KSingh | Engineers Scientists Consultants

3636 N. 124th Street
Wauwatosa, WI 53222

Revised Remedial Action Options Report
Community Within the Corridor – East Block
2748 N. 32nd Street, Milwaukee, WI 53210
BRRTS #: 02-41-263675, FID #: 241025400

Submitted To:
Ms. Jane K. Pfeiffer
Remediation and Redevelopment Program
Wisconsin Department of Natural Resources
1027 West St. Paul Avenue
Milwaukee WI, 53233

KSingh | Engineers Scientists Consultants

December 5, 2023

Ms. Jane K. Pfeiffer
Remediation and Redevelopment Program
Wisconsin Department of Natural Resources
1027 W. St. Paul Avenue
Milwaukee WI, 53233

Project # 40441B

Subject: **Revised Remedial Action Options Report for Community Within the Corridor – East Block, 2748 N. 32nd Street, Milwaukee, WI, BRRTS #: 02-41-263675, FID #: 241025400**

Dear Ms. Pfeiffer:

Enclosed please find a copy of the Revised Remedial Action Options Report (RAOR), which K. Singh & Associates, Inc. (KSingh) has prepared for the referenced property. The site is anticipated to be redeveloped into a residential facility. Remedial options identified within this plan will also incorporate environmental control measures necessary to mitigate future environmental concerns associated with the new development.

Please note that Robert S. Fedorchak, PE, with Patriot Engineering and Environmental, Inc., an NRPP-Certified Radon Mitigation Specialist, has provided plan input and feedback.

KSingh requests a review and approval of the revised RAOR in 15 days. Please note that the proposed schedule for commissioning assumes an expedited review of commissioning plans and reports. We appreciate your support and cooperation in moving this project forward. Should you need any additional information, please contact us.

Sincerely,

K. SINGH & ASSOCIATES, INC.

Sameer Neve, Ph.D., ENV SP
Staff Engineer

Robert T. Reineke, P.E.
Senior Engineer

Pratap N. Singh, Ph.D., P.E
Principal Engineer

cc: Shane LaFave, Roers Companies, LLC
Que El-Amin / Scott Crawford, Inc.
Robert Fedorchak, PE / Patriot Engineering and Environmental, Inc.

REVISED REMEDIAL ACTION OPTIONS REPORT

COMMUNITY WITHIN THE CORRIDOR – EAST BLOCK
2748 N. 32ND STREET
CITY OF MILWAUKEE
MILWAUKEE COUNTY, WISCONSIN

DECEMBER 5, 2023

PREPARED BY

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2748 N. 32ND STREET
MILWAUKEE, WI 53210

PROJECT #40441B

KSingh Engineers Scientists Consultants

REVISED REMEDIAL ACTION OPTIONS REPORT

COMMUNITY WITHIN THE CORRIDOR – EAST BLOCK
2748 N. 32ND STREET
CITY OF MILWAUKEE
MILWAUKEE COUNTY, WISCONSIN

DECEMBER 5, 2023

This report was prepared by:	Sameer Neve, Ph.D., ENV SP Staff Engineer K. Singh & Associates, Inc.	Date: December 5, 2023
This report was reviewed by:	Robert T. Reineke, P.E. Senior Engineer, P.E. #32737 – 006 K. Singh & Associates, Inc.	Date: December 5, 2023
This report was reviewed by:	Timothy P. Welch, PG Senior Geologist, PG # 558-13 K. Singh & Associates, Inc.	Date: December 5, 2023

"I, Robert T. Reineke, hereby certify that I am a registered Professional Engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

I certify that the interim action meets or exceeds all design criteria and the plans and specifications developed in accordance with all of the requirements of chapter NR 724, Wis. Adm. Code.

Robert T. Reineke
____

This report was reviewed by:	Pratap N. Singh, Ph.D., P.E. Principal Engineer P.E. # 22177 - 006 K. Singh & Associates, Inc.	Date: December 5, 2023

"I, Pratap N. Singh, hereby certify that I am a registered Professional Engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

Pratap N. Singh
____

"I, Timothy P. Welch, hereby certify that I am a Hydrogeologist as that term is defined in s. NR 712.03(1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

Timothy P Welch

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EXECUTIVE SUMMARY

As part of a property redevelopment, K. Singh & Associates, Inc. (KSingh) was retained by Community Within the Corridor Limited Partnership (CWC) to prepare a Remedial Action Options Report (RAOR) for the property located at 2748 N. 32nd Street, City of Milwaukee, Milwaukee County, Wisconsin. The approximately 4.16-acre property is owned by CWC and is zoned as IM – Industrial Mixed. The Responsible Party is CWC. The property is in the Southwest ¼, of the Northeast ¼, of Section 13, Township 7 North, Range 22 East, and the elevation of the site ranges between 686 to 673 feet Mean Sea Level (MSL). The overall topography of the site area slopes gradually to the west-southwest.

Project Background

CWC is redeveloping the property into a mix of 197 units of affordable rental housing, commercial spaces, community facilities and other amenities. The property has been rezoned as Industrial Mix to facilitate development of the project.

The property was previously investigated and granted Case Closure with continuing obligations as an industrial property under BRRTS # 02-41-263675. KSingh was retained to perform environmental consulting services for the redevelopment of the property. Following a Phase I Environmental Site Assessment, a Phase II Environmental Site Assessment, and Sub-Slab Vapor Sampling, a Post-Closure Modification Request was submitted to the WDNR on July 8, 2020. Following submission of the Post-Closure Modification Request, KSingh performed a Sub-Slab Vapor Investigation of the building. Based on the Sub-Slab Vapor Investigation, it was determined that a Vapor Mitigation System (VMS) consisting of a Sub-Slab Depressurization System (SSDS), would be required for the facility, in addition to construction and maintenance of engineered barriers and removal of contaminated soils from hot spot areas to remove contaminant mass.

Based on a Sub-Slab Vapor Investigation completed by KSingh in January 2021, Trichloroethene (TCE) was identified as a contaminant present underneath the buildings of CWC – East Block, and KSingh designed and implemented a VMS to reduce the risk of TCE vapors entering the buildings. The remediation efforts at CWC are regulated by WDNR using the following performance metrics as required under WDNR publication RR-800:

- The concentration of TCE in indoor air is less than 2.1 $\mu g/m^3$ according to the Vapor Action Level (VAL) indicated in the Wisconsin Vapor Quick Look-Up Table published in August 2023.
- The differential negative pressure under the building documenting pressure field extension is required to be greater than -0.004 inches of H_2O.

KSingh prepared a Remedial Action Plan which was approved by WDNR on June 8, 2021. The plan elements were hot spot soil excavation, installation of a SSDS, and construction of a vapor barrier including concrete slab replacement.

In August 2021, hot spot soil excavations were conducted in several areas of Building 1B-W, Building 1B-SW, and Building 1B-S. The three hot spot areas had a total area of approximately 14,957 square feet. Approximately 1,765 tons of contaminated soils were removed from the hot spot areas. These areas were excavated to an approximate depth of 1 foot and were backfilled with granular material and topped with a vapor barrier consisting of 20-mil PERMINATOR EVOH. Utilities were also installed during the hot spot excavations. Areas containing utilities were excavated to a maximum depth of 4 feet. The SSDS was constructed in accordance with the approved design and modifications as documented in the Interim Remedial Action Design Report dated April 6, 2023.

In December 2022, KSingh conducted a Pilot-Scale Test to evaluate if the SSDS was functioning as intended. The Pilot-Scale Test indicated that the SSDS was functioning properly. Given these results, KSingh submitted a Commissioning Plan for the SSDS to WDNR. In March 2023, KSingh conducted the first round of commissioning and TCE exceedances were detected in areas of the 1st floor of the East Block that exceeded residential Vapor Action Levels (VALs). Out of 81 samples collected, there were 19 VAL exceedances found in the building: 15 exceedances on the first floor, 3 exceedances on the second floor, and 1 exceedance located on the third floor. These results were reported to WDNR on March 23, 2023, and CWC notified tenants of this issue on March 24, 2023.

On March 25, 2023, the City of Milwaukee issued an evacuation order for all tenants at CWC – East Block. WDNR issued an Emergency Order to CWC on March 31, 2023. As a part of the Emergency Order, starting in April 2023, KSingh conducted discrete and continuous air sampling using a portable Gas Chromatograph (GC) and submitted daily and weekly activity reports with test results to WDNR. The Standard Operating Procedures (SOP) for the GC and the personnel qualifications were submitted to WDNR for CWC West Block on August 25, 2023, and have been included in this submittal for reference in Appendix G.

During this time, KSingh and CWC worked to identify how TCE was entering the building in the areas of concern. As part of an Emergency Corrective Action Plan, KSingh focused on removing water from the SSDS piping to prevent water from entering the sub-slab, restoring depressurization beneath the buildings and areas of concern, and identifying and sealing points of vapor intrusion throughout the facility. KSingh prepared a response to this effect in the form of an Emergency Corrective Action Plan (ECAP) submitted on April 19, 2023 to WDNR.

On May 8, 2023, WDNR provided feedback and guidance on the ECAP and based on this, CWC implemented the corrective action outlined in the ECAP. This involved removing water from the underground piping, adding more fans/blowers to the SSDS to help depressurize the system, and sealing of cracks and open areas to ensure vapors did not enter the building. In the month of May, considerable work took place to modify the SSDS so that it was functioning as intended. This included the construction of 14 access points for televising the SSDS to determine if there was water or any blockages in the system. In addition, gutters and downspouts were redirected to divert storm water away from the SSDS, and four sumps were added for draining water from the system.

The two primary goals of acceptable indoor air quality standards and effective depressurization had shown dramatic improvements based on the corrective actions implemented between May and June, 2023. By mid-July 2023, TCE levels in indoor air had decreased throughout the entire building to concentrations below residential VALs except for in the Northern Mechanical Room where safe levels were achieved later. In addition, the required vacuum was achieved throughout the building except for the Northern Mechanical Room by Fall 2023.

On July 25, 2023, KSingh submitted a Remedial Action Options Report (RAOR) to WDNR. Given that WDNR recommended removing more source, the RAOR focused on excavating soil from specific areas within the building and adding more SSDS fans. This plan involved removing an additional 412 tons of contaminated soil from 16 areas within the East Block. This approach was recommended by WDNR to supplement the performance metrics. On September 7, 2023, WDNR provided a review of the RAOR, and requested a revised RAOR be submitted by November 6, 2023. CWC requested an extension for submittal of the revised RAOR on November 3, 2023, and this extension was granted by WDNR on the same day.

On October 6, 2023, WDNR provided a response to a Soil Sampling Plan submitted by KSingh on September 14, 2023. This response was focused on determination of hazardous soils for purposes of disposal. On November 7, 2023, WDNR issued an email recommending additional source removal beyond what was proposed on the original RAOR, and also suggested that KSingh and CWC explore chemical injections to address residual TCE contamination in the soil. Additional source removal beyond 4 feet below grade is likely to undermine the structural integrity of the foundation of the building therefore making this an infeasible option. Further, chemical treatment in the areas with the highest residual contamination is being explored and may be implemented if it is cost-effective.

In summary, the selected remedial action alternative is based on 180,189 square feet of building area encompassing Buildings 1, 2, and 3 along with the parking areas and the loading dock. As of November 9, 2023, the extent of contamination is 10 feet below ground surface, with a median TCE concentration of 1.1 mg/Kg. The total TCE on site amounts to approximately 258 pounds (lbs.) out of an estimated 120,000 tons of contaminated soil. The proposed soil excavation work is expected to remove approximately 412 tons of contaminated soil containing 96 lbs. of TCE from the proposed areas of excavation. By removing 96 lbs. of TCE from the approximately 258 lbs. of total TCE in soil, more than 37% of TCE from the site is eliminated by additional soil excavation.

Soil Quality Test Results

58 soil samples were tested from the SW Garage area of Building 1B-NW, Building 1B-W and the North Mechanical Room between July 2023 and October 2023. In general, TCE levels were greater than 8.41 mg/kg, the industrial direct contact Residual Contaminant Limit (RCL) in most of the areas except for the North Mechanical Room and the SW Garage. Of the 58 samples tested in total, 29 samples had a TCE value greater than 10 mg/Kg. The greatest concentration was observed in the Electrical Room (Unit 1056) with a concentration of 1900 mg/Kg. 13 of these samples with TCE concentrations greater than 10 mg/Kg were sent for TCLP testing. Ten (10) out of the 13 samples tested for TCLP had a TCE concentration greater than 0.5 mg/L classifying it as a characteristic Hazardous waste while the other 3 samples were characteristic non-Hazardous waste. Nearly all the soil samples had TCE detections of 0.0036 mg/Kg or greater exceeding NR 720 RCLs for groundwater protection. Low levels of benzene, toluene, xylene, and ethyl benzene were also detected below their RCL concentrations in the soil samples.

Groundwater Quality Test Results

Previous groundwater investigations indicate that there were no Chlorinated Volatile Organic Compound (CVOCs) nor Petroleum Volatile Organic Compounds (PVOCs) detected on the southern half of the site, suggesting that there has not been an expansion of the known CVOC groundwater contaminant plume from the northern courtyard southward. In addition, it appears that CVOCs in soil have not impacted groundwater on the southern portion of the site. Groundwater contamination has not migrated off-site and has been delineated. The CVOC groundwater impacts remain confined to the northern one-third of the subject property whereas the southern two-thirds of the subject property have been free of CVOC which is consistent with the SIR groundwater data.

Vapor Test Results

Sub slab vapor results indicated that TCE in sub slab vapors were above their respective Vapor Risk Screening Levels (VRSLs) for residential buildings in areas in the SW Garage in Building 1B-NW and in the Gym in Building 1C. The historical exceedances of TCE as compared to VRSLs have been effectively addressed in the East Block by the SSDS.

Remedial Options

Numerous remedial alternatives were evaluated in accordance with Wisconsin Administrative Code NR 722 for the proposed site redevelopment, in addition to monitored natural attenuation as a means of groundwater remediation. Section 2 of this submittal outlines these alternatives in more detail. Many of the alternatives were eliminated from further consideration based on economic and technical feasibility as well as site suitability. The following alternatives were selected for further consideration:

- Alternative 1: Complete site-wide source (soil) removal
- Alternative 2: Selective Source Removal with application of Engineered Barriers
- Alternative 3: Alternative 2 and vapor mitigation / soil vapor extraction

Alternative 3 was the selected remediation option. The selected alternative consists of the following:

- Remove approximately 412 tons of soils to depths of 2 to 4 feet, including in the Northern Mechanical Room. Dispose of soils appropriately, including as hazardous waste.
- Backfill the excavations with granular materials, cover with vapor barriers, and restore concrete.
- Implement a column sealing program.
- Operate the 11 blowers that have been installed, including the additional vapor depressurization piping runs under units 1044, 1045, and 1050 and under the laundry room, electrical room, and storage room, and alterations to the mechanical room sump to keep the new excavation dry.
- Perform 3 rounds of vapor system commissioning.
- Perform 3 rounds of groundwater monitoring.
- Install telemetry and backup power for the SSDS.

Chemical oxidation of residual TCE contamination is being evaluated for technical and economic feasibility during excavation activities. Engineered barriers that exist at this site to minimize direct contact and infiltration of water include:

- The existing building (125,700 square feet);
- Asphalt parking and driveways (31,600 square feet);
- Concrete sidewalks, terraces, and patios (10,700 square feet);
- Soils covered with 1.5 feet of clean fill and 0.5 feet of topsoil and vegetation in landscaped and grassy areas (16,700 square feet).

Vapor intrusion risks will be managed through sub-slab depressurization, replacement of damaged vapor barriers, and column sealing. Eleven vapor extraction points for sub-slab depressurization are implemented covering the entire built footprint of the East Block comprising of a vapor barrier, horizontal depressurization pipes beneath the slab, and eleven blower fans. Additional sub-slab vapor probes in conjunction with indoor air and sub-slab vapor testing will be performed to monitor the effectiveness of the systems.

The proposed Alternative will not only meet but exceed the performance metrics for a SSDS. In addition, this alternative will ensure that the air quality within the living space is protective of public health and the environment. We estimate the proposed remediation program will cost approximately $1.4 million.

SECTION I. BACKGROUND INFORMATION

1.1 Introduction

On behalf of Community Within the Corridor Limited Partnership (CWC), K. Singh & Associates, Inc. (KSingh) was retained to prepare a Remedial Action Options Report (RAOR) for the property located at 2748 N. 32nd Street, City of Milwaukee, Milwaukee County, Wisconsin.

This report evaluates a range of technically feasible options for the remediation of the environment to comply with state and federal laws to the extent practicable. The preferred remedial action considers the site and contaminant characteristics, surrounding environment, cleanup goals, and both technical and economic feasibility. The RAOR Report has been developed in accordance with Wisconsin Department of Natural Resources (WDNR) Administrative Code NR 722, Standards for Selecting Remedial Actions.

1.2 Site Description and Location

The subject property, owned by CWC (BRRTS # 02-41-263675), is located at 2748 N. 32nd Street, Milwaukee County, Wisconsin (1). The parcel total is approximately 4.16 acres and zoned as IM – Industrial Mixed (2). The subject property is covered by one- to three-story buildings. Historically, the East Block of the facility served various industrial purposes for over 100 years (since 1906). The East Block building complex was recently vacant and is currently completing construction for redevelopment which started in February 2021, which is described in more detail below. The property is in the Southwest ¼, of the Northeast ¼, of Section 13, Township 7 North, Range 22 East, and the elevation of the site ranges between 686 to 673 feet Mean Sea Level (MSL). The overall topography of the site area slopes gradually to the west-southwest. A topographic map of the project location is shown on Figure 1. A site aerial view with utility locations is shown on Figure 2. A Floor plan with residential and utility units, vapor pin locations, and sump locations are shown on Figure 3.

The property has the following Wisconsin Transverse Mercator (WTM) Coordinates (approximate center of subject site):

WTMX 686,613
WTMY 290,511
2748 N. 32nd Street
Parcel Number: 3091206000

1.3 Proposed Project Plans

CWC proposed to redevelop the property into a mix of affordable housing, commercial spaces, and other amenities. The proposed development made to date includes the following: The Corridor Lofts (64 Units), Creme City Lofts (36 Units) & 30 Square Townhomes (6 Units) and the Briggs Apartment Homes (91 Units) and a Community Service Facility which will include early childhood education, Science, Technology, Engineering, Art & Math after school programming, a health club (Basketball, Volleyball & Futsal, Skatepark), laundromat and a petite grocery store which are primarily on the West Block of the site. The property has been rezoned Industrial Mix to facilitate development of the project.

1.4 Property Owner and Responsible Party Information

Property contact information is as follows:

Community within the Corridor Limited Partnership, LLC
Attn: Mr. Shane LaFave
110 Cheshire Lane, Suite 120
Minnetonka, MN 55305
Office: (763) 285-8795
Cell Phone: (763) 300-1861
shane@roerscompanies.com

1.5 Consultant Information

The Project Manager and Principal Engineer for the site investigation is:

Pratap N. Singh, Ph.D., PE
K. Singh & Associates, Inc.
3636 North 124th Street, Wauwatosa, WI 53222
(262) 821-1171 ext. 105
psingh@ksinghengineering.com

1.6 Regulatory Status of Site

The Site is regulated under the NR 700 Wisconsin Administrative Code (WAC) for the investigation and remediation of environmental contamination. KSingh reviewed information on the WDNRs BRRTS website (1) regarding a listing of case files for the subject site, of which there were four that pertain to Facility Identification (FID) No. 241025400.

03-41-000793 Jonas Construction – Closed Leaking Underground Storage Tank (LUST)
This case was opened on June 8, 1990, and was closed on February 14, 2007, with continuing obligations. This case pertains to petroleum and chlorinated solvent contamination associated with LUST. There were seven Underground Storage Tanks (USTs) in the northern courtyard that were removed with one being closed-in-place.

02-41-263675 Community Within the Corridor – East Block (Formerly Wisconsin Industries Pension & Trust) - Open Environmental Repair Program (ERP)
This case was opened on January 11, 2001, and was closed on August 26, 2008, with continuing obligations; however, was reopened on April 6, 2021, due to CWC redevelopment of the East Block.

04-41-550446 Wisconsin Industries Pension & Trust– Closed SPILL
This case was opened on January 29, 2002, due to vandalism (copper piping removed) which released approximately 2,134-gallons of mineral oil. This spill activity case was closed on January 16, 2003. This area is located in a transformer courtyard on the southeastern portion of the subject site.

02-41-304988 Briggs & Stratton (Former) – Closed ERP

This case was opened on January 29, 2002 when a mineral oils spill occurred due to vandalism, as noted previously. Approximately 362 tons of Diesel Range Organics (DRO) impacted soil was excavated and disposed of as non-hazardous waste at a landfill. Verification soil sampling was performed and met state standards then the excavation was backfilled. This case was closed on January 16, 2003.

The property was previously investigated and granted Case Closure with continuing obligations as an industrial property under BRRTS # 02-41-263675. KSingh was retained to perform environmental consulting services for the redevelopment of the property. Following a Phase I Environmental Site Assessment (3), a Phase II Environmental Site Assessment (4), and Sub-Slab Vapor Sampling (5), a Post-Closure Modification Request was submitted to the WDNR on July 8, 2020 (6). Following submission of the Post-Closure Modification Request, KSingh performed a Sub-Slab Vapor Investigation of the building (7). Based on the Sub-Slab Vapor Investigation, it was determined that a vapor mitigation system would be required for the facility in addition to construction and maintenance of engineered barriers.

Twenty-three (23) soil borings, thirty (30) hand augers, six (6) groundwater monitoring wells, and forty-nine (49) sub-slab vapor probe were installed on site between May 2020 and April 2023. A Remedial Action Design Report was submitted to WDNR on March 2021 and was not approved (8, 9). A revised Remedial Action Design Report was submitted to the WDNR and was approved on June 8, 2021 (10).

The following remedial actions were performed.

- In August 2021, hot spot soil excavations were conducted in several areas of Building 1BW, Building 1B-SW, and Building 1B-S. The three hot spot areas had a total area of approximately 14,957 square feet. Approximately 1,765 tons of contaminated soils were removed from the hot spot areas. These areas were excavated to an approximate depth of 1 foot and were backfilled with granular material and topped with a vapor barrier consisting of 20-mil PERMINATOR EVOH. Utilities were also installed during the hot spot excavations. Areas containing utilities were excavated to an approximate depth of 4 feet.

- Confirmation soil samples were collected from the excavation areas. Residual CVOCs exceeding NR 720 Residual Contaminant Levels (RCLs) for protection of groundwater were detected in EB-HS-1, EB-HS-2, EB-HS-3, EB-HS-4, EB-HS-5, EB-HS-6, EB-HS-7, EB-HS-8, EB-HS-9, EB-HS-12, EB-HS-13, EB-LF, EB-HS-14, EB-HS-15, EB-HS-17, EB-HS-21, EB-HS-22, EB-HS-23, EB-HS-24. TCE was detected in eight soil samples at concentrations above its direct contact RCLs for non-industrial uses.

- Additional confirmation samples were collected for the parking structure access ramp during construction which detected concentrations of Mercury, Chrysene, and Trichloroethene (TCE) in exceedance of the NR 700 RCL for Groundwater Protection, as well as Benzo[a]pyrene in exceedance of the NR 720 RCL for Non-Industrial Use for Direct Contact Protection.

- One 10,000-gallon underground storage tank was discovered on the western portion of Building 1A. During construction, the tank was uncovered to confirm dimensions as well as to assess the tanks' condition. On November 19, 2021, the tank was closed by removal as part of site remediation activities. Soil samples were collected to assess the tank system. Exceedances of 1,2-

Dichloroethane, cis-1,2-Dichloroethane, and TCE were discovered in exceedance of the NR 700 RCL for Groundwater Protection in the southern bottom sample. There were no other exceedances of NR 700 RCLs associated with the UST.

- A total of 4,097.58 tons of soil were excavated and disposed of at Orchard Ridge Recycling and Disposal Facility. Approximately 1,764.93 tons originated from hotspot excavation areas, while the remainder originated from miscellaneous excavations across the East Block.

- During the four rounds of groundwater monitoring, purge water was drummed onsite and discharged into the sanitary sewer under Notice of Intent. Approximately 150 gallons of groundwater was discharged to the sanitary sewer under the Notice of Intent during remediation activities.

- Five sub-slab vapor probes were installed and sampled to assess vapor concentrations under the building. Several VOCs including Trichloroethene (TCE) were detected in concentrations above the Residential, Small Commercial, and/or Large Industrial/Commercial VRSLs across the subject site.

- A Remedial Action Plan (RAP) was prepared by KSingh and approved by WDNR. The RAP contained a plan for the SSDS and hot spot removal.

- During the excavation of CVOCs contaminated soils and the replacement of underground utilities for CWC – East Block, a vapor barrier and SSDS was installed in accordance with the approved remedial action plan during Summer and Fall of 2021. Periodic inspection performed by KSingh verified that the vapor barrier was installed in accordance with manufacturer recommendations.

- Pilot testing, which took place during Winter 2022/2023, consisted of the installation of a blower in the northern and southern vapor extraction points. A K09-MS 10-horsepower blower was installed for pilot testing by Fliteway for pilot testing. During the test, approximately 43 sub-slab vapor pins were installed and vacuum measurements were taken, which confirmed that the system was creating a vacuum of at least 0.004 inches of water below the building slab. Several measurements were also made from the blower to ensure that mass reduction was taking place, including photoionization detector readings, and exhaust air sampling.

1.7 Geologic and Hydrogeologic Characteristics

Geologic and hydrogeologic characteristics of the site were identified in KSingh's Phase II Environmental Site Assessment dated May 24, 2020 (4) and the subsequent Site Investigation Report dated November 2, 2021 (11).

The site stratigraphy generally consists of approximately 4 feet of fill material. The fill material is underlain by brown clay, with gravel and sand ranging in thickness from 2 to 6 feet to depths of 10 feet below ground surface (bgs). The brown clay is underlain by gray, silty clay with some gravel and little sand ranging in thickness from 7 to 11 feet to a depth of approximately 21 feet bgs. The gray, silty clay is underlain by interbedded silty sand and silty clay with gravel and cobbles to approximately 27 feet bgs. Weathered, dolomitic bedrock was encountered at approximately 32 feet bgs. Groundwater flow at the site is to the south / southeast.

1.8 Summary of Nature and Extent of Contamination

Based on the data from the Interim RADR submitted in April 2023 and June 2023 supported by past results, the soil, groundwater, and vapor quality results and the extent of contamination is discussed below (12).

1.8.1 Soil Quality

Soil contamination is present at the site consisting of CVOCs, PVOCs, Polycyclic Aromatic Hydrocarbons (PAHs), and Resource Conservation and Recovery Act (RCRA) Metals (arsenic, lead and selenium). CVOCs hot spot removals are ongoing at the site to reduce the mass of CVOCs within the buildings footprint as planned. The additional Polyfluoroalkyl Substances (PFAS) soil testing revealed that there are no concerns with respect to PFAS. The majority of the CVOC impacts were defined to within the footprint of the buildings to an approximate depth of 10-feet with the exception of one location within Building B1-S that will need further delineation.

Soil borings were conducted in the SW Garage area of Building 1B-NW in July 2023. Based on the test results of the 11 soil borings conducted at the depth of 3 – 4 feet, the highest concentration of TCE was reported to be 12 mg/kg from Stairwell 4 which was higher than the NR 720 RCLs - Industrial Use for Direct Contact Protection level of 8.41 mg/kg. This area has also shown lower levels of vacuum in the past mainly due to presence of foundation footings in the near proximity. The rest of the areas have shown lower levels of TCE. All the soil boring locations with their corresponding TCE concentrations are shown on Figures 4A to 4C.

In response to WDNR's review of the previously submitted RAOR, 16 additional soil borings were conducted in and around the areas of historically high residual contamination. The results of the soil borings were shared with WDNR in the Soil Boring Report submitted on October 24, 2023. Results from the soil borings suggest a relatively lower concentration of TCE in soil near the surface, with increasing concentrations with depth. This is observed more likely due to the impact of the existing VMS being present at the depth of 0.5 – 1.5 feet below ground surface. The soil up to 4 feet is planned to be removed from these areas as part of the remedial action.

Based on the initial TCE test results for the soil samples, Toxicity Characteristic Leaching Protocol (TCLP) testing was conducted to determine the Hazardous characteristics of the soil. Based on this investigation, out of the 412 tons of soil proposed to be removed, approximately 172 tons are determined to be characteristic hazardous waste for TCE belonging to the Stairwell 4, North Hall outside Unit 1051, Storage Room, Electrical Room, Laundry Room, the Hallway outside these units, and the South Hall outside Unit 1050. The rationale for volume of soil excavation is detailed in Table 1. The findings of the additional testing were submitted to the WDNR in a Memorandum dated October 24, 2023 (13).

The entire footprint of the East Block, encompassing Buildings 1, 2, and 3 along with the parking areas and the loading dock, has an area of 180,189 sq. ft. All the soil sampling data from previous reports was collated to calculate mean and median TCE concentration in soil. The mean TCE concentration was 55.83 mg/Kg while the median value was 1.1 mg/Kg (Appendix H). Since the data did not have a normal distribution, the median value was considered for calculation purposes in place of the mean. Assuming the extent of contamination is 10 feet bgs, with a median TCE concentration of 1.1 mg/Kg, the total TCE on site amounts to approximately 258 lbs. The proposed excavation work is expected to remove more than 96 lbs. of TCE from the proposed area of excavation, thus eliminating more than 37% of TCE from the site just by soil excavation in just over 1% of the total footprint.

1.8.2 Groundwater Quality

Groundwater sampling was conducted for four groundwater monitoring wells on June 30, 2021 (MW-2, MW-5) July 29, 2021, (MW-4) and August 25, 2021 (MW-6). Groundwater sampling was conducted for four (4) of the six (6) monitoring wells on November 12, 2021 (MW-5 and MW-6), November 29, 2021 (MW-3) and December 14, 2021 (MW-4R). Groundwater sampling was conducted for four (3) of the six (6) monitoring wells on March 10, 2022 (MW-4R, MW-5 and MW-6) and March 30, 2022 (MW-2 and MW4R).

Prior to groundwater sampling, depth to water was measured from the top of the Polyvinyl Chloride (PVC) casing in each groundwater monitoring well using a water level indicator. Groundwater flow direction appears to be to the southwest for the East Block. The depth to groundwater across the site ranges from approximately 8 to 24 feet.

NR 140 PAL and NR 140 ES exceedances were limited to EB-B-18/MW-2, and EB-MW-3 which had TCE and cis-1,2-dichloroethen ES exceedances. There were no VOCs exceeding the PALs/ES for groundwater sampled from EB-B-20/MW-4 (and SVOCs), EB-B-21/MW-5 (and PAHs) and EB-B-27/MW-6. In addition, there were no SVOCs and PAHs exceeding the PALs/ES for groundwater sampled from MW-4 and MW-5, respectively. From the newer wells installed and sampled during the site investigation there were no CVOCs nor PVOCs detected on the southern half of the site suggesting that there has not been an expansion of the known contaminated groundwater from the northern courtyard southward. In addition, it appears that CVOCs in soil have not impacted groundwater on the southern portion of the site. Groundwater contamination has not migrated off-site and has been delineated.

Groundwater sampling was conducted for four (4) of the seven (7) monitoring wells on August 4, 2022 (MW-2, MW-4RR, MW-5 and MW-6). MW-1 has been dry since its installation back on May 5, 2021; MW-3, and MW-3R were also dry during this sampling event. There were detections of VOCs in EB-MW-2 that were above both the NR 140 PAL and ES concentrations. The CVOC groundwater impacts remain confined to the northern one-third of the subject property whereas the southern two-thirds of the subject property have been free of CVOC which is consistent with the SIR groundwater data. CVOCs are related to BRRTS file # 02-41-263675 (Formerly Wisconsin Industries Pension & Trust).

1.8.3 Vapor Quality

In December 2022, KSingh conducted a Pilot-Scale Test to evaluate if the SSDS was functioning as intended. The Pilot-Scale Test indicated that the SSDS was functioning properly. Given these results, KSingh submitted a Commissioning Plan for the SSDS to WDNR. In March 2023, KSingh conducted the first round of commissioning and TCE exceedances were detected in areas of the 1st floor of the East Block that exceeded residential VALs. Out of 81 samples collected, there were 19 VAL exceedances found in the building: 15 exceedances on the first floor, 3 exceedances on the second floor, and 1 exceedance located on the third floor. These results were reported to WDNR on March 23, 2023, and CWC notified tenants of this issue on March 24, 2023.

On March 25, 2023, the City of Milwaukee issued an evacuation order for all tenants at CWC – East Block. WDNR issued an Emergency Order to CWC on March 31, 2023. As a part of the Emergency Order, starting in April 2023, KSingh conducted discrete and continuous air sampling using a portable Gas Chromatograph (GC) and submitted daily and weekly activity reports with test results to WDNR. As this was taking place, KSingh and CWC worked to identify how TCE was entering the building in the areas of concern, and KSingh prepared a response to the Emergency Order in the form of an Emergency Corrective Action Plan (ECAP) submitted on April 19, 2023 (14). As a part of this plan, KSingh also submitted an Interim Remedial Action Documentation Report to WDNR (12).

On May 8, 2023, WDNR provided feedback and guidance on the ECAP and based on this, CWC implemented the corrective action outlined in the ECAP. This involved removing water from the underground piping, adding more fans/blowers to the SSDS to help depressurize the system, and sealing of cracks and open areas to ensure vapors did not enter the building. In the month of May, considerable work took place to modify the SSDS so that it was functioning as intended. This plan and progress were documented in weekly reports submitted to WDNR.

On June 7, 2023, WDNR held a meeting with CWC, KSingh, and the City of Milwaukee to present their feedback on the Interim Remedial Action Documentation Report that was submitted in April 2023, as well as the weekly reports. WDNR indicated their opinion that the ECAP activities were not going to be sufficient, and therefore additional work was required. WDNR required that CWC evaluate additional options for remediation and suggested that CWC remove more sources, i.e., conduct more excavation and remove more soil in an effort to remove TCE from under the building (15).

Many of the ECAP activities were completed in the first week of June 2023, and with these activities, the SSDS was highly functional and had nearly met all the requirements. The two primary goals of acceptable indoor air quality standards and effective depressurization had shown dramatic improvements based on the corrective actions implemented in June 2023. Depressurization data is summarized to date in Appendix D. By mid-July 2023, TCE levels in indoor air had decreased throughout the entire building to safe levels with the exception of an isolated mechanical room and Stairwell 4. Gas chromatograph indoor air data is summarized to date in Appendix E. KSingh continued to collect data while preparing a Remedial Actions Options Report (RAOR) as required by WDNR. The improvements to indoor air TCE concentrations, sub-slab TCE concentrations, and vacuum measurements are documented in Figures 1 to 12 of Appendix A. The layout of the vapor mitigation system is shown in Figures 3A and 3B of Appendix B. Table 1 of Appendix C documents TCE removal by the vapor mitigation / soil vapor extraction system.

On July 25, 2023, KSingh submitted the RAOR to WDNR. Given that WDNR recommended removing more source, the RAOR focused on excavating soil from specific areas within the building and adding more sub-slab depressurization fans. This plan involved removing an additional 412 tons of contaminated soil from 16 areas within the East Block based on feedback from WDNR. This approach would provide additional safeguards against TCE entering the building.

The quality of the sub-slab vapors, the depressurization of the sub-slab, and the indoor air quality have been documented by collecting more than 80,000 data points. From an engineering standpoint, the results to date indicate that the corrective action taken to date has been effective in complying with the performance metrics set forth by WDNR.

The vapor quality was assessed by sampling indoor air, sub-slab vapors through the vapor pins, and the SSDS Blower exhaust. All the data has been reported to WDNR through weekly reports between April and

October. All the samples were analyzed using the GC with regular calibrations. A summary of the data suggests:

- Indoor air is compliant with the TCE VAL with the exception of the isolated North Mechanical Room. Marginally elevated levels were obtained in the areas where the construction work was in progress but were restored to below VALs in September when construction activities were paused.
- Sub-slab vapor data was collected from the vapor pins and analyzed on a weekly basis in the months of June – August. Sub-slab vapor data is summarized in Appendix G. The results suggest a progressive decline in the TCE concentration and ultimately all the readings were observed to be below the VRSL by mid-August.
- Blower exhaust data collected since May shows that more than 2 lbs. of TCE beneath the slab has been eliminated through the continuously improving SSDS at a current rate of about 0.1 lb/week.

SECTION II. REMEDIAL ACTION OPTIONS

The cleanup goal for the site is to perform remediation: 1) sufficient to obtain approval of a Post-Closure Modification from the WDNR in a reasonable time, 2) ensure that the remediation approach is consistent with the development goals of the site, and 3) ensure that the air quality within the building is protective of public health and environment. The objectives are to eliminate exposure pathways using WDNR-approved remedial actions that are economical and achieve the goal of redevelopment. Our proposed remedial action plan consists of the following items:

2.1 Soil Remediation Approaches

Various remedial alternatives are available for the remediation of contaminated soil (16). These technologies may be classified as in-situ technologies and ex-situ technologies. In-situ treatment refers to treatment of soil in place. Ex-situ refers to treatment of contaminated soil at another location. The following is a non-exhaustive list of technologies that are currently available for remediation of contaminated soils.

Available Technologies for Remediation of Contaminated Soils	
In-Situ Technologies	**Ex-Situ Technologies**
Vapor Extraction	Soil Excavation and Disposal
Biodegradation	Soil Excavation and Aeration
Engineered Barriers	Soil Excavation and Incineration
Chemical Purging/Treatment	Soil Excavation and Chemical Treatment
Sequestration through Adsorption	Soil Excavation and Adsorption
	Soil Excavation and Photo-Thermal Treatment

The selection of technology for the remediation of contaminated soils is based on the extent of contamination, nature of contaminants, sub-surface nature of soil, effectiveness of selected technology for remediation of soils, time frame required for remediation, and cost of remediation.

2.1.1 In-Situ Technologies

2.1.1.1 Soil Vapor Extraction

Soil vapor extraction (SVE) is an in-situ treatment approach for the remediation of contaminated soil. This approach is further classified as 1) passive vapor extraction, and 2) active vapor extraction. Passive systems consist of vents which are open to the atmosphere. Active systems make use of vacuum or pressure pumps to accelerate the removal of TCE vapors from the soil. Pressure and vacuum can be used in tandem to increase the rate at which volatile hydrocarbons are removed from soils. The effectiveness of this approach depends on the type of sub-surface soil, level of contamination, and applied vacuum. The cost of installing vapor extraction wells is low since conventional drilling equipment is used for the installation.

Vapor extraction has proved to be an effective in-situ approach to prevent the migration of vapor-phase TCE in the living spaces. TCE has a relatively high Henry's Law value which makes it particularly volatile and favorable for SVE technologies. The network of SSDS piping and strategic location of blowers has allowed to create adequate vacuum across the East Block with about 0.1 lb. of TCE removal every week.

The U.S. Army Corp of Engineers (17) states that "SVE treatment rates are highly site-specific, varying greatly as a function of such factors as air permeability, contaminant concentrations, cleanup standards, and offgas treatment system characteristics. The number of pore volume exchanges necessary to complete a cleanup is likewise highly variable, but a typical number might be 5,000 pore volumes" and to "complete remediation in 1 to 2 years would necessitate about 10 pore volume exchanges per day." The current SSDS is removing approximately 4,490 cubic feet per minute or 6.46 million cubic feet per day. Given that the depth of contamination is approximately 10 feet, the floor area of the building is approximately 125,700 square feet, and the porosity of the soil is approximately 40%, we calculate that 13 pore volumes are being removed per day.

However, given the extent and magnitude of contamination, and nature of clayey soils, this alternative is unlikely to reach all the residual TCE in a short amount of time although the reduction in indoor air concentrations of TCE indicates that SVE is taking place. Further, no additional local, state or federal licenses, permits or approvals are required to adopt this alternative. WDNR has previously indicated that a SSDS is not acceptable as a sole option. Therefore, SVE via the SSDS is being considered as a supplementary option.

2.1.1.2 Biodegradation

Biodegradation is a viable alternative for in-situ and on-site remediation of contaminated soil. The organic contaminants in the soil are destroyed by soil bacteria. Chlorinated and non-chlorinated VOCs are amenable to remediation through oxidation and biodegradation. However, like oxidation, the effectiveness of the treatment is highly dependent on site-specific environmental conditions.

This treatment approach is cost effective for the remediation of contaminated soil and may only require long-term monitoring or institutional controls. However, bioremediation is not a viable option due to the low permeability clay soils at the site. This alternative as a sole method of remediation is not recommended due to the relatively high contaminant concentrations in clayey soil, but it may be used in conjunction with other methods once the high concentrations are addressed by another remedial technology. This alternative will not be considered and hence no additional local, state or federal licenses, permits or approvals are required.

2.1.1.3 Engineered Barriers

An engineered barrier limits direct contact exposure and/or controls migration of contaminants. These barriers may consist of buildings, pavement, soil covers, flexible vapor barriers, etc. Although engineered barriers do not actively remediate contamination, it offers a means of protecting human health and the environment from residual contamination.

As part of the condition of site closure, a cover will be necessary over the residual soil and groundwater impacts at the site. Additionally, the site will be required to be on the WDNR GIS Database for residual soil and groundwater contamination. A maintenance plan will be submitted with the closure request when pavement, an engineered cover or other type of cover is required to protect public health, safety, welfare, or the environment.

Given the relatively high concentrations of contaminants in the clayey soil, which is a continual, contributing source to negative indoor air quality, using this alternative as the sole remediation approach is not feasible.

However, it may be used in conjunction with other techniques once another remedial alternative has reduced the CVOC contaminant mass in soils. No additional local, state, or federal licenses, permits or approvals are required to adopt this alternative.

2.1.1.4 Chemical Treatment

Chemical treatment involves the introduction of chemicals, often in a liquid form, into the contaminated zone to either mobilize or break down the VOCs. The principle is to reduce the VOC's affinity to the soil particles or to transform it into a less toxic or non-toxic form. In clayey soils, where low permeability hinders the movement of water and air, chemical purging can be particularly disadvantageous. The injected chemicals can displace VOCs from soil pores, allowing for their easier extraction or degradation only if they can come in contact. There are various chemicals used for this purpose, including surfactants, which can increase the solubility of VOCs, making them easier to flush out. In some cases, oxidants, like hydrogen peroxide or potassium permanganate, are introduced to chemically react with and break down the VOCs.

However, while chemical purging presents a promising solution for treating VOCs in soils, it is crucial to consider factors like the specific VOCs present, the type and chemistry of the soil, and potential secondary environmental impacts and time it takes to restore the environment. This approach was eliminated from further consideration because of clayey nature of soil which will limit the effectiveness of injection and the contact potential of the chemical solution and uncertainty in achieving environmental restoration in a reasonable amount of time.

Further, soil mixing was presented as an option to be considered by the WDNR. Soil mixing equipment is particularly robust and is only rarely used inside of the building due to limited access and overhead room. In addition, soil mixing risks damaging the foundation system of the building and would create structural issues. Expansion of soils would also need to be managed and clay soils are difficult to compact. Therefore, logistically, technically, and practically soil mixing of chemical oxidants was determined to be non-feasible and eliminated from further consideration.

2.1.1.5 Sequestration through Adsorption

Biochar is a carbon-rich material derived from the pyrolysis of organic matter. Its porous nature, large surface area, and complex internal structure make it a strong adsorbent. This large surface area is conducive to adsorbing a wide range of organic compounds, including VOCs. When Biochar is introduced into VOC-contaminated clayey soils, it acts as a sponge, capturing and holding the VOCs and preventing their migration or volatilization. Over time, this can lead to a significant reduction in VOC concentrations within the treated zone. Moreover, biochar has an added advantage: it can be produced from waste biomass, making it a sustainable option. Biochar's ability to enhance soil quality, in terms of water retention and nutrient availability, provides dual benefits when used for remediation purposes.

It is vital, however, to ensure the appropriate design and monitoring of these interventions. While sequestration is effective in the short to medium term, long-term strategies might require combined methods to ensure the complete breakdown or removal of VOCs from the environment. Although biochar has proven to be an effective remediation media in other state governed projects throughout the US, we will not be proceeding with this recommendation based on the concerns raised by the WDNR.

2.1.2 Ex-Situ Technologies

2.1.2.1 Excavation and Disposal

Contaminated soil may be excavated and transported to an approved disposal facility utilizing conventional construction equipment. Soil excavation would result in the removal of the contaminated soil / fill from the site. Excavation also further reduces the potential for migration of contamination from soil to groundwater, improving the effectiveness of any additional groundwater remediation techniques and overall groundwater quality. Further, soil excavation will reduce contaminant partitioning from soil to vapor/indoor air.

A site-wide excavation would comprise of demolition of the existing building structure and hauling of over 117,000 tons of soil leading to over $9.6M in just hauling and tipping fee charges. Although this site-wide excavation of soil would lead to the removal of approximately 258 lbs. of TCE from the site, this alternative by itself will not be economically feasible and would lead to the destruction of a historic landmark. Limited excavation and off-site disposal are a viable alternative for the remediation of this site based on the depth and volume of contaminated soil.

2.1.2.2 Excavation and Aeration

One approach for remediation of contaminated soil is excavation and aeration. The advantage of this approach over excavation and disposal is that this treatment approach may be cost effective since landfill costs are not involved. Maximum aeration is possible only when the contaminated soil is spread as a thin layer over a large area. Moreover, emissions from aerated soil may be objectionable to the surrounding community.

This treatment approach is viable only in project sites with a large area to spread the contaminated soil, and it should be located away from residential areas. In addition to this, this approach can be used where there is a potential for reuse of the excavated soil. This project site does not satisfy any of these three criteria and is not an acceptable approach for managing the contaminated soil, and hence does not have any permitting requirements.

2.1.2.3 Excavation and Incineration

An alternate treatment approach for remediation of contaminated soil is excavation and thermal treatment of soil. The thermal treatment of the soil may be off-site or on-site. On-site thermal treatment technology consists of the use of either thermal or catalytic incinerator. Both incineration techniques are efficient for removal of contaminants, and they are suited for remediation of large quantities of contaminated soil.

On-site thermal treatment is not feasible because of space constraints. Off-site treatment of contaminated soil is achieved at a dedicated thermal treatment facility which is not present in the area currently. Additionally, the cost of thermal treatment is $300/ton based on previous projects. There will be additional costs for excavation, hauling, and compaction thus making it an unfeasible option.

2.1.2.4 Soil Excavation and Chemical Treatment

Excavation is the primary step in this approach. VOC-contaminated clayey soils are dug up and transferred to a designated treatment area. The process of excavation ensures that the contaminant source is physically removed, addressing immediate risks associated with VOC volatilization and leaching.

Once excavated, chemical treatment plays a pivotal role in decontaminating the soil. The goal is to neutralize, transform, or remove VOCs from the excavated soil matrix. Common chemicals employed include oxidizing agents like hydrogen peroxide or potassium permanganate. Surfactants may also be used to increase the solubility of VOCs, aiding in their subsequent removal from the soil.

The combination of soil excavation and chemical treatment provides a comprehensive solution to VOC contamination in clayey soils. While excavation addresses immediate concerns by isolating the contamination, chemical treatment ensures the long-term safety of the soil by eliminating or reducing VOC levels. Despite its effectiveness, this approach comes with challenges like the need for proper disposal of any residual waste, potential secondary contaminants from chemical reactions, and the logistics and costs associated with large-scale excavation projects, thus making it an unfeasible option. This option was removed from further consideration because of site constraints and its location in a residential area.

2.1.2.5 Soil Excavation and Photo-Thermal Treatment

Following excavation, the contaminated clayey soil can be transported to a treatment facility or designated area. Here, the soil undergoes a two-step treatment procedure: thermal treatment using heaters and ultraviolet (UV) light exposure.

Thermal treatment is the primary step. Heaters are employed to elevate the soil temperature, which serves a dual purpose. Firstly, the heat volatilizes the VOCs, allowing for their separation from the soil matrix. As VOCs transition into the gas phase, they become easier to capture and treat. Secondly, the elevated temperature can, in some instances, directly break down certain VOCs or make them more amenable to subsequent treatments. Following the thermal process, the soil can be exposed to ultraviolet (UV) light. UV radiation has been proven to be effective in degrading a variety of organic compounds. When VOCs, either still adsorbed to the soil or volatilized by the preceding heat, interact with UV light, photochemical reactions occur. These reactions often lead to the breakdown of VOCs into simpler, non-toxic compounds, such as water and carbon dioxide.

While the combination of soil excavation and photo-thermal treatment offers an effective solution for VOC-contaminated clayey soils, it is essential to consider the energy inputs, particularly for large-scale operations, and to ensure proper handling of any by-products or off-gases produced. Additionally, since this is an unexplored alternative with reference to this project, there are likely to be permitting issues in addition to the site constraints, making this an unacceptable option.

2.1.2.6 Soil Excavation and Adsorption

When addressing VOC contamination in clayey soils, the integration of excavation and adsorption treatments offers a comprehensive solution. By combining soil excavation with adsorption using biochar within a confined environment, practitioners can efficiently target and treat VOCs, ensuring a cleaner and safer end product.

The initial phase involves soil excavation. Contaminated clayey soils can be dug up and transported to a specialized treatment facility or an appropriately designed containment area. Excavation provides an immediate response by isolating the contaminated material, eliminating direct risks of VOC migration to groundwater or its volatilization to the atmosphere. After excavation, the treatment pivots to the adsorption process. Here, the excavated soil is mixed or passed through beds of biochar.

Executing these processes in a confined space holds significant advantages. It ensures that any volatilized VOCs are contained and don't escape into the atmosphere without a proper channel. Moreover, confinement enables better control over environmental conditions, enhancing the effectiveness of the adsorption process. In conclusion, the amalgamation of soil excavation with biochar adsorption in a controlled environment provides a robust strategy for dealing with VOC-contaminated clayey soils. However, since this will require a big area and WDNR has expressed its concerns with the use of this technology, this option will not be implemented.

2.2 Groundwater Remediation Approaches

Groundwater remediation approaches typically are 1) groundwater extraction and treatment or disposal, 2) air sparging, 3) groundwater containment, 4) in-situ chemical injection, and 5) monitored natural attenuation.

2.2.1 Groundwater Extraction and Treatment or Disposal

Groundwater extraction is used to control the movement of contaminated groundwater, preventing the continued expansion of the plume. The groundwater extracted is then treated to reduce the contaminant level and the treated water is then disposed of off-site.

Groundwater extraction and treatment is considered as a technology for removing large quantities of highly contaminated groundwater under a variety of hydrogeologic conditions. Groundwater extraction is not feasible because of low permeability of clayey soils. Based on the soil types at the site and their low hydraulic conductivity, this option was eliminated from further consideration.

2.2.2 Air Sparging

Air sparging is an in-situ approach for treating contaminated groundwater by injecting air into the groundwater and removing groundwater contamination via Henry's Law (transfer the contaminant mass from the ground water into the air vapor) and enhanced natural attenuation. Air sparging is not effective in 1) stiff to very stiff silty clays which are at the site, and 2) will pose significant challenges in residential environment because of migration of vapors. This approach was eliminated from further consideration.

2.2.3 Groundwater Containment

Physical barriers are used to prevent the flow of groundwater at the site. A slurry wall or other containment option, such as grout curtains, sheet pilings, or liners, would be necessary if the groundwater plume needed to be contained. A barrier that completely encircles a contaminated area will provide better containment than a straight barrier, because groundwater can flow around the ends. However, groundwater contamination is localized in perched water. Therefore, containment option was eliminated from further consideration because of excessive cost.

2.2.4 In-Situ Chemical Injection

Enhanced Reductive Dechlorination (ERD) consists of the injection of a carbon source into contaminated groundwater to enhance a reducing environment that stimulates the reductive dechlorination of contaminants into innocuous end products. Molasses, whey, edible oil substrate, and several other proprietary reagents are available; these are all sources of carbon intended to encourage microbial growth and associated biodegradation of the CVOCs. A series of injection wells (either temporary or permanent wells) are installed within the desired area of treatment within the dissolved phase CVOC plume, and above-grade equipment is used to inject the carbon source. Based on the stiff to very stiff silty clays, this option was eliminated from further consideration.

2.2.5 Monitored Natural Attenuation

Monitored natural attenuations describes a range of physical and biological processes, which, unaided by deliberate intervention, reduce the concentration, toxicity, or mobility of chemical or radioactive contaminants. Biodegradation, which relies upon microorganisms to convert contaminants to less harmful compounds, is the primary natural attenuation mechanism for reducing the mass and concentration of petroleum contaminants. Many of the environmentally significant components of petroleum hydrocarbons such as BTEX (benzene, toluene, ethyl benzene, and xylenes) and some PAHs (polynuclear aromatic hydrocarbons) can be biodegraded under the proper environmental conditions.

Long-term monitoring is necessary to demonstrate that contaminant concentrations continue to decrease at a rate sufficient to ensure that they do not become a health threat or violate regulatory standards. Monitoring should be designed to verify that potentially toxic transformation products are not created at levels that are a threat to human health, that the plume is not expanding, and that there are not changes in the hydrological, geochemical, or microbiological parameters that could reduce the effectiveness of natural attenuation.

The EPA considers monitored natural attenuation an appropriate remediation method only if it meets two conditions:

- Its use will be protective of human health and the environment.
- It is capable of achieving site-specific remediation objectives within a reasonable time frame.

Reliance on natural attenuation with active soil remediation is a viable option for this site. The constituents of concern are degradable and the concentration and toxicity of the contaminants, if the source is removed, may be low enough to attenuate naturally. To achieve site cleanup goals within a reasonable time frame, source control actions (such as excavation) should be utilized in conjunction with natural attenuation.

2.3 Vapor Remediation Approaches

Vapor mitigation measures are required at buildings where sub-slab vapor concentrations exceed screening levels. Source control (i.e., remedial or interim actions involving soil or groundwater treatment, excavation or a combination of these) is the preferred approach to eliminate the vapor intrusion pathway. Several options exist for interrupting the vapor pathway for the protection of human health. Vapor mitigation technologies for buildings include the following:

- sealing potential vapor entry points
- sub-slab depressurization
- soil vapor extraction

2.3.1 Passive System

Passive vapor mitigation systems depressurize the sub-slab utilizing the warming effect of the building and wind velocity at the vent location to move air from the sub-slab area to the atmosphere. Several penetrations are made to the sub-slab area utilizing 3-inch to 4-inch diameter PVC pipes and the pipes are vented to the outside. The movement of air lowers the pressure of sub-slab area and combined with an underlying vapor barrier creates air flow from the building into the sub-slab preventing vapors from migrating into the building.

The movement of air may increase heating costs for the building, but otherwise there are no expenses beyond installation. A passive system may be limited to a zone of effectiveness and may need to be supplemented with fans. The zone of influence will depend on the properties of the sub slab soils primarily. Additional sub-slab and indoor air testing and measurement of relative sub-slab vapor pressure should be performed to determine the effectiveness of the system. The passive system is not a technically feasible option for the site because of elevated levels of TCEs and the clayey nature of soils. Nor is a passive system a system that can be approved by WDNR based on the guidelines of WDNR Publication RR-800.

2.3.2 Active System

As the area of effectiveness of a passive vapor mitigation system may be limited, the addition of fans to a system can increase both the depressurization and the area of influence. Electric powered fan systems that are similar to radon mitigation systems have been added to the system. There are additional expenses with active systems, primarily electrical, and they require periodic maintenance. Typically, one fan for every 4,000 sq. feet of building has proven to be effective, although that is dependent on underlying sub-slab soil conditions as well. Additional sub-slab and indoor air testing and measurement of relative sub-slab vapor pressure has been performed and proved the effectiveness of the system with additional or more powerful fans added as necessary with time. Currently, the entire SSDS is supported by 11 blower fans with a throughput volume of over 4400 cubic feet per minute (cfm). An active SSDS is not sufficient to totally remove high concentrations of TCE soil contamination to depth and will be supplemented by additional remediation.

2.3.3 Soil Vapor Extraction

SVE is an in-situ remediation technique specifically designed to address VOC contamination within the vadose zone (unsaturated portion) of the soil profile. Given the volatile nature of VOCs, this method capitalizes on their ability to transition from a liquid or solid phase in the soil into the gaseous phase via Henry's Law, facilitating their extraction. TCE, in particular, is particularly volatile based on its Henry's Law constant.

One of the primary advantages of SVE is its non-invasive nature. There's minimal disturbance to the site, which is especially beneficial in urban or industrially active areas where excavation or other disruptive techniques might be impractical. However, the presence of clay soils and the significant concentrations of TCE, in addition to regulatory concerns, does not allow for its sole use at this site. In conclusion, SVE by itself is not an approved method for addressing VOC contamination in clayey soils at this property and has to be supplemented by other alternatives.

2.4 Sustainable Remedial Action – NR 722.09

"The U.S. Environmental Protection Agency (EPA) defines Green Remediation as the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprint of cleanup actions."

Green Remediation focuses on maximizing the net environmental benefit of cleanup, while preserving the effectiveness of the selected remedy, for the protection of human health and the environment. The following six core elements of green remediation have been established by the US EPA (18):

- Minimize total energy use and maximum use of renewable energy
- Minimize air pollutants and greenhouse gas emissions
- Minimize water use and impacts to water resources
- Optimize future land use and enhance ecosystem
- Reduce, reuse, and recycle materials and waste
- Optimize sustainable management practices during stewardship

In general, these green remediation core elements have been established to reduce the demand placed on the environment during cleanup actions and evaluate the net environmental impact of remediation. Sustainable development meets the needs of the present without compromising the needs of future generations. Green remediation objectives include:

- Achieve remedial action goals
- Support use and reuse of remediated parcels
- Increase operational efficiencies
- Reduce total pollutant and waste burdens on the environment
- Minimize degradation and enhance ecology of the site and other affected areas
- Reduce air emissions and greenhouse gas production
- Minimize impacts to water quality and water cycles
- Conserve natural resources
- Achieve greater long-term financial return from investments
- Increase sustainability of site cleanups

An analysis of remedial alternatives with respect to the six core green remediation objectives is provided in Table 2.

2.5 Comparative Analysis of Remedial Action Alternatives

Potential cleanup alternatives for the site were evaluated based on effectiveness, implementability and cost. The groundwater exposure pathway does not represent a significant concern since the area is serviced by municipal water. While monitored natural attenuation (MNA) is not a sole remedy for the site given soil and vapor considerations, it is a component of the Remedial Action Plan (RAP) for groundwater. Conducting MNA, along with GIS registry of the site, would be utilized to address the residual groundwater contamination present at the site. MNA ranks low in terms of overall cost. Capital costs are comparatively low for small groundwater plumes incorporating a small number of monitoring points. KSingh estimates a minimum of four rounds of quarterly monitoring, subsequent to contaminated source soil excavation, will be required to evaluate the contamination, demonstrate contaminant concentration decreases, plume stability, and to achieve levels where monitoring would no longer be necessary. A semi-annual and annual report would be compiled with the sampling results. The groundwater sampling will be done in conjunction with the commissioning work and is outlined in the Proposed Schedule.

The three alternatives considered to address soil and vapor contamination at the site are as follows:

2.5.1 Alternative 1 – Complete Source Removal

Soils at the site in areas greater than WDNR standards would be excavated to an average depth of 10 feet. Excavated soil would be disposed of off-site at a landfill as solid waste. The site would be backfilled to return to grade. The amount of soil anticipated for excavation and disposal for this alternative is approximately 117,000 tons. The existing buildings would have to be demolished in order to remove this volume of soil.

Technical Feasibility
Excavation and off-site disposal would be effective at complying with cleanup standards and eliminating risk for the site and would provide long-term solutions to the contaminated soils on the site. This alternative would also most effectively reduce the toxicity, mobility, and volume of impacted soils / groundwater on the site. This would require demolition of the existing buildings in order for soil at the site to be exposed for removal.

The areas in the residential building would then be constructed with a 20-mil thick vapor barrier, horizontal vapor depressurization piping installed in the sub-slab area below the vapor barrier, and blowers to facilitate exhaust of the contaminated vapors above the roof level. Following completion of reconstruction of the buildings, the sub-slab vapor would be sampled for vapors and depressurization measurements would be performed. If sub-slab vapors are detected above vapor risk levels, indoor air testing would be performed. The results of indoor air testing would determine if further ventilation needed to be installed to assist in the remediation efforts. The option of complete source removal is technically feasible; however, the building has been designated to be of historical significance, with demolition/alteration not an option.

Economic Feasibility
This is an economically infeasible option considering that $67 million has been invested in this redevelopment project, and the hauling and tipping costs for disposal alone would result in additional costs of $9.8 million.

Costs for excavation and disposal of contaminated materials are relatively high depending on the type of contamination and volume of material removed and disposed. Fees associated with hazardous and non-hazardous materials typically include excavation, hauling, backfilling and either bioremediation or landfilling. As TCLP results for TCE came back greater than 0.5 mg/L, it will add to the costs as there is no active Hazardous Waste Landfill in Wisconsin, and the waste will need to be hauled out of state. Economically, this effort will involve costs of demolition, and management non-hazardous and hazardous waste management in addition to the cost of site restoration and building reconstruction. This option would not be cost-effective given the existing capital investment, source removal, SSDS, backfilling the site to return to grade, and costs related to reconstruction of the buildings.

In addition, the building has been designated to be of historic significance. Demolition or significant alteration of the building is not an option for the site.

Conclusion
Due to the high cost and the historic nature of the site, this approach is not recommended and was eliminated from further consideration.

2.5.2 Alternative 2 – Selective Source Removal and Engineered Barriers

Soils contaminated with CVOCs, PCBs, PAHs, and metals greater than WDNR standards would be excavated to an average of 4 feet, so as not to undermine structural elements. The excavated soil would be disposed of off-site at a landfill as special waste. The site would be backfilled to return to grade. For this alternative, an estimated 16,100 sq. ft. of soil would be excavated. The summary of areas of excavation and estimated TCE removal is included in Table 1. Engineered barriers could include a vapor barrier in addition to a mitigative layer of biochar to retain the residual contamination and prevent further entry into the living spaces.

Technical Feasibility
This alternative provides a reduced amount of soil for excavation based on leaving the soil not impacted with TCE on site. While TCE was detected greater than the NR 720 RCL for groundwater protection, concentrations detected in the groundwater only exceeded the NR 140 ES in two monitoring wells. Additionally, engineered barriers would be effective in preventing both direct contact and infiltration in these areas. Further, source removal and engineered barrier installation alone will not be protective of public health and environment. In addition, WDNR raised concerns regarding the application of biochar as a treatment option and hence, this will be considered infeasible.

Economic Feasibility
Costs for excavating and disposal of contaminated materials are relatively high depending on the type of contamination and volume of material removed and disposed. Fees associated with hazardous and non-hazardous materials typically include excavation, hauling, backfilling and either bioremediation or landfilling. As the TCLP test results included samples with TCE greater than 0.5 mg/L, it will add to the costs as there is no active Hazardous Waste Landfill in Wisconsin, and the waste will need to be hauled out of state. Economically, this effort will require costs of demolition, construction waste management, solid and hazardous waste management in addition to the cost of the remedial action.

Costs for engineered barriers are a relatively inexpensive method of site remediation. In this case, the building is already existing, and no additional cost would be incurred. The cost of biochar is nominal as compared to other engineered barrier options. Overall, the soil excavation coupled with installation of engineered barriers will not be cost-effective with respect to the extent of removal of contamination.

Conclusion
Due to the high cost and technical infeasibility, this approach is not recommended at this site.

2.5.3 Alternative 3 – Selective Source Removal, Engineered Barriers, and Soil Vapor Mitigation

For this alternative, excavation would be conducted on a limited scale in the vicinity of the location of the highest accessible CVOC concentrations impacted soils. The results to date have shown significant improvement in Indoor Air Quality, Sub-Slab Vapor Quality, emissions rates that demonstrate the achievement of SVE removal rates, and the achievement of depressurization under the entire building except for the Northern Mechanical Room, Stairwell 4, and parts of the garage. Sub-slab vapor risk screening levels for TCE were exceeded in the laundry room (room 1048), Unit 1045, Unit 1050, Unit 1044, in the southern portion of the gym at vapor pin BB 1 and 2, and the vapor pin in the SW Garage 2. The proposed plan includes additional source removal to bring Sub-Slab Vapor Quality in compliance with VRSLs and to improve vacuum performance in areas of inadequate depressurization. Please refer to Figure 8 for locations of VAL and VRSL exceedances.

This report does not include Room 1052 (Mechanical Room), Room 1053 (Men's Locker Room), Room 1054 (Fitness Room), and Room 1055 (Women's Locker Room) as it has historically shown adequate sub-slab de-pressurization and indoor air quality to be compliant to VAL.

This alternative consists of the following:

- Remove approximately 412 tons of soils to depths of 2 to 4 feet, including in the Northern Mechanical Room. Dispose of soils appropriately, including soils determined to be hazardous waste.
- Backfill the excavations with granular materials, cover with vapor barriers, and restore concrete.
- Implement a column sealing program.
- Explore economic feasibility of chemical application for select areas with high levels of residual TCE contamination.
- Operate the 11 blowers that have been installed including with additional vapor depressurization piping runs under units 1044, 1045, and 1050 and under the laundry room, electrical room, and storage room, and alterations to the mechanical room sump to keep the new excavation dry.
- Perform 3 rounds of vapor system commissioning.
- Perform 3 rounds of groundwater monitoring.
- Install telemetry and backup power for the VMS systems.

The proposed excavation areas are depicted on Figures 5A – 5C and also summarized in Table 1.

The residential building is constructed with a 20-mil thick vapor barrier, horizontal vapor depressurization piping installed in the sub-slab area below the vapor barrier, and blower exhausts venting of the building. Following completion of construction, the sub-slab vapor probes would be sampled for vapors and depressurization measurements would be performed. If sub-slab vapors are detected above vapor risk levels, indoor air testing would be performed. The results of indoor air testing would determine if fans would need to be installed to add to the active sub-slab depressurization system.

Technical Feasibility
This alternative provides an appropriate amount of soil for excavation based on the Soil Boring Report submitted to WDNR on October 24, 2023. Additionally, engineered barriers would be effective in preventing both direct contact and infiltration in these areas. Approximately 172 tons out of the 412 tons of the proposed excavation is characteristically hazardous waste, therefore, the soil will need to be hauled to an out-of-State Subtitle C landfill for disposal. The SSDS will be designed to mitigate the residual vapor-phase TCE contamination from the soil.

Economic Feasibility
Costs for excavating and disposal of the proposed quantity of soils are relatively high based on the presence of hazardous waste soils. Fees associated with hazardous and non-hazardous materials typically include excavation, hauling, backfilling and either bioremediation or landfilling. Though these costs are high, the

approach of additional source removal in select areas in conjunction with the vapor mitigation system including a concrete barrier is economically feasible and likely to be protective of public health and the environment.

Preliminary cost estimates for this option are approximately $1.4 million, as shown in Table 3.

Conclusion
This alternative provides the most technically feasible amount of soil for excavation and off-site disposal and is the most cost-effective. This approach is recommended for this site.

2.5.4 Discussion of Alternatives

Alternative 1: Complete Source Removal
This alternative discusses a direct approach of source removal. The entire project site is declared as a historic site with an existing redevelopment. In order to perform complete source removal, it would require demolition of the newly constructed areas in addition to the historically existing ones. This is an economically infeasible option at this point considering that $67 million has been invested in this redevelopment project, and the hauling and tipping costs for disposal alone would result in additional costs of $9.8 million. This option was deleted from further consideration because of the excessive cost of remediation and the historic nature of the building.

Alternative 2: Selective Source Removal and Engineered Barriers
Although this alternative suggests selective removal of soil and mitigation of direct contact risk, it is unlikely to restore the site that would be protective of public health and environment in the absence of SSDS. Nor does it take into account the improved performance of the existing SSDS. Although this option is technically feasible, it has high costs involved due to the larger volume of excavation to be performed and soil to be disposed of.

Alternative 3: Selective Source Removal, Engineered Barriers, and Soil Vapor Mitigation
This alternative addresses the hot-spot areas and focusses on source removal at the locations where the residual concentration of TCE has been high. The proposed Alternative will not only meet but exceed the performance metrics for a vapor mitigation system. In addition, this alternative will ensure that the air quality within the living space is protective of public health and the environment.

SECTION III. SELECTED REMEDIAL ACTION

The cleanup goal for the site is to perform remediation: 1) sufficient to obtain a Case Closure letter from the WDNR in a reasonable time; 2) ensure that the remediation approach is consistent with the development goals of the site; and 3) ensure complete occupancy of the residential units. The objectives are to eliminate exposure pathways using WDNR-approved remedial actions that are economical and achieve the goal of redevelopment. It is anticipated the redevelopment plan will require excavation and backfilling of multiple areas in residential and utility units. The proposed excavation plan for the site is provided as Figures 5A – 5C. Our proposed RAP consists of the following elements:

3.1 Soil Remediation

3.1.1 Excavation and Disposal of Non-Hazardous CVOC Impacted Soils

Soil excavation would be conducted on a limited scale in the SW Garage of Building 1B-NW, Units 1049, 1056, 1048, 1050, 1045, and 1044, Gym area of Building 1C, North Mechanical Room of Building 2A - the locations with the highest accessible CVOC concentration. An estimated 412 tons would be excavated in an approximately 2,500 square feet area to a depth of 4 feet bgs, to address direct contact and vapor intrusion. Out of these 412 tons, approximately 172 tons are characteristic hazardous waste soil for TCE.

Non-hazardous contaminated soils, approximately 240 tons, will be trucked to Waste Management's Orchard Ridge Landfill in Menomonee Falls, Wisconsin for disposal. Costs to excavate, transport and dispose of the contaminated soil are estimated at $82/ton. Since there is no intention to reuse the soil, there is no requirement of a Soil Management Plan.

3.1.2 Excavation and Disposal of Hazardous CVOC Impacted Soils

The proposed excavation is expected to generate approximately 412 tons of soil. Out of these 412 tons, approximately 172 tons are characteristic hazardous waste soil for TCE. In order to safely and efficiently manage and transport soil contaminated with TCE to a Subtitle C regulated hazardous waste treatment, storage, and disposal facility, KSingh proposes to follow a standard operating procedure for Hazardous Waste Management. The following steps will be followed:

A. Identification and Assessment:

- KSingh has already conducted a comprehensive soil sampling and analysis to confirm TCE concentrations along with TCLP for TCE leaching from the excavated soils.
- Clearly demarcate contaminated zones using barriers or flags to prevent unauthorized access.

B. Safety Precautions:

- Equip personnel with personal protective equipment (PPE), including chemical-resistant gloves, protective eyewear, and respirators.
- Train personnel in handling hazardous materials, potential risks of TCE, and emergency response procedures.

C. Excavation and Packaging:

- Excavate the TCE-contaminated soil using heavy machinery, ensuring minimal aerosolization.

- Excavate as much as practical in hazardous waste TCE areas in order to maximize source removal without endangering the structural integrity of the building.
- Place the excavated soil in U.S. Department of Transportation (DOT) approved hazardous waste transport containers assuring that they will not leak liquids or materials during transport.

D. Transport:

- Engage a licensed hazardous waste transporter with experience in moving TCE-contaminated soils.
- Ensure all transport vehicles are labeled according to DOT regulations and accompanied by a manifest detailing the waste's origin, composition, and destination.

E. Disposal at Subtitle C Facility:

- Coordinate with the chosen Subtitle C facility to ensure they are equipped and prepared to handle and dispose of TCE-contaminated soil.
- Obtain and maintain records of the waste's receipt and disposal at the facility for future reference and compliance purposes.

F. Additional Source Reduction Activities

- After excavation is completed in an area, but before backfilling occurs, raise the temperature in the area to maximize volatilization of TCE.
- Evaluate the feasibility of utilizing limited chemical injection to dechlorinate residual TCE in areas with the greatest concentration of TCE.

G. Post-remediation Activities:

- Monitor the excavation site for potential residual contamination and groundwater impacts, ensuring no ongoing environmental hazards persist.

By adhering to this plan, we aim to ensure the safe, compliant, and environmentally responsible handling of TCE-contaminated hazardous soil.

3.1.3 Engineered Barriers / Continuing Obligations

An engineered barrier limits direct contact exposure and/or controls migration of contaminants. These barriers may consist of buildings, pavement, soil covers, flexible vapor barriers, etc. As part of the proposed design and as a condition of site closure, a cover will be necessary over the residual soil impacts at the site. Engineered barriers that will be implemented at this site to minimize direct contact and infiltration of groundwater include:

- The existing building (125,700 square feet);
- Asphalt parking and driveways (31,600 square feet);
- Concrete sidewalks, terraces, and patios (10,700 square feet);
- Soils covered with 1.5 feet of clean fill and 0.5 feet of topsoil and vegetation in landscaped and grassy areas (16,700 square feet).

Additionally, the site will be required to be on the WDNR GIS Soil Database for residual soil contamination. The location of existing and proposed engineered barriers are shown on Figure 6. A maintenance plan will be submitted with the closure request when pavement, an engineered cover or other type of cover is required to protect public health, safety, welfare or the environment.

3.2 Groundwater Remediation

Natural attenuation with soil excavation is the preferred alternative for this site. The constituents of concern are degradable, and the concentration and toxicity of the contaminants is low enough to attenuate naturally.

3.2.1 Long-Term Groundwater Monitoring

The groundwater monitoring wells will be sampled on a quarterly basis until each has been sampled three additional times in conjunction with the proposed commissioning. Groundwater samples will be analyzed for VOCs, PAHs, and RCRA Metals. Test results will be used to document whether an improvement in groundwater quality has been achieved and whether the plume is stable or receding. Upon documentation of a stable or receding plume, case closure will be requested. One semi-annual report and one annual report is proposed for documentation.

3.3 Vapor Intrusion and Mitigation Approach

The presence of VOCs in the subsurface beneath the existing building present vapor intrusion risks that will need to be managed. Active sub-slab depressurization will be the principal means of managing vapor intrusion risks for the existing building. Eleven blowers are being utilized to provide sub-slab depressurization. Additional perforated piping runs are being installed in areas with significant TCE contamination to provide additional long-term removal, resiliency, and redundancy to the VMS system. Redevelopment of the building also incorporates a vapor barrier over excavated hot spots to provide additional protection against vapor intrusion risks. Additional investigation and vapor sampling will be necessary to monitor the effectiveness of the approaches for both buildings.

The vapor mitigation map is depicted on Figures 3A and 3B included in Appendix B.

3.3.1 Vapor System for Existing Building

A total of forty-nine (49) sub-slab vapor probes have been installed in the existing building as part of the vapor intrusion assessment proposed for the project. The sub-slab vapor probes were sampled to assess vapor issues under the building. Several VOCs including TCE were detected in concentrations above the Residential, Small Commercial, and/or Large Industrial/Commercial VRSLs across the subject site.

During the excavation of CVOCs contaminated soils and the replacement of underground utilities for CWC – East Block, a vapor barrier and venting system was installed in accordance with the approved remedial action plan during Summer and Fall of 2021. An inspection performed by KSingh verified that the vapor barrier was installed in accordance with manufacturer recommendations. After the TCE was detected in indoor air during the first round of commissioning, the SSDS was supplemented with additional depressurization fans to a total of 11, drainage sumps, and inspection ports. The existing SSDS has reduced indoor air TCE concentrations to less than the VALs and greater than -0.004 inches of water column vacuum is present under the entire building currently. The current SSDS with the addition of telemetry and backup power supply is adequate for the building but will be confirmed during the commissioning process and adjusted as needed.

3.3.2 Column Sealing

KSingh proposed a sealing program for wooden support columns based on the following findings of investigation.

- TCE air data was collected from ninety-four wooden columns (columns) located on the first floor of the site building complex. Real-time indoor air samples were collected from cracks/holes that exist in the columns using a gas chromatograph unit. Sealing activities are proposed at the sixteen columns where TCE was identified greater than its detection limit of 0.6 µg/m^3.
- A 15% (w/w) biochar-alginate mix is proposed to seal the cracks in the sixteen columns. A caulking mix will also be used. Once all cracks are sealed, a fresh coat of paint will be applied to the impacted columns.
- Performance evaluation of the sealing options is planned to include periodic inspection of the columns and air sampling near the surface of the columns for the first year and semi-annual basis from the following year.

Based on KSingh's findings, WDNR responded with the following points of emphasis.

- WDNR concurred with KSingh's proposed sealing program with the requested addition of the following columns: 1043-C4, 1042-C1, 1042-C2, 1051-C1, and 1052-C.
- WDNR recommended that a commercially available and proven sealant be used to seal any building features that may be acting as a preferential pathway for vapor intrusion.

Based on the approval, a column sealing program will be incorporated into the vapor intrusion mitigation plan in order to limit pathways for migration.

3.4 Estimated Cost of Integrated Remediation

Preliminary estimated costs for the selected alternative have been discussed previously in this section and are provided in Table 3. Remedial alternative 3, utilizing excavation, additional source reduction, engineered barriers, and vapor mitigation measures including column sealing is summarized in Table 3.

Principal costs include approximately $195,000 for the blower systems, $49,600 for removal of concrete slabs inside the building, $195,160 for excavation and handling of contaminated soils, $119,000 for transportation and disposal of hazardous waste soils, $105,000 for restoration of concrete surfaces, approximately $50,000 for back-up power, and $54,000 in commissioning expenses. It should be noted that these costs do not include the costs related to MNA.

We estimate the proposed remediation program will cost approximately $1.4 million. This is an estimated cost to case closure with GIS registration, but we anticipate that there may be some revision upon finalization of the cost for in-situ chemical treatment, if economically feasible.

3.5 Health and Safety on Site

KSingh has prepared a Health and Safety plan for KSingh personnel who will be on site during the construction activities and recommended all contractors to establish and implement a Health and Safety Plan for their personnel. All staff on site are required to have appropriate Personal Protective Equipment at all times and be OSHA 40-hr Hazwoper certified. Indoor air quality in the areas where work is conducted is monitored frequently and reported at a common location on site where all the contractors can be informed about the changing air quality. Based on the TCE concentrations, the contractors are advised to take timely breaks to limit the exposure.

3.6 Proposed Schedule

Work should proceed on an accelerated schedule for case closure and property redevelopment, as follows:

- Begin Excavation — October 30, 2023
- Submittal of 2nd Round Commissioning Plan — November 28, 2023
- Complete Excavation/Restoration of Engineered Barriers — December 22, 2023
- Fine-tuning of SSDS — December 31, 2023
- 2nd Round of Commissioning and Reporting — January 8 - 22, 2024
- Submittal of 3rd Round Commissioning Plan — February 5, 2024
- 3rd Round of Commissioning and Reporting — March 4 – 22, 2024
- Install Telemetry — March 31, 2024
- Remedial Action Documentation Report and O&M Report — March 31, 2024
- Submittal of 4th Round Commissioning Plan (if necessary) — April 22, 2024
- 4th Round of Commissioning and Reporting (if necessary) — May 15 – 31, 2024
- Semi-annual Report — July 2024
- Annual Report — December 2024
- O & M Plan Implementation — January 2025 – December 2026
- Case Closure Request — March 2026

Groundwater sampling and Reporting will be completed before December 22, 2023. Groundwater sampling and Reporting will be conducted on a quarterly basis thereafter as needed.

The proposed schedule relative to commissioning assumes that feedback from WDNR is received on an expedited basis. It is requested that WDNR consider commissioning to be complete after two successful rounds of commissioning.

SECTION IV. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Based on a Sub-Slab Vapor Investigation completed by KSingh in January 2021, TCE was identified as a contaminant present underneath the buildings of CWC – East Block.

Three remedial alternatives were evaluated for the proposed site redevelopment, in addition to monitored natural attenuation as a means of groundwater remediation. These included the following:

- Alternative 1: Complete site-wide source removal
- Alternative 2: Selective Source Removal with application of Engineered Barriers
- Alternative 3: Selective Source Removal, Engineered Barriers, and Soil Vapor Mitigation

4.2 Recommendations

Alternative 3 was the selected remediation option. An estimated 412 tons would be excavated from the North Mechanical Room in Building 2A, SW Garage in Building 1B-NW, Residential and Utility units of Building 1B-W, and gym area from Building 1C, approximately 2,500 square feet to a depth of 4 feet bgs, to address direct contact, reduce groundwater risks, and reduce vapor risks. Engineered barriers that exist at this site to minimize direct contact and infiltration of groundwater include:

- The existing building (125,700 square feet);
- Asphalt parking and driveways (31,600 square feet);
- Concrete sidewalks, terraces, and patios (10,700 square feet);
- Soils covered with 1.5 feet of clean fill and 0.5 feet of topsoil and vegetation in landscaped and grassy areas (16,700 square feet).

Vapor intrusion risks will be managed through sub-slab depressurization and installation of a vapor barrier. Eleven vapor extraction blowers for sub-slab depressurization are installed. The vapor mitigation system covers the entire built footprint of the East Block consisting of a vapor barrier, horizontal depressurization pipes beneath the slab, and eleven blower fans. Additional sub-slab vapor probes in conjunction with indoor air and sub-slab vapor testing will be performed to monitor the effectiveness of the systems.

We estimate the proposed remediation program will cost approximately $1.4 million.

4.3 Limitations of Data

This RAOR is based on conditions known to exist prior to and encountered during field investigation and the commissioning process. This investigation and remediation work completed to date confirms near surface contamination of soil. Additional investigation and remediation may be needed to achieve environmental restoration because of the former land use of the site.

This report has been prepared exclusively for Community Within the Corridor Limited Partnership and it may not be altered or changed in any manner without expressed written consent of K. Singh & Associates, Inc.

SECTION VI. REFERENCES

1. Wisconsin Department of Natural Resources Bureau of Remediation and Redevelopment Tracking System. http://dnr.wi.gov/topic/Brownfields/botw.html

2. Milwaukee County Land Information Office. http://county.milwaukee.gov/mclio/applications/interactivemapping.html

3. Phase I Environmental Site Assessment, Community Within the Corridor, 2748 N 32nd Street, Milwaukee, Wisconsin prepared by K. Singh & Associates, Inc. dated March 10, 2020.

4. Phase II Environmental Site Assessment, Community Within the Corridor, 2748 N 32nd Street, Milwaukee, Wisconsin prepared by K. Singh & Associates, Inc. dated May 24, 2020.

5. Indoor Air and Sub-Slab Vapor Sampling, Community Within the Corridor, 2748 N 32nd Street, Milwaukee, Wisconsin prepared by K. Singh & Associates, Inc. dated July 7, 2020.

6. Request for Post Closure Modification, The Community Within the Corridor Development, 2748 N 32nd Street, Milwaukee, Wisconsin prepared by K. Singh & Associates, Inc. dated July 8, 2020.

7. Additional Sub-Slab Vapor Sampling Investigation for Post Closure Modification, Community Within the Corridor Development, 2748 N 32nd Street, Milwaukee, Wisconsin prepared by K. Singh & Associates, Inc. dated January 8, 2021.

8. Feasibility Study and Design – Vapor Mitigation System, The Community within the Corridor Development (East Block), Former Wisconsin Industries Pension Plan & Trust. 2748 N. 32nd Street, Milwaukee, WI 53208, prepared by K. Singh & Associates, Inc., dated March 10, 2021.

9. Update to Post Closure Modification Request / Remedial Action Plan, Community Within the Corridor Development (Former Wisconsin Industries Pension Plan & Trust), 2748 N. 32nd Street, Milwaukee, WI, prepared by K. Singh & Associates, Inc., dated March 19, 2021.

10. Proposed Modification of Vapor Mitigation / Extraction System for Community Within the Corridor – East Block, 2748 N 32nd Street, Milwaukee, WI, prepared by K. Singh & Associates, Inc., dated April 29, 2021.

11. Site Investigation Report, Community within the Corridor Limited Partnership - East Block, 2748 N. 32nd Street, Milwaukee, WI 53210, prepared by K. Singh & Associates, Inc., dated November 2, 2021.

12. Interim Remedial Action Documentation Report, Community Within the Corridor Limited Partnership - East Block, 2748 N. 32nd Street, Milwaukee, WI 53210, prepared by K. Singh & Associates, Inc., dated April 6, 2023.

13. Memorandum – Soil Borings Report for Hotspot Areas, Community Within the Corridor (CWC) – East Block, prepared by K. Singh & Associates, Inc., dated October 24, 2023.

14. Emergency Corrective Action Plan for Vapor Mitigation System, Community Within the Corridor Limited Partnership – East Block, prepared by K. Singh & Associates, Inc., dated April 18, 2023.

15. DNR Review of Interim & Remedial Action Status at Community Within the Corridor - East Block, prepared by WDNR, dated June 7, 2023.

16. Contaminated Site Clean-Up Information (CLU-IN): Providing information about innovative treatment, characterization, and monitoring technologies while acting as a forum for all waste remediation stakeholders (cluin.org)

17. Engineering and Design Manual, Soil Vapor Extraction and Bioventing, USACE Publication No. 1110-1-4001, prepared by the U.S. Army Corps of Engineers, dated June 3, 2002.

18. Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites, EPA Publication EPA 542-R-08-002, prepared by US EPA, dated April 2008.

FIGURES

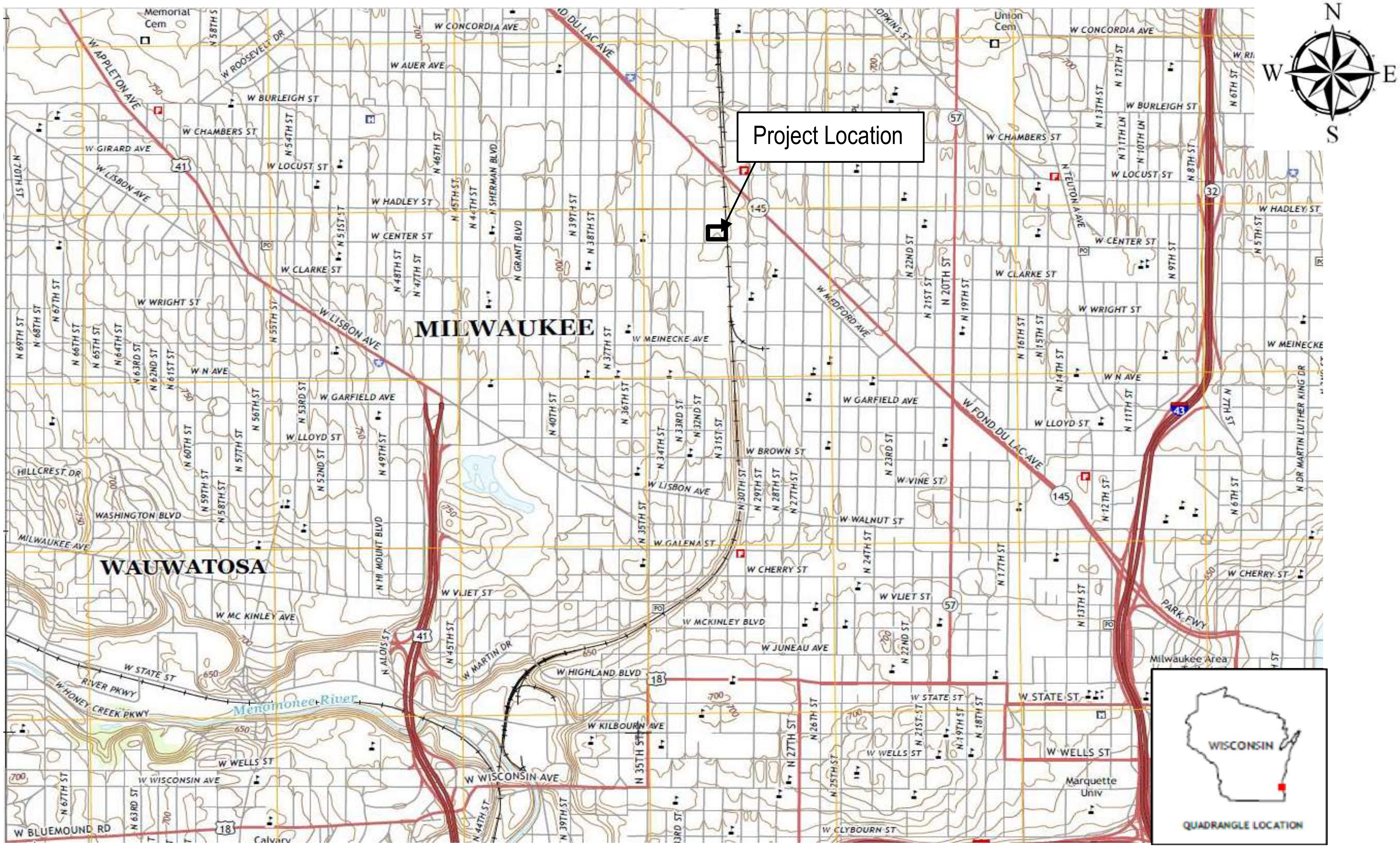

Figure 1. Topographic Map of Project Location
from 2016 Milwaukee, WI 7.5-Minute Series
Map Scale 1: 24,000

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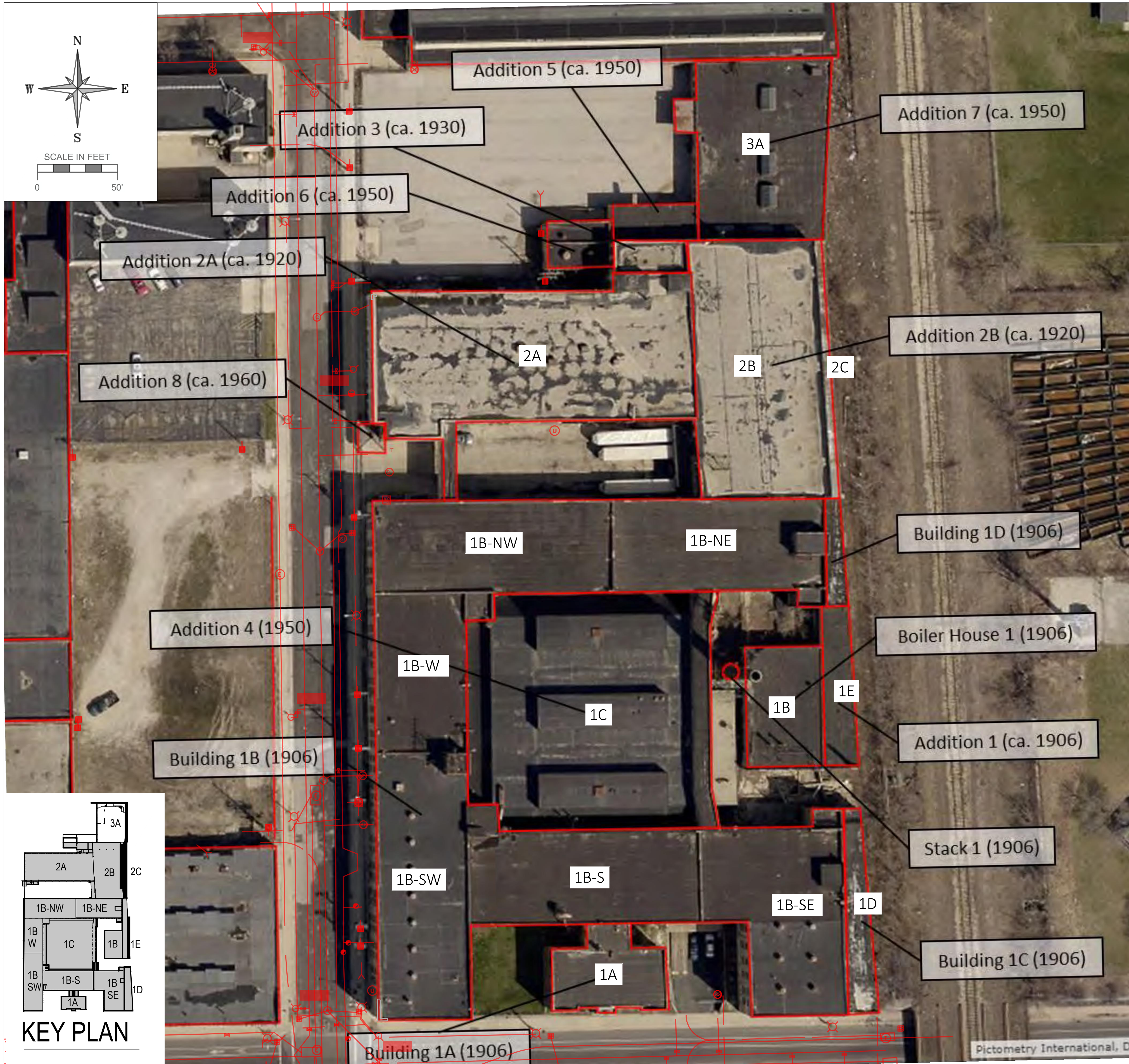

- - -	Property Boundary
	SECTION CORNER MONUMENT
	EX. CHISELED CROSS FOUND
	EX. IRON ROD FOUND
	EX. IRON PIPE FOUND
	EX. CITY OR SITE BENCHARK
	EX. STORM MANHOLE
	EX. CATCH BASIN ROUND
	EX. CATCH BASIN SQUARE
	EX. FLOOD LAMP
	EX. BOLLARD LIGHT
	EX. FLAG POLE
	EX. GAS VALVE
	EX. AIR CONDITIONER
	EX. ELECTRIC METER
	EX. GAS METER
	EX. ELECTRIC PEDESTAL
	EX. TELEPHONE PEDESTAL
	EX. CLEANOUT
	EX. POWER POLE
	EX. POWER / TELEPHONE POLE
MW	EX. MONITORING WELL OR CORING
P	EX. MAILBOX
	EX. SANITARY MANHOLE
	EX. UNKNOWN MANHOLE
	EX. COMBINED SEWER MANHOLE
	EX. ELECTRIC MANHOLE
	EX. ELECTRIC TRANSFORMER
	EX. TELEPHONE MANHOLE
	EX. GUY WIRE
	EX. LIGHT POLE
	EX. SIGN
	EX. BOLLARD (BOL)
	EX. WATER VALVE
	EX. HYDRANT
	EX. SIAMESE HYDRANT
OH	EX. OVERHEAD WIRES
BES	EX. BUREAU OF ELECTRICAL SERVICES
	EX. UG. COMBINED SEWER
CUC	EX. CITY UG. CONDUIT/COMM
COM	EX. UG. COMMUNICATIONS
T	EX. UG. TELEPHONE
E	EX. UG. GAS
G	EX. UG. ELECTRIC
FIB	EX. UG. FIBER OPTICS
	EX. UG. CABLE TELEVISION
SS	EX. SANITARY SEWER (SAN)
ST	EX. STORM SEWER (STO)
W	EX. WATER MAIN
	EX. TREE LINE
X	EX. FENCE LINE
XXXXXXXXXXXXXXX	EX. RETAINING WALL
O	EX. STEEL RAILING
92	EX. 1-FOOT CONTOUR
105	EX. 5-FOOT CONTOUR
	PROP. STRAW WATTLE
SF	PROP. SILT FENCE
CAUTION	UNDERGROUND COMBUSTIBLE GAS LINE

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PROJECT TITLE: SITE INVESTIGATION REPORT
COMMUNITY WITHIN THE CORRIDOR
2748 N. 32nd Street
MILWAUKEE, WI 53210
PROJECT NUMBER: 40449

CLIENT:
COMMUNITY WITHIN THE CORRIDOR LIMITED PARTNERSHIP

REVISIONS	DATE	DESCRIPTION

DRAWN BY AMZ	DATE 10/04/2021
CHECKED BY DKP	DATE 10/04/2021

SHEET TITLE
SITE AERIAL VIEW WITH UTILITY LOCATIONS

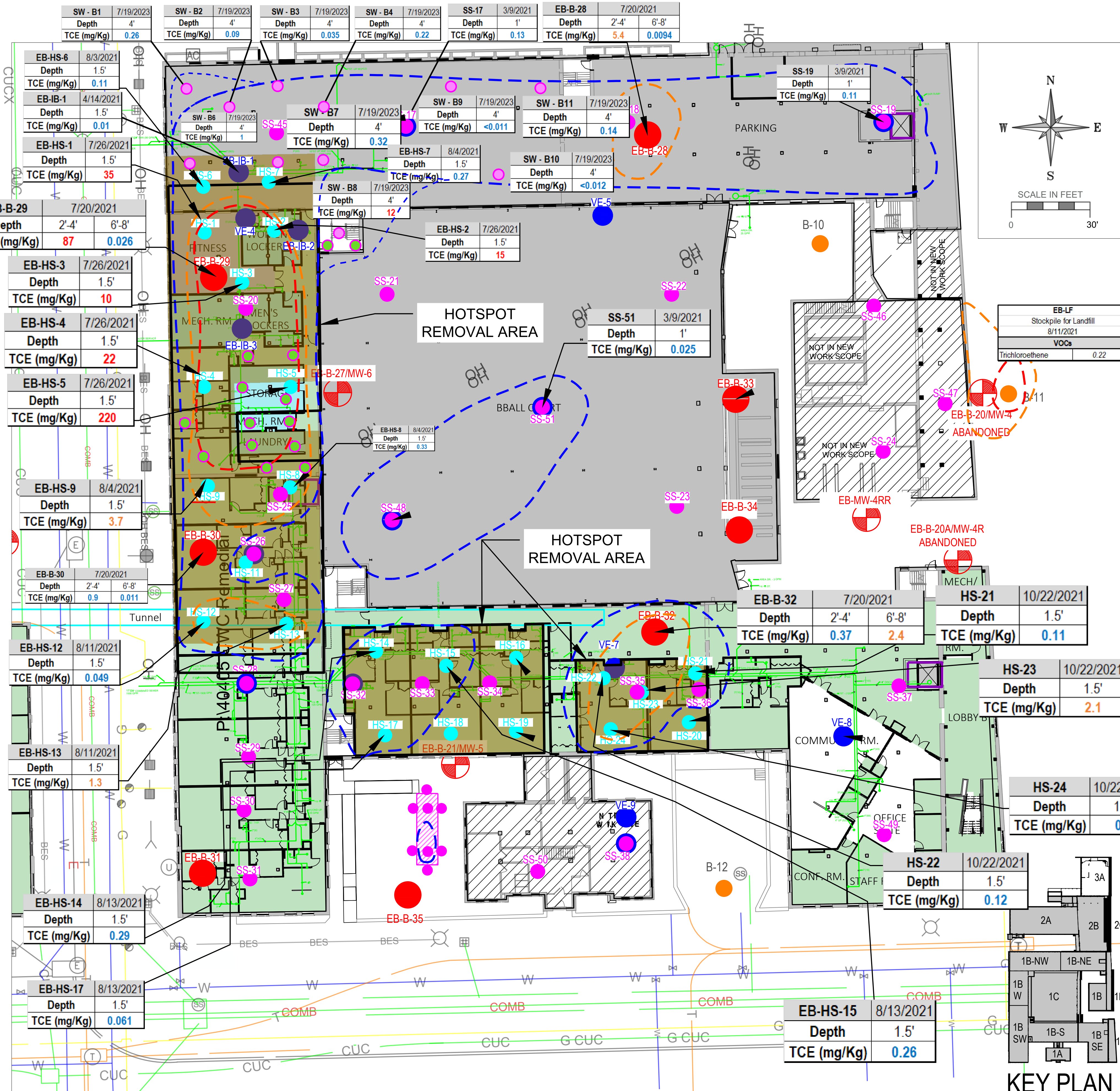
FIGURE 2

SHEET 2 of SHEET 17

FILE NAME :P:\40449 CWC EAST BLOCK SITE INVESTIGATION\ENVIRONMENTAL\CADD\SHEETS\CWC - EAST BLOCK SIR.DWG PLOT DATE :10/15/2021 5:06 PM PLOT BY :AILEEN ZEBROWSKI

East Building Level 1

Figure 3 - CWC EB Level 1 Map with Blower, Vapor Pins, Access Points, and Sump Locations



FLOOR FINISH LEGEND

ATH-1	ATHLETIC FLOORING - FLEXIBLE / NON-ADHERED
CPT-1	BROADLOOM CARPET (UNIT BEDROOMS)
CT-1	CERAMIC TILE (UNIT BATHROOMS W/ ROLL-IN SHOWERS ONLY)
ERF-1	EPOXY RESINOUS FLOORING
EXTG-WD	EXISTING WOOD FLOORING TO REMAIN IN PLACE & BE REFINISHED
EXTG-WS	EXISTING CONCRETE SLAB WITH WEATHER SEAL
LVT-1	LUXURY VINYL TILE (UNIT BATHROOMS)
PC-1	POLISHED CONCRETE
RF-1	RUBBER FLOORING
SC-1	SEALED CONCRETE
WD-SV	SALVAGED WOOD - REMOVED, REINSTALLED AND REFINISHED (SALVAGED WOOD WILL BE REINSTALLED IN CORRIDORS FIRST THEN CONTINUE INTO UNITS - IF THERE IS NOT ENOUGH QUANTITY - INSTALL NEW WOOD FLOORING TO MATCH HISTORIC SIZE)

LEGEND

- GROUNDWATER PROTECTION RCL EXCEEDANCE EXTENTS
- NON-INDUSTRIAL DIRECT CONTACT RCL EXCEEDANCE EXTENTS
- INDUSTRIAL DIRECT CONTACT RCL EXCEEDENCE EXTENTS

LEGEND

- Planned Underground Plumbing
- Underground Tunnel
- Previous Soil Probe, Hand Auger, and Temp. Well Locations (9)
- Monitoring Well Locations (6)
- Soil Probe Locations (13)
- Sub-Slab Soil Sampling Locations (28)
- Approximate Underground Storage Tank Location

Analyte	NR 720 RCLs for GW Protection (1)	NR 720 RCLs - Non-Industrial Use for Direct Contact Protection (1)	NR 720 RCLs - Industrial Use for Direct Contact Protection (1)	Background Threshold Value
Volatile Organic Compounds (VOCs)				
1,1,1-Trichloroethane	*0.1402*	**640**	**640**	---
1,1-Dichloroethane	*0.4834*	**5.06**	**22.2**	---
1,2-Dichloroethane	*0.0028*	**0.652**	**2.87**	---
1,4-Dichlorobenzene	*0.144*	**3.74**	**16.4**	---
1,2,4-Trimethylbenzene	*1.3787***	**219**	**219**	---
1,3,5-Trimethylbenzene	*1.3787***	**182**	**182**	---
Benzene	*0.0051*	**1.6**	**7.07**	---
Chloroform	*0.0033*	**0.454**	**1.98**	---
cis-1,2-Dichloroethene	*0.0412*	**156**	**2,340**	---
Ethylbenzene	*1.57*	**8.02**	**35.4**	---
Methylene Chloride	*0.0026*	**61.80**	**1150**	---
Naphthalene	*0.658182*	**5.52**	**24.10**	---
Styrene	*0.22*	**867**	**867**	---
trans-1,2-Dichloroethene	*0.0626*	**1560**	**1850**	---
Tetrachloroethene	*0.0045*	**33**	**145**	---
Trichloroethene	*0.0036*	**1.3**	**8.41**	---
Vinyl chloride	*0.0001*	**0.067**	**2.08**	---
Xylenes, Total	*3.96*	**1,212**	**1212**	---
Semivolatile Organic Compounds (SVOCs) / Polycyclic Aromatic Hydrocarbons (PAHs)				
Benzo[a]anthracene	---	**1.14**	**21**	---
Benzo[a]pyrene	*0.47*	**0.115**	**2.11**	---
Benzo[b]fluoranthene	*0.4781*	**1.15**	**21.1**	---
Benzo[k]fluoranthene	---	**11.5**	**211**	---
Chrysene	*0.1442*	**115**	**2110**	---
Dibenz(a,h)anthracene	---	**0.115**	**2**	---
Indeno[1,2,3-cd]pyrene	---	**1.15**	**21.1**	---
Naphthalene	*0.6582*	**5.52**	**24.1**	---
Polychlorinated Biphenyls (PCBs)				
PCB-1254	*0.0094****	**0.239**	**1**	---
RCRA Metals				
Arsenic	*0.584*	**0.677**	**3**	8.3
Selenium	*0.52*	**391**	**5840**	---
Lead	*27*	**400**	**800**	51.6

NOTES:

1. (1) FROM WDNR RCLS WORKSHEET DATED DECEMBER 2018
2. REPORTED UNITS IN MG/KG
3. ONLY RCL EXCEEDANCES SHOWN
4. *Italics* = DETECTION IS ABOVE GROUNDWATER PROTECTION RCLS
6. **BOLD** = DETECTION IS ABOVE NON-INDUSTRIAL DIRECT CONTACT RCLS
7. **BOLD Underlined** = DETECTION IS ABOVE INDUSTRIAL DIRECT CONTACT RCLS
8. ** = COMBINED ESTABLISHED STANDARD OF 1,2,4- & 1,3,5-TRIMETHYLBENZENE
9. *** = COMBINED ESTABLISHED STANDARD OF PCBS
10. **** = EXCEEDS BACKGROUND THRESHOLDS
11. --- = NO ESTABLISHED STANDARD
12. * = LABORATORY CONTROL SAMPLE AND/OR DUPLICATE IS OUTSIDE ACCEPTANCE LIMITS
13. *+ = LABORATORY CONTROL SAMPLE AND/OR DUPLICATE IS OUTSIDE ACCEPTANCE LIMITS, HIGH BIASED
14. "B" = COMPOUND WAS FOUND IN THE BLANK AND SAMPLE
15. "F1" = MATRIX SPIKE AND/OR MATRIX SPIKE DUP RECOVERY EXCEEDS CONTROL LIMITS
16. "J" = ANALYTE DETECTED BETWEEN 'LIMIT OF DETECTION' AND 'LIMIT OF QUANTITATION'
17. METHYLENE CHLORIDE OMITTED - COMMON LABORATORY ARTIFACT
18. SAMPLING LOCATIONS ARE APPROXIMATE

KSingh Engineers Scientists Consultants
3636 North 124th Street
Wauwatosa, WI 53222
262-821-1171

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COMMUNITY WITHIN THE CORRIDOR
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PROJECT NUMBER: 40449

CLIENT: COMMUNITY WITHIN THE CORRIDOR LIMITED PARTNERSHIP

REVISIONS	DATE	DESCRIPTION

DRAWN BY	DATE
JDS	04/02/2023
CHECKED BY	DATE
RTR	04/02/2023

SHEET TITLE
POST-REMEDIAL ACTION SOIL CONTAMINATION
ISO-CONCENTRATION MAP (SOUTH)

FIGURE 4A

GP1	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	0.3	<0.093	3.5

GP2	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	0.27	1.4	1.4

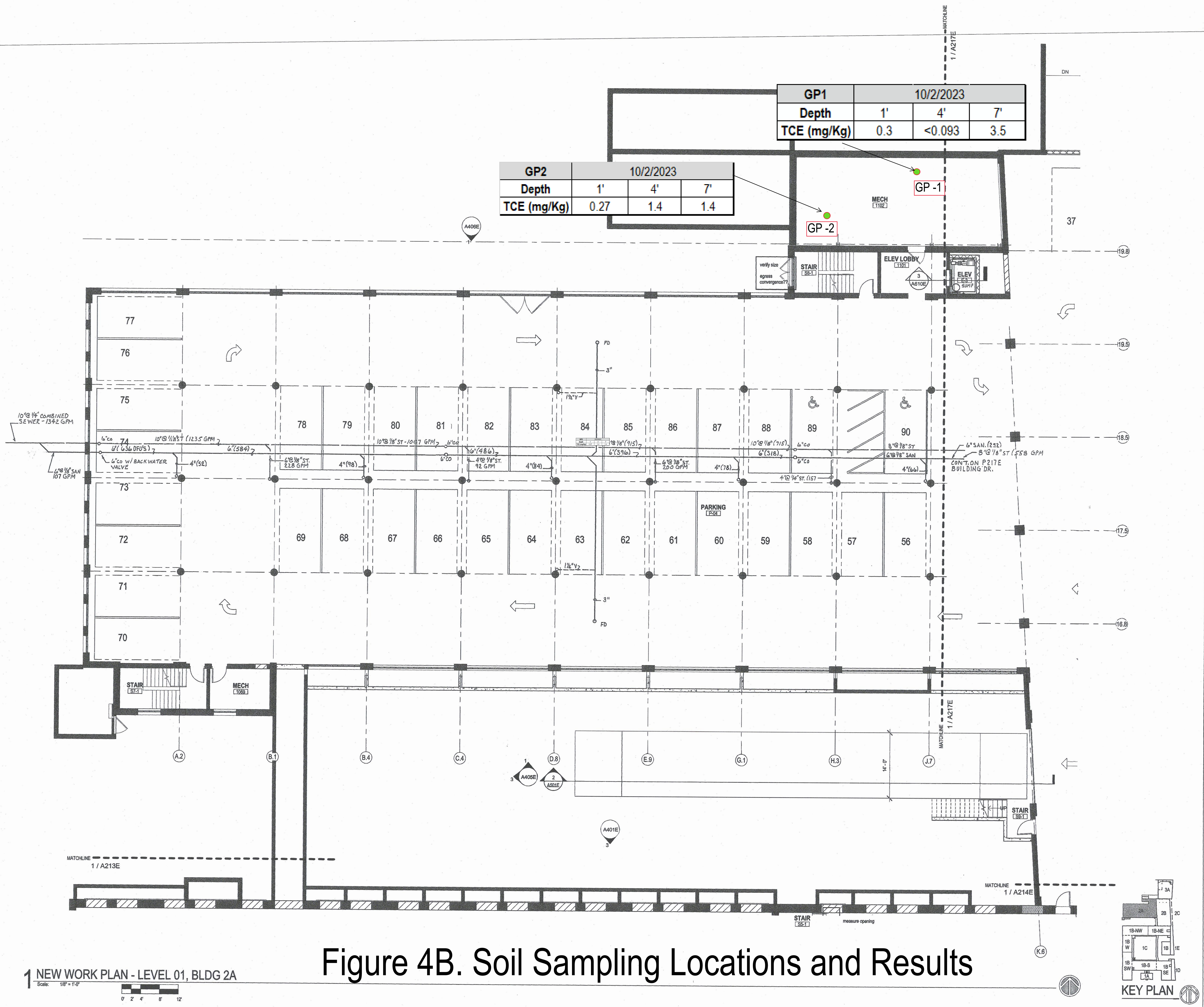


Figure 4B. Soil Sampling Locations and Results

HORNER PLUMBING
379 Forest Grove Dr
Pewaukee, WI 53072
PH: (262) 695-7120

Project:
Community Within the Corridor
East Block
2748 N. 32nd Street
Milwaukee, WI 53210

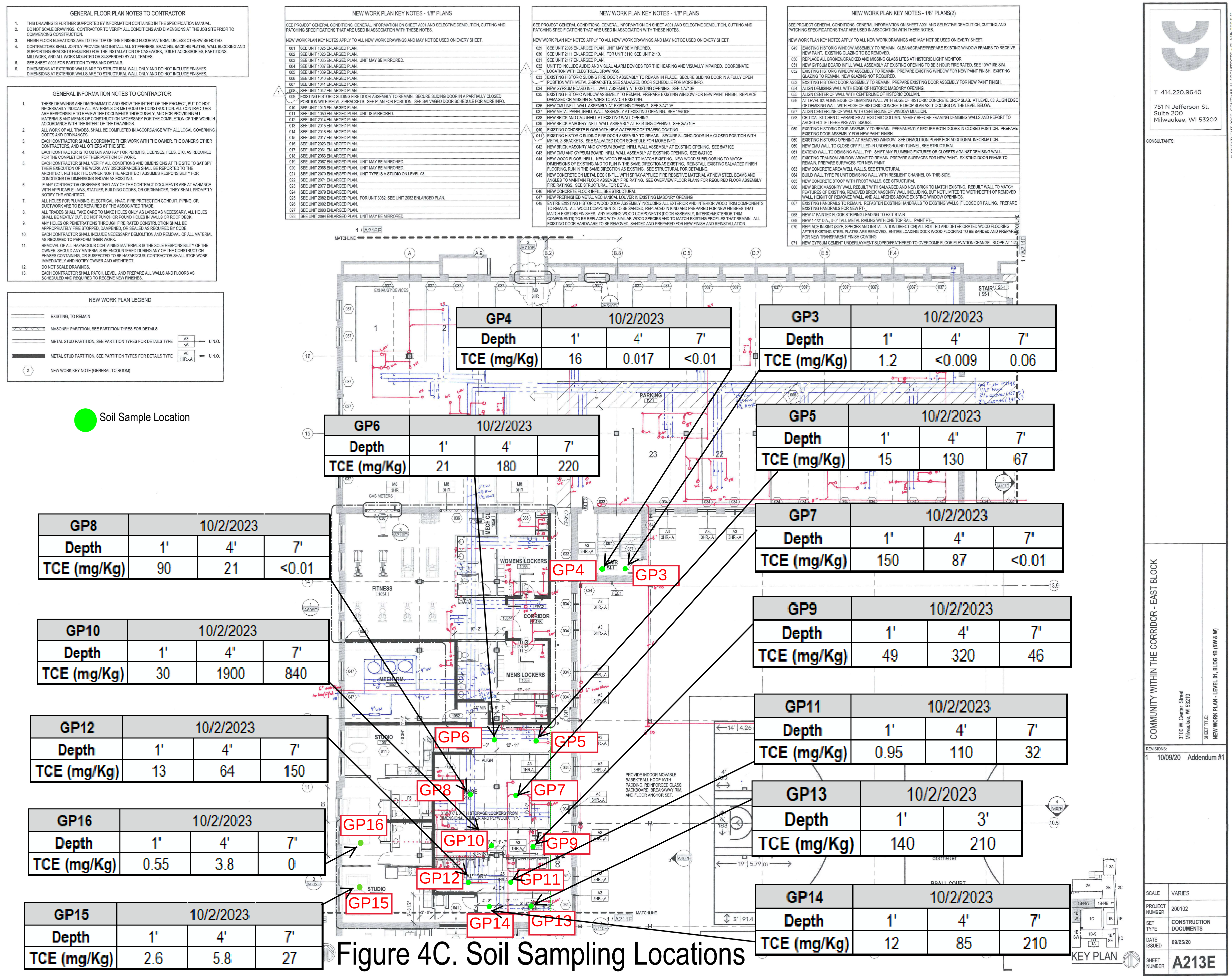
Revisions

stamp:

scale: 1/8" = 1'-0"

date: 7-10-2020

sheet no. P216E



GP4	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	16	0.017	<0.01

GP3	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	1.2	<0.009	0.06

GP6	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	21	180	220

GP5	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	15	130	67

GP8	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	90	21	<0.01

GP7	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	150	87	<0.01

GP10	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	30	1900	840

GP9	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	49	320	46

GP12	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	13	64	150

GP11	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	0.95	110	32

GP16	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	0.55	3.8	0

GP13	10/2/2023	
Depth	1'	3'
TCE (mg/Kg)	140	210

GP15	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	2.6	5.8	27

GP14	10/2/2023		
Depth	1'	4'	7'
TCE (mg/Kg)	12	85	210

Figure 4C. Soil Sampling Locations and Results

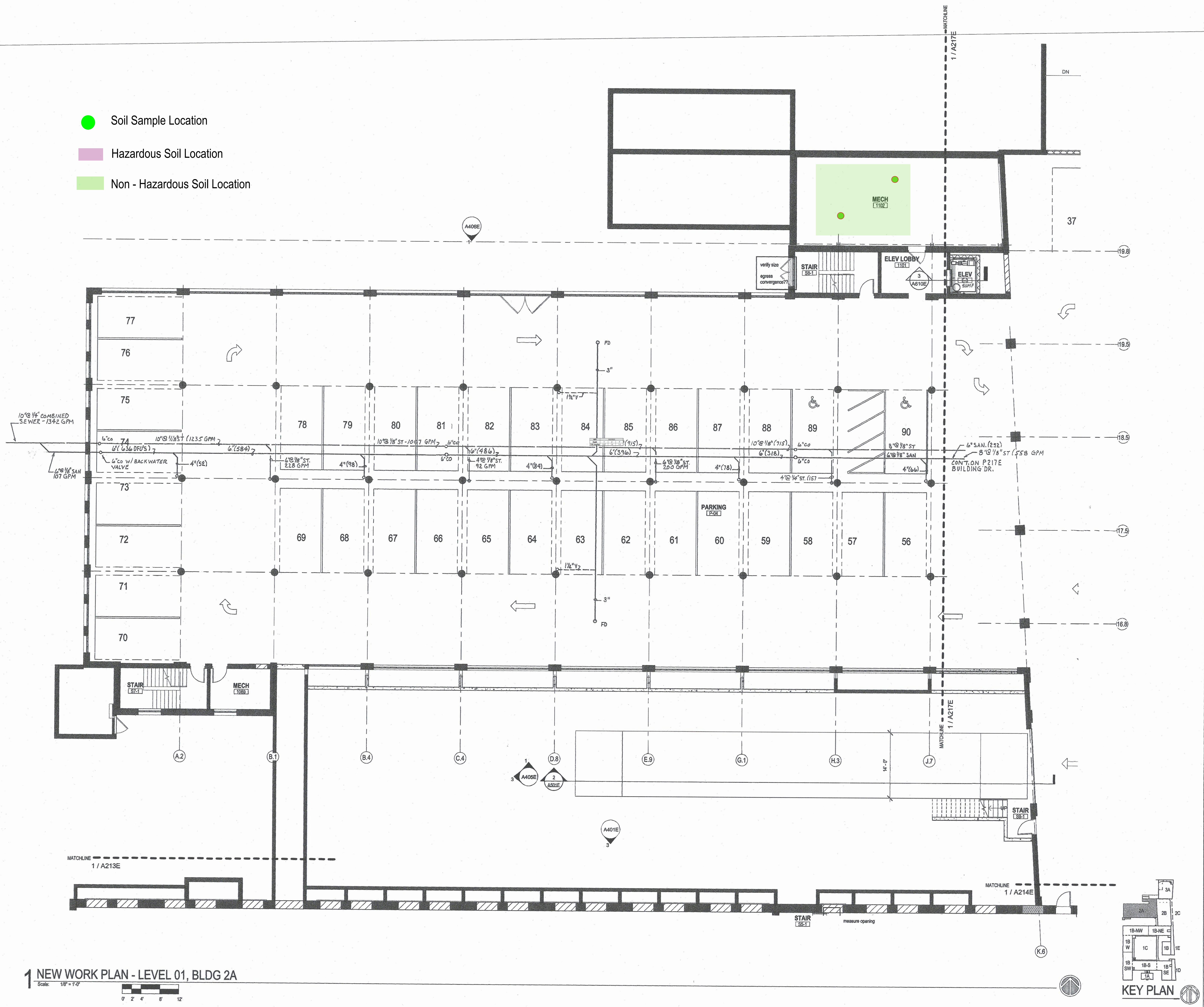


Figure 5A. Soil Excavation Locations and Characteristics in North Mechanical Room, Building 2A

HORNER PLUMBING
379 Forest Grove Dr
Pewaukee, WI 53072
PH: (262) 695-7120

Project:

Community Within the Corridor
East Block
2748 N. 32nd Street
Milwaukee, WI 53210

Revisions

stamp:

scale: ⅛" = 1'-0"

date: 7-10-2020

sheet no. P216E

GENERAL FLOOR PLAN NOTES TO CONTRACTOR

1. THIS DRAWING IS FURTHER SUPPORTED BY INFORMATION CONTAINED IN THE SPECIFICATION MANUAL.
2. DO NOT SCALE DRAWINGS. CONTRACTOR TO VERIFY ALL CONDITIONS AND DIMENSIONS AT THE JOB SITE PRIOR TO COMMENCING CONSTRUCTION.
3. FINISH FLOOR ELEVATIONS ARE TO THE TOP OF THE FINISHED FLOOR MATERIAL UNLESS OTHERWISE NOTED.
4. CONTRACTORS SHALL JOINTLY PROVIDE AND INSTALL ALL STIFFENERS, BRACING, BACKING PLATES, WALL BLOCKING AND SUPPORTING BRACKETS REQUIRED FOR THE INSTALLATION OF CASEWORK, TOILET ACCESSORIES, PARTITIONS. MILLWORK, AND ALL WORK MOUNTED OR SUSPENDED BY ALL TRADES.
5. SEE SHEET A002 FOR PARTITION TYPES AND DETAILS.
6. DIMENSIONS AT EXTERIOR WALLS ARE TO STRUCTURAL WALL ONLY AND DO NOT INCLUDE FINISHES. DIMENSIONS AT EXTERIOR WALLS ARE TO STRUCTURAL WALL ONLY AND DO NOT INCLUDE FINISHES.

GENERAL INFORMATION NOTES TO CONTRACTOR

1. THESE DRAWINGS ARE DIAGRAMMATIC AND SHOW THE INTENT OF THE PROJECT, BUT DO NOT NECESSARILY INDICATE ALL MATERIALS OR METHODS OF CONSTRUCTION. ALL CONTRACTORS ARE RESPONSIBLE TO REVIEW THE DOCUMENTS THOROUGHLY, AND FOR PROVIDING ALL MATERIALS AND MEANS OF CONSTRUCTION NECESSARY FOR THE COMPLETION OF THE WORK IN ACCORDANCE WITH THE INTENT OF THE DRAWINGS.
2. ALL WORK OF ALL TRADES, SHALL BE COMPLETED IN ACCORDANCE WITH ALL LOCAL GOVERNING CODES AND ORDINANCES.
3. EACH CONTRACTOR SHALL COORDINATE THEIR WORK WITH THE OWNER, THE OWNER'S OTHER CONTRACTORS, AND ALL OTHERS AT THE SITE.
4. EACH CONTRACTOR IS TO OBTAIN AND PAY FOR PERMITS, LICENSES, FEES, ETC. AS REQUIRED FOR THE COMPLETION OF THEIR PORTION OF WORK.
5. EACH CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AT THE SITE TO SATISFY THEIR EXECUTION OF THE WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE ARCHITECT. NEITHER THE OWNER NOR THE ARCHITECT ASSUMES RESPONSIBILITY FOR CONDITIONS OR DIMENSIONS SHOWN AS EXISTING.
6. IF ANY CONTRACTOR OBSERVES THAT ANY OF THE CONTRACT DOCUMENTS ARE AT VARIANCE WITH APPLICABLE LAWS, STATUES, BUILDING CODES, OR ORDINANCES, THEY SHALL PROMPTLY NOTIFY THE ARCHITECT.
7. ALL HOLES FOR PLUMBING, ELECTRICAL, HVAC, FIRE PROTECTION CONDUIT, PIPING, OR DUCTWORK ARE TO BE REPAIRED BY THE ASSOCIATED TRADE.
8. ALL TRADES SHALL TAKE CARE TO MAKE HOLES ONLY AS LARGE AS NECESSARY. ALL HOLES SHALL BE NEATLY CUT. DO NOT PUNCH OR POUND HOLES IN WALLS OR ROOF DECK.
9. ANY HOLES OR PENETRATIONS THROUGH FIRE RATED CONSTRUCTION SHALL BE APPROPRIATELY FIRE STOPPED, DAMPENED, OR SEALED AS REQUIRED BY CODE.
10. EACH CONTRACTOR SHALL INCLUDE NECESSARY DEMOLITION AND REMOVAL OF ALL MATERIAL AS REQUIRED TO PERFORM THEIR WORK.
11. REMOVAL OF ALL HAZARDOUS CONTAINING MATERIALS IS THE SOLE RESPONSIBILITY OF THE OWNER. SHOULD ANY MATERIALS BE ENCOUNTERED DURING ANY OF THE CONSTRUCTION PHASES CONTAINING, OR SUSPECTED TO BE HAZARDOUS: CONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY OWNER AND ARCHITECT.
12. DO NOT SCALE DRAWINGS.
13. EACH CONTRACTOR SHALL PATCH, LEVEL, AND PREPARE ALL WALLS AND FLOORS AS SCHEDULED AND REQUIRED TO RECEIVE NEW FINISHES.

NEW WORK PLAN LEGEND

- EXISTING, TO REMAIN
- MASONRY PARTITION, SEE PARTITION TYPES FOR DETAILS
- METAL STUD PARTITION, SEE PARTITION TYPES FOR DETAILS TYPE (A3 -A) U.N.O.
- METAL STUD PARTITION, SEE PARTITION TYPES FOR DETAILS TYPE (A6 1HR.-A) U.N.O.
- (X) NEW WORK KEY NOTE (GENERAL TO ROOM)

NEW WORK PLAN KEY NOTES - 1/8" PLANS

SEE PROJECT GENERAL CONDITIONS, GENERAL INFORMATION ON SHEET A001 AND SELECTIVE DEMOLITION, CUTTING AND PATCHING SPECIFICATIONS THAT ARE USED IN ASSOCIATION WITH THESE NOTES.

NEW WORK PLAN KEY NOTES APPLY TO ALL NEW WORK DRAWINGS AND MAY NOT BE USED ON EVERY SHEET.

001	SEE UNIT 1025 ENLARGED PLAN.
002	SEE UNIT 1026 ENLARGED PLAN.
003	SEE UNIT 1035 ENLARGED PLAN. UNIT MAY BE MIRRORED.
004	SEE UNIT 1037 ENLARGED PLAN.
005	SEE UNIT 1039 ENLARGED PLAN.
006	SEE UNIT 1040 ENLARGED PLAN.
007	SEE UNIT 1041 ENLARGED PLAN.
008	SEE UNIT 1042 ENLARGED PLAN.
009	EXISTING HISTORIC SLIDING FIRE DOOR ASSEMBLY TO REMAIN. SECURE SLIDING DOOR IN A PARTIALLY CLOSED POSITION WITH METAL Z-BRACKETS. SEE PLAN FOR POSITION. SEE SALVAGED DOOR SCHEDULE FOR MORE INFO.
010	SEE UNIT 1045 ENLARGED PLAN.
011	SEE UNIT 1050 ENLARGED PLAN. UNIT IS MIRRORED.
012	SEE UNIT 2014 ENLARGED PLAN.
013	SEE UNIT 2015 ENLARGED PLAN.
014	SEE UNIT 2016 ENLARGED PLAN.
015	SEE UNIT 2017 ENLARGED PLAN.
016	SEE UNIT 2023 ENLARGED PLAN.
017	SEE UNIT 2061 ENLARGED PLAN.
018	SEE UNIT 2063 ENLARGED PLAN.
019	SEE UNIT 2067 ENLARGED PLAN. UNIT MAY BE MIRRORED.
020	SEE UNIT 2068 ENLARGED PLAN. UNIT MAY BE MIRRORED.
021	SEE UNIT 2070 ENLARGED PLAN. UNIT TYPE IS A STUDIO ON LEVEL 03.
022	SEE UNIT 2071 ENLARGED PLAN.
023	SEE UNIT 2077 ENLARGED PLAN.
024	SEE UNIT 2079 ENLARGED PLAN.
025	SEE UNIT 2082 ENLARGED PLAN. FOR UNIT 3082: SEE UNIT 2082 ENLARGED PLAN.
026	SEE UNIT 2092 ENLARGED PLAN.
027	SEE UNIT 2093 ENLARGED PLAN.
028	SEE UNIT 2094 ENLARGED PLAN. UNIT MAY BE MIRRORED.

NEW WORK PLAN KEY NOTES - 1/8" PLANS

SEE PROJECT GENERAL CONDITIONS, GENERAL INFORMATION ON SHEET A001 AND SELECTIVE DEMOLITION, CUTTING AND PATCHING SPECIFICATIONS THAT ARE USED IN ASSOCIATION WITH THESE NOTES.

NEW WORK PLAN KEY NOTES APPLY TO ALL NEW WORK DRAWINGS AND MAY NOT BE USED ON EVERY SHEET.

029	SEE UNIT 2095 ENLARGED PLAN. UNIT MAY BE MIRRORED.
030	SEE UNIT 2111 ENLARGED PLAN. FOR UNIT 3110: SEE UNIT 2110.
031	SEE UNIT 2117 ENLARGED PLAN.
032	UNIT TO INCLUDE AUDIO AND VISUAL ALARM DEVICES FOR THE HEARING AND VISUALLY IMPAIRED. COORDINATE LOCATION WITH ELECTRICAL DRAWINGS
033	EXISTING HISTORIC SLIDING FIRE DOOR ASSEMBLY TO REMAIN IN PLACE. SECURE SLIDING DOOR IN A FULLY OPEN POSITION WITH METAL Z-BRACKETS. SEE SALVAGED DOOR SCHEDULE FOR MORE INFO.
034	NEW GYPSUM BOARD INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 1/A710E
035	EXISTING HISTORIC WINDOW ASSEMBLY TO REMAIN. PREPARE EXISTING WINDOW FOR NEW PAINT FINISH. REPLACE DAMAGED OR MISSING GLAZING TO MATCH EXISTING.
036	NEW CMU INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 3/A710E
037	NEW METAL PANEL INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 1/A510E
038	NEW BRICK AND CMU INFILL AT EXISTING WALL OPENING.
039	NEW BRICK MASONRY INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 3/A710E
040	EXISTING CONCRETE FLOOR WITH NEW WATERPROOF TRAFFIC COATING
041	EXISTING HISTORIC SLIDING FIRE DOOR ASSEMBLY TO REMAIN. SECURE SLIDING DOOR IN A CLOSED POSITION WITH METAL Z-BRACKETS. SEE SALVAGED DOOR SCHEDULE FOR MORE INFO.
042	NEW BRICK MASONRY AND GYPSUM BOARD INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 5/A710E
043	NEW CMU AND GYPSUM BOARD INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 6/A710E
044	NEW WOOD FLOOR INFILL. NEW WOOD FRAMING TO MATCH EXISTING. NEW WOOD SUBFLOORING TO MATCH DIMENSIONS OF EXISTING AND TO RUN IN THE SAME DIRECTIONAS EXISTING. REINSTALL EXISTING SALVAGED FINISH FLOORING, RUN IN THE SAME DIRECTION AS EXISTING. SEE STRUCTURAL FOR DETAILING.
045	NEW CONCRETE ON METAL DECK INFILL WITH SPRAY-APPLIED FIRE RESISTIVE MATERIAL AT NEW STEEL BEAMS AND ANGLES TO MAINTAIN FLOOR ASSEMBLY FIRE RATING. SEE OVERVIEW FLOOR PLANS FOR REQUIRED FLOOR ASSEMBLY FIRE RATINGS. SEE STRUCTURAL FOR DETAIL
046	NEW CONCRETE FLOOR INFILL, SEE STRUCTURAL
047	NEW PREFINISHED METAL MECHANICAL LOUVER IN EXISTING MASONRY OPENING
048	ENTIRE EXISTING HISTORIC WOOD DOOR ASSEMBLY INCLUDING ALL EXTERIOR AND INTERIOR WOOD TRIM COMPONENTS TO REMAIN. ALL WOOD COMPONENTS TO BE SANDED, REPLACED IN KIND AND PREPARED FOR NEW FINISHES THAT MATCH EXISTING FINISHES. ANY MISSING WOOD COMPONENTS (DOOR ASSEMBLY, INTERIOR/EXTERIOR TRIM COMPONENTS) TO BE REPLACED WITH SIMILAR WOOD SPECIES AND TO MATCH EXISTING PROFILES THAT REMAIN. ALL EXISTING DOOR HARDWARE TO BE REMOVED, SANDED AND PREPARED FOR NEW FINISH AND REINSTALLATION.

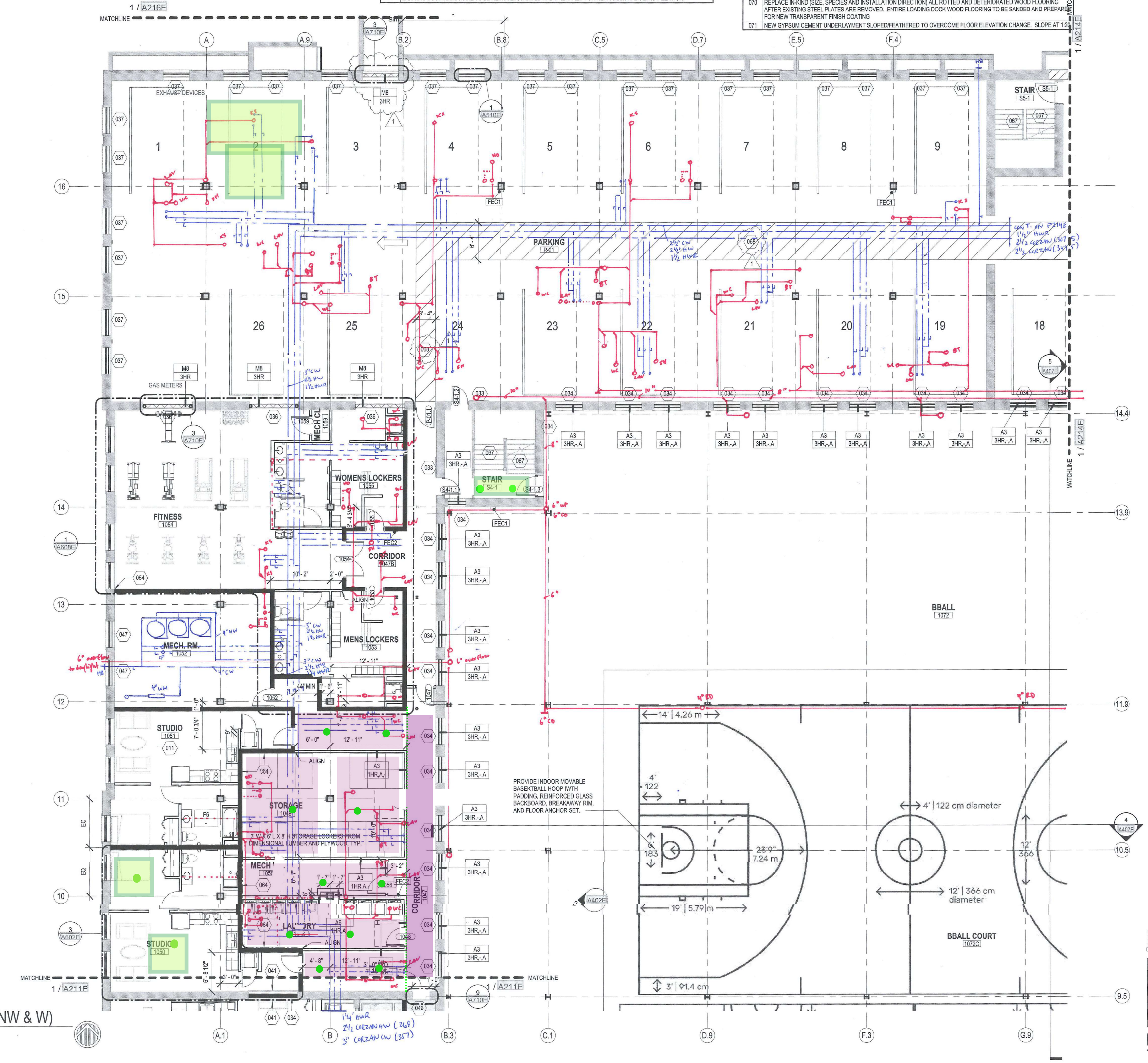
NEW WORK PLAN KEY NOTES - 1/8" PLANS(2)

SEE PROJECT GENERAL CONDITIONS, GENERAL INFORMATION ON SHEET A001 AND SELECTIVE DEMOLITION, CUTTING AND PATCHING SPECIFICATIONS THAT ARE USED IN ASSOCIATION WITH THESE NOTES.

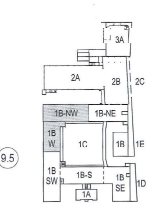
NEW WORK PLAN KEY NOTES APPLY TO ALL NEW WORK DRAWINGS AND MAY NOT BE USED ON EVERY SHEET.

049	EXISTING HISTORIC WINDOW ASSEMBLY TO REMAIN. CLEAN/SCRAPE/PREPARE EXISTING WINDOW FRAMES TO RECEIVE NEW PAINT. EXISTING GLAZING TO BE REMOVED.
050	REPLACE ALL BROKEN/CRACKED AND MISSING GLASS LITES AT HISTORIC LIGHT MONITOR
051	NEW GYPSUM BOARD INFILL WALL ASSEMBLY AT EXISTING OPENING TO BE 3 HOUR FIRE RATED, SEE 10/A710E SIM.
052	EXISTING HISTORIC WINDOW ASSEMBLY TO REMAIN. PREPARE EXISTING WINDOW FOR NEW PAINT FINISH. EXISTING GLAZING TO REMAIN. NEW GLAZING NOT REQUIRED.
053	EXSITING HISTORIC DOOR ASSEMBLY TO REMAIN. PREPARE EXISTING DOOR ASSEMBLY FOR NEW PAINT FINISH.
054	ALIGN DEMISING WALL WITH EDGE OF HISTORIC MASONRY OPENING.
055	ALIGN CENTER OF WALL WITH CENTERLINE OF HISTORIC COLUMN.
056	AT LEVEL 02: ALIGN EDGE OF DEMISING WALL WITH EDGE OF HISTORIC CONCRETE DROP SLAB. AT LEVEL 03: ALIGN EDGE OF DEMISING WALL WITH EDGE OF HISTORIC CONCRETE DROP SLAB AS IT OCCURS ON THE LEVEL BELOW.
057	ALIGN CENTERLINE OF WALL WITH CENTERLINE OF WINDOW MULLION.
058	CRITICAL KITCHEN CLEARANCES AT HISTORIC COLUMN. VERIFY BEFORE FRAMING DEMISING WALLS AND REPORT TO ARCHITECT IF THERE ARE ANY ISSUES.
059	EXSITING HISTORIC DOOR ASSEMBLY TO REMAIN. PERMANENTLY SECURE BOTH DOORS IN CLOSED POSITION. PREPARE EXISTING DOOR ASSEMBLY FOR NEW PAINT FINISH.
060	EXISTING HISTORIC OPENING AT REMOVED WINDOW. SEE DEMOLITION PLANS FOR ADDITIONAL INFORMATION.
060	NEW CMU WALL TO CLOSE OFF FILLED-IN UNDERGROUND TUNNEL, SEE STRUCTURAL
061	EXTEND WALL TO DEMISING WALL, TYP. SHIFT ANY PLUMBING FIXTURES OR CLOSETS AGAINST DEMISING WALL.
062	EXISTING TRANSOM WINDOW ABOVE TO REMAIN, PREPARE SURFACES FOR NEW PAINT. EXISTING DOOR FRAME TO REMAIN, PREPARE SURFACES FOR NEW PAINT
063	NEW CONCRETE AREA WELL WALLS, SEE STRUCTURAL
064	BUILD WALL TYPE P6 UNIT DEMISING WALL WITH RESILIENT CHANNEL ON THIS SIDE.
065	NEW CONCRETE STOOP WITH FROST WALLS, SEE STRUCTURAL
066	NEW BRICK MASONRY WALL REBUILT WITH SALVAGED AND NEW BRICK TO MATCH EXISTING. REBUILT WALL TO MATCH FEATURES OF EXISTING, REMOVED BRICK MASONRY WALL INCLUDING, BUT NOT LIMITED TO WIDTH/DEPTH OF REMOVED WALL, HEIGHT OF REMOVED WALL, AND ALL ARCHES ABOVE EXISTING WINDOW OPENINGS.
067	EXISTING HANDRAILS TO REMAIN. REFASTEN EXISTING HANDRAILS TO EXISTING WALLS IF LOOSE OR FAILING. PREPARE EXISTING HANDRAILS FOR NEW PT-_
068	NEW 4" PAINTED FLOOR STRIPING LEADING TO EXIT STAIR
069	NEW 1-1/2" DIA., 3'-0" TALL METAL RAILING WITH ONE TOP RAIL. PAINT PT-_
070	REPLACE IN-KIND (SIZE, SPECIES AND INSTALLATION DIRECTION) ALL ROTTED AND DETERIORATED WOOD FLOORING AFTER EXISTING STEEL PLATES ARE REMOVED. ENTIRE LOADING DOCK WOOD FLOORING TO BE SANDED AND PREPARED FOR NEW TRANSPARENT FINISH COATING
071	NEW GYPSUM CEMENT UNDERLAYMENT SLOPED/FEATHERED TO OVERCOME FLOOR ELEVATION CHANGE. SLOPE AT 1:20

- Soil Sample Location
- Hazardous Soil Location
- Non - Hazardous Soil Location



1 NEW WORK PLAN - LEVEL 01, BLDG 1B (NW & W)
Scale: 1/8" = 1'-0"



KEY PLAN

T 414.220.9640
751 N Jefferson St.
Suite 200
Milwaukee, WI 53202

CONSULTANTS:

Figure 5B. Soil Excavation Locations and Characteristics in Buildings 1B-W and 1B-NW

COMMUNITY WITHIN THE CORRIDOR - EAST BLOCK
3100 W. Center Street
Milwaukee, WI 53210

SHEET TITLE: NEW WORK PLAN - LEVEL 01, BLDG 1B (NW & W)

REVISIONS:
1 10/09/20 Addendum #1

SCALE	VARIES
PROJECT NUMBER	200102
SET TYPE	CONSTRUCTION DOCUMENTS
DATE ISSUED	09/25/20
SHEET NUMBER	A213E

GENERAL FLOOR PLAN NOTES TO CONTRACTOR

1. THIS DRAWING IS FURTHER SUPPORTED BY INFORMATION CONTAINED IN THE SPECIFICATION MANUAL.
2. DO NOT SCALE DRAWINGS. CONTRACTOR TO VERIFY ALL CONDITIONS AND DIMENSIONS AT THE JOB SITE PRIOR TO COMMENCING CONSTRUCTION.
3. FINISH FLOOR ELEVATIONS ARE TO THE TOP OF THE FINISHED FLOOR MATERIAL UNLESS OTHERWISE NOTED.
4. CONTRACTORS SHALL JOINTLY PROVIDE AND INSTALL ALL STIFFENERS, BRACING, BACKING PLATES, WALL BLOCKING AND SUPPORTING BRACKETS REQUIRED FOR THE INSTALLATION OF CASEWORK, TOILET ACCESSORIES, PARTITIONS. MILLWORK, AND ALL WORK MOUNTED OR SUSPENDED BY ALL TRADES.
5. SEE SHEET A002 FOR PARTITION TYPES AND DETAILS.
6. DIMENSIONS AT EXTERIOR WALLS ARE TO STRUCTURAL WALL ONLY AND DO NOT INCLUDE FINISHES. DIMENSIONS AT EXTERIOR WALLS ARE TO STRUCTURAL WALL ONLY AND DO NOT INCLUDE FINISHES.

GENERAL INFORMATION NOTES TO CONTRACTOR

1. THESE DRAWINGS ARE DIAGRAMMATIC AND SHOW THE INTENT OF THE PROJECT, BUT DO NOT NECESSARILY INDICATE ALL MATERIALS OR METHODS OF CONSTRUCTION. ALL CONTRACTORS ARE RESPONSIBLE TO REVIEW THE DOCUMENTS THOROUGHLY, AND FOR PROVIDING ALL MATERIALS AND MEANS OF CONSTRUCTION NECESSARY FOR THE COMPLETION OF THE WORK IN ACCORDANCE WITH THE INTENT OF THE DRAWINGS.
2. ALL WORK OF ALL TRADES, SHALL BE COMPLETED IN ACCORDANCE WITH ALL LOCAL GOVERNING CODES AND ORDINANCES.
3. EACH CONTRACTOR SHALL COORDINATE THEIR WORK WITH THE OWNER, THE OWNER'S OTHER CONTRACTORS, AND ALL OTHERS AT THE SITE.
4. EACH CONTRACTOR IS TO OBTAIN AND PAY FOR PERMITS, LICENSES, FEES, ETC. AS REQUIRED FOR THE COMPLETION OF THEIR PORTION OF WORK.
5. EACH CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AT THE SITE TO SATISFY THEIR EXECUTION OF THE WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE ARCHITECT. NEITHER THE OWNER NOR THE ARCHITECT ASSUMES RESPONSIBILITY FOR CONDITIONS OR DIMENSIONS SHOWN AS EXISTING.
6. IF ANY CONTRACTOR OBSERVES THAT ANY OF THE CONTRACT DOCUMENTS ARE AT VARIANCE WITH APPLICABLE LAWS, STATUES, BUILDING CODES, OR ORDINANCES, THEY SHALL PROMPTLY NOTIFY THE ARCHITECT.
7. ALL HOLES FOR PLUMBING, ELECTRICAL, HVAC, FIRE PROTECTION CONDUIT, PIPING, OR DUCTWORK ARE TO BE REPAIRED BY THE ASSOCIATED TRADE.
8. ALL TRADES SHALL TAKE CARE TO MAKE HOLES ONLY AS LARGE AS NECESSARY. ALL HOLES SHALL BE NEATLY CUT. DO NOT PUNCH OR POUND HOLES IN WALLS OR ROOF DECK.
9. ANY HOLES OR PENETRATIONS THROUGH FIRE RATED CONSTRUCTION SHALL BE APPROPRIATELY FIRE STOPPED, DAMPENED, OR SEALED AS REQUIRED BY CODE.
10. EACH CONTRACTOR SHALL INCLUDE NECESSARY DEMOLITION AND REMOVAL OF ALL MATERIAL AS REQUIRED TO PERFORM THEIR WORK.
11. REMOVAL OF ALL HAZARDOUS CONTAINING MATERIALS IS THE SOLE RESPONSIBILITY OF THE OWNER. SHOULD ANY MATERIALS BE ENCOUNTERED DURING ANY OF THE CONSTRUCTION PHASES CONTAINING, OR SUSPECTED TO BE HAZARDOUS: CONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY OWNER AND ARCHITECT.
12. DO NOT SCALE DRAWINGS.
13. EACH CONTRACTOR SHALL PATCH, LEVEL, AND PREPARE ALL WALLS AND FLOORS AS SCHEDULED AND REQUIRED TO RECEIVE NEW FINISHES.

NEW WORK PLAN LEGEND

- EXISTING, TO REMAIN
- MASONRY PARTITION, SEE PARTITION TYPES FOR DETAILS
- METAL STUD PARTITION, SEE PARTITION TYPES FOR DETAILS TYPE (A3 -A, U.N.O.)
- METAL STUD PARTITION, SEE PARTITION TYPES FOR DETAILS TYPE (A6 1HR - A, U.N.O.)
- (X) NEW WORK KEY NOTE (GENERAL TO ROOM)

Non - Hazardous Soil Location

NEW WORK PLAN KEY NOTES - 1/8" PLANS

SEE PROJECT GENERAL CONDITIONS, GENERAL INFORMATION ON SHEET A001 AND SELECTIVE DEMOLITION, CUTTING AND PATCHING SPECIFICATIONS THAT ARE USED IN ASSOCIATION WITH THESE NOTES.

NEW WORK PLAN KEY NOTES APPLY TO ALL NEW WORK DRAWINGS AND MAY NOT BE USED ON EVERY SHEET.

001	SEE UNIT 1025 ENLARGED PLAN.
002	SEE UNIT 1026 ENLARGED PLAN.
003	SEE UNIT 1035 ENLARGED PLAN. UNIT MAY BE MIRRORED.
004	SEE UNIT 1037 ENLARGED PLAN.
005	SEE UNIT 1039 ENLARGED PLAN.
006	SEE UNIT 1040 ENLARGED PLAN.
007	SEE UNIT 1041 ENLARGED PLAN.
008	SEE UNIT 1042 ENLARGED PLAN.
009	EXISTING HISTORIC SLIDING FIRE DOOR ASSEMBLY TO REMAIN. SECURE SLIDING DOOR IN A PARTIALLY CLOSED POSITION WITH METAL Z-BRACKETS. SEE PLAN FOR POSITION. SEE SALVAGED DOOR SCHEDULE FOR MORE INFO.
010	SEE UNIT 1045 ENLARGED PLAN.
011	SEE UNIT 1050 ENLARGED PLAN. UNIT IS MIRRORED.
012	SEE UNIT 2014 ENLARGED PLAN.
013	SEE UNIT 2015 ENLARGED PLAN.
014	SEE UNIT 2016 ENLARGED PLAN.
015	SEE UNIT 2017 ENLARGED PLAN.
016	SEE UNIT 2023 ENLARGED PLAN.
017	SEE UNIT 2061 ENLARGED PLAN.
018	SEE UNIT 2063 ENLARGED PLAN.
019	SEE UNIT 2067 ENLARGED PLAN. UNIT MAY BE MIRRORED.
020	SEE UNIT 2068 ENLARGED PLAN. UNIT MAY BE MIRRORED.
021	SEE UNIT 2070 ENLARGED PLAN. UNIT TYPE IS A STUDIO ON LEVEL 03.
022	SEE UNIT 2071 ENLARGED PLAN.
023	SEE UNIT 2077 ENLARGED PLAN.
024	SEE UNIT 2079 ENLARGED PLAN.
025	SEE UNIT 2082 ENLARGED PLAN. FOR UNIT 3082: SEE UNIT 2082 ENLARGED PLAN.
026	SEE UNIT 2092 ENLARGED PLAN.
027	SEE UNIT 2093 ENLARGED PLAN.
028	SEE UNIT 2094 ENLARGED PLAN. UNIT MAY BE MIRRORED.

NEW WORK PLAN KEY NOTES - 1/8" PLANS

SEE PROJECT GENERAL CONDITIONS, GENERAL INFORMATION ON SHEET A001 AND SELECTIVE DEMOLITION, CUTTING AND PATCHING SPECIFICATIONS THAT ARE USED IN ASSOCIATION WITH THESE NOTES.

NEW WORK PLAN KEY NOTES APPLY TO ALL NEW WORK DRAWINGS AND MAY NOT BE USED ON EVERY SHEET.

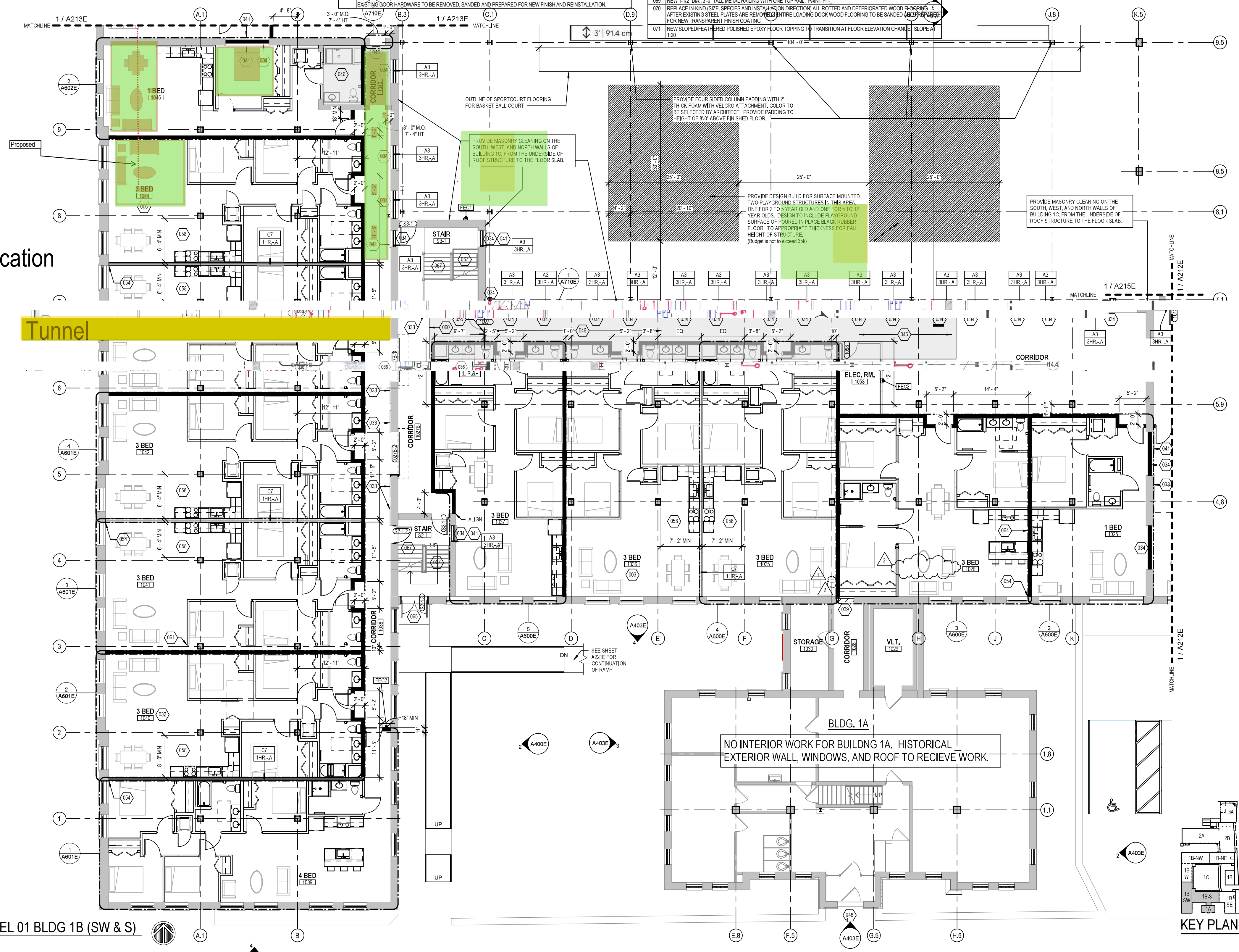
029	SEE UNIT 2095 ENLARGED PLAN. UNIT MAY BE MIRRORED.
030	SEE UNIT 2111 ENLARGED PLAN. FOR UNIT 3110: SEE UNIT 2110.
031	SEE UNIT 2117 ENLARGED PLAN.
032	UNIT TO INCLUDE AUDIO AND VISUAL ALARM DEVICES FOR THE HEARING AND VISUALLY IMPAIRED. COORDINATE LOCATION WITH ELECTRICAL DRAWINGS
033	EXISTING HISTORIC SLIDING FIRE DOOR ASSEMBLY TO REMAIN IN PLACE. SECURE SLIDING DOOR IN A FULLY OPEN POSITION WITH METAL Z-BRACKETS. SEE SALVAGED DOOR SCHEDULE FOR MORE INFO.
034	NEW GYPSUM BOARD INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 1/A710E
035	EXISTING HISTORIC WINDOW ASSEMBLY TO REMAIN. PREPARE EXISTING WINDOW FOR NEW PAINT FINISH. REPLACE DAMAGED OR MISSING GLAZING TO MATCH EXISTING.
036	NEW CMU INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 3/A710E
037	NEW METAL PANEL INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 1/A510E
038	NEW BRICK AND CMU INFILL AT EXISTING WALL OPENING.
039	NEW BRICK MASONRY INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 3/A710E
040	EXISTING CONCRETE FLOOR WITH NEW WATERPROOF TRAFFIC COATING
041	EXISTING HISTORIC SLIDING FIRE DOOR ASSEMBLY TO REMAIN. SECURE SLIDING DOOR IN A CLOSED POSITION WITH METAL Z-BRACKETS. SEE SALVAGED DOOR SCHEDULE FOR MORE INFO.
042	NEW BRICK MASONRY AND GYPSUM BOARD INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 5/A710E
043	NEW CMU AND GYPSUM BOARD INFILL WALL ASSEMBLY AT EXISTING OPENING. SEE 6/A710E
044	NEW WOOD FLOOR INFILL. NEW WOOD FRAMING TO MATCH EXISTING. NEW WOOD SUBFLOORING TO MATCH DIMENSIONS OF EXISTING AND TO RUN IN THE SAME DIRECTIONAS EXISTING. REINSTALL EXISTING SALVAGED FINISH FLOORING, RUN IN THE SAME DIRECTION AS EXISTING. SEE STRUCTURAL FOR DETAILING.
045	NEW CONCRETE ON METAL DECK INFILL WITH SPRAY-APPLIED FIRE RESISTIVE MATERIAL AT NEW STEEL BEAMS AND ANGLES TO MAINTAIN FLOOR ASSEMBLY FIRE RATING. SEE OVERVIEW FLOOR PLANS FOR REQUIRED FLOOR ASSEMBLY FIRE RATINGS. SEE STRUCTURAL FOR DETAIL
046	NEW CONCRETE FLOOR INFILL, SEE STRUCTURAL
047	NEW PREFINISHED METAL MECHANICAL LOUVER IN EXISTING MASONRY OPENING
048	ENTIRE EXISTING HISTORIC WOOD DOOR ASSEMBLY INCLUDING ALL EXTERIOR AND INTERIOR WOOD TRIM COMPONENTS TO REMAIN. ALL WOOD COMPONENTS TO BE SANDED, REPLACED IN KIND AND PREPARED FOR NEW FINISHES THAT MATCH EXISTING FINISHES. ANY MISSING WOOD COMPONENTS (DOOR ASSEMBLY, INTERIOR/EXTERIOR TRIM COMPONENTS) TO BE REPLACED WITH SIMILAR WOOD SPECIES AND TO MATCH EXISTING PROFILES THAT REMAIN. ALL EXISTING DOOR HARDWARE TO BE REMOVED, SANDED AND PREPARED FOR NEW FINISH AND REINSTALLATION.

NEW WORK PLAN KEY NOTES - 1/8" PLANS(2)

SEE PROJECT GENERAL CONDITIONS, GENERAL INFORMATION ON SHEET A001 AND SELECTIVE DEMOLITION, CUTTING AND PATCHING SPECIFICATIONS THAT ARE USED IN ASSOCIATION WITH THESE NOTES.

NEW WORK PLAN KEY NOTES APPLY TO ALL NEW WORK DRAWINGS AND MAY NOT BE USED ON EVERY SHEET.

049	EXISTING HISTORIC WINDOW ASSEMBLY TO REMAIN. CLEAN/SCRAPE/PREPARE EXISTING WINDOW FRAMES TO RECEIVE NEW PAINT. EXISTING GLAZING TO BE REMOVED.
050	REPLACE ALL BROKEN/CRACKED AND MISSING GLASS LITES AT HISTORIC LIGHT MONITOR
051	NEW GYPSUM BOARD INFILL WALL ASSEMBLY AT EXISTING OPENING TO BE 3 HOUR FIRE RATED, SEE 10/A710E SIM.
052	EXISTING HISTORIC WINDOW ASSEMBLY TO REMAIN. PREPARE EXISTING WINDOW FOR NEW PAINT FINISH. EXISTING GLAZING TO REMAIN. NEW GLAZING NOT REQUIRED.
053	EXSITING HISTORIC DOOR ASSEMBLY TO REMAIN. PREPARE EXISTING DOOR ASSEMBLY FOR NEW PAINT FINISH.
054	ALIGN DEMISING WALL WITH EDGE OF HISTORIC MASONRY OPENING.
055	ALIGN CENTER OF WALL WITH CENTERLINE OF HISTORIC COLUMN.
056	AT LEVEL 02: ALIGN EDGE OF DEMISING WALL WITH EDGE OF HISTORIC CONCRETE DROP SLAB. AT LEVEL 03: ALIGN EDGE OF DEMISING WALL WITH EDGE OF HISTORIC CONCRETE DROP SLAB AS IT OCCURS ON THE LEVEL BELOW.
057	ALIGN CENTERLINE OF WALL WITH CENTERLINE OF WINDOW MULLION.
058	CRITICAL KITCHEN CLEARANCES AT HISTORIC COLUMN. VERIFY BEFORE FRAMING DEMISING WALLS AND REPORT TO ARCHITECT IF THERE ARE ANY ISSUES.
059	EXSITING HISTORIC DOOR ASSEMBLY TO REMAIN. PERMANENTLY SECURE BOTH DOORS IN CLOSED POSITION. PREPARE EXISTING DOOR ASSEMBLY FOR NEW PAINT FINISH.
060	EXISTING HISTORIC OPENING AT REMOVED WINDOW. SEE DEMOLITION PLANS FOR ADDITIONAL INFORMATION.
060	NEW CMU WALL TO CLOSE OFF FILLED-IN UNDERGROUND TUNNEL, SEE STRUCTURAL
061	EXTEND WALL TO DEMISING WALL, TYP. SHIFT ANY PLUMBING FIXTURES OR CLOSETS AGAINST DEMISING WALL.
062	EXISTING TRANSOM WINDOW ABOVE TO REMAIN, PREPARE SURFACES FOR NEW PAINT. EXISTING DOOR FRAME TO REMAIN, PREPARE SURFACES FOR NEW PAINT
063	NEW CONCRETE AREA WELL WALLS, SEE STRUCTURAL
064	BUILD WALL TYPE P6 UNIT DEMISING WALL WITH RESILIENT CHANNEL ON THIS SIDE.
065	NEW CONCRETE STOOP WITH FROST WALLS, SEE STRUCTURAL
066	NEW BRICK MASONRY WALL REBUILT WITH SALVAGED AND NEW BRICK TO MATCH EXISTING. REBUILT WALL TO MATCH FEATURES OF EXISTING, REMOVED BRICK MASONRY WALL INCLUDING, BUT NOT LIMITED TO WIDTH/DEPTH OF REMOVED WALL, HEIGHT OF REMOVED WALL, AND ALL ARCHES ABOVE EXISTING WINDOW OPENINGS.
067	EXISTING HANDRAILS TO REMAIN. REFASTEN EXISTING HANDRAILS TO EXISTING WALLS IF LOOSE OR FAILING. PREPARE EXISTING HANDRAILS FOR NEW PT-_
068	NEW 4" PAINTED FLOOR STRIPING LEADING TO EXIT STAIR
069	NEW 1-1/2" DIA., 3'-0" TALL METAL RAILING WITH ONE TOP RAIL. PAINT PT-_
070	REPLACE IN-KIND (SIZE, SPECIES AND INSTALLATION DIRECTION) ALL ROTTED AND DETERIORATED WOOD FLOORING AFTER EXISTING STEEL PLATES ARE REMOVED. ENTIRE LOADING DOCK WOOD FLOORING TO BE SANDED AND PREPARED FOR NEW TRANSPARENT FINISH COATING
071	NEW SLOPED/FEATHERED POLISHED EPOXY FLOOR TOPPING TO TRANSITION AT FLOOR ELEVATION CHANGE. SLOPE AT 1:20



1 NEW WORK PLAN - BASEMENT, BLDG 1A & LEVEL 01 BLDG 1B (SW & S)
Scale: 1/8" = 1'-0"

KEY PLAN

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751 N Jefferson St.
Suite 200
Milwaukee, WI 53202

CONSULTANTS:

Figure 5C. Soil Excavation Locations and Characteristics in Buildings 1B-W and 1C

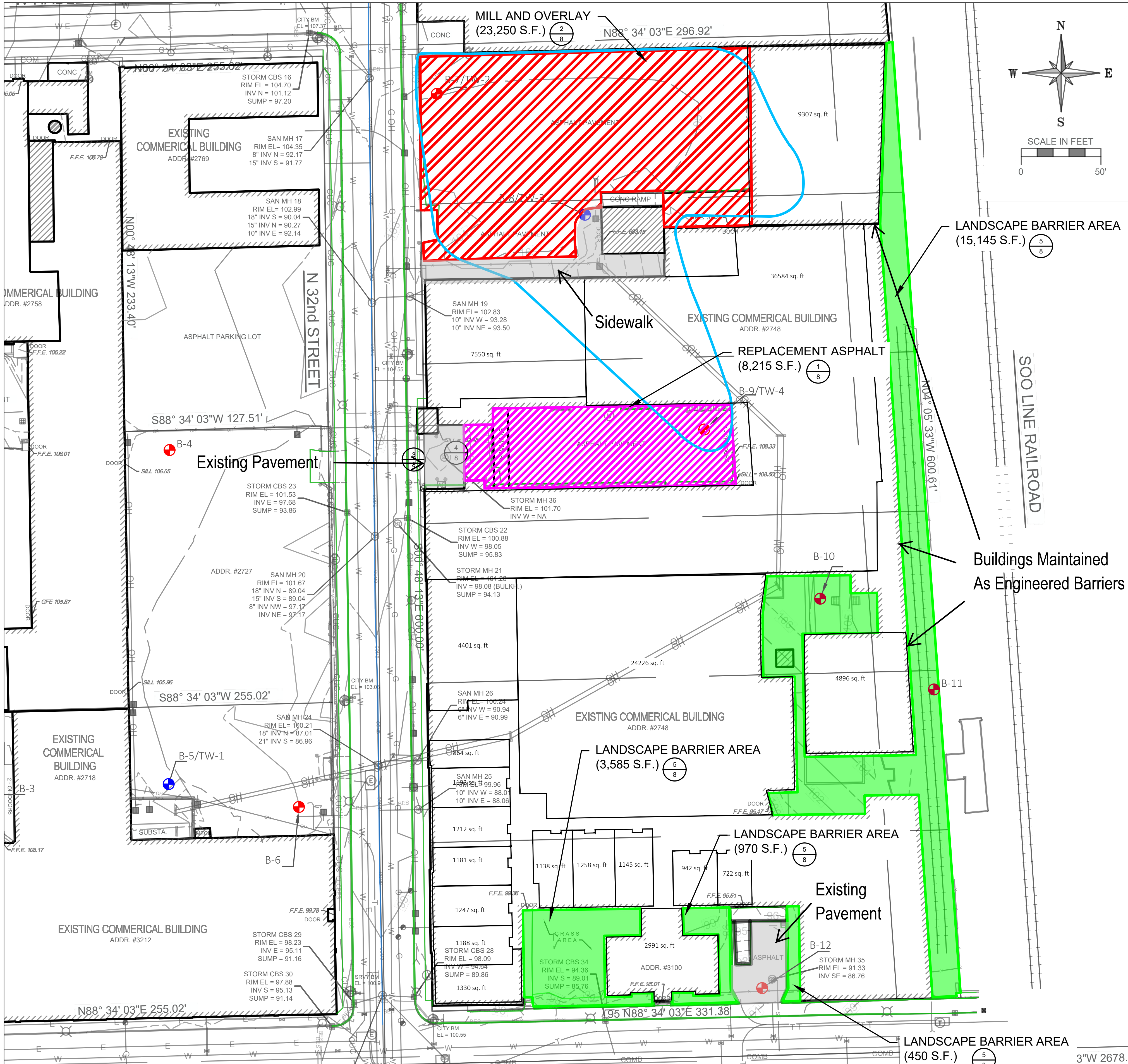
COMMUNITY WITHIN THE CORRIDOR - EAST BLOCK
3100 W. Center Street
Milwaukee, WI 53210

SHEET TITLE: Figure 2. Proposed Areas of Additional Excavations (1B-SW and 1C)

REVISIONS:

1	10/09/20	Addendum #1
2	10/13/20	Addendum #2

SCALE	VARIES
PROJECT NUMBER	200102
SET TYPE	CONSTRUCTION DOCUMENTS
DATE ISSUED	09/25/20
SHEET NUMBER	A211E



SOIL BORINGS AND TEMPORARY WELL LOCATIONS

- VOCs, PAHs, RCRA Metals, PCBs
- VOCs, PAHs, RCRA Metals
- VOCs, SVOCs, RCRA Metals, PCBs, Pesticide, Herbicides
- NR 720 RCL Exceedance Extents

ABBREVIATIONS:

AC. = ACRES
ARC = ARC OF CURVE
ASPH = ASPHALT
BM = BENCHMARK
CH. = CHORD LENGTH
COR = CORNER
CSM = CERTIFIED SURVEY MAP OR MAPPING
C.T.H. = COUNTY TRUNK HIGHWAY
D = DELTA
DEG = DEGREE OF CURVE
E = EAST
EL. = ELEVATION
EX. = EXISTING
EXC. = EXCEPTION
FFE = FINISH FLOOR EL.
FND = FOUND
GFE = GARAGE FLOOR EL.
GND = GROUND
INV. = INVERT
IP = IRON PIPE
IRD = IRON ROD
MEA = MEASURED
NAD = NORTH AMERICAN DATUM
N = NORTH
NE = NORTHEAST
NO. = NUMBER
NW = NORTHWEST
PG. = PAGE
QTR = QUARTER
REC = RECORDED AS
RIM = RIM OR TOP POINT
R/W = RIGHT OF WAY
S = SOUTH
SE = SOUTHEAST
SEWRPC = SOUTHEAST WISCONSIN REGIONAL PLANNING COMMISSION
C.T.H. = STATE TRUNK HIGHWAY
SW = SOUTHWEST
SUR = SURVEYED
U.S.H. = UNITED STATES HIGHWAY
U.S.G.S. = UNITED STATES GEOLOGICAL SURVEY
VAR = VARIES
VPI = VERTICAL POINT OF INTERSECTION
W = WEST

LEGEND:

SECTION CORNER MONUMENT
EX. CHISELED CROSS FOUND
EX. IRON ROD FOUND
EX. IRON PIPE FOUND
EX. STORM MANHOLE
EX. CATCH BASIN ROUND
EX. CATCH BASIN SQUARE
EX. SIAMESE HYDRANT
EX. GAS VALVE
EX. AIR CONDITIONER
EX. ELECTRIC METER
EX. GAS METER
EX. ELECTRIC PEDESTAL
EX. TELEPHONE PEDESTAL
EX. CLEANOUT
EX. POWER POLE
EX. MONITORING WELL OR CORING
EX. MAILBOX
EX. SANITARY MANHOLE
EX. UNKNOWN MANHOLE
EX. COMBINED SEWER MANHOLE
EX. ELECTRIC MANHOLE
EX. ELECTRIC TRANSFORMER
EX. TELEPHONE MANHOLE
EX. GUY WIRE
EX. LIGHT POLE
EX. SIGN
EX. BOLLARD (BOL)
EX. WATER VALVE
OH — EX. OVERHEAD WIRES
BES — EX. BUREAU OF ELECTRICAL SERVICES
X — EX. FENCE LINE
COM — EX. COMMUNICATIONS
T — EX. TELEPHONE LINE
G — EX. GAS LINE
FIB — EX. FIBER OPTICS
SS — EX. SANITARY SEWER (SAN)
ST — EX. STORM SEWER (STO)
W — EX. WATER MAIN
EX. TREE LINE
CAUTION — UNDERGROUND COMBUSTIBLE GAS LINE

KSingh Engineers Scientists Consultants
3636 North 124th Street
Wauwatosa, WI 53222
262-821-1171

CONSULTANT

CONSULTANT

CONSULTANT

PROJECT TITLE: COMMUNITY WITHIN THE CORRIDOR
MILWAUKEE, WI
PROJECT NUMBER: 40405

CLIENT: COMMUNITY WITHIN THE CORRIDOR LIMITED PARTNERSHIP

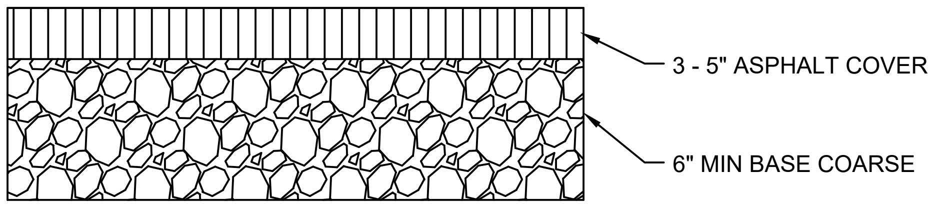
REVISIONS	DATE	DESCRIPTION

DRAWN BY	DATE
AMZ	01/29/2021
CHECKED BY	DATE
KVH	01/29/2021

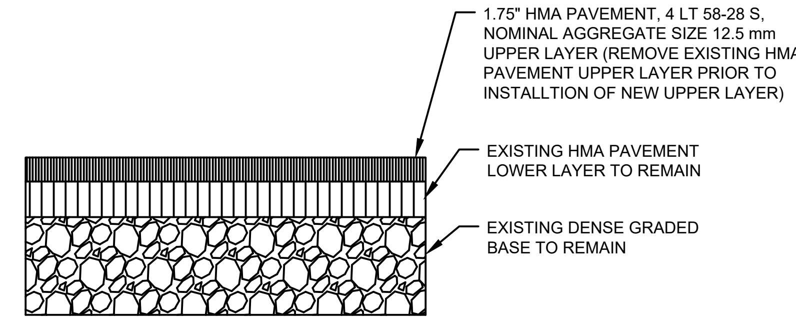
SHEET TITLE
ENGINEERED BARRIER PLAN

FIGURE 6A

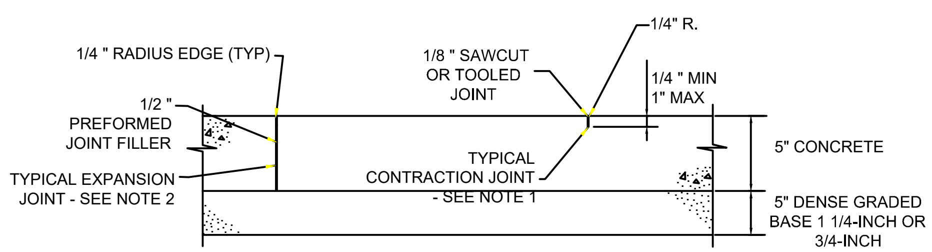
FILE NAME :P:\40405 CWC REMEDIAL ACTION PLAN\ENVIRONMENTAL\CADD\SHEETS\RAP\CWC RAP - FIG 2, 6,10.DWG PLOT DATE :1/30/2021 12:48 PM PLOT BY :RYAN TOY



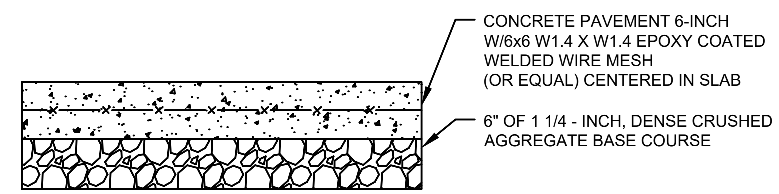
1/5 ASPHALT PAVEMENT
NOT TO SCALE



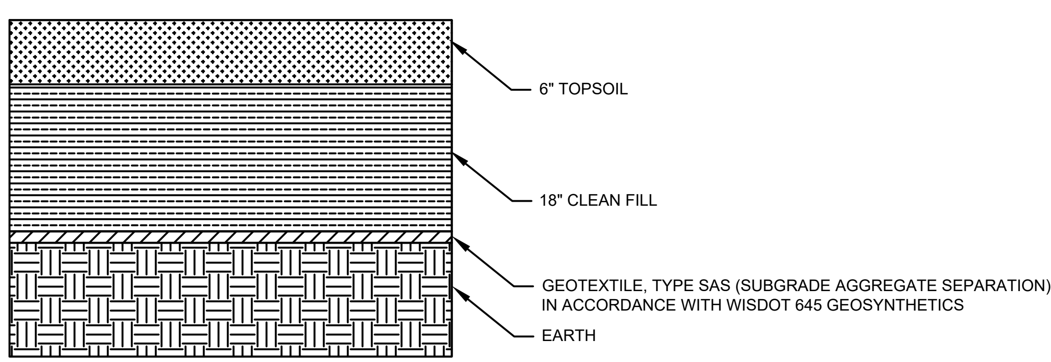
2/5 MILL & OVERLAY HMA
NOT TO SCALE



3/5 CONCRETE SIDEWALK
NOT TO SCALE



4/5 CONCRETE PAVEMENT
NOT TO SCALE



5/5 LANDSCAPE
NOT TO SCALE

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Wauwatosa, WI 53222
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CONSULTANT

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PROJECT TITLE: COMMUNITY WITHIN THE CORRIDOR
MILWAUKEE, WI
PROJECT NUMBER: 40405

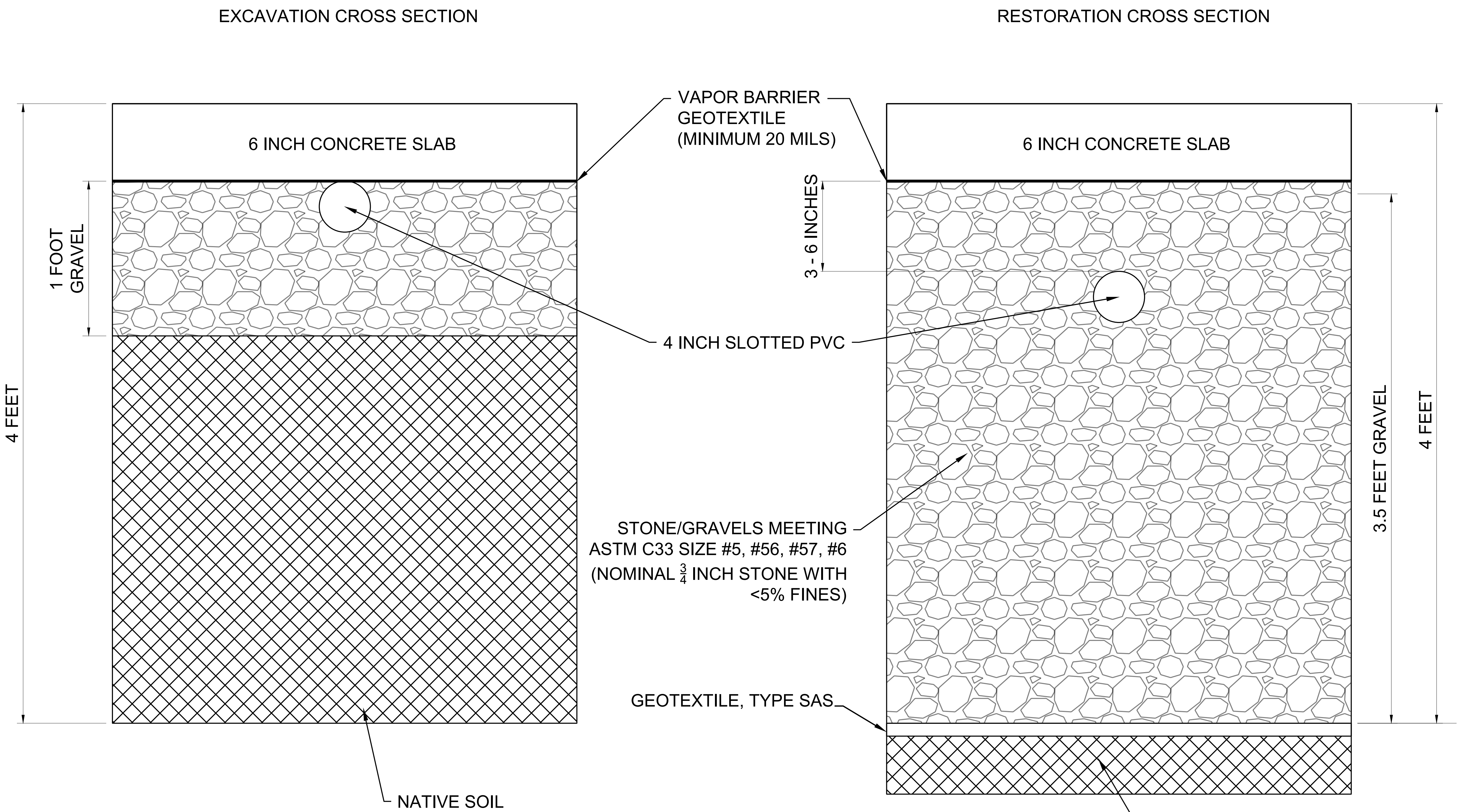
CLIENT: COMMUNITY WITHIN THE CORRIDOR LIMITED PARTNERSHIP

REVISIONS	DATE	DESCRIPTION

DRAWN BY AMZ	DATE 01/29/2021
CHECKED BY KVH	DATE 01/29/2021

SHEET TITLE
ENGINEERED BARRIER DETAILS

FIGURE 6B



KSingh | Engineers Scientists Consultants

3636 North 124th Street
Wauwatosa, WI 53222
262-821-1171

CONSULTANT

CONSULTANT

CONSULTANT

PROJECT TITLE: COMMUNITY WITHIN THE CORRIDOR
2748 N 32ND STREET
MILWAUKEE, WI 53210
PROJECT NUMBER: 40441

CLIENT: COMMUNITY WITHIN THE CORRIDOR LIMITED PARTNERSHIP

REVISIONS	DATE	DESCRIPTION

DRAWN BY	DATE 4/7/2023
CHECKED BY	DATE 4/7/2023

SHEET TITLE

CROSS SECTIONS OF EXCAVATION AND RESTORATION

FIGURE 7

FILE NAME :C:\USERS\RHARRYANKARLO\ONEDRIVE - K. SINGH & ASSOCIATES, INC\DOCUMENTS\PROJECTS\40441B CWC ER\ENV\CADD\RADR CROSS SECTION FIGURE.DWG PLOT DATE :7/20/2023 9:48 AM PLOT BY :RAVEN HARRY-ANKARLO

East Building Level 1

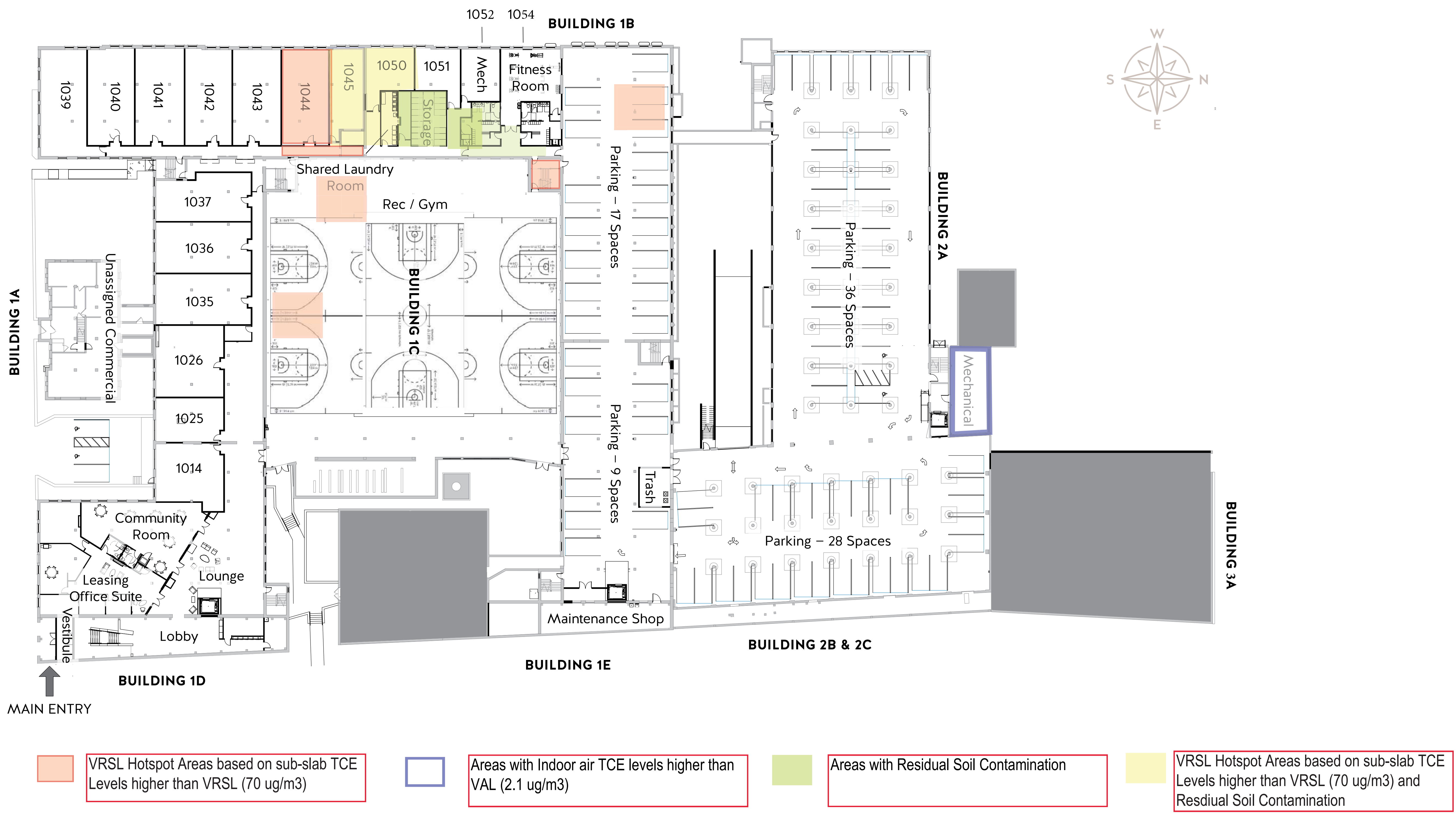


Figure 8. Locations of VAL and VRSL Exceedances and Residual Soil Contamination

TABLES

Table 1
Estimated Additional Soil Excavation Volumes and TCE Mass

Unit	Location	Area (square feet)	Depth (feet)	Volume (cubic yards)	Weight (tons)	TCE Concentration (mg/kg)	TCE in Soil (lbs)	Hazardous	Reason
Hall	Hall Outside 1044 and 1045	186	2.5	17.22	30.225	1.1	0.07	No	Subslab Vapor Exceedance
1044	Main	100	2.5	9.26	16.25	1.1	0.04	No	Subslab Vapor Exceedance
1045	Main	99	2.5	9.17	16.0875	3.7	0.12	No	Subslab Vapor Exceedance and Residual Soil Contamination
1045	Bedroom	100	2.5	9.26	16.25	1.1	0.04	No	Subslab Vapor Exceedance and Residual Soil Contamination
1050	Main	50	2.5	4.63	8.125	5.8	0.09	No	Subslab Vapor Exceedance and Residual Soil Contamination
Hall	Hall to 1050	126	2.5	11.67	20.475	210	8.58	Yes	Subslab Vapor Exceedance and Residual Soil Contamination
Hall	Corridor Outside 1048/1049	192	2.5	17.78	31.2	1.1	0.07	Yes	Residual Soil Contamination
1048	Laundry	150	2.5	13.89	24.375	110	5.35	Yes	Subslab Vapor Exceedance and Residual Soil Contamination
1056	Mechanical Electrical Room	92	2.5	8.52	14.95	1900	56.69	Yes	Residual Soil Contamination
1049	Storage Room	384	2.5	35.56	62.4	150	18.68	Yes	Residual Soil Contamination
Hall	Hall to 1051	109.72	2.5	10.16	17.8295	180	6.41	Yes	Residual Soil Contamination
1B-NW	Garage Near SW Garage Vapor Pin (Parking Space 2, Parking Space 6, and Parking Space 19)	400	3.5	51.85	91.00	1.10	0.20	No	Subslab Vapor Exceedance and Lack of Vacuum
N. Mech. Room	N. Mech. Room	100	3.5	12.96	22.75	1.40	0.06	No	Indoor Air Exceedance and Lack of Vacuum
1B-C	SW Portion of Gym (Vapor Pin BB1)	200	1.5	11.11	19.50	1.10	0.04	No	Subslab Vapor Exceedance, Lack of Vacuum
1B-C	S Portion of Gym (Vapor Pin BB2)	200	1.5	11.11	19.50	1.10	0.04	No	Subslab Vapor Exceedance, Lack of Vacuum
NW Gym Stairwell	NW Gym Stairwell	12	1.5	0.67	1.17	16.00	0.04	Yes	Subslab Vapor Exceedance and Lack of Vacuum
Total		**2,500.72**		**234.81**	**412.09**		**96.52**		

Table 2

Green Remediation Core Elements Analysis

Green Remediation Core Elements	Vapor Mitigation System / Soil Vapor Extracton*	Excavation and Disposal**	Engineered Barriers***
Minimize total energy use and maximum use of renewable energy	Can adjust Obar Fans rates over time to minimize energy use, as necessary. Backup power sources will consider energy sources.	Targeted excavation and disposal will minimize energy use to minimum required.	Local Contractors and Suppliers Used.
Minimize air pollutants and greenhouse gas emissions	Can adjust Obar Fans rates over time to minimize emissions, as necessary.	Electric equipment and vehicles used inside building.	Local source to minimize transport. Barriers will prevent air and dust emissions.
Minimize water use and impacts to water resources	No water used. Will remove residual contamination over time to further extents under building than is practicable with excavation.	No water used. Reduction of contamination will be more protective of groundwater.	Water only used in concrete. Barriers will reduce potential impacts to groundwater.
Optimize future land use and enhance ecosystem	Will redevelop Brownfield site in blighted neighborhood.	Will redevelop Brownfield site in blighted neighborhood.	Will redevelop Brownfield site in blighted neighborhood.
Reduce, reuse, and recycle materials and waste	No waste produced from VMS / SVE system.	Targeted excavation to only what is necessary. Concrete will be recycled.	Existing concrete recycled. Removal limited to hot spots.
Optimize sustainable management practices during stewardship	Systems will be optimized periodically.	Not applicable.	Barriers will be inspected and maintained to extend life.

*https://www.clu-in.org/greenremediation/docs/GR_fact_sheet_SVE_air-driven_systems.pdf

**https://www.clu-in.org/greenremediation/docs/GR_Quick_Ref_FS_exc_rest.pdf

***https://www.clu-in.org/greenremediation/docs/GR%20BMP%20fact%20sheet_materials&waste.pdf

Table 3
Estimated Cost of Selected Alternatives
Community Within the Corridor - East Block

	Task	Project Manager	Senior Engineer	Senior Geologist / Project Engineer	Staff Engineer	Drafting	Survey	Expenses	Engineering	Amount	Unit	Unit Cost	Unit	TOTAL COMMODITY	Total Cost for Alternative
	Task	$200.00	$145.00	$130.00	$115.00	$100.00	$100.00								
Remediation	Project Management, Nov to April (6 months)	48	16		8				$12,840.00	1		$56.00		$56.00	$ 12,896.00
	Weekly Project Team Meeting	24							$4,800.00					$0.00	$ 4,800.00
	Weekly Reporting, Nov and Dec		16		24				$5,080.00					$0.00	$ 5,080.00
	RAOR Preparation	4	40		60	48			$18,300.00					$0.00	$ 18,300.00
	Preparation for Remediation	4	8		16				$3,800.00					$0.00	$ 3,800.00
	Waste Profiling for Hazardous and Non-Hazardous Waste		8						$1,160.00					$0.00	$ 1,160.00
	GC Monitoring - August to Dec, 2023				180				$20,700.00	5		$25,000.00		$125,000.00	$ 145,700.00
	Vapor Mitigation System Improvements								$0.00	1	Blowers	$195,000.00		$195,000.00	$ 195,000.00
	Construction Oversight for Soil Remediation, Nov and Dec				180				$20,700.00					$0.00	$ 20,700.00
	Removal of Concrete Slab								$0.00	1	concrete	$49,600.00		$49,600.00	$ 49,600.00
	Excavation and Handling of Contaminated soils								$0.00	410		$476.00		$195,160.00	$ 195,160.00
	Transporting &Tipping Fee for Non-Hazardous Waste								$0.00	240		$82.00		$19,680.00	$ 19,680.00
	Transportation and Tipping Fee for Hazardous Soils								$0.00	170		$700.00		$119,000.00	$ 119,000.00
	Restoration of Concrete Surface within the living space								$0.00	2500		$42.00		$105,000.00	$ 105,000.00
	In-Situ Chemical Treatment of Residual TCE Contaminated Soils	4	16		40				$7,720.00	1	Potassium Permanganate				$ 7,720.00
	Sealing of Select Columns				16				$1,840.00					$0.00	$ 1,840.00
	Preparation of Constrction Documentation Report	4	24	8	60	40			$16,220.00					$0.00	$ 16,220.00
	Preparation of O & M Report		16		24	12			$6,280.00					$0.00	$ 6,280.00
	Groundwater Sampling, two rounds			20	20	8			$5,700.00	300		$10.00		$3,000.00	$ 8,700.00
	Additional Groundwater Investigation		12	32		24	8	$24.00	$9,124.00	5		$3,000.00		$15,000.00	$ 24,124.00
	Tweaking of Vapor Mitigation System for three weeks		8		60			$120.00	$8,180.00	21		$1,400.00		$29,400.00	$ 37,580.00
	Backup Power								$0.00	1		$50,000.00		$50,000.00	$ 50,000.00
	Plumbing								$0.00	1		$50,000.00		$50,000.00	$ 50,000.00
	Electrical								$0.00	1		$25,000.00		$25,000.00	$ 25,000.00
	WDNR Reporting, August to December, 2023	60	80	100	60				$43,500.00					$0.00	$ 43,500.00
Total Cost - Remediation															**$ 1,166,840.00**
Commissioning	Preparation of Commissioning Plan and Approval, First Round	1	4		24	4			$3,940.00	50	1	$300.00		$15,000.00	$ 18,940.00
	Implementation of Commissioning including Testing		2		40			$24.00	$4,914.00	2	GC	$1,500.00		$3,000.00	$ 7,914.00
	Comissioning Report Preparation	1	4		24	4			$3,940.00					$0.00	$ 3,940.00
	Preparation of Commissioning Plan and Approval	1	4		24	4			$3,940.00	50		$300.00		$15,000.00	$ 18,940.00
	Implementation of commissioning including testing		2		40	4			$5,290.00	2	GC	$1,500.00		$3,000.00	$ 8,290.00
	Comissioning Report Preparation	1	4		24	4			$3,940.00					$0.00	$ 3,940.00
	Preparation of Commissioning Plan and Approval, 3rd round	1	4		24	4			$3,940.00	50		$300.00		$15,000.00	$ 18,940.00
	Implementation of Commissioning including Testing		2		40	4			$5,290.00	2	GC	$1,500.00		$3,000.00	$ 8,290.00
	Commissioning Report Preparation	1	2		24	4			$3,650.00					$0.00	$ 3,650.00
Total Cost - Commissioning															**$ 92,844.00**
O & M	Telemetry and Remote Monitoring (three years, 36 months)	12	36		144			$72.00	$24,252.00	1		$12,000.00	1	$12,000.00	$ 36,252.00
	Quarterly Site Visit and Maintenance, 36 months	12	48		96			$96.00	$20,496.00					$0.00	$ 20,496.00
	Semi-Annual Reporting, three years	8	24		48			$1,200.00	$11,800.00					$0.00	$ 11,800.00
Total Cost - O & M															**$ 68,548.00**
GW Monitoring	Post-Remediation GW Monitoring, four rounds	4	8	48		56			$13,800.00	4		$1,200.00		$4,800.00	$ 18,600.00
Total Cost - GW Monitoring															**$ 18,600.00**
Closure	Well Abandonment			8		8			$1,840.00	1		$5,000.00	1	$5,000.00	$ 6,840.00
	Closure Documentation package Preparation	2	16		60	24		$1,700.00	$13,720.00						$ 13,720.00
Total Cost - Closure Documentation															**$ 20,560.00**
Total Costs/Hours	**Engineering**	192	404	216	1360	252	8	$3,236.00							**$ 310,696.00**
	Commodity														**$ 1,056,696.00**
Grand Total															**$ 1,367,392.00**

**WDNR Fees to be paid by client
**This is an estimate only
**This estimate does not include the cost of chemical injection which is unknown at this time

APPENDICES

APPENDIX A

Data from Indoor Air Monitoring

Appendix A

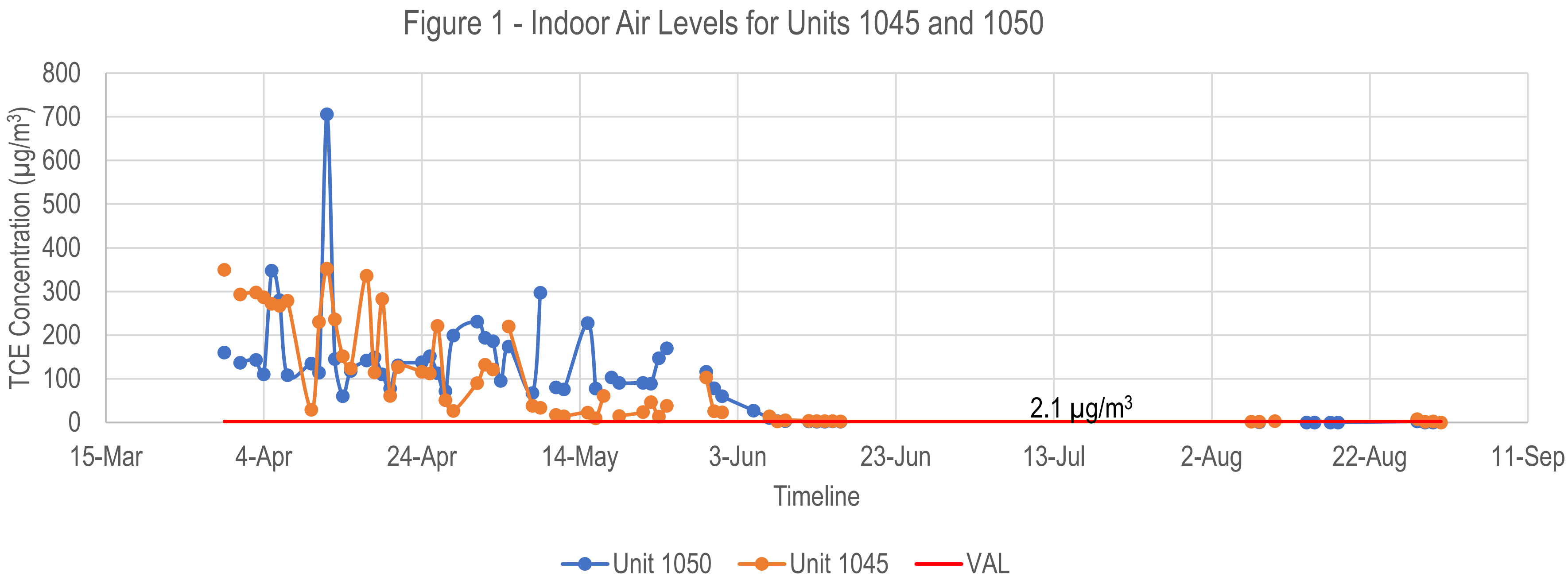


Figure 1 - Indoor Air Levels for Units 1045 and 1050
TCE Concentration (µg/m3)
800
700
600
500
400
300
200
100
0
2.1 µg/m3
15-Mar
4-Apr
24-Apr
14-May
3-Jun
23-Jun
13-Jul
2-Aug
22-Aug
11-Sep
Timeline
Unit 1050
Unit 1045
VAL

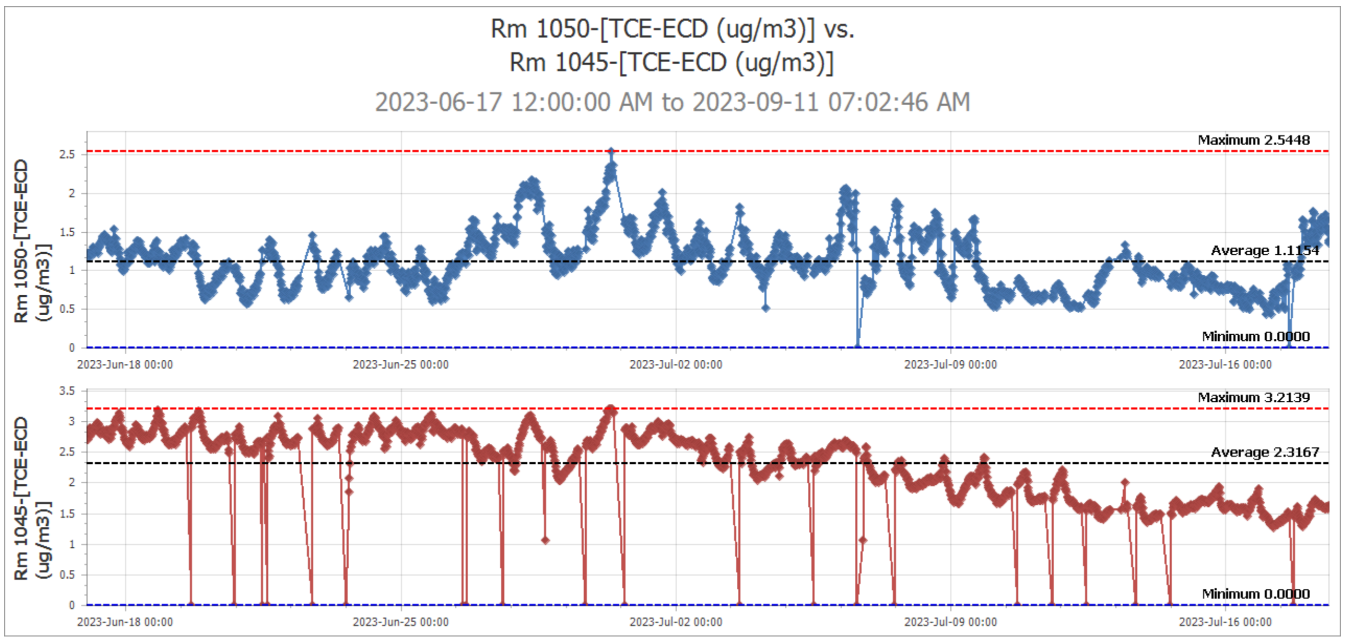
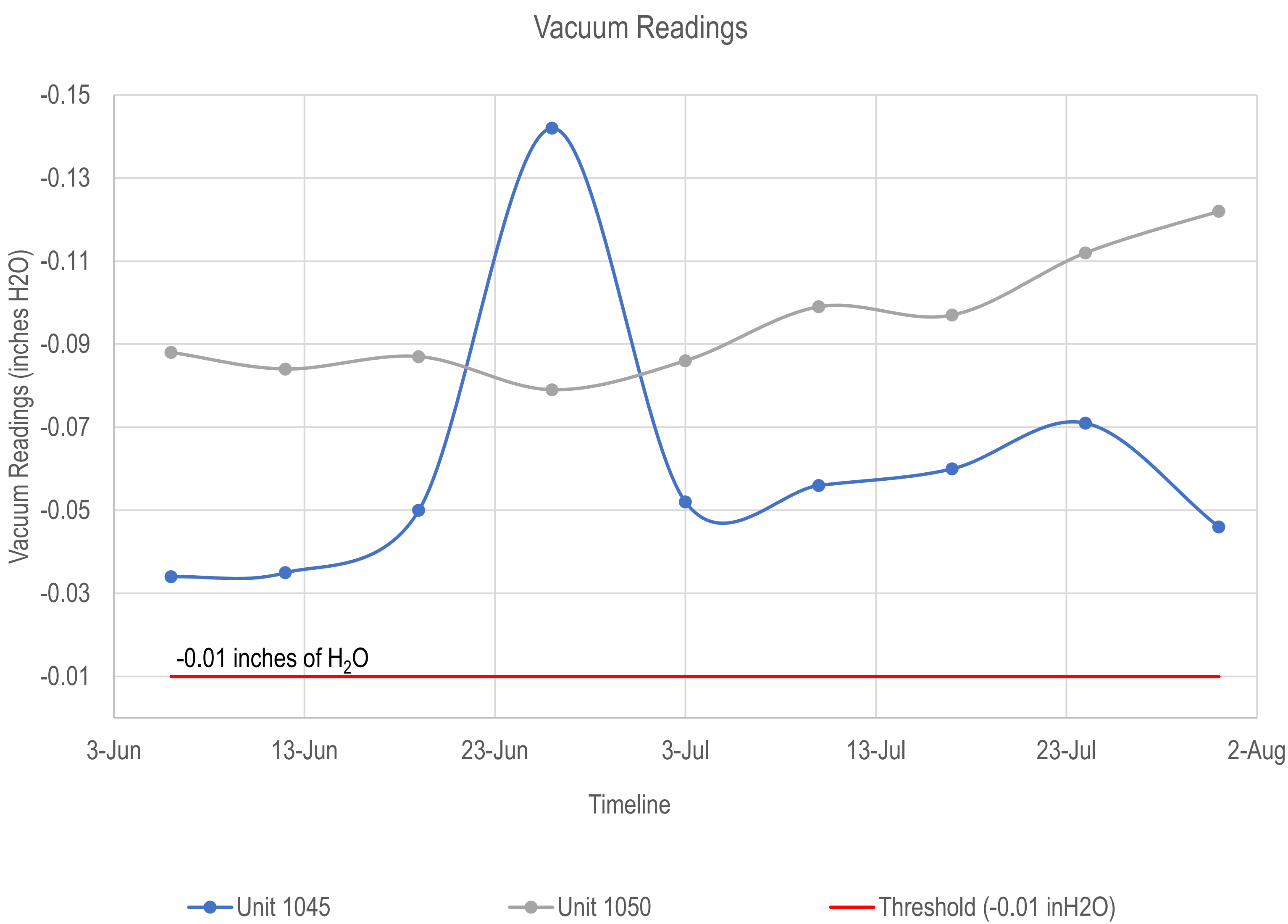
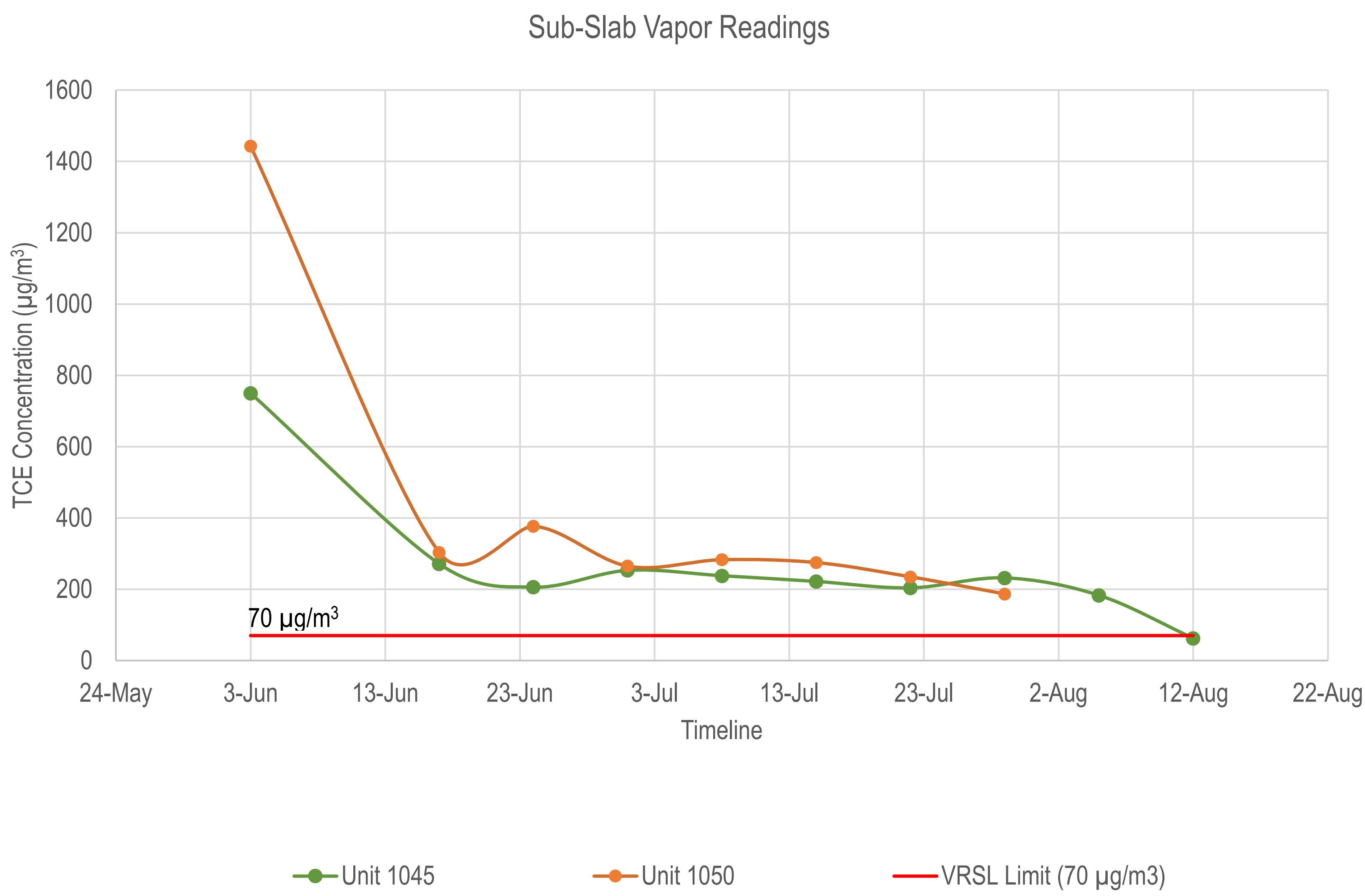

Rm 1050-[TCE-ECD (ug/m3)] vs.
Rm 1045-[TCE-ECD (ug/m3)]
2023-06-17 12:00:00 AM to 2023-09-11 07:02:46 AM
Rm 1050-[TCE-ECD (ug/m3)]
Maximum 2.5448
Average 1.1154
Minimum 0.0000
Rm 1045-[TCE-ECD (ug/m3)]
Maximum 3.2139
Average 2.3167
Minimum 0.0000
2023-Jun-18 00:00
2023-Jun-25 00:00
2023-Jul-02 00:00
2023-Jul-09 00:00
2023-Jul-16 00:00

Figure 2



Vacuum Readings
-0.15
-0.13
-0.11
-0.09
-0.07
-0.05
-0.03
-0.01
Vacuum Readings (inches H2O)
-0.01 inches of H_2O
3-Jun
13-Jun
23-Jun
3-Jul
13-Jul
23-Jul
2-Aug
Timeline
Unit 1045
Unit 1050
Threshold (-0.01 inH2O)

Figure 3



Sub-Slab Vapor Readings
TCE Concentration (µg/m3)
1600
1400
1200
1000
800
600
400
200
0
70 µg/m3
24-May
3-Jun
13-Jun
23-Jun
3-Jul
13-Jul
23-Jul
2-Aug
12-Aug
22-Aug
Timeline
Unit 1045
Unit 1050
VRSL Limit (70 µg/m3)

Figure 4

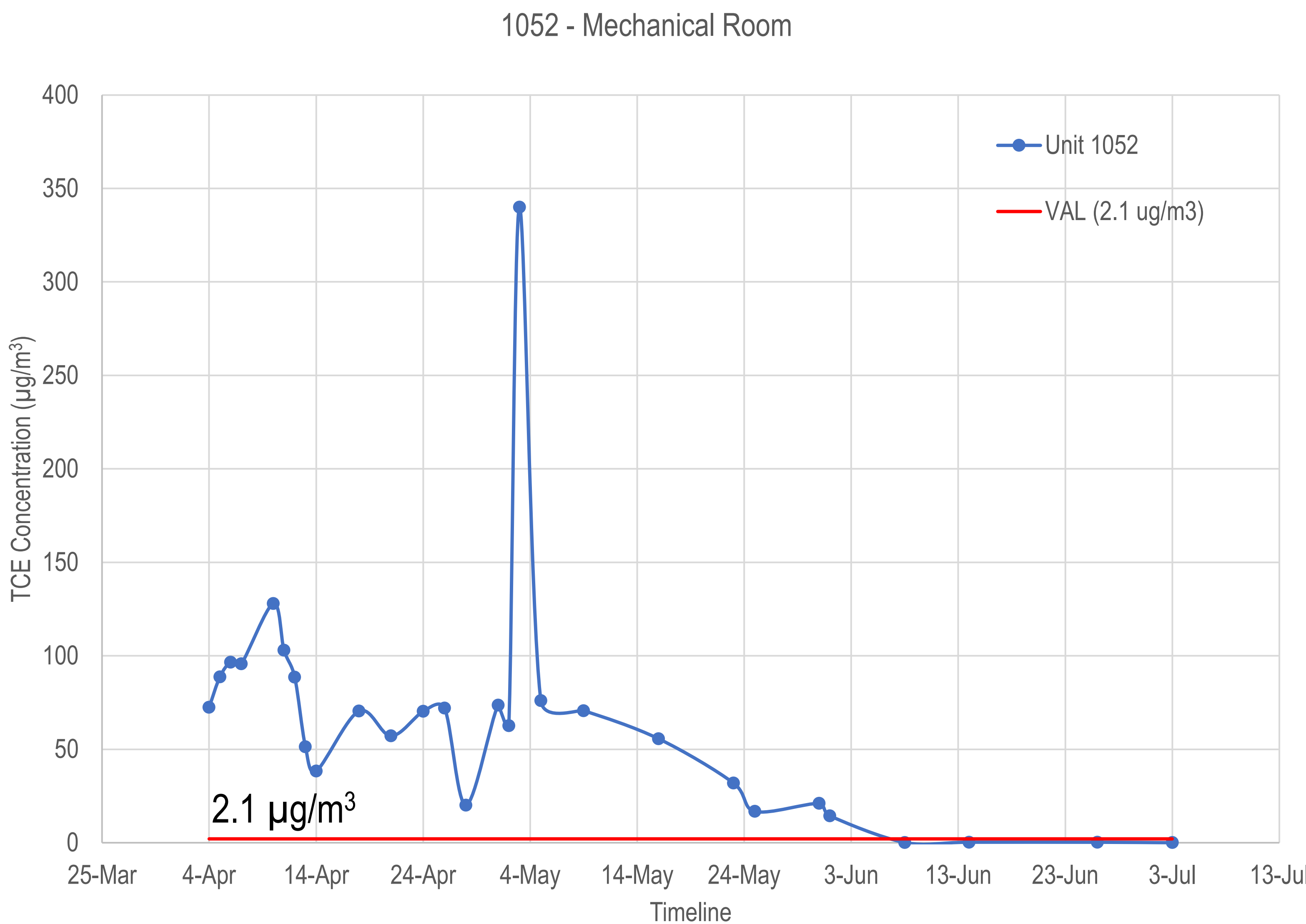
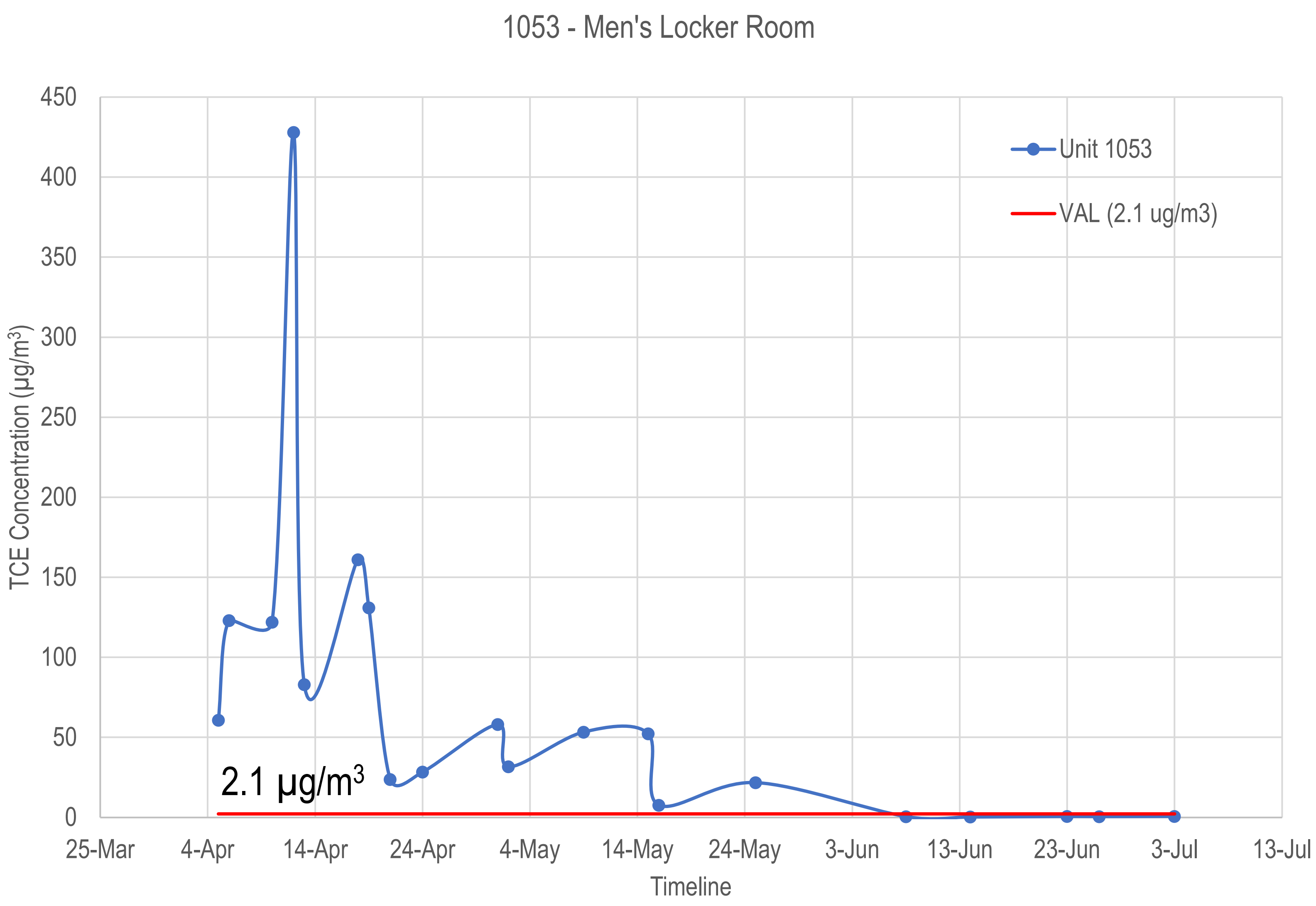

1052 - Mechanical Room
Unit 1052
VAL (2.1 ug/m3)
2.1 µg/m3
TCE Concentration (µg/m3)
0
50
100
150
200
250
300
350
400
25-Mar
4-Apr
14-Apr
24-Apr
4-May
14-May
24-May
3-Jun
13-Jun
23-Jun
3-Jul
13-Jul
Timeline

Figure 5



1053 - Men's Locker Room
Unit 1053
VAL (2.1 ug/m3)
2.1 µg/m3
TCE Concentration (µg/m3)
450
400
350
300
250
200
150
100
50
0
25-Mar
4-Apr
14-Apr
24-Apr
4-May
14-May
24-May
3-Jun
13-Jun
23-Jun
3-Jul
13-Jul
Timeline

Figure 6

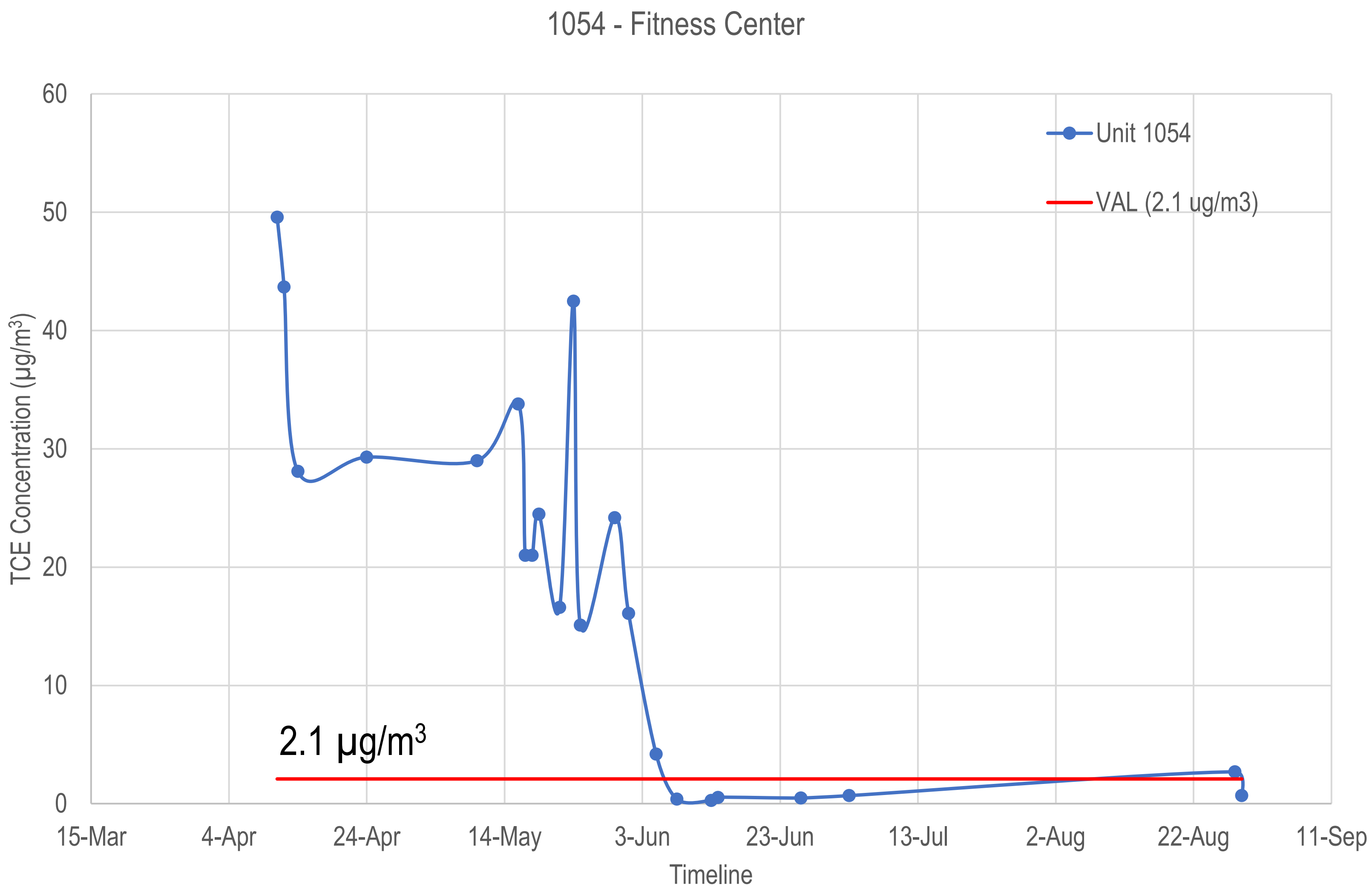
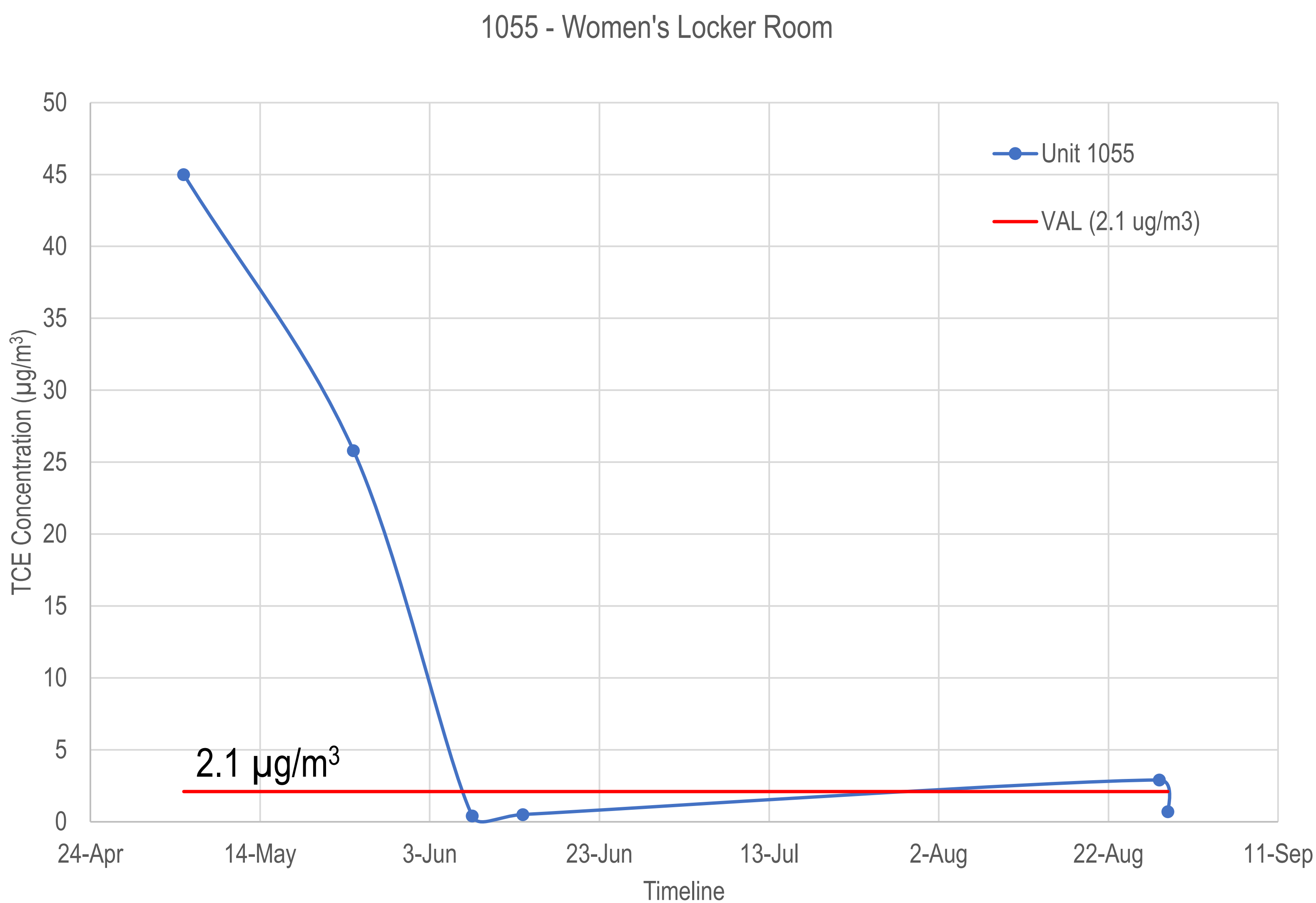
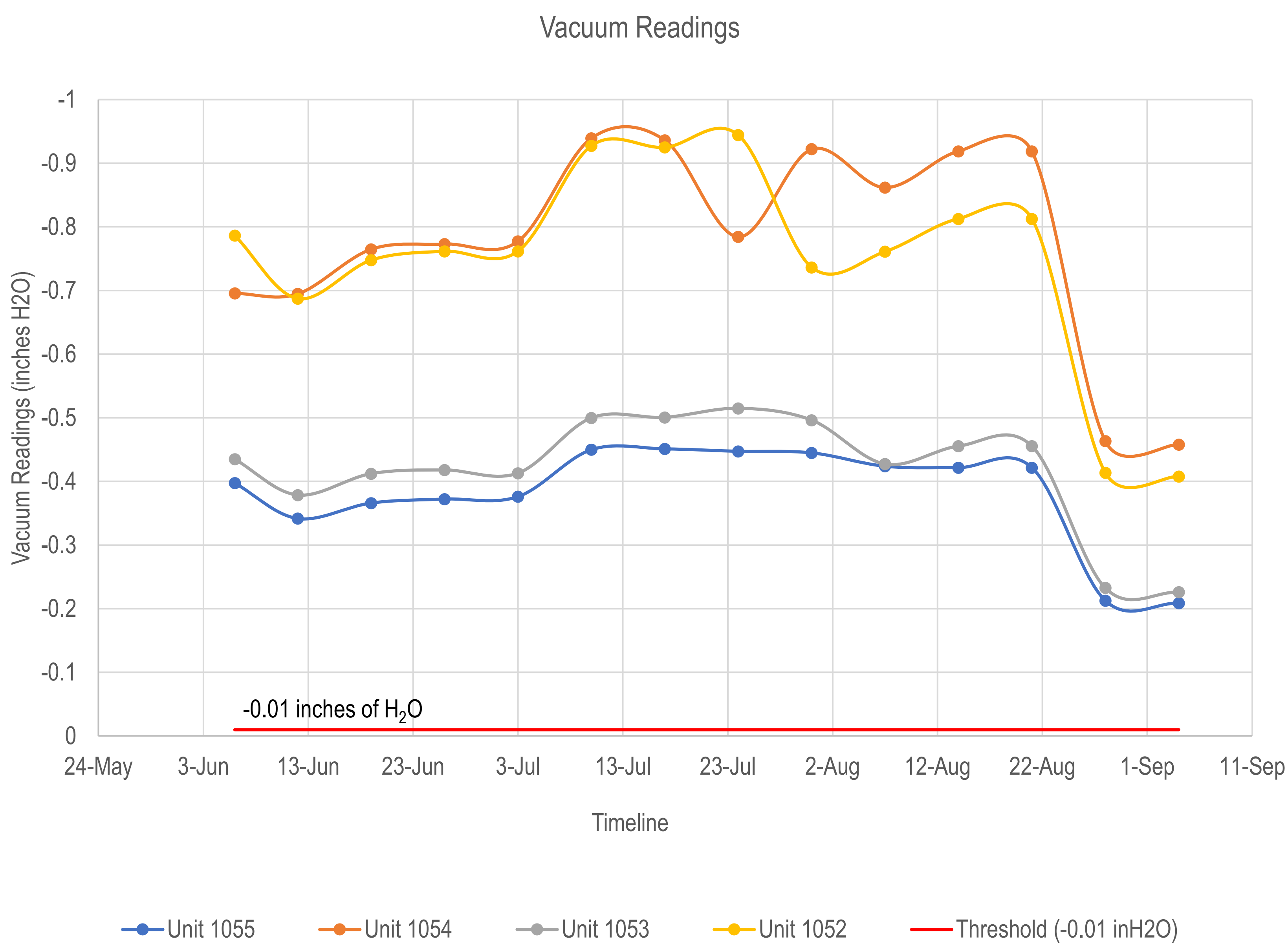

1054 - Fitness Center
Unit 1054
VAL (2.1 ug/m3)
2.1 µg/m3
TCE Concentration (µg/m3)
60
50
40
30
20
10
0
15-Mar
4-Apr
24-Apr
14-May
3-Jun
23-Jun
13-Jul
2-Aug
22-Aug
11-Sep
Timeline

Figure 7



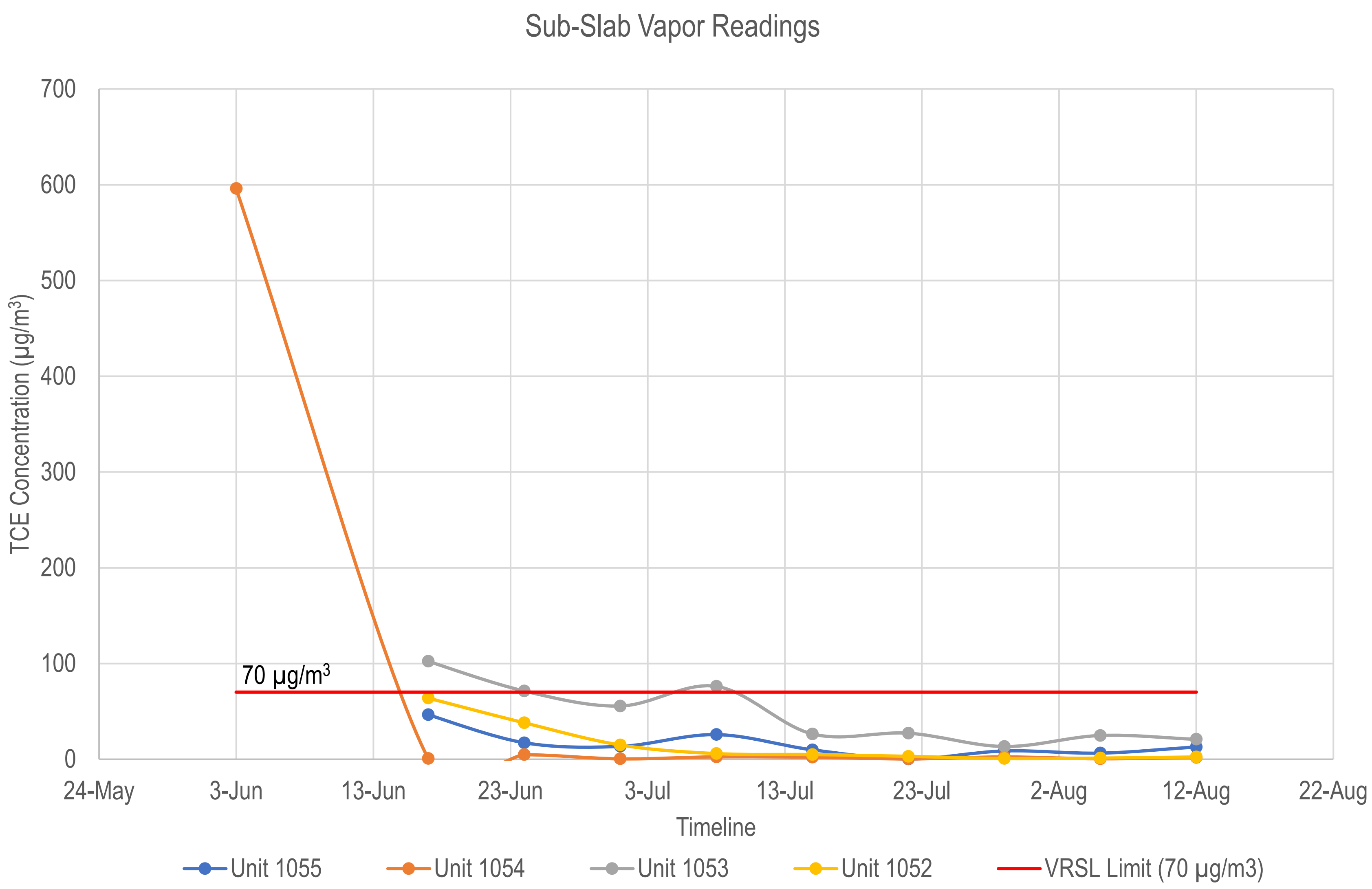
1055 - Women's Locker Room
Unit 1055
VAL (2.1 ug/m3)
2.1 µg/m3
TCE Concentration (µg/m3)
50
45
40
35
30
25
20
15
10
5
0
24-Apr
14-May
3-Jun
23-Jun
13-Jul
2-Aug
22-Aug
11-Sep
Timeline

Figure 8



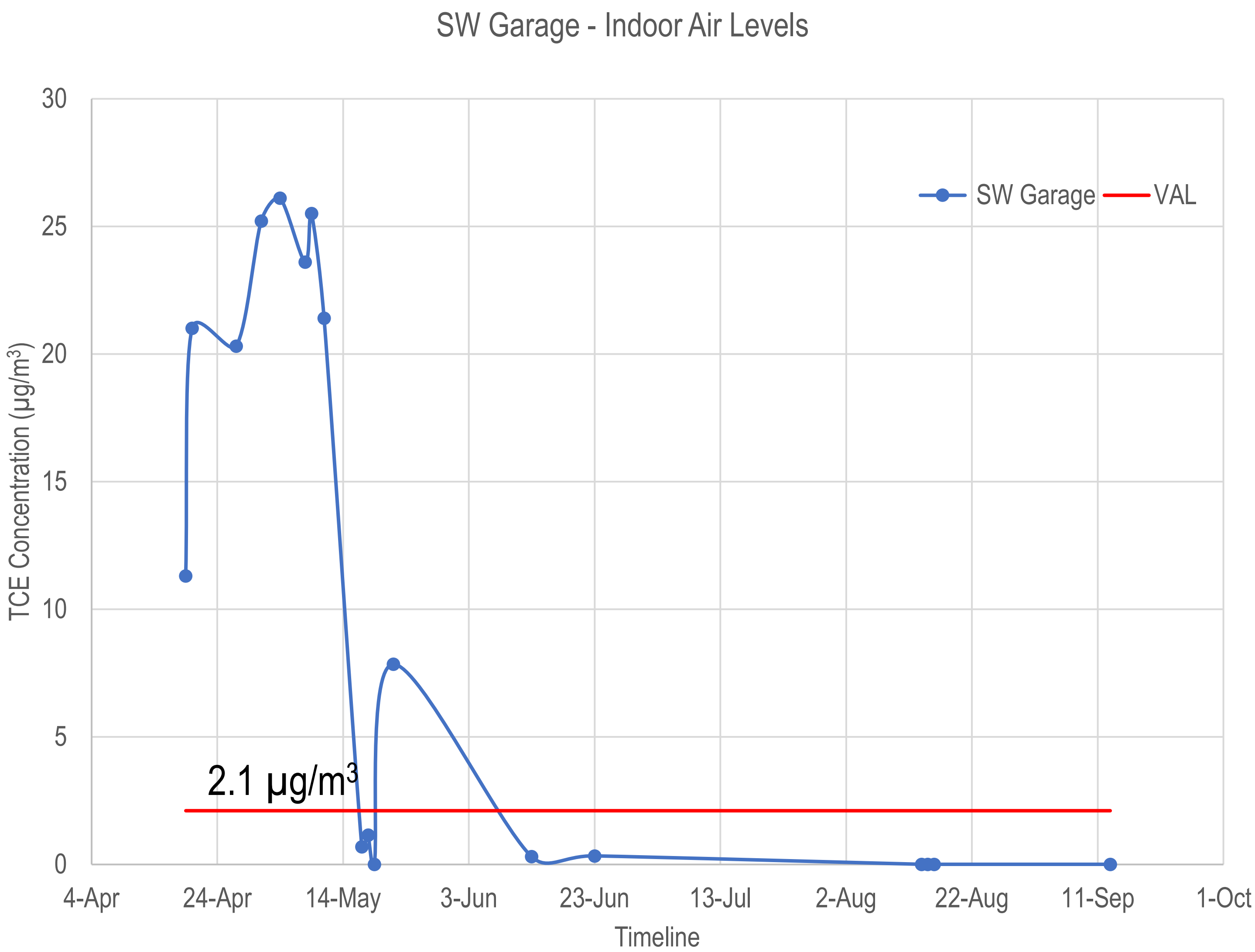
Vacuum Readings
-1
-0.9
-0.8
-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0
Vacuum Readings (inches H2O)
-0.01 inches of H2O
24-May
3-Jun
13-Jun
23-Jun
3-Jul
13-Jul
23-Jul
2-Aug
12-Aug
22-Aug
1-Sep
11-Sep
Timeline
Unit 1055
Unit 1054
Unit 1053
Unit 1052
Threshold (-0.01 inH2O)

Figure 9



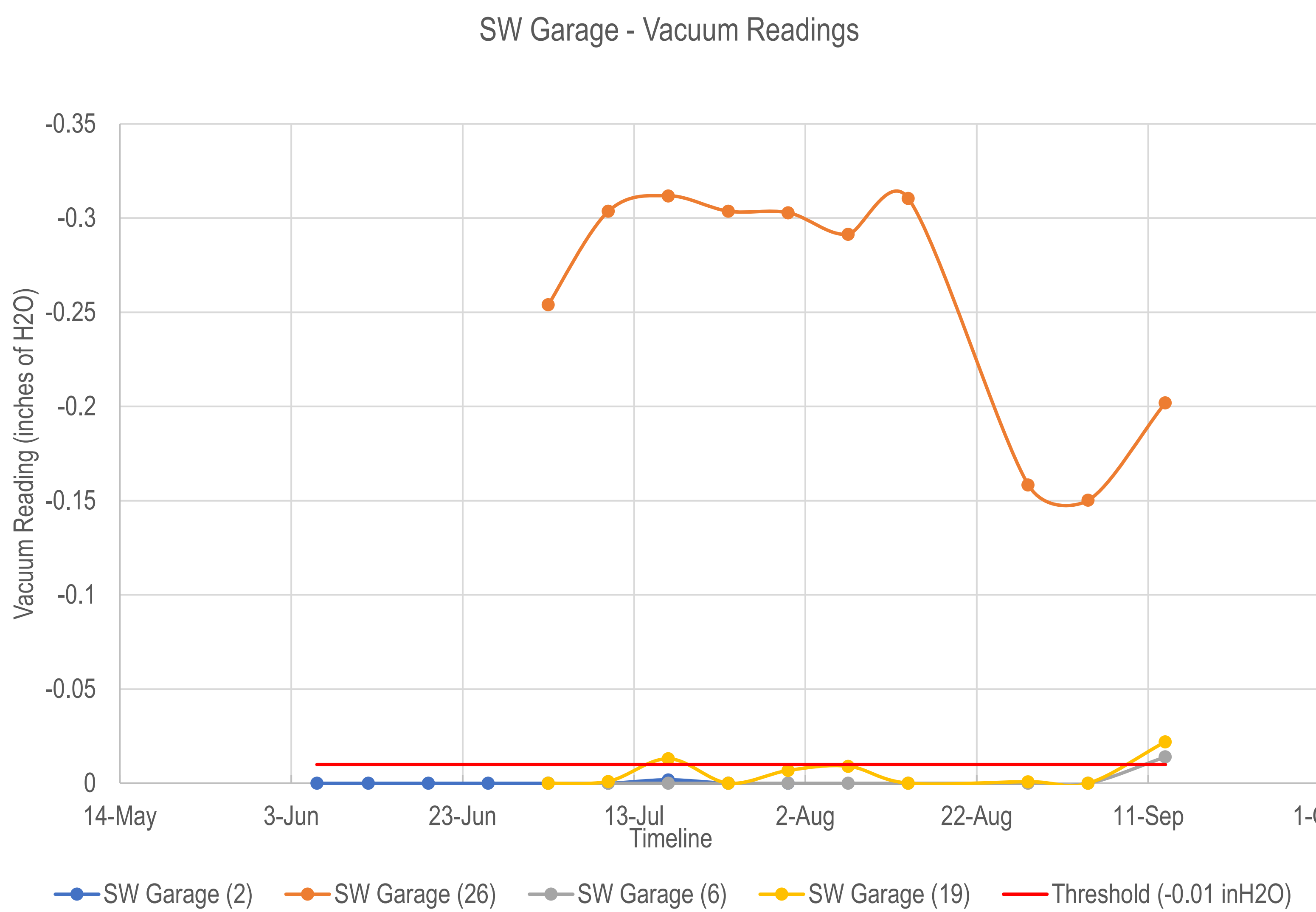
Sub-Slab Vapor Readings
TCE Concentration (µg/m3)
700
600
500
400
300
200
100
0
70 µg/m3
24-May
3-Jun
13-Jun
23-Jun
3-Jul
13-Jul
23-Jul
2-Aug
12-Aug
22-Aug
Timeline
Unit 1055
Unit 1054
Unit 1053
Unit 1052
VRSL Limit (70 µg/m3)

Figure 10



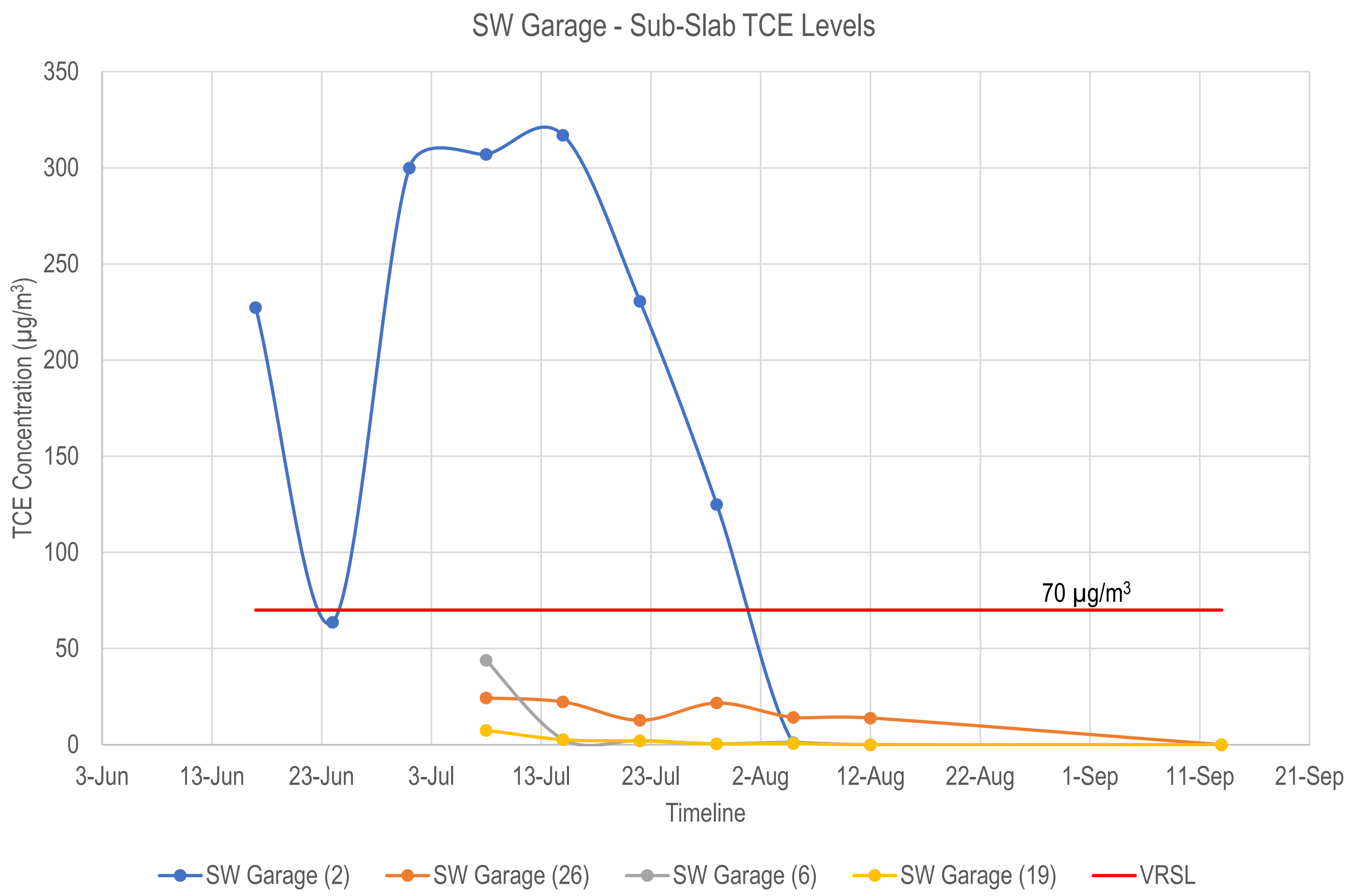
SW Garage - Indoor Air Levels
SW Garage
VAL
TCE Concentration (µg/m³)
30
25
20
15
10
5
0
2.1 µg/m³
4-Apr
24-Apr
14-May
3-Jun
23-Jun
13-Jul
2-Aug
22-Aug
11-Sep
1-Oct
Timeline

Figure 11



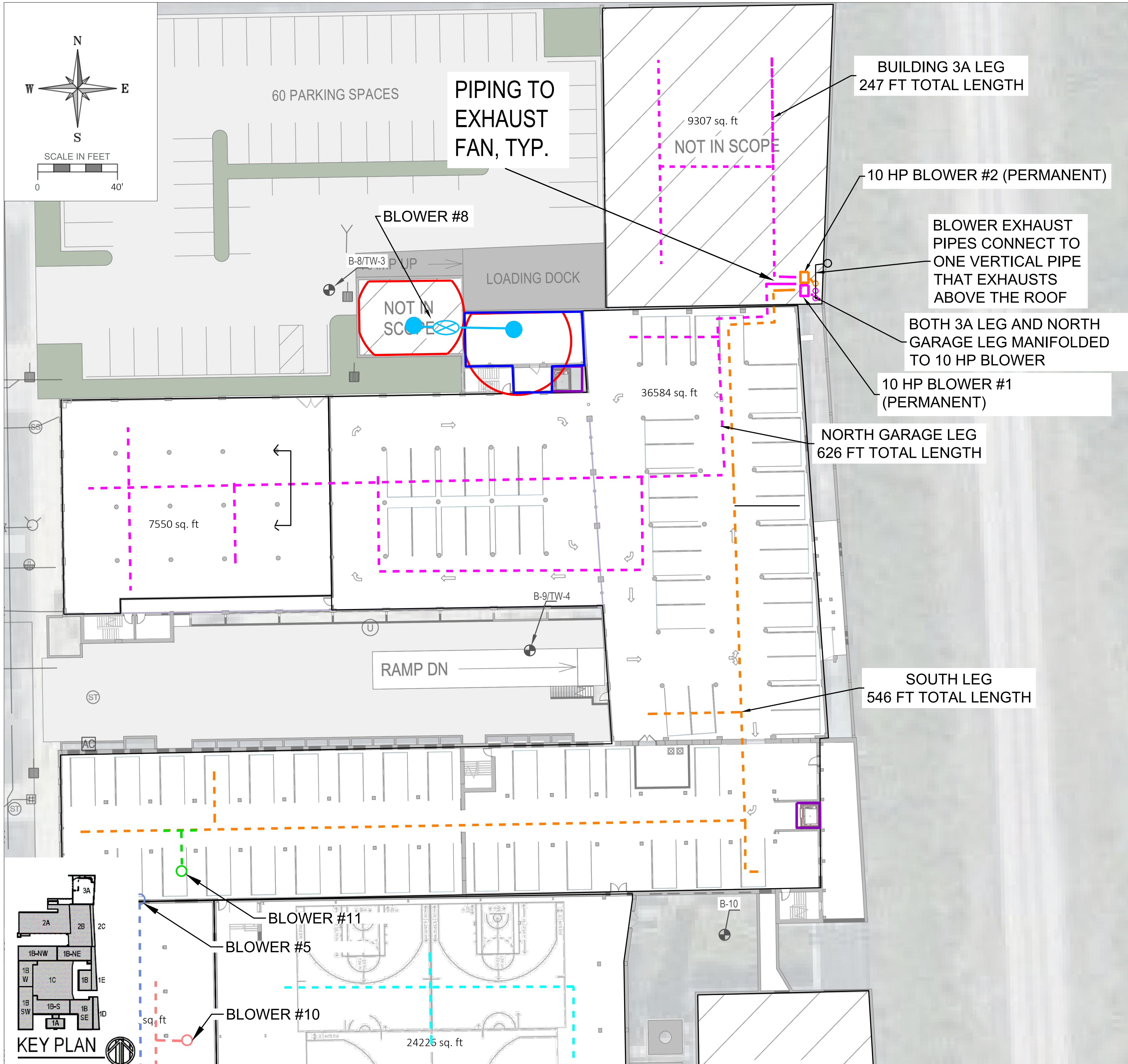
SW Garage - Vacuum Readings
Vacuum Reading (inches of H2O)
-0.35
-0.3
-0.25
-0.2
-0.15
-0.1
-0.05
0
14-May
3-Jun
23-Jun
13-Jul
2-Aug
22-Aug
11-Sep
1-Oct
Timeline
SW Garage (2)
SW Garage (26)
SW Garage (6)
SW Garage (19)
Threshold (-0.01 inH2O)

Figure 12



SW Garage - Sub-Slab TCE Levels
350
300
250
200
150
100
50
0
TCE Concentration (µg/m3)
70 µg/m3
3-Jun
13-Jun
23-Jun
3-Jul
13-Jul
23-Jul
2-Aug
12-Aug
22-Aug
1-Sep
11-Sep
21-Sep
Timeline
SW Garage (2)
SW Garage (26)
SW Garage (6)
SW Garage (19)
VRSL

APPENDIX B
Vapor Mitigation System Layout



LEGEND

- Sub-Slab Sampling Locations (51)
- Previous Boring and Temporary Well Locations
- Known Elevator Shaft
- 1 - Bedroom Apartment
- 2 - Bedroom Apartment
- 3 - Bedroom Apartment
- 4 - Bedroom Apartment
- Studio Apartment
- Slotted Horizontal Extraction Piping (North Garage and 3A leg)
- Slotted Horizontal Extraction Piping (SW Garage)
- Slotted Horizontal Extraction Piping (SE leg)
- Slotted Horizontal Extraction Piping (Building 1B-S leg)
- Slotted Horizontal Extraction Piping (Gym leg)
- Slotted Horizontal Extraction Piping (Building 1B-SW leg)
- Slotted Horizontal Extraction Piping (Building 1B-W Hallway)
- Slotted Horizontal Extraction Piping (Building 1B-W leg)
- Slotted Horizontal Extraction Piping (Units 1044, 1045, 1050)
- Slotted Horizontal Extraction Piping (Laundry Room, Mechanical Room, Storage Room)
- Slotted Horizontal Extraction Piping (SW Garage Connection)

NOTES:
1. SAMPLING LOCATIONS AND VAPOR EXTRACTION POINTS ARE APPROXIMATE

KSingh Engineers Scientists Consultants
3636 North 124th Street
Wauwatosa, WI 53222
262-821-1171

CONSULTANT

CONSULTANT

CONSULTANT

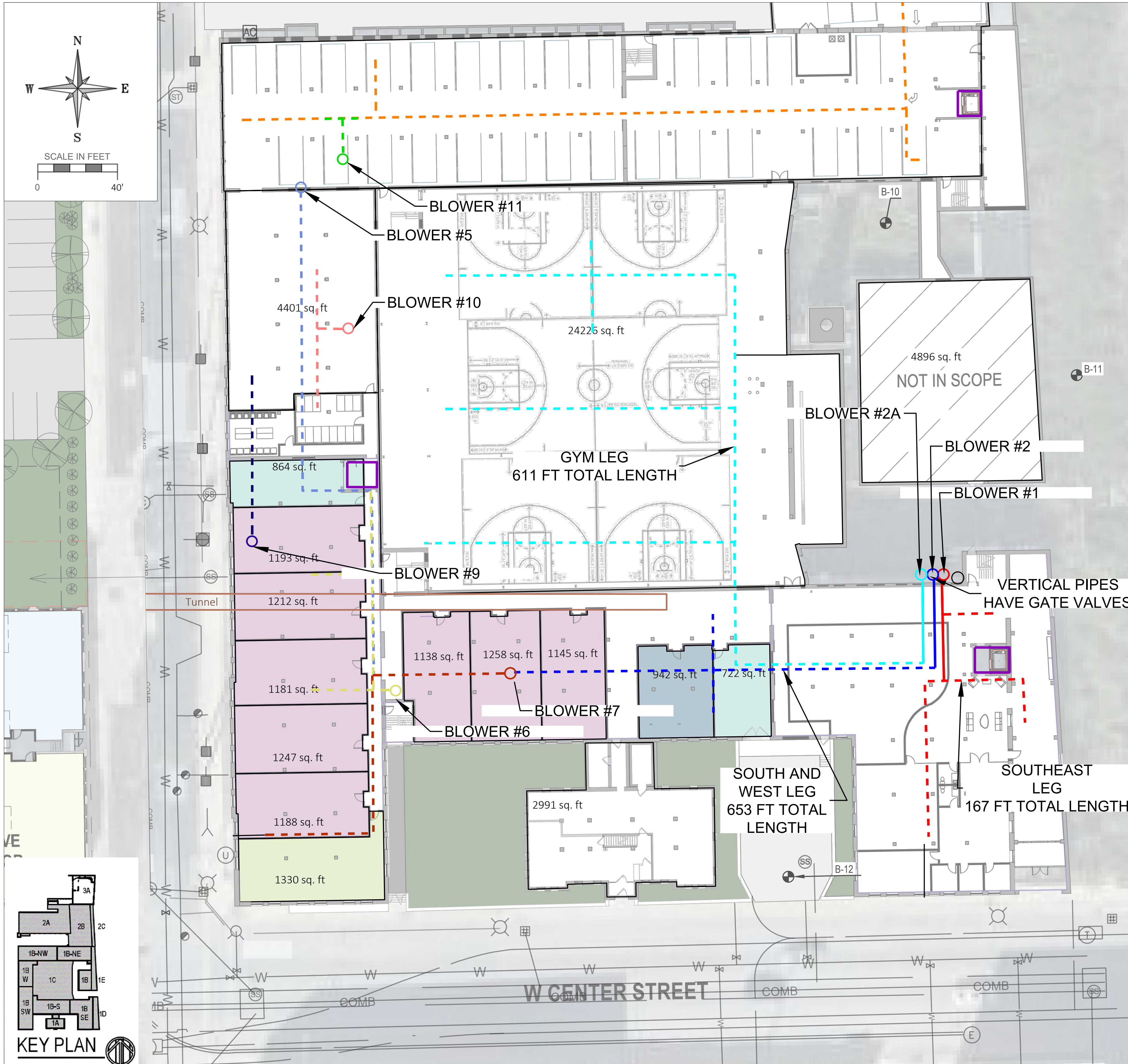
PROJECT TITLE: COMMUNITY WITHIN THE CORRIDOR
2748 N 32ND STREET
MILWAUKEE, WI 53210
PROJECT NUMBER: 40441

CLIENT: COMMUNITY WITHIN THE CORRIDOR LIMITED PARTNERSHIP

SHEET TITLE
VAPOR MITIGATION AS-BUILT LAYOUT SOUTH

FIGURE 3A

0.019



LEGEND

- Sub-Slab Sampling Locations (51)
- Previous Boring and Temporary Well Locations
- Known Elevator Shaft
- 1 - Bedroom Apartment
- 2 - Bedroom Apartment
- 3 - Bedroom Apartment
- 4 - Bedroom Apartment
- Studio Apartment

- Slotted Horizontal Extraction Piping (North Garage and 3A leg)
- Slotted Horizontal Extraction Piping (SW Garage)
- Slotted Horizontal Extraction Piping (SE leg)
- Slotted Horizontal Extraction Piping (Building 1B-S leg)
- Slotted Horizontal Extraction Piping (Gym leg)
- Slotted Horizontal Extraction Piping (Building 1B-SW leg)
- Slotted Horizontal Extraction Piping (Building 1B-W Hallway)
- Slotted Horizontal Extraction Piping (Building 1B-W leg)
- Slotted Horizontal Extraction Piping (Units 1044, 1045, 1050)
- Slotted Horizontal Extraction Piping (Laundry Room, Mechanical Room, Storage Room)
- Slotted Horizontal Extraction Piping (SW Garage Connection)

NOTES:
1. SAMPLING LOCATIONS AND VAPOR EXTRACTION POINTS ARE APPROXIMATE

KSingh
Engineers
Scientists
Consultants
3636 North 124th Street
Wauwatosa, WI 53222
262-821-1171

CONSULTANT

CONSULTANT

CONSULTANT

PROJECT TITLE: COMMUNITY WITHIN THE CORRIDOR
2748 N 32ND STREET
MILWAUKEE, WI 53210
PROJECT NUMBER: 40441

CLIENT: COMMUNITY WITHIN THE CORRIDOR LIMITED PARTNERSHIP

REVISIONS	DATE	DESCRIPTION

DRAWN BY	DATE
JDS	04/14/2023
CHECKED BY	DATE
RR	04/14/2023

SHEET TITLE
VAPOR MITIGATION
AS-BUILT LAYOUT SOUTH

FIGURE 3B

FILE NAME :C:\USERS\CAD\ONEDRIVE - K SINGH\PROJECTS\40441B CWC ER\ENV\CADD\CWC - VAPOR MITIGATION SYSTEM NORTH AND SOUTH.DWG PLOT DATE :8/17/2023 6:10 PM PLOT BY :CAD

APPENDIX C

GC TCE Measurements of Blower Effluent and Estimated Removal Rates

KSingh | Engineers Scientists Consultants

Table 1

TCE Measurements of Blower Effluent and Removal							
TCE Removal (lbs in Month)							
Blower No.	**May**	**June**	**July**	**August**	**September**	**October**	**Total**
1	0.0172	0.0619	0.0250	0.0039	0.0049	0.0033	0.1162
2	0.0313	0.0206	0.0190	0.0149	0.0144	0.0166	0.1168
2A				0.0277	0.0201	0.0170	0.0648
3+4	0.0241	0.0154	0.0387	0.0471	0.0220	0.0154	0.1626
5		0.4196	0.2556	0.3277	0.1883	0.3067	1.4978
6		0.0229	0.0085	0.0886	0.0445	0.0669	0.2315
7		0.0093	0.0210	0.0179	0.0000	0.0212	0.0694
8		0.0015		0.0052	0.0066	0.0035	0.0168
9				0.0001	0.0004	0.0011	0.0015
10					0.0003	0.0011	0.0014
11					0.0252	0.0292	0.0544
Total	0.0726	0.5511	0.3677	0.5330	0.3267	0.4821	**2.3332**
Cumulative Flow Rate (cfm)	1342	2078	2766	3523	3817	4422	**17948**

APPENDIX D

Summary of Differential Pressure Measurements at Vapor Pins

Appendix D - Summary of Differential Pressure Measurements at Vapor Pins

Location	June	July	August	September
1055	-0.369	-0.431	-0.376	-0.211
1054	-0.732	-0.859	-0.791	-0.457
1053	-0.411	-0.482	-0.403	-0.224
Oppo. 1054	-0.244	-0.300	-0.244	-0.103
Stairwell 4	-0.002	-0.003	-0.022	-0.005
1052	-0.746	-0.889	-0.681	-0.410
1051	-0.176	-0.208	-0.230	
1049	-0.170	-0.211	-0.085	
1048	-0.072	-0.086	-0.101	
1050	-0.081	-0.098	-0.122	
Out 1050	-0.101	-0.133	-0.167	
1045	-0.065	-0.060	-0.046	
Out 1044	-0.093	-0.155	-0.109	-0.034
1043	-0.017	-0.046	-0.056	-0.014
1042	-0.013	-0.029	-0.050	-0.034
1041	-0.039	-0.061	-0.087	-0.031
1040	-0.021	-0.067	-0.080	-0.032
Out 1040	-0.036	-0.091	-0.126	-0.053
1039	-0.007	-0.017	-0.029	-0.035
1037	-0.033	-0.050	-0.115	-0.043
1036	-0.094	-0.125	-0.235	-0.013
1035	-0.058	-0.071	-0.143	-0.017
Out 1035	-0.019	-0.022	-0.063	-0.007
1058 E	-0.043	-0.049	-0.104	-0.018
1058 W	-0.057	-0.063	-0.135	-0.008
1026	-0.075	-0.086	-0.168	-0.044
1025	-0.057	-0.052	-0.141	-0.054
1014	-0.220	-0.198	-0.572	-0.240
1011	-0.330	-0.049	-0.155	-0.090
SE Lobby	-0.292	-0.534	-1.524	-0.827
BB 1	-0.019	-0.014	-0.121	
BB 2	-0.019	-0.009	-0.019	
BB 3	-0.049	-0.045	-0.123	-0.081
BB 4	-0.019	-0.008	-0.029	-0.567
BB 5	-0.024	-0.020	-0.052	-0.033
SW Garage (2)		0.000	0.000	
SW Garage (26)		-0.293	-0.266	-0.167
SW Garage (6)		0.000	0.000	-0.009
SW Garage (19)		-0.004	-0.004	-0.015
SE Garage (11)		-0.018	-0.014	-0.017
SE Garage (14)		-0.037	-0.037	-0.034
NW Garage (80)		-0.032	-0.034	-0.025
NE Garage (36)		-1.602	-1.625	-1.703
N Mech Room		0.000	0.000	

APPENDIX E

GC TCE Measurements of Indoor Air

Community Within the Corridor - East Block

Appendix E - GC TCE Measurements of Indoor Air

Sample Location	30-Mar	31-Mar	1-Apr	3-Apr	4-Apr	5-Apr	6-Apr	7-Apr	10-Apr	11-Apr	12-Apr	13-Apr	14-Apr	15-Apr	17-Apr	18-Apr	19-Apr	20-Apr	21-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr
1045 Entry Floor Hole			400																					
1045 North Wall			360																					
1045 Wood Column			1500								352													
1050 South Wall Hole			8000																					
1st Floor Hallway Center	15				3.5	17.7	64	25	81.1	35		42.7	63.3	106	181	147	8.5	22.4	7.4	7.8		4.7	17.7	2.7
1st Floor Hallway North	10																							
1st Floor Hallway South	5.2																							
2081 Hallway		0																						
2nd Floor Corridor North		0																						
2nd Floor Corridor South		0																						
2nd Floor Hallway Center	0.7											3	3.6											
2nd Floor Hallway North	0.8	0																						
2nd Floor Hallway South	0.8																							
Stairwell 2	3.2	2																		4.5				2.9
2nd Floor Stairwell 4		0																			12.4			
2nd Floor Stairwell 8		0																						
3rd Floor Corridor			0																					
3rd Floor Hallway Center			0									3.3	2											
3rd Floor Hallway South	0																							
3rd Floor Stairwell 2	3.4					2.1																		
Stairwell 3			0.6																					
3rd Floor Stairwell 4			0.7																		11.2			
Basket Ball Court	0.3																				12			
Basket Ball Court 2	0																					7.5	6.3	
Basket Ball Court 3																								
Basket Ball Court 4																								
Elevator	0																							
Fitness Center										49.6	43.7		28.1							29.3				
Front Lobby		0																			4			
NW Garage	0.6																							
N Garage	0																					0		
SE Garage	0.8																							7.7
Hallway Outside 3021			0																					
Hallway Outside 3035			0																					
Hallway Outside 3065			0.7																					
N Mechanical Room										6.26	2.4	5.9	14.8	7	7.3	7.2	5.3	7.9		10	7	7.2	7.8	4.5
Men's Locker Room						60.7	123		122		428	82.9				161	131		23.7	28.3				
Women's Locker Room																								
Powerhouse																						0.7	3.2	
Unit 1002 - Postboxes																								
Unit 1006	0.3	0															4.3			1.4				
SSD Vent Pipe #1 - S - 7.5 HP			13	22	24.5	22	24.8	24	26.7	26.2	28	28	30.3	31.4	34.6	28.2	36.4	33.1	35.2	32		31.4	28.6	
SSD Vent Pipe #2 - S - 10 HP			26	30	21.9	16.4	18.7	17.2	44.4	19.5	19	47.7	29.3	57.8	20.5	21.1	19.8	21.4	20.9	20.7		20.6	28.5	
SSD Vent Pipe #3 - N - 7.5 HP					17.6	2.2	3	5	3.3	3	4.3	11.9	7.17	16.7	11.3	9.4	8.1	5.3	6.1	7.2		43.5	6.1	
SSD Vent Pipe #4 - N - 10 HP					41.2	29.5	33	39	37	38.7	39.1	29.3	44	41.9	36.8	38.2	35	42.8	43.1	46.3		5.7	44.4	
SW Garage																	11.3	21					20.3	
Stairwell 4	1.6					2.2			2.7	2.6				14.4			7							
Stairwell 6																								
Stairwell 7																								
Unit 1011																								
Unit 1014										0														

Unit 1025	0							0.96									3.6						4.8	
Unit 1026	0.3									0														
Unit 1035	0.3																							
Unit 1036	0.5																							
Unit 1037	2									0.9														
Unit 1039	4.7									11.4	8										3.4			
Unit 1040	10.3			12.7							14.5					21.2	22.6							
Unit 1041	11.6							19.9		16.8	14.4													
Unit 1042	11.4									16.2	15.2											12.6		9.3
Unit 1043	17.6					21.6	31.3				24													
Unit 1044	56					77	95			69.7	84.5					85.8		45.6		53.3				
Unit 1045	350		293	298	287	272	267	279	28.9	230	352	236	151.5	124	336	115	283	61	127	116	112	221	51.3	26.6
Unit 1048																								
Unit 1049																								
Unit 1050	160		137	143	110	348	280	108	135	114	706	145	60	118	142	149	110	77.8	131	138	152	113	71.7	199
Unit 1051	19					23		25.4			45.3													
Unit 1052					72.5	88.7	96.6	95.7	128	103	88.6	51.4	38.4			70.5			57.2	70.3		72		20.2
Unit 1056					24.8																	44		
Unit 1057																								
Unit 1058																								
Unit 1079																								
Unit 2014																								
Unit 2015																								
Unit 2016		0																						
Unit 2017		0																						
Unit 2022		0																						
Unit 2025		0																						
Unit 2036		0																			0			
Unit 2037		0																						
Unit 2039		0										2.5	2.5											
Unit 2040		0						0													0			
Unit 2042		0																						
Unit 2043	0.4	0																						
Unit 2044		0																						
Unit 2045	23	18				8		9	2.9			3.7	5.2											
Unit 2049																								
Unit 2056	60	52				42.2	24.7	49.2	9.6			3.4	6.6								1.5			
Unit 2057		4.7																						
Unit 2058	3.8	4.2				8.5			3.8															
Unit 2059	0.3	0																						
Unit 2061		0																						
Unit 2062		0																						
Unit 2063																								
Unit 2064	0					1																		
Unit 2065																								
Unit 2068																								
Unit 2077	0					1.6																		
Unit 2079																								
Unit 2111		0																						
Unit 2112																								
Unit 2114																								
Unit 2116																								
Unit 3014																								
Unit 3015			0					0																
Unit 3016																								
Unit 3017																								

Unit 3020																								
Unit 3021																								
Unit 3023																								
Unit 3025																					0			
Unit 3035			0																					
Unit 3036			0																					
Unit 3037			0					2	ND															
Unit 3039			0										1.8											
Unit 3040			0																		0			
Unit 3041			0																					
Unit 3042			0																					
Unit 3043			0																					
Unit 3044		0																						
Unit 3045		6.6										2.7	2.7											
Unit 3056	6	9.6				2.4		5.13	0.9			2.4	2.4								0			
Unit 3057		0																						
Unit 3058			0																					
Unit 3059			0																					
Unit 3061			0																					
Unit 3062			0																					
Unit 3063																								
Unit 3079																								
Unit 3092																								

Community Within the Corridor - East Block

Appendix E - GC TCE Measurements of Indoor Air

Sample Location	1-May	2-May	3-May	4-May	5-May	8-May	9-May	10-May	11-May	12-May	15-May	16-May	17-May	18-May	19-May	22-May	23-May	24-May	25-May	26-May	30-May	31-May
1045 Entry Floor Hole																						
1045 North Wall																						
1045 Wood Column																						
1050 South Wall Hole																						
1st Floor Hallway Center		14	9	3.5	2.3		3.49							21.2	3.48	5.39				2.38	3.6	
1st Floor Hallway North																						
1st Floor Hallway South									0.947	1.92	1.96		0									
2081 Hallway																						
2nd Floor Corridor North																						
2nd Floor Corridor South																						
2nd Floor Hallway Center								4.69			4.2									2.74		
2nd Floor Hallway North																						
2nd Floor Hallway South																						
Stairwell 2								4.15														
2nd Floor Stairwell 4						7.19																
2nd Floor Stairwell 8																						
3rd Floor Corridor																						
3rd Floor Hallway Center											1.7									1.71		
3rd Floor Hallway South																						
3rd Floor Stairwell 2				2.35																		
Stairwell 3								3.9														
3rd Floor Stairwell 4																						
Basket Ball Court														1.84			8.96					
Basket Ball Court 2		2.2		3	2.3	0.624			1.02					1.53			0					
Basket Ball Court 3														1.56			0.536					
Basket Ball Court 4														0.816			0.734					
Elevator																						
Fitness Center								29				33.8	21	21	24.5	16.6		42.5	15.1		24.2	
Front Lobby																						
NW Garage													14			0.62						
N Garage										1.78			0.607		0	0.63		0.776				
SE Garage																6.6		0.6				
Hallway Outside 3021																						
Hallway Outside 3035																						
Hallway Outside 3065																						
N Mechanical Room	13.7	11.5			10.1	10.9	11.8		6.89		10.7						0.737					
Men's Locker Room	58	31.6					53.3				52.3	7.62							21.7			
Women's Locker Room					45														25.8			
Powerhouse																						
Unit 1002 - Postboxes																					0	
Unit 1006	2.97							2.4			1.7						0.737				0	
SSD Vent Pipe #1 - S - 7.5 HP	26.1	27.9			25.7		26.2		21.9				27.01		26.7			7.04				19.6
SSD Vent Pipe #2 - S - 10 HP	1.2				20		15.7		18.7				18.2		19.3			11.1				33.8

SSD Vent Pipe #3 - N - 7.5 HP	8.6				5.9		4.97		0				3.47		3.41			1.85				4.8
SSD Vent Pipe #4 - N - 10 HP	38.3				37.7		22.4		4.83				31.1		21.9			4.7				20.2
SW Garage	25.2			26.1		23.6	25.5		21.4				0.683	1.15	0	7.84						
Stairwell 4		12								6			9.03									
Stairwell 6																						
Stairwell 7																						
Unit 1011								2.61	0													
Unit 1014																					0	
Unit 1025																	1.1	0		0	0	
Unit 1026								1.67	0	0											0.7	
Unit 1035																					1.1	
Unit 1036								1.37									4.59			2.37	1.2	
Unit 1037																						3.7
Unit 1039			1.4									5.18				6.06			1.19			8.1
Unit 1040								11.2	7.37			7.25							5.29			11.5
Unit 1041				13								7.07							9.13			10.9
Unit 1042	15.5					11.9	13.1			8.22	13.6	6.61	0.53		1.42	5.16		3.88	10.1		5.3	
Unit 1043												117							12.2			11.7
Unit 1044												37.6							29.3			37.8
Unit 1045	90.3	132	121		220	38.4	33.8		17.2	14.3	22.6	9.82	60.7		14.9	24.1	46.3	13.7	38.1		103	26
Unit 1048										86.2							45.7					
Unit 1049					142			159		96.9							66.1		21.4			30.3
Unit 1050	231	194	186	95.5	174	67.5	297		80.2	75.7	228	77.9		103	90.7	90.9	88.5	147	170		116	78.4
Unit 1051												52.7						39.8	18.2			
Unit 1052	73.6	62.6	340		76		70.7					55.7					32		16.8			21.1
Unit 1056																						
Unit 1057																					0	
Unit 1058																	1.46			0		
Unit 1079											152											
Unit 2014			48.8							0												
Unit 2015								0.77														
Unit 2016																						
Unit 2017																						
Unit 2022																						
Unit 2025																						
Unit 2036																						
Unit 2037																						
Unit 2039								0.77														
Unit 2040																						
Unit 2042				2.5																		
Unit 2043																						
Unit 2044																						
Unit 2045			19.1			1.36					0.99			1.97		2.99				11.8		
Unit 2049										1.07												
Unit 2056											1.11			5.89		11.5				66.4		
Unit 2057						1.24			0.64													
Unit 2058				2.9																		
Unit 2059																						
Unit 2061																						

Unit 2062																						
Unit 2063																						
Unit 2064						1.78																
Unit 2065																						
Unit 2068																						
Unit 2077				1.7		0.838																
Unit 2079																						
Unit 2111																		0				
Unit 2112																						
Unit 2114																						
Unit 2116																						
Unit 3014																						
Unit 3015																						
Unit 3016																						
Unit 3017																						
Unit 3020																						
Unit 3021																						
Unit 3023											0											
Unit 3025																						
Unit 3035																						
Unit 3036																						
Unit 3037																						
Unit 3039																						
Unit 3040																						
Unit 3041				2.45																		
Unit 3042																						
Unit 3043																						
Unit 3044																						
Unit 3045						0										3.75				8.11		
Unit 3056																1.21				6.99		
Unit 3057						0																
Unit 3058																						
Unit 3059																						
Unit 3061																						
Unit 3062																						
Unit 3063						0																
Unit 3079																						
Unit 3092				1.67																		

Community Within the Corridor - East Block

Appendix E - GC TCE Measurements of Indoor Air

Sample Location	1-Jun	5-Jun	7-Jun	8-Jun	9-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	23-Jun	26-Jun	3-Jul	10-Jul	11-Jul	12-Jul	14-Jul	19-Jul	21-Jul
1045 Entry Floor Hole																			
1045 North Wall																			
1045 Wood Column																			
1050 South Wall Hole																			
1st Floor Hallway Center							0.24							0.1					
1st Floor Hallway North																			
1st Floor Hallway South					**0.4**												0.39	0	0
2081 Hallway																			
2nd Floor Corridor North																			
2nd Floor Corridor South																			
2nd Floor Hallway Center					**0.42**									0.1					
2nd Floor Hallway North																			
2nd Floor Hallway South																			
Stairwell 2																			
2nd Floor Stairwell 4																			
2nd Floor Stairwell 8																			
3rd Floor Corridor																			
3rd Floor Hallway Center						0.47								0.1					
3rd Floor Hallway South																			
3rd Floor Stairwell 2																			
Stairwell 3					0.1		0.23										0.42	0	0
3rd Floor Stairwell 4																			
Basket Ball Court					2.65							0.2							
Basket Ball Court 2																	0.48	0.34	0.19
Basket Ball Court 3							0.24												
Basket Ball Court 4																			
Elevator																			
Fitness Center	16.1	4.2		**0.4**			0.29	0.55				0.49	0.69						
Front Lobby																	0.56	0.21	0.23

NW Garage						0.85	0												
N Garage							0.27												
SE Garage							0.23												
Hallway Outside 3021																			
Hallway Outside 3035																			
Hallway Outside 3065																			
N Mechanical Room	1.5					7.7	3.4				2.2	2.86							
Men's Locker Room				**0.5**				0.2			0.56	0.47	0.6						
Women's Locker Room				**0.4**				0.5											
Powerhouse																			
Unit 1002 - Postboxes																			
Unit 1006							0.21												
SSD Vent Pipe #1 - S - 7.5 HP						21.7													
SSD Vent Pipe #2 - S - 10 HP						18.4													
SSD Vent Pipe #3 - N - 7.5 HP																			
SSD Vent Pipe #4 - N - 10 HP																			
SW Garage							0.3				0.33								
Stairwell 4		3			**0.34**		0.24				0.33	0.2							
Stairwell 6																			
Stairwell 7																			
Unit 1011																			
Unit 1014					**0.21**						0			0.1					
Unit 1025					**0.31**														
Unit 1026														0.1					
Unit 1035					**0.22**						0.28	0.1		0.1					
Unit 1036			6.9		**0.26**						0.3								
Unit 1037					**0.46**						0.35	0.1		0.1					
Unit 1039				**0.7**	**0.3**						0.27	0.19		0.1					
Unit 1040				**0.6**								0.24							

Unit 1041					**0.51**											0.19	1.66	0.24	0.22
Unit 1042		4	19.2	**0.8**								0.24	0.1			0.1	0.82	0.21	0
Unit 1043					**0.53**			0.32			0.47		1.19						
Unit 1044		65.2	11.7	**1.7**				1.85			3.2	1.67	1.79			1.76	2.1	1.4	0.92
Unit 1045	23.3		14.4	2.4	5.26	3.84	3.33	2.99	2.88	2.57									
Unit 1048	121	19.8	13.5	**0.33**				0.43			0.72	0.1	0.55						
Unit 1049	21.8	23.6		**1.2**				0.58			2.5	1.03							
Unit 1050	60.4	27.3	10.3	3.4	3.05	2.28	1.95	2.12	2.17	1.62									
Unit 1051	16.9				**0.76**			0.38								0.26	1.35	0.27	0.24
Unit 1052	14.5			**0.23**				0.36				0.35	0.1						
Unit 1056	14.6																		
Unit 1057																			
Unit 1058							0.21				0.34								
Unit 1079																			
Unit 2014						0.35										0.1	0.54	0	0
Unit 2015																			
Unit 2016														0.1					
Unit 2017														0.1					
Unit 2022																			
Unit 2025														0.1					
Unit 2036																			
Unit 2037																			
Unit 2039																			
Unit 2040														0.1					
Unit 2042														0.1					
Unit 2043																			
Unit 2044																			
Unit 2045					**0.52**														
Unit 2049																			
Unit 2056					**1**											0.1	1.23	0.41	0.5
Unit 2057																0.1	0.49	1.09	0
Unit 2058																0.1	1.05	0.97	0
Unit 2059																0.1	0.21	0.77	0

Unit 2061																			
Unit 2062																			
Unit 2063															0.1				
Unit 2064																			
Unit 2065															0.1				
Unit 2068															0.1				
Unit 2077															0.1				
Unit 2079															0.1				
Unit 2111																			
Unit 2112															0.1				
Unit 2114															0.1				
Unit 2116															0.1				
Unit 3014						0.35										0.1			
Unit 3015																			
Unit 3016																0.1			
Unit 3017																			
Unit 3020																0.1			
Unit 3021																0.1			
Unit 3023																			
Unit 3025																			
Unit 3035																			
Unit 3036																			
Unit 3037																			
Unit 3039																			
Unit 3040																			
Unit 3041																			
Unit 3042																			
Unit 3043																			
Unit 3044																			
Unit 3045																			
Unit 3056						0.22													
Unit 3057						0.3										0.1	0.43	0.5	0
Unit 3058																			

Unit 3059																			
Unit 3061																			
Unit 3062																0.1	0.56	0.19	0
Unit 3063																			
Unit 3079															0.1				
Unit 3092																			

Community Within the Corridor - East Block

Appendix E - GC TCE Measurements of Indoor Air

Sample Location	1-Aug	2-Aug	7-Aug	8-Aug	9-Aug	10-Aug	11-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug	28-Aug	29-Aug	30-Aug	31-Aug	
1045 Entry Floor Hole																	
1045 North Wall																	
1045 Wood Column																	
1050 South Wall Hole																	
1st Floor Hallway Center				< 0.6	0.75	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	<0.6	<0.6	1.73	<0.6	
1st Floor Hallway North																	
1st Floor Hallway South																	
2081 Hallway																	
2nd Floor Corridor North																	
2nd Floor Corridor South																	
2nd Floor Hallway Center																	
2nd Floor Hallway North																	
2nd Floor Hallway South																	
Stairwell 2																	
2nd Floor Stairwell 4																	
2nd Floor Stairwell 8																	
3rd Floor Corridor																	
3rd Floor Hallway Center																	
3rd Floor Hallway South																	
3rd Floor Stairwell 2																	
Stairwell 3																	
3rd Floor Stairwell 4																	
Basket Ball Court																	
Basket Ball Court 2											<0.6	< 0.6			3.76	<0.6	
Basket Ball Court 3																	
Basket Ball Court 4													<0.6				
Elevator																	
Fitness Center													2.7	0.7			
Front Lobby																	
NW Garage																	
N Garage													<0.6				
SE Garage																	
Hallway Outside 3021																	
Hallway Outside 3035																	
Hallway Outside 3065																	
N Mechanical Room													4.8	7.3	9.9	2.74	
Men's Locker Room																	
Women's Locker Room													2.9	0.7			
Powerhouse																	
Unit 1002 - Postboxes																	
Unit 1006																	
SSD Vent Pipe #1 - S - 7.5 HP																	

SSD Vent Pipe #2 - S - 10 HP																	
SSD Vent Pipe #3 - N - 7.5 HP																	
SSD Vent Pipe #4 - N - 10 HP																	
SW Garage								<0.6	<0.6	<0.6							
Stairwell 4											< 0.6	< 0.6	<0.6				
Stairwell 6																	
Stairwell 7																	
Unit 1011																	
Unit 1014																	
Unit 1025																	
Unit 1026																	
Unit 1035																	
Unit 1036																	
Unit 1037																	
Unit 1039																	
Unit 1040																	
Unit 1041														<0.6			
Unit 1042		< 0.6												<0.6			
Unit 1043													2.3	<0.6	<0.6		
Unit 1044	< 0.6	< 0.6		**0.68**									2.5	0.9			
Unit 1045			1.72	1.87		2.95							7.8	1.7	2.7	<0.6	
Unit 1048	0.76		1.22	< 0.6	< 0.6		2	<0.6	<0.6				3.3	<0.6	2.63	<0.6	
Unit 1049	< 0.6	0.63	< 0.6	**1.99**	< 0.6	< 0.6	3.6	<0.6	<0.6	<0.6			1.5	<0.6			
Unit 1050				0.71				<0.6	<0.6		<0.6	<0.6	2.4	<0.6	<0.6		
Unit 1051		< 0.6		< 0.6													
Unit 1052																	
Unit 1056			< 0.6	< 0.6	0.62		< 0.6	<0.6	<0.6	<0.6			4.2	<0.6			
Unit 1057																	
Unit 1058																	
Unit 1079																	
Unit 2014																	
Unit 2015																	
Unit 2016																	
Unit 2017																	
Unit 2022																	
Unit 2025																	
Unit 2036																	
Unit 2037																	
Unit 2039																	
Unit 2040																	
Unit 2042																	
Unit 2043																	
Unit 2044																	
Unit 2045										< 0.6							
Unit 2049																	

Unit 2056										< 0.6							
Unit 2057																	
Unit 2058																	
Unit 2059																	
Unit 2061																	
Unit 2062																	
Unit 2063																	
Unit 2064																	
Unit 2065																	
Unit 2068																	
Unit 2077																	
Unit 2079																	
Unit 2111																	
Unit 2112																	
Unit 2114																	
Unit 2116																	
Unit 3014																	
Unit 3015																	
Unit 3016																	
Unit 3017																	
Unit 3020																	
Unit 3021																	
Unit 3023																	
Unit 3025																	
Unit 3035																	
Unit 3036																	
Unit 3037																	
Unit 3039																	
Unit 3040																	
Unit 3041																	
Unit 3042																	
Unit 3043																	
Unit 3044																	
Unit 3045																	
Unit 3056																	
Unit 3057																	
Unit 3058																	
Unit 3059																	
Unit 3061																	
Unit 3062																	
Unit 3063																	
Unit 3079																	
Unit 3092																	

Community Within the Corridor - East Block

Appendix E - GC TCE Measurements of Indoor Air

Sample Location	7-Sep	8-Sep	19-Sep	20-Sep	21-Sep	5-Oct	27-Oct
1045 Entry Floor Hole							
1045 North Wall							
1045 Wood Column							
1050 South Wall Hole							
1st Floor Hallway Center			< 0.6				
1st Floor Hallway North							
1st Floor Hallway South							
2081 Hallway							
2nd Floor Corridor North							
2nd Floor Corridor South							
2nd Floor Hallway Center							
2nd Floor Hallway North							
2nd Floor Hallway South							
Stairwell 2							
2nd Floor Stairwell 4							
2nd Floor Stairwell 8							
3rd Floor Corridor							
3rd Floor Hallway Center							
3rd Floor Hallway South							
3rd Floor Stairwell 2							
Stairwell 3							
3rd Floor Stairwell 4							
Basket Ball Court							
Basket Ball Court 2							
Basket Ball Court 3							
Basket Ball Court 4							
Elevator							
Fitness Center			< 0.6	< 0.6			
Front Lobby							
NW Garage							
N Garage							

SE Garage							
Hallway Outside 3021							
Hallway Outside 3035							
Hallway Outside 3065							
N Mechanical Room			4.19				
Men's Locker Room				< 0.6			
Women's Locker Room				< 0.6			
Powerhouse							
Unit 1002 - Postboxes							
Unit 1006							
SSD Vent Pipe #1 - S - 7.5 HP							
SSD Vent Pipe #2 - S - 10 HP							
SSD Vent Pipe #3 - N - 7.5 HP							
SSD Vent Pipe #4 - N - 10 HP							
SW Garage			< 0.6				
Stairwell 4			< 0.6				
Stairwell 6							
Stairwell 7							
Unit 1011							
Unit 1014				< 0.6			
Unit 1025				< 0.6			
Unit 1026				< 0.6			
Unit 1035				< 0.6			
Unit 1036				< 0.6			
Unit 1037				< 0.6			
Unit 1039				< 0.6			
Unit 1040				< 0.6			
Unit 1041				< 0.6			
Unit 1042					< 0.6		
Unit 1043					< 0.6		
Unit 1044					< 0.6		
Unit 1045					< 0.6		
Unit 1048					< 0.6		
Unit 1049					< 0.6		

Unit 1050					< 0.6		
Unit 1051							
Unit 1052					< 0.6		
Unit 1056					< 0.6		
Unit 1057							
Unit 1058							
Unit 1079							
Unit 2014	< 0.6	< 0.6					
Unit 2015							
Unit 2016							
Unit 2017							
Unit 2019		< 0.6					
Unit 2022							
Unit 2023		< 0.6					
Unit 2025							
Unit 2036							
Unit 2037							
Unit 2039	< 0.6	< 0.6					
Unit 2040							
Unit 2041		< 0.6					
Unit 2042	< 0.6						
Unit 2043							
Unit 2044							
Unit 2045	< 0.6						
Unit 2049							
Unit 2056							
Unit 2057							
Unit 2058		< 0.6					
Unit 2059							
Unit 2061							
Unit 2062							
Unit 2063		< 0.6					
Unit 2064							
Unit 2065		< 0.6					

Unit 2068							
Unit 2077							
Unit 2079		< 0.6					
Unit 2082		< 0.6					
Unit 2111							
Unit 2112							
Unit 2114						< 0.6	
Unit 2116		< 0.6					
Unit 3014	< 0.6	< 0.6					
Unit 3015							
Unit 3016							
Unit 3017							
Unit 3020							
Unit 3021							
Unit 3023							
Unit 3025							
Unit 3035							
Unit 3036							
Unit 3037							
Unit 3038							
Unit 3039	< 0.6	< 0.6					< 0.6
Unit 3040							
Unit 3041							
Unit 3042							
Unit 3043							
Unit 3044							
Unit 3045	< 0.6						
Unit 3056	< 0.6						
Unit 3057		< 0.6					
Unit 3058							
Unit 3059							
Unit 3061							
Unit 3062							
Unit 3063							

Unit 3079							
Unit 3092							
Unit 3093		< 0.6					< 0.6

APPENDIX F

GC TCE Measurements of Sub-Slab Vapors

Appendix F: Comprehensive Data Table – Sub-Slab Vapor TCE

Green cells indicate the VRSL levels below the DNR limit of 70 ug/m3											
Location		**Week of 6/3**	**Week of 6/17**	**Week of 6/24**	**Week of 7/1**	**Week of 7/8**	**Week of 7/15**	**Week of 7/22**	**Week of 7/29**	**Week of 8/5**	**Week of 8/12**
1055	**Women's Locker Room**		46.5	17.3	13.5	25.8	9.89	0.36	8.72	6.45	12.9
1054	**Fitness Room**	596	0.8	4.8	0.483	2.6	2.23	0.44	2.52	0.58	1.99
1053	**Men's Locker Room**		102.3	71.31	55.7	76.2	26.5	27.3	13.4	24.9	20.9
Oppo. 1054			58.9	55.6	46.9	48.2	53.3	31.5	33.6	25.3	21.3
Stairwell 4			252.5	6.3	27.4	22.1	14.2	11.7	0.68	25.9	8.11
1052	**Mechanical Room**		63.9	38.1	14.9	5.96	4.97	3.1	0.75	1.26	2.44
1051			47.3	32.4	22.7	25.8	12.6	7.55	9.86	NA	NA
1049	**Storage Room**	426	2.6	3.38	1.76	2	2.25	1.01	1.31	2.06	26.5
1048	**Laundry Room**	322	679	572	561	637	556	538	386	NA	68.8
1050		1443	303.4	377	265	283	275	235	187	NA	NA
Out 1050		971	113.1	10.1	64.1	46.3	72.8	68.1	47.2	NA	16.1
1045		750	271.6	206	253	238	222	204	232	183	62.6
Out 1044		456	380.5	364	419	205	376	430	275	457	513
1043			178.5	185	7.92	14.3	10.7	7.49	9.26	5.26	3.57
1042		11.8	15.93	10.4	2.67	1.22	6.43	7.05	5.25	3.78	1.48
1041			108.7	13.2	4.48	4.24	18.8	6.52	7.14	37.6	1.12
1040		1.6	11.7	16.1	3.22	1.13	3.83	7.8	11.6	1.31	0.207
1040 - out				21.3	3.1	10.3	5	25.9	4.08	1.61	< 0.6
1039		23.5	62.2	4.3	15.2	23.8	16.5	4.1	12.6	14.7	13.9
1037			240.4	4.3	11.04	50.1	43.7	13.8	9.37	2.85	1.45
1036			17.2	5.5	2.85	10.2	6.13	3.06	2.68	3	1.33
1035			0.8	7	0.534	1.4	1.61	5.18	1.2	0.79	<0.6
1035 - out			87	55.4	73.2	98.9	95.1	16.9	2.54	5.93	1.38
1058 E	**Electric Room**		433.8	1.5	87	307	181	117	45.7	1.63	13.4
1058 W	**Electric Room**		73.3	6.99	0.1	5.3	3.19	8.7	6.3	2.2	3.1
1026			16.7	6.6	7.39	20.8	14.8	10.4	7.38	3.8	4.02
1025			2.2	2.1	1.01	10.5	2.15	1.54	3.08	1.05	<0.6
1014			23.9	2.2	21.2	124	44.7	38.9	57.9	8.71	16.1
1011	**Conference Room**		17.5	1.6	1.5	5.24	0.6	2.47	2.38	1.05	<0.6
SE Lobby	**Near Exit**	**328**	0.46	0.5	0.1	0.37	0.1	2.15	0.79	2.75	<0.6
BB 1	**SW of the Gym**			73	25.1	553	571	0.62	421	14.7	358
BB 2	**South part of the Gym**		30.8	1.5	286	65	43	18.9	40.5	1.05	1
BB 3	**SE part of the Gym**		2.2	1.6	0.733	1.05	7.5	97.9	4.55	0.55	1.4
BB 4	**N of the Gym**		2.6	1.9	0.569	0.77	3.37	1.22	2.21	1.58	<0.6
BB 5	**Center of the Gym**		58.9	1.9	27.5	87	86.5	1.23	26	20.4	<0.6
SW Garage (2)			227.4	63.7	300	307	317	230.7	125	0.6	<0.6
SW Garage (26)						24.3	22.3	12.7	21.7	14.2	13.9
SW Garage (6)						43.9	2.7	2.11	0.46	1.2	<0.6
SW Garage (19)						7.49	2.61	1.93	0.44	0.62	<0.6
SE Garage (11)						49.5	17.8	1.89	0.5	1.57	<0.6
SE Garage (14)			10.3	1.6	1.24	2.02	1.99	1.3	0.4	0.65	<0.6
NW Garage (80)			141.5	4.7	12.7	27.2	21.2	17.4	8.6	24.8	22.3
NE Garage (36)			24.8	2.8	9.87	13	6.07	5.1	32.9	10.5	<0.6
N Mech Room			60.2	147	27.07	18.7	0.98	15.3	7.36	17.9	3.64

APPENDIX G

GC SOP and Qualification Letter to WDNR

August 25, 2023

Ms. Jane K. Pfeiffer **Project # 40443A**
Remediation and Redevelopment Program
Wisconsin Department of Natural Resources
1027 West St. Paul Avenue
Milwaukee, WI 53233

Subject: **Response to Requested Information Regarding Sample Collection and Analysis Community Within the Corridor Limited Partnership – West Block**
2748 N. 32nd Street, Milwaukee, WI 53210
BRRTS #: 02-41-587376, FID #: 341333190

Dear Ms. Pfeiffer:

On behalf of the Community Within the Corridor Limited Partnership (CWC), K. Singh & Associates, Inc. (KSingh) in consultation with Hartman Environmental Geoscience (HEG) is pleased to submit a response to WDNR's request for information for the referenced project.

On July 10, 2023, the Wisconsin Department of Natural Resources (WDNR) received the Fifth Round of Commissioning for CWC – West Block – Buildings 6, 7, 8A, and 8B (the Report) presented without a technical assistance fee by KSingh on behalf CWC for the CWC West Block Site. The WDNR requested technical information after reviewing the Report to demonstrate that the quality of the data collected from the Gas Chromatograph (GC) units is acceptable to confirm that the building conditions are protective of human health. The requests from WDNR are itemized below (written in ***bolded italics***) with responses for the individual item:

1. ***Personnel qualifications**: Document whether sampling technicians meet the minimum qualifications and training for operating the GC.*

   HEG acted as the primary technical support by providing the Portable Gas Chromatograph (GC) and the training required to operate the instrument. Dr. Blayne Hartman and Mr. Clint Hartman from HEG assisted in setting up the instrument and conducted the initial calibration. Mr. Clint Hartman provided in-person training in sample collection, instrument operation, and using analytical software. Dr. Hartman has provided remote support throughout the project in analysis of the data and troubleshooting as needed. The two key personnel from KSingh responsible for sample collection and analysis are:

   - Sameer Neve, Ph.D. ENV SP
     Dr. Neve is an Environmental Engineer with masters and doctoral degrees in environmental engineering. Sameer has over 7 years of experience with analytical instruments like Inductively Coupled Plasma – Optical Emission Spectroscopy, High Performance Liquid Chromatography, Gas Chromatography – Mass Spectrometry, FTIR, etc. He has trained other undergraduate and graduate students in the operation, maintenance, and calibration of such analytical instruments.

   - Samuel Ramirez
     Mr. Ramirez is a Geologist with over one year of experience in conducting sub-slab vapor

investigation, installing vapor pins, sub-slab vacuum measurements, and installing vapor mitigation systems. Sam is also experienced in air quality monitoring for PCB remediation and has significant experience in environmental sampling. Further, Sam is involved in early action remediation activities where he has been documenting remedial action and taking confirmatory samples to document residual contamination. He is trained in operating analytical instruments and VOC sampling. In addition to this work, Sam has experience in groundwater sampling, geotechnical investigations, and remediation of large-scale environmental projects.

2. ***Reporting limits*: Indicate what method detection limit and reporting (quantitation) limits are being achieved for trichloroethene (TCE). TCE concentrations of 0.00 µg/m^3 are portrayed on Table 2, but other concentrations are reported at 0.3 µg/m^3. It appears that the reporting limit may be between these values.**

   An initial multipoint calibration was performed by Dr. Blayne Hartman on March 1, 2023. The lowest calibration concentration was 0.1 ppbv which is equivalent to 0.55 µg/m^3, which rounded up is 0.6 µg/m^3. This value is listed on the tables of discrete sample results as the reporting limit. In automated monitoring mode, the software might report values lower than 0.6 µg/m^3, but these should be treated as non-detect. Any zeros in tables should be reported as non-detect. The Method Detection Limit (MDL) of the instrument is 0.3 µg/m^3.

3. ***Sample collection*: Provide a description of how the sample analyzed was collected and delivered to the GC unit.**

   Air grab samples are collected in 50 cc gas-tight, ground-glass syringes with on-off valves. Glass syringes are preferred because the sample can be readily and directly introduced into the analytical instrument, there is no adsorption of TCE onto the glass surface and there is no carry-over between samples. The syringes are transferred to the on-site gas chromatograph and analyzed within 10 minutes of collection.

4. ***Quality Assurance and Quality Control (QA/QC)*: Provide a description of how the procedures described in Section 11 of the HEG SOP were complied with, including:**

   a. ***Initial calibration*: Procedure, date, and results from calibration of the GC unit prior to its use.**

      An initial multipoint calibration was performed by Dr. Blayne Hartman on March 1, 2023, using the procedure described in the SOP. The initial calibration file is also attached. The text 'Last calibrated: May 16, 2023' on the print-out refers to the date on which the March 1st initial calibration data were installed on a new laptop after the original laptop was stolen.

   b. ***On-going QA/QC*: A description of the procedures and frequency used to check the accuracy of the device during use, including calibration analysis, blank analysis, replicate analysis, a description of how calibration sample results were used to correct for instrument drift or determine the need for recalibration, and method used for standard preparation. Provide all QA/QC results.**

      Calibration samples were collected from the concentrated source of the scotty canister and diluted from 1000 ppbv to 100 ppbv, 10 ppbv, 1 ppbv, and 0.1 ppbv. The instrument calibration checks were conducted on about a weekly basis with the results given in Table 1 below. Since the calibration results were within 35% of the Relative Standard Deviation (RSD), there was no need to correct for instrument drift or recalibration of the instrument.

The early measurements were not a concern as the TCE detections were high. When the TCE detection levels came down, we used a lower number to plot trends which needed a specific number not ND with occasional calibration at high levels.

Table 1 – Calibration Results

Sample ID	Date	Sample Time	TCE (ppbv)	%RSD
1 ppbv	5/30/2023	14:41	0.96	-4%
0.1 ppbv	6/8/2023	14:48	0.08	-22%
0.1 ppbv	6/14/2023	13:00	0.09	-6%
1 ppbv	6/20/2023	15:43	0.92	-8%
10 ppbv	6/20/2023	17:03	11.27	13%
0.1 ppbv	6/27/2023	12:59	0.09	-10%
100 ppbv	7/3/2023	12:06	70.66	-29%
10 ppbv	7/11/2023	13:58	12.44	24%
0.1 ppbv	7/17/2023	16:40	0.08	-24%
1 ppbv	7/24/2023	14:38	0.71	-29%
0.1 ppbv	8/1/2023	7:02	0.13	30%
100 ppbv	8/8/2023	16:03	94.48	-6%
Allowable %RSD: ± 35%				

Conclusion

In conclusion, the GC was properly calibrated by HEG, continues to be operated by trained personnel at all times, that samples were collected in accordance with standard practice, and that the QA/QC procedures indicate that the GC is operating within specifications (± 35%). This is indicative of the data collected to be reliable and that the compliance of the VALs can also be verified with the data from the Passive samplers.

Please contact us if you have any questions or seek clarification regarding this information.

Sincerely,

K. SINGH & ASSOCIATES, INC.

Sameer Neve, Ph.D. ENV SP
Staff Environmental Engineer

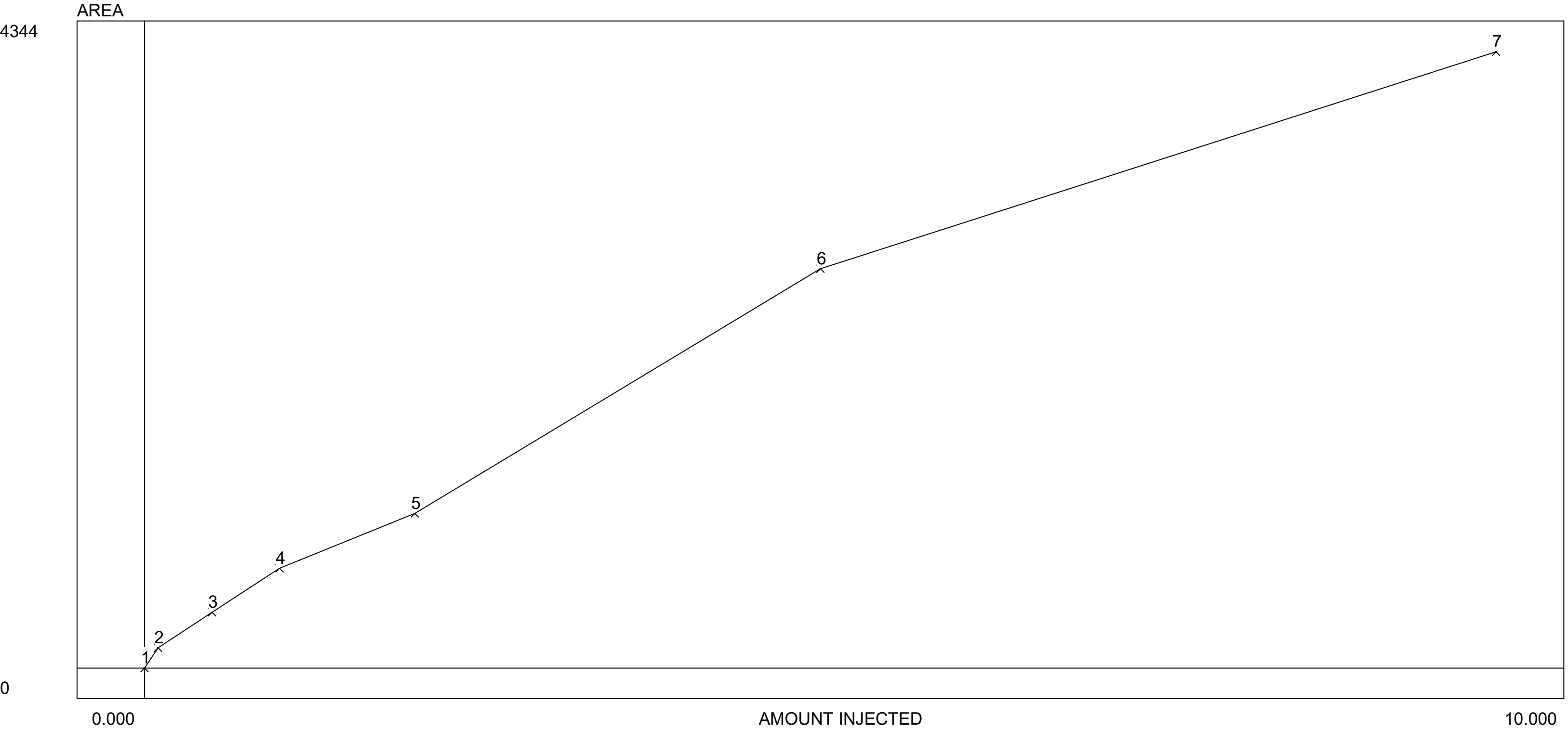
Robert T. Reineke, P.E
Senior Engineer

KSingh Engineers Scientists Consultants

Pratap N. Singh, Ph.D., P.E.
Principal Engineer

cc: Shane LaFave / Roers Companies
Que El-Amin / Scott Crawford, Inc.
Dr. Blayne Hartman / Hartman Environmental Geoscience

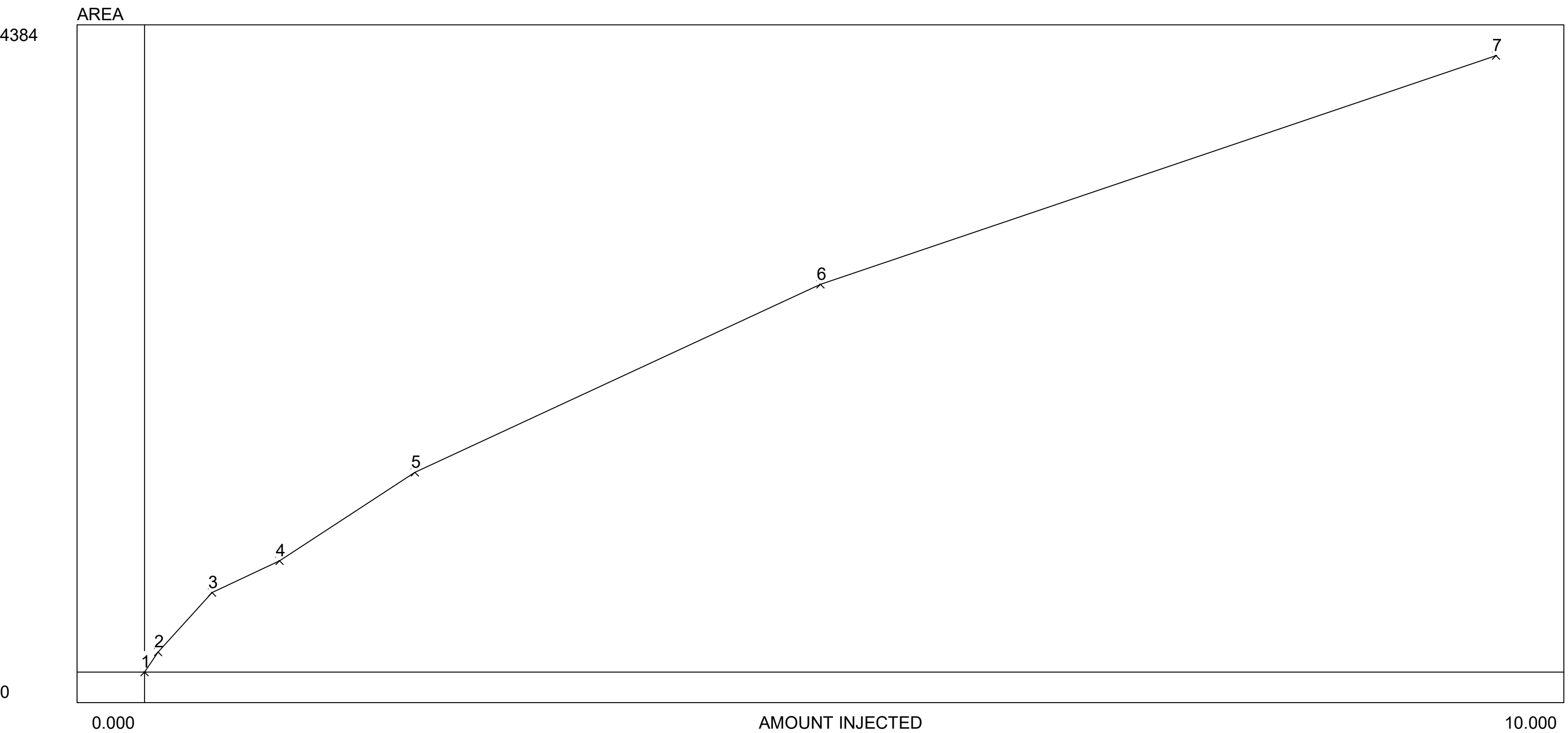
Calibration file: C:\Peak489Win10\TCE ECD2 3-1-2023.cal



Avg slope of curve: 656.05
Y-axis intercept: 0.00
Linearity: 0.46
Number of levels: 7
SD/rel SD of CF's: 428.3/67.3
Y=<multi-line>
r2: 1.0000
Last calibrated: Tue May 16 14:01:44 2023

Lvl.	Area/ht.	Amount	CF	Current	Previous #1	Previous #2
1	0.000	0.000	0.000	0.000	N/A	N/A
2	142.000	0.100	1420.000	142.000	N/A	N/A
3	393.000	0.500	786.000	393.000	N/A	N/A
4	704.000	1.000	704.000	704.000	N/A	N/A
5	1090.000	2.000	545.000	1090.000	N/A	N/A
6	2815.000	5.000	563.000	2815.000	N/A	N/A
7	4344.000	10.000	434.400	4344.000	N/A	N/A

Calibration file: C:\Peak489Win10\TCE ECD2 10-13-2023.cal



Avg slope of curve: 721.54
Y-axis intercept: 0.00
Linearity: 0.51
Number of levels: 7
SD/rel SD of CF's: 463.5/64.4
Y=<multi-line>
r2: 1.0000
Last calibrated: Fri Oct 13 15:39:59 2023

Lvl.	Area/ht.	Amount	CF	Current	Previous #1	Previous #2
1	0.000	0.000	0.000	0.000	N/A	N/A
2	142.000	0.100	1420.000	142.000	N/A	N/A
3	565.000	0.500	1130.000	565.000	N/A	N/A
4	790.000	1.000	790.000	790.000	N/A	N/A
5	1421.000	2.000	710.500	1421.000	N/A	N/A
6	2757.000	5.000	551.400	2757.000	N/A	N/A
7	4384.000	10.000	438.400	4384.000	N/A	N/A

APPENDIX H

Supporting Data for Median Value of TCE

KSingh | Engineers Scientists Consultants

APPENDIX H

TCE CONCENTRATIONS IN SOIL - CWC EAST BLOCK

Boring ID	Depth (ft)	Date	TCE (mg/kg)
EB-B-28	2 TO 4	7/20/2021	5.4
EB-B-28	6 TO 8	7/20/2021	0.0094
EB-B-29	2 TO 4	7/20/2021	87
EB-B-29	6 TO 8	7/20/2021	0.026
EB-B-30	2 TO 4	7/20/2021	0.9
EB-B-30	6 TO 8	7/20/2021	0.011
EB-B-32	2 TO 4	7/20/2021	0.37
EB-B-32	6 TO 8	7/20/2021	2.4
EB-HS-1	1.5	7/26/2021	35
EB-HS-12	1.5	8/11/2021	0.049
EB-HS-13	1.5	8/11/2021	1.3
EB-HS-14	1.5	8/13/2021	0.29
EB-HS-15	1.5	8/13/2021	0.26
EB-HS-17	1.5	8/13/2021	0.061
EB-HS-2	1.5	7/26/2021	15
EB-HS-3	1.5	7/26/2021	10
EB-HS-4	1.5	7/26/2021	22
EB-HS-5	1.5	7/26/2021	220
EB-HS-6	1.5	8/3/2021	0.11
EB-HS-7	1.5	8/3/2021	0.27
EB-HS-9	1.5	8/4/2021	3.7
EB-IB-1	0.5-1.5	4/14/2021	0.01
GP1	1	10/2/2023	0.3
GP1	4	10/2/2023	<0.093
GP1	7	10/2/2023	3.5
GP10	1	10/2/2023	30
GP10	4	10/2/2023	1900
GP10	7	10/2/2023	840
GP11	1	10/2/2023	0.95
GP11	4	10/2/2023	110
GP11	7	10/2/2023	32
GP12	1	10/2/2023	13
GP12	4	10/2/2023	64
GP12	7	10/2/2023	150
GP13	1	10/2/2023	140
GP13	4	10/2/2023	210
GP13	7	10/2/2023	N/A
GP14	1	10/2/2023	12
GP14	4	10/2/2023	85
GP14	7	10/2/2023	210
GP15	1	10/2/2023	2.6
GP15	4	10/2/2023	5.8
GP15	7	10/2/2023	27
GP16	1	10/2/2023	0.55
GP16	4	10/2/2023	3.8
GP16	7	10/2/2023	0
GP2	1	10/2/2023	0.27
GP2	4	10/2/2023	1.4
GP2	7	10/2/2023	1.4
GP3	1	10/2/2023	1.2
GP3	4	10/2/2023	<0.009
GP3	7	10/2/2023	0.06
GP4	1	10/2/2023	16
GP4	4	10/2/2023	0.017
GP4	7	10/2/2023	<0.009
GP5	1	10/2/2023	15
GP5	4	10/2/2023	130
GP5	7	10/2/2023	67
GP6	1	10/2/2023	21
GP6	4	10/2/2023	180
GP6	7	10/2/2023	220
GP7	1	10/2/2023	150
GP7	4	10/2/2023	87
GP7	7	10/2/2023	0
GP8	1	10/2/2023	90
GP8	4	10/2/2023	21
GP8	7	10/2/2023	0
GP9	1	10/2/2023	49
GP9	4	10/2/2023	320
GP9	7	10/2/2023	46
HS-21	1.5	10/22/2021	0.11
HS-22	1.5	10/22/2021	0.12
HS-23	1.5	10/22/2021	2.1
HS-24	1.5	10/22/2021	0.4
SS-17	1	3/9/2021	0.13
SS-19	1	3/9/2021	0.11
SW-B1	3 TO 4	7/19/2023	0.26
SW-B10	3 TO 4	7/19/2023	0.012
SW-B11	3 TO 4	7/19/2023	0.14
SW-B2	3 TO 4	7/19/2023	0.09
SW-B3	3 TO 4	7/19/2023	0.035
SW-B4	3 TO 4	7/19/2023	0.22
SW-B5	3 TO 4	7/19/2023	0.15
SW-B6	3 TO 4	7/19/2023	1
SW-B7	3 TO 4	7/19/2023	0.32
SW-B8	3 TO 4	7/19/2023	12
SW-B9	3 TO 4	7/19/2023	0.011
VE-1	1	2/24/2021	0.034
VE-2	1	2/24/2021	2.7
VE-3	1	2/24/2021	0.16
Ramp 1	1	12/13/2021	<0.01
Ramp 2	1	12/13/2021	<0.011
Ramp 3	1	12/13/2021	<0.012
Ramp 4	1	12/13/2021	0.068
Ramp 5	1	12/13/2021	<0.01
Ramp 6	1	12/13/2021	<0.011
EB-RTS-1	0.5-2.5	4/6/2021	0.017
EB-RTS-4	0.5-2.5	4/6/2021	0.02
EB-RTS-5	0.5-2.5	4/6/2021	0.02
EB-RTS-6	0.5-2.5	4/6/2021	0.071
EB-RTS-7	0.5-2.5	4/6/2021	0.032
ss-19	1	3/9/2021	0.11
SS-6	1	3/9/2021	0.086
SS-51	1	3/9/2021	0.025
B-8	9'-11'	4/10/2020	2.2
B-9	4'-6'	4/10/2020	0.16
EB-B-18	2 TO 4	6/3/2021	1.7
EB-B-18	5 TO 7	6/3/2021	0.41
EB-B-17	1 TO 4	5/4/2021	0.23
EB-B-17	16-18	5/4/2021	8.6
EB-B-23	1 TO 4	5/5/2021	0.15
EB-B-23	4 TO 7	5/5/2021	<0.012
EB-HS-8	1.5	8/4/2021	0.33

MEAN	55.83
MEDIAN	1.1