TRUE NORTH CONSULTANTS

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April 24, 2024

Ms. Cindy Koepke
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Madison, WI 53711

RE: Supplemental Site Investigation Workplan
Shorewood Commons Property
3330 University Avenue
Madison, Wisconsin
True North Project No.: T243003
WDNR BRRTS: 02-13-560698

Dear Cindy:

True North Consultants, Inc. (True North) is pleased to provide this description of the planned supplemental site investigation activities at the Shorewood Commons property located at 3330 University Avenue in Madison, Wisconsin (Subject Property). This workplan was prepared based on the comments provided by WDNR in their review of the Site Investigation Report submitted in September 2023. In addition, we have reviewed the historic information collected during the project, as well as select data from several other nearby WDNR sites, to determined what additional environmental work would be required to evaluate the impact of the dry-cleaning chemical release on the environmental quality from the Subject Property. The objective of the proposed work is to address several outstanding WDNR concerns related to the contaminant migration at the Subject Property. This proposed work involves supplemental soil sampling, vapor mitigation system commissioning testing, installation of additional monitoring wells, groundwater sampling, and other associated activities.

Data collected at the Subject Property is not sufficient to adequately characterize the extent of groundwater contamination. Investigative data collected to date was evaluated to develop a conceptual site model (CSM). The CSM provides a picture of the contamination at the Subject Property and how the contamination is migrating from the source area. Development of the CSM uses water level data to determine the groundwater flow direction, aquifer hydraulic measurements to estimate groundwater flow and contaminant transport rates, and the measured contaminant levels to evaluate trends in contaminant levels. The CSM developed for the Subject Property is provided as **Attachment A**. The CSM was used as the framework for determining the additional investigation activities required to complete a site investigation and pursue case closure with the WDNR.

The activities covered within this workplan are related to assessment of the contaminant impacts on the Subject Property. Most importantly, the work is intended to better characterize the source area soils that may be contributing to on-going contamination of the groundwater and evaluate the vertical extent of the dry-cleaning chemicals in the groundwater at the Subject Property. It is our opinion that this information is necessary to determine whether the existing monitoring wells are adequate to characterize the lateral migration of the contamination. Additional work not covered within this workplan may be needed to address the Department's concerns regarding downgradient migration of the dry-cleaning chemicals in the groundwater. After completion of this scope of work, True North will reassess the CSM and make recommendations for further investigation or closure, as warranted.

SCOPE OF WORK

True North will complete supplemental site investigation activities at the Subject Property. The objectives of the investigative work are to better define the lateral and vertical extent of soil contamination, clarify site stratigraphy and aquifer hydraulics, and assess the vertical extent of the groundwater impacted by the historic release of dry-cleaning related chemicals. Additionally, data will be collected to determine whether the mitigation system that was installed at the 3330 University Avenue building is operating as required by WDNR. The scope of work and methods are described below.

SOURCE PROPERTY ACTIVITIES

Task 1: Soil Sampling

Additional soil sampling will be conducted around the source area (**Figure 1**). The objective of this sampling is to better delimit the extent of impacted soils around the former dry cleaner building. We believe this is particularly important because of the relatively large impediment (building) located in the area of the impacted soil. Four soil borings will be advanced to a depth of approximately 25 feet using direct-push technology (DPT) drilling methods. Soil samples will be collected continuously during the drilling. The soil samples will be described in the field and screened for organic vapors using a photoionization detector (PID) equipped with a 10.6 eV lamp. Laboratory analytical samples will be collected at two horizons in each boring: approximately 15 feet below ground surface (bgs), and approximately 20 feet bgs (near the water table). Analysis of the shallower soils will not be conducted since previous sampling has delimited the extent of dry-cleaning chemicals in the shallower soils. If field evidence indicates that the soil sample collected near the water table contains high levels of dry-cleaning chemicals the borings will be extended into the saturated soils to evaluate whether non-aqueous phase chemicals are present. Soil samples will be analyzed for volatile organic compounds (VOCs). The proposed sampling locations/elevations are shown relative to the previously identified contamination in a cross-section on **Figure 2**.

Task 2: Vapor Mitigation System Commissioning

Vapor mitigation system commissioning activities will be conducted in the building at 3330 University to confirm that the mitigation system installed in 2015 is operating as intended and required under WDNR regulations. The commissioning activities includes two components, pressure field extension monitoring and indoor air quality analysis.

Pressure field extension testing measures the pressure beneath the floor slab relative to the indoor pressure. This test should confirm that a negative pressure gradient exists across the floor slab. This ensures that any dry-cleaning chemicals in the sub-slab vapors are being drawn toward the mitigation system and removed from below the slab rather than potentially entering the building. Measurement of this will be accomplished by using a micro-Magnehelic® differential pressure gauge. The gauge will be attached to the existing Vapor Pins® in the floor slab and the pressure differential measured. If necessary, additional Vapor Pins® will be installed so that sufficient data may be collected to demonstrate that a negative pressure is being generated beneath the floor slab across the area of concern.

In addition to the pressure field extension testing, indoor air samples will be collected to confirm that the indoor air meets acceptable regulatory levels. Indoor air samples will be collected at locations in both the basement and the first floor. Two samples will be collected in the partial basement present under the western portion of the building. One of these samples will be collected in the east central part of the basement where elevated tetrachloroethylene (PCE) was detected at VP-3 during the previous assessment, and the second sample will be collected near the elevator pit (**Figure 3**). Two indoor air samples will also be collected on the first-floor level. One of these samples will be collected in the mechanical room which is present adjacent to the May 2017 remedial excavation. The second first floor sample will be collected near the elevators to evaluate

whether the elevator shaft may act as preferential vertical migration pathway.

Pace Analytical (Pace) was selected to conduct the analysis since they provided previous vapor analytical services on the project. Indoor air samples will be collected using 6-liter Summa canisters supplied by the Pace. This sampling method was selected over passive sampling because Pace currently does not employ passive sampling devices. The indoor air samples will be collected over a period of 24 hours to account for the potential temporal variations in concentrations. The Summa canister will be placed so that the inlet is located within the breathing zone several feet above the floor and equipped with a flow regulator, so the sample is collected over a period of 24 hours. The vapor sample collected will be analyzed for CVOC using EPA method TO15. Because of the building usage, the commercial building standards would be the acceptable applicable limits for the indoor air and results of the sampling will be compared to those values.

Task 3: Source Area Monitoring Wells Installation and Sampling

New monitoring wells will be installed in the source area to better delimit the extent of groundwater impacted by the dry-cleaning chemicals. Soil sampling will be conducted for textural analysis during installation of the monitoring wells to better characterize the site stratigraphy. Grain size distribution analysis will be conducted on select soil samples collected during the drilling since the WDNR has expressed concern that variations in the texture of the soils at depth may have resulted in preferential flow within select layers of the soil. The proposed source area monitoring wells include:

- Replacement of MW-1R with a water table monitoring well screened from 867.5 to 852.5 msl (30 feet total depth). The base of MW-1R is located at an elevation of 858.47 msl. Historic information indicates that the water table typically is present at an elevation of approximately 859 msl. Because of this, MW-1R has been dry since 2021.
- Installation of a deeper source area piezometer located adjacent to MW-3/PZ-1. The existing piezometer in this location is screened from 838.2 to 843.2 feet msl (~38 to 43 feet deep). Sampling indicates that the PCE concentration at the piezometer elevation is approximately 50 times greater than the NR140 ES. A deeper piezometer should be installed to characterize the contaminant levels deeper within the aquifer. The proposed well should be screened from 818-823 feet msl (~59 to 64 feet deep).

After installation of the new wells, groundwater monitoring will be conducted across the monitoring well network (5 water table wells and 5 piezometers). Water level data will be collected to evaluate the horizontal flow potential and vertical flow gradient at the well nest. Groundwater samples will be collected and analyzed for VOCs to characterize the vertical migration of the dry-cleaning chemicals in the source area and evaluate the horizontal distribution of the dry-cleaning chemicals. In addition, as required by the WDNR, a groundwater sample will be collected from MW-3 for analysis of the standard WDNR list of 18 per- and polyfluoroalkyl substances (PFAS) compounds.

Task 4: Summary Report

A letter report will be generated and submitted to WDNR upon receipt of the laboratory results for the soil samples, soil grain-size distribution, vapor mitigation system testing, and well installation and groundwater sampling. The report will include documentation of the activities conducted, tables of data, and maps showing the sampling results.

If mitigation system testing shows that the existing system is operating in accordance with WDNR requirements, then a Vapor Mitigation Maintenance and Inspection Plan will be included with the update. In the event that the mitigation system testing does not meet WDNR objectives, then recommendations for modifications to the mitigation system will be included in the letter report.

Monitoring well installation and groundwater sampling data results will be discussed in the report. A figure will be included that shows the location of the new wells. A cross-section will be included that shows the soil stratigraphy based on the supplemental drilling, the elevation of the well screens relative to the site soils, and the groundwater analytical results. This data will be used to evaluate the vertical migration of the dry-cleaning chemicals in the groundwater. This newly collected water level and groundwater chemistry data will be used as the basis for selecting locations/elevations for subsequent monitoring wells, if warranted.

If PFAS are detected in the groundwater sample from source well MW-3, additional sampling may be needed to be performed to meet WDNR objectives. Recommendations for additional PFAS sampling will be included in the updated report if warranted.

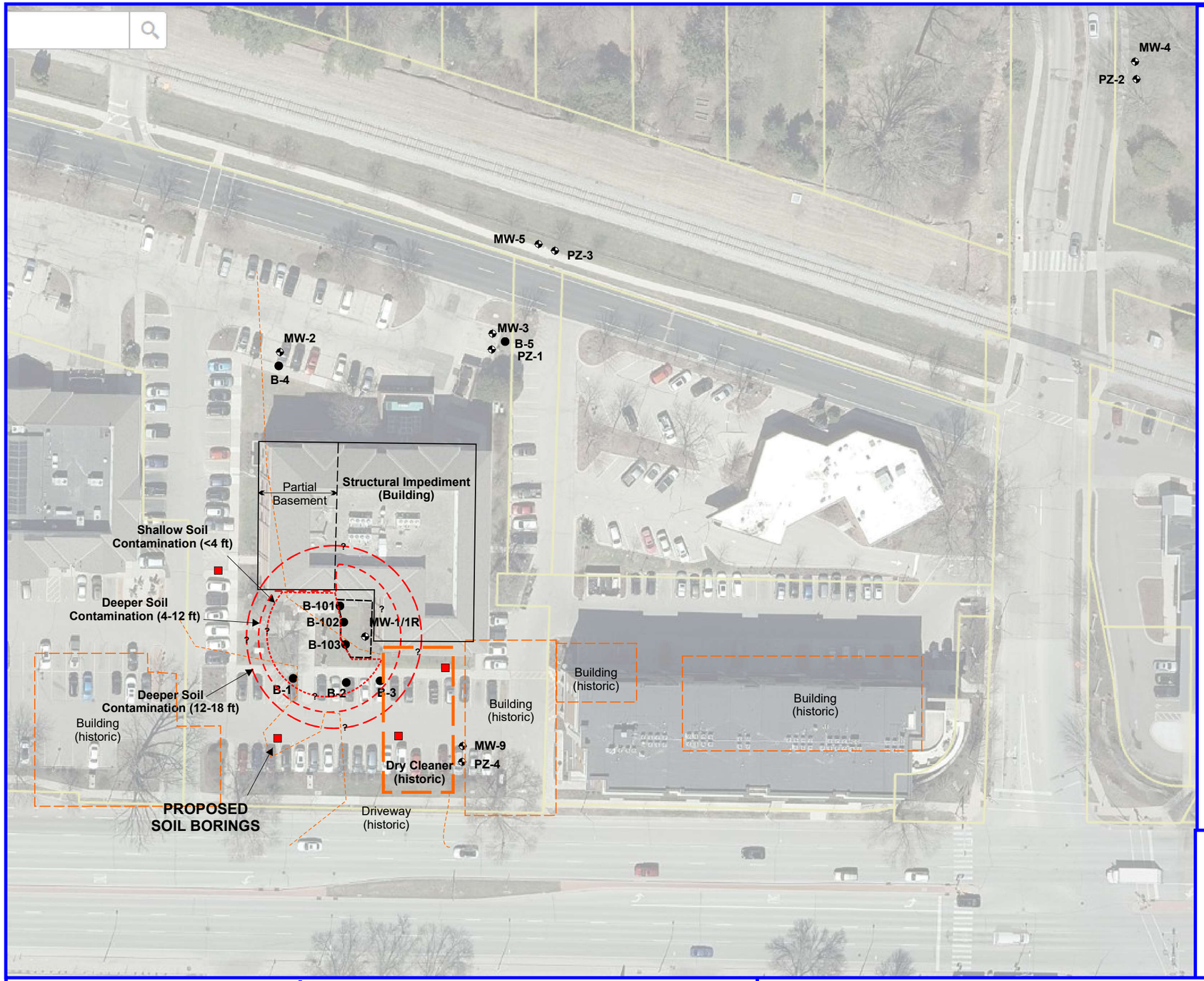
We appreciate the opportunity to assist you with this project. If you have any questions, please contact us at 608-234-5092 or cvalcheff@consulttruenorth.com or mfryman@consulttruenorth.com. Thank you!

Regards,
TRUE NORTH CONSULTANTS

Christopher H. Valcheff
Vice President

Mark Fryman
Staff Consultant

Attachments:
Figure 1: Identified Soil Contamination and Proposed Supplemental Sampling Locations
Figure 2: Vertical Distribution of PCE in Soils
Figure 3: Vapor Sampling Data and Proposed Indoor Air Sampling Locations
Figure 4: Cross-Section Showing Proposed Source Area Piezometer
Attachment A: Conceptual Site Model (including Figures and Graphs)



LEGEND

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1 INCH = 70 FEET
SCALE IS APPROXIMATE

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FIGURE 1

IDENTIFIED SOIL CONTAMINATION AND PROPOSED SUPPLEMENTAL SAMPLING LOCATIONS

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

FLAD DEVELOPMENT & INVESTMENT CORP.
3330 UNIVERSITY AVENUE
MADISON, WI 53705

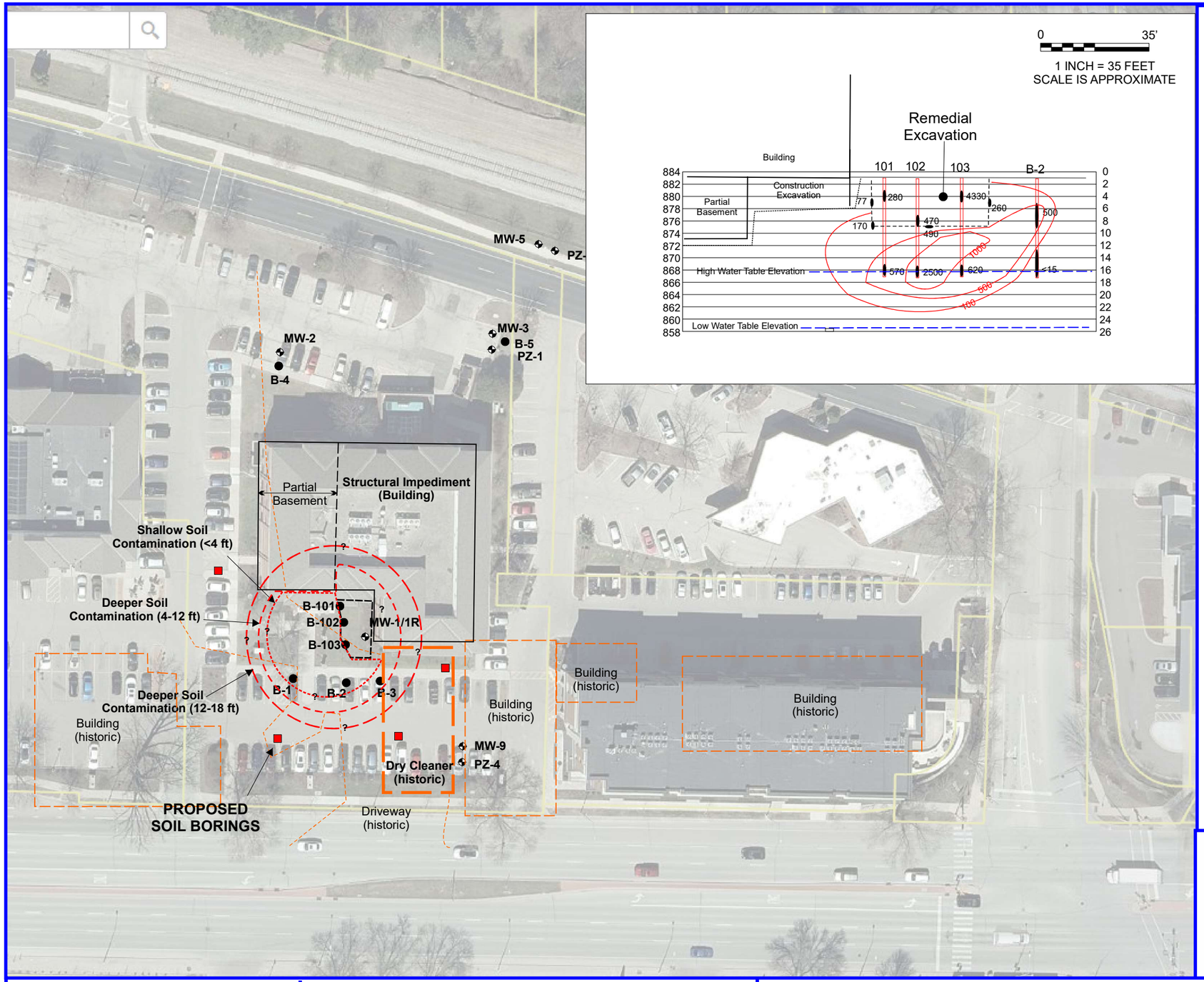
SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T243003

DATE 03/08/2024

SOURCE REA Basemap



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1 INCH = 70 FEET
SCALE IS APPROXIMATE

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FIGURE **2**

VERTICAL DISTRIBUTION OF PCE IN SOILS

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

FLAD DEVELOPMENT & INVESTMENT CORP.
3330 UNIVERSITY AVENUE
MADISON, WI 53705

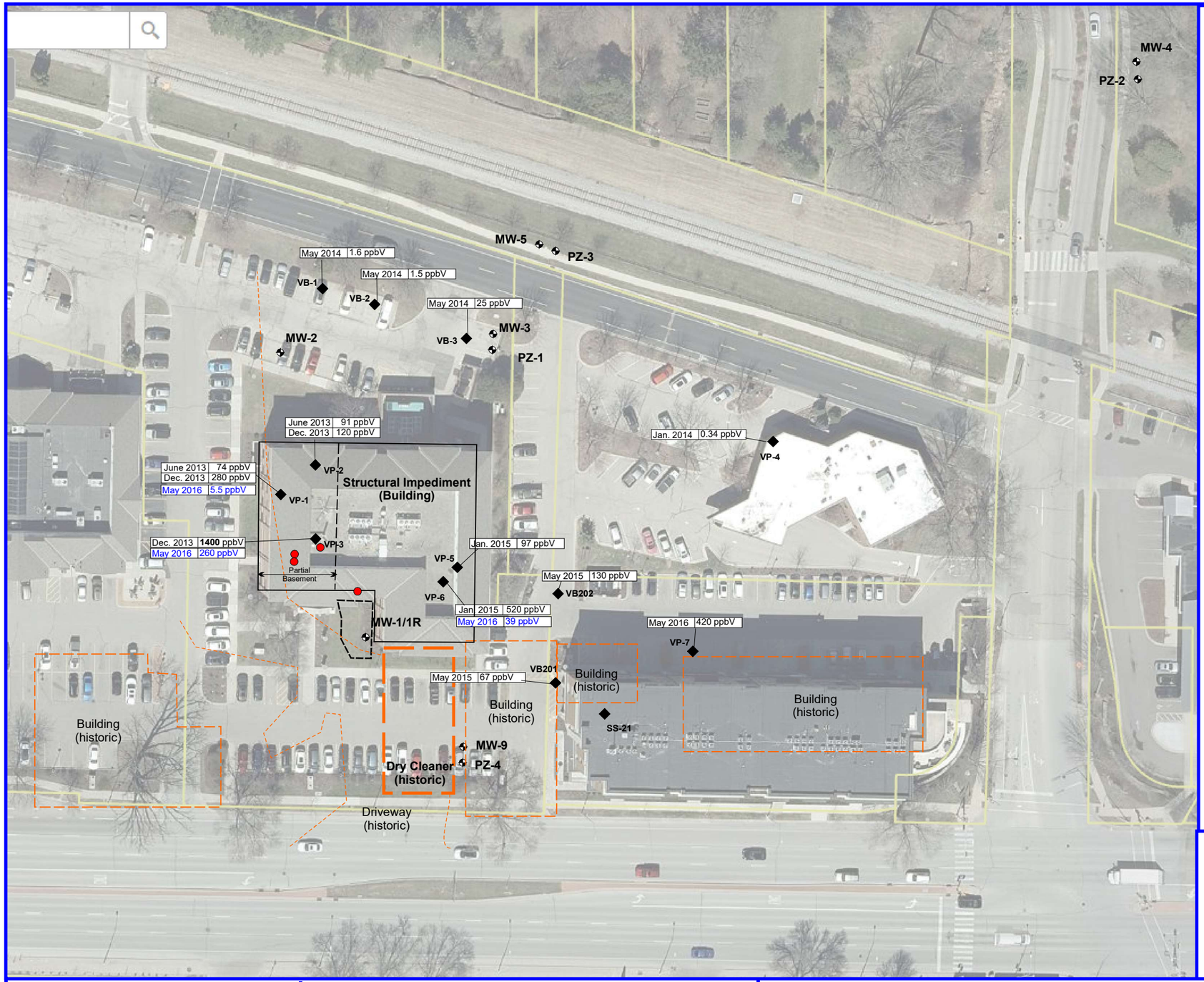
SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T243003

DATE 03/08/2024

SOURCE REA Basemap



LEGEND

Jan. 2015 | 520 ppbV - PCE Assessment Vapor Sampling Data

May 2016 | 39 ppbV - PCE Post-Mitiagtion Vapor Sampling Data

- Proposed Interior Air Vapor Sampling Location

- Vapor Mitigation Piping

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1 INCH = 70 FEET
SCALE IS APPROXIMATE

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FIGURE **3**

VAPOR SAMPLING DATA AND PROPOSED INDOOR AIR SAMPLING LOCATIOIN

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

FLAD DEVELOPMENT & INVESTMENT CORP.
3330 UNIVERSITY AVENUE
MADISON, WI 53705

SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T243003

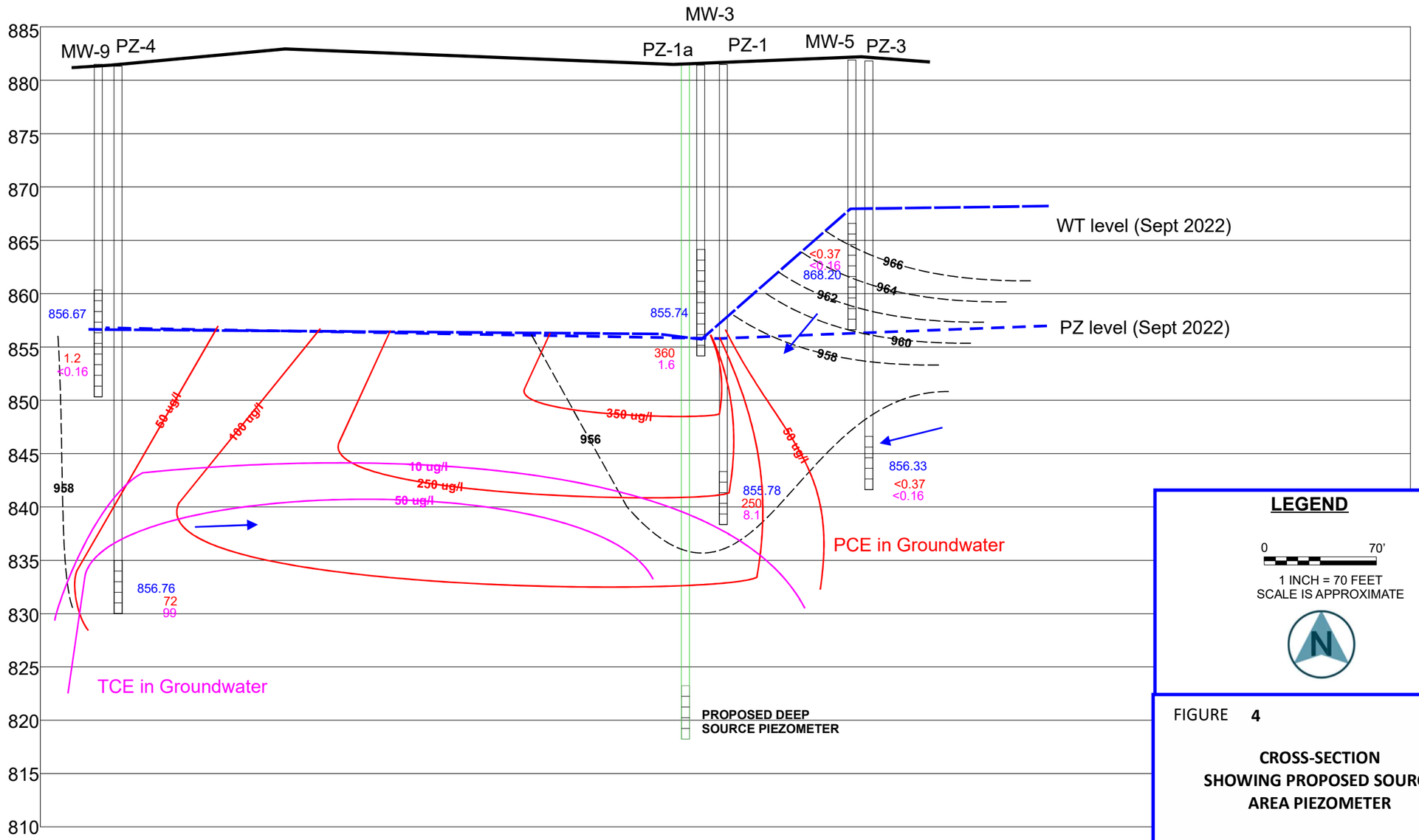
DATE 03/08/2024

SOURCE REA Basemap

SOUTH

NORTH-SOUTH SECTION

NORTH



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0 70’

1 INCH = 70 FEET
SCALE IS APPROXIMATE

FIGURE **4**

CROSS-SECTION SHOWING PROPOSED SOURCE AREA PIEZOMETER

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

FLAD DEVELOPMENT & INVESTMENT CORP.
3330 UNIVERSITY AVENUE
MADISON, WI 53705

SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T243003

DATE 02/28/2024

SOURCE REA Basemap

CONCEPTUAL SITE MODEL
SHOREWOOD COMMONS PROPERTY
3303 UNIVERSITY AVENUE
MADISON, WISCONSIN

Distribution of Contamination and Contaminant Migration

1.0 Source Area Soil Contamination

Data collected indicates that contaminants originate near the historic dry cleaner that was located in the south-central portion of the Subject Property (Avenue Cleaners – 3322 University Ave.). Soil sampling conducted in that location identified tetrachloroethylene (PCE) in the near surface soils (4 ft bgs). Analysis of deeper soils from those borings (B-1 B-2, B-3) show that the PCE concentrations in the soil exceed the groundwater pathway RCLs to a depth of at least 16 feet. Subsequent soil sampling conducted slightly further to the north (~40 feet) confirmed that soil containing dry cleaning chemicals extends over an area of at least 10,500 square feet. The northward limit of the PCE contamination could not be well-constrained because of a building (3330 University Ave.). That building was constructed in approximately 1987. The building has a partial basement on the western side that extends to an elevation of ~870 ft msl or depth of ~10 feet below the general site grade. During the construction of the building basement, it appears that PCE impacted soils likely were removed from the site. Based on the data that has been collected, an estimated 5950 tons of soil that are impacted by dry cleaning chemicals remain at the site. These soils extend from approximately 2 feet below grade to the groundwater table (~18 feet deep). Sampling indicates that the contaminant concentrations are below the non-industrial direct contact RCL. However, the PCE and or trichloroethylene (TCE) concentrations exceed the groundwater pathway RCLs. The residual soil mass identified contains an estimated 12 pounds of PCE and 0.52 pounds of TCE.

2.0 Vapor Contamination and Migration

Soil and sub-slab vapor assessment sampling was conducted at the site in 2013 to 2015. Analysis of the vapor samples showed that dry cleaning chemicals are present in the soil vapors in the area of the site. Sampling conducted of the vapors at the buildings present at 810 Shorewood and 3310/3326 University and the associated parking lot showed that the levels of dry-cleaning chemicals were below applicable standards. Sampling conducted at the 3330 University building showed that the PCE concentration in the vapors below the building floor slab exceeded the WDNR vapor risk screening level (VRSL) at one location, VP-3. That sample was collected in the southwestern part of the building approximately 45 feet to the northwest of the soil excavation area. The area of higher vapor contaminant concentrations is located directly north of the location of the identified soil contamination (Figure 2).

In 2015 a vapor mitigation system was installed at the 3330 University building. Sub-slab vapor samples were collected from the existing vapor pins after the system was installed. Analysis of the vapor samples showed that the concentrations of dry-cleaning chemical dropped markedly after operation of the mitigation system began.

3.0 Groundwater Contamination and Migration

Determination of the extent and migration of the dry-cleaning chemicals in the groundwater at the Subject Property has been problematic because of variability in the groundwater levels. To better understand the groundwater flow in the area, data from the Subject Property and several nearby BRRTS activities were analyzed. Monitoring wells installed at the source and nearby remediation sites are shown on **Figure 3**.

3.1 Groundwater Level Data and Variation

Groundwater level data were collected at the Subject Property wells from 2013 to 2022 as part of the assessment. The water level data show a large variation in the water table elevation exceeding 11.5 feet. A graph showing the water level variation in the 4 water-table wells located on the Subject Property is included as **Figure 4**.

The variability in the water level data at the Subject Property appears to be typical for the area. Water level data collected at 2 nearby sites was reviewed for comparison. At the Shell Station, located directly south of the Subject Property, groundwater monitoring was conducted from1994 to 1999. During that time period the data showed a variation of approximately 4 feet with higher water levels present during the spring (see **Figure 5**). Data from the Mobil Station, located to the southwest, was collected from 1996 to 2018. The Mobil Station water level information during the period from 1996 to 1999 looks similar to the data from the Shell Station with a variation of approximately 3 feet. From 2012 to 2018 the water level data shows much greater variation (similar to the data collected at the Subject Property) with a total variation of 9 feet. Water level variation from the Mobil Station is shown on **Figure 6**.

Vertical gradient data within the aquifer at the Subject Property was characterized by data from the 4 well nests installed as part of the assessment. Graphs showing the relative potentiometric levels at each of the well nests are attached as **Figure 7**. This data indicates that the vertical gradient within the aquifer on the Subject Property is very small and typically upward. At the well nests to the north of the Subject Property the data shows a downward gradient. This gradient appears to reflect higher water table elevations resulting from increased groundwater recharge rates to the north. Potentiometric elevations at the well nests were normalized to the elevation of the well screen at PZ-1 (840.5 ft msl) to remove depth related water level variation. This normalization was performed using the hydraulic gradients measured at the northern well nests (MW4/PZ2 and MW5/PZ3). This estimate indicates that the flow in the deeper aquifer should be toward the northeast (**Figure 8**).

3.2 Groundwater Flow

Determination of the groundwater flow direction at the Subject Property has been problematic. The confusion in the groundwater level and flow data is related to several factors including the regional topography, variation in precipitation and infiltration rates (groundwater recharge), and variability in the screened elevations and formations.

The topography surrounding the Subject Property impacts the water level/flow data. Although the relief on the Subject Property is small, the topography in the area is not. The Subject Property is located in a relatively narrow valley. The elevation at the Subject Property is ~882 ft msl. The ground surface rises sharply to the north and south in the area of the Subject Property. The surface elevation within about 1000 feet of the Subject Property to both the north and south rises to an elevation of over 930 feet msl. The topographic relief reflects a buried valley that is present in the area of the Subject Property. This paleo-valley extends downward to an elevation of approximately 730 ft msl (150 feet deep). Sediments within the valley are predominantly sand eroded from the sandstone present on the adjacent uplands. This paleo-valley trends toward the east northeast, extending beneath Lake Mendota in the area of University Bay. The topography surrounding the Subject Property and the location of the buried paleo-valley are shown on **Figure 9**. This large topographic variation likely impacts the water table elevation and groundwater flow to the north of the Subject Property. Precipitation in the upland area located to the north flows down slope and infiltrates in the unpaved areas and is reflected in localized flooding that has occurred in the area. This recharge results in higher water table elevations slightly to the north of the Subject Property. A north-south cross-section showing the relief and bedrock elevation surrounding the Subject Property is attached as **Figure 10**.

Water level data from the 4 water-table wells located on the Subject Property were evaluated to provide insight to the variability in the groundwater levels and the flow direction. Data from these wells (MW-1, MW-2, MW-3 and MW-9) were normalized to the groundwater elevation at MW-9. MW-9 was selected because the most water level data is available from that well. The data show a fairly consistent picture of the water table gradient at the Subject Property. The highest water levels were present at MW-1/1R. On average the water level at that well has been 0.1 feet higher than the elevation at MW-9. Wells MW-2 and MW-3 have consistently showed lower groundwater levels present at MW-9. The average differences of the head levels measured at these wells (from MW-9) are 0.61 ft at MW-2 and 1.0 feet at MW-3. Based on this data it is clear that the water table drops in elevation toward the northeast and large-scale flow is toward that direction (**Figure 11**).

During the timeframe of the groundwater monitoring at the Subject Property there have been short time periods where excursions from this typical flow have been noted. These excursions occurred during periods of rapid changes in the water table level during 2018. During those periods it appears that there was significant infiltration along the northern boundary of the Subject Property. Data from these events is temporary and is not believed to have a substantial impact on the long-term migration of the contaminants.

The groundwater flow direction determined using the data from the source wells was compared to information from nearby sites. This information indicates that the gradient in the water table aquifer is east northeasterly. The comparison is shown on **Figure 12**.

Water level data collected from the newer well nests installed off-site (MW4/PZ2 and MW5/PZ-3) to the north indicate groundwater flow changes in that direction. The water table elevations measured at both MW-4 and MW-5 are higher than would be expected based on the Subject Property data. This indicates that the flow direction at the water table changes, and flow becomes more easterly. The water level data and potentiometric contours in this area are shown in cross-section on **Figure 13**.

3.3 Aquifer Hydraulics

Limited testing of the hydraulic conductivity has been conducted at the Subject Property. Conductivity testing was performed at one well, MW-5. The conductivity value determined at this well was 2.5×10^{-6} cm/sec. This conductivity is quite low and is a value typical of silt or silty clay. It appears that the screen at MW-5 is at least in part placed in silt, so the conductivity determined is reasonable. However, the soils noted at MW-5 are not typical of the saturated materials at the Subject Property which appear to be predominantly sand or silty sand.

At nearby BRRTS sites hydraulic testing was performed at a number of wells screened within the sandy saturated soils. Conductivity values measured at the Mobil site (to the southwest) ranged from 1.0×10^{-2} to 1.0×10^{-4} cm/sec and the conductivity from the Shorewood Shell site (south across University Avenue) were 3.0×10^{-2} to 5.6×10^{-4} cm/sec. These measured conductivities are typical values for silty sand to medium-grained sand. The conductivities measured at those sites are fairly consistent and should be representative of conditions in the aquifer at the Subject Property.

Groundwater Flow Rate

It is difficult to calculate the horizontal hydraulic gradient at the Subject Property because of inconsistencies in the head data. Source area wells indicate that the hydraulic gradient is 0.002 ft/ft. The average hydraulic conductivity is estimated to be 8.2×10^{-4} (~70 ft/day) based on the data from the nearby sites. Assuming a porosity of 0.3, the groundwater flux rate at the Subject Property is ~175 ft/year.

Groundwater Contaminant Migration

Contaminants released into the soils at the Subject Property have migrated downward into the groundwater. In the soil source area, the contaminant concentrations in the groundwater are approximately 350 ug/l PCE and 10 ug/l TCE. The PCE concentration measured in the groundwater in the source area is consistent with the expected level based on the PCE concentration in the soils near the water table and typical soil/water partitioning values. The TCE level in the source area groundwater is higher than would be expected based on soil/water partitioning calculation. It is unclear whether this disparity results from unidentified TCE soil contamination or simply reflects the partial degradation of the PCE to TCE.

The dry-cleaning chemicals that entered the groundwater have migrated away from the source area. Analytical data suggest that the horizontal migration has primarily been toward the northeast (**Figure 14**). Average contaminant levels in the water table in the area of identified soil contamination during the assessment were 350 ug/l PCE and 9.4 ug/l TCE. Water table monitoring wells are present slightly to the northeast (MW-3), slightly to the southeast (MW-9), and slightly to the northwest (MW-2) of the soil contamination. The average PCE concentrations in those well during the assessment were 232 ug/l (MW-3), 2.1 ug/l (MW-9) and 3.8 ug/l (MW-2). Average TCE concentrations at those wells were 3.7 ug/l, <0.17, and 1.4 ug/l respectively.

Deeper monitoring wells are present adjacent to both MW-3 (PZ-1) and MW-9 (PZ-4). Groundwater sampling at those wells confirms that the dry-cleaning chemicals have migrated downward within the unconsolidated aquifer. Water level data collected at these well nests indicates that the vertical hydraulic gradient on the source parcel is fairly small. Data from the well nest southeast of the soil contamination (MW-9/PZ-4) show a consistent, small upward gradient ranging from 0.0003 to 0.0077 ft/ft. Data from the well nest northeast of the soil contamination (MW-3/PZ-1) show a variable vertical gradient ranging from 0.0046 ft/ft upward to 0.0099 ft/ft downward. Inspection of the gradient data at this well nest indicates that the vertical gradient is typically small and/or upward and the higher downward vertical gradient was noted in 2018 during a period of high water (flooding).

Average contaminant levels in the deeper groundwater northeast of the source soils (PZ-1) measured during the assessment were 560 ug/l PCE and 8.6 ug/l TCE. Average contaminant levels in the deeper groundwater southeast of the source soils (PZ-4) were 51 ug/l PCE and 30 ug/l TCE. The higher contaminant levels noted in the piezometers relative to the water table wells shows that the contaminants have migrated downward within the aquifer. Simple comparison of the contaminant concentrations at wells PZ-1 and PZ-4 cannot be made to evaluate lateral migration in the deeper aquifer because the wells are not screened at the same elevation. PZ-1 to the northeast is screened at an elevation of approximately 841 ft msl and PZ-4 is screened at 832.5 ft msl. It is unclear whether the differences in the average contaminant levels noted in these wells reflect lateral or vertical variation in the plume. It should be noted, however, that the groundwater analytical data show higher rates of PCE dechlorination in the area of MW-4/PZ-9. This likely reflects changes in the aquifer conditions in that area (low DO) associated with the petroleum-release from a separate BRRTS activity which have enhanced the aquifer conditions for anaerobic de-chlorination locally.

The downflow migration of the dry-cleaning chemicals in the water table aquifer is poorly constrained. Data from the water table aquifer indicates that the contaminant plume has migrated eastward approximately 450 feet. Historic water table monitoring well sampling at the Shorewood Service site located on Shorewood Avenue showed that PCE was present in the groundwater (~4 ug/l), but the concentration was below NR140 ES. This is consistent with monitoring well data and grab sample groundwater data collected from geoprobes. No dry-cleaning chemical have been identified in groundwater at 2 water table monitoring wells located off-site to the north (MW-4 and MW-5). This appears to reflect a more easterly flow in that area indicated by the head data. Additionally, no

contaminants were identified in the piezometers located adjacent to these wells which are screened only slightly below the low water table elevations.

The extent of the impacted groundwater deeper within the aquifer is not known. The existing piezometers located to the north and northeast of the source property are screened at elevations 844 (PZ-2) and 848 (PZ-3) feet msl. These screens are above the elevation of the groundwater contamination identified in the source area. Deeper wells will be required to determine whether the groundwater contamination in the deeper sand / silty sand aquifer has migrated significantly from the source area.

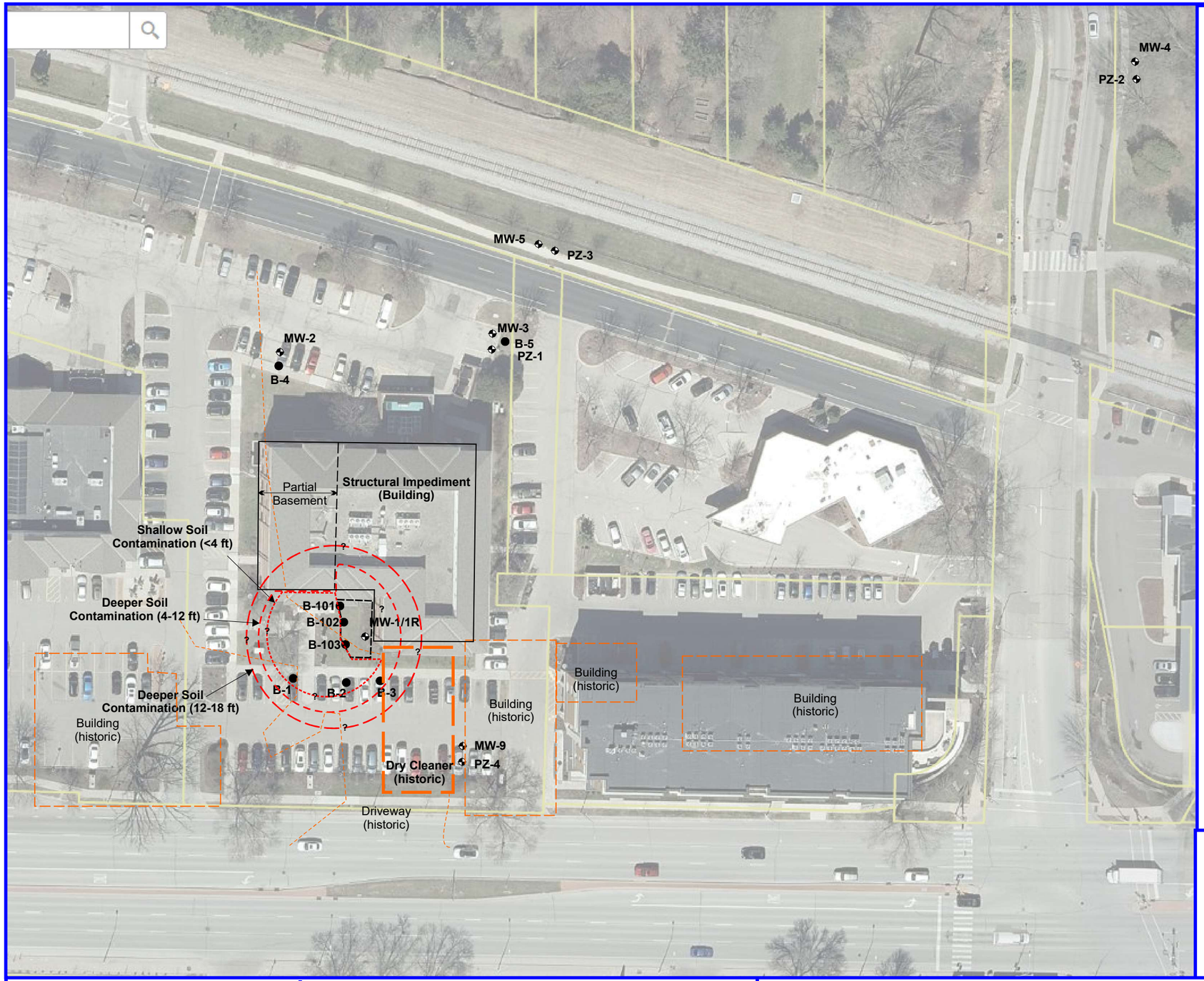
Groundwater analytical data indicate that the contaminant levels at the wells are stable or declining. The groundwater contaminant trends are shown graphically on **Figure 15** and details regarding individual wells are discussed below.

- Contaminant levels in the source area well (MW-1/1R) showed a small but steady decline during the monitoring. Variations in the groundwater elevation do not appear to have caused significant changes in the groundwater chemistry at MW-1/1R.

- Contaminant levels in the well near the northwest corner of the site (MW-2) showed a marked decline during the early portion of the site investigation (2013-2017). The drop in the contaminant levels at that time appear to correlate with a significant rise in the water table elevation at the well. More recent data collected at MW-2 shows a slight rebound in the concentrations of dry-cleaning chemical which appears to correlate with a drop in the groundwater level.

- The contaminant levels at well MW-3, located northeast of the identified soil contamination, showed a steady decline from 2013 to 2017. During this time the water level at the well rose steadily. From 2018 to 2021 the groundwater levels at the well dropped and the contaminant levels increased. The variation in the contaminant levels at MW-3 appears to be related primarily to dilution by clean infiltrate. PCE concentrations in the piezometer located adjacent to MW-3 (PZ-1) typically were higher than those in the monitoring well. However, the contaminant concentrations at PZ-1 showed a steady decline from 2017 to 2021.

- Similar to other wells at the Subject Property, the PCE levels at MW-9 showed a decline from 2013 to 2015 as the water table at the site rose. PCE concentrations rebounded slightly as the water table dropped from 2018 to 2021. At the piezometer located adjacent to this well, PZ-4, the contaminant concentrations also declined during the time-frame of the rising groundwater levels. However, the contaminant levels at the piezometer jumped dramatically when the groundwater elevation declined from 2018 to 2021. This appears to indicate that substantial contaminant mass is present below the water table in this area unlike at PZ-1 located slightly downgradient.



LEGEND

0 70’

1 INCH = 70 FEET
SCALE IS APPROXIMATE

N

FIGURE 1

IDENTIFIED SOIL CONTAMINATION

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

FLAD DEVELOPMENT & INVESTMENT CORP.
3330 UNIVERSITY AVENUE
MADISON, WI 53705

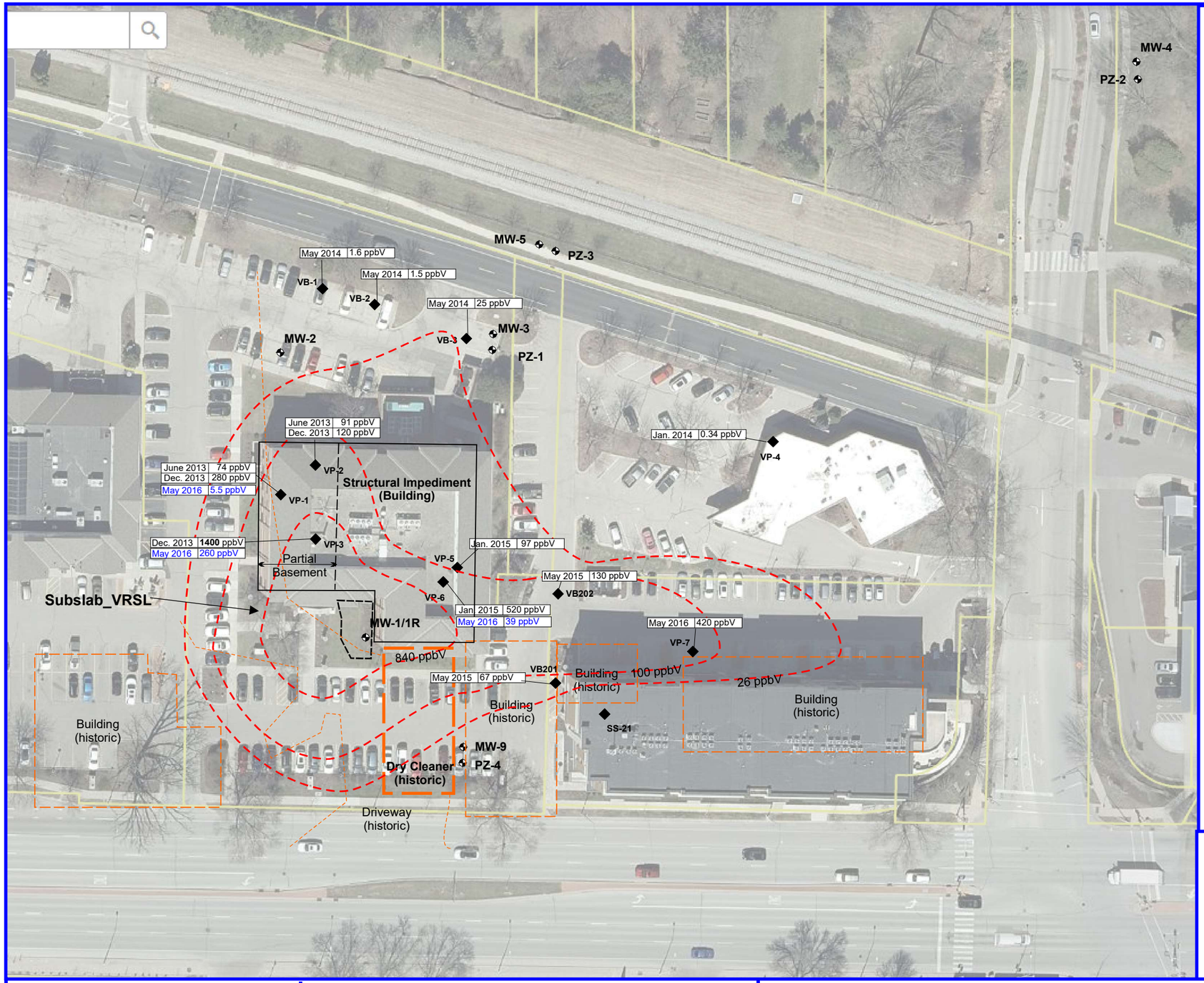
SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T243003

DATE 03/08/2024

SOURCE REA Basemap



LEGEND

Jan. 2015 | 520 ppbV - PCE Assessment Vapor Sampling Data

May 2016 | 39 ppbV - PCE Post-Mitiagtion Vapor Sampling Data

- PCE Vapor Contour Shallow soil gas/subslab vapors

- Vapor Mitigation Piping

0 70’

1 INCH = 70 FEET
SCALE IS APPROXIMATE

N

FIGURE **2**

VAPOR SAMPLING DATA AND VAPOR CONTAMINATION

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

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MADISON, WI 53705

SITE LOCATION

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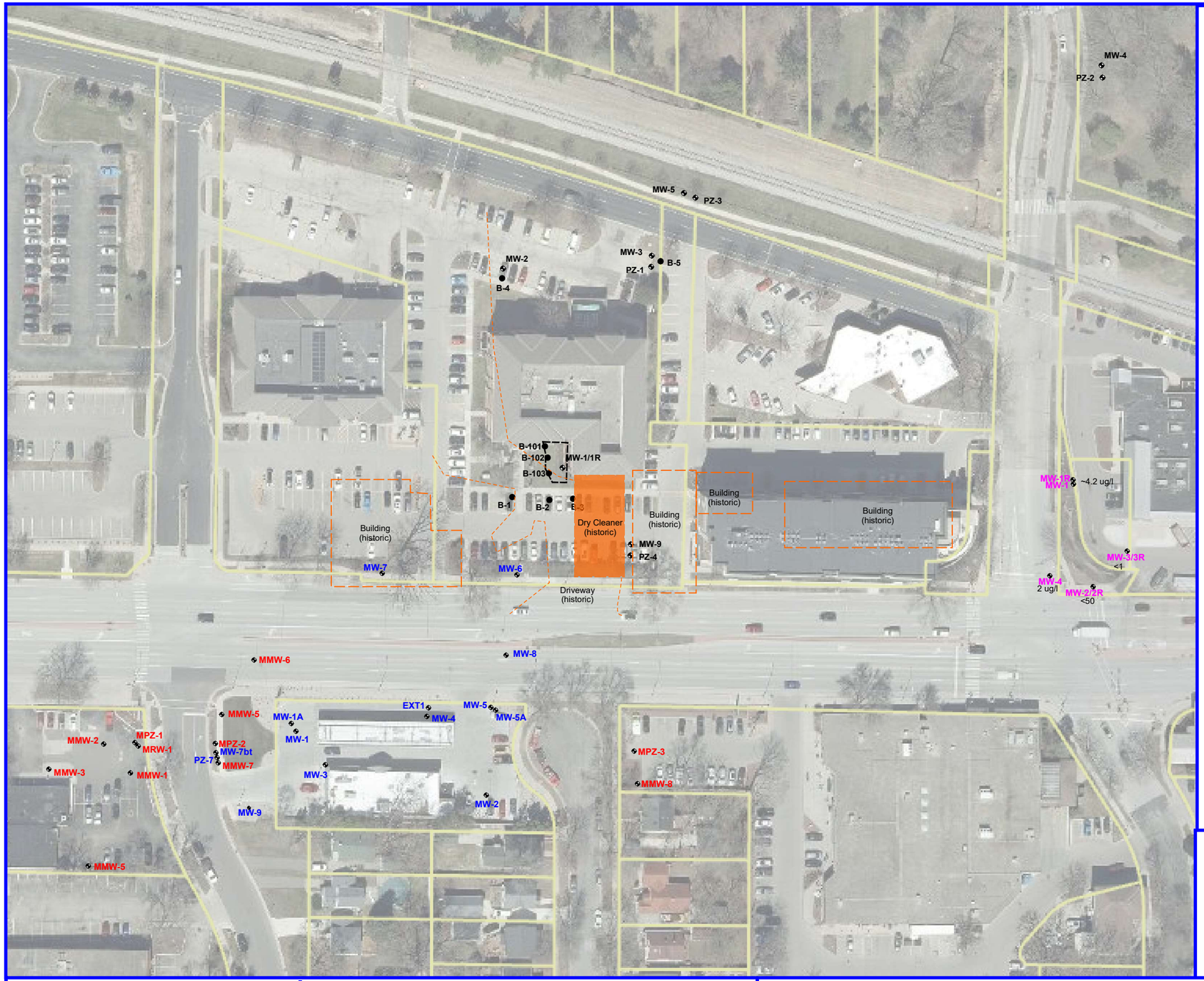
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T243003

DATE 03/08/2024

SOURCE REA Basemap



MW-1 - Monitoring Well - Shorewood Shell (data from 1994 to 1999)

MW-4 - Monitoring Well - Shorewood Service (data from 1997 to 2003)

MMW-3 - Monitoring Well - Mobil (data from 1996 to current)

LEGEND

0 100’

1 INCH = 100 FEET
SCALE IS APPROXIMATE

N

FIGURE **3**

MONITORING WELLS LOCATED IN AREA OF THE SITE

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T232875

DATE 12/28/2023

SOURCE REA Basemap

Figure 4
Groundwater Levels - Source Site Water Table Wells

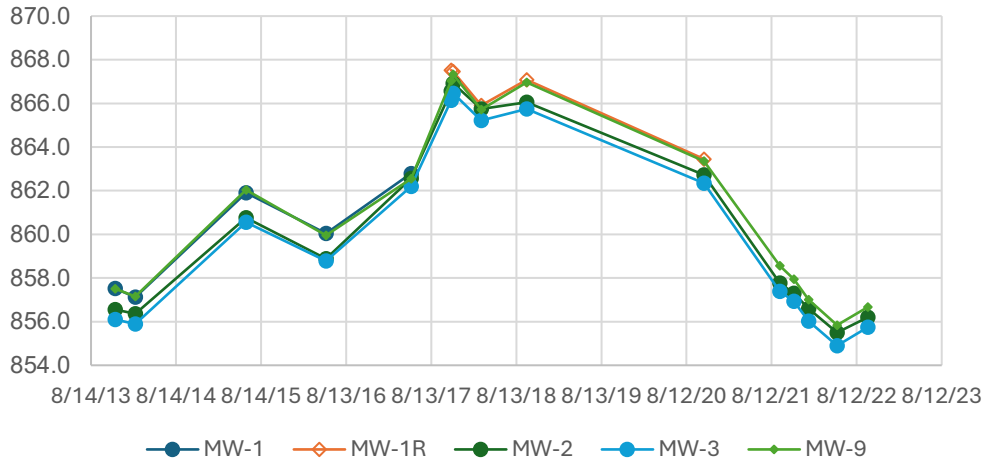


Figure 5
Water Table Elevation Variation (Shell Station)

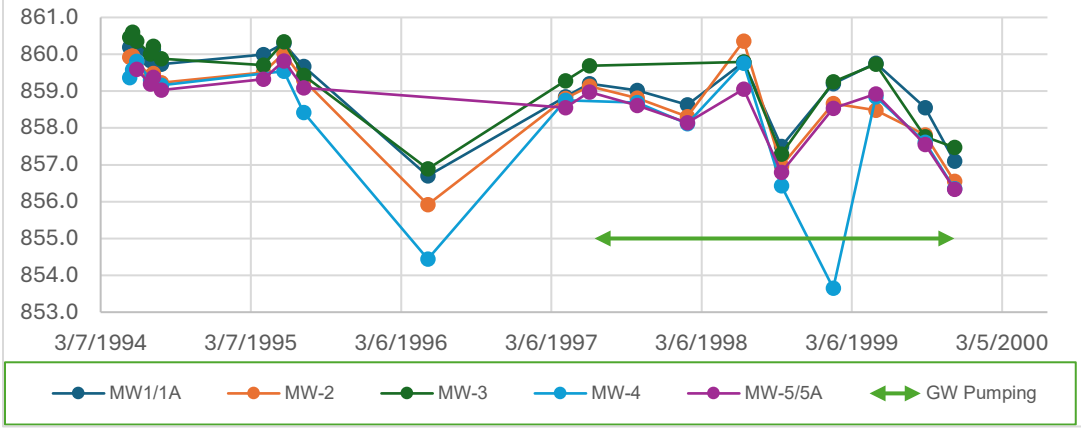


Figure 6
Water Level Variation (Mobil Station)

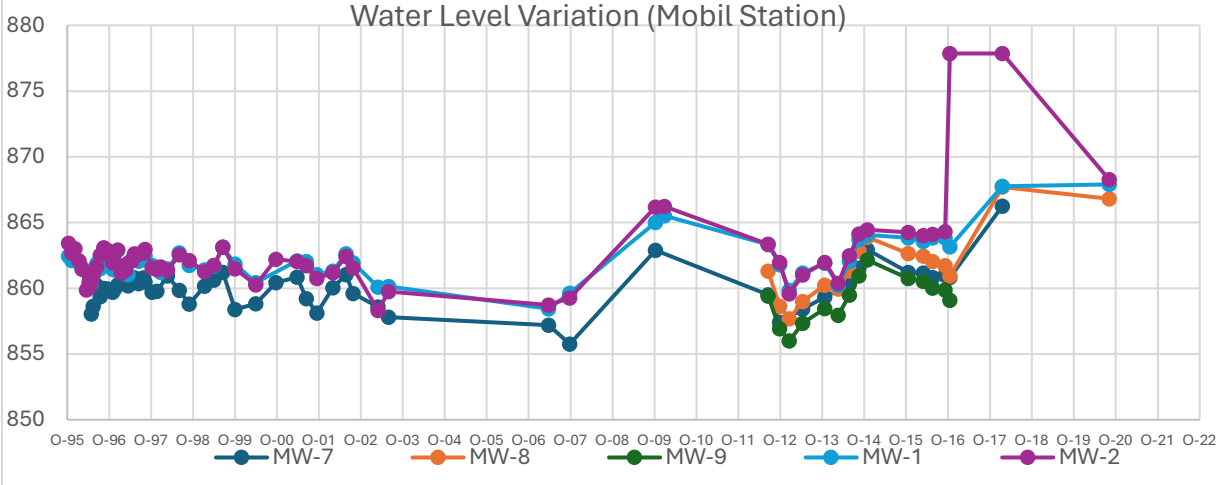


FIGURE 7 – VERTICAL WATER LEVEL VARIATION AT SITE WLL NESTS

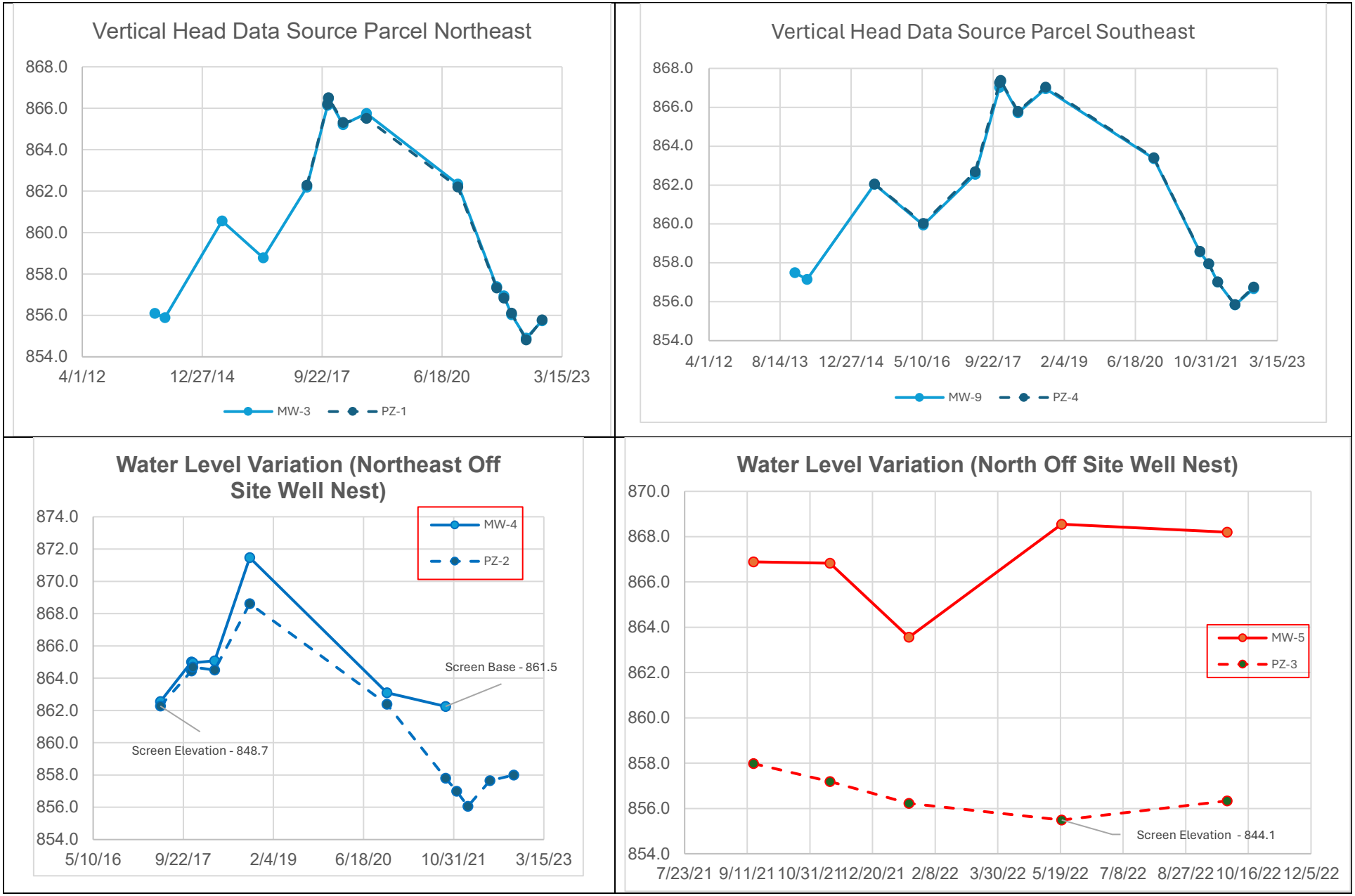
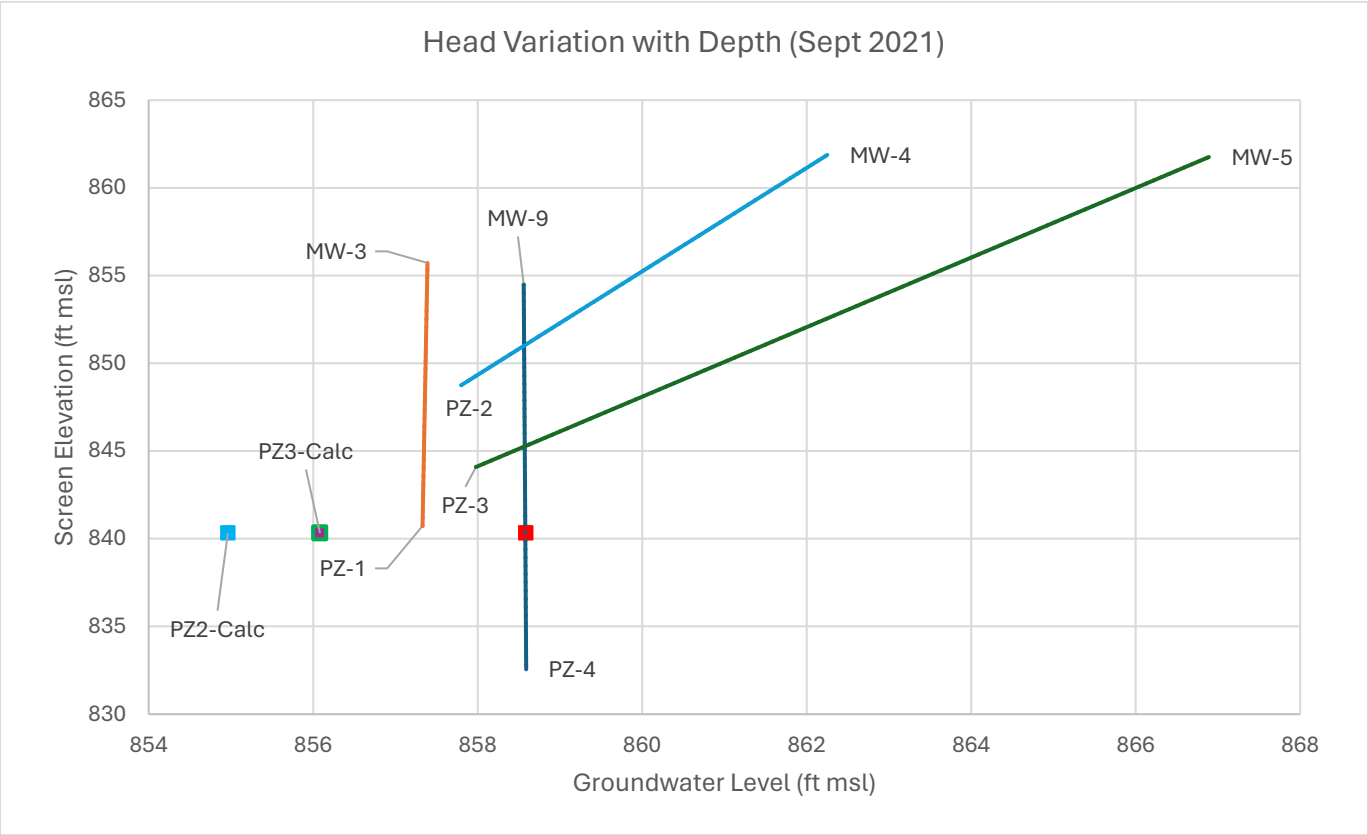
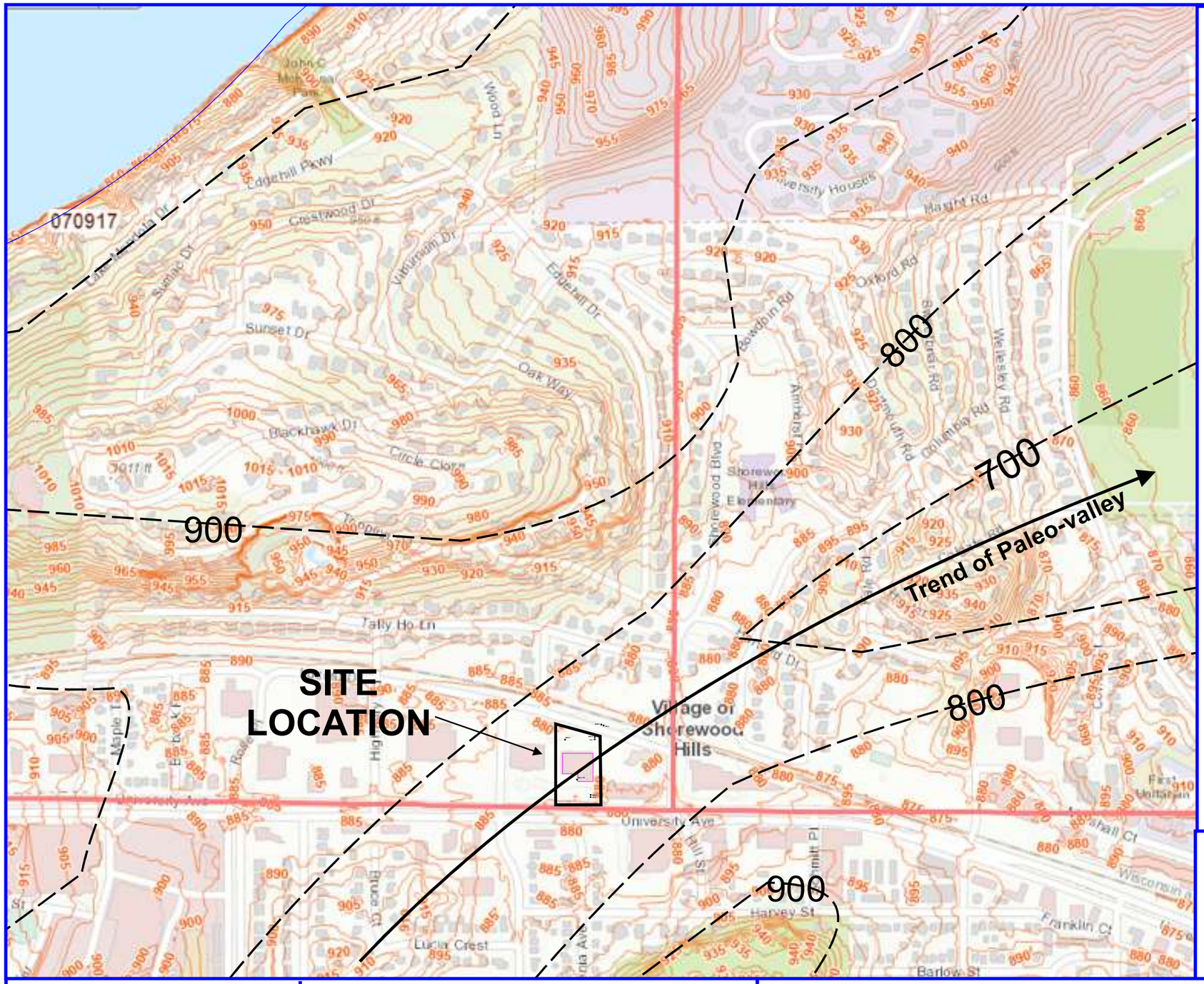


FIGURE 8 – Potentiometirc Level Estimation



This figure illustrates the flow situation at the site. There are higher water table elevations to the north.
Infiltrating water flows downward at a steep gradient in that area through the upper 15 feet of the saturated aquifer.
This steep vertical gradient does not extend southwaard very far onto the subject property.
On the north side of the site a slight downward gradient remains as the pressure passifies.
The water pressure in the aquifer then increases (upward flow) below an elevation of 840 ft.



- Bedrock Elevation (from Cline, 1960)

LEGEND

0 500’

1 INCH = 500 FEET
SCALE IS APPROXIMATE

N

FIGURE **9**

AREA TOPOGRAPHY AND BEDROCK ELEVATION

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

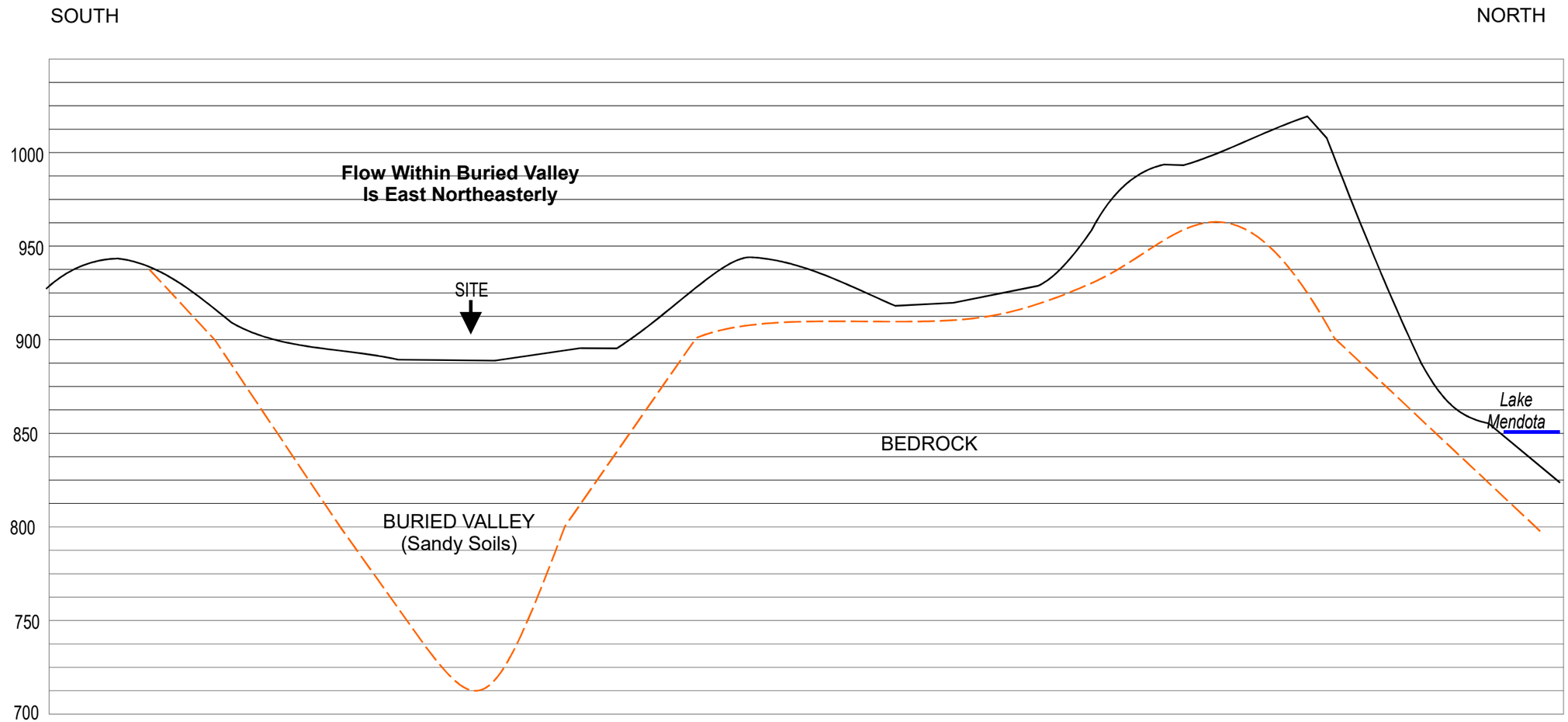
SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T24XXXX

DATE 03/08/2024

SOURCE Dane County GIS



LEGEND

0 500'

1 INCH = 500 FEET
SCALE IS APPROXIMATE

N

FIGURE **10**

CROSS-SECTION
SHOWING AREA GEOLOGY

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

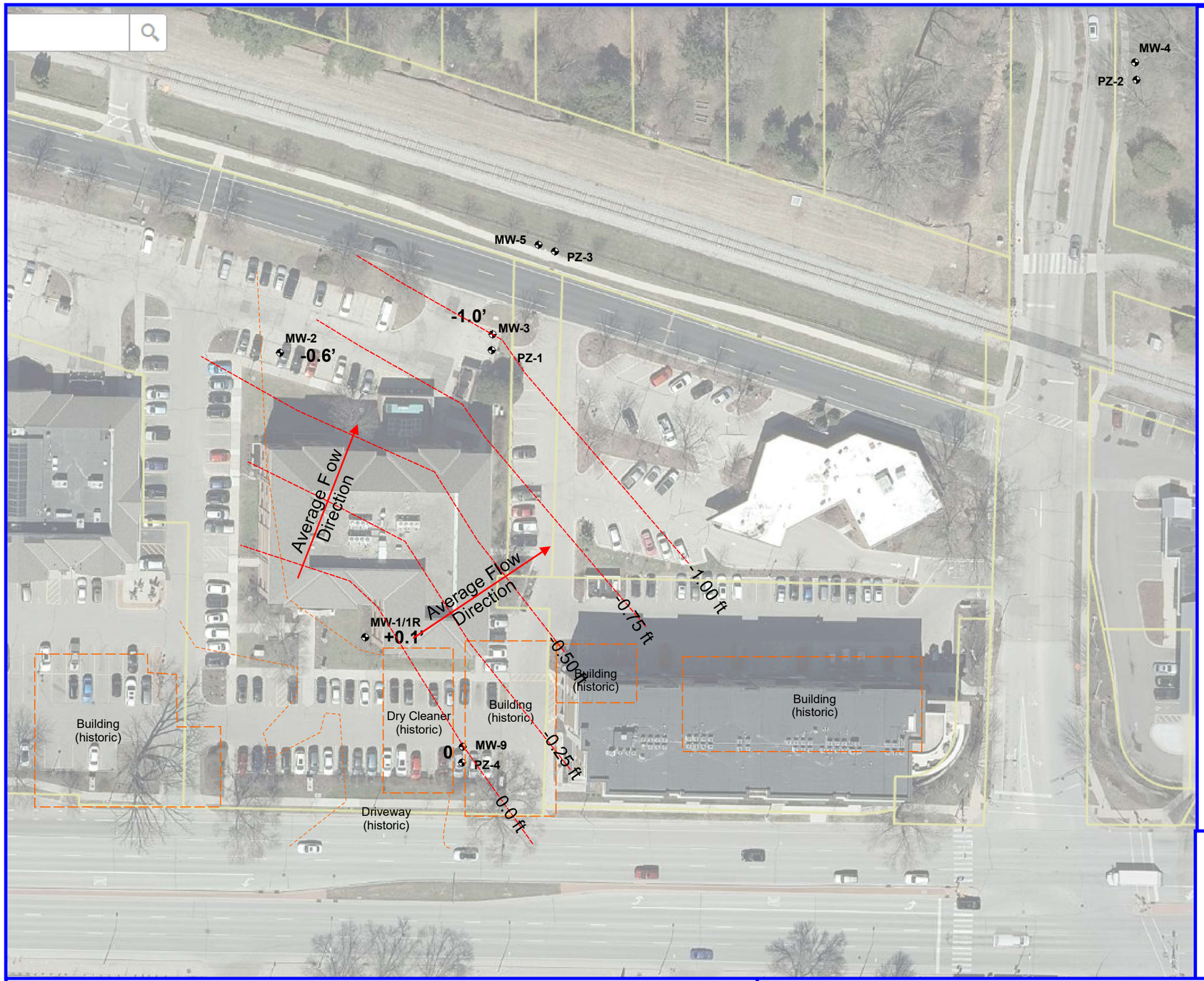
SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T232875

DATE 12/28/2023

SOURCE REA Basemap



LEGEND

0 70'

1 INCH = 70 FEET
SCALE IS APPROXIMATE

N

FIGURE **11**

AVERAGE HEAD DIFFERENCES (SOURCE PROPERTY WELLS)

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

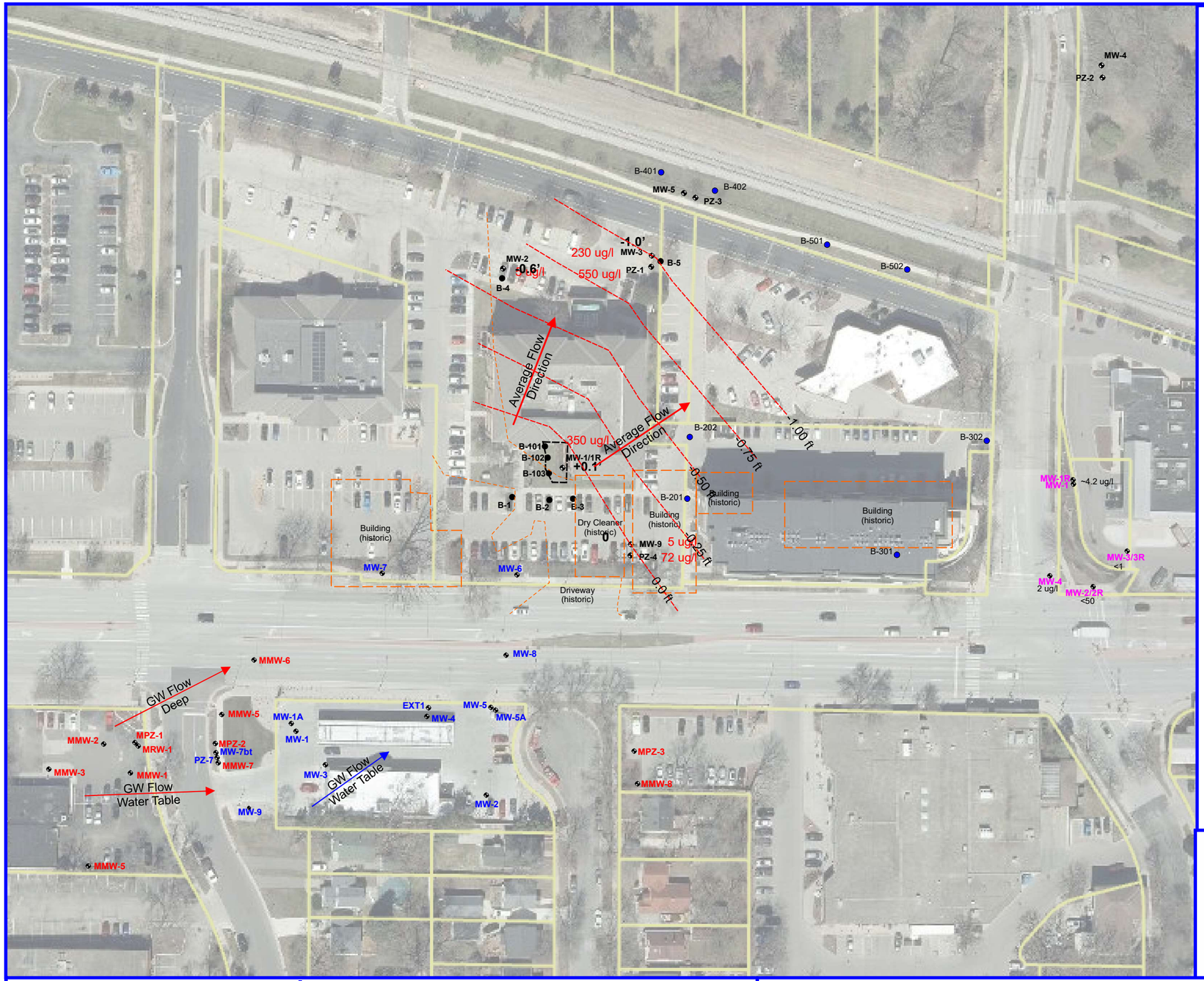
SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T24XXXX

DATE 03/08/2024

SOURCE REA Basemap



MW-1 - Monitoring Well - Shorewood Shell (data from 1994 to 1999)

MW-4 - Monitoring Well - Shorewood Service (data from 1997 to 2003)

MMW-3 - Monitoring Well - Mobil (data from 1996 to current)

LEGEND

0 100'

1 INCH = 100 FEET
SCALE IS APPROXIMATE

FIGURE **12**

AREA GROUNDWATER FLOW DIRECTIION INFORMATION

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T232875

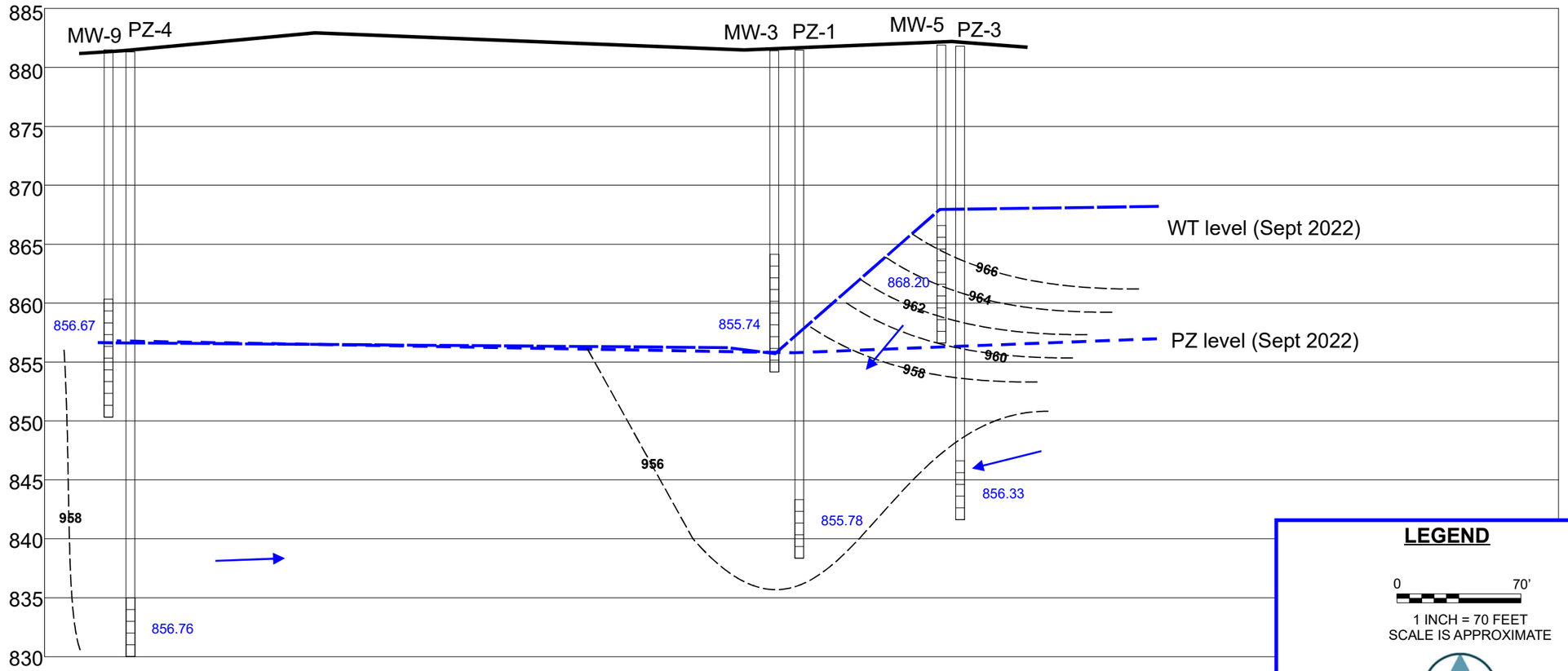
DATE 12/28/2023

SOURCE REA Basemap

SOUTH

NORTH-SOUTH SECTION

NORTH



LEGEND

0 70’

1 INCH = 70 FEET
SCALE IS APPROXIMATE

FIGURE **13**

CROSS-SECTION
SHOWING POTENTIOMETRIC SURFACE
IN EAST PART OF PROPERTY

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

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CLIENT

FLAD DEVELOPMENT & INVESTMENT CORP.
3330 UNIVERSITY AVENUE
MADISON, WI 53705

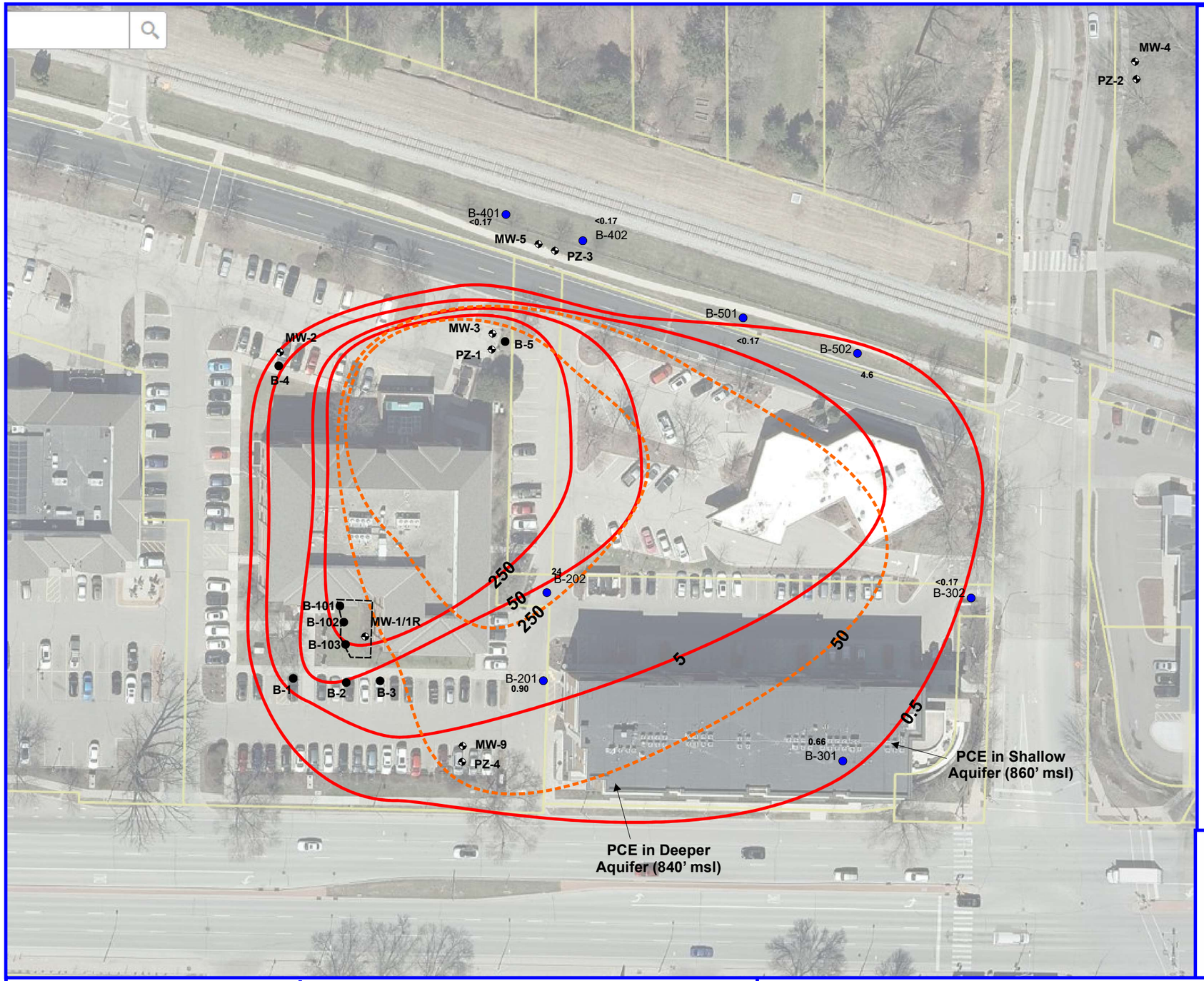
SITE LOCATION

SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

PROJECT NUMBER T243003

DATE 02/28/2024

SOURCE REA Basemap



LEGEND

0 70'

1 INCH = 70 FEET
SCALE IS APPROXIMATE

FIGURE **14**

IDENTIFIED GROUNDWATER CONTAMINATION (PCE)

525 JUNCTION ROAD
SUITE 5800
MADISON, WI

TRUENORTH CONSULTANTS

CLIENT

SITE LOCATION

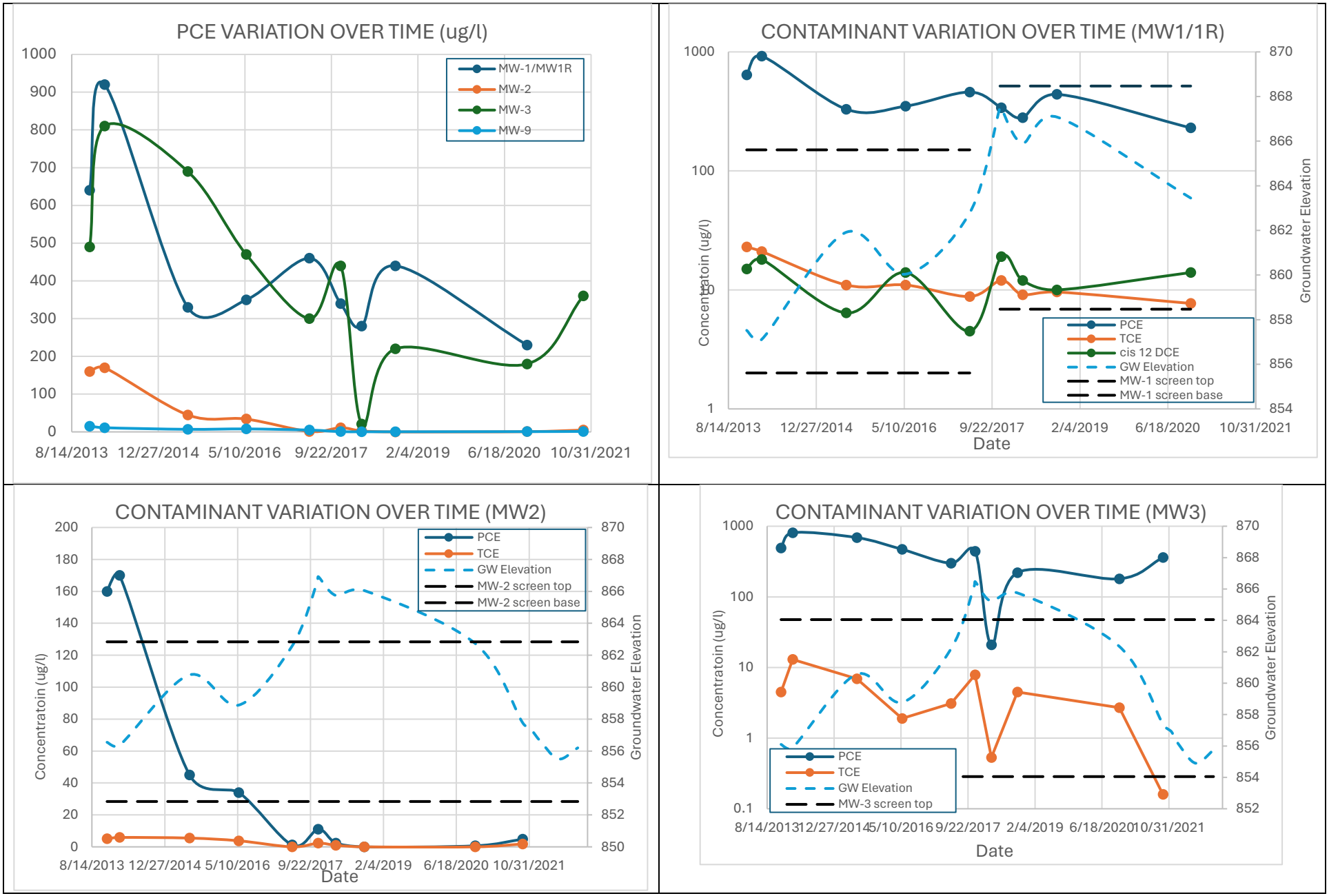
SHOREWOOD COMMONS, LLC
3330 UNIVERSITY AVENUE
MADISON, WI

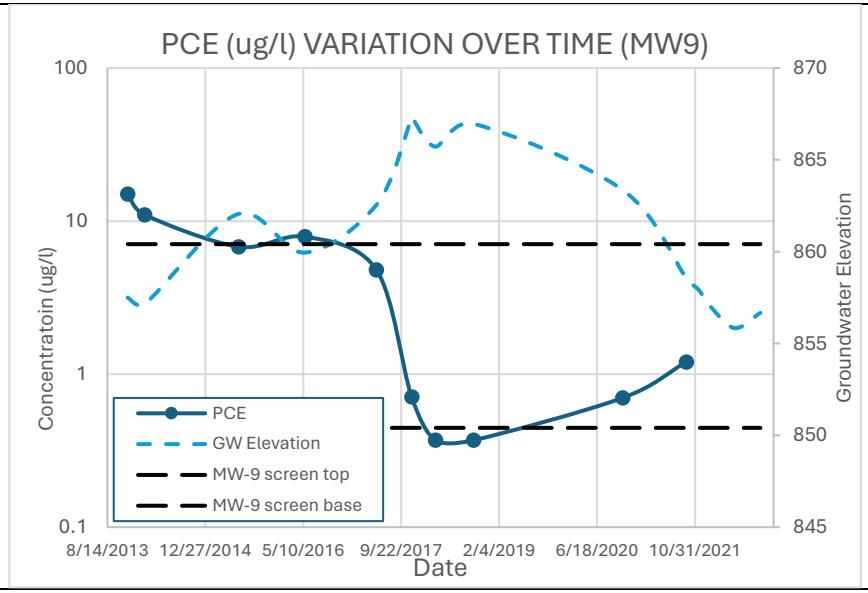
PROJECT NUMBER T232875

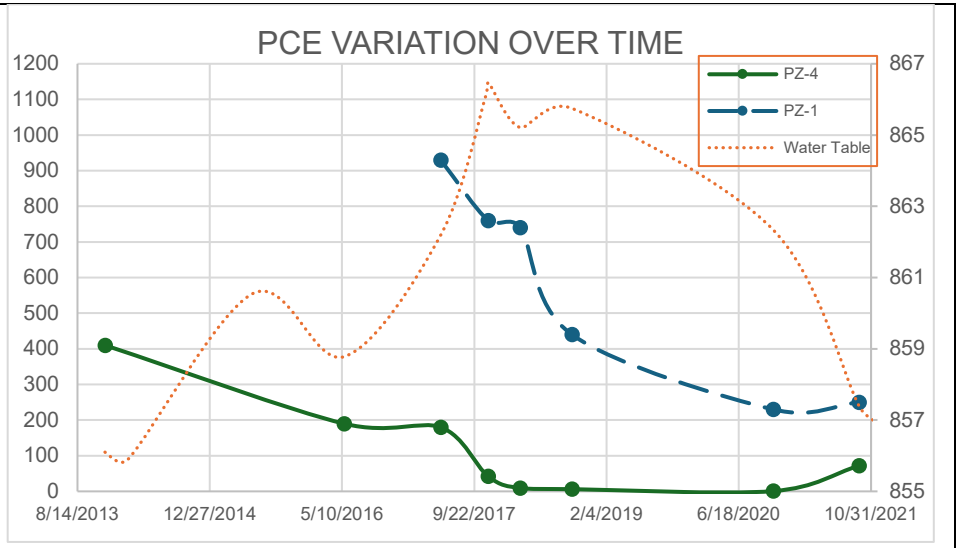
DATE 12/28/2023

SOURCE REA Basemap

FIGURE 15 – Contaminant Concentration Trend Graphs




PCE (ug/l) VARIATION OVER TIME (MW9)
100
10
1
0.1
Concentratoin (ug/l)
870
865
860
855
850
845
Groundwater Elevation
PCE
GW Elevation
MW-9 screen top
MW-9 screen base
8/14/2013
12/27/2014
5/10/2016
9/22/2017
2/4/2019
6/18/2020
10/31/2021
Date


PCE VARIATION OVER TIME
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
867
865
863
861
859
857
855
PZ-4
PZ-1
Water Table
8/14/2013
12/27/2014
5/10/2016
9/22/2017
2/4/2019
6/18/2020
10/31/2021