WEST QUESNEL LAND STABILITY PROGRAM

2021-2023 MONITORING REPORT

CITY OF QUESNEL

FINAL

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1 INTRODUCTION

WSP Canada Inc. (formerly WSP E&I Canada Ltd. and Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited), has conducted ongoing instrumentation monitoring in West Quesnel as part of the West Quesnel Land Stability Program. The instrumentation monitoring aims to track landslide-related ground movement, groundwater conditions, and precipitation. The monitoring is also used to assess the effectiveness of dewatering programs implemented by the City of Quesnel in 2007 (Trial), 2012 (Phase I) and 2016 (Phase II).

Several sets of Global Positioning System (GPS) ground surface movement hubs have been established in the field and surveyed between 1998 and 2023. In addition, between 2000 and 2007, geotechnical instrumentation, including slope inclinometers and piezometers were installed. Additional instrumentation, including slope inclinometers, piezometers, flow meters and precipitation measurement equipment, were installed in 2012 and 2016 in conjunction with the construction of the various phases of dewatering pumping wells, horizontal drains, and storm drainage improvements.

For detailed background information, including geology and project history, the reader is referred to previous reports by AMEC, Amec Foster Wheeler, and Wood, including previous annual monitoring reports, the "2012 Subsurface Dewatering System" report dated 21 November 2014, the "Trial Dewatering" report dated May 2008, and the "West Quesnel Land Stability Study" report dated May 2007.

In 2016 a program involving storm drainage improvements, horizontal drain and pumping well construction, along with reconfiguration and addition to some of the geotechnical instrumentation, was carried out in the West Quesnel area. Some of those works involved temporary disruption or changes to pre-existing instrumentation. In some cases, it may have influenced data collection as the new Phase II drainage measures (and related instrumentation) were only gradually brought into service during the latter half of 2016 and early 2017.

During 2018, several instrumentation data collection stations experienced communications issues, resulting in data gaps between late spring and mid-summer 2018. In 2018, a program of decommissioning previously sheared slope inclinometer casings and the abandoned pumping well, PW10, was completed. Pumping well PW25 was also cleaned.

In 2019, slope inclinometer SI17 was decommissioned and replaced by SI17a. Pumping wells PW5 and PW24 were also cleaned but not reactivated.

In 2020, pumping wells PW5 and PW24 were reactivated, and instrument data logging Station 3 was moved and updated as part of the Voyageur School parking lot construction. Slope Inclinometer installation SI16 failed as well as several deep VWP sensors.

In 2021, Slope Inclinometer installation SI18 failed along with several deep VWP sensors. Additionally, horizontal drain installations HD4 and HD12 were cleaned and a new flow meter was installed at HD4.

In 2022, Slope Inclinometer installation SI17a failed, and a new borehole was drilled to replace SI18, named SI18a.

In 2023 a Shape Acceleration Array (SAA) system was installed in borehole SI18a to provide real time subsurface movement information and was connected to the data management system.

This report summarizes monitoring data collected between January 2021 and the end of 2023 and provides an update on observed trends or interpretations that have developed or changed since our 2020 Monitoring Report, dated 6 June 2021.

2 GPS MOVEMENT HUBS

In September 1998, FortisBC (formerly Terasen Gas and BC Gas) installed and monitored a series of GPS surface movement hubs. Subsequently, in 2001, 2006 and 2008, the GPS hub network was expanded and modified to monitor a total of up to 47 hubs. The monitoring consisted of comparing changes in the specific positions of the defined survey reference points over time as measured periodically by survey contractors (most recently McElhanney Consultants Limited), retained by both FortisBC and WSP on behalf of the City of Quesnel. Surveys are typically conducted twice annually, with the results forwarded to WSP for inclusion in the monitoring program. In addition, in 2011, Fortis arranged to install some additional closely spaced GPS hubs in a small part of West Quesnel that are monitored annually in conjunction with UBC for a research project. These hubs are not generally monitored as part of the West Quesnel Land Stability Program and are not reported herein.

During 2021, 2022 and 2023, semi-annual GPS monitoring was completed in June and December (for 2023 the scheduled December reading was carried out in early January 2024) for the GPS hubs established in 1998, 2001, 2006, and 2008 and for one replacement location (GPS Hub 13-02) established in 2013.

Appendix A provides summary tables and detailed individual plots of movements for all GPS hubs. Please note that while horizontal and vertical movement data is recorded, vertical GPS survey data typically has at least one order of magnitude lower accuracy than the horizontal data. Accordingly, while general trends can be observed regarding vertical and/or the resultant of horizontal and vertical movement (i.e. three-dimensional movement), the following discussion refers primarily to horizontal movement information.

Figure 1 depicts the locations of the various GPS hubs monitored for the West Quesnel Land Stability Program. It also provides a simplified vector movement plot for GPS hubs surveyed in the West Quesnel area. The GPS vector plots in Figure 1 show the relative magnitude and azimuth of the latest total horizontal movement vectors. Intermediate movements between the start point and the latest reading are approximated. Details for individual GPS movement hubs and intermediate movement vectors are provided in Appendix A.

The GPS movement hubs can be separated into four general categories based on location and displacement. The first category represents benchmark hubs, which provide reference control for the survey. These benchmarks are theoretically located outside the landslide area on stable ground and have recorded little movement since installation. The exceptions to this are survey tolerance variations that may suggest no or minor movement (typically less than 15 mm of total horizontal movement over the length of time the surveying has been conducted with no discernible consistent directional trend). While there have been as many as eight benchmark hubs installed, typically only three (Water Tank, GPS 01-38, and GPS 98-23) have been utilized to gauge the accuracy of the survey data. Note that due to the construction and replacement of the water tank, a control point (Water Tank 3) was added as a replacement in 2017.

The second category consists of twelve hubs located at or near the eastern extremity of the study area. These hubs define the approximate toe area or likely eastern boundary of active landslide movement. Generally, cumulative total horizontal displacement of less than 20 to 25 mm means that the location is beyond the active movement toe area. It is especially true if no long-term consistent directional trend is observed in successive measurements. Conversely, higher values suggest that the hub is on or very near the toe of the slide, more so if there is a consistently observed easterly trend in successive measurements.

The third category consists of three hubs located at or near the upper western portion of the study area (GPS06-16, GPS06-18 and GPS08-01), which were placed to assist in defining the western extent or crest of the landslide. Similar to the toe area, where total horizontal displacement is less than 20 to 25 mm and a lack of consistent directional movement of the hubs has occurred, they have been considered outside the area of active landslide movement.

The fourth category comprises 30 GPS hubs that are interpreted to be within the main body of the landslide. These hubs have shown continuing cumulative displacement and consistent directionality of movement (easterly or north-easterly) over the 26 years that the 15 oldest hubs have been monitored. The total horizontal movement measured between September 1998 and January 2024 for the 15 oldest hubs ranged from 366 to 895 mm, depending on location.

Table 1 below presents cumulative and annual horizontal movement data for GPS Hub 98-17 since 1998. GPS Hub 98-17 is considered a representative but essentially 'worst-case' monitoring location near the middle of the study area. Figure 2.1 (duplicated from Appendix A) graphically shows the cumulative annual horizontal movement data pattern presented in Table 1. Before 2013, the long-term average horizontal movement detected was in the order of 44 mm per year. Movements over average were detected in eight of the 14 years of monitoring before 2013, while there were six years of significantly less than average movements (e.g. less than 25 mm/year). The lower movement years have generally been attributed to three periods of unusually low precipitation extending over successive years.

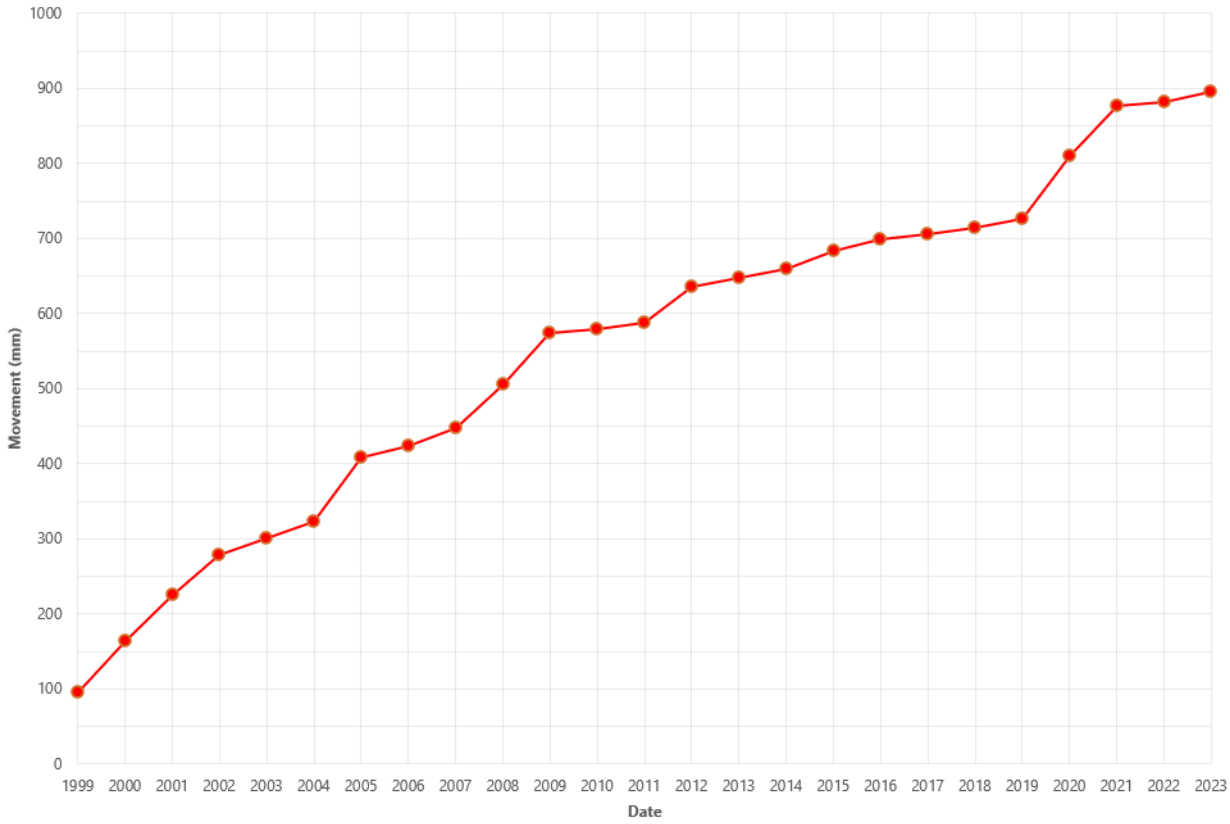
Conversely, the higher movement years have been generally correlated with periods of above-average precipitation. Between 2013 and the end of 2019, average yearly horizontal displacements were around 13 mm per year, with the lowest displacement of 6 mm measured in 2017 and the highest displacement of 24 mm in 2015. In 2020, 84 mm of horizontal displacement was measured at Hub 98-17. To date, that is the second highest yearly displacement that has been measured since the inception of the GPS hub monitoring. In 2021, 2022, and 2023, 67 mm, 5 mm and 13 mm of horizontal displacement were measured, respectively.

Table 1 – Typical Horizontal Movement (from GPS Hub 98-17) from 1998 to 2023

Year	Cumulative movement (mm)	Annual Movement Rate (mm/yr)
1998	16[1]	n/a[2]
1999	96	80
2000	163	67
2001	225	62
2002	279	54
2003	300	21
2004	322	22
2005	409	87
2006	423	14
2007	447	24
2008	506	59
2009	574	68
2010	580	6
2011	588	8
2012	635	47
2013	647	12
2014	660	13
2015	684	24
2016	699	14
2017	705	6
2018	714	9
2019	726	12
2020	810	84
2021	877	67
2022	882	5
2023	895	13

Note(s): GPS Hub was initialized in September 1998

Figure 2.1 - HUB 98-17 Total Horizontal Ground Movement



Figures 2 through 40 show movement GPS hub contour plots, showing movement data over selected periods and for different components (i.e. horizontal movement, vertical movement and resultant total three-dimensional (3D) movement). Only active survey hubs during the entire period are included in the representative contour plots. Please note that these are simplified contour plots and that not all the cumulative movements are necessarily in the same vector direction.

Figure 2 shows the total horizontal movement between September 1998 and January 2024 for the GPS hubs installed in September 1998. The most significant movements have been observed at the 1998 GPS hubs within the slide mass. The maximum total horizontal movement of 895 mm has been detected at GPS Hub 98-17 (corner of Bettcher St. and Lark Ave.) since the inception of GPS monitoring.

Figure 3 shows the total horizontal movement between December 2001 and January 2024 for the GPS hubs installed in September 1998 and December 2001.

Figure 4 shows the total horizontal movement between November 2006 and January 2024 for the GPS hubs installed in September 1998, December 2001 and November 2006. Figures 2, 3, and 4 show that the most significant horizontal movement observed since 1998 has generally occurred in the middle and near the northern boundary of the slide area.

Figure 5 shows the total vertical movement between November 2006 and January 2024. This contour plot generally shows downward movement along the slide's upper, north and west edges (typically near the scarp area). However, it should be noted that there are very few hubs in this area to properly define the scarp area separately from the main body of the slide). There were also some upward movement trends (thrusting/bulging) near the toe of the slide. A significant bulge related to toe thrust movements of the slide has been detected on Lewis Drive, just east of Healy Street.

Figure 6 shows the total 3D movement between November 2006 and January 2024. Similar to the horizontal movements figure, significant movement occurs in the middle and near the northern boundary of the slide area.

Figures 7 through 40 show annual (horizontal movement and 3D movement) contoured plots for 2007 through January 2024. In the first six months of 2021, similarly to 2020, significant movement was observed throughout the landslide area. After the June 2021 reading of the GPS hubs, only relatively small movements were recorded in the second half of 2021, and in 2022 and 2023. Ignoring the GPS Hubs located outside the active landslide area, an average horizontal movement of 45 mm and average 3D movement of 48 mm were observed in 2021, with the highest horizontal and 3D movements of 71 mm and 75 mm respectively observed at GPS98-06. In 2022, an average horizontal movement of 9 mm and average 3D movement of 14 mm were observed, with the highest horizontal movement of 27 mm observed at GPS98-06 and the highest 3D movement of 30 mm observed at GPS06-15. In 2023 an average horizontal movement of 6 mm and average 3D movement of 11 mm were observed, with the highest horizontal and 3D movements of 12 mm and 23 mm respectively observed at GPS06-14.

The differences in annual movements between the relatively low activity years of 2007, 2010, 2011, 2022, and 2023 as compared to the higher movement years of 2008, 2009, 2012, 2020, and 2021 are mainly attributable to differences in annual precipitation that influenced the groundwater pressures within the landslide area. There also appears to be a cumulative precipitation effect that further contributes to annual movements.

Beginning in the second half of 2012, the effects of the subsurface dewatering have been a significant contributing factor to the reduced movements relative to precipitation observed from 2013 through 2019 (see Section 7.0 for more details on precipitation data and Section 8.0 for a discussion on the relationships between precipitation, groundwater pressures and ground movement).

3 SLOPE INCLINOMETERS

A total of 15 slope inclinometer (SI) casings were installed in West Quesnel between November 2000 and August 2006 to monitor depths and rates of subsurface lateral ground movements. Installation details and the results of previous SI monitoring on the original 15 SI's are described in previous reports. By mid-2009, most of the initially installed slope inclinometers (except SI8 and SI11) had sheared off due to continued ground movement.

In November 2018, to accommodate the revised BC Groundwater Protection Regulation 152/2016, a decommissioning program was completed by Westech Drilling Corp., under the supervision of a WSP representative. During this program, all previously sheared SI installations installed between November 2000 and August 2006 were decommissioned. Please refer to the 2018 and 2019 Monitoring Report, dated 21 July 2020, for additional decommissioning details.

In 2012, as part of the monitoring package for the Phase I dewatering program, two real-time in-place slope inclinometer (IPI) strings were installed across the approximate depths of previously detected sub-surface landslide failure surfaces. The in-place inclinometer strings allow the determination of subsurface lateral displacement in real-time. The real-time data allows for the most accurate correlation between movement, water infiltration and dewatering activities. Real-time data collection for these instruments, SI16 and SI17, commenced on 20 September 2012 and 16 October 2012, respectively. Before installing the IPIs, manual baseline SI survey measurements were also performed. In mid-2016, a third real-time IPI (SI18) was installed as part of Phase II West Quesnel dewatering works. Real-time data collection of SI18 commenced in mid-2017. The installed locations of the IPIs are shown on Figure 41.

In early fall 2018, SI17 displayed very irregular readings across most of the sensors, and in late 2019 it was decommissioned using the same decommissioning procedure described above. SI17a replaced SI17 in an immediately adjacent location.

In late 2019, SI16 started to have inconsistent and unreliable readings indicating that the sensors were approaching the end of life. These readings continued to be irregular throughout 2020. However, some of the sensors did seem to provide representative data. Finally, on 8 November 2020, the entire SI16 sensor array failed. The highest displacement, at the SI16D sensor, of 84.8 mm was observed on 14 July 2020.

In late spring 2020, a significant change in movement direction was observed along the A-Axis of SI18. Before late spring 2020, the movement was generally east to northeast, consistent with movement observed with the GPS Hubs in the area. However, after spring 2020, the movement trended south to southwest. A manual reading was attempted in 2021 to determine the cause of the change. Unfortunately, not all of the previously installed sensors could be removed during this attempt, so a manual reading could not be completed. Furthermore, after the partial removal of the sensors, SI18 could no longer be read automatically. It is speculated that deformation of the slope inclinometer casing resulted in damage to the sensors and caused some of the sensors to become stuck in the casing. Therefore, as of 19 August 2021, this installation is considered to have failed.

In late May of 2022, SI17a was considered to have failed after recording inverse movement starting in late 2020.

In November 2022, a new borehole (SI18a) was drilled immediately adjacent to the old, failed SI18, a slope inclinometer casing was installed in the new borehole and a baseline SI survey was performed. In early April 2023, a new Shape Acceleration Array (SAA) sub surface movement monitoring instrument was installed in the SI18a borehole and was initialized and connected to the datalogger at Station 33. Prior to installation of the SAA another baseline SI survey was performed. The SAA system consists of a series of rigid segments separated by joints that move in any direction but do not twist. Gravity sensors within the segments measure tilt in two directions and can thereby provide real-time displacement detection along the connected segments. Within SI18a, 112 segments with a

length of 0.5 m each for a total length of 56 m were installed between a depth of 27.75 m and of 83.75 m below ground surface (between elevation 517 m and 461 m).

Appendix B contains the lifetime IPI/SAA sensor displacement data that was collected from the IPI/SAA sensors that were active within the reporting period of 2021-2023 (SI17a and SI18, SI18a SAA). For detailed displacement plots on failed IPI sensors (SI16 and SI17) the reader is referred to previous annual monitoring reports. The data associated with the plots depicting IPI/SAA displacement, in Appendix B, were automatically collected using WSP's web-based data management system, which was custom developed for the West Quesnel Land Stability Program. Although the IPIs and SAA provide continuous real-time movement detection, the Appendix B plots only show the average daily horizontal ground displacement at specific depths along each IPI/SAA sensor string. A sensor at the depth of between 76.25 m and 75.75 m (Sensor 016) was used to create the chart of the SAA data. Sensor 016 is located directly above the landslide failure surface and is considered to be most representative of the differential movement across the failure.

Between the 2012 installation and the beginning of 2014, the SI16 and SI17 IPI sensors detected similar small movement events, with SI16 showing an additional event before SI17 being initialized (20 - 22 September 2012). The four events occurred on 17-18 October 2012, 3-7 January 2013, 29 April – 7 May 2013, and 19-22 December 2013. SI16 moved 12 mm over this time frame with individual event movements of approximately 1.5 mm, 1.5 mm, 3 mm, 5 mm, and 1 mm, respectively. SI17 moved a total of 15 mm with individual event movements of approximately 2 mm, 4 mm, 6 mm and 3 mm, respectively. Typically, the movements were observed to be relatively short events; however, creep-like movements were also observed at SI17 between the two major movement events (7 January through 29 April 2013).

In 2014, a total of 7 mm and 8 mm of movement was observed for SI16 and SI17, respectively. The movement occurred in two distinct movement events: 20-25 April, and 26 May – 11 June. The April event had an approximate relative movement of 3 mm for both SI16 and SI17, while the May-June event had an approximate relative movement of 4 mm and 5 mm for SI16 and SI17, respectively.

The total 2015 movement for SI16 was on the order of 25 mm. SI17 recorded a total movement of approximately 14 mm before the data was interrupted in April. A larger than average movement event was noted at SI16 between 10 March and 15 May, with a total of 18 mm of movement. The beginning of this movement event was also noted at SI17 before the instrument began to malfunction. Additional smaller movements of 2 mm and 1 mm were noted on 7-23 February and 31 July – 22 August respectively, at SI16. In addition, 4 mm of creep movement occurred between approximately 14 September and the end of 2015 at SI16.

In 2016, the connection to SI17 was reestablished in March and total movements in 8 mm and 10 mm were observed at SI16 and SI17, respectively. The movements occurred in five different events at SI16: 7-10 March, 22-27 April, 22-28 July, 27-30 November, and 13-20 December. Individual event movements in SI16 were small (from 0.5 to 1.5 mm each); however, there was also about 2 mm of creep movement throughout the year not associated with any specific event. The SI17 sensor string had not been reinstalled until after the first 2016 movement event was detected in SI16, but it did record the three distinct movement events on 22-27 April, 22-28 July, and 27-30 November of 2016. Movements recorded for each event were slightly greater at SI17, being approximately 4 mm, 3 mm and 2 mm respectively.

In 2017, SI18 was installed and three small movements in the order of approximately 1 mm each were detected between late March and mid-May at SI16 and SI17. SI17 and SI18 indicated a movement event on the order of 1 mm in October 2017, and a 0.5 mm movement event at SI18 in late December.

In 2018, SI16 showed a net 5 mm inverse movement or relaxation over the course of the year, however two positive slide type movement events were noted. A 0.5 mm movement was observed between 25 and 31 May, and a 1.4 mm creep movement was observed between 7 and 31 December. Total movements on the order of approximately 8 mm were observed at SI17 (prior to failure on 31 August) and at SI18. Three distinct movement events were observed at

SI17 consisting of: a 2 mm movement event between 16 and 18 March, a 0.5 mm movement event between 23 and 31 May, and an approximately 1.5 mm event that started on 28 August. In addition to the distinct movement events, a 4 mm creep movement was observed, between 1 July and 28 August. Three distinct movement events were also observed at SI18 consisting of: 1.5 mm between 16 and 20 March, 2 mm between 3 and 13 April, and 2.5 mm between 14 and 25 November. Between 25 April and 29 October there was a communication error with the data logger for this station that resulted in data loss. Based on SI16 and SI17 movement events, it is likely that another 2 mm of movement occurred at SI18 in early to mid-May.

In 2019, total movements on the order of 8.5 mm and 4.5 mm were observed at SI16 and SI18, respectively. SI17 failed in 2018 and was not replaced by SI17a until late 2019. SI17a did not detect any movement during its short operation period in 2019. The majority of the movement observed at SI16 occurred between 17 March and 8 May. During this period four distinct movement events and four creep movements were observed totalling 8 mm of movement. A distinct movement event of 0.5 mm was also observed between 19 and 23 November. In addition to the distinct and major movement events, creep like movement (positive and inverse), were also observed throughout the year with no overall change. At SI18, movement events observed in 2019 consisted of two distinct and two creep like movement events. A 0.5 mm movement event was observed between 7 and 10 January, and a 2 mm movement event was observed between 30 March and 6 April. Creep like movement (positive and inverse) with no net change was observed between 2 February and 30 March, and a 2 mm creep like movement was observed between 6 April and 31 December.

In 2020, total movements on the order of approximately 25 mm, 53.5 mm and 60 mm were observed at SI16 (prior to failure), SI17a, and SI18, respectively. All the movement at SI16 was observed between 13 April and 20 May (13.5 mm) and between 10 June and 14 July (11.5 mm) prior to its failure in July. The majority of the movement (37 mm) observed at SI17a occurred between 9 April and 9 June with a relatively consistent movement rate of 0.6 mm/day, and between 6 May and 29 July (37 mm) at SI18 with a relatively consistent movement rate of 0.44 mm/day. In addition to the large movement events noted above at SI17a and SI18, there were several distinct and creep like movement events observed. At SI17a, four distinct movement events were observed: in early January (1.5 mm), in early August (3 mm), mid October (4.5 mm) and late October (2 mm); with three creep like events that occurred between mid January to late March (4 mm), between mid June to late July (3.5 mm) and between early November to the end of 2020 (inverse 2 mm). At SI18, there were four distinct movement events observed: in early August (3 mm), mid August (2 mm), in mid September (2 mm) and in mid October (3 mm); a creep like movement was observed between late October to the end of 2020 (13 mm).

In 2021, continued creep movement was observed on SI18 between the start of the year and the instrument failure in August, totaling 24 mm of movement. For SI17a the observed creep like movement was inverse to the previously observed movement and totaled 9 mm between January and the end of December with the majority of that inverse movement (6 mm) observed between January and May.

In 2022, SI17a recorded one inverse movement event of 1.5 mm in March followed by approximately inverse 2 mm of creep like movement before equipment failure at the end of May.

Data recording for the ShapeArray (SAA) installed in SI18a started on April 5, 2023. After start-up of the data recording, three minor movement events were observed in 2023, approximately 0.6 mm and then 0.3 mm of movement at the end of April, and an additional approximately 0.6 mm of movement at the beginning of August. Additionally, 0.3 mm of creep movement was recorded for a total movement of approximately 1.8 mm between the beginning of April and the end of December 2023. The observed movement occurred at a depth of 76.5 m below ground surface (elevation of 468.5 m) and was recorded on sensor 016 between 76.25 and 75.75 m depth. The movement direction was recoded in a Northeast direction (approximately 60 degrees) and is consistent with the movement direction recorded by nearby GPS hubs.

In general, there is a strong correlation between the ground movement data collected through surface GPS hub monitoring and the subsurface IPI/SAA sensors with the exception of some data recorded within the months leading up to the instruments' failure. However, like GPS hub movements, subsurface IPI/SAA movements vary between locations. Figure 1 depicts ground movement observations from the IPI/SAA sensor measurements.

4 PIEZOMETERS

In West Quesnel, two general types of piezometers (with three different installation configurations) have been used to monitor groundwater pressures in the vicinity of the landslide. A vibrating wire piezometer (VWP) is an electronic water pressure sensing device installed directly in the ground via grouting in a borehole to continuously and remotely detect and record groundwater pressure over time, is the most common type of piezometer used in West Quesnel. VWPs measure the water pressure acting at the specific depth of their tip and can respond quickly to changes in ambient pressure. There have also been several retrofit installations where vibrating wire piezometer sensors were suspended inside open pipes (standpipes or well casings, see below) for automated electronic detection of water. Figure 41 depicts the locations for the various groundwater instruments and their related data logger stations.

The second type of installed piezometer at the site is a standpipe, which generally consists of a vertical pipe (plastic or steel) with openings (slots or screens) at depth that admit groundwater from the surrounding horizon where the screen is placed. The slotted screen sections of the standpipe piezometers are typically surrounded by a sand pack and have a bentonite seal both below and above the sand pack. Water levels in the standpipes were historically measured manually using a water level dip tape, but these readings were discontinued at the end of 2012 as this information was more readily available with the addition of the automated VWPs installed during the 2012 full scale subsurface dewatering program.

Four standpipes have since been retrofitted with vibrating wire piezometer transducers installed inside the standpipes (VWP 3A/B and VWP 4A/B). A total of 48 vibrating wire piezometers were grouted directly in the ground to various depths at 21 different locations during the trial dewatering program prior to 2008. An additional 32 vibrating wire piezometers were grouted in at 14 new locations during the 2012 Phase I dewatering program. An additional nine vibrating wire piezometers were installed at six new locations during the Phase II dewatering program in 2016, bringing the installed total to 93 vibrating wire piezometer instruments. However, some of these instruments have been damaged or become dysfunctional (or dry) over time. Between the beginning of 2021 and the end of 2023, four previously active instruments, VWP30B, VWP31B, VWP33C and VWP40A failed. All of the previously mentioned instruments, with the exception of VWP40A, failed in late spring of 2021 and are presumed to have sheared off due to the ground movement observed at this time. Data inaccuracies were noted in VWP40A between 2021 and 2023 and the data is not being reported pending future corrections. As of the end of 2023, there were 77 active, 10 failed and 6 dry vibrating wire piezometers.

All of the vibrating wire piezometer sensors are connected to Campbell Scientific data loggers (stations). These data loggers are used to automatically record sensor water pressures at set intervals and can store large quantities of data. Studies have shown that barometric pressure changes impact VWP readings[1]. Thus, all collected VWP readings have been corrected using readings from a barometer installed in data logger Station 2. The Campbell Scientific data loggers are connected to cellular modems, such that near real time data can be collected and accessed remotely by WSP and City of Quesnel staff.

A summary table listing the various piezometers, along with their status can be found in Appendix C.

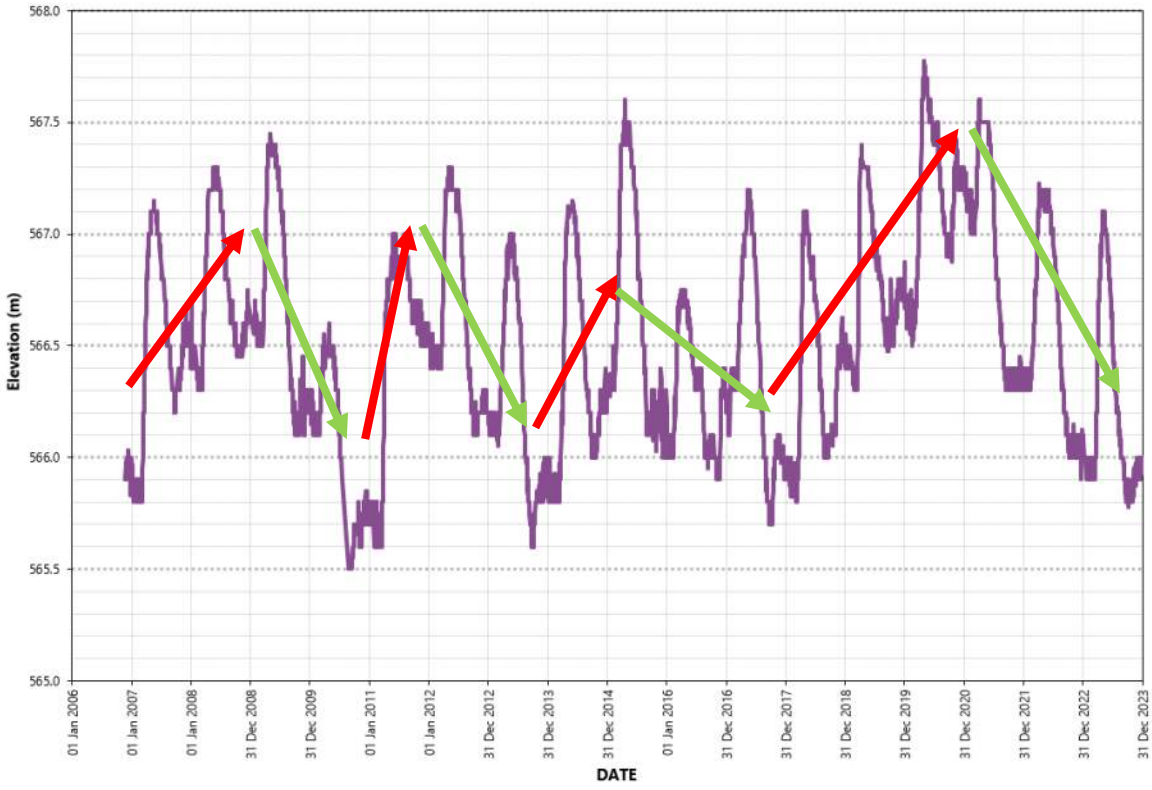
Depending on the location of the piezometers, they depict various short and long-term groundwater pressure conditions within the West Quesnel area. Some near surface installations are more sensitive to seasonal precipitation trends, short-term weather events and potential water service line breaks, particularly if they are installed in shallow sands or gravels. Deeper installations tend to show longer term background trends with subdued seasonal responses

[1] Contreras, I.A., Grosser, A.T., Ver-Strate, R.H; 2012,"Update of the Fully-grouted Method for Piezometer Installations". Geotechnical News, Volume 30, No. 2., June 2012, www.geotechnicalnews.com/instrumentation_news.php

and are indicative of larger scale, more regional groundwater conditions. Some of the piezometers show the effects of nearby dewatering installations (pumping wells and horizontal drains).

Table C1 (Background Piezometers), in Appendix C, presents the individual trends and observations from between 2021 and 2023 for piezometer locations that were judged to be unlikely to have been affected by the dewatering efforts, and are more reflective of general background subsurface groundwater patterns in the West Quesnel study area. At some of the near surface piezometers, temporary increases in response to seasonal precipitation and freshet have been observed. In addition to the seasonal temporary increases there appears to be some secondary fluctuations, typically observed over the fall-winter months. The seasonal increases are predominantly dependent on relatively short-term weather influences while the general trends are more dependent on long-term weather patterns and also the ability and capacity of the area to drain and/or retain groundwater. Although similar pore pressure observations can be made for most of the near surface piezometers, VWP14A is considered typical of background conditions and is plotted in Figure 4.1 below. While the influence of typical annual freshets is clearly indicated, the plot also indicates gradual trends in base and peak conditions over the years. Most notable is a recent sustained rise in both base and peak groundwater elevations between 2018 to mid 2021 followed by a gradual decrease in the base and peak levels through to the end of 2023, suggesting a longer-term climate influence.

Figure 4.1 - Background Groundwater Levels (VWP14A)



At VWP39, atypical pore pressures have also been observed since 2018. Pore pressure spikes of approximately 4 m, 3.5 m, 1.5 m, and 1.0 have been observed in 2018, 2019, 2020, and 2021 respectively without any significant post freshet dissipation prior to Fall 2021. Starting in the Fall of 2021 a slight decreasing trend was observed along with the seasonal fluctuations up to the end of 2023. The general overall increasing trend was similar to that observed at

VWP14A, however relatively recent clearing and regrading of a nearby upslope property may be contributing to some of the observed pattern through a potential change in groundwater infiltration.

Table C2 (Piezometers Near Pumping Wells), in Appendix C, presents overall trends and observations for piezometers that are situated near the pumping wells and may have been influenced by them. The piezometers nearest the pumping wells and closer to surface have experienced the greatest influence (decrease in groundwater pressure) since pumping started and many have reached a new steady-state pressure, depending on how productive and what the radius of influence of the well has been. Piezometers that have groundwater pressures remaining at steady state (with or without seasonal influences) are likely out of the radius of influence of the well or are too deep to be influenced. Some of the piezometers influenced by the pumping wells are also still reactive to seasonal precipitation. Generally, for this set of piezometers, between 2021 and 2023 there was a slight decrease noted relative to 2020. VWP44 recorded a significant spike in porewater pressure starting in the Fall of 2022 which corresponds with the shut down of PW25. Some instrument locations still indicated slight influences from seasonal or storm events.

Table C3 (Piezometers Near Horizontal Drains), in Appendix C, presents the overall trends and observations for piezometers situated above or near the horizontal drain (HD) installations. These piezometers have generally been at a steady state since initial drawdowns in 2012 when the majority of the horizontal drains were installed. Several of the instruments also exhibit regular variation patterns in reaction to seasonal weather and precipitation conditions.

The plots depicting the groundwater elevations found in Appendix C have been generated utilizing WSP's data management system. The average daily groundwater elevation (phreatic surface) is presented in the plots. In order to allow practical plotting of the instrument data, digital filters were utilized to remove some erroneous data points, however some data 'noise' remains in a few of the instruments such as VWP 13A, VWP 18A, and VWP25.

In general, historic groundwater pressures within the West Quesnel area have been generally quite high relative to the ground surface, and thus detrimental to slope stability. In 2020, there was a general increase in pore pressures observed with some short-term season spikes observed. Between 2021 and 2023 a generally decreasing porewater pressure trend was observed, bringing the pore pressure levels back to pre 2020 levels. Figure 42 is a simplified graphic showing the estimated groundwater drawdown at the end of 2023 relative to what was inferred to be natural background elevations just prior to the implementation of the subsurface dewatering system.

5 PUMPING WELLS

Prior to 2012, there were four pumping wells (PW) installed in West Quesnel. PW1 and PW2 were installed in 2003 and PW4 and PW5 were installed in 2007 as part of previous trial groundwater dewatering assessment studies. As part of the 2012 Phase I subsurface dewatering program, 14 new potential pumping well locations (PW6 through PW19) were drilled and pumps were installed at 13 of the locations (potential well PW10 was dry upon completion so no pump was installed). Though the pumps were installed and tested during the latter part of 2012, they were not fully activated until April 2013. As part of the Phase II dewatering works, six new wells (PW20 through PW25) were drilled and pumps installed during 2016, bringing the total number of installed and instrumented pumping well sites in West Quesnel to 23. Figure 41 shows the locations of the pumping wells.

A summary table of the well installation details including well status, a chart of the volume removed, and charts of well water elevations and production rates between 2021 and 2023 are presented in Appendix D. The plots depicting the pumping well levels and production rates have been generated, utilizing WSP's data management system. The pumping well flow measurements were collected on an hourly basis and summed to establish a daily flow rate. Water well elevations presented are average daily values with digital filtering to remove erroneous readings.

An estimated 116 million liters, 48 million liters, and 15 million liters of water was removed by the pumping wells in 2021, 2022, and 2023 respectively. The trend of declining production observed over the last three years can generally be attributed to the lack of production from some of the wells that have historically produced significant volumes of water. In September 2022 the most productive pumping well (PW25) stopped producing water which led to a significant decline in the overall water volume removed by the pumping wells in 2022 and 2023. Likewise, PW6, PW8, PW9, and PW13 stopped producing water in August 2023, May 2022, July 2023, and August 2023 respectively. None of the above five pumps that stopped producing water had been restarted by the end of 2023 which has contributed to the decrease in total water volume removed via the pumping wells. Additionally, the flow meters in PW13, PW22 and PW23 have experienced intermittent functionality in the three-year period which has also led to a reduction in the recorded water volumes removed from the pumps.

Overall, approximately 594 million litres of water was recorded to have been removed by all wells since installation. This estimate is based on the automatic flow metering data; however, the true total is expected to be higher due to periodic communication outages and failure of flow meters where the actual well production was not being recorded accurately. Further details of annual recorded production totals per well installation are presented in Appendix D, Figure D1.

6 HORIZONTAL DRAINS

During the fall of 2007, four trial horizontal (gravity) drains (HD) were installed at two different locations (HD1 and HD4) into the slope underlying the West Quesnel study area. In mid-2012, as part of the Phase I subsurface dewatering program, 64 additional horizontal drains were installed at ten other sites (HD5 through HD14, see Figure 41). A total of 21 of the drains were observed to be dry (at the discharge end) shortly after installation. This included all the drains at sites HD1, HD5, HD6, HD7 and HD14 as well as three drains at HD9 and one drain at HD11. Although there was no initial water flowing from any of the drains at HD14, one drain did begin to produce water during the 2013 spring melt, and the flow rate was manually measured periodically until it stopped flowing in mid-2013. In mid-2016, 14 new horizontal drains were installed at three different sites (HD15, HD16, and HD18) as part of the Phase II dewatering program. Six of these drains were noted to be dry (at the discharge end) shortly after installation (five at HD16 and one at HD18). The installation and activation of PW25 also appears to have resulted in curtailment of production from HD10, as PW25 has effectively drained HD10's recharge source. Water restarted flowing in HD10 in 2023 which is attributed to PW25 not producing any water from September 2022 onwards. A summary table of the drain installations and status can be found in Appendix E.

Appendix E also contains individual production charts for each of the horizontal drain installations from 2021 to 2023. The plots presented in Appendix E depicting the flow rate measurements for the horizontal drain sites have been generated, utilizing WSP's data management system. The flow measurements were collected on an hourly basis and summed to establish daily flow rates. Where flow data gaps exist or an incomplete daily data set was collected, false drops in flow rates were recorded. These are temporary data aberrations and can generally be disregarded, as the horizontal drains flow regardless of the flow meters being functional or not.

To date almost 978 million liters of water has been recorded as being removed through the horizontal drains, with 76% (over 747 million liters) removed by HD8. An overall production summary is presented in Appendix E, in Figure E1. In 2021, approximately 61 million liters of water was removed, with more than 72% (44 million liters) removed by HD8. In 2022, approximately 57 million liters of water was removed, with more than 80% (45 million liters) removed by HD8. In 2023, approximately 72 million liters of water was removed, with more than 82% (59 million liters) removed by HD8. HD8 continues to be a significant producer with its percentage of the total annual water removed from the horizontal drains gradually increasing over the last three years. While the percentage of overall production from HD8 has increased in the last three years, this trend can generally be attributed to decrease in production from the other horizontal drains and not a significant increase in average flow from HD8. An exception to this trend was observed in 2023, where the production from HD8 increased by approximately 30% over the previous 5-year average. Between 2021 and 2023 there was a notable peak observed in the flow from HD8 between February and May 2023. This peak is generally associated with the spring freshet and a higher than average precipitation recorded in the first four months of 2023. Seasonal peaks for the spring freshet were observed at HD4, HD9, HD12 and HD13 between 2021 and 2023.

Prior to October 2021 the flow rate at HD4 was limited by the capacity of the flow meter. In October 2021 the flow meter was replaced with one with a larger maximum capacity and the individual horizontal drains were cleaned leading to a significant increase in the recorded water production from HD4 in 2022 and 2023. Also in October 2021, the individual drains were cleaned at HD12 after which the recorded flows rates stabilized compared to the inconsistent flows recorded in previous years. Water restarted flowing in HD10 in March 2023 after no flow was recorded in 2021 and 2022. The restarting of flow from HD10 is attributed to PW25 not producing any water from September 2022 onwards. HD15 was not monitored between 2021 and 2023. Flow rates at HD16 continued to decrease from the peak observed in 2019. A significant decrease in the recorded flow from HD13 was also observed since the peak annual flow rate was recorded in 2020 with only approximately 1% of the of the peak flow recorded in 2023.

7 PRECIPITATION DATA

Precipitation has a significant influence on groundwater patterns and hence ground stability in West Quesnel. The primary source of precipitation information has been data from Environment Canada[2] for the Quesnel Airport weather station variously known as Quesnel AWOS (prior to June 2010), Quesnel (from June 2010 to the end of 2012) and Quesnel Airport Auto (from 2013 to present), located approximately 6 km northeast of West Quesnel. Where missing or incomplete daily data is reported at Quesnel Airport Auto weather station, where possible, the data from the West Quesnel weather station was used to infill the missing data. Monthly and daily precipitation records, including current and previous historic 30-year climate normals, were obtained from the Environment Canada stations. **Error! Reference source not found.**, below, presents a comparison between published climate normals[3] data and computed 30-year average with associated observed trends, and 2021, 2022 and 2023 data.

Table 2 – Monthly Precipitation Historical Data Trends and 2021, 2022, and 2023 Data (mm)

	Quesnel Climate Normals			30 yr Average	Quesnel Airport	Quesnel Airport	Quesnel Airport
	1961-1990	1971-2000	1981-2010	1994-2023	Auto 2021	Auto 2022	Auto 2023
Jan	50.5	48.5	47.8	42.5	8.2	64.6	53.0
Feb	28.7	24.4	22.7	26.7	49.3	36.4	93.7
Mar	28.2	28.9	24.9	24.1	10.9	25.8	5.5
Apr	22.6	21.9	24.5	28.3	42.6	17.2	23.1
May	42.5	40.7	42.6	41.8	46.0	45.7	25.3
Jun	56.7	68.6	66.4	53.9	29.2	40.5	29.3
Jul	59.0	61.6	65.6	59.8	27.0	38.1	33.1
Aug	56.3	50.0	46.2	41.6	65.6	43.7	42.1
Sep	49.3	44.8	50.2	44.8	37.4	30.8	32.3
Oct	49.6	51.4	52.6	48.6	31.8	4.8	16.7
Nov	46.0	49.8	51.3	44.5	28.2	48.2	44.2
Dec	49.3	49.7	41.6	37.3	60.7	39.9	30.0
Year	**538.7**	**540.3**	**536.4**	**493.9**	**436.9**	**435.7**	**428.3**

The annual total precipitation amounts recorded by Environment Canada at the Quesnel Airport for 2021, 2022 and 2023 were 436.9 mm, 435.7 mm, and 428.3 mm respectively which are all lower than the climate normal and the 30-year average. While the precipitation totals for the last three years have been lower than historical climate normals, they appear to be a continuation of the general drying trend observed in Quesnel over the last 15 years. The average annual total precipitation for the period between 2009 and 2023 (15 years) is recorded as 435.4 mm which is similar to the annual precipitation recorded in the last 3 years, as report above.

In August 2015, an optical precipitation sensor (Optical Scientific Inc. ORS-815-DS) was installed within West Quesnel (Station 31) on Dixon Street north of Lewis Drive. This sensor (WS1) allows near real-time measurement of local precipitation (rain and snow events) intensity and duration within the West Quesnel Land Stability Program area. The optical sensor collects data by measuring the amount of obstructions, typically rain and snow, but unfortunately it also appears to measure suspended particulates, such as dust and ash from wildfires. Thus, this instrument can be expected to record precipitation generally higher than actual precipitation depending on air quality at the time.

2 Environment Canada, 2020. Historical Data https://climate.weather.gc.ca/historical_data/search_historic_data_e.html Last visited July 13, 2020.

3 Environment Canada, 2020. Canadian Climate Normals https://climate.weather.gc.ca/climate_normals/index_e.html Last visited July 13, 2020.

Therefor, at this time the precipitation data from the optical sensor is only used to infill the missing data from the Quesnel Airport Auto data set were possible.

Table 3, below, presents the annual total precipitation (rainfall and snow water equivalent) for the Quesnel Airport Auto data station from 1996 to 2023. It also presents the antecedent total precipitation (i.e. precipitation in the months leading up to spring freshet from the previous November through to April) compared to a 1981-2010 historic normal of 213 mm for those same months.

Table 3 – Annual and Antecedent Total Precipitation from 1996 to 2023

Year	Data Source	Annual		Antecedent	
		Total precipitation (mm)	Difference from Historic Normal (1981 to 2010) (mm)	Nov-Apr Precipitation (mm)	Difference from Historic Normal (1981 to 2010) (mm)
1996	Quesnel AWOS	657	+121	231	18
1997	Quesnel AWOS	579	+43	287	74
1998	Quesnel AWOS	488	-48	181	-32
1999	Quesnel AWOS	628	+92	275	62
2000	Quesnel AWOS	554	+18	189	-24
2001	Quesnel AWOS	554	+18	172	-41
2002	Quesnel AWOS	471	-65	213	0
2003	Quesnel AWOS	478	-58	140	-73
2004	Quesnel AWOS	692	+156	226	13
2005	Quesnel AWOS	524	-12	249	36
2006	Quesnel AWOS	465	-71	142	-71
2007	Quesnel AWOS	541	+5	273	60
2008	Quesnel AWOS	530	-6	206	-7
2009	Quesnel AWOS	423	-113	238	25
2010	Quesnel AWOS/Quesnel	315	-221	135	-78
2011	Quesnel	450	-86	104	-109
2012	Quesnel	427	-109	163	-50
2013	Quesnel Airport Auto	404	-132	161	-52
2014	Quesnel Airport Auto	416	-120	168	-45
2015	Quesnel Airport Auto	428	-108	233	20
2016	Quesnel Airport Auto	495	-41	169	-44
2017	Quesnel Airport Auto	301	-235	128	-85
2018	Quesnel Airport Auto	448	-88	177	-36
2019	Quesnel Airport Auto	500	-36	237	24
2020	Quesnel Airport Auto	636	100	277	64
2021	Quesnel Airport Auto	437	-73	196	-15
2022	Quesnel Airport Auto	436	-74	233	22
2023	Quesnel Airport Auto	428	-82	263	52

Figure F1, presents the 2021, 2022, and 2023 monthly precipitation data recorded from Quesnel Airport compared to Canadian Climate Normals, 10 year, and 30 year moving averages. The overall drying trend starting in 2009 (with the exception of 2020) is shown on Figure F2, a chart which presents the cumulative difference of total monthly precipitation relative to the 30-year monthly average. Starting in approximately June of 2019 and continuing through to the end of 2020, a significant reversal in the drying trend is apparent before returning to a more normal precipitation pattern or continuation of the previous drying trend through 2021, 2022, and 2023.

8 TRENDS & CORRELATIONS

Typical data taken from different types of instruments was plotted to determine if any general trends or correlations were apparent. Although the availability of relatively comprehensive data sets across the study area was only phased in between 2007 and 2012, several trends can be identified, and are discussed below. Charts illustrating the data comparisons are presented in Appendix G.

8.1 PRECIPITATION EFFECT ON GROUNDWATER

Figure G1, depicts total monthly precipitation compared to general groundwater pressures (elevations) at selected VWP sensors. Upon reviewing the collected data it is apparent that a significant natural seasonal rise in groundwater elevations occurs just after the winter season (during the freshet) each year. In some rarer instances, post-freshet secondary rises in groundwater levels can also be seen, generally corresponding with individual storm events or general late fall (pre-freezing) increases in precipitation. These seasonal rise patterns are more obvious on some instruments than others and can be artificially influenced by drainage systems and/or utility leaks. In general, the natural groundwater increases are observed to occur either gradually (e.g. as depicted by VWP 14A) or relatively rapidly (e.g. VWP 15A and VWP 39B). Examples of more subdued seasonal responses (VWP 4 and VWP 9A) and little or no apparent spring freshet response (VWP 10C) are also depicted on Figure G1. The freshet response at a particular location is highly dependent on local ground permeability and precipitation accumulated over the preceding winter months. Shortly after the freshet increase, a gradual decrease in groundwater pressures can typically be observed. The rate of decrease is also dependent on ground permeability and dissipation capacity within the overall regional groundwater system but can also be influenced by the connectivity to the natural hydro-geologic environment and/or artificial dewatering systems.

A sharp upward spike in the groundwater pressure at VWP 10C observed in November of 2017 coincided with the same period when the pump in PW14 was off. In 2020, although pump PW14 continued to operate at the same rate with similar and slightly elevated production levels, there appears to be a slight pore pressure increase of approximately 0.7 m that continued through 2021, 2022, and 2023. This increase shows the limitations of the influence of PW14 with respect to ground permeability in this area.

There is also likely an over-riding time-lag effect of infiltration of previous rainfall or snow melt (during frozen/non-frozen and dry/saturated ground conditions) which likely influences groundwater pressures, along with the long-term precipitation trends. There may also be additional influencing factors, such as infiltration variability depending on surface moisture conditions and near surface groundwater conditions, lawn watering, variable losses from sewers and water systems and other unknown factors. In addition, in some landslide masses, the degree of infiltration has been found to vary with ongoing ground movement over time, as internal flow paths, tension cracks and shear zones change as movement occurs.

Starting in 2019 and continuing through to the peak in the spring of 2021, a generally increasing pore pressure trend was observed within most of the near surface VWP sensors. This increasing trend is directly related to increasing precipitation observed in the area over those years. In 2020 and early 2021 significantly higher precipitation was observed causing the highest to date pore pressure within some instruments during the 2021 spring freshet. This pore pressure increase was reflected by higher ground movement rates in 2020 and the first half of 2021. In general, reduced precipitation was recorded in 2022, and 2023 and is reflected in a slightly decreasing pore water pressure from the peak observed in the spring of 2021.

8.2 PRECIPITATION EFFECT ON GROUND MOVEMENT

Previous reports describe a general and expected correlation between periods of higher precipitation and subsequently increased ground movements as measured by semi-annual GPS surveys, with the majority of movement observed within any one year generally correlating with spring freshet. As noted in previous annual reports, there also appears to be a time-lag between increased precipitation and resulting magnitude of annual total ground movement, likely due to the delayed effect on groundwater pressures from the location, timing, type and amount of precipitation as noted above. Figure G2 illustrates this time-lag effect between the magnitude of total movement in any given year and the total amount of antecedent precipitation (i.e. that occurring in the previous November to April) prior to the movement. Although still a fairly general and simplistic correlation made with limited available data, it is clear that up until 2012 there was a relatively good correlation between the antecedent precipitation and the magnitude of movement, i.e. whenever the total antecedent precipitation was higher than about 150 mm for one or two years then the annual ground movement was typically in excess of 50 mm (averaging 54 mm per year). However, from 2013 to 2019, whenever the antecedent precipitation has been above 150 mm the observed annual ground movement has been averaging 13 mm per year. This change in the historic correlation pattern is attributed to the early effects of components of the subsurface dewatering system coming online in 2012- 2013 and again in 2016.

In 2017 the antecedent precipitation fell to below 150 mm, and at the same time the annual movement was the second lowest recorded (6 mm). In 2018 and 2019, the departure from the historically higher movement pattern observed prior to 2013 continued, with movements of only 9 mm and 13 mm per year against antecedent precipitation of 177 mm and 237 mm in 2018 and 2019, respectively. In 2020, the antecedent precipitation increased to 277 mm which is the highest recorded level since monitoring started. The corresponding ground movement was also much higher both in 2020 and the early part of 2021, and similar in magnitude to the ground movements observed in peak precipitation years of 1999 and 2005, prior to installation of the subsurface dewatering system. Starting in the latter half of 2021, recorded ground movement returned to significantly lower levels with only 5 mm (lowest recorded movement) and 13 mm recoded in 2022 and 2023 respectively. A spike in the antecedent precipitation was recorded in 2023 but is mainly attributed to a significantly wetter January and February in 2023 while the average total rainfall in 2023 was below historical normals.

Beginning in the fall of 2012, more detailed (daily) ground movement data from the IPI instruments (as opposed to intermittent GPS surveys) became available. Various iterations of IPI/SAA instruments have been used to record real time ground movement data since 2012 and are shown on Figure G3 along with daily precipitation and temperature since the beginning of 2016.

8.3 GROUNDWATER CORRELATION WITH GROUND MOVEMENT

While precipitation patterns can be shown to have a general influence on ground movement, typically it is actually the resulting groundwater pressures that more directly influence landslide movements. Previous reports have described how increased groundwater pressures acting on a landslide failure surface reduce the overall stability and potentially cause subsequent increases in ground movement. Figure G3 depicts daily precipitation, ground movement (as determined by horizontal GPS surveys and daily IPI and SAA data) and daily groundwater elevation from a typical background groundwater instrument (VWP 14A). A clear correlation exists between the most significant movement events that do occur, and the corresponding spring freshet groundwater pressure rises. Some non-freshet movement events also occurred; however those were noted to correspond with reports of significant water main and sewer utility

leaks, and storm events. The detected leak events demonstrate the importance of the City of Quesnel's annual leak detection and repair program.

Figure G4 presents a longer-term plot of horizontal ground movement (GPS 98-17, SI6C, SI17B/SI17aB, and SI18B) versus typical background groundwater pressure (VWP 14A). From 2008 to 2012 a clear pattern of increased ground movement and corresponding annual spring freshet groundwater pressure increases is evident. During 2010 and 2011 there was a very subdued spring groundwater pressure rise (likely due to an extended period of significantly lower than normal antecedent precipitation), which also corresponded with a period of lesser ground movement. However, starting in 2013 there has been appreciably less ground movement despite background seasonal groundwater pressures at or above elevations that would have been expected to trigger greater movements in previous years. This change in the historic pattern is deemed to be due to the incremental effects of the Phase I subsurface dewatering works installed and initiated between mid-2012 and the spring of 2013. The timing of the installation of the dewatering works as well as the output from select horizontal drains are overlain on Figure G4 to illustrate this effect. The even further reduced movement observed in 2017 through 2019 is contrasted against still significantly high natural seasonal groundwater peaks and is judged to be further evidence of the cumulative positive stabilizing effect of the storm drainage improvements and additional pumping wells and horizontal drains being brought on line during the last half of 2016. Spikes in ground movement were noted in 2020 and the first half of 2021 and are attributed to the record high background groundwater pressure recorded following above average precipitation. In the second half of 2021 and in 2022 and 2023 ground movement returned to low levels, similar to those observed between 2013 and 2019.

Figure G5, presents an approximate correlation between ground movements and groundwater levels (pore pressures). To establish the correlation, ground movement at GPS 98-17 was compared to the VWP 14A pore pressures. Specifically, the number of days in a calendar year that the average daily VWP 14A readings were measured to be equal to or greater than an observed pore pressure elevation of 567 m. This correlation contains a number of very simplistic assumptions but does demonstrate a general correlation between higher-than-normal natural groundwater levels (as observed at VWP 14A) and expected ground movement.

Beginning in 2019 and extending through 2021, generally increased groundwater levels over previous steady state and gradually declining elevations were observed throughout the area within the near surface instruments. This was also evidenced by the higher flow rates from the dewatering system. It is considered that the elevated groundwater levels (attributable to the much higher-than-average antecedent precipitation), compounded by the freshet and seasonal peak precipitation resulted in the significant increase in ground movement observed for 2020 and the first half of 2021. This higher movement happened despite the presence of the dewatering measures and suggests that under severe and/or prolonged precipitation patterns the current system capacity to drain groundwater can be exceeded. It is anticipated that future severe and/or prolonged precipitation events could lead to increased risk of slide mass movement if the capacity of the current system is exceeded. Continued monitoring of the in place instrumentation will provide additional insight into the relationship between severe weather events and slide movement.

9 CLOSURE

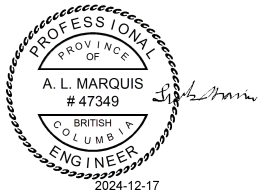
This report presents the results of the monitoring carried out by WSP for the 2021, 2022 and 2023 calendar years. This report has been prepared for the exclusive use of the City of Quesnel and their representatives for specific application to West Quesnel Land Stability Program. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report was prepared in accordance with generally accepted geotechnical engineering principles and practice. No other warranty, express or implied, is made. This report and associated data are subject to the attached limitations (Appendix H).

Please do not hesitate to contact the undersigned should you have any questions or require further information.

Respectfully submitted,

WSP Canada Inc.,



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Reviewed by:



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WSP E&I Canada Limited
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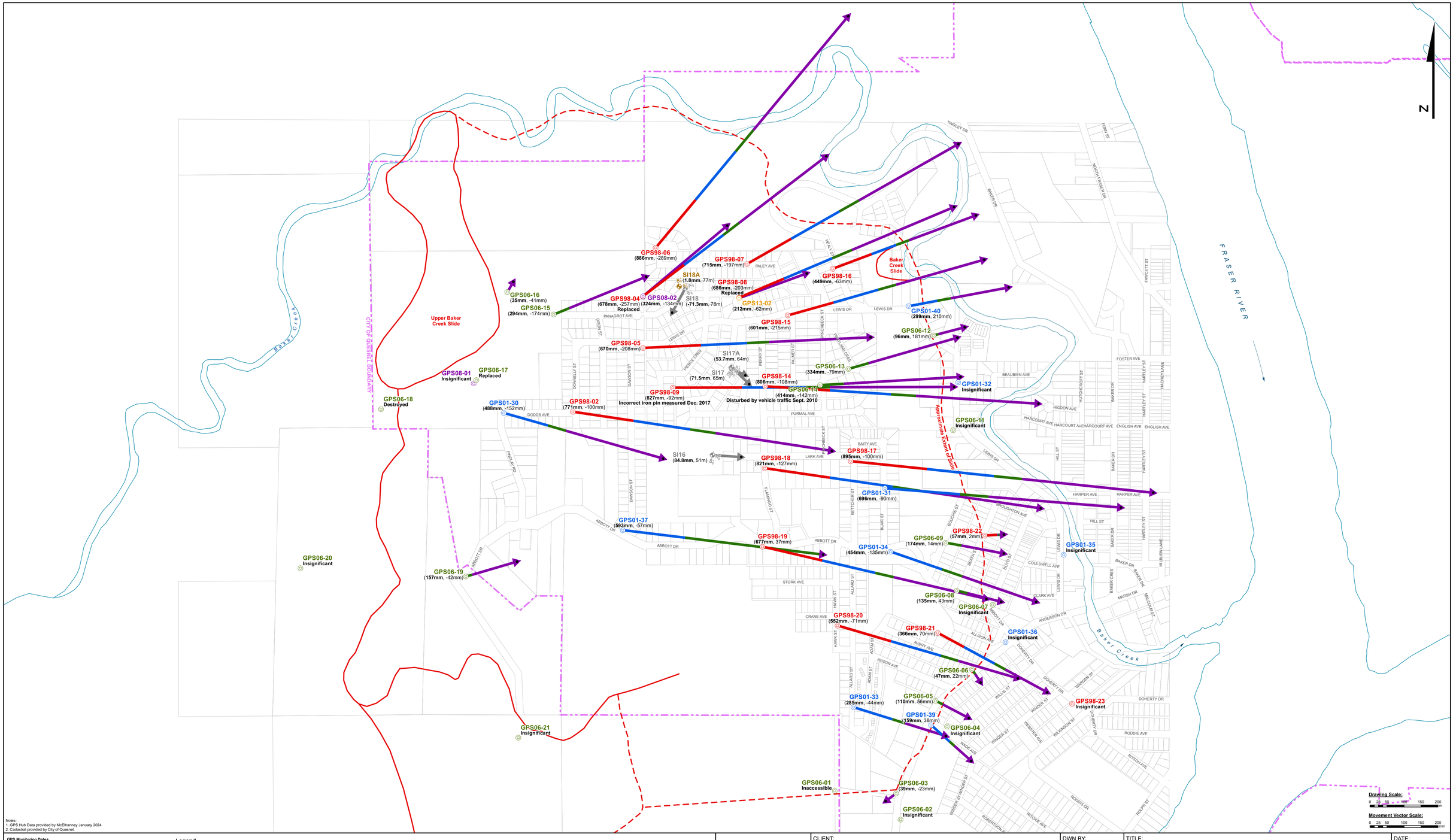
Permit #1004452



Notes:
1. GPS Hub Data provided by McElhanney January 2024.
2. Cadastral provided by City of Quesnel.

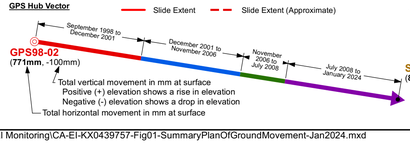
GPS Monitoring Dates

Initial September 1998
#1 December 1998
#2 April 1999
#3 December 1999
#4 May 2000
#5 May 2002
#6 December 2000
#7 May 2001
#8 December 2001
#9 May 2002
#10 October 2002
#11 December 2003
#12 January 2005
#13 March 2006
#14 November 2006
#15 April 2007
#16 August 2007
#17 December 2007
#18 March 2008
#19 June 2008
#20 November 2008
#21 November 2008
#22 March 2009
#23 June 2009
#24 September 2009
#25 November 2009
#26 March 2010
#27 June 2010
#28 September 2010
#29 November 2010
#30 April 2011
#31 June 2011
#32 October 2011
#33 November 2011
#34 April 2012
#35 July 2012
#36 November 2012
#37 December 2012
#38 April 2013
#39 July 2013
#40 October 2013
#41 November 2013
#42 April 2014
#43 July 2014
#44 October 2014
#45 November 2014
#46 April 2015
#47 July 2015
#48 October 2015
#49 December 2015
#50 April 2016
#51 July 2016
#52 November 2016
#53 December 2016
#54 April 2017
#55 August 2017
#56 October 2017
#57 December 2017
#58 June 2018
#59 November 2018
#60 June 2019
#61 December 2019
#62 June 2020
#63 December 2020
#64 June 2021
#65 December 2021
#66 June 2022
#67 December 2022
#68 June 2023
#69 January 2024

Legend

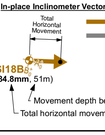
GPS Hubs Installed
- September 1998
- December 2001
- November 2006
- June 2008
- November 2013

GPS Hub Vector



Slide Extent
Slide Extent (Approximate)

In-place Inclinometer Vector



Active In-place Inclinometer Vector
Inactive In-place Inclinometer Vector

Sensor	Initialization Date	Total Movement Date	Comments
SI16-D	20-Sep-2012	14-July-2020	Failed 8-Nov-2020
SI17-B	16-Oct-2012	31-Aug-2018	Decommissioned
SI17A-A	26-Nov-2019	29-May-2022	Failed 29-May-2022
SI18-A	1-Jun-2016	19-Aug-2021	Failed 19-Aug-2021
SI18A-016	5-Apr-2024	31-Dec-2023	Active

CITY OF Quesnel

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9

DWN BY: BB
CHK'D BY: LM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: 1:5,250

TITLE: SUMMARY PLAN OF GROUND MOVEMENT (GPS HUBS AND SLOPE INCLINOMETERS)

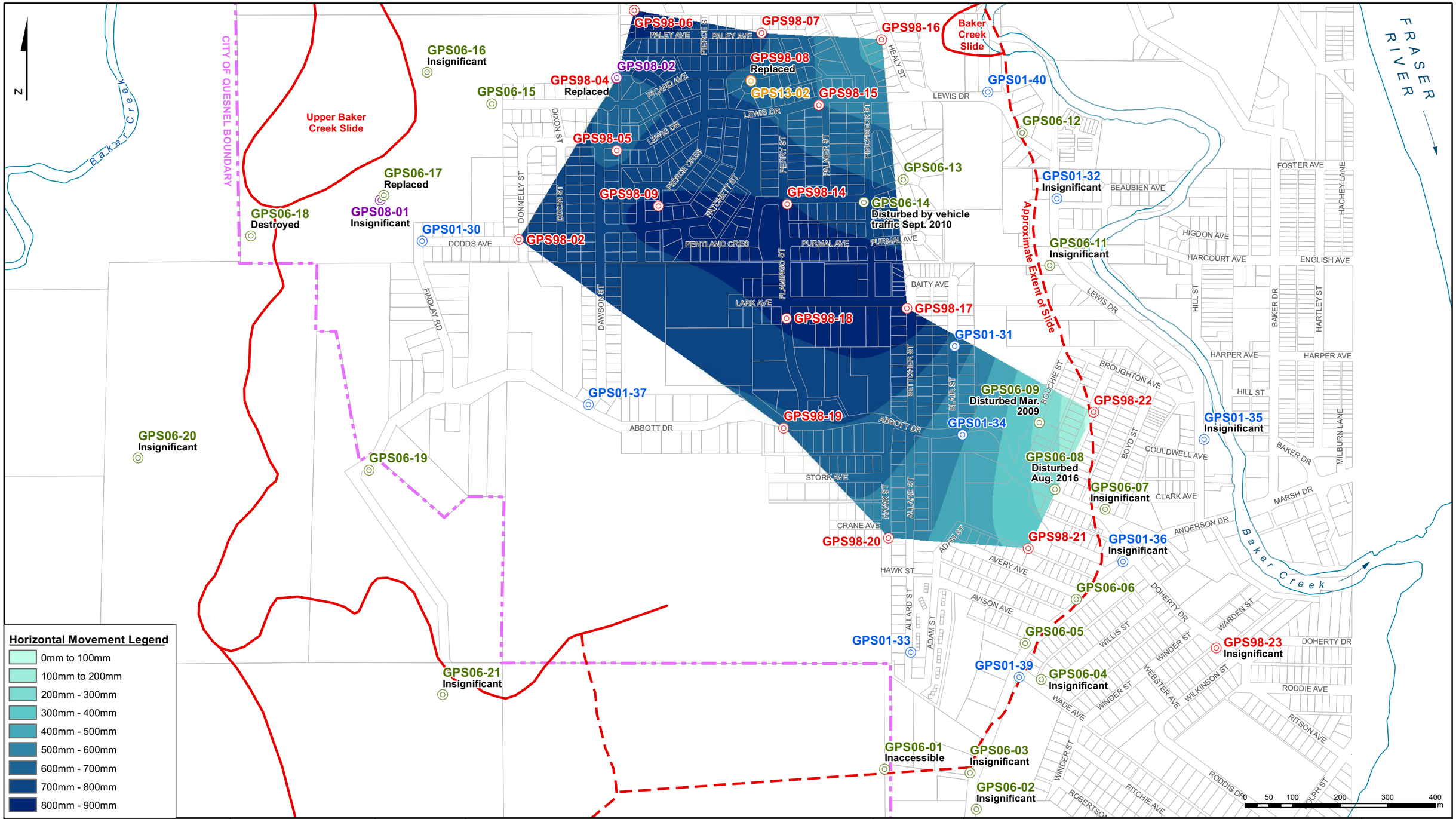
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE: MAY 2024
PROJECT NO.: KX0439757
REV NO.: A

FIGURE 1

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig01-SummaryPlanOfGroundMovement-Jan2024.mxd

This drawing was originally produced in colour.



Horizontal Movement Legend

- 0mm to 100mm
- 100mm to 200mm
- 200mm - 300mm
- 300mm - 400mm
- 400mm - 500mm
- 500mm - 600mm
- 600mm - 700mm
- 700mm - 800mm
- 800mm - 900mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

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CLIENT: CITY OF QUESNEL

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Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: TOTAL HORIZONTAL MOVEMENT SEPTEMBER 1998 TO JANUARY 2024 FOR THE 1998 GPS HUBS

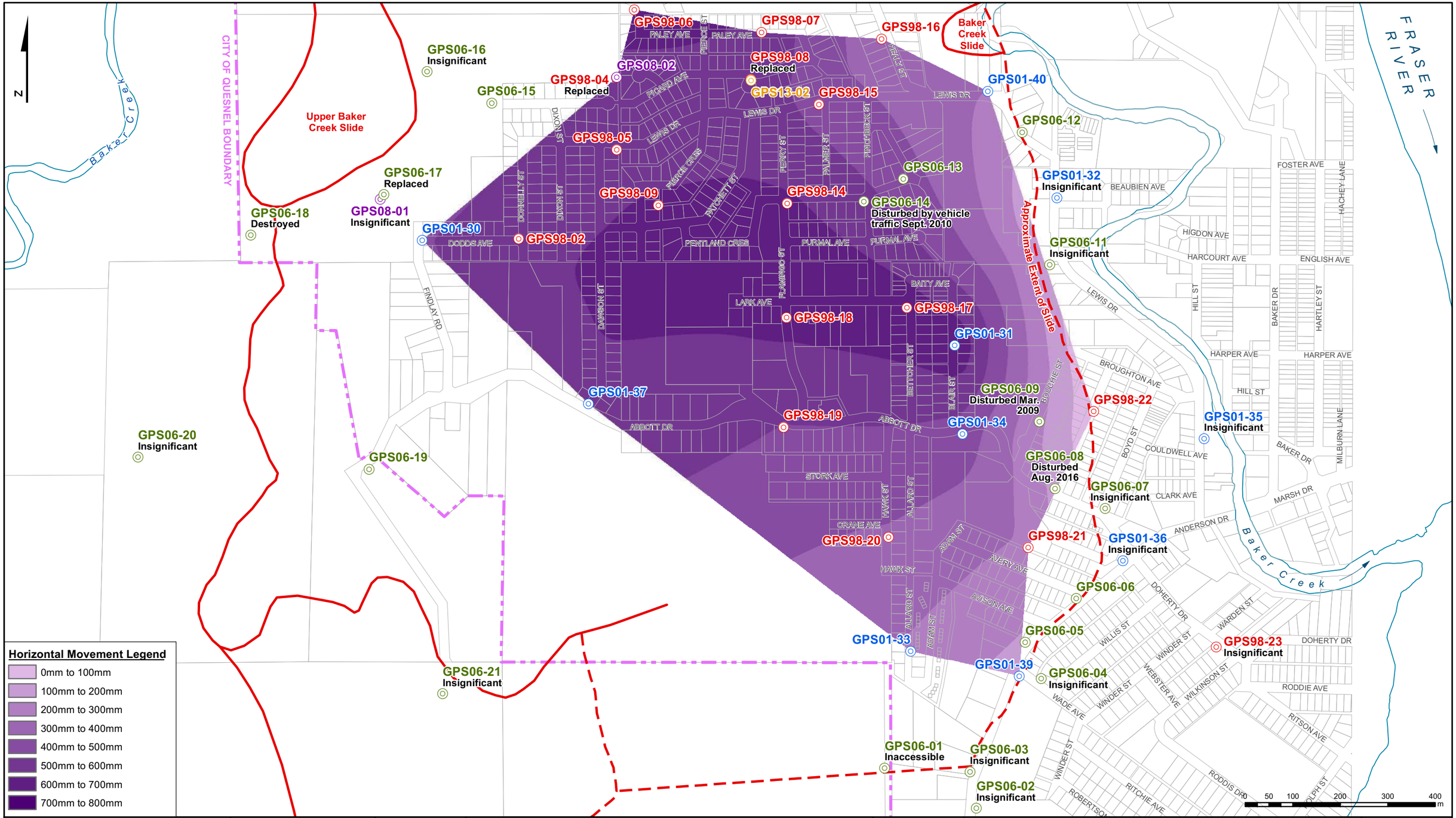
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 2

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig02-HMove-Sept98-Jan24-98Hubs.mxd

This drawing was originally produced in colour.



Horizontal Movement Legend

- 0mm to 100mm
- 100mm to 200mm
- 200mm to 300mm
- 300mm to 400mm
- 400mm to 500mm
- 500mm to 600mm
- 600mm to 700mm
- 700mm to 800mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CLIENT: CITY OF QUESNEL

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Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY: BB
CHK'D BY: LM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: 1:7,500

TITLE: TOTAL HORIZONTAL MOVEMENT DECEMBER 2001 TO JANUARY 2024 FOR THE 1998 AND 2001 GPS HUBS

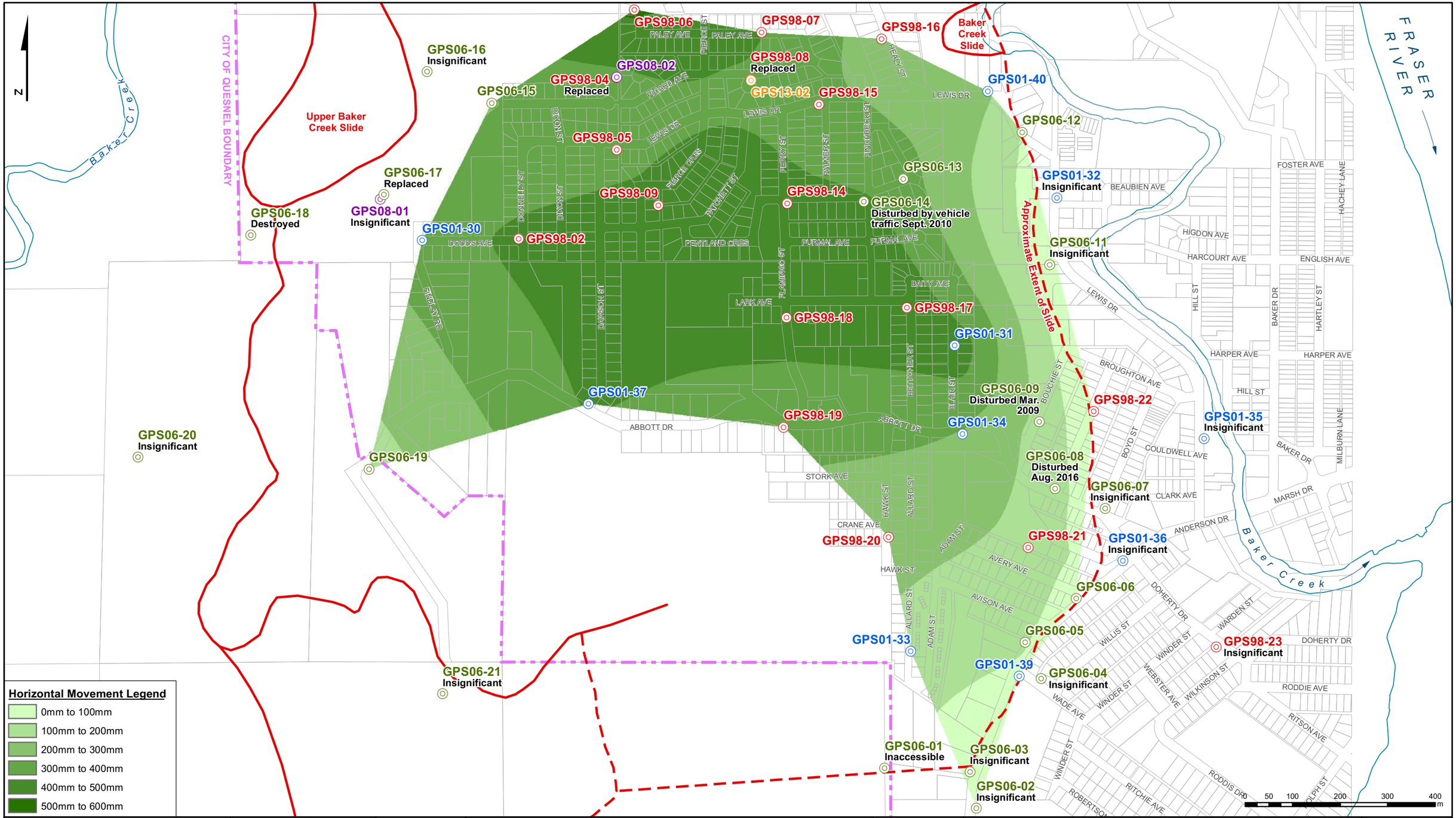
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE: MAY 2024
PROJECT NO.: KX0439757
REV NO.: A

FIGURE 3

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig03-HMove-Dec01-Jan24-98-01Hubs.mxd

This drawing was originally produced in colour.



Horizontal Movement Legend

- 0mm to 100mm
- 100mm to 200mm
- 200mm to 300mm
- 300mm to 400mm
- 400mm to 500mm
- 500mm to 600mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

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Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: TOTAL HORIZONTAL MOVEMENT
NOVEMBER 2006 TO JANUARY 2024
FOR THE 1998, 2001 AND 2006 GPS HUBS

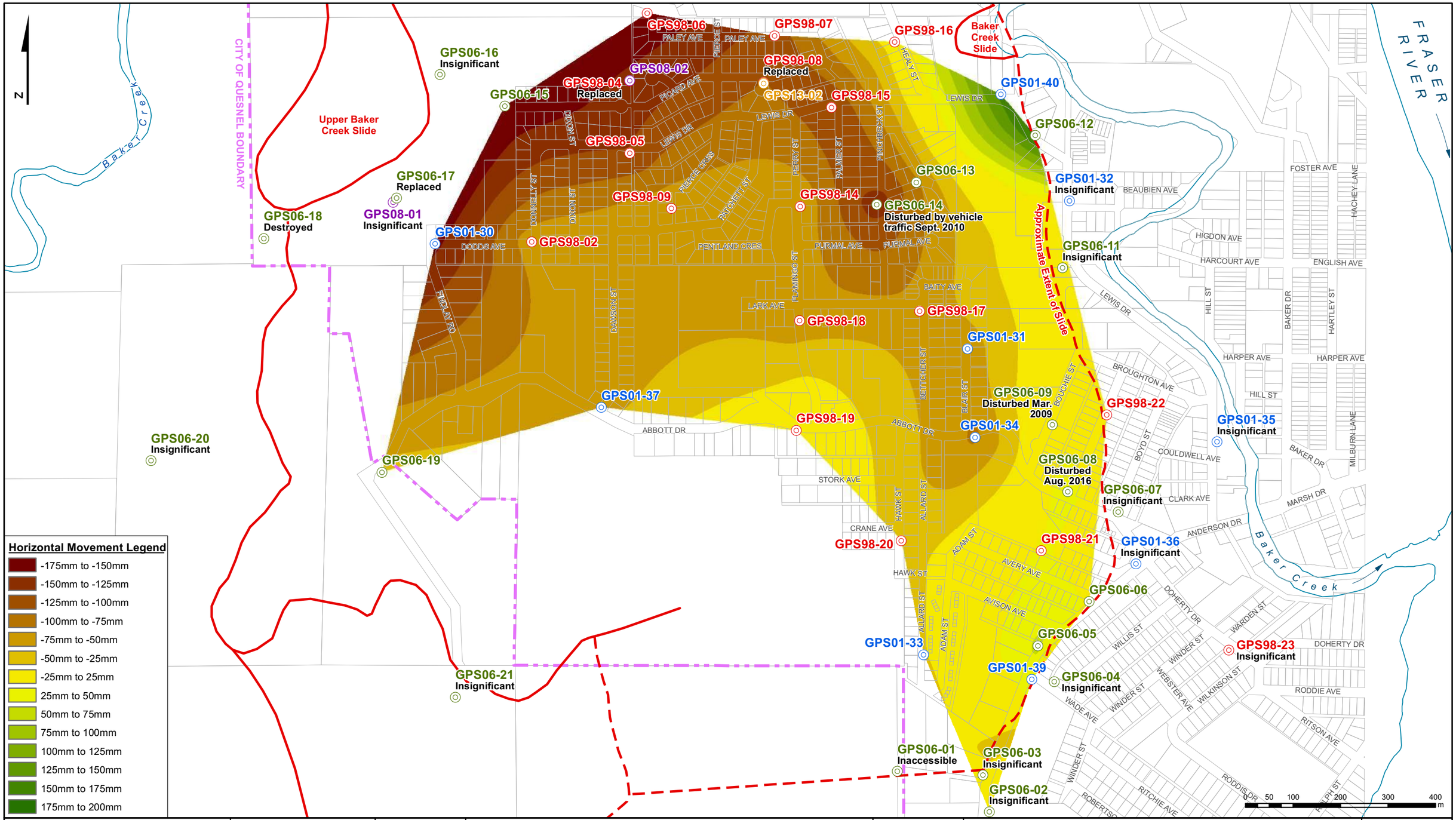
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 4

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig04-HMove-Nov06-Jan24-AllHubs.mxd

This drawing was originally produced in colour.



Horizontal Movement Legend

- -175mm to -150mm
- -150mm to -125mm
- -125mm to -100mm
- -100mm to -75mm
- -75mm to -50mm
- -50mm to -25mm
- -25mm to 25mm
- 25mm to 50mm
- 50mm to 75mm
- 75mm to 100mm
- 100mm to 125mm
- 125mm to 150mm
- 150mm to 175mm
- 175mm to 200mm

Legend

- Slide Extent
- Slide Extent (Approximate)

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Tel:+1 250-564-3243

DWN BY: BB

CHK'D BY: LM

DATUM: NAD 83

PROJECTION: UTM Zone 10

SCALE: 1:7,500

TITLE: TOTAL VERTICAL MOVEMENT NOVEMBER 2006 TO JANUARY 2024 FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC

DATE: MAY 2024

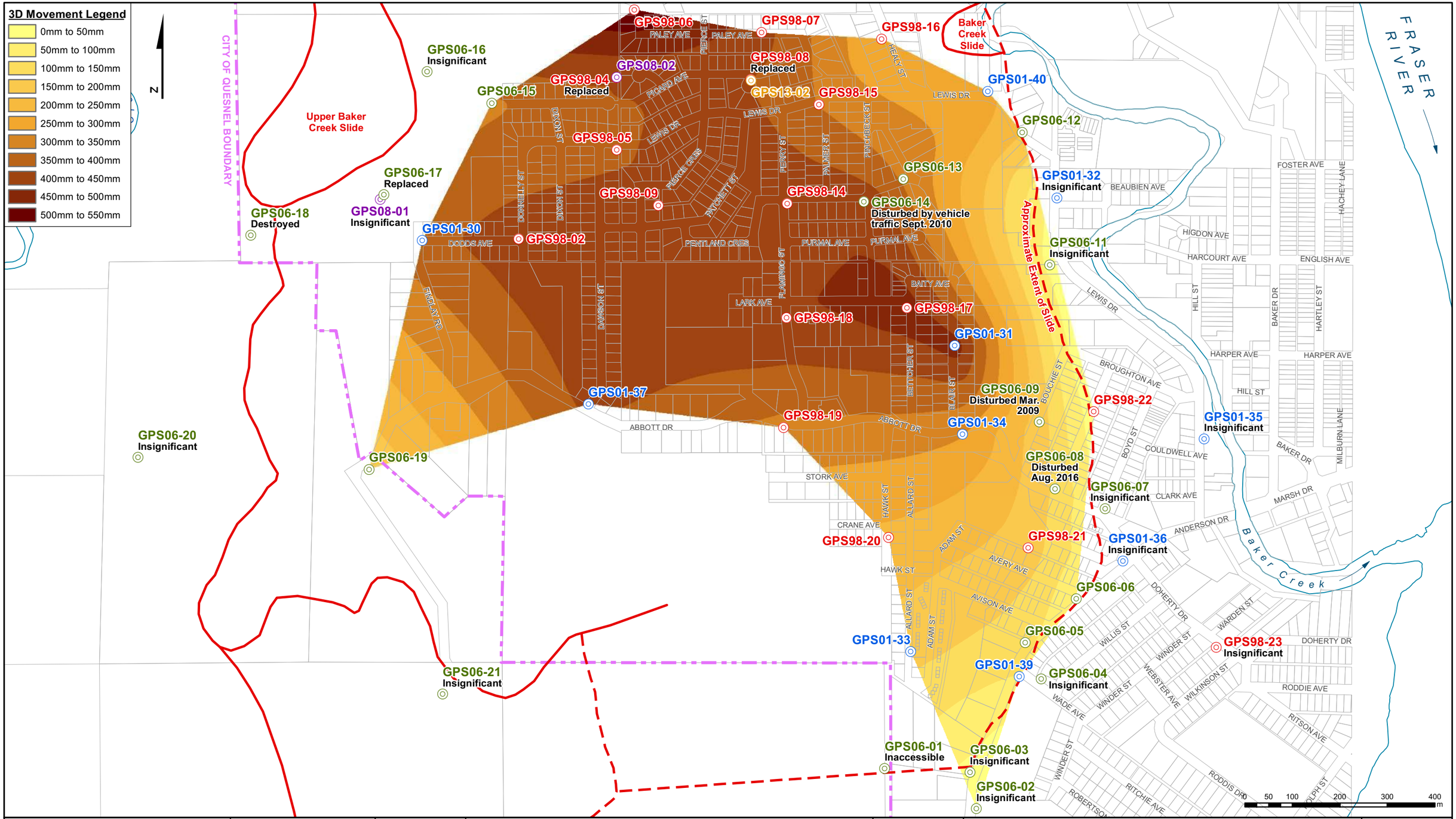
PROJECT NO.: KX0439757

REV NO.: A

FIGURE 5

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig05-VMove-Nov06-Jan24-AllHubs.mxd

This drawing was originally produced in colour.



Legend
- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

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DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: TOTAL 3D MOVEMENT
NOVEMBER 2006 TO JANUARY 2024
FOR THE 1998, 2001 AND 2006 GPS HUBS

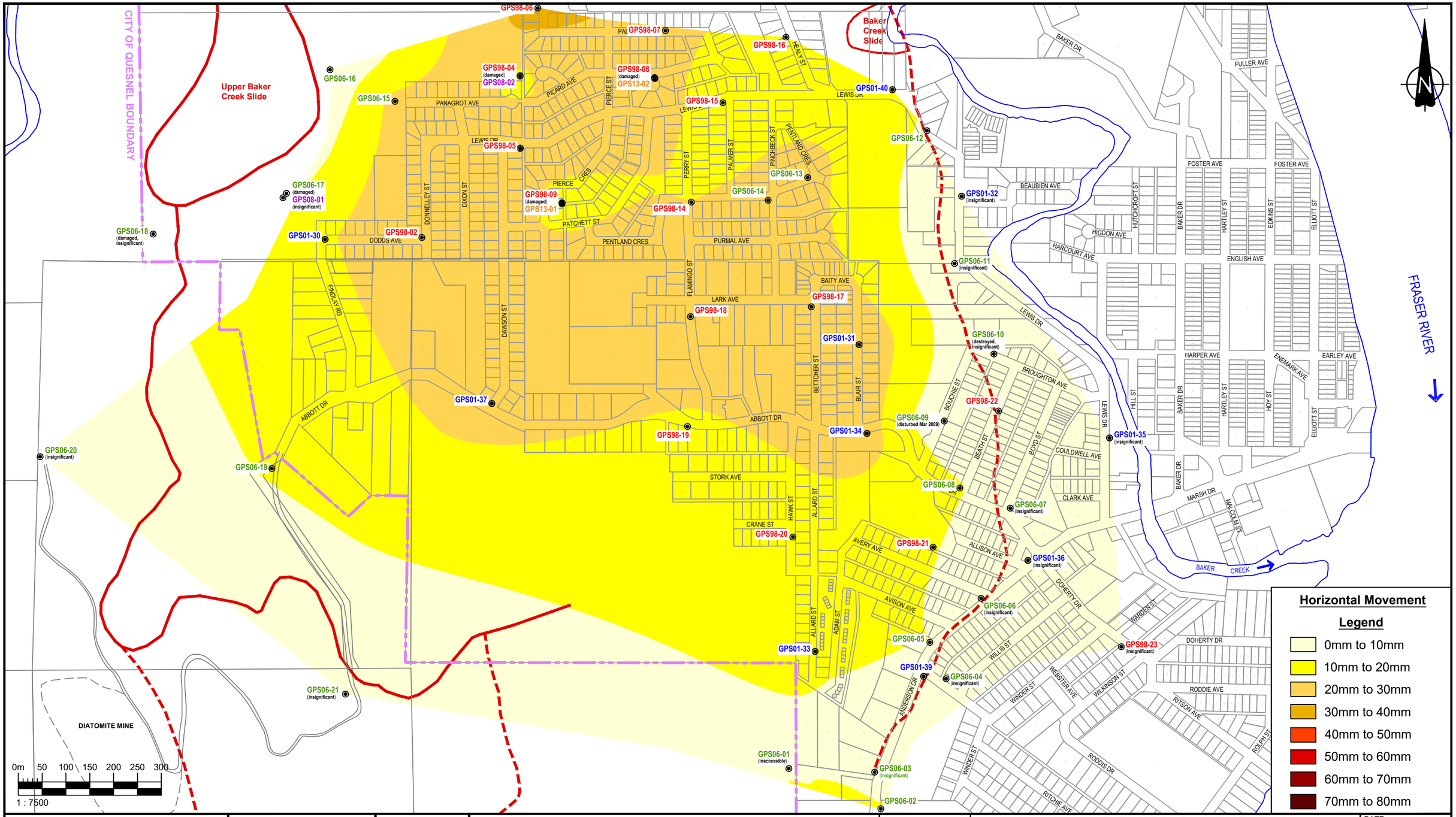
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 6

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig06-3DMove-Nov06-Jan24-AllHubs.mxd

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF QUESNEL

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WSP Canada Inc.
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Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2007
NOVEMBER 2006 TO DECEMBER 2007
FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A
	FIGURE 7

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig07-HMove-Nov06-Dec07-AllHubs.dwg - Figure7 - May. 08, 2024 3:29pm

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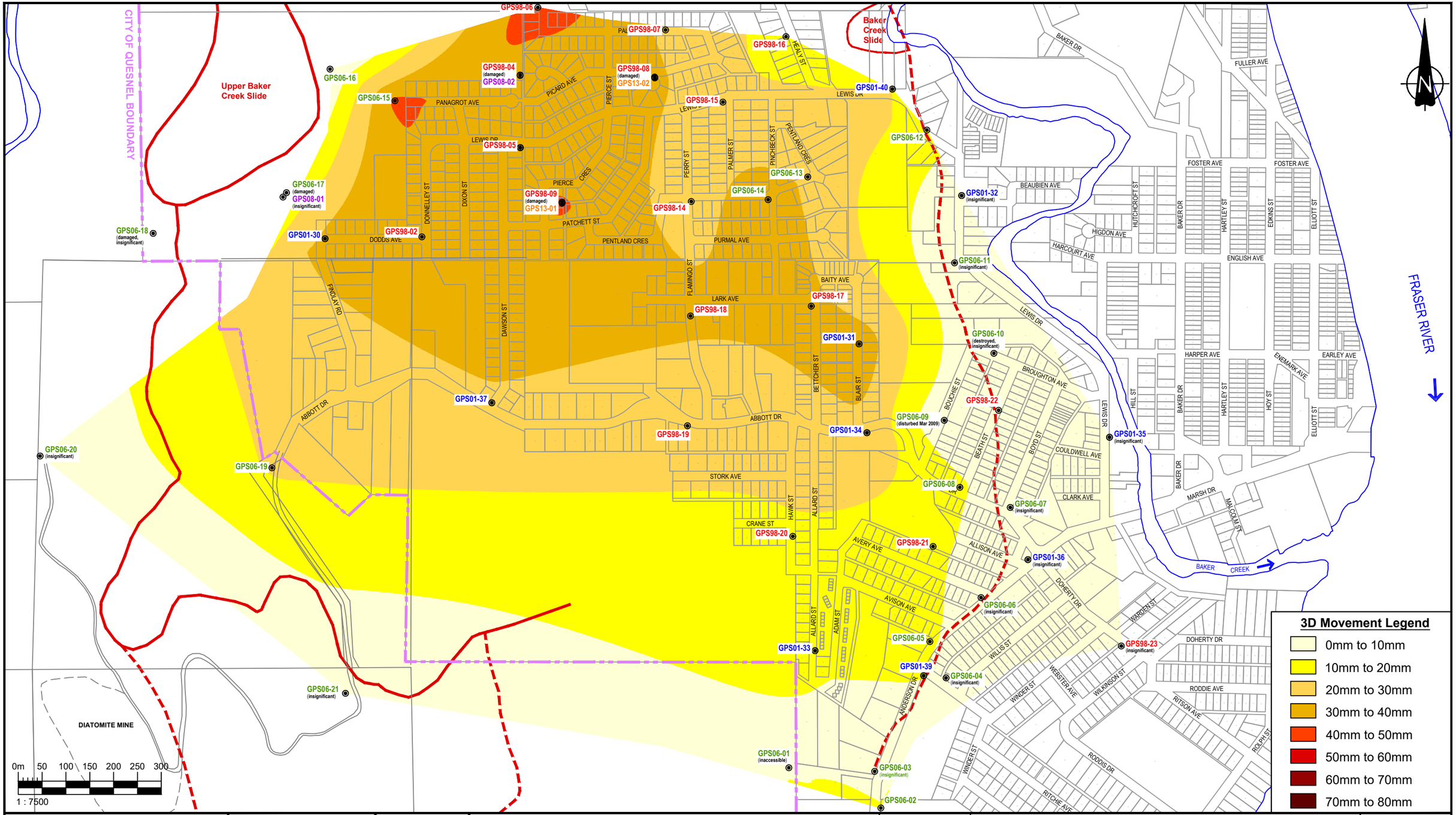

Legend

- Slide Extent
- Slide Extent (Approximate)

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
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Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL 3D MOVEMENT - 2007
NOVEMBER 2006 TO DECEMBER 2007
FOR THE 1998, 2001 AND 2006 GPS HUBS

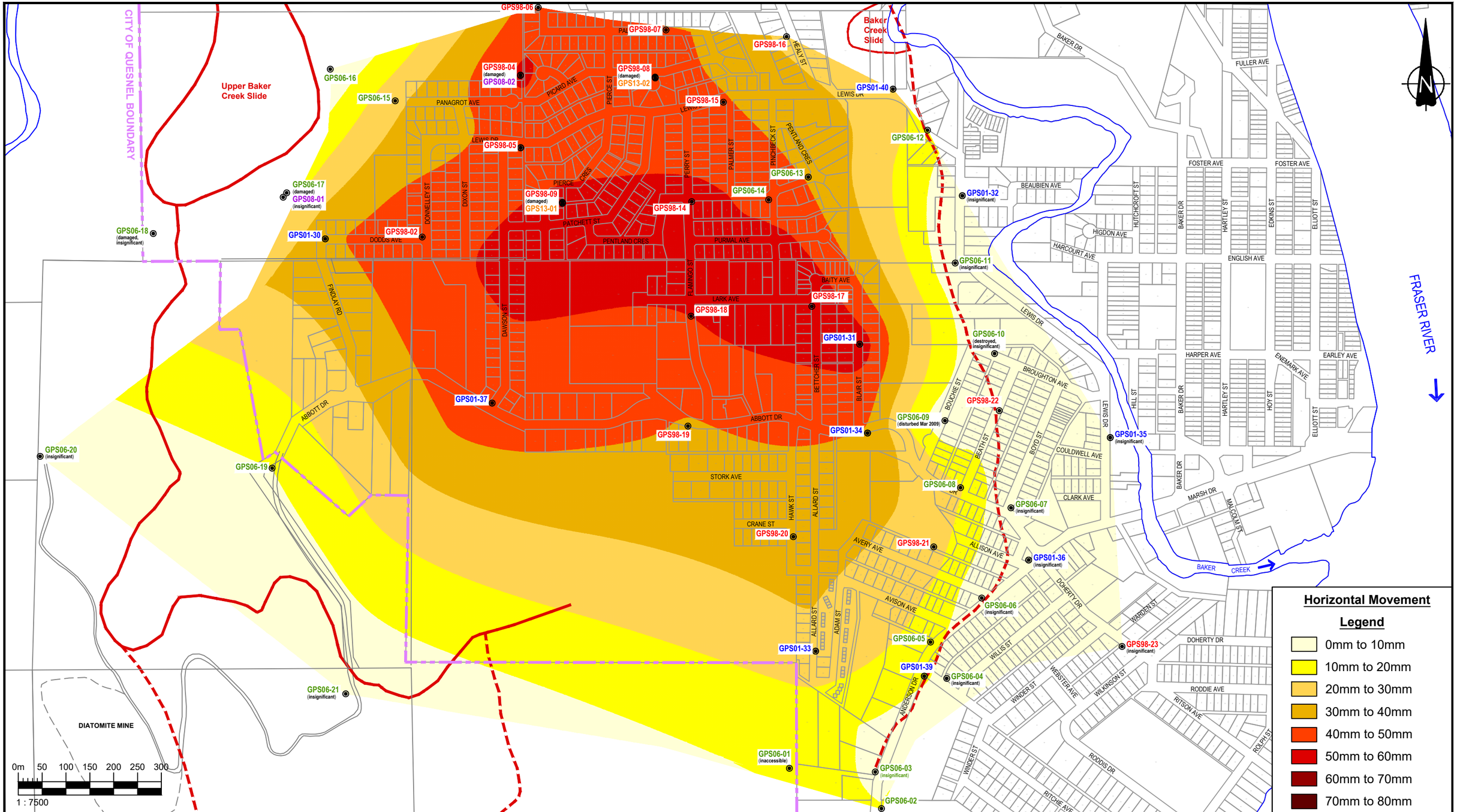
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A

FIGURE 8

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig08-3DMove-Nov06-Dec07-AllHubs.dwg - Figure8 - May. 08, 2024 3:30pm

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

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WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2008
DECEMBER 2007 TO NOVEMBER 2008
FOR THE 1998, 2001 AND 2006 GPS HUBS

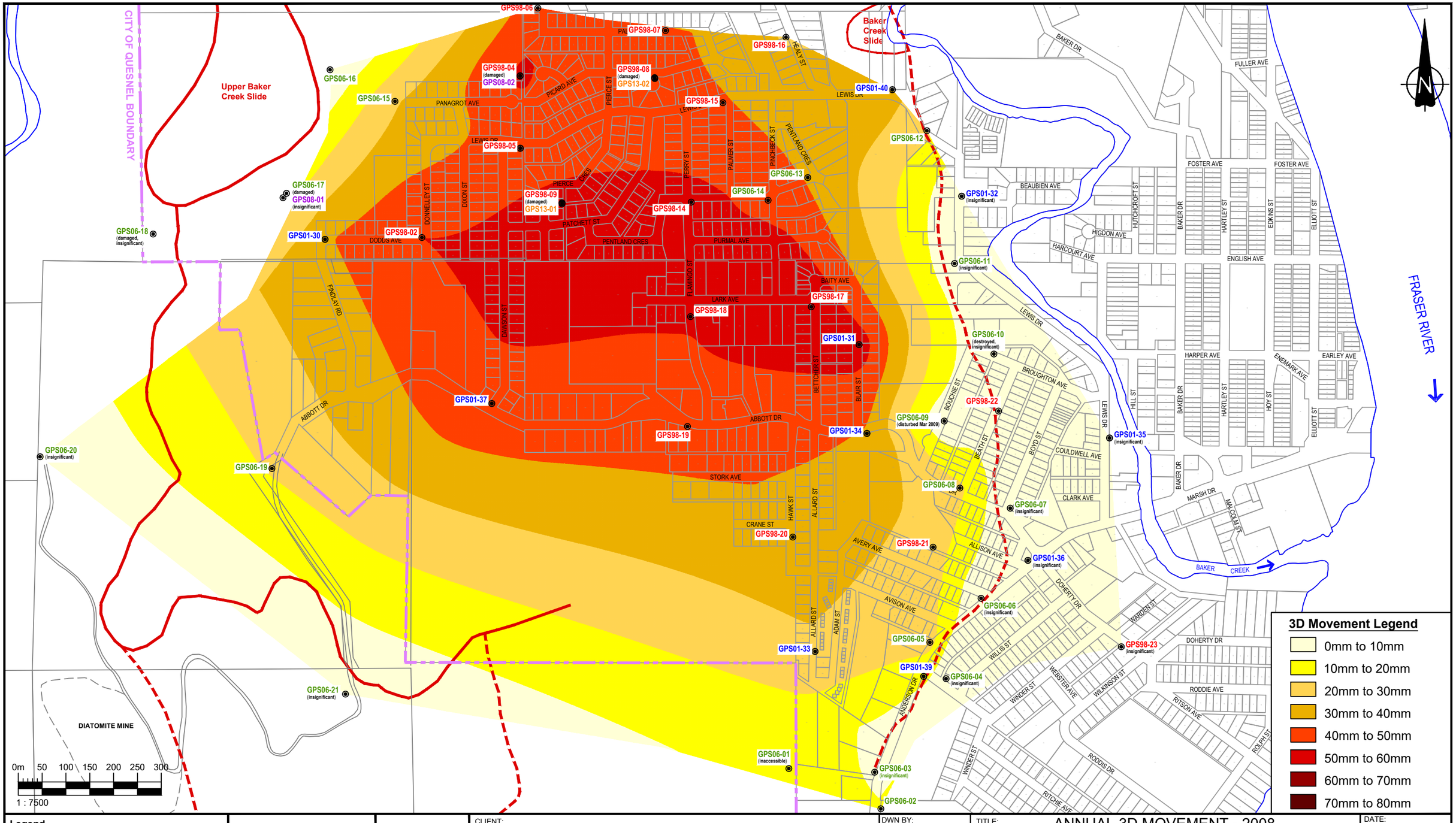
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A

FIGURE 9

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig09-HMove-Dec07-Nov08-AllHubs.dwg - Figure9 - May. 08, 2024 3:31pm

This drawing was originally produced in colour.



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Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

CLIENT: CITY OF QUESNEL

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

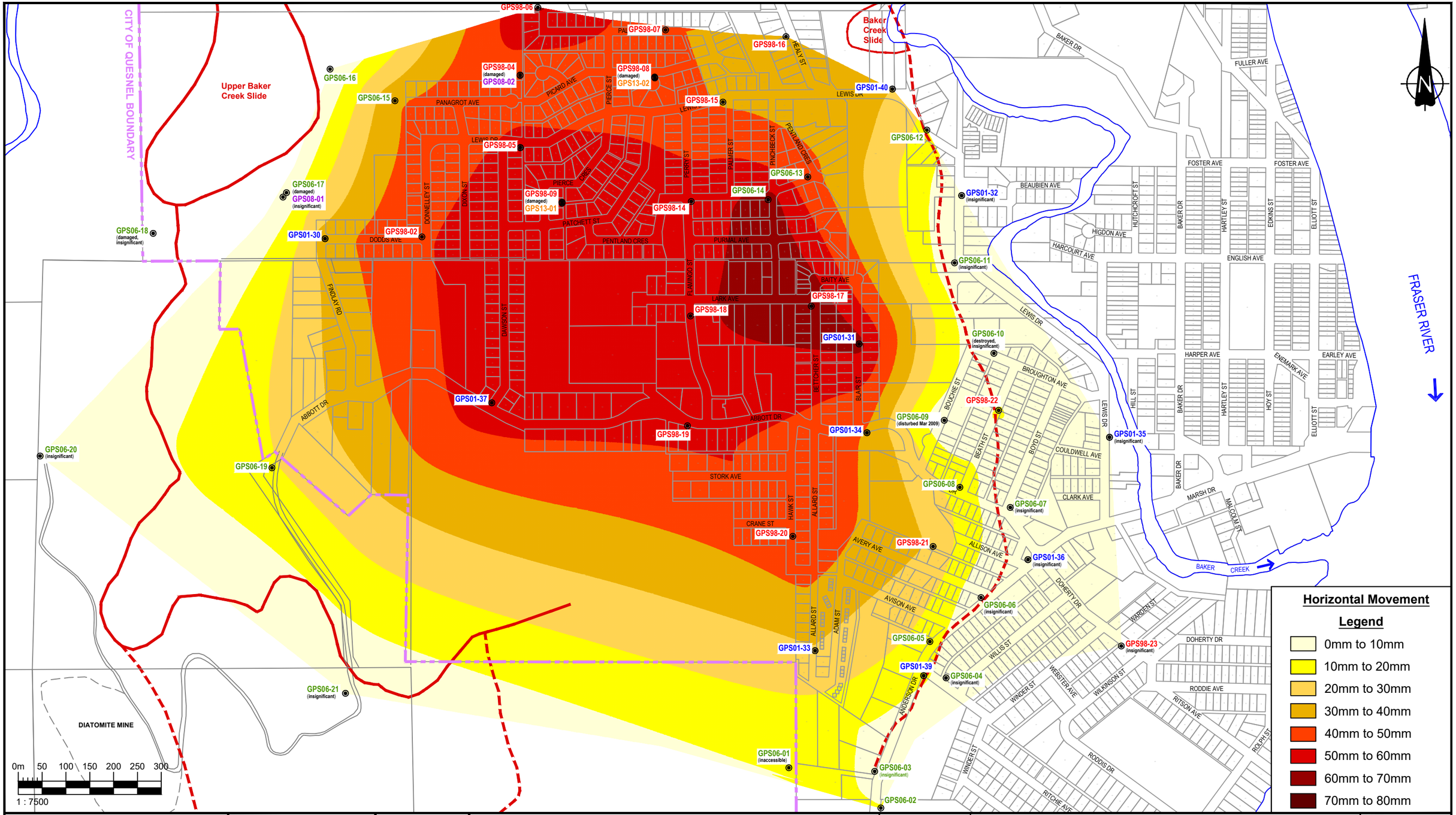
TITLE: ANNUAL 3D MOVEMENT - 2008
DECEMBER 2007 TO NOVEMBER 2008
FOR THE 1998, 2001 AND 2006 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A
	FIGURE 10

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig10-3DMove-Dec07-Nov08-AllHubs.dwg - Figure10 - May. 08, 2024 3:31pm

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

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Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2009
NOVEMBER 2008 TO NOVEMBER 2009
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

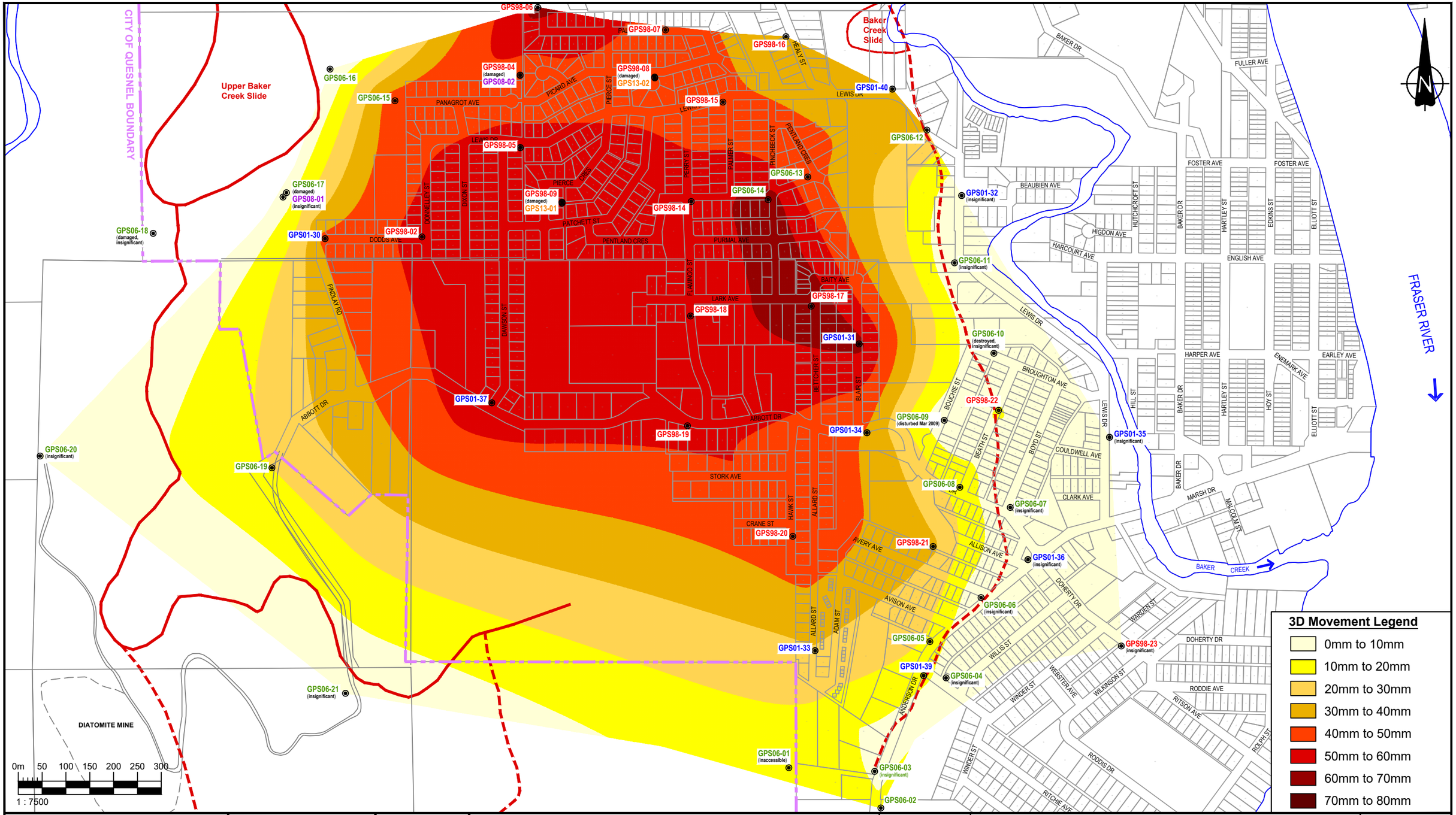
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A

FIGURE 11

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig11-HMove-Nov08-Nov09-AllHubs.dwg - Figure11 - May. 08, 2024 3:31pm

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

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Tel:+1 250-564-3243

CLIENT: CITY OF QUESNEL

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL 3D MOVEMENT - 2009
NOVEMBER 2008 TO NOVEMBER 2009
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

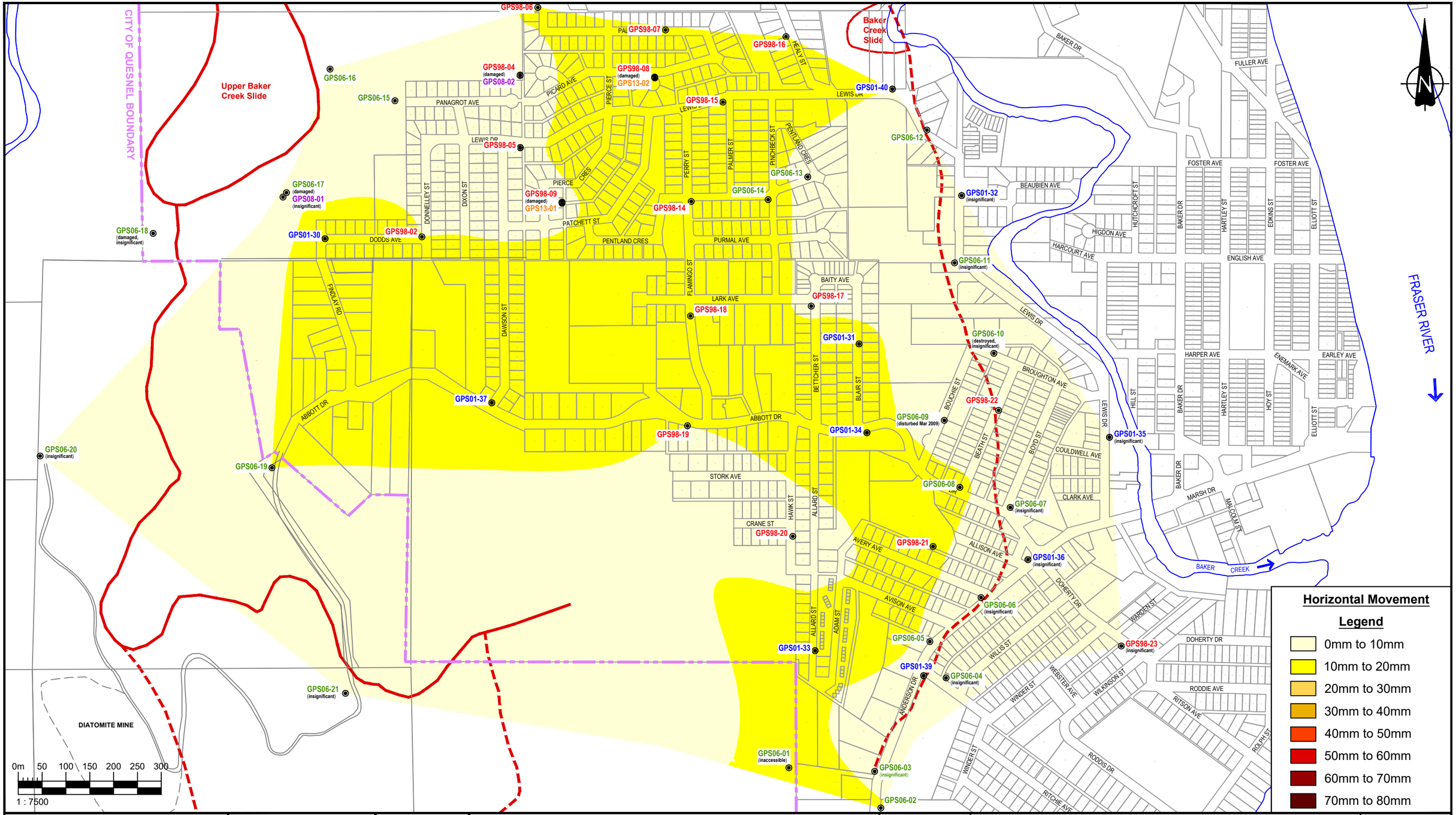
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A

FIGURE 12

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig12-3DMove-Nov08-Nov09-AllHubs.dwg - Figure12 - May. 08, 2024 3:32pm

This drawing was originally produced in colour.



Horizontal Movement

Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm
- 60mm to 70mm
- 70mm to 80mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

WSP

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DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2010
NOVEMBER 2009 TO NOVEMBER 2010
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

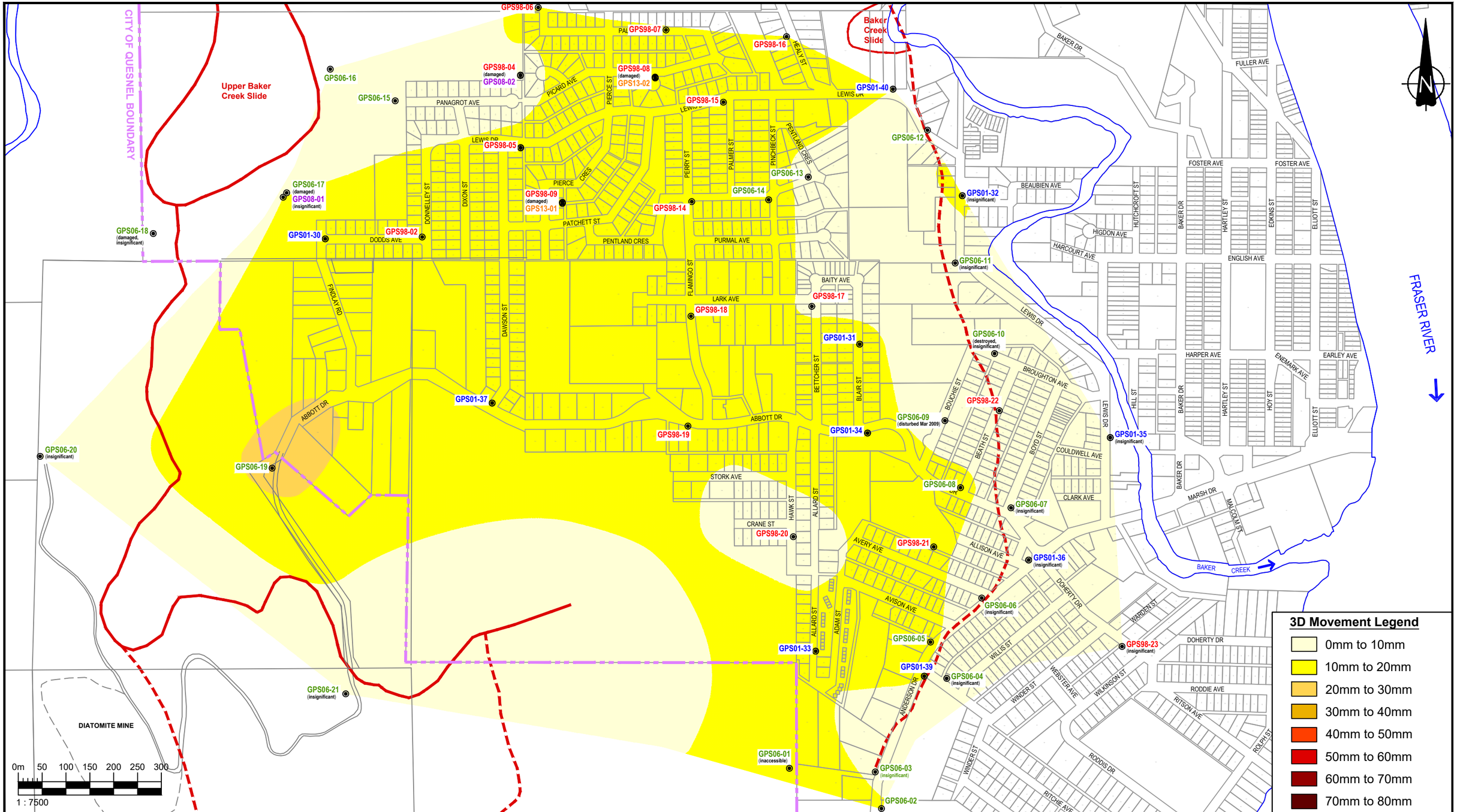
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A

FIGURE 13

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig13-HMove-Nov09-Nov10-AllHubs.dwg - Figure13 - May. 08, 2024 3:35pm

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
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Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL 3D MOVEMENT - 2010
NOVEMBER 2009 TO NOVEMBER 2010
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

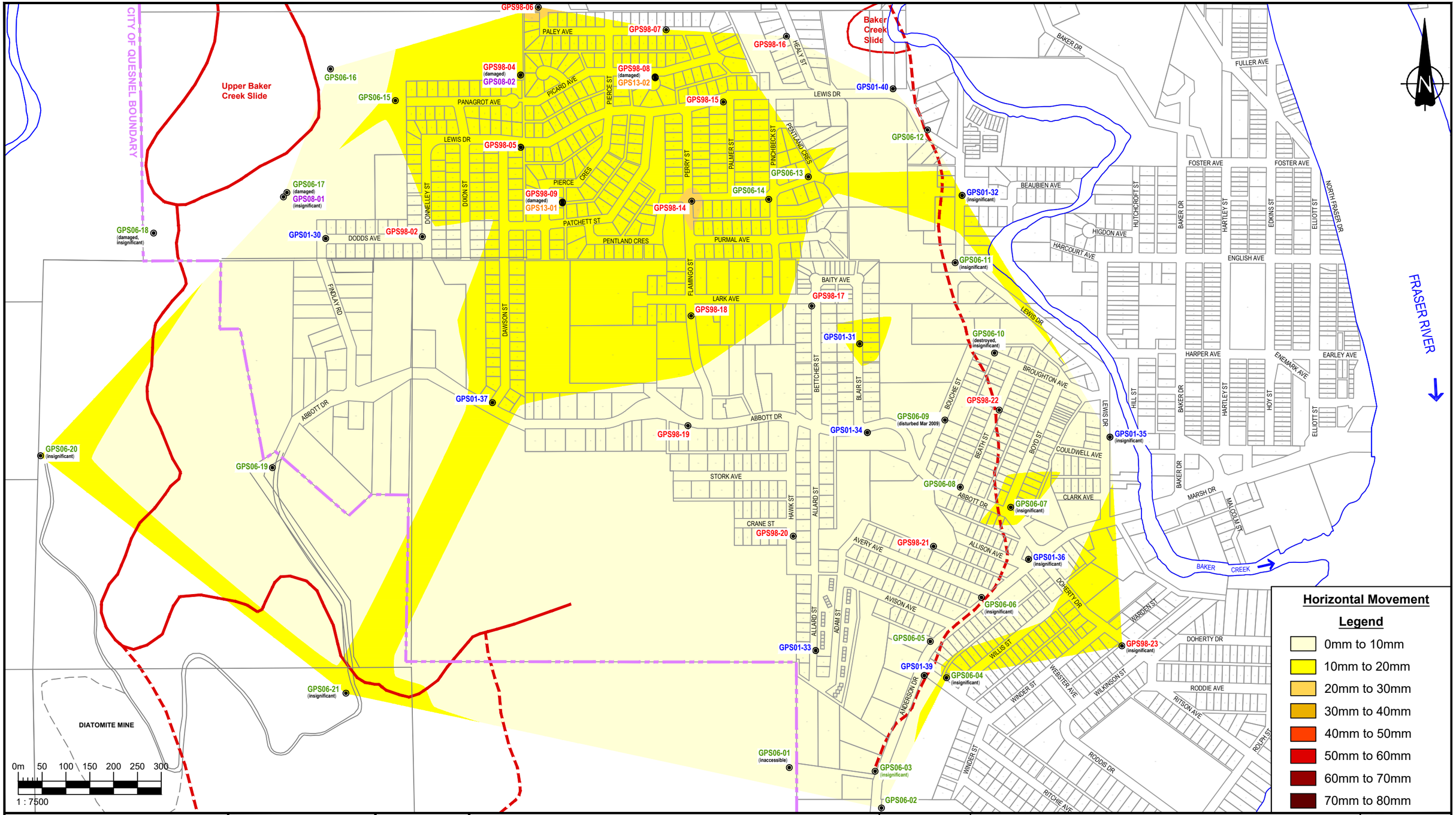
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A

FIGURE 14

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig14-3DMove-Nov09-Nov10-AllHubs.dwg - Figure14 - May. 08, 2024 3:35pm

This drawing was originally produced in colour.



Horizontal Movement

Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm
- 60mm to 70mm
- 70mm to 80mm

Legend

- Slide Extent
- Slide Extent (Approximate)

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Tel:+1 250-564-3243

CLIENT: CITY OF QUESNEL

DWN BY: BB
CHK'D BY: LM
DATUM: NAD83
PROJECTION: UTM Zone 10
SCALE: 1:7 500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2011
NOVEMBER 2010 TO NOVEMBER 2011
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

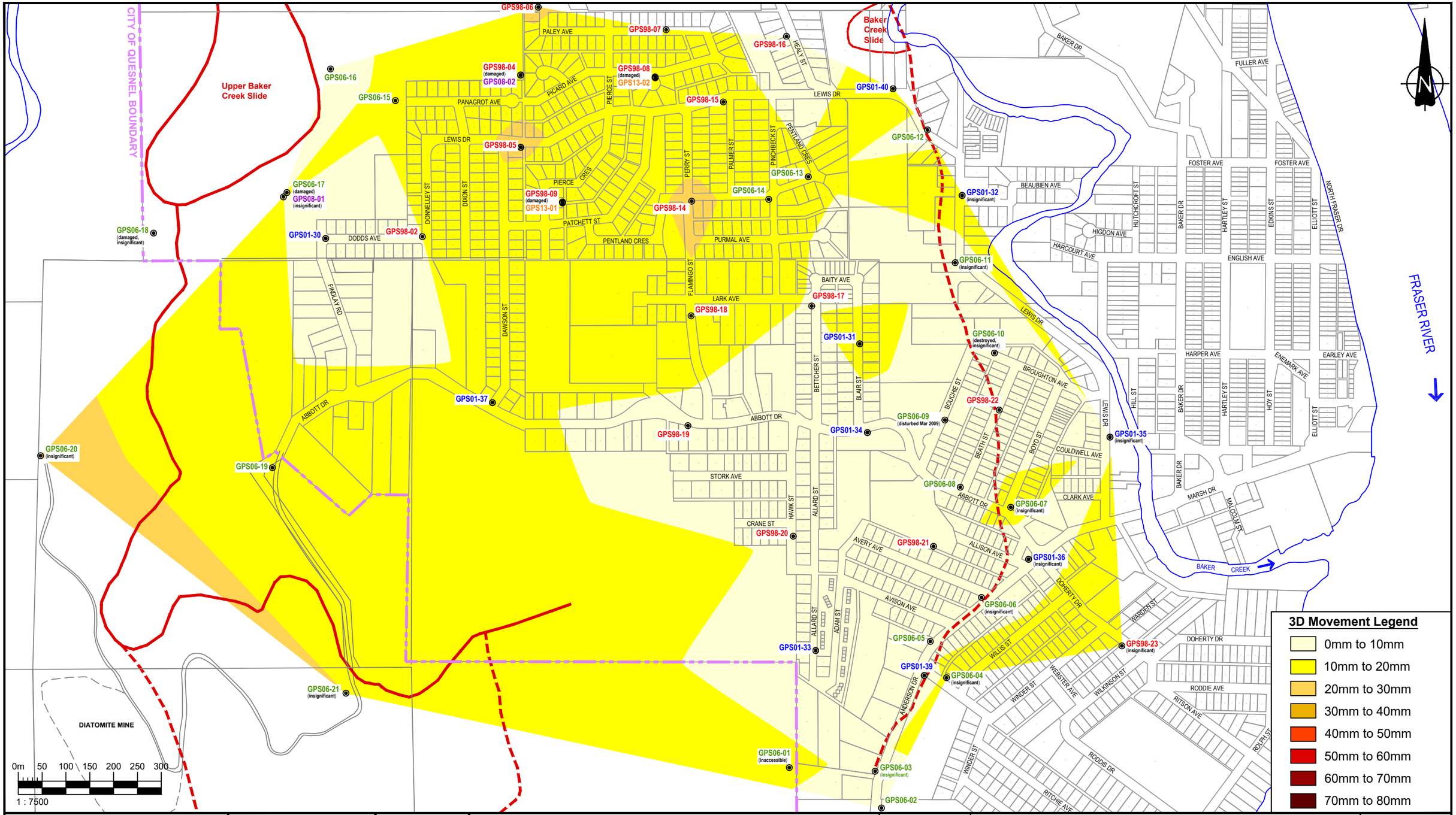
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE: MAY 2024
PROJECT NO.: KX0439757
REV. NO.: A

FIGURE 15

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig15-HMove-Nov10-Nov11-AllHubs.dwg - Figure15 - May. 08, 2024 3:35pm

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

CLIENT: CITY OF QUESNEL

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

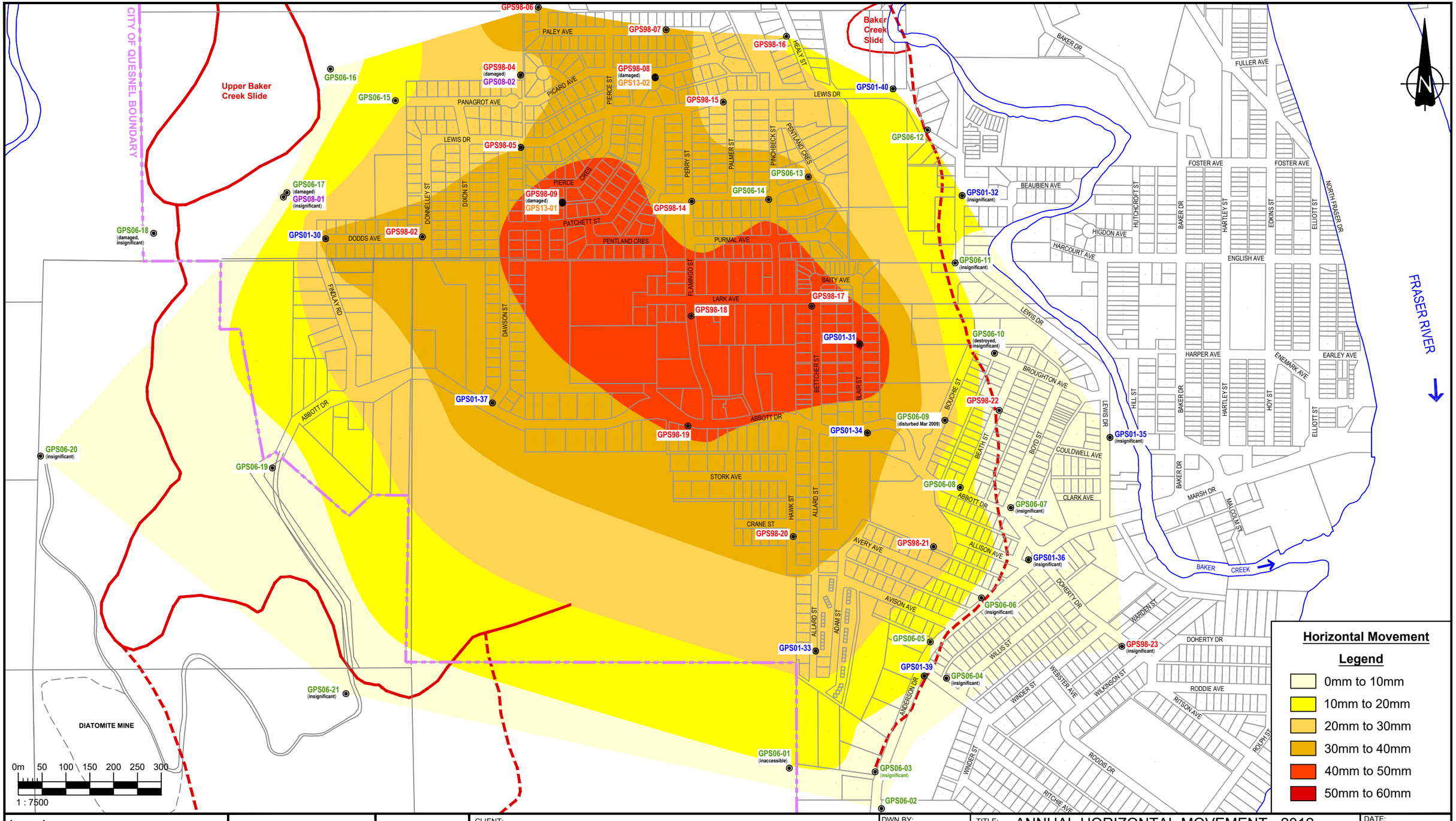
TITLE: ANNUAL 3D MOVEMENT - 2011
NOVEMBER 2010 TO NOVEMBER 2011
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A
	FIGURE 16

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig16-3DMove-Nov10-Nov11-AllHubs.dwg - Figure16 - May. 08, 2024 3:35pm

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

CLIENT: CITY OF QUESNEL

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

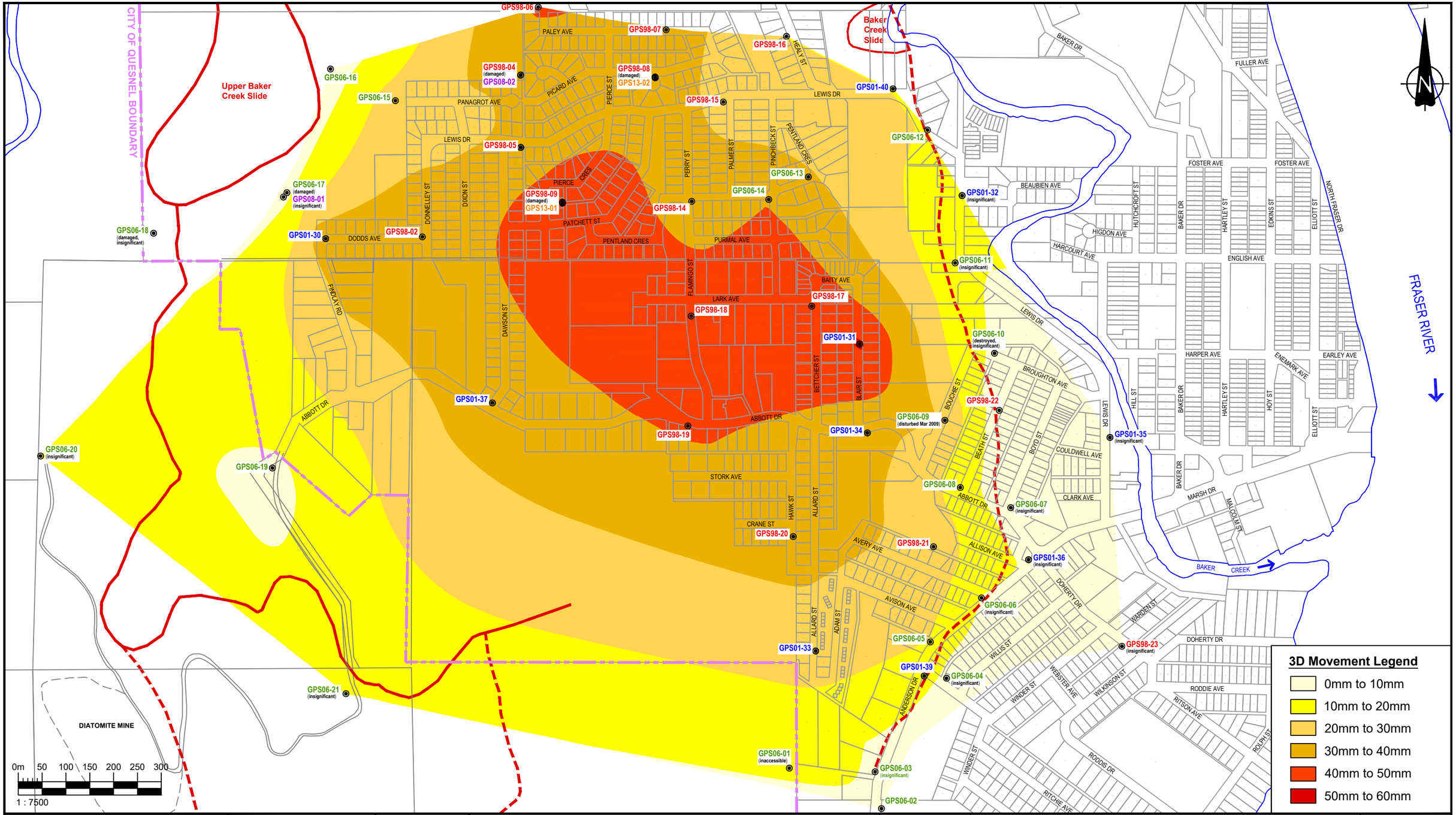
TITLE: ANNUAL HORIZONTAL MOVEMENT - 2012
NOVEMBER 2011 TO DECEMBER 2012
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A
	FIGURE 17

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig17-HMove-Nov11-Dec12-AllHubs.dwg - Figure17 - May. 08, 2024 3:36pm

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL 3D MOVEMENT - 2012
NOVEMBER 2011 TO DECEMBER 2012
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

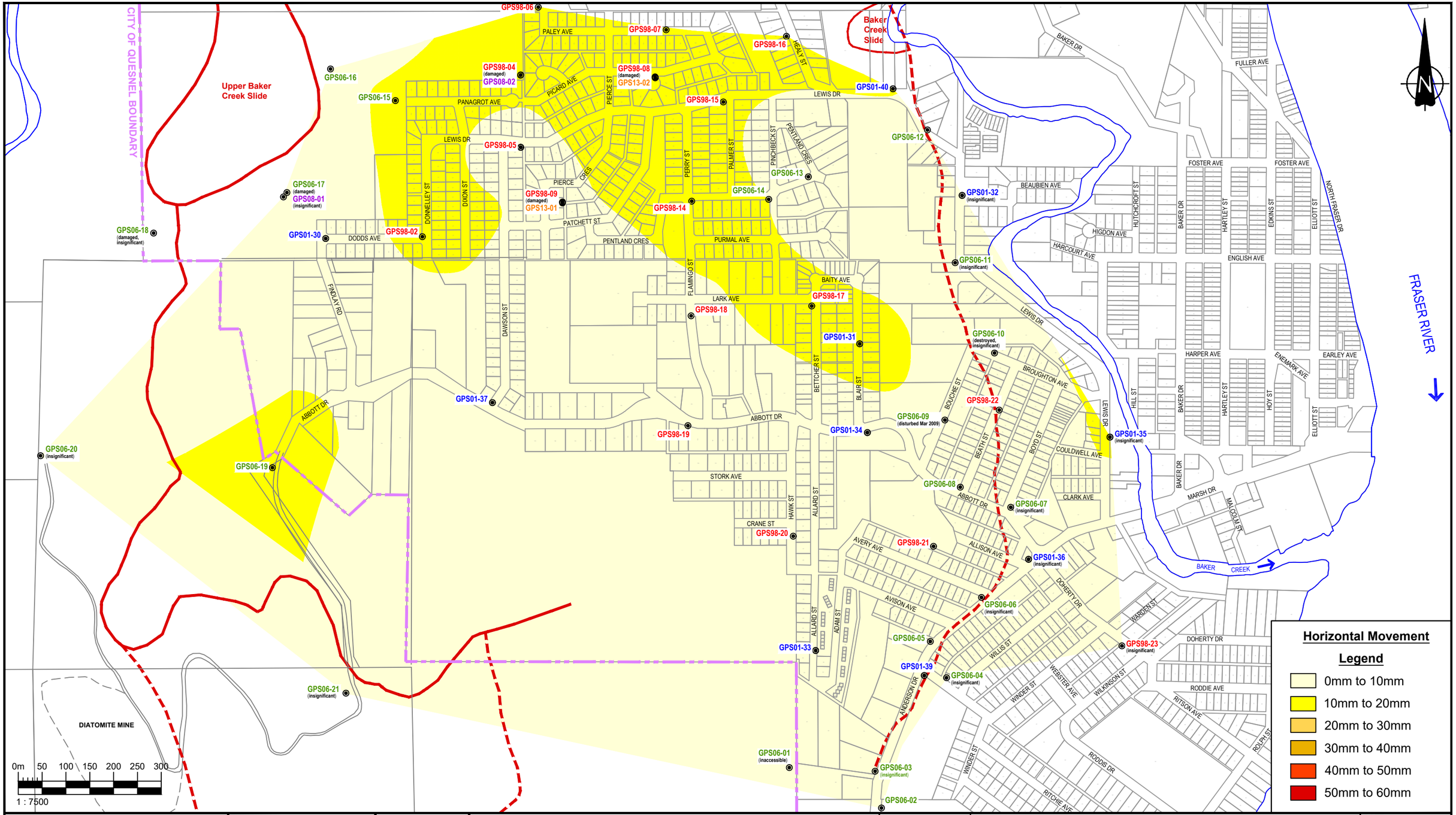
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A

FIGURE 18

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig18-3DMove-Nov11-Dec12-AllHubs.dwg - Figure18 - May. 08, 2024 3:36pm

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2013
NOVEMBER 2012 TO NOVEMBER 2013
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

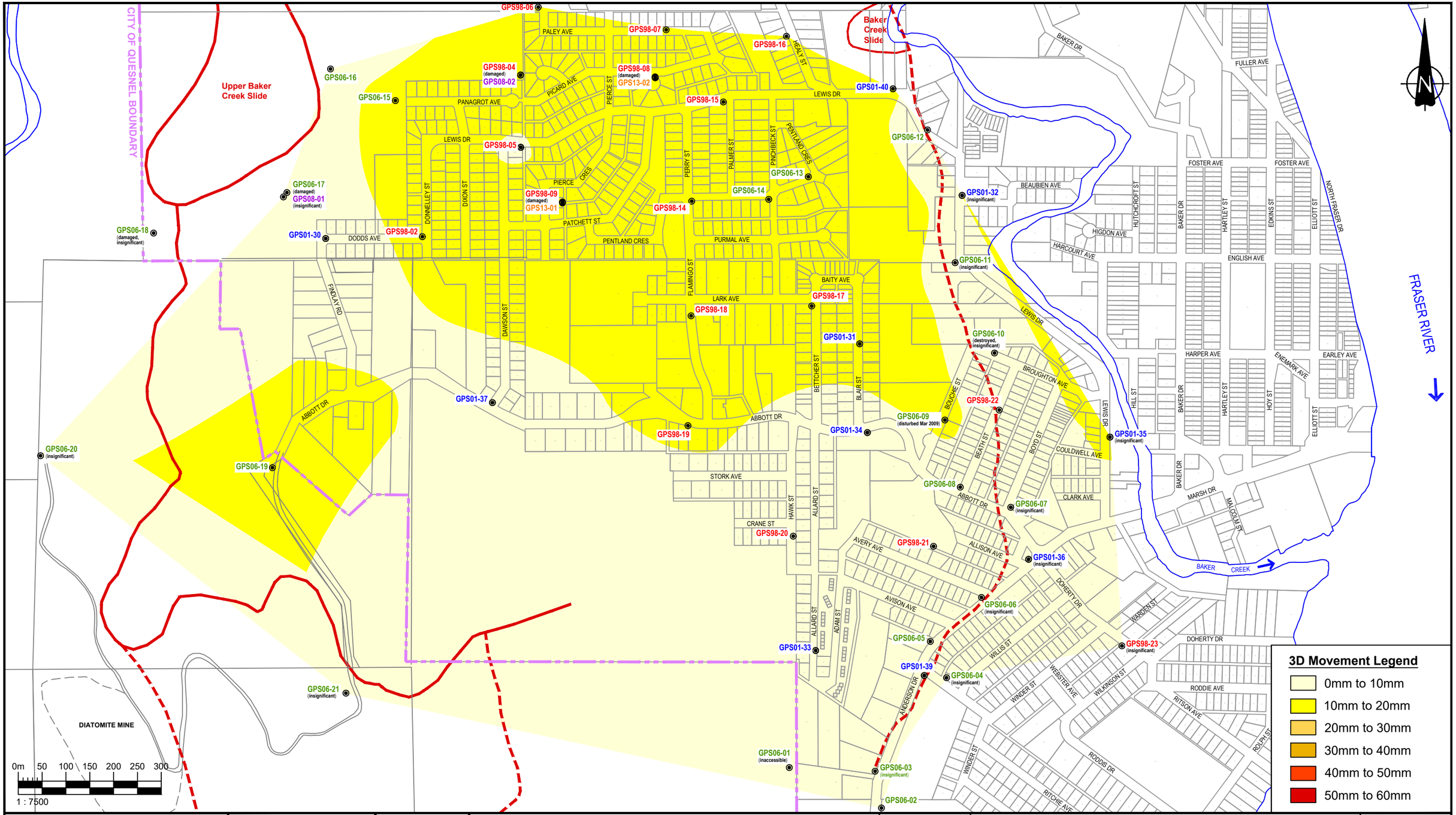
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A

FIGURE 19

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig19-HMove-Dec12-Nov13-AllHubs.dwg - Figure19 - May. 08, 2024 3:38pm

This drawing was originally produced in colour.



CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	1:7 500

TITLE: ANNUAL 3D MOVEMENT - 2013
NOVEMBER 2012 TO NOVEMBER 2013
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

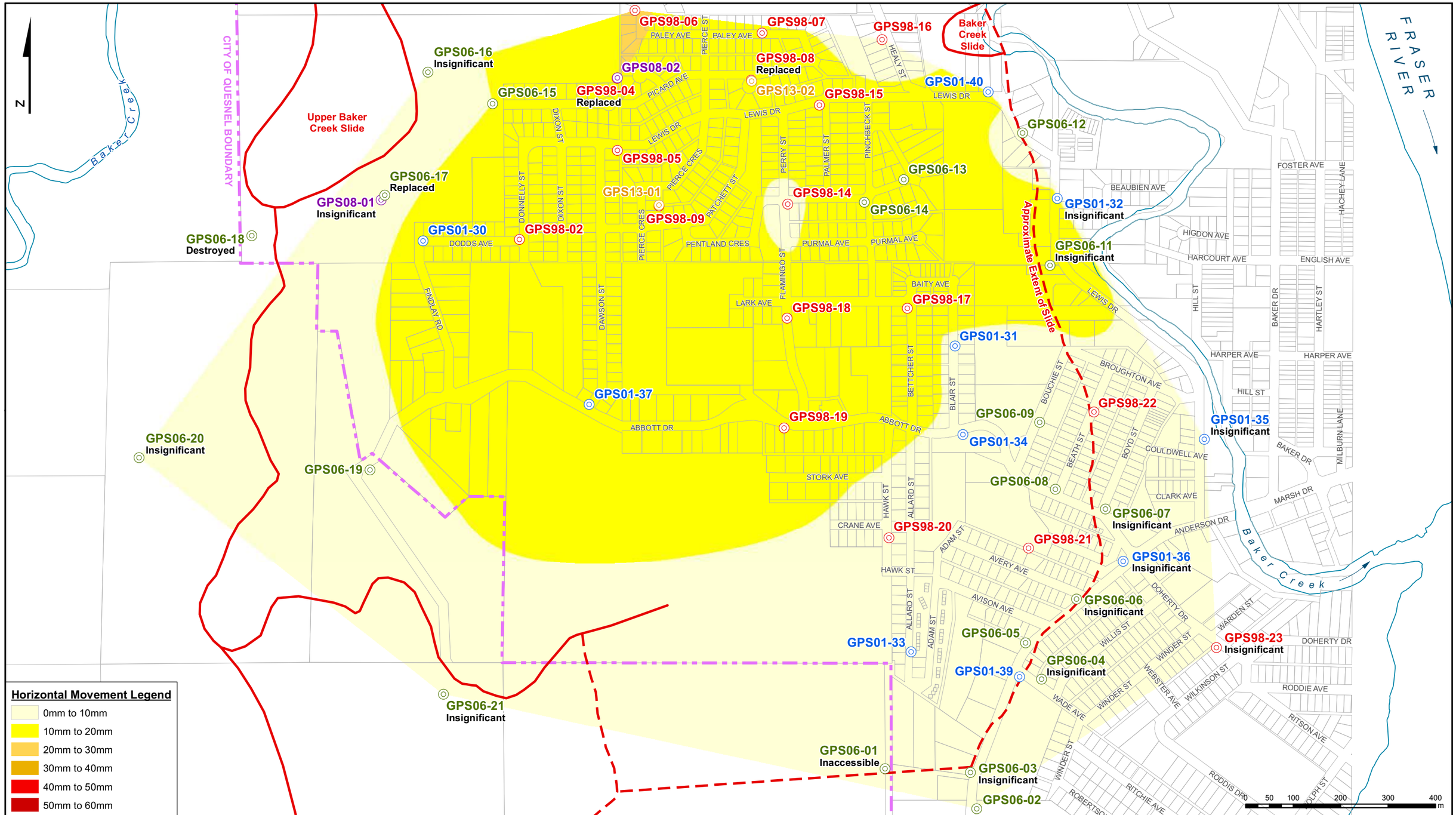
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV. NO.:	A

FIGURE 20

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig20-3DMove-Dec12-Nov13-AllHubs.dwg - Figure20 - May. 08, 2024 3:38pm

This drawing was originally produced in colour.



Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2014
NOVEMBER 2013 TO NOVEMBER 2014
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

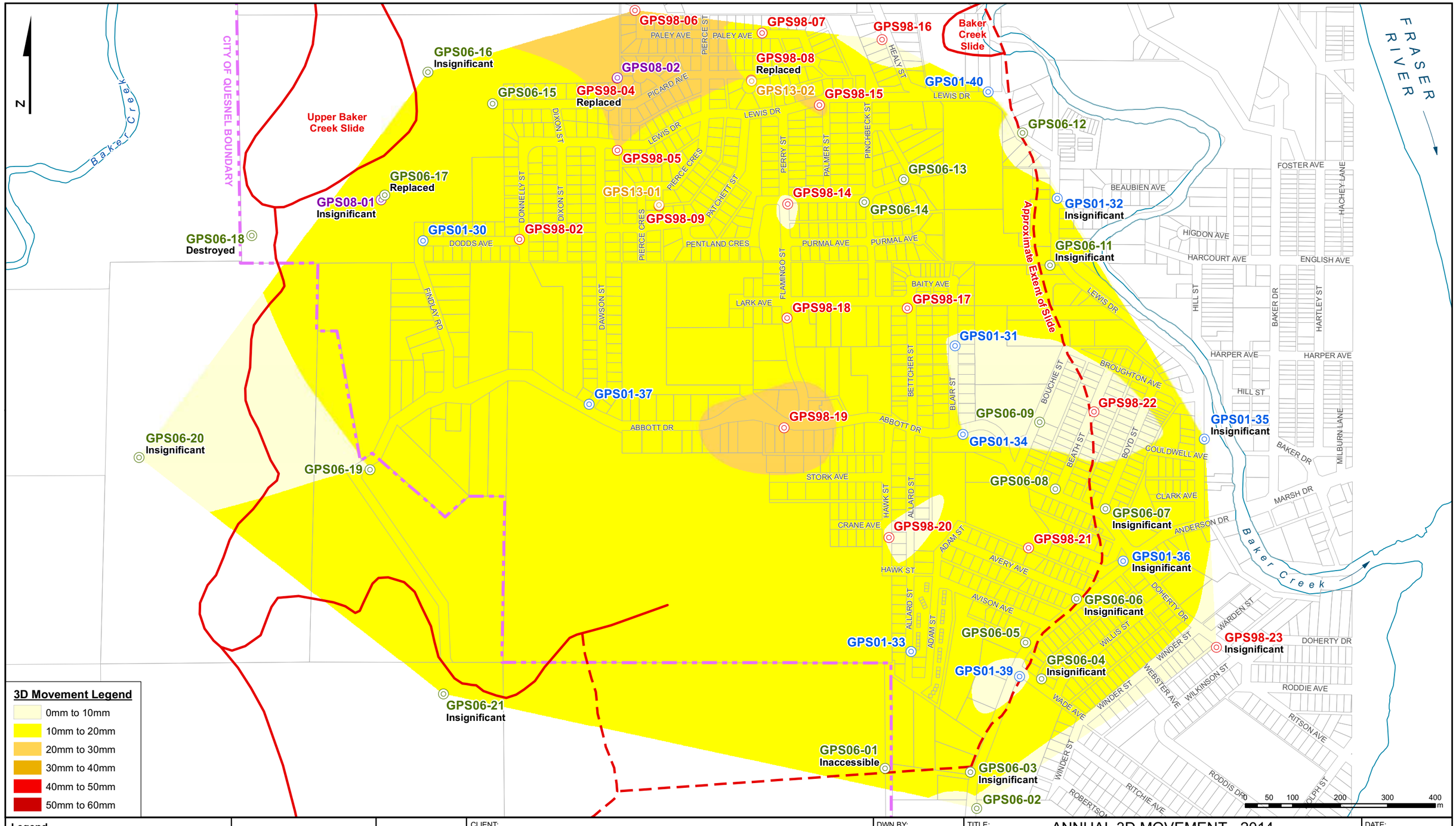
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 21

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig21-HMove-Nov13-Nov14-AllHubs.mxd

This drawing was originally produced in colour.



3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2014
NOVEMBER 2013 TO NOVEMBER 2014
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

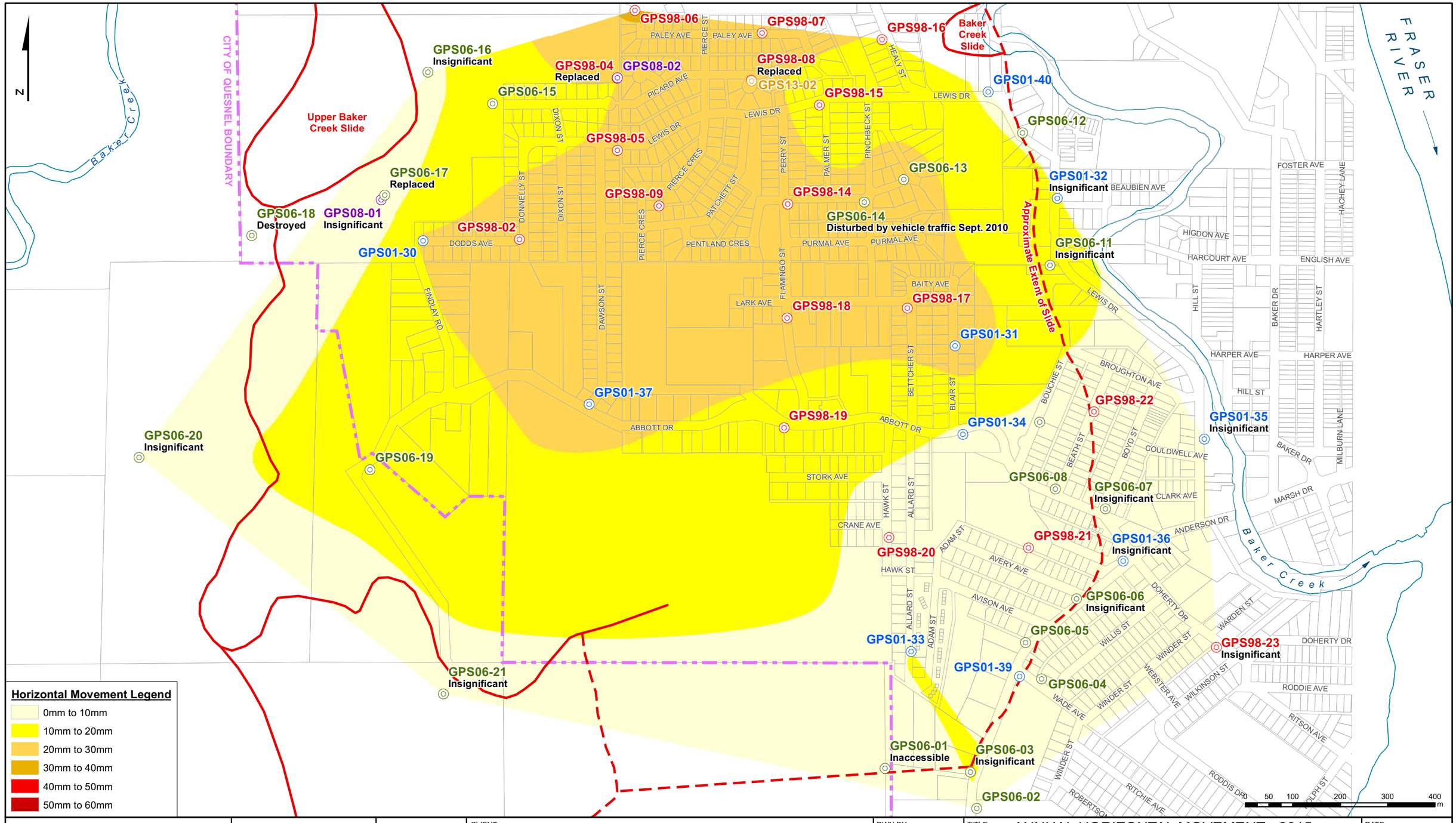
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 22

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig22-3DMove-Nov13-Nov14-AllHubs.mxd

This drawing was originally produced in colour.



Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2015
NOVEMBER 2014 TO DECEMBER 2015
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

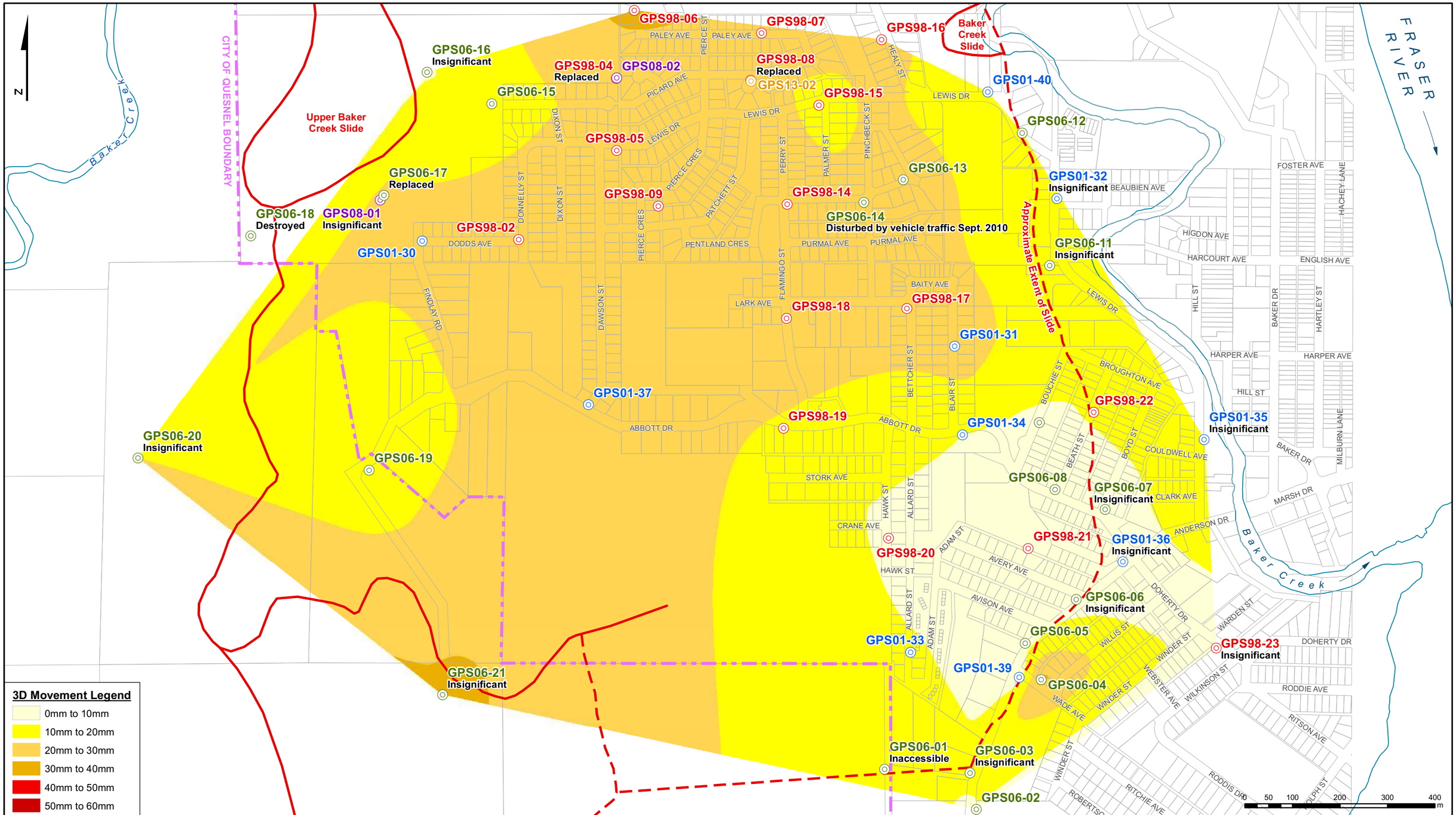
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 23

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig23-HMove-Nov14-Dec15-AllHubs.mxd

This drawing was originally produced in colour.



3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2015
NOVEMBER 2014 TO DECEMBER 2015
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

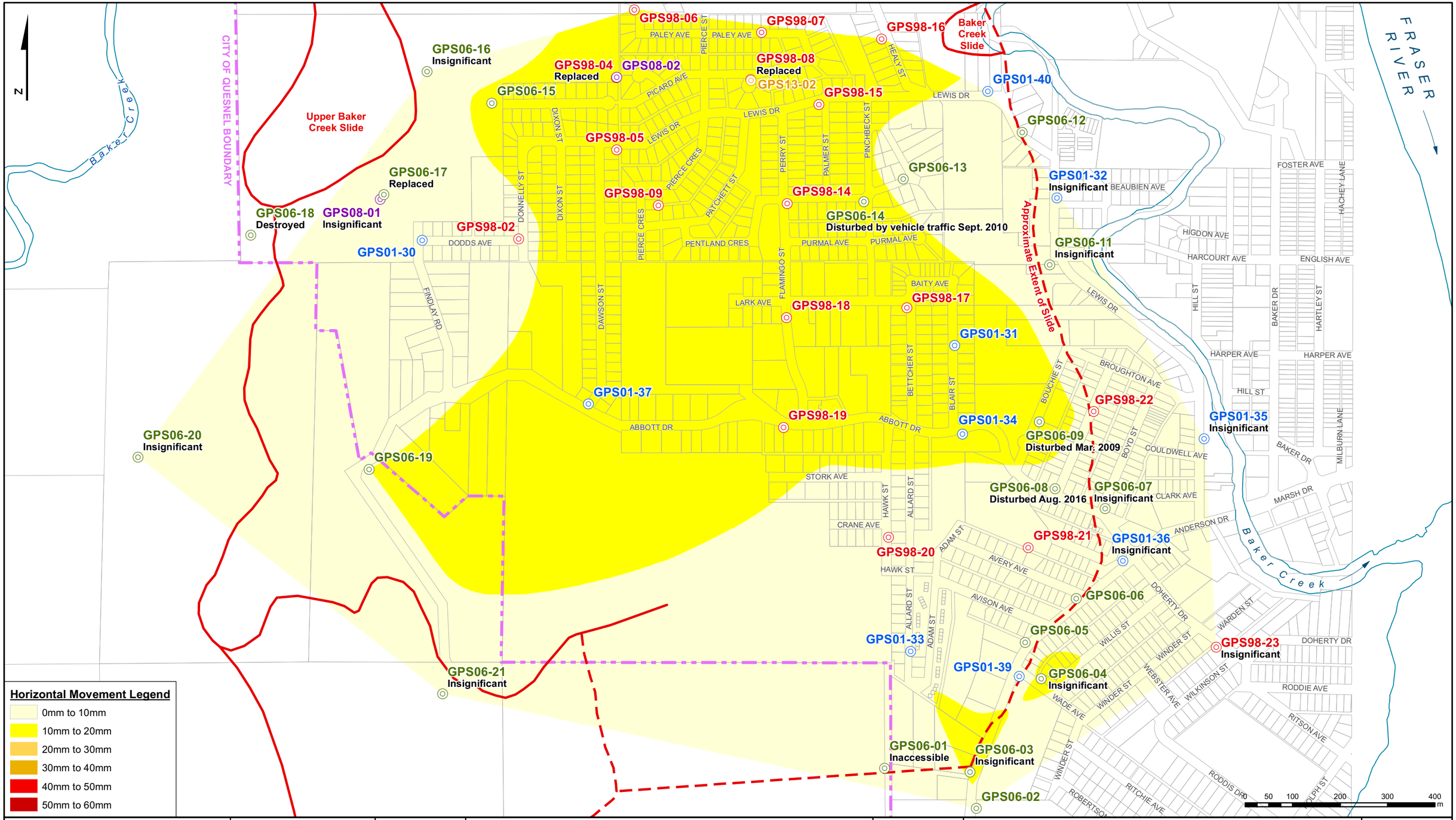
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 24

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig24-3DMove-Nov14-Dec15-AllHubs.mxd

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

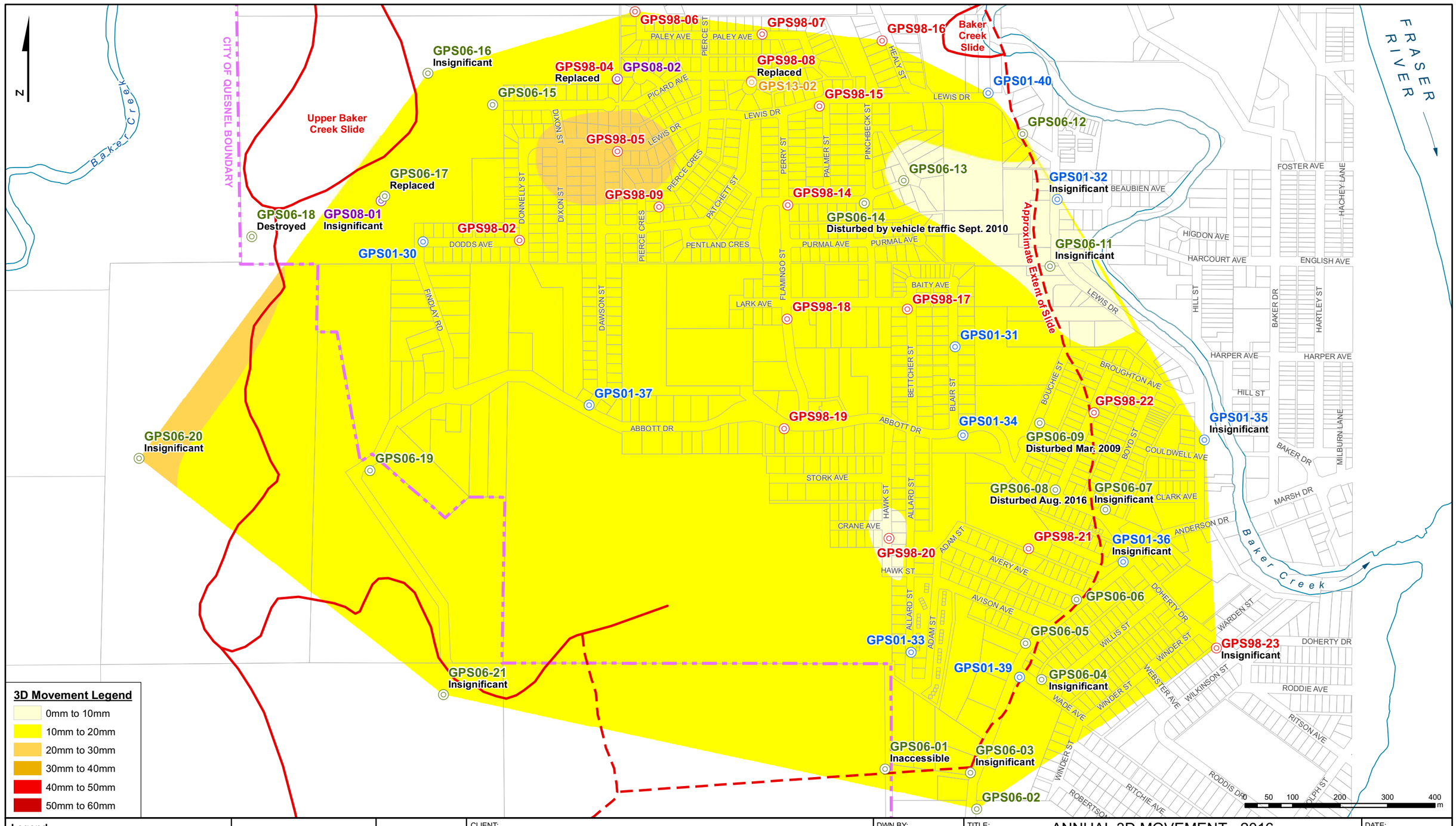
wsp

CLIENT:	CITY OF QUESNEL
DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500
TITLE:	ANNUAL HORIZONTAL MOVEMENT - 2016 DECEMBER 2015 TO DECEMBER 2016 FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS
DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A
PROJECT:	WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC
	FIGURE 25

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig25-HMove-Nov15-Dec16-AllHubs.mxd

This drawing was originally produced in colour.



3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2016
NOVEMBER 2015 TO DECEMBER 2016
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 26

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig26-3DMove-Nov15-Dec16-AllHubs.mxd

This drawing was originally produced in colour.

N

Baker Creek

CITY OF QUESNEL BOUNDARY

Upper Baker Creek Slide

Baker Creek Slide

Approximate Extent of Slide

FRASER RIVER

GPS98-06
GPS98-07
GPS98-16
GPS06-16
Insignificant
GPS98-04
Replaced
GPS08-02
GPS98-08
Replaced
GPS13-02
GPS06-15
GPS98-15
GPS01-40
GPS06-12
GPS98-05
GPS06-17
Replaced
GPS06-13
GPS01-32
Insignificant
GPS06-18
Destroyed
GPS08-01
Insignificant
GPS98-02
GPS98-14
GPS06-14
Disturbed by vehicle traffic Sept. 2010
GPS98-09
Incorrect iron pin measured Dec. 2017
GPS01-30
GPS06-11
Insignificant
GPS98-18
GPS98-17
GPS01-31
GPS01-37
GPS98-19
GPS01-34
GPS06-09
Disturbed Mar. 2009
GPS98-22
GPS01-35
Insignificant
GPS06-20
Insignificant
GPS06-19
GPS06-08
Disturbed Aug. 2016
GPS06-07
Insignificant
GPS98-21
GPS01-36
Insignificant
GPS98-20
GPS06-06
GPS06-05
GPS01-33
GPS98-23
Insignificant
GPS01-39
GPS06-04
Insignificant
GPS06-21
Insignificant
GPS06-01
Inaccessible
GPS06-03
Insignificant
GPS06-02
Insignificant

PALEY AVE
PIERCE ST
HEALY ST
PICARD AVE
LEWIS DR
DIXON ST
DONNELLY ST
PIERCE CRES
PATCHETT ST
PERRY ST
PALMER ST
PINCHBECK ST
FOSTER AVE
BEAUBIEN AVE
HACHEY LANE
HIGDON AVE
HARCOURT AVE
ENGLISH AVE
DODDS AVE
PENTLAND CRES
PURMAL AVE
FLAMINGO ST
BAITY AVE
LARK AVE
FINDLAY RD
DAWSON ST
HILL ST
BAKER DR
HARTLEY ST
HARPER AVE
BETTCHER ST
BLAIR ST
BOUCHIE ST
BROUGHTON AVE
ABBOTT DR
STORK AVE
HAWK ST
ALLARD ST
CRANE AVE
ADAM ST
AVERY AVE
AVISON AVE
COULDWELL AVE
BOYD ST
MILBURN LANE
MARSH DR
ANDERSON DR
CLARK AVE
DOHERTY DR
WARDEN ST
WILLIS ST
WINDER ST
WEBSTER AVE
WILKINSON ST
RODDIE AVE
RITSON AVE
WADE AVE
RITCHIE AVE
RODDIS DR
ROBERTSON
DOLPH ST

0 50 100 200 300 400 m

Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY: BB
CHK'D BY: LM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: 1:7,500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2017
DECEMBER 2016 TO DECEMBER 2017
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE: MAY 2024
PROJECT NO.: KX0439757
REV NO.: A

FIGURE 27

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig27-HMove-Dec16-Dec17-AllHubs.mxd

This drawing was originally produced in colour.

N

Baker Creek

CITY OF QUESNEL BOUNDARY

Upper Baker Creek Slide

GPS06-16
Insignificant

GPS98-06

GPS98-07

GPS98-16

Baker Creek Slide

GPS98-04
Replaced

GPS08-02

GPS98-08
Replaced

GPS13-02

GPS06-15

GPS98-15

GPS01-40

GPS06-12

GPS98-05

GPS06-17
Replaced

GPS06-13

GPS01-32
Insignificant

GPS06-18
Destroyed

GPS08-01
Insignificant

GPS98-14

GPS06-14
Disturbed by vehicle traffic Sept. 2010

GPS98-09
Incorrect iron pin measured Dec. 2017

GPS98-02

GPS01-30

Approximate Extent of Slide

GPS06-11
Insignificant

GPS98-18

GPS98-17

GPS01-31

GPS01-37

GPS98-19

GPS01-34

GPS06-09
Disturbed Mar. 2009

GPS98-22

GPS01-35
Insignificant

GPS06-20
Insignificant

GPS06-19

GPS06-08
Disturbed Aug. 2016

GPS06-07
Insignificant

GPS98-21

GPS01-36
Insignificant

GPS98-20

GPS06-06

GPS06-05

GPS01-33

GPS98-23
Insignificant

GPS01-39

GPS06-04
Insignificant

GPS06-21
Insignificant

GPS06-01
Inaccessible

GPS06-03
Insignificant

GPS06-02
Insignificant

PALEY AVE
PIERCE ST
HEALY ST
PICARD AVE
LEWIS DR
DIXON ST
DONNELLY ST
PIERCE CRES
PERRY ST
PALMER ST
PINCHBECK ST
PATCHETT ST
DODDS AVE
FINDLAY RD
PENTLAND CRES
PURMAL AVE
FLAMINGO ST
DAWSON ST
LARK AVE
BAITY AVE
BETTCHER ST
BLAIR ST
ABBOTT DR
STORK AVE
HAWK ST
ALLARD ST
CRANE AVE
ADAM ST
AVERY AVE
AVISON AVE
WILLIS ST
WINDER ST
WADE AVE
WEBSTER AVE
WILKINSON ST
WARDEN ST
DOHERTY DR
RODDIE AVE
RITSON AVE
RITCHIE AVE
RODDIS DR
ROBERTSON
BOUCHIE ST
BROUGHTON AVE
BOYD ST
COULDWELL AVE
CLARK AVE
ANDERSON DR
MARSH DR
FOSTER AVE
BEAUBIEN AVE
HACHEY LANE
HIGDON AVE
HARCOURT AVE
ENGLISH AVE
HILL ST
BAKER DR
HARTLEY ST
HARPER AVE
MILBURN LANE

FRASER RIVER

Baker Creek

0 50 100 200 300 400 m

3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY: BB
CHK'D BY: LM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: 1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2017
DECEMBER 2016 TO DECEMBER 2017
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE: MAY 2024
PROJECT NO.: KX0439757
REV NO.: A

FIGURE 28

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig28-3DMove-Dec16-Dec17-AllHubs.mxd

This drawing was originally produced in colour.

N

Baker Creek

CITY OF QUESNEL BOUNDARY

Upper Baker Creek Slide

Baker Creek Slide

Approximate Extent of Slide

FRASER RIVER

GPS98-06
GPS98-07
GPS98-16
GPS06-16
Insignificant
GPS98-04
Replaced
GPS08-02
GPS98-08
Replaced
GPS13-02
GPS06-15
GPS98-15
GPS01-40
GPS06-12
GPS98-05
GPS06-17
Replaced
GPS06-13
GPS01-32
Insignificant
GPS06-18
Destroyed
GPS08-01
Insignificant
GPS98-14
GPS06-14
Disturbed by vehicle traffic Sept. 2010
GPS98-09
GPS98-02
GPS01-30
GPS06-11
Insignificant
GPS98-18
GPS98-17
GPS01-31
GPS01-37
GPS98-19
GPS01-34
GPS06-09
Disturbed
Mar. 2009
GPS98-22
GPS01-35
Insignificant
GPS06-20
Insignificant
GPS06-19
GPS06-08
Disturbed
Aug. 2016
GPS06-07
Insignificant
GPS98-21
GPS01-36
Insignificant
GPS98-20
GPS06-06
Insignificant
GPS06-05
GPS01-33
GPS98-23
Insignificant
GPS01-39
GPS06-04
Insignificant
GPS06-21
Insignificant
June 2018 elevation used as December 2018 value is not reliable
GPS06-01
Inaccessible
GPS06-03
Insignificant
GPS06-02
Insignificant

PALEY AVE
PIERCE ST
HEALY ST
PICARD AVE
LEWIS DR
DIXON ST
PINCHBECK ST
PERRY ST
PALMER ST
PIERCE CRES
DONNELLY ST
PATCHETT ST
DODDS AVE
PENTLAND CRES
PURMAL AVE
FINDLAY RD
DAWSON ST
FLAMINGO ST
BAITY AVE
LARK AVE
BETTCHER ST
BLAIR ST
ABBOTT DR
STORK AVE
HAWK ST
ALLARD ST
CRANE AVE
ADAM ST
AVERY AVE
AVISON AVE
WILLIS ST
WINDER ST
WADE AVE
WEBSTER AVE
WILKINSON ST
WARDEN ST
DOHERTY DR
RODDIE AVE
RITSON AVE
RODDIS DR
RITCHIE AVE
ROBERTSON
BOUCHIE ST
BROUGHTON AVE
BOYD ST
COULDWELL AVE
CLARK AVE
ANDERSON DR
MARSH DR
Baker Creek
FOSTER AVE
BEAUBIEN AVE
HACHEY LANE
HIGDON AVE
HARCOURT AVE
ENGLISH AVE
HILL ST
BAKER DR
HARTLEY ST
HARPER AVE
MILBURN LANE

0 50 100 200 300 400 m

Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY: BB
CHK'D BY: LM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: 1:7,500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2018
DECEMBER 2017 TO DECEMBER 2018
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE: MAY 2024
PROJECT NO.: KX0439757
REV NO.: A

FIGURE 29

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig29-HMove-Dec17-Dec18-AllHubs.mxd

This drawing was originally produced in colour.

N

Baker Creek

CITY OF QUESNEL BOUNDARY

Upper Baker Creek Slide

Baker Creek Slide

Approximate Extent of Slide

FRASER RIVER

GPS98-06
GPS98-07
GPS98-16
GPS06-16
Insignificant
GPS98-04
Replaced
GPS08-02
GPS98-08
Replaced
GPS13-02
GPS06-15
GPS98-15
GPS01-40
GPS06-12
GPS98-05
GPS06-17
Replaced
GPS06-13
GPS01-32
Insignificant
GPS06-18
Destroyed
GPS08-01
Insignificant
GPS98-14
GPS06-14
Disturbed by vehicle traffic Sept. 2010
GPS98-02
GPS98-09
GPS01-30
GPS06-11
Insignificant
GPS98-18
GPS98-17
GPS01-31
GPS01-37
GPS98-19
GPS98-22
GPS01-34
GPS01-35
Insignificant
GPS06-09
Disturbed Mar. 2009
GPS06-20
Insignificant
GPS06-19
GPS06-08
Disturbed Aug. 2016
GPS06-07
Insignificant
GPS98-21
GPS01-36
Insignificant
GPS98-20
GPS06-06
Insignificant
GPS06-05
GPS06-21
Insignificant
June 2018 elevation used as December 2018 value is not reliable
GPS01-33
GPS98-23
Insignificant
GPS01-39
GPS06-04
Insignificant
GPS06-01
Inaccessible
GPS06-03
Insignificant
GPS06-02
Insignificant

PALEY AVE
PIERCE ST
PICARD AVE
LEWIS DR
HEALY ST
PINCHBECK ST
PERRY ST
PALMER ST
DIXON ST
DONNELLY ST
PIERCE CRES
PATCHETT ST
DODDS AVE
PENTLAND CRES
PURMAL AVE
FLAMINGO ST
DAWSON ST
FINDLAY RD
BAITY AVE
LARK AVE
BETTCHER ST
BLAIR ST
ABBOTT DR
STORK AVE
CRANE AVE
HAWK ST
ALLARD ST
ADAM ST
FOSTER AVE
HACHEY LANE
BEAUBIEN AVE
HIGDON AVE
HARCOURT AVE
ENGLISH AVE
HILL ST
BAKER DR
HARTLEY ST
HARPER AVE
BROUGHTON AVE
BOUCHIE ST
BOYD ST
COULDWELL AVE
MILBURN LANE
MARSH DR
CLARK AVE
ANDERSON DR
AVERY AVE
AVISON AVE
DOHERTY DR
WARDEN ST
WILLIS ST
WINDER ST
WEBSTER AVE
WILKINSON ST
RODDIE AVE
RITSON AVE
WADE AVE
RITCHIE AVE
RODDIS DR
DOLPH ST

0 50 100 200 300 400 m

3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY: BB
CHK'D BY: LM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: 1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2018
DECEMBER 2017 TO DECEMBER 2018
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE: MAY 2024
PROJECT NO.: KX0439757
REV NO.: A

FIGURE 30

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig30-3DMove-Dec17-Dec18-AllHubs.mxd

This drawing was originally produced in colour.

N

Baker Creek

CITY OF QUESNEL BOUNDARY

Upper Baker Creek Slide

Baker Creek Slide

Approximate Extent of Slide

FRASER RIVER

GPS98-06 PALEY AVE
GPS98-07 PALEY AVE
PIERCE ST
GPS98-16
HEALY ST
GPS06-16 Insignificant
GPS98-04 Replaced
GPS08-02
GPS98-08 Replaced
GPS13-02
GPS01-40
LEWIS DR
PICARD AVE
GPS06-15
GPS98-15
GPS06-12
DIXON ST
LEWIS DR
GPS98-05
PERRY ST
PALMER ST
PINCHBECK ST
GPS06-13
GPS01-32 Insignificant
BEAUBIEN AVE
FOSTER AVE
HACHEY LANE
PIERCE CRES
PATCHETT ST
GPS08-01 Insignificant
GPS06-17 Replaced
GPS98-14
GPS06-14 Disturbed by vehicle traffic Sept. 2010
GPS06-18 Destroyed
DONNELLY ST
DIXON ST
GPS98-09
GPS01-30
DODDS AVE
GPS98-02
PENTLAND CRES
PURMAL AVE
PURMAL AVE
HIGDON AVE
HARCOURT AVE
ENGLISH AVE
GPS06-11 Insignificant
FLAMINGO ST
BAITY AVE
GPS98-17
LARK AVE
GPS98-18
LEWIS DR
HILL ST
BAKER DR
HARTLEY ST
FINDLAY RD
DAWSON ST
GPS01-31
HARPER AVE
HARPER AVE
BETTCHER ST
BLAIR ST
BOUCHIE ST
BROUGHTON AVE
GPS06-09 Disturbed Mar. 2009
GPS98-22
HILL ST
GPS01-37
GPS98-19
ABBOTT DR
ABBOTT DR
GPS01-34
GPS01-35 Insignificant
BAKER DR
MILBURN LANE
GPS06-20 Insignificant
GPS06-19
GPS06-08 Disturbed Aug. 2016
BOYD ST
COULDWELL AVE
STORK AVE
GPS06-07 Insignificant
CLARK AVE
MARSH DR
HAWK ST
ALLARD ST
CRANE AVE
GPS98-20
ADAM ST
GPS98-21
GPS01-36 Insignificant
ANDERSON DR
AVERY AVE
HAWK ST
GPS06-06 Insignificant
DOHERTY DR
Baker Creek
AVISON AVE
ALLARD ST
ADAM ST
GPS06-05
WILLIS ST
WARDEN ST
GPS01-33
WINDER ST
GPS98-23 Insignificant
DOHERTY DR
GPS01-39
GPS06-04 Insignificant
WEBSTER AVE
WILKINSON ST
RODDIE AVE
WADE AVE
WINDER ST
RITSON AVE
GPS06-21 Insignificant
GPS06-01 Inaccessible
GPS06-03 Insignificant
WINDER ST
RODDIS DR
GPS06-02 Insignificant
RITCHIE AVE
ROBERTSON
OLPH ST

0 50 100 200 300 400 m

Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2019
DECEMBER 2018 TO DECEMBER 2019
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

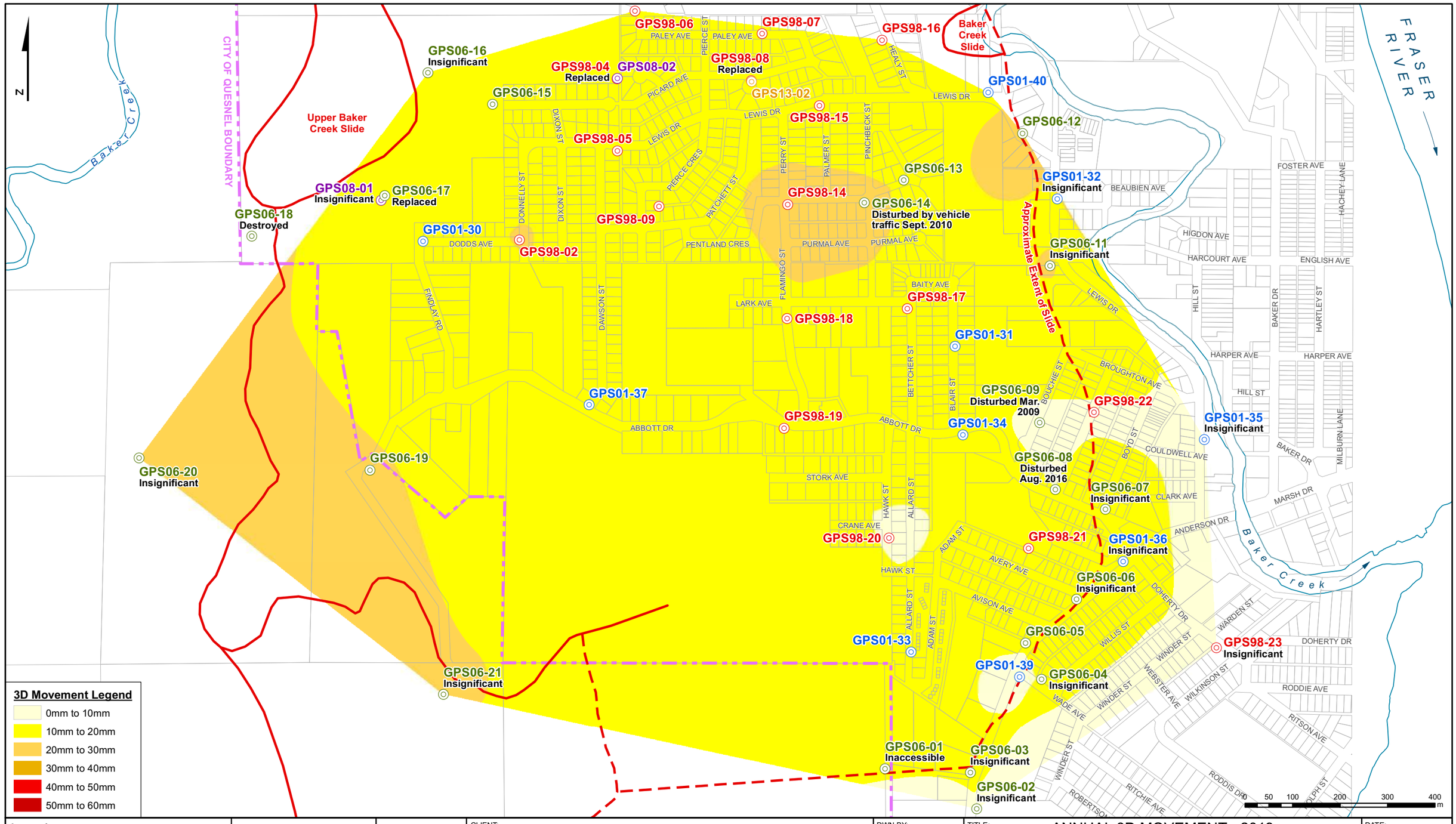
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 31

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig31-HMove-Dec18-Dec19-AllHubs.mxd

This drawing was originally produced in colour.



3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2019
DECEMBER 2018 TO DECEMBER 2019
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

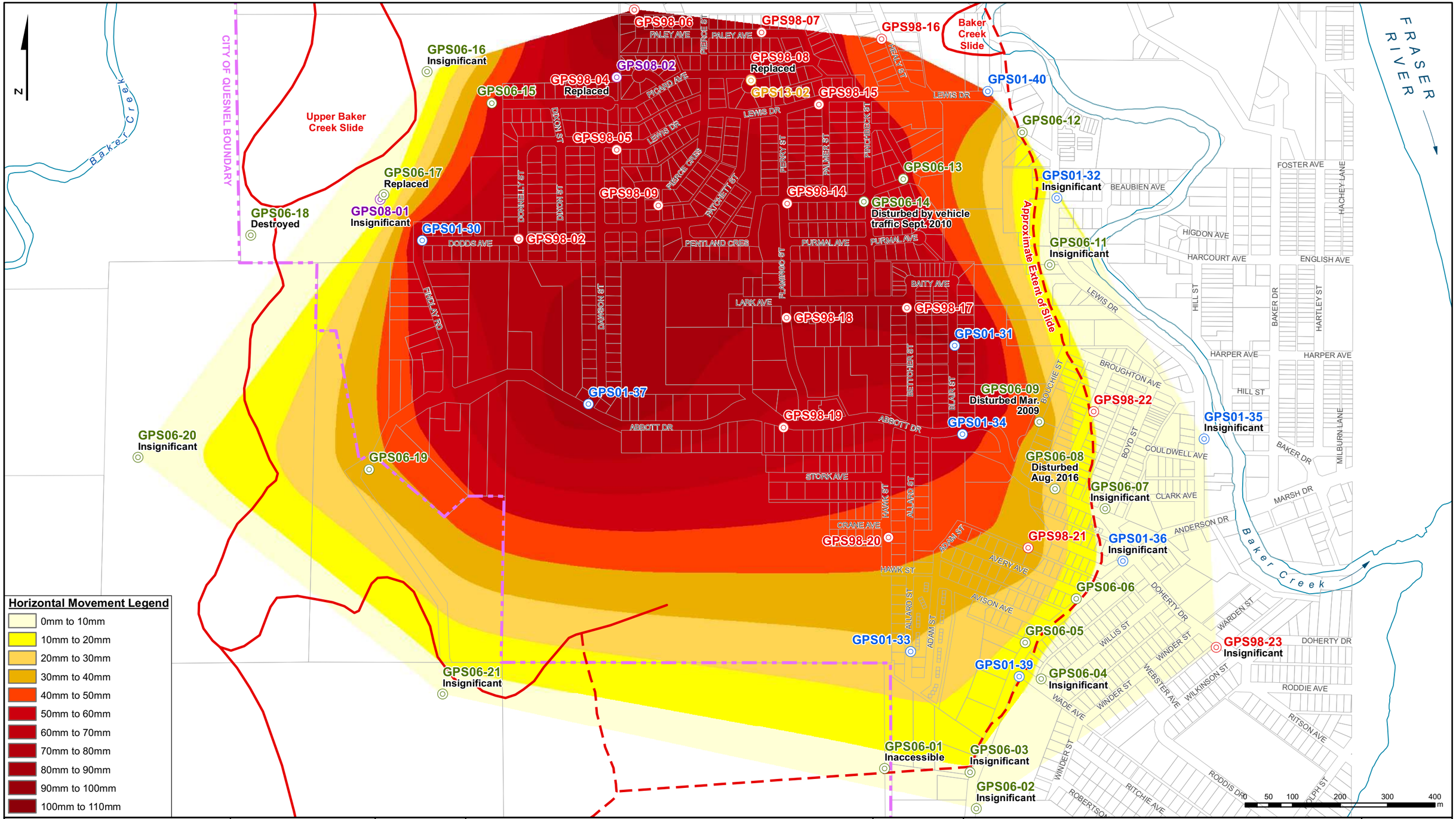
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 32

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig32-3DMove-Dec18-Dec19-AllHubs.mxd

This drawing was originally produced in colour.



Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm
- 60mm to 70mm
- 70mm to 80mm
- 80mm to 90mm
- 90mm to 100mm
- 100mm to 110mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2020
DECEMBER 2019 TO DECEMBER 2020
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

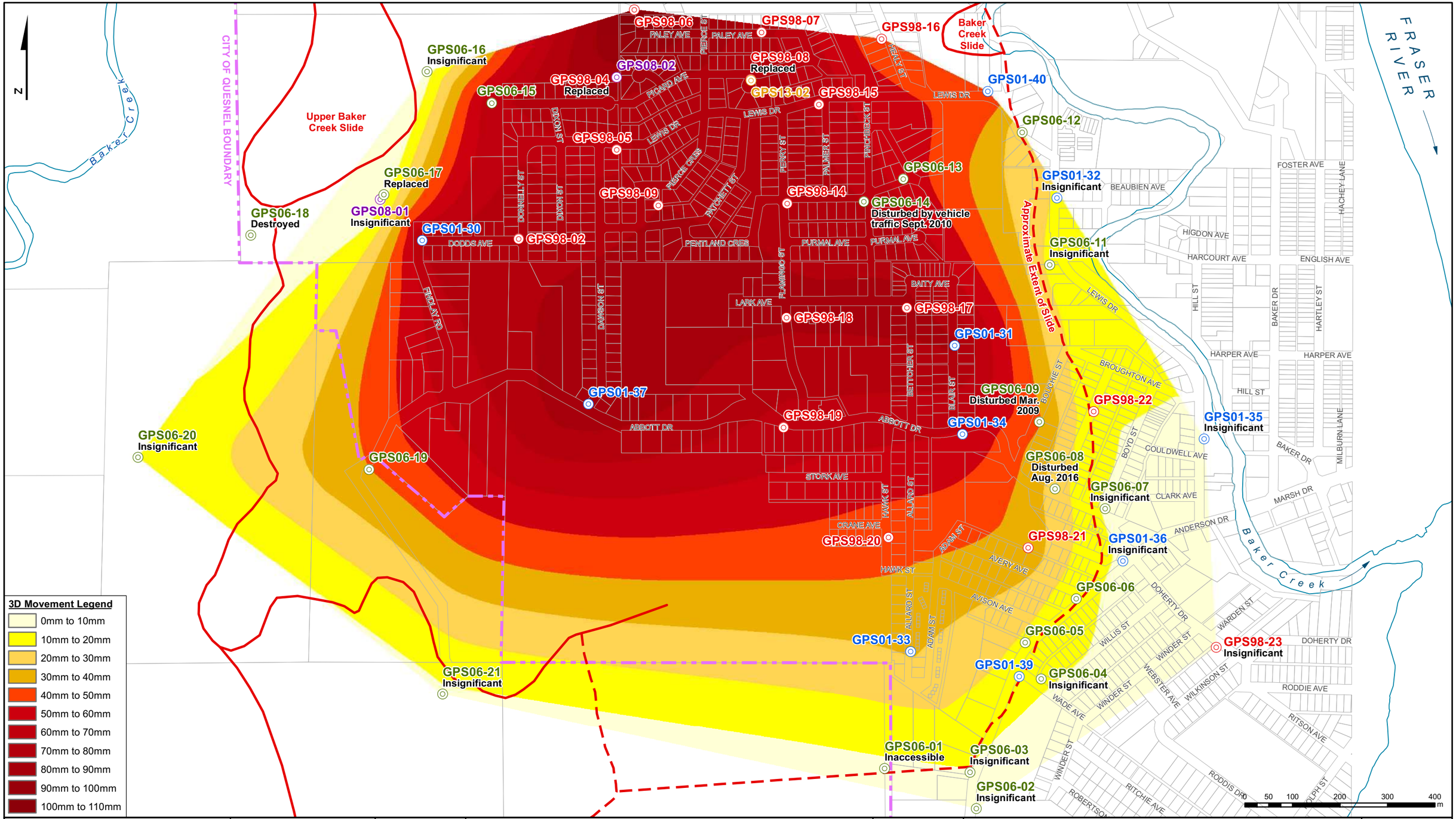
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 33

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig33-HMove-Dec19-Dec20-AllHubs.mxd

This drawing was originally produced in colour.



3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm
- 60mm to 70mm
- 70mm to 80mm
- 80mm to 90mm
- 90mm to 100mm
- 100mm to 110mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2020
DECEMBER 2019 TO DECEMBER 2020
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

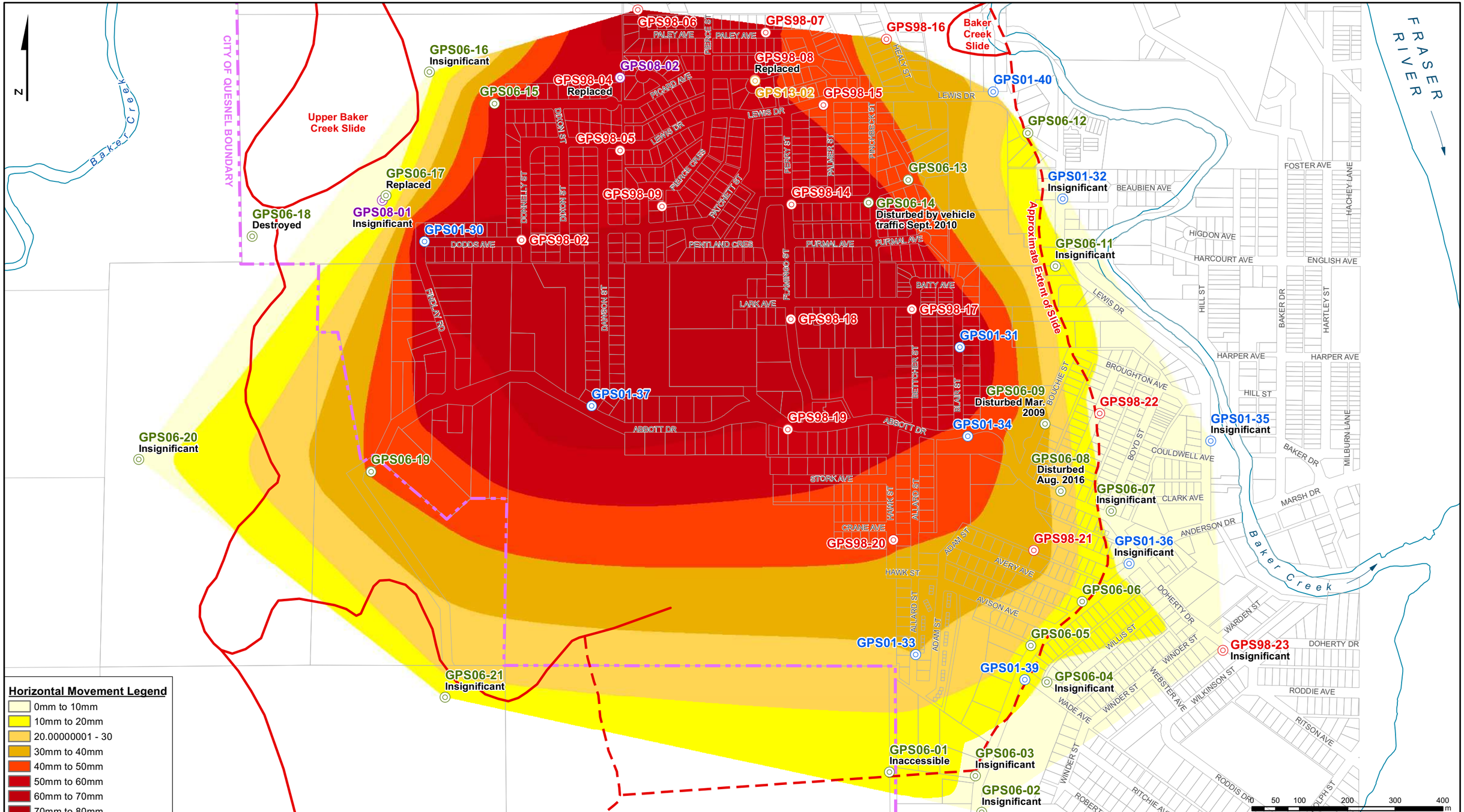
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 34

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig34-3DMove-Dec19-Dec20-AllHubs.mxd

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

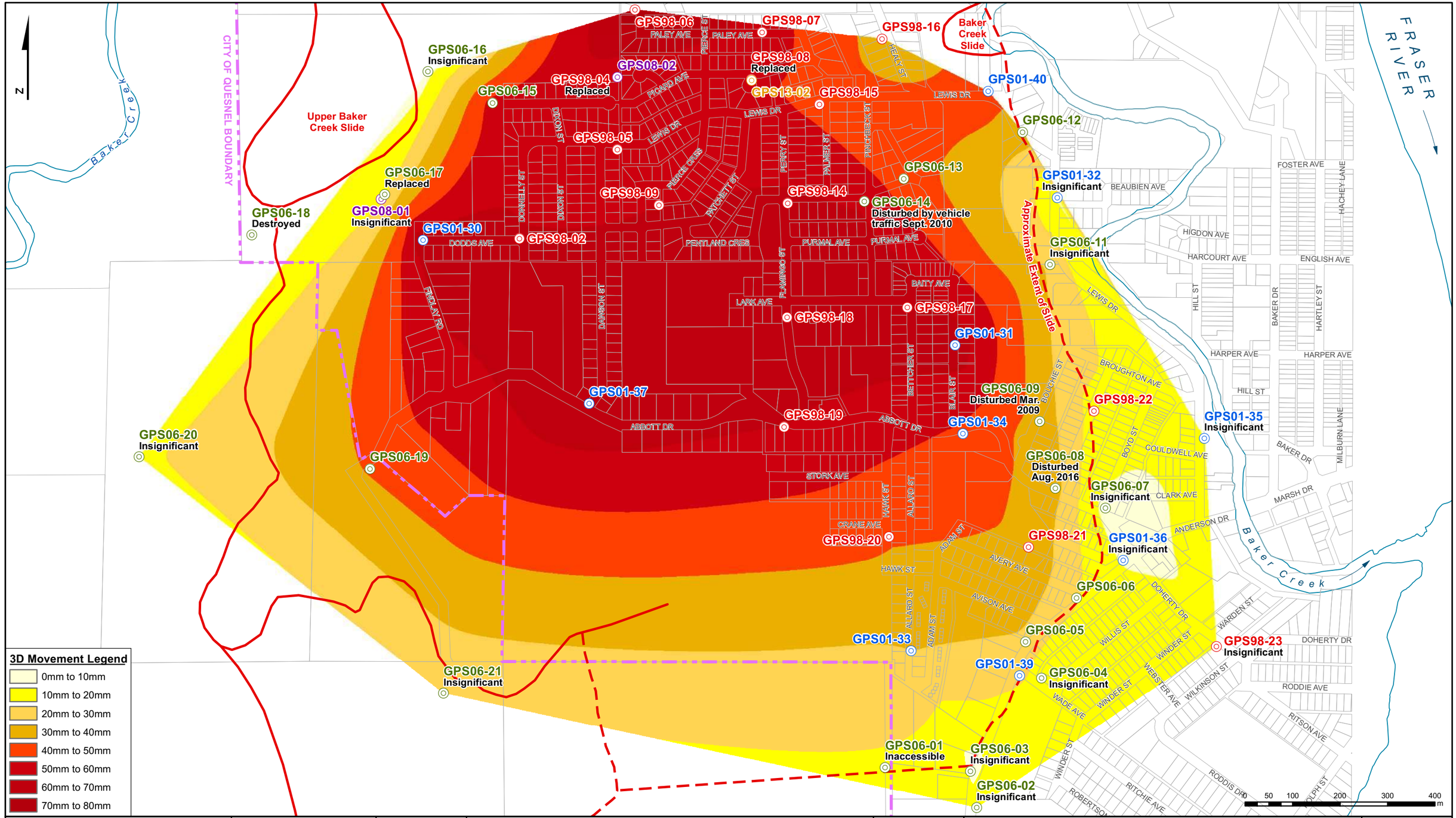
CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL	DWN BY: BB	TITLE: ANNUAL HORIZONTAL MOVEMENT - 2021 DECEMBER 2020 TO DECEMBER 2021 FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS	DATE: MAY 2024
	CHK'D BY: LM		PROJECT NO.: KX0439757
WSP Canada Inc. 3456 Opie Crescent Prince George, BC, CANADA V2N 2P9 Tel:+1 250-564-3243	DATUM: NAD 83	PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC	REV NO.: A
	PROJECTION: UTM Zone 10		FIGURE 35
	SCALE: 1:7,500		

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig35-HMove-Dec20-Dec21-AllHubs.mxd

This drawing was originally produced in colour.



3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm
- 50mm to 60mm
- 60mm to 70mm
- 70mm to 80mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2021
DECEMBER 2020 TO DECEMBER 2021
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 36

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig36-3DMove-Dec20-Dec21-AllHubs.mxd

This drawing was originally produced in colour.

N

Baker Creek

CITY OF QUESNEL BOUNDARY

Upper Baker Creek Slide

Baker Creek Slide

Approximate Extent of Slide

FRASER RIVER

GPS98-06 PALEY AVE
GPS98-07 PALEY AVE
GPS98-16
GPS06-16 Insignificant
GPS08-02
GPS98-08 Replaced
GPS98-04 Replaced
GPS06-15
GPS13-02
GPS98-15
GPS01-40
GPS06-12
GPS98-05
GPS06-17 Replaced
GPS06-13
GPS01-32 Insignificant
GPS98-09
GPS98-14
GPS06-14 Disturbed by vehicle traffic Sept. 2010
GPS06-18 Destroyed
GPS08-01 Insignificant
GPS01-30
GPS98-02
GPS06-11 Insignificant
GPS98-17
GPS98-18
GPS01-31
GPS01-37
GPS98-19
GPS01-34
GPS06-09 Disturbed Mar. 2009
GPS98-22
GPS01-35 Insignificant
GPS06-20
GPS06-19
GPS06-08 Disturbed Aug. 2016
GPS06-07 Insignificant
GPS98-20
GPS98-21
GPS01-36 Insignificant
GPS06-06
GPS06-05
GPS01-33
GPS98-23 Insignificant
GPS01-39
GPS06-04 Insignificant
GPS06-21
GPS06-01
GPS06-03
GPS06-02 Insignificant

PALEY AVE, PIERCE ST, HEALY ST, PICARD AVE, LEWIS DR, DIXON ST, DONNELLY ST, PIERCE CRES, PERRY ST, PALMER ST, PINCHBECK ST, PATCHETT ST, DODDS AVE, PENTLAND CRES, PURMAL AVE, FLAMINGO ST, LARK AVE, BAITY AVE, FINDLAY RD, DAWSON ST, BETTCHER ST, BLAIR ST, ABBOTT DR, STORK AVE, CRANE AVE, HAWK ST, ALLARD ST, ADAM ST, AVERY AVE, AVISON AVE, WILLIS ST, WINDER ST, WADE AVE, WEBSTER AVE, WILKINSON ST, WARDEN ST, DOHERTY DR, RODDIE AVE, RITSON AVE, RODDIS DR, RITCHIE AVE, ROBERTSON, BOUCHIE ST, BROUGHTON AVE, HILL ST, BOYD ST, COULDWELL AVE, CLARK AVE, ANDERSON DR, MARSH DR, BAKER DR, MILBURN LANE, HARPER AVE, HARTLEY ST, ENGLISH AVE, HIGDON AVE, HARCOURT AVE, BEAUBIEN AVE, FOSTER AVE, HACHEY LANE

Baker Creek

0 50 100 200 300 400 m

Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2022
DECEMBER 2021 TO DECEMBER 2022
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

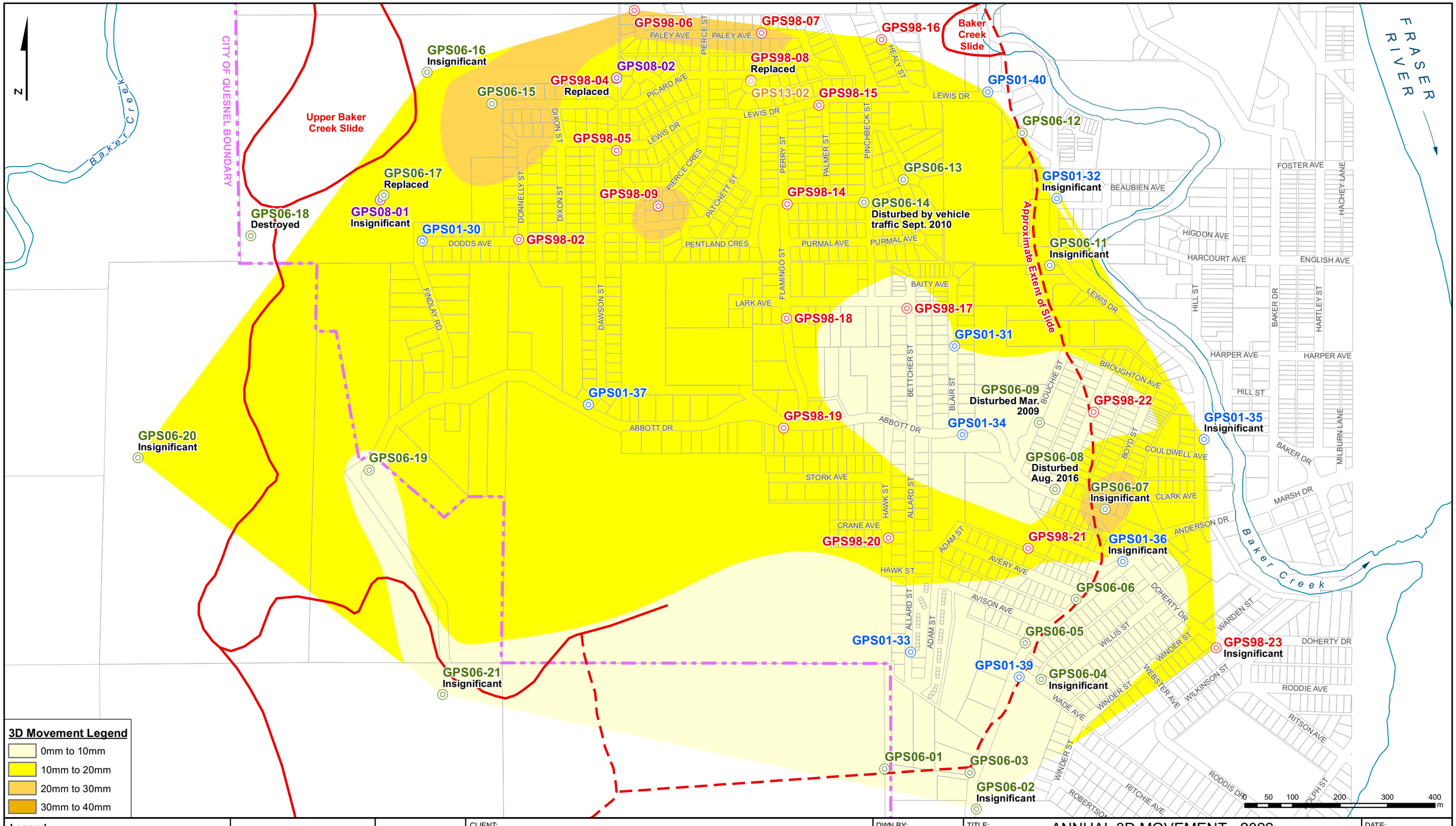
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 37

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig37-HMove-Dec21-Dec22-AllHubs.mxd

This drawing was originally produced in colour.



3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2022
DECEMBER 2021 TO DECEMBER 2022
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 38

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig38-3DMove-Dec21-Dec22-AllHubs.mxd

This drawing was originally produced in colour.

N

Baker Creek

CITY OF QUESNEL BOUNDARY

Upper Baker Creek Slide

Baker Creek Slide

Approximate Extent of Slide

FRASER RIVER

GPS98-06 PALEY AVE
GPS98-07 PALEY AVE
PIERCE ST
GPS98-16
GPS06-16 Insignificant
GPS08-02
GPS98-08 Replaced
GPS98-04 Replaced
GPS06-15
GPS13-02
GPS98-15
HEALY ST
LEWIS DR
GPS01-40
GPS06-12
PICARD AVE
DIXON ST
GPS98-05
LEWIS DR
PIERCE CRES
PERRY ST
PALMER ST
PINCHBECK ST
GPS06-13
GPS06-17 Replaced
GPS08-01 Insignificant
GPS06-18 Destroyed
GPS98-09
GPS98-14
GPS06-14 Disturbed by vehicle traffic Sept. 2010
GPS01-32 Insignificant
BEAUBIEN AVE
FOSTER AVE
HACHEY LANE
GPS01-30
DODDS AVE
GPS98-02
DONNELLY ST
DIXON ST
PATCHETT ST
PENTLAND CRES
PURMAL AVE
PURMAL AVE
HIGDON AVE
GPS06-11 Insignificant
HARCOURT AVE
ENGLISH AVE
FLAMINGO ST
BAITY AVE
LARK AVE
GPS98-17
GPS98-18
FINDLAY RD
DAWSON ST
LEWIS DR
HILL ST
BAKER DR
HARTLEY ST
GPS01-31
HARPER AVE
HARPER AVE
BETTCHER ST
BLAIR ST
BOUCHIE ST
BROUGHTON AVE
GPS06-09 Disturbed Mar. 2009
GPS98-22
HILL ST
GPS01-37
GPS98-19
ABBOTT DR
ABBOTT DR
GPS01-34
GPS01-35 Insignificant
GPS06-20
GPS06-19
GPS06-08 Disturbed Aug. 2016
BOYD ST
COULDWELL AVE
BAKER DR
MILBURN LANE
STORK AVE
GPS06-07 Insignificant
CLARK AVE
MARSH DR
HAWK ST
ALLARD ST
CRANE AVE
GPS98-20
ADAM ST
GPS98-21
GPS01-36 Insignificant
ANDERSON DR
Baker Creek
AVERY AVE
HAWK ST
GPS06-06
DOHERTY DR
AVISON AVE
ALLARD ST
ADAM ST
GPS06-05
WILLIS ST
WARDEN ST
GPS01-33
WINDER ST
GPS98-23 Insignificant
DOHERTY DR
GPS01-39
GPS06-04 Insignificant
WEBSTER AVE
WILKINSON ST
RODDIE AVE
WADE AVE
WINDER ST
RITSON AVE
GPS06-21
GPS06-01
GPS06-03
WINDER ST
GPS06-02 Insignificant
RODDIS DR
ROBERTSON
RITCHIE AVE
DOLPH ST

0 50 100 200 300 400 m

Horizontal Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY: BB
CHK'D BY: LM
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: 1:7,500

TITLE: ANNUAL HORIZONTAL MOVEMENT - 2023
DECEMBER 2022 TO JANUARY 2024
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

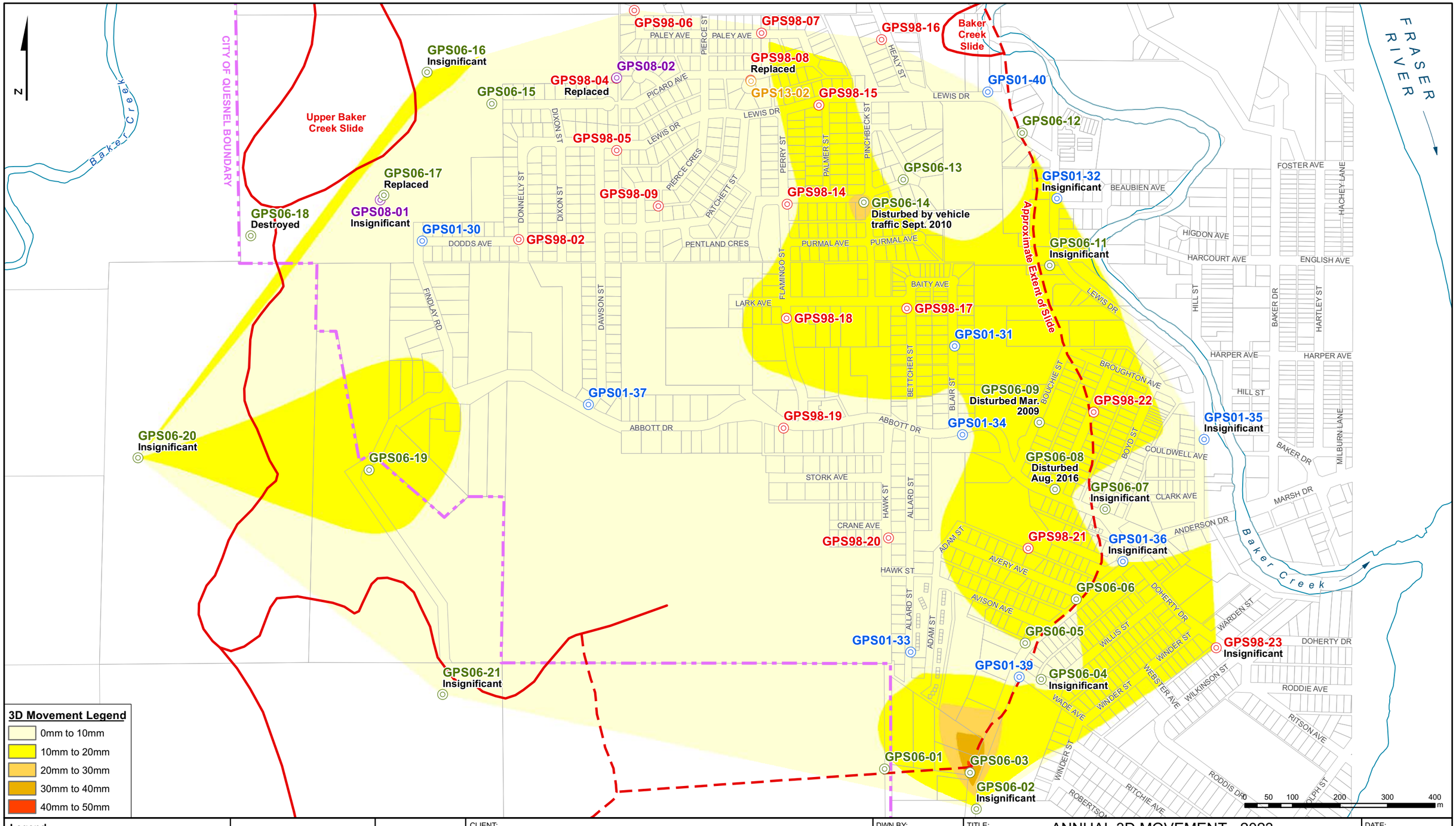
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE: MAY 2024
PROJECT NO.: KX0439757
REV NO.: A

FIGURE 39

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig39-HMove-Dec22-Jan24-AllHubs.mxd

This drawing was originally produced in colour.



3D Movement Legend

- 0mm to 10mm
- 10mm to 20mm
- 20mm to 30mm
- 30mm to 40mm
- 40mm to 50mm

Legend

- Slide Extent
- Slide Extent (Approximate)

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: ANNUAL 3D MOVEMENT - 2023
DECEMBER 2022 TO JANUARY 2024
FOR THE 1998, 2001, 2006 AND 2008 GPS HUBS

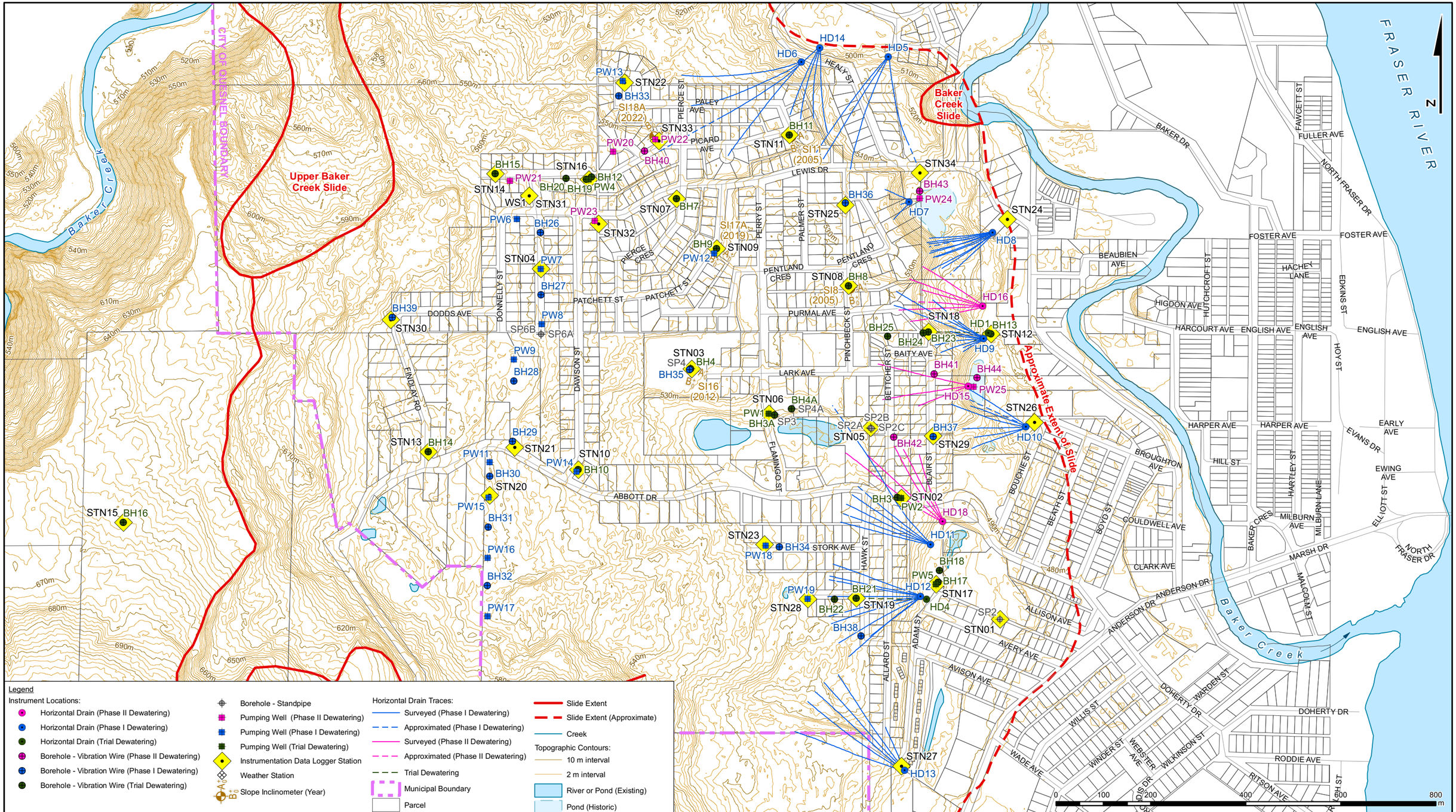
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 40

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig40-3DMove-Dec22-Jan24-AllHubs.mxd

This drawing was originally produced in colour.



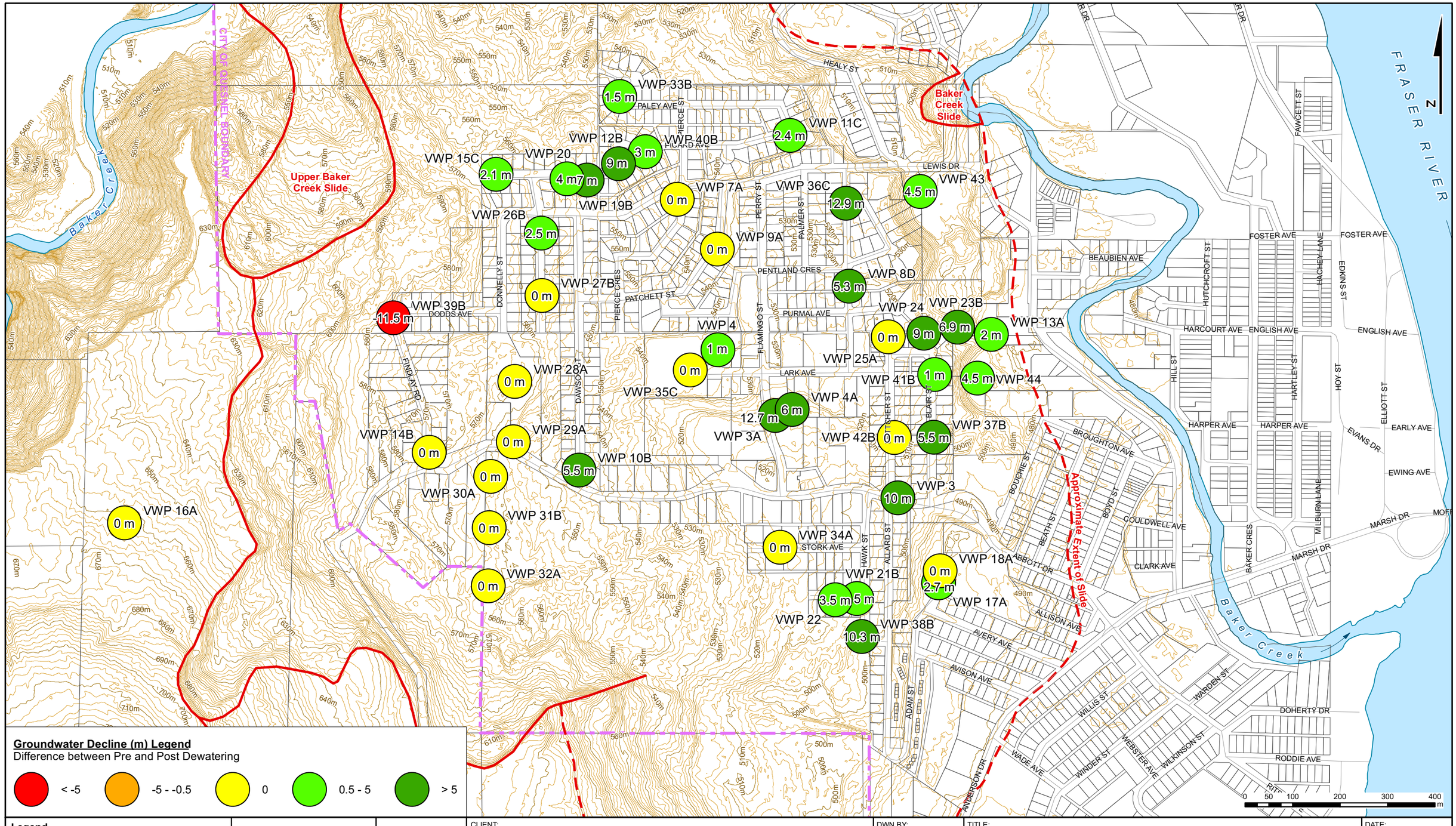
CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL	DWN BY: BB	TITLE: OVERALL INSTRUMENTATION SITE PLAN	DATE: MAY 2024
	CHK'D BY: LM		PROJECT NO.: KX0439757
WSP Canada Inc. 3456 Opie Crescent Prince George, BC, CANADA V2N 2P9 Tel:+1 250-564-3243	DATUM: NAD 83	PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC	REV NO.: A
	PROJECTION: UTM Zone 10		FIGURE 41
	SCALE: 1:7,500		

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig41-OverallInstrumentationSitePlan.mxd

This drawing was originally produced in colour.



Groundwater Decline (m) Legend
Difference between Pre and Post Dewatering

< -5	-5 - -0.5	0	0.5 - 5	> 5

Legend
- Slide Extent
- Slide Extent (Approximate)

Note: Groundwater elevation of VWP 39B has increased by 2.5 m.

CITY OF QUESNEL

WSP

CLIENT: CITY OF QUESNEL

WSP Canada Inc.
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9
Tel:+1 250-564-3243

DWN BY:	BB
CHK'D BY:	LM
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	1:7,500

TITLE: CUMULATIVE GROUNDWATER DRAWDOWN TO END OF DECEMBER 2023

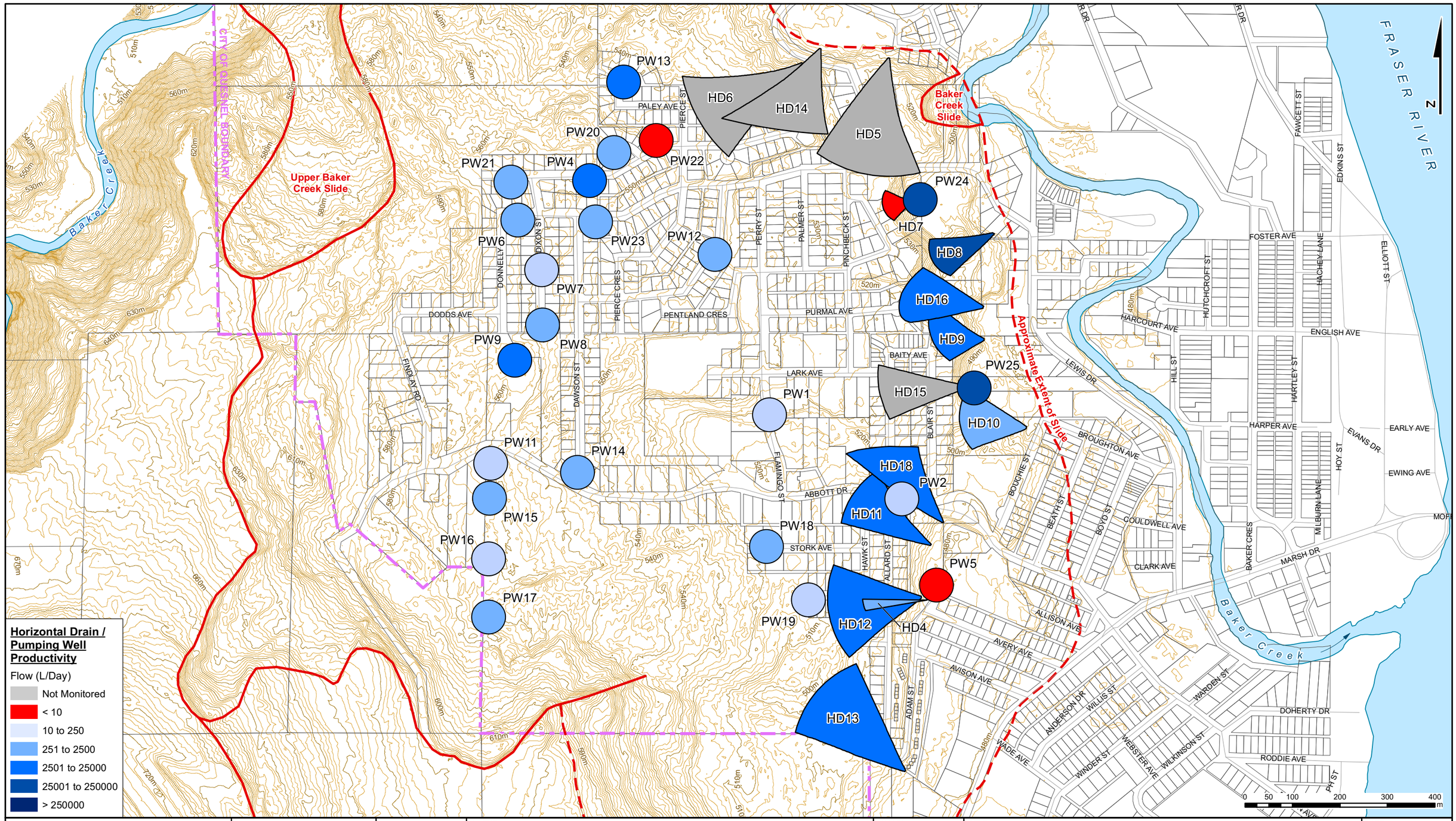
PROJECT: WEST QUESNEL LAND STABILITY PROGRAM
QUESNEL, BC

DATE:	MAY 2024
PROJECT NO.:	KX0439757
REV NO.:	A

FIGURE 42

C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig42-CumulGWDrawdToEndOfDec2023.mxd

This drawing was originally produced in colour.



Legend

- Slide Extent
- Slide Extent (Approximate)

Note: Productivity flow (L/day) calculated by averaging total flows over number of days in service.

CITY OF Quesnel

wsp

CLIENT: CITY OF QUESNEL	DWN BY: BB	TITLE: 2021/2022/2023 AVERAGE PUMPING WELL & HORIZONTAL DRAIN PRODUCTIVITY	DATE: MAY 2024
	CHK'D BY: LM		PROJECT NO.: KX0439757
WSP Canada Inc. 3456 Opie Crescent Prince George, BC, CANADA V2N 2P9 Tel:+1 250-564-3243	DATUM: NAD 83	PROJECT: WEST QUESNEL LAND STABILITY PROGRAM QUESNEL, BC	REV NO.: A
	PROJECTION: UTM Zone 10		FIGURE 43
	SCALE: 1:7,500		

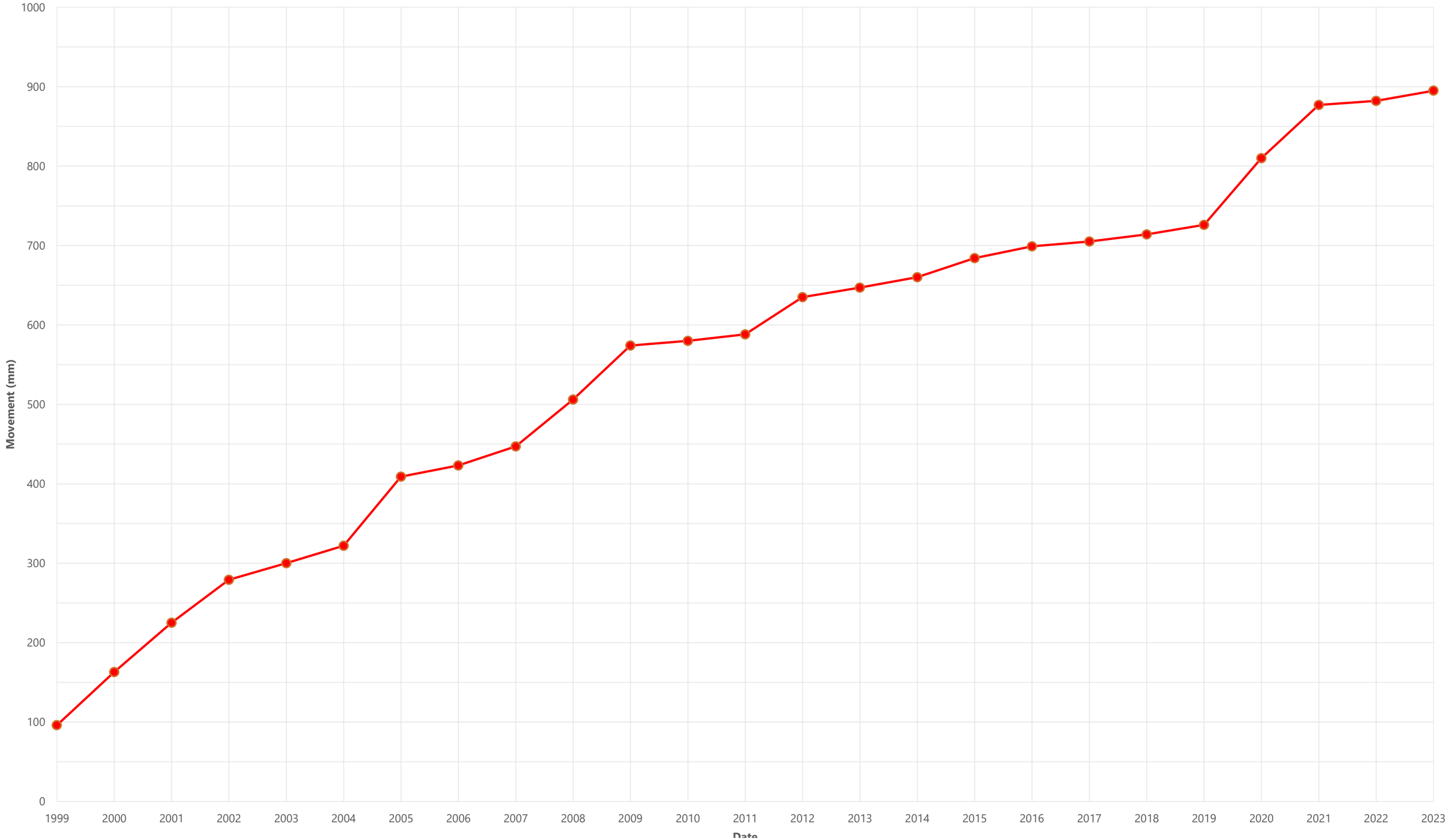
C:\0 PG CAD\Internal\KX04397-WQLS-GIS\CA-EI-KX0439757-WQ 2021_2022 Annual Monitoring\CA-EI-KX0439757-Fig43-2021,2022&2023AveragePW&HDProductivity.mxd

This drawing was originally produced in colour.

APPENDIX

A GPS MOVEMENT HUBS – FIGURE A1, STATUS, DATA TABLES AND PLOTS

Figure A1. HUB 98-17 Total Horizontal Ground Movement



Hub	Location	Initial Survey Date	Status	Pages
82C256	Government Benchmark at Airport	December 1998	Not Currently Read/Not Presented	N/A
98-02	Donnely/Dodds Intersection	September 1998	Active	A1-A3
98-04	Picard Place (Lane)	September 1998	Destroyed - replaced by 08-02	A4-A5
08-02	Picard Place (Lane) - Replaces 98-04	August 2008	Active	A6-A8
98-05	East of Dawson/Lewis Intersection	September 1998	Active	A9-A11
98-06	Paley West	September 1998	Active	A12-A14
98-07	Paley East	September 1998	Active	A15-A17
98-08	Picard Avenue	September 1998	Destroyed - replaced by 13-02	A18-A20
13-02	Picard Avenue - Replaces 98-08	November 2013	Active	A21-A22
98-09	Lane between Patchett/Pierce	September 1998	Active	A23-A25
13-01	Lane between Patchett/Pierce	November 2013	Not Currently Read/Not Presented	N/A
98-14	Pentland/Flamingo Intersection	September 1998	Active	A26-A28
98-15	Palmer/Lewis Intersection	September 1998	Active	A29-A31
98-16	Healy Road	September 1998	Active	A32-A34
98-17	Bettcher/Lark Intersection	September 1998	Active	A35-A37
98-18	Lark/Flamingo Intersection	September 1998	Active	A38-A40
98-19	Abbott/Flamingo Intersection	September 1998	Active	A41-A43
98-20	Hawk Street @ Crane Ave.	September 1998	Active	A44-A46
98-21	Lane between Avery/Allison	September 1998	Active	A47-A49
98-22	Lane between Beath/Bouchie	September 1998	Active	A50-A52
98-23	Doherty Dr. - BM	September 1998	Active	A53-A55
98-24	Salton Road (Hixon Road)	September 1998	Not Currently Read/Not Presented	N/A
98-26	Benchmark by Airport - BM	September 1998	Not Currently Read/Not Presented	N/A
98-28	Red Bluff Pump Station - BM	September 1998	Not Currently Read/Not Presented	N/A
98-29	Quesnel Hill	September 1998	Not Currently Read/Not Presented	N/A
01-30	West End of Dodds Avenue at Findlay Road	December 2001	Active	A56-A58
01-31	Blair Street	December 2001	Active	A59-A61
01-32	Lewis Drive/Beabien Avenue	December 2001	Active	A62-A64
01-33	South End of Allard Street	December 2001	Active	A65-A67
01-34	Abbott Road and Blair Street	December 2001	Active	A68-A70
01-35	Lewis Drive North of Couldwell Street	December 2001	Active	A71-A73
01-36	Anderson Drive at Abbott Drive	December 2001	Active	A74-A76
01-37	Dawson Street at Abbott Drive	December 2001	Active	A77-A79
01-38	Quesnel No. 1 Station - BM	December 2001	Not cuurently Read- Benchmark Station	A80-A81
01-39	Anderson Avenue at Wade Avenue	December 2001	Active	A82-A84
01-40	Lewis Drive East of Healy Street	December 2001	Active	A85-A87
06-01	End alley E. of Anderson Dr., opposite school	November 2006	Not Currently Read/Not Presented	N/A
06-02	East side Anderson Drive by school	November 2006	Active	A88-A90
06-03	West side Anderson Dr., opposite school yard	November 2006	Active	A91-A93
06-04	North side Wade Ave, one lot E. Anderson Dr.	November 2006	Active	A94-A96
06-05	Anderson Drive west side, one lot S. of Avison	November 2006	Active	A97-A99
06-06	North corner Avery Ave / Anderson Drive	November 2006	Active	A100-A102
06-07	NE. corner Boyd Street / Abbott Rd.	November 2006	Active	A103-A105
06-08	North side Abbott Road., alley E. Beath Street	November 2006	Active	A106-A108
06-09	East side Bouchie Street	November 2006	Active	A109-A111
06-10	South side Broughton Avenue	November 2006	Destroyed/Not Presented	N/A
06-11	East side Lewis Road, opposite house # 391	November 2006	Active	A112-A114
06-12	East side Lewis Road, opposite house # 547	November 2006	Active	A115-A117
06-13	NW. corner Pentland Crescent	November 2006	Active	A118-A120
06-14	SW. corner Pinchbeck Street / Pentland Crescent	November 2006	Active	A121-A123
06-15	By trail, NW unnamed Rd. N. Dixon St.	November 2006	Active	A124-A126
06-16	By end trail, NW unnamed road N. Dixon St.	November 2006	Active	A127-A129
06-17	In clearing, NW of end Findlay Road	November 2006	Disturbed - replaced by 08-01	A130-A131
08-01	In clearing, NW of end Findlay Road	June 2008	Active	A132-A134
06-18	On upper bench by trail, off end Findlay Road	November 2006	Destroyed/Not Presented	N/A
06-19	West side Abbott Dr.100m south last house	November 2006	Disturbed Jan 2024	A135-A137
06-20	End of trail, by BH 16,off end Abbott Drive	November 2006	Active	A138-A140
06-21	100m past gate, off end Abbott Drive	November 2006	Active	A141-A143
WaterTank	Water Tank	March 2006	Removed in Spring 2018 - Not Presented	N/A
WaterTank3	New WaterTank	December 2017	Active - Benchmark Station	A144-A145

CITY OF Quesnel

GPS Hub 98-02 (Intersection of Donnelly Street and Dodds Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869992.878	531420.902	563.021	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5869992.871	531420.907	563.014	0.25	-0.007	0.005	0.009	-0.007	144.5	-39.1	0.035	-0.028	0.25	-0.007	0.005	0.009	-0.007	144.5	-39.1	34.527	-28.096
15/04/1999	5869992.867	531420.931	563.007	0.58	-0.011	0.029	0.031	-0.014	110.8	-24.3	0.053	-0.024	0.33	-0.004	0.024	0.024	-0.007	99.5	-16.1	73.446	-21.130
15/12/1999	5869992.879	531420.978	563.027	1.25	0.001	0.076	0.076	0.006	89.2	4.5	0.061	0.005	0.67	0.012	0.047	0.049	0.020	75.7	22.4	72.612	29.939
15/02/2000	5869992.874	531420.976	563.006	1.42	-0.004	0.074	0.074	-0.015	93.1	-11.4	0.052	-0.011	0.17	-0.005	-0.002	0.005	-0.021	201.8	-75.6	-31.725	-123.714
15/05/2000	5869992.860	531420.991	563.009	1.66	-0.018	0.089	0.091	-0.012	101.4	-7.5	0.055	-0.007	0.25	-0.014	0.015	0.021	0.003	133.0	8.3	83.270	12.175
30/11/2000	5869992.847	531421.038	562.998	2.21	-0.031	0.136	0.139	-0.023	102.8	-9.4	0.063	-0.010	0.54	-0.013	0.047	0.049	-0.011	105.5	-12.7	89.504	-20.190
05/05/2001	5869992.846	531421.051	562.986	2.64	-0.032	0.149	0.152	-0.035	102.1	-12.9	0.058	-0.013	0.43	-0.001	0.013	0.013	-0.012	94.4	-42.6	30.527	-28.096
15/12/2001	5869992.844	531421.079	562.988	3.25	-0.034	0.177	0.180	-0.033	100.9	-10.4	0.055	-0.010	0.61	-0.002	0.028	0.028	0.002	94.1	4.1	45.773	3.261
15/05/2002	5869992.824	531421.125	562.983	3.66	-0.054	0.223	0.229	-0.038	103.6	-9.4	0.063	-0.010	0.41	-0.020	0.046	0.050	-0.005	113.5	-5.7	121.330	-12.094
24/10/2002	5869992.849	531421.127	562.960	4.11	-0.029	0.225	0.227	-0.061	97.3	-15.1	0.055	-0.015	0.44	0.025	0.002	0.025	-0.023	4.6	-42.5	-56.546	-51.856
12/11/2003	5869992.830	531421.149	562.984	5.16	-0.048	0.247	0.251	-0.037	100.9	-8.5	0.049	-0.007	1.05	-0.019	0.022	0.029	0.024	130.2	39.4	27.323	22.467
11/01/2005	5869992.835	531421.159	562.997	6.32	-0.043	0.257	0.260	-0.024	99.5	-5.2	0.041	-0.004	1.17	0.005	0.010	0.011	0.014	64.1	51.6	9.291	11.729
10/03/2006	5869992.817	531421.230	562.976	7.48	-0.061	0.328	0.334	-0.045	100.5	-7.7	0.045	-0.006	1.16	-0.018	0.071	0.074	-0.021	104.3	-16.1	63.540	-18.392
10/11/2006	5869992.815	531421.245	562.980	8.15	-0.063	0.343	0.349	-0.041	100.4	-6.7	0.043	-0.005	0.67	-0.002	0.015	0.015	0.004	97.6	14.8	22.560	5.963
05/04/2007	5869992.816	531421.258	562.967	8.55	-0.062	0.356	0.361	-0.054	99.9	-8.5	0.042	-0.006	0.40	0.001	0.013	0.013	-0.013	85.6	-44.9	32.618	-32.522
16/08/2007	5869992.811	531421.276	562.960	8.92	-0.067	0.374	0.380	-0.061	100.2	-9.1	0.043	-0.007	0.36	-0.005	0.018	0.019	-0.007	105.5	-20.5	51.304	-19.224
13/12/2007	5869992.815	531421.272	562.956	9.24	-0.063	0.370	0.375	-0.065	99.7	-9.8	0.041	-0.007	0.33	0.004	-0.004	0.006	-0.004	315.0	-35.3	-17.363	-12.277
18/03/2008	5869992.814	531421.278	562.965	9.51	-0.064	0.376	0.381	-0.056	99.7	-8.4	0.040	-0.006	0.26	-0.001	0.006	0.006	0.009	99.5	55.9	23.143	34.242
03/06/2008	5869992.814	531421.303	562.956	9.72	-0.064	0.401	0.406	-0.065	99.1	-9.1	0.042	-0.007	0.21	0.000	0.025	0.025	-0.009	90.0	-19.8	118.588	-42.692
29/08/2008	5869992.805	531421.309	562.958	9.95	-0.073	0.407	0.413	-0.063	100.2	-8.7	0.042	-0.006	0.24	-0.009	0.006	0.011	0.002	146.3	10.5	45.411	8.397
19/11/2008	5869992.805	531421.320	562.964	10.18	-0.073	0.418	0.424	-0.057	99.9	-7.7	0.042	-0.006	0.22	0.000	0.011	0.011	0.006	90.0	28.6	48.997	26.726
26/03/2009	5869992.805	531421.326	562.964	10.53	-0.073	0.424	0.430	-0.057	99.8	-7.5	0.041	-0.005	0.35	0.000	0.006	0.006	0.000	90.0	0.0	17.256	0.000
10/06/2009	5869992.794	531421.358	562.972	10.74	-0.084	0.456	0.464	-0.049	100.4	-6.0	0.043	-0.005	0.21	-0.011	0.032	0.034	0.008	109.0	13.3	162.622	38.447
17/09/2009	5869992.797	531421.362	562.959	11.01	-0.081	0.460	0.467	-0.062	100.0	-7.6	0.042	-0.006	0.27	0.003	0.004	0.005	-0.013	53.1	-69.0	18.447	-47.962
23/11/2009	5869992.810	531421.369	562.947	11.19	-0.068	0.467	0.472	-0.074	98.3	-8.9	0.042	-0.007	0.18	0.013	0.007	0.015	-0.012	28.3	-39.1	80.490	-65.418
27/03/2010	5869992.801	531421.372	562.964	11.53	-0.077	0.470	0.476	-0.057	99.3	-6.8	0.041	-0.005	0.34	-0.009	0.003	0.009	0.017	161.6	60.8	27.944	50.075
04/07/2010	5869992.793	531421.368	562.957	11.80	-0.085	0.466	0.474	-0.064	100.3	-7.7	0.040	-0.005	0.27	-0.008	-0.004	0.009	-0.007	206.6	-38.0	-32.999	-25.826
13/09/2010	5869992.800	531421.370	562.956	11.99	-0.078	0.468	0.474	-0.065	99.5	-7.8	0.040	-0.005	0.19	0.007	0.002	0.007	-0.001	15.9	-7.8	37.452	-5.144
22/11/2010	5869992.806	531421.378	562.955	12.19	-0.072	0.476	0.481	-0.066	98.6	-7.8	0.040	-0.005	0.19	0.006	0.008	0.010	-0.001	53.1	-5.7	52.179	-5.218
04/04/2011	5869992.797	531421.376	562.957	12.55	-0.081	0.474	0.481	-0.064	99.7	-7.6	0.038	-0.005	0.36	-0.009	-0.002	0.009	0.002	192.5	12.2	-25.319	5.492
18/06/2011	5869992.792	531421.387	562.953	12.76	-0.086	0.485	0.493	-0.068	100.1	-7.9	0.039	-0.005	0.21	-0.005	0.011	0.012	-0.004	114.4	-18.3	58.844	-19.480
03/10/2011	5869992.797	531421.387	562.953	13.05	-0.081	0.485	0.492	-0.068	99.5	-7.9	0.038	-0.005	0.29	0.005	0.000	0.005	0.000	0.0	0.0	-17.068	0.000
28/11/2011	5869992.801	531421.386	562.951	13.20	-0.077	0.484	0.490	-0.070	99.0	-8.1	0.037	-0.005	0.15	0.004	-0.001	0.004	-0.002	346.0	-25.9	-26.892	-13.045
09/04/2012	5869992.796	531421.396	562.956	13.57	-0.082	0.494	0.501	-0.065	99.4	-7.4	0.037	-0.005	0.36	-0.005	0.010	0.011	0.005	116.6	24.1	30.704	13.731

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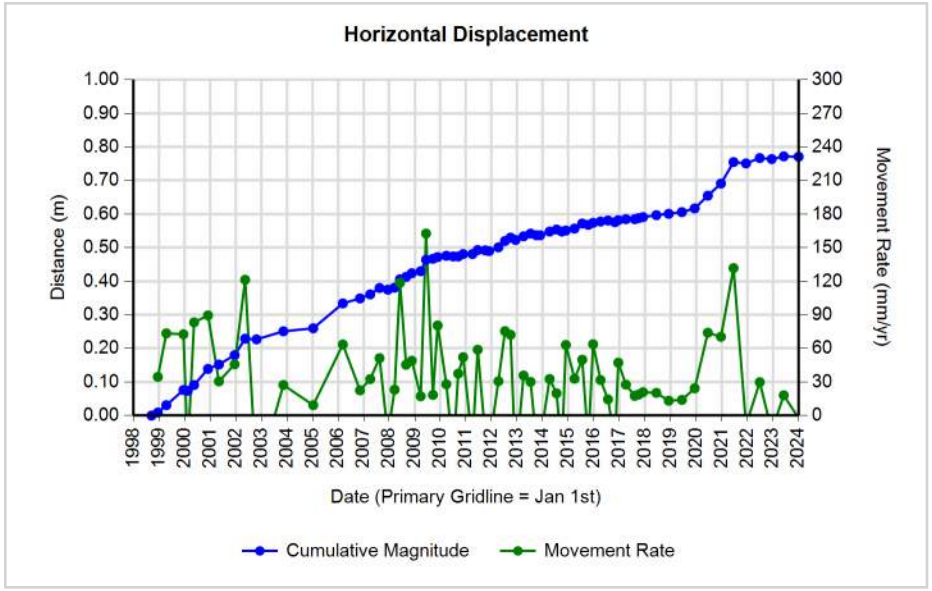
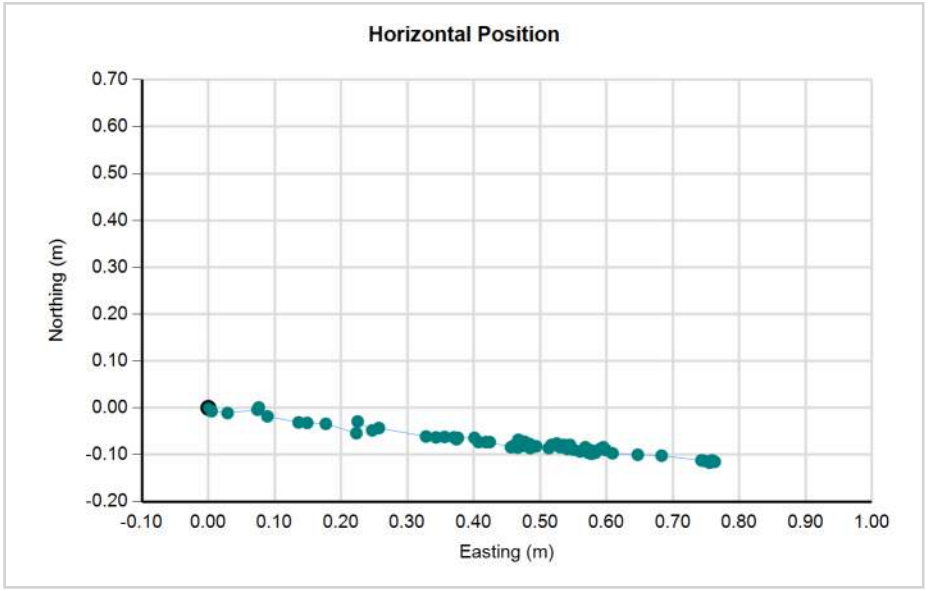
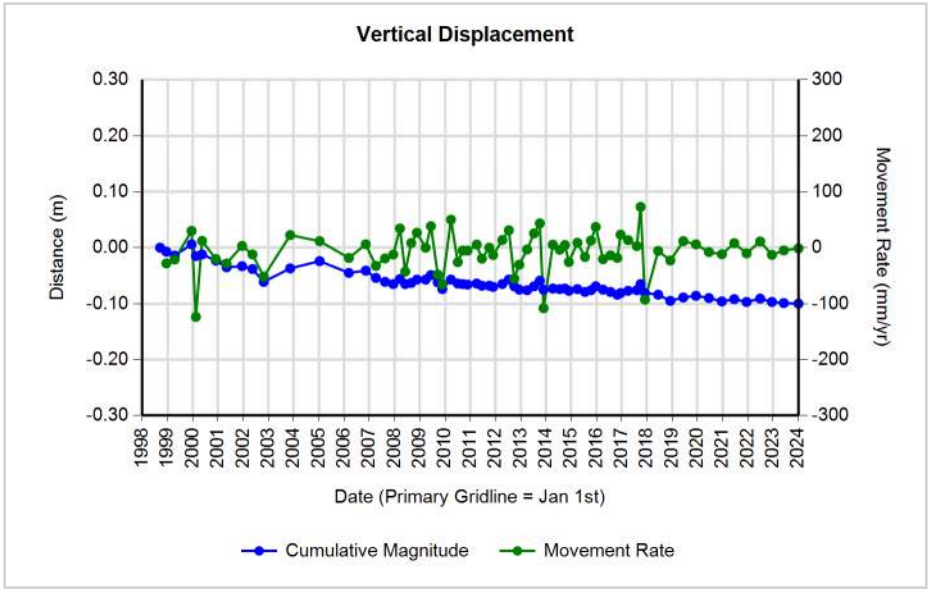
GPS Hub 98-02 (Intersection of Donnelly Street and Dodds Avenue)

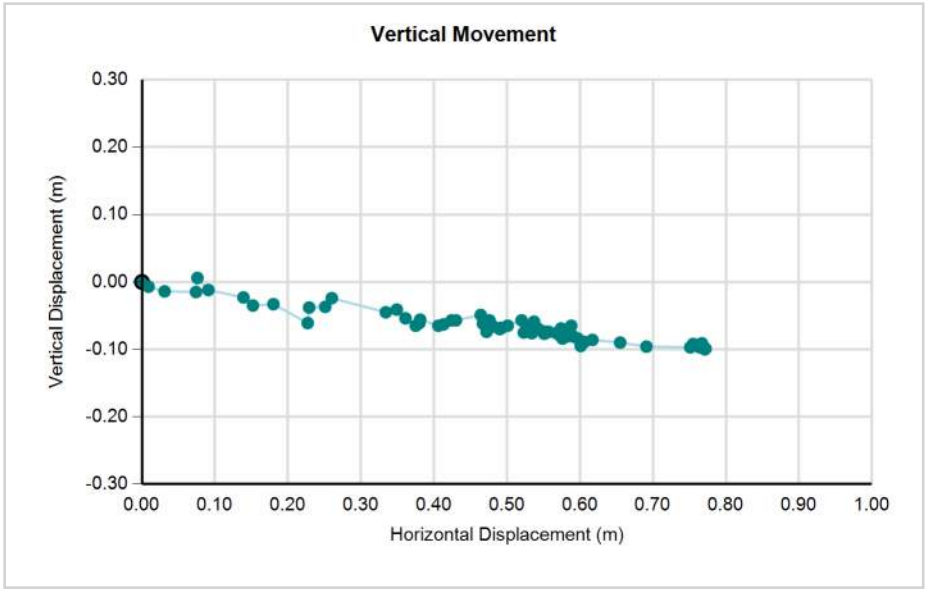
12/07/2012	5869992.792	531421.415	562.964	13.82	-0.086	0.513	0.520	-0.057	99.5	-6.3	0.038	-0.004	0.26	-0.004	0.019	0.019	0.008	101.9	22.4	75.445	31.085
29/09/2012	5869992.802	531421.427	562.952	14.04	-0.076	0.525	0.530	-0.069	98.2	-7.4	0.038	-0.005	0.22	0.010	0.012	0.016	-0.012	50.2	-37.5	72.220	-55.481
10/12/2012	5869992.799	531421.419	562.946	14.24	-0.079	0.517	0.523	-0.075	98.7	-8.2	0.037	-0.005	0.20	-0.003	-0.008	0.009	-0.006	249.4	-35.1	-43.343	-30.437
03/04/2013	5869992.797	531421.430	562.945	14.55	-0.081	0.528	0.534	-0.076	98.7	-8.1	0.037	-0.005	0.31	-0.002	0.011	0.011	-0.001	100.3	-5.1	35.821	-3.204
12/07/2013	5869992.799	531421.438	562.952	14.82	-0.079	0.536	0.542	-0.069	98.4	-7.3	0.037	-0.005	0.27	0.002	0.008	0.008	0.007	76.0	40.3	30.119	25.567
04/10/2013	5869992.797	531421.433	562.962	15.05	-0.081	0.531	0.537	-0.059	98.7	-6.3	0.036	-0.004	0.23	-0.002	-0.005	0.005	0.010	248.2	61.7	-23.416	43.482
27/11/2013	5869992.794	531421.432	562.946	15.20	-0.084	0.530	0.537	-0.075	99.0	-8.0	0.035	-0.005	0.15	-0.003	-0.001	0.003	-0.016	198.4	-78.8	-21.389	-108.222
10/04/2014	5869992.794	531421.444	562.948	15.57	-0.084	0.542	0.548	-0.073	98.8	-7.6	0.035	-0.005	0.37	0.000	0.012	0.012	0.002	90.0	9.5	32.709	5.451
18/07/2014	5869992.792	531421.449	562.947	15.84	-0.086	0.547	0.554	-0.074	98.9	-7.6	0.035	-0.005	0.27	-0.002	0.005	0.005	-0.001	111.8	-10.5	19.868	-3.689
02/10/2014	5869992.790	531421.443	562.948	16.05	-0.088	0.541	0.548	-0.073	99.2	-7.6	0.034	-0.005	0.21	-0.002	-0.006	0.006	0.001	251.6	9.0	-30.395	4.806
28/11/2014	5869992.799	531421.447	562.944	16.20	-0.079	0.545	0.551	-0.077	98.2	-8.0	0.034	-0.005	0.16	0.009	0.004	0.010	-0.004	24.0	-22.1	63.110	-25.632
01/04/2015	5869992.789	531421.452	562.947	16.54	-0.089	0.550	0.557	-0.074	99.2	-7.6	0.034	-0.004	0.34	-0.010	0.005	0.011	0.003	153.4	15.0	32.932	8.837
20/07/2015	5869992.788	531421.467	562.942	16.84	-0.090	0.565	0.572	-0.079	99.1	-7.9	0.034	-0.005	0.30	-0.001	0.015	0.015	-0.005	93.8	-18.4	49.917	-16.602
14/10/2015	5869992.785	531421.462	562.945	17.08	-0.093	0.560	0.568	-0.076	99.4	-7.6	0.033	-0.004	0.24	-0.003	-0.005	0.006	0.003	239.0	27.2	-24.765	12.741
22/12/2015	5869992.794	531421.470	562.952	17.27	-0.084	0.568	0.574	-0.069	98.4	-6.9	0.033	-0.004	0.19	0.009	0.008	0.012	0.007	41.6	30.2	63.742	37.054
06/04/2016	5869992.785	531421.472	562.946	17.56	-0.093	0.570	0.578	-0.075	99.3	-7.4	0.033	-0.004	0.29	-0.009	0.002	0.009	-0.006	167.5	-33.1	31.768	-20.675
22/07/2016	5869992.782	531421.475	562.942	17.85	-0.096	0.573	0.581	-0.079	99.5	-7.7	0.033	-0.004	0.29	-0.003	0.003	0.004	-0.004	135.0	-43.3	14.482	-13.654
30/10/2016	5869992.787	531421.471	562.937	18.12	-0.091	0.569	0.576	-0.084	99.1	-8.3	0.032	-0.005	0.27	0.005	-0.004	0.006	-0.005	321.3	-38.0	-23.387	-18.262
16/12/2016	5869992.788	531421.477	562.940	18.25	-0.090	0.575	0.582	-0.081	98.9	-7.9	0.032	-0.004	0.13	0.001	0.006	0.006	0.003	80.5	26.3	47.271	23.314
04/04/2017	5869992.780	531421.479	562.944	18.55	-0.098	0.577	0.585	-0.077	99.6	-7.5	0.032	-0.004	0.30	-0.008	0.002	0.008	0.004	166.0	25.9	27.632	13.404
08/08/2017	5869992.786	531421.480	562.945	18.90	-0.092	0.578	0.585	-0.076	99.0	-7.4	0.031	-0.004	0.34	0.006	0.001	0.006	0.001	9.5	9.3	17.633	2.899
02/10/2017	5869992.784	531421.482	562.956	19.05	-0.094	0.580	0.588	-0.065	99.2	-6.3	0.031	-0.003	0.15	-0.002	0.002	0.003	0.011	135.0	75.6	18.783	73.050
04/12/2017	5869992.782	531421.485	562.940	19.22	-0.096	0.583	0.591	-0.081	99.4	-7.8	0.031	-0.004	0.17	-0.002	0.003	0.004	-0.016	123.7	-77.3	20.904	-92.762
13/06/2018	5869992.790	531421.492	562.937	19.74	-0.088	0.590	0.597	-0.084	98.5	-8.0	0.030	-0.004	0.52	0.008	0.007	0.011	-0.003	41.2	-15.8	20.328	-5.737
06/12/2018	5869992.794	531421.497	562.926	20.22	-0.084	0.595	0.601	-0.095	98.0	-9.0	0.030	-0.005	0.48	0.004	0.005	0.006	-0.011	51.3	-59.8	13.288	-22.828
12/06/2019	5869992.788	531421.501	562.932	20.74	-0.090	0.599	0.606	-0.089	98.5	-8.4	0.029	-0.004	0.51	-0.006	0.004	0.007	0.006	146.3	39.8	14.010	11.657
12/12/2019	5869992.781	531421.511	562.935	21.24	-0.097	0.609	0.617	-0.086	99.0	-7.9	0.029	-0.004	0.50	-0.007	0.010	0.012	0.003	125.0	13.8	24.363	5.988
17/06/2020	5869992.778	531421.549	562.931	21.75	-0.100	0.647	0.655	-0.090	98.8	-7.8	0.030	-0.004	0.51	-0.003	0.038	0.038	-0.004	94.5	-6.0	74.057	-7.771
21/12/2020	5869992.776	531421.585	562.925	22.27	-0.102	0.683	0.691	-0.096	98.5	-7.9	0.031	-0.004	0.51	-0.002	0.036	0.036	-0.006	93.2	-9.4	70.424	-11.719
19/06/2021	5869992.765	531421.649	562.929	22.76	-0.113	0.747	0.755	-0.092	98.6	-6.9	0.033	-0.004	0.49	-0.011	0.064	0.065	0.004	99.8	3.5	131.771	8.117
14/12/2021	5869992.766	531421.645	562.924	23.25	-0.112	0.743	0.751	-0.097	98.6	-7.4	0.032	-0.004	0.49	0.001	-0.004	0.004	-0.005	284.0	-50.5	-8.460	-10.260
28/06/2022	5869992.766	531421.661	562.930	23.78	-0.112	0.759	0.767	-0.091	98.4	-6.8	0.032	-0.004	0.54	0.000	0.016	0.016	0.006	90.0	20.6	29.816	11.181
16/12/2022	5869992.761	531421.657	562.924	24.25	-0.117	0.755	0.764	-0.097	98.8	-7.2	0.032	-0.004	0.47	-0.005	-0.004	0.006	-0.006	218.7	-43.1	-13.677	-12.816
06/06/2023	5869992.763	531421.665	562.922	24.72	-0.115	0.763	0.772	-0.099	98.6	-7.3	0.031	-0.004	0.47	0.002	0.008	0.009	-0.002	76.5	-15.0	18.130	-4.863
04/01/2024	5869992.763	531421.664	562.921	25.30	-0.115	0.762	0.771	-0.100	98.6	-7.4	0.030	-0.004	0.58	0.000	-0.001	0.001	-0.001	270.0	-28.6	-2.240	-1.223

GPS Hub 98-02 (Intersection of Donnelly Street and Dodds Avenue)









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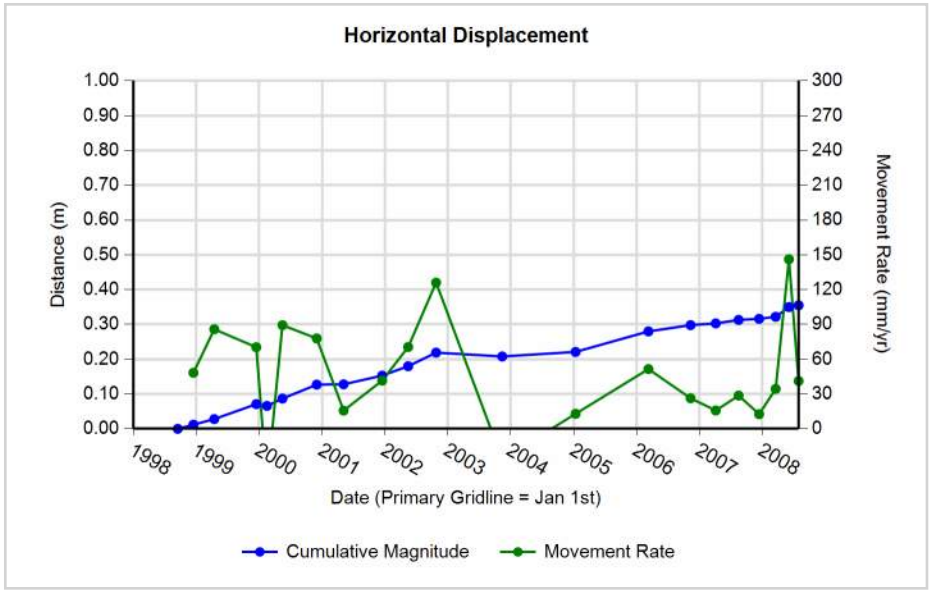
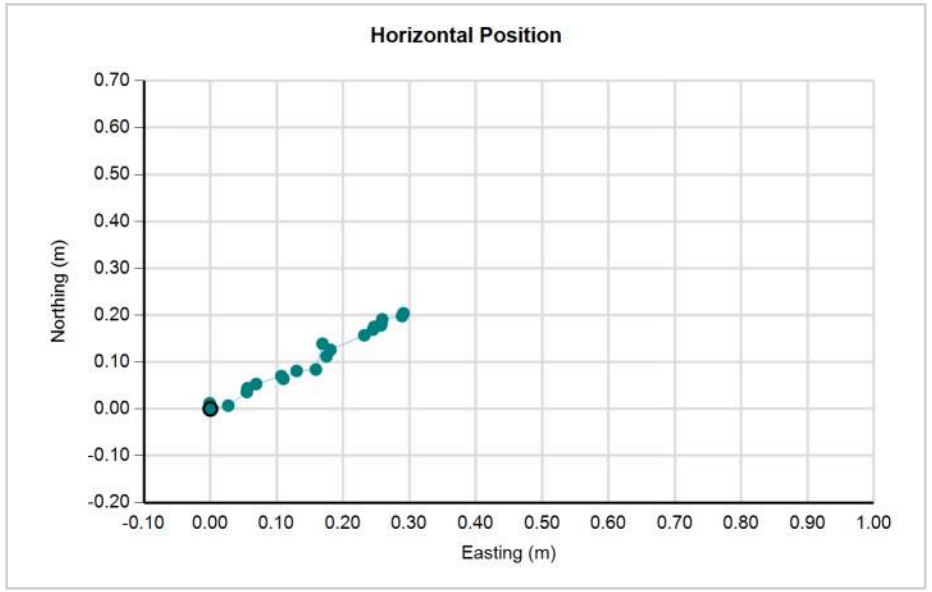
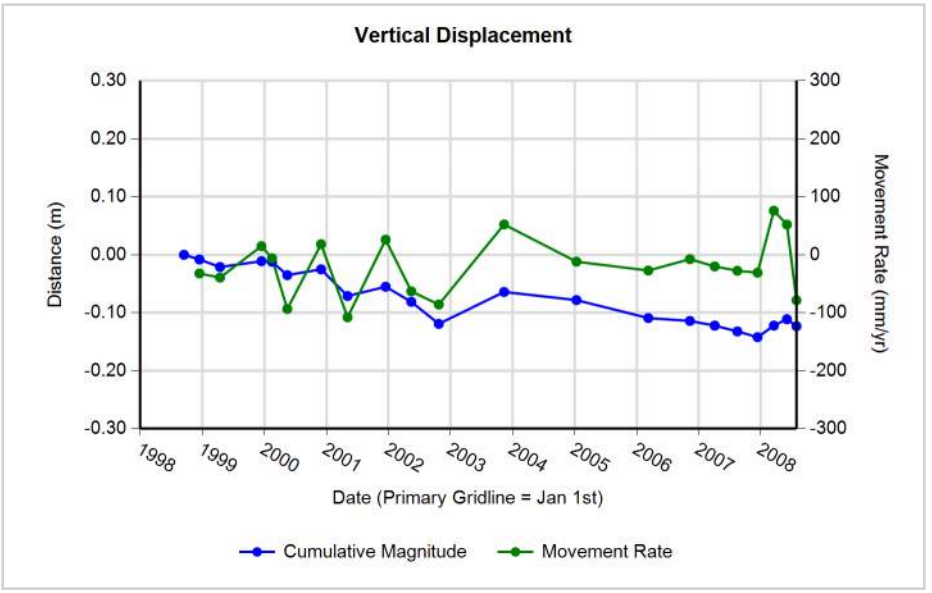
GPS Hub 98-04 (West of Picard Place) Replaced by 08-02

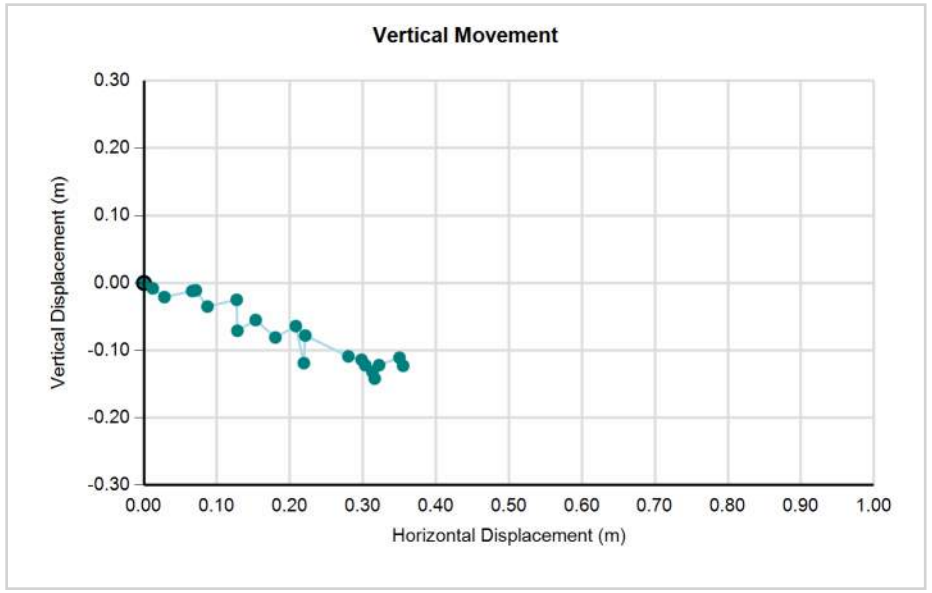
	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870331.949	531626.829	557.171	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5870331.961	531626.828	557.163	0.25	0.012	-0.001	0.012	-0.008	355.2	-33.6	0.048	-0.032	0.25	0.012	-0.001	0.012	-0.008	355.2	-33.6	48.332	-32.110
15/04/1999	5870331.956	531626.856	557.150	0.58	0.007	0.027	0.028	-0.021	75.5	-37.0	0.048	-0.036	0.33	-0.005	0.028	0.028	-0.013	100.1	-24.6	85.858	-39.242
15/12/1999	5870331.993	531626.885	557.160	1.25	0.044	0.056	0.071	-0.011	51.8	-8.8	0.057	-0.009	0.67	0.037	0.029	0.047	0.010	38.1	12.0	70.371	14.969
15/02/2000	5870331.985	531626.884	557.159	1.42	0.036	0.055	0.066	-0.012	56.8	-10.3	0.046	-0.008	0.17	-0.008	-0.001	0.008	-0.001	187.1	-7.1	-47.496	-5.891
15/05/2000	5870332.002	531626.898	557.136	1.66	0.053	0.069	0.087	-0.035	52.5	-21.9	0.052	-0.021	0.25	0.017	0.014	0.022	-0.023	39.5	-46.2	89.376	-93.342
30/11/2000	5870332.013	531626.939	557.146	2.21	0.064	0.110	0.127	-0.025	59.8	-11.1	0.058	-0.011	0.54	0.011	0.041	0.042	0.010	75.0	13.3	77.914	18.354
05/05/2001	5870332.019	531626.936	557.100	2.64	0.070	0.107	0.128	-0.071	56.8	-29.0	0.048	-0.027	0.43	0.006	-0.003	0.007	-0.046	333.4	-81.7	15.706	-107.702
15/12/2001	5870332.030	531626.959	557.116	3.25	0.081	0.130	0.153	-0.055	58.1	-19.8	0.047	-0.017	0.61	0.011	0.023	0.025	0.016	64.4	32.1	41.572	26.089
15/05/2002	5870332.033	531626.988	557.090	3.66	0.084	0.159	0.180	-0.081	62.2	-24.2	0.049	-0.022	0.41	0.003	0.029	0.029	-0.026	84.1	-41.7	70.522	-62.891
24/10/2002	5870332.088	531626.998	557.052	4.11	0.139	0.169	0.219	-0.119	50.6	-28.5	0.053	-0.029	0.44	0.055	0.010	0.056	-0.038	10.3	-34.2	126.038	-85.676
12/11/2003	5870332.061	531627.004	557.107	5.16	0.112	0.175	0.208	-0.064	57.4	-17.1	0.040	-0.012	1.05	-0.027	0.006	0.028	0.055	167.8	63.4	-26.278	52.381
11/01/2005	5870332.075	531627.010	557.093	6.32	0.126	0.181	0.221	-0.078	55.3	-19.4	0.035	-0.012	1.17	0.014	0.006	0.015	-0.014	24.9	-42.4	12.947	-11.806
10/03/2006	5870332.106	531627.061	557.062	7.48	0.157	0.232	0.280	-0.109	55.9	-21.3	0.037	-0.015	1.16	0.031	0.051	0.060	-0.031	58.4	-27.7	51.522	-27.027
10/11/2006	5870332.118	531627.074	557.057	8.15	0.169	0.245	0.298	-0.114	55.4	-21.0	0.037	-0.014	0.67	0.012	0.013	0.018	-0.005	47.3	-15.8	26.375	-7.454
05/04/2007	5870332.124	531627.076	557.049	8.55	0.175	0.247	0.303	-0.122	54.7	-22.0	0.035	-0.014	0.40	0.006	0.002	0.006	-0.008	18.4	-51.7	15.822	-20.014
16/08/2007	5870332.127	531627.086	557.039	8.92	0.178	0.257	0.313	-0.132	55.3	-22.9	0.035	-0.015	0.36	0.003	0.010	0.010	-0.010	73.3	-43.8	28.672	-27.462
13/12/2007	5870332.131	531627.087	557.029	9.24	0.182	0.258	0.316	-0.142	54.8	-24.2	0.034	-0.015	0.33	0.004	0.001	0.004	-0.010	14.0	-67.6	12.655	-30.693
18/03/2008	5870332.140	531627.088	557.049	9.51	0.191	0.259	0.322	-0.122	53.6	-20.8	0.034	-0.013	0.26	0.009	0.001	0.009	0.020	6.3	65.6	34.453	76.094
03/06/2008	5870332.147	531627.118	557.060	9.72	0.198	0.289	0.350	-0.111	55.6	-17.6	0.036	-0.011	0.21	0.007	0.030	0.031	0.011	76.9	19.7	146.128	52.179
29/07/2008	5870332.153	531627.120	557.048	9.87	0.204	0.291	0.355	-0.123	55.0	-19.1	0.036	-0.012	0.15	0.006	0.002	0.006	-0.012	18.4	-62.2	41.251	-78.268

GPS Hub 98-04 (West of Picard Place) Replaced by 08-02









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GPS Hub 08-02 (West of Picard Place)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
29/08/2008	5870332.611	531627.128	557.121	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
19/11/2008	5870332.614	531627.141	557.102	0.22	0.003	0.013	0.013	-0.019	77.0	-54.9	0.059	-0.085	0.22	0.003	0.013	0.013	-0.019	77.0	-54.9	59.427	-84.631
26/03/2009	5870332.628	531627.138	557.112	0.57	0.017	0.010	0.020	-0.009	30.5	-24.5	0.034	-0.016	0.35	0.014	-0.003	0.014	0.010	347.9	34.9	41.178	28.760
10/06/2009	5870332.628	531627.164	557.119	0.78	0.017	0.036	0.040	-0.002	64.7	-2.9	0.051	-0.003	0.21	0.000	0.026	0.026	0.007	90.0	15.1	124.954	33.641
17/09/2009	5870332.648	531627.169	557.108	1.05	0.037	0.041	0.055	-0.013	47.9	-13.2	0.053	-0.012	0.27	0.020	0.005	0.021	-0.011	14.0	-28.1	76.059	-40.583
23/11/2009	5870332.646	531627.169	557.090	1.23	0.035	0.041	0.054	-0.031	49.5	-29.9	0.044	-0.025	0.18	-0.002	0.000	0.002	-0.018	180.0	-83.7	-10.903	-98.127
27/03/2010	5870332.646	531627.167	557.096	1.57	0.035	0.039	0.052	-0.025	48.1	-25.5	0.033	-0.016	0.34	0.000	-0.002	0.002	0.006	270.0	71.6	-5.891	17.673
04/07/2010	5870332.640	531627.165	557.113	1.85	0.029	0.037	0.047	-0.008	51.9	-9.7	0.025	-0.004	0.27	-0.006	-0.002	0.006	0.017	198.4	69.6	-23.334	62.720
13/09/2010	5870332.652	531627.173	557.103	2.04	0.041	0.045	0.061	-0.018	47.7	-16.5	0.030	-0.009	0.19	0.012	0.008	0.014	-0.010	33.7	-34.7	74.193	-51.444
22/11/2010	5870332.648	531627.176	557.094	2.23	0.037	0.048	0.061	-0.027	52.4	-24.0	0.027	-0.012	0.19	-0.004	0.003	0.005	-0.009	143.1	-60.9	-26.089	-46.961
04/04/2011	5870332.650	531627.164	557.095	2.60	0.039	0.036	0.053	-0.026	42.7	-26.1	0.020	-0.010	0.36	0.002	-0.012	0.012	0.001	279.5	4.7	-33.409	2.746
18/06/2011	5870332.649	531627.184	557.104	2.80	0.038	0.056	0.068	-0.017	55.8	-14.1	0.024	-0.006	0.21	-0.001	0.020	0.020	0.009	92.9	24.2	97.522	43.830
03/10/2011	5870332.670	531627.172	557.113	3.09	0.059	0.044	0.074	-0.008	36.7	-6.2	0.024	-0.003	0.29	0.021	-0.012	0.024	0.009	330.3	20.4	82.563	30.722
28/11/2011	5870332.663	531627.180	557.102	3.25	0.052	0.052	0.074	-0.019	45.0	-14.5	0.023	-0.006	0.15	-0.007	0.008	0.011	-0.011	131.2	-46.0	-69.333	-71.746
09/04/2012	5870332.657	531627.183	557.094	3.61	0.046	0.055	0.072	-0.027	50.1	-20.6	0.020	-0.007	0.36	-0.006	0.003	0.007	-0.008	153.4	-50.0	-18.422	-21.970
12/07/2012	5870332.679	531627.195	557.096	3.87	0.068	0.067	0.095	-0.025	44.6	-14.7	0.025	-0.006	0.26	0.022	0.012	0.025	0.002	28.6	4.6	97.374	7.771
29/09/2012	5870332.684	531627.203	557.083	4.08	0.073	0.075	0.105	-0.038	45.8	-20.0	0.026	-0.009	0.22	0.005	0.008	0.009	-0.013	58.0	-54.0	43.617	-60.104
10/12/2012	5870332.674	531627.202	557.082	4.28	0.063	0.074	0.097	-0.039	49.6	-21.9	0.023	-0.009	0.20	-0.010	-0.001	0.010	-0.001	185.7	-5.7	-50.982	-5.073
03/04/2013	5870332.683	531627.208	557.079	4.59	0.072	0.080	0.108	-0.042	48.0	-21.3	0.023	-0.009	0.31	0.009	0.006	0.011	-0.003	33.7	-15.5	34.656	-9.612
12/07/2013	5870332.691	531627.200	557.097	4.87	0.080	0.072	0.108	-0.024	42.0	-12.6	0.022	-0.005	0.27	0.008	-0.008	0.011	0.018	315.0	57.8	-41.323	65.745
04/10/2013	5870332.691	531627.209	557.107	5.10	0.080	0.081	0.114	-0.014	45.4	-7.0	0.022	-0.003	0.23	0.000	0.009	0.009	0.010	90.0	48.0	39.134	43.482
27/11/2013	5870332.681	531627.213	557.069	5.25	0.070	0.085	0.110	-0.052	50.5	-25.3	0.021	-0.010	0.15	-0.010	0.004	0.011	-0.038	158.2	-74.2	-72.849	-257.028
10/04/2014	5870332.690	531627.216	557.077	5.61	0.079	0.088	0.118	-0.044	48.1	-20.4	0.021	-0.008	0.37	0.009	0.003	0.009	0.008	18.4	40.1	25.859	21.806
18/07/2014	5870332.683	531627.221	557.077	5.88	0.072	0.093	0.118	-0.044	52.3	-20.5	0.020	-0.007	0.27	-0.007	0.005	0.009	0.000	144.5	0.0	-31.737	0.000
02/10/2014	5870332.695	531627.229	557.082	6.09	0.084	0.101	0.131	-0.039	50.3	-16.5	0.022	-0.006	0.21	0.012	0.008	0.014	0.005	33.7	19.1	69.312	24.030
28/11/2014	5870332.699	531627.222	557.077	6.25	0.088	0.094	0.129	-0.044	46.9	-18.9	0.021	-0.007	0.16	0.004	-0.007	0.008	-0.005	299.7	-31.8	-51.662	-32.039
01/04/2015	5870332.699	531627.231	557.073	6.59	0.088	0.103	0.135	-0.048	49.5	-19.5	0.021	-0.007	0.34	0.000	0.009	0.009	-0.004	90.0	-24.0	26.510	-11.782
20/07/2015	5870332.705	531627.246	557.078	6.89	0.094	0.118	0.151	-0.043	51.5	-15.9	0.022	-0.006	0.30	0.006	0.015	0.016	0.005	68.2	17.2	53.644	16.602
14/10/2015	5870332.706	531627.230	557.070	7.12	0.095	0.102	0.139	-0.051	47.0	-20.1	0.020	-0.007	0.24	0.001	-0.016	0.016	-0.008	273.6	-26.5	-68.086	-33.977
22/12/2015	5870332.710	531627.238	557.068	7.31	0.099	0.110	0.148	-0.053	48.0	-19.7	0.020	-0.007	0.19	0.004	0.008	0.009	-0.002	63.4	-12.6	47.346	-10.587
06/04/2016	5870332.702	531627.235	557.064	7.60	0.091	0.107	0.140	-0.057	49.6	-22.1	0.018	-0.007	0.29	-0.008	-0.003	0.009	-0.004	200.6	-25.1	-29.441	-13.783
22/07/2016	5870332.703	531627.246	557.071	7.90	0.092	0.118	0.150	-0.050	52.1	-18.5	0.019	-0.006	0.29	0.001	0.011	0.011	0.007	84.8	32.4	37.704	23.895
30/10/2016	5870332.715	531627.243	557.058	8.17	0.104	0.115	0.155	-0.063	47.9	-22.1	0.019	-0.008	0.27	0.012	-0.003	0.012	-0.013	346.0	-46.4	45.179	-47.483
16/12/2016	5870332.710	531627.248	557.064	8.30	0.099	0.120	0.156	-0.057	50.5	-20.1	0.019	-0.007	0.13	-0.005	0.005	0.007	0.006	135.0	40.3	54.951	46.628
04/04/2017	5870332.710	531627.246	557.062	8.60	0.099	0.118	0.154	-0.059	50.0	-21.0	0.018	-0.007	0.30	0.000	-0.002	0.002	-0.002	270.0	-45.0	-6.702	-6.702

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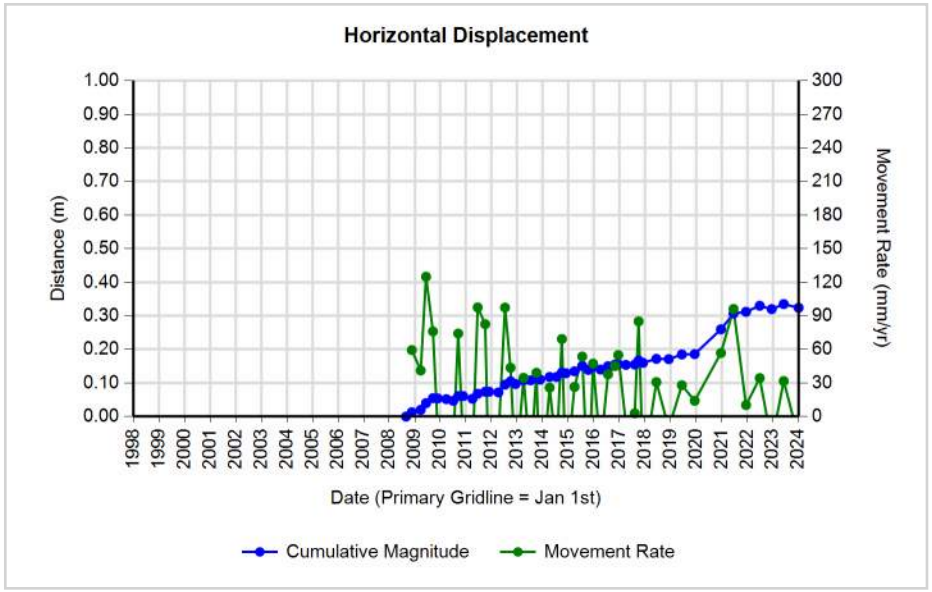
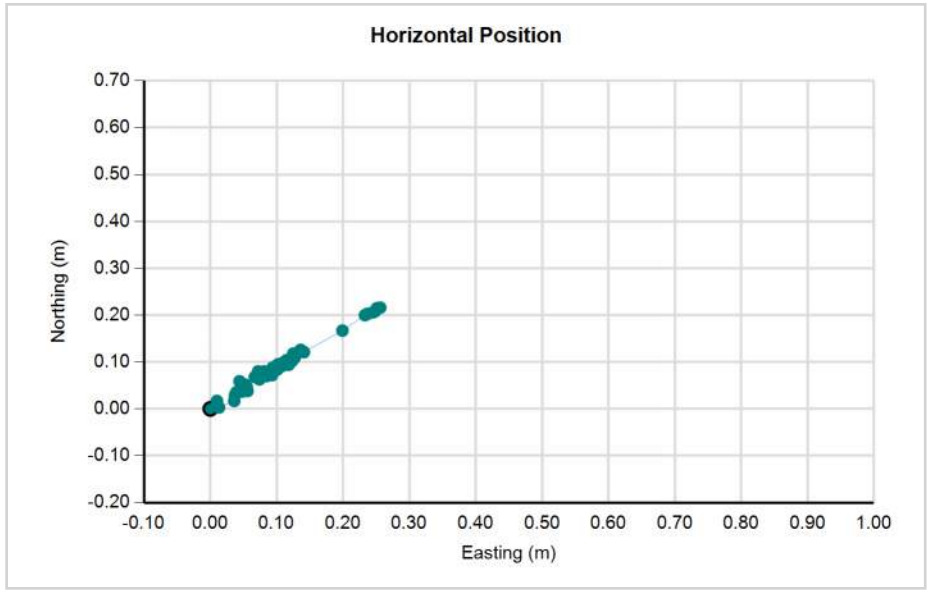
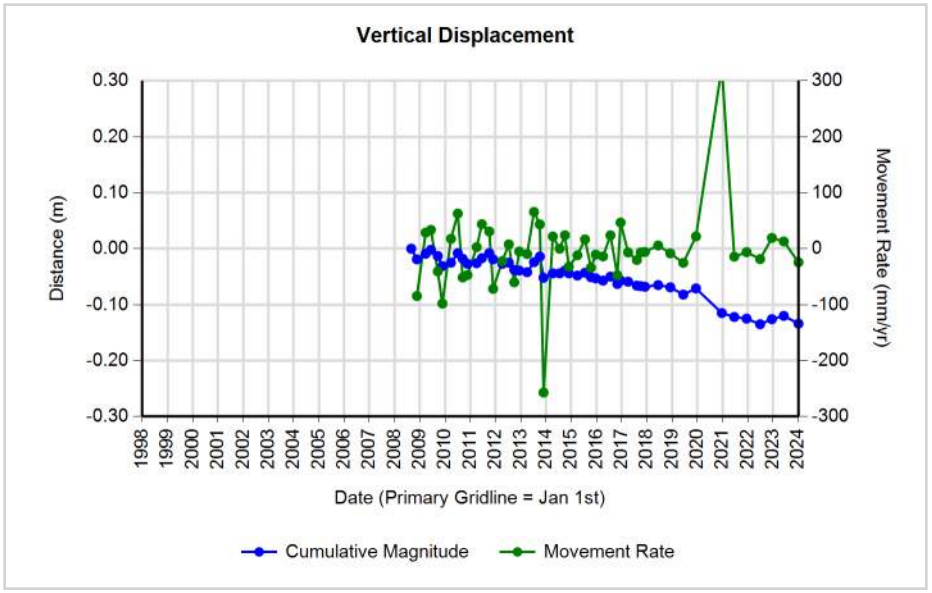
GPS Hub 08-02 (West of Picard Place)

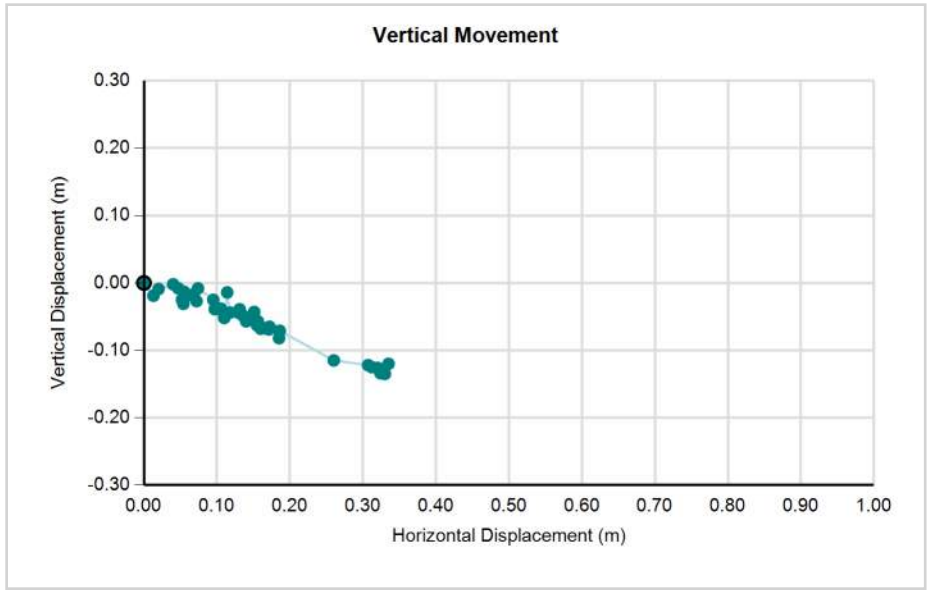
08/08/2017	5870332.710	531627.247	557.055	8.94	0.099	0.119	0.155	-0.066	50.2	-23.1	0.017	-0.007	0.34	0.000	0.001	0.001	-0.007	90.0	-81.9	2.899	-20.292
02/10/2017	5870332.720	531627.255	557.054	9.09	0.109	0.127	0.167	-0.067	49.4	-21.8	0.018	-0.007	0.15	0.010	0.008	0.013	-0.001	38.7	-4.5	85.045	-6.641
04/12/2017	5870332.713	531627.251	557.053	9.26	0.102	0.123	0.160	-0.068	50.3	-23.1	0.017	-0.007	0.17	-0.007	-0.004	0.008	-0.001	209.7	-7.1	-46.742	-5.798
13/06/2018	5870332.729	531627.253	557.056	9.79	0.118	0.125	0.172	-0.065	46.7	-20.7	0.018	-0.007	0.52	0.016	0.002	0.016	0.003	7.1	10.5	30.835	5.737
06/12/2018	5870332.725	531627.256	557.052	10.27	0.114	0.128	0.171	-0.069	48.3	-21.9	0.017	-0.007	0.48	-0.004	0.003	0.005	-0.004	143.1	-38.7	-10.376	-8.301
12/06/2019	5870332.737	531627.264	557.039	10.78	0.126	0.136	0.185	-0.082	47.2	-23.9	0.017	-0.008	0.51	0.012	0.008	0.014	-0.013	33.7	-42.0	28.020	-25.257
12/12/2019	5870332.732	531627.269	557.050	11.29	0.121	0.141	0.186	-0.071	49.4	-20.9	0.016	-0.006	0.50	-0.005	0.005	0.007	0.011	135.0	57.3	14.113	21.955
21/12/2020	5870332.778	531627.327	557.006	12.31	0.167	0.199	0.260	-0.115	50.0	-23.9	0.021	-0.009	0.51	0.019	0.022	0.029	0.166	49.2	80.1	56.778	324.233
19/06/2021	5870332.811	531627.361	556.999	12.80	0.200	0.233	0.307	-0.122	49.4	-21.7	0.024	-0.010	0.49	0.033	0.034	0.047	-0.007	45.9	-8.4	96.145	-14.204
14/12/2021	5870332.814	531627.365	556.996	13.29	0.203	0.237	0.312	-0.125	49.4	-21.8	0.023	-0.009	0.49	0.003	0.004	0.005	-0.003	53.1	-31.0	10.260	-6.156
28/06/2022	5870332.826	531627.379	556.986	13.83	0.215	0.251	0.330	-0.135	49.4	-22.2	0.024	-0.010	0.54	0.012	0.014	0.018	-0.010	49.4	-28.5	34.362	-18.635
16/12/2022	5870332.817	531627.373	556.995	14.30	0.206	0.245	0.320	-0.126	49.9	-21.5	0.022	-0.009	0.47	-0.009	-0.006	0.011	0.009	213.7	39.8	-23.104	19.224
06/06/2023	5870332.827	531627.384	557.001	14.77	0.216	0.256	0.335	-0.120	49.9	-19.7	0.023	-0.008	0.47	0.010	0.011	0.015	0.006	48.0	22.2	31.726	12.954
04/01/2024	5870332.819	531627.376	556.987	15.35	0.208	0.248	0.324	-0.134	50.0	-22.5	0.021	-0.009	0.58	-0.008	-0.008	0.011	-0.014	225.4	-51.1	-19.614	-24.293

GPS Hub 08-02 (West of Picard Place)









CITY OF Quesnel

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GPS Hub 98-05 (Southeast Corner of Lewis Drive and Dawson Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870180.442	531627.209	551.978	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5870180.445	531627.216	551.965	0.25	0.003	0.007	0.008	-0.013	66.8	-59.6	0.031	-0.052	0.25	0.003	0.007	0.008	-0.013	66.8	-59.6	30.568	-52.179
15/04/1999	5870180.438	531627.250	551.951	0.58	-0.004	0.041	0.041	-0.027	95.6	-33.2	0.071	-0.047	0.33	-0.007	0.034	0.035	-0.014	101.6	-22.0	104.785	-42.260
15/12/1999	5870180.448	531627.288	551.953	1.25	0.006	0.079	0.079	-0.025	85.7	-17.5	0.063	-0.020	0.67	0.010	0.038	0.039	0.002	75.3	2.9	58.820	2.994
15/02/2000	5870180.447	531627.289	551.948	1.42	0.005	0.080	0.080	-0.030	86.4	-20.5	0.057	-0.021	0.17	-0.001	0.001	0.001	-0.005	135.0	-74.2	8.331	-29.456
15/05/2000	5870180.448	531627.297	551.936	1.66	0.006	0.088	0.088	-0.042	86.1	-25.5	0.053	-0.025	0.25	0.001	0.008	0.008	-0.012	82.9	-56.1	32.719	-48.700
30/11/2000	5870180.441	531627.341	551.947	2.21	-0.001	0.132	0.132	-0.031	90.4	-13.2	0.060	-0.014	0.54	-0.007	0.044	0.045	0.011	99.0	13.9	81.774	20.190
05/05/2001	5870180.438	531627.349	551.923	2.64	-0.004	0.140	0.140	-0.055	91.6	-21.4	0.053	-0.021	0.43	-0.003	0.008	0.009	-0.024	110.6	-70.4	20.004	-56.192
15/12/2001	5870180.449	531627.379	551.943	3.25	0.007	0.170	0.170	-0.035	87.6	-11.6	0.052	-0.011	0.61	0.011	0.030	0.032	0.020	69.9	32.0	52.102	32.612
15/05/2002	5870180.432	531627.388	551.910	3.66	-0.010	0.179	0.179	-0.068	93.2	-20.8	0.049	-0.019	0.41	-0.017	0.009	0.019	-0.033	152.1	-59.8	46.528	-79.823
24/10/2002	5870180.456	531627.415	551.896	4.11	0.014	0.206	0.206	-0.082	86.1	-21.7	0.050	-0.020	0.44	0.024	0.027	0.036	-0.014	48.4	-21.2	81.448	-31.565
12/11/2003	5870180.438	531627.431	551.910	5.16	-0.004	0.222	0.222	-0.068	91.0	-17.0	0.043	-0.013	1.05	-0.018	0.016	0.024	0.014	137.7	29.9	22.974	13.193
11/01/2005	5870180.448	531627.446	551.906	6.32	0.006	0.237	0.237	-0.072	88.5	-16.8	0.037	-0.011	1.17	0.010	0.015	0.018	-0.004	56.0	-11.4	15.146	-3.061
10/03/2006	5870180.448	531627.506	551.899	7.48	0.006	0.297	0.297	-0.079	88.8	-14.9	0.040	-0.011	1.16	0.000	0.060	0.060	-0.007	90.0	-6.9	51.895	-6.303
10/11/2006	5870180.446	531627.515	551.893	8.15	0.004	0.306	0.306	-0.085	89.3	-15.5	0.038	-0.010	0.67	-0.002	0.009	0.009	-0.006	102.5	-33.1	13.745	-8.945
05/04/2007	5870180.448	531627.529	551.905	8.55	0.006	0.320	0.320	-0.073	88.9	-12.8	0.037	-0.009	0.40	0.002	0.014	0.014	0.012	81.9	40.3	35.380	30.021
16/08/2007	5870180.444	531627.541	551.877	8.92	0.002	0.332	0.332	-0.101	89.7	-16.9	0.037	-0.011	0.36	-0.004	0.012	0.013	-0.028	108.4	-65.7	34.738	-76.895
13/12/2007	5870180.451	531627.538	551.870	9.24	0.009	0.329	0.329	-0.108	88.4	-18.2	0.036	-0.012	0.33	0.007	-0.003	0.008	-0.007	336.8	-42.6	-23.375	-21.485
18/03/2008	5870180.457	531627.544	551.884	9.51	0.015	0.335	0.335	-0.094	87.4	-15.7	0.035	-0.010	0.26	0.006	0.006	0.008	0.014	45.0	58.8	32.284	53.266
03/06/2008	5870180.451	531627.565	551.876	9.72	0.009	0.356	0.356	-0.102	88.6	-16.0	0.037	-0.010	0.21	-0.006	0.021	0.022	-0.008	105.9	-20.1	103.600	-37.948
29/08/2008	5870180.467	531627.582	551.883	9.95	0.025	0.373	0.374	-0.095	86.2	-14.3	0.038	-0.010	0.24	0.016	0.017	0.023	0.007	46.7	16.7	98.010	29.388
19/11/2008	5870180.461	531627.579	551.874	10.18	0.019	0.370	0.370	-0.104	87.1	-15.7	0.036	-0.010	0.22	-0.006	-0.003	0.007	-0.009	206.6	-53.3	-29.880	-40.088
26/03/2009	5870180.457	531627.587	551.873	10.53	0.015	0.378	0.378	-0.105	87.7	-15.5	0.036	-0.010	0.35	-0.004	0.008	0.009	-0.001	116.6	-6.4	25.724	-2.876
10/06/2009	5870180.448	531627.627	551.881	10.74	0.006	0.418	0.418	-0.097	89.2	-13.1	0.039	-0.009	0.21	-0.009	0.040	0.041	0.008	102.7	11.0	197.043	38.447
17/09/2009	5870180.463	531627.632	551.882	11.01	0.021	0.423	0.424	-0.096	87.2	-12.8	0.038	-0.009	0.27	0.015	0.005	0.016	0.001	18.4	3.6	58.334	3.689
23/11/2009	5870180.470	531627.631	551.867	11.19	0.028	0.422	0.423	-0.111	86.2	-14.7	0.038	-0.010	0.18	0.007	-0.001	0.007	-0.015	351.9	-64.8	-38.548	-81.772
27/03/2010	5870180.466	531627.625	551.868	11.53	0.024	0.416	0.417	-0.110	86.7	-14.8	0.036	-0.010	0.34	-0.004	-0.006	0.007	0.001	236.3	7.9	-21.241	2.946
04/07/2010	5870180.454	531627.626	551.858	11.80	0.012	0.417	0.417	-0.120	88.4	-16.0	0.035	-0.010	0.27	-0.012	0.001	0.012	-0.010	175.2	-39.7	44.426	-36.894
13/09/2010	5870180.457	531627.629	551.851	11.99	0.015	0.420	0.420	-0.127	88.0	-16.8	0.035	-0.011	0.19	0.003	0.003	0.004	-0.007	45.0	-58.8	21.826	-36.011
22/11/2010	5870180.460	531627.632	551.862	12.19	0.018	0.423	0.423	-0.116	87.6	-15.3	0.035	-0.010	0.19	0.003	0.003	0.004	0.011	45.0	68.9	22.137	57.396
04/04/2011	5870180.456	531627.633	551.854	12.55	0.014	0.424	0.424	-0.124	88.1	-16.3	0.034	-0.010	0.36	-0.004	0.001	0.004	-0.008	166.0	-62.7	11.323	-21.970
18/06/2011	5870180.458	531627.649	551.867	12.76	0.016	0.440	0.440	-0.111	87.9	-14.1	0.035	-0.009	0.21	0.002	0.016	0.016	0.013	82.9	38.9	78.526	63.310
03/10/2011	5870180.459	531627.644	551.849	13.05	0.017	0.435	0.435	-0.129	87.8	-16.5	0.033	-0.010	0.29	0.001	-0.005	0.005	-0.018	281.3	-74.2	-17.406	-61.444
28/11/2011	5870180.467	531627.647	551.847	13.20	0.025	0.438	0.439	-0.131	86.7	-16.6	0.033	-0.010	0.15	0.008	0.003	0.009	-0.002	20.6	-13.2	55.727	-13.045
09/04/2012	5870180.459	531627.650	551.850	13.57	0.017	0.441	0.441	-0.128	87.8	-16.2	0.033	-0.009	0.36	-0.008	0.003	0.009	0.003	159.4	19.3	23.464	8.239

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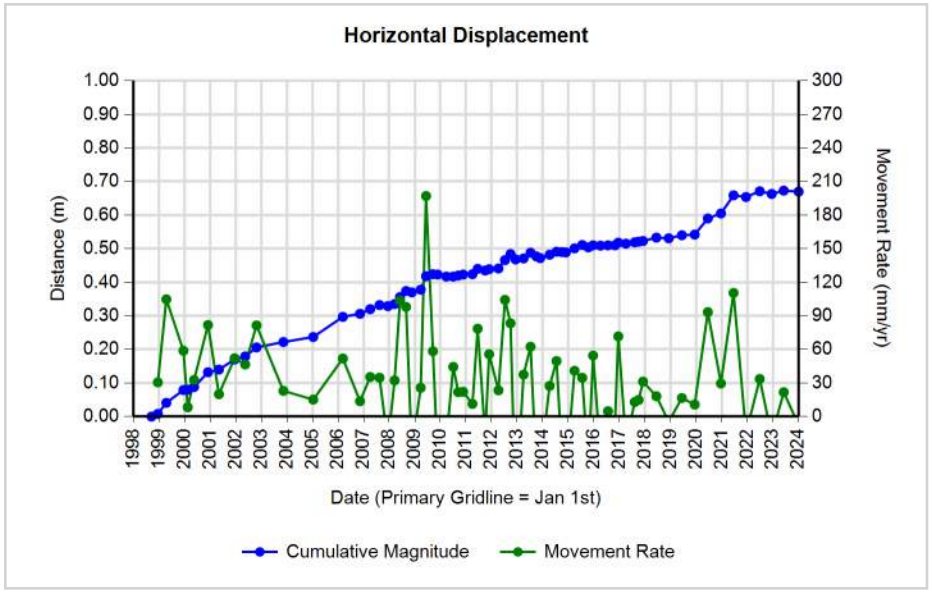
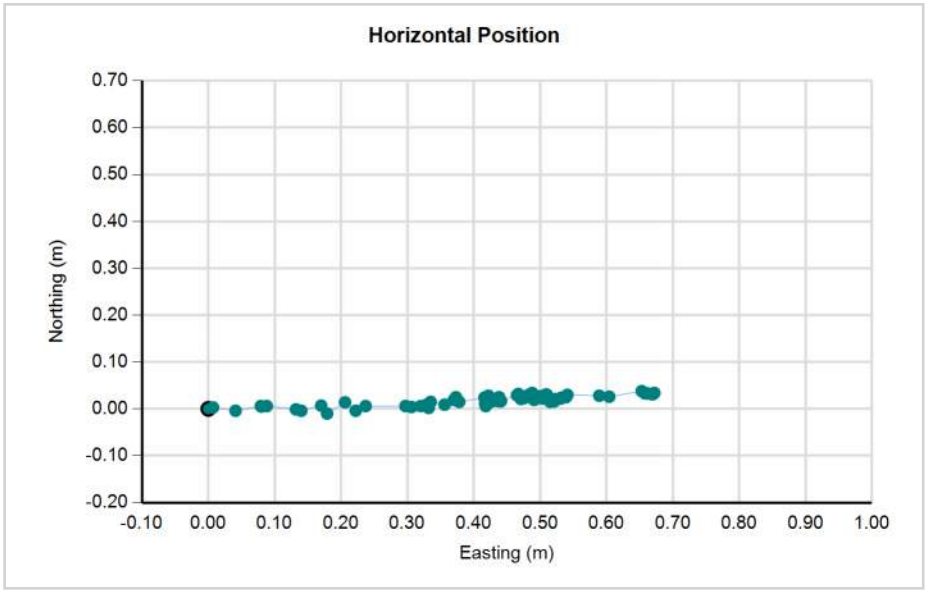
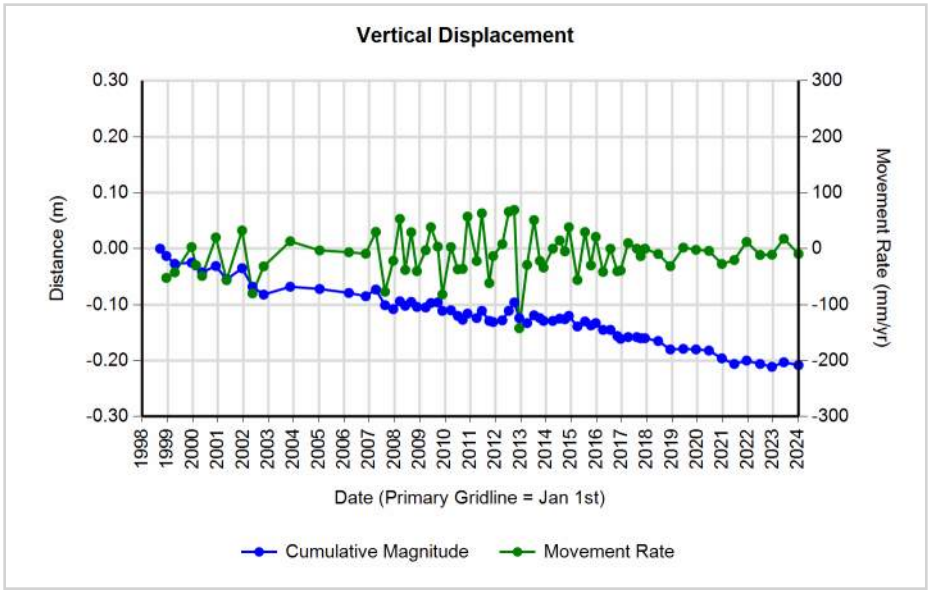
GPS Hub 98-05 (Southeast Corner of Lewis Drive and Dawson Street)

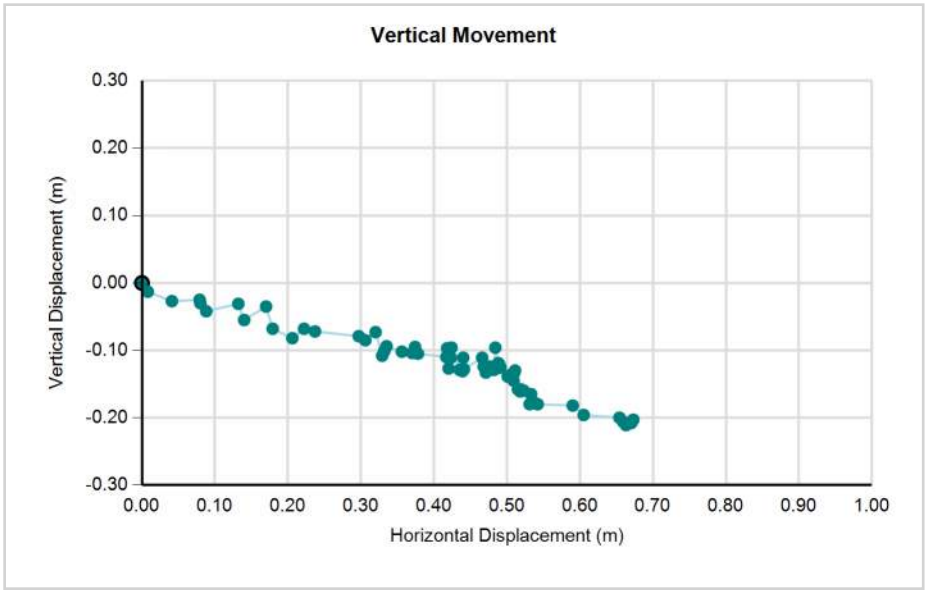
12/07/2012	5870180.471	531627.674	551.867	13.82	0.029	0.465	0.466	-0.111	86.4	-13.4	0.034	-0.008	0.26	0.012	0.024	0.027	0.017	63.4	32.4	104.263	66.056
29/09/2012	5870180.472	531627.692	551.882	14.04	0.030	0.483	0.484	-0.096	86.4	-11.2	0.034	-0.007	0.22	0.001	0.018	0.018	0.015	86.8	39.8	83.350	69.351
10/12/2012	5870180.474	531627.676	551.854	14.24	0.032	0.467	0.468	-0.124	86.1	-14.8	0.033	-0.009	0.20	0.002	-0.016	0.016	-0.028	277.1	-60.1	-81.798	-142.042
03/04/2013	5870180.463	531627.680	551.845	14.55	0.021	0.471	0.471	-0.133	87.4	-15.8	0.032	-0.009	0.31	-0.011	0.004	0.012	-0.009	160.0	-37.6	37.501	-28.836
12/07/2013	5870180.469	531627.696	551.859	14.82	0.027	0.487	0.488	-0.119	86.8	-13.7	0.033	-0.008	0.27	0.006	0.016	0.017	0.014	69.4	39.3	62.414	51.135
04/10/2013	5870180.465	531627.685	551.854	15.05	0.023	0.476	0.477	-0.124	87.2	-14.6	0.032	-0.008	0.23	-0.004	-0.011	0.012	-0.005	250.0	-23.1	-50.895	-21.741
27/11/2013	5870180.469	531627.680	551.849	15.20	0.027	0.471	0.472	-0.129	86.7	-15.3	0.031	-0.008	0.15	0.004	-0.005	0.006	-0.005	308.7	-38.0	-43.310	-33.819
10/04/2014	5870180.470	531627.690	551.849	15.57	0.028	0.481	0.482	-0.129	86.7	-15.0	0.031	-0.008	0.37	0.001	0.010	0.010	0.000	84.3	0.0	27.393	0.000
18/07/2014	5870180.461	531627.700	551.853	15.84	0.019	0.491	0.491	-0.125	87.8	-14.3	0.031	-0.008	0.27	-0.009	0.010	0.013	0.004	132.0	16.6	49.636	14.758
02/10/2014	5870180.468	531627.698	551.852	16.05	0.026	0.489	0.490	-0.126	87.0	-14.4	0.031	-0.008	0.21	0.007	-0.002	0.007	-0.001	344.1	-7.8	-34.988	-4.806
28/11/2014	5870180.476	531627.697	551.858	16.20	0.034	0.488	0.489	-0.120	86.0	-13.8	0.030	-0.007	0.16	0.008	-0.001	0.008	0.006	352.9	36.7	-51.662	38.447
01/04/2015	5870180.469	531627.709	551.839	16.54	0.027	0.500	0.501	-0.139	86.9	-15.5	0.030	-0.008	0.34	-0.007	0.012	0.014	-0.019	120.3	-53.8	40.921	-55.966
20/07/2015	5870180.472	531627.719	551.848	16.84	0.030	0.510	0.511	-0.130	86.6	-14.3	0.030	-0.008	0.30	0.003	0.010	0.010	0.009	73.3	40.8	34.667	29.884
14/10/2015	5870180.464	531627.713	551.841	17.08	0.022	0.504	0.504	-0.137	87.5	-15.2	0.030	-0.008	0.24	-0.008	-0.006	0.010	-0.007	216.9	-35.0	-42.471	-29.730
22/12/2015	5870180.473	531627.718	551.845	17.27	0.031	0.509	0.510	-0.133	86.5	-14.6	0.030	-0.008	0.19	0.009	0.005	0.010	0.004	29.1	21.2	54.500	21.174
06/04/2016	5870180.463	531627.718	551.833	17.56	0.021	0.509	0.509	-0.145	87.6	-15.9	0.029	-0.008	0.29	-0.010	0.000	0.010	-0.012	180.0	-50.2	-34.458	-41.349
22/07/2016	5870180.464	531627.719	551.833	17.85	0.022	0.510	0.510	-0.145	87.5	-15.9	0.029	-0.008	0.29	0.001	0.001	0.001	0.000	45.0	0.0	4.827	0.000
30/10/2016	5870180.465	531627.718	551.822	18.12	0.023	0.509	0.510	-0.156	87.4	-17.0	0.028	-0.009	0.27	0.001	-0.001	0.001	-0.011	315.0	-82.7	-5.165	-40.177
16/12/2016	5870180.463	531627.727	551.817	18.25	0.021	0.518	0.518	-0.161	87.7	-17.3	0.028	-0.009	0.13	-0.002	0.009	0.009	-0.005	102.5	-28.5	71.648	-38.856
04/04/2017	5870180.457	531627.724	551.820	18.55	0.015	0.515	0.515	-0.158	88.3	-17.0	0.028	-0.009	0.30	-0.006	-0.003	0.007	0.003	206.6	24.1	-22.479	10.053
08/08/2017	5870180.459	531627.728	551.820	18.90	0.017	0.519	0.519	-0.158	88.1	-16.9	0.027	-0.008	0.34	0.002	0.004	0.004	0.000	63.4	0.0	12.964	0.000
02/10/2017	5870180.458	531627.730	551.818	19.05	0.016	0.521	0.521	-0.160	88.2	-17.1	0.027	-0.008	0.15	-0.001	0.002	0.002	-0.002	116.6	-41.8	14.850	-13.282
04/12/2017	5870180.463	531627.732	551.818	19.22	0.021	0.523	0.523	-0.160	87.7	-17.0	0.027	-0.008	0.17	0.005	0.002	0.005	0.000	21.8	0.0	31.221	0.000
13/06/2018	5870180.466	531627.741	551.813	19.74	0.024	0.532	0.533	-0.165	87.4	-17.2	0.027	-0.008	0.52	0.003	0.009	0.009	-0.005	71.6	-27.8	18.142	-9.562
06/12/2018	5870180.464	531627.740	551.798	20.22	0.022	0.531	0.531	-0.180	87.6	-18.7	0.026	-0.009	0.48	-0.002	-0.001	0.002	-0.015	206.6	-81.5	-4.640	-31.129
12/06/2019	5870180.467	531627.748	551.799	20.74	0.025	0.539	0.540	-0.179	87.3	-18.4	0.026	-0.009	0.51	0.003	0.008	0.009	0.001	69.4	6.7	16.599	1.943
12/12/2019	5870180.472	531627.750	551.798	21.24	0.030	0.541	0.542	-0.180	86.8	-18.4	0.026	-0.008	0.50	0.005	0.002	0.005	-0.001	21.8	-10.5	10.748	-1.996
17/06/2020	5870180.470	531627.798	551.796	21.75	0.028	0.589	0.590	-0.182	87.3	-17.2	0.027	-0.008	0.51	-0.002	0.048	0.048	-0.002	92.4	-2.4	93.336	-3.886
21/12/2020	5870180.468	531627.813	551.782	22.27	0.026	0.604	0.605	-0.196	87.5	-18.0	0.027	-0.009	0.51	-0.002	0.015	0.015	-0.014	97.6	-42.8	29.557	-27.345
19/06/2021	5870180.475	531627.867	551.772	22.76	0.033	0.658	0.659	-0.206	87.1	-17.4	0.029	-0.009	0.49	0.007	0.054	0.054	-0.010	82.6	-10.4	110.492	-20.292
14/12/2021	5870180.480	531627.862	551.778	23.25	0.038	0.653	0.654	-0.200	86.7	-17.0	0.028	-0.009	0.49	0.005	-0.005	0.007	0.006	315.0	40.3	-14.510	12.312
28/06/2022	5870180.474	531627.879	551.772	23.78	0.032	0.670	0.671	-0.206	87.3	-17.1	0.028	-0.009	0.54	-0.006	0.017	0.018	-0.006	109.4	-18.4	33.595	-11.181
16/12/2022	5870180.475	531627.871	551.767	24.25	0.033	0.662	0.663	-0.211	87.1	-17.7	0.027	-0.009	0.47	0.001	-0.008	0.008	-0.005	277.1	-31.8	-17.221	-10.680
06/06/2023	5870180.476	531627.881	551.775	24.72	0.034	0.672	0.673	-0.203	87.1	-16.8	0.027	-0.008	0.47	0.001	0.010	0.010	0.008	84.4	39.3	21.764	17.817
04/01/2024	5870180.473	531627.878	551.770	25.30	0.031	0.669	0.670	-0.208	87.3	-17.3	0.026	-0.008	0.58	-0.003	-0.003	0.004	-0.005	226.8	-50.9	-7.557	-9.286

GPS Hub 98-05 (Southeast Corner of Lewis Drive and Dawson Street)









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GPS Hub 98-06 (West End of Paley Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870474.774	531664.168	539.628	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5870474.771	531664.179	539.615	0.25	-0.003	0.011	0.011	-0.013	105.3	-48.7	0.046	-0.052	0.25	-0.003	0.011	0.011	-0.013	105.3	-48.7	45.764	-52.179
15/04/1999	5870474.788	531664.208	539.613	0.58	0.014	0.040	0.042	-0.015	70.7	-19.5	0.073	-0.026	0.33	0.017	0.029	0.034	-0.002	59.6	-3.4	101.471	-6.037
15/12/1999	5870474.805	531664.239	539.608	1.25	0.031	0.071	0.077	-0.020	66.4	-14.5	0.062	-0.016	0.67	0.017	0.031	0.035	-0.005	61.3	-8.0	52.924	-7.485
15/02/2000	5870474.829	531664.236	539.608	1.42	0.055	0.068	0.087	-0.020	51.0	-12.9	0.062	-0.014	0.17	0.024	-0.003	0.024	0.000	352.9	0.0	142.487	0.000
15/05/2000	5870474.840	531664.240	539.586	1.66	0.066	0.072	0.098	-0.042	47.5	-23.3	0.059	-0.025	0.25	0.011	0.004	0.012	-0.022	20.0	-62.0	47.502	-89.283
30/11/2000	5870474.883	531664.276	539.588	2.21	0.109	0.108	0.153	-0.040	44.7	-14.6	0.069	-0.018	0.54	0.043	0.036	0.056	0.002	39.9	2.0	102.931	3.671
05/05/2001	5870474.886	531664.285	539.551	2.64	0.112	0.117	0.162	-0.077	46.3	-25.4	0.061	-0.029	0.43	0.003	0.009	0.009	-0.037	71.6	-75.6	22.212	-86.630
15/12/2001	5870474.904	531664.298	539.564	3.25	0.130	0.130	0.184	-0.064	45.0	-19.2	0.057	-0.020	0.61	0.018	0.013	0.022	0.013	35.8	30.3	36.205	21.198
15/05/2002	5870474.892	531664.320	539.554	3.66	0.118	0.152	0.192	-0.074	52.2	-21.0	0.053	-0.020	0.41	-0.012	0.022	0.025	-0.010	118.6	-21.8	60.617	-24.189
24/10/2002	5870474.971	531664.345	539.518	4.11	0.197	0.177	0.265	-0.110	41.9	-22.6	0.064	-0.027	0.44	0.079	0.025	0.083	-0.036	17.6	-23.5	186.822	-81.167
12/11/2003	5870474.963	531664.357	539.530	5.16	0.189	0.189	0.267	-0.098	45.0	-20.2	0.052	-0.019	1.05	-0.008	0.012	0.014	0.012	125.2	38.8	13.775	11.072
11/01/2005	5870474.983	531664.364	539.544	6.32	0.209	0.196	0.287	-0.084	43.1	-16.3	0.045	-0.013	1.17	0.021	0.007	0.022	0.015	18.8	34.0	18.784	12.655
10/03/2006	5870475.037	531664.410	539.513	7.48	0.263	0.242	0.357	-0.115	42.6	-17.8	0.048	-0.015	1.16	0.054	0.046	0.071	-0.031	40.7	-23.9	61.046	-27.113
10/11/2006	5870475.043	531664.421	539.509	8.15	0.269	0.253	0.369	-0.119	43.2	-17.9	0.045	-0.015	0.67	0.006	0.011	0.013	-0.004	61.4	-17.7	18.680	-5.963
05/04/2007	5870475.051	531664.427	539.493	8.55	0.277	0.259	0.379	-0.135	43.1	-19.6	0.044	-0.016	0.40	0.008	0.006	0.010	-0.016	36.9	-58.0	25.017	-40.027
16/08/2007	5870475.072	531664.442	539.521	8.92	0.298	0.274	0.405	-0.107	42.6	-14.8	0.045	-0.012	0.36	0.021	0.015	0.026	0.028	35.5	47.3	70.872	76.895
13/12/2007	5870475.070	531664.444	539.479	9.24	0.296	0.276	0.405	-0.149	43.0	-20.2	0.044	-0.016	0.33	-0.002	0.002	0.003	-0.042	135.0	-86.1	-8.681	-128.912
18/03/2008	5870475.074	531664.442	539.498	9.51	0.300	0.274	0.406	-0.130	42.4	-17.7	0.043	-0.014	0.26	0.004	-0.002	0.004	0.019	333.4	76.8	17.015	72.289
03/06/2008	5870475.090	531664.464	539.498	9.72	0.316	0.296	0.433	-0.130	43.1	-16.7	0.045	-0.013	0.21	0.016	0.022	0.027	0.000	54.0	0.0	129.037	0.000
29/08/2008	5870475.091	531664.475	539.507	9.95	0.317	0.307	0.441	-0.121	44.1	-15.3	0.044	-0.012	0.24	0.001	0.011	0.011	0.009	84.8	39.2	46.371	37.784
19/11/2008	5870475.108	531664.470	539.474	10.18	0.334	0.302	0.450	-0.154	42.1	-18.9	0.044	-0.015	0.22	0.017	-0.005	0.018	-0.033	343.6	-61.8	78.930	-146.991
26/03/2009	5870475.114	531664.476	539.477	10.53	0.340	0.308	0.459	-0.151	42.2	-18.2	0.044	-0.014	0.35	0.006	0.006	0.008	0.003	45.0	19.5	24.404	8.628
10/06/2009	5870475.129	531664.500	539.474	10.74	0.355	0.332	0.486	-0.154	43.1	-17.6	0.045	-0.014	0.21	0.015	0.024	0.028	-0.003	58.0	-6.1	136.017	-14.418
17/09/2009	5870475.129	531664.519	539.500	11.01	0.355	0.351	0.499	-0.128	44.7	-14.4	0.045	-0.012	0.27	0.000	0.019	0.019	0.026	90.0	53.8	70.098	95.924
23/11/2009	5870475.157	531664.507	539.459	11.19	0.383	0.339	0.511	-0.169	41.5	-18.3	0.046	-0.015	0.18	0.028	-0.012	0.030	-0.041	336.8	-53.4	166.069	-223.511
27/03/2010	5870475.154	531664.513	539.470	11.53	0.380	0.345	0.513	-0.158	42.2	-17.1	0.045	-0.014	0.34	-0.003	0.006	0.007	0.011	116.6	58.6	19.759	32.401
04/07/2010	5870475.139	531664.511	539.473	11.80	0.365	0.343	0.501	-0.155	43.2	-17.2	0.042	-0.013	0.27	-0.015	-0.002	0.015	0.003	187.6	11.2	-55.831	11.068
13/09/2010	5870475.144	531664.522	539.490	11.99	0.370	0.354	0.512	-0.138	43.7	-15.1	0.043	-0.012	0.19	0.005	0.011	0.012	0.017	65.6	54.6	62.160	87.454
22/11/2010	5870475.151	531664.516	539.453	12.19	0.377	0.348	0.513	-0.175	42.7	-18.8	0.042	-0.014	0.19	0.007	-0.006	0.009	-0.037	319.4	-76.0	48.106	-193.061
04/04/2011	5870475.161	531664.509	539.449	12.55	0.387	0.341	0.516	-0.179	41.4	-19.1	0.041	-0.014	0.36	0.010	-0.007	0.012	-0.004	325.0	-18.1	33.522	-10.985
18/06/2011	5870475.155	531664.531	539.484	12.76	0.381	0.363	0.526	-0.144	43.6	-15.3	0.041	-0.011	0.21	-0.006	0.022	0.023	0.035	105.3	56.9	111.053	170.450
03/10/2011	5870475.172	531664.524	539.464	13.05	0.398	0.356	0.534	-0.164	41.8	-17.1	0.041	-0.013	0.29	0.017	-0.007	0.018	-0.020	337.6	-47.4	62.757	-68.271
28/11/2011	5870475.169	531664.527	539.453	13.20	0.395	0.359	0.534	-0.175	42.3	-18.2	0.040	-0.013	0.15	-0.003	0.003	0.004	-0.011	135.0	-68.9	-27.672	-71.746
09/04/2012	5870475.170	531664.529	539.461	13.57	0.396	0.361	0.536	-0.167	42.4	-17.3	0.039	-0.012	0.36	0.001	0.002	0.002	0.008	63.4	74.4	6.141	21.970

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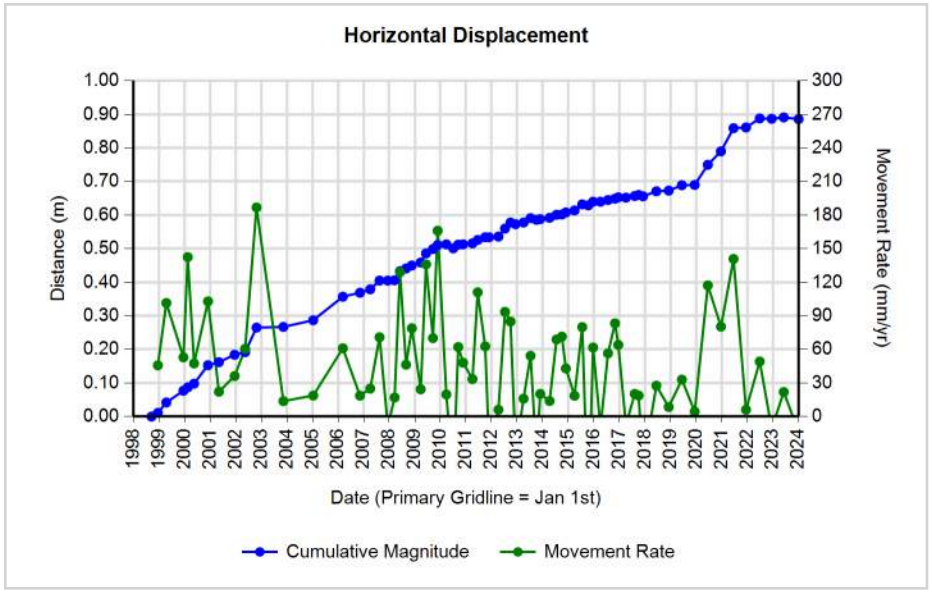
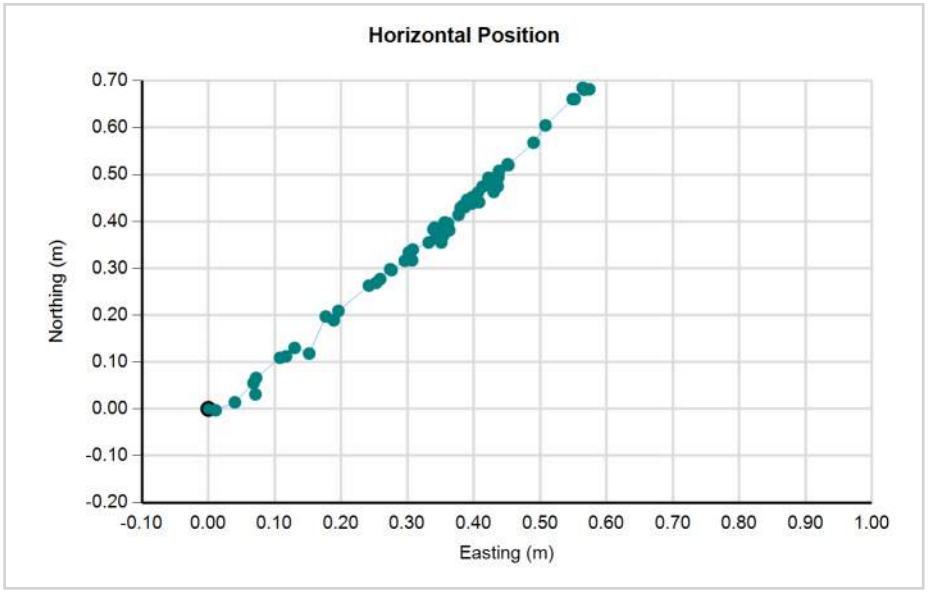
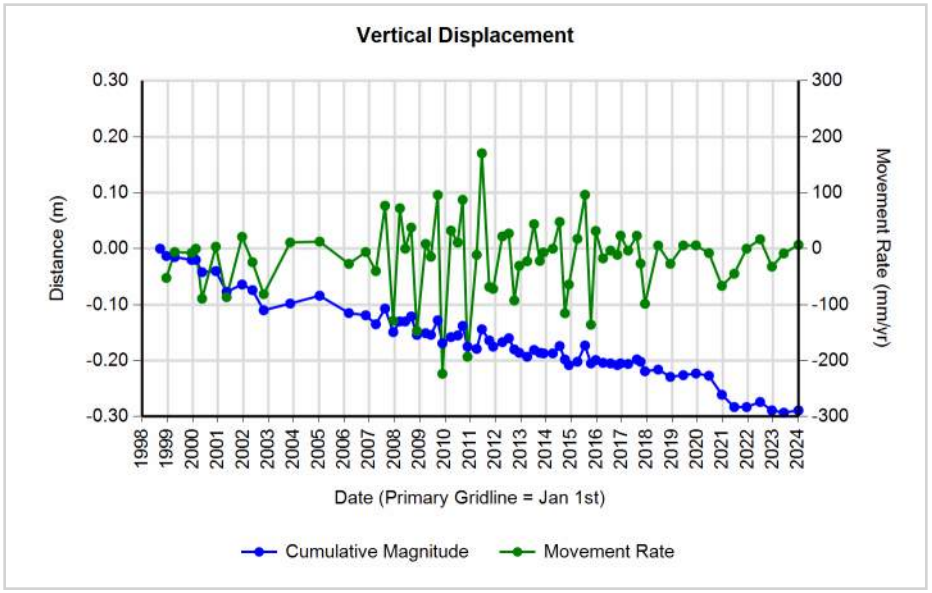
GPS Hub 98-06 (West End of Paley Avenue)

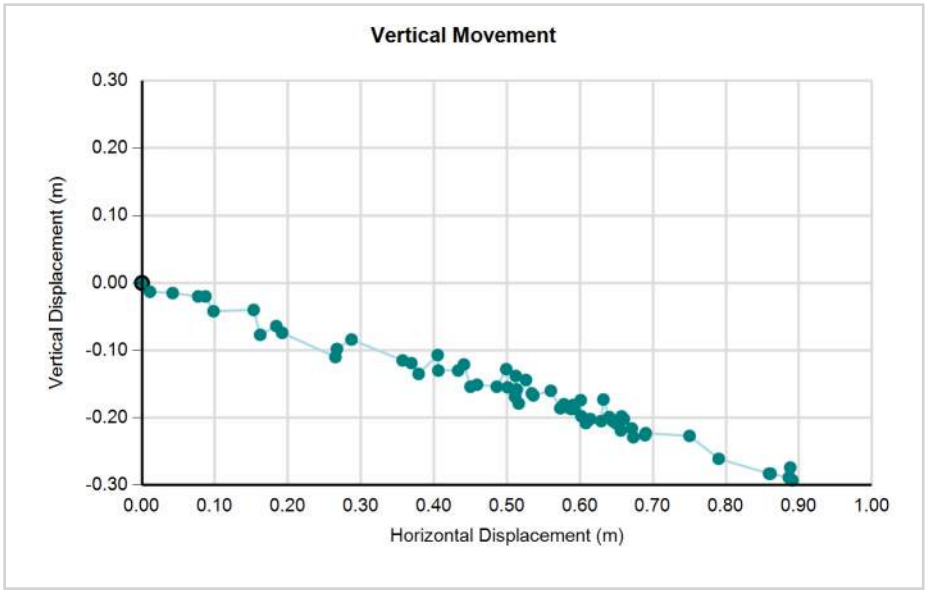
12/07/2012	5870475.188	531664.545	539.468	13.82	0.414	0.377	0.560	-0.160	42.3	-15.9	0.041	-0.012	0.26	0.018	0.016	0.024	0.007	41.6	16.2	93.579	27.199
29/09/2012	5870475.204	531664.554	539.448	14.04	0.430	0.386	0.578	-0.180	41.9	-17.3	0.041	-0.013	0.22	0.016	0.009	0.018	-0.020	29.4	-47.5	84.875	-92.468
10/12/2012	5870475.203	531664.548	539.442	14.24	0.429	0.380	0.573	-0.186	41.5	-18.0	0.040	-0.013	0.20	-0.001	-0.006	0.006	-0.006	260.5	-44.6	-30.857	-30.437
03/04/2013	5870475.207	531664.551	539.435	14.55	0.433	0.383	0.578	-0.193	41.5	-18.5	0.040	-0.013	0.31	0.004	0.003	0.005	-0.007	36.9	-54.5	16.020	-22.428
12/07/2013	5870475.212	531664.565	539.447	14.82	0.438	0.397	0.591	-0.181	42.2	-17.0	0.040	-0.012	0.27	0.005	0.014	0.015	0.012	70.3	38.9	54.298	43.830
04/10/2013	5870475.212	531664.557	539.442	15.05	0.438	0.389	0.586	-0.186	41.6	-17.6	0.039	-0.012	0.23	0.000	-0.008	0.008	-0.005	270.0	-32.0	-34.786	-21.741
27/11/2013	5870475.215	531664.557	539.441	15.20	0.441	0.389	0.588	-0.187	41.4	-17.6	0.039	-0.012	0.15	0.003	0.000	0.003	-0.001	0.0	-18.4	20.292	-6.764
10/04/2014	5870475.220	531664.558	539.441	15.57	0.446	0.390	0.592	-0.187	41.2	-17.5	0.038	-0.012	0.37	0.005	0.001	0.005	0.000	11.3	0.0	13.899	0.000
18/07/2014	5870475.215	531664.576	539.454	15.84	0.441	0.408	0.601	-0.174	42.8	-16.2	0.038	-0.011	0.27	-0.005	0.018	0.019	0.013	105.5	34.8	68.924	47.962
02/10/2014	5870475.226	531664.566	539.430	16.05	0.452	0.398	0.602	-0.198	41.4	-18.2	0.038	-0.012	0.21	0.011	-0.010	0.015	-0.024	317.7	-58.2	71.445	-115.342
28/11/2014	5870475.229	531664.572	539.420	16.20	0.455	0.404	0.608	-0.208	41.6	-18.9	0.038	-0.013	0.16	0.003	0.006	0.007	-0.010	63.4	-56.1	42.985	-64.079
01/04/2015	5870475.235	531664.574	539.426	16.54	0.461	0.406	0.614	-0.202	41.4	-18.2	0.037	-0.012	0.34	0.006	0.002	0.006	0.006	18.4	43.5	18.629	17.673
20/07/2015	5870475.237	531664.598	539.455	16.84	0.463	0.430	0.632	-0.173	42.9	-15.3	0.038	-0.010	0.30	0.002	0.024	0.024	0.029	85.2	50.3	79.967	96.293
14/10/2015	5870475.248	531664.581	539.423	17.08	0.474	0.413	0.629	-0.205	41.1	-18.1	0.037	-0.012	0.24	0.011	-0.017	0.020	-0.032	302.9	-57.7	-85.997	-135.907
22/12/2015	5870475.254	531664.591	539.429	17.27	0.480	0.423	0.640	-0.199	41.4	-17.3	0.037	-0.012	0.19	0.006	0.010	0.012	0.006	59.0	27.2	61.732	31.761
06/04/2016	5870475.256	531664.589	539.424	17.56	0.482	0.421	0.640	-0.204	41.1	-17.7	0.036	-0.012	0.29	0.002	-0.002	0.003	-0.005	315.0	-60.5	-9.746	-17.229
22/07/2016	5870475.249	531664.604	539.423	17.85	0.475	0.436	0.645	-0.205	42.5	-17.6	0.036	-0.011	0.29	-0.007	0.015	0.017	-0.001	115.0	-3.5	56.504	-3.414
30/10/2016	5870475.267	531664.590	539.420	18.12	0.493	0.422	0.649	-0.208	40.6	-17.8	0.036	-0.011	0.27	0.018	-0.014	0.023	-0.003	322.1	-7.5	83.290	-10.958
16/12/2016	5870475.265	531664.598	539.423	18.25	0.491	0.430	0.653	-0.205	41.2	-17.4	0.036	-0.011	0.13	-0.002	0.008	0.008	0.003	104.0	20.0	64.084	23.314
04/04/2017	5870475.266	531664.596	539.422	18.55	0.492	0.428	0.652	-0.206	41.0	-17.5	0.035	-0.011	0.30	0.001	-0.002	0.002	-0.001	296.6	-24.1	-7.493	-3.351
08/08/2017	5870475.266	531664.603	539.430	18.90	0.492	0.435	0.657	-0.198	41.5	-16.8	0.035	-0.010	0.34	0.000	0.007	0.007	0.008	90.0	48.8	20.292	23.190
02/10/2017	5870475.268	531664.605	539.426	19.05	0.494	0.437	0.660	-0.202	41.5	-17.0	0.035	-0.011	0.15	0.002	0.002	0.003	-0.004	45.0	-54.7	18.783	-26.564
04/12/2017	5870475.270	531664.598	539.409	19.22	0.496	0.430	0.656	-0.219	40.9	-18.4	0.034	-0.011	0.17	0.002	-0.007	0.007	-0.017	285.9	-66.8	-42.207	-98.560
13/06/2018	5870475.282	531664.606	539.412	19.74	0.508	0.438	0.671	-0.216	40.8	-17.8	0.034	-0.011	0.52	0.012	0.008	0.014	0.003	33.7	11.8	27.580	5.737
06/12/2018	5870475.286	531664.605	539.399	20.22	0.512	0.437	0.673	-0.229	40.5	-18.8	0.033	-0.011	0.48	0.004	-0.001	0.004	-0.013	346.0	-72.4	8.557	-26.979
12/06/2019	5870475.294	531664.620	539.402	20.74	0.520	0.452	0.689	-0.226	41.0	-18.2	0.033	-0.011	0.51	0.008	0.015	0.017	0.003	61.9	10.0	33.028	5.828
12/12/2019	5870475.296	531664.619	539.405	21.24	0.522	0.451	0.690	-0.223	40.8	-17.9	0.032	-0.010	0.50	0.002	-0.001	0.002	0.003	333.4	53.3	4.463	5.988
17/06/2020	5870475.342	531664.658	539.401	21.75	0.568	0.490	0.750	-0.227	40.8	-16.8	0.034	-0.010	0.51	0.046	0.039	0.060	-0.004	40.3	-3.8	117.167	-7.771
21/12/2020	5870475.379	531664.676	539.367	22.27	0.605	0.508	0.790	-0.261	40.0	-18.3	0.035	-0.012	0.51	0.037	0.018	0.041	-0.034	25.9	-39.6	80.367	-66.409
19/06/2021	5870475.435	531664.717	539.345	22.76	0.661	0.549	0.859	-0.283	39.7	-18.2	0.038	-0.012	0.49	0.056	0.041	0.069	-0.022	36.2	-17.6	140.834	-44.642
14/12/2021	5870475.435	531664.720	539.345	23.25	0.661	0.552	0.861	-0.283	39.9	-18.2	0.037	-0.012	0.49	0.000	0.003	0.003	0.000	90.0	0.0	6.156	0.000
28/06/2022	5870475.456	531664.736	539.354	23.78	0.682	0.568	0.888	-0.274	39.8	-17.2	0.037	-0.012	0.54	0.021	0.016	0.026	0.009	37.3	18.8	49.198	16.772
16/12/2022	5870475.459	531664.732	539.339	24.25	0.685	0.564	0.887	-0.289	39.5	-18.0	0.037	-0.012	0.47	0.003	-0.004	0.005	-0.015	306.9	-71.6	-10.680	-32.039
06/06/2023	5870475.456	531664.742	539.335	24.72	0.682	0.574	0.891	-0.293	40.1	-18.2	0.036	-0.012	0.47	-0.003	0.010	0.010	-0.004	106.9	-21.1	21.967	-8.473
04/01/2024	5870475.455	531664.734	539.339	25.30	0.681	0.566	0.886	-0.289	39.7	-18.1	0.035	-0.011	0.58	-0.001	-0.008	0.008	0.004	262.8	26.6	-13.719	6.874

GPS Hub 98-06 (West End of Paley Avenue)









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GPS Hub 98-07 (North Side of Paley Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870427.297	531932.241	533.473	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5870427.299	531932.249	533.467	0.25	0.002	0.008	0.008	-0.006	76.0	-36.0	0.033	-0.024	0.25	0.002	0.008	0.008	-0.006	76.0	-36.0	33.098	-24.082
15/04/1999	5870427.300	531932.279	533.462	0.58	0.003	0.038	0.038	-0.011	85.5	-16.1	0.066	-0.019	0.33	0.001	0.030	0.030	-0.005	88.1	-9.5	90.608	-15.093
15/12/1999	5870427.321	531932.307	533.461	1.25	0.024	0.066	0.070	-0.012	70.0	-9.7	0.056	-0.010	0.67	0.021	0.028	0.035	-0.001	53.1	-1.6	52.392	-1.497
15/02/2000	5870427.327	531932.311	533.457	1.42	0.030	0.070	0.076	-0.016	66.8	-11.9	0.054	-0.011	0.17	0.006	0.004	0.007	-0.004	33.7	-29.0	42.482	-23.565
15/05/2000	5870427.334	531932.321	533.449	1.66	0.037	0.080	0.088	-0.024	65.2	-15.2	0.053	-0.014	0.25	0.007	0.010	0.012	-0.008	55.0	-33.2	49.538	-32.467
30/11/2000	5870427.348	531932.349	533.436	2.21	0.051	0.108	0.119	-0.037	64.7	-17.2	0.054	-0.017	0.54	0.014	0.028	0.031	-0.013	63.4	-22.6	57.458	-23.861
05/05/2001	5870427.359	531932.364	533.417	2.64	0.062	0.123	0.138	-0.056	63.2	-22.1	0.052	-0.021	0.43	0.011	0.015	0.019	-0.019	53.7	-45.6	43.552	-44.486
15/12/2001	5870427.363	531932.376	533.430	3.25	0.066	0.135	0.150	-0.043	63.9	-16.0	0.046	-0.013	0.61	0.004	0.012	0.013	0.013	71.6	45.8	20.625	21.198
15/05/2002	5870427.379	531932.388	533.422	3.66	0.082	0.147	0.168	-0.051	60.8	-16.9	0.046	-0.014	0.41	0.016	0.012	0.020	-0.008	36.9	-21.8	48.377	-19.351
24/10/2002	5870427.421	531932.432	533.390	4.11	0.124	0.191	0.228	-0.083	57.0	-20.0	0.055	-0.020	0.44	0.042	0.044	0.061	-0.032	46.3	-27.7	137.144	-72.148
12/11/2003	5870427.392	531932.439	533.408	5.16	0.095	0.198	0.219	-0.065	64.3	-16.5	0.043	-0.013	1.05	-0.029	0.007	0.030	0.018	167.1	31.3	-28.284	17.169
11/01/2005	5870427.408	531932.451	533.424	6.32	0.111	0.210	0.237	-0.049	62.1	-11.7	0.037	-0.008	1.17	0.016	0.012	0.020	0.016	37.0	38.4	17.062	13.504
10/03/2006	5870427.431	531932.506	533.396	7.48	0.134	0.265	0.297	-0.077	63.2	-14.5	0.040	-0.010	1.16	0.023	0.055	0.060	-0.028	67.4	-24.9	51.828	-24.005
10/11/2006	5870427.441	531932.519	533.389	8.15	0.144	0.278	0.313	-0.084	62.6	-15.0	0.038	-0.010	0.67	0.010	0.013	0.016	-0.007	52.4	-23.1	24.451	-10.436
05/04/2007	5870427.447	531932.528	533.380	8.55	0.150	0.287	0.324	-0.093	62.4	-16.0	0.038	-0.011	0.40	0.006	0.009	0.011	-0.009	56.3	-39.8	27.060	-22.515
16/08/2007	5870427.454	531932.536	533.400	8.92	0.157	0.295	0.334	-0.073	62.0	-12.3	0.037	-0.008	0.36	0.007	0.008	0.011	0.020	48.8	62.0	29.193	54.925
13/12/2007	5870427.455	531932.537	533.372	9.24	0.158	0.296	0.336	-0.101	61.9	-16.8	0.036	-0.011	0.33	0.001	0.001	0.001	-0.028	45.0	-87.1	4.341	-85.941
18/03/2008	5870427.459	531932.544	533.382	9.51	0.162	0.303	0.344	-0.091	61.9	-14.8	0.036	-0.010	0.26	0.004	0.007	0.008	0.010	60.3	51.1	30.674	38.047
03/06/2008	5870427.460	531932.561	533.391	9.72	0.163	0.320	0.359	-0.082	63.0	-12.9	0.037	-0.008	0.21	0.001	0.017	0.017	0.009	86.6	27.9	80.779	42.692
29/08/2008	5870427.458	531932.561	533.399	9.95	0.161	0.320	0.358	-0.074	63.3	-11.7	0.036	-0.007	0.24	-0.002	0.000	0.002	0.008	180.0	76.0	-8.397	33.586
19/11/2008	5870427.480	531932.572	533.372	10.18	0.183	0.331	0.378	-0.101	61.1	-15.0	0.037	-0.010	0.22	0.022	0.011	0.025	-0.027	26.6	-47.7	109.561	-120.265
26/03/2009	5870427.478	531932.579	533.376	10.53	0.181	0.338	0.383	-0.097	61.8	-14.2	0.036	-0.009	0.35	-0.002	0.007	0.007	0.004	105.9	28.8	20.937	11.504
10/06/2009	5870427.484	531932.604	533.378	10.74	0.187	0.363	0.408	-0.095	62.7	-13.1	0.038	-0.009	0.21	0.006	0.025	0.026	0.002	76.5	4.4	123.560	9.612
17/09/2009	5870427.491	531932.612	533.372	11.01	0.194	0.371	0.419	-0.101	62.4	-13.6	0.038	-0.009	0.27	0.007	0.008	0.011	-0.006	48.8	-29.4	39.219	-22.136
23/11/2009	5870427.506	531932.605	533.360	11.19	0.209	0.364	0.420	-0.113	60.1	-15.1	0.038	-0.010	0.18	0.015	-0.007	0.017	-0.012	335.0	-35.9	90.238	-65.418
27/03/2010	5870427.502	531932.614	533.363	11.53	0.205	0.373	0.426	-0.110	61.2	-14.5	0.037	-0.010	0.34	-0.004	0.009	0.010	0.003	114.0	16.9	29.010	8.837
04/07/2010	5870427.482	531932.599	533.376	11.80	0.185	0.358	0.403	-0.097	62.7	-13.5	0.034	-0.008	0.27	-0.020	-0.015	0.025	0.013	216.9	27.5	-92.235	47.962
13/09/2010	5870427.496	531932.611	533.363	11.99	0.199	0.370	0.420	-0.110	61.7	-14.7	0.035	-0.009	0.19	0.014	0.012	0.018	-0.013	40.6	-35.2	94.857	-66.877
22/11/2010	5870427.504	531932.621	533.356	12.19	0.207	0.380	0.433	-0.117	61.4	-15.1	0.036	-0.010	0.19	0.008	0.010	0.013	-0.007	51.3	-28.7	66.821	-36.525
04/04/2011	5870427.500	531932.620	533.362	12.55	0.203	0.379	0.430	-0.111	61.8	-14.5	0.034	-0.009	0.36	-0.004	-0.001	0.004	0.006	194.0	55.5	-11.323	16.477
18/06/2011	5870427.507	531932.629	533.363	12.76	0.210	0.388	0.441	-0.110	61.6	-14.0	0.035	-0.009	0.21	0.007	0.009	0.011	0.001	52.1	5.0	55.527	4.870
03/10/2011	5870427.511	531932.622	533.366	13.05	0.214	0.381	0.437	-0.107	60.7	-13.8	0.033	-0.008	0.29	0.004	-0.007	0.008	0.003	299.7	20.4	-27.521	10.241
28/11/2011	5870427.516	531932.632	533.356	13.20	0.219	0.391	0.448	-0.117	60.7	-14.6	0.034	-0.009	0.15	0.005	0.010	0.011	-0.010	63.4	-41.8	72.922	-65.223
09/04/2012	5870427.507	531932.637	533.367	13.57	0.210	0.396	0.448	-0.106	62.1	-13.3	0.033	-0.008	0.36	-0.009	0.005	0.010	0.011	150.9	46.9	28.274	30.209

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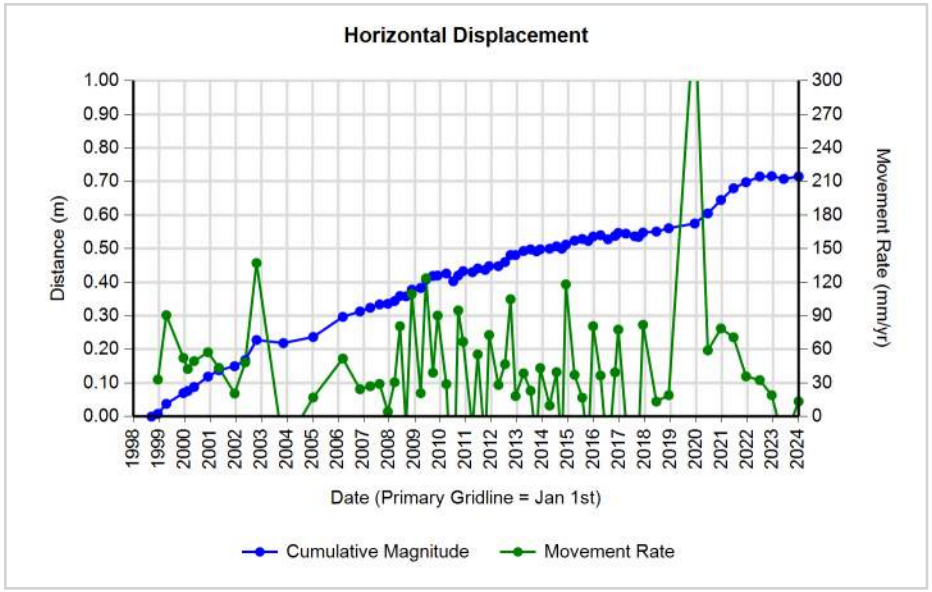
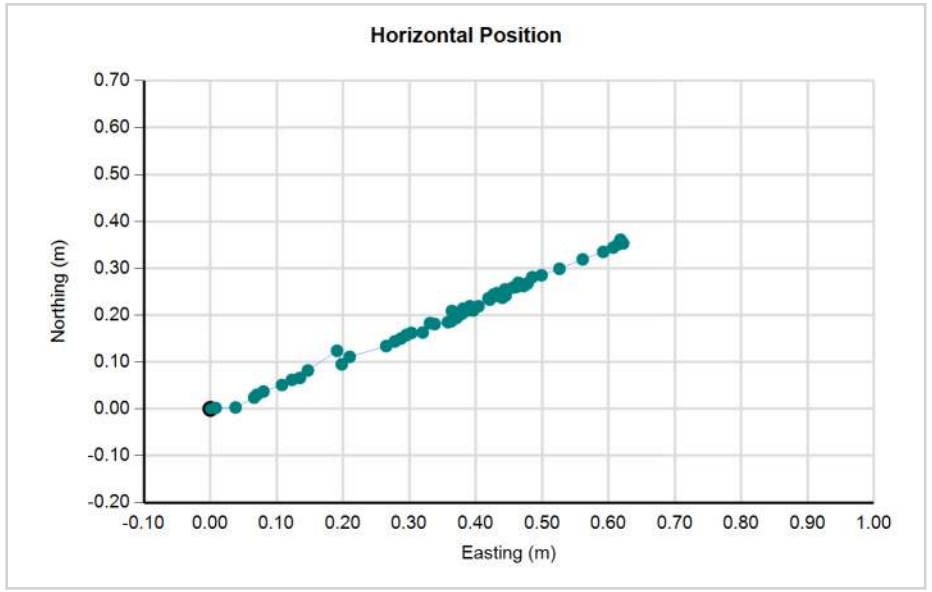
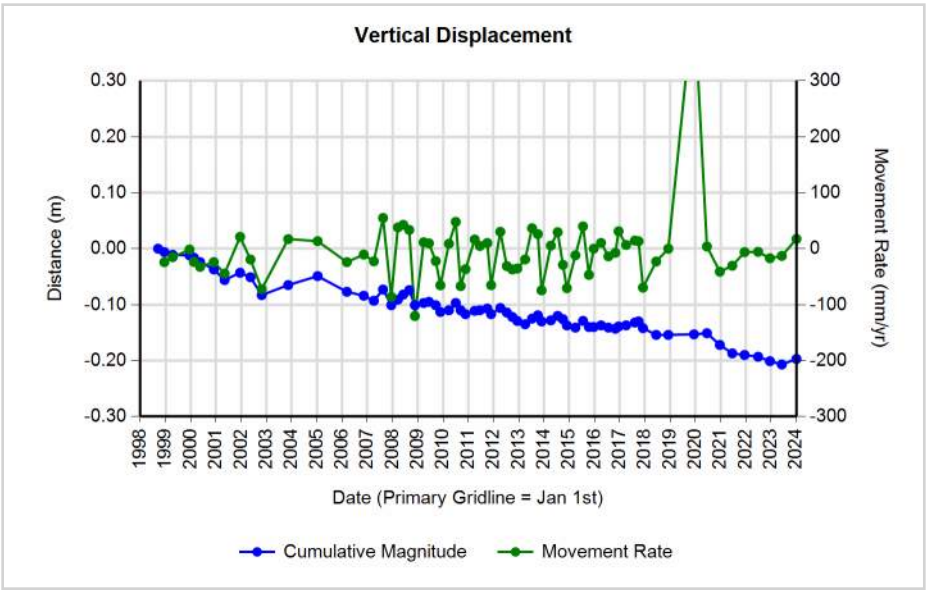
GPS Hub 98-07 (North Side of Paley Avenue)

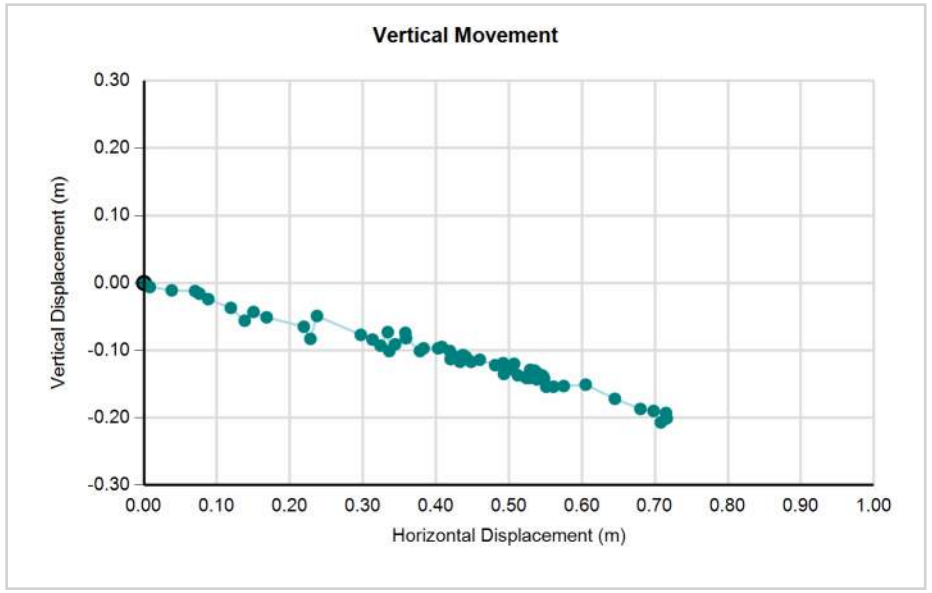
12/07/2012	5870427.516	531932.645	533.359	13.82	0.219	0.404	0.460	-0.114	61.5	-13.9	0.033	-0.008	0.26	0.009	0.008	0.012	-0.008	41.6	-33.6	46.789	-31.085
29/09/2012	5870427.533	531932.660	533.351	14.04	0.236	0.419	0.481	-0.122	60.6	-14.2	0.034	-0.009	0.22	0.017	0.015	0.023	-0.008	41.4	-19.4	104.820	-36.987
10/12/2012	5870427.530	531932.662	533.344	14.24	0.233	0.421	0.481	-0.129	61.0	-15.0	0.034	-0.009	0.20	-0.003	0.002	0.004	-0.007	146.3	-62.7	18.291	-35.510
03/04/2013	5870427.538	531932.671	533.338	14.55	0.241	0.430	0.493	-0.135	60.7	-15.3	0.034	-0.009	0.31	0.008	0.009	0.012	-0.006	48.4	-26.5	38.581	-19.224
12/07/2013	5870427.544	531932.673	533.348	14.82	0.247	0.432	0.498	-0.125	60.2	-14.1	0.034	-0.008	0.27	0.006	0.002	0.006	0.010	18.4	57.7	23.100	36.525
04/10/2013	5870427.541	531932.668	533.354	15.05	0.244	0.427	0.492	-0.119	60.3	-13.6	0.033	-0.008	0.23	-0.003	-0.005	0.006	0.006	239.0	45.8	-25.354	26.089
27/11/2013	5870427.545	531932.673	533.343	15.20	0.248	0.432	0.498	-0.130	60.1	-14.6	0.033	-0.009	0.15	0.004	0.005	0.006	-0.011	51.3	-59.8	43.310	-74.403
10/04/2014	5870427.543	531932.676	533.345	15.57	0.246	0.435	0.500	-0.128	60.5	-14.4	0.032	-0.008	0.37	-0.002	0.003	0.004	0.002	123.7	29.0	9.828	5.451
18/07/2014	5870427.539	531932.686	533.353	15.84	0.242	0.445	0.507	-0.120	61.5	-13.3	0.032	-0.008	0.27	-0.004	0.010	0.011	0.008	111.8	36.6	39.736	29.515
02/10/2014	5870427.534	531932.681	533.347	16.05	0.237	0.440	0.500	-0.126	61.7	-14.2	0.031	-0.008	0.21	-0.005	-0.005	0.007	-0.006	225.0	-40.3	-33.983	-28.836
28/11/2014	5870427.552	531932.685	533.336	16.20	0.255	0.444	0.512	-0.137	60.1	-15.0	0.032	-0.008	0.16	0.018	0.004	0.018	-0.011	12.5	-30.8	118.156	-70.487
01/04/2015	5870427.556	531932.697	533.332	16.54	0.259	0.456	0.524	-0.141	60.4	-15.0	0.032	-0.009	0.34	0.004	0.012	0.013	-0.004	71.6	-17.5	37.259	-11.782
20/07/2015	5870427.557	531932.702	533.344	16.84	0.260	0.461	0.529	-0.129	60.6	-13.7	0.031	-0.008	0.30	0.001	0.005	0.005	0.012	78.7	67.0	16.931	39.845
14/10/2015	5870427.553	531932.697	533.333	17.08	0.256	0.456	0.523	-0.140	60.7	-15.0	0.031	-0.008	0.24	-0.004	-0.005	0.006	-0.011	231.3	-59.8	-27.195	-46.718
22/12/2015	5870427.566	531932.705	533.333	17.27	0.269	0.464	0.536	-0.140	59.9	-14.6	0.031	-0.008	0.19	0.013	0.008	0.015	0.000	31.6	0.0	80.801	0.000
06/04/2016	5870427.559	531932.713	533.336	17.56	0.262	0.472	0.540	-0.137	61.0	-14.2	0.031	-0.008	0.29	-0.007	0.008	0.011	0.003	131.2	15.8	36.629	10.337
22/07/2016	5870427.555	531932.702	533.332	17.85	0.258	0.461	0.528	-0.141	60.8	-14.9	0.030	-0.008	0.29	-0.004	-0.011	0.012	-0.004	250.0	-18.9	-39.955	-13.654
30/10/2016	5870427.564	531932.708	533.330	18.12	0.267	0.467	0.538	-0.143	60.2	-14.9	0.030	-0.008	0.27	0.009	0.006	0.011	-0.002	33.7	-10.5	39.508	-7.305
16/12/2016	5870427.564	531932.718	533.334	18.25	0.267	0.477	0.547	-0.139	60.8	-14.3	0.030	-0.008	0.13	0.000	0.010	0.010	0.004	90.0	21.8	77.713	31.085
04/04/2017	5870427.563	531932.717	533.336	18.55	0.266	0.476	0.545	-0.137	60.8	-14.1	0.029	-0.007	0.30	-0.001	-0.001	0.001	0.002	225.0	54.7	-4.739	6.702
08/08/2017	5870427.563	531932.708	533.341	18.90	0.266	0.467	0.537	-0.132	60.3	-13.8	0.028	-0.007	0.34	0.000	-0.009	0.009	0.005	270.0	29.1	-26.089	14.494
02/10/2017	5870427.563	531932.705	533.343	19.05	0.266	0.464	0.535	-0.130	60.2	-13.7	0.028	-0.007	0.15	0.000	-0.003	0.003	0.002	270.0	33.7	-19.923	13.282
04/12/2017	5870427.565	531932.719	533.331	19.22	0.268	0.478	0.548	-0.142	60.7	-14.5	0.029	-0.007	0.17	0.002	0.014	0.014	-0.012	81.9	-40.3	81.991	-69.571
13/06/2018	5870427.572	531932.719	533.319	19.74	0.275	0.478	0.551	-0.154	60.1	-15.6	0.028	-0.008	0.52	0.007	0.000	0.007	-0.012	0.0	-59.7	13.386	-22.948
06/12/2018	5870427.578	531932.726	533.319	20.22	0.281	0.485	0.561	-0.154	59.9	-15.4	0.028	-0.008	0.48	0.006	0.007	0.009	0.000	49.4	0.0	19.133	0.000
12/12/2019	5870427.582	531932.740	533.320	21.24	0.285	0.499	0.575	-0.153	60.3	-14.9	0.027	-0.007	0.50	-0.018	0.181	0.182	0.224	95.7	50.9	363.040	447.082
17/06/2020	5870427.596	531932.767	533.322	21.75	0.299	0.526	0.605	-0.151	60.4	-14.0	0.028	-0.007	0.51	0.014	0.027	0.030	0.002	62.6	3.8	59.089	3.886
21/12/2020	5870427.616	531932.802	533.301	22.27	0.319	0.561	0.645	-0.172	60.4	-14.9	0.029	-0.008	0.51	0.020	0.035	0.040	-0.021	60.3	-27.5	78.736	-41.017
19/06/2021	5870427.632	531932.833	533.286	22.76	0.335	0.592	0.680	-0.187	60.5	-15.4	0.030	-0.008	0.49	0.016	0.031	0.035	-0.015	62.7	-23.3	70.789	-30.438
14/12/2021	5870427.641	531932.848	533.283	23.25	0.344	0.607	0.698	-0.190	60.5	-15.2	0.030	-0.008	0.49	0.009	0.015	0.017	-0.003	59.0	-9.7	35.895	-6.156
28/06/2022	5870427.650	531932.863	533.280	23.78	0.353	0.622	0.715	-0.193	60.4	-15.1	0.030	-0.008	0.54	0.009	0.015	0.017	-0.003	59.0	-9.7	32.598	-5.591
16/12/2022	5870427.658	531932.859	533.272	24.25	0.361	0.618	0.716	-0.201	59.7	-15.7	0.030	-0.008	0.47	0.008	-0.004	0.009	-0.008	333.4	-41.8	19.105	-17.088
06/06/2023	5870427.648	531932.855	533.266	24.72	0.351	0.614	0.708	-0.207	60.3	-16.3	0.029	-0.008	0.47	-0.010	-0.004	0.011	-0.006	199.8	-29.8	-22.570	-12.911
04/01/2024	5870427.650	531932.863	533.276	25.30	0.353	0.622	0.715	-0.197	60.4	-15.4	0.028	-0.008	0.58	0.002	0.008	0.008	0.010	75.3	52.1	13.540	17.367

GPS Hub 98-07 (North Side of Paley Avenue)









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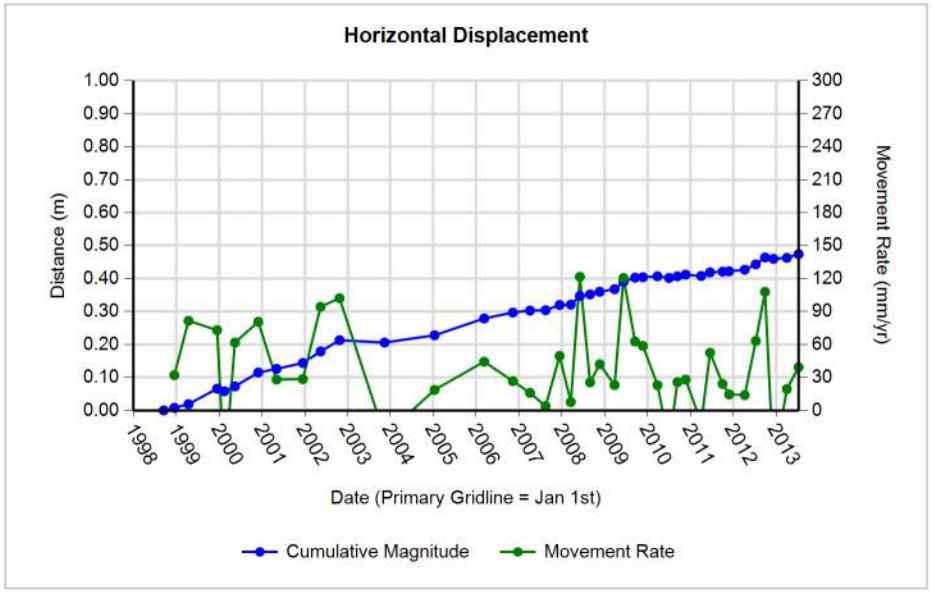
GPS Hub 98-08 (South Side of Picard Avenue) Replaced by 13-02

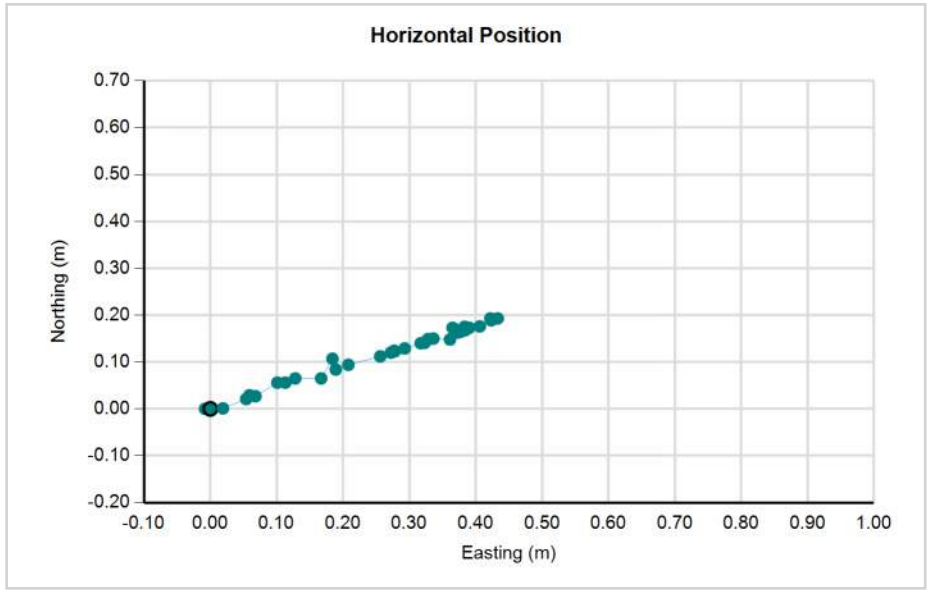
	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870328.580	531909.295	536.943	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5870328.580	531909.287	536.905	0.25	0.000	-0.008	0.008	-0.038	270.0	-78.1	0.032	-0.153	0.25	0.000	-0.008	0.008	-0.038	270.0	-78.1	32.110	-152.522
15/04/1999	5870328.581	531909.314	536.909	0.58	0.001	0.019	0.019	-0.034	87.0	-60.8	0.033	-0.059	0.33	0.001	0.027	0.027	0.004	87.9	8.4	81.558	12.074
15/12/1999	5870328.609	531909.354	536.909	1.25	0.029	0.059	0.066	-0.034	63.8	-27.3	0.053	-0.027	0.67	0.028	0.040	0.049	0.000	55.0	0.0	73.089	0.000
15/02/2000	5870328.601	531909.349	536.907	1.42	0.021	0.054	0.058	-0.036	68.7	-31.9	0.041	-0.025	0.17	-0.008	-0.005	0.009	-0.002	212.0	-12.0	-55.577	-11.782
15/05/2000	5870328.607	531909.363	536.886	1.66	0.027	0.068	0.073	-0.057	68.3	-37.9	0.044	-0.034	0.25	0.006	0.014	0.015	-0.021	66.8	-54.0	61.815	-85.225
30/11/2000	5870328.636	531909.396	536.885	2.21	0.056	0.101	0.115	-0.058	61.0	-26.7	0.052	-0.026	0.54	0.029	0.033	0.044	-0.001	48.7	-1.3	80.634	-1.835
05/05/2001	5870328.636	531909.408	536.872	2.64	0.056	0.113	0.126	-0.071	63.6	-29.4	0.048	-0.027	0.43	0.000	0.012	0.012	-0.013	90.0	-47.3	28.096	-30.438
15/12/2001	5870328.645	531909.423	536.882	3.25	0.065	0.128	0.144	-0.061	63.1	-23.0	0.044	-0.019	0.61	0.009	0.015	0.017	0.010	59.0	29.8	28.524	16.306
15/05/2002	5870328.645	531909.462	536.866	3.66	0.065	0.167	0.179	-0.077	68.7	-23.3	0.049	-0.021	0.41	0.000	0.039	0.039	-0.016	90.0	-22.3	94.336	-38.702
24/10/2002	5870328.687	531909.479	536.828	4.11	0.107	0.184	0.213	-0.115	59.8	-28.4	0.052	-0.028	0.44	0.042	0.017	0.045	-0.038	22.0	-40.0	102.157	-85.676
12/11/2003	5870328.664	531909.484	536.879	5.16	0.084	0.189	0.206	-0.064	66.1	-17.3	0.040	-0.012	1.05	-0.023	0.005	0.024	0.051	168.3	64.7	-22.796	48.167
11/01/2005	5870328.674	531909.503	536.862	6.32	0.094	0.208	0.228	-0.081	65.6	-19.5	0.036	-0.013	1.17	0.011	0.019	0.022	-0.016	60.0	-36.7	18.657	-13.924
10/03/2006	5870328.692	531909.551	536.845	7.48	0.112	0.256	0.279	-0.098	66.4	-19.3	0.037	-0.013	1.16	0.018	0.048	0.051	-0.017	70.0	-18.7	44.388	-15.024
10/11/2006	5870328.700	531909.567	536.839	8.15	0.120	0.272	0.297	-0.104	66.2	-19.3	0.036	-0.013	0.67	0.008	0.016	0.018	-0.006	63.4	-18.5	26.669	-8.945
05/04/2007	5870328.704	531909.572	536.840	8.55	0.124	0.277	0.303	-0.103	65.9	-18.7	0.035	-0.012	0.40	0.004	0.005	0.006	0.001	51.3	8.9	16.019	2.502
16/08/2007	5870328.703	531909.573	536.832	8.92	0.123	0.278	0.304	-0.111	66.1	-20.1	0.034	-0.012	0.36	-0.001	0.001	0.001	-0.008	135.0	-80.0	3.884	-21.970
13/12/2007	5870328.709	531909.588	536.817	9.24	0.129	0.293	0.320	-0.126	66.2	-21.5	0.035	-0.014	0.33	0.006	0.015	0.016	-0.015	68.2	-42.9	49.587	-46.040
18/03/2008	5870328.711	531909.588	536.835	9.51	0.131	0.293	0.321	-0.108	65.9	-18.6	0.034	-0.011	0.26	0.002	0.000	0.002	0.018	0.0	83.7	7.609	68.484
03/06/2008	5870328.720	531909.612	536.832	9.72	0.140	0.317	0.347	-0.111	66.2	-17.8	0.036	-0.011	0.21	0.009	0.024	0.026	-0.003	69.4	-6.7	121.586	-14.231
29/08/2008	5870328.721	531909.618	536.829	9.95	0.141	0.323	0.352	-0.114	66.4	-17.9	0.035	-0.011	0.24	0.001	0.006	0.006	-0.003	80.5	-26.3	25.537	-12.595
19/11/2008	5870328.729	531909.623	536.821	10.18	0.149	0.328	0.360	-0.122	65.6	-18.7	0.035	-0.012	0.22	0.008	0.005	0.009	-0.008	32.0	-40.3	42.021	-35.634
26/03/2009	5870328.730	531909.631	536.822	10.53	0.150	0.336	0.368	-0.121	65.9	-18.2	0.035	-0.011	0.35	0.001	0.008	0.008	0.001	82.9	7.1	23.187	2.876
10/06/2009	5870328.728	531909.656	536.824	10.74	0.148	0.361	0.390	-0.119	67.7	-17.0	0.036	-0.011	0.21	-0.002	0.025	0.025	0.002	94.6	4.6	120.532	9.612
17/09/2009	5870328.743	531909.664	536.818	11.01	0.163	0.369	0.403	-0.125	66.2	-17.2	0.037	-0.011	0.27	0.015	0.008	0.017	-0.006	28.1	-19.4	62.720	-22.136
23/11/2009	5870328.753	531909.660	536.808	11.19	0.173	0.365	0.404	-0.135	64.6	-18.5	0.036	-0.012	0.18	0.010	-0.004	0.011	-0.010	338.2	-42.9	58.714	-54.515
27/03/2010	5870328.748	531909.666	536.811	11.53	0.168	0.371	0.407	-0.132	65.6	-18.0	0.035	-0.011	0.34	-0.005	0.006	0.008	0.003	129.8	21.0	23.006	8.837
04/07/2010	5870328.740	531909.664	536.806	11.80	0.160	0.369	0.402	-0.137	66.6	-18.8	0.034	-0.012	0.27	-0.008	-0.002	0.008	-0.005	194.0	-31.2	-30.424	-18.447
13/09/2010	5870328.743	531909.668	536.813	11.99	0.163	0.373	0.407	-0.130	66.4	-17.7	0.034	-0.011	0.19	0.003	0.004	0.005	0.007	53.1	54.5	25.722	36.011
22/11/2010	5870328.745	531909.673	536.808	12.19	0.165	0.378	0.412	-0.135	66.4	-18.1	0.034	-0.011	0.19	0.002	0.005	0.005	-0.005	68.2	-42.9	28.099	-26.089
04/04/2011	5870328.744	531909.669	536.801	12.55	0.164	0.374	0.408	-0.142	66.3	-19.2	0.033	-0.011	0.36	-0.001	-0.004	0.004	-0.007	256.0	-59.5	-11.323	-19.224
18/06/2011	5870328.748	531909.679	536.808	12.76	0.168	0.384	0.419	-0.135	66.4	-17.9	0.033	-0.011	0.21	0.004	0.010	0.011	0.007	68.2	33.0	52.452	34.090
03/10/2011	5870328.755	531909.678	536.808	13.05	0.175	0.383	0.421	-0.135	65.4	-17.8	0.032	-0.010	0.29	0.007	-0.001	0.007	0.000	351.9	0.0	24.137	0.000
28/11/2011	5870328.754	531909.680	536.805	13.20	0.174	0.385	0.422	-0.138	65.7	-18.1	0.032	-0.010	0.15	-0.001	0.002	0.002	-0.003	116.6	-53.3	14.584	-19.567
09/04/2012	5870328.753	531909.685	536.803	13.57	0.173	0.390	0.427	-0.140	66.1	-18.2	0.031	-0.010	0.36	-0.001	0.005	0.005	-0.002	101.3	-21.4	14.003	-5.492

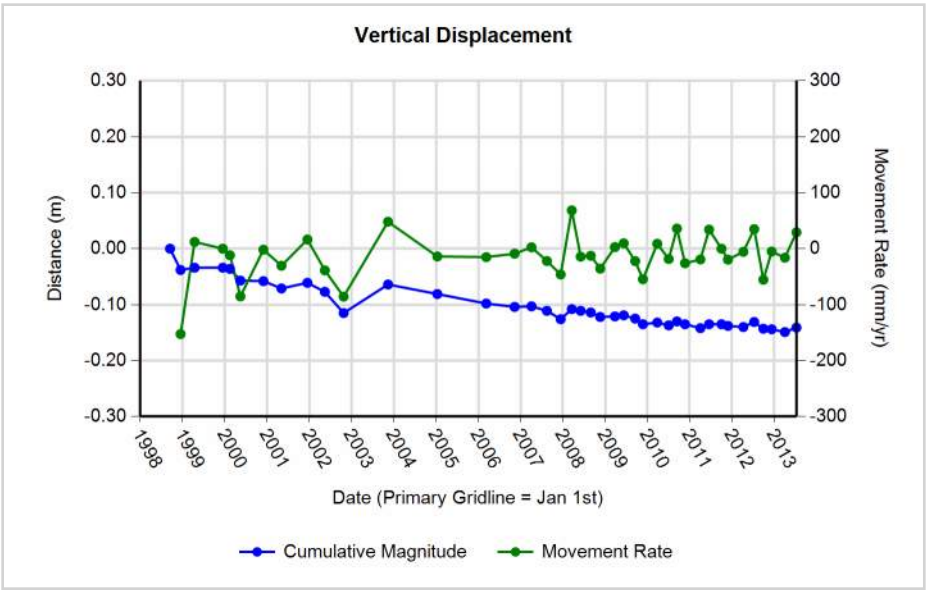
GPS Hub 98-08 (South Side of Picard Avenue) Replaced by 13-02

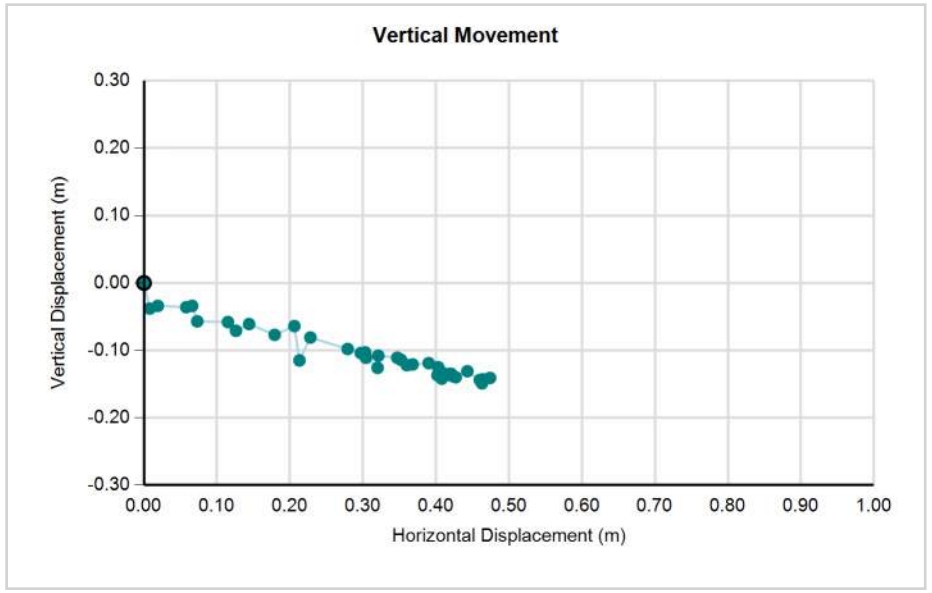
12/07/2012	5870328.756	531909.701	536.812	13.82	0.176	0.406	0.443	-0.131	66.6	-16.5	0.032	-0.009	0.26	0.003	0.016	0.016	0.009	79.4	28.9	63.254	34.971
29/09/2012	5870328.773	531909.717	536.800	14.04	0.193	0.422	0.464	-0.143	65.4	-17.1	0.033	-0.010	0.22	0.017	0.016	0.023	-0.012	43.3	-27.2	107.935	-55.481
10/12/2012	5870328.763	531909.717	536.799	14.24	0.183	0.422	0.460	-0.144	66.6	-17.4	0.032	-0.010	0.20	-0.010	0.000	0.010	-0.001	180.0	-5.7	-50.729	-5.073
03/04/2013	5870328.769	531909.718	536.794	14.55	0.189	0.423	0.463	-0.149	65.9	-17.8	0.032	-0.010	0.31	0.006	0.001	0.006	-0.005	9.5	-39.4	19.489	-16.020
12/07/2013	5870328.773	531909.728	536.802	14.82	0.193	0.433	0.474	-0.141	66.0	-16.6	0.032	-0.010	0.27	0.004	0.010	0.011	0.008	68.2	36.6	39.339	29.220

GPS Hub 98-08 (South Side of Picard Avenue) Replaced by 13-02







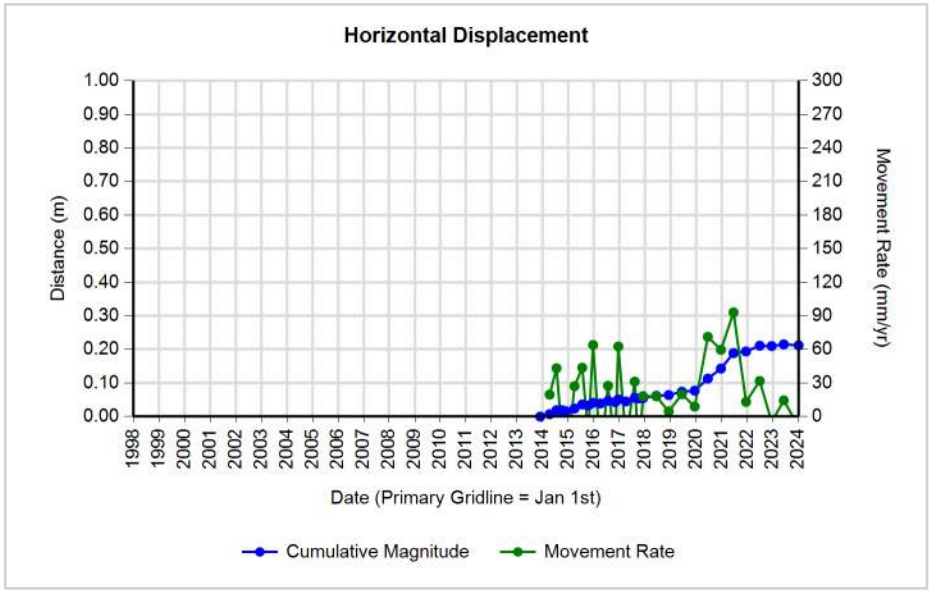


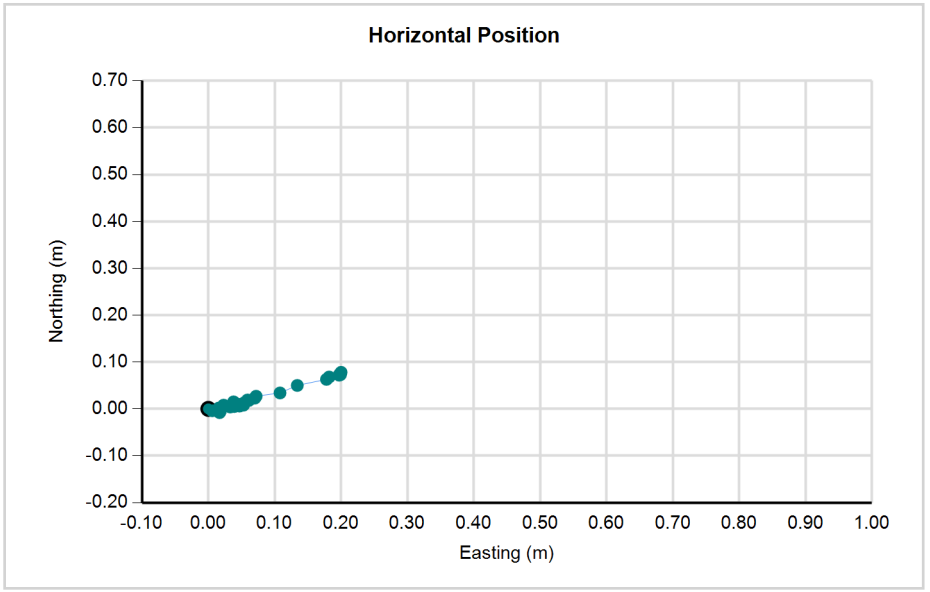
CITY OF Quesnel

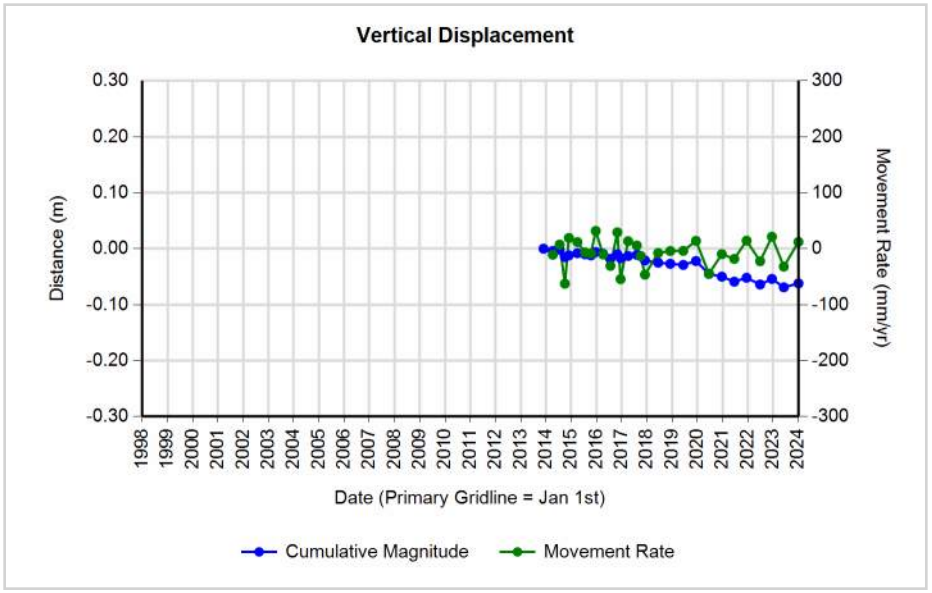
GPS Hub 13-02 (South Side of Picard Avenue)

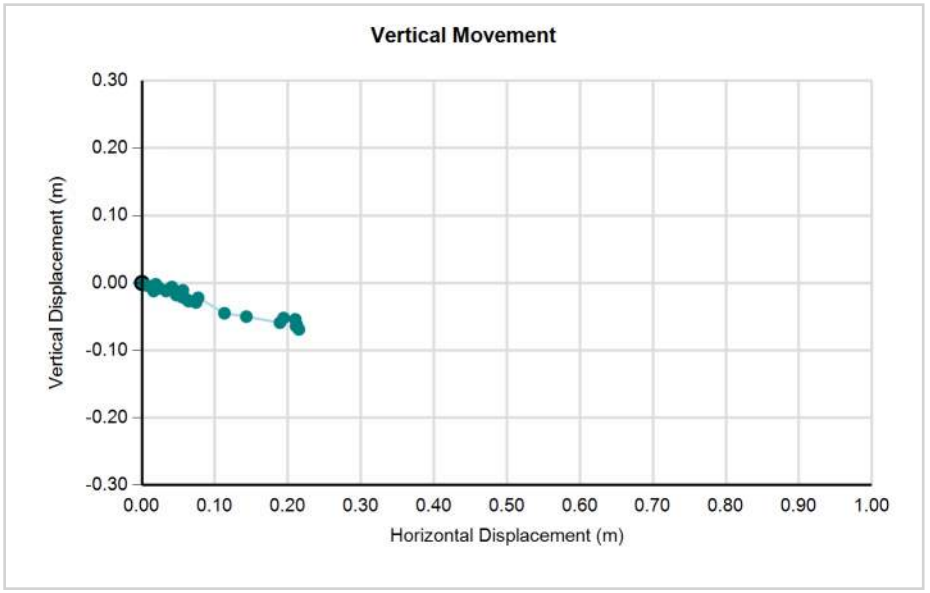
	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
27/11/2013	5870326.711	531909.535	537.074	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
10/04/2014	5870326.707	531909.541	537.070	0.37	-0.004	0.006	0.007	-0.004	123.7	-29.0	0.020	-0.011	0.37	-0.004	0.006	0.007	-0.004	123.7	-29.0	19.656	-10.903
18/07/2014	5870326.703	531909.552	537.072	0.64	-0.008	0.017	0.019	-0.002	115.2	-6.1	0.029	-0.003	0.27	-0.004	0.011	0.012	0.002	110.0	9.7	43.183	7.379
02/10/2014	5870326.706	531909.553	537.059	0.85	-0.005	0.018	0.019	-0.015	105.5	-38.8	0.022	-0.018	0.21	0.003	0.001	0.003	-0.013	18.4	-76.3	-15.198	-62.477
28/11/2014	5870326.713	531909.551	537.062	1.00	0.002	0.016	0.016	-0.012	82.9	-36.7	0.016	-0.012	0.16	0.007	-0.002	0.007	0.003	344.1	22.4	-46.650	19.224
01/04/2015	5870326.719	531909.558	537.066	1.34	0.008	0.023	0.024	-0.008	70.8	-18.2	0.018	-0.006	0.34	0.006	0.007	0.009	0.004	49.4	23.5	27.157	11.782
20/07/2015	5870326.717	531909.571	537.064	1.64	0.006	0.036	0.036	-0.010	80.5	-15.3	0.022	-0.006	0.30	-0.002	0.013	0.013	-0.002	98.7	-8.6	43.674	-6.641
14/10/2015	5870326.715	531909.568	537.062	1.88	0.004	0.033	0.033	-0.012	83.1	-19.8	0.018	-0.006	0.24	-0.002	-0.003	0.004	-0.002	236.3	-29.0	-15.313	-8.494
22/12/2015	5870326.726	531909.573	537.068	2.07	0.015	0.038	0.041	-0.006	68.5	-8.4	0.020	-0.003	0.19	0.011	0.005	0.012	0.006	24.4	26.4	63.961	31.761
06/04/2016	5870326.716	531909.574	537.065	2.36	0.005	0.039	0.039	-0.009	82.7	-12.9	0.017	-0.004	0.29	-0.010	0.001	0.010	-0.003	174.3	-16.6	-34.629	-10.337
22/07/2016	5870326.717	531909.582	537.056	2.65	0.006	0.047	0.047	-0.018	82.7	-20.8	0.018	-0.007	0.29	0.001	0.008	0.008	-0.009	82.9	-48.1	27.521	-30.722
30/10/2016	5870326.722	531909.577	537.064	2.92	0.011	0.042	0.043	-0.010	75.3	-13.0	0.015	-0.003	0.27	0.005	-0.005	0.007	0.008	315.0	48.5	-25.827	29.220
16/12/2016	5870326.721	531909.585	537.057	3.05	0.010	0.050	0.051	-0.017	78.7	-18.4	0.017	-0.006	0.13	-0.001	0.008	0.008	-0.007	97.1	-41.0	62.654	-54.399
04/04/2017	5870326.720	531909.579	537.061	3.35	0.009	0.044	0.045	-0.013	78.4	-16.1	0.013	-0.004	0.30	-0.001	-0.006	0.006	0.004	260.5	33.3	-20.383	13.404
08/08/2017	5870326.724	531909.589	537.063	3.70	0.013	0.054	0.056	-0.011	76.5	-11.2	0.015	-0.003	0.34	0.004	0.010	0.011	0.002	68.2	10.5	31.221	5.798
02/10/2017	5870326.719	531909.588	537.061	3.85	0.008	0.053	0.054	-0.013	81.4	-13.6	0.014	-0.003	0.15	-0.005	-0.001	0.005	-0.002	191.3	-21.4	-33.862	-13.282
04/12/2017	5870326.722	531909.589	537.053	4.02	0.011	0.054	0.055	-0.021	78.5	-20.9	0.014	-0.005	0.17	0.003	0.001	0.003	-0.008	18.4	-68.4	18.334	-46.381
13/06/2018	5870326.730	531909.594	537.049	4.54	0.019	0.059	0.062	-0.025	72.1	-22.0	0.014	-0.006	0.52	0.008	0.005	0.009	-0.004	32.0	-23.0	18.041	-7.649
06/12/2018	5870326.729	531909.596	537.047	5.02	0.018	0.061	0.064	-0.027	73.6	-23.0	0.013	-0.005	0.48	-0.001	0.002	0.002	-0.002	116.6	-41.8	4.640	-4.151
12/06/2019	5870326.734	531909.605	537.045	5.54	0.023	0.070	0.074	-0.029	71.8	-21.5	0.013	-0.005	0.51	0.005	0.009	0.010	-0.002	60.9	-11.0	20.003	-3.886
12/12/2019	5870326.738	531909.607	537.052	6.04	0.027	0.072	0.077	-0.022	69.4	-16.0	0.013	-0.004	0.50	0.004	0.002	0.004	0.007	26.6	57.4	8.926	13.971
17/06/2020	5870326.745	531909.643	537.029	6.55	0.034	0.108	0.113	-0.045	72.5	-21.7	0.017	-0.007	0.51	0.007	0.036	0.037	-0.023	79.0	-32.1	71.251	-44.685
21/12/2020	5870326.761	531909.669	537.024	7.07	0.050	0.134	0.143	-0.050	69.5	-19.3	0.020	-0.007	0.51	0.016	0.026	0.031	-0.005	58.4	-9.3	59.629	-9.766
19/06/2021	5870326.774	531909.713	537.015	7.56	0.063	0.178	0.189	-0.059	70.5	-17.4	0.025	-0.008	0.49	0.013	0.044	0.046	-0.009	73.5	-11.1	93.099	-18.263
14/12/2021	5870326.779	531909.717	537.022	8.05	0.068	0.182	0.194	-0.052	69.5	-15.0	0.024	-0.006	0.49	0.005	0.004	0.006	0.007	38.7	47.5	13.139	14.364
28/06/2022	5870326.785	531909.733	537.010	8.58	0.074	0.198	0.211	-0.064	69.5	-16.8	0.025	-0.007	0.54	0.006	0.016	0.017	-0.012	69.4	-35.1	31.844	-22.362
16/12/2022	5870326.783	531909.732	537.020	9.05	0.072	0.197	0.210	-0.054	69.9	-14.4	0.023	-0.006	0.47	-0.002	-0.001	0.002	0.010	206.6	77.4	-4.776	21.360
06/06/2023	5870326.789	531909.735	537.005	9.52	0.078	0.200	0.215	-0.069	68.7	-17.8	0.023	-0.007	0.47	0.006	0.003	0.007	-0.015	28.1	-65.7	14.440	-32.023
04/01/2024	5870326.784	531909.734	537.012	10.10	0.073	0.199	0.212	-0.062	69.9	-16.3	0.021	-0.006	0.58	-0.005	-0.001	0.005	0.007	193.5	54.0	-8.859	12.198

GPS Hub 13-02 (South Side of Picard Avenue)









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GPS Hub 98-09 (Lane Between Patchett Street and Pierce Crescent)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870063.599	531714.863	549.785	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5870063.588	531714.875	549.766	0.25	-0.011	0.012	0.016	-0.019	132.5	-49.4	0.065	-0.076	0.25	-0.011	0.012	0.016	-0.019	132.5	-49.4	65.339	-76.261
15/04/1999	5870063.593	531714.910	549.753	0.58	-0.006	0.047	0.047	-0.032	97.3	-34.0	0.082	-0.055	0.33	0.005	0.035	0.035	-0.013	81.9	-20.2	106.723	-39.242
15/12/1999	5870063.614	531714.965	549.774	1.25	0.015	0.102	0.103	-0.011	81.6	-6.1	0.083	-0.009	0.67	0.021	0.055	0.059	0.021	69.1	19.6	88.128	31.435
15/02/2000	5870063.597	531714.959	549.773	1.42	-0.002	0.096	0.096	-0.012	91.2	-7.1	0.068	-0.008	0.17	-0.017	-0.006	0.018	-0.001	199.4	-3.2	-106.204	-5.891
15/05/2000	5870063.593	531714.979	549.763	1.66	-0.006	0.116	0.116	-0.022	93.0	-10.7	0.070	-0.013	0.25	-0.004	0.020	0.020	-0.010	101.3	-26.1	82.774	-40.583
30/11/2000	5870063.603	531715.031	549.752	2.21	0.004	0.168	0.168	-0.033	88.6	-11.1	0.076	-0.015	0.54	0.010	0.052	0.053	-0.011	79.1	-11.7	97.191	-20.190
05/05/2001	5870063.598	531715.033	549.740	2.64	-0.001	0.170	0.170	-0.045	90.3	-14.8	0.064	-0.017	0.43	-0.005	0.002	0.005	-0.012	158.2	-65.8	12.609	-28.096
15/12/2001	5870063.587	531715.066	549.752	3.25	-0.012	0.203	0.203	-0.033	93.4	-9.2	0.063	-0.010	0.61	-0.011	0.033	0.035	0.012	108.4	19.0	56.720	19.567
15/05/2002	5870063.581	531715.091	549.755	3.66	-0.018	0.228	0.229	-0.030	94.5	-7.5	0.062	-0.008	0.41	-0.006	0.025	0.026	0.003	103.5	6.7	62.189	7.257
24/10/2002	5870063.593	531715.120	549.734	4.11	-0.006	0.257	0.257	-0.051	91.3	-11.2	0.063	-0.012	0.44	0.012	0.029	0.031	-0.021	67.5	-33.8	70.761	-47.347
12/11/2003	5870063.592	531715.139	549.745	5.16	-0.007	0.276	0.276	-0.040	91.5	-8.3	0.053	-0.008	1.05	-0.001	0.019	0.019	0.011	93.3	29.4	17.808	10.054
11/01/2005	5870063.600	531715.159	549.753	6.32	0.001	0.296	0.296	-0.032	89.8	-6.2	0.047	-0.005	1.17	0.008	0.020	0.022	0.008	68.6	20.1	18.793	6.885
10/03/2006	5870063.593	531715.234	549.741	7.48	-0.006	0.371	0.371	-0.044	90.9	-6.8	0.050	-0.006	1.16	-0.007	0.075	0.075	-0.012	95.3	-8.8	64.948	-10.016
10/11/2006	5870063.594	531715.253	549.747	8.15	-0.005	0.390	0.390	-0.038	90.7	-5.6	0.048	-0.005	0.67	0.001	0.019	0.019	0.006	87.0	17.5	28.365	8.945
05/04/2007	5870063.598	531715.262	549.734	8.55	-0.001	0.399	0.399	-0.051	90.1	-7.3	0.047	-0.006	0.40	0.004	0.009	0.010	-0.013	66.0	-52.9	24.639	-32.522
16/08/2007	5870063.593	531715.273	549.738	8.92	-0.006	0.410	0.410	-0.047	90.8	-6.5	0.046	-0.005	0.36	-0.005	0.011	0.012	0.004	114.4	18.3	33.183	10.985
13/12/2007	5870063.593	531715.271	549.710	9.24	-0.006	0.408	0.408	-0.075	90.8	-10.4	0.044	-0.008	0.33	0.000	-0.002	0.002	-0.028	270.0	-85.9	-6.139	-85.941
18/03/2008	5870063.596	531715.282	549.739	9.51	-0.003	0.419	0.419	-0.046	90.4	-6.3	0.044	-0.005	0.26	0.003	0.011	0.011	0.029	74.7	68.5	43.380	110.336
03/06/2008	5870063.588	531715.312	549.747	9.72	-0.011	0.449	0.449	-0.038	91.4	-4.8	0.046	-0.004	0.21	-0.008	0.030	0.031	0.008	104.9	14.4	147.278	37.948
29/07/2008	5870063.581	531715.318	549.755	9.87	-0.018	0.455	0.455	-0.030	92.3	-3.8	0.046	-0.003	0.15	-0.007	0.006	0.009	0.008	139.4	40.9	60.133	52.179
29/08/2008	5870063.578	531715.312	549.740	9.95	-0.021	0.449	0.449	-0.045	92.7	-5.7	0.045	-0.005	0.08	-0.003	-0.006	0.007	-0.015	243.4	-65.9	-79.038	-176.734
19/11/2008	5870063.596	531715.324	549.722	10.18	-0.003	0.461	0.461	-0.063	90.4	-7.8	0.045	-0.006	0.22	0.018	0.012	0.022	-0.018	33.7	-39.8	96.361	-80.177
26/03/2009	5870063.597	531715.334	549.731	10.53	-0.002	0.471	0.471	-0.054	90.2	-6.5	0.045	-0.005	0.35	0.001	0.010	0.010	0.009	84.3	41.8	28.903	25.884
10/06/2009	5870063.589	531715.370	549.743	10.74	-0.010	0.507	0.507	-0.042	91.1	-4.7	0.047	-0.004	0.21	-0.008	0.036	0.037	0.012	102.5	18.0	177.234	57.671
17/09/2009	5870063.591	531715.384	549.726	11.01	-0.008	0.521	0.521	-0.059	90.9	-6.5	0.047	-0.005	0.27	0.002	0.014	0.014	-0.017	81.9	-50.2	52.176	-62.720
23/11/2009	5870063.603	531715.382	549.725	11.19	0.004	0.519	0.519	-0.060	89.6	-6.6	0.046	-0.005	0.18	0.012	-0.002	0.012	-0.001	350.5	-4.7	-66.320	-5.451
27/03/2010	5870063.604	531715.385	549.732	11.53	0.005	0.522	0.522	-0.053	89.5	-5.8	0.045	-0.005	0.34	0.001	0.003	0.003	0.007	71.6	65.7	9.315	20.619
04/07/2010	5870063.597	531715.379	549.744	11.80	-0.002	0.516	0.516	-0.041	90.2	-4.5	0.044	-0.003	0.27	-0.007	-0.006	0.009	0.012	220.6	52.5	-34.015	44.273
13/09/2010	5870063.596	531715.384	549.726	11.99	-0.003	0.521	0.521	-0.059	90.3	-6.5	0.043	-0.005	0.19	-0.001	0.005	0.005	-0.018	101.3	-74.2	26.231	-92.599
22/11/2010	5870063.598	531715.390	549.718	12.19	-0.001	0.527	0.527	-0.067	90.1	-7.2	0.043	-0.005	0.19	0.002	0.006	0.006	-0.008	71.6	-51.7	33.001	-41.743
04/04/2011	5870063.597	531715.390	549.722	12.55	-0.002	0.527	0.527	-0.063	90.2	-6.8	0.042	-0.005	0.36	-0.001	0.000	0.001	0.004	180.0	76.0	2.746	10.985
18/06/2011	5870063.598	531715.396	549.750	12.76	-0.001	0.533	0.533	-0.035	90.1	-3.8	0.042	-0.003	0.21	0.001	0.006	0.006	0.028	80.5	77.7	29.623	136.360
03/10/2011	5870063.592	531715.400	549.720	13.05	-0.007	0.537	0.537	-0.065	90.7	-6.9	0.041	-0.005	0.29	-0.006	0.004	0.007	-0.030	146.3	-76.5	24.615	-102.407
28/11/2011	5870063.605	531715.399	549.726	13.20	0.006	0.536	0.536	-0.059	89.4	-6.3	0.041	-0.004	0.15	0.013	-0.001	0.013	0.006	355.6	24.7	-85.041	39.134

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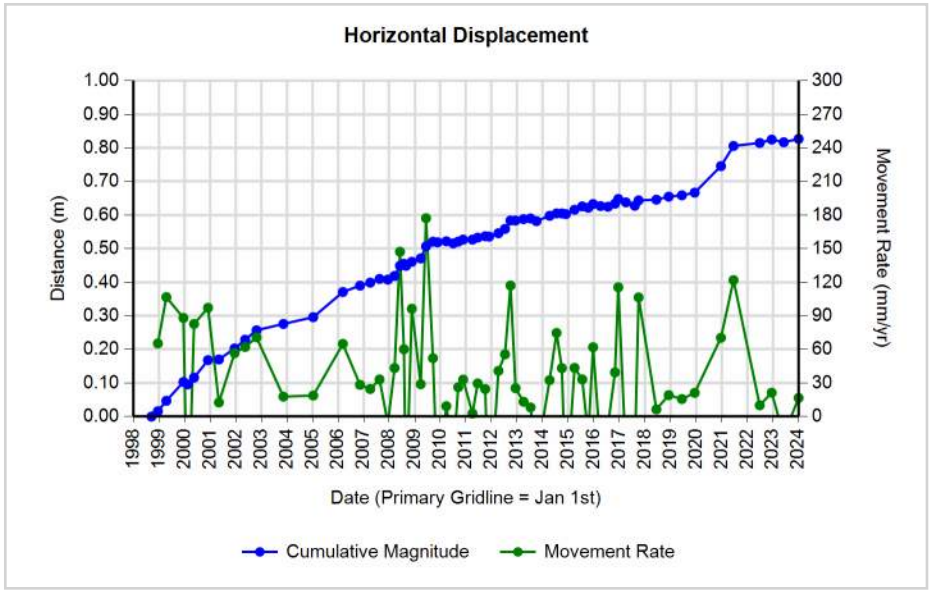
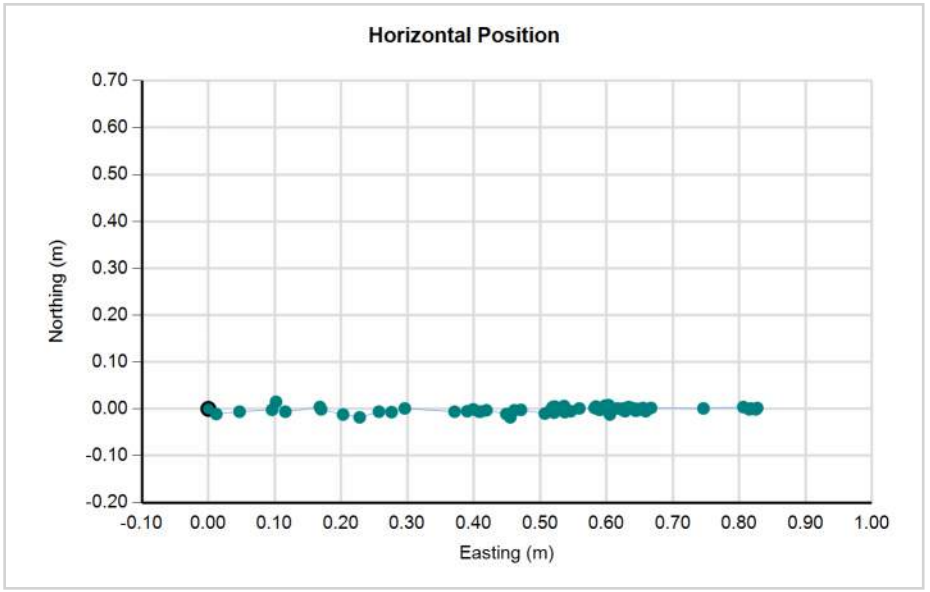
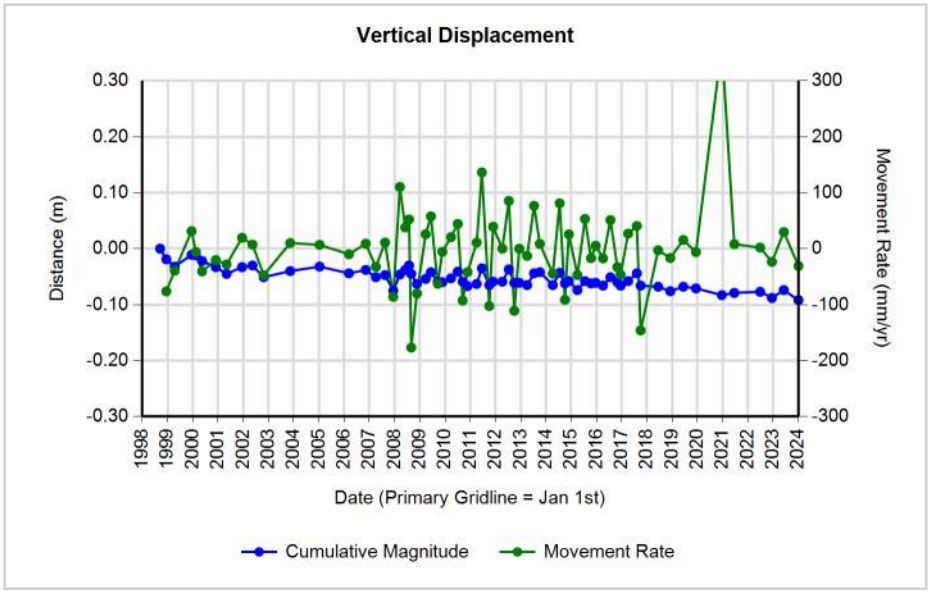
GPS Hub 98-09 (Lane Between Patchett Street and Pierce Crescent)

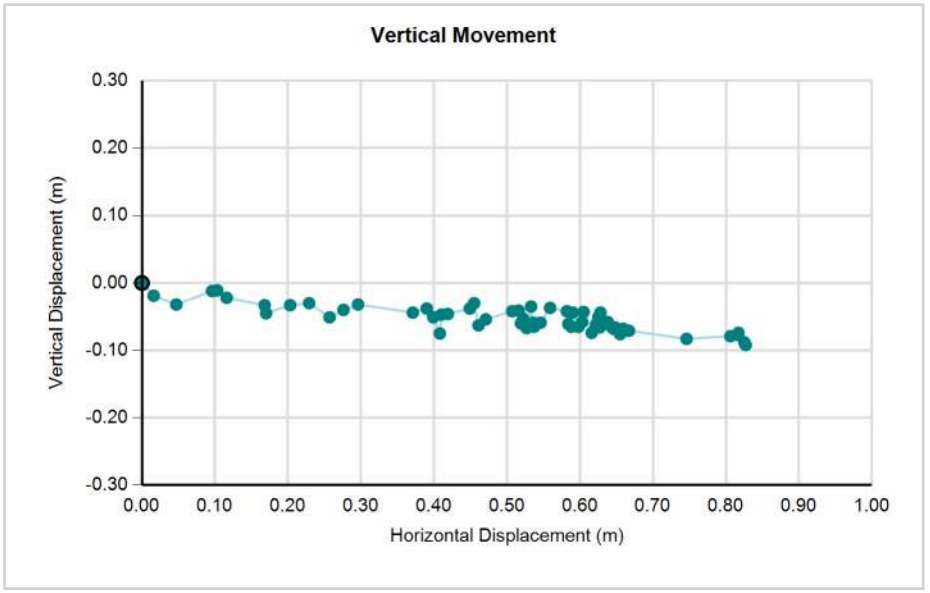
09/04/2012	5870063.594	531715.409	549.726	13.57	-0.005	0.546	0.546	-0.059	90.5	-6.2	0.040	-0.004	0.36	-0.011	0.010	0.015	0.000	137.7	0.0	40.826	0.000
12/07/2012	5870063.600	531715.422	549.748	13.82	0.001	0.559	0.559	-0.037	89.9	-3.8	0.040	-0.003	0.26	0.006	0.013	0.014	0.022	65.2	56.9	55.634	85.484
29/09/2012	5870063.604	531715.447	549.724	14.04	0.005	0.584	0.584	-0.061	89.5	-6.0	0.042	-0.004	0.22	0.004	0.025	0.025	-0.024	80.9	-43.5	117.056	-110.962
10/12/2012	5870063.599	531715.447	549.724	14.24	0.000	0.584	0.584	-0.061	90.0	-6.0	0.041	-0.004	0.20	-0.005	0.000	0.005	0.000	180.0	0.0	25.365	0.000
03/04/2013	5870063.598	531715.451	549.720	14.55	-0.001	0.588	0.588	-0.065	90.1	-6.3	0.040	-0.004	0.31	-0.001	0.004	0.004	-0.004	104.0	-44.1	13.210	-12.816
12/07/2013	5870063.597	531715.453	549.741	14.82	-0.002	0.590	0.590	-0.044	90.2	-4.3	0.040	-0.003	0.27	-0.001	0.002	0.002	0.021	116.6	83.9	8.167	76.702
04/10/2013	5870063.601	531715.445	549.743	15.05	0.002	0.582	0.582	-0.042	89.8	-4.1	0.039	-0.003	0.23	0.004	-0.008	0.009	0.002	296.6	12.6	-38.892	8.696
10/04/2014	5870063.606	531715.461	549.720	15.57	0.007	0.598	0.598	-0.065	89.3	-6.2	0.038	-0.004	0.51	0.005	0.016	0.017	-0.023	72.6	-53.9	32.568	-44.685
18/07/2014	5870063.587	531715.468	549.742	15.84	-0.012	0.605	0.605	-0.043	91.1	-4.1	0.038	-0.003	0.27	-0.019	0.007	0.020	0.022	159.8	47.4	74.705	81.167
02/10/2014	5870063.596	531715.468	549.723	16.05	-0.003	0.605	0.605	-0.062	90.3	-5.9	0.038	-0.004	0.21	0.009	0.000	0.009	-0.019	0.0	-64.7	43.253	-91.313
28/11/2014	5870063.607	531715.466	549.727	16.20	0.008	0.603	0.603	-0.058	89.2	-5.5	0.037	-0.004	0.16	0.011	-0.002	0.011	0.004	349.7	19.7	-71.642	25.632
01/04/2015	5870063.600	531715.479	549.711	16.54	0.001	0.616	0.616	-0.074	89.9	-6.9	0.037	-0.004	0.34	-0.007	0.013	0.015	-0.016	118.3	-47.3	43.491	-47.129
20/07/2015	5870063.600	531715.489	549.727	16.84	0.001	0.626	0.626	-0.058	89.9	-5.3	0.037	-0.003	0.30	0.000	0.010	0.010	0.016	90.0	58.0	33.205	53.127
14/10/2015	5870063.599	531715.485	549.723	17.08	0.000	0.622	0.622	-0.062	90.0	-5.7	0.036	-0.004	0.24	-0.001	-0.004	0.004	-0.004	256.0	-44.1	-17.511	-16.988
22/12/2015	5870063.603	531715.496	549.724	17.27	0.004	0.633	0.633	-0.061	89.6	-5.5	0.037	-0.004	0.19	0.004	0.011	0.012	0.001	70.0	4.9	61.959	5.293
06/04/2016	5870063.597	531715.490	549.719	17.56	-0.002	0.627	0.627	-0.066	90.2	-6.0	0.036	-0.004	0.29	-0.006	-0.006	0.008	-0.005	225.0	-30.5	-29.238	-17.229
22/07/2016	5870063.596	531715.488	549.734	17.85	-0.003	0.625	0.625	-0.051	90.3	-4.7	0.035	-0.003	0.29	-0.001	-0.002	0.002	0.015	243.4	81.5	-7.633	51.203
30/10/2016	5870063.602	531715.497	549.725	18.12	0.003	0.634	0.634	-0.060	89.7	-5.4	0.035	-0.003	0.27	0.006	0.009	0.011	-0.009	56.3	-39.8	39.508	-32.873
16/12/2016	5870063.597	531715.511	549.719	18.25	-0.002	0.648	0.648	-0.066	90.2	-5.8	0.036	-0.004	0.13	-0.005	0.014	0.015	-0.006	109.7	-22.0	115.528	-46.628
04/04/2017	5870063.601	531715.501	549.727	18.55	0.002	0.638	0.638	-0.058	89.8	-5.2	0.034	-0.003	0.30	0.004	-0.010	0.011	0.008	291.8	36.6	-36.090	26.807
08/08/2017	5870063.594	531715.491	549.741	18.90	-0.005	0.628	0.628	-0.044	90.5	-4.0	0.033	-0.002	0.34	-0.007	-0.010	0.012	0.014	235.0	48.9	-35.384	40.583
02/10/2017	5870063.595	531715.507	549.719	19.05	-0.004	0.644	0.644	-0.066	90.4	-5.9	0.034	-0.003	0.15	0.001	0.016	0.016	-0.022	86.4	-53.9	106.462	-146.100
13/06/2018	5870063.599	531715.509	549.717	19.74	0.000	0.646	0.646	-0.068	90.0	-6.0	0.033	-0.003	0.70	0.004	0.002	0.004	-0.002	26.6	-24.1	6.431	-2.876
06/12/2018	5870063.601	531715.518	549.709	20.22	0.002	0.655	0.655	-0.076	89.8	-6.6	0.032	-0.004	0.48	0.002	0.009	0.009	-0.008	77.5	-40.9	19.133	-16.602
12/06/2019	5870063.594	531715.522	549.717	20.74	-0.005	0.659	0.659	-0.068	90.4	-5.9	0.032	-0.003	0.51	-0.007	0.004	0.008	0.008	150.3	44.8	15.664	15.543
12/12/2019	5870063.601	531715.530	549.714	21.24	0.002	0.667	0.667	-0.071	89.8	-6.1	0.031	-0.003	0.50	0.007	0.008	0.011	-0.003	48.8	-15.8	21.217	-5.988
21/12/2020	5870063.600	531715.609	549.702	22.27	0.001	0.746	0.746	-0.083	89.9	-6.3	0.034	-0.004	0.51	0.002	0.036	0.036	0.186	86.8	79.0	70.424	363.297
19/06/2021	5870063.603	531715.669	549.706	22.76	0.004	0.806	0.806	-0.079	89.7	-5.6	0.035	-0.003	0.49	0.003	0.060	0.060	0.004	87.1	3.8	121.902	8.117
28/06/2022	5870063.598	531715.678	549.708	23.78	-0.001	0.815	0.815	-0.077	90.1	-5.4	0.034	-0.003	1.02	-0.005	0.009	0.010	0.002	119.1	11.0	10.055	1.953
16/12/2022	5870063.598	531715.688	549.697	24.25	-0.001	0.825	0.825	-0.088	90.1	-6.1	0.034	-0.004	0.47	0.000	0.010	0.010	-0.011	90.0	-47.7	21.360	-23.496
06/06/2023	5870063.600	531715.680	549.711	24.72	0.001	0.817	0.817	-0.074	89.9	-5.2	0.033	-0.003	0.47	0.002	-0.008	0.008	0.014	284.7	60.8	-16.688	29.815
04/01/2024	5870063.601	531715.690	549.693	25.30	0.002	0.827	0.827	-0.092	89.9	-6.3	0.033	-0.004	0.58	0.001	0.010	0.010	-0.018	84.1	-61.9	16.629	-31.081

GPS Hub 98-09 (Lane Between Patchett Street and Pierce Crescent)









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GPS Hub 98-14 (Southeast Corner of Pentland Crescent and Flamingo Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870067.437	531986.027	531.224	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5870067.435	531986.023	531.210	0.25	-0.002	-0.004	0.004	-0.014	243.4	-72.3	0.018	-0.056	0.25	-0.002	-0.004	0.004	-0.014	243.4	-72.3	17.950	-56.192
15/04/1999	5870067.428	531986.061	531.205	0.58	-0.009	0.034	0.035	-0.019	104.8	-28.4	0.061	-0.033	0.33	-0.007	0.038	0.039	-0.005	100.4	-7.4	116.637	-15.093
15/12/1999	5870067.441	531986.116	531.199	1.25	0.004	0.089	0.089	-0.025	87.4	-15.7	0.071	-0.020	0.67	0.013	0.055	0.057	-0.006	76.7	-6.1	84.600	-8.982
15/02/2000	5870067.437	531986.106	531.221	1.42	0.000	0.079	0.079	-0.003	90.0	-2.2	0.056	-0.002	0.17	-0.004	-0.010	0.011	0.022	248.2	63.9	-63.449	129.605
15/05/2000	5870067.432	531986.128	531.198	1.66	-0.005	0.101	0.101	-0.026	92.8	-14.4	0.061	-0.016	0.25	-0.005	0.022	0.023	-0.023	102.8	-45.6	91.560	-93.342
30/11/2000	5870067.429	531986.169	531.198	2.21	-0.008	0.142	0.142	-0.026	93.2	-10.4	0.064	-0.012	0.54	-0.003	0.041	0.041	0.000	94.2	0.0	75.454	0.000
05/05/2001	5870067.422	531986.189	531.193	2.64	-0.015	0.162	0.163	-0.031	95.3	-10.8	0.062	-0.012	0.43	-0.007	0.020	0.021	-0.005	109.3	-13.3	49.612	-11.707
15/12/2001	5870067.419	531986.217	531.202	3.25	-0.018	0.190	0.191	-0.022	95.4	-6.6	0.059	-0.007	0.61	-0.003	0.028	0.028	0.009	96.1	17.7	45.918	14.675
15/05/2002	5870067.410	531986.243	531.190	3.66	-0.027	0.216	0.218	-0.034	97.1	-8.9	0.059	-0.009	0.41	-0.009	0.026	0.028	-0.012	109.1	-23.6	66.552	-29.026
24/10/2002	5870067.409	531986.267	531.172	4.11	-0.028	0.240	0.242	-0.052	96.7	-12.1	0.059	-0.013	0.44	-0.001	0.024	0.024	-0.018	92.4	-36.8	54.158	-40.583
12/11/2003	5870067.414	531986.285	531.172	5.16	-0.023	0.258	0.259	-0.052	95.1	-11.3	0.050	-0.010	1.05	0.005	0.018	0.018	0.000	73.5	0.6	17.507	0.181
11/01/2005	5870067.427	531986.306	531.192	6.32	-0.010	0.279	0.279	-0.032	92.1	-6.6	0.044	-0.005	1.17	0.012	0.021	0.025	0.019	59.8	38.3	21.086	16.642
10/03/2006	5870067.418	531986.384	531.196	7.48	-0.019	0.357	0.358	-0.028	93.0	-4.5	0.048	-0.004	1.16	-0.009	0.078	0.079	0.004	96.3	3.2	67.845	3.799
10/11/2006	5870067.410	531986.397	531.171	8.15	-0.027	0.370	0.371	-0.053	94.2	-8.1	0.046	-0.007	0.67	-0.008	0.013	0.015	-0.025	121.6	-58.6	22.756	-37.270
05/04/2007	5870067.408	531986.404	531.167	8.55	-0.029	0.377	0.378	-0.057	94.4	-8.6	0.044	-0.007	0.40	-0.002	0.007	0.007	-0.004	105.9	-28.8	18.213	-10.007
16/08/2007	5870067.405	531986.420	531.157	8.92	-0.032	0.393	0.394	-0.067	94.7	-9.6	0.044	-0.008	0.36	-0.003	0.016	0.016	-0.010	100.6	-31.6	44.706	-27.462
13/12/2007	5870067.410	531986.417	531.157	9.24	-0.027	0.390	0.391	-0.067	94.0	-9.7	0.042	-0.007	0.33	0.005	-0.003	0.006	0.000	329.0	0.0	-17.897	0.000
18/03/2008	5870067.410	531986.431	531.173	9.51	-0.027	0.404	0.405	-0.051	93.8	-7.2	0.043	-0.005	0.26	0.000	0.014	0.014	0.016	90.0	48.8	53.266	60.875
03/06/2008	5870067.408	531986.455	531.168	9.72	-0.029	0.428	0.429	-0.056	93.9	-7.4	0.044	-0.006	0.21	-0.002	0.024	0.024	-0.005	94.8	-11.7	114.239	-23.718
29/08/2008	5870067.401	531986.466	531.170	9.95	-0.036	0.439	0.440	-0.054	94.7	-7.0	0.044	-0.005	0.24	-0.007	0.011	0.013	0.002	122.5	8.7	54.739	8.397
19/11/2008	5870067.411	531986.470	531.156	10.18	-0.026	0.443	0.444	-0.068	93.4	-8.7	0.044	-0.007	0.22	0.010	0.004	0.011	-0.014	21.8	-52.4	47.974	-62.360
26/03/2009	5870067.413	531986.476	531.167	10.53	-0.024	0.449	0.450	-0.057	93.1	-7.2	0.043	-0.005	0.35	0.002	0.006	0.006	0.011	71.6	60.1	18.189	31.636
10/06/2009	5870067.401	531986.514	531.167	10.74	-0.036	0.487	0.488	-0.057	94.2	-6.7	0.045	-0.005	0.21	-0.012	0.038	0.040	0.000	107.5	0.0	191.515	0.000
17/09/2009	5870067.411	531986.532	531.170	11.01	-0.026	0.505	0.506	-0.054	92.9	-6.1	0.046	-0.005	0.27	0.010	0.018	0.021	0.003	60.9	8.3	75.969	11.068
23/11/2009	5870067.416	531986.525	531.155	11.19	-0.021	0.498	0.498	-0.069	92.4	-7.9	0.045	-0.006	0.18	0.005	-0.007	0.009	-0.015	305.5	-60.2	-46.896	-81.772
27/03/2010	5870067.415	531986.525	531.160	11.53	-0.022	0.498	0.498	-0.064	92.5	-7.3	0.043	-0.006	0.34	-0.001	0.000	0.001	0.005	180.0	78.7	2.946	14.728
04/07/2010	5870067.396	531986.525	531.159	11.80	-0.041	0.498	0.500	-0.065	94.7	-7.4	0.042	-0.006	0.27	-0.019	0.000	0.019	-0.001	180.0	-3.0	70.098	-3.689
13/09/2010	5870067.407	531986.530	531.163	11.99	-0.030	0.503	0.504	-0.061	93.4	-6.9	0.042	-0.005	0.19	0.011	0.005	0.012	0.004	24.4	18.3	62.160	20.577
22/11/2010	5870067.404	531986.536	531.151	12.19	-0.033	0.509	0.510	-0.073	93.7	-8.1	0.042	-0.006	0.19	-0.003	0.006	0.007	-0.012	116.6	-60.8	35.002	-62.614
04/04/2011	5870067.403	531986.539	531.160	12.55	-0.034	0.512	0.513	-0.064	93.8	-7.1	0.041	-0.005	0.36	-0.001	0.003	0.003	0.009	108.4	70.6	8.684	24.716
18/06/2011	5870067.411	531986.552	531.166	12.76	-0.026	0.525	0.526	-0.058	92.8	-6.3	0.041	-0.005	0.21	0.008	0.013	0.015	0.006	58.4	21.5	74.337	29.220
03/10/2011	5870067.408	531986.547	531.155	13.05	-0.029	0.520	0.521	-0.069	93.2	-7.5	0.040	-0.005	0.29	-0.003	-0.005	0.006	-0.011	239.0	-62.1	-19.904	-37.549
28/11/2011	5870067.413	531986.555	531.157	13.20	-0.024	0.528	0.529	-0.067	92.6	-7.2	0.040	-0.005	0.15	0.005	0.008	0.009	0.002	58.0	12.0	61.531	13.045
09/04/2012	5870067.406	531986.555	531.154	13.57	-0.031	0.528	0.529	-0.070	93.4	-7.5	0.039	-0.005	0.36	-0.007	0.000	0.007	-0.003	180.0	-23.2	-19.224	-8.239

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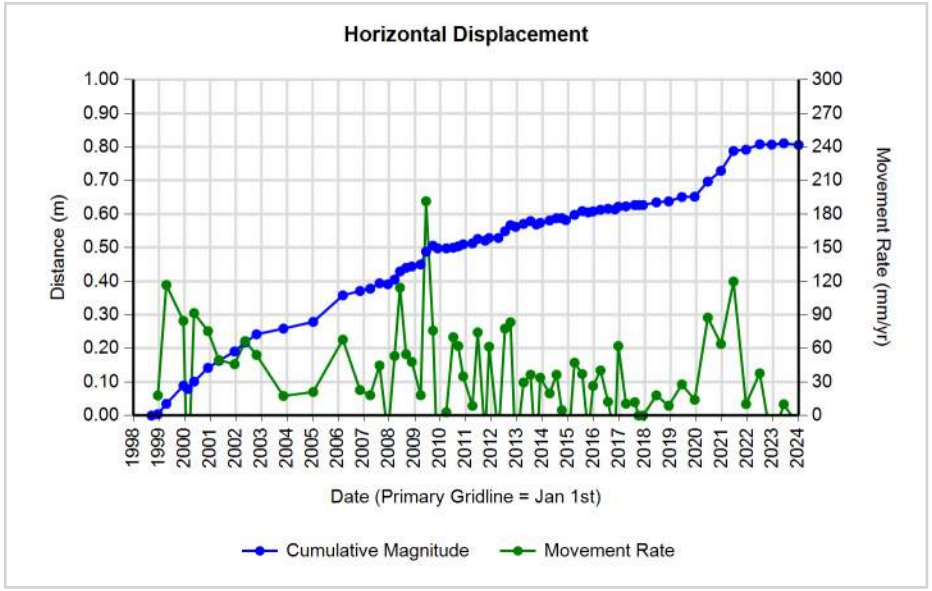
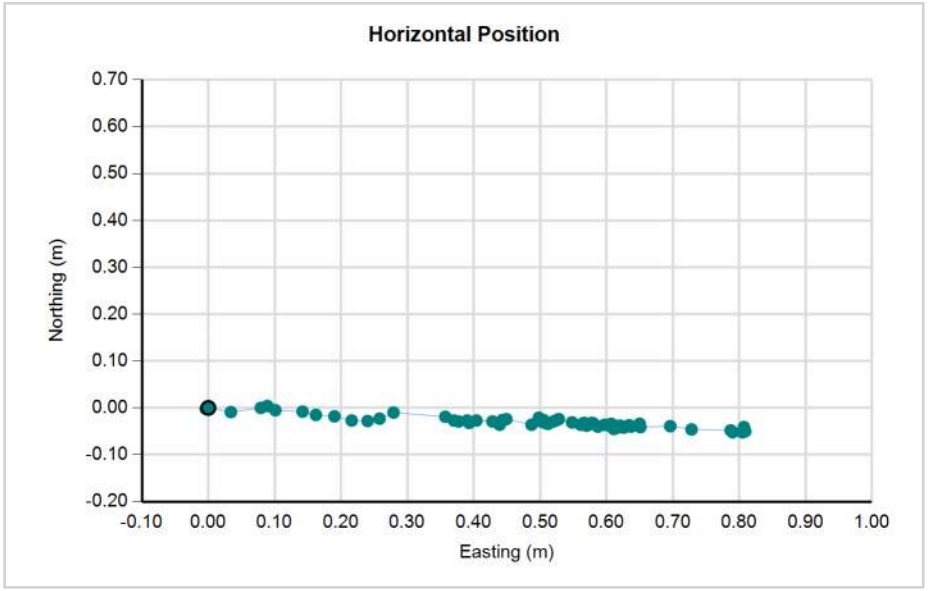
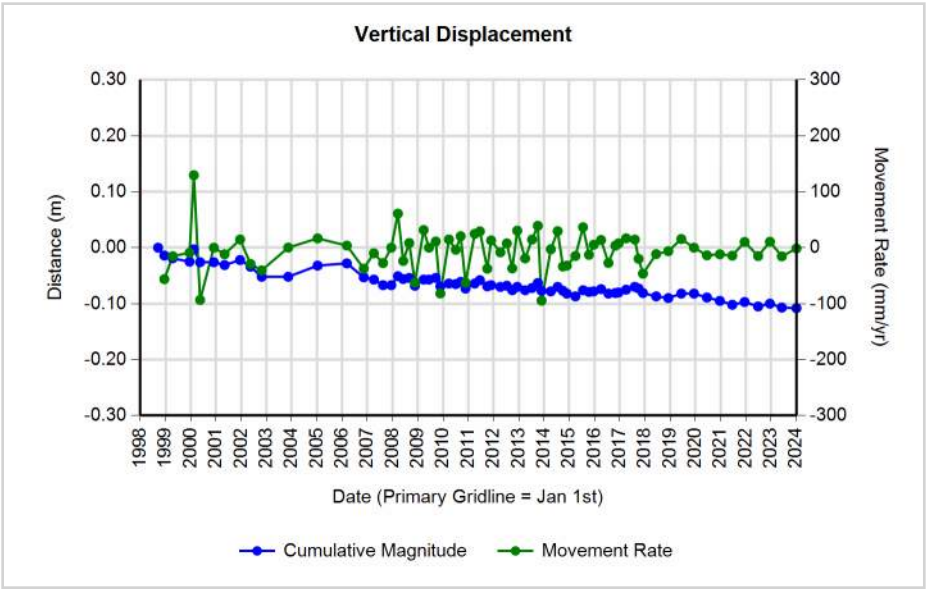
GPS Hub 98-14 (Southeast Corner of Pentland Crescent and Flamingo Street)

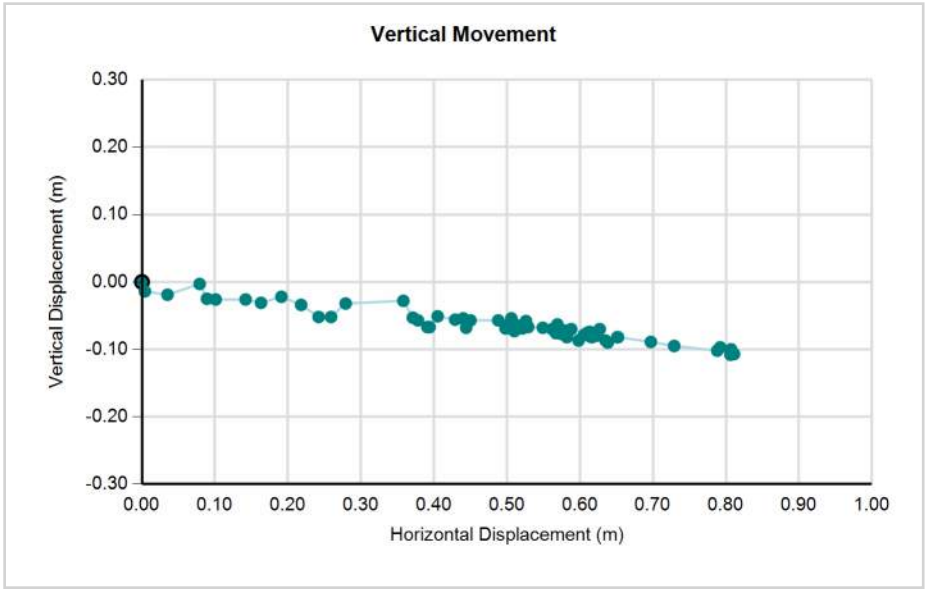
12/07/2012	5870067.406	531986.575	531.156	13.82	-0.031	0.548	0.549	-0.068	93.2	-7.1	0.040	-0.005	0.26	0.000	0.020	0.020	0.002	90.0	5.7	77.713	7.771
29/09/2012	5870067.405	531986.593	531.148	14.04	-0.032	0.566	0.567	-0.076	93.2	-7.6	0.040	-0.005	0.22	-0.001	0.018	0.018	-0.008	93.2	-23.9	83.350	-36.987
10/12/2012	5870067.401	531986.588	531.154	14.24	-0.036	0.561	0.562	-0.070	93.7	-7.1	0.039	-0.005	0.20	-0.004	-0.005	0.006	0.006	231.3	43.1	-32.483	30.437
03/04/2013	5870067.399	531986.597	531.148	14.55	-0.038	0.570	0.571	-0.076	93.8	-7.6	0.039	-0.005	0.31	-0.002	0.009	0.009	-0.006	102.5	-33.1	29.539	-19.224
12/07/2013	5870067.405	531986.605	531.152	14.82	-0.032	0.578	0.579	-0.072	93.2	-7.1	0.039	-0.005	0.27	0.006	0.008	0.010	0.004	53.1	21.8	36.525	14.610
04/10/2013	5870067.402	531986.595	531.161	15.05	-0.035	0.568	0.569	-0.063	93.5	-6.3	0.038	-0.004	0.23	-0.003	-0.010	0.010	0.009	253.3	40.8	-45.397	39.134
27/11/2013	5870067.402	531986.600	531.147	15.20	-0.035	0.573	0.574	-0.077	93.5	-7.6	0.038	-0.005	0.15	0.000	0.005	0.005	-0.014	90.0	-70.3	33.819	-94.694
10/04/2014	5870067.404	531986.607	531.146	15.57	-0.033	0.580	0.581	-0.078	93.3	-7.6	0.037	-0.005	0.37	0.002	0.007	0.007	-0.001	74.1	-7.8	19.844	-2.726
18/07/2014	5870067.397	531986.614	531.154	15.84	-0.040	0.587	0.588	-0.070	93.9	-6.8	0.037	-0.004	0.27	-0.007	0.007	0.010	0.008	135.0	38.9	36.523	29.515
02/10/2014	5870067.396	531986.614	531.147	16.05	-0.041	0.587	0.588	-0.077	94.0	-7.5	0.037	-0.005	0.21	-0.001	0.000	0.001	-0.007	180.0	-81.9	4.806	-33.641
28/11/2014	5870067.402	531986.608	531.142	16.20	-0.035	0.581	0.582	-0.082	93.4	-8.0	0.036	-0.005	0.16	0.006	-0.006	0.008	-0.005	315.0	-30.5	-54.373	-32.039
01/04/2015	5870067.401	531986.624	531.137	16.54	-0.036	0.597	0.598	-0.087	93.5	-8.3	0.036	-0.005	0.34	-0.001	0.016	0.016	-0.005	93.6	-17.3	47.221	-14.728
20/07/2015	5870067.399	531986.635	531.148	16.84	-0.038	0.608	0.609	-0.076	93.6	-7.1	0.036	-0.005	0.30	-0.002	0.011	0.011	0.011	100.3	44.5	37.124	36.525
14/10/2015	5870067.399	531986.631	531.145	17.08	-0.038	0.604	0.605	-0.079	93.6	-7.4	0.035	-0.005	0.24	0.000	-0.004	0.004	-0.003	270.0	-36.9	-16.988	-12.741
22/12/2015	5870067.403	531986.634	531.146	17.27	-0.034	0.607	0.608	-0.078	93.2	-7.3	0.035	-0.005	0.19	0.004	0.003	0.005	0.001	36.9	11.3	26.467	5.293
06/04/2016	5870067.392	531986.638	531.150	17.56	-0.045	0.611	0.613	-0.074	94.2	-6.9	0.035	-0.004	0.29	-0.011	0.004	0.012	0.004	160.0	18.9	40.332	13.783
22/07/2016	5870067.394	531986.641	531.142	17.85	-0.043	0.614	0.616	-0.082	94.0	-7.6	0.034	-0.005	0.29	0.002	0.003	0.004	-0.008	56.3	-65.7	12.308	-27.308
30/10/2016	5870067.399	531986.640	531.143	18.12	-0.038	0.613	0.614	-0.081	93.5	-7.5	0.034	-0.004	0.27	0.005	-0.001	0.005	0.001	348.7	11.1	-18.624	3.652
16/12/2016	5870067.399	531986.648	531.144	18.25	-0.038	0.621	0.622	-0.080	93.5	-7.3	0.034	-0.004	0.13	0.000	0.008	0.008	0.001	90.0	7.1	62.170	7.771
04/04/2017	5870067.396	531986.649	531.149	18.55	-0.041	0.622	0.623	-0.075	93.8	-6.9	0.034	-0.004	0.30	-0.003	0.001	0.003	0.005	161.6	57.7	10.597	16.755
08/08/2017	5870067.395	531986.653	531.154	18.90	-0.042	0.626	0.627	-0.070	93.8	-6.4	0.033	-0.004	0.34	-0.001	0.004	0.004	0.005	104.0	50.5	11.952	14.494
02/10/2017	5870067.395	531986.653	531.151	19.05	-0.042	0.626	0.627	-0.073	93.8	-6.6	0.033	-0.004	0.15	0.000	0.000	0.000	-0.003	0.0	0.0	0.000	-19.923
04/12/2017	5870067.395	531986.653	531.143	19.22	-0.042	0.626	0.627	-0.081	93.8	-7.4	0.033	-0.004	0.17	0.000	0.000	0.000	-0.008	0.0	0.0	0.000	-46.381
13/06/2018	5870067.400	531986.661	531.137	19.74	-0.037	0.634	0.635	-0.087	93.3	-7.8	0.032	-0.004	0.52	0.005	0.008	0.009	-0.006	58.0	-32.5	18.041	-11.474
06/12/2018	5870067.397	531986.664	531.134	20.22	-0.040	0.637	0.638	-0.090	93.6	-8.0	0.032	-0.004	0.48	-0.003	0.003	0.004	-0.003	135.0	-35.3	8.805	-6.226
12/06/2019	5870067.403	531986.677	531.142	20.74	-0.034	0.650	0.651	-0.082	93.0	-7.2	0.031	-0.004	0.51	0.006	0.013	0.014	0.008	65.2	29.2	27.817	15.543
12/12/2019	5870067.396	531986.678	531.142	21.24	-0.041	0.651	0.652	-0.082	93.6	-7.2	0.031	-0.004	0.50	-0.007	0.001	0.007	0.000	171.9	0.0	14.113	0.000
17/06/2020	5870067.398	531986.723	531.135	21.75	-0.039	0.696	0.697	-0.089	93.2	-7.3	0.032	-0.004	0.51	0.002	0.045	0.045	-0.007	87.5	-8.8	87.513	-13.600
21/12/2020	5870067.391	531986.755	531.129	22.27	-0.046	0.728	0.729	-0.095	93.6	-7.4	0.033	-0.004	0.51	-0.007	0.032	0.033	-0.006	102.3	-10.4	63.981	-11.719
19/06/2021	5870067.389	531986.814	531.122	22.76	-0.048	0.787	0.788	-0.102	93.5	-7.4	0.035	-0.004	0.49	-0.002	0.059	0.059	-0.007	91.9	-6.8	119.790	-14.204
14/12/2021	5870067.385	531986.817	531.127	23.25	-0.052	0.790	0.792	-0.097	93.8	-7.0	0.034	-0.004	0.49	-0.004	0.003	0.005	0.005	143.1	45.0	10.260	10.260
28/06/2022	5870067.396	531986.834	531.119	23.78	-0.041	0.807	0.808	-0.105	92.9	-7.4	0.034	-0.004	0.54	0.011	0.017	0.020	-0.008	57.1	-21.6	37.733	-14.908
16/12/2022	5870067.385	531986.832	531.124	24.25	-0.052	0.805	0.807	-0.100	93.7	-7.1	0.033	-0.004	0.47	-0.011	-0.002	0.011	0.005	190.3	24.1	-23.881	10.680
06/06/2023	5870067.387	531986.836	531.117	24.72	-0.050	0.809	0.811	-0.107	93.5	-7.5	0.033	-0.004	0.47	0.002	0.004	0.005	-0.007	65.1	-56.8	10.071	-15.396
04/01/2024	5870067.386	531986.831	531.116	25.30	-0.051	0.804	0.806	-0.108	93.6	-7.6	0.032	-0.004	0.58	-0.001	-0.005	0.005	-0.001	259.3	-7.9	-9.292	-1.292

GPS Hub 98-14 (Southeast Corner of Pentland Crescent and Flamingo Street)









CITY OF Quesnel

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GPS Hub 98-15 (Southwest Corner of Palmer Street and Lewis Drive)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870275.888	532052.513	524.385	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5870275.892	532052.515	524.393	0.25	0.004	0.002	0.004	0.008	26.6	60.8	0.018	0.032	0.25	0.004	0.002	0.004	0.008	26.6	60.8	17.950	32.110
15/04/1999	5870275.902	532052.557	524.361	0.58	0.014	0.044	0.046	-0.024	72.3	-27.5	0.080	-0.041	0.33	0.010	0.042	0.043	-0.032	76.6	-36.5	130.325	-96.595
15/12/1999	5870275.903	532052.589	524.376	1.25	0.015	0.076	0.077	-0.009	78.8	-6.6	0.062	-0.007	0.67	0.001	0.032	0.032	0.015	88.2	25.1	47.925	22.454
15/02/2000	5870275.906	532052.581	524.364	1.42	0.018	0.068	0.070	-0.021	75.2	-16.6	0.050	-0.015	0.17	0.003	-0.008	0.009	-0.012	290.6	-54.5	-50.334	-70.694
15/05/2000	5870275.909	532052.594	524.343	1.66	0.021	0.081	0.084	-0.042	75.5	-26.7	0.050	-0.025	0.25	0.003	0.013	0.013	-0.021	77.0	-57.6	54.145	-85.225
30/11/2000	5870275.922	532052.628	524.353	2.21	0.034	0.115	0.120	-0.032	73.5	-14.9	0.054	-0.014	0.54	0.013	0.034	0.036	0.010	69.1	15.4	66.811	18.354
05/05/2001	5870275.914	532052.630	524.335	2.64	0.026	0.117	0.120	-0.050	77.5	-22.6	0.045	-0.019	0.43	-0.008	0.002	0.008	-0.018	166.0	-65.4	-19.307	-42.144
15/12/2001	5870275.910	532052.652	524.336	3.25	0.022	0.139	0.141	-0.049	81.0	-19.2	0.043	-0.015	0.61	-0.004	0.022	0.022	0.001	100.3	2.6	36.461	1.631
15/05/2002	5870275.924	532052.682	524.322	3.66	0.036	0.169	0.173	-0.063	78.0	-20.0	0.047	-0.017	0.41	0.014	0.030	0.033	-0.014	65.0	-22.9	80.079	-33.864
24/10/2002	5870275.960	532052.698	524.298	4.11	0.072	0.185	0.199	-0.087	68.7	-23.7	0.048	-0.021	0.44	0.036	0.016	0.039	-0.024	24.0	-31.4	88.822	-54.111
12/11/2003	5870275.932	532052.704	524.314	5.16	0.044	0.191	0.196	-0.071	77.0	-20.1	0.038	-0.014	1.05	-0.028	0.006	0.029	0.016	168.5	28.4	-27.242	14.753
11/01/2005	5870275.941	532052.719	524.317	6.32	0.053	0.206	0.213	-0.068	75.7	-17.6	0.034	-0.011	1.17	0.009	0.016	0.018	0.004	61.0	12.3	15.310	3.335
10/03/2006	5870275.957	532052.780	524.300	7.48	0.069	0.267	0.276	-0.085	75.5	-17.1	0.037	-0.011	1.16	0.016	0.061	0.063	-0.017	74.9	-15.5	54.292	-15.024
10/11/2006	5870275.950	532052.783	524.292	8.15	0.062	0.270	0.277	-0.093	77.1	-18.6	0.034	-0.011	0.67	-0.007	0.003	0.008	-0.008	156.8	-46.4	11.354	-11.927
05/04/2007	5870275.962	532052.791	524.282	8.55	0.074	0.278	0.288	-0.103	75.1	-19.7	0.034	-0.012	0.40	0.012	0.008	0.014	-0.010	33.7	-34.7	36.080	-25.017
16/08/2007	5870275.954	532052.794	524.292	8.92	0.066	0.281	0.289	-0.093	76.8	-17.9	0.032	-0.010	0.36	-0.008	0.003	0.009	0.010	159.4	49.5	23.464	27.462
13/12/2007	5870275.960	532052.795	524.275	9.24	0.072	0.282	0.291	-0.110	75.7	-20.7	0.031	-0.012	0.33	0.006	0.001	0.006	-0.017	9.5	-70.3	18.670	-52.179
18/03/2008	5870275.962	532052.804	524.287	9.51	0.074	0.291	0.300	-0.098	75.7	-18.1	0.032	-0.010	0.26	0.002	0.009	0.009	0.012	77.5	52.5	35.077	45.656
03/06/2008	5870275.967	532052.825	524.282	9.72	0.079	0.312	0.322	-0.103	75.8	-17.7	0.033	-0.011	0.21	0.005	0.021	0.022	-0.005	76.6	-13.0	102.398	-23.718
29/08/2008	5870275.964	532052.829	524.283	9.95	0.076	0.316	0.325	-0.102	76.5	-17.4	0.033	-0.010	0.24	-0.003	0.004	0.005	0.001	126.9	11.3	20.991	4.198
19/11/2008	5870275.971	532052.834	524.268	10.18	0.083	0.321	0.332	-0.117	75.5	-19.4	0.033	-0.011	0.22	0.007	0.005	0.009	-0.015	35.5	-60.2	38.317	-66.814
26/03/2009	5870275.974	532052.840	524.266	10.53	0.086	0.327	0.338	-0.119	75.3	-19.4	0.032	-0.011	0.35	0.003	0.006	0.007	-0.002	63.4	-16.6	19.293	-5.752
10/06/2009	5870275.968	532052.864	524.273	10.74	0.080	0.351	0.360	-0.112	77.2	-17.3	0.034	-0.010	0.21	-0.006	0.024	0.025	0.007	104.0	15.8	118.892	33.641
17/09/2009	5870275.973	532052.865	524.263	11.01	0.085	0.352	0.362	-0.122	76.4	-18.6	0.033	-0.011	0.27	0.005	0.001	0.005	-0.010	11.3	-63.0	18.812	-36.894
23/11/2009	5870275.985	532052.870	524.251	11.19	0.097	0.357	0.370	-0.134	74.8	-19.9	0.033	-0.012	0.18	0.012	0.005	0.013	-0.012	22.6	-42.7	70.869	-65.418
27/03/2010	5870275.986	532052.873	524.256	11.53	0.098	0.360	0.373	-0.129	74.8	-19.1	0.032	-0.011	0.34	0.001	0.003	0.003	0.005	71.6	57.7	9.315	14.728
04/07/2010	5870275.974	532052.870	524.260	11.80	0.086	0.357	0.367	-0.125	76.5	-18.8	0.031	-0.011	0.27	-0.012	-0.003	0.012	0.004	194.0	17.9	-45.635	14.758
13/09/2010	5870275.980	532052.875	524.264	11.99	0.092	0.362	0.374	-0.121	75.7	-18.0	0.031	-0.010	0.19	0.006	0.005	0.008	0.004	39.8	27.1	40.179	20.577
22/11/2010	5870275.984	532052.882	524.252	12.19	0.096	0.369	0.381	-0.133	75.4	-19.2	0.031	-0.011	0.19	0.004	0.007	0.008	-0.012	60.3	-56.1	42.068	-62.614
04/04/2011	5870275.984	532052.877	524.253	12.55	0.096	0.364	0.376	-0.132	75.2	-19.3	0.030	-0.011	0.36	0.000	-0.005	0.005	0.001	270.0	11.3	-13.731	2.746
18/06/2011	5870275.982	532052.888	524.257	12.76	0.094	0.375	0.387	-0.128	75.9	-18.3	0.030	-0.010	0.21	-0.002	0.011	0.011	0.004	100.3	19.7	54.448	19.480
03/10/2011	5870275.985	532052.887	524.253	13.05	0.097	0.374	0.386	-0.132	75.5	-18.9	0.030	-0.010	0.29	0.003	-0.001	0.003	-0.004	341.6	-51.7	-10.795	-13.654
28/11/2011	5870275.990	532052.893	524.250	13.20	0.102	0.380	0.393	-0.135	75.0	-18.9	0.030	-0.010	0.15	0.005	0.006	0.008	-0.003	50.2	-21.0	50.941	-19.567
09/04/2012	5870275.988	532052.891	524.252	13.57	0.100	0.378	0.391	-0.133	75.2	-18.8	0.029	-0.010	0.36	-0.002	-0.002	0.003	0.002	225.0	35.3	-7.768	5.492

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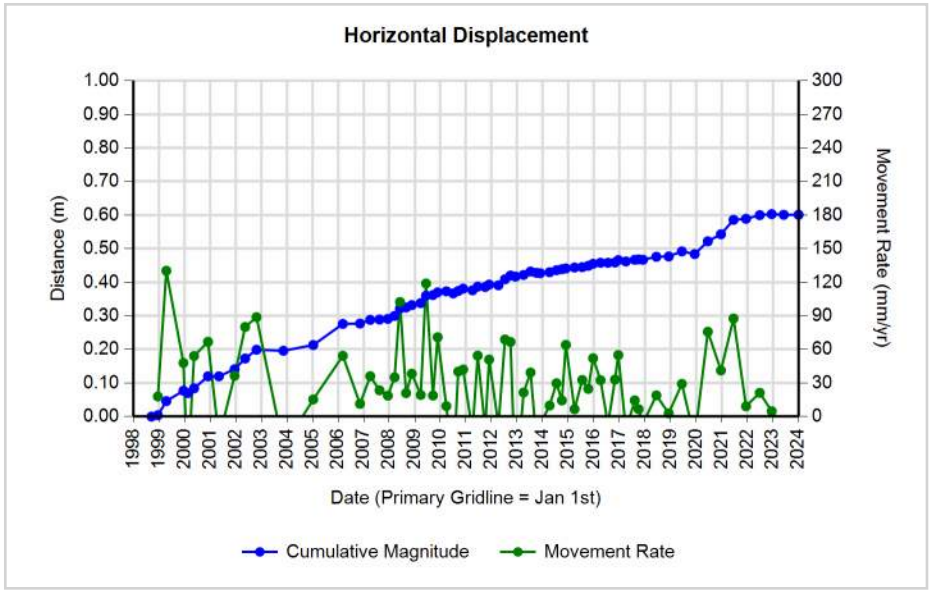
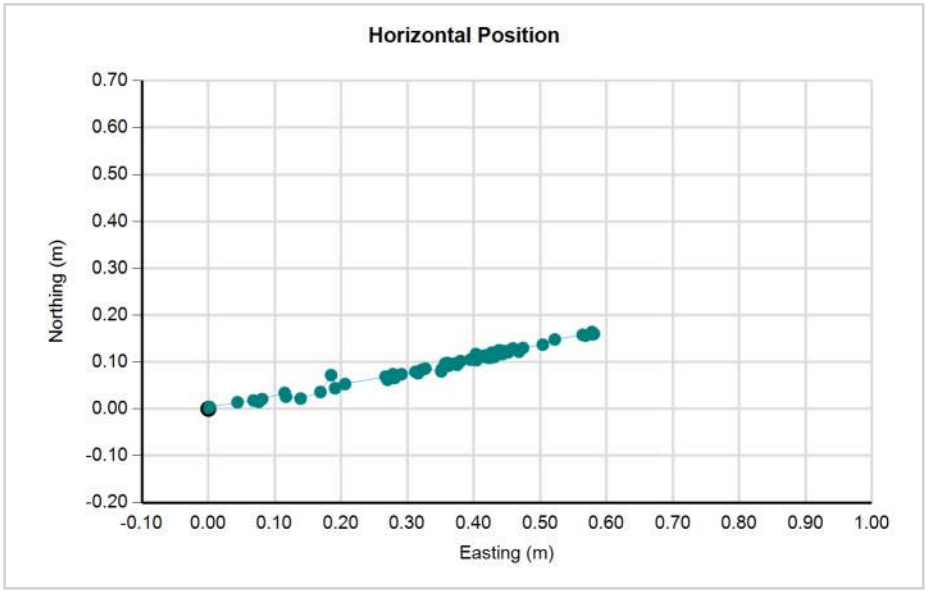
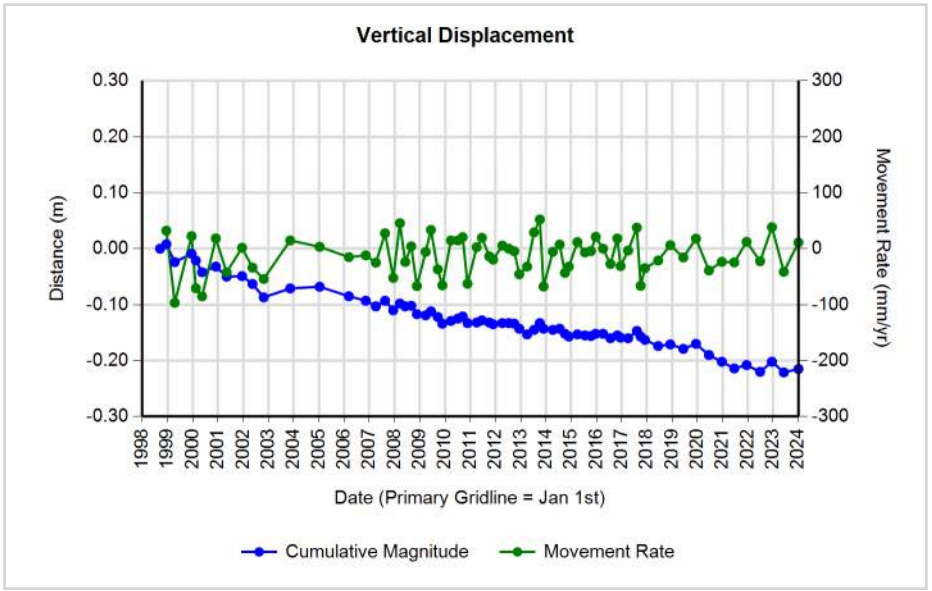
GPS Hub 98-15 (Southwest Corner of Palmer Street and Lewis Drive)

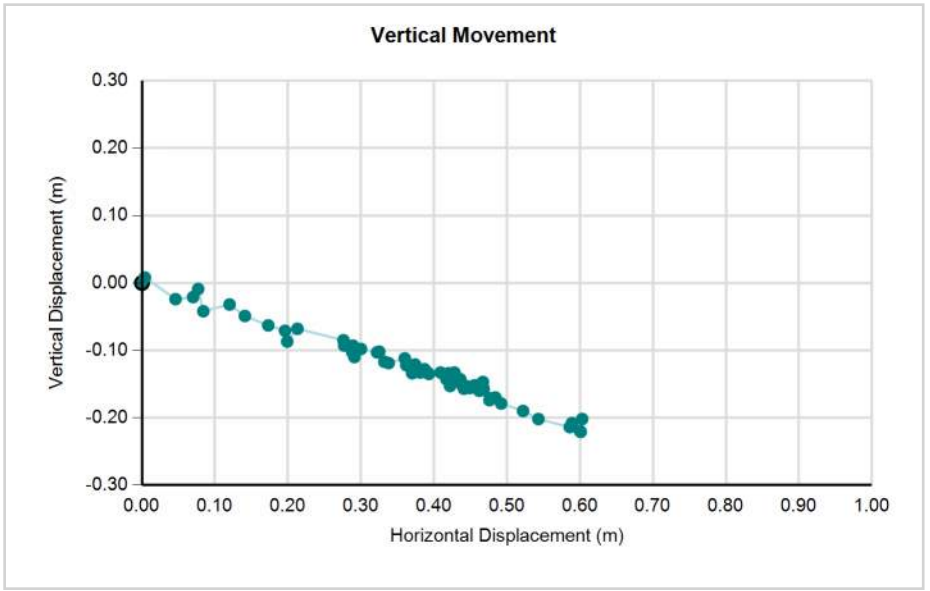
12/07/2012	5870275.993	532052.908	524.252	13.82	0.105	0.395	0.409	-0.133	75.1	-18.0	0.030	-0.010	0.26	0.005	0.017	0.018	0.000	73.6	0.0	68.854	0.000
29/09/2012	5870276.005	532052.916	524.251	14.04	0.117	0.403	0.420	-0.134	73.8	-17.7	0.030	-0.010	0.22	0.012	0.008	0.014	-0.001	33.7	-4.0	66.680	-4.623
10/12/2012	5870275.992	532052.917	524.242	14.24	0.104	0.404	0.417	-0.143	75.6	-18.9	0.029	-0.010	0.20	-0.013	0.001	0.013	-0.009	175.6	-34.6	-66.143	-45.656
03/04/2013	5870275.998	532052.920	524.232	14.55	0.110	0.407	0.422	-0.153	74.9	-19.9	0.029	-0.011	0.31	0.006	0.003	0.007	-0.010	26.6	-56.1	21.493	-32.039
12/07/2013	5870276.002	532052.930	524.240	14.82	0.114	0.417	0.432	-0.145	74.7	-18.5	0.029	-0.010	0.27	0.004	0.010	0.011	0.008	68.2	36.6	39.339	29.220
04/10/2013	5870275.999	532052.926	524.252	15.05	0.111	0.413	0.428	-0.133	75.0	-17.3	0.028	-0.009	0.23	-0.003	-0.004	0.005	0.012	233.1	67.4	-21.741	52.179
27/11/2013	5870275.998	532052.926	524.242	15.20	0.110	0.413	0.427	-0.143	75.1	-18.5	0.028	-0.009	0.15	-0.001	0.000	0.001	-0.010	180.0	-84.3	-6.764	-67.639
10/04/2014	5870276.001	532052.928	524.240	15.57	0.113	0.415	0.430	-0.145	74.8	-18.6	0.028	-0.009	0.37	0.003	0.002	0.004	-0.002	33.7	-29.0	9.828	-5.451
18/07/2014	5870275.997	532052.935	524.242	15.84	0.109	0.422	0.436	-0.143	75.5	-18.2	0.028	-0.009	0.27	-0.004	0.007	0.008	0.002	119.7	13.9	29.745	7.379
02/10/2014	5870275.997	532052.938	524.233	16.05	0.109	0.425	0.439	-0.152	75.6	-19.1	0.027	-0.009	0.21	0.000	0.003	0.003	-0.009	90.0	-71.6	14.418	-43.253
28/11/2014	5870276.007	532052.938	524.228	16.20	0.119	0.425	0.441	-0.157	74.4	-19.6	0.027	-0.010	0.16	0.010	0.000	0.010	-0.005	0.0	-26.6	64.079	-32.039
01/04/2015	5870276.008	532052.940	524.232	16.54	0.120	0.427	0.444	-0.153	74.3	-19.0	0.027	-0.009	0.34	0.001	0.002	0.002	0.004	63.4	60.8	6.586	11.782
20/07/2015	5870275.999	532052.944	524.230	16.84	0.111	0.431	0.445	-0.155	75.6	-19.2	0.026	-0.009	0.30	-0.009	0.004	0.010	-0.002	156.0	-11.5	32.703	-6.641
14/10/2015	5870276.004	532052.947	524.229	17.08	0.116	0.434	0.449	-0.156	75.0	-19.1	0.026	-0.009	0.24	0.005	0.003	0.006	-0.001	31.0	-9.7	24.765	-4.247
22/12/2015	5870276.013	532052.951	524.233	17.27	0.125	0.438	0.455	-0.152	74.1	-18.5	0.026	-0.009	0.19	0.009	0.004	0.010	0.004	24.0	22.1	52.135	21.174
06/04/2016	5870276.005	532052.956	524.233	17.56	0.117	0.443	0.458	-0.152	75.2	-18.4	0.026	-0.009	0.29	-0.008	0.005	0.009	0.000	148.0	0.0	32.507	0.000
22/07/2016	5870276.003	532052.956	524.225	17.85	0.115	0.443	0.458	-0.160	75.4	-19.3	0.026	-0.009	0.29	-0.002	0.000	0.002	-0.008	180.0	-76.0	-6.827	-27.308
30/10/2016	5870276.012	532052.955	524.230	18.12	0.124	0.442	0.459	-0.155	74.3	-18.7	0.025	-0.009	0.27	0.009	-0.001	0.009	0.005	353.7	28.9	33.075	18.262
16/12/2016	5870276.011	532052.962	524.226	18.25	0.123	0.449	0.466	-0.159	74.7	-18.9	0.026	-0.009	0.13	-0.001	0.007	0.007	-0.004	98.1	-29.5	54.951	-31.085
04/04/2017	5870276.009	532052.959	524.225	18.55	0.121	0.446	0.462	-0.160	74.8	-19.1	0.025	-0.009	0.30	-0.002	-0.003	0.004	-0.001	236.3	-15.5	-12.082	-3.351
08/08/2017	5870276.009	532052.964	524.238	18.90	0.121	0.451	0.467	-0.147	75.0	-17.5	0.025	-0.008	0.34	0.000	0.005	0.005	0.013	90.0	69.0	14.494	37.685
02/10/2017	5870276.009	532052.965	524.228	19.05	0.121	0.452	0.468	-0.157	75.0	-18.5	0.025	-0.008	0.15	0.000	0.001	0.001	-0.010	90.0	-84.3	6.641	-66.409
04/12/2017	5870276.009	532052.964	524.222	19.22	0.121	0.451	0.467	-0.163	75.0	-19.2	0.024	-0.008	0.17	0.000	-0.001	0.001	-0.006	270.0	-80.5	-5.798	-34.786
13/06/2018	5870276.016	532052.971	524.211	19.74	0.128	0.458	0.476	-0.174	74.4	-20.1	0.024	-0.009	0.52	0.007	0.007	0.010	-0.011	45.0	-48.0	18.931	-21.035
06/12/2018	5870276.017	532052.972	524.214	20.22	0.129	0.459	0.477	-0.171	74.3	-19.7	0.024	-0.008	0.48	0.001	0.001	0.001	0.003	45.0	64.8	2.935	6.226
12/06/2019	5870276.018	532052.987	524.206	20.74	0.130	0.474	0.492	-0.179	74.7	-20.0	0.024	-0.009	0.51	0.001	0.015	0.015	-0.008	86.2	-28.0	29.207	-15.543
12/12/2019	5870276.010	532052.981	524.215	21.24	0.122	0.468	0.484	-0.170	75.4	-19.4	0.023	-0.008	0.50	-0.008	-0.006	0.010	0.009	216.9	42.0	-19.959	17.963
17/06/2020	5870276.025	532053.017	524.195	21.75	0.137	0.504	0.522	-0.190	74.8	-20.0	0.024	-0.009	0.51	0.015	0.036	0.039	-0.020	67.4	-27.1	75.770	-38.856
21/12/2020	5870276.036	532053.035	524.183	22.27	0.148	0.522	0.543	-0.202	74.2	-20.4	0.024	-0.009	0.51	0.011	0.018	0.021	-0.012	58.6	-29.6	41.203	-23.439
19/06/2021	5870276.046	532053.077	524.171	22.76	0.158	0.564	0.586	-0.214	74.4	-20.1	0.026	-0.009	0.49	0.010	0.042	0.043	-0.012	76.6	-15.5	87.607	-24.350
14/12/2021	5870276.044	532053.081	524.177	23.25	0.156	0.568	0.589	-0.208	74.6	-19.4	0.025	-0.009	0.49	-0.002	0.004	0.004	0.006	116.6	53.3	9.177	12.312
28/06/2022	5870276.047	532053.092	524.165	23.78	0.159	0.579	0.600	-0.220	74.6	-20.1	0.025	-0.009	0.54	0.003	0.011	0.011	-0.012	74.7	-46.5	21.247	-22.362
16/12/2022	5870276.048	532053.094	524.183	24.25	0.160	0.581	0.603	-0.202	74.6	-18.5	0.025	-0.008	0.47	0.001	0.002	0.002	0.018	63.4	82.9	4.776	38.447
06/06/2023	5870276.052	532053.092	524.164	24.72	0.164	0.579	0.601	-0.221	74.2	-20.2	0.024	-0.009	0.47	0.004	-0.002	0.005	-0.019	330.1	-76.7	-9.798	-41.345
04/01/2024	5870276.052	532053.091	524.170	25.30	0.164	0.578	0.601	-0.215	74.2	-19.7	0.024	-0.008	0.58	0.000	-0.001	0.001	0.006	270.0	83.8	-1.206	11.147

GPS Hub 98-15 (Southwest Corner of Palmer Street and Lewis Drive)









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GPS Hub 98-16 (West Side of Healy Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5870413.504	532184.864	509.104	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5870413.499	532184.859	509.086	0.25	-0.005	-0.005	0.007	-0.018	225.0	-68.6	0.028	-0.072	0.25	-0.005	-0.005	0.007	-0.018	225.0	-68.6	28.381	-72.247
15/04/1999	5870413.501	532184.880	509.054	0.58	-0.003	0.016	0.016	-0.050	100.6	-72.0	0.028	-0.086	0.33	0.002	0.021	0.021	-0.032	84.6	-56.6	63.677	-96.595
15/12/1999	5870413.509	532184.907	509.068	1.25	0.005	0.043	0.043	-0.036	83.4	-39.7	0.035	-0.029	0.67	0.008	0.027	0.028	0.014	73.5	26.4	42.154	20.957
15/02/2000	5870413.515	532184.912	509.064	1.42	0.011	0.048	0.049	-0.040	77.1	-39.1	0.035	-0.028	0.17	0.006	0.005	0.008	-0.004	39.8	-27.1	46.011	-23.565
15/05/2000	5870413.516	532184.916	509.071	1.66	0.012	0.052	0.053	-0.033	77.0	-31.7	0.032	-0.020	0.25	0.001	0.004	0.004	0.007	76.0	59.5	16.733	28.408
30/11/2000	5870413.524	532184.943	509.062	2.21	0.020	0.079	0.081	-0.042	75.8	-27.3	0.037	-0.019	0.54	0.008	0.027	0.028	-0.009	73.5	-17.7	51.686	-16.519
05/05/2001	5870413.522	532184.942	509.052	2.64	0.018	0.078	0.080	-0.052	77.0	-33.0	0.030	-0.020	0.43	-0.002	-0.001	0.002	-0.010	206.6	-77.4	-5.235	-23.413
15/12/2001	5870413.530	532184.984	509.054	3.25	0.026	0.120	0.123	-0.050	77.8	-22.2	0.038	-0.015	0.61	0.008	0.042	0.043	0.002	79.2	2.7	69.716	3.261
15/05/2002	5870413.517	532184.970	509.027	3.66	0.013	0.106	0.107	-0.077	83.0	-35.8	0.029	-0.021	0.41	-0.013	-0.014	0.019	-0.027	227.1	-54.7	-46.213	-65.310
24/10/2002	5870413.570	532184.994	509.024	4.11	0.066	0.130	0.146	-0.080	63.1	-28.8	0.036	-0.019	0.44	0.053	0.024	0.058	-0.003	24.4	-3.0	131.176	-6.764
12/11/2003	5870413.535	532185.001	509.048	5.16	0.031	0.137	0.140	-0.056	77.2	-21.7	0.027	-0.011	1.05	-0.035	0.007	0.036	0.024	169.1	34.3	-33.908	23.161
11/01/2005	5870413.550	532185.005	509.051	6.32	0.046	0.141	0.148	-0.053	71.9	-19.7	0.023	-0.008	1.17	0.015	0.004	0.016	0.003	15.7	9.5	13.547	2.272
10/03/2006	5870413.558	532185.041	509.050	7.48	0.054	0.177	0.185	-0.054	73.0	-16.3	0.025	-0.007	1.16	0.008	0.036	0.037	-0.001	77.8	-1.6	31.806	-0.863
10/11/2006	5870413.561	532185.055	509.051	8.15	0.057	0.191	0.199	-0.053	73.4	-14.9	0.024	-0.007	0.67	0.003	0.014	0.014	0.001	77.9	4.0	21.345	1.491
05/04/2007	5870413.563	532185.060	509.046	8.55	0.059	0.196	0.205	-0.058	73.2	-15.8	0.024	-0.007	0.40	0.002	0.005	0.005	-0.005	68.2	-42.9	13.472	-12.509
16/08/2007	5870413.572	532185.056	509.054	8.92	0.068	0.192	0.204	-0.050	70.5	-13.8	0.023	-0.006	0.36	0.009	-0.004	0.010	0.008	336.0	39.1	-27.047	21.970
13/12/2007	5870413.572	532185.064	509.043	9.24	0.068	0.200	0.211	-0.061	71.2	-16.1	0.023	-0.007	0.33	0.000	0.008	0.008	-0.011	90.0	-54.0	24.555	-33.763
18/03/2008	5870413.570	532185.068	509.052	9.51	0.066	0.204	0.214	-0.052	72.1	-13.6	0.023	-0.005	0.26	-0.002	0.004	0.004	0.009	116.6	63.6	17.015	34.242
03/06/2008	5870413.570	532185.079	509.046	9.72	0.066	0.215	0.225	-0.058	72.9	-14.5	0.023	-0.006	0.21	0.000	0.011	0.011	-0.006	90.0	-28.6	52.179	-28.461
29/08/2008	5870413.573	532185.087	509.059	9.95	0.069	0.223	0.233	-0.045	72.8	-10.9	0.023	-0.005	0.24	0.003	0.008	0.009	0.013	69.4	56.7	35.870	54.578
19/11/2008	5870413.583	532185.090	509.050	10.18	0.079	0.226	0.239	-0.054	70.7	-12.7	0.024	-0.005	0.22	0.010	0.003	0.010	-0.009	16.7	-40.8	46.504	-40.088
26/03/2009	5870413.582	532185.093	509.049	10.53	0.078	0.229	0.242	-0.055	71.2	-12.8	0.023	-0.005	0.35	-0.001	0.003	0.003	-0.001	108.4	-17.5	9.095	-2.876
10/06/2009	5870413.583	532185.108	509.056	10.74	0.079	0.244	0.256	-0.048	72.1	-10.6	0.024	-0.004	0.21	0.001	0.015	0.015	0.007	86.2	25.0	72.249	33.641
17/09/2009	5870413.578	532185.112	509.068	11.01	0.074	0.248	0.259	-0.036	73.4	-7.9	0.024	-0.003	0.27	-0.005	0.004	0.006	0.012	141.3	61.9	23.624	44.273
23/11/2009	5870413.595	532185.117	509.032	11.19	0.091	0.253	0.269	-0.072	70.2	-15.0	0.024	-0.006	0.18	0.017	0.005	0.018	-0.036	16.4	-63.8	96.601	-196.254
27/03/2010	5870413.596	532185.117	509.045	11.53	0.092	0.253	0.269	-0.059	70.0	-12.4	0.023	-0.005	0.34	0.001	0.000	0.001	0.013	0.0	85.6	2.946	38.292
04/07/2010	5870413.586	532185.113	509.050	11.80	0.082	0.249	0.262	-0.054	71.8	-11.6	0.022	-0.005	0.27	-0.010	-0.004	0.011	0.005	201.8	24.9	-39.736	18.447
13/09/2010	5870413.590	532185.121	509.021	11.99	0.086	0.257	0.271	-0.083	71.5	-17.0	0.023	-0.007	0.19	0.004	0.008	0.009	-0.029	63.4	-72.9	46.013	-149.187
22/11/2010	5870413.595	532185.130	509.039	12.19	0.091	0.266	0.281	-0.065	71.1	-13.0	0.023	-0.005	0.19	0.005	0.009	0.010	0.018	60.9	60.2	53.721	93.921
04/04/2011	5870413.598	532185.118	509.035	12.55	0.094	0.254	0.271	-0.069	69.7	-14.3	0.022	-0.005	0.36	0.003	-0.012	0.012	-0.004	284.0	-17.9	-33.969	-10.985
18/06/2011	5870413.592	532185.127	509.054	12.76	0.088	0.263	0.277	-0.050	71.5	-10.2	0.022	-0.004	0.21	-0.006	0.009	0.011	0.019	123.7	60.3	52.677	92.530
03/10/2011	5870413.597	532185.125	509.049	13.05	0.093	0.261	0.277	-0.055	70.4	-11.2	0.021	-0.004	0.29	0.005	-0.002	0.005	-0.005	338.2	-42.9	18.383	-17.068
28/11/2011	5870413.601	532185.130	509.038	13.20	0.097	0.266	0.283	-0.066	70.0	-13.1	0.021	-0.005	0.15	0.004	0.005	0.006	-0.011	51.3	-59.8	41.763	-71.746
09/04/2012	5870413.598	532185.131	509.050	13.57	0.094	0.267	0.283	-0.054	70.6	-10.8	0.021	-0.004	0.36	-0.003	0.001	0.003	0.012	161.6	75.2	8.684	32.955

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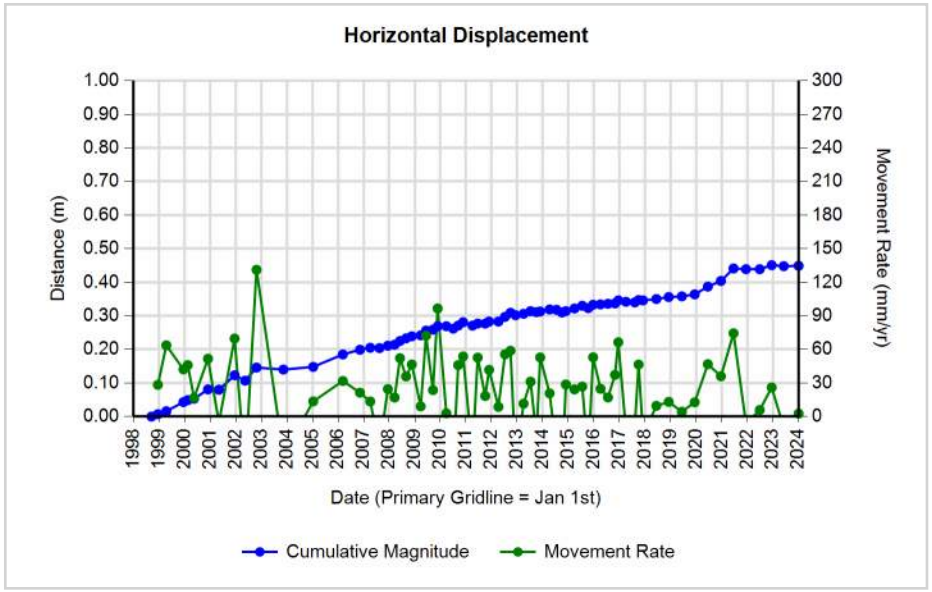
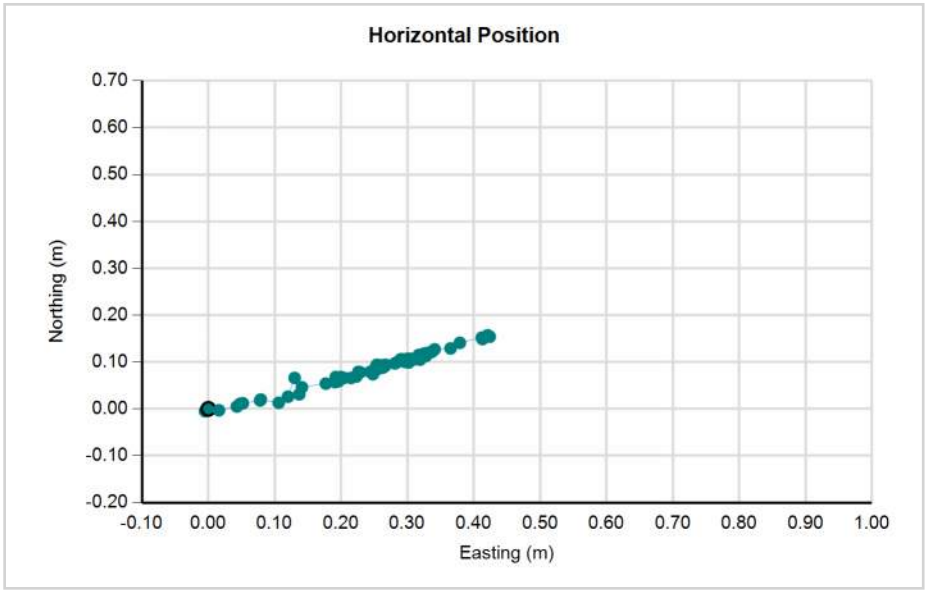
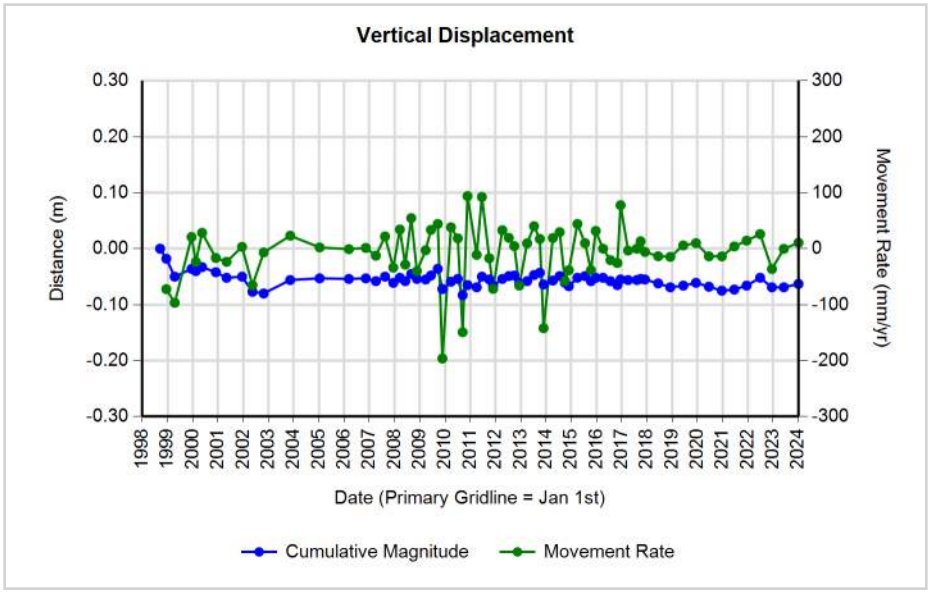
GPS Hub 98-16 (West Side of Healy Street)

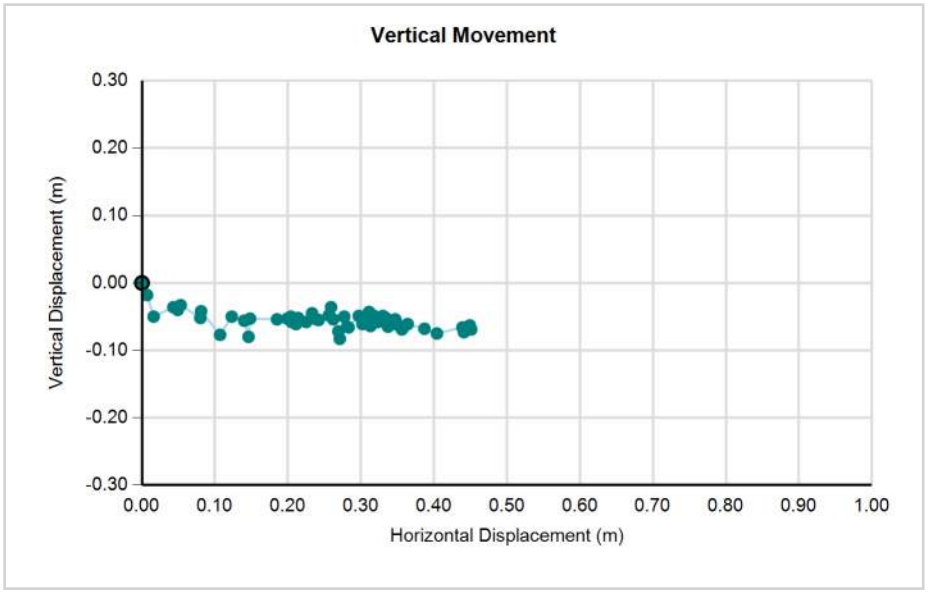
12/07/2012	5870413.601	532185.145	509.055	13.82	0.097	0.281	0.297	-0.049	71.0	-9.4	0.022	-0.004	0.26	0.003	0.014	0.014	0.005	77.9	19.2	55.634	19.428
29/09/2012	5870413.610	532185.154	509.056	14.04	0.106	0.290	0.309	-0.048	69.9	-8.8	0.022	-0.003	0.22	0.009	0.009	0.013	0.001	45.0	4.5	58.847	4.623
10/12/2012	5870413.604	532185.149	509.043	14.24	0.100	0.285	0.302	-0.061	70.7	-11.4	0.021	-0.004	0.20	-0.006	-0.005	0.008	-0.013	219.8	-59.0	-39.621	-65.948
03/04/2013	5870413.606	532185.152	509.046	14.55	0.102	0.288	0.306	-0.058	70.5	-10.7	0.021	-0.004	0.31	0.002	0.003	0.004	0.003	56.3	39.8	11.552	9.612
12/07/2013	5870413.609	532185.160	509.057	14.82	0.105	0.296	0.314	-0.047	70.5	-8.5	0.021	-0.003	0.27	0.003	0.008	0.009	0.011	69.4	52.2	31.207	40.178
04/10/2013	5870413.610	532185.156	509.061	15.05	0.106	0.292	0.311	-0.043	70.0	-7.9	0.021	-0.003	0.23	0.001	-0.004	0.004	0.004	284.0	44.1	-17.928	17.393
27/11/2013	5870413.604	532185.161	509.040	15.20	0.100	0.297	0.313	-0.064	71.4	-11.5	0.021	-0.004	0.15	-0.006	0.005	0.008	-0.021	140.2	-69.6	52.828	-142.042
10/04/2014	5870413.611	532185.164	509.047	15.57	0.107	0.300	0.319	-0.057	70.4	-10.1	0.020	-0.004	0.37	0.007	0.003	0.008	0.007	23.2	42.6	20.759	19.080
18/07/2014	5870413.603	532185.166	509.055	15.84	0.099	0.302	0.318	-0.049	71.9	-8.8	0.020	-0.003	0.27	-0.008	0.002	0.008	0.008	166.0	44.1	-30.424	29.515
02/10/2014	5870413.607	532185.156	509.043	16.05	0.103	0.292	0.310	-0.061	70.6	-11.1	0.019	-0.004	0.21	0.004	-0.010	0.011	-0.012	291.8	-48.1	-51.761	-57.671
28/11/2014	5870413.609	532185.160	509.037	16.20	0.105	0.296	0.314	-0.067	70.5	-12.0	0.019	-0.004	0.16	0.002	0.004	0.004	-0.006	63.4	-53.3	28.657	-38.447
01/04/2015	5870413.611	532185.168	509.052	16.54	0.107	0.304	0.322	-0.052	70.6	-9.2	0.019	-0.003	0.34	0.002	0.008	0.008	0.015	76.0	61.2	24.290	44.183
20/07/2015	5870413.610	532185.176	509.055	16.84	0.106	0.312	0.330	-0.049	71.2	-8.5	0.020	-0.003	0.30	-0.001	0.008	0.008	0.003	97.1	20.4	26.770	9.961
14/10/2015	5870413.613	532185.168	509.046	17.08	0.109	0.304	0.323	-0.058	70.3	-10.2	0.019	-0.003	0.24	0.003	-0.008	0.009	-0.009	290.6	-46.5	-36.287	-38.224
22/12/2015	5870413.619	532185.176	509.052	17.27	0.115	0.312	0.333	-0.052	69.8	-8.9	0.019	-0.003	0.19	0.006	0.008	0.010	0.006	53.1	31.0	52.935	31.761
06/04/2016	5870413.613	532185.180	509.052	17.56	0.109	0.316	0.334	-0.052	71.0	-8.8	0.019	-0.003	0.29	-0.006	0.004	0.007	0.000	146.3	0.0	24.848	0.000
22/07/2016	5870413.609	532185.183	509.046	17.85	0.105	0.319	0.336	-0.058	71.8	-9.8	0.019	-0.003	0.29	-0.004	0.003	0.005	-0.006	143.1	-50.2	17.068	-20.481
30/10/2016	5870413.619	532185.181	509.039	18.12	0.115	0.317	0.337	-0.065	70.1	-10.9	0.019	-0.004	0.27	0.010	-0.002	0.010	-0.007	348.7	-34.5	37.248	-25.567
16/12/2016	5870413.622	532185.189	509.049	18.25	0.118	0.325	0.346	-0.055	70.0	-9.0	0.019	-0.003	0.13	0.003	0.008	0.009	0.010	69.4	49.5	66.398	77.713
04/04/2017	5870413.620	532185.186	509.048	18.55	0.116	0.322	0.342	-0.056	70.2	-9.3	0.018	-0.003	0.30	-0.002	-0.003	0.004	-0.001	236.3	-15.5	-12.082	-3.351
08/08/2017	5870413.617	532185.185	509.048	18.90	0.113	0.321	0.340	-0.056	70.6	-9.3	0.018	-0.003	0.34	-0.003	-0.001	0.003	0.000	198.4	0.0	-9.167	0.000
02/10/2017	5870413.617	532185.192	509.050	19.05	0.113	0.328	0.347	-0.054	71.0	-8.8	0.018	-0.003	0.15	0.000	0.007	0.007	0.002	90.0	15.9	46.486	13.282
04/12/2017	5870413.619	532185.190	509.049	19.22	0.115	0.326	0.346	-0.055	70.6	-9.0	0.018	-0.003	0.17	0.002	-0.002	0.003	-0.001	315.0	-19.5	-16.398	-5.798
13/06/2018	5870413.623	532185.193	509.042	19.74	0.119	0.329	0.350	-0.062	70.1	-10.0	0.018	-0.003	0.52	0.004	0.003	0.005	-0.007	36.9	-54.5	9.562	-13.386
06/12/2018	5870413.625	532185.199	509.035	20.22	0.121	0.335	0.356	-0.069	70.1	-11.0	0.018	-0.003	0.48	0.002	0.006	0.006	-0.007	71.6	-47.9	13.125	-14.527
12/06/2019	5870413.626	532185.201	509.038	20.74	0.122	0.337	0.358	-0.066	70.1	-10.4	0.017	-0.003	0.51	0.001	0.002	0.002	0.003	63.4	53.3	4.344	5.828
12/12/2019	5870413.631	532185.205	509.043	21.24	0.127	0.341	0.364	-0.061	69.6	-9.5	0.017	-0.003	0.50	0.005	0.004	0.006	0.005	38.7	38.0	12.780	9.980
17/06/2020	5870413.633	532185.229	509.036	21.75	0.129	0.365	0.387	-0.068	70.5	-10.0	0.018	-0.003	0.51	0.002	0.024	0.024	-0.007	85.2	-16.2	46.789	-13.600
21/12/2020	5870413.645	532185.243	509.029	22.27	0.141	0.379	0.404	-0.075	69.6	-10.5	0.018	-0.003	0.51	0.012	0.014	0.018	-0.007	49.4	-20.8	36.015	-13.672
19/06/2021	5870413.656	532185.278	509.031	22.76	0.152	0.414	0.441	-0.073	69.8	-9.4	0.019	-0.003	0.49	0.011	0.035	0.037	0.002	72.6	3.1	74.446	4.058
14/12/2021	5870413.653	532185.277	509.038	23.25	0.149	0.413	0.439	-0.066	70.2	-8.5	0.019	-0.003	0.49	-0.003	-0.001	0.003	0.007	198.4	65.7	-6.489	14.364
28/06/2022	5870413.656	532185.276	509.052	23.78	0.152	0.412	0.439	-0.052	69.7	-6.8	0.018	-0.002	0.54	0.003	-0.001	0.003	0.014	341.6	77.3	5.893	26.089
16/12/2022	5870413.658	532185.288	509.035	24.25	0.154	0.424	0.451	-0.069	70.0	-8.7	0.019	-0.003	0.47	0.002	0.012	0.012	-0.017	80.5	-54.4	25.985	-36.311
06/06/2023	5870413.660	532185.284	509.035	24.72	0.156	0.420	0.448	-0.069	69.6	-8.8	0.018	-0.003	0.47	0.002	-0.004	0.005	0.000	295.5	-1.7	-9.878	-0.297
04/01/2024	5870413.661	532185.285	509.041	25.30	0.157	0.421	0.449	-0.063	69.5	-8.0	0.018	-0.002	0.58	0.001	0.001	0.002	0.006	50.2	75.7	2.691	10.578

GPS Hub 98-16 (West Side of Healy Street)









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GPS Hub 98-17 (Southwest Corner of Bettcher Street and Lark Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869847.647	532237.862	519.610	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5869847.634	532237.872	519.599	0.25	-0.013	0.010	0.016	-0.011	142.4	-33.8	0.066	-0.044	0.25	-0.013	0.010	0.016	-0.011	142.4	-33.8	65.830	-44.151
15/04/1999	5869847.634	532237.910	519.610	0.58	-0.013	0.048	0.050	0.000	105.2	0.0	0.086	0.000	0.33	0.000	0.038	0.038	0.011	90.0	16.1	114.707	33.205
15/12/1999	5869847.644	532237.958	519.608	1.25	-0.003	0.096	0.096	-0.002	91.8	-1.2	0.077	-0.002	0.67	0.010	0.048	0.049	-0.002	78.2	-2.3	73.395	-2.994
15/02/2000	5869847.634	532237.962	519.603	1.42	-0.013	0.100	0.101	-0.007	97.4	-4.0	0.071	-0.005	0.17	-0.010	0.004	0.011	-0.005	158.2	-24.9	63.449	-29.456
15/05/2000	5869847.626	532237.988	519.593	1.66	-0.021	0.126	0.128	-0.017	99.5	-7.6	0.077	-0.010	0.25	-0.008	0.026	0.027	-0.010	107.1	-20.2	110.399	-40.583
30/11/2000	5869847.618	532238.022	519.580	2.21	-0.029	0.160	0.163	-0.030	100.3	-10.5	0.074	-0.014	0.54	-0.008	0.034	0.035	-0.013	103.2	-20.4	64.109	-23.861
05/05/2001	5869847.619	532238.054	519.581	2.64	-0.028	0.192	0.194	-0.029	98.3	-8.5	0.074	-0.011	0.43	0.001	0.032	0.032	0.001	88.2	1.8	74.960	2.341
15/12/2001	5869847.610	532238.084	519.605	3.25	-0.037	0.222	0.225	-0.005	99.5	-1.3	0.069	-0.002	0.61	-0.009	0.030	0.031	0.024	106.7	37.5	51.071	39.134
15/05/2002	5869847.602	532238.105	519.573	3.66	-0.045	0.243	0.247	-0.037	100.5	-8.5	0.067	-0.010	0.41	-0.008	0.021	0.022	-0.032	110.9	-54.9	54.357	-77.404
24/10/2002	5869847.616	532238.139	519.552	4.11	-0.031	0.277	0.279	-0.058	96.4	-11.8	0.068	-0.014	0.44	0.014	0.034	0.037	-0.021	67.6	-29.7	82.902	-47.347
12/11/2003	5869847.601	532238.158	519.575	5.16	-0.046	0.296	0.300	-0.035	98.8	-6.7	0.058	-0.007	1.05	-0.015	0.019	0.024	0.023	127.6	42.7	23.302	21.506
11/01/2005	5869847.611	532238.182	519.582	6.32	-0.036	0.320	0.322	-0.028	96.3	-4.9	0.051	-0.004	1.17	0.010	0.024	0.026	0.007	66.6	16.0	22.334	6.422
10/03/2006	5869847.596	532238.268	519.572	7.48	-0.051	0.406	0.409	-0.038	97.2	-5.3	0.055	-0.005	1.16	-0.015	0.086	0.087	-0.010	100.2	-6.6	75.185	-8.721
10/11/2006	5869847.594	532238.282	519.571	8.15	-0.053	0.420	0.423	-0.039	97.2	-5.3	0.052	-0.005	0.67	-0.002	0.014	0.014	-0.001	98.1	-4.0	21.083	-1.491
05/04/2007	5869847.595	532238.292	519.562	8.55	-0.052	0.430	0.433	-0.048	96.9	-6.3	0.051	-0.006	0.40	0.001	0.010	0.010	-0.009	84.3	-41.8	25.142	-22.515
16/08/2007	5869847.591	532238.307	519.569	8.92	-0.056	0.445	0.449	-0.041	97.2	-5.2	0.050	-0.005	0.36	-0.004	0.015	0.016	0.007	104.9	24.3	42.633	19.224
13/12/2007	5869847.604	532238.307	519.553	9.24	-0.043	0.445	0.447	-0.057	95.5	-7.3	0.048	-0.006	0.33	0.013	0.000	0.013	-0.016	0.0	-50.9	-39.901	-49.109
18/03/2008	5869847.592	532238.315	519.569	9.51	-0.055	0.453	0.456	-0.041	96.9	-5.1	0.048	-0.004	0.26	-0.012	0.008	0.014	0.016	146.3	48.0	54.872	60.875
03/06/2008	5869847.599	532238.348	519.576	9.72	-0.048	0.486	0.488	-0.034	95.6	-4.0	0.050	-0.003	0.21	0.007	0.033	0.034	0.007	78.0	11.7	160.019	33.205
29/08/2008	5869847.593	532238.365	519.572	9.95	-0.054	0.503	0.506	-0.038	96.1	-4.3	0.051	-0.004	0.24	-0.006	0.017	0.018	-0.004	109.4	-12.5	75.685	-16.793
19/11/2008	5869847.590	532238.365	519.560	10.18	-0.057	0.503	0.506	-0.050	96.5	-5.6	0.050	-0.005	0.22	-0.003	0.000	0.003	-0.012	180.0	-76.0	13.363	-53.451
26/03/2009	5869847.593	532238.371	519.553	10.53	-0.054	0.509	0.512	-0.057	96.1	-6.4	0.049	-0.005	0.35	0.003	0.006	0.007	-0.007	63.4	-46.2	19.293	-20.132
10/06/2009	5869847.577	532238.413	519.570	10.74	-0.070	0.551	0.555	-0.040	97.2	-4.1	0.052	-0.004	0.21	-0.016	0.042	0.045	0.017	110.9	20.7	215.999	81.701
17/09/2009	5869847.595	532238.432	519.567	11.01	-0.052	0.570	0.572	-0.043	95.2	-4.3	0.052	-0.004	0.27	0.018	0.019	0.026	-0.003	46.5	-6.5	96.561	-11.068
23/11/2009	5869847.588	532238.433	519.552	11.19	-0.059	0.571	0.574	-0.058	95.9	-5.8	0.051	-0.005	0.18	-0.007	0.001	0.007	-0.015	171.9	-64.8	38.548	-81.772
27/03/2010	5869847.586	532238.424	519.546	11.53	-0.061	0.562	0.565	-0.064	96.2	-6.5	0.049	-0.006	0.34	-0.002	-0.009	0.009	-0.006	257.5	-33.1	-27.157	-17.673
04/07/2010	5869847.577	532238.425	519.561	11.80	-0.070	0.563	0.567	-0.049	97.1	-4.9	0.048	-0.004	0.27	-0.009	0.001	0.009	0.015	173.7	58.9	33.409	55.341
13/09/2010	5869847.586	532238.431	519.560	11.99	-0.061	0.569	0.572	-0.050	96.1	-5.0	0.048	-0.004	0.19	0.009	0.006	0.011	-0.001	33.7	-5.3	55.645	-5.144
22/11/2010	5869847.580	532238.438	519.551	12.19	-0.067	0.576	0.580	-0.059	96.6	-5.8	0.048	-0.005	0.19	-0.006	0.007	0.009	-0.009	130.6	-44.3	48.106	-46.961
04/04/2011	5869847.578	532238.433	519.546	12.55	-0.069	0.571	0.575	-0.064	96.9	-6.3	0.046	-0.005	0.36	-0.002	-0.005	0.005	-0.005	248.2	-42.9	-14.789	-13.731
18/06/2011	5869847.587	532238.453	519.578	12.76	-0.060	0.591	0.594	-0.032	95.8	-3.1	0.047	-0.003	0.21	0.009	0.020	0.022	0.032	65.8	55.6	106.807	155.840
03/10/2011	5869847.580	532238.449	519.554	13.05	-0.067	0.587	0.591	-0.056	96.5	-5.4	0.045	-0.004	0.29	-0.007	-0.004	0.008	-0.024	209.7	-71.4	-27.521	-81.925
28/11/2011	5869847.582	532238.446	519.548	13.20	-0.065	0.584	0.588	-0.062	96.4	-6.0	0.045	-0.005	0.15	0.002	-0.003	0.004	-0.006	303.7	-59.0	-23.517	-39.134
09/04/2012	5869847.577	532238.456	519.546	13.57	-0.070	0.594	0.598	-0.064	96.7	-6.1	0.044	-0.005	0.36	-0.005	0.010	0.011	-0.002	116.6	-10.1	30.704	-5.492

CITY OF Quesnel

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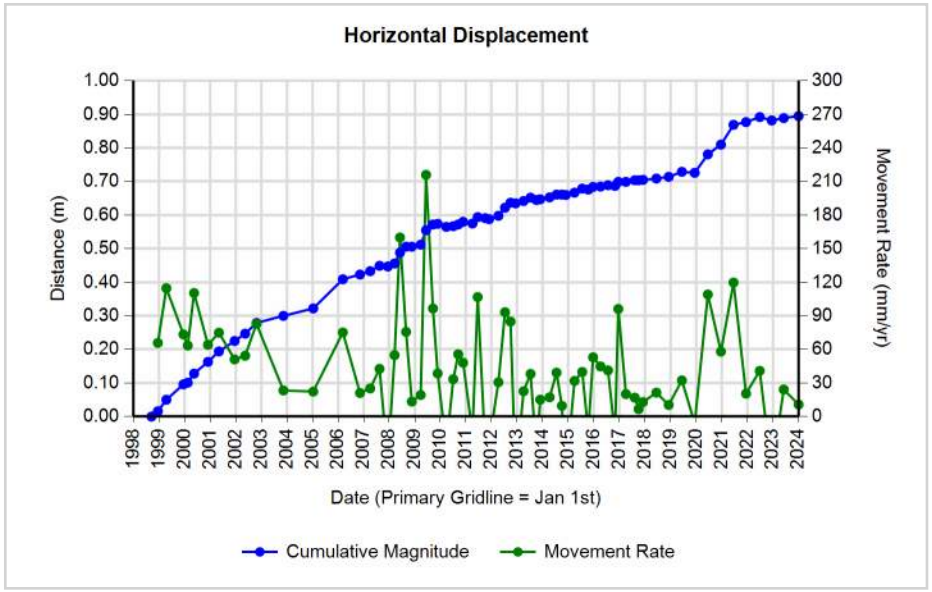
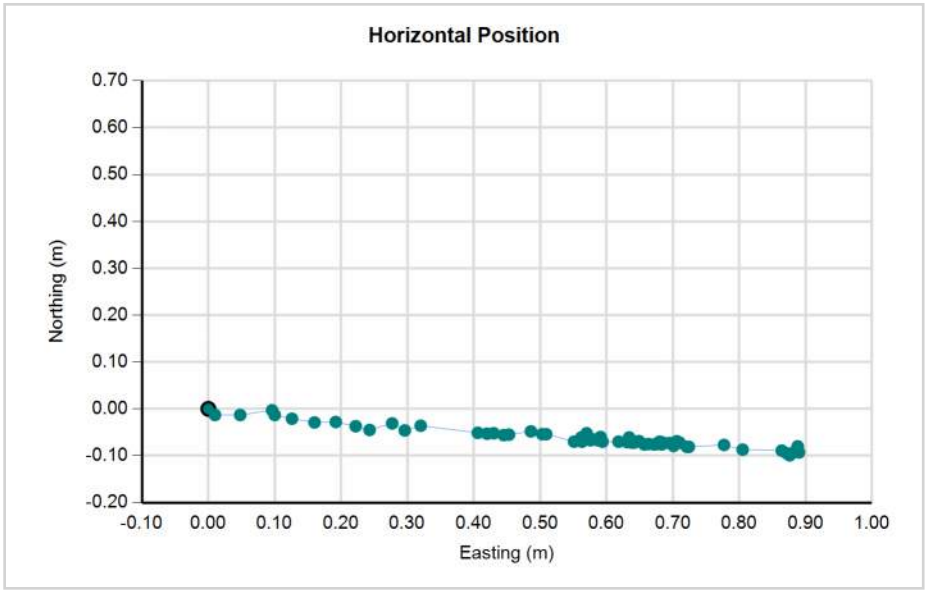
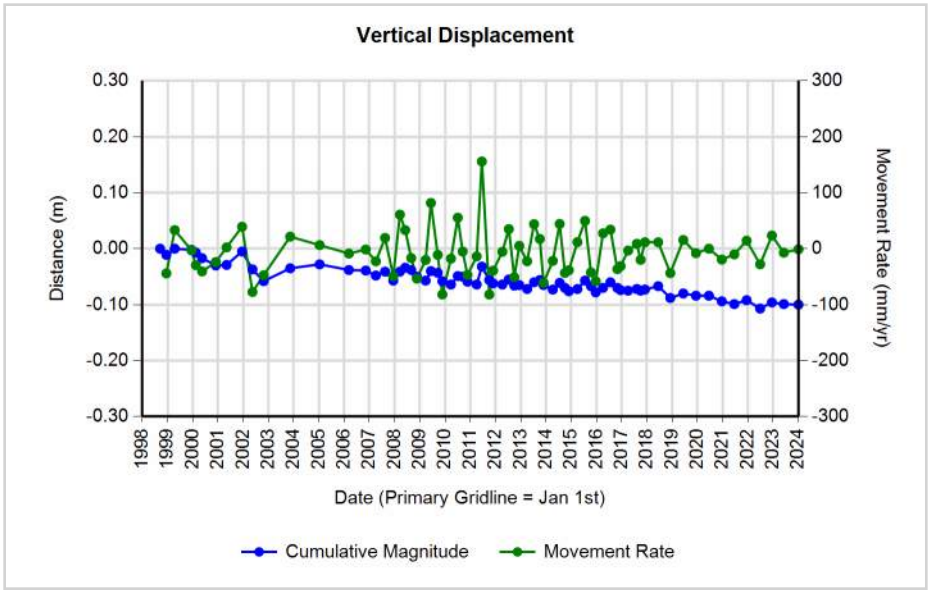
GPS Hub 98-17 (Southwest Corner of Bettcher Street and Lark Avenue)

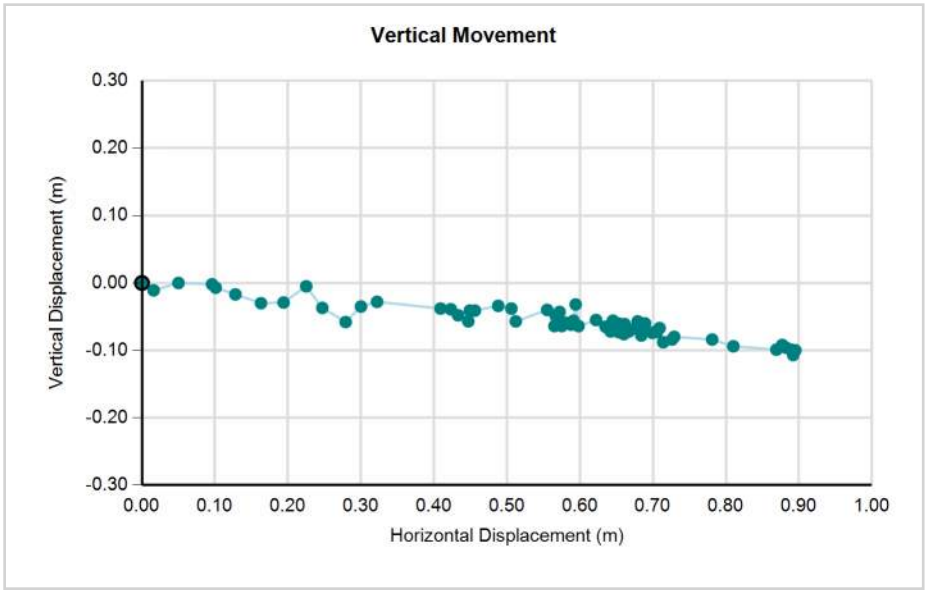
12/07/2012	5869847.577	532238.480	519.555	13.82	-0.070	0.618	0.622	-0.055	96.5	-5.1	0.045	-0.004	0.26	0.000	0.024	0.024	0.009	90.0	20.6	93.255	34.971
29/09/2012	5869847.586	532238.496	519.544	14.04	-0.061	0.634	0.637	-0.066	95.5	-5.9	0.045	-0.005	0.22	0.009	0.016	0.018	-0.011	60.6	-30.9	84.875	-50.858
10/12/2012	5869847.576	532238.493	519.545	14.24	-0.071	0.631	0.635	-0.065	96.4	-5.8	0.045	-0.005	0.20	-0.010	-0.003	0.010	0.001	196.7	5.5	-52.963	5.073
03/04/2013	5869847.575	532238.500	519.538	14.55	-0.072	0.638	0.642	-0.072	96.4	-6.4	0.044	-0.005	0.31	-0.001	0.007	0.007	-0.007	98.1	-44.7	22.655	-22.428
12/07/2013	5869847.578	532238.510	519.550	14.82	-0.069	0.648	0.652	-0.060	96.1	-5.3	0.044	-0.004	0.27	0.003	0.010	0.010	0.012	73.3	49.0	38.133	43.830
04/10/2013	5869847.575	532238.503	519.554	15.05	-0.072	0.641	0.645	-0.056	96.4	-5.0	0.043	-0.004	0.23	-0.003	-0.007	0.008	0.004	246.8	27.7	-33.115	17.393
27/11/2013	5869847.576	532238.505	519.545	15.20	-0.071	0.643	0.647	-0.065	96.3	-5.7	0.043	-0.004	0.15	0.001	0.002	0.002	-0.009	63.4	-76.0	15.125	-60.875
10/04/2014	5869847.578	532238.511	519.537	15.57	-0.069	0.649	0.653	-0.073	96.1	-6.4	0.042	-0.005	0.37	0.002	0.006	0.006	-0.008	71.6	-51.7	17.239	-21.806
18/07/2014	5869847.571	532238.519	519.549	15.84	-0.076	0.657	0.661	-0.061	96.6	-5.3	0.042	-0.004	0.27	-0.007	0.008	0.011	0.012	131.2	48.5	39.219	44.273
02/10/2014	5869847.573	532238.519	519.540	16.05	-0.074	0.657	0.661	-0.070	96.4	-6.0	0.041	-0.004	0.21	0.002	0.000	0.002	-0.009	0.0	-77.5	9.612	-43.253
28/11/2014	5869847.581	532238.519	519.534	16.20	-0.066	0.657	0.660	-0.076	95.7	-6.6	0.041	-0.005	0.16	0.008	0.000	0.008	-0.006	0.0	-36.9	-51.263	-38.447
01/04/2015	5869847.572	532238.525	519.538	16.54	-0.075	0.663	0.667	-0.072	96.5	-6.2	0.040	-0.004	0.34	-0.009	0.006	0.011	0.004	146.3	20.3	31.861	11.782
20/07/2015	5869847.572	532238.537	519.553	16.84	-0.075	0.675	0.679	-0.057	96.3	-4.8	0.040	-0.003	0.30	0.000	0.012	0.012	0.015	90.0	51.3	39.845	49.807
14/10/2015	5869847.571	532238.534	519.543	17.08	-0.076	0.672	0.676	-0.067	96.5	-5.7	0.040	-0.004	0.24	-0.001	-0.003	0.003	-0.010	251.6	-72.5	-13.430	-42.471
22/12/2015	5869847.577	532238.542	519.532	17.27	-0.070	0.680	0.684	-0.078	95.9	-6.5	0.040	-0.005	0.19	0.006	0.008	0.010	-0.011	53.1	-47.7	52.935	-58.228
06/04/2016	5869847.564	532238.542	519.540	17.56	-0.083	0.680	0.685	-0.070	97.0	-5.8	0.039	-0.004	0.29	-0.013	0.000	0.013	0.008	180.0	31.6	44.795	27.566
22/07/2016	5869847.575	532238.547	519.550	17.85	-0.072	0.685	0.689	-0.060	96.0	-5.0	0.039	-0.003	0.29	0.011	0.005	0.012	0.010	24.4	39.6	41.246	34.136
30/10/2016	5869847.571	532238.545	519.540	18.12	-0.076	0.683	0.687	-0.070	96.3	-5.8	0.038	-0.004	0.27	-0.004	-0.002	0.004	-0.010	206.6	-65.9	-16.334	-36.525
16/12/2016	5869847.574	532238.557	519.536	18.25	-0.073	0.695	0.699	-0.074	96.0	-6.0	0.038	-0.004	0.13	0.003	0.012	0.012	-0.004	76.0	-17.9	96.125	-31.085
04/04/2017	5869847.568	532238.557	519.535	18.55	-0.079	0.695	0.699	-0.075	96.5	-6.1	0.038	-0.004	0.30	-0.006	0.000	0.006	-0.001	180.0	-9.5	20.106	-3.351
08/08/2017	5869847.571	532238.562	519.538	18.90	-0.076	0.700	0.704	-0.072	96.2	-5.8	0.037	-0.004	0.34	0.003	0.005	0.006	0.003	59.0	27.2	16.903	8.696
02/10/2017	5869847.570	532238.562	519.535	19.05	-0.077	0.700	0.704	-0.075	96.3	-6.1	0.037	-0.004	0.15	-0.001	0.000	0.001	-0.003	180.0	-71.6	6.641	-19.923
04/12/2017	5869847.568	532238.563	519.537	19.22	-0.079	0.701	0.705	-0.073	96.4	-5.9	0.037	-0.004	0.17	-0.002	0.001	0.002	0.002	153.4	41.8	12.964	11.595
13/06/2018	5869847.578	532238.568	519.543	19.74	-0.069	0.706	0.709	-0.067	95.6	-5.4	0.036	-0.003	0.52	0.010	0.005	0.011	0.006	26.6	28.2	21.380	11.474
06/12/2018	5869847.575	532238.572	519.522	20.22	-0.072	0.710	0.714	-0.088	95.8	-7.0	0.035	-0.004	0.48	-0.003	0.004	0.005	-0.021	126.9	-76.6	10.376	-43.581
12/06/2019	5869847.566	532238.586	519.530	20.74	-0.081	0.724	0.729	-0.080	96.4	-6.3	0.035	-0.004	0.51	-0.009	0.014	0.017	0.008	122.7	25.7	32.335	15.543
12/12/2019	5869847.566	532238.583	519.526	21.24	-0.081	0.721	0.726	-0.084	96.4	-6.6	0.034	-0.004	0.50	0.000	-0.003	0.003	-0.004	270.0	-53.1	-5.988	-7.984
17/06/2020	5869847.570	532238.639	519.526	21.75	-0.077	0.777	0.781	-0.084	95.7	-6.1	0.036	-0.004	0.51	0.004	0.056	0.056	0.000	85.9	0.0	109.075	0.000
21/12/2020	5869847.560	532238.667	519.516	22.27	-0.087	0.805	0.810	-0.094	96.2	-6.6	0.036	-0.004	0.51	-0.010	0.028	0.030	-0.010	109.7	-18.6	58.073	-19.532
19/06/2021	5869847.558	532238.726	519.511	22.76	-0.089	0.864	0.869	-0.099	95.9	-6.5	0.038	-0.004	0.49	-0.002	0.059	0.059	-0.005	91.9	-4.8	119.790	-10.146
14/12/2021	5869847.552	532238.734	519.518	23.25	-0.095	0.872	0.877	-0.092	96.2	-6.0	0.038	-0.004	0.49	-0.006	0.008	0.010	0.007	126.9	35.0	20.520	14.364
28/06/2022	5869847.567	532238.750	519.503	23.78	-0.080	0.888	0.892	-0.107	95.1	-6.8	0.037	-0.004	0.54	0.015	0.016	0.022	-0.015	46.8	-34.4	40.870	-27.953
16/12/2022	5869847.548	532238.738	519.514	24.25	-0.099	0.876	0.882	-0.096	96.4	-6.2	0.036	-0.004	0.47	-0.019	-0.012	0.022	0.011	212.3	26.1	-48.000	23.496
06/06/2023	5869847.556	532238.746	519.511	24.72	-0.091	0.884	0.889	-0.099	95.9	-6.4	0.036	-0.004	0.47	0.008	0.008	0.011	-0.003	45.4	-16.4	24.176	-7.135
04/01/2024	5869847.554	532238.752	519.510	25.30	-0.093	0.890	0.895	-0.100	96.0	-6.4	0.035	-0.004	0.58	-0.002	0.006	0.006	-0.001	108.7	-5.9	10.733	-1.103

GPS Hub 98-17 (Southwest Corner of Bettcher Street and Lark Avenue)









CITY OF Quesnel

GPS Hub 98-18 (Southest Corner of Lark Avenue and Flamingo Street)

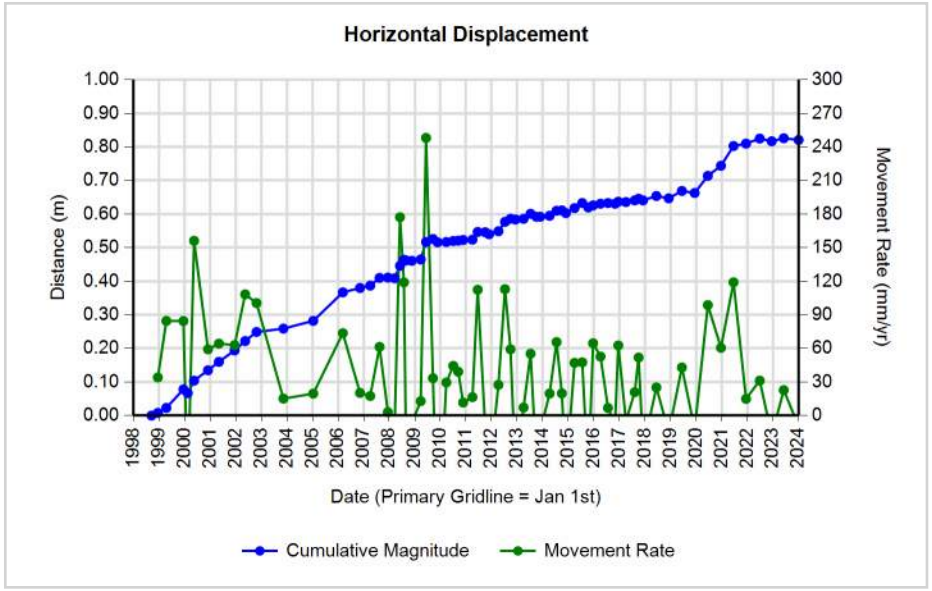
	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869826.923	531984.617	524.147	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5869826.929	531984.611	524.132	0.25	0.006	-0.006	0.008	-0.015	315.0	-60.5	0.034	-0.060	0.25	0.006	-0.006	0.008	-0.015	315.0	-60.5	34.058	-60.206
15/04/1999	5869826.930	531984.639	524.126	0.58	0.007	0.022	0.023	-0.021	72.3	-42.3	0.040	-0.036	0.33	0.001	0.028	0.028	-0.006	88.0	-12.1	84.575	-18.112
15/12/1999	5869826.923	531984.695	524.127	1.25	0.000	0.078	0.078	-0.020	90.0	-14.4	0.062	-0.016	0.67	-0.007	0.056	0.056	0.001	97.1	1.0	84.480	1.497
15/02/2000	5869826.919	531984.684	524.127	1.42	-0.004	0.067	0.067	-0.020	93.4	-16.6	0.047	-0.014	0.17	-0.004	-0.011	0.012	0.000	250.0	0.0	-68.954	0.000
15/05/2000	5869826.903	531984.719	524.125	1.66	-0.020	0.102	0.104	-0.022	101.1	-12.0	0.062	-0.013	0.25	-0.016	0.035	0.038	-0.002	114.6	-3.0	156.180	-8.117
30/11/2000	5869826.907	531984.751	524.107	2.21	-0.016	0.134	0.135	-0.040	96.8	-16.5	0.061	-0.018	0.54	0.004	0.032	0.032	-0.018	82.9	-29.2	59.191	-33.038
05/05/2001	5869826.892	531984.774	524.104	2.64	-0.031	0.157	0.160	-0.043	101.2	-15.0	0.061	-0.016	0.43	-0.015	0.023	0.027	-0.003	123.1	-6.2	64.291	-7.024
15/12/2001	5869826.906	531984.810	524.129	3.25	-0.017	0.193	0.194	-0.018	95.0	-5.3	0.060	-0.006	0.61	0.014	0.036	0.039	0.025	68.7	32.9	62.983	40.765
15/05/2002	5869826.867	531984.832	524.097	3.66	-0.056	0.215	0.222	-0.050	104.6	-12.7	0.061	-0.014	0.41	-0.039	0.022	0.045	-0.032	150.6	-35.6	108.310	-77.404
24/10/2002	5869826.897	531984.865	524.084	4.11	-0.026	0.248	0.249	-0.063	96.0	-14.2	0.061	-0.015	0.44	0.030	0.033	0.045	-0.013	47.7	-16.3	100.552	-29.310
12/11/2003	5869826.883	531984.873	524.079	5.16	-0.040	0.256	0.259	-0.068	98.8	-14.7	0.050	-0.013	1.05	-0.014	0.008	0.016	-0.005	148.3	-18.0	15.157	-4.927
11/01/2005	5869826.885	531984.896	524.112	6.32	-0.038	0.279	0.282	-0.035	97.8	-7.0	0.045	-0.005	1.17	0.001	0.023	0.023	0.033	86.6	55.7	19.609	28.706
10/03/2006	5869826.869	531984.980	524.087	7.48	-0.054	0.363	0.367	-0.060	98.5	-9.3	0.049	-0.008	1.16	-0.016	0.084	0.085	-0.025	100.7	-16.5	73.634	-21.846
10/11/2006	5869826.865	531984.993	524.085	8.15	-0.058	0.376	0.380	-0.062	98.8	-9.3	0.047	-0.008	0.67	-0.004	0.013	0.014	-0.002	107.1	-8.4	20.277	-2.982
05/04/2007	5869826.865	531985.000	524.082	8.55	-0.058	0.383	0.387	-0.065	98.6	-9.5	0.045	-0.008	0.40	0.000	0.007	0.007	-0.003	90.0	-23.2	17.512	-7.505
16/08/2007	5869826.861	531985.022	524.091	8.92	-0.062	0.405	0.410	-0.056	98.7	-7.8	0.046	-0.006	0.36	-0.004	0.022	0.022	0.009	100.3	21.9	61.408	24.716
13/12/2007	5869826.861	531985.023	524.074	9.24	-0.062	0.406	0.411	-0.073	98.7	-10.1	0.044	-0.008	0.33	0.000	0.001	0.001	-0.017	90.0	-86.6	3.069	-52.179
18/03/2008	5869826.864	531985.022	524.083	9.51	-0.059	0.405	0.409	-0.064	98.3	-8.9	0.043	-0.007	0.26	0.003	-0.001	0.003	0.009	341.6	70.6	-12.031	34.242
03/06/2008	5869826.854	531985.058	524.085	9.72	-0.069	0.441	0.446	-0.062	98.9	-7.9	0.046	-0.006	0.21	-0.010	0.036	0.037	0.002	105.5	3.1	177.232	9.487
29/07/2008	5869826.857	531985.076	524.093	9.87	-0.066	0.459	0.464	-0.054	98.2	-6.6	0.047	-0.005	0.15	0.003	0.018	0.018	0.008	80.5	23.7	119.021	52.179
29/08/2008	5869826.855	531985.074	524.081	9.95	-0.068	0.457	0.462	-0.066	98.5	-8.1	0.046	-0.007	0.08	-0.002	-0.002	0.003	-0.012	225.0	-76.7	-33.325	-141.387
19/11/2008	5869826.854	531985.073	524.081	10.18	-0.069	0.456	0.461	-0.066	98.6	-8.1	0.045	-0.006	0.22	-0.001	-0.001	0.001	0.000	225.0	0.0	-6.299	0.000
26/03/2009	5869826.852	531985.077	524.075	10.53	-0.071	0.460	0.465	-0.072	98.8	-8.8	0.044	-0.007	0.35	-0.002	0.004	0.004	-0.006	116.6	-53.3	12.862	-17.256
10/06/2009	5869826.844	531985.128	524.084	10.74	-0.079	0.511	0.517	-0.063	98.8	-6.9	0.048	-0.006	0.21	-0.008	0.051	0.052	0.009	98.9	9.9	248.099	43.253
17/09/2009	5869826.843	531985.137	524.076	11.01	-0.080	0.520	0.526	-0.071	98.7	-7.7	0.048	-0.006	0.27	-0.001	0.009	0.009	-0.008	96.3	-41.5	33.409	-29.515
23/11/2009	5869826.863	531985.130	524.062	11.19	-0.060	0.513	0.516	-0.085	96.7	-9.3	0.046	-0.008	0.18	0.020	-0.007	0.021	-0.014	340.7	-33.5	-115.515	-76.321
27/03/2010	5869826.853	531985.129	524.070	11.53	-0.070	0.512	0.517	-0.077	97.8	-8.5	0.045	-0.007	0.34	-0.010	-0.001	0.010	0.008	185.7	38.5	29.603	23.565
04/07/2010	5869826.841	531985.130	524.074	11.80	-0.082	0.513	0.520	-0.073	99.1	-8.0	0.044	-0.006	0.27	-0.012	0.001	0.012	0.004	175.2	18.4	44.426	14.758
13/09/2010	5869826.848	531985.133	524.074	11.99	-0.075	0.516	0.521	-0.073	98.3	-8.0	0.043	-0.006	0.19	0.007	0.003	0.008	0.000	23.2	0.0	39.178	0.000
22/11/2010	5869826.849	531985.135	524.067	12.19	-0.074	0.518	0.523	-0.080	98.1	-8.7	0.043	-0.007	0.19	0.001	0.002	0.002	-0.007	63.4	-72.3	11.667	-36.525
04/04/2011	5869826.843	531985.135	524.073	12.55	-0.080	0.518	0.524	-0.074	98.8	-8.0	0.042	-0.006	0.36	-0.006	0.000	0.006	0.006	180.0	45.0	16.477	16.477
18/06/2011	5869826.836	531985.157	524.079	12.76	-0.087	0.540	0.547	-0.068	99.2	-7.1	0.043	-0.005	0.21	-0.007	0.022	0.023	0.006	107.7	14.6	112.433	29.220
03/10/2011	5869826.839	531985.157	524.066	13.05	-0.084	0.540	0.546	-0.081	98.8	-8.4	0.042	-0.006	0.29	0.003	0.000	0.003	-0.013	0.0	-77.0	-10.241	-44.376
28/11/2011	5869826.844	531985.151	524.061	13.20	-0.079	0.534	0.540	-0.086	98.4	-9.1	0.041	-0.007	0.15	0.005	-0.006	0.008	-0.005	309.8	-32.6	-50.941	-32.612

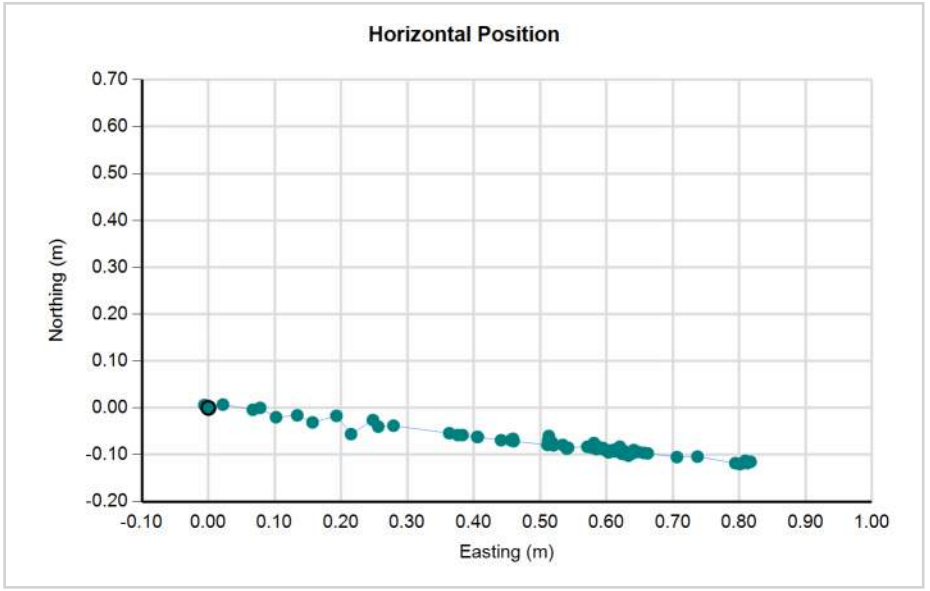
CITY OF Quesnel

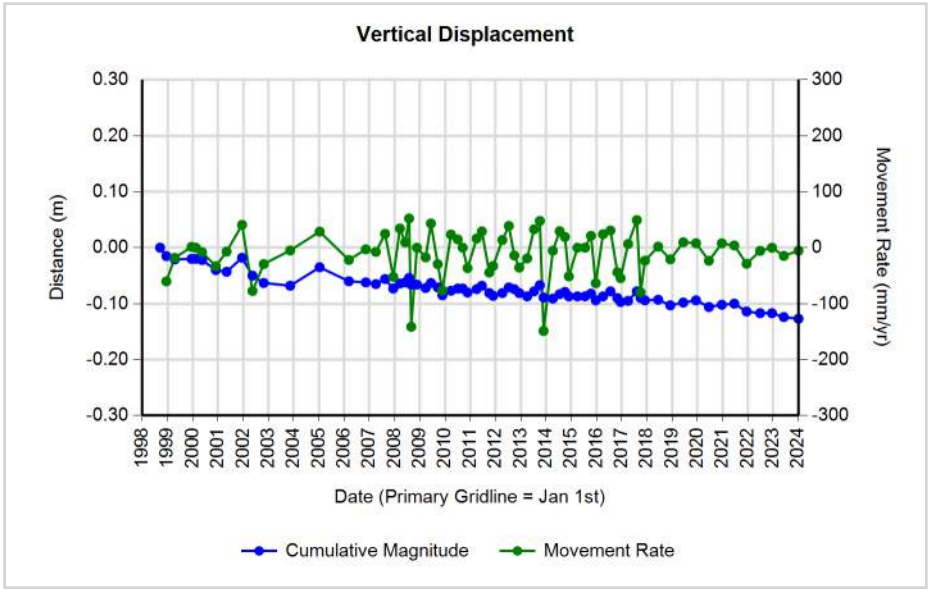
GPS Hub 98-18 (Southest Corner of Lark Avenue and Flamingo Street)

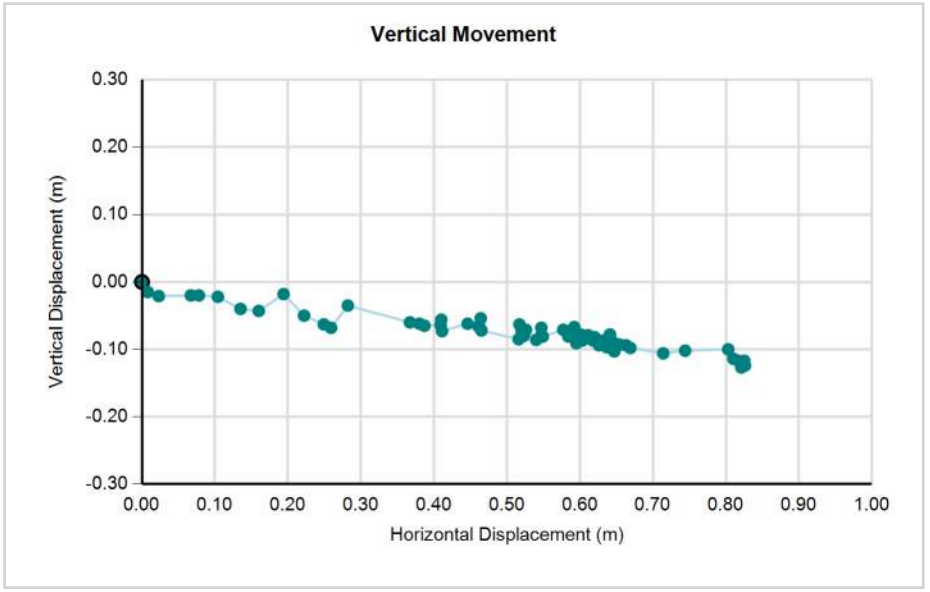
09/04/2012	5869826.838	531985.159	524.066	13.57	-0.085	0.542	0.549	-0.081	98.9	-8.4	0.040	-0.006	0.36	-0.006	0.008	0.010	0.005	126.9	26.6	27.462	13.731
12/07/2012	5869826.840	531985.188	524.076	13.82	-0.083	0.571	0.577	-0.071	98.3	-7.0	0.042	-0.005	0.26	0.002	0.029	0.029	0.010	86.1	19.0	112.951	38.856
29/09/2012	5869826.848	531985.198	524.073	14.04	-0.075	0.581	0.586	-0.074	97.4	-7.2	0.042	-0.005	0.22	0.008	0.010	0.013	-0.003	51.3	-13.2	59.209	-13.870
10/12/2012	5869826.838	531985.195	524.066	14.24	-0.085	0.578	0.584	-0.081	98.4	-7.9	0.041	-0.006	0.20	-0.010	-0.003	0.010	-0.007	196.7	-33.8	-52.963	-35.510
03/04/2013	5869826.839	531985.197	524.060	14.55	-0.084	0.580	0.586	-0.087	98.2	-8.4	0.040	-0.006	0.31	0.001	0.002	0.002	-0.006	63.4	-69.6	7.164	-19.224
12/07/2013	5869826.837	531985.212	524.069	14.82	-0.086	0.595	0.601	-0.078	98.2	-7.4	0.041	-0.005	0.27	-0.002	0.015	0.015	0.009	97.6	30.7	55.272	32.873
04/10/2013	5869826.835	531985.202	524.080	15.05	-0.088	0.585	0.592	-0.067	98.6	-6.5	0.039	-0.004	0.23	-0.002	-0.010	0.010	0.011	258.7	47.2	-44.343	47.830
27/11/2013	5869826.833	531985.202	524.058	15.20	-0.090	0.585	0.592	-0.089	98.7	-8.6	0.039	-0.006	0.15	-0.002	0.000	0.002	-0.022	180.0	-84.8	-13.528	-148.806
10/04/2014	5869826.839	531985.206	524.056	15.57	-0.084	0.589	0.595	-0.091	98.1	-8.7	0.038	-0.006	0.37	0.006	0.004	0.007	-0.002	33.7	-15.5	19.656	-5.451
18/07/2014	5869826.828	531985.220	524.064	15.84	-0.095	0.603	0.610	-0.083	99.0	-7.7	0.039	-0.005	0.27	-0.011	0.014	0.018	0.008	128.2	24.2	65.688	29.515
02/10/2014	5869826.832	531985.221	524.068	16.05	-0.091	0.604	0.611	-0.079	98.6	-7.4	0.038	-0.005	0.21	0.004	0.001	0.004	0.004	14.0	44.1	19.815	19.224
28/11/2014	5869826.834	531985.213	524.060	16.20	-0.089	0.596	0.603	-0.087	98.5	-8.2	0.037	-0.005	0.16	0.002	-0.008	0.008	-0.008	284.0	-44.1	-52.841	-51.263
01/04/2015	5869826.834	531985.229	524.060	16.54	-0.089	0.612	0.618	-0.087	98.3	-8.0	0.037	-0.005	0.34	0.000	0.016	0.016	0.000	90.0	0.0	47.129	0.000
20/07/2015	5869826.831	531985.243	524.060	16.84	-0.092	0.626	0.633	-0.087	98.4	-7.8	0.038	-0.005	0.30	-0.003	0.014	0.014	0.000	102.1	0.0	47.542	0.000
14/10/2015	5869826.830	531985.230	524.065	17.08	-0.093	0.613	0.620	-0.082	98.6	-7.5	0.036	-0.005	0.24	-0.001	-0.013	0.013	0.005	265.6	21.0	-55.375	21.235
22/12/2015	5869826.840	531985.237	524.053	17.27	-0.083	0.620	0.626	-0.094	97.6	-8.5	0.036	-0.005	0.19	0.010	0.007	0.012	-0.012	35.0	-44.5	64.615	-63.522
06/04/2016	5869826.825	531985.240	524.060	17.56	-0.098	0.623	0.631	-0.087	98.9	-7.9	0.036	-0.005	0.29	-0.015	0.003	0.015	0.007	168.7	24.6	52.710	24.120
22/07/2016	5869826.825	531985.242	524.069	17.85	-0.098	0.625	0.633	-0.078	98.9	-7.0	0.035	-0.004	0.29	0.000	0.002	0.002	0.009	90.0	77.5	6.827	30.722
30/10/2016	5869826.824	531985.240	524.057	18.12	-0.099	0.623	0.631	-0.090	99.0	-8.1	0.035	-0.005	0.27	-0.001	-0.002	0.002	-0.012	243.4	-79.4	-8.167	-43.830
16/12/2016	5869826.828	531985.247	524.050	18.25	-0.095	0.630	0.637	-0.097	98.6	-8.7	0.035	-0.005	0.13	0.004	0.007	0.008	-0.007	60.3	-41.0	62.654	-54.399
04/04/2017	5869826.827	531985.246	524.052	18.55	-0.096	0.629	0.636	-0.095	98.7	-8.5	0.034	-0.005	0.30	-0.001	-0.001	0.001	0.002	225.0	54.7	-4.739	6.702
08/08/2017	5869826.821	531985.250	524.069	18.90	-0.102	0.633	0.641	-0.078	99.2	-6.9	0.034	-0.004	0.34	-0.006	0.004	0.007	0.017	146.3	67.0	20.904	49.280
02/10/2017	5869826.826	531985.256	524.057	19.05	-0.097	0.639	0.646	-0.090	98.6	-7.9	0.034	-0.005	0.15	0.005	0.006	0.008	-0.012	50.2	-56.9	51.867	-79.691
04/12/2017	5869826.827	531985.251	524.053	19.22	-0.096	0.634	0.641	-0.094	98.6	-8.3	0.033	-0.005	0.17	0.001	-0.005	0.005	-0.004	281.3	-38.1	-29.562	-23.190
13/06/2018	5869826.829	531985.264	524.054	19.74	-0.094	0.647	0.654	-0.093	98.3	-8.1	0.033	-0.005	0.52	0.002	0.013	0.013	0.001	81.3	4.3	25.152	1.912
06/12/2018	5869826.833	531985.258	524.044	20.22	-0.090	0.641	0.647	-0.103	98.0	-9.0	0.032	-0.005	0.48	0.004	-0.006	0.007	-0.010	303.7	-54.2	-14.965	-20.753
12/06/2019	5869826.826	531985.279	524.049	20.74	-0.097	0.662	0.669	-0.098	98.3	-8.3	0.032	-0.005	0.51	-0.007	0.021	0.022	0.005	108.4	12.7	43.006	9.714
12/12/2019	5869826.827	531985.273	524.053	21.24	-0.096	0.656	0.663	-0.094	98.3	-8.1	0.031	-0.004	0.50	0.001	-0.006	0.006	0.004	279.5	33.3	-12.141	7.984
17/06/2020	5869826.818	531985.323	524.041	21.75	-0.105	0.706	0.714	-0.106	98.5	-8.4	0.033	-0.005	0.51	-0.009	0.050	0.051	-0.012	100.2	-13.3	98.702	-23.314
21/12/2020	5869826.819	531985.354	524.045	22.27	-0.104	0.737	0.744	-0.102	98.0	-7.8	0.033	-0.005	0.51	0.001	0.031	0.031	0.004	88.2	7.3	60.581	7.813
19/06/2021	5869826.805	531985.411	524.047	22.76	-0.118	0.794	0.803	-0.100	98.5	-7.1	0.035	-0.004	0.49	-0.014	0.057	0.059	0.002	103.8	2.0	119.100	4.058
14/12/2021	5869826.803	531985.418	524.033	23.25	-0.120	0.801	0.810	-0.114	98.5	-8.0	0.035	-0.005	0.49	-0.002	0.007	0.007	-0.014	105.9	-62.5	14.939	-28.728
28/06/2022	5869826.808	531985.434	524.030	23.78	-0.115	0.817	0.825	-0.117	98.0	-8.1	0.035	-0.005	0.54	0.005	0.016	0.017	-0.003	72.6	-10.1	31.238	-5.591
16/12/2022	5869826.810	531985.426	524.030	24.25	-0.113	0.809	0.817	-0.117	98.0	-8.2	0.034	-0.005	0.47	0.002	-0.008	0.008	0.000	284.0	0.0	-17.614	0.000
06/06/2023	5869826.803	531985.434	524.023	24.72	-0.120	0.817	0.826	-0.124	98.4	-8.5	0.033	-0.005	0.47	-0.007	0.008	0.011	-0.007	130.8	-32.8	22.734	-14.631
04/01/2024	5869826.805	531985.429	524.020	25.30	-0.118	0.812	0.821	-0.127	98.3	-8.8	0.032	-0.005	0.58	0.002	-0.005	0.005	-0.003	291.4	-29.6	-9.438	-5.358

GPS Hub 98-18 (Southest Corner of Lark Avenue and Flamingo Street)









CITY OF Quesnel

GPS Hub 98-19 (South Side of Abbott Drive)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869596.532	531978.061	517.225	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5869596.534	531978.063	517.219	0.25	0.002	0.002	0.003	-0.006	45.0	-64.8	0.011	-0.024	0.25	0.002	0.002	0.003	-0.006	45.0	-64.8	11.353	-24.082
15/04/1999	5869596.525	531978.098	517.218	0.58	-0.007	0.037	0.038	-0.007	100.7	-10.5	0.065	-0.012	0.33	-0.009	0.035	0.036	-0.001	104.4	-1.6	109.088	-3.019
15/12/1999	5869596.519	531978.134	517.213	1.25	-0.013	0.073	0.074	-0.012	100.1	-9.2	0.059	-0.010	0.67	-0.006	0.036	0.036	-0.005	99.5	-7.8	54.633	-7.485
15/02/2000	5869596.525	531978.140	517.238	1.42	-0.007	0.079	0.079	0.013	95.1	9.3	0.056	0.009	0.17	0.006	0.006	0.008	0.025	45.0	71.3	49.988	147.278
15/05/2000	5869596.502	531978.164	517.224	1.66	-0.030	0.103	0.107	-0.001	106.2	-0.5	0.064	-0.001	0.25	-0.023	0.024	0.033	-0.014	133.8	-22.8	134.905	-56.817
30/11/2000	5869596.531	531978.200	517.202	2.21	-0.001	0.139	0.139	-0.023	90.4	-9.4	0.063	-0.010	0.54	0.029	0.036	0.046	-0.022	51.1	-25.5	84.848	-40.379
05/05/2001	5869596.487	531978.205	517.207	2.64	-0.045	0.144	0.151	-0.018	107.4	-6.8	0.057	-0.007	0.43	-0.044	0.005	0.044	0.005	173.5	6.4	103.682	11.707
15/12/2001	5869596.493	531978.237	517.234	3.25	-0.039	0.176	0.180	0.009	102.5	2.9	0.055	0.003	0.61	0.006	0.032	0.033	0.027	79.4	39.7	53.088	44.026
15/05/2002	5869596.463	531978.282	517.216	3.66	-0.069	0.221	0.232	-0.009	107.3	-2.2	0.063	-0.002	0.41	-0.030	0.045	0.054	-0.018	123.7	-18.4	130.821	-43.540
24/10/2002	5869596.484	531978.276	517.200	4.11	-0.048	0.215	0.220	-0.025	102.6	-6.5	0.054	-0.006	0.44	0.021	-0.006	0.022	-0.016	344.1	-36.2	-49.242	-36.074
12/11/2003	5869596.467	531978.287	517.212	5.16	-0.065	0.226	0.235	-0.013	106.1	-3.1	0.046	-0.002	1.05	-0.017	0.011	0.021	0.012	147.5	31.3	19.523	11.852
11/01/2005	5869596.480	531978.307	517.249	6.32	-0.052	0.246	0.251	0.024	102.0	5.3	0.040	0.004	1.17	0.013	0.020	0.024	0.036	56.0	56.8	20.244	30.900
10/03/2006	5869596.456	531978.375	517.242	7.48	-0.076	0.314	0.323	0.017	103.6	3.0	0.043	0.002	1.16	-0.024	0.068	0.072	-0.007	109.3	-5.1	62.563	-5.613
10/11/2006	5869596.451	531978.392	517.248	8.15	-0.081	0.331	0.341	0.023	103.8	3.9	0.042	0.003	0.67	-0.005	0.017	0.018	0.006	106.4	18.7	26.417	8.945
05/04/2007	5869596.454	531978.393	517.244	8.55	-0.078	0.332	0.341	0.019	103.2	3.2	0.040	0.002	0.40	0.003	0.001	0.003	-0.004	18.4	-51.7	7.911	-10.007
16/08/2007	5869596.459	531978.408	517.241	8.92	-0.073	0.347	0.355	0.016	101.9	2.6	0.040	0.002	0.36	0.005	0.015	0.016	-0.003	71.6	-10.7	43.422	-8.239
13/12/2007	5869596.450	531978.410	517.233	9.24	-0.082	0.349	0.359	0.008	103.2	1.3	0.039	0.001	0.33	-0.009	0.002	0.009	-0.008	167.5	-40.9	28.298	-24.555
18/03/2008	5869596.458	531978.410	517.253	9.51	-0.074	0.349	0.357	0.028	102.0	4.5	0.038	0.003	0.26	0.008	0.000	0.008	0.020	0.0	68.2	-30.437	76.094
03/06/2008	5869596.441	531978.438	517.242	9.72	-0.091	0.377	0.388	0.017	103.6	2.5	0.040	0.002	0.21	-0.017	0.028	0.033	-0.011	121.3	-18.6	155.382	-52.179
29/08/2008	5869596.440	531978.449	517.252	9.95	-0.092	0.388	0.399	0.027	103.3	3.9	0.040	0.003	0.24	-0.001	0.011	0.011	0.010	95.2	42.2	46.371	41.983
19/11/2008	5869596.453	531978.449	517.253	10.18	-0.079	0.388	0.396	0.028	101.5	4.0	0.039	0.003	0.22	0.013	0.000	0.013	0.001	0.0	4.4	-57.905	4.454
26/03/2009	5869596.438	531978.457	517.244	10.53	-0.094	0.396	0.407	0.019	103.4	2.7	0.039	0.002	0.35	-0.015	0.008	0.017	-0.009	151.9	-27.9	48.892	-25.884
10/06/2009	5869596.426	531978.495	517.261	10.74	-0.106	0.434	0.447	0.036	103.7	4.6	0.042	0.003	0.21	-0.012	0.038	0.040	0.017	107.5	23.1	191.515	81.701
17/09/2009	5869596.435	531978.503	517.260	11.01	-0.097	0.442	0.453	0.035	102.4	4.4	0.041	0.003	0.27	0.009	0.008	0.012	-0.001	41.6	-4.7	44.426	-3.689
23/11/2009	5869596.437	531978.497	517.256	11.19	-0.095	0.436	0.446	0.031	102.3	4.0	0.040	0.003	0.18	0.002	-0.006	0.006	-0.004	288.4	-32.3	-34.478	-21.806
27/03/2010	5869596.434	531978.494	517.243	11.53	-0.098	0.433	0.444	0.018	102.8	2.3	0.039	0.002	0.34	-0.003	-0.003	0.004	-0.013	225.0	-71.9	-12.497	-38.292
04/07/2010	5869596.429	531978.497	517.247	11.80	-0.103	0.436	0.448	0.022	103.3	2.8	0.038	0.002	0.27	-0.005	0.003	0.006	0.004	149.0	34.4	21.513	14.758
13/09/2010	5869596.437	531978.501	517.258	11.99	-0.095	0.440	0.450	0.033	102.2	4.2	0.038	0.003	0.19	0.008	0.004	0.009	0.011	26.6	50.9	46.013	56.588
22/11/2010	5869596.432	531978.506	517.249	12.19	-0.100	0.445	0.456	0.024	102.7	3.0	0.037	0.002	0.19	-0.005	0.005	0.007	-0.009	135.0	-51.8	36.896	-46.961
04/04/2011	5869596.427	531978.500	517.245	12.55	-0.105	0.439	0.451	0.020	103.5	2.5	0.036	0.002	0.36	-0.005	-0.006	0.008	-0.004	230.2	-27.1	-21.449	-10.985
18/06/2011	5869596.433	531978.513	517.264	12.76	-0.099	0.452	0.463	0.039	102.4	4.8	0.036	0.003	0.21	0.006	0.013	0.014	0.019	65.2	53.0	69.728	92.530
03/10/2011	5869596.431	531978.511	517.254	13.05	-0.101	0.450	0.461	0.029	102.7	3.6	0.035	0.002	0.29	-0.002	-0.002	0.003	-0.010	225.0	-74.2	-9.655	-34.136
28/11/2011	5869596.432	531978.510	517.253	13.20	-0.100	0.449	0.460	0.028	102.6	3.5	0.035	0.002	0.15	0.001	-0.001	0.001	-0.001	315.0	-35.3	-9.224	-6.522
09/04/2012	5869596.434	531978.521	517.249	13.57	-0.098	0.460	0.470	0.024	102.0	2.9	0.035	0.002	0.36	0.002	0.011	0.011	-0.004	79.7	-19.7	30.704	-10.985

CITY OF Quesnel

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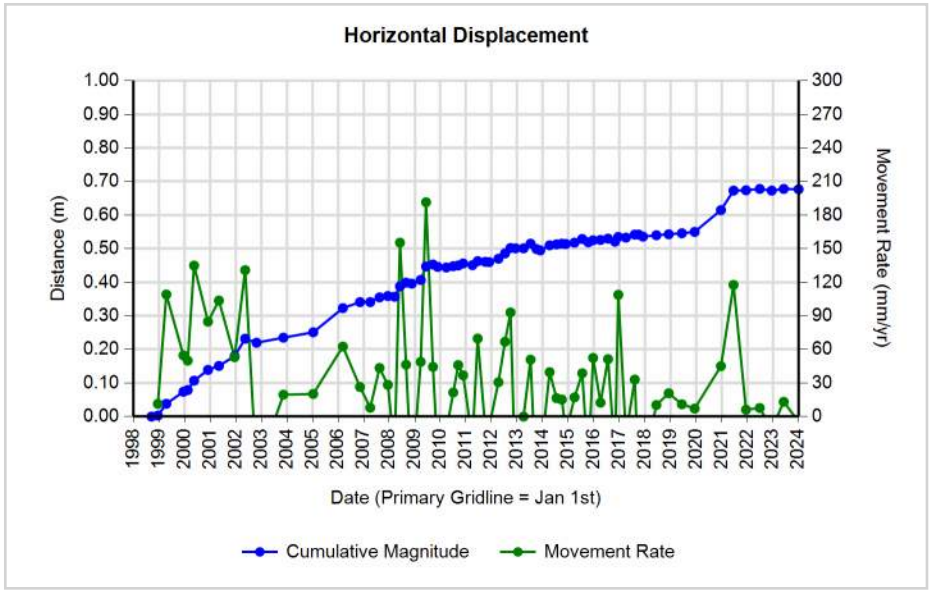
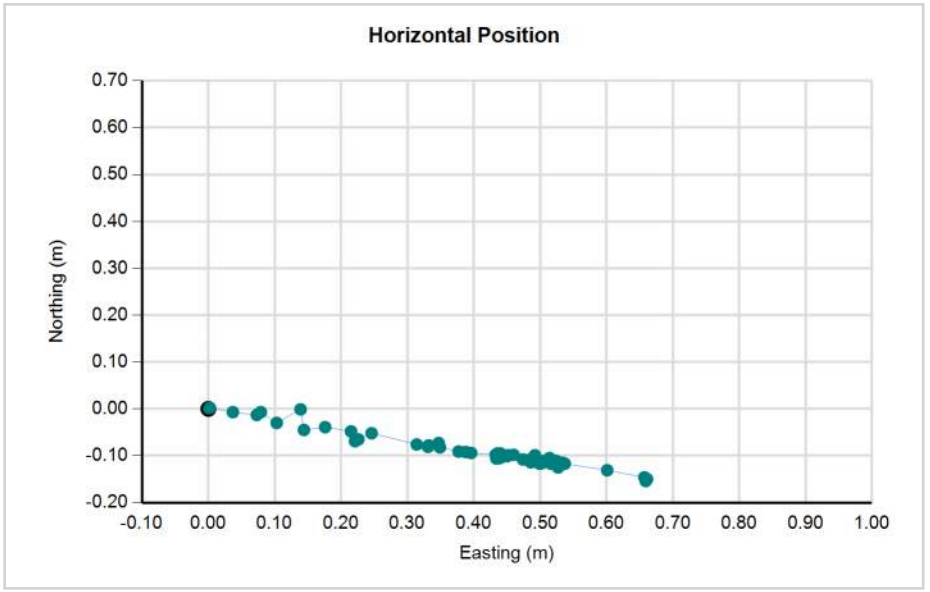
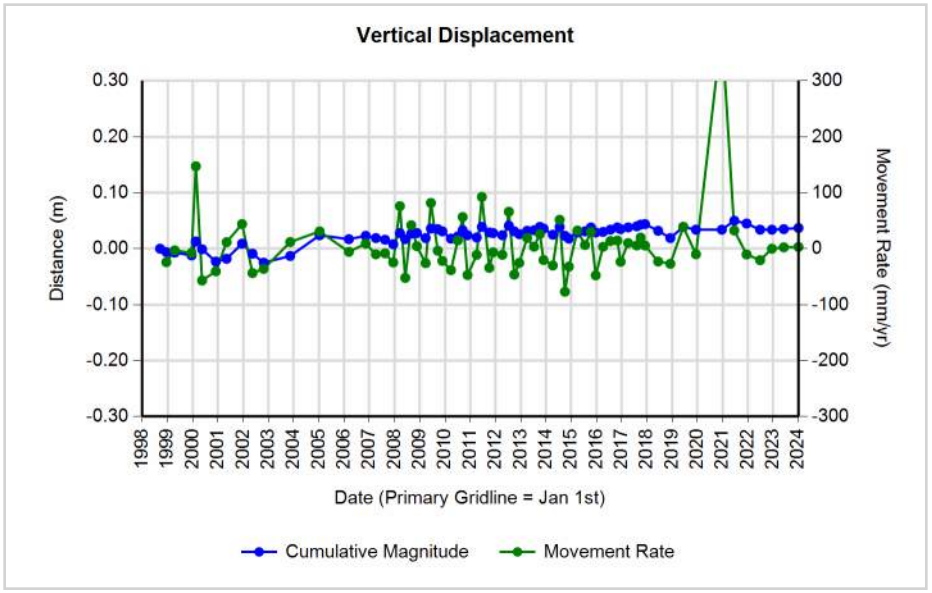
GPS Hub 98-19 (South Side of Abbott Drive)

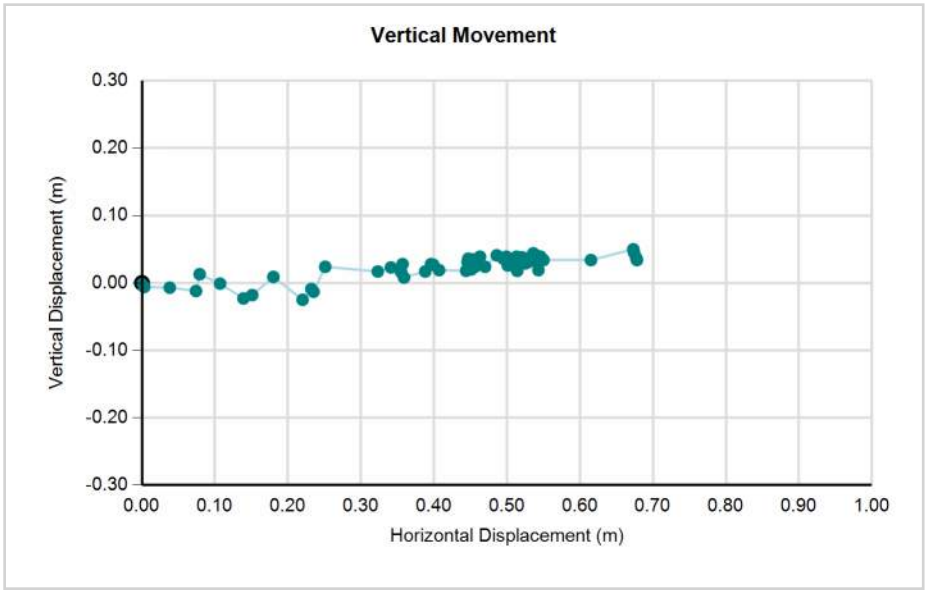
12/07/2012	5869596.424	531978.535	517.266	13.82	-0.108	0.474	0.486	0.041	102.8	4.8	0.035	0.003	0.26	-0.010	0.014	0.017	0.017	125.5	44.7	66.851	66.056
29/09/2012	5869596.433	531978.553	517.256	14.04	-0.099	0.492	0.502	0.031	101.4	3.5	0.036	0.002	0.22	0.009	0.018	0.020	-0.010	63.4	-26.4	93.044	-46.234
10/12/2012	5869596.421	531978.550	517.251	14.24	-0.111	0.489	0.501	0.026	102.8	3.0	0.035	0.002	0.20	-0.012	-0.003	0.012	-0.005	194.0	-22.0	-62.749	-25.365
03/04/2013	5869596.421	531978.550	517.257	14.55	-0.111	0.489	0.501	0.032	102.8	3.7	0.034	0.002	0.31	0.000	0.000	0.000	0.006	0.0	0.0	0.000	19.224
12/07/2013	5869596.416	531978.563	517.258	14.82	-0.116	0.502	0.515	0.033	103.0	3.7	0.035	0.002	0.27	-0.005	0.013	0.014	0.001	111.0	4.1	50.873	3.653
04/10/2013	5869596.418	531978.547	517.264	15.05	-0.114	0.486	0.499	0.039	103.2	4.5	0.033	0.003	0.23	0.002	-0.016	0.016	0.006	277.1	20.4	-70.113	26.089
27/11/2013	5869596.423	531978.544	517.261	15.20	-0.109	0.483	0.495	0.036	102.7	4.2	0.033	0.002	0.15	0.005	-0.003	0.006	-0.003	329.0	-27.2	-39.440	-20.292
10/04/2014	5869596.419	531978.558	517.250	15.57	-0.113	0.497	0.510	0.025	102.8	2.8	0.033	0.002	0.37	-0.004	0.014	0.015	-0.011	105.9	-37.1	39.687	-29.983
18/07/2014	5869596.415	531978.560	517.264	15.84	-0.117	0.499	0.513	0.039	103.2	4.4	0.032	0.002	0.27	-0.004	0.002	0.004	0.014	153.4	72.3	16.499	51.652
02/10/2014	5869596.416	531978.563	517.248	16.05	-0.116	0.502	0.515	0.023	103.0	2.6	0.032	0.001	0.21	0.001	0.003	0.003	-0.016	71.6	-78.8	15.198	-76.895
28/11/2014	5869596.418	531978.562	517.243	16.20	-0.114	0.501	0.514	0.018	102.8	2.0	0.032	0.001	0.16	0.002	-0.001	0.002	-0.005	333.4	-65.9	-14.328	-32.039
01/04/2015	5869596.421	531978.567	517.254	16.54	-0.111	0.506	0.518	0.029	102.4	3.2	0.031	0.002	0.34	0.003	0.005	0.006	0.011	59.0	62.1	17.175	32.401
20/07/2015	5869596.415	531978.577	517.256	16.84	-0.117	0.516	0.529	0.031	102.8	3.4	0.031	0.002	0.30	-0.006	0.010	0.012	0.002	121.0	9.7	38.723	6.641
14/10/2015	5869596.420	531978.568	517.263	17.08	-0.112	0.507	0.519	0.038	102.5	4.2	0.030	0.002	0.24	0.005	-0.009	0.010	0.007	299.1	34.2	-43.726	29.730
22/12/2015	5869596.427	531978.575	517.254	17.27	-0.105	0.514	0.525	0.029	101.5	3.2	0.030	0.002	0.19	0.007	0.007	0.010	-0.009	45.0	-42.3	52.403	-47.641
06/04/2016	5869596.430	531978.577	517.255	17.56	-0.102	0.516	0.526	0.030	101.2	3.3	0.030	0.002	0.29	0.003	0.002	0.004	0.001	33.7	15.5	12.424	3.446
22/07/2016	5869596.415	531978.578	517.259	17.85	-0.117	0.517	0.530	0.034	102.8	3.7	0.030	0.002	0.29	-0.015	0.001	0.015	0.004	176.2	14.9	51.317	13.654
30/10/2016	5869596.420	531978.570	517.263	18.12	-0.112	0.509	0.521	0.038	102.4	4.2	0.029	0.002	0.27	0.005	-0.008	0.009	0.004	302.0	23.0	-34.458	14.610
16/12/2016	5869596.420	531978.584	517.260	18.25	-0.112	0.523	0.535	0.035	102.1	3.7	0.029	0.002	0.13	0.000	0.014	0.014	-0.003	90.0	-12.1	108.798	-23.314
04/04/2017	5869596.416	531978.581	517.263	18.55	-0.116	0.520	0.533	0.038	102.6	4.1	0.029	0.002	0.30	-0.004	-0.003	0.005	0.003	216.9	31.0	-16.755	10.053
08/08/2017	5869596.407	531978.588	517.265	18.90	-0.125	0.527	0.542	0.040	103.3	4.2	0.029	0.002	0.34	-0.009	0.007	0.011	0.002	142.1	9.9	33.052	5.798
02/10/2017	5869596.415	531978.590	517.268	19.05	-0.117	0.529	0.542	0.043	102.5	4.5	0.028	0.002	0.15	0.008	0.002	0.008	0.003	14.0	20.0	-54.762	19.923
04/12/2017	5869596.421	531978.585	517.269	19.22	-0.111	0.524	0.536	0.044	102.0	4.7	0.028	0.002	0.17	0.006	-0.005	0.008	0.001	320.2	7.3	-45.281	5.798
13/06/2018	5869596.423	531978.590	517.257	19.74	-0.109	0.529	0.540	0.032	101.6	3.4	0.027	0.002	0.52	0.002	0.005	0.005	-0.012	68.2	-65.8	10.298	-22.948
06/12/2018	5869596.413	531978.591	517.244	20.22	-0.119	0.530	0.543	0.019	102.7	2.0	0.027	0.001	0.48	-0.010	0.001	0.010	-0.013	174.3	-52.3	20.856	-26.979
12/06/2019	5869596.417	531978.595	517.264	20.74	-0.115	0.534	0.546	0.039	102.2	4.1	0.026	0.002	0.51	0.004	0.004	0.006	0.020	45.0	74.2	10.990	38.856
12/12/2019	5869596.415	531978.598	517.259	21.24	-0.117	0.537	0.550	0.034	102.3	3.5	0.026	0.002	0.50	-0.002	0.003	0.004	-0.005	123.7	-54.2	7.196	-9.980
21/12/2020	5869596.401	531978.662	517.259	22.27	-0.131	0.601	0.615	0.034	102.3	3.2	0.028	0.002	0.51	0.002	0.023	0.023	0.201	85.0	83.4	45.093	392.595
19/06/2021	5869596.386	531978.718	517.275	22.76	-0.146	0.657	0.673	0.050	102.5	4.2	0.030	0.002	0.49	-0.015	0.056	0.058	0.016	105.0	15.4	117.639	32.467
14/12/2021	5869596.383	531978.718	517.270	23.25	-0.149	0.657	0.674	0.045	102.8	3.8	0.029	0.002	0.49	-0.003	0.000	0.003	-0.005	180.0	-59.0	6.156	-10.260
28/06/2022	5869596.382	531978.722	517.259	23.78	-0.150	0.661	0.678	0.034	102.8	2.9	0.028	0.001	0.54	-0.001	0.004	0.004	-0.011	104.0	-69.5	7.683	-20.499
16/12/2022	5869596.385	531978.718	517.259	24.25	-0.147	0.657	0.673	0.034	102.6	2.9	0.028	0.001	0.47	0.003	-0.004	0.005	0.000	306.9	0.0	-10.680	0.000
06/06/2023	5869596.380	531978.722	517.260	24.72	-0.152	0.661	0.678	0.035	103.0	3.0	0.027	0.001	0.47	-0.005	0.004	0.006	0.001	143.5	10.5	13.209	2.442
04/01/2024	5869596.378	531978.720	517.262	25.30	-0.154	0.659	0.677	0.037	103.2	3.1	0.027	0.001	0.58	-0.002	-0.002	0.003	0.002	220.4	35.2	-4.522	3.187

GPS Hub 98-19 (South Side of Abbott Drive)









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GPS Hub 98-20 (East Side of Hawk Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869364.259	532199.105	504.356	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5869364.263	532199.109	504.333	0.25	0.004	0.004	0.006	-0.023	45.0	-76.2	0.023	-0.092	0.25	0.004	0.004	0.006	-0.023	45.0	-76.2	22.705	-92.316
15/04/1999	5869364.256	532199.136	504.327	0.58	-0.003	0.031	0.031	-0.029	95.5	-43.0	0.054	-0.050	0.33	-0.007	0.027	0.028	-0.006	104.5	-12.1	84.197	-18.112
15/12/1999	5869364.259	532199.176	504.353	1.25	0.000	0.071	0.071	-0.003	90.0	-2.4	0.057	-0.002	0.67	0.003	0.040	0.040	0.026	85.7	33.0	60.045	38.920
15/02/2000	5869364.255	532199.171	504.340	1.42	-0.004	0.066	0.066	-0.016	93.5	-13.6	0.047	-0.011	0.17	-0.004	-0.005	0.006	-0.013	231.3	-63.8	-37.722	-76.585
15/05/2000	5869364.247	532199.193	504.330	1.66	-0.012	0.088	0.089	-0.026	97.8	-16.3	0.053	-0.016	0.25	-0.008	0.022	0.023	-0.010	110.0	-23.1	95.003	-40.583
30/11/2000	5869364.240	532199.240	504.315	2.21	-0.019	0.135	0.136	-0.041	98.0	-16.7	0.062	-0.019	0.54	-0.007	0.047	0.048	-0.015	98.5	-17.5	87.217	-27.531
05/05/2001	5869364.221	532199.244	504.315	2.64	-0.038	0.139	0.144	-0.041	105.3	-15.9	0.055	-0.016	0.43	-0.019	0.004	0.019	0.000	168.1	0.0	45.461	0.000
15/12/2001	5869364.223	532199.265	504.332	3.25	-0.036	0.160	0.164	-0.024	102.7	-8.3	0.050	-0.007	0.61	0.002	0.021	0.021	0.017	84.6	38.9	34.397	27.720
15/05/2002	5869364.206	532199.318	504.309	3.66	-0.053	0.213	0.219	-0.047	104.0	-12.1	0.060	-0.013	0.41	-0.017	0.053	0.056	-0.023	107.8	-22.5	134.634	-55.634
24/10/2002	5869364.218	532199.317	504.299	4.11	-0.041	0.212	0.216	-0.057	100.9	-14.8	0.053	-0.014	0.44	0.012	-0.001	0.012	-0.010	355.2	-39.7	-27.149	-22.546
12/11/2003	5869364.193	532199.318	504.319	5.16	-0.066	0.213	0.223	-0.037	107.1	-9.5	0.043	-0.007	1.05	-0.025	0.001	0.025	0.020	176.6	38.5	23.517	18.729
11/01/2005	5869364.194	532199.331	504.332	6.32	-0.065	0.226	0.235	-0.024	106.1	-5.8	0.037	-0.004	1.17	0.000	0.012	0.012	0.014	87.8	48.1	10.485	11.669
10/03/2006	5869364.172	532199.396	504.320	7.48	-0.087	0.291	0.304	-0.036	106.6	-6.8	0.041	-0.005	1.16	-0.022	0.065	0.069	-0.012	108.5	-10.1	59.444	-10.621
10/11/2006	5869364.170	532199.409	504.322	8.15	-0.089	0.304	0.317	-0.034	106.3	-6.1	0.039	-0.004	0.67	-0.002	0.013	0.013	0.002	98.7	8.6	19.609	2.982
05/04/2007	5869364.173	532199.407	504.316	8.55	-0.086	0.302	0.314	-0.040	105.9	-7.3	0.037	-0.005	0.40	0.003	-0.002	0.004	-0.006	326.3	-59.0	-9.020	-15.010
16/08/2007	5869364.162	532199.421	504.308	8.92	-0.097	0.316	0.331	-0.048	107.1	-8.3	0.037	-0.005	0.36	-0.011	0.014	0.018	-0.008	128.2	-24.2	48.895	-21.970
13/12/2007	5869364.165	532199.424	504.313	9.24	-0.094	0.319	0.333	-0.043	106.4	-7.4	0.036	-0.005	0.33	0.003	0.003	0.004	0.005	45.0	49.7	13.022	15.347
18/03/2008	5869364.166	532199.424	504.319	9.51	-0.093	0.319	0.332	-0.037	106.3	-6.4	0.035	-0.004	0.26	0.001	0.000	0.001	0.006	0.0	80.5	-3.805	22.828
03/06/2008	5869364.153	532199.455	504.322	9.72	-0.106	0.350	0.366	-0.034	106.8	-5.3	0.038	-0.003	0.21	-0.013	0.031	0.034	0.003	112.8	5.1	159.455	14.231
29/07/2008	5869364.148	532199.461	504.314	9.87	-0.111	0.356	0.373	-0.042	107.3	-6.4	0.038	-0.004	0.15	-0.005	0.006	0.008	-0.008	129.8	-45.7	50.941	-52.179
29/08/2008	5869364.156	532199.458	504.313	9.95	-0.103	0.353	0.368	-0.043	106.3	-6.7	0.037	-0.004	0.08	0.008	-0.003	0.009	-0.001	339.4	-6.7	-100.668	-11.782
19/11/2008	5869364.159	532199.460	504.309	10.18	-0.100	0.355	0.369	-0.047	105.7	-7.3	0.036	-0.005	0.22	0.003	0.002	0.004	-0.004	33.7	-48.0	16.060	-17.817
26/03/2009	5869364.158	532199.465	504.308	10.53	-0.101	0.360	0.374	-0.048	105.7	-7.3	0.036	-0.005	0.35	-0.001	0.005	0.005	-0.001	101.3	-11.1	14.665	-2.876
10/06/2009	5869364.134	532199.506	504.315	10.74	-0.125	0.401	0.420	-0.041	107.3	-5.6	0.039	-0.004	0.21	-0.024	0.041	0.048	0.007	120.3	8.4	228.319	33.641
17/09/2009	5869364.142	532199.509	504.312	11.01	-0.117	0.404	0.421	-0.044	106.2	-6.0	0.038	-0.004	0.27	0.008	0.003	0.009	-0.003	20.6	-19.3	31.522	-11.068
23/11/2009	5869364.139	532199.506	504.311	11.19	-0.120	0.401	0.419	-0.045	106.7	-6.1	0.037	-0.004	0.18	-0.003	-0.003	0.004	-0.001	225.0	-13.3	-23.129	-5.451
27/03/2010	5869364.148	532199.499	504.311	11.53	-0.111	0.394	0.409	-0.045	105.7	-6.3	0.036	-0.004	0.34	0.009	-0.007	0.011	0.000	322.1	0.0	-33.585	0.000
04/07/2010	5869364.138	532199.502	504.305	11.80	-0.121	0.397	0.415	-0.051	107.0	-7.0	0.035	-0.004	0.27	-0.010	0.003	0.010	-0.006	163.3	-29.9	38.518	-22.136
13/09/2010	5869364.146	532199.506	504.317	11.99	-0.113	0.401	0.417	-0.039	105.7	-5.3	0.035	-0.003	0.19	0.008	0.004	0.009	0.012	26.6	53.3	46.013	61.732
22/11/2010	5869364.142	532199.510	504.309	12.19	-0.117	0.405	0.422	-0.047	106.1	-6.4	0.035	-0.004	0.19	-0.004	0.004	0.006	-0.008	135.0	-54.7	29.517	-41.743
04/04/2011	5869364.149	532199.508	504.305	12.55	-0.110	0.403	0.418	-0.051	105.3	-7.0	0.033	-0.004	0.36	0.007	-0.002	0.007	-0.004	344.1	-28.8	-19.993	-10.985
18/06/2011	5869364.136	532199.515	504.312	12.76	-0.123	0.410	0.428	-0.044	106.7	-5.9	0.034	-0.003	0.21	-0.013	0.007	0.015	0.007	151.7	25.4	71.905	34.090
03/10/2011	5869364.140	532199.513	504.305	13.05	-0.119	0.408	0.425	-0.051	106.3	-6.8	0.033	-0.004	0.29	0.004	-0.002	0.004	-0.007	333.4	-57.4	-15.266	-23.895
28/11/2011	5869364.140	532199.510	504.300	13.20	-0.119	0.405	0.422	-0.056	106.4	-7.6	0.032	-0.004	0.15	0.000	-0.003	0.003	-0.005	270.0	-59.0	-19.567	-32.612

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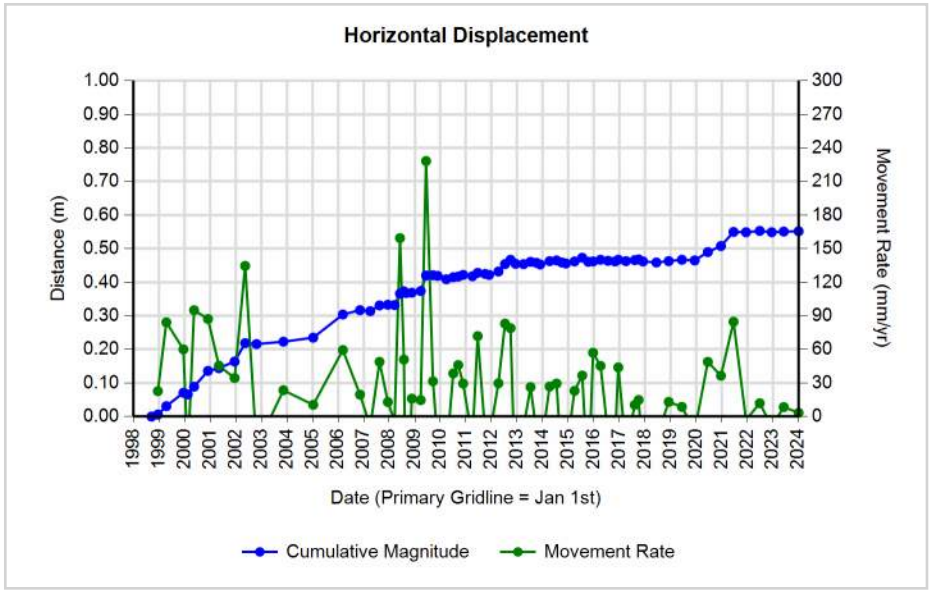
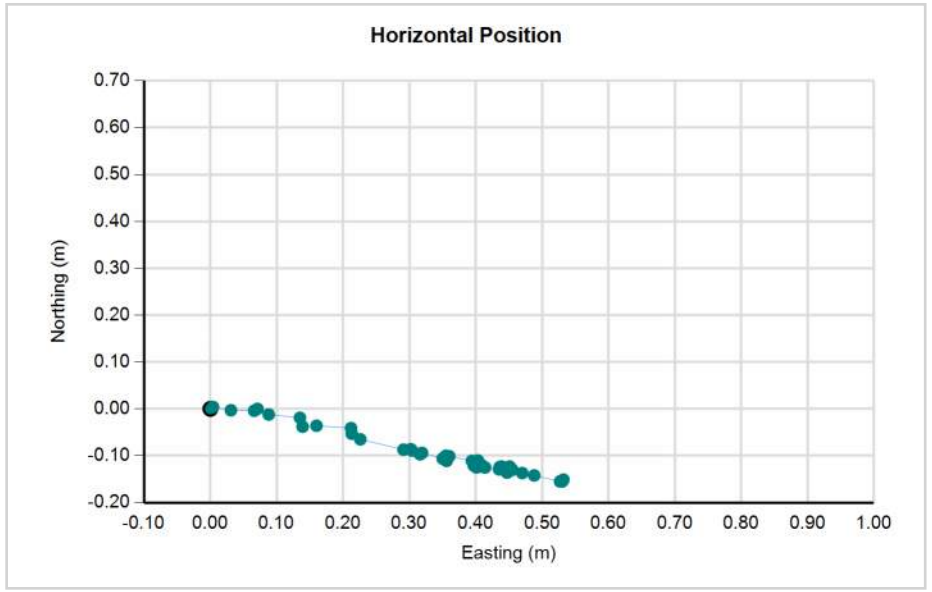
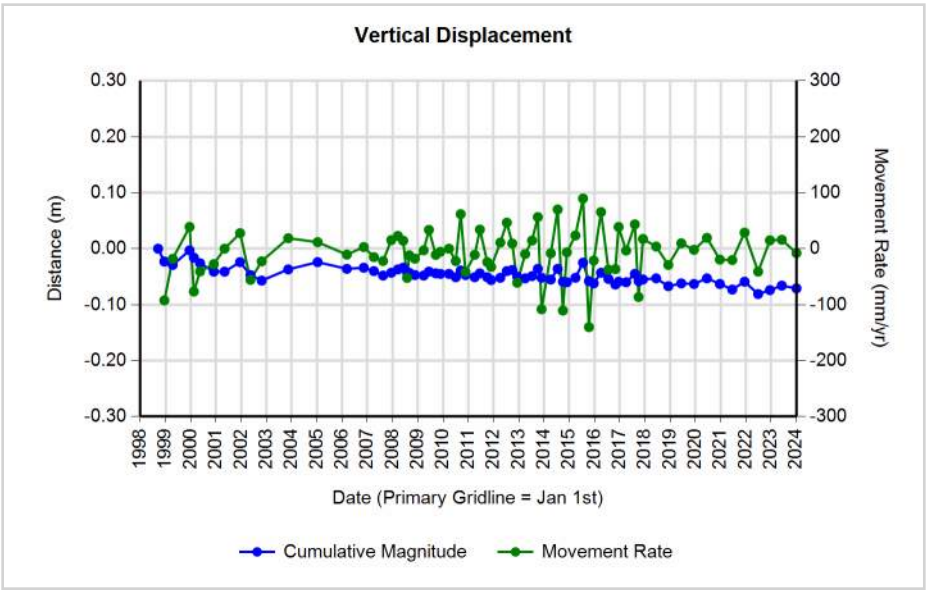
GPS Hub 98-20 (East Side of Hawk Street)

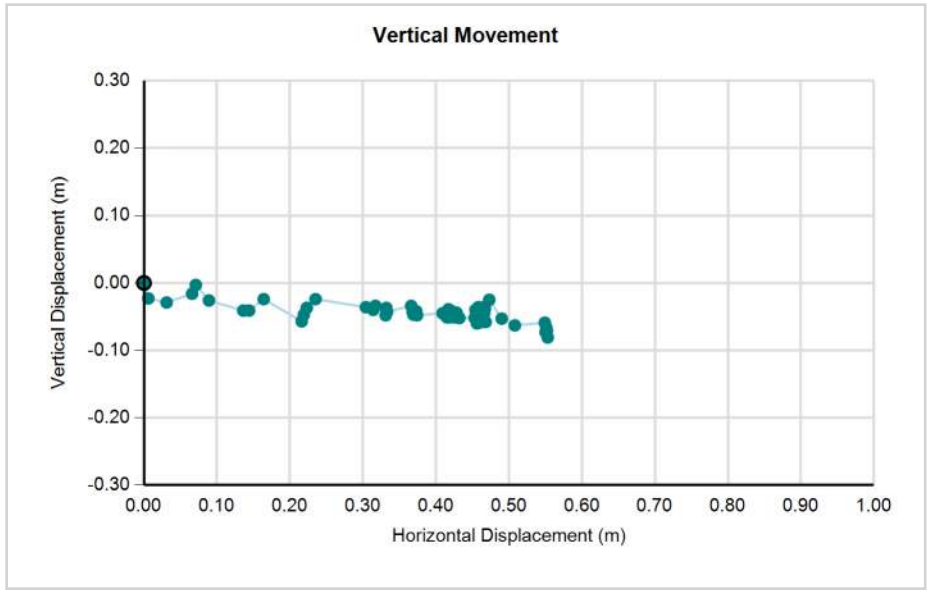
09/04/2012	5869364.134	532199.519	504.304	13.57	-0.125	0.414	0.432	-0.052	106.8	-6.9	0.032	-0.004	0.36	-0.006	0.009	0.011	0.004	123.7	20.3	29.705	10.985
12/07/2012	5869364.130	532199.540	504.316	13.82	-0.129	0.435	0.454	-0.040	106.5	-5.0	0.033	-0.003	0.26	-0.004	0.021	0.021	0.012	100.8	29.3	83.065	46.628
29/09/2012	5869364.136	532199.556	504.318	14.04	-0.123	0.451	0.467	-0.038	105.3	-4.6	0.033	-0.003	0.22	0.006	0.016	0.017	0.002	69.4	6.7	79.005	9.247
10/12/2012	5869364.132	532199.542	504.306	14.24	-0.127	0.437	0.455	-0.050	106.2	-6.3	0.032	-0.004	0.20	-0.004	-0.014	0.015	-0.012	254.1	-39.5	-73.863	-60.875
03/04/2013	5869364.135	532199.542	504.303	14.55	-0.124	0.437	0.454	-0.053	105.8	-6.7	0.031	-0.004	0.31	0.003	0.000	0.003	-0.003	0.0	-45.0	-9.612	-9.612
12/07/2013	5869364.131	532199.548	504.307	14.82	-0.128	0.443	0.461	-0.049	106.1	-6.1	0.031	-0.003	0.27	-0.004	0.006	0.007	0.004	123.7	29.0	26.339	14.610
04/10/2013	5869364.132	532199.545	504.320	15.05	-0.127	0.440	0.458	-0.036	106.1	-4.5	0.030	-0.002	0.23	0.001	-0.003	0.003	0.013	288.4	76.3	-13.750	56.527
27/11/2013	5869364.135	532199.541	504.304	15.20	-0.124	0.436	0.453	-0.052	105.9	-6.5	0.030	-0.003	0.15	0.003	-0.004	0.005	-0.016	306.9	-72.6	-33.819	-108.222
10/04/2014	5869364.131	532199.550	504.301	15.57	-0.128	0.445	0.463	-0.055	106.0	-6.8	0.030	-0.004	0.37	-0.004	0.009	0.010	-0.003	114.0	-16.9	26.845	-8.177
18/07/2014	5869364.123	532199.550	504.320	15.84	-0.136	0.445	0.465	-0.036	107.0	-4.4	0.029	-0.002	0.27	-0.008	0.000	0.008	0.019	180.0	67.2	29.515	70.098
02/10/2014	5869364.131	532199.546	504.297	16.05	-0.128	0.441	0.459	-0.059	106.2	-7.3	0.029	-0.004	0.21	0.008	-0.004	0.009	-0.023	333.4	-68.7	-42.985	-110.536
28/11/2014	5869364.136	532199.544	504.296	16.20	-0.123	0.439	0.456	-0.060	105.7	-7.5	0.028	-0.004	0.16	0.005	-0.002	0.005	-0.001	338.2	-10.5	-34.508	-6.408
01/04/2015	5869364.130	532199.549	504.304	16.54	-0.129	0.444	0.462	-0.052	106.2	-6.4	0.028	-0.003	0.34	-0.006	0.005	0.008	0.008	140.2	45.7	23.006	23.565
20/07/2015	5869364.129	532199.560	504.331	16.84	-0.130	0.455	0.473	-0.025	105.9	-3.0	0.028	-0.001	0.30	-0.001	0.011	0.011	0.027	95.2	67.8	36.676	89.652
14/10/2015	5869364.126	532199.546	504.298	17.08	-0.133	0.441	0.461	-0.058	106.8	-7.2	0.027	-0.003	0.24	-0.003	-0.014	0.014	-0.033	257.9	-66.5	-60.809	-140.154
22/12/2015	5869364.136	532199.550	504.294	17.27	-0.123	0.445	0.462	-0.062	105.5	-7.6	0.027	-0.004	0.19	0.010	0.004	0.011	-0.004	21.8	-20.4	57.013	-21.174
06/04/2016	5869364.123	532199.552	504.313	17.56	-0.136	0.447	0.467	-0.043	106.9	-5.3	0.027	-0.002	0.29	-0.013	0.002	0.013	0.019	171.3	55.3	45.322	65.469
22/07/2016	5869364.127	532199.550	504.302	17.85	-0.132	0.445	0.464	-0.054	106.5	-6.6	0.026	-0.003	0.29	0.004	-0.002	0.004	-0.011	333.4	-67.9	-15.266	-37.549
30/10/2016	5869364.133	532199.550	504.292	18.12	-0.126	0.445	0.462	-0.064	105.8	-7.9	0.026	-0.004	0.27	0.006	0.000	0.006	-0.010	0.0	-59.0	-21.915	-36.525
16/12/2016	5869364.129	532199.554	504.297	18.25	-0.130	0.449	0.467	-0.059	106.1	-7.2	0.026	-0.003	0.13	-0.004	0.004	0.006	0.005	135.0	41.5	43.961	38.856
04/04/2017	5869364.123	532199.548	504.296	18.55	-0.136	0.443	0.463	-0.060	107.1	-7.4	0.025	-0.003	0.30	-0.006	-0.006	0.008	-0.001	225.0	-6.7	-28.433	-3.351
08/08/2017	5869364.125	532199.551	504.311	18.90	-0.134	0.446	0.466	-0.045	106.7	-5.5	0.025	-0.002	0.34	0.002	0.003	0.004	0.015	56.3	76.5	10.452	43.482
02/10/2017	5869364.124	532199.553	504.298	19.05	-0.135	0.448	0.468	-0.058	106.8	-7.1	0.025	-0.003	0.15	-0.001	0.002	0.002	-0.013	116.6	-80.2	14.850	-86.332
04/12/2017	5869364.128	532199.548	504.301	19.22	-0.131	0.443	0.462	-0.055	106.5	-6.8	0.024	-0.003	0.17	0.004	-0.005	0.006	0.003	308.7	25.1	-37.123	17.393
13/06/2018	5869364.138	532199.548	504.303	19.74	-0.121	0.443	0.459	-0.053	105.3	-6.6	0.023	-0.003	0.52	0.010	0.000	0.010	0.002	0.0	11.3	-19.123	3.825
06/12/2018	5869364.132	532199.550	504.289	20.22	-0.127	0.445	0.463	-0.067	105.9	-8.2	0.023	-0.003	0.48	-0.006	0.002	0.006	-0.014	161.6	-65.7	13.125	-29.054
12/06/2019	5869364.130	532199.554	504.294	20.74	-0.129	0.449	0.467	-0.062	106.0	-7.6	0.023	-0.003	0.51	-0.002	0.004	0.004	0.005	116.6	48.2	8.689	9.714
12/12/2019	5869364.125	532199.550	504.293	21.24	-0.134	0.445	0.465	-0.063	106.8	-7.7	0.022	-0.003	0.50	-0.005	-0.004	0.006	-0.001	218.7	-8.9	-12.780	-1.996
17/06/2020	5869364.122	532199.575	504.303	21.75	-0.137	0.470	0.490	-0.053	106.3	-6.2	0.023	-0.002	0.51	-0.003	0.025	0.025	0.010	96.8	21.7	48.919	19.428
21/12/2020	5869364.117	532199.593	504.293	22.27	-0.142	0.488	0.508	-0.063	106.2	-7.1	0.023	-0.003	0.51	-0.005	0.018	0.019	-0.010	105.5	-28.2	36.489	-19.532
19/06/2021	5869364.105	532199.633	504.283	22.76	-0.154	0.528	0.550	-0.073	106.3	-7.6	0.024	-0.003	0.49	-0.012	0.040	0.042	-0.010	106.7	-13.5	84.740	-20.292
14/12/2021	5869364.104	532199.632	504.297	23.25	-0.155	0.527	0.549	-0.059	106.4	-6.1	0.024	-0.003	0.49	-0.001	-0.001	0.001	0.014	225.0	84.2	-2.902	28.728
28/06/2022	5869364.108	532199.637	504.275	23.78	-0.151	0.532	0.553	-0.081	105.8	-8.3	0.023	-0.003	0.54	0.004	0.005	0.006	-0.022	51.3	-73.8	11.932	-40.997
16/12/2022	5869364.107	532199.633	504.282	24.25	-0.152	0.528	0.549	-0.074	106.1	-7.7	0.023	-0.003	0.47	-0.001	-0.004	0.004	0.007	256.0	59.5	-8.807	14.952
06/06/2023	5869364.103	532199.633	504.290	24.72	-0.156	0.528	0.551	-0.066	106.5	-6.9	0.022	-0.003	0.47	-0.004	0.000	0.004	0.008	175.7	61.9	8.518	15.969
04/01/2024	5869364.104	532199.635	504.285	25.30	-0.155	0.530	0.552	-0.071	106.3	-7.3	0.022	-0.003	0.58	0.001	0.002	0.002	-0.005	59.5	-66.4	3.398	-7.787

GPS Hub 98-20 (East Side of Hawk Street)









CITY OF Quesnel

GPS Hub 98-21 (Lane North of Avery Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869342.996	532493.483	485.474	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5869343.005	532493.492	485.459	0.25	0.009	0.009	0.013	-0.015	45.0	-49.7	0.051	-0.060	0.25	0.009	0.009	0.013	-0.015	45.0	-49.7	51.087	-60.206
15/04/1999	5869342.998	532493.516	485.473	0.58	0.002	0.033	0.033	-0.001	86.5	-1.7	0.057	-0.002	0.33	-0.007	0.024	0.025	0.014	106.3	29.2	75.465	42.260
15/12/1999	5869342.998	532493.539	485.478	1.25	0.002	0.056	0.056	0.004	88.0	4.1	0.045	0.003	0.67	0.000	0.023	0.023	0.005	90.0	12.3	34.429	7.485
15/02/2000	5869342.994	532493.539	485.472	1.42	-0.002	0.056	0.056	-0.002	92.0	-2.0	0.040	-0.001	0.17	-0.004	0.000	0.004	-0.006	180.0	-56.3	23.565	-35.347
15/05/2000	5869342.985	532493.547	485.486	1.66	-0.011	0.064	0.065	0.012	99.8	10.5	0.039	0.007	0.25	-0.009	0.008	0.012	0.014	138.4	49.3	48.869	56.817
30/11/2000	5869343.007	532493.555	485.488	2.21	0.011	0.072	0.073	0.014	81.3	10.9	0.033	0.006	0.54	0.022	0.008	0.023	0.002	20.0	4.9	42.966	3.671
05/05/2001	5869342.971	532493.555	485.475	2.64	-0.025	0.072	0.076	0.001	109.1	0.8	0.029	0.000	0.43	-0.036	0.000	0.036	-0.013	180.0	-19.9	84.288	-30.437
15/12/2001	5869342.958	532493.562	485.490	3.25	-0.038	0.079	0.088	0.016	115.7	10.3	0.027	0.005	0.61	-0.013	0.007	0.015	0.015	151.7	45.5	24.075	24.459
12/11/2003	5869342.951	532493.603	485.500	5.16	-0.045	0.120	0.128	0.026	110.7	11.5	0.025	0.005	1.91	-0.007	0.041	0.041	0.010	100.2	13.7	21.700	5.293
11/01/2005	5869342.944	532493.612	485.502	6.32	-0.052	0.129	0.139	0.028	112.1	11.5	0.022	0.004	1.17	-0.007	0.009	0.011	0.002	127.8	10.5	9.710	1.801
10/03/2006	5869342.914	532493.648	485.507	7.48	-0.082	0.165	0.184	0.033	116.4	10.2	0.025	0.004	1.16	-0.030	0.036	0.047	0.005	129.3	5.8	40.499	4.145
10/11/2006	5869342.914	532493.655	485.515	8.15	-0.082	0.172	0.191	0.041	115.5	12.1	0.023	0.005	0.67	0.000	0.007	0.007	0.008	90.0	48.8	10.436	11.927
05/04/2007	5869342.918	532493.661	485.504	8.55	-0.078	0.178	0.194	0.030	113.7	8.8	0.023	0.004	0.40	0.004	0.006	0.007	-0.011	56.3	-56.8	18.040	-27.519
16/08/2007	5869342.901	532493.666	485.513	8.92	-0.095	0.183	0.206	0.039	117.4	10.7	0.023	0.004	0.36	-0.017	0.005	0.018	0.009	163.6	26.9	48.664	24.716
13/12/2007	5869342.907	532493.664	485.507	9.24	-0.089	0.181	0.202	0.033	116.2	9.3	0.022	0.004	0.33	0.006	-0.002	0.006	-0.006	341.6	-43.5	-19.412	-18.416
18/03/2008	5869342.910	532493.663	485.519	9.51	-0.086	0.180	0.199	0.045	115.5	12.7	0.021	0.005	0.26	0.003	-0.001	0.003	0.012	341.6	75.2	-12.031	45.656
03/06/2008	5869342.895	532493.686	485.510	9.72	-0.101	0.203	0.227	0.036	116.5	9.0	0.023	0.004	0.21	-0.015	0.023	0.027	-0.009	123.1	-18.1	130.252	-42.692
29/08/2008	5869342.895	532493.688	485.546	9.95	-0.101	0.205	0.229	0.072	116.2	17.5	0.023	0.007	0.24	0.000	0.002	0.002	0.036	90.0	86.8	8.397	151.138
19/11/2008	5869342.900	532493.688	485.501	10.18	-0.096	0.205	0.226	0.027	115.1	6.8	0.022	0.003	0.22	0.005	0.000	0.005	-0.045	0.0	-83.7	-22.271	-200.442
26/03/2009	5869342.889	532493.693	485.511	10.53	-0.107	0.210	0.236	0.037	117.0	8.9	0.022	0.004	0.35	-0.011	0.005	0.012	0.010	155.6	39.6	34.751	28.760
10/06/2009	5869342.879	532493.714	485.523	10.74	-0.117	0.231	0.259	0.049	116.9	10.7	0.024	0.005	0.21	-0.010	0.021	0.023	0.012	115.5	27.3	111.783	57.671
17/09/2009	5869342.888	532493.721	485.536	11.01	-0.108	0.238	0.261	0.062	114.4	13.3	0.024	0.006	0.27	0.009	0.007	0.011	0.013	37.9	48.7	42.066	47.962
23/11/2009	5869342.887	532493.714	485.515	11.19	-0.109	0.231	0.255	0.041	115.3	9.1	0.023	0.004	0.18	-0.001	-0.007	0.007	-0.021	261.9	-71.4	-38.548	-114.481
27/03/2010	5869342.887	532493.716	485.522	11.53	-0.109	0.233	0.257	0.048	115.1	10.6	0.022	0.004	0.34	0.000	0.002	0.002	0.007	90.0	74.1	5.891	20.619
04/07/2010	5869342.871	532493.717	485.531	11.80	-0.125	0.234	0.265	0.057	118.1	12.1	0.022	0.005	0.27	-0.016	0.001	0.016	0.009	176.4	29.3	59.145	33.205
13/09/2010	5869342.880	532493.716	485.538	11.99	-0.116	0.233	0.260	0.064	116.5	13.8	0.022	0.005	0.19	0.009	-0.001	0.009	0.007	353.7	37.7	-46.584	36.011
22/11/2010	5869342.881	532493.725	485.521	12.19	-0.115	0.242	0.268	0.047	115.4	9.9	0.022	0.004	0.19	0.001	0.009	0.009	-0.017	83.7	-62.0	47.250	-88.704
04/04/2011	5869342.872	532493.716	485.522	12.55	-0.124	0.233	0.264	0.048	118.0	10.3	0.021	0.004	0.36	-0.009	-0.009	0.013	0.001	225.0	4.5	-34.954	2.746
18/06/2011	5869342.871	532493.723	485.532	12.76	-0.125	0.240	0.271	0.058	117.5	12.1	0.021	0.005	0.21	-0.001	0.007	0.007	0.010	98.1	54.7	34.436	48.700
03/10/2011	5869342.874	532493.726	485.528	13.05	-0.122	0.243	0.272	0.054	116.7	11.2	0.021	0.004	0.29	0.003	0.003	0.004	-0.004	45.0	-43.3	14.482	-13.654
28/11/2011	5869342.878	532493.719	485.523	13.20	-0.118	0.236	0.264	0.049	116.6	10.5	0.020	0.004	0.15	0.004	-0.007	0.008	-0.005	299.7	-31.8	-52.585	-32.612
09/04/2012	5869342.863	532493.724	485.526	13.57	-0.133	0.241	0.275	0.052	118.9	10.7	0.020	0.004	0.36	-0.015	0.005	0.016	0.003	161.6	10.7	43.422	8.239
12/07/2012	5869342.861	532493.735	485.541	13.82	-0.135	0.252	0.286	0.067	118.2	13.2	0.021	0.005	0.26	-0.002	0.011	0.011	0.015	100.3	53.3	43.443	58.285
29/09/2012	5869342.870	532493.741	485.544	14.04	-0.126	0.258	0.287	0.070	116.0	13.7	0.020	0.005	0.22	0.009	0.006	0.011	0.003	33.7	15.5	50.010	13.870

CITY OF Quesnel

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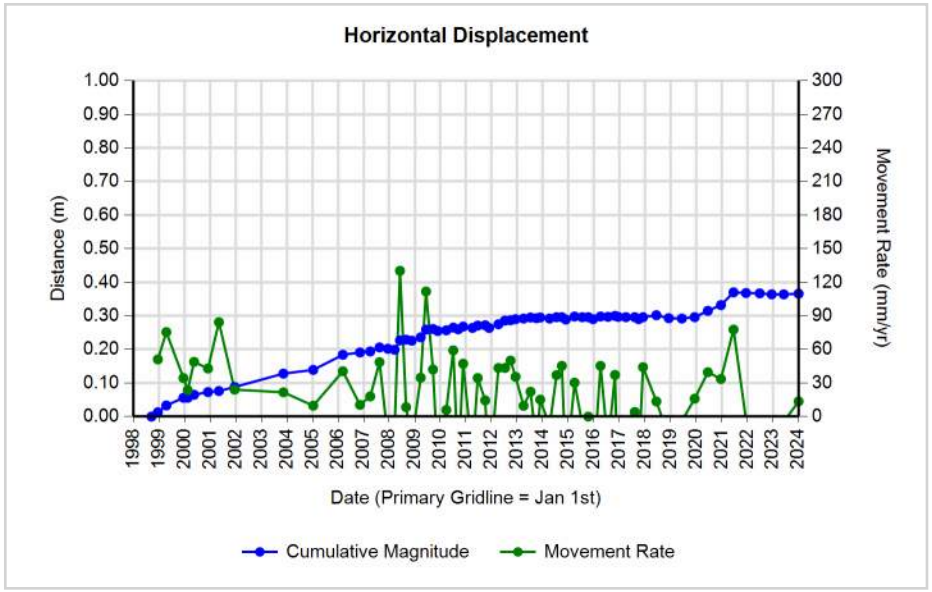
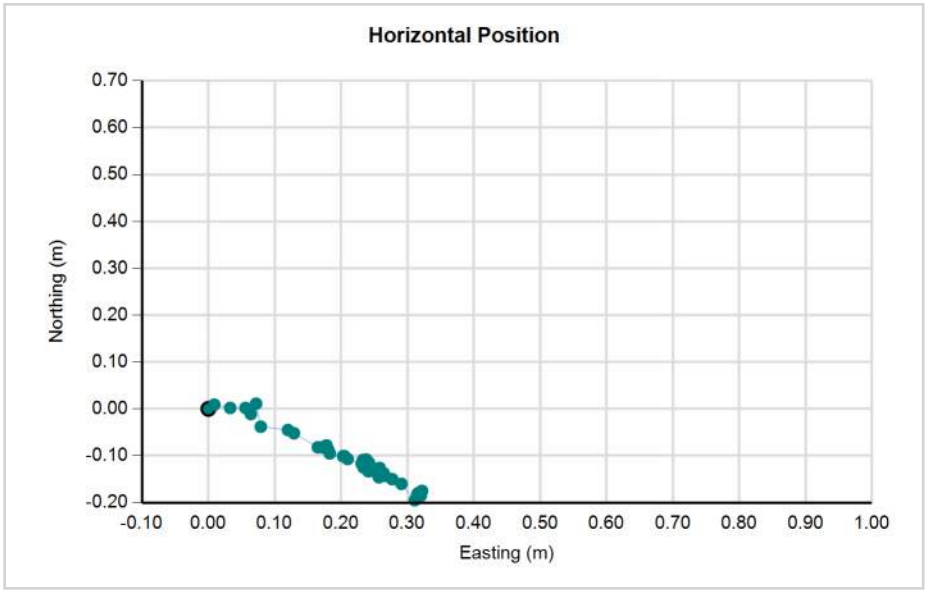
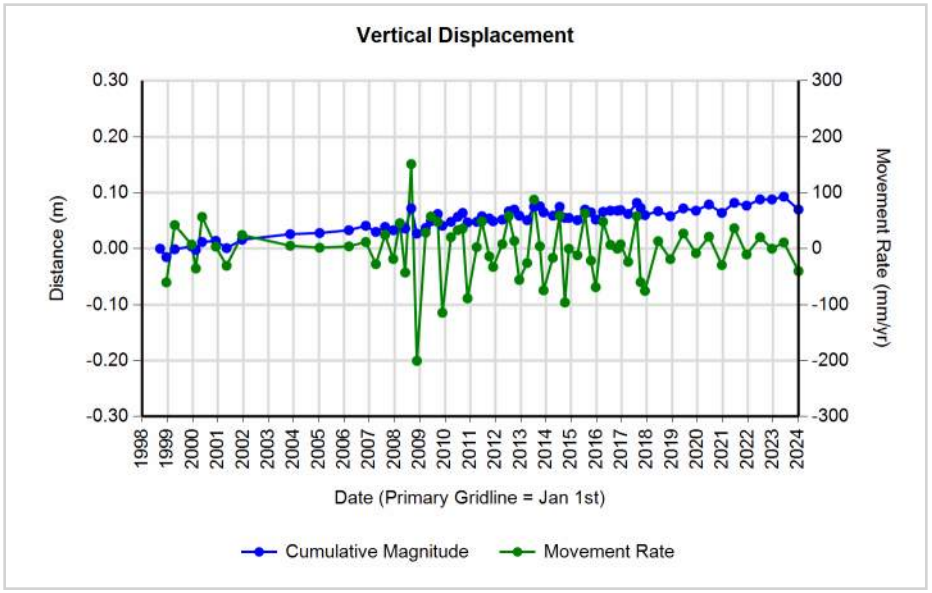
GPS Hub 98-21 (Lane North of Avery Avenue)

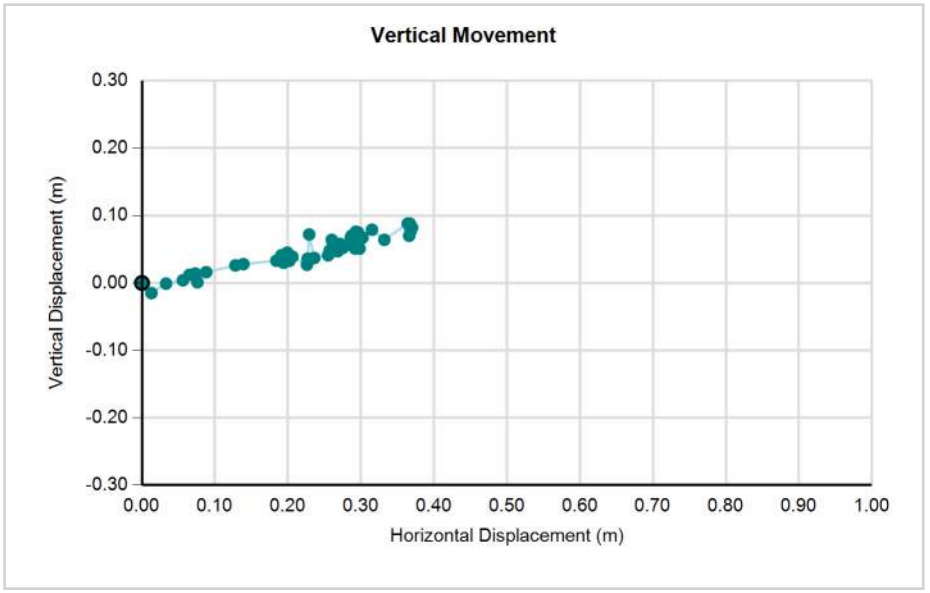
10/12/2012	5869342.863	532493.741	485.533	14.24	-0.133	0.258	0.290	0.059	117.3	11.5	0.020	0.004	0.20	-0.007	0.000	0.007	-0.011	180.0	-57.5	35.510	-55.802
03/04/2013	5869342.860	532493.741	485.525	14.55	-0.136	0.258	0.292	0.051	117.8	9.9	0.020	0.004	0.31	-0.003	0.000	0.003	-0.008	180.0	-69.4	9.612	-25.632
12/07/2013	5869342.854	532493.742	485.549	14.82	-0.142	0.259	0.295	0.075	118.7	14.2	0.020	0.005	0.27	-0.006	0.001	0.006	0.024	170.5	75.8	22.217	87.660
04/10/2013	5869342.860	532493.742	485.550	15.05	-0.136	0.259	0.293	0.076	117.7	14.6	0.019	0.005	0.23	0.006	0.000	0.006	0.001	0.0	9.5	-26.089	4.348
27/11/2013	5869342.859	532493.744	485.539	15.20	-0.137	0.261	0.295	0.065	117.7	12.4	0.019	0.004	0.15	-0.001	0.002	0.002	-0.011	116.6	-78.5	15.125	-74.403
10/04/2014	5869342.860	532493.741	485.533	15.57	-0.136	0.258	0.292	0.059	117.8	11.4	0.019	0.004	0.37	0.001	-0.003	0.003	-0.006	288.4	-62.2	-8.620	-16.354
18/07/2014	5869342.850	532493.740	485.549	15.84	-0.146	0.257	0.296	0.075	119.6	14.2	0.019	0.005	0.27	-0.010	-0.001	0.010	0.016	185.7	57.9	37.078	59.030
02/10/2014	5869342.858	532493.745	485.529	16.05	-0.138	0.262	0.296	0.055	117.8	10.5	0.018	0.003	0.21	0.008	0.005	0.009	-0.020	32.0	-64.7	45.339	-96.118
28/11/2014	5869342.864	532493.740	485.529	16.20	-0.132	0.257	0.289	0.055	117.2	10.8	0.018	0.003	0.16	0.006	-0.005	0.008	0.000	320.2	0.0	-50.047	0.000
01/04/2015	5869342.855	532493.745	485.525	16.54	-0.141	0.262	0.298	0.051	118.3	9.7	0.018	0.003	0.34	-0.009	0.005	0.010	-0.004	150.9	-21.2	30.326	-11.782
20/07/2015	5869342.855	532493.743	485.544	16.84	-0.141	0.260	0.296	0.070	118.5	13.3	0.018	0.004	0.30	0.000	-0.002	0.002	0.019	270.0	84.0	-6.641	63.089
14/10/2015	5869342.855	532493.743	485.539	17.08	-0.141	0.260	0.296	0.065	118.5	12.4	0.017	0.004	0.24	0.000	0.000	0.000	-0.005	0.0	0.0	0.000	-21.235
22/12/2015	5869342.865	532493.742	485.526	17.27	-0.131	0.259	0.290	0.052	116.8	10.2	0.017	0.003	0.19	0.010	-0.001	0.010	-0.013	354.3	-52.3	-53.199	-68.815
06/04/2016	5869342.852	532493.744	485.540	17.56	-0.144	0.261	0.298	0.066	118.9	12.5	0.017	0.004	0.29	-0.013	0.002	0.013	0.014	171.3	46.8	45.322	48.241
22/07/2016	5869342.859	532493.747	485.542	17.85	-0.137	0.264	0.297	0.068	117.4	12.9	0.017	0.004	0.29	0.007	0.003	0.008	0.002	23.2	14.7	-25.997	6.827
30/10/2016	5869342.849	532493.745	485.542	18.12	-0.147	0.262	0.300	0.068	119.3	12.8	0.017	0.004	0.27	-0.010	-0.002	0.010	0.000	191.3	0.0	37.248	0.000
16/12/2016	5869342.860	532493.747	485.543	18.25	-0.136	0.264	0.297	0.069	117.3	13.1	0.016	0.004	0.13	0.011	0.002	0.011	0.001	10.3	5.1	-86.886	7.771
04/04/2017	5869342.855	532493.743	485.536	18.55	-0.141	0.260	0.296	0.062	118.5	11.8	0.016	0.003	0.30	-0.005	-0.004	0.006	-0.007	218.7	-47.5	-21.456	-23.456
08/08/2017	5869342.856	532493.744	485.556	18.90	-0.140	0.261	0.296	0.082	118.2	15.5	0.016	0.004	0.34	0.001	0.001	0.001	0.020	45.0	86.0	4.100	57.976
02/10/2017	5869342.859	532493.739	485.547	19.05	-0.137	0.256	0.290	0.073	118.2	14.1	0.015	0.004	0.15	0.003	-0.005	0.006	-0.009	301.0	-57.1	-38.723	-59.768
04/12/2017	5869342.852	532493.742	485.534	19.22	-0.144	0.259	0.296	0.060	119.1	11.4	0.015	0.003	0.17	-0.007	0.003	0.008	-0.013	156.8	-59.6	44.153	-75.369
13/06/2018	5869342.853	532493.749	485.541	19.74	-0.143	0.266	0.302	0.067	118.3	12.5	0.015	0.003	0.52	0.001	0.007	0.007	0.007	81.9	44.7	13.522	13.386
06/12/2018	5869342.858	532493.742	485.532	20.22	-0.138	0.259	0.293	0.058	118.0	11.2	0.015	0.003	0.48	0.005	-0.007	0.009	-0.009	305.5	-46.3	-17.852	-18.678
12/06/2019	5869342.858	532493.740	485.546	20.74	-0.138	0.257	0.292	0.072	118.2	13.9	0.014	0.003	0.51	0.000	-0.002	0.002	0.014	270.0	81.9	-3.886	27.199
12/12/2019	5869342.850	532493.740	485.542	21.24	-0.146	0.257	0.296	0.068	119.6	13.0	0.014	0.003	0.50	-0.008	0.000	0.008	-0.004	180.0	-26.6	15.967	-7.984
17/06/2020	5869342.846	532493.760	485.553	21.75	-0.150	0.277	0.315	0.079	118.4	14.1	0.014	0.004	0.51	-0.004	0.020	0.020	0.011	101.3	28.3	39.626	21.371
21/12/2020	5869342.836	532493.774	485.538	22.27	-0.160	0.291	0.332	0.064	118.8	10.9	0.015	0.003	0.51	-0.010	0.014	0.017	-0.015	125.5	-41.1	33.604	-29.298
19/06/2021	5869342.811	532493.803	485.556	22.76	-0.185	0.320	0.370	0.082	120.0	12.5	0.016	0.004	0.49	-0.025	0.029	0.038	0.018	130.8	25.2	77.694	36.525
14/12/2021	5869342.812	532493.802	485.551	23.25	-0.184	0.319	0.368	0.077	120.0	11.8	0.016	0.003	0.49	0.001	-0.001	0.001	-0.005	315.0	-74.2	-2.902	-10.260
28/06/2022	5869342.801	532493.794	485.562	23.78	-0.195	0.311	0.367	0.088	122.1	13.5	0.015	0.004	0.54	-0.011	-0.008	0.014	0.011	216.0	39.0	-25.347	20.499
16/12/2022	5869342.814	532493.798	485.562	24.25	-0.182	0.315	0.364	0.088	120.0	13.6	0.015	0.004	0.47	0.013	0.004	0.014	0.000	17.1	0.0	-29.052	0.000
06/06/2023	5869342.816	532493.799	485.567	24.72	-0.180	0.316	0.364	0.093	119.7	14.4	0.015	0.004	0.47	0.002	0.001	0.002	0.005	24.2	67.3	-4.657	11.127
04/01/2024	5869342.821	532493.805	485.544	25.30	-0.175	0.322	0.366	0.070	118.5	10.8	0.014	0.003	0.58	0.005	0.006	0.008	-0.023	50.7	-71.3	13.589	-40.040

GPS Hub 98-21 (Lane North of Avery Avenue)









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GPS Hub 98-22 (East Side of Beath Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869628.968	532631.086	478.920	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5869628.968	532631.095	478.920	0.25	0.000	0.009	0.009	0.000	90.0	0.0	0.036	0.000	0.25	0.000	0.009	0.009	0.000	90.0	0.0	36.124	0.000
15/04/1999	5869628.972	532631.109	478.920	0.58	0.004	0.023	0.023	0.000	80.1	0.0	0.040	0.000	0.33	0.004	0.014	0.015	0.000	74.1	0.0	43.951	0.000
15/12/1999	5869628.969	532631.117	478.922	1.25	0.001	0.031	0.031	0.002	88.2	3.7	0.025	0.002	0.67	-0.003	0.008	0.009	0.002	110.6	13.2	12.790	2.994
15/02/2000	5869628.979	532631.117	478.918	1.42	0.011	0.031	0.033	-0.002	70.5	-3.5	0.023	-0.001	0.17	0.010	0.000	0.010	-0.004	0.0	-21.8	58.911	-23.565
15/05/2000	5869628.964	532631.113	478.913	1.66	-0.004	0.027	0.027	-0.007	98.4	-14.4	0.016	-0.004	0.25	-0.015	-0.004	0.016	-0.005	194.9	-17.9	-63.002	-20.292
30/11/2000	5869628.980	532631.118	478.908	2.21	0.012	0.032	0.034	-0.012	69.4	-19.3	0.015	-0.005	0.54	0.016	0.005	0.017	-0.005	17.4	-16.6	30.767	-9.177
05/05/2001	5869628.962	532631.106	478.908	2.64	-0.006	0.020	0.021	-0.012	106.7	-29.9	0.008	-0.005	0.43	-0.018	-0.012	0.022	0.000	213.7	0.0	-50.651	0.000
15/12/2001	5869628.967	532631.124	478.927	3.25	-0.001	0.038	0.038	0.007	91.5	10.4	0.012	0.002	0.61	0.005	0.018	0.019	0.019	74.5	45.5	30.462	30.981
15/05/2002	5869628.946	532631.150	478.912	3.66	-0.022	0.064	0.068	-0.008	109.0	-6.7	0.018	-0.002	0.41	-0.021	0.026	0.033	-0.015	128.9	-24.2	80.843	-36.283
24/10/2002	5869628.966	532631.114	478.894	4.11	-0.002	0.028	0.028	-0.026	94.1	-42.8	0.007	-0.006	0.44	0.020	-0.036	0.041	-0.018	299.1	-23.6	-92.851	-40.583
12/11/2003	5869628.958	532631.116	478.922	5.16	-0.010	0.030	0.032	0.002	107.7	2.8	0.006	0.000	1.05	-0.008	0.002	0.008	0.028	162.9	73.8	7.621	26.195
11/01/2005	5869628.965	532631.123	478.934	6.32	-0.003	0.037	0.037	0.014	95.1	20.9	0.006	0.002	1.17	0.006	0.006	0.009	0.013	45.4	54.2	7.767	10.769
10/03/2006	5869628.963	532631.126	478.926	7.48	-0.005	0.040	0.040	0.006	97.1	8.5	0.005	0.001	1.16	-0.002	0.003	0.004	-0.008	118.0	-65.9	3.129	-6.994
10/11/2006	5869628.961	532631.126	478.922	8.15	-0.007	0.040	0.041	0.002	99.9	2.8	0.005	0.000	0.67	-0.002	0.000	0.002	-0.004	180.0	-63.4	2.982	-5.963
05/04/2007	5869628.968	532631.128	478.926	8.55	0.000	0.042	0.042	0.006	90.0	8.1	0.005	0.001	0.40	0.007	0.002	0.007	0.004	15.9	28.8	18.213	10.007
16/08/2007	5869628.962	532631.129	478.924	8.92	-0.006	0.043	0.043	0.004	97.9	5.3	0.005	0.000	0.36	-0.006	0.001	0.006	-0.002	170.5	-18.2	16.705	-5.492
13/12/2007	5869628.966	532631.124	478.921	9.24	-0.002	0.038	0.038	0.001	93.0	1.5	0.004	0.000	0.33	0.004	-0.005	0.006	-0.003	308.7	-25.1	-19.653	-9.208
18/03/2008	5869628.967	532631.127	478.925	9.51	-0.001	0.041	0.041	0.005	91.4	7.0	0.004	0.001	0.26	0.001	0.003	0.003	0.004	71.6	51.7	12.031	15.219
03/06/2008	5869628.963	532631.129	478.926	9.72	-0.005	0.043	0.043	0.006	96.6	7.9	0.004	0.001	0.21	-0.004	0.002	0.004	0.001	153.4	12.6	21.214	4.744
29/08/2008	5869628.958	532631.129	478.927	9.95	-0.010	0.043	0.044	0.007	103.1	9.0	0.004	0.001	0.24	-0.005	0.000	0.005	0.001	180.0	11.3	20.991	4.198
19/11/2008	5869628.965	532631.130	478.922	10.18	-0.003	0.044	0.044	0.002	93.9	2.6	0.004	0.000	0.22	0.007	0.001	0.007	-0.005	8.1	-35.3	31.496	-22.271
26/03/2009	5869628.964	532631.133	478.924	10.53	-0.004	0.047	0.047	0.004	94.9	4.8	0.004	0.000	0.35	-0.001	0.003	0.003	0.002	108.4	32.3	9.095	5.752
10/06/2009	5869628.947	532631.140	478.940	10.74	-0.021	0.054	0.058	0.020	111.3	19.0	0.005	0.002	0.21	-0.017	0.007	0.018	0.016	157.6	41.0	88.356	76.895
17/09/2009	5869628.963	532631.139	478.930	11.01	-0.005	0.053	0.053	0.010	95.4	10.6	0.005	0.001	0.27	0.016	-0.001	0.016	-0.010	356.4	-32.0	-59.145	-36.894
23/11/2009	5869628.970	532631.140	478.923	11.19	0.002	0.054	0.054	0.003	87.9	3.2	0.005	0.000	0.18	0.007	0.001	0.007	-0.007	8.1	-44.7	38.548	-38.160
27/03/2010	5869628.973	532631.135	478.921	11.53	0.005	0.049	0.049	0.001	84.2	1.2	0.004	0.000	0.34	0.003	-0.005	0.006	-0.002	301.0	-18.9	-17.175	-5.891
04/07/2010	5869628.959	532631.134	478.923	11.80	-0.009	0.048	0.049	0.003	100.6	3.5	0.004	0.000	0.27	-0.014	-0.001	0.014	0.002	184.1	8.1	-51.783	7.379
13/09/2010	5869628.966	532631.137	478.925	11.99	-0.002	0.051	0.051	0.005	92.2	5.6	0.004	0.000	0.19	0.007	0.003	0.008	0.002	23.2	14.7	39.178	10.289
22/11/2010	5869628.968	532631.134	478.927	12.19	0.000	0.048	0.048	0.007	90.0	8.3	0.004	0.001	0.19	0.002	-0.003	0.004	0.002	303.7	29.0	-18.813	10.436
04/04/2011	5869628.970	532631.135	478.924	12.55	0.002	0.049	0.049	0.004	87.7	4.7	0.004	0.000	0.36	0.002	0.001	0.002	-0.003	26.6	-53.3	6.141	-8.239
18/06/2011	5869628.966	532631.145	478.943	12.76	-0.002	0.059	0.059	0.023	91.9	21.3	0.005	0.002	0.21	-0.004	0.010	0.011	0.019	111.8	60.5	52.452	92.530
03/10/2011	5869628.960	532631.137	478.928	13.05	-0.008	0.051	0.052	0.008	98.9	8.8	0.004	0.001	0.29	-0.006	-0.008	0.010	-0.015	233.1	-56.3	-34.136	-51.203
28/11/2011	5869628.972	532631.138	478.930	13.20	0.004	0.052	0.052	0.010	85.6	10.9	0.004	0.001	0.15	0.012	0.001	0.012	0.002	4.8	9.4	78.539	13.045
09/04/2012	5869628.966	532631.139	478.927	13.57	-0.002	0.053	0.053	0.007	92.2	7.5	0.004	0.001	0.36	-0.006	0.001	0.006	-0.003	170.5	-26.3	16.705	-8.239

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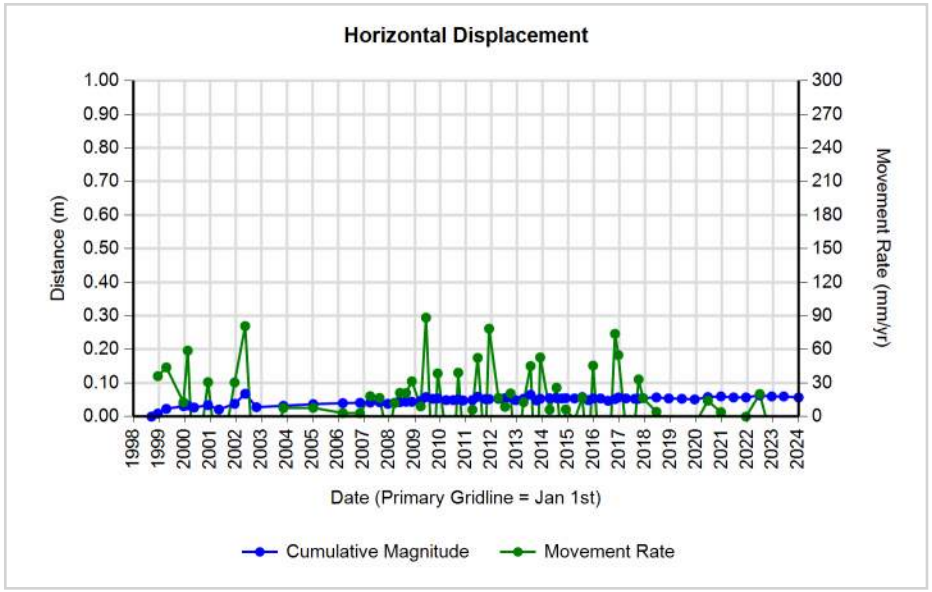
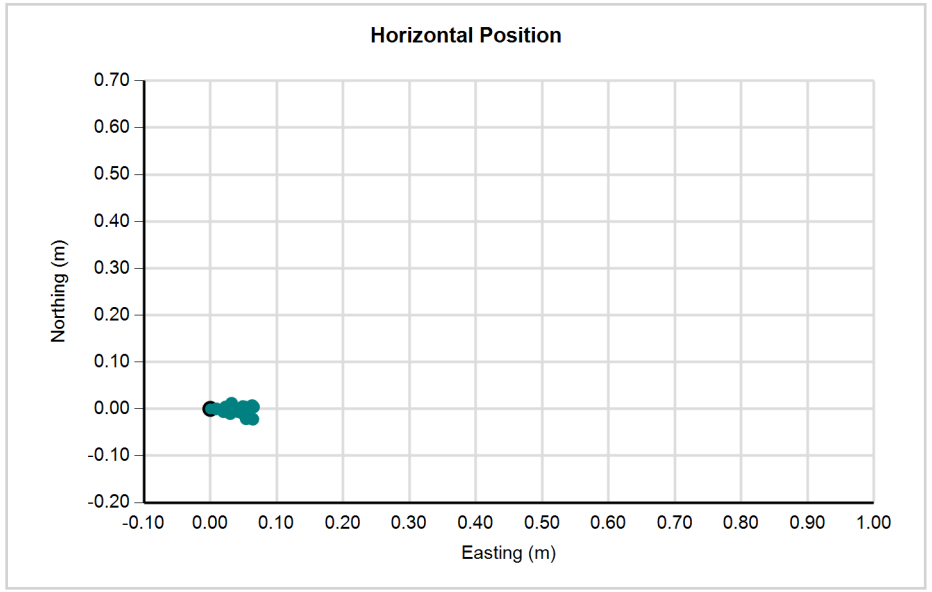
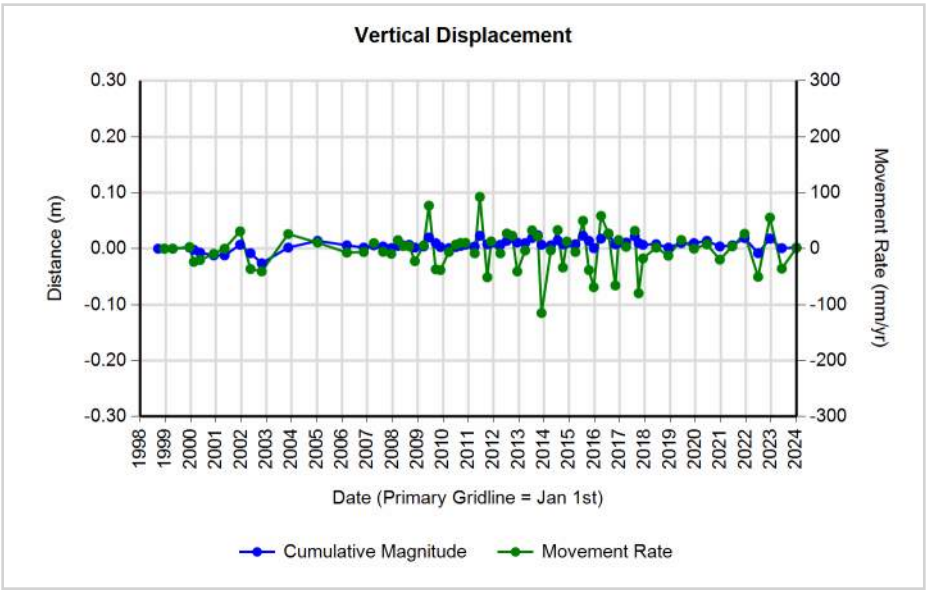
GPS Hub 98-22 (East Side of Beath Street)

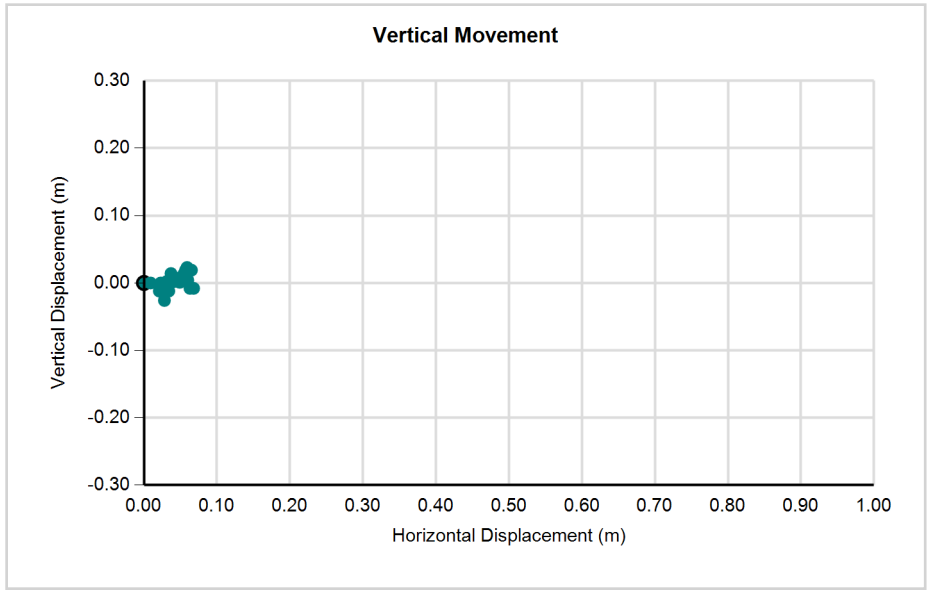
12/07/2012	5869628.967	532631.141	478.934	13.82	-0.001	0.055	0.055	0.014	91.0	14.3	0.004	0.001	0.26	0.001	0.002	0.002	0.007	63.4	72.3	8.689	27.199
29/09/2012	5869628.971	532631.143	478.939	14.04	0.003	0.057	0.057	0.019	87.0	18.4	0.004	0.001	0.22	0.004	0.002	0.004	0.005	26.6	48.2	20.677	23.117
10/12/2012	5869628.969	532631.135	478.931	14.24	0.001	0.049	0.049	0.011	88.8	12.7	0.003	0.001	0.20	-0.002	-0.008	0.008	-0.008	256.0	-44.1	-41.832	-40.583
03/04/2013	5869628.969	532631.139	478.930	14.55	0.001	0.053	0.053	0.010	88.9	10.7	0.004	0.001	0.31	0.000	0.004	0.004	-0.001	90.0	-14.0	12.816	-3.204
12/07/2013	5869628.972	532631.151	478.939	14.82	0.004	0.065	0.065	0.019	86.5	16.3	0.004	0.001	0.27	0.003	0.012	0.012	0.009	76.0	36.0	45.179	32.872
04/10/2013	5869628.966	532631.134	478.944	15.05	-0.002	0.048	0.048	0.024	92.4	26.5	0.003	0.002	0.23	-0.006	-0.017	0.018	0.005	250.6	15.5	-78.389	21.741
27/11/2013	5869628.972	532631.139	478.927	15.20	0.004	0.053	0.053	0.007	85.7	7.5	0.003	0.000	0.15	0.006	0.005	0.008	-0.017	39.8	-65.3	52.828	-114.986
10/04/2014	5869628.971	532631.141	478.926	15.57	0.003	0.055	0.055	0.006	86.9	6.2	0.004	0.000	0.37	-0.001	0.002	0.002	-0.001	116.6	-24.1	6.095	-2.726
18/07/2014	5869628.964	532631.141	478.935	15.84	-0.004	0.055	0.055	0.015	94.2	15.2	0.003	0.001	0.27	-0.007	0.000	0.007	0.009	180.0	52.1	25.826	33.205
02/10/2014	5869628.969	532631.140	478.928	16.05	0.001	0.054	0.054	0.008	88.9	8.4	0.003	0.000	0.21	0.005	-0.001	0.005	-0.007	348.7	-53.9	-24.505	-33.641
28/11/2014	5869628.969	532631.141	478.930	16.20	0.001	0.055	0.055	0.010	89.0	10.3	0.003	0.001	0.16	0.000	0.001	0.001	0.002	90.0	63.4	6.408	12.816
01/04/2015	5869628.969	532631.140	478.928	16.54	0.001	0.054	0.054	0.008	88.9	8.4	0.003	0.000	0.34	0.000	-0.001	0.001	-0.002	270.0	-63.4	-2.946	-5.891
20/07/2015	5869628.966	532631.144	478.943	16.84	-0.002	0.058	0.058	0.023	92.0	21.6	0.003	0.001	0.30	-0.003	0.004	0.005	0.015	126.9	71.6	16.602	49.807
14/10/2015	5869628.967	532631.135	478.934	17.08	-0.001	0.049	0.049	0.014	91.2	15.9	0.003	0.001	0.24	0.001	-0.009	0.009	-0.009	276.3	-44.8	-38.459	-38.224
22/12/2015	5869628.974	532631.140	478.921	17.27	0.006	0.054	0.054	0.001	83.7	1.1	0.003	0.000	0.19	0.007	0.005	0.009	-0.013	35.5	-56.5	45.536	-68.815
06/04/2016	5869628.960	532631.139	478.938	17.56	-0.008	0.053	0.054	0.018	98.6	18.6	0.003	0.001	0.29	-0.014	-0.001	0.014	0.017	184.1	50.5	-48.363	58.578
22/07/2016	5869628.946	532631.127	478.946	17.85	-0.022	0.041	0.047	0.026	118.2	29.2	0.003	0.001	0.29	-0.014	-0.012	0.018	0.008	220.6	23.5	-62.943	27.308
30/10/2016	5869628.963	532631.138	478.928	18.12	-0.005	0.052	0.052	0.008	95.5	8.7	0.003	0.000	0.27	0.017	0.011	0.020	-0.018	32.9	-41.6	73.957	-65.745
16/12/2016	5869628.968	532631.143	478.930	18.25	0.000	0.057	0.057	0.010	90.0	10.0	0.003	0.001	0.13	0.005	0.005	0.007	0.002	45.0	15.8	54.951	15.543
04/04/2017	5869628.966	532631.140	478.931	18.55	-0.002	0.054	0.054	0.011	92.1	11.5	0.003	0.001	0.30	-0.002	-0.003	0.004	0.001	236.3	15.5	-12.082	3.351
08/08/2017	5869628.964	532631.139	478.942	18.90	-0.004	0.053	0.053	0.022	94.3	22.5	0.003	0.001	0.34	-0.002	-0.001	0.002	0.011	206.6	78.5	-6.482	31.887
02/10/2017	5869628.969	532631.139	478.930	19.05	0.001	0.053	0.053	0.010	88.9	10.7	0.003	0.001	0.15	0.005	0.000	0.005	-0.012	0.0	-67.4	33.205	-79.691
04/12/2017	5869628.967	532631.141	478.927	19.22	-0.001	0.055	0.055	0.007	91.0	7.3	0.003	0.000	0.17	-0.002	0.002	0.003	-0.003	135.0	-46.7	16.398	-17.393
13/06/2018	5869628.966	532631.143	478.928	19.74	-0.002	0.057	0.057	0.008	92.0	8.0	0.003	0.000	0.52	-0.001	0.002	0.002	0.001	116.6	24.1	4.276	1.912
06/12/2018	5869628.970	532631.140	478.922	20.22	0.002	0.054	0.054	0.002	87.9	2.1	0.003	0.000	0.48	0.004	-0.003	0.005	-0.006	323.1	-50.2	-10.376	-12.452
12/06/2019	5869628.970	532631.139	478.930	20.74	0.002	0.053	0.053	0.010	87.8	10.7	0.003	0.000	0.51	0.000	-0.001	0.001	0.008	270.0	82.9	-1.943	15.543
12/12/2019	5869628.967	532631.137	478.930	21.24	-0.001	0.051	0.051	0.010	91.1	11.1	0.002	0.000	0.50	-0.003	-0.002	0.004	0.000	213.7	0.0	-7.196	0.000
17/06/2020	5869628.969	532631.144	478.934	21.75	0.001	0.058	0.058	0.014	89.0	13.6	0.003	0.001	0.51	0.002	0.007	0.007	0.004	74.1	28.8	14.144	7.771
21/12/2020	5869628.969	532631.146	478.924	22.27	0.001	0.060	0.060	0.004	89.0	3.8	0.003	0.000	0.51	0.000	0.002	0.002	-0.010	90.0	-78.7	3.906	-19.532
19/06/2021	5869628.966	532631.143	478.926	22.76	-0.002	0.057	0.057	0.006	92.0	6.0	0.003	0.000	0.49	-0.003	-0.003	0.004	0.002	225.0	25.2	-8.609	4.058
14/12/2021	5869628.966	532631.143	478.939	23.25	-0.002	0.057	0.057	0.019	92.0	18.4	0.002	0.001	0.49	0.000	0.000	0.000	0.013	0.0	0.0	0.000	26.676
28/06/2022	5869628.975	532631.149	478.912	23.78	0.007	0.063	0.063	-0.008	83.7	-7.2	0.003	0.000	0.54	0.009	0.006	0.011	-0.027	33.7	-68.2	20.157	-50.315
16/12/2022	5869628.966	532631.146	478.938	24.25	-0.002	0.060	0.060	0.018	91.9	16.7	0.002	0.001	0.47	-0.009	-0.003	0.009	0.026	198.4	70.0	-20.264	55.535
06/06/2023	5869628.969	532631.146	478.921	24.72	0.001	0.060	0.060	0.001	89.0	1.2	0.002	0.000	0.47	0.003	0.000	0.003	-0.017	358.1	-79.9	-6.374	-35.633
04/01/2024	5869628.971	532631.143	478.922	25.30	0.003	0.057	0.057	0.002	87.0	2.0	0.002	0.000	0.58	0.002	-0.003	0.004	0.001	304.6	12.5	-6.069	1.344

GPS Hub 98-22 (East Side of Beath Street)









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GPS Hub 98-23 (South Side of Doherty Drive)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/09/1998	5869134.064	532888.607	475.384	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/12/1998	5869134.061	532888.608	475.357	0.25	-0.003	0.001	0.003	-0.027	161.6	-83.3	0.013	-0.108	0.25	-0.003	0.001	0.003	-0.027	161.6	-83.3	12.693	-108.371
15/04/1999	5869134.068	532888.623	475.365	0.58	0.004	0.016	0.016	-0.019	76.0	-49.0	0.028	-0.033	0.33	0.007	0.015	0.017	0.008	65.0	25.8	49.967	24.149
15/12/1999	5869134.069	532888.628	475.374	1.25	0.005	0.021	0.022	-0.010	76.6	-24.9	0.017	-0.008	0.67	0.001	0.005	0.005	0.009	78.7	60.5	7.633	13.472
15/02/2000	5869134.068	532888.624	475.373	1.42	0.004	0.017	0.017	-0.011	76.8	-32.2	0.012	-0.008	0.17	-0.001	-0.004	0.004	-0.001	256.0	-13.6	-24.290	-5.891
15/05/2000	5869134.069	532888.617	475.376	1.66	0.005	0.010	0.011	-0.008	63.4	-35.6	0.007	-0.005	0.25	0.001	-0.007	0.007	0.003	278.1	23.0	-28.697	12.175
30/11/2000	5869134.081	532888.636	475.383	2.21	0.017	0.029	0.034	-0.001	59.6	-1.7	0.015	0.000	0.54	0.012	0.019	0.022	0.007	57.7	17.3	41.246	12.848
05/05/2001	5869134.053	532888.618	475.346	2.64	-0.011	0.011	0.016	-0.038	135.0	-67.7	0.006	-0.014	0.43	-0.028	-0.018	0.033	-0.037	212.7	-48.0	-77.936	-86.630
15/12/2001	5869134.066	532888.633	475.373	3.25	0.002	0.026	0.026	-0.011	85.6	-22.9	0.008	-0.003	0.61	0.013	0.015	0.020	0.027	49.1	53.7	32.366	44.026
15/05/2002	5869134.071	532888.631	475.342	3.66	0.007	0.024	0.025	-0.042	73.7	-59.2	0.007	-0.011	0.41	0.005	-0.002	0.005	-0.031	338.2	-80.1	-13.026	-74.985
12/11/2003	5869134.065	532888.627	475.369	5.16	0.001	0.020	0.020	-0.015	87.7	-35.7	0.004	-0.003	1.49	-0.006	-0.004	0.007	0.027	211.2	75.2	-4.836	18.349
11/01/2005	5869134.059	532888.627	475.375	6.32	-0.005	0.020	0.021	-0.009	104.0	-23.6	0.003	-0.001	1.17	-0.006	0.000	0.006	0.006	182.5	43.7	4.995	4.776
10/03/2006	5869134.058	532888.626	475.375	7.48	-0.006	0.019	0.020	-0.009	107.5	-24.3	0.003	-0.001	1.16	-0.001	-0.001	0.001	0.000	225.0	0.0	-1.221	0.000
10/11/2006	5869134.058	532888.627	475.366	8.15	-0.006	0.020	0.021	-0.018	106.7	-40.8	0.003	-0.002	0.67	0.000	0.001	0.001	-0.009	90.0	-83.7	1.491	-13.417
05/04/2007	5869134.057	532888.631	475.358	8.55	-0.007	0.024	0.025	-0.026	106.3	-46.1	0.003	-0.003	0.40	-0.001	0.004	0.004	-0.008	104.0	-62.7	10.315	-20.014
16/08/2007	5869134.051	532888.623	475.354	8.92	-0.013	0.016	0.021	-0.030	129.1	-55.5	0.002	-0.003	0.36	-0.006	-0.008	0.010	-0.004	233.1	-21.8	-27.462	-10.985
13/12/2007	5869134.062	532888.631	475.359	9.24	-0.002	0.024	0.024	-0.025	94.8	-46.1	0.003	-0.003	0.33	0.011	0.008	0.014	0.005	36.0	20.2	41.747	15.347
18/03/2008	5869134.059	532888.629	475.369	9.51	-0.005	0.022	0.023	-0.015	102.8	-33.6	0.002	-0.002	0.26	-0.003	-0.002	0.004	0.010	213.7	70.2	-13.718	38.047
03/06/2008	5869134.060	532888.628	475.364	9.72	-0.004	0.021	0.021	-0.020	100.8	-43.1	0.002	-0.002	0.21	0.001	-0.001	0.001	-0.005	315.0	-74.2	-6.708	-23.718
29/07/2008	5869134.055	532888.629	475.365	9.87	-0.009	0.022	0.024	-0.019	112.2	-38.6	0.002	-0.002	0.15	-0.005	0.001	0.005	0.001	168.7	11.1	33.257	6.522
29/08/2008	5869134.056	532888.626	475.359	9.95	-0.008	0.019	0.021	-0.025	112.8	-50.5	0.002	-0.003	0.08	0.001	-0.003	0.003	-0.006	288.4	-62.2	-37.259	-70.694
19/11/2008	5869134.060	532888.627	475.360	10.18	-0.004	0.020	0.020	-0.024	101.3	-49.6	0.002	-0.002	0.22	0.004	0.001	0.004	0.001	14.0	13.6	-18.365	4.454
26/03/2009	5869134.062	532888.634	475.362	10.53	-0.002	0.027	0.027	-0.022	94.2	-39.1	0.003	-0.002	0.35	0.002	0.007	0.007	0.002	74.1	15.4	20.937	5.752
10/06/2009	5869134.052	532888.639	475.372	10.74	-0.012	0.032	0.034	-0.012	110.6	-19.3	0.003	-0.001	0.21	-0.010	0.005	0.011	0.010	153.4	41.8	53.732	48.059
17/09/2009	5869134.057	532888.635	475.361	11.01	-0.007	0.028	0.029	-0.023	104.0	-38.6	0.003	-0.002	0.27	0.005	-0.004	0.006	-0.011	321.3	-59.8	-23.624	-40.583
23/11/2009	5869134.069	532888.636	475.365	11.19	0.005	0.029	0.029	-0.019	80.2	-32.8	0.003	-0.002	0.18	0.012	0.001	0.012	0.004	4.8	18.4	65.645	21.806
27/03/2010	5869134.068	532888.630	475.360	11.53	0.004	0.023	0.023	-0.024	80.1	-45.8	0.002	-0.002	0.34	-0.001	-0.006	0.006	-0.005	260.5	-39.4	-17.917	-14.728
04/07/2010	5869134.057	532888.631	475.363	11.80	-0.007	0.024	0.025	-0.021	106.3	-40.0	0.002	-0.002	0.27	-0.011	0.001	0.011	0.003	174.8	15.2	40.751	11.068
13/09/2010	5869134.060	532888.628	475.370	11.99	-0.004	0.021	0.021	-0.014	100.8	-33.2	0.002	-0.001	0.19	0.003	-0.003	0.004	0.007	315.0	58.8	-21.826	36.011
22/11/2010	5869134.059	532888.639	475.374	12.19	-0.005	0.032	0.032	-0.010	98.9	-17.2	0.003	-0.001	0.19	-0.001	0.011	0.011	0.004	95.2	19.9	57.633	20.871
04/04/2011	5869134.065	532888.630	475.364	12.55	0.001	0.023	0.023	-0.020	87.5	-41.0	0.002	-0.002	0.36	0.006	-0.009	0.011	-0.010	303.7	-42.8	-29.705	-27.462
18/06/2011	5869134.059	532888.632	475.368	12.76	-0.005	0.025	0.025	-0.016	101.3	-32.1	0.002	-0.001	0.21	-0.006	0.002	0.006	0.004	161.6	32.3	30.801	19.480
03/10/2011	5869134.061	532888.628	475.365	13.05	-0.003	0.021	0.021	-0.019	98.1	-41.8	0.002	-0.001	0.29	0.002	-0.004	0.004	-0.003	296.6	-33.9	-15.266	-10.241
28/11/2011	5869134.068	532888.624	475.365	13.20	0.004	0.017	0.017	-0.019	76.8	-47.4	0.001	-0.001	0.15	0.007	-0.004	0.008	0.000	330.3	0.0	-52.585	0.000
09/04/2012	5869134.057	532888.630	475.366	13.57	-0.007	0.023	0.024	-0.018	106.9	-36.8	0.002	-0.001	0.36	-0.011	0.006	0.013	0.001	151.4	4.6	34.410	2.746

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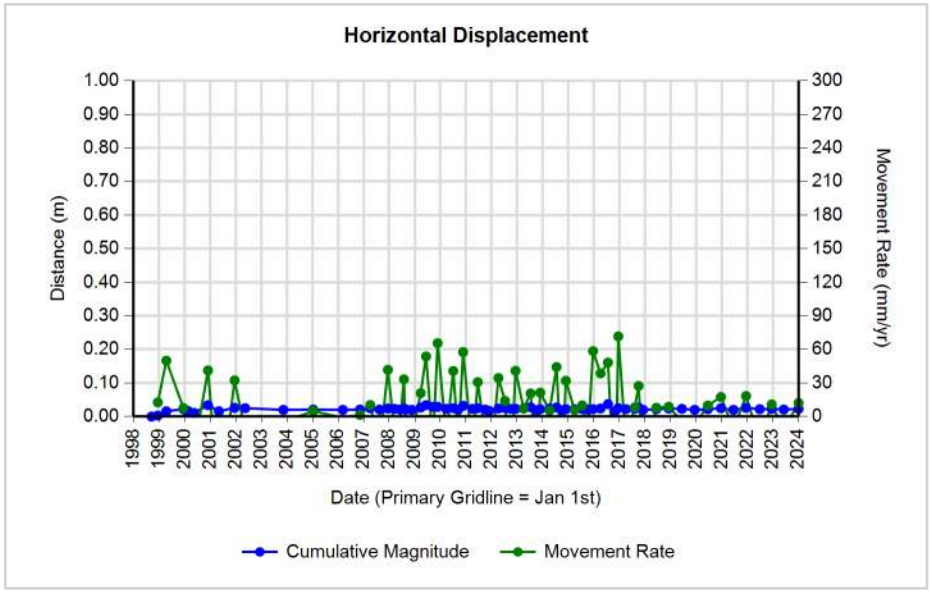
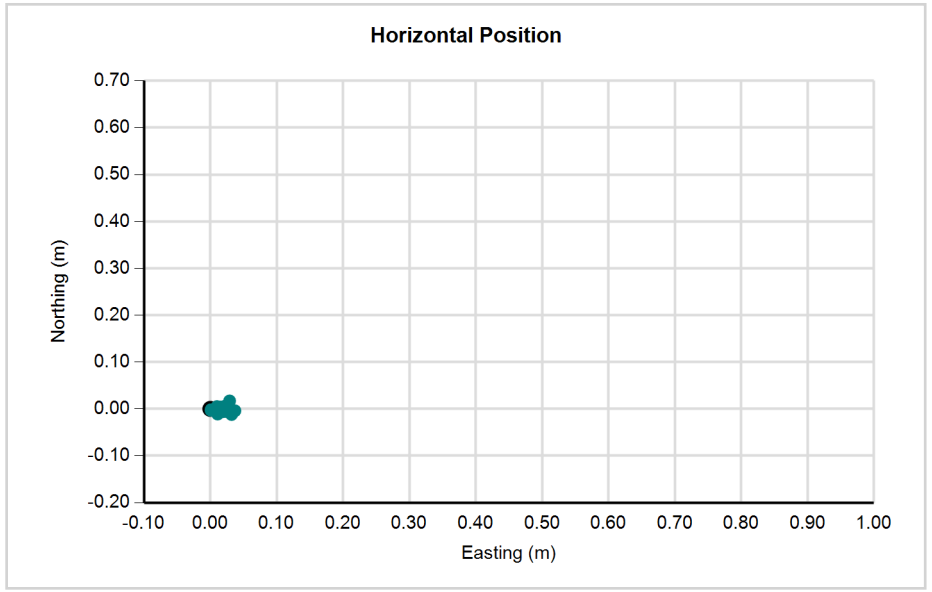
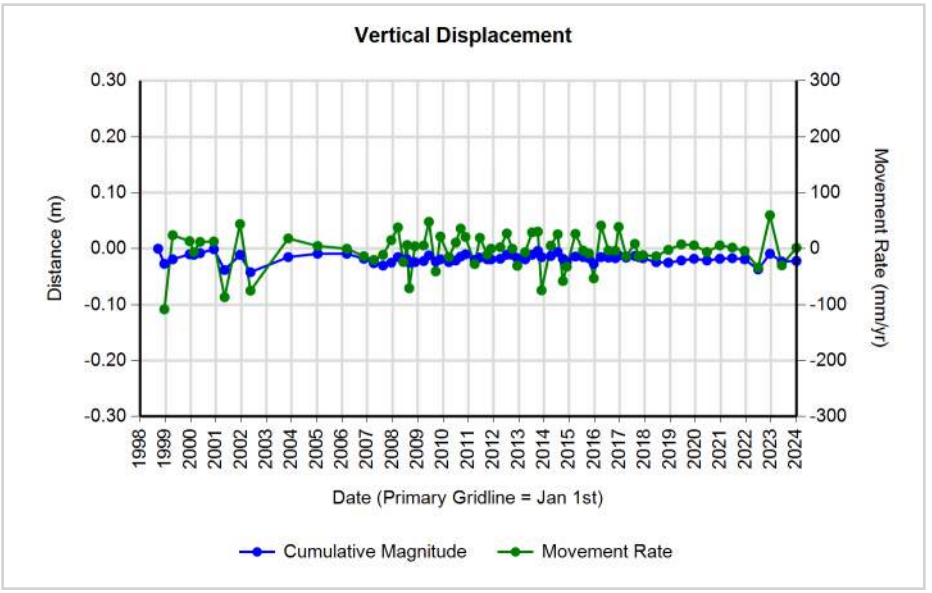
GPS Hub 98-23 (South Side of Doherty Drive)

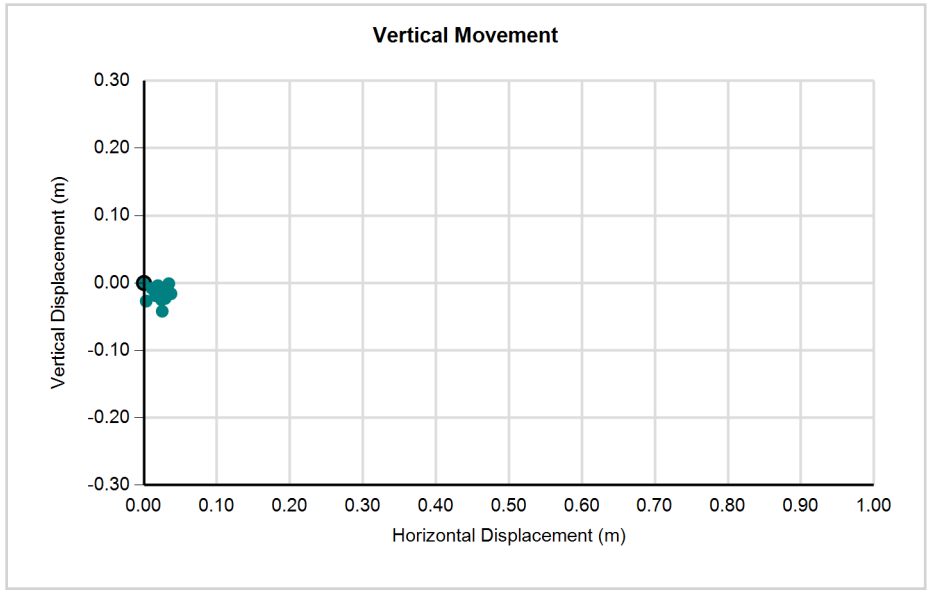
12/07/2012	5869134.060	532888.632	475.373	13.82	-0.004	0.025	0.025	-0.011	99.1	-23.5	0.002	-0.001	0.26	0.003	0.002	0.004	0.007	33.7	62.7	14.010	27.199
29/09/2012	5869134.071	532888.629	475.373	14.04	0.007	0.022	0.023	-0.011	72.3	-25.5	0.002	-0.001	0.22	0.011	-0.003	0.011	0.000	344.7	0.0	-52.715	0.000
10/12/2012	5869134.063	532888.630	475.367	14.24	-0.001	0.023	0.023	-0.017	92.5	-36.4	0.002	-0.001	0.20	-0.008	0.001	0.008	-0.006	172.9	-36.7	40.899	-30.437
03/04/2013	5869134.065	532888.631	475.365	14.55	0.001	0.024	0.024	-0.019	87.6	-38.3	0.002	-0.001	0.31	0.002	0.001	0.002	-0.002	26.6	-41.8	7.164	-6.408
12/07/2013	5869134.061	532888.635	475.373	14.82	-0.003	0.028	0.028	-0.011	96.1	-21.3	0.002	-0.001	0.27	-0.004	0.004	0.006	0.008	135.0	54.7	20.662	29.220
04/10/2013	5869134.063	532888.626	475.380	15.05	-0.001	0.019	0.019	-0.004	93.0	-11.9	0.001	0.000	0.23	0.002	-0.009	0.009	0.007	282.5	37.2	-40.089	30.438
27/11/2013	5869134.064	532888.629	475.369	15.20	0.000	0.022	0.022	-0.015	90.0	-34.3	0.001	-0.001	0.15	0.001	0.003	0.003	-0.011	71.6	-74.0	21.389	-74.403
10/04/2014	5869134.064	532888.631	475.371	15.57	0.000	0.024	0.024	-0.013	90.0	-28.4	0.002	-0.001	0.37	0.000	0.002	0.002	0.002	90.0	45.0	5.451	5.451
18/07/2014	5869134.052	532888.631	475.378	15.84	-0.012	0.024	0.027	-0.006	116.6	-12.6	0.002	0.000	0.27	-0.012	0.000	0.012	0.007	180.0	30.3	44.273	25.826
02/10/2014	5869134.061	532888.626	475.366	16.05	-0.003	0.019	0.019	-0.018	99.0	-43.1	0.001	-0.001	0.21	0.009	-0.005	0.010	-0.012	330.9	-49.4	-49.480	-57.671
28/11/2014	5869134.065	532888.629	475.361	16.20	0.001	0.022	0.022	-0.023	87.4	-46.2	0.001	-0.001	0.16	0.004	0.003	0.005	-0.005	36.9	-45.0	32.039	-32.039
01/04/2015	5869134.063	532888.629	475.370	16.54	-0.001	0.022	0.022	-0.014	92.6	-32.4	0.001	-0.001	0.34	-0.002	0.000	0.002	0.009	180.0	77.5	5.891	26.510
20/07/2015	5869134.060	532888.629	475.369	16.84	-0.004	0.022	0.022	-0.015	100.3	-33.9	0.001	-0.001	0.30	-0.003	0.000	0.003	-0.001	180.0	-18.4	9.961	-3.320
14/10/2015	5869134.058	532888.627	475.367	17.08	-0.006	0.020	0.021	-0.017	106.7	-39.2	0.001	-0.001	0.24	-0.002	-0.002	0.003	-0.002	225.0	-35.3	-12.013	-8.494
22/12/2015	5869134.069	532888.628	475.357	17.27	0.005	0.021	0.022	-0.027	76.6	-51.4	0.001	-0.002	0.19	0.011	0.001	0.011	-0.010	5.2	-42.2	58.468	-52.935
06/04/2016	5869134.058	532888.630	475.369	17.56	-0.006	0.023	0.024	-0.015	104.6	-32.3	0.001	-0.001	0.29	-0.011	0.002	0.011	0.012	169.7	47.0	38.525	41.349
22/07/2016	5869134.060	532888.644	475.368	17.85	-0.004	0.037	0.037	-0.016	96.2	-23.3	0.002	-0.001	0.29	0.002	0.014	0.014	-0.001	81.9	-4.0	48.275	-3.414
30/10/2016	5869134.066	532888.623	475.367	18.12	0.002	0.016	0.016	-0.017	82.9	-46.5	0.001	-0.001	0.27	0.006	-0.021	0.022	-0.001	285.9	-2.6	-79.772	-3.652
16/12/2016	5869134.064	532888.632	475.372	18.25	0.000	0.025	0.025	-0.012	90.0	-25.6	0.001	-0.001	0.13	-0.002	0.009	0.009	0.005	102.5	28.5	71.648	38.856
04/04/2017	5869134.058	532888.628	475.368	18.55	-0.006	0.021	0.022	-0.016	105.9	-36.2	0.001	-0.001	0.30	-0.006	-0.004	0.007	-0.004	213.7	-29.0	-24.164	-13.404
08/08/2017	5869134.060	532888.630	475.371	18.90	-0.004	0.023	0.023	-0.013	99.9	-29.1	0.001	-0.001	0.34	0.002	0.002	0.003	0.003	45.0	46.7	8.199	8.696
02/10/2017	5869134.061	532888.634	475.369	19.05	-0.003	0.027	0.027	-0.015	96.3	-28.9	0.001	-0.001	0.15	0.001	0.004	0.004	-0.002	76.0	-25.9	27.381	-13.282
04/12/2017	5869134.063	532888.627	475.367	19.22	-0.001	0.020	0.020	-0.017	92.9	-40.3	0.001	-0.001	0.17	0.002	-0.007	0.007	-0.002	285.9	-15.4	-42.207	-11.595
13/06/2018	5869134.059	532888.628	475.360	19.74	-0.005	0.021	0.022	-0.024	103.4	-48.0	0.001	-0.001	0.52	-0.004	0.001	0.004	-0.007	166.0	-59.5	7.885	-13.386
06/12/2018	5869134.062	532888.631	475.359	20.22	-0.002	0.024	0.024	-0.025	94.8	-46.1	0.001	-0.001	0.48	0.003	0.003	0.004	-0.001	45.0	-13.3	8.805	-2.075
12/06/2019	5869134.060	532888.630	475.363	20.74	-0.004	0.023	0.023	-0.021	99.9	-42.0	0.001	-0.001	0.51	-0.002	-0.001	0.002	0.004	206.6	60.8	-4.344	7.771
12/12/2019	5869134.062	532888.627	475.366	21.24	-0.002	0.020	0.020	-0.018	95.7	-41.8	0.001	-0.001	0.50	0.002	-0.003	0.004	0.003	303.7	39.8	-7.196	5.988
17/06/2020	5869134.057	532888.628	475.363	21.75	-0.007	0.021	0.022	-0.021	108.4	-43.5	0.001	-0.001	0.51	-0.005	0.001	0.005	-0.003	168.7	-30.5	9.906	-5.828
21/12/2020	5869134.065	532888.632	475.366	22.27	0.001	0.025	0.025	-0.018	87.7	-35.7	0.001	-0.001	0.51	0.008	0.004	0.009	0.003	26.6	18.5	17.470	5.860
19/06/2021	5869134.063	532888.627	475.367	22.76	-0.001	0.020	0.020	-0.017	92.9	-40.3	0.001	-0.001	0.49	-0.002	-0.005	0.005	0.001	248.2	10.5	-10.927	2.029
14/12/2021	5869134.055	532888.631	475.365	23.25	-0.009	0.024	0.026	-0.019	110.6	-36.5	0.001	-0.001	0.49	-0.008	0.004	0.009	-0.002	153.4	-12.6	18.353	-4.104
28/06/2022	5869134.066	532888.629	475.347	23.78	0.002	0.022	0.022	-0.037	84.8	-59.2	0.001	-0.002	0.54	0.011	-0.002	0.011	-0.018	349.7	-58.2	-20.835	-33.543
16/12/2022	5869134.061	532888.630	475.375	24.25	-0.003	0.023	0.023	-0.009	97.4	-21.2	0.001	0.000	0.47	-0.005	0.001	0.005	0.028	168.7	79.7	10.891	59.807
06/06/2023	5869134.066	532888.628	475.361	24.72	0.002	0.021	0.021	-0.023	84.6	-47.1	0.001	-0.001	0.47	0.005	-0.002	0.005	-0.014	341.2	-69.4	-11.215	-29.772
04/01/2024	5869134.059	532888.629	475.362	25.30	-0.005	0.022	0.023	-0.022	102.8	-44.3	0.001	-0.001	0.58	-0.007	0.001	0.007	0.001	174.3	8.2	12.120	1.757

GPS Hub 98-23 (South Side of Doherty Drive)









CITY OF Quesnel

wsp

GPS Hub 01-30 (West End of Dodds Avenue at Findlay Road)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869989.266	531217.807	575.401	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5869989.252	531217.849	575.435	0.41	-0.014	0.042	0.044	0.034	108.4	37.5	0.107	0.082	0.41	-0.014	0.042	0.044	0.034	108.4	37.5	107.088	82.242
24/10/2002	5869989.264	531217.857	575.398	0.86	-0.002	0.050	0.050	-0.003	92.3	-3.4	0.058	-0.004	0.44	0.012	0.008	0.014	-0.037	33.7	-68.7	32.517	-83.421
12/11/2003	5869989.248	531217.866	575.425	1.91	-0.018	0.059	0.061	0.024	107.4	21.2	0.032	0.012	1.05	-0.016	0.009	0.019	0.027	152.1	55.4	17.628	25.510
11/01/2005	5869989.254	531217.875	575.426	3.07	-0.012	0.068	0.069	0.025	99.6	20.0	0.023	0.008	1.17	0.007	0.010	0.012	0.001	55.4	7.1	10.238	1.269
10/03/2006	5869989.233	531217.925	575.406	4.23	-0.033	0.118	0.123	0.005	105.6	2.3	0.029	0.001	1.16	-0.021	0.050	0.054	-0.020	113.4	-20.6	46.565	-17.529
10/11/2006	5869989.230	531217.937	575.406	4.90	-0.036	0.130	0.135	0.005	105.5	2.1	0.028	0.001	0.67	-0.003	0.012	0.012	0.000	104.0	0.0	18.440	0.000
05/04/2007	5869989.230	531217.942	575.386	5.30	-0.036	0.135	0.140	-0.015	104.9	-6.1	0.026	-0.003	0.40	0.000	0.005	0.005	-0.020	90.0	-76.0	12.509	-50.034
16/08/2007	5869989.219	531217.951	575.383	5.67	-0.047	0.144	0.151	-0.018	108.1	-6.8	0.027	-0.003	0.36	-0.011	0.009	0.014	-0.003	140.7	-11.9	39.031	-8.239
13/12/2007	5869989.233	531217.956	575.380	5.99	-0.033	0.149	0.153	-0.021	102.5	-7.8	0.025	-0.004	0.33	0.014	0.005	0.015	-0.003	19.7	-11.4	45.629	-9.208
18/03/2008	5869989.226	531217.953	575.384	6.26	-0.040	0.146	0.151	-0.017	105.3	-6.4	0.024	-0.003	0.26	-0.007	-0.003	0.008	0.004	203.2	27.7	-28.976	15.219
03/06/2008	5869989.222	531217.971	575.378	6.47	-0.044	0.164	0.170	-0.023	105.0	-7.7	0.026	-0.004	0.21	-0.004	0.018	0.018	-0.006	102.5	-18.0	87.466	-28.461
29/08/2008	5869989.214	531217.983	575.380	6.70	-0.052	0.176	0.184	-0.021	106.5	-6.5	0.027	-0.003	0.24	-0.008	0.012	0.014	0.002	123.7	7.9	60.548	8.397
19/11/2008	5869989.215	531217.990	575.376	6.93	-0.051	0.183	0.190	-0.025	105.6	-7.5	0.027	-0.004	0.22	0.001	0.007	0.007	-0.004	81.9	-29.5	31.496	-17.817
26/03/2009	5869989.212	531217.996	575.374	7.28	-0.054	0.189	0.197	-0.027	105.9	-7.8	0.027	-0.004	0.35	-0.003	0.006	0.007	-0.002	116.6	-16.6	19.293	-5.752
10/06/2009	5869989.202	531218.025	575.377	7.49	-0.064	0.218	0.227	-0.024	106.4	-6.0	0.030	-0.003	0.21	-0.010	0.029	0.031	0.003	109.0	5.6	147.425	14.418
17/09/2009	5869989.203	531218.028	575.356	7.76	-0.063	0.221	0.230	-0.045	105.9	-11.1	0.030	-0.006	0.27	0.001	0.003	0.003	-0.021	71.6	-81.4	11.667	-77.477
23/11/2009	5869989.213	531218.026	575.351	7.94	-0.053	0.219	0.225	-0.050	103.6	-12.5	0.028	-0.006	0.18	0.010	-0.002	0.010	-0.005	348.7	-26.1	-55.595	-27.257
27/03/2010	5869989.210	531218.027	575.362	8.28	-0.056	0.220	0.227	-0.039	104.3	-9.7	0.027	-0.005	0.34	-0.003	0.001	0.003	0.011	161.6	74.0	9.315	32.401
04/07/2010	5869989.196	531218.031	575.353	8.55	-0.070	0.224	0.235	-0.048	107.4	-11.6	0.027	-0.006	0.27	-0.014	0.004	0.015	-0.009	164.1	-31.7	53.718	-33.205
13/09/2010	5869989.204	531218.034	575.357	8.74	-0.062	0.227	0.235	-0.044	105.3	-10.6	0.027	-0.005	0.19	0.008	0.003	0.009	0.004	20.6	25.1	43.953	20.577
22/11/2010	5869989.205	531218.037	575.355	8.94	-0.061	0.230	0.238	-0.046	104.9	-10.9	0.027	-0.005	0.19	0.001	0.003	0.003	-0.002	71.6	-32.3	16.500	-10.436
04/04/2011	5869989.203	531218.032	575.358	9.30	-0.063	0.225	0.234	-0.043	105.6	-10.4	0.025	-0.005	0.36	-0.002	-0.005	0.005	0.003	248.2	29.1	-14.789	8.239
18/06/2011	5869989.194	531218.044	575.362	9.51	-0.072	0.237	0.248	-0.039	106.9	-8.9	0.026	-0.004	0.21	-0.009	0.012	0.015	0.004	126.9	14.9	73.050	19.480
03/10/2011	5869989.202	531218.041	575.354	9.80	-0.064	0.234	0.243	-0.047	105.3	-11.0	0.025	-0.005	0.29	0.008	-0.003	0.009	-0.008	339.4	-43.1	-29.165	-27.308
28/11/2011	5869989.205	531218.041	575.354	9.95	-0.061	0.234	0.242	-0.047	104.6	-11.0	0.024	-0.005	0.15	0.003	0.000	0.003	0.000	0.0	0.0	-19.567	0.000
09/04/2012	5869989.194	531218.047	575.348	10.32	-0.072	0.240	0.251	-0.053	106.7	-11.9	0.024	-0.005	0.36	-0.011	0.006	0.013	-0.006	151.4	-25.6	34.410	-16.477
12/07/2012	5869989.192	531218.064	575.358	10.57	-0.074	0.257	0.267	-0.043	106.1	-9.1	0.025	-0.004	0.26	-0.002	0.017	0.017	0.010	96.7	30.3	66.511	38.856
29/09/2012	5869989.196	531218.071	575.347	10.79	-0.070	0.264	0.273	-0.054	104.9	-11.2	0.025	-0.005	0.22	0.004	0.007	0.008	-0.011	60.3	-53.8	37.275	-50.858
10/12/2012	5869989.194	531218.073	575.336	10.99	-0.072	0.266	0.276	-0.065	105.1	-13.3	0.025	-0.006	0.20	-0.002	0.002	0.003	-0.011	135.0	-75.6	14.348	-55.802
03/04/2013	5869989.195	531218.073	575.335	11.30	-0.071	0.266	0.275	-0.066	104.9	-13.5	0.024	-0.006	0.31	0.001	0.000	0.001	-0.001	0.0	-45.0	-3.204	-3.204
12/07/2013	5869989.191	531218.077	575.348	11.57	-0.075	0.270	0.280	-0.053	105.5	-10.7	0.024	-0.005	0.27	-0.004	0.004	0.006	0.013	135.0	66.5	20.662	47.482
04/10/2013	5869989.191	531218.077	575.348	11.80	-0.075	0.270	0.280	-0.053	105.5	-10.7	0.024	-0.004	0.23	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
27/11/2013	5869989.193	531218.076	575.336	11.95	-0.073	0.269	0.279	-0.065	105.2	-13.1	0.023	-0.005	0.15	0.002	-0.001	0.002	-0.012	333.4	-79.4	-15.125	-81.167
10/04/2014	5869989.196	531218.083	575.343	12.32	-0.070	0.276	0.285	-0.058	104.2	-11.5	0.023	-0.005	0.37	0.003	0.007	0.008	0.007	66.8	42.6	20.759	19.080

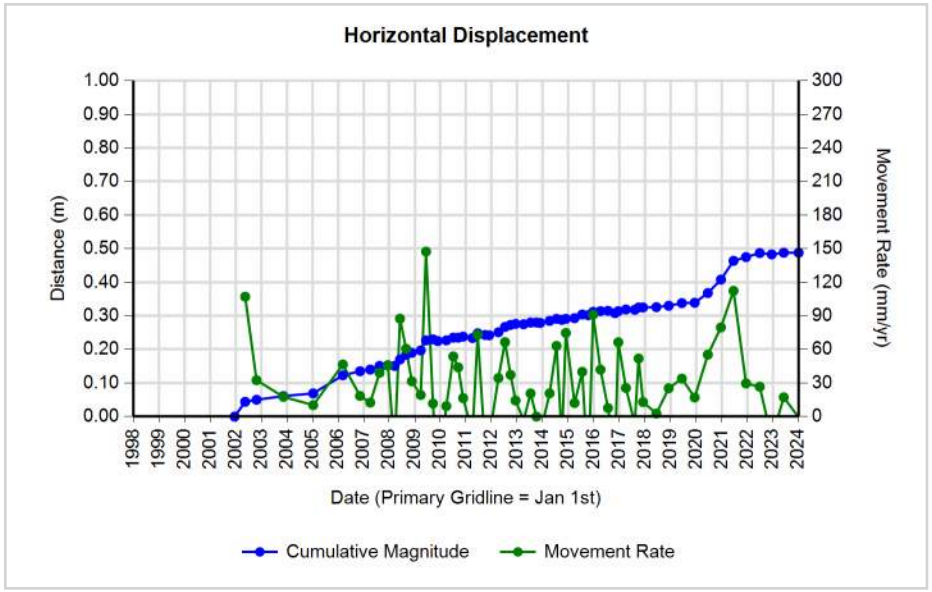
CITY OF Quesnel

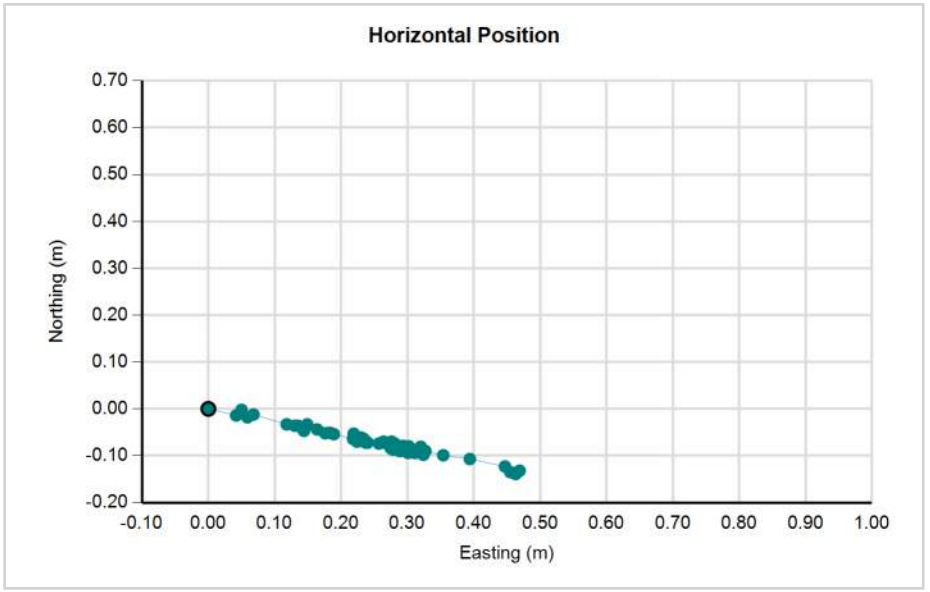
wsp

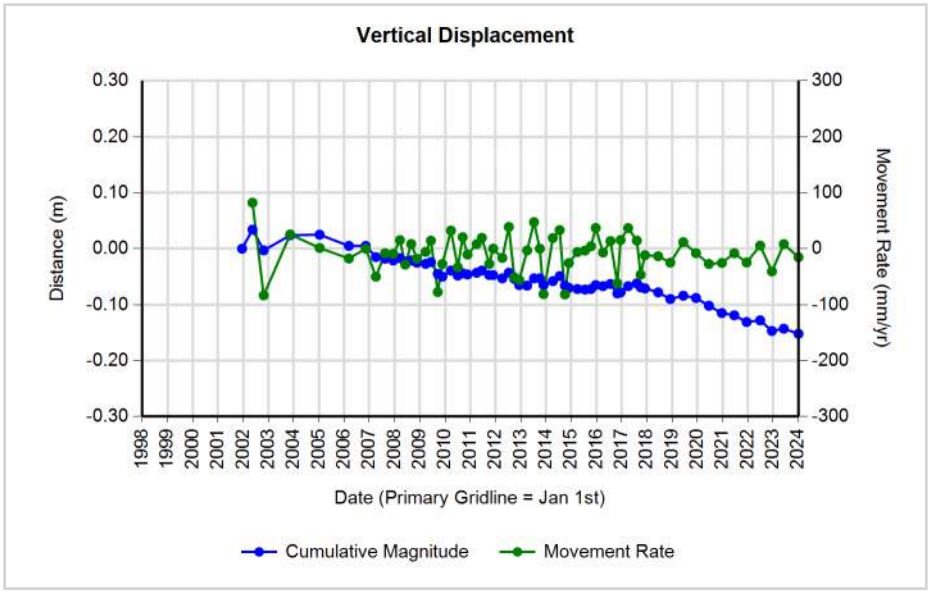
GPS Hub 01-30 (West End of Dodds Avenue at Findlay Road)

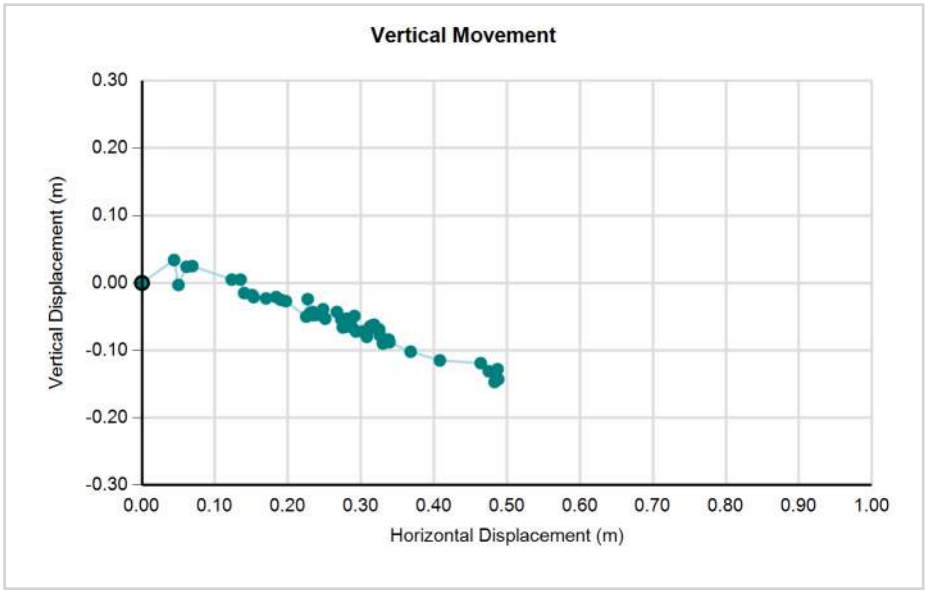
18/07/2014	5869989.179	531218.085	575.352	12.59	-0.087	0.278	0.291	-0.049	107.4	-9.5	0.023	-0.004	0.27	-0.017	0.002	0.017	0.009	173.3	27.7	63.152	33.205
02/10/2014	5869989.182	531218.082	575.335	12.80	-0.084	0.275	0.288	-0.066	107.0	-12.9	0.022	-0.005	0.21	0.003	-0.003	0.004	-0.017	315.0	-76.0	-20.390	-81.701
28/11/2014	5869989.192	531218.088	575.331	12.95	-0.074	0.281	0.291	-0.070	104.8	-13.5	0.022	-0.005	0.16	0.010	0.006	0.012	-0.004	31.0	-18.9	74.728	-25.632
01/04/2015	5869989.188	531218.089	575.329	13.29	-0.078	0.282	0.293	-0.072	105.5	-13.8	0.022	-0.005	0.34	-0.004	0.001	0.004	-0.002	166.0	-25.9	12.145	-5.891
20/07/2015	5869989.187	531218.101	575.328	13.59	-0.079	0.294	0.304	-0.073	105.0	-13.5	0.022	-0.005	0.30	-0.001	0.012	0.012	-0.001	94.8	-4.7	39.984	-3.320
14/10/2015	5869989.176	531218.095	575.329	13.83	-0.090	0.288	0.302	-0.072	107.4	-13.4	0.022	-0.005	0.24	-0.011	-0.006	0.013	0.001	208.6	4.6	-53.216	4.247
22/12/2015	5869989.186	531218.109	575.336	14.02	-0.080	0.302	0.312	-0.065	104.8	-11.8	0.022	-0.005	0.19	0.010	0.014	0.017	0.007	54.5	22.1	91.072	37.054
06/04/2016	5869989.174	531218.107	575.334	14.31	-0.092	0.300	0.314	-0.067	107.0	-12.1	0.022	-0.005	0.29	-0.012	-0.002	0.012	-0.002	189.5	-9.3	41.919	-6.892
22/07/2016	5869989.172	531218.108	575.338	14.60	-0.094	0.301	0.315	-0.063	107.3	-11.3	0.022	-0.004	0.29	-0.002	0.001	0.002	0.004	153.4	60.8	7.633	13.654
30/10/2016	5869989.179	531218.102	575.321	14.87	-0.087	0.295	0.308	-0.080	106.4	-14.6	0.021	-0.005	0.27	0.007	-0.006	0.009	-0.017	319.4	-61.5	-33.674	-62.092
16/12/2016	5869989.182	531218.110	575.323	15.00	-0.084	0.303	0.314	-0.078	105.5	-13.9	0.021	-0.005	0.13	0.003	0.008	0.009	0.002	69.4	13.2	66.398	15.543
04/04/2017	5869989.175	531218.113	575.334	15.30	-0.091	0.306	0.319	-0.067	106.6	-11.9	0.021	-0.004	0.30	-0.007	0.003	0.008	0.011	156.8	55.3	25.520	36.860
08/08/2017	5869989.177	531218.112	575.339	15.65	-0.089	0.305	0.318	-0.062	106.3	-11.0	0.020	-0.004	0.34	0.002	-0.001	0.002	0.005	333.4	65.9	-6.482	14.494
02/10/2017	5869989.172	531218.118	575.332	15.80	-0.094	0.311	0.325	-0.069	106.8	-12.0	0.021	-0.004	0.15	-0.005	0.006	0.008	-0.007	129.8	-41.9	51.867	-46.486
04/12/2017	5869989.174	531218.119	575.330	15.97	-0.092	0.312	0.325	-0.071	106.4	-12.3	0.020	-0.004	0.17	0.002	0.001	0.002	-0.002	26.6	-41.8	12.964	-11.595
13/06/2018	5869989.175	531218.120	575.323	16.49	-0.091	0.313	0.326	-0.078	106.2	-13.5	0.020	-0.005	0.52	0.001	0.001	0.001	-0.007	45.0	-78.6	2.704	-13.386
06/12/2018	5869989.185	531218.127	575.311	16.97	-0.081	0.320	0.330	-0.090	104.2	-15.3	0.019	-0.005	0.48	0.010	0.007	0.012	-0.012	35.0	-44.5	25.332	-24.903
12/06/2019	5869989.168	531218.131	575.317	17.49	-0.098	0.324	0.338	-0.084	106.8	-13.9	0.019	-0.005	0.51	-0.017	0.004	0.017	0.006	166.8	19.0	33.930	11.657
12/12/2019	5869989.176	531218.134	575.313	17.99	-0.090	0.327	0.339	-0.088	105.4	-14.5	0.019	-0.005	0.50	0.008	0.003	0.009	-0.004	20.6	-25.1	17.053	-7.984
17/06/2020	5869989.167	531218.161	575.299	18.51	-0.099	0.354	0.368	-0.102	105.6	-15.5	0.020	-0.006	0.51	-0.009	0.027	0.028	-0.014	108.4	-26.2	55.294	-27.199
21/12/2020	5869989.159	531218.201	575.286	19.02	-0.107	0.394	0.408	-0.115	105.2	-15.7	0.021	-0.006	0.51	-0.008	0.040	0.041	-0.013	101.3	-17.7	79.676	-25.392
19/06/2021	5869989.143	531218.254	575.282	19.51	-0.123	0.447	0.464	-0.119	105.4	-14.4	0.024	-0.006	0.49	-0.016	0.053	0.055	-0.004	106.8	-4.1	112.340	-8.117
14/12/2021	5869989.131	531218.262	575.270	20.00	-0.135	0.455	0.475	-0.131	106.5	-15.4	0.024	-0.007	0.49	-0.012	0.008	0.014	-0.012	146.3	-39.8	29.594	-24.624
28/06/2022	5869989.134	531218.276	575.273	20.53	-0.132	0.469	0.487	-0.128	105.7	-14.7	0.024	-0.006	0.54	0.003	0.014	0.014	0.003	77.9	11.8	26.682	5.591
16/12/2022	5869989.127	531218.270	575.254	21.00	-0.139	0.463	0.483	-0.147	106.7	-16.9	0.023	-0.007	0.47	-0.007	-0.006	0.009	-0.019	220.6	-64.1	-19.693	-40.583
06/06/2023	5869989.132	531218.276	575.258	21.47	-0.134	0.469	0.488	-0.143	105.9	-16.3	0.023	-0.007	0.47	0.005	0.006	0.008	0.004	52.0	25.4	17.247	8.197
04/01/2024	5869989.132	531218.276	575.249	22.05	-0.134	0.469	0.488	-0.152	105.9	-17.3	0.022	-0.007	0.58	0.000	0.000	0.000	-0.009	270.0	-87.4	-0.689	-15.265

GPS Hub 01-30 (West End of Dodds Avenue at Findlay Road)









CITY OF Quesnel

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GPS Hub 01-31 (East Side of Blair Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869768.124	532338.411	508.144	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5869768.142	532338.444	508.116	0.41	0.018	0.033	0.038	-0.028	61.4	-36.7	0.091	-0.068	0.41	0.018	0.033	0.038	-0.028	61.4	-36.7	90.925	-67.728
24/10/2002	5869768.143	532338.482	508.117	0.86	0.019	0.071	0.073	-0.027	75.0	-20.2	0.086	-0.032	0.44	0.001	0.038	0.038	0.001	88.5	1.5	85.706	2.255
12/11/2003	5869768.122	532338.497	508.122	1.91	-0.002	0.086	0.086	-0.022	91.6	-14.2	0.045	-0.011	1.05	-0.021	0.015	0.026	0.005	144.4	11.2	24.997	4.946
11/01/2005	5869768.131	532338.519	508.128	3.07	0.007	0.108	0.108	-0.017	86.1	-8.7	0.035	-0.005	1.17	0.010	0.022	0.024	0.005	66.2	12.5	20.515	4.544
10/03/2006	5869768.115	532338.611	508.108	4.23	-0.009	0.200	0.200	-0.036	92.6	-10.2	0.047	-0.009	1.16	-0.016	0.092	0.093	-0.019	100.1	-11.8	80.507	-16.838
10/11/2006	5869768.115	532338.632	508.118	4.90	-0.009	0.221	0.221	-0.026	92.3	-6.7	0.045	-0.005	0.67	0.000	0.021	0.021	0.010	90.0	25.5	31.307	14.908
05/04/2007	5869768.112	532338.638	508.105	5.30	-0.012	0.227	0.227	-0.039	93.0	-9.7	0.043	-0.007	0.40	-0.003	0.006	0.007	-0.013	116.6	-62.7	16.782	-32.522
16/08/2007	5869768.108	532338.658	508.104	5.67	-0.016	0.247	0.248	-0.040	93.7	-9.2	0.044	-0.007	0.36	-0.004	0.020	0.020	-0.001	101.3	-2.8	56.013	-2.746
13/12/2007	5869768.103	532338.660	508.097	5.99	-0.021	0.249	0.250	-0.047	94.8	-10.7	0.042	-0.008	0.33	-0.005	0.002	0.005	-0.007	158.2	-52.4	16.529	-21.485
18/03/2008	5869768.112	532338.663	508.109	6.26	-0.012	0.252	0.252	-0.035	92.7	-7.9	0.040	-0.006	0.26	0.009	0.003	0.009	0.012	18.4	51.7	36.094	45.656
03/06/2008	5869768.098	532338.700	508.102	6.47	-0.026	0.289	0.290	-0.042	95.1	-8.2	0.045	-0.006	0.21	-0.014	0.037	0.040	-0.007	110.7	-10.0	187.654	-33.205
29/07/2008	5869768.100	532338.716	508.098	6.62	-0.024	0.305	0.306	-0.046	94.5	-8.6	0.046	-0.007	0.15	0.002	0.016	0.016	-0.004	82.9	-13.9	105.169	-26.089
29/08/2008	5869768.105	532338.710	508.101	6.70	-0.019	0.299	0.300	-0.043	93.6	-8.2	0.045	-0.006	0.08	0.005	-0.006	0.008	0.003	309.8	21.0	-92.022	35.347
19/11/2008	5869768.106	532338.716	508.093	6.93	-0.018	0.305	0.306	-0.051	93.4	-9.5	0.044	-0.007	0.22	0.001	0.006	0.006	-0.008	80.5	-52.8	27.094	-35.634
26/03/2009	5869768.109	532338.727	508.096	7.28	-0.015	0.316	0.316	-0.048	92.7	-8.6	0.043	-0.007	0.35	0.003	0.011	0.011	0.003	74.7	14.7	32.791	8.628
10/06/2009	5869768.087	532338.771	508.098	7.49	-0.037	0.360	0.362	-0.046	95.9	-7.2	0.048	-0.006	0.21	-0.022	0.044	0.049	0.002	116.6	2.3	236.420	9.612
17/09/2009	5869768.101	532338.778	508.101	7.76	-0.023	0.367	0.368	-0.043	93.6	-6.7	0.047	-0.006	0.27	0.014	0.007	0.016	0.003	26.6	10.8	57.748	11.068
23/11/2009	5869768.102	532338.779	508.088	7.94	-0.022	0.368	0.369	-0.056	93.4	-8.6	0.046	-0.007	0.18	0.001	0.001	0.001	-0.013	45.0	-83.8	7.710	-70.869
27/03/2010	5869768.105	532338.784	508.084	8.28	-0.019	0.373	0.373	-0.060	92.9	-9.1	0.045	-0.007	0.34	0.003	0.005	0.006	-0.004	59.0	-34.4	17.175	-11.782
04/07/2010	5869768.099	532338.777	508.096	8.55	-0.025	0.366	0.367	-0.048	93.9	-7.5	0.043	-0.006	0.27	-0.006	-0.007	0.009	0.012	229.4	52.5	-34.015	44.273
13/09/2010	5869768.101	532338.780	508.052	8.74	-0.023	0.369	0.370	-0.092	93.6	-14.0	0.042	-0.011	0.19	0.002	0.003	0.004	-0.044	56.3	-85.3	18.548	-226.352
22/11/2010	5869768.095	532338.790	508.091	8.94	-0.029	0.379	0.380	-0.053	94.4	-7.9	0.043	-0.006	0.19	-0.006	0.010	0.012	0.039	121.0	73.4	60.850	203.496
04/04/2011	5869768.094	532338.790	508.087	9.30	-0.030	0.379	0.380	-0.057	94.5	-8.5	0.041	-0.006	0.36	-0.001	0.000	0.001	-0.004	180.0	-76.0	2.746	-10.985
18/06/2011	5869768.101	532338.803	508.101	9.51	-0.023	0.392	0.393	-0.043	93.4	-6.2	0.041	-0.005	0.21	0.007	0.013	0.015	0.014	61.7	43.5	71.905	68.180
03/10/2011	5869768.099	532338.803	508.089	9.80	-0.025	0.392	0.393	-0.055	93.6	-8.0	0.040	-0.006	0.29	-0.002	0.000	0.002	-0.012	180.0	-80.5	-6.827	-40.963
28/11/2011	5869768.098	532338.802	508.085	9.95	-0.026	0.391	0.392	-0.059	93.8	-8.6	0.039	-0.006	0.15	-0.001	-0.001	0.001	-0.004	225.0	-70.5	-9.224	-26.089
09/04/2012	5869768.087	532338.811	508.090	10.32	-0.037	0.400	0.402	-0.054	95.3	-7.7	0.039	-0.005	0.36	-0.011	0.009	0.014	0.005	140.7	19.4	39.031	13.731
12/07/2012	5869768.089	532338.840	508.090	10.57	-0.035	0.429	0.430	-0.054	94.7	-7.2	0.041	-0.005	0.26	0.002	0.029	0.029	0.000	86.1	0.0	112.951	0.000
29/09/2012	5869768.096	532338.856	508.084	10.79	-0.028	0.445	0.446	-0.060	93.6	-7.7	0.041	-0.006	0.22	0.007	0.016	0.017	-0.006	66.4	-19.0	80.745	-27.741
10/12/2012	5869768.091	532338.853	508.083	10.99	-0.033	0.442	0.443	-0.061	94.3	-7.8	0.040	-0.006	0.20	-0.005	-0.003	0.006	-0.001	211.0	-9.7	-29.580	-5.073
03/04/2013	5869768.093	532338.859	508.082	11.30	-0.031	0.448	0.449	-0.062	94.0	-7.9	0.040	-0.005	0.31	0.002	0.006	0.006	-0.001	71.6	-9.0	20.264	-3.204
12/07/2013	5869768.094	532338.867	508.089	11.57	-0.030	0.456	0.457	-0.055	93.8	-6.9	0.039	-0.005	0.27	0.001	0.008	0.008	0.007	82.9	41.0	29.447	25.567
04/10/2013	5869768.092	532338.863	508.094	11.80	-0.032	0.452	0.453	-0.050	94.0	-6.3	0.038	-0.004	0.23	-0.002	-0.004	0.004	0.005	243.4	48.2	-19.446	21.741
27/11/2013	5869768.091	532338.868	508.080	11.95	-0.033	0.457	0.458	-0.064	94.1	-8.0	0.038	-0.005	0.15	-0.001	0.005	0.005	-0.014	101.3	-70.0	34.489	-94.694

CITY OF Quesnel

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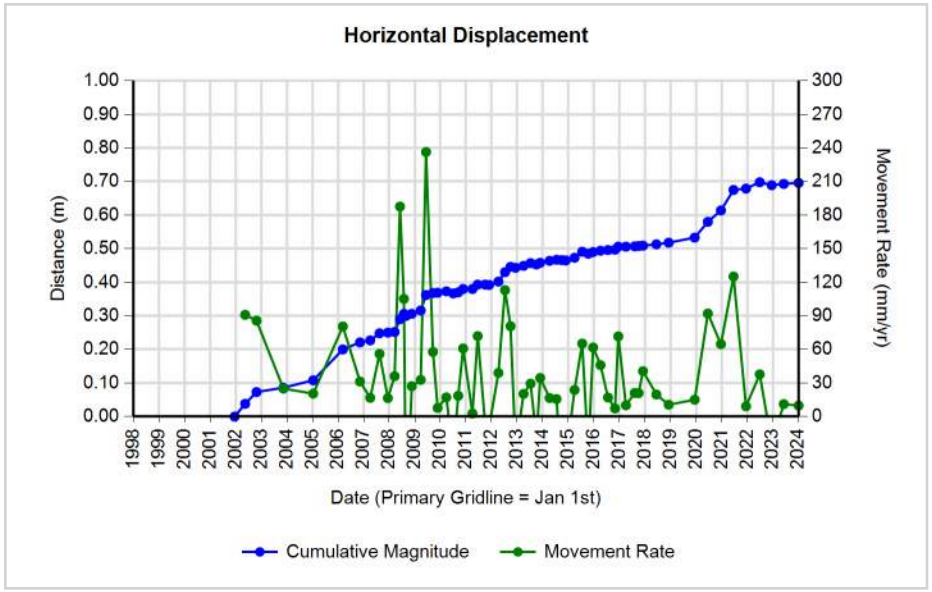
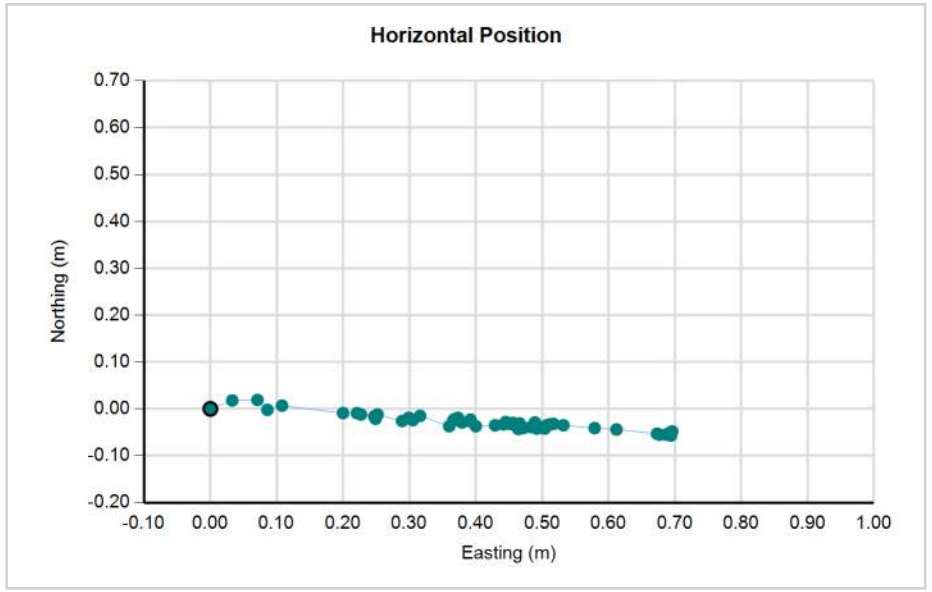
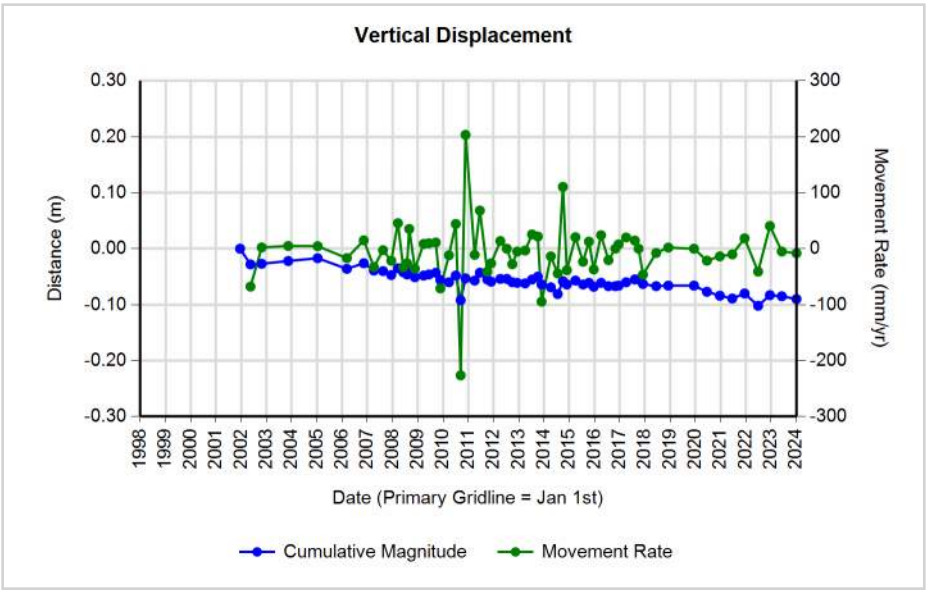
GPS Hub 01-31 (East Side of Blair Street)

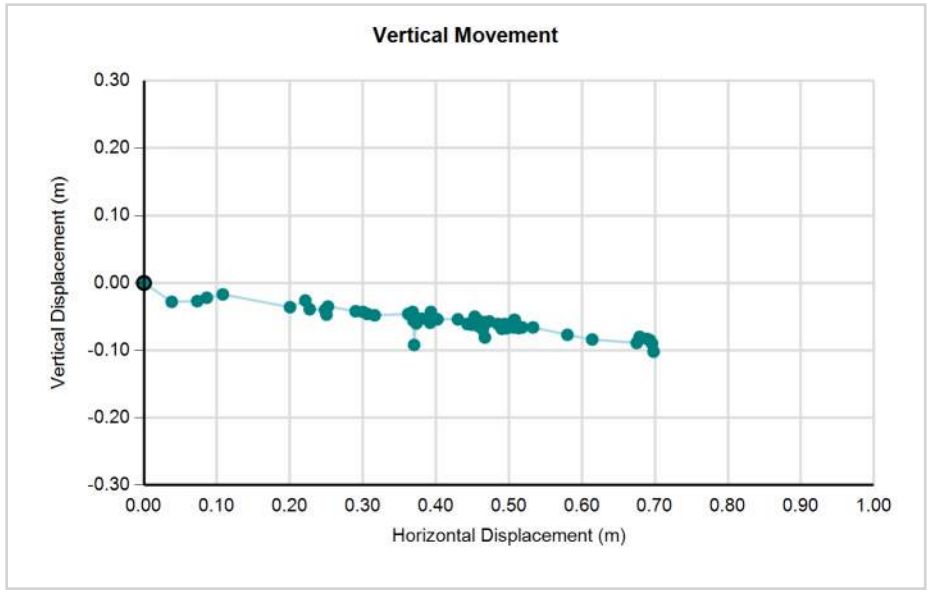
10/04/2014	5869768.090	532338.874	508.075	12.32	-0.034	0.463	0.464	-0.069	94.2	-8.5	0.038	-0.006	0.37	-0.001	0.006	0.006	-0.005	99.5	-39.4	16.580	-13.629
18/07/2014	5869768.093	532338.877	508.063	12.59	-0.031	0.466	0.467	-0.081	93.8	-9.8	0.037	-0.006	0.27	0.003	0.003	0.004	-0.012	45.0	-70.5	15.653	-44.273
02/10/2014	5869768.081	532338.875	508.086	12.80	-0.043	0.464	0.466	-0.058	95.3	-7.1	0.036	-0.005	0.21	-0.012	-0.002	0.012	0.023	189.5	62.1	-58.467	110.536
28/11/2014	5869768.087	532338.875	508.080	12.95	-0.037	0.464	0.465	-0.064	94.6	-7.8	0.036	-0.005	0.16	0.006	0.000	0.006	-0.006	0.0	-45.0	-38.447	-38.447
01/04/2015	5869768.083	532338.882	508.087	13.29	-0.041	0.471	0.473	-0.057	95.0	-6.9	0.036	-0.004	0.34	-0.004	0.007	0.008	0.007	119.7	41.0	23.748	20.619
20/07/2015	5869768.088	532338.901	508.080	13.59	-0.036	0.490	0.491	-0.064	94.2	-7.4	0.036	-0.005	0.30	0.005	0.019	0.020	-0.007	75.3	-19.6	65.237	-23.243
14/10/2015	5869768.085	532338.894	508.083	13.83	-0.039	0.483	0.485	-0.061	94.6	-7.2	0.035	-0.004	0.24	-0.003	-0.007	0.008	0.003	246.8	21.5	-32.345	12.741
22/12/2015	5869768.095	532338.900	508.076	14.02	-0.029	0.489	0.490	-0.068	93.4	-7.9	0.035	-0.005	0.19	0.010	0.006	0.012	-0.007	31.0	-31.0	61.732	-37.054
06/04/2016	5869768.082	532338.903	508.083	14.31	-0.042	0.492	0.494	-0.061	94.9	-7.0	0.035	-0.004	0.29	-0.013	0.003	0.013	0.007	167.0	27.7	45.972	24.120
22/07/2016	5869768.086	532338.906	508.077	14.60	-0.038	0.495	0.496	-0.067	94.4	-7.7	0.034	-0.005	0.29	0.004	0.003	0.005	-0.006	36.9	-50.2	17.068	-20.481
30/10/2016	5869768.084	532338.906	508.077	14.87	-0.040	0.495	0.497	-0.067	94.6	-7.7	0.033	-0.005	0.27	-0.002	0.000	0.002	0.000	180.0	0.0	7.305	0.000
16/12/2016	5869768.082	532338.915	508.078	15.00	-0.042	0.504	0.506	-0.066	94.8	-7.4	0.034	-0.004	0.13	-0.002	0.009	0.009	0.001	102.5	6.2	71.648	7.771
04/04/2017	5869768.079	532338.915	508.084	15.30	-0.045	0.504	0.506	-0.060	95.1	-6.8	0.033	-0.004	0.30	-0.003	0.000	0.003	0.006	180.0	63.4	10.053	20.106
08/08/2017	5869768.086	532338.917	508.089	15.65	-0.038	0.506	0.507	-0.055	94.3	-6.2	0.032	-0.004	0.34	0.007	0.002	0.007	0.005	15.9	34.5	21.104	14.494
02/10/2017	5869768.089	532338.918	508.089	15.80	-0.035	0.507	0.508	-0.055	93.9	-6.2	0.032	-0.003	0.15	0.003	0.001	0.003	0.000	18.4	0.0	21.000	0.000
04/12/2017	5869768.082	532338.918	508.081	15.97	-0.042	0.507	0.509	-0.063	94.7	-7.1	0.032	-0.004	0.17	-0.007	0.000	0.007	-0.008	180.0	-48.8	40.583	-46.381
13/06/2018	5869768.091	532338.923	508.077	16.49	-0.033	0.512	0.513	-0.067	93.7	-7.4	0.031	-0.004	0.52	0.009	0.005	0.010	-0.004	29.1	-21.2	19.688	-7.649
06/12/2018	5869768.092	532338.928	508.078	16.97	-0.032	0.517	0.518	-0.066	93.5	-7.3	0.031	-0.004	0.48	0.001	0.005	0.005	0.001	78.7	11.1	10.582	2.075
12/12/2019	5869768.089	532338.943	508.078	17.99	-0.035	0.532	0.533	-0.066	93.8	-7.1	0.030	-0.004	1.02	-0.003	0.015	0.015	0.000	101.3	0.0	15.060	0.000
17/06/2020	5869768.083	532338.990	508.067	18.51	-0.041	0.579	0.580	-0.077	94.1	-7.6	0.031	-0.004	0.51	-0.006	0.047	0.047	-0.011	97.3	-13.1	92.054	-21.371
21/12/2020	5869768.080	532339.023	508.060	19.02	-0.044	0.612	0.614	-0.084	94.1	-7.8	0.032	-0.004	0.51	-0.003	0.033	0.033	-0.007	95.2	-11.9	64.722	-13.672
19/06/2021	5869768.071	532339.084	508.055	19.51	-0.053	0.673	0.675	-0.089	94.5	-7.5	0.035	-0.005	0.49	-0.009	0.061	0.062	-0.005	98.4	-4.6	125.119	-10.146
14/12/2021	5869768.069	532339.088	508.064	20.00	-0.055	0.677	0.679	-0.080	94.6	-6.7	0.034	-0.004	0.49	-0.002	0.004	0.004	0.009	116.6	63.6	9.177	18.468
28/06/2022	5869768.076	532339.107	508.042	20.53	-0.048	0.696	0.698	-0.102	93.9	-8.3	0.034	-0.005	0.54	0.007	0.019	0.020	-0.022	69.8	-47.4	37.733	-40.997
16/12/2022	5869768.069	532339.098	508.061	21.00	-0.055	0.687	0.689	-0.083	94.6	-6.9	0.033	-0.004	0.47	-0.007	-0.009	0.011	0.019	232.1	59.0	-24.354	40.583
06/06/2023	5869768.072	532339.102	508.059	21.47	-0.052	0.691	0.693	-0.085	94.3	-7.0	0.032	-0.004	0.47	0.003	0.004	0.005	-0.002	55.1	-24.4	11.134	-5.054
04/01/2024	5869768.067	532339.105	508.054	22.05	-0.057	0.694	0.696	-0.090	94.7	-7.4	0.032	-0.004	0.58	-0.005	0.003	0.006	-0.005	151.6	-39.1	9.790	-7.960

GPS Hub 01-31 (East Side of Blair Street)









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GPS Hub 01-32 (Intersection of Lewis Drive and Beabien Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5870079.631	532553.538	481.549	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5870079.618	532553.546	481.519	0.41	-0.013	0.008	0.015	-0.030	148.4	-63.0	0.037	-0.073	0.41	-0.013	0.008	0.015	-0.030	148.4	-63.0	36.923	-72.566
24/10/2002	5870079.634	532553.543	481.512	0.86	0.003	0.005	0.006	-0.037	59.0	-81.0	0.007	-0.043	0.44	0.016	-0.003	0.016	-0.007	349.4	-23.3	-36.703	-15.782
12/11/2003	5870079.614	532553.534	481.561	1.91	-0.017	-0.004	0.017	0.012	191.7	33.7	0.009	0.006	1.05	-0.020	-0.009	0.022	0.049	203.0	65.8	20.743	46.246
11/01/2005	5870079.619	532553.544	481.545	3.07	-0.012	0.006	0.013	-0.004	154.2	-15.8	0.004	-0.001	1.17	0.005	0.009	0.011	-0.015	60.3	-55.2	-9.113	-13.135
10/03/2006	5870079.615	532553.543	481.542	4.23	-0.016	0.005	0.017	-0.007	162.6	-22.7	0.004	-0.002	1.16	-0.004	-0.001	0.004	-0.003	189.5	-37.8	3.677	-2.849
10/11/2006	5870079.618	532553.548	481.536	4.90	-0.013	0.010	0.016	-0.013	142.4	-38.4	0.003	-0.003	0.67	0.003	0.005	0.006	-0.006	59.0	-45.8	-8.693	-8.945
05/04/2007	5870079.619	532553.545	481.543	5.30	-0.012	0.007	0.014	-0.006	149.7	-23.4	0.003	-0.001	0.40	0.001	-0.003	0.003	0.007	288.4	65.7	-7.911	17.512
16/08/2007	5870079.619	532553.542	481.547	5.67	-0.012	0.004	0.013	-0.002	161.6	-9.0	0.002	0.000	0.36	0.000	-0.003	0.003	0.004	270.0	53.1	-8.239	10.985
13/12/2007	5870079.616	532553.540	481.540	5.99	-0.015	0.002	0.015	-0.009	172.4	-30.7	0.003	-0.002	0.33	-0.003	-0.002	0.004	-0.007	213.7	-62.7	11.067	-21.485
18/03/2008	5870079.619	532553.543	481.544	6.26	-0.012	0.005	0.013	-0.005	157.4	-21.0	0.002	-0.001	0.26	0.003	0.003	0.004	0.004	45.0	43.3	-16.142	15.219
03/06/2008	5870079.615	532553.546	481.554	6.47	-0.016	0.008	0.018	0.005	153.4	15.6	0.003	0.001	0.21	-0.004	0.003	0.005	0.010	143.1	63.4	23.718	47.435
29/08/2008	5870079.610	532553.543	481.564	6.70	-0.021	0.005	0.022	0.015	166.6	34.8	0.003	0.002	0.24	-0.005	-0.003	0.006	0.010	211.0	59.8	24.480	41.983
19/11/2008	5870079.611	532553.546	481.544	6.93	-0.020	0.008	0.022	-0.005	158.2	-13.1	0.003	-0.001	0.22	0.001	0.003	0.003	-0.020	71.6	-81.0	-14.086	-89.085
26/03/2009	5870079.621	532553.547	481.539	7.28	-0.010	0.009	0.013	-0.010	138.0	-36.6	0.002	-0.001	0.35	0.010	0.001	0.010	-0.005	5.7	-26.5	-28.903	-14.380
10/06/2009	5870079.608	532553.549	481.543	7.49	-0.023	0.011	0.025	-0.006	154.4	-13.2	0.003	-0.001	0.21	-0.013	0.002	0.013	0.004	171.3	16.9	63.212	19.224
17/09/2009	5870079.618	532553.542	481.556	7.76	-0.013	0.004	0.014	0.007	162.9	27.2	0.002	0.001	0.27	0.010	-0.007	0.012	0.013	325.0	46.8	-45.035	47.962
23/11/2009	5870079.624	532553.547	481.541	7.94	-0.007	0.009	0.011	-0.008	127.9	-35.1	0.001	-0.001	0.18	0.006	0.005	0.008	-0.015	39.8	-62.5	-42.578	-81.772
27/03/2010	5870079.625	532553.537	481.554	8.28	-0.006	-0.001	0.006	0.005	189.5	39.4	0.001	0.001	0.34	0.001	-0.010	0.010	0.013	275.7	52.3	-29.603	38.292
04/07/2010	5870079.616	532553.545	481.556	8.55	-0.015	0.007	0.017	0.007	155.0	22.9	0.002	0.001	0.27	-0.009	0.008	0.012	0.002	138.4	9.4	44.426	7.379
13/09/2010	5870079.619	532553.547	481.542	8.74	-0.012	0.009	0.015	-0.007	143.1	-25.0	0.002	-0.001	0.19	0.003	0.002	0.004	-0.014	33.7	-75.6	-18.548	-72.021
22/11/2010	5870079.616	532553.555	481.555	8.94	-0.015	0.017	0.023	0.006	131.4	14.8	0.003	0.001	0.19	-0.003	0.008	0.009	0.013	110.6	56.7	44.581	67.832
04/04/2011	5870079.616	532553.545	481.540	9.30	-0.015	0.007	0.017	-0.009	155.0	-28.5	0.002	-0.001	0.36	0.000	-0.010	0.010	-0.015	270.0	-56.3	-27.462	-41.194
18/06/2011	5870079.616	532553.547	481.567	9.51	-0.015	0.009	0.017	0.018	149.0	45.8	0.002	0.002	0.21	0.000	0.002	0.002	0.027	90.0	85.8	9.740	131.490
03/10/2011	5870079.618	532553.546	481.553	9.80	-0.013	0.008	0.015	0.004	148.4	14.7	0.002	0.000	0.29	0.002	-0.001	0.002	-0.014	333.4	-80.9	-7.633	-47.790
28/11/2011	5870079.619	532553.540	481.557	9.95	-0.012	0.002	0.012	0.008	170.5	33.3	0.001	0.001	0.15	0.001	-0.006	0.006	0.004	279.5	33.3	-39.674	26.089
09/04/2012	5870079.612	532553.545	481.548	10.32	-0.019	0.007	0.020	-0.001	159.8	-2.8	0.002	0.000	0.36	-0.007	0.005	0.009	-0.009	144.5	-46.3	23.624	-24.716
12/07/2012	5870079.620	532553.542	481.582	10.57	-0.011	0.004	0.012	0.033	160.0	70.5	0.001	0.003	0.26	0.008	-0.003	0.009	0.034	339.4	75.9	-33.199	132.112
29/09/2012	5870079.625	532553.543	481.569	10.79	-0.006	0.005	0.008	0.020	140.2	68.7	0.001	0.002	0.22	0.005	0.001	0.005	-0.013	11.3	-68.6	-23.575	-60.104
10/12/2012	5870079.617	532553.551	481.553	10.99	-0.014	0.013	0.019	0.004	137.1	11.8	0.002	0.000	0.20	-0.008	0.008	0.011	-0.016	135.0	-54.7	57.394	-81.167
03/04/2013	5870079.621	532553.546	481.555	11.30	-0.010	0.008	0.013	0.006	141.3	25.1	0.001	0.001	0.31	0.004	-0.005	0.006	0.002	308.7	17.3	-20.515	6.408
12/07/2013	5870079.634	532553.538	481.607	11.57	0.003	0.000	0.003	0.058	0.0	87.0	0.000	0.005	0.27	0.013	-0.008	0.015	0.052	328.4	73.6	-55.753	189.930
04/10/2013	5870079.617	532553.523	481.600	11.80	-0.014	-0.015	0.021	0.051	227.0	68.1	0.002	0.004	0.23	-0.017	-0.015	0.023	-0.007	221.4	-17.2	98.581	-30.438
27/11/2013	5870079.619	532553.543	481.558	11.95	-0.012	0.005	0.013	0.009	157.4	34.7	0.001	0.001	0.15	0.002	0.020	0.020	-0.042	84.3	-64.4	-135.952	-284.083
10/04/2014	5870079.621	532553.547	481.557	12.32	-0.010	0.009	0.013	0.008	138.0	30.7	0.001	0.001	0.37	0.002	0.004	0.004	-0.001	63.4	-12.6	12.190	-2.726

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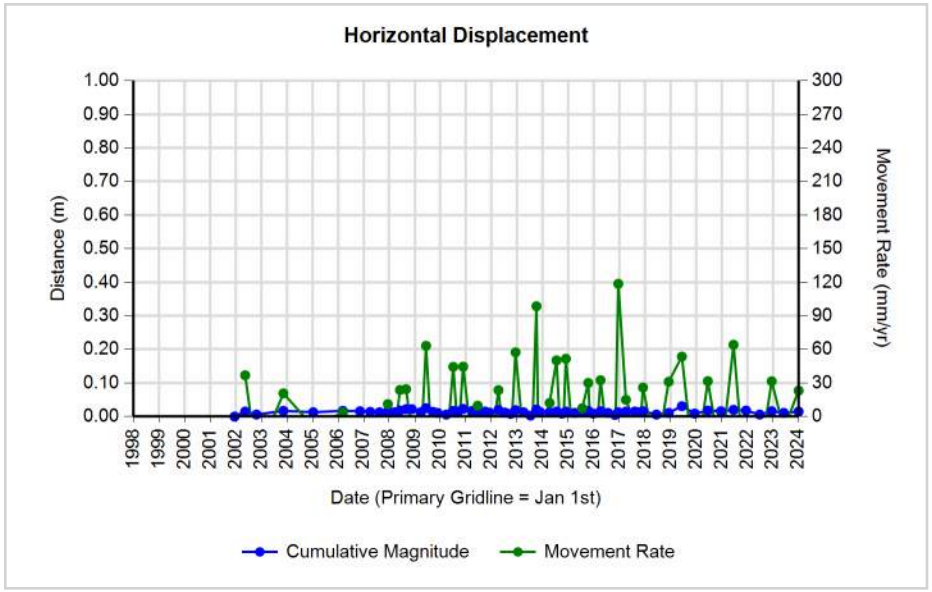
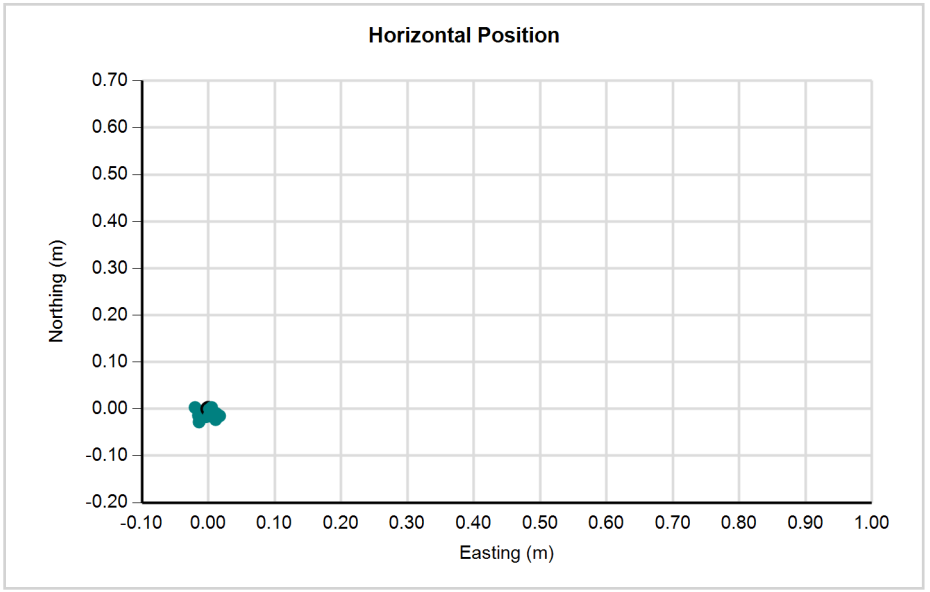
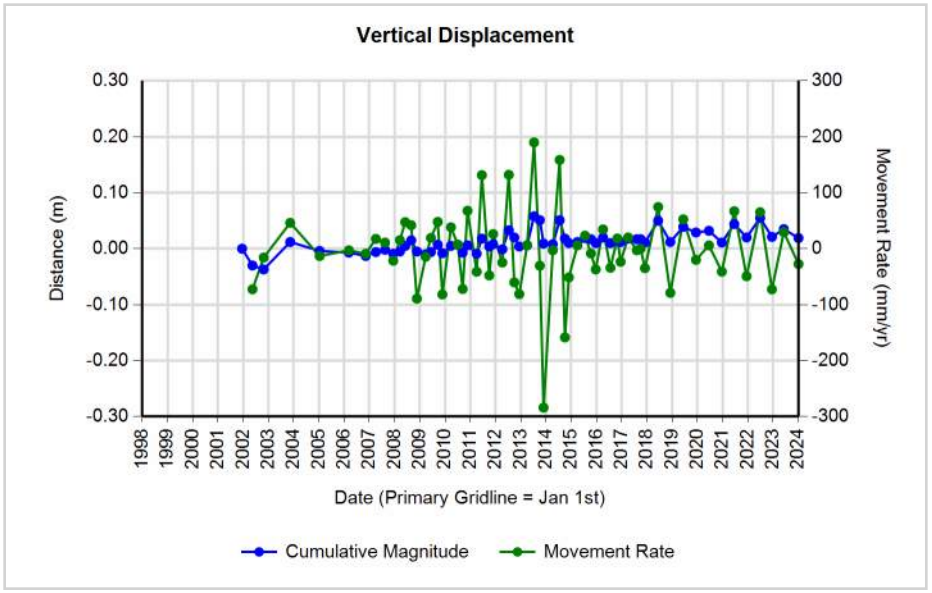
GPS Hub 01-32 (Intersection of Lewis Drive and Beabien Avenue)

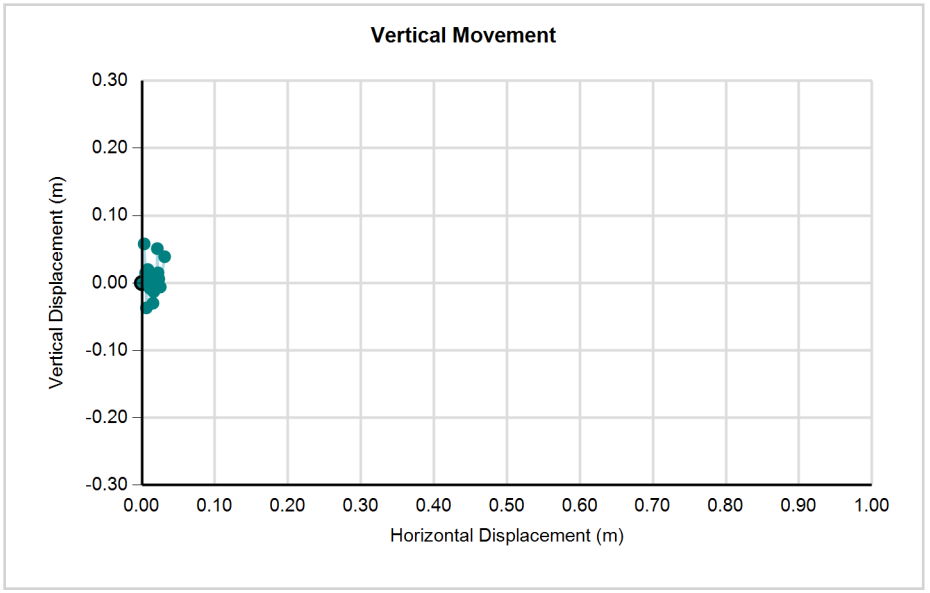
18/07/2014	5870079.617	532553.534	481.600	12.59	-0.014	-0.004	0.015	0.051	195.9	74.1	0.001	0.004	0.27	-0.004	-0.013	0.014	0.043	252.9	72.4	50.181	158.644
02/10/2014	5870079.625	532553.531	481.567	12.80	-0.006	-0.007	0.009	0.018	229.4	62.9	0.001	0.001	0.21	0.008	-0.003	0.009	-0.033	339.4	-75.5	-41.062	-158.595
28/11/2014	5870079.617	532553.532	481.559	12.95	-0.014	-0.006	0.015	0.010	203.2	33.3	0.001	0.001	0.16	-0.008	0.001	0.008	-0.008	172.9	-44.8	51.662	-51.263
01/04/2015	5870079.621	532553.543	481.561	13.29	-0.010	0.005	0.011	0.012	153.4	47.0	0.001	0.001	0.34	0.004	0.011	0.012	0.002	70.0	9.7	-34.477	5.891
20/07/2015	5870079.619	532553.542	481.568	13.59	-0.012	0.004	0.013	0.019	161.6	56.3	0.001	0.001	0.30	-0.002	-0.001	0.002	0.007	206.6	72.3	7.425	23.243
14/10/2015	5870079.614	532553.537	481.566	13.83	-0.017	-0.001	0.017	0.017	183.4	45.0	0.001	0.001	0.24	-0.005	-0.005	0.007	-0.002	225.0	-15.8	30.031	-8.494
22/12/2015	5870079.623	532553.543	481.559	14.02	-0.008	0.005	0.009	0.010	148.0	46.7	0.001	0.001	0.19	0.009	0.006	0.011	-0.007	33.7	-32.9	-57.258	-37.054
06/04/2016	5870079.615	532553.538	481.569	14.31	-0.016	0.000	0.016	0.020	180.0	51.3	0.001	0.001	0.29	-0.008	-0.005	0.009	0.010	212.0	46.7	32.507	34.458
22/07/2016	5870079.621	532553.534	481.559	14.60	-0.010	-0.004	0.011	0.010	201.8	42.9	0.001	0.001	0.29	0.006	-0.004	0.007	-0.010	326.3	-54.2	-24.615	-34.136
30/10/2016	5870079.629	532553.533	481.564	14.87	-0.002	-0.005	0.005	0.015	248.2	70.3	0.000	0.001	0.27	0.008	-0.001	0.008	0.005	352.9	31.8	-29.447	18.262
16/12/2016	5870079.621	532553.546	481.561	15.00	-0.010	0.008	0.013	0.012	141.3	43.1	0.001	0.001	0.13	-0.008	0.013	0.015	-0.003	121.6	-11.1	118.623	-23.314
04/04/2017	5870079.617	532553.544	481.567	15.30	-0.014	0.006	0.015	0.018	156.8	49.8	0.001	0.001	0.30	-0.004	-0.002	0.004	0.006	206.6	53.3	14.986	20.106
08/08/2017	5870079.617	532553.542	481.566	15.65	-0.014	0.004	0.015	0.017	164.1	49.4	0.001	0.001	0.34	0.000	-0.002	0.002	-0.001	270.0	-26.6	-5.798	-2.899
02/10/2017	5870079.618	532553.538	481.566	15.80	-0.013	0.000	0.013	0.017	180.0	52.6	0.001	0.001	0.15	0.001	-0.004	0.004	0.000	284.0	0.0	-27.381	0.000
04/12/2017	5870079.616	532553.542	481.560	15.97	-0.015	0.004	0.016	0.011	165.1	35.3	0.001	0.001	0.17	-0.002	0.004	0.004	-0.006	116.6	-53.3	25.928	-34.786
13/06/2018	5870079.631	532553.532	481.599	16.49	0.000	-0.006	0.006	0.050	270.0	83.2	0.000	0.003	0.52	0.015	-0.010	0.018	0.039	326.3	65.2	-34.475	74.580
06/12/2018	5870079.622	532553.544	481.561	16.97	-0.009	0.006	0.011	0.012	146.3	48.0	0.001	0.001	0.48	-0.009	0.012	0.015	-0.038	126.9	-68.5	31.129	-78.861
12/06/2019	5870079.603	532553.524	481.588	17.49	-0.028	-0.014	0.031	0.039	206.6	51.2	0.002	0.002	0.51	-0.019	-0.020	0.028	0.027	226.5	44.4	53.595	52.456
12/12/2019	5870079.622	532553.541	481.578	17.99	-0.009	0.003	0.009	0.029	161.6	71.9	0.001	0.002	0.50	0.019	0.017	0.025	-0.010	41.8	-21.4	-50.886	-19.959
17/06/2020	5870079.619	532553.525	481.581	18.51	-0.012	-0.013	0.018	0.032	227.3	61.1	0.001	0.002	0.51	-0.003	-0.016	0.016	0.003	259.4	10.4	31.627	5.828
21/12/2020	5870079.616	532553.544	481.560	19.02	-0.015	0.006	0.016	0.011	158.2	34.3	0.001	0.001	0.51	-0.003	0.019	0.019	-0.021	99.0	-47.5	-37.571	-41.017
19/06/2021	5870079.634	532553.518	481.593	19.51	0.003	-0.020	0.020	0.044	278.5	65.3	0.001	0.002	0.49	0.018	-0.026	0.032	0.033	304.7	46.2	64.168	66.963
14/12/2021	5870079.614	532553.544	481.569	20.00	-0.017	0.006	0.018	0.020	160.6	48.0	0.001	0.001	0.49	-0.020	0.026	0.033	-0.024	127.6	-36.2	-67.309	-49.247
28/06/2022	5870079.634	532553.543	481.604	20.53	0.003	0.005	0.006	0.055	59.0	83.9	0.000	0.003	0.54	0.020	-0.001	0.020	0.035	357.1	60.2	-37.317	65.223
16/12/2022	5870079.621	532553.550	481.570	21.00	-0.010	0.012	0.016	0.021	129.8	53.4	0.001	0.001	0.47	-0.013	0.007	0.015	-0.034	151.7	-66.5	31.537	-72.623
06/06/2023	5870079.626	532553.548	481.584	21.47	-0.005	0.010	0.011	0.035	116.6	72.2	0.001	0.002	0.47	0.005	-0.002	0.005	0.014	338.2	68.8	-11.436	29.517
04/01/2024	5870079.616	532553.539	481.568	22.05	-0.015	0.001	0.015	0.019	176.2	51.6	0.001	0.001	0.58	-0.010	-0.009	0.013	-0.016	222.0	-49.8	23.179	-27.394

GPS Hub 01-32 (Intersection of Lewis Drive and Beabien Avenue)









CITY OF Quesnel

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GPS Hub 01-33 (South End of Allard Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869124.379	532245.960	495.342	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5869124.352	532245.998	495.329	0.41	-0.027	0.038	0.047	-0.013	125.4	-15.6	0.113	-0.031	0.41	-0.027	0.038	0.047	-0.013	125.4	-15.6	112.757	-31.445
24/10/2002	5869124.378	532245.999	495.304	0.86	-0.001	0.039	0.039	-0.038	91.5	-44.2	0.046	-0.044	0.44	0.026	0.001	0.026	-0.025	2.2	-43.9	-58.664	-56.366
12/11/2003	5869124.365	532246.002	495.322	1.91	-0.014	0.042	0.044	-0.020	108.0	-24.4	0.023	-0.010	1.05	-0.013	0.003	0.013	0.018	167.8	54.7	12.196	17.245
11/01/2005	5869124.368	532246.017	495.344	3.07	-0.011	0.057	0.058	0.002	100.9	1.7	0.019	0.001	1.17	0.003	0.015	0.015	0.022	80.6	54.3	13.279	18.494
10/03/2006	5869124.341	532246.061	495.330	4.23	-0.038	0.101	0.108	-0.012	110.6	-6.3	0.025	-0.003	1.16	-0.027	0.044	0.052	-0.014	121.5	-14.9	44.576	-11.830
10/11/2006	5869124.347	532246.075	495.325	4.90	-0.032	0.115	0.119	-0.017	105.5	-8.1	0.024	-0.003	0.67	0.006	0.014	0.015	-0.005	66.8	-18.2	22.707	-7.454
05/04/2007	5869124.345	532246.074	495.323	5.30	-0.034	0.114	0.119	-0.019	106.6	-9.1	0.022	-0.004	0.40	-0.002	-0.001	0.002	-0.002	206.6	-41.8	-5.594	-5.003
16/08/2007	5869124.330	532246.083	495.309	5.67	-0.049	0.123	0.132	-0.033	111.7	-14.0	0.023	-0.006	0.36	-0.015	0.009	0.017	-0.014	149.0	-38.7	48.040	-38.447
13/12/2007	5869124.338	532246.084	495.321	5.99	-0.041	0.124	0.131	-0.021	108.3	-9.1	0.022	-0.004	0.33	0.008	0.001	0.008	0.012	7.1	56.1	-24.746	36.832
18/03/2008	5869124.342	532246.081	495.326	6.26	-0.037	0.121	0.127	-0.016	107.0	-7.2	0.020	-0.003	0.26	0.004	-0.003	0.005	0.005	323.1	45.0	-19.023	19.023
03/06/2008	5869124.332	532246.109	495.334	6.47	-0.047	0.149	0.156	-0.008	107.5	-2.9	0.024	-0.001	0.21	-0.010	0.028	0.030	0.008	109.7	15.1	141.035	37.948
29/07/2008	5869124.323	532246.113	495.325	6.62	-0.056	0.153	0.163	-0.017	110.1	-6.0	0.025	-0.003	0.15	-0.009	0.004	0.010	-0.009	156.0	-42.4	64.237	-58.701
29/08/2008	5869124.327	532246.112	495.318	6.70	-0.052	0.152	0.161	-0.024	108.9	-8.5	0.024	-0.004	0.08	0.004	-0.001	0.004	-0.007	346.0	-59.5	-48.579	-82.476
19/11/2008	5869124.333	532246.111	495.314	6.93	-0.046	0.151	0.158	-0.028	106.9	-10.1	0.023	-0.004	0.22	0.006	-0.001	0.006	-0.004	350.5	-33.3	-27.094	-17.817
26/03/2009	5869124.334	532246.116	495.319	7.28	-0.045	0.156	0.162	-0.023	106.1	-8.1	0.022	-0.003	0.35	0.001	0.005	0.005	0.005	78.7	44.4	14.665	14.380
10/06/2009	5869124.318	532246.152	495.321	7.49	-0.061	0.192	0.201	-0.021	107.6	-6.0	0.027	-0.003	0.21	-0.016	0.036	0.039	0.002	114.0	2.9	189.331	9.612
17/09/2009	5869124.323	532246.149	495.318	7.76	-0.056	0.189	0.197	-0.024	106.5	-6.9	0.025	-0.003	0.27	0.005	-0.003	0.006	-0.003	329.0	-27.2	-21.513	-11.068
23/11/2009	5869124.321	532246.137	495.310	7.94	-0.058	0.177	0.186	-0.032	108.1	-9.7	0.023	-0.004	0.18	-0.002	-0.012	0.012	-0.008	260.5	-33.3	-66.320	-43.612
27/03/2010	5869124.323	532246.144	495.313	8.28	-0.056	0.184	0.192	-0.029	106.9	-8.6	0.023	-0.004	0.34	0.002	0.007	0.007	0.003	74.1	22.4	21.444	8.837
04/07/2010	5869124.309	532246.146	495.326	8.55	-0.070	0.186	0.199	-0.016	110.6	-4.6	0.023	-0.002	0.27	-0.014	0.002	0.014	0.013	171.9	42.6	52.176	47.962
13/09/2010	5869124.321	532246.146	495.320	8.74	-0.058	0.186	0.195	-0.022	107.3	-6.4	0.022	-0.003	0.19	0.012	0.000	0.012	-0.006	0.0	-26.6	-61.732	-30.866
22/11/2010	5869124.326	532246.151	495.314	8.94	-0.053	0.191	0.198	-0.028	105.5	-8.0	0.022	-0.003	0.19	0.005	0.005	0.007	-0.006	45.0	-40.3	36.896	-31.307
04/04/2011	5869124.321	532246.145	495.318	9.30	-0.058	0.185	0.194	-0.024	107.4	-7.1	0.021	-0.003	0.36	-0.005	-0.006	0.008	0.004	230.2	27.1	-21.449	10.985
18/06/2011	5869124.312	532246.159	495.332	9.51	-0.067	0.199	0.210	-0.010	108.6	-2.7	0.022	-0.001	0.21	-0.009	0.014	0.017	0.014	122.7	40.1	81.053	68.180
03/10/2011	5869124.321	532246.150	495.317	9.80	-0.058	0.190	0.199	-0.025	107.0	-7.2	0.020	-0.003	0.29	0.009	-0.009	0.013	-0.015	315.0	-49.7	-43.447	-51.203
28/11/2011	5869124.321	532246.152	495.311	9.95	-0.058	0.192	0.201	-0.031	106.8	-8.8	0.020	-0.003	0.15	0.000	0.002	0.002	-0.006	90.0	-71.6	13.045	-39.134
09/04/2012	5869124.317	532246.156	495.317	10.32	-0.062	0.196	0.206	-0.025	107.6	-6.9	0.020	-0.002	0.36	-0.004	0.004	0.006	0.006	135.0	46.7	15.535	16.477
12/07/2012	5869124.310	532246.174	495.328	10.57	-0.069	0.214	0.225	-0.014	107.9	-3.6	0.021	-0.001	0.26	-0.007	0.018	0.019	0.011	111.3	29.7	75.044	42.742
29/09/2012	5869124.320	532246.184	495.318	10.79	-0.059	0.224	0.232	-0.024	104.8	-5.9	0.021	-0.002	0.22	0.010	0.010	0.014	-0.010	45.0	-35.3	65.385	-46.234
10/12/2012	5869124.314	532246.176	495.317	10.99	-0.065	0.216	0.226	-0.025	106.7	-6.3	0.021	-0.002	0.20	-0.006	-0.008	0.010	-0.001	233.1	-5.7	-50.729	-5.073
03/04/2013	5869124.315	532246.177	495.318	11.30	-0.064	0.217	0.226	-0.024	106.4	-6.1	0.020	-0.002	0.31	0.001	0.001	0.001	0.001	45.0	35.3	4.531	3.204
12/07/2013	5869124.312	532246.185	495.329	11.57	-0.067	0.225	0.235	-0.013	106.6	-3.2	0.020	-0.001	0.27	-0.003	0.008	0.009	0.011	110.6	52.2	31.207	40.178
04/10/2013	5869124.311	532246.174	495.327	11.80	-0.068	0.214	0.225	-0.015	107.6	-3.8	0.019	-0.001	0.23	-0.001	-0.011	0.011	-0.002	264.8	-10.3	-48.028	-8.696
27/11/2013	5869124.315	532246.178	495.316	11.95	-0.064	0.218	0.227	-0.026	106.4	-6.5	0.019	-0.002	0.15	0.004	0.004	0.006	-0.011	45.0	-62.8	38.262	-74.403

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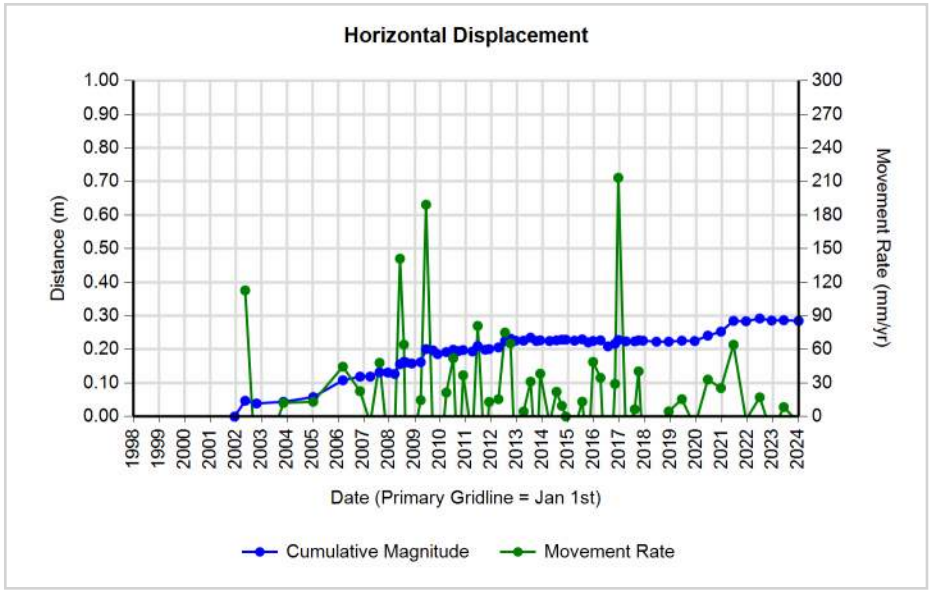
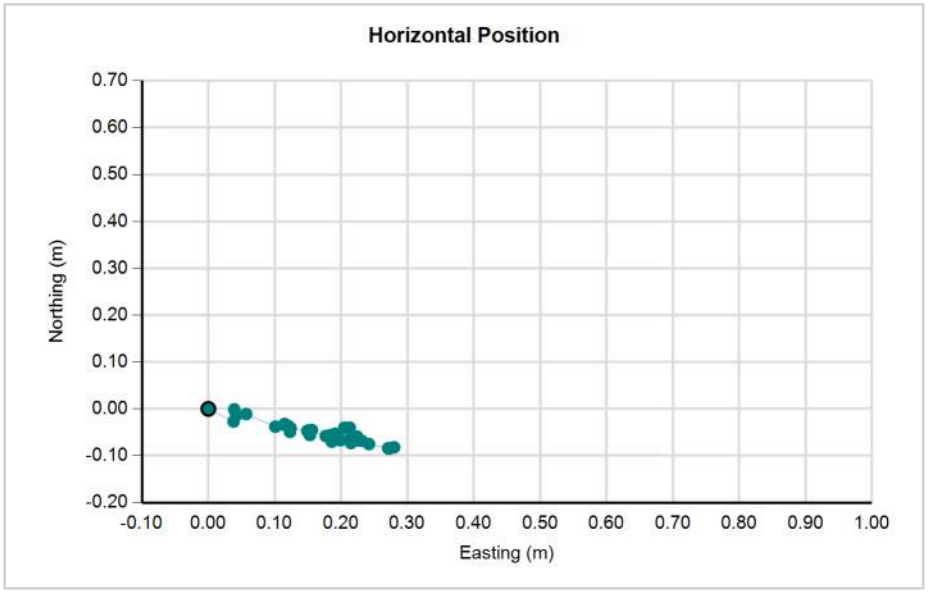
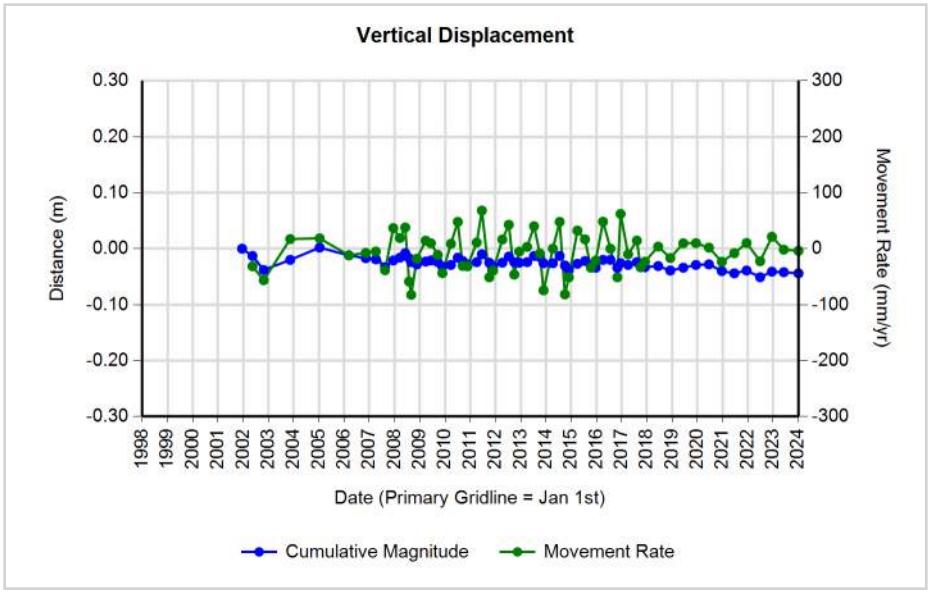
GPS Hub 01-33 (South End of Allard Street)

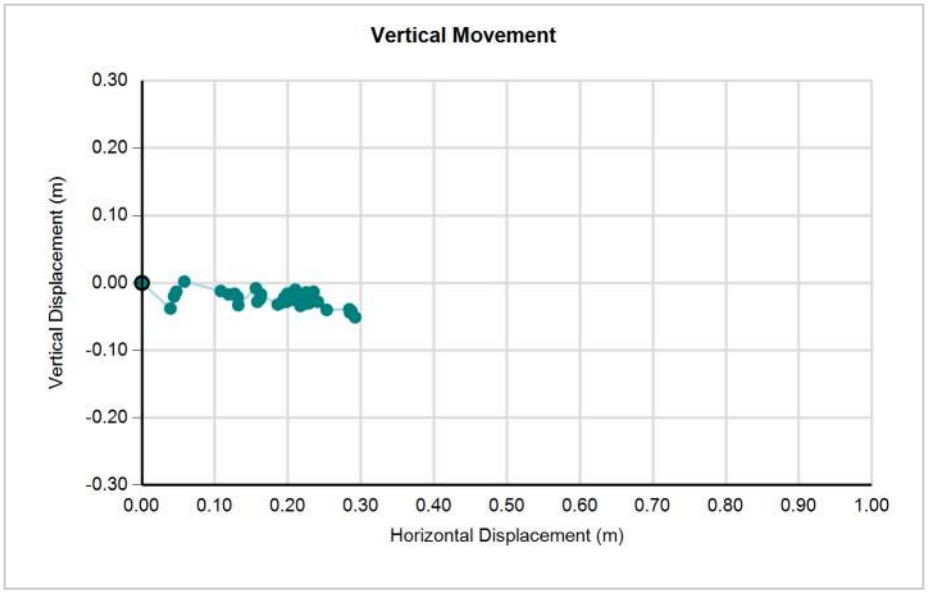
10/04/2014	5869124.316	532246.176	495.316	12.32	-0.063	0.216	0.225	-0.026	106.3	-6.6	0.018	-0.002	0.37	0.001	-0.002	0.002	0.000	296.6	0.0	-6.095	0.000
18/07/2014	5869124.310	532246.176	495.329	12.59	-0.069	0.216	0.227	-0.013	107.7	-3.3	0.018	-0.001	0.27	-0.006	0.000	0.006	0.013	180.0	65.2	22.136	47.962
02/10/2014	5869124.310	532246.178	495.312	12.80	-0.069	0.218	0.229	-0.030	107.6	-7.5	0.018	-0.002	0.21	0.000	0.002	0.002	-0.017	90.0	-83.3	9.612	-81.701
28/11/2014	5869124.310	532246.178	495.304	12.95	-0.069	0.218	0.229	-0.038	107.6	-9.4	0.018	-0.003	0.16	0.000	0.000	0.000	-0.008	0.0	0.0	0.000	-51.263
01/04/2015	5869124.313	532246.176	495.315	13.29	-0.066	0.216	0.226	-0.027	107.0	-6.8	0.017	-0.002	0.34	0.003	-0.002	0.004	0.011	326.3	71.9	-10.620	32.401
20/07/2015	5869124.313	532246.180	495.320	13.59	-0.066	0.220	0.230	-0.022	106.7	-5.5	0.017	-0.002	0.30	0.000	0.004	0.004	0.005	90.0	51.3	13.282	16.602
14/10/2015	5869124.313	532246.171	495.312	13.83	-0.066	0.211	0.221	-0.030	107.4	-7.7	0.016	-0.002	0.24	0.000	-0.009	0.009	-0.008	270.0	-41.6	-38.224	-33.977
22/12/2015	5869124.320	532246.177	495.308	14.02	-0.059	0.217	0.225	-0.034	105.2	-8.6	0.016	-0.002	0.19	0.007	0.006	0.009	-0.004	40.6	-23.5	48.803	-21.174
06/04/2016	5869124.310	532246.176	495.322	14.31	-0.069	0.216	0.227	-0.020	107.7	-5.0	0.016	-0.001	0.29	-0.010	-0.001	0.010	0.014	185.7	54.3	34.629	48.241
22/07/2016	5869124.339	532246.165	495.322	14.60	-0.040	0.205	0.209	-0.020	101.0	-5.5	0.014	-0.001	0.29	0.029	-0.011	0.031	0.000	339.2	0.0	-105.875	0.000
30/10/2016	5869124.339	532246.173	495.308	14.87	-0.040	0.213	0.217	-0.034	100.6	-8.9	0.015	-0.002	0.27	0.000	0.008	0.008	-0.014	90.0	-60.3	29.220	-51.135
16/12/2016	5869124.312	532246.178	495.316	15.00	-0.067	0.218	0.228	-0.026	107.1	-6.5	0.015	-0.002	0.13	-0.027	0.005	0.027	0.008	169.5	16.2	213.392	62.170
04/04/2017	5869124.310	532246.173	495.313	15.30	-0.069	0.213	0.224	-0.029	107.9	-7.4	0.015	-0.002	0.30	-0.002	-0.005	0.005	-0.003	248.2	-29.1	-18.045	-10.053
08/08/2017	5869124.312	532246.174	495.318	15.65	-0.067	0.214	0.224	-0.024	107.4	-6.1	0.014	-0.002	0.34	0.002	0.001	0.002	0.005	26.6	65.9	6.482	14.494
02/10/2017	5869124.306	532246.175	495.313	15.80	-0.073	0.215	0.227	-0.029	108.8	-7.3	0.014	-0.002	0.15	-0.006	0.001	0.006	-0.005	170.5	-39.4	40.395	-33.205
04/12/2017	5869124.311	532246.176	495.309	15.97	-0.068	0.216	0.226	-0.033	107.5	-8.3	0.014	-0.002	0.17	0.005	0.001	0.005	-0.004	11.3	-38.1	-29.562	-23.190
13/06/2018	5869124.320	532246.175	495.311	16.49	-0.059	0.215	0.223	-0.031	105.3	-7.9	0.014	-0.002	0.52	0.009	-0.001	0.009	0.002	353.7	12.5	-17.317	3.825
06/12/2018	5869124.322	532246.176	495.303	16.97	-0.057	0.216	0.223	-0.039	104.8	-9.9	0.013	-0.002	0.48	0.002	0.001	0.002	-0.008	26.6	-74.4	4.640	-16.602
12/06/2019	5869124.314	532246.176	495.308	17.49	-0.065	0.216	0.226	-0.034	106.7	-8.6	0.013	-0.002	0.51	-0.008	0.000	0.008	0.005	180.0	32.0	15.543	9.714
12/12/2019	5869124.310	532246.174	495.313	17.99	-0.069	0.214	0.225	-0.029	107.9	-7.3	0.012	-0.002	0.50	-0.004	-0.002	0.004	0.005	206.6	48.2	-8.926	9.980
17/06/2020	5869124.311	532246.191	495.314	18.51	-0.068	0.231	0.241	-0.028	106.4	-6.6	0.013	-0.002	0.51	0.001	0.017	0.017	0.001	86.6	3.4	33.085	1.943
21/12/2020	5869124.304	532246.202	495.302	19.02	-0.075	0.242	0.253	-0.040	107.2	-9.0	0.013	-0.002	0.51	-0.007	0.011	0.013	-0.012	122.5	-42.6	25.467	-23.439
19/06/2021	5869124.294	532246.232	495.298	19.51	-0.085	0.272	0.285	-0.044	107.4	-8.8	0.015	-0.002	0.49	-0.010	0.030	0.032	-0.004	108.4	-7.2	64.168	-8.117
14/12/2021	5869124.295	532246.231	495.303	20.00	-0.084	0.271	0.284	-0.039	107.2	-7.8	0.014	-0.002	0.49	0.001	-0.001	0.001	0.005	315.0	74.2	-2.902	10.260
28/06/2022	5869124.297	532246.240	495.291	20.53	-0.082	0.280	0.292	-0.051	106.3	-9.9	0.014	-0.002	0.54	0.002	0.009	0.009	-0.012	77.5	-52.5	17.181	-22.362
16/12/2022	5869124.295	532246.233	495.301	21.00	-0.084	0.273	0.286	-0.041	107.1	-8.2	0.014	-0.002	0.47	-0.002	-0.007	0.007	0.010	254.1	53.9	-15.550	21.360
06/06/2023	5869124.291	532246.233	495.300	21.47	-0.088	0.273	0.287	-0.042	107.9	-8.3	0.013	-0.002	0.47	-0.004	0.000	0.004	-0.001	181.4	-11.3	8.497	-1.699
04/01/2024	5869124.294	532246.232	495.298	22.05	-0.085	0.272	0.285	-0.044	107.4	-8.8	0.013	-0.002	0.58	0.003	-0.001	0.003	-0.002	343.3	-35.1	-5.396	-3.790

GPS Hub 01-33 (South End of Allard Street)









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GPS Hub 01-34 (Abbott Road and Blair Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869581.862	532354.652	494.462	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5869581.832	532354.679	494.423	0.41	-0.030	0.027	0.040	-0.039	138.0	-44.0	0.098	-0.094	0.41	-0.030	0.027	0.040	-0.039	138.0	-44.0	97.628	-94.336
24/10/2002	5869581.848	532354.695	494.407	0.86	-0.014	0.043	0.045	-0.055	108.0	-50.6	0.053	-0.064	0.44	0.016	0.016	0.023	-0.016	45.0	-35.3	51.016	-36.074
12/11/2003	5869581.840	532354.709	494.425	1.91	-0.022	0.057	0.061	-0.037	110.8	-31.2	0.032	-0.019	1.05	-0.008	0.014	0.016	0.018	118.6	47.4	15.595	16.988
11/01/2005	5869581.838	532354.726	494.434	3.07	-0.024	0.074	0.078	-0.028	108.1	-19.6	0.025	-0.009	1.17	-0.002	0.017	0.017	0.009	98.1	29.4	14.376	8.094
10/03/2006	5869581.814	532354.794	494.411	4.23	-0.048	0.142	0.150	-0.051	108.7	-18.8	0.035	-0.012	1.16	-0.024	0.068	0.072	-0.023	109.3	-17.9	62.209	-20.119
10/11/2006	5869581.813	532354.805	494.407	4.90	-0.049	0.153	0.161	-0.055	107.8	-18.9	0.033	-0.011	0.67	-0.001	0.011	0.011	-0.004	95.2	-19.9	16.467	-5.963
05/04/2007	5869581.805	532354.814	494.403	5.30	-0.057	0.162	0.172	-0.059	109.4	-19.0	0.032	-0.011	0.40	-0.008	0.009	0.012	-0.004	131.6	-18.4	30.125	-10.007
16/08/2007	5869581.805	532354.825	494.403	5.67	-0.057	0.173	0.182	-0.059	108.2	-17.9	0.032	-0.010	0.36	0.000	0.011	0.011	0.000	90.0	0.0	30.209	0.000
13/12/2007	5869581.807	532354.828	494.392	5.99	-0.055	0.176	0.184	-0.070	107.4	-20.8	0.031	-0.012	0.33	0.002	0.003	0.004	-0.011	56.3	-71.9	11.067	-33.763
18/03/2008	5869581.805	532354.830	494.406	6.26	-0.057	0.178	0.187	-0.056	107.8	-16.7	0.030	-0.009	0.26	-0.002	0.002	0.003	0.014	135.0	78.6	10.761	53.266
03/06/2008	5869581.795	532354.857	494.400	6.47	-0.067	0.205	0.216	-0.062	108.1	-16.0	0.033	-0.010	0.21	-0.010	0.027	0.029	-0.006	110.3	-11.8	136.577	-28.461
29/08/2008	5869581.794	532354.868	494.398	6.70	-0.068	0.216	0.226	-0.064	107.5	-15.8	0.034	-0.010	0.24	-0.001	0.011	0.011	-0.002	95.2	-10.3	46.371	-8.397
19/11/2008	5869581.794	532354.865	494.390	6.93	-0.068	0.213	0.224	-0.072	107.7	-17.8	0.032	-0.010	0.22	0.000	-0.003	0.003	-0.008	270.0	-69.4	-13.363	-35.634
26/03/2009	5869581.792	532354.870	494.389	7.28	-0.070	0.218	0.229	-0.073	107.8	-17.7	0.031	-0.010	0.35	-0.002	0.005	0.005	-0.001	111.8	-10.5	15.488	-2.876
10/06/2009	5869581.771	532354.910	494.386	7.49	-0.091	0.258	0.274	-0.076	109.4	-15.5	0.037	-0.010	0.21	-0.021	0.040	0.045	-0.003	117.7	-3.8	217.119	-14.418
17/09/2009	5869581.774	532354.908	494.388	7.76	-0.088	0.256	0.271	-0.074	109.0	-15.3	0.035	-0.010	0.27	0.003	-0.002	0.004	0.002	326.3	29.0	-13.302	7.379
23/11/2009	5869581.782	532354.902	494.386	7.94	-0.080	0.250	0.262	-0.076	107.7	-16.1	0.033	-0.010	0.18	0.008	-0.006	0.010	-0.002	323.1	-11.3	-54.515	-10.903
27/03/2010	5869581.774	532354.910	494.375	8.28	-0.088	0.258	0.273	-0.087	108.8	-17.7	0.033	-0.011	0.34	-0.008	0.008	0.011	-0.011	135.0	-44.2	33.325	-32.401
04/07/2010	5869581.768	532354.910	494.383	8.55	-0.094	0.258	0.275	-0.079	110.0	-16.1	0.032	-0.009	0.27	-0.006	0.000	0.006	0.008	180.0	53.1	22.136	29.515
13/09/2010	5869581.784	532354.918	494.398	8.74	-0.078	0.266	0.277	-0.064	106.3	-13.0	0.032	-0.007	0.19	0.016	0.008	0.018	0.015	26.6	40.0	92.025	77.165
22/11/2010	5869581.775	532354.919	494.380	8.94	-0.087	0.267	0.281	-0.082	108.0	-16.3	0.031	-0.009	0.19	-0.009	0.001	0.009	-0.018	173.7	-63.3	47.250	-93.921
04/04/2011	5869581.774	532354.914	494.375	9.30	-0.088	0.262	0.276	-0.087	108.6	-17.5	0.030	-0.009	0.36	-0.001	-0.005	0.005	-0.005	258.7	-44.4	-14.003	-13.731
18/06/2011	5869581.768	532354.931	494.381	9.51	-0.094	0.279	0.294	-0.081	108.6	-15.4	0.031	-0.009	0.21	-0.006	0.017	0.018	0.006	109.4	18.4	87.795	29.220
03/10/2011	5869581.769	532354.925	494.375	9.80	-0.093	0.273	0.288	-0.087	108.8	-16.8	0.029	-0.009	0.29	0.001	-0.006	0.006	-0.006	279.5	-44.6	-20.764	-20.481
28/11/2011	5869581.773	532354.923	494.376	9.95	-0.089	0.271	0.285	-0.086	108.2	-16.8	0.029	-0.009	0.15	0.004	-0.002	0.004	0.001	333.4	12.6	-29.169	6.522
09/04/2012	5869581.765	532354.934	494.372	10.32	-0.097	0.282	0.298	-0.090	109.0	-16.8	0.029	-0.009	0.36	-0.008	0.011	0.014	-0.004	126.0	-16.4	37.353	-10.985
12/07/2012	5869581.762	532354.953	494.386	10.57	-0.100	0.301	0.317	-0.076	108.4	-13.5	0.030	-0.007	0.26	-0.003	0.019	0.019	0.014	99.0	36.0	74.742	54.399
29/09/2012	5869581.766	532354.965	494.374	10.79	-0.096	0.313	0.327	-0.088	107.1	-15.0	0.030	-0.008	0.22	0.004	0.012	0.013	-0.012	71.6	-43.5	58.482	-55.481
10/12/2012	5869581.759	532354.954	494.376	10.99	-0.103	0.302	0.319	-0.086	108.8	-15.1	0.029	-0.008	0.20	-0.007	-0.011	0.013	0.002	237.5	8.7	-66.143	10.146
03/04/2013	5869581.761	532354.960	494.377	11.30	-0.101	0.308	0.324	-0.085	108.2	-14.7	0.029	-0.008	0.31	0.002	0.006	0.006	0.001	71.6	9.0	20.264	3.204
12/07/2013	5869581.759	532354.969	494.379	11.57	-0.103	0.317	0.333	-0.083	108.0	-14.0	0.029	-0.007	0.27	-0.002	0.009	0.009	0.002	102.5	12.2	33.674	7.305
04/10/2013	5869581.759	532354.957	494.385	11.80	-0.103	0.305	0.322	-0.077	108.7	-13.5	0.027	-0.007	0.23	0.000	-0.012	0.012	0.006	270.0	26.6	-52.179	26.089
27/11/2013	5869581.759	532354.959	494.375	11.95	-0.103	0.307	0.324	-0.087	108.5	-15.0	0.027	-0.007	0.15	0.000	0.002	0.002	-0.010	90.0	-78.7	13.528	-67.639
10/04/2014	5869581.758	532354.963	494.371	12.32	-0.104	0.311	0.328	-0.091	108.5	-15.5	0.027	-0.007	0.37	-0.001	0.004	0.004	-0.004	104.0	-44.1	11.239	-10.903

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wsp

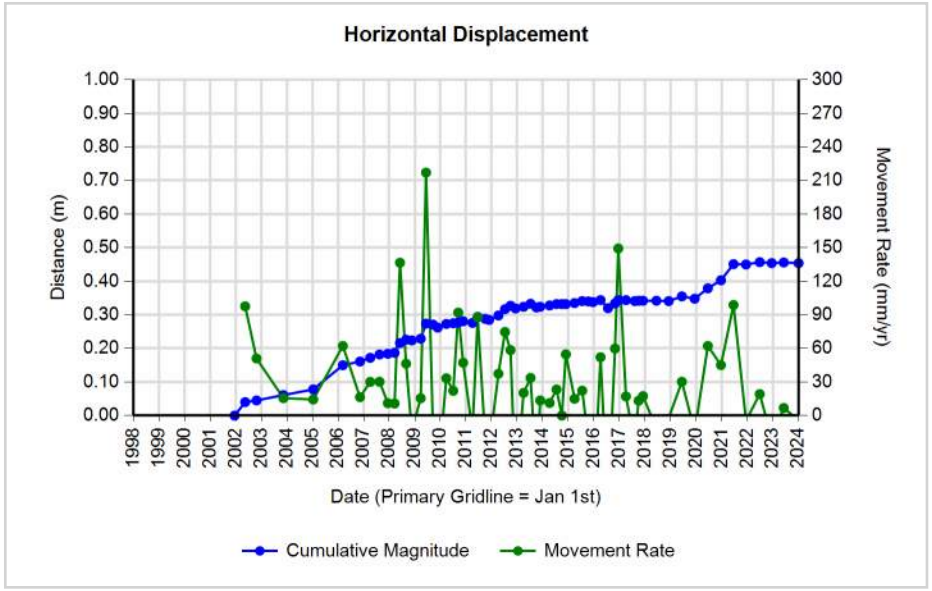
GPS Hub 01-34 (Abbott Road and Blair Street)

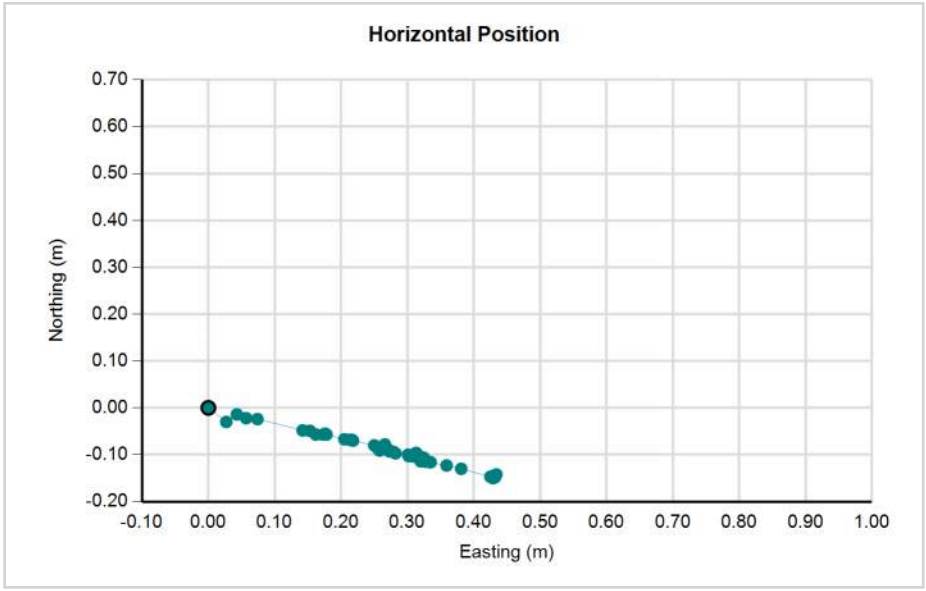
18/07/2014	5869581.752	532354.965	494.377	12.59	-0.110	0.313	0.332	-0.085	109.4	-14.4	0.026	-0.007	0.27	-0.006	0.002	0.006	0.006	161.6	43.5	23.334	22.136
02/10/2014	5869581.752	532354.965	494.367	12.80	-0.110	0.313	0.332	-0.095	109.4	-16.0	0.026	-0.007	0.21	0.000	0.000	0.000	-0.010	0.0	0.0	0.000	-48.059
28/11/2014	5869581.760	532354.968	494.371	12.95	-0.102	0.316	0.332	-0.091	107.9	-15.3	0.026	-0.007	0.16	0.008	0.003	0.009	0.004	20.6	25.1	54.749	25.632
01/04/2015	5869581.755	532354.969	494.369	13.29	-0.107	0.317	0.335	-0.093	108.7	-15.5	0.025	-0.007	0.34	-0.005	0.001	0.005	-0.002	168.7	-21.4	15.019	-5.891
20/07/2015	5869581.752	532354.975	494.376	13.59	-0.110	0.323	0.341	-0.086	108.8	-14.1	0.025	-0.006	0.30	-0.003	0.006	0.007	0.007	116.6	46.2	22.274	23.243
14/10/2015	5869581.748	532354.972	494.363	13.83	-0.114	0.320	0.340	-0.099	109.6	-16.2	0.025	-0.007	0.24	-0.004	-0.003	0.005	-0.013	216.9	-69.0	-21.235	-55.212
22/12/2015	5869581.764	532354.975	494.364	14.02	-0.098	0.323	0.338	-0.098	106.9	-16.2	0.024	-0.007	0.19	0.016	0.003	0.016	0.001	10.6	3.5	-86.172	5.293
06/04/2016	5869581.749	532354.977	494.374	14.31	-0.113	0.325	0.344	-0.088	109.2	-14.3	0.024	-0.006	0.29	-0.015	0.002	0.015	0.010	172.4	33.5	52.144	34.458
22/07/2016	5869581.754	532354.953	494.367	14.60	-0.108	0.301	0.320	-0.095	109.7	-16.5	0.022	-0.007	0.29	0.005	-0.024	0.025	-0.007	281.8	-15.9	-83.684	-23.895
30/10/2016	5869581.741	532354.963	494.362	14.87	-0.121	0.311	0.334	-0.100	111.3	-16.7	0.022	-0.007	0.27	-0.013	0.010	0.016	-0.005	142.4	-17.0	59.905	-18.263
16/12/2016	5869581.753	532354.978	494.366	15.00	-0.109	0.326	0.344	-0.096	108.5	-15.6	0.023	-0.006	0.13	0.012	0.015	0.019	0.004	51.3	11.8	149.281	31.085
04/04/2017	5869581.748	532354.977	494.365	15.30	-0.114	0.325	0.344	-0.097	109.3	-15.7	0.023	-0.006	0.30	-0.005	-0.001	0.005	-0.001	191.3	-11.1	17.086	-3.351
08/08/2017	5869581.756	532354.976	494.371	15.65	-0.106	0.324	0.341	-0.091	108.1	-14.9	0.022	-0.006	0.34	0.008	-0.001	0.008	0.006	352.9	36.7	-23.371	17.393
02/10/2017	5869581.754	532354.976	494.359	15.80	-0.108	0.324	0.342	-0.103	108.4	-16.8	0.022	-0.007	0.15	-0.002	0.000	0.002	-0.012	180.0	-80.5	13.282	-79.691
04/12/2017	5869581.751	532354.976	494.358	15.97	-0.111	0.324	0.342	-0.104	108.9	-16.9	0.021	-0.007	0.17	-0.003	0.000	0.003	-0.001	180.0	-18.4	17.393	-5.798
13/06/2018	5869581.757	532354.977	494.358	16.49	-0.105	0.325	0.342	-0.104	107.9	-16.9	0.021	-0.006	0.52	0.006	0.001	0.006	0.000	9.5	0.0	-11.632	0.000
06/12/2018	5869581.757	532354.976	494.354	16.97	-0.105	0.324	0.341	-0.108	108.0	-17.6	0.020	-0.006	0.48	0.000	-0.001	0.001	-0.004	270.0	-76.0	-2.075	-8.301
12/06/2019	5869581.746	532354.987	494.348	17.49	-0.116	0.335	0.355	-0.114	109.1	-17.8	0.020	-0.007	0.51	-0.011	0.011	0.016	-0.006	135.0	-21.1	30.223	-11.657
12/12/2019	5869581.747	532354.980	494.362	17.99	-0.115	0.328	0.348	-0.100	109.3	-16.1	0.019	-0.006	0.50	0.001	-0.007	0.007	0.014	278.1	63.2	-14.113	27.943
17/06/2020	5869581.739	532355.011	494.347	18.51	-0.123	0.359	0.379	-0.115	108.9	-16.9	0.021	-0.006	0.51	-0.008	0.031	0.032	-0.015	104.5	-25.1	62.201	-29.142
21/12/2020	5869581.732	532355.033	494.342	19.02	-0.130	0.381	0.403	-0.120	108.8	-16.6	0.021	-0.006	0.51	-0.007	0.022	0.023	-0.005	107.7	-12.2	45.093	-9.766
19/06/2021	5869581.716	532355.079	494.332	19.51	-0.146	0.427	0.451	-0.130	108.9	-16.1	0.023	-0.007	0.49	-0.016	0.046	0.049	-0.010	109.2	-11.6	98.827	-20.292
14/12/2021	5869581.715	532355.077	494.336	20.00	-0.147	0.425	0.450	-0.126	109.1	-15.7	0.022	-0.006	0.49	-0.001	-0.002	0.002	0.004	243.4	60.8	-4.588	8.208
28/06/2022	5869581.720	532355.086	494.323	20.53	-0.142	0.434	0.457	-0.139	108.1	-16.9	0.022	-0.007	0.54	0.005	0.009	0.010	-0.013	60.9	-51.6	19.186	-24.226
16/12/2022	5869581.712	532355.081	494.336	21.00	-0.150	0.429	0.454	-0.126	109.3	-15.5	0.022	-0.006	0.47	-0.008	-0.005	0.009	0.013	212.0	54.0	-20.151	27.768
06/06/2023	5869581.714	532355.083	494.330	21.47	-0.148	0.432	0.456	-0.132	108.9	-16.1	0.021	-0.006	0.47	0.002	0.002	0.003	-0.006	51.3	-60.6	6.799	-12.062
04/01/2024	5869581.714	532355.081	494.327	22.05	-0.148	0.429	0.454	-0.135	109.0	-16.6	0.021	-0.006	0.58	0.000	-0.002	0.002	-0.003	270.0	-53.0	-4.307	-5.720

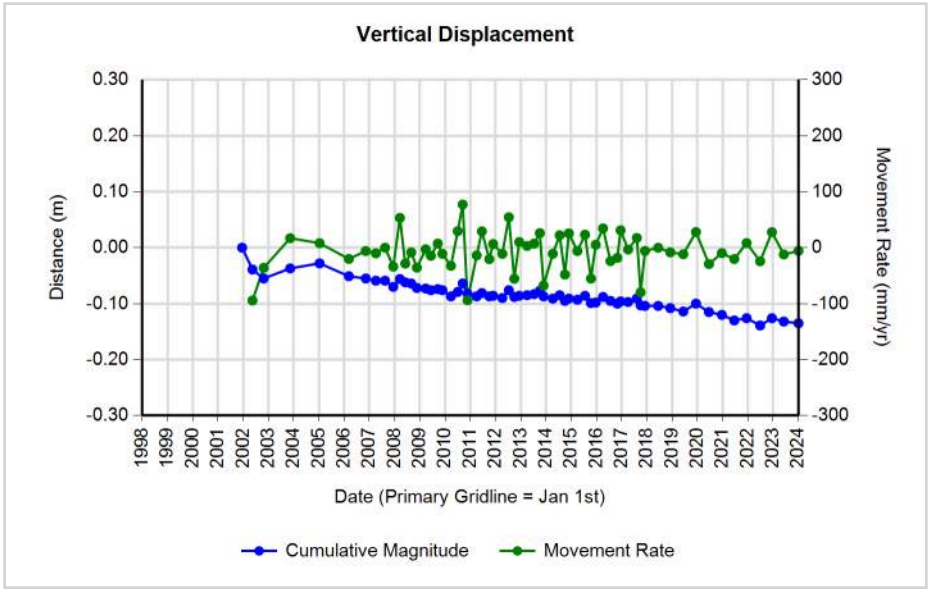
CITY OF Quesnel

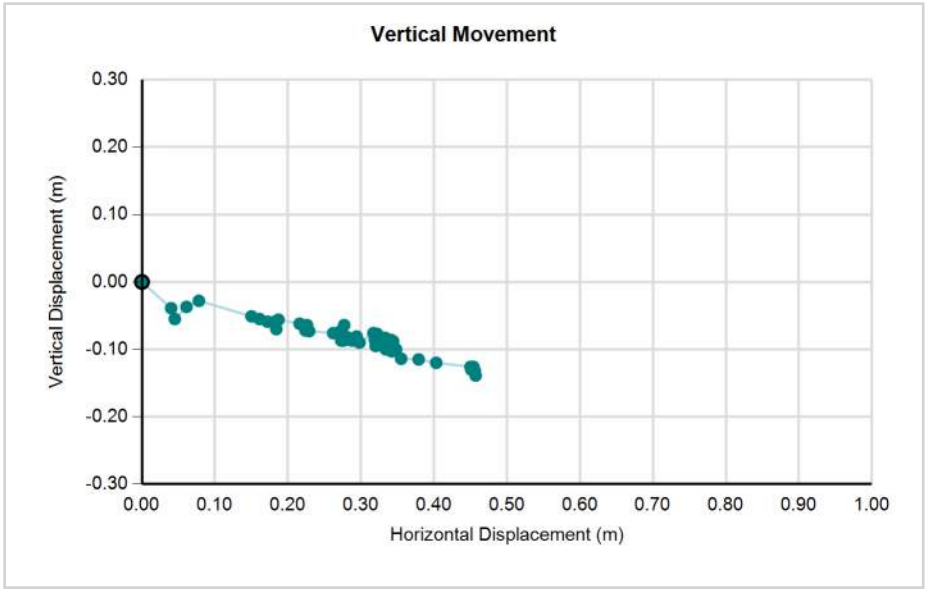
wsp

GPS Hub 01-34 (Abbott Road and Blair Street)









CITY OF Quesnel

wsp

GPS Hub 01-35 (Lewis Drive North of Couldwell Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869572.261	532863.710	473.090	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5869572.217	532863.733	473.093	0.41	-0.044	0.023	0.050	0.003	152.4	3.5	0.120	0.007	0.41	-0.044	0.023	0.050	0.003	152.4	3.5	120.094	7.257
24/10/2002	5869572.284	532863.719	473.019	0.86	0.023	0.009	0.025	-0.071	21.4	-70.8	0.029	-0.083	0.44	0.067	-0.014	0.068	-0.074	348.2	-47.2	-154.323	-166.843
12/11/2003	5869572.241	532863.717	473.076	1.91	-0.020	0.007	0.021	-0.014	160.8	-32.9	0.011	-0.007	1.05	-0.043	-0.002	0.043	0.057	182.7	53.1	-40.918	54.521
11/01/2005	5869572.256	532863.720	473.093	3.07	-0.005	0.010	0.011	0.003	117.5	14.2	0.004	0.001	1.17	0.015	0.003	0.015	0.017	12.5	47.8	-12.881	14.216
10/03/2006	5869572.252	532863.717	473.087	4.23	-0.009	0.007	0.011	-0.003	142.1	-14.7	0.003	-0.001	1.16	-0.004	-0.003	0.005	-0.006	220.9	-50.3	4.224	-5.095
10/11/2006	5869572.250	532863.721	473.087	4.90	-0.011	0.011	0.016	-0.003	135.0	-10.9	0.003	-0.001	0.67	-0.002	0.004	0.004	0.000	116.6	0.0	6.667	0.000
05/04/2007	5869572.252	532863.721	473.085	5.30	-0.009	0.011	0.014	-0.005	129.3	-19.4	0.003	-0.001	0.40	0.002	0.000	0.002	-0.002	0.0	-45.0	-5.003	-5.003
16/08/2007	5869572.247	532863.717	473.113	5.67	-0.014	0.007	0.016	0.023	153.4	55.8	0.003	0.004	0.36	-0.005	-0.004	0.006	0.028	218.7	77.1	17.585	76.895
13/12/2007	5869572.257	532863.714	473.076	5.99	-0.004	0.004	0.006	-0.014	135.0	-68.0	0.001	-0.002	0.33	0.010	-0.003	0.010	-0.037	343.3	-74.2	-32.045	-113.565
18/03/2008	5869572.253	532863.717	473.089	6.26	-0.008	0.007	0.011	-0.001	138.8	-5.4	0.002	0.000	0.26	-0.004	0.003	0.005	0.013	143.1	69.0	19.023	49.461
03/06/2008	5869572.250	532863.718	473.094	6.47	-0.011	0.008	0.014	0.004	144.0	16.4	0.002	0.001	0.21	-0.003	0.001	0.003	0.005	161.6	57.7	15.000	23.718
29/08/2008	5869572.251	532863.712	473.114	6.70	-0.010	0.002	0.010	0.024	168.7	67.0	0.002	0.004	0.24	0.001	-0.006	0.006	0.020	279.5	73.1	-25.537	83.966
19/11/2008	5869572.258	532863.719	473.087	6.93	-0.003	0.009	0.009	-0.003	108.4	-17.5	0.001	0.000	0.22	0.007	0.007	0.010	-0.027	45.0	-69.9	-44.095	-120.265
26/03/2009	5869572.250	532863.717	473.090	7.28	-0.011	0.007	0.013	0.000	147.5	0.0	0.002	0.000	0.35	-0.008	-0.002	0.008	0.003	194.0	20.0	23.716	8.628
10/06/2009	5869572.247	532863.722	473.099	7.49	-0.014	0.012	0.018	0.009	139.4	26.0	0.002	0.001	0.21	-0.003	0.005	0.006	0.009	121.0	57.1	28.023	43.253
17/09/2009	5869572.246	532863.720	473.100	7.76	-0.015	0.010	0.018	0.010	146.3	29.0	0.002	0.001	0.27	-0.001	-0.002	0.002	0.001	243.4	24.1	8.250	3.689
23/11/2009	5869572.262	532863.717	473.093	7.94	0.001	0.007	0.007	0.003	81.9	23.0	0.001	0.000	0.18	0.016	-0.003	0.016	-0.007	349.4	-23.3	-88.744	-38.160
27/03/2010	5869572.261	532863.713	473.085	8.28	0.000	0.003	0.003	-0.005	90.0	-59.0	0.000	-0.001	0.34	-0.001	-0.004	0.004	-0.008	256.0	-62.7	-12.145	-23.565
04/07/2010	5869572.247	532863.721	473.078	8.55	-0.014	0.011	0.018	-0.012	141.8	-34.0	0.002	-0.001	0.27	-0.014	0.008	0.016	-0.007	150.3	-23.5	59.490	-25.826
13/09/2010	5869572.255	532863.723	473.097	8.74	-0.006	0.013	0.014	0.007	114.8	26.1	0.002	0.001	0.19	0.008	0.002	0.008	0.019	14.0	66.5	-42.422	97.743
22/11/2010	5869572.253	532863.724	473.084	8.94	-0.008	0.014	0.016	-0.006	119.7	-20.4	0.002	-0.001	0.19	-0.002	0.001	0.002	-0.013	153.4	-80.2	11.667	-67.832
04/04/2011	5869572.263	532863.717	473.076	9.30	0.002	0.007	0.007	-0.014	74.1	-62.5	0.001	-0.002	0.36	0.010	-0.007	0.012	-0.008	325.0	-33.2	-33.522	-21.970
18/06/2011	5869572.247	532863.722	473.104	9.51	-0.014	0.012	0.018	0.014	139.4	37.2	0.002	0.001	0.21	-0.016	0.005	0.017	0.028	162.6	59.1	81.636	136.360
03/10/2011	5869572.254	532863.718	473.094	9.80	-0.007	0.008	0.011	0.004	131.2	20.6	0.001	0.000	0.29	0.007	-0.004	0.008	-0.010	330.3	-51.1	-27.521	-34.136
28/11/2011	5869572.261	532863.723	473.087	9.95	0.000	0.013	0.013	-0.003	90.0	-13.0	0.001	0.000	0.15	0.007	0.005	0.009	-0.007	35.5	-39.1	56.107	-45.656
09/04/2012	5869572.249	532863.719	473.081	10.32	-0.012	0.009	0.015	-0.009	143.1	-31.0	0.001	-0.001	0.36	-0.012	-0.004	0.013	-0.006	198.4	-25.4	34.738	-16.477
12/07/2012	5869572.253	532863.721	473.101	10.57	-0.008	0.011	0.014	0.011	126.0	39.0	0.001	0.001	0.26	0.004	0.002	0.004	0.020	26.6	77.4	-17.377	77.713
29/09/2012	5869572.263	532863.723	473.092	10.79	0.002	0.013	0.013	0.002	81.3	8.6	0.001	0.000	0.22	0.010	0.002	0.010	-0.009	11.3	-41.4	-47.150	-41.611
10/12/2012	5869572.263	532863.716	473.089	10.99	0.002	0.006	0.006	-0.001	71.6	-9.0	0.001	0.000	0.20	0.000	-0.007	0.007	-0.003	270.0	-23.2	-35.510	-15.219
03/04/2013	5869572.256	532863.720	473.093	11.30	-0.005	0.010	0.011	0.003	116.6	15.0	0.001	0.000	0.31	-0.007	0.004	0.008	0.004	150.3	26.4	25.831	12.816
12/07/2013	5869572.256	532863.722	473.110	11.57	-0.005	0.012	0.013	0.020	112.6	57.0	0.001	0.002	0.27	0.000	0.002	0.002	0.017	90.0	83.3	7.305	62.092
04/10/2013	5869572.255	532863.722	473.105	11.80	-0.006	0.012	0.013	0.015	116.6	48.2	0.001	0.001	0.23	-0.001	0.000	0.001	-0.005	180.0	-78.7	4.348	-21.741
27/11/2013	5869572.262	532863.727	473.088	11.95	0.001	0.017	0.017	-0.002	86.6	-6.7	0.001	0.000	0.15	0.007	0.005	0.009	-0.017	35.5	-63.2	58.185	-114.986
10/04/2014	5869572.257	532863.724	473.092	12.32	-0.004	0.014	0.015	0.002	105.9	7.8	0.001	0.000	0.37	-0.005	-0.003	0.006	0.004	211.0	34.4	-15.894	10.903

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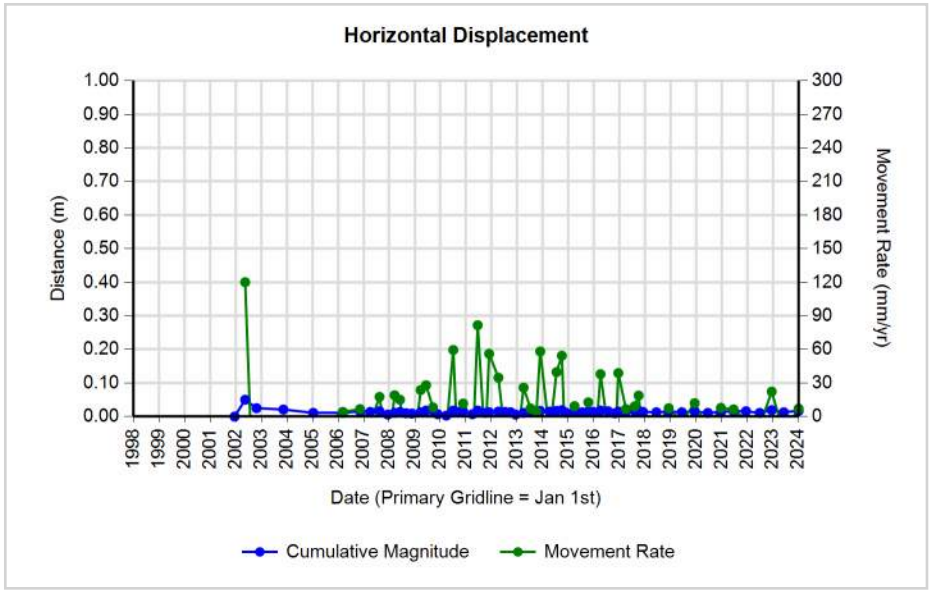
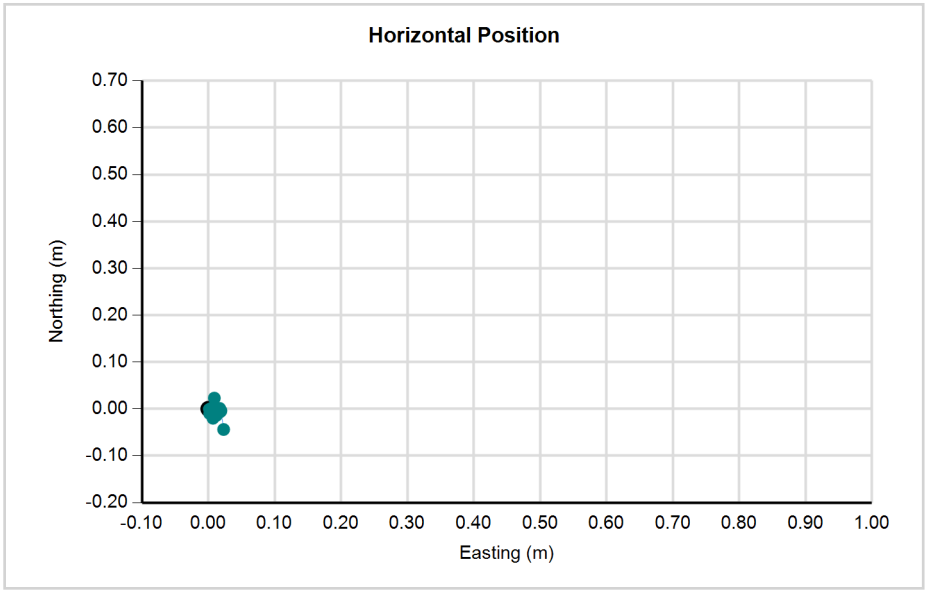
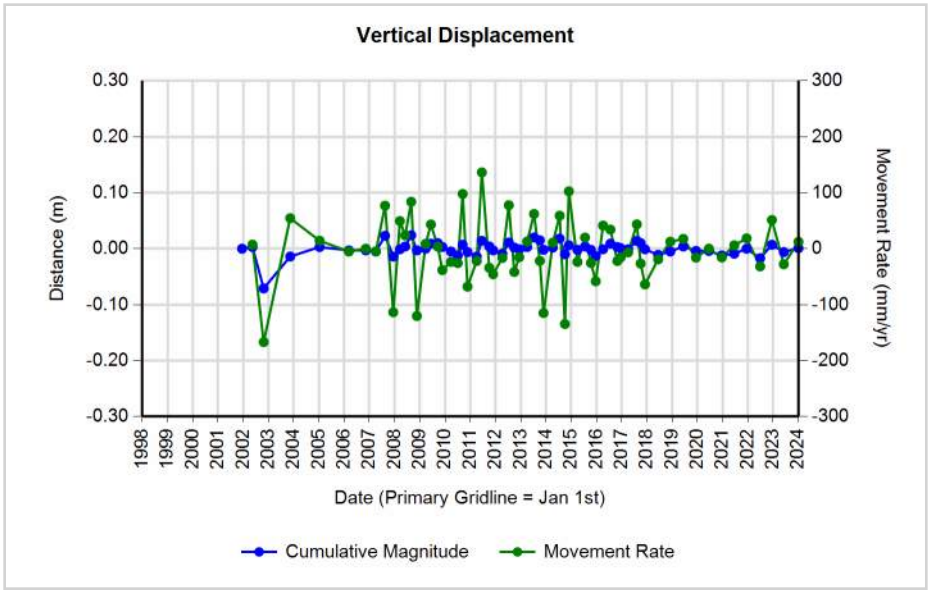
GPS Hub 01-35 (Lewis Drive North of Couldwell Street)

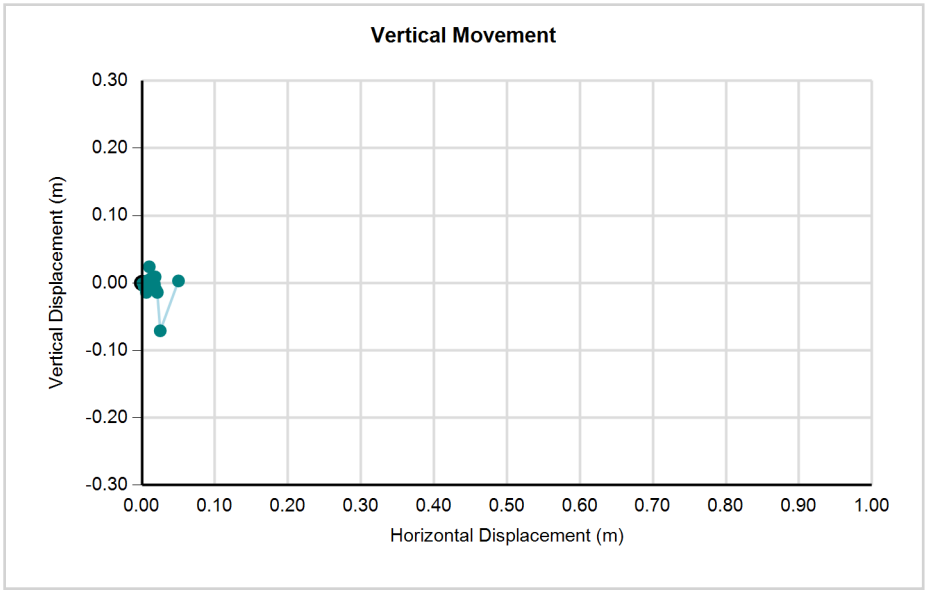
18/07/2014	5869572.247	532863.720	473.108	12.59	-0.014	0.010	0.017	0.018	144.5	46.3	0.001	0.001	0.27	-0.010	-0.004	0.011	0.016	201.8	56.1	39.736	59.030
02/10/2014	5869572.255	532863.728	473.080	12.80	-0.006	0.018	0.019	-0.010	108.4	-27.8	0.001	-0.001	0.21	0.008	0.008	0.011	-0.028	45.0	-68.0	54.373	-134.566
28/11/2014	5869572.256	532863.721	473.096	12.95	-0.005	0.011	0.012	0.006	114.4	26.4	0.001	0.000	0.16	0.001	-0.007	0.007	0.016	278.1	66.2	-45.311	102.526
01/04/2015	5869572.257	532863.724	473.088	13.29	-0.004	0.014	0.015	-0.002	105.9	-7.8	0.001	0.000	0.34	0.001	0.003	0.003	-0.008	71.6	-68.4	9.315	-23.565
20/07/2015	5869572.254	532863.721	473.094	13.59	-0.007	0.011	0.013	0.004	122.5	17.1	0.001	0.000	0.30	-0.003	-0.003	0.004	0.006	225.0	54.7	-14.087	19.923
14/10/2015	5869572.251	532863.721	473.088	13.83	-0.010	0.011	0.015	-0.002	132.3	-7.7	0.001	0.000	0.24	-0.003	0.000	0.003	-0.006	180.0	-63.4	12.741	-25.483
22/12/2015	5869572.260	532863.724	473.077	14.02	-0.001	0.014	0.014	-0.013	94.1	-42.8	0.001	-0.001	0.19	0.009	0.003	0.009	-0.011	18.4	-49.2	-50.218	-58.228
06/04/2016	5869572.249	532863.724	473.089	14.31	-0.012	0.014	0.018	-0.001	130.6	-3.1	0.001	0.000	0.29	-0.011	0.000	0.011	0.012	180.0	47.5	37.903	41.349
22/07/2016	5869572.252	532863.723	473.099	14.60	-0.009	0.013	0.016	0.009	124.7	29.6	0.001	0.001	0.29	0.003	-0.001	0.003	0.010	341.6	72.5	-10.795	34.136
30/10/2016	5869572.259	532863.720	473.093	14.87	-0.002	0.010	0.010	0.003	101.3	16.4	0.001	0.000	0.27	0.007	-0.003	0.008	-0.006	336.8	-38.2	-27.817	-21.915
16/12/2016	5869572.256	532863.724	473.091	15.00	-0.005	0.014	0.015	0.001	109.7	3.8	0.001	0.000	0.13	-0.003	0.004	0.005	-0.002	126.9	-21.8	38.856	-15.543
04/04/2017	5869572.254	532863.724	473.089	15.30	-0.007	0.014	0.016	-0.001	116.6	-3.7	0.001	0.000	0.30	-0.002	0.000	0.002	-0.002	180.0	-45.0	6.702	-6.702
08/08/2017	5869572.251	532863.723	473.104	15.65	-0.010	0.013	0.016	0.014	127.6	40.5	0.001	0.001	0.34	-0.003	-0.001	0.003	0.015	198.4	78.1	9.167	43.482
02/10/2017	5869572.253	532863.725	473.100	15.80	-0.008	0.015	0.017	0.010	118.1	30.5	0.001	0.001	0.15	0.002	0.002	0.003	-0.004	45.0	-54.7	18.783	-26.564
04/12/2017	5869572.254	532863.722	473.089	15.97	-0.007	0.012	0.014	-0.001	120.3	-4.1	0.001	0.000	0.17	0.001	-0.003	0.003	-0.011	288.4	-74.0	-18.334	-63.774
13/06/2018	5869572.258	532863.723	473.079	16.49	-0.003	0.013	0.013	-0.011	103.0	-39.5	0.001	-0.001	0.52	0.004	0.001	0.004	-0.010	14.0	-67.6	-7.885	-19.123
06/12/2018	5869572.261	532863.725	473.085	16.97	0.000	0.015	0.015	-0.005	90.0	-18.4	0.001	0.000	0.48	0.003	0.002	0.004	0.006	33.7	59.0	7.483	12.452
12/06/2019	5869572.260	532863.723	473.094	17.49	-0.001	0.013	0.013	0.004	94.4	17.1	0.001	0.000	0.51	-0.001	-0.002	0.002	0.009	243.4	76.0	-4.344	17.485
12/12/2019	5869572.254	532863.723	473.086	17.99	-0.007	0.013	0.015	-0.004	118.3	-15.2	0.001	0.000	0.50	-0.006	0.000	0.006	-0.008	180.0	-53.1	11.975	-15.967
17/06/2020	5869572.253	532863.718	473.086	18.51	-0.008	0.008	0.011	-0.004	135.0	-19.5	0.001	0.000	0.51	-0.001	-0.005	0.005	0.000	258.7	0.0	-9.906	0.000
21/12/2020	5869572.253	532863.722	473.078	19.02	-0.008	0.012	0.014	-0.012	123.7	-39.8	0.001	-0.001	0.51	0.000	0.004	0.004	-0.008	90.0	-63.4	7.813	-15.626
19/06/2021	5869572.250	532863.721	473.081	19.51	-0.011	0.011	0.016	-0.009	135.0	-30.1	0.001	0.000	0.49	-0.003	-0.001	0.003	0.003	198.4	43.5	6.417	6.088
14/12/2021	5869572.251	532863.722	473.090	20.00	-0.010	0.012	0.016	0.000	129.8	0.0	0.001	0.000	0.49	0.001	0.001	0.001	0.009	45.0	81.1	-2.902	18.468
28/06/2022	5869572.254	532863.719	473.073	20.53	-0.007	0.009	0.011	-0.017	127.9	-56.2	0.001	-0.001	0.54	0.003	-0.003	0.004	-0.017	315.0	-76.0	-7.906	-31.680
16/12/2022	5869572.257	532863.729	473.097	21.00	-0.004	0.019	0.019	0.007	101.9	19.8	0.001	0.000	0.47	0.003	0.010	0.010	0.024	73.3	66.5	22.300	51.263
06/06/2023	5869572.257	532863.722	473.084	21.47	-0.004	0.012	0.013	-0.006	108.4	-25.8	0.001	0.000	0.47	0.000	-0.007	0.007	-0.013	270.0	-61.9	-14.865	-27.861
04/01/2024	5869572.256	532863.726	473.091	22.05	-0.005	0.016	0.017	0.001	107.4	3.4	0.001	0.000	0.58	-0.001	0.004	0.004	0.007	104.0	59.9	7.104	12.267

GPS Hub 01-35 (Lewis Drive North of Couldwell Street)









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GPS Hub 01-36 (Anderson Drive at Abbott Drive)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869315.625	532692.784	476.837	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5869315.619	532692.818	476.814	0.41	-0.006	0.034	0.035	-0.023	100.0	-33.7	0.084	-0.056	0.41	-0.006	0.034	0.035	-0.023	100.0	-33.7	83.512	-55.634
24/10/2002	5869315.641	532692.787	476.793	0.86	0.016	0.003	0.016	-0.044	10.6	-69.7	0.019	-0.051	0.44	0.022	-0.031	0.038	-0.021	305.4	-28.9	-85.706	-47.347
12/11/2003	5869315.631	532692.792	476.822	1.91	0.006	0.008	0.010	-0.015	56.7	-56.4	0.005	-0.008	1.05	-0.010	0.005	0.012	0.029	152.2	67.7	-11.203	27.299
11/01/2005	5869315.625	532692.801	476.820	3.07	0.000	0.017	0.018	-0.017	88.7	-45.0	0.006	-0.006	1.17	-0.005	0.009	0.010	-0.002	119.9	-12.0	8.911	-1.886
10/03/2006	5869315.629	532692.794	476.820	4.23	0.004	0.010	0.011	-0.017	68.2	-57.6	0.003	-0.004	1.16	0.004	-0.008	0.008	0.000	295.6	3.4	-7.183	0.432
10/11/2006	5869315.631	532692.795	476.818	4.90	0.006	0.011	0.013	-0.019	61.4	-56.6	0.003	-0.004	0.67	0.002	0.001	0.002	-0.002	26.6	-41.8	3.334	-2.982
05/04/2007	5869315.629	532692.800	476.808	5.30	0.004	0.016	0.016	-0.029	76.0	-60.4	0.003	-0.005	0.40	-0.002	0.005	0.005	-0.010	111.8	-61.7	13.472	-25.017
16/08/2007	5869315.623	532692.792	476.832	5.67	-0.002	0.008	0.008	-0.005	104.0	-31.2	0.001	-0.001	0.36	-0.006	-0.008	0.010	0.024	233.1	67.4	-27.462	65.910
13/12/2007	5869315.633	532692.796	476.811	5.99	0.008	0.012	0.014	-0.026	56.3	-61.0	0.002	-0.004	0.33	0.010	0.004	0.011	-0.021	21.8	-62.8	33.058	-64.456
18/03/2008	5869315.631	532692.796	476.825	6.26	0.006	0.012	0.013	-0.012	63.4	-41.8	0.002	-0.002	0.26	-0.002	0.000	0.002	0.014	180.0	81.9	-7.609	53.266
03/06/2008	5869315.629	532692.796	476.817	6.47	0.004	0.012	0.013	-0.020	71.6	-57.7	0.002	-0.003	0.21	-0.002	0.000	0.002	-0.008	180.0	-76.0	-9.487	-37.948
29/08/2008	5869315.629	532692.793	476.823	6.70	0.004	0.009	0.010	-0.014	66.0	-54.9	0.001	-0.002	0.24	0.000	-0.003	0.003	0.006	270.0	63.4	-12.595	25.190
19/11/2008	5869315.631	532692.797	476.812	6.93	0.006	0.013	0.014	-0.025	65.2	-60.2	0.002	-0.004	0.22	0.002	0.004	0.004	-0.011	63.4	-67.9	19.920	-48.997
26/03/2009	5869315.632	532692.799	476.814	7.28	0.007	0.015	0.017	-0.023	65.0	-54.3	0.002	-0.003	0.35	0.001	0.002	0.002	0.002	63.4	41.8	6.431	5.752
10/06/2009	5869315.628	532692.796	476.825	7.49	0.003	0.012	0.012	-0.012	76.0	-44.1	0.002	-0.002	0.21	-0.004	-0.003	0.005	0.011	216.9	65.6	-24.030	52.865
17/09/2009	5869315.624	532692.792	476.811	7.76	-0.001	0.008	0.008	-0.026	97.1	-72.8	0.001	-0.003	0.27	-0.004	-0.004	0.006	-0.014	225.0	-68.0	-20.870	-51.652
23/11/2009	5869315.634	532692.798	476.813	7.94	0.009	0.014	0.017	-0.024	57.3	-55.3	0.002	-0.003	0.18	0.010	0.006	0.012	0.002	31.0	9.7	63.575	10.903
27/03/2010	5869315.640	532692.798	476.818	8.28	0.015	0.014	0.021	-0.019	43.0	-42.8	0.002	-0.002	0.34	0.006	0.000	0.006	0.005	0.0	39.8	17.673	14.728
04/07/2010	5869315.626	532692.793	476.821	8.55	0.001	0.009	0.009	-0.016	83.7	-60.5	0.001	-0.002	0.27	-0.014	-0.005	0.015	0.003	199.7	11.4	-54.847	11.068
13/09/2010	5869315.634	532692.797	476.820	8.74	0.009	0.013	0.016	-0.017	55.3	-47.1	0.002	-0.002	0.19	0.008	0.004	0.009	-0.001	26.6	-6.4	46.013	-5.144
22/11/2010	5869315.640	532692.797	476.817	8.94	0.015	0.013	0.020	-0.020	40.9	-45.2	0.002	-0.002	0.19	0.006	0.000	0.006	-0.003	0.0	-26.6	31.307	-15.654
04/04/2011	5869315.629	532692.803	476.812	9.30	0.004	0.019	0.019	-0.025	78.1	-52.2	0.002	-0.003	0.36	-0.011	0.006	0.013	-0.005	151.4	-21.8	-34.410	-13.731
18/06/2011	5869315.629	532692.798	476.823	9.51	0.004	0.014	0.015	-0.014	74.1	-43.9	0.002	-0.001	0.21	0.000	-0.005	0.005	0.011	270.0	65.6	-24.350	53.570
03/10/2011	5869315.632	532692.793	476.820	9.80	0.007	0.009	0.011	-0.017	52.1	-56.2	0.001	-0.002	0.29	0.003	-0.005	0.006	-0.003	301.0	-27.2	-19.904	-10.241
28/11/2011	5869315.635	532692.794	476.816	9.95	0.010	0.010	0.014	-0.021	45.0	-56.0	0.001	-0.002	0.15	0.003	0.001	0.003	-0.004	18.4	-51.7	20.625	-26.089
09/04/2012	5869315.632	532692.797	476.817	10.32	0.007	0.013	0.015	-0.020	61.7	-53.6	0.001	-0.002	0.36	-0.003	0.003	0.004	0.001	135.0	13.3	11.651	2.746
12/07/2012	5869315.629	532692.800	476.826	10.57	0.004	0.016	0.016	-0.011	76.0	-33.7	0.002	-0.001	0.26	-0.003	0.003	0.004	0.009	135.0	64.8	16.485	34.971
29/09/2012	5869315.638	532692.795	476.828	10.79	0.013	0.011	0.017	-0.009	40.2	-27.9	0.002	-0.001	0.22	0.009	-0.005	0.010	0.002	330.9	11.0	47.601	9.247
10/12/2012	5869315.635	532692.800	476.824	10.99	0.010	0.016	0.019	-0.013	58.0	-34.6	0.002	-0.001	0.20	-0.003	0.005	0.006	-0.004	121.0	-34.4	29.580	-20.292
03/04/2013	5869315.633	532692.800	476.819	11.30	0.008	0.016	0.018	-0.018	63.4	-45.2	0.002	-0.002	0.31	-0.002	0.000	0.002	-0.005	180.0	-68.2	-6.408	-16.020
12/07/2013	5869315.635	532692.801	476.827	11.57	0.010	0.017	0.020	-0.010	59.5	-26.9	0.002	-0.001	0.27	0.002	0.001	0.002	0.008	26.6	74.4	8.167	29.220
04/10/2013	5869315.634	532692.795	476.832	11.80	0.009	0.011	0.014	-0.005	50.7	-19.4	0.001	0.000	0.23	-0.001	-0.006	0.006	0.005	260.5	39.4	-26.449	21.741
27/11/2013	5869315.637	532692.796	476.825	11.95	0.012	0.012	0.017	-0.012	45.0	-35.3	0.001	-0.001	0.15	0.003	0.001	0.003	-0.007	18.4	-65.7	21.389	-47.347
10/04/2014	5869315.637	532692.797	476.822	12.32	0.012	0.013	0.018	-0.015	47.3	-40.3	0.001	-0.001	0.37	0.000	0.001	0.001	-0.003	90.0	-71.6	2.726	-8.177

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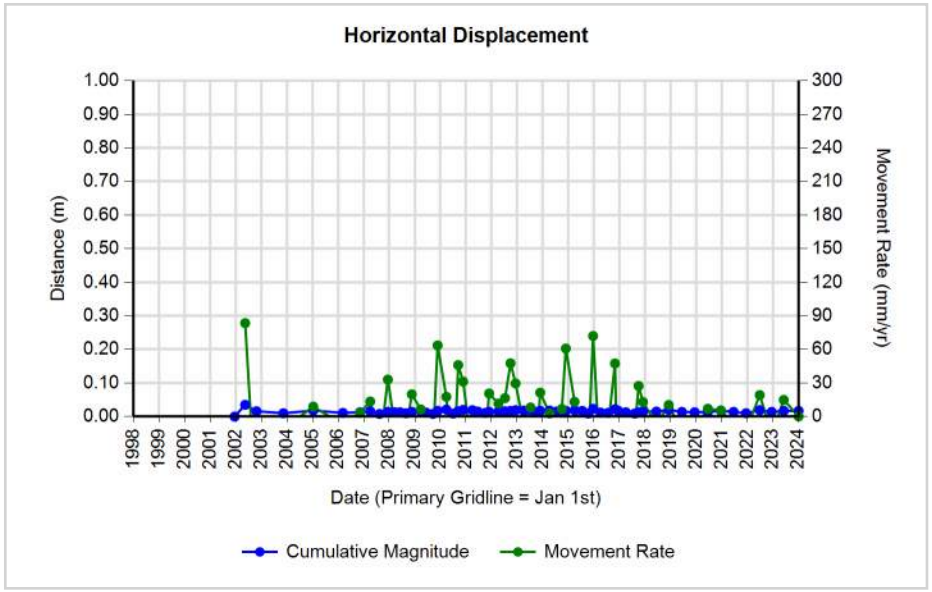
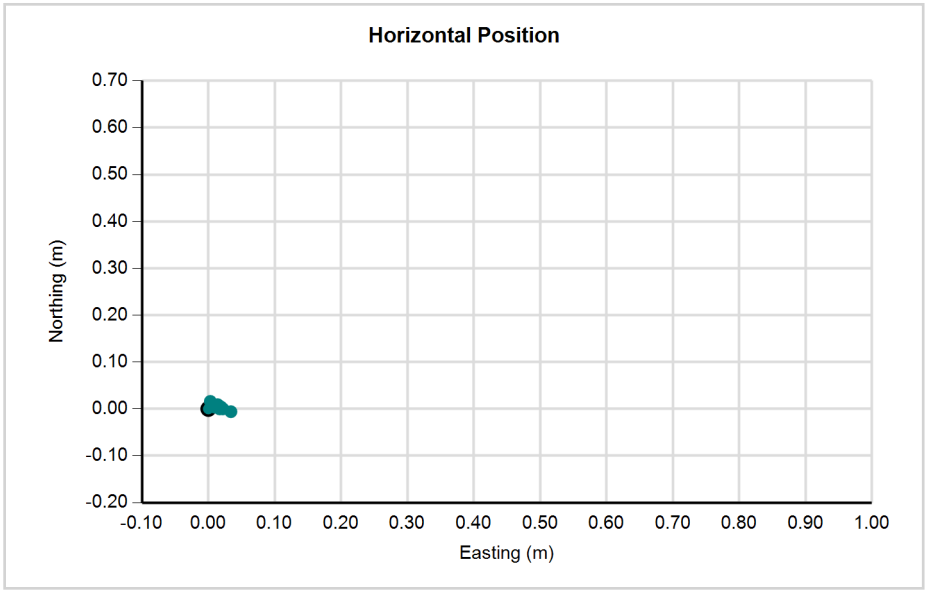
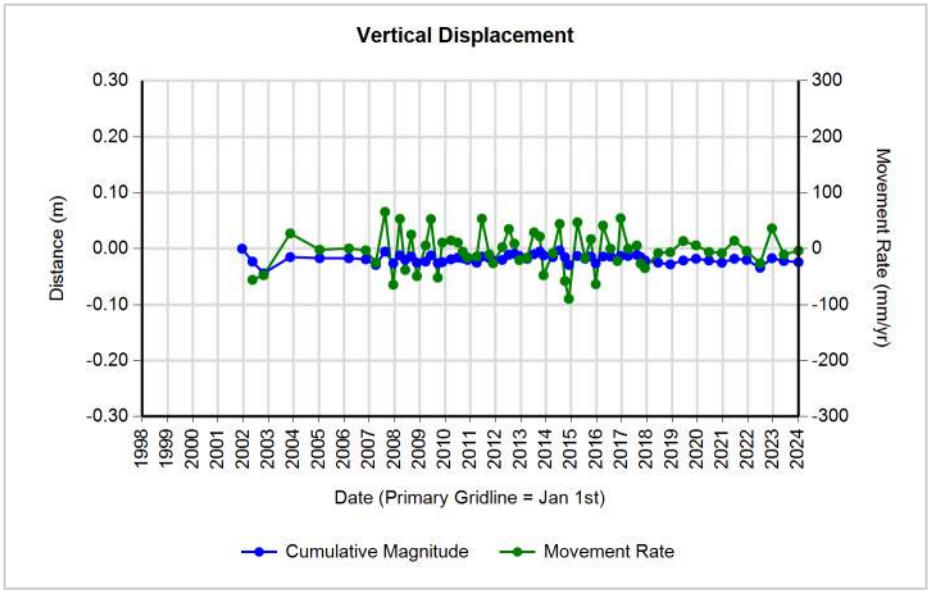
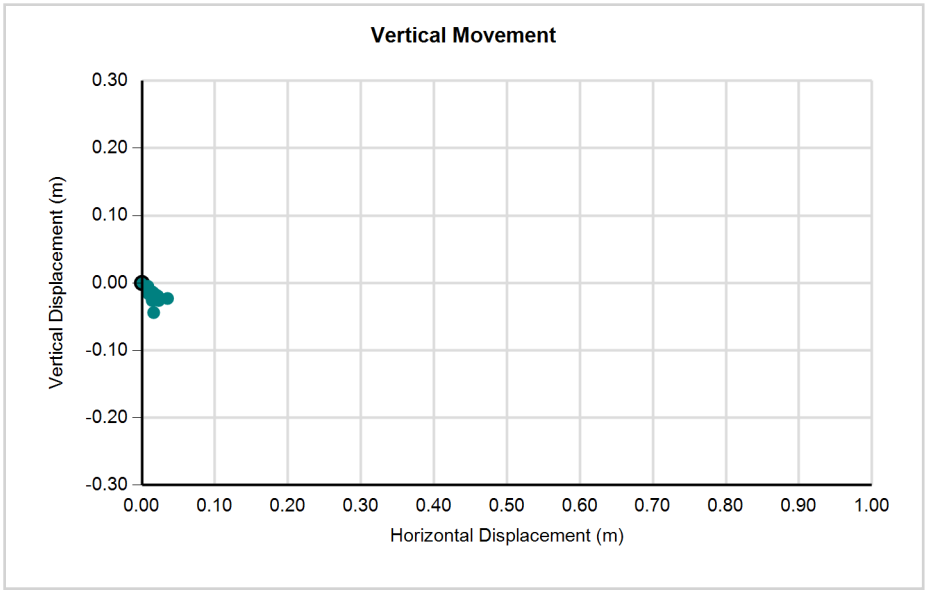
18/07/2014	5869315.626	532692.799	476.834	12.59	0.001	0.015	0.015	-0.003	86.2	-11.3	0.001	0.000	0.27	-0.011	0.002	0.011	0.012	169.7	47.0	-41.249	44.273
02/10/2014	5869315.627	532692.800	476.822	12.80	0.002	0.016	0.016	-0.015	82.9	-42.9	0.001	-0.001	0.21	0.001	0.001	0.001	-0.012	45.0	-83.3	6.797	-57.671
28/11/2014	5869315.636	532692.797	476.808	12.95	0.011	0.013	0.017	-0.029	49.8	-59.6	0.001	-0.002	0.16	0.009	-0.003	0.009	-0.014	341.6	-55.9	60.791	-89.711
01/04/2015	5869315.640	532692.795	476.824	13.29	0.015	0.011	0.019	-0.013	36.3	-34.9	0.001	-0.001	0.34	0.004	-0.002	0.004	0.016	333.4	74.4	13.173	47.129
20/07/2015	5869315.634	532692.798	476.819	13.59	0.009	0.014	0.017	-0.018	57.3	-47.2	0.001	-0.001	0.30	-0.006	0.003	0.007	-0.005	153.4	-36.7	-22.274	-16.602
14/10/2015	5869315.630	532692.792	476.823	13.83	0.005	0.008	0.009	-0.014	58.0	-56.0	0.001	-0.001	0.24	-0.004	-0.006	0.007	0.004	236.3	29.0	-30.626	16.988
22/12/2015	5869315.641	532692.800	476.811	14.02	0.016	0.016	0.023	-0.026	45.0	-49.0	0.002	-0.002	0.19	0.011	0.008	0.014	-0.012	36.0	-41.4	71.999	-63.522
06/04/2016	5869315.628	532692.796	476.823	14.31	0.003	0.012	0.012	-0.014	76.0	-48.5	0.001	-0.001	0.29	-0.013	-0.004	0.014	0.012	197.1	41.4	-46.867	41.349
22/07/2016	5869315.630	532692.794	476.823	14.60	0.005	0.010	0.011	-0.014	63.4	-51.4	0.001	-0.001	0.29	0.002	-0.002	0.003	0.000	315.0	0.0	-9.655	0.000
30/10/2016	5869315.625	532692.806	476.817	14.87	0.000	0.022	0.022	-0.020	90.0	-42.3	0.001	-0.001	0.27	-0.005	0.012	0.013	-0.006	112.6	-24.8	47.483	-21.915
16/12/2016	5869315.634	532692.799	476.824	15.00	0.009	0.015	0.017	-0.013	59.0	-36.6	0.001	-0.001	0.13	0.009	-0.007	0.011	0.007	322.1	31.5	-88.606	54.399
04/04/2017	5869315.631	532692.795	476.824	15.30	0.006	0.011	0.013	-0.013	61.4	-46.1	0.001	-0.001	0.30	-0.003	-0.004	0.005	0.000	233.1	0.0	-16.755	0.000
08/08/2017	5869315.629	532692.792	476.826	15.65	0.004	0.008	0.009	-0.011	63.4	-50.9	0.001	-0.001	0.34	-0.002	-0.003	0.004	0.002	236.3	29.0	-10.452	5.798
02/10/2017	5869315.630	532692.796	476.822	15.80	0.005	0.012	0.013	-0.015	67.4	-49.1	0.001	-0.001	0.15	0.001	0.004	0.004	-0.004	76.0	-44.1	27.381	-26.564
04/12/2017	5869315.631	532692.798	476.816	15.97	0.006	0.014	0.015	-0.021	66.8	-54.0	0.001	-0.001	0.17	0.001	0.002	0.002	-0.006	63.4	-69.6	12.964	-34.786
13/06/2018	5869315.634	532692.796	476.812	16.49	0.009	0.012	0.015	-0.025	53.1	-59.0	0.001	-0.002	0.52	0.003	-0.002	0.004	-0.004	326.3	-48.0	-6.895	-7.649
06/12/2018	5869315.637	532692.800	476.809	16.97	0.012	0.016	0.020	-0.028	53.1	-54.5	0.001	-0.002	0.48	0.003	0.004	0.005	-0.003	53.1	-31.0	10.376	-6.226
12/06/2019	5869315.631	532692.797	476.816	17.49	0.006	0.013	0.014	-0.021	65.2	-55.7	0.001	-0.001	0.51	-0.006	-0.003	0.007	0.007	206.6	46.2	-13.033	13.600
12/12/2019	5869315.634	532692.793	476.819	17.99	0.009	0.009	0.013	-0.018	45.0	-54.7	0.001	-0.001	0.50	0.003	-0.004	0.005	0.003	306.9	31.0	-9.980	5.988
17/06/2020	5869315.632	532692.796	476.816	18.51	0.007	0.012	0.014	-0.021	59.7	-56.5	0.001	-0.001	0.51	-0.002	0.003	0.004	-0.003	123.7	-39.8	7.005	-5.828
21/12/2020	5869315.634	532692.798	476.812	19.02	0.009	0.014	0.017	-0.025	57.3	-56.3	0.001	-0.001	0.51	0.002	0.002	0.003	-0.004	45.0	-54.7	5.525	-7.813
19/06/2021	5869315.633	532692.795	476.819	19.51	0.008	0.011	0.014	-0.018	54.0	-52.9	0.001	-0.001	0.49	-0.001	-0.003	0.003	0.007	251.6	65.7	-6.417	14.204
14/12/2021	5869315.627	532692.794	476.817	20.00	0.002	0.010	0.010	-0.020	78.7	-63.0	0.001	-0.001	0.49	-0.006	-0.001	0.006	-0.002	189.5	-18.2	-12.482	-4.104
28/06/2022	5869315.636	532692.799	476.803	20.53	0.011	0.015	0.019	-0.034	53.7	-61.3	0.001	-0.002	0.54	0.009	0.005	0.010	-0.014	29.1	-53.7	19.186	-26.089
16/12/2022	5869315.629	532692.797	476.820	21.00	0.004	0.013	0.014	-0.017	72.9	-51.3	0.001	-0.001	0.47	-0.007	-0.002	0.007	0.017	195.9	66.8	-15.550	36.311
06/06/2023	5869315.636	532692.797	476.815	21.47	0.011	0.013	0.017	-0.022	49.5	-52.3	0.001	-0.001	0.47	0.007	0.000	0.007	-0.005	359.2	-35.0	14.866	-10.405
04/01/2024	5869315.636	532692.797	476.813	22.05	0.011	0.013	0.017	-0.024	49.8	-54.6	0.001	-0.001	0.58	0.000	0.000	0.000	-0.002	90.0	-87.3	0.172	-3.618

GPS Hub 01-36 (Anderson Drive at Abbott Drive)









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GPS Hub 01-37 (Dawson Street at Abbott Drive)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869644.821	531567.709	545.684	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5869644.805	531567.740	545.706	0.41	-0.016	0.031	0.035	0.022	117.3	32.2	0.084	0.053	0.41	-0.016	0.031	0.035	0.022	117.3	32.2	84.384	53.215
24/10/2002	5869644.819	531567.765	545.664	0.86	-0.002	0.056	0.056	-0.020	92.0	-19.6	0.065	-0.023	0.44	0.014	0.025	0.029	-0.042	60.8	-55.7	64.602	-94.694
12/11/2003	5869644.808	531567.776	545.704	1.91	-0.013	0.067	0.068	0.020	100.7	16.3	0.036	0.010	1.05	-0.011	0.011	0.015	0.040	133.9	68.9	14.698	38.075
11/01/2005	5869644.810	531567.789	545.704	3.07	-0.011	0.080	0.081	0.020	97.6	13.8	0.026	0.006	1.17	0.002	0.013	0.013	0.000	80.5	-1.5	11.014	-0.283
10/03/2006	5869644.790	531567.873	545.689	4.23	-0.031	0.164	0.167	0.005	100.7	1.7	0.039	0.001	1.16	-0.020	0.084	0.087	-0.015	103.6	-9.6	74.808	-12.693
10/11/2006	5869644.782	531567.890	545.685	4.90	-0.039	0.181	0.185	0.001	102.2	0.3	0.038	0.000	0.67	-0.008	0.017	0.019	-0.004	115.2	-12.0	28.010	-5.963
05/04/2007	5869644.790	531567.891	545.679	5.30	-0.031	0.182	0.185	-0.005	99.7	-1.6	0.035	-0.001	0.40	0.008	0.001	0.008	-0.006	7.1	-36.7	-20.169	-15.010
16/08/2007	5869644.778	531567.912	545.676	5.67	-0.043	0.203	0.208	-0.008	102.0	-2.2	0.037	-0.001	0.36	-0.012	0.021	0.024	-0.003	119.7	-7.1	66.423	-8.239
13/12/2007	5869644.794	531567.911	545.669	5.99	-0.027	0.202	0.204	-0.015	97.6	-4.2	0.034	-0.003	0.33	0.016	-0.001	0.016	-0.007	356.4	-23.6	-49.205	-21.485
18/03/2008	5869644.788	531567.910	545.676	6.26	-0.033	0.201	0.204	-0.008	99.3	-2.2	0.033	-0.001	0.26	-0.006	-0.001	0.006	0.007	189.5	49.0	-23.143	26.633
03/06/2008	5869644.788	531567.942	545.674	6.47	-0.033	0.233	0.235	-0.010	98.1	-2.4	0.036	-0.002	0.21	0.000	0.032	0.032	-0.002	90.0	-3.6	151.792	-9.487
29/07/2008	5869644.781	531567.957	545.683	6.62	-0.040	0.248	0.251	-0.001	99.2	-0.2	0.038	0.000	0.15	-0.007	0.015	0.017	0.009	115.0	28.5	107.964	58.701
29/08/2008	5869644.781	531567.965	545.697	6.70	-0.040	0.256	0.259	0.013	98.9	2.9	0.039	0.002	0.08	0.000	0.008	0.008	0.014	90.0	60.3	94.258	164.952
19/11/2008	5869644.793	531567.960	545.675	6.93	-0.028	0.251	0.253	-0.009	96.4	-2.0	0.036	-0.001	0.22	0.012	-0.005	0.013	-0.022	337.4	-59.4	-57.905	-97.994
26/03/2009	5869644.788	531567.963	545.657	7.28	-0.033	0.254	0.256	-0.027	97.4	-6.0	0.035	-0.004	0.35	-0.005	0.003	0.006	-0.018	149.0	-72.1	16.770	-51.768
10/06/2009	5869644.777	531568.017	545.691	7.49	-0.044	0.308	0.311	0.007	98.1	1.3	0.042	0.001	0.21	-0.011	0.054	0.055	0.034	101.5	31.7	264.849	163.401
17/09/2009	5869644.769	531568.025	545.698	7.76	-0.052	0.316	0.320	0.014	99.3	2.5	0.041	0.002	0.27	-0.008	0.008	0.011	0.007	135.0	31.7	41.741	25.826
23/11/2009	5869644.790	531568.017	545.666	7.94	-0.031	0.308	0.310	-0.018	95.7	-3.3	0.039	-0.002	0.18	0.021	-0.008	0.022	-0.032	339.1	-54.9	-122.507	-174.448
27/03/2010	5869644.788	531568.016	545.669	8.28	-0.033	0.307	0.309	-0.015	96.1	-2.8	0.037	-0.002	0.34	-0.002	-0.001	0.002	0.003	206.6	53.3	-6.586	8.837
04/07/2010	5869644.767	531568.022	545.688	8.55	-0.054	0.313	0.318	0.004	99.8	0.7	0.037	0.000	0.27	-0.021	0.006	0.022	0.019	164.1	41.0	80.578	70.098
13/09/2010	5869644.785	531568.020	545.665	8.74	-0.036	0.311	0.313	-0.019	96.6	-3.5	0.036	-0.002	0.19	0.018	-0.002	0.018	-0.023	353.7	-51.8	-93.168	-118.320
22/11/2010	5869644.781	531568.026	545.673	8.94	-0.040	0.317	0.320	-0.011	97.2	-2.0	0.036	-0.001	0.19	-0.004	0.006	0.007	0.008	123.7	48.0	37.627	41.743
04/04/2011	5869644.790	531568.021	545.657	9.30	-0.031	0.312	0.314	-0.027	95.7	-4.9	0.034	-0.003	0.36	0.009	-0.005	0.010	-0.016	330.9	-57.2	-28.274	-43.940
18/06/2011	5869644.768	531568.041	545.698	9.51	-0.053	0.332	0.336	0.014	99.1	2.4	0.035	0.001	0.21	-0.022	0.020	0.030	0.041	137.7	54.1	144.796	199.670
03/10/2011	5869644.777	531568.030	545.660	9.80	-0.044	0.321	0.324	-0.024	97.8	-4.2	0.033	-0.002	0.29	0.009	-0.011	0.014	-0.038	309.3	-69.5	-48.516	-129.715
28/11/2011	5869644.780	531568.037	545.668	9.95	-0.041	0.328	0.331	-0.016	97.1	-2.8	0.033	-0.002	0.15	0.003	0.007	0.008	0.008	66.8	46.4	49.673	52.179
09/04/2012	5869644.776	531568.041	545.665	10.32	-0.045	0.332	0.335	-0.019	97.7	-3.2	0.032	-0.002	0.36	-0.004	0.004	0.006	-0.003	135.0	-27.9	15.535	-8.239
12/07/2012	5869644.774	531568.067	545.678	10.57	-0.047	0.358	0.361	-0.006	97.5	-1.0	0.034	-0.001	0.26	-0.002	0.026	0.026	0.013	94.4	26.5	101.325	50.513
29/09/2012	5869644.782	531568.075	545.667	10.79	-0.039	0.366	0.368	-0.017	96.1	-2.6	0.034	-0.002	0.22	0.008	0.008	0.011	-0.011	45.0	-44.2	52.308	-50.858
10/12/2012	5869644.777	531568.073	545.669	10.99	-0.044	0.364	0.367	-0.015	96.9	-2.3	0.033	-0.001	0.20	-0.005	-0.002	0.005	0.002	201.8	20.4	-27.318	10.146
03/04/2013	5869644.778	531568.073	545.653	11.30	-0.043	0.364	0.367	-0.031	96.7	-4.8	0.032	-0.003	0.31	0.001	0.000	0.001	-0.016	0.0	-86.4	-3.204	-51.263
12/07/2013	5869644.777	531568.085	545.674	11.57	-0.044	0.376	0.379	-0.010	96.7	-1.5	0.033	-0.001	0.27	-0.001	0.012	0.012	0.021	94.8	60.2	43.982	76.702
04/10/2013	5869644.773	531568.081	545.688	11.80	-0.048	0.372	0.375	0.004	97.4	0.6	0.032	0.000	0.23	-0.004	-0.004	0.006	0.014	225.0	68.0	-24.597	60.875
27/11/2013	5869644.777	531568.074	545.662	11.95	-0.044	0.365	0.368	-0.022	96.9	-3.4	0.031	-0.002	0.15	0.004	-0.007	0.008	-0.026	299.7	-72.8	-54.532	-175.861

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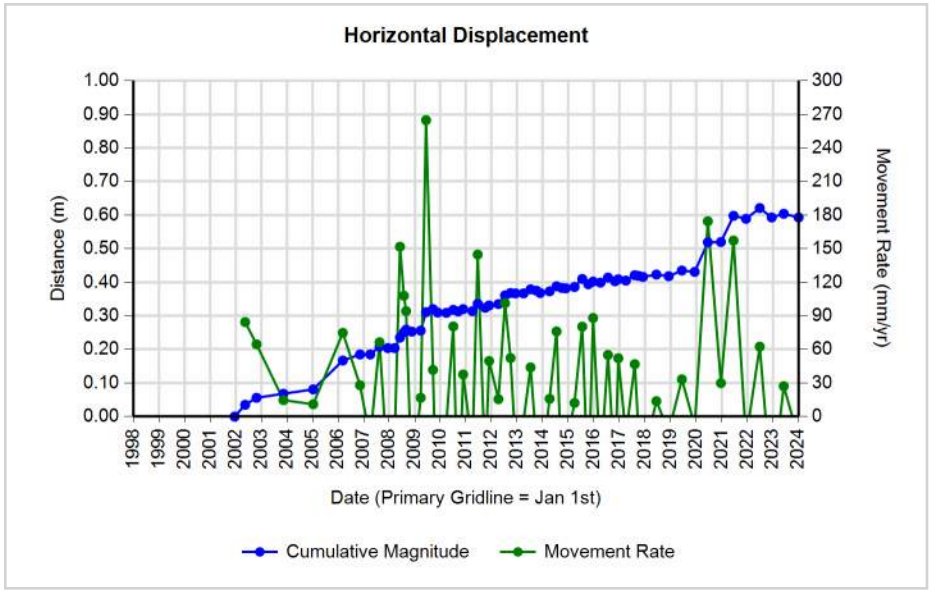
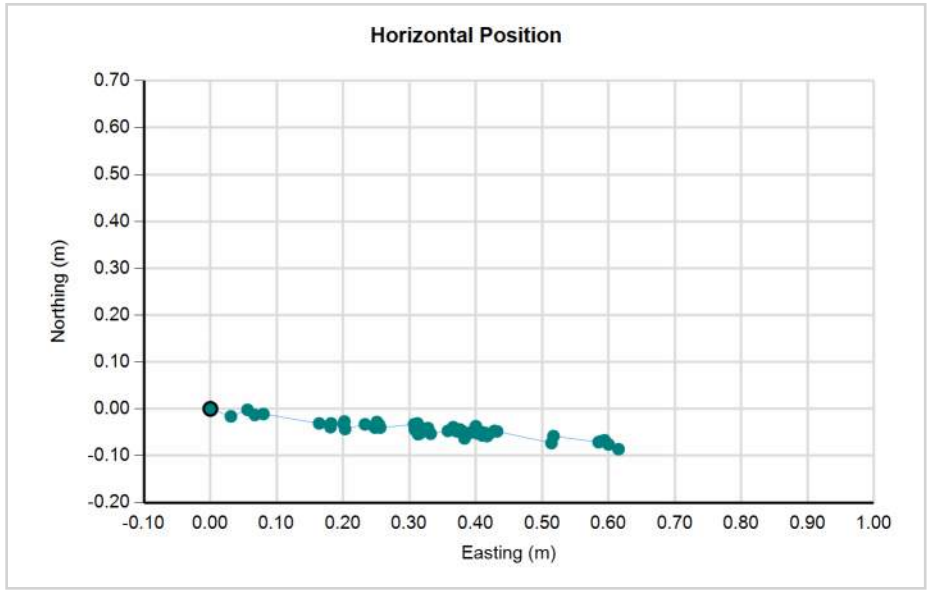
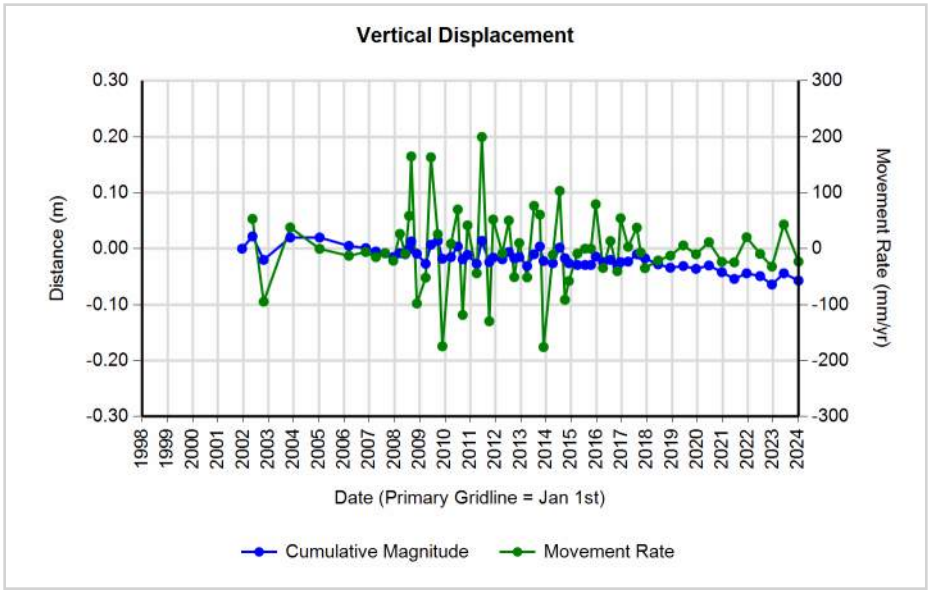
GPS Hub 01-37 (Dawson Street at Abbott Drive)

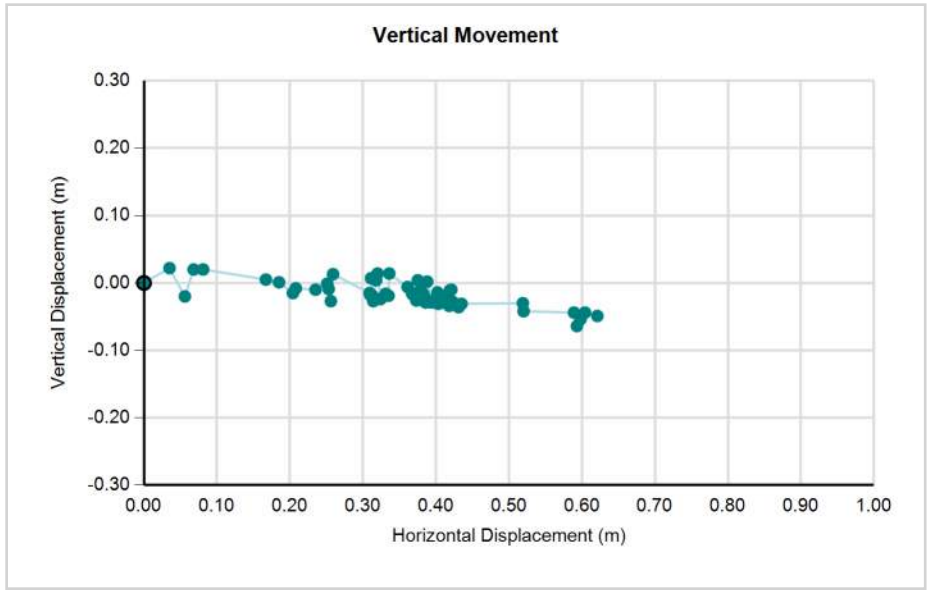
10/04/2014	5869644.774	531568.079	545.658	12.32	-0.047	0.370	0.373	-0.026	97.2	-4.0	0.030	-0.002	0.37	-0.003	0.005	0.006	-0.004	121.0	-34.4	15.894	-10.903
18/07/2014	5869644.758	531568.092	545.686	12.59	-0.063	0.383	0.388	0.002	99.3	0.3	0.031	0.000	0.27	-0.016	0.013	0.021	0.028	140.9	53.6	76.059	103.303
02/10/2014	5869644.770	531568.089	545.667	12.80	-0.051	0.380	0.383	-0.017	97.6	-2.5	0.030	-0.001	0.21	0.012	-0.003	0.012	-0.019	346.0	-56.9	-59.446	-91.313
28/11/2014	5869644.774	531568.088	545.658	12.95	-0.047	0.379	0.382	-0.026	97.1	-3.9	0.029	-0.002	0.16	0.004	-0.001	0.004	-0.009	346.0	-65.4	-26.420	-57.671
01/04/2015	5869644.775	531568.092	545.655	13.29	-0.046	0.383	0.386	-0.029	96.8	-4.3	0.029	-0.002	0.34	0.001	0.004	0.004	-0.003	76.0	-36.0	12.145	-8.837
20/07/2015	5869644.772	531568.116	545.655	13.59	-0.049	0.407	0.410	-0.029	96.9	-4.0	0.030	-0.002	0.30	-0.003	0.024	0.024	0.000	97.1	0.0	80.311	0.000
14/10/2015	5869644.770	531568.100	545.655	13.83	-0.051	0.391	0.394	-0.029	97.4	-4.2	0.029	-0.002	0.24	-0.002	-0.016	0.016	0.000	262.9	0.0	-68.482	0.000
22/12/2015	5869644.784	531568.109	545.670	14.02	-0.037	0.400	0.402	-0.014	95.3	-2.0	0.029	-0.001	0.19	0.014	0.009	0.017	0.015	32.7	42.0	88.101	79.402
06/04/2016	5869644.772	531568.105	545.660	14.31	-0.049	0.396	0.399	-0.024	97.1	-3.4	0.028	-0.002	0.29	-0.012	-0.004	0.013	-0.010	198.4	-38.3	-43.586	-34.458
22/07/2016	5869644.764	531568.119	545.664	14.60	-0.057	0.410	0.414	-0.020	97.9	-2.8	0.028	-0.001	0.29	-0.008	0.014	0.016	0.004	119.7	13.9	55.042	13.654
30/10/2016	5869644.775	531568.109	545.653	14.87	-0.046	0.400	0.403	-0.031	96.6	-4.4	0.027	-0.002	0.27	0.011	-0.010	0.015	-0.011	317.7	-36.5	-54.298	-40.177
16/12/2016	5869644.772	531568.115	545.660	15.00	-0.049	0.406	0.409	-0.024	96.9	-3.4	0.027	-0.002	0.13	-0.003	0.006	0.007	0.007	116.6	46.2	52.131	54.399
04/04/2017	5869644.769	531568.111	545.661	15.30	-0.052	0.402	0.405	-0.023	97.4	-3.2	0.026	-0.002	0.30	-0.003	-0.004	0.005	0.001	233.1	11.3	-16.755	3.351
08/08/2017	5869644.763	531568.126	545.674	15.65	-0.058	0.417	0.421	-0.010	97.9	-1.4	0.027	-0.001	0.34	-0.006	0.015	0.016	0.013	111.8	38.8	46.832	37.685
02/10/2017	5869644.764	531568.124	545.673	15.80	-0.057	0.415	0.419	-0.011	97.8	-1.5	0.027	-0.001	0.15	0.001	-0.002	0.002	-0.001	296.6	-24.1	-14.850	-6.641
04/12/2017	5869644.770	531568.122	545.667	15.97	-0.051	0.413	0.416	-0.017	97.0	-2.3	0.026	-0.001	0.17	0.006	-0.002	0.006	-0.006	341.6	-43.5	-36.667	-34.786
13/06/2018	5869644.766	531568.128	545.656	16.49	-0.055	0.419	0.423	-0.028	97.5	-3.8	0.026	-0.002	0.52	-0.004	0.006	0.007	-0.011	123.7	-56.8	13.790	-21.035
06/12/2018	5869644.771	531568.124	545.650	16.97	-0.050	0.415	0.418	-0.034	96.9	-4.7	0.025	-0.002	0.48	0.005	-0.004	0.006	-0.006	321.3	-43.1	-13.288	-12.452
12/06/2019	5869644.773	531568.141	545.653	17.49	-0.048	0.432	0.435	-0.031	96.3	-4.1	0.025	-0.002	0.51	0.002	0.017	0.017	0.003	83.3	9.9	33.256	5.828
12/12/2019	5869644.774	531568.137	545.648	17.99	-0.047	0.428	0.431	-0.036	96.3	-4.8	0.024	-0.002	0.50	0.001	-0.004	0.004	-0.005	284.0	-50.5	-8.229	-9.980
17/06/2020	5869644.748	531568.223	545.654	18.51	-0.073	0.514	0.519	-0.030	98.1	-3.3	0.028	-0.002	0.51	-0.026	0.086	0.090	0.006	106.8	3.8	174.551	11.657
21/12/2020	5869644.763	531568.226	545.642	19.02	-0.058	0.517	0.520	-0.042	96.4	-4.6	0.027	-0.002	0.51	0.015	0.003	0.015	-0.012	11.3	-38.1	29.878	-23.439
19/06/2021	5869644.754	531568.303	545.630	19.51	-0.067	0.594	0.598	-0.054	96.4	-5.2	0.031	-0.003	0.49	-0.009	0.077	0.078	-0.012	96.7	-8.8	157.310	-24.350
14/12/2021	5869644.750	531568.294	545.640	20.00	-0.071	0.585	0.589	-0.044	96.9	-4.3	0.029	-0.002	0.49	-0.004	-0.009	0.010	0.010	246.0	45.4	-20.210	20.520
28/06/2022	5869644.735	531568.324	545.635	20.53	-0.086	0.615	0.621	-0.049	98.0	-4.5	0.030	-0.002	0.54	-0.015	0.030	0.034	-0.005	116.6	-8.5	62.504	-9.318
16/12/2022	5869644.752	531568.298	545.620	21.00	-0.069	0.589	0.593	-0.064	96.7	-6.2	0.028	-0.003	0.47	0.017	-0.026	0.031	-0.015	303.2	-25.8	-66.353	-32.039
06/06/2023	5869644.745	531568.309	545.640	21.47	-0.076	0.600	0.604	-0.044	97.2	-4.1	0.028	-0.002	0.47	-0.007	0.011	0.013	0.020	123.2	57.8	27.152	43.193
04/01/2024	5869644.749	531568.298	545.627	22.05	-0.072	0.589	0.593	-0.057	97.0	-5.5	0.027	-0.003	0.58	0.004	-0.011	0.011	-0.013	290.5	-49.4	-19.681	-22.983

GPS Hub 01-37 (Dawson Street at Abbott Drive)







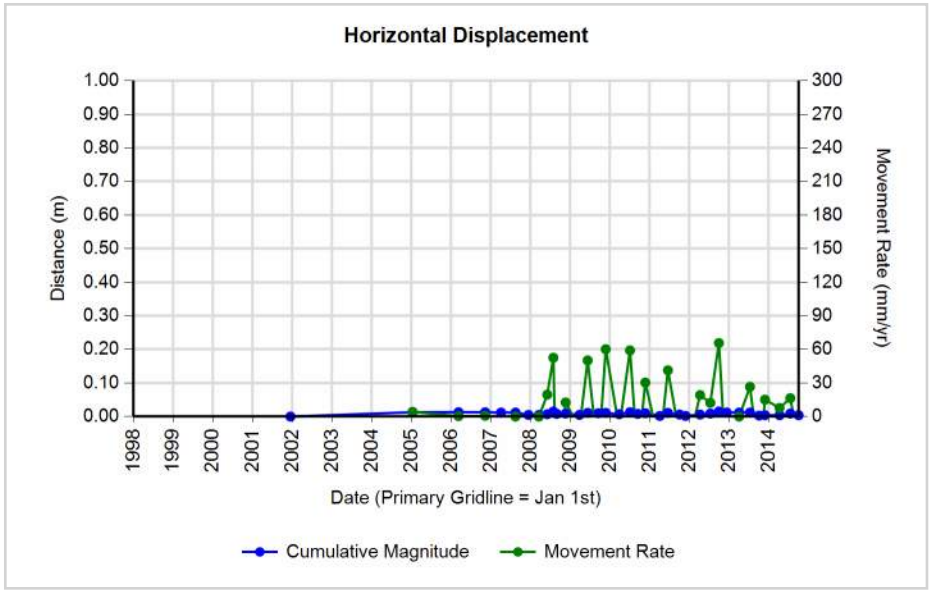


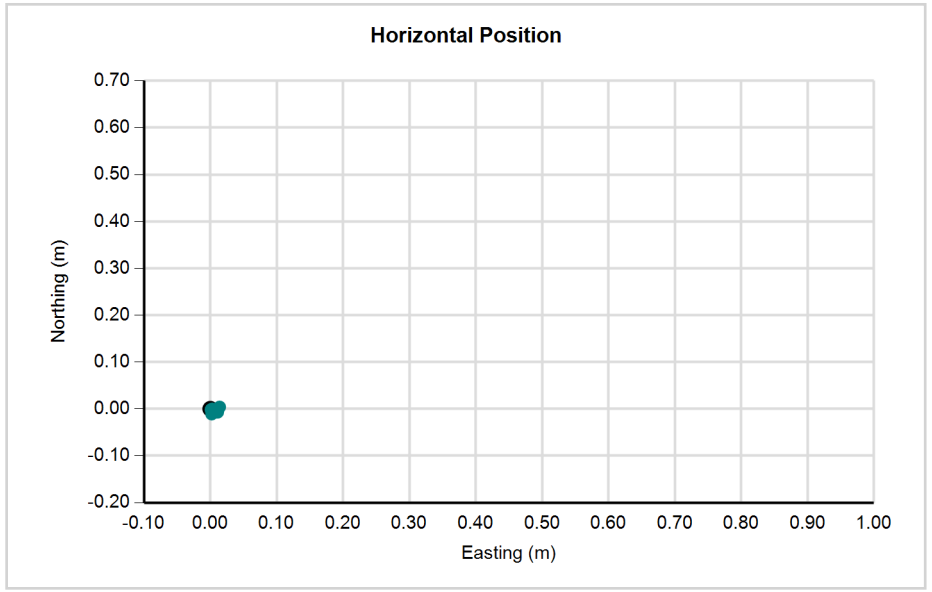
CITY OF Quesnel

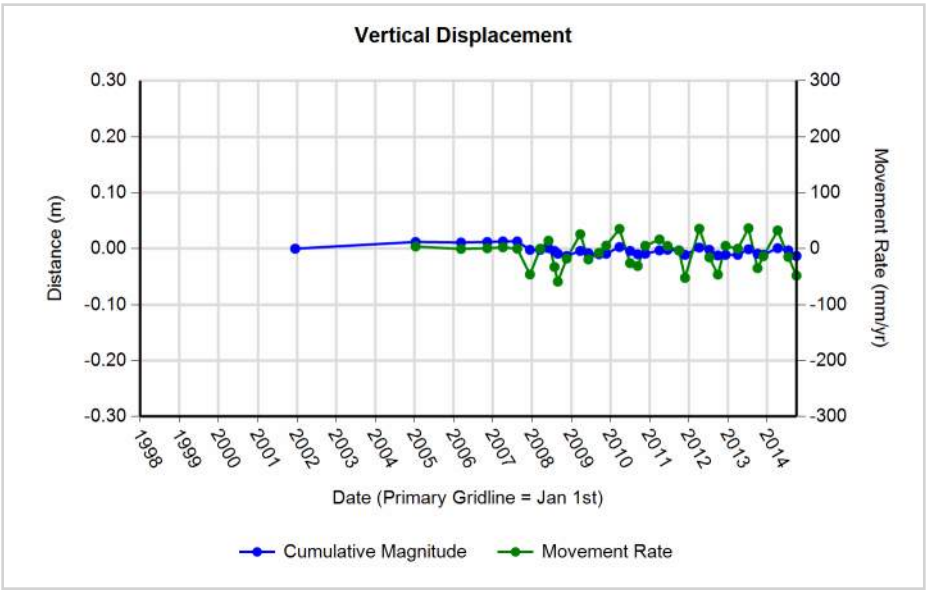
GPS Hub 01-38 (Quesnel No. 1 Station Benchmark)

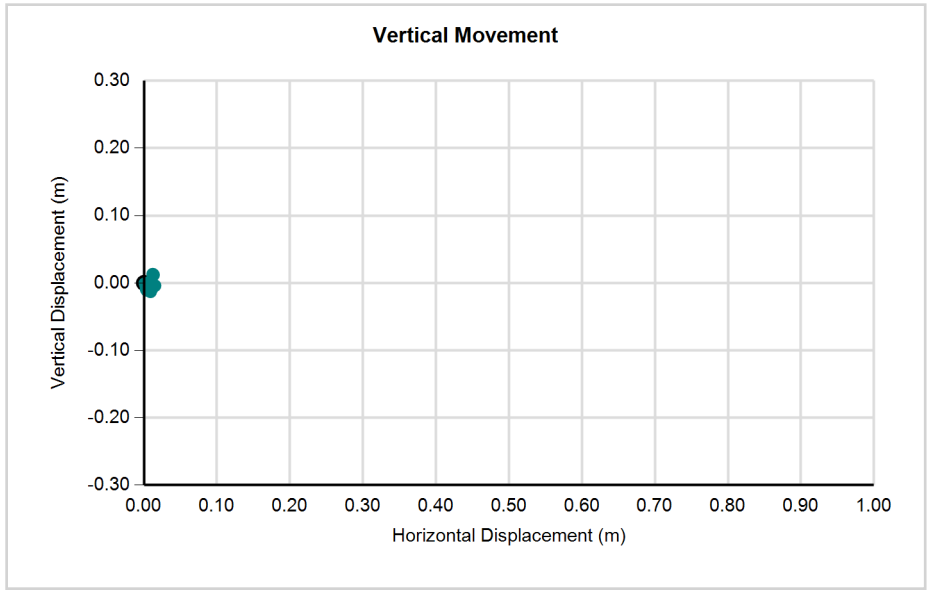
	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5870193.015	537018.228	596.514	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
11/01/2005	5870193.008	537018.239	596.526	3.07	-0.007	0.011	0.013	0.012	122.5	42.6	0.004	0.004	3.07	-0.007	0.011	0.013	0.012	122.5	42.6	4.241	3.903
10/03/2006	5870193.008	537018.239	596.525	4.23	-0.007	0.011	0.013	0.011	120.8	40.9	0.003	0.003	1.16	0.000	0.000	0.000	0.000	63.4	-48.2	0.386	-0.432
10/11/2006	5870193.008	537018.239	596.526	4.90	-0.007	0.011	0.013	0.012	122.5	42.6	0.003	0.002	0.67	0.000	0.000	0.000	0.000	243.4	48.2	0.667	0.745
05/04/2007	5870193.008	537018.238	596.527	5.30	-0.007	0.010	0.012	0.013	125.0	46.8	0.002	0.002	0.40	0.000	-0.001	0.001	0.001	270.0	45.0	-2.502	2.502
16/08/2007	5870193.008	537018.238	596.527	5.67	-0.007	0.010	0.012	0.013	125.0	46.8	0.002	0.002	0.36	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
13/12/2007	5870193.013	537018.233	596.512	5.99	-0.002	0.005	0.005	-0.002	111.8	-20.4	0.001	0.000	0.33	0.005	-0.005	0.007	-0.015	315.0	-64.8	-21.703	-46.040
18/03/2008	5870193.013	537018.233	596.512	6.26	-0.002	0.005	0.005	-0.002	111.8	-20.4	0.001	0.000	0.26	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
03/06/2008	5870193.009	537018.232	596.515	6.47	-0.006	0.004	0.007	0.001	146.3	7.9	0.001	0.000	0.21	-0.004	-0.001	0.004	0.003	194.0	36.0	19.558	14.231
29/07/2008	5870193.005	537018.239	596.510	6.62	-0.010	0.011	0.015	-0.004	132.3	-15.1	0.002	-0.001	0.15	-0.004	0.007	0.008	-0.005	119.7	-31.8	52.585	-32.612
29/08/2008	5870193.010	537018.234	596.505	6.70	-0.005	0.006	0.008	-0.009	129.8	-49.0	0.001	-0.001	0.08	0.005	-0.005	0.007	-0.005	315.0	-35.3	-83.313	-58.911
19/11/2008	5870193.012	537018.236	596.501	6.93	-0.003	0.008	0.009	-0.013	110.6	-56.7	0.001	-0.002	0.22	0.002	0.002	0.003	-0.004	45.0	-54.7	12.599	-17.817
26/03/2009	5870193.014	537018.233	596.510	7.28	-0.001	0.005	0.005	-0.004	101.3	-38.1	0.001	-0.001	0.35	0.002	-0.003	0.004	0.009	303.7	68.2	-10.370	25.884
10/06/2009	5870193.004	537018.230	596.506	7.49	-0.011	0.002	0.011	-0.008	169.7	-35.6	0.001	-0.001	0.21	-0.010	-0.003	0.010	-0.004	196.7	-21.0	50.175	-19.224
17/09/2009	5870193.011	537018.237	596.504	7.76	-0.004	0.009	0.010	-0.010	114.0	-45.4	0.001	-0.001	0.27	0.007	0.007	0.010	-0.002	45.0	-11.4	-36.523	-7.379
23/11/2009	5870193.022	537018.236	596.505	7.94	0.007	0.008	0.011	-0.009	48.8	-40.3	0.001	-0.001	0.18	0.011	-0.001	0.011	0.001	354.8	5.2	60.214	5.451
27/03/2010	5870193.020	537018.233	596.517	8.28	0.005	0.005	0.007	0.003	45.0	23.0	0.001	0.000	0.34	-0.002	-0.003	0.004	0.012	236.3	73.3	-10.620	35.347
04/07/2010	5870193.004	537018.234	596.510	8.55	-0.011	0.006	0.013	-0.004	151.4	-17.7	0.001	0.000	0.27	-0.016	0.001	0.016	-0.007	176.4	-23.6	59.145	-25.826
13/09/2010	5870193.011	537018.235	596.504	8.74	-0.004	0.007	0.008	-0.010	119.7	-51.1	0.001	-0.001	0.19	0.007	0.001	0.007	-0.006	8.1	-40.3	-36.376	-30.866
22/11/2010	5870193.016	537018.238	596.505	8.94	0.001	0.010	0.010	-0.009	84.3	-41.8	0.001	-0.001	0.19	0.005	0.003	0.006	0.001	31.0	9.7	30.425	5.218
04/04/2011	5870193.013	537018.229	596.511	9.30	-0.002	0.001	0.002	-0.003	153.4	-53.3	0.000	0.000	0.36	-0.003	-0.009	0.009	0.006	251.6	32.3	-26.053	16.477
18/06/2011	5870193.007	537018.235	596.512	9.51	-0.008	0.007	0.011	-0.002	138.8	-10.7	0.001	0.000	0.21	-0.006	0.006	0.008	0.001	135.0	6.7	41.323	4.870
03/10/2011	5870193.011	537018.232	596.511	9.80	-0.004	0.004	0.006	-0.003	135.0	-27.9	0.001	0.000	0.29	0.004	-0.003	0.005	-0.001	323.1	-11.3	-17.068	-3.414
28/11/2011	5870193.016	537018.230	596.503	9.95	0.001	0.002	0.002	-0.011	63.4	-78.5	0.000	-0.001	0.15	0.005	-0.002	0.005	-0.008	338.2	-56.1	-35.124	-52.179
09/04/2012	5870193.009	537018.230	596.516	10.32	-0.006	0.002	0.006	0.002	161.6	17.5	0.001	0.000	0.36	-0.007	0.000	0.007	0.013	180.0	61.7	19.224	35.701
12/07/2012	5870193.008	537018.233	596.512	10.57	-0.007	0.005	0.009	-0.002	144.5	-13.1	0.001	0.000	0.26	-0.001	0.003	0.003	-0.004	108.4	-51.7	12.287	-15.543
29/09/2012	5870193.019	537018.242	596.502	10.79	0.004	0.014	0.015	-0.012	74.1	-39.5	0.001	-0.001	0.22	0.011	0.009	0.014	-0.010	39.3	-35.1	65.711	-46.234
10/12/2012	5870193.009	537018.238	596.503	10.99	-0.006	0.010	0.012	-0.011	121.0	-43.3	0.001	-0.001	0.20	-0.010	-0.004	0.011	0.001	201.8	5.3	-54.637	5.073
03/04/2013	5870193.009	537018.238	596.503	11.30	-0.006	0.010	0.012	-0.011	121.0	-43.3	0.001	-0.001	0.31	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
12/07/2013	5870193.016	537018.240	596.513	11.57	0.001	0.012	0.012	-0.001	85.2	-4.7	0.001	0.000	0.27	0.007	0.002	0.007	0.010	15.9	53.9	26.591	36.525
04/10/2013	5870193.015	537018.231	596.505	11.80	0.000	0.003	0.003	-0.009	90.0	-71.6	0.000	-0.001	0.23	-0.001	-0.009	0.009	-0.008	263.7	-41.5	-39.375	-34.786
27/11/2013	5870193.013	537018.232	596.503	11.95	-0.002	0.004	0.004	-0.011	116.6	-67.9	0.000	-0.001	0.15	-0.002	0.001	0.002	-0.002	153.4	-41.8	15.125	-13.528
10/04/2014	5870193.011	537018.230	596.515	12.32	-0.004	0.002	0.004	0.001	153.4	12.6	0.000	0.000	0.37	-0.002	-0.002	0.003	0.012	225.0	76.7	7.710	32.709
18/07/2014	5870193.007	537018.232	596.511	12.59	-0.008	0.004	0.009	-0.003	153.4	-18.5	0.001	0.000	0.27	-0.004	0.002	0.004	-0.004	153.4	-41.8	16.499	-14.758
02/10/2014	5870193.012	537018.231	596.501	12.80	-0.003	0.003	0.004	-0.013	135.0	-71.9	0.000	-0.001	0.21	0.005	-0.001	0.005	-0.010	348.7	-63.0	-24.505	-48.059

GPS Hub 01-38 (Quesnel No. 1 Station Benchmark)









CITY OF Quesnel

GPS Hub 01-39 (Anderson Avenue at Wade Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5869071.953	532473.937	476.875	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5869071.931	532473.976	476.838	0.41	-0.022	0.039	0.045	-0.037	119.4	-39.6	0.108	-0.089	0.41	-0.022	0.039	0.045	-0.037	119.4	-39.6	108.310	-89.498
24/10/2002	5869071.948	532473.964	476.827	0.86	-0.005	0.027	0.027	-0.048	100.5	-60.2	0.032	-0.056	0.44	0.017	-0.012	0.021	-0.011	324.8	-27.9	-46.916	-24.801
12/11/2003	5869071.923	532473.967	476.852	1.91	-0.030	0.030	0.042	-0.023	135.0	-28.8	0.022	-0.012	1.05	-0.025	0.003	0.025	0.025	174.0	45.2	23.587	23.713
11/01/2005	5869071.918	532473.970	476.859	3.07	-0.035	0.033	0.048	-0.016	136.7	-18.4	0.016	-0.005	1.17	-0.005	0.003	0.006	0.007	147.6	48.2	5.423	6.062
10/03/2006	5869071.910	532473.985	476.870	4.23	-0.043	0.048	0.064	-0.005	131.9	-4.4	0.015	-0.001	1.16	-0.008	0.015	0.017	0.011	118.1	32.9	14.679	9.498
10/11/2006	5869071.902	532473.990	476.865	4.90	-0.051	0.053	0.074	-0.010	133.9	-7.7	0.015	-0.002	0.67	-0.008	0.005	0.009	-0.005	148.0	-27.9	14.064	-7.454
05/04/2007	5869071.905	532473.991	476.858	5.30	-0.048	0.054	0.072	-0.017	131.6	-13.2	0.014	-0.003	0.40	0.003	0.001	0.003	-0.007	18.4	-65.7	-7.911	-17.512
16/08/2007	5869071.890	532473.993	476.856	5.67	-0.063	0.056	0.084	-0.019	138.4	-12.7	0.015	-0.003	0.36	-0.015	0.002	0.015	-0.002	172.4	-7.5	41.558	-5.492
13/12/2007	5869071.904	532473.997	476.873	5.99	-0.049	0.060	0.077	-0.002	129.2	-1.5	0.013	0.000	0.33	0.014	0.004	0.015	0.017	15.9	49.4	-44.690	52.179
18/03/2008	5869071.902	532473.994	476.871	6.26	-0.051	0.057	0.076	-0.004	131.8	-3.0	0.012	-0.001	0.26	-0.002	-0.003	0.004	-0.002	236.3	-29.0	-13.718	-7.609
03/06/2008	5869071.890	532474.006	476.876	6.47	-0.063	0.069	0.093	0.001	132.4	0.6	0.014	0.000	0.21	-0.012	0.012	0.017	0.005	135.0	16.4	80.500	23.718
29/08/2008	5869071.885	532474.005	476.876	6.70	-0.068	0.068	0.096	0.001	135.0	0.6	0.014	0.000	0.24	-0.005	-0.001	0.005	0.000	191.3	0.0	21.407	0.000
19/11/2008	5869071.896	532474.009	476.874	6.93	-0.057	0.072	0.092	-0.001	128.4	-0.6	0.013	0.000	0.22	0.011	0.004	0.012	-0.002	20.0	-9.7	-52.136	-8.909
26/03/2009	5869071.891	532474.007	476.874	7.28	-0.062	0.070	0.094	-0.001	131.5	-0.6	0.013	0.000	0.35	-0.005	-0.002	0.005	0.000	201.8	0.0	15.488	0.000
10/06/2009	5869071.871	532474.024	476.891	7.49	-0.082	0.087	0.120	0.016	133.3	7.6	0.016	0.002	0.21	-0.020	0.017	0.026	0.017	139.6	32.9	126.150	81.701
17/09/2009	5869071.875	532474.025	476.887	7.76	-0.078	0.088	0.118	0.012	131.6	5.8	0.015	0.002	0.27	0.004	0.001	0.004	-0.004	14.0	-44.1	-15.212	-14.758
23/11/2009	5869071.887	532474.020	476.882	7.94	-0.066	0.083	0.106	0.007	128.5	3.8	0.013	0.001	0.18	0.012	-0.005	0.013	-0.005	337.4	-21.0	-70.869	-27.257
27/03/2010	5869071.889	532474.019	476.889	8.28	-0.064	0.082	0.104	0.014	128.0	7.7	0.013	0.002	0.34	0.002	-0.001	0.002	0.007	333.4	72.3	-6.586	20.619
04/07/2010	5869071.876	532474.021	476.888	8.55	-0.077	0.084	0.114	0.013	132.5	6.5	0.013	0.002	0.27	-0.013	0.002	0.013	-0.001	171.3	-4.3	48.526	-3.689
13/09/2010	5869071.883	532474.023	476.890	8.74	-0.070	0.086	0.111	0.015	129.1	7.7	0.013	0.002	0.19	0.007	0.002	0.007	0.002	15.9	15.4	-37.452	10.289
22/11/2010	5869071.879	532474.019	476.889	8.94	-0.074	0.082	0.110	0.014	132.1	7.2	0.012	0.002	0.19	-0.004	-0.004	0.006	-0.001	225.0	-10.0	-29.517	-5.218
04/04/2011	5869071.878	532474.017	476.884	9.30	-0.075	0.080	0.110	0.009	133.2	4.7	0.012	0.001	0.36	-0.001	-0.002	0.002	-0.005	243.4	-65.9	-6.141	-13.731
18/06/2011	5869071.877	532474.026	476.894	9.51	-0.076	0.089	0.117	0.019	130.5	9.2	0.012	0.002	0.21	-0.001	0.009	0.009	0.010	96.3	47.8	44.100	48.700
03/10/2011	5869071.876	532474.022	476.891	9.80	-0.077	0.085	0.115	0.016	132.2	7.9	0.012	0.002	0.29	-0.001	-0.004	0.004	-0.003	256.0	-36.0	-14.074	-10.241
28/11/2011	5869071.877	532474.019	476.888	9.95	-0.076	0.082	0.112	0.013	132.8	6.6	0.011	0.001	0.15	0.001	-0.003	0.003	-0.003	288.4	-43.5	-20.625	-19.567
09/04/2012	5869071.873	532474.026	476.882	10.32	-0.080	0.089	0.120	0.007	132.0	3.3	0.012	0.001	0.36	-0.004	0.007	0.008	-0.006	119.7	-36.7	22.141	-16.477
12/07/2012	5869071.870	532474.032	476.908	10.57	-0.083	0.095	0.126	0.033	131.1	14.7	0.012	0.003	0.26	-0.003	0.006	0.007	0.026	116.6	75.5	26.066	101.027
29/09/2012	5869071.879	532474.032	476.904	10.79	-0.074	0.095	0.120	0.029	127.9	13.5	0.011	0.003	0.22	0.009	0.000	0.009	-0.004	0.0	-24.0	-41.611	-18.494
10/12/2012	5869071.879	532474.030	476.899	10.99	-0.074	0.093	0.119	0.024	128.5	11.4	0.011	0.002	0.20	0.000	-0.002	0.002	-0.005	270.0	-68.2	-10.146	-25.365
03/04/2013	5869071.873	532474.030	476.893	11.30	-0.080	0.093	0.123	0.018	130.7	8.3	0.011	0.002	0.31	-0.006	0.000	0.006	-0.006	180.0	-45.0	19.224	-19.224
12/07/2013	5869071.871	532474.038	476.910	11.57	-0.082	0.101	0.130	0.035	129.1	15.1	0.011	0.003	0.27	-0.002	0.008	0.008	0.017	104.0	64.1	30.119	62.093
04/10/2013	5869071.872	532474.026	476.910	11.80	-0.081	0.089	0.120	0.035	132.3	16.2	0.010	0.003	0.23	0.001	-0.012	0.012	0.000	274.8	0.0	-52.359	0.000
27/11/2013	5869071.873	532474.032	476.896	11.95	-0.080	0.095	0.124	0.021	130.1	9.6	0.010	0.002	0.15	0.001	0.006	0.006	-0.014	80.5	-66.5	41.143	-94.694
10/04/2014	5869071.872	532474.035	476.900	12.32	-0.081	0.098	0.127	0.025	129.6	11.1	0.010	0.002	0.37	-0.001	0.003	0.003	0.004	108.4	51.7	8.620	10.903

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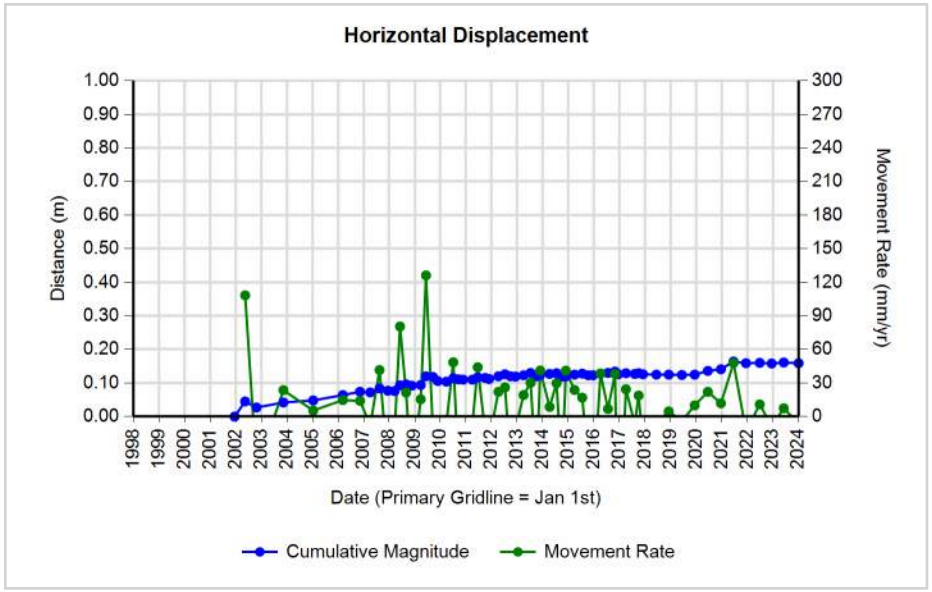
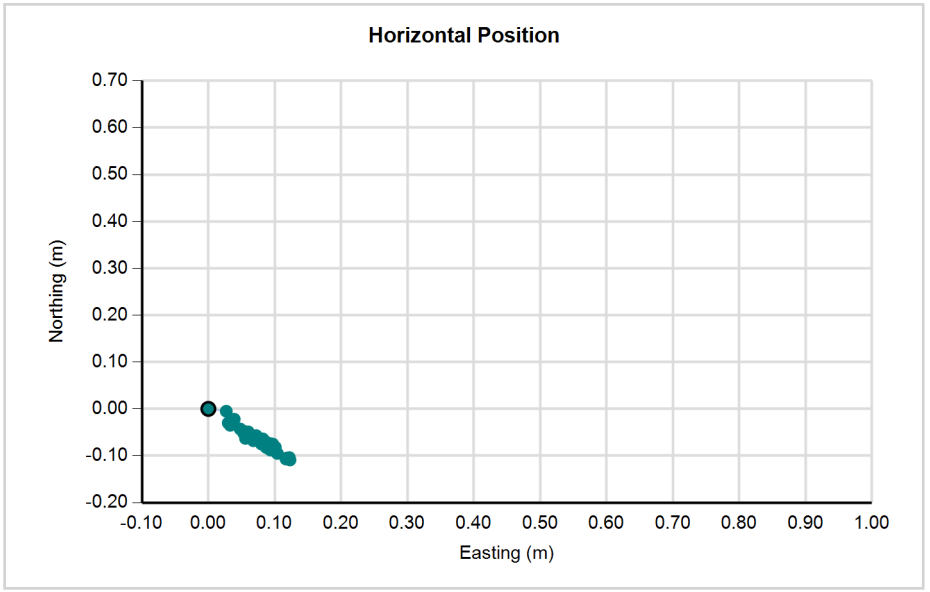
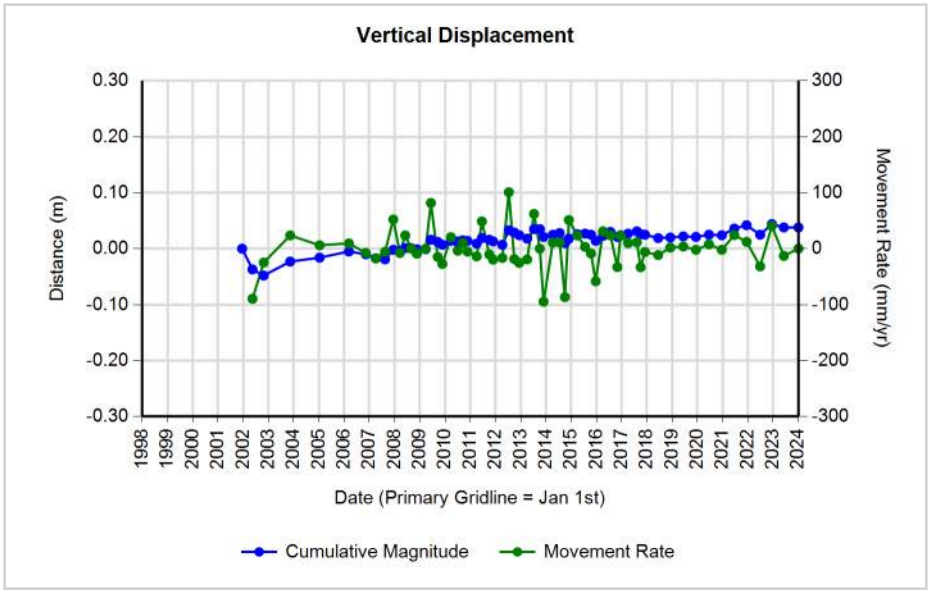
GPS Hub 01-39 (Anderson Avenue at Wade Avenue)

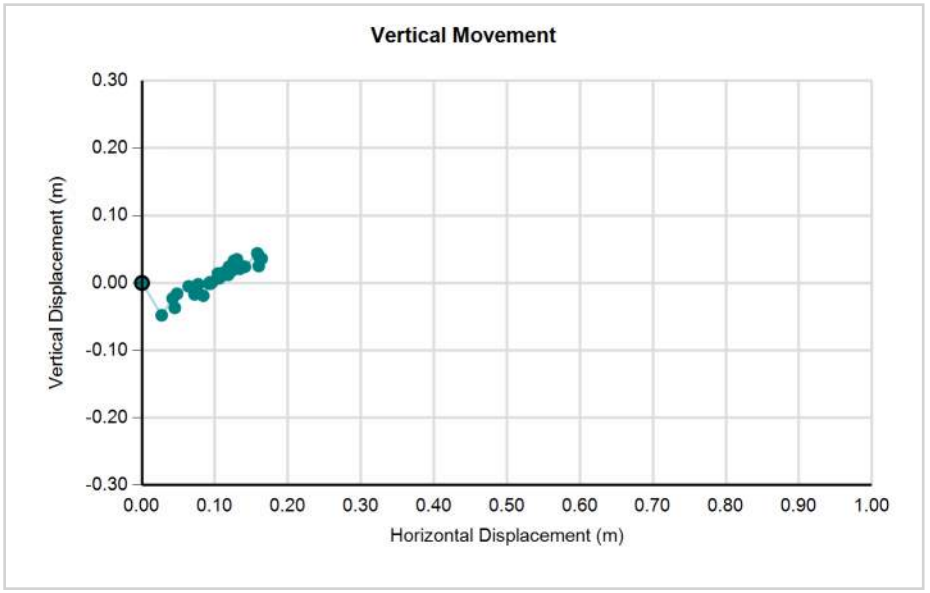
18/07/2014	5869071.865	532474.031	476.903	12.59	-0.088	0.094	0.129	0.028	133.1	12.3	0.010	0.002	0.27	-0.007	-0.004	0.008	0.003	209.7	20.4	29.745	11.068
02/10/2014	5869071.874	532474.026	476.885	12.80	-0.079	0.089	0.119	0.010	131.6	4.8	0.009	0.001	0.21	0.009	-0.005	0.010	-0.018	330.9	-60.2	-49.480	-86.507
28/11/2014	5869071.878	532474.031	476.893	12.95	-0.075	0.094	0.120	0.018	128.6	8.5	0.009	0.001	0.16	0.004	0.005	0.006	0.008	51.3	51.3	41.031	51.263
01/04/2015	5869071.870	532474.030	476.901	13.29	-0.083	0.093	0.125	0.026	131.7	11.8	0.009	0.002	0.34	-0.008	-0.001	0.008	0.008	187.1	44.8	23.748	23.565
20/07/2015	5869071.871	532474.035	476.902	13.59	-0.082	0.098	0.128	0.027	129.9	11.9	0.009	0.002	0.30	0.001	0.005	0.005	0.001	78.7	11.1	16.931	3.320
14/10/2015	5869071.868	532474.026	476.900	13.83	-0.085	0.089	0.123	0.025	133.7	11.5	0.009	0.002	0.24	-0.003	-0.009	0.009	-0.002	251.6	-11.9	-40.291	-8.494
22/12/2015	5869071.878	532474.034	476.889	14.02	-0.075	0.097	0.123	0.014	127.7	6.5	0.009	0.001	0.19	0.010	0.008	0.013	-0.011	38.7	-40.7	-67.790	-58.228
06/04/2016	5869071.867	532474.032	476.898	14.31	-0.086	0.095	0.128	0.023	132.2	10.2	0.009	0.002	0.29	-0.011	-0.002	0.011	0.009	190.3	38.8	38.525	31.012
22/07/2016	5869071.867	532474.034	476.905	14.60	-0.086	0.097	0.130	0.030	131.6	13.0	0.009	0.002	0.29	0.000	0.002	0.002	0.007	90.0	74.1	6.827	23.895
30/10/2016	5869071.857	532474.031	476.896	14.87	-0.096	0.094	0.134	0.021	135.6	8.9	0.009	0.001	0.27	-0.010	-0.003	0.010	-0.009	196.7	-40.8	38.133	-32.872
16/12/2016	5869071.873	532474.034	476.899	15.00	-0.080	0.097	0.126	0.024	129.5	10.8	0.008	0.002	0.13	0.016	0.003	0.016	0.003	10.6	10.4	-126.507	23.314
04/04/2017	5869071.866	532474.032	476.902	15.30	-0.087	0.095	0.129	0.027	132.5	11.8	0.008	0.002	0.30	-0.007	-0.002	0.007	0.003	195.9	22.4	24.395	10.053
08/08/2017	5869071.867	532474.030	476.906	15.65	-0.086	0.093	0.127	0.031	132.8	13.8	0.008	0.002	0.34	0.001	-0.002	0.002	0.004	296.6	60.8	-6.482	11.595
02/10/2017	5869071.865	532474.032	476.901	15.80	-0.088	0.095	0.129	0.026	132.8	11.4	0.008	0.002	0.15	-0.002	0.002	0.003	-0.005	135.0	-60.5	18.783	-33.205
04/12/2017	5869071.869	532474.031	476.900	15.97	-0.084	0.094	0.126	0.025	131.8	11.2	0.008	0.002	0.17	0.004	-0.001	0.004	-0.001	346.0	-13.6	-23.904	-5.798
13/06/2018	5869071.872	532474.032	476.894	16.49	-0.081	0.095	0.125	0.019	130.5	8.7	0.008	0.001	0.52	0.003	0.001	0.003	-0.006	18.4	-62.2	-6.047	-11.474
06/12/2018	5869071.870	532474.031	476.895	16.97	-0.083	0.094	0.125	0.020	131.4	9.1	0.007	0.001	0.48	-0.002	-0.001	0.002	0.001	206.6	24.1	4.640	2.075
12/06/2019	5869071.872	532474.031	476.897	17.49	-0.081	0.094	0.124	0.022	130.8	10.1	0.007	0.001	0.51	0.002	0.000	0.002	0.002	0.0	45.0	-3.886	3.886
12/12/2019	5869071.868	532474.028	476.896	17.99	-0.085	0.091	0.125	0.021	133.0	9.6	0.007	0.001	0.50	-0.004	-0.003	0.005	-0.001	216.9	-11.3	9.980	-1.996
17/06/2020	5869071.859	532474.035	476.900	18.51	-0.094	0.098	0.136	0.025	133.8	10.4	0.007	0.001	0.51	-0.009	0.007	0.011	0.004	142.1	19.3	22.152	7.771
21/12/2020	5869071.858	532474.041	476.899	19.02	-0.095	0.104	0.141	0.024	132.4	9.7	0.007	0.001	0.51	-0.001	0.006	0.006	-0.001	99.5	-9.3	11.881	-1.953
19/06/2021	5869071.844	532474.060	476.911	19.51	-0.109	0.123	0.164	0.036	131.5	12.4	0.008	0.002	0.49	-0.014	0.019	0.024	0.012	126.4	27.0	47.890	24.350
14/12/2021	5869071.846	532474.054	476.917	20.00	-0.107	0.117	0.159	0.042	132.4	14.8	0.008	0.002	0.49	0.002	-0.006	0.006	0.006	288.4	43.5	-12.978	12.312
28/06/2022	5869071.849	532474.059	476.900	20.53	-0.104	0.122	0.160	0.025	130.4	8.9	0.008	0.001	0.54	0.003	0.005	0.006	-0.017	59.0	-71.1	10.866	-31.680
16/12/2022	5869071.848	532474.055	476.919	21.00	-0.105	0.118	0.158	0.044	131.7	15.6	0.008	0.002	0.47	-0.001	-0.004	0.004	0.019	256.0	77.8	-8.807	40.583
06/06/2023	5869071.848	532474.059	476.913	21.47	-0.105	0.122	0.161	0.038	130.8	13.3	0.007	0.002	0.47	0.000	0.003	0.003	-0.006	90.0	-60.1	7.432	-12.932
04/01/2024	5869071.847	532474.055	476.913	22.05	-0.106	0.118	0.159	0.038	131.9	13.5	0.007	0.002	0.58	-0.001	-0.003	0.004	0.000	254.1	1.4	-6.271	0.155

GPS Hub 01-39 (Anderson Avenue at Wade Avenue)









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GPS Hub 01-40 (Lewis Drive East of Healy Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
15/12/2001	5870303.346	532408.207	493.536	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
15/05/2002	5870303.321	532408.222	493.526	0.41	-0.025	0.015	0.029	-0.010	149.0	-18.9	0.071	-0.024	0.41	-0.025	0.015	0.029	-0.010	149.0	-18.9	70.522	-24.189
24/10/2002	5870303.370	532408.233	493.514	0.86	0.024	0.026	0.035	-0.022	47.3	-31.9	0.041	-0.026	0.44	0.049	0.011	0.050	-0.012	12.7	-13.4	113.226	-27.056
12/11/2003	5870303.345	532408.242	493.575	1.91	-0.001	0.035	0.035	0.039	92.0	48.2	0.018	0.021	1.05	-0.025	0.009	0.027	0.061	160.2	66.4	25.478	58.202
11/01/2005	5870303.349	532408.249	493.571	3.07	0.003	0.042	0.042	0.035	85.9	39.7	0.014	0.011	1.17	0.004	0.007	0.008	-0.004	58.7	-27.4	6.940	-3.592
10/03/2006	5870303.347	532408.282	493.589	4.23	0.001	0.075	0.075	0.053	89.2	35.2	0.018	0.013	1.16	-0.002	0.033	0.033	0.018	93.5	28.6	28.547	15.543
10/11/2006	5870303.355	532408.292	493.587	4.90	0.009	0.085	0.085	0.051	84.0	30.8	0.017	0.010	0.67	0.008	0.010	0.013	-0.002	51.3	-8.9	19.092	-2.982
05/04/2007	5870303.358	532408.295	493.596	5.30	0.012	0.088	0.089	0.060	82.2	34.0	0.017	0.011	0.40	0.003	0.003	0.004	0.009	45.0	64.8	10.614	22.515
16/08/2007	5870303.359	532408.302	493.598	5.67	0.013	0.095	0.096	0.062	82.2	32.9	0.017	0.011	0.36	0.001	0.007	0.007	0.002	81.9	15.8	19.419	5.492
13/12/2007	5870303.361	532408.306	493.600	5.99	0.015	0.099	0.100	0.064	81.4	32.6	0.017	0.011	0.33	0.002	0.004	0.004	0.002	63.4	24.1	13.726	6.139
18/03/2008	5870303.360	532408.308	493.607	6.26	0.014	0.101	0.102	0.071	82.1	34.8	0.016	0.011	0.26	-0.001	0.002	0.002	0.007	116.6	72.3	8.508	26.633
03/06/2008	5870303.363	532408.320	493.637	6.47	0.017	0.113	0.114	0.101	81.4	41.5	0.018	0.016	0.21	0.003	0.012	0.012	0.030	76.0	67.6	58.674	142.305
29/08/2008	5870303.366	532408.326	493.641	6.70	0.020	0.119	0.121	0.105	80.5	41.0	0.018	0.016	0.24	0.003	0.006	0.007	0.004	63.4	30.8	28.163	16.793
19/11/2008	5870303.366	532408.331	493.621	6.93	0.020	0.124	0.126	0.085	80.8	34.1	0.018	0.012	0.22	0.000	0.005	0.005	-0.020	90.0	-76.0	22.271	-89.085
26/03/2009	5870303.370	532408.334	493.624	7.28	0.024	0.127	0.129	0.088	79.3	34.2	0.018	0.012	0.35	0.004	0.003	0.005	0.003	36.9	31.0	14.380	8.628
10/06/2009	5870303.362	532408.346	493.644	7.49	0.016	0.139	0.140	0.108	83.4	37.7	0.019	0.014	0.21	-0.008	0.012	0.014	0.020	123.7	54.2	69.312	96.118
17/09/2009	5870303.370	532408.354	493.649	7.76	0.024	0.147	0.149	0.113	80.7	37.2	0.019	0.015	0.27	0.008	0.008	0.011	0.005	45.0	23.8	41.741	18.447
23/11/2009	5870303.380	532408.357	493.643	7.94	0.034	0.150	0.154	0.107	77.2	34.8	0.019	0.013	0.18	0.010	0.003	0.010	-0.006	16.7	-29.9	56.915	-32.709
27/03/2010	5870303.378	532408.357	493.639	8.28	0.032	0.150	0.153	0.103	78.0	33.9	0.019	0.012	0.34	-0.002	0.000	0.002	-0.004	180.0	-63.4	-5.891	-11.782
04/07/2010	5870303.363	532408.356	493.649	8.55	0.017	0.149	0.150	0.113	83.5	37.0	0.018	0.013	0.27	-0.015	-0.001	0.015	0.010	183.8	33.6	-55.464	36.894
13/09/2010	5870303.364	532408.360	493.610	8.74	0.018	0.153	0.154	0.074	83.3	25.7	0.018	0.008	0.19	0.001	0.004	0.004	-0.039	76.0	-84.0	21.211	-200.630
22/11/2010	5870303.373	532408.364	493.643	8.94	0.027	0.157	0.159	0.107	80.2	33.9	0.018	0.012	0.19	0.009	0.004	0.010	0.033	24.0	73.4	51.390	172.189
04/04/2011	5870303.374	532408.360	493.637	9.30	0.028	0.153	0.156	0.101	79.6	33.0	0.017	0.011	0.36	0.001	-0.004	0.004	-0.006	284.0	-55.5	-11.323	-16.477
18/06/2011	5870303.369	532408.370	493.670	9.51	0.023	0.163	0.165	0.134	82.0	39.1	0.017	0.014	0.21	-0.005	0.010	0.011	0.033	116.6	71.3	54.448	160.710
03/10/2011	5870303.366	532408.364	493.654	9.80	0.020	0.157	0.158	0.118	82.7	36.7	0.016	0.012	0.29	-0.003	-0.006	0.007	-0.016	243.4	-67.3	-22.899	-54.617
28/11/2011	5870303.374	532408.372	493.653	9.95	0.028	0.165	0.167	0.117	80.4	35.0	0.017	0.012	0.15	0.008	0.008	0.011	-0.001	45.0	-5.1	73.792	-6.522
09/04/2012	5870303.371	532408.371	493.656	10.32	0.025	0.164	0.166	0.120	81.3	35.9	0.016	0.012	0.36	-0.003	-0.001	0.003	0.003	198.4	43.5	-8.684	8.239
12/07/2012	5870303.368	532408.388	493.687	10.57	0.022	0.181	0.182	0.151	83.1	39.6	0.017	0.014	0.26	-0.003	0.017	0.017	0.031	100.0	60.9	67.077	120.455
29/09/2012	5870303.382	532408.389	493.692	10.79	0.036	0.182	0.186	0.156	78.8	40.1	0.017	0.014	0.22	0.014	0.001	0.014	0.005	4.1	19.6	64.893	23.117
10/12/2012	5870303.387	532408.377	493.667	10.99	0.041	0.170	0.175	0.131	76.4	36.8	0.016	0.012	0.20	0.005	-0.012	0.013	-0.025	292.6	-62.5	-65.948	-126.823
03/04/2013	5870303.380	532408.386	493.663	11.30	0.034	0.179	0.182	0.127	79.2	34.9	0.016	0.011	0.31	-0.007	0.009	0.011	-0.004	127.9	-19.3	36.531	-12.816
12/07/2013	5870303.374	532408.395	493.687	11.57	0.028	0.188	0.190	0.151	81.5	38.5	0.016	0.013	0.27	-0.006	0.009	0.011	0.024	123.7	65.7	39.508	87.660
04/10/2013	5870303.379	532408.387	493.694	11.80	0.033	0.180	0.183	0.158	79.6	40.8	0.016	0.013	0.23	0.005	-0.008	0.009	0.007	302.0	36.6	-41.021	30.438
27/11/2013	5870303.381	532408.386	493.669	11.95	0.035	0.179	0.182	0.133	78.9	36.1	0.015	0.011	0.15	0.002	-0.001	0.002	-0.025	333.4	-84.9	-15.125	-169.097
10/04/2014	5870303.380	532408.393	493.669	12.32	0.034	0.186	0.189	0.133	79.6	35.1	0.015	0.011	0.37	-0.001	0.007	0.007	0.000	98.1	0.0	19.274	0.000

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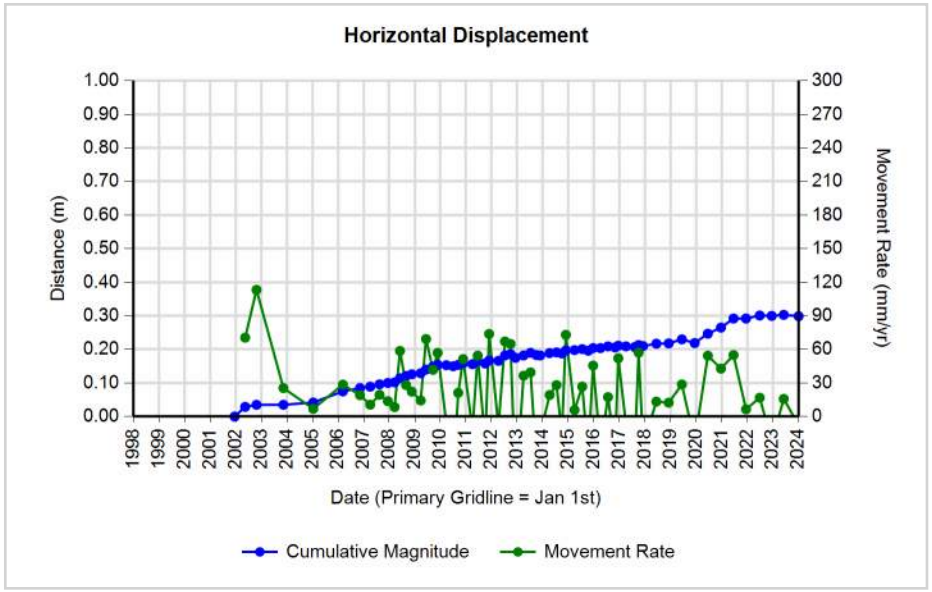
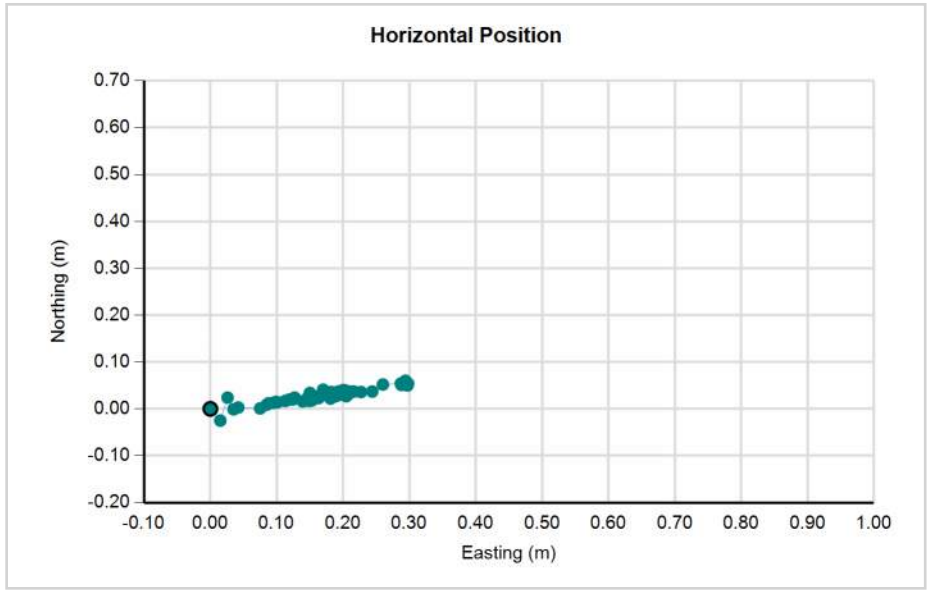
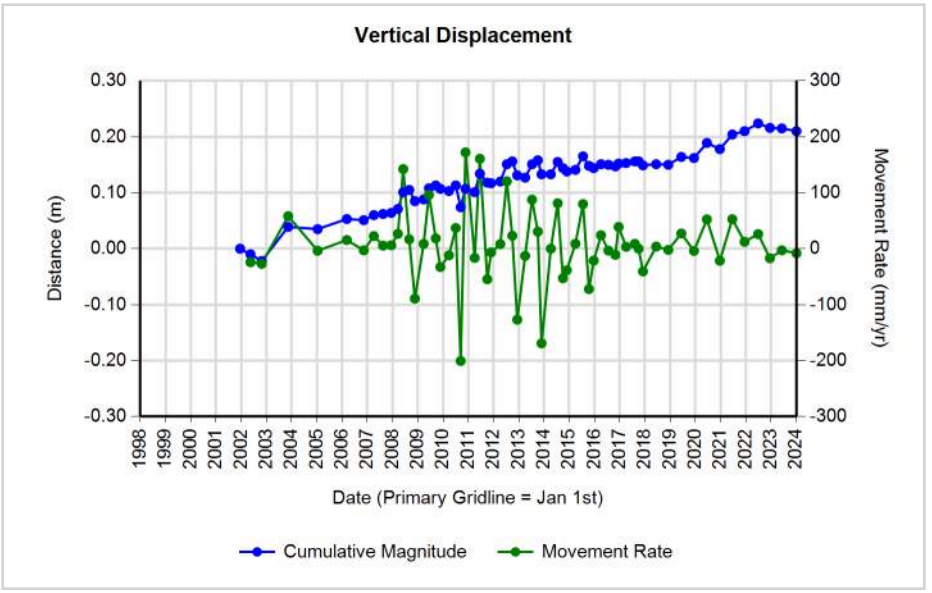
GPS Hub 01-40 (Lewis Drive East of Healy Street)

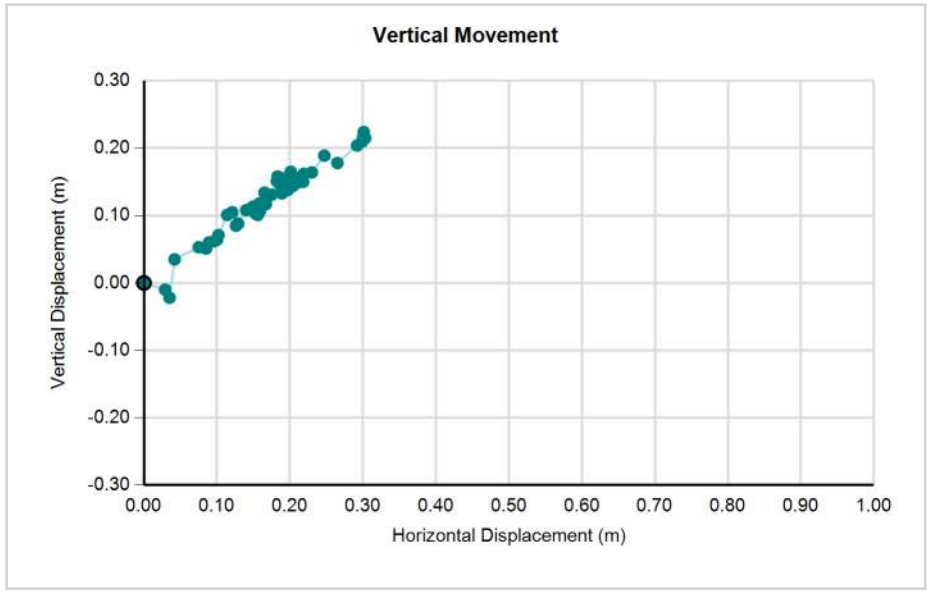
18/07/2014	5870303.373	532408.396	493.691	12.59	0.027	0.189	0.191	0.155	81.9	39.1	0.015	0.012	0.27	-0.007	0.003	0.008	0.022	156.8	70.9	28.098	81.167
02/10/2014	5870303.374	532408.393	493.680	12.80	0.028	0.186	0.188	0.144	81.4	37.4	0.015	0.011	0.21	0.001	-0.003	0.003	-0.011	288.4	-74.0	-15.198	-52.865
28/11/2014	5870303.383	532408.400	493.674	12.95	0.037	0.193	0.197	0.138	79.1	35.1	0.015	0.011	0.16	0.009	0.007	0.011	-0.006	37.9	-27.8	73.061	-38.447
01/04/2015	5870303.383	532408.402	493.677	13.29	0.037	0.195	0.198	0.141	79.3	35.4	0.015	0.011	0.34	0.000	0.002	0.002	0.003	90.0	56.3	5.891	8.837
20/07/2015	5870303.376	532408.406	493.701	13.59	0.030	0.199	0.201	0.165	81.4	39.3	0.015	0.012	0.30	-0.007	0.004	0.008	0.024	150.3	71.4	26.770	79.691
14/10/2015	5870303.381	532408.400	493.684	13.83	0.035	0.193	0.196	0.148	79.7	37.0	0.014	0.011	0.24	0.005	-0.006	0.008	-0.017	309.8	-65.3	-33.171	-72.201
22/12/2015	5870303.386	532408.407	493.680	14.02	0.040	0.200	0.204	0.144	78.7	35.2	0.015	0.010	0.19	0.005	0.007	0.009	-0.004	54.5	-24.9	45.536	-21.174
06/04/2016	5870303.378	532408.408	493.687	14.31	0.032	0.201	0.204	0.151	81.0	36.6	0.014	0.011	0.29	-0.008	0.001	0.008	0.007	172.9	41.0	-27.781	24.120
22/07/2016	5870303.379	532408.413	493.686	14.60	0.033	0.206	0.209	0.150	80.9	35.7	0.014	0.010	0.29	0.001	0.005	0.005	-0.001	78.7	-11.1	17.406	-3.414
30/10/2016	5870303.386	532408.409	493.683	14.87	0.040	0.202	0.206	0.147	78.8	35.5	0.014	0.010	0.27	0.007	-0.004	0.008	-0.003	330.3	-20.4	-29.447	-10.957
16/12/2016	5870303.383	532408.415	493.688	15.00	0.037	0.208	0.211	0.152	79.9	35.7	0.014	0.010	0.13	-0.003	0.006	0.007	0.005	116.6	36.7	52.131	38.856
04/04/2017	5870303.383	532408.413	493.689	15.30	0.037	0.206	0.209	0.153	79.8	36.2	0.014	0.010	0.30	0.000	-0.002	0.002	0.001	270.0	26.6	-6.702	3.351
08/08/2017	5870303.373	532408.412	493.692	15.65	0.027	0.205	0.207	0.156	82.5	37.0	0.013	0.010	0.34	-0.010	-0.001	0.010	0.003	185.7	16.6	-29.133	8.696
02/10/2017	5870303.380	532408.417	493.692	15.80	0.034	0.210	0.213	0.156	80.8	36.3	0.013	0.010	0.15	0.007	0.005	0.009	0.000	35.5	0.0	57.127	0.000
04/12/2017	5870303.383	532408.414	493.685	15.97	0.037	0.207	0.210	0.149	79.9	35.3	0.013	0.009	0.17	0.003	-0.003	0.004	-0.007	315.0	-58.8	-24.597	-40.583
13/06/2018	5870303.383	532408.421	493.687	16.49	0.037	0.214	0.217	0.151	80.2	34.8	0.013	0.009	0.52	0.000	0.007	0.007	0.002	90.0	15.9	13.386	3.825
06/12/2018	5870303.389	532408.421	493.686	16.97	0.043	0.214	0.218	0.150	78.6	34.5	0.013	0.009	0.48	0.006	0.000	0.006	-0.001	0.0	-9.5	12.452	-2.075
12/06/2019	5870303.382	532408.434	493.700	17.49	0.036	0.227	0.230	0.164	81.0	35.5	0.013	0.009	0.51	-0.007	0.013	0.015	0.014	118.3	43.5	28.685	27.199
12/12/2019	5870303.383	532408.423	493.698	17.99	0.037	0.216	0.219	0.162	80.3	36.5	0.012	0.009	0.50	0.001	-0.011	0.011	-0.002	275.2	-10.3	-22.045	-3.992
17/06/2020	5870303.383	532408.451	493.725	18.51	0.037	0.244	0.247	0.189	81.4	37.4	0.013	0.010	0.51	0.000	0.028	0.028	0.027	90.0	44.0	54.399	52.456
21/12/2020	5870303.398	532408.467	493.714	19.02	0.052	0.260	0.265	0.178	78.7	33.9	0.014	0.009	0.51	0.015	0.016	0.022	-0.011	46.8	-26.6	42.837	-21.485
19/06/2021	5870303.400	532408.494	493.740	19.51	0.054	0.287	0.292	0.204	79.3	34.9	0.015	0.010	0.49	0.002	0.027	0.027	0.026	85.8	43.8	54.938	52.758
14/12/2021	5870303.397	532408.495	493.746	20.00	0.051	0.288	0.292	0.210	80.0	35.7	0.015	0.011	0.49	-0.003	0.001	0.003	0.006	161.6	62.2	6.489	12.312
28/06/2022	5870303.396	532408.504	493.760	20.53	0.050	0.297	0.301	0.224	80.4	36.6	0.015	0.011	0.54	-0.001	0.009	0.009	0.014	96.3	57.1	16.875	26.089
16/12/2022	5870303.406	532408.501	493.752	21.00	0.060	0.294	0.300	0.216	78.5	35.7	0.014	0.010	0.47	0.010	-0.003	0.010	-0.008	343.3	-37.5	-22.300	-17.088
06/06/2023	5870303.400	532408.505	493.751	21.47	0.054	0.298	0.303	0.215	79.7	35.3	0.014	0.010	0.47	-0.006	0.004	0.007	-0.001	143.7	-10.2	15.800	-2.846
04/01/2024	5870303.401	532408.501	493.746	22.05	0.055	0.294	0.299	0.210	79.4	35.1	0.014	0.010	0.58	0.001	-0.004	0.005	-0.005	282.8	-45.9	-7.774	-8.029

GPS Hub 01-40 (Lewis Drive East of Healy Street)









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GPS Hub 06-02 (East Side of Anderson Drive by School)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5868793.977	532384.115	473.102	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5868793.986	532384.108	473.099	0.40	0.009	-0.007	0.011	-0.003	322.1	-14.7	0.029	-0.008	0.40	0.009	-0.007	0.011	-0.003	322.1	-14.7	28.524	-7.505
16/08/2007	5868793.981	532384.109	473.110	0.76	0.004	-0.006	0.007	0.008	303.7	48.0	0.009	0.010	0.36	-0.005	0.001	0.005	0.011	168.7	65.1	-14.003	30.209
13/12/2007	5868793.988	532384.111	473.098	1.09	0.011	-0.004	0.012	-0.004	340.0	-18.9	0.011	-0.004	0.33	0.007	0.002	0.007	-0.012	15.9	-58.8	22.345	-36.832
18/03/2008	5868793.988	532384.104	473.107	1.35	0.011	-0.011	0.016	0.005	315.0	17.8	0.012	0.004	0.26	0.000	-0.007	0.007	0.009	270.0	52.1	26.633	34.242
03/06/2008	5868793.988	532384.119	473.117	1.56	0.011	0.004	0.012	0.015	20.0	52.0	0.007	0.010	0.21	0.000	0.015	0.015	0.010	90.0	33.7	-71.153	47.435
29/08/2008	5868793.990	532384.119	473.120	1.80	0.013	0.004	0.014	0.018	17.1	52.9	0.008	0.010	0.24	0.002	0.000	0.002	0.003	0.0	56.3	8.397	12.595
19/11/2008	5868794.000	532384.113	473.091	2.03	0.023	-0.002	0.023	-0.011	355.0	-25.5	0.011	-0.005	0.22	0.010	-0.006	0.012	-0.029	329.0	-68.1	51.945	-129.174
26/03/2009	5868793.992	532384.111	473.118	2.37	0.015	-0.004	0.016	0.016	345.1	45.9	0.007	0.007	0.35	-0.008	-0.002	0.008	0.027	194.0	73.0	-23.716	77.652
10/06/2009	5868793.982	532384.118	473.112	2.58	0.005	0.003	0.006	0.010	31.0	59.8	0.002	0.004	0.21	-0.010	0.007	0.012	-0.006	145.0	-26.2	-58.664	-28.836
17/09/2009	5868793.980	532384.121	473.111	2.85	0.003	0.006	0.007	0.009	63.4	53.3	0.002	0.003	0.27	-0.002	0.003	0.004	-0.001	123.7	-15.5	13.302	-3.689
23/11/2009	5868794.011	532384.112	473.105	3.04	0.034	-0.003	0.034	0.003	355.0	5.0	0.011	0.001	0.18	0.031	-0.009	0.032	-0.006	343.8	-10.5	175.974	-32.709
27/03/2010	5868793.999	532384.112	473.104	3.38	0.022	-0.003	0.022	0.002	352.2	5.1	0.007	0.001	0.34	-0.012	0.000	0.012	-0.001	180.0	-4.8	-35.347	-2.946
04/07/2010	5868793.990	532384.120	473.120	3.65	0.013	0.005	0.014	0.018	21.0	52.3	0.004	0.005	0.27	-0.009	0.008	0.012	0.016	138.4	53.0	-44.426	59.030
13/09/2010	5868793.998	532384.123	473.121	3.84	0.021	0.008	0.022	0.019	20.9	40.2	0.006	0.005	0.19	0.008	0.003	0.009	0.001	20.6	6.7	43.953	5.144
22/11/2010	5868793.998	532384.118	473.112	4.03	0.021	0.003	0.021	0.010	8.1	25.2	0.005	0.002	0.19	0.000	-0.005	0.005	-0.009	270.0	-60.9	-26.089	-46.961
04/04/2011	5868793.994	532384.110	473.102	4.40	0.017	-0.005	0.018	0.000	343.6	0.0	0.004	0.000	0.36	-0.004	-0.008	0.009	-0.010	243.4	-48.2	-24.563	-27.462
18/06/2011	5868793.990	532384.119	473.115	4.60	0.013	0.004	0.014	0.013	17.1	43.7	0.003	0.003	0.21	-0.004	0.009	0.010	0.013	114.0	52.9	-47.964	63.310
03/10/2011	5868793.994	532384.114	473.109	4.90	0.017	-0.001	0.017	0.007	356.6	22.3	0.003	0.001	0.29	0.004	-0.005	0.006	-0.006	308.7	-43.1	21.857	-20.481
28/11/2011	5868794.001	532384.112	473.107	5.05	0.024	-0.003	0.024	0.005	352.9	11.7	0.005	0.001	0.15	0.007	-0.002	0.007	-0.002	344.1	-15.4	47.483	-13.045
09/04/2012	5868793.991	532384.120	473.096	5.41	0.014	0.005	0.015	-0.006	19.7	-22.0	0.003	-0.001	0.36	-0.010	0.008	0.013	-0.011	141.3	-40.7	-35.169	-30.209
12/07/2012	5868793.993	532384.122	473.119	5.67	0.016	0.007	0.017	0.017	23.6	44.2	0.003	0.003	0.26	0.002	0.002	0.003	0.023	45.0	83.0	10.990	89.370
29/09/2012	5868794.005	532384.120	473.111	5.89	0.028	0.005	0.028	0.009	10.1	17.6	0.005	0.002	0.22	0.012	-0.002	0.012	-0.008	350.5	-33.3	56.246	-36.987
10/12/2012	5868793.997	532384.120	473.107	6.08	0.020	0.005	0.021	0.005	14.0	13.6	0.003	0.001	0.20	-0.008	0.000	0.008	-0.004	180.0	-26.6	-40.583	-20.292
03/04/2013	5868793.999	532384.116	473.102	6.40	0.022	0.001	0.022	0.000	2.6	0.0	0.003	0.000	0.31	0.002	-0.004	0.004	-0.005	296.6	-48.2	14.328	-16.020
12/07/2013	5868793.992	532384.126	473.069	6.67	0.015	0.011	0.019	-0.033	36.3	-60.6	0.003	-0.005	0.27	-0.007	0.010	0.012	-0.033	125.0	-69.7	-44.584	-120.532
04/10/2013	5868793.998	532384.114	473.116	6.90	0.021	-0.001	0.021	0.014	357.3	33.7	0.003	0.002	0.23	0.006	-0.012	0.013	0.047	296.6	74.1	58.337	204.366
27/11/2013	5868794.004	532384.118	473.108	7.05	0.027	0.003	0.027	0.006	6.3	12.5	0.004	0.001	0.15	0.006	0.004	0.007	-0.008	33.7	-48.0	48.775	-54.111
10/04/2014	5868794.003	532384.115	473.104	7.41	0.026	0.000	0.026	0.002	0.0	4.4	0.004	0.000	0.37	-0.001	-0.003	0.003	-0.004	251.6	-51.7	-8.620	-10.903
18/07/2014	5868793.993	532384.116	473.116	7.69	0.016	0.001	0.016	0.014	3.6	41.1	0.002	0.002	0.27	-0.010	0.001	0.010	0.012	174.3	50.1	-37.078	44.273
02/10/2014	5868793.998	532384.119	473.092	7.89	0.021	0.004	0.021	-0.010	10.8	-25.1	0.003	-0.001	0.21	0.005	0.003	0.006	-0.024	31.0	-76.3	28.023	-115.342
28/11/2014	5868793.999	532384.118	473.100	8.05	0.022	0.003	0.022	-0.002	7.8	-5.1	0.003	0.000	0.16	0.001	-0.001	0.001	0.008	315.0	80.0	9.062	51.263
01/04/2015	5868794.004	532384.114	473.105	8.39	0.027	-0.001	0.027	0.003	357.9	6.3	0.003	0.000	0.34	0.005	-0.004	0.006	0.005	321.3	38.0	18.861	14.728
20/07/2015	5868793.999	532384.116	473.104	8.69	0.022	0.001	0.022	0.002	2.6	5.2	0.003	0.000	0.30	-0.005	0.002	0.005	-0.001	158.2	-10.5	-17.881	-3.320
14/10/2015	5868793.992	532384.113	473.105	8.93	0.015	-0.002	0.015	0.003	352.4	11.2	0.002	0.000	0.24	-0.007	-0.003	0.008	0.001	203.2	7.5	-32.345	4.247

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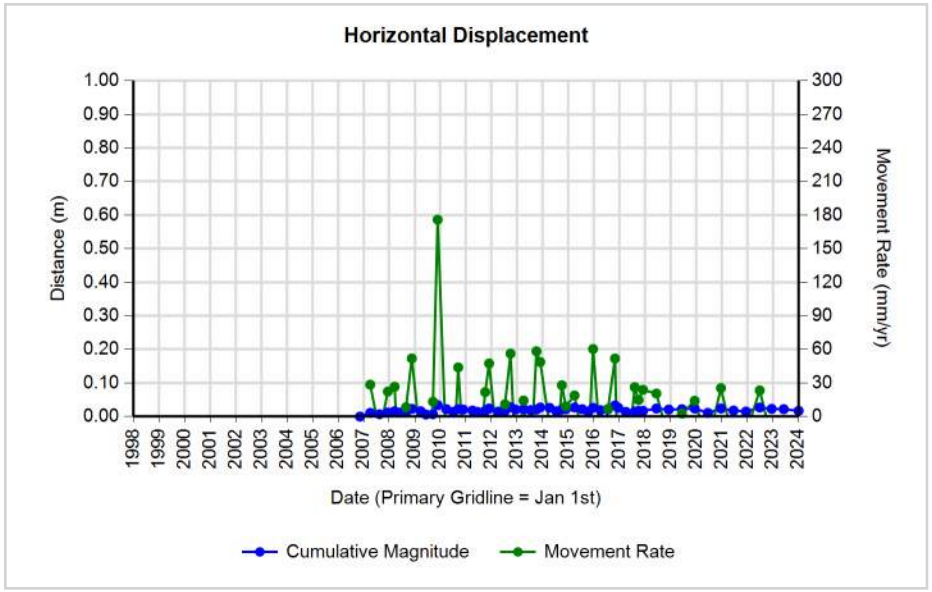
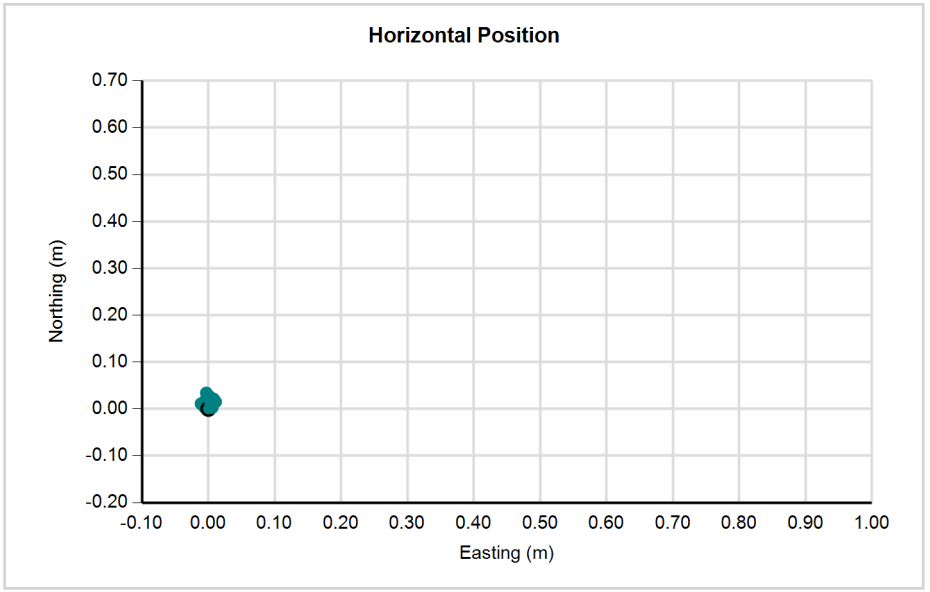
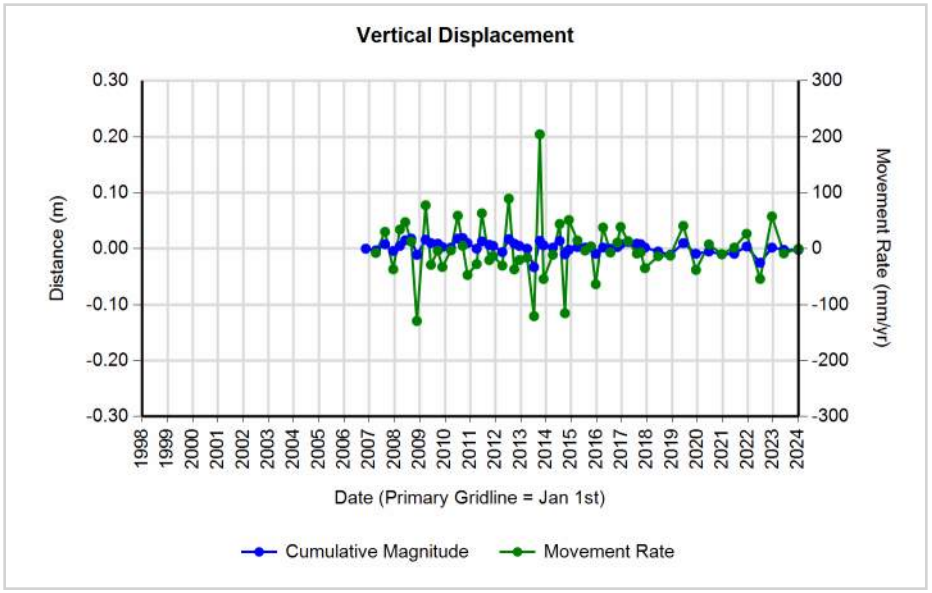
GPS Hub 06-02 (East Side of Anderson Drive by School)

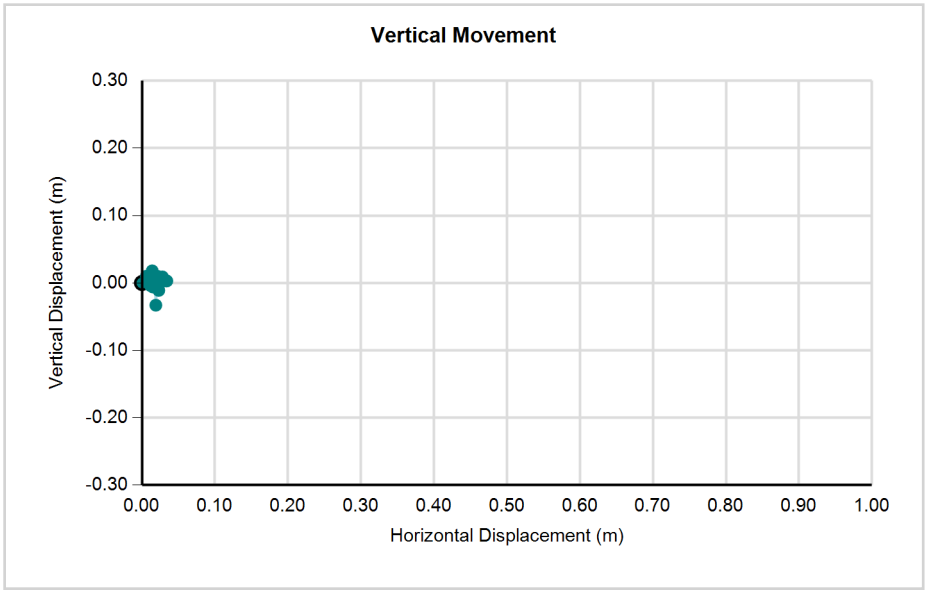
22/12/2015	5868794.003	532384.116	473.093	9.11	0.026	0.001	0.026	-0.009	2.2	-19.1	0.003	-0.001	0.19	0.011	0.003	0.011	-0.012	15.3	-46.5	60.355	-63.522
06/04/2016	5868793.996	532384.118	473.104	9.40	0.019	0.003	0.019	0.002	9.0	5.9	0.002	0.000	0.29	-0.007	0.002	0.007	0.011	164.1	56.5	-25.085	37.903
22/07/2016	5868793.998	532384.118	473.102	9.70	0.021	0.003	0.021	0.000	8.1	0.0	0.002	0.000	0.29	0.002	0.000	0.002	-0.002	0.0	-45.0	6.827	-6.827
30/10/2016	5868794.009	532384.109	473.105	9.97	0.032	-0.006	0.033	0.003	349.4	5.3	0.003	0.000	0.27	0.011	-0.009	0.014	0.003	320.7	11.9	51.912	10.958
16/12/2016	5868794.003	532384.117	473.110	10.10	0.026	0.002	0.026	0.008	4.4	17.1	0.003	0.001	0.13	-0.006	0.008	0.010	0.005	126.9	26.6	-77.713	38.856
04/04/2017	5868793.990	532384.110	473.114	10.40	0.013	-0.005	0.014	0.012	339.0	40.7	0.001	0.001	0.30	-0.013	-0.007	0.015	0.004	208.3	15.2	-49.476	13.404
08/08/2017	5868793.991	532384.119	473.111	10.74	0.014	0.004	0.015	0.009	15.9	31.7	0.001	0.001	0.34	0.001	0.009	0.009	-0.003	83.7	-18.3	26.250	-8.696
02/10/2017	5868793.993	532384.120	473.110	10.89	0.016	0.005	0.017	0.008	17.4	25.5	0.002	0.001	0.15	0.002	0.001	0.002	-0.001	26.6	-24.1	14.850	-6.641
04/12/2017	5868793.994	532384.116	473.104	11.07	0.017	0.001	0.017	0.002	3.4	6.7	0.002	0.000	0.17	0.001	-0.004	0.004	-0.006	284.0	-55.5	23.904	-34.786
13/06/2018	5868793.998	532384.126	473.097	11.59	0.021	0.011	0.024	-0.005	27.6	-11.9	0.002	0.000	0.52	0.004	0.010	0.011	-0.007	68.2	-33.0	20.596	-13.386
06/12/2018	5868793.998	532384.116	473.091	12.07	0.021	0.001	0.021	-0.011	2.7	-27.6	0.002	-0.001	0.48	0.000	-0.010	0.010	-0.006	270.0	-31.0	-20.753	-12.452
12/06/2019	5868793.999	532384.117	473.112	12.59	0.022	0.002	0.022	0.010	5.2	24.4	0.002	0.001	0.51	0.001	0.001	0.001	0.021	45.0	86.1	2.748	40.799
12/12/2019	5868794.000	532384.110	473.093	13.09	0.023	-0.005	0.024	-0.009	347.7	-20.9	0.002	-0.001	0.50	0.001	-0.007	0.007	-0.019	278.1	-69.6	14.113	-37.922
17/06/2020	5868793.988	532384.113	473.097	13.60	0.011	-0.002	0.011	-0.005	349.7	-24.1	0.001	0.000	0.51	-0.012	0.003	0.012	0.004	166.0	17.9	-24.031	7.771
21/12/2020	5868794.001	532384.113	473.092	14.11	0.024	-0.002	0.024	-0.010	355.2	-22.5	0.002	-0.001	0.51	0.013	0.000	0.013	-0.005	0.0	-21.0	25.392	-9.766
19/06/2021	5868793.994	532384.122	473.093	14.61	0.017	0.007	0.018	-0.009	22.4	-26.1	0.001	-0.001	0.49	-0.007	0.009	0.011	0.001	127.9	5.0	-23.136	2.029
14/12/2021	5868793.992	532384.115	473.106	15.09	0.015	0.000	0.015	0.004	0.0	14.9	0.001	0.000	0.49	-0.002	-0.007	0.007	0.013	254.1	60.8	-14.939	26.676
28/06/2022	5868794.003	532384.121	473.077	15.63	0.026	0.006	0.027	-0.025	13.0	-43.1	0.002	-0.002	0.54	0.011	0.006	0.013	-0.029	28.6	-66.6	23.350	-54.042
16/12/2022	5868794.000	532384.112	473.104	16.10	0.023	-0.003	0.023	0.002	352.6	4.9	0.001	0.000	0.47	-0.003	-0.009	0.009	0.027	251.6	70.6	-20.264	57.671
06/06/2023	5868793.999	532384.117	473.100	16.57	0.022	0.002	0.022	-0.002	5.5	-5.0	0.001	0.000	0.47	-0.001	0.005	0.005	-0.004	101.1	-37.2	-11.036	-8.367
04/01/2024	5868793.994	532384.115	473.100	17.15	0.017	0.000	0.017	-0.002	0.0	-6.7	0.001	0.000	0.58	-0.005	-0.002	0.005	0.000	202.8	-0.6	-9.343	-0.103

GPS Hub 06-02 (East Side of Anderson Drive by School)









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GPS Hub 06-03 (West Side of Anderson Drive)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5868871.062	532370.952	474.521	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5868871.072	532370.949	474.515	0.40	0.010	-0.003	0.010	-0.006	343.3	-29.9	0.026	-0.015	0.40	0.010	-0.003	0.010	-0.006	343.3	-29.9	26.119	-15.010
16/08/2007	5868871.049	532370.956	474.536	0.76	-0.013	0.004	0.014	0.015	162.9	47.8	0.018	0.020	0.36	-0.023	0.007	0.024	0.021	163.1	41.1	66.024	57.671
13/12/2007	5868871.068	532370.952	474.525	1.09	0.006	0.000	0.006	0.004	0.0	33.7	0.006	0.004	0.33	0.019	-0.004	0.019	-0.011	348.1	-29.5	-59.596	-33.763
18/03/2008	5868871.066	532370.950	474.522	1.35	0.004	-0.002	0.004	0.001	333.4	12.6	0.003	0.001	0.26	-0.002	-0.002	0.003	-0.003	225.0	-46.7	-10.761	-11.414
03/06/2008	5868871.057	532370.960	474.544	1.56	-0.005	0.008	0.009	0.023	122.0	67.7	0.006	0.015	0.21	-0.009	0.010	0.013	0.022	132.0	58.6	63.817	104.357
29/08/2008	5868871.059	532370.956	474.550	1.80	-0.003	0.004	0.005	0.029	126.9	80.2	0.003	0.016	0.24	0.002	-0.004	0.004	0.006	296.6	53.3	-18.775	25.190
19/11/2008	5868871.064	532370.954	474.512	2.03	0.002	0.002	0.003	-0.009	45.0	-72.6	0.001	-0.004	0.22	0.005	-0.002	0.005	-0.038	338.2	-81.9	-23.987	-169.262
26/03/2009	5868871.064	532370.951	474.514	2.37	0.002	-0.001	0.002	-0.007	333.4	-72.3	0.001	-0.003	0.35	0.000	-0.003	0.003	0.002	270.0	33.7	-8.628	5.752
10/06/2009	5868871.044	532370.977	474.529	2.58	-0.018	0.025	0.031	0.008	125.8	14.6	0.012	0.003	0.21	-0.020	0.026	0.033	0.015	127.6	24.6	157.646	72.089
17/09/2009	5868871.065	532370.953	474.520	2.85	0.003	0.001	0.003	-0.001	18.4	-17.5	0.001	0.000	0.27	0.021	-0.024	0.032	-0.009	311.2	-15.8	-117.656	-33.205
23/11/2009	5868871.067	532370.954	474.513	3.04	0.005	0.002	0.005	-0.008	21.8	-56.1	0.002	-0.003	0.18	0.002	0.001	0.002	-0.007	26.6	-72.3	12.190	-38.160
27/03/2010	5868871.063	532370.948	474.518	3.38	0.001	-0.004	0.004	-0.003	284.0	-36.0	0.001	-0.001	0.34	-0.004	-0.006	0.007	0.005	236.3	34.7	-21.241	14.728
04/07/2010	5868871.041	532370.962	474.541	3.65	-0.021	0.010	0.023	0.020	154.5	40.7	0.006	0.005	0.27	-0.022	0.014	0.026	0.023	147.5	41.4	96.208	84.856
13/09/2010	5868871.063	532370.970	474.543	3.84	0.001	0.018	0.018	0.022	86.8	50.7	0.005	0.006	0.19	0.022	0.008	0.023	0.002	20.0	4.9	-120.427	10.289
22/11/2010	5868871.063	532370.957	474.518	4.03	0.001	0.005	0.005	-0.003	78.7	-30.5	0.001	-0.001	0.19	0.000	-0.013	0.013	-0.025	270.0	-62.5	-67.832	-130.446
04/04/2011	5868871.069	532370.952	474.517	4.40	0.007	0.000	0.007	-0.004	0.0	-29.7	0.002	-0.001	0.36	0.006	-0.005	0.008	-0.001	320.2	-7.3	21.449	-2.746
18/06/2011	5868871.068	532370.960	474.543	4.60	0.006	0.008	0.010	0.022	53.1	65.6	0.002	0.005	0.21	-0.001	0.008	0.008	0.026	97.1	72.8	39.263	126.620
03/10/2011	5868871.061	532370.960	474.534	4.90	-0.001	0.008	0.008	0.013	97.1	58.2	0.002	0.003	0.29	-0.007	0.000	0.007	-0.009	180.0	-52.1	-23.895	-30.722
28/11/2011	5868871.067	532370.954	474.525	5.05	0.005	0.002	0.005	0.004	21.8	36.6	0.001	0.001	0.15	0.006	-0.006	0.008	-0.009	315.0	-46.7	-55.344	-58.701
09/04/2012	5868871.059	532370.956	474.525	5.41	-0.003	0.004	0.005	0.004	126.9	38.7	0.001	0.001	0.36	-0.008	0.002	0.008	0.000	166.0	0.0	-22.646	0.000
12/07/2012	5868871.053	532370.961	474.532	5.67	-0.009	0.009	0.013	0.011	135.0	40.8	0.002	0.002	0.26	-0.006	0.005	0.008	0.007	140.2	41.9	30.348	27.199
29/09/2012	5868871.068	532370.966	474.528	5.89	0.006	0.014	0.015	0.007	66.8	24.7	0.003	0.001	0.22	0.015	0.005	0.016	-0.004	18.4	-14.2	73.103	-18.494
10/12/2012	5868871.067	532370.955	474.520	6.08	0.005	0.003	0.006	-0.001	31.0	-9.7	0.001	0.000	0.20	-0.001	-0.011	0.011	-0.008	264.8	-35.9	-56.032	-40.583
03/04/2013	5868871.066	532370.955	474.519	6.40	0.004	0.003	0.005	-0.002	36.9	-21.8	0.001	0.000	0.31	-0.001	0.000	0.001	-0.001	180.0	-45.0	-3.204	-3.204
12/07/2013	5868871.060	532370.962	474.527	6.67	-0.002	0.010	0.010	0.006	101.3	30.5	0.002	0.001	0.27	-0.006	0.007	0.009	0.008	130.6	40.9	33.674	29.220
04/10/2013	5868871.063	532370.961	474.534	6.90	0.001	0.009	0.009	0.013	83.7	55.1	0.001	0.002	0.23	0.003	-0.001	0.003	0.007	341.6	65.7	-13.750	30.438
27/11/2013	5868871.070	532370.957	474.521	7.05	0.008	0.005	0.009	0.000	32.0	0.0	0.001	0.000	0.15	0.007	-0.004	0.008	-0.013	330.3	-58.2	54.532	-87.931
10/04/2014	5868871.070	532370.959	474.521	7.41	0.008	0.007	0.011	0.000	41.2	0.0	0.001	0.000	0.37	0.000	0.002	0.002	0.000	90.0	0.0	5.451	0.000
18/07/2014	5868871.051	532370.969	474.538	7.69	-0.011	0.017	0.020	0.017	122.9	40.0	0.003	0.002	0.27	-0.019	0.010	0.021	0.017	152.2	38.4	79.215	62.720
02/10/2014	5868871.056	532370.969	474.528	7.89	-0.006	0.017	0.018	0.007	109.4	21.2	0.002	0.001	0.21	0.005	0.000	0.005	-0.010	0.0	-63.4	-24.030	-48.059
28/11/2014	5868871.065	532370.958	474.510	8.05	0.003	0.006	0.007	-0.011	63.4	-58.6	0.001	-0.001	0.16	0.009	-0.011	0.014	-0.018	309.3	-51.7	-91.073	-115.342
01/04/2015	5868871.074	532370.955	474.520	8.39	0.012	0.003	0.012	-0.001	14.0	-4.6	0.001	0.000	0.34	0.009	-0.003	0.009	0.010	341.6	46.5	27.944	29.456
20/07/2015	5868871.060	532370.966	474.529	8.69	-0.002	0.014	0.014	0.008	98.1	29.5	0.002	0.001	0.30	-0.014	0.011	0.018	0.009	141.8	26.8	59.119	29.884
14/10/2015	5868871.063	532370.952	474.521	8.93	0.001	0.000	0.001	0.000	0.0	0.0	0.000	0.000	0.24	0.003	-0.014	0.014	-0.008	282.1	-29.2	-60.809	-33.977

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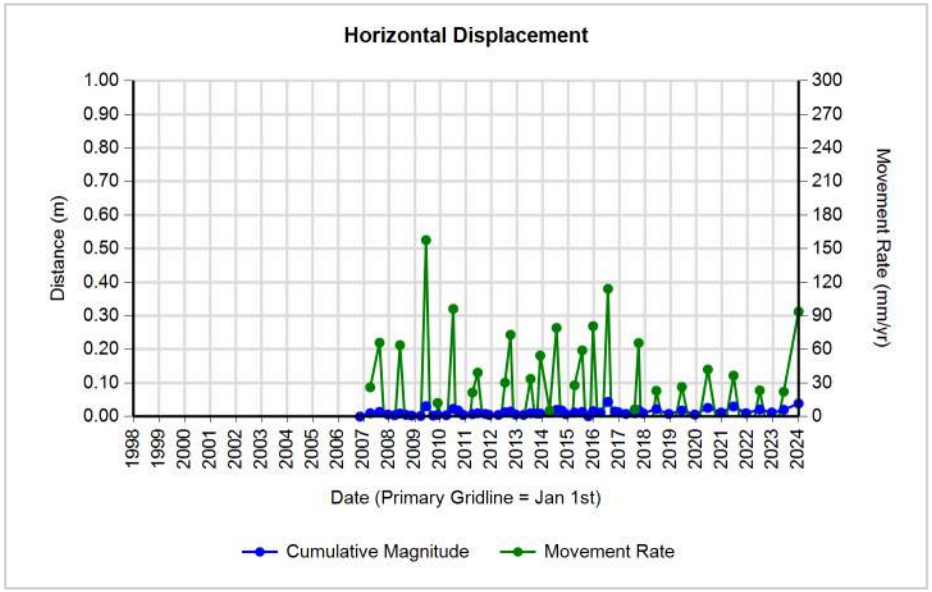
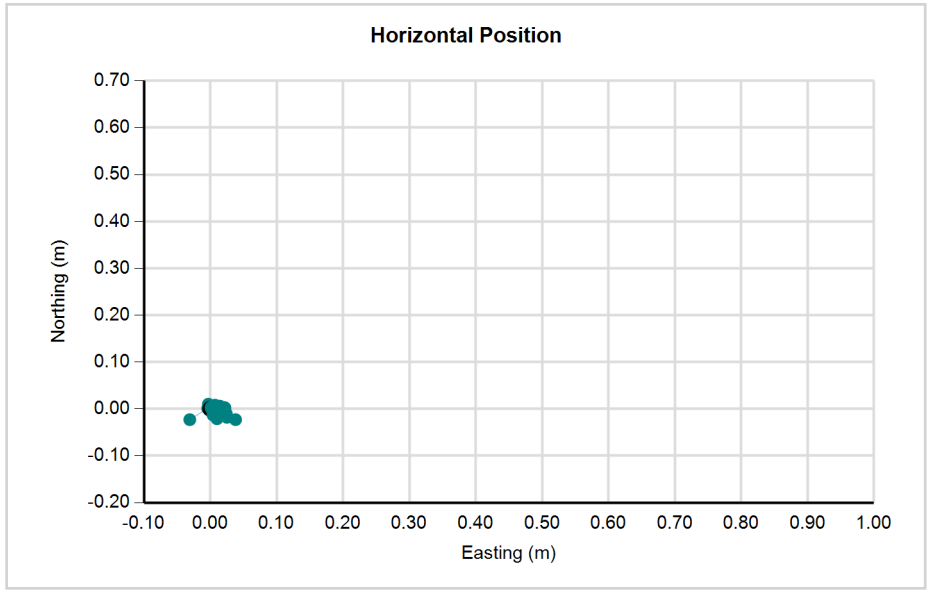
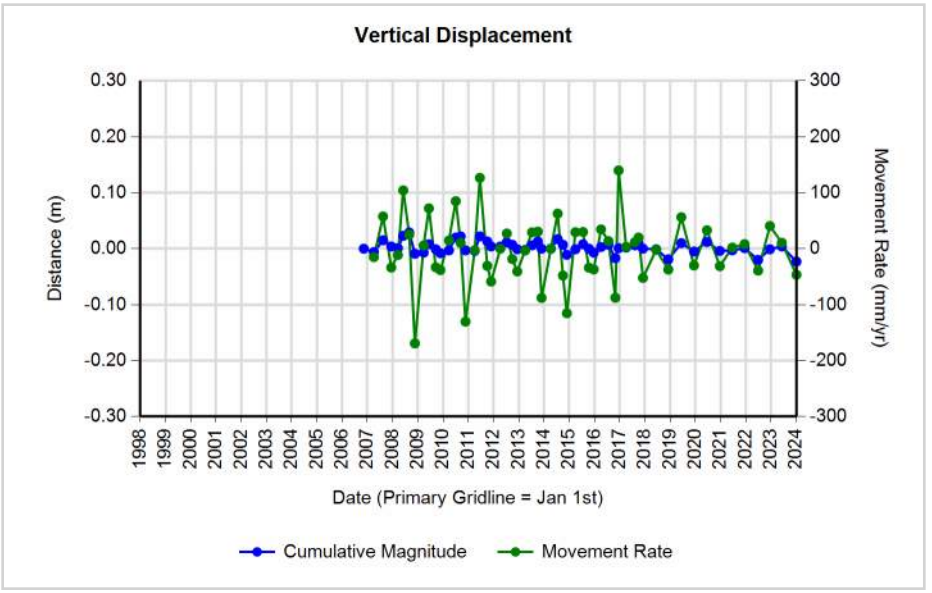
GPS Hub 06-03 (West Side of Anderson Drive)

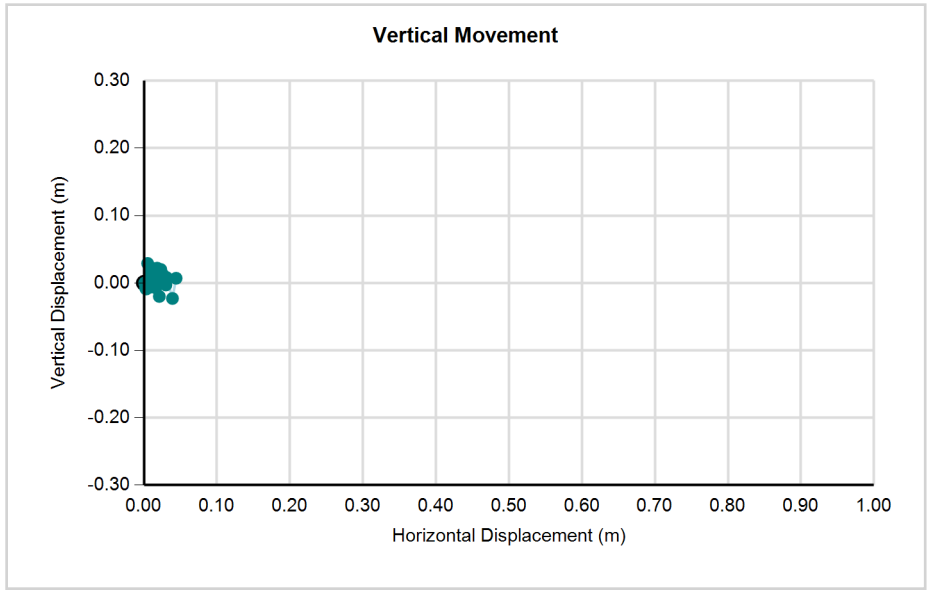
22/12/2015	5868871.076	532370.960	474.514	9.11	0.014	0.008	0.016	-0.007	29.7	-23.5	0.002	-0.001	0.19	0.013	0.008	0.015	-0.007	31.6	-24.6	80.801	-37.054
06/04/2016	5868871.060	532370.964	474.524	9.40	-0.002	0.012	0.012	0.003	99.5	13.9	0.001	0.000	0.29	-0.016	0.004	0.016	0.010	166.0	31.2	-56.829	34.458
22/07/2016	5868871.039	532370.990	474.528	9.70	-0.023	0.038	0.044	0.007	121.2	9.0	0.005	0.001	0.29	-0.021	0.026	0.033	0.004	128.9	6.8	114.086	13.654
30/10/2016	5868871.065	532370.967	474.504	9.97	0.003	0.015	0.015	-0.017	78.7	-48.0	0.002	-0.002	0.27	0.026	-0.023	0.035	-0.024	318.5	-34.7	-126.790	-87.660
16/12/2016	5868871.062	532370.965	474.522	10.10	0.000	0.013	0.013	0.001	90.0	4.4	0.001	0.000	0.13	-0.003	-0.002	0.004	0.018	213.7	78.7	-28.020	139.883
04/04/2017	5868871.061	532370.960	474.523	10.40	-0.001	0.008	0.008	0.002	97.1	13.9	0.001	0.000	0.30	-0.001	-0.005	0.005	0.001	258.7	11.1	-17.086	3.351
08/08/2017	5868871.060	532370.962	474.527	10.74	-0.002	0.010	0.010	0.006	101.3	30.5	0.001	0.001	0.34	-0.001	0.002	0.002	0.004	116.6	60.8	6.482	11.595
02/10/2017	5868871.053	532370.969	474.530	10.89	-0.009	0.017	0.019	0.009	117.9	25.1	0.002	0.001	0.15	-0.007	0.007	0.010	0.003	135.0	16.9	65.742	19.923
04/12/2017	5868871.063	532370.962	474.521	11.07	0.001	0.010	0.010	0.000	84.3	0.0	0.001	0.000	0.17	0.010	-0.007	0.012	-0.009	325.0	-36.4	-70.769	-52.179
13/06/2018	5868871.064	532370.974	474.520	11.59	0.002	0.022	0.022	-0.001	84.8	-2.6	0.002	0.000	0.52	0.001	0.012	0.012	-0.001	85.2	-4.7	23.027	-1.912
06/12/2018	5868871.066	532370.959	474.502	12.07	0.004	0.007	0.008	-0.019	60.3	-67.0	0.001	-0.002	0.48	0.002	-0.015	0.015	-0.018	277.6	-49.9	-31.405	-37.355
12/06/2019	5868871.058	532370.970	474.531	12.59	-0.004	0.018	0.018	0.010	102.5	28.5	0.001	0.001	0.51	-0.008	0.011	0.014	0.029	126.0	64.9	26.425	56.342
12/12/2019	5868871.064	532370.958	474.516	13.09	0.002	0.006	0.006	-0.005	71.6	-38.3	0.000	0.000	0.50	0.006	-0.012	0.013	-0.015	296.6	-48.2	-26.778	-29.939
17/06/2020	5868871.052	532370.976	474.533	13.60	-0.010	0.024	0.026	0.012	112.6	24.8	0.002	0.001	0.51	-0.012	0.018	0.022	0.017	123.7	38.2	42.030	33.028
21/12/2020	5868871.056	532370.962	474.517	14.11	-0.006	0.010	0.012	-0.004	121.0	-18.9	0.001	0.000	0.51	0.004	-0.014	0.015	-0.016	285.9	-47.7	-28.439	-31.251
19/06/2021	5868871.046	532370.977	474.518	14.61	-0.016	0.025	0.030	-0.003	122.6	-5.8	0.002	0.000	0.49	-0.010	0.015	0.018	0.001	123.7	3.2	36.581	2.029
14/12/2021	5868871.059	532370.962	474.522	15.09	-0.003	0.010	0.010	0.001	106.7	5.5	0.001	0.000	0.49	0.013	-0.015	0.020	0.004	310.9	11.4	-40.730	8.208
28/06/2022	5868871.065	532370.973	474.501	15.63	0.003	0.021	0.021	-0.020	81.9	-43.3	0.001	-0.001	0.54	0.006	0.011	0.013	-0.021	61.4	-59.2	23.350	-39.134
16/12/2022	5868871.055	532370.962	474.520	16.10	-0.007	0.010	0.012	-0.001	125.0	-4.7	0.001	0.000	0.47	-0.010	-0.011	0.015	0.019	227.7	52.0	-31.753	40.583
06/06/2023	5868871.058	532370.972	474.525	16.57	-0.004	0.020	0.020	0.004	101.3	11.1	0.001	0.000	0.47	0.003	0.010	0.010	0.005	73.3	25.6	22.170	10.639
04/01/2024	5868871.039	532370.921	474.498	17.15	-0.023	-0.031	0.039	-0.023	233.4	-30.8	0.002	-0.001	0.58	-0.019	-0.051	0.054	-0.027	249.6	-26.4	93.766	-46.535

GPS Hub 06-03 (West Side of Anderson Drive)









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GPS Hub 06-04 (North Side of Wade Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869067.298	532520.728	474.933	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869067.297	532520.728	474.927	0.40	-0.001	0.000	0.001	-0.006	180.0	-80.5	0.003	-0.015	0.40	-0.001	0.000	0.001	-0.006	180.0	-80.5	2.502	-15.010
16/08/2007	5869067.291	532520.719	474.941	0.76	-0.007	-0.009	0.011	0.008	232.1	35.1	0.015	0.010	0.36	-0.006	-0.009	0.011	0.014	236.3	52.3	29.705	38.447
13/12/2007	5869067.302	532520.725	474.927	1.09	0.004	-0.003	0.005	-0.006	323.1	-50.2	0.005	-0.006	0.33	0.011	0.006	0.013	-0.014	28.6	-48.2	-38.459	-42.971
18/03/2008	5869067.301	532520.722	474.937	1.35	0.003	-0.006	0.007	0.004	296.6	30.8	0.005	0.003	0.26	-0.001	-0.003	0.003	0.010	251.6	72.5	12.031	38.047
03/06/2008	5869067.298	532520.722	474.931	1.56	0.000	-0.006	0.006	-0.002	270.0	-18.4	0.004	-0.001	0.21	-0.003	0.000	0.003	-0.006	180.0	-63.4	-14.231	-28.461
29/08/2008	5869067.300	532520.728	474.931	1.80	0.002	0.000	0.002	-0.002	0.0	-45.0	0.001	-0.001	0.24	0.002	0.006	0.006	0.000	71.6	0.0	-26.552	0.000
19/11/2008	5869067.295	532520.724	475.019	2.03	-0.003	-0.004	0.005	0.086	233.1	86.7	0.002	0.042	0.22	-0.005	-0.004	0.006	0.088	218.7	85.8	28.521	391.976
26/03/2009	5869067.301	532520.726	474.924	2.37	0.003	-0.002	0.004	-0.009	326.3	-68.2	0.002	-0.004	0.35	0.006	0.002	0.006	-0.095	18.4	-86.2	-18.189	-273.219
10/06/2009	5869067.289	532520.720	474.937	2.58	-0.009	-0.008	0.012	0.004	221.6	18.4	0.005	0.002	0.21	-0.012	-0.006	0.013	0.013	206.6	44.1	64.478	62.477
17/09/2009	5869067.294	532520.731	474.939	2.85	-0.004	0.003	0.005	0.006	143.1	50.2	0.002	0.002	0.27	0.005	0.011	0.012	0.002	65.6	9.4	-44.579	7.379
23/11/2009	5869067.301	532520.729	474.926	3.04	0.003	0.001	0.003	-0.007	18.4	-65.7	0.001	-0.002	0.18	0.007	-0.002	0.007	-0.013	344.1	-60.8	-39.687	-70.869
27/03/2010	5869067.303	532520.714	474.935	3.38	0.005	-0.014	0.015	0.002	289.7	7.7	0.004	0.001	0.34	0.002	-0.015	0.015	0.009	277.6	30.7	44.574	26.510
04/07/2010	5869067.287	532520.725	474.934	3.65	-0.011	-0.003	0.011	0.001	195.3	5.0	0.003	0.000	0.27	-0.016	0.011	0.019	-0.001	145.5	-2.9	-71.635	-3.689
13/09/2010	5869067.298	532520.727	474.927	3.84	0.000	-0.001	0.001	-0.006	270.0	-80.5	0.000	-0.002	0.19	0.011	0.002	0.011	-0.007	10.3	-32.1	-57.516	-36.011
22/11/2010	5869067.301	532520.729	474.930	4.03	0.003	0.001	0.003	-0.003	18.4	-43.5	0.001	-0.001	0.19	0.003	0.002	0.004	0.003	33.7	39.8	18.813	15.654
04/04/2011	5869067.285	532520.726	474.925	4.40	-0.013	-0.002	0.013	-0.008	188.7	-31.3	0.003	-0.002	0.36	-0.016	-0.003	0.016	-0.005	190.6	-17.1	44.706	-13.731
18/06/2011	5869067.293	532520.724	474.939	4.60	-0.005	-0.004	0.006	0.006	218.7	43.1	0.001	0.001	0.21	0.008	-0.002	0.008	0.014	346.0	59.5	-40.159	68.180
03/10/2011	5869067.294	532520.720	474.930	4.90	-0.004	-0.008	0.009	-0.003	243.4	-18.5	0.002	-0.001	0.29	0.001	-0.004	0.004	-0.009	284.0	-65.4	14.074	-30.722
28/11/2011	5869067.296	532520.717	474.930	5.05	-0.002	-0.011	0.011	-0.003	259.7	-15.0	0.002	-0.001	0.15	0.002	-0.003	0.004	0.000	303.7	0.0	23.517	0.000
09/04/2012	5869067.289	532520.720	474.928	5.41	-0.009	-0.008	0.012	-0.005	221.6	-22.5	0.002	-0.001	0.36	-0.007	0.003	0.008	-0.002	156.8	-14.7	20.915	-5.492
12/07/2012	5869067.292	532520.726	474.944	5.67	-0.006	-0.002	0.006	0.011	198.4	60.1	0.001	0.002	0.26	0.003	0.006	0.007	0.016	63.4	67.3	-26.066	62.170
29/09/2012	5869067.300	532520.722	474.935	5.89	0.002	-0.006	0.006	0.002	288.4	17.5	0.001	0.000	0.22	0.008	-0.004	0.009	-0.009	333.4	-45.2	41.353	-41.611
10/12/2012	5869067.297	532520.722	474.934	6.08	-0.001	-0.006	0.006	0.001	260.5	9.3	0.001	0.000	0.20	-0.003	0.000	0.003	-0.001	180.0	-18.4	15.219	-5.073
03/04/2013	5869067.294	532520.722	474.937	6.40	-0.004	-0.006	0.007	0.004	236.3	29.0	0.001	0.001	0.31	-0.003	0.000	0.003	0.003	180.0	45.0	9.612	9.612
12/07/2013	5869067.295	532520.728	474.947	6.67	-0.003	0.000	0.003	0.014	180.0	77.9	0.000	0.002	0.27	0.001	0.006	0.006	0.010	80.5	58.7	-22.217	36.525
04/10/2013	5869067.293	532520.717	474.946	6.90	-0.005	-0.011	0.012	0.013	245.6	47.1	0.002	0.002	0.23	-0.002	-0.011	0.011	-0.001	259.7	-5.1	48.615	-4.348
27/11/2013	5869067.299	532520.720	474.934	7.05	0.001	-0.008	0.008	0.001	277.1	7.1	0.001	0.000	0.15	0.006	0.003	0.007	-0.012	26.6	-60.8	-45.374	-81.167
10/04/2014	5869067.296	532520.721	474.937	7.41	-0.002	-0.007	0.007	0.004	254.1	28.8	0.001	0.001	0.37	-0.003	0.001	0.003	0.003	161.6	43.5	-8.620	8.177
18/07/2014	5869067.288	532520.716	474.937	7.69	-0.010	-0.012	0.016	0.004	230.2	14.4	0.002	0.001	0.27	-0.008	-0.005	0.009	0.000	212.0	0.0	34.806	0.000
02/10/2014	5869067.288	532520.717	474.927	7.89	-0.010	-0.011	0.015	-0.006	227.7	-22.0	0.002	-0.001	0.21	0.000	0.001	0.001	-0.010	90.0	-84.3	-4.806	-48.059
28/11/2014	5869067.302	532520.715	474.920	8.05	0.004	-0.013	0.014	-0.013	287.1	-43.7	0.002	-0.002	0.16	0.014	-0.002	0.014	-0.007	351.9	-26.3	-90.621	-44.855
01/04/2015	5869067.299	532520.715	474.927	8.39	0.001	-0.013	0.013	-0.006	274.4	-24.7	0.002	-0.001	0.34	-0.003	0.000	0.003	0.007	180.0	66.8	-8.837	20.619
20/07/2015	5869067.296	532520.721	474.902	8.69	-0.002	-0.007	0.007	-0.031	254.1	-76.8	0.001	-0.004	0.30	-0.003	0.006	0.007	-0.025	116.6	-75.0	-22.274	-83.011
14/10/2015	5869067.290	532520.717	474.897	8.93	-0.008	-0.011	0.014	-0.036	234.0	-69.3	0.002	-0.004	0.24	-0.006	-0.004	0.007	-0.005	213.7	-34.7	30.626	-21.235

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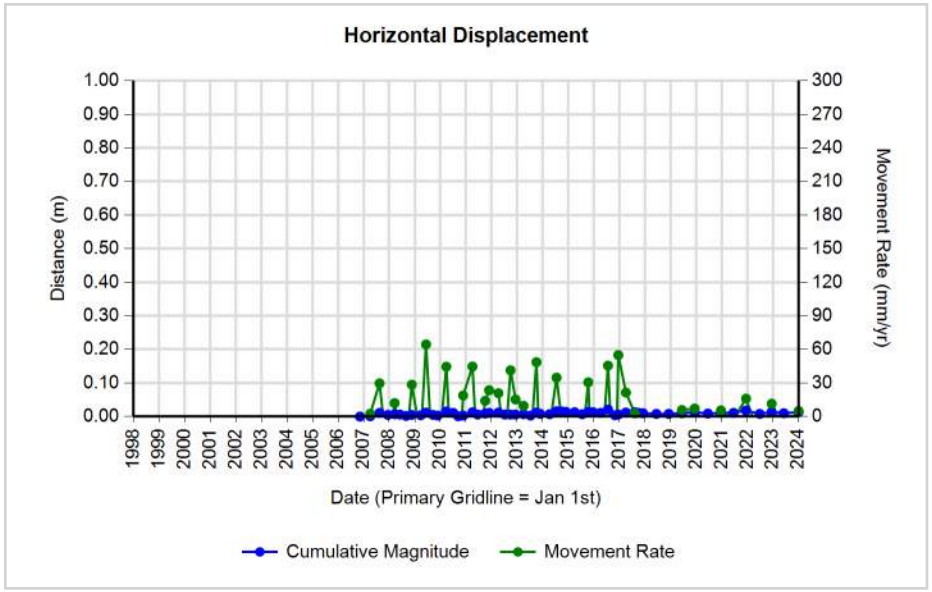
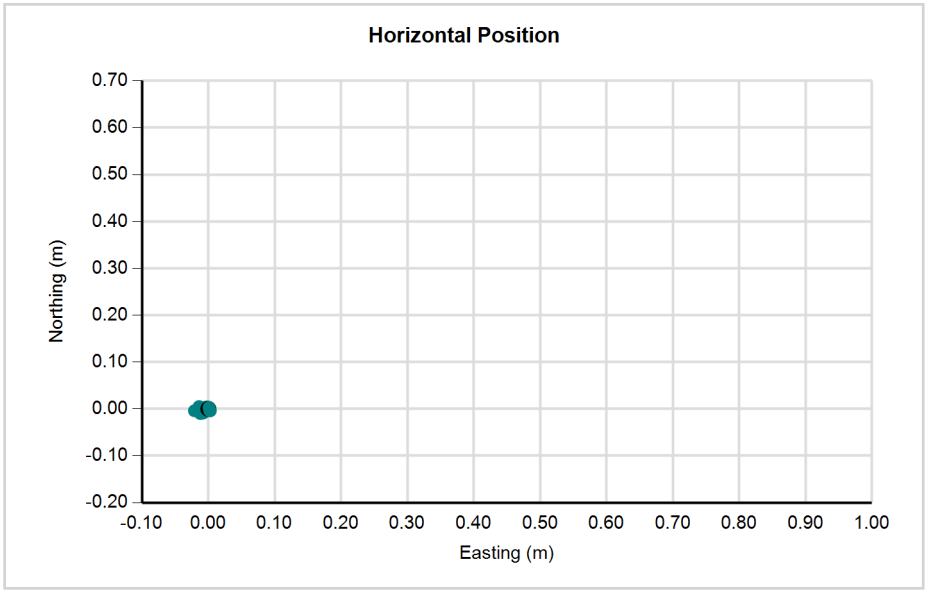
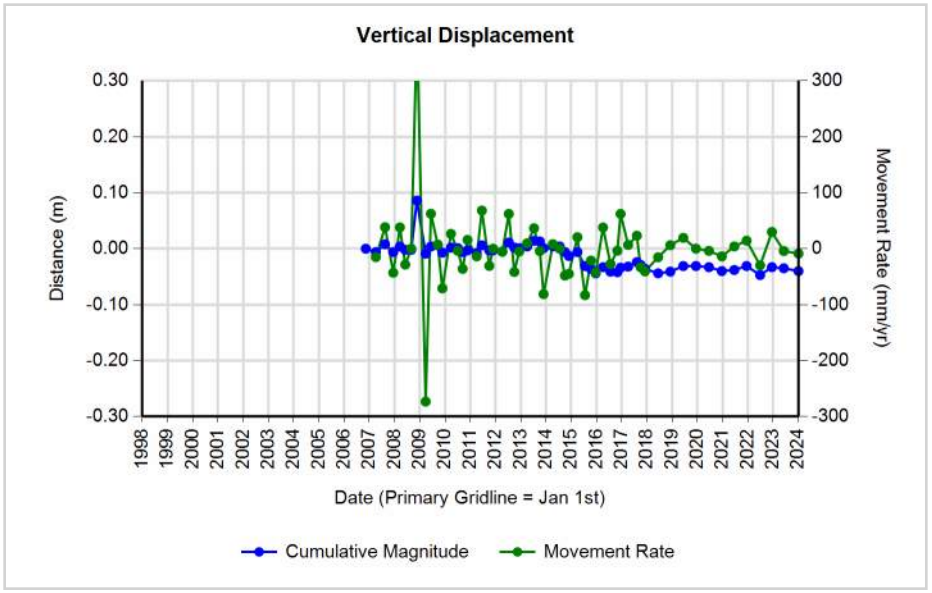
GPS Hub 06-04 (North Side of Wade Avenue)

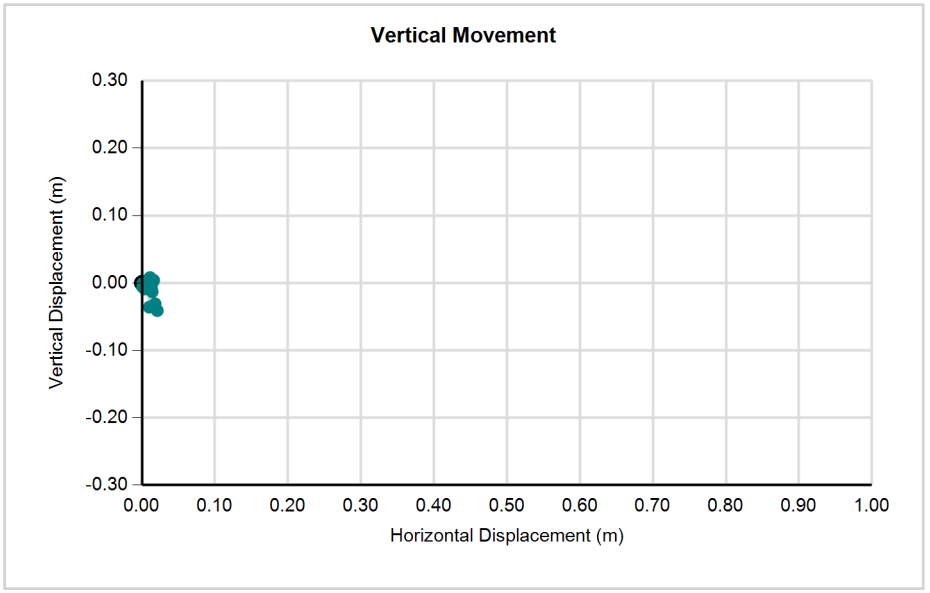
22/12/2015	5869067.305	532520.717	474.889	9.11	0.007	-0.011	0.013	-0.044	302.5	-73.5	0.001	-0.005	0.19	0.015	0.000	0.015	-0.008	0.0	-28.1	-79.402	-42.348
06/04/2016	5869067.291	532520.720	474.900	9.40	-0.007	-0.008	0.011	-0.033	228.8	-72.1	0.001	-0.004	0.29	-0.014	0.003	0.014	0.011	167.9	37.5	-49.336	37.903
22/07/2016	5869067.294	532520.707	474.892	9.70	-0.004	-0.021	0.021	-0.041	259.2	-62.5	0.002	-0.004	0.29	0.003	-0.013	0.013	-0.008	283.0	-30.9	45.542	-27.308
30/10/2016	5869067.294	532520.730	474.891	9.97	-0.004	0.002	0.004	-0.042	153.4	-83.9	0.000	-0.004	0.27	0.000	0.023	0.023	-0.001	90.0	-2.5	-84.007	-3.652
16/12/2016	5869067.295	532520.723	474.899	10.10	-0.003	-0.005	0.006	-0.034	239.0	-80.3	0.001	-0.003	0.13	0.001	-0.007	0.007	0.008	278.1	48.5	54.951	62.170
04/04/2017	5869067.290	532520.719	474.901	10.40	-0.008	-0.009	0.012	-0.032	228.4	-69.4	0.001	-0.003	0.30	-0.005	-0.004	0.006	0.002	218.7	17.3	21.456	6.702
08/08/2017	5869067.289	532520.719	474.909	10.74	-0.009	-0.009	0.013	-0.024	225.0	-62.1	0.001	-0.002	0.34	-0.001	0.000	0.001	0.008	180.0	82.9	2.899	23.190
02/10/2017	5869067.289	532520.722	474.904	10.89	-0.009	-0.006	0.011	-0.029	213.7	-69.5	0.001	-0.003	0.15	0.000	0.003	0.003	-0.005	90.0	-59.0	-19.923	-33.205
04/12/2017	5869067.293	532520.719	474.897	11.07	-0.005	-0.009	0.010	-0.036	240.9	-74.0	0.001	-0.003	0.17	0.004	-0.003	0.005	-0.007	323.1	-54.5	-28.988	-40.583
13/06/2018	5869067.299	532520.720	474.889	11.59	0.001	-0.008	0.008	-0.044	277.1	-79.6	0.001	-0.004	0.52	0.006	0.001	0.006	-0.008	9.5	-52.8	-11.632	-15.298
06/12/2018	5869067.295	532520.721	474.892	12.07	-0.003	-0.007	0.008	-0.041	246.8	-79.5	0.001	-0.003	0.48	-0.004	0.001	0.004	0.003	166.0	36.0	-8.557	6.226
12/06/2019	5869067.295	532520.718	474.902	12.59	-0.003	-0.010	0.010	-0.031	253.3	-71.4	0.001	-0.002	0.51	0.000	-0.003	0.003	0.010	270.0	73.3	5.828	19.428
12/12/2019	5869067.292	532520.716	474.902	13.09	-0.006	-0.012	0.013	-0.031	243.4	-66.6	0.001	-0.002	0.50	-0.003	-0.002	0.004	0.000	213.7	0.0	7.196	0.000
17/06/2020	5869067.291	532520.723	474.900	13.60	-0.007	-0.005	0.009	-0.033	215.5	-75.4	0.001	-0.002	0.51	-0.001	0.007	0.007	-0.002	98.1	-15.8	-13.738	-3.886
21/12/2020	5869067.289	532520.721	474.893	14.11	-0.009	-0.007	0.011	-0.040	217.9	-74.1	0.001	-0.003	0.51	-0.002	-0.002	0.003	-0.007	225.0	-68.0	5.525	-13.672
19/06/2021	5869067.290	532520.721	474.895	14.61	-0.008	-0.007	0.011	-0.038	221.2	-74.4	0.001	-0.003	0.49	0.001	0.000	0.001	0.002	0.0	63.4	-2.029	4.058
14/12/2021	5869067.284	532520.716	474.902	15.09	-0.014	-0.012	0.018	-0.031	220.6	-59.3	0.001	-0.002	0.49	-0.006	-0.005	0.008	0.007	219.8	41.9	16.026	14.364
28/06/2022	5869067.292	532520.722	474.886	15.63	-0.006	-0.006	0.008	-0.047	225.0	-79.8	0.001	-0.003	0.54	0.008	0.006	0.010	-0.016	36.9	-58.0	-18.635	-29.816
16/12/2022	5869067.290	532520.717	474.900	16.10	-0.008	-0.011	0.014	-0.033	234.0	-67.6	0.001	-0.002	0.47	-0.002	-0.005	0.005	0.014	248.2	69.0	11.503	29.904
06/06/2023	5869067.289	532520.723	474.898	16.57	-0.009	-0.005	0.010	-0.035	208.6	-73.7	0.001	-0.002	0.47	-0.001	0.006	0.006	-0.002	99.3	-17.6	-13.127	-4.162
04/01/2024	5869067.287	532520.721	474.893	17.15	-0.011	-0.007	0.013	-0.040	212.5	-71.9	0.001	-0.002	0.58	-0.002	-0.002	0.003	-0.005	226.4	-60.1	4.996	-8.683

GPS Hub 06-04 (North Side of Wade Avenue)









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GPS Hub 06-05 (West Side of Anderson Drive)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869143.444	532486.772	478.133	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869143.448	532486.774	478.128	0.40	0.004	0.002	0.004	-0.005	26.6	-48.2	0.011	-0.013	0.40	0.004	0.002	0.004	-0.005	26.6	-48.2	11.188	-12.509
16/08/2007	5869143.438	532486.773	478.114	0.76	-0.006	0.001	0.006	-0.019	170.5	-72.2	0.008	-0.025	0.36	-0.010	-0.001	0.010	-0.014	185.7	-54.3	27.599	-38.447
13/12/2007	5869143.445	532486.782	478.125	1.09	0.001	0.010	0.010	-0.008	84.3	-38.5	0.009	-0.007	0.33	0.007	0.009	0.011	0.011	52.1	44.0	34.996	33.763
18/03/2008	5869143.445	532486.779	478.144	1.35	0.001	0.007	0.007	0.011	81.9	57.3	0.005	0.008	0.26	0.000	-0.003	0.003	0.019	270.0	81.0	-11.414	72.289
03/06/2008	5869143.439	532486.790	478.142	1.56	-0.005	0.018	0.019	0.009	105.5	25.7	0.012	0.006	0.21	-0.006	0.011	0.013	-0.002	118.6	-9.1	59.436	-9.487
29/08/2008	5869143.434	532486.794	478.149	1.80	-0.010	0.022	0.024	0.016	114.4	33.5	0.013	0.009	0.24	-0.005	0.004	0.006	0.007	141.3	47.5	26.882	29.388
19/11/2008	5869143.437	532486.796	478.141	2.03	-0.007	0.024	0.025	0.008	106.3	17.7	0.012	0.004	0.22	0.003	0.002	0.004	-0.008	33.7	-65.7	16.060	-35.634
26/03/2009	5869143.436	532486.797	478.142	2.37	-0.008	0.025	0.026	0.009	107.7	18.9	0.011	0.004	0.35	-0.001	0.001	0.001	0.001	135.0	35.3	4.067	2.876
10/06/2009	5869143.427	532486.812	478.170	2.58	-0.017	0.040	0.043	0.037	113.0	40.4	0.017	0.014	0.21	-0.009	0.015	0.017	0.028	121.0	58.0	84.069	134.566
17/09/2009	5869143.431	532486.805	478.155	2.85	-0.013	0.033	0.035	0.022	111.5	31.8	0.012	0.008	0.27	0.004	-0.007	0.008	-0.015	299.7	-61.7	-29.745	-55.341
23/11/2009	5869143.439	532486.812	478.151	3.04	-0.005	0.040	0.040	0.018	97.1	24.1	0.013	0.006	0.18	0.008	0.007	0.011	-0.004	41.2	-20.6	57.950	-21.806
27/03/2010	5869143.434	532486.813	478.154	3.38	-0.010	0.041	0.042	0.021	103.7	26.5	0.013	0.006	0.34	-0.005	0.001	0.005	0.003	168.7	30.5	15.019	8.837
04/07/2010	5869143.423	532486.810	478.157	3.65	-0.021	0.038	0.043	0.024	118.9	28.9	0.012	0.007	0.27	-0.011	-0.003	0.011	0.003	195.3	14.7	42.066	11.068
13/09/2010	5869143.430	532486.814	478.160	3.84	-0.014	0.042	0.044	0.027	108.4	31.4	0.012	0.007	0.19	0.007	0.004	0.008	0.003	29.7	20.4	41.475	15.433
22/11/2010	5869143.430	532486.813	478.160	4.03	-0.014	0.041	0.043	0.027	108.9	31.9	0.011	0.007	0.19	0.000	-0.001	0.001	0.000	270.0	0.0	-5.218	0.000
04/04/2011	5869143.427	532486.812	478.164	4.40	-0.017	0.040	0.043	0.031	113.0	35.5	0.010	0.007	0.36	-0.003	-0.001	0.003	0.004	198.4	51.7	8.684	10.985
18/06/2011	5869143.425	532486.820	478.161	4.60	-0.019	0.048	0.052	0.028	111.6	28.5	0.011	0.006	0.21	-0.002	0.008	0.008	-0.003	104.0	-20.0	40.159	-14.610
03/10/2011	5869143.427	532486.816	478.156	4.90	-0.017	0.044	0.047	0.023	111.1	26.0	0.010	0.005	0.29	0.002	-0.004	0.004	-0.005	296.6	-48.2	-15.266	-17.068
28/11/2011	5869143.427	532486.816	478.155	5.05	-0.017	0.044	0.047	0.022	111.1	25.0	0.009	0.004	0.15	0.000	0.000	0.000	-0.001	0.0	0.0	0.000	-6.522
09/04/2012	5869143.419	532486.821	478.154	5.41	-0.025	0.049	0.055	0.021	117.0	20.9	0.010	0.004	0.36	-0.008	0.005	0.009	-0.001	148.0	-6.1	25.908	-2.746
12/07/2012	5869143.420	532486.828	478.177	5.67	-0.024	0.056	0.061	0.044	113.2	35.8	0.011	0.008	0.26	0.001	0.007	0.007	0.023	81.9	72.9	27.476	89.370
29/09/2012	5869143.429	532486.829	478.171	5.89	-0.015	0.057	0.059	0.038	104.7	32.8	0.010	0.006	0.22	0.009	0.001	0.009	-0.006	6.3	-33.5	-41.867	-27.741
10/12/2012	5869143.422	532486.825	478.172	6.08	-0.022	0.053	0.057	0.039	112.5	34.2	0.009	0.006	0.20	-0.007	-0.004	0.008	0.001	209.7	7.1	-40.899	5.073
03/04/2013	5869143.422	532486.827	478.164	6.40	-0.022	0.055	0.059	0.031	111.8	27.6	0.009	0.005	0.31	0.000	0.002	0.002	-0.008	90.0	-76.0	6.408	-25.632
12/07/2013	5869143.417	532486.832	478.181	6.67	-0.027	0.060	0.066	0.048	114.2	36.1	0.010	0.007	0.27	-0.005	0.005	0.007	0.017	135.0	67.4	25.827	62.093
04/10/2013	5869143.421	532486.823	478.183	6.90	-0.023	0.051	0.056	0.050	114.3	41.8	0.008	0.007	0.23	0.004	-0.009	0.010	0.002	294.0	11.5	-42.825	8.696
27/11/2013	5869143.421	532486.829	478.175	7.05	-0.023	0.057	0.061	0.042	112.0	34.3	0.009	0.006	0.15	0.000	0.006	0.006	-0.008	90.0	-53.1	40.583	-54.111
10/04/2014	5869143.420	532486.828	478.166	7.41	-0.024	0.056	0.061	0.033	113.2	28.4	0.008	0.004	0.37	-0.001	-0.001	0.001	-0.009	225.0	-81.1	-3.855	-24.532
18/07/2014	5869143.415	532486.829	478.173	7.69	-0.029	0.057	0.064	0.040	117.0	32.0	0.008	0.005	0.27	-0.005	0.001	0.005	0.007	168.7	53.9	18.812	25.826
02/10/2014	5869143.418	532486.828	478.164	7.89	-0.026	0.056	0.062	0.031	114.9	26.7	0.008	0.004	0.21	0.003	-0.001	0.003	-0.009	341.6	-70.6	-15.198	-43.253
28/11/2014	5869143.428	532486.830	478.164	8.05	-0.016	0.058	0.060	0.031	105.4	27.3	0.007	0.004	0.16	0.010	0.002	0.010	0.000	11.3	0.0	-65.348	0.000
01/04/2015	5869143.425	532486.830	478.171	8.39	-0.019	0.058	0.061	0.038	108.1	31.9	0.007	0.005	0.34	-0.003	0.000	0.003	0.007	180.0	66.8	8.837	20.619
20/07/2015	5869143.421	532486.833	478.174	8.69	-0.023	0.061	0.065	0.041	110.7	32.2	0.008	0.005	0.30	-0.004	0.003	0.005	0.003	143.1	31.0	16.602	9.961
14/10/2015	5869143.416	532486.826	478.172	8.93	-0.028	0.054	0.061	0.039	117.4	32.7	0.007	0.004	0.24	-0.005	-0.007	0.009	-0.002	234.5	-13.1	-36.535	-8.494

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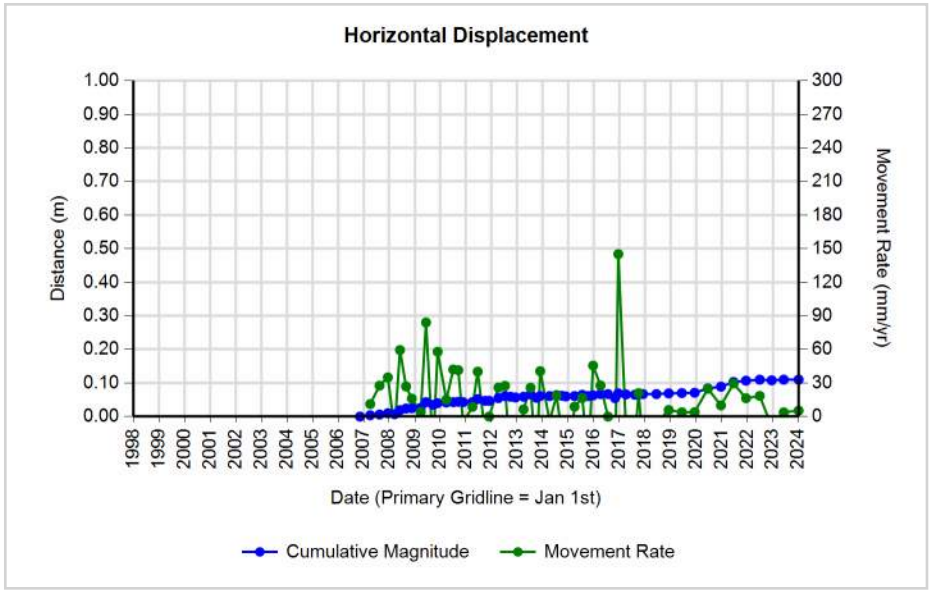
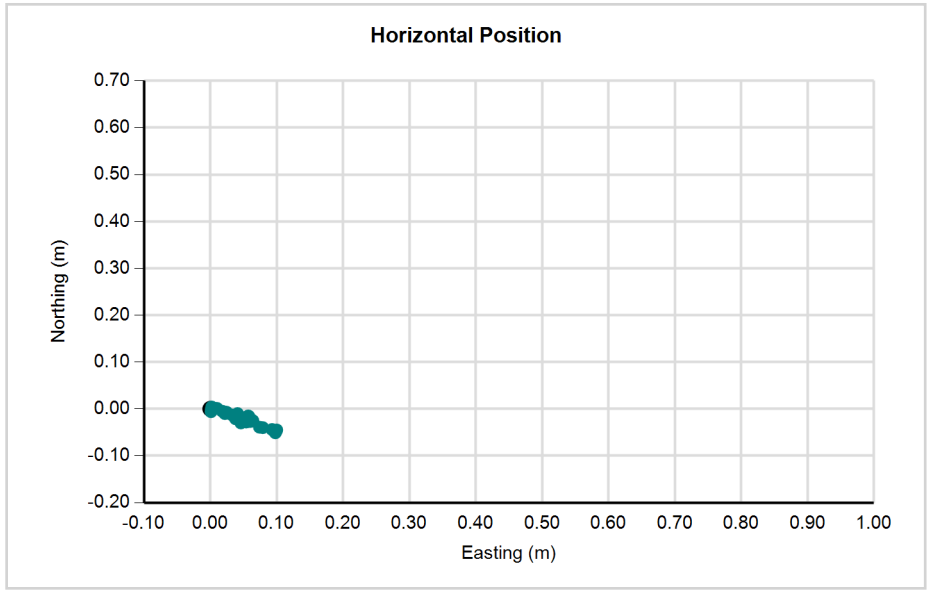
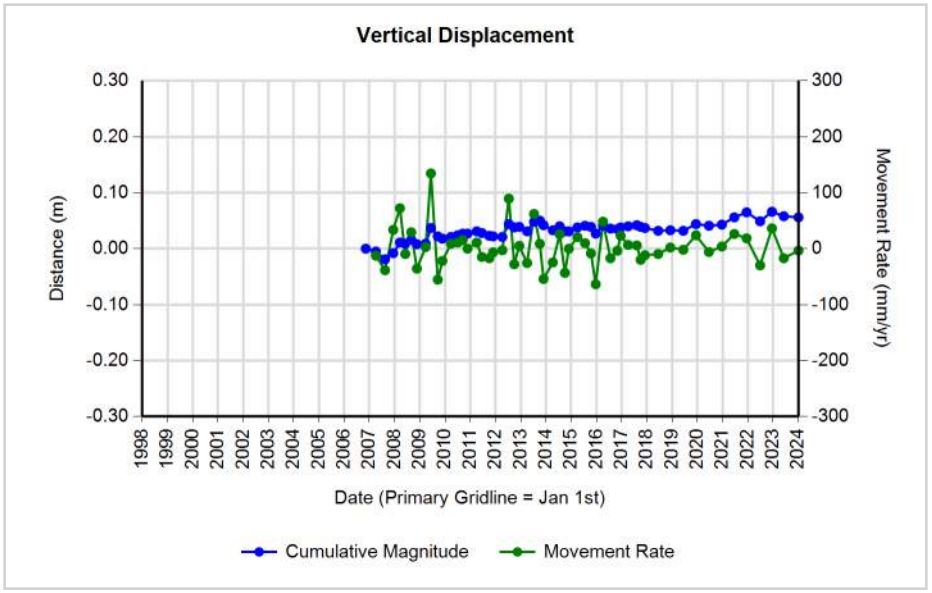
GPS Hub 06-05 (West Side of Anderson Drive)

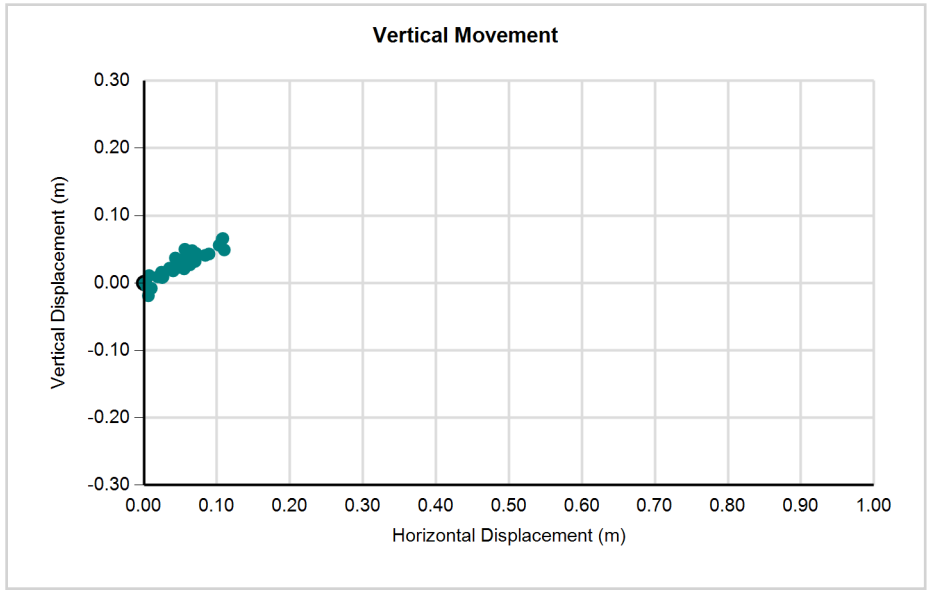
22/12/2015	5869143.423	532486.831	478.160	9.11	-0.021	0.059	0.063	0.027	109.6	23.3	0.007	0.003	0.19	0.007	0.005	0.009	-0.012	35.5	-54.4	45.536	-63.522
06/04/2016	5869143.415	532486.832	478.174	9.40	-0.029	0.060	0.067	0.041	115.8	31.6	0.007	0.004	0.29	-0.008	0.001	0.008	0.014	172.9	60.1	27.781	48.241
22/07/2016	5869143.415	532486.832	478.169	9.70	-0.029	0.060	0.067	0.036	115.8	28.4	0.007	0.004	0.29	0.000	0.000	0.000	-0.005	0.0	0.0	0.000	-17.068
30/10/2016	5869143.414	532486.818	478.168	9.97	-0.030	0.046	0.055	0.035	123.1	32.5	0.006	0.004	0.27	-0.001	-0.014	0.014	-0.001	265.9	-4.1	-51.265	-3.652
16/12/2016	5869143.419	532486.836	478.171	10.10	-0.025	0.064	0.069	0.038	111.3	28.9	0.007	0.004	0.13	0.005	0.018	0.019	0.003	74.5	9.1	145.179	23.314
04/04/2017	5869143.420	532486.833	478.173	10.40	-0.024	0.061	0.066	0.040	111.5	31.4	0.006	0.004	0.30	0.001	-0.003	0.003	0.002	288.4	32.3	-10.597	6.702
08/08/2017	5869143.413	532486.829	478.175	10.74	-0.031	0.057	0.065	0.042	118.5	32.9	0.006	0.004	0.34	-0.007	-0.004	0.008	0.002	209.7	13.9	-23.371	5.798
02/10/2017	5869143.412	532486.832	478.172	10.89	-0.032	0.060	0.068	0.039	118.1	29.8	0.006	0.004	0.15	-0.001	0.003	0.003	-0.003	108.4	-43.5	21.000	-19.923
04/12/2017	5869143.416	532486.833	478.170	11.07	-0.028	0.061	0.067	0.037	114.7	28.9	0.006	0.003	0.17	0.004	0.001	0.004	-0.002	14.0	-25.9	-23.904	-11.595
13/06/2018	5869143.419	532486.834	478.165	11.59	-0.025	0.062	0.067	0.032	112.0	25.6	0.006	0.003	0.52	0.003	0.001	0.003	-0.005	18.4	-57.7	-6.047	-9.562
06/12/2018	5869143.417	532486.836	478.166	12.07	-0.027	0.064	0.069	0.033	112.9	25.4	0.006	0.003	0.48	-0.002	0.002	0.003	0.001	135.0	19.5	5.870	2.075
12/06/2019	5869143.415	532486.836	478.165	12.59	-0.029	0.064	0.070	0.032	114.4	24.5	0.006	0.003	0.51	-0.002	0.000	0.002	-0.001	180.0	-26.6	3.886	-1.943
12/12/2019	5869143.413	532486.836	478.177	13.09	-0.031	0.064	0.071	0.044	115.8	31.7	0.005	0.003	0.50	-0.002	0.000	0.002	0.012	180.0	80.5	3.992	23.951
17/06/2020	5869143.405	532486.846	478.174	13.60	-0.039	0.074	0.084	0.041	117.8	26.1	0.006	0.003	0.51	-0.008	0.010	0.013	-0.003	128.7	-13.2	24.880	-5.828
21/12/2020	5869143.404	532486.851	478.176	14.11	-0.040	0.079	0.089	0.043	116.9	25.9	0.006	0.003	0.51	-0.001	0.005	0.005	0.002	101.3	21.4	9.959	3.906
19/06/2021	5869143.400	532486.865	478.189	14.61	-0.044	0.093	0.103	0.056	115.3	28.6	0.007	0.004	0.49	-0.004	0.014	0.015	0.013	105.9	41.8	29.545	26.379
14/12/2021	5869143.392	532486.865	478.198	15.09	-0.052	0.093	0.107	0.065	119.2	31.4	0.007	0.004	0.49	-0.008	0.000	0.008	0.009	180.0	48.4	16.416	18.468
28/06/2022	5869143.399	532486.872	478.182	15.63	-0.045	0.100	0.110	0.049	114.2	24.1	0.007	0.003	0.54	0.007	0.007	0.010	-0.016	45.0	-58.3	18.448	-29.816
16/12/2022	5869143.396	532486.869	478.199	16.10	-0.048	0.097	0.108	0.066	116.3	31.4	0.007	0.004	0.47	-0.003	-0.003	0.004	0.017	225.0	76.0	-9.062	36.311
06/06/2023	5869143.396	532486.871	478.191	16.57	-0.048	0.099	0.110	0.058	115.9	27.8	0.007	0.003	0.47	0.000	0.002	0.002	-0.008	90.0	-77.4	3.822	-17.031
04/01/2024	5869143.393	532486.870	478.189	17.15	-0.051	0.098	0.110	0.056	117.5	26.9	0.006	0.003	0.58	-0.003	-0.001	0.003	-0.002	194.9	-32.5	5.349	-3.411

GPS Hub 06-05 (West Side of Anderson Drive)









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GPS Hub 06-06 (North Corner of Avery Avenue and Anderson Drive)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869235.696	532594.188	476.641	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869235.691	532594.191	476.638	0.40	-0.005	0.003	0.006	-0.003	149.0	-27.2	0.015	-0.008	0.40	-0.005	0.003	0.006	-0.003	149.0	-27.2	14.587	-7.505
16/08/2007	5869235.683	532594.184	476.627	0.76	-0.013	-0.004	0.014	-0.014	197.1	-45.8	0.018	-0.018	0.36	-0.008	-0.007	0.011	-0.011	221.2	-46.0	29.193	-30.209
13/12/2007	5869235.695	532594.193	476.639	1.09	-0.001	0.005	0.005	-0.002	101.3	-21.4	0.005	-0.002	0.33	0.012	0.009	0.015	0.012	36.9	38.7	-46.040	36.832
18/03/2008	5869235.691	532594.189	476.646	1.35	-0.005	0.001	0.005	0.005	168.7	44.4	0.004	0.004	0.26	-0.004	-0.004	0.006	0.007	225.0	51.1	21.523	26.633
03/06/2008	5869235.685	532594.192	476.641	1.56	-0.011	0.004	0.012	0.000	160.0	0.0	0.007	0.000	0.21	-0.006	0.003	0.007	-0.005	153.4	-36.7	31.820	-23.718
29/08/2008	5869235.685	532594.195	476.686	1.80	-0.011	0.007	0.013	0.045	147.5	73.8	0.007	0.025	0.24	0.000	0.003	0.003	0.045	90.0	86.2	12.595	188.922
19/11/2008	5869235.682	532594.197	476.641	2.03	-0.014	0.009	0.017	0.000	147.3	0.0	0.008	0.000	0.22	-0.003	0.002	0.004	-0.045	146.3	-85.4	16.060	-200.442
26/03/2009	5869235.685	532594.195	476.646	2.37	-0.011	0.007	0.013	0.005	147.5	21.0	0.005	0.002	0.35	0.003	-0.002	0.004	0.005	326.3	54.2	-10.370	14.380
10/06/2009	5869235.676	532594.204	476.658	2.58	-0.020	0.016	0.026	0.017	141.3	33.6	0.010	0.007	0.21	-0.009	0.009	0.013	0.012	135.0	43.3	61.169	57.671
17/09/2009	5869235.686	532594.198	476.653	2.85	-0.010	0.010	0.014	0.012	135.0	40.3	0.005	0.004	0.27	0.010	-0.006	0.012	-0.005	329.0	-23.2	-43.025	-18.447
23/11/2009	5869235.693	532594.202	476.653	3.04	-0.003	0.014	0.014	0.012	102.1	40.0	0.005	0.004	0.18	0.007	0.004	0.008	0.000	29.7	0.0	43.951	0.000
27/03/2010	5869235.692	532594.197	476.647	3.38	-0.004	0.009	0.010	0.006	114.0	31.4	0.003	0.002	0.34	-0.001	-0.005	0.005	-0.006	258.7	-49.6	-15.019	-17.673
04/07/2010	5869235.674	532594.196	476.652	3.65	-0.022	0.008	0.023	0.011	160.0	25.2	0.006	0.003	0.27	-0.018	-0.001	0.018	0.005	183.2	15.5	66.511	18.447
13/09/2010	5869235.679	532594.198	476.656	3.84	-0.017	0.010	0.020	0.015	149.5	37.3	0.005	0.004	0.19	0.005	0.002	0.005	0.004	21.8	36.6	-27.703	20.577
22/11/2010	5869235.685	532594.202	476.653	4.03	-0.011	0.014	0.018	0.012	128.2	34.0	0.004	0.003	0.19	0.006	0.004	0.007	-0.003	33.7	-22.6	-37.627	-15.654
04/04/2011	5869235.682	532594.203	476.656	4.40	-0.014	0.015	0.021	0.015	133.0	36.2	0.005	0.003	0.36	-0.003	0.001	0.003	0.003	161.6	43.5	8.684	8.239
18/06/2011	5869235.674	532594.200	476.659	4.60	-0.022	0.012	0.025	0.018	151.4	35.7	0.005	0.004	0.21	-0.008	-0.003	0.009	0.003	200.6	19.3	41.609	14.610
03/10/2011	5869235.684	532594.195	476.659	4.90	-0.012	0.007	0.014	0.018	149.7	52.3	0.003	0.004	0.29	0.010	-0.005	0.011	0.000	333.4	0.0	-38.165	0.000
28/11/2011	5869235.683	532594.198	476.655	5.05	-0.013	0.010	0.016	0.014	142.4	40.5	0.003	0.003	0.15	-0.001	0.003	0.003	-0.004	108.4	-51.7	20.625	-26.089
09/04/2012	5869235.676	532594.199	476.654	5.41	-0.020	0.011	0.023	0.013	151.2	29.7	0.004	0.002	0.36	-0.007	0.001	0.007	-0.001	171.9	-8.0	19.419	-2.746
12/07/2012	5869235.676	532594.202	476.668	5.67	-0.020	0.014	0.024	0.027	145.0	47.9	0.004	0.005	0.26	0.000	0.003	0.003	0.014	90.0	77.9	11.657	54.399
29/09/2012	5869235.684	532594.202	476.664	5.89	-0.012	0.014	0.018	0.023	130.6	51.3	0.003	0.004	0.22	0.008	0.000	0.008	-0.004	0.0	-26.6	-36.987	-18.494
10/12/2012	5869235.679	532594.203	476.662	6.08	-0.017	0.015	0.023	0.021	138.6	42.8	0.004	0.003	0.20	-0.005	0.001	0.005	-0.002	168.7	-21.4	25.867	-10.146
03/04/2013	5869235.678	532594.203	476.655	6.40	-0.018	0.015	0.023	0.014	140.2	30.9	0.004	0.002	0.31	-0.001	0.000	0.001	-0.007	180.0	-81.9	3.204	-22.428
12/07/2013	5869235.676	532594.204	476.664	6.67	-0.020	0.016	0.026	0.023	141.3	41.9	0.004	0.003	0.27	-0.002	0.001	0.002	0.009	153.4	76.0	8.167	32.873
04/10/2013	5869235.676	532594.198	476.670	6.90	-0.020	0.010	0.022	0.029	153.4	52.4	0.003	0.004	0.23	0.000	-0.006	0.006	0.006	270.0	45.0	-26.089	26.089
27/11/2013	5869235.679	532594.201	476.659	7.05	-0.017	0.013	0.021	0.018	142.6	40.1	0.003	0.003	0.15	0.003	0.003	0.004	-0.011	45.0	-68.9	-28.697	-74.403
10/04/2014	5869235.679	532594.202	476.659	7.41	-0.017	0.014	0.022	0.018	140.5	39.3	0.003	0.002	0.37	0.000	0.001	0.001	0.000	90.0	0.0	2.726	0.000
18/07/2014	5869235.668	532594.200	476.667	7.69	-0.028	0.012	0.030	0.026	156.8	40.5	0.004	0.003	0.27	-0.011	-0.002	0.011	0.008	190.3	35.6	41.249	29.515
02/10/2014	5869235.674	532594.204	476.658	7.89	-0.022	0.016	0.027	0.017	144.0	32.0	0.003	0.002	0.21	0.006	0.004	0.007	-0.009	33.7	-51.3	-34.656	-43.253
28/11/2014	5869235.681	532594.204	476.649	8.05	-0.015	0.016	0.022	0.008	133.2	20.0	0.003	0.001	0.16	0.007	0.000	0.007	-0.009	0.0	-52.1	-44.855	-57.671
01/04/2015	5869235.680	532594.201	476.657	8.39	-0.016	0.013	0.021	0.016	140.9	37.8	0.002	0.002	0.34	-0.001	-0.003	0.003	0.008	251.6	68.4	-9.315	23.565
20/07/2015	5869235.677	532594.203	476.666	8.69	-0.019	0.015	0.024	0.025	141.7	45.9	0.003	0.003	0.30	-0.003	0.002	0.004	0.009	146.3	68.2	11.972	29.884
14/10/2015	5869235.671	532594.197	476.663	8.93	-0.025	0.009	0.027	0.022	160.2	39.6	0.003	0.002	0.24	-0.006	-0.006	0.008	-0.003	225.0	-19.5	36.038	-12.741

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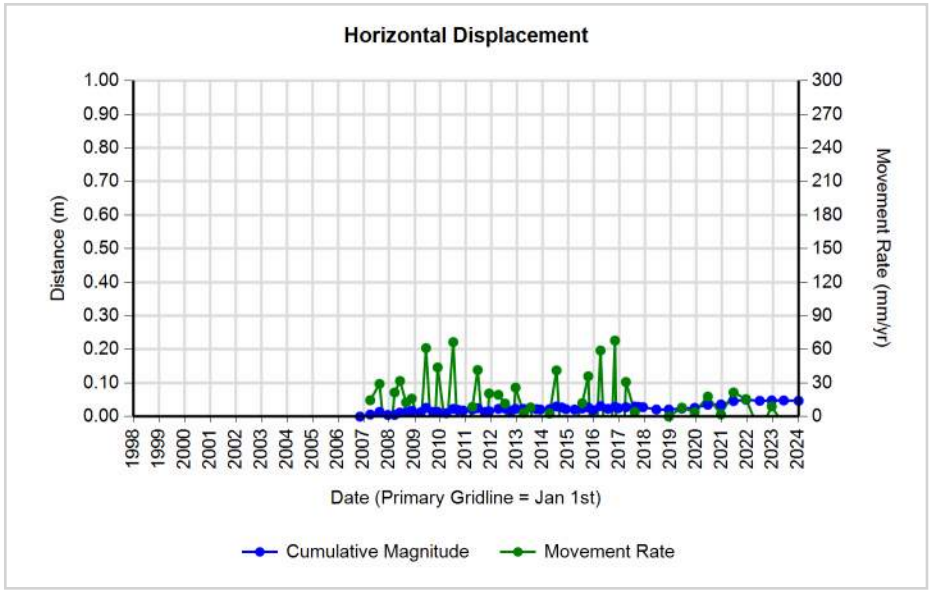
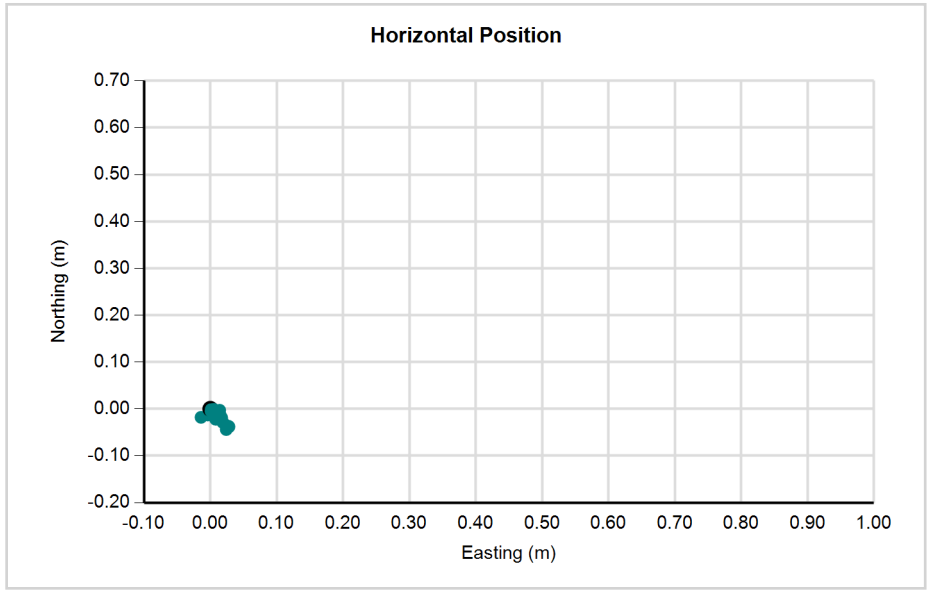
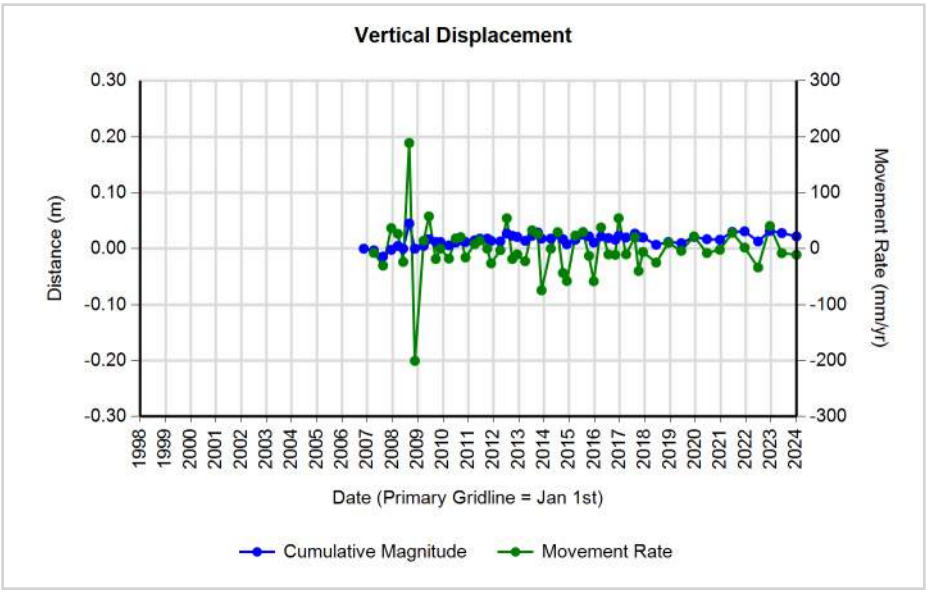
GPS Hub 06-06 (North Corner of Avery Avenue and Anderson Drive)

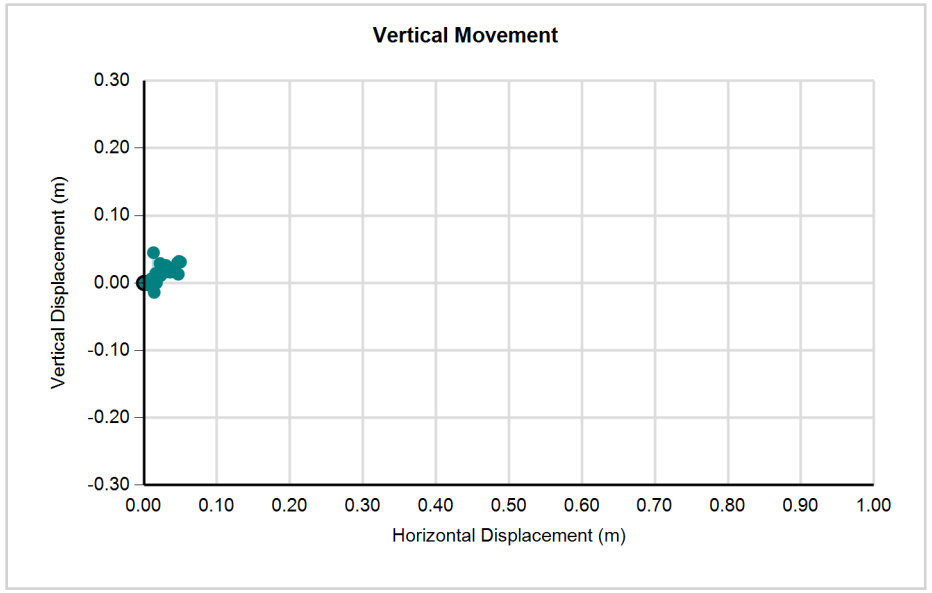
22/12/2015	5869235.685	532594.204	476.652	9.11	-0.011	0.016	0.019	0.011	124.5	29.5	0.002	0.001	0.19	0.014	0.007	0.016	-0.011	26.6	-35.1	-82.856	-58.228
06/04/2016	5869235.668	532594.202	476.663	9.40	-0.028	0.014	0.031	0.022	153.4	35.1	0.003	0.002	0.29	-0.017	-0.002	0.017	0.011	186.7	32.7	58.982	37.903
22/07/2016	5869235.678	532594.174	476.660	9.70	-0.018	-0.014	0.023	0.019	217.9	39.8	0.002	0.002	0.29	0.010	-0.028	0.030	-0.003	289.7	-5.8	-101.492	-10.241
30/10/2016	5869235.667	532594.189	476.657	9.97	-0.029	0.001	0.029	0.016	178.0	28.9	0.003	0.002	0.27	-0.011	0.015	0.019	-0.003	126.3	-9.2	67.940	-10.957
16/12/2016	5869235.677	532594.205	476.664	10.10	-0.019	0.017	0.025	0.023	138.2	42.1	0.003	0.002	0.13	0.010	0.016	0.019	0.007	58.0	20.4	-146.628	54.399
04/04/2017	5869235.670	532594.199	476.661	10.40	-0.026	0.011	0.028	0.020	157.1	35.3	0.003	0.002	0.30	-0.007	-0.006	0.009	-0.003	220.6	-18.0	30.894	-10.053
08/08/2017	5869235.669	532594.200	476.668	10.74	-0.027	0.012	0.030	0.027	156.0	42.4	0.003	0.003	0.34	-0.001	0.001	0.001	0.007	135.0	78.6	4.100	20.292
02/10/2017	5869235.671	532594.203	476.662	10.89	-0.025	0.015	0.029	0.021	149.0	35.8	0.003	0.002	0.15	0.002	0.003	0.004	-0.006	56.3	-59.0	-23.944	-39.845
04/12/2017	5869235.672	532594.202	476.661	11.07	-0.024	0.014	0.028	0.020	149.7	35.7	0.003	0.002	0.17	0.001	-0.001	0.001	-0.001	315.0	-35.3	-8.199	-5.798
13/06/2018	5869235.679	532594.201	476.648	11.59	-0.017	0.013	0.021	0.007	142.6	18.1	0.002	0.001	0.52	0.007	-0.001	0.007	-0.013	351.9	-61.5	-13.522	-24.860
06/12/2018	5869235.679	532594.201	476.653	12.07	-0.017	0.013	0.021	0.012	142.6	29.3	0.002	0.001	0.48	0.000	0.000	0.000	0.005	0.0	0.0	0.000	10.376
12/06/2019	5869235.675	532594.200	476.651	12.59	-0.021	0.012	0.024	0.010	150.3	22.5	0.002	0.001	0.51	-0.004	-0.001	0.004	-0.002	194.0	-25.9	8.010	-3.886
12/12/2019	5869235.673	532594.200	476.662	13.09	-0.023	0.012	0.026	0.021	152.4	39.0	0.002	0.002	0.50	-0.002	0.000	0.002	0.011	180.0	79.7	3.992	21.955
17/06/2020	5869235.667	532594.207	476.658	13.60	-0.029	0.019	0.035	0.017	146.8	26.1	0.003	0.001	0.51	-0.006	0.007	0.009	-0.004	130.6	-23.5	17.912	-7.771
21/12/2020	5869235.666	532594.207	476.657	14.11	-0.030	0.019	0.036	0.016	147.7	24.3	0.003	0.001	0.51	-0.001	0.000	0.001	-0.001	180.0	-45.0	1.953	-1.953
19/06/2021	5869235.659	532594.215	476.671	14.61	-0.037	0.027	0.046	0.030	143.9	33.2	0.003	0.002	0.49	-0.007	0.008	0.011	0.014	131.2	52.8	21.570	28.408
14/12/2021	5869235.652	532594.212	476.672	15.09	-0.044	0.024	0.050	0.031	151.4	31.7	0.003	0.002	0.49	-0.007	-0.003	0.008	0.001	203.2	7.5	15.627	2.052
28/06/2022	5869235.658	532594.216	476.654	15.63	-0.038	0.028	0.047	0.013	143.6	15.4	0.003	0.001	0.54	0.006	0.004	0.007	-0.018	33.7	-68.2	-13.438	-33.543
16/12/2022	5869235.655	532594.213	476.673	16.10	-0.041	0.025	0.048	0.032	148.6	33.7	0.003	0.002	0.47	-0.003	-0.003	0.004	0.019	225.0	77.4	9.062	40.583
06/06/2023	5869235.657	532594.216	476.669	16.57	-0.039	0.028	0.048	0.028	144.4	30.5	0.003	0.002	0.47	0.002	0.003	0.004	-0.004	55.4	-46.7	-7.481	-7.942
04/01/2024	5869235.657	532594.214	476.663	17.15	-0.039	0.026	0.047	0.022	146.3	25.1	0.003	0.001	0.58	0.000	-0.002	0.002	-0.006	270.0	-73.1	-3.273	-10.785

GPS Hub 06-06 (North Corner of Avery Avenue and Anderson Drive)









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GPS Hub 06-07 (Northeast Corner of Boyd Street and Abbott Road)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869425.109	532655.428	477.850	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869425.106	532655.425	477.843	0.40	-0.003	-0.003	0.004	-0.007	225.0	-58.8	0.011	-0.018	0.40	-0.003	-0.003	0.004	-0.007	225.0	-58.8	10.614	-17.512
16/08/2007	5869425.093	532655.418	477.844	0.76	-0.016	-0.010	0.019	-0.006	212.0	-17.6	0.025	-0.008	0.36	-0.013	-0.007	0.015	0.001	208.3	3.9	40.548	2.746
13/12/2007	5869425.107	532655.420	477.858	1.09	-0.002	-0.008	0.008	0.008	256.0	44.1	0.008	0.007	0.33	0.014	0.002	0.014	0.014	8.1	44.7	-43.407	42.971
18/03/2008	5869425.105	532655.418	477.853	1.35	-0.004	-0.010	0.011	0.003	248.2	15.6	0.008	0.002	0.26	-0.002	-0.002	0.003	-0.005	225.0	-60.5	10.761	-19.023
03/06/2008	5869425.099	532655.416	477.850	1.56	-0.010	-0.012	0.016	0.000	230.2	0.0	0.010	0.000	0.21	-0.006	-0.002	0.006	-0.003	198.4	-25.4	30.001	-14.231
29/08/2008	5869425.101	532655.419	477.851	1.80	-0.008	-0.009	0.012	0.001	228.4	4.7	0.007	0.001	0.24	0.002	0.003	0.004	0.001	56.3	15.5	-15.137	4.198
19/11/2008	5869425.106	532655.418	477.844	2.03	-0.003	-0.010	0.010	-0.006	253.3	-29.9	0.005	-0.003	0.22	0.005	-0.001	0.005	-0.007	348.7	-53.9	-22.712	-31.180
26/03/2009	5869425.099	532655.417	477.849	2.37	-0.010	-0.011	0.015	-0.001	227.7	-3.8	0.006	0.000	0.35	-0.007	-0.001	0.007	0.005	188.1	35.3	20.336	14.380
10/06/2009	5869425.100	532655.415	477.852	2.58	-0.009	-0.013	0.016	0.002	235.3	7.2	0.006	0.001	0.21	0.001	-0.002	0.002	0.003	296.6	53.3	10.746	14.418
17/09/2009	5869425.088	532655.426	477.851	2.85	-0.021	-0.002	0.021	0.001	185.4	2.7	0.007	0.000	0.27	-0.012	0.011	0.016	-0.001	137.5	-3.5	60.059	-3.689
23/11/2009	5869425.105	532655.421	477.837	3.04	-0.004	-0.007	0.008	-0.013	240.3	-58.2	0.003	-0.004	0.18	0.017	-0.005	0.018	-0.014	343.6	-38.3	-96.601	-76.321
27/03/2010	5869425.112	532655.414	477.851	3.38	0.003	-0.014	0.014	0.001	282.1	4.0	0.004	0.000	0.34	0.007	-0.007	0.010	0.014	315.0	54.7	29.160	41.238
04/07/2010	5869425.098	532655.416	477.853	3.65	-0.011	-0.012	0.016	0.003	227.5	10.4	0.004	0.001	0.27	-0.014	0.002	0.014	0.002	171.9	8.0	52.176	7.379
13/09/2010	5869425.098	532655.417	477.856	3.84	-0.011	-0.011	0.016	0.006	225.0	21.1	0.004	0.002	0.19	0.000	0.001	0.001	0.003	90.0	71.6	-5.144	15.433
22/11/2010	5869425.107	532655.424	477.849	4.03	-0.002	-0.004	0.004	-0.001	243.4	-12.6	0.001	0.000	0.19	0.009	0.007	0.011	-0.007	37.9	-31.5	-59.493	-36.525
04/04/2011	5869425.097	532655.421	477.841	4.40	-0.012	-0.007	0.014	-0.009	210.3	-32.9	0.003	-0.002	0.36	-0.010	-0.003	0.010	-0.008	196.7	-37.5	28.672	-21.970
18/06/2011	5869425.095	532655.418	477.848	4.60	-0.014	-0.010	0.017	-0.002	215.5	-6.6	0.004	0.000	0.21	-0.002	-0.003	0.004	0.007	236.3	62.7	17.559	34.090
03/10/2011	5869425.102	532655.416	477.846	4.90	-0.007	-0.012	0.014	-0.004	239.7	-16.1	0.003	-0.001	0.29	0.007	-0.002	0.007	-0.002	344.1	-15.4	-24.851	-6.827
28/11/2011	5869425.102	532655.413	477.852	5.05	-0.007	-0.015	0.017	0.002	245.0	6.9	0.003	0.000	0.15	0.000	-0.003	0.003	0.006	270.0	63.4	19.567	39.134
09/04/2012	5869425.095	532655.417	477.842	5.41	-0.014	-0.011	0.018	-0.008	218.2	-24.2	0.003	-0.001	0.36	-0.007	0.004	0.008	-0.010	150.3	-51.1	22.141	-27.462
12/07/2012	5869425.093	532655.419	477.856	5.67	-0.016	-0.009	0.018	0.006	209.4	18.1	0.003	0.001	0.26	-0.002	0.002	0.003	0.014	135.0	78.6	10.990	54.399
29/09/2012	5869425.108	532655.421	477.859	5.89	-0.001	-0.007	0.007	0.009	261.9	51.8	0.001	0.002	0.22	0.015	0.002	0.015	0.003	7.6	11.2	-69.965	13.870
10/12/2012	5869425.098	532655.415	477.852	6.08	-0.011	-0.013	0.017	0.002	229.8	6.7	0.003	0.000	0.20	-0.010	-0.006	0.012	-0.007	211.0	-31.0	59.160	-35.510
03/04/2013	5869425.099	532655.416	477.847	6.40	-0.010	-0.012	0.016	-0.003	230.2	-10.9	0.002	0.000	0.31	0.001	0.001	0.001	-0.005	45.0	-74.2	-4.531	-16.020
12/07/2013	5869425.097	532655.422	477.860	6.67	-0.012	-0.006	0.013	0.010	206.6	36.7	0.002	0.001	0.27	-0.002	0.006	0.006	0.013	108.4	64.1	-23.100	47.482
04/10/2013	5869425.097	532655.414	477.865	6.90	-0.012	-0.014	0.018	0.015	229.4	39.1	0.003	0.002	0.23	0.000	-0.008	0.008	0.005	270.0	32.0	34.786	21.741
27/11/2013	5869425.102	532655.417	477.855	7.05	-0.007	-0.011	0.013	0.005	237.5	21.0	0.002	0.001	0.15	0.005	0.003	0.006	-0.010	31.0	-59.8	-39.440	-67.639
10/04/2014	5869425.099	532655.419	477.847	7.41	-0.010	-0.009	0.013	-0.003	222.0	-12.6	0.002	0.000	0.37	-0.003	0.002	0.004	-0.008	146.3	-65.7	9.828	-21.806
18/07/2014	5869425.088	532655.415	477.855	7.69	-0.021	-0.013	0.025	0.005	211.8	11.4	0.003	0.001	0.27	-0.011	-0.004	0.012	0.008	200.0	34.4	43.183	29.515
02/10/2014	5869425.099	532655.420	477.848	7.89	-0.010	-0.008	0.013	-0.002	218.7	-8.9	0.002	0.000	0.21	0.011	0.005	0.012	-0.007	24.4	-30.1	-58.070	-33.641
28/11/2014	5869425.101	532655.417	477.842	8.05	-0.008	-0.011	0.014	-0.008	234.0	-30.5	0.002	-0.001	0.16	0.002	-0.003	0.004	-0.006	303.7	-59.0	23.104	-38.447
01/04/2015	5869425.096	532655.414	477.845	8.39	-0.013	-0.014	0.019	-0.005	227.1	-14.7	0.002	-0.001	0.34	-0.005	-0.003	0.006	0.003	211.0	27.2	17.175	8.837
20/07/2015	5869425.098	532655.418	477.848	8.69	-0.011	-0.010	0.015	-0.002	222.3	-7.7	0.002	0.000	0.30	0.002	0.004	0.004	0.003	63.4	33.9	-14.850	9.961
14/10/2015	5869425.092	532655.411	477.848	8.93	-0.017	-0.017	0.024	-0.002	225.0	-4.8	0.003	0.000	0.24	-0.006	-0.007	0.009	0.000	229.4	0.0	39.156	0.000

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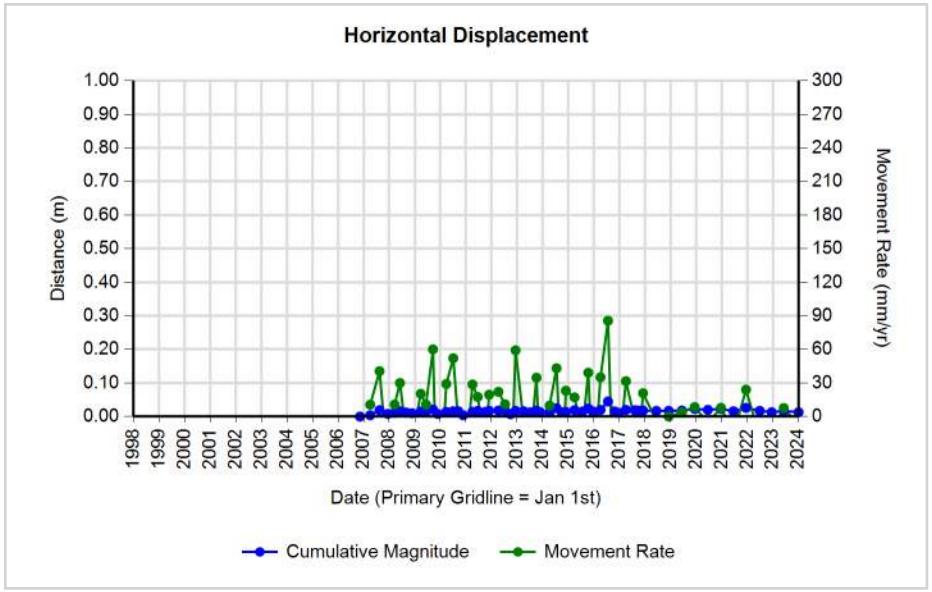
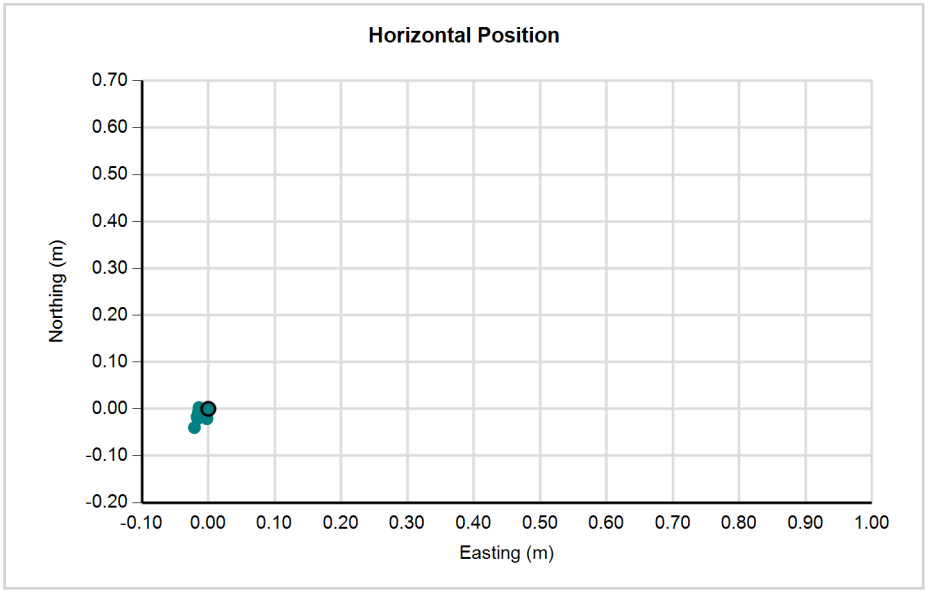
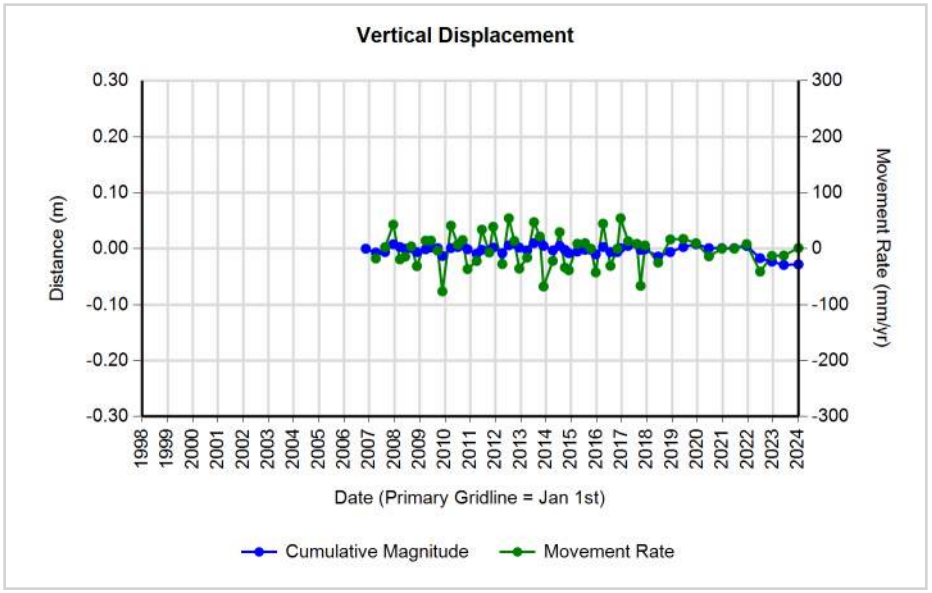
GPS Hub 06-07 (Northeast Corner of Boyd Street and Abbott Road)

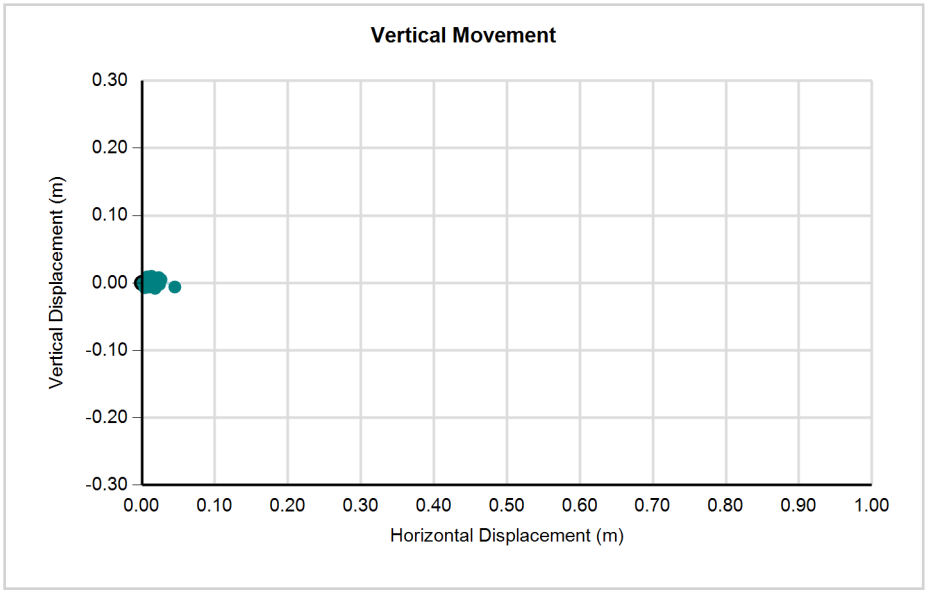
22/12/2015	5869425.102	532655.415	477.840	9.11	-0.007	-0.013	0.015	-0.010	241.7	-34.1	0.002	-0.001	0.19	0.010	0.004	0.011	-0.008	21.8	-36.6	-57.013	-42.348
06/04/2016	5869425.092	532655.417	477.853	9.40	-0.017	-0.011	0.020	0.003	212.9	8.4	0.002	0.000	0.29	-0.010	0.002	0.010	0.013	168.7	51.9	35.140	44.795
22/07/2016	5869425.069	532655.407	477.844	9.70	-0.040	-0.021	0.045	-0.006	207.7	-7.6	0.005	-0.001	0.29	-0.023	-0.010	0.025	-0.009	203.5	-19.7	85.611	-30.722
30/10/2016	5869425.102	532655.415	477.844	9.97	-0.007	-0.013	0.015	-0.006	241.7	-22.1	0.001	-0.001	0.27	0.033	0.008	0.034	0.000	13.6	0.0	-124.024	0.000
16/12/2016	5869425.102	532655.420	477.851	10.10	-0.007	-0.008	0.011	0.001	228.8	5.4	0.001	0.000	0.13	0.000	0.005	0.005	0.007	90.0	54.5	-38.856	54.399
04/04/2017	5869425.094	532655.415	477.855	10.40	-0.015	-0.013	0.020	0.005	220.9	14.1	0.002	0.000	0.30	-0.008	-0.005	0.009	0.004	212.0	23.0	31.612	13.404
08/08/2017	5869425.095	532655.415	477.858	10.74	-0.014	-0.013	0.019	0.008	222.9	22.7	0.002	0.001	0.34	0.001	0.000	0.001	0.003	0.0	71.6	-2.899	8.696
02/10/2017	5869425.093	532655.419	477.848	10.89	-0.016	-0.009	0.018	-0.002	209.4	-6.2	0.002	0.000	0.15	-0.002	0.004	0.004	-0.010	116.6	-65.9	-29.699	-66.409
04/12/2017	5869425.095	532655.416	477.849	11.07	-0.014	-0.012	0.018	-0.001	220.6	-3.1	0.002	0.000	0.17	0.002	-0.003	0.004	0.001	303.7	15.5	20.904	5.798
13/06/2018	5869425.097	532655.416	477.836	11.59	-0.012	-0.012	0.017	-0.014	225.0	-39.5	0.001	-0.001	0.52	0.002	0.000	0.002	-0.013	0.0	-81.3	-3.825	-24.860
06/12/2018	5869425.097	532655.416	477.844	12.07	-0.012	-0.012	0.017	-0.006	225.0	-19.5	0.001	0.000	0.48	0.000	0.000	0.000	0.008	0.0	0.0	0.000	16.602
12/06/2019	5869425.097	532655.414	477.853	12.59	-0.012	-0.014	0.018	0.003	229.4	9.2	0.001	0.000	0.51	0.000	-0.002	0.002	0.009	270.0	77.5	3.886	17.485
12/12/2019	5869425.094	532655.411	477.858	13.09	-0.015	-0.017	0.023	0.008	228.6	19.4	0.002	0.001	0.50	-0.003	-0.003	0.004	0.005	225.0	49.7	8.468	9.980
17/06/2020	5869425.096	532655.413	477.851	13.60	-0.013	-0.015	0.020	0.001	229.1	2.9	0.001	0.000	0.51	0.002	0.002	0.003	-0.007	45.0	-68.0	-5.495	-13.600
21/12/2020	5869425.092	532655.413	477.851	14.11	-0.017	-0.015	0.023	0.001	221.4	2.5	0.002	0.000	0.51	-0.004	0.000	0.004	0.000	180.0	0.0	7.813	0.000
19/06/2021	5869425.099	532655.416	477.851	14.61	-0.010	-0.012	0.016	0.001	230.2	3.7	0.001	0.000	0.49	0.007	0.003	0.008	0.000	23.2	0.0	-15.454	0.000
14/12/2021	5869425.088	532655.412	477.855	15.09	-0.021	-0.016	0.026	0.005	217.3	10.7	0.002	0.000	0.49	-0.011	-0.004	0.012	0.004	200.0	18.9	24.018	8.208
28/06/2022	5869425.097	532655.416	477.833	15.63	-0.012	-0.012	0.017	-0.017	225.0	-45.0	0.001	-0.001	0.54	0.009	0.004	0.010	-0.022	24.0	-65.9	-18.354	-40.997
16/12/2022	5869425.103	532655.416	477.827	16.10	-0.006	-0.012	0.013	-0.023	243.4	-59.7	0.001	-0.001	0.47	0.006	0.000	0.006	-0.006	0.0	-45.0	-12.816	-12.816
06/06/2023	5869425.100	532655.414	477.821	16.57	-0.009	-0.014	0.017	-0.029	237.3	-59.9	0.001	-0.002	0.47	-0.003	-0.002	0.004	-0.006	213.7	-57.8	7.657	-12.168
04/01/2024	5869425.104	532655.416	477.822	17.15	-0.005	-0.012	0.013	-0.028	247.4	-65.1	0.001	-0.002	0.58	0.004	0.002	0.004	0.001	26.6	9.3	-7.705	1.258

GPS Hub 06-07 (Northeast Corner of Boyd Street and Abbott Road)









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GPS Hub 06-08 (North Side of Abbott Road at Beath Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869467.088	532549.595	480.412	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869467.091	532549.600	480.419	0.40	0.003	0.005	0.006	0.007	59.0	50.2	0.015	0.018	0.40	0.003	0.005	0.006	0.007	59.0	50.2	14.587	17.512
16/08/2007	5869467.079	532549.607	480.409	0.76	-0.009	0.012	0.015	-0.003	126.9	-11.3	0.020	-0.004	0.36	-0.012	0.007	0.014	-0.010	149.7	-35.7	38.152	-27.462
13/12/2007	5869467.081	532549.604	480.414	1.09	-0.007	0.009	0.011	0.002	127.9	9.9	0.010	0.002	0.33	0.002	-0.003	0.004	0.005	303.7	54.2	-11.067	15.347
18/03/2008	5869467.084	532549.606	480.424	1.35	-0.004	0.011	0.012	0.012	110.0	45.7	0.009	0.009	0.26	0.003	0.002	0.004	0.010	33.7	70.2	13.718	38.047
03/06/2008	5869467.079	532549.622	480.427	1.56	-0.009	0.027	0.028	0.015	108.4	27.8	0.018	0.010	0.21	-0.005	0.016	0.017	0.003	107.4	10.1	79.516	14.231
29/08/2008	5869467.074	532549.620	480.427	1.80	-0.014	0.025	0.029	0.015	119.2	27.6	0.016	0.008	0.24	-0.005	-0.002	0.005	0.000	201.8	0.0	22.608	0.000
19/11/2008	5869467.077	532549.625	480.421	2.03	-0.011	0.030	0.032	0.009	110.1	15.7	0.016	0.004	0.22	0.003	0.005	0.006	-0.006	59.0	-45.8	25.973	-26.726
26/03/2009	5869467.070	532549.624	480.426	2.37	-0.018	0.029	0.034	0.014	121.8	22.3	0.014	0.006	0.35	-0.007	-0.001	0.007	0.005	188.1	35.3	20.336	14.380
10/06/2009	5869467.056	532549.643	480.445	2.58	-0.032	0.048	0.058	0.033	123.7	29.8	0.022	0.013	0.21	-0.014	0.019	0.024	0.019	126.4	38.8	113.424	91.313
17/09/2009	5869467.066	532549.648	480.433	2.85	-0.022	0.053	0.057	0.021	112.5	20.1	0.020	0.007	0.27	0.010	0.005	0.011	-0.012	26.6	-47.0	-41.249	-44.273
23/11/2009	5869467.073	532549.639	480.426	3.04	-0.015	0.044	0.046	0.014	108.8	16.8	0.015	0.005	0.18	0.007	-0.009	0.011	-0.007	307.9	-31.5	-62.157	-38.160
27/03/2010	5869467.073	532549.641	480.426	3.38	-0.015	0.046	0.048	0.014	108.1	16.1	0.014	0.004	0.34	0.000	0.002	0.002	0.000	90.0	0.0	5.891	0.000
04/07/2010	5869467.060	532549.644	480.434	3.65	-0.028	0.049	0.056	0.022	119.7	21.3	0.015	0.006	0.27	-0.013	0.003	0.013	0.008	167.0	30.9	49.223	29.515
13/09/2010	5869467.063	532549.646	480.437	3.84	-0.025	0.051	0.057	0.025	116.1	23.8	0.015	0.007	0.19	0.003	0.002	0.004	0.003	33.7	39.8	18.548	15.433
22/11/2010	5869467.062	532549.645	480.432	4.03	-0.026	0.050	0.056	0.020	117.5	19.5	0.014	0.005	0.19	-0.001	-0.001	0.001	-0.005	225.0	-74.2	-7.379	-26.089
04/04/2011	5869467.066	532549.646	480.427	4.40	-0.022	0.051	0.056	0.015	113.3	15.1	0.013	0.003	0.36	0.004	0.001	0.004	-0.005	14.0	-50.5	-11.323	-13.731
18/06/2011	5869467.064	532549.652	480.440	4.60	-0.024	0.057	0.062	0.028	112.8	24.4	0.013	0.006	0.21	-0.002	0.006	0.006	0.013	108.4	64.1	30.801	63.310
03/10/2011	5869467.063	532549.654	480.430	4.90	-0.025	0.059	0.064	0.018	113.0	15.7	0.013	0.004	0.29	-0.001	0.002	0.002	-0.010	116.6	-77.4	7.633	-34.136
28/11/2011	5869467.062	532549.650	480.436	5.05	-0.026	0.055	0.061	0.024	115.3	21.5	0.012	0.005	0.15	-0.001	-0.004	0.004	0.006	256.0	55.5	-26.892	39.134
09/04/2012	5869467.059	532549.655	480.434	5.41	-0.029	0.060	0.067	0.022	115.8	18.3	0.012	0.004	0.36	-0.003	0.005	0.006	-0.002	121.0	-18.9	16.013	-5.492
12/07/2012	5869467.056	532549.665	480.448	5.67	-0.032	0.070	0.077	0.036	114.6	25.1	0.014	0.006	0.26	-0.003	0.010	0.010	0.014	106.7	53.3	40.567	54.399
29/09/2012	5869467.069	532549.667	480.444	5.89	-0.019	0.072	0.074	0.032	104.8	23.3	0.013	0.005	0.22	0.013	0.002	0.013	-0.004	8.7	-16.9	-60.812	-18.494
10/12/2012	5869467.057	532549.661	480.443	6.08	-0.031	0.066	0.073	0.031	115.2	23.0	0.012	0.005	0.20	-0.012	-0.006	0.013	-0.001	206.6	-4.3	-68.060	-5.073
03/04/2013	5869467.056	532549.665	480.437	6.40	-0.032	0.070	0.077	0.025	114.6	18.0	0.012	0.004	0.31	-0.001	0.004	0.004	-0.006	104.0	-55.5	13.210	-19.224
12/07/2013	5869467.056	532549.669	480.455	6.67	-0.032	0.074	0.081	0.043	113.4	28.1	0.012	0.006	0.27	0.000	0.004	0.004	0.018	90.0	77.5	14.610	65.745
04/10/2013	5869467.055	532549.661	480.452	6.90	-0.033	0.066	0.074	0.040	116.6	28.5	0.011	0.006	0.23	-0.001	-0.008	0.008	-0.003	262.9	-20.4	-35.056	-13.045
27/11/2013	5869467.061	532549.661	480.449	7.05	-0.027	0.066	0.071	0.037	112.2	27.4	0.010	0.005	0.15	0.006	0.000	0.006	-0.003	0.0	-26.6	-40.583	-20.292
10/04/2014	5869467.058	532549.666	480.441	7.41	-0.030	0.071	0.077	0.029	112.9	20.6	0.010	0.004	0.37	-0.003	0.005	0.006	-0.008	121.0	-53.9	15.894	-21.806
18/07/2014	5869467.049	532549.668	480.453	7.69	-0.039	0.073	0.083	0.041	118.1	26.4	0.011	0.005	0.27	-0.009	0.002	0.009	0.012	167.5	52.5	34.015	44.273
02/10/2014	5869467.053	532549.666	480.438	7.89	-0.035	0.071	0.079	0.026	116.2	18.2	0.010	0.003	0.21	0.004	-0.002	0.004	-0.015	333.4	-73.4	-21.493	-72.089
28/11/2014	5869467.057	532549.667	480.436	8.05	-0.031	0.072	0.078	0.024	113.3	17.0	0.010	0.003	0.16	0.004	0.001	0.004	-0.002	14.0	-25.9	-26.420	-12.816
01/04/2015	5869467.053	532549.667	480.435	8.39	-0.035	0.072	0.080	0.023	115.9	16.0	0.010	0.003	0.34	-0.004	0.000	0.004	-0.001	180.0	-14.0	11.782	-2.946
20/07/2015	5869467.049	532549.671	480.438	8.69	-0.039	0.076	0.085	0.026	117.2	16.9	0.010	0.003	0.30	-0.004	0.004	0.006	0.003	135.0	27.9	18.783	9.961
14/10/2015	5869467.048	532549.665	480.441	8.93	-0.040	0.070	0.081	0.029	119.7	19.8	0.009	0.003	0.24	-0.001	-0.006	0.006	0.003	260.5	26.3	-25.834	12.741

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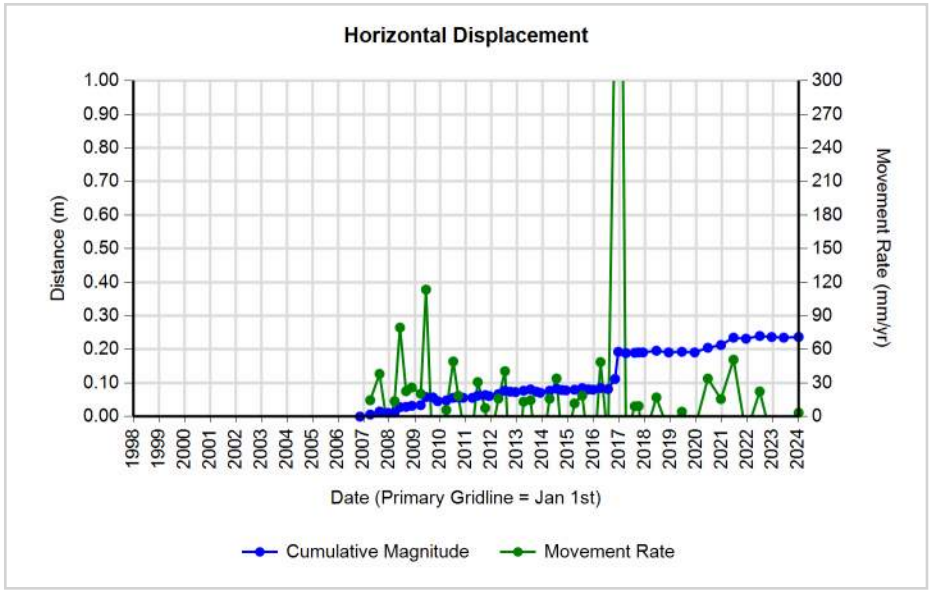
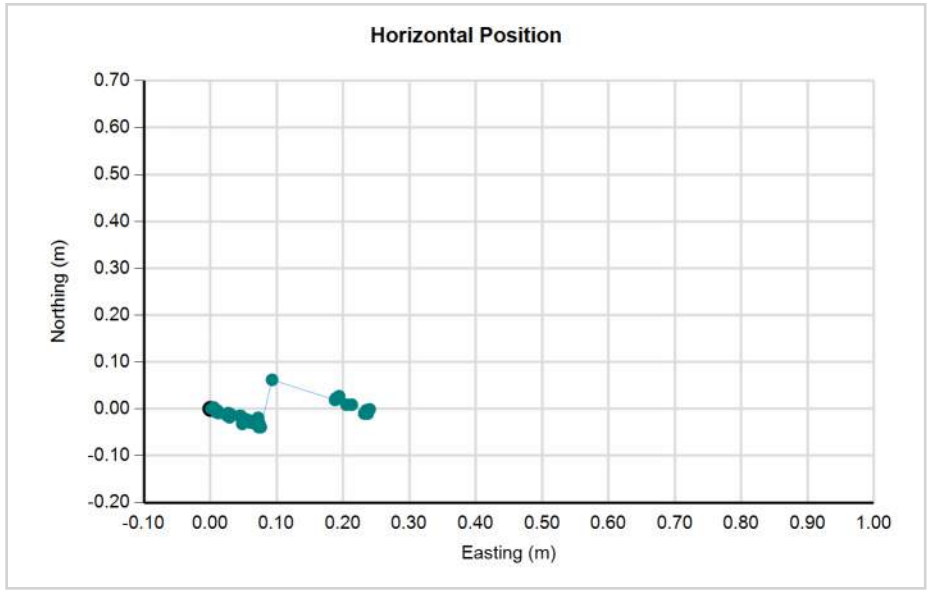
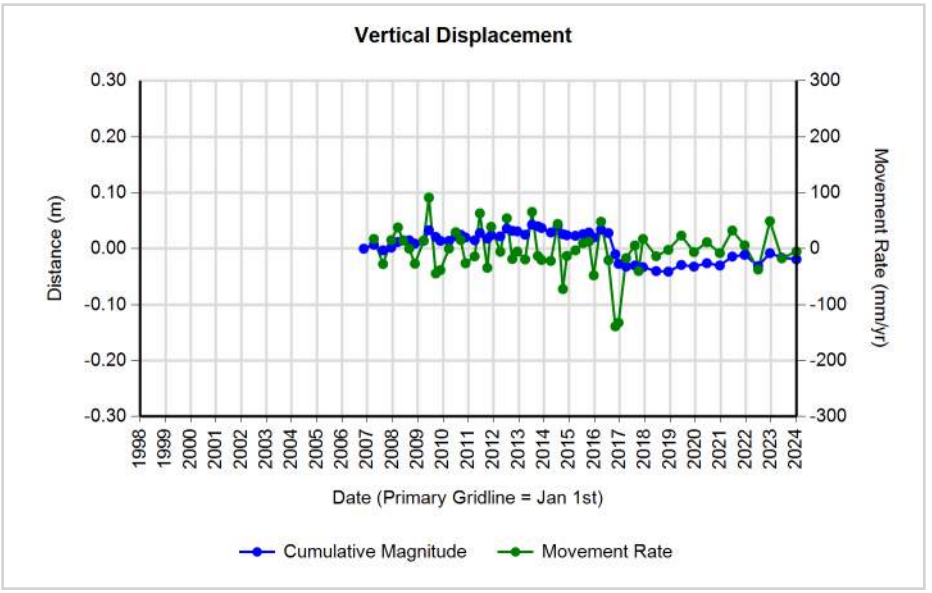
GPS Hub 06-08 (North Side of Abbott Road at Beath Street)

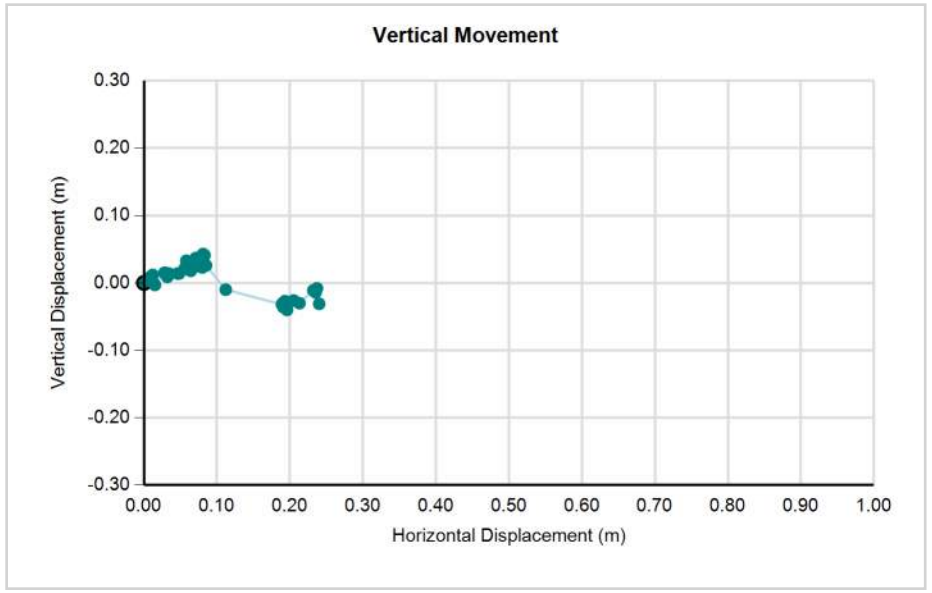
22/12/2015	5869467.057	532549.669	480.432	9.11	-0.031	0.074	0.080	0.020	112.7	14.0	0.009	0.002	0.19	0.009	0.004	0.010	-0.009	24.0	-42.4	-52.135	-47.641
06/04/2016	5869467.043	532549.667	480.446	9.40	-0.045	0.072	0.085	0.034	122.0	21.8	0.009	0.004	0.29	-0.014	-0.002	0.014	0.014	188.1	44.7	48.730	48.241
22/07/2016	5869467.050	532549.668	480.440	9.70	-0.038	0.073	0.082	0.028	117.5	18.8	0.008	0.003	0.29	0.007	0.001	0.007	-0.006	8.1	-40.3	-24.137	-20.481
30/10/2016	5869467.150	532549.688	480.402	9.97	0.062	0.093	0.112	-0.010	56.3	-5.1	0.011	-0.001	0.27	0.100	0.020	0.102	-0.038	11.3	-20.4	372.483	-138.795
16/12/2016	5869467.111	532549.787	480.385	10.10	0.023	0.192	0.193	-0.027	83.2	-7.9	0.019	-0.003	0.13	-0.039	0.099	0.106	-0.017	111.5	-9.1	826.902	-132.112
04/04/2017	5869467.107	532549.783	480.380	10.40	0.019	0.188	0.189	-0.032	84.2	-9.6	0.018	-0.003	0.30	-0.004	-0.004	0.006	-0.005	225.0	-41.5	-18.956	-16.755
08/08/2017	5869467.110	532549.784	480.382	10.74	0.022	0.189	0.190	-0.030	83.4	-9.0	0.018	-0.003	0.34	0.003	0.001	0.003	0.002	18.4	32.3	9.167	5.798
02/10/2017	5869467.111	532549.785	480.376	10.89	0.023	0.190	0.191	-0.036	83.1	-10.7	0.018	-0.003	0.15	0.001	0.001	0.001	-0.006	45.0	-76.7	9.392	-39.845
04/12/2017	5869467.107	532549.785	480.379	11.07	0.019	0.190	0.191	-0.033	84.3	-9.8	0.017	-0.003	0.17	-0.004	0.000	0.004	0.003	180.0	36.9	-23.190	17.393
13/06/2018	5869467.115	532549.789	480.372	11.59	0.027	0.194	0.196	-0.040	82.1	-11.5	0.017	-0.003	0.52	0.008	0.004	0.009	-0.007	26.6	-38.0	17.104	-13.386
06/12/2018	5869467.110	532549.785	480.371	12.07	0.022	0.190	0.191	-0.041	83.4	-12.1	0.016	-0.003	0.48	-0.005	-0.004	0.006	-0.001	218.7	-8.9	-13.288	-2.075
12/06/2019	5869467.111	532549.787	480.383	12.59	0.023	0.192	0.193	-0.029	83.2	-8.5	0.015	-0.002	0.51	0.001	0.002	0.002	0.012	63.4	79.4	4.344	23.314
12/12/2019	5869467.106	532549.785	480.380	13.09	0.018	0.190	0.191	-0.032	84.6	-9.5	0.015	-0.002	0.50	-0.005	-0.002	0.005	-0.003	201.8	-29.1	-10.748	-5.988
17/06/2020	5869467.097	532549.800	480.386	13.60	0.009	0.205	0.205	-0.026	87.5	-7.2	0.015	-0.002	0.51	-0.009	0.015	0.017	0.006	121.0	18.9	33.985	11.657
21/12/2020	5869467.097	532549.808	480.382	14.11	0.009	0.213	0.213	-0.030	87.6	-8.0	0.015	-0.002	0.51	0.000	0.008	0.008	-0.004	90.0	-26.6	15.626	-7.813
19/06/2021	5869467.085	532549.830	480.398	14.61	-0.003	0.235	0.235	-0.014	90.7	-3.4	0.016	-0.001	0.49	-0.012	0.022	0.025	0.016	118.6	32.6	50.851	32.467
14/12/2021	5869467.078	532549.827	480.401	15.09	-0.010	0.232	0.232	-0.011	92.5	-2.7	0.015	-0.001	0.49	-0.007	-0.003	0.008	0.003	203.2	21.5	-15.627	6.156
28/06/2022	5869467.087	532549.835	480.381	15.63	-0.001	0.240	0.240	-0.031	90.2	-7.4	0.015	-0.002	0.54	0.009	0.008	0.012	-0.020	41.6	-58.9	22.440	-37.270
16/12/2022	5869467.078	532549.832	480.404	16.10	-0.010	0.237	0.237	-0.008	92.4	-1.9	0.015	0.000	0.47	-0.009	-0.003	0.009	0.023	198.4	67.6	-20.264	49.127
06/06/2023	5869467.084	532549.830	480.396	16.57	-0.004	0.235	0.235	-0.016	91.0	-3.9	0.014	-0.001	0.47	0.006	-0.002	0.006	-0.008	344.2	-52.4	-13.243	-17.222
04/01/2024	5869467.083	532549.832	480.393	17.15	-0.005	0.237	0.237	-0.019	91.2	-4.6	0.014	-0.001	0.58	-0.001	0.002	0.002	-0.003	120.5	-55.7	3.398	-4.979

GPS Hub 06-08 (North Side of Abbott Road at Beath Street)









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GPS Hub 06-09 (East Side of Bouchie Street)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869608.045	532517.087	491.073	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869608.042	532517.092	491.064	0.40	-0.003	0.005	0.006	-0.009	121.0	-57.1	0.015	-0.023	0.40	-0.003	0.005	0.006	-0.009	121.0	-57.1	14.587	-22.515
16/08/2007	5869608.037	532517.105	491.070	0.76	-0.008	0.018	0.020	-0.003	114.0	-8.7	0.026	-0.004	0.36	-0.005	0.013	0.014	0.006	111.0	23.3	38.251	16.477
13/12/2007	5869608.038	532517.097	491.064	1.09	-0.007	0.010	0.012	-0.009	125.0	-36.4	0.011	-0.008	0.33	0.001	-0.008	0.008	-0.006	277.1	-36.7	-24.746	-18.416
18/03/2008	5869608.037	532517.103	491.079	1.35	-0.008	0.016	0.018	0.006	116.6	18.5	0.013	0.004	0.26	-0.001	0.006	0.006	0.015	99.5	67.9	23.143	57.070
03/06/2008	5869608.030	532517.124	491.081	1.56	-0.015	0.037	0.040	0.008	112.1	11.3	0.026	0.005	0.21	-0.007	0.021	0.022	0.002	108.4	5.2	105.002	9.487
29/08/2008	5869608.026	532517.129	491.089	1.80	-0.019	0.042	0.046	0.016	114.3	19.1	0.026	0.009	0.24	-0.004	0.005	0.006	0.008	128.7	51.3	26.882	33.586
19/11/2008	5869608.031	532517.132	491.074	2.03	-0.014	0.045	0.047	0.001	107.3	1.2	0.023	0.000	0.22	0.005	0.003	0.006	-0.015	31.0	-68.8	25.973	-66.814
26/03/2009	5869608.059	532517.095	491.067	2.37	0.014	0.008	0.016	-0.006	29.7	-20.4	0.007	-0.003	0.35	0.028	-0.037	0.046	-0.007	307.1	-8.6	-133.447	-20.132
10/06/2009	5869608.040	532517.123	491.082	2.58	-0.005	0.036	0.036	0.009	97.9	13.9	0.014	0.003	0.21	-0.019	0.028	0.034	0.015	124.2	23.9	162.622	72.089
17/09/2009	5869608.053	532517.121	491.063	2.85	0.008	0.034	0.035	-0.010	76.8	-16.0	0.012	-0.004	0.27	0.013	-0.002	0.013	-0.019	351.3	-55.3	-48.526	-70.098
23/11/2009	5869608.060	532517.123	491.072	3.04	0.015	0.036	0.039	-0.001	67.4	-1.5	0.013	0.000	0.18	0.007	0.002	0.007	0.009	15.9	51.0	39.687	49.063
27/03/2010	5869608.055	532517.126	491.071	3.38	0.010	0.039	0.040	-0.002	75.6	-2.8	0.012	-0.001	0.34	-0.005	0.003	0.006	-0.001	149.0	-9.7	17.175	-2.946
04/07/2010	5869608.045	532517.130	491.077	3.65	0.000	0.043	0.043	0.004	90.0	5.3	0.012	0.001	0.27	-0.010	0.004	0.011	0.006	158.2	29.1	39.736	22.136
13/09/2010	5869608.052	532517.128	491.086	3.84	0.007	0.041	0.042	0.013	80.3	17.4	0.011	0.003	0.19	0.007	-0.002	0.007	0.009	344.1	51.0	-37.452	46.299
22/11/2010	5869608.054	532517.135	491.079	4.03	0.009	0.048	0.049	0.006	79.4	7.0	0.012	0.001	0.19	0.002	0.007	0.007	-0.007	74.1	-43.9	37.987	-36.525
04/04/2011	5869608.046	532517.129	491.078	4.40	0.001	0.042	0.042	0.005	88.6	6.8	0.010	0.001	0.36	-0.008	-0.006	0.010	-0.001	216.9	-5.7	-27.462	-2.746
18/06/2011	5869608.043	532517.135	491.081	4.60	-0.002	0.048	0.048	0.008	92.4	9.5	0.010	0.002	0.21	-0.003	0.006	0.007	0.003	116.6	24.1	32.669	14.610
03/10/2011	5869608.047	532517.133	491.083	4.90	0.002	0.046	0.046	0.010	87.5	12.3	0.009	0.002	0.29	0.004	-0.002	0.004	0.002	333.4	24.1	-15.266	6.827
28/11/2011	5869608.052	532517.134	491.078	5.05	0.007	0.047	0.048	0.005	81.5	6.0	0.009	0.001	0.15	0.005	0.001	0.005	-0.005	11.3	-44.4	33.257	-32.612
09/04/2012	5869608.042	532517.140	491.073	5.41	-0.003	0.053	0.053	0.000	93.2	0.0	0.010	0.000	0.36	-0.010	0.006	0.012	-0.005	149.0	-23.2	32.026	-13.731
12/07/2012	5869608.044	532517.150	491.088	5.67	-0.001	0.063	0.063	0.015	90.9	13.4	0.011	0.003	0.26	0.002	0.010	0.010	0.015	78.7	55.8	39.626	58.285
29/09/2012	5869608.047	532517.158	491.088	5.89	0.002	0.071	0.071	0.015	88.4	11.9	0.012	0.003	0.22	0.003	0.008	0.009	0.000	69.4	0.0	39.502	0.000
10/12/2012	5869608.045	532517.158	491.092	6.08	0.000	0.071	0.071	0.019	90.0	15.0	0.012	0.003	0.20	-0.002	0.000	0.002	0.004	180.0	63.4	-10.146	20.292
03/04/2013	5869608.043	532517.159	491.090	6.40	-0.002	0.072	0.072	0.017	91.6	13.3	0.011	0.003	0.31	-0.002	0.001	0.002	-0.002	153.4	-41.8	7.164	-6.408
12/07/2013	5869608.043	532517.160	491.094	6.67	-0.002	0.073	0.073	0.021	91.6	16.0	0.011	0.003	0.27	0.000	0.001	0.001	0.004	90.0	76.0	3.653	14.610
04/10/2013	5869608.042	532517.157	491.089	6.90	-0.003	0.070	0.070	0.016	92.5	12.9	0.010	0.002	0.23	-0.001	-0.003	0.003	-0.005	251.6	-57.7	-13.750	-21.741
27/11/2013	5869608.047	532517.166	491.083	7.05	0.002	0.079	0.079	0.010	88.5	7.2	0.011	0.001	0.15	0.005	0.009	0.010	-0.006	60.9	-30.2	69.638	-40.583
10/04/2014	5869608.045	532517.165	491.082	7.41	0.000	0.078	0.078	0.009	90.0	6.6	0.011	0.001	0.37	-0.002	-0.001	0.002	-0.001	206.6	-24.1	-6.095	-2.726
18/07/2014	5869608.033	532517.164	491.088	7.69	-0.012	0.077	0.078	0.015	98.9	10.9	0.010	0.002	0.27	-0.012	-0.001	0.012	0.006	184.8	26.5	-44.426	22.136
02/10/2014	5869608.036	532517.159	491.069	7.89	-0.009	0.072	0.073	-0.004	97.1	-3.2	0.009	-0.001	0.21	0.003	-0.005	0.006	-0.019	301.0	-72.9	-28.023	-91.312
28/11/2014	5869608.047	532517.165	491.077	8.05	0.002	0.078	0.078	0.004	88.5	2.9	0.010	0.000	0.16	0.011	0.006	0.013	0.008	28.6	32.6	80.291	51.263
01/04/2015	5869608.038	532517.167	491.088	8.39	-0.007	0.080	0.080	0.015	95.0	10.6	0.010	0.002	0.34	-0.009	0.002	0.009	0.011	167.5	50.0	27.157	32.401
20/07/2015	5869608.037	532517.171	491.086	8.69	-0.008	0.084	0.084	0.013	95.4	8.8	0.010	0.001	0.30	-0.001	0.004	0.004	-0.002	104.0	-25.9	13.691	-6.641
14/10/2015	5869608.039	532517.167	491.088	8.93	-0.006	0.080	0.080	0.015	94.3	10.6	0.009	0.002	0.24	0.002	-0.004	0.004	0.002	296.6	24.1	-18.994	8.494

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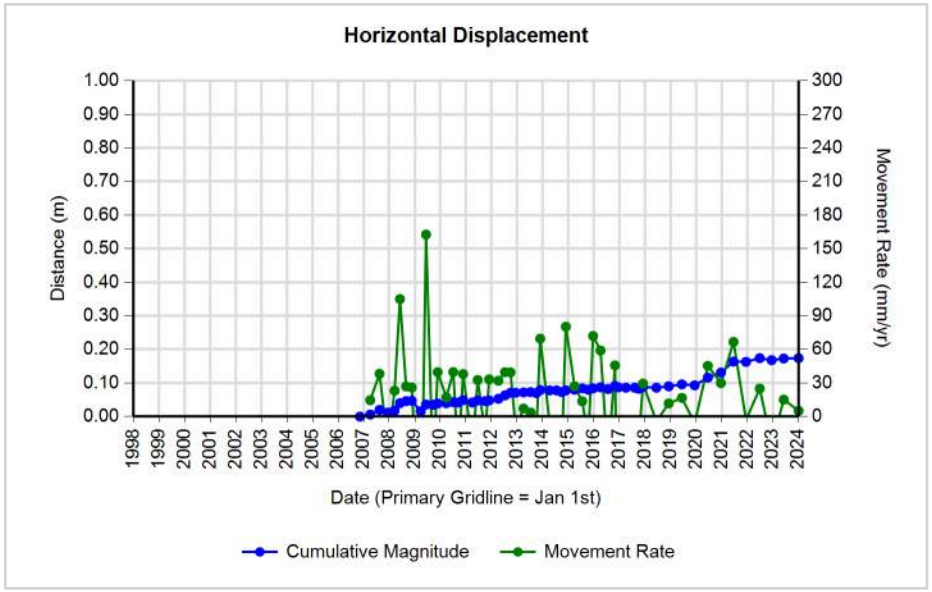
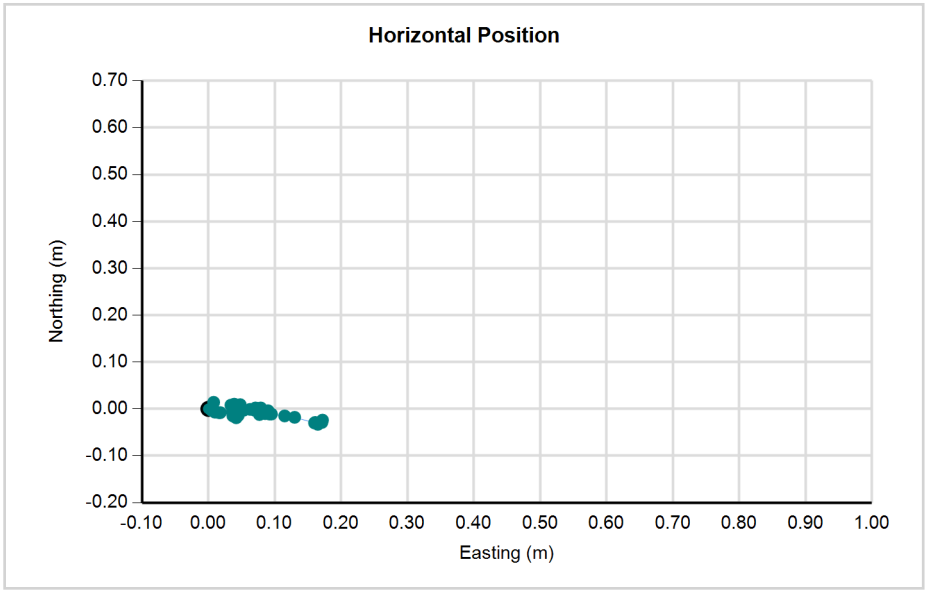
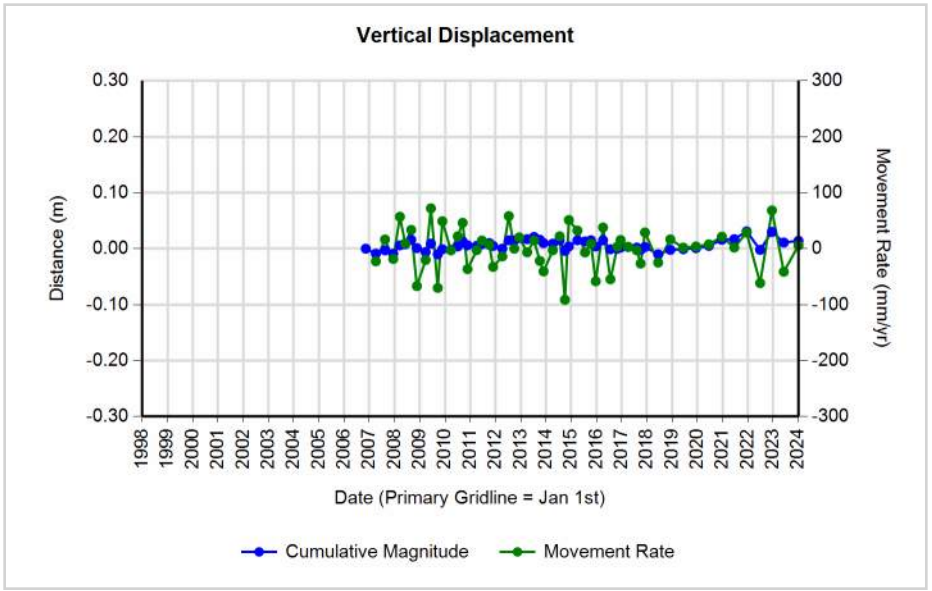
GPS Hub 06-09 (East Side of Bouchie Street)

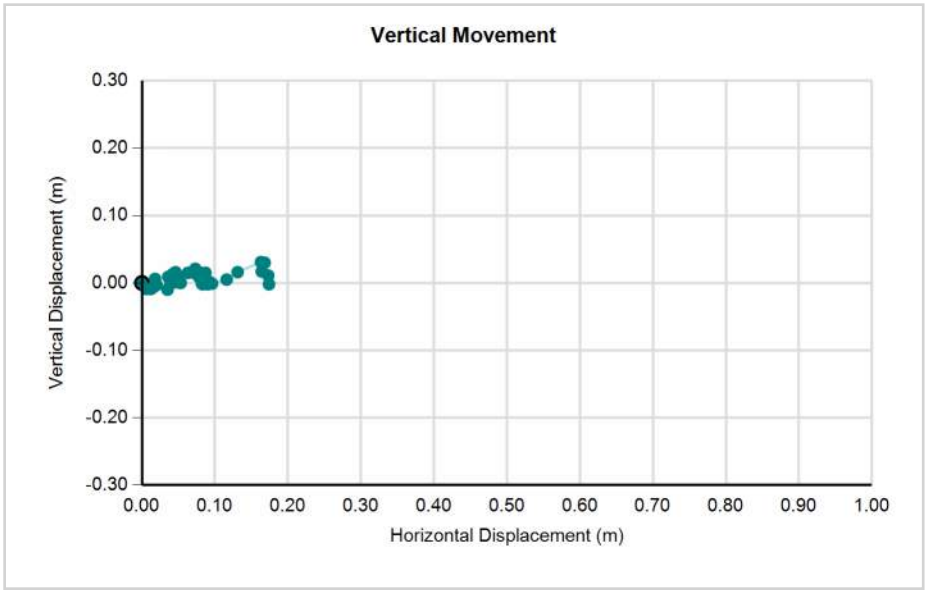
22/12/2015	5869608.052	532517.171	491.077	9.11	0.007	0.084	0.084	0.004	85.2	2.7	0.009	0.000	0.19	0.013	0.004	0.014	-0.011	17.1	-39.0	71.999	-58.228
06/04/2016	5869608.035	532517.173	491.088	9.40	-0.010	0.086	0.087	0.015	96.6	9.8	0.009	0.002	0.29	-0.017	0.002	0.017	0.011	173.3	32.7	58.982	37.903
22/07/2016	5869608.025	532517.167	491.072	9.70	-0.020	0.080	0.082	-0.001	104.0	-0.7	0.009	0.000	0.29	-0.010	-0.006	0.012	-0.016	211.0	-53.9	-39.809	-54.617
30/10/2016	5869608.014	532517.173	491.073	9.97	-0.031	0.086	0.091	0.000	109.8	0.0	0.009	0.000	0.27	-0.011	0.006	0.013	0.001	151.4	4.6	45.766	3.652
16/12/2016	5869608.036	532517.174	491.075	10.10	-0.009	0.087	0.087	0.002	95.9	1.3	0.009	0.000	0.13	0.022	0.001	0.022	0.002	2.6	5.2	-171.145	15.543
04/04/2017	5869608.035	532517.172	491.076	10.40	-0.010	0.085	0.086	0.003	96.7	2.0	0.008	0.000	0.30	-0.001	-0.002	0.002	0.001	243.4	24.1	-7.493	3.351
08/08/2017	5869608.034	532517.172	491.075	10.74	-0.011	0.085	0.086	0.002	97.4	1.3	0.008	0.000	0.34	-0.001	0.000	0.001	-0.001	180.0	-45.0	-2.899	-2.899
02/10/2017	5869608.037	532517.170	491.071	10.89	-0.008	0.083	0.083	-0.002	95.5	-1.4	0.008	0.000	0.15	0.003	-0.002	0.004	-0.004	326.3	-48.0	-23.944	-26.564
04/12/2017	5869608.036	532517.175	491.076	11.07	-0.009	0.088	0.088	0.003	95.8	1.9	0.008	0.000	0.17	-0.001	0.005	0.005	0.005	101.3	44.4	29.562	28.988
13/06/2018	5869608.037	532517.173	491.063	11.59	-0.008	0.086	0.086	-0.010	95.3	-6.6	0.007	-0.001	0.52	0.001	-0.002	0.002	-0.013	296.6	-80.2	-4.276	-24.860
06/12/2018	5869608.041	532517.177	491.071	12.07	-0.004	0.090	0.090	-0.002	92.5	-1.3	0.007	0.000	0.48	0.004	0.004	0.006	0.008	45.0	54.7	11.740	16.602
12/06/2019	5869608.034	532517.182	491.072	12.59	-0.011	0.095	0.096	-0.001	96.6	-0.6	0.008	0.000	0.51	-0.007	0.005	0.009	0.001	144.5	6.6	16.713	1.943
12/12/2019	5869608.034	532517.179	491.074	13.09	-0.011	0.092	0.093	0.001	96.8	0.6	0.007	0.000	0.50	0.000	-0.003	0.003	0.002	270.0	33.7	-5.988	3.992
17/06/2020	5869608.030	532517.202	491.078	13.60	-0.015	0.115	0.116	0.005	97.4	2.5	0.009	0.000	0.51	-0.004	0.023	0.023	0.004	99.9	9.7	45.356	7.771
21/12/2020	5869608.027	532517.217	491.089	14.11	-0.018	0.130	0.131	0.016	97.9	7.0	0.009	0.001	0.51	-0.003	0.015	0.015	0.011	101.3	35.7	29.878	21.485
19/06/2021	5869608.016	532517.248	491.090	14.61	-0.029	0.161	0.164	0.017	100.2	5.9	0.011	0.001	0.49	-0.011	0.031	0.033	0.001	109.5	1.7	66.747	2.029
14/12/2021	5869608.015	532517.247	491.104	15.09	-0.030	0.160	0.163	0.031	100.6	10.8	0.011	0.002	0.49	-0.001	-0.001	0.001	0.014	225.0	84.2	-2.902	28.728
28/06/2022	5869608.021	532517.259	491.071	15.63	-0.024	0.172	0.174	-0.002	97.9	-0.7	0.011	0.000	0.54	0.006	0.012	0.013	-0.033	63.4	-67.9	25.002	-61.496
16/12/2022	5869608.012	532517.252	491.103	16.10	-0.033	0.165	0.168	0.030	101.3	10.1	0.010	0.002	0.47	-0.009	-0.007	0.011	0.032	217.9	70.4	-24.354	68.351
06/06/2023	5869608.016	532517.258	491.084	16.57	-0.029	0.171	0.173	0.011	99.6	3.5	0.010	0.001	0.47	0.004	0.006	0.007	-0.019	55.9	-69.8	15.137	-41.176
04/01/2024	5869608.013	532517.258	491.087	17.15	-0.032	0.171	0.174	0.014	100.6	4.6	0.010	0.001	0.58	-0.003	0.000	0.003	0.003	178.1	48.5	5.172	5.841

GPS Hub 06-09 (East Side of Bouchie Street)









CITY OF Quesnel

GPS Hub 06-11 (East Side of Lewis Road)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869938.491	532538.683	480.061	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869938.492	532538.686	480.067	0.40	0.001	0.003	0.003	0.006	71.6	62.2	0.008	0.015	0.40	0.001	0.003	0.003	0.006	71.6	62.2	7.911	15.010
16/08/2007	5869938.494	532538.680	480.071	0.76	0.003	-0.003	0.004	0.010	315.0	67.0	0.006	0.013	0.36	0.002	-0.006	0.006	0.004	288.4	32.3	17.369	10.985
13/12/2007	5869938.497	532538.679	480.065	1.09	0.006	-0.004	0.007	0.004	326.3	29.0	0.007	0.004	0.33	0.003	-0.001	0.003	-0.006	341.6	-62.2	9.706	-18.416
18/03/2008	5869938.492	532538.680	480.065	1.35	0.001	-0.003	0.003	0.004	288.4	51.7	0.002	0.003	0.26	-0.005	0.001	0.005	0.000	168.7	0.0	-19.400	0.000
03/06/2008	5869938.497	532538.686	480.071	1.56	0.006	0.003	0.007	0.010	26.6	56.1	0.004	0.006	0.21	0.005	0.006	0.008	0.006	50.2	37.5	37.048	28.461
29/08/2008	5869938.507	532538.683	480.080	1.80	0.016	0.000	0.016	0.019	0.0	49.9	0.009	0.011	0.24	0.010	-0.003	0.010	0.009	343.3	40.8	43.831	37.784
19/11/2008	5869938.495	532538.684	480.066	2.03	0.004	0.001	0.004	0.005	14.0	50.5	0.002	0.002	0.22	-0.012	0.001	0.012	-0.014	175.2	-49.3	-53.636	-62.360
26/03/2009	5869938.504	532538.690	480.064	2.37	0.013	0.007	0.015	0.003	28.3	11.5	0.006	0.001	0.35	0.009	0.006	0.011	-0.002	33.7	-10.5	31.109	-5.752
10/06/2009	5869938.498	532538.684	480.078	2.58	0.007	0.001	0.007	0.017	8.1	67.4	0.003	0.007	0.21	-0.006	-0.006	0.008	0.014	225.0	58.8	-40.780	67.283
17/09/2009	5869938.499	532538.694	480.080	2.85	0.008	0.011	0.014	0.019	54.0	54.4	0.005	0.007	0.27	0.001	0.010	0.010	0.002	84.3	11.3	37.078	7.379
23/11/2009	5869938.499	532538.691	480.065	3.04	0.008	0.008	0.011	0.004	45.0	19.5	0.004	0.001	0.18	0.000	-0.003	0.003	-0.015	270.0	-78.7	-16.354	-81.772
27/03/2010	5869938.505	532538.685	480.065	3.38	0.014	0.002	0.014	0.004	8.1	15.8	0.004	0.001	0.34	0.006	-0.006	0.008	0.000	315.0	0.0	24.994	0.000
04/07/2010	5869938.489	532538.684	480.069	3.65	-0.002	0.001	0.002	0.008	153.4	74.4	0.001	0.002	0.27	-0.016	-0.001	0.016	0.004	183.6	14.0	-59.145	14.758
13/09/2010	5869938.499	532538.689	480.041	3.84	0.008	0.006	0.010	-0.020	36.9	-63.4	0.003	-0.005	0.19	0.010	0.005	0.011	-0.028	26.6	-68.2	57.516	-144.042
22/11/2010	5869938.496	532538.695	480.070	4.03	0.005	0.012	0.013	0.009	67.4	34.7	0.003	0.002	0.19	-0.003	0.006	0.007	0.029	116.6	77.0	35.002	151.318
04/04/2011	5869938.494	532538.686	480.053	4.40	0.003	0.003	0.004	-0.008	45.0	-62.1	0.001	-0.002	0.36	-0.002	-0.009	0.009	-0.017	257.5	-61.5	-25.319	-46.686
18/06/2011	5869938.499	532538.687	480.087	4.60	0.008	0.004	0.009	0.026	26.6	71.0	0.002	0.006	0.21	0.005	0.001	0.005	0.034	11.3	81.5	24.832	165.580
03/10/2011	5869938.498	532538.687	480.075	4.90	0.007	0.004	0.008	0.014	29.7	60.1	0.002	0.003	0.29	-0.001	0.000	0.001	-0.012	180.0	-85.2	-3.414	-40.963
28/11/2011	5869938.499	532538.690	480.072	5.05	0.008	0.007	0.011	0.011	41.2	46.0	0.002	0.002	0.15	0.001	0.003	0.003	-0.003	71.6	-43.5	20.625	-19.567
09/04/2012	5869938.494	532538.687	480.068	5.41	0.003	0.004	0.005	0.007	53.1	54.5	0.001	0.001	0.36	-0.005	-0.003	0.006	-0.004	211.0	-34.4	-16.013	-10.985
12/07/2012	5869938.503	532538.687	480.081	5.67	0.012	0.004	0.013	0.020	18.4	57.7	0.002	0.004	0.26	0.009	0.000	0.009	0.013	0.0	55.3	34.971	50.513
29/09/2012	5869938.507	532538.686	480.083	5.89	0.016	0.003	0.016	0.022	10.6	53.5	0.003	0.004	0.22	0.004	-0.001	0.004	0.002	346.0	25.9	19.063	9.247
10/12/2012	5869938.505	532538.683	480.077	6.08	0.014	0.000	0.014	0.016	0.0	48.8	0.002	0.003	0.20	-0.002	-0.003	0.004	-0.006	236.3	-59.0	-18.291	-30.438
03/04/2013	5869938.507	532538.685	480.064	6.40	0.016	0.002	0.016	0.003	7.1	10.5	0.003	0.000	0.31	0.002	0.002	0.003	-0.013	45.0	-77.7	9.062	-41.651
12/07/2013	5869938.507	532538.690	480.087	6.67	0.016	0.007	0.017	0.026	23.6	56.1	0.003	0.004	0.27	0.000	0.005	0.005	0.023	90.0	77.7	18.262	84.007
04/10/2013	5869938.504	532538.680	480.099	6.90	0.013	-0.003	0.013	0.038	347.0	70.7	0.002	0.006	0.23	-0.003	-0.010	0.010	0.012	253.3	49.0	-45.397	52.179
27/11/2013	5869938.508	532538.685	480.070	7.05	0.017	0.002	0.017	0.009	6.7	27.7	0.002	0.001	0.15	0.004	0.005	0.006	-0.029	51.3	-77.5	43.310	-196.153
10/04/2014	5869938.511	532538.688	480.079	7.41	0.020	0.005	0.021	0.018	14.0	41.1	0.003	0.002	0.37	0.003	0.003	0.004	0.009	45.0	64.8	11.564	24.532
18/07/2014	5869938.500	532538.690	480.086	7.69	0.009	0.007	0.011	0.025	37.9	65.5	0.001	0.003	0.27	-0.011	0.002	0.011	0.007	169.7	32.1	-41.249	25.826
02/10/2014	5869938.504	532538.682	480.069	7.89	0.013	-0.001	0.013	0.008	355.6	31.5	0.002	0.001	0.21	0.004	-0.008	0.009	-0.017	296.6	-62.2	42.985	-81.701
28/11/2014	5869938.497	532538.695	480.071	8.05	0.006	0.012	0.013	0.010	63.4	36.7	0.002	0.001	0.16	-0.007	0.013	0.015	0.002	118.3	7.7	94.611	12.816
01/04/2015	5869938.505	532538.684	480.073	8.39	0.014	0.001	0.014	0.012	4.1	40.5	0.002	0.001	0.34	0.008	-0.011	0.014	0.002	306.0	8.4	40.064	5.891
20/07/2015	5869938.507	532538.689	480.087	8.69	0.016	0.006	0.017	0.026	20.6	56.7	0.002	0.003	0.30	0.002	0.005	0.005	0.014	68.2	69.0	17.881	46.486
14/10/2015	5869938.499	532538.680	480.087	8.93	0.008	-0.003	0.009	0.026	339.4	71.8	0.001	0.003	0.24	-0.008	-0.009	0.012	0.000	228.4	0.0	-51.142	0.000

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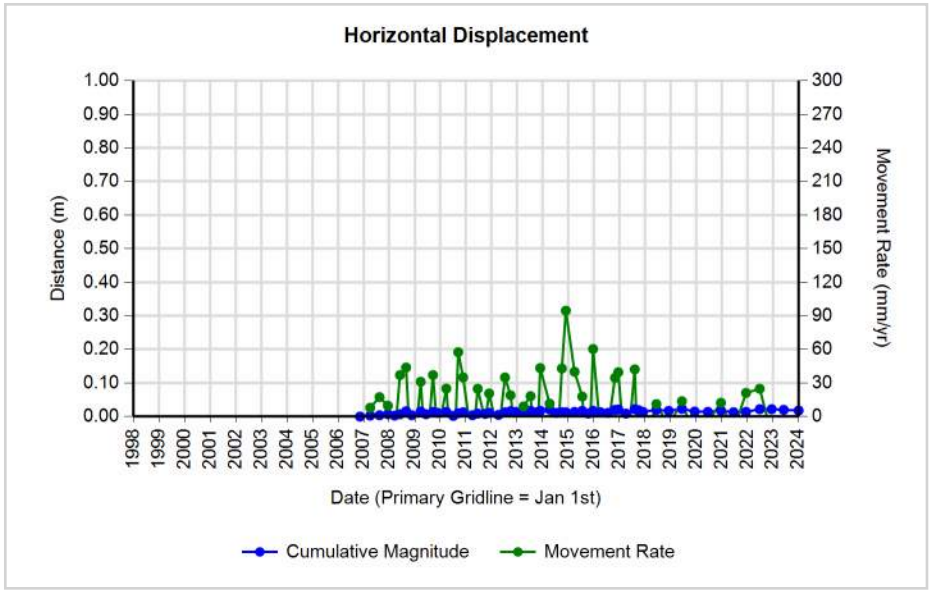
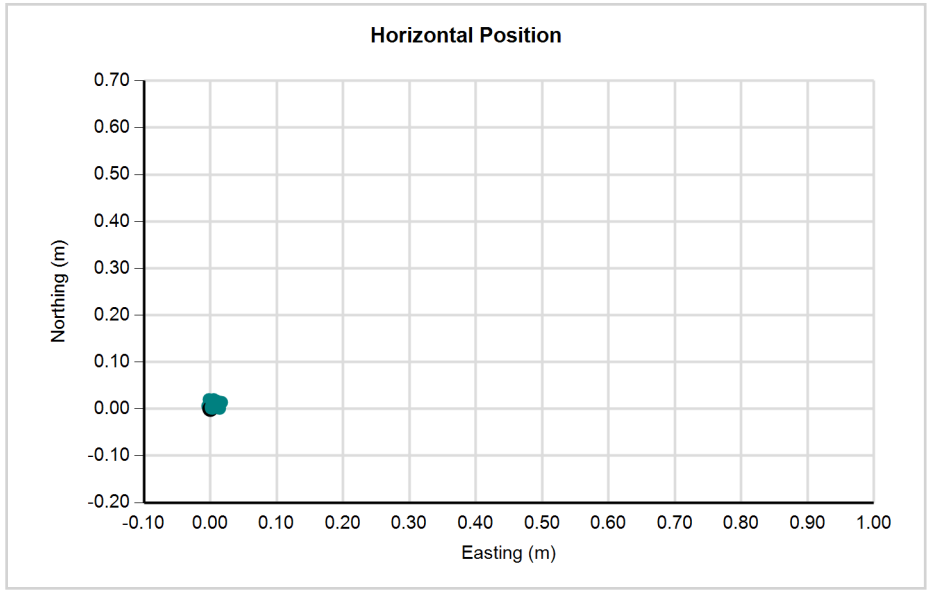
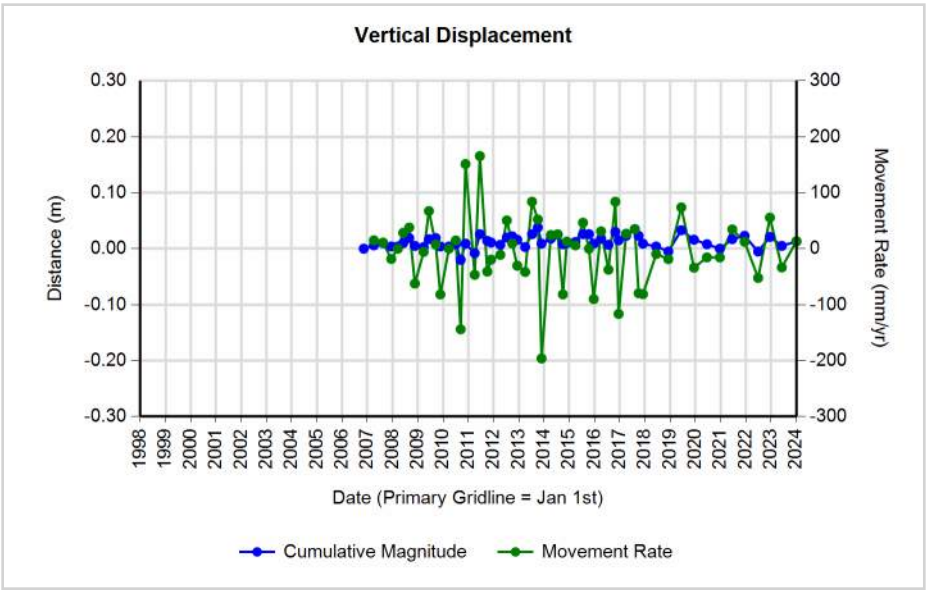
GPS Hub 06-11 (East Side of Lewis Road)

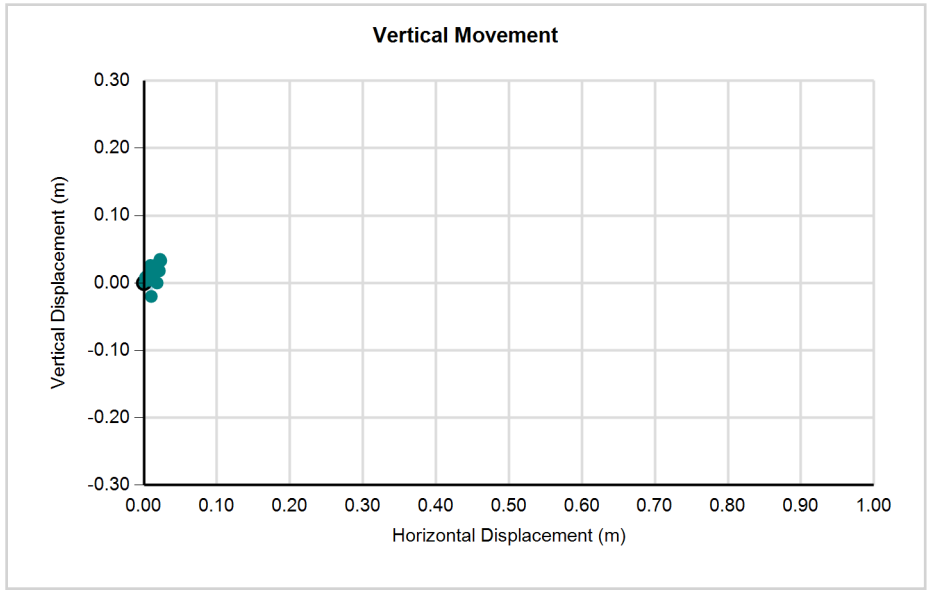
22/12/2015	5869938.508	532538.687	480.070	9.11	0.017	0.004	0.017	0.009	13.2	27.3	0.002	0.001	0.19	0.009	0.007	0.011	-0.017	37.9	-56.2	60.355	-89.989
06/04/2016	5869938.504	532538.686	480.079	9.40	0.013	0.003	0.013	0.018	13.0	53.5	0.001	0.002	0.29	-0.004	-0.001	0.004	0.009	194.0	65.4	-14.207	31.012
22/07/2016	5869938.502	532538.684	480.068	9.70	0.011	0.001	0.011	0.007	5.2	32.4	0.001	0.001	0.29	-0.002	-0.002	0.003	-0.011	225.0	-75.6	-9.655	-37.549
30/10/2016	5869938.511	532538.681	480.091	9.97	0.020	-0.002	0.020	0.030	354.3	56.2	0.002	0.003	0.27	0.009	-0.003	0.009	0.023	341.6	67.6	34.651	84.008
16/12/2016	5869938.512	532538.686	480.076	10.10	0.021	0.003	0.021	0.015	8.1	35.3	0.002	0.001	0.13	0.001	0.005	0.005	-0.015	78.7	-71.2	39.626	-116.569
04/04/2017	5869938.499	532538.688	480.084	10.40	0.008	0.005	0.009	0.023	32.0	67.7	0.001	0.002	0.30	-0.013	0.002	0.013	0.008	171.3	31.3	-44.074	26.807
08/08/2017	5869938.513	532538.684	480.096	10.74	0.022	0.001	0.022	0.035	2.6	57.8	0.002	0.003	0.34	0.014	-0.004	0.015	0.012	344.1	39.5	42.207	34.786
02/10/2017	5869938.508	532538.692	480.084	10.89	0.017	0.009	0.019	0.023	27.9	50.1	0.002	0.002	0.15	-0.005	0.008	0.009	-0.012	122.0	-51.8	-62.650	-79.691
04/12/2017	5869938.503	532538.691	480.070	11.07	0.012	0.008	0.014	0.009	33.7	32.0	0.001	0.001	0.17	-0.005	-0.001	0.005	-0.014	191.3	-70.0	-29.562	-81.167
13/06/2018	5869938.506	532538.696	480.065	11.59	0.015	0.013	0.020	0.004	40.9	11.4	0.002	0.000	0.52	0.003	0.005	0.006	-0.005	59.0	-40.6	11.151	-9.562
06/12/2018	5869938.506	532538.692	480.056	12.07	0.015	0.009	0.017	-0.005	31.0	-16.0	0.001	0.000	0.48	0.000	-0.004	0.004	-0.009	270.0	-66.0	-8.301	-18.678
12/06/2019	5869938.513	532538.691	480.094	12.59	0.022	0.008	0.023	0.033	20.0	54.6	0.002	0.003	0.51	0.007	-0.001	0.007	0.038	351.9	79.5	13.738	73.827
12/12/2019	5869938.503	532538.692	480.077	13.09	0.012	0.009	0.015	0.016	36.9	46.8	0.001	0.001	0.50	-0.010	0.001	0.010	-0.017	174.3	-59.4	-20.059	-33.930
17/06/2020	5869938.501	532538.693	480.069	13.60	0.010	0.010	0.014	0.008	45.0	29.5	0.001	0.001	0.51	-0.002	0.001	0.002	-0.008	153.4	-74.4	-4.344	-15.543
21/12/2020	5869938.507	532538.691	480.061	14.11	0.016	0.008	0.018	0.000	26.6	0.0	0.001	0.000	0.51	0.006	-0.002	0.006	-0.008	341.6	-51.7	12.353	-15.626
19/06/2021	5869938.501	532538.692	480.078	14.61	0.010	0.009	0.013	0.017	42.0	51.6	0.001	0.001	0.49	-0.006	0.001	0.006	0.017	170.5	70.3	-12.343	34.496
14/12/2021	5869938.492	532538.697	480.084	15.09	0.001	0.014	0.014	0.023	85.9	58.6	0.001	0.002	0.49	-0.009	0.005	0.010	0.006	150.9	30.2	21.126	12.312
28/06/2022	5869938.505	532538.700	480.056	15.63	0.014	0.017	0.022	-0.005	50.5	-12.8	0.001	0.000	0.54	0.013	0.003	0.013	-0.028	13.0	-64.5	24.862	-52.179
16/12/2022	5869938.510	532538.694	480.082	16.10	0.019	0.011	0.022	0.021	30.1	43.7	0.001	0.001	0.47	0.005	-0.006	0.008	0.026	309.8	73.3	-16.682	55.535
06/06/2023	5869938.504	532538.698	480.066	16.57	0.013	0.015	0.020	0.005	48.9	14.8	0.001	0.000	0.47	-0.006	0.004	0.007	-0.016	147.0	-65.6	-15.196	-33.510
04/01/2024	5869938.502	532538.697	480.074	17.15	0.011	0.014	0.018	0.013	51.8	36.1	0.001	0.001	0.58	-0.002	-0.001	0.002	0.008	204.2	74.3	-3.779	13.404

GPS Hub 06-11 (East Side of Lewis Road)









CITY OF Quesnel

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GPS Hub 06-12 (East Side of Lewis Road)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870217.210	532480.538	484.776	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5870217.214	532480.538	484.776	0.40	0.004	0.000	0.004	0.000	0.0	0.0	0.010	0.000	0.40	0.004	0.000	0.004	0.000	0.0	0.0	10.007	0.000
16/08/2007	5870217.218	532480.541	484.785	0.76	0.008	0.003	0.009	0.009	20.6	46.5	0.011	0.012	0.36	0.004	0.003	0.005	0.009	36.9	60.9	13.731	24.716
13/12/2007	5870217.218	532480.537	484.791	1.09	0.008	-0.001	0.008	0.015	352.9	61.7	0.007	0.014	0.33	0.000	-0.004	0.004	0.006	270.0	56.3	-12.277	18.416
18/03/2008	5870217.217	532480.537	484.792	1.35	0.007	-0.001	0.007	0.016	351.9	66.2	0.005	0.012	0.26	-0.001	0.000	0.001	0.001	180.0	45.0	-3.805	3.805
03/06/2008	5870217.211	532480.545	484.812	1.56	0.001	0.007	0.007	0.036	81.9	78.9	0.005	0.023	0.21	-0.006	0.008	0.010	0.020	126.9	63.4	47.435	94.870
29/08/2008	5870217.217	532480.554	484.830	1.80	0.007	0.016	0.017	0.054	66.4	72.1	0.010	0.030	0.24	0.006	0.009	0.011	0.018	56.3	59.0	45.411	75.569
19/11/2008	5870217.218	532480.552	484.807	2.03	0.008	0.014	0.016	0.031	60.3	62.5	0.008	0.015	0.22	0.001	-0.002	0.002	-0.023	296.6	-84.4	-9.960	-102.448
26/03/2009	5870217.228	532480.554	484.810	2.37	0.018	0.016	0.024	0.034	41.6	54.7	0.010	0.014	0.35	0.010	0.002	0.010	0.003	11.3	16.4	29.329	8.628
10/06/2009	5870217.215	532480.560	484.831	2.58	0.005	0.022	0.023	0.055	77.2	67.7	0.009	0.021	0.21	-0.013	0.006	0.014	0.021	155.2	55.7	-68.810	100.924
17/09/2009	5870217.220	532480.564	484.835	2.85	0.010	0.026	0.028	0.059	69.0	64.7	0.010	0.021	0.27	0.005	0.004	0.006	0.004	38.7	32.0	23.624	14.758
23/11/2009	5870217.228	532480.565	484.832	3.04	0.018	0.027	0.032	0.056	56.3	59.9	0.011	0.018	0.18	0.008	0.001	0.008	-0.003	7.1	-20.4	43.951	-16.354
27/03/2010	5870217.238	532480.566	484.838	3.38	0.028	0.028	0.040	0.062	45.0	57.4	0.012	0.018	0.34	0.010	0.001	0.010	0.006	5.7	30.8	29.603	17.673
04/07/2010	5870217.217	532480.562	484.833	3.65	0.007	0.024	0.025	0.057	73.7	66.3	0.007	0.016	0.27	-0.021	-0.004	0.021	-0.005	190.8	-13.2	-78.870	-18.447
13/09/2010	5870217.227	532480.566	484.825	3.84	0.017	0.028	0.033	0.049	58.7	56.2	0.009	0.013	0.19	0.010	0.004	0.011	-0.008	21.8	-36.6	55.407	-41.155
22/11/2010	5870217.224	532480.568	484.837	4.03	0.014	0.030	0.033	0.061	65.0	61.5	0.008	0.015	0.19	-0.003	0.002	0.004	0.012	146.3	73.3	18.813	62.614
04/04/2011	5870217.225	532480.562	484.824	4.40	0.015	0.024	0.028	0.048	58.0	59.5	0.006	0.011	0.36	0.001	-0.006	0.006	-0.013	279.5	-64.9	-16.705	-35.701
18/06/2011	5870217.234	532480.573	484.871	4.60	0.024	0.035	0.042	0.095	55.6	65.9	0.009	0.021	0.21	0.009	0.011	0.014	0.047	50.7	73.2	69.216	228.890
03/10/2011	5870217.222	532480.569	484.842	4.90	0.012	0.031	0.033	0.066	68.8	63.3	0.007	0.013	0.29	-0.012	-0.004	0.013	-0.029	198.4	-66.4	-43.178	-98.993
28/11/2011	5870217.224	532480.570	484.845	5.05	0.014	0.032	0.035	0.069	66.4	63.2	0.007	0.014	0.15	0.002	0.001	0.002	0.003	26.6	53.3	14.584	19.567
09/04/2012	5870217.223	532480.571	484.850	5.41	0.013	0.033	0.035	0.074	68.5	64.4	0.007	0.014	0.36	-0.001	0.001	0.001	0.005	135.0	74.2	3.884	13.731
12/07/2012	5870217.242	532480.582	484.878	5.67	0.032	0.044	0.054	0.102	54.0	61.9	0.010	0.018	0.26	0.019	0.011	0.022	0.028	30.1	51.9	85.307	108.798
29/09/2012	5870217.233	532480.577	484.870	5.89	0.023	0.039	0.045	0.094	59.5	64.3	0.008	0.016	0.22	-0.009	-0.005	0.010	-0.008	209.1	-37.8	-47.601	-36.987
10/12/2012	5870217.226	532480.579	484.862	6.08	0.016	0.041	0.044	0.086	68.7	62.9	0.007	0.014	0.20	-0.007	0.002	0.007	-0.008	164.1	-47.7	-36.931	-40.583
03/04/2013	5870217.229	532480.581	484.860	6.40	0.019	0.043	0.047	0.084	66.2	60.8	0.007	0.013	0.31	0.003	0.002	0.004	-0.002	33.7	-29.0	11.552	-6.408
12/07/2013	5870217.229	532480.584	484.870	6.67	0.019	0.046	0.050	0.094	67.6	62.1	0.007	0.014	0.27	0.000	0.003	0.003	0.010	90.0	73.3	10.958	36.525
04/10/2013	5870217.227	532480.583	484.885	6.90	0.017	0.045	0.048	0.109	69.3	66.2	0.007	0.016	0.23	-0.002	-0.001	0.002	0.015	206.6	81.5	-9.723	65.223
27/11/2013	5870217.227	532480.577	484.866	7.05	0.017	0.039	0.043	0.090	66.4	64.7	0.006	0.013	0.15	0.000	-0.006	0.006	-0.019	270.0	-72.5	-40.583	-128.514
10/04/2014	5870217.224	532480.581	484.867	7.41	0.014	0.043	0.045	0.091	72.0	63.6	0.006	0.012	0.37	-0.003	0.004	0.005	0.001	126.9	11.3	13.629	2.726
18/07/2014	5870217.219	532480.586	484.883	7.69	0.009	0.048	0.049	0.107	79.4	65.5	0.006	0.014	0.27	-0.005	0.005	0.007	0.016	135.0	66.2	26.088	59.030
02/10/2014	5870217.230	532480.580	484.865	7.89	0.020	0.042	0.047	0.089	64.5	62.4	0.006	0.011	0.21	0.011	-0.006	0.013	-0.018	331.4	-55.2	-60.218	-86.507
28/11/2014	5870217.229	532480.580	484.861	8.05	0.019	0.042	0.046	0.085	65.7	61.5	0.006	0.011	0.16	-0.001	0.000	0.001	-0.004	180.0	-76.0	-6.408	-25.632
01/04/2015	5870217.225	532480.580	484.869	8.39	0.015	0.042	0.045	0.093	70.3	64.4	0.005	0.011	0.34	-0.004	0.000	0.004	0.008	180.0	63.4	-11.782	23.565
20/07/2015	5870217.229	532480.587	484.878	8.69	0.019	0.049	0.053	0.102	68.8	62.7	0.006	0.012	0.30	0.004	0.007	0.008	0.009	60.3	48.1	26.770	29.884
14/10/2015	5870217.225	532480.582	484.877	8.93	0.015	0.044	0.046	0.101	71.2	65.3	0.005	0.011	0.24	-0.004	-0.005	0.006	-0.001	231.3	-8.9	-27.195	-4.247

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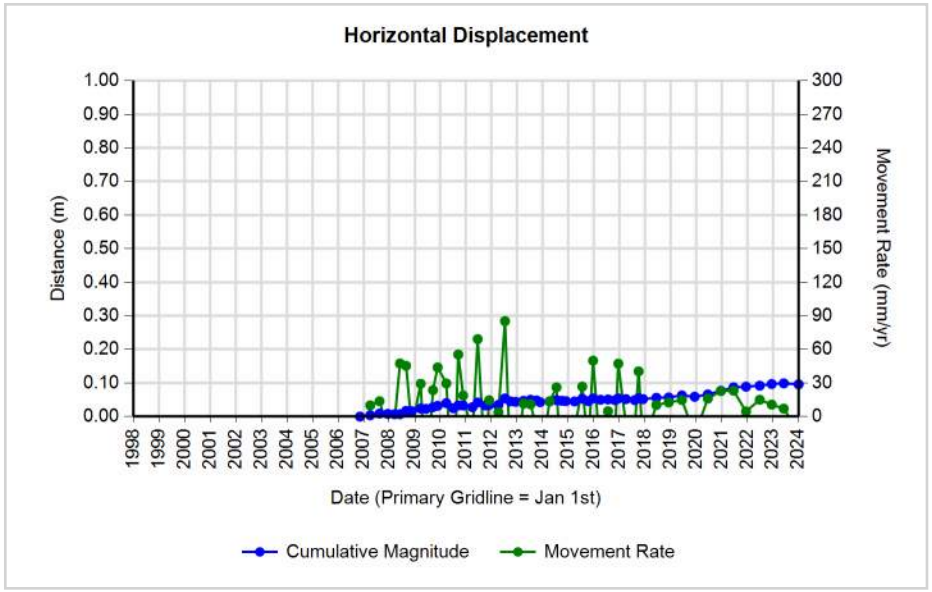
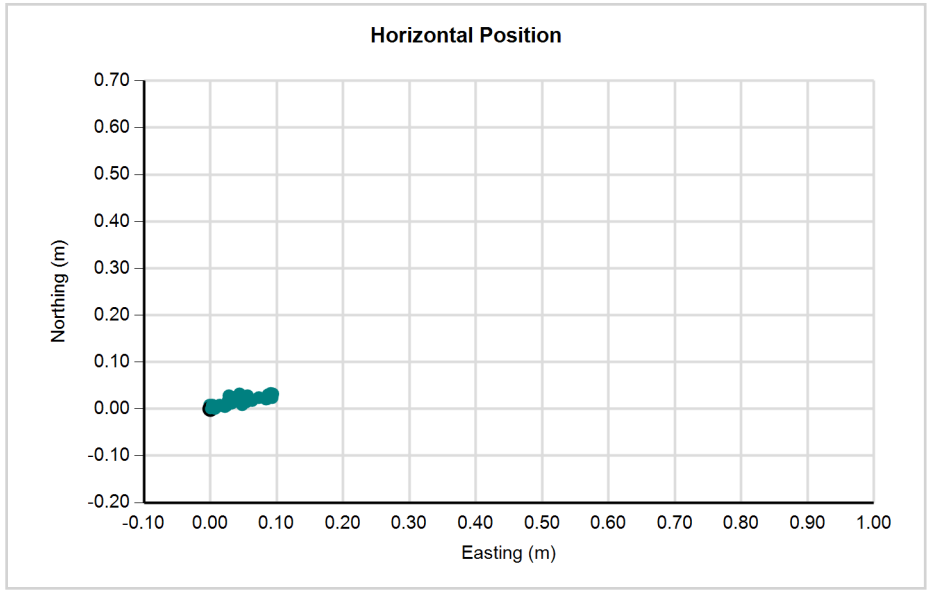
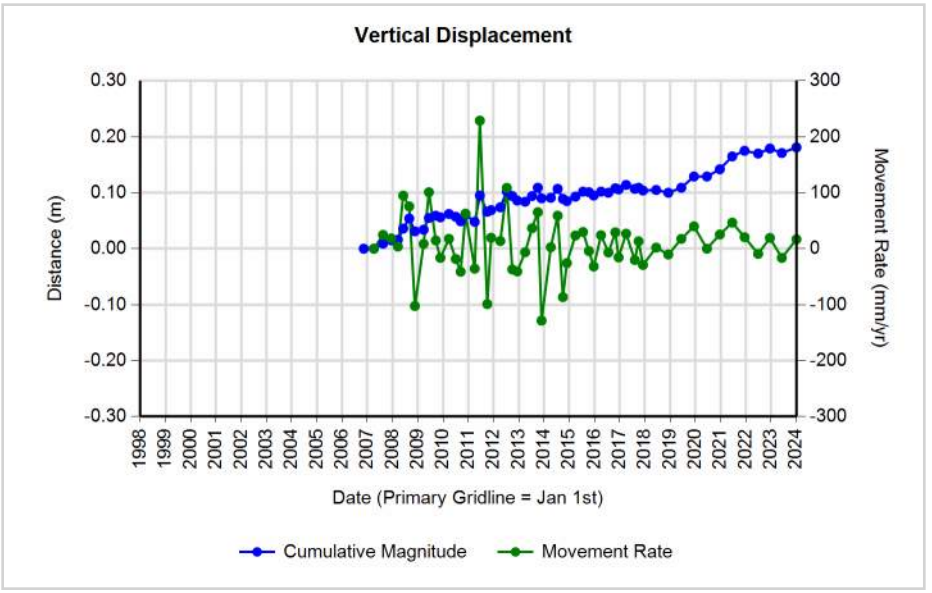
GPS Hub 06-12 (East Side of Lewis Road)

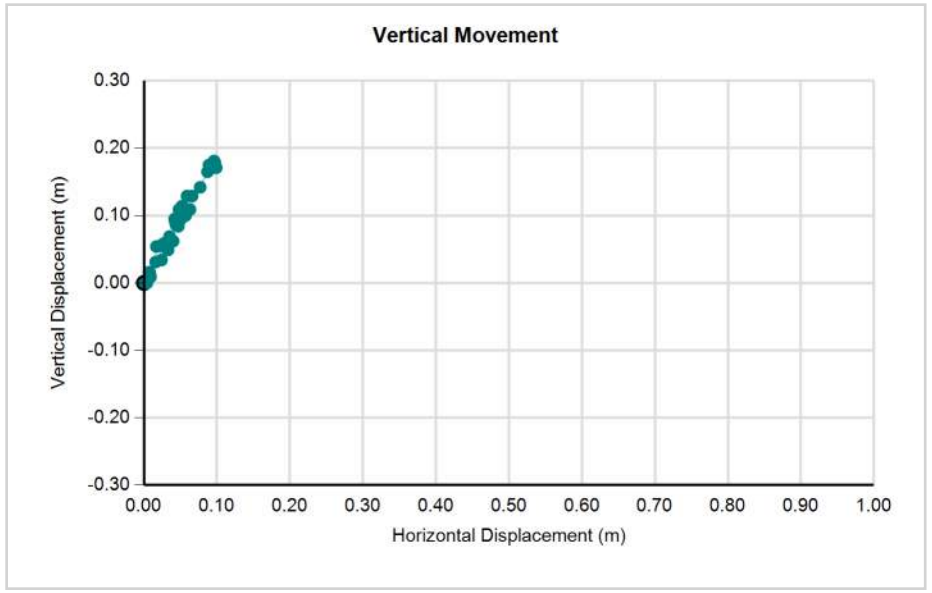
22/12/2015	5870217.233	532480.587	484.871	9.11	0.023	0.049	0.054	0.095	64.9	60.3	0.006	0.010	0.19	0.008	0.005	0.009	-0.006	32.0	-32.5	49.939	-31.761
06/04/2016	5870217.223	532480.586	484.878	9.40	0.013	0.048	0.050	0.102	74.8	64.0	0.005	0.011	0.29	-0.010	-0.001	0.010	0.007	185.7	34.9	-34.629	24.120
22/07/2016	5870217.224	532480.587	484.876	9.70	0.014	0.049	0.051	0.100	74.1	63.0	0.005	0.010	0.29	0.001	0.001	0.001	-0.002	45.0	-54.7	4.827	-6.827
30/10/2016	5870217.226	532480.584	484.884	9.97	0.016	0.046	0.049	0.108	70.8	65.7	0.005	0.011	0.27	0.002	-0.003	0.004	0.008	303.7	65.7	-13.169	29.220
16/12/2016	5870217.225	532480.590	484.882	10.10	0.015	0.052	0.054	0.106	73.9	63.0	0.005	0.010	0.13	-0.001	0.006	0.006	-0.002	99.5	-18.2	47.271	-15.543
04/04/2017	5870217.224	532480.588	484.890	10.40	0.014	0.050	0.052	0.114	74.4	65.5	0.005	0.011	0.30	-0.001	-0.002	0.002	0.008	243.4	74.4	-7.493	26.807
08/08/2017	5870217.224	532480.585	484.883	10.74	0.014	0.047	0.049	0.107	73.4	65.4	0.005	0.010	0.34	0.000	-0.003	0.003	-0.007	270.0	-66.8	-8.696	-20.292
02/10/2017	5870217.225	532480.591	484.885	10.89	0.015	0.053	0.055	0.109	74.2	63.2	0.005	0.010	0.15	0.001	0.006	0.006	0.002	80.5	18.2	40.395	13.282
04/12/2017	5870217.227	532480.587	484.880	11.07	0.017	0.049	0.052	0.104	70.9	63.5	0.005	0.009	0.17	0.002	-0.004	0.004	-0.005	296.6	-48.2	-25.928	-28.988
13/06/2018	5870217.225	532480.592	484.881	11.59	0.015	0.054	0.056	0.105	74.5	61.9	0.005	0.009	0.52	-0.002	0.005	0.005	0.001	111.8	10.5	10.298	1.912
06/12/2018	5870217.231	532480.591	484.876	12.07	0.021	0.053	0.057	0.100	68.4	60.3	0.005	0.008	0.48	0.006	-0.001	0.006	-0.005	350.5	-39.4	12.623	-10.376
12/06/2019	5870217.238	532480.594	484.885	12.59	0.028	0.056	0.063	0.109	63.4	60.1	0.005	0.009	0.51	0.007	0.003	0.008	0.009	23.2	49.8	14.796	17.485
12/12/2019	5870217.230	532480.593	484.905	13.09	0.020	0.055	0.059	0.129	70.0	65.6	0.004	0.010	0.50	-0.008	-0.001	0.008	0.020	187.1	68.0	-16.091	39.918
17/06/2020	5870217.228	532480.601	484.905	13.60	0.018	0.063	0.066	0.129	74.1	63.1	0.005	0.009	0.51	-0.002	0.008	0.008	0.000	104.0	0.0	16.021	0.000
21/12/2020	5870217.234	532480.611	484.918	14.11	0.024	0.073	0.077	0.142	71.8	61.6	0.005	0.010	0.51	0.006	0.010	0.012	0.013	59.0	48.1	22.778	25.392
19/06/2021	5870217.231	532480.622	484.941	14.61	0.021	0.084	0.087	0.165	76.0	62.3	0.006	0.011	0.49	-0.003	0.011	0.011	0.023	105.3	63.6	23.136	46.671
14/12/2021	5870217.232	532480.624	484.951	15.09	0.022	0.086	0.089	0.175	75.7	63.1	0.006	0.012	0.49	0.001	0.002	0.002	0.010	63.4	77.4	4.588	20.520
28/06/2022	5870217.240	532480.625	484.946	15.63	0.030	0.087	0.092	0.170	71.0	61.6	0.006	0.011	0.54	0.008	0.001	0.008	-0.005	7.1	-31.8	15.024	-9.318
16/12/2022	5870217.243	532480.629	484.955	16.10	0.033	0.091	0.097	0.179	70.1	61.6	0.006	0.011	0.47	0.003	0.004	0.005	0.009	53.1	60.9	10.680	19.224
06/06/2023	5870217.242	532480.632	484.947	16.57	0.032	0.094	0.099	0.171	71.2	59.8	0.006	0.010	0.47	-0.001	0.003	0.003	-0.008	107.4	-66.6	7.119	-16.436
04/01/2024	5870217.234	532480.631	484.957	17.15	0.024	0.093	0.096	0.181	75.5	62.0	0.006	0.011	0.58	-0.008	-0.001	0.008	0.010	188.5	50.3	-13.937	16.781

GPS Hub 06-12 (East Side of Lewis Road)









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GPS Hub 06-13 (Northwest Corner of Pentland Crescent)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870118.621	532230.725	527.301	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5870118.621	532230.735	527.300	0.40	0.000	0.010	0.010	-0.001	90.0	-5.7	0.025	-0.003	0.40	0.000	0.010	0.010	-0.001	90.0	-5.7	25.017	-2.502
16/08/2007	5870118.627	532230.741	527.292	0.76	0.006	0.016	0.017	-0.009	69.4	-27.8	0.022	-0.012	0.36	0.006	0.006	0.008	-0.008	45.0	-43.3	23.303	-21.970
13/12/2007	5870118.627	532230.747	527.287	1.09	0.006	0.022	0.023	-0.014	74.7	-31.5	0.021	-0.013	0.33	0.000	0.006	0.006	-0.005	90.0	-39.8	18.416	-15.347
18/03/2008	5870118.624	532230.752	527.300	1.35	0.003	0.027	0.027	-0.001	83.7	-2.1	0.020	-0.001	0.26	-0.003	0.005	0.006	0.013	121.0	65.8	22.185	49.461
03/06/2008	5870118.638	532230.774	527.290	1.56	0.017	0.049	0.052	-0.011	70.9	-12.0	0.033	-0.007	0.21	0.014	0.022	0.026	-0.010	57.5	-21.0	123.696	-47.435
29/08/2008	5870118.629	532230.778	527.309	1.80	0.008	0.053	0.054	0.008	81.4	8.5	0.030	0.004	0.24	-0.009	0.004	0.010	0.019	156.0	62.6	41.348	79.767
19/11/2008	5870118.638	532230.784	527.282	2.03	0.017	0.059	0.061	-0.019	73.9	-17.2	0.030	-0.009	0.22	0.009	0.006	0.011	-0.027	33.7	-68.2	48.180	-120.265
26/03/2009	5870118.641	532230.786	527.285	2.37	0.020	0.061	0.064	-0.016	71.8	-14.0	0.027	-0.007	0.35	0.003	0.002	0.004	0.003	33.7	39.8	10.370	8.628
10/06/2009	5870118.639	532230.818	527.306	2.58	0.018	0.093	0.095	0.005	79.0	3.0	0.037	0.002	0.21	-0.002	0.032	0.032	0.021	93.6	33.2	154.090	100.924
17/09/2009	5870118.639	532230.820	527.280	2.85	0.018	0.095	0.097	-0.021	79.3	-12.3	0.034	-0.007	0.27	0.000	0.002	0.002	-0.026	90.0	-85.6	7.379	-95.924
23/11/2009	5870118.653	532230.824	527.274	3.04	0.032	0.099	0.104	-0.027	72.1	-14.5	0.034	-0.009	0.18	0.014	0.004	0.015	-0.006	15.9	-22.4	79.375	-32.709
27/03/2010	5870118.653	532230.821	527.285	3.38	0.032	0.096	0.101	-0.016	71.6	-9.0	0.030	-0.005	0.34	0.000	-0.003	0.003	0.011	270.0	74.7	-8.837	32.401
04/07/2010	5870118.638	532230.818	527.296	3.65	0.017	0.093	0.095	-0.005	79.6	-3.0	0.026	-0.001	0.27	-0.015	-0.003	0.015	0.011	191.3	35.7	-56.437	40.583
13/09/2010	5870118.649	532230.827	527.285	3.84	0.028	0.102	0.106	-0.016	74.6	-8.6	0.028	-0.004	0.19	0.011	0.009	0.014	-0.011	39.3	-37.7	73.115	-56.588
22/11/2010	5870118.650	532230.833	527.274	4.03	0.029	0.108	0.112	-0.027	75.0	-13.6	0.028	-0.007	0.19	0.001	0.006	0.006	-0.011	80.5	-61.1	31.739	-57.396
04/04/2011	5870118.649	532230.833	527.283	4.40	0.028	0.108	0.112	-0.018	75.5	-9.2	0.025	-0.004	0.36	-0.001	0.000	0.001	0.009	180.0	83.7	-2.746	24.716
18/06/2011	5870118.653	532230.843	527.301	4.60	0.032	0.118	0.122	0.000	74.8	0.0	0.027	0.000	0.21	0.004	0.010	0.011	0.018	68.2	59.1	52.452	87.660
03/10/2011	5870118.652	532230.837	527.269	4.90	0.031	0.112	0.116	-0.032	74.5	-15.4	0.024	-0.007	0.29	-0.001	-0.006	0.006	-0.032	260.5	-79.2	-20.764	-109.234
28/11/2011	5870118.656	532230.842	527.273	5.05	0.035	0.117	0.122	-0.028	73.3	-12.9	0.024	-0.006	0.15	0.004	0.005	0.006	0.004	51.3	32.0	41.763	26.089
09/04/2012	5870118.647	532230.841	527.287	5.41	0.026	0.116	0.119	-0.014	77.4	-6.7	0.022	-0.003	0.36	-0.009	-0.001	0.009	0.014	186.3	57.1	-24.868	38.447
12/07/2012	5870118.660	532230.863	527.283	5.67	0.039	0.138	0.143	-0.018	74.2	-7.2	0.025	-0.003	0.26	0.013	0.022	0.026	-0.004	59.4	-8.9	99.293	-15.543
29/09/2012	5870118.670	532230.878	527.280	5.89	0.049	0.153	0.161	-0.021	72.2	-7.4	0.027	-0.004	0.22	0.010	0.015	0.018	-0.003	56.3	-9.4	83.350	-13.870
10/12/2012	5870118.663	532230.872	527.273	6.08	0.042	0.147	0.153	-0.028	74.1	-10.4	0.025	-0.005	0.20	-0.007	-0.006	0.009	-0.007	220.6	-37.2	-46.770	-35.510
03/04/2013	5870118.666	532230.875	527.263	6.40	0.045	0.150	0.157	-0.038	73.3	-13.6	0.024	-0.006	0.31	0.003	0.003	0.004	-0.010	45.0	-67.0	13.593	-32.039
12/07/2013	5870118.666	532230.883	527.275	6.67	0.045	0.158	0.164	-0.026	74.1	-9.0	0.025	-0.004	0.27	0.000	0.008	0.008	0.012	90.0	56.3	29.220	43.830
04/10/2013	5870118.665	532230.875	527.273	6.90	0.044	0.150	0.156	-0.028	73.7	-10.2	0.023	-0.004	0.23	-0.001	-0.008	0.008	-0.002	262.9	-13.9	-35.056	-8.696
27/11/2013	5870118.668	532230.874	527.257	7.05	0.047	0.149	0.156	-0.044	72.5	-15.7	0.022	-0.006	0.15	0.003	-0.001	0.003	-0.016	341.6	-78.8	21.389	-108.222
10/04/2014	5870118.664	532230.885	527.273	7.41	0.043	0.160	0.166	-0.028	75.0	-9.6	0.022	-0.004	0.37	-0.004	0.011	0.012	0.016	110.0	53.8	31.904	43.612
18/07/2014	5870118.659	532230.888	527.281	7.69	0.038	0.163	0.167	-0.020	76.9	-6.8	0.022	-0.003	0.27	-0.005	0.003	0.006	0.008	149.0	53.9	21.513	29.515
02/10/2014	5870118.667	532230.891	527.258	7.89	0.046	0.166	0.172	-0.043	74.5	-14.0	0.022	-0.005	0.21	0.008	0.003	0.009	-0.023	20.6	-69.6	41.062	-110.536
28/11/2014	5870118.661	532230.890	527.260	8.05	0.040	0.165	0.170	-0.041	76.4	-13.6	0.021	-0.005	0.16	-0.006	-0.001	0.006	0.002	189.5	18.2	-38.978	12.816
01/04/2015	5870118.668	532230.894	527.259	8.39	0.047	0.169	0.175	-0.042	74.5	-13.5	0.021	-0.005	0.34	0.007	0.004	0.008	-0.001	29.7	-7.1	23.748	-2.946
20/07/2015	5870118.675	532230.906	527.273	8.69	0.054	0.181	0.189	-0.028	73.4	-8.4	0.022	-0.003	0.30	0.007	0.012	0.014	0.014	59.7	45.2	46.129	46.486
14/10/2015	5870118.670	532230.902	527.264	8.93	0.049	0.177	0.184	-0.037	74.5	-11.4	0.021	-0.004	0.24	-0.005	-0.004	0.006	-0.009	218.7	-54.6	-27.195	-38.224

CITY OF Quesnel

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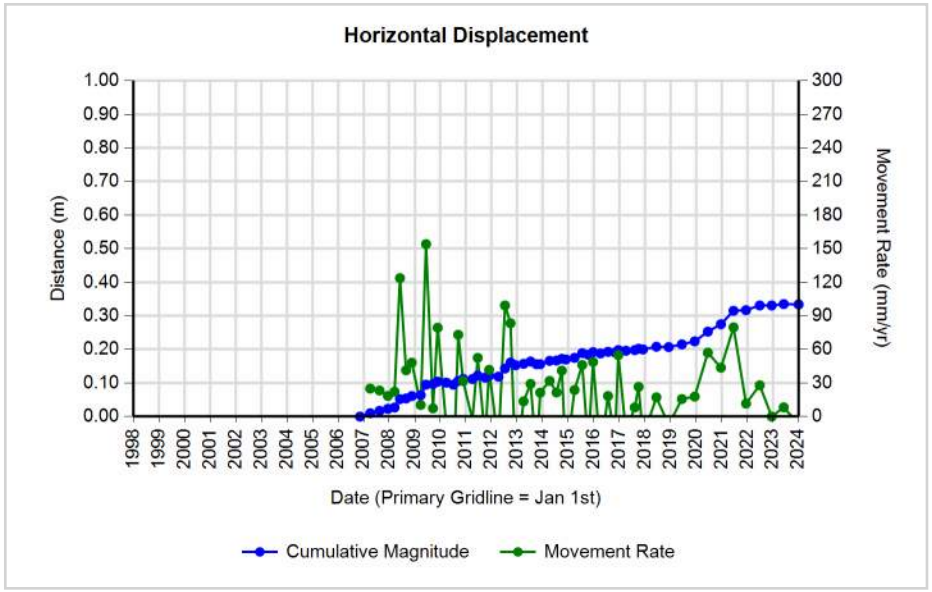
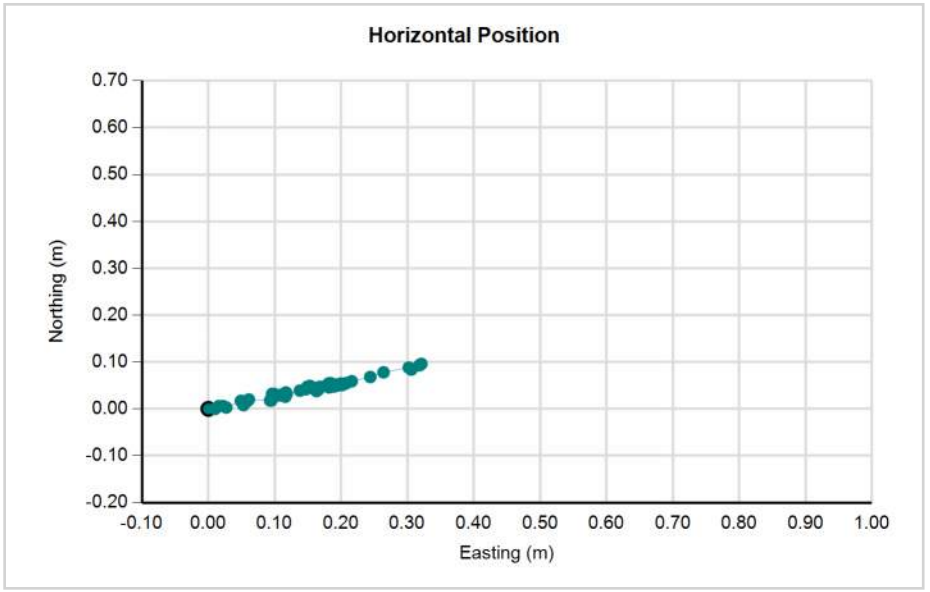
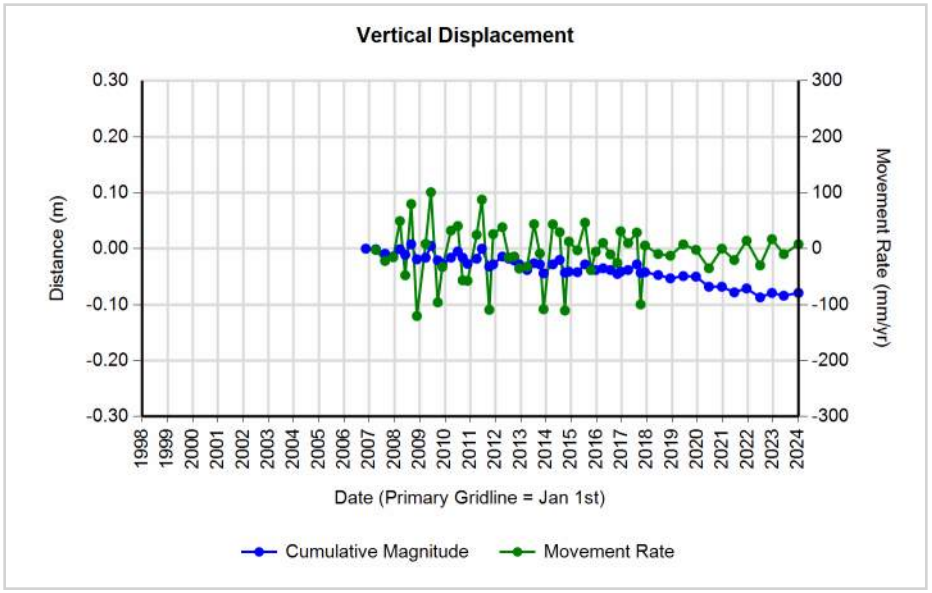
GPS Hub 06-13 (Northwest Corner of Pentland Crescent)

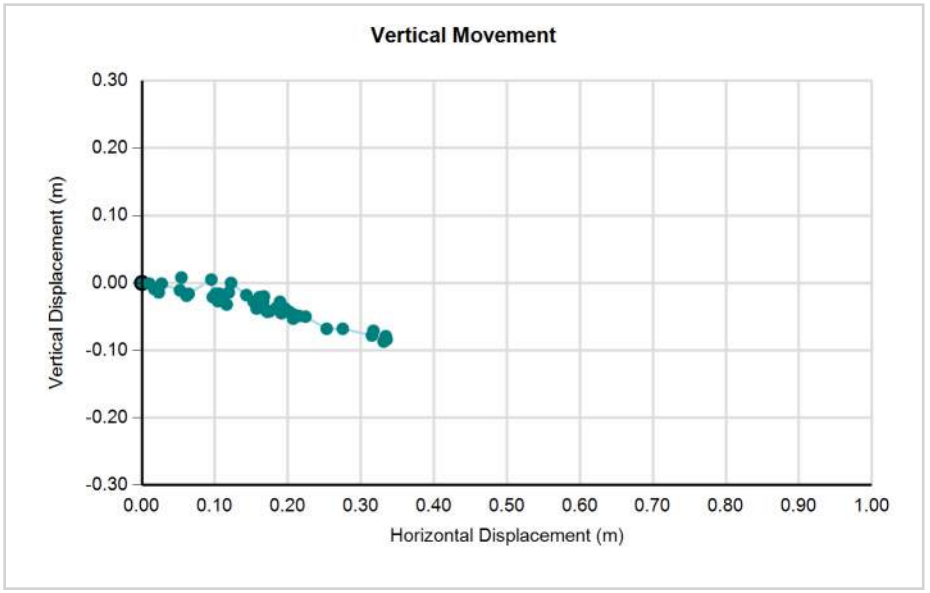
22/12/2015	5870118.676	532230.909	527.263	9.11	0.055	0.184	0.192	-0.038	73.4	-11.2	0.021	-0.004	0.19	0.006	0.007	0.009	-0.001	49.4	-6.2	48.803	-5.293
06/04/2016	5870118.667	532230.907	527.266	9.40	0.046	0.182	0.188	-0.035	75.8	-10.6	0.020	-0.004	0.29	-0.009	-0.002	0.009	0.003	192.5	18.0	-31.768	10.337
22/07/2016	5870118.669	532230.912	527.263	9.70	0.048	0.187	0.193	-0.038	75.6	-11.1	0.020	-0.004	0.29	0.002	0.005	0.005	-0.003	68.2	-29.1	18.383	-10.241
30/10/2016	5870118.674	532230.909	527.256	9.97	0.053	0.184	0.191	-0.045	73.9	-13.2	0.019	-0.005	0.27	0.005	-0.003	0.006	-0.007	329.0	-50.2	-21.298	-25.568
16/12/2016	5870118.673	532230.916	527.260	10.10	0.052	0.191	0.198	-0.041	74.8	-11.7	0.020	-0.004	0.13	-0.001	0.007	0.007	0.004	98.1	29.5	54.951	31.085
04/04/2017	5870118.669	532230.915	527.263	10.40	0.048	0.190	0.196	-0.038	75.8	-11.0	0.019	-0.004	0.30	-0.004	-0.001	0.004	0.003	194.0	36.0	-13.816	10.053
08/08/2017	5870118.671	532230.917	527.273	10.74	0.050	0.192	0.198	-0.028	75.4	-8.0	0.018	-0.003	0.34	0.002	0.002	0.003	0.010	45.0	74.2	8.199	28.988
02/10/2017	5870118.671	532230.921	527.258	10.89	0.050	0.196	0.202	-0.043	75.7	-12.0	0.019	-0.004	0.15	0.000	0.004	0.004	-0.015	90.0	-75.1	26.564	-99.614
04/12/2017	5870118.672	532230.918	527.259	11.07	0.051	0.193	0.200	-0.042	75.2	-11.9	0.018	-0.004	0.17	0.001	-0.003	0.003	0.001	288.4	17.5	-18.334	5.798
13/06/2018	5870118.672	532230.927	527.254	11.59	0.051	0.202	0.208	-0.047	75.8	-12.7	0.018	-0.004	0.52	0.000	0.009	0.009	-0.005	90.0	-29.1	17.211	-9.562
06/12/2018	5870118.675	532230.925	527.248	12.07	0.054	0.200	0.207	-0.053	74.9	-14.4	0.017	-0.004	0.48	0.003	-0.002	0.004	-0.006	326.3	-59.0	-7.483	-12.452
12/06/2019	5870118.676	532230.933	527.252	12.59	0.055	0.208	0.215	-0.049	75.2	-12.8	0.017	-0.004	0.51	0.001	0.008	0.008	0.004	82.9	26.4	15.664	7.771
12/12/2019	5870118.680	532230.941	527.251	13.09	0.059	0.216	0.224	-0.050	74.7	-12.6	0.017	-0.004	0.50	0.004	0.008	0.009	-0.001	63.4	-6.4	17.852	-1.996
17/06/2020	5870118.689	532230.969	527.233	13.60	0.068	0.244	0.253	-0.068	74.4	-15.0	0.019	-0.005	0.51	0.009	0.028	0.029	-0.018	72.2	-31.5	57.140	-34.971
21/12/2020	5870118.699	532230.989	527.233	14.11	0.078	0.264	0.275	-0.068	73.5	-13.9	0.020	-0.005	0.51	0.010	0.020	0.022	0.000	63.4	0.0	43.675	0.000
19/06/2021	5870118.709	532231.027	527.223	14.61	0.088	0.302	0.315	-0.078	73.8	-13.9	0.022	-0.005	0.49	0.010	0.038	0.039	-0.010	75.3	-14.3	79.734	-20.292
14/12/2021	5870118.705	532231.031	527.230	15.09	0.084	0.306	0.317	-0.071	74.6	-12.6	0.021	-0.005	0.49	-0.004	0.004	0.006	0.007	135.0	51.1	11.608	14.364
28/06/2022	5870118.714	532231.043	527.214	15.63	0.093	0.318	0.331	-0.087	73.7	-14.7	0.021	-0.006	0.54	0.009	0.012	0.015	-0.016	53.1	-46.8	27.953	-29.816
16/12/2022	5870118.714	532231.043	527.222	16.10	0.093	0.318	0.331	-0.079	73.7	-13.4	0.021	-0.005	0.47	0.000	0.000	0.000	0.008	0.0	0.0	0.000	17.088
06/06/2023	5870118.717	532231.046	527.217	16.57	0.096	0.321	0.335	-0.084	73.3	-14.0	0.020	-0.005	0.47	0.003	0.003	0.004	-0.005	39.8	-49.9	8.293	-9.853
04/01/2024	5870118.713	532231.046	527.222	17.15	0.092	0.321	0.334	-0.079	74.0	-13.3	0.019	-0.005	0.58	-0.004	0.001	0.004	0.005	172.9	49.0	-6.945	7.994

GPS Hub 06-13 (Northwest Corner of Pentland Crescent)









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GPS Hub 06-14 (Southwest Corner of Pinchbeck Street and Pentland Crescent)

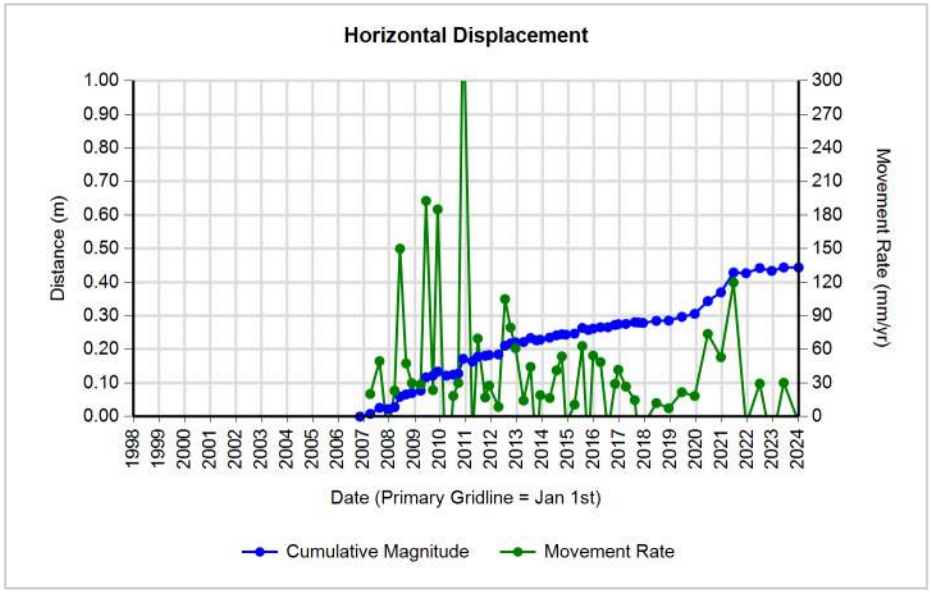
	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870071.251	532147.507	527.150	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5870071.250	532147.515	527.129	0.40	-0.001	0.008	0.008	-0.021	97.1	-69.0	0.020	-0.053	0.40	-0.001	0.008	0.008	-0.021	97.1	-69.0	20.169	-52.536
16/08/2007	5870071.249	532147.533	527.126	0.76	-0.002	0.026	0.026	-0.024	94.4	-42.6	0.034	-0.031	0.36	-0.001	0.018	0.018	-0.003	93.2	-9.4	49.509	-8.239
13/12/2007	5870071.253	532147.529	527.119	1.09	0.002	0.022	0.022	-0.031	84.8	-54.5	0.020	-0.028	0.33	0.004	-0.004	0.006	-0.007	315.0	-51.1	-17.363	-21.485
18/03/2008	5870071.254	532147.535	527.133	1.35	0.003	0.028	0.028	-0.017	83.9	-31.1	0.021	-0.013	0.26	0.001	0.006	0.006	0.014	80.5	66.5	23.143	53.266
03/06/2008	5870071.264	532147.565	527.128	1.56	0.013	0.058	0.059	-0.022	77.4	-20.3	0.038	-0.014	0.21	0.010	0.030	0.032	-0.005	71.6	-9.0	150.003	-23.718
29/08/2008	5870071.256	532147.573	527.123	1.80	0.005	0.066	0.066	-0.027	85.7	-22.2	0.037	-0.015	0.24	-0.008	0.008	0.011	-0.005	135.0	-23.8	47.498	-20.991
19/11/2008	5870071.262	532147.576	527.114	2.03	0.011	0.069	0.070	-0.036	80.9	-27.3	0.034	-0.018	0.22	0.006	0.003	0.007	-0.009	26.6	-53.3	29.880	-40.088
26/03/2009	5870071.256	532147.584	527.108	2.37	0.005	0.077	0.077	-0.042	86.3	-28.6	0.033	-0.018	0.35	-0.006	0.008	0.010	-0.006	126.9	-31.0	28.760	-17.256
10/06/2009	5870071.253	532147.624	527.137	2.58	0.002	0.117	0.117	-0.013	89.0	-6.3	0.045	-0.005	0.21	-0.003	0.040	0.040	0.029	94.3	35.9	192.777	139.372
17/09/2009	5870071.249	532147.629	527.107	2.85	-0.002	0.122	0.122	-0.043	90.9	-19.4	0.043	-0.015	0.27	-0.004	0.005	0.006	-0.030	128.7	-78.0	23.624	-110.682
23/11/2009	5870071.282	532147.637	527.121	3.04	0.031	0.130	0.134	-0.029	76.6	-12.2	0.044	-0.010	0.18	0.033	0.008	0.034	0.014	13.6	22.4	185.110	76.321
27/03/2010	5870071.259	532147.629	527.094	3.38	0.008	0.122	0.122	-0.056	86.2	-24.6	0.036	-0.017	0.34	-0.023	-0.008	0.024	-0.027	199.2	-48.0	-71.729	-79.530
04/07/2010	5870071.255	532147.632	527.104	3.65	0.004	0.125	0.125	-0.046	88.2	-20.2	0.034	-0.013	0.27	-0.004	0.003	0.005	0.010	143.1	63.4	18.447	36.894
13/09/2010	5870071.260	532147.635	527.110	3.84	0.009	0.128	0.128	-0.040	86.0	-17.3	0.033	-0.010	0.19	0.005	0.003	0.006	0.006	31.0	45.8	29.997	30.866
22/11/2010	5870071.197	532147.670	527.098	4.03	-0.054	0.163	0.172	-0.052	108.3	-16.8	0.043	-0.013	0.19	-0.063	0.035	0.072	-0.012	150.9	-9.5	376.048	-62.614
04/04/2011	5870071.198	532147.662	527.097	4.40	-0.053	0.155	0.164	-0.053	108.9	-17.9	0.037	-0.012	0.36	0.001	-0.008	0.008	-0.001	277.1	-7.1	-22.141	-2.746
18/06/2011	5870071.195	532147.676	527.105	4.60	-0.056	0.169	0.178	-0.045	108.3	-14.2	0.039	-0.010	0.21	-0.003	0.014	0.014	0.008	102.1	29.2	69.728	38.960
03/10/2011	5870071.198	532147.680	527.094	4.90	-0.053	0.173	0.181	-0.056	107.0	-17.2	0.037	-0.011	0.29	0.003	0.004	0.005	-0.011	53.1	-65.6	17.068	-37.549
28/11/2011	5870071.201	532147.683	527.090	5.05	-0.050	0.176	0.183	-0.060	105.9	-18.2	0.036	-0.012	0.15	0.003	0.003	0.004	-0.004	45.0	-43.3	27.672	-26.089
09/04/2012	5870071.198	532147.684	527.096	5.41	-0.053	0.177	0.185	-0.054	106.7	-16.3	0.034	-0.010	0.36	-0.003	0.001	0.003	0.006	161.6	62.2	8.684	16.477
12/07/2012	5870071.197	532147.711	527.091	5.67	-0.054	0.204	0.211	-0.059	104.8	-15.6	0.037	-0.010	0.26	-0.001	0.027	0.027	-0.005	92.1	-10.5	104.984	-19.428
29/09/2012	5870071.211	532147.721	527.087	5.89	-0.040	0.214	0.218	-0.063	100.6	-16.1	0.037	-0.011	0.22	0.014	0.010	0.017	-0.004	35.5	-13.1	79.544	-18.494
10/12/2012	5870071.199	532147.722	527.082	6.08	-0.052	0.215	0.221	-0.068	103.6	-17.1	0.036	-0.011	0.20	-0.012	0.001	0.012	-0.005	175.2	-22.5	61.086	-25.365
03/04/2013	5870071.203	532147.724	527.074	6.40	-0.048	0.217	0.222	-0.076	102.5	-18.9	0.035	-0.012	0.31	0.004	0.002	0.004	-0.008	26.6	-60.8	14.328	-25.632
12/07/2013	5870071.201	532147.736	527.091	6.67	-0.050	0.229	0.234	-0.059	102.3	-14.1	0.035	-0.009	0.27	-0.002	0.012	0.012	0.017	99.5	54.4	44.435	62.093
04/10/2013	5870071.205	532147.729	527.096	6.90	-0.046	0.222	0.227	-0.054	101.7	-13.4	0.033	-0.008	0.23	0.004	-0.007	0.008	0.005	299.7	31.8	-35.056	21.741
27/11/2013	5870071.203	532147.731	527.074	7.05	-0.048	0.224	0.229	-0.076	102.1	-18.4	0.033	-0.011	0.15	-0.002	0.002	0.003	-0.022	135.0	-82.7	19.131	-148.806
10/04/2014	5870071.204	532147.737	527.075	7.41	-0.047	0.230	0.235	-0.075	101.5	-17.7	0.032	-0.010	0.37	0.001	0.006	0.006	0.001	80.5	9.3	16.580	2.726
18/07/2014	5870071.194	532147.742	527.081	7.69	-0.057	0.235	0.242	-0.069	103.6	-15.9	0.031	-0.009	0.27	-0.010	0.005	0.011	0.006	153.4	28.2	41.249	22.136
02/10/2014	5870071.204	532147.747	527.073	7.89	-0.047	0.240	0.245	-0.077	101.1	-17.5	0.031	-0.010	0.21	0.010	0.005	0.011	-0.008	26.6	-35.6	53.732	-38.447
28/11/2014	5870071.205	532147.747	527.076	8.05	-0.046	0.240	0.244	-0.074	100.9	-16.8	0.030	-0.009	0.16	0.001	0.000	0.001	0.003	0.0	71.6	-6.408	19.224
01/04/2015	5870071.202	532147.749	527.072	8.39	-0.049	0.242	0.247	-0.078	101.4	-17.5	0.029	-0.009	0.34	-0.003	0.002	0.004	-0.004	146.3	-48.0	10.620	-11.782
20/07/2015	5870071.208	532147.767	527.068	8.69	-0.043	0.260	0.264	-0.082	99.4	-17.3	0.030	-0.009	0.30	0.006	0.018	0.019	-0.004	71.6	-11.9	63.001	-13.282
14/10/2015	5870071.203	532147.761	527.070	8.93	-0.048	0.254	0.258	-0.080	100.7	-17.2	0.029	-0.009	0.24	-0.005	-0.006	0.008	0.002	230.2	14.4	-33.171	8.494

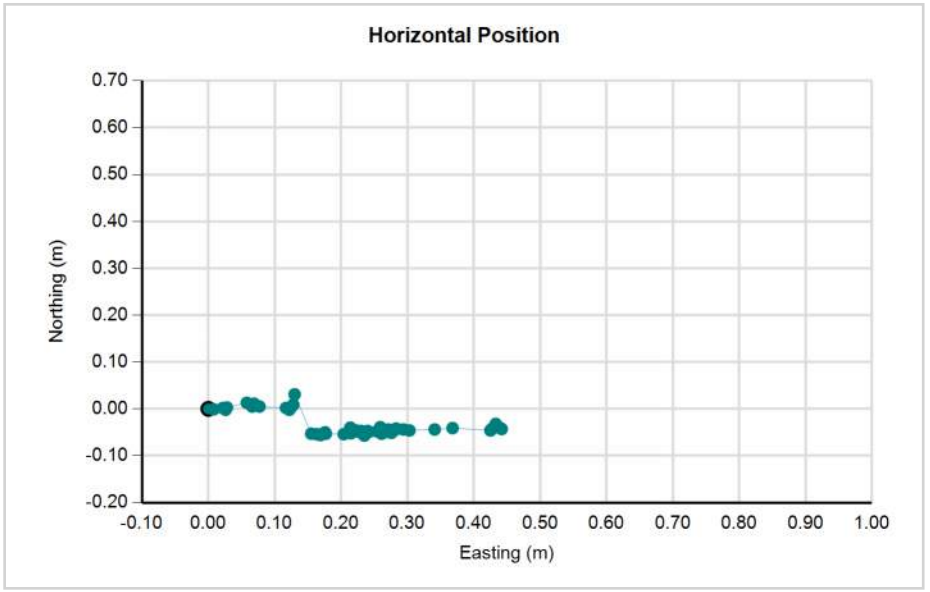
CITY OF Quesnel

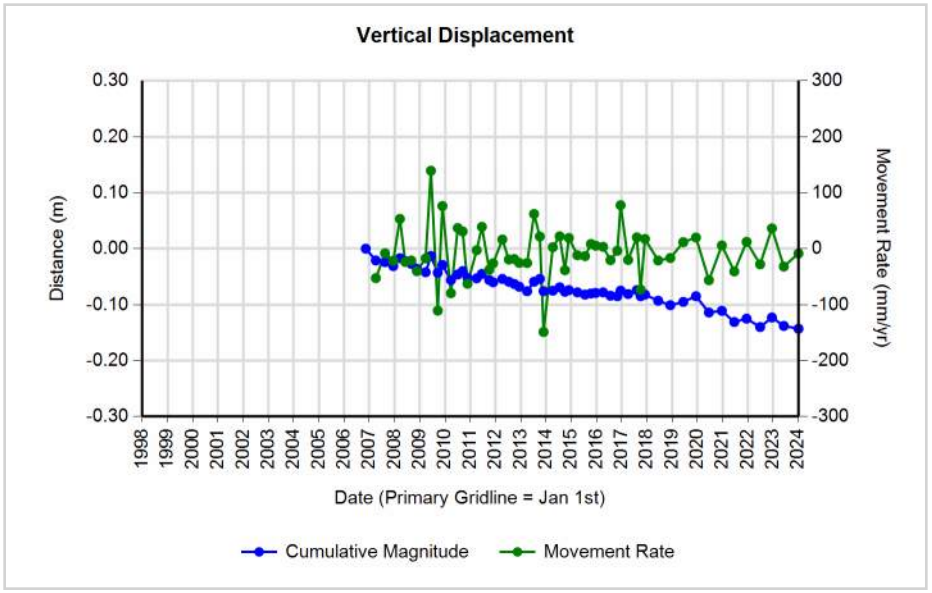
GPS Hub 06-14 (Southwest Corner of Pinchbeck Street and Pentland Crescent)

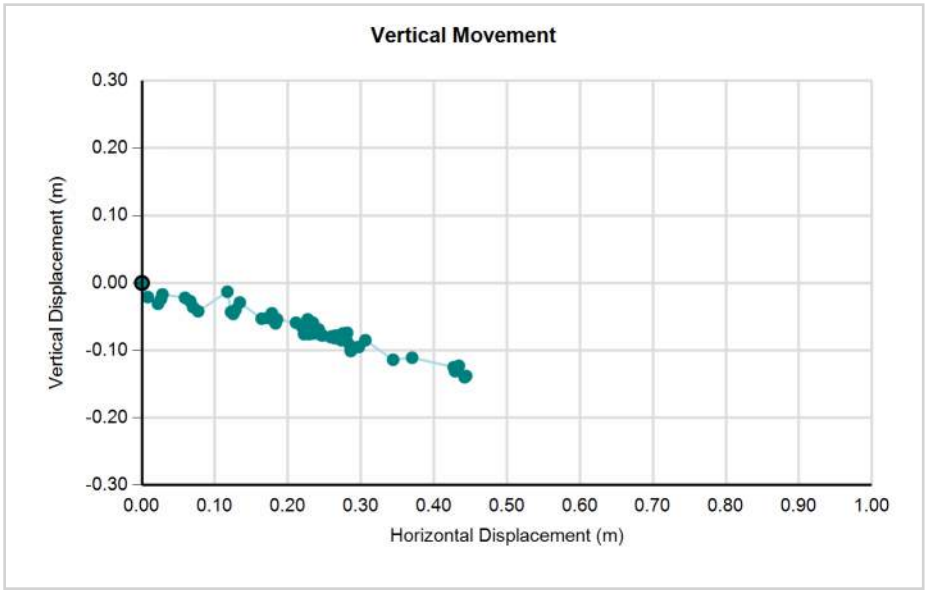
22/12/2015	5870071.212	532147.766	527.071	9.11	-0.039	0.259	0.262	-0.079	98.6	-16.8	0.029	-0.009	0.19	0.009	0.005	0.010	0.001	29.1	5.5	54.500	5.293
06/04/2016	5870071.198	532147.768	527.072	9.40	-0.053	0.261	0.266	-0.078	101.5	-16.3	0.028	-0.008	0.29	-0.014	0.002	0.014	0.001	171.9	4.0	48.730	3.446
22/07/2016	5870071.202	532147.768	527.066	9.70	-0.049	0.261	0.266	-0.084	100.6	-17.6	0.027	-0.009	0.29	0.004	0.000	0.004	-0.006	0.0	-56.3	-13.654	-20.481
30/10/2016	5870071.202	532147.776	527.065	9.97	-0.049	0.269	0.273	-0.085	100.3	-17.3	0.027	-0.009	0.27	0.000	0.008	0.008	-0.001	90.0	-7.1	29.220	-3.652
16/12/2016	5870071.207	532147.778	527.075	10.10	-0.044	0.271	0.275	-0.075	99.2	-15.3	0.027	-0.007	0.13	0.005	0.002	0.005	0.010	21.8	61.7	41.850	77.713
04/04/2017	5870071.199	532147.778	527.069	10.40	-0.052	0.271	0.276	-0.081	100.9	-16.4	0.027	-0.008	0.30	-0.008	0.000	0.008	-0.006	180.0	-36.9	26.807	-20.106
08/08/2017	5870071.200	532147.783	527.076	10.74	-0.051	0.276	0.281	-0.074	100.5	-14.8	0.026	-0.007	0.34	0.001	0.005	0.005	0.007	78.7	53.9	14.781	20.292
02/10/2017	5870071.203	532147.783	527.065	10.89	-0.048	0.276	0.280	-0.085	99.9	-16.9	0.026	-0.008	0.15	0.003	0.000	0.003	-0.011	0.0	-74.7	-19.923	-73.050
04/12/2017	5870071.204	532147.782	527.068	11.07	-0.047	0.275	0.279	-0.082	99.7	-16.4	0.025	-0.007	0.17	0.001	-0.001	0.001	0.003	315.0	64.8	-8.199	17.393
13/06/2018	5870071.206	532147.788	527.057	11.59	-0.045	0.281	0.285	-0.093	99.1	-18.1	0.025	-0.008	0.52	0.002	0.006	0.006	-0.011	71.6	-60.1	12.094	-21.035
06/12/2018	5870071.209	532147.790	527.049	12.07	-0.042	0.283	0.286	-0.101	98.4	-19.4	0.024	-0.008	0.48	0.003	0.002	0.004	-0.008	33.7	-65.7	7.483	-16.602
12/06/2019	5870071.207	532147.801	527.055	12.59	-0.044	0.294	0.297	-0.095	98.5	-17.7	0.024	-0.008	0.51	-0.002	0.011	0.011	0.006	100.3	28.2	21.721	11.657
12/12/2019	5870071.205	532147.810	527.065	13.09	-0.046	0.303	0.306	-0.085	98.6	-15.5	0.023	-0.006	0.50	-0.002	0.009	0.009	0.010	102.5	47.3	18.401	19.959
17/06/2020	5870071.207	532147.848	527.036	13.60	-0.044	0.341	0.344	-0.114	97.4	-18.3	0.025	-0.008	0.51	0.002	0.038	0.038	-0.029	87.0	-37.3	73.929	-56.342
21/12/2020	5870071.210	532147.875	527.039	14.11	-0.041	0.368	0.370	-0.111	96.4	-16.7	0.026	-0.008	0.51	0.003	0.027	0.027	0.003	83.7	6.3	53.061	5.860
19/06/2021	5870071.208	532147.934	527.019	14.61	-0.043	0.427	0.429	-0.131	95.8	-17.0	0.029	-0.009	0.49	-0.002	0.059	0.059	-0.020	91.9	-18.7	119.790	-40.583
14/12/2021	5870071.205	532147.932	527.025	15.09	-0.046	0.425	0.427	-0.125	96.2	-16.3	0.028	-0.008	0.49	-0.003	-0.002	0.004	0.006	213.7	59.0	-7.398	12.312
28/06/2022	5870071.210	532147.947	527.010	15.63	-0.041	0.440	0.442	-0.140	95.3	-17.6	0.028	-0.009	0.54	0.005	0.015	0.016	-0.015	71.6	-43.5	29.465	-27.953
16/12/2022	5870071.219	532147.940	527.027	16.10	-0.032	0.433	0.434	-0.123	94.2	-15.8	0.027	-0.008	0.47	0.009	-0.007	0.011	0.017	322.1	56.2	-24.354	36.311
06/06/2023	5870071.208	532147.949	527.012	16.57	-0.043	0.442	0.444	-0.138	95.6	-17.3	0.027	-0.008	0.47	-0.011	0.009	0.014	-0.015	140.7	-46.6	30.181	-31.874
04/01/2024	5870071.211	532147.949	527.007	17.15	-0.040	0.442	0.444	-0.143	95.2	-17.9	0.026	-0.008	0.58	0.003	0.000	0.003	-0.005	0.0	-59.0	-5.169	-8.597

GPS Hub 06-14 (Southwest Corner of Pinchbeck Street and Pentland Crescent)









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GPS Hub 06-15 (North End of Panagrot Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870278.754	531364.331	568.367	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5870278.760	531364.335	568.348	0.40	0.006	0.004	0.007	-0.019	33.7	-69.2	0.018	-0.048	0.40	0.006	0.004	0.007	-0.019	33.7	-69.2	18.040	-47.533
16/08/2007	5870278.759	531364.344	568.349	0.76	0.005	0.013	0.014	-0.018	69.0	-52.3	0.018	-0.024	0.36	-0.001	0.009	0.009	0.001	96.3	6.3	24.868	2.746
13/12/2007	5870278.770	531364.348	568.332	1.09	0.016	0.017	0.023	-0.035	46.7	-56.3	0.021	-0.032	0.33	0.011	0.004	0.012	-0.017	20.0	-55.5	35.926	-52.179
18/03/2008	5870278.762	531364.347	568.342	1.35	0.008	0.016	0.018	-0.025	63.4	-54.4	0.013	-0.018	0.26	-0.008	-0.001	0.008	0.010	187.1	51.1	-30.674	38.047
03/06/2008	5870278.768	531364.370	568.351	1.56	0.014	0.039	0.041	-0.016	70.3	-21.1	0.027	-0.010	0.21	0.006	0.023	0.024	0.009	75.4	20.7	112.752	42.692
29/08/2008	5870278.772	531364.367	568.333	1.80	0.018	0.036	0.040	-0.034	63.4	-40.2	0.022	-0.019	0.24	0.004	-0.003	0.005	-0.018	323.1	-74.5	-20.991	-75.569
19/11/2008	5870278.775	531364.376	568.337	2.03	0.021	0.045	0.050	-0.030	65.0	-31.1	0.025	-0.015	0.22	0.003	0.009	0.009	0.004	71.6	22.9	42.257	17.817
26/03/2009	5870278.779	531364.381	568.335	2.37	0.025	0.050	0.056	-0.032	63.4	-29.8	0.024	-0.013	0.35	0.004	0.005	0.006	-0.002	51.3	-17.3	18.415	-5.752
10/06/2009	5870278.775	531364.406	568.342	2.58	0.021	0.075	0.078	-0.025	74.4	-17.8	0.030	-0.010	0.21	-0.004	0.025	0.025	0.007	99.1	15.5	121.676	33.641
17/09/2009	5870278.775	531364.412	568.319	2.85	0.021	0.081	0.084	-0.048	75.5	-29.8	0.029	-0.017	0.27	0.000	0.006	0.006	-0.023	90.0	-75.4	22.136	-84.856
23/11/2009	5870278.794	531364.410	568.310	3.04	0.040	0.079	0.089	-0.057	63.1	-32.8	0.029	-0.019	0.18	0.019	-0.002	0.019	-0.009	354.0	-25.2	104.151	-49.063
27/03/2010	5870278.795	531364.412	568.323	3.38	0.041	0.081	0.091	-0.044	63.2	-25.9	0.027	-0.013	0.34	0.001	0.002	0.002	0.013	63.4	80.2	6.586	38.292
04/07/2010	5870278.790	531364.415	568.335	3.65	0.036	0.084	0.091	-0.032	66.8	-19.3	0.025	-0.009	0.27	-0.005	0.003	0.006	0.012	149.0	64.1	21.513	44.273
13/09/2010	5870278.780	531364.410	568.335	3.84	0.026	0.079	0.083	-0.032	71.8	-21.0	0.022	-0.008	0.19	-0.010	-0.005	0.011	0.000	206.6	0.0	-57.516	0.000
22/11/2010	5870278.788	531364.414	568.306	4.03	0.034	0.083	0.090	-0.061	67.7	-34.2	0.022	-0.015	0.19	0.008	0.004	0.009	-0.029	26.6	-72.9	46.670	-151.318
04/04/2011	5870278.791	531364.411	568.315	4.40	0.037	0.080	0.088	-0.052	65.2	-30.5	0.020	-0.012	0.36	0.003	-0.003	0.004	0.009	315.0	64.8	-11.651	24.716
18/06/2011	5870278.782	531364.420	568.315	4.60	0.028	0.089	0.093	-0.052	72.5	-29.1	0.020	-0.011	0.21	-0.009	0.009	0.013	0.000	135.0	0.0	61.985	0.000
03/10/2011	5870278.779	531364.415	568.313	4.90	0.025	0.084	0.088	-0.054	73.4	-31.6	0.018	-0.011	0.29	-0.003	-0.005	0.006	-0.002	239.0	-18.9	-19.904	-6.827
28/11/2011	5870278.795	531364.422	568.311	5.05	0.041	0.091	0.100	-0.056	65.7	-29.3	0.020	-0.011	0.15	0.016	0.007	0.017	-0.002	23.6	-6.5	113.907	-13.045
09/04/2012	5870278.787	531364.423	568.313	5.41	0.033	0.092	0.098	-0.054	70.3	-28.9	0.018	-0.010	0.36	-0.008	0.001	0.008	0.002	172.9	13.9	-22.141	5.492
12/07/2012	5870278.794	531364.437	568.314	5.67	0.040	0.106	0.113	-0.053	69.3	-25.1	0.020	-0.009	0.26	0.007	0.014	0.016	0.001	63.4	3.7	60.820	3.886
29/09/2012	5870278.797	531364.442	568.306	5.89	0.043	0.111	0.119	-0.061	68.8	-27.1	0.020	-0.010	0.22	0.003	0.005	0.006	-0.008	59.0	-53.9	26.959	-36.987
10/12/2012	5870278.796	531364.441	568.294	6.08	0.042	0.110	0.118	-0.073	69.1	-31.8	0.019	-0.012	0.20	-0.001	-0.001	0.001	-0.012	225.0	-83.3	-7.174	-60.875
03/04/2013	5870278.799	531364.447	568.288	6.40	0.045	0.116	0.124	-0.079	68.8	-32.4	0.019	-0.012	0.31	0.003	0.006	0.007	-0.006	63.4	-41.8	21.493	-19.224
12/07/2013	5870278.794	531364.453	568.294	6.67	0.040	0.122	0.128	-0.073	71.8	-29.6	0.019	-0.011	0.27	-0.005	0.006	0.008	0.006	129.8	37.5	28.527	21.915
04/10/2013	5870278.796	531364.444	568.312	6.90	0.042	0.113	0.121	-0.055	69.6	-24.5	0.017	-0.008	0.23	0.002	-0.009	0.009	0.018	282.5	62.9	-40.089	78.268
27/11/2013	5870278.806	531364.450	568.291	7.05	0.052	0.119	0.130	-0.076	66.4	-30.3	0.018	-0.011	0.15	0.010	0.006	0.012	-0.021	31.0	-61.0	78.880	-142.042
10/04/2014	5870278.808	531364.456	568.301	7.41	0.054	0.125	0.136	-0.066	66.6	-25.9	0.018	-0.009	0.37	0.002	0.006	0.006	0.010	71.6	57.7	17.239	27.257
18/07/2014	5870278.794	531364.452	568.295	7.69	0.040	0.121	0.127	-0.072	71.7	-29.5	0.017	-0.009	0.27	-0.014	-0.004	0.015	-0.006	195.9	-22.4	-53.718	-22.136
02/10/2014	5870278.798	531364.462	568.288	7.89	0.044	0.131	0.138	-0.079	71.4	-29.8	0.018	-0.010	0.21	0.004	0.010	0.011	-0.007	68.2	-33.0	51.761	-33.641
28/11/2014	5870278.810	531364.459	568.285	8.05	0.056	0.128	0.140	-0.082	66.4	-30.4	0.017	-0.010	0.16	0.012	-0.003	0.012	-0.003	346.0	-13.6	79.261	-19.224
01/04/2015	5870278.806	531364.465	568.284	8.39	0.052	0.134	0.144	-0.083	68.8	-30.0	0.017	-0.010	0.34	-0.004	0.006	0.007	-0.001	123.7	-7.9	21.241	-2.946
20/07/2015	5870278.805	531364.475	568.301	8.69	0.051	0.144	0.153	-0.066	70.5	-23.4	0.018	-0.008	0.30	-0.001	0.010	0.010	0.017	95.7	59.4	33.370	56.448
14/10/2015	5870278.804	531364.467	568.278	8.93	0.050	0.136	0.145	-0.089	69.8	-31.6	0.016	-0.010	0.24	-0.001	-0.008	0.008	-0.023	262.9	-70.7	-34.241	-97.683

CITY OF Quesnel

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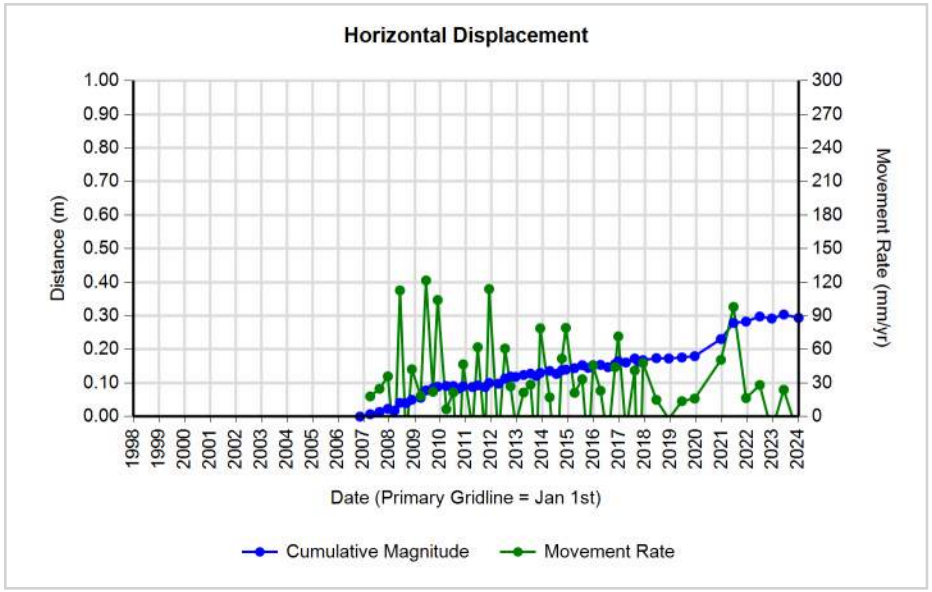
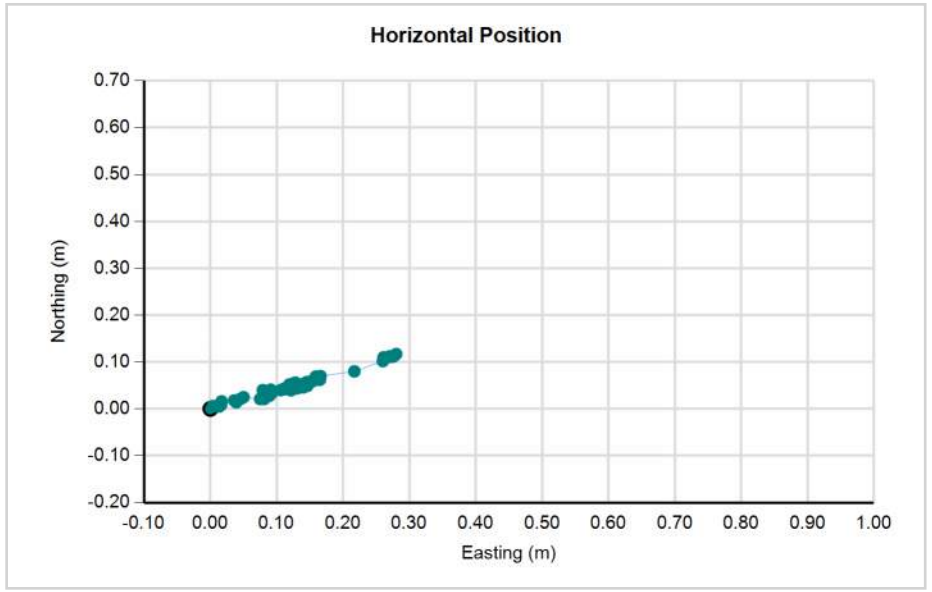
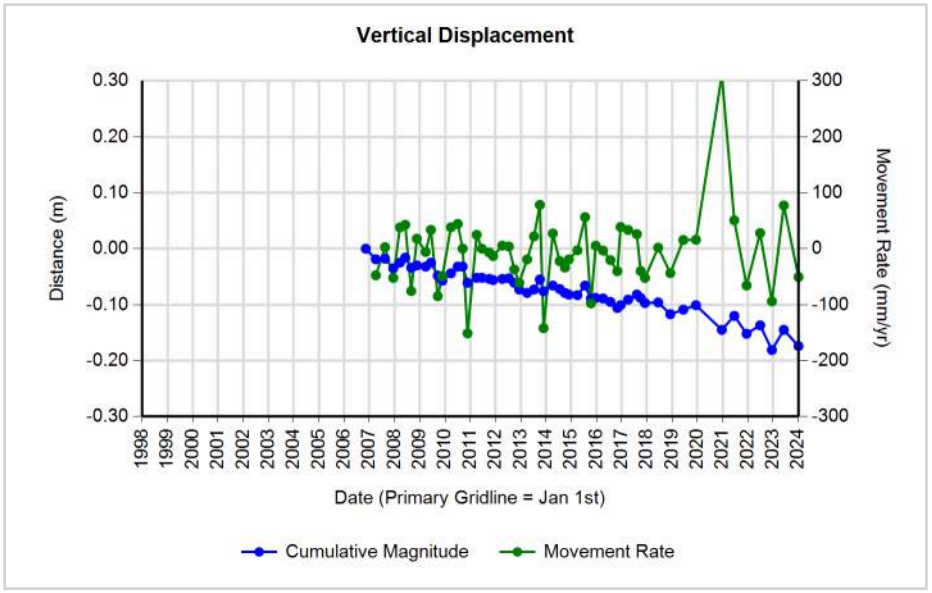
GPS Hub 06-15 (North End of Panagrot Avenue)

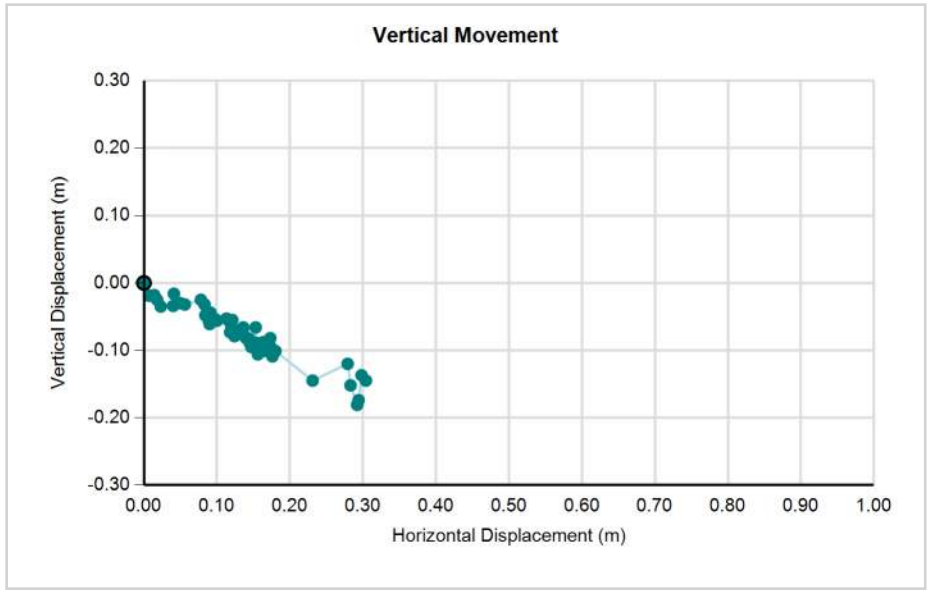
22/12/2015	5870278.809	531364.474	568.279	9.11	0.055	0.143	0.153	-0.088	69.0	-29.9	0.017	-0.010	0.19	0.005	0.007	0.009	0.001	54.5	6.6	45.536	5.293
06/04/2016	5870278.803	531364.477	568.278	9.40	0.049	0.146	0.154	-0.089	71.4	-30.0	0.016	-0.009	0.29	-0.006	0.003	0.007	-0.001	153.4	-8.5	23.115	-3.446
22/07/2016	5870278.800	531364.471	568.272	9.70	0.046	0.140	0.147	-0.095	71.8	-32.8	0.015	-0.010	0.29	-0.003	-0.006	0.007	-0.006	243.4	-41.8	-22.899	-20.481
30/10/2016	5870278.811	531364.476	568.261	9.97	0.057	0.145	0.156	-0.106	68.5	-34.2	0.016	-0.011	0.27	0.011	0.005	0.012	-0.011	24.4	-42.3	44.133	-40.178
16/12/2016	5870278.813	531364.485	568.266	10.10	0.059	0.154	0.165	-0.101	69.0	-31.5	0.016	-0.010	0.13	0.002	0.009	0.009	0.005	77.5	28.5	71.648	38.856
04/04/2017	5870278.812	531364.481	568.276	10.40	0.058	0.150	0.161	-0.091	68.9	-29.5	0.015	-0.009	0.30	-0.001	-0.004	0.004	0.010	256.0	67.6	-13.816	33.509
08/08/2017	5870278.823	531364.490	568.285	10.74	0.069	0.159	0.173	-0.082	66.5	-25.3	0.016	-0.008	0.34	0.011	0.009	0.014	0.009	39.3	32.3	41.200	26.089
02/10/2017	5870278.807	531364.485	568.279	10.89	0.053	0.154	0.163	-0.088	71.0	-28.4	0.015	-0.008	0.15	-0.016	-0.005	0.017	-0.006	197.4	-19.7	-111.322	-39.845
04/12/2017	5870278.815	531364.487	568.270	11.07	0.061	0.156	0.168	-0.097	68.6	-30.1	0.015	-0.009	0.17	0.008	0.002	0.008	-0.009	14.0	-47.5	47.808	-52.179
13/06/2018	5870278.821	531364.492	568.271	11.59	0.067	0.161	0.174	-0.096	67.4	-28.8	0.015	-0.008	0.52	0.006	0.005	0.008	0.001	39.8	7.3	14.936	1.912
06/12/2018	5870278.821	531364.491	568.250	12.07	0.067	0.160	0.173	-0.117	67.3	-34.0	0.014	-0.010	0.48	0.000	-0.001	0.001	-0.021	270.0	-87.3	-2.075	-43.581
12/06/2019	5870278.816	531364.496	568.258	12.59	0.062	0.165	0.176	-0.109	69.4	-31.7	0.014	-0.009	0.51	-0.005	0.005	0.007	0.008	135.0	48.5	13.738	15.543
12/12/2019	5870278.824	531364.497	568.266	13.09	0.070	0.166	0.180	-0.101	67.1	-29.3	0.014	-0.008	0.50	0.008	0.001	0.008	0.008	7.1	44.8	16.091	15.967
21/12/2020	5870278.834	531364.548	568.222	14.11	0.080	0.217	0.231	-0.145	69.8	-32.1	0.016	-0.010	0.51	0.007	0.025	0.026	0.159	74.4	80.7	50.708	310.560
19/06/2021	5870278.856	531364.591	568.247	14.61	0.102	0.260	0.279	-0.120	68.6	-23.3	0.019	-0.008	0.49	0.022	0.043	0.048	0.025	62.9	27.4	98.011	50.729
14/12/2021	5870278.864	531364.592	568.215	15.09	0.110	0.261	0.283	-0.152	67.1	-28.2	0.019	-0.010	0.49	0.008	0.001	0.008	-0.032	7.1	-75.9	16.543	-65.663
28/06/2022	5870278.866	531364.607	568.230	15.63	0.112	0.276	0.298	-0.137	67.9	-24.7	0.019	-0.009	0.54	0.002	0.015	0.015	0.015	82.4	44.7	28.200	27.953
16/12/2022	5870278.866	531364.601	568.186	16.10	0.112	0.270	0.292	-0.181	67.5	-31.8	0.018	-0.011	0.47	0.000	-0.006	0.006	-0.044	270.0	-82.2	-12.816	-93.982
06/06/2023	5870278.871	531364.611	568.222	16.57	0.117	0.280	0.304	-0.145	67.3	-25.5	0.018	-0.009	0.47	0.005	0.010	0.011	0.036	63.7	72.8	23.932	77.233
04/01/2024	5870278.865	531364.603	568.193	17.15	0.111	0.272	0.294	-0.174	67.8	-30.6	0.017	-0.010	0.58	-0.006	-0.008	0.010	-0.029	233.5	-71.1	-17.367	-50.601

GPS Hub 06-15 (North End of Panagrot Avenue)









CITY OF Quesnel

GPS Hub 06-16 (North of Panagrot Avenue)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870345.023	531228.061	572.222	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5870345.025	531228.062	572.189	0.40	0.002	0.001	0.002	-0.033	26.6	-86.1	0.006	-0.083	0.40	0.002	0.001	0.002	-0.033	26.6	-86.1	5.594	-82.557
16/08/2007	5870345.004	531228.064	572.185	0.76	-0.019	0.003	0.019	-0.037	171.0	-62.5	0.025	-0.048	0.36	-0.021	0.002	0.021	-0.004	174.6	-10.7	57.932	-10.985
13/12/2007	5870345.025	531228.065	572.159	1.09	0.002	0.004	0.004	-0.063	63.4	-85.9	0.004	-0.058	0.33	0.021	0.001	0.021	-0.026	2.7	-51.0	-64.529	-79.803
18/03/2008	5870345.026	531228.062	572.170	1.35	0.003	0.001	0.003	-0.052	18.4	-86.5	0.002	-0.038	0.26	0.001	-0.003	0.003	0.011	288.4	74.0	-12.031	41.852
03/06/2008	5870345.032	531228.065	572.193	1.56	0.009	0.004	0.010	-0.029	24.0	-71.2	0.006	-0.019	0.21	0.006	0.003	0.007	0.023	26.6	73.7	31.820	109.101
29/08/2008	5870345.001	531228.065	572.198	1.80	-0.022	0.004	0.022	-0.024	169.7	-47.0	0.012	-0.013	0.24	-0.031	0.000	0.031	0.005	180.0	9.2	130.147	20.991
19/11/2008	5870345.032	531228.060	572.174	2.03	0.009	-0.001	0.009	-0.048	353.7	-79.3	0.004	-0.024	0.22	0.031	-0.005	0.031	-0.024	350.8	-37.4	-139.867	-106.902
26/03/2009	5870345.031	531228.065	572.172	2.37	0.008	0.004	0.009	-0.050	26.6	-79.9	0.004	-0.021	0.35	-0.001	0.005	0.005	-0.002	101.3	-21.4	-14.665	-5.752
10/06/2009	5870345.014	531228.070	572.216	2.58	-0.009	0.009	0.013	-0.006	135.0	-25.2	0.005	-0.002	0.21	-0.017	0.005	0.018	0.044	163.6	68.1	85.161	211.461
17/09/2009	5870345.028	531228.063	572.215	2.85	0.005	0.002	0.005	-0.007	21.8	-52.4	0.002	-0.002	0.27	0.014	-0.007	0.016	-0.001	333.4	-3.7	-57.748	-3.689
23/11/2009	5870345.039	531228.067	572.174	3.04	0.016	0.006	0.017	-0.048	20.6	-70.4	0.006	-0.016	0.18	0.011	0.004	0.012	-0.041	20.0	-74.1	63.808	-223.511
27/03/2010	5870345.043	531228.067	572.185	3.38	0.020	0.006	0.021	-0.037	16.7	-60.6	0.006	-0.011	0.34	0.004	0.000	0.004	0.011	0.0	70.0	11.782	32.401
04/07/2010	5870345.029	531228.065	572.201	3.65	0.006	0.004	0.007	-0.021	33.7	-71.0	0.002	-0.006	0.27	-0.014	-0.002	0.014	0.016	188.1	48.5	-52.176	59.030
13/09/2010	5870345.031	531228.070	572.196	3.84	0.008	0.009	0.012	-0.026	48.4	-65.1	0.003	-0.007	0.19	0.002	0.005	0.005	-0.005	68.2	-42.9	27.703	-25.722
22/11/2010	5870345.038	531228.069	572.177	4.03	0.015	0.008	0.017	-0.045	28.1	-69.3	0.004	-0.011	0.19	0.007	-0.001	0.007	-0.019	351.9	-69.6	36.896	-99.139
04/04/2011	5870345.030	531228.065	572.173	4.40	0.007	0.004	0.008	-0.049	29.7	-80.7	0.002	-0.011	0.36	-0.008	-0.004	0.009	-0.004	206.6	-24.1	-24.563	-10.985
18/06/2011	5870345.022	531228.065	572.198	4.60	-0.001	0.004	0.004	-0.024	104.0	-80.3	0.001	-0.005	0.21	-0.008	0.000	0.008	0.025	180.0	72.3	-38.960	121.750
03/10/2011	5870345.026	531228.059	572.182	4.90	0.003	-0.002	0.004	-0.040	326.3	-84.8	0.001	-0.008	0.29	0.004	-0.006	0.007	-0.016	303.7	-65.7	-24.615	-54.617
28/11/2011	5870345.043	531228.069	572.182	5.05	0.020	0.008	0.022	-0.040	21.8	-61.7	0.004	-0.008	0.15	0.017	0.010	0.020	0.000	30.5	0.0	128.640	0.000
09/04/2012	5870345.028	531228.063	572.185	5.41	0.005	0.002	0.005	-0.037	21.8	-81.7	0.001	-0.007	0.36	-0.015	-0.006	0.016	0.003	201.8	10.5	-44.367	8.239
12/07/2012	5870345.032	531228.072	572.196	5.67	0.009	0.011	0.014	-0.026	50.7	-61.3	0.003	-0.005	0.26	0.004	0.009	0.010	0.011	66.0	48.2	38.269	42.742
29/09/2012	5870345.036	531228.071	572.206	5.89	0.013	0.010	0.016	-0.016	37.6	-44.3	0.003	-0.003	0.22	0.004	-0.001	0.004	0.010	346.0	67.6	19.063	46.234
10/12/2012	5870345.042	531228.065	572.182	6.08	0.019	0.004	0.019	-0.040	11.9	-64.1	0.003	-0.007	0.20	0.006	-0.006	0.008	-0.024	315.0	-70.5	43.045	-121.750
03/04/2013	5870345.033	531228.066	572.176	6.40	0.010	0.005	0.011	-0.046	26.6	-76.3	0.002	-0.007	0.31	-0.009	0.001	0.009	-0.006	173.7	-33.5	-29.013	-19.224
12/07/2013	5870345.039	531228.072	572.195	6.67	0.016	0.011	0.019	-0.027	34.5	-54.3	0.003	-0.004	0.27	0.006	0.006	0.008	0.019	45.0	65.9	30.992	69.398
04/10/2013	5870345.033	531228.063	572.202	6.90	0.010	0.002	0.010	-0.020	11.3	-63.0	0.001	-0.003	0.23	-0.006	-0.009	0.011	0.007	236.3	32.9	-47.033	30.437
27/11/2013	5870345.037	531228.066	572.184	7.05	0.014	0.005	0.015	-0.038	19.7	-68.6	0.002	-0.005	0.15	0.004	0.003	0.005	-0.018	36.9	-74.5	33.819	-121.750
10/04/2014	5870345.036	531228.068	572.165	7.41	0.013	0.007	0.015	-0.057	28.3	-75.5	0.002	-0.008	0.37	-0.001	0.002	0.002	-0.019	116.6	-83.3	-6.095	-51.789
18/07/2014	5870345.019	531228.058	572.204	7.69	-0.004	-0.003	0.005	-0.018	216.9	-74.5	0.001	-0.002	0.27	-0.017	-0.010	0.020	0.039	210.5	63.2	-72.766	143.886
02/10/2014	5870345.003	531228.081	572.189	7.89	-0.020	0.020	0.028	-0.033	135.0	-49.4	0.004	-0.004	0.21	-0.016	0.023	0.028	-0.015	124.8	-28.2	134.652	-72.089
28/11/2014	5870345.033	531228.071	572.196	8.05	0.010	0.010	0.014	-0.026	45.0	-61.5	0.002	-0.003	0.16	0.030	-0.010	0.032	0.007	341.6	12.5	-202.635	44.855
01/04/2015	5870345.038	531228.066	572.175	8.39	0.015	0.005	0.016	-0.047	18.4	-71.4	0.002	-0.006	0.34	0.005	-0.005	0.007	-0.021	315.0	-71.4	20.828	-61.857
20/07/2015	5870345.041	531228.072	572.196	8.69	0.018	0.011	0.021	-0.026	31.4	-50.9	0.002	-0.003	0.30	0.003	0.006	0.007	0.021	63.4	72.3	22.274	69.730
14/10/2015	5870345.037	531228.064	572.187	8.93	0.014	0.003	0.014	-0.035	12.1	-67.8	0.002	-0.004	0.24	-0.004	-0.008	0.009	-0.009	243.4	-45.2	-37.987	-38.224

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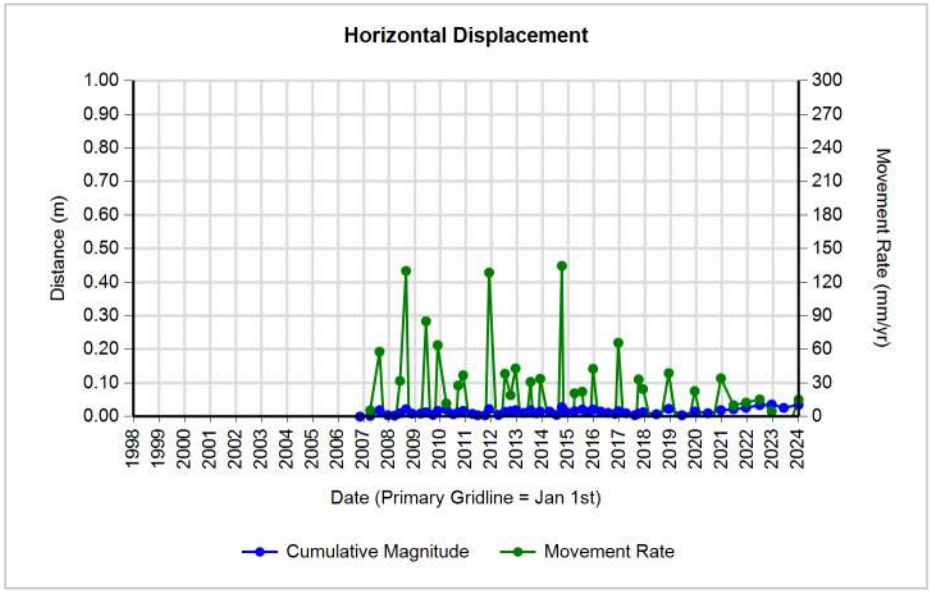
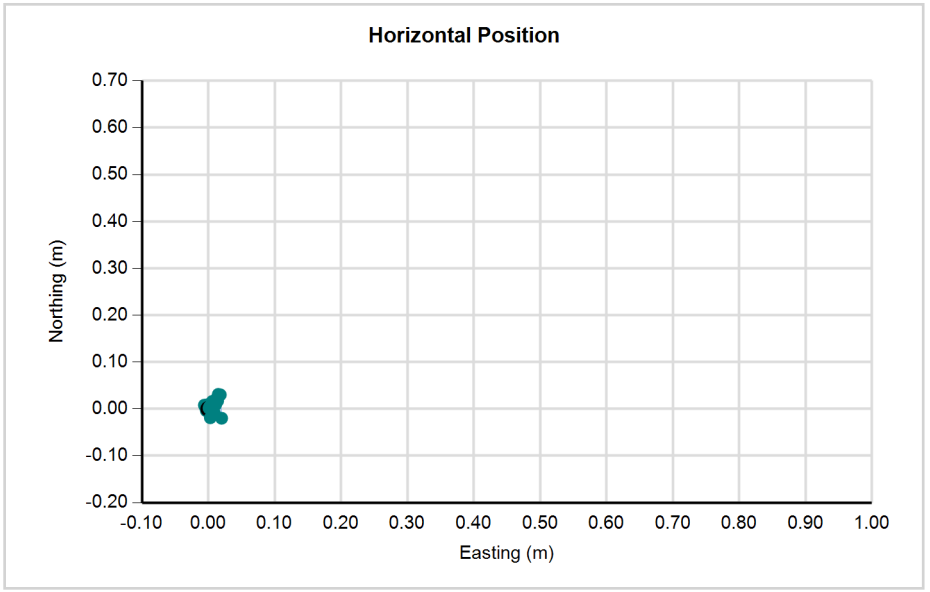
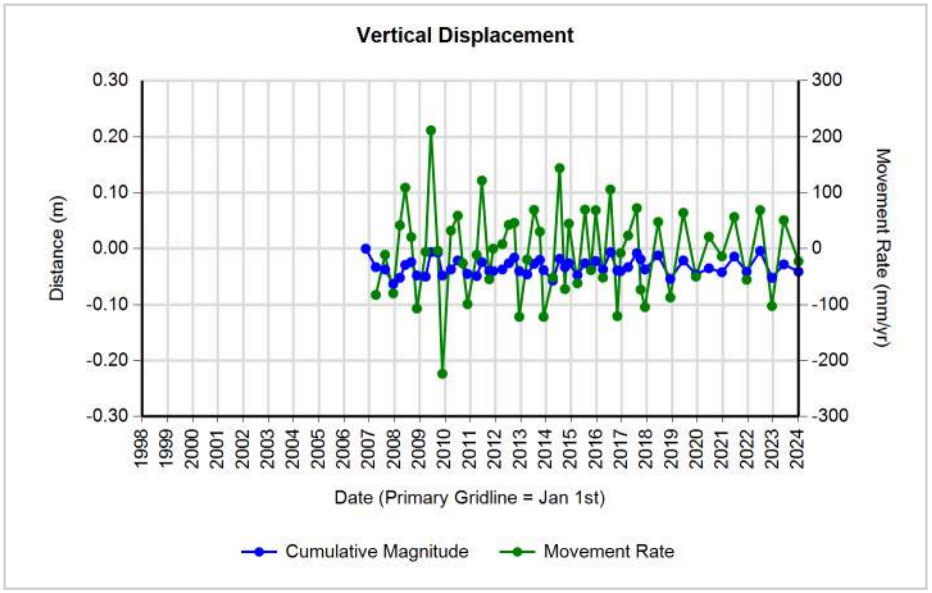
GPS Hub 06-16 (North of Panagrot Avenue)

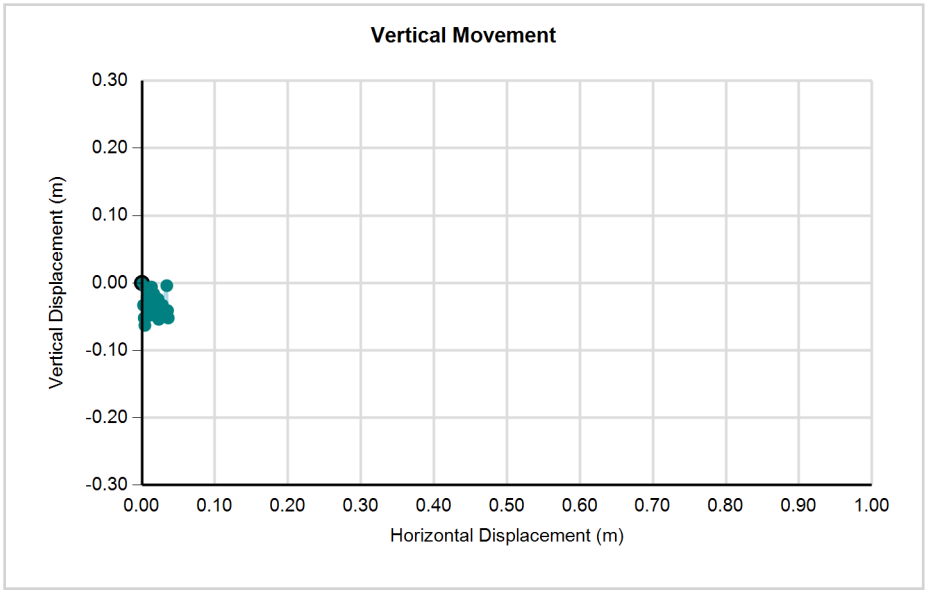
22/12/2015	5870345.041	531228.071	572.200	9.11	0.018	0.010	0.021	-0.022	29.1	-46.9	0.002	-0.002	0.19	0.004	0.007	0.008	0.013	60.3	58.2	42.677	68.815
06/04/2016	5870345.036	531228.068	572.185	9.40	0.013	0.007	0.015	-0.037	28.3	-68.2	0.002	-0.004	0.29	-0.005	-0.003	0.006	-0.015	211.0	-68.8	-20.092	-51.686
22/07/2016	5870345.034	531228.064	572.216	9.70	0.011	0.003	0.011	-0.006	15.3	-27.8	0.001	-0.001	0.29	-0.002	-0.004	0.004	0.031	243.4	81.8	-15.266	105.820
30/10/2016	5870345.031	531228.062	572.183	9.97	0.008	0.001	0.008	-0.039	7.1	-78.3	0.001	-0.004	0.27	-0.003	-0.002	0.004	-0.033	213.7	-83.8	-13.169	-120.533
16/12/2016	5870345.037	531228.068	572.182	10.10	0.014	0.007	0.016	-0.040	26.6	-68.6	0.002	-0.004	0.13	0.006	0.006	0.008	-0.001	45.0	-6.7	65.941	-7.771
04/04/2017	5870345.026	531228.071	572.189	10.40	0.003	0.010	0.010	-0.033	73.3	-72.4	0.001	-0.003	0.30	-0.011	0.003	0.011	0.007	164.7	31.5	-38.206	23.456
08/08/2017	5870345.027	531228.062	572.214	10.74	0.004	0.001	0.004	-0.008	14.0	-62.7	0.000	-0.001	0.34	0.001	-0.009	0.009	0.025	276.3	70.1	-26.250	72.470
02/10/2017	5870345.031	531228.065	572.203	10.89	0.008	0.004	0.009	-0.019	26.6	-64.8	0.001	-0.002	0.15	0.004	0.003	0.005	-0.011	36.9	-65.6	33.205	-73.050
04/12/2017	5870345.034	531228.068	572.185	11.07	0.011	0.007	0.013	-0.037	32.5	-70.6	0.001	-0.003	0.17	0.003	0.003	0.004	-0.018	45.0	-76.7	24.597	-104.357
13/06/2018	5870345.028	531228.056	572.210	11.59	0.005	-0.005	0.007	-0.012	315.0	-59.5	0.001	-0.001	0.52	-0.006	-0.012	0.013	0.025	243.4	61.8	-25.656	47.808
06/12/2018	5870345.046	531228.061	572.168	12.07	0.023	0.000	0.023	-0.054	0.0	-66.9	0.002	-0.004	0.48	0.018	0.005	0.019	-0.042	15.5	-66.0	38.770	-87.162
12/06/2019	5870345.027	531228.062	572.201	12.59	0.004	0.001	0.004	-0.021	14.0	-78.9	0.000	-0.002	0.51	-0.019	0.001	0.019	0.033	177.0	60.0	-36.965	64.113
12/12/2019	5870345.036	531228.069	572.176	13.09	0.013	0.008	0.015	-0.046	31.6	-71.6	0.001	-0.004	0.50	0.009	0.007	0.011	-0.025	37.9	-65.5	22.757	-49.898
17/06/2020	5870345.031	531228.055	572.187	13.60	0.008	-0.006	0.010	-0.035	323.1	-74.1	0.001	-0.003	0.51	-0.005	-0.014	0.015	0.011	250.3	36.5	-28.882	21.371
21/12/2020	5870345.040	531228.070	572.180	14.11	0.017	0.009	0.019	-0.042	27.9	-65.4	0.001	-0.003	0.51	0.009	0.015	0.017	-0.007	59.0	-21.8	34.167	-13.672
19/06/2021	5870345.040	531228.075	572.208	14.61	0.017	0.014	0.022	-0.014	39.5	-32.4	0.002	-0.001	0.49	0.000	0.005	0.005	0.028	90.0	79.9	10.146	56.817
14/12/2021	5870345.046	531228.074	572.181	15.09	0.023	0.013	0.026	-0.041	29.5	-57.2	0.002	-0.003	0.49	0.006	-0.001	0.006	-0.027	350.5	-77.3	12.482	-55.403
28/06/2022	5870345.054	531228.076	572.218	15.63	0.031	0.015	0.034	-0.004	25.8	-6.6	0.002	0.000	0.54	0.008	0.002	0.008	0.037	14.0	77.4	15.367	68.950
16/12/2022	5870345.056	531228.075	572.170	16.10	0.033	0.014	0.036	-0.052	23.0	-55.4	0.002	-0.003	0.47	0.002	-0.001	0.002	-0.048	333.4	-87.3	4.776	-102.526
06/06/2023	5870345.046	531228.074	572.194	16.57	0.023	0.013	0.026	-0.028	28.9	-46.8	0.002	-0.002	0.47	-0.010	-0.001	0.010	0.024	187.4	67.2	-21.414	51.008
04/01/2024	5870345.053	531228.079	572.181	17.15	0.030	0.018	0.035	-0.041	31.0	-49.5	0.002	-0.002	0.58	0.007	0.005	0.009	-0.013	37.1	-56.0	15.127	-22.432

GPS Hub 06-16 (North of Panagrot Avenue)





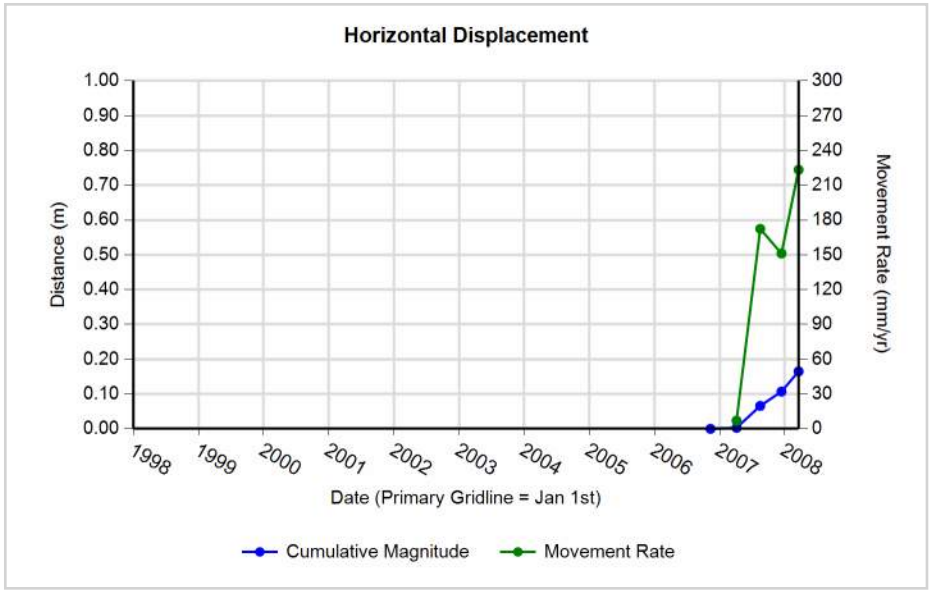


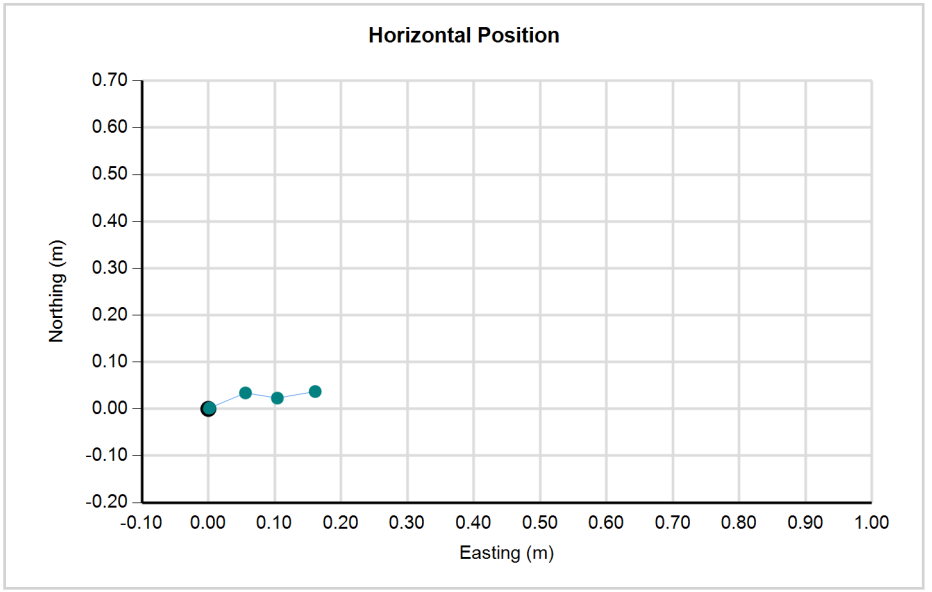


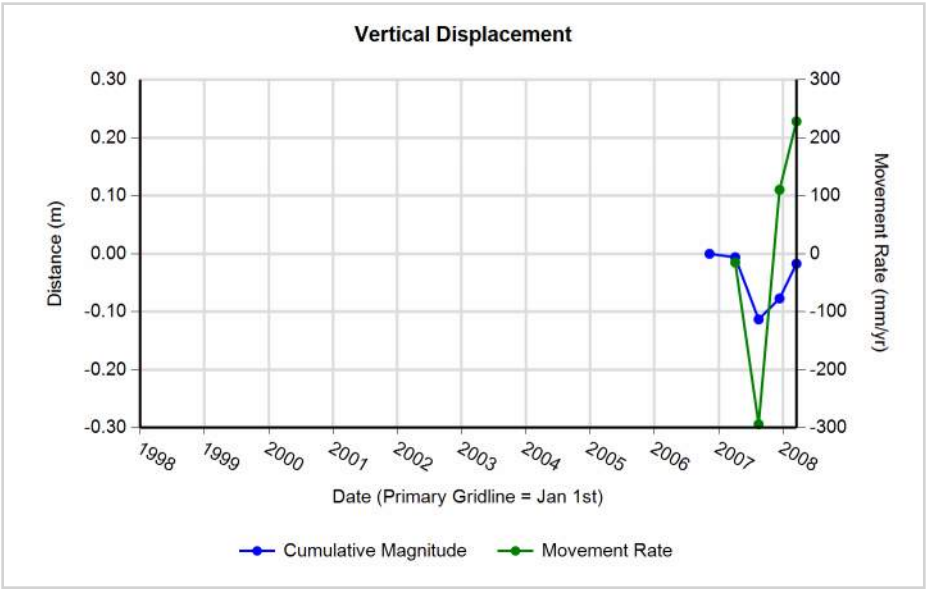
GPS Hub 06-17 (Northwest End of Findlay Road) replaced by 08-01

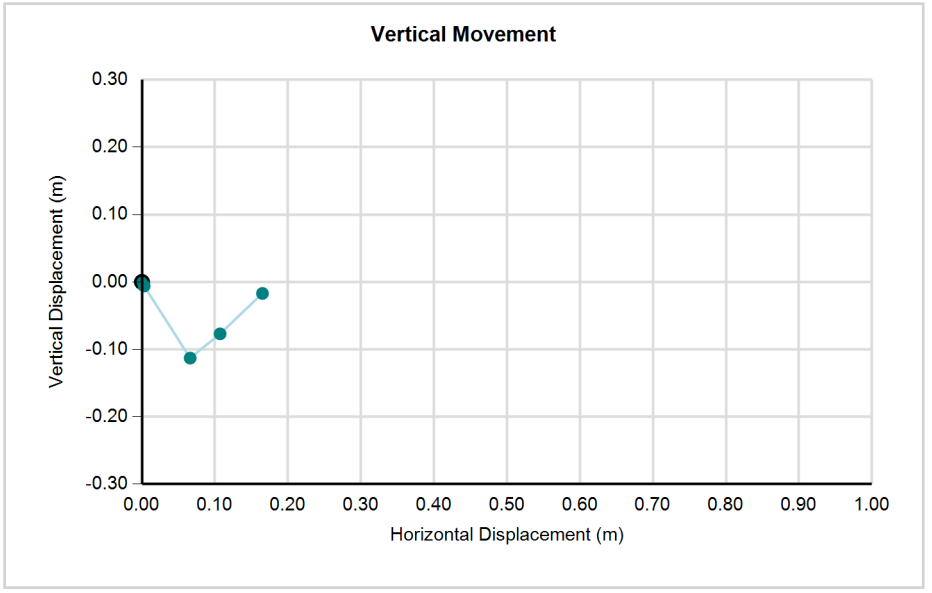
	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5870085.686	531136.829	595.126	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5870085.688	531136.831	595.120	0.40	0.002	0.002	0.003	-0.006	45.0	-64.8	0.007	-0.015	0.40	0.002	0.002	0.003	-0.006	45.0	-64.8	7.076	-15.010
16/08/2007	5870085.720	531136.885	595.013	0.76	0.034	0.056	0.066	-0.113	58.7	-59.9	0.086	-0.148	0.36	0.032	0.054	0.063	-0.107	59.3	-59.6	172.380	-293.848
13/12/2007	5870085.709	531136.933	595.049	1.09	0.023	0.104	0.107	-0.077	77.5	-35.9	0.098	-0.071	0.33	-0.011	0.048	0.049	0.036	102.9	36.2	151.147	110.496
18/03/2008	5870085.723	531136.990	595.109	1.35	0.037	0.161	0.165	-0.017	77.1	-5.9	0.122	-0.013	0.26	0.014	0.057	0.059	0.060	76.2	45.6	223.313	228.281

GPS Hub 06-17 (Northwest End of Findlay Road) replaced by 08-01









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GPS Hub 08-01 (Northwest End of Findaly Road)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
03/06/2008	5870076.380	531129.361	595.426	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
29/08/2008	5870076.376	531129.358	595.411	0.24	-0.004	-0.003	0.005	-0.015	216.9	-71.6	0.021	-0.063	0.24	-0.004	-0.003	0.005	-0.015	216.9	-71.6	20.991	-62.974
19/11/2008	5870076.377	531129.365	595.407	0.46	-0.003	0.004	0.005	-0.019	126.9	-75.3	0.011	-0.041	0.22	0.001	0.007	0.007	-0.004	81.9	-29.5	-31.496	-17.817
26/03/2009	5870076.375	531129.360	595.419	0.81	-0.005	-0.001	0.005	-0.007	191.3	-53.9	0.006	-0.009	0.35	-0.002	-0.005	0.005	0.012	248.2	65.8	15.488	34.512
10/06/2009	5870076.368	531129.374	595.425	1.02	-0.012	0.013	0.018	-0.001	132.7	-3.2	0.017	-0.001	0.21	-0.007	0.014	0.016	0.006	116.6	21.0	75.225	28.836
17/09/2009	5870076.368	531129.371	595.414	1.29	-0.012	0.010	0.016	-0.012	140.2	-37.5	0.012	-0.009	0.27	0.000	-0.003	0.003	-0.011	270.0	-74.7	-11.068	-40.583
23/11/2009	5870076.375	531129.365	595.409	1.47	-0.005	0.004	0.006	-0.017	141.3	-69.4	0.004	-0.012	0.18	0.007	-0.006	0.009	-0.005	319.4	-28.5	-50.260	-27.257
27/03/2010	5870076.378	531129.367	595.413	1.81	-0.002	0.006	0.006	-0.013	108.4	-64.1	0.003	-0.007	0.34	0.003	0.002	0.004	0.004	33.7	48.0	10.620	11.782
04/07/2010	5870076.362	531129.367	595.411	2.08	-0.018	0.006	0.019	-0.015	161.6	-38.3	0.009	-0.007	0.27	-0.016	0.000	0.016	-0.002	180.0	-7.1	59.030	-7.379
13/09/2010	5870076.375	531129.368	595.418	2.28	-0.005	0.007	0.009	-0.008	125.5	-42.9	0.004	-0.004	0.19	0.013	0.001	0.013	0.007	4.4	28.2	-67.074	36.011
22/11/2010	5870076.371	531129.371	595.402	2.47	-0.009	0.010	0.013	-0.024	132.0	-60.7	0.005	-0.010	0.19	-0.004	0.003	0.005	-0.016	143.1	-72.6	26.089	-83.486
04/04/2011	5870076.373	531129.363	595.409	2.83	-0.007	0.002	0.007	-0.017	164.1	-66.8	0.003	-0.006	0.36	0.002	-0.008	0.008	0.007	284.0	40.3	-22.646	19.224
18/06/2011	5870076.371	531129.374	595.419	3.04	-0.009	0.013	0.016	-0.007	124.7	-23.9	0.005	-0.002	0.21	-0.002	0.011	0.011	0.010	100.3	41.8	54.448	48.700
03/10/2011	5870076.370	531129.370	595.418	3.33	-0.010	0.009	0.013	-0.008	138.0	-30.7	0.004	-0.002	0.29	-0.001	-0.004	0.004	-0.001	256.0	-13.6	-14.074	-3.414
28/11/2011	5870076.378	531129.366	595.407	3.49	-0.002	0.005	0.005	-0.019	111.8	-74.2	0.002	-0.005	0.15	0.008	-0.004	0.009	-0.011	333.4	-50.9	-58.337	-71.746
12/07/2012	5870076.365	531129.368	595.422	4.11	-0.015	0.007	0.017	-0.004	155.0	-13.6	0.004	-0.001	0.62	-0.013	0.002	0.013	0.015	171.3	48.8	21.163	24.135
29/09/2012	5870076.371	531129.371	595.415	4.32	-0.009	0.010	0.013	-0.011	132.0	-39.3	0.003	-0.003	0.22	0.006	0.003	0.007	-0.007	26.6	-46.2	-31.015	-32.364
10/12/2012	5870076.372	531129.368	595.404	4.52	-0.008	0.007	0.011	-0.022	138.8	-64.2	0.002	-0.005	0.20	0.001	-0.003	0.003	-0.011	288.4	-74.0	-16.042	-55.802
03/04/2013	5870076.376	531129.366	595.392	4.83	-0.004	0.005	0.006	-0.034	128.7	-79.3	0.001	-0.007	0.31	0.004	-0.002	0.004	-0.012	333.4	-69.6	-14.328	-38.447
12/07/2013	5870076.369	531129.369	595.424	5.11	-0.011	0.008	0.014	-0.002	144.0	-8.4	0.003	0.000	0.27	-0.007	0.003	0.008	0.032	156.8	76.6	27.817	116.880
04/10/2013	5870076.366	531129.361	595.420	5.34	-0.014	0.000	0.014	-0.006	180.0	-23.2	0.003	-0.001	0.23	-0.003	-0.008	0.009	-0.004	249.4	-25.1	-37.151	-17.393
27/11/2013	5870076.371	531129.369	595.398	5.48	-0.009	0.008	0.012	-0.028	138.4	-66.7	0.002	-0.005	0.15	0.005	0.008	0.009	-0.022	58.0	-66.8	-63.810	-148.806
10/04/2014	5870076.375	531129.370	595.397	5.85	-0.005	0.009	0.010	-0.029	119.1	-70.5	0.002	-0.005	0.37	0.004	0.001	0.004	-0.001	14.0	-13.6	-11.239	-2.726
18/07/2014	5870076.365	531129.374	595.418	6.12	-0.015	0.013	0.020	-0.008	139.1	-22.0	0.003	-0.001	0.27	-0.010	0.004	0.011	0.021	158.2	62.8	39.736	77.477
02/10/2014	5870076.364	531129.365	595.402	6.33	-0.016	0.004	0.016	-0.024	166.0	-55.5	0.003	-0.004	0.21	-0.001	-0.009	0.009	-0.016	263.7	-60.5	-43.519	-76.895
28/11/2014	5870076.369	531129.370	595.392	6.49	-0.011	0.009	0.014	-0.034	140.7	-67.3	0.002	-0.005	0.16	0.005	0.005	0.007	-0.010	45.0	-54.7	-45.311	-64.079
01/04/2015	5870076.370	531129.372	595.396	6.83	-0.010	0.011	0.015	-0.030	132.3	-63.6	0.002	-0.004	0.34	0.001	0.002	0.002	0.004	63.4	60.8	6.586	11.782
20/07/2015	5870076.368	531129.376	595.420	7.13	-0.012	0.015	0.019	-0.006	128.7	-17.3	0.003	-0.001	0.30	-0.002	0.004	0.004	0.024	116.6	79.4	14.850	79.691
14/10/2015	5870076.373	531129.361	595.405	7.36	-0.007	0.000	0.007	-0.021	180.0	-71.6	0.001	-0.003	0.24	0.005	-0.015	0.016	-0.015	288.4	-43.5	-67.152	-63.706
22/12/2015	5870076.373	531129.370	595.413	7.55	-0.007	0.009	0.011	-0.013	127.9	-48.7	0.002	-0.002	0.19	0.000	0.009	0.009	0.008	90.0	41.6	47.641	42.348
06/04/2016	5870076.367	531129.367	595.400	7.84	-0.013	0.006	0.014	-0.026	155.2	-61.2	0.002	-0.003	0.29	-0.006	-0.003	0.007	-0.013	206.6	-62.7	23.115	-44.795
22/07/2016	5870076.360	531129.367	595.409	8.13	-0.020	0.006	0.021	-0.017	163.3	-39.2	0.003	-0.002	0.29	-0.007	0.000	0.007	0.009	180.0	52.1	23.895	30.722
30/10/2016	5870076.373	531129.370	595.403	8.41	-0.007	0.009	0.011	-0.023	127.9	-63.6	0.001	-0.003	0.27	0.013	0.003	0.013	-0.006	13.0	-24.2	-48.730	-21.915
16/12/2016	5870076.368	531129.367	595.394	8.54	-0.012	0.006	0.013	-0.032	153.4	-67.3	0.002	-0.004	0.13	-0.005	-0.003	0.006	-0.009	211.0	-57.1	45.314	-69.941
04/04/2017	5870076.366	531129.369	595.407	8.84	-0.014	0.008	0.016	-0.019	150.3	-49.7	0.002	-0.002	0.30	-0.002	0.002	0.003	0.013	135.0	77.7	9.478	43.562

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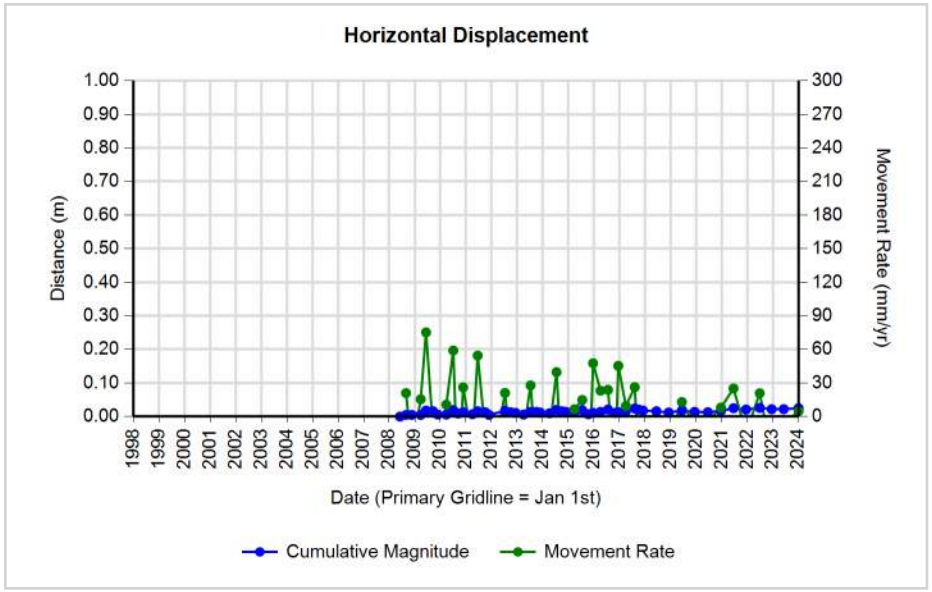
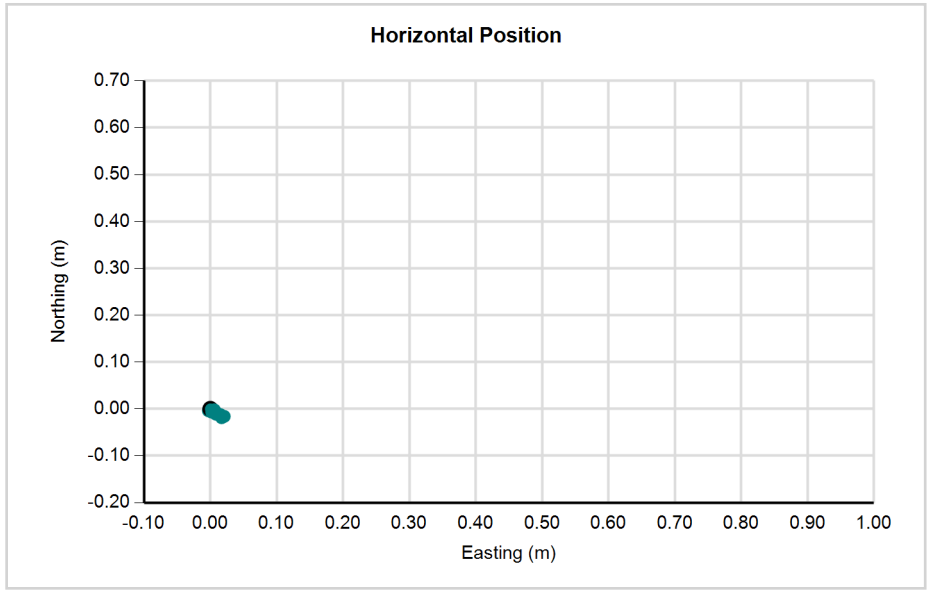
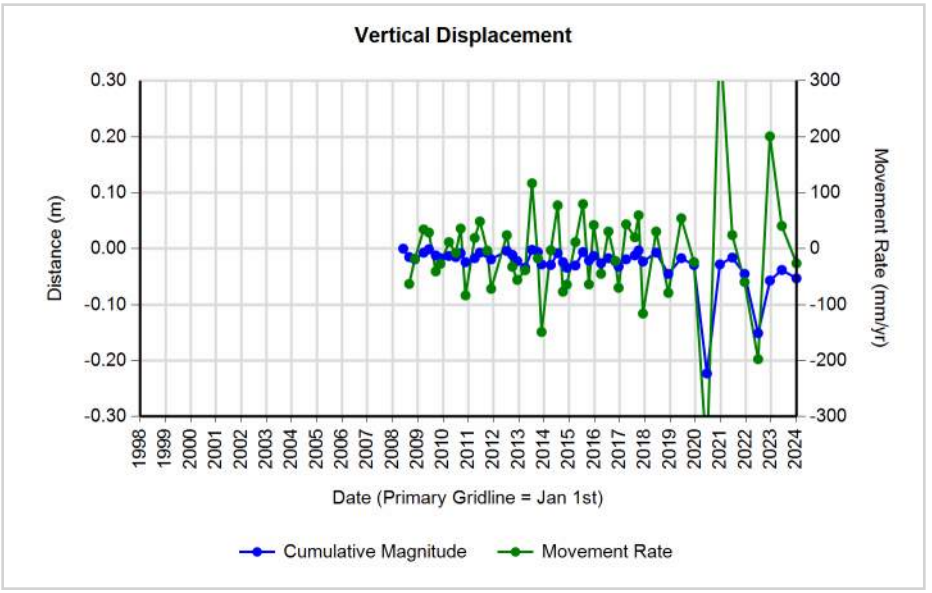
GPS Hub 08-01 (Northwest End of Findaly Road)

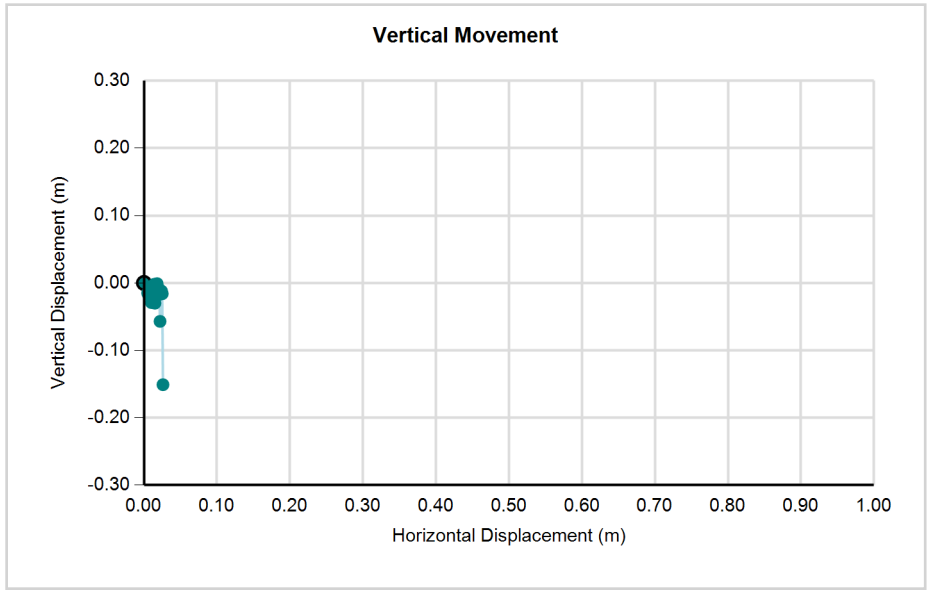
08/08/2017	5870076.357	531129.368	595.414	9.18	-0.023	0.007	0.024	-0.012	163.1	-26.5	0.003	-0.001	0.34	-0.009	-0.001	0.009	0.007	186.3	37.7	26.250	20.292
02/10/2017	5870076.362	531129.371	595.423	9.33	-0.018	0.010	0.021	-0.003	150.9	-8.3	0.002	0.000	0.15	0.005	0.003	0.006	0.009	31.0	57.1	-38.723	59.768
04/12/2017	5870076.363	531129.366	595.403	9.50	-0.017	0.005	0.018	-0.023	163.6	-52.4	0.002	-0.002	0.17	0.001	-0.005	0.005	-0.020	281.3	-75.7	-29.562	-115.952
13/06/2018	5870076.371	531129.374	595.419	10.03	-0.009	0.013	0.016	-0.007	124.7	-23.9	0.002	-0.001	0.52	0.008	0.008	0.011	0.016	45.0	54.7	-21.635	30.597
06/12/2018	5870076.369	531129.365	595.381	10.51	-0.011	0.004	0.012	-0.045	160.0	-75.4	0.001	-0.004	0.48	-0.002	-0.009	0.009	-0.038	257.5	-76.4	-19.133	-78.861
12/06/2019	5870076.363	531129.368	595.409	11.02	-0.017	0.007	0.018	-0.017	157.6	-42.8	0.002	-0.002	0.51	-0.006	0.003	0.007	0.028	153.4	76.5	13.033	54.399
12/12/2019	5870076.367	531129.367	595.397	11.52	-0.013	0.006	0.014	-0.029	155.2	-63.7	0.001	-0.003	0.50	0.004	-0.001	0.004	-0.012	346.0	-71.0	-8.229	-23.951
17/06/2020	5870076.368	531129.365	595.203	12.04	-0.012	0.004	0.013	-0.223	161.6	-86.8	0.001	-0.019	0.51	0.001	-0.002	0.002	-0.194	296.6	-89.3	-4.344	-376.907
21/12/2020	5870076.364	531129.366	595.398	12.55	-0.016	0.005	0.017	-0.028	162.6	-59.1	0.001	-0.002	0.51	-0.004	0.001	0.004	0.195	166.0	88.8	8.053	380.876
19/06/2021	5870076.361	531129.378	595.410	13.04	-0.019	0.017	0.025	-0.016	138.2	-32.1	0.002	-0.001	0.49	-0.003	0.012	0.012	0.012	104.0	44.1	25.099	24.350
14/12/2021	5870076.362	531129.371	595.381	13.53	-0.018	0.010	0.021	-0.045	150.9	-65.4	0.002	-0.003	0.49	0.001	-0.007	0.007	-0.029	278.1	-76.3	-14.510	-59.507
28/06/2022	5870076.364	531129.382	595.275	14.07	-0.016	0.021	0.026	-0.151	127.3	-80.1	0.002	-0.011	0.54	0.002	0.011	0.011	-0.106	79.7	-84.0	20.835	-197.533
16/12/2022	5870076.359	531129.367	595.369	14.54	-0.021	0.006	0.022	-0.057	164.1	-69.0	0.002	-0.004	0.47	-0.005	-0.015	0.016	0.094	251.6	80.5	-33.773	200.781
06/06/2023	5870076.360	531129.370	595.388	15.01	-0.020	0.009	0.022	-0.038	155.8	-59.9	0.001	-0.003	0.47	0.001	0.003	0.003	0.019	71.6	80.6	-6.715	40.666
04/01/2024	5870076.358	531129.372	595.373	15.59	-0.022	0.011	0.025	-0.053	153.4	-65.1	0.002	-0.003	0.58	-0.002	0.002	0.003	-0.015	135.0	-79.4	4.873	-26.102

GPS Hub 08-01 (Northwest End of Findaly Road)









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GPS Hub 06-19 (West Side of Abbott Drive)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869508.279	531106.114	585.415	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869508.279	531106.122	585.395	0.40	0.000	0.008	0.008	-0.020	90.0	-68.2	0.020	-0.050	0.40	0.000	0.008	0.008	-0.020	90.0	-68.2	20.014	-50.034
16/08/2007	5869508.274	531106.123	585.400	0.76	-0.005	0.009	0.010	-0.015	119.1	-55.5	0.013	-0.020	0.36	-0.005	0.001	0.005	0.005	168.7	44.4	14.003	13.731
13/12/2007	5869508.286	531106.123	585.397	1.09	0.007	0.009	0.011	-0.018	52.1	-57.6	0.010	-0.017	0.33	0.012	0.000	0.012	-0.003	0.0	-14.0	36.832	-9.208
18/03/2008	5869508.281	531106.122	585.395	1.35	0.002	0.008	0.008	-0.020	76.0	-67.6	0.006	-0.015	0.26	-0.005	-0.001	0.005	-0.002	191.3	-21.4	-19.400	-7.609
03/06/2008	5869508.281	531106.131	585.396	1.56	0.002	0.017	0.017	-0.019	83.3	-48.0	0.011	-0.012	0.21	0.000	0.009	0.009	0.001	90.0	6.3	42.692	4.744
29/08/2008	5869508.276	531106.130	585.391	1.80	-0.003	0.016	0.016	-0.024	100.6	-55.9	0.009	-0.013	0.24	-0.005	-0.001	0.005	-0.005	191.3	-44.4	-21.407	-20.991
19/11/2008	5869508.283	531106.133	585.379	2.03	0.004	0.019	0.019	-0.036	78.1	-61.7	0.010	-0.018	0.22	0.007	0.003	0.008	-0.012	23.2	-57.6	33.923	-53.451
26/03/2009	5869508.283	531106.132	585.387	2.37	0.004	0.018	0.018	-0.028	77.5	-56.6	0.008	-0.012	0.35	0.000	-0.001	0.001	0.008	270.0	82.9	-2.876	23.008
10/06/2009	5869508.288	531106.145	585.411	2.58	0.009	0.031	0.032	-0.004	73.8	-7.1	0.013	-0.002	0.21	0.005	0.013	0.014	0.024	69.0	59.9	66.939	115.342
17/09/2009	5869508.287	531106.150	585.391	2.85	0.008	0.036	0.037	-0.024	77.5	-33.1	0.013	-0.008	0.27	-0.001	0.005	0.005	-0.020	101.3	-75.7	18.812	-73.788
23/11/2009	5869508.294	531106.148	585.373	3.04	0.015	0.034	0.037	-0.042	66.2	-48.5	0.012	-0.014	0.18	0.007	-0.002	0.007	-0.018	344.1	-68.0	39.687	-98.127
27/03/2010	5869508.293	531106.147	585.378	3.38	0.014	0.033	0.036	-0.037	67.0	-45.9	0.011	-0.011	0.34	-0.001	-0.001	0.001	0.005	225.0	74.2	-4.166	14.728
04/07/2010	5869508.262	531106.145	585.397	3.65	-0.017	0.031	0.035	-0.018	118.7	-27.0	0.010	-0.005	0.27	-0.031	-0.002	0.031	0.019	183.7	31.5	-114.609	70.098
13/09/2010	5869508.288	531106.147	585.387	3.84	0.009	0.033	0.034	-0.028	74.7	-39.3	0.009	-0.007	0.19	0.026	0.002	0.026	-0.010	4.4	-21.0	-134.149	-51.444
22/11/2010	5869508.287	531106.155	585.395	4.03	0.008	0.041	0.042	-0.020	79.0	-25.6	0.010	-0.005	0.19	-0.001	0.008	0.008	0.008	97.1	44.8	42.068	41.743
04/04/2011	5869508.284	531106.142	585.391	4.40	0.005	0.028	0.028	-0.024	79.9	-40.2	0.006	-0.005	0.36	-0.003	-0.013	0.013	-0.004	257.0	-16.7	-36.639	-10.985
18/06/2011	5869508.291	531106.155	585.400	4.60	0.012	0.041	0.043	-0.015	73.7	-19.3	0.009	-0.003	0.21	0.007	0.013	0.015	0.009	61.7	31.4	71.905	43.830
03/10/2011	5869508.287	531106.151	585.385	4.90	0.008	0.037	0.038	-0.030	77.8	-38.4	0.008	-0.006	0.29	-0.004	-0.004	0.006	-0.015	225.0	-69.3	-19.310	-51.203
28/11/2011	5869508.289	531106.157	585.380	5.05	0.010	0.043	0.044	-0.035	76.9	-38.4	0.009	-0.007	0.15	0.002	0.006	0.006	-0.005	71.6	-38.3	41.251	-32.612
09/04/2012	5869508.279	531106.153	585.381	5.41	0.000	0.039	0.039	-0.034	90.0	-41.1	0.007	-0.006	0.36	-0.010	-0.004	0.011	0.001	201.8	5.3	-29.578	2.746
12/07/2012	5869508.282	531106.161	585.395	5.67	0.003	0.047	0.047	-0.020	86.3	-23.0	0.008	-0.004	0.26	0.003	0.008	0.009	0.014	69.4	58.6	33.199	54.399
29/09/2012	5869508.296	531106.158	585.380	5.89	0.017	0.044	0.047	-0.035	68.9	-36.6	0.008	-0.006	0.22	0.014	-0.003	0.014	-0.015	347.9	-46.3	66.197	-69.351
10/12/2012	5869508.285	531106.154	585.374	6.08	0.006	0.040	0.040	-0.041	81.5	-45.4	0.007	-0.007	0.20	-0.011	-0.004	0.012	-0.006	200.0	-27.1	-59.377	-30.437
03/04/2013	5869508.283	531106.154	585.374	6.40	0.004	0.040	0.040	-0.041	84.3	-45.6	0.006	-0.006	0.31	-0.002	0.000	0.002	0.000	180.0	0.0	6.408	0.000
12/07/2013	5869508.289	531106.165	585.392	6.67	0.010	0.051	0.052	-0.023	78.9	-23.9	0.008	-0.003	0.27	0.006	0.011	0.013	0.018	61.4	55.2	45.766	65.745
04/10/2013	5869508.290	531106.156	585.382	6.90	0.011	0.042	0.043	-0.033	75.3	-37.2	0.006	-0.005	0.23	0.001	-0.009	0.009	-0.010	276.3	-47.8	-39.375	-43.482
27/11/2013	5869508.297	531106.163	585.380	7.05	0.018	0.049	0.052	-0.035	69.8	-33.8	0.007	-0.005	0.15	0.007	0.007	0.010	-0.002	45.0	-11.4	66.959	-13.528
10/04/2014	5869508.289	531106.159	585.386	7.41	0.010	0.045	0.046	-0.029	77.5	-32.2	0.006	-0.004	0.37	-0.008	-0.004	0.009	0.006	206.6	33.9	-24.380	16.354
18/07/2014	5869508.281	531106.165	585.417	7.69	0.002	0.051	0.051	0.002	87.8	2.2	0.007	0.000	0.27	-0.008	0.006	0.010	0.031	143.1	72.1	36.894	114.371
02/10/2014	5869508.288	531106.164	585.388	7.89	0.009	0.050	0.051	-0.027	79.8	-28.0	0.006	-0.003	0.21	0.007	-0.001	0.007	-0.029	351.9	-76.3	-33.983	-139.372
28/11/2014	5869508.288	531106.165	585.383	8.05	0.009	0.051	0.052	-0.032	80.0	-31.7	0.006	-0.004	0.16	0.000	0.001	0.001	-0.005	90.0	-78.7	6.408	-32.039
01/04/2015	5869508.295	531106.167	585.385	8.39	0.016	0.053	0.055	-0.030	73.2	-28.5	0.007	-0.004	0.34	0.007	0.002	0.007	0.002	15.9	15.4	21.444	5.891
20/07/2015	5869508.296	531106.170	585.404	8.69	0.017	0.056	0.059	-0.011	73.1	-10.6	0.007	-0.001	0.30	0.001	0.003	0.003	0.019	71.6	80.6	10.500	63.089
14/10/2015	5869508.288	531106.161	585.375	8.93	0.009	0.047	0.048	-0.040	79.2	-39.9	0.005	-0.004	0.24	-0.008	-0.009	0.012	-0.029	228.4	-67.5	-51.142	-123.166

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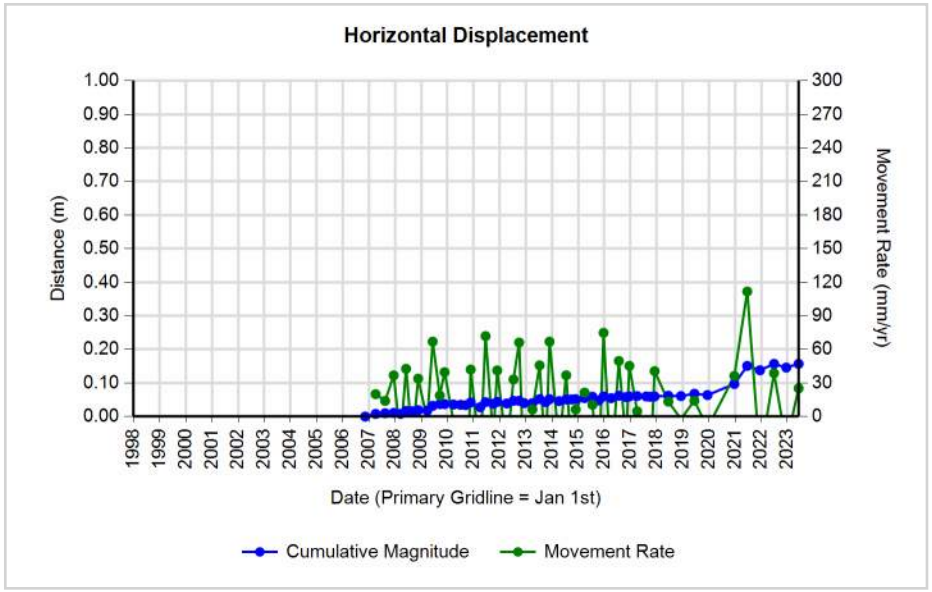
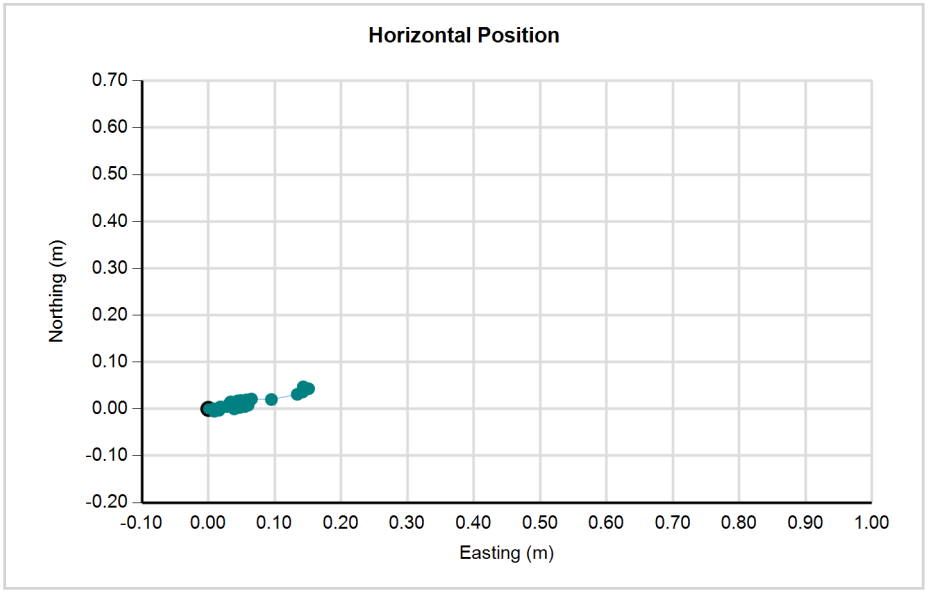
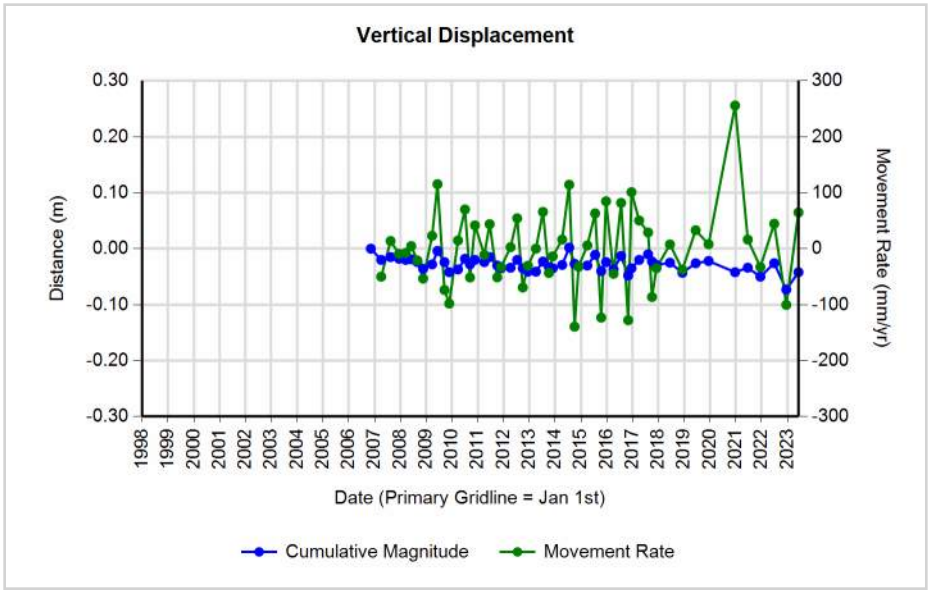
GPS Hub 06-19 (West Side of Abbott Drive)

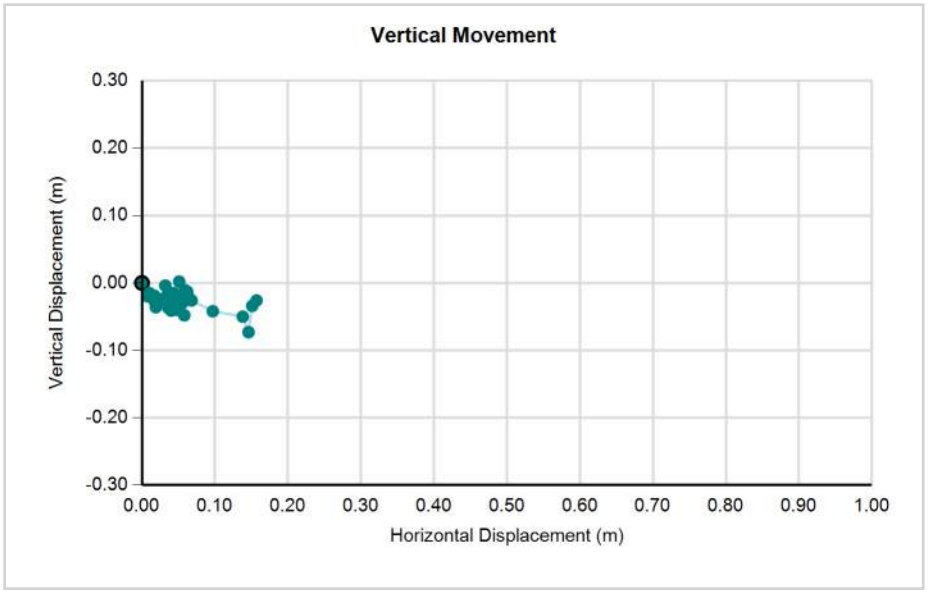
22/12/2015	5869508.298	531106.171	585.391	9.11	0.019	0.057	0.060	-0.024	71.6	-21.8	0.007	-0.003	0.19	0.010	0.010	0.014	0.016	45.0	48.5	74.861	84.696
06/04/2016	5869508.284	531106.169	585.378	9.40	0.005	0.055	0.055	-0.037	84.8	-33.8	0.006	-0.004	0.29	-0.014	-0.002	0.014	-0.013	188.1	-42.6	-48.730	-44.795
22/07/2016	5869508.298	531106.173	585.402	9.70	0.019	0.059	0.062	-0.013	72.1	-11.8	0.006	-0.001	0.29	0.014	0.004	0.015	0.024	15.9	58.8	49.702	81.925
30/10/2016	5869508.293	531106.170	585.367	9.97	0.014	0.056	0.058	-0.048	76.0	-39.7	0.006	-0.005	0.27	-0.005	-0.003	0.006	-0.035	211.0	-80.5	-21.298	-127.838
16/12/2016	5869508.288	531106.173	585.380	10.10	0.009	0.059	0.060	-0.035	81.3	-30.4	0.006	-0.003	0.13	-0.005	0.003	0.006	0.013	149.0	65.8	45.314	101.027
04/04/2017	5869508.287	531106.174	585.395	10.40	0.008	0.060	0.061	-0.020	82.4	-18.3	0.006	-0.002	0.30	-0.001	0.001	0.001	0.015	135.0	84.6	4.739	50.264
08/08/2017	5869508.291	531106.173	585.405	10.74	0.012	0.059	0.060	-0.010	78.5	-9.4	0.006	-0.001	0.34	0.004	-0.001	0.004	0.010	346.0	67.6	-11.952	28.988
02/10/2017	5869508.284	531106.173	585.392	10.89	0.005	0.059	0.059	-0.023	85.2	-21.2	0.005	-0.002	0.15	-0.007	0.000	0.007	-0.013	180.0	-61.7	-46.486	-86.332
04/12/2017	5869508.291	531106.173	585.386	11.07	0.012	0.059	0.060	-0.029	78.5	-25.7	0.005	-0.003	0.17	0.007	0.000	0.007	-0.006	0.0	-40.6	40.583	-34.786
13/06/2018	5869508.298	531106.173	585.390	11.59	0.019	0.059	0.062	-0.025	72.1	-22.0	0.005	-0.002	0.52	0.007	0.000	0.007	0.004	0.0	29.7	13.386	7.649
06/12/2018	5869508.298	531106.172	585.372	12.07	0.019	0.058	0.061	-0.043	71.9	-35.2	0.005	-0.004	0.48	0.000	-0.001	0.001	-0.018	270.0	-86.8	-2.075	-37.355
12/06/2019	5869508.300	531106.179	585.389	12.59	0.021	0.065	0.068	-0.026	72.1	-20.8	0.005	-0.002	0.51	0.002	0.007	0.007	0.017	74.1	66.8	14.144	33.028
12/12/2019	5869508.300	531106.174	585.393	13.09	0.021	0.060	0.064	-0.022	70.7	-19.1	0.005	-0.002	0.50	0.000	-0.005	0.005	0.004	270.0	38.7	-9.980	7.984
21/12/2020	5869508.299	531106.209	585.373	14.11	0.020	0.095	0.097	-0.042	78.1	-23.4	0.007	-0.003	0.51	-0.011	0.015	0.019	0.131	126.3	81.9	36.332	255.870
19/06/2021	5869508.326	531106.257	585.381	14.61	0.047	0.143	0.151	-0.034	71.8	-12.7	0.010	-0.002	0.49	0.027	0.048	0.055	0.008	60.6	8.3	111.752	16.233
14/12/2021	5869508.310	531106.248	585.365	15.09	0.031	0.134	0.138	-0.050	77.0	-20.0	0.009	-0.003	0.49	-0.016	-0.009	0.018	-0.016	209.4	-41.1	-37.669	-32.831
28/06/2022	5869508.322	531106.265	585.389	15.63	0.043	0.151	0.157	-0.026	74.1	-9.4	0.010	-0.002	0.54	0.012	0.017	0.021	0.024	54.8	49.1	38.777	44.724
16/12/2022	5869508.315	531106.256	585.342	16.10	0.036	0.142	0.146	-0.073	75.8	-26.5	0.009	-0.005	0.47	-0.007	-0.009	0.011	-0.047	232.1	-76.4	-24.354	-100.390
06/06/2023	5869508.323	531106.265	585.373	16.57	0.044	0.151	0.157	-0.042	73.7	-15.1	0.009	-0.003	0.47	0.008	0.009	0.012	0.031	47.7	68.7	25.255	64.832

GPS Hub 06-19 (West Side of Abbott Drive)









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GPS Hub 06-20 (Diatomite Mine)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869533.109	530619.695	661.719	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869533.111	530619.695	661.723	0.40	0.002	0.000	0.002	0.004	0.0	63.4	0.005	0.010	0.40	0.002	0.000	0.002	0.004	0.0	63.4	5.003	10.007
16/08/2007	5869533.103	530619.682	661.736	0.76	-0.006	-0.013	0.014	0.017	245.2	49.9	0.019	0.022	0.36	-0.008	-0.013	0.015	0.013	238.4	40.4	41.920	35.701
13/12/2007	5869533.109	530619.694	661.719	1.09	0.000	-0.001	0.001	0.000	270.0	0.0	0.001	0.000	0.33	0.006	0.012	0.013	-0.017	63.4	-51.7	-41.179	-52.179
18/03/2008	5869533.117	530619.691	661.725	1.35	0.008	-0.004	0.009	0.006	333.4	33.9	0.007	0.004	0.26	0.008	-0.003	0.009	0.006	339.4	35.1	32.507	22.828
03/06/2008	5869533.107	530619.690	661.718	1.56	-0.002	-0.005	0.005	-0.001	248.2	-10.5	0.003	-0.001	0.21	-0.010	-0.001	0.010	-0.007	185.7	-34.9	-47.672	-33.205
29/08/2008	5869533.107	530619.695	661.728	1.80	-0.002	0.000	0.002	0.009	180.0	77.5	0.001	0.005	0.24	0.000	0.005	0.005	0.010	90.0	63.4	-20.991	41.983
19/11/2008	5869533.115	530619.698	661.723	2.03	0.006	0.003	0.007	0.004	26.6	30.8	0.003	0.002	0.22	0.008	0.003	0.009	-0.005	20.6	-30.3	38.057	-22.271
26/03/2009	5869533.135	530619.690	661.726	2.37	0.026	-0.005	0.026	0.007	349.1	14.8	0.011	0.003	0.35	0.020	-0.008	0.022	0.003	338.2	7.9	61.951	8.628
10/06/2009	5869533.112	530619.692	661.742	2.58	0.003	-0.003	0.004	0.023	315.0	79.5	0.002	0.009	0.21	-0.023	0.002	0.023	0.016	175.0	34.7	-110.953	76.895
17/09/2009	5869533.112	530619.698	661.710	2.85	0.003	0.003	0.004	-0.009	45.0	-64.8	0.001	-0.003	0.27	0.000	0.006	0.006	-0.032	90.0	-79.4	22.136	-118.061
23/11/2009	5869533.124	530619.693	661.723	3.04	0.015	-0.002	0.015	0.004	352.4	14.8	0.005	0.001	0.18	0.012	-0.005	0.013	0.013	337.4	45.0	70.869	70.869
27/03/2010	5869533.122	530619.685	661.721	3.38	0.013	-0.010	0.016	0.002	322.4	7.0	0.005	0.001	0.34	-0.002	-0.008	0.008	-0.002	256.0	-13.6	24.290	-5.891
04/07/2010	5869533.109	530619.689	661.739	3.65	0.000	-0.006	0.006	0.020	270.0	73.3	0.002	0.005	0.27	-0.013	0.004	0.014	0.018	162.9	52.9	-50.181	66.409
13/09/2010	5869533.118	530619.695	661.729	3.84	0.009	0.000	0.009	0.010	0.0	48.0	0.002	0.003	0.19	0.009	0.006	0.011	-0.010	33.7	-42.8	55.645	-51.444
22/11/2010	5869533.109	530619.698	661.725	4.03	0.000	0.003	0.003	0.006	90.0	63.4	0.001	0.001	0.19	-0.009	0.003	0.009	-0.004	161.6	-22.9	-49.501	-20.871
04/04/2011	5869533.115	530619.688	661.729	4.40	0.006	-0.007	0.009	0.010	310.6	47.3	0.002	0.002	0.36	0.006	-0.010	0.012	0.004	301.0	18.9	32.026	10.985
18/06/2011	5869533.115	530619.697	661.726	4.60	0.006	0.002	0.006	0.007	18.4	47.9	0.001	0.002	0.21	0.000	0.009	0.009	-0.003	90.0	-18.4	-43.830	-14.610
03/10/2011	5869533.108	530619.688	661.711	4.90	-0.001	-0.007	0.007	-0.008	261.9	-48.5	0.001	-0.002	0.29	-0.007	-0.009	0.011	-0.015	232.1	-52.8	38.920	-51.203
28/11/2011	5869533.119	530619.691	661.706	5.05	0.010	-0.004	0.011	-0.013	338.2	-50.4	0.002	-0.003	0.15	0.011	0.003	0.011	-0.005	15.3	-23.7	74.366	-32.612
09/04/2012	5869533.103	530619.693	661.739	5.41	-0.006	-0.002	0.006	0.020	198.4	72.5	0.001	0.004	0.36	-0.016	0.002	0.016	0.033	172.9	64.0	-44.282	90.626
12/07/2012	5869533.110	530619.697	661.730	5.67	0.001	0.002	0.002	0.011	63.4	78.5	0.000	0.002	0.26	0.007	0.004	0.008	-0.009	29.7	-48.1	-31.327	-34.971
29/09/2012	5869533.119	530619.698	661.730	5.89	0.010	0.003	0.010	0.011	16.7	46.5	0.002	0.002	0.22	0.009	0.001	0.009	0.000	6.3	0.0	41.867	0.000
10/12/2012	5869533.116	530619.696	661.720	6.08	0.007	0.001	0.007	0.001	8.1	8.0	0.001	0.000	0.20	-0.003	-0.002	0.004	-0.010	213.7	-70.2	-18.291	-50.729
03/04/2013	5869533.117	530619.692	661.718	6.40	0.008	-0.003	0.009	-0.001	339.4	-6.7	0.001	0.000	0.31	0.001	-0.004	0.004	-0.002	284.0	-25.9	13.210	-6.408
12/07/2013	5869533.116	530619.694	661.716	6.67	0.007	-0.001	0.007	-0.003	351.9	-23.0	0.001	0.000	0.27	-0.001	0.002	0.002	-0.002	116.6	-41.8	-8.167	-7.305
04/10/2013	5869533.115	530619.692	661.724	6.90	0.006	-0.003	0.007	0.005	333.4	36.7	0.001	0.001	0.23	-0.001	-0.002	0.002	0.008	243.4	74.4	-9.723	34.786
10/04/2014	5869533.121	530619.695	661.721	7.41	0.012	0.000	0.012	0.002	0.0	9.5	0.002	0.000	0.51	0.006	0.003	0.007	-0.003	26.6	-24.1	13.033	-5.828
02/10/2014	5869533.113	530619.693	661.717	7.89	0.004	-0.002	0.004	-0.002	333.4	-24.1	0.001	0.000	0.48	-0.008	-0.002	0.008	-0.004	194.0	-25.9	-17.211	-8.349
28/11/2014	5869533.113	530619.693	661.717	8.05	0.004	-0.002	0.004	-0.002	333.4	-24.1	0.001	0.000	0.16	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
01/04/2015	5869533.125	530619.693	661.702	8.39	0.016	-0.002	0.016	-0.017	352.9	-46.5	0.002	-0.002	0.34	0.012	0.000	0.012	-0.015	0.0	-51.3	35.347	-44.183
20/07/2015	5869533.113	530619.690	661.713	8.69	0.004	-0.005	0.006	-0.006	308.7	-43.1	0.001	-0.001	0.30	-0.012	-0.003	0.012	0.011	194.0	41.6	-41.072	36.525
14/10/2015	5869533.108	530619.687	661.720	8.93	-0.001	-0.008	0.008	0.001	262.9	7.1	0.001	0.000	0.24	-0.005	-0.003	0.006	0.007	211.0	50.2	24.765	29.730
22/12/2015	5869533.121	530619.698	661.735	9.11	0.012	0.003	0.012	0.016	14.0	52.3	0.001	0.002	0.19	0.013	0.011	0.017	0.015	40.2	41.4	90.145	79.402
06/04/2016	5869533.110	530619.693	661.717	9.40	0.001	-0.002	0.002	-0.002	296.6	-41.8	0.000	0.000	0.29	-0.011	-0.005	0.012	-0.018	204.4	-56.1	-41.635	-62.024

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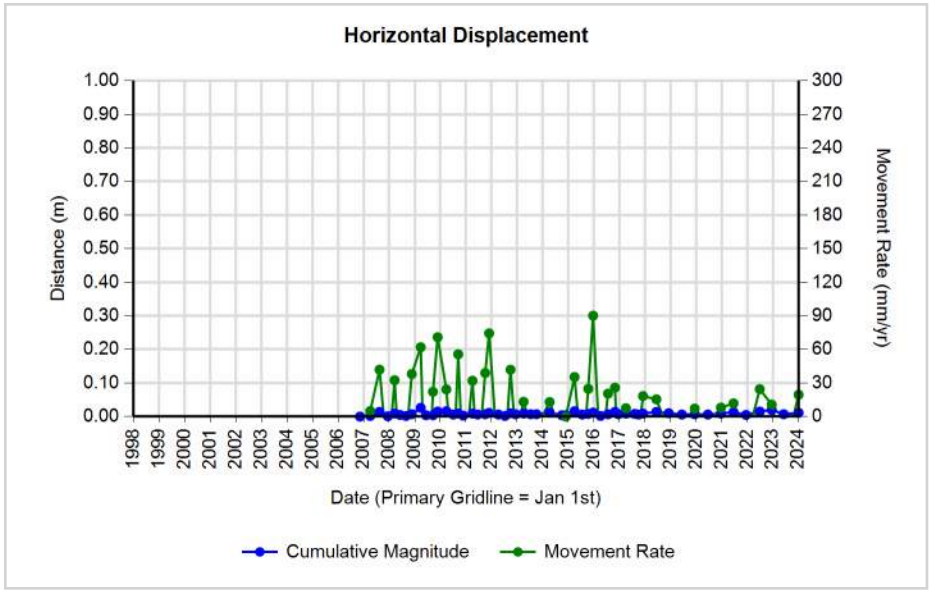
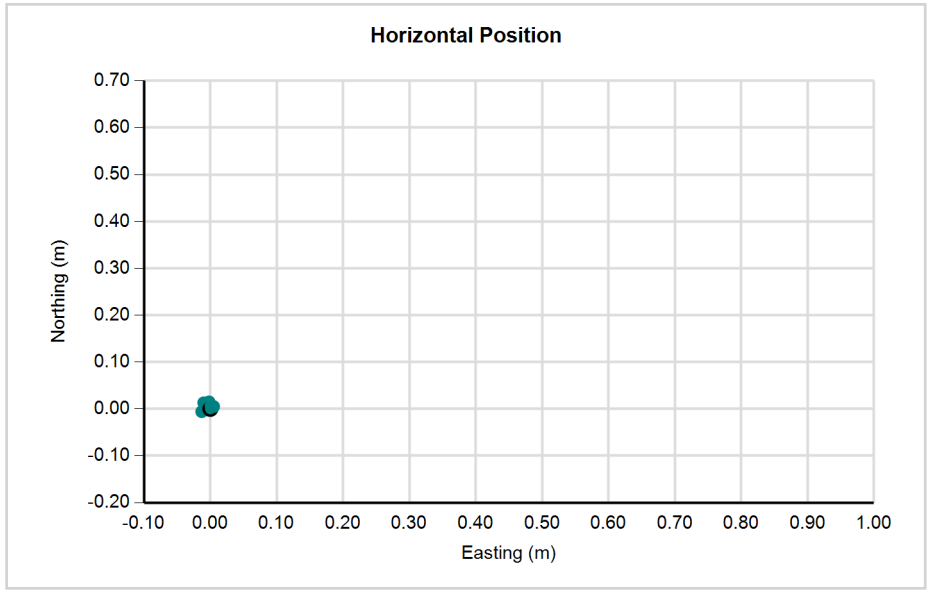
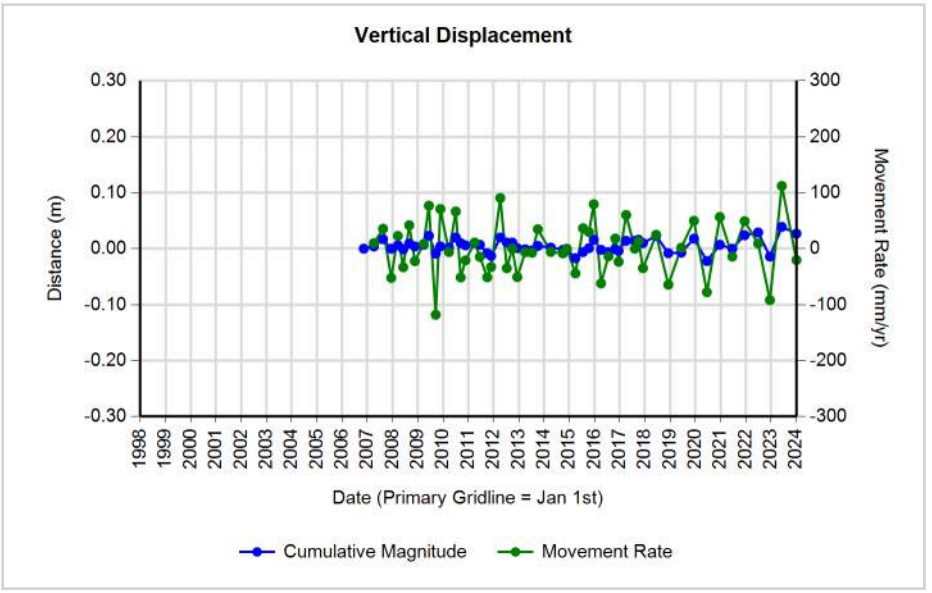
GPS Hub 06-20 (Diatomite Mine)

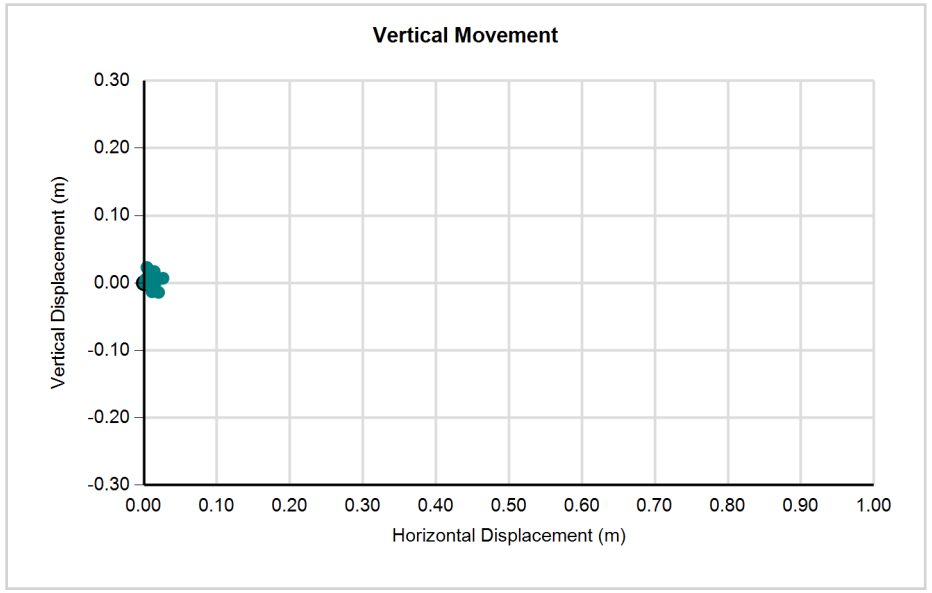
22/07/2016	5869533.116	530619.693	661.713	9.70	0.007	-0.002	0.007	-0.006	344.1	-39.5	0.001	-0.001	0.29	0.006	0.000	0.006	-0.004	0.0	-33.7	20.481	-13.654
30/10/2016	5869533.123	530619.692	661.718	9.97	0.014	-0.003	0.014	-0.001	347.9	-4.0	0.001	0.000	0.27	0.007	-0.001	0.007	0.005	351.9	35.3	25.827	18.262
16/12/2016	5869533.116	530619.694	661.715	10.10	0.007	-0.001	0.007	-0.004	351.9	-29.5	0.001	0.000	0.13	-0.007	0.002	0.007	-0.003	164.1	-22.4	-56.576	-23.314
04/04/2017	5869533.118	530619.695	661.733	10.40	0.009	0.000	0.009	0.014	0.0	57.3	0.001	0.001	0.30	0.002	0.001	0.002	0.018	26.6	82.9	7.493	60.317
08/08/2017	5869533.115	530619.690	661.733	10.74	0.006	-0.005	0.008	0.014	320.2	60.8	0.001	0.001	0.34	-0.003	-0.005	0.006	0.000	239.0	0.0	-16.903	0.000
02/10/2017	5869533.113	530619.691	661.735	10.89	0.004	-0.004	0.006	0.016	315.0	70.5	0.001	0.001	0.15	-0.002	0.001	0.002	0.002	153.4	41.8	-14.850	13.282
04/12/2017	5869533.116	530619.690	661.729	11.07	0.007	-0.005	0.009	0.010	324.5	49.3	0.001	0.001	0.17	0.003	-0.001	0.003	-0.006	341.6	-62.2	18.334	-34.786
13/06/2018	5869533.123	530619.694	661.742	11.59	0.014	-0.001	0.014	0.023	355.9	58.6	0.001	0.002	0.52	0.007	0.004	0.008	0.013	29.7	58.2	15.417	24.860
06/12/2018	5869533.118	530619.690	661.711	12.07	0.009	-0.005	0.010	-0.008	330.9	-37.8	0.001	-0.001	0.48	-0.005	-0.004	0.006	-0.031	218.7	-78.3	-13.288	-64.334
12/06/2019	5869533.113	530619.691	661.712	12.59	0.004	-0.004	0.006	-0.007	315.0	-51.1	0.000	-0.001	0.51	-0.005	0.001	0.005	0.001	168.7	11.1	-9.906	1.943
12/12/2019	5869533.116	530619.693	661.737	13.09	0.007	-0.002	0.007	0.018	344.1	68.0	0.001	0.001	0.50	0.003	0.002	0.004	0.025	33.7	81.8	7.196	49.898
17/06/2020	5869533.113	530619.691	661.697	13.60	0.004	-0.004	0.006	-0.022	315.0	-75.6	0.000	-0.002	0.51	-0.003	-0.002	0.004	-0.040	213.7	-84.8	-7.005	-77.713
21/12/2020	5869533.117	530619.690	661.726	14.11	0.008	-0.005	0.009	0.007	328.0	36.6	0.001	0.000	0.51	0.004	-0.001	0.004	0.029	346.0	81.9	8.053	56.643
19/06/2021	5869533.122	530619.693	661.719	14.61	0.013	-0.002	0.013	0.000	351.3	0.0	0.001	0.000	0.49	0.005	0.003	0.006	-0.007	31.0	-50.2	11.832	-14.204
14/12/2021	5869533.111	530619.690	661.743	15.09	0.002	-0.005	0.005	0.024	291.8	77.4	0.000	0.002	0.49	-0.011	-0.003	0.011	0.024	195.3	64.6	-23.396	49.247
28/06/2022	5869533.124	530619.692	661.748	15.63	0.015	-0.003	0.015	0.029	348.7	62.2	0.001	0.002	0.54	0.013	0.002	0.013	0.005	8.7	20.8	24.511	9.318
16/12/2022	5869533.128	530619.689	661.705	16.10	0.019	-0.006	0.020	-0.014	342.5	-35.1	0.001	-0.001	0.47	0.004	-0.003	0.005	-0.043	323.1	-83.4	10.680	-91.846
06/06/2023	5869533.114	530619.700	661.758	16.57	0.005	0.005	0.007	0.039	42.6	80.1	0.000	0.002	0.47	-0.014	0.011	0.018	0.053	142.9	71.6	-37.290	112.166
04/01/2024	5869533.118	530619.689	661.746	17.15	0.009	-0.006	0.011	0.027	326.3	68.2	0.001	0.002	0.58	0.004	-0.011	0.011	-0.012	290.7	-46.2	19.520	-20.364

GPS Hub 06-20 (Diatomite Mine)









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GPS Hub 06-21 (North End of Abbott Road)

	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
10/11/2006	5869034.916	531260.448	620.924	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
05/04/2007	5869034.916	531260.451	620.919	0.40	0.000	0.003	0.003	-0.005	90.0	-59.0	0.008	-0.013	0.40	0.000	0.003	0.003	-0.005	90.0	-59.0	7.505	-12.509
16/08/2007	5869034.907	531260.441	620.938	0.76	-0.009	-0.007	0.011	0.014	217.9	50.8	0.015	0.018	0.36	-0.009	-0.010	0.013	0.019	228.0	54.7	36.947	52.179
13/12/2007	5869034.918	531260.441	620.922	1.09	0.002	-0.007	0.007	-0.002	285.9	-15.4	0.007	-0.002	0.33	0.011	0.000	0.011	-0.016	0.0	-55.5	-33.763	-49.109
18/03/2008	5869034.916	531260.445	620.920	1.35	0.000	-0.003	0.003	-0.004	270.0	-53.1	0.002	-0.003	0.26	-0.002	0.004	0.004	-0.002	116.6	-24.1	-17.015	-7.609
03/06/2008	5869034.918	531260.448	620.938	1.56	0.002	0.000	0.002	0.014	0.0	81.9	0.001	0.009	0.21	0.002	0.003	0.004	0.018	56.3	78.7	-17.103	85.383
29/08/2008	5869034.907	531260.452	620.940	1.80	-0.009	0.004	0.010	0.016	156.0	58.4	0.005	0.009	0.24	-0.011	0.004	0.012	0.002	160.0	9.7	49.140	8.397
19/11/2008	5869034.917	531260.448	620.923	2.03	0.001	0.000	0.001	-0.001	0.0	-45.0	0.000	0.000	0.22	0.010	-0.004	0.011	-0.017	338.2	-57.6	-47.974	-75.723
26/03/2009	5869034.918	531260.449	620.920	2.37	0.002	0.001	0.002	-0.004	26.6	-60.8	0.001	-0.002	0.35	0.001	0.001	0.001	-0.003	45.0	-64.8	4.067	-8.628
10/06/2009	5869034.914	531260.456	620.948	2.58	-0.002	0.008	0.008	0.024	104.0	71.0	0.003	0.009	0.21	-0.004	0.007	0.008	0.028	119.7	73.9	38.747	134.566
17/09/2009	5869034.907	531260.458	620.926	2.85	-0.009	0.010	0.013	0.002	132.0	8.5	0.005	0.001	0.27	-0.007	0.002	0.007	-0.022	164.1	-71.7	26.859	-81.167
23/11/2009	5869034.931	531260.454	620.921	3.04	0.015	0.006	0.016	-0.003	21.8	-10.5	0.005	-0.001	0.18	0.024	-0.004	0.024	-0.005	350.5	-11.6	132.641	-27.257
27/03/2010	5869034.926	531260.443	620.915	3.38	0.010	-0.005	0.011	-0.009	333.4	-38.8	0.003	-0.003	0.34	-0.005	-0.011	0.012	-0.006	245.6	-26.4	-35.591	-17.673
04/07/2010	5869034.910	531260.456	620.927	3.65	-0.006	0.008	0.010	0.003	126.9	16.7	0.003	0.001	0.27	-0.016	0.013	0.021	0.012	140.9	30.2	-76.059	44.273
13/09/2010	5869034.918	531260.454	620.926	3.84	0.002	0.006	0.006	0.002	71.6	17.5	0.002	0.001	0.19	0.008	-0.002	0.008	-0.001	346.0	-6.9	-42.422	-5.144
22/11/2010	5869034.909	531260.450	620.926	4.03	-0.007	0.002	0.007	0.002	164.1	15.4	0.002	0.000	0.19	-0.009	-0.004	0.010	0.000	204.0	0.0	51.390	0.000
04/04/2011	5869034.918	531260.443	620.924	4.40	0.002	-0.005	0.005	0.000	291.8	0.0	0.001	0.000	0.36	0.009	-0.007	0.011	-0.002	322.1	-9.9	-31.312	-5.492
18/06/2011	5869034.905	531260.456	620.944	4.60	-0.011	0.008	0.014	0.020	144.0	55.8	0.003	0.004	0.21	-0.013	0.013	0.018	0.020	135.0	47.4	89.534	97.400
03/10/2011	5869034.915	531260.442	620.929	4.90	-0.001	-0.006	0.006	0.005	260.5	39.4	0.001	0.001	0.29	0.010	-0.014	0.017	-0.015	305.5	-41.1	-58.729	-51.203
28/11/2011	5869034.918	531260.443	620.909	5.05	0.002	-0.005	0.005	-0.015	291.8	-70.3	0.001	-0.003	0.15	0.003	0.001	0.003	-0.020	18.4	-81.0	-20.625	-130.446
09/04/2012	5869034.906	531260.443	620.926	5.41	-0.010	-0.005	0.011	0.002	206.6	10.1	0.002	0.000	0.36	-0.012	0.000	0.012	0.017	180.0	54.8	32.955	46.686
12/07/2012	5869034.907	531260.450	620.939	5.67	-0.009	0.002	0.009	0.015	167.5	58.4	0.002	0.003	0.26	0.001	0.007	0.007	0.013	81.9	61.5	-27.476	50.513
29/09/2012	5869034.914	531260.452	620.956	5.89	-0.002	0.004	0.004	0.032	116.6	82.0	0.001	0.005	0.22	0.007	0.002	0.007	0.017	15.9	66.8	-33.659	78.598
10/12/2012	5869034.914	531260.442	620.919	6.08	-0.002	-0.006	0.006	-0.005	251.6	-38.3	0.001	-0.001	0.20	0.000	-0.010	0.010	-0.037	270.0	-74.9	50.729	-187.698
03/04/2013	5869034.918	531260.444	620.920	6.40	0.002	-0.004	0.004	-0.004	296.6	-41.8	0.001	-0.001	0.31	0.004	0.002	0.004	0.001	26.6	12.6	-14.328	3.204
12/07/2013	5869034.909	531260.440	620.923	6.67	-0.007	-0.008	0.011	-0.001	228.8	-5.4	0.002	0.000	0.27	-0.009	-0.004	0.010	0.003	204.0	16.9	35.973	10.958
04/10/2013	5869034.911	531260.446	620.956	6.90	-0.005	-0.002	0.005	0.032	201.8	80.4	0.001	0.005	0.23	0.002	0.006	0.006	0.033	71.6	79.2	-27.501	143.491
27/11/2013	5869034.916	531260.440	620.917	7.05	0.000	-0.008	0.008	-0.007	270.0	-41.2	0.001	-0.001	0.15	0.005	-0.006	0.008	-0.039	309.8	-78.7	52.828	-263.792
10/04/2014	5869034.917	531260.445	620.921	7.41	0.001	-0.003	0.003	-0.003	288.4	-43.5	0.000	0.000	0.37	0.001	0.005	0.005	0.004	78.7	38.1	-13.899	10.903
18/07/2014	5869034.902	531260.441	620.931	7.69	-0.014	-0.007	0.016	0.007	206.6	24.1	0.002	0.001	0.27	-0.015	-0.004	0.016	0.010	194.9	32.8	57.275	36.894
02/10/2014	5869034.908	531260.444	620.928	7.89	-0.008	-0.004	0.009	0.004	206.6	24.1	0.001	0.001	0.21	0.006	0.003	0.007	-0.003	26.6	-24.1	-32.239	-14.418
28/11/2014	5869034.920	531260.446	620.898	8.05	0.004	-0.002	0.004	-0.026	333.4	-80.2	0.001	-0.003	0.16	0.012	0.002	0.012	-0.030	9.5	-67.9	-77.955	-192.237
01/04/2015	5869034.929	531260.447	620.906	8.39	0.013	-0.001	0.013	-0.018	355.6	-54.1	0.002	-0.002	0.34	0.009	0.001	0.009	0.008	6.3	41.5	26.673	23.565
20/07/2015	5869034.907	531260.449	620.929	8.69	-0.009	0.001	0.009	0.005	173.7	28.9	0.001	0.001	0.30	-0.022	0.002	0.022	0.023	174.8	46.2	-73.351	76.370
14/10/2015	5869034.912	531260.436	620.917	8.93	-0.004	-0.012	0.013	-0.007	251.6	-29.0	0.001	-0.001	0.24	0.005	-0.013	0.014	-0.012	291.0	-40.7	59.155	-50.965

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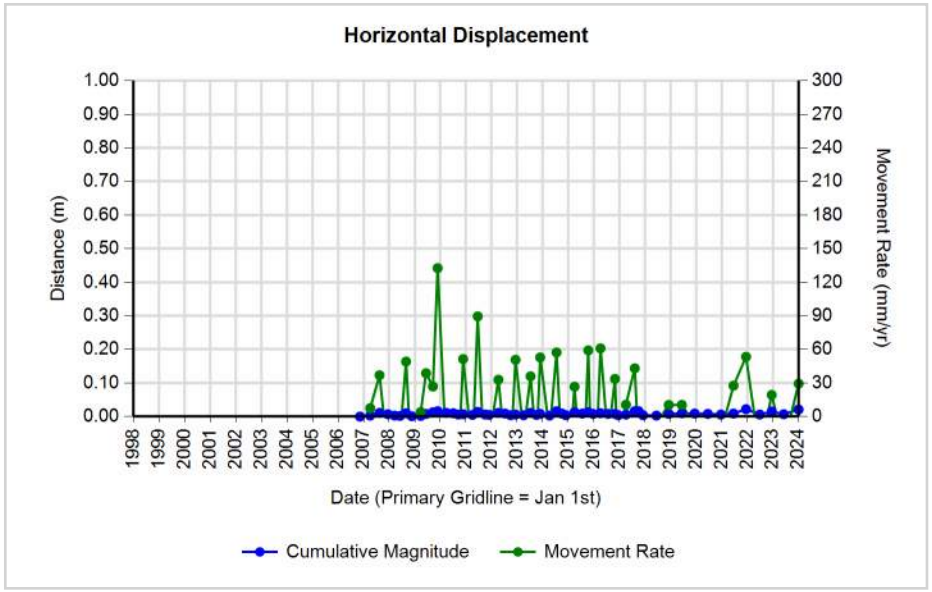
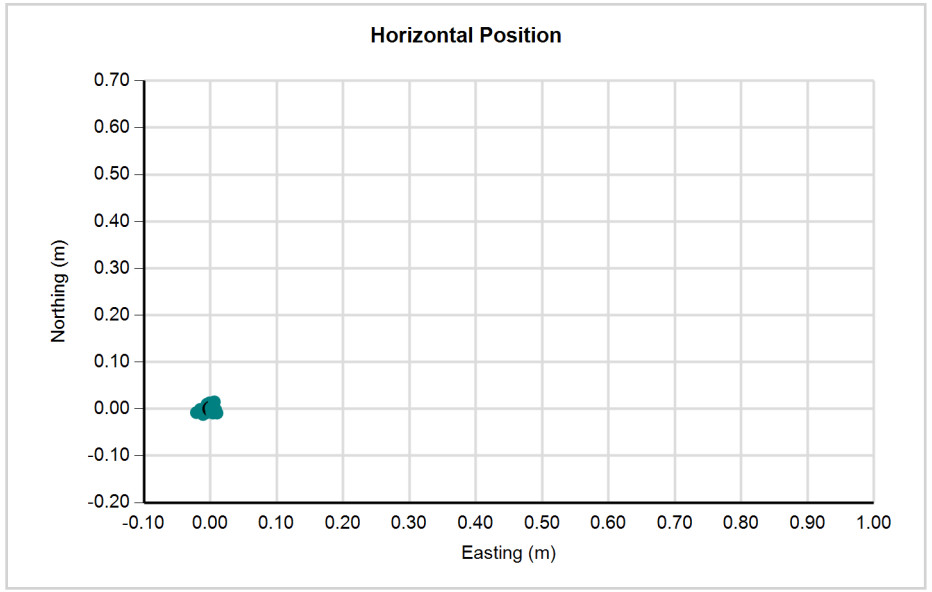
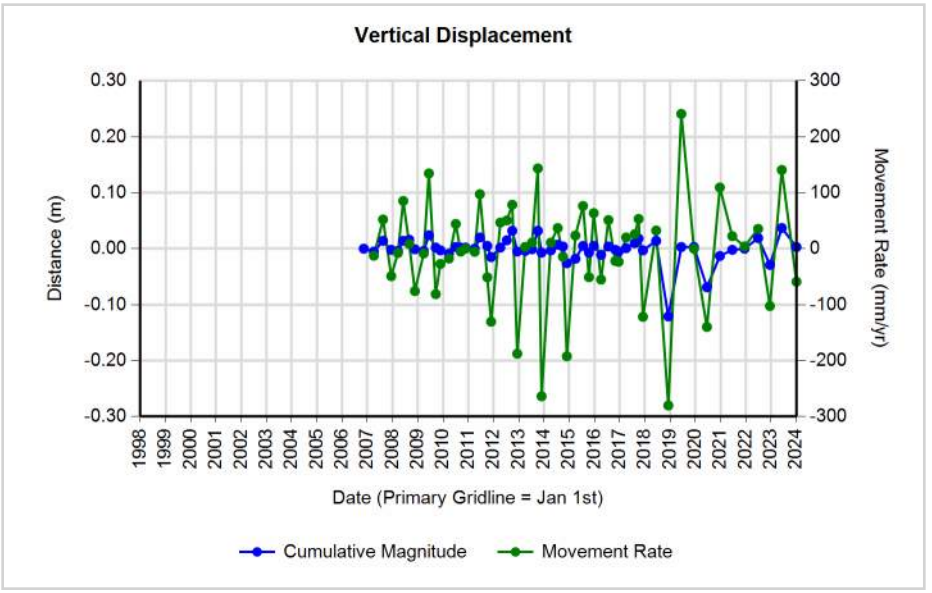
GPS Hub 06-21 (North End of Abbott Road)

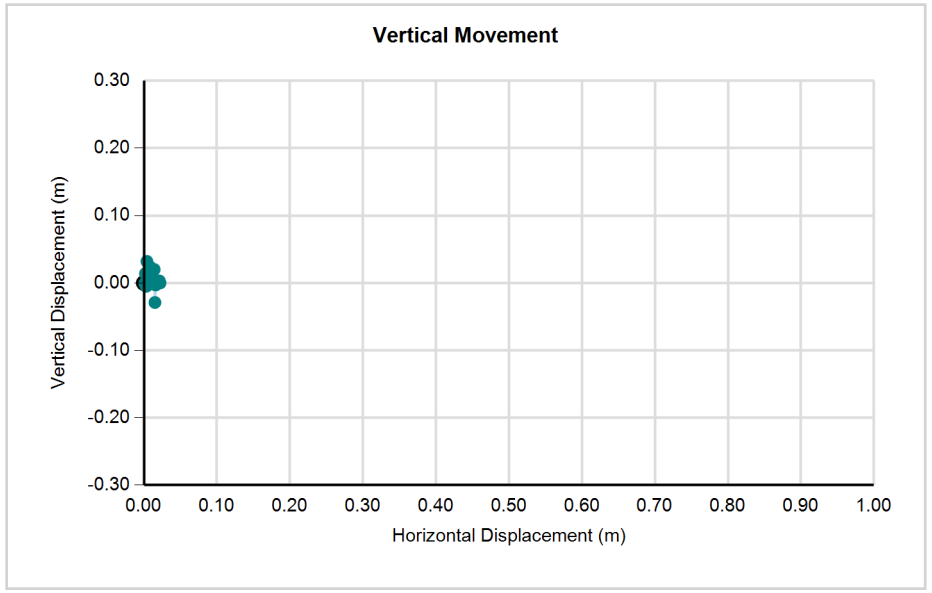
22/12/2015	5869034.922	531260.453	620.929	9.11	0.006	0.005	0.008	0.005	39.8	32.6	0.001	0.001	0.19	0.010	0.017	0.020	0.012	59.5	31.3	-104.404	63.522
06/04/2016	5869034.909	531260.441	620.913	9.40	-0.007	-0.007	0.010	-0.011	225.0	-48.0	0.001	-0.001	0.29	-0.013	-0.012	0.018	-0.016	222.7	-42.1	60.962	-55.132
22/07/2016	5869034.908	531260.447	620.928	9.70	-0.008	-0.001	0.008	0.004	187.1	26.4	0.001	0.000	0.29	-0.001	0.006	0.006	0.015	99.5	67.9	-20.764	51.203
30/10/2016	5869034.914	531260.440	620.922	9.97	-0.002	-0.008	0.008	-0.002	256.0	-13.6	0.001	0.000	0.27	0.006	-0.007	0.009	-0.006	310.6	-33.1	33.674	-21.915
16/12/2016	5869034.919	531260.445	620.919	10.10	0.003	-0.003	0.004	-0.005	315.0	-49.7	0.000	0.000	0.13	0.005	0.005	0.007	-0.003	45.0	-23.0	-54.951	-23.314
04/04/2017	5869034.918	531260.442	620.925	10.40	0.002	-0.006	0.006	0.001	288.4	9.0	0.001	0.000	0.30	-0.001	-0.003	0.003	0.006	251.6	62.2	10.597	20.106
08/08/2017	5869034.904	531260.437	620.934	10.74	-0.012	-0.011	0.016	0.010	222.5	31.6	0.002	0.001	0.34	-0.014	-0.005	0.015	0.009	199.7	31.2	43.094	26.089
02/10/2017	5869034.902	531260.441	620.942	10.89	-0.014	-0.007	0.016	0.018	206.6	49.0	0.001	0.002	0.15	-0.002	0.004	0.004	0.008	116.6	60.8	-29.699	53.127
04/12/2017	5869034.914	531260.444	620.921	11.07	-0.002	-0.004	0.004	-0.003	243.4	-33.9	0.000	0.000	0.17	0.012	0.003	0.012	-0.021	14.0	-59.5	-71.713	-121.750
13/06/2018	5869034.913	531260.447	620.938	11.59	-0.003	-0.001	0.003	0.014	198.4	77.3	0.000	0.001	0.52	-0.001	0.003	0.003	0.017	108.4	79.5	-6.047	32.509
06/12/2018	5869034.909	531260.444	620.803	12.07	-0.007	-0.004	0.008	-0.121	209.7	-86.2	0.001	-0.010	0.48	-0.004	-0.003	0.005	-0.135	216.9	-87.9	10.376	-280.163
12/06/2019	5869034.911	531260.439	620.927	12.59	-0.005	-0.009	0.010	0.003	240.9	16.2	0.001	0.000	0.51	0.002	-0.005	0.005	0.124	291.8	87.5	10.462	240.910
12/12/2019	5869034.915	531260.439	620.927	13.09	-0.001	-0.009	0.009	0.003	263.7	18.3	0.001	0.000	0.50	0.004	0.000	0.004	0.000	0.0	0.0	-7.984	0.000
17/06/2020	5869034.910	531260.443	620.855	13.60	-0.006	-0.005	0.008	-0.069	219.8	-83.5	0.001	-0.005	0.51	-0.005	0.004	0.006	-0.072	141.3	-84.9	-12.440	-139.883
21/12/2020	5869034.917	531260.442	620.911	14.11	0.001	-0.006	0.006	-0.013	279.5	-64.9	0.000	-0.001	0.51	0.007	-0.001	0.007	0.056	351.9	82.8	-13.811	109.380
19/06/2021	5869034.909	531260.453	620.922	14.61	-0.007	0.005	0.009	-0.002	144.5	-13.1	0.001	0.000	0.49	-0.008	0.011	0.014	0.011	126.0	39.0	27.600	22.321
14/12/2021	5869034.908	531260.427	620.924	15.09	-0.008	-0.021	0.022	0.000	249.1	0.0	0.001	0.000	0.49	-0.001	-0.026	0.026	0.002	267.8	4.4	53.391	4.104
28/06/2022	5869034.916	531260.442	620.943	15.63	0.000	-0.006	0.006	0.019	270.0	72.5	0.000	0.001	0.54	0.008	0.015	0.017	0.019	61.9	48.2	-31.680	35.407
16/12/2022	5869034.915	531260.433	620.895	16.10	-0.001	-0.015	0.015	-0.029	266.2	-62.6	0.001	-0.002	0.47	-0.001	-0.009	0.009	-0.048	263.7	-79.3	19.342	-102.526
06/06/2023	5869034.910	531260.444	620.961	16.57	-0.006	-0.004	0.007	0.037	215.0	78.9	0.000	0.002	0.47	-0.005	0.011	0.012	0.066	114.8	79.8	-25.273	140.664
04/01/2024	5869034.913	531260.427	620.927	17.15	-0.003	-0.021	0.021	0.003	261.9	8.0	0.001	0.000	0.58	0.003	-0.017	0.017	-0.034	280.1	-63.5	29.402	-58.991

GPS Hub 06-21 (North End of Abbott Road)









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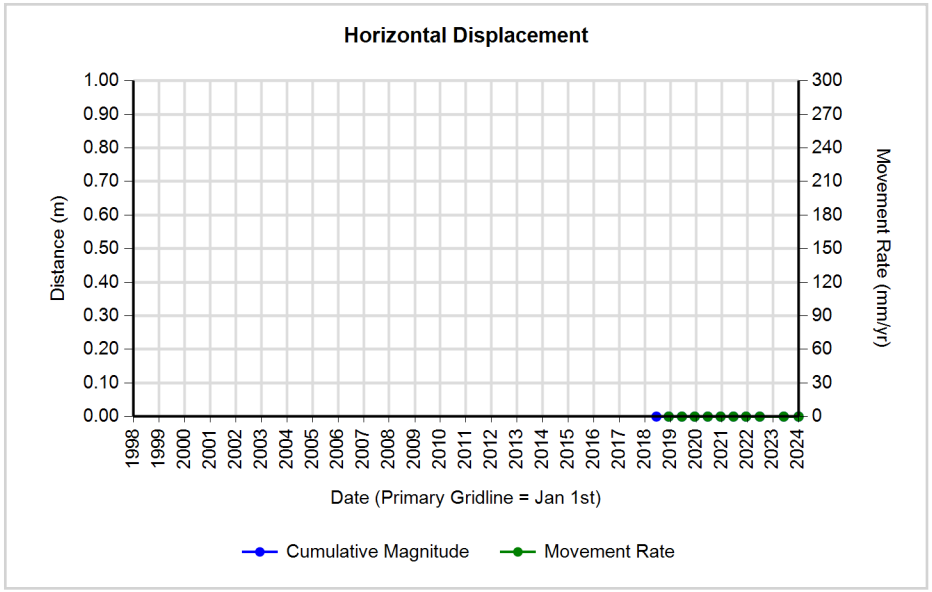
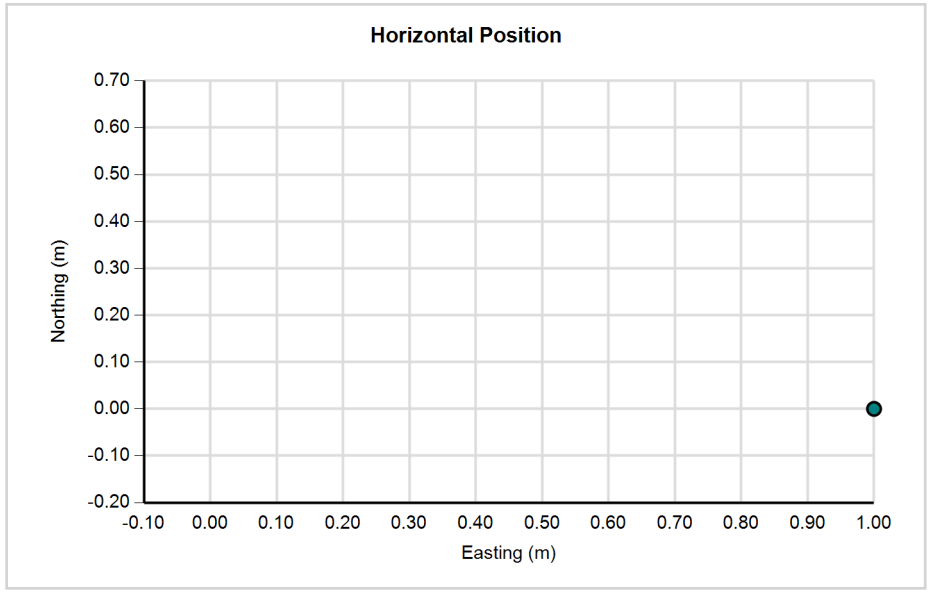
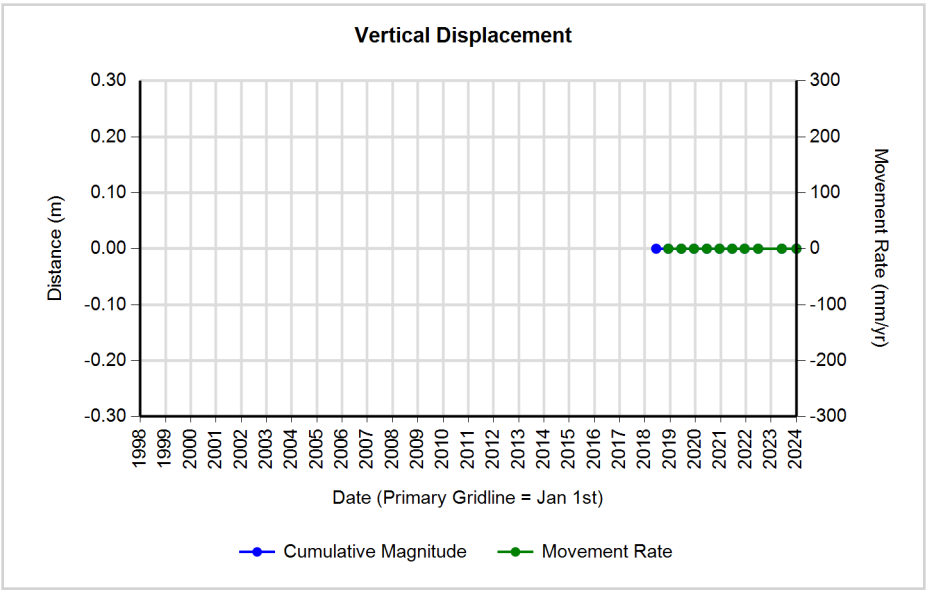
GPS Hub Water Tank (Water Tank 3 Benchmark)

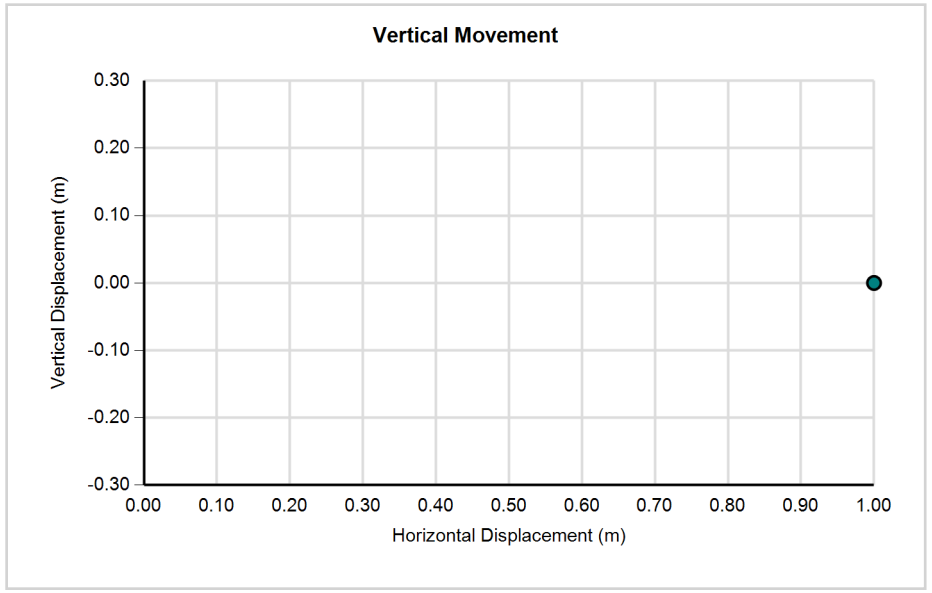
	Surveyed Position			Total Change in Position							Overall Rates(m/yr)		Incremental Change in Position							Incremental Rates	
Date	N	E	Z	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical	Time	N	E	Horizontal	Vertical	Azimuth	Plunge	Horizontal	Vertical
	m	m	m	yrs	m	m	m	m	°	°	m/yr	m/yr	yrs	m	m	m	m	°	°	mm/yr	mm/yr
13/06/2018	5872717.522	532888.232	523.471	0.00	0.000	0.000	0.000	0.000	0.0	0.0			0.00	0.000	0.000	0.000	0.000	0.0	0.0		
06/12/2018	5872717.522	532888.232	523.471	0.48	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.48	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
12/06/2019	5872717.522	532888.232	523.471	1.00	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.51	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
12/12/2019	5872717.522	532888.232	523.471	1.50	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.50	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
16/06/2020	5872717.522	532888.232	523.471	2.01	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.51	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
16/12/2020	5872717.522	532888.232	523.471	2.51	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.50	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
18/06/2021	5872717.522	532888.232	523.471	3.01	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.50	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
14/12/2021	5872717.522	532888.232	523.471	3.50	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.49	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
28/06/2022	5872717.522	532888.232	523.471	4.04	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.54	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
06/06/2023	5872717.522	532888.232	523.471	4.98	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.94	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000
04/01/2024	5872717.522	532888.232	523.471	5.56	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000	0.58	0.000	0.000	0.000	0.000	0.0	0.0	0.000	0.000

GPS Hub Water Tank (Water Tank 3 Benchmark)









APPENDIX

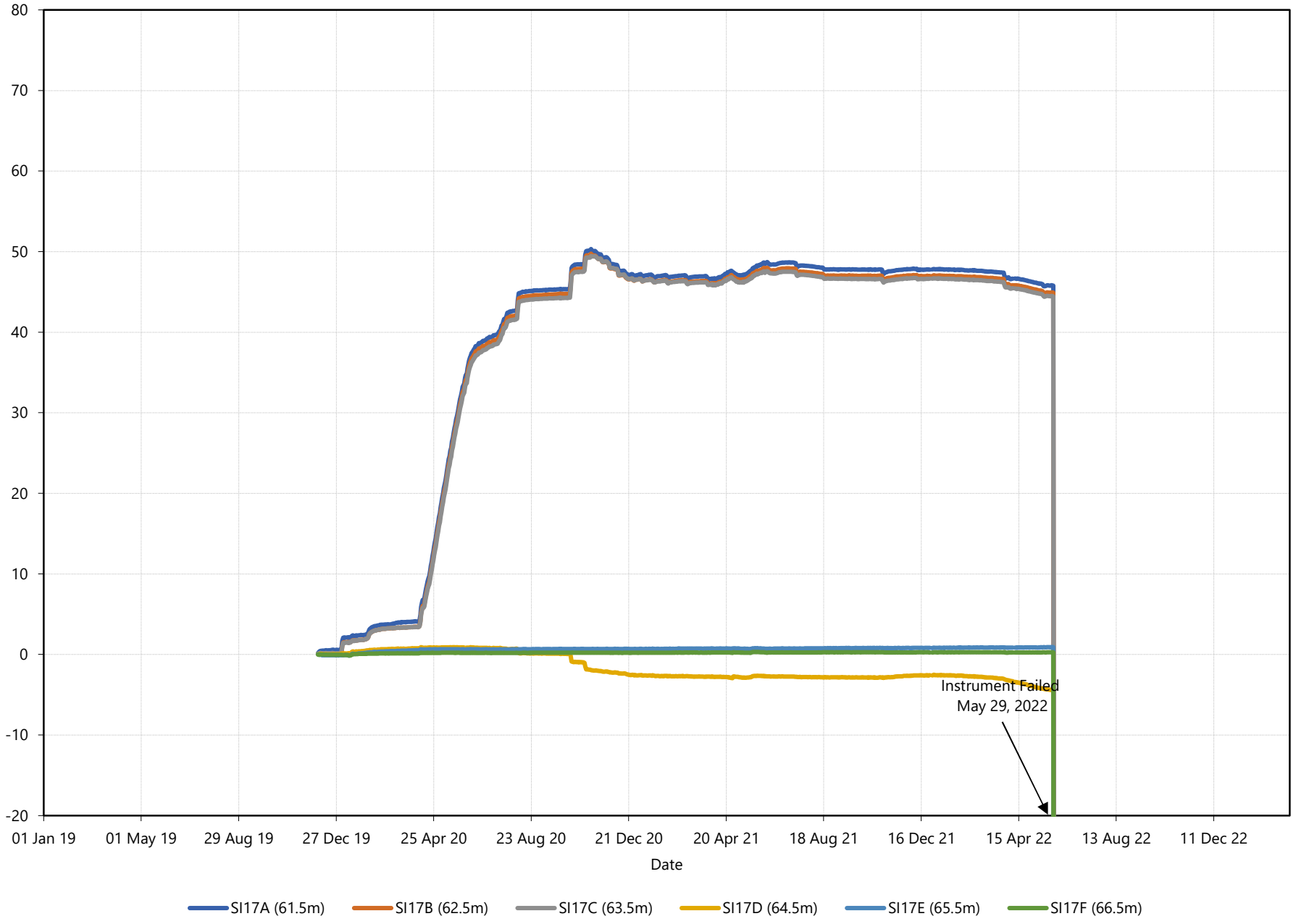
B SLOPE INCLINOMETERS – SUMMARY TABLE AND TREND PLOTS

Appendix B - Slope Inclinometer Status

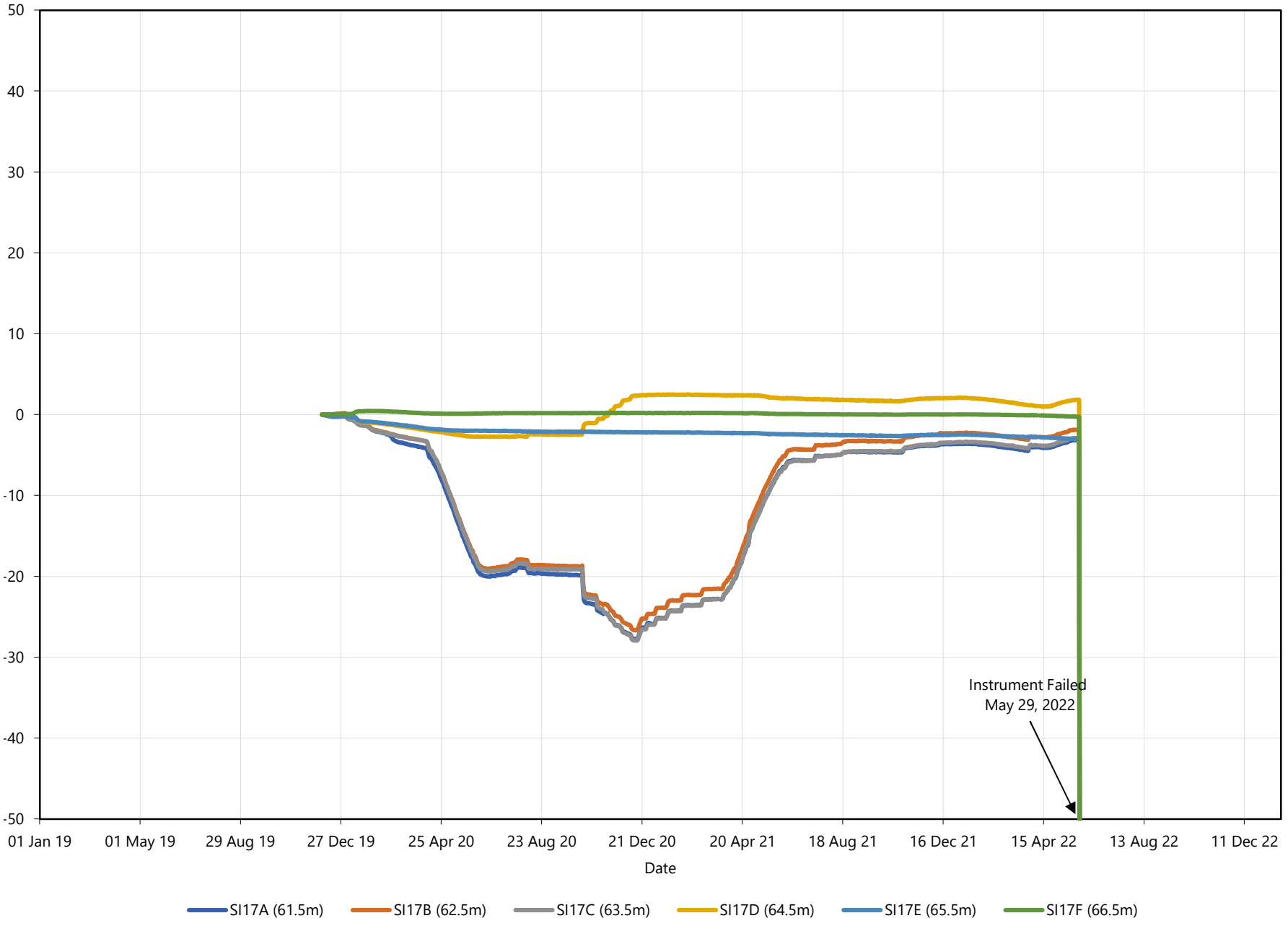
SI ID	Location	Initial Reading Date	Status	Max Displacement To Date
SI1	Avery Lane	November 2000	Decommissioned in 2018	23mm at 40m bgs
SI2	Avery Lane	November 2000	Decommissioned in 2018	86mm at 41m bgs
SI3	Abbott Dr. & Bettcher St.	November 2000	Decommissioned in 2018	61mm at 39m bgs
SI4	Voyager School	November 2000	Decommissioned in 2018	59mm at 51m bgs
SI5	Abbott Dr. (near Flamingo)	October 2000	Decommissioned in 2018	13mm at 35m bgs
SI6	Dixon St.	November 2000	Decommissioned in 2018	83mm at 78m bgs
SI7	Pierce Cres.	November 2000	Decommissioned in 2018	73mm at 68m bgs
SI8	Pinchbeck St.	June 2005	Active - Manual (last read Jun 2012)	No movement detected to 70.5 m depth*
SI9	Patchett St.	April 2005	Decommissioned in 2018	110mm at 65m bgs
SI10	Dawson St.	April 2005	Decommissioned in 2018	12mm at 21m bgs
SI11	Picard Ave.	May 2005	Active - Manual (last read Jun 2009)	No movement detected to 70 m depth*
SI12	Panagrot Ave. (east end)	April 2005	Decommissioned in 2018	47mm at 63m bgs
SI13	Lewis Dr. (at Sikh Temple)	April 2005	Decommissioned in 2018	72mm at 13m bgs
SI14	Findlay Rd.	November 2006	Decommissioned in 2018	62mm at 20m bgs
SI15	Panagrot Ave. (west end)	November 2006	Decommissioned in 2018	56mm at 18m bgs
SI16	Voyager School	September 2012	Failed - in November 2020	84.8mm at 51m gbs
SI17	Uplands Park	October 2012	Decommissioned in 2019	71.5mm at 65.0m bgs
SI17a	Uplands Park	December 2019	Failed - in May 2022	53.7mm at 65.0m bgs
SI18	Picard Ave.	June 2016	Failed - in August 2021	97.1mm at 78m bgs
SI18a SAA	Picard Ave.	April 2023	Active - Real time monitoring	1.5 mm at 76.5 m bgs

* Inclinometer not deep enough to detect movement

SI17a (Station 9) A-Axis



SI17a (Station 9) B-Axis



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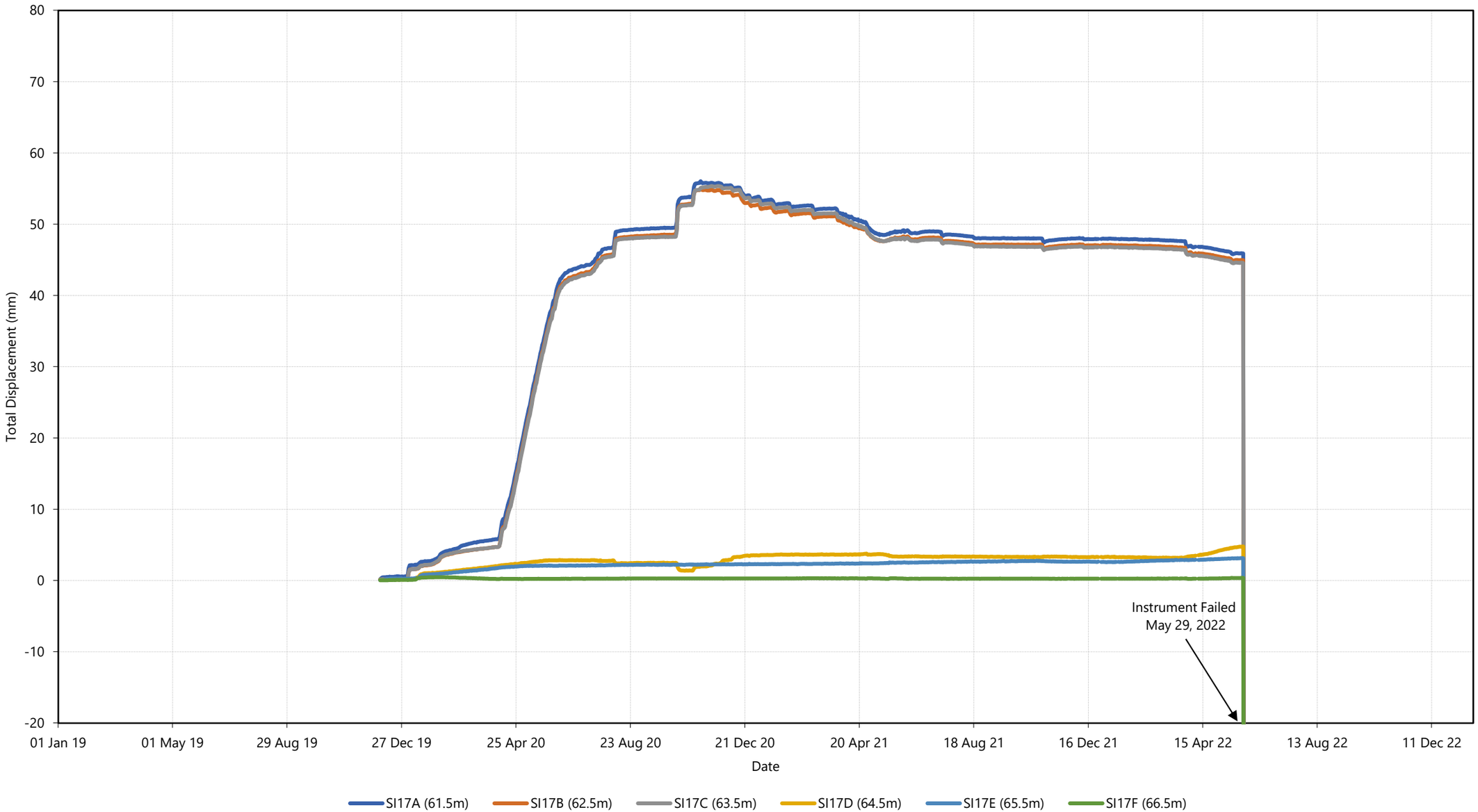
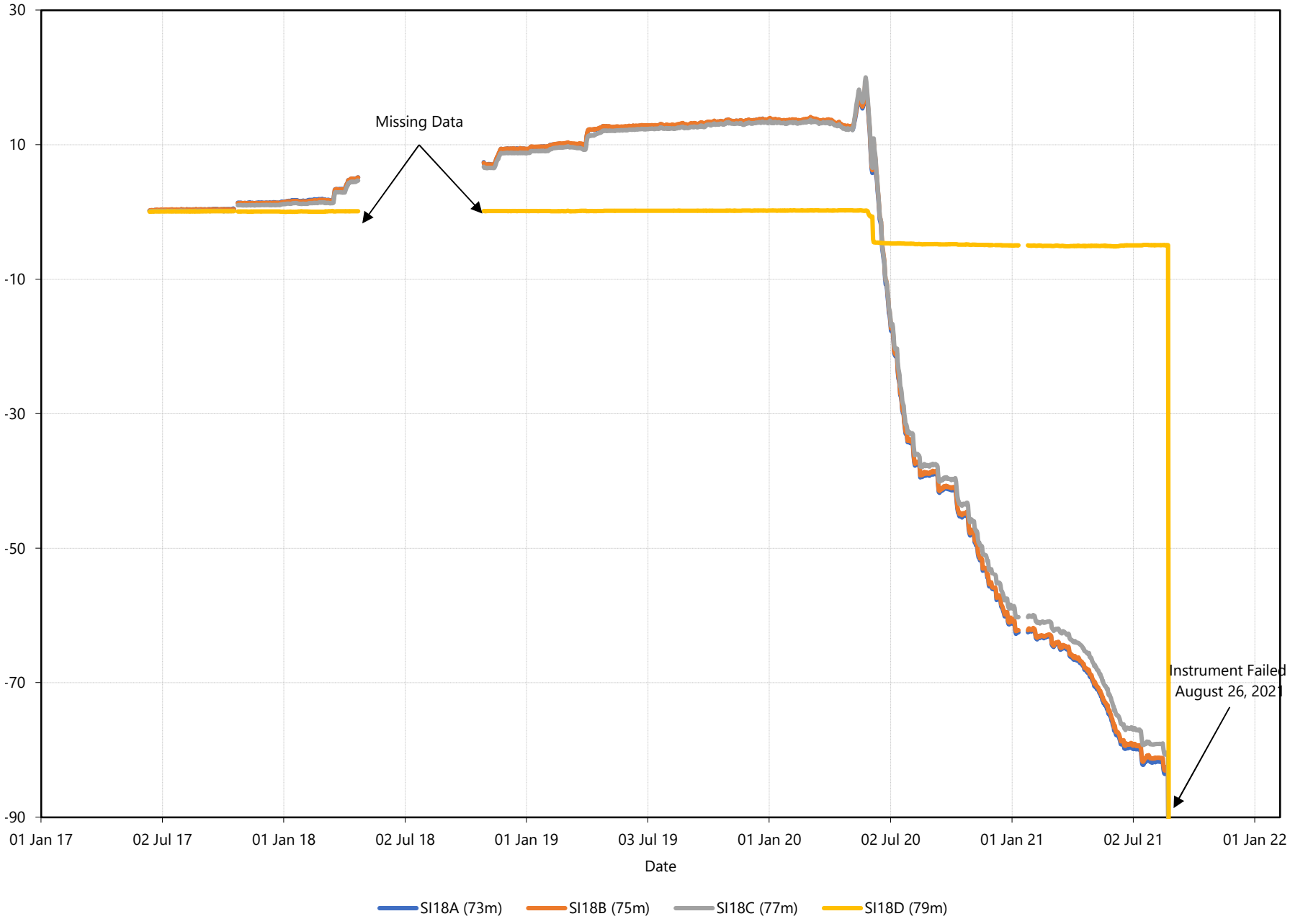
SI17a (Station 9) AB-Axis



SI18 (Station 33) A-Axis



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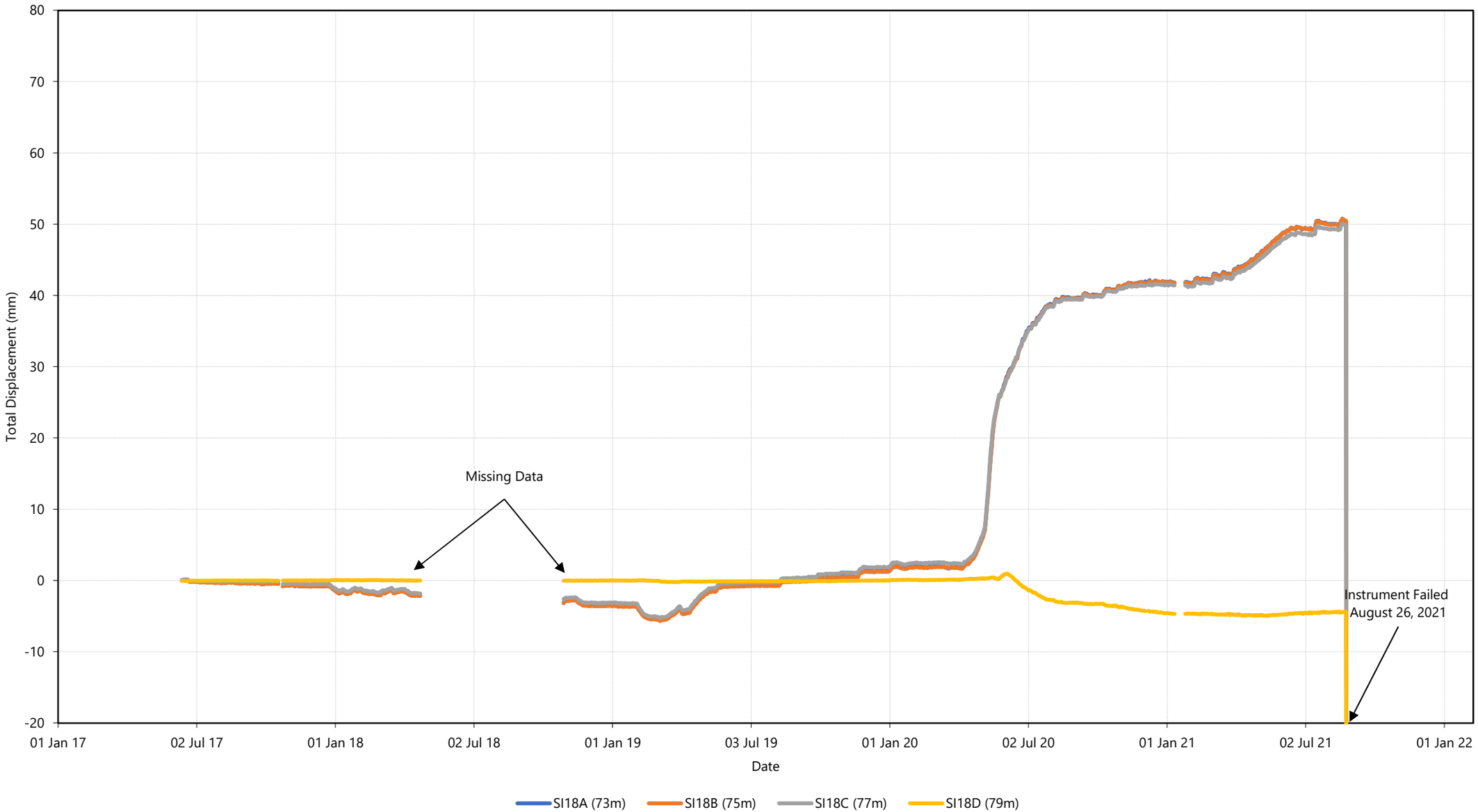
SI18 (Station 33) B-Axis



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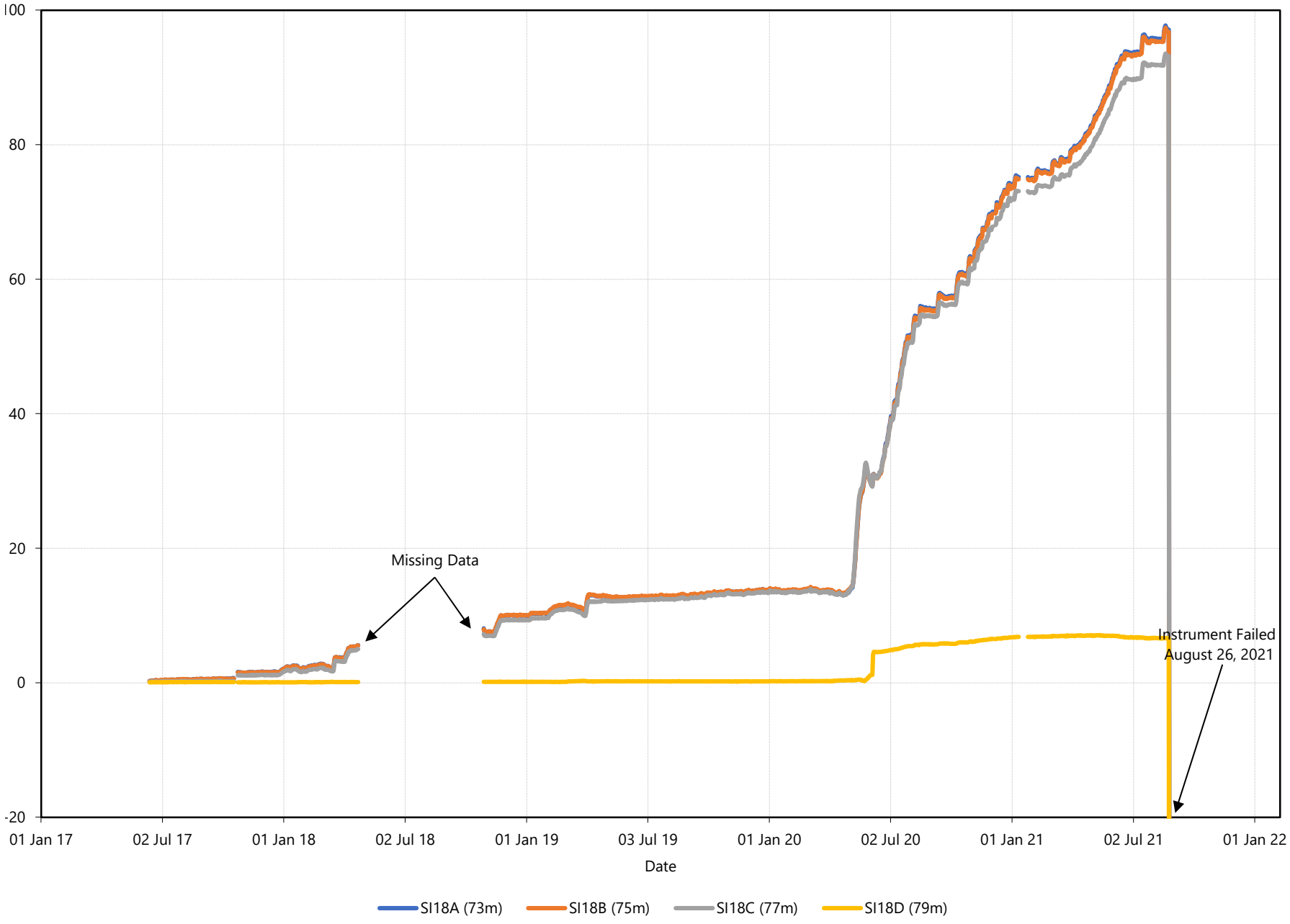

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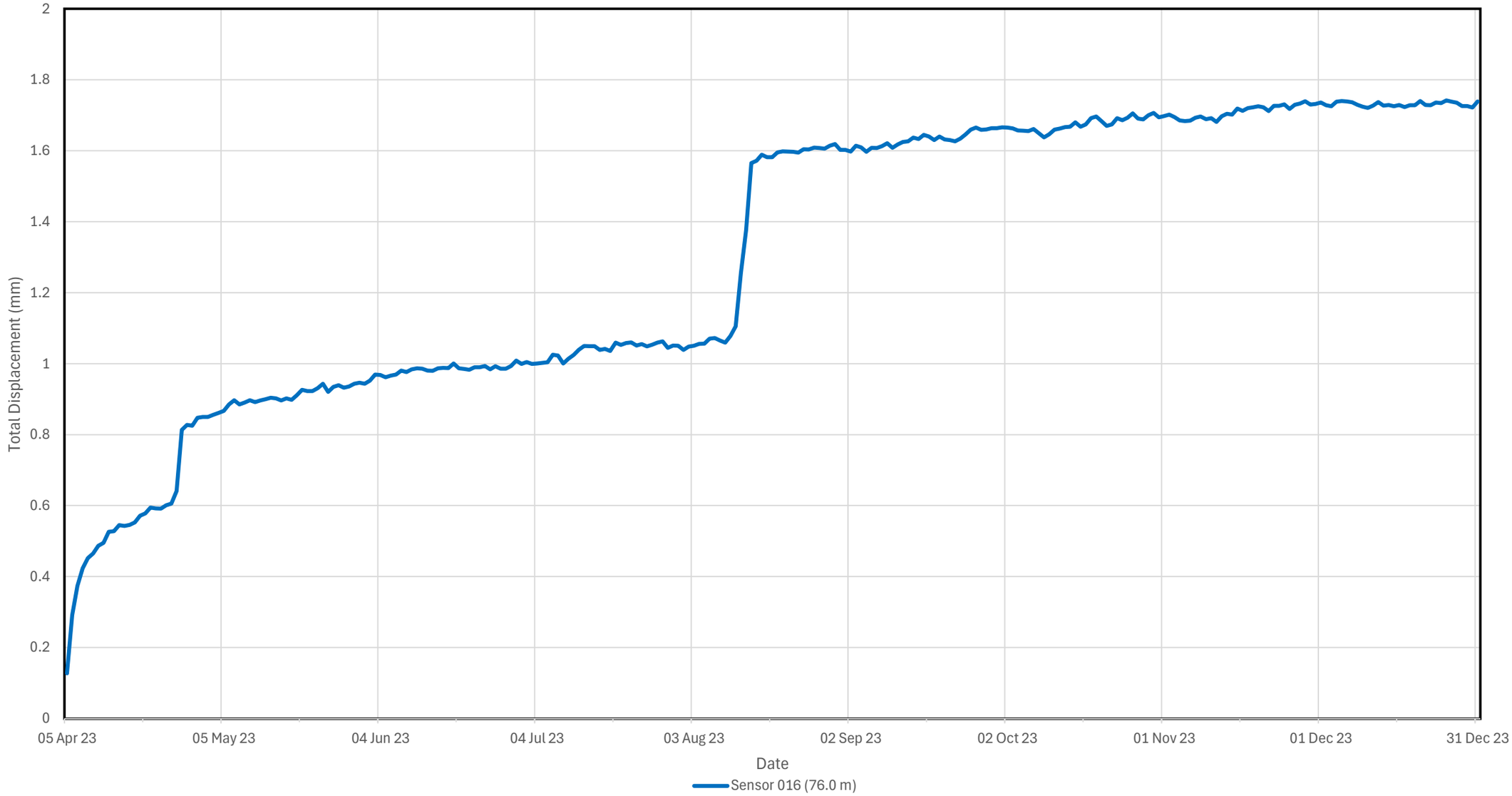
SA18a SAA (Station 33) X-Axis



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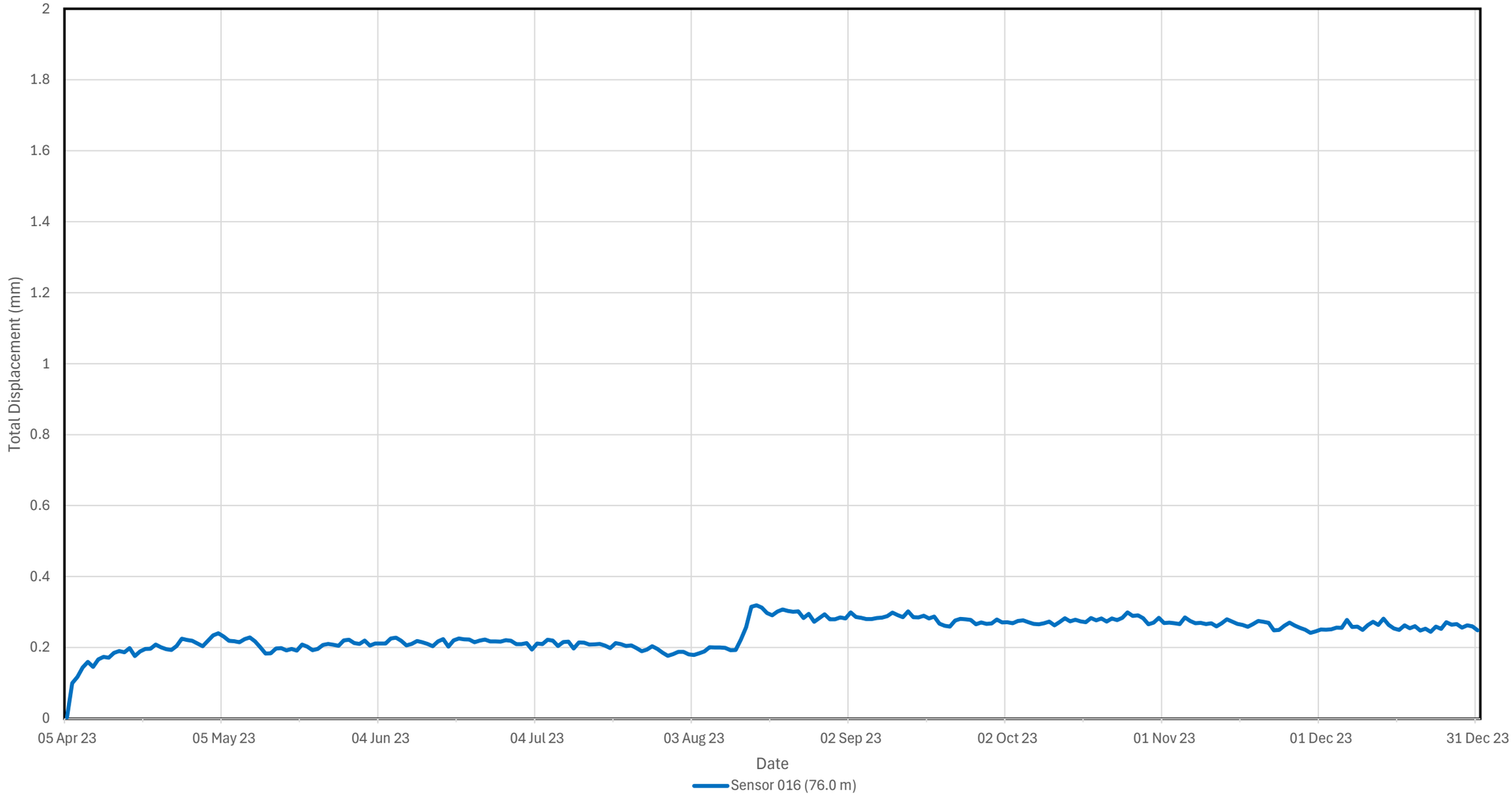

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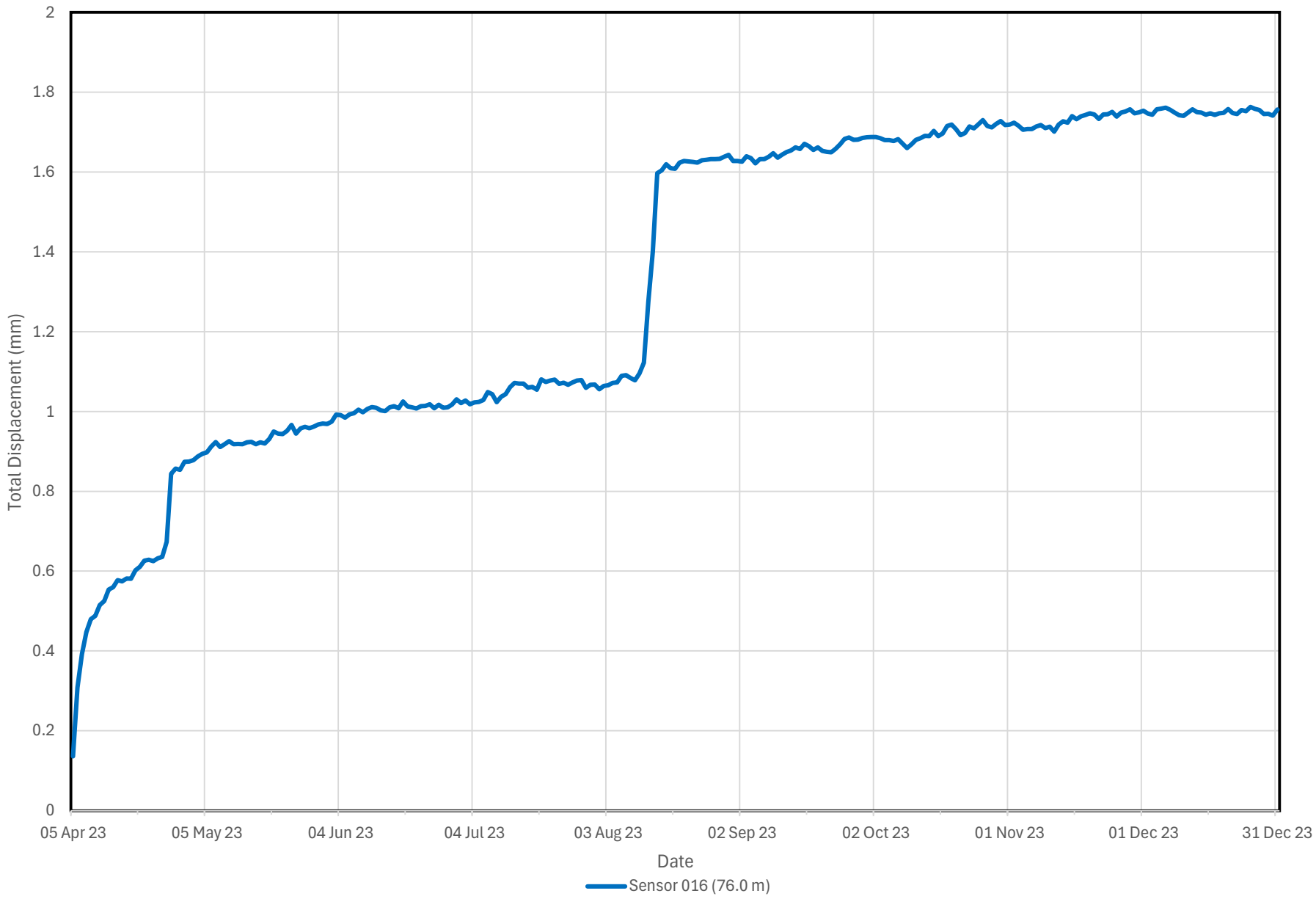


APPENDIX

C PIEZOMETERS – STATUS, OBSERVATION SUMMARY TABLES (C1 TO C3), TREND PLOTS

Table C1 Background Piezometers – Overall Trend and Recent Observations

Instrument	Background Groundwater Condition	Post Dewatering Observations	Difference Between Pre and Post Dewatering
VWP 4	Steady state at 521 m elevation until sharp rise to 526 m elevation in April 2009, spike to 531.8 during BH 35 installation during summer of 2012	Steady state near 527 m with slight seasonal groundwater response then gradual decline to 525 m starting in September 2015. In 2021 to 2023 steady state near 525-525.5 m, with slight spike to 526 m in April-May 2023.	0.5-1.0 m decrease
VWP 7A	Varies, 537 m to 537.5 m elevation	Slight seasonal groundwater rise to 537.5 m in spring, then decreased to 537 m.	Relatively unchanged
VWP 7B	Varies, 535 m to 536 m elevation	Failed in September 2014.	Prior to failure relatively unchanged
VWP 8A	Steady state at 513 m elevation, intermittently dry	Dry.	Unchanged
VWP 8B	Steady state at 513 m elevation, intermittently dry	Dry.	Unchanged
VWP 8C	Steady state at 511 m elevation	Steady state near 510.5 m.	0.5 m decrease
VWP 8D	Gradual decline from 508 m to 505 m elevation, with slight seasonal precipitation response	No seasonal response, continued gradual decline. At end of 2023 at 499.7 m	5.3 m decrease
VWP 11A	Steady state at 517 m elevation	No significant change, possibly dry.	Unchanged
VWP 11B	Steady state at 515.4 m elevation with slight seasonal precipitation response	Steady state near 515.0 m with slight to no seasonal precipitation response.	Relatively unchanged
VWP 11C	Slight decline 515 m to 514 m elevation	Steady state near 511.7 m with slight seasonal precipitation response.	2.4 m decrease
VWP 13A	Varies, generally between 479 m to 480 m elevation, slight longer-term decline	Seasonal groundwater responses, varied between 479 m and 480 m, then erratic unreliable reading between spring of 2017 and late fall 2018. Between 2021 and 2023 seasonal groundwater responses, varied between 477 m and 479.5 m	0.5-2.0 m decrease
VWP 13B	Varies, generally between 481 m to 482.5 m elevation	Seasonal groundwater responses, varied between 481 m and 483 m, seasonal spike to 488 m in spring 2017. Between 2021 and 2023 seasonal groundwater responses, varied between 480 m and 483.5 m.	Relatively unchanged
VWP 14A	Varies, 565.5 m to 567.5 m elevation, with seasonal precipitation response	Seasonal groundwater responses, varies between 565.5 and 568 m.	Relatively unchanged
VWP 14B	Varies, 530 m to 531 m elevation, with minimal seasonal precipitation response	Temporary groundwater increases to 532, 531, 532.3 m and 532 m elevations in March/April 2015, April/May 2019, April/June 2020, April/June 2021 respectively are noted, with gradual returns to steady state near 530 m by the end of respective year.	Relatively unchanged
VWP 14C	Varies, 529 m to 530 m elevation, with minimal seasonal precipitation response	Temporary groundwater increases to 533, 531.5,533.6 m and 532.2 m elevations in March/April 2015, April/May 2019, April/June 2020, April/June 2021 respectively are noted, with gradual returns to steady state near 529 m by the end of respective year.	Relatively unchanged
VWP 15A	Varies, 560 m to 563 m elevation, with strong seasonal and storm precipitation response	Seasonal groundwater responses, from 560 m to 563 m.	Relatively unchanged
VWP 15B	Gradual decline from 540 m to 537.5 m elevation	Gradual decrease to 536.3 m	1.2 m decease

Table C1 Background Piezometers – Overall Trend and Recent Observations

Instrument	Background Groundwater Condition	Post Dewatering Observations	Difference Between Pre and Post Dewatering
VWP 15C	Gradual decline from 538 m to 534.5 m elevation	Gradual decrease to 532.4 m.	2.1 m decrease
VWP 16A	Gradual rise from 645 m to steady state near 646.5 m elevation	Steady state near 646.5 m.	Relatively unchanged
VWP 16B	Increasing from 580 to 589 m elevation until August 2010, steady state until May 2012, then decreasing to near 587 m	Gradual decrease to 582 m.	5.0 m decrease
VWP 16C	Steady state near 550 m elevation	Steady state near 549.5 m.	Relatively unchanged
VWP 16D	Slight variation, near 550 m elevation	Steady state near 550 m with a slight decrease to 549.0 starting in 2020	1.0 m decrease
VWP 35A	Varies, 531 m to 533 m elevation, with seasonal precipitation response	Seasonal groundwater response in the spring, from 531 m to 533 m.	Relatively unchanged
VWP 35B	Varies, 530 m to 531 m elevation, with seasonal precipitation response	Seasonal groundwater response in the spring, from 530 m to 531 m.	Relatively unchanged
VWP 35C	Decrease from 532 m to near 528.5 m elevation after completion of drilling.	Steady state near 528.5 m	Relatively unchanged
VWP 39A	Varies, 561.5 m to 564 m elevation, intermittently dry, seasonal precipitation response	Seasonal groundwater responses varied between 561.5 m and 565.5 m, with generally increasing trend. In spring 2018, spike to 567.5 m, in spring 2019 spiked to 570 m, in spring 2020 spiked to 571.5 m, and in spring 2021, 2022, and 2023 spiked to 572.5 m, and dissipated to 570 m.	6.0 m increase
VWP 39B	Varies, 558 m to 561 m elevation, with seasonal precipitation response	Seasonal groundwater responses varied between 558 m and 564.5 m, with generally increasing trend. In spring 2018, spike to 567.5 m, in spring 2019 spiked to 570 m, in spring 2020 spiked to 571.5 m and in spring 2021, 2022, and 2023 spiked to 572.5 m, and dissipated to 570 m	11.5 m increase

Table C2 Piezometers Near Pumping Wells – Overall Trend and Recent Observations

Instrument	Background Groundwater Condition	Post Dewatering Observations	Difference Between Pre and Post Dewatering
VWP 3 (PW2)	Groundwater level generally varied between 500 to 501 m elevation with seasonal precipitation response; level began to decrease from near 500.5 m following horizontal drain installation in 2012	Gradual decrease, to 490.5 m by end of 2023.	10.0 m decrease
VWP 3A (PW1)	Decreased from start of pump trials in Nov. 2007 until mid-2009, from 518.5 to 504.5 m elevation	Decreasing trend plateau in 2010 at around 503.5 m, an increasing trend observed since 2010 and at the end of 2023 at 505.8 m elevation. Spikes observed in 2019, 2020, and 2023 in relation to the PW1 pump temporarily off.	12.7 m decrease

Table C2 Piezometers Near Pumping Wells – Overall Trend and Recent Observations

Instrument	Background Groundwater Condition	Post Dewatering Observations	Difference Between Pre and Post Dewatering
VWP 3B (PW1)	Decreasing from start of pump trials in Nov. 2007, from 518.5 to 505.5 m elevation	Steady state near 505.5 m. Spikes observed in 2019, 2020, and 2023 in relation to the PW1 pump temporarily off.	13.0 m decrease
VWP 4A (PW1)	Steady state around 521 m elevation with spikes due to precipitation events	Decrease of the steady state around 516 m elevation with spikes due to precipitation events in 2007, 2008, and 2011. No significant spikes noted post 2011.	6 m decrease
VWP 4B (PW1)	Steady state near 516 m elevation with spikes due to precipitation events, no apparent influence from pumping	No significant change with spikes due to precipitation events in 2007, 2008, and 2011. No significant spikes noted post 2011.	Relatively unchanged
VWP 9A (PW12)	Varies, 529.5 m to 530.5 m elevation, with seasonal precipitation response	No significant change with precipitation responses. Since 2018 precipitation responses have been more apparent with a slightly decreased dissipation.	Relatively unchanged
VWP 9B (PW12)	Varies, 530 m to 531 m elevation, with slight seasonal precipitation response	Decreased from near 531 m to near 529 m, following activation of PW12 in April 2013. In late 2019, artificial and localized increase caused by SI17A drilling process, dissipation continues and at the end of 2023 at 530.5 m.	Relatively unchanged
VWP 9C (PW12)	Varies, 531.5 to 529 m elevation	Decreased from near 531 m to near 528.5 m, following activation of PW12 in April 2013. In late 2019, artificial and localized increase caused by SI17A drilling process, dissipation continues and at the end of 2023 at 531.5 m.	Relatively unchanged
VWP 10A (PW14)	Varies, 541 m to 542.5 m elevation, with seasonal precipitation response	Decreased from near 542 m to near 539 m, following activation of PW14 in April 2013. Steady state fluctuates between 539.5 to 542.0 m elevation. Prominent precipitation responses observed up to end of 2018 with muted precipitation response since.	1.5 m decrease
VWP 10B (PW14)	Varies, 541 m to 543 m elevation, with seasonal precipitation response	Decreased from near 542 m to near 531 m, following activation of PW14 in April 2013. Starting in 2020 increased to near 535.5 m by end of 2023.	5.5 m decrease
VWP 10C (PW14)	At or near 536 m elevation, slightly decreasing over time	Decreased from near 536 to near 530.5 m, plateau noted in early 2018, following activation of PW14 in April 2013. Since 2018 increase to near 532 m.	4.0 m decrease
VWP 12A (PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008 from 545 to near 538 m elevation, dry	Dry, immediate response in 2018 noted during PW4 shutdown	7 m+ decrease
VWP 12B (PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008, from 545 to 537 m elevation	Gradual decrease to near 535.5 m, plateau noted in 2018 though the start of 2020. A slight increase to 536 m elevation noted post 2020 freshet. Immediate response in 2018 noted during PW4 shutdown	9.0 m decrease

Table C2 Piezometers Near Pumping Wells – Overall Trend and Recent Observations

Instrument	Background Groundwater Condition	Post Dewatering Observations	Difference Between Pre and Post Dewatering
VWP 12C (PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008, from 537 to 530.5 m elevation	Decrease to near 530.5 m, plateau noted in 2008, with a generally increasing trend, at 533 m elevation at the end of 2023. Seasonal responses observed during freshet followed by dissipation events.	4.0 m decrease
VWP 12D (PW4)	Steady state near 525 m elevation, no apparent influence from pumping or seasonal precipitation response	Gradual increase from 525 to 527 m elevation, observed at the end of 2023.	2.0 m increase
VWP 17A (PW5)	Gradual decrease from start of pump trials in Oct. 2007, from 484 to 482 m elevation, noted in later 2017. Pump failed in late 2017 and reinitialized in early 2020.	Initial gradual decrease from 484 to 482 m with seasonal precipitation response. Increase from 482 to 483.7 m during pump failure (2017 to 2020). Decrease to 482.5 in 2020, with seasonal precipitation responses. Further decrease to 481.3 m by end of 2023.	2.7 m decrease
VWP 17B (PW5)	Gradual decrease from start of pump trials in Oct. 2007, from 483 to 479.5 m elevation, noted in later 2017. Pump failed in late 2017 and reinitialized in early 2020.	Initial gradual decrease from 483 to 479.5 m with seasonal precipitation response. Increase from 479.5 to 483 m during pump failure (2017 to 2020). Decrease to 480.5 in 2020 prior to suspected instrument failure on 22 May 2020.	Prior to instrument failure 2.5 m decrease
VWP 18A (PW5)	Gradual decrease from start of pump trials in Oct. 2007 until Oct 2013 from 481 to 479.5 m elevation, with seasonal precipitation response.	Between Oct 2013 to Oct 2019, steady state near 480 m, with seasonal precipitation response. Between Oct. 2019 and May 2020 increase to approximately 481.5. Between 2021 and 2023 steady state at 481 m with instrumentation noise.	Relatively unchanged
VWP 18B (near PW5)	Not working	N/A	N/A
VWP 19A (PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008, from 545 to 541 m elevation, possibly dry	Steady state near 541 m, immediate response in 2018 noted during PW4 shutdown. Possibly dry.	4.0 m decrease
VWP 19B (PW4)	Decreased from start of pump trials in Oct. 2007 until early 2008 from 545 to 538 m elevation	Steady state near 538 m, immediate response in 2018 noted during PW4 shutdown. Possibly dry	7.0 m decrease
VWP 20 (PW4)	Gradual decrease from start of pump trials in Oct. 2007 until June 2011, from 545 to 542 m elevation), seasonal increases to 543 m	Between June 2011 to June 2016, steady state with seasonal precipitation fluctuations between 542 and 543 m. Between June 2016 and June 2020, a further decrease of steady state to 541.3 m. In June 2020, an increase to near 543 was observed. Between 2021 and 2023 decreasing to 541 m.	4.0 m decrease
VWP 26A (PW6 and PW7)	Decreasing from 554 m to 552 m elevation since installation, slight seasonal precipitation response	Seasonal groundwater responses between 551 to 553 m elevation.	1.0 m decrease
VWP 26B (PW6 and PW7)	Decreasing from near 555 m to near 552.5 m elevation since installation	Gradual decrease to near 550 m. steady state since late 2017.	2.5 m decrease

Table C2 Piezometers Near Pumping Wells – Overall Trend and Recent Observations

Instrument	Background Groundwater Condition	Post Dewatering Observations	Difference Between Pre and Post Dewatering
VWP 27A (PW7 and PW8)	Decreasing from near 553 m to 552.5 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater response, from 552.0 m to 553.5 m, no apparent influence from pumping.	Relatively unchanged
VWP 27B (PW7 and PW8)	Steady state near 551.0 m elevation, no apparent influence from pumping.	Steady state near 551.0 m elevation, no apparent influence from pumping.	Relatively unchanged
VWP 28A (PW9)	Decreasing from near 551 m to 550.5 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 549 to 552 m elevation.	Relatively unchanged
VWP 28B (PW9)	Decreasing from near 551 m to 550.5 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 549 to 552 m elevation. Instrument failure on 28 April 2020.	Prior to instrument failure relatively unchanged
VWP 29A (PW11)	Decreasing from near 555 m to near 552 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 551 to 553 m elevation.	Relatively unchanged
VWP 29B (PW11)	Decreasing from near 556 m to near 552 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 551 to 553 m elevation. Instrument failure on 26 May 2020.	Prior to instrument failure relatively unchanged
VWP 30A (PW11 and PW15)	Decreasing from near 558 m to near 556 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 555 to 557.5 m elevation. In 2020, noted to be higher than typical. Dissipation to 554.5 m elevation by the end of 2023.	Relatively unchanged
VWP 30B (PW11 and PW15)	Decreasing from near 558 m to near 556 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 554 to 557 m elevation. In 2020, noted to be higher than typical. Instrument failure on 4 June 2021.	Prior to instrument failure relatively unchanged
VWP 31A (PW15 and PW16)	Decreasing from near 558.5 m to near 557.5 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 556.5 to 559 m elevation. In 2020, noted to be higher than typical. Dissipation to 556.0 m by the end of 2023.	Relatively unchanged
VWP 31B (PW15 and PW16)	Decreasing from near 553 m to near 550.5 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 550 to 552 m elevation. In 2020, noted to be higher than typical. Instrument failure on 4 June 2021.	Prior to instrument failure relatively unchanged
VWP 32A (PW16 and PW17)	Decreasing from near 560.5 m to near 559 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 558.5 to 561 m elevation. In 2020, noted to be higher than typical. Dissipation to 558 m by the end of 2023.	Relatively unchanged
VWP 32B (PW16 and PW17)	Decreasing from near 560.5 m to near 559 m elevation since installation no apparent influence from pumping.	Seasonal groundwater responses between 558.5 to 561 m elevation. In 2020, noted to be higher than typical Dissipation to 558 m by the end of 2023.	Relatively unchanged

Table C2 Piezometers Near Pumping Wells – Overall Trend and Recent Observations

Instrument	Background Groundwater Condition	Post Dewatering Observations	Difference Between Pre and Post Dewatering
VWP 33A (PW13)	Increasing from dry to 528 m, no apparent influence from pumping.	Seasonal groundwater responses between 527 to 529 m elevation. Generally increasing trend since 2018.	Relatively unchanged
VWP 33B (PW13)	Decreasing from near 526.5 m to near 525.0 m elevation since installation	Initial decrease to 522 m elevation. Seasonal groundwater responses between 522 to 525 m elevation.	1.5 m decrease
VWP 33C (PW13)	Gradual decrease from near 530 m to near 519 m elevation since installation, no apparent influence from pumping.	Steady decrease from 519 m to near 512.0 m. Apparent steady state at near 512.0 m established in 2020. Instrument failure on 15 May 2021	Prior to instrument failure, 7.0 m decrease
VWP 34A (PW18)	Decreasing from near 512 m to near 511.5 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 511 to 513 m elevation.	Relatively unchanged
VWP 34B (PW18)	Decreasing from near 513 m to near 511.5 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 511 to 512.5 m elevation.	Relatively unchanged
VWP 34C (PW18)	Decreasing from near 512.5 m to near 512.0 m elevation since installation, no apparent influence from pumping.	Seasonal groundwater responses between 511.5 to 513 m elevation. Instrument failure on 22 April 2020	Prior to instrument failure relatively unchanged
VWP 40A adjusted by -65 m. (PW20 and PW22)	Near 544 m elevation shortly after installation, no apparent influence from pumping.	Gradual decrease from 544 to near 542.5 m elevation (end of 2020), with muted seasonal groundwater responses. Instrument failure on 22 January 2021.	Prior to instrument failure 1.5 m decrease
VWP 40B (PW20 and PW22)	Near 544 m elevation shortly after installation, no apparent influence from pumping.	Gradual decrease from 544 to near 541 m elevation with muted seasonal groundwater responses.	3.0 m decrease
VWP 40C (PW20 and PW22)	Near 541 m elevation shortly after installation, no apparent influence from pumping.	Gradual decrease from 541 to near 530 m elevation, with muted seasonal groundwater responses.	11.0 m decrease
VWP 43 (PW24)	Near 490 m elevation shortly after installation, significant influence from pumping.	Immediate drawdown to near 485.5 m elevation. Fluctuation between 485.5 to 491 m due to pumping cycles. The pump is unable to maintain steady state.	Fluctuating 4.5 m decrease
VWP 44 (PW25)	Near 481 m elevation shortly after installation, significant influence from pumping.	Immediate drawdown to near 477 m elevation. Fluctuation due to pumping cycles. The pump is unable to maintain steady state. Increased to 480.5 by end of 2023 due to PW25 shutdown in Fall 2022.	Fluctuating 4.5 m decrease

Table C3 Piezometers Near Horizontal Drains – Overall Trend and Recent Observations

Instrument	Background Groundwater Condition	Post Dewatering Observations	Difference Between Pre and Post Dewatering
VWP 21A (HD4/HD12)	Seasonal groundwater responses between 499 to 501 m elevation; until affected by HD12 install in summer of 2012 drawdown from 500 to 498 m.	Seasonal groundwater responses between 498 to 500 m.	1 m decrease
VWP 21B (HD4/HD12)	Seasonal groundwater responses between 500.5 to 501.5 m elevation; until affected by HD12 install in summer of 2012 drawdown from 501 m to near 492 m.	Variable seasonal groundwater responses: fall 2012 through to spring 2016, between 492 to 493.5 m elevation; spring 2016 through to spring 2020, between 493.5 to 495.5 m elevation; post spring 2020, between 495.5 and 497 m.	5.0 m decrease
VWP 22 (HD4/HD12)	Seasonal groundwater responses between 504.5 to 505.5 m elevation; until affected by HD12 install in summer of 2012 drawdown from 505 m to near 497.5 m.	Post initial drawdown, generally increasing trend with seasonal groundwater responses. In 2023, seasonal responses were up to 502 m.	3.5 m decrease
VWP 23A (HD9)	Steady state near 495 m elevation, no apparent seasonal or influence from horizontal drains	Steady state near 495 m.	Relatively unchanged
VWP 23B (HD9)	Gradual decrease since installation of trial HD1 in Nov. 2007 until mid-2010 from near 495 to 489 m elevation, no seasonal precipitation response	Very gradual decreasing trend from 489 to 488.1 m.	6.9 m decrease
VWP 24 (HD9)	Decreased upon installation of trial HD1 in Nov. 2007 from 501 m to below 492 m elevation, dry	Dry.	9 m + decrease
VWP 25A (HD9)	Varies, 500 to 501 m elevation, very slight seasonal precipitation response, no apparent influence from horizontal drains	Steady state near 500 m.	Relatively unchanged
VWP 25B (HD9)	Steady state near 498 m elevation, no apparent seasonal or influence from horizontal drains	Steady state near 498, with irregular and inconsistent readings.	Relatively unchanged
VWP 36A (HD8)	Dry	Dry	Unchanged
VWP 36B (HD8)	Near 502 m elevation shortly after installation	Gradual decrease from 502 to near 493.5 m elevation. Very minor seasonal groundwater responses.	8.5 m decrease
VWP 36C (HD8)	Near 501.5 m elevation shortly after installation	Gradual decrease from 501.5 m to near 488.6 m elevation. Very minor seasonal groundwater responses.	12.9 m decrease
VWP 37A (HD10)	Dry	Dry	Unchanged
VWP 37B (HD10)	Near 498.5 m elevation shortly after installation	Gradual decrease from 498.5 m to near 493.0 m elevation. Very minor seasonal groundwater responses.	5.5 m decrease

Table C3 Piezometers Near Horizontal Drains – Overall Trend and Recent Observations

Instrument	Background Groundwater Condition	Post Dewatering Observations	Difference Between Pre and Post Dewatering
VWP 38A (HD4/HD12)	Varied from near 494.5 m to 492 m elevation, with seasonal precipitation response	Muted seasonal precipitation responses, with a slightly increase trend.	Relatively unchanged
VWP 38B (HD4/HD12)	Near 500 m elevation shortly after installation	Initial decrease to near 489 m, with a generally increasing trend, up to 491.5 m at the end of 2021 and then decreasing to 489.7 at the end of 2023. Seasonal responses observed during freshet followed by dissipation events.	10.3 m decrease
VWP 41A (HD15)	Near 493 m elevation shortly after installation, no apparent influence from horizontal drains	A slight initial decrease to near 492.5 m. Since 2018, gradual increase to near 496 m.	3.0 m increase
VWP 41B (HD15)	Near 491 m elevation shortly after installation, no apparent influence from horizontal drains	Gradual decrease from 491 m to 490 m. Very minor seasonal groundwater responses.	1.0 m decrease
VWP 42A (HD18)	Near 503.5 m elevation shortly after installation, no apparent influence from horizontal drains	Minor seasonal groundwater responses between 503.5 and 504.5 m.	Relatively unchanged
VWP 42B (HD18)	Near 505.5 m elevation shortly after installation, no apparent influence from horizontal drains	Steady state near 505.5 m elevation, with muted seasonal groundwater responses	Relatively unchanged

Appendix C - Piezometer Status

Standpipe Piezometers

(Previous Name)	Piezometer	Datalogger Station	Location	Installation Date	Depth (screen)	Status
	SP2 (BH2)	STN01	Avery Lane	November 2001	54.2 to 60.2m	Manual
	SP2A (BH2A)	STN05	Bettcher St.	August 2003	86.9-88.4m	Manual
	SP2B (BH2B)	STN05	Bettcher St.	August 2003	47.4-48.2m	Manual
	SP2C (BH2C)	STN05	Bettcher St.	August 2003	25.3-25.9m	Manual
	SP3 (BH3A)	STN06	Flamingo St.	July 2003	50.0-50.6m	Manual
	SP4A (BH4C)	STN06	Flamingo St.	July 2003	22.9-23.5m	Manual
	SP4 (BH4 SP)	STN03	Voyager School	December 2001	39.6-39.9m	Damaged and plugged
	SP6A (BH6A)	STN04	Dixon St.	December 2001	44.0-45.2m	Damaged - sheared at 26.8m
	SP6B (BH6B)	STN04	Dixon St.	December 2001	26.4-27.8m	Manual

Standpipe Piezometers with Vibrating Wires

(Previous Name)	Piezometer	Datalogger Station	Location	Installation Date	Depth (tip)	Status
	VWP 3A (BH3B)	STN06	Flamingo St.	August 2003	40.0m	Active
	VWP 3B (BH3C)	STN06	Flamingo St.	August 2003	31.0m	Active
	VWP 4A (BH4A)	STN06	Flamingo St.	July 2003	40.0m	Active
	VWP 4B (BH4B)	STN06	Flamingo St.	July 2003	23.0m	Active

(Previous Name)

Vibrating Wire Piezometers

Piezometer	Datalogger Station	Location	Installation Date	Depth (tip)	Status
VWP 3 (BH3)	STN02	Abbott Dr.	November 2001	37.5m	Active
VWP 4 (BH4)	STN03	Voyager School	December 2001	49.0m	Active
VWP 7A (BH7A)	STN07	Pierce Cres.	July 2005	27.0m	Active
VWP 7B (BH7B)	STN07	Pierce Cres.	July 2005	64.9m	Failed
VWP 8A (BH8A)	STN08	Pinchbeck St.	June 2005	13.1m	Dry
VWP 8B (BH8B)	STN08	Pinchbeck St.	June 2005	13.0m	Dry
VWP 8C (BH8C)	STN08	Pinchbeck St.	June 2005	28.0m	Active
VWP 8D (BH8D)	STN08	Pinchbeck St.	June 2005	56.2m	Active
VWP 9A (BH9A)	STN09	Patchett St.	June 2005	15.1m	Active
VWP 9B (BH9B)	STN09	Patchett St.	June 2005	30.6m	Active
VWP 9C (BH9C)	STN09	Patchett St.	June 2005	50.1m	Active
VWP 10A (BH10A)	STN10	Dawson St.	July 2005	11.6m	Active
VWP 10B (BH10B)	STN10	Dawson St.	July 2005	20.4m	Active
VWP 10C (BH10C)	STN10	Dawson St.	July 2005	48.6m	Active
VWP 11A (BH11A)	STN11	Picard Ave.	June 2005	14.3m	Active
VWP 11B (BH11B)	STN11	Picard Ave.	June 2005	32.0m	Active
VWP 11C (BH11C)	STN11	Picard Ave.	June 2005	50.3m	Active
VWP 12A (BH12A)	STN16	Panagrot Ave. (east end)	June 2005	18.0m	Dry
VWP 12B (BH12B)	STN16	Panagrot Ave. (east end)	June 2005	22.9m	Active
VWP 12C (BH12C)	STN16	Panagrot Ave. (east end)	June 2005	26.5m	Active
VWP 12D (BH12D)	STN16	Panagrot Ave. (east end)	June 2005	54.9m	Active
VWP 13A (BH13A)	STN12	Lewis Dr. (at Sikh Temple)	July 2005	51.m	Active
VWP 13B (BH13B)	STN12	Lewis Dr. (at Sikh Temple)	July 2005	14.4m	Active
VWP 14A (BH14A)	STN13	Findlay Rd.	June 2006	20.1m	Active
VWP 14B (BH14B)	STN13	Findlay Rd.	June 2006	65.9m	Active
VWP 14C (BH14C)	STN13	Findlay Rd.	June 2006	98.7m	Active
VWP 15A (BH15A)	STN14	Panagrot Ave. (west end)	July 2006	8.8m	Active
VWP 15B (BH15B)	STN14	Panagrot Ave. (west end)	July 2006	63.3m	Active
VWP 15C (BH15C)	STN14	Panagrot Ave. (west end)	July 2006	83.2m	Active

(Previous Name)

Vibrating Wire Piezometers

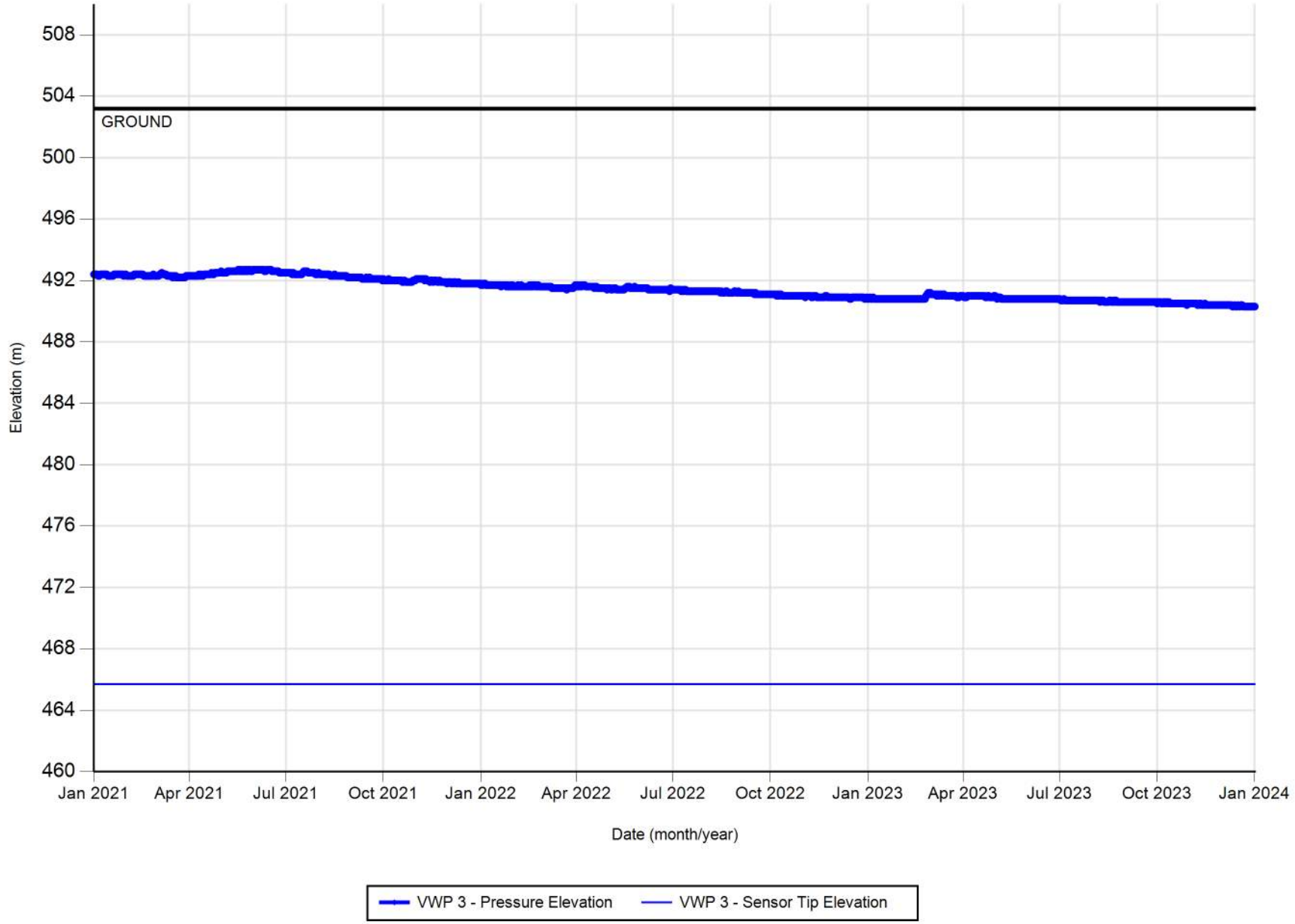
Piezometer	Datalogger Station	Location	Installation Date	Depth (tip)	Status
VWP 16A (BH16A)	STN15	Diatomite Mine	October 2006	42.7m	Active
VWP 16B (BH16B)	STN15	Diatomite Mine	October 2006	85.5m	Active
VWP 16C (BH16C)	STN15	Diatomite Mine	October 2006	139.1m	Active
VWP 16D (BH16D)	STN15	Diatomite Mine	October 2006	214.9m	Active
VWP 17A (BH17A)	STN17	Adam St.	July 2007	37.7m	Active
VWP 17B (BH17B)	STN17	Adam St.	July 2007	57.4m	Failed
VWP 18A (BH18A)	STN17	Adam St.	July 2007	38.2m	Active
VWP 18B (BH18B)	STN17	Adam St.	July 2007	60.1m	Failed
VWP 19A (BH19A)	STN16	Panagrot Ave. (east end)	July 2007	16.5m	Active
VWP 19B (BH19B)	STN16	Panagrot Ave. (east end)	July 2007	22.3m	Active
VWP 20 (BH20)	STN16	Panagrot Ave. (east end)	July 2007	21.4m	Active
VWP 21A (BH21A)	STN19	Crane St.	July 2007	12.6m	Active
VWP 21B (BH21B)	STN19	Crane St.	July 2007	21.3m	Active
VWP 22 (BH22)	STN19	Crane St.	July 2007	18.3m	Active
VWP 23A (BH23A)	STN18	Baity Ave.	July 2007	22.4m	Active
VWP 23B (BH23B)	STN18	Baity Ave.	July 2007	33.1m	Active
VWP 24 (BH24)	STN18	Baity Ave.	July 2007	22.9m	Dry
VWP 25A (BH25A)	STN18	Baity Ave.	July 2007	16.8m	Active
VWP 25B (BH25B)	STN18	Baity Ave.	July 2007	30.2m	Active
VWP 26A	STN4	Dixon St.	August 2012	13.7m	Active
VWP 26B	STN4	Dixon St.	August 2012	29.3m	Active
VWP 27A	STN4	Dixon St.	August 2012	13.9m	Active
VWP 27B	STN4	Dixon St.	August 2012	30.9m	Active
VWP 28A	STN21	South of Dixion St.	August 2012	14.0m	Active
VWP 28B	STN21	South of Dixion St.	August 2012	27.3m	Failed
VWP 29A	STN21	South of Dixion St.	August 2012	14.0m	Active
VWP 29B	STN21	South of Dixion St.	August 2012	22.6m	Failed
VWP 30A	STN20	South of Abbot Dr.	August 2012	13.4m	Active
VWP 30B	STN20	South of Abbot Dr.	August 2012	22.3m	Failed

(Previous Name)

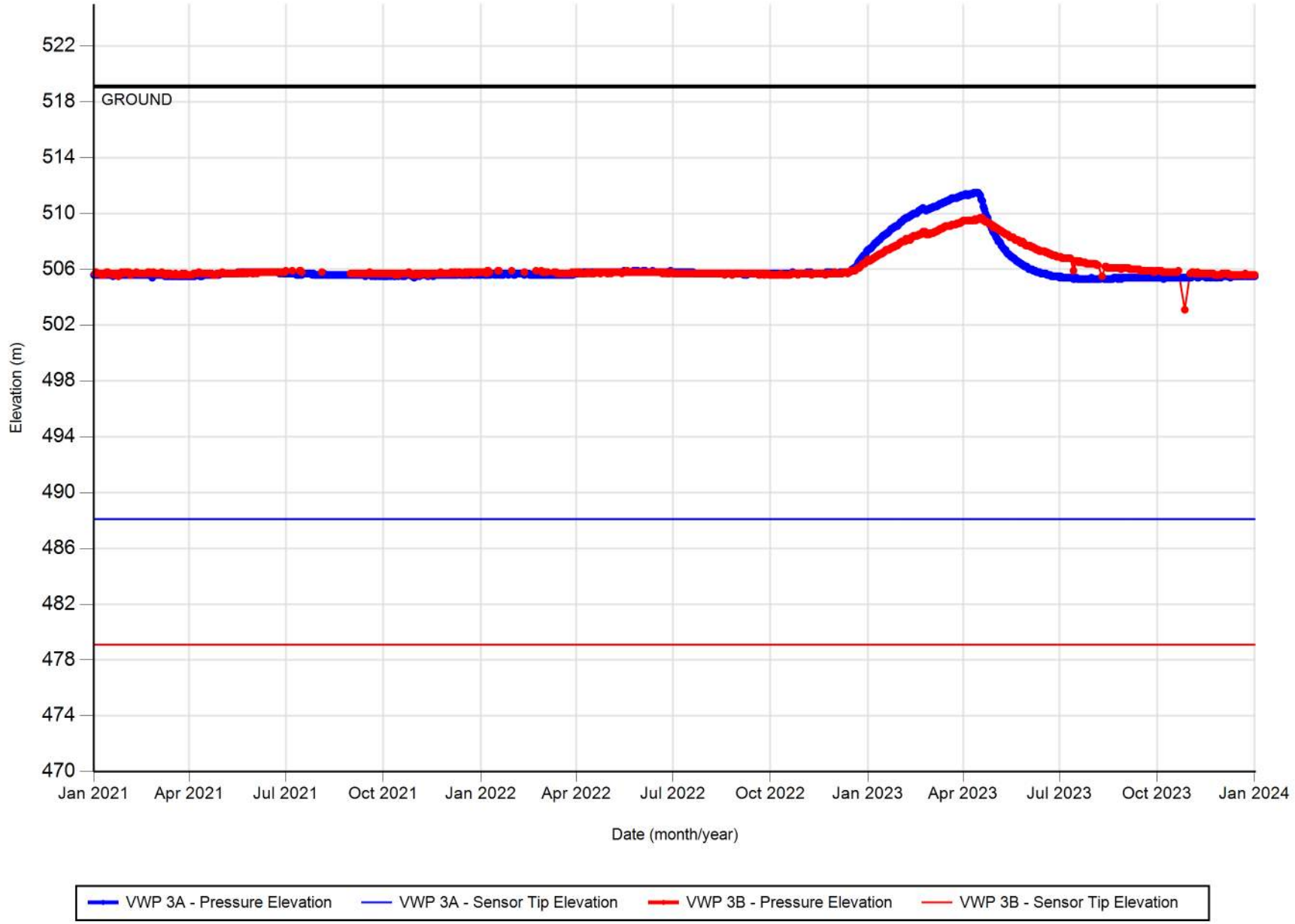
Vibrating Wire Piezometers

Piezometer	Datalogger Station	Location	Installation Date	Depth (tip)	Status
VWP 31A	STN20	South of Abbot Dr.	August 2012	14.2m	Active
VWP 31B	STN20	South of Abbot Dr.	August 2012	22.3m	Failed
VWP 32A	STN20	South of Abbot Dr.	August 2012	14.0m	Active
VWP 32B	STN20	South of Abbot Dr.	August 2012	22.3m	Active
VWP 33A	STN22	Paley Ave.	August 2012	13.7m	Active
VWP 33B	STN22	Paley Ave.	August 2012	22.9m	Active
VWP 33C	STN22	Paley Ave.	August 2012	64.3m	Failed
VWP 34A	STN23	Stork Ave.	August 2012	11.3m	Active
VWP 34B	STN23	Stork Ave.	August 2012	23.5m	Active
VWP 34C	STN23	Stork Ave.	August 2012	39.0m	Failed
VWP 35A	STN03	Voyager School	August 2012	13.7m	Active
VWP 35B	STN03	Voyager School	August 2012	27.4m	Active
VWP 35C	STN03	Voyager School	August 2012	48.8m	Active
VWP 36A	STN25	Pinchbeck St.	August 2012	18.3m	Dry
VWP 36B	STN25	Pinchbeck St.	August 2012	41.1m	Active
VWP 36C	STN25	Pinchbeck St.	August 2012	67.1m	Active
VWP 37A	STN29	Blair St.	August 2012	12.2m	Dry
VWP 37B	STN29	Blair St.	August 2012	34.1m	Active
VWP 38A	STN19	Hawk St.	August 2012	13.7m	Active
VWP 38B	STN19	Hawk St.	August 2012	34.4m	Active
VWP 39A	STN30	Dodds Ave.	August 2012	14.2m	Active
VWP 39B	STN30	Dodds Ave.	August 2012	19.8m	Active
VWP 40A	STN33	Picard Ave.	April 2016	20.5m	Failed
VWP 40B	STN33	Picard Ave.	April 2016	34.2m	Active
VWP 40C	STN33	Picard Ave.	April 2016	63.9m	Active
VWP 41A	STN18	Blair St.	April 2016	24.5m	Active
VWP 41B	STN18	Blair St.	April 2016	45.9m	Active
VWP 42A	STN29	Bettcher St.	May 2016	19.0m	Active
VWP 42B	STN29	Bettcher St.	May 2016	46.0m	Active
VWP 43	STN34	Lewis Pond	October 2016	13.1m	Active
VWP 44	STN12	Blair Pond	October 2016	6.9m	Active

VWP 3 (Station 02)



VWP 3A and B (Station 06)



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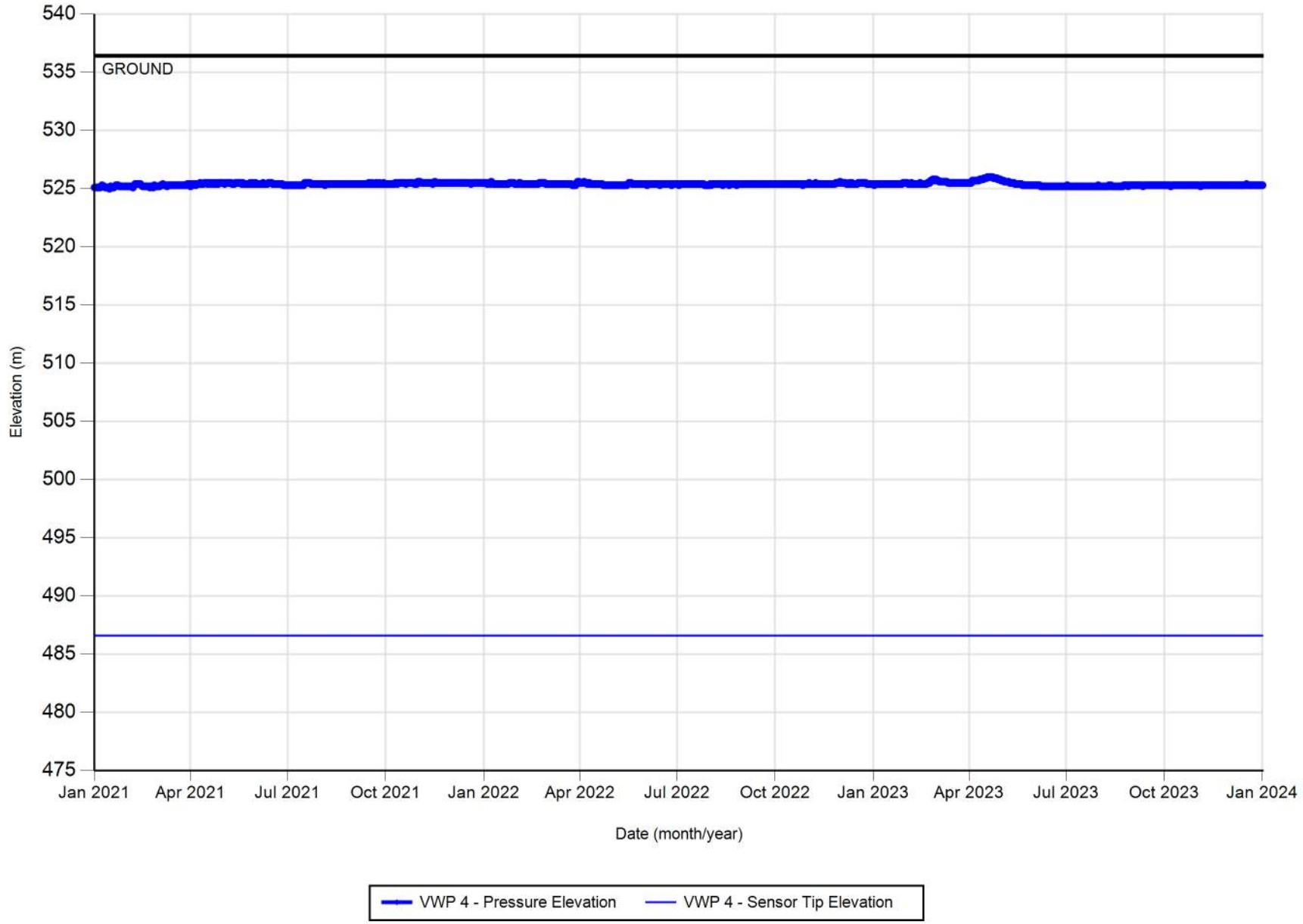

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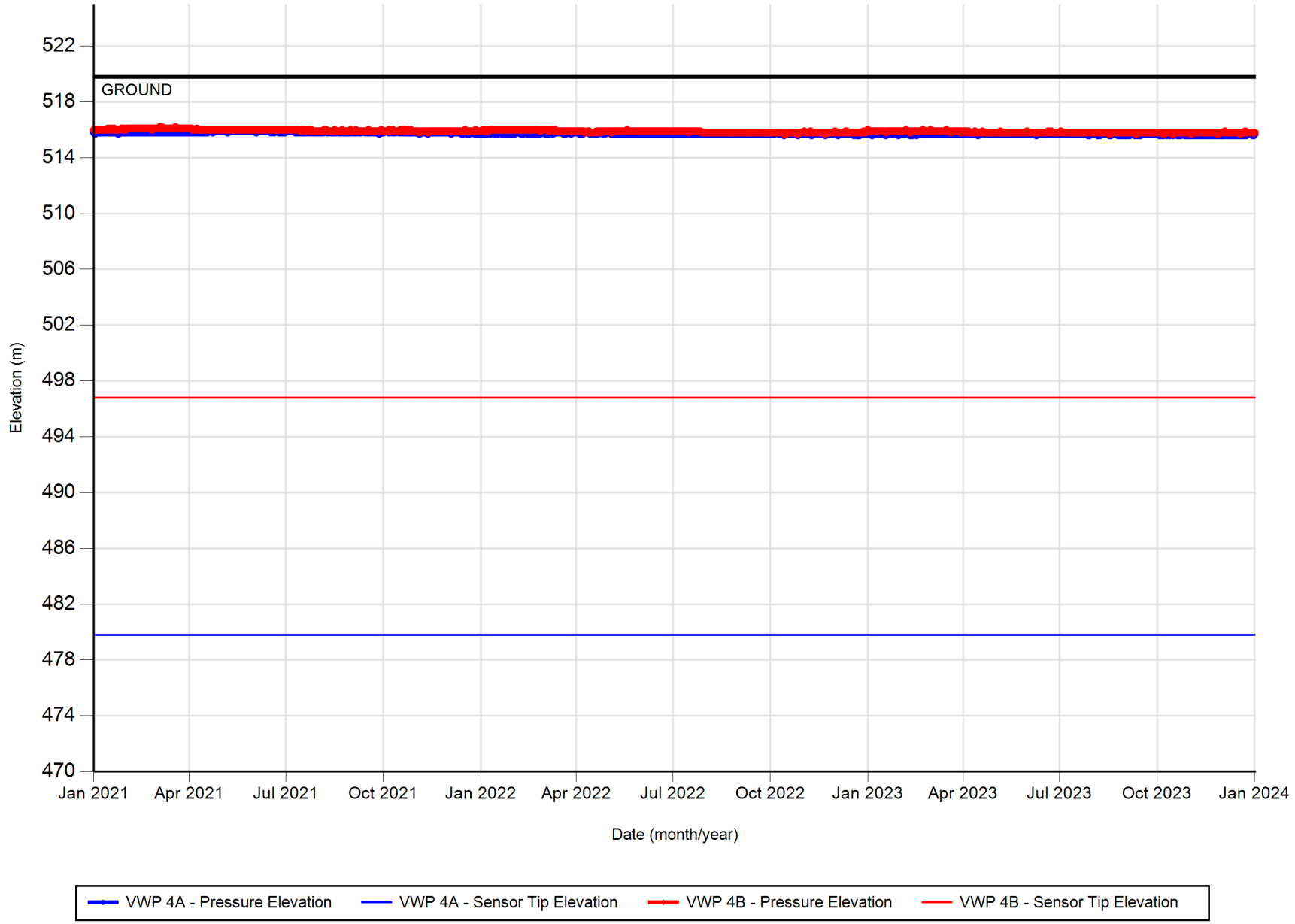

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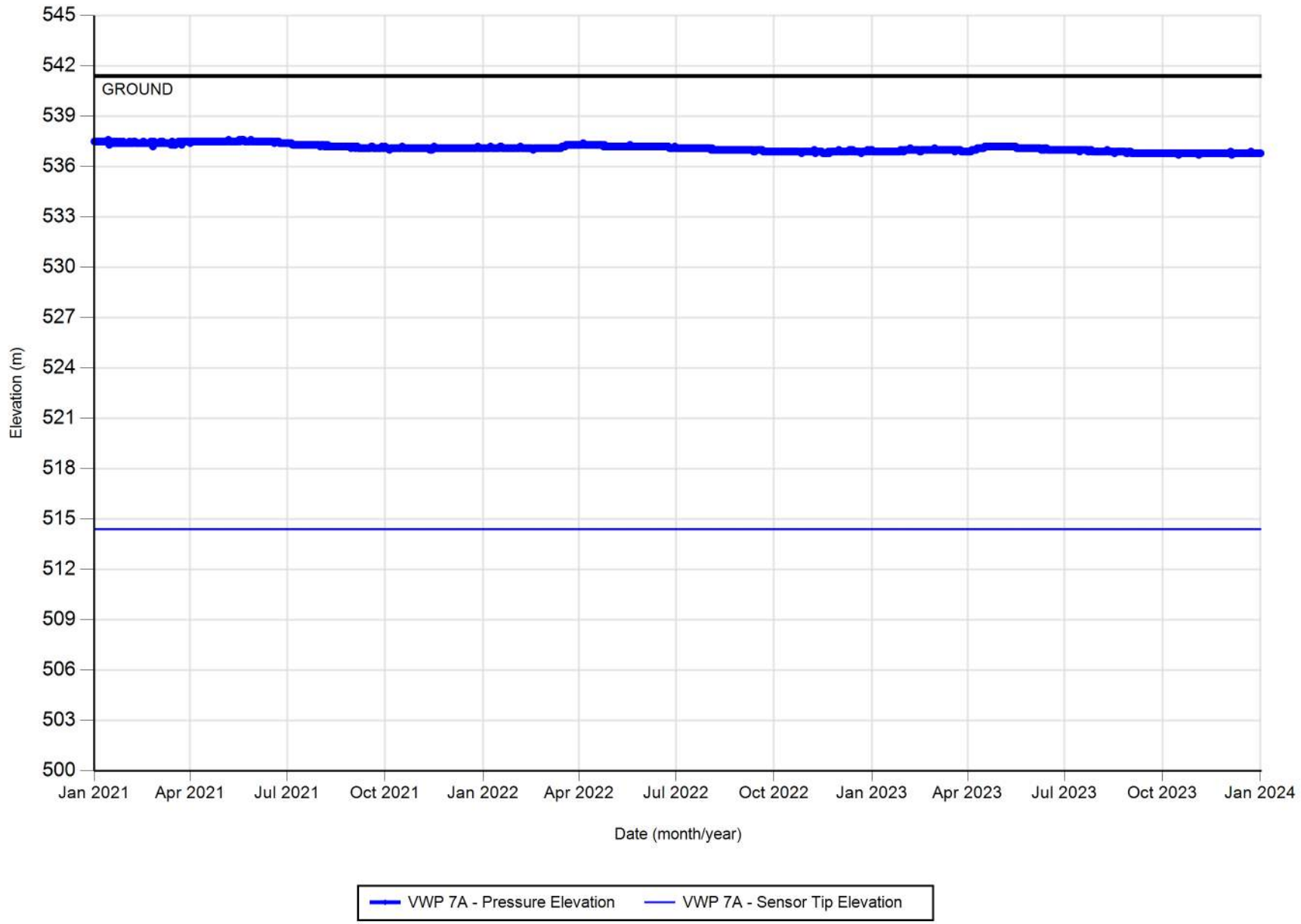

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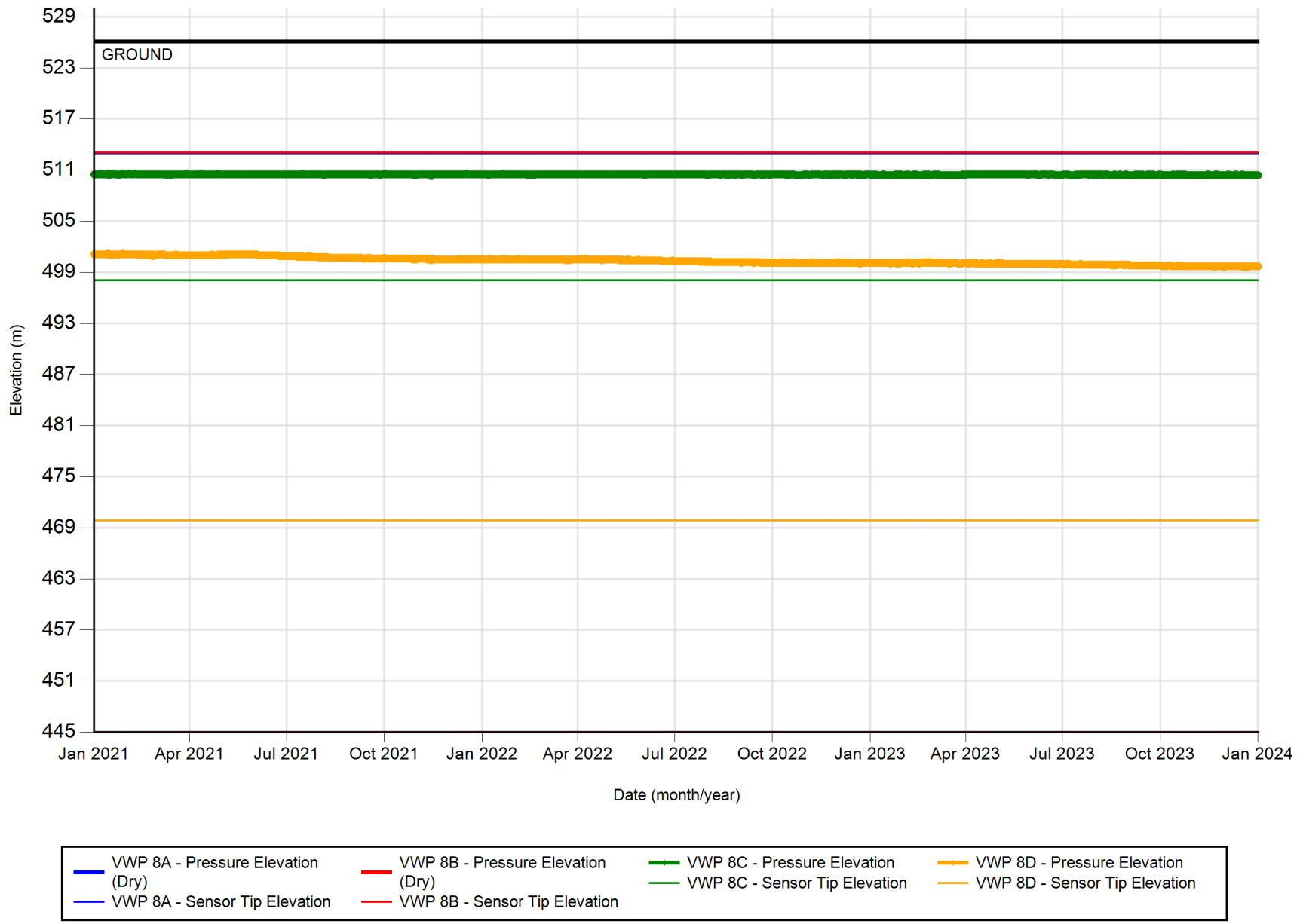

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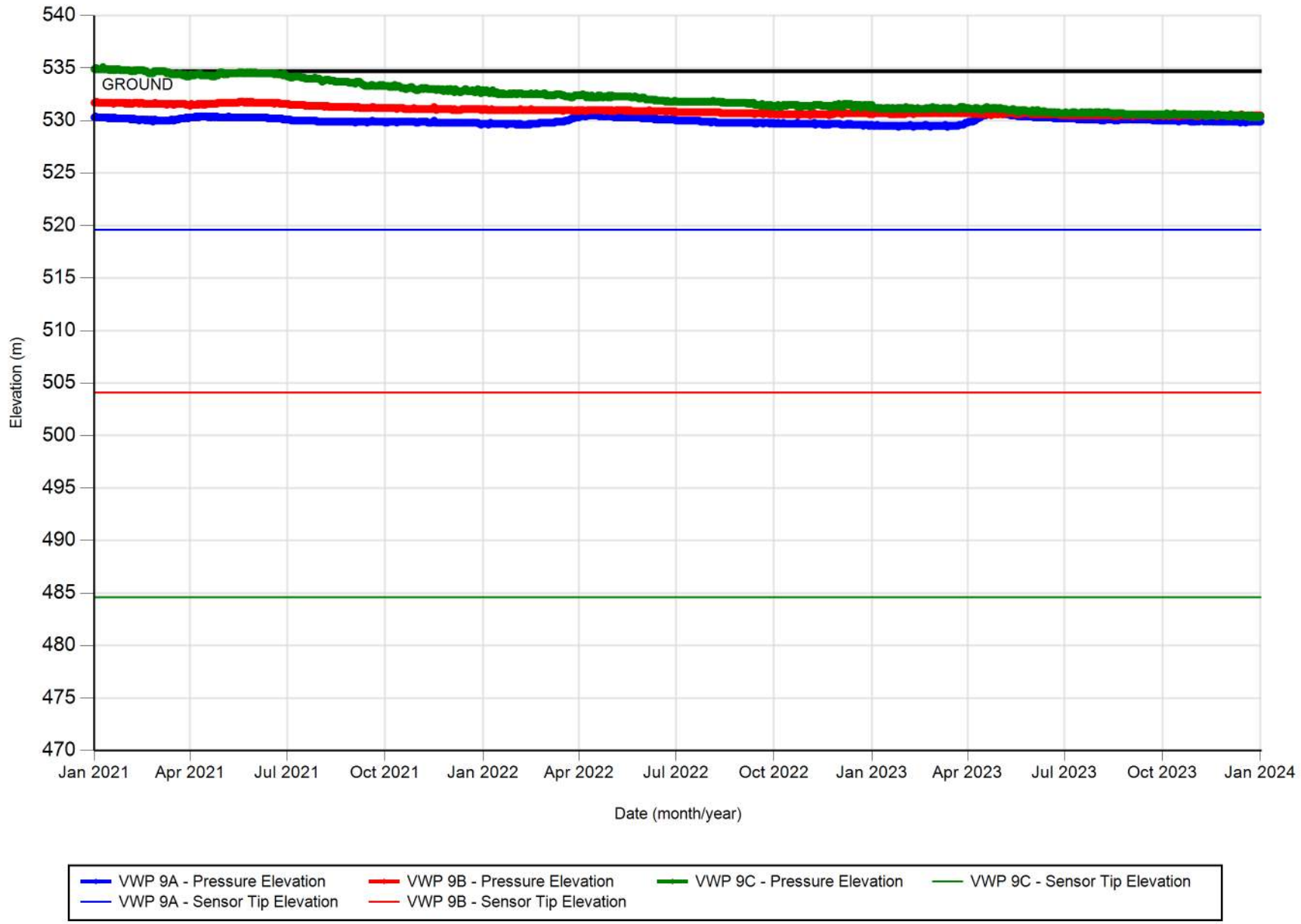

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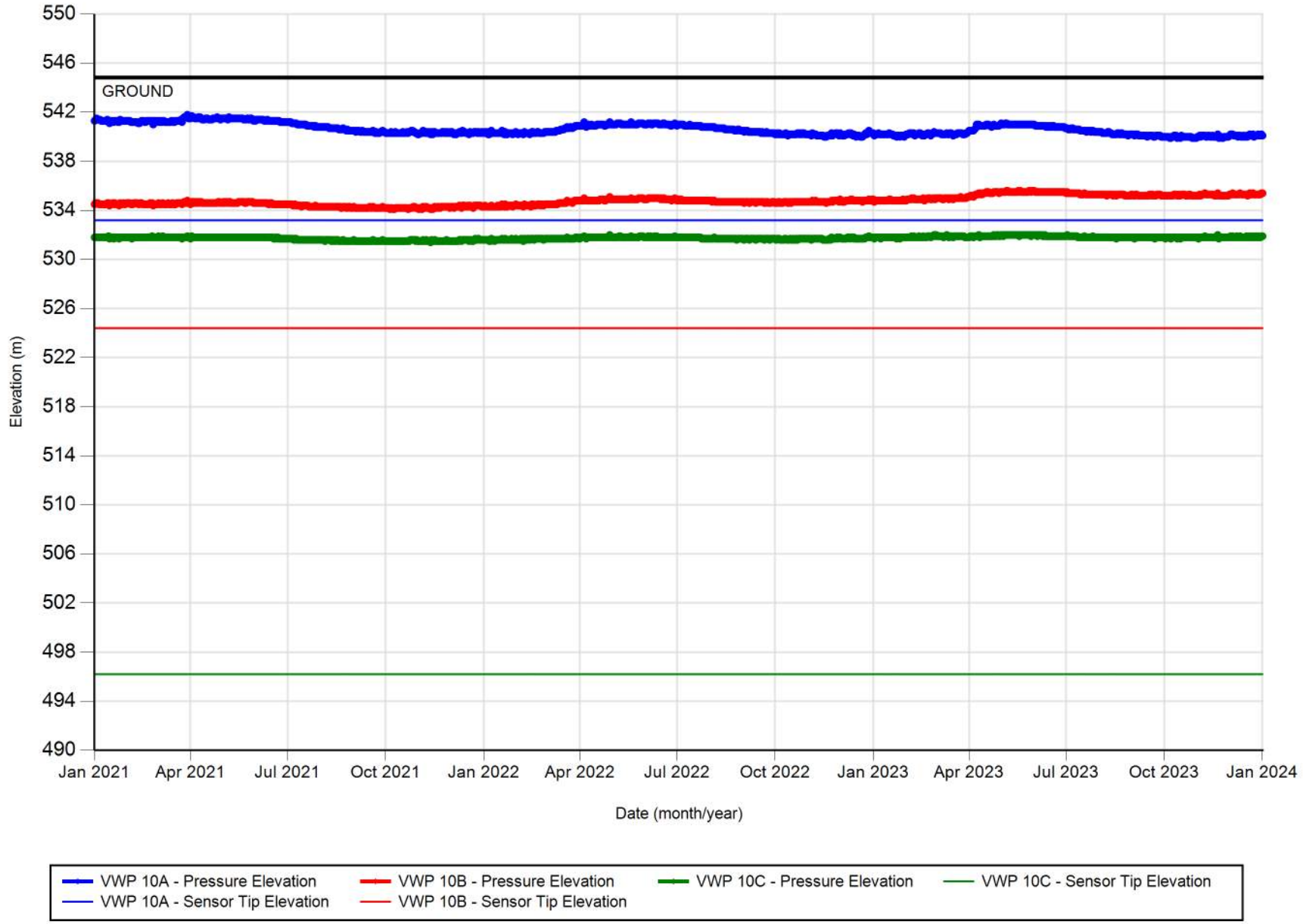
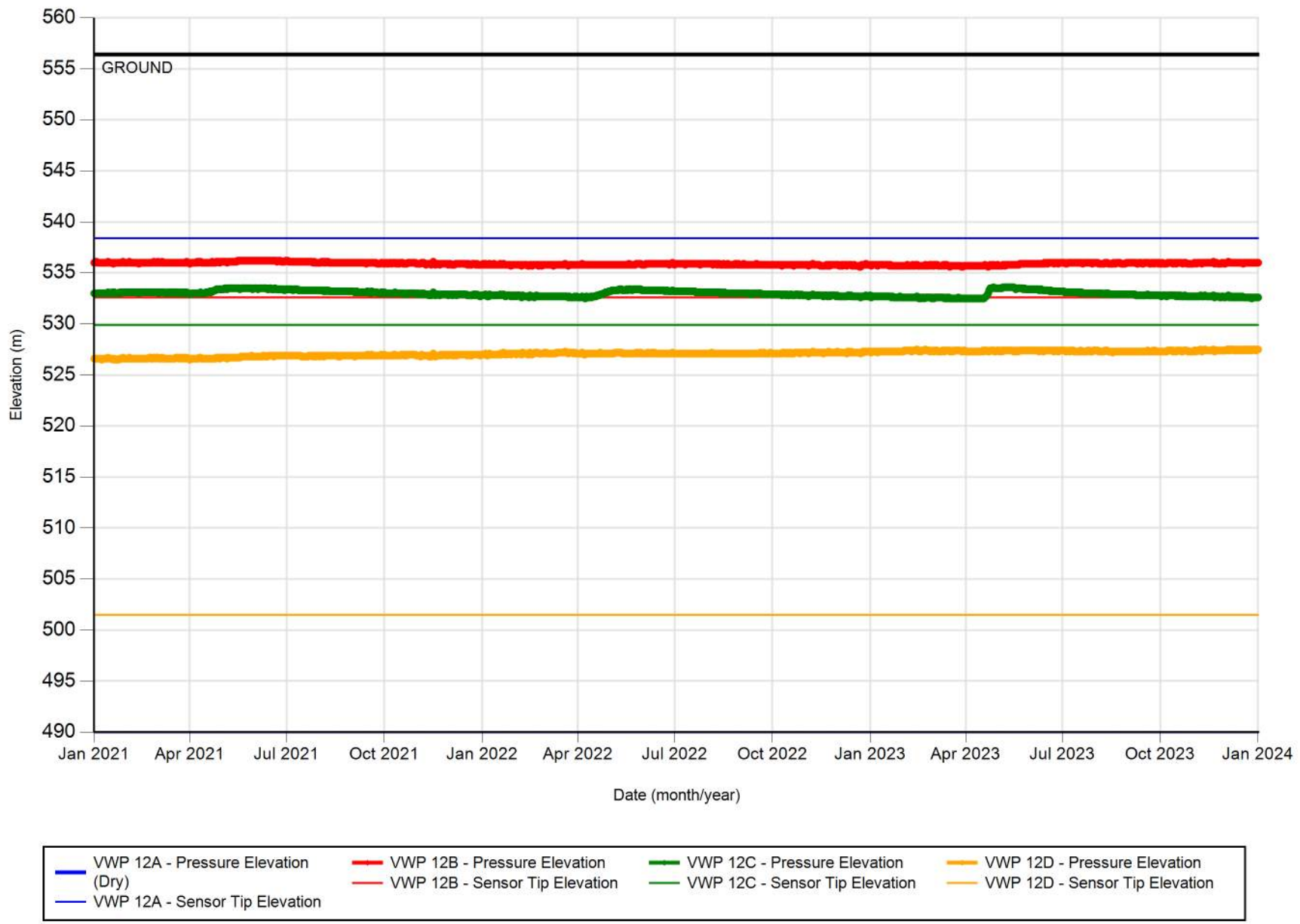


VWP 11A, B, and C (Station 11)



VWP 12A, B, C, and D (Station 16)



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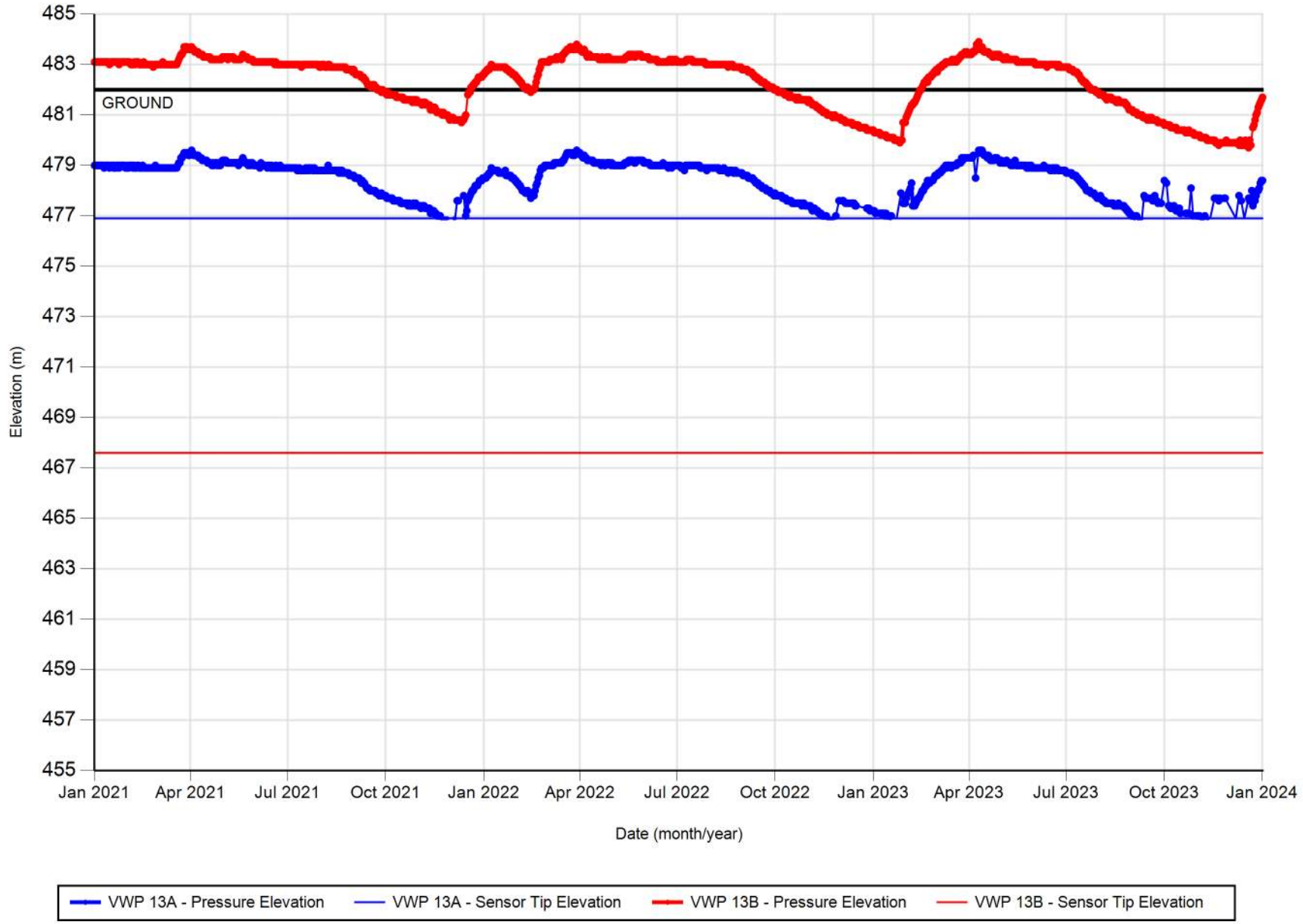

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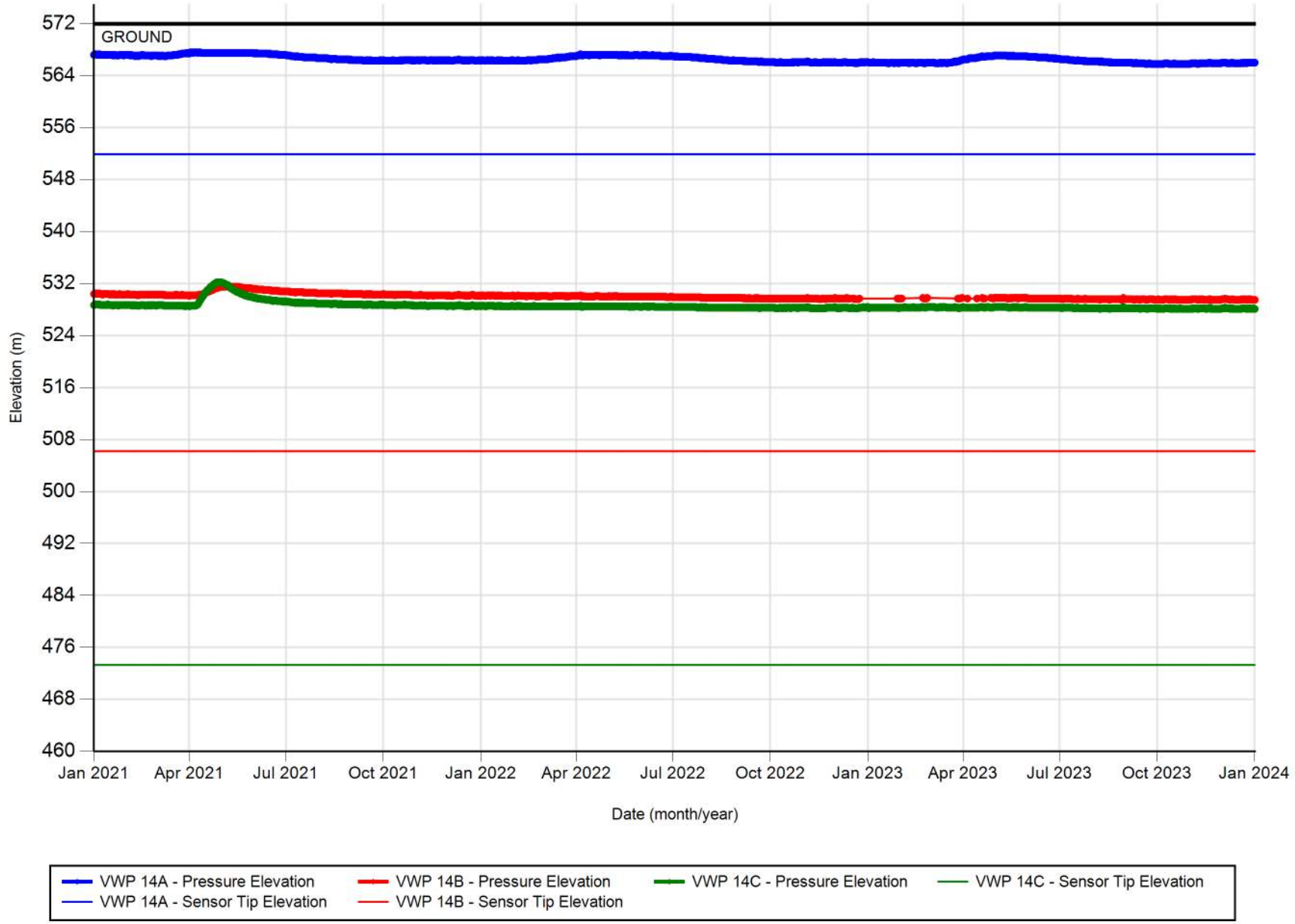

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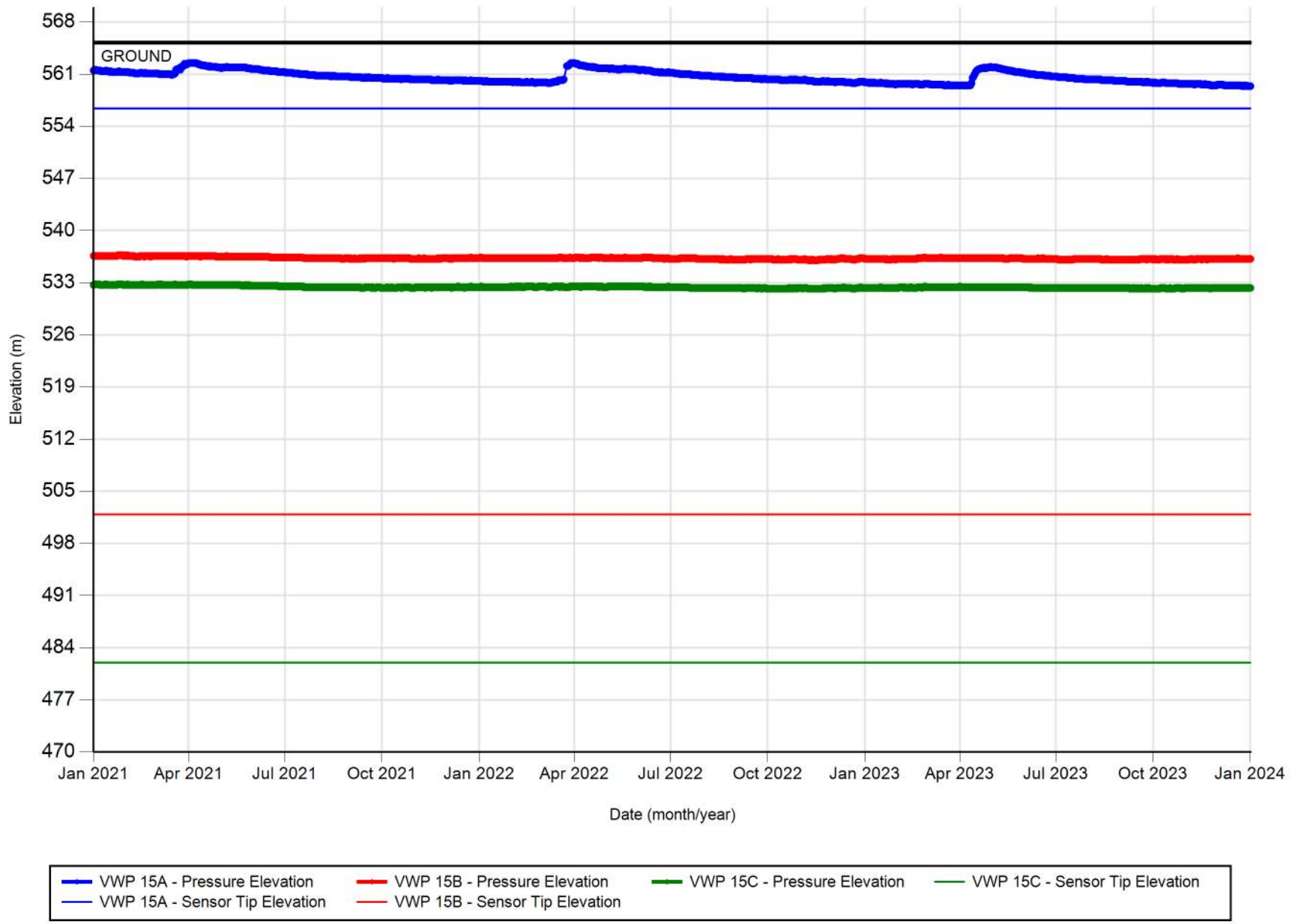
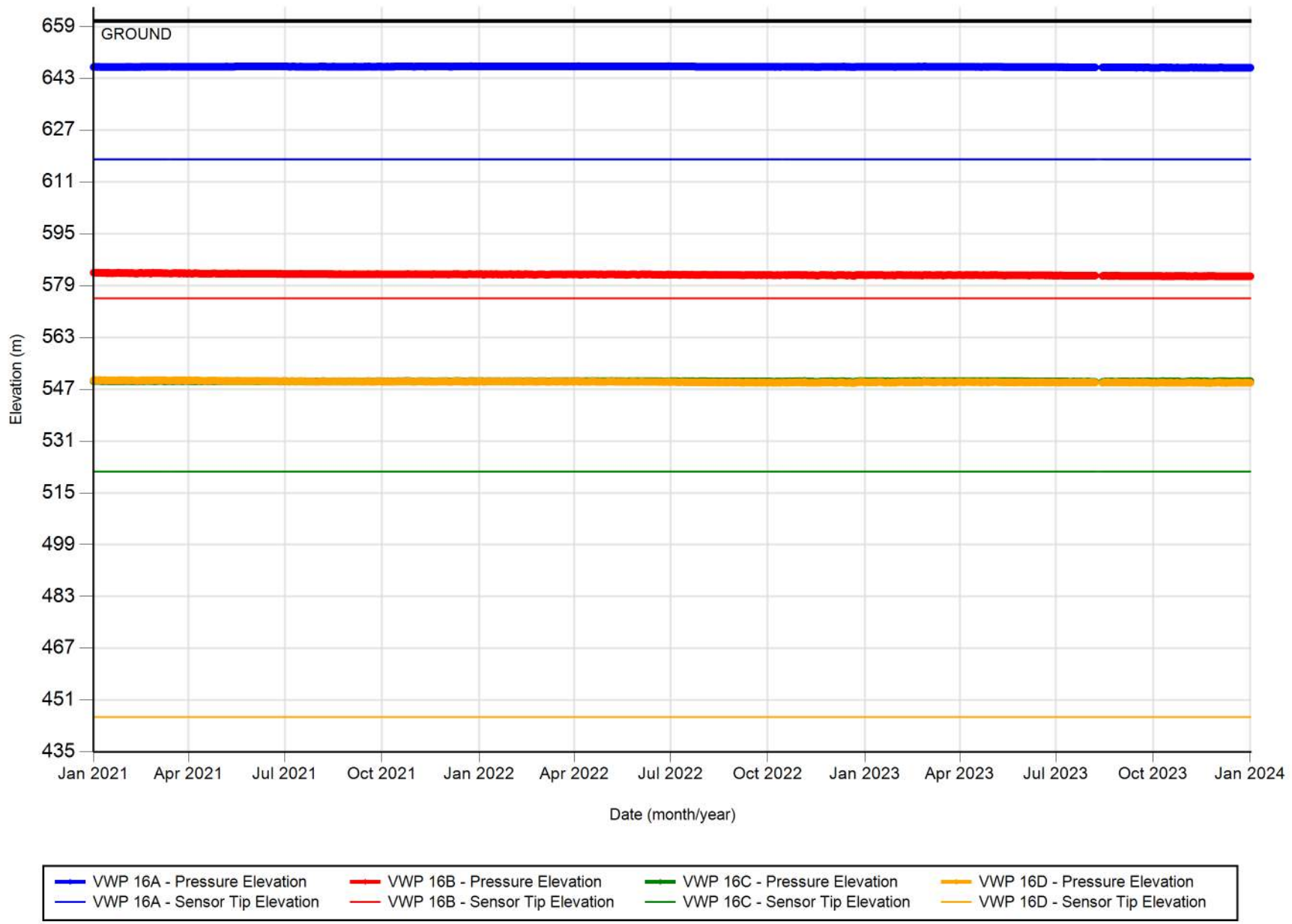


VWP 16A, B, C, and D (Station 15)



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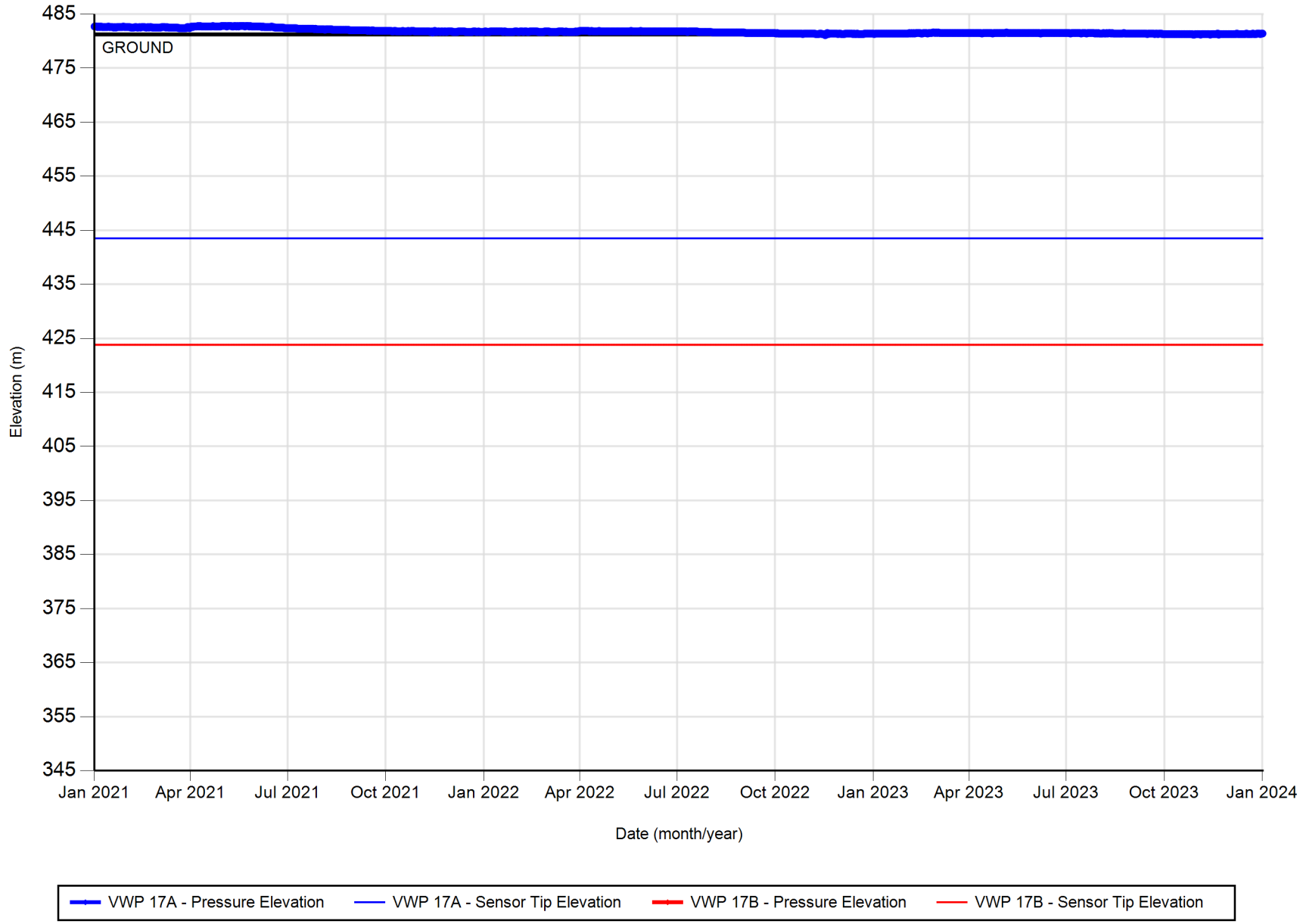

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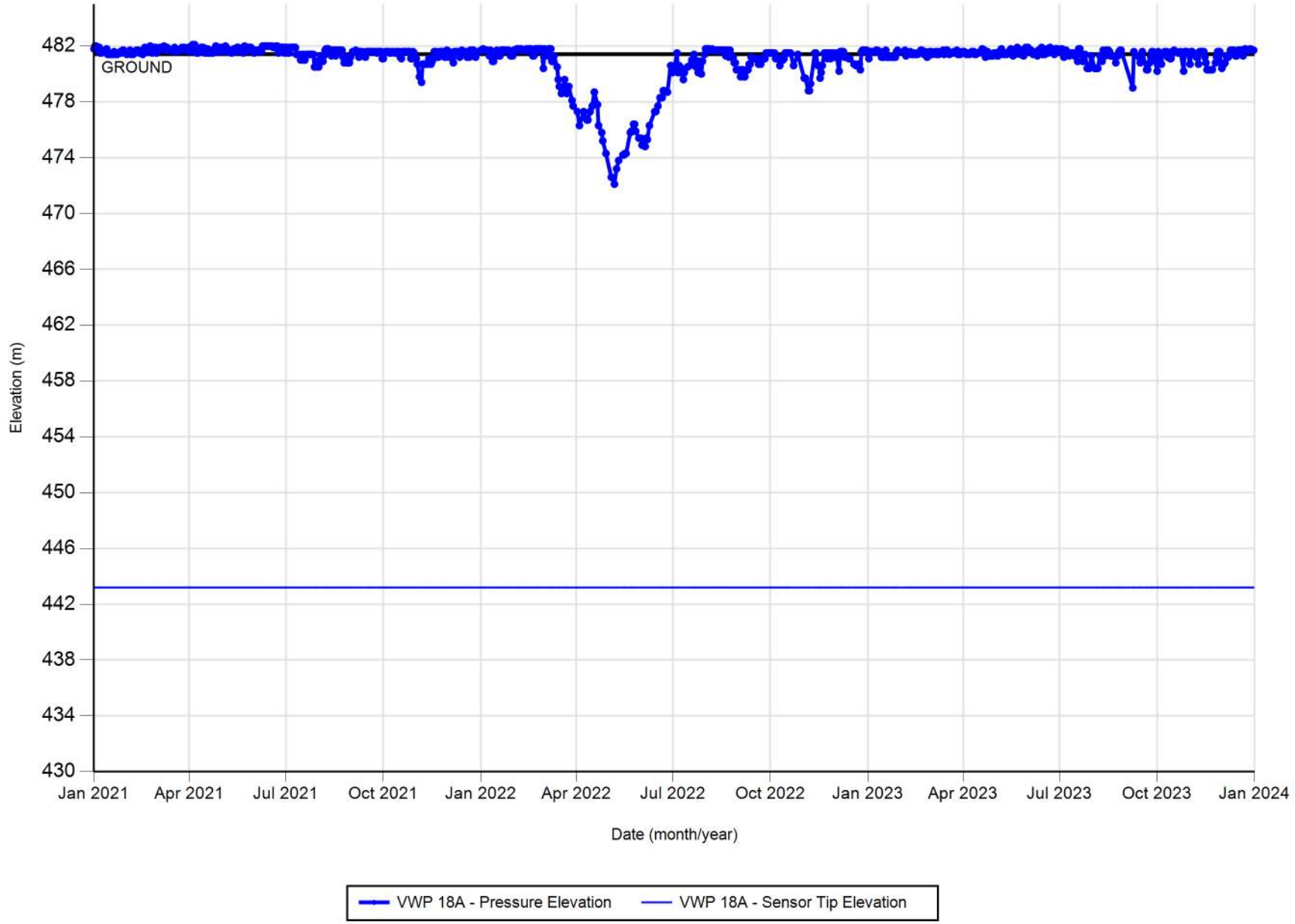

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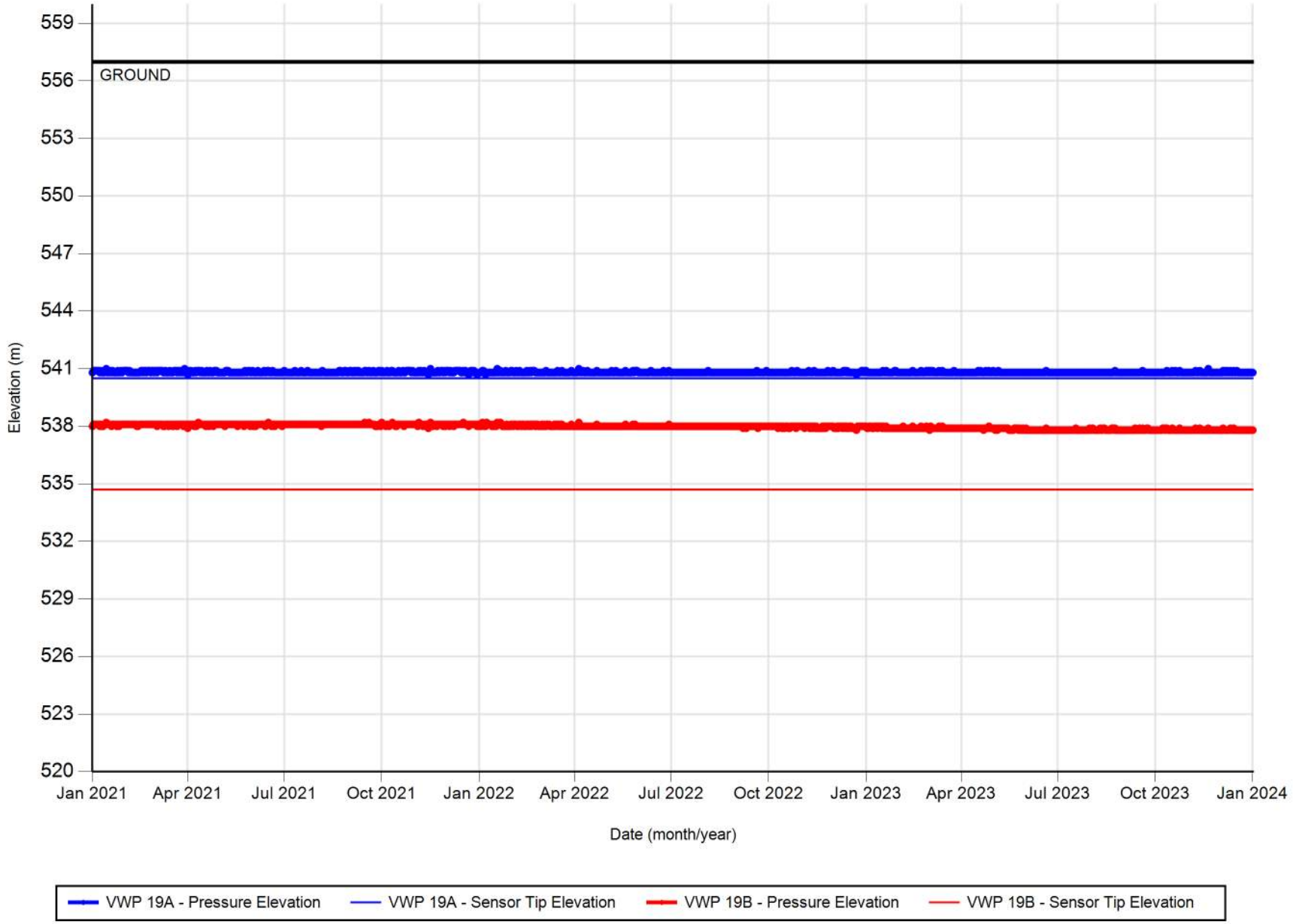

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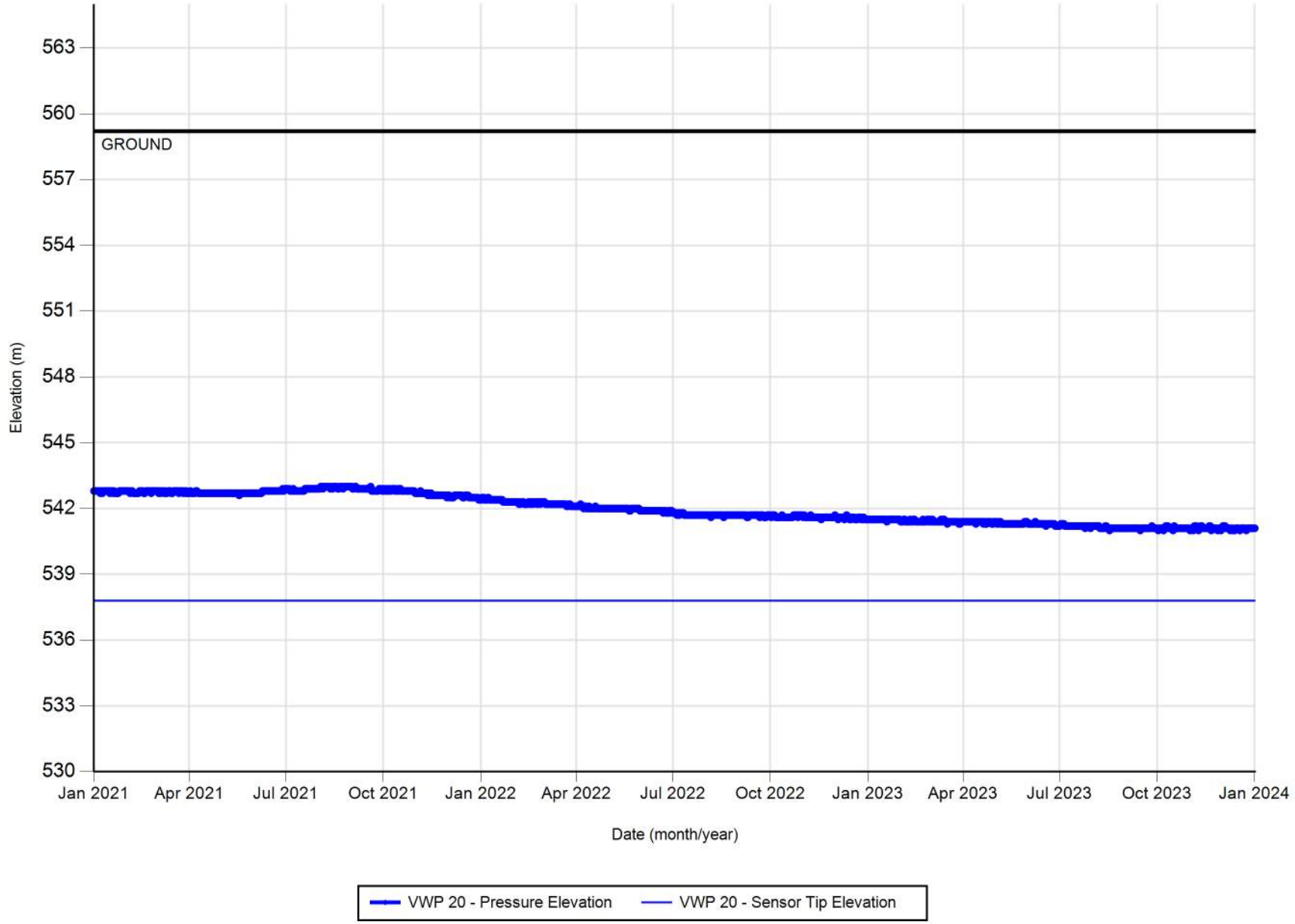
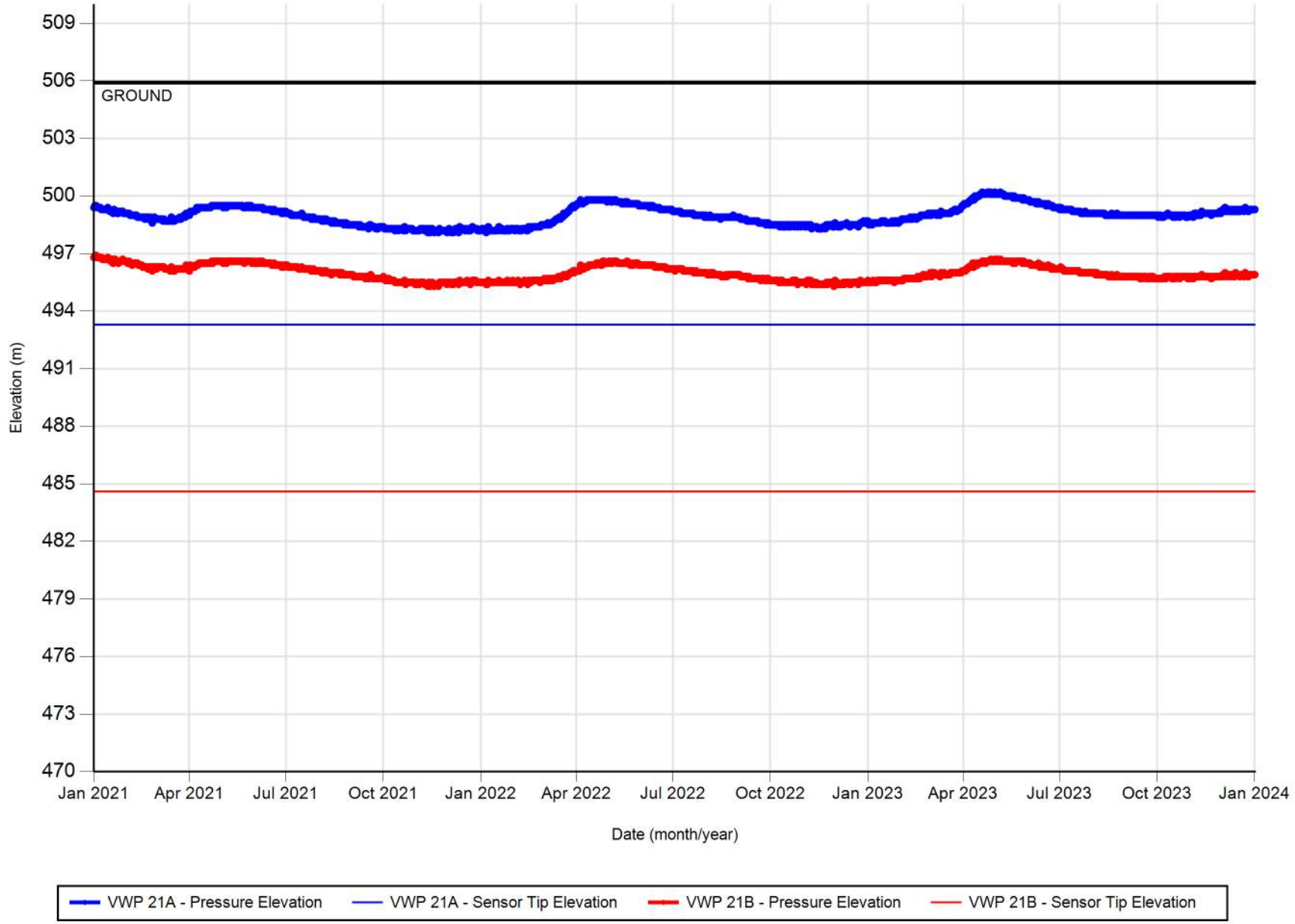
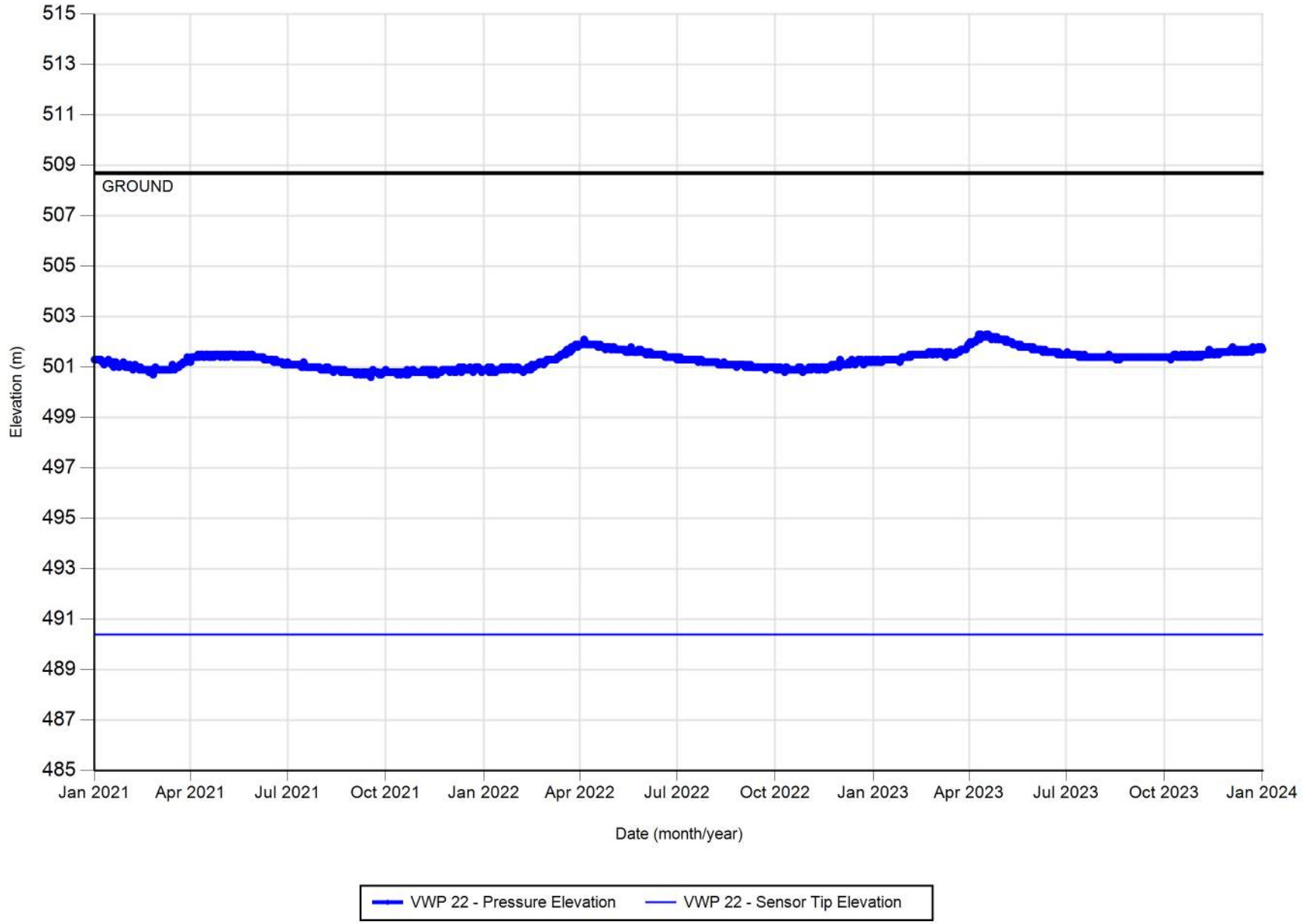


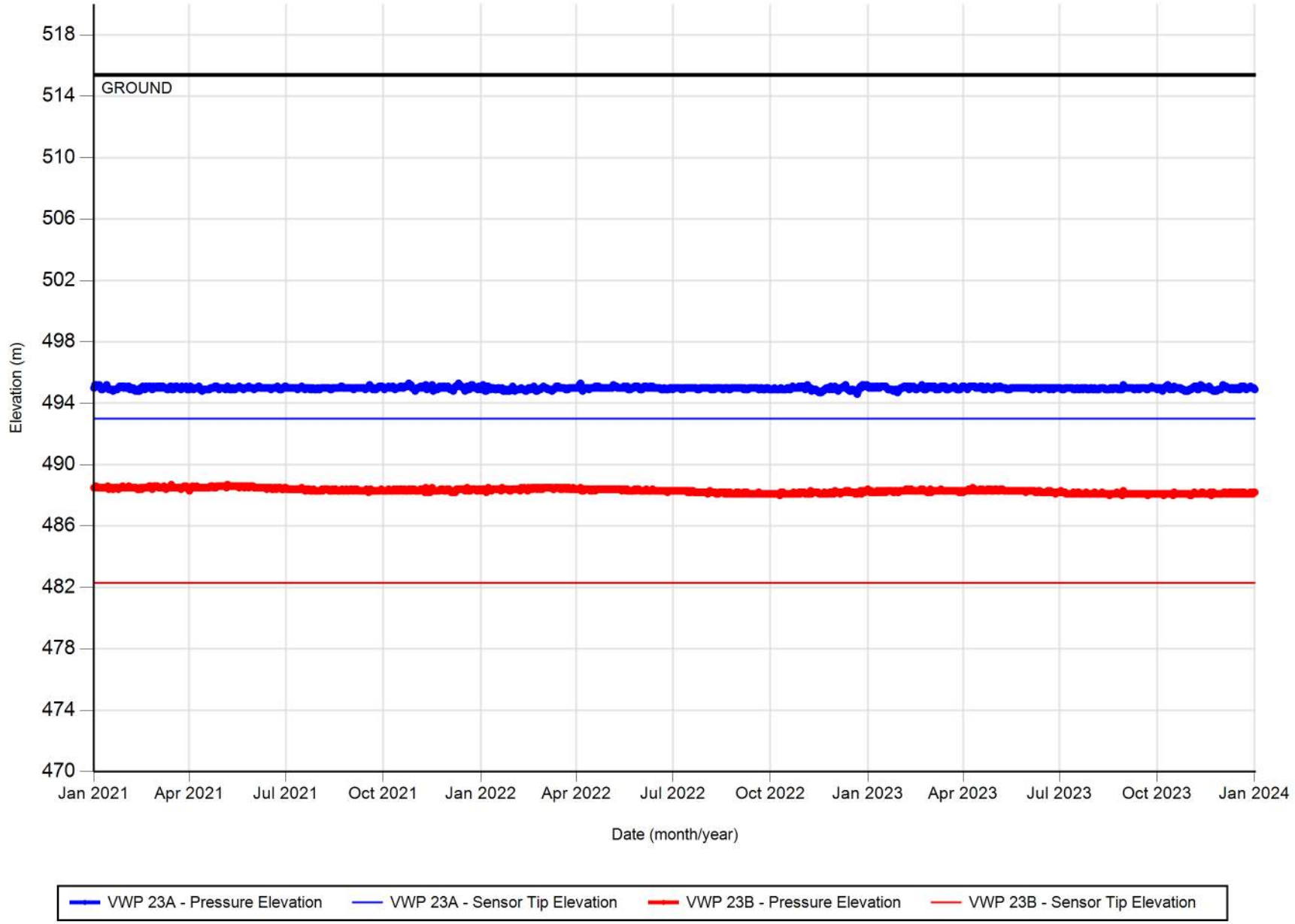
VWP 21A and B (Station 19)



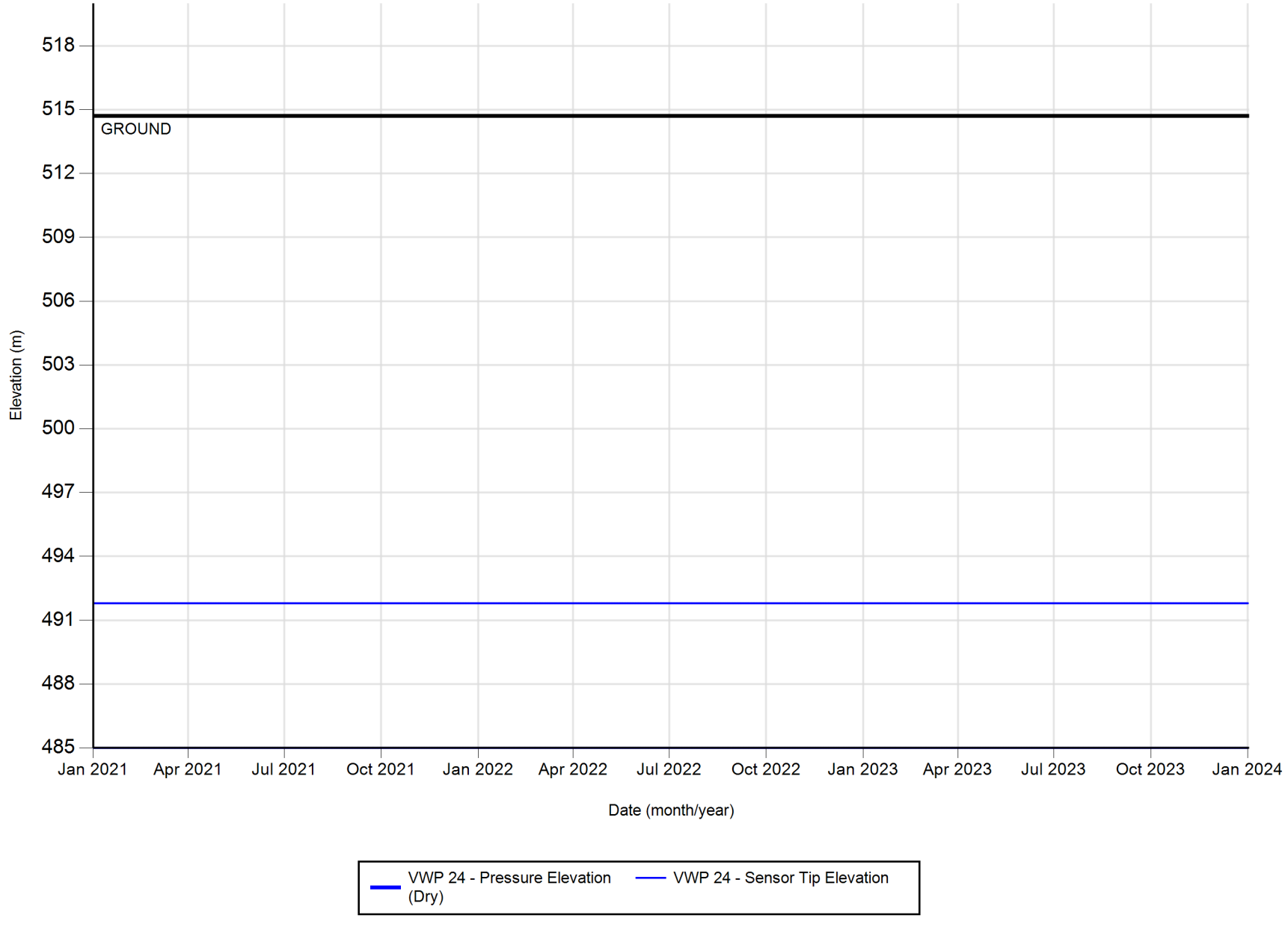
VWP 22 (Station 19)



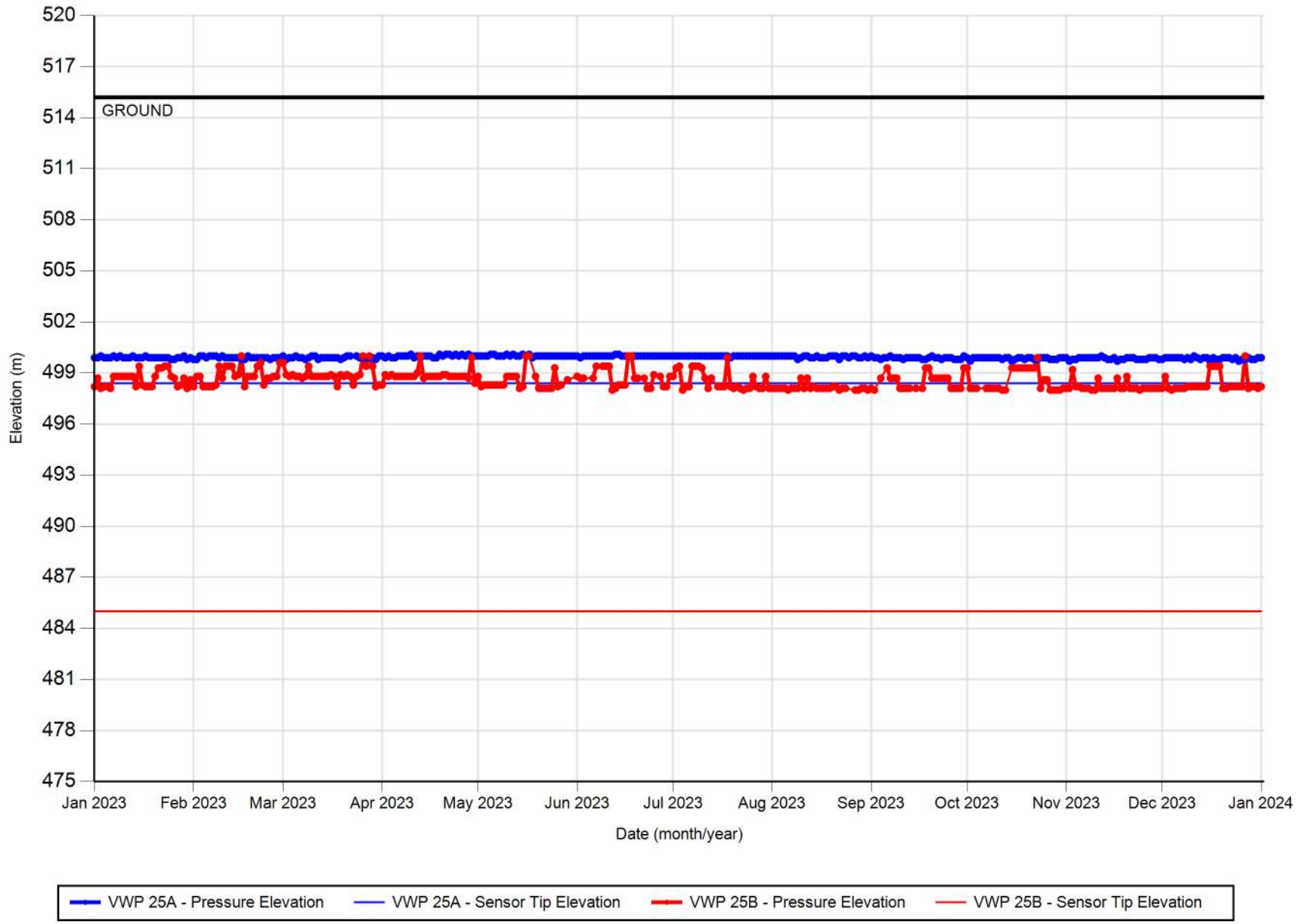
VWP 23A and B (Station 18)



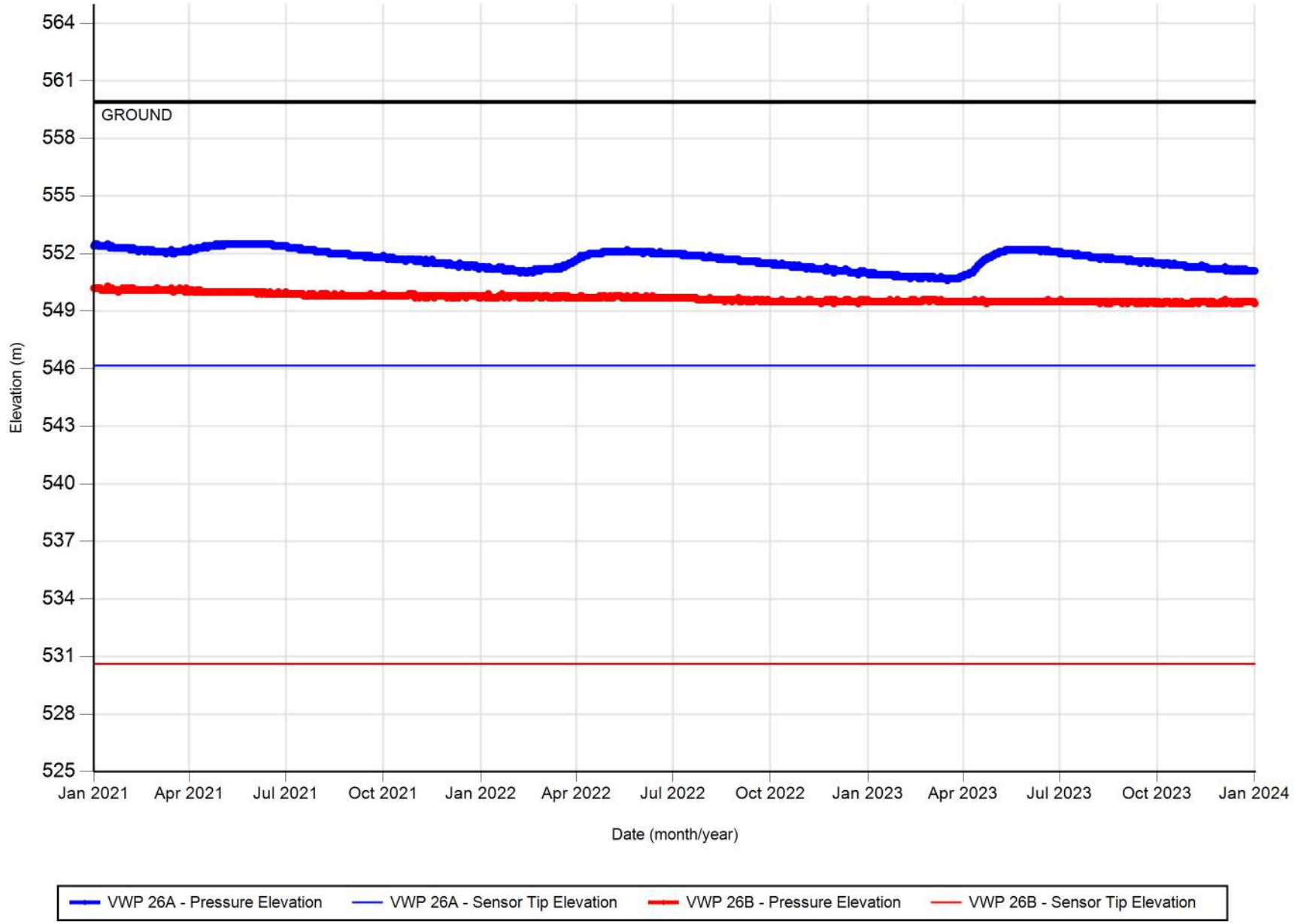
VWP 24 (Station 18)



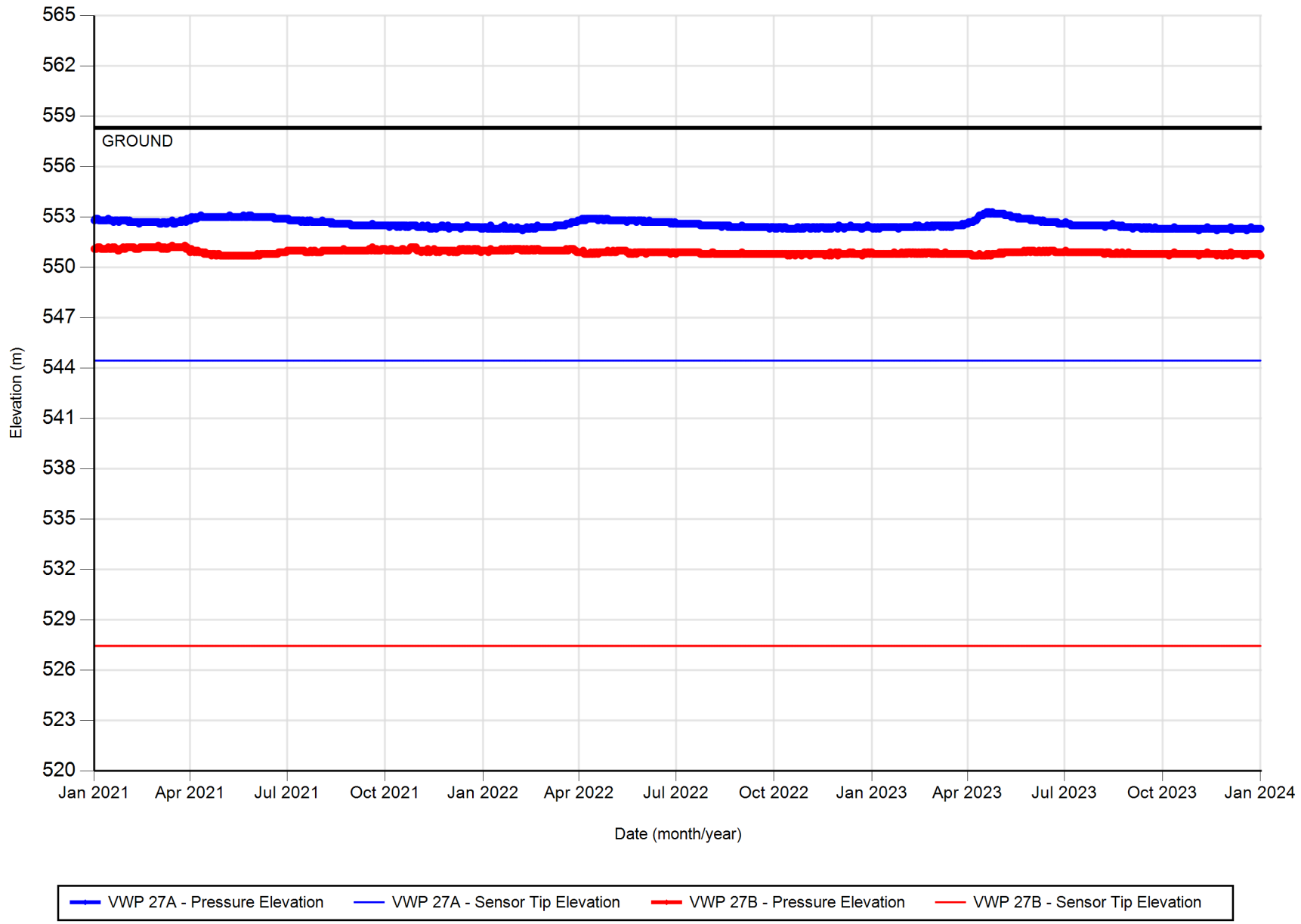
VWP 25A and B(Station 18)



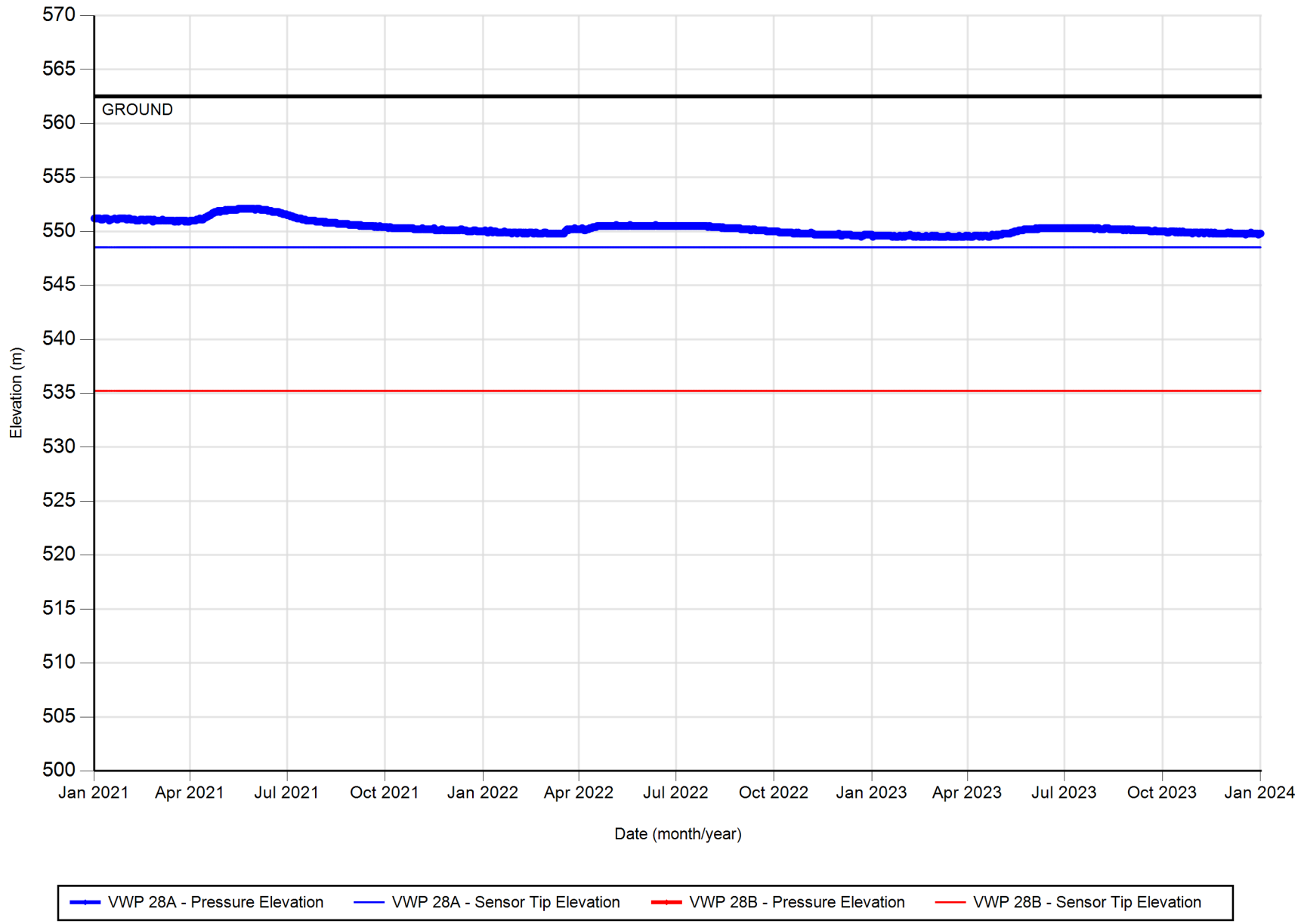
VWP 26A and B (Station 04)



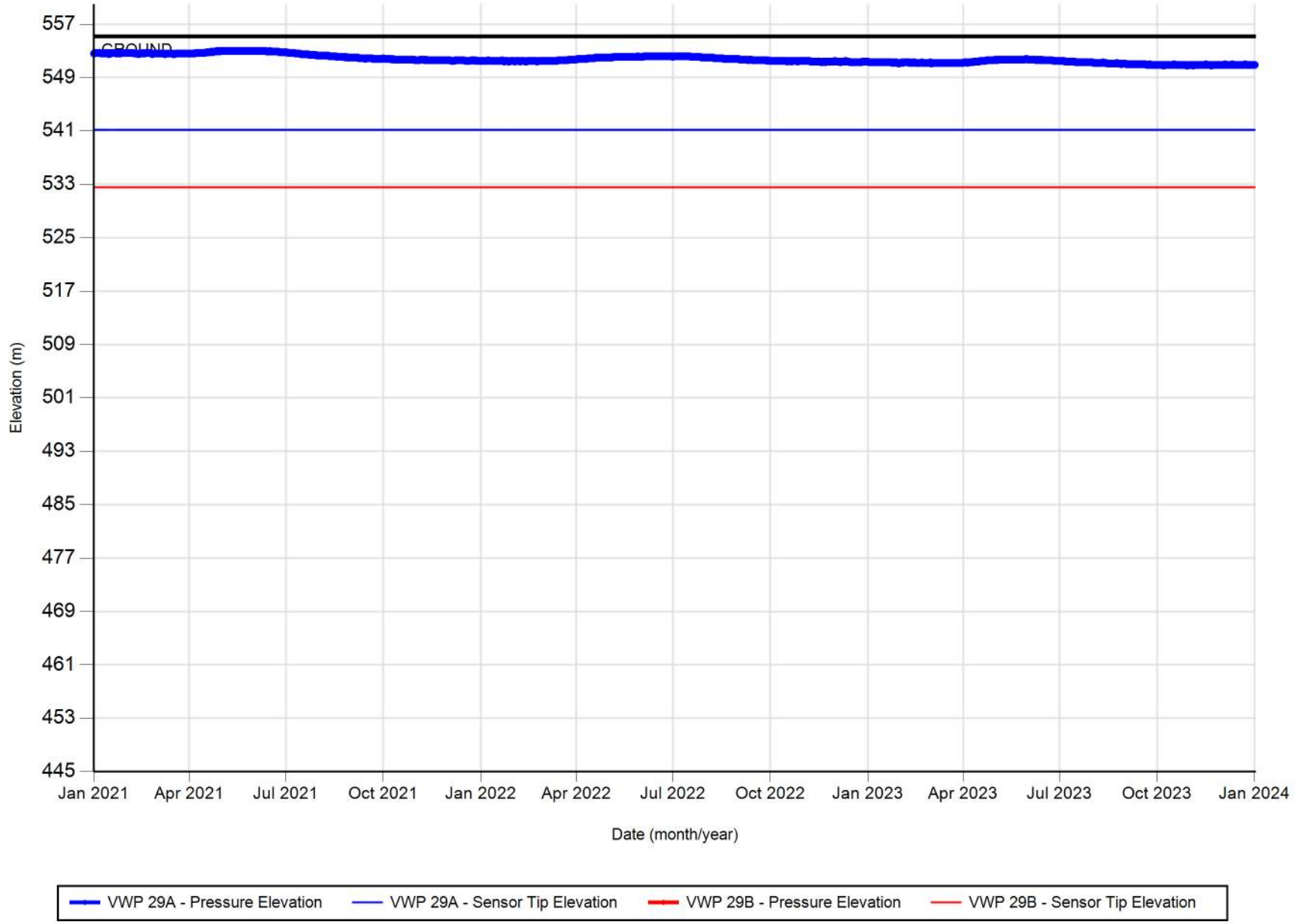
VWP 27A and B (Station 04)



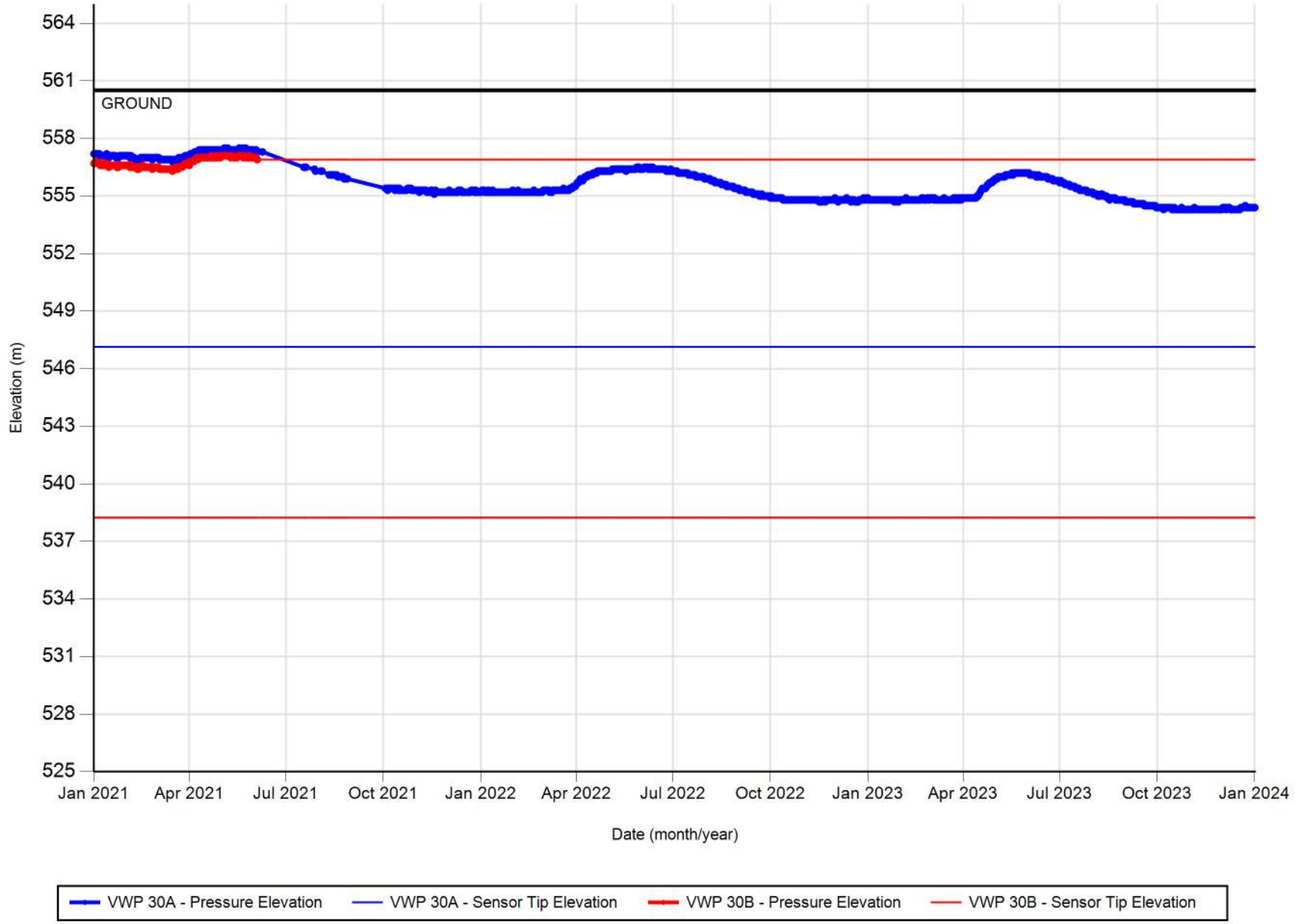
VWP 28A and B (Station 21)



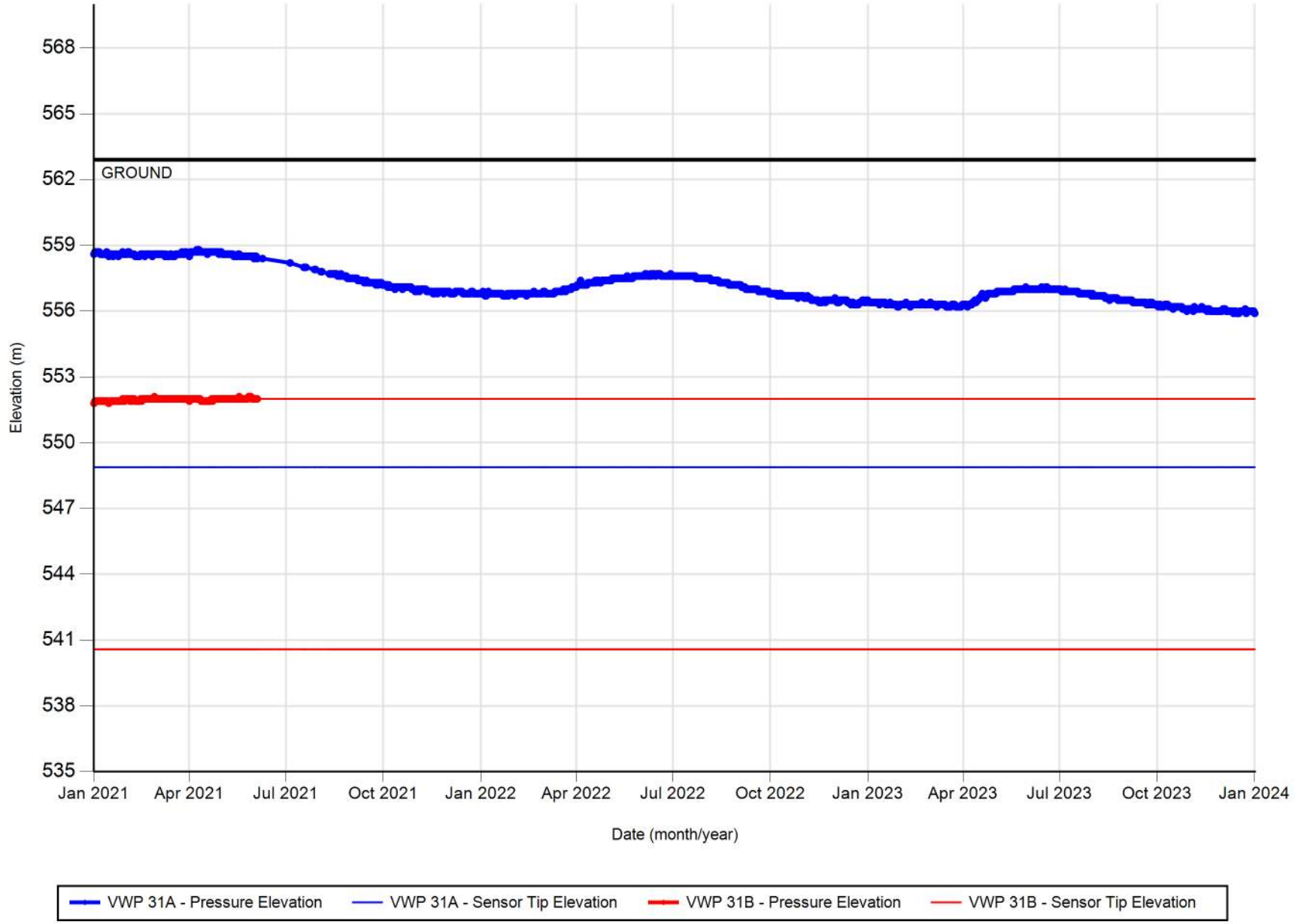
VWP 29A and B (Station 21)



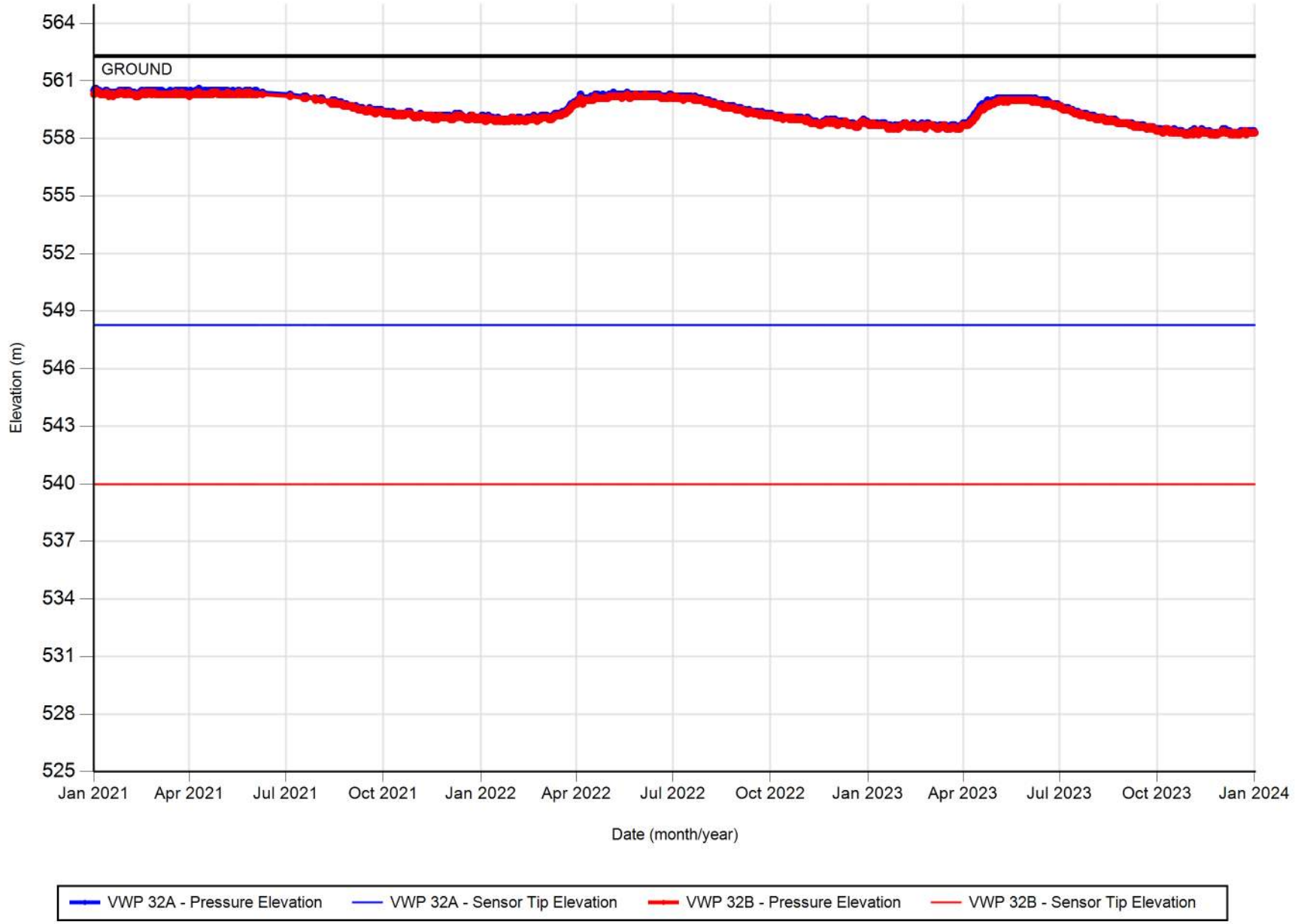
VWP 30A and B (Station 20)



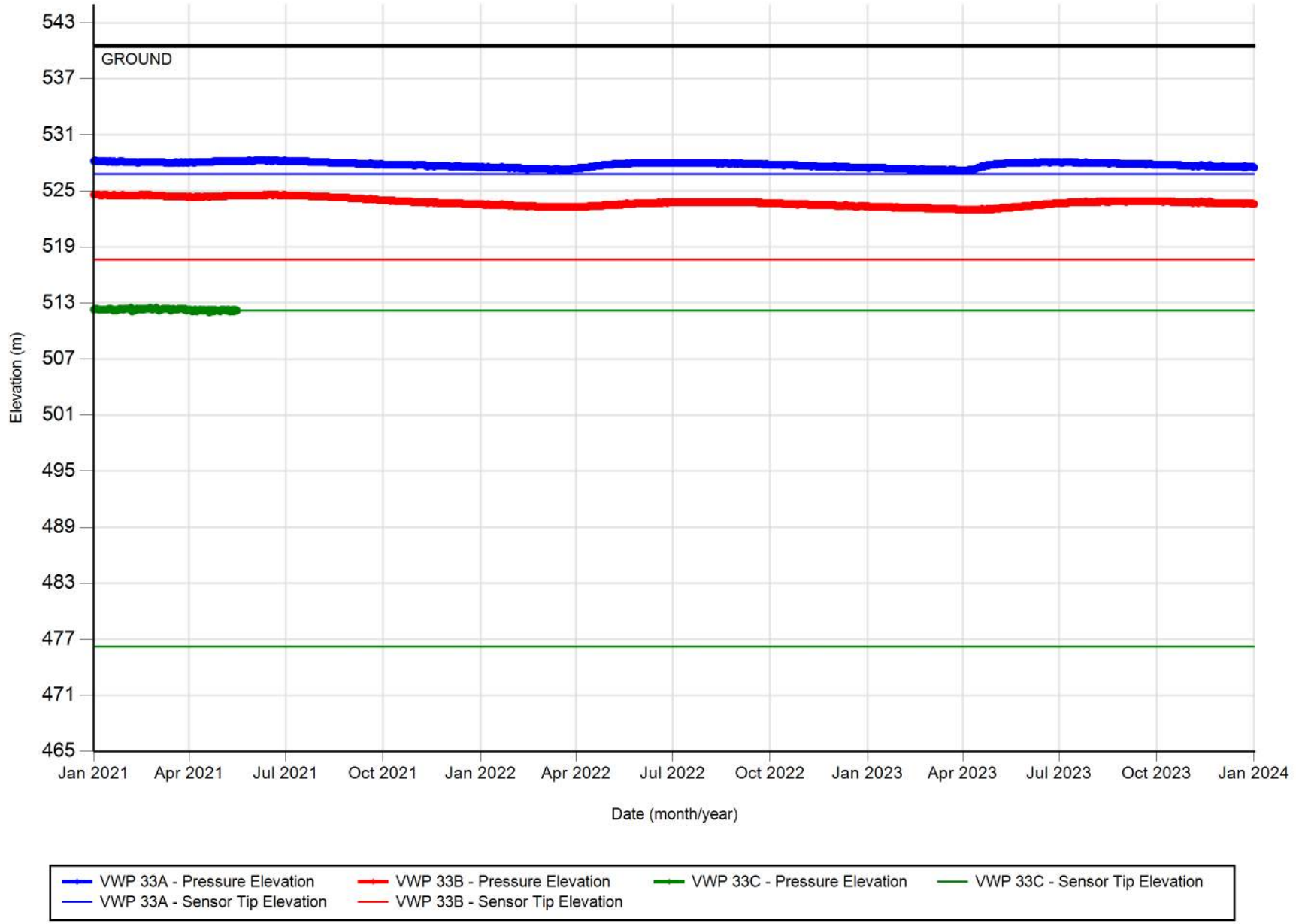
VWP 31A and B (Station 20)



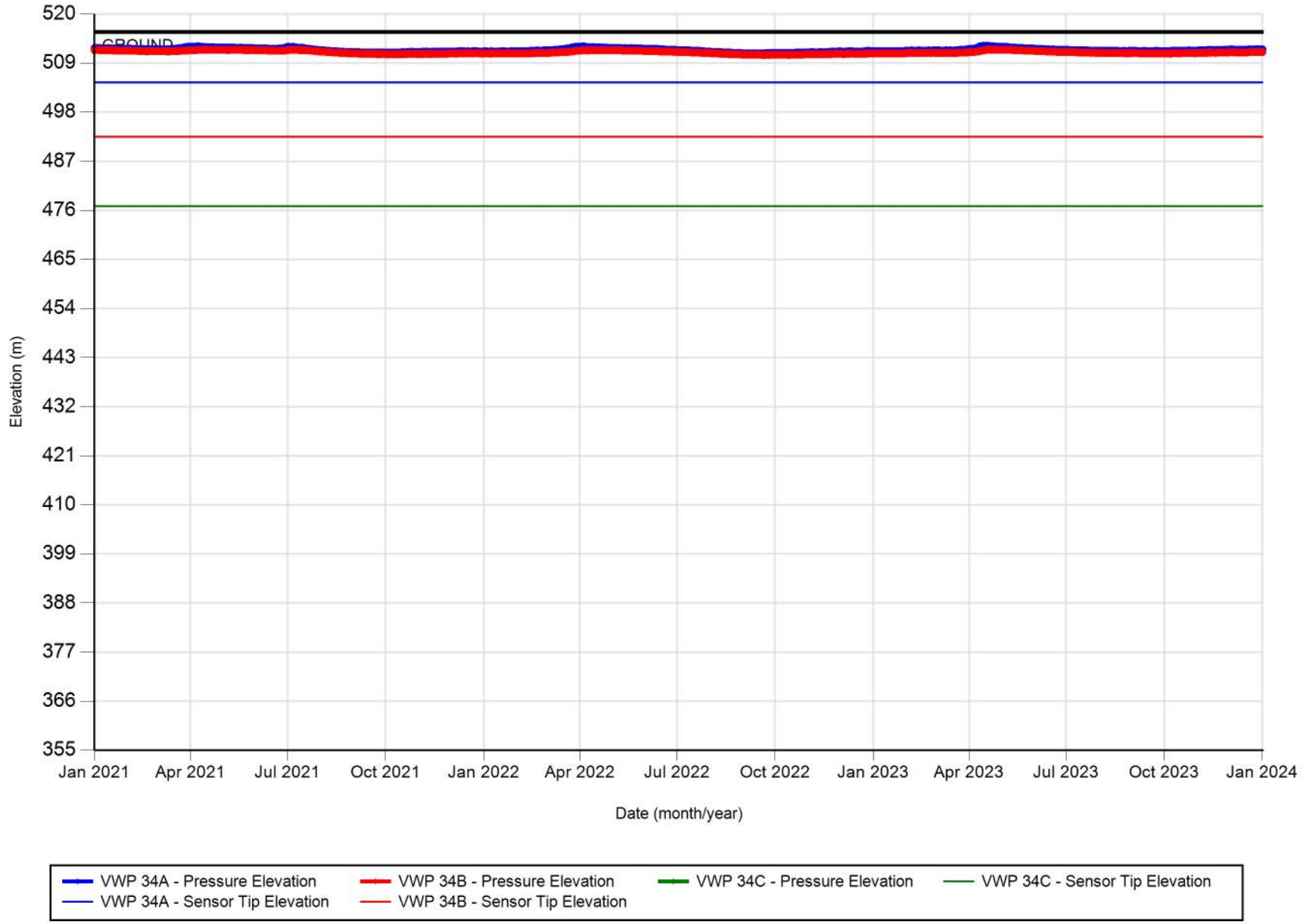
VWP 32A and B (Station 20)



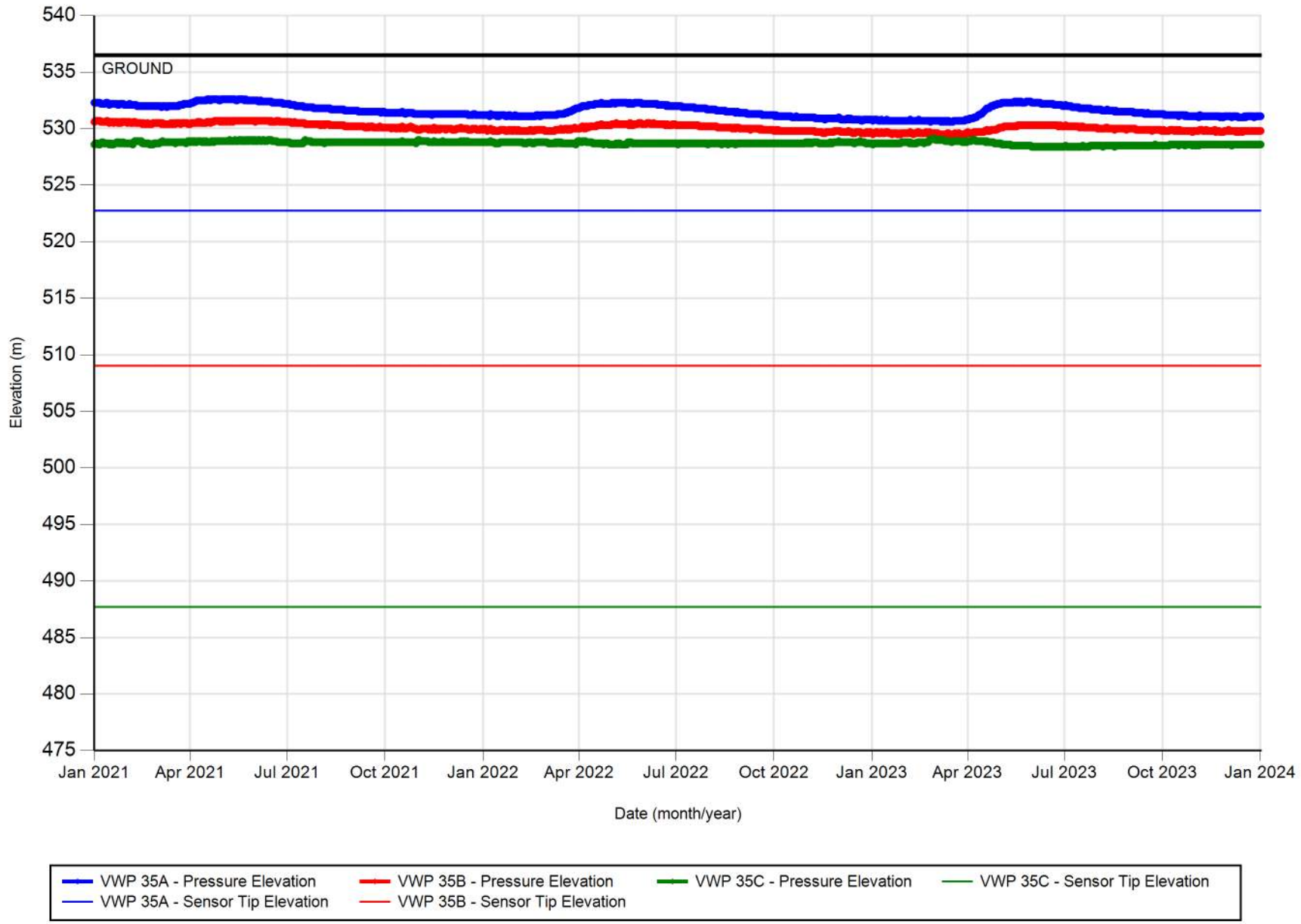
VWP 33A, B, and C (Station 22)



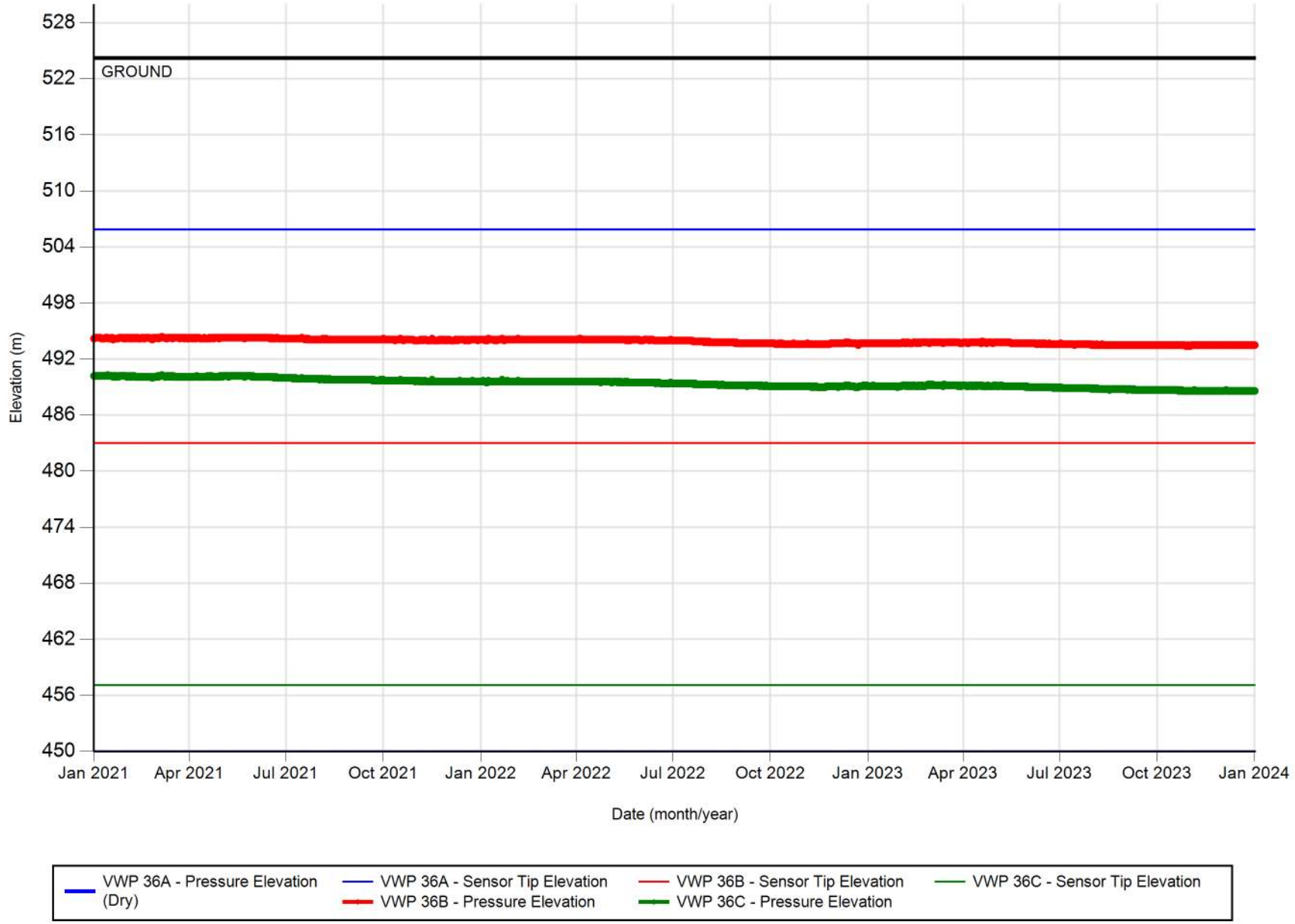
VWP 34A, B, and C (Station 23)



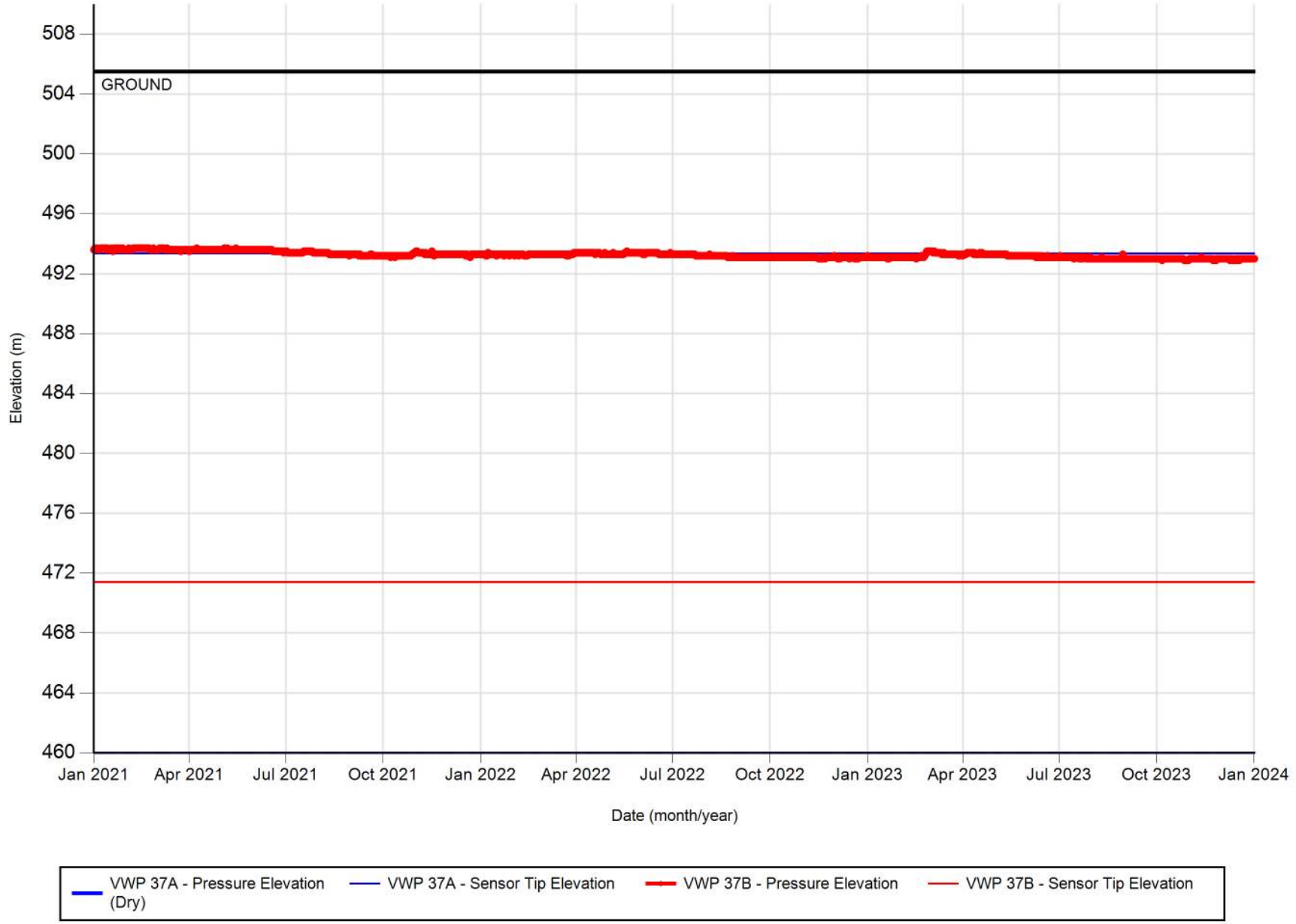
VWP 35A, B, and C (Station 03)



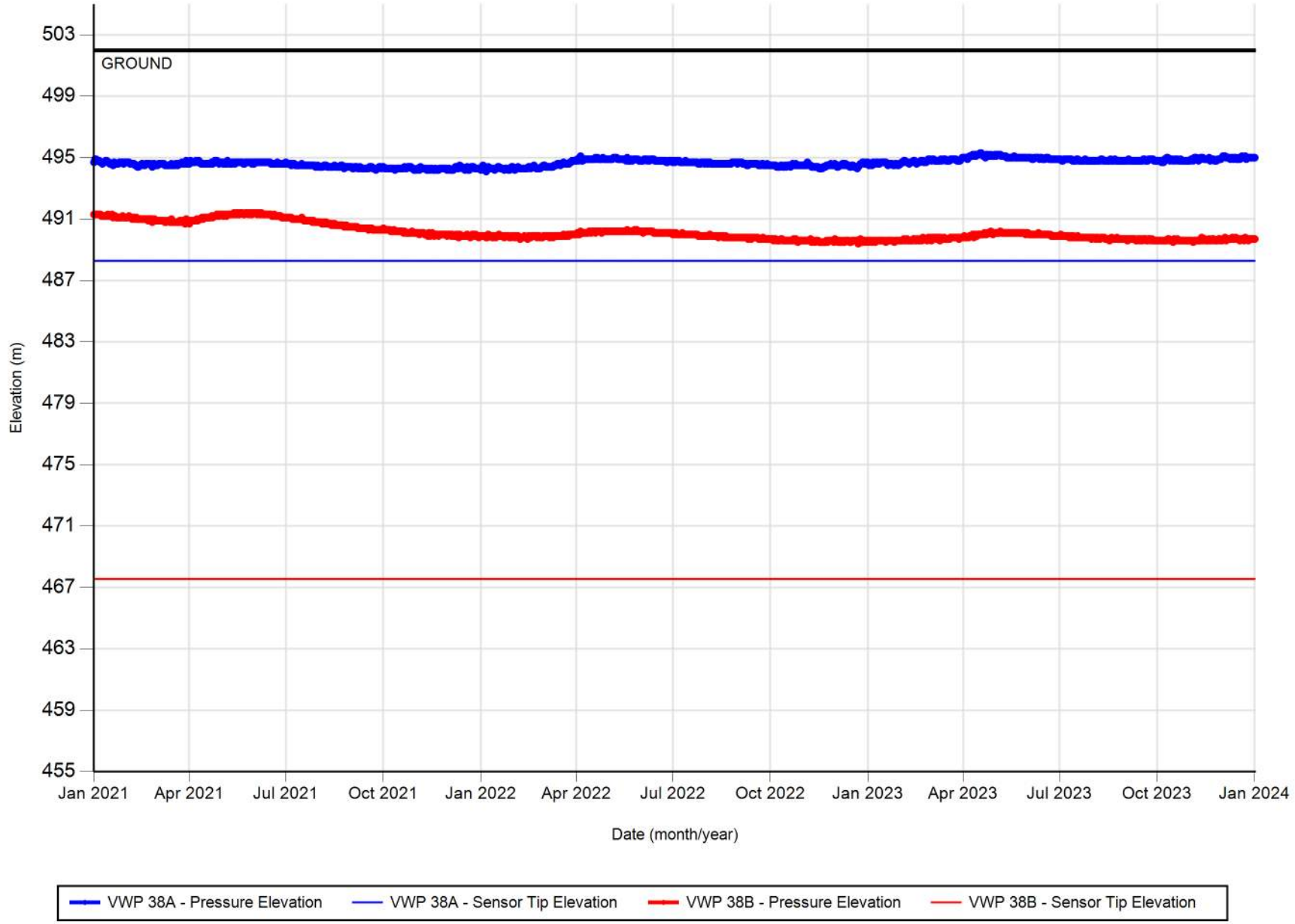
VWP 36A, B, and C (Station 25)



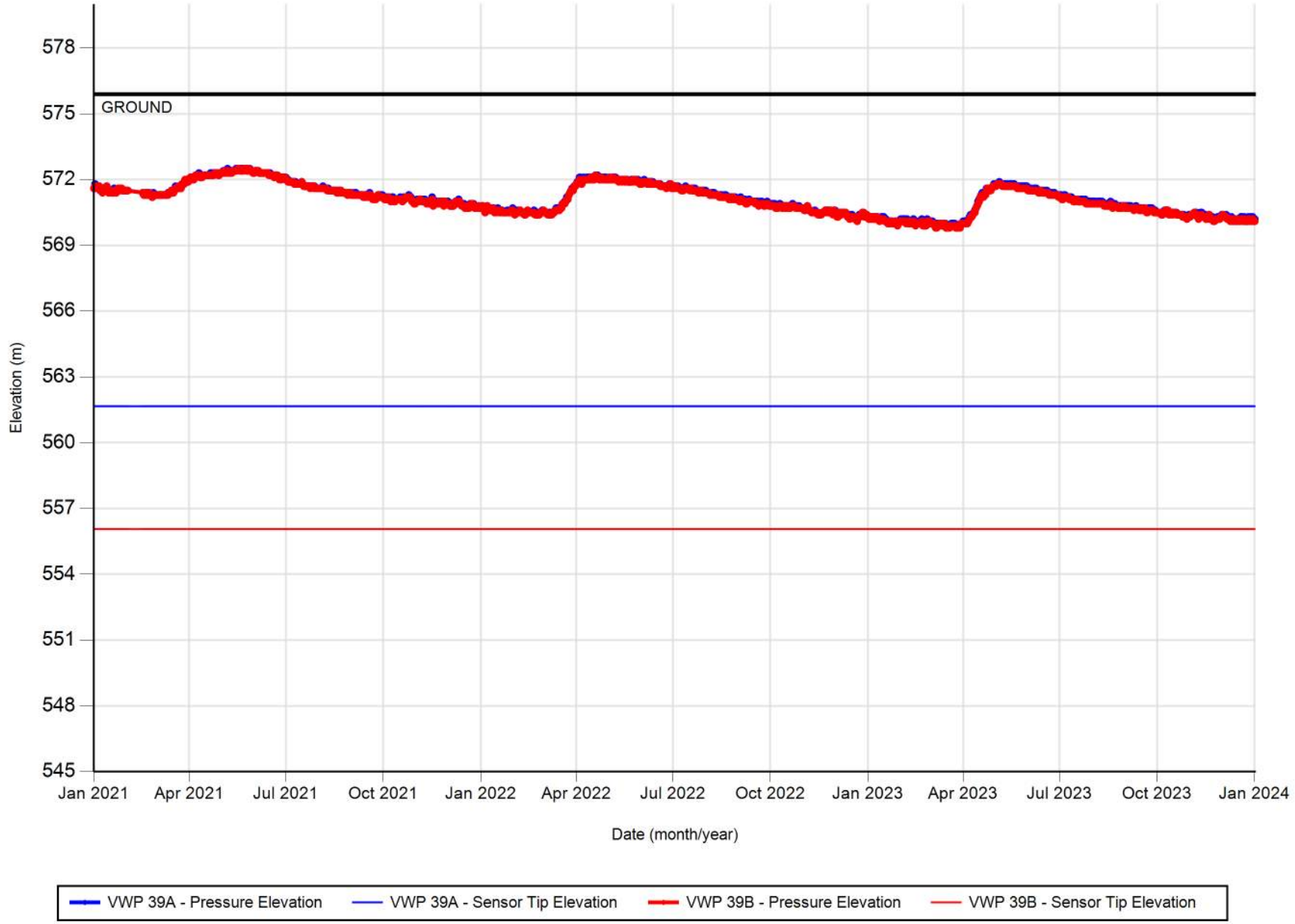
VWP 37A and B (Station 29)



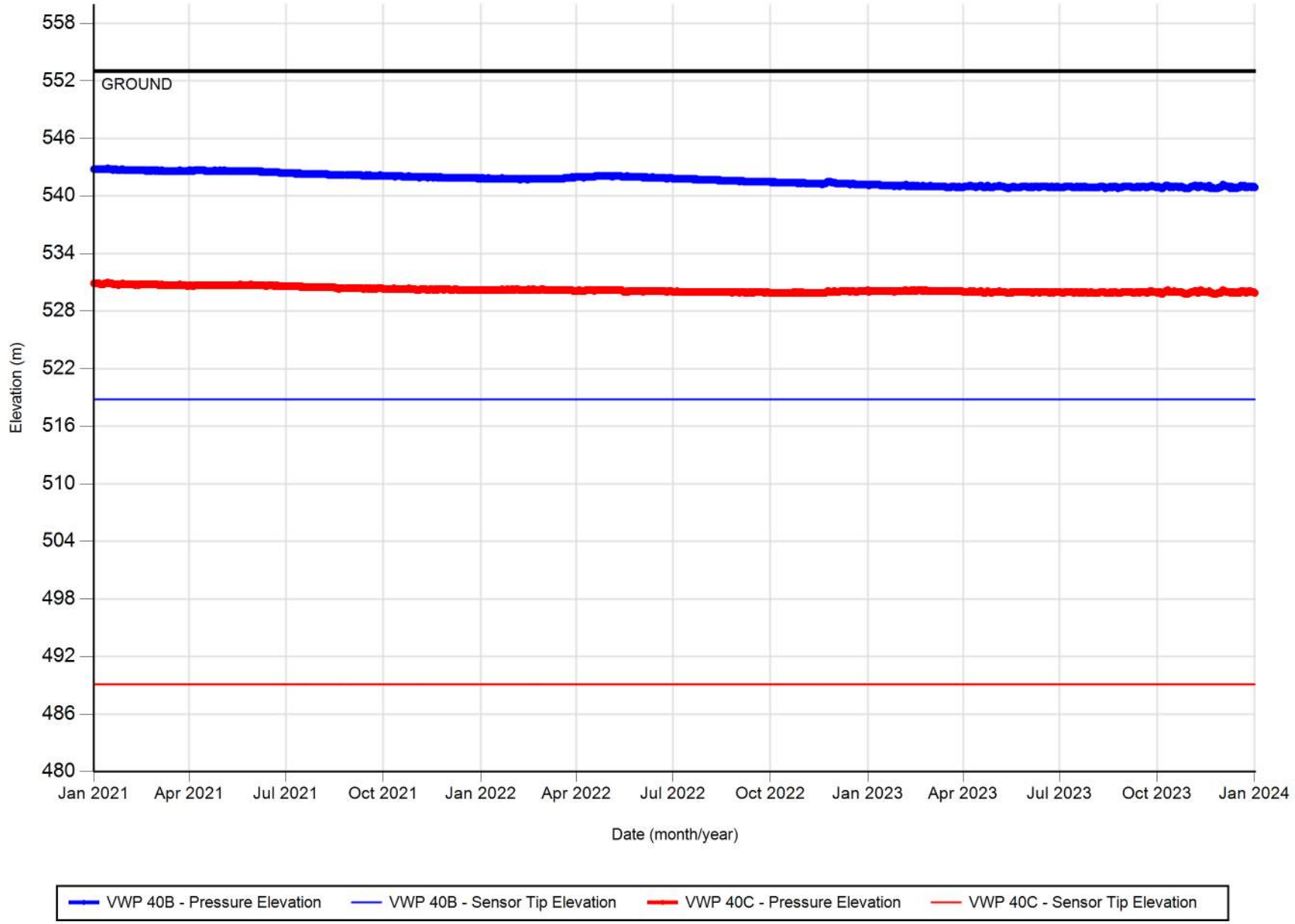
VWP 38A and B (Station 19)



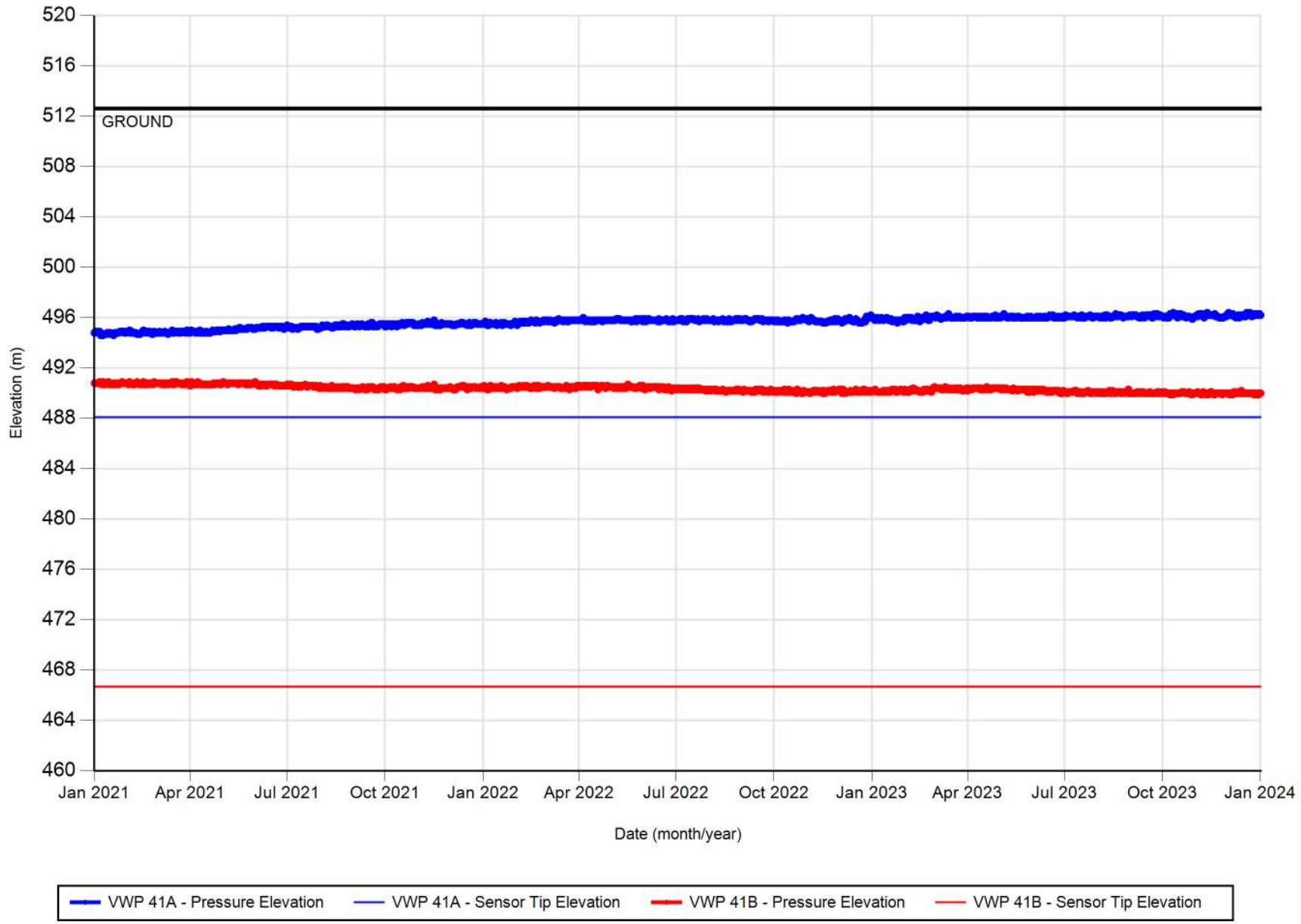
VWP 39A and B (Station 30)



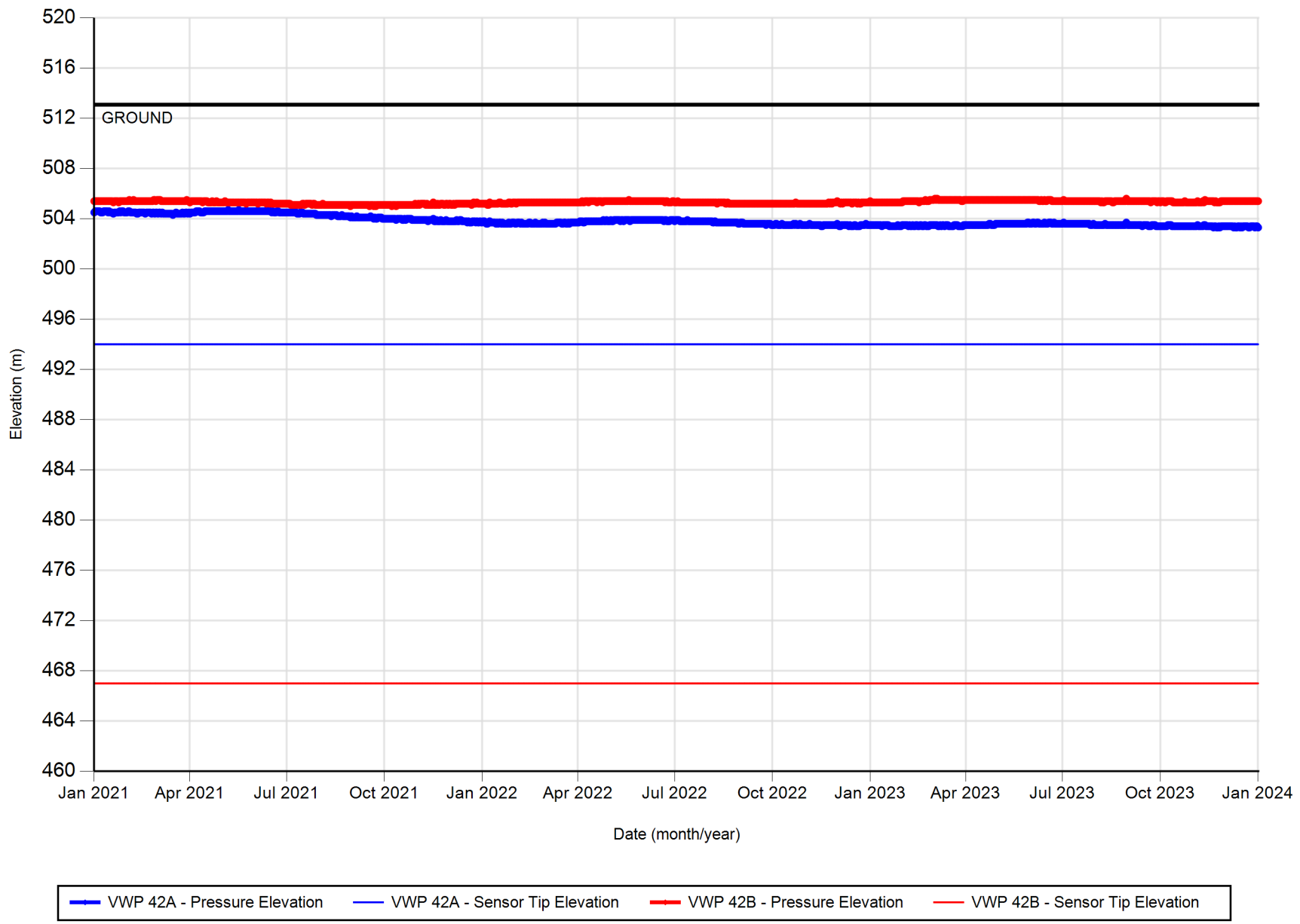
VWP 40B and C


558
552
546
540
534
528
522
516
510
504
498
492
486
480
GROUND
Elevation (m)
Jan 2021
Apr 2021
Jul 2021
Oct 2021
Jan 2022
Apr 2022
Jul 2022
Oct 2022
Jan 2023
Apr 2023
Jul 2023
Oct 2023
Jan 2024
Date (month/year)
VWP 40B - Pressure Elevation
VWP 40B - Sensor Tip Elevation
VWP 40C - Pressure Elevation
VWP 40C - Sensor Tip Elevation

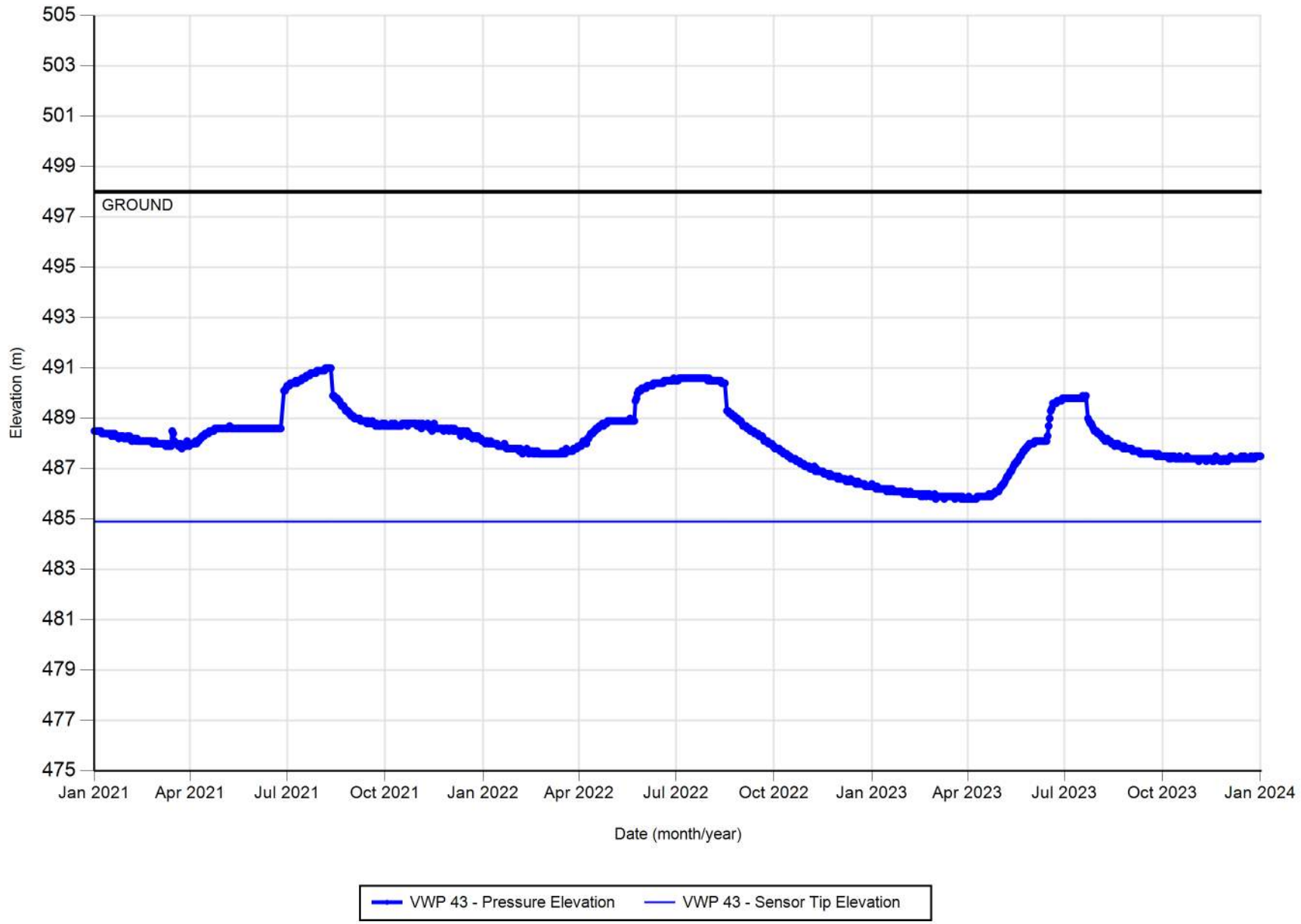
VWP 41A and B (Station 18)



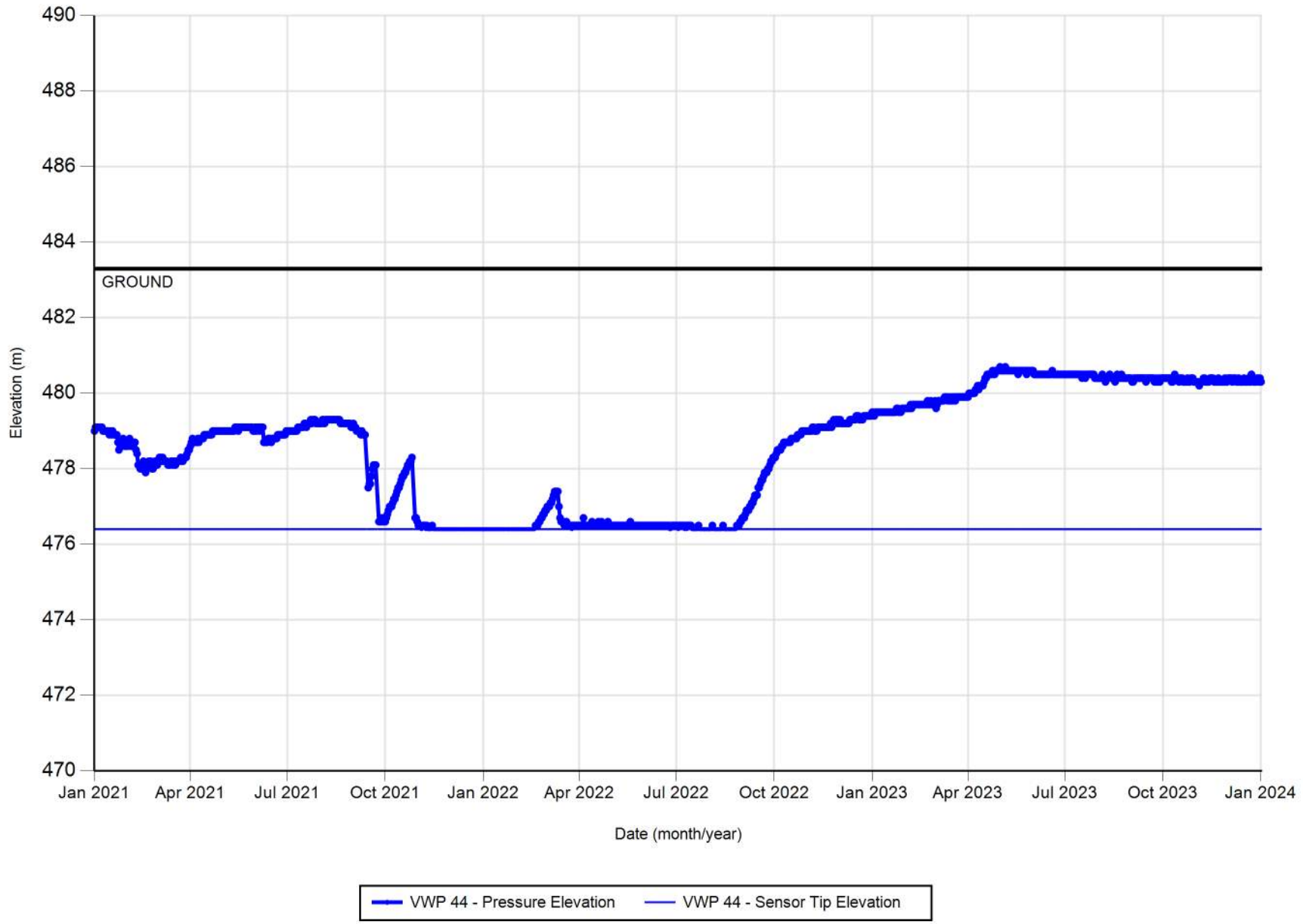
VWP 42A and B (Station 29)



VWP 43 (Station 34)



VWP 44 (Station 12)



APPENDIX

D PUMPING WELLS – STATUS TABLE, FIGURE D1 AND PRODUCTION CHARTS

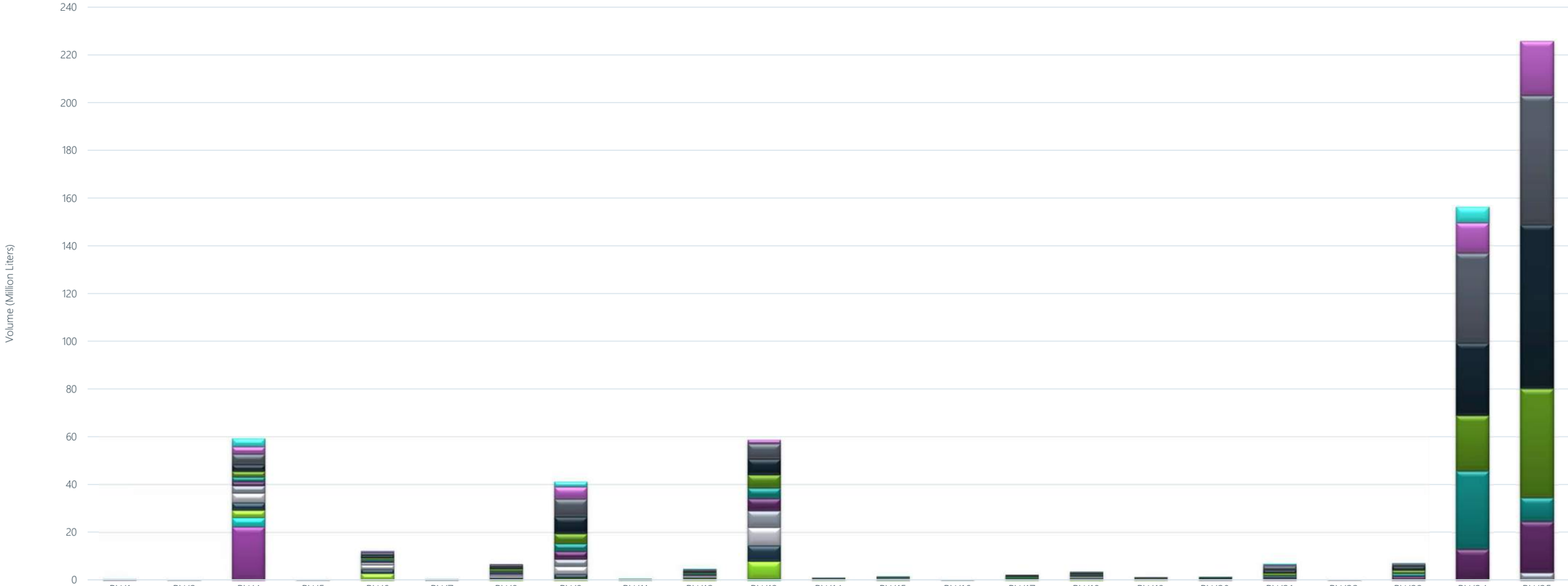
Appendix D - Pumping Well Status

Well	Location	Installation Date	Depth (Screen)	Depth (Pump)	Depth (VW tip)	Monitoring Well VWPs	Status
PW1	Flamingo St.	September 2003	29.9-47.5m	45.0m	44.3m	VWP 3A&B, VWP 4A&B	Active - VWP dynamic controls
PW2	Abbott Dr.	September 2003	30.0-55.0m	33.5m	32.9m	VWP 3	Active - VWP dynamic controls
PW4	Panagrot Ave. (east end)	June 2007	6.1-30.5m	29.0m	28.3m	VWP 12A,B,C&D, VWP 19A&B, VWP 20	Active - VWP dynamic controls
PW5	Adam St.	June 2007	42.7-61.0m	58.5m	57.9m	VWP 17A&B, VWP 18A	Active - VWP dynamic controls
PW6	Lewis Dr.	October 2012	8.3-33.5m	31.7m	29.9m	VWP 26A&B	Inactive due to pump control failure from August 2023
PW7	Dixon St.	October 2012	8.4-33.5m	32.8m	32m	VWP 26A&B, VWP 27A&B	Active - VWP dynamic controls
PW8	Dixon St.	October 2012	8.5-33.5m	32.7m	31.9m	VWP 27A&B	Inactive due to mechanical failure from May 2022
PW9	South of Dixon St.	October 2012	8.7-39.6m	39.2m	38.7m	VWP 28A&B	Inactive due to mechanical failure from July 2023
PW10	South of Dixon St.	NA	3.9-16.8m	NA	NA	NA	Decommissioned in 2018
PW11	South of Abbot Dr.	October 2012	8.7-33.5m	32.8m	32.0m	VWP 30A&B	Active - VWP dynamic controls
PW12	Uplands Park	October 2012	10.5-72.5m	71.5m	70.7m	VWP 9A,B&C	Active - VWP dynamic controls
PW13	Paley Ave.	October 2012	8.6-70.1m	68.1m	67.3m	VWP 33A,B&C	Pump Inactive due to mechanical failure from August 2023, and flowmeter inactive from May 2022
PW14	Dawson St.	October 2012	8.5-33.5m	32.8m	32.0m	VWP 10A,B&C	Active - VWP dynamic controls
PW15	South of Abbot Dr.	October 2012	8.5-33.5m	32.8m	32.0m	VWP 30A&B, VWP 31A&B	Active - VWP dynamic controls

Appendix D - Pumping Well Status

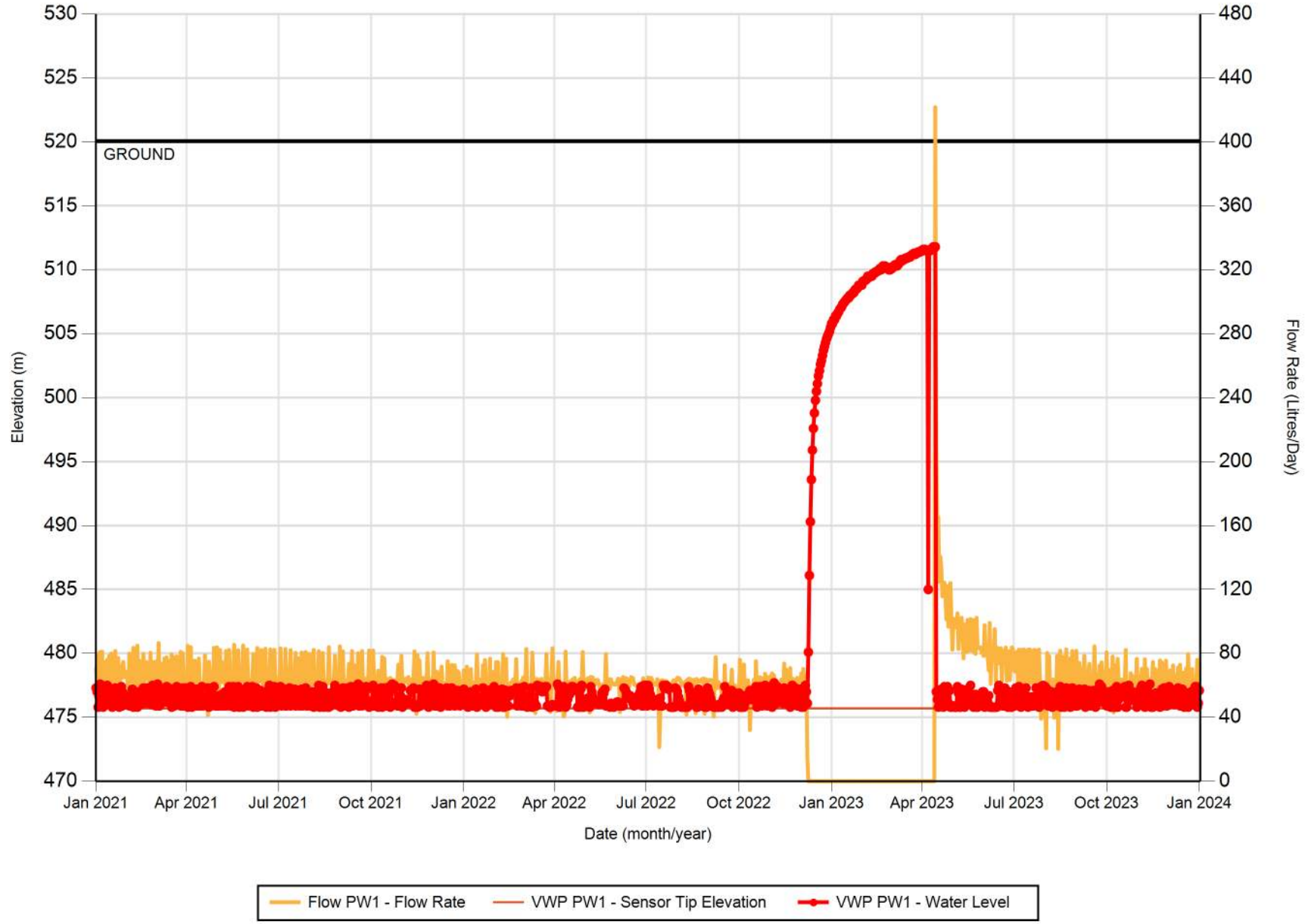
Well	Location	Installation Date	Depth (Screen)	Depth (Pump)	Depth (VW tip)	Monitoring Well VWPs	Status
PW16	South of Abbot Dr.	October 2012	8.6-33.5m	32.8m	32.0m	VWP 31A&B, VWP 31A&B	Active - VWP dynamic controls
PW17	South of Abbot Dr.	October 2012	4.1-29.0m	26.2	25.6	VWP 32A&B	Active - VWP dynamic controls
PW18	Stork Ave.	October 2012	13.7-44.2m	43.8m	43.0m	VWP 34A,B&C	Active - VWP dynamic controls
PW19	Crane Ave.	October 2012	13.7-44.2m	42.7m	41.9m	VWP 22	Active - VWP dynamic controls
PW20	Picard Pl.	April 2016	8.1-69.0m	64.9m	64.0m	VWP 40B&C	Active - VWP dynamic controls
PW21	Panagrot Ave.	April 2016	7.6-29.0m	27.4m	26.8m	NA	Active - VWP dynamic controls
PW22	Picard Ave.	April 2016	8.8-42.7m	33.8m	33.2m	VWP 40A&B	Pump Active, flowmeter inactive from December 2022
PW23	Lewis Dr.	April 2016	0.0-65.2m	62.5m	61.9m	NA	Pump active, flowmeter functionality issue from August 2021 to November 2023.
PW24	Lewis Pond	December 2016	1.0-12.8m	14.0m	13.3m	VWP 43	Active - VWP dynamic controls
PW25	Blair Pond	December 2016	2.0-7.7m	9.1m	7.9m	VWP 44	Inactive due to mechanical failure from September 2022

Figure D1: Pumping Wells Dewatering Summary

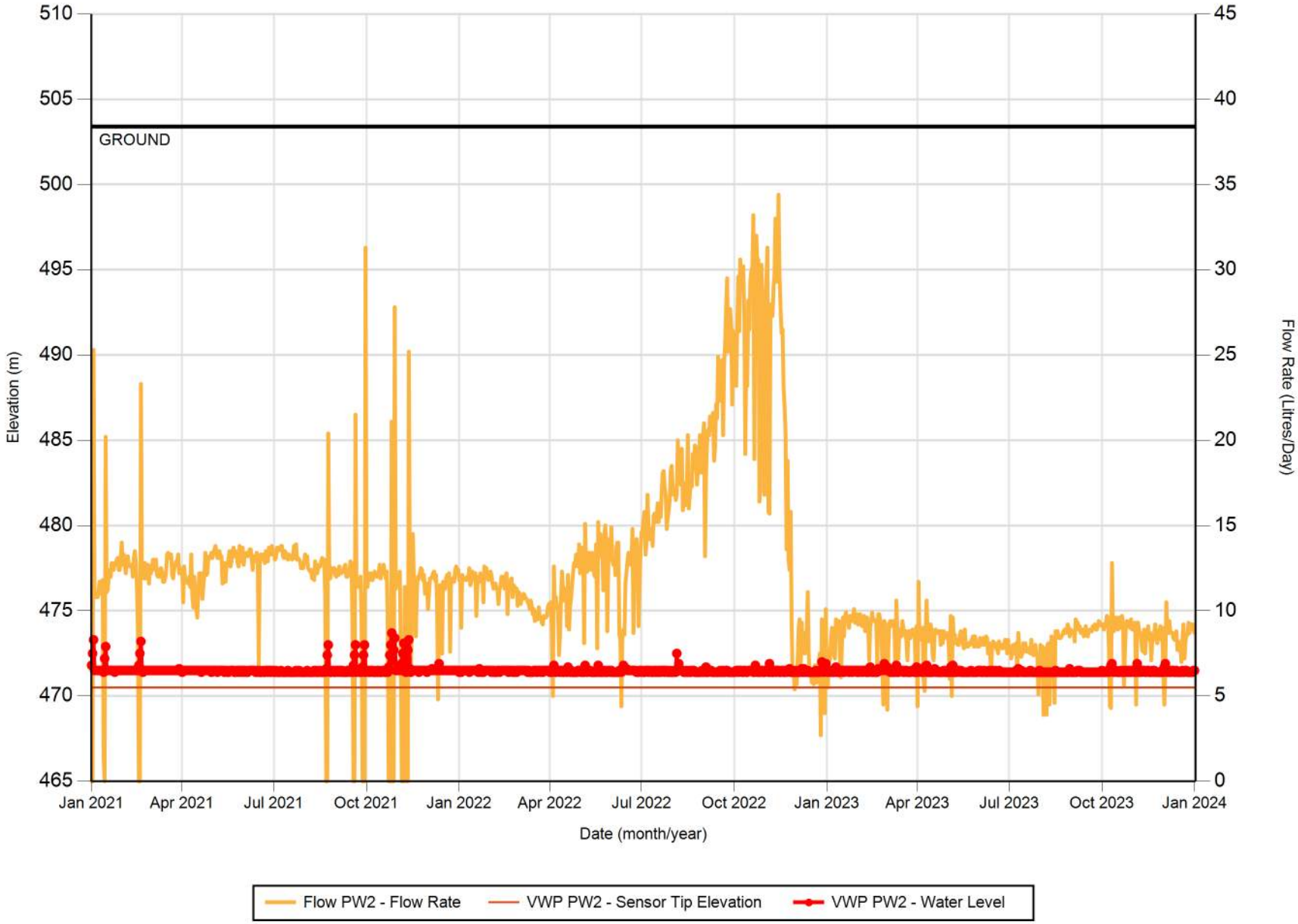


	PW1	PW2	PW4	PW5	PW6	PW7	PW8	PW9	PW11	PW12	PW13	PW14	PW15	PW16	PW17	PW18	PW19	PW20	PW21	PW22	PW23	PW24	PW25	Total
2023	19,397	3,050	3,514,351	606	227,745	34,294	0	2,210,242	29,561	325,504	0	102,031	77,242	16,656	60,052	261,079	60,516	308,363	588,300	0	160,466	6,697,533	0	**14,696,988**
2022	20,761	5,513	2,984,213	145	499,123	33,643	250,630	5,055,553	38,400	374,612	1,634,706	99,864	102,503	18,503	69,170	247,417	61,072	115,246	427,592	1,056	46,983	12,760,794	22,798,443	**47,645,940**
2021	23,785	4,294	4,373,965	620	1,164,085	45,341	945,216	7,437,616	41,058	399,115	6,364,227	115,955	114,944	15,282	269,470	252,963	111,779	156,162	1,568,986	1,144	1,027,914	37,526,822	54,122,506	**116,083,247**
2020	25,003	7,436	2,951,436	678	1,166,886	38,034	943,607	7,029,979	50,909	445,265	6,697,274	122,551	151,053	15,756	519,108	314,020	149,800	280,403	1,490,123	987	1,834,004	30,398,428	68,664,454	**123,297,194**
2019	21,705	10,743	2,298,874	0	721,468	38,668	961,057	4,177,945	50,628	425,780	5,509,769	88,305	145,631	14,269	481,471	311,844	195,108	315,581	1,087,563	1,009	1,293,156	23,178,285	45,648,535	**86,977,394**
2018	22,785	4,485	1,908,692	0	614,248	27,616	584,691	3,211,611	61,482	414,317	4,353,351	98,451	132,920	12,338	547,879	367,855	184,312	130,179	797,209	795	1,246,714	32,715,210	9,901,211	**57,338,351**
2017	22,320	2,973	1,795,188	1,158	580,029	37,515	742,902	3,321,569	72,243	425,178	5,214,966	90,099	146,742	16,010	128,711	378,801	154,698	272,704	624,774	1,458	1,365,214	12,970,502	21,480,437	**49,846,191**
2016	23,423	3,776	3,058,067	2,046	1,058,655	40,679	722,871	3,032,918	74,729	507,771	6,897,191	128,879	153,144	16,294	114,322	412,744	136,346	100,977	484,758	876	309,480		3,157,163	**20,437,109**
2015	24,630	3,804	3,971,731	2,388	1,746,516	55,996	767,049	3,184,648	93,443	529,493	7,575,833	145,181	205,415	17,098	102,347	469,060	163,317							**19,057,949**
2014	25,593	4,133	3,229,209	2,402	1,799,771	75,270	602,785	1,940,319	90,536	542,492	6,597,194	155,488	262,035	17,033	116,501	350,403	140,671							**15,951,835**
2013	25,968	2,668	3,052,650	2,685	2,766,654	66,372	347,589	621,910	80,110	502,858	7,592,947	119,548	244,830	16,222	90,417	391,458	98,713							**16,023,599**
2012	26,867	0	3,810,749	1,613	35,940	321	682	949	560	300	288,641	641	859	532	530	1,123	8,177							**4,178,484**
(2008-2011)	127,313	12,718	22,304,424	3,104																				**22,447,559**
Total	**409,549**	**65,593**	**59,253,549**	**17,445**	**12,381,121**	**493,749**	**6,869,078**	**41,225,258**	**683,659**	**4,892,685**	**58,726,100**	**1,266,994**	**1,737,318**	**175,993**	**2,499,978**	**3,758,767**	**1,464,508**	**1,679,615**	**7,069,304**	**7,325**	**7,283,930**	**156,247,574**	**225,772,749**	**593,981,840**

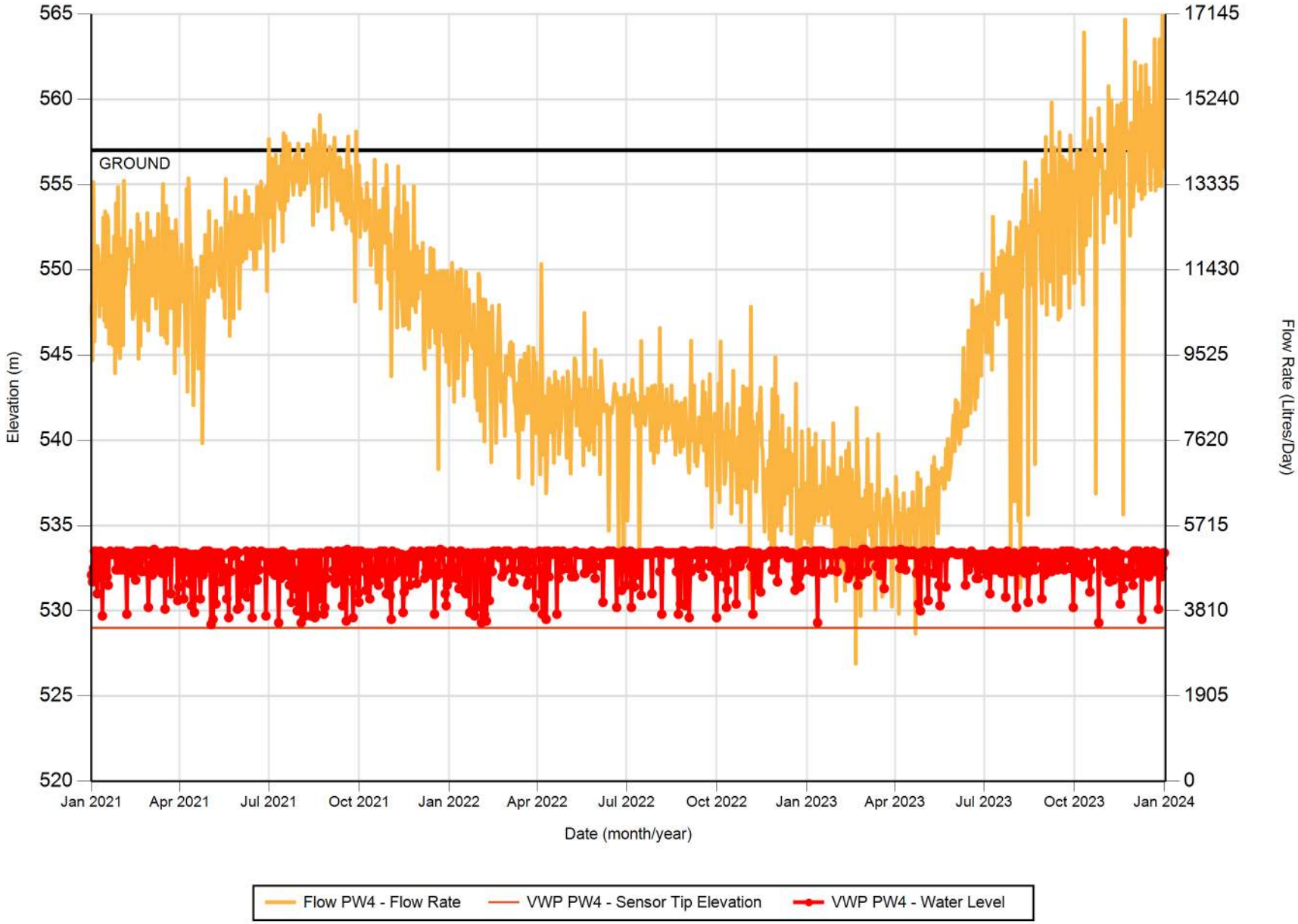
PW1 (Station 06) - Daily Flow and Well Level



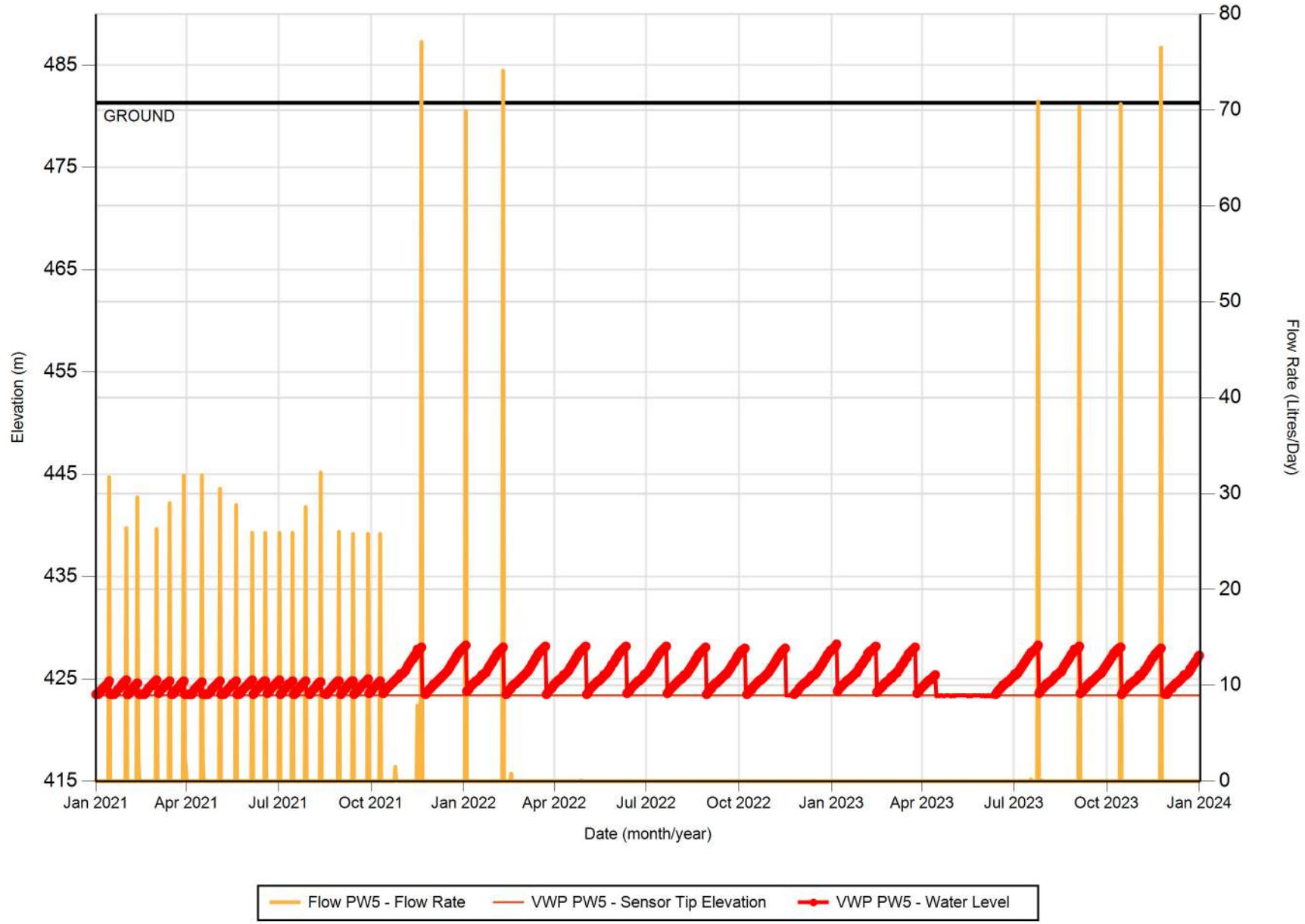
PW2 (Station 02)- Daily Flow and Well Level



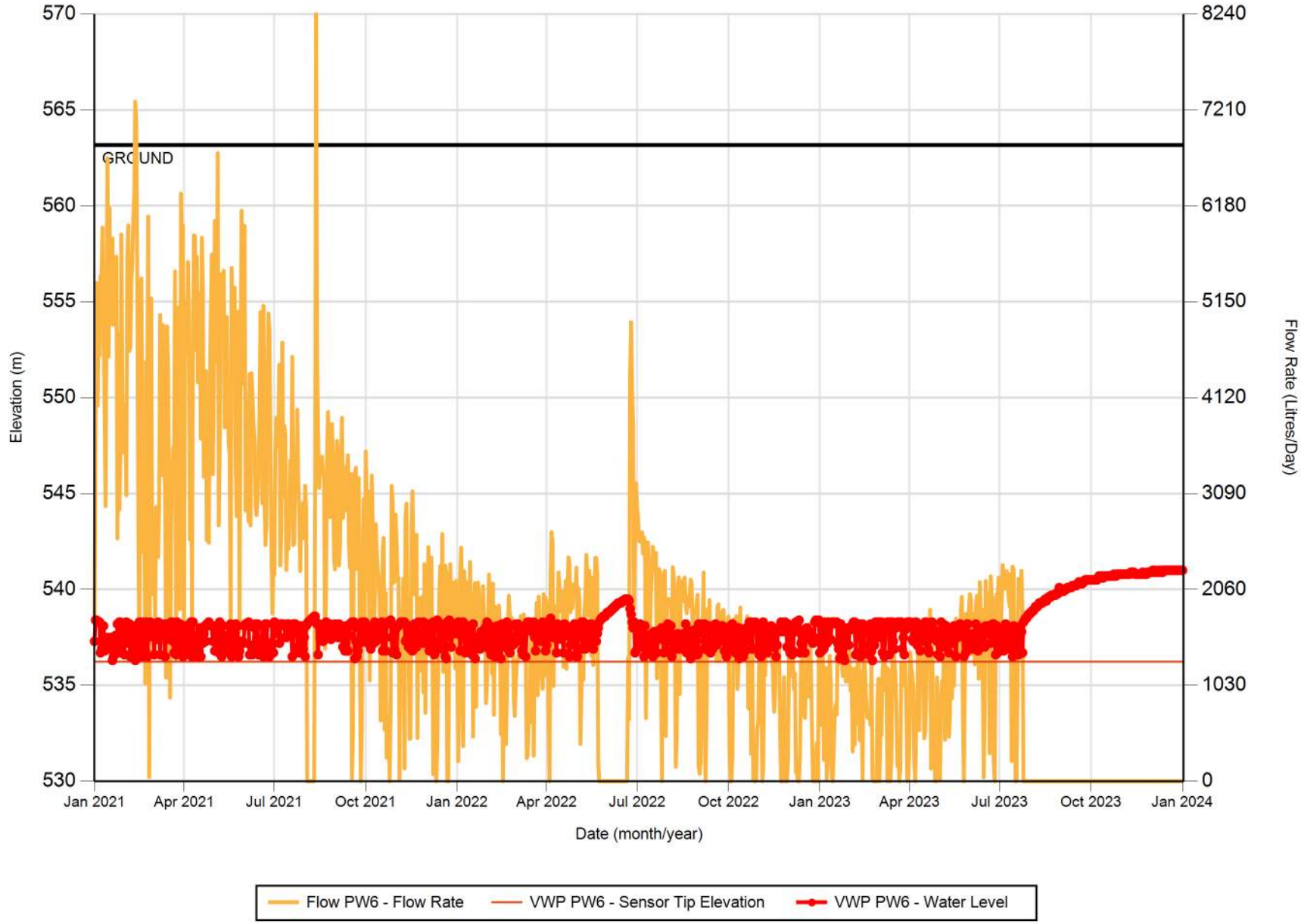
PW4 (Station 16) - Daily Flow and Well Level



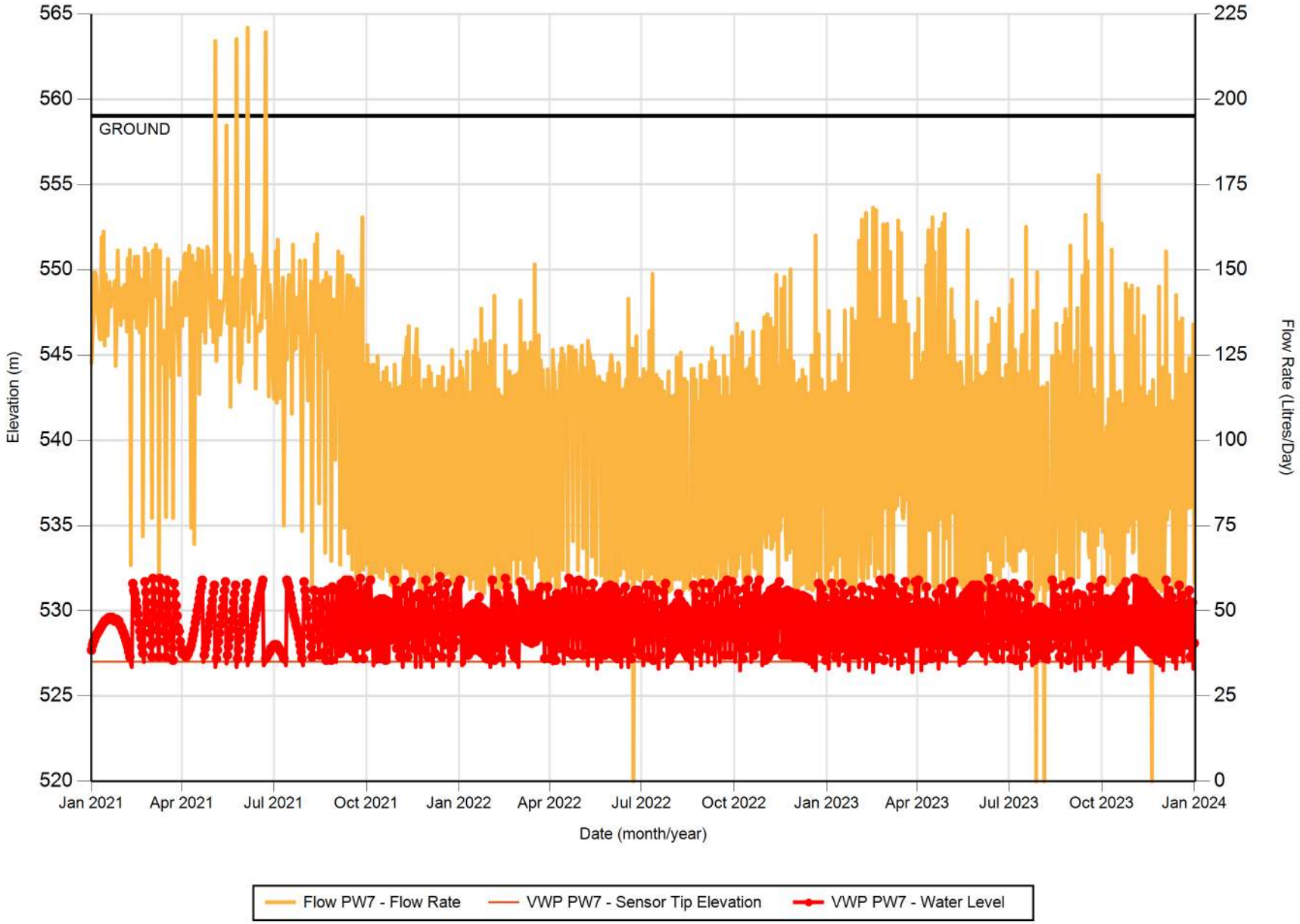
PW5 (Station 17) - Daily Flow and Well Level



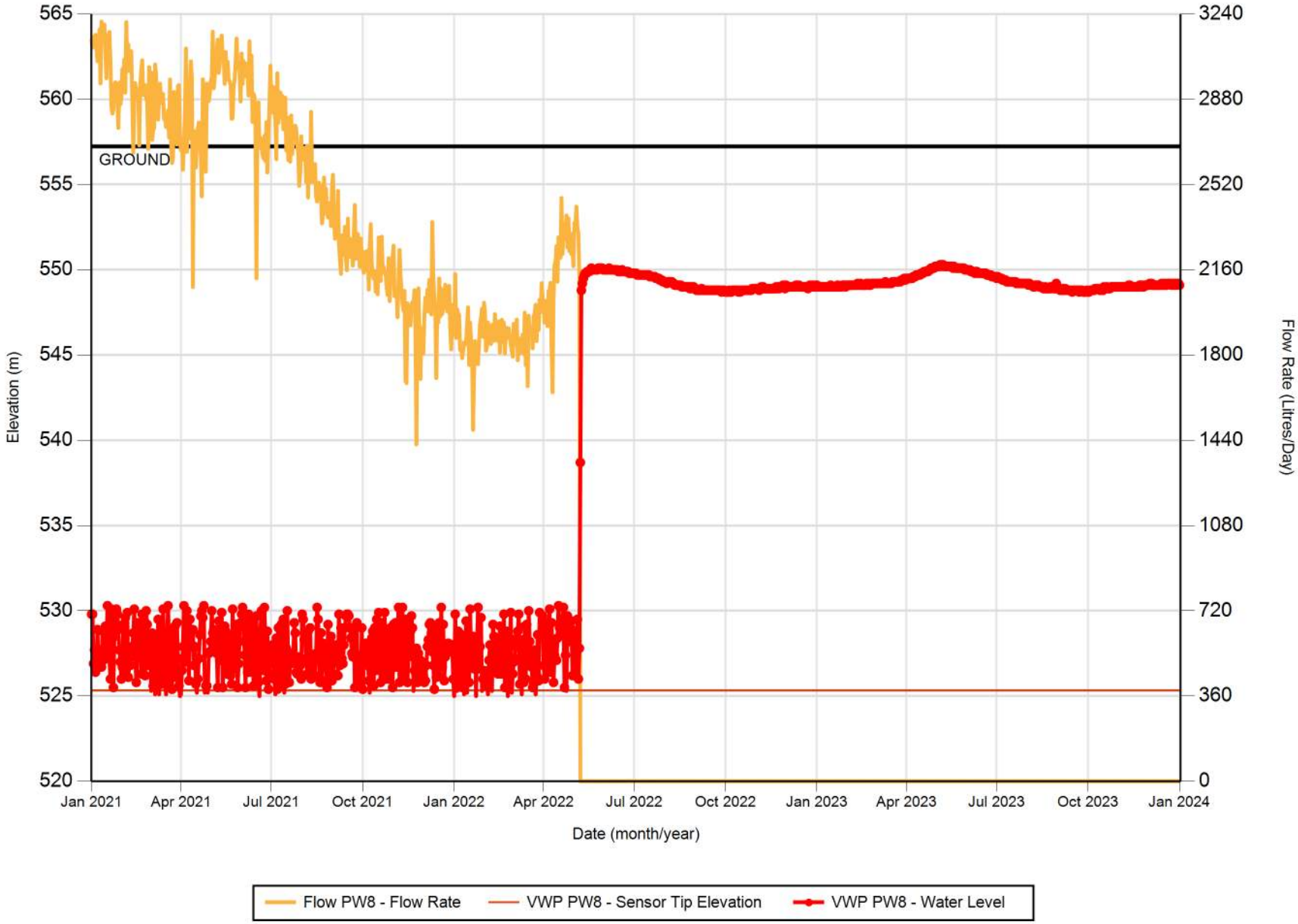
PW6 (Station 04) - Daily Flow and Well Level



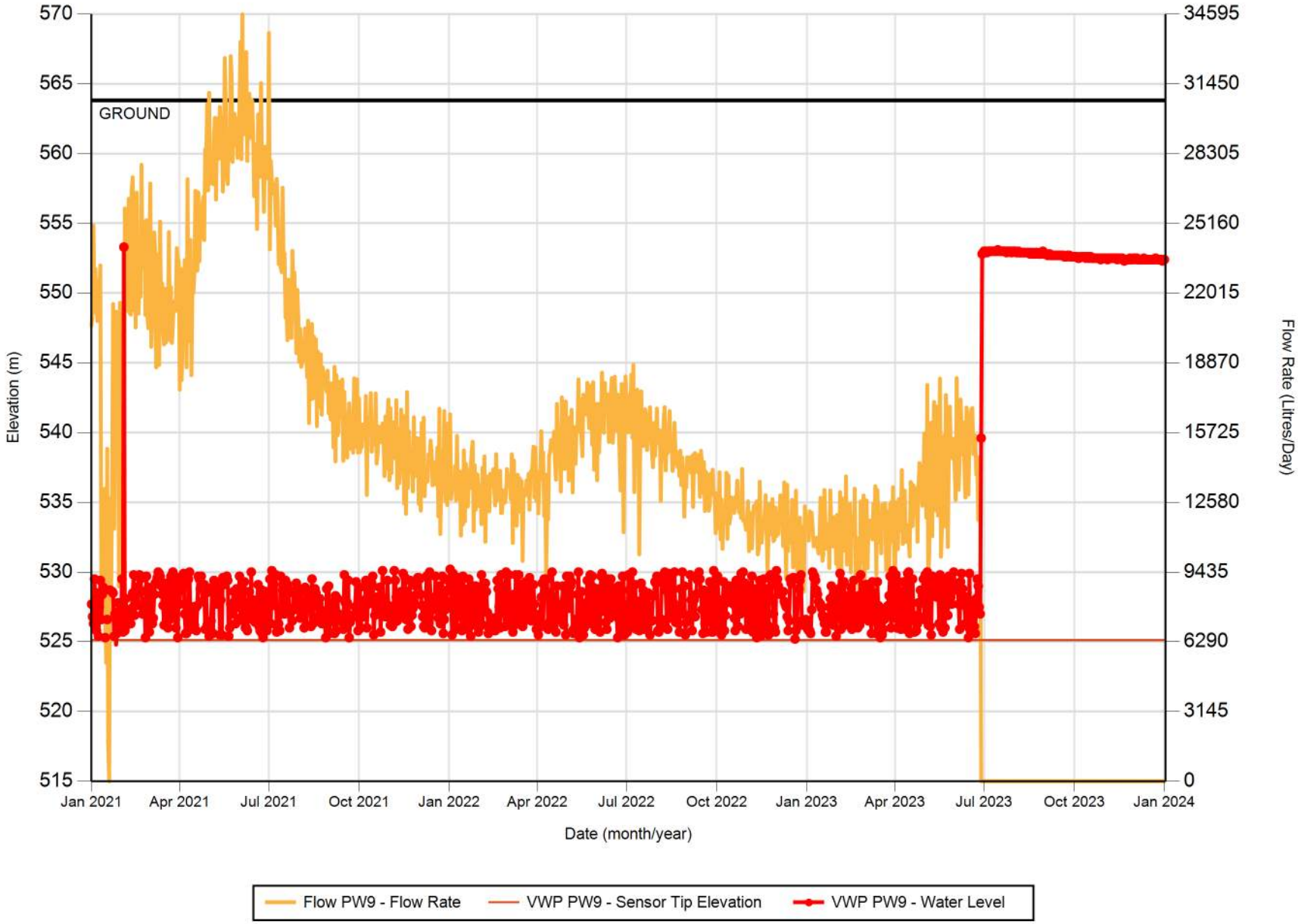
PW7 (Station 04) - Daily Flow and Well Level



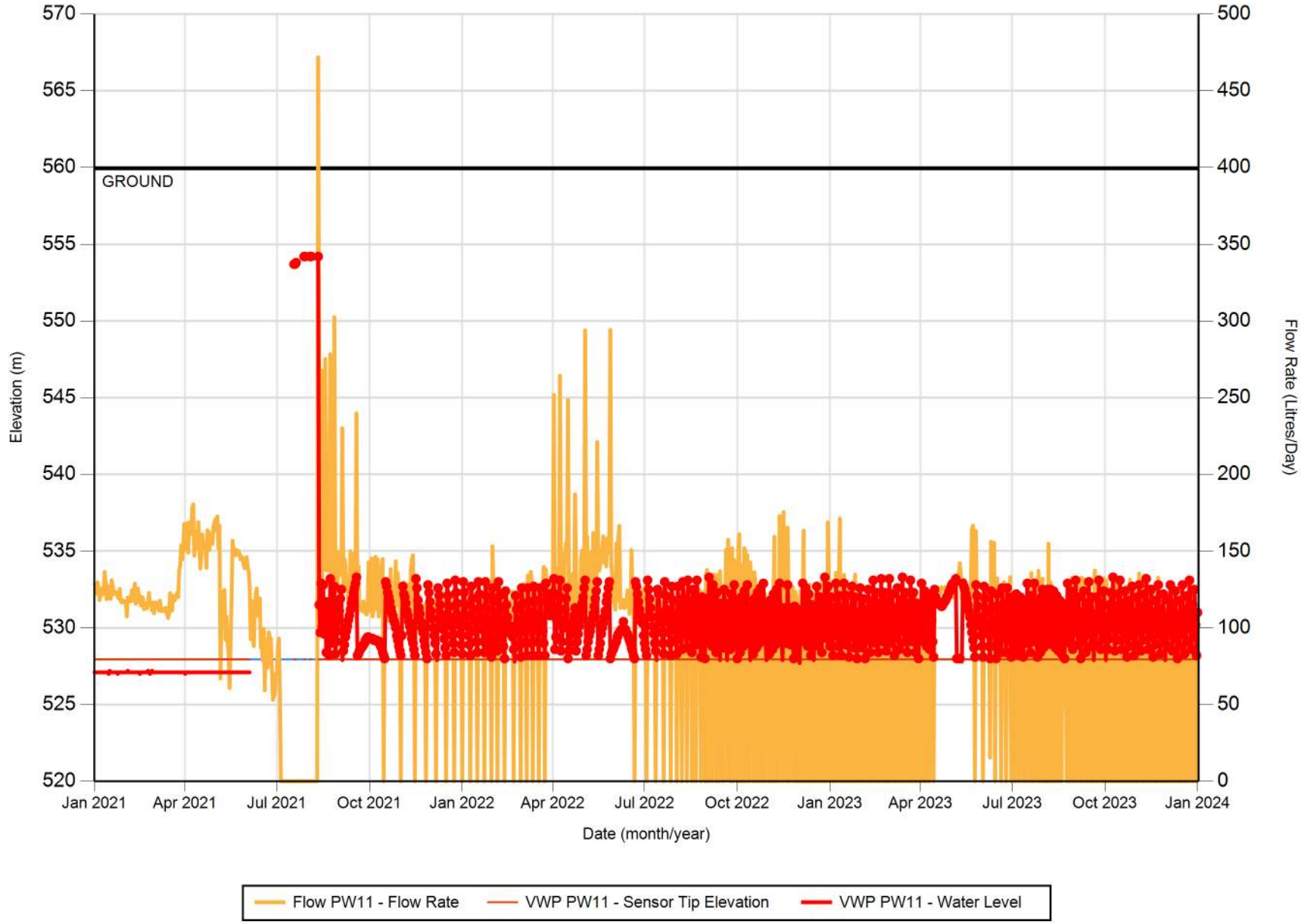
PW8 (Station 04) - Daily Flow and Well Level



PW9 (Station 21) - Daily Flow and Well Level



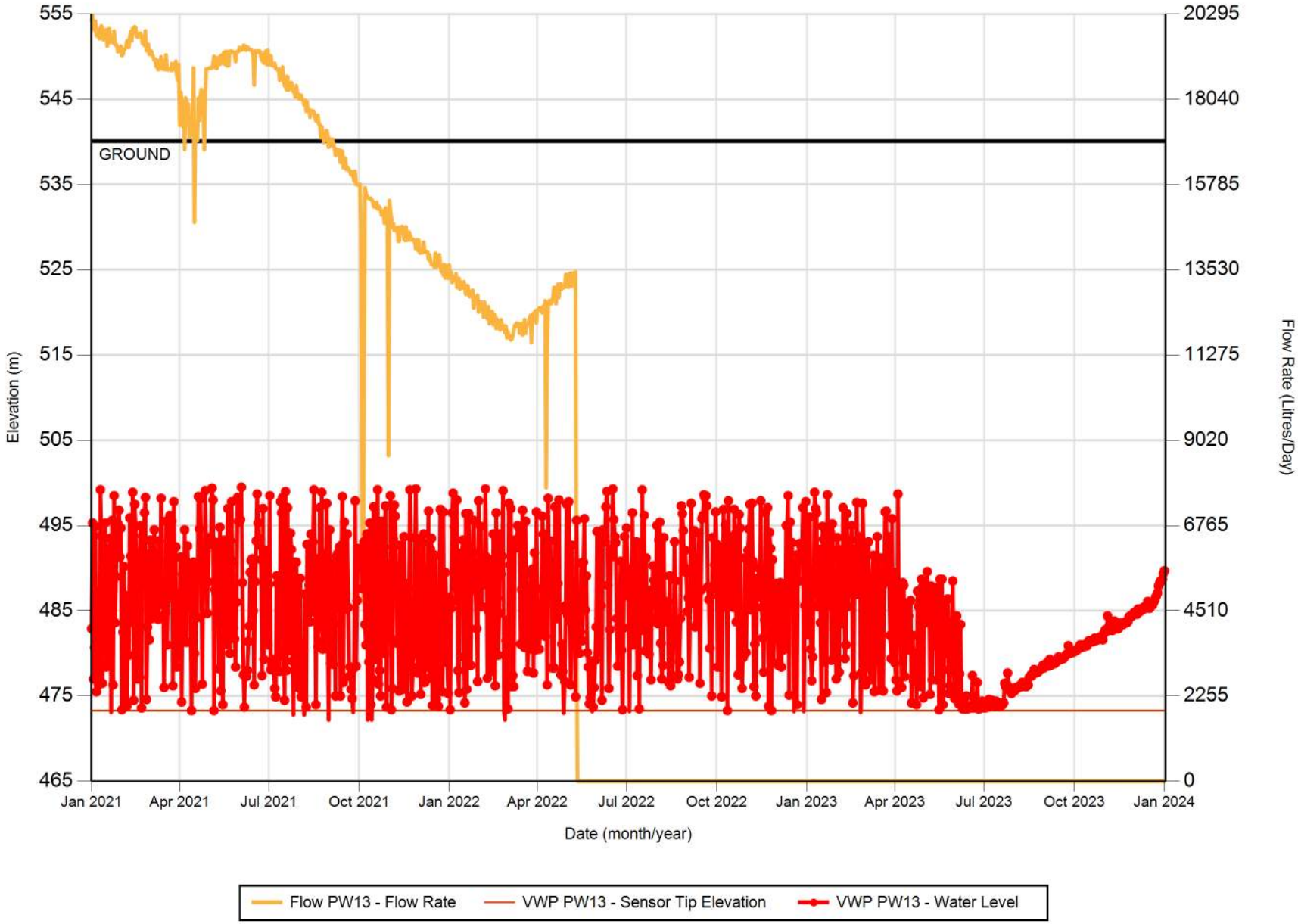
PW11 (Station 20) - Daily Flow and Well Level



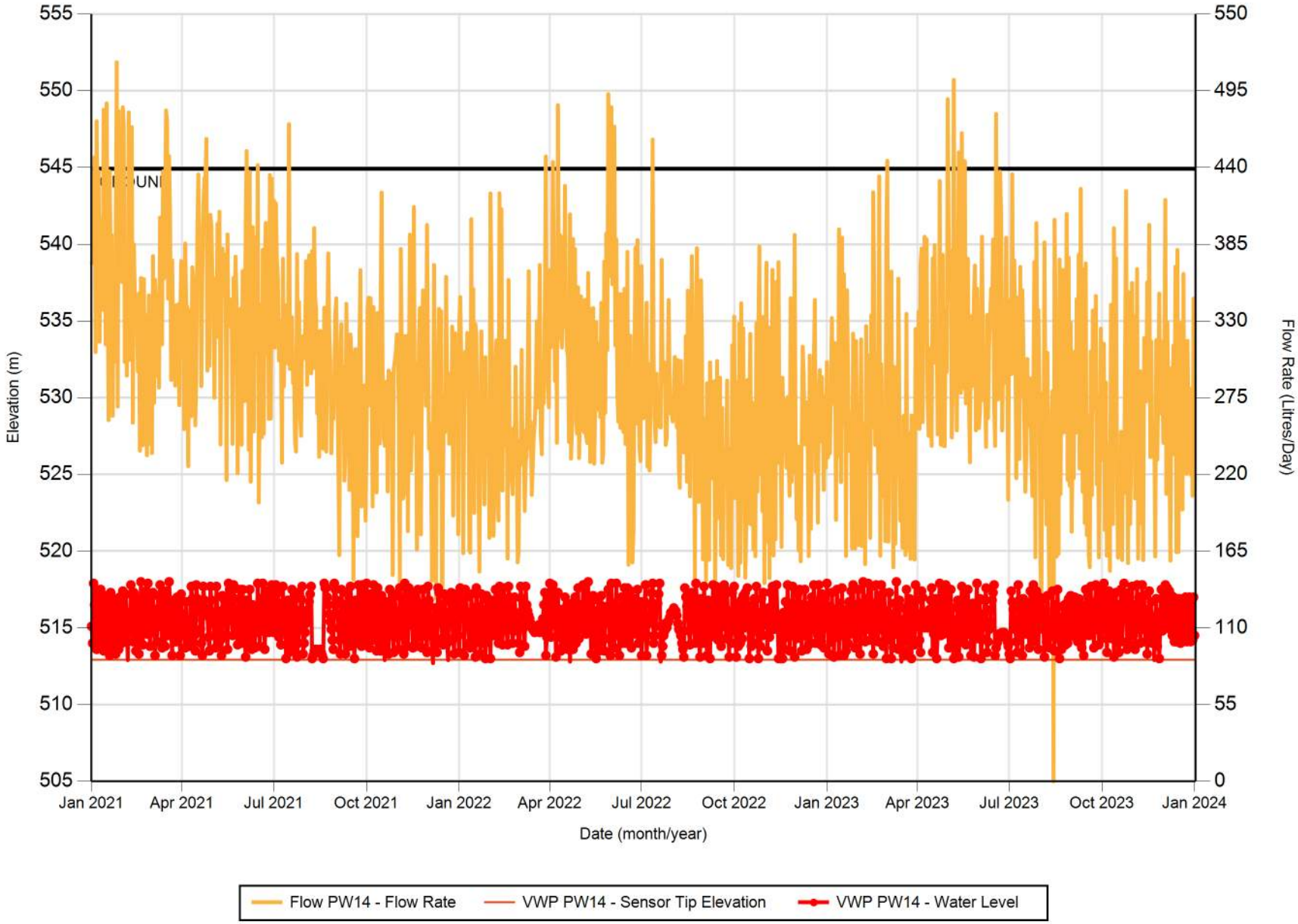
PW12 (Station 09) - Daily Flow and Well Level



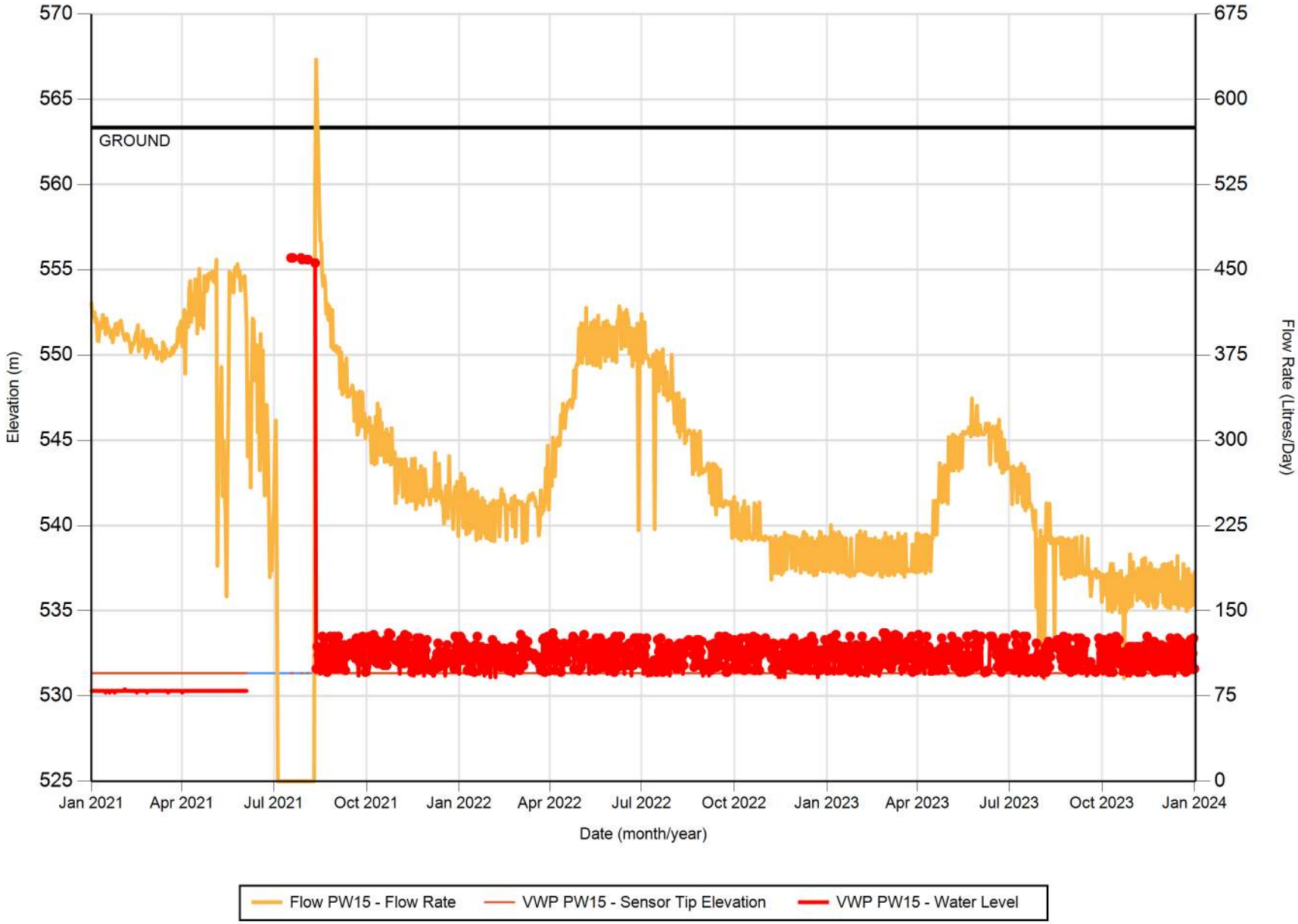
PW13 (Station 22) - Daily Flow and Well Level



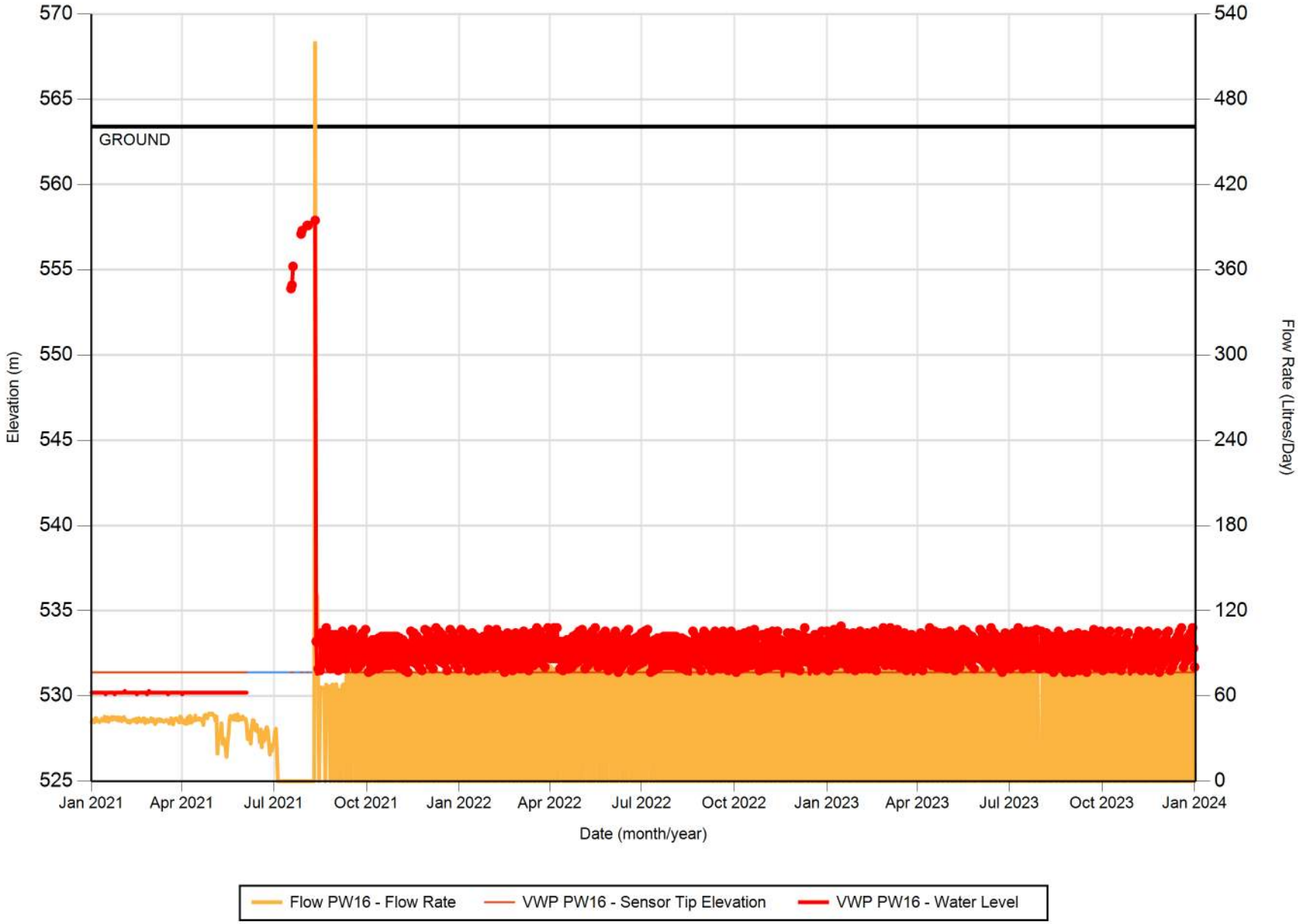
PW14 (Station 10) - Daily Flow and Well Level



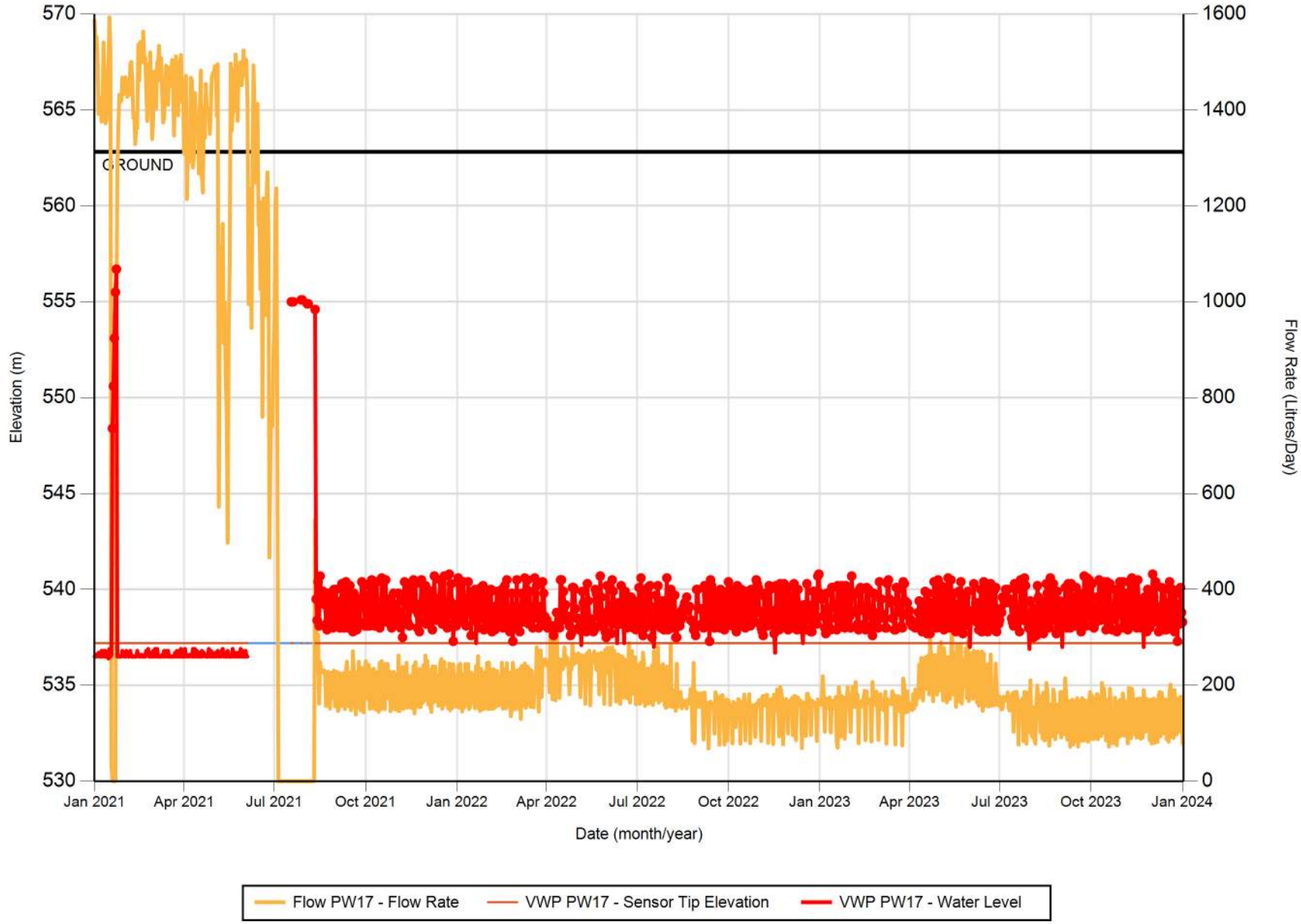
PW15 (Station 20) - Daily Flow and Well Level



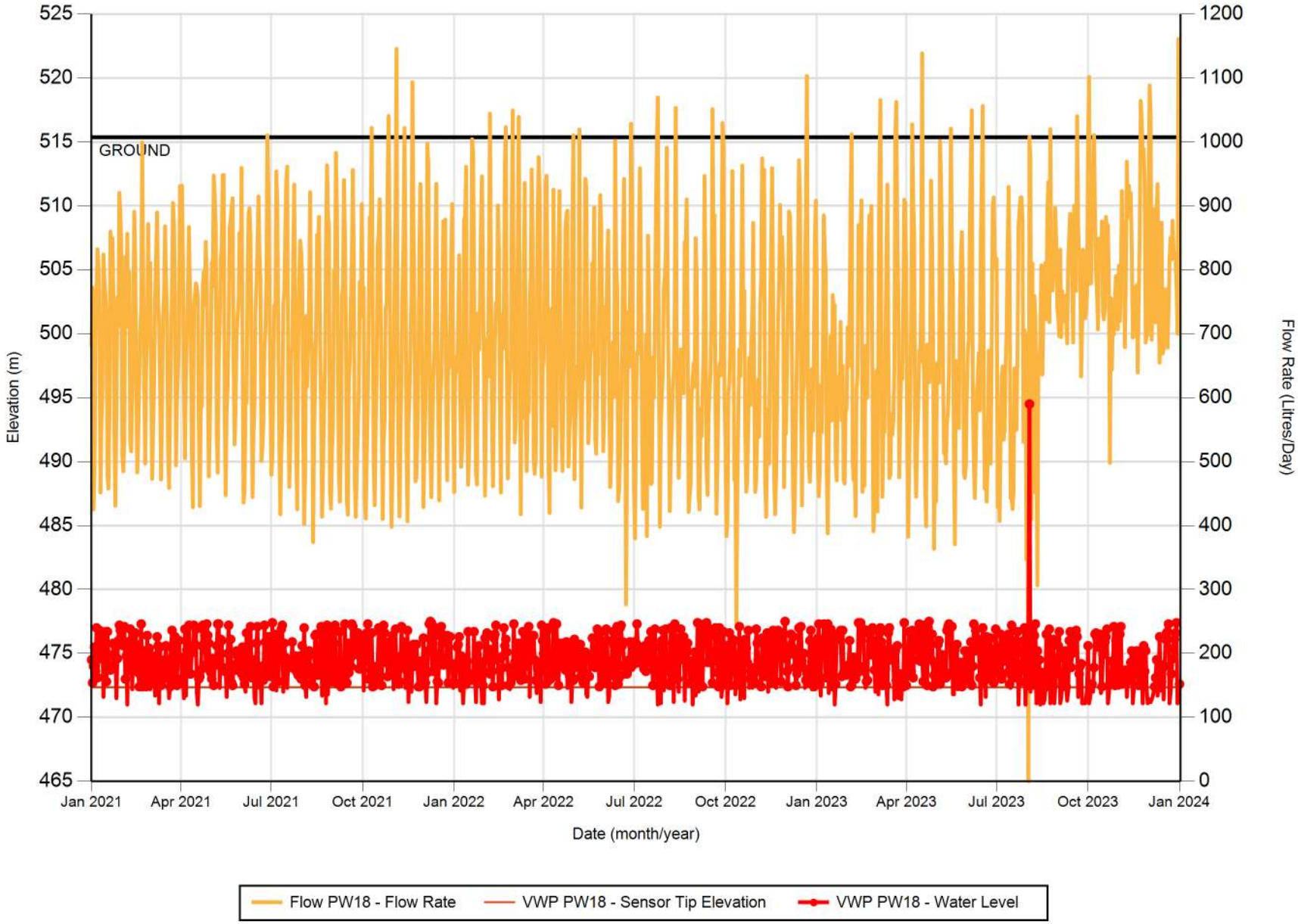
PW16 (Station 20) - Daily Flow and Well Level



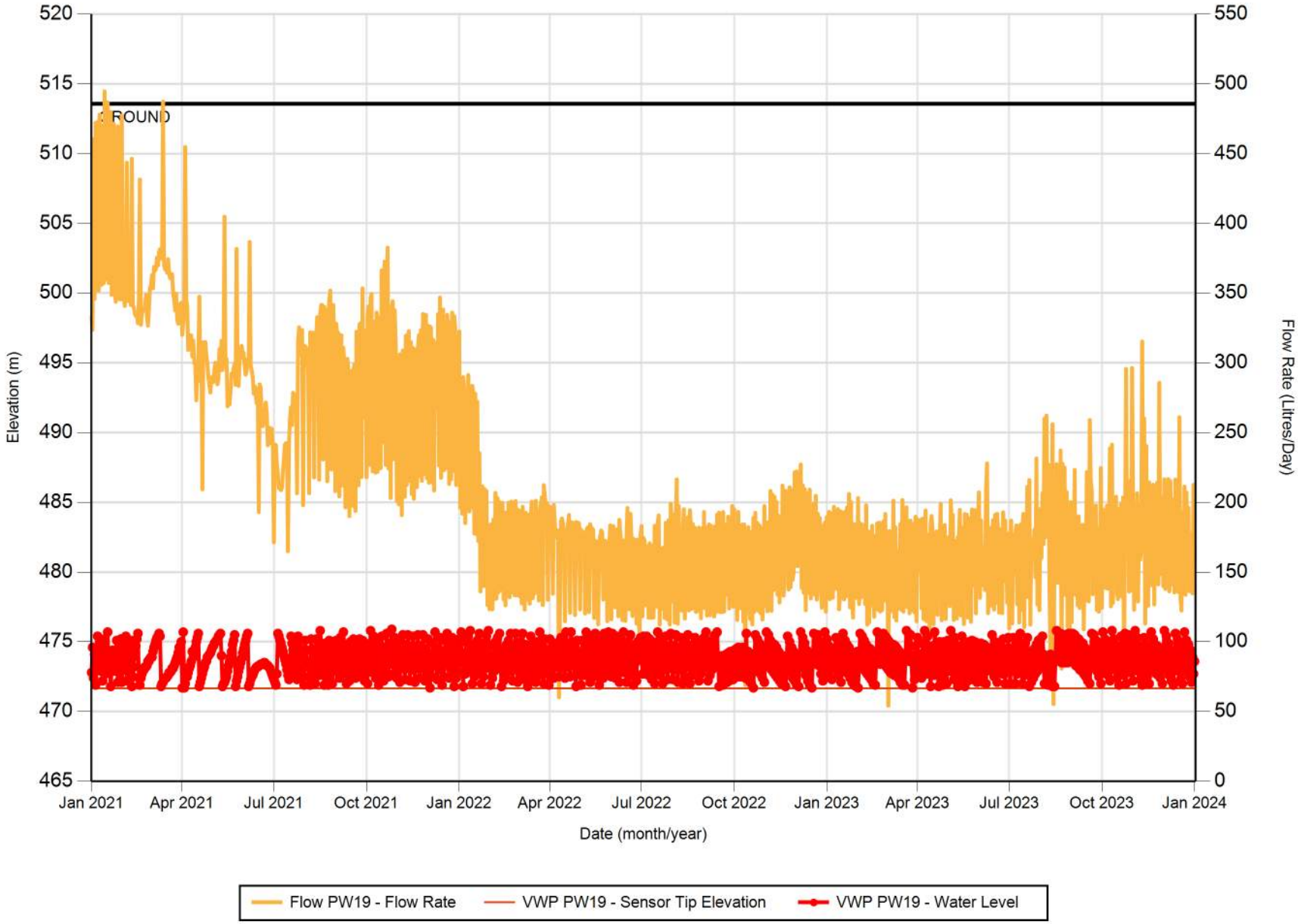
PW17 (Station 20) - Daily Flow and Well Level



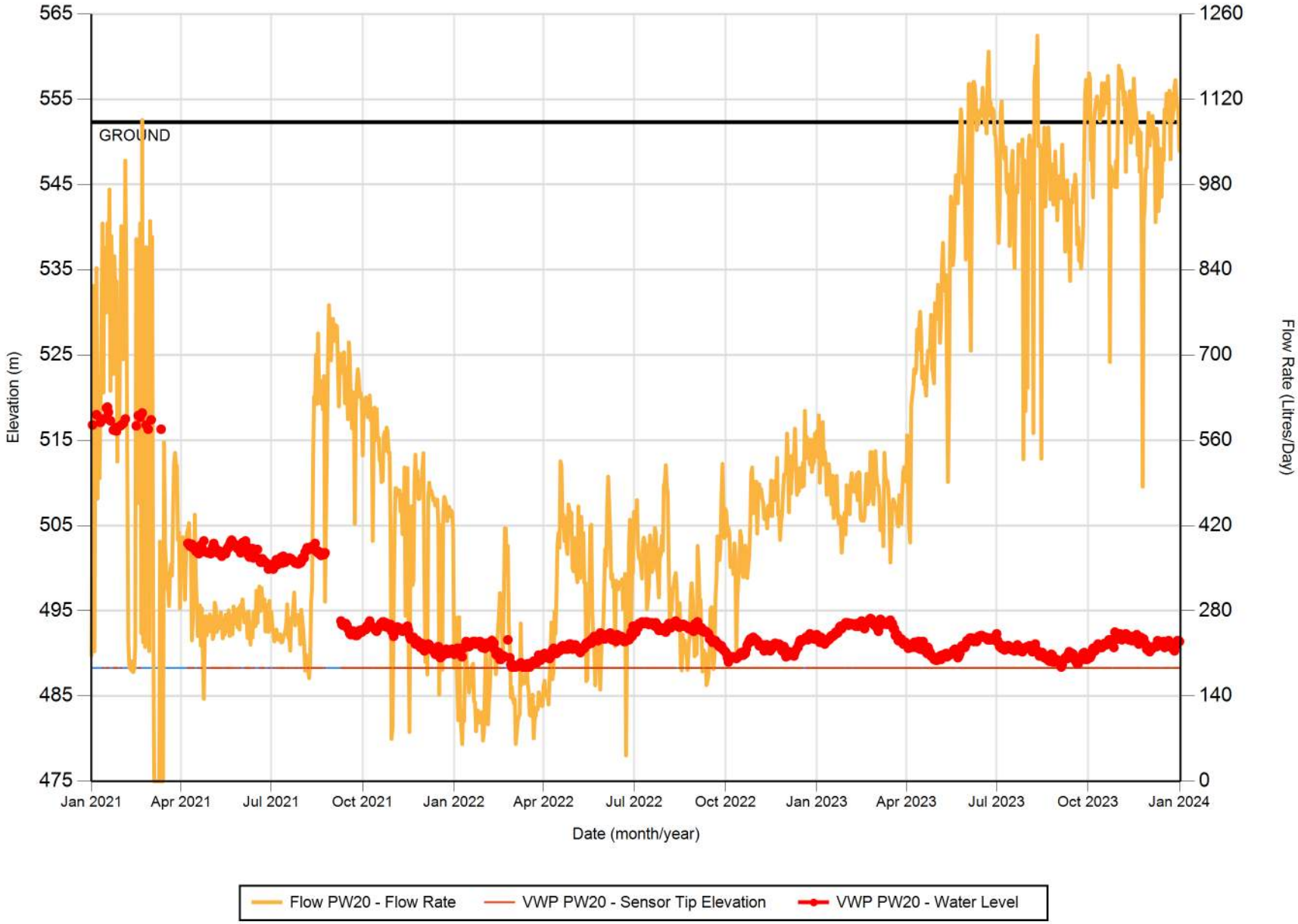
PW18 (Station 23) - Daily Flow and Well Level



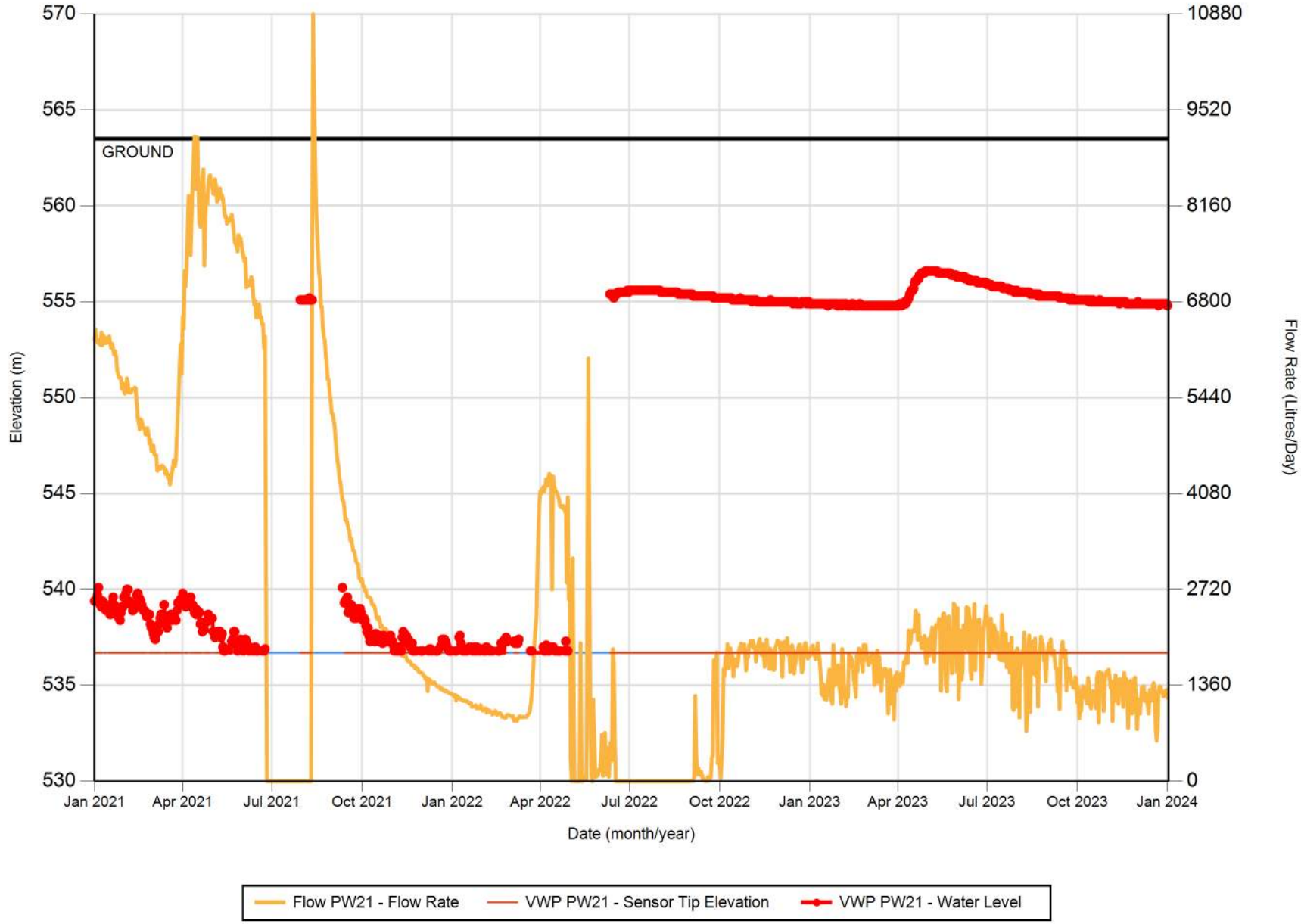
PW19 (Station 28) - Daily Flow and Well Level



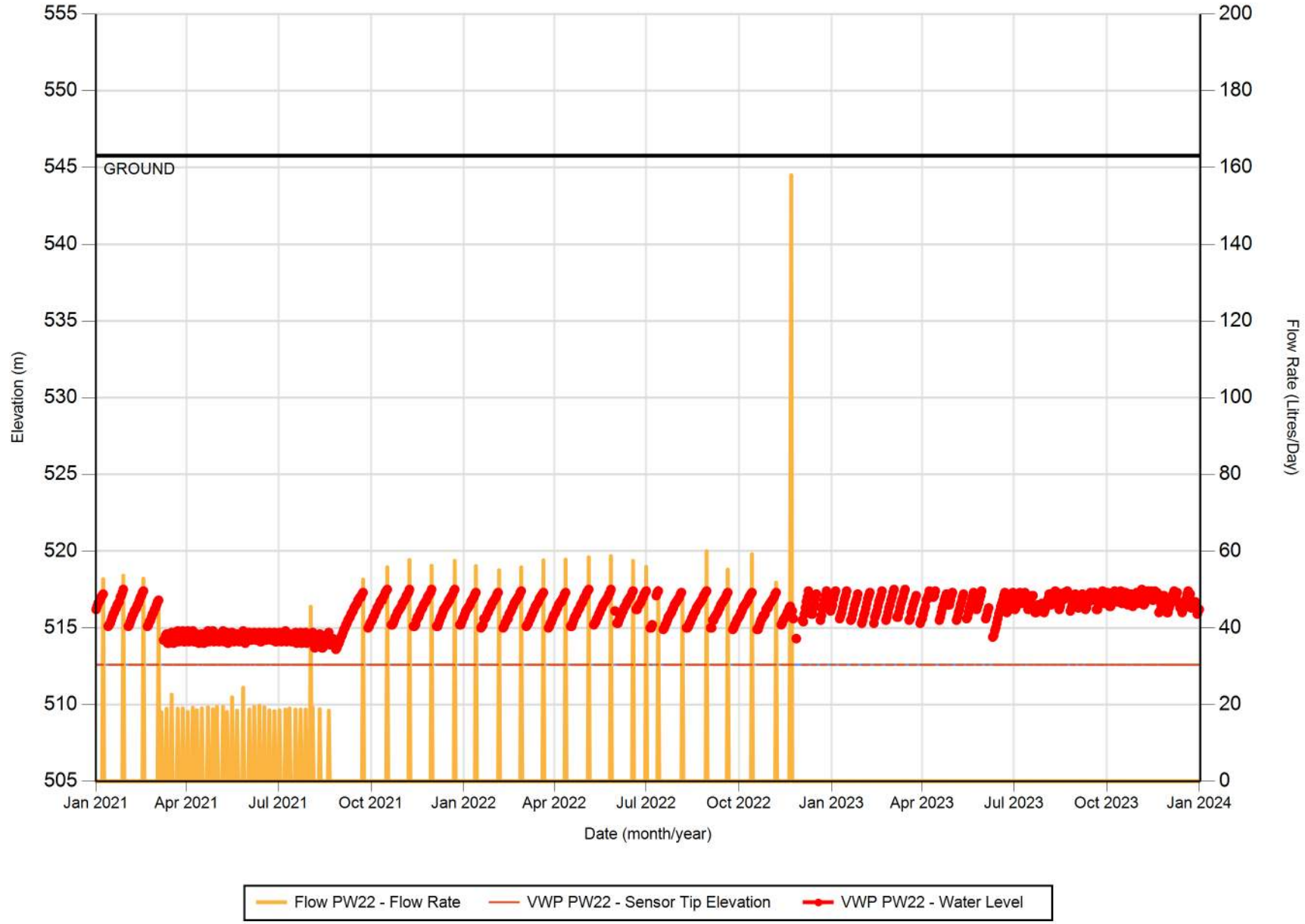
PW20 (Station 33) - Daily Flow and Well Level



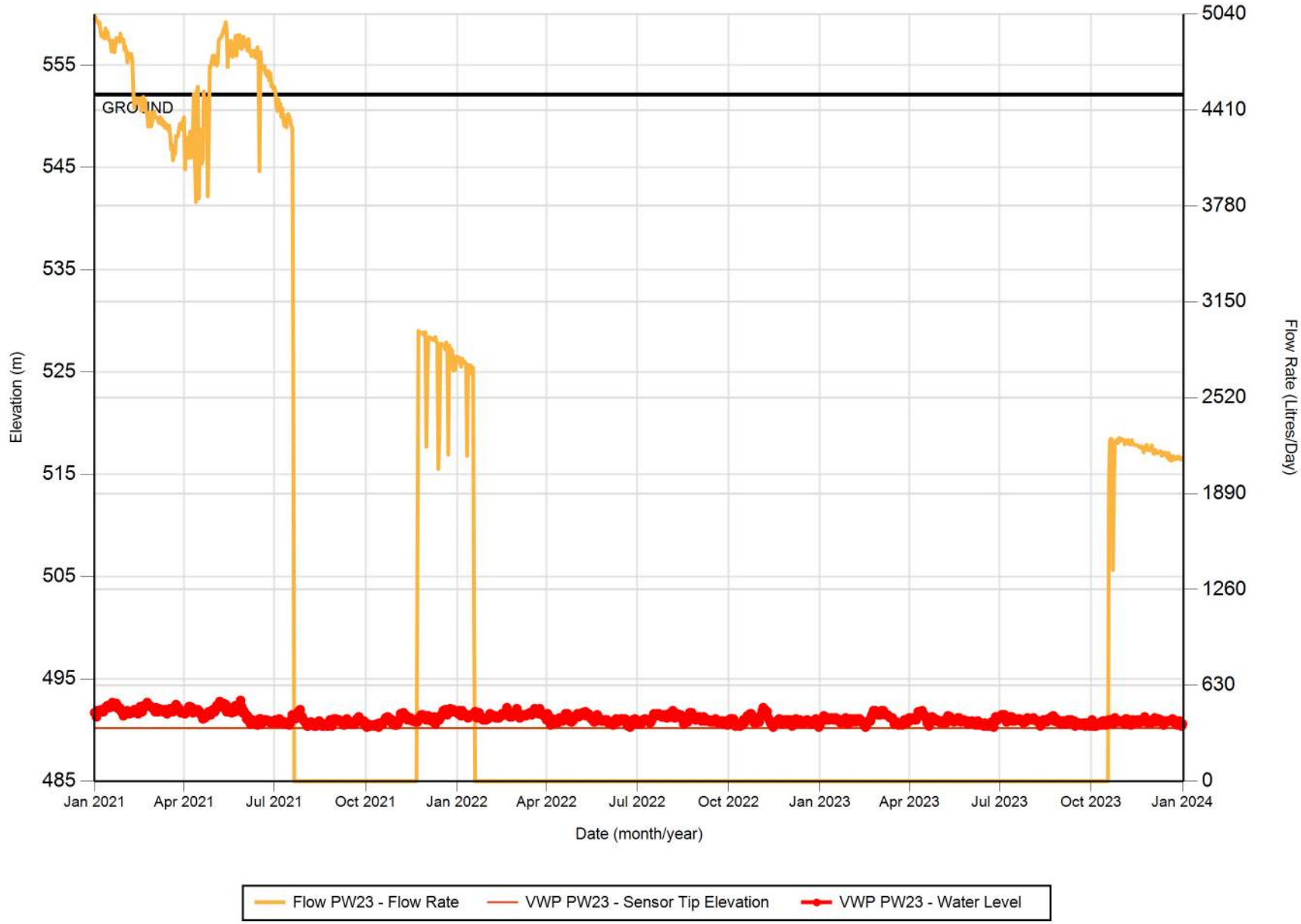
PW21 (Station 14) - Daily Flow and Well Level



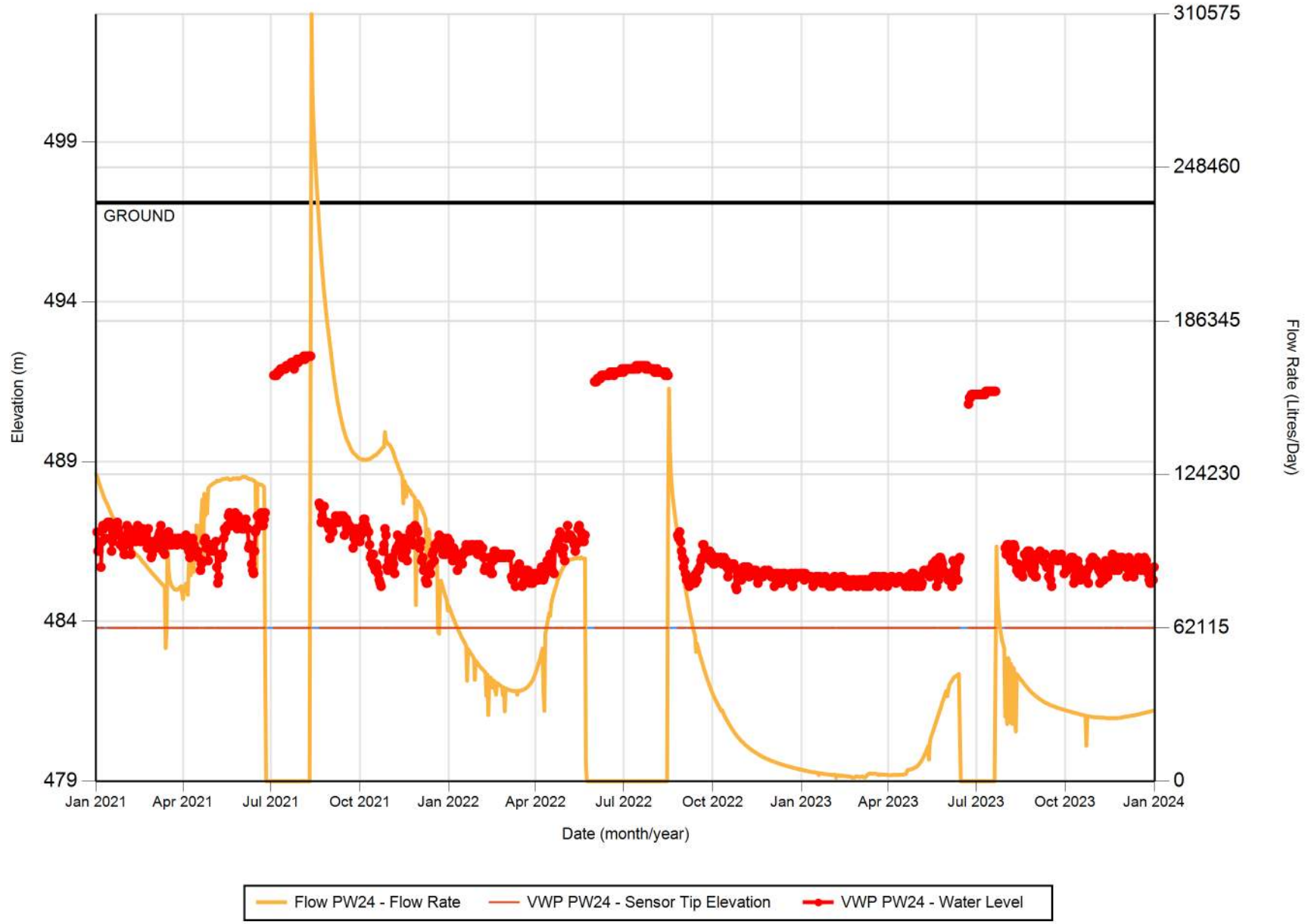
PW22 (Station 33) - Daily Flow and Well Level



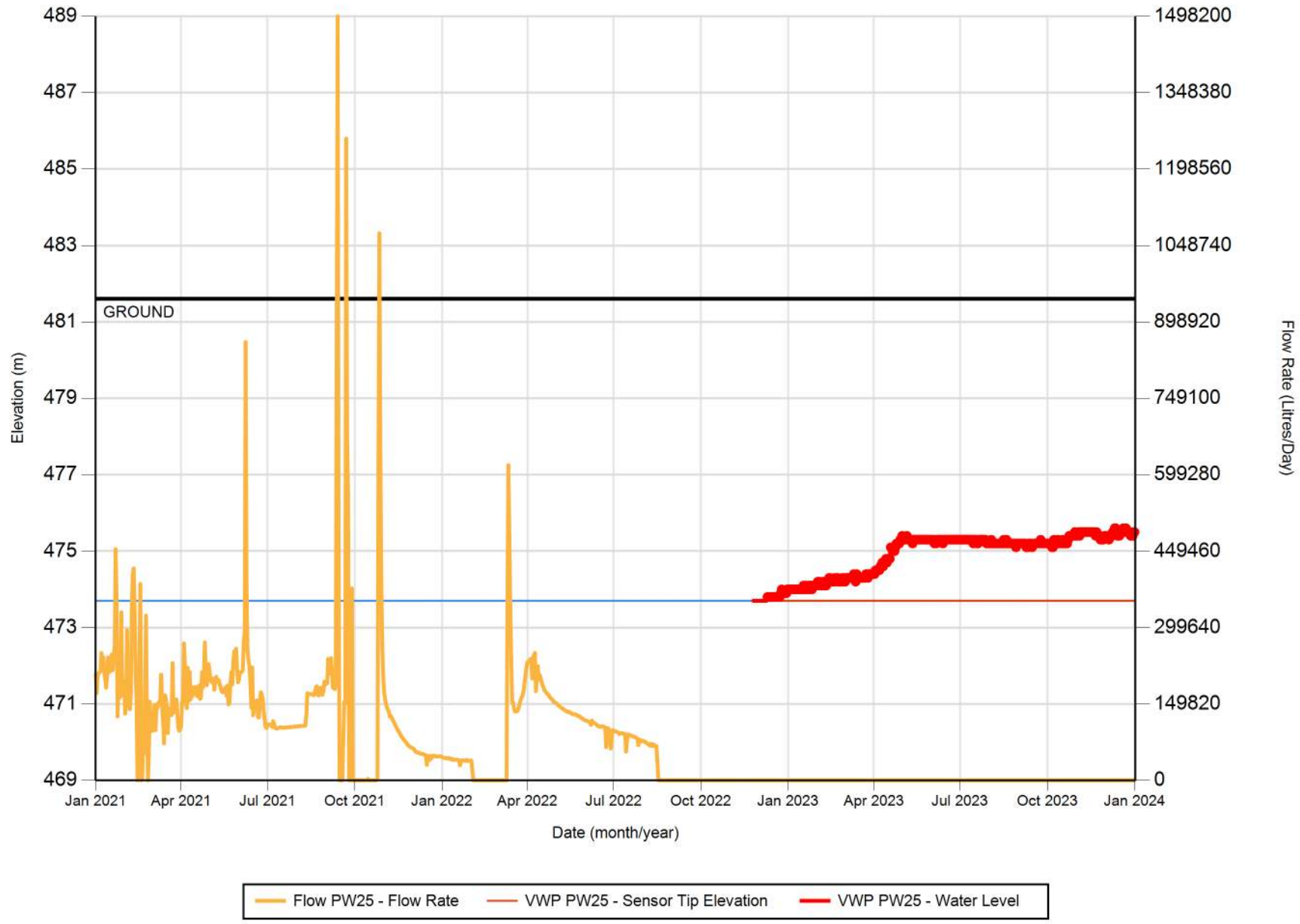
PW23 (Station 32) - Daily Flow and Well Level



PW24 (Station 34) - Daily Flow and Well Level



PW25 (Station 12) - Daily Flow and Well Level



APPENDIX

E HORIZONTAL DRAINS – STATUS TABLE, FIGURE E1 AND PRODUCTION CHARTS

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Appendix E - Horizontal Drain Status

HD	Location	Drilled Date	Length (total/slotted)	Azimuth	Inclination	Monitoring Well VWPs	Status
HD1-1	Lewis Dr. (at Sikh Temple)	November 2007	64.0m/57.9m	271	+2°	VWP 23A&B, VWP 24, VWP 25A&B	Inactive - dry
HD1-2	Lewis Dr. (at Sikh Temple)	November 2007	48.8m/42.7m	241	+1°	VWP 23A&B, VWP 24, VWP 25A&B	Inactive - dry
HD4-1	Adam St.	October 2007	135.6m/129.5m	271	+2°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD4-2	Adam St.	November 2007	45.7m/39.6m	271	-2°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD5-1	Below Healy St.	August 2012	251.5m/245.4m	220	0°	VWP 11A,B&C	Inactive - dry
HD5-2	Below Healy St.	August 2012	251.5m/245.4m	210	-1°	VWP 11A,B&C	Inactive - dry
HD5-3	Below Healy St.	August 2012	251.5m/245.4m	200	+0.5°	VWP 11A,B&C	Inactive - dry
HD5-4	Below Healy St.	August 2012	251.5m/245.4m	175	-2°	VWP 11A,B&C	Inactive - dry
HD6-1	Healy St.	August 2012	250.9m/244.8m	216	0°	VWP 11A,B&C	Inactive - dry
HD6-2	Healy St.	August 2012	251.2m/245.1m	240	-2°	VWP 11A,B&C	Inactive - dry
HD6-3	Healy St.	August 2012	251.5m/245.4m	226	-0.5°	VWP 11A,B&C	Inactive - dry
HD7-1	Below Pentland Cres.	August 2012	15.2m/15.2m	252	0°	VWP 36A,B&C	Inactive - dry
HD7-2	Below Pentland Cres.	August 2012	47.2m/32.0m	212	-2°	VWP 36A,B&C	Inactive - dry
HD7-3	Below Pentland Cres.	August 2012	56.1m/48.8m	292	-2°	VWP 36A,B&C	Inactive - dry
HD8-1	Below Pentland Cres.	September 2012	137.2m/134.1m	250	0°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-2	Below Pentland Cres.	September 2012	137.2m/134.1m	260	-1°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-3	Below Pentland Cres.	September 2012	140.2m/137.2m	240	-2°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-4	Below Pentland Cres.	September 2012	140.2m/137.2m	252	-1°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-5	Below Pentland Cres.	September 2012	134.1m/131.1m	254	-3°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-6	Below Pentland Cres.	September 2012	137.2m/134.1m	248	-2.5°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-7	Below Pentland Cres.	September 2012	137.2m/134.1m	238	-2°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-8	Below Pentland Cres.	September 2012	132.6m/131.1m	228	0°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-9	Below Pentland Cres.	September 2012	153.9m/152.4m	225	+1°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-10	Below Pentland Cres.	September 2012	134.1m/131.1m	222	-2°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD8-11	Below Pentland Cres.	September 2012	128.0m/125.0m	218	0°	VWP 8A,B,C&D VWP 36A,B&C	Active
HD9-1	Lewis Dr. (at Sikh Temple)	August 2012	208.8m/204.2m	290	-5°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD9-2	Lewis Dr. (at Sikh Temple)	August 2012	202.7m/199.6m	280	-2°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD9-3	Lewis Dr. (at Sikh Temple)	August 2012	71.6m/67.1m	270	0°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD9-4	Lewis Dr. (at Sikh Temple)	August 2012	105.2m/97.5m	260	-1.8°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD9-5	Lewis Dr. (at Sikh Temple)	August 2012	99.1m/94.5m	250	-2°	VWP 23A&B, VWP 24, VWP 25A&B	Active

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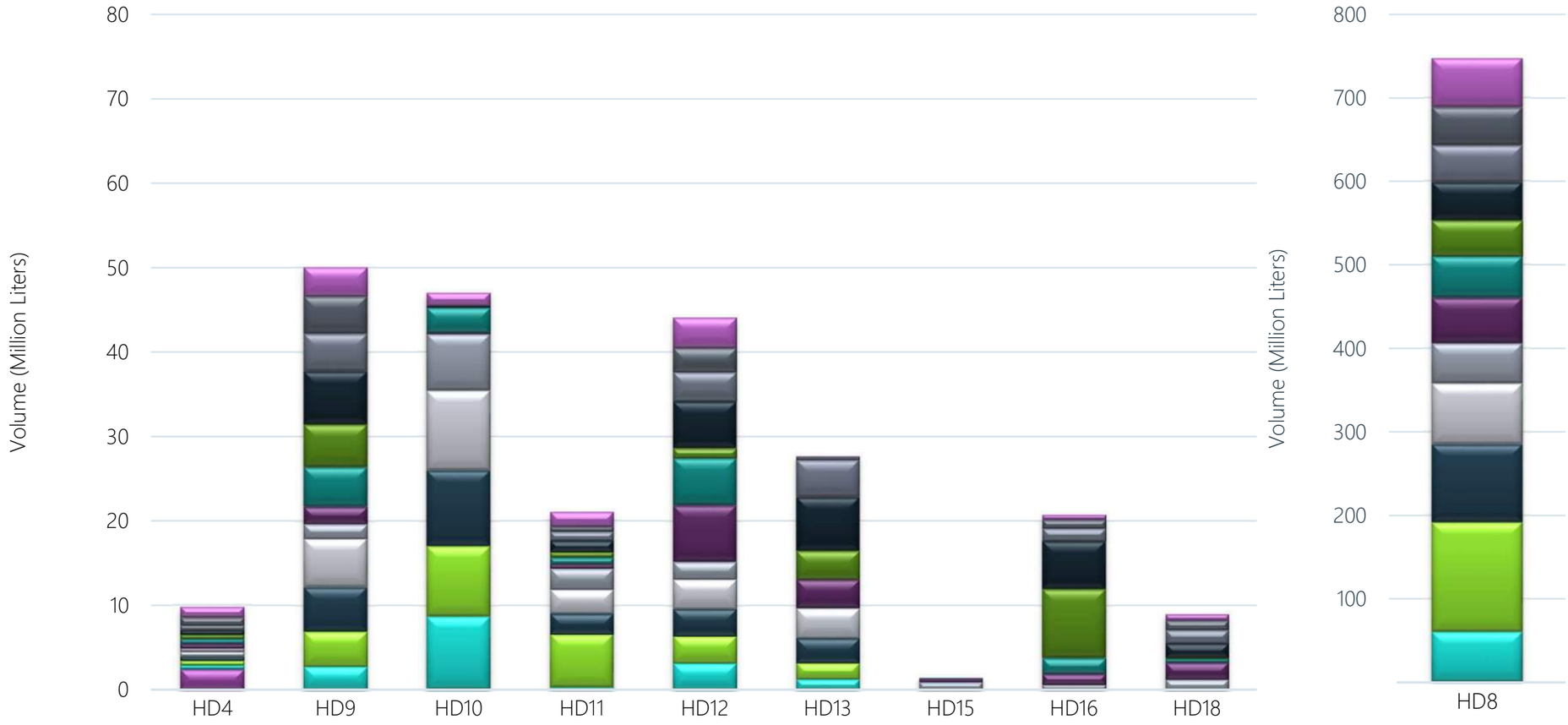
Appendix E - Horizontal Drain Status

HD	Location	Drilled Date	Length (total/slotted)	Azimuth	Inclination	Monitoring Well VWPs	Status
HD9-6	Lewis Dr. (at Sikh Temple)	August 2012	50.3m/45.2m	230	-2°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD9-6	Lewis Dr. (at Sikh Temple)	August 2012	135.6m/134.1m	300	-1°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD9-7	Lewis Dr. (at Sikh Temple)	August 2012	77.7m/73.2m	290	+0.5°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD9-8	Lewis Dr. (at Sikh Temple)	August 2012	74.7m/70.1m	265	-1.5°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD9-9	Lewis Dr. (at Sikh Temple)	August 2012	47.2m/42.7m	265	-1°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD10-1	Bouchie St.	September 2012	134.1m/131.1m	265	-0.5°	VWP 37A&B	Active
HD10-2	Bouchie St.	September 2012	146.3m/143.3m	305	0°	VWP 37A&B	Active
HD10-3	Bouchie St.	September 2012	146.3m/143.3m	295	-1.5°	VWP 37A&B	Active
HD10-4	Bouchie St.	September 2012	125.0m/121.9m	285	+0.1°	VWP 37A&B	Active
HD10-5	Bouchie St.	September 2012	164.6m/161.5m	275	-1.7°	VWP 37A&B	Active
HD10-6	Bouchie St.	September 2012	109.7m/106.7m	255	+1°	VWP 37A&B	Active
HD10-7	Bouchie St.	September 2012	121.9m/118.9m	244	+.8°	VWP 37A&B	Active
HD11-1	Below Allard St.	August 2012	196.6m/190.5m	315	-1.5°	VWP 3, VWP 34A,B&C	Active
HD11-2	Below Allard St.	August 2012	196.6m/190.5m	305	-2.2°	VWP 3, VWP 34A,B&C	Active
HD11-3	Below Allard St.	August 2012	196.6m/190.5m	295	-1.5°	VWP 3, VWP 34A,B&C	Active
HD11-4	Below Allard St.	August 2012	196.6m/190.5m	285	-2.2°	VWP 3, VWP 34A,B&C	Active
HD11-5	Below Allard St.	August 2012	196.6m/190.5m	275	-1.5°	VWP 3, VWP 34A,B&C	Active
HD11-6	Below Allard St.	August 2012	365.8m/362.8m	315	+0.2°	VWP 3, VWP 34A,B&C	Active
HD12-1	Adam St.	July 2012	198.1m/190.5m	258	0°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD12-2	Adam St.	July 2012	198.1m/190.5m	240	0°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD12-3	Adam St.	July 2012	132.6m/131.1m	230	0°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD12-4	Adam St.	July 2012	196.6m/190.5m	260	0°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD12-5	Adam St.	July 2012	196.6m/190.5m	278	0°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD12-6	Adam St.	July 2012	196.6m/190.5m	250	0°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD12-7	Adam St.	July 2012	196.6m/190.5m	230	-1.5°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD12-8	Adam St.	July 2012	196.6m/190.5m	286	-0.5°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD12-9	Adam St.	July 2012	196.6m/190.5m	292	-1°	VWP 21A&B, VWP22, VWP 38A&B	Active
HD13-1	Below Adam St.	August 2012	245.4m/239.3m	330	0°	VWP 38A&B	Active
HD13-2	Below Adam St.	August 2012	251.5m/245.4m	320	-0.5°	VWP 38A&B	Active
HD13-3	Below Adam St.	August 2012	251.5m/245.4m	310	-0.5°	VWP 38A&B	Active

Appendix E - Horizontal Drain Status

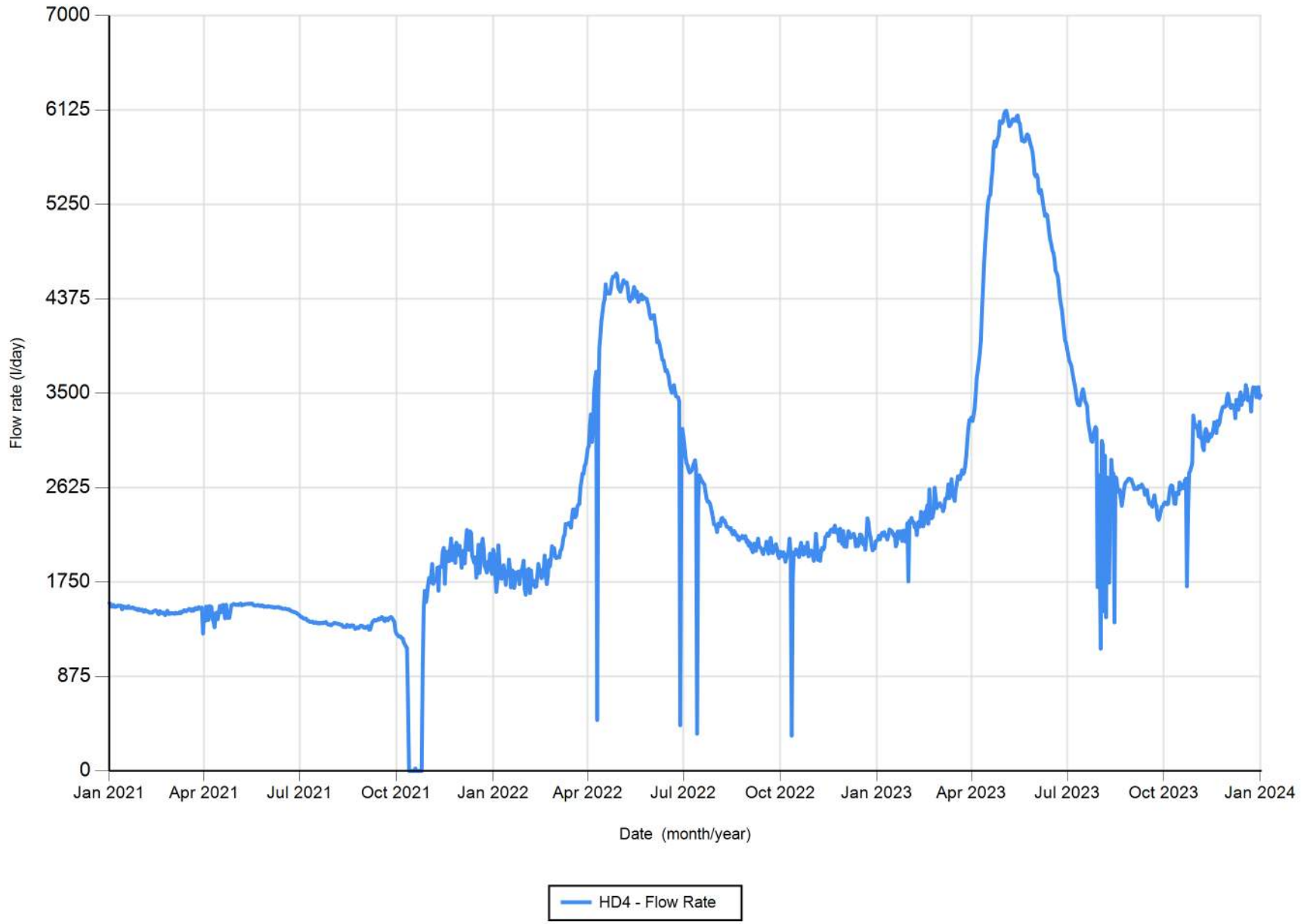
HD	Location	Drilled Date	Length (total/slotted)	Azimuth	Inclination	Monitoring Well VWPs	Status
HD13-4	Below Adam St.	August 2012	251.5m/245.4m	300	0°	VWP 38A&B	Active
HD13-5	Below Adam St.	August 2012	99.1m/92.0m	340	-2°	VWP 38A&B	Active
HD13-6	Below Adam St.	August 2012	245.4m/239.3m	290	0°	VWP 38A&B	Active
HD14-1	Below Healy St.	September 2012	150.9m/147.9m	218	-1.5°	VWP 11A,B&C	Inactive - dry
HD14-2	Below Healy St.	September 2012	157.0m/154.0m	205	+0.5°	VWP 11A,B&C	Inactive - dry
HD14-3	Below Healy St.	September 2012	157.0m/154.0m	192	+2°	VWP 11A,B&C	Inactive - dry
HD14-4	Below Healy St.	September 2012	181.4m/178.4m	180	0°	VWP 11A,B&C	Inactive - dry
HD14-5	Below Healy St.	September 2012	403.9m/400.9m	230	+1°	VWP 11A,B&C	Inactive - dry
HD15-1	Blair Pond	June 2016	27.4m/0.0m	240	0°	VWP 41A&B	Not monitored
HD15-2	Blair Pond	July 2016	112.8m/106.7m	249	+2.7°	VWP 41A&B	Not monitored
HD15-3	Blair Pond	July 2016	182.9m/176.8m	261	+2°	VWP 41A&B	Not monitored
HD15-4	Blair Pond	July 2016	192.0m/189.0m	285	+1.5°	VWP 41A&B	Not monitored
HD16-1	Lewis Dr. (at Sikh Temple)	June 2016	152.4m/149.4m	258	0°	VWP 23A&B, VWP 24, VWP 25A&B	Inactive - dry
HD16-2	Lewis Dr. (at Sikh Temple)	June 2016	187.9m/158.3m	277	+4°	VWP 23A&B, VWP 24, VWP 25A&B	Inactive - dry
HD16-3	Lewis Dr. (at Sikh Temple)	June 2016	149.4m/143.3m	303	+2°	VWP 23A&B, VWP 24, VWP 25A&B	Active
HD16-4	Lewis Dr. (at Sikh Temple)	July 2016	164.6m/158.5m	290	+2°	VWP 23A&B, VWP 24, VWP 25A&B	Inactive - dry
HD16-5	Lewis Dr. (at Sikh Temple)	July 2016	140.2m/134.1m	285	+2°	VWP 23A&B, VWP 24, VWP 25A&B	Inactive - dry
HD16-6	Lewis Dr. (at Sikh Temple)	July 2016	173.7m/167.6m	268	+2.4°	VWP 23A&B, VWP 24, VWP 25A&B	Inactive - dry
HD18-1	Below Abbot Dr.	July 2016	205.7m/199.6m	306	-0.2°	VWP 42A&B	Active
HD18-2	Below Abbot Dr.	July 2016	243.8m/240.8m	293	+1°	VWP 42A&B	Inactive - dry
HD18-3	Below Abbot Dr.	July 2016	198.1m/192.0m	315	+0.5°	VWP 42A&B	Active
HD18-4	Below Abbot Dr.	July 2016	150.9m/147.8m	335	+1°	VWP 42A&B	Active
HD18-5	Below Abbot Dr.	July 2016	192.0m/185.9m	325	+1.7°	VWP 42A&B	Active

Figure E1: Horizontal Drains Dewatering Summary

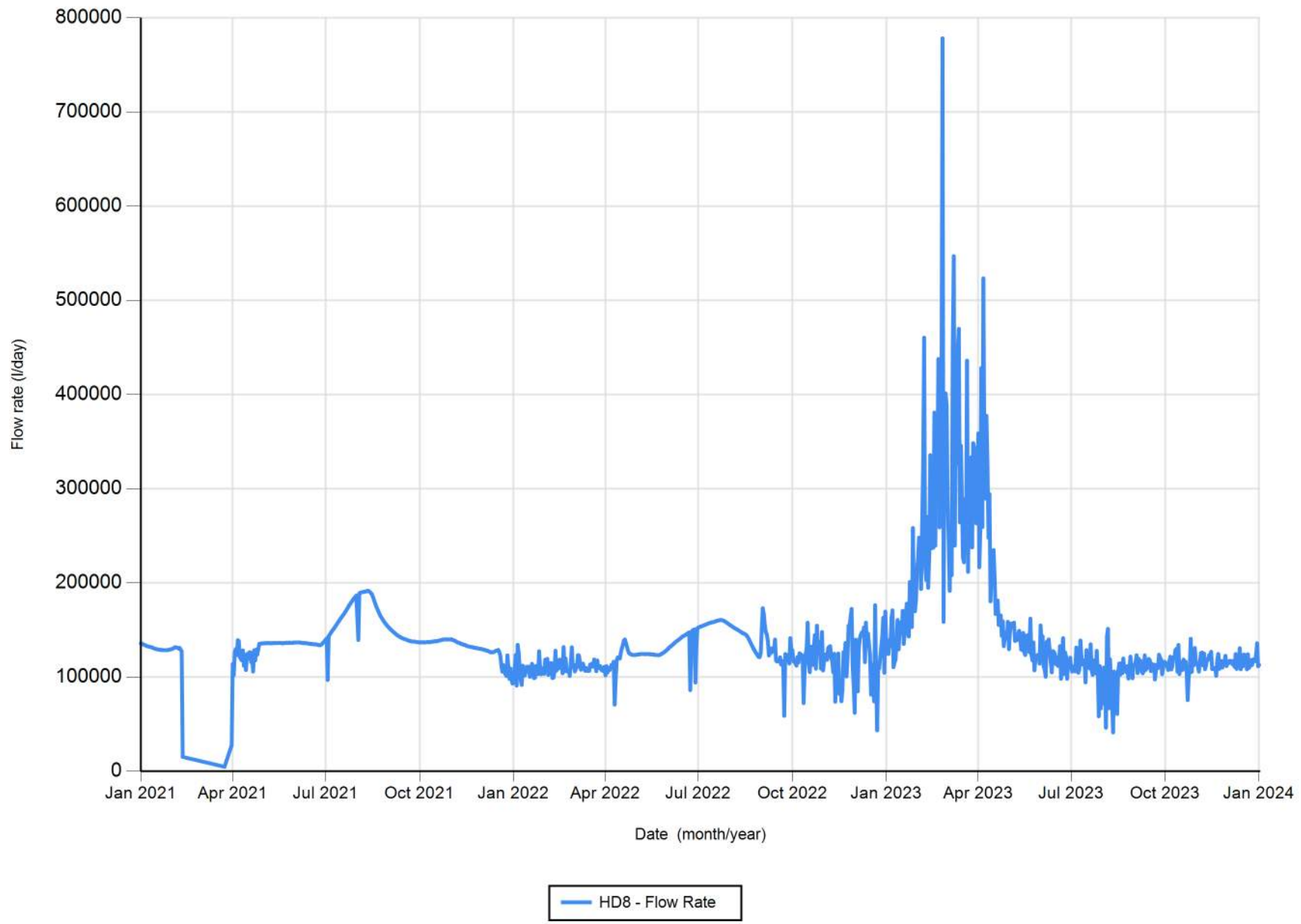


	HD4	HD9	HD10	HD11	HD12	HD13	HD15	HD16	HD18	HD8	Total
2023	1,231,721	3,464,859	1,586,761	1,730,015	3,578,276	89,144	0	571,483	715,128	58,566,563	**71,533,949**
2022	946,480	4,430,623	0	582,473	2,862,343	359,511	0	1,025,381	1,110,472	45,688,732	**57,006,015**
2021	539,246	4,435,324	0	1,059,133	3,452,647	4,410,204	0	1,528,726	1,597,524	44,253,669	**61,276,472**
2020	555,826	6,329,725	186,020	1,387,227	5,579,249	6,342,334	0	5,698,016	1,736,837	45,935,880	**73,751,115**
2019	530,157	5,034,212	122	654,007	1,160,890	3,380,525	0	8,150,457	114,172	42,580,903	**61,605,444**
2018	551,058	4,671,093	2,980,364	769,510	5,575,363	26	90,628	1,839,726	392,591	49,874,455	**66,744,816**
2017	519,994	2,062,926	178,637	497,370	6,710,462	3,307,956	384,094	1,289,485	2,001,913	54,380,246	**71,333,083**
2016	425,710	1,719,005	6,669,935	2,499,992	2,074,991	104,717	906,198	625,215	1,244,710	48,116,214	**64,386,687**
2015	525,125	5,745,353	9,443,228	2,832,054	3,472,076	3,521,426	0	0	0	72,516,006	**98,055,268**
2014	519,272	5,252,638	8,953,907	2,464,888	3,244,899	2,934,880	0	0	0	93,775,808	**117,146,292**
2013	535,725	4,134,390	8,326,985	6,291,139	3,210,809	1,914,268	0	0	0	130,934,967	**155,348,283**
2012	448,443	2,772,172	8,682,037	267,408	3,151,386	1,254,748	0	0	0	60,390,352	**76,966,546**
2008-2011	2,437,384	0	0	0	0	0	0	0	0	0	**2,437,384**
Total	**9,766,142**	**50,052,320**	**47,007,996**	**21,035,216**	**44,073,392**	**27,619,741**	**1,380,920**	**20,728,489**	**8,913,346**	**747,013,794**	**977,591,354**

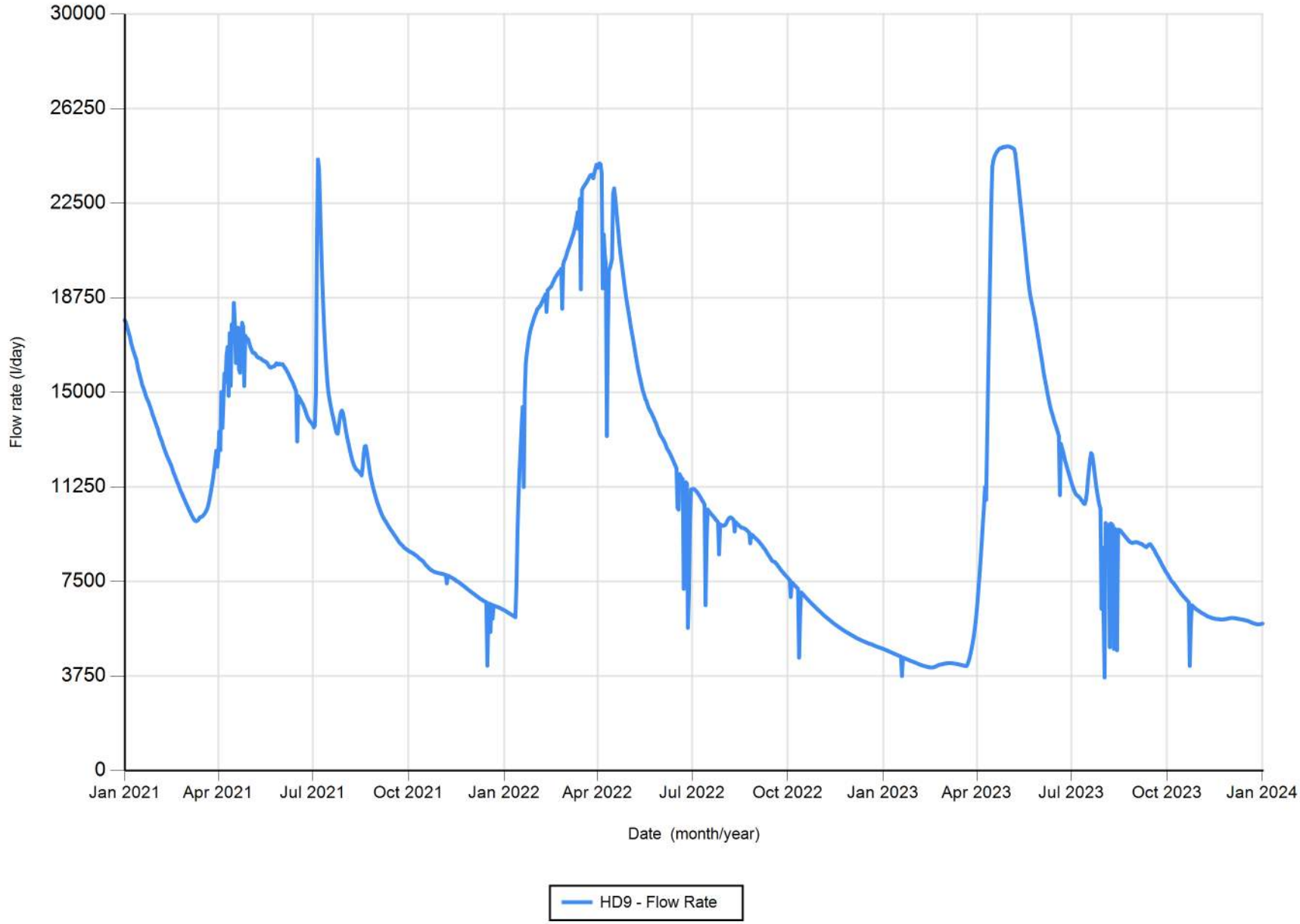
HD4 (Station 17) - Daily Flow Rate



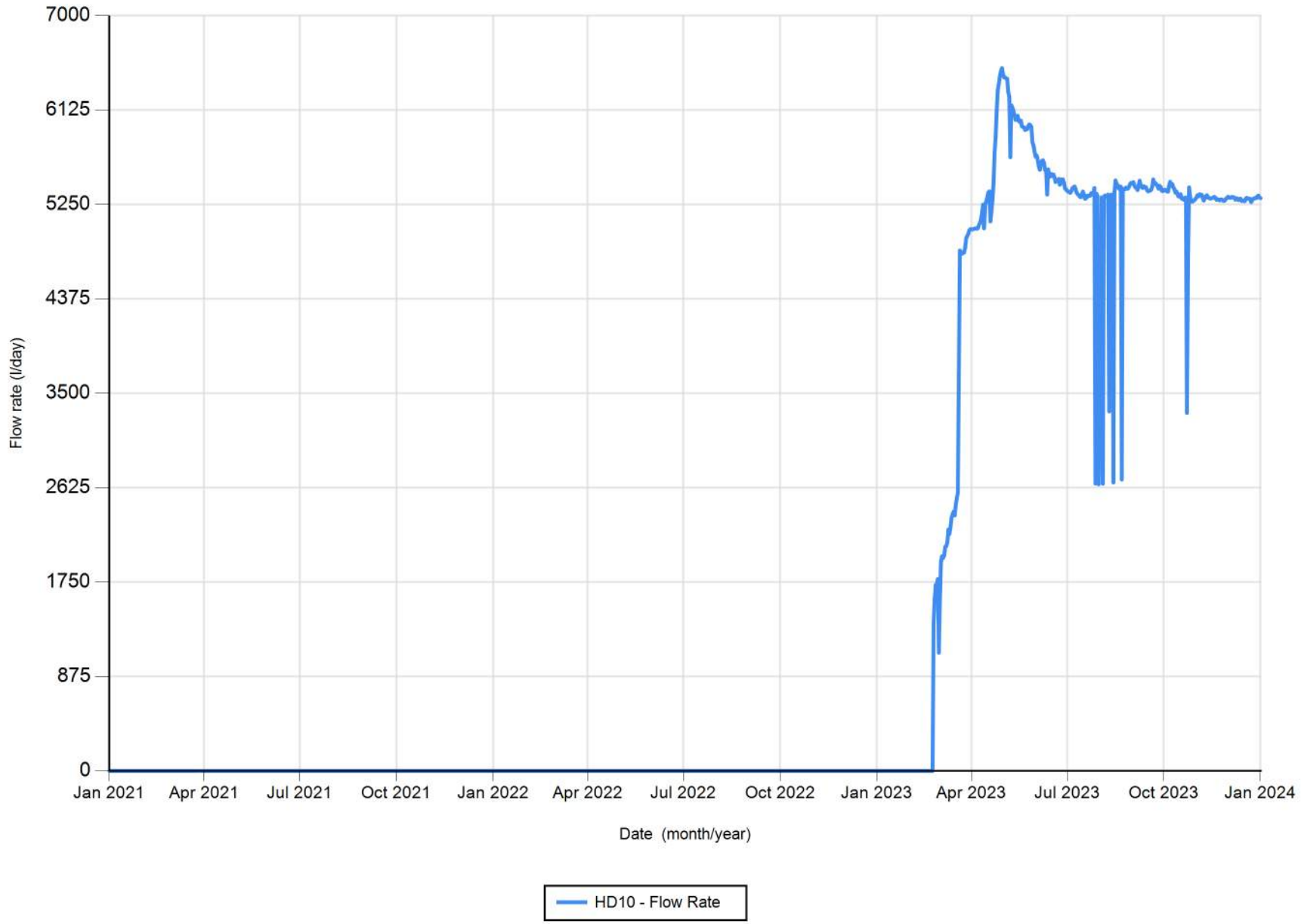
HD8 (Station 24) - Daily Flow Rate



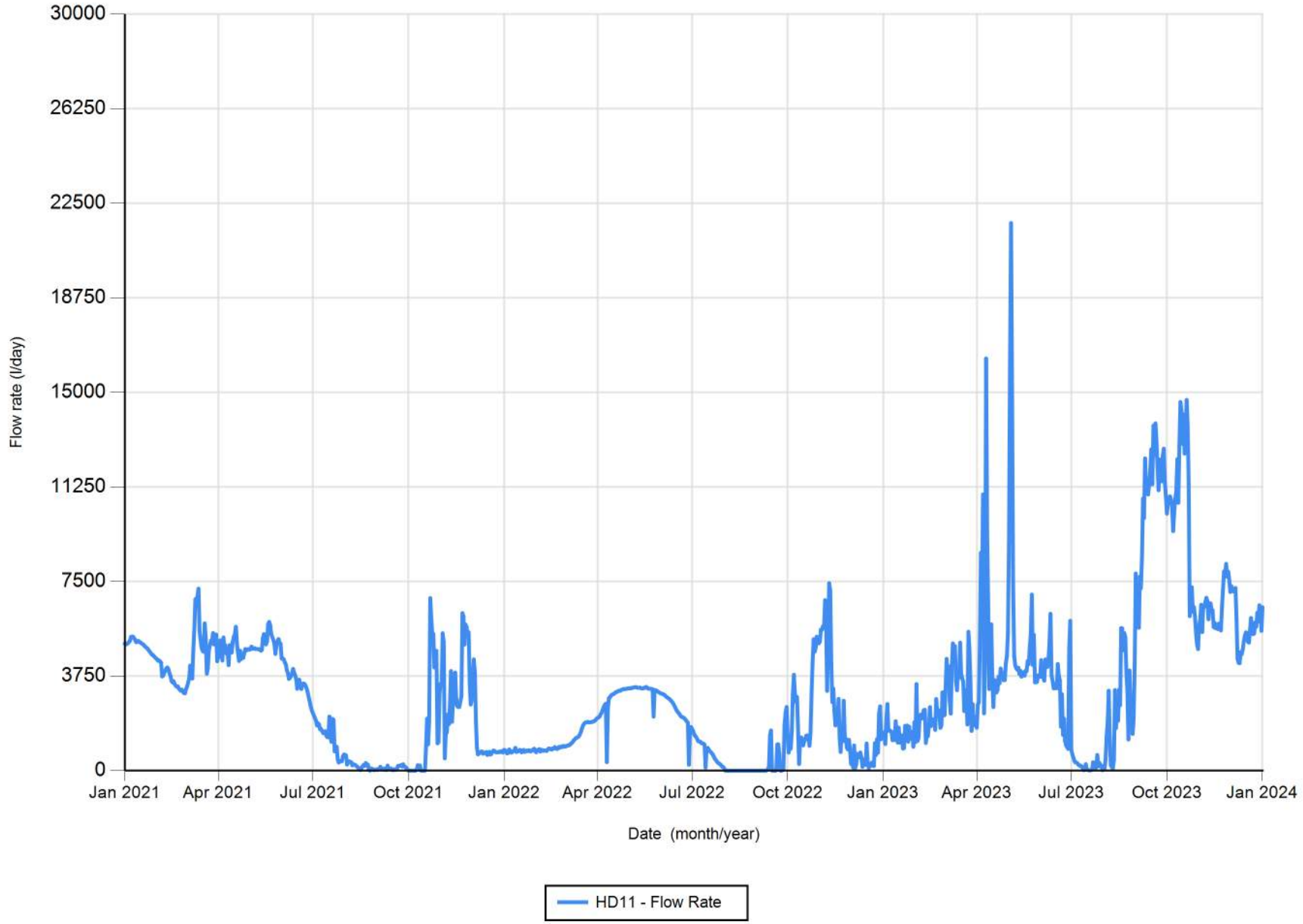
HD9 (Station 12) - Daily Flow Rate



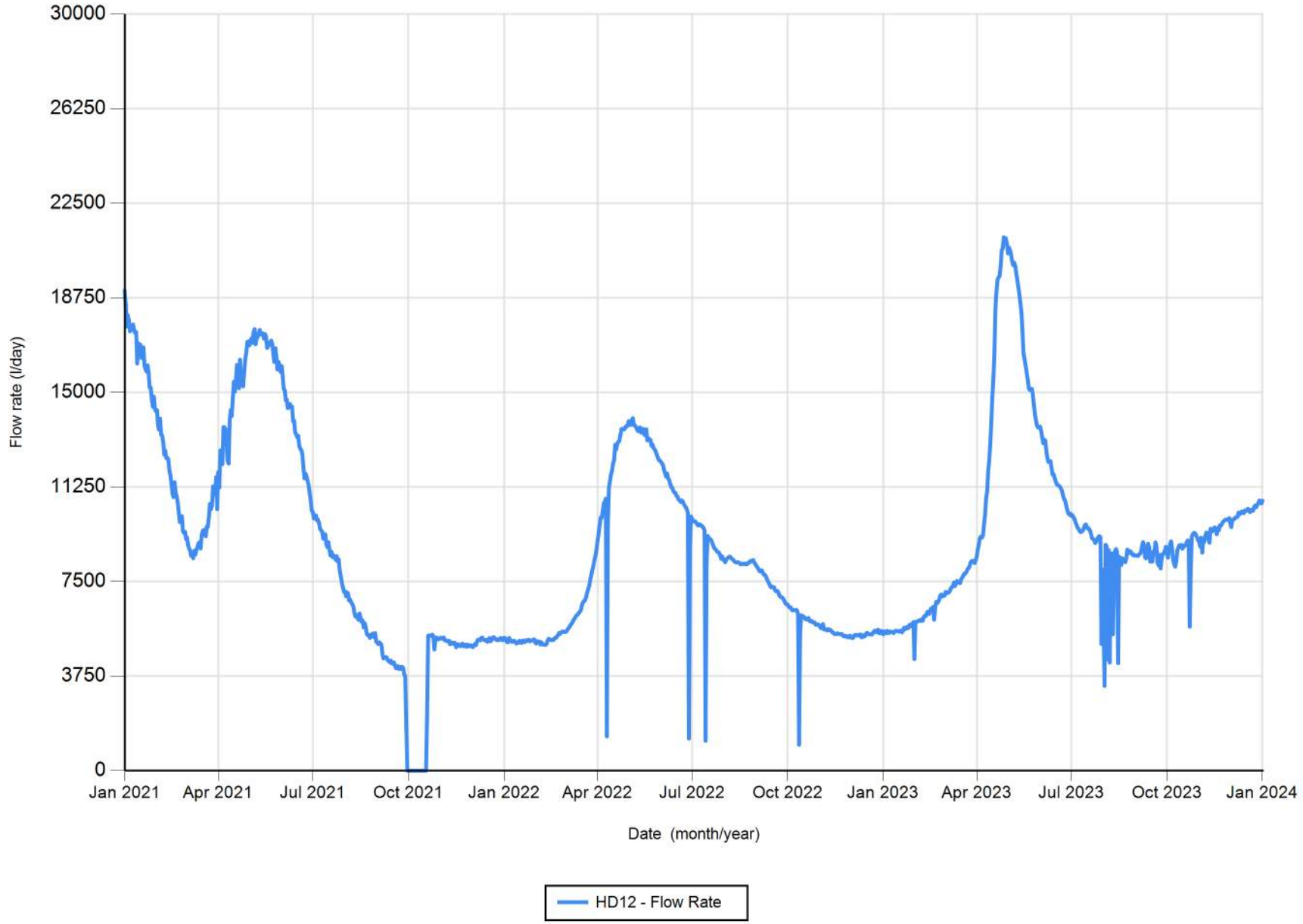
HD10 (Station 26) - Daily Flow Rate



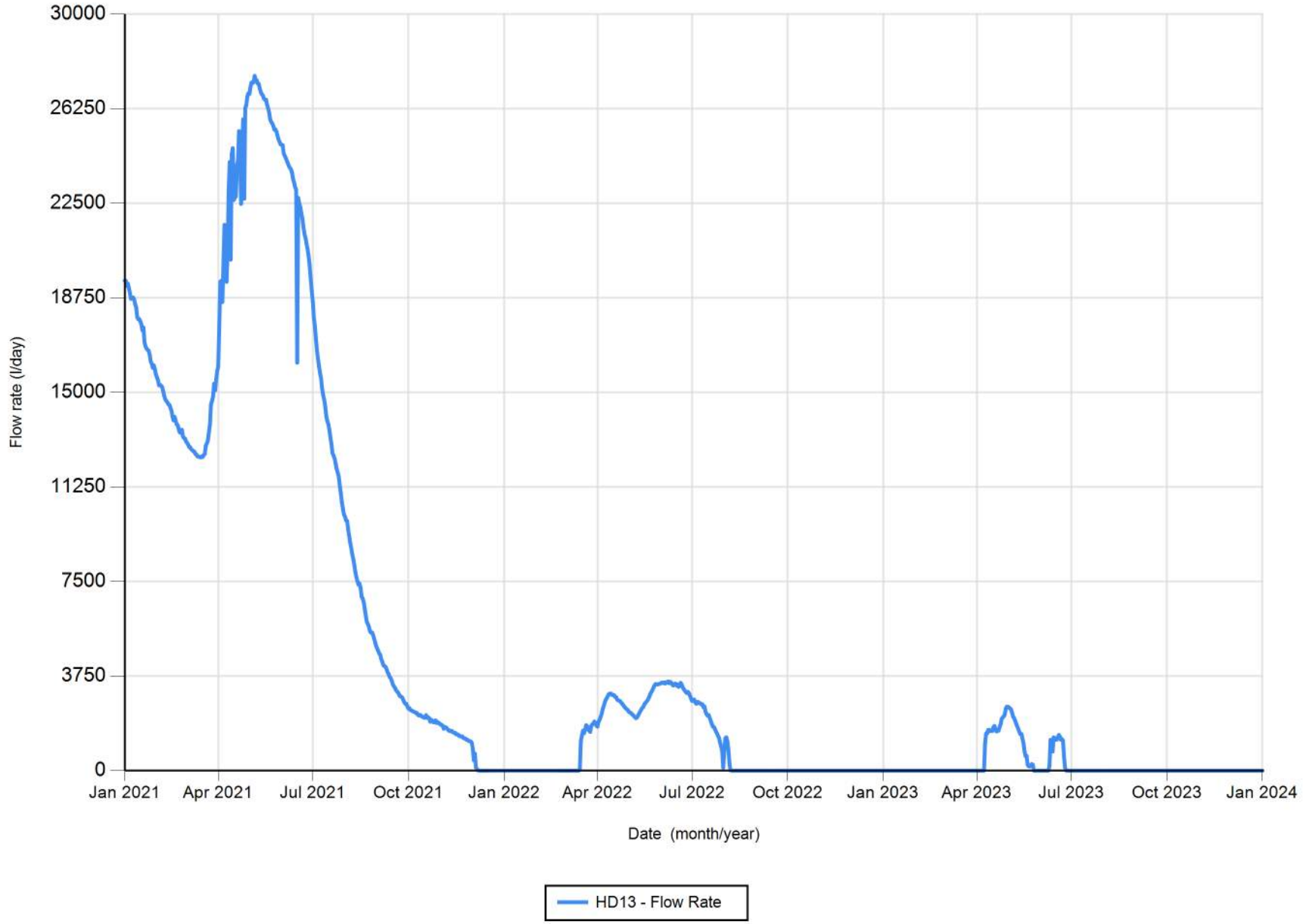
HD11 (Station 17) - Daily Flow Rate



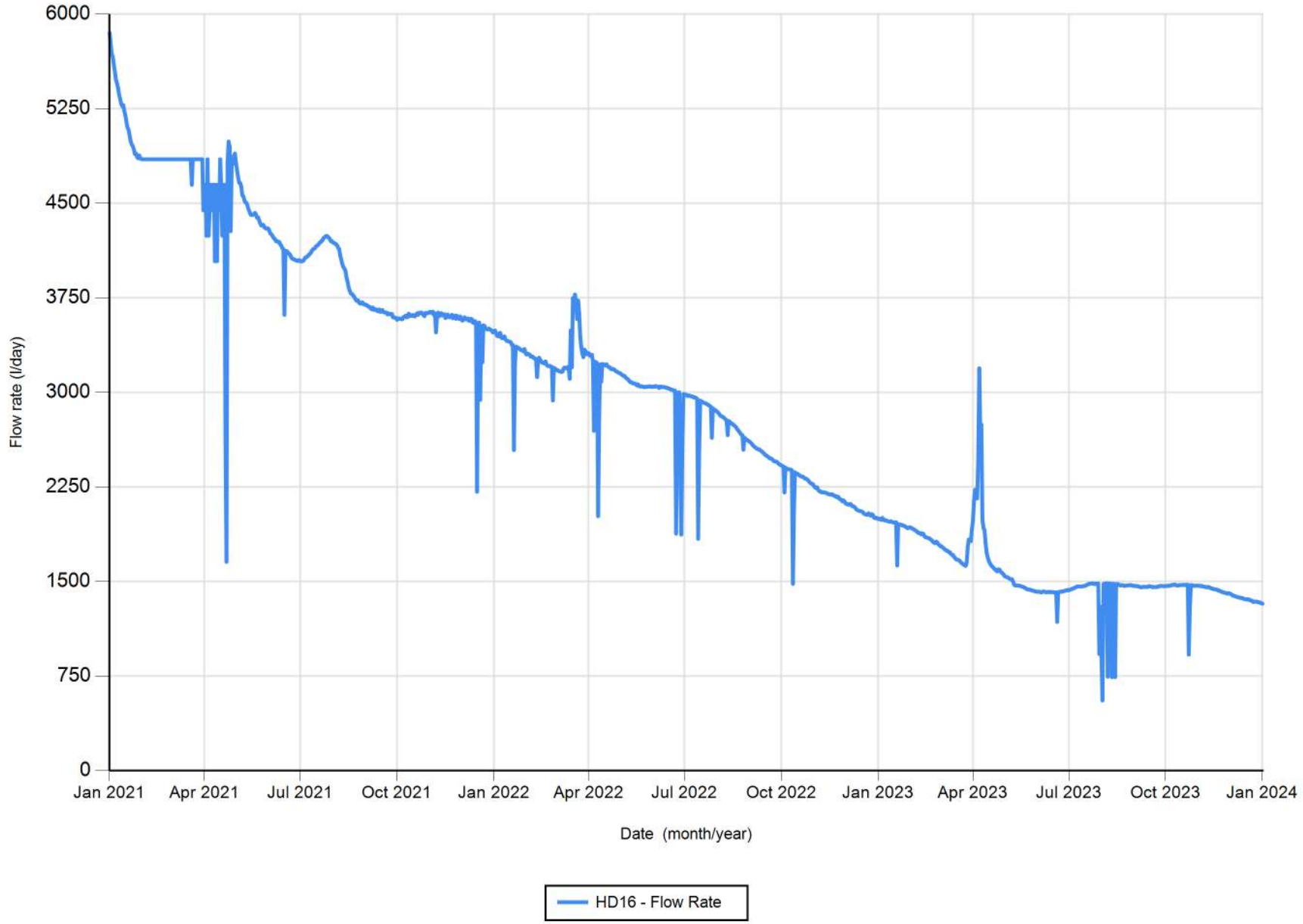
HD12 (Station 17) - Daily Flow Rate



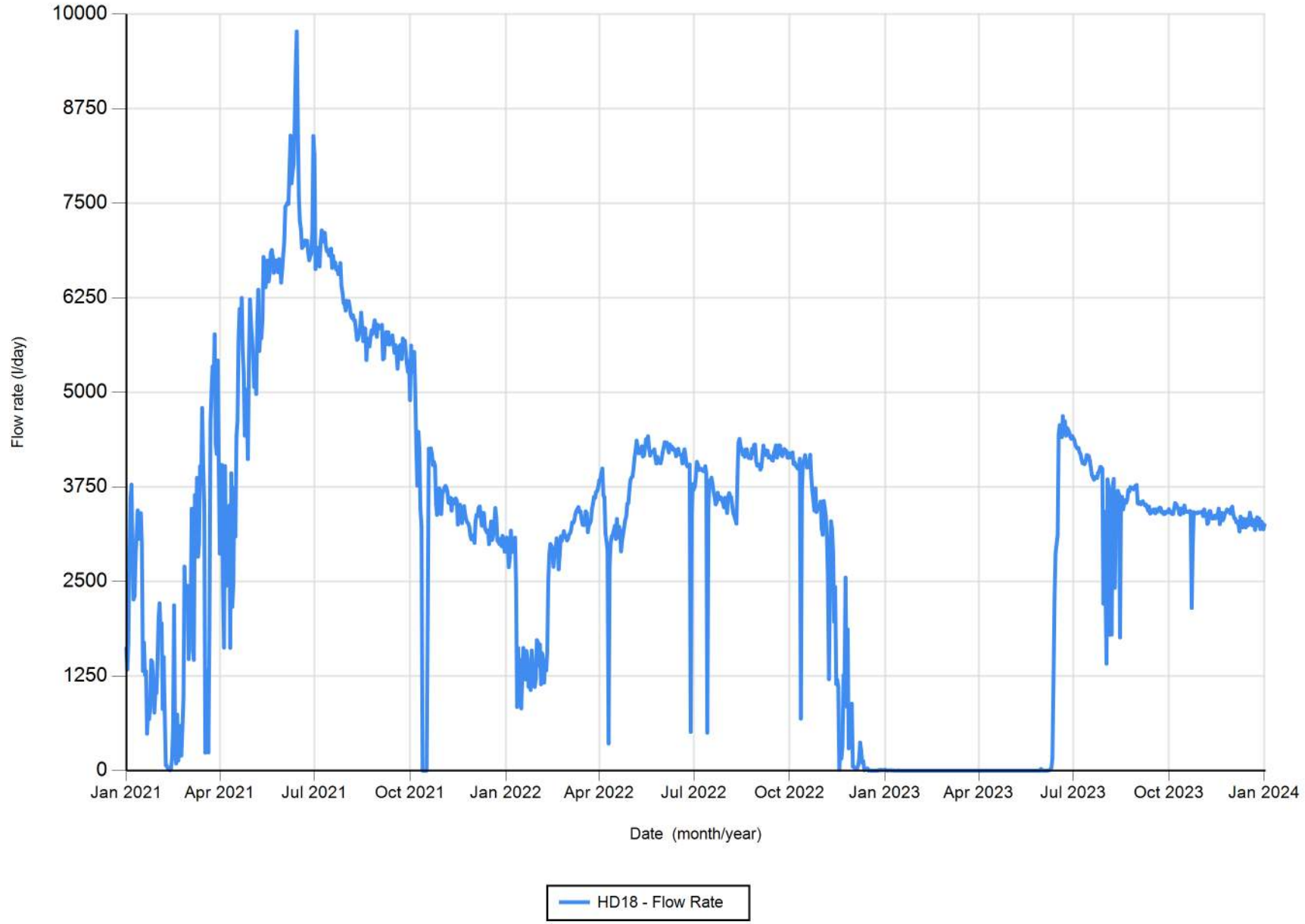
HD13 (Station 27) - Daily Flow Rate



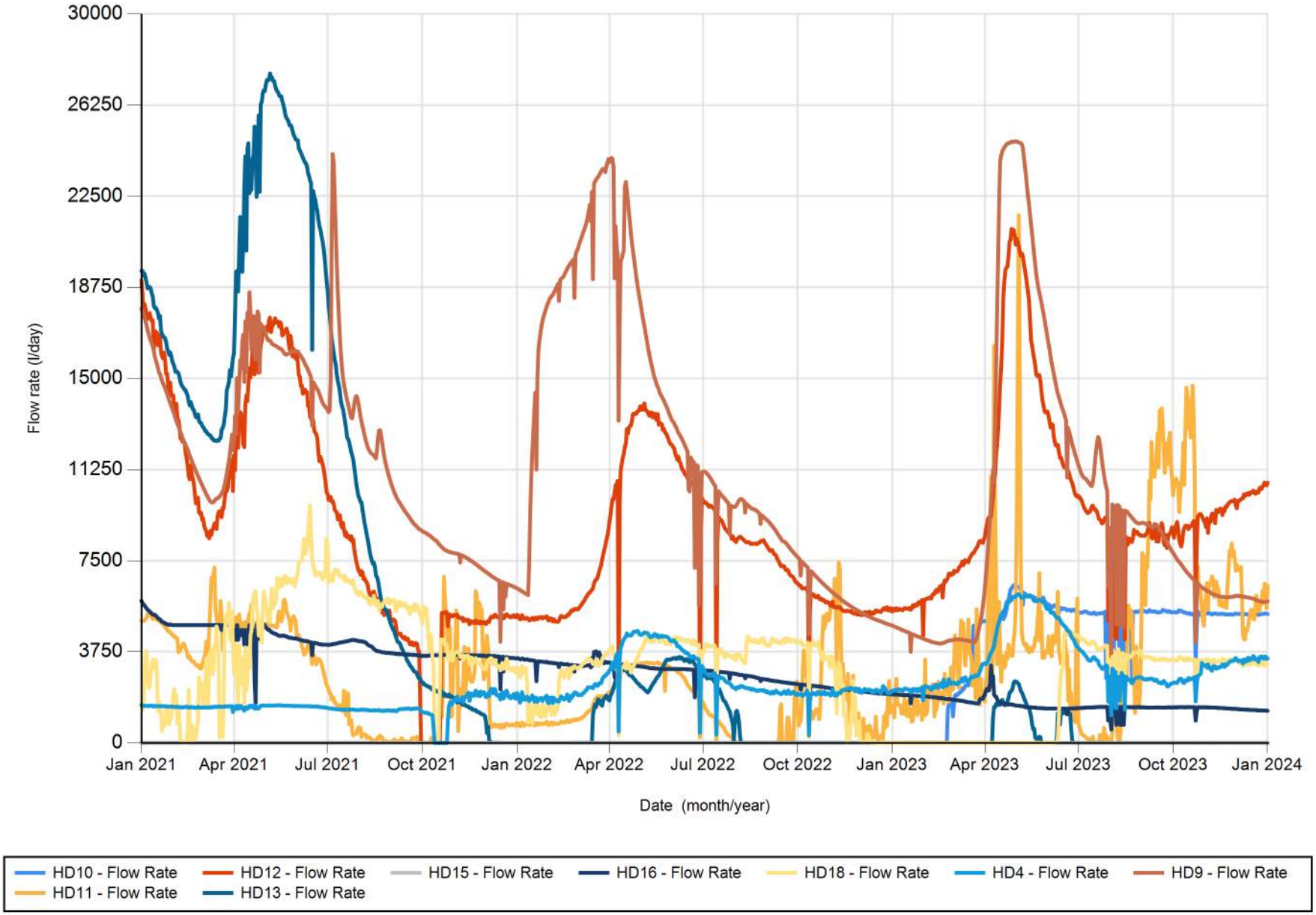
HD16 (Station 12) - Daily Flow Rate



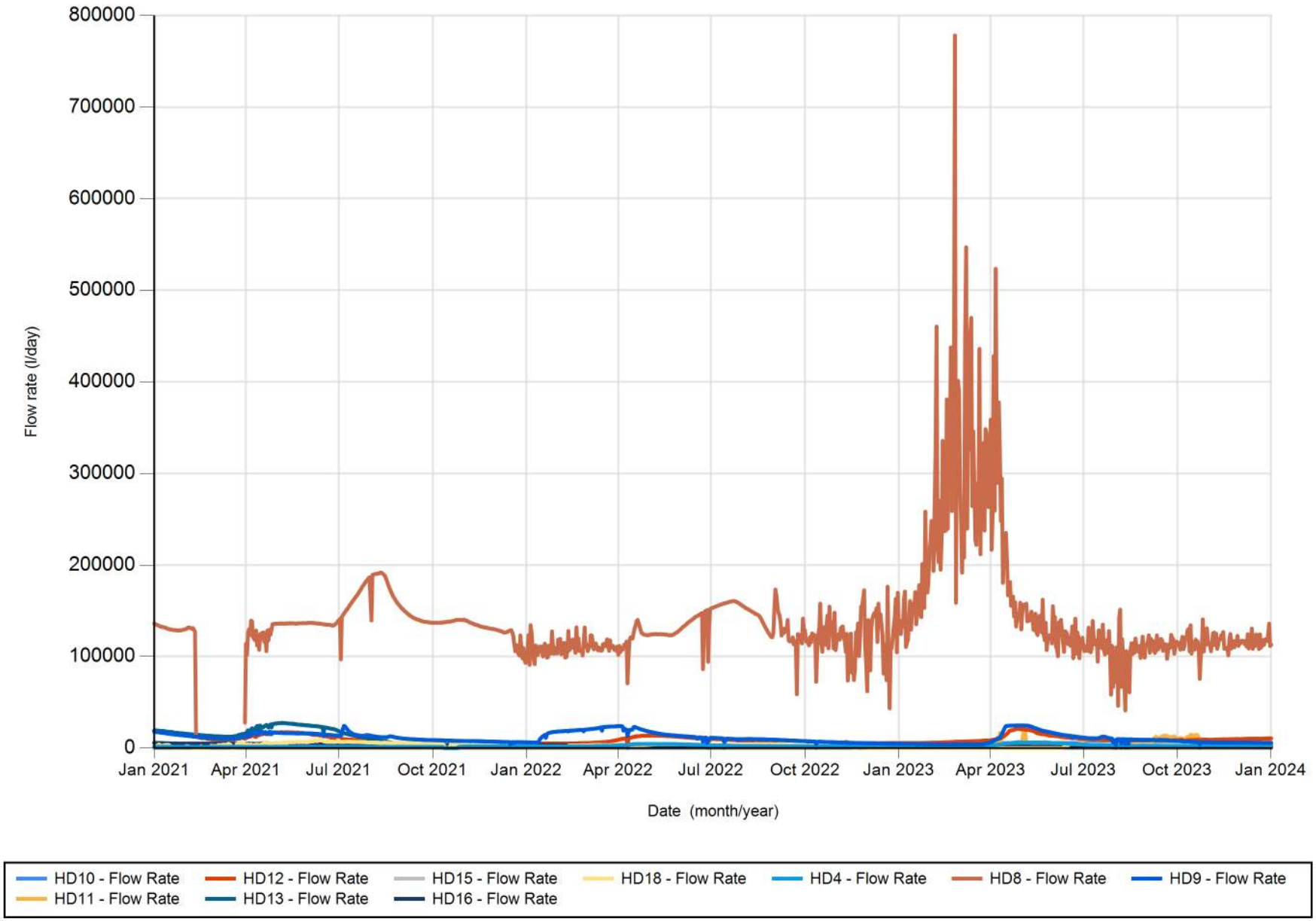
HD18 (Station 17) - Daily Flow Rate



Horizontal Drains Flow Rates (Combined)



Horizontal Drain Flow Rates (Combined)



APPENDIX

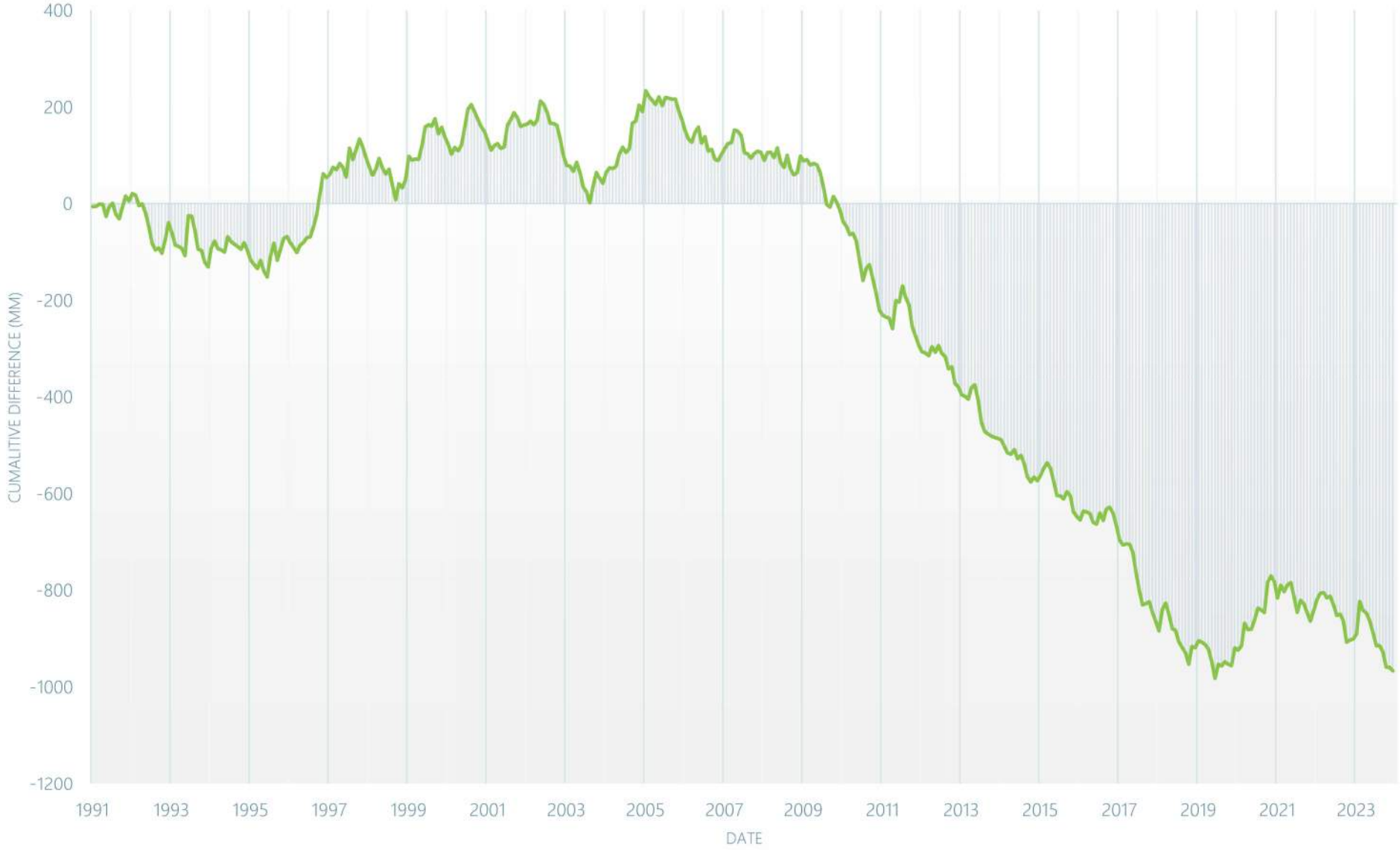
F PRECIPITATION DATA CHARTS FOR THE QUESNEL AREA (FIGURES F1 TO F4)

FIGURE F1 – 2021 TO 2023 MONTHLY PRECIPITION COMPARISON
FIGURE F2 – TOTAL MONTHLY PRECIPITATION – CUMULATIVE DIFFERENCE 1991 TO 2023

Figure F1: 2021-2023 Monthly Precipitation Comparison



Figure F2: Total Monthly Precipitation - Cumulative Difference 1991 to 2023 (Environment Canada Quesnel)
Cumulative Difference = (Total Monthly Precipitiation) - (30-Year Monthly Average)



APPENDIX

G DATA COMPARISON CHARTS (FIGURES G1 TO G5)

FIGURE G1 – TOTAL MONTHLY PRECIPITATION & SELECTED GROUNDWATER ELEVATIONS
FIGURE G2 – HORIZONTAL MOVEMENT RELATIVE TO ANTECEDENT PRECIPITATION
FIGURE G3 – CUMULATIVE GROUND MOVEMENT, DAILY PRECIPITATION AND TEMPERATURE, TYPICAL GROUNDWATER ELEVATIONS
FIGURE G4 – CUMULATIVE GROUND MOVEMENT & TYPICAL BACKGROUND GROUNDWATER ELEVATION
FIGURE G5 – HORIZONTAL MOVEMENT RELATIVE TO GROUNDWATER PORE PRESSURE

Figure G1 - Total Monthly Precipitation & Selected Groundwater Elevations

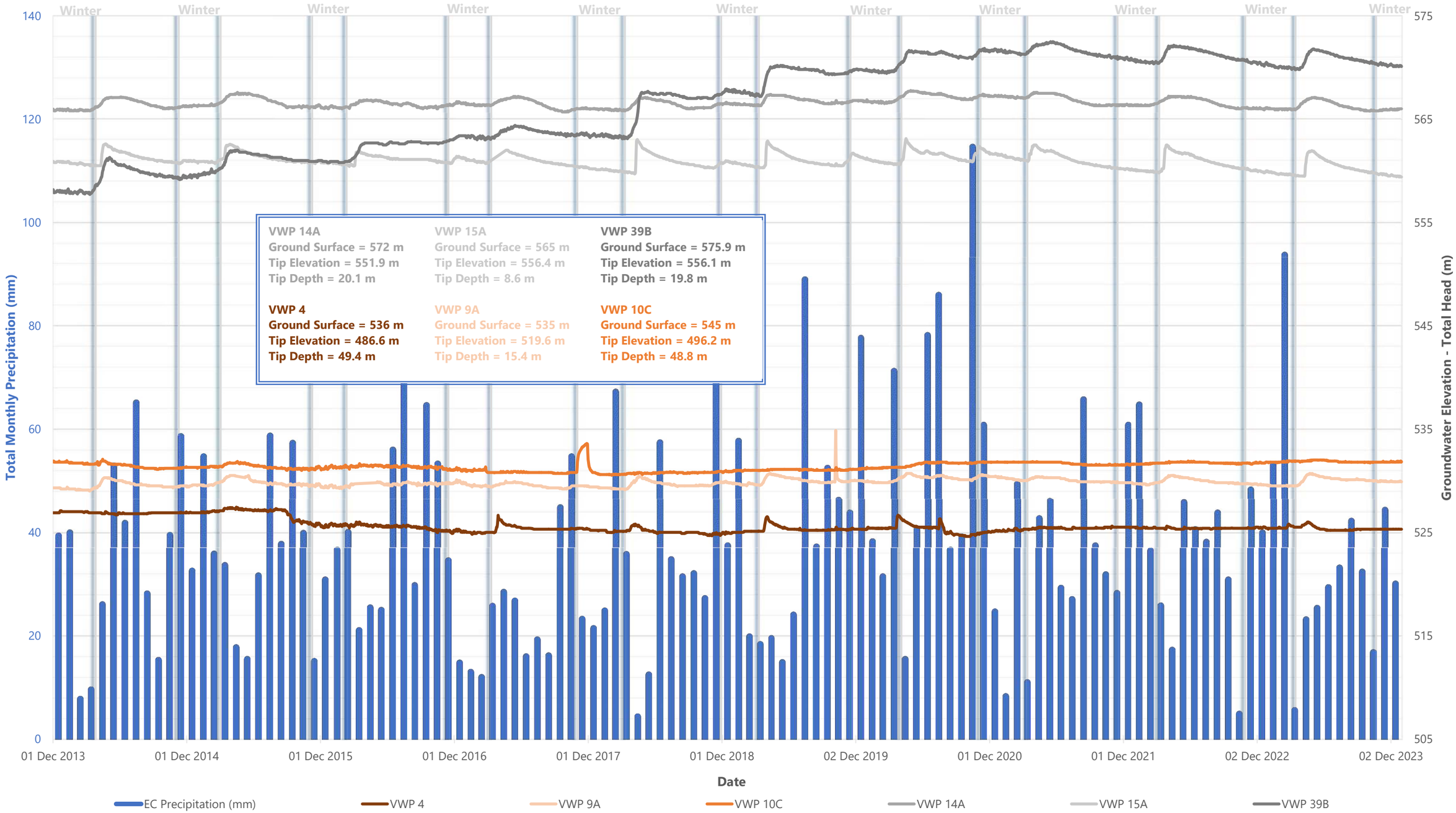
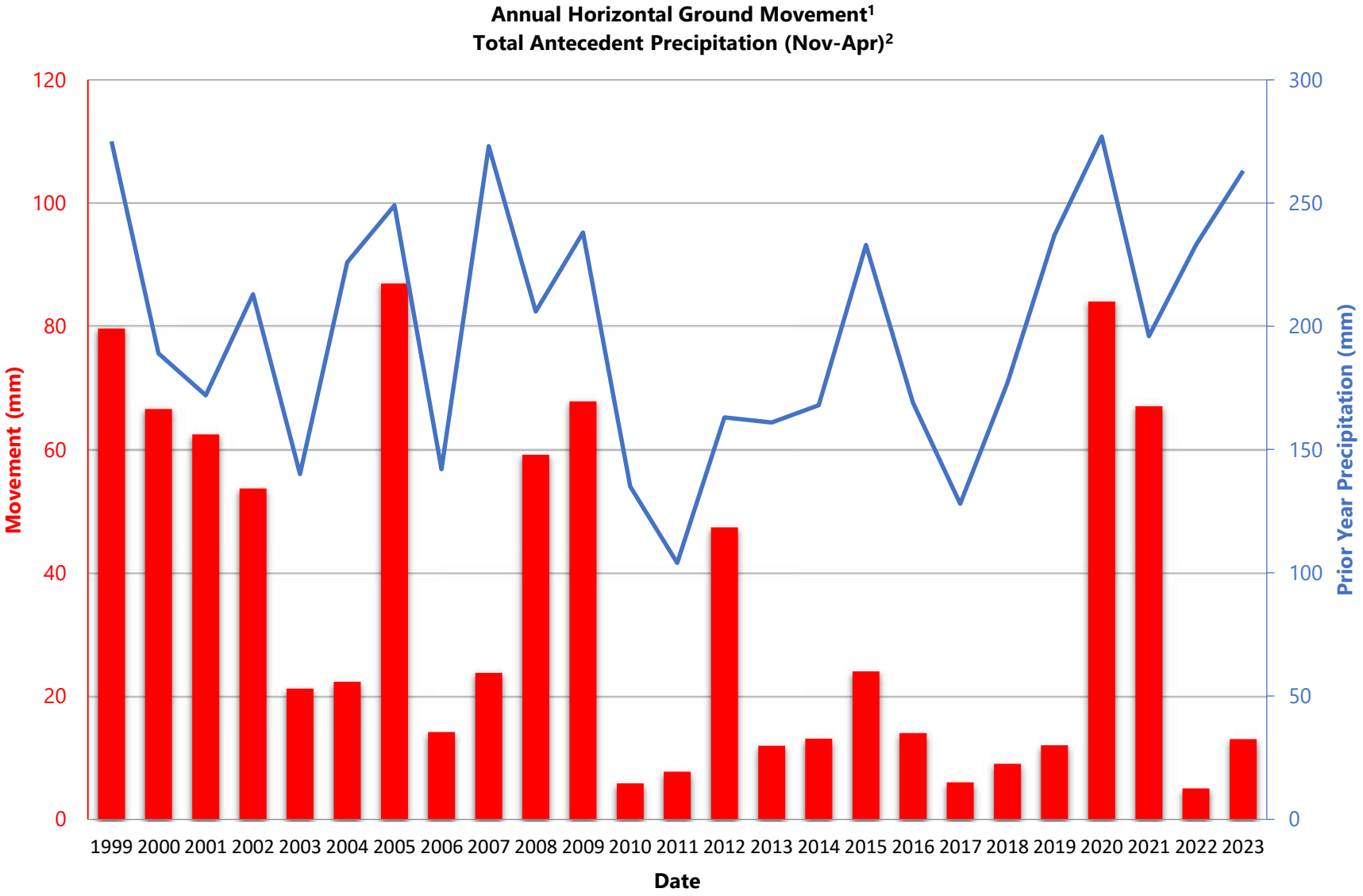


Figure G2 - Horizontal Movement Relative to Precipitation



Note 1: Movement data collected from GPS98-17.

Note 2: Precipitation data collected from Environment Canada - Quesnel Airport.

Figure G3 - Cumulative Ground Movement, Daily Precipitation and Temperature, Typical Groundwater Elevations

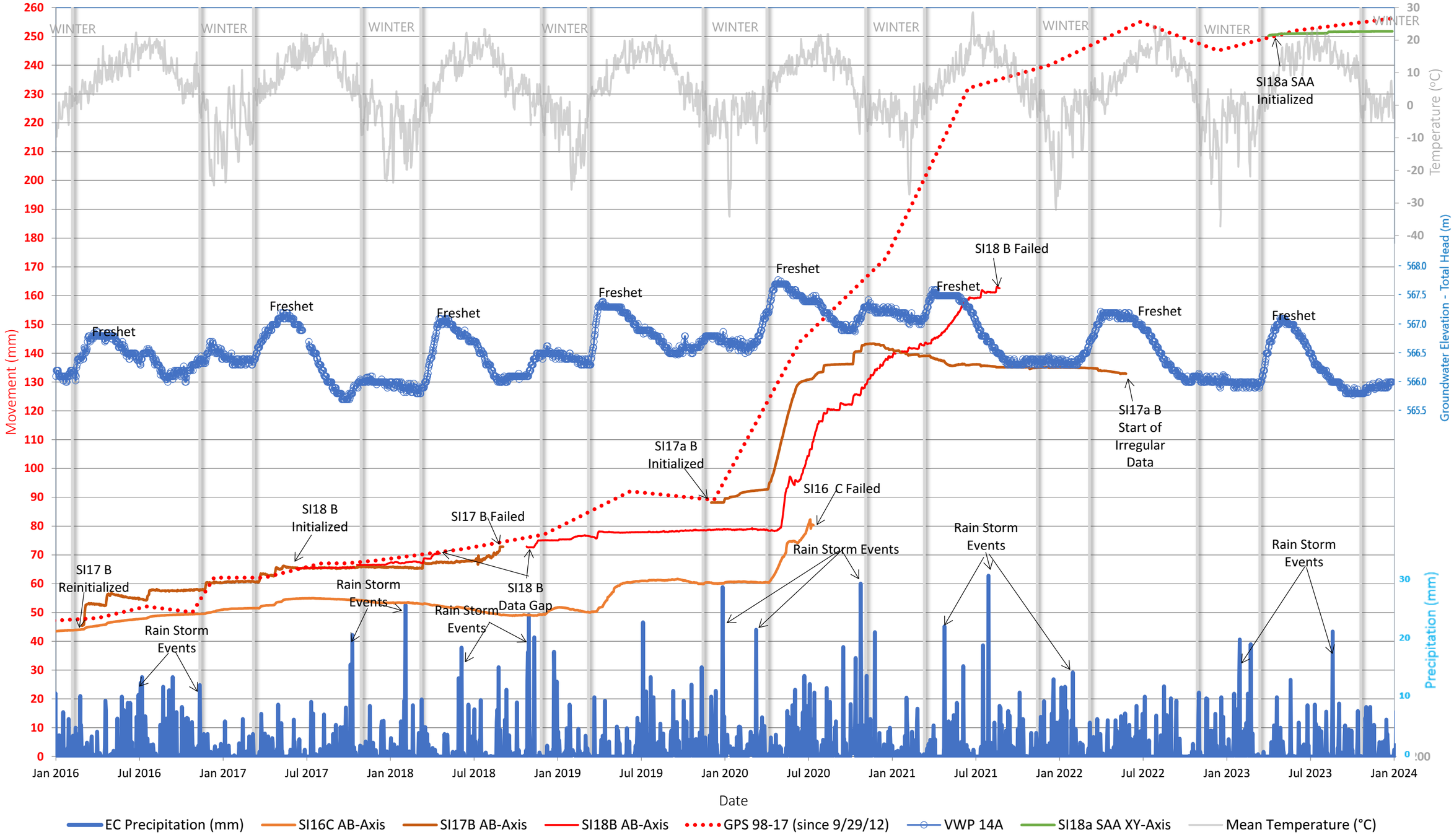


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Figure G4 - Cumulative Ground Movement & Typical Background Groundwater Elevation

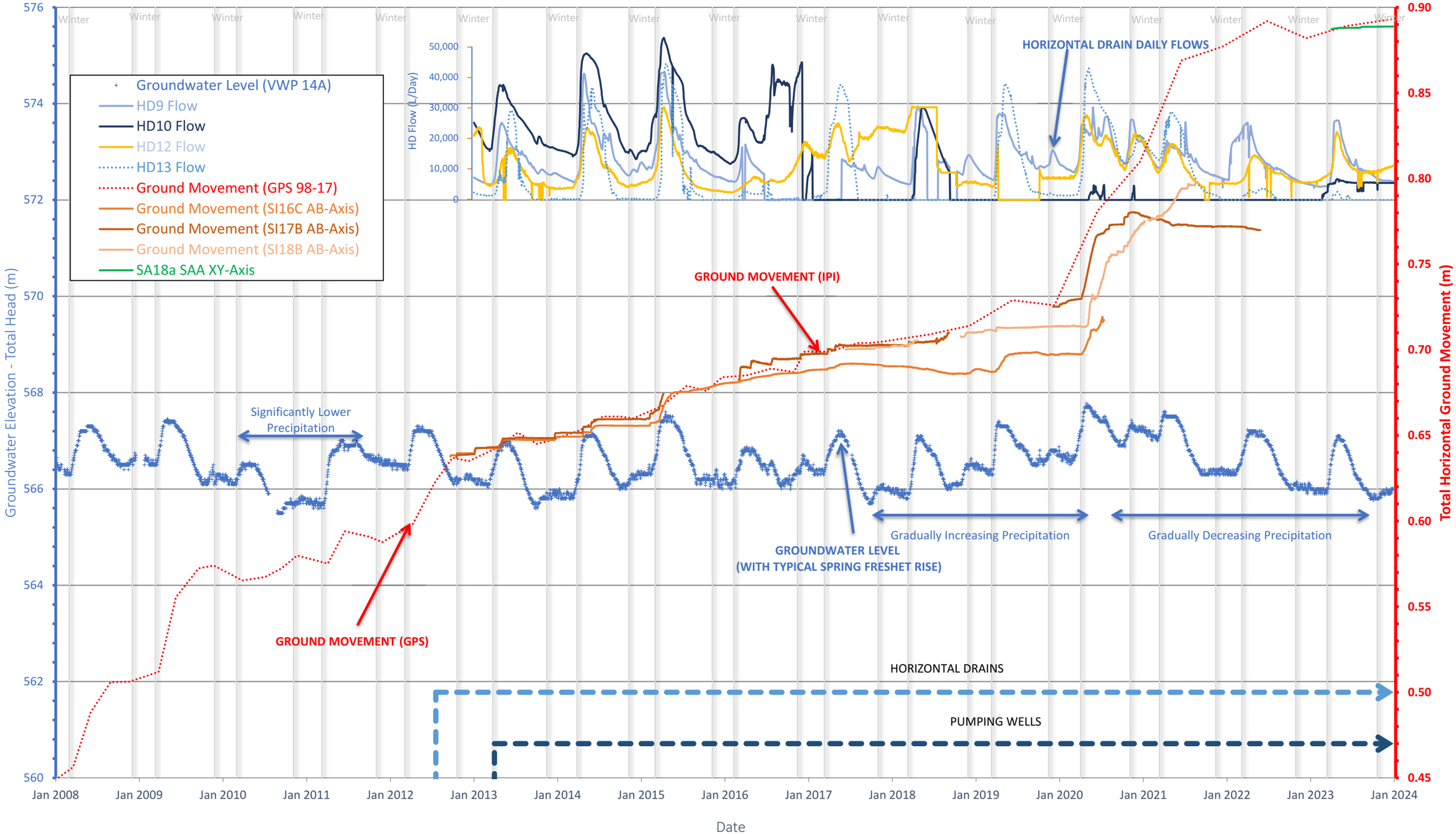
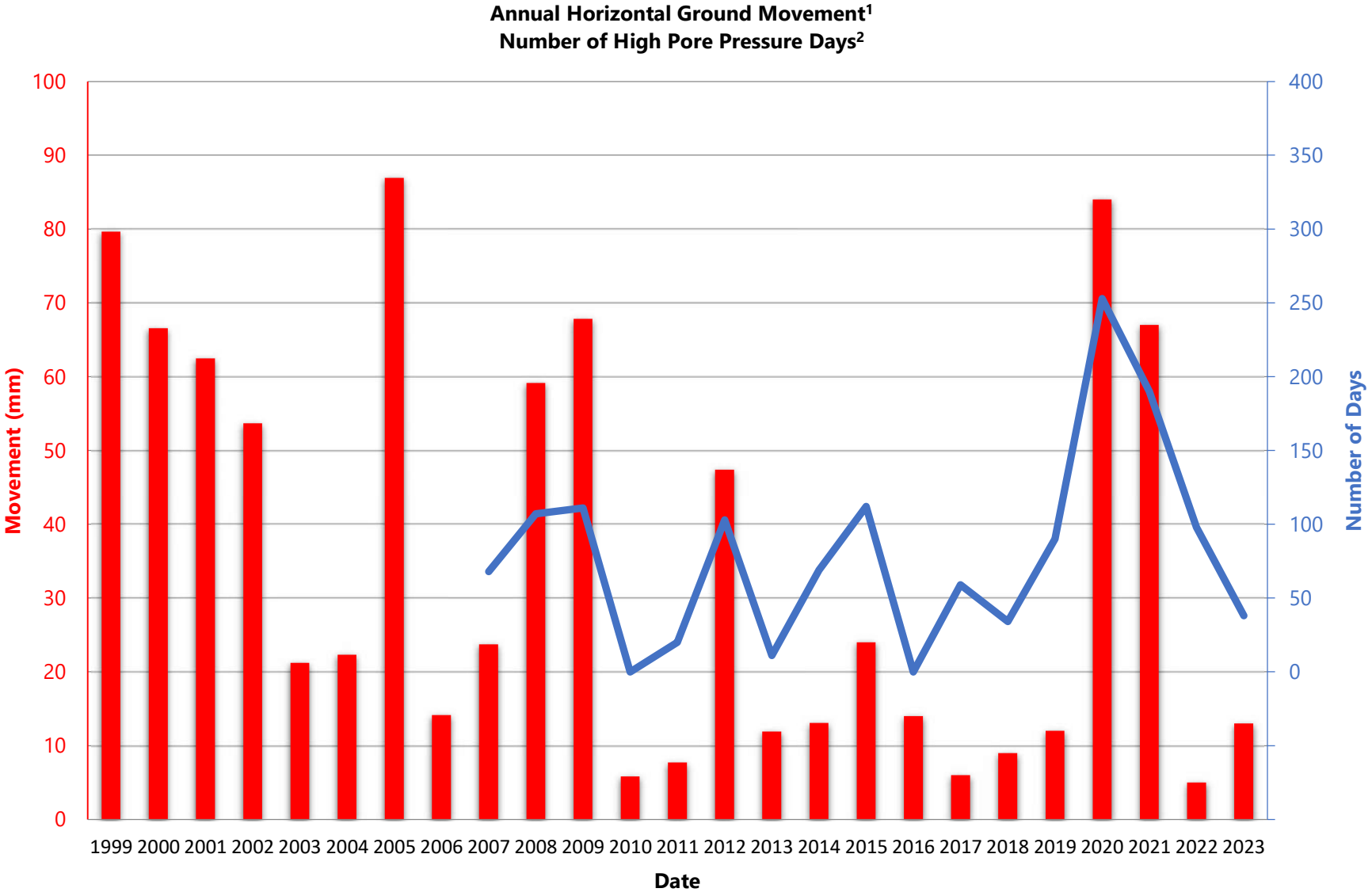


Figure G5 - Horizontal Movement Relative to Groundwater Pore Pressure



Note 1: Precipitation data collected from Environment Canada - Quesnel Airport.

Note 2: Number of days that VWP14A daily average pressure elevation was ≥567 m

APPENDIX

H LIMITATIONS

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