2023

WELL INSTALLATION AND COMPLETION REPORT
HORIZONTAL EXTRACTION WELL HW-1
ARCH CHEMICALS, INC.
SITE NO. 828018a

Prepared for:

Arch Chemicals, Inc.

Prepared by:

MACTEC E & G (PC)

PROJECT NO: 3616226199

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1.0 Introduction

MACTEC Engineering & Geology (Mactec) has prepared this Well Installation and Completion Report for the Horizontal Groundwater Extraction Well HW-1, on behalf of Arch Chemicals, Inc. (Arch) for the manufacturing facility located in Rochester, New York (the Site). This report details activities related to well installation and pumping tests performed for horizontal groundwater extraction well (HW-1) intended to improve mass removal of contaminated groundwater and overall hydraulic control of the groundwater contaminant plumes present at the Site.

Ongoing remedial actions at the Site have included groundwater extraction utilizing six vertical extraction wells, treatment, and discharge to the Monroe County VanLare Wastewater Treatment Facility (POTW).

Arch submitted a Feasibility Study (FS) in 2019 (Mactec, 2019) to develop and evaluate remedial alternatives intended to protect human health and the environment to the New York State Department of Environmental Conservation (NYSDEC). The FS addresses both potential human health and environmental exposures to contaminated media and source removal and containment of groundwater. Following the FS, work plans were submitted to NYSDEC to support the chosen remedial efforts. These include the Remedial Action Work Plan – Horizontal Extraction Well HW-1 Installation (RAWP) (Mactec, 2021) in April 2021 as well as the Water Treatment Plan for Constant Rate Pumping Test – HW-1 Well (Mactec 2022).

Technologies were screened and evaluated in the FS to assess their effectiveness in addressing the contaminant source area and improving hydraulic capture the contaminant plumes. Three alternatives were evaluated, including continued operation of the current system, hydraulic fracturing along with the installation of additional vertical extraction wells, and the installation of up to two horizontal groundwater extraction wells (HGEW). Following pilot testing of the hydraulic fracturing of existing wells, it was determined to install one HGEW.

This report details activities related to extraction well installation and pumping tests performed in 2021 and 2022. Recommendations are also provided for pilot testing HW-1 with the objective of determining treatment technologies needed to meet permit discharge limits and demonstrating improved containment and mass removal of contaminated groundwater.

1.2 Site Background

The Site includes an active chemical manufacturing plant located at 100 McKee Road, Rochester, Monroe County, New York, **Figure 1**. The plant property occupies approximately 19.5 acres, see **Figure 2**.

The Site has been the subject of various environmental investigations since the early 1980s, including, but not limited to, a groundwater investigation conducted in 1990 and a two-phase remedial investigation conducted between 1993 and 1996 (Arch, 2000). A prior Consent Order was executed in August 1993, between Olin Corporation (the former owner) for the implementation of Remedial Investigation (RI) and FS. Arch implemented a portion of the previously recommended remedial alternative in the 2000 FS for the Site after Arch entered into a new Consent Order with the NYSDEC to implement the requirements of the NYSDEC's Record of Decision (ROD) in August 2003. The recommended remedial alternative included groundwater extraction and treatment to maintain hydraulic control of groundwater at the property boundary. Groundwater extraction system operations, maintenance, and upgrades have occurred between August 2000 to the present. Extracted groundwater is conveyed by pipeline to a treatment system prior to discharge to the local POTW. The recommended remedial alternative also included a provision for installing and operating a downgradient extraction well near the Dolomite Products quarry on Buffalo Road; however, subsequent monitoring and an updated risk evaluation have demonstrated that potential exposure risks at the quarry are below levels of concern. The NYSDEC has indicated that installation of the downgradient extraction well is no longer required (Mactec, 2005).

In 2019 the NYSDEC issued the Record of Decision for the Site selecting installation of an HGEW beneath the Site as the preferred alternative (NYSDEC, 2019). The 2019 FS, the supporting document for the record of decision, evaluated the installation of up to two horizontal groundwater extraction wells to improve groundwater capture at the western property boundary and to increase contaminant mass removal rates. The installation of one horizontal extraction well, through the primary source area underneath the facility was chosen. The design of this well allows for improved contaminant mass removal rates and hydraulic control of the groundwater impacted by Site contaminants of concern (COCs).

2.0 SITE PHYSICAL SETTING

The physical characteristics especially relevant to remediation of the contamination source area are presented in this section.

2.1 Geology

Glacial and postglacial deposits comprise the undisturbed surficial material overlying bedrock present at the Site. Fine to coarse sand with silt and trace gravel, with varying degrees of sorting is the primary material described at the Site. Local fill, interpreted as recompacted soil or sediment from a local source, overlies the undisturbed material. This report refers to the undisturbed sediment and fill as overburden. Overburden thickness ranges from approximately 10 to 20 feet across the Site.

Lockport Dolomite bedrock underlies the overburden. The bedrock surface elevation ranges from approximately 520 to 525 feet above mean sea level (ft amsl). A fractured upper bedrock zone ranges in thickness from 11 to 40 feet (or 27 to 54 feet below ground surface [bgs]). Fractures within the upper zone appear to be primarily near horizontal.

Below the upper zone, the bedrock becomes less fractured and more competent. **Figure 3** illustrates the interpreted depth to bedrock across the Site while **Figure 4** provides a conceptual cross section of the subsurface material.

2.2 Hydrogeology

Groundwater flow occurs primarily in the saturated portions of the overburden and the uppermost 10 feet of bedrock. No significant barrier to flow between the overburden and the upper bedrock has been identified. However, the degree of hydraulic communication between the overburden and bedrock units may vary locally due to heterogeneities in the shallow bedrock.

The ambient groundwater table in the overburden is generally less than 10 feet bgs throughout the property. Overburden groundwater is present at the Site but is absent in areas west and southwest towards the Erie Barge Canal (the canal). The presence of a non-engineered stormwater infiltration basin along the railroad right-of-way east of the Arch Site serves as a recharge area that raises the water table at the eastern side of the property. Other factors that influence flow include bedrock surface topography, the location of the canal, the nature and distribution of water-bearing fractures, and flow direction in bedrock.

Historical groundwater contours indicate that overburden groundwater flows primarily west and south from the plant toward the canal and Buffalo Road. An easterly and southeasterly flow component is also present along the east and the southeast corner of the Site. Groundwater in shallow and deeper bedrock flows primarily toward the west and south.

Overburden groundwater contours suggest a southerly horizontal component of flow near the southern boundary of the plant. However, when compared to shallow bedrock groundwater elevations, a larger magnitude downward vertical gradient is apparent, indicating the dominant flow path for overburden groundwater is to the underlying bedrock. Groundwater levels are monitored and reported semi-annually as a part of the monitoring program for the Site.

Hydraulic conductivity estimates calculated from the Phase I RI (ABB-ES, 1995) for the water bearing zones range as follows:

- Overburden: 1.9×10^{-5} to 7.7×10^{-3} centimeters per second (cm/sec)
- Shallow bedrock: 4.0×10^{-5} to 1.17×10^{-2} cm/sec
- Deeper bedrock: 1×10^{-6} to 2.4×10^{-4} cm/sec.

While the overburden and shallow bedrock ranges are similar, experience with pumping well operations at this Site over the past 40 years indicates that the transmissivity of the shallow bedrock is noticeably greater than the saturated overburden zone.

3.0 Remedial Action objectives

HW-1 was installed to improve mass removal of the Site contaminants of concern, chloropyridines and volatile organic compounds (VOCs), by withdrawal of groundwater near the core and likely source areas of each contaminant plume.

The vertical extent of groundwater contamination for both VOCs and chloropyridines extends throughout saturated zone in overburden and into bedrock. The placement of the horizontal extraction well was intended to target the shallow bedrock (generally the upper 5 feet). The shallow bedrock is characterized by significant fracturing and weathering and is generally more transmissive than the overburden and deeper bedrock zones.

By pumping groundwater from the most transmissive zone of fractured bedrock near the core of the contaminant plumes, the horizontal well is intended to provide an opportunity to optimize contaminant mass removal and hydraulic containment.

4.0 Field Activities

The scope of work detailed in this report is consistent with the March 2019 ROD, the September 2019 Feasibility Study (FS), the April 2021 Remedial Action Workplan, and the October 2022 Water Treatment Plan for the Constant Rate Pumping Test. The scope incorporates Site preparation including utility clearance, utility relocation, well abandonment, installation of soil borings to confirm top of rock, and a survey of locations relevant to the well installation. Once preparations were made, drilling of the horizontal well commenced in June of 2021 and was completed in July 2021. Continuous monitoring of vibrations from drilling operations as well as particulate and VOC monitoring consistent with the Community Air Monitoring Plan (CAMP) were implemented for drilling activities. Following installation and well construction in July 2021 well development was completed in August of 2021. A variable rate pumping test was completed in December of 2021 and a 96-hour constant rate pumping test was completed in November of 2022.

4.1 Well Installation Site Preparation

Prior to the commencement of drilling operations, several tasks were completed to prepare for the installation of HW-1. This included identifying the location of underground utilities and relocating them where necessary, abandonment of several existing monitoring wells, installation of several soil borings to confirm depth to the top of bedrock, and a survey of existing Site conditions.

4.1.1 Utility clearance

Subsurface utility location and clearance activities were completed by New York Leak Detection, Inc of Jamesville NY (NYLD) on March 23rd, 2021. The intent of the subsurface utility clearance was to locate and identify each subsurface utility (i.e., buried electrical, sewer, water mains, etc.) at the proposed entry and exit points of HW-1 and at locations of soil borings planned along the proposed bore path of HW-1. NYLD utilized a 250 millihertz (mHz) Noggin Ground Penetrating Radar (GPR) and 1000 mHz Conquest GPR for scanning overburden and concrete for buried utilities. A Field Report completed by

NYLD documenting subsurface utility location activities is provided as part of **Appendix A**.

4.1.2 Utility relocation

Subsurface utility clearance identified one underground electrical conduit that was required to be relocated to accommodate the proposed western exit pit for HW-1 and boring location BP-1. This utility line provided electricity to the pump for extraction well PW-13. The line was excavated and relocated to provide a safe corridor for subsurface excavations at BP-1 and the entry/exit for HW-1. This effort was completed by and coordinated through Matrix Environmental Services of Rochester New York (Matrix).

4.1.3 Well Decommissioning

Prior to commencement of horizontal drilling activities several overburden and bedrock groundwater monitoring wells located along or in the immediate vicinity of the proposed bore path of HW-1 were abandoned on April 20, 2021. The wells were abandoned to prevent potential uncontrolled migration of drilling mud, utilized to stabilize the borehole during drilling activities, to the surface through the vertical pathway provided by the wells. These wells include PW-10, BR-2, BR-2A, C-2, C-2A, and one unknown well. The wells were decommissioned by Matrix, utilizing a tremie pipe to inject a grout mix including water, bentonite and Type 1 Portland Cement, from the bottom of the well to the top of the well casing. Well decommissioning records including details of the grout mix and limited well construction details are provided as **Appendix B**. **Figure 2** presents the locations of the decommissioned wells.

4.1.4 Pre-installation borings

Four soil borings, BP-1, BP-2, BP-5, and BP-6 were completed to confirm depth to the top of bedrock along the planned pathway of HW-1. Boring locations BP-3 and BP-4 were proposed but were not completed due to the potential presence of subsurface obstructions identified prior to drilling. The borings were advanced by direct push method using a Geoprobe 7822 DT by Matrix under the oversight of Mactec personnel. Each boring was advanced through unconsolidated overburden to refusal (i.e., apparent top of bedrock). No logging or sampling of soils was completed.

The borings confirmed the top of bedrock ranged from roughly 13 feet below grade on the eastern limit of HW-1, corresponding to an elevation of approximately 524 ft amsl, to roughly 19 feet below grade at the western limit of HW-1, at an elevation of approximately 518 ft amsl. The soil borings, along with prior exploration data were used to develop an interpreted bedrock surface contour map. This map is provided as **Figure 3.** Using the depth to bedrock data, a cross section was developed by Mactec along the vertical profile of the planned well location to show the estimated bedrock surface depth in relation to the completed borehole/well position. The cross-section is shown on **Figure 4**.

4.1.5 Survey

Following completion of the soil borings, each location and select monitoring wells were surveyed by NYLD, under contract to Mactec. Data collected from this survey was also used to aid in bore path design and planning.

4.2 Mobilization and Drilling of HW-1

Drilling operations for HW-1 began on June 6th, 2021, and were completed on July 27th 2021. Horizontal drilling was completed by the directional drilling division of Ellingson Companies (Ellingson). The drill rig and primary support equipment for this project consisted of two units: the directional drill, an American Augers DD10 drill rig and a mud recycling and supply system.

Mactec planned HW-1 as a double-ended configuration. The borehole entry and exit locations were selected based on the well screen target zone, depth of foundations, space needed for the drill rig set up, well riser and screen assembly, and long-term maintenance considerations. The drill was initially set up on the western side of the facility, using a small entry pit for access and to capture and recycled drilling mud. The initial attempt to complete the boring was unsuccessful due to uncontrollable drift in the bore path. As a result, the drill set up was relocated to the eastern side of the facility where drilling operations continued until the borehole was completed. Throughout drilling activities Ellingson used biopolymer degradable mud with a mud recycling system to stabilize the borehole. The unit was stationed near drilling operations with roll-off boxes positioned to capture waste cuttings and drilling mud to transfer to the recycler. The initial borehole was drilled with an 8-inch nominal diameter drill bit in soil and bedrock and later reamed and enlarged to 12-inch nominal diameter for final well installation.

The ground surface at the eastern end of the borehole is reported at an elevation of 537.1 ft amsl. The ground surface at the western end is reported at an elevation of 537.2 ft amsl. The central portion of the borehole ranges in elevation from approximately 515 to 516 ft amsl and is estimated to range from approximately three to six feet below the overburden-bedrock interface, the intended target zone for well screen installation

Navigation of the borehole in the subsurface was performed with a combination of near bit walkover location technology and a wireline gyroscopic steering navigation tool to direct and map the borehole in three dimensions.

During drilling operations, a “frac out” occurred in the vicinity of a monitoring well cluster (area of former wells BR-2, BR-2A and C-2A as shown on **Figure 2**. The frac out resulted in vertical displacement at the surface and damage to pavement. A frac out is described as the uncontrolled migration of drilling mud to the surface at a location other than the entry or exit point of the drill tooling. The damaged area of pavement was repaired by Matrix, under contract to Arch.

Following the frac out, Ellingson proposed the drilling of a relief borehole at a location roughly halfway along the bore path. The relief borehole was installed with approval by Mactec and Arch to function as a potential relief point for excess pressure build up within the borehole and to allow for the release of drilling mud in a controlled way. The boring was advanced from the ground surface to roughly the halfway point of the boring and is displayed in the well construction details, **Appendix C.**

Following the completion of the relief boring, drilling resumed along the primary borehole and advanced to the planned exit location in the paved loading/unloading area on the

west side of the facility on July 20, 2021. The total completed borehole length is approximately 648 feet from the eastern to western portal. Between July 21st through July 27th, the borehole was back-reamed to nominal 12-inch diameter to remove excess cuttings and debris and to prepare for well pipe installation (described in section 4.3).

4.2.1 Vibration Monitoring

Drilling activities associated with the installation of HW-1 had the potential to produce vibrations which, if not monitored could be disruptive or damaging to buildings or structures. LaBella Associates (LaBella) conducted vibration monitoring, under contract to Mactec. The vibration monitoring by LaBella was completed in accordance with the vibration monitoring plan as prepared by Mactec. Site-specific vibration threshold criteria were established in the plan prior to drilling. Threshold values for peak particle velocity (PPV) were selected as follows:

- Transient Limit = 0.45 inches per second (in/s) PPV. The Transient Limit is defined as the peak particle velocity level for occasional or one-time events (no more than 1-minute duration) causing the ground vibration.

- Continuous Limit = 0.18 in/s PPV. The Continuous Limit is defined as the peak particle velocity level for frequent or sustained actions causing the ground vibration

The PPV limits were set considering the type of structure, proximity to the boring and with guidance from the following resources:

- Siskind, D.E., Stagg, M.S., Kopp, J.W., & Dowding, C.H. (1980). Structure Response and Damage by Ground Vibration from Surface Mine Blasting. United States Bureau of Mines.

- Johnson, A.P., & Hannen, R. (2015). Vibration Limits for Historic Buildings and Art Collections. Association of Preservation Technology.

Four separate seismographs for continuous vibration monitoring were installed along the bore path on nearby structures to assess drilling-related vibrations. These monitoring points were identified as:

- Station 1 – Wall at West Loading Dock,
- Station 2 – Inside Building (Interior Wall at Maintenance Shop)
- Station 3 – Loading Dock (Foundation near subgrade water collection pit-”B pit”)
- Station 4 – Track Tower (Rail Unloading Station).

Select monitoring stations were activated through the course of drilling to coincide with the location of the drill head. The seismographs were set to have an alarmed threshold of 0.45 in/s and monitored every hour while drilling was occurring.

Daily field reports were prepared by LaBella. Logs of the vibration monitoring are included in **Appendix D** which include the date and name of the vibration monitoring technician, the drilling start and stop time, hourly readings, and other relevant comments or issues

with monitoring. No exceedances of the threshold transient or continuous limits were measured at any monitoring point through the drilling process.

4.2.2 CAMP Operations

A community air monitoring plan (CAMP) was implemented in accordance with the RAWP. Monitoring was conducted during drilling utilizing a mini-RAE PID for VOCs and a DustTrak aerosol monitor for particulate matter. This monitoring was conducted as required by the New York State Department of Health (NYSDEC, 2010). A review of CAMP monitoring results is provided as **Appendix E.**

4.3 HW-1 Well Installation

Well pipe and screen installation activities were initiated on July 27, 2021. The following sections describe well construction, jetting and flushing, and grouting of the well.

4.3.1 HW-1 Well Construction

Installation of the casing and screen for HW-1 occurred between July 27th and July 31st, 2021. Each well casing and screen section consisted of six-inch diameter; 20-foot-long sections constructed of stainless-steel. The optimal screen slot design for this application was determined to be 1.5" long by 0.02" wide slots oriented parallel to the long axis of the pipe section. The casing and screen sections were installed by utilizing the drill head to pull each section from east to west into the open borehole. As each 20-foot section was pulled into the borehole new segments were welded on to the well string one section at a time.

A predetermined 340-foot-long screened section of the pipe was installed in the borehole along a section beneath the process area for the plant, in the location interpreted to be near the core of the contaminant plumes. Approximately 138 feet of casing was installed to the east and approximately 170 feet of solid casing was installed to the west of the screened section for a total well length of approximately 648 feet. The total horizontal distance between from end to end, not accounting for vertical drop, is estimated at 644 feet. The depth of the screened interval ranges from three to six feet below the identified overburden/bedrock interface. **Figure 2** illustrates the plan view and **Figure 4** provides a conceptualized cross section with the well construction details. **Appendix C** provides the borehole location and well construction details reported by Ellingson based on borehole drill bit location information collected by Sharewell HDD who was contracted by Ellingson.

At completion of well installation activities the work area was restored to pre-work conditions. Restoration included grading and filling in the mud pit excavations and installing of steel access vaults to the well ports at either side of the well.

4.3.2 Jetting and Flushing of HW-1

Following the placement of the casing and screen in the well, an initial jetting and flushing of HW-1 was completed on August 4th, 2021. The goal of this flushing process was to remove as much of the residual mud and cuttings from the borehole as possible prior to

grouting the well casing in place. Potable city water was used to jet the well casing and screen from either end of the well. After the initial jetting with water, a pH-adjusting and fluid-breaking solution was injected into the well. The fluid-breaking chemical is a catalyst to speeds the breakdown of the chemical bonds in the long-chain polymers comprising the drilling fluid. Following the injection of the fluid-breaking solution, flushing of the well was completed.

4.3.3 Grouting of HW-1

The casing annulus and relief borehole of HW-1 were grouted into place on August 5th, 2021, following the jetting and flushing of the well. Before grouting, a casing plug was installed roughly 55 feet from the western port and 60 feet from the eastern port to prevent migration of grout into the screened interval. The borehole anulus around the casing was filled with a cement-bentonite grout mixture using a tremie pipe from the plug to the exit ports at either end of the borehole. The temporary relief borehole was plugged then filled with bentonite grout mix from the end of the relief borehole to the ground surface.

4.4 Well Development

Following grouting of the casing, HW-1 was developed by alternating between pumping, flushing, and jetting the well. Development activities occurred between August 6th through August 18th, 2021. A diaphragm suction pump was installed at the end of a stinger pipe constructed of one-inch PVC that was extended into HW-1. The stinger pipe intake was advanced to various points along the screened interval to ensure development occurred along the entire screened interval. Repeated jetting and flushing of HW-1 using potable water was completed until pumping rates could be sustained between 20 and 25 gallons per minute (gpm). Development continued until approximately 3500 gallons was removed which was estimated to be equivalent to approximately 1.5 well volumes based on the borehole size.

The fluids removed from the well during development were containerized in on-site frac tanks for characterization. These fluids were treated later using a temporary granulated activated carbon (GAC) treatment system before being discharged to the facility pretreatment area prior to discharge to the local POTW.

4.5 Pumping Tests

A 6-hour variable rate pumping test (VRT) was completed in December 2021 and a 96-hour constant rate pumping test (CRT) was completed in November 2022. The purpose of running these tests was to:

- test hydraulic performance of HW-1,
- determine approximate zone of influence of HW-1, and
- collect representative samples of influent and effluent samples during treatment to evaluate treatment alternatives.

In addition to monitoring the flow rate and drawdown during pumping at HW-1, water levels from a series of monitoring wells were monitored during the VRT and CRT. The wells included in the monitoring network include a combination of overburden and bedrock wells, shown on **Figure 2** and detailed in **Table 1**, for the VRT, and **Table 2** for the CRT. The well network includes wells that were monitored using vented pressure transducers with periodic checks using a water level meter and wells where water levels were measured using only a water meter at regular intervals.

4.5.1 Variable Rate Test

The VRT was completed on December 15th, 2021. The test was completed using portable, gasoline powered centrifugal (transfer) pumps. Initially, a transfer pump with a two-inch intake was used however, to obtain pumping rates greater than 25 gpm, a larger transfer pump with a three-inch intake was used. An approximate 450 foot long, 1.5inch diameter PVC intake pipe was installed from the eastern port of HW-1 with three separate, five-to-ten-foot perforated intervals along the length of the screen. The perforated intervals were designed to draw water from each third of the well screen. The perforations were sized and spaced to approximate a 0.030" screen slot size to exceed the 0.020" screen slot size of the borehole well screen. The western end of the intake pipe was capped to ensure water was drawn from the perforated intervals. The eastern end of the intake pipe was plumbed to a centrifugal pump staged near the port hole for HW-1. The discharge from the pump was contained within an on-site frac tank staged near the eastern port.

From the western port, a second, roughly 175 foot long, 1.5" diameter PVC pipe was installed to house a vented pressure transducer to collect regular readings. The initial depth of the transducer in HW-1 was recorded as 14.1 feet below static water level. With the construction of the horizontal well and setup of the transducer, an exact static water elevation cannot be determined, however based on the well construction details and placement of the transducer, the static water level prior to pumping was estimated at 529 ft amsl. This elevation is consistent with the expected static water level in this portion of the Site. A schematic of this setup is shown in **Figure 5**.

Throughout the VRT water levels were monitored in select wells, detailed in **Table 1**. A selection of these wells were monitored using vented pressure transducers collecting instantaneous readings on two-minute intervals. Water levels were monitored in these wells using a water level meter at 15- or 30-minute intervals throughout the test. Additional wells were monitored periodically throughout the test using a water level meter, as detailed in **Table 1**.

Water quality samples were collected for VOCs and 2-chloropyridine at the start, the end, and at various points throughout the test. Results are summarized in **Appendix F.** The laboratory analytical reports are provided in **Appendix G**.

The VRT proceeded in the following manner:

1) Existing on-site extraction wells were shut off five days prior to the start of the test.
2) Prior to the start of the test, a synoptic round of water level measurements was completed using water level meters. Pressure transducers were installed in select wells and set to record at two-minute intervals with a common start time of 10:00 AM.

3) At 10:00 AM pumping commenced at a rate of 10 gpm. Pumping was continued at 10 gpm until water levels in HW-1 began to stabilize at 8.0 feet of drawdown at 11:35 am. Water quality samples were collected at 10:05 and 11:35.
4) At 11:35 the pumping rate was increased to 15 gpm. Pumping was continued at 15 gpm until water levels in HW-1 began to stabilize at 11.0 feet of drawdown at 12:30.
5) At 12:30 the pumping rate was increased to 20 gpm. Pumping was continued at 20 gpm until water levels in HW-1 began to stabilize at 12.6 feet of drawdown at 13:50. At this point, the smaller two-inch intake centrifugal pump was replaced with a large three-inch pump to increase the pumping rate. Water levels recovered to 12.4 feet of drawdown while the pumps were changed out. A water quality sample was collected at 13:45.
6) At 14:00 the pumping rate was increased to 30 gpm. Pumping was continued at 30 gpm until the pump began cavitating around 14:40, and the pressure transducer in HW-1 reported 14.1 feet of drawdown, indicating the well was running dry. At this point the pump was idled and the pumping rate decreased to 18 gpm to allow the well to recharge. A water quality sample was collected at 15:00.
7) The pumping rate gradually increased with the pump set on idle and by 15:07 the pumping rate had returned to 20 gpm.
8) At 15:20 the pumping rate was increased and sustained at 21 gpm until 16:00 when the pump was turned off and the well was allowed to recover. A water quality sample was collected at 16:00 immediately prior to pump shutoff.
9) The vented pressure transducers were left in the wells to monitor the recovery of water levels and were collected on either December 23, 2021 or January 11, 2022.

The VRT was able to Illustrate the maximum pumping rate expected of HW-1, provide preliminary data regarding water quality, and provide preliminary data regarding the hydraulic influence imposed by pumping at HW-1. Manual water level measurements collected throughout the VRT using water level meters are summarized in **Table 1**. Hydrographs developed from the vented pressure transducer readings are included in **Appendix F**.

The hydrographs for the water levels observed in the monitoring wells during the VRT illustrate potential influence from pumping at PW-15, B-17, PZ-109, and PZ-106. The hydrographs for BR-8 and BR-106 illustrate a slight rise in water level, which is not attributed to pumping at HW-1. As these wells are located closer to the Erie Canal, it was determined that additional monitoring was needed during the CRT to disentangle the influence exerted by pumping at HW-1 from the influence of the canal.

4.5.2 Planning and Preparation of the Constant Rate Test

The results of the VRT provided data to plan and prepare for the CRT. The monitoring well network for the CRT was revised based on the drawdown results of the VRT. It was determined that additional monitoring wells BR-111D, PW-16, PZ-102, PZ-103, and PZ-104 should be monitored with vented pressure transducers to collect readings prior to, during, and after the end of the CRT. This is in addition to monitoring wells, B-17, BR-106, BR-5A, BR-7A, MW-127, PW-13, PW-15, PZ-106, and PZ-109 that were monitored

with transducers during the VRT. Several overburden wells (B-14 and B-16) along the southern portion of the Site, were removed from water level monitoring and replaced with bedrock monitoring points (PZ-104 and PZ-105) in these areas. The pressure transducer proposed for BR-8 was moved to PW-16 and converted to a hand level monitoring point. The network of monitoring wells monitored during the CRT is included in **Table 2** and presented on **Figures 2 and 6**.

The water quality analytical results indicated that the effluent from HW-1 contained higher concentrations of Site COCs than the existing extraction well network. In order to utilize the existing on-site treatment system for the CRT, the higher concentrations from HW-1 would need to undergo pretreatment. A Water Treatment Plan for the CRT was submitted to NYSDEC (Mactec, 2022) which detailed the construction, operation, and monitoring of a temporary treatment system designed to handle the effluent from the pumping test prior to discharge to the existing treatment system. The temporary treatment system consisted of a series of bag filters designed to remove particulate matter down to ten microns followed by a series of three vessels filled with GAC. The first two vessels contained 1,000 pounds of GAC while the final vessel contained 2,000 pounds of GAC. A schematic of this treatment system is provided in **Appendix H.**

4.5.3 Constant Rate Test Field Activities

The CRT was completed over 96 hours between October 31st and November 4th, 2022.

The CRT was completed using an air powered pneumatic pump. The pump was plumbed to the roughly 450-foot-long intake pipe from the VRT as shown in **Figure 5** and described in **Section 4.5.1**. The pumping rate was maintained at rates ranging from 18 to 20 gpm throughout the test. Groundwater was pumped from HW-1 to an on-site frac tank then through a temporary treatment system staged near the eastern port of HW-1. Pumping rates and total volume were tracked throughout the test using in-line flow meters installed between the pump and the frac tank and between the frac tank and the temporary treatment system. The documentation of the pumping rates and total volume are provided in **Appendix I**, a schematic of the treatment system is included as **Appendix H**.

The CRT was completed in the following manner:

1) Seven days before the CRT the existing extraction wells were turned off.
2) Four days before the CRT, vented pressure transducers were deployed in select wells to collect readings at 15-minute intervals, detailed in **Figure 2**
3) Prior to the start of the test on October 31st, a synoptic round of water level measurements was taken using water level meters. Vented pressure transducers were reset in select wells to record at five-minute intervals.
4) Pumping commenced at 11:30 at a rate of 20 gpm. Water level readings were collected manually at thirty-minute intervals for the first four hours of the test from designated wells. Periodic checks were performed on the wells outfitted with transducers. The pumping rate and total flow from the in-line flow meters, along with pressure readings to monitor the operation of the treatment system were recorded at 30-minute intervals throughout the test.
5) After four hours, the rate of collection of manual water level measurement was reduced to every hour

6) Water quality samples were collected from the discharge of the well, throughout the treatment system, and from the effluent of the treatment system at intervals consistent with the water treatment work plan. The results are detailed in **Table 3** and sample locations are detailed in the schematic included in **Appendix H**.
7) After twelve hours, the rate of collection of manual water level measurements was reduced to two-hour intervals.
8) The test continued to run for 96 hours until shutoff at 11:30 am on November 4th, 2022.

Following the shutoff of the pump, the vented pressure transducers were left in the monitoring wells for four days to monitor the recovery of water levels. The existing extraction wells resumed pumping after the pressure transducers were removed from the wells.

The temporary treatment system was installed consistent with the Water Treatment Work Plan (Mactec, 2022) that was reviewed and approved by Monroe County Department of Environmental Services. Samples were collected from the effluent of the temporary treatment system at 24, 48, and at 72 hours following the start of the test in accordance with the work plan. Additional samples were collected twice daily, in the morning and the evening, to evaluate the exhaustion rate of the GAC. Samples were collected from the influent (pre-treatment) and from effluent of the three GAC beds in series. These samples and were analyzed for the following at the on-site analytical laboratory at the facility:

VOCs	**Pyridines**	**Inorganics**
Chloroform	2-Chloropyridine	Zinc
Carbon Tetrachloride	3-Chloropyridine	Iron*
Methylene Chloride	Pyridine	

*Influent only

These analytes were selected as representative COCs for the groundwater plumes. Zinc was analyzed to evaluate against discharge permit limits. Iron analysis was performed to support treatment alternatives selection. Two samples were collected from the influent and after GAC #3 for total organic carbon (TOC) analysis near the end of the 96-hour pumping period. The sampling results are provided in **Table 3.** The sampling setup is shown in **Appendix H**. The sampling results and treatment evaluation are discussed in detail in **Section 4.5.5**, below.

No exceedances were reported from the compliance samples that were collected, as reported on **Table 3**.

4.5.4 Constant Rate Test Drawdown Evaluation

Following completion of the CRT and recovery of water levels, an evaluation of the manual water level measurements as well as the data supplied by the pressure transducers, was completed. The manual measurements are included in **Table 2** and the hydrographs generated from the pressure transducer readings and manual measurements are included in **Appendix I**.

Background Conditions – Canal Influence and Ambient Conditions Evaluation

The water level measurements from the transducers ranged up to +/- 0.1 feet within consecutive readings for most wells but up to +/- 0.3 feet for BR-111D. These fluctuations are likely introduced through the influence of background drainage, fluctuations in water level in the canal, heterogeneities and fracture flow in the subsurface, and individual monitoring well construction.

The nearest staff gage on the Erie Barge Canal to the Site is maintained by the United States Geological Survey (USGS) (site ID #04218700) and is located roughly two miles south of the Site. The data from the gage including the date, time, and gage height of the canal at 15-minute intervals was downloaded between October 28th and November 8th, 2022 (USGS 2022). The timing and magnitude of changes in water levels at the USGS gage during this period closely mirrored the water level responses (magnitude and timing) observed at BR-111D, which is located near the canal and approximately 1200 feet west of HW-1. Based on these results BR-111D is likely beyond the influence of the pumping well and may be used as reference point for monitoring the effect of the canal water levels on the bedrock aquifer water levels.

For monitoring wells BR-106, PZ-102, and BR-7A, the canals influence on water levels is apparent, but the response is delayed and the magnitude of the response is dampened. Manual water level measurements were collected from PZ-105 at the southwestern corner of the Site, exhibited fluctuating water levels throughout the monitoring period, **Table 2**. This well is likely influenced by the canal however, the manual measurements are unable to capture short term fluctuations within the well, therefore the response of the canal on this well is undetermined

Water level measurements in upgradient or cross gradient monitoring wells were used to evaluate how background water levels at the Site and beyond the influence of the canal, fluctuated during the CRT. Monitoring wells BR-5A and PZ-104, were selected as representative shallow bedrock wells for background monitoring during the CRT, **Figure 2**. Each of these wells illustrated a slight decrease in water level of 0.25 and 0.15 feet respectively, during the CRT. Although some of the decreases in levels could be attributed to pumping, these wells provided the best available data set to represent nearby ambient aquifer conditions. The declining water levels in these wells was used to modify the drawdown calculations by 0.2 ft for wells interpreted as being influenced by pumping. Those wells showing response to pumping were PW-16, BR-8, PZ-103, HW-1, B-17, PZ-109, PW-15, PZ-107, PZ-106, and MW-127. The reported drawdown values for these responses shown on **Figure 6** should be considered estimates informed by interpretations of the background data collected.

Time series plots showing net water level change in wells before, during and after the 96-hour pumping period are provided in **Appendix I**.

HW-1

Water level trends in HW-1 were evaluated using the start of the CRT as a baseline with drawdown values calculated as the difference between the baseline and the recorded reading. An initial steep drop in water levels was observed in HW-1 over the first twelve hours of the test followed by a more gradual drop in water levels through the end of the test (**Appendix I**). While the slope of the water level trend does decrease towards the end of the test, water levels in HW-1 do not appear to stabilize by the end of the test. This indicates that the pumping rate of 20 gpm determined during the VRT may not be

sustainable for longer periods of extraction or during periods of the year when static water levels may be lower due to draining of the canal or seasonal variability.

Monitoring Wells

An evaluation of water levels collected from select monitoring wells during the CRT was completed to determine estimates of drawdown induced from the pumping of HW-1 and to evaluate the zone of influence of the horizontal well for longer term operation. The network of monitoring wells that were monitored with either vented pressure transducers or with water level meters is displayed in **Figure 2**. The measured water levels are included in **Table 2** and hydrographs displaying the calculated offset of water levels from the start of the test are included in **Appendix I**.

Monitoring wells BR-111D, BR-106, BR-7A, PZ-102, and PZ-105 were likely influenced by changes in water levels in the canal, and the potential influence from pumping at HW-1 was not observed within the 96-hour test period.

BR-9 and PW-12, on the northern end of the property exhibited coincident fluctuations in water level which may be due to delayed influence from the canal. BR-9, being further west, likely experiences greater influence from the canal than PW-12. No water level response due to pumping was interpreted for these wells. Manual water level measurements were collected only during the CRT therefore the antecedent and recovery phases of the test could not be used to evaluate the potential influence of the canal at these locations.

BR-6A and BR-4 exhibited minimal change in water level, less than 0.1 feet throughout the duration of the CRT. Neither response to pumping nor influence from the canal is interpreted for these monitoring wells.

Pumping Drawdown Response

An estimate of drawdown at hour 96 of the CRT was made for the remaining overburden wells (B-17, PZ-109, and MW-127) and shallow bedrock wells (PW-15, BR-8, and PZ-107). These wells exhibit drawdown from pumping that continued to decrease throughout the test and recovers following the end of pumping. Hydrographs are included in **Appendix I** and the manual measurements are provided in **Table 2**. The interpreted drawdown is detailed and incorporated in a contour map provided as **Figure 6.**

Two of the bedrock monitoring wells, PZ-106 and PZ-103, exhibited an initial reduction in water level over the first two days of pumping, however, water levels remained relatively consistent for the remainder of the test. For PZ-103 the initial drop in water levels was delayed from the start of pumping by roughly eight hours. For PZ-106, the initial drop in water levels was coincident with the start of the test. The initial drop in water levels observed in these wells likely indicates there is a hydraulic connection to HW-1. The fact that water levels remain constant after this initial drawdown suggests that there is another source of groundwater maintaining the hydraulic head of the well which is not influenced by the fracture network supplying water to HW-1. These observations may be due the open borehole well construction of PZ-103 and PZ-106, which allows these well to intercept multiple fracture networks which may be isolated from each other. For these two wells the interpreted drawdown is simply the difference between the maximum water level and the minimum water level reported, which was then corrected for the 0.2 ft ambient

aquifer fluctuations.

Water levels from extraction wells PW-16 and PW-13 are inconsistent with those observed in nearby wells. For the pre-test synoptic round of water level measurements, the water level at PW-13 was observed at 512.6 ft amsl and measured at 523.6 ft amsl for PW-16. The closest wells were BR-8 and PZ-103 which had static water levels at the start of the test of 527.7 ft amsl and 525.6 ft amsl, respectively.

The pre-test water levels at PW-16 suggest this well never fully recovered following the shutdown of the existing extraction system prior to the start of the CRT. For PW-16 the transducer readings indicate that the water levels rose 1 foot during the CRT and 4.5 feet over the monitoring period. The final elevation at the end of the monitoring period was calculated to be 526.1 ft amsl, lower than the static water level at nearby BR-8. There is a decrease in the slope of the hydrograph following the start of pumping, indicating there is some hydraulic connection between HW-1 and PW-16.

It was determined that for PW-13, the pressure transducer was installed above the water in the well, therefore the data collected by the transducer could not be used for the test evaluation. The manual measurements for PW-13 were inconclusive regarding whether the observed changes in water level are due to pumping, the canal, or from the recovery to static water conditions.

4.5.5 Water Treatment Sampling and Evaluation

Water treatment during the CRT was conducted consistent with the Water Treatment Plan for the Constant Rate Pumping Test (Mactec, 2022). Groundwater was pumped, as described in **Section 4.5.3**, from HW-1 into a frac tank sited near the well at a rate of approximately 20 gpm. The water was then pumped from the frac tank through a series of bag filters to remove particulate matter. Following particulate filtering, the water was treated in a series of three GAC vessels, the first two being 1,000 pounds and the last being 2,000 pounds. This treated water was discharged to the existing on-site water treatment system before discharge to the POTW, consistent with permit conditions. Effluent samples were collected at 24, 48, and 72 hours following the start of pumping. The compliance sampling resulted in no exceedances of compounds above the permit discharge limits and are reported in **Table 3** and **Appendix J**.

Water quality samples were collected throughout the test to support an evaluation of GAC usage rates. Samples were collected from a series of taps, throughout the treatment system, allowing for analysis of the influent to the system and following treatment at each carbon vessel. These samples were analyzed at the on-site analytical laboratory at the Site. These results are detailed in **Table 3** with a schematic of the treatment system illustrating the corresponding sample locations included in **Appendix H**.

The key analytical parameters monitored to evaluate carbon use are chloroform and 2-chloropyridine. Breakthrough is represented by the time when effluent levels from a specific GAC vessel exceed the daily maximum permit discharge limits. For chloroform and 2-chloropyridine the permit limits are 0.325 mg/l and 40 mg/l, respectively.

For chloroform, the results of the on-site analysis show breakthrough on the 1st 1000-pound GAC vessel after about 1 day of pumping and on the 2nd 1000-pound vessel just

after 2 days of pumping. Breakthrough for 2-chloropyridine occurred on the 1st 1000-pound vessel just after 2 days of pumping followed by breakthrough on the 2nd 1000-pound vessel just after 3 days of pumping.

No breakthrough was apparent for chloroform or 2-chloropyridine on the 3rd GAC vessel, the 2000-pound unit, at the end of the 4-day pumping period. Chloroform was reported at 0.004 mg/l and 2-chloropyridine was not detected.

From the well influent concentrations and flow rates measured, Mactec estimates a carbon usage rate of approximately 4000 to 6000 pounds per week for HW-1 at the anticipated pumping rate of 20 gpm. This is a rough order estimate for longer term usage and could vary over time. However, it's important to note that both chloroform and 2-chloropyridine concentrations increased from Day 1 to Day 4 of the CRT and this pattern could continue at startup for long term operation before stabilizing.

One water quality sample was collected from the discharge of HW-1, prior to treatment, to be utilized for bench scale testing conducted by APT water under contract to Mactec. The bench scale testing will evaluate the potential usage of proprietary treatment systems utilizing advanced oxidation to break down Site contaminants. These bench scale test results may be utilized to evaluate the application of these technologies into the design of the groundwater treatment system.

5.0 Conclusions and Recommendations

The pumping test data collected during the CRT demonstrate that HW-1 can be pumped at a rate of up to 20 gpm for 96-hours. Long term operation rates however may be somewhat lower based on the continued drawdown measured at that pumping rate at the end of the CRT.

Drawdowns measured in both overburden and bedrock wells indicate hydraulic capture in overburden and shallow bedrock groundwater can be achieved over a large area that coincides with core of the VOC and chloropyridine plumes. The influence of the water level in the nearby canal that is known to be lowered seasonally from December to April is also likely to have some effect on pumping rates and hydraulic capture. This is assumed based on responses in nearby wells to fluctuating canal water levels of less than 1 foot during the CRT. The CRT was performed at a time before water levels were lowered. Typically, the canal water level is lowered by the NYS Canal Authority approximately 8 feet in winter months in the vicinity of the Site.

It's recommended for future operation that automated flow controls be utilized such as a variable frequency drive system with level control operation for HW-1.

The test results from the CRT effluent show treatment of discharge water using GAC remains as an option for long term operation for HW-1. However, given the concentrations and expected usage rates, a pilot test treatment operation is recommended for a period of at least 2 months. This pilot test would be planned to monitor longer term usage rates for GAC as well monitor the effects on the VOC and chloropyridine plumes with periodic groundwater sampling. It's recommended that the six operating extraction wells be shut down during the pilot test period while HW-1 is operating.

6.0 REFERENCES

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Tables

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 1
Variable Rate Pumping Test - Water Level Measurements

Step	Pumping Rate (gpm)	Water Level Monitoring																Comment
		Manual Water Level Measurements																
		B-14		B-16		BR-4		BR-6A		PW-12		PW-16		PZ-103		PZ-107		
		Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	
1	10	10:54	8.22	10:55	4.50	10:02	10.29	10:08	12.75	10:15	5.87	10:11	10.01	10:18	12.65	10:05	6.59	
1	10	-	-	-	-	11:06	10.27	11:17	12.75	11:10	5.88	11:08	10.01	10:01	12.68	11:20	6.69	
2	15	12:22	8.20	12:23	4.52	12:26	10.26	-	-	-	-	-	-	-	-	-	-	
3	20	13:53	8.19	13:55	4.53	-	-	12:39	12.73	12:31	5.84	12:34	10.00	12:30	12.60	12:42	6.91	
4	30	-	-	-	-	-	-	-	-	-	-	14:19	9.90	14:09	12.57	-	-	
---	20	15:04	8.15	15:07	4.51	15:37	10.30	15:49	12.74	15:42	5.82	15:23	9.92	15:19	12.54	15:53	7.35	
---	20	15:46	8.15	15:48	4.53	-	-	-	-	-	-	15:58	9.95	15:52	12.53	-	-	

Step	Pumping Rate (gpm)	Transducer Well Checks																				
		B-17		BR-106		BR-5A		BR-7A		BR-8		MW-127		PW-13		PW-15		PZ-106		PZ-109		
		Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	Time	DTW	
---	---	9:47	8.38	9:17	21.10	9:03	4.79	9:23	21.00	9:11	9.86	8:59	4.82	9:28	24.28	9:45	6.56	8:57	8.48	9:45	6.77	Set Transducer/Pre-pumping
1	10	10:22	8.36	10:24	21.10	10:17	4.78	10:52	21.00	10:38	9.83	10:28	4.85	10:33	24.30	10:25	6.56	10:27	8.49	10:23	6.76	
1	10	10:35	7.87	10:44	21.15	10:32	4.80	11:19	22.00	11:10	9.88	10:42	4.85	11:22	24.34	10:39	6.54	10:41	8.50	10:37	6.73	
1	10	10:48	8.38	11:16	21.01	10:45	4.81	-	-	-	-	11:04	4.87	-	-	10:51	6.55	11:03	8.56	10:50	6.76	
1	10	11:12	8.39	-	-	11:08	4.81	-	-	-	-	11:21	4.86	-	-	11:15	6.58	11:19	8.53	11:14	6.76	
2	15	11:52	8.37	11:40	21.30	11:49	4.82	11:44	23.70	11:30	9.85	11:57	4.86	11:48	24.32	11:54	6.58	11:56	8.56	11:53	6.76	
2	15	12:05	8.36	12:11	21.31	12:00	4.80	12:18	23.69	-	-	12:10	4.88	12:15	24.32	12:07	6.61	12:09	8.58	12:06	6.74	
2	15	12:18	8.39	-	-	12:14	4.80	-	-	-	-	12:23	4.88	-	-	12:21	6.61	12:22	8.60	12:19	6.75	
2	15	-	-	-	-	12:28	4.78	-	-	-	-	-	-	-	-	-	-	-	-	-		
3	20	12:34	8.41	12:49	21.30	13:00	4.80	12:49	23.80	12:35	9.80	12:43	4.88	13:15	24.34	12:37	6.59	12:41	8.63	12:35	6.74	
3	20	13:03	8.60	13:05	21.41	13:17	4.78	13:11	22.80	12:54	9.80	13:09	4.90	13:38	24.34	13:06	6.65	13:08	8.66	13:05	6.78	
3	20	13:19	8.66	13:29	21.40	13:30	4.78	13:32	22.28	13:20	9.80	13:25	4.90	-	-	13:22	6.65	13:23	8.70	13:21	6.80	
3	20	13:34	8.72	-	-	13:48	4.80	-	-	13:41	9.80	13:39	4.90	-	-	13:36	6.66	13:38	8.72	13:35	6.82	
3	20	13:52	8.74	-	-	-	-	-	-	-	-	13:57	4.89	-	-	13:54	6.67	13:56	8.75	13:53	6.83	
4	30	14:16	8.80	14:31	21.40	14:13	4.78	14:00	22.30	14:21	9.73	14:25	4.89	14:03	24.30	14:19	6.70	14:24	8.78	14:18	6.84	
4	30	14:35	8.80	-	-	14:31	4.77	14:37	22.30	-	-	14:42	4.89	-	-	14:38	6.74	14:40	8.82	14:37	6.86	
---	20	15:03	8.84	14:54	21.40	14:59	4.76	15:13	22.61	14:49	9.77	15:09	4.90	14:42	24.30	15:06	6.75	15:07	8.85	15:05	6.91	
---	20	15:23	8.86	15:40	21.48	15:19	4.72	-	-	15:25	9.74	15:28	4.91	15:12	24.33	15:25	6.77	15:26	8.89	15:24	6.93	
---	20	15:45	8.89	-	-	15:39	4.76	-	-	16:00	9.75	15:55	4.95	-	-	15:47	6.81	15:52	8.91	15:46	6.96	

Notes:
gpm = Gallons per minute
DTW = Depth to water (feet below measurement point)
- = no measurement taken

Created By: RJO 11/11/22
Checked By: AMC 12/12/2022

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 2
HW-1 Constant Rate Pumping Test
Water Level Measurements

Monitoring Wells - Manual Readings only																					
Date	BR-8 (casing el.= 539.72')			BR-9 (casing el.= 542.17')			PW-12 (casing el.= 537.49')			PZ-105 (casing el.= 536.93')			PZ-107 (casing el.= 538.39')			BR-4 (casing el.= 539.03')			BR-6A (casing el.= 540.90')		
	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.
10/31/2022	9:55	12.02	527.70	8:55	26.84	515.33	10:59	6.52	530.97	11:12	11.11	525.82	10:14	7.39	531.00	10:49	11.30	527.73	10:16	12.63	528.27
10/31/2022	11:52	12.01	527.71	11:48	26.85	515.32	11:45	6.54	530.95	11:46	11.05	525.88	11:50	7.48	530.91	11:58	11.30	527.73	11:48	12.65	528.25
10/31/2022	12:25	12.01	527.71	12:20	26.85	515.32	12:15	6.54	530.95	12:18	10.96	525.97	12:23	7.62	530.77	12:26	11.30	527.73	12:20	12.64	528.26
10/31/2022	12:55	12.00	527.72	12:50	26.83	515.34	12:45	6.54	530.95	12:47	10.91	526.02	12:53	7.79	530.60	12:56	11.30	527.73	12:50	12.64	528.26
10/31/2022	13:25	11.99	527.73	13:20	26.84	515.33	13:15	6.54	530.95	13:31	10.85	526.08	13:35	7.96	530.43	13:50	11.30	527.73	13:30	12.63	528.27
10/31/2022	14:02	11.98	527.74	13:59	26.82	515.35	13:56	6.54	530.95	14:09	10.80	526.13	14:13	8.08	530.31	14:15	11.30	527.73	14:11	12.63	528.27
10/31/2022	14:27	11.97	527.75	14:23	26.84	515.33	14:20	6.55	530.94	14:33	10.80	526.13	14:37	8.14	530.25	14:40	11.30	527.73	14:35	12.64	528.26
10/31/2022	15:06	11.95	527.77	15:03	26.83	515.34	14:59	6.55	530.94	15:13	10.78	526.15	15:18	8.22	530.17	15:22	11.30	527.73	15:16	12.63	528.27
10/31/2022	15:35	11.95	527.77	15:33	26.82	515.35	15:30	6.54	530.95	15:48	10.75	526.18	15:53	8.25	530.14	15:57	11.30	527.73	15:50	12.63	528.27
10/31/2022	16:44	11.93	527.79	16:36	26.83	515.34	16:33	6.53	530.96	16:51	10.71	526.22	16:55	8.35	530.04	16:59	11.30	527.73	16:53	12.62	528.28
10/31/2022	17:43	11.96	527.76	17:08	26.83	515.34	17:35	6.55	530.94	17:54	10.70	526.23	18:00	8.44	529.95	18:02	11.30	527.73	17:56	12.63	528.27
10/31/2022	-	-	-	18:29	26.84	515.33	18:26	6.55	530.94	18:39	10.70	526.23	18:43	8.49	529.90	18:48	11.30	527.73	18:40	12.63	528.27
10/31/2022	19:27	11.98	527.74	19:23	26.85	515.32	19:20	6.55	530.94	19:40	10.71	526.22	19:45	8.54	529.85	19:49	11.30	527.73	19:42	12.62	528.28
10/31/2022	20:40	12.02	527.70	20:30	26.85	515.32	20:25	6.55	530.94	20:52	10.70	526.23	20:57	8.60	529.79	20:47	11.30	527.73	20:55	12.62	528.28
10/31/2022	21:26	12.02	527.70	21:21	26.85	515.32	21:19	6.54	530.95	21:43	10.71	526.22	21:47	8.64	529.75	21:34	11.30	527.73	21:45	12.62	528.28
10/31/2022	22:29	12.04	527.68	22:24	26.88	515.29	22:20	6.54	530.95	22:44	10.70	526.23	22:48	8.69	529.70	22:34	11.30	527.73	22:45	12.62	528.28
10/31/2022	23:29	12.07	527.65	23:24	26.85	515.32	23:21	6.56	530.93	23:45	10.71	526.22	23:51	8.75	529.64	23:36	11.30	527.73	23:47	12.63	528.27
11/1/2022	1:20	12.11	527.61	1:15	26.85	515.32	1:11	6.57	530.92	1:40	10.72	526.21	1:45	8.84	529.55	1:33	11.30	527.73	1:42	12.62	528.28
11/1/2022	3:15	12.15	527.57	3:10	26.85	515.32	3:06	6.55	530.94	3:33	10.73	526.20	3:40	8.92	529.47	3:23	11.30	527.73	3:35	12.64	528.26
11/1/2022	5:36	12.19	527.53	5:30	26.85	515.32	5:25	6.54	530.95	5:55	10.75	526.18	5:59	9.00	529.39	5:52	11.30	527.73	5:57	12.65	528.25
11/1/2022	7:16	12.22	527.50	7:11	26.85	515.32	7:07	6.54	530.95	7:34	10.78	526.15	7:39	9.05	529.34	7:25	11.30	527.73	7:36	12.63	528.27
11/1/2022	9:17	12.29	527.43	9:11	26.89	515.28	9:07	6.55	530.94	9:36	10.81	526.12	9:39	9.11	529.28	9:43	11.30	527.73	9:38	12.63	528.27
11/1/2022	11:20	12.32	527.40	11:16	26.88	515.29	11:12	6.56	530.93	12:08	10.85	526.08	12:11	9.20	529.19	12:15	11.30	527.73	12:10	12.64	528.26
11/1/2022	13:23	12.35	527.37	13:20	26.88	515.29	13:17	6.58	530.91	13:29	10.88	526.05	13:33	9.23	529.16	13:39	11.30	527.73	13:31	12.63	528.27
11/1/2022	15:22	12.36	527.36	15:17	26.88	515.29	15:14	6.59	530.90	15:54	10.89	526.04	15:58	9.30	529.09	16:01	11.30	527.73	15:56	12.64	528.26
11/1/2022	-	-	-	-	-	-	17:14	6.57	530.92	17:42	10.92	526.01	17:45	9.33	529.06	17:50	11.30	527.73	17:45	12.63	528.27
11/1/2022	19:47	12.48	527.24	19:44	26.88	515.29	19:40	6.60	530.89	20:05	10.95	525.98	20:09	9.43	528.96	19:56	11.30	527.73	20:07	12.63	528.27
11/1/2022	21:32	12.50	527.22	21:27	26.91	515.26	21:24	6.62	530.87	22:05	11.00	525.93	22:09	9.49	528.90	21:47	11.30	527.73	22:07	12.63	528.27
11/1/2022	23:15	12.51	527.21	23:12	26.89	515.28	23:07	6.62	530.87	23:34	11.01	525.92	23:38	9.54	528.85	23:26	11.30	527.73	23:36	12.63	528.27
11/2/2022	1:16	12.55	527.17	1:11	26.89	515.28	1:07	6.62	530.87	1:39	11.05	525.88	1:43	9.59	528.80	1:31	11.30	527.73	1:40	12.63	528.27
11/2/2022	3:17	12.55	527.17	3:13	26.88	515.29	3:09*	6.61	530.88	3:34	11.09	525.84	3:39	9.65	528.74	3:21	11.30	527.73	3:36	12.63	528.27
11/2/2022	5:10	12.57	527.15	5:06	26.89	515.28	5:03*	6.62	530.87	5:36	11.11	525.82	5:41	9.69	528.70	5:27	11.30	527.73	5:39	12.63	528.27
11/2/2022	8:17	12.60	527.12	8:13	26.90	515.27	8:11	6.64	530.85	8:43	11.18	525.75	8:47	9.75	528.64	8:51	11.30	527.73	8:45	12.63	528.27
11/2/2022	9:44	12.64	527.08	9:41	26.90	515.27	9:36	6.65	530.84	9:50	11.20	525.73	9:55	9.78	528.61	9:59	11.30	527.73	9:52	12.65	528.25
11/2/2022	11:32	12.63	527.09	11:29	26.9	515.27	11:26	6.63	530.86	12:12	11.22	525.71	12:16	9.81	528.58	12:19	11.30	527.73	12:13	12.64	528.26
11/2/2022	13:25	12.62	527.10	13:22	26.88	515.29	13:19	6.63	530.86	13:30	11.22	525.71	13:34	9.82	528.57	13:38	11.30	527.73	13:31	12.64	528.26
11/2/2022	15:42	12.56	527.16	15:39	26.86	515.31	15:36	6.64	530.85	16:15	11.25	525.68	16:19	9.81	528.58	16:22	11.30	527.73	16:17	12.63	528.27
11/2/2022	17:32	12.55	527.17	17:29	26.89	515.28	17:26	6.63	530.86	17:42	11.29	525.64	17:46	9.82	528.57	17:49	11.30	527.73	17:44	12.63	528.27
11/2/2022	20:00	12.55	527.17	19:56	26.84	515.33	19:53	6.65	530.84	20:14	11.26	525.67	20:18	9.84	528.55	20:36	11.30	527.73	20:16	12.63	528.27
11/2/2022	21:14	12.55	527.17	21:11	26.83	515.34	21:07	6.64	530.85	21:38	11.26	525.67	21:42	9.86	528.53	21:33	11.30	527.73	21:10	12.63	528.27
11/2/2022	23:15	12.55	527.17	23:11	26.82	515.35	23:08	6.65	530.84	23:50	11.27	525.66	23:35	9.87	528.52	23:22	11.30	527.73	23:33	12.64	528.26
11/3/2022	1:18	12.54	527.18	1:13	26.79	515.38	1:10	6.60	530.89	1:40	11.28	525.65	1:46	9.88	528.51	1:33	11.30	527.73	1:43	12.63	528.27
11/3/2022	3:19	12.55	527.17	3:14	26.78	515.39	3:11	6.60	530.89	3:33	11.30	525.63	3:37	9.90	528.49	3:24	11.30	527.73	3:35	12.64	528.26
11/3/2022	5:21	12.55	527.17	5:13	26.73	515.44	5:10	6.60	530.89	5:40	11.30	525.63	5:47	9.91	528.48	5:33	11.30	527.73	5:43	12.64	528.26

Created by: RAC 11/8/2022
Checked by: AMC 12/12/22

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 2
HW-1 Constant Rate Pumping Test
Water Level Measurements

Monitoring Wells - Manual Readings only																					
Date	BR-8 (casing el.= 539.72')			BR-9 (casing el.= 542.17')			PW-12 (casing el.= 537.49')			PZ-105 (casing el.= 536.93')			PZ-107 (casing el.= 538.39')			BR-4 (casing el.= 539.03')			BR-6A (casing el.= 540.90)		
	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.	Time	DTW	GW EL.
11/3/2022	8:21	12.55	527.17	8:18	26.74	515.43	8:14	6.59	530.90	8:52	11.29	525.64	8:56	9.93	528.46	9:00	11.30	527.73	8:54	12.65	528.25
11/3/2022	9:50	12.58	527.14	9:47	26.78	515.39	9:44	6.60	530.89	10:02	11.30	525.63	10:06	9.93	528.46	10:09	11.30	527.73	10:04	12.64	528.26
11/3/2022	11:16	12.60	527.12	11:14	26.74	515.43	11:10	6.58	530.91	11:41	11.30	525.63	11:44	9.95	528.44	11:47	11.30	527.73	11:43	12.64	528.26
11/3/2022	13:21	12.58	527.14	13:24	26.70	515.47	13:27	6.55	530.94	13:53	11.29	525.64	13:56	9.92	528.47	13:35	11.30	527.73	13:54	12.64	528.26
11/3/2022	15:35	12.54	527.18	15:32	26.67	515.50	15:29	6.56	530.93	17:21	11.28	525.65	17:25	9.93	528.46	17:28	11.30	527.73	17:22	12.64	528.26
11/3/2022	19:24	12.54	527.18	19:21	26.64	515.53	19:17	6.55	530.94	19:40	11.23	525.70	19:44	9.93	528.46	19:31	11.30	527.73	19:42	12.63	528.27
11/3/2022	21:12	12.55	527.17	21:09	26.65	515.52	21:06	6.56	530.93	21:30	11.23	525.70	21:34	9.95	528.44	21:24	11.30	527.73	21:32	12.63	528.27
11/3/2022	23:09	12.57	527.15	23:06	26.70	515.47	23:03	6.57	530.92	23:26	11.23	525.70	23:31	9.97	528.42	23:16	11.30	527.73	23:28	12.64	528.26
11/4/2022	1:09	12.57	527.15	1:05	26.71	515.46	1:02	6.58	530.91	1:28	11.23	525.70	1:33	9.96	528.43	1:22	11.30	527.73	1:31	12.64	528.26
11/4/2022	3:16	12.55	527.17	3:12	26.74	515.43	3:09	6.59	530.90	3:34	11.23	525.70	3:40	9.98	528.41	3:22	11.30	527.73	3:37	12.64	528.26
11/4/2022	5:14	12.57	527.15	5:10	26.78	515.39	5:07	6.60	530.89	5:37	11.23	525.70	5:42	9.99	528.40	5:30	11.30	527.73	5:39	12.64	528.26
11/4/2022	8:15	12.56	527.16	8:13	26.80	515.37	8:10	6.61	530.88	8:52	11.25	525.68	8:55	9.98	528.41	8:59	11.30	527.73	8:53	12.65	528.25
11/4/2022	9:29	12.60	527.12	9:26	26.84	515.33	9:23	6.63	530.86	9:38	11.25	525.68	9:45	9.98	528.41	9:45	11.30	527.73	9:40	12.65	528.25
11/4/2022	10:56	12.62	527.10	10:53	26.87	515.30	10:51	6.64	530.85	11:15	11.24	525.69	11:10	9.97	528.42	11:18	11.30	527.73	11:13	12.63	528.27

Notes:
Water level gauging frequency:
Hours 0-4 every 30 minutes
Hours 4-12 every hour
Hours 12-96 every two hours
*On 11/2/22 water levels at PW-12 collected at 0309 and 0503 were recorded as 8.61 and 8.52 - these are interpretted to be incorrect and correct depth to water is assumed to be 6.61' and 6.62'
DTW= Depth to Water
GW EL. = Groundwater elevation - calculated

Created by: RAC 11/8/2022
Checked by: AMC 12/12/22

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 2
HW-1 Constant Rate Pumping Test
Water Level Measurements

Monitoring wells with pressure transducers																				
B-17 (casing el.= 538.74')			BR-106 (casing el.= 535.74')			BR-5A (casing el.= 536.35')			BR-7A (casing el.= 539.12')			BR-111D (casing el.= 540.34')			MW-127 (casing el.= 536.87')			PW-13 (casing el.= 536.13')		
Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.
10/31/22 10:28	8.49	530.25	10/31/22 09:10	21.00	514.74	10/31/22 10:53	5.25	531.10	10/31/22 09:32	26.53	512.59	-	-	-	10/31/22 10:11	5.75	531.12	10/31/22 09:41	23.50	512.63
10/31/22 12:00	8.51	530.23	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 12:40	5.75	531.12	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 13:05	5.79	531.08	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 15:20	5.85	531.02	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 15:55	5.86	531.01	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 16:57	5.91	530.96	-	-	-
10/31/22 18:15	8.95	529.79	-	-	-	10/31/22 18:24	5.28	531.07	-	-	-	-	-	-	10/31/22 18:06	5.97	530.90	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 18:44	5.99	530.88	-	-	-
-	-	-	-	-	-	-	-	-	10/31/22 19:34	21.82	517.3	-	-	-	10/31/22 19:46	6.02	530.85	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 20:48	6.04	530.83	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 21:37	6.06	530.81	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 22:36	6.09	530.78	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10/31/22 23:38	6.12	530.75	-	-	-
11/01/22 01:25	9.25	529.49	-	-	-	11/01/22 01:05	5.35	531.00	-	-	-	-	-	-	11/01/22 01:36	6.19	530.68	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/01/22 03:26	6.24	530.63	-	-	-
11/01/22 05:44	9.45	529.29	-	-	-	11/01/22 05:20	5.35	531.00	-	-	-	-	-	-	11/01/22 05:50	6.28	530.59	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/01/22 07:28	6.32	530.55	-	-	-
11/01/22 10:25	9.54	529.20	-	-	-	11/01/22 09:04	5.37	530.98	-	-	-	-	-	-	11/01/22 09:41	6.39	530.48	-	-	-
-	-	-	11/01/22 11:49	21.00	514.74	-	-	-	11/01/22 11:29	26.69	512.43	-	-	-	11/01/22 12:13	6.41	530.46	11/01/22 11:36	23.65	512.48
11/01/22 13:43	9.65	529.09	-	-	-	11/01/22 13:12	5.38	530.97	-	-	-	11/01/22 14:13	29.25	511.09	11/01/22 13:34	6.43	530.44	-	-	-
-	-	-	11/01/22 15:34	21.10	514.64	-	-	-	11/01/22 15:46	26.68	512.44	-	-	-	11/01/22 15:58	6.47	530.40	11/01/22 15:48	23.62	512.51
11/01/22 17:32	9.90	528.84	-	-	-	11/01/22 17:11	5.40	530.95	-	-	-	-	-	-	11/01/22 17:47	6.50	530.37	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/01/22 19:58	6.53	530.34	-	-	-
11/01/22 21:37	10.09	528.65	-	-	-	11/01/22 21:21	5.44	530.91	-	-	-	-	-	-	11/01/22 22:00	6.57	530.30	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/01/22 23:28	6.58	530.29	-	-	-
11/02/22 01:21	10.16	528.58	-	-	-	11/02/22 01:03	5.44	530.91	-	-	-	-	-	-	11/02/22 01:34	6.59	530.28	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 03:25	6.60	530.27	-	-	-
11/02/22 05:16	10.27	528.47	-	-	-	11/02/22 05:00	5.44	530.91	-	-	-	-	-	-	11/02/22 05:32	6.61	530.26	-	-	-
-	-	-	11/02/22 08:29	21.15	514.59	11/02/22 08:07	5.48	530.87	11/02/22 08:35	26.75	512.37	-	-	-	11/02/22 08:49	6.69	530.18	11/02/22 08:38	23.71	512.42
11/02/22 10:02	10.36	528.38	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 09:56	6.70	530.17	-	-	-
-	-	-	11/02/22 11:47	21.10	514.64	11/02/22 11:21	5.45	530.90	11/02/22 11:57	26.78	512.34	11/02/22 12:40	29.31	511.03	11/02/22 12:17	6.70	530.17	11/02/22 12:03	23.70	512.43
11/02/22 13:43	10.40	528.34	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 13:36	6.66	530.21	-	-	-
-	-	-	11/02/22 15:43	21.10	514.64	11/02/22 15:30	5.45	530.90	11/02/22 16:05	26.73	512.39	-	-	-	11/02/22 16:20	6.68	530.19	11/02/22 16:08	23.68	512.45
11/02/22 17:52	10.45	528.29	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 17:48	6.69	530.18	-	-	-
-	-	-	-	-	-	11/02/22 19:57	5.45	530.90	-	-	-	-	-	-	11/02/22 20:08	6.68	530.19	-	-	-
11/02/22 21:25	10.48	528.26	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 21:35	6.68	530.19	-	-	-
-	-	-	-	-	-	11/02/22 23:04	5.45	530.90	-	-	-	-	-	-	11/02/22 23:24	6.70	530.17	-	-	-
11/03/22 01:26	10.53	528.21	-	-	-	-	-	-	-	-	-	-	-	-	11/03/22 01:37	6.70	530.17	-	-	-
-	-	-	-	-	-	11/03/22 03:08	5.45	530.90	-	-	-	-	-	-	11/03/22 03:27	6.71	530.16	-	-	-
11/03/22 05:26	10.57	528.17	-	-	-	-	-	-	-	-	-	-	-	-	11/03/22 05:37	6.73	530.14	-	-	-
-	-	-	11/03/22 08:34	21.10	21.10	11/03/22 08:12	5.48	530.87	11/03/22 08:50	26.51	512.61	-	-	-	11/03/22 08:58	6.80	530.07	11/03/22 08:44	23.53	512.6

Created By: RAC 11/8/22
Checked By: AMC 12/12/22

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 2
HW-1 Constant Rate Pumping Test
Water Level Measurements

Monitoring wells with pressure transducers																				
B-17 (casing el.= 538.74')			BR-106 (casing el.= 535.74')			BR-5A (casing el.= 536.35')			BR-7A (casing el.= 539.12')			BR-111D (casing el.= 540.34')			MW-127 (casing el.= 536.87')			PW-13 (casing el.= 536.13')		
Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.
11/03/22 10:13	10.62	528.12	-	-	-	11/03/22 09:41	5.50	530.85	-	-	-	-	-	-	11/03/22 10:07	6.80	530.07	-	-	-
-	-	-	11/03/22 11:26	21.11	514.63	-	-	-	11/03/22 11:38	26.50	512.62	11/03/22 12:49	28.97	511.37	11/03/22 11:46	6.78	530.09	11/03/22 11:33	23.48	512.65
11/03/22 13:37	10.63	528.11	-	-	-	11/03/22 13:29	5.48	530.87	-	-	-	-	-	-	11/03/22 13:58	6.77	530.1	-	-	-
-	-	-	11/03/22 16:56	21.10	514.64	-	-	-	11/03/22 17:19	26.40	512.72	-	-	-	11/03/22 17:26	6.75	530.12	11/03/22 17:09	23.41	512.72
-	-	-	-	-	-	11/03/22 19:14	5.48	530.87	-	-	-	-	-	-	11/03/22 19:35	6.78	530.09	-	-	-
11/03/22 21:17	10.69	528.05	-	-	-	-	-	-	-	-	-	-	-	-	11/03/22 21:26	6.78	530.09	-	-	-
-	-	-	-	-	-	11/03/22 23:00	5.50	530.85	-	-	-	-	-	-	11/03/22 23:20	6.78	530.09	-	-	-
11/04/22 01:14	10.72	528.02	-	-	-	-	-	-	-	-	-	-	-	-	11/04/22 01:25	6.79	530.08	-	-	-
-	-	-	-	-	-	11/04/22 03:05	5.48	530.87	-	-	-	-	-	-	11/04/22 03:27	6.80	530.07	-	-	-
11/04/22 05:20	10.75	527.99	-	-	-	-	-	-	-	-	-	-	-	-	11/04/22 05:32	6.81	530.06	-	-	-
-	-	-	11/04/22 08:30	21.10	514.64	11/04/22 08:07	5.50	530.85	11/04/22 08:46	26.50	512.62	-	-	-	11/04/22 08:57	6.85	530.02	11/04/22 08:40	23.50	512.63
11/04/22 09:48	10.88	527.86	-	-	-	11/04/22 09:19	5.52	530.83	-	-	-	-	-	-	11/04/22 09:43	6.88	529.99	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	11/04/22 10:41	29.12	511.22	11/04/22 11:17	6.85	530.02	-	-	-

Notes:
DTW = Depth to Water below measuring point
GW EL. = Groundwater Elevation (calculated)
*The connection to the pressure transducer in well MW-127 was damaged so manual readings were collected on a regular interval to ensure data was collected
- = No measurement taken
No manual measurements were collected on monitoring wells with transducers on overnight shift

Created By: RAC 11/8/22
Checked By: AMC 12/12/22

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 2
HW-1 Constant Rate Pumping Test
Water Level Measurements

Monitoring wells with pressure transducers

PW-15 (casing el.= 538.32')			PW-16 (casing el.= 539.32')			PZ-102 (casing el.= 540.89')			PZ-103 (casing el.= 540.20')			PZ-104 (casing el.= 536.85')			PZ=106 (casing el.= 537.24')			PZ-109 (casing el.= 538.59')		
Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.
10/31/22 10:37	6.86	531.46	10/31/22 09:51	15.68	523.64	10/31/22 08:59	18.68	522.21	10/31/22 09:21	14.61	525.59	10/31/22 09:27	17.08	519.77	10/31/22 10:23	8.92	528.32	10/31/22 10:34	7.16	531.43
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/31/22 13:00	7.04	531.28	10/31/22 12:27	15.60	523.72	-	-	-	-	-	-	-	-	-	10/31/22 13:03	9.29	527.95	10/31/22 12:59	7.16	531.43
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/31/22 18:12	7.38	530.94	10/31/22 19:30	15.50	523.82	-	-	-	-	-	-	-	-	-	10/31/22 18:09	9.43	527.81	10/31/22 18:11	7.48	531.11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/31/22 22:41	7.58	530.74	10/31/22 21:29	15.45	523.87	-	-	-	-	-	-	-	-	-	10/31/22 21:40	9.52	527.72	10/31/22 22:39	7.67	530.92
-	-	-	10/31/22 23:31	15.55	523.77	-	-	-	-	-	-	-	-	-	10/31/22 23:42	9.59	527.65	-	-	-
11/01/22 01:30	7.68	530.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/01/22 01:28	7.80	530.79
-	-	-	11/01/22 03:17	15.58	523.74	-	-	-	-	-	-	-	-	-	11/01/22 03:30	9.65	527.59	-	-	-
11/01/22 05:48	7.89	530.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/01/22 05:46	7.96	530.63
-	-	-	11/01/22 07:20	15.58	523.74	-	-	-	-	-	-	-	-	-	11/01/22 07:32	9.75	527.49	-	-	-
11/01/22 10:18	8.05	530.27	11/01/22 09:20	15.42	523.90	-	-	-	-	-	-	-	-	-	11/01/22 10:10	9.79	527.45	11/01/22 10:15	8.14	530.45
-	-	-	-	-	-	11/01/22 11:59	18.69	522.20	11/01/22 11:43	14.80	525.40	11/01/22 11:54	17.14	519.71	-	-	-	-	-	-
11/01/22 13:46	8.12	530.20	11/01/22 13:25	15.39	523.93	-	-	-	-	-	-	-	-	-	11/01/22 13:48	9.85	527.39	11/01/22 13:45	8.23	530.36
-	-	-	11/01/22 15:24	15.30	524.02	11/01/22 15:28	18.72	522.17	11/01/22 15:31	14.82	525.38	11/01/22 15:38	17.14	519.71	-	-	-	-	-	-
11/01/22 17:36	8.30	530.02	-	-	-	-	-	-	-	-	-	-	-	-	11/01/22 17:38	9.90	527.34	11/01/22 17:34	8.39	530.20
-	-	-	11/01/22 19:50	15.35	523.97	-	-	-	-	-	-	-	-	-	11/01/22 20:02	9.95	527.29	-	-	-
11/01/22 21:42	8.44	529.88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/01/22 21:40	8.53	530.06
-	-	-	11/01/22 23:19	15.30	524.02	-	-	-	-	-	-	-	-	-	11/01/22 23:30	10.02	527.22	-	-	-
11/02/22 01:25	8.53	529.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 01:23	8.62	529.97
-	-	-	11/02/22 03:19	15.22	524.10	-	-	-	-	-	-	-	-	-	11/02/22 03:32	10.06	527.18	-	-	-
11/02/22 05:21	8.59	529.73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 05:19	8.71	529.88
-	-	-	11/02/22 08:20	15.12	524.20	11/02/22 08:23	18.85	522.04	11/02/22 08:26	15.09	525.11	11/02/22 08:32	17.20	519.65	11/02/22 08:54	10.12	527.12	-	-	-
11/02/22 10:05	8.70	529.62	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 10:07	10.14	527.10	11/02/22 10:04	8.80	529.79
-	-	-	11/02/22 11:34	15.05	524.27	11/02/22 11:39	18.88	522.01	11/02/22 11:41	15.10	525.10	11/02/22 11:53	17.19	519.66	-	-	-	-	-	-
11/02/22 13:50	8.73	529.59	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 13:54	10.19	527.05	11/02/22 13:47	8.81	529.78
-	-	-	11/02/22 15:45	14.90	524.42	11/02/22 15:48	18.90	521.99	11/02/22 15:50	15.05	525.15	11/02/22 15:54	17.18	519.67	-	-	-	-	-	-
11/02/22 17:55	8.70	529.62	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 17:58	10.15	527.09	11/02/22 17:54	8.87	529.72
-	-	-	11/02/22 20:03	14.95	524.37	-	-	-	-	-	-	-	-	-	11/02/22 20:11	10.06	527.18	-	-	-
11/02/22 21:29	8.77	529.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/02/22 21:27	8.89	529.70
-	-	-	11/02/22 23:18	14.85	524.47	-	-	-	-	-	-	-	-	-	11/02/22 23:28	10.05	527.19	-	-	-
11/03/22 01:29	8.81	529.51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/03/22 01:28	8.91	529.68
-	-	-	11/03/22 03:21	14.80	524.52	-	-	-	-	-	-	-	-	-	11/03/22 03:30	10.16	527.08	-	-	-
11/03/22 05:30	8.83	529.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/03/22 05:28	8.95	529.64
-	-	-	11/03/22 08:23	14.94	524.38	11/03/22 08:26	18.86	522.03	11/03/22 08:29	15.04	525.16	11/03/22 08:38	17.26	519.59	11/03/22 09:03	10.18	527.06	-	-	-

Created By: RAC 11/8/22
Checked By: AMC 12/12/22

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 2
HW-1 Constant Rate Pumping Test
Water Level Measurements

Monitoring wells with pressure transducers																				
PW-15 (casing el.= 538.32')			PW-16 (casing el.= 539.32')			PZ-102 (casing el.= 540.89')			PZ-103 (casing el.= 540.20')			PZ-104 (casing el.= 536.85')			PZ=106 (casing el.= 537.24')			PZ-109 (casing el.= 538.59')		
Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.	Date & Time	DTW	GW EL.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11/03/22 10:16	8.92	529.40	-	-	-	-	-	-	-	-	-	-	-	-	11/03/22 10:18	10.18	527.06	11/03/22 10:15	9.02	529.57
-	-	-	11/03/22 11:18	14.88	524.44	11/03/22 11:21	18.83	522.06	11/03/22 11:23	15.03	525.17	11/03/22 11:30	17.20	519.65	-	-	-	-	-	-
11/03/22 13:44	8.90	529.42	-	-	-	-	-	-	-	-	-	-	-	-	11/03/22 13:48	10.18	527.06	11/03/22 13:41	9.02	529.57
-	-	-	11/03/22 15:36	14.70	524.62	11/03/22 16:49	18.81	522.08	11/03/22 16:52	15.03	525.17	11/03/22 17:00	17.18	519.67	-	-	-	-	-	-
-	-	-	11/03/22 19:26	14.75	524.57	-	-	-	-	-	-	-	-	-	11/03/22 19:38	10.17	527.07	-	-	-
11/03/22 21:21	8.93	529.39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/03/22 21:19	9.05	529.54
-	-	-	11/03/22 23:11	14.68	524.64	-	-	-	-	-	-	-	-	-	11/03/22 23:24	10.17	527.07	-	-	-
11/04/22 01:19	8.95	529.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/04/22 01:17	9.07	529.52
-	-	-	11/04/22 03:18	14.63	524.69	-	-	-	-	-	-	-	-	-	11/04/22 03:31	10.17	527.07	-	-	-
11/04/22 05:24	8.97	529.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11/04/22 05:22	9.11	529.48
-	-	-	11/04/22 08:18	14.55	524.77	11/04/22 08:23	18.81	522.08	11/04/22 08:26	14.90	525.30	11/04/22 08:36	17.20	519.65	11/04/22 08:59	10.16	527.08	-	-	-
11/04/22 09:55	8.98	529.34	-	-	-	-	-	-	-	-	-	-	-	-	11/04/22 09:58	10.16	527.08	11/04/22 09:51	9.15	529.44

Notes:
DTW = Depth to Water below measuring point
GW EL. = Groundwater Elevation (calculated)
*The connection to the pressure transducer in well MW-127 was damaged so manual readings were collected on a regular interval to ensure data was collected
- = No measurement taken
No manual measurements were collected on monitoring wells with transducers on overnight shift

Created By: RAC 11/8/22
Checked By: AMC 12/12/22

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 3:
Treatment System Evaluation Analytical Results - Constant Rate Test

Lab Sample/ Flow Data					VOC (ug/L)			SVOC (mg/L)			Metals (mg/L)		TOC (mg/L)
Sample ID	**Date**	**Time**	**Influent Volume (gal)**	**Cumulative Volume (gal)**	$MeCl_2$	$CHCl_3$	CCl_4	PY	2PCl	3PCl	Zn	Fe	
DAY 1													
AM	* Day 1 "morning" sample between 1330 and 1450												
Influent A	10/31/22	-	-	-	813	917	118	ND	110	ND	0.03	1.93	NS
GAC #1 B	10/31/22	-	-	-	7	2	ND	ND	ND	ND	0.12	NS	NS
GAC #2 C	10/31/22	-	-	-	ND	1	ND	ND	ND	ND	0.49	NS	NS
GAC# 3 D	10/31/22	-	-	-	7	ND	ND	ND	ND	ND	0.11	NS	NS
PM													
Influent E	10/31/22	17:05	11511	11511	84	1197	216	12	110	ND	0.19	NS	NS
GAC #1 F	10/31/22	17:05	11511	11511	7	2	ND	ND	ND	ND	0.10	NS	NS
GAC #2 G	10/31/22	17:05	11511	11511	6	ND	ND	ND	ND	ND	0.00	NS	NS
GAC# 3 H	10/31/22	17:05	11511	11511	6	1	ND	ND	ND	ND	0.6	NS	NS
DAY 2													
AM													
Influent A	11/1/22	11:30	17194	28705	57	925	223	13	141	6	0.24	1.59	NS
GAC #1 B	11/1/22	11:35	17194	28705	34	121	6	ND	ND	ND	0.10	NS	NS
GAC #2 C	11/1/22	11:36	17194	28705	5	ND	ND	ND	ND	ND	0.23	NS	NS
GAC# 3 D	11/1/22	11:38	17194	28705	5	1	ND	ND	ND	ND	0.05	NS	NS
Compliance Sample 1	11/1/22	11:55	-		<12.5	<5	-	<0.04	0.0832	<0.04	<0.03	NS	NS
PM													
Influent E	11/1/22	21:35	12117	40822	72	1253	306	25	201	8	0.37	NS	NS
GAC #1 F	11/1/22	21:40	12117	40822	67	500	18	14	ND	23	0.03	NS	NS
GAC #2 G	11/1/22	21:42	12117	40822	8	1	ND	ND	ND	ND	0.00	NS	NS
GAC# 3 H	11/1/22	21:45	12117	40822	5	1	ND	ND	ND	ND	0.03	NS	NS
DAY 3													
AM													
Influent A	11/2/22	11:30	16953	57775	72	1146	345	25	196	8	0.32	1.49	NS
GAC #1 B	11/2/22	11:35	16953	57775	66	745	46	26	90	ND	0.08	NS	NS
GAC #2 C	11/2/22	11:38	16953	57775	31	69	1	ND	ND	ND	0.09	NS	NS
GAC# 3 D	11/2/22	11:40	16953	57775	5	1	ND	ND	ND	ND	0.1	NS	NS
Compliance Sample 2	11/2/22	11:58	-		<12.5	<5	-	<0.04	0.172	<0.04	0.0764	NS	NS
PM													
Influent E	11/2/22	17:10	11387	69162	73	1038	356	27	227	9	0.29	NS	NS
GAC #1 F	11/2/22	17:10	11387	69162	66	842	55	21	130	5	0.07	NS	NS
GAC #2 G	11/2/22	17:10	11387	69162	59	238	2	11	6	ND	0.16	NS	NS
GAC# 3 H	11/2/22	17:10	11387	69162	5	1	ND	ND	ND	ND	0.04	NS	NS

Created By: RAC 11/8/22
Checked By: RJO 12/19/22

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 3:
Treatment System Evaluation Analytical Results - Constant Rate Test

Lab Sample/ Flow Data					VOC (ug/L)			SVOC (mg/L)			Metals (mg/L)		TOC (mg/L)
Sample ID	**Date**	**Time**	**Influent Volume (gal)**	**Cumulative Volume (gal)**	$MeCl_2$	$CHCl_3$	CCl_4	PY	2PCl	3PCl	Zn	Fe	
DAY 4													
AM													
Influent A	11/3/22	11:05	17158	86320	ND	1121	322	29	250	11	0.38	1.49	NS
GAC #1 B	11/3/22	11:07	17158	86320	ND	871	61	23	208	5	0.11	NS	NS
GAC #2 C	11/3/22	11:09	17158	86320	ND	601	7	26	34	ND	0.09	NS	NS
GAC# 3 D	11/3/22	11:10	17158	86320	ND	8	ND	ND	ND	ND	0.12	NS	NS
Compliance Sample 3	11/3/22	11:28	-		<12.5	<5	-	<0.04	0.181	<0.04	0.0402	NS	NS
PM													
Influent E	11/3/22	17:30	11525	97845	82	1122	345	16	245	10	0.28	NS	NS
GAC #1 F	11/3/22	17:32	11525	97845	70	924	81	13	219	9	0.27	NS	NS
GAC #2 G	11/3/22	17:34	11525	97845	86	800	14	28	65	ND	0.13	NS	NS
GAC# 3 H	11/3/22	17:36	11525	97845	9	1	ND	ND	ND	ND	0.19	NS	NS
DAY 5													
AM													
Influent A	11/4/22	8:30	12750	110595	82	1539	429	29	265	11	0.34	1.30	220
GAC #1 B	11/4/22	8:32	12750	110595	66	967	113	32	249	10	0.41	NS	NS
GAC #2 C	11/4/22	8:34	12750	110595	80	951	23	34	109	ND	0.13	NS	NS
GAC# 3 D	11/4/22	8:36	12750	110595	16	4	ND	ND	ND	ND	0.07	NS	380
End of Pumping	11/4/22	11:30	3545	114140	NS	NS	NS	NS	NS	NS	NS	NS	NS

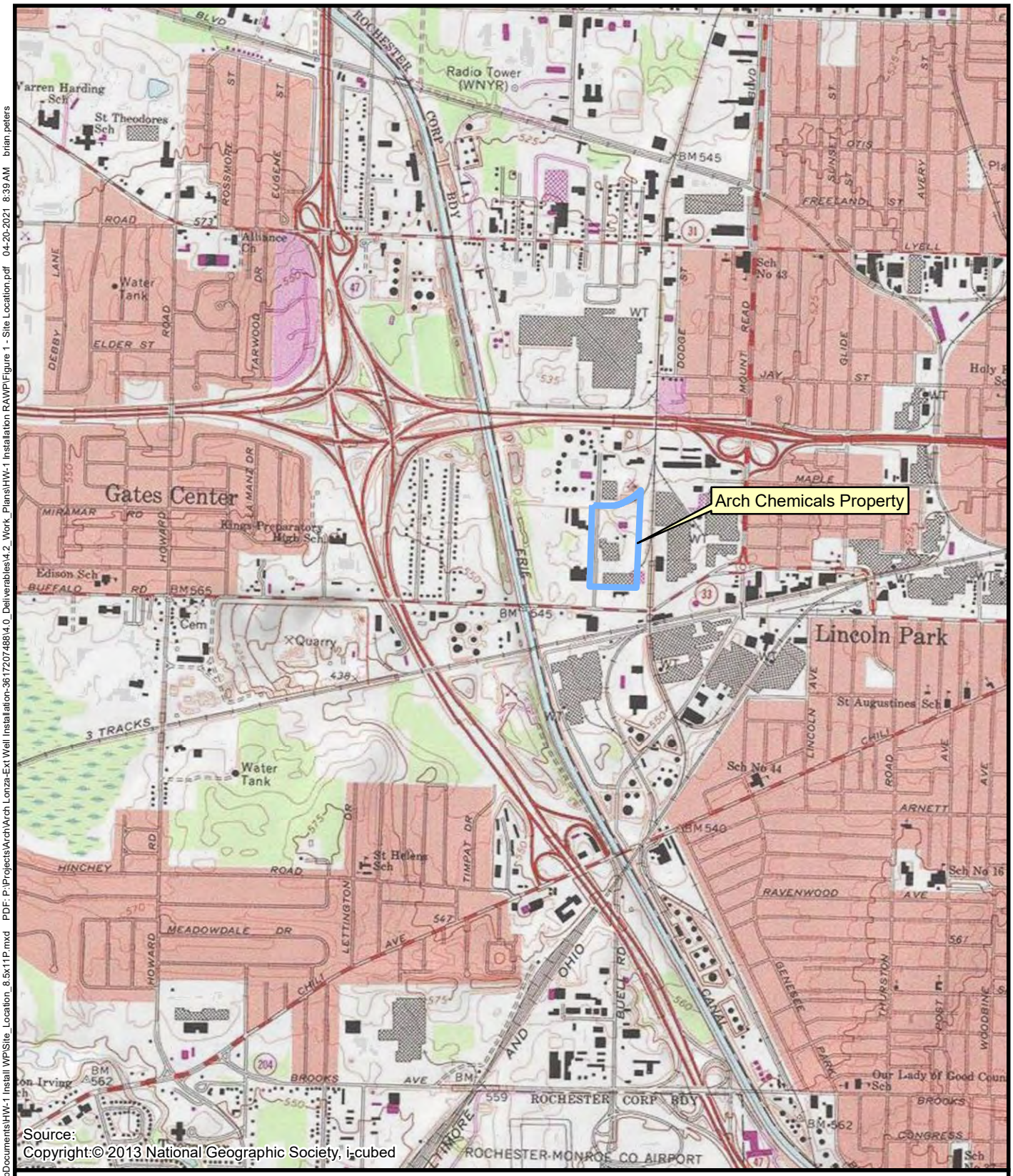
Notes:

$MeCl_2$ = Methylene chloride
$CHCl_3$ = Chloroform
CCl_4 = Carbon tetrachloride
PY = Pyridine
2PCl = 2-Chloropyridine
3PCl = 3-Chloropyridine
Zn = Zinc
Fe = Iron
TOC = Total Organic Carbon
gal = gallon
NS = Not Sampled
ND = Non-Detect
- = Data not reported

AM	Influent A	Influent sample from pump discharge
	GAC #1 B	Discharge after 1st GAC bed
	GAC #2 C	Discharge after 2nd GAC bed
	GAC #3 D	Discharge after 3rd GAC bed
PM	Influent E	Influent sample from pump discharge
	GAC #1 F	Discharge after 1st GAC bed
	GAC #2 G	Discharge after 2nd GAC bed
	GAC #3 H	Discharge after 3rd GAC bed

Created By: RAC 11/8/22
Checked By: RJO 12/19/22

Figures



Legend

Arch Property Boundary

0 1,000 2,000 Feet

N

MACTEC

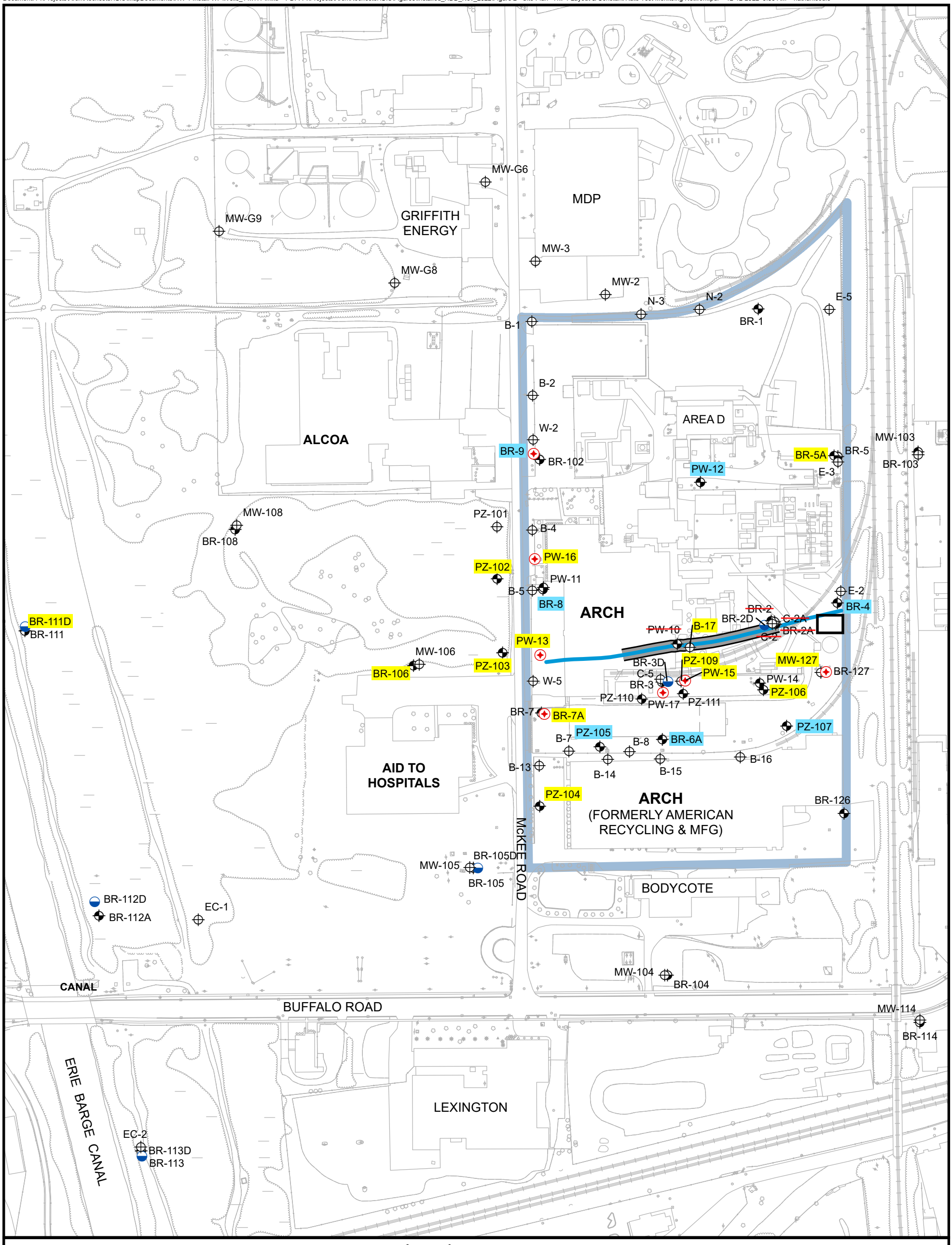
Prepared/Date: BRP 04-20-21 | Checked/Date: NMB 04-20-21

Figure 1
Site Location

Arch Chemicals
Rochester, New York

Document: P:\Projects\Arch\Rochester\GIS\MapDocuments\HW-1 Install WP\Site_Location_8.5x11P.mxd PDF: P:\Projects\Arch\Arch Lonza-Ext Well Installation-36172074881\4.0_Deliverables\4.2_Work_Plans\HW-1 Installation RAWP\Figure 1 - Site Location.pdf 04-20-2021 8:39 AM brian.peters

Document: P:\Projects\Arch\Rochester\GIS\MapDocuments\HW-1 Install WP\Wells_11x17P.mxd PDF: P:\Projects\Arch\Rochester\GIS\Figures\Installed_HDD_Nov_2022\Figure 2 - Site Plan - Hw-1 Layout & Constant Rate Test Monitoing Network.pdf 12-12-2022 9:36 AM nathan.soule



Note:
Red line strike-through of label indicates well abandoned April 2021

0 100 200 Feet

N

Legend

- Existing Extraction Well
- Overburden Monitoring Well
- Bedrock Monitoring Well
- Deep Bedrock Monitoring Well

BR-5A Water Level Monitored with Vented Pressure Transducers during constant rate pumping test

BR-6A Water level monitored manually with water level meters throughout constant rate pumping test

- Installed HDD Borehole and Well
- Approximate Well Screen Placement
- Staging Area for Carbon Bed Treatment System
- Property Owned by Arch

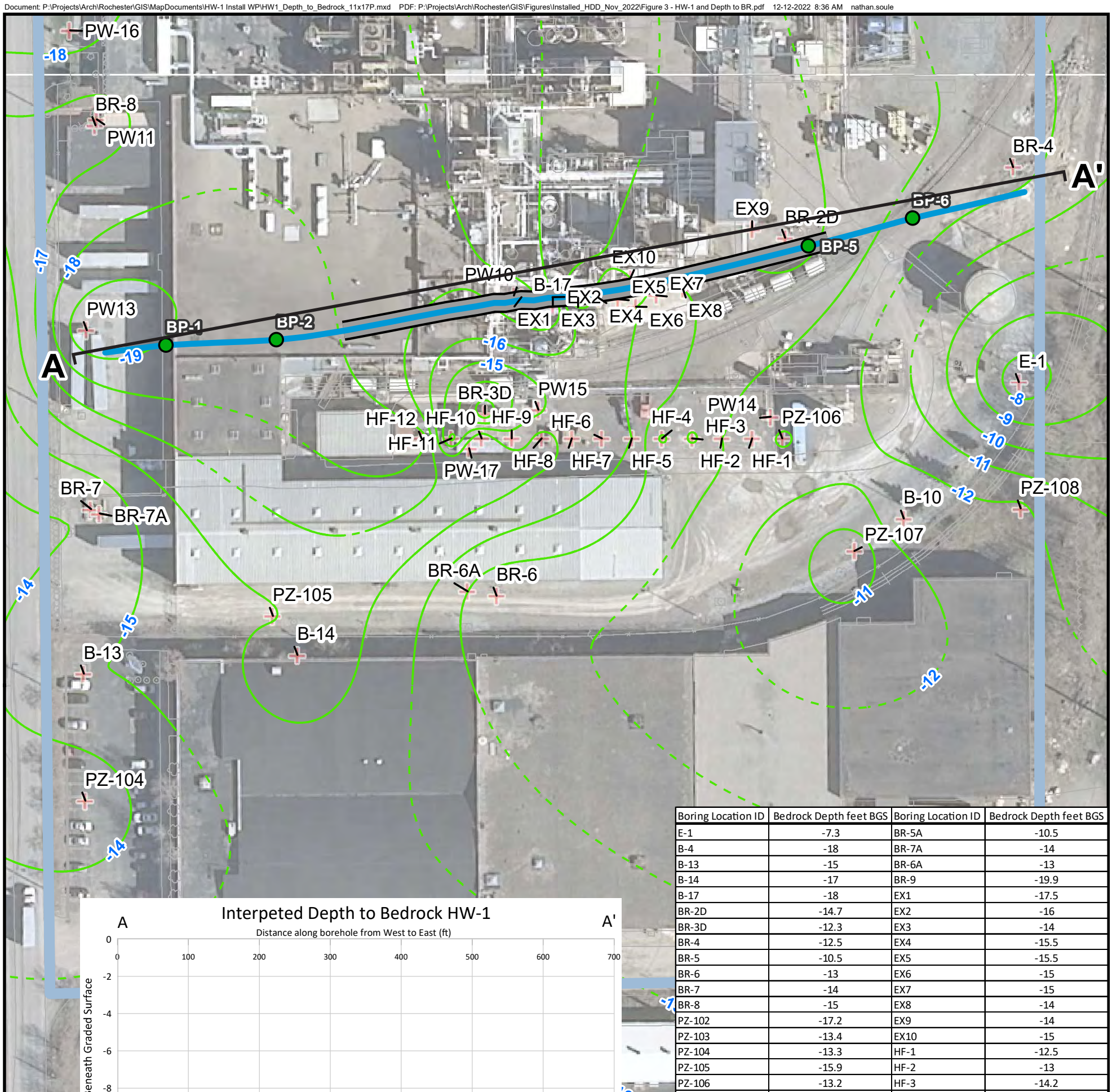
Figure 2
Site Plan - HW-1 Layout and Constant Rate Test Monitoring Network

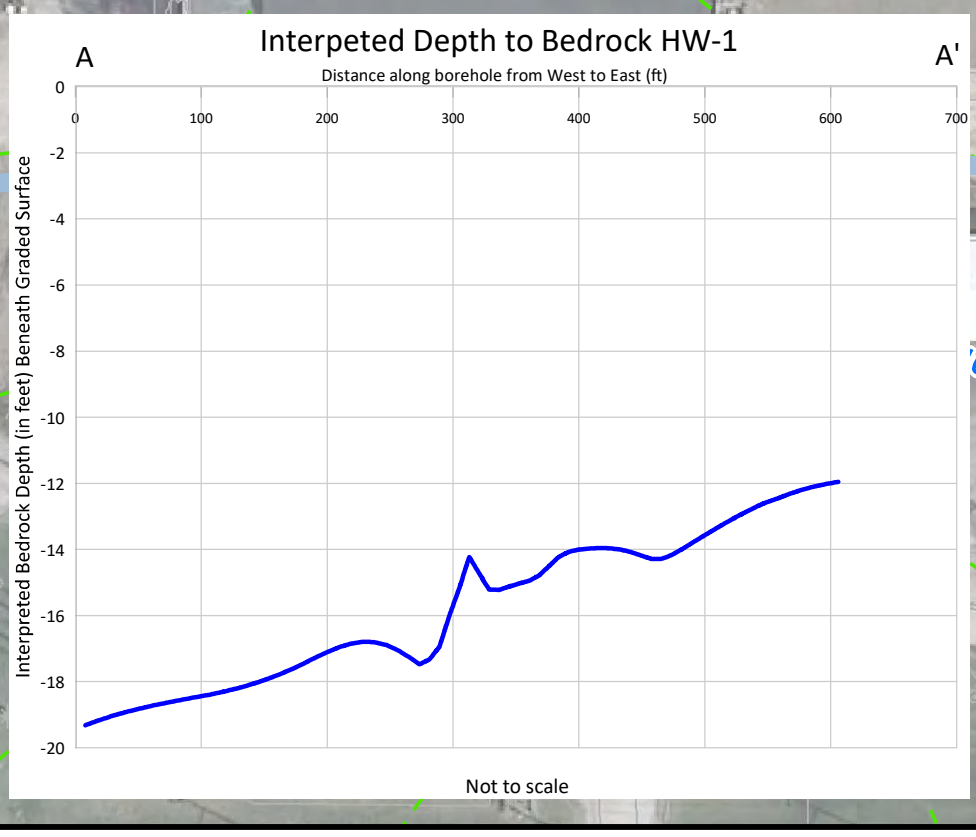
Arch Chemicals
Rochester, NY

MACTEC

Prepared/Date: RJO 12-12-22	Checked/Date: AH 1-6-23

Document: P:\Projects\Arch\Rochester\GIS\MapDocuments\HW-1 Install WP\HW1_Depth_to_Bedrock_11x17P.mxd PDF: P:\Projects\Arch\Rochester\GIS\Figures\Installed_HDD_Nov_2022\Figure 3 - HW-1 and Depth to BR.pdf 12-12-2022 8:36 AM nathan.soule





Boring Location ID	Bedrock Depth feet BGS	Boring Location ID	Bedrock Depth feet BGS
E-1	-7.3	BR-5A	-10.5
B-4	-18	BR-7A	-14
B-13	-15	BR-6A	-13
B-14	-17	BR-9	-19.9
B-17	-18	EX1	-17.5
BR-2D	-14.7	EX2	-16
BR-3D	-12.3	EX3	-14
BR-4	-12.5	EX4	-15.5
BR-5	-10.5	EX5	-15.5
BR-6	-13	EX6	-15
BR-7	-14	EX7	-15
BR-8	-15	EX8	-14
PZ-102	-17.2	EX9	-14
PZ-103	-13.4	EX10	-15
PZ-104	-13.3	HF-1	-12.5
PZ-105	-15.9	HF-2	-13
PZ-106	-13.2	HF-3	-14.2
PZ-107	-10.2	HF-4	-12.8
PZ-101	-20.4	HF-5	-15
PW12	-15.5	HF-6	-16
BR-102	-19.9	HF-7	-15.6
BR-103	-10.8	HF-8	-16.4
BR-104	-18.8	HF-9	-15.4
BR-105	-15	HF-10	-17
BR-106	-13.2	HF-11	-13.7
BR-108	-12.5	HF-12	-18.7
BR-105D	-15.4	B-10	-13
PW10	-16.5	PZ-108	-12.2
PW11	-16.5	BR-107	-16.8
PW13	-20	BP-1	-19.2
PW14	-12.5	BP-2	-22.5
PW-16	-18.5	BP-5	-12.7
PW15	-14.8	BP-6	-13
PW-17	-16.7		

Legend

- Existing Boring with Known Depth to Bedrock
- Interpreted Depth to Bedrock (ftbgs)
- Inferred Depth to Bedrock (ftbgs)
- Outline of Arch Property Boundary
- HW-1 Well Location
- Approximate Well Screen Placement
- Completed Bedrock Probe Location (April 2021)

0 25 50 75 Feet

N

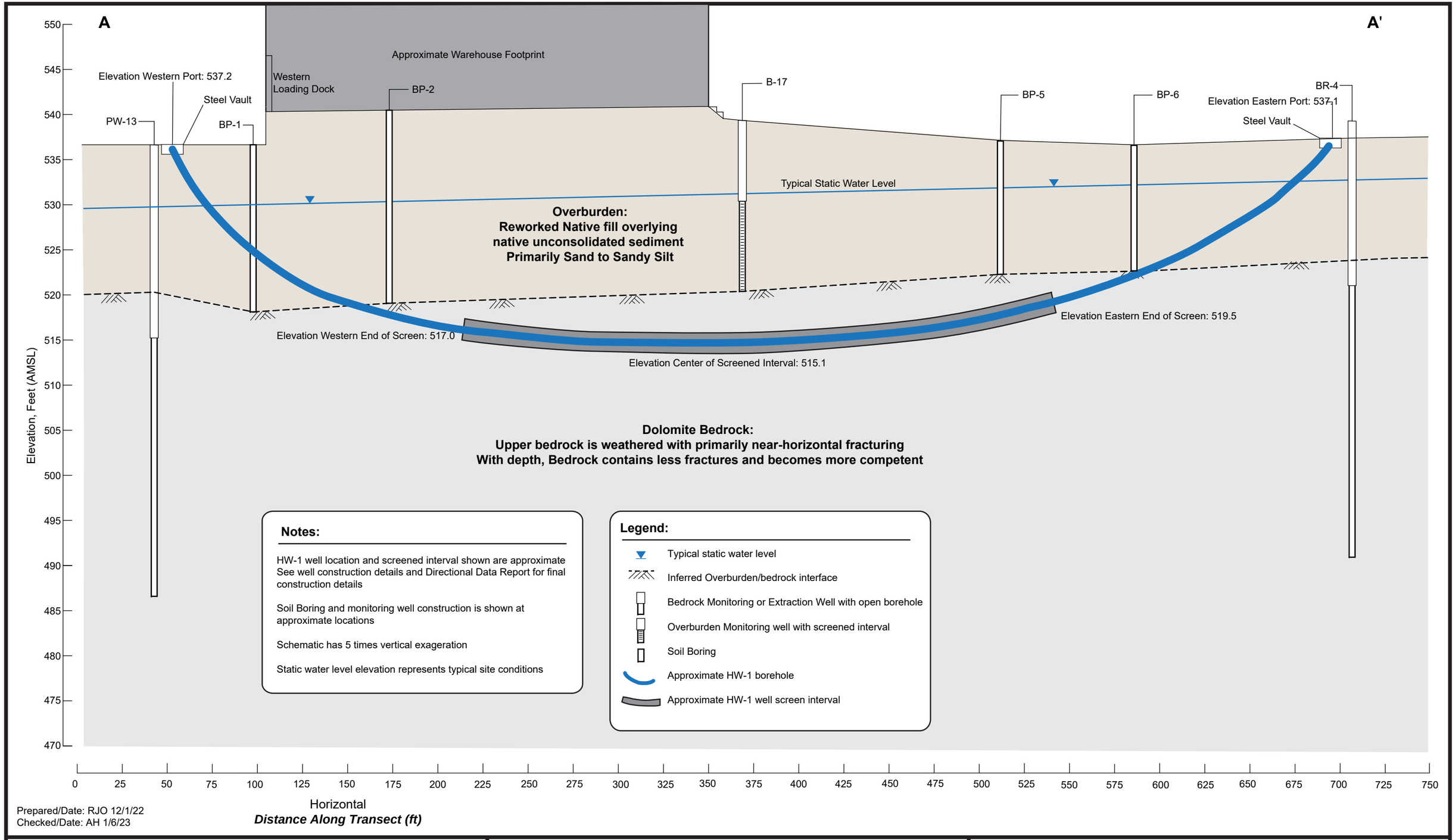
NOTES: Depth to Bedrock contoured using linear Kriging interpolation. Total number of boring locations in model reduced to minimize effects of clustering. A-A' provides transect for cross section line for Figures 4 and 5

MACTEC

Prepared/Date: RJO 12-12-22	Checked/Date: AH 1-6-23

Figure 3
HW-1 Well Location and Interpreted Depth to Bedrock Surface (feet bgs)

Arch Chemicals
Rochester, NY



Notes:

HW-1 well location and screened interval shown are approximate See well construction details and Directional Data Report for final construction details

Soil Boring and monitoring well construction is shown at approximate locations

Schematic has 5 times vertical exaggeration

Static water level elevation represents typical site conditions

Legend:

- Typical static water level
- Inferred Overburden/bedrock interface
- Bedrock Monitoring or Extraction Well with open borehole
- Overburden Monitoring well with screened interval
- Soil Boring
- Approximate HW-1 borehole
- Approximate HW-1 well screen interval

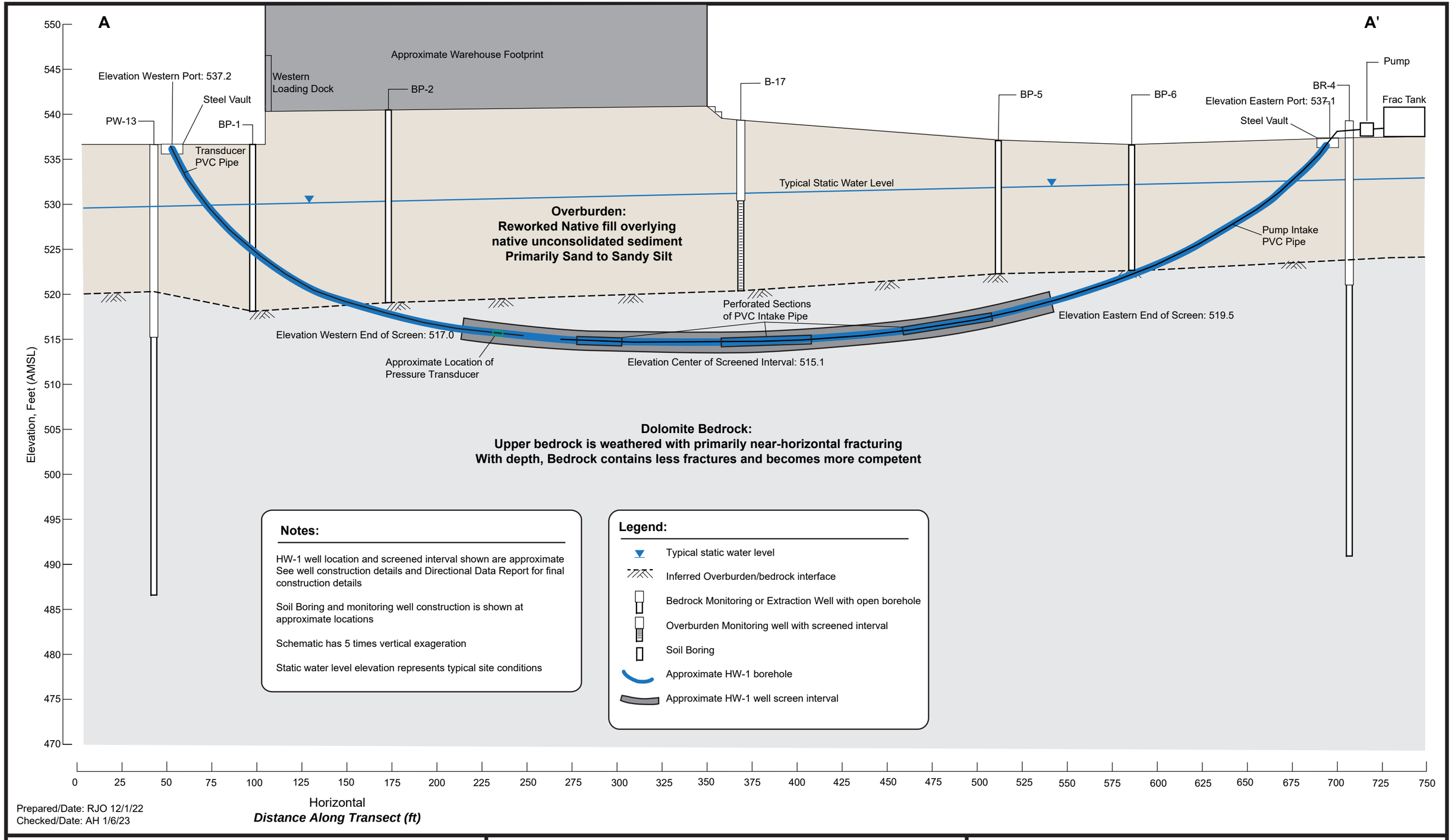
Prepared/Date: RJO 12/1/22
Checked/Date: AH 1/6/23

Arch Chemicals
Rochester, New York
Project 3616226199

MACTEC

Figure 4: HW-1 Location and Conceptual Cross Section Schematic
Horizontal Extraction Well HW-1 Installation and Completion Report
January 2023

HW-1Schematic-ArchRochesterb.ai



Notes:

HW-1 well location and screened interval shown are approximate See well construction details and Directional Data Report for final construction details

Soil Boring and monitoring well construction is shown at approximate locations

Schematic has 5 times vertical exaggeration

Static water level elevation represents typical site conditions

Legend:

- Typical static water level
- Inferred Overburden/bedrock interface
- Bedrock Monitoring or Extraction Well with open borehole
- Overburden Monitoring well with screened interval
- Soil Boring
- Approximate HW-1 borehole
- Approximate HW-1 well screen interval

Prepared/Date: RJO 12/1/22
Checked/Date: AH 1/6/23

Arch Chemicals
Rochester, New York
Project 3616226199

MACTEC

Figure 5: HW-1 Pumping Test Setup
Horizontal Extraction Well HW-1 Installation and Completion Report
January 2023

HW-1Schematic-ArchRochesterb.ai

Document: P:\Projects\Arch\Rochester\GIS\MapDocuments\HW-1 Install WP\Wells_11x17P.mxd PDF: P:\Projects\Arch\Rochester\GIS\Figures\Installed_HDD_Nov_2022\Figure 7 - 96 Hour Pumping Conditions - Interpreted GW Contour Map.pdf

MW-G6
MDP
GRIFFITH ENERGY
MW-3
MW-G8
MW-2
N-3
N-2
BR-1
E-5
B-1
B-2
AREA D
W-2
BR-9 NR
BR-102
BR-5A NR
BR-5
E-3
MW-103
BR-103
PW-12 NR
100
1,000
0.1′
10,000
1′
PZ-101
B-4
PW-16 0.4
PZ-102 NR
100,000
5′
PW-11
B-5
BR-8 0.4
E-2
BR-4 NR
10′
ARCH
BR-2D
HW-1 10.8
B-17 2.3
PZ-103 0.4
MW-106
BR-106 NR
PW-13*
PZ-109 1.8
BR-3D
MW-127 0.9
BR-127
C-5
BR-3
PW-15 1.8
PW-14
W-5
PZ-106 0.7
PZ-110
PW-17
PZ-111
BR-7
BR-7A NR
PZ-107 2.4
PZ-105 NR
BR-6A NR
10,000
B-7
B-8
B-13
B-14
B-15
B-16
AID TO HOSPITALS
PZ-104 NR
ARCH
(FORMERLY AMERICAN RECYCLING & MFG)
BR-126
1,000
McKEE ROAD
MW-105
BR-105D
BR-105
BODYCOTE

Existing Extraction Well
Overburden Monitoring Well (Not Included drawdown contour)
Bedrock Monitoring Well
Deep Bedrock Monitoring Well

NR = No Response Interpreted
* - No interpretation made for well PW-13

Legend

B-17 3.0 — Monitoring well with interpreted drawdown value in feet

BR-6A NR — Monitoring well with interpreted drawdown value in feet

Installed HDD Borehole and Well

Approximate Well Screen Placement

Interpreted drawdown contour - Dashed where inferred

*Drawdown contours overlain above Spring 2022 Iso-concentration map of select chloropyridines - as reported in November 2022

0 62.5 125 Feet

N

MACTEC

Prepared/Date: RJO 1-30-23 | Checked/Date: NB 1-30-23

Figure 6
96 Hour Pumping Conditions
Interpreted Groundwater Contour Map

Arch Chemicals
Rochester, NY

Appendix A

NYLD Infrastructure

NEW YORK LEAK DETECTION, INC.
PO Box 269 Jamesville, NY 13078
315-469-4601 info@nyld.com

Field Report – Utility Location

Date(s) on site: 3/23/21

Technician: Joe Goodfellow **Other Technicians on site:**

Customer: Wood PLC

Site Address: Arch Chemicals 100 McKee Rd. Rochester.

Contact Person: Alexander Howe **Phone:** 860-208-1926

Scope of Work: Provide pre-clearing at 7 proposed boring locations. Two of the 7 locations are within the facility to be drilled through the slab.

Type of Service: *mark all that apply*

- ☐ *Leak Detection*
- ☐ Comprehensive *Leak Survey*
- ☐ *Pressurized Pipe Inspection*
- ☐ *Infrastructure Assessment*
- ☒ *Utility Location/GPR*
- ☐ *Utility Mapping/AutoCAD*
- ☐ *EM Survey*
- ☐ *Video Inspection*
- ☐ *Valve Exercising*

Type of Equipment Used: *mark all that apply*

- ☐ *Profiler EMP 400*
- ☐ *RD8000 Pipe & Cable Locator*
- ☒ MetroTech vLocPro2
- ☐ *LC2500 Leak Correlator*
- ☒ *Noggin 250* mHz
- ☐ PosiTector UTG G3
- ☐ *S-30 Surveyor*
- ☒ Noggin 500 mHz
- ☐ *Video Inspection Camera*
- ☐ *Sonde / Locatable Rodder*
- ☒ Conquest 1000 mHz
- ☐ *Helium # Bottles*
- ☐ *Leica Robotic Total Station*
- ☐ *Leica RTK GPS*
- ☐ *JD7 Investigator*
- ☐ *Valve Maintenance Trailer*
- ☐ *Thermal Imaging Camera*
- ☐ *ZCorr Data Loggers*

Marking Used: *mark all that apply*

- ☒ *Paint*
- ☐ *Flags*
- ☒ *Chalk/Marker*
- ☐ *Tape*
- ☐ *Updated Onsite Mapping*
- ☐ *Other* _____

Site Access/Safety Training: **Expiration Date:**

Ground Cover/Weather Conditions: Pavement, concrete, gravel. Sun, 60s.

NYLD Infrastructure

NEW YORK LEAK DETECTION, INC.
PO Box 269 Jamesville, NY 13078
315-469-4601 info@nyld.com

Field Report – Utility Location

Instructions from Onsite Contact: Clear designated areas for borings.

Information Transfer:

☒ *Information relayed on site to:*

Alex Howe

In addition to this field report, mark all that apply:

☐ *Hand drawn sketch*
☒ *Photographs*
☐ *Surveyed and AutoCAD Mapping by NYLD*
☐ *Maps updated onsite*
☐ *Surveyed by others*

Notes/Testing Results:

A visual inspection was performed in the area of concern to assess for utility structures. Utilizing the MetroTech vLocPro2 in conductive, inductive and power/radio modes, located and marked out utilities as shown in the area below. Sonde/Locatable Rodder was used within applicable utilities. Additional confirmation performed with the Noggin with a 250 MHz antenna. GPR signal reception varies depending upon soil conditions. Therefore, it is utilized in combination with various other geophysical tools for the most accurate verification of known/unknown utilities and/or structures.

Located 4 borings outside, 2 borings inside.

- BP-1 - Loading Dock area McKee Rd. side. Electric conduit 3' southeast.
- BP-2 - Inside loading dock, concrete floor, mesh 5" down, concrete 8"
- BP-3 – Inside Maintenance Shop, wire mesh down 10" concrete 8"-10".
- BP-4 - Ground wire 4' north of mark.
- BP-5 - Near wells, unknow pipe 3'-4' east of mark.
- BP-6 - Outside, east area, unknown pipe 7' to the west &5' down, unknown pipe/abandoned steam line 10' to the east.
- Outside scanning was moderate to fair.

Utilities were painted in appropriate color, marked with flags and depths provided where possible.

This report is back up to information relayed and marked on site at time of service. It is for informational purposes only.

Key

Blue	Water
Red	Power
Orange	Communications
Yellow	Gas/Flammable Fuel
White	Unknown
Green	Storm/Sanitary

NYLD Infrastructure

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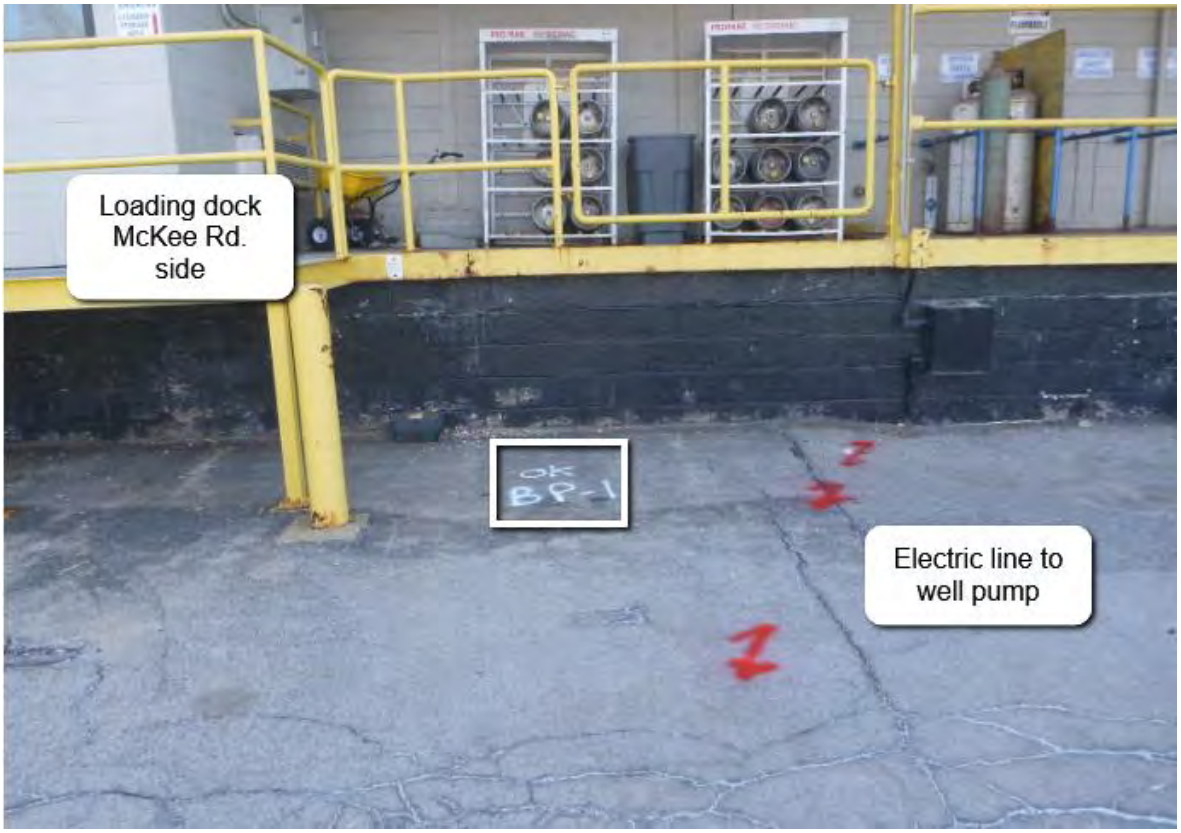
Field Report – Utility Location



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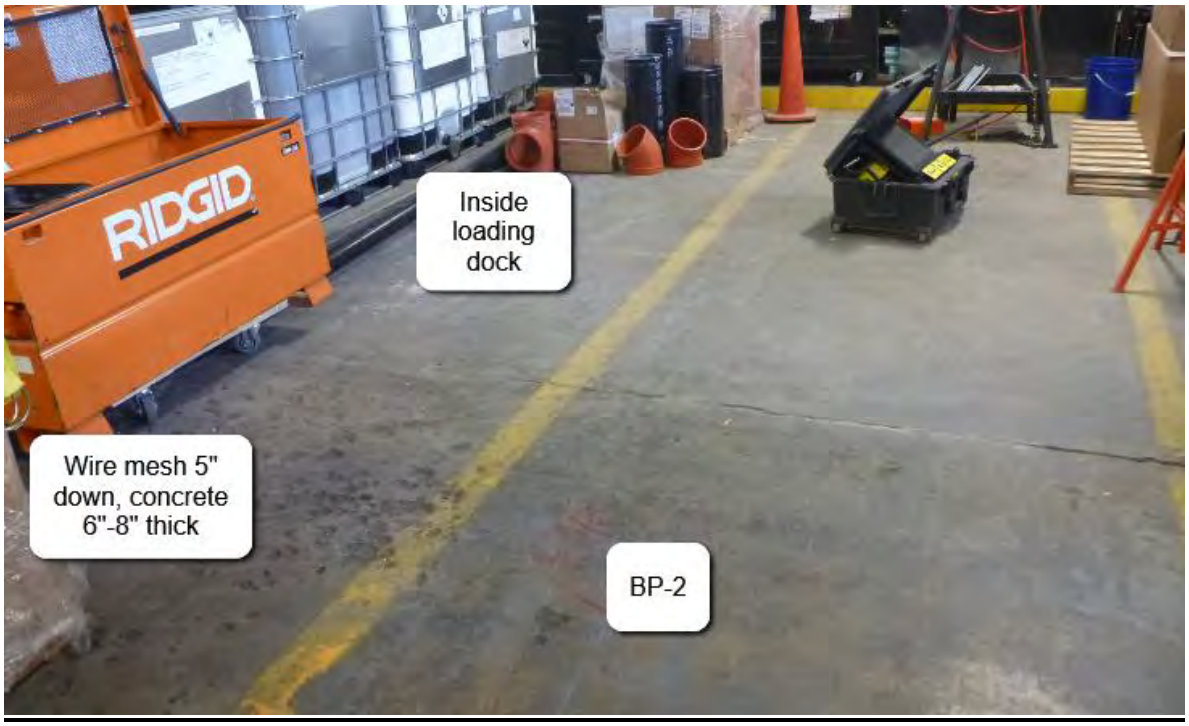
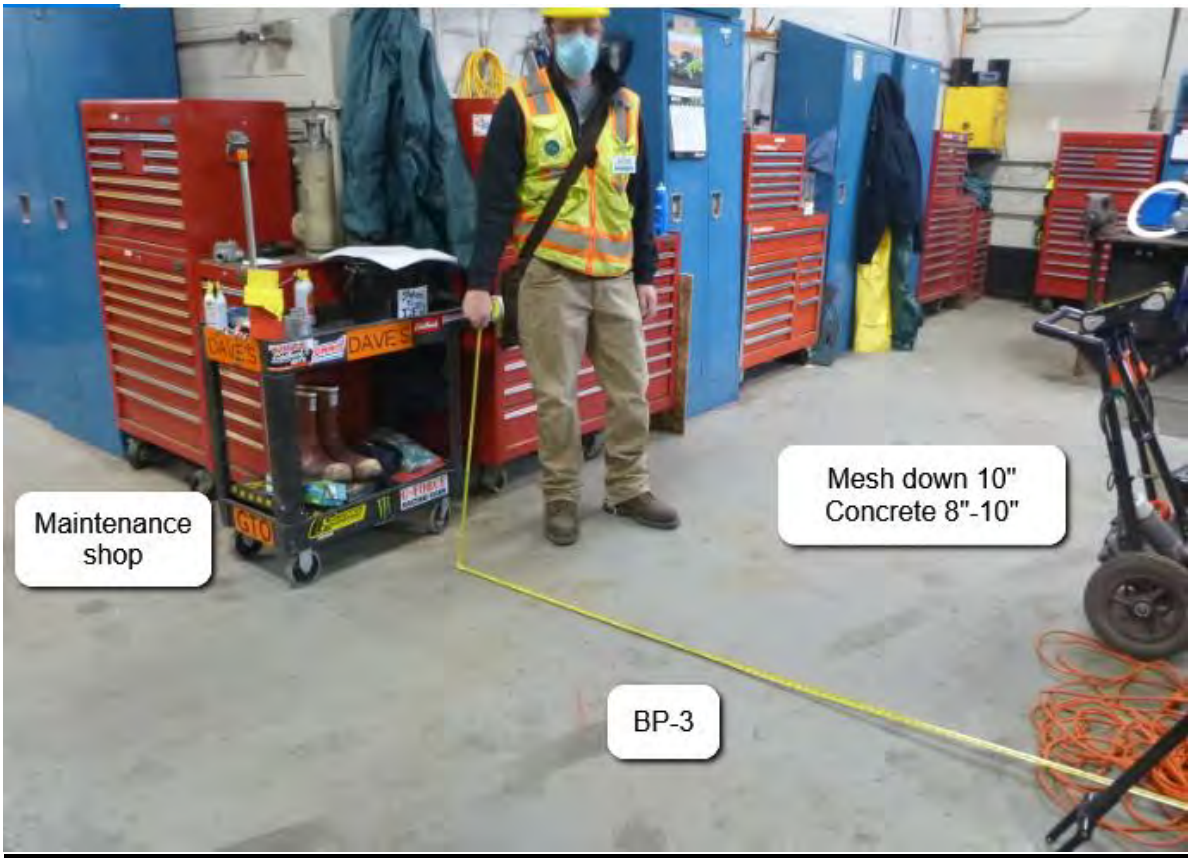
Field Report – Utility Location





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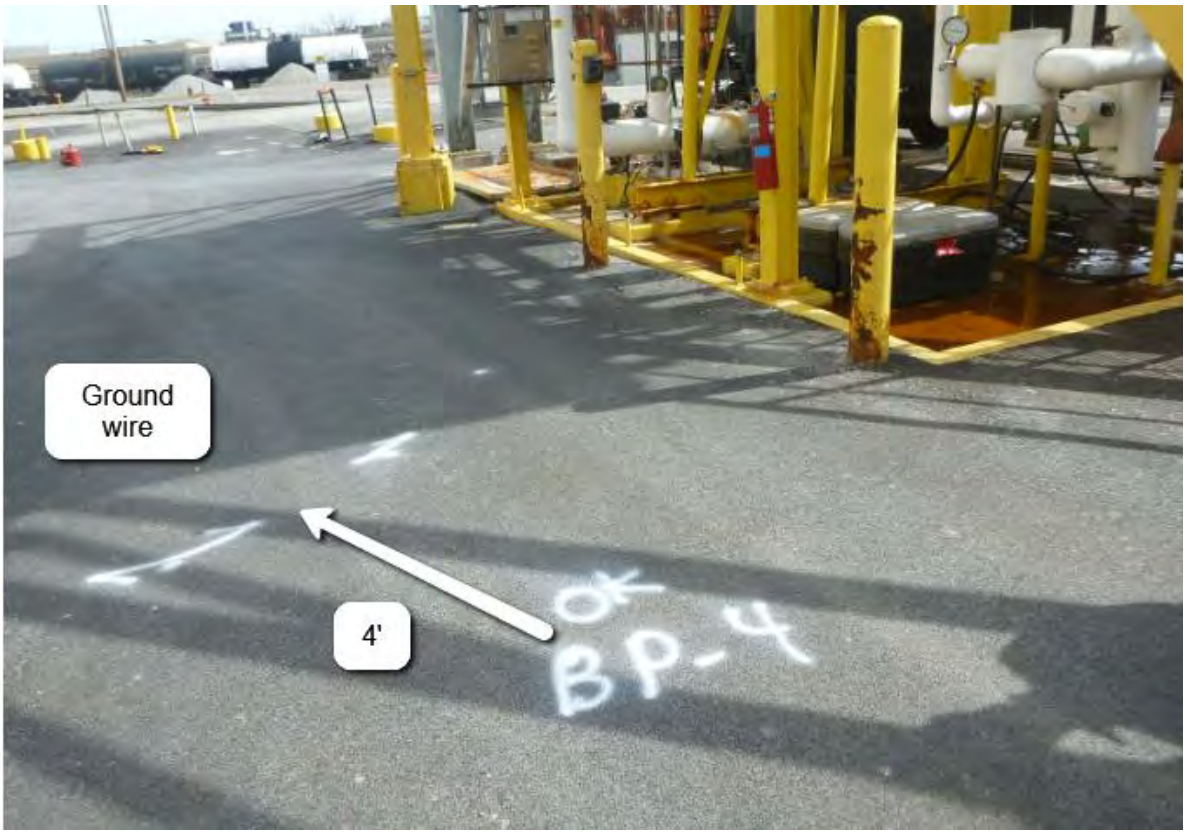
Field Report – Utility Location



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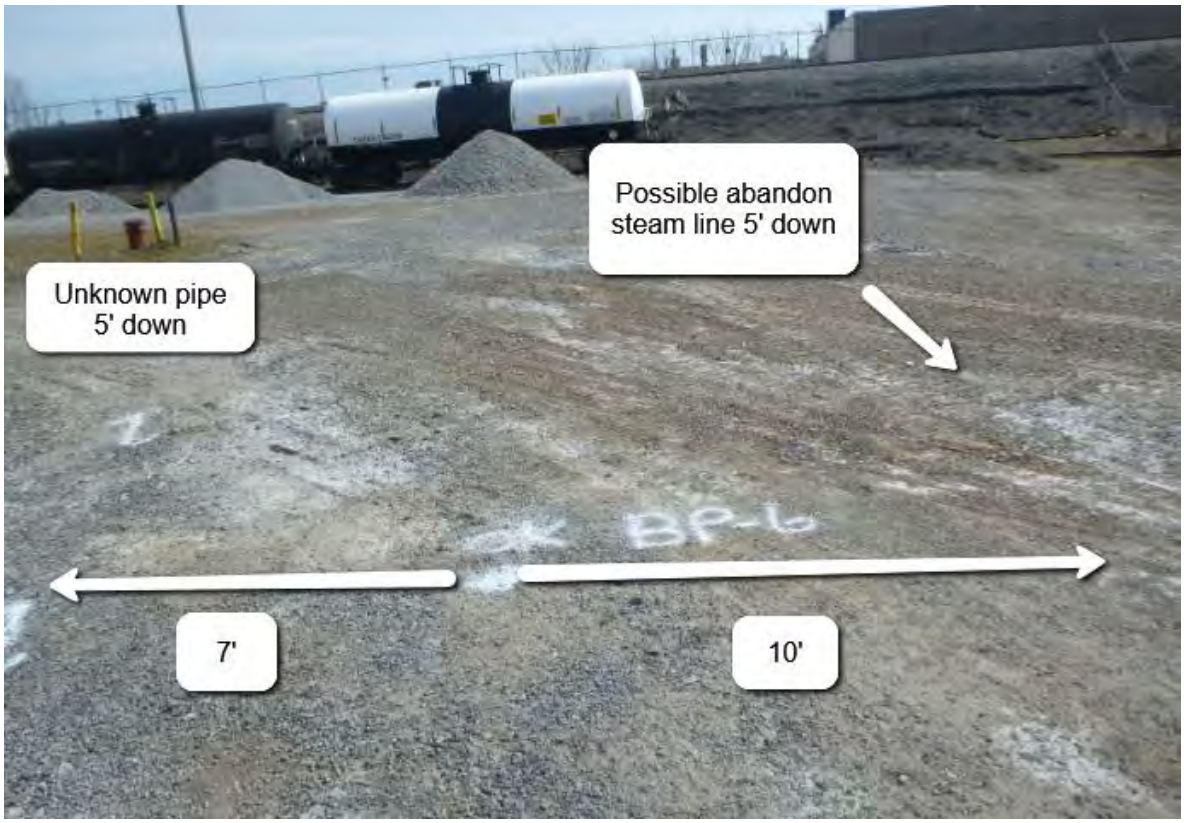
Field Report – Utility Location



NYLD Infrastructure

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Field Report – Utility Location

Subsurface Limitations

Utility locating is the art and science of using non-intrusive methods to search for, find and mark out buried, unseen conduits or other objects. There are innumerable variables involved in locating underground utilities, such as topography, size and complexity of job site, depth and proximity of buried utilities, above ground obstructions, short turnaround schedules, changes in the scope of work, lack of (or outdated) blueprints and adverse weather conditions.

New York Leak Detection, Inc. (NYLD) has made a substantial financial investment in crossover technologies and training to meet our clients' needs when locating and mapping utilities. However, due to unpredictable factors that may affect the results, NYLD makes no guarantee, expressed or implied, with respect to the completeness or accuracy of the information provided. Any use or reliance on the information or opinion is at the risk of the user and NYLD shall not be liable for any damage or injury arising out of the use or misuse of the information provided.

NYLD strives to provide the highest quality utility location services possible with the technical expertise of our field specialists and state-of-the-art equipment used. Every effort is made to provide our clients with the most accurate information possible without adverse consequences.

NYLD makes no guarantee that all subsurface utilities and obstructions will be detected. GPR signal penetration might not be sufficient to detect all utilities. NYLD is not responsible for detecting subsurface utilities and obstructions that normally cannot be detected by the methods employed or that cannot be detected because of site conditions. NYLD is not responsible for maintaining mark-outs after leaving the work area. Mark-outs made in inclement weather and in high traffic areas may not last. Surveyor assumes responsibility of picking up data on site.

Appendix B

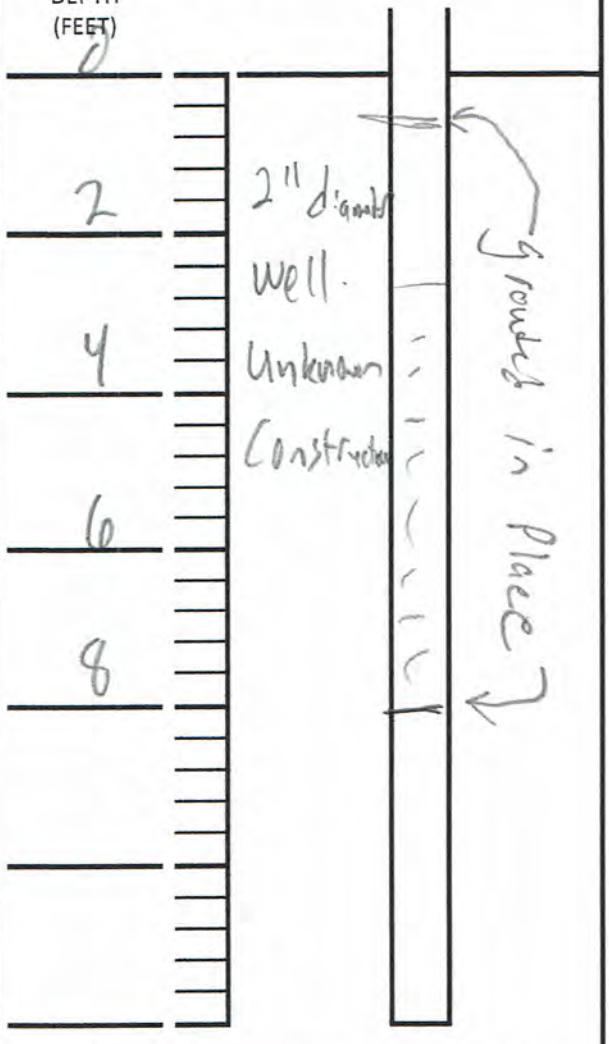
WELL DECOMMISSIONING RECORD

SITE NAME:	Arch Chemical/Lonza	WELL I.D.:	Unknown Well 1
SITE LOCATION:	100 Mckee Rochester, New York	DRILLER:	Matrix Environmental Technologies Inc.
COMPANY:	Wood PLC	INSPECTOR:	Alex Howe
		DATE:	4/20/2021

DECOMMISSIONING DATA
(Fill in all that apply)

OVERDRILLING	
INTERVAL DRILLED	
DRILLING METHOD(S)	
BOREHOLE DIA. (IN)	
TEMPORARY CASING INSTALLED? (Y/N)	
DEPTH TEMPORARY CASING INSTALLED	
CASING TYPE/DIA (IN)	
METHOD OF INSTALLING	
CASING PULLING	
METHOD EMPLOYED	
CASING RETRIEVED (FT)	
CASING TYPE/DIA (IN)	
CASING PERORATING	
EQUIPMENT USED	
NUMBER OF PERFORATIONS/FOOT	
SIZE OF PERFORATIONS	
INTERVAL PERFORATED	
GROUTING	
INTERVAL GROUTED (FBLS)	1-8
# OF BATCHES PREPARED	0.32
FOR EACH BATCH RECORD:	
QUANTITY OF WATER USED (GAL)	22
QUANTITY OF CEMENT USED (LBS)	188
CEMENT TYPE	TYPE I PORTLAND
QUANTITY OF BENTONITE USED (LBS)	8
QUANTITY OF CALCIUM CHLORIDE USED (LBS)	
VOLUME OF GROUT PREPARED (GAL)	22
VOLUME OF GROUNT USED (GAL)	7

WELL SCHEMATIC*



COMMENTS:	Casing remained in place

*Sketch all relevant decommisisoning data, including:interval overdrilled, interval grouted, casing left in hole, well stickup, etc.

DRILLING CONTRACTOR

DEPARTMENT REPRESENTATIVE

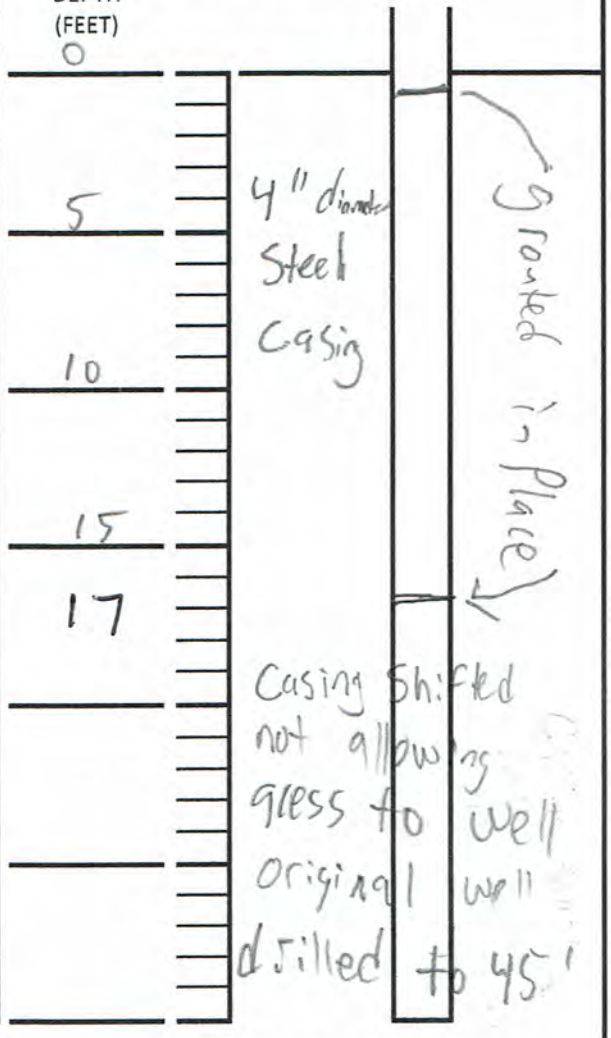
WELL DECOMMISSIONING RECORD

SITE NAME:	Arch Chemical/Lonza	WELL I.D.:	BR2
SITE LOCATION:	100 Mckee Rochester, New York	DRILLER:	Matrix Environmental Technologies Inc.
COMPANY:	Wood PLC	INSPECTOR:	Alex Howe
		DATE:	4/20/2021

DECOMMISSIONING DATA
(Fill in all that apply)

OVERDRILLING	
INTERVAL DRILLED	
DRILLING METHOD(S)	
BOREHOLE DIA. (IN)	
TEMPORARY CASING INSTALLED? (Y/N)	
DEPTH TEMPORARY CASING INSTALLED	
CASING TYPE/DIA (IN)	
METHOD OF INSTALLING	
CASING PULLING	
METHOD EMPLOYED	
CASING RETRIEVED (FT)	
CASING TYPE/DIA (IN)	
CASING PERORATING	
EQUIPMENT USED	
NUMBER OF PERFORATIONS/FOOT	
SIZE OF PERFORATIONS	
INTERVAL PERFORATED	
GROUTING	
INTERVAL GROUTED (FBLS)	1-17
# OF BATCHES PREPARED	0.5
FOR EACH BATCH RECORD:	
QUANTITY OF WATER USED (GAL)	22
QUANTITY OF CEMENT USED (LBS)	188
CEMENT TYPE	TYPE I PORTLAND
QUANTITY OF BENTONITE USED (LBS)	8
QUANTITY OF CALCIUM CHLORIDE USED (LBS)	
VOLUME OF GROUT PREPARED (GAL)	22
VOLUME OF GROUNT USED (GAL)	11

WELL SCHEMATIC*



COMMENTS: Casing remained in place
Original well was drilled to 45' deep. Looks like casing has shifted not allowing gress to well.

*Sketch all relevant decommisisoning data, including:interval overdrilled, interval grouted, casing left in hole, well stickup, etc.

DRILLING CONTRACTOR

DEPARTMENT REPRESENTATIVE

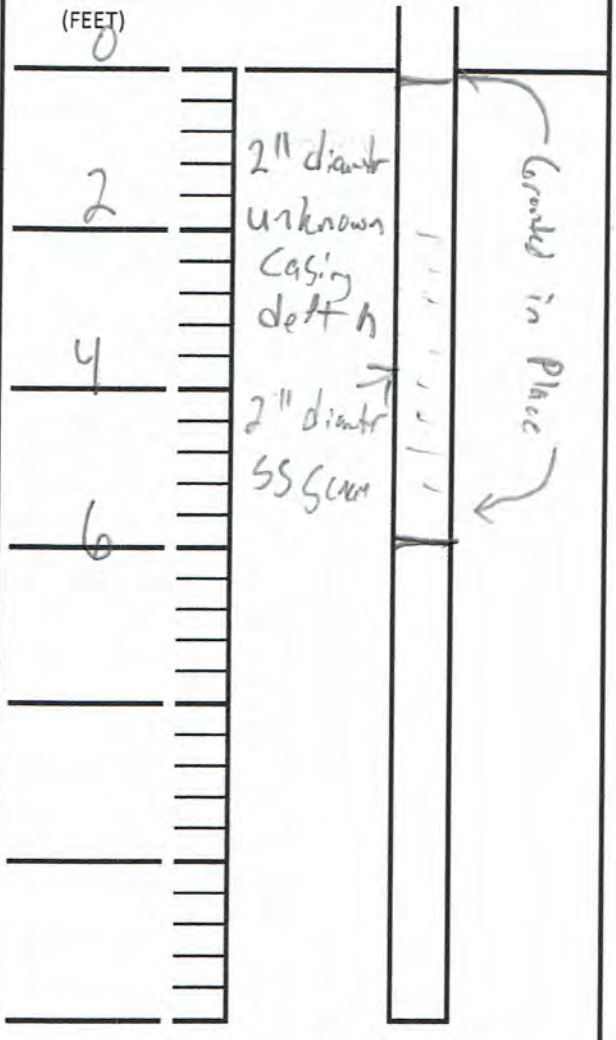
WELL DECOMMISSIONING RECORD

SITE NAME:	Arch Chemical/Lonza	WELL I.D.:	C2
SITE LOCATION:	100 Mckee Rochester, New York	DRILLER:	Matrix Environmental Technologies Inc.
COMPANY:	Wood PLC	INSPECTOR:	Alex Howe
		DATE:	4/20/2021

DECOMMISSIONING DATA
(Fill in all that apply)

OVERDRILLING				
INTERVAL DRILLED				
DRILLING METHOD(S)				
BOREHOLE DIA. (IN)				
TEMPORARY CASING INSTALLED? (Y/N)				
DEPTH TEMPORARY CASING INSTALLED				
CASING TYPE/DIA (IN)				
METHOD OF INSTALLING				
CASING PULLING				
METHOD EMPLOYED				
CASING RETRIEVED (FT)				
CASING TYPE/DIA (IN)				
CASING PERORATING				
EQUIPMENT USED				
NUMBER OF PERFORATIONS/FOOT				
SIZE OF PERFORATIONS				
INTERVAL PERFORATED				
GROUTING				
INTERVAL GROUTED (FBLS)	1-6			
# OF BATCHES PREPARED	0.14			
FOR EACH BATCH RECORD:				
QUANTITY OF WATER USED (GAL)	22			
QUANTITY OF CEMENT USED (LBS)	188			
CEMENT TYPE	TYPE I PORTLAND			
QUANTITY OF BENTONITE USED (LBS)	8			
QUANTITY OF CALCIUM CHLORIDE USED (LBS)				
VOLUME OF GROUT PREPARED (GAL)	22			
VOLUME OF GROUNT USED (GAL)	3			

WELL SCHEMATIC*



COMMENTS:	Casing remained in place

*Sketch all relevant decommisisoning data, including:interval overdrilled, interval grouted, casing left in hole, well stickup, etc.

DRILLING CONTRACTOR

DEPARTMENT REPRESENTATIVE

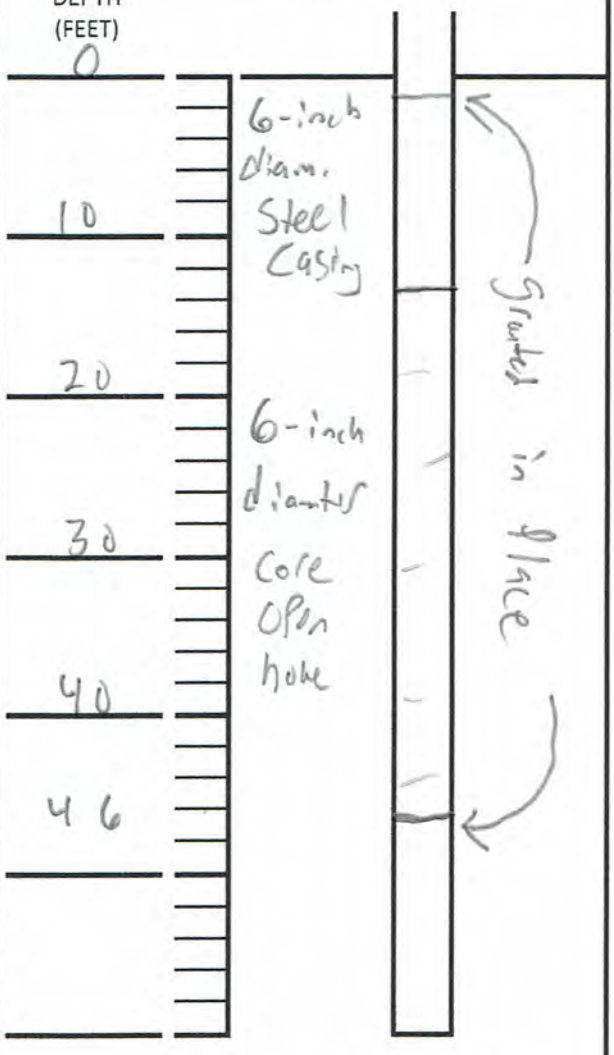
WELL DECOMMISSIONING RECORD

SITE NAME:	Arch Chemical/Lonza	WELL I.D.:	BR2A
SITE LOCATION:	100 Mckee Rochester, New York	DRILLER:	Matrix Environmental Technologies Inc.
COMPANY:	Wood PLC	INSPECTOR:	Alex Howe
		DATE:	4/20/2021

DECOMMISSIONING DATA
(Fill in all that apply)

OVERDRILLING				
INTERVAL DRILLED				
DRILLING METHOD(S)				
BOREHOLE DIA. (IN)				
TEMPORARY CASING INSTALLED? (Y/N)				
DEPTH TEMPORARY CASING INSTALLED				
CASING TYPE/DIA (IN)				
METHOD OF INSTALLING				
CASING PULLING				
METHOD EMPLOYED				
CASING RETRIEVED (FT)				
CASING TYPE/DIA (IN)				
CASING PERORATING				
EQUIPMENT USED				
NUMBER OF PERFORATIONS/FOOT				
SIZE OF PERFORATIONS				
INTERVAL PERFORATED				
GROUTING				
INTERVAL GROUTED (FBLS)	1-46			
# OF BATCHES PREPARED	3.18			
FOR EACH BATCH RECORD:				
QUANTITY OF WATER USED (GAL)	88			
QUANTITY OF CEMENT USED (LBS)	376			
CEMENT TYPE	TYPE I PORTLAND			
QUANTITY OF BENTONITE USED (LBS)	32			
QUANTITY OF CALCIUM CHLORIDE USED (LBS)				
VOLUME OF GROUT PREPARED (GAL)	88			
VOLUME OF GROUNT USED (GAL)	70			

WELL SCHEMATIC*



COMMENTS:	Casing remained in place

*Sketch all relevant decommisisoning data, including:interval overdrilled, interval grouted, casing left in hole, well stickup, etc.

DRILLING CONTRACTOR

DEPARTMENT REPRESENTATIVE

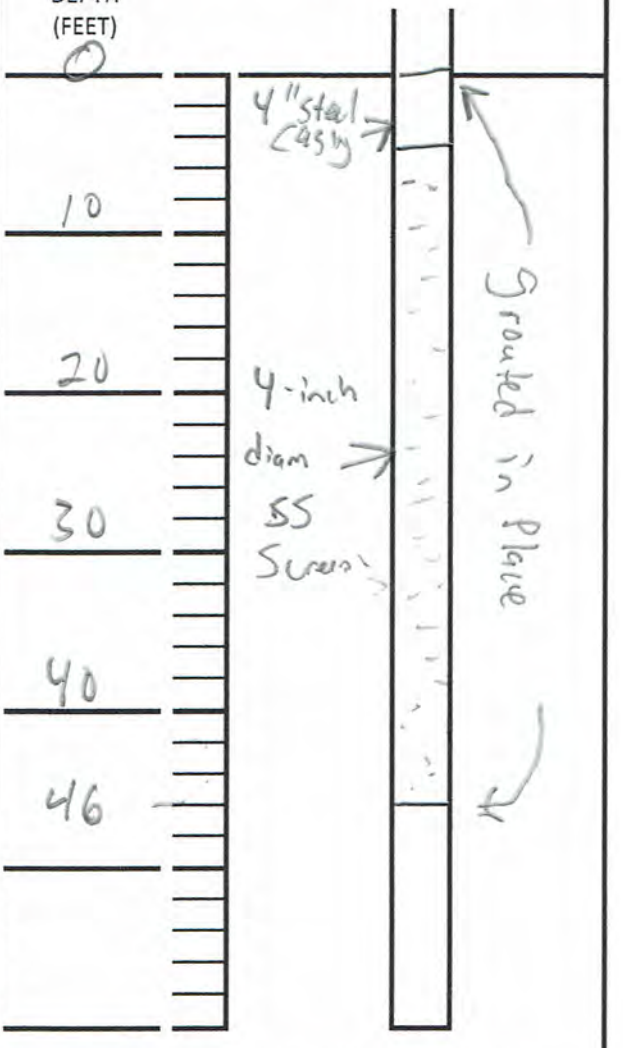
WELL DECOMMISSIONING RECORD

SITE NAME:	Arch Chemical/Lonza	WELL I.D.:	PW10
SITE LOCATION:	100 Mckee Rochester, New York	DRILLER:	Matrix Environmental Technologies Inc.
COMPANY:	Wood PLC	INSPECTOR:	Alex Howe
		DATE:	4/20/2021

DECOMMISSIONING DATA
(Fill in all that apply)

OVERDRILLING				
INTERVAL DRILLED				
DRILLING METHOD(S)				
BOREHOLE DIA. (IN)				
TEMPORARY CASING INSTALLED? (Y/N)				
DEPTH TEMPORARY CASING INSTALLED				
CASING TYPE/DIA (IN)				
METHOD OF INSTALLING				
CASING PULLING				
METHOD EMPLOYED				
CASING RETRIEVED (FT)				
CASING TYPE/DIA (IN)				
CASING PERORATING				
EQUIPMENT USED				
NUMBER OF PERFORATIONS/FOOT				
SIZE OF PERFORATIONS				
INTERVAL PERFORATED				
GROUTING				
INTERVAL GROUTED (FBLS)	1-46			
# OF BATCHES PREPARED	1.36			
FOR EACH BATCH RECORD:				
QUANTITY OF WATER USED (GAL)	44			
QUANTITY OF CEMENT USED (LBS)	188			
CEMENT TYPE	TYPE I PORTLAND			
QUANTITY OF BENTONITE USED (LBS)	16			
QUANTITY OF CALCIUM CHLORIDE USED (LBS)				
VOLUME OF GROUT PREPARED (GAL)	44			
VOLUME OF GROUNT USED (GAL)	30			

WELL SCHEMATIC*



COMMENTS: Casing remained in place

*Sketch all relevant decommisisoning data, including:interval overdrilled, interval grouted, casing left in hole, well stickup, etc.

DRILLING CONTRACTOR

DEPARTMENT REPRESENTATIVE

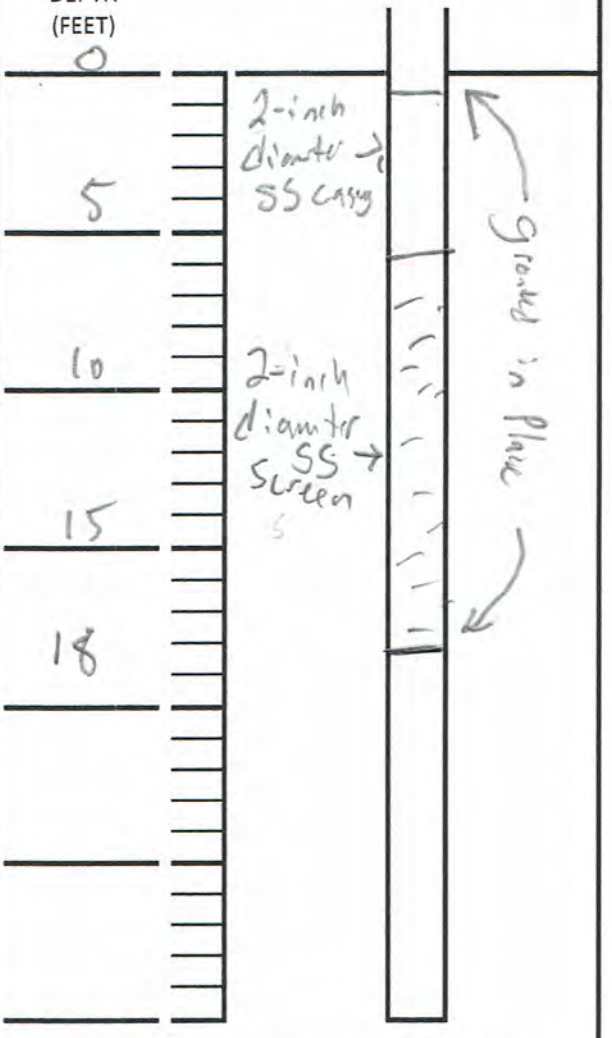
WELL DECOMMISSIONING RECORD

SITE NAME:	Arch Chemical/Lonza	WELL I.D.:	C2-A
SITE LOCATION:	100 Mckee Rochester, New York	DRILLER:	Matrix Environmental Technologies Inc.
COMPANY:	Wood PLC	INSPECTOR:	Alex Howe
		DATE:	4/20/2021

DECOMMISSIONING DATA
(Fill in all that apply)

OVERDRILLING				
INTERVAL DRILLED				
DRILLING METHOD(S)				
BOREHOLE DIA. (IN)				
TEMPORARY CASING INSTALLED? (Y/N)				
DEPTH TEMPORARY CASING INSTALLED				
CASING TYPE/DIA (IN)				
METHOD OF INSTALLING				
CASING PULLING				
METHOD EMPLOYED				
CASING RETRIEVED (FT)				
CASING TYPE/DIA (IN)				
CASING PERORATING				
EQUIPMENT USED				
NUMBER OF PERFORATIONS/FOOT				
SIZE OF PERFORATIONS				
INTERVAL PERFORATED				
GROUTING				
INTERVAL GROUTED (FBLS)	1-18			
# OF BATCHES PREPARED	0.68			
FOR EACH BATCH RECORD:				
QUANTITY OF WATER USED (GAL)	22			
QUANTITY OF CEMENT USED (LBS)	188			
CEMENT TYPE	TYPE I PORTLAND			
QUANTITY OF BENTONITE USED (LBS)	8			
QUANTITY OF CALCIUM CHLORIDE USED (LBS)				
VOLUME OF GROUT PREPARED (GAL)	22			
VOLUME OF GROUNT USED (GAL)	15			

WELL SCHEMATIC*



COMMENTS:	Casing remained in place

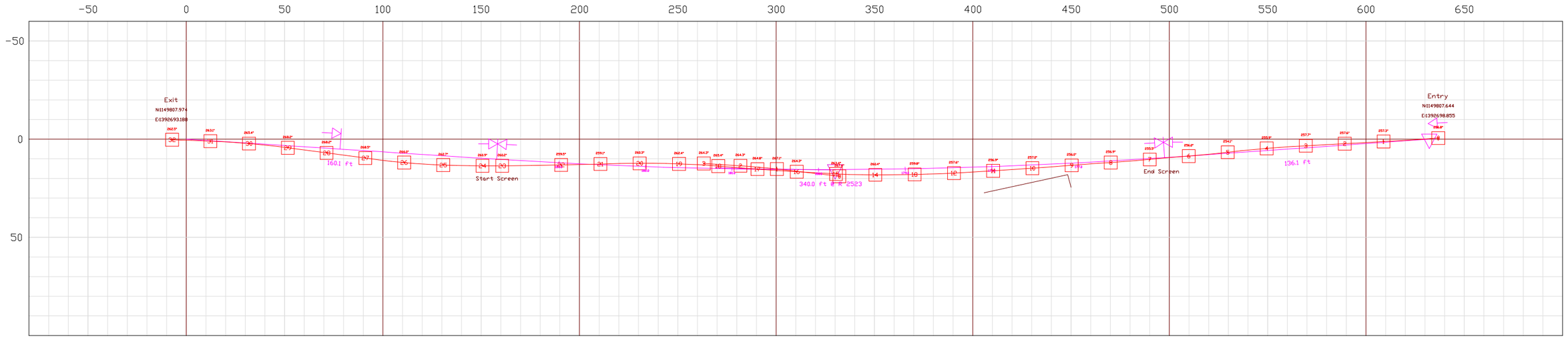
*Sketch all relevant decommisisoning data, including:interval overdrilled, interval grouted, casing left in hole, well stickup, etc.

DRILLING CONTRACTOR

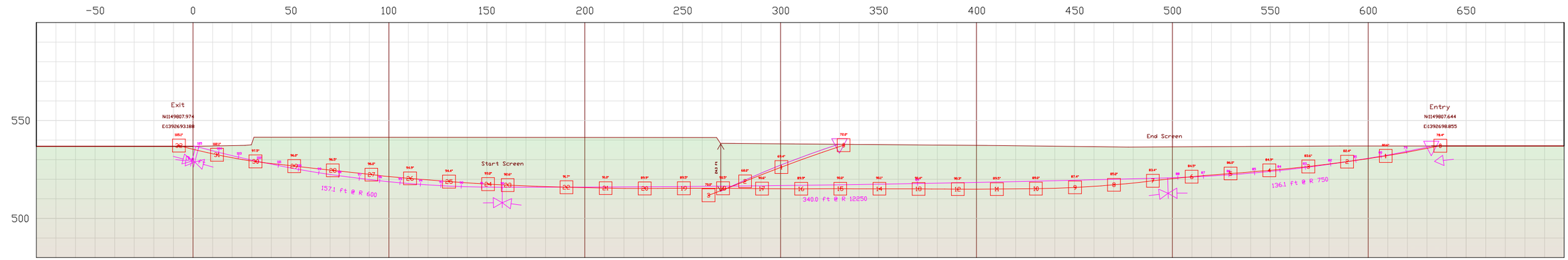
DEPARTMENT REPRESENTATIVE

Appendix C

PLAN



PROFILE



Sharewell HDD
Downhole Products & Services

Sharewell HDD
21315 W. Hardy Rd.
Houston, TX 77073

ELLINGSON DTD

Drilling Contractor:	Elllingson/DTD
Drilling Contractor Job Number:	N/A
Pipeline Owner:	Lonza
Pipeline Type:	STEEL
Pipeline Size:	6"

Job: Lonza Extraction Well	***Start Date:*** 06/03/2021	***End Date:*** 07/20/2021

Entry:	Away: -4.63 ' 11.6° Elev: 537.07'
Exit:	Away: 640.24' 15.09° Elev: 537.17'
True Pipe Length (MD):	648.37'
Horizontal Distance:	644.87'

Sharewell Job Number:	***21-096***
Field Technician:	Dillon Wilson
Designed By:	Osmin Leija
Checked By:	Rob Coyle
Approved By:	Richard Bond

Legend

- ***Power***
- ***Gas***
- ***Sewer***
- ***Fiber***

TrueGyde Steer : Directional Data Report

Job Name	21-096 EllingsonDTD Kickout	**Line Az**	80.7°
Service Company	Sharewell H.D.D.	**Customer**	Ellingson/DTD
Location	Rochester, NY	**Description**	Extraction Well
Product Size/Type	6"/Steel	**Probe S/N**	Gyro 0013

Survey	MD	CL	Station	Arc	Elev	Incl	Raw Az	Plg Az	Pilot Rad	Reamed R	DLS	DS	Probe	G Total	H Tot
Tie-In	0.00	N/A	-4.63	0.23	537.07	78.40	256.76	256.76	N/A	N/A	N/A	TI	N/A	N/A	N
1	28.37	28.37	23.27	0.41	531.90	80.60	257.31	257.31	N/A	N/A	N/A	KB	N/A	N/A	N
2	48.37	20.00	43.05	0.68	528.94	82.37	257.62	257.62	N/A	N/A	N/A	KB	N/A	N/A	N
3	68.37	20.00	62.90	1.03	526.50	83.64	257.72	257.72	N/A	N/A	N/A	KB	N/A	N/A	N
4	88.37	20.00	82.80	1.08	524.51	84.94	255.95	255.95	N/A	N/A	N/A	KB	N/A	N/A	N
5	108.37	20.00	102.73	0.51	522.92	85.95	254.10	254.10	832	970	6.88	KB	N/A	N/A	N
6	128.37	20.00	122.65	-0.06	521.26	84.48	255.96	255.96	1477	2096	3.88	KB	N/A	N/A	N
7	148.37	20.00	142.52	-0.40	519.15	83.40	255.50	255.50	5563	INF	1.03	KB	N/A	N/A	N
8	168.37	20.00	162.41	-0.69	517.13	85.04	255.50	256.92	4093	22550	1.40	KB	N/A	N/A	N
9	188.37	20.00	182.36	-1.07	515.82	87.42	255.34	255.97	2310	4295	2.48	KB	N/A	N/A	N
10	208.37	20.00	202.33	-1.59	515.20	89.03	257.02	257.02	1860	2962	3.08	KB	N/A	N/A	N
11	228.37	20.00	222.31	-2.09	514.94	89.51	257.02	256.95	1139	1475	5.03	KB	N/A	N/A	N
12	248.37	20.00	242.28	-2.65	514.91	90.31	260.00	257.62	829	994	6.91	KB	N/A	N/A	N
13	268.37	20.00	262.26	-2.87	515.03	90.39	261.00	259.77	1071	1363	5.35	KB	N/A	N/A	N
14	288.37	20.00	282.23	-2.76	515.12	90.09	260.42	260.42	2146	3759	2.67	KB	N/A	N/A	N
15	308.37	20.00	302.20	-2.18	515.13	89.99	262.88	263.39	5968	INF	0.96	KB	N/A	N/A	N
16	328.37	20.00	322.16	-1.08	515.11	89.92	264.30	264.30	13975	INF	0.41	KB	N/A	N/A	N
17	348.37	20.00	342.12	0.10	515.20	90.59	264.80	264.80	20463	INF	0.28	KB	N/A	N/A	N
18	368.37	20.00	362.09	1.32	515.39	90.49	265.41	265.41	57296	INF	0.10	KB	N/A	N/A	N
19	388.37	20.00	382.09	1.98	515.39	89.49	262.45	262.45	9549	INF	0.60	KB	N/A	N/A	N
20	408.37	20.00	402.10	1.58	515.28	89.88	259.88	260.32	52087	INF	0.11	KB	N/A	N/A	N
21	428.37	20.00	422.07	0.45	515.43	90.97	261.00	259.10	5457	INF	1.05	KB	N/A	N/A	N
22	448.37	20.00	442.01	-0.99	515.89	91.66	263.00	259.50	5355	INF	1.07	KB	N/A	N/A	N
23	478.37	30.00	471.89	-3.16	517.00	92.59	260.00	260.17	3001	5956	1.91	KB	N/A	N/A	N
24	488.37	10.00	481.85	-3.83	517.49	93.02	260.89	260.89	1623	2403	3.53	KB	N/A	N/A	N
25	508.37	20.00	501.79	-4.73	518.78	94.41	262.63	262.73	1265	1693	4.53	KB	N/A	N/A	N
26	528.37	20.00	521.72	-4.73	520.41	94.94	265.00	266.04	1443	2029	3.97	KB	N/A	N/A	N
27	548.37	20.00	541.60	-3.73	522.33	96.03	267.20	268.50	1311	1777	4.37	KB	N/A	N/A	N
28	568.37	20.00	561.44	-2.36	524.52	96.55	269.59	268.20	1302	1919	4.40	KB	N/A	N/A	N
29	588.37	20.00	581.28	-1.04	526.70	96.00	268.00	268.20	1923	3124	2.98	KB	N/A	N/A	N
30	608.37	20.00	601.12	-0.20	529.06	97.53	266.50	265.40	1836	2902	3.12	KB	N/A	N/A	N
31	628.37	20.00	620.82	-0.24	532.47	102.09	266.50	263.10	801	954	7.15	KB	N/A	N/A	N
32	648.37	20.00	640.24	-0.78	537.17	105.09	266.50	262.50	632	724	9.06	KB	N/A	N/A	N

Appendix D

LaBella
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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	6/4/2021

Weather Conditions:	Mostly Sunny no rain in the upper 70s

Drill Start Time:	3:00 PM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	
8:00 AM		8:00 AM		8:00 AM		8:00 AM	
9:00 AM		9:00 AM		9:00 AM		9:00 AM	
10:00 AM		10:00 AM		10:00 AM		10:00 AM	
11:00 AM		11:00 AM		11:00 AM		11:00 AM	
12:00 PM		12:00 PM		12:00 PM		12:00 PM	
1:00 PM		1:00 PM		1:00 PM		1:00 PM	
2:00 PM		2:00 PM		2:00 PM		2:00 PM	
3:00 PM	0.004	3:00 PM		3:00 PM		3:00 PM	
4:00 PM	0.015	4:00 PM		4:00 PM		4:00 PM	
5:00 PM	0.018	5:00 PM		5:00 PM		5:00 PM	
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	5:12 PM

Comments/Problems:	today they started drilling at 3:00 pm. They managed to get around 80 feet done today. I only ran station 1 (Drill Entry) today. When the drill bit intersected the building wall beneath the building footer you were able to feel the vibrations. Peak vibrations during this time were .074. all vibration leveles did not exced the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	6/5/2021

Weather Conditions:	Sunny, No rain, in the upper 80s

Drill Start Time:	8:13 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	
8:00 AM	0.003	8:00 AM		8:00 AM		8:00 AM	
9:00 AM	0.003	9:00 AM		9:00 AM		9:00 AM	
10:00 AM	0.002	10:00 AM		10:00 AM		10:00 AM	
11:00 AM	0.002	11:00 AM		11:00 AM		11:00 AM	
12:00 PM	0.003	12:00 PM		12:00 PM		12:00 PM	
1:00 PM	0.002	1:00 PM		1:00 PM		1:00 PM	
2:00 PM	0.003	2:00 PM		2:00 PM		2:00 PM	
3:00 PM	0.002	3:00 PM		3:00 PM		3:00 PM	
4:00 PM	0.01	4:00 PM		4:00 PM		4:00 PM	
4:45 PM	0.002	5:00 PM		5:00 PM		5:00 PM	
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	4:45 PM

Comments/Problems:	Today they started drilling at 8 AM. I only ran station 1 (Drill Entry) today. Peak vibrations throughout the day were .059. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	6/7/2021

Weather Conditions:	Sunny, upper 80s

Drill Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM	0.002	7:00 AM	0.002	7:00 AM		7:00 AM	
8:00 AM	0.002	8:00 AM	0.002	8:00 AM		8:00 AM	
9:00 AM	0.025	9:00 AM	0.002	9:00 AM		9:00 AM	
10:00 AM	0.002	10:00 AM	0.002	10:00 AM		10:00 AM	
11:00 AM	0.002	11:00 AM	0.002	11:00 AM		11:00 AM	
12:00 PM	0.002	12:00 PM	0.002	12:00 PM		12:00 PM	
1:00 PM	0.003	1:00 PM	0.002	1:00 PM		1:00 PM	
2:00 PM	0.002	2:00 PM	0.002	2:00 PM		2:00 PM	
3:00 PM	0.002	3:00 PM	0.002	3:00 PM		3:00 PM	
4:00 PM	0.005	4:00 PM	0.002	4:00 PM		4:00 PM	
5:00 PM	0.011	5:00 PM	0.002	5:00 PM		5:00 PM	
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	5:00 PM

Comments/Problems:	Today they started drilling at 7 AM. I ran Station 1 (Drill Entry) and Station 2 (Inside Building). Peak vibrations throughout the day were .231. All vicbration levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	6/8/2021

Weather Conditions:	Partial sun/partial rain, upper 70s

Drill Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM	0.003	7:00 AM	0.002	7:00 AM		7:00 AM	
8:00 AM	0.003	8:00 AM	0.002	8:00 AM		8:00 AM	
9:00 AM	0.005	9:00 AM	0.002	9:00 AM		9:00 AM	
10:00 AM	0.003	10:00 AM	0.003	10:00 AM		10:00 AM	
11:00 AM	0.002	11:00 AM	0.002	11:00 AM		11:00 AM	
12:00 PM	0.002	12:00 PM	0.002	12:00 PM		12:00 PM	
1:00 PM	0.003	1:00 PM	0.002	1:00 PM		1:00 PM	
2:00 PM	0.002	2:00 PM	0.002	2:00 PM		2:00 PM	
3:00 PM	0.002	3:00 PM	0.002	3:00 PM		3:00 PM	
3:30 PM	0.002	3:30 PM	0.002	4:00 PM		4:00 PM	
5:00 PM		5:00 PM		5:00 PM		5:00 PM	
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	3:30 PM

Comments/Problems:	Today I started the vibration monitoring at 7 AM; however, they did not drill today. I ran Station 1 (Drill Entry) and Station 2 (Inside Building). I stopped the vibration monitoring at 3:30 PM. Peak vibrations throughout the day were .025. All vicbration levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

LaBella
Powered by partnership.

Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	6/9/2021

Weather Conditions:	Upper 70 low 80s. Mostly Sunny with some clouds

Drill Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM	0.002	7:00 AM	0.002	7:00 AM		7:00 AM	
8:00 AM	0.01	8:00 AM	0.002	8:00 AM		8:00 AM	
9:00 AM	0.012	9:00 AM	0.002	9:00 AM		9:00 AM	
10:00 AM	0.007	10:00 AM	0.002	10:00 AM		10:00 AM	
11:00 AM	0.013	11:00 AM	0.002	11:00 AM		11:00 AM	
12:00 PM	0.022	12:00 PM	0.002	12:00 PM		12:00 PM	
1:00 PM	0.004	1:00 PM	0.002	1:00 PM		1:00 PM	
2:00 PM	0.009	2:00 PM	0.002	2:00 PM		2:00 PM	
3:00 PM	0.003	3:00 PM	0.002	3:00 PM		3:00 PM	
4:00 PM	0.002	4:00 PM	0.002	4:00 PM		4:00 PM	
5:00 PM		5:00 PM		5:00 PM		5:00 PM	
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	4:00 PM

Comments/Problems:	Drilled this morning. The drill got off course and they had to pull the bit back out around 1:00pm. They then decided to call it for drilling due to some complications.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	6/21/2021

Weather Conditions:	Mid 80s, sun then rain, thunder and lightening

Vibration Monitoring Start Time:	1:45 PM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	
8:00 AM		8:00 AM		8:00 AM		8:00 AM	
9:00 AM		9:00 AM		9:00 AM		9:00 AM	
10:00 AM		10:00 AM		10:00 AM		10:00 AM	
11:00 AM		11:00 AM		11:00 AM		11:00 AM	
12:00 PM		12:00 PM		12:00 PM		12:00 PM	
1:00 PM		1:00 PM		1:00 PM		1:45 PM	0.002
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	4:00 PM

Comments/Problems:	Today I started the vibration monitoring at 1:45 PM. I ran Station 4 (Track Tower). They stopped drilling due to a lightening storm. I stopped the vibration monitoring at 4:00 PM. Peak vibrations throughout the day were .006. All vibration levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	6/22/2021

Weather Conditions:	Partly sunny, high 50s/low 60s

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM		10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM		11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM		12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM		1:45 PM	0.002
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM		6:00 PM	0.002
7:00 PM		7:00 PM		7:00 PM		6:30 PM	0.002
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	6:30 PM

Comments/Problems:	Today I started the vibration monitoring at 7:00 AM. I ran Station 4 (Track Tower). I stopped the vibration monitoring at 6:30 PM. Peak vibrations throughout the day were .015. All vibration levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	6/23/2021

Weather Conditions:	Partly Cloudy with some sun. Temp in the 70s

Drill Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM		10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM		11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM		12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM		1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	4:00pm

Comments/Problems:	Drilling went smooth all day. Around 4:00pm the drilling mud started seeping out of the gound through the ashphalt near station 4. drill halted while clean up started.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	6/29/2021

Weather Conditions:	Sunny, 90's

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM	0.002	10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM	0.002	11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM	0.005	12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM	0.004	1:00 PM	0.002
2:00 PM		2:00 PM		1:30 PM	0.003	1:30 PM	0.002
3:00 PM		3:00 PM		3:00 PM	0.003	3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM	0.005	4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM	0.003	5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM	0.003	6:00 PM	0.002
7:00 PM		7:00 PM		6:30 PM	0.002	6:30 PM	0.002
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	6:30 PM

Comments/Problems:	Started Vibration Monitoring at Station 4 at 7 AM. Started Station 3 at 10 AM. Stopped both machines for lunch at 1:30 PM, and resumed at 3 PM. Drilling stopped at 6:30 PM. Peak vibration throughout the day were .012. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	6/30/2021

Weather Conditions:	Mostly sunny some clous and some rain. Lower 80s

Drill Start Time:	7:00am

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM	0.003	7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM	0.005	8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM	0.006	9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM	0.005	10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM	0.009	11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM	0.002	12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM		1:00 PM	
2:00 PM		2:00 PM		2:00 PM		2:00 PM	
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	5:30pm

Comments/Problems:	Finished vertical drill then moved rig back to the drill exit point to stsart drilling again.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	7/1/2021

Weather Conditions:	Mostly sunny some clous and some rain. Lower 80s

Drill Start Time:	7:00am

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM		10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM		11:00 AM	0.004
12:00 PM		12:00 PM		12:00 PM		12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM		1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	4:00pm

Comments/Problems:	No Comments, It was a good day

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	7/7/2021

Weather Conditions:	Rain, then sun. High 60s

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM	0.003	7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM	0.003	8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM	0.002	9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM	0.002	10:00 AM	0.003
11:00 AM		11:00 AM		11:00 AM	0.002	11:00 AM	0.003
12:00 PM		12:00 PM		12:00 PM		12:00 PM	
1:00 PM		1:00 PM		1:00 PM	0.002	1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM	0.002	2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM	0.002	3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM	0.002	4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM	0.002	5:00 PM	0.002
6:00 PM		6:00 PM		5:30 PM	0.002	5:30 PM	0.002
7:00 PM		7:00 PM		6:30 PM		6:30 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	5:30 PM

Comments/Problems:	Started Vibration Monitoring at Station 3 and 4 at 7 AM. Peak vibration throughout the day were .075. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	7/10/2021

Weather Conditions:	Mostly Sunny in the 70s

Drill Start Time:	1:00pm

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	
8:00 AM		8:00 AM		8:00 AM		8:00 AM	
9:00 AM		9:00 AM		9:00 AM		9:00 AM	
10:00 AM		10:00 AM		10:00 AM		10:00 AM	
11:00 AM		11:00 AM		11:00 AM		11:00 AM	
12:00 PM		12:00 PM		12:00 PM		12:00 PM	
1:00 PM		1:00 PM		1:00 PM		1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	5:00pm

Comments/Problems:	Installed me bit and motor and spent most of the day putting the rods back in. All vibration levels were below the .45 threshold.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	7/11/2021

Weather Conditions:	Rain most of the day in the 60s

Drill Start Time:	7:00am

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM		10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM		11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM		12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM		1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	5:00pm

Comments/Problems:	spent most of the day grinding into bedrock. All vibration levels were below the .45 threshold.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	7/12/2021

Weather Conditions:	Mid-60's, partly sunny

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM		10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM		11:00 AM	0.004
12:00 PM		12:00 PM		12:00 PM		12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM		1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM		6:00 PM	0.002
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	6:00 PM

Comments/Problems:	Started Vibration Monitoring at Station 4 at 7 AM and ended at 6 PM. Peak vibration throughout the day were .014. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	7/13/2021

Weather Conditions:	Sunny and 80's, then rain and thunderstorms

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM		10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM		11:00 AM	0.004
12:00 PM		12:00 PM		12:00 PM		12:30 PM	0.002
1:00 PM		1:00 PM		1:00 PM		1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM		6:00 PM	0.002
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	6:00 PM

Comments/Problems:	Started Vibration Monitoring at Station 4 at 7 AM and ended at 6 PM. Peak vibration throughout the day were .012. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	7/14/2021

Weather Conditions:	Mostly sunny Some rain mid 70s

Drill Start Time:	7:00am

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM	0.002	7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM	0.002	8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM	0.002	9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM	0.002	10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM	0.002	11:00 AM	0.004
12:00 PM		12:00 PM		12:00 PM	0.002	12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM	0.003	1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM	0.002	2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM	0.002	3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM	0.002	4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM	0.002	5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	5:00pm

Comments/Problems:	Peak vibration level was .042 at 11:30am. All readings were below the threshold of .45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	7/15/2021

Weather Conditions:	Mostly sunny in low 80s

Drill Start Time:	7:00am

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM	0.002	7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM	0.002	8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM	0.002	9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM	0.002	10:00 AM	0.004
11:00 AM		11:00 AM		11:00 AM	0.002	11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM	0.002	12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM	0.006	1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM	0.007	2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM	0.006	3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM	0.002	4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM	0.002	5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM	0.002	6:00 PM	0.002
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	5:30pm

Comments/Problems:	Peak levels were at .054 around 1:30pm. All readings were below the .45 Threshold.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	7/16/2021

Weather Conditions:	Partly cloudy, 70's

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM	0.002	7:00 AM	0.002	7:00 AM	
8:00 AM		8:00 AM	0.002	8:00 AM	0.002	8:00 AM	
9:00 AM		9:00 AM	0.002	9:00 AM	0.003	9:00 AM	
10:00 AM		10:00 AM	0.002	10:00 AM	0.003	10:00 AM	
11:00 AM		11:00 AM	0.002	11:00 AM	0.002	11:00 AM	
12:00 PM		12:00 PM	0.003	12:00 PM	0.002	12:00 PM	
1:00 PM		1:00 PM	0.003	1:00 PM	0.002	1:00 PM	
2:00 PM		2:00 PM	0.003	2:00 PM	0.002	2:00 PM	
3:00 PM		3:00 PM	0.002	3:00 PM	0.002	3:00 PM	
4:00 PM		4:00 PM	0.002	4:00 PM	0.002	4:00 PM	
5:00 PM		5:00 PM	0.002	5:00 PM	0.002	5:00 PM	
6:00 PM		5:30 PM	0.002	5:30 PM	0.002	6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	5:30 PM

Comments/Problems:	Started Vibration Monitoring at Station 2 and 3 at 7 AM and ended at 5:30 PM. Peak vibration throughout the day were .027. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	7/17/2021

Weather Conditions:	Heavy rain, 60s

Vibration Monitoring Start Time:	8:30 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	
8:00 AM		8:30 AM	0.003	8:30 AM	0.002	8:00 AM	
9:30 AM	0.002	9:30 AM	0.003	9:30 AM	0.002	9:00 AM	
10:00 AM	0.002	10:00 AM	0.002	10:00 AM		10:00 AM	
11:00 AM	0.006	11:00 AM	0.002	11:00 AM		11:00 AM	
12:00 PM	0.002	12:00 PM	0.002	12:00 PM		12:00 PM	
1:00 PM	0.002	1:00 PM	0.002	1:00 PM		1:00 PM	
2:00 PM	0.002	2:00 PM	0.002	2:00 PM		2:00 PM	
3:00 PM	0.002	3:00 PM	0.002	3:00 PM		3:00 PM	
4:00 PM		4:00 PM		4:00 PM		4:00 PM	
5:00 PM		5:00 PM		5:00 PM		5:00 PM	
6:00 PM		5:30 PM		5:30 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	3:00 PM

Comments/Problems:	Arrived on site at 6:30 AM while there was a heavy downpour. Driller decided to hold off starting to drill until the rain let up a bit. Started Vibration Monitoring at Station 2 and 3 at 8:30 AM. Reached a point past Station 2 at 9:30 AM, so turned on Station 1 and turned off Station 3. Ended Vibration Monitoring at 3 PM due to rain. Peak vibration throughout the day were .006. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	7/19/2021

Weather Conditions:	Sunny, 80s

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM	0.003	7:00 AM	0.002	7:00 AM		7:00 AM	
8:00 AM	0.002	8:00 AM	0.002	8:00 AM		8:00 AM	
9:00 AM	0.002	9:00 AM	0.002	9:00 AM		9:00 AM	
10:00 AM	0.002	10:00 AM	0.002	10:00 AM		10:00 AM	
11:00 AM	0.003	11:00 AM	0.003	11:00 AM		11:00 AM	
12:00 PM	0.002	12:00 PM	0.002	12:00 PM		12:00 PM	
1:00 PM	0.002	1:00 PM	0.002	1:00 PM		1:00 PM	
2:00 PM	0.002	2:00 PM	0.002	2:00 PM		2:00 PM	
3:00 PM	0.002	3:00 PM	0.003	3:00 PM		3:00 PM	
4:00 PM	0.002	4:00 PM	0.002	4:00 PM		4:00 PM	
5:00 PM	0.002	5:00 PM	0.002	5:00 PM		5:00 PM	
6:00 PM	0.002	6:00 PM	0.002	6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	6:00 PM

Comments/Problems:	Started Vibration Monitoring at Station 1 and 2 at 7:00 AM. Ended Vibration Monitoring at 6 PM. Peak vibration throughout the day were .150. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	7/20/2021

Weather Conditions:	Sunny, 80s

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM	0.002	7:00 AM	0.002	7:00 AM		7:00 AM	
8:00 AM	0.002	8:00 AM	0.002	8:00 AM		8:00 AM	
9:00 AM	0.092	9:00 AM	0.002	9:00 AM		9:00 AM	
10:00 AM	0.007	10:00 AM	0.002	10:00 AM		10:00 AM	
11:00 AM	0.002	11:00 AM	0.002	11:00 AM		11:00 AM	
12:00 PM	0.002	12:00 PM	0.002	12:00 PM		12:00 PM	
1:00 PM	0.004	1:00 PM	0.003	1:00 PM		1:00 PM	
2:00 PM	0.006	2:00 PM	0.003	2:00 PM		2:00 PM	
3:00 PM	0.007	3:00 PM	0.003	3:00 PM		3:00 PM	
3:30 PM	0.004	3:30 PM	0.002	4:00 PM		4:00 PM	
5:00 PM		5:00 PM		5:00 PM		5:00 PM	
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	3:30 PM

Comments/Problems:	Started Vibration Monitoring at Station 1 and 2 at 7:00 AM. Ended Vibration Monitoring at 3:30 PM. Peak vibration throughout the day were .104. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	DavidPaye
Date:	7/21/2021

Weather Conditions:	Mostly Sunny in the 70s

Drill Start Time:	7:00am

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM		10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM		11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM		12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM		1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.003
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	5:00pm

Comments/Problems:	Peak was .14. all readings were below the threshold of .45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	7/22/2021

Weather Conditions:	Mostly Sunny in the upper 70s

Drill Start Time:	7:00am

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.003
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM		10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM		11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM		12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM		1:00 PM	0.003
2:00 PM		2:00 PM		2:00 PM		2:00 PM	0.002
3:00 PM		3:00 PM		3:00 PM		3:00 PM	0.004
4:00 PM		4:00 PM		4:00 PM		4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM		5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	5:00pm

Comments/Problems:	Peak level was .12. all readings were below the .45 threshold.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	7/23/2021

Weather Conditions:	Sunny in the 70s

Drill Start Time:	7:00am

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM		7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM		8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM		9:00 AM	0.003
10:00 AM		10:00 AM		10:00 AM		10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM		11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM	0.002	12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM	0.002	1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM	0.002	2:00 PM	0.003
3:00 PM		3:00 PM		3:00 PM	0.004	3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM	0.002	4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM	0.004	5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM	0.002	6:00 PM	0.004
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	

Comments/Problems:	No readings above the .45 Threshold

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Moniitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	David Paye
Date:	7/24/2021

Weather Conditions:	Sunny in the 70s

Drill Start Time:	7:00am

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM		7:00 AM	0.002	7:00 AM	0.002
8:00 AM		8:00 AM		8:00 AM	0.002	8:00 AM	0.002
9:00 AM		9:00 AM		9:00 AM	0.002	9:00 AM	0.002
10:00 AM		10:00 AM		10:00 AM	0.003	10:00 AM	0.002
11:00 AM		11:00 AM		11:00 AM	0.003	11:00 AM	0.002
12:00 PM		12:00 PM		12:00 PM	0.002	12:00 PM	0.002
1:00 PM		1:00 PM		1:00 PM	0.002	1:00 PM	0.002
2:00 PM		2:00 PM		2:00 PM	0.002	2:00 PM	0.004
3:00 PM		3:00 PM		3:00 PM	0.003	3:00 PM	0.002
4:00 PM		4:00 PM		4:00 PM	0.002	4:00 PM	0.002
5:00 PM		5:00 PM		5:00 PM	0.002	5:00 PM	0.002
6:00 PM		6:00 PM		6:00 PM	0.002	6:00 PM	0.004
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Drill Stop Time:	

Comments/Problems:	No readings above the .45 Threshold

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	7/26/2021

Weather Conditions:	Sunny, 80s

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM		7:00 AM	0.003	7:00 AM	0.002	7:00 AM	
8:00 AM		8:00 AM	0.002	8:00 AM	0.002	8:00 AM	
9:00 AM		9:00 AM	0.002	9:00 AM	0.002	9:00 AM	
10:00 AM		10:00 AM	0.002	10:00 AM	0.002	10:00 AM	
11:00 AM		11:00 AM	0.002	11:00 AM	0.002	11:00 AM	
12:00 PM		12:00 PM	0.002	12:00 PM	0.002	12:00 PM	
1:00 PM		1:00 PM	0.002	1:00 PM	0.002	1:00 PM	
2:00 PM		2:00 PM	0.002	2:00 PM	0.002	2:00 PM	
3:00 PM		3:00 PM	0.002	3:00 PM	0.002	3:00 PM	
3:30 PM		3:30 PM	0.002	4:00 PM	0.002	4:00 PM	
5:00 PM		5:00 PM	0.002	5:00 PM	0.002	5:00 PM	
6:00 PM		6:00 PM	0.002	6:00 PM	0.002	6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	6:00 PM

Comments/Problems:	Started Vibration Monitoring at Station 2 and 3 at 7 AM. Ended Vibration Monitoring at 6 PM. Peak vibration throughout the day were .014. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

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Daily Report
Wood Environmental
Vibration Monitoring
Lonza - Arch - McKee Rd Rochester New York

Name:	Sara LoBello
Date:	7/27/2021

Weather Conditions:	Sunny, High 70s

Vibration Monitoring Start Time:	7:00 AM

Station 1 (Drill Entry) Unit 8658 Baseline: 0.002		Station 2 (Inside Building) Unit 8656 Baseline: 0.002		Station 3 (Loading Dock) Unit 6940 Baseline: 0.003		Station 4 (Track Tower) Unit 8655 Baseline: 0.002	
Time	**Reading**	**Time**	**Reading**	**Time**	**Reading**	**Time**	**Reading**
6:00 AM		6:00 AM		6:00 AM		6:00 AM	
7:00 AM	0.009	7:00 AM	0.003	7:00 AM		7:00 AM	
8:00 AM	0.004	8:00 AM	0.002	8:00 AM		8:00 AM	
9:00 AM	0.002	9:00 AM	0.002	9:00 AM		9:00 AM	
10:00 AM	0.01	10:00 AM	0.004	10:00 AM		10:00 AM	
11:00 AM	0.002	11:00 AM	0.002	11:00 AM		11:00 AM	
12:00 PM	0.002	12:00 PM	0.002	12:00 PM		12:00 PM	
1:00 PM	0.017	1:00 PM	0.002	1:00 PM		1:00 PM	
2:00 PM	0.004	2:00 PM	0.002	2:00 PM		2:00 PM	
3:00 PM	0.007	3:00 PM	0.002	3:00 PM		3:00 PM	
3:30 PM	0.004	3:30 PM	0.002	4:00 PM		4:00 PM	
5:00 PM	0.002	5:00 PM	0.002	5:00 PM		5:00 PM	
5:30 PM	0.002	5:30 PM	0.002	6:00 PM		6:00 PM	
7:00 PM		7:00 PM		7:00 PM		7:00 PM	
8:00 PM		8:00 PM		8:00 PM		8:00 PM	
9:00 PM		9:00 PM		9:00 PM		9:00 PM	

All units have an alarmed Threshold set to 0.45 in/s

Vibration Monitoring Stop Time:	5:30 PM

Comments/Problems:	Started Vibration Monitoring at Station 1 and 2 at 7 AM. Ended Vibration Monitoring at 5:30 PM. Peak vibration throughout the day were .080. All vibrations levels did not exceed the vibration threshold of 0.45.

Forward to Alex Howe @ alexander.howe@woodplc.com and Nelson Breton @ nelson.breton@woodplc.com

Appendix E

From: Howe, Alexander
Sent: Friday, June 4, 2021 10:22 PM
To: Breton, Nelson M.
Subject: Arch Rochester Drilling Day 1 060421
Attachments: HW-1 060421 Dust.pdf

Hi Nelson,

Below is a summary of the daily activities related to day 1 of horizontal well 1 (HW-1) installation.

Arrived onsite 06:30, held daily tailgate meeting.
Continued drill set up and staging of equipment including the following activities:

- Mud pit was cut and excavated.
- Drill set up completed
- Mud recycler was filled with water and biobore drilling mud was added to the system.

At 1500 drilling commenced and continued through 1730. Approximately 80 feet of progress was complete into the warehouse.

The CAMP was set up and run from 0830 – 1730. No exceedances of dust action limits were noted. Down wind PID and work area PID did not register readings through out the day. Attached is a graph of the upwind and downwind dust monitors. Down wind was positioned to the North of the drilling area, up wind was positioned in the South of the drilling area. It should be noted that the majority of dust readings were likely directly associated with traffic on the road and not from drilling activities.

Let me know if you have any questions!

Alex

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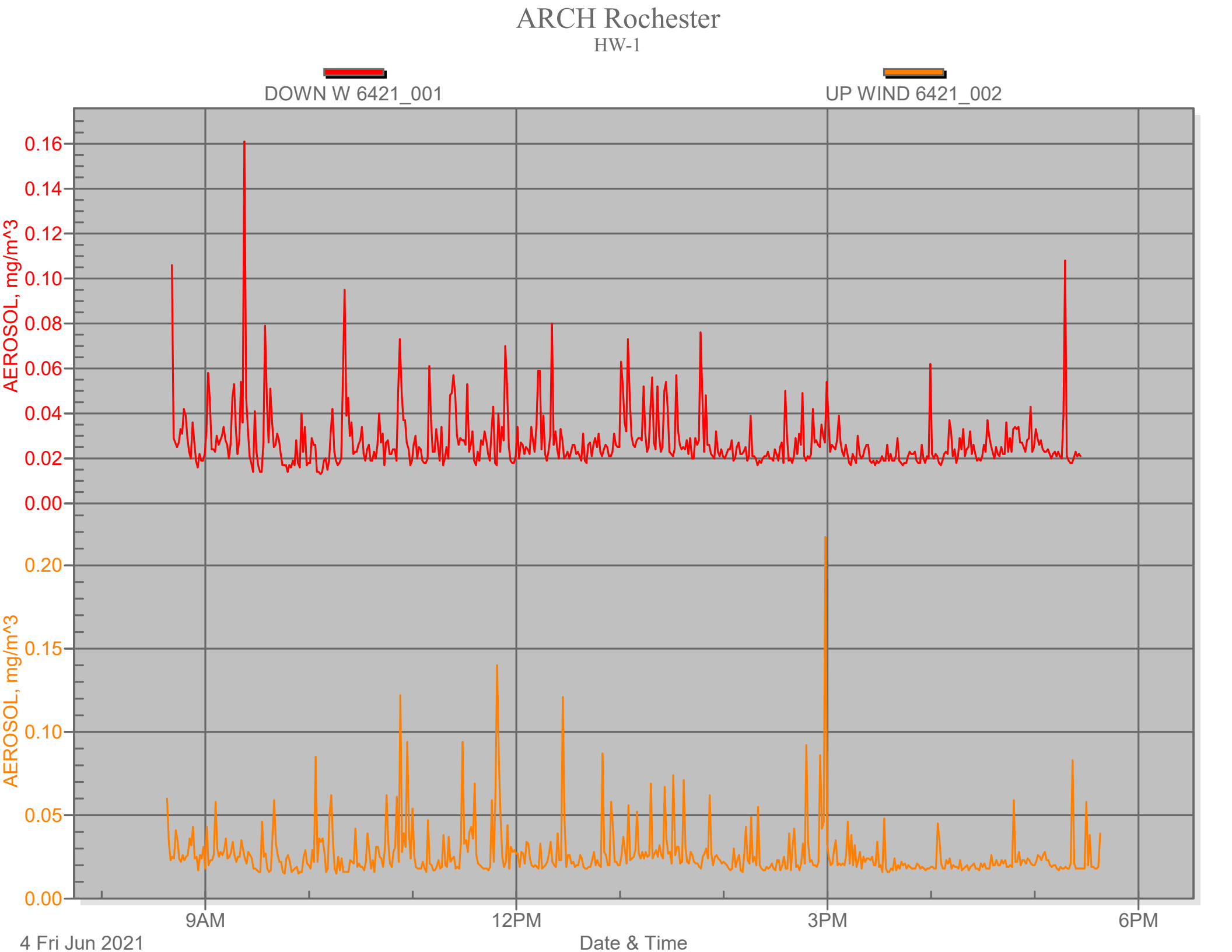
ARCH Rochester

HW-1



From: Howe, Alexander
Sent: Sunday, June 6, 2021 8:08 AM
To: Breton, Nelson M.
Cc: Livoti, Dominic
Subject: Arch Rochester Drilling Day 2 060421
Attachments: HW-1 060521 Dust.pdf

Hi Nelson,

Below is a summary of the daily activities related to day 2 of horizontal well 1 (HW-1) installation.

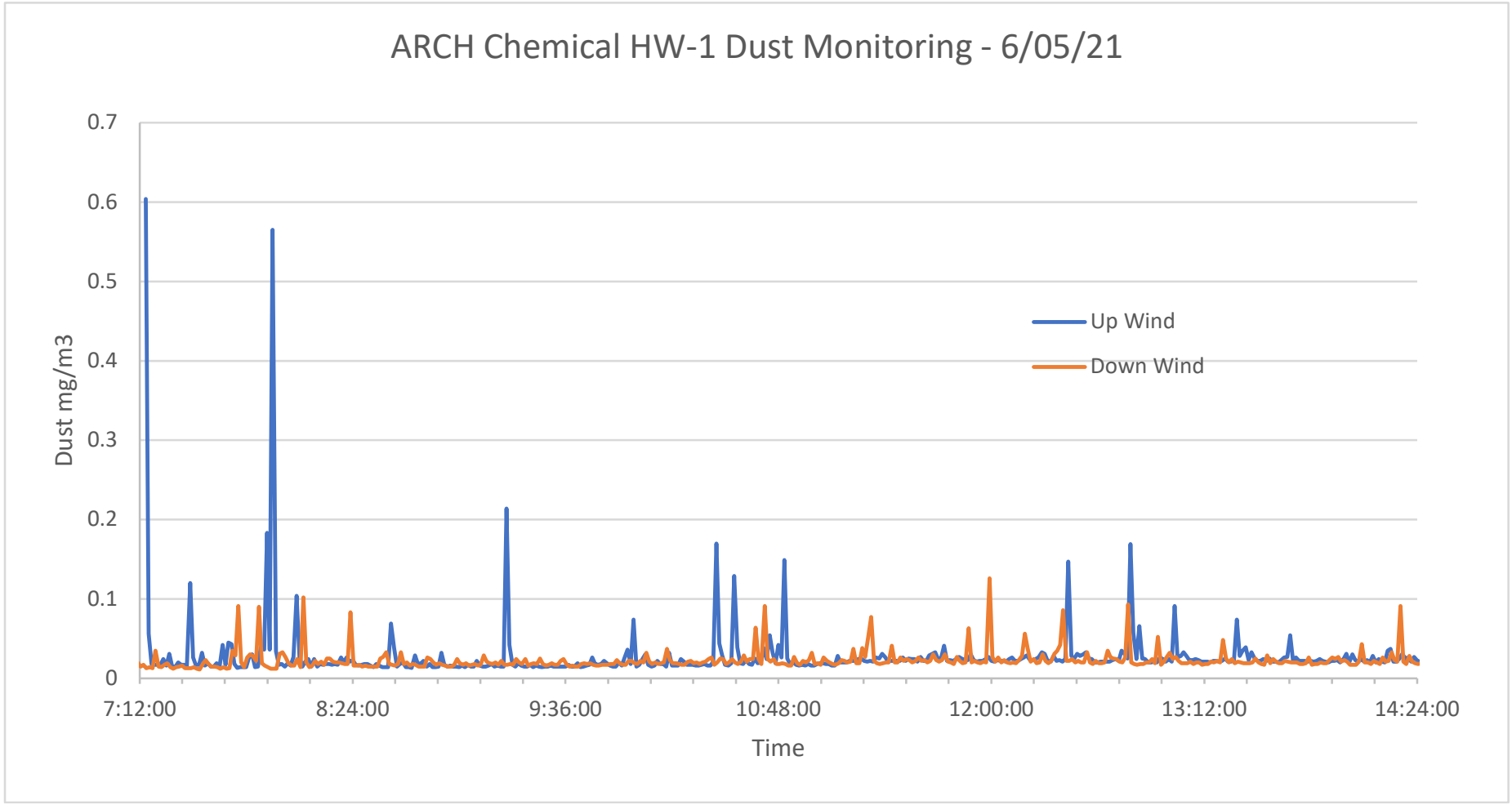
Arrived onsite 06:30, held daily tailgate meeting: Wood, Lanza, Labella, Ellingson DTD, Sharewell HDD.

Over view of tasks:

- Minor repairs on the drill
- Drill using jetting tool
- Set up rock drilling assembly
- Drill into rock

Drilling commenced at 0900 using the jetting tool. Almost immediately the assembly hit hard rock, assumed to be the upper interface of bedrock. The drillers then needed to trip out the equipment and assemble the rock drilling tooling. This took a few hours to complete, including warm up for the gyroscope navigation tool. At 1500 drilling commenced and roughly 7 feet of progress was completed. The drill cuttings clogged the mud pumps and the drillers will need to come up with a new pumping system for Monday.

The CAMP was set up and run from 0710 – 1730. Downwind PID and work area PID did not register readings throughout the day. Attached is a graph of the upwind and downwind dust monitors. Downwind was positioned to the North of the drilling area, up wind was positioned in the South of the drilling area. The wind today was generally from the west/south west through the day gusting to 38 mph through out the work day. Visible dust could be seen coming from the road and adjacent parking lots into the work area and crossing the dust monitoring area. Dust was not generated from drilling activities.


ARCH Chemical HW-1 Dust Monitoring - 6/05/21
Dust mg/m3
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Up Wind
Down Wind
7:12:00
8:24:00
9:36:00
10:48:00
12:00:00
13:12:00
14:24:00
Time

Alex

Alexander Howe, PG
Geologist
Main 860-529-7191
Direct 860-257-5536

From: Howe, Alexander
Sent: Monday, June 7, 2021 7:38 PM
To: Breton, Nelson M.
Cc: Livoti, Dominic
Subject: ARCH Rochester HW-1 Drilling
Attachments: HW-1 060721 Dust.pdf

Hi Nelson,

Below is a summary of the daily activities related to day 3 of horizontal well 1 (HW-1) installation.

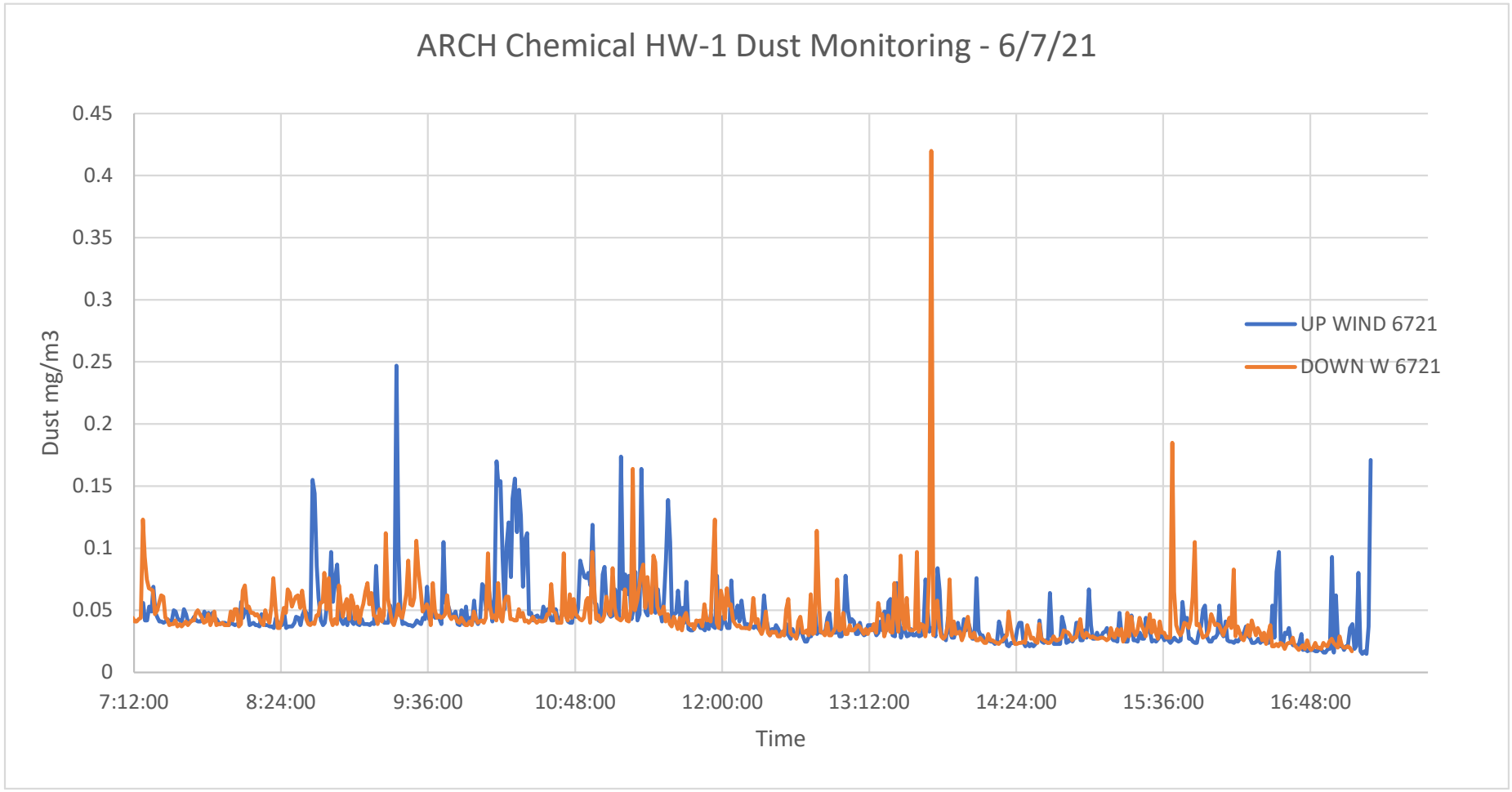
Arrived onsite 06:30, held daily tailgate meeting: Wood, Lanza, Labella, Ellingson DTD, Sharewell HDD.

Over view of tasks:

- Commence drilling
- Clean up "froth over" of mud recycler
- Standby from 10:35-1520. Lack of materials onsite mix mud to needed consistency.
- Drilled 60' for the day.

Pumping issues resolved quickly in the morning and commenced drilling. At 10:35 the lead driller decided that viscosity of drilling mud was below value needed to properly float cuttings out of the drill hole. Expected delivery of drilling mud has not arrived so crew went on standby. One driller was sent to local shop to purchase alternative drilling liquid to cover while waiting for biobore to arrive.

The CAMP was set up and run from 0710 – 1710. Downwind PID and work area PID did not register readings throughout the day. The PID did pick up low level 0.3 ppm at the mud recycler while drilling today, otherwise all readings were non detect. Attached is a graph of the upwind and downwind dust monitors. Downwind was positioned to the North of the drilling area, up wind was positioned in the South of the drilling area. The wind today was generally from the west/south west through the day. Visible dust could be seen coming from the road and adjacent parking lots into the work area and crossing the dust monitoring area. Visible dust was not generated from drilling activities, and the small soil pile adjacent to the mud pit was covered with poly sheeting.


ARCH Chemical HW-1 Dust Monitoring - 6/7/21
Dust mg/m3
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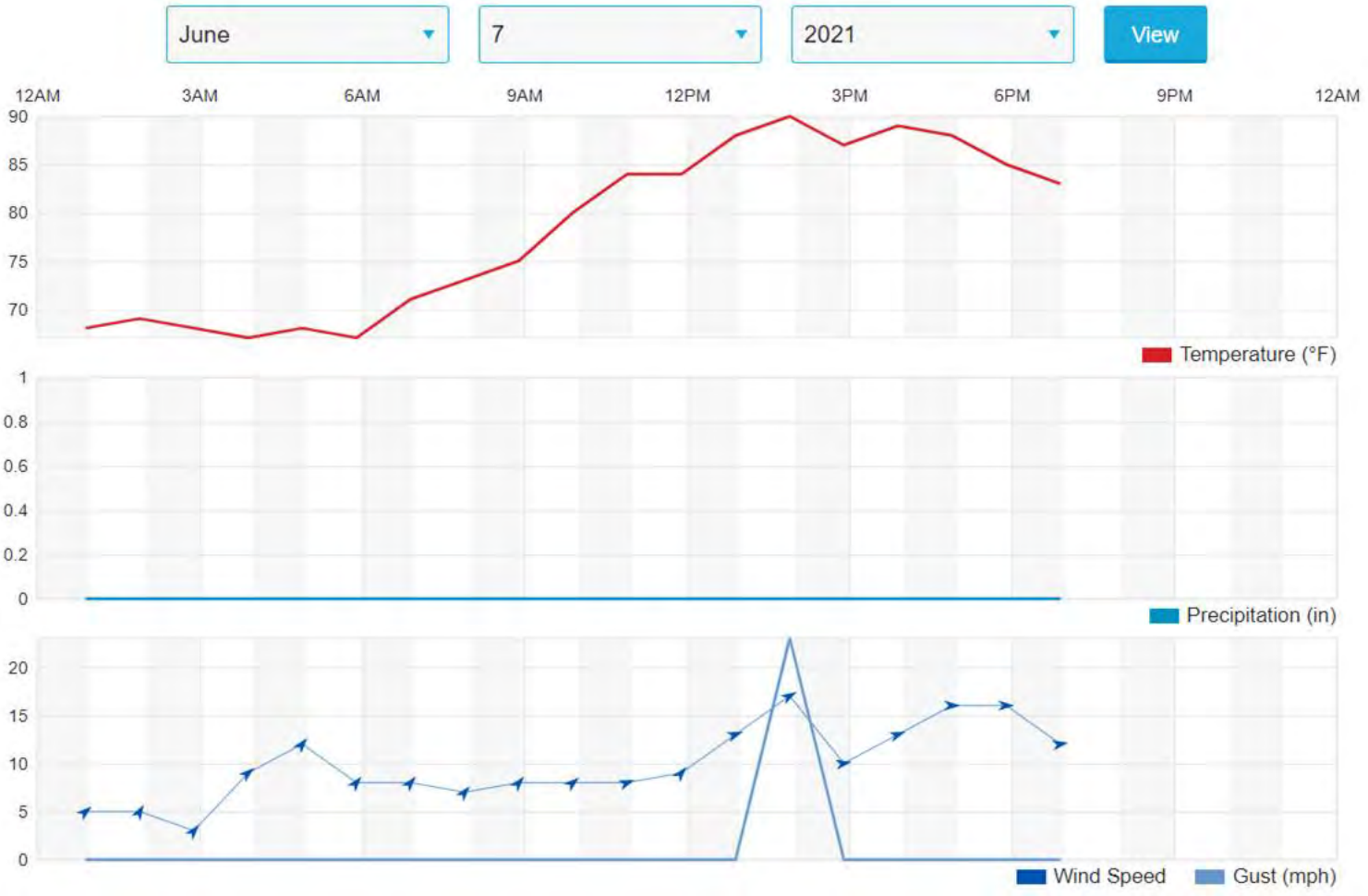
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
7:12:00
8:24:00
9:36:00
10:48:00
12:00:00
13:12:00
14:24:00
15:36:00
16:48:00
Time
UP WIND 6721
DOWN W 6721



Alex

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From: Livoti, Dominic
Sent: Wednesday, June 9, 2021 7:04 PM
To: Breton, Nelson M.
Cc: Howe, Alexander
Subject: Arch Rochester HW-1 install day 4
Attachments: 6921 weather.JPG; HW-1 6921 Graph.pdf

Hi Nelson,

Below is a summary of the daily activities related to day 4 of horizontal well 1 (HW-1) installation.

Arrived onsite 06:30, held daily tailgate meeting: Wood, Lanza, Labella, Ellingson DTD, Sharewell HDD.

Over view of tasks:

- Receive mud mix and commence drilling
- Clean out borehole with fresh mud mix
- Drill bit pops out of incompetent rock and drill rods are backed out to re-try entering competent bedrock
- 10:50 DEC onsite for an hour to look over drilling process
- Standby from 15:00-17:30. Unable to get drill bit into bedrock. New ideas proposed
- Walk through with Joe Flores to the exit hole to see if drilling set up is possible on that side.

EDTD picked up drill mud yesterday 6/8 and brought it to the site today 6/9. Drilling began at 8:35 and at 9:30 the lead driller and steering hand informed us that the drill bit was not in bedrock. They proceeded to back out 4 of the 6 rods in the ground and re-try drilling into bedrock at a steeper and slower pace. The DEC was onsite at 10:50 for about an hour and looked over the process, no issues were brought up by the DEC. Alex Howe was offsite at 11:15. 15:00 drilling into competent bedrock was unsuccessful and work went on standby for the rest of the day.

The CAMP was set up and run from 0700 – 1650. Downwind PID and work area PID did not register readings throughout the day. Mud recycler PID readings were constantly registering around 0.5 during drilling. Attached is a graph of the upwind and downwind dust monitors as well as todays weather. Downwind was positioned to the North of the drilling area, up wind was positioned in the South of the drilling area. The wind today was generally from the north east/south west through the day. Visible dust could be seen coming from the road and adjacent parking lots into the work area and crossing the dust monitoring area. Visible dust was not generated from drilling activities.

Thanks,
Dom

Dominic Livoti
Staff Geologist

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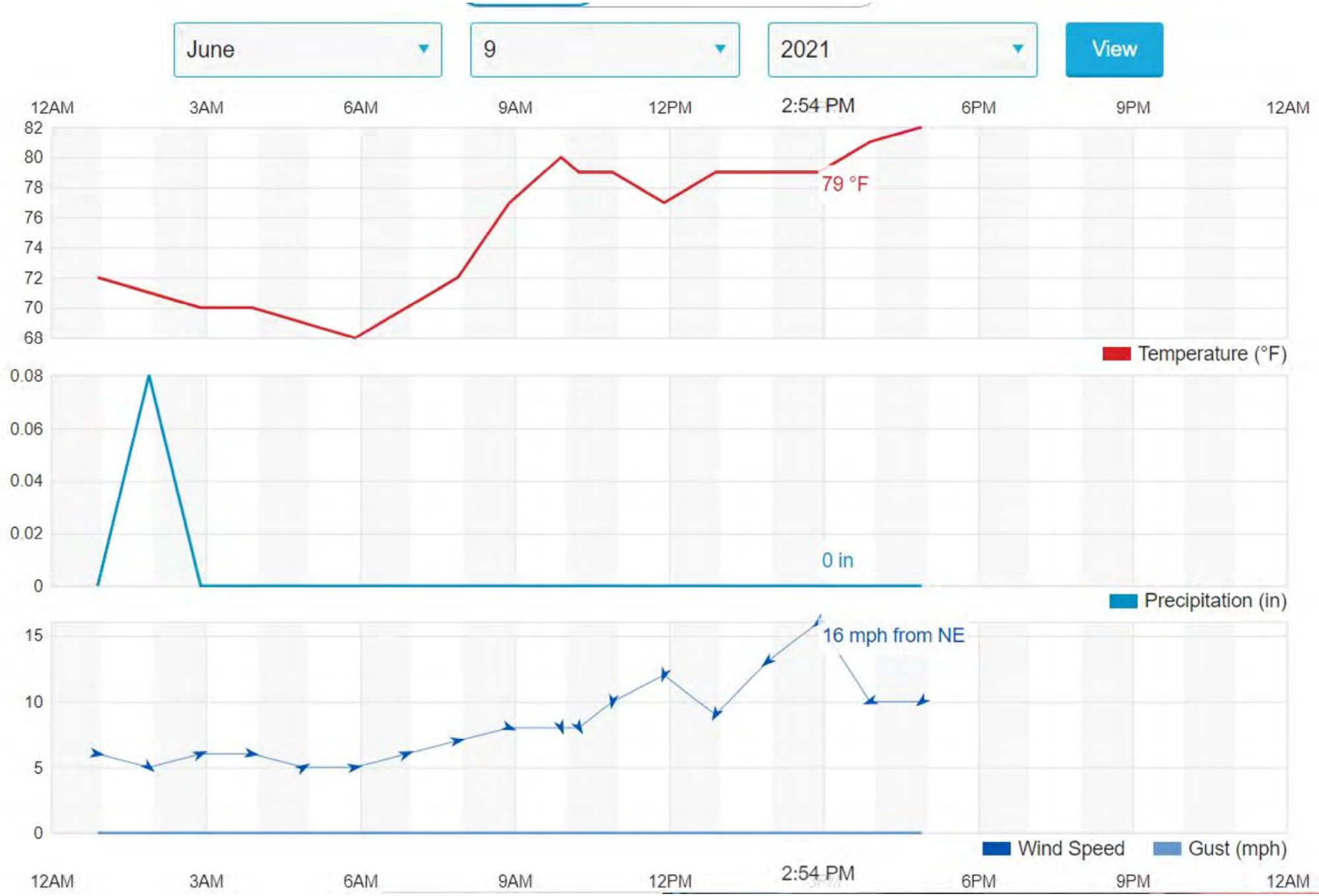
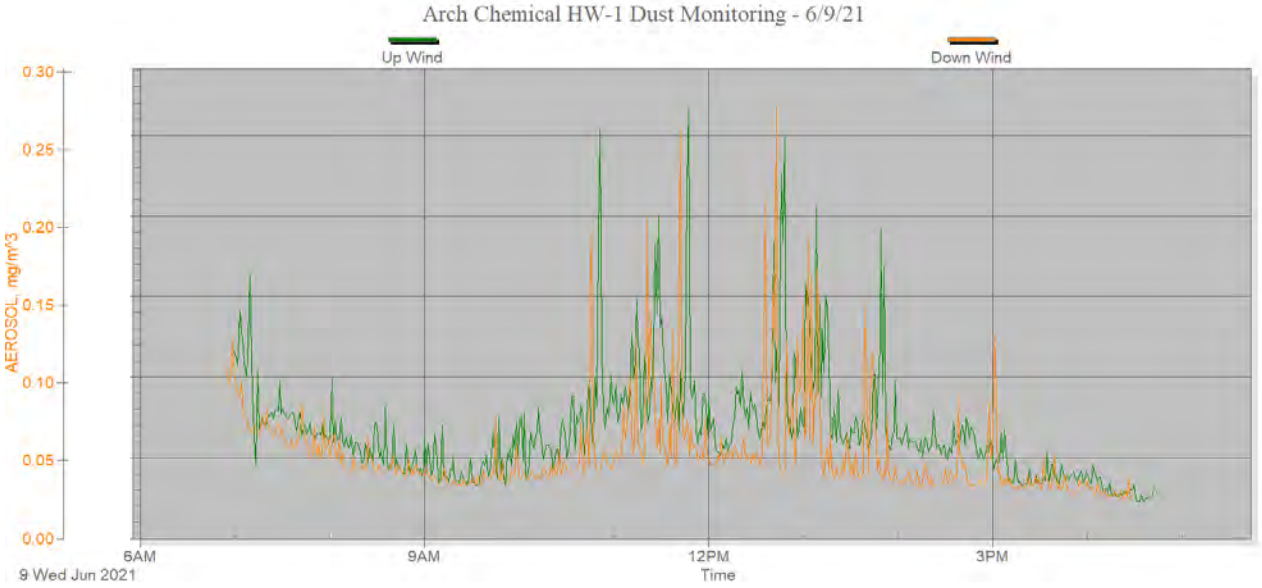

June
9
2021
View
12AM
3AM
6AM
9AM
12PM
2:54 PM
6PM
9PM
12AM
82
80
78
76
74
72
70
68
79 °F
Temperature (°F)
0.08
0.06
0.04
0.02
0
0 in
Precipitation (in)
15
10
5
0
16 mph from NE
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
2:54 PM
6PM
9PM
12AM


Arch Chemical HW-1 Dust Monitoring - 6/9/21
Up Wind
Down Wind
0.30
0.25
0.20
0.15
0.10
0.05
0.00
AEROSOL mg/m^3
6AM
9AM
12PM
3PM
9 Wed Jun 2021
Time

From: Livoti, Dominic
Sent: Thursday, June 10, 2021 3:49 PM
To: Breton, Nelson M.
Cc: Howe, Alexander
Subject: Arch Rochester HW-1 install day 5

Hi Nelson,

Below is a summary of the daily activities related to day 5 of horizontal well 1 (HW-1) installation.

Arrived onsite 06:30, held daily tailgate meeting: Wood, Lanza, Labella, Ellingson DTD, Sharewell HDD.

Over view of tasks:

- Removed all rods and drill tool from bore hole
- Cleaned up/secured any hazards onsite
- Staged equipment in preparation for arriving drill tool.

EDTD removed all rods from the bore hole in anticipation of arriving drill bit and continuing effort with this boring. 0700 Labella offsite as we were not doing anything the required vibration monitoring. No PID readings were registered as the drilling rods were being pulled out of the boring hole. CAMPs were not set up and no data for dust monitoring was recorded. Wood, EDTD, Sharewell were offsite for the day at 0930. Possible Sunday work was brought up by EDTD, Joe Flores had no issues coming in to give us site access.

Thanks,
Dom

Dominic Livoti
Staff Geologist

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From: Howe, Alexander
Sent: Tuesday, June 22, 2021 9:16 PM
To: Breton, Nelson M.
Subject: ARCH Rochester HW-1 Restart Drilling day 2
Attachments: HW-1 062221 Dust.pdf

Hi Nelson,

Below is a summary of the daily activities related to day 2 of horizontal well 1 (HW-1) installation from the exit point.

Onsite between 0630 and 1900 held daily tailgate meeting: Wood, Lanza, Labella, Ellingson DTD, Sharewell HDD.

Over view of tasks:

- Commence drilling
- Trip out mud jetting tool, swap to mud motor.
- Continue drilling into bedrock.
- Measured distance to bit is 95.7 feet

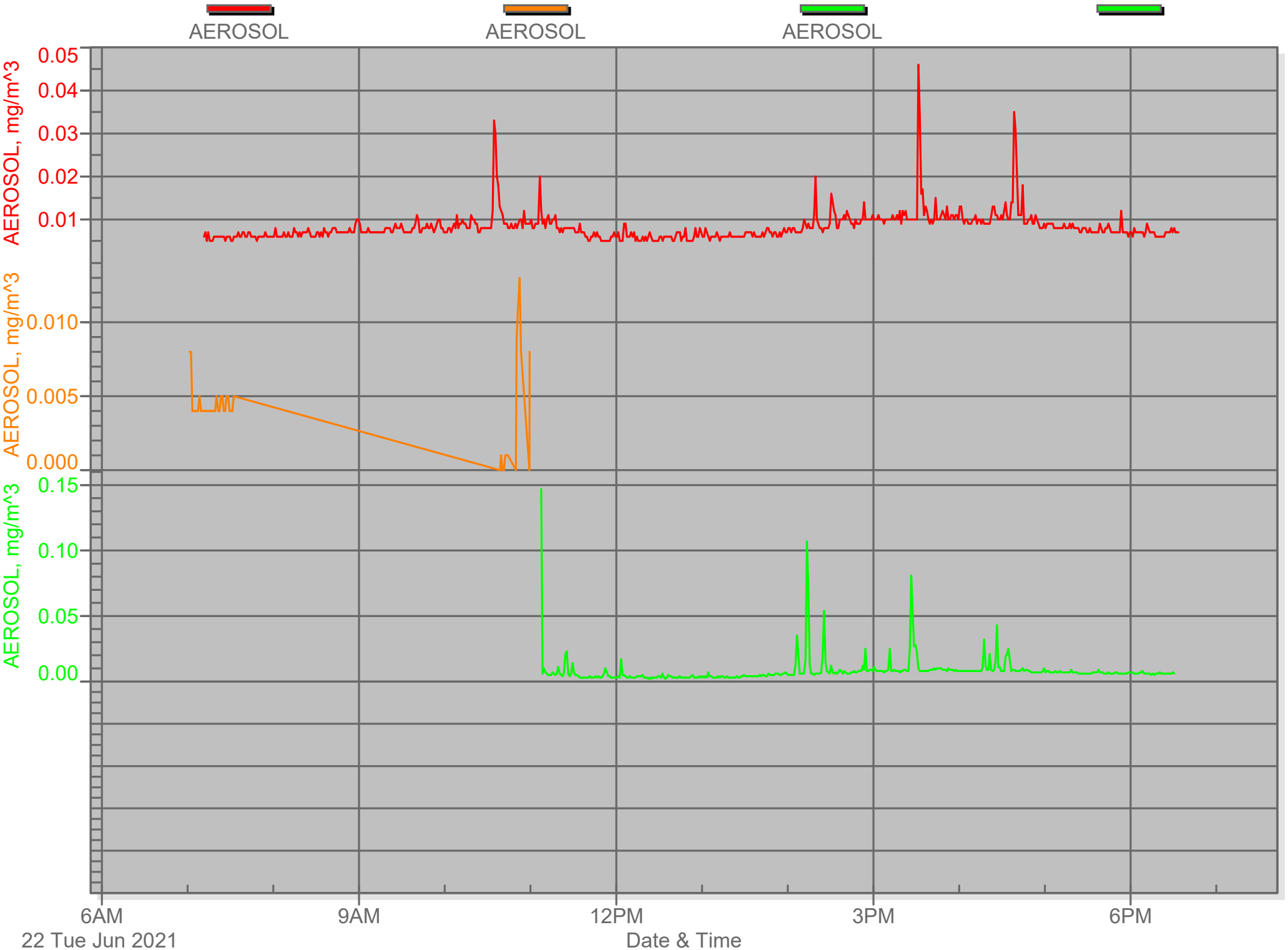
Drilling progressed slowly in an effort to progress the bore into bedrock. Ellingson is confident that they have entered bedrock and will continue to dive deeper and progress forward tomorrow.

The CAMP was set up and run from 0700 – 1835. Downwind PID and work area PID did not register readings throughout the day. The PID picked up low level 0.1 ppm at the mud recycler while drilling today, otherwise all readings were non detect. Attached is a graph of the upwind and downwind dust monitors. Downwind was positioned to the North East of the drilling area, up wind was positioned in the South West of the drilling area. The wind today was generally from the north west through the day. Wind speed picked up in the afternoon and some dust clouds were observed from the unpaved areas of the site moving into the work area. No dust was observed to be generated from drilling activities. Note the down wind location was down today between 9 am and 10 am because of a power connection issue. This was resolved and monitoring continued through out the day.

Alex

HW-1 Dust Monitoring

062221



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From: Howe, Alexander
Sent: Wednesday, June 23, 2021 9:21 PM
To: Breton, Nelson M.
Subject: ARCH Rochester restart drilling day 3
Attachments: HW-1 062321 Dust.pdf

Hi Nelson,

Below is a summary of the daily activities related to day 3 of horizontal well 1 (HW-1) installation from the exit point.

Onsite between 0630 and 1800 held daily tailgate meeting: Wood, Lanza, Labella, Ellingson DTD, Sharewell HDD.

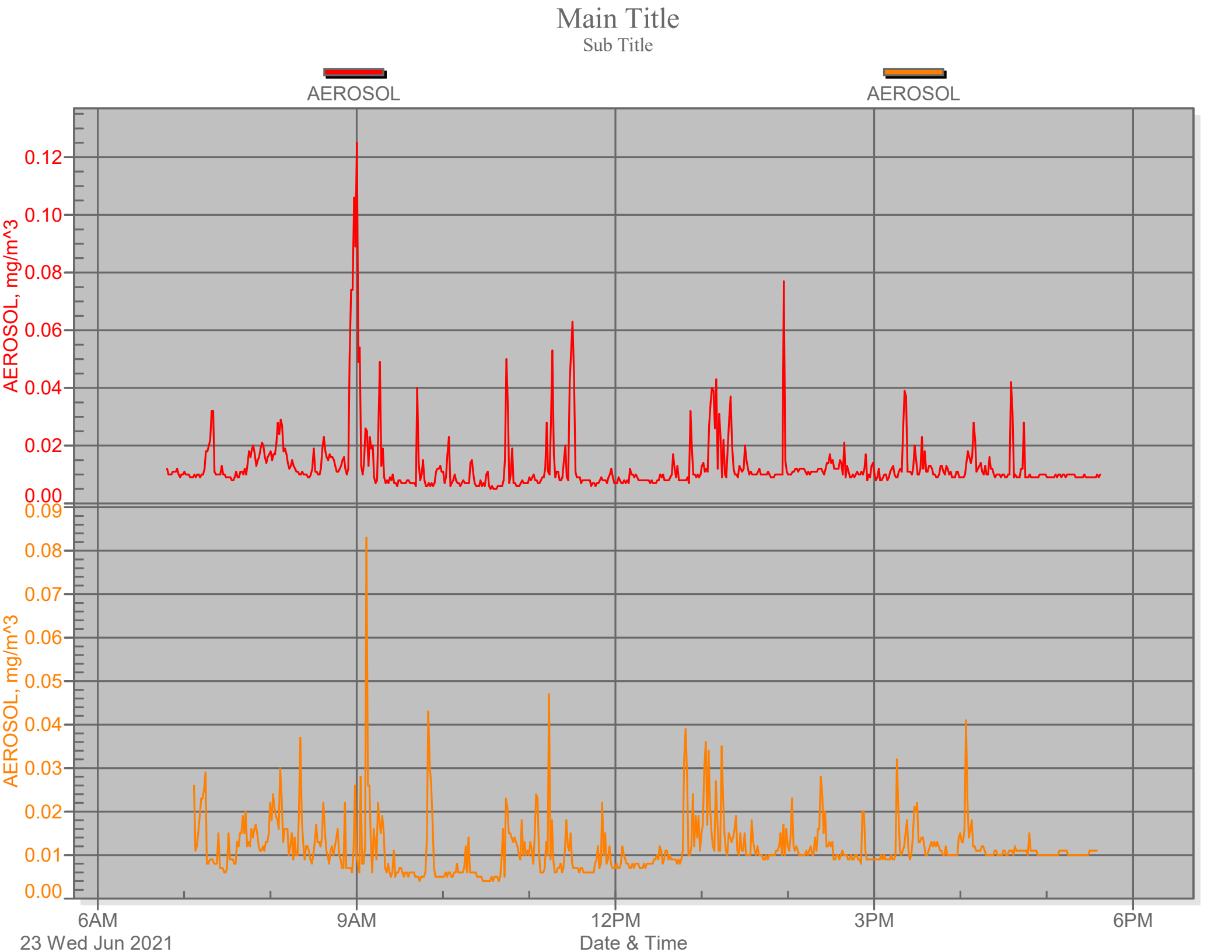
Over view of tasks:

- Continue Drilling using mud motor.
- Drilled under railroad tracks.
- Clean up IR "Frac out" occurring in vicinity of well cluster.

Drilling progressed slowly continuing the bore into bedrock. At approximately ~1530 the drillers noticed that mud returns had slowed and immediately started to look for potential sources for the loss. Bulging pavement was quickly identified in the vicinity of the well cluster adjacent to BP-5. Drilling was immediately stopped and Lonza (Joe Flores) was notified of the issue. Following conversations onsite Lonza personnel drilling was stopped for the day. Ellingson continued to recover mud that had leaked out onto the pavement and the area was restricted with danger tape. Next steps will be reviewed tomorrow during the 7 am call scheduled with all interested parties.

The CAMP was set up and run from 0700 – 1745. Downwind PID and work area PID did not register readings throughout the day. Attached is a graph of the upwind and downwind dust monitors. Downwind was positioned to the North East of the drilling area, up wind was positioned in the South West of the drilling area. The wind today was generally from the north west through the day. Some dust clouds were observed being generated by onsite activities unrelated to drilling moving into the work area. No dust was observed to be generated from drilling activities

Alex


Main Title
Sub Title
AEROSOL
AEROSOL
AEROSOL, mg/m^3
0.12
0.10
0.08
0.06
0.04
0.02
0.00
AEROSOL, mg/m^3
0.09
0.08
0.07
0.06
0.05
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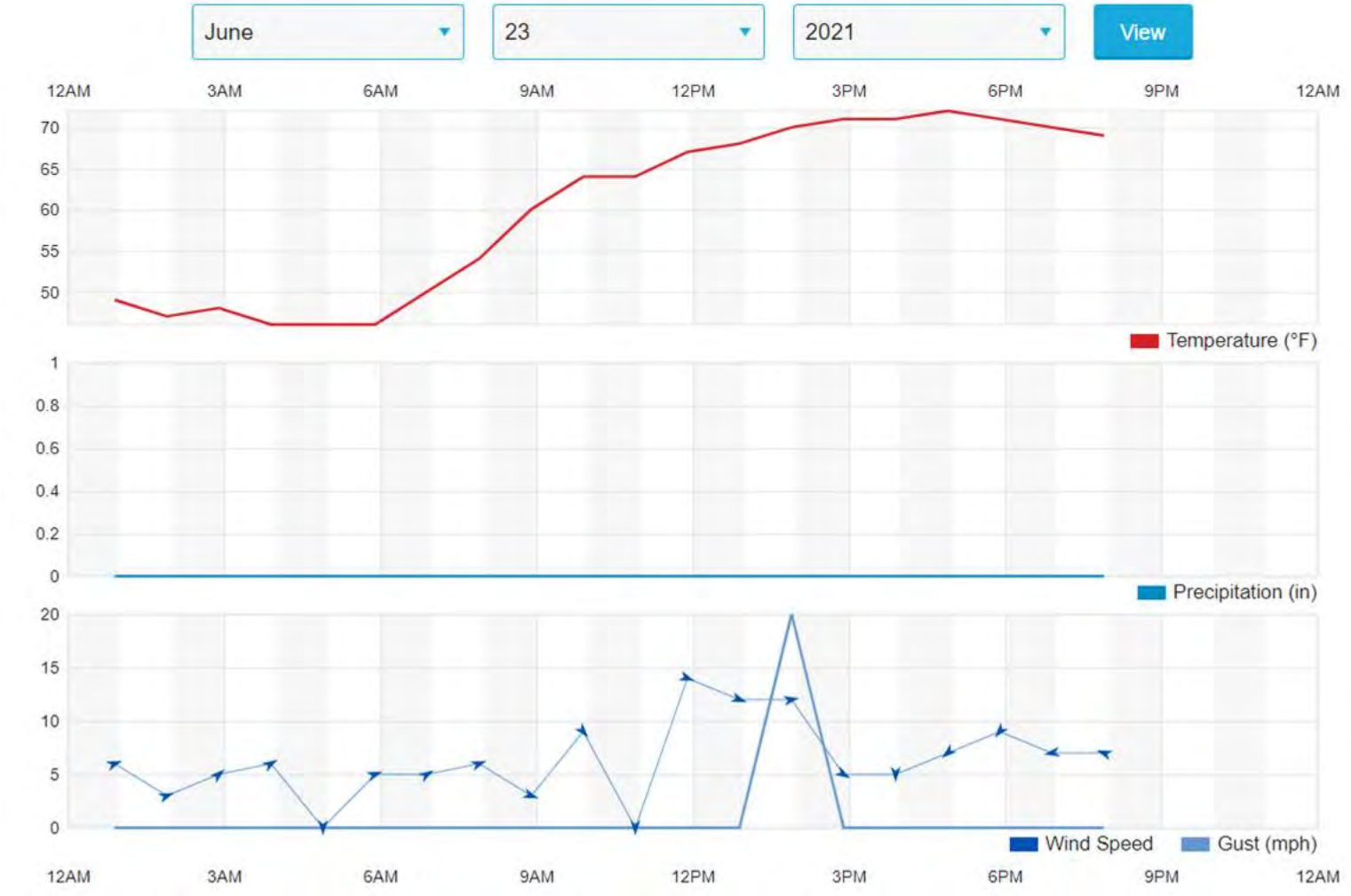
0.02
0.01
0.00
6AM
9AM
12PM
3PM
6PM
23 Wed Jun 2021
Date & Time



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www.woodplc.com

From: Howe, Alexander
Sent: Tuesday, June 29, 2021 10:16 PM
To: Breton, Nelson M.
Subject: ARCH Rochester HW-1 field report 062821
Attachments: HW-1 062921 Dust.pdf

Hello Nelson,

The crew was onsite today between 0635 and 1840 today to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, Labella, and Matrix Environmental. Tasks for today included the following:

- Held daily tailgate meeting reviewed planned activities. Extreme heat expected.
- Matrix environmental used air knife to clear western excavation to 4 ft bgs. No utilities identified in the excavation.
- Two relief groundwater well locations were spotted along to bore path. Both locations were saw cut, however following conversations with Joe Flores both were identified to be over known abandoned utilities. Both locations were shifted to avoid these abandoned utilities. Secondary locations were precleared to 5' bg. At each boring 2 inch PVC monitoring wells were installed to a depth of 12 ft bgs and constructed with 10 ft slotted screens. Water level meters will be deployed in each well tomorrow as sentry locations to monitor for IRs.
- Labella activated the two stations adjacent to the drilling activities of the day.
- Ellingson commenced drilling at relief boring location. The bore was completed to approximately 20 ft bgs, I will confirm the horizontal length completed tomorrow.

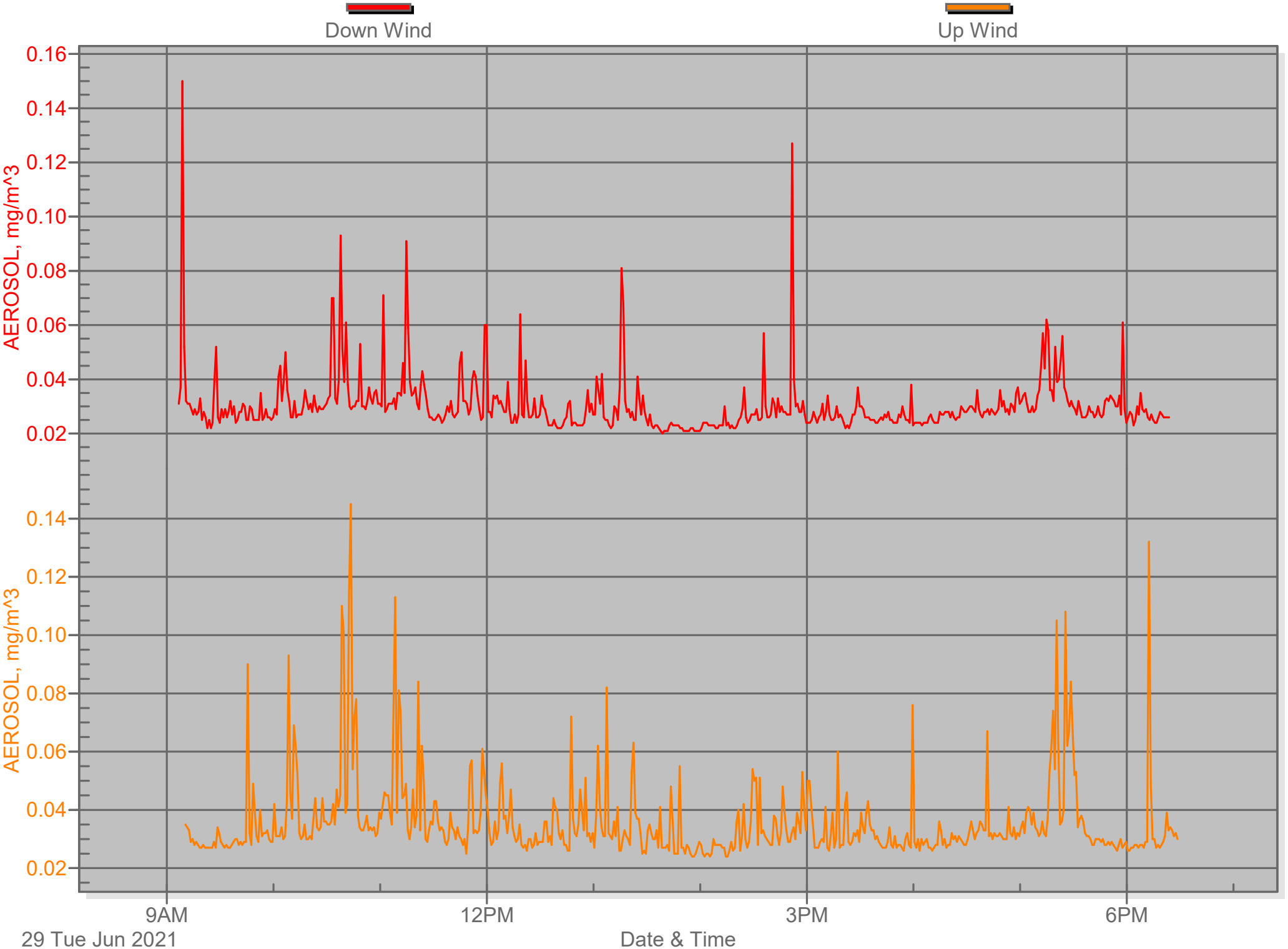
The CAMP was activated through out the day. Continuous air monitoring using PIDs was completed at the mud recycling plant, and the bore entry pit. No significant readings from the PID were observed at these locations through out the day. The dust tracks were set up, upwind and down wind of the mud recycling plant. No dust was generated through the drilling activities.

Ellingson subcontractor from Sharewell reported to myself and Francine that he tasted an "acrid" taste in his mouth while drinking water in the approved location in the truck parking area. Additionally, he identified and showed the location of fugitive vapors emanating from an area adjacent to the bore using the PID. PID was observed to reach 35 ppm in this area. Myself and the Sharewell employee spent time in this location observing the drilling activities and monitoring the drill bit progress. This location will be marked tomorrow and reviewed with the drilling team as an area to avoid.

Alex

HW-1

6/29/21


Down Wind
Up Wind
AEROSOL, mg/m^3
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
AEROSOL, mg/m^3
0.14
0.12
0.10
0.08
0.06
0.04
0.02
9AM
12PM
3PM
6PM
29 Tue Jun 2021
Date & Time

Alexander Howe, PG
Geologist
Main 860-529-7191
Direct 860-257-5536

From: Howe, Alexander
Sent: Wednesday, June 30, 2021 8:57 PM
To: Breton, Nelson M.
Subject: ARCH Rochester HW-1 field report 063021
Attachments: HW-1 063021 Dust.pdf

Hi Nelson,

The crew was onsite today between 0635 and 1715 today to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, and Labella. Tasks for today included the following:

- Held daily tailgate meeting reviewed planned activities.
- Ellingson DTD completed the relief boring in the alleyway to target depth and distance and the tooling was tripped out of the bore. The drill was then mobilized back to the main boring entry pit.
- 50 feet of 2 inch PVC pipe was deployed into the relief boring to maintain the bore in event of a collapse in the overburden.
- West utility excavation within the alleyway was backfilled with clean crusher run stone and the alleyway was cleaned up.
- Drill tooling was tripped back into the HW-1 bore to the extent reached prior to the IR.

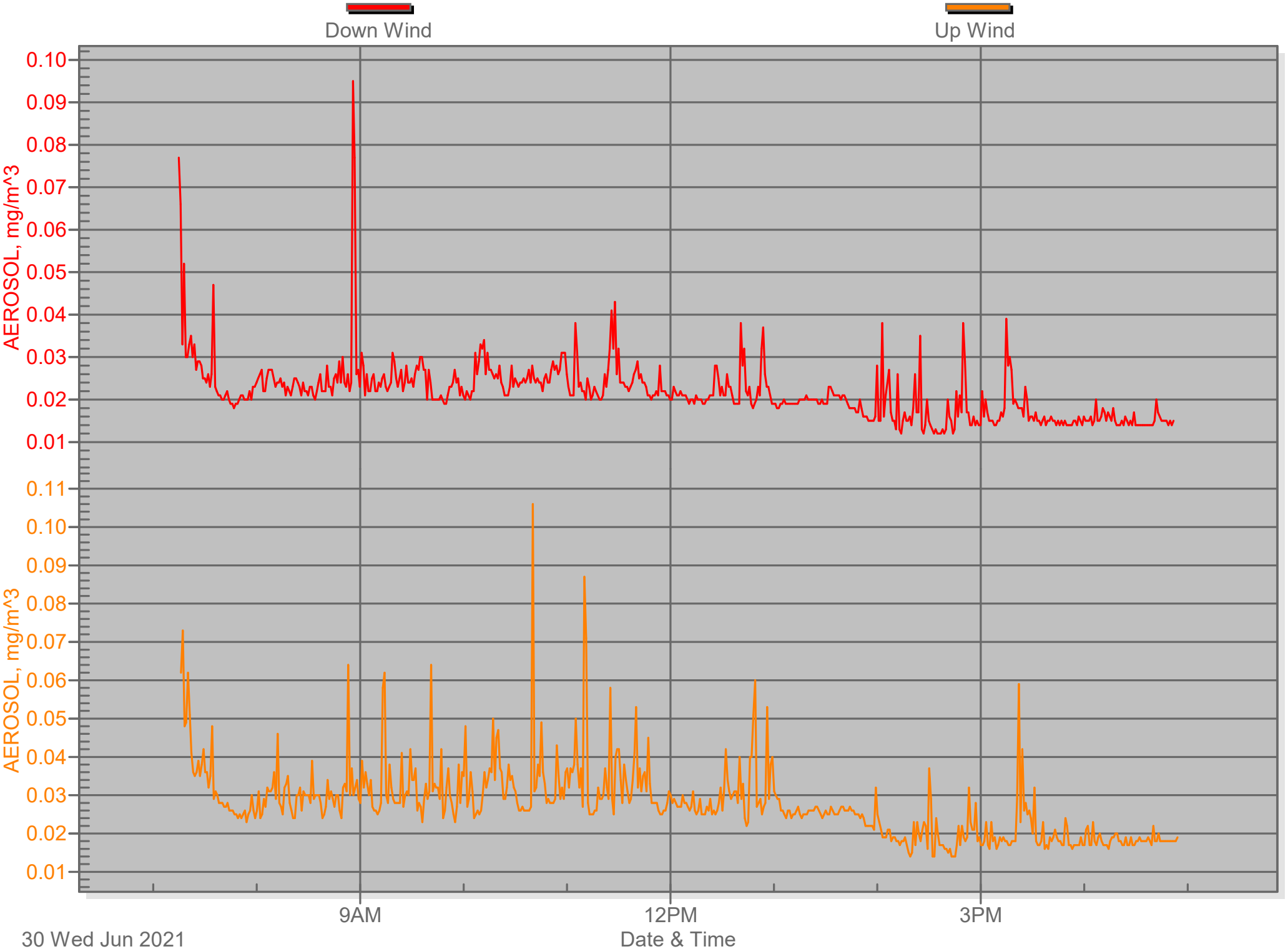
Tomorrow drilling will recommence on HW-1 bore while monitoring for IRs and the jobsite will be made safe for the holiday weekend.

The CAMP was operated throughout the day and dust clouds could be observed moving across the site moving from South West to North East. No dust was generated by drilling activities. PIDs were used to continuously monitoring for vapors at the mud recycling plant and both entry pits. Highest concentrations observed was 1.5 ppm at the mud recycling plant. Graph of dust is attached for reference.

Alex

HW-1

06/30/21


Down Wind
Up Wind
AEROSOL, mg/m^3
0.10
0.09
0.08
0.07
0.06
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0.03
0.02
0.01
AEROSOL, mg/m^3
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0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
9AM
12PM
3PM
30 Wed Jun 2021
Date & Time

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From: Howe, Alexander
Sent: Friday, July 2, 2021 6:08 AM
To: Breton, Nelson M.
Subject: ARCH Rochester HW-1 field report 070121
Attachments: HW-1 070121 Dust.pdf

Hi Nelson,

The crew was onsite today between 0635 and 1730 yesterday to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, and Labella. Tasks for today included the following:

- Continue drilling main HW-1 pilot bore. 40 feet (2 joints) of new drilling progress was completed. The total length of the bore is approximately 176 ft at a current depth of 16.9 ft bgs.
- Drilling equipment was tripped out of the bore hole at the end of the day for safe storage over the holiday weekend.
- Work areas were made safe including all open excavations.
- The porta pottys were cleaned.

The drilling crew is now offsite until Wednesday July 7th when drilling on HW-1 will recommence.

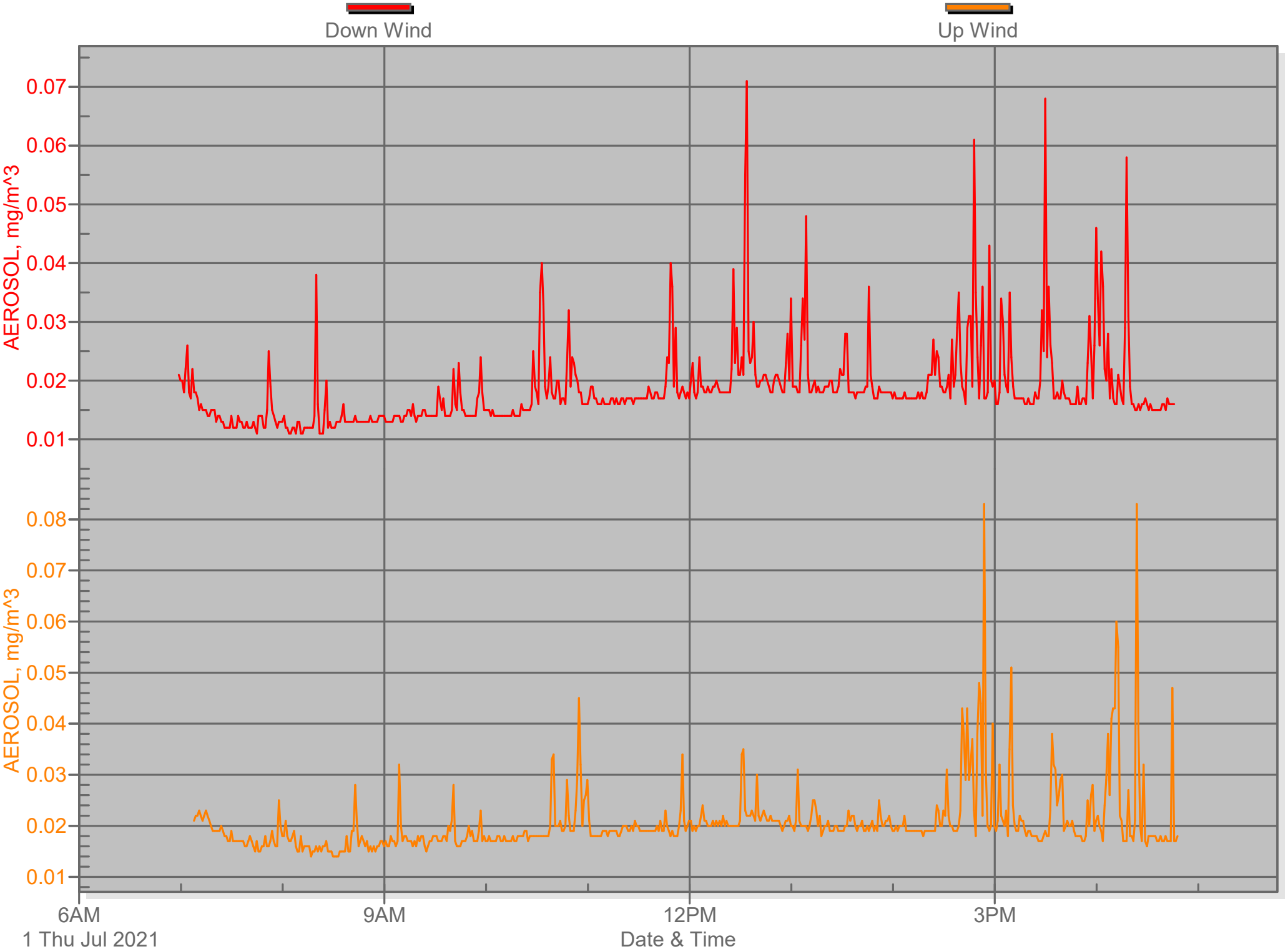
The CAMP was activated throughout the day with continuous monitoring for vapors at the mud pit and mud recycling plant. The highest observed readings at the mud pit were 1.5 ppm in the breathing space and 3.5 ppm directly over the recycling tank. No elevated readings were observed at the mud pit. Dust monitors were active throughout the day and a graph of the results are attached. As usual no dust was generated by drilling activities dust clouds could be observed crossing the work area generated for the gravel areas of the site.

Thanks,

Alex

HW-1

07/01/21


Down Wind
Up Wind
AEROSOL, mg/m^3
0.07
0.06
0.05
0.04
0.03
0.02
0.01
AEROSOL, mg/m^3
0.08
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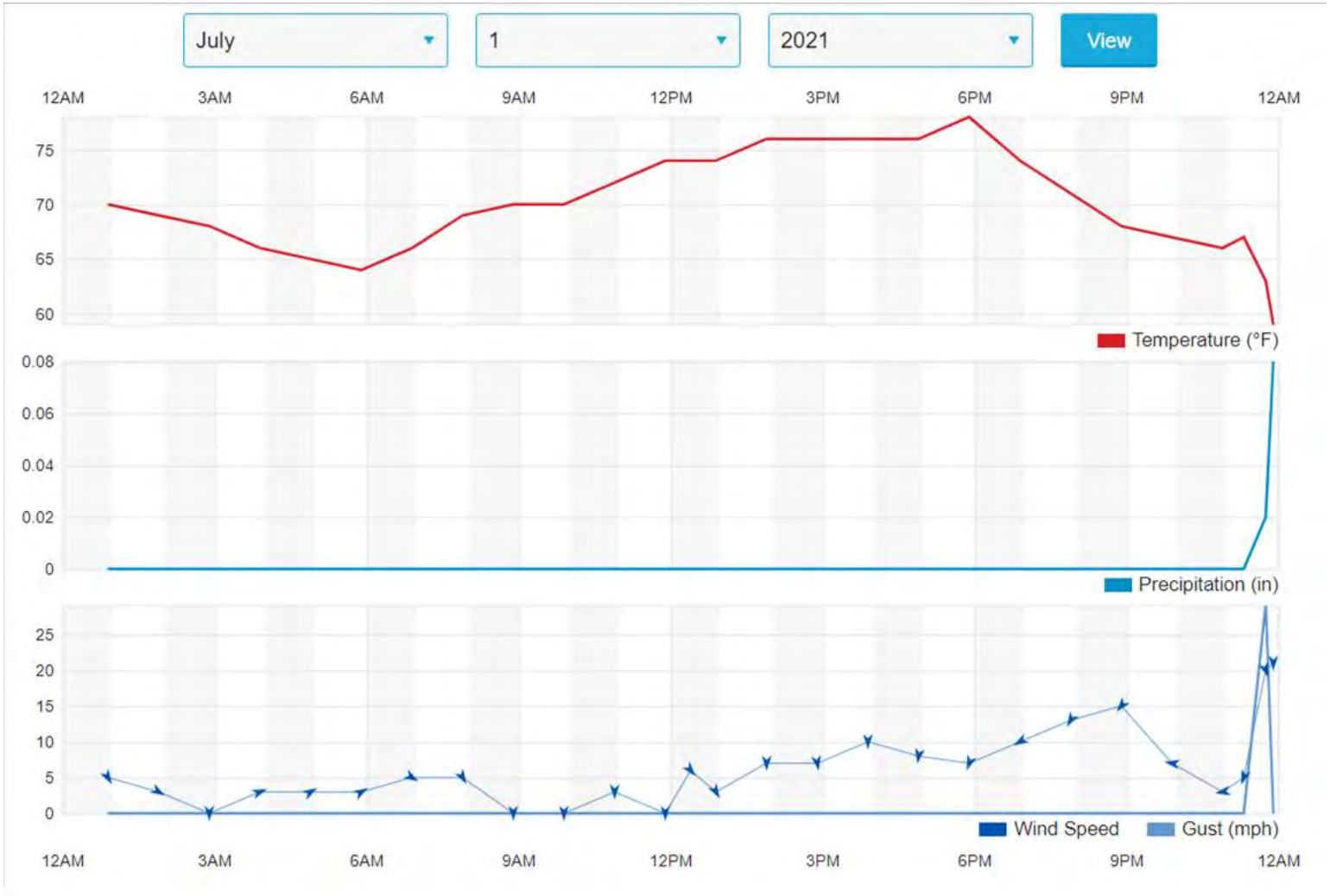
6AM
9AM
12PM
3PM
1 Thu Jul 2021
Date & Time



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From: Howe, Alexander
Sent: Friday, July 9, 2021 8:09 AM
To: Breton, Nelson M.
Subject: ARCH Rochester HW-1 field report 070721
Attachments: HW-1 070721 Dust.pdf

Hi Nelson,

The crew returned to site today between 0635 and 1830 to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, and Labella. Tasks for today included the following:

- Trip tolling back into the bore hole following holiday break.
- Continue drilling main HW-1 pilot bore. 25 feet of new drilling progress was completed. The total length of the bore is approximately 200 ft and current depth at the termination is approximately 15.5 ft bgs. Drilling was completed at a slow pace today in an effort to limit the bore path getting pushed up and out of bedrock. At 1720 Ellingson DTD informed me the will trip out the drill tooling from the bore and will change the drilling bit to a style that will assist with cutting down into the bedrock more aggressively.
- At the end of the day all drill tooling was tripped out of the bore. Tomorrow morning the drill bit will be swapped and tooling tripped back into the bore hole.

The CAMP was activated throughout the day with continuous monitoring for vapors at the mud pit and mud recycling plant. The highest observed readings at the mud recycling plant was 1.0 ppm in the breathing space and 3.5 ppm directly over the recycling tank. No elevated readings were observed at the mud pit. Dust monitors were active starting at 10:30 after passing showers during the morning. A graph of the upwind and downwind results are attached. Wind was predominantly from the NE – SW (weather data below). It should be noted that the dust monitoring located down wind of the drilling plant identified elevated levels while the mud plant was in operation. However, downwind PM-10 particulate levels not in exceedance of 0.15 mg/m^3 of the up wind monitoring station.

Alexander Howe, PG
Geologist
Main 860-529-7191
Direct 860-257-5536
Cell 207-776-8242
alexander.howe@woodplc.com
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From: Brent Fleming <BFleming@ellingsoncompanies.com>
Sent: Thursday, July 8, 2021 9:46 PM
To: Breton, Nelson M.; Howe, Alexander; Livoti, Dominic
Cc: Dan Ombalski; Brian Younkin
Subject: Wood - Arch Chemical dewatering well - Rochester, NY - Thursday 7/8/21 Daily Report

Site: Arch Chemical
Client: Wood
Location: Rochester, NY
Date: Thursday, 7/8/21
Ellingson-DTD Personnel on site: 4 (Jason Houseton, Adam Armstrong, Brad Fleming, Brent Fleming)
Subcontractors on site: 1 (Reno Maynard – Sharewell HDD)
Hours on site: 0645 – 1500 (8.25 hours)
Hours worked on site this week: 20 hrs
Safety Topics Discussed: Lightening
NY811 Ticket#: 05251-002-706
Drilling Assembly: American Augers DD10, 6 1/8" TCI bit, Sharewell GST navigation, mud motor
Company Equipment: American Augers 600 mud recycler, jetter trailer, DD10 drill rig, tool trailer #6169
Rental Equipment: skid steer, 15k generator, 10k reach lift, mini-excavator, 500-gal water trailer
Drilling Completed: 0 feet (202 feet total)
Drilling Completed Relief Hole: 0' (74' total)
Water Filled: 0 Gallons (19,000 gallons total)
Water used for drilling: 0 gallons (17,700 gallons total)
Water Used for Development: 0 gallons (0 gallons total)
Bio-polymer drilling mud mixed: 0 bags (96 totals)
Approximate drilling waste generated: 0 gallons (3,245 gallons total)
Approximate development waste: 0 gallons (0 gallons total)
Interpreted Borehole Log: soft drilling conditions near surface. Fractured rock 60-100 feet along bore. Solid bed rock starting at 100' along bore.

Brief Summary
Ellingson-DTD arrived onsite at 0645 and conducted the morning safety tailgate meeting. After the safety meeting the crew began changing bits, however a failure on the front of the mud motor was observed during the change out which renders it unusable. After discussion with Wood the decision was made to have another near bit motor shipped rather than attempting to continue the pilot with a conventional motor and risk further deviation from the boreplan. The new near bit motor is expected to arrive Saturday am. After the motor was broken down and staged for return shipping the crew completed some maintenance items on the drill rig. While completing the maintenance items worn bearings were noticed on the carriage of the drill rig. The crew decided to change out the worn bearings as a preventative measure while awaiting the arrival of the new mud motor. The remainder of the day was spent working on the carriage bearings. Site shut down at 1500 due to lightening and forecasted continuation of storms for the remainder of the day. Tomorrow Ellingson-DTD plans to continue work on the worn carriage bearings.

Brent Fleming
Ellingson-DTD
Cell 607-226-0179
Email: brent@horizontaldrill.com
bfleming@ellingsoncompanies.com

From: Livoti, Dominic
Sent: Saturday, July 10, 2021 7:14 PM
To: Breton, Nelson M.
Cc: Howe, Alexander
Subject: ARCH Rochester HW-1 field report 071021
Attachments: 071021 weather.JPG; HW-1 071021 Dust.JPG

Hi Nelson,

The crew returned to the site today from 6:30 and 1745 to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, Sharewell, and Labella. Tasks for today included the following:

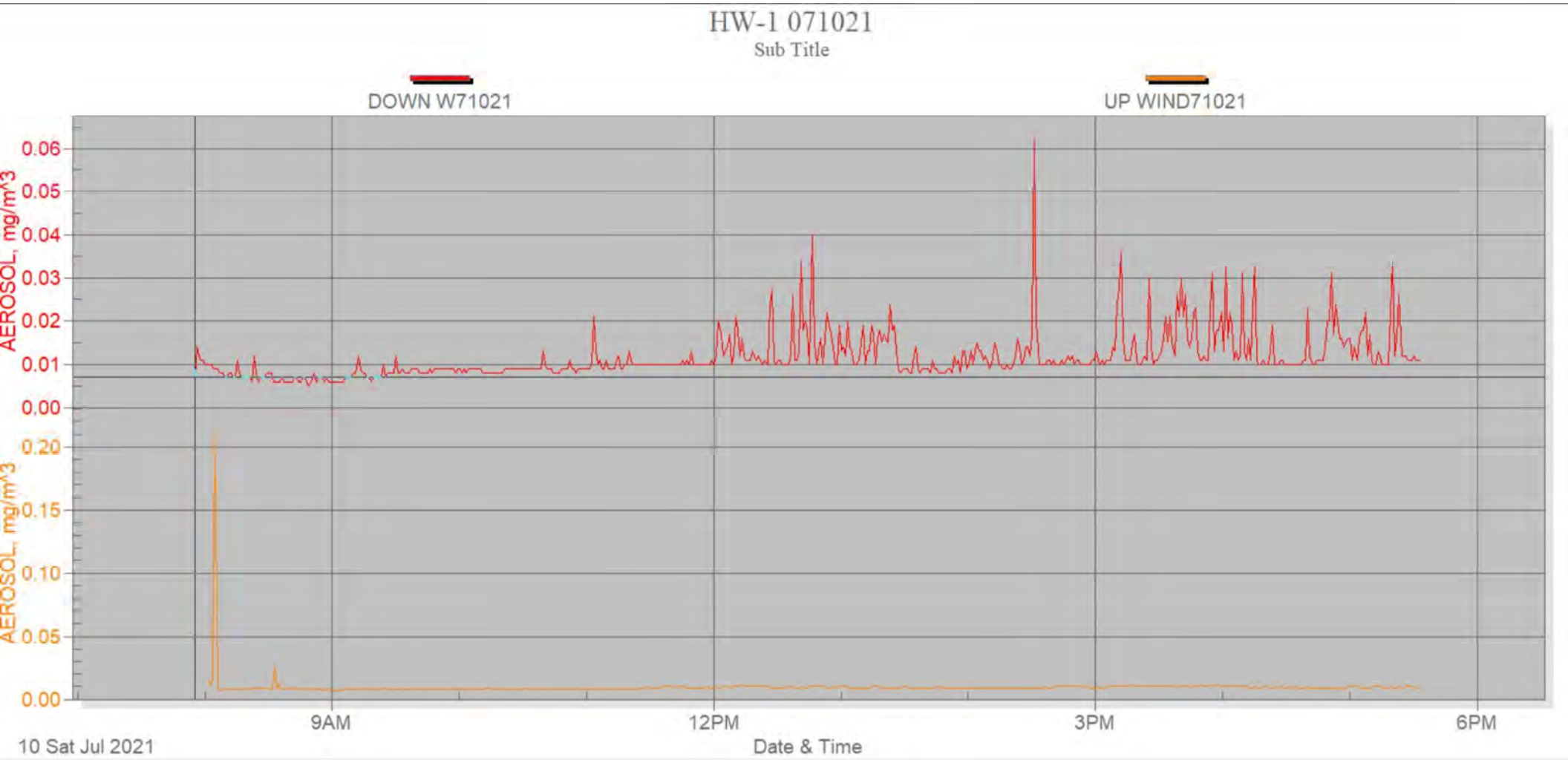
- Unload new mud motor.
- Hook up new drill bit and mud motor.
- Begin tripping tolling back into the bore hole.
- No new progress was made on HW-1, tripping tooling into well is at a slow pace to ensure they are following the correct pathway.

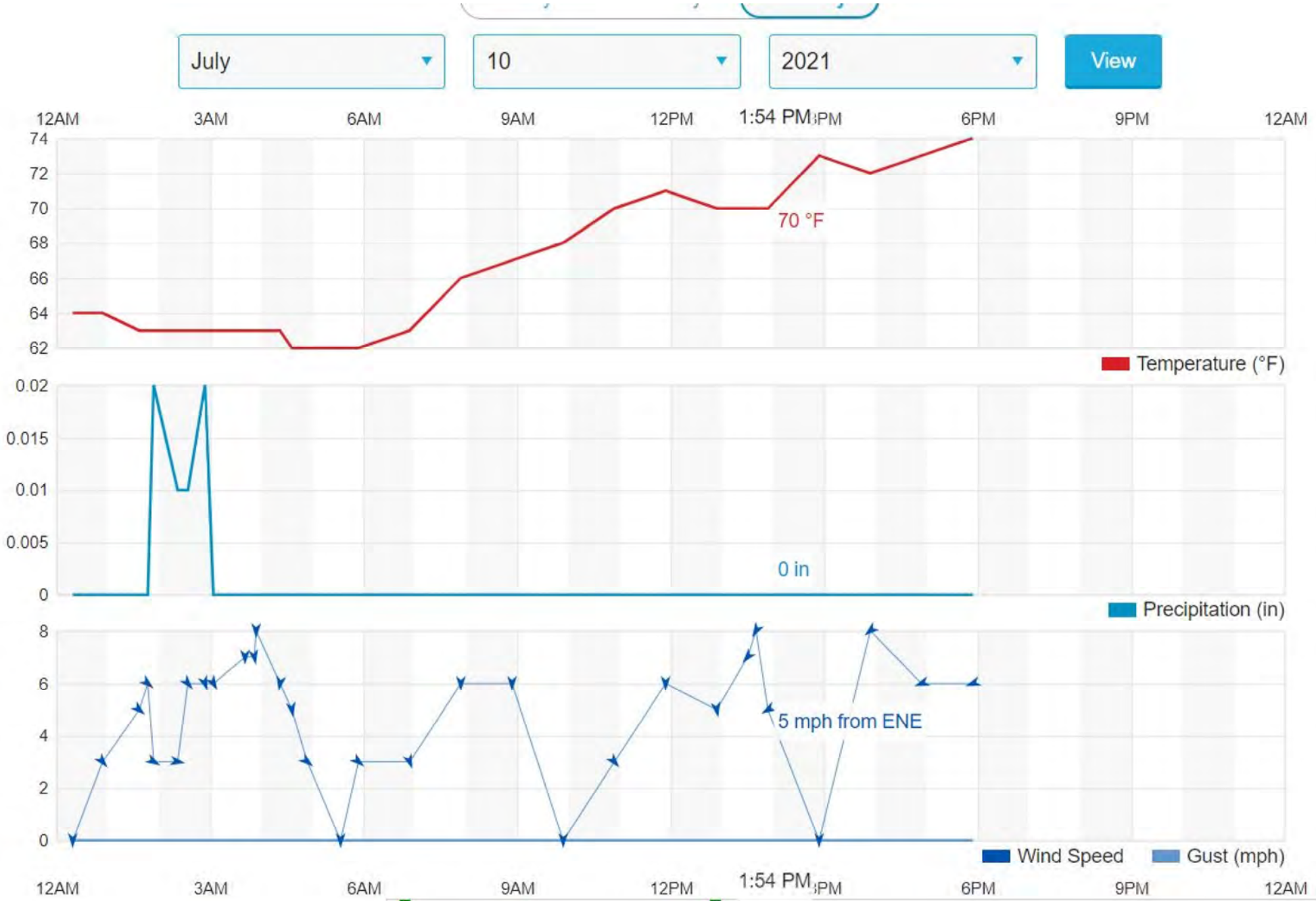
The CAMP was activated throughout the day with continuous monitoring for vapors at the mud pit and mud recycling plant. The highest observed readings at the mud recycling plant was 0.4 ppm in the breathing space and 1.0 ppm directly over the recycling tank. No elevated readings were observed at the mud pit. Dust monitors were active starting at 0800 until 17:30. No significant dust or vibration reading were recorded.

A graph of the upwind and downwind results are attached. Wind was predominantly from the NW – SE (weather data attached). It should be noted that the dust monitoring located down wind of the drilling plant identified elevated levels while the upwind showed no elevated readings as the mud plant was in operation. Down wind readings did not exceed 0.062 mg/m3.

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com


HW-1 071021
Sub Title
DOWN W71021
UP WIND71021
AEROSOL, mg/m^3
0.06
0.05
0.04
0.03
0.02
0.01
0.00
AEROSOL, mg/m^3
0.20
0.15
0.10
0.05
0.00
9AM
12PM
3PM
6PM
10 Sat Jul 2021
Date & Time


July
10
2021
View
12AM
3AM
6AM
9AM
12PM
1:54 PM
6PM
9PM
12AM
74
72
70
68
66
64
62
70 °F
Temperature (°F)
0.02
0.015
0.01
0.005
0
0 in
Precipitation (in)
8
6
4
2
0
5 mph from ENE
Wind Speed
Gust (mph)

From: Livoti, Dominic
Sent: Sunday, July 11, 2021 6:22 PM
To: Breton, Nelson M.
Cc: Howe, Alexander
Subject: ARCH Rochester HW-1 field report 071121
Attachments: HW-1 071121 Dust.JPG; 71121 Weather data.JPG

Hi Nelson,

The crew returned to the site today from 6:30 and 1735 to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, Sharewell, and Labella. Tasks for today included the following:

- Continue drilling within the same bore hole but "Kick out" and steer more aggressively down into more competent rock.
- Drilled 15' down joint #5 trying to kick out.

Drilling Data:

- Joint #4 down
- MD to Bit 114.91'
- Lateral at Gyro 1.13' right
- Elevation at Gyro 524.41'
- Vertical Depth at gyro 12.66'

The CAMP was activated throughout the day with continuous monitoring for vapors at the mud pit and mud recycling plant. The highest observed readings at the mud recycling plant was 0.3 ppm in the breathing space and 2.2 ppm directly over the recycling tank. No elevated readings were observed at the mud pit. Dust monitors were active starting at 0705 until 1730. No significant dust or vibration reading were recorded.

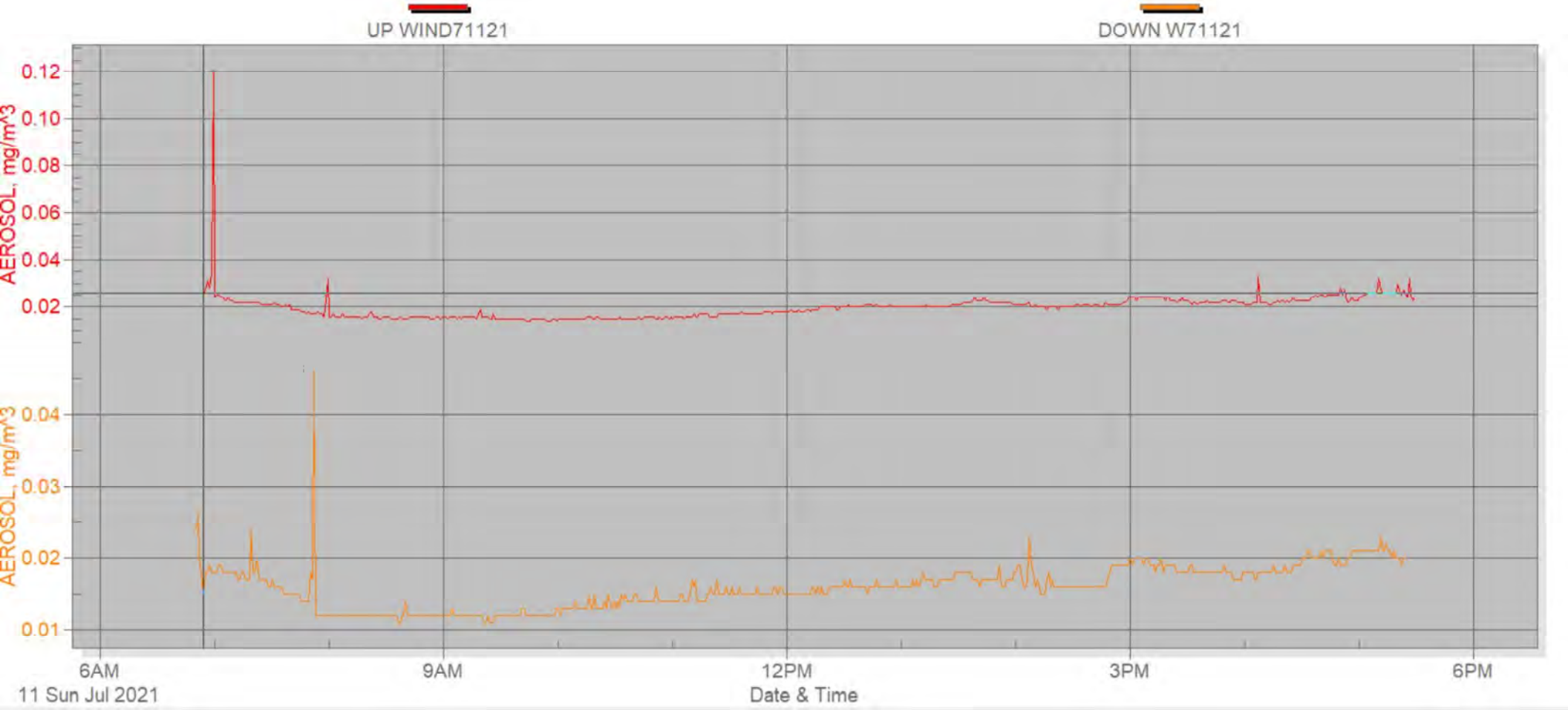
A graph of the upwind and downwind results are attached. Wind was predominantly from the SE – NW (weather data attached).

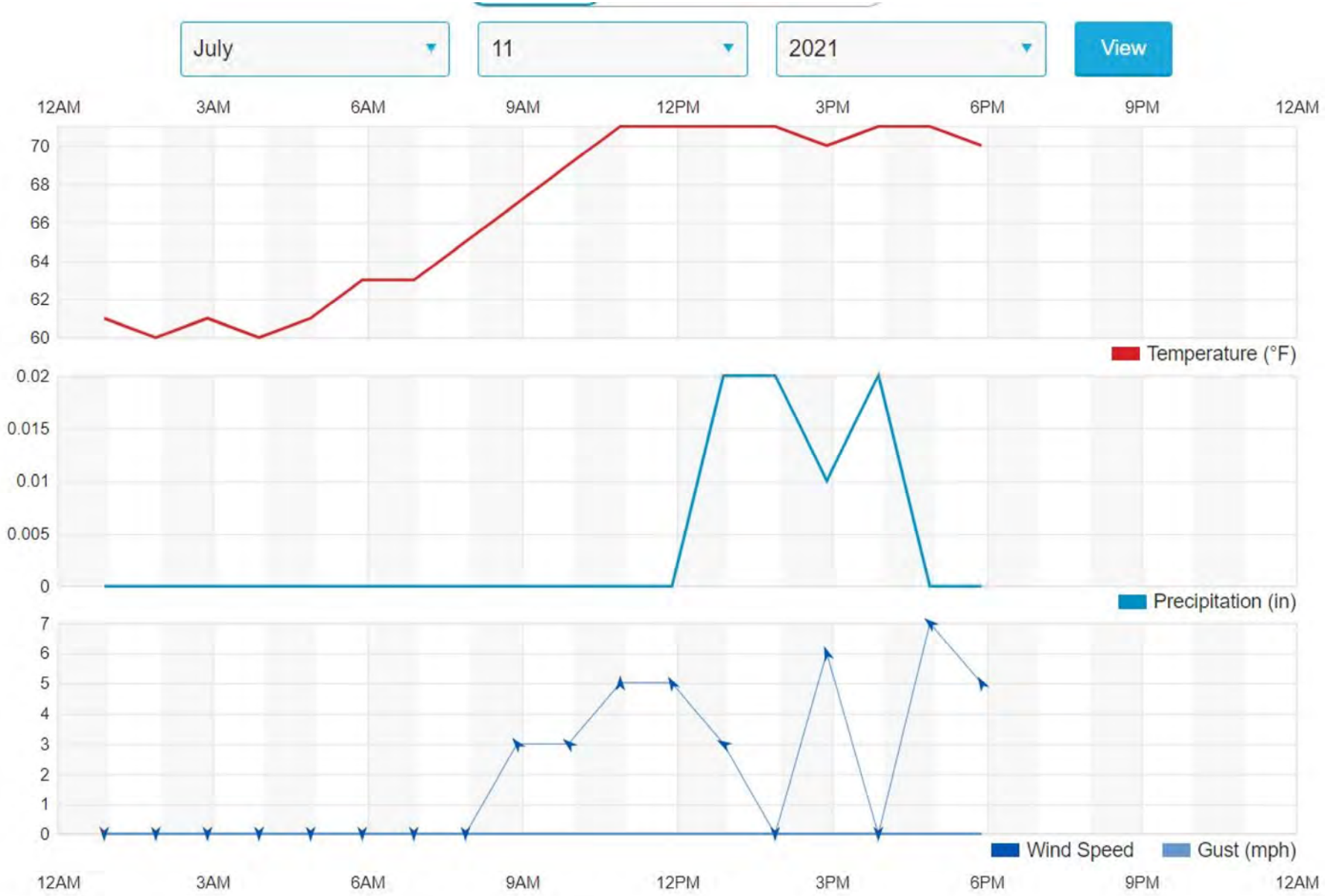
Tomorrow, Labella will not be able to be onsite until 12 so I will handle the vibration monitoring up until that point.

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com

HW-1 071121


UP WIND71121
DOWN W71121
AEROSOL, mg/m^3
0.12
0.10
0.08
0.06
0.04
0.02
AEROSOL, mg/m^3
0.04
0.03
0.02
0.01
6AM
9AM
12PM
3PM
6PM
11 Sun Jul 2021
Date & Time


July
11
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
70
68
66
64
62
60
Temperature (°F)
0.02
0.015
0.01
0.005
0
Precipitation (in)
7
6
5
4
3
2
1
0
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM

From: Livoti, Dominic
Sent: Monday, July 12, 2021 6:48 PM
To: Breton, Nelson M.
Cc: Howe, Alexander
Subject: Arch Rochester HW-1 field report 071221
Attachments: HW-1 071221 dust.JPG; Arch 071221 Weather.JPG

Hi Nelson,

The crew returned to the site today from 6:30 and 1750 to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, Sharewell, and Labella (arrived at noon). Tasks for today included the following:

- Continue drilling the new bore hole within the original pilot hole. Lead driller informed me that the rock is still highly fractured and drill rate will likely be at a slow pace.
- Drilled 10' down joint #6.

Drilling Data:

- Joint #5 down
- MD to Bit 134.91'
- Lateral at Gyro 0.52' right
- Elevation at Gyro 522.96'
- Vertical Depth at gyro 14.11'

The CAMP was activated throughout the day with continuous monitoring for vapors at the mud pit and mud recycling plant. The highest observed readings at the mud recycling plant was 0.2 ppm in the breathing space and 2.8 ppm directly over the recycling tank. No elevated readings were observed at the mud pit. Dust monitors were active starting at 0655 until 1740. No significant dust or vibration readings were recorded.

A graph of the upwind and downwind results are attached. Wind was predominantly from the E – W (weather data attached).

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
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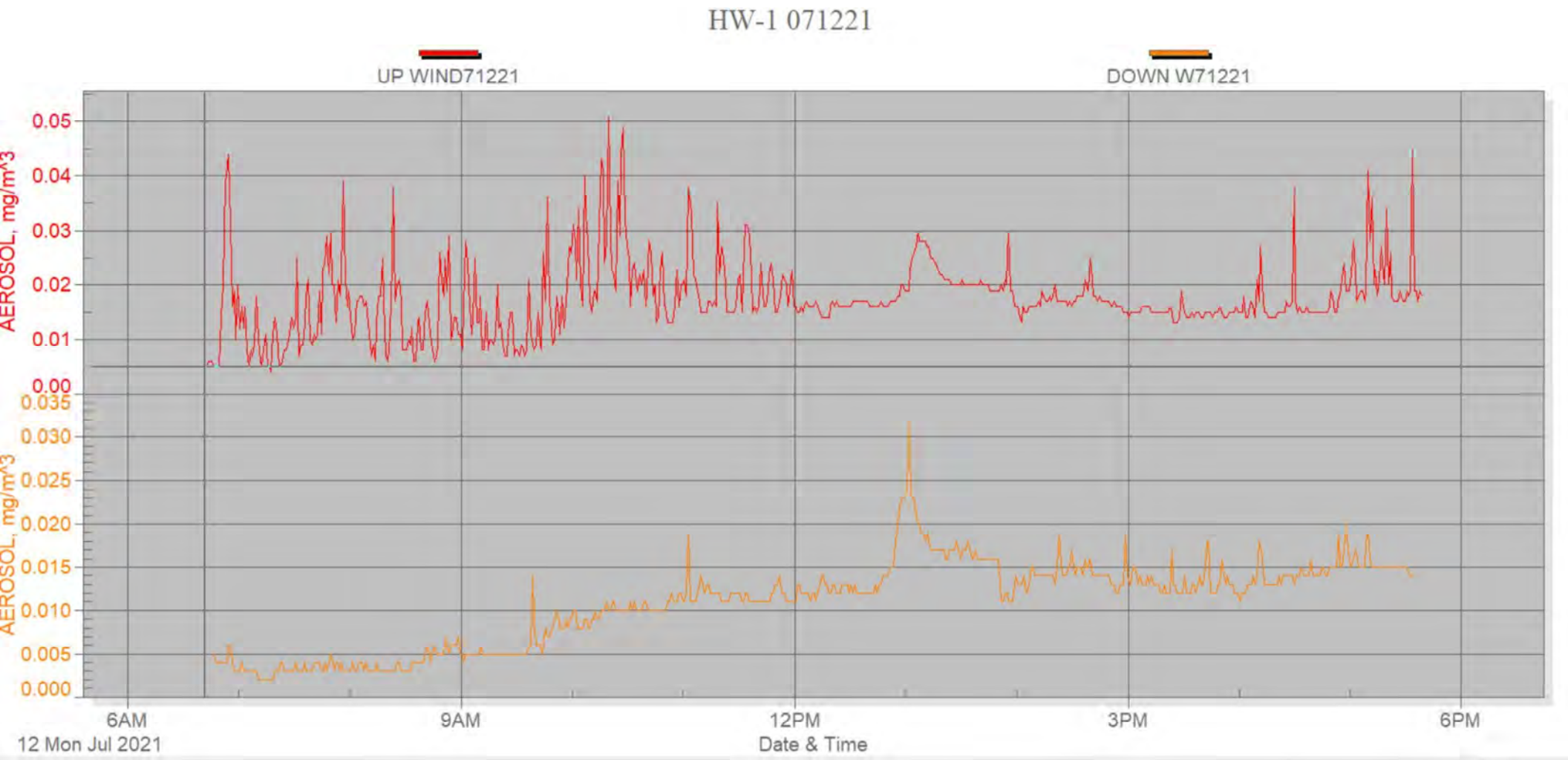

HW-1 071221
UP WIND71221
DOWN W71221
AEROSOL, mg/m^3
0.05
0.04
0.03
0.02
0.01
0.00
AEROSOL, mg/m^3
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
6AM
9AM
12PM
3PM
6PM
12 Mon Jul 2021
Date & Time


Daily
Weekly
Monthly
July
12
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
74
72
70
68
66
64
62
Temperature (°F)
0.2
0.15
0.1
0.05
0
Precipitation (in)
8
6
4
2
0
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM

From: Livoti, Dominic
Sent: Tuesday, July 13, 2021 7:52 PM
To: Breton, Nelson M.
Cc: Howe, Alexander
Subject: Arch Rochester HW-1 Field Report 071321
Attachments: HW-1 071321 dust.JPG; rochester weather data 071321.JPG

Hi Nelson,

The crew returned to the site today from 6:30 and 1750 to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, Sharewell, and Labella. Tasks for today included the following:

- Continue drilling the bore hole, separate from previous hole.
- 80' of new progress made today.
- Drilled down joint #9 and will add #10 tomorrow morning.

Drilling Data:

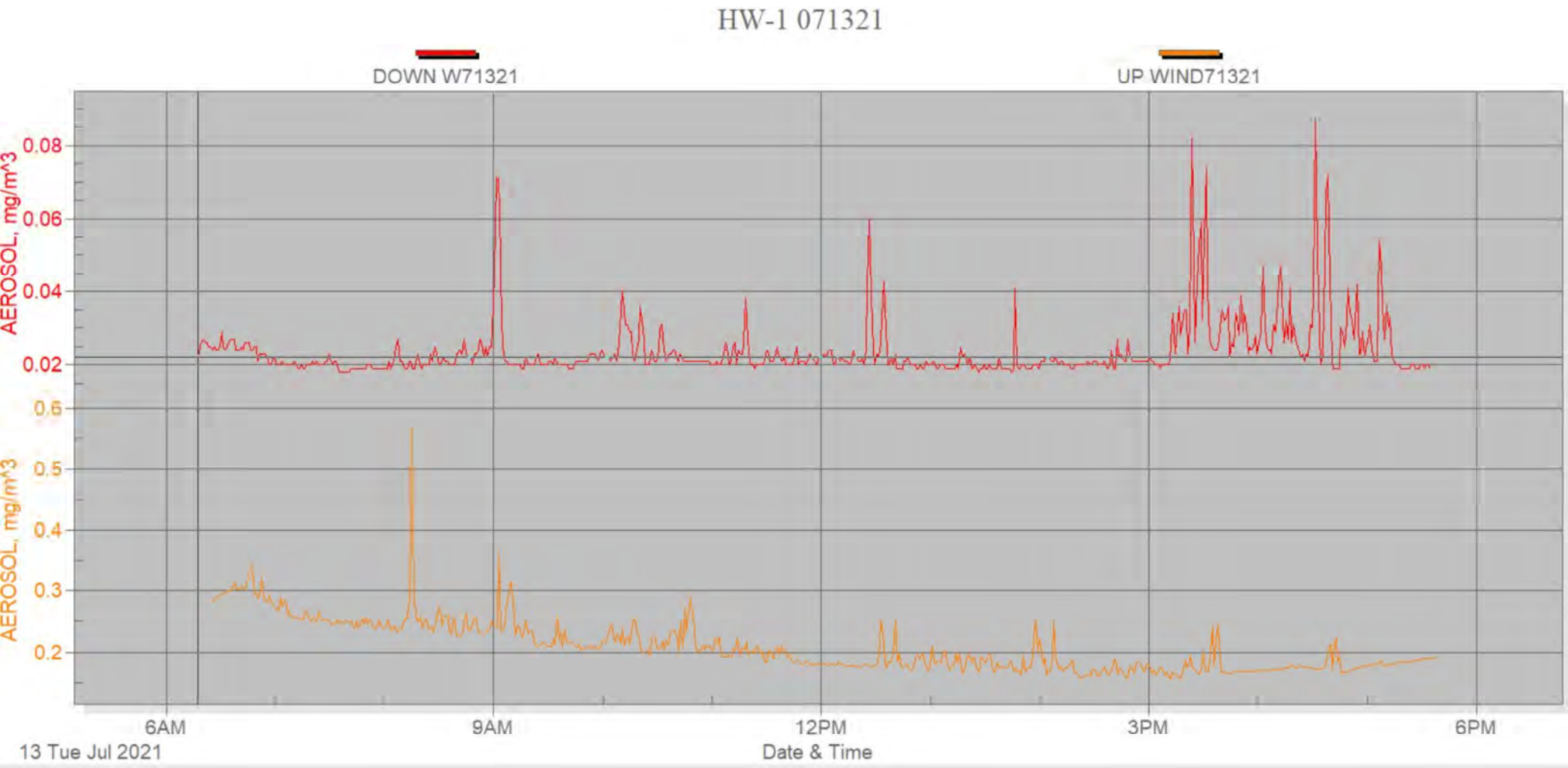
- Joint #9 down
- MD to Bit 214.91'
- Lateral at Gyro 1.18' left
- Elevation at Gyro 515.88'
- Vertical Depth at gyro 21.19'

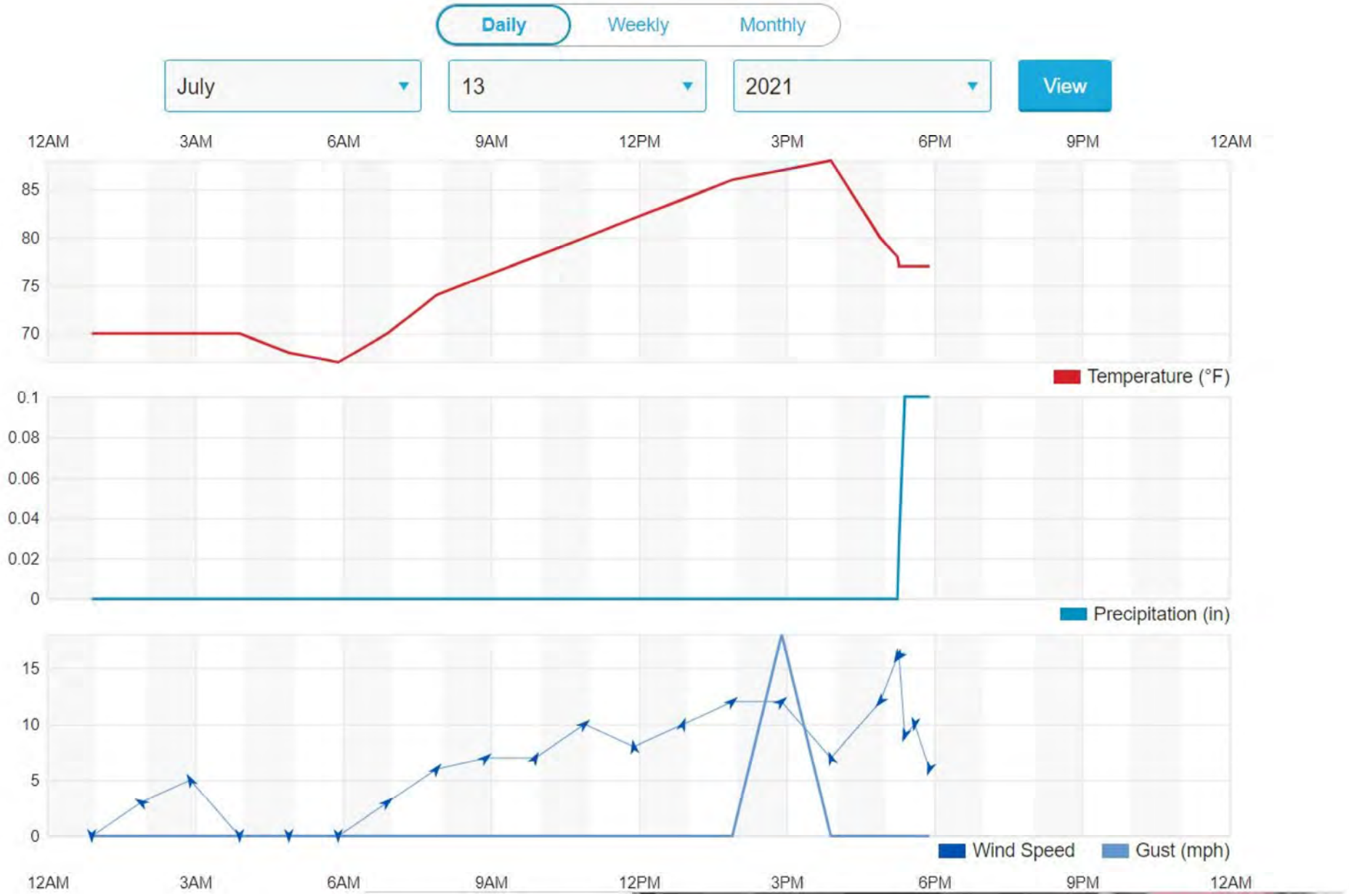
The CAMP was activated throughout the day with continuous monitoring for vapors at the mud pit and mud recycling plant. The highest observed readings at the mud recycling plant was 0 ppm in the breathing space and 0.7 ppm directly over the recycling tank. No elevated readings were observed at the mud pit. Dust monitors were active starting at 065 3until 1740. No significant vibration readings were recorded. Dust readings in the downwind (upwind on graph) direction were more elevated than previous days. Wind direction reversed throughout the day.

A graph of the upwind and downwind results are attached. Wind was predominantly from the W– E (weather data attached).

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com


HW-1 071321
DOWN W71321
UP WIND71321
AEROSOL, mg/m^3
0.08
0.06
0.04
0.02
AEROSOL, mg/m^3
0.6
0.5
0.4
0.3
0.2
6AM
9AM
12PM
3PM
6PM
13 Tue Jul 2021
Date & Time


Daily
Weekly
Monthly
July
13
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
85
80
75
70
Temperature (°F)
0.1
0.08
0.06
0.04
0.02
0
Precipitation (in)
15
10
5
0
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM

From: Livoti, Dominic
Sent: Wednesday, July 14, 2021 5:48 PM
To: Breton, Nelson M.
Cc: Howe, Alexander
Subject: Arch Rochester HW-1 Field Report 071421
Attachments: HW-1 071421 dust.JPG; Rochester Weather 071421.JPG

Hi Nelson,

The crew returned to the site today from 6:30 and 1715 to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, Sharewell, and Labella. Tasks for today included the following:

- Continue drilling the bore hole
- 40' of new progress made today
- Battery was changed out of the near bit sensor, this required tripping all tooling out of the well and then re-tripping it back in.

Drilling Data:

- Joint #11 down
- MD to Bit 254.91'
- MD for the day 40'
- Lateral at Gyro 2.14' left
- Elevation at Gyro 515.02'
- Vertical Depth at gyro 22.05'

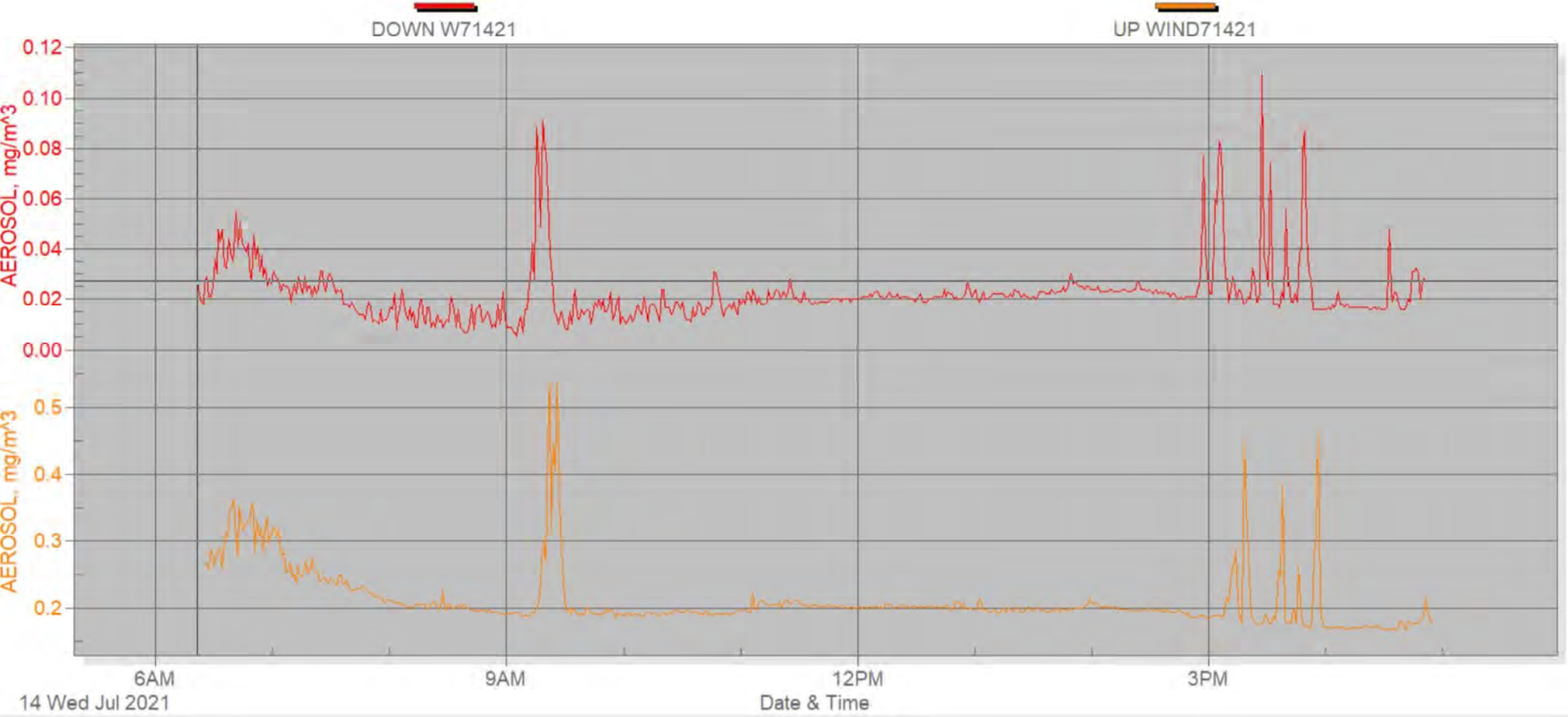
The CAMP was activated throughout the day with continuous monitoring for vapors at the mud pit and mud recycling plant. The highest observed readings at the mud recycling plant was 0.1 ppm in the breathing space and 0.5 ppm directly over the recycling tank. No elevated readings were observed at the mud pit. Dust monitors were active starting at 0640 until 1710. No significant vibration readings were recorded. Dust readings in the upwind direction were more elevated than previous days, however, the downwind direction was not affected. Both water level meters where placed in the two observation wells and did not show any significant changes in DTW.

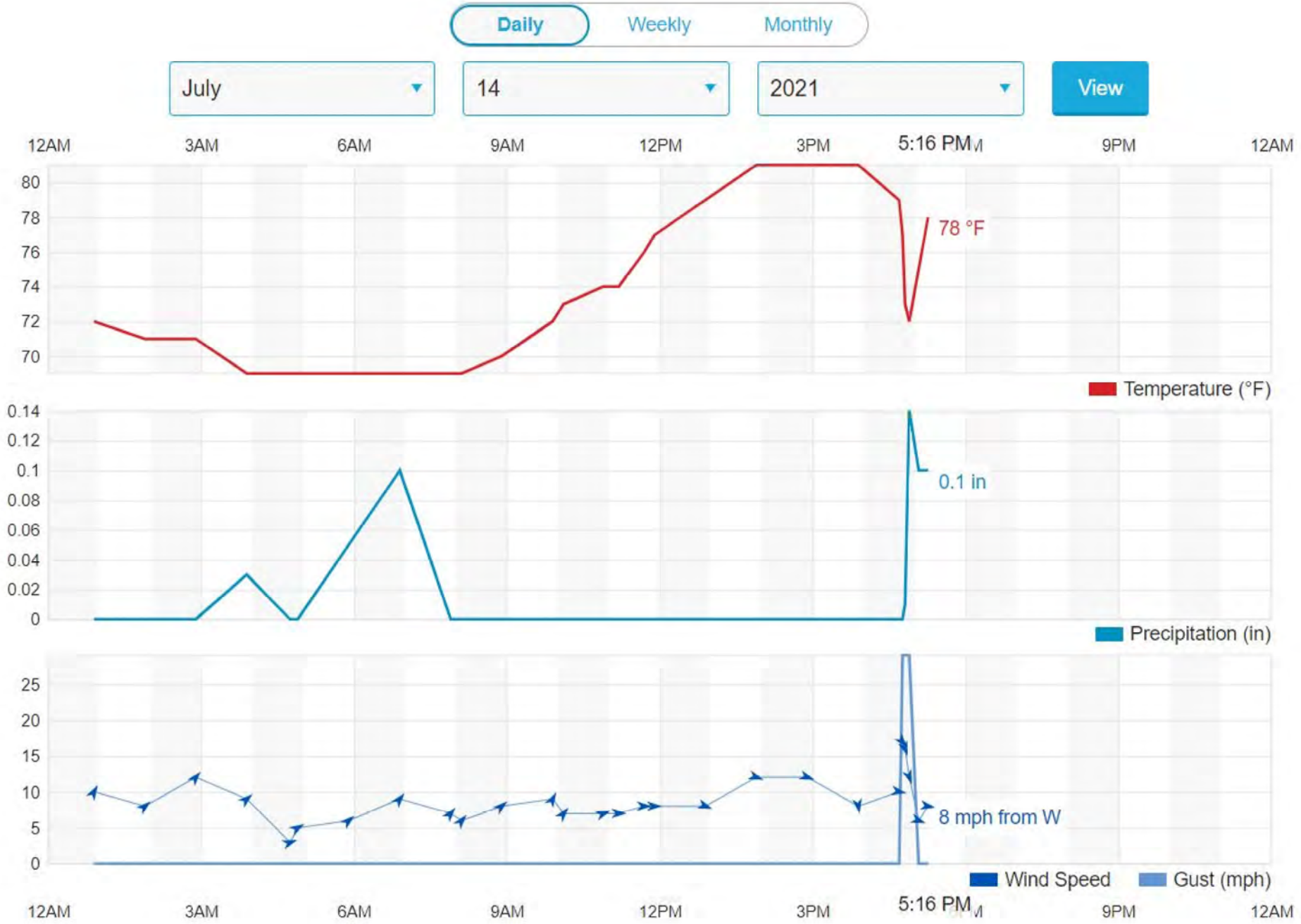
A graph of the upwind and downwind results are attached. Wind was predominantly from the W– E (weather data attached).

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com

HW-1 071421


DOWN W71421
UP WIND71421
AEROSOL, mg/m^3
0.12
0.10
0.08
0.06
0.04
0.02
0.00
AEROSOL, mg/m^3
0.5
0.4
0.3
0.2
6AM
9AM
12PM
3PM
14 Wed Jul 2021
Date & Time


Daily
Weekly
Monthly
July
14
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
5:16 PM
9PM
12AM
80
78
76
74
72
70
78 °F
Temperature (°F)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0.1 in
Precipitation (in)
25
20
15
10
5
0
8 mph from W
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
5:16 PM
9PM
12AM

From: Livoti, Dominic
Sent: Thursday, July 15, 2021 6:44 PM
To: Breton, Nelson M.
Cc: Howe, Alexander; Aube, Rene P.
Subject: Arch Rochester Field Report HW-1 071521
Attachments: HW-1 071521 dust.JPG; Rochester 071521 weather.JPG

Hi Nelson,

The crew returned to the site today from 6:30 and 1730 to continue work on HW-1 installation. Subcontractors onsite include: Ellingson DTD, Sharewell, and Labella. Tasks for today included the following:

- Continue drilling the bore hole
- 100' of new progress made today
- Discussion with drill crew on the correct bore plan
- Prepare for adding on the second box of drill rods (this will be placed onto the drill rig itself)
- We are now past B-17.

Drilling Data:

- Joint #16 down
- MD to Bit 354.91'
- MD for the day 100'
- Lateral at Gyro 1.09' left
- Elevation at Gyro 515.25'
- Vertical Depth at gyro 21.8'

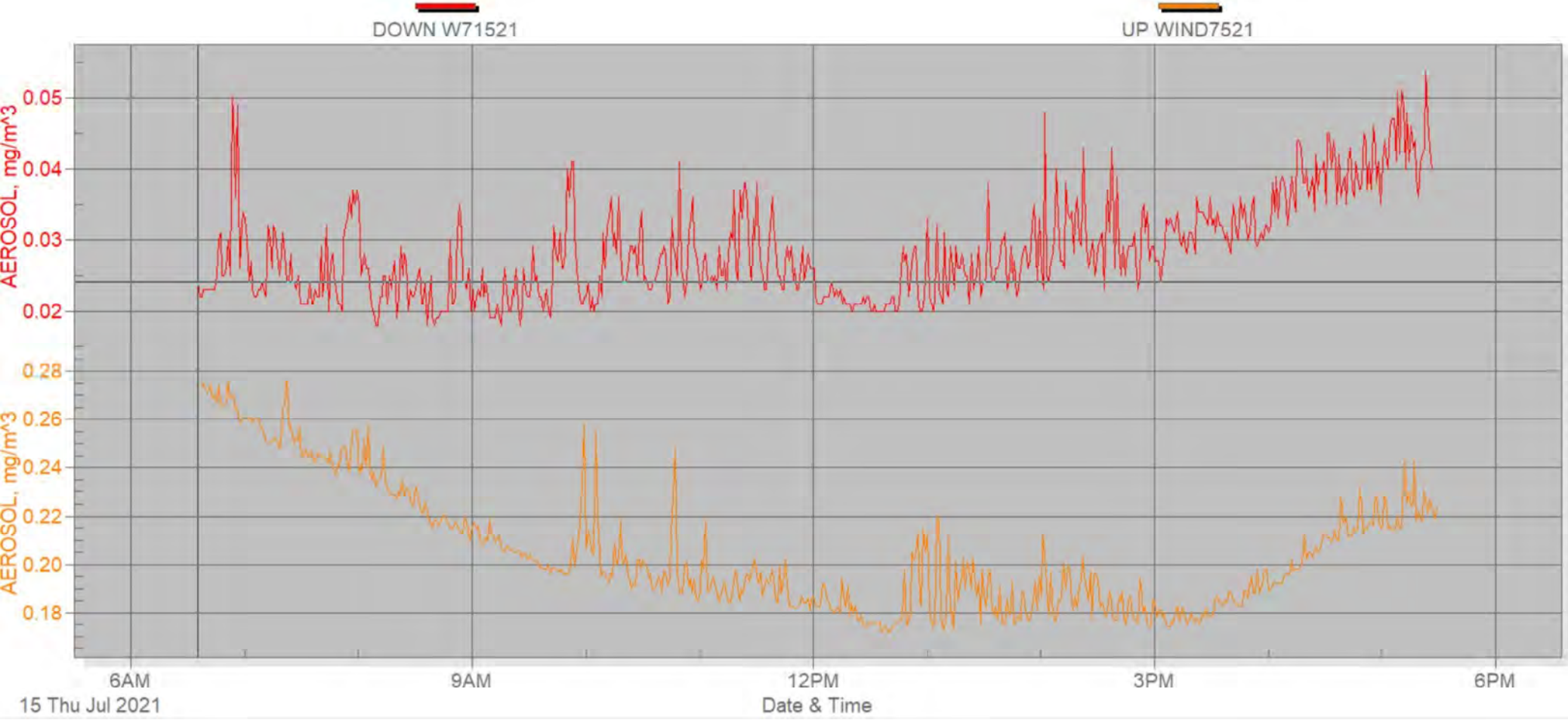
The CAMP was activated throughout the day with continuous monitoring for vapors at the mud pit and mud recycling plant. The highest observed readings at the mud recycling plant was 0 ppm in the breathing space and 1.4 ppm directly over the recycling tank. No elevated readings were observed at the mud pit. Dust monitors were active starting at 0640 until 1730. No significant vibration readings were recorded. Dust readings in the upwind direction were more elevated, however, the downwind direction was not affected. Three water level meters where deployed, one in the each of the observation wells and one in existing well B-17. All water level meters did not show any significant changes in DTW.

A graph of the upwind and downwind results are attached. Wind was predominantly from the W– E (weather data attached).

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com

HW-1 071521


DOWN W71521
UP WIND7521
AEROSOL, mg/m^3
0.05
0.04
0.03
0.02
AEROSOL, mg/m^3
0.28
0.26
0.24
0.22
0.20
0.18
6AM
9AM
12PM
3PM
6PM
15 Thu Jul 2021
Date & Time


Daily
Weekly
Monthly
July
15
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
85
80
75
70
65
Temperature (°F)
1
0.8
0.6
0.4
0.2
0
Precipitation (in)
20
15
10
5
0
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM

From: Howe, Alexander
Sent: Thursday, July 22, 2021 10:07 PM
To: joseph.flores@lonza.com
Cc: warner.golden@lonza.com; gayle.taylor@lonza.com; Brian Younkin; francien.trubia@lonza.com; Livoti, Dominic; richard.flynt@lonza.com; Paye, Dave; Breton, Nelson M.; Aube, Rene P.
Subject: July 21 and 21 field report - Rochester horizontal well drilling
Attachments: 072121 Arch Chemical daily report; Wood - Arch Chemical dewatering well - Rochester, NY - Thursday 7/22/21 Daily Report ; Wood - Arch Chemical dewatering well - Rochester, NY - Wednesday 7/21/21 Daily Report ; Vibration Report 7/21/2021; Vibrations Report for 7/22/2021; HW-1 072221 Dust.pdf

Hi Joe,

Attached is the field reports for July 21st and July 22nd. As Nelson is on vacation starting today I will be submitting the field reports on his behalf.

On July 21st approximately 90 feet of new progress was completed of the 12" reaming pass. At the end of the day the drilling crew let me know that the cutting heads on the reaming bit were not performing as they expected the drill tooling would be tripped out in the morning to replace the cutting heads. See my attached email for more details about 7/21/21.

July 22nd, 2021 Field report.
Work crew was onsite from 0630 to 1750 today. Work continued on HW-1 installation, drilling portion of work was completed today. Subcontractors onsite were: Ellingson DTD and Labella. The following tasks were performed today:

- Tripped out the tooling to replaced cutting heads on the reaming bit.
- Tripped tooling back into the borehole and completed 35 feet of new reaming progress. A total of 200 feet has been completed on the 12" reaming pass.

The CAMP was active throughout the day with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0.7 ppm in the breathing space and 0.4 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0645 until 1730. No CAMP exceedances were recorded today. Wind direction varied slightly throughout the day, with winds predominantly from the West. There appears to be an issue with the upwind dust monitor, we will troubleshoot this to resolve the issue. No significant vibration readings were recorded.

Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

Alex


bore
BR-2 -abandoned
BR-2A - abandoned
BP-5-bor
WELL-1-unk-abandoned
PW10-abandoned
B-17
bore exit
BP-2-boring

From: Howe, Alexander
Sent: Wednesday, July 21, 2021 8:59 PM
To: Breton, Nelson M.
Subject: 072121 Arch Chemical daily report
Attachments: HW-1 072121 Dust.pdf

Hi Nelson,

Work crew was onsite from 0615 to 1800 today. Work continued on HW-1 installation, drilling portion of work was completed today. Subcontractors onsite were: Ellingson DTD and Labella. The following tasks were performed today:

- Continue reaming pilot bore hole using 12" reaming bit. The 12" bit was selected because of the difficult drilling conditions encountered during the pilot bore.
- Total of 90 feet of reaming was completed today.

The CAMP was activated throughout the day with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0.0 ppm in the breathing space and 0.0 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0645 until 1715. No CAMP exceedances were recorded today. Wind direction varied slightly throughout the day, with winds predominantly from the North. No significant vibration readings were recorded.

Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

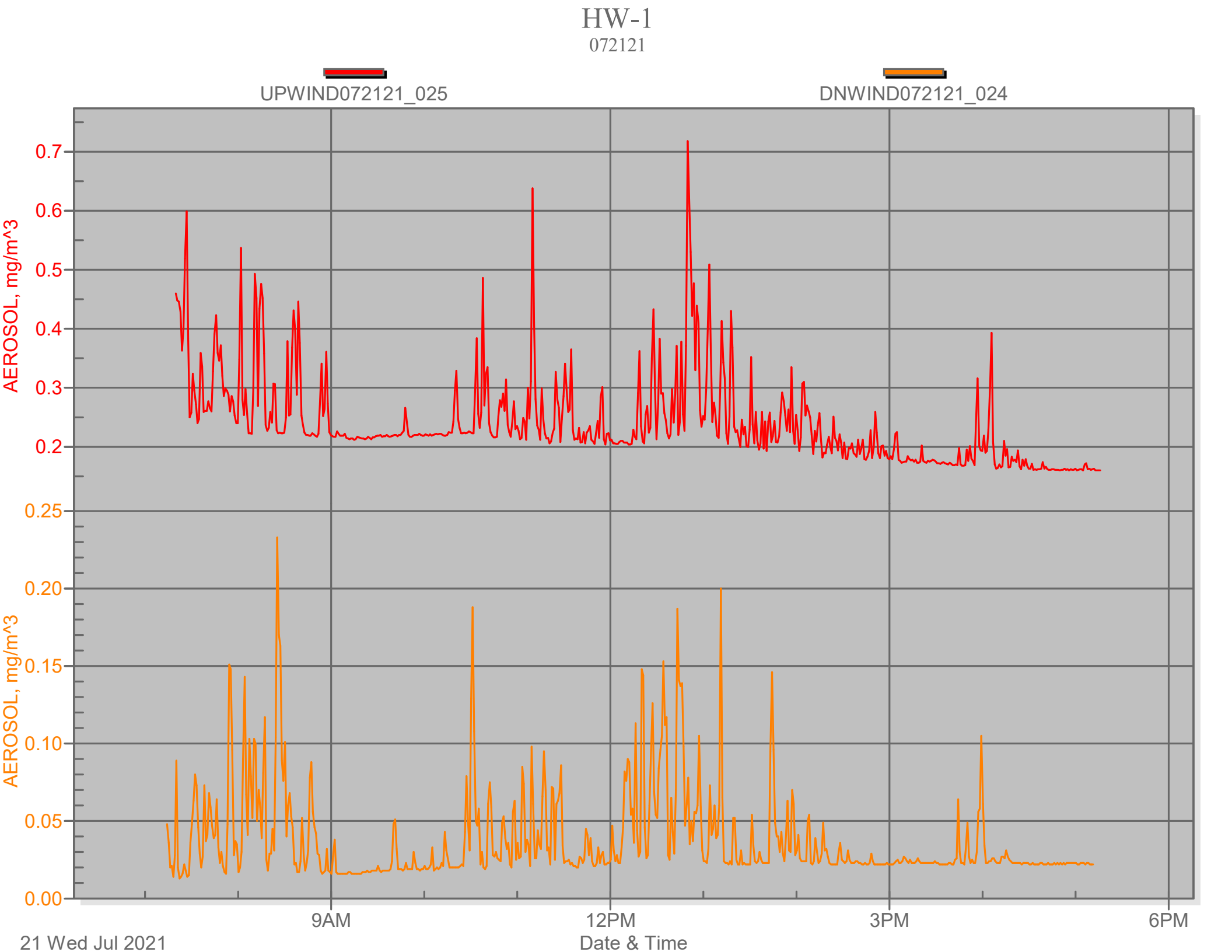
Alex

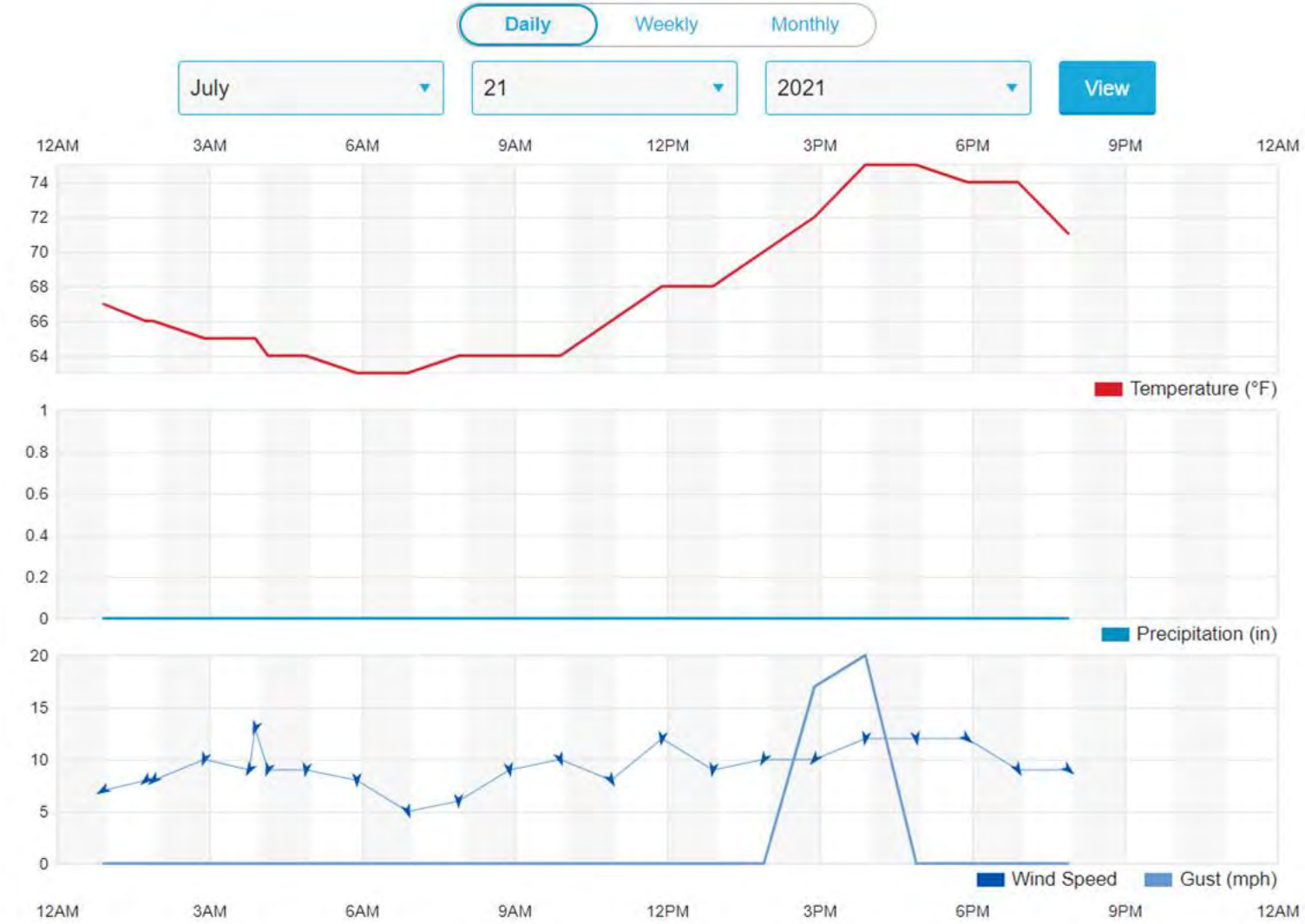
From: Brent Fleming <BFleming@ellingsoncompanies.com>
Sent: Wednesday, July 21, 2021 9:07 PM
To: Breton, Nelson M.; Howe, Alexander; Livoti, Dominic
Cc: Dan Ombalski; Brian Younkin
Subject: Wood - Arch Chemical dewatering well - Rochester, NY - Wednesday 7/21/21 Daily Report

Site: Arch Chemical
Client: Wood
Location: Rochester, NY
Date: Wednesday, 7/21/21
Ellingson-DTD Personnel on site: 5 (Jason Houseton, Scott Surber, Brad Fleming, Brent Fleming, Fred Kruzlik)
Subcontractors on site: 0
Hours on site: 0645 – 1830 (11.75 hours)
Hours worked on site this week: 34.5 hrs
Safety Topics Discussed: Communication
NY811 Ticket#: 05251-002-706
Drilling Assembly: American Augers DD10, 6 1/8" TCI bit, Sharewell GST navigation, mud motor
Company Equipment: American Augers 600 mud recycler, jetter trailer, DD10 drill rig, tool trailer #6169
Rental Equipment: skid steer, 15k generator, 10k reach lift, mini-excavator, 500-gal water trailer
Drilling Completed: 0 feet (649 feet total)
Drilling Completed Relief Hole: 0' (74' total)
Reaming Completed: 90 feet (160 feet total)
Water Filled: 0 Gallons (19,000 gallons total)
Water used for drilling: 0 gallons (18,000 gallons total)
Water Used for Development: 0 gallons (0 gallons total)
Bio-polymer drilling mud mixed: 10 bags (142 bags total)
Approximate drilling waste generated: 500 gallons (4,845 gallons total)
Approximate development waste: 0 gallons (0 gallons total)
Interpreted Borehole Log: soft drilling conditions near surface. Fractured rock 60-100 feet along bore. Solid Dolomite with chert at 100'- 475' along bore.

Brief Summary
Ellingson-DTD arrived onsite at 0645 and conducted the morning safety tailgate meeting. After completing the morning safety meeting equipment was warmed up and work continued on the 12" ream pass. Reaming continued throughout the remainder of the day with the reamer advanced 90' before shutting down and securing site for the day. Tomorrow Ellingson-DTD plans to trip the reamer out of the bore to inspect/replace worn cones on the reamer before tripping back to bottom and continuing the ream pass.

Brent Fleming
Ellingson-DTD
Cell 607-226-0179
Email: brent@horizontaldrill.com
bfleming@ellingsoncompanies.com


HW-1
072121
UPWIND072121_025
DNWIND072121_024
AEROSOL, mg/m^3
0.7
0.6
0.5
0.4
0.3
0.2
0.25
0.20
0.15
0.10
0.05
0.00
AEROSOL, mg/m^3
9AM
12PM
3PM
6PM
21 Wed Jul 2021
Date & Time



Alexander Howe, PG
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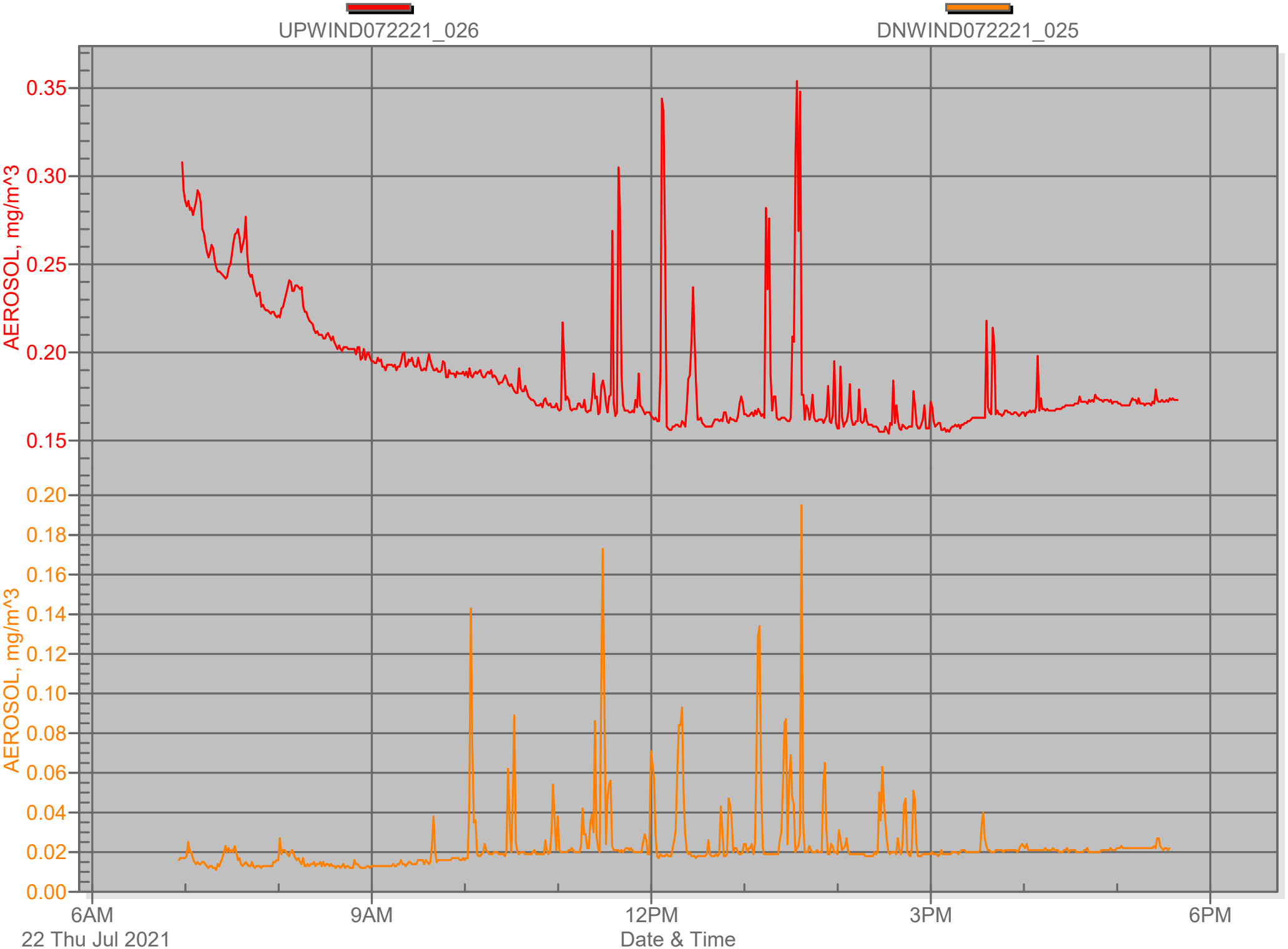
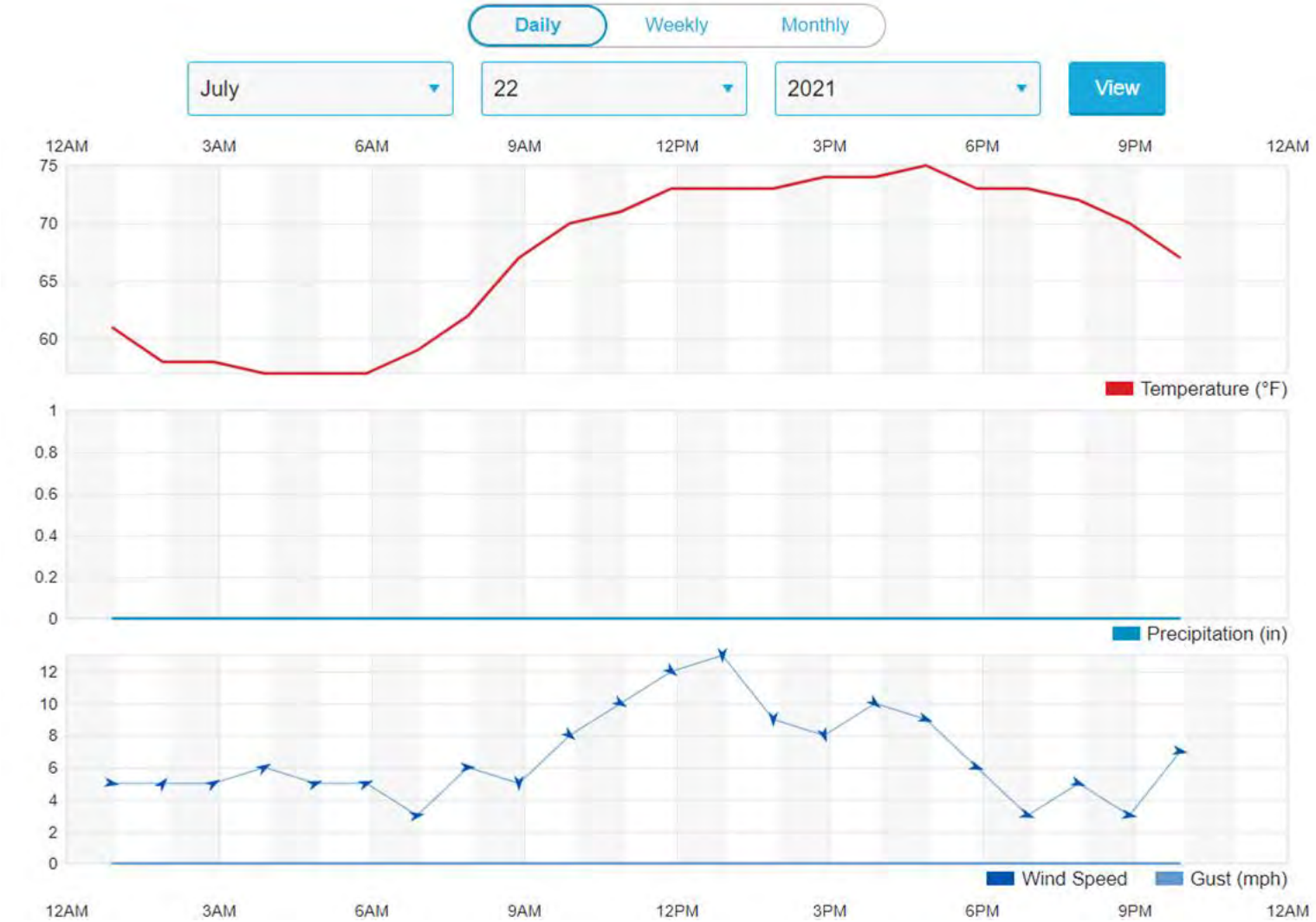
HW-1

07/22/21


UPWIND072221_026
DNWIND072221_025
AEROSOL, mg/m^3
0.35
0.30
0.25
0.20
0.15
AEROSOL, mg/m^3
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
6AM
9AM
12PM
3PM
6PM
22 Thu Jul 2021
Date & Time



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From: Howe, Alexander
Sent: Sunday, July 25, 2021 12:43 PM
To: joseph.flores@lonza.com
Cc: warner.golden@lonza.com; gayle.taylor@lonza.com; Brian Younkin; francien.trubia@lonza.com; Livoti, Dominic; richard.flynt@lonza.com; Paye, Dave; Breton, Nelson M.; Aube, Rene P.
Subject: July 23 field report - Rochester horizontal well drilling
Attachments: HW-1 072321 Dust.pdf; Wood - Arch Chemical dewatering well - Rochester, NY - Friday 7/23/21 Daily Report ; 7-23-2021.pdf

Hi Joe,

July 23nd, 2021 Field report.

Work crew was onsite from 0630 to 1750. Work continued on the 12 inch reaming pass of the HW-1 borehole. Subcontractors onsite were: Ellingson DTD and Labella. The following tasks were performed today:

- Completed 100' of the 12 inch reaming pass. To increase the speed of reaming the mini excavator was used to pull on the exit string using a swivel to increase the cutting power of the reaming bit. Reaming progress represented by the green line below.
- Ellingson loaded Sharewell equipment for shipment offsite.

The CAMP was active throughout the day on July 23rd with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 1.0 ppm in the breathing space and 1.0 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0645 until 1730. No CAMP exceedances were recorded today. Wind direction varied slightly throughout the day, with winds predominantly from the West in the AM and North in the PM. The calibration issue with the upwind monitor continues to persist, on Monday we will look at swapping out the unit. No significant vibration readings were recorded.

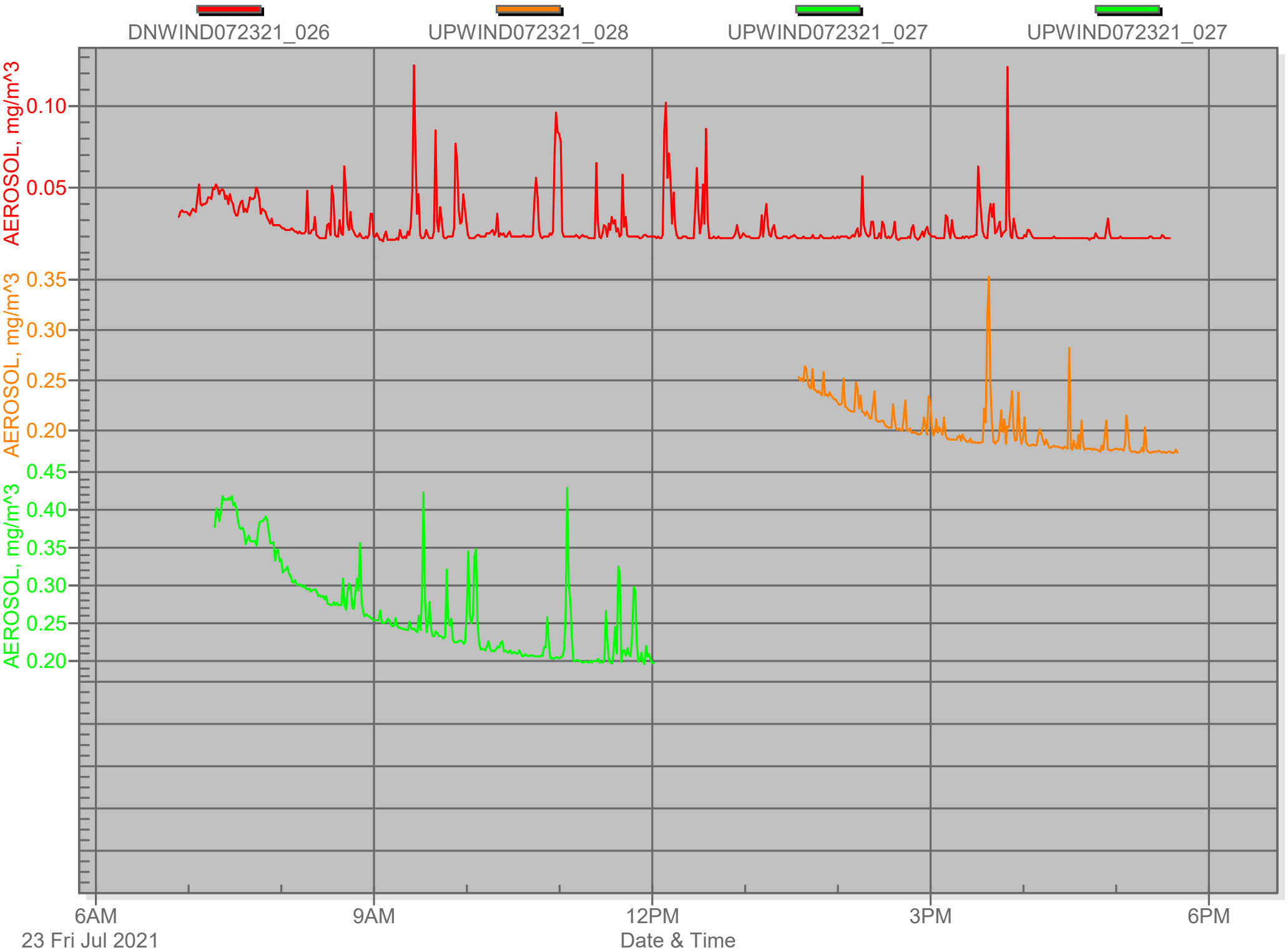
Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

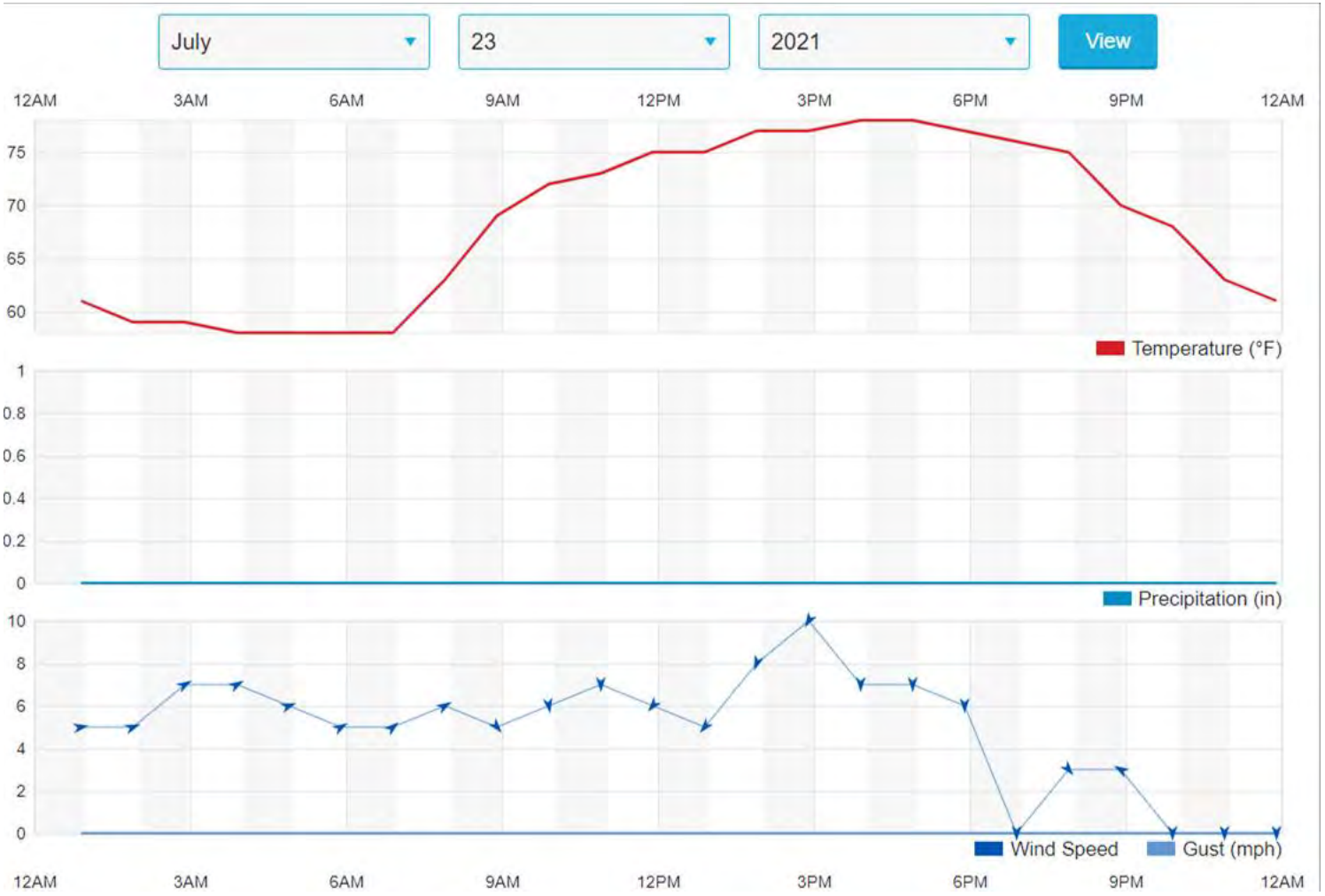
Alex


bore
BR-2 -abandoned
BR-2A - abandoned
BP-5-boring
WELL-1-unk-abandoned
PW10-abandoned
bore exit
BP-2-boring

HW-1

07/23/21


DNWIND072321_026
UPWIND072321_028
UPWIND072321_027
UPWIND072321_027
AEROSOL, mg/m^3
0.10
0.05
AEROSOL, mg/m^3
0.35
0.30
0.25
0.20
AEROSOL, mg/m^3
0.45
0.40
0.35
0.30
0.25
0.20
6AM
9AM
12PM
3PM
6PM
23 Fri Jul 2021
Date & Time



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From: Howe, Alexander
Sent: Sunday, July 25, 2021 1:30 PM
To: joseph.flores@lonza.com
Cc: warner.golden@lonza.com; gayle.taylor@lonza.com; Brian Younkin; francien.trubia@lonza.com; Livoti, Dominic; richard.flynt@lonza.com; Paye, Dave; Breton, Nelson M.; Aube, Rene P.
Subject: July 24 field report - Rochester horizontal well drilling
Attachments: HW-1 072421 Dust.pdf; Wood - Arch Chemical dewatering well - Rochester, NY - Saturday 7/24/21 Daily Report ; 7-24-2021.pdf

Hi Joe,

July 24th, 2021 Field report.

Work crew was onsite from 0630 to 1700. Work continued on the 12 inch reaming pass of the HW-1 borehole. Subcontractors onsite were: Ellingson DTD and Labella. The following tasks were performed yesterday:

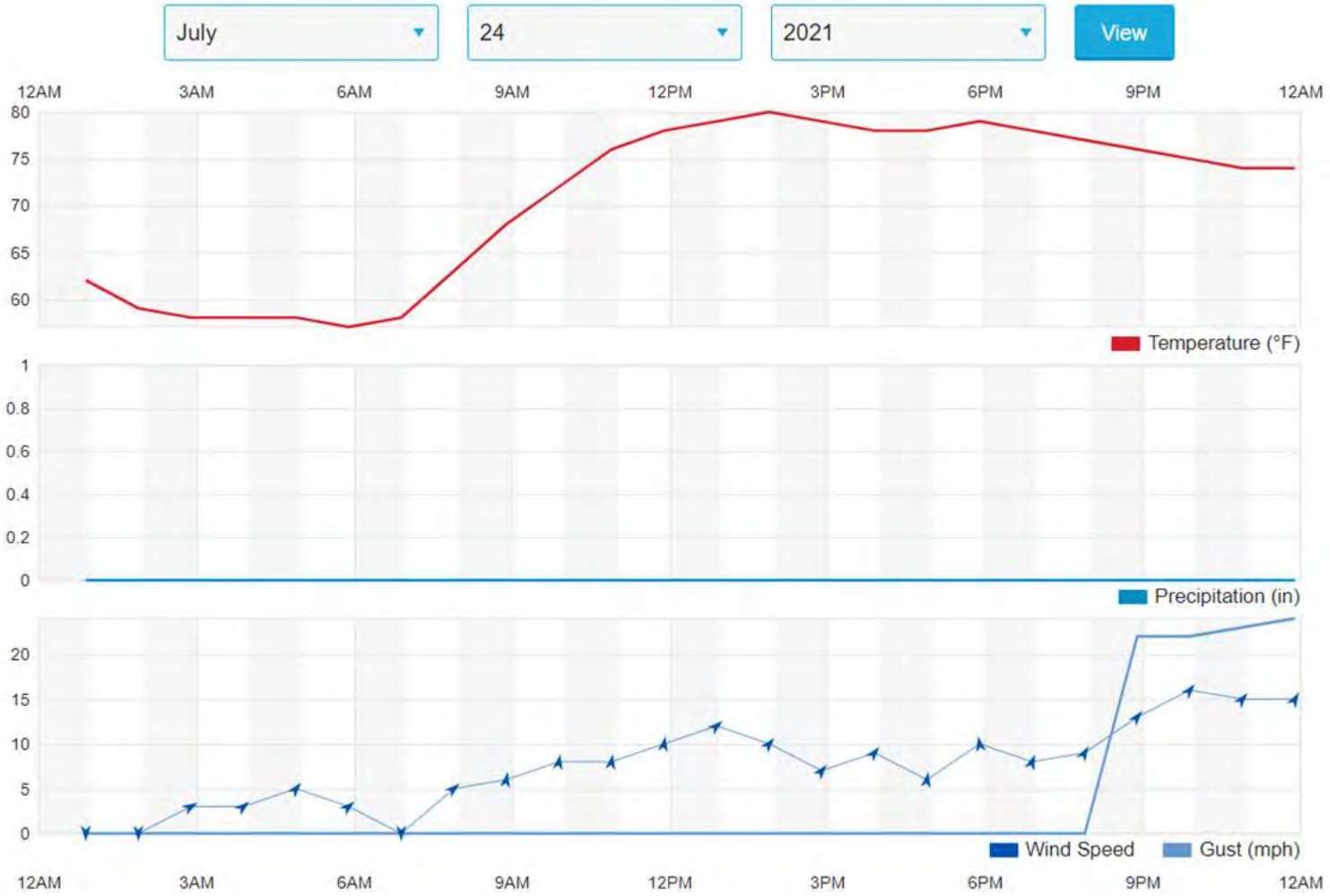
- Completed 65' of the 12 inch reaming pass. To increase the speed of reaming the mini excavator was used to pull on the exit string using a swivel to increase the cutting power of the reaming bit. Reaming progress represented by the green line below. Total reaming progress is 360'.
- Swapped the drilling rod rack from the exit and entry pits.
- The water level meter was deployed in B-17 throughout the day. No changes in water level were observed.
- Drilling mud is flowing into both the exit and entry pits of the boring. Ellingson now must recover drilling mud from the exit pit and transport it using the vac trailer and water truck to the mud recycling plant.

The CAMP was active throughout the day on July 24th with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0.1 ppm in the breathing space and 1.0 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0645 until 1640. No CAMP exceedances were recorded today. Wind direction varied slightly throughout the day, with winds predominantly from the southwest throughout the day. The calibration issue with the upwind monitor continues to persist, on Monday we will look at swapping out the unit. No significant vibration readings were recorded.

Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

Alex


bore exit
BP 2 boring
FW10 abandoned
BR-2 abandoned
BR-2A - abandoned
BP 5 boring



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From: Livoti, Dominic
Sent: Monday, July 26, 2021 7:25 PM
To: Howe, Alexander
Cc: Breton, Nelson M.
Subject: July 26 field report - Rochester horizontal well drilling
Attachments: HW-1 072621 dust.JPG; Rochester Weather 072621.JPG

Hi Alex,

Here is the July 26th, 2021 Field report.

Work crew was onsite from 0630 to 1810. Work continued on the 12 inch reaming pass of the HW-1 borehole. Subcontractors onsite were: Ellingson DTD and Labella. Dominic Livoti arrived onsite and took over for Alex Howe at 13:58. The following tasks were performed:

- Completed 100' of the 12 inch reaming pass.
- The water level meter was deployed in B-17 throughout the day. No changes in water level were observed.
- Drilling mud is flowing into both the exit and entry pits of the boring. Ellingson continues to recover drilling mud from the exit pit and transport it using the vac trailer and water truck to the mud recycling plant.
- Reaming was on stand by for an hour due to overheating of the drill rig. EDTD went and purchased more antifreeze.

The CAMP was active throughout the day on July 26th with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0.3 ppm in the breathing space and 0.7 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0710 until 1750. No CAMP exceedances were recorded today. Wind direction varied slightly throughout the day, with winds predominantly from the Northeast throughout the day. The calibration issue with the upwind monitor continues to persist. No significant vibration readings were recorded.

Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

Thanks,
Dom

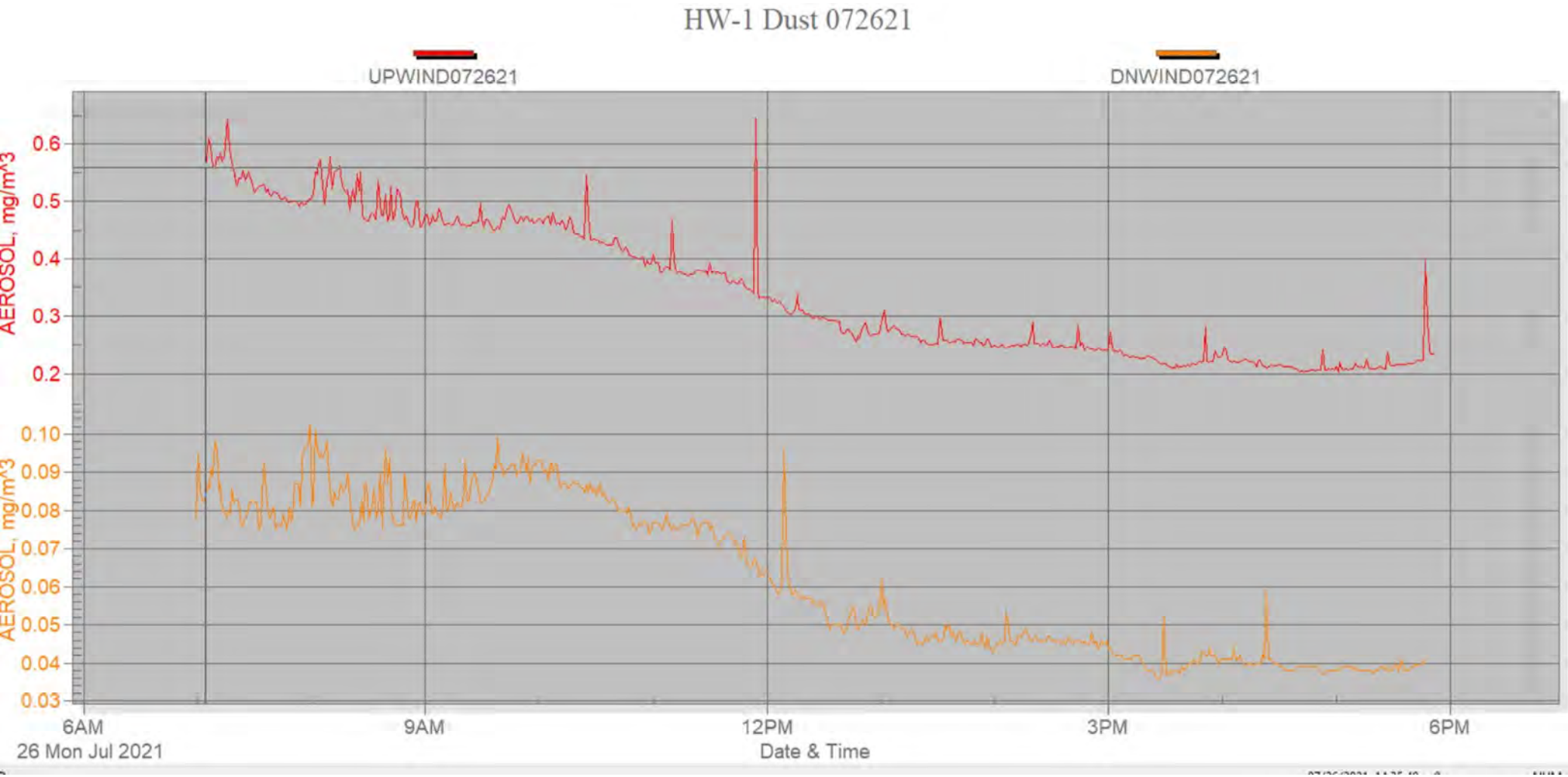
Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com

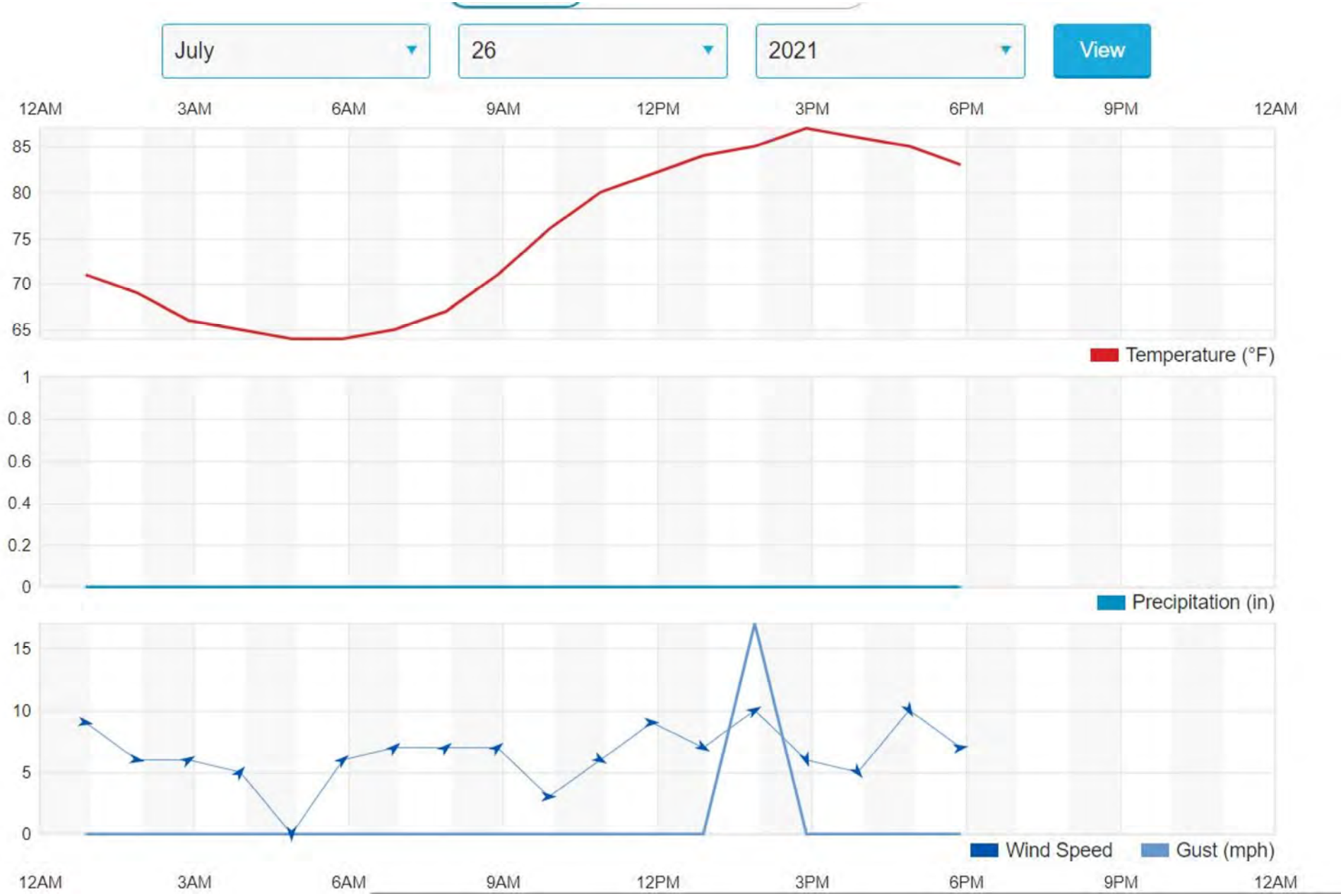
From: Howe, Alexander
Sent: Tuesday, July 27, 2021 8:37 AM
To: joseph.flores@lonza.com
Cc: warner.golden@lonza.com; gayle.taylor@lonza.com; Brian Younkin; francien.trubia@lonza.com; Livoti, Dominic; richard.flynt@lonza.com; Paye, Dave; Breton, Nelson M.; Aube, Rene P.
Subject: July 27 field report - Rochester horizontal well drilling
Attachments: Wood - Arch Chemical dewatering well - Rochester, NY - Monday 7/26/21 Daily Report ; July 26 field report - Rochester horizontal well drilling; RE: Vibration Report 7/26/2021

Hi Joe,

Please see the attached filed reports for 7/26. The reaming pass continued towards the west exit pit for a total of ~100 feet of progress. Drill mud returns are being discharged into both the entry and exit pits of the borehole requiring Ellingson to recover mud from the exit pit using the vac trailer and water truck and move it back to the mud recycling plant. Reaming progress is represented by the green line below.

Alex


HW-1 Dust 072621
UPWIND072621
DNWIND072621
AEROSOL, mg/m^3
0.6
0.5
0.4
0.3
0.2
AEROSOL, mg/m^3
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
6AM
9AM
12PM
3PM
6PM
26 Mon Jul 2021
Date & Time


July
26
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
85
80
75
70
65
Temperature (°F)
1
0.8
0.6
0.4
0.2
0
Precipitation (in)
15
10
5
0
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM

From: Livoti, Dominic
Sent: Tuesday, July 27, 2021 6:44 PM
To: Howe, Alexander
Cc: Breton, Nelson M.
Subject: July 27 field report - rochester Horizontal well drilling
Attachments: HW-1 Dust graph 072721.JPG; Rochester 072721 weather.JPG

Hi Alex,

Here is the July 27th, 2021 Field report.

Work crew was onsite from 0630 to 1800. EDTD completed the 12 inch reaming pass of the HW-1 borehole. Subcontractors onsite were: Ellingson DTD and Labella. The following tasks were performed:

- Completed the entire 12 inch reaming of bore hole HW-1
- Turned reaming bit around for the swab pass which will start tomorrow morning 7/28
- The water level meter was deployed in B-17 throughout the day. No changes in water level were observed.
- Drilling mud is flowing into both the exit and entry pits of the boring. Ellingson continues to recover drilling mud from the exit pit and transport it using the vac trailer and water truck to the mud recycling plant.
- Informed Labella that reaming was completed and vibration monitoring was no longer needed. Labella will return tomorrow 7/28 to pack up their remaining equipment.

The CAMP was active throughout the day on July 27th with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0.0 ppm in the breathing space and 0.7 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0645 until 1735. No CAMP exceedances were recorded today. Wind direction varied slightly throughout the day, with winds predominantly from the Northeast throughout the day. The calibration issue with the upwind monitor continues to persist. No significant vibration readings were recorded.

Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com

From: Howe, Alexander
Sent: Wednesday, July 28, 2021 7:47 AM
To: joseph.flores@lonza.com
Cc: warner.golden@lonza.com; gayle.taylor@lonza.com; Brian Younkin; francien.trubia@lonza.com; Livoti, Dominic; richard.flynt@lonza.com; Paye, Dave; Breton, Nelson M.; Aube, Rene P.
Subject: July 27 field report - Rochester horizontal well drilling
Attachments: Wood - Arch Chemical dewatering well - Rochester, NY - Tuesday 7/27/21 Daily Report ; July 27 field report - rochester Horizontal well drilling; RE: Vibration Report 7/27/2021

Hi Joe,

Please see the attached filed reports for 7/27. The reaming pass was completed towards the west exit pit for a total of ~189 feet of progress, 649 ft total. In the afternoon, Ellingson detached the reaming bit from the drill rods and rotated it. They will now complete the swab pass back towards the entry pit to clear the boring of debris and cuttings. Drill mud returns continue to be discharged into both the entry and exit pits of the borehole requiring Ellingson to recover mud from the exit pit using the vac trailer and water truck and move it back to the mud recycling plant.

Vibration monitoring has been stopped at the conclusion of the reaming pass. Labella will be onsite today to recovery their equipment.

Next steps include:

- Completing the swab pass
- Mobilizing the drilling rig to the west exit pit
- Commencing well installation

Alex

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alexander.howe@woodplc.com
www.woodplc.com

From: Livoti, Dominic
Sent: Tuesday, July 27, 2021 6:44 PM
To: Howe, Alexander
Cc: Breton, Nelson M.
Subject: July 27 field report - rochester Horizontal well drilling
Attachments: HW-1 Dust graph 072721.JPG; Rochester 072721 weather.JPG

Hi Alex,

Here is the July 27th, 2021 Field report.

Work crew was onsite from 0630 to 1800. EDTD completed the 12 inch reaming pass of the HW-1 borehole. Subcontractors onsite were: Ellingson DTD and Labella. The following tasks were performed:

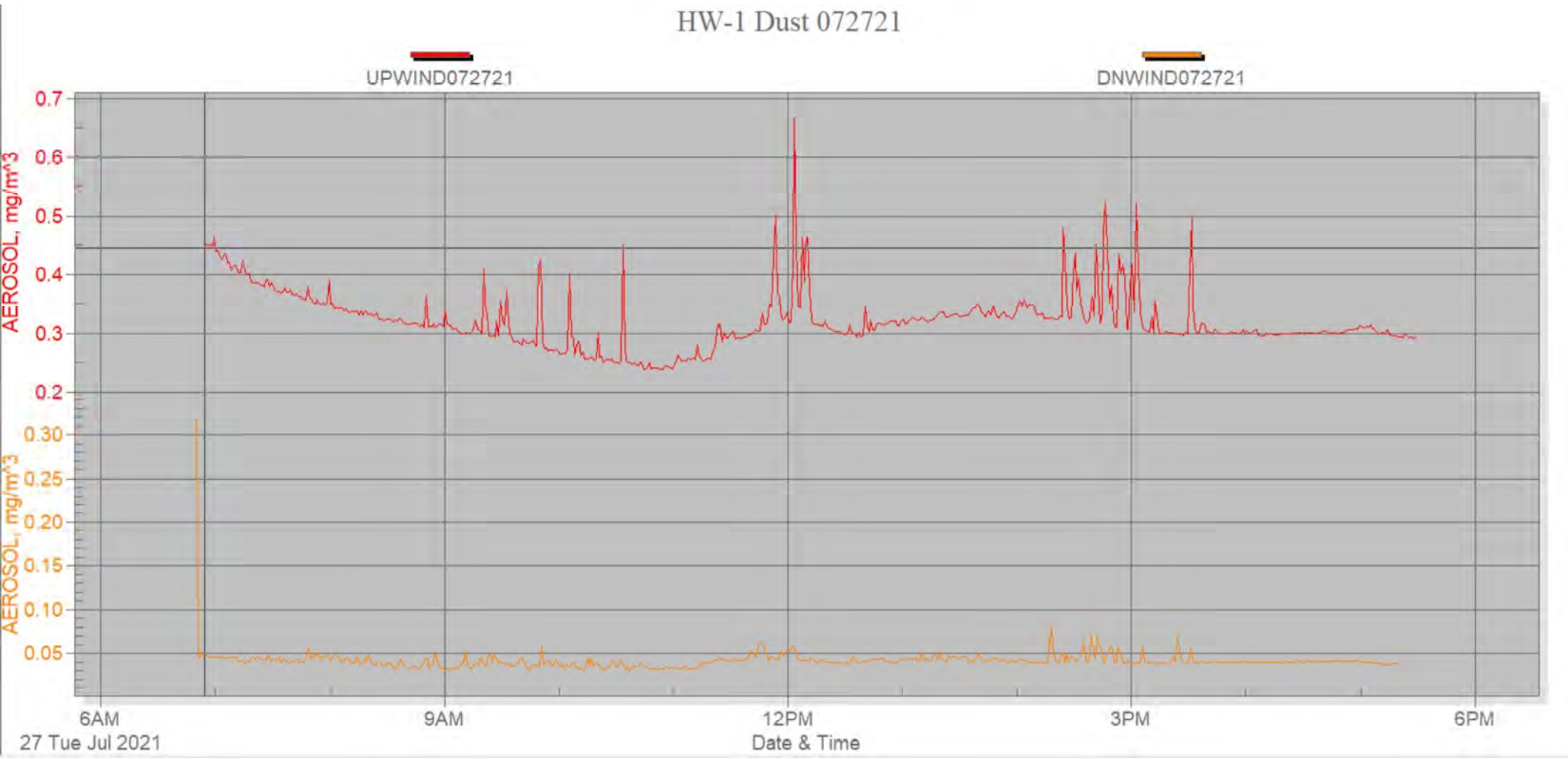
- Completed the entire 12 inch reaming of bore hole HW-1
- Turned reaming bit around for the swab pass which will start tomorrow morning 7/28
- The water level meter was deployed in B-17 throughout the day. No changes in water level were observed.
- Drilling mud is flowing into both the exit and entry pits of the boring. Ellingson continues to recover drilling mud from the exit pit and transport it using the vac trailer and water truck to the mud recycling plant.
- Informed Labella that reaming was completed and vibration monitoring was no longer needed. Labella will return tomorrow 7/28 to pack up their remaining equipment.

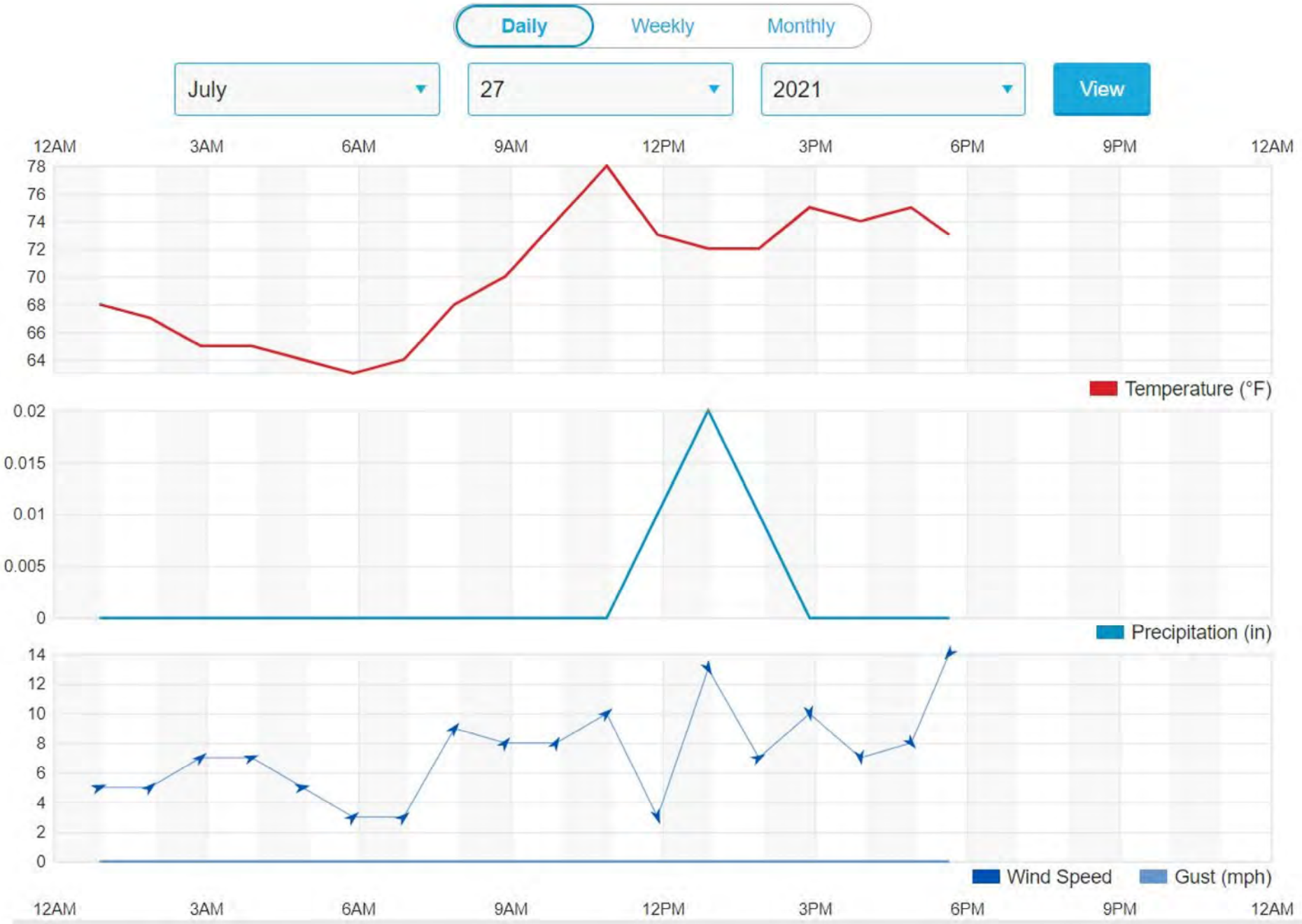
The CAMP was active throughout the day on July 27th with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0.0 ppm in the breathing space and 0.7 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0645 until 1735. No CAMP exceedances were recorded today. Wind direction varied slightly throughout the day, with winds predominantly from the Northeast throughout the day. The calibration issue with the upwind monitor continues to persist. No significant vibration readings were recorded.

Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com


HW-1 Dust 072721
UPWIND072721
DNWIND072721
AEROSOL, mg/m^3
0.7
0.6
0.5
0.4
0.3
0.2
AEROSOL, mg/m^3
0.30
0.25
0.20
0.15
0.10
0.05
6AM
9AM
12PM
3PM
6PM
27 Tue Jul 2021
Date & Time


Daily
Weekly
Monthly
July
27
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
78
76
74
72
70
68
66
64
Temperature (°F)
0.02
0.015
0.01
0.005
0
Precipitation (in)
14
12
10
8
6
4
2
0
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM

From: Livoti, Dominic
Sent: Wednesday, July 28, 2021 5:58 PM
To: Howe, Alexander
Cc: Breton, Nelson M.
Subject: July 28 Field report- Rochester horizontal well drilling
Attachments: Rochester weather 072821.JPG; HW-1 Dust 072821.JPG

Hi Alex,

Here is the July 28th, 2021 Field report.

Work crew was onsite from 0630 to 1450. EDTD completed the swab pass of the HW-1 borehole. Subcontractors onsite were: Ellingson DTD and Labella (briefly). The following tasks were performed:

- Completed the swab pass
- Extra roll off dumpster was delivered
- Switched out drill boxes (empty one from the front was put onto the rig)
- The water level meter was deployed in B-17 throughout the day. No changes in water level were observed.
- Drilling mud is flowing into both the exit and entry pits of the boring. Ellingson continued to recover drilling mud from the exit pit and transport it using the vac trailer and water truck to the mud recycling plant.
- Mud play shut down at 15:05
- Start work on moving equipment to the front of the build in order to pull casing which is expected to start this Friday 7/30
- Labella returned this morning and packed up all of their equipment.

The CAMP was active throughout the day on July 28th with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0.1 ppm in the breathing space and 1.0 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0700 until 1505. No CAMP exceedances were recorded today. Wind direction was predominantly from the Northeast throughout the day. The calibration issue with the upwind monitor continues to persist.

Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

Thanks,
Dom

From: Howe, Alexander
Sent: Thursday, July 29, 2021 1:36 PM
To: joseph.flores@lonza.com
Cc: warner.golden@lonza.com; gayle.taylor@lonza.com; Brian Younkin; francien.trubia@lonza.com; Livoti, Dominic; richard.flynt@lonza.com; Paye, Dave; Breton, Nelson M.; Aube, Rene P.
Subject: July 28 field report - Rochester horizontal well drilling
Attachments: Wood - Arch Chemical dewatering well - Rochester, NY - Wednesday 7/28/21 Daily Report ; July 28 Field report- Rochester horizontal well drilling

Hello Joe,

Please see the attached filed reports for 7/28. The swab pass was completed towards the east exit pit along the entire length of the borehole. In the afternoon, Ellingson began to move the rig to western end of the bore hole and prepare the jobsite to commence installation of the well into the open bore hole. Well installation is anticipated to start possibly as early as tomorrow morning and will continue through the day until all sections have been welded and pulled into the bore.

Alex

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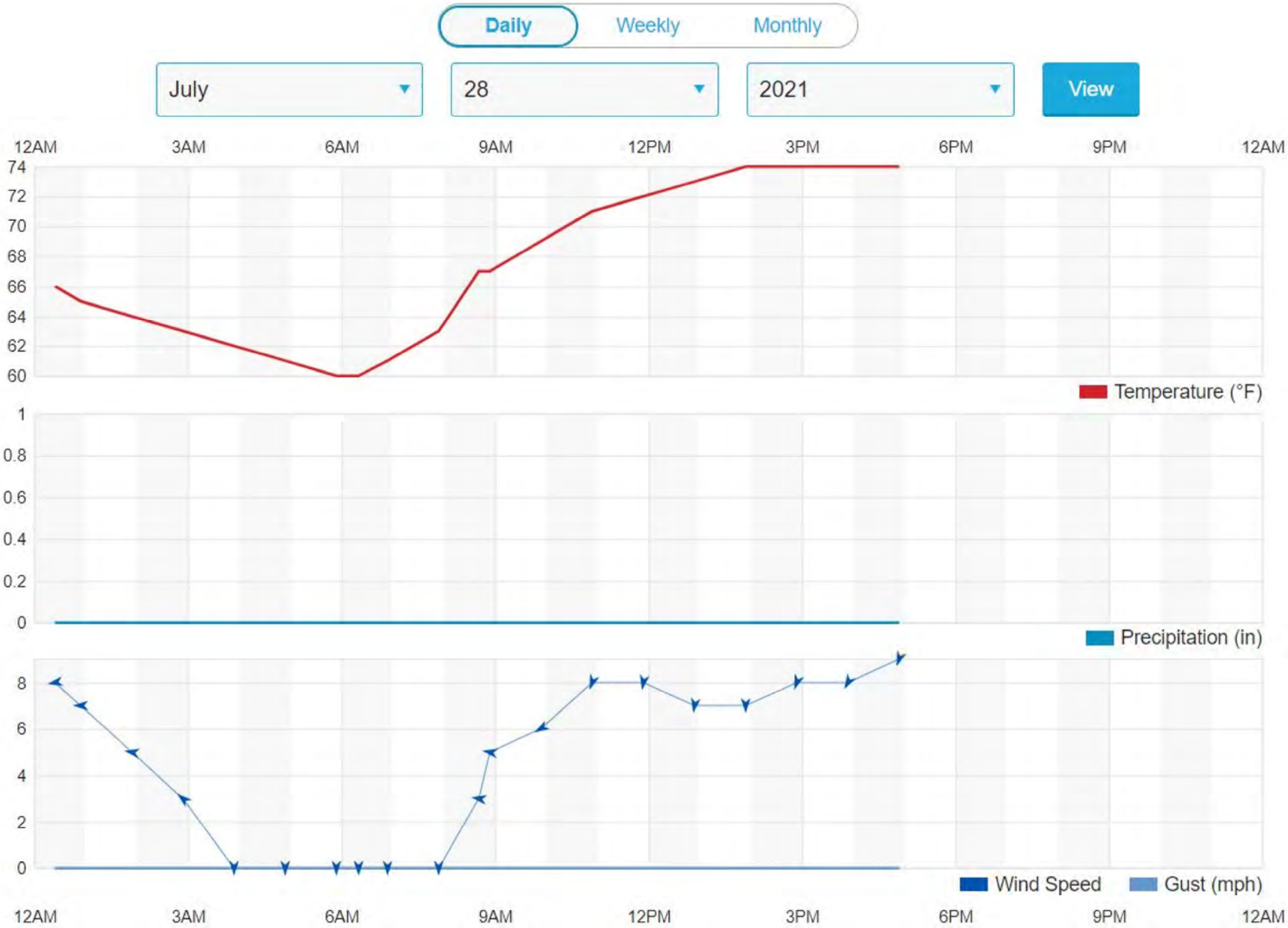
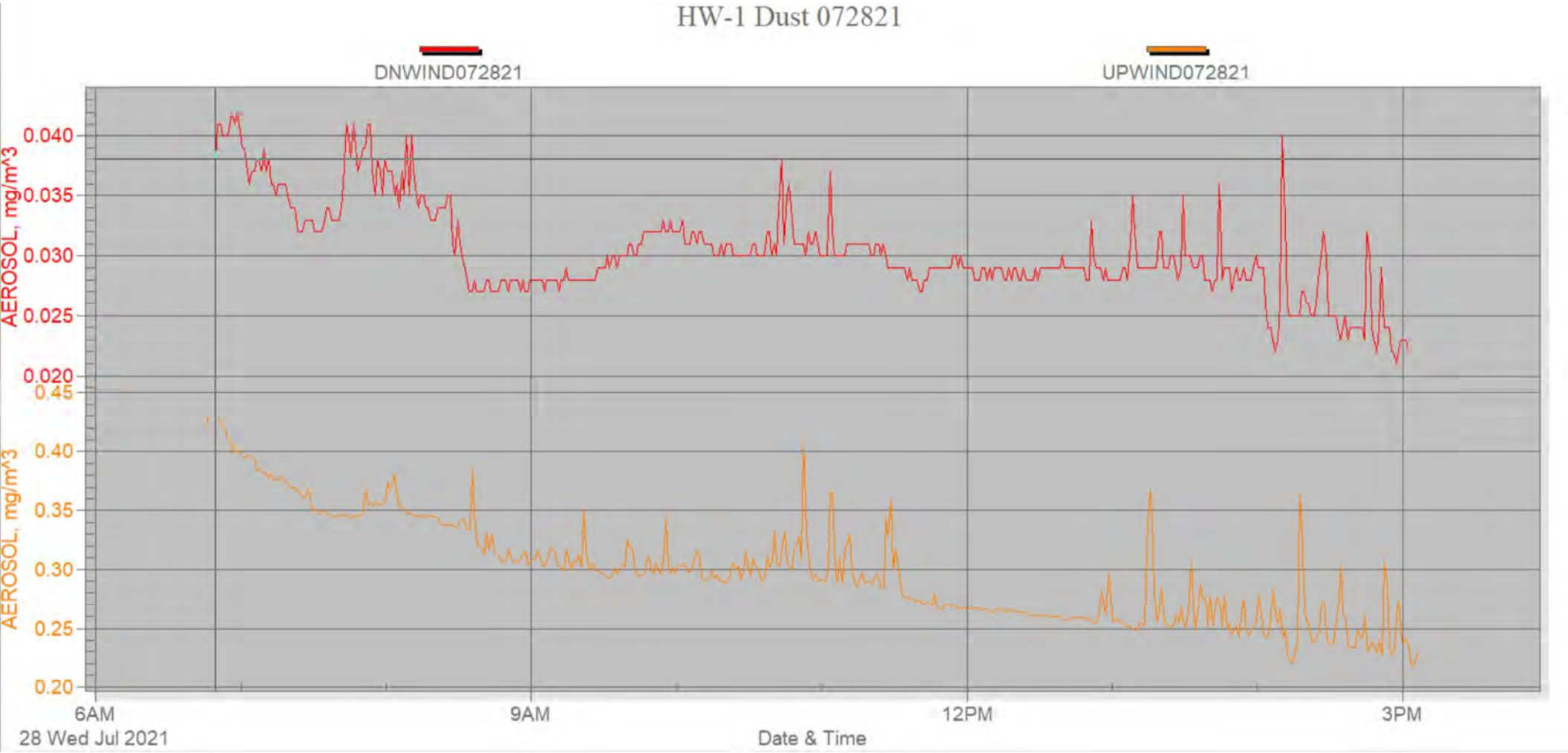

Daily
Weekly
Monthly
July
28
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
74
72
70
68
66
64
62
60
Temperature (°F)
1
0.8
0.6
0.4
0.2
0
Precipitation (in)
8
6
4
2
0
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM


HW-1 Dust 072821
DNWIND072821
UPWIND072821
AEROSOL, mg/m^3
0.040
0.035
0.030
0.025
0.020
AEROSOL, mg/m^3
0.45
0.40
0.35
0.30
0.25
0.20
6AM
9AM
12PM
3PM
28 Wed Jul 2021
Date & Time

From: Livoti, Dominic
Sent: Wednesday, July 28, 2021 5:58 PM
To: Howe, Alexander
Cc: Breton, Nelson M.
Subject: July 28 Field report- Rochester horizontal well drilling
Attachments: Rochester weather 072821.JPG; HW-1 Dust 072821.JPG

Hi Alex,

Here is the July 28th, 2021 Field report.

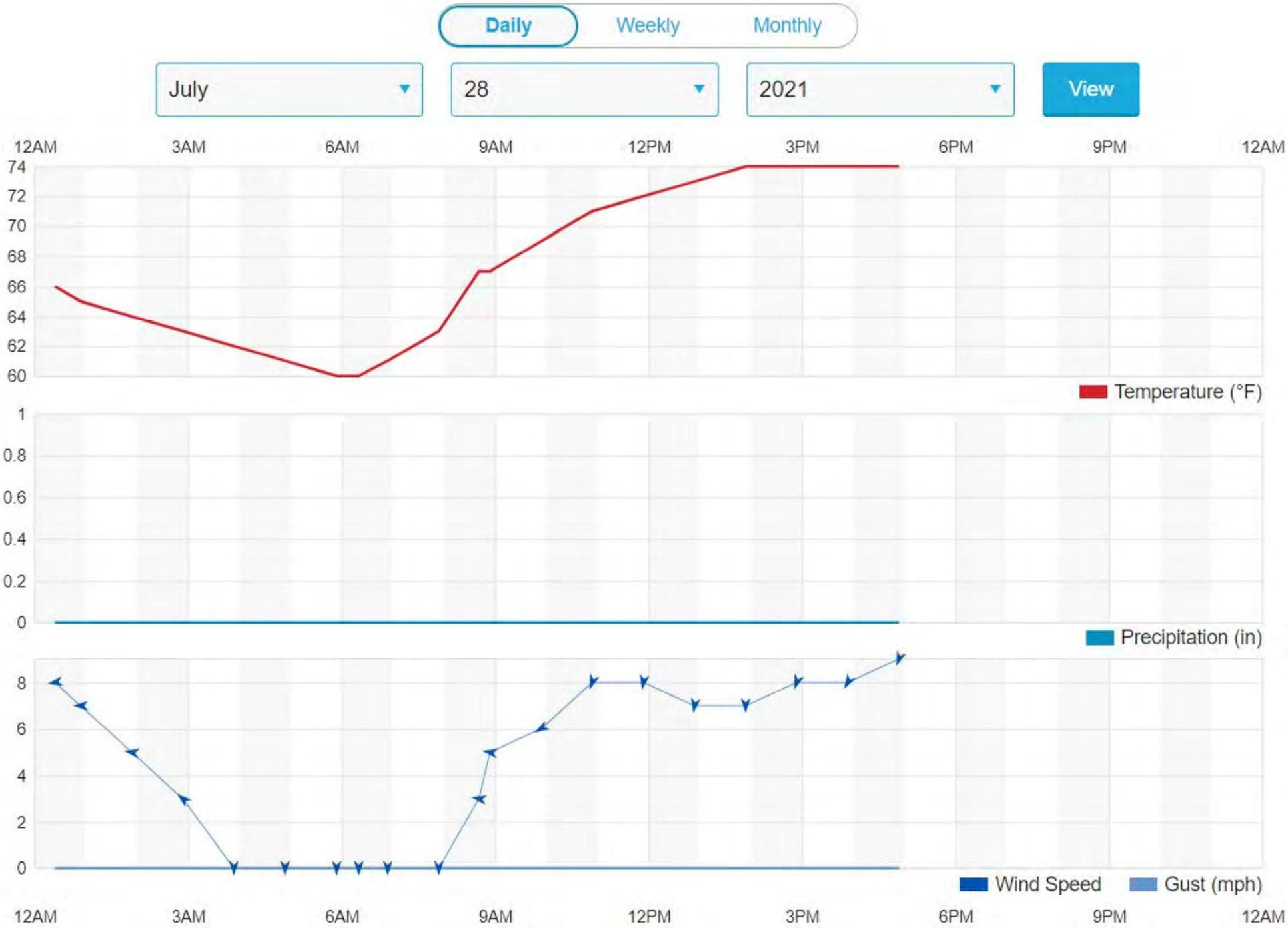
Work crew was onsite from 0630 to 1450. EDTD completed the swab pass of the HW-1 borehole. Subcontractors onsite were: Ellingson DTD and Labella (briefly). The following tasks were performed:

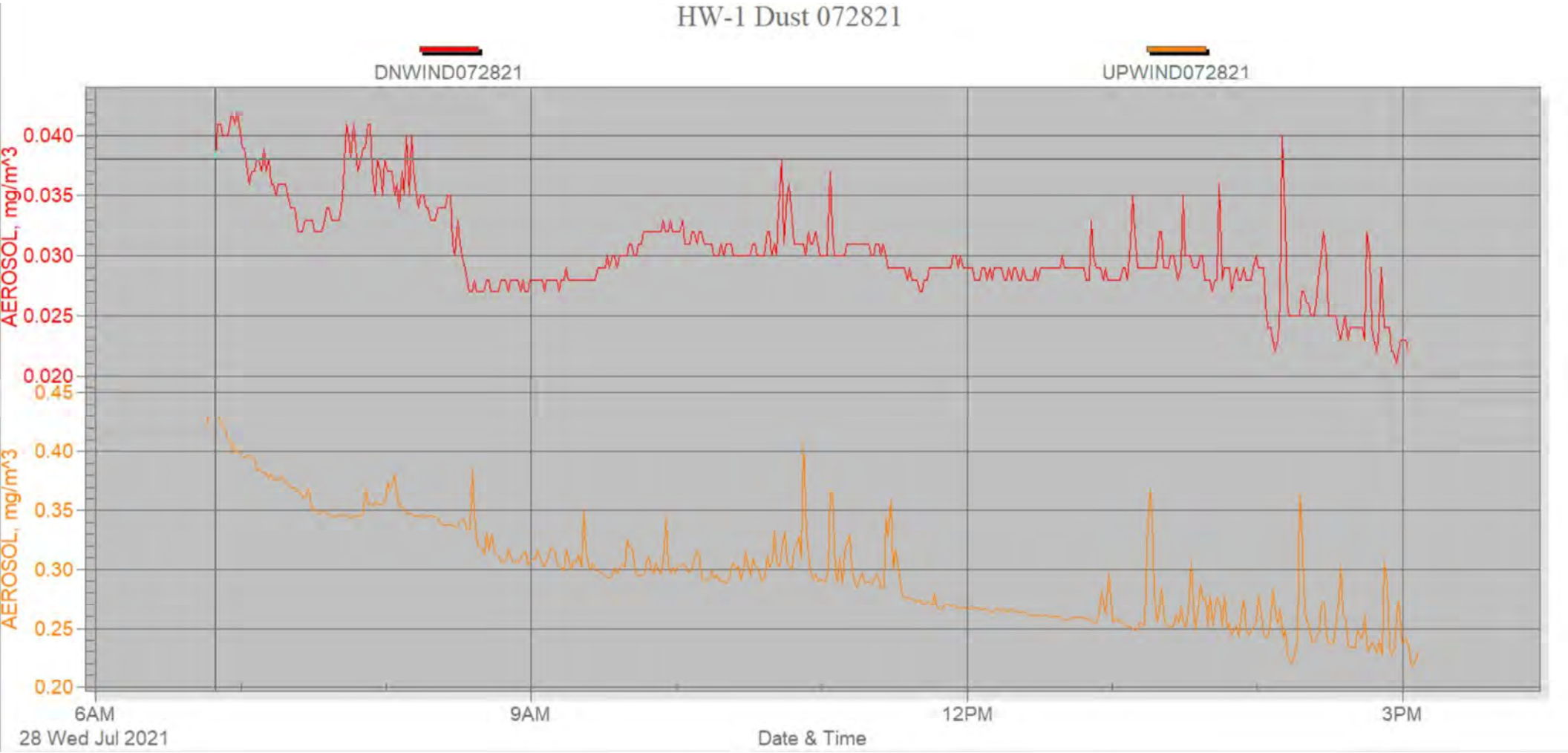
- Completed the swab pass
- Extra roll off dumpster was delivered
- Switched out drill boxes (empty one from the front was put onto the rig)
- The water level meter was deployed in B-17 throughout the day. No changes in water level were observed.
- Drilling mud is flowing into both the exit and entry pits of the boring. Ellingson continued to recover drilling mud from the exit pit and transport it using the vac trailer and water truck to the mud recycling plant.
- Mud play shut down at 15:05
- Start work on moving equipment to the front of the build in order to pull casing which is expected to start this Friday 7/30
- Labella returned this morning and packed up all of their equipment.

The CAMP was active throughout the day on July 28th with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0.1 ppm in the breathing space and 1.0 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0700 until 1505. No CAMP exceedances were recorded today. Wind direction was predominantly from the Northeast throughout the day. The calibration issue with the upwind monitor continues to persist.

Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

Thanks,
Dom


Daily
Weekly
Monthly
July
28
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
74
72
70
68
66
64
62
60
Temperature (°F)
1
0.8
0.6
0.4
0.2
0
Precipitation (in)
8
6
4
2
0
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM


HW-1 Dust 072821
DNWIND072821
UPWIND072821
AEROSOL, mg/m^3
0.040
0.035
0.030
0.025
0.020
AEROSOL, mg/m^3
0.45
0.40
0.35
0.30
0.25
0.20
6AM
9AM
12PM
3PM
28 Wed Jul 2021
Date & Time

From: Livoti, Dominic
Sent: Thursday, July 29, 2021 8:34 PM
To: Howe, Alexander
Cc: Breton, Nelson M.
Subject: July 29 Field report- Rochester horizontal well drilling

Hi Alex,
Here is the July 29th, 2021 Field report.
Work crew was onsite from 0630 to 17:50. EDTD completed moving the rig to the front of the building in preparation to pull casing. Subcontractors onsite were: Ellingson DTD. The following tasks were performed:

- Move drill rig to the front on the building to prepare to pull casing.
- Obtain hot work permit at 15:50
- Cut ~20' off 2 well casing sections in ordered for them to fit and be fed down HW-1 in the space provided. All sections of casing and screen will need to be cut.

The CAMP was not active today as no drilling or pulling happened. A PID was active since the start of the day. No elevated readings at either end of the HW-1 borehole were recorded. Tomorrow EDTD plans on pulling casing, which if need will go into Saturday.

Thanks,
Dom

From: Howe, Alexander
Sent: Friday, July 30, 2021 1:39 PM
To: joseph.flores@lonza.com
Cc: warner.golden@lonza.com; gayle.taylor@lonza.com; Brian Younkin; francien.trubia@lonza.com; Livoti, Dominic; richard.flynt@lonza.com; Breton, Nelson M.; Aube, Rene P.
Subject: RE: July 29 field report - Rochester horizontal well drilling
Attachments: July 29 Field report- Rochester horizontal well drilling

My apologies. Please see the correct email detailing yesterday's field report from Wood.

Alex

From: Howe, Alexander
Sent: Friday, July 30, 2021 1:37 PM
To: joseph.flores@lonza.com
Cc: warner.golden@lonza.com; gayle.taylor@lonza.com; Brian Younkin <BYounkin@ellingsoncompanies.com>; francien.trubia@lonza.com; Livoti, Dominic <dominic.livoti@woodplc.com>; richard.flynt@lonza.com; Breton, Nelson M. <nelson.breton@woodplc.com>; Aube, Rene P. <rene.aube@woodplc.com>
Subject: July 29 field report - Rochester horizontal well drilling

Hello Joe,

Please see the attached filed reports for 7/29. The drilling crew has commenced installation of the well and are actively pulling sections and welding as needed. They plan to continue as long as feasible today with the installation process. This work may extend into a second day.

Alex

Alexander Howe, PG
Geologist
Main 860-529-7191
Direct 860-257-5536
Cell 207-776-8242
alexander.howe@woodplc.com
www.woodplc.com

From: Livoti, Dominic
Sent: Saturday, July 31, 2021 5:53 PM
To: Howe, Alexander
Cc: Breton, Nelson M.
Subject: July 30 Field report- Rochester horizontal well drilling
Attachments: Arch Weather 073021.JPG; Upwind Dust 073021.JPG; Downwind Dust graph 073021.jpg

Hi Alex,

Here is the July 30th, 2021 Field report.

Work crew was onsite from 0630 to 1800. EDTD began pulling casing and screen into the HW-1 borehole. Subcontractors onsite were: Ellingson DTD. The following tasks were performed:

- Pulled casing and screen into HW-1, ~ 170' remaining to be pulled. This will be completed tomorrow 7/31.
- Completed welding as casing/screen is pulled through HW-1
- DEC onsite to observe well installation.

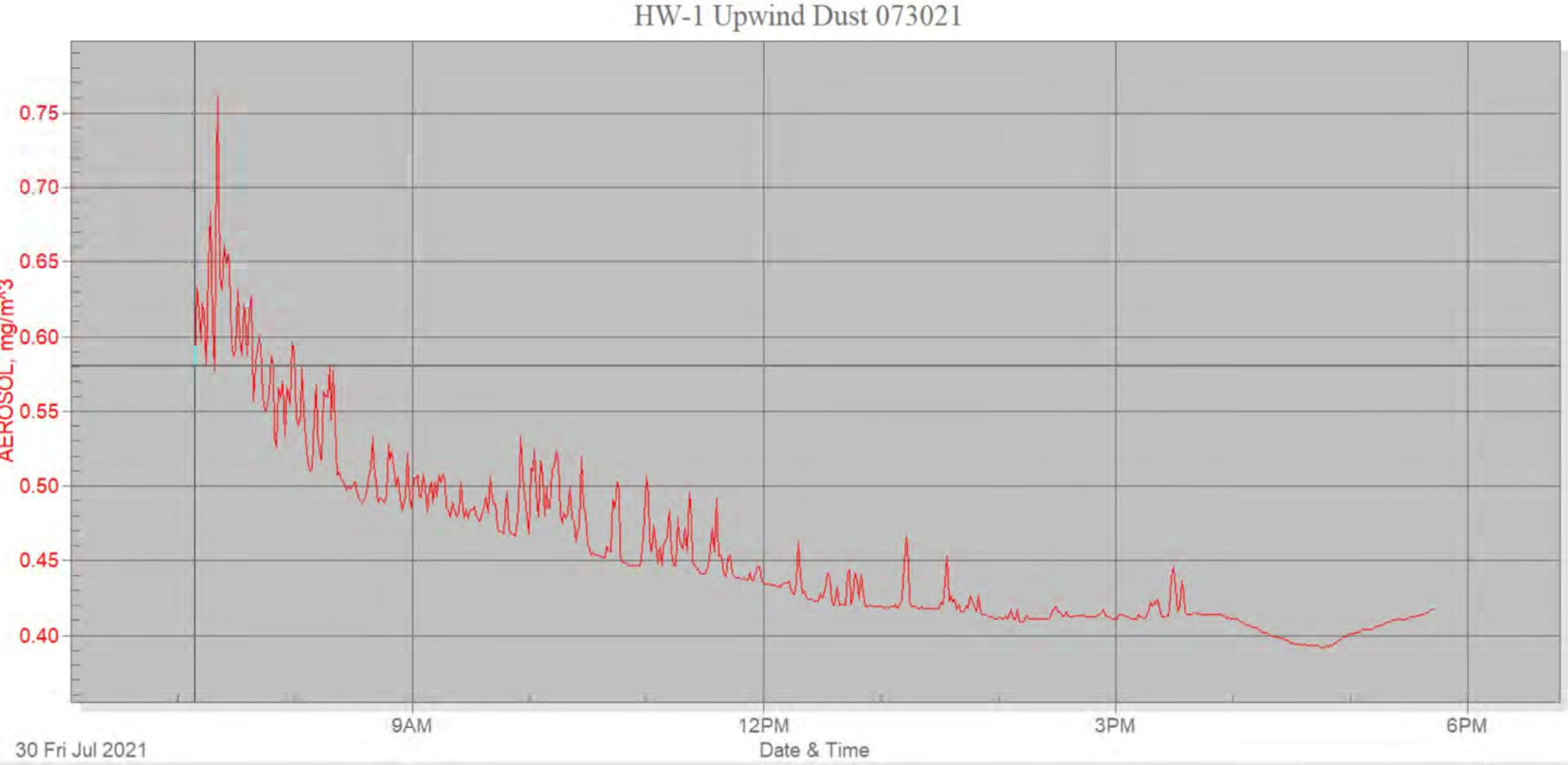
At 0813 a pressure release occurred from the tanker truck while unloading drilling mud into the mud recycling plant. Used drill mud was discharged onto the ground. Drilling mud on the ground was collected and cleaned up using the excavator and put into the mud pit.

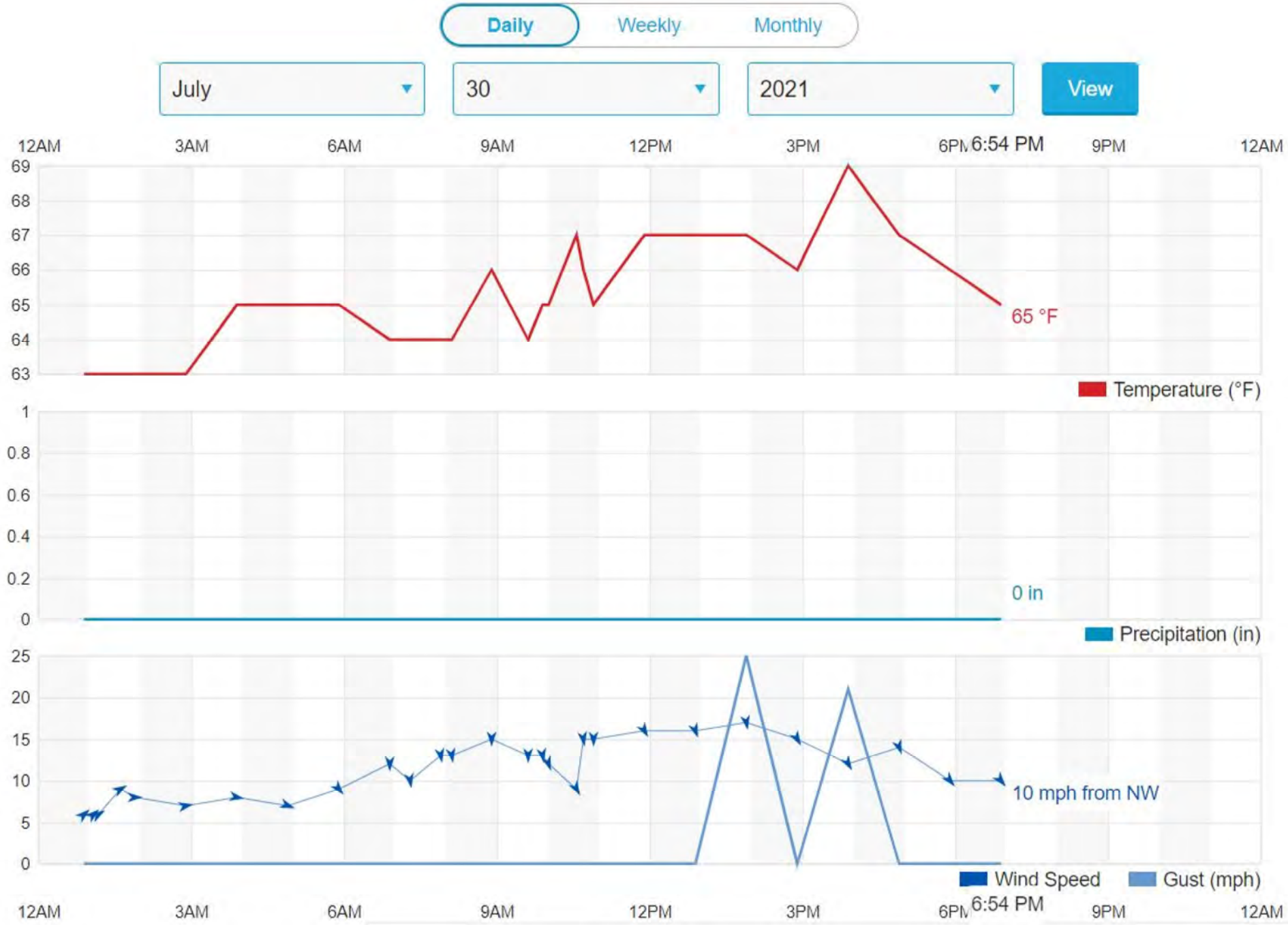
The CAMP was active throughout the day on July 30th with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0 ppm in the breathing space and 0.3 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0650 until 1740. No CAMP exceedances were recorded today. Wind direction was predominantly from West to East throughout the day. The calibration issue with the upwind monitor continues to persist. The downwind CAMP in no longer capable of transferring data from the unit to laptop due to a damaged port connection. The unit is able to generate a graph of the stored data which is provided as its own attachment.

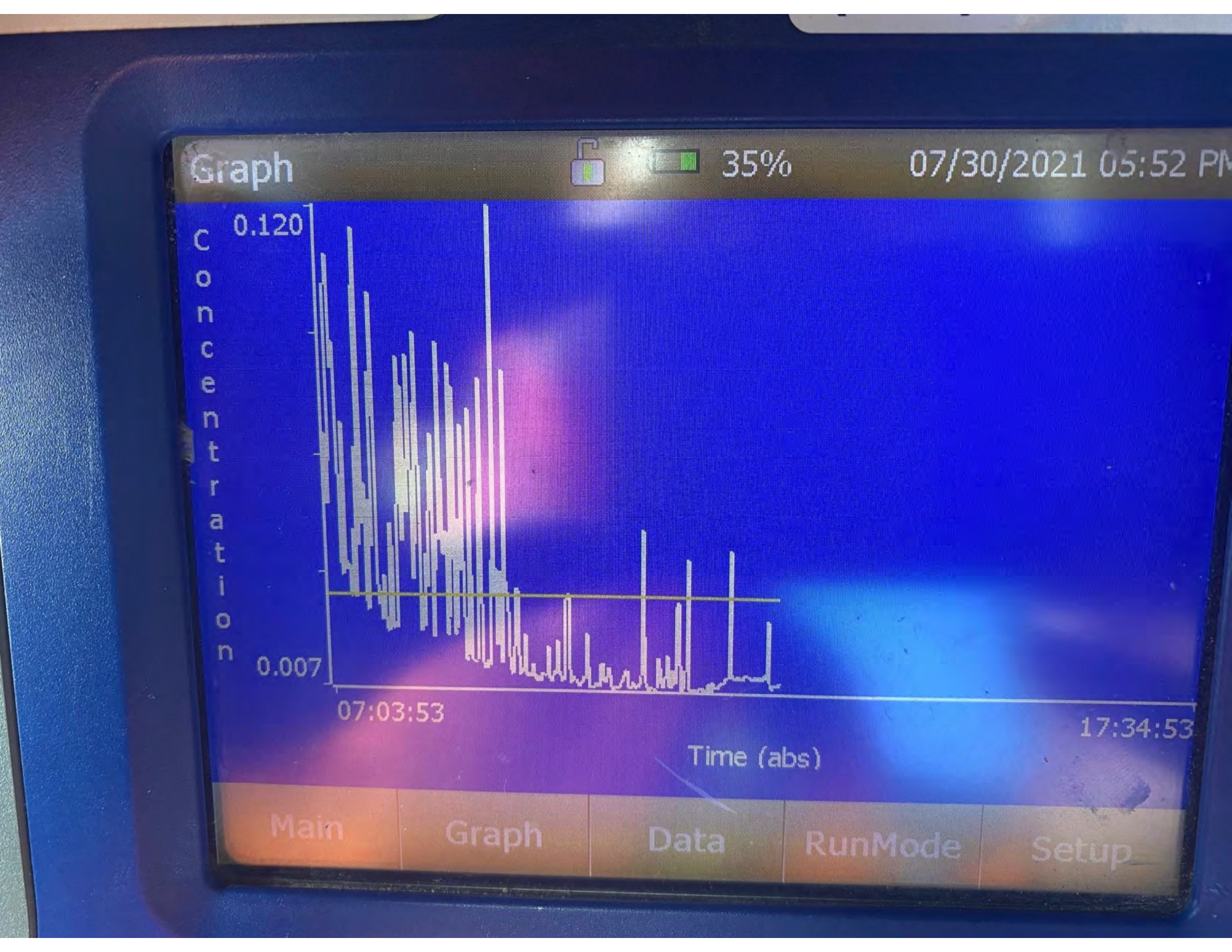
Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com


HW-1 Upwind Dust 073021
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
AEROSOL, mg/m^3
9AM
12PM
3PM
6PM
30 Fri Jul 2021
Date & Time


Daily
Weekly
Monthly
July
30
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
6:54 PM
9PM
12AM
69
68
67
66
65
64
63
65 °F
Temperature (°F)
1
0.8
0.6
0.4
0.2
0
0 in
Precipitation (in)
25
20
15
10
5
0
10 mph from NW
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
6:54 PM
9PM
12AM


Graph
35%
07/30/2021 05:52 PM
Concentration
0.120
0.007
07:03:53
17:34:53
Time (abs)
Main
Graph
Data
RunMode
Setup

From: Livoti, Dominic
Sent: Saturday, July 31, 2021 5:57 PM
To: Howe, Alexander
Cc: Breton, Nelson M.
Subject: July 31 Field report- Rochester horizontal well drilling
Attachments: upwind 073121 dust graph.jpg; downwind 073121 dust graph.jpg; Arch Weather 073121.JPG

Hi Alex,

Here is the July 31th, 2021 Field report.

Work crew was onsite from 0630 to 1150. EDTD finished pulling casing and screen into the HW-1 borehole. Subcontractors onsite were: Ellingson DTD. The following tasks were performed:

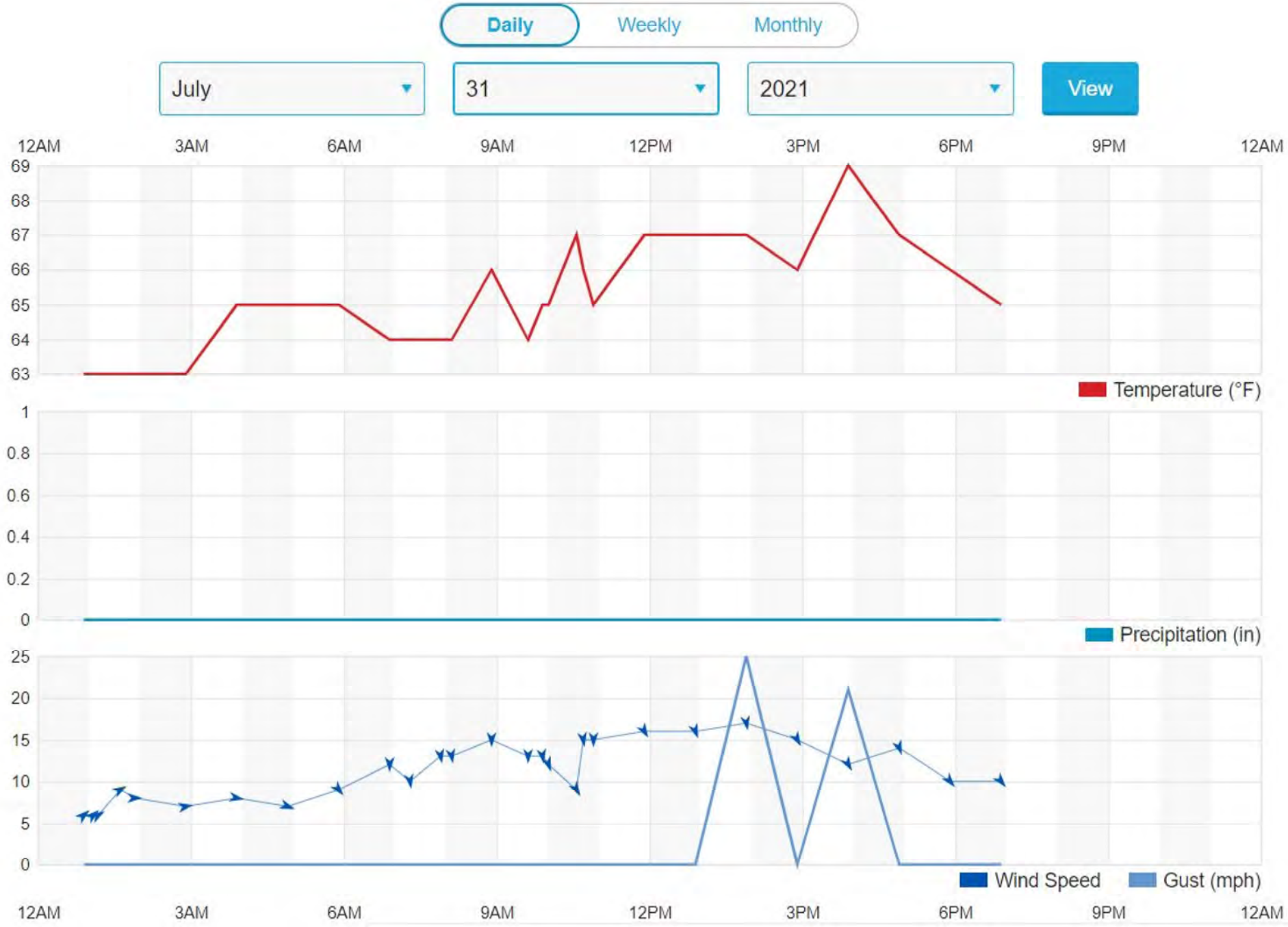
- Finish pulling well casing and screen into HW-1
- Completed all welding for HW-1
- Secured site for the weekend.

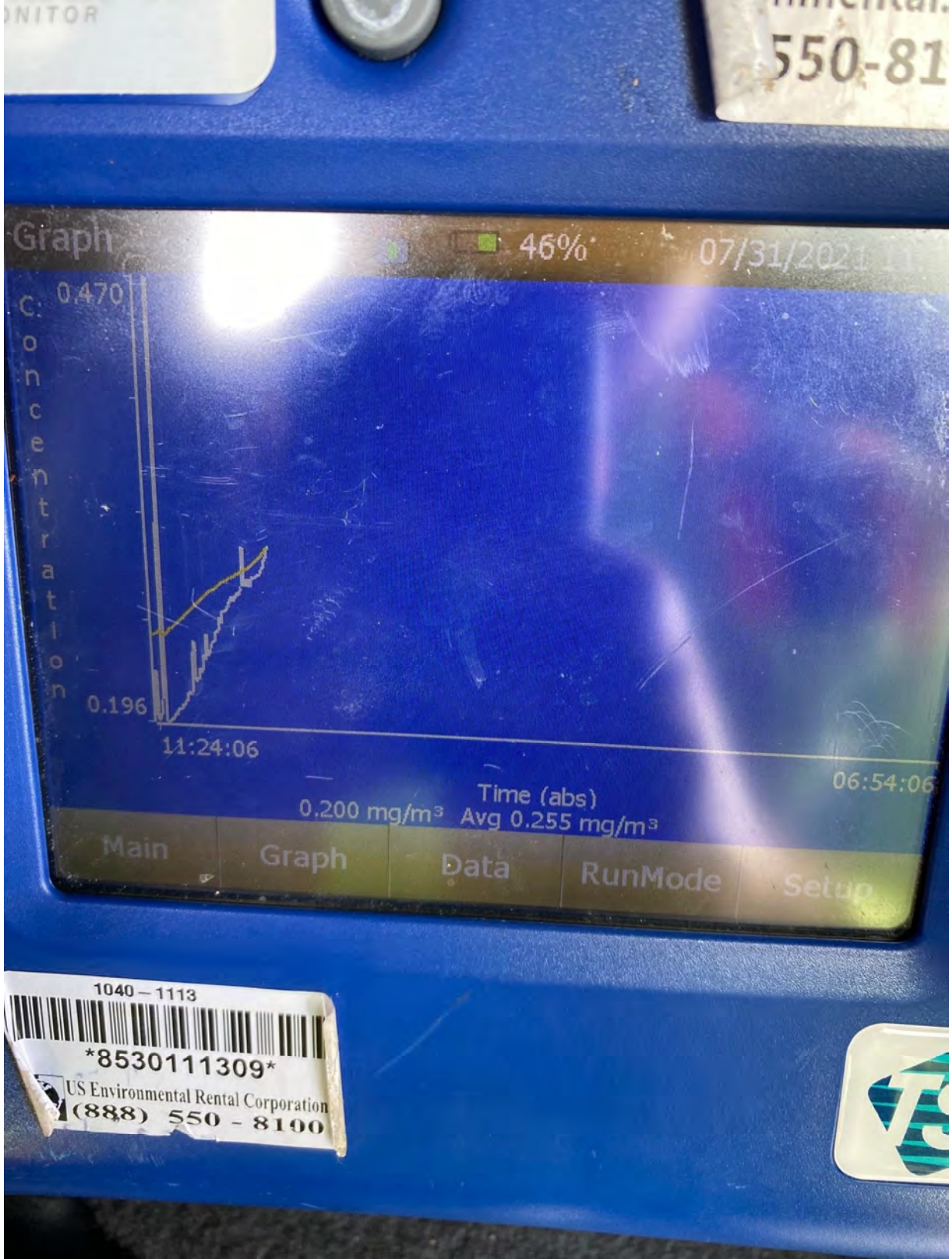
The CAMP was active throughout the day on July 31th with continuous monitoring for airborne dust, and VOC vapors at both mud pits and the mud recycling plant. The highest observed readings at the mud recycling plant were 0 ppm in the breathing space and 0.1 ppm directly over the recycling tank. No elevated readings were observed at either of the mud pits. Dust monitors were operated from 0645 until 1125. No CAMP exceedances were recorded today. Wind direction was predominantly from West to East throughout the day. The calibration issue with the upwind monitor continues to persist. The downwind CAMP in no longer capable of transferring data from the unit to laptop due to a damaged port connection. The unit is able to generate a graph of the stored data which is provided as its own attachment.

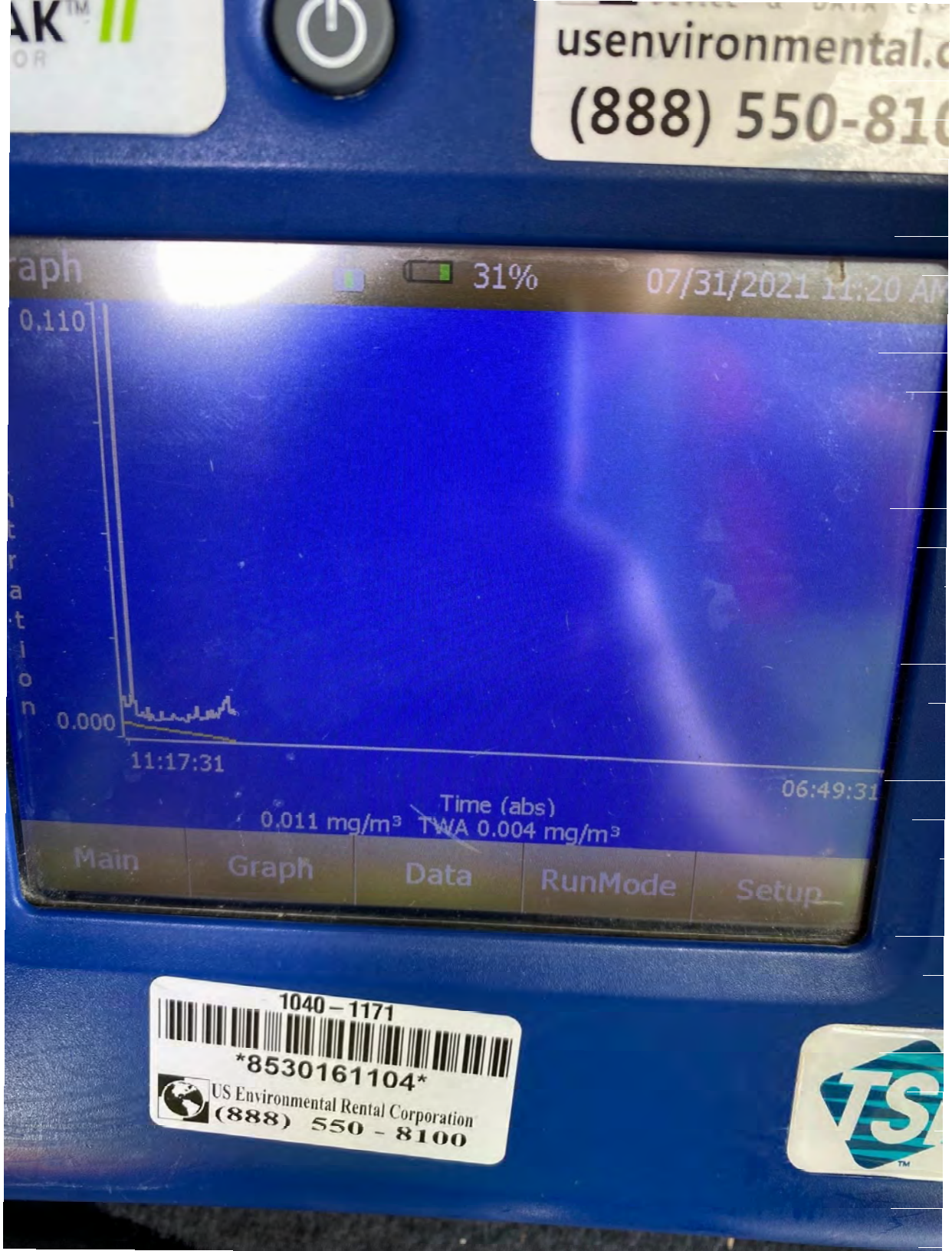
Graphs of the weather data, and of the upwind & downwind airborne dust data are attached.

Thanks,
Dom

Dominic Livoti
Staff Geologist
Cell 203-823-0008
www.woodplc.com


Daily
Weekly
Monthly
July
31
2021
View
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
69
68
67
66
65
64
63
Temperature (°F)
1
0.8
0.6
0.4
0.2
0
Precipitation (in)
25
20
15
10
5
0
Wind Speed
Gust (mph)
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM


Graph
46%
07/31/2021
0.470
Concentration
0.196
11:24:06
06:54:06
Time (abs)
0.200 mg/m³ Avg 0.255 mg/m³
Main
Graph
Data
RunMode
Setup
1040 – 1113
8530111309
US Environmental Rental Corporation
(888) 550 - 8100


usenvironmental.c
(888) 550-81
raph
31%
07/31/2021 11:20 AM
0.110
0.000
11:17:31
06:49:31
Time (abs)
0.011 mg/m³ TWA 0.004 mg/m³
Main
Graph
Data
RunMode
Setup
1040 – 1171
8530161104
US Environmental Rental Corporation
(888) 550 - 8100

From: Aube, Rene P.
Sent: Monday, August 2, 2021 6:48 PM
To: Howe, Alexander; Breton, Nelson M.
Subject: 08/02/21 Arch Rochester Daily Field Report

Alex & Nelson,

Here is the Monday August 2nd, 2021 daily field report for Arch Rochester NY:

Work crew was onsite from 0630 to 1700. Subcontractors onsite were: Ellingson DTD. The following summary outlines work performed today::

- Dust monitors were not operated today. No ground intrusive or waste materials handling work was performed today.
- Monitoring of breathing air and drill pit air was performed with a PID, all readings were 0.0 ppm.
- Drill rig equipment breakdown, maintenance and clean-up work was performed today.
- Both east & west drill pit work areas were cleared of unnecessary equipment and supplies in preparation for well jetting ops.
- The mud plant was not operated today, but consolidation of mud plant tailings into one roll-off dumpster was begun.
- Further advancement of the HW-1 installation project is now dependent upon delivery of frac tanks to the site for containment of flushing, jetting and development water.
- Two frac tanks were delivered to the site at 1430 today by Rain-for-Rent. The tanks were staged near the east drill pit with both tanks placed in portable secondary containment berms.
- AM weather: Sunny, 58°F, wind NW@6mph. PM weather Sunny, 75°F, wind W@7mph.

Thanks,
Rene P. Aube

From: Aube, Rene P.
Sent: Tuesday, August 3, 2021 7:45 PM
To: Breton, Nelson M.; Howe, Alexander
Subject: 080321 Arch Rochester daily field report

Alex & Nelson,

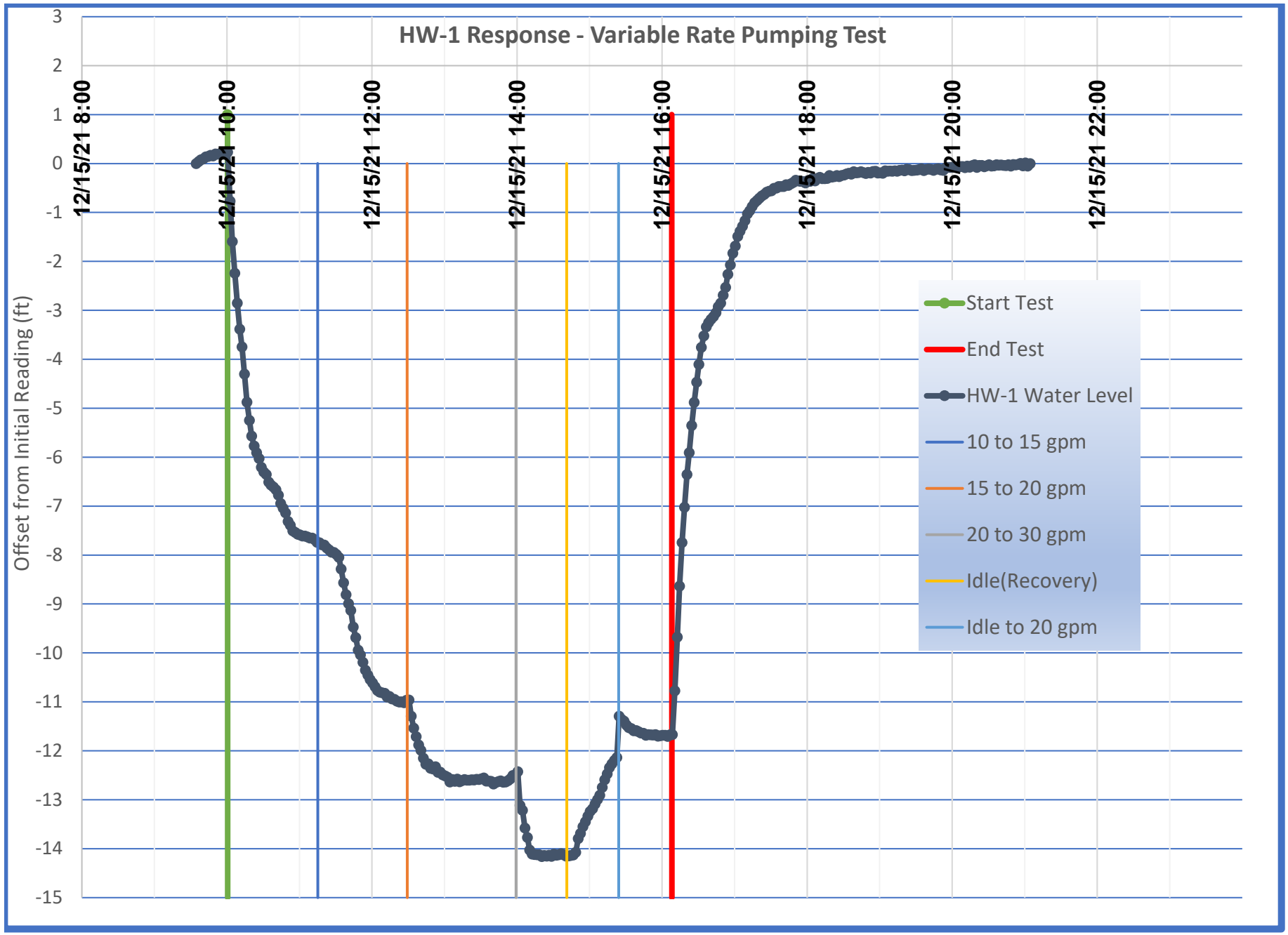
Here is the Tuesday August 3rd, 2021 daily field report for Arch Rochester NY:

Work crew was onsite from 0630 to 1800. Subcontractors onsite were: Ellingson DTD. The following summary outlines work performed today::

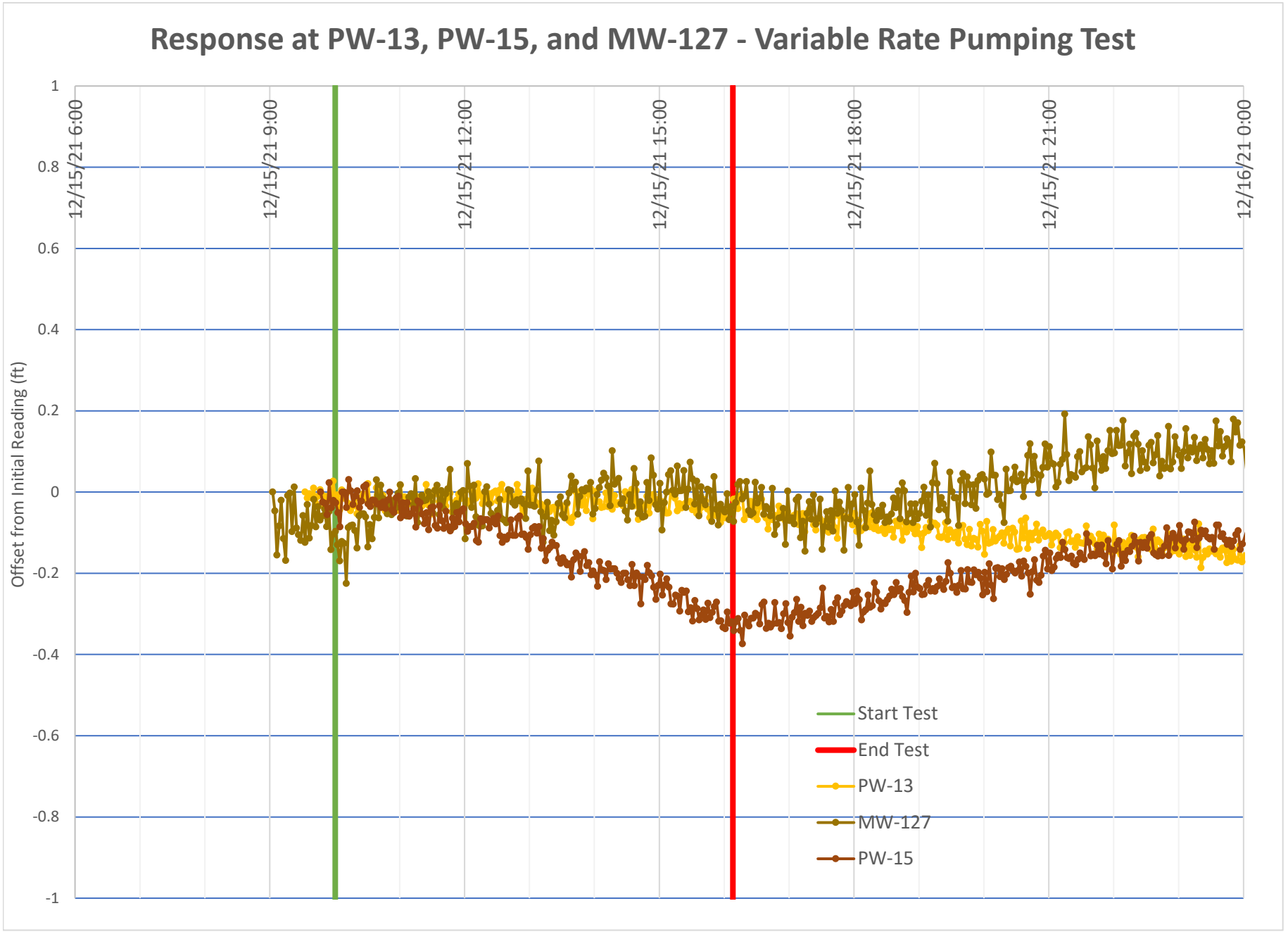
- Dust monitors were not operated today. No ground intrusive or solid waste materials handling work was performed today.
- Monitoring of breathing air, mud plant air, and drill pit air was performed with a PID, all readings were 0.0 ppm.
- The directional drill rig was mobilized offsite to a storage lot pending loading & shipment away from the project.
- Vac-trailer was used to evacuate standing water from the frac-out pit and the frac-relief boring.
- Frac-out pit was filled with gravel. Relief boring will need to be grouted.
- Vac-trailer and tanker truck were drained to the east drill pit. Fluids were then pumped to the mud plant to remove solids. Mud plant effluent liquids were pumped to a frac tank.
- Vac-trailer and tanker truck were rinsed several times with fresh water, which was then pumped to the frac tank
- Mud plant was flushed and power washed with fresh water, in preparation for removal from site. All fluids were pumped to the frac tank..
- Maintenance and clean-up work was performed, including draining and rinsing of mud recycle pump, and all mud lines for mud plant, vac-trailer, and tanker truck.
- AM weather: Sunny, 54°F, wind SW@7mph. PM weather Sunny, 79°F, wind E@4mph.

Thanks,
Rene P. Aube

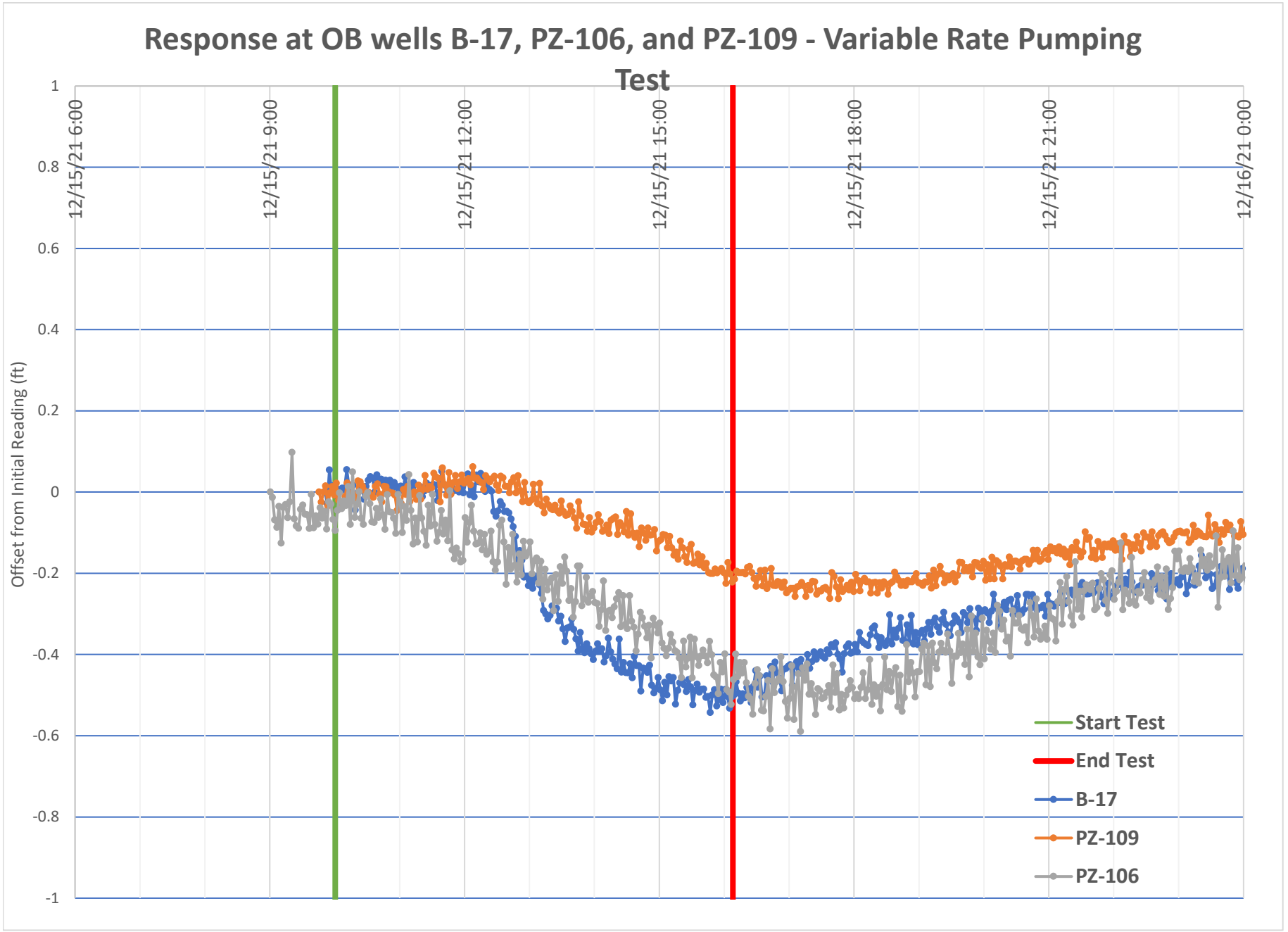
Appendix F



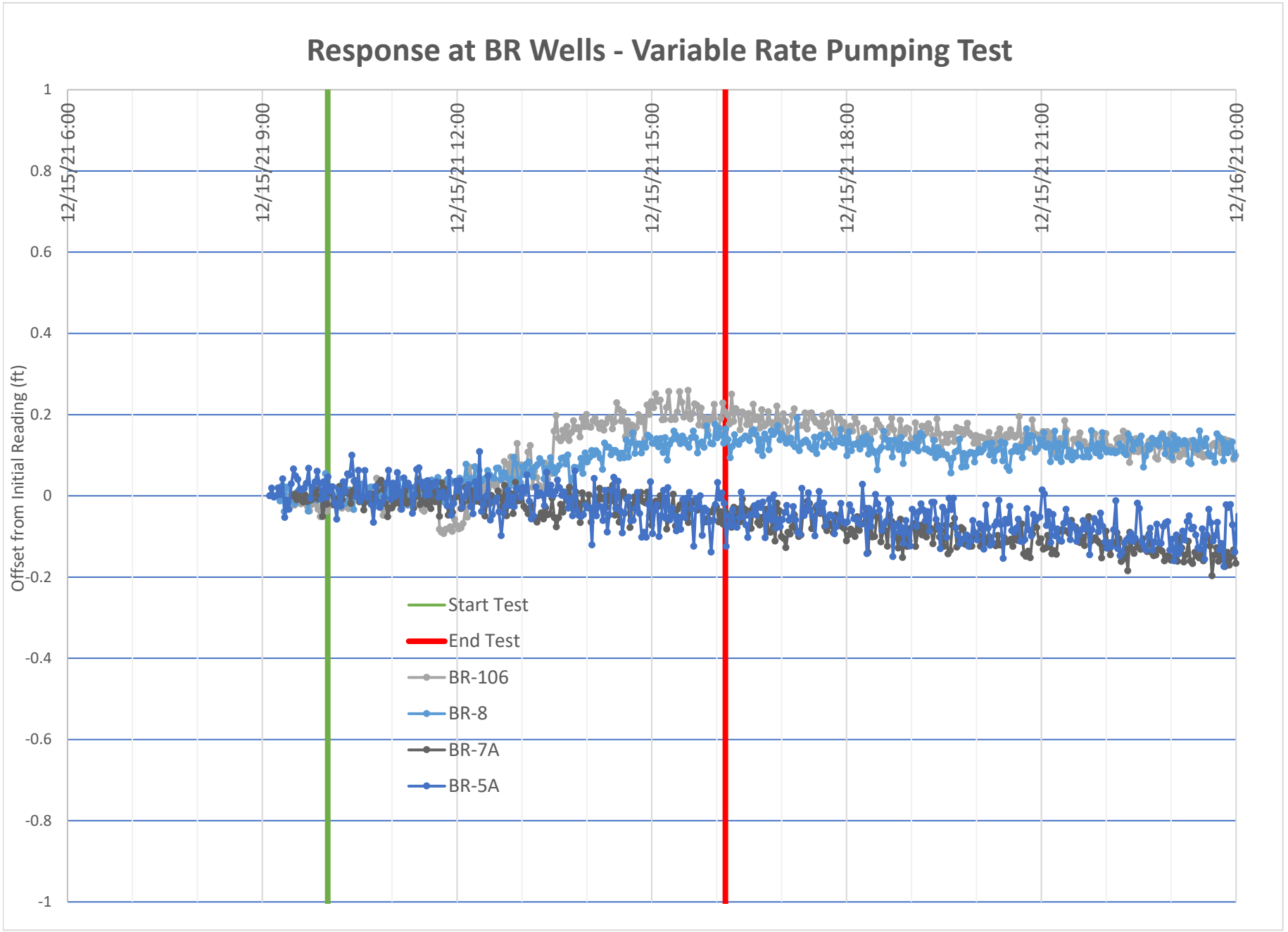
Created By : NWV 2-8-22
Checked By: RJO 12-15-22



Created By : NWV 2-8-22
Checked By: RJO 12-15-22



Created By : NWV 2-8-22
Checked By: RJO 12-15-22



Created By : NWV 2-8-22
Checked By: RJO 12-15-22

HW-1 Variable Rate Test Groundwater Concentration Summary

Sample ID	Sample Date	Sample Time	Step Start Time	Flow Rate (gpm)	Step Duration Prior to Sample Collection (min)	Total VOCs (µg/L)**	2-PCL (µg/L)**
HW-1-Start	12/15/2021	1005	1000	10	5	3,179	18,800
HW-1-Step 1	12/15/2021	1135	1000	10	95	6,397	18,000
HW-1-Step-3	12/15/2021	1345	1230	20	75	3,612	65,300
HW-1-Step-4	12/15/2021	1500	1400	20*	60	4,808	156,000
HW-1-Step-5	12/15/2021	1600	1507	20	53	5,145	203,000

Notes:

* Step 4 operated at 30 gpm until 1440 at which point the well was dewatered. The Step 4 sample was collected after steady flow was re-achieved at 20 gpm.
gpm - gallons per minute
min - minutes
(µg/L) - micrograms per liter
VOCs - Volatile organic compounds (sum)
2-PCL - 2 Chloropyridine c l r yri in .

Prepared by: NWV 2/15/2022
Checked by: RJO 2/1/2023

Appendix G

PARADIGM

PARADIGM
ENVIRONMENTAL SERVICES, INC

Analytical Report For

Arch Chemicals

For Lab Project ID

215739

Referencing

2021 GW Variable Pump Test December 2021

Prepared

Monday, January 3, 2022

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below.

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Start		
Lab Sample ID:	215739-01	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Semi-Volatile Organics (Pyridines)

Analyte	Result	Units	Qualifier	Date Analyzed
2,6-Dichloropyridine	< 4000	ug/L	A	12/28/2021 19:48
2-Chloropyridine	**18800**	ug/L	A	12/28/2021 19:48
3-Chloropyridine	< 4000	ug/L	A	12/28/2021 19:48
4-Chloropyridine	< 4000	ug/L	A	12/28/2021 19:48
4-Fluoroaniline	< 4000	ug/L	A	12/28/2021 19:48
Pyridine	< 4000	ug/L		12/28/2021 19:48

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	NC	18.6 - 104		12/28/2021 19:48

Method Reference(s): EPA 8270D
Preparation Date: 12/21/2021
Data File: B59006.D

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
1,1,1-Trichloroethane	< 2.00	ug/L		12/28/2021 16:45
1,1,2,2-Tetrachloroethane	< 2.00	ug/L		12/28/2021 16:45
1,1,2-Trichloroethane	< 2.00	ug/L		12/28/2021 16:45
1,1-Dichloroethane	< 2.00	ug/L		12/28/2021 16:45
1,1-Dichloroethene	< 2.00	ug/L		12/28/2021 16:45
1,2,3-Trichlorobenzene	< 5.00	ug/L		12/28/2021 16:45
1,2,4-Trichlorobenzene	< 5.00	ug/L		12/28/2021 16:45
1,2-Dibromo-3-Chloropropane	< 10.0	ug/L		12/28/2021 16:45
1,2-Dibromoethane	< 2.00	ug/L		12/28/2021 16:45
1,2-Dichlorobenzene	< 2.00	ug/L		12/28/2021 16:45
1,2-Dichloroethane	< 2.00	ug/L		12/28/2021 16:45
1,2-Dichloropropane	< 2.00	ug/L		12/28/2021 16:45
1,3-Dichlorobenzene	**8.32**	ug/L		12/28/2021 16:45
1,4-Dichlorobenzene	**22.4**	ug/L		12/28/2021 16:45

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Start		
Lab Sample ID:	215739-01	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

1,4-Dioxane	< 10.0	ug/L		12/28/2021	16:45
2-Butanone	**232**	ug/L	E	12/28/2021	16:45
2-Hexanone	< 5.00	ug/L		12/28/2021	16:45
4-Methyl-2-pentanone	< 5.00	ug/L		12/28/2021	16:45
Acetone	**169**	ug/L		12/28/2021	16:45
Benzene	**3.03**	ug/L		12/28/2021	16:45
Bromochloromethane	< 5.00	ug/L		12/28/2021	16:45
Bromodichloromethane	< 2.00	ug/L		12/28/2021	16:45
Bromoform	< 5.00	ug/L		12/28/2021	16:45
Bromomethane	< 2.00	ug/L		12/28/2021	16:45
Carbon disulfide	**530**	ug/L	E	12/28/2021	16:45
Carbon Tetrachloride	**947**	ug/L	E	12/28/2021	16:45
Chlorobenzene	**6.97**	ug/L		12/28/2021	16:45
Chloroethane	< 2.00	ug/L		12/28/2021	16:45
Chloroform	**990**	ug/L	E	12/28/2021	16:45
Chloromethane	< 2.00	ug/L		12/28/2021	16:45
cis-1,2-Dichloroethene	**16.7**	ug/L		12/28/2021	16:45
cis-1,3-Dichloropropene	< 2.00	ug/L		12/28/2021	16:45
Cyclohexane	< 10.0	ug/L		12/28/2021	16:45
Dibromochloromethane	< 2.00	ug/L		12/28/2021	16:45
Dichlorodifluoromethane	< 2.00	ug/L		12/28/2021	16:45
Ethylbenzene	< 2.00	ug/L		12/28/2021	16:45
Freon 113	< 2.00	ug/L		12/28/2021	16:45
Isopropylbenzene	< 2.00	ug/L		12/28/2021	16:45
m,p-Xylene	**3.94**	ug/L		12/28/2021	16:45
Methyl acetate	< 2.00	ug/L		12/28/2021	16:45
Methyl tert-butyl Ether	< 2.00	ug/L		12/28/2021	16:45
Methylcyclohexane	< 2.00	ug/L		12/28/2021	16:45
Methylene chloride	**190**	ug/L		12/28/2021	16:45
o-Xylene	< 2.00	ug/L		12/28/2021	16:45

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Start		
Lab Sample ID:	215739-01	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Styrene	< 5.00	ug/L		12/28/2021 16:45
Tetrachloroethene	**19.1**	ug/L		12/28/2021 16:45
Toluene	**7.28**	ug/L		12/28/2021 16:45
trans-1,2-Dichloroethene	< 2.00	ug/L		12/28/2021 16:45
trans-1,3-Dichloropropene	< 2.00	ug/L		12/28/2021 16:45
Trichloroethene	**20.5**	ug/L		12/28/2021 16:45
Trichlorofluoromethane	< 2.00	ug/L		12/28/2021 16:45
Vinyl chloride	**13.1**	ug/L		12/28/2021 16:45

Surrogate	**Percent Recovery**	**Limits**	**Outliers**	**Date Analyzed**
1,2-Dichloroethane-d4	**94.7**	77.9 - 132		12/28/2021 16:45
4-Bromofluorobenzene	**105**	62.6 - 133		12/28/2021 16:45
Pentafluorobenzene	**100**	88.9 - 114		12/28/2021 16:45
Toluene-D8	**93.2**	75.6 - 117		12/28/2021 16:45

Method Reference(s): EPA 8260C
EPA 5030C

Data File: z06362.D

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-1		
Lab Sample ID:	215739-02	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Semi-Volatile Organics (Pyridines)

Analyte	Result	Units	Qualifier	Date Analyzed
2,6-Dichloropyridine	< 4000	ug/L	A	12/28/2021 20:17
2-Chloropyridine	**18000**	ug/L	A	12/28/2021 20:17
3-Chloropyridine	< 4000	ug/L	A	12/28/2021 20:17
4-Chloropyridine	< 4000	ug/L	A	12/28/2021 20:17
4-Fluoroaniline	< 4000	ug/L	A	12/28/2021 20:17
Pyridine	< 4000	ug/L		12/28/2021 20:17

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	NC	18.6 - 104		12/28/2021 20:17

Method Reference(s): EPA 8270D
Preparation Date: 12/21/2021
Data File: B59007.D

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
1,1,1-Trichloroethane	< 2.00	ug/L		12/28/2021 17:05
1,1,2,2-Tetrachloroethane	< 2.00	ug/L		12/28/2021 17:05
1,1,2-Trichloroethane	< 2.00	ug/L		12/28/2021 17:05
1,1-Dichloroethane	< 2.00	ug/L		12/28/2021 17:05
1,1-Dichloroethene	< 2.00	ug/L		12/28/2021 17:05
1,2,3-Trichlorobenzene	< 5.00	ug/L		12/28/2021 17:05
1,2,4-Trichlorobenzene	< 5.00	ug/L		12/28/2021 17:05
1,2-Dibromo-3-Chloropropane	< 10.0	ug/L		12/28/2021 17:05
1,2-Dibromoethane	< 2.00	ug/L		12/28/2021 17:05
1,2-Dichlorobenzene	**2.60**	ug/L		12/28/2021 17:05
1,2-Dichloroethane	< 2.00	ug/L		12/28/2021 17:05
1,2-Dichloropropane	< 2.00	ug/L		12/28/2021 17:05
1,3-Dichlorobenzene	**7.30**	ug/L		12/28/2021 17:05
1,4-Dichlorobenzene	**18.4**	ug/L		12/28/2021 17:05

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-1		
Lab Sample ID:	215739-02	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

1,4-Dioxane	< 10.0	ug/L		12/28/2021	17:05
2-Butanone	**219**	ug/L	E	12/28/2021	17:05
2-Hexanone	< 5.00	ug/L		12/28/2021	17:05
4-Methyl-2-pentanone	< 5.00	ug/L		12/28/2021	17:05
Acetone	**148**	ug/L		12/28/2021	17:05
Benzene	**3.09**	ug/L		12/28/2021	17:05
Bromochloromethane	< 5.00	ug/L		12/28/2021	17:05
Bromodichloromethane	< 2.00	ug/L		12/28/2021	17:05
Bromoform	**7.33**	ug/L		12/28/2021	17:05
Bromomethane	< 2.00	ug/L		12/28/2021	17:05
Carbon disulfide	**1060**	ug/L	E	12/28/2021	17:05
Carbon Tetrachloride	**2950**	ug/L	E	12/28/2021	17:05
Chlorobenzene	**16.1**	ug/L		12/28/2021	17:05
Chloroethane	< 2.00	ug/L		12/28/2021	17:05
Chloroform	**1630**	ug/L	E	12/28/2021	17:05
Chloromethane	< 2.00	ug/L		12/28/2021	17:05
cis-1,2-Dichloroethene	**15.4**	ug/L		12/28/2021	17:05
cis-1,3-Dichloropropene	< 2.00	ug/L		12/28/2021	17:05
Cyclohexane	< 10.0	ug/L		12/28/2021	17:05
Dibromochloromethane	< 2.00	ug/L		12/28/2021	17:05
Dichlorodifluoromethane	< 2.00	ug/L		12/28/2021	17:05
Ethylbenzene	< 2.00	ug/L		12/28/2021	17:05
Freon 113	< 2.00	ug/L		12/28/2021	17:05
Isopropylbenzene	< 2.00	ug/L		12/28/2021	17:05
m,p-Xylene	**3.60**	ug/L		12/28/2021	17:05
Methyl acetate	< 2.00	ug/L		12/28/2021	17:05
Methyl tert-butyl Ether	< 2.00	ug/L		12/28/2021	17:05
Methylcyclohexane	< 2.00	ug/L		12/28/2021	17:05
Methylene chloride	**229**	ug/L	E	12/28/2021	17:05
o-Xylene	< 2.00	ug/L		12/28/2021	17:05

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-1		
Lab Sample ID:	215739-02	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Styrene	< 5.00	ug/L		12/28/2021 17:05
Tetrachloroethene	**47.5**	ug/L		12/28/2021 17:05
Toluene	**10.3**	ug/L		12/28/2021 17:05
trans-1,2-Dichloroethene	< 2.00	ug/L		12/28/2021 17:05
trans-1,3-Dichloropropene	< 2.00	ug/L		12/28/2021 17:05
Trichloroethene	**19.4**	ug/L		12/28/2021 17:05
Trichlorofluoromethane	< 2.00	ug/L		12/28/2021 17:05
Vinyl chloride	**10.4**	ug/L		12/28/2021 17:05

Surrogate	**Percent Recovery**	**Limits**	**Outliers**	**Date Analyzed**
1,2-Dichloroethane-d4	**92.5**	77.9 - 132		12/28/2021 17:05
4-Bromofluorobenzene	**104**	62.6 - 133		12/28/2021 17:05
Pentafluorobenzene	**95.2**	88.9 - 114		12/28/2021 17:05
Toluene-D8	**91.2**	75.6 - 117		12/28/2021 17:05

Method Reference(s): EPA 8260C
EPA 5030C

Data File: z06363.D

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-3		
Lab Sample ID:	215739-03	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Semi-Volatile Organics (Pyridines)

Analyte	Result	Units	Qualifier	Date Analyzed
2,6-Dichloropyridine	< 8000	ug/L	A	12/28/2021 20:46
2-Chloropyridine	**65300**	ug/L	A	12/28/2021 20:46
3-Chloropyridine	< 8000	ug/L	A	12/28/2021 20:46
4-Chloropyridine	< 8000	ug/L	A	12/28/2021 20:46
4-Fluoroaniline	< 8000	ug/L	A	12/28/2021 20:46
Pyridine	**9860**	ug/L		12/28/2021 20:46

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	NC	18.6 - 104		12/28/2021 20:46

Method Reference(s): EPA 8270D
Preparation Date: 12/21/2021
Data File: B59008.D

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
1,1,1-Trichloroethane	< 2.00	ug/L		12/28/2021 17:24
1,1,2,2-Tetrachloroethane	< 2.00	ug/L		12/28/2021 17:24
1,1,2-Trichloroethane	< 2.00	ug/L		12/28/2021 17:24
1,1-Dichloroethane	< 2.00	ug/L		12/28/2021 17:24
1,1-Dichloroethene	< 2.00	ug/L		12/28/2021 17:24
1,2,3-Trichlorobenzene	< 5.00	ug/L		12/28/2021 17:24
1,2,4-Trichlorobenzene	**11.2**	ug/L		12/28/2021 17:24
1,2-Dibromo-3-Chloropropane	< 10.0	ug/L		12/28/2021 17:24
1,2-Dibromoethane	< 2.00	ug/L		12/28/2021 17:24
1,2-Dichlorobenzene	**30.3**	ug/L		12/28/2021 17:24
1,2-Dichloroethane	< 2.00	ug/L		12/28/2021 17:24
1,2-Dichloropropane	< 2.00	ug/L		12/28/2021 17:24
1,3-Dichlorobenzene	**11.1**	ug/L		12/28/2021 17:24
1,4-Dichlorobenzene	**23.9**	ug/L		12/28/2021 17:24

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-3		
Lab Sample ID:	215739-03	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

1,4-Dioxane	< 10.0	ug/L		12/28/2021 17:24
2-Butanone	**57.8**	ug/L		12/28/2021 17:24
2-Hexanone	< 5.00	ug/L		12/28/2021 17:24
4-Methyl-2-pentanone	< 5.00	ug/L		12/28/2021 17:24
Acetone	**33.5**	ug/L		12/28/2021 17:24
Benzene	**4.77**	ug/L		12/28/2021 17:24
Bromochloromethane	< 5.00	ug/L		12/28/2021 17:24
Bromodichloromethane	< 2.00	ug/L		12/28/2021 17:24
Bromoform	**33.9**	ug/L		12/28/2021 17:24
Bromomethane	< 2.00	ug/L		12/28/2021 17:24
Carbon disulfide	**547**	ug/L	E	12/28/2021 17:24
Carbon Tetrachloride	**1380**	ug/L	E	12/28/2021 17:24
Chlorobenzene	**147**	ug/L		12/28/2021 17:24
Chloroethane	< 2.00	ug/L		12/28/2021 17:24
Chloroform	**1070**	ug/L	E	12/28/2021 17:24
Chloromethane	< 2.00	ug/L		12/28/2021 17:24
cis-1,2-Dichloroethene	**7.97**	ug/L		12/28/2021 17:24
cis-1,3-Dichloropropene	< 2.00	ug/L		12/28/2021 17:24
Cyclohexane	< 10.0	ug/L		12/28/2021 17:24
Dibromochloromethane	**2.43**	ug/L		12/28/2021 17:24
Dichlorodifluoromethane	< 2.00	ug/L		12/28/2021 17:24
Ethylbenzene	**2.21**	ug/L		12/28/2021 17:24
Freon 113	< 2.00	ug/L		12/28/2021 17:24
Isopropylbenzene	< 2.00	ug/L		12/28/2021 17:24
m,p-Xylene	**5.68**	ug/L		12/28/2021 17:24
Methyl acetate	< 2.00	ug/L		12/28/2021 17:24
Methyl tert-butyl Ether	< 2.00	ug/L		12/28/2021 17:24
Methylcyclohexane	< 2.00	ug/L		12/28/2021 17:24
Methylene chloride	**121**	ug/L		12/28/2021 17:24
o-Xylene	**2.23**	ug/L		12/28/2021 17:24

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-3		
Lab Sample ID:	215739-03	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Styrene	< 5.00	ug/L		12/28/2021 17:24
Tetrachloroethene	**56.0**	ug/L		12/28/2021 17:24
Toluene	**40.8**	ug/L		12/28/2021 17:24
trans-1,2-Dichloroethene	< 2.00	ug/L		12/28/2021 17:24
trans-1,3-Dichloropropene	< 2.00	ug/L		12/28/2021 17:24
Trichloroethene	**13.6**	ug/L		12/28/2021 17:24
Trichlorofluoromethane	< 2.00	ug/L		12/28/2021 17:24
Vinyl chloride	**9.20**	ug/L		12/28/2021 17:24

Surrogate	**Percent Recovery**	**Limits**	**Outliers**	**Date Analyzed**
1,2-Dichloroethane-d4	**62.4**	77.9 - 132	*	12/28/2021 17:24
4-Bromofluorobenzene	**114**	62.6 - 133		12/28/2021 17:24
Pentafluorobenzene	**62.4**	88.9 - 114	*	12/28/2021 17:24
Toluene-D8	**66.7**	75.6 - 117	*	12/28/2021 17:24

Method Reference(s): EPA 8260C
EPA 5030C

Data File: z06364.D

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-4		
Lab Sample ID:	215739-04	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Semi-Volatile Organics (Pyridines)

Analyte	Result	Units	Qualifier	Date Analyzed
2,6-Dichloropyridine	< 20000	ug/L	A	12/28/2021 21:14
2-Chloropyridine	**156000**	ug/L	A	12/28/2021 21:14
3-Chloropyridine	< 20000	ug/L	A	12/28/2021 21:14
4-Chloropyridine	< 20000	ug/L	A	12/28/2021 21:14
4-Fluoroaniline	< 20000	ug/L	A	12/28/2021 21:14
Pyridine	< 20000	ug/L		12/28/2021 21:14

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	NC	18.6 - 104		12/28/2021 21:14

Method Reference(s): EPA 8270D
Preparation Date: 12/21/2021
Data File: B59009.D

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
1,1,1-Trichloroethane	< 20.0	ug/L		12/28/2021 17:43
1,1,2,2-Tetrachloroethane	< 20.0	ug/L		12/28/2021 17:43
1,1,2-Trichloroethane	< 20.0	ug/L		12/28/2021 17:43
1,1-Dichloroethane	< 20.0	ug/L		12/28/2021 17:43
1,1-Dichloroethene	< 20.0	ug/L		12/28/2021 17:43
1,2,3-Trichlorobenzene	< 50.0	ug/L		12/28/2021 17:43
1,2,4-Trichlorobenzene	< 50.0	ug/L		12/28/2021 17:43
1,2-Dibromo-3-Chloropropane	< 100	ug/L		12/28/2021 17:43
1,2-Dibromoethane	< 20.0	ug/L		12/28/2021 17:43
1,2-Dichlorobenzene	**45.2**	ug/L		12/28/2021 17:43
1,2-Dichloroethane	< 20.0	ug/L		12/28/2021 17:43
1,2-Dichloropropane	< 20.0	ug/L		12/28/2021 17:43
1,3-Dichlorobenzene	< 20.0	ug/L		12/28/2021 17:43
1,4-Dichlorobenzene	**29.4**	ug/L		12/28/2021 17:43

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-4		
Lab Sample ID:	215739-04	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

1,4-Dioxane	< 100	ug/L	12/28/2021 17:43
2-Butanone	**170**	ug/L	12/28/2021 17:43
2-Hexanone	< 50.0	ug/L	12/28/2021 17:43
4-Methyl-2-pentanone	< 50.0	ug/L	12/28/2021 17:43
Acetone	< 100	ug/L	12/28/2021 17:43
Benzene	**19.0**	ug/L	12/28/2021 17:43
Bromochloromethane	< 50.0	ug/L	12/28/2021 17:43
Bromodichloromethane	< 20.0	ug/L	12/28/2021 17:43
Bromoform	< 50.0	ug/L	12/28/2021 17:43
Bromomethane	< 20.0	ug/L	12/28/2021 17:43
Carbon disulfide	**721**	ug/L	12/28/2021 17:43
Carbon Tetrachloride	**1030**	ug/L	12/28/2021 17:43
Chlorobenzene	**302**	ug/L	12/28/2021 17:43
Chloroethane	< 20.0	ug/L	12/28/2021 17:43
Chloroform	**1830**	ug/L	12/28/2021 17:43
Chloromethane	< 20.0	ug/L	12/28/2021 17:43
cis-1,2-Dichloroethene	< 20.0	ug/L	12/28/2021 17:43
cis-1,3-Dichloropropene	< 20.0	ug/L	12/28/2021 17:43
Cyclohexane	< 100	ug/L	12/28/2021 17:43
Dibromochloromethane	< 20.0	ug/L	12/28/2021 17:43
Dichlorodifluoromethane	< 20.0	ug/L	12/28/2021 17:43
Ethylbenzene	< 20.0	ug/L	12/28/2021 17:43
Freon 113	< 20.0	ug/L	12/28/2021 17:43
Isopropylbenzene	< 20.0	ug/L	12/28/2021 17:43
m,p-Xylene	< 20.0	ug/L	12/28/2021 17:43
Methyl acetate	< 20.0	ug/L	12/28/2021 17:43
Methyl tert-butyl Ether	< 20.0	ug/L	12/28/2021 17:43
Methylcyclohexane	< 20.0	ug/L	12/28/2021 17:43
Methylene chloride	**134**	ug/L	12/28/2021 17:43
o-Xylene	< 20.0	ug/L	12/28/2021 17:43

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-4		
Lab Sample ID:	215739-04	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Styrene	< 50.0	ug/L		12/28/2021 17:43
Tetrachloroethene	**229**	ug/L		12/28/2021 17:43
Toluene	**257**	ug/L		12/28/2021 17:43
trans-1,2-Dichloroethene	< 20.0	ug/L		12/28/2021 17:43
trans-1,3-Dichloropropene	< 20.0	ug/L		12/28/2021 17:43
Trichloroethene	**41.0**	ug/L		12/28/2021 17:43
Trichlorofluoromethane	< 20.0	ug/L		12/28/2021 17:43
Vinyl chloride	< 20.0	ug/L		12/28/2021 17:43

Surrogate	**Percent Recovery**	**Limits**	**Outliers**	**Date Analyzed**
1,2-Dichloroethane-d4	**115**	77.9 - 132		12/28/2021 17:43
4-Bromofluorobenzene	**103**	62.6 - 133		12/28/2021 17:43
Pentafluorobenzene	**116**	88.9 - 114	*	12/28/2021 17:43
Toluene-D8	**111**	75.6 - 117		12/28/2021 17:43

Method Reference(s): EPA 8260C
EPA 5030C

Data File: z06365.D

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-5		
Lab Sample ID:	215739-05	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Semi-Volatile Organics (Pyridines)

Analyte	Result	Units	Qualifier	Date Analyzed
2,6-Dichloropyridine	< 20000	ug/L	A	12/30/2021 15:08
2-Chloropyridine	**203000**	ug/L	A	12/30/2021 15:08
3-Chloropyridine	< 20000	ug/L	A	12/30/2021 15:08
4-Chloropyridine	< 20000	ug/L	A	12/30/2021 15:08
4-Fluoroaniline	< 20000	ug/L	A	12/30/2021 15:08
Pyridine	< 20000	ug/L		12/30/2021 15:08

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	NC	18.6 - 104		12/30/2021 15:08

Method Reference(s): EPA 8270D
Preparation Date: 12/21/2021
Data File: B59067.D

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
1,1,1-Trichloroethane	< 20.0	ug/L		12/28/2021 18:03
1,1,2,2-Tetrachloroethane	< 20.0	ug/L		12/28/2021 18:03
1,1,2-Trichloroethane	< 20.0	ug/L		12/28/2021 18:03
1,1-Dichloroethane	< 20.0	ug/L		12/28/2021 18:03
1,1-Dichloroethene	< 20.0	ug/L		12/28/2021 18:03
1,2,3-Trichlorobenzene	< 50.0	ug/L		12/28/2021 18:03
1,2,4-Trichlorobenzene	< 50.0	ug/L		12/28/2021 18:03
1,2-Dibromo-3-Chloropropane	< 100	ug/L		12/28/2021 18:03
1,2-Dibromoethane	< 20.0	ug/L		12/28/2021 18:03
1,2-Dichlorobenzene	**47.9**	ug/L		12/28/2021 18:03
1,2-Dichloroethane	< 20.0	ug/L		12/28/2021 18:03
1,2-Dichloropropane	< 20.0	ug/L		12/28/2021 18:03
1,3-Dichlorobenzene	< 20.0	ug/L		12/28/2021 18:03
1,4-Dichlorobenzene	**27.8**	ug/L		12/28/2021 18:03

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-5		
Lab Sample ID:	215739-05	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

1,4-Dioxane	< 100	ug/L	12/28/2021 18:03
2-Butanone	**103**	ug/L	12/28/2021 18:03
2-Hexanone	< 50.0	ug/L	12/28/2021 18:03
4-Methyl-2-pentanone	< 50.0	ug/L	12/28/2021 18:03
Acetone	< 100	ug/L	12/28/2021 18:03
Benzene	**18.7**	ug/L	12/28/2021 18:03
Bromochloromethane	< 50.0	ug/L	12/28/2021 18:03
Bromodichloromethane	< 20.0	ug/L	12/28/2021 18:03
Bromoform	< 50.0	ug/L	12/28/2021 18:03
Bromomethane	< 20.0	ug/L	12/28/2021 18:03
Carbon disulfide	**905**	ug/L	12/28/2021 18:03
Carbon Tetrachloride	**1030**	ug/L	12/28/2021 18:03
Chlorobenzene	**430**	ug/L	12/28/2021 18:03
Chloroethane	< 20.0	ug/L	12/28/2021 18:03
Chloroform	**1880**	ug/L	12/28/2021 18:03
Chloromethane	< 20.0	ug/L	12/28/2021 18:03
cis-1,2-Dichloroethene	< 20.0	ug/L	12/28/2021 18:03
cis-1,3-Dichloropropene	< 20.0	ug/L	12/28/2021 18:03
Cyclohexane	< 100	ug/L	12/28/2021 18:03
Dibromochloromethane	< 20.0	ug/L	12/28/2021 18:03
Dichlorodifluoromethane	< 20.0	ug/L	12/28/2021 18:03
Ethylbenzene	< 20.0	ug/L	12/28/2021 18:03
Freon 113	< 20.0	ug/L	12/28/2021 18:03
Isopropylbenzene	< 20.0	ug/L	12/28/2021 18:03
m,p-Xylene	< 20.0	ug/L	12/28/2021 18:03
Methyl acetate	< 20.0	ug/L	12/28/2021 18:03
Methyl tert-butyl Ether	< 20.0	ug/L	12/28/2021 18:03
Methylcyclohexane	< 20.0	ug/L	12/28/2021 18:03
Methylene chloride	**136**	ug/L	12/28/2021 18:03
o-Xylene	< 20.0	ug/L	12/28/2021 18:03

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 215739

Client: **Arch Chemicals**

Project Reference: 2021 GW Variable Pump Test December 2021

Sample Identifier:	HW-1-Step-5		
Lab Sample ID:	215739-05	**Date Sampled:**	12/15/2021
Matrix:	Groundwater	**Date Received:**	12/16/2021

Styrene	< 50.0	ug/L		12/28/2021 18:03
Tetrachloroethene	**235**	ug/L		12/28/2021 18:03
Toluene	**290**	ug/L		12/28/2021 18:03
trans-1,2-Dichloroethene	< 20.0	ug/L		12/28/2021 18:03
trans-1,3-Dichloropropene	< 20.0	ug/L		12/28/2021 18:03
Trichloroethene	**41.4**	ug/L		12/28/2021 18:03
Trichlorofluoromethane	< 20.0	ug/L		12/28/2021 18:03
Vinyl chloride	< 20.0	ug/L		12/28/2021 18:03

Surrogate	**Percent Recovery**	**Limits**	**Outliers**	**Date Analyzed**
1,2-Dichloroethane-d4	**111**	77.9 - 132		12/28/2021 18:03
4-Bromofluorobenzene	**103**	62.6 - 133		12/28/2021 18:03
Pentafluorobenzene	**112**	88.9 - 114		12/28/2021 18:03
Toluene-D8	**106**	75.6 - 117		12/28/2021 18:03

Method Reference(s): EPA 8260C
EPA 5030C

Data File: z06366.D

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

Each page of this document is part of a multipage report. This document may not be reproduced except in its entirety, without the prior consent of Paradigm Environmental Services, Inc.

All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

"<" = Analyzed for but not detected at or above the quantitation limit.
"E" = Result has been estimated, calibration limit exceeded.
"Z" = See case narrative.
"D" = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
"J" = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
"P" = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

CHAIN OF CUSTODY

PARADIGM ENVIRONMENTAL SERVICES, INC.

REPORT TO:		INVOICE TO:	
COMPANY:	Arch Chemicals, Inc.	COMPANY:	SAME
ADDRESS:	100 McKee Road, P.O. Box 30205	ADDRESS:	
CITY:	Rochester STATE: NY ZIP: 14603	CITY:	STATE: ZIP:
PHONE:	585-613-3752 FAX:	PHONE:	FAX:
ATTN:	Francien Trubia	ATTN:	

LAB PROJECT ID: 215739
Quotation #: MS 121620D
Email: francien.trubia@lonza.com

PROJECT REFERENCE
2021 GW Variable Pump Test
December 2021

Matrix Codes:
AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	Site Specific SVOCs (8270)	TCL Volatiles (8260)	REMARKS	PARADIGM LAB SAMPLE NUMBER
12/15/21	1005		X	HW-1 - Start	WG	3	X	X	High TSS, High conc.	01
12/15/21	1135		X	HW-1 - Step - 1	WG	3	X	X	"	02
12/15/21	1345		X	HW-1 - Step - 3	WG	3	X	X	"	03
12/15/21	1500		X	HW-1 - Step - 4	WG	3	X	X	"	04
12/15/21	1600		X	HW-1 - Step - 5	WG	3	X	X	"	05

(1) nelson.breton@woodplc.com

Special 12/16/21 1437

Turnaround Time		Report Supplements			
Availability contingent upon lab approval; additional fees may apply.					
Standard 5 day	☐	None Required	☐	None Required	☐
10 day	☒	Batch QC	☐	Basic EDD	☐
Rush 3 day	☐	Category A	☐	NYSDEC EDD	☐
Rush 2 day	☐	Category B	☐		
Rush 1 day	☐				
Other (please indicate date needed: ____)	☐	Other (please indicate package needed: ____)	☐	Other EDD (please indicate EDD needed ____)	☐

Sampled By	12/16/21 Date/Time	0947
Relinquished By	12/16/21 Date/Time	0950
Received By	16/DEC/21 Date/Time	0950
Received @ Lab By	12/16/21 Date/Time	1437

Total Cost: ☐

P.I.F. ☐

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

Francien Trubia 12/16/21 @ 1321
Relinquished By Date/Time
Joe Fook 12/16/2021 @ 1321
Received By Date/Time

See additional page for sample conditions.

PARADIGM

Chain of Custody Supplement

Client: Arch **Completed by:** Mulyaid

Lab Project ID: 215759 **Date:** 12/16/21

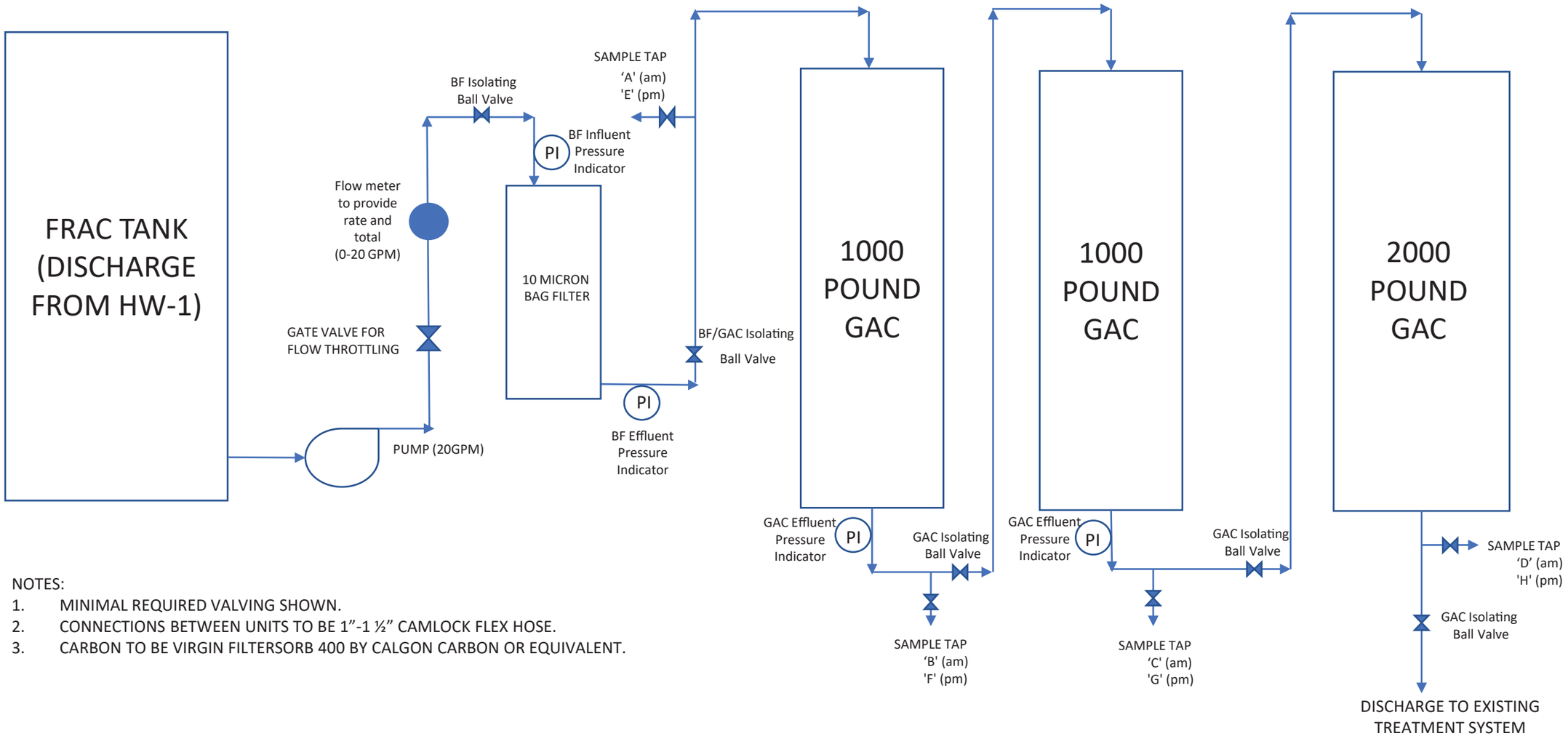
Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	NELAC compliance with the sample condition requirements upon receipt- Yes	No	N/A
Container Type	☑	☐	☐
Comments			
Transferred to method-compliant container	☐	☐	☑
Headspace (<1 mL)	☑ VOA	☐	☑
Comments			
Preservation	☑ VOA	☐	☑
Comments			
Chlorine Absent (<0.10 ppm per test strip)	☐	☐	☑
Comments			
Holding Time	☑	☐	☐
Comments			
Temperature	☑	☐	☐
Comments	3°C i wl		
Compliant Sample Quantity/Type	☑	☐	☐
Comments			

Appendix H

ARCH GAC FLOW SCHEMATIC

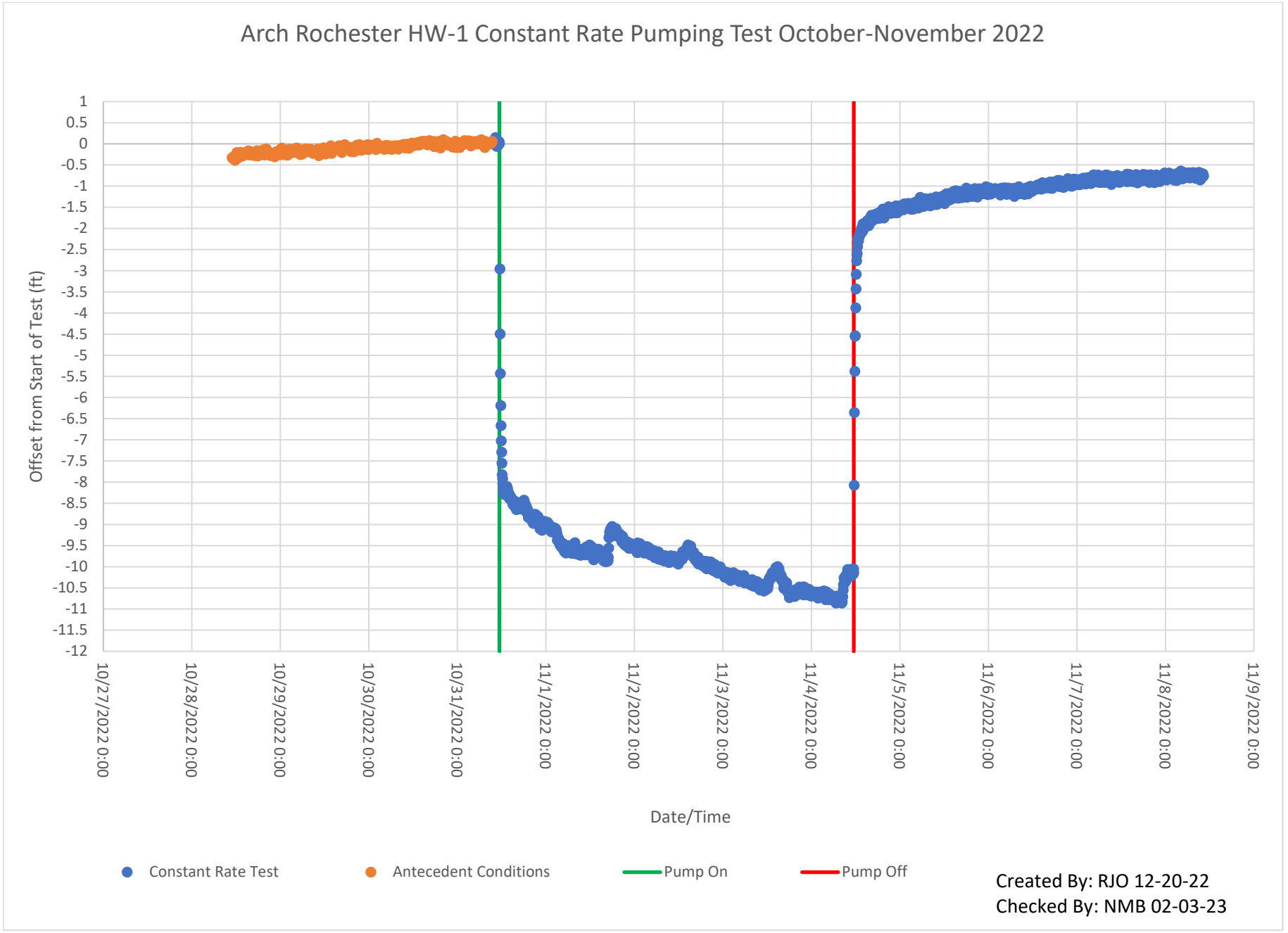


NOTES:

1. MINIMAL REQUIRED VALVING SHOWN.
2. CONNECTIONS BETWEEN UNITS TO BE 1”-1 ½” CAMLOCK FLEX HOSE.
3. CARBON TO BE VIRGIN FILTERSORB 400 BY CALGON CARBON OR EQUIVALENT.

Created By: EWT, 8/30/2022
Checked By: TNG, 9/5/2022

Appendix I



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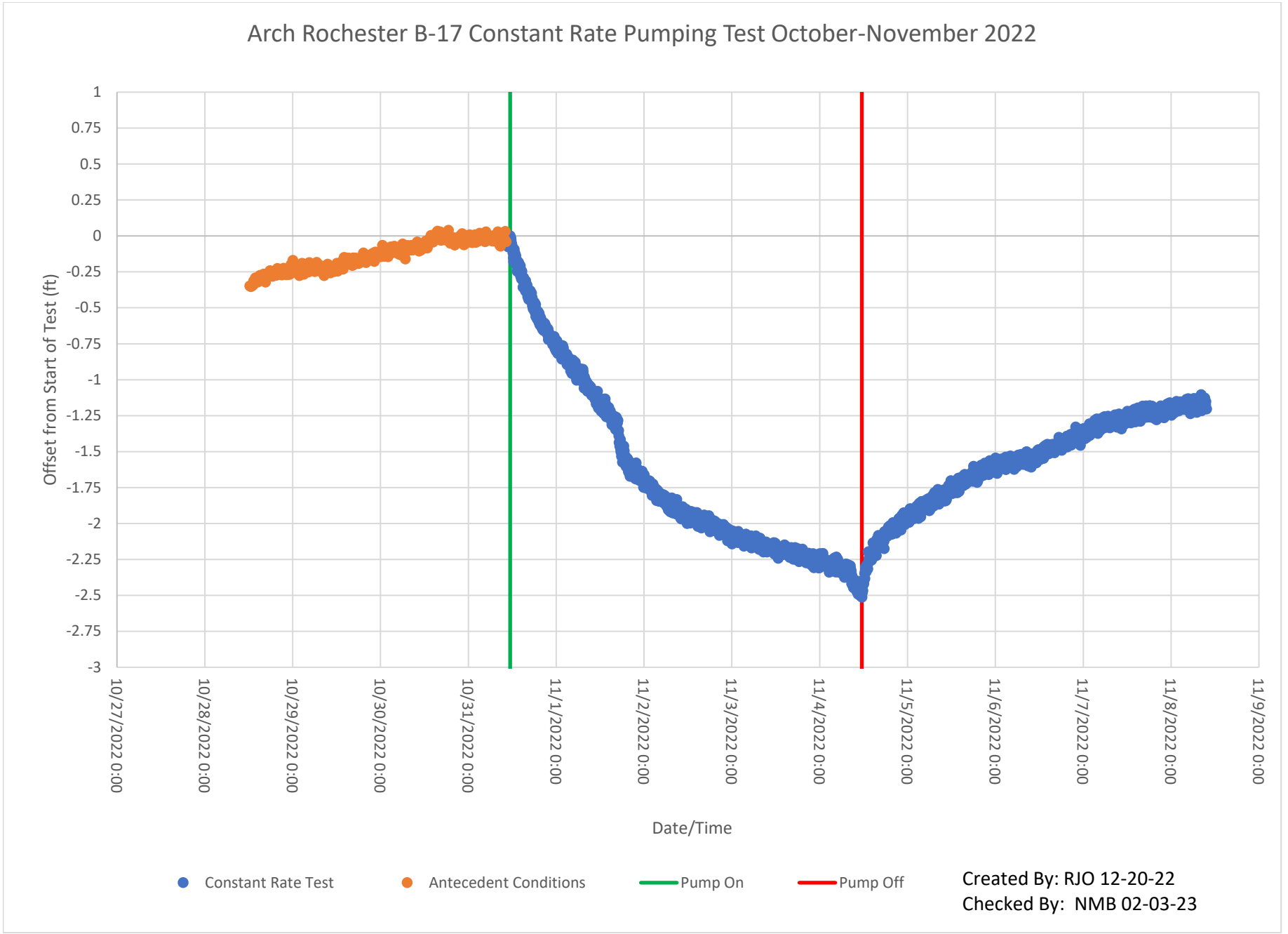
Checked By: NMB 02-03-23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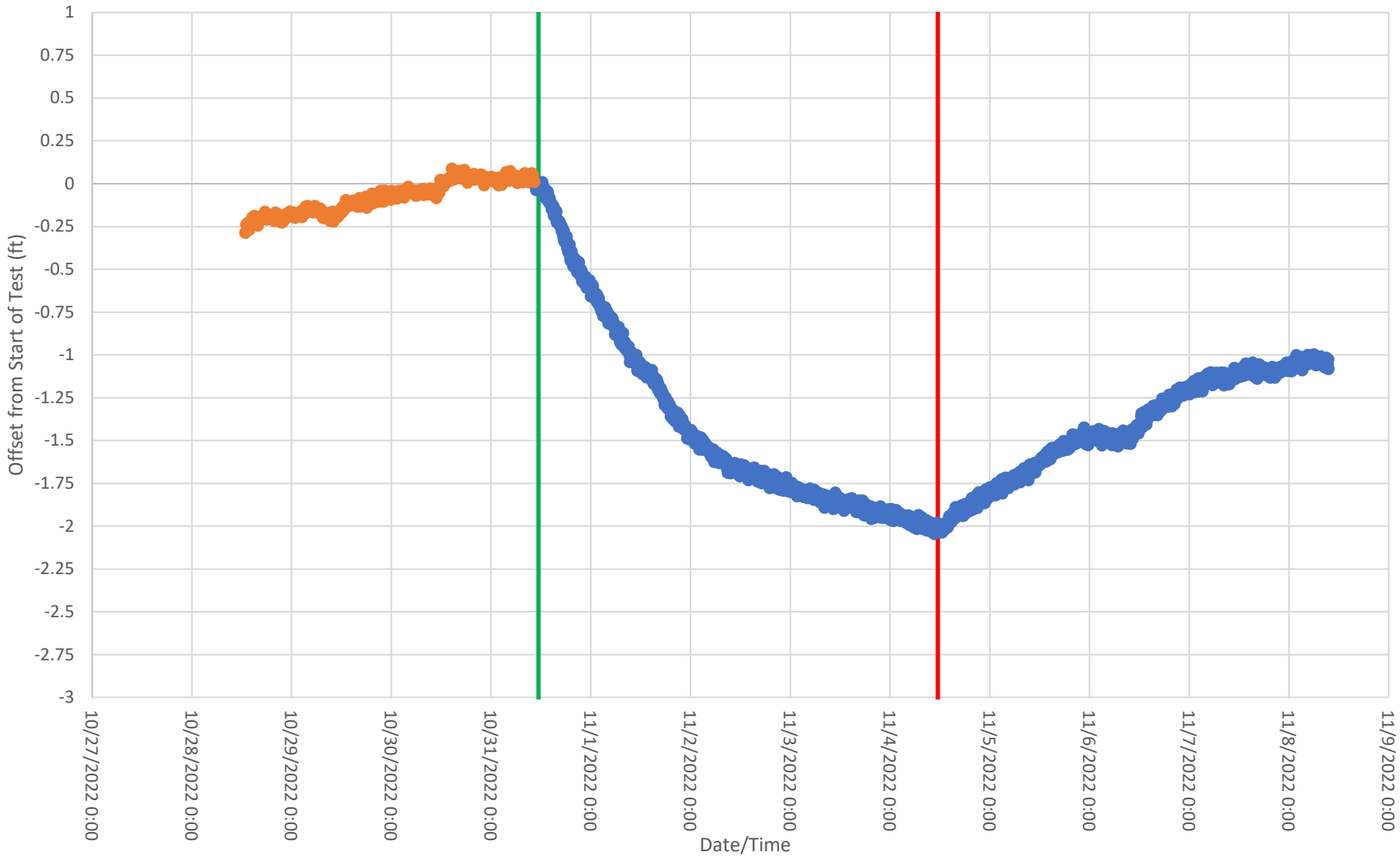
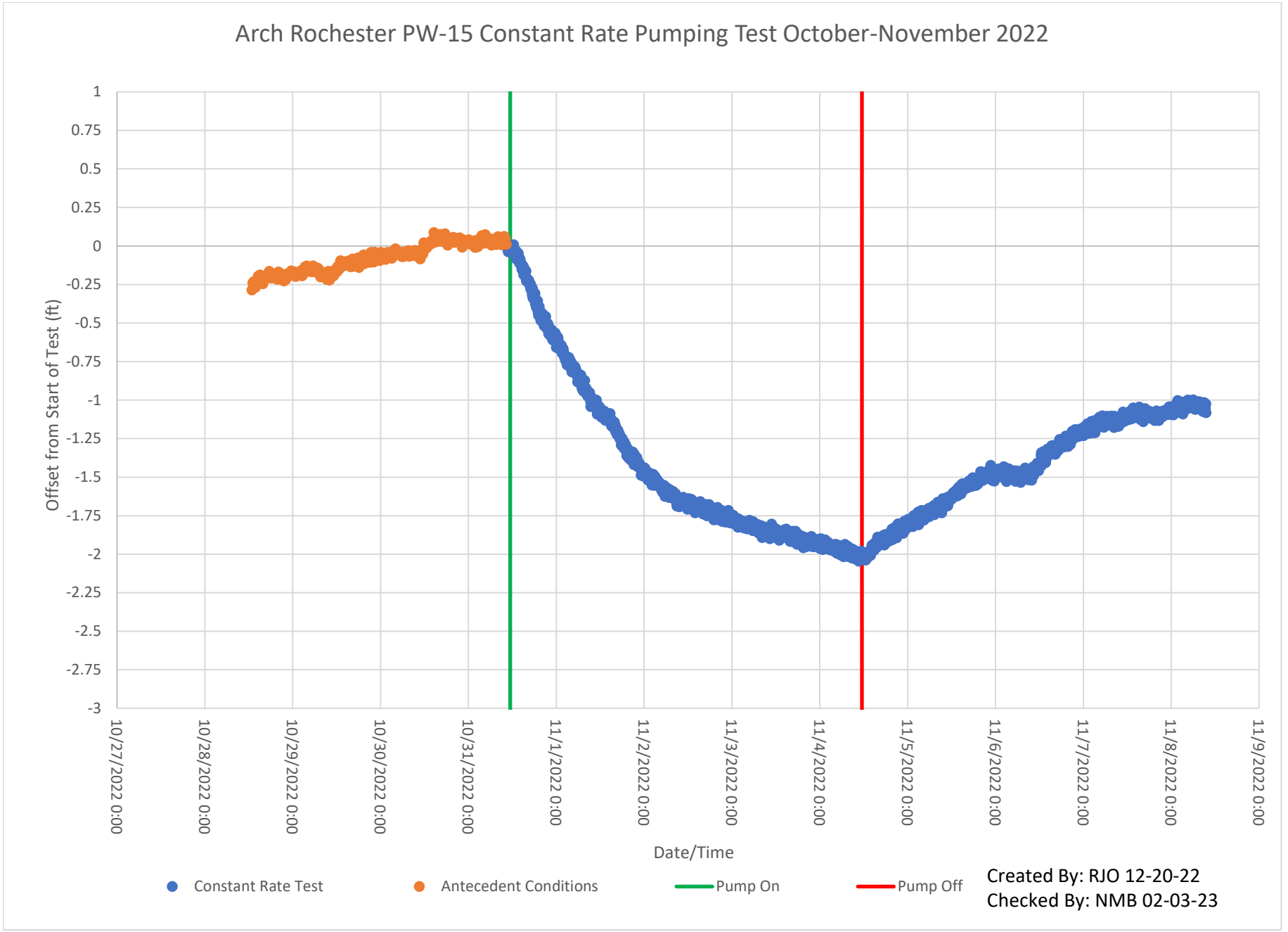
0.5
0.25
0
-0.25
-0.5
-0.75
-1
-1.25
-1.5
-1.75
-2
-2.25
-2.5
-2.75
-3
10/27/2022 0:00
10/28/2022 0:00
10/29/2022 0:00
10/30/2022 0:00
10/31/2022 0:00
11/1/2022 0:00
11/2/2022 0:00
11/3/2022 0:00
11/4/2022 0:00
11/5/2022 0:00
11/6/2022 0:00
11/7/2022 0:00
11/8/2022 0:00
11/9/2022 0:00
Date/Time
Constant Rate Test
Antecedent Conditions
Pump On
Pump Off
Created By: RJO 12-20-22
Checked By: NMB 02-03-23

Arch Rochester PZ-109 Constant Rate Pumping Test October-November 2022



Created By: RJO 12-20-22
Checked By: NMB 02-03-23


Arch Rochester PW-15 Constant Rate Pumping Test October-November 2022
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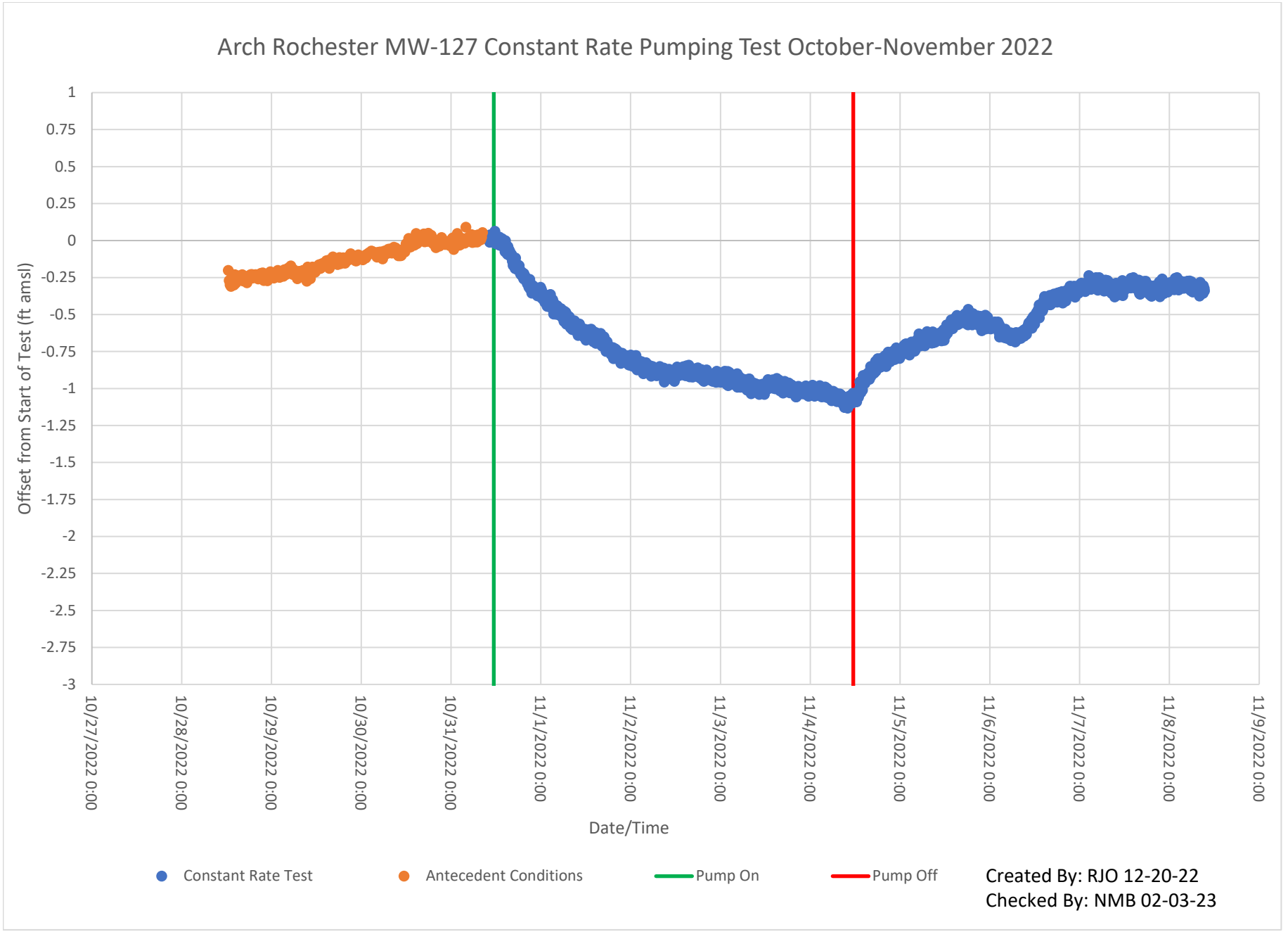
0.25
0
-0.25
-0.5
-0.75
-1
-1.25
-1.5
-1.75
-2
-2.25
-2.5
-2.75
-3
10/27/2022 0:00
10/28/2022 0:00
10/29/2022 0:00
10/30/2022 0:00
10/31/2022 0:00
11/1/2022 0:00
11/2/2022 0:00
11/3/2022 0:00
11/4/2022 0:00
11/5/2022 0:00
11/6/2022 0:00
11/7/2022 0:00
11/8/2022 0:00
11/9/2022 0:00
Date/Time
Constant Rate Test
Antecedent Conditions
Pump On
Pump Off
Created By: RJO 12-20-22
Checked By: NMB 02-03-23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Offset from Start of Test (ft amsl)
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0
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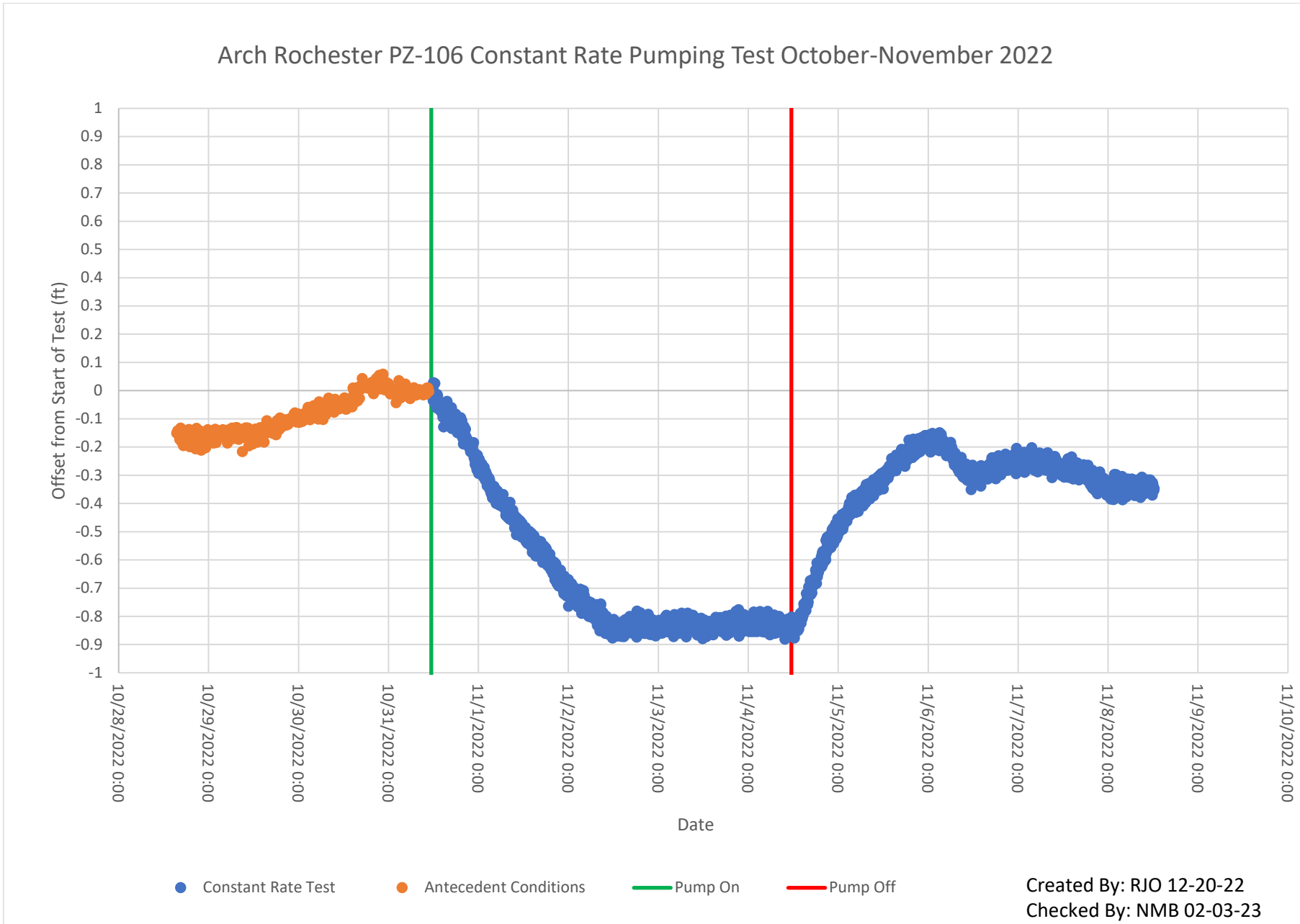
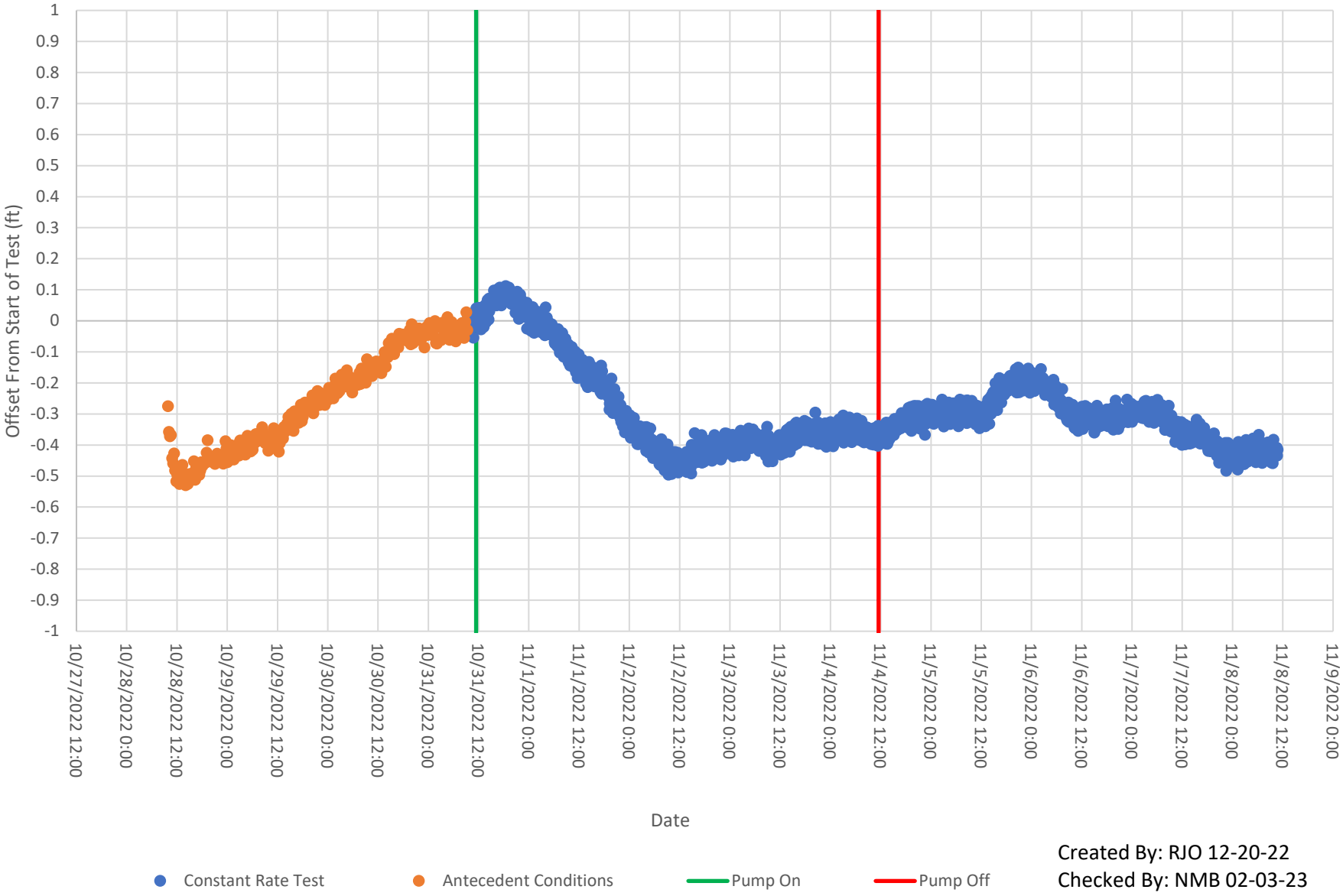
-0.5
-0.75
-1
-1.25
-1.5
-1.75
-2
-2.25
-2.5
-2.75
-3
10/27/2022 0:00
10/28/2022 0:00
10/29/2022 0:00
10/30/2022 0:00
10/31/2022 0:00
11/1/2022 0:00
11/2/2022 0:00
11/3/2022 0:00
11/4/2022 0:00
11/5/2022 0:00
11/6/2022 0:00
11/7/2022 0:00
11/8/2022 0:00
11/9/2022 0:00
Date/Time
Constant Rate Test
Antecedent Conditions
Pump On
Pump Off
Created By: RJO 12-20-22
Checked By: NMB 02-03-23

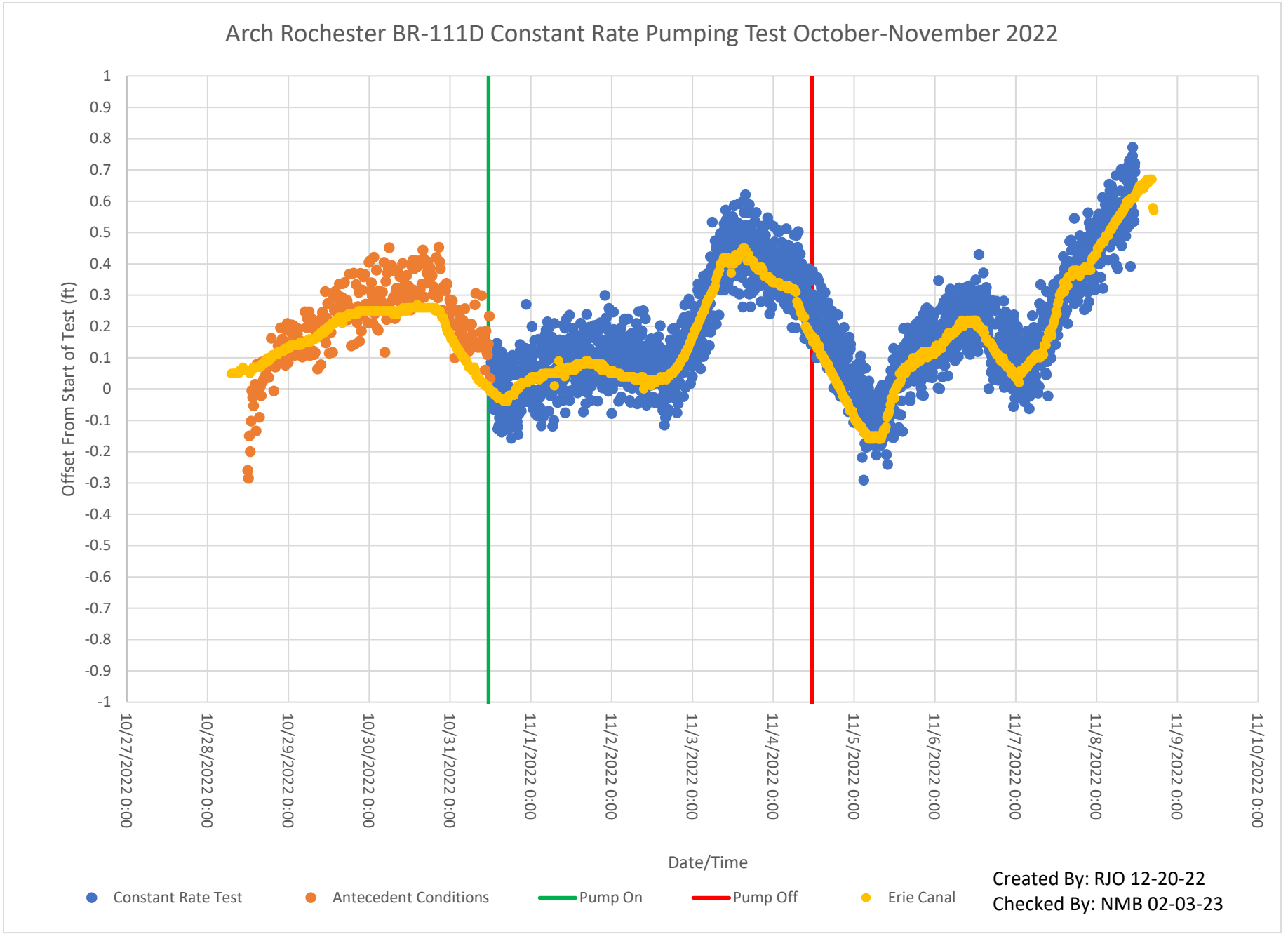


Created By: RJO 12-20-22
Checked By: NMB 02-03-23

Arch Rochester PZ-103 Constant Rate Pumping Test October-November 2022



Created By: RJO 12-20-22
Checked By: NMB 02-03-23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Offset From Start of Test (ft)
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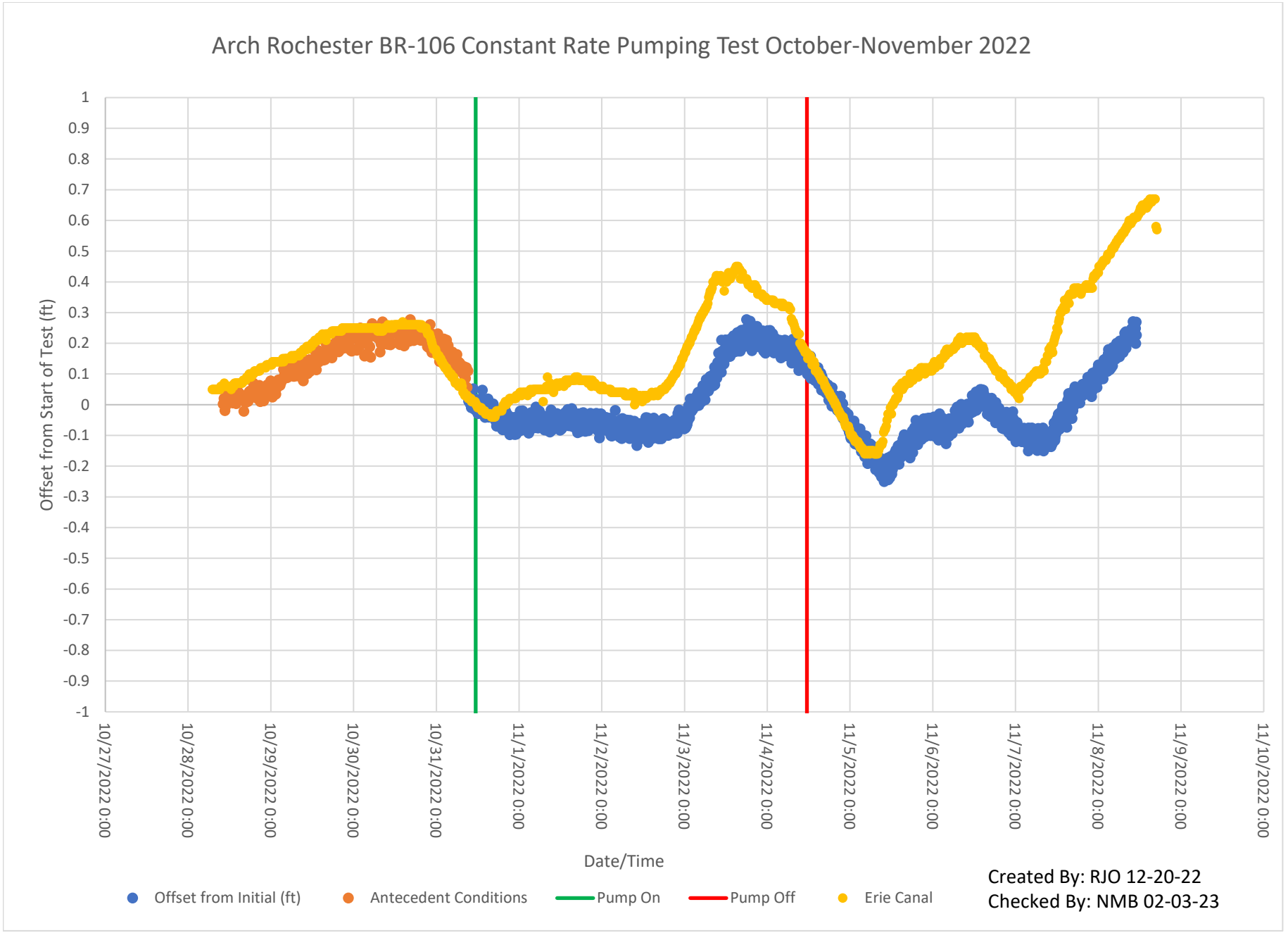
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
10/27/2022 0:00
10/28/2022 0:00
10/29/2022 0:00
10/30/2022 0:00
10/31/2022 0:00
11/1/2022 0:00
11/2/2022 0:00
11/3/2022 0:00
11/4/2022 0:00
11/5/2022 0:00
11/6/2022 0:00
11/7/2022 0:00
11/8/2022 0:00
11/9/2022 0:00
11/10/2022 0:00
Date/Time
Constant Rate Test
Antecedent Conditions
Pump On
Pump Off
Erie Canal
Created By: RJO 12-20-22
Checked By: NMB 02-03-23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Offset from Start of Test (ft)
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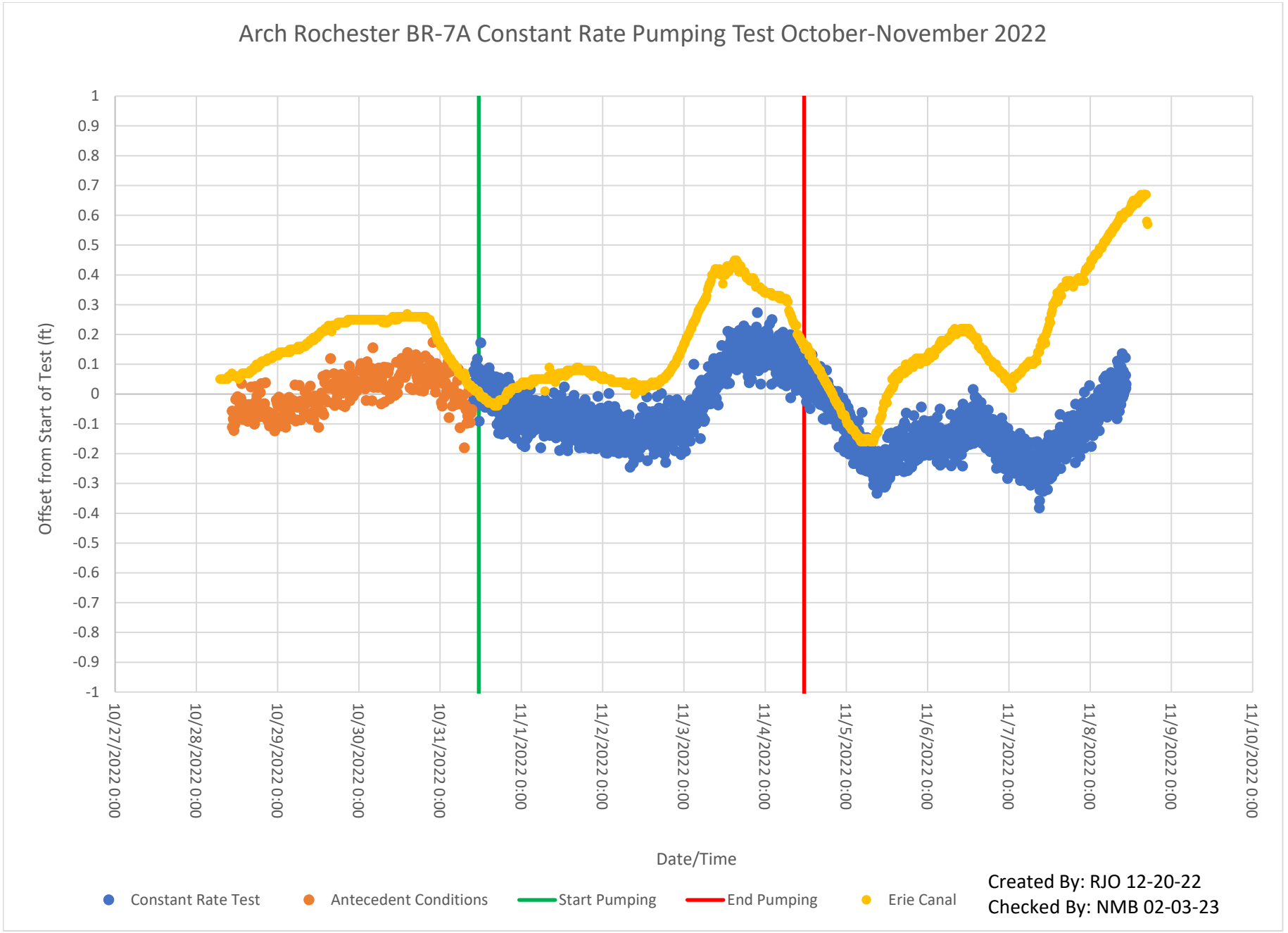
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
10/27/2022 0:00
10/28/2022 0:00
10/29/2022 0:00
10/30/2022 0:00
10/31/2022 0:00
11/1/2022 0:00
11/2/2022 0:00
11/3/2022 0:00
11/4/2022 0:00
11/5/2022 0:00
11/6/2022 0:00
11/7/2022 0:00
11/8/2022 0:00
11/9/2022 0:00
11/10/2022 0:00
Date/Time
Offset from Initial (ft)
Antecedent Conditions
Pump On
Pump Off
Erie Canal
Created By: RJO 12-20-22
Checked By: NMB 02-03-23


Arch Rochester BR-7A Constant Rate Pumping Test October-November 2022
Offset from Start of Test (ft)
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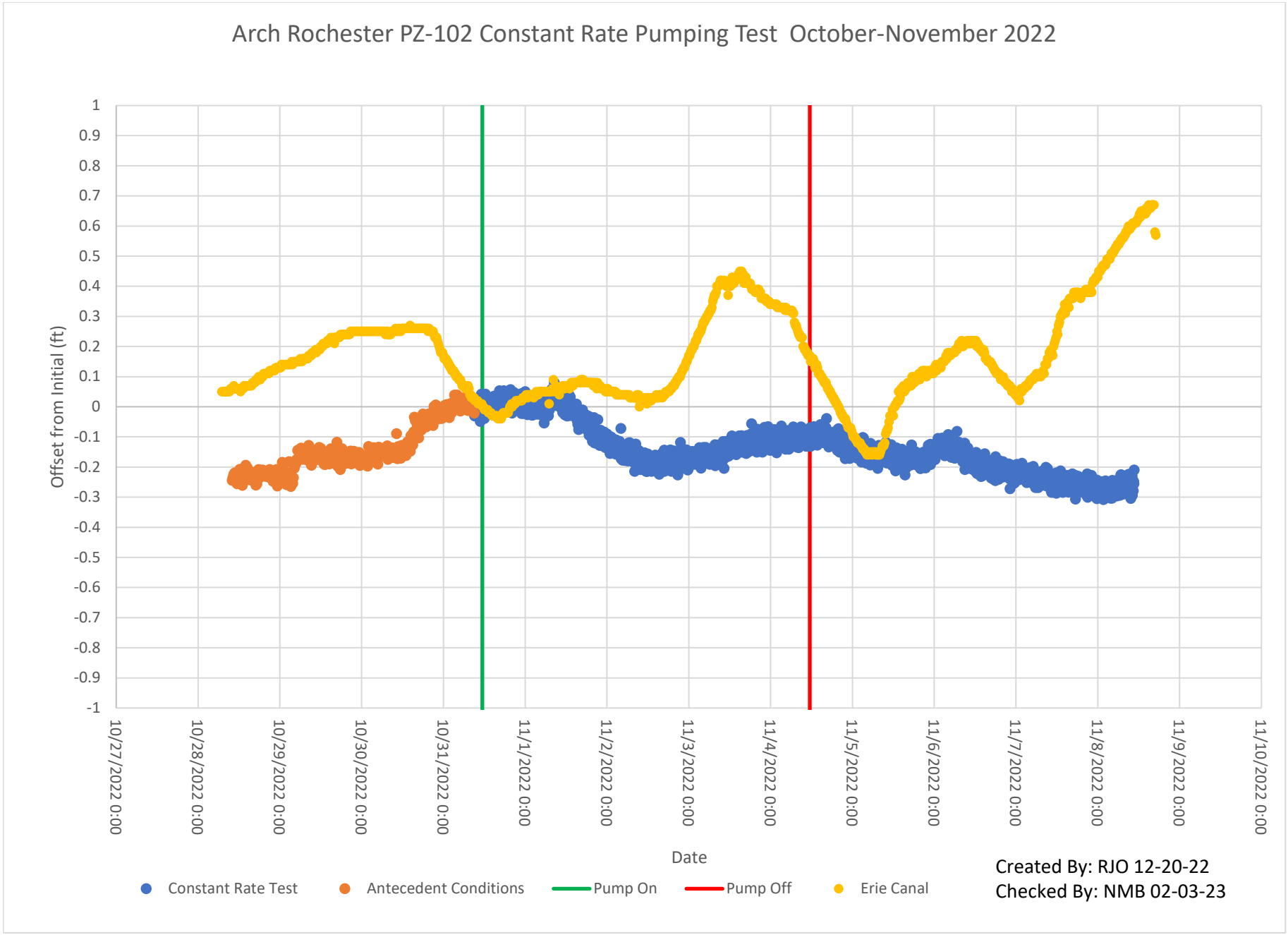
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
10/27/2022 0:00
10/28/2022 0:00
10/29/2022 0:00
10/30/2022 0:00
10/31/2022 0:00
11/1/2022 0:00
11/2/2022 0:00
11/3/2022 0:00
11/4/2022 0:00
11/5/2022 0:00
11/6/2022 0:00
11/7/2022 0:00
11/8/2022 0:00
11/9/2022 0:00
11/10/2022 0:00
Date/Time
Constant Rate Test
Antecedent Conditions
Start Pumping
End Pumping
Erie Canal
Created By: RJO 12-20-22
Checked By: NMB 02-03-23


Arch Rochester PZ-102 Constant Rate Pumping Test October-November 2022
Offset from Initial (ft)
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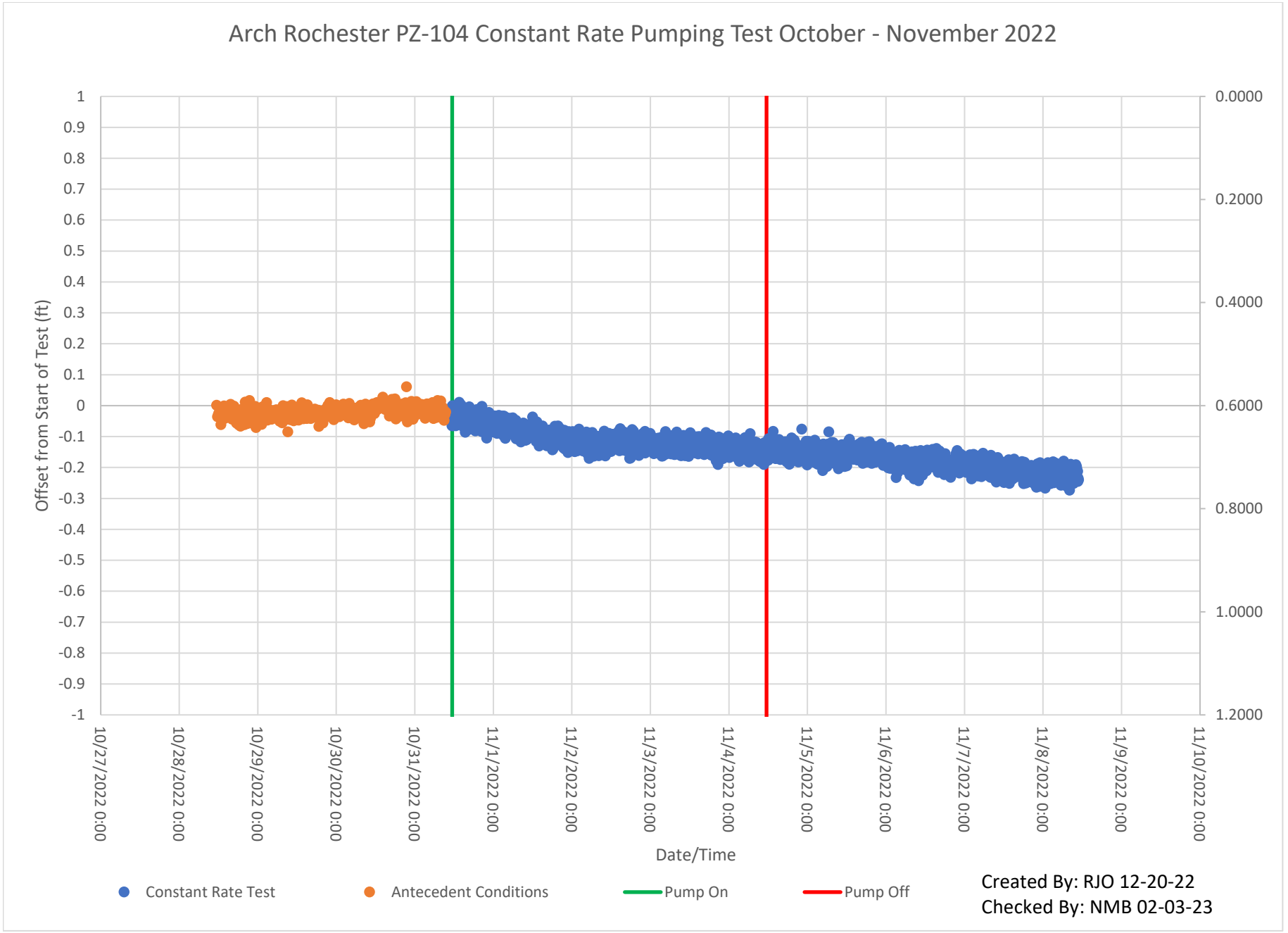
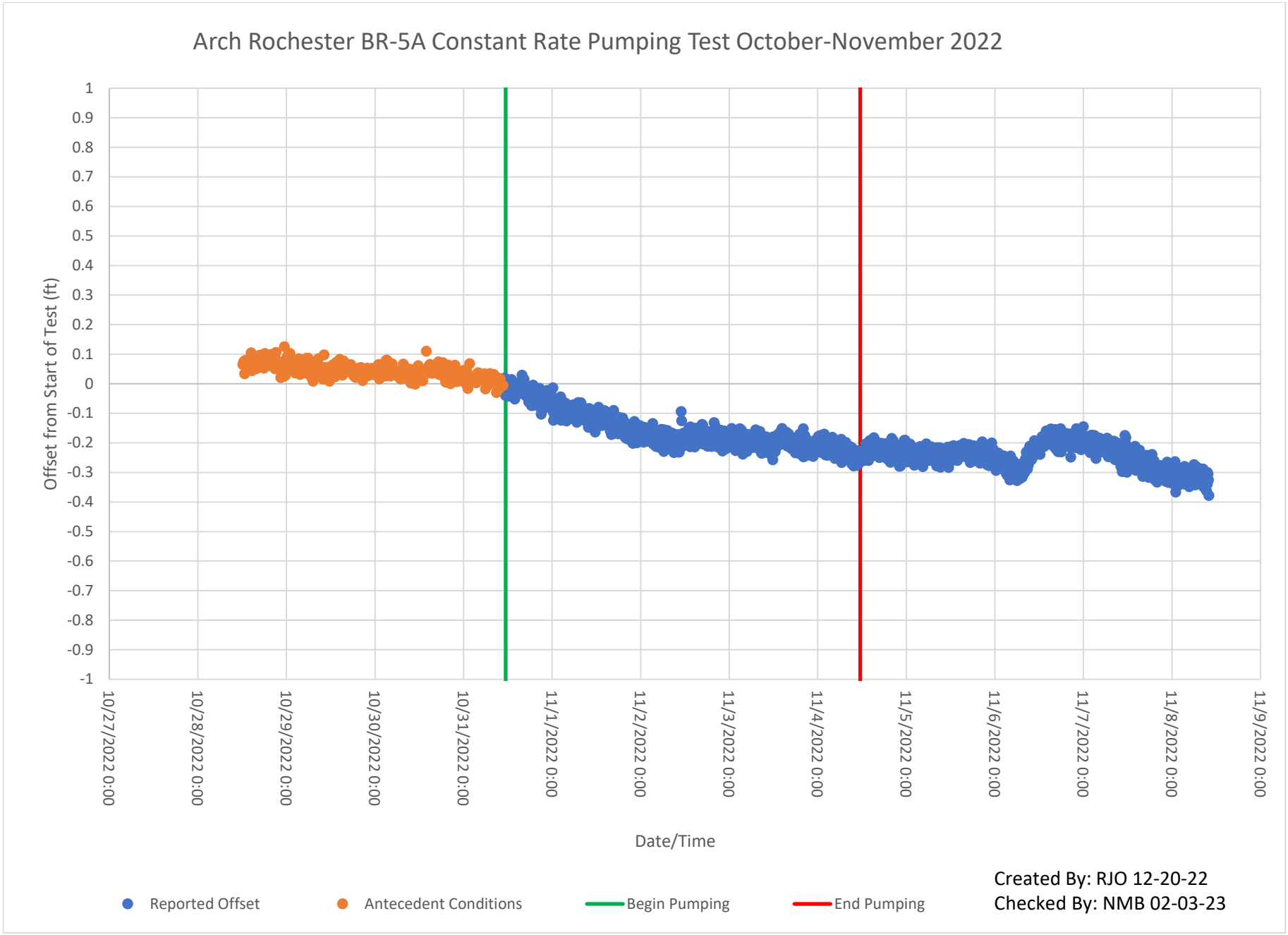
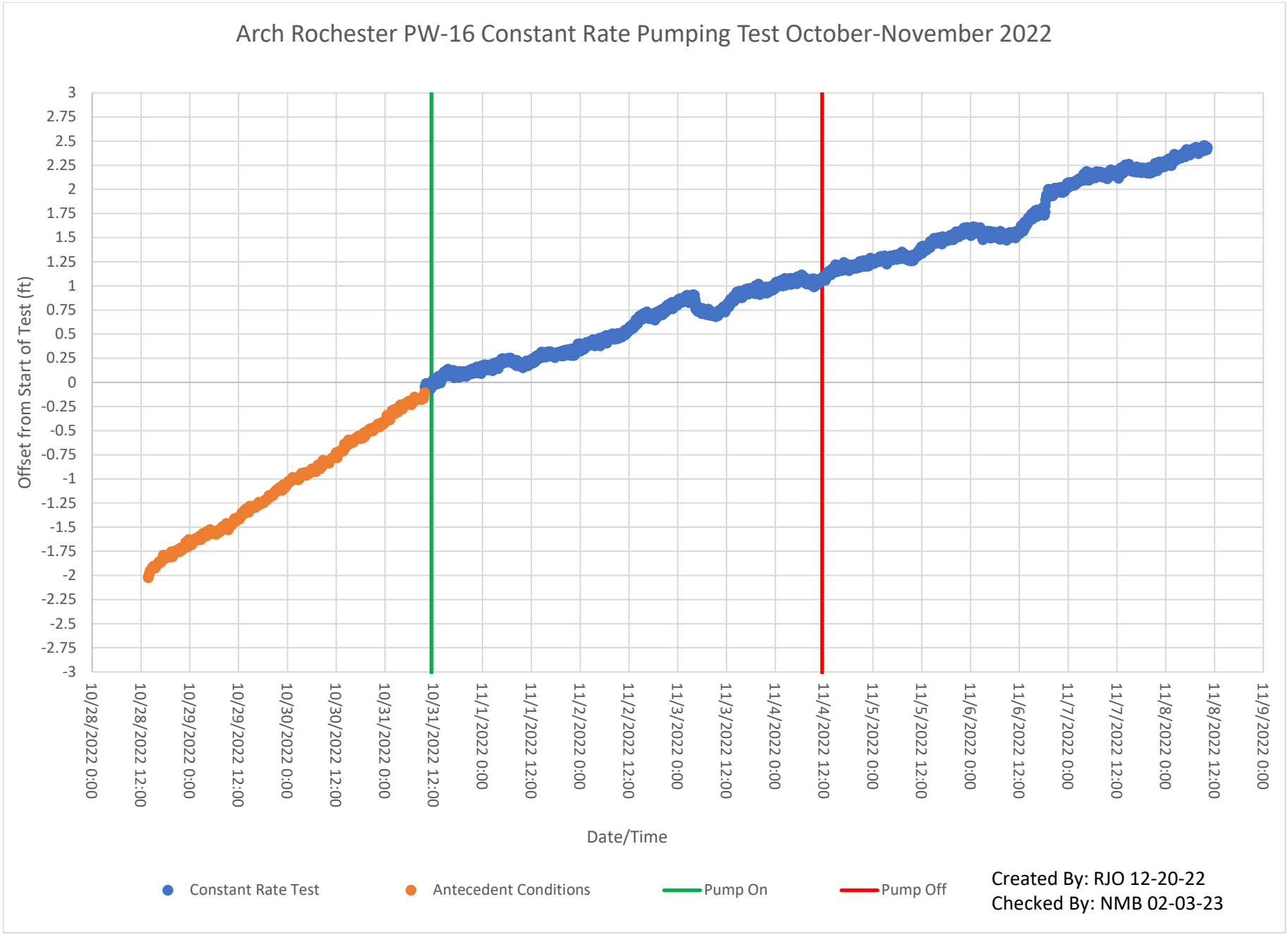
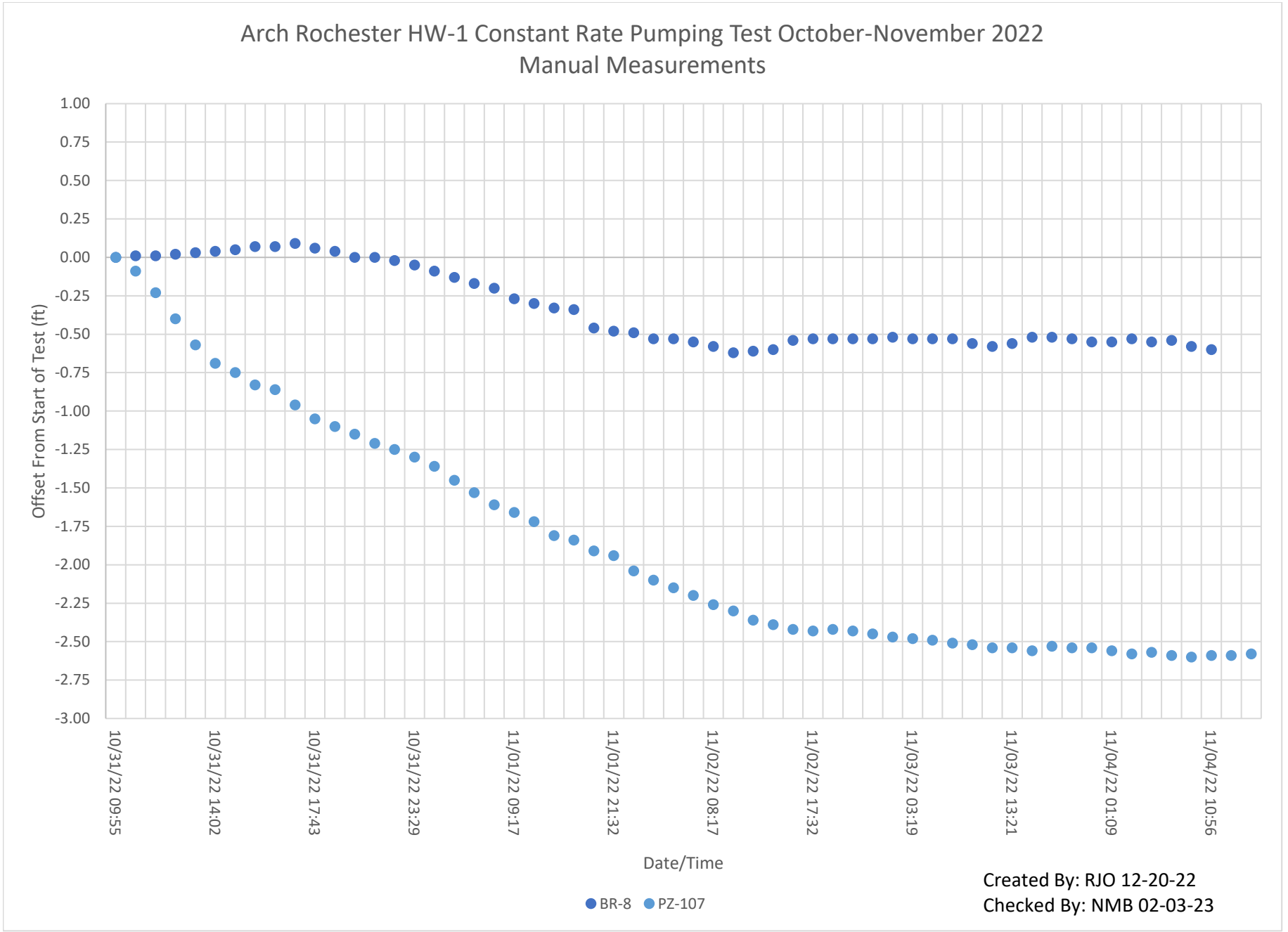
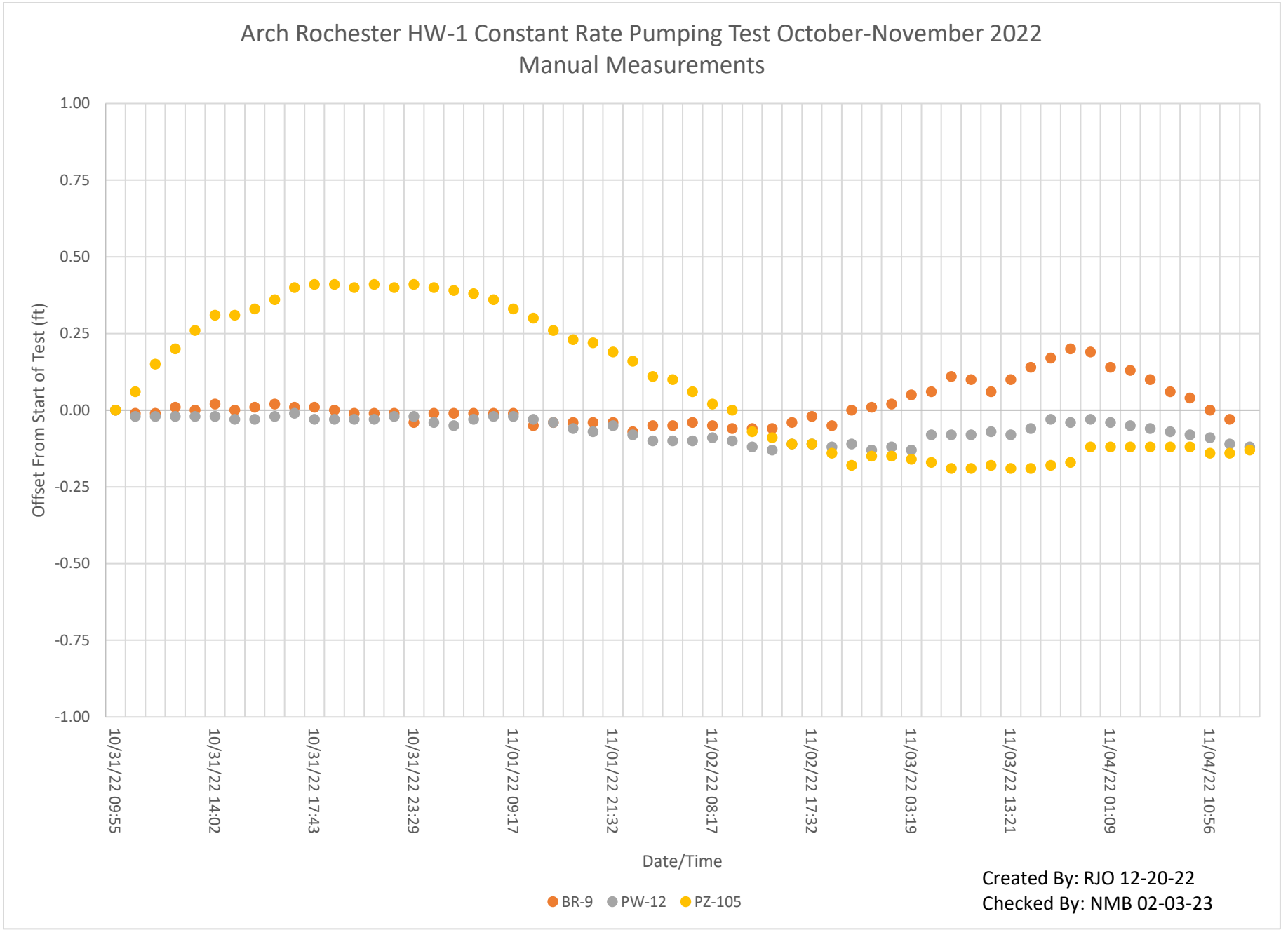
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
10/27/2022 0:00
10/28/2022 0:00
10/29/2022 0:00
10/30/2022 0:00
10/31/2022 0:00
11/1/2022 0:00
11/2/2022 0:00
11/3/2022 0:00
11/4/2022 0:00
11/5/2022 0:00
11/6/2022 0:00
11/7/2022 0:00
11/8/2022 0:00
11/9/2022 0:00
11/10/2022 0:00
Date
Constant Rate Test
Antecedent Conditions
Pump On
Pump Off
Erie Canal
Created By: RJO 12-20-22
Checked By: NMB 02-03-23

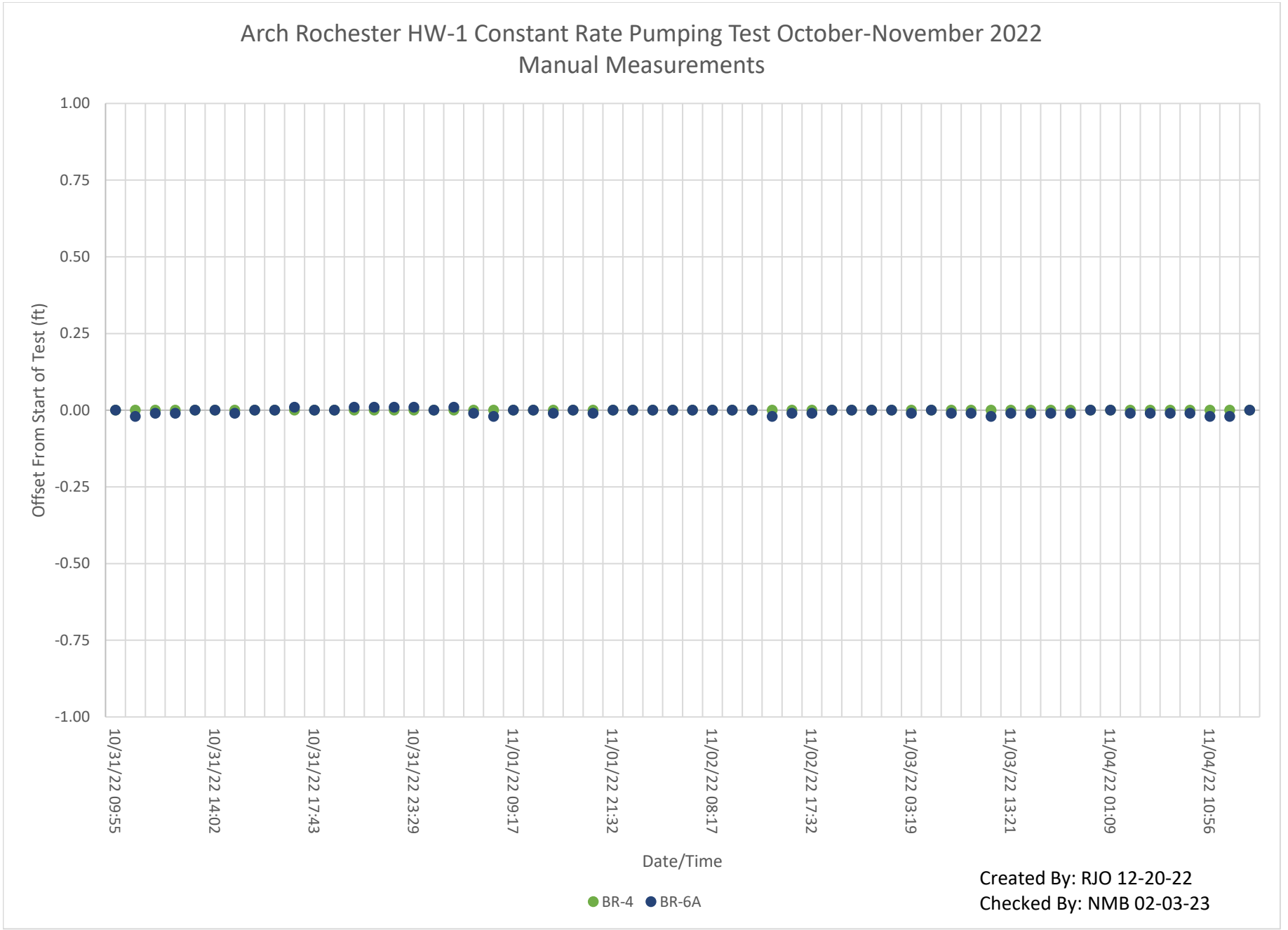

Arch Rochester PZ-104 Constant Rate Pumping Test October - November 2022
Offset from Start of Test (ft)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
0.0000
0.2000
0.4000
0.6000
0.8000
1.0000
1.2000
10/27/2022 0:00
10/28/2022 0:00
10/29/2022 0:00
10/30/2022 0:00
10/31/2022 0:00
11/1/2022 0:00
11/2/2022 0:00
11/3/2022 0:00
11/4/2022 0:00
11/5/2022 0:00
11/6/2022 0:00
11/7/2022 0:00
11/8/2022 0:00
11/9/2022 0:00
11/10/2022 0:00
Date/Time
Constant Rate Test
Antecedent Conditions
Pump On
Pump Off
Created By: RJO 12-20-22
Checked By: NMB 02-03-23


Arch Rochester BR-5A Constant Rate Pumping Test October-November 2022
Offset from Start of Test (ft)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
10/27/2022 0:00
10/28/2022 0:00
10/29/2022 0:00
10/30/2022 0:00
10/31/2022 0:00
11/1/2022 0:00
11/2/2022 0:00
11/3/2022 0:00
11/4/2022 0:00
11/5/2022 0:00
11/6/2022 0:00
11/7/2022 0:00
11/8/2022 0:00
11/9/2022 0:00
Date/Time
Reported Offset
Antecedent Conditions
Begin Pumping
End Pumping
Created By: RJO 12-20-22
Checked By: NMB 02-03-23


Arch Rochester PW-16 Constant Rate Pumping Test October-November 2022
Offset from Start of Test (ft)
3
2.75
2.5
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
-0.25
-0.5
-0.75
-1
-1.25
-1.5
-1.75
-2
-2.25
-2.5
-2.75
-3
10/28/2022 0:00
10/28/2022 12:00
10/29/2022 0:00
10/29/2022 12:00
10/30/2022 0:00
10/30/2022 12:00
10/31/2022 0:00
10/31/2022 12:00
11/1/2022 0:00
11/1/2022 12:00
11/2/2022 0:00
11/2/2022 12:00
11/3/2022 0:00
11/3/2022 12:00
11/4/2022 0:00
11/4/2022 12:00
11/5/2022 0:00
11/5/2022 12:00
11/6/2022 0:00
11/6/2022 12:00
11/7/2022 0:00
11/7/2022 12:00
11/8/2022 0:00
11/8/2022 12:00
11/9/2022 0:00
Date/Time
Constant Rate Test
Antecedent Conditions
Pump On
Pump Off
Created By: RJO 12-20-22
Checked By: NMB 02-03-23


Arch Rochester HW-1 Constant Rate Pumping Test October-November 2022
Manual Measurements
Offset From Start of Test (ft)
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
-1.25
-1.50
-1.75
-2.00
-2.25
-2.50
-2.75
-3.00
10/31/22 09:55
10/31/22 14:02
10/31/22 17:43
10/31/22 23:29
11/01/22 09:17
11/01/22 21:32
11/02/22 08:17
11/02/22 17:32
11/03/22 03:19
11/03/22 13:21
11/04/22 01:09
11/04/22 10:56
Date/Time
BR-8
PZ-107
Created By: RJO 12-20-22
Checked By: NMB 02-03-23


Arch Rochester HW-1 Constant Rate Pumping Test October-November 2022
Manual Measurements
Offset From Start of Test (ft)
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
10/31/22 09:55
10/31/22 14:02
10/31/22 17:43
10/31/22 23:29
11/01/22 09:17
11/01/22 21:32
11/02/22 08:17
11/02/22 17:32
11/03/22 03:19
11/03/22 13:21
11/04/22 01:09
11/04/22 10:56
Date/Time
BR-9
PW-12
PZ-105
Created By: RJO 12-20-22
Checked By: NMB 02-03-23


Arch Rochester HW-1 Constant Rate Pumping Test October-November 2022
Manual Measurements
Offset From Start of Test (ft)
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
10/31/22 09:55
10/31/22 14:02
10/31/22 17:43
10/31/22 23:29
11/01/22 09:17
11/01/22 21:32
11/02/22 08:17
11/02/22 17:32
11/03/22 03:19
11/03/22 13:21
11/04/22 01:09
11/04/22 10:56
Date/Time
BR-4
BR-6A
Created By: RJO 12-20-22
Checked By: NMB 02-03-23

DAILY FLOW LOGSHEET

FLOW RATE MEASURED OVER 1 MIN USING TOTALIZER MEASUREMENTS

		HW1	R4R EFFLUENT	HW1	R4R EFFLUENT	10 micron (A) BAG FILTER PRESSURE		10 micron (B) BAG FILTER PRESSURE		0.5 micron (A) BAG FILTER PRESSURE		0.5 micron (B) BAG FILTER PRESSURE	
DATE	TIME	FLOW gpm	FLOW gpm	TOTALIZER (Gal)	TOTALIZER (GAL)	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI
10/31	5:45p	20.12	19.67	7600	6572	6	6	5.5	5.5	3	3	6	5
	6:00p	19.78	19.66	7949	6874	6	6	5.5	5.5	3	3	6	5
	6:30p	19.94	19.64	8526	7430	6	6	6	6	3	3	7	5
	7:15p	20.001	19.65	9434	8339	6	6	6	6	3	3	7	5
	7:30p	20.001	19.64	9695	8621	6	6	6	6	3	3	7	5
	8:00p	20.12	19.64	10276	9188	6	6	6	6	3	3	7	5
	8:30p	20.001	19.66	10941	9846	6	6	6	6	3	3	7	5
	9:00p	19.94	19.63	11511	10370	6	6	6	6	3	3	7	5
	9:40p	20.38	19.68	12290	11134	6	6	6	6	3	3	7	5
	10:00p	20.30	19.68	12699	11527	6	6	6	6	3	2	6	5
	10:30p	20.06	19.69	13296	12150	6	6	6	6	3	3	6	5
	11:00p	19.94	19.70	13833	12679	6	6	6	6	3	3	6	5
	11:30p	20.06	19.69	14402	13212	6	6	6	6	3	3	6	5
11/1	12:00a	19.94	19.68	15051	13851	6	6	6	6	3	3	6	5
	12:30a	19.88	19.66	15639	14424	6	6	6	6	3	3	6	5
	1:00a	19.94	19.71	16316	15078	6	6	6	6	3	3	6	5
	1:30a	20.06	19.72	16843	15610	6	6	6	6	3	3	6	5
	2:00a	19.94	19.71	17526	16215	6	6	6	6	3	3	6	5
	2:30a	20.01	19.72	18053	16742	6	6	6	6	3	3	6	5
	3:00a	19.94	19.71	18580	17269	6	6	6	6	3	3	6	5
	3:30a	20.30	19.74	19203	17891	6	6	6	6	3	3	6	5
	4:00a	20.30	19.72	19913	18541	6	6	6	6	3	3	6	5
	4:30a	20.24	19.72	20476	19126	6	6	6	6	3	3	6	5
	5:00a	20.30	19.74	21158	19760	6	6	6	6	3	3	6	5
	5:30a	20.24	19.72	21789	20376	6	6	6	6	3	3	6	5
	6:00a	19.94	19.75	22406	20986	6	6	6	6	3	3	6	5
	6:30a	20.00	19.77	22963	21549	6	6	6	6	3	3	6	5
	7:00a	19.82	19.79	23564	22136	6	6	6	6	3	3	6	5
	7:30a	19.90	19.79	24119	22724	6	6	6	6	3	3	6	5

DAILY FLOW LOGSHEET

FLOW RATE MEASURED OVER 1 MIN USING TOTALIZER MEASUREMENTS

		HW1	R4R EFFLUENT	HW1	R4R EFFLUENT	10 micron (A) BAG FILTER PRESSURE		10 micron (B) BAG FILTER PRESSURE		0.5 micron (A) BAG FILTER PRESSURE		0.5 micron (B) BAG FILTER PRESSURE	
DATE	TIME	FLOW gpm	FLOW gpm	TOTALIZER (Gal)	TOTALIZER (GAL)	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI
11/1	800 AM	20.19	19.82	24750	23342	6	6	6	6	3	3	6	5
	830	19.89	19.77	25156	24093	6	6	6	6	3	3	6	5
	900	19.78	19.82	25925	24520	6	6	6	6	3	3	6	6
	930	19.76	19.80	26500	25109	6	6	6	6	3	3	6	6
	10:00	19.70	19.82	27086	25720	6	6	6	6	3	3	6	5
	1030	19.70	19.80	27671	26284	6	6	6	6	3	3	6	5
	1100	19.64	19.81	28304	27098	6	6	6	6	3	3	6	5
Sample	1130	19.55	19.76	[illegible]	27563	6	6	6	6	3	3	6	5
	1200	19.52	19.76	29502	28102	6	6	6	6	3	3	6	5
	1230	19.76	19.74	29980	28592	6	6	6	6	3	3	6	5
	1300	19.62	19.71	30678	[illegible]	6	6	6	6	3	3	6	5
	1330	19.65	19.71	31225	29802	6	6	6	6	3	3	6	5
	1400	19.88	19.70	31912	30491	6	6	5	6	3	3	6	5
	1430	19.79	19.80	32361	30946	6	6	6	6	3	3	6	5
15:15	[illegible]	19.52	19.78	33235	31798	6	6	6	6	3	3	6	5
	1530	19.88	19.78	33576	32142	6	6	6	6	2	2	6	4
	1600	19.76	19.78	34200	32769	6	6	6	6	2	2	6	4
	1630	19.82	19.80	34771	33339	6	6	6	6	2	2	6	4
	1700	19.94	19.75	35338	33909	6	6	6	5	2	2	6	4
	1730	20.12	19.76	35943	34498	6	6	6	5	2	2	6	4
	1800	20.24	19.75	36542	35083	6	6	6	5	2	2	6	4
	1830	20.30	19.73	37094	35619	6	6	6	5	2	2	6	4
	1910	20.36	19.75	37996	36497	6	6	6	6	3	2	6	4
	1930	20.48	19.81	38440	36923	6	6	6	6	3	2	7	5
	2000	20.24	19.69	38991	37460	6	6	6	6	3	2	7	5
	2030	20.36	19.80	39622	38077	6	6	6	6	3	2	7	5
	2100	20.24	19.67	40222	38660	6	6	6	6	3	2	7	5
Sample	2130	20.001	19.69	40822	39247	6	6	6	6	3	2	7	5

DAILY FLOW LOGSHEET

FLOW RATE MEASURED OVER 1 MIN USING TOTALIZER MEASUREMENTS

DATE	TIME	HW1 FLOW gpm	R4R EFFLUENT FLOW gpm	HW1 TOTALIZER (Gal)	R4R EFFLUENT TOTALIZER (GAL)	10 micron (A) BAG FILTER PRESSURE INF PSI	10 micron (A) BAG FILTER PRESSURE EFF PSI	10 micron (B) BAG FILTER PRESSURE INF PSI	10 micron (B) BAG FILTER PRESSURE EFF PSI	0.5 micron (A) BAG FILTER PRESSURE INF PSI	0.5 micron (A) BAG FILTER PRESSURE EFF PSI	0.5 micron (B) BAG FILTER PRESSURE INF PSI	0.5 micron (B) BAG FILTER PRESSURE EFF PSI
11/1 ~~1030~~	10:30	20.36	19.64	42031	40415	6	6	6	6	3	3	6	5
~~1100~~	1100	20.18	19.73	42509	40867	6	6	6	6	3	3	6	5
~~1130~~	1130	20.18	19.76	43191	41540	6	6	6	6	3	3	6	5
11/2 ~~1200~~	1200	20.12	19.78	43778	42120	6	6	6	6	3	3	6	5
~~1230~~	1230	20.24	19.90	44433	42711	6	6	6	6	3	3	6	5
~~100~~	100	20.18	19.76	45033	43311	6	6	6	6	3	3	6	5
~~130~~	130	20.20	19.78	45603	43881	6	6	6	6	3	3	6	5
	200	20.24	19.77	46222	44517	6	6	6	6	3	3	6	5
	230	20.24	19.78	46811	45084	6	6	6	6	3	3	6	5
	300	20.20	19.76	47631	45874	6	6	6	6	3	3	6	5
	330	20.24	19.77	48427	46670	6	6	6	6	3	3	6	5
	400	20.20	19.76	48957	47200	6	6	6	6	3	3	6	5
	430	20.20	19.78	49487	47730	6	6	6	6	3	3	6	5
	500	20.24	19.81	50019	48244	6	6	6	6	3	3	6	5
	530	20.30	19.79	50461	48603	6	6	6	6	3	3	6	5
	600	20.24	19.78	51027	49195	6	6	6	6	3	3	6	5
	630	20.18	19.79	51726	49853	6	6	6	6	3	3	6	5
	700	20.36	19.87	52267	50416	6	6	6	6	3	3	6	5
	730	20.18	19.96	52913	51040	6	6	6	6	3	3	6	5
	800	20.12	19.90	53487	51616	6	6	6	6	3	3	6	5
	830	20.08	19.94	54130	52252	6	6	6	6	3	3	6	5
	900	20.18	19.93	54767	52798	6	6	6	6	3	3	6	5
	930	20.07	20.00	55335	53382	6	6	6	6	3	3	6	5
	1000	20.08	20.02	55970	53962	6	6	6	6	3	3	6	5
	1030	20.12	20.00	56506	54542	6	6	6	6	3	3	6	5
	1100	20.20	20.00	57129	55170	6	6	6	6	3	3	6	5
Sampled →	1130	20.18	20.02	57775	55802	6	6	6	6	3	3	6	5
	1200	20.16	20.04	58305	56236	6	6	6	6	3	3	6	5
	1230	20.20	20.09	58942		6	6	6	6	3	3	6	5

DAILY FLOW LOGSHEET

FLOW RATE MEASURED OVER 1 MIN USING TOTALIZER MEASUREMENTS

						10 micron (A)		10 micron (B)		0.5 micron (A)		0.5 micron (B)	
		HW1	R4R EFFLUENT	HW1	R4R EFFLUENT	BAG FILTER PRESSURE		BAG FILTER PRESSURE		BAG FILTER PRESSURE		BAG FILTER PRESSURE	
DATE	TIME	FLOW gpm	FLOW gpm	TOTALIZER (Gal)	TOTALIZER (GAL)	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI
11/2/22	13:00	19.88	20.06	59527	57479	6	6	6	6	3	3	6	5
11/2/22	13:30	19.82	20.04	60149	58070	5	5	5	5	3	3	6	5
11/2/22	14:00	19.82	20.02	60716	58639	5	5	5	5	3	3	5	5
11/2/22	14:30	20.00	20.02	61339	59274	5	5	5	5	3	3	5	5
11/2/22	15:00	19.88	20.01	61851	59817	5	5	5	5	3	3	5	5
11/2/22	15:30	20.00	20.01	62461	60394	5	5	5	5	3	3	5	5
11/2/22	16:00	19.76	19.99	63151	61095	5	5	5	5	3	2	5	4
11/2/22	16:30	19.88	20.00	63679	61622	5	5	5	5	3	2	5	4
11/2/22	17:00	20.06	20.00	64267	62218	5	5	5	5	2	2	6	4
11/2/22	17:30	19.64	20.00	64866	62821	5	5	5	5	2	2	6	4
11/2/22	18:00	19.70	19.99	65487	63435	6	6	6	6	3	2	7	5
11/2/22	18:30	19.82	19.98	66088	64050	6	6	6	6	3	2	7	5
11/2/22	19:00	19.76	19.96	66761	64723	6	6	6	6	3	2	7	5
11/2/22	19:30	20.00	19.94	67482	65452	6	6	6	6	3	2	7	5
11/2/22	20:00	19.82	19.96	67877	65854	6	6	6	6	3	2	7	5
11/2/22	20:30	19.88	19.94	68524	66500	6	6	6	6	3	2	7	5
11/2/22	21:00	19.76	19.93	69162	67145	6	6	6	6	3	2	7	5
11/2/22	21:30	19.76	19.92	69759	67734	6	6	6	6	3	2	7	5
11/2/22	22:00	20.00	19.91	70506	68498	6	6	6	6	3	2	7	5
11/2/22	22:30	19.76	19.88	70878	68845	6	6	6	6	3	2	7	5
11/2/22	23:00	20.06	19.75	71402	69377	6	6	6	6	3	2	7	5
11/2/22	23:30	20.02	19.71	71993	69947	6	6	6	6	3	2	7	5
11/3/22	0:00	19.94	19.72	72512	70476	6	6	6	6	3	2	7	5
11/3/22	0:30	19.83	19.75	73114	70972	6	6	6	6	3	2	7	5
11/3/22	1:00	19.62	19.66	74155	72103	6	6	6	6	3	2	7	5
11/3/22	1:30	19.76	19.63	74364	72315	6	6	6	6	3	2	7	5
11/3/22	2:00	19.94	19.62	74969	72907	6	6	6	6	3	2	7	5
11/3/22	2:30	19.64	19.59	75562	73497	6	6	6	6	3	2	7	5
11/3/22	3:00	19.64	19.73	76182	74110	6	6	6	6	3	2	7	5

DAILY FLOW LOGSHEET

FLOW RATE MEASURED OVER 1 MIN USING TOTALIZER MEASUREMENTS

						10 micron (A)		10 micron (B)		0.5 micron (A)		0.5 micron (B)	
		HW1	R4R EFFLUENT	HW1	R4R EFFLUENT	BAG FILTER PRESSURE		BAG FILTER PRESSURE		BAG FILTER PRESSURE		BAG FILTER PRESSURE	
DATE	TIME	FLOW gpm	FLOW gpm	TOTALIZER (Gal)	TOTALIZER (GAL)	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI
11/3/22	3:30	19.94	19.53	76803	74718	6	6	6	6	3	2	7	5
11/3/22	4:00	19.52	19.51	77358	75275	6	6	6	6	3	2	7	5
11/3/22	4:30	19.58	19.48	77948	75859	6	6	6	6	3	2	7	5
11/3/22	5:00	19.70	19.51	80224	76467	6	6	6	6	3	2	7	5
11/3/22	5:30	19.70	19.41	79162	~~77543~~	6	6	6	6	3	2	7	5
11/3/22	6:00	19.70	19.38	79717	77569	6	6	6	6	3	2	7	5
11/3/22	6:30	19.62	19.34	80343	78187	6	6	6	6	3	2	7	5
11/3/22	7:00	19.76	19.45	80982	78820	6	6	6	6	3	2	7	5
11/3/22	7:30	19.70	19.25	81526	79344	6	6	6	6	3	2	7	5
11/3/22	8:00	19.64	19.19	82127	79911	7	6	7	6	3	2	7	5
11/3/22	8:30	19.86	19.12	82720	80529	7	6	7	6	3	2	7	5
11/3/22	9:00	19.64	19.05	83330	81105	7	6	7	6	3	2	7	5
11/3/22	9:30	19.46	19.61	83936	81578	7	6	7	6	3	2	7	5
11/3/22	10:00	19.76	19.52	84516	82291	7	6	7	6	3	2	7	5
11/3/22	10:30	19.76	19.43	85110	82898	7	6	7	6	3	2	7	5
11/3/22	11:00	19.58	19.51	85659	83442	7	6	7	6	3	2	7	5
11/3/22	11:30	19.64	19.51	86320	84100	7	6	7	6	3	2	7	5
11/3/22	12:00	20.06	19.43	86892	84651	7	6	7	6	3	2	7	5
11/3/22	12:30	19.64	19.36	87511	85298	7	6	7	6	3	2	7	5
11/3/22	13:00	19.76	19.27	87930	85741	7	6	7	6	3	2	7	5
11/3/22	13:30	19.58	19.06	88747	86456	7	6	7	6	3	2	7	5
11/3/22	14:00	19.82	19.98	89138	86922	7	6	7	6	3	2	7	5
11/3/22	14:30	19.76	19.82	89663	87384	7	6	7	6	2	1	5	2
11/3/22	15:00	19.82	19.60	90301	88018	7	6	7	5	2	1	6	1
11/3/22	15:30	19.45	19.76	90854	88650	8	6	8	6	4	2	6	
11/3/22	16:00	19.50	19.60	91444	89254	8	6	8	6	4	2	6	
11/3/22	16:30	19.46	19.60	92021	89839	8	6	8	6	4	2	6	2
11/3/22	17:00	19.70	19.57	92540	90440	10	8	10	8	6	2	8	4
11/3/22	17:30	19.45	19.60	~~92918~~ 93184	91002	10	8	~~10~~ 10	8	~~6~~ 6	2	~~8~~ 8	4

77030

DAILY FLOW LOGSHEET

FLOW RATE MEASURED OVER 1 MIN USING TOTALIZER MEASUREMENTS

						10 micron (A)		10 micron (B)		0.5 micron (A)		0.5 micron (B)	
		HW1	R4R EFFLUENT	HW1	R4R EFFLUENT	BAG FILTER PRESSURE		BAG FILTER PRESSURE		BAG FILTER PRESSURE		BAG FILTER PRESSURE	
DATE	TIME	FLOW gpm	FLOW gpm	TOTALIZER (Gal)	TOTALIZER (GAL)	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI
11/3/22	18:00	19.48	19.86	93754	91570	12	8	12	8	7	2	10	4
11/3/22	18:30	19.52	19.75	94324	92160	12	8	12	8	7	2	10	4
11/3/22	19:00	19.40	19.82	94915	92770	12	8	12	8	7	2	10	4
11/3/22	19:30	19.50	19.75	95555	93414	12	8	12	8	7	2	10	4
11/3/22	20:00	19.52	19.78	96118	93981	14	8	14	8	7	2	10	4
11/3/22	20:30	19.58	19.69	96681	94552	14	8	14	8	7	2	10	4
11/3/22	21:00	19.46	19.45	97250	95141								
11/3/22	21:30	19.40	19.40	97845	95709								
11/3/22	22:00	19.65	19.88	98434	96297	14	9	14	9	7	2	10	4
11/3/22	22:30	19.52	18.81	99026	97364	5	5	5	5	3	3	6	4
11/3/22	23:00		~~18.93~~										
11/3/22	23:30	19.34	18.93	100180	98001	5	5	5	5	3	3	6	4
11/4/22	0:00	19.04	18.80	100743	98556	5	5	5	5	3	3	6	4
11/4/22	0:30	20.30	18.72	101396	99191	5	5	5	5	3	3	6	4
11/4/22	1:00	19.28	18.79	102302	100067	5	5	5	5	3	3	6	4
11/4/22	1:30	19.28	18.79	102915	100261	5	5	5	5	3	3	6	4
11/4/22	2:00	19.40	18.79	103092	100827	5	5	5	5	3	3	6	4
11/4/22	2:30	19.46	18.80	105310	101368	5	5	5	5	3	3	6	4
11/4/22	3:00	19.46	18.78	104221	101927	5	5	5	5	3	3	6	4
11/4/22	3:30	19.40	18.80	104745	102429	5	5	5	5	3	3	6	4
11/4/22	4:00	19.34	18.78	105403	103067	5	5	5	5	3	3	6	4
11/4/22	4:30	19.40	18.78	106003	103667	5	5	5	5	3	3	6	4
11/4/22	5:00	19.46	18.80	106521	104145	5	5	5	5	3	3	6	4
11/4/22	5:30	19.22	18.78	108735	104737	5	5	5	5	3	3	6	4
11/4/22	6:00	19.46	18.93	107692	105291	5	5	5	5	3	3	6	4
11/4/22	6:30	19.48	18.78	108255	105860	5	5	5	5	5	3	6	4
11/4/22	7:00	19.46	18.78	108831	106420	5	5	5	5	5	3	6	4
11/4/22	7:30	19.38	18.99	109484	107090	5	5	5	5	5	3	6	4
11/4/22	8:00	19.40	18.87	110034	107615	5	6	5	5	5	3	6	4

Sample X

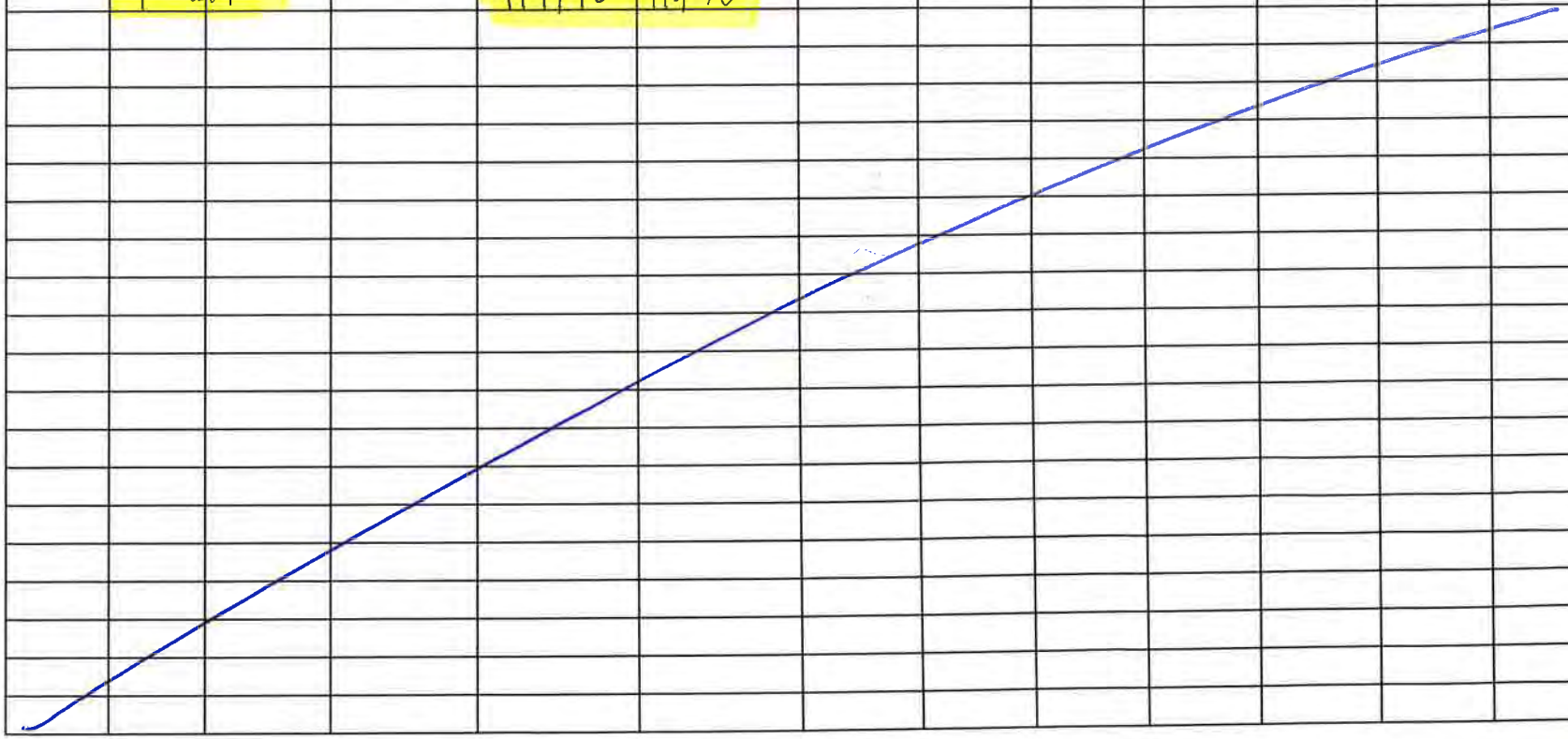
Chevy Body

DAILY FLOW LOGSHEET

FLOW RATE MEASURED OVER 1 MIN USING TOTALIZER MEASUREMENTS

Sample #

		HW1	R4R EFFLUENT	HW1	R4R EFFLUENT	10 micron (A) BAG FILTER PRESSURE		10 micron (B) BAG FILTER PRESSURE		0.5 micron (A) BAG FILTER PRESSURE		0.5 micron (B) BAG FILTER PRESSURE	
DATE	TIME	FLOW gpm	FLOW gpm	TOTALIZER (Gal)	TOTALIZER (GAL)	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI	INF PSI	EFF PSI
11/4/22	8:30	19.58	18.87	110595	109167	5	5	5	5	5	3	6	4
11/4/22	9:00	19.82	18.85	111271	108805	5	5	5	5	5	5	6	4
11/4/22	9:30	19.72	18.85	111754	109277	5	5	5	5	5	5	6	4
11/4/22	10:00	19.64	18.87	112253	109867	5	5	5	5	5	5	6	4
11/4/22	10:30	19.88	18.87	[illegible]	110434	5	5	5	5	5	5	6	4
11/4/22	11:00	19.76	↑ 20.10	112966 113528	111061	5	5	5	5	5	5	6	4
11/4/22	11:30	19.76	20.20	114105	111711	6	5	5	5	5	5	6	4
11/4/22	12:00												
	Final			114140	111970								



SAMPLE LOGSHEET

SAMPLE ID	DATE	TIME	HW1 TOTALIZER (Gal)	R4R EFFLUENT TOTALIZER (GAL)	CHECK AS APPROPRIATE WITH SAMPLE DESIGNATION BELOW			
					INF	GAC #1 EFF	GAC #2 EFF	GAC #3 EFF
Influent E	10/31/22	9:05	11511	10370	E			
GAC 1 F	10/31/22	↓	↓	↓		F		
GAC 2 G	10/31/22	↓	↓	↓			G	
GAC 3 H	10/31/22	↓	↓	↓				H
Influent A	11/1/22	1130	28705	27563	A			
GAC 1 B	11/1/22	1136	↓	↓		B		
GAC 2 C	11/1/22	1136	↓	↓			C	
GAC 3 D	11/1/22	1138	↓	↓				D
Influent E	11/1/22	21:35	40822	39247	E			
GAC 1 F	↓	21:40	↓	↓		F		
GAC 2 G	↓	21:42	↓	↓			G	
GAC 3 H	↓	21:45	↓	↓				H
Influent A	11/2/2	11:30	57775	55802	A			
GAC 1 B	↓	11:35	↓	↓		B		
GAC 2 C	↓	11:38	↓	↓			C	
GAC 3 D	↓	11:40	↓	↓				D

SAMPLE DESIGNATIONS:

	1 OF 2	2 OF 2
INF	A	E
GAC #1 EFF	B	F
GAC #2 EFF	C	G
GAC #3 EFF	D	H

SAMPLE LOGSHEET

SAMPLE ID	DATE	TIME	HW1 TOTALIZER (Gal)	R4R EFFLUENT TOTALIZER (GAL)	CHECK AS APPROPRIATE WITH SAMPLE DESIGNATION BELOW			
					INF	GAC #1 EFF	GAC #2 EFF	GAC #3 EFF
Influent E	11/2/22	9:10	69162	67145	E			
GAC 1 F		9:12				F		
GAC 2 G		9:15					G	
GAC 3 H		9:20						H
Influent A	11/3/22	11:05	86320	84100	A			
GAC 1 B		11:07				B		
GAC 2 C		11:09					C	
GAC 3 D		11:10						D
Influent A1		11:00			A1			
Influent E		9:36	97845	95709	E			
GAC 1 F		932				F		
GAC 2 G		934					G	
GAC 3 H		936						H
Influent A	11/4	830	110595	108167	A			
GAC 1 B		832				B		
GAC 2 C		934					C	
GAC 3 D		936						D

SAMPLE DESIGNATIONS:

	1 OF 2	2 OF 2
INF	A	E
GAC #1 EFF	B	F
GAC #2 EFF	C	G
GAC #3 EFF	D	H

Appendix J

PARADIGM

PARADIGM
ENVIRONMENTAL SERVICES, INC

Analytical Report For

Arch Chemicals

For Lab Project ID

225227

Referencing

GW Continuous Pumping Test 2022 - Day 1 - 24 Hours

Prepared

Thursday, November 10, 2022

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below.

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225227

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 1 - 24 Hours

Sample Identifier:	Post Carbon - Day 1		
Lab Sample ID:	225227-01	**Date Sampled:** 11/1/2022	11:55
Matrix:	Wastewater	**Date Received** 11/1/2022	

Volatile Organics (Halogenated)

Analyte	Result	Units	Qualifier	Date Analyzed
Chloroform	< 5.00	ug/L		11/3/2022 11:59
Methyl Chloride	< 5.00	ug/L		11/3/2022 11:59
Methylene chloride	< 12.5	ug/L		11/3/2022 11:59

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
1,2-Dichloroethane-d4	**99.3**	81.1 - 136		11/3/2022 11:59
4-Bromofluorobenzene	**89.1**	75.8 - 132		11/3/2022 11:59
Pentafluorobenzene	**104**	82 - 132		11/3/2022 11:59
Toluene-D8	**100**	64.6 - 137		11/3/2022 11:59

Method Reference(s): EPA 624.1
EPA 5030C

Data File: z13180.D

The analyte 2-Chloroethyl vinyl Ether does not recover from acid preserved VOA vials.

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225227

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 1 - 24 Hours

Sample Identifier:	Post Carbon - Day 1		
Lab Sample ID:	225227-02	**Date Sampled:** 11/1/2022	11:42
Matrix:	Wastewater	**Date Received** 11/1/2022	

Semi-Volatile Organics (Pyridines)

Analyte	Result	Units	Qualifier	Date Analyzed
2,6-Dichloropyridine	< 40.0	ug/L	A	11/9/2022 18:21
2-Chloropyridine	**83.2**	ug/L	A	11/9/2022 18:21
3-Chloropyridine	< 40.0	ug/L	A	11/9/2022 18:21
4-Chloropyridine	< 40.0	ug/L	A	11/9/2022 18:21
4-Fluoroaniline	< 40.0	ug/L	A	11/9/2022 18:21
Pyridine	< 40.0	ug/L		11/9/2022 18:21

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	**49.4**	10 - 124		11/9/2022 18:21

Method Reference(s): EPA 625.1
Preparation Date: 11/7/2022
Data File: B64887.D

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225227

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 1 - 24 Hours

Sample Identifier:	Post Carbon - Day 1		
Lab Sample ID:	225227-03	**Date Sampled:** 11/1/2022	11:48
Matrix:	Wastewater	**Date Received** 11/1/2022	

Metals

Analyte	Result	Units	Qualifier	Date Analyzed
Zinc	< 0.0300	mg/L		11/4/2022 15:23

Method Reference(s): EPA 200.7 Rev 4.4 (1994)
Preparation Date: 11/2/2022
Data File: 221104B

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225227

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 1 - 24 Hours

Sample Identifier:	Post Carbon - Day 1		
Lab Sample ID:	225227-04	**Date Sampled:** 11/1/2022	11:45
Matrix:	Wastewater	**Date Received** 11/1/2022	

Amenable Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Amenable	<0.010	mg/L		11/8/2022

Method Reference(s): SM22 4500 CN E
Subcontractor ELAP ID: 10478

Total Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Total	**0.015**	mg/L	D	11/7/2022

Method Reference(s): SM 4500 CN E
Subcontractor ELAP ID: 10478

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225227

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 1 - 24 Hours

Sample Identifier:	Post Carbon - Day 1		
Lab Sample ID:	225227-04A	**Date Sampled:** 11/1/2022	11:45
Matrix:	Wastewater	**Date Received** 11/1/2022	

Total Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Total	<0.010	mg/L		11/8/2022

Method Reference(s): EPA 335.4 Rev 1.0
Subcontractor ELAP ID: 10709

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225227

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 1 - 24 Hours

Sample Identifier:	Post Carbon - Day 1		
Lab Sample ID:	225227-05	**Date Sampled:**	11/1/2022 11:50
Matrix:	Wastewater	**Date Received**	11/1/2022

pH

Analyte	Result	Units	Qualifier	Date Analyzed
pH	10.25 @ 21.6 C	S.U.		11/1/2022 16:02

Method Reference(s): SM22 4500 H+ B

ELAP does not offer this test for approval as part of their laboratory certification program.

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

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All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

"<" = Analyzed for but not detected at or above the quantitation limit.
"E" = Result has been estimated, calibration limit exceeded.
"H" = Denotes a parameter analyzed outside of holding time.
"Z" = See case narrative.
"D" = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
"J" = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
"P" = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

CHAIN OF CUSTODY

PARADIGM ENVIRONMENTAL SERVICES, INC.

REPORT TO:		INVOICE TO:		
COMPANY:	Arch Chemicals, Inc.	COMPANY:	SAME	LAB PROJECT ID: 22527
ADDRESS:	100 McKee Road, P.O. Box 30205	ADDRESS:		
CITY:	Rochester STATE: NY ZIP: 14603	CITY:	STATE: ZIP:	Quotation #: MS 211117B
PHONE:	585-613-3752 FAX:	PHONE:	FAX:	Email: francien.trubia@arxada.com
ATTN:	Francien Trubia	ATTN:		david.harris1@arxada.com

PROJECT REFERENCE

GW Continuous Pumping Test

2022 - Day 1 - 24 hours

Matrix Codes:
AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	624 Halogens (1)(HCL)	Pyridine (2)	Zinc	Total & Am Cyanide	Am Cyanide	pH					REMARKS	PARADIGM LAB SAMPLE NUMBER
11/1/2022	11:55AM		X	Post Carbon - Day 1	WW	2	X											-01
11/1/2022	11:42AM		X	Post Carbon - Day 1	WW	1		X									(2) +2PCL; 3PCL; 4PCL; 2,6DCP; 4Fluoroaniline	-02
11/1/2022	11:48AM		X	Post Carbon - Day 1	WW	1			X									-03
11/1/2022	11:45AM		X	Post Carbon - Day 1	WW	1				X	X						PO No. 4503044595	-04A
11/1/2022	11:50 AM		X	Post Carbon - Day 1	WW	1						X						-05
																	A=Aliquot for TCN	
																	from second sublab KH 11/10	
				pH limit is 5.0 - 12.0														

(1) chloroform, methyl chloride, & methylene chloride

Turnaround Time		Report Supplements		
Availability contingent upon lab approval; additional fees may apply.				
Standard 5 day	X	None Required	X	None Required
10 day		Batch QC		Basic EDD
Rush 3 day		Category A		NYSDEC EDD
Rush 2 day		Category B		
Rush 1 day				
Other (please indicate date needed: ____)		Other (please indicate package needed: ____)		Other EDD (please indicate EDD needed: ____)

Richard Reagan (Matrix) — 11/1/22 @ 11:50AM

Sampled By	Francien Trubia	Date/Time	11/1/22@1330
Relinquished By	Quentin Milloy	Date/Time	11/1/2022 1330
Received By		Date/Time	
Received @ Lab By	@ KHO	Date/Time	11/1/22

Total Cost: ____

P.I.F. ____

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

16°C @ 1440 11/1/22
iced in field

See additional page for sample conditions.

2 of 2

PARADIGM

Chain of Custody Supplement

Client:	Arch	**Completed by:**	ZF
Lab Project ID:	225227	**Date:**	11/1/22

Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	Yes	No	N/A
	NELAC compliance with the sample condition requirements upon receipt		
Container Type	X		
Comments			
Transferred to method-compliant container			X
Headspace (<1 mL)	X		
Comments			
Preservation	X		X
Comments	VOA Meth TCN/ACN		
Chlorine Absent (<0.10 ppm per test strip)	X		
Comments	~~VOA Cl~~ SD 11/1/22		
Holding Time	X		
Comments			
Temperature	X		X
Comments	16°C iced in field		Met pH
Compliant Sample Quantity/Type	X		
Comments			

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

1 of 1

CHAIN OF CUSTODY

22110271 Adirondack

REPORT TO:		INVOICE TO:		ELAP ID#
CLIENT:	Paradigm Environmental Services	CLIENT:	Same	LAB PROJECT ID
ADDRESS:	179 Lake Avenue	ADDRESS:		
CITY:	Rochester STATE: NY ZIP: 14608	CITY:	STATE: ZIP:	Quotation #:
PHONE:		PHONE:		Email: please email reports to
ATTN:	Reporting	ATTN:	Accounts Payable	reporting@paradigmenv.com

PROJECT REFERENCE

Matrix Codes:
AQ - Aqueous Liquid; **NQ** - Non-Aqueous Liquid; **WA** - Water; **WG** - Groundwater; **DW** - Drinking Water; **WW** - Wastewater; **SO** - Soil; **SL** - Sludge; **SD** - Solid; **PT** - Paint; **WP** - Wipe; **CK** - Caulk; **OL** - Oil; **AR** - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	Total Cyanide									REMARKS	PARADIGM LAB SAMPLE NUMBER
11/1/22	1145		X	25227-04	WW	1	X									Provide sample specific matrix spike for TCN	

Turnaround Time		Report Supplements			
Availability contingent upon lab approval; additional fees may apply.					
Standard 5 day	X	None Required		None Required	
10 day		Batch QC		Basic EDD	
Rush 3 day		Category A		NYSDEC EDD	
Rush 2 day		Category B		4°C	
Rush 1 day					
Other please indicate date needed:		Other please indicate package needed:		Other EDD please indicate EDD needed :	

		Date/Time
Sampled By	Zach @	1600 11/1/22
Relinquished By	Ryan Zacher	11/2/22 12:56
Received By		11/2/22 16:00
Received @ Lab By		Date/Time

Total Cost:

P.I.F.

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

1081

CHAIN OF CUSTODY

Pace

REPORT TO:		INVOICE TO:		ELAP ID#
CLIENT:	Paradigm Environmental Services	CLIENT:	Same	LAB PROJECT ID
ADDRESS:	179 Lake Avenue	ADDRESS:		
CITY:	Rochester STATE: NY ZIP 14608	CITY:	STATE: ZIP:	Quotation #:
PHONE:		PHONE:		Email: please email reports to reporting@paradigmenv.com
ATTN:	Reporting	ATTN:	Accounts Payable	

PROJECT REFERENCE

Matrix Codes:
AQ - Aqueous Liquid; **NQ** - Non-Aqueous Liquid; **WA** - Water; **WG** - Groundwater; **DW** - Drinking Water; **WW** - Wastewater; **SO** - Soil; **SL** - Sludge; **SD** - Solid; **PT** - Paint; **WP** - Wipe; **CK** - Caulk; **OL** - Oil; **AR** - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	Total Cyanide	Amenable Cyanide	REMARKS	PARADIGM LAB SAMPLE NUMBER
11/1/22	1145		X	225227-04	WW	1	X	X	Provide sample specific matrix spike for TCN	

WO# : 70235647
70235647

Turnaround Time		Report Supplements		
Availability contingent upon lab approval; additional fees may apply.				
Standard 5 day	X	None Required		None Required
10 day		Batch QC		Basic EDD
Rush 3 day		Category A		NYSDEC EDD
Rush 2 day		Category B		
Rush 1 day				
Other		Other		Other EDD
please indicate date needed:	11/10/22	please indicate package needed:		please indicate EDD needed

Sampled By — Date/Time: @1600 11/1/22

Relinquished By — Date/Time

Received By — Date/Time

Received @ Lab By — Date/Time

Total Cost:

P.I.F.

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

PARADIGM

PARADIGM
ENVIRONMENTAL SERVICES, INC

Analytical Report For

Arch Chemicals

For Lab Project ID

225252

Referencing

GW Continuous Pumping Test 2022 - Day 2 - 48 Hours

Prepared

Friday, November 11, 2022

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below.

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225252

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 2 - 48 Hours

Sample Identifier:	Post Carbon - Day 2		
Lab Sample ID:	225252-01	**Date Sampled:**	11/2/2022 11:58
Matrix:	Wastewater	**Date Received**	11/2/2022

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
Chloroform	< 5.00	ug/L		11/4/2022 18:22
Methyl Chloride	< 5.00	ug/L		11/4/2022 18:22
Methylene chloride	< 12.5	ug/L		11/4/2022 18:22

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
1,2-Dichloroethane-d4	**105**	81.1 - 136		11/4/2022 18:22
4-Bromofluorobenzene	**89.4**	75.8 - 132		11/4/2022 18:22
Pentafluorobenzene	**105**	82 - 132		11/4/2022 18:22
Toluene-D8	**103**	64.6 - 137		11/4/2022 18:22

Method Reference(s): EPA 624.1

Data File: z13235.D

The analyte 2-Chloroethyl vinyl Ether does not recover from acid preserved VOA vials.

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225252

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 2 - 48 Hours

Sample Identifier:	Post Carbon - Day 2		
Lab Sample ID:	225252-02	**Date Sampled:**	11/2/2022 11:45
Matrix:	Wastewater	**Date Received**	11/2/2022

Semi-Volatile Organics (Pyridines)

Analyte	Result	Units	Qualifier	Date Analyzed
2,6-Dichloropyridine	< 40.0	ug/L	A	11/9/2022 18:49
2-Chloropyridine	**172**	ug/L	A	11/9/2022 18:49
3-Chloropyridine	< 40.0	ug/L	A	11/9/2022 18:49
4-Chloropyridine	< 40.0	ug/L	A	11/9/2022 18:49
4-Fluoroaniline	< 40.0	ug/L	A	11/9/2022 18:49
Pyridine	< 40.0	ug/L		11/9/2022 18:49

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	**43.3**	10 - 124		11/9/2022 18:49

Method Reference(s): EPA 625.1
Preparation Date: 11/7/2022
Data File: B64888.D

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225252

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 2 - 48 Hours

Sample Identifier:	Post Carbon - Day 2		
Lab Sample ID:	225252-03	**Date Sampled:**	11/2/2022 11:50
Matrix:	Wastewater	**Date Received**	11/2/2022

Metals

Analyte	Result	Units	Qualifier	Date Analyzed
Zinc	**0.0764**	mg/L		11/9/2022 09:19

Method Reference(s): EPA 200.7 Rev 4.4 (1994)
Preparation Date: 11/4/2022
Data File: 221109A

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225252

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 2 - 48 Hours

Sample Identifier:	Post Carbon - Day 2		
Lab Sample ID:	225252-04	**Date Sampled:** 11/2/2022	11:48
Matrix:	Wastewater	**Date Received** 11/2/2022	

Amenable Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Amenable	**0.0166**	mg/L		11/8/2022

Method Reference(s): SM22 4500 CN E
Subcontractor ELAP ID: 10478

Total Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Total	**0.052**	mg/L	M	11/7/2022

Method Reference(s): SM22 4500 CN E
Subcontractor ELAP ID: 10478

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225252

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 2 - 48 Hours

Sample Identifier:	Post Carbon - Day 2		
Lab Sample ID:	225252-04A	**Date Sampled:** 11/2/2022	11:48
Matrix:	Wastewater	**Date Received** 11/2/2022	

Total Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Total	<0.010	mg/L	M	11/10/2022

Method Reference(s): EPA 335.4 Rev 1.0
Subcontractor ELAP ID: 10709

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225252

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 2 - 48 Hours

Sample Identifier:	Post Carbon - Day 2		
Lab Sample ID:	225252-05	**Date Sampled:**	11/2/2022 11:52
Matrix:	Wastewater	**Date Received**	11/2/2022

pH

Analyte	Result	Units	Qualifier	Date Analyzed
pH	9.70 @ 22.3 C	S.U.		11/2/2022 18:05

Method Reference(s): SM22 4500 H+ B

ELAP does not offer this test for approval as part of their laboratory certification program.

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

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All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

"<" = Analyzed for but not detected at or above the quantitation limit.
"E" = Result has been estimated, calibration limit exceeded.
"H" = Denotes a parameter analyzed outside of holding time.
"Z" = See case narrative.
"D" = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
"J" = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
"P" = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

CHAIN OF CUSTODY

PARADIGM

REPORT TO:		INVOICE TO:		
COMPANY:	Arch Chemicals, Inc.	COMPANY:	SAME	LAB PROJECT ID: 22527
ADDRESS:	100 McKee Road, P.O. Box 30205	ADDRESS:		
CITY:	Rochester STATE: NY ZIP: 14603	CITY:	STATE: ZIP:	Quotation #: MS 211117B
PHONE:	585-613-3752 FAX:	PHONE:	FAX:	Email: francien.trubia@arxada.com
ATTN:	Francien Trubia	ATTN:		david.harris1@arxada.com

PROJECT REFERENCE

GW Continuous Pumping Test

2022 - Day 2 - 48 hours

Matrix Codes:
AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	624 Halogens (1)(HCL)	Pyridine (2)	Zinc	Total & Am Cyanide	Am. Cyanide	pH					REMARKS	PARADIGM LAB SAMPLE NUMBER
11/2/2022	11:58AM		X	Post Carbon - Day 2	WW	2	X											-01
11/2/2022	11:45AM		X	Post Carbon - Day 2	WW	1		X									(2) +2PCL; 3PCL; 4PCL; 2,6DCP; 4Fluoroaniline	-02
11/2/2022	11:50AM		X	Post Carbon - Day 2	WW	1			X									-03
11/2/2022	11:48AM		X	Post Carbon - Day 2	WW	1				X	X						PO No. 4503044595	-04, A
11/2/2022	11:52 AM		X	Post Carbon - Day 2	WW	1						X						-05
																	A= Aliquot for TCN from second subleb. JCH 11/11	
				pH limit is 5.0 - 12.0														

(1) chloroform, methyl chloride, & methylene chloride

Turnaround Time		Report Supplements			
Availability contingent upon lab approval; additional fees may apply.					
Standard 5 day	X	None Required	X	None Required	
10 day		Batch QC		Basic EDD	
Rush 3 day		Category A		NYSDEC EDD	
Rush 2 day		Category B			
Rush 1 day					
Other (please indicate date needed: ____)		Other (please indicate package needed: ____)		Other EDD (please indicate EDD needed ____)	

Richard Reagan (Matrix)

Sampled By: Francien Trubia	Date/Time: 11/2/22@1314	Total Cost:
Relinquished By: Joe Funk	Date/Time: 11/2/2022 1314	
Received By:	Date/Time:	P.I.F.
Received @ Lab By: @ 1507	Date/Time: 11/2/22	

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

16°C iced in field @ 1314 11/2/22

See additional page for sample conditions.

2082

PARADIGM

Chain of Custody Supplement

Client: Arch **Completed by:** ZF

Lab Project ID: 225252 **Date:** 11/2/22

Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	NELAC compliance with the sample condition requirements upon receipt		
	Yes	No	N/A
Container Type	X		
Comments	pH→2 p3 (cyanide)		
Transferred to method-compliant container	X		
Headspace (<1 mL)	X VOA		X
Comments			
Preservation	X VOA Met		X
Comments			
Chlorine Absent (<0.10 ppm per test strip)	X		X
Comments	VOA: Cl⁻ neg.		
Holding Time	X		
Comments			
Temperature	X 16°C		X met pH
Comments			
Compliant Sample Quantity/Type	X		
Comments			

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

CHAIN OF CUSTODY

2211035011

ELAP ID: 10709

REPORT TO:		INVOICE TO:			
COMPANY:	Paradigm Environmental	COMPANY:	Same	LAB PROJECT #:	CLIENT PROJECT #:
ADDRESS:		ADDRESS:			
CITY: STATE: ZIP:		CITY: STATE: ZIP:		TURNAROUND TIME: (WORKING DAYS)	
PHONE: FAX:		PHONE: FAX:		STD OTHER	
PROJECT NAME/SITE NAME:		ATTN:	Reporting	ATTN:	Accounts Payable	☐1 ☐2 ☐3 ☒5 ☐
		COMMENTS:	Please email results to reporting@paradigmenv.com	Date Due:	11/10/22

REQUESTED ANALYSIS

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER OF CONTAINERS	TCN										REMARKS	PARADIGM LAB SAMPLE NUMBER
1	11/2/22	1148		X	Post Carbon -Day2	WW	1	X										225252-04	
2																			
3																		Matrix Specific Spike for TCN	
4																			
5																			
6																			
7																			
8																			
9																			
10																			

****LAB USE ONLY BELOW THIS LINE****

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	NELAC Compliance	
Container Type:	Y ☐	N ☐
Comments:		
Preservation:	Y ☐	N ☐
Comments:		
Holding Time:	Y ☐	N ☐
Comments:		
Temperature: 4°C	Y ☐	N ☐
Comments:		

Client

		Date/Time	
Sampled By		@ 0830	11/3/22
Relinquished By		Date/Time	
	Ryan Zacher	11/3/22	11:13
Received By		Date/Time	
		11/3/22	16:00
Received @ Lab By		Date/Time	

Total Cost:

P.I.F.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

PARADIGM ENVIRONMENTAL SERVICES, INC.

CHAIN OF CUSTODY

ELAP ID: 10478

REPORT TO:		INVOICE TO:			
COMPANY:	Paradigm Environmental	COMPANY:	Same	LAB PROJECT #:	CLIENT PROJECT #:
ADDRESS:		ADDRESS:			
CITY: STATE: ZIP:		CITY: STATE: ZIP:		TURNAROUND TIME: (WORKING DAYS)	
PHONE: FAX:		PHONE: FAX:			STD OTHER
PROJECT NAME/SITE NAME:		ATTN:	Reporting	ATTN: Accounts Payable	☐ 1 ☐ 2 ☐ 3 ☐ 5 ☐
		COMMENTS:	Please email results to reporting@paradigmenv.com	Date Due:	11/10/22

REQUESTED ANALYSIS

DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	TCN	ACN	REMARKS	PARADIGM LAB SAMPLE NUMBER
11/2/22	1148		X	225252-04	WW	1	X	X	please provide matrix specific Spike	

WO# : 70235646

70235646

LAB USE ONLY BELOW THIS LINE

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	NELAC Compliance	
Container Type:	Y ☐	N ☐
Comments:		
Preservation:	Y ☐	N ☐
Comments:		
Holding Time:	Y ☐	N ☐
Comments:		
Temperature:	Y ☐	N ☐
Comments:		

Client

Sampled By — Date/Time

Relinquished By — Date/Time @ 1600 11/2/22

Received By — Date/Time

Received @ Lab By — Date/Time

Total Cost:

P.I.F.

PARADIGM

PARADIGM
ENVIRONMENTAL SERVICES, INC

Analytical Report For

Arch Chemicals

For Lab Project ID

225298

Referencing

GW Continuous Pumping Test 2022 - Day 3 - 72 Hours

Prepared

Monday, November 14, 2022

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below.

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225298

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 3 - 72 Hours

Sample Identifier:	Post Carbon - Day 3		
Lab Sample ID:	225298-01	**Date Sampled:** 11/3/2022	11:28
Matrix:	Wastewater	**Date Received** 11/3/2022	

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
Chloroform	< 5.00	ug/L		11/7/2022 14:36
Methyl Chloride	< 5.00	ug/L		11/7/2022 14:36
Methylene chloride	< 12.5	ug/L		11/7/2022 14:36

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
1,2-Dichloroethane-d4	**103**	81.1 - 136		11/7/2022 14:36
4-Bromofluorobenzene	**93.6**	75.8 - 132		11/7/2022 14:36
Pentafluorobenzene	**103**	82 - 132		11/7/2022 14:36
Toluene-D8	**104**	64.6 - 137		11/7/2022 14:36

Method Reference(s): EPA 624.1

Data File: z13259.D

The analyte 2-Chloroethyl vinyl Ether does not recover from acid preserved VOA vials.

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225298

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 3 - 72 Hours

Sample Identifier:	Post Carbon - Day 3		
Lab Sample ID:	225298-02	**Date Sampled:** 11/3/2022	11:44
Matrix:	Wastewater	**Date Received** 11/3/2022	

Semi-Volatile Organics (Pyridines)

Analyte	Result	Units	Qualifier	Date Analyzed
2,6-Dichloropyridine	< 40.0	ug/L	A	11/9/2022 20:16
2-Chloropyridine	**181**	ug/L	A	11/9/2022 20:16
3-Chloropyridine	< 40.0	ug/L	A	11/9/2022 20:16
4-Chloropyridine	< 40.0	ug/L	A	11/9/2022 20:16
4-Fluoroaniline	< 40.0	ug/L	A	11/9/2022 20:16
Pyridine	< 40.0	ug/L		11/9/2022 20:16

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	**56.1**	10 - 124		11/9/2022 20:16

Method Reference(s): EPA 625.1
Preparation Date: 11/7/2022
Data File: B64891.D

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225298

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 3 - 72 Hours

Sample Identifier:	Post Carbon - Day 3		
Lab Sample ID:	225298-03	**Date Sampled:** 11/3/2022	11:38
Matrix:	Wastewater	**Date Received** 11/3/2022	

Metals

Analyte	Result	Units	Qualifier	Date Analyzed
Zinc	**0.0402**	mg/L		11/9/2022 13:56

Method Reference(s): EPA 200.7 Rev 4.4 (1994)
Preparation Date: 11/7/2022
Data File: 221109B

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225298

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 3 - 72 Hours

Sample Identifier:	Post Carbon - Day 3		
Lab Sample ID:	225298-04	**Date Sampled:** 11/3/2022	11:35
Matrix:	Wastewater	**Date Received** 11/3/2022	

Amenable Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Amenable	**0.017**	mg/L		11/8/2022

Method Reference(s): SM 4500 CN E
Subcontractor ELAP ID: 10478

Total Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Total	**0.039**	mg/L		11/8/2022

Method Reference(s): SM22 4500 CN E
Subcontractor ELAP ID: 10478

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225298

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 3 - 72 Hours

Sample Identifier:	Post Carbon - Day 3		
Lab Sample ID:	225298-04A	**Date Sampled:** 11/3/2022	11:35
Matrix:	Wastewater	**Date Received** 11/3/2022	

Total Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Total	<0.010	mg/L		11/11/2022

Method Reference(s): EPA 335.4 Rev 1.0
Subcontractor ELAP ID: 10709

Lab Project ID: 225298

Client: **Arch Chemicals**

Project Reference: GW Continuous Pumping Test 2022 - Day 3 - 72 Hours

Sample Identifier:	Post Carbon - Day 3		
Lab Sample ID:	225298-05	**Date Sampled:** 11/3/2022	11:32
Matrix:	Wastewater	**Date Received** 11/3/2022	

pH

Analyte	Result	Units	Qualifier	Date Analyzed
pH	9.76 @ 21.9 C	S.U.		11/3/2022 17:16

Method Reference(s): SM22 4500 H+ B

ELAP does not offer this test for approval as part of their laboratory certification program.

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

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All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

"<" = Analyzed for but not detected at or above the quantitation limit.
"E" = Result has been estimated, calibration limit exceeded.
"H" = Denotes a parameter analyzed outside of holding time.
"Z" = See case narrative.
"D" = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
"J" = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
"P" = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

1 of 2

CHAIN OF CUSTODY

PARADIGM ENVIRONMENTAL SERVICES, INC.

REPORT TO:		INVOICE TO:	
COMPANY:	Arch Chemicals, Inc.	COMPANY:	SAME
ADDRESS:	100 McKee Road, P.O. Box 30205	ADDRESS:	
CITY:	Rochester STATE: NY ZIP: 14603	CITY: STATE: ZIP:	
PHONE:	585-613-3752 FAX:	PHONE: FAX:	
ATTN:	Francien Trubia	ATTN:	

LAB PROJECT ID: 225298

Quotation #: MS 211117B

Email: francien.trubia@arxada.com

david.harris1@arxada.com

PROJECT REFERENCE

GW Continuous Pumping Test

2022 - Day 3 - 72 hours

Matrix Codes:

AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	624 Halogens (1)(HCL)	Pyridine (2)	Zinc	Total & Am Cyanide	Am. Cyanide	pH					REMARKS	PARADIGM LAB SAMPLE NUMBER
11/3/2022	11:28AM		X	Post Carbon - Day 3	WW	2	X											-01
11/3/2022	11:44AM		X	Post Carbon - Day 3	WW	1		X									(2) +2PCL; 3PCL; 4PCL; 2,6DCP; 4Fluoroaniline	-02
11/3/2022	11:38AM		X	Post Carbon - Day 3	WW	1			X									-03
11/3/2022	11:35AM		X	Post Carbon - Day 3	WW	1				X	X						PO No. 4503044595	-04, A
11/3/2022	11:32 AM		X	Post Carbon - Day 3	WW	1						X						-05
																	A=Aliquot for TCN from second subleb KH 11/14	
				pH limit is 5.0 - 12.0														

(1) chloroform, methyl chloride, & methylene chloride

Turnaround Time		Report Supplements			
Availability contingent upon lab approval; additional fees may apply.					
Standard 5 day	X	None Required	X	None Required	
10 day		Batch QC		Basic EDD	
Rush 3 day		Category A		NYSDEC EDD	
Rush 2 day		Category B			
Rush 1 day					
Other (please indicate date needed:)		Other (please indicate package needed:)		Other EDD (please indicate EDD needed:)	

Sampled By	11/3/22 12:22	Total Cost:
Relinquished By (Francien Trubia)	11/3/22 @ 1400	
Received By (Quinton McCoy)	11/3/2022 1400	
Received @ Lab By	11/3/22 1449	P.I.F.

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

6°C iced @ 1432 11/3/22

See additional page for sample conditions.

PARADIGM

Chain of Custody Supplement

Client: Arch **Completed by:** ZC

Lab Project ID: 225298 **Date:** 11/3/22

Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	NELAC compliance with the sample condition requirements upon receipt Yes	No	N/A
Container Type	X		
Comments	pH → 2 p3 (TCN)		
Transferred to method-compliant container	X		X
Headspace (<1 mL)	X VOA		
Comments			
Preservation	X VOA MeA TCN		X
Comments			
Chlorine Absent (<0.10 ppm per test strip)	X SVOA		X
Comments	V624: Cl⁻ neg.		
Holding Time	X		
Comments			
Temperature	X		X MeA pH
Comments	6°C		
Compliant Sample Quantity/Type	X		
Comments			

1of1

PARADIGM ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

CHAIN OF CUSTODY

ELAP ID: 10709

REPORT TO:		INVOICE TO:	
COMPANY:	Paradigm Environmental	COMPANY:	Same
ADDRESS:		ADDRESS:	
CITY: STATE: ZIP:		CITY: STATE: ZIP:	
PHONE: FAX:		PHONE: FAX:	
ATTN:	Reporting	ATTN:	Accounts Payable
COMMENTS:	Please email results to reporting@paradigmenv.com		

LAB PROJECT #: CLIENT PROJECT #:

TURNAROUND TIME: (WORKING DAYS) ☐1 ☐2 ☐3 ☒5 (STD) OTHER ☐

Date Due: 11/11/22

PROJECT NAME/SITE NAME:

REQUESTED ANALYSIS

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	TCN	REMARKS	PARADIGM LAB SAMPLE NUMBER
1	11/3/22	1135		X	Post Carbon - Day 3	WW	1	X	225298-04	
2										
3									Please preform	
4									matrix specific	
5									spike	
6										
7										
8										
9										
10										

****LAB USE ONLY BELOW THIS LINE****

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	NELAC Compliance	
Container Type:	Y ☐	N ☐
Comments:		
Preservation:	Y ☐	N ☐
Comments:		
Holding Time:	Y ☐	N ☐
Comments:		
Temperature:	Y ☐	N ☐
Comments: 4C		

Client	Date/Time
Sampled By: [signature]	@ 0830 11/4/22
Relinquished By: [signature]	11/4/22 13:05
Received By: [signature]	11/4/22 16:40
Received @ Lab By	

Total Cost:

P.I.F.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

1 of 1

CHAIN OF CUSTODY

ELAP ID: 10478

PAGE

PARADIGM ENVIRONMENTAL SERVICES, INC.

REPORT TO:		INVOICE TO:			
COMPANY:	Paradigm Environmental	COMPANY:	Same	LAB PROJECT #:	CLIENT PROJECT #:
ADDRESS:		ADDRESS:			
CITY: STATE: ZIP:		CITY: STATE: ZIP:		TURNAROUND TIME: (WORKING DAYS)	
PHONE: FAX:		PHONE: FAX:		STD	OTHER
PROJECT NAME/SITE NAME:		ATTN:	Reporting	☐ 1 ☐ 2 ☐ 3 ☒ 5	☐
		COMMENTS:	Please email results to reporting@paradigmenv.com	Date Due:	11/11/22

REQUESTED ANALYSIS

DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER OF CONTAINERS	TCN	ACN	REMARKS	PARADIGM LAB SAMPLE NUMBER
11/3/22	1135		X	Post Carbon - Day 3	WW	1	X	X	225298-04	
									Please preform matrix specific spike	

WO# : 70235701

70235701

LAB USE ONLY BELOW THIS LINE

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	NELAC Compliance	
Container Type:	Y ☐	N ☐
Comments:		
Preservation:	Y ☐	N ☐
Comments:		
Holding Time:	Y ☐	N ☐
Comments:		
Temperature:	Y ☐	N ☐
Comments:		

Client

Sampled By: [signature] @ Date/Time: 1600 11/3/22

Relinquished By: Date/Time:

Received By: Date/Time:

Received @ Lab By: [signature] Date/Time: 11/4/22 9:30

Total Cost:

P.I.F.

PARADIGM

ENVIRONMENTAL SERVICES, INC

Analytical Report For

Arch Chemicals

For Lab Project ID

225328

Referencing

GW Continuous Pump Test Nov. 2022

Prepared

Tuesday, November 15, 2022

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below.

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225328

Client: **Arch Chemicals**

Project Reference: GW Continuous Pump Test Nov. 2022

Sample Identifier:	10422-0847-HW1		
Lab Sample ID:	225328-01	**Date Sampled:** 11/4/2022	8:47
Matrix:	Groundwater	**Date Received** 11/4/2022	

Total Organic Carbon

Analyte	Result	Units	Qualifier	Date Analyzed
Total Organic Carbon	**220**	mg/L		11/9/2022

Method Reference(s): SM 5310 C - 2011
Subcontractor ELAP ID: 10709

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 225328

Client: **Arch Chemicals**

Project Reference: GW Continuous Pump Test Nov. 2022

Sample Identifier:	110422-0845-GAC3(D)		
Lab Sample ID:	225328-02	**Date Sampled:** 11/4/2022	8:45
Matrix:	Groundwater	**Date Received** 11/4/2022	

Total Organic Carbon

Analyte	Result	Units	Qualifier	Date Analyzed
Total Organic Carbon	**380**	mg/L		11/9/2022

Method Reference(s): SM 5310 C - 2011
Subcontractor ELAP ID: 10709

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

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All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

"<" = Analyzed for but not detected at or above the quantitation limit.
"E" = Result has been estimated, calibration limit exceeded.
"H" = Denotes a parameter analyzed outside of holding time.
"Z" = See case narrative.
"D" = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
"J" = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
"P" = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

CHAIN OF CUSTODY

PARADIGM ENVIRONMENTAL SERVICES, INC.

REPORT TO:		INVOICE TO:		
COMPANY:	Arch Chemicals, Inc.	COMPANY:	SAME	LAB PROJECT ID: 225328
ADDRESS:	100 McKee Road, P.O. Box 30205	ADDRESS:		
CITY:	Rochester STATE: NY ZIP: 14603	CITY:	STATE: ZIP:	Quotation #: MS 211117B
PHONE:	585-613-3752 FAX:	PHONE:	FAX:	Email: francien.trubia@arxada.com
ATTN:	Francien Trubia	ATTN:		

PROJECT REFERENCE
GW Continuous Pump Test
Nov. 2022

Matrix Codes:
AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	TOC	REMARKS	PARADIGM LAB SAMPLE NUMBER
11/4/2022	8:47AM		X	110422-0847 -HW1	WG	2	X		-01
11/4/2022	8:45AM		X	110422-0845-GAC3(D)	WG	2	X	PO No. 4503044595	-02

(1) nelson.breton@wsp.com

Turnaround Time		Report Supplements		
Availability contingent upon lab approval; additional fees may apply.				
Standard 5 day	X	None Required		None Required	
10 day		Batch QC		Basic EDD	
Rush 3 day		Category A		NYSDEC EDD	
Rush 2 day		Category B			
Rush 1 day					
Other (please indicate date needed: ____)		Other (please indicate package needed: ____)		Other EDD (please indicate EDD needed: ____)	

Richard Reagan (Matrix) — Sampled By — 11/4/22 @ 8:45AM — Date/Time

Francien Trubia — Relinquished By — 11/04/22 @ 1310 — Date/Time

Quentin McCoy — Received By — 11/4/2022 @ 1310 — Date/Time

Received @ Lab By — @ 1342 11/4/22 — Date/Time

Total Cost:

P.I.F

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

18°C @ 1332 11/4/22
iced in field

See additional page for sample conditions.

PARADIGM

Chain of Custody Supplement

Client: Arch

Lab Project ID: 225328

Completed by: ZL

Date: 11/4/22

Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	NELAC compliance with the sample condition requirements upon receipt: Yes	No	N/A
Container Type	X		
Comments			
Transferred to method-compliant container			X
Headspace (<1 mL)	X		
Comments			
Preservation	X		
Comments			
Chlorine Absent (<0.10 ppm per test strip)			X
Comments			
Holding Time	X		
Comments			
Temperature	X		
Comments	18°C iced in field		
Compliant Sample Quantity/Type	X		
Comments			

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

PARADIGM ENVIRONMENTAL SERVICES, INC.

CHAIN OF CUSTODY

221107012

ELAP ID: 1

REPORT TO:		INVOICE TO:			
COMPANY:	Paradigm Environmental	COMPANY:	Same	LAB PROJECT #:	CLIENT PROJECT
ADDRESS:		ADDRESS:			
CITY: STATE: ZIP:		CITY: STATE: ZIP:		TURNAROUND TIME: (WORKING DAYS)	
PHONE: FAX:		PHONE: FAX:			STD
PROJECT NAME/SITE NAME:		ATTN:	Reporting	ATTN:	Accounts Payable	☐ 1 ☐ 2 ☐ 3 ☒ 5
		COMMENTS:	Please email results to reporting@paradigmenv.com	Date Due:	11/14/22

REQUESTED ANALYSIS

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	TCL									REMARKS	PARADIGM LAB SAMPLE NUMBER
1	11/4/22	0847		X	110422-0847-HW1	WG	2	X									225328-01	
2	↓	0845		X	110422-0845-GAC3(D)	WG	2	X									↓ -02	
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

****LAB USE ONLY BELOW THIS LINE****

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	NELAC Compliance	
Container Type:	Y ☐	N ☐
Comments:		
Preservation:	Y ☐	N ☐
Comments:		
Holding Time:	Y ☐	N ☐
Comments:		
Temperature: 4°C	Y ☐	N ☐
Comments:		

Client

Sampled By	Date/Time	
[signature]	@ 0830	11/9/22
Relinquished By	Date/Time	
Ryan Zecher	11/7/22	11:07
Received By	Date/Time	
[signature]	11/7/22	~~14:38~~ ER
Received @ Lab By	Date/Time	14:38

Total Cost:

P.I.F.