REMEDIAL ACTION WORK PLAN

BCP Site # C734148

The Smith Restaurant Building
500 Erie Boulevard East
City of Syracuse, Onondaga County, New York

Prepared for:

Smith Building, LLC
225 Wilkinson Street
Syracuse, New York 13204

November 2020

REVISION	DATE	SUMMARY OF REVISION

AECC
ENVIRONMENTAL CONSULTING

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CERTIFICATION

Remedial Action Work Plan

I, H. Nevin Bradford, certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

HENRY NEVIN BRADFORD
No. 086008

Henry Nevin Bradford III

H. Nevin Bradford
NYS Professional Engineer
(#086008)

November 18, 2020
Date

Signature / Stamp

Remedial Alternatives Analysis

I, H. Nevin Bradford, certify that I am currently a NYS registered professional engineer and that the Remedial Alternatives Analysis was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

HENRY NEVIN BRADFORD
No. 086008

Henry Nevin Bradford III

H. Nevin Bradford
NYS Professional Engineer
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November 18, 2020
Date

Signature / Stamp

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education.

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EXECUTIVE SUMMARY

The Property, currently owned by Smith Building, LLC, is located at 500 Erie Boulevard East in the City of Syracuse, and consists of 0.334 acre of land. An existing building comprised of two contiguous parts (standing 3-6 stories tall and totaling approximately 31,196 square feet) encompasses the majority of the Site. Two asphalt parking lots are located on the northern and eastern portions of the Site (2,000 square feet and 4,500 square feet, respectively).

The Property is known to have VOCs, SVOCs, organochlorine pesticides, and metals impacts as a result of the site's history of commercial use (including gasoline filling station, dry-cleaning and laundry facility, and the past presence of underground petroleum storage tanks).

In Spring 2020, Smith Building, LLC submitted an application into the Brownfield Cleanup Program (BCP) as a Volunteer. The project was accepted into the Program (Brownfield # C734148), and a Remedial Investigation (RI) was performed in Summer 2020. In general, the RI concluded:

Near-Surface Soils

The RI identified specific Semi-Volatile Organic Compounds (SVOCs), organochlorine pesticides, and metals at concentrations above their respective NYSDEC 6 NYCRR Part 375 Restricted Residential Use Soil Cleanup Objectives (SCOs) and/or Unrestricted Use SCOs within near-surface soil samples collected. See Figures 3A, 4A, and 5A for additional details.

Subsurface Soils

Previous investigation has identified specific VOCs, SVOCs, organochlorine pesticides, and metals at concentrations above their respective NYSDEC 6 NYCRR Part 375 Restricted Residential Use SCOs and/or Unrestricted Use SCOs within subsurface soil samples collected. See Figures 3A, 4B, 4C, 5B, and 5C for additional details.

Groundwater

Previous groundwater investigations have revealed that specific VOCs and metals were detected in some of the on-site monitoring wells at concentrations above the applicable NYSDEC Groundwater Quality Standards (TOGS 1.1.1). See Figure 6 for additional details.

Soil Vapor

Specific VOCs (PERC, TCE, and DCE) exceeding their respective NYSDOH standards were detected in two sub-slab vapor samples collected from the basement (northeastern portion of the existing building) during the 2019 Phase II ESA. See Figure 7 for additional details.

Using the project-specific feasible technologies as options, the following remedial alternatives were developed:

Remedial Alternative 1:	No Further Action
Remedial Alternative 2:	Unrestricted Use (Track 1) – Remove All Contamination to Unrestricted Standards
Remedial Alternative 3:	Restricted Residential Use (Track 2) – Remove All Contamination to Restricted Residential SCOs

Remedial Alternative 4: Restricted Residential Use (Track 4) – Remove All Contamination Exterior to the Building to Unrestricted Standards, and Vapor Mitigation System

Remedial Alternative 5: Restricted Residential Use (Track 4) – Remove All Contamination Exterior to the Building to Restricted Residential Standards, and Vapor Mitigation System

Remedial Alternative 6: Restricted Residential Use (Track 4) – Cover System, Site Management Plan, and Vapor Mitigation System

Based on a comparative analysis, Remedial Alternative 6 was selected as the preferred remedial alternative for the site. This remedial alternative will provide an appropriate, cost-effective remedy that protects human health and the environment and can be implemented during site development.

The selected soil cleanup levels for this alternative are consistent with the Restricted Residential Use RSCOs set forth in 6 NYCRR Table 375-6.8 (b).

Under this remedial alternative, soil and fill material impacted with contaminants at concentrations above the Restricted Residential Use SCOs that are excavated as part of site development (utility trenches, building addition foundations, etc.) will be either be transported to a permitted off-site waste disposal facility, or possibly used as backfill with NYSDEC approval. On-site soil which does not exceed Unrestricted Use SCOs may be used to backfill the excavation and establish the designed grades at the site. No confirmation / verification sampling of excavation walls / bottoms will be required.

Although not expected, any excavated grossly-contaminated material encountered that exhibits significant nuisance characteristics will be transported to permitted off-site waste disposal facilities.

The following are the key elements of this remedial alternative (in anticipated sequence of performance):

- Excavation of soil limited to what is necessary for site development (utility trenches, building addition foundations, etc.)
- Dewatering of excavations
- Waste characterization and disposal of soils and wastewater (from dewatering operations)
- Backfill and compaction of certified clean fill
- Within landscaped areas, the installation of “soft” cover consisting of a minimum of 2 feet of clean soil placed atop a demarcation layer
- In the remainder of the exterior portions of the site, the installation of a “hard” cover consisting of asphalt parking lots and concrete sidewalks placed atop a demarcation layer
- Hazardous Materials abatement (including clearance testing)
    - Asbestos abatement in accordance with NYSDOL Code Rule 56
    - Lead-based paint in accordance with the USEPA Renovation, Repair, and Painting Rule (40 CFR 745 Subpart E)
    - PCB-containing caulk abatement in accordance with 40 CFR Part 761
    - Mold abatement in accordance with Article 32 of NYS Labor Law
- Disposal of remaining building components containing miscellaneous / hazardous wastes
- Design and installation of a vapor mitigation system in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- Preparation of and adherence to a Site Management Plan (SMP), including appropriate engineering control (EC) protocols
- Establishment of institutional controls (ICs) in the form of a NYSDEC Environmental Easement

- Pre-occupation mold and radon testing
- Pre-occupation vapor mitigation system performance testing
- LBP and Asbestos O&M Plans; Vapor Mitigation System Manual
- Preparation of a Final Engineering Report

The estimated total volume of impacted fill and soil that would be removed from the site totals approximately 530 cubic yards. Assuming a conversion rate of 1.4 tons per cubic yard, the total weight of the excavated fill and soil is estimated to be approximately 740 tons. Other than removal / disposal of groundwater encountered during excavation, this remedial alternative assumes that no groundwater remediation or long-term monitoring of groundwater is required. Approximately 100 CY of topsoil will be required to meet the 2’ minimum thickness in landscaped areas. Plans and specifications associated with soil handling, excavations, and backfill are presented within Appendix E.

A SMP is required, and will include an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site, and details the steps and media-specific requirements necessary to ensure that the following institutional and / or engineering controls remain in place and effective:

Institutional Controls:

This remedial alternative incorporates the imposition of an institutional control (IC) in the form of an environmental easement for the controlled property that:

- Requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- Allows the use and development of the controlled property for Restricted Residential uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- Restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and,
- Requires compliance with the Department-approved Site Management Plan.

Engineering Controls:

The ECs for this remedial alternative involve:

- A sub-slab vapor mitigation system will be installed to eliminate the potential of indoor air quality concerns; and,
- Installation of a site cover system. The cover will consist of existing building slabs, asphalt pavement, concrete sidewalks, and a soil cover in areas where exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required, it will be a minimum of two feet of certified clean imported soil (meeting the requirements as set forth in 6 NYCRR Part 375-6.7(d)). The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer.

Plans and specifications associated with the site cover and vapor mitigation system are presented within Appendices E and F.

The SMP includes, but may not be limited to:

- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- Descriptions of the provisions of the environmental easement including any land use, groundwater or surface water use restrictions;
- A provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion. Any future on-site buildings may be required to have a sub-slab depressurization system, or a similar engineered system, to prevent the migration of vapors into the building from soil and / or groundwater;
- Provisions for the management and inspection of the identified engineering controls;
- Maintaining site access controls and Department notification;
- The steps necessary for the periodic reviews and certification of the institutional and / or engineering controls; and,
- A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not necessarily be limited to:
  - a schedule of monitoring and frequency of submittals to the Department;
  - monitoring for vapor intrusion, as may be required by the Institutional and Engineering Control Plan discussed above.

In addition to the ECs and ICs described above, the SMP will include a Health and Safety Plan (HASP) to further protect against exposure.

Operations & Maintenance Plans will be prepared for any asbestos and lead-based paint remaining after abatement. A Vapor Mitigation System Manual will be prepared for building maintenance staff.

There does not appear to be a point source for the on-site groundwater contamination, and due to the low concentrations of a limited number of contaminants detected in groundwater during the Remedial Investigation, continued groundwater monitoring will not be required. During the remedial actions, three of the existing groundwater monitoring wells (MW-01, MW-06, and MW-09) will be protected in case future groundwater monitoring is necessary. The remaining wells (MW-02, MW-03, MW-07, MW-08, and MW-10) will be decommissioned during remedial activities, in accordance with NYSDEC Commissioner's Policy #43 (CP-43).

The vapor mitigation and cover systems will be inspected on an annual basis in accordance with the protocols detailed in the SMP. Reports summarizing the inspections will be prepared and submitted annually.

The present worth of this remedy (assuming a 3.25% interest rate) is approximately $470,000, consisting of approximately $447,000 of capital cost and approximately $5,000 of annual costs (annual vapor mitigation system and cover inspection) for 5 years.

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this report is to outline a Remedial Action Work Plan for the Site. This objective will be accomplished by providing background information related to the Site and summarizing previous investigations to date. This report will present, define, and compare multiple remedial alternatives that could be utilized. Public health and safety considerations will also be taken into account and presented. Quality assurance and control parameters will also be defined.

1.2 SITE BACKGROUND

1.2.1 Location and Description

The Smith Restaurant Building property (Site) is located at 500 Erie Boulevard East in the City of Syracuse (see Figure 1). The Site is located on 0.334 acres. The BCP area comprises the entire property.

The Site is bordered to the north, northwest and northeast by Erie Boulevard and the Interstate 81/690 corridor, to the east by the Interstate 81/690 corridor, to the southeast by Water Street and a parking lot, to the south by Water Street and an abandoned parcel (recently demolished building), to the southwest by a Goodyear Tire Center (including auto repair), and to the west by a bank.

The Site is situated at an elevation of approximately 400 feet above mean sea level, and is generally flat. The surrounding area is also relatively flat. The nearest surface water feature is Onondaga Creek, located approximately 3,300 feet to the west of the Site.

The existing building, which encompasses the majority of the Site, is comprised of two contiguous parts (totaling approximately 31,196 square feet):

- a three-story, timber framed (with exterior brick mass walls) section
- a six-story, steel framed (with concrete mass walls) section

In addition, two asphalt parking lots are located on the Site:

- a 2,000 square foot alcove to the north of the building, along Erie Boulevard East
- a 4,500 square foot lot in the eastern section of the Site, along Water Street

1.2.2 History and Previous Investigations

The Property is known to have surface soil, subsurface soil, groundwater, and soil vapor impacts related to the site's history of use as a gasoline filling station, dry-cleaning and laundry facility, and the past presence of underground petroleum storage tanks.

Several investigations and reports have been compiled respective to the Site and are listed below:

- *Phase I Environmental Site Assessment Report, Prepared by EA Engineering P.C., July 2019*
- *Phase II Environmental Site Assessment for Smith Restaurant Supply Building, Prepared by EA Engineering P.C. (and Its Affiliate EA Science & Technology), November 2019*
- *Remedial Investigation Report, Prepared by AECC, September 2020*

The Remedial Investigation Report, which includes a summary of the previous Phase I and Phase II ESA reports, can be viewed at the NYSDEC Region 7 Office and / or Onondaga County Public Library in Syracuse, New York. Information is also available online via the DECInfo Locator Web Application: https://www.dec.ny.gov/data/DecDocs/C734148/

1.2.3 Current Zoning and Land Use

The Site is zoned Central Business District – Office and Service District Restricted (CBD-OSR). The current and proposed uses are in accordance with existing zoning. The surrounding parcels are currently utilized for commercial purposes. The nearest residential area is located more than 1,000 feet from the Site (on the opposite side of the Interstate 690 corridor).

1.2.4 Geologic Setting

According to New York State Geological Survey, the bedrock in the area of the Site is shale and dolostone (on border of Syracuse & Vernon Formation – Upper Silurian in age).

According to the USDA online soil survey database, the soil at the Site is considered 'Urban Land'. The term 'Urban Land' indicates that a significant portion of the Site is covered by impervious surface (i.e., buildings, pavement), or that soil has been significantly altered by past development activities. The characterization of Site soils as 'Urban Land' is not unexpected given the urban history of the Site and vicinity.

Previous investigation at the Site included the use of Geoprobe drilling techniques that encountered soil consisting of silt and clay, with alternating layers of fine to coarse sand and gravel. The Geoprobe investigation included eight boring locations and encountered refusal (estimated as bedrock or a similarly restrictive layer) at depths ranging from 20' to 24' below ground surface (bgs) at seven of the eight boring locations. Refusal was encountered at 13' bgs at one location on the Site.

Groundwater was encountered at depths ranging from approximately 12' to 16' bgs during previous investigation, and was determined to flow in a general east to west direction across the Site. Based on local topography, it is assumed that broader groundwater flow is to the west and northwest towards Onondaga Creek, en route to Onondaga Lake.

As the Site is situated in a dense urban environment, there are no surface waters or wetlands on or in the vicinity of the Site.

1.3 FUTURE SITE USE

It is AECC's understanding that the intended future use of the Site entails the renovation of the existing building for first floor mixed commercial and residential use and upper floor residential use, with ancillary parking and landscaping features.

2.0 SITE DESCRIPTION

2.1 NEAR-SURFACE SOILS

Asphalt and underlying concrete (where present, mostly in the eastern lot) approximately 6” in total thickness are present atop the near-surface soils. Near-surface soils across the northern parking lot and eastern parking lot areas of the Site were investigated during the Remedial Investigation.

Beneath the asphalt / concrete, near-surface soils are typified by the presence of brown and grayish-brown coarse sand and fine gravel. No obvious staining or other visual indications of contamination of surface soils were observed during the RI. No petroleum or otherwise suspicious odors were observed during the near-surface soil screening process. No instrument response was detected while screening the exposed near-surface soils with a PID during the RI.

Specific SVOCs (including PAHs) and metals were detected in near-surface soils (beneath existing asphalt and/or concrete) at concentrations above Restricted Residential Use SCOs. The organochlorine pesticides 4,4’-DDD and 4,4’-DDT were detected in discrete locations in near-surface soils above Unrestricted Use SCOs, but below Restricted Residential Use SCOs.

The investigation of near-surface soils did not identify VOCs above Unrestricted Use SCOs at the Site.

The investigation of near-surface soils did not identify contamination in the form of PCBs or Herbicides at the Site (not detected in any of the samples collected).

Near-surface soils screened during the RI did not exhibit nuisance characteristics (staining, odors) or PID instrument response.

See Figures 3A, 4A, and 5A for additional details.

2.2 SUBSURFACE SOILS

Subsurface soils at the Site were investigated during the Phase II ESA and RI.

Subsurface soil conditions are typified by the presence of mostly brown, light brown, and brownish-gray sandy material of varying grain size / thickness. Discrete areas of silty-sand and trace clay components with slightly-reddish coloration are present at depths generally greater than 10-12 feet below ground surface (till material). See Figure 8 for a soil profile of the Site. Wet soils are generally encountered approximately 12 feet below exterior ground surface. No obvious staining or other visual indications of contamination were observed among subsurface soils during previous investigation activities. No petroleum or otherwise suspicious odors were observed during previous investigation activities, and no instrument response was recorded when screening the soil with a PID.

Specific SVOCs (including PAHs) and metals were detected in subsurface soils in the north lot and beneath the existing building at concentrations above Restricted Residential Use SCOs. Additional SVOCs, metals, and the organochlorine pesticides 4,4’-DDE and 4,4’-DDT were also detected in similar locations among subsurface soils above Unrestricted Use SCOs, but below Restricted Residential Use SCOs.

Specific VOCs (Tetrachloroethene and Trichloroethene) were detected in the subsurface sample collected beneath the basement of the existing building (northeast corner of building) at concentrations above Unrestricted Use SCOs, but below Restricted Residential Use SCOs.

The investigation of subsurface soils did not identify PFAS above applicable guidance values at the Site. The investigation of subsurface soils did not identify contamination in the form of PCBs, Herbicides, or 1,4-Dioxane at the Site (not detected in any of the samples collected).

Subsurface soils screened during the RI did not exhibit nuisance characteristics (staining, odors) or PID instrument response.

See Figures 3A, 4B, 4C, 5B, and 5C for additional details.

2.3 GROUNDWATER

According to NYSDEC, groundwater beneath the Site is classified as class GA groundwater. The site does not appear to directly overlie any aquifers and does not appear to be located near any primary or principal water supply aquifers as classified by NYSDEC. A surficial (unconfined) aquifer is located approximately six miles south of the site.

The approximate depth to groundwater, as measured during field activities associated with previous investigations, ranges from 12 to 14 feet (see Figure 2). Due to the orientation and size of the Site, location of the Site in relation to other infrastructure (buildings, paved roadways and parking lots, and municipal stormwater sewer system drains), the orientation of the monitoring wells, and the general flatness of the relative depth to groundwater measurements collected across the Site during the RI, a specific groundwater flow direction cannot be inferred. The relative depth to groundwater measured beneath the northeastern basement area of the existing building is approximately five feet lower than the exterior portions of the Site.

Specific VOCs were detected in groundwater in discrete locations at the Site at concentrations above their respective Groundwater Standard (Tetrachloroethene at TW/MW-03 and Chloroform at TW/MW-06 and TW/MW-07). Specific metals were detected across the Site in concentrations above their respective Groundwater Standard.

The investigation of groundwater did not identify SVOCs, pesticides, or PFAS above applicable standards and guidance values at the Site. The investigation of groundwater did not identify contamination in the form of PCBs, Herbicides, or 1,4-Dioxane at the Site (not detected in any of the samples collected).

A cloudy (non-petroleum) surface film and high turbidity was noted of groundwater collected from MW-06.

The pH of groundwater screened during the RI was relatively neutral (7.17 to 7.77). No free product, petroleum sheens, or odors were observed during the groundwater screening and sampling process.

Since the City of Syracuse supplies public potable water throughout the entire city, properties in the vicinity of the Property are not used for the extraction of potable groundwater. Furthermore, there are no wellhead protection areas, groundwater recharge areas, residential wells, or commercial wells within a one-mile radius of the Site. Therefore, the potential vulnerability of groundwater from hazardous substances dissolved in groundwater that emanate from the site is considered to be low. Also note that it appears unlikely that groundwater in the vicinity of the Property will be used as a future potable groundwater supply.

See Figure 6 for additional details.

2.4 SOIL GAS AND VAPOR

Specific VOCs (cis-1,2-dichloroethene, trichloroethene, and tetrachloroethene) exceeding their respective NYSDOH standards were detected in two sub-slab vapor samples collected from beneath the basement of the existing building (northeast corner of the building, near SB-09/MW-09, where tetrachloroethene and trichloroethene were detected in soil at concentrations exceeding their respective Unrestricted Use SCOs).

Tetrachloroethene was detected at the highest concentration of the three compounds, and the location is near the location of TW/MW-03, where tetrachloroethene was detected in groundwater at a concentration exceeding its applicable Groundwater Standard.

See Figure 7 for additional details.

3.0 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are developed in accordance with appropriate, relevant, and applicable requirements. These requirements are known as standards, criteria, and guidance (SCGs), and include the NYSDEC Division of Environmental Remediation (DER) regulations and guidance documents, as well as regulations and guidance from other divisions within the NYSDEC, other State Agencies and Departments, and external agencies such as the U.S. Environmental Protection Agency (USEPA) and the Occupational Safety and Health Agency (OSHA).

RAOs for the site were developed to protect human health and environmental receptors from unacceptable risk due to the residual contaminants identified in the subsurface as a result of historic uses of the site. The following site-specific remedial goals serve as the design basis for the Remedial Alternatives Analysis presented in Section 4.

3.1 SOIL RAOS

RAOs for Public Health Protection

- Prevent ingestion of, or direct contact with, contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater contamination.

3.2 GROUNDWATER RAOS

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards
- Prevent contact with, or inhalation of volatiles from, contaminated groundwater.

RAOs for Environmental Protection

- Restore groundwater to pre-release conditions, to the extent practicable

3.3 SOIL VAPOR RAOS

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from potential soil vapor intrusion into the Site building.

3.4 HAZARDOUS BUILDING MATERIALS RAOS

RAOs for Public Health Protection

- Prevent public from coming into contact with various hazardous materials associated with the existing building (asbestos-containing materials, lead-based paint, PCB-containing caulks, mold-contaminated materials, and other miscellaneous / hazardous wastes).

4.0 SUMMARY OF REMEDIAL ALTERNATIVE ANALYSIS

4.1 SCREENING OF AVAILABLE REMEDIAL TECHNOLOGIES

The first step in the process of developing viable remedial alternatives was to review available and proven remedial technologies. These technologies were screened utilizing the following criteria to determine their applicability to the Site and eliminate those technologies that are not technically or economically feasible:

- Short-term effectiveness
- Long-term effectiveness
- Implementability
- Relative cost; and
- Short-term risk

A list of the screened remedial technologies follows, with those considered technically and economically feasible for this project in bold:

- **Institutional Control (IC)**
- **Site Management Plan (SMP), including Institutional and Engineering Controls**
- **Cover System**
- **Excavation**
- Ex-Situ Incineration
- Ex-Situ Thermal Desorption
- Consolidation/Capping
- In-Situ Solidification
- In-Situ Stabilization
- Ex-Situ Solidification/Stabilization
- **On-Site Disposal / Re-Use**
- **Off-Site Disposal / Re-Use**
- In-Situ Thermal Treatment
- Soil Vapor Extraction
- Air Sparging
- **Vapor Mitigation**
- In-Situ Chemical Oxidation or Reduction
- Enhanced Bioremediation
- Monitored Natural Attenuation
- Groundwater Extraction and Treatment
- Air Stripping
- Liquid-Phase Absorption Using Granular Active Carbon
- Chemical/Ultraviolet Oxidation
- Chemical Precipitation
- Ion Exchange/Absorption

4.2 SUMMARY OF POTENTIAL REMEDIAL ALTERNATIVES FOR SITE

Using the project-specific feasible technologies as options, the following remedial alternatives were developed:

Remedial Alternative 1: No Further Action

Remedial Alternative 2: Unrestricted Use (Track 1) – Remove All Contamination to Unrestricted Standards

Remedial Alternative 3: Restricted Residential Use (Track 2) – Remove All Contamination to Restricted Residential SCOs

Remedial Alternative 4: Restricted Residential Use (Track 4) – Remove All Contamination Exterior to the Building to Unrestricted Standards, and Vapor Mitigation System

Remedial Alternative 5: Restricted Residential Use (Track 4) – Remove All Contamination Exterior to the Building to Restricted Residential Standards, and Vapor Mitigation System

Remedial Alternative 6: Restricted Residential Use (Track 4) – Cover System, Site Management Plan, and Vapor Mitigation System

Each of these remedial alternatives is evaluated in detail in the following subsections.

4.2.1 Remedial Alternative 1 - No Further Action

This remedial alternative is included as a procedural requirement and as a baseline to evaluate other alternatives. Under this remedial alternative, the site would remain in its current state, with no additional controls in-place, no further remedial or monitoring activities would occur, and no environmental easement would be recorded. The site would remain virtually as-is, and change in use would not be limited except by existing land use controls such as zoning.

The site as it exists is not protective of human health and the environment, due to the absence of institutional controls to prevent less restrictive forms of future site use (unrestricted) or export of site soils to uncontrolled off-site locations. Accordingly, the No Further Action alternative is not protective of public health and does not satisfy the RAOs.

Under the current and reasonably anticipated future use of the site (mixed residential and commercial building with ancillary asphalt parking lots / concrete sidewalks, and landscaping), the concentrations of constituents detected in the soil / fill do not comply with applicable Restricted Residential Use SCOs (SVOC and metals), groundwater standards (VOCs and metals), and soil vapor standards.

The costs associated with this alternative are limited to the production of a Final Report for the site. The present worth of this remedy is $9,000, consisting of entirely of capital costs ($0 of annual costs).

4.2.2 Remedial Alternative 2 - Remove All Contamination to Unrestricted SCOs

This remedial alternative would necessitate remediation of all soil / fill where concentrations exceed the Unrestricted Use SCOs per 6 NYCRR Part 375. Under this remedial alternative, soil and fill material impacted with contaminants at concentrations above the Unrestricted Use SCOs would be excavated and disposed of at appropriately permitted off-site waste disposal facilities.

The following are the key elements of this remedial alternative (in anticipated sequence of performance):

- Excavation and off-site disposal of fill and soil material impacted by SVOCs, metals, and pesticides from all areas of the Site;
- Dewatering of excavations and off-site disposal of wastewater
- Backfill and compaction of certified clean fill

However, this remedial alternative would require the demolition of the existing building to access contamination beneath the building slabs. Therefore, this remedial alternative is deemed to be unfeasible and will not be further analyzed.

A more practical remedial alternative is detailed in Section 4.2.4.

4.2.3 Remedial Alternative 3 - Remove All Contamination to Restricted Residential SCOs

This remedial alternative is the same as Remedial Alternative 2, except soil and fill material impacted with contaminants at concentrations above the Restricted Residential Use SCOs would be excavated and disposed of at appropriately permitted off-site waste disposal facilities.

However, this remedial alternative would also require the demolition of the existing building to access contamination beneath the building slabs. Therefore, this remedial alternative is deemed to be unfeasible and will not be further analyzed.

A more practical remedial alternative is detailed in Section 4.2.5.

4.2.4 Remedial Alternative 4 - Remove All Contamination Exterior to the Building to Unrestricted Standards and Vapor Mitigation System

This remedial alternative would include the remediation of soil / fill exterior to the building footprint where concentrations exceed the Unrestricted Use SCOs per 6NYCRR Part 375.

Under this remedial alternative, soil and fill material impacted with contaminants at concentrations above the Unrestricted Use SCOs would be excavated and disposed of at appropriately permitted off-site waste disposal facilities. On-site soil which does not exceed Unrestricted Use SCOs may be used to backfill the excavation and establish the designed grades at the site.

Although not expected, any excavated grossly-contaminated material encountered that exhibits significant nuisance characteristics will be removed and transported to permitted off-site waste disposal facilities.

The following are the key elements of this remedial alternative (in anticipated sequence of performance):

- Excavation of fill and soil material impacted by SVOCs, metals, and pesticides from all areas of the Site exterior to the building footprint, including excavation and building foundation shoring systems
- Dewatering of excavations
- Waste characterization and disposal of soils and wastewater (from dewatering operations)
- Backfill and compaction of certified clean fill
- Installation of parking lots, sidewalks, and landscaping
- Hazardous Materials abatement (including clearance testing)
  - Asbestos abatement in accordance with NYSDOL Code Rule 56
  - Lead-based paint in accordance with the USEPA Renovation, Repair, and Painting Rule (40 CFR 745 Subpart E)
  - PCB-containing caulk abatement in accordance with 40 CFR Part 761
  - Mold abatement in accordance with Article 32 of NYS Labor Law
- Design and installation of a vapor mitigation system in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)

- Preparation of and adherence to a Site Management Plan (SMP), including appropriate engineering control (EC) protocols
- Establishment of institutional controls (ICs) in the form of a NYSDEC Environmental Easement
- Pre-occupation mold and radon testing
- Pre-occupation vapor mitigation system performance testing
- LBP and Asbestos O&M Plans; Vapor Mitigation System Manual
- Preparation of a Final Engineering Report

This remedial alternative would involve remedial work in two Areas of Concern (AOCs). Since the on-site contamination includes metals and SVOCs, which are not easily rendered inert by any remedial technologies deemed feasible for this project, excavation and off-site disposal of impacted soil / fill is considered to be the most applicable remedial measure. As such, and based on the conclusions presented in the Remedial Investigation report, this remedial alternative assumes that the following areas would be excavated and disposed at an off-site regulated solid waste landfill:

- AOC-1: Northern Parking Lot (elevated SVOCs, metals, and pesticides throughout the area from 0 feet bgs to >13 feet bgs)
- AOC-2: Eastern Parking Lot (elevated SVOCs and pesticides in limited areas from 0 feet bgs to 1 foot bgs; elevated metals throughout the area from 0 feet bgs to 1 feet bgs; and elevated metals in limited areas from 0 feet bgs to >4 feet bgs)

The estimated total volume of impacted fill and soil that would be removed from these areas totals approximately 2,000 cubic yards. Assuming a conversion rate of 1.4 tons per cubic yard, the total weight of the excavated fill and soil is estimated to be approximately 2,800 tons. Other than removal / disposal of groundwater encountered during excavation, this remedial alternative assumes that no groundwater remediation or long-term monitoring of groundwater is required.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil or complete the backfilling of the excavation and establish the designed grades at the site.

A SMP is required, and will include an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site, and details the steps and media-specific requirements necessary to ensure that the following institutional and / or engineering controls remain in place and effective:

Institutional Controls:

This remedial alternative incorporates the imposition of an institutional control (IC) in the form of an environmental easement for the controlled property that:

- Requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3)
- Allows the use and development of the controlled property for Restricted Residential uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws
- Restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH
- Requires compliance with the Department-approved Site Management Plan

Engineering Controls:

The ECs for this remedial alternative involves the installation of a sub-slab vapor mitigation system to eliminate the potential of indoor air quality concerns.

The SMP will include, but may not necessarily be limited to:

- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- Descriptions of the provisions of the environmental easement including any land use, groundwater or surface water use restrictions;
- A provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- Provisions for the management and inspection of the identified engineering controls;
- Maintaining site access controls and Department notification;
- The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls; and
- A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not necessarily be limited to:
  - A schedule of monitoring and frequency of submittals to the Department;
  - Monitoring for vapor intrusion, as may be required by the Institutional and Engineering Control Plan discussed above.

In addition to the ECs and ICs described above, the SMP will include a Health and Safety Plan (HASP) to further protect against exposure.

Operations & Maintenance Plans will be prepared for any asbestos and lead-based paint remaining after abatement. A Vapor Mitigation System Manual will be prepared for building maintenance staff.

There does not appear to be a point source for the on-site groundwater contamination, and due to the low concentrations of a limited number of contaminants detected in groundwater during the Remedial Investigation, continued groundwater monitoring will not be required.

The vapor mitigation and cover systems will be inspected on an annual basis in accordance with the protocols detailed in the SMP. Reports summarizing the inspections will be prepared and submitted annually.

The present worth of this remedy (assuming a 3.25% interest rate) is approximately $798,000, consisting of approximately $775,000 of capital cost and approximately $5,000 of annual costs (annual vapor mitigation system and cover inspection) for 5 years.

4.2.5 Remedial Alternative 5 - Remove All Contamination Exterior to the Building to Restricted Residential Standards and Vapor Mitigation System

This remedial alternative is the same as Remedial Alternative 4, except soil and fill material impacted with contaminants at concentrations above the Restricted Residential Use SCOs (in lieu of the Unrestricted Use SCOs) would be excavated and disposed of at appropriately permitted off-site waste disposal facilities.

Based on the conclusions presented in the Remedial Investigation report, this remedial alternative assumes that the following areas would be excavated and disposed at an off-site regulated solid waste landfill:

- AOC-1: Northern Parking Lot (elevated SVOCs and metals throughout the area from 0 feet bgs to 4 feet bgs; and elevated SVOCs and metals in limited areas from 4 feet bgs to >13 feet bgs)
- AOC-2: Eastern Parking Lot (elevated SVOCs in limited areas from 0 feet bgs to 1 foot bgs; elevated metals throughout the area from 0 feet bgs to 1 feet bgs)

The estimated total volume of impacted fill and soil that would be removed from these areas totals approximately 900 cubic yards. Assuming a conversion rate of 1.4 tons per cubic yard, the total weight of the excavated fill and soil is estimated to be approximately 1,300 tons. Other than removal / disposal of groundwater encountered during excavation, this remedial alternative assumes that no groundwater remediation or long-term monitoring is required.

On-site soil which does not exceed Restricted Residential SCOs may be used to backfill the excavation and establish the designed grades at the site.

The present worth of this remedy (assuming a 3.25% interest rate) is approximately $615,000, consisting of approximately $592,000 of capital cost and approximately $5,000 of annual costs (annual vapor mitigation system and cover inspection) for 5 years.

4.2.6 Remedial Alternative 6 - Restricted Residential Use (Track 4) – Cover System, Site Management Plan, and Vapor Mitigation System

The selected soil cleanup levels for this alternative are consistent with the Restricted Residential Use RSCOs set forth in 6 NYCRR Table 375-6.8 (b).

Under this remedial alternative, soil and fill material impacted with contaminants at concentrations above the Restricted Residential Use SCOs that are excavated as part of site development (utility trenches, building addition foundations, etc.) will be either be transported to a permitted off-site waste disposal facility, or possibly used as backfill with NYSDEC approval. On-site soil which does not exceed Unrestricted Use SCOs may be used to backfill the excavation and establish the designed grades at the site. No confirmation / verification sampling of excavation walls / bottoms will be required.

Although not expected, any excavated grossly-contaminated material encountered that exhibits significant nuisance characteristics will be transported to permitted off-site waste disposal facilities.

The following are the key elements of this remedial alternative (in anticipated sequence of performance):

- Excavation of soil limited to what is necessary for site development (utility trenches, building addition foundations, etc.)
- Dewatering of excavations
- Waste characterization and disposal of soils and wastewater (from dewatering operations)
- Backfill and compaction of certified clean fill
- Within landscaped areas, the installation of “soft” cover consisting of a minimum of 2 feet of clean soil placed atop a demarcation layer
- In the remainder of the exterior portions of the site, the installation of a “hard” cover consisting of asphalt parking lots and concrete sidewalks placed atop a demarcation layer
- Hazardous Materials abatement (including clearance testing)

  - Asbestos abatement in accordance with NYSDOL Code Rule 56
  - Lead-based paint in accordance with the USEPA Renovation, Repair, and Painting Rule (40 CFR 745 Subpart E)
  - PCB-containing caulk abatement in accordance with 40 CFR Part 761
  - Mold abatement in accordance with Article 32 of NYS Labor Law
- Disposal of remaining building components containing miscellaneous / hazardous wastes
- Design and installation of a vapor mitigation system in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- Preparation of and adherence to a Site Management Plan (SMP), including appropriate engineering control (EC) protocols
- Establishment of institutional controls (ICs) in the form of a NYSDEC Environmental Easement
- Pre-occupation mold and radon testing
- Pre-occupation vapor mitigation system performance testing
- LBP and Asbestos O&M Plans; Vapor Mitigation System Manual
- Preparation of a Final Engineering Report

The estimated total volume of impacted fill and soil that would be removed from the site totals approximately 530 cubic yards. Assuming a conversion rate of 1.4 tons per cubic yard, the total weight of the excavated fill and soil is estimated to be approximately 740 tons. Other than removal / disposal of groundwater encountered during excavation, this remedial alternative assumes that no groundwater remediation or long-term monitoring of groundwater is required. Approximately 100 CY of topsoil will be required to meet the 2' minimum thickness in landscaped areas. Plans and specifications associated with the soil handling, excavations, and backfill for this remedial alternative are presented within Appendix E.

A SMP is required, and will include an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site, and details the steps and media-specific requirements necessary to ensure that the following institutional and / or engineering controls remain in place and effective:

Institutional Controls:

This remedial alternative incorporates the imposition of an institutional control (IC) in the form of an environmental easement for the controlled property that:

- Requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- Allows the use and development of the controlled property for Restricted Residential uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- Restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and,
- Requires compliance with the Department-approved Site Management Plan.

Engineering Controls:

The ECs for this remedial alternative involve:

- A sub-slab vapor mitigation system will be installed to eliminate the potential of indoor air quality concerns; and,
- Installation of a site cover system. The cover will consist of existing building slabs, asphalt pavement, concrete sidewalks, and a soil cover in areas where exposed surface soil will exceed

the applicable soil cleanup objectives (SCOs). Where the soil cover is required, it will be a minimum of two feet of certified clean imported soil (meeting the requirements as set forth in 6 NYCRR Part 375-6.7(d)). The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer.

Plans and specifications associated with the site cover and vapor mitigation system for this remedial alternative are presented within Appendices E and F.

The SMP includes, but may not be limited to:

- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- Descriptions of the provisions of the environmental easement including any land use, groundwater or surface water use restrictions;
- A provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion. Any future on-site buildings may be required to have a sub-slab depressurization system, or a similar engineered system, to prevent the migration of vapors into the building from soil and / or groundwater;
- Provisions for the management and inspection of the identified engineering controls;
- Maintaining site access controls and Department notification;
- The steps necessary for the periodic reviews and certification of the institutional and / or engineering controls; and,
- A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not necessarily be limited to:
    - a schedule of monitoring and frequency of submittals to the Department;
    - monitoring for vapor intrusion, as may be required by the Institutional and Engineering Control Plan discussed above.

In addition to the ECs and ICs described above, the SMP will include a Health and Safety Plan (HASP) to further protect against exposure.

Operations & Maintenance Plans will be prepared for any asbestos and lead-based paint remaining after abatement. A Vapor Mitigation System Manual will be prepared for building maintenance staff.

There does not appear to be a point source for the on-site groundwater contamination, and due to the low concentrations of a limited number of contaminants detected in groundwater during the Remedial Investigation, continued groundwater monitoring will not be required. During the remedial actions, three of the existing groundwater monitoring wells (MW-01, MW-06, and MW-09) will be protected in case future groundwater monitoring is necessary. The remaining wells (MW-02, MW-03, MW-07, MW-08, and MW-10) will be decommissioned during remedial activities, in accordance with NYSDEC Commissioner’s Policy #43 (CP-43).

The vapor mitigation and cover systems will be inspected annually in accordance with the protocols detailed in the SMP. Reports summarizing the inspections will be prepared and submitted annually.

The present worth of this remedy (assuming a 3.25% interest rate) is approximately $470,000, consisting of approximately $447,000 of capital cost and approximately $5,000 of annual costs (annual vapor mitigation system and cover inspection) for 5 years.

4.3 SUMMARY OF COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

The comparative analysis is designed to provide decision makers with information to aid in the selection of a remedial alternative that best meets the requirements for remedial actions. The following analysis compares the remedial alternatives relative to each other using the following evaluation criteria to support selection of a preferred remedial alternative:

- Protection of human health and the environment
- Compliance with SCGs
- Reduction of toxicity, mobility, or volume
- Short-term effectiveness
- Long-term effectiveness and permanence
- Implementability
- Cost effectiveness
- Land use
- Community acceptance
- "Green" principles and techniques
- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and,
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

Each remedial alternative was assessed and assigned a rating (poor, fair, good, excellent, or superior) for each evaluation criteria. Based on the evaluation of the individual criteria, each alternative was also given an overall rating (poor, fair, good, excellent, or superior). Note that community acceptance was not rated since it is based upon public comments received after issuance of this report.

Remedial Alternative 1: No Further Action

Overall Rating: **POOR**

Evaluation Criteria	Rating	Reason
Protectiveness	Poor	Not protective of human health and the environment
Compliance	Poor	SCGs will not be met
Reduction	Poor	No reduction of toxicity, mobility, or volume
Short-term effectiveness	Poor	No short-term reduction in risk
Long-term effectiveness	Poor	No long-term reduction in risk, although volatiles may naturally degrade over time
Implementability	Superior	Already implemented
Cost Effectiveness	Superior	Present Worth = $9,000
Land Use	Poor	Anticipated use is hindered by existing contamination
"Green" Principles	Fair	No energy requirements or emissions; no production of waste materials; does not encourage green communities or sustainable redevelopment

Remedial Alternative 2: Unrestricted Use (Track 1) – Remove All Contamination to Unrestricted Standards

This remedial alternative is not feasible since it would require demolition of the site building in order to access contaminated soil beneath building slabs. Therefore, this remedial alternative is disqualified from consideration.

Remedial Alternative 3: Restricted Residential Use (Track 2) – Remove All Contamination to Restricted Residential SCOs

This remedial alternative is not feasible since it would require demolition of the site building in order to access contaminated soil beneath building slabs. Therefore, this remedial alternative is disqualified from consideration.

Remedial Alternative 4: Restricted Residential Use (Track 4) – Remove All Contamination Exterior to the Building to Unrestricted Standards, and Vapor Mitigation System

Overall Rating: **GOOD**

Evaluation Criteria	Rating	Reason
Protectiveness	Excellent	Protective of human health and the environment
Compliance	Good	Exceedances of SGGs remain, but concentrations of contaminants are relatively low
Reduction	Excellent	Volume of contaminated soils is significantly reduced. Mobility reduced since remaining contamination is beneath a building slab.
Short-term effectiveness	Excellent	Protection would be gained in a relatively short time frame; low short-term risk
Long-term effectiveness	Excellent	Remaining contamination is beneath a building slab
Implementability	Poor	Remediation would have to precede site construction. Extensive excavations required adjacent to a 4-6 story building, a state highway, and an interstate highway bridge foundation. Limited area for mobility would complicate excavations.
Cost Effectiveness	Fair	Present worth = $798,000.
Land Use	Excellent	Compatible with planned use
"Green" Principles	Fair	Relatively high emissions and production of waste materials; merely transfers waste from site to landfill; encourages both green communities and sustainable redevelopment

(continued on following page)

Remedial Alternative 5: Restricted Residential Use (Track 4) – Remove All Contamination Exterior to the Building to Restricted Residential Standards, and Vapor Mitigation System

Overall Rating: **GOOD**

Evaluation Criteria	Rating	Reason
Protectiveness	Excellent	Protective of human health and the environment
Compliance	Good	Exceedances of SGGs remain, but concentrations of contaminants are relatively low
Reduction	Excellent	Volume of contaminated soils is moderately reduced. Mobility reduced since remaining contamination is beneath a building slab.
Short-term effectiveness	Excellent	Protection would be gained in a relatively short time frame; low short-term risk
Long-term effectiveness	Excellent	Remaining contamination is beneath a building slab
Implementability	Poor	Remediation would have to precede site construction. Extensive excavations required adjacent to a 4-6 story building and a state highway. Limited excavations required adjacent to an interstate highway bridge foundation. Limited area for mobility would complicate excavations.
Cost Effectiveness	Good	Present worth = $615,000.
Land Use	Excellent	Compatible with planned use
"Green" Principles	Fair	Moderately high emissions and production of waste materials; merely transfers waste from site to landfill; encourages both green communities and sustainable redevelopment

Remedial Alternative 6: Restricted Residential Use (Track 4) – Cover System, Site Management Plan, and Vapor Mitigation System

Overall Rating: **EXCELLENT**

Evaluation Criteria	Rating	Reason
Protectiveness	Excellent	Protective of human health and the environment
Compliance	Good	Exceedances of SGGs remain, but concentrations of contaminants are relatively low
Reduction	Fair	Volume of contaminated soils are reduced slightly. Mobility reduced due to extensive impermeable cover.
Short-term effectiveness	Excellent	Protection would be gained in a relatively short time frame; low short-term risk
Long-term effectiveness	Good	Extensive impermeable cover with long expected useful life.
Implementability	Superior	Can be performed concurrent with site construction

Cost Effectiveness	Excellent	Low cost, especially when performed in conjunction with site construction. Present worth = $470,000.
Land Use	Excellent	Compatible with planned use
"Green" Principles	Superior	Relatively low emissions and production of waste materials; encourages both green communities and sustainable redevelopment

4.4 PREFERRED REMEDY

Remedial Alternative 1 would not be protective of human health and the environment, and therefore, is disqualified from consideration.

Remedial Alternatives 2 and 3 are not feasible since they would require demolition of the site building in order to access contaminated soil beneath building slabs. Therefore, they are disqualified from consideration.

Remedial Alternatives 4, 5, and 6 are protective of human health and the environment. Each of these remedial alternatives, if implemented, will achieve the RAOs. However, Remedial Alternative 6 is lower in cost, is more implementable, and creates less waste than Remedial Alternatives 4 and 5.

Based on the above comparisons, Remedial Alternative 6 - Restricted Residential Use (Track 4) - Cover System, Site Management Plan, and Vapor Mitigation System was selected as the preferred remedial alternative for the site. This remedial alternative includes the removal of contaminated soil and fill only as necessary to facilitate site / building development, the installation of a cover system and a vapor mitigation system, and the implementation of other ICs / ECs to prevent exposure to the public and environment. This remedial alternative will provide an appropriate, cost-effective remedy that protects human health and the environment and can be implemented during site development.

5.0 REMEDIAL ACTION DESCRIPTION

The planned site redevelopment consists of the renovation of a mixed residential and commercial building with ancillary asphalt parking, concrete sidewalks, and landscaping. Site redevelopment activities that will disturb site soils include excavations for subsurface utilities, building addition foundations, and installation of parking lots and sidewalks.

The preferred remedial action is installation of a cover system and a vapor mitigation system. The following are the key elements of this remedial alternative (in anticipated sequence of performance):

- Excavation of soil limited to what is necessary for site development (utility trenches, building addition foundations, etc.)
- Dewatering of excavations
- Waste characterization and disposal of soils and wastewater (from dewatering operations)
- Backfill and compaction of certified clean fill
- Within landscaped areas, the installation of “soft” cover consisting of a minimum of 2 feet of clean soil placed atop a demarcation layer
- In the remainder of the exterior portions of the site, the installation of a “hard” cover consisting of asphalt parking lots and concrete sidewalks placed atop a demarcation layer
- Hazardous Materials abatement (including clearance testing)
  - Asbestos abatement in accordance with NYSDOL Code Rule 56
  - Lead-based paint in accordance with the USEPA Renovation, Repair, and Painting Rule (40 CFR 745 Subpart E)
  - PCB-containing caulk abatement in accordance with 40 CFR Part 761
  - Mold abatement in accordance with Article 32 of NYS Labor Law
- Disposal of remaining building components containing miscellaneous / hazardous wastes
- Design and installation of a vapor mitigation system in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- Preparation of and adherence to a Site Management Plan (SMP), including appropriate engineering control (EC) protocols
- Establishment of institutional controls (ICs) in the form of a NYSDEC Environmental Easement
- Pre-occupation mold and radon testing
- Pre-occupation vapor mitigation system performance testing
- LBP and Asbestos O&M Plans; Vapor Mitigation System Manual
- Preparation of a Final Engineering Report

Refer to Section 4.2.6 for details of the description of the preferred remedial alternative measure. Plans and specifications associated with soil handling, excavations, backfill, site cover, and vapor mitigation system are presented within Appendices E and F.

5.1 FIELD SAMPLING PLAN

Soil and groundwater samples collected for laboratory analysis will be delivered to the laboratory at the completion of each sample delivery group. The sampling procedures are described in more detail below, and are further detailed in the Standard Operating Procedures presented as Appendix A.

5.1.1 Sampling Objective

It is anticipated that sampling during remedial actions will be limited to the collection of waste characterization samples, and sampling of imported soils / materials. Therefore, sampling will be designed to obtain representative samples of environmental media in an effort to assist with proper disposal and/or reuse on-site. Although it is unlikely that the field sampling plan will include media sampling for in-situ groundwater or soils other than for waste characterization purposes, the associated procedures have been detailed below in case they become necessary.

5.1.2 Soil Sampling Procedures

It is anticipated that soil sampling will be limited to the collection of waste characterization samples. In general, the following steps will be followed for the collection of soil samples.

Soil Sampling – AECC SOP #101

Spoons, scoops, and trowels are of similarly designed construction and will therefore be used in accordance with the following procedures, unless an alternate method is described. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Don PPE as per the project HASP.
2. Select location and be sure that all surface preparation and soil sampling tools are decontaminated.
3. Prepare surface for sampling. Loosen soils by use of a long-handled shovel or pitchfork outside of the perimeter of the sample location.
4. Remove the bulk of the vegetated layer (plants and roots).
5. Use a disposable trowel to collect a representative sample of soil immediately beneath the vegetative layer.
6. The soils shall be screened with a PID to identify the presence or absence of volatile organic vapors. Soils shall be visually characterized with respect to color, grain size, consistency and moisture status. Each distinct layer shall be described using the Modified Burmister classification system.
7. If sampling for VOCs is required, collect this sample portion first.
8. If a specific depth interval has been targeted, collect soils from that depth into a collection pan.
9. If more soil is needed to meet sample volume requirements, additional soil may be collected from an immediately-adjacent location.
10. Homogenize the soil in the collection pan (excluding soil for VOC analysis) by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.
11. Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.
12. Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled. Do not submerge the sample containers in water to clean them.
13. Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.
14. Log the samples in field notebook, chain of custody and other required documentation.
15. Handle samples for shipment to the laboratory.

16. Decontaminate sampling tools prior to reuse.
17. Investigation-derived waste (IDW) should be properly contained before leaving the area.
18. In order to eliminate surface hazard and/or the creation of a preferred path for contaminant migration, backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible.

5.1.3 Groundwater Sampling Procedures (Not Anticipated)

Groundwater Sampling – AECC SOP #106

It is anticipated that groundwater sampling will be limited to the collection of waste characterization samples of groundwater that was pumped from excavations (if necessary). Sampling and analysis of such wastewaters would be performed in accordance with the requirements of the disposal facility (typically grab samples of stored wastewaters).

If sampling of groundwater monitoring wells becomes necessary, the following steps will be followed for the collection of groundwater samples.

1. The sampling technician will remove the well cap and, using a PID, test for VOC vapors immediately above well riser pipe. The PID reading will be recorded in the field logbook. This procedure will then be performed at each well to be sampled.
2. Using a peristaltic pump, each monitoring well will be purged utilizing low-flow techniques. A metering device will be used to monitor field parameters as listed below. Only after the meter readings indicate that the following acceptance criteria (USEPA EQASOP- GW 001, Rev. 3, updated January 19, 2010) have been achieved will the sample be collected:
    - *groundwater turbidity (10% for values >5 NTU)*
    - *temperature (3%)*
    - *pH (+ 0.1 unit)*
    - *specific conductance (3%)*
    - *dissolved oxygen (10% for values >5mg/L)*
    - *Oxygen/Reduction Potential (+ 10 millivolts)*
3. Purged groundwater will be placed into a 55-gallon drum which will be labeled, tightly covered, and temporarily stored on-site.
4. A sufficient volume of groundwater will be collected from each well to fill dedicated vials/jars.
5. The label on each sample jar will identify the sample location, date and time, and parameters to be analyzed.

5.1.4 Sample Handling and Chain-of-Custody Procedures

Sample Handling, Packaging, & Shipping / Sample Labeling & COC – AECC SOPs #102 and #108

Upon completion of the soil and groundwater sampling for a particular day or period of time, the following procedures will be followed:

1. The sealed, labeled samples of soil and groundwater will be carefully packed into a cooler refrigerated with ice or ice packs for delivery to the laboratory for analysis.
2. Packing material may be placed around the sample jars inside the cooler to minimize the potential for sample container breakage that could occur during sample handling and delivery to the laboratory.
3. A chain-of-custody form will be properly completed, signed, and dated by all persons responsible for the collection and delivery of the soil and groundwater samples.
4. The chain-of-custody form will be placed into a sealable plastic bag, sealed, and placed inside the cooler to accompany the soil and groundwater samples from the time of collection until delivery to the laboratory within 24-hours from the time of collection.

5.1.5 Sample Identification

Samples of soil and groundwater will be identified and labeled to include the site name, the sample location, grid location (if applicable), and the sampling time and date. The following alphanumeric system will be used to identify each sample and will correspond with the sample location to be identified on a field-generated sampling diagram:

Sample Type +	Location No. +	Depth =	Example Sample I.D
Soil – Test Pit	TP-01, 02…	(# - #”, # - #’)	TP-02 (48-60”)
Soil – Boring	SB-01, 02…	(# - #”, # - #’)	SB-02 (2-6”)
Groundwater	MW-01	N/A	MW-01
Blind Duplicate	SB, MW,	N/A	SB-D2, MW-D1

5.2 QUALITY ASSURANCE / QUALITY CONTROL PROCEDURES

A Quality Assurance Project Plan (QAPP) describes the manner in which quality assurance / quality control (QA/QC) procedures will be implemented during the RI activities to assure the accuracy and precision of the data collection. Guidance for the selection of QAPP objectives was obtained from NYSDEC’s *DER-10 Technical Guidance for Site Investigation and Remediation* (May 2010).

Quality Assurance (QA) refers to the conduct of all planned and systematic actions necessary to perform satisfactorily all task-specific activities and to provide information and data confidence as a result of such activities. The QA for task-specific activities includes the development of procedures, auditing, monitoring, and surveillance of the performance.

Quality Control (QC) refers to the activity performed to determine if the work activities conform to the requirements. This includes activities such as inspections of the work activities in the field. QA is an overview monitoring of the performance of QC activities through audits rather than first time inspections.

The project-specific QAPP is presented as Appendix B.

5.3 ENGINEERING CONTROLS

The NYSDEC’s definition of an engineering control (EC) is “any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.”

For the purpose of this site, ECs for the preferred remedial alternative will include:

- A sub-slab vapor mitigation system to eliminate the potential of indoor air quality concerns as a result of residual soil and / or groundwater impacts.
- A cover system to prevent exposures to and reduce mobility of subsurface contamination. To accomplish this, the exterior portions of the site (i.e. – outside the building footprint) will be paved with asphalt parking lots or concrete sidewalks, or covered with soil (landscaping).

5.4 INSTITUTIONAL CONTROLS

The NYSDEC's definition of an engineering control (IC) is "any non-physical means of enforcing a restriction on the use of real property that limits human or environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and / or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site."

For the purpose of this site, ICs for the preferred remedial alternative will include:

- NYSDEC Environmental Easement would be placed on the property to control the use of the site.
- A SMP will be developed to provide monitoring requirements and management controls to help ensure soil and/or groundwater contaminants at the site do not adversely impact human health or the environment and that the conditions within the SMP are followed if soil and/or groundwater is handled, stored, disposed of or reused on site.
- A HASP will be developed to define the health and safety requirements necessary to protect nearby residents and workers involved in the remedial activities to be conducted at the site. The Contractors undertaking future site development activities will be required to prepare a site-specific HASP for review and approval prior to the commencement of any site work.
- Operations & Maintenance Plans will be prepared for any asbestos and lead-based paint remaining after abatement. A Vapor Mitigation System Manual will be prepared for building maintenance staff.

6.0 GENERAL SITE-SPECIFIC HEALTH AND SAFETY PLAN

A Health and Safety Plan (HASP) sets forth requirements for maintaining the health and safety of persons at the Site. The HASP addresses general health and safety issues related to the presence of specific chemical and physical hazards that may be encountered during performance of the work activities at the Site. The HASP includes an Emergency Response Plan, which presents the procedures to be followed in the event of an emergency situation.

The site-specific Health and Safety Plan is presented as Appendix C.

7.0 QUALITY ASSURANCE / QUALITY CONTROL

A Quality Assurance Project Plan (QAPP) describes the manner in which quality assurance / quality control (QA/QC) procedures will be implemented during the RA activities to assure the accuracy and precision of the data collection. Guidance for the selection of QAPP objectives was obtained from NYSDEC's *DER-10 Technical Guidance for Site Investigation and Remediation* (May 2010).

Quality Assurance (QA) refers to the conduct of all planned and systematic actions necessary to perform satisfactorily all task-specific activities and to provide information and data confidence as a result of such activities. The QA for task-specific activities includes the development of procedures, auditing, monitoring, and surveillance of the performance.

Quality Control (QC) refers to the activity performed to determine if the work activities conform to the requirements. This includes activities such as inspections of the work activities in the field. QA is an overview monitoring of the performance of QC activities through audits rather than first time inspections.

The project-specific QAPP is presented as Appendix B.

8.0 COMMUNITY AIR MONITORING PROGRAM

The intent of the CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air. Exceedance of the action levels specified within the Plan requires increased monitoring, corrective actions to abate emissions, and / or work shutdown.

The site-specific CAMP, prepared in accordance with Appendix 1A of DER-10, is presented as Appendix D.

9.0 REMEDIATION SCHEDULE

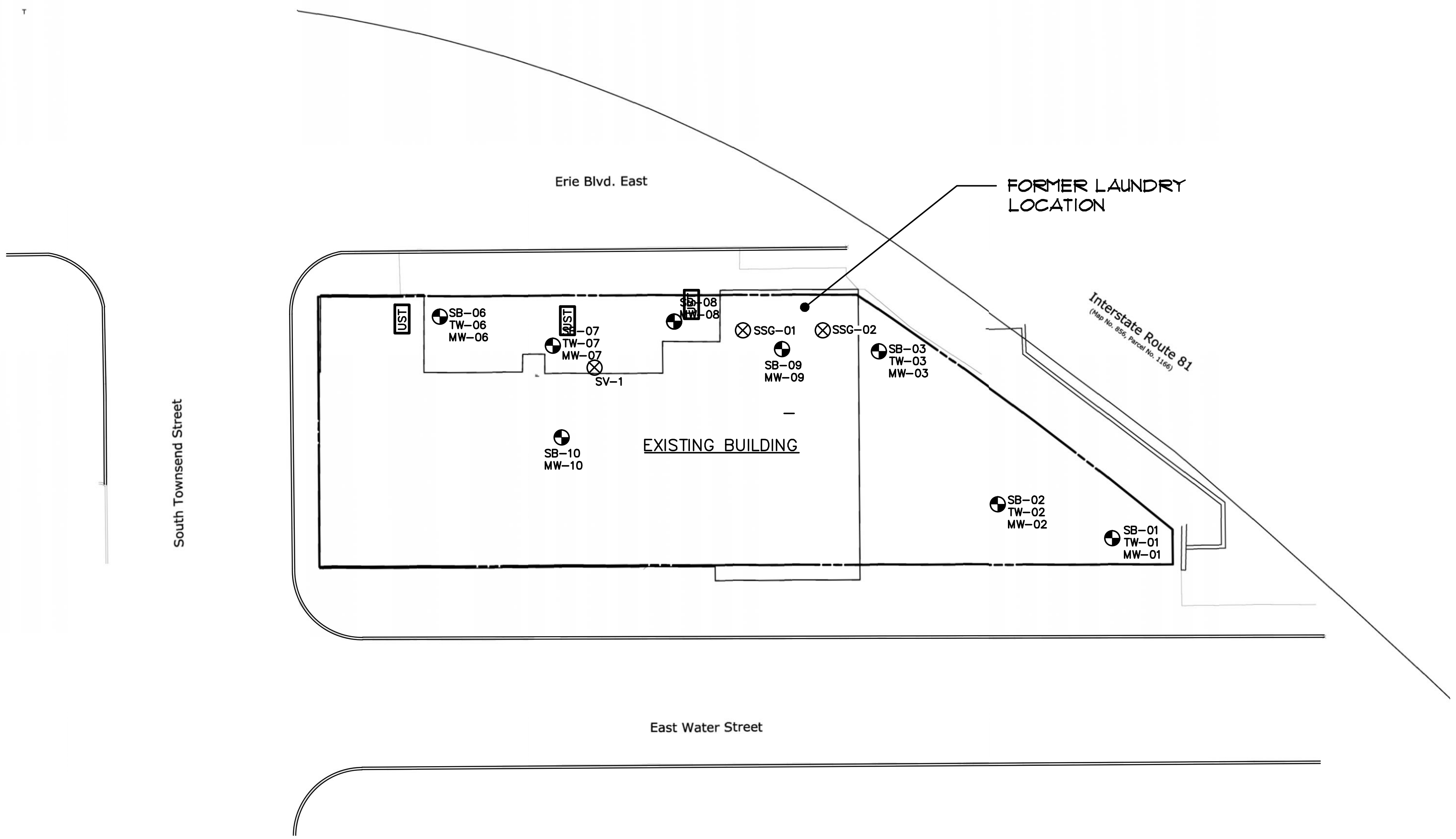
The Remedial Investigation report is being submitted at the same time as this RAWP.

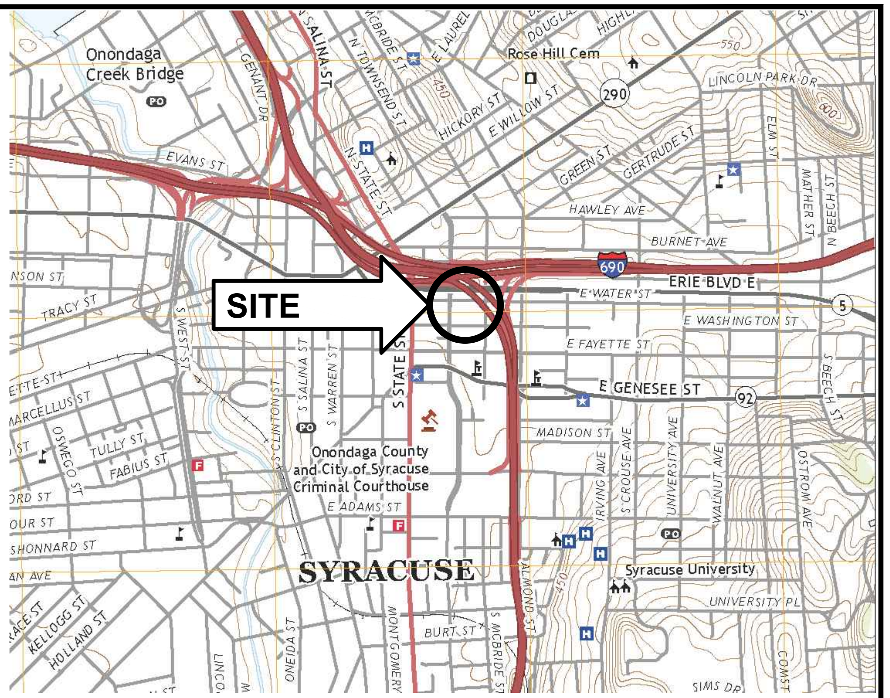
Remedial activities will be performed in conjunction with site development activities.

The following project schedule is proposed. Note that due to the required coordination between State agencies and potential construction delays, additional time to obtain approvals and complete each task may be necessary. In such a case, the project schedule will be revised.

DEC Approval of Remedial Action Work Plan	November 2020
Submit Fact Sheet Announcing Start of Construction	December 2020
Begin Construction / Remediation	**December 2020**
Complete Exterior Remediation (excavations, cover, etc.)	June 2021
Submit Draft Site Management Plan	June 2021
Submit Environmental Easement Package	June 2021
DEC/DOH Review of Draft Site Management Plan	July 2021
Submit Executed Environmental Easement Package	**July 2021**
Submit Draft Final Engineering Report	July 2021
Environmental Easement Recorded	August 2021
DEC/DOH Review of Draft Final Engineering Report	August 2021
Lead Risk Assessment and Vapor Mitigation System Testing	September 2021
Complete Construction	**October 2021**
Submit Final Engineering Report	**October 2021**
Submit Site Management Plan	**October 2021**
Certificate of Completion	**November 2021**
Submit Fact Sheet Announcing FER and COC	November 2021

FIGURES





SITE LOCATION

LEGEND:

— – – —	APPROXIMATE PROPERTY LINE
◕	BORING / WELL LOCATION
⊗	SOIL VAPOR POINT LOCATION
UST	APPROXIMATE LOCATION OF HISTORIC UST (REMOVED)

NOTES:

1. PROPERTY LINE AND BUILDING PER ENGINEERING DOCUMENT PG 47 SITE PLAN DATED JULY 2019 .
2. ALL LOCATIONS ARE APPROXIMATE.

0 32'6"' 75'

GRAPHIC SCALE

AECC
ENVIRONMENTAL CONSULTING
Asbestos & Environmental
Consulting Corporation

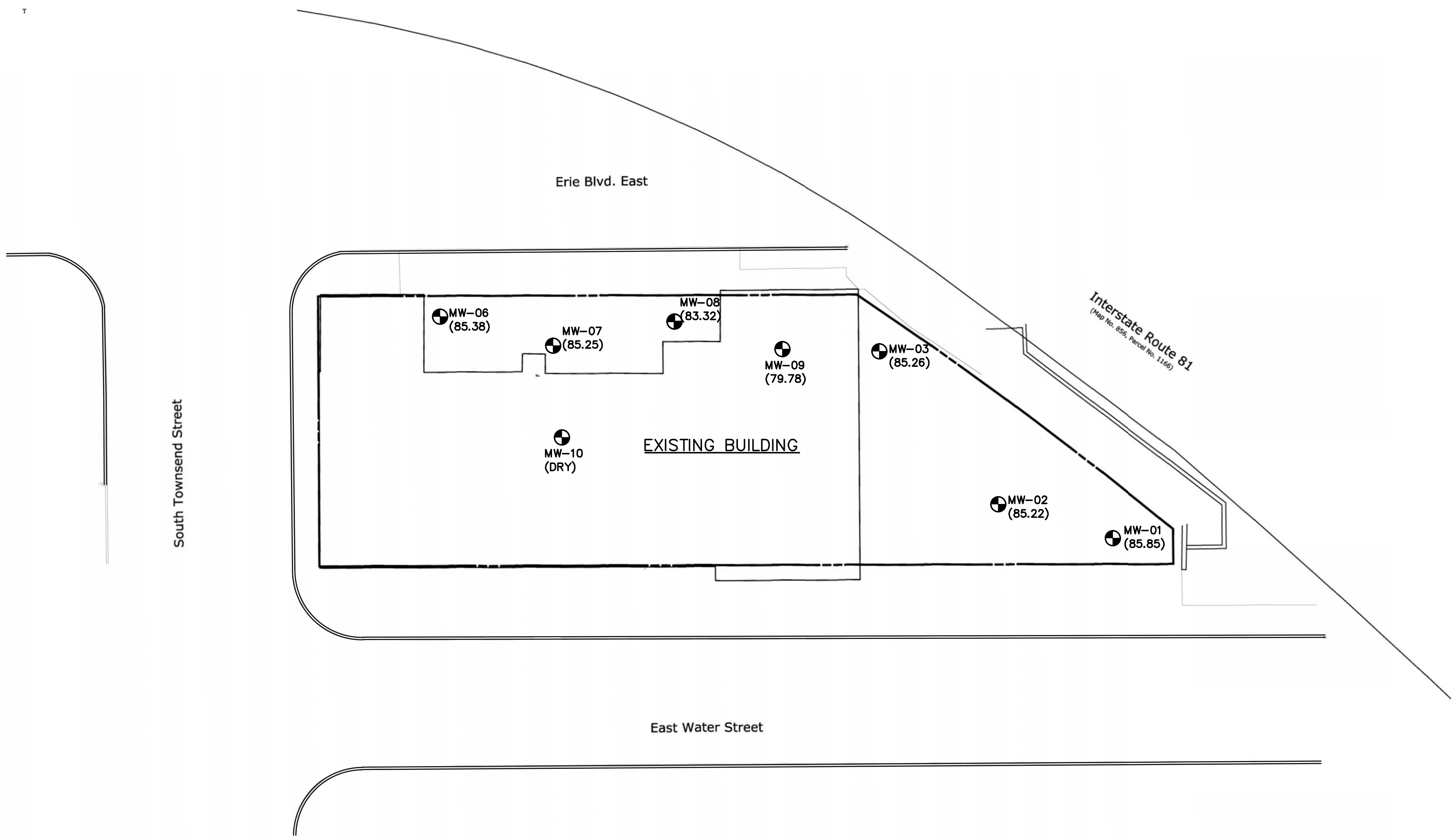
6308 Fly Road
East Syracuse, NY 13057

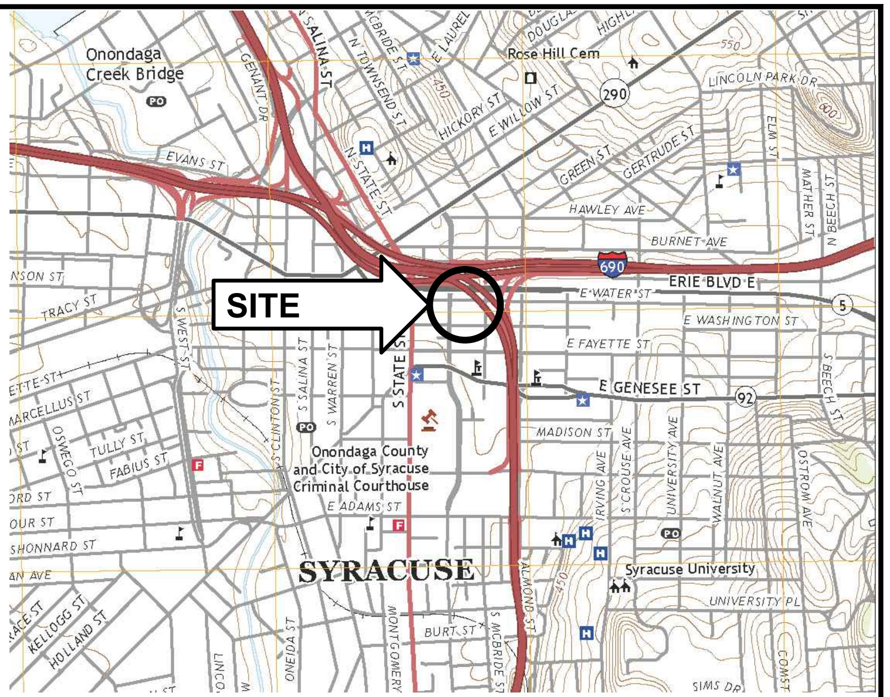
PROJECT NO. 20-032-24
DRAWN: SEPT. 2020
DRAWN BY: NP
CHECKED BY: RM

Site and Sample Location Plan

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
1





SITE LOCATION

LEGEND:

— — — — APPROXIMATE PROPERTY LINE

● BORING / WELL LOCATION
(RELATIVE GROUNDWATER DEPTH)

NOTES:

1. PROPERTY LINE AND BUILDING PER ENGINEERING DOCUMENT PG 47 SITE PLAN DATED JULY 2019 .
2. ALL LOCATIONS ARE APPROXIMATE.
3. RELATIVE DEPTH TO GROUNDWATER MEASURED JULY 30, 2020

0 32'6"' 75'
GRAPHIC SCALE

AECC
ENVIRONMENTAL CONSULTING
Asbestos & Environmental
Consulting Corporation

6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.20-032-24
DRAWN: AUG. 2020
DRAWN BY: NP
CHECKED BY: RM

Relative Groundwater Elevation Plan

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
2

Sample ID / Location			**SB-06-SS**
Sampling Date			**07/08/20**
Sample Depth			**0.5 - 1'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**3000**
Benzo[a]pyrene	**1000**	**1000**	**3600**
Benzo[b]fluoranthene	**1000**	**1000**	**4300**
Benzo[k]fluoranthene	800	3900	2000
Chrysene	1000	3900	3000
Dibenz(a,h)anthracene	**330^{e}**	**330^{e}**	**800 J**
Indeno[1,2,3-cd]pyrene	**500**	**500**	**2500**
Pesticides	SCO	RRSCO	CONC (ug/Kg)
4,4'-DDD	3.3^{e}	13000	12 J J+
Metals	SCO	RRSCO	CONC (mg/Kg)
Copper	50	270	79.1 Jv
Lead	63	400	125 Jv
Nickel	30	310	48.3 J-
Zinc	109	10000	154 Jv
Sample ID / Location			**SB-06**
Sampling Date - SVOC & Metals			**09/25/19**
Sampling Date - Pesticides			**07/14/20**
Sample Depth			**1 - 4'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**1600 J**
Benzo[a]pyrene	**1000**	**1000**	**1600 J**
Benzo[b]fluoranthene	**1000**	**1000**	**2100**
Chrysene	1000	3900	1600 J
Indeno[1,2,3-cd]pyrene	**500**	**500**	**1300 J**
Phenanthrene	100000	100000	970 J
Pesticides	SCO	RRSCO	CONC (ug/Kg)
4,4'-DDT	3.3^{e}	7900	4.8 J J+
Metals	SCO	RRSCO	CONC (mg/Kg)
Barium	350	400	372
Copper	**50**	**270**	**332**
Lead	**63**	**400**	**2850**
Mercury	0.18	0.81	0.43
Nickel	30	310	35.5
Zinc	109	10000	326
Sample ID / Location			**SB-06**
Sampling Date - Pesticides			**07/14/20**
Sample Depth			**10 - 13'**
Pesticides	SCO	RRSCO	CONC (ug/Kg)
4,4'-DDT	3.3^{e}	7900	5.4 J J+

Sample ID / Location			**SB-10**
Sampling Date			**07/15/20**
Sample Depth			**3 - 6.75'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**41000**
Benzo[a]pyrene	**1000**	**1000**	**33000 Jv**
Benzo[b]fluoranthene	**1000**	**1000**	**37000 Jv**
Benzo[g,h,i]perylene	100000	100000	20000 Jv
Benzo[k]fluoranthene	**800**	**3900**	**19000 Jv**
Chrysene	**1000**	**3900**	**33000**
Dibenz(a,h)anthracene	**330^{e}**	**330^{e}**	**4900**
Dibenzofuran	7000	59000	8600
Indeno[1,2,3-cd]pyrene	**500**	**500**	**18000 Jv**
Phenanthrene	**100000**	**100000**	**120000**
Pesticides	SCO	RRSCO	CONC (ug/Kg)
4,4'-DDD	3.3^{e}	13000	~~7.5~~ J R
4,4'-DDE	3.3^{e}	8900	4.1 J J-
4,4'-DDT	3.3^{e}	7900	18 J JN
Metals	SCO	RRSCO	CONC (mg/Kg)
Copper	**50**	**270**	**299 Jv**
Lead	**63**	**400**	**1080 Jv**
Selenium	3.9	180	5.1
Zinc	109	10000	132 J-
Sample ID / Location			**SB-10**
Sampling Date			**07/15/20**
Sample Depth			**12 - 14'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**11000**
Benzo[a]pyrene	**1000**	**1000**	**8800**
Benzo[b]fluoranthene	**1000**	**1000**	**9100**
Benzo[k]fluoranthene	**800**	**3900**	**5900**
Chrysene	**1000**	**3900**	**9000**
Dibenz(a,h)anthracene	**330^{e}**	**330^{e}**	**1700 J**
Indeno[1,2,3-cd]pyrene	**500**	**500**	**4300**
Pesticides	SCO	RRSCO	CONC (ug/Kg)
4,4'-DDT	3.3^{e}	7900	14 J JN
Metals	SCO	RRSCO	CONC (mg/Kg)
Lead	63	400	82.1

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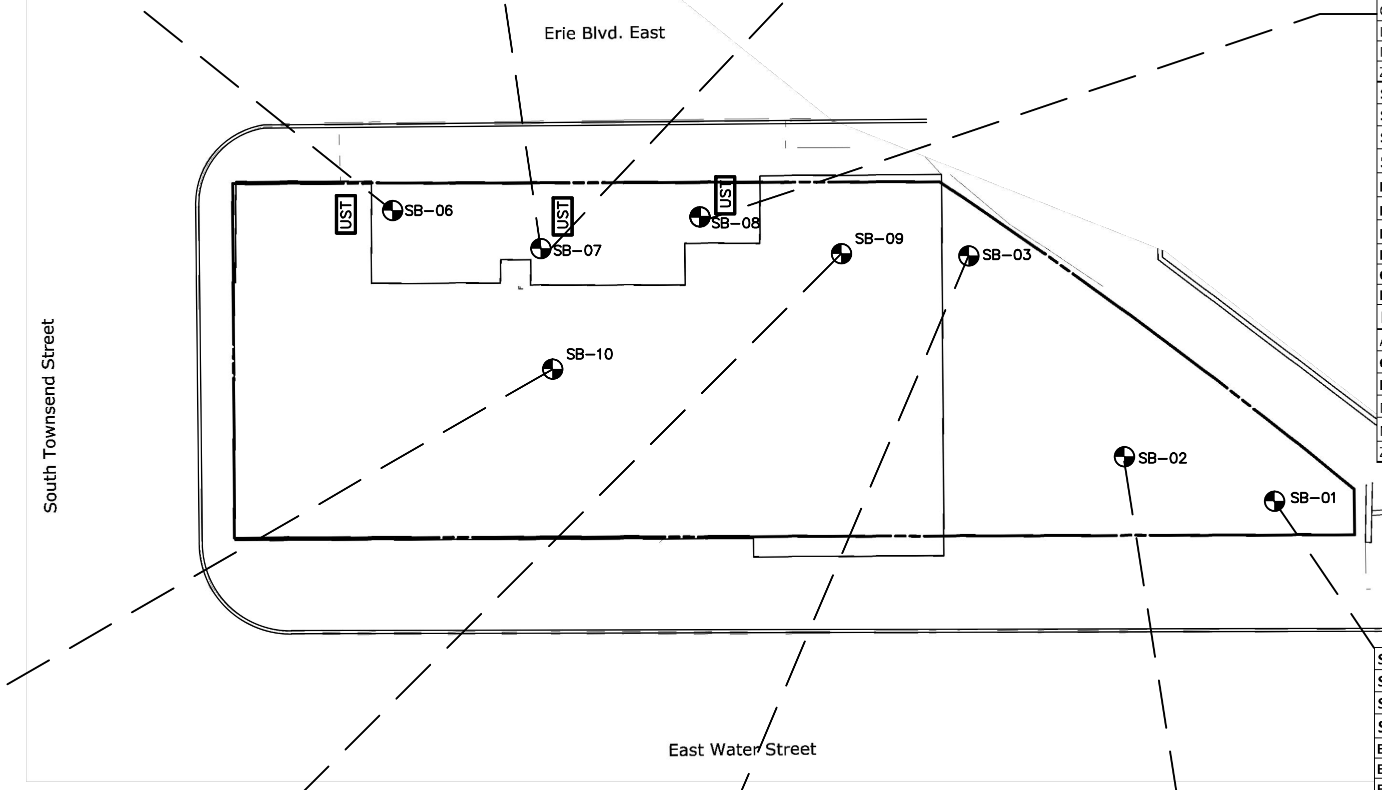
Sample ID / Location			**SB-07-SS**
Sampling Date			**07/08/20**
Sample Depth			**0.5 - 1'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**17000 J**
Benzo[a]pyrene	**1000**	**1000**	**20000 J**
Benzo[b]fluoranthene	**1000**	**1000**	**21000 J**
Benzo[k]fluoranthene	**800**	**3900**	**8800 J**
Chrysene	**1000**	**3900**	**15000 J**
Indeno[1,2,3-cd]pyrene	**500**	**500**	**10000 J**
Pesticides	SCO	RRSCO	CONC (ug/Kg)
4,4'-DDD	3.3^{e}	13000	15 J J-
4,4'-DDT	3.3^{e}	7900	37 J J+
Metals	SCO	RRSCO	CONC (mg/Kg)
Arsenic	**13**	**16**	**25.3**
Barium	**350**	**400**	**1300 ^ Jv**
Copper	50	270	226 Jv
Lead	**63**	**400**	**468 Jv**
Mercury	0.18	0.81	0.22
Nickel	30	310	37.0 J-
Zinc	109	10000	389 Jv

Sample ID / Location			**SB-07**
Sampling Date			**09/25/19**
Sample Depth			**1 - 4'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**18000**
Benzo[a]pyrene	**1000**	**1000**	**18000**
Benzo[b]fluoranthene	**1000**	**1000**	**21000**
Benzo[k]fluoranthene	**800**	**3900**	**8900**
Chrysene	**1000**	**3900**	**17000**
Indeno[1,2,3-cd]pyrene	**500**	**500**	**11000**
Metals	SCO	RRSCO	CONC (mg/Kg)
Lead	**63**	**400**	**504**
Mercury	0.18	0.81	0.72
Zinc	109	10000	184



Sample ID / Location			**SB-09**
Sampling Date			**07/15/20**
Sample Depth			**3 - 7'**
VOC	SCO	RRSCO	CONC (ug/Kg)
Tetrachloroethene (PERC)	1300	19000	3500
Trichloroethene (TCE)	470	21000	960

Sample ID / Location			**SB-03-SS**
Sampling Date			**07/08/20**
Sample Depth			**0.5 - 1'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**2000**
Benzo[a]pyrene	**1000**	**1000**	**1700 J**
Benzo[b]fluoranthene	**1000**	**1000**	**1800 J**
Benzo[k]fluoranthene	800	3900	950 J
Chrysene	1000	3900	1700 J
Pesticides	SCO	RRSCO	CONC (ug/Kg)
4,4'-DDT	3.3^{e}	7900	9.7 J J+
Metals	SCO	RRSCO	CONC (mg/Kg)
Arsenic	**13**	**16**	**17.1**
Copper	50	270	98.4 Jv
Lead	63	400	182 Jv
Zinc	109	10000	148 Jv
Sample ID / Location			**SB-03**
Sampling Date			**09/24/19**
Sample Depth			**1 - 4'**
Metals	SCO	RRSCO	CONC (mg/Kg)
Mercury	0.18	0.81	0.18

Sample ID / Location			**SB-02-SS**
Sampling Date			**07/08/20**
Sample Depth			**0.5 - 1'**
Metals	SCO	RRSCO	CONC (mg/Kg)
Arsenic	**13**	**16**	**48.1**
Copper	50	270	80.7 Jv
Lead	63	400	188 Jv
Selenium	3.9	180	4.9

Sample ID / Location			**SB-08-SS**
Sampling Date			**07/08/20**
Sample Depth			**0.5 - 1'**
Metals	SCO	RRSCO	CONC (mg/Kg)
Arsenic	**13**	**16**	**32.7**
Lead	63	400	133 Jv
Mercury	0.18	0.81	0.23
Sample ID / Location			**SB-08**
Sampling Date - SVOC & Metals			**09/25/19**
Sampling Date - Pesticides			**07/14/20**
Sample Depth			**1 - 4'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**3400 J**
Benzo[a]pyrene	**1000**	**1000**	**3300 J**
Benzo[b]fluoranthene	**1000**	**1000**	**4200 J**
Benzo[k]fluoranthene	800	3900	1700 J
Chrysene	1000	3900	2900 J
Indeno[1,2,3-cd]pyrene	**500**	**500**	**2000 J**
Pesticides	SCO	RRSCO	CONC (ug/Kg)
4,4'-DDD	3.3^{e}	13000	~~38~~ R
4,4'-DDE	3.3^{e}	8900	6.1 J J+
4,4'-DDT	3.3^{e}	7900	14 J J+
Metals	SCO	RRSCO	CONC (mg/Kg)
Copper	50	270	55.0
Lead	63	400	362 J
Mercury	0.18	0.81	0.31
Zinc	109	10000	148
Sample ID / Location			**SB-08**
Sampling Date			**09/25/19**
Sample Depth			**10 - 12'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**11000**
Benzo[a]pyrene	**1000**	**1000**	**11000**
Benzo[b]fluoranthene	**1000**	**1000**	**11000**
Benzo[k]fluoranthene	**800**	**3900**	**6400**
Chrysene	**1000**	**3900**	**11000**
Indeno[1,2,3-cd]pyrene	**500**	**500**	**4700**
Metals	SCO	RRSCO	CONC (mg/Kg)
Arsenic	13	16	14.5
Copper	**50**	**270**	**531**
Lead	**63**	**400**	**490**
Mercury	0.18	0.81	0.37
Nickel	30	310	44.8
Zinc	109	10000	344

Sample ID / Location			**SB-01-SS**
Sampling Date			**07/08/20**
Sample Depth			**0.5 - 1'**
SVOC	SCO	RRSCO	CONC (ug/Kg)
Benzo[a]anthracene	**1000**	**1000**	**1000 J+**
Benzo[a]pyrene	**1000**	**1000**	**1200 J+**
Benzo[b]fluoranthene	**1000**	**1000**	**1500**
Chrysene	1000	3900	1100 J+
Indeno[1,2,3-cd]pyrene	**500**	**500**	**1000**
Metals	SCO	RRSCO	CONC (mg/Kg)
Arsenic	**13**	**16**	**275**
Copper	50	270	121 Jv
Lead	63	400	329 Jv
Mercury	0.18	0.81	0.54
Selenium	3.9	180	9.2
Zinc	109	10000	156 Jv
Sample ID / Location			**SB-01**
Sampling Date			**09/24/19**
Sample Depth			**1 - 4'**
Metals	SCO	RRSCO	CONC (mg/Kg)
Mercury	0.18	0.81	0.18
Nickel	30	310	37.1

LEGEND:

— — —	APPROXIMATE PROPERTY LINE
◒ SB-#	SOIL BORING LOCATION AND ID
UST	APPROXIMATE LOCATION OF HISTORIC UST

TABLE NOTES:

SCO - NYSDEC UNRESTRICTED USE SOIL CLEANUP OBJECTIVE

RRSCO - NYSDEC RESTRICTED RESIDENTIAL USE SOIL CLEANUP OBJECTIVE

J - ESTIMATED VALUE (THE CONCENTRATION IS GREATER THAN THE METHOD DETECTION LIMIT, BUT BELOW THE QUANTITATION LIMIT)

BOLD - CONCENTRATION EXCEEDS APPLICABLE RRSCO VALUE

Jv - ANALYTE IS PRESENT, BUT REPORTED VALUE MAY BE ASSOCIATED WITH A HIGHER LEVEL OF UNCERTAINTY THAT IS NORMALLY EXPECTED WITH THE ANALYTICAL METHOD (QUALIFIER ADDED BY DATA VALIDATOR)

J- - ANALYTE IS PRESENT. REPORTED VALUE MAY BE BIASED LOW AND ASSOCIATED WITH A HIGHER LEVEL OF UNCERTAINTY THAN IS NORMALLY EXPECTED WITH THE ANALYTICAL METHOD.

J+ - ANALYTE IS PRESENT.REPORTED VALUE MAY BE BIASED HIGH AND ASSOCIATED WITH A HIGHER LEVEL OF UNCERTAINTY THAN IS NORMALLY EXPECTED WITH THE ANALYTICAL METHOD.

R - UNRELIABLE RESULT; DATA IS REJECTED OR UNUSABLE. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA OR INFORMATION IS NECESSARY TO CONFIRM THE RESULT.

N - TENTATIVE IDENTIFICATION. ANALYTE IS CONSIDERED PRESENT. SPECIAL METHODS MAY BE NEEDED TO CONFIRM ITS PRESENCE OR ABSENCE DURING FUTURE SAMPLING EFFORTS

NOTES / DISCLAIMERS:

1. APPROXIMATE PROPERTY LINE BASED ON PROVIDED PROPERTY SURVEY (C.T. MALE ASSOCIATES, JUNE 2019)
2. ALL LOCATIONS ARE APPROXIMATE.

0 37'–6" 75'

GRAPHIC SCALE

AECC
ENVIRONMENTAL CONSULTING

Asbestos & Environmental
Consulting Corporation

6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.20-032-24

DRAWN: AUG. 2020

DRAWN BY: NP

CHECKED BY: RM

Summary of Analytical Exceedances
In Soil

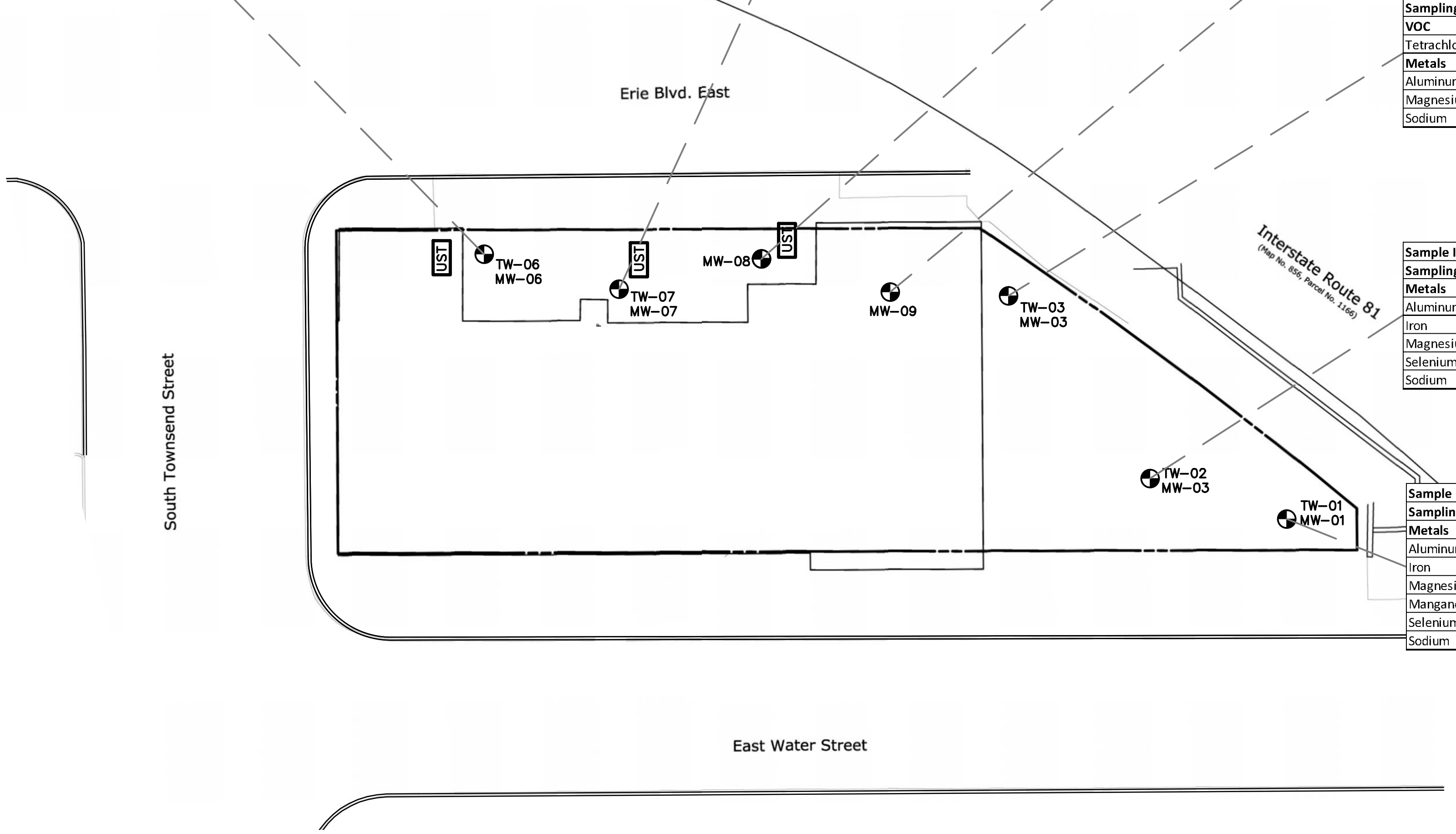
Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE

3A

Sample ID / Location		**TW/MW-06**
Sampling Date		**09/26/19**
VOC	AWQS (ug/L)	CONC (ug/L)
Chloroform	7	**9.3**
Metals	AWQS (mg/L)	CONC (mg/L)
Aluminum	0.1	**8.8**
Iron	0.3	**12.8**
Lead	0.025	**0.110**
Magnesium	35	**41.2**
Manganese	0.3	**0.3**
Sodium	20	**190**

Sample ID / Location		**TW/MW-07**
Sampling Date		**09/26/19**
VOC	AWQS (ug/L)	CONC (ug/L)
Chloroform	7	**11**
Metals	AWQS (mg/L)	CONC (mg/L)
Aluminum	0.1	**0.56**
Iron	0.3	**0.64**
Sodium	20	**191**



Sample ID / Location		**MW-08**
Sampling Date		**07/17/20**
Metals	AWQS (mg/L)	CONC (mg/L)
Iron	0.3	**0.33 B**
Magnesium	35	**162**
Manganese	0.3	**0.31 B**
Sodium	20	**2770 B**

Sample ID / Location		**MW-09 / MW-D4**
Sampling Date		07/17/20
Metals	AWQS (mg/L)	CONC (mg/L)
Magnesium	35	**113 / 109**
Sodium	20	**3210 B / 3160 B**

Sample ID / Location		**TW/MW-03**
Sampling Date		**09/26/19**
VOC	AWQS (ug/L)	CONC (ug/L)
Tetrachloroethene	5	**7.6**
Metals	AWQS (mg/L)	CONC (mg/L)
Aluminum	0.1	**0.11**
Magnesium	35	**39.9**
Sodium	20	**1080**

Sample ID / Location		**TW/MW-02**
Sampling Date		**09/26/19**
Metals	AWQS (mg/L)	CONC (mg/L)
Aluminum	0.1	**0.4**
Iron	0.3	**0.45**
Magnesium	35	**57.5**
Selenium	0.01	**0.013 J**
Sodium	20	**567**

Sample ID / Location		**TW/MW-01**
Sampling Date		**09/26/19**
Metals	AWQS (mg/L)	CONC (mg/L)
Aluminum	0.1	**6.8**
Iron	0.3	**8.3**
Magnesium	35	**71.9**
Manganese	0.3	**0.35**
Selenium	0.01	**0.039**
Sodium	20	**508**

LEGEND:

— — —	APPROXIMATE PROPERTY LINE
◐ TW/MW-#	GROUNDWATER MONITORING WELL LOCATION AND ID
UST	APPROXIMATE LOCATION OF HISTORIC UST

TABLE NOTES:

AWQS - NYSDEC AMBIENT WATER QUALITY STANDARD OR GUIDANCE VALUE

J-ESTIMATED VALUE (THE CONCENTRATION IS GREATER THAN THE METHOD DETECTION LIMIT, BUT BELOW THE QUANTITATION LIMIT)

B- COMPOUND WAS FOUND IN THE BLANK SAMPLE

NOTES / DISCLAIMERS:

1. APPROXIMATE PROPERTY LINE BASED ON PROVIDED PROPERTY SURVEY (C.T. MALE ASSOCIATES, JUNE 2019)
2. ALL LOCATIONS ARE APPROXIMATE.

0 37'–6" 75'
GRAPHIC SCALE

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6308 Fly Road
East Syracuse, NY 13057

PROJECT NO. 20-032-24
DRAWN: AUG. 2020
DRAWN BY: NP
CHECKED BY: RM

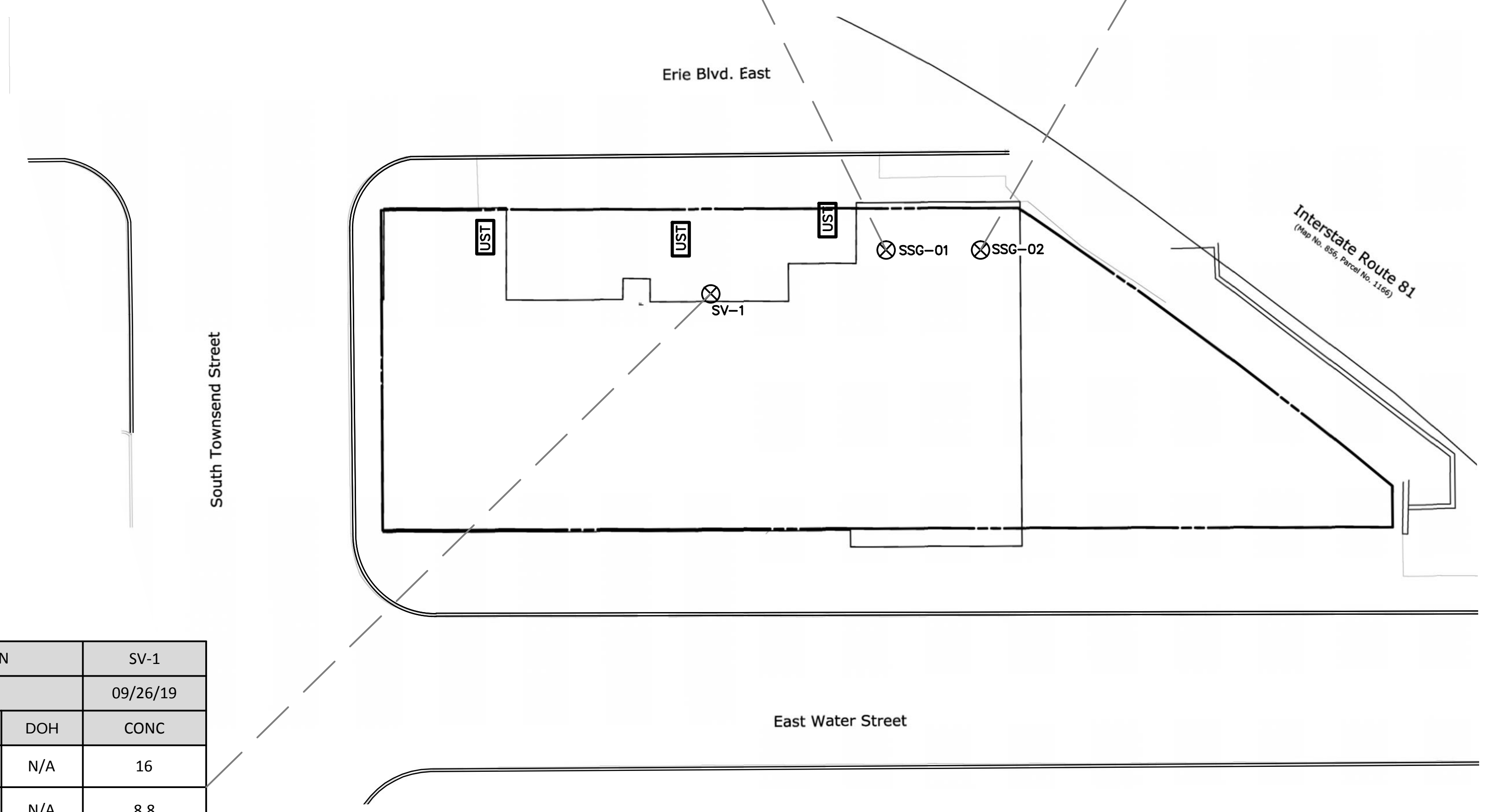
Summary of Analytical Exceedances
In Groundwater

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
3B

SAMPLE ID / LOCATION		SSG-01
SAMPLING DATE		09/26/19
VOC	DOH	CONC
cis-1,2 Dichloroethene	**6**	**34**
Tetrachloroethene (PCE / PERC)	**100**	**7,400**
Trichloroethene (TCE)	**6**	**350**
Chloroform	N/A	54

SAMPLE ID / LOCATION		SSG-02
SAMPLING DATE		09/27/19
VOC	DOH	CONC
cis-1,2 Dichloroethene	**6**	**54**
Tetrachloroethene (PCE / PERC)	**100**	**520**
Trichloroethene (TCE)	**6**	**70**
Chloroform	N/A	8.3



SAMPLE ID / LOCATION		SV-1
SAMPLING DATE		09/26/19
VOC	DOH	CONC
Benzene	N/A	16
Chloroform	N/A	8.8
Ethylbenzene	N/A	54
Naphthalene	N/A	3.2
Trichloroethene (TLE)	N/A	2.4 J
1,2,4 - Trimethylbenzene	N/A	11

LEGEND:

— — — —	APPROXIMATE PROPERTY LINE
⊗ SSG-#	SUB-SLAB SOIL GAS SAMPLE LOCATION AND ID
UST	APPROXIMATE LOCATION OF HISTORIC UST (REMOVED)

TABLE NOTES:

ALL SOIL GAS / VAPOR VALUES ARE REPORTED IN MICROGRAMS PER CUBIC METER (ug/m^3)

DOH - NOTE THAT SUB-SLAB SOIL GAS CONCENTRATION AT WHICH MITIGATION MAY BE DEPENDENT ON MEASURED CONCENTRATION OF INDOOR VAPORS.

BOLD - CONCENTRATION EXCEEDS APPLICABLE DOH VALUE

NOTES / DISCLAIMERS:

1. APPROXIMATE PROPERTY LINE BASED ON PROVIDED PROPERTY SURVEY (C.T. MALE ASSOCIATES, JUNE 2019)
2. ALL LOCATIONS ARE APPROXIMATE.
3. THE NYSDOH ONLY MAINTAINS STANDARDS FOR A LIMITED NUMBER OF COMPOUNDS

0 37'-6" 75'
GRAPHIC SCALE

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Asbestos & Environmental
Consulting Corporation

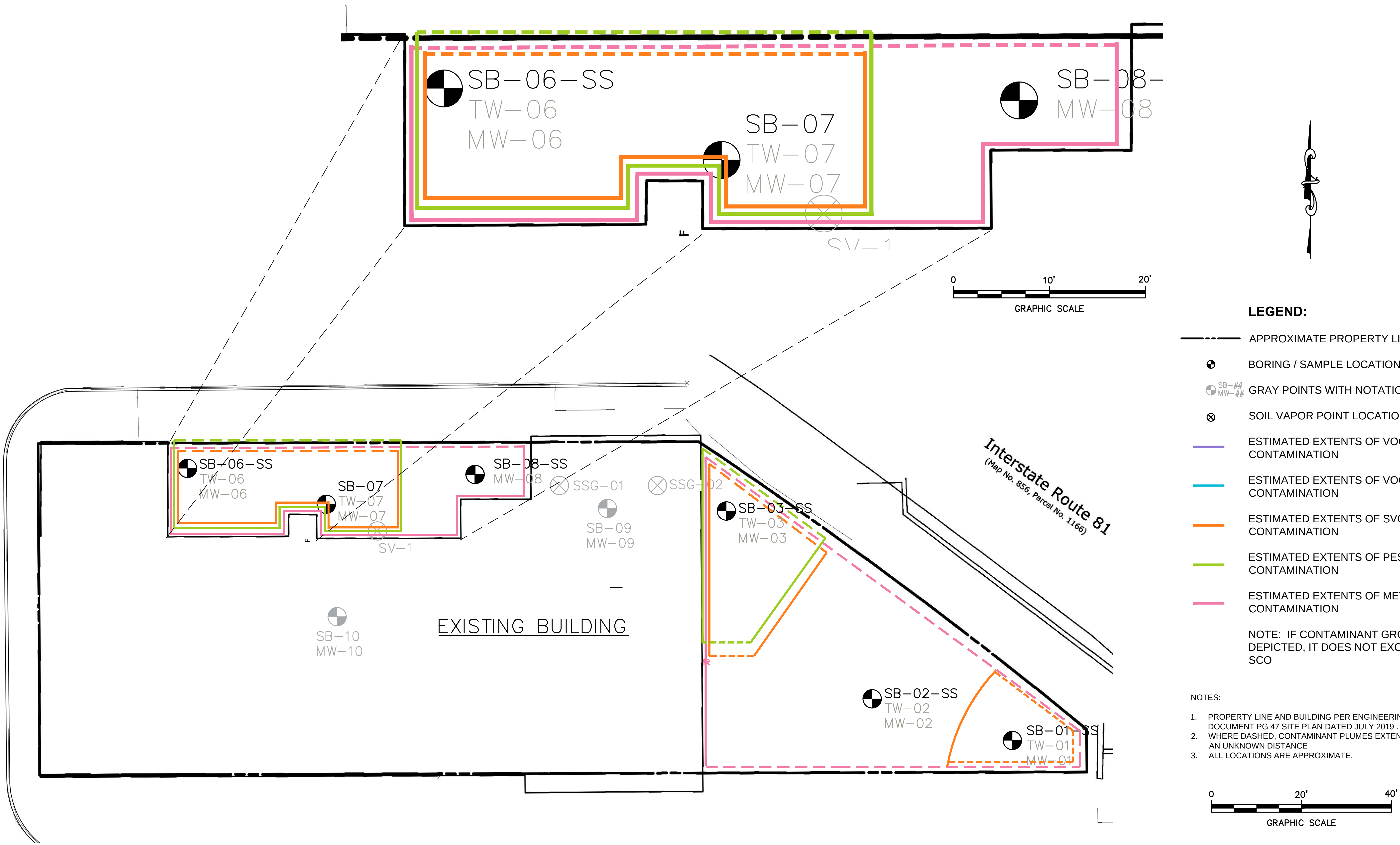
6308 Fly Road
East Syracuse, NY 13057

PROJECT NO. 20-032-24
DRAWN: AUG. 2020
DRAWN BY: NP
CHECKED BY: RM

Summary of Analytical Exceedances
In Soil Vapor

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
3C



LEGEND:

— · — APPROXIMATE PROPERTY LINE

◕ BORING / SAMPLE LOCATION

◕ SB–## MW–## GRAY POINTS WITH NOTATION NOT SAMPLED.

⊗ SOIL VAPOR POINT LOCATION

— ESTIMATED EXTENTS OF VOC (TCE, PERC) CONTAMINATION

— ESTIMATED EXTENTS OF VOC (CHLOROFORM) CONTAMINATION

— ESTIMATED EXTENTS OF SVOC (PAH) CONTAMINATION

— ESTIMATED EXTENTS OF PESTICIDE CONTAMINATION

— ESTIMATED EXTENTS OF METALS CONTAMINATION

NOTE: IF CONTAMINANT GROUP IS NOT DEPICTED, IT DOES NOT EXCEED APPLICABLE SCO

NOTES:

1. PROPERTY LINE AND BUILDING PER ENGINEERING DOCUMENT PG 47 SITE PLAN DATED JULY 2019 .
2. WHERE DASHED, CONTAMINANT PLUMES EXTEND AN UNKNOWN DISTANCE
3. ALL LOCATIONS ARE APPROXIMATE.

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PROJECT NO. 20-032-24
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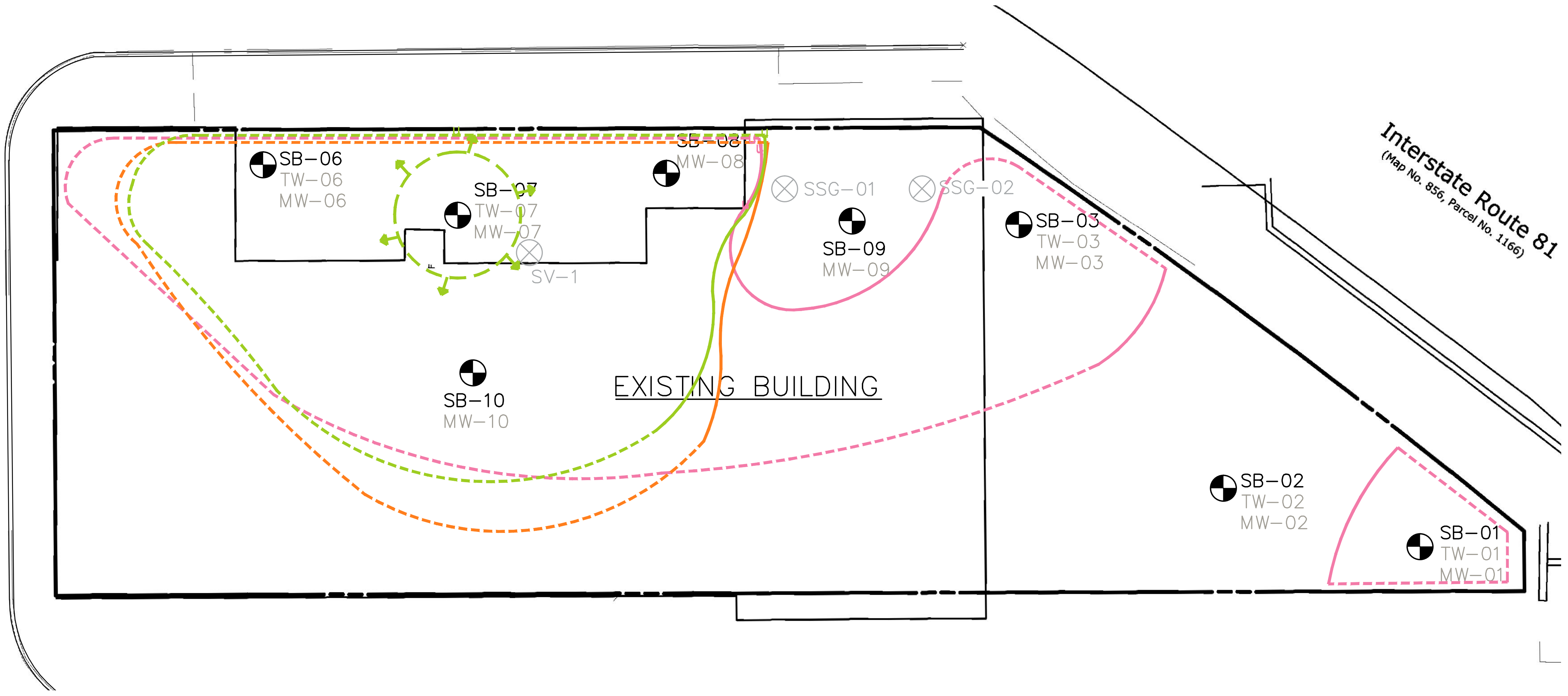
CHECKED BY: RM

Extents of Surface Soil Contamination in Excess of Unrestricted SCOs

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
4A



LEGEND:

—·—·—	APPROXIMATE PROPERTY LINE
●	BORING / SAMPLE LOCATION
● SB-## MW-##	GRAY POINTS WITH NOTATION NOT SAMPLED.
⊗	SOIL VAPOR POINT LOCATION
🟪	ESTIMATED EXTENTS OF VOC (TCE, PERC) CONTAMINATION
🟦	ESTIMATED EXTENTS OF VOC (CHLOROFORM) CONTAMINATION
🟧	ESTIMATED EXTENTS OF SVOC (PAH) CONTAMINATION
🟩	ESTIMATED EXTENTS OF PESTICIDE CONTAMINATION
🟥	ESTIMATED EXTENTS OF METALS CONTAMINATION

NOTE: IF CONTAMINANT GROUP IS NOT DEPICTED, IT DOES NOT EXCEED APPLICABLE SCO

NOTES:

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0 20' 40'
GRAPHIC SCALE

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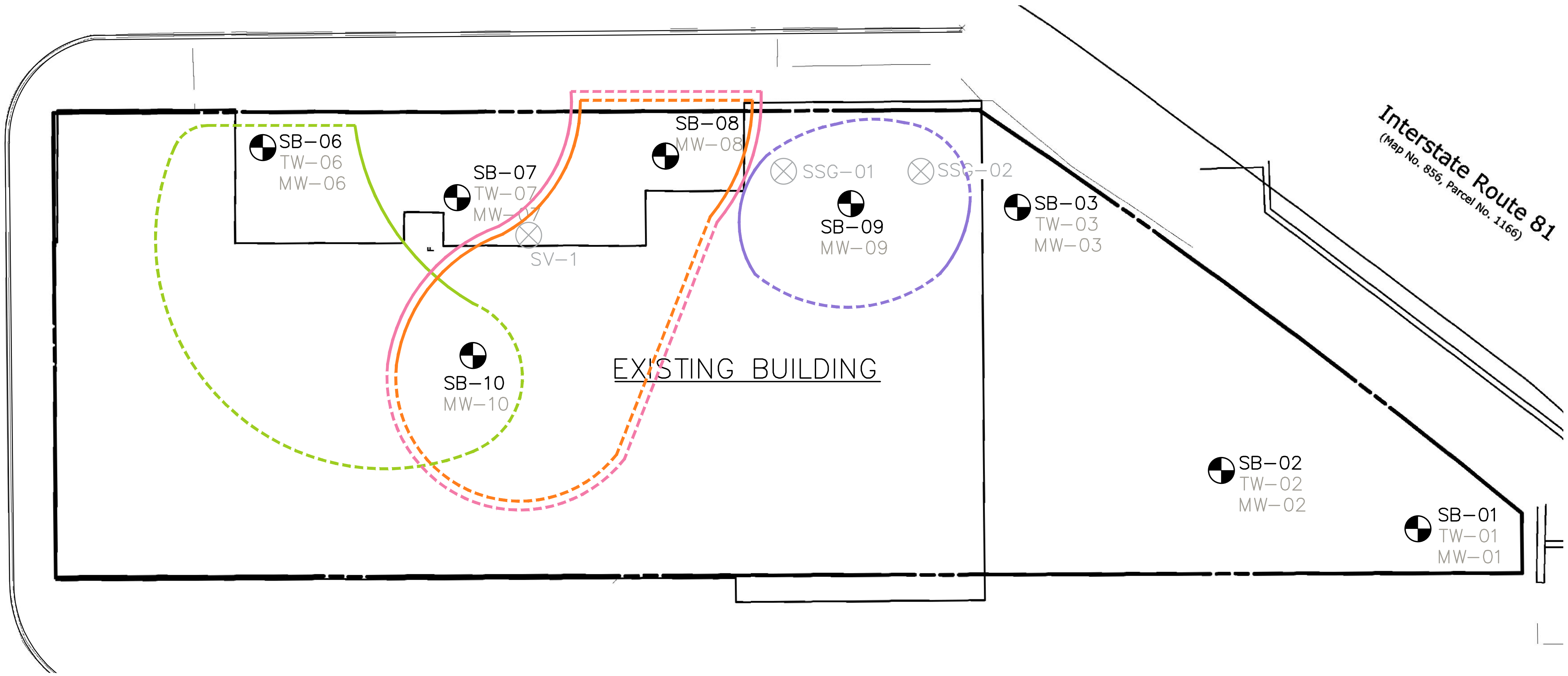
Extents of Shallow SubSurface Soil Contamination in Excess of Unrestricted SCOs

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
4B



LEGEND:

—·—·—	APPROXIMATE PROPERTY LINE
◕	BORING / SAMPLE LOCATION
◕ SB-## MW-##	GRAY POINTS WITH NOTATION NOT SAMPLED.
⊗	SOIL VAPOR POINT LOCATION
🟪	ESTIMATED EXTENTS OF VOC (TCE, PERC) CONTAMINATION
🟦	ESTIMATED EXTENTS OF VOC (CHLOROFORM) CONTAMINATION
🟧	ESTIMATED EXTENTS OF SVOC (PAH) CONTAMINATION
🟩	ESTIMATED EXTENTS OF PESTICIDE CONTAMINATION
🟥	ESTIMATED EXTENTS OF METALS CONTAMINATION

NOTE: IF CONTAMINANT GROUP IS NOT DEPICTED, IT DOES NOT EXCEED APPLICABLE SCO

NOTES:

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3. ALL LOCATIONS ARE APPROXIMATE.

0 20' 40'

GRAPHIC SCALE

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DRAWN: SEPT. 2020
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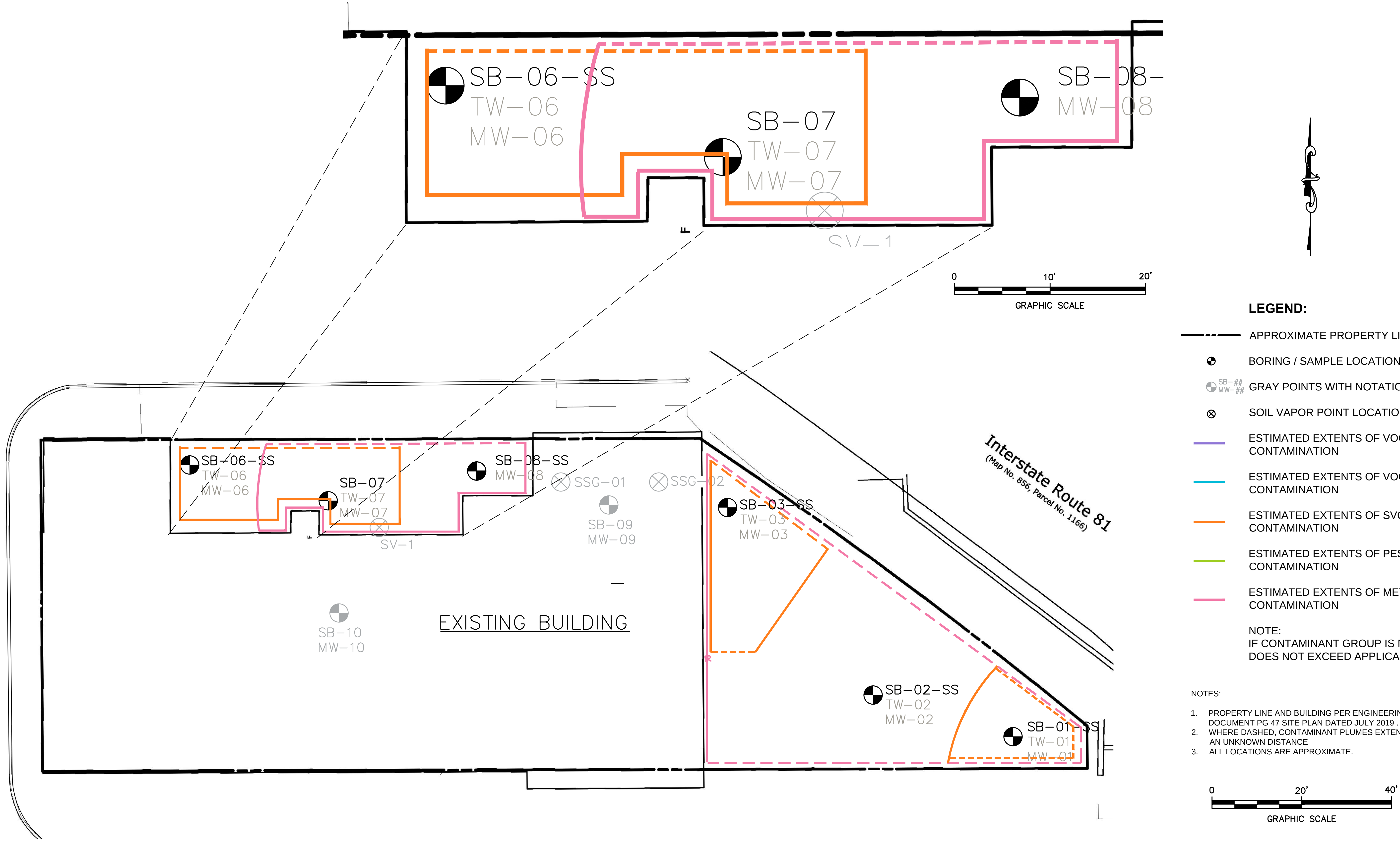
Extents of Deep SubSurface Contamination in Excess of Unrestricted SCOs

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
4C



LEGEND:

— - —	APPROXIMATE PROPERTY LINE
●	BORING / SAMPLE LOCATION
● SB-## MW-##	GRAY POINTS WITH NOTATION NOT SAMPLED.
⊗	SOIL VAPOR POINT LOCATION
🟪	ESTIMATED EXTENTS OF VOC (TCE, PERC) CONTAMINATION
🟦	ESTIMATED EXTENTS OF VOC (CHLOROFORM) CONTAMINATION
🟧	ESTIMATED EXTENTS OF SVOC (PAH) CONTAMINATION
🟩	ESTIMATED EXTENTS OF PESTICIDE CONTAMINATION
🟥	ESTIMATED EXTENTS OF METALS CONTAMINATION

NOTE:
IF CONTAMINANT GROUP IS NOT DEPICTED, IT DOES NOT EXCEED APPLICABLE SCO

NOTES:

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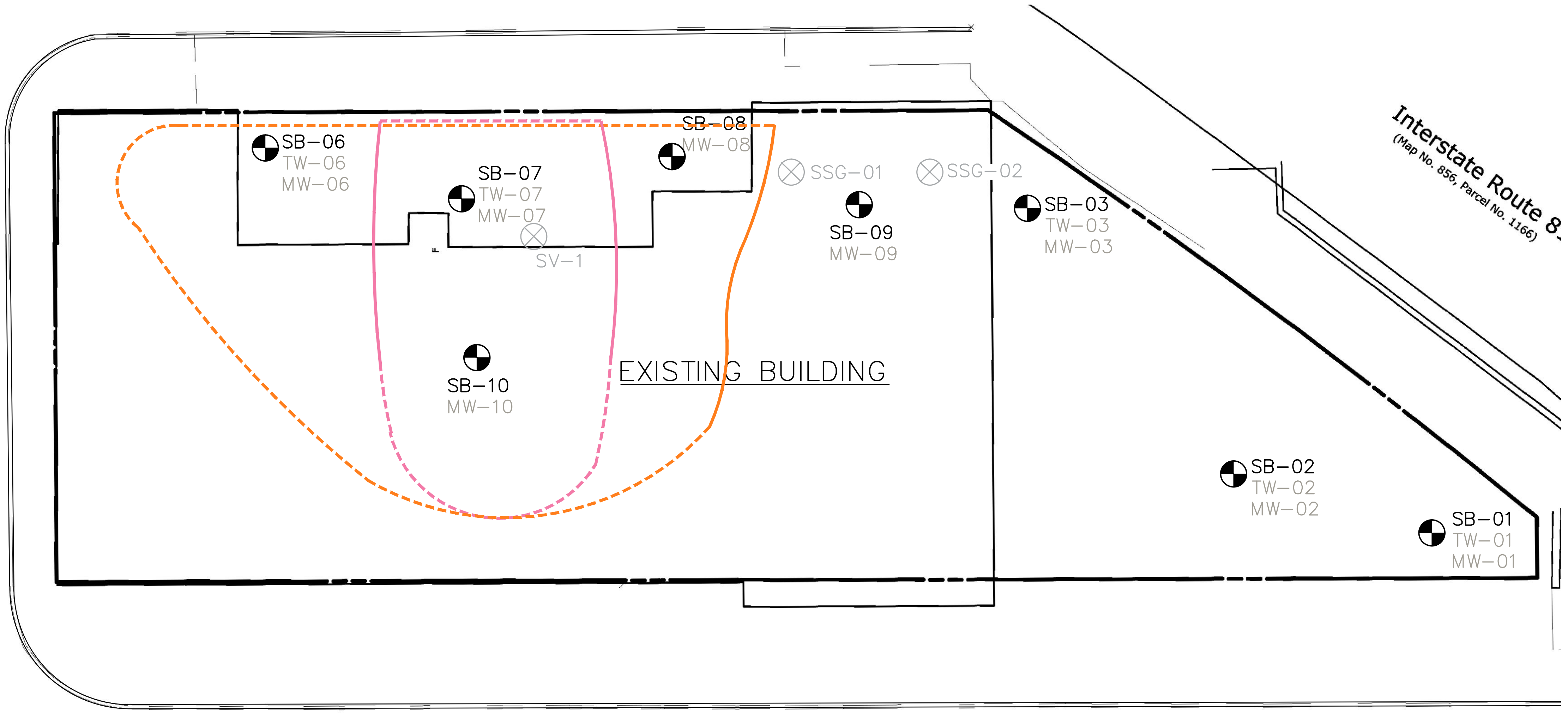
CHECKED BY: RM

Extents of Surface Soil Contamination
in Excess of Restricted Residential SCOs

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
5A



LEGEND:

— - — APPROXIMATE PROPERTY LINE

● BORING / SAMPLE LOCATION

● SB–## MW–## GRAY POINTS WITH NOTATION NOT SAMPLED.

⊗ SOIL VAPOR POINT LOCATION

— ESTIMATED EXTENTS OF VOC (TCE, PERC) CONTAMINATION

— ESTIMATED EXTENTS OF VOC (CHLOROFORM) CONTAMINATION

— ESTIMATED EXTENTS OF SVOC (PAH) CONTAMINATION

— ESTIMATED EXTENTS OF PESTICIDE CONTAMINATION

— ESTIMATED EXTENTS OF METALS CONTAMINATION

NOTE:
IF CONTAMINANT GROUP IS NOT DEPICTED, IT DOES NOT EXCEED APPLICABLE SCO

NOTES:

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3. ALL LOCATIONS ARE APPROXIMATE.

0 20' 40'
GRAPHIC SCALE

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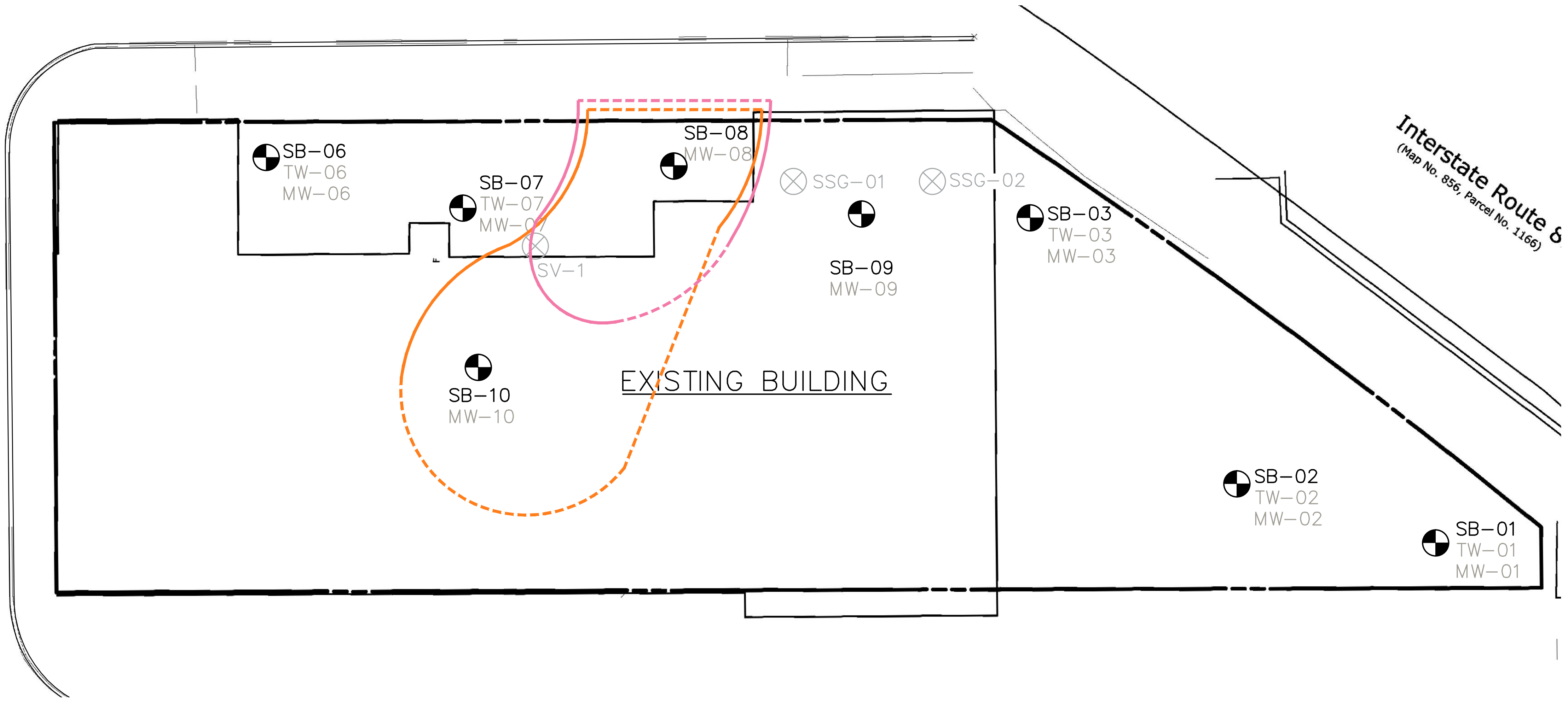
PROJECT NO.20-032-24
DRAWN: SEPT. 2020
DRAWN BY: NP
CHECKED BY: RM

Extents of Shallow SubSurface Soil Contamination in Excess of Restricted Residential SCOs

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
5B



LEGEND:

—·— APPROXIMATE PROPERTY LINE

● BORING / SAMPLE LOCATION

● SB–## MW–## GRAY POINTS WITH NOTATION NOT SAMPLED.

⊗ SOIL VAPOR POINT LOCATION

— ESTIMATED EXTENTS OF VOC (TCE, PERC) CONTAMINATION

— ESTIMATED EXTENTS OF VOC (CHLOROFORM) CONTAMINATION

— ESTIMATED EXTENTS OF SVOC (PAH) CONTAMINATION

— ESTIMATED EXTENTS OF PESTICIDE CONTAMINATION

— ESTIMATED EXTENTS OF METALS CONTAMINATION

NOTE:
IF CONTAMINANT GROUP IS NOT DEPICTED, IT DOES NOT EXCEED APPLICABLE SCO

NOTES:

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0 20' 40'
GRAPHIC SCALE

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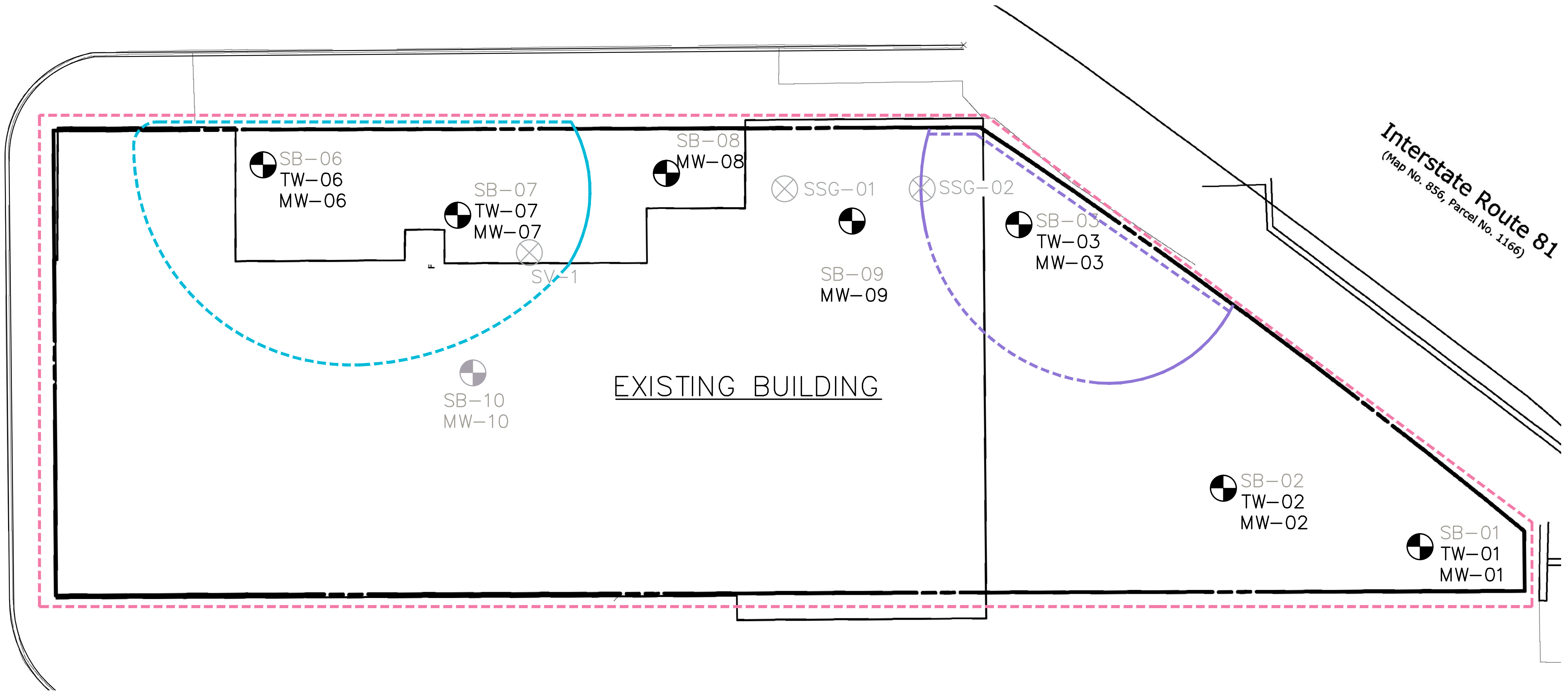
Extents of Deep SubSurface Contamination in Excess of Restricted Residential SCOs

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
5C



LEGEND:

—·—·—	APPROXIMATE PROPERTY LINE
●	BORING / SAMPLE LOCATION
● SB-## MW-##	GRAY POINTS WITH NOTATION NOT SAMPLED.
⊗	SOIL VAPOR POINT LOCATION
—	ESTIMATED EXTENTS OF VOC (TCE) CONTAMINATION
—	ESTIMATED EXTENTS OF VOC (CHLOROFORM) CONTAMINATION
—	ESTIMATED EXTENTS OF SVOC (PAH) CONTAMINATION
—	ESTIMATED EXTENTS OF PESTICIDE CONTAMINATION
—	ESTIMATED EXTENTS OF METALS CONTAMINATION

NOTE: IF CONTAMINANT GROUP IS NOT DEPICTED, IT DOES NOT EXCEED APPLICABLE TOGS 1.1.1 STANDARD

NOTES:

1. PROPERTY LINE AND BUILDING PER ENGINEERING DOCUMENT PG 47 SITE PLAN DATED JULY 2019 .
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0 20' 40'
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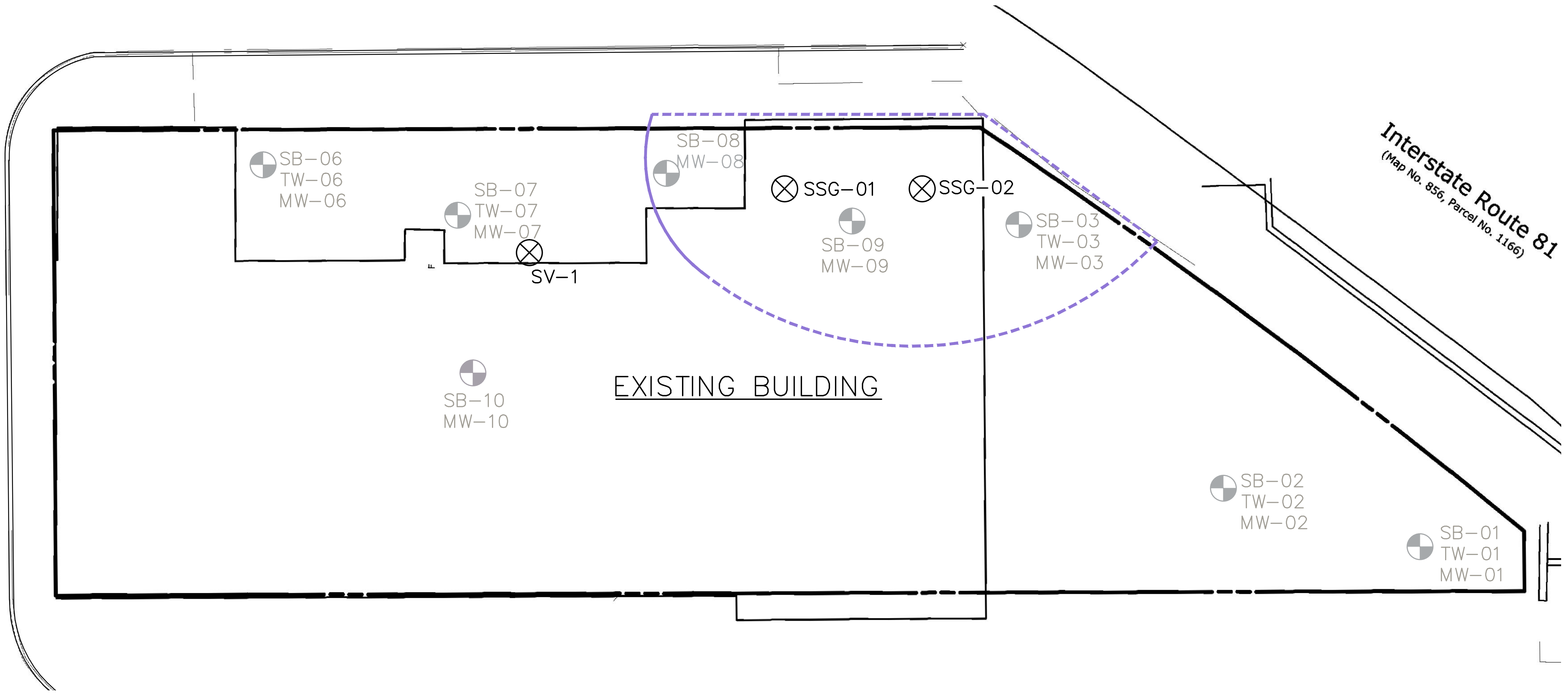
Extents of Groundwater Contamination
in Excess of TOGS 1.1.1 Standards

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
6



LEGEND:

- APPROXIMATE PROPERTY LINE
- ● BORING / SAMPLE LOCATION
- SB-## MW-## GRAY POINTS WITH NOTATION NOT SAMPLED.
- ⊗ SOIL VAPOR POINT LOCATION
- ESTIMATED EXTENTS OF VOC (DCE, TCE, AND PERC) CONTAMINATION

NOTES:

1. PROPERTY LINE AND BUILDING PER ENGINEERING DOCUMENT PG 47 SITE PLAN DATED JULY 2019 .
2. WHERE DASHED, CONTAMINANT PLUMES EXTEND AN UNKNOWN DISTANCE
3. ALL LOCATIONS ARE APPROXIMATE.

0 20' 40'
GRAPHIC SCALE

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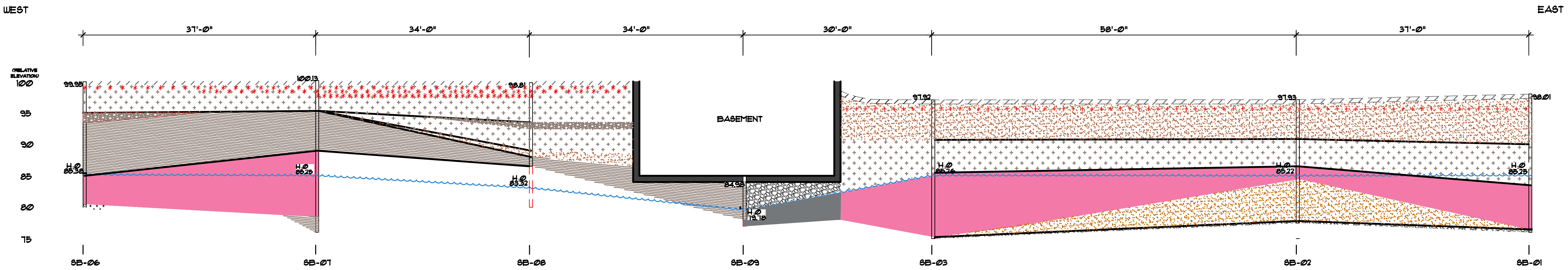
PROJECT NO.20-032-24
DRAWN: SEPT. 2020
DRAWN BY: NP
CHECKED BY: RM

Extents of Soil Vapor Contamination
in Excess of NYSDOH Standards

Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
7



LEGEND:

▨ ASPHALT / CONCRETE

░ FINE SAND AND SILT (BROWN)

🟥 SILT (RED OR REDDISH-BROWN)

▩ GRAVEL / ROCK FRAGMENTS

░ MEDIUM-COARSE SAND (BROWN TO BROWNISH-GRAY), SOMETIMES W/TRACE GRAVEL

▤ MIX OF FINE GRAVEL, SAND (VARYING GRAIN SIZE), AND (SOMETIMES) SILT (GRAYISH-BROWN)

******** TRACE BRICK

▩ FINE GRAVEL / STONE (LIGHT GRAY) WITH SOME SAND (BROWN)

■ SILTY-CLAY (GRAY)

■ BUILDING FOUNDATION

~~~~ OBSERVED WATER LEVEL

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PROJECT NO.20-032-24
DRAWN: SEPT. 2020
DRAWN BY: NP/DB
CHECKED BY: RM

Soil Profile

Smith Resturant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE
8
~~~~

APPENDIX A

Standard Operating Procedures

AECC ENVIRONMENTAL CONSULTING	Asbestos & Environmental Consulting Corporation Standard Operating Procedures	Doc No:	SOP No. 101
		Initial Issue Date	November 2011
		Revision Date:	Initial Version
SOP#101 – SURFACE AND SHALLOW SOIL SAMPLING USING HAND-OPERATED SAMPLING EQUIPMENT		Revision No.	0
		Next Revision Date:	November 2012
Preparation:	Authority:	Issuing Dept: Environmental Group	Page: 1 of 8

Scope and Application

The purpose of this SOP is to establish uniform procedures for the collection of surface and shallow soil samples using hand-operated sampling tools/equipment. Adherence to this SOP will promote consistency in sampling methods and if followed properly will provide a basis for sample representativeness.

It is noted that other state or federal agency standard operating procedures may exist that require deviation from this SOP. These required deviations must be identified before the sampling program begins (ideally during the work plan/sampling plan development), and must be explained in the project-specific work plan/sampling plan.

Equipment/Apparatus/Supplies

Materials needed for this SOP may include:

Spoons/Scoops/Trowels – Sampling spoon/scoops/trowels may be reusable or disposable. Reusable spoons/scoops shall be constructed of stainless steel to facilitate easy decontamination. Disposable scoops may be constructed of other materials (example: high density polypropylene (HDPE), which are preferable to stainless steel when acquiring samples for trace element analysis.) however the use of softer and more brittle materials may be less effective in higher density soils.

Shovel – Shovels may be used for the preparation of the sample collection area (i.e., to remove surface materials to allow sampling with a spoon or scoop) or for samples requiring large sample volume (i.e, bench-scale treatability samples).

Soil Auger/Bucket (Hand) Auger - A soil auger/bucket (hand) auger usually comprises a T-handle attached to a spiral-bladed metal auger (soil auger) or a hollow tube with cutting teeth at the bottom (bucket or hand auger). Turning the handle in a clockwise direction, either brings soil toward the surface (hand auger) or into the hollow tube (bucket). Only moderate down-pressure should be used as forcing the auger through hard zones or in cobble-rich soils can damage equipment and injure the individual using the equipment.

Soil Augers are typically good for sampling depths up to 3 feet. Representative samples can be collected directly from the auger flight as it is withdrawn from the ground, or from the tube-sampler attachment which can be advanced into the soil after augering to the top of the desired depth interval. It should be noted that soil augers cause considerable disturbance of the soil that can cause the loss of volatile organic compounds (VOCs) from the soil, therefore, some consideration should be given to using a tube-sampler attachment, or another less invasive method for sampling soils for (VOCs).

Bucket/hand augers are generally used to collect soil samples from depths ranging from the ground surface to approximately five (5) feet below the ground surface. In some instances, soil samples may be collected from greater depths, but often with considerable more difficulty. Bucket/hand augers allow for discrete depth interval sampling as the soil is retained within the hollow tube of the auger when it is extracted from the ground. It should be noted that if depth-discrete sampling is the objective, more than one auger may be necessary, with one larger bucket auger used to provide access to the required sampling depth and another (clean) smaller auger used for sample collection.

Upon retrieval from the ground, the soil on the flights of the auger or within the bucket can be poured directly into collection pan or sample container (if loosely consolidated) or be removed with a clean decontaminated spoon or scoop and transferred into the appropriate container.

Collection Pan – A soil collection pan is often used as an intermediate between removal of soil from the ground and filling the sample containers/soil jars. Stainless steel is required material of construction..

Other commonly used materials –

- Stainless steel teaspoon or spatula
- Ziploc-type bags
- Aluminum Foil
- Sampling kit (i.e., bottles, labels, custody records, cooler, etc.)
- Six foot folding tape for depth measurement
- Personal protective equipment (as required in HASP)
- Field project notebook/pen

Procedures

General

Site-specific soil characteristics and project-specific requirements such as sampling depth will dictate the preferred type of sampling equipment to be used. In addition, the analytical program requirements will define the volume of sample needed, which will also influence the selection of the appropriate sampling equipment (i.e., sampling for semi-volatile organic compounds requires a larger soil volume and thus a larger sized bucket auger, than that necessary for total lead sampling). The project work plan/sampling plan should define specific requirements and equipment required for the given site. Sampling personnel should be equipped with a variety of sampling equipment to address deviations from anticipated sampling situations.

Equipment Decontamination

Sampling equipment must be decontaminated prior to its initial use and following the collection of each soil sample. Site specific decontamination should be outlined in the sampling plan/work plan. If site-specific decontamination procedures are not stipulated in the work/sampling plan, the procedures described in AECC SOP # 103 – Equipment Decontamination, shall be used.

Samples for Volatile Organic Compound Analysis

Because volatile organic compounds (VOCs) can volatilize and be lost during the sampling process, precautions are necessary to minimize this effect during soil sampling. A sample collected for VOC analysis should be collected first (before collecting samples to be analyzed for other parameters) and should collected as quickly and as directly as possible, from a discrete, relatively undisturbed portion of soil. In general, it is best to transfer soils directly from the sampling device into the sampling container, without the use of an intermediate collection pan.

Sampling Procedures

Preparing the Ground Surface at the Sampling Location

At most locations the surface must be prepared prior to surface soil sampling. This may include removal of surface debris or vegetation to expose the actual soil surface, or the loosening of dense compacted soils such as those in heavy traffic areas or frozen soils.

Shovel Sampling

Detailed operating procedures for shovels, trowels, spoons and scoops is unnecessary, other than to state that this equipment shall be decontaminated before use.

Upon completion of sampling activities, backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible to eliminate surface hazard or preferred path for contaminant migration. The sampling plan/work plan may specify the requirements for backfilling and surface restoration.

Trowel, Spoon and Scoop Sampling

Spoons, scoops, and trowels are of similarly designed construction and will therefore be operated in accordance with the following procedure, unless an alternate method is described in the site-specific work plan or sampling plan. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Select location and be sure that all surface preparation and soil sampling tools are decontaminated.
2. Prepare surface for sampling – Remove surficial material with shovel if necessary to achieve the required depth.
3. Turn the sampling tool into the ground and rotate so that a representative column of soil is removed.

4. If sampling for VOCs is required, collect this sample portion first.
5. If a specific depth interval has been targeted, collect soils from that depth into a collection pan.
6. If more soil is needed to meet sample volume requirements, additional soil cores may be collected from an immediately adjacent location.
7. Homogenize the soil in the collection pan (excluding soil for VOC analysis) by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.
8. Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.
9. Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled. Do not submerge the sample containers in water to clean them.
10. Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.
11. Log the samples in field notebook, chain of custody and other required documentation.

12. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.
13. Decontaminate sampling tools prior to reuse.
14. Investigation-derived waste (IDW) should be properly contained before leaving the area.
15. Backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible, to eliminate surface hazard and/or the creation of a preferred path for contaminant migration. The sampling plan/work plan may specify the requirements for backfilling and surface restoration.

Soil Auger Sampling

When using a soil auger for the collection of surface or shallow soil samples, the following procedure will be employed unless an alternate method is described in the site-specific work plan or sampling plan. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Select Location and be sure that all surface preparation and soil sampling tools are decontaminated.
2. Prepare surface for sampling – remove vegetation or surface debris as necessary.
3. Turn the soil auger gently in a clockwise direction until the top of the desired depth is achieved.
4. Remove the auger, thus clearing the disturbed soil from the augered hole.
5. If using the auger flights to collect the sample, return the auger to the hole and continue turning the auger so that it penetrates the interval of interest. Retrieve the auger and transfer soil into a collection pan.

6. If using a tube–sampler attachment, insert the tube sampler into the augered hole to the top of the desired interval and push/turn the tube sampler through the interval of interest.
7. Multiple trips and/or multiple adjacent auger holes may be necessary to sample the interval of interest at a given location.
8. Samples to be analyzed for VOCs should be collected first, directly from the auger flights or tube-sampler attachment.
9. With the exception of the VOC fraction (if required), the remaining soils should be placed into the soil collection pan.
10. Homogenize the soil in the collection pan (excluding soil for VOC analysis) by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.
11. Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.
12. Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled.
13. Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.
14. Log the samples in field notebook, chain of custody and other required documentation.
15. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.
16. Decontaminate sampling tools prior to reuse.
17. Investigation-derived waste (IDW) should be contained before leaving the area.
18. Backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible, to eliminate surface hazard and/or the creation of a preferred path for contaminant migration. The sampling plan/work plan may specify the requirements for backfilling and surface restoration.

Bucket/Hand Auger Sampling

When using a bucket/hand auger for the collection of surface or shallow soil samples, the following procedure will be employed unless an alternate method is described in the site-specific work plan or sampling plan. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Select location and be sure that all surface preparation and soil sampling tools are decontaminated.
2. Prepare surface for sampling – remove vegetation or surface debris as necessary.
3. Push downward and turn the bucket/hand auger in a clockwise direction until bucket becomes filled with soil. Usually a 6 to 12-inch core of soil is obtained each time the auger is inserted.
4. Empty and repeat until the top of the interval of interest is encountered. Soil from above the interval that requires sampling and analysis can be emptied onto plastic sheeting for description/classification.

5. Using a clean/decontaminated bucket auger, insert the auger into the bottom of the hole so that it is positioned above the interval of interest. A smaller diameter bucket may be necessary to prevent the auger from being contaminated by passing through the overburden soils.
6. Turn the bucket/hand auger so that bucket fills with soil from the interval of interest.
7. Once filled, the auger should be removed from the ground and emptied into the soil collection pan. If a VOC sample is required, the sample should be taken directly from the auger bucket using a clean/decontaminated teaspoon or spatula and/or directly filling the sample container from the auger.
8. Repeat the process until the desired sample interval has been thoroughly penetrated with extracted soils placed into the collection pan.
9. Except for VOC sample fractions, the remainder of the soil sample should be collected into the collection pan.
10. Homogenize the soil in the collection pan by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.
11. Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.
12. Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled.
13. Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.
14. Log the samples in field notebook, chain of custody and other required documentation
15. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.
16. Decontaminate sampling tools prior to reuse.
17. Investigation-derived waste (IDW) should be contained before leaving the area.
18. Backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible to eliminate surface hazard and/or the creation of a preferred path for contaminant migration. The sampling plan/work plan may specify the requirements for backfilling and surface restoration.

Quality Assurance/Quality Control

Quality control requirements for sample collection are dependent on project-specific sampling objectives which may be outlined in the site-specific Quality Assurance Project Plan (QAPP) if applicable, or may be included in the site-specific work plan/sampling plan. This information will include requirements for sample preservation and holding times, container types, sample packaging and shipment, as well as requirements for the collection of various quality assurance samples such as trip blanks, matrix spike/matrix spike duplicates, field blanks/equipment blanks, and field duplicates. The Project Manager is responsible for assuring that the Quality Assurance/Quality Control objectives are specified and communicated to individuals responsible for collecting the samples.

Documentation

Documentation of sample collection, handling and shipping is required, and takes a variety of forms including:

- Field log book
- Sample collection records
- Chain-of-Custody forms
- Shipping Labels

The field book will be maintained as an overall log of all samples collected during a project. Sample collection records are generated for each sample collected during a project and must include:

- Project Number and Location
- Sampling point location location/ID
- Date and time that sample was collected
- Description/designation of the sample location
- Name of collector
- Equipment used to collect the sample
- Number of sample containers, sizes, preservatives
- Specific Sample ID
- Depth
- Soil type
- Analysis Requested
- Laboratory Designation
- Shipping ID Number/Tracking ID Number

Depending on project-specific requirements, this information may be required to be collected on a separate sample collection record form. If such a form is not required, the information will be collected in the project field log book.

Chain-of-custody forms are transmitted with the samples to the laboratory for sample tracking purposes. These may be AECC-specific or be provided by the laboratory providing analytical services for the project. Shipping labels are required if sample coolers are to be transported to the laboratory by a third-party (courier service). Original and/or copies of these documents will be retained in the appropriate project files.

Training & Qualifications

Surface soil sampling is a relatively simple procedure requiring minimal training and generally a small amount of equipment. Individuals conducting surface soil sampling for the first time will be supervised/trained by experienced personnel. Sampling personnel collecting samples that might contain petroleum compounds, heavy metals, or other potentially hazardous materials will be trained and certified in accordance with the requirements of 29 CFR 191O.120(e)(3}(i), OSHA's HAZWOPER standard.

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SOP#102 – ENVIRONMENTAL SAMPLE HANDLING, PACKAGING, AND SHIPPING			Revision No.	0
			Next Revision Date:	As Needed
Preparation:	Authority:	Issuing Dept: Environmental Group	Page:	1 of 3

Scope and Application

The purpose of this procedure is to establish a uniform set of procedures for handling, packaging and shipping environmental samples. Adherence to this SOP will ensure that samples are received by the laboratory in good condition. This procedure will also prevent cross-contamination of samples during shipment and minimize sample container breakage.

This SOP is to be used **ONLY** for environmental samples. Hazardous material shipments shall adhere to USDOT requirements which are not presented in this document.

Equipment/Apparatus/Supplies

Required materials include the following:

Duct tape
Strapping tape (1-inch minimum width)
Clear packing tape
Re-sealable plastic bags (Ziploc® or equivalent) sized for the sample containers used
Bubble wrap
“Fragile” labels
“This Side Up” labels
Adhesive address labels

Procedures

Sample bottle shipping preparation

Each bottle shall be properly labeled using the provided labels as detailed in SOP # 108. Once the label is affixed to the bottle the label shall be covered with clear packing tape which is wrapped completely around the bottle.

Each bottle shall be sealed by placing clear packing tape completely around the neck of the bottle and the bottle cap. If a QAPP for a particular project states that a custody seal on the bottle cap is required it shall be placed across the bottle cap prior to placing the clear packing tape on the bottle.

Sample bottle packaging

Each bottle or VOA vial pair (aqueous samples) shall be placed in an appropriately sized sealable plastic bag. Care shall be taken to ensure that air is removed from each bag. The purpose of bagging the samples is to protect against sample material release and cross-contamination should the sample container leak or break during shipment.

Bubble wrap shall then be used to completely wrap the bagged sample bottle or VOA vial pair. The bubble wrap shall be secured in place using packing tape.

Cooler Inspection, Preparation and Packing

Each cooler to be used for shipment of samples shall be inspected for integrity. The hinges shall be inspected and the walls, bottom and top of the cooler shall be inspected for cracks. Coolers with broken hinges and/or cracks shall not be used for sample shipment.

Each cooler shall be clean and free of any solid or liquid residue. If the cooler is equipped with a drain then duct tape shall be placed on the inside and outside portions of the drain to ensure that liquids or solids cannot pass through it.

Prior to placement of ice and or samples in the cooler, the cooler shall be lined with bubble wrap. A layer of bagged ice (see below) shall then be placed on the bottom of the cooler.

Prepared sample containers shall then be placed upright in the cooler such that they are tightly arranged. If there are insufficient sample bottles to achieve a tight packing arrangement then the samples shall be equally spaced throughout the cooler and the interstices shall be filled with additional bubble wrap.

A second layer of bagged ice shall then be placed on top of the samples and bubble wrap shall be laid over the top of them.

If the cooler is to be shipped via an overnight carrier (i.e.FedEx®, UPS or similar) the signed chain of custody shall be placed in a sealable plastic bag and taped to the underside of the cooler lid.

Ice Bagging

Ice, consisting of commercially available cubed ice, shall be placed in sealable plastic bags sized for the cooler to be used. A second bag shall be place over the first to provide a secondary containment layer. Care shall be taken not to overfill the bags such that the bag is difficult to seal. A typical cooler will require four 1 or 2-gallon bags with two bags beneath the samples and two on top of the samples.

Cooler Sealing and Labeling

The cooler shall be closed and the lid shall be securely sealed using duct tape. Duct tape shall be placed along the entire perimeter of the lid where it meets the cooler body including hinges. Care shall be taken to ensure a tight seal by the tape on the cooler surface.

"Fragile" and "This Side Up" labels shall be placed on each side of the cooler. A "Fragile" label shall be placed on the top of the cooler. "This Side Up" labels shall have an arrow pointing upward. Clear packing tape shall be placed over labels. Examples of the labels are shown below:

An adhesive label shall be attached to the top of the cooler which has the destination information clearly shown on it. Clear packing tape shall be placed over the entire surface of the label.

Clear packing tape shall be wrapped completely around the cooler at a minimum of two points. Strapping tape (1-inch width minimum) shall then be placed on top of the packing tape and shall completely encircle the cooler.

If shipping will be by FedEx® or similar, the airbill shall be affixed to the top of the cooler.

Quality Assurance/Quality Control

Prior to shipment, the cooler shall be inspected to ensure that it is properly sealed and labeled.

Documentation

If samples are being shipped via courier or via direct delivery then a copy of the signed chain of custody shall be retained. If shipping via other carrier, the copy of the airbill shall be retained for the project records.

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Scope and Application

The purpose of this procedure is to establish a uniform set of procedures for conducting decontamination of field sampling equipment. Decontamination is performed as a quality assurance measure and a safety precaution. The use of equipment that has not been properly decontaminated for collecting samples for chemical analysis can lead to erroneous data due to cross contamination. In addition, decontamination protects field personnel and others from potential exposure to hazardous materials and prevents contamination from being transported away from a site.

This SOP focuses on decontamination of non-disposable equipment used for sampling environmental media for chemical analysis. Decontamination of other materials (well-construction materials and drill stem for example)are sometimes required and are discussed in other SOPs or dealt with in project-specific work plans.

It is noted that other state or federal agency standard operating procedures may exist that require deviation from this SOP. These required deviations must be identified before the sampling program begins (ideally during the work plan/sampling plan development), and must be explained in the project-specific work plan/sampling plan.

Equipment/Apparatus/Supplies

Required materials may include:

- Tap/potable water
- Phosphate-free detergent (Liqui-nox, Alconox, or similar)
- Distilled and/or deionized water
- Solvents as defined by the Work Plan, QAPP, etc. (may include nitric acid, dilute hydrochloric acid, methanol, hexane, isopropanol, etc.)
- PPE
- Paper towels
- Wash buckets/basins/containers
- Waste containers pails/buckets with lids, drums or plastic bags.
- Cleaning brushes
- Pressure sprayers and/or squeeze bottles
- Plastic sheeting
- Aluminum foil/plastic bags
- Project notebook/pen

Procedures

AECC's standard decontamination procedure is presented in the steps listed below. The standard may be modified on a project-specific basis, as described in project specific QAPP, sampling programs or other documents, and may include additional steps, solvents, materials, etc., depending on the quality assurance objectives for the project.

1. Don PPE items appropriate to the characteristics of the contaminated material that was encountered (safety glasses, latex or nitrile gloves, and disposable Tyvek garment for example).
2. Remove gross contamination, dirt, etc from the equipment by brushing and rinsing with tap water. This step should be completed in a 5-gallon bucket or appropriately sized container.
3. Wash the equipment with a phosphate-free detergent and tap water solution. This step should be completed in a separate wash bucket using brush, or pressure sprayer.
4. Rinse the equipment with potable water until all detergent has been removed. This step can be performed over an empty bucket using a squeeze bottle or pressure sprayer.
5. Triple-rinse the equipment with distilled or de-ionized water. Rinseate should be collected in the bucket used in step 3.
6. Allow the equipment to air dry on clean plastic sheeting. If faster drying is required, use paper towels to blot the equipment dry before reuse.
7. Wrap the dried decontaminated equipment with aluminum foil, shiny side out, for storage until the equipment is to be used again. Alternately, small equipment can be placed into clean plastic bags and sealed for longer term storage.
8. Containerize and/or manage wash water and decontamination rinseate in accordance with project-specific requirements.

When decontaminating submersible pumps used for groundwater sampling (or monitoring well development), the above-listed steps 2 and 3 may be conducted in a tube or cylinder that is sealed at the bottom end (commonly a 3-foot length of PVC pipe affixed with a water-tight end cap). The pump is inserted into the cylinder which is filled with the wash water, detergent solution, or rinse water and is turned on at a low setting for approximately five (5) minutes, so as to cycle the wash solutions through the pump's impellers and internal components. After the pump is removed from the potable water rinse cycle, the triple-rinse is performed with copious amounts of distilled/deionized water, being sure to flush through the impellers.

As stated previously, project-specific decontamination procedures may be required and will be specified in the project's QAPP, sampling plan or project-specific work plan. Some project-specific modifications may include the following:

- For glass and plastic sampling equipment used for sampling environmental media for metals analyses, decontamination may include a rinse with a 10% solution of nitric acid.
- For metallic sampling equipment used for sampling environmental media for metals analyses, decontamination may include a rinse with a 10% hydrochloric acid solution.

- For sampling equipment used for sampling environmental media for organic parameters (volatile organic compounds, semivolatile organic compounds, pesticides, polychlorinated biphenyls, etc.), decontamination may include an intermediate rinse with methanol, hexane, or isopropanol.

The above-listed solvents are hazardous materials due to their toxicity and/or corrosivity, and are specifically excluded from AECC's standard decontamination procedure because of these properties. When the use of these (or other similar) solvents is required by a project-specific QAPP or Sampling Plan, the plans must also describe additional protocols and procedures regarding their safe use and handling and to assure that associated investigation-derived waste (wash water and spent rinseate) is handled, characterized, and disposed of in accordance with federal, state and local requirements.

Large Equipment Decontamination

On some projects, large equipment (excavators, backhoes, truck-mounted drilling equipment, etc) is used for sampling or site characterization activities, and may become contaminated during site activities (or may require decontamination prior to use on site). For these situations, the drilling subcontractor will construct a temporary decontamination pad that typically consists of a bermed, plastic-sheet lined area where equipment and tooling can be brought for decontamination with a high-temperature high pressure washer (steam jenny) and/or manual scrubbing. If heavy equipment decontamination is required for a specific project, the specifications for the decontamination pad, and procedures for decontamination will be stipulated in the project QAPP and/or Sampling Plan.

Quality Assurance/Quality Control

General guidelines for quality control check of field equipment decontamination usually require the collection of one equipment blank from the decontaminated equipment per day, however the collection of equipment blanks and similar QA/QC samples is to be based on specific project requirements. For projects with a QAPP, the document will specify the type and frequency of collection of each type of quality assurance sample. For projects without a QAPP, the need for and/or frequency of equipment blanks and other QA/QC samples will be specified in the scope of work, or the project work plan.

Equipment blanks are generally collected by pouring laboratory-supplied deionized water into, over, or through the freshly decontaminated sampling equipment and then transferring this water into a sample container. Field blanks should then be labeled as a sample and submitted to the laboratory to be analyzed for the same parameters as the associated sample. Field blank sample numbers, as well as collection method, time and location should be recorded in the field notebook.

Documentation

Specific information regarding decontamination procedures should be documented in the project-specific field notebook. Documentation in the notebook should thoroughly describe the construction of each decontamination facility and the decontamination steps implemented in order to show compliance with the project work plan. Decontamination events should be logged when they occur with the following information documented:

- Date, time and location of each decontamination event
- What equipment was decontaminated
- Method used for decontamination
- Solvents used
- Notable circumstances
- Date, time and location of equipment blanks collected and the methods/procedures used for collection.
- Storage of decontamination wastes (spent wash and rinse water).

Repetitive decontamination of small items of equipment does not need to be logged each time the item is cleaned, however a note should be made that such equipment was decontaminated as required and in accordance with this SOP, or project specific QAPP, Work Plan, etc.

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SOP#106 – GROUNDWATER SAMPLING			Revision No.	0
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Scope and Application

The purpose of this SOP is to establish uniform procedures for the collection of groundwater samples. Adherence to this SOP will promote consistency in sampling methods and if followed properly will provide a basis for sample representativeness.

This SOP focuses on the collection of groundwater samples from properly developed monitoring wells, and may be applicable from other wells, springs etc that can be accessed for sampling. Groundwater samples might also need to be collected from residential potable water wells, industrial supply wells, open soil borings/core holes, and other sources which are not readily accessible, or that might require additional instruction and protocols for sampling. The collection of groundwater samples from these sources will vary according to the project and protocols, and procedures for collecting groundwater samples from these features will be discussed in the project-specific QAPP, or sampling plan.

State or federal agency mandated operating procedures may exist that require deviation from this SOP. These required deviations must be identified before the sampling program begins (ideally during the work plan/sampling plan development), and must be explained in the project-specific work plan/sampling plan.

Responsibilities

Project Manager

The project manager is responsible for assuring that project specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the work in accordance with this SOP and associated project-specific work plan.

Sampling Technician

The sampling technician is responsible for conducting groundwater sampling in a manner consistent with this SOP and/or in accordance with the QAPP, sampling plan or other project documents. The sampling technician will observe all sampling activities to ensure that the SOP is followed, and will record all pertinent data and information on appropriate forms, logs and/or in the project field notebook.

The sampling technician is responsible for ensuring that he/she has the appropriate laboratory supplied sampling supplies, the sampling equipment and supplies, and the supplies and materials for equipment decontamination.

Generally, the sampling technician is also responsible for handling the collected samples, maintaining custody documentation and preparing the samples for shipping/delivery to the analytical laboratory. On larger projects, a separate team may be assigned this task.

Equipment/Apparatus/Supplies

Required materials will vary depending on the method of groundwater sampling being conducted. In general, the equipment necessary may include:

- Project-specific plans (QAPP, sampling plan, scope of work, HASP).
- Appropriate PPE and safety equipment.
- Plastic sheeting
- Bailers (disposable or re-usable) and bailer-line/string.
- Development pumps (submersible, peristaltic, bladder, Waterra, centrifugal, air-lift, etc.)
- Sampling pumps (typically submersible, peristaltic or bladder)
- Monitors/meters (water quality meter) with calibration standards.
- Water Level Indicator (WLI) or Oil/Water Interface Probe
- Decontamination equipment and supplies (see AECC SOP-103)
- Sample bottles, labels, preservatives, chains of custody, coolers, etc. (sampling kits)
- Sample handling and shipping supplies (see AECC SOP–102),
- Field notebook, and records/forms for documentation/pen(s).
- Buckets and/or drums for carrying/containing purge water.
- Sampling cup/clear container for checking field parameters during purging
- Cooler and ice for samples
- Filters if required for metals analysis.
- Paper Towels

It is important that the sampling technician understand how to use all equipment and supplies that are provided for, and expected to be used, for collection of groundwater samples. If you have never used a particular piece of equipment, be sure to talk to the project manager for direction/instructions prior to deploying to the jobsite.

All equipment/supplies/apparatus that will be inserted into a well to facilitate well purging or groundwater sample collection, or that will come into contact with potentially contaminated groundwater during the sampling process must be decontaminated before and after each use.

Field monitoring equipment/meters should be calibrated and operated in accordance with manufacturer's instructions.

Procedures

General

During a groundwater sampling event, the first activity upon arrival at the site is typically the measurement/collection of depth-to-water data at each well location. Each of the wells to be gauged should be opened so that they are each able to equilibrate with the atmosphere, and should be gauged with a water level indicator, for depth to water and total well depth. If free phase product is anticipated at a given location, this should be field verified with a clean new disposable bailer and/or an oil/water interface probe.

Data on depth to water, depth to the base of the welland the diameter of each well should be recorded on the groundwater sample collection record and/or in the field notebook, as should any other pertinent information such as length and vertical position of well screen (if present), depth and thicknesses of immiscible layers, odors, lack of water, etc. The water level indicator/oil water separator must be decontaminated between use at each well. Flushing the probe and tape of the WLI with distilled water is generally sufficient for wells with no free product, however decontamination with detergents or solvents may be necessary if wells contain non-aqueous phase liquids (NAPLs).

NOTE: Historical water-level and groundwater quality data if available, should be used be used by the sampling technician. These data will aid in identifying changes in water levels over time, changes in well conditions (e.g., gradual silting up of a well screen), and which wells may be the most contaminated.

The length of the water column and the well diameter are used to calculate the volume of water in the well (calculated well volume) and is recorded on the groundwater sample collection record and/or the field notebook. Well volume is calculated as presented below.

$V = 0.041D^2(d2-d1)$, where
V = Calculated well volume in gallons
D = inside diameter of well casing in inches
$d2$ = total well depth in feet
$d1$ = depth to water surface in feet

Groundwater Sampling

Groundwater sampling is conducted in two general stages, well purging and sample collection. During purging, groundwater is removed from the well so as to remove the water that might have been affected by exposure to the atmosphere. This is commonly done by pumping or bailing a minimum of three (3) calculated well volumes from a well, prior sample collection. Field parameters such as temperature, specific conductivity, turbidity, and pH may be collected during the purging process. When such field parameters are collected, purging continues until the parameters have stabilized to within 10-percent of their preceding measurement, or until a maximum of five (5) calculated well volumes have been removed from the well.

Sample collection involves the filling of sample containers and the measurement of field-measured parameters. A summary of the most common groundwater sampling methods, and procedures to be followed for each method, are presented below.

Sampling with a Bailer

Bailing is a common and convenient method for purging and sampling groundwater, especially for situations where the depth of groundwater and the total depth of groundwater and well depth are both relatively shallow.

A bailer is a tube shaped device with a check valve at its lower end. Bailers come in a variety of sizes and volumes and are commonly disposable, although reusable bailers are available. Clean braided nylon or cotton cord is tied to the top of the bailer and the bailer is lowered into groundwater. When filled, the bailer is lifted from the well and the check-valve prevents water from draining out.

Procedures

Purging

1. Don PPE as per the project HASP section regarding groundwater sampling.
2. Obtain a clean bailer and a spool of clean polypropylene or nylon bailer cord.
3. Uncover the top end of the bailer and tie the cord to the bailer loop. Test the knot to ensure that it is secure, and remove the wrapping from the bailer.
4. Gently lower the bailer to bottom of the well.
5. Cut the cord at a proper length and tie a hand loop at the end of the cord, and attach it to your arm, or other fixed feature to prevent losing it down the well.
6. Gently raise the bailer, using the cord. The bailer cord should never touch the ground surface during purging or sampling.
7. Grab the bailer with one hand as it emerges from the well. Pour the bailed groundwater from the bailer into a graduated purge container.
8. Repeat this procedure until one calculated well volume of water is removed from the well.
9. After purging one calculated well volume, place a small volume of purged water into a sample cup and measure any required field parameters and record results on the Groundwater Sample Collection Record or in the field logbook or groundwater sampling form. If using a flow through apparatus for monitoring field parameters, record the readings from the display at this time and record in the filed logbook or groundwater sampling form.
10. Continue purging, by repeated bailing until the required purge volume has been removed from the well or until field parameters have stabilized.

Sample Collection

1. After completing purging, allow the well to recover to 90% of its static level before collecting the sample.
2. Insert the bailer into the well and gently lower the bailer to the bottom of the well.
3. Gently raise and retrieve the filled bailer from the well.
4. Grab the bailer with one hand as it emerges from the well. Insert a sample discharge tube into the bottom of the bailer to open the check valve and collect the discharging water into sample containers. In general, samples to be analyzed for VOCs are to be collected first, followed by samples to be analyzed for other organic compounds and inorganic constituents.
5. The samples to be analyzed for volatile organic compounds (VOCs) should be collected as gently as possible; so as to minimize the disturbance and aeration of the water as it enters the sample vials. Care should be taken to fill the vials such that no air bubbles are visible within the vial.
6. Repeat the sampling process until all sample containers are filled, adding required preservatives as necessary before capping.
7. After all sample containers are filled, fill the sampling cup with water and collect any required field-measured data (may include: temperature, pH, specific conductance, dissolved oxygen, total dissolved solids, oxidation-reduction potential, turbidity, salinity, etc) on the Groundwater Sample Collection Record, or in the field notebook.
8. Label and log the samples and place the containers into a cooler with ice as soon as possible (immediately) after collection.
9. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.

Sampling with a Peristaltic Pump

Peristaltic pumps are commonly used for groundwater samples when the volume of water required to be purged is low, and when the depth to the groundwater surface is less than approximately 20 feet. Peristaltic pumps provide a low flow rate, typically in the range of 0.02-0.2 gallons/minute (75-750 ml/min), and are therefore best suited to low-flow sampling techniques, or for collecting samples from wells with low purge volumes.

A peristaltic pump is a type of positive displacement pump. During operation, a series of rollers rotate inside the pump casing, over a section of flexible silicone tubing. The silicone tubing is compressed and continued rotation forces water to be pumped through the system. A suction tube typically made of polyethylene or Teflon-lined polyethylene is attached to the intake end of the silicone tubing, and a discharge tube of similar material is attached to the outflow end of the silicone tubing. The suction tube is lowered into the water surface far enough so that it will remain submerged if drawdown occurs. Upon turning the pump on, the water is drawn up the suction tube, through the pump tube, and pushed out the discharge tube. Because each of the sections of hose comes in contact with groundwater, clean, new tubing must be used for each sampling location, and it is common practice to dedicate tubing to a specific well for use during future groundwater sampling events.

Procedure

Purging

1. Don PPE as per the project HASP section regarding groundwater sampling.
2. Attach new (or dedicated) sections of suction, silicone and discharge tubing, and install the silicone tubing into the peristaltic pump.
3. Insert the suction tubing into the well so that the open end is below the water surface (commonly set midway along the well screen, or so the intake is situated halfway between the lower screen slot and the uppermost submerged screen slot).
4. Start the pump and direct the discharging purge water into a graduated purge bucket, and adjust the pump speed to produce a smoothly flowing discharge.
5. Calculate the purge rate by recording the time required to purge a given volume and adjust to a flow rate of between 250 and 500 ml/min (if possible).
6. Measurements of temperature, pH and specific conductance (and/or other assigned parameters) should be made after each well purge volume and documented on the Groundwater Sample Collection Record or in the field logbook.
7. Samples may be collected after the required purge volume has been removed or the field-parameters have stabilized.

Sample Collection

1. After completing purging, allow the well to recover to 90% of its static level before collecting the sample.
2. During sample collection from a given well, samples to be analyzed for VOCs are collected first, and samples to be analyzed for other organic compounds and inorganic constituents are collected last.
3. When sampling for VOCs, reduce the flow rate so that the flow approximates 50 ml/min and use the discharge to fill the sample vials. This should be done as gently as possible, minimizing the disturbance and aeration of the water as it enters the vials. Care should be taken to fill the vial completely such that no air bubbles are visible in the vial.
4. For subsequent, non VOC samples, return the flow rate to approximately 250 ml/min and fill sample containers, being sure to add the required preservatives as necessary before capping.
5. After all sample containers are filled, fill the sampling cup with water and collect any required field-measured data (may include: temperature, pH, specific conductance, dissolved oxygen, total dissolved solids, oxidation-reduction potential, turbidity, salinity, etc) on the Groundwater Sample Collection Record or in the field notebook.
6. Label and log the samples and place the containers into a cooler with ice as soon as possible (immediately) after collection.
7. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.

Sampling with a Submersible Pump

Submersible pumps are commonly used for groundwater sampling activities when groundwater is deep, or when a large volume of water must be purged prior to sampling. Because this type of pump is inserted into the groundwater being sampled, thorough decontamination between sampling locations is necessary to prevent cross-contamination. As an additional measure to prevent potential cross-contamination, historic groundwater quality data should be used (if available) to establish the order in which sampling occurs. Groundwater sampling with submersible pumps should proceed from the least contaminated wells to the most contaminated wells.

Discharge tubing, typically made of polyethylene or Teflon lined polyethylene is attached to the outflow of the pump. The pump, discharge tubing, and power cord/ air hose is lowered into the groundwater far enough so that the pump intake will remain submerged if drawdown occurs. A support cable/line is used to support the weight of the pump while it is suspended in the well, and the power cable/air hose is attached to a controller at the ground surface. Upon turning the pump on, the water is pushed up the discharge tube. Because the tubing comes in contact with groundwater, clean, new tubing must be used for each sampling location, and it is common practice to dedicate tubing to a specific well for use during subsequent groundwater sampling events.

Purging

1. Attach new or dedicated discharge tubing to the submersible pump.
2. Insert the pump, discharge hose, power cable/air hose, and support cable into the well so that the pump's intake is below the water surface (commonly set midway along the well screen, or so the intake is situated halfway between the lower screen slot and the uppermost submerged screen slot).
3. Start the pump and direct discharge into graduated purge bucket, and adjust the pump speed to produce a smoothly flowing discharge.
4. Calculate the purge rate by recording the time required to purge a given volume.
5. Measurements of temperature, pH and specific conductance (and/or other assigned parameters) should be made after each well purge volume and documented on the Groundwater Sample Collection Record or in the field logbook.
6. Samples may be collected after the required purge volume has been removed or until field parameters have stabilized.

Sample Collection

1. After completing purging, allow the well to recover to 90% of its static level before collecting the sample.
2. In general, samples to be analyzed for VOCs are to be collected first, followed by samples to be analyzed for other organic compounds and inorganic constituents.
3. If sampling for VOCs, reduce the flow rate so that the flow approximates 50 ml/min and use the discharge tube to fill the sample vials. This should be done as gently as possible, minimizing the disturbance and aeration of the water as it enters the vials. Care should be taken to completely fill the vial such that no air bubbles are visible in the vial.

4. For other parameters, adjust the flow rate to approximately 250 ml/min, and fill other sample containers, being sure to add the required preservatives as necessary before capping.
5. After all sample containers have been filled, fill the sampling cup with water and collect any required field-measured data (may include: temperature, pH, specific conductance, dissolved oxygen, total dissolved solids, oxidation-reduction potential, turbidity, salinity, etc) on the groundwater sample collection record or in the field notebook.
6. Label and log the samples and place the containers into a cooler with ice as soon as possible (immediately) after collection.
7. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.

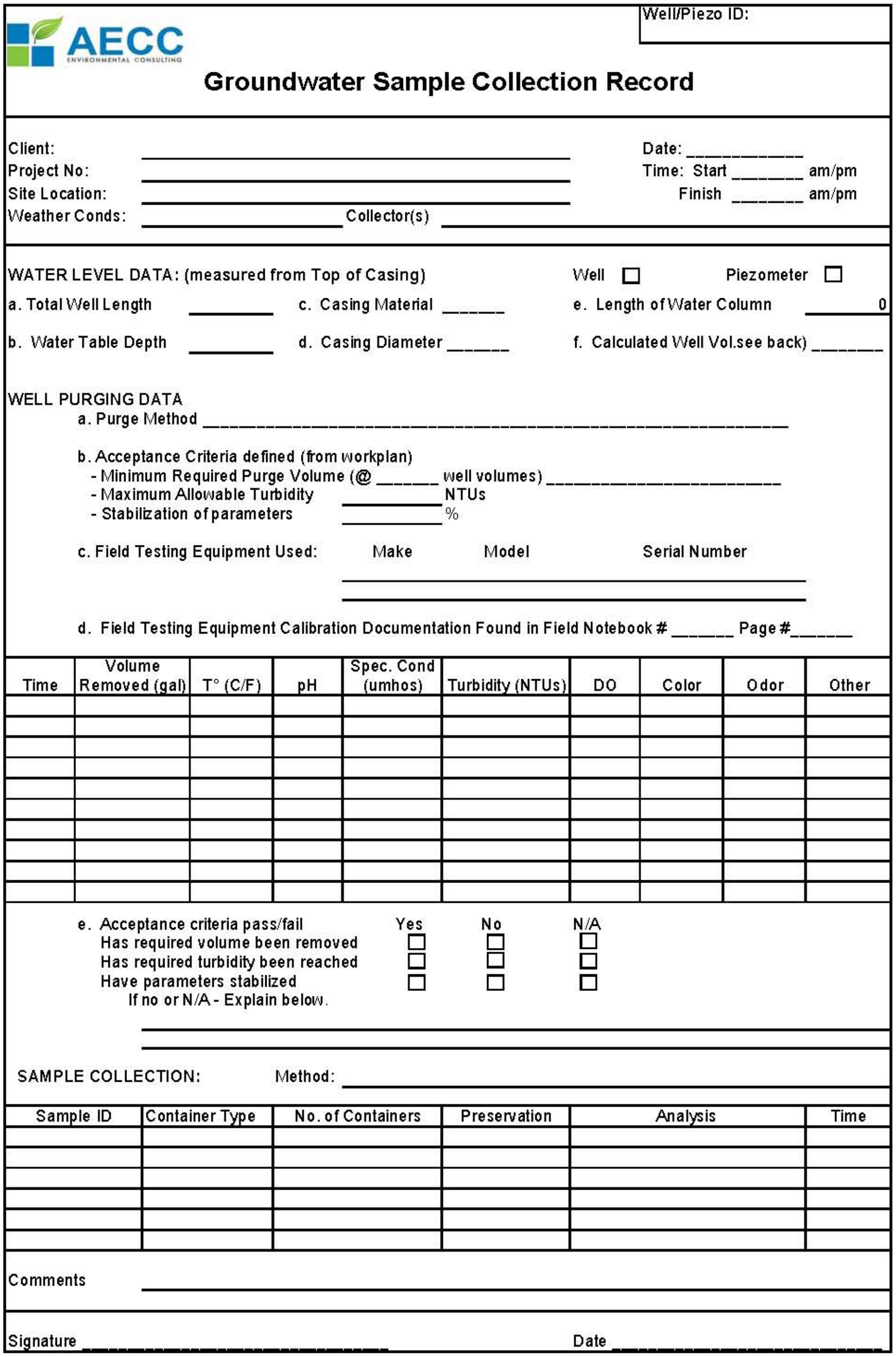
Quality Assurance/Quality Control

Quality assurance sampling is a common component of groundwater sampling programs. QA/QC sampling involves the collection and analysis of additional samples for the purposes of verifying that sampling equipment is suitably clean (equipment blanks), to check the laboratory's accuracy and/or precision (field duplicate), whether the sample matrix may be affecting the analytical results (Matrix Spike/Matrix Spike Duplicate), and whether samples might have been affected by conditions during shipment of the sample containers or samples (trip blank). The specific types of samples to be collected, the procedures to be used for collection, and the frequency QA/QC sample collection will be defined in the QAPP, work plan or project-specific work plan.

Documentation

Groundwater sampling activities should be documented in the field notebook, as well as on forms including the chain of custody record and sample collection records. Purge data collected during well purging prior to sample collection may be collected in the field notes, or on Groundwater Sample Collection Records (See Figure 1 Groundwater Sample Collection Record and Figure 2 for Low Flow Groundwater Sample Collection Record). Labels for sample jars must replicate the information provided on the chain-of-custody and at a minimum must include site ID/project number, sample ID, sampling date, sampling time, preservative, and sampler's initials. Other documentation such as meter calibration records, certifications for pre-cleaned sample containers, and shipping paperwork should be maintained as part of the project file.

FIGURE 1 Groundwater Sample Collection Record



AECC ENVIRONMENTAL CONSULTING

Well/Piezo ID:

Groundwater Sample Collection Record

Client: ______________________ Date: ____________
Project No: ______________________ Time: Start _______ am/pm
Site Location: ______________________ Finish _______ am/pm
Weather Conds: ____________ Collector(s) ______________________

WATER LEVEL DATA: (measured from Top of Casing) Well ☐ Piezometer ☐

a. Total Well Length ________ c. Casing Material ______ e. Length of Water Column ________0

b. Water Table Depth ________ d. Casing Diameter ______ f. Calculated Well Vol.see back) _______

WELL PURGING DATA

a. Purge Method ____

b. Acceptance Criteria defined (from workplan)
- Minimum Required Purge Volume (@ ______ well volumes) ________________________
- Maximum Allowable Turbidity __________ NTUs
- Stabilization of parameters __________ %

c. Field Testing Equipment Used: Make Model Serial Number
____
____

d. Field Testing Equipment Calibration Documentation Found in Field Notebook # ______ Page #______

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	Other

e. Acceptance criteria pass/fail	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.
____
____

SAMPLE COLLECTION: Method: ______________________________

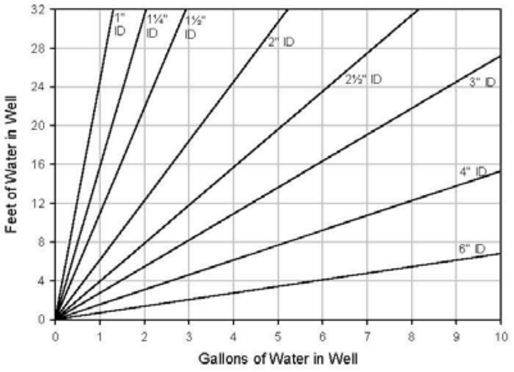
Sample ID	Container Type	No. of Containers	Preservation	Analysis	Time

Comments ____

Signature ______________________________ Date ______________________________

FIGURE 1 (Cont'd) Groundwater Sample Collection Record

Purge Volume Calculation



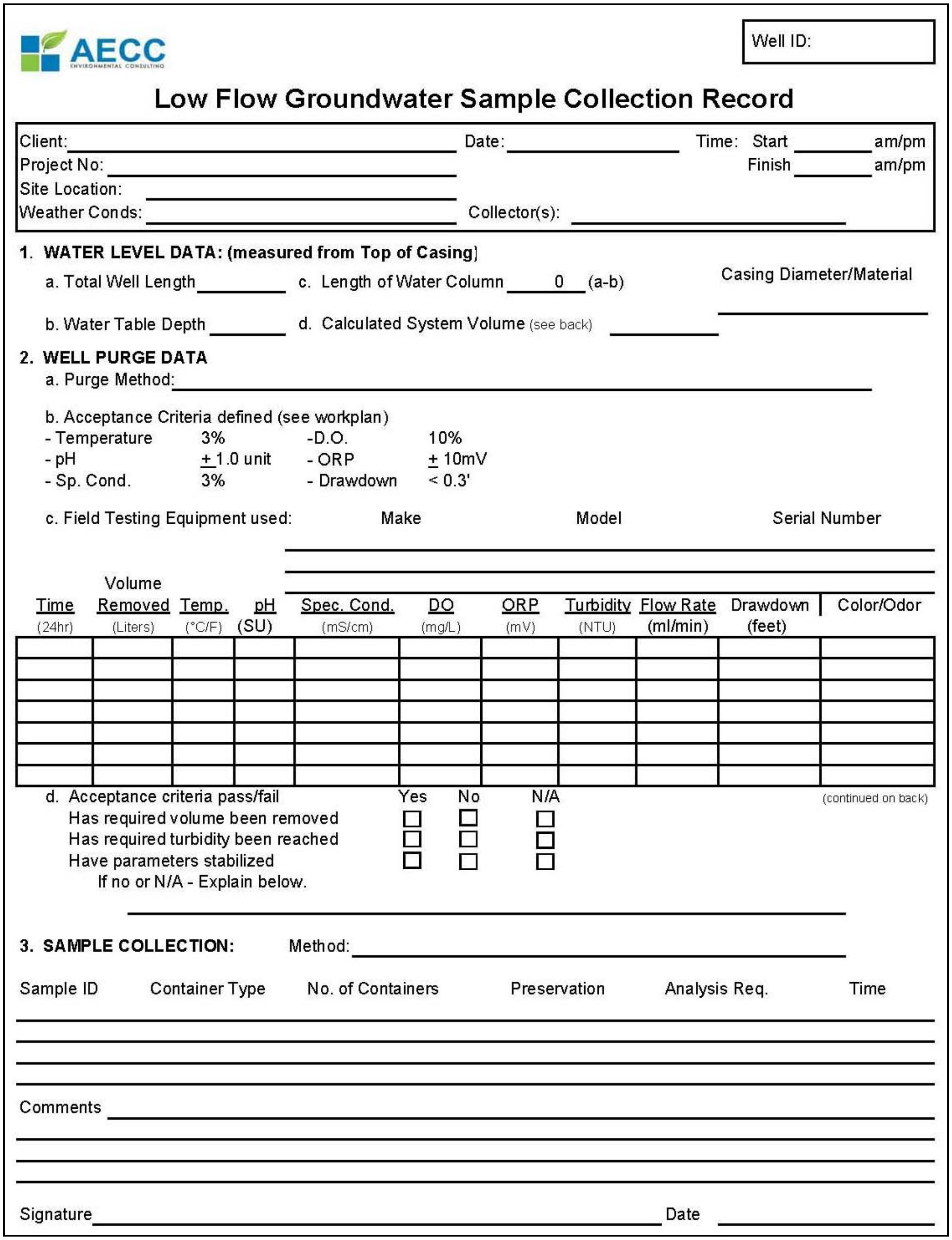
Volume / Linear Ft. of Pipe

ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

(continued from front)

Time	Depth to GW	Temp	pH	Spec. Cond.	Turbidity	Flow Rate	Volume Removed	Draw-down	Other
(24 hr)	(feet)	(°C/F)	(SU)	(µS/cm)	(NTU)	(liters/min)	(liters)	(feet)	(Color, odor, sheen, etc.)

FIGURE 2 Low Flow Groundwater Sample Collection Record



Well ID:

Low Flow Groundwater Sample Collection Record

Client:________________ Date:__________ Time: Start ______ am/pm
Project No:________________ Finish ______ am/pm
Site Location: ________________
Weather Conds: ________________ Collector(s): ________________

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length________ c. Length of Water Column ____0____ (a-b) Casing Diameter/Material

b. Water Table Depth ________ d. Calculated System Volume (see back) ________ ________________

2. WELL PURGE DATA

a. Purge Method:________________

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used: Make Model Serial Number

Time (24hr)	Volume Removed (Liters)	Temp. (°C/F)	pH (SU)	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor

d. Acceptance criteria pass/fail	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

(continued on back)

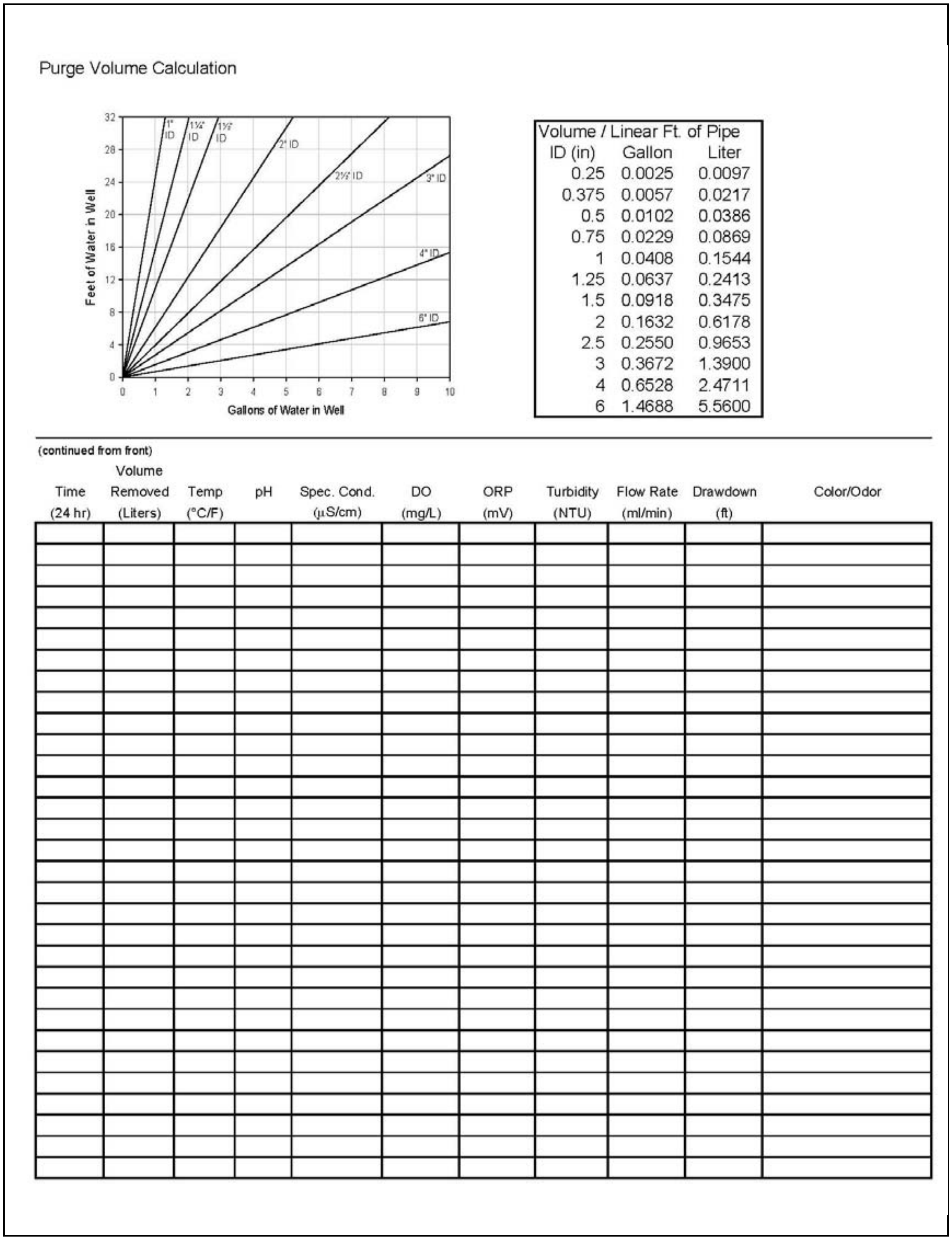
3. SAMPLE COLLECTION: Method:________________

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time

Comments ________________

Signature________________ Date ________

FIGURE 2 (Cont'd) Low Flow Groundwater Sample Collection Record



Purge Volume Calculation

Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C/F)	pH	Spec. Cond. (μS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (ft)	Color/Odor

	Asbestos & Environmental Consulting Corporation Standard Operating Procedures		Doc No:	SOP # 108
			Initial Issue Date	September 2012
			Revision Date:	Initial Version
SOP#108 – ENVIRONMENTAL SAMPLE LABELING AND CHAIN OF CUSTODY COMPLETION			Revision No.	0
			Next Revision Date:	As Needed
Preparation:	Authority: Bryan Bowers, President	Issuing Dept: Environmental Group	Page:	1 of 3

Scope and Application

The purpose of this procedure is to establish a uniform set of procedures for labeling environmental sample containers and properly completing a Chain of Custody (COC) form. Adherence to this SOP will ensure that sample containers are properly labeled, the sample collection and descriptive information is documented and that the required analytical parameters are specified on the COC form.

Sample labels provide the information necessary during handling to complete the COC forms and they reduce the possibility of confusing sample containers. The COC form is intended as a legal record of possession of a sample.

This SOP is to be used **ONLY** for the labeling and COC documentation of environmental samples. The labeling of hazardous material sample containers and the completion of COC forms shall adhere to USDOT regulations.

Equipment/Apparatus/Supplies

Required materials include the following:

Adhesive Sample Labels (laboratory-provided)
COC form(s)
Clear packing tape

Procedures

Sample bottle labeling

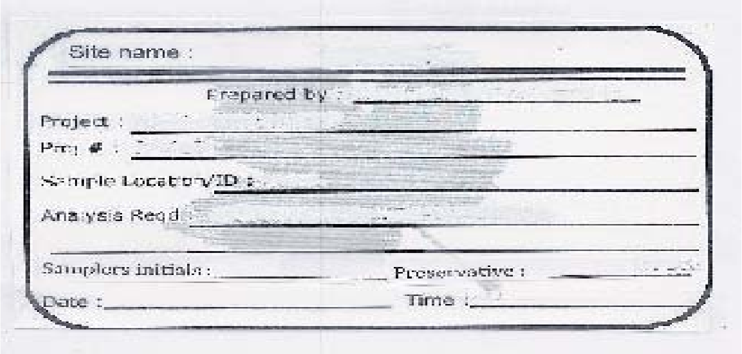
Sample containers shall be pre-labeled with blank adhesive label before samples are collected. The container shall be labeled using the adhesive labels provided by the analytical laboratory

Once a sample has been placed into a container and the container is properly sealed, the sampler shall record the following information on the label:

- Site name
- Label prepared by (lab name)
- Project name
- Project number
- Sample Location / ID
- Analysis required
- Samplers' initials
- Preservative (if present)
- Date and time that the sample was acquired

The label shall then be covered with clear packing tape which is wrapped completely around the bottle.

An example of a sample container label is shown below.



Site name :

Prepared by :

Project :

Proj # :

Sample Location/ID :

Analysis Reqd :

[redacted]

Samplers initials : ________ Preservative :

Date : ________ Time :

Chain of Custody Completion

The COC form is typically provided by the analytical laboratory and must be partially completed by the sampler prior to releasing custody of the sample. The essential information that must be provided on the COC form by the sampler is as follows:

- Project Name/Site Name
- Details of who the lab report should be routed to
- Details of who should be invoiced for the analytical services
- Project number
- Turnaround time requested
- Date and time that each sample was collected
- Type of sample collection method (composite or grab)
- Matrix sampled (liquid, soil, sludge)
- Number of containers filled per sample number
- Requested analyses
- Remarks

Most importantly, each COC form has a section where the sampler signs, dates and records the time that he/she releases the samples to a shipping agent or the sample receiver at the laboratory. Once the samples are released a copy of the COC form shall be retained by the sampler and routed to the project file. If the cooler is to be shipped via an overnight carrier (i.e. FedEx®, UPS or similar) the signed chain of custody shall be placed in a sealable plastic bag and taped to the underside of the cooler lid. The COC form should be initiated at the lab at sample container receipt and it remains with the sample at all times.

Quality Assurance/Quality Control

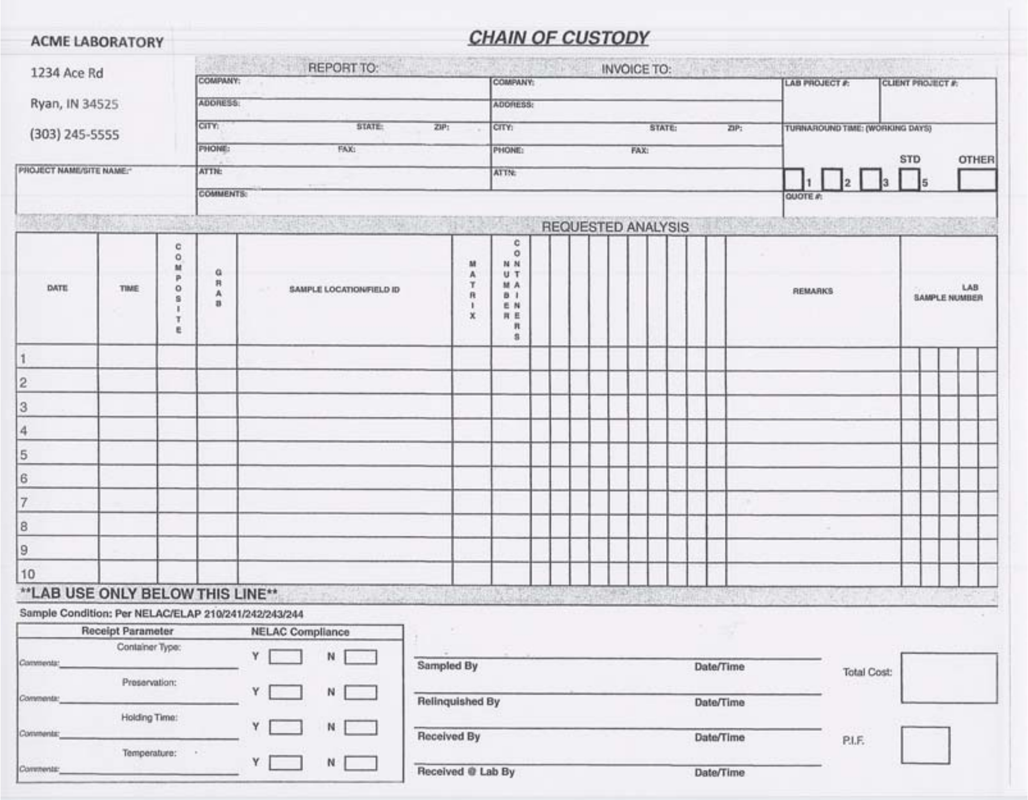
Prior to affixing a container label to a sample container, and then completing the label, the sampler shall review the project sampling plan/scope of work to ensure that the required label information has been recorded on the label.

Prior to sealing the COC for shipment the sampler shall review the project sampling plan/scope of work to ensure that the form has been fully and accurately completed (e.g., all sample Location / ID information, the appropriate laboratory analyses, and the required turn-around-time for analytical results are requested).

Documentation

If samples are being shipped via courier or via direct delivery then a copy of the signed chain of custody shall be retained. If shipping via other carrier, the copy of the airbill shall be retained for the project records.

An example of a chain of custody form is presented below.



ACME LABORATORY
1234 Ace Rd
Ryan, IN 34525
(303) 245-5555

CHAIN OF CUSTODY

PROJECT NAME/SITE NAME:

REPORT TO:	INVOICE TO:		
COMPANY:	COMPANY:	LAB PROJECT #:	CLIENT PROJECT #:
ADDRESS:	ADDRESS:		
CITY: STATE: ZIP:	CITY: STATE: ZIP:	TURNAROUND TIME: (WORKING DAYS)	
PHONE: FAX:	PHONE: FAX:	STD ☐ 1 ☐ 2 ☐ 3 ☐ 5	OTHER ☐
ATTN:	ATTN:		
COMMENTS:		QUOTE #:	

REQUESTED ANALYSIS

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS											REMARKS	LAB SAMPLE NUMBER
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

LAB USE ONLY BELOW THIS LINE

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	NELAC Compliance
Container Type: Comments:	Y ☐ N ☐
Preservation: Comments:	Y ☐ N ☐
Holding Time: Comments:	Y ☐ N ☐
Temperature: Comments:	Y ☐ N ☐

Sampled By Date/Time
Relinquished By Date/Time
Received By Date/Time
Received @ Lab By Date/Time

Total Cost: ☐
P.I.F. ☐

AECC ENVIRONMENTAL CONSULTING	Asbestos & Environmental Consulting Corporation Standard Operating Procedures		Doc No:	SOP # 110
			Initial Issue Date	July 2012
			Revision Date:	Initial Version
SOP#110 – FIELD MONITORING EQUIPMENT CALIBRATION			Revision No.	0
			Next Revision Date:	July 2013
Preparation: P. Micciche	Authority: Bryan Bowers, President	Issuing Dept: Environmental Group	Page:	1 of 2

Scope and Application

The purpose of this procedure is to establish a uniform general set of procedures for the calibration of field monitoring equipment. Calibration is performed as a quality assurance measure and a safety precaution. The use of equipment that has not been properly calibrated can lead to erroneous data. In addition, proper calibration of monitoring equipment helps to protect field personnel and others from potential exposure to hazardous materials.

This SOP focuses on calibration of equipment used for monitoring field activities and sampling environmental parameters.

It is noted that other state or federal agency standard operating procedures may exist that require deviation from this SOP. These required deviations must be identified before the sampling program begins (ideally during the work plan/sampling plan development), and must be explained in the project-specific work plan/sampling plan.

Equipment/Apparatus/Supplies

Examples of commonly used equipment items that require calibration include:

- Organic vapor monitors – a Photoionization detector (PID) for sampling volatile organic compounds (VOCs) in air for example.
- Combustible gas monitors – an explosimeter for detecting concentrations of explosive gases in air for example.
- Water quality meters for measuring parameters such as temperature, pH, and turbidity

Required materials may include:

- Distilled and/or deionized water
- Paper towels
- Cylinder containing standard reference gas (span gas)
- Cylinder containing clean dry air
- Calibration standards/reagents
- Tedlar® bags
- Project notebook/pen

Procedures

Given that there exist a wide variety of monitoring equipment items, and that such items are supplied by many different manufacturers, AECC does not have a standard equipment calibration procedure. However, at a minimum, each item of field monitoring equipment shall be calibrated on a daily basis. Note that specific calibration instructions are not addressed in this SOP, and personnel shall consult the equipment manufacturer supplied documents (e.g., User's

Guidebook) for detailed instructions. Equipment must be calibrated as per the manufacturer's requirements. In the case where equipment is procured on a rental basis the calibration records specific to each piece of equipment shall be provided by the vendor and remain with the equipment item. Manufacturer's specification for calibration frequency may be superseded if required by a project-specific QAPP, sampling program or other documents, depending on the quality assurance objectives for the project.

Chemical reagents used for calibration purposes sometimes can be hazardous. When the use of these (or other similar) reagents solvents is required by a project-specific QAPP or Sampling Plan, the plans must also describe additional protocols and procedures regarding their safe use and handling. If associated investigation-derived waste is generated through the use of chemical reagents the plans should detail how it is to be handled, characterized, and disposed of in accordance with federal, state and local requirements.

Quality Assurance/Quality Control

General guidelines for quality control check of field equipment calibration usually require the equipment to be calibrated on a daily basis. As stated above, AECC's procedure is that each item of field monitoring equipment shall be calibrated on a daily basis. Additional calibration shall be performed whenever an exceptionally high reading ("spike") is detected. For projects with a QAPP, the document will specify the frequency of equipment calibration. For projects without a QAPP, the need for and/or frequency of equipment calibration will be specified in the scope of work, or the project work plan.

Documentation

Specific information regarding equipment calibration procedures should be documented in the project-specific field notebook. Documentation in the notebook should thoroughly describe the calibration steps implemented in order to show compliance with the project work plan. Calibration events should be logged when they occur with the following information documented:

- Date, time and location of each calibration event
- What equipment was calibrated
- Method used for calibration
- Notable circumstances.

APPENDIX B

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN

Remedial Action Work Plan
The Smith Restaurant Building
City of Syracuse, New York

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ATTACHMENTS

Attachment A	Data Quality Objectives Forms

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is an appendix to the Remedial Action Work Plan (RAWP), which is required as an element of the remedial program at the Smith Restaurant Building site (hereinafter referred to as the "Site") under the New York State (NYS) Brownfield Cleanup Program (BCP), administered by New York State Department of Environmental Conservation (NYSDEC). The Site is being remediated in accordance with Brownfield Cleanup Agreement (BCA) Index # C734148-06-20, which was executed on June 9, 2020.

1.1 Scope of the QAPP

This QAPP was prepared to provide quality assurance (QA) guidelines to be implemented during the Remedial Investigation (RI). The QAPP will assure the accuracy and precision of data collection during the implementation of the remedial measures. The QAPP identifies procedures for sample collection to mitigate the potential for cross-contamination, as well as analytical requirements necessary to allow for independent data validation. The QAPP has been prepared in accordance with USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations; the EPA Region II CERCLA Quality Assurance Manual, and NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010). This document may be modified for subsequent phases of investigative and remedial work, as necessary. The QAPP provides:

- A means to communicate to the persons executing the various activities exactly what is to be done, by whom, and when
- A culmination to the planning process that ensures that the program includes provisions for obtaining quality data (e.g., suitable methods of field operations)
- A document that can be used by the Project Managers and QA Officer to assess if the activities planned are being implemented and their importance for accomplishing the goal of quality data
- A plan to document and track project data and results
- Detailed descriptions of the data documentation materials and procedures, project files, and tabular and graphical reports

The QAPP is primarily concerned with the quality assurance and quality control aspects of the procedures involved in the collection, preservation, packaging, and transportation of samples; field testing; record keeping; data management; chain-of-custody procedures; laboratory analyses; and other necessary matters to assure that the investigation activities, once completed, will yield data whose integrity can be defended.

QA refers to the conduct of all planned and systematic actions necessary to perform satisfactorily all task-specific activities and to provide information and data confidence as a result of such activities. The QA for task-specific activities includes the development of procedures, auditing, monitoring and surveillance of the performance.

QC refers to the activity performed to determine if the work activities conform to the requirements. This includes activities such as inspections of the work activities in the field (verification that the items and materials installed conform to applicable codes and design specifications). QA is an overview monitoring of the performance of QC activities through audits rather than first time inspections.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The following section provides a generic organization for sampling activities, including roles, responsibilities, and required qualifications of these organizations.

2.1 Project Team

2.1.1 NYSDEC and NYSDOH

It is the responsibility of the NYSDEC, in conjunction with the New York State Department of Health (NYSDOH), to review the project documents for completeness and conformance with the site-specific cleanup objectives and to make a decision to accept or reject these documents based on this review. The NYSDEC also has the responsibility and authority to review and approve QA documentation collected during investigative and remedial activities and to confirm that the QA Plan was followed.

2.1.2 Property Owner

For this BCP project, the property owner (Owner) is also the BCP Volunteer. The Owner will be responsible for complying with the QA requirements as specified herein and for monitoring and controlling the quality of the Brownfield cleanup activities either directly or through their designated environmental consultant and/or legal counsel. The Owner will also have the authority to select Contractor(s) to assist them in fulfilling these responsibilities. The Owner is responsible for implementing the project, and has the authority to commit the resources necessary to meet project objectives and requirements.

2.1.3 Environmental Consultant

On behalf of the Owner, AECC will be responsible for the coordination / oversight of the remedial activities, interpretation of the analytical data, and evaluation of the need for and performance of Interim Remedial Measures (IRMs), if necessary.

<u>Project Manager</u>

The Project Manager has the responsibility for ensuring that the project meets the overall project objectives, reports directly to the Owner, coordinates with the NYSDEC/NYSDOH Project Coordinators, and is responsible for technical and project oversight. The PM will:

- Define project objectives and develop a detailed work plan schedule
- Establish project policy and procedures to address the specific needs of the project as a whole, as well as the objectives of each task
- Acquire and apply technical and corporate resources as needed to assure performance within budget and schedule constraints
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product
- Review the work performed on each task to assure its quality, responsiveness, and timeliness
- Review and analyze overall task performance with respect to planned requirements and authorizations
- Review and approve all deliverables before their submission to NYSDEC
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product

- Ultimately be responsible for the preparation and quality of interim and final reports
- Represent the project team at meetings

Field Team Manager / Head Field Technician

The Field Team Manager and Head Field Technician have the shared responsibility for implementation of specific project tasks identified at the Site. They are responsible for the supervision of project field personnel, subconsultants, and subcontractors. The Head Field Technician is typically responsible for on-site operations, while the Field Team Manager is responsible for general oversight and managerial aspects of the field work. Both report directly to the Project Manager. The Field Team Manager and Head Field Technical will:

- Define daily develop work activities
- Orient field staff concerning the project’s special considerations
- Monitor and direct subcontractor personnel
- Review the work performed on each task to ensure its quality, responsiveness, and timeliness
- Assure that field activities, including sample collection and handling, are carried out in accordance with this QAPP

Quality Assurance Officer

The QA Officer will have direct access to corporate executive staff as necessary, to resolve any QA dispute, and is responsible for auditing the implementation of the QA program in conformance with the demands of specific investigations and policies, and NYSDEC requirements. Specific function and duties include:

- Performing QA audits on various phases of the field operations
- Reviewing and approving QA plans and procedures
- Providing QA technical assistance to project staff
- Reporting on the adequacy, status, and effectiveness of the QA program on a regular basis to the Project Manager for technical operations
- Responsible for assuring third party data review of all sample results from the analytical laboratory

2.1.4 General Contractor and Subcontractors

During the remedial investigation, the General Contractor, subcontractors, and subconsultants will be utilized to perform various project tasks, likely including:

- General Contractor – to manage, coordinate, and oversee the construction and remedial work at the Site
- Site Contractor - to perform excavations, stage excavated materials, place demarcation barrier, backfill, and install site features such as asphalt parking lots, concrete sidewalks, and landscaping that will serve as the remedial cover for the site
- Environmental Laboratory - to analyze soil and groundwater samples
- Data Validator - to prepare Data Usability Summary Reports
- Licensed Land Surveyor - to determine location and/or elevation data associated with excavations, monitoring wells, sample locations, etc.

2.1.5 Key Personnel

Key personnel anticipated for this project are as follows:

Team Member	Organization	Telephone	Role/Title
Matthew Paulus	Smith Building, LLC	315.481.1552	Owner Contact
Harry Warner	NYSDEC	315.426.7400	Regional HW Engineer
Gary Priscott	NYSDEC	607.775.2545	DEC Project Coordinator
Stephanie Selmer	NYSDOH	518.402.7860	DOH Project Coordinator
Richard McKenna	AECC	315.432.9400	Project Manager
H. Nevin Bradford	AECC	315.432.9400	Field Team Manager
Drew Brantner	AECC	315.432.9400	Head Field Technician
Bryan Airel	AECC	315.432.9400	Health & Safety Officer
James Saxton	AECC	315.432.9400	QAPP Officer
Mike Freund	Rich & Gardner	315.474.1900	General Contractor Manager
TBD	TBD	TBD	Site Contractor Manager
Brian Fischer	Eurofins TestAmerica	716.504.9835	Laboratory Director/Manager
Don Anne	Alpha Geoscience	518.348.6995	Data Validator

2.2 Laboratory Responsibilities

Environmental laboratories utilized for sample analysis for this project must be an independent, NYSDOH Environmental Laboratory Approval Program (ELAP)-certified facility approved to perform the analyses prescribed herein.

Laboratory Director

The Laboratory Director is a technical advisor and is responsible for summarizing and reporting overall unit performance. Responsibilities of the Laboratory Director include:

- Provide technical, operational, and administrative leadership
- Allocation and management of personnel and equipment resources
- Quality performance of the facility
- Certification and accreditation activities
- Blind and reference sample analysis

Quality Assurance Manager (QA Manager)

The QA Manager has the overall responsibility for data after it leaves the laboratory. The QA Manager will be independent of the laboratory but will communicate data issues through the Laboratory Director. In addition, the QA Manager will:

- Oversee laboratory QA
- Oversee QA/QC documentation
- Conduct detailed data review
- Determine whether to implement laboratory corrective actions, if required
- Define appropriate laboratory QA procedures
- Prepare laboratory SOPs

3.0 QA/QC OBJECTIVES

The overall objectives and criteria for assuring quality for this effort are discussed below. This QAPP addresses how the acquisition and handling of samples and the review and reporting of data will be documented. The objectives of this QAPP are to address the following:

- The procedures to be used to collect, preserve, package, and transport soil, groundwater and air samples
- Field data collection
- Record keeping
- Data management
- Chain-of-custody procedures
- Precision, accuracy, completeness, representativeness, for sample analysis and data management under EPA analytical methods

3.1 Data Quality Objectives

Data Quality Objectives (DQOs) are statements that describe the desired quality of data necessary to meet the objectives of the sampling program. The DQOs for the project were prepared in anticipation of the various media that would require sampling for laboratory analysis. DQO Forms have been completed for each type of sampling media and are located in Attachment A.

The DQO forms include information on the type of media sampled, the intended use of the data being collected, the type of analyses that will be requested, the level of analytical methodology and documentation required, sampling procedures, and the type of QAPP field samples that will be collected in support of the project. The sections of the DQO forms are described below.

Sampled Media: This section describes the material that is being sampled (groundwater, soil, surface water, waste material, etc.).

Data Use: This section is used to indicate the intended purpose of the sampling and analytical data. (i.e., for site characterization, evaluation or remedial alternatives, risk assessment, monitoring of existing sampling points, or waste characterization, etc.).

Data Type: This section identifies the compounds/analytes that samples collected during the program will be analyzed for. Also indicates whether field parameters such as pH, specific conductivity, temperature and turbidity will be monitored during sample collection.

Level of Analysis: This section identifies the level of analytical support required of the samples collected for a specific purpose as described below:

- Level I - Field Screening: This level is characterized by the use of portable type instruments that provide real-time data.

- Level II - Field Analysis: This level is characterized by the use of portable analytical instruments in an on-site lab or transported to the site. This section identifies the field analysis to be used.

- Level III - Standard Analytical Protocols: This level may include standard analytical protocols in accordance with NYSDOH Environmental Laboratory Approval Program (ELAP) certification requirements, without the NYSDEC Analytical Services Protocol (ASP) Category B QAPP and deliverables / reportables documentation.

- Level IV - NYSDEC ASP Reportables / Deliverables: This level is characterized by rigorous QAPP NYSDEC ASP protocols and Category B reportable / deliverable documentation that is suitable for data validation.

Sampling Procedures: This section provides information on sampling procedures to be used in sample collection, or provides directions to where to find this information in the project plans.

Data Quality Factors: This section describes factors that influence the quality or quantity of data to be collected. Primary contaminants and associated levels of concern are identified concerning ARARs or potential risks. The required detection limits are also given or referenced.

QAPP Samples: This section indicates additional samples to be collected to support QA/QC procedures. Additional samples to be collected include:

- Split Samples –Split samples (or duplicates) are two samples taken from the same source; digested, distilled or otherwise processed; and then analyzed. Duplicate sample analysis is used to determine reproducibility or consistency in the analysis. For this RI, spilt samples will noted in AECC's log book, but will not be identified on the sample label (known as a blind duplicate), preventing the laboratory from knowing which samples are duplicates. Duplicate / split samples shall be collected at a rate of 1 per 20 samples (5%).

- Matrix Spike / Matrix Spike Duplicates – Matrix spike duplicate samples are collected as a duplicate sample, to which the analytical laboratory will add known amounts of analyte. These QA/QC samples are intended to assess the extraction procedure used by the laboratory. These samples shall be collected at a rate of 1 per 20 samples (5%) or sample delivery group whichever is smaller and for each sample matrix.

- Trip Blanks – Trip blanks are samples that are prepared prior to the sampling event in the same type of sample container and are kept with the collected samples throughout the sampling event. Trip blank vials are not opened in the field and are analyzed for volatile organics only, and trip blanks are only collected when the sampling program includes samples that are being analyzed for VOCs. Trip Blanks shall accompany any shipment of aqueous samples for VOCs.

- Equipment Blanks – Equipment blanks are samples that are obtained by running analyte-free water through or over the sample collection equipment in a way that is identical to the sample collection procedures. Field blanks may be used during QA/QC procedures to evaluate if sampling equipment has contributed contaminants to the samples. These samples shall be collected daily whenever re-usable sampling equipment is used.

3.2 Sampling Procedures

Objectives and procedures for soil, groundwater, and soil vapor sampling have been designed to allow for the acquisition of accurate and precise data, and are detailed in the Field Sampling Plan and Standard Operating Procedures attached to this RIWP.

3.3 Laboratory Coordination

Laboratory coordination will be conducted under the direction of the Project Manager and QA Officer.

All chemical analyses for matrices will be completed by a laboratory capable of performing project-specific analyses as indicated in this QAPP and approved by the NYSDOH/NYSDEC as having the appropriate standard operating procedures, QA/QC programs, resumes, and organizational structure to complete analytical work as specified in this Work Plan. The laboratory will have current certification for standard methodologies and QA/QC, and will be required to remain certified as such throughout the project.

The laboratory utilized for laboratory analysis required under this project will be certified under the NYSDOH Environmental Laboratory Approval Program (ELAP) and will be required to maintain this certification for the duration of the program.

The laboratory will be capable of producing ASP Category B deliverables, as needed for subsequent data validation / data usability evaluation purposes.

3.4 Analytical Methodologies

All analyses will be performed by SW-846 methodologies with QAPP guidelines of 2005 ASP Category B. The following criteria will describe the appropriate methodologies for extraction, digestion, and analysis of the previously listed matrices. The specific analytes to be identified by each method, along with the Contract Required Quantitation Limits, are listed in Appendix C of the NYSDEC ASP (http://www.dec.ny.gov/data/der/asp2005cd/asp2005cd.zip).

Parameter Group	Analytical Method
TCL VOCs	USEPA Method 8260B + TICS
TCL SVOCs	USEPA Method 8270C +TICS
TAL Metals	USEPA Method 6010, 7470/7471 (Hg), 9014 (CN)
PCB Aroclors	USEPA Method 8082
Herbicides	USEPA Method 8151
Organochlorine Pesticides	USEPA Method 8081
1,4-Dioxane*	USEPA Methods 8270SIM (soil) and 522 (groundwater)
PFAS**	NYSDOH Method 537 (Modified)

*The detection limit for 1,4-Dioxane in aqueous samples is to be no greater than 0.35 ug/L
**Polyfluoroalkyl substances, 2ng/L reporting limit for PFOA and PFOS

Soil / Groundwater Analysis – Although not anticipated during remedial activities, soil and groundwater samples (i.e. – for clearance / verification purposes) would be analyzed for certain parameters listed above, if necessary. Groundwater samples collected from monitoring wells would also be field-analyzed for a limited group of field parameter analyses to include pH, specific conductance, dissolved oxygen (DO), redox potential (ORP), temperature, and turbidity.

Soil Vapor Sampling – Soil vapor sampling will not be performed as part of the remedial activities since a vapor mitigation system will be installed in the Site building. The system will be tested prior to occupation of the building, which might include sampling of the exhaust for VOCs.

Waste Characterization Samples – Samples collected for waste characterization/disposal purposes will be analyzed in accordance with the appropriate SW-846 methodologies, for the parameters required by the disposal facility.

Sampling of Imported Soil / Materials – Samples collected to characterize soil or other materials to be imported to the site will be analyzed in accordance with the appropriate SW-846 methodologies, and in accordance with the requirements set forth in NYSDEC's Technical Guidance for Site Investigation and Remediation (DER-10), 6 NYCRR Part 375, and NYSDEC Commissioner's Policy #51 (CP-51).

3.5 Analytical Quality Control

As stated previously, analytical quality for samples collected for site characterization or monitoring purposes will be in accordance with NYSDEC-ASP Category B. Analysis in accordance with NYSDOH-ELAP certification requirements may be used for samples collected for waste characterization or disposal purposes. The following holding times will be required from the contracted analytical laboratory, regardless of sample matrix:

Parameter	Task	Aqueous Holding Time	Solids Holding Time
VOCs	Analysis*	14 days	14 days
SVOCs	Extraction	7 days	14 days
	Analysis**	40 days	40 days
PCBs	Extraction	7 days	14 days
	Analysis**	40 days	40 days
Pesticides	Extraction	7 days	14 days
	Analysis**	40 days	40 days
Herbicides	Extraction	7 days	14 days
	Analysis**	40 days	40 days
Metals	Analysis	180 days	180 days
Mercury	Analysis	28 days	28 days
Cyanide	Analysis	14 days	14 days
1,4-Dioxane	Extraction	7 days	7 days
	Analysis**	40 days	40 days
PFAS	Analysis	14 days	Not Applicable

* The extraction time for Encore samplers is 48 hours.
** Days after extraction.

3.6 Laboratory Deliverables

The analytical data will be presented in 2005 ASP Category B reportable/deliverables format. Category B deliverables will not be requested for waste characterization samples.

4.0 SAMPLE CUSTODY PROCEDURES

Sample custody is controlled and maintained through the chain-of-custody procedures. Chain of custody is the means by which the possession and handling of samples will be tracked from the source (field) to their final disposition, the laboratory. A sample is considered to be in a person’s custody if it is in the person’s possession or it is in the person's view after being in his or her possession or it was in that person's possession and that person has locked it in a vehicle or room. Sample containers will be cleaned and preserved at the laboratory before shipment to the Site.

4.1 Sample Storage

Samples are stored in secure limited-access areas. Walk-in coolers or refrigerators are maintained at 4°C, ± 2°C, or as required by the applicable regulatory program. The temperatures of all refrigerated storage areas are monitored and recorded a minimum of once per day. Deviations of temperature from the applicable range require corrective action, including moving samples to another storage location if necessary.

4.2 Sample Custody

Sample custody is defined by this document as when any of the following occur:

- It is in someone’s actual possession
- It is in someone’s view after being in his or her physical possession
- It was in someone’s possession and then locked, sealed, or secured in a manner that prevents unsuspected tampering
- It is placed in a designated and secured area

Samples are removed from storage areas by the sample custodian or analysts and transported to secure laboratory areas for analysis. Access to the laboratory and sample storage areas is restricted to laboratory personnel and escorted visitors only; all areas of the laboratory are therefore considered secure. If required by the applicable regulatory program, internal chain-of-custody is documented in a log by the person moving the samples between laboratory and storage areas.

Laboratory documentation used to establish COC and sample identification may include the following:

- Field COC forms or other paperwork that arrives with the sample
- The laboratory COC
- Sample labels or tags are attached to each sample container
- Sample custody seals
- Sample preparation logs (i.e., extraction and digestion information) recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist
- Sample analysis logs (e.g., metals, GC/MS, etc.) information recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist

- Sample storage log (same as the laboratory COC)
- Sample disposition log, which documents sample disposal by a contracted waste disposal company

4.3 Sample Tracking

All samples are maintained in the appropriate coolers prior to and after analysis. The analysts remove and return their samples as needed. Samples that require internal COC are relinquished to the analysts by the sample custodians. The analyst and sample custodian must sign the original COC relinquishing custody of the samples from the sample custodian to the analyst. When the samples are returned, the analyst will sign the original COC returning sample custody to the sample custodian. Sample extracts are relinquished to the instrumentation analysts by the preparatory analysts. Each preparation department tracks internal COC through their logbooks/spreadsheets.

Any change in the sample during the time of custody will be noted on the COC (e.g., sample breakage or depletion).

5.0 CALIBRATION PROCEDURES AND FREQUENCY

This section describes the calibration procedures and the frequency at which these procedures will be performed for both field and laboratory instruments.

5.1 Field Instruments

Field equipment that will likely be used for the project includes:

- Photoionization detector (PID)
- Peristaltic pump
- Multi-parameter water quality meter (includes pH, turbidity, temperature, Eh, and specific conductance)
- Electric water level indicator
- Hand-held Global Positioning System (GPS) device

5.2 Preventative Maintenance

Each piece of field equipment is checked according to its routine maintenance schedule and before field activities begin. Field personnel will report all equipment maintenance and/or replacement needs to the Project QA Officer and will record the information on the daily field record.

5.3 Field Instrument Calibration

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer’s guidelines and recommendations as well as criteria set fort hin the applicable analytical methodology references. Operation, calibration, and maintenance will be performed by personnel properly-trained in these procedures. Brief descriptions of calibration procedures for field and laboratory instruments follow.

- Photoionization detector (PID) – Standard operating procedures for the PID require that routine maintenance and calibration be performed every six months. Field calibration will be performed on a daily basis. The packages used for calibration are non-toxic analyzed gas mixtures available in pressurized containers. All calibration procedures will follow the manufacturer recommendations.

- Peristaltic pump – No calibration required.
- Multi-parameter water quality meter - This instrument is factory-calibrated, and is also re-calibrated on a regular interval by the equipment rental company. The certification of calibration is provided by the equipment rental company.
- Electric water level indicator – No calibration required.
- Hand-held GPS device – This instrument is self-calibrating.

Further calibration procedures can be reviewed in AECC Standard Operating Procedure #110 – Field Monitoring Equipment Calibration, which attached to the RIWP.

6.0 DATA VALIDATION AND REPORTING

All data generated through field activities, or by the laboratory operation shall be validated before reported. Data validation will not be requested for waste characterization samples.

6.1 Data Usability Evaluation

Data evaluation will be performed by a third-party data validator using the most current methods and quality control criteria from the USEPA's Contract Laboratory Program (CLP) *National Functional Guidelines for Organic Data Review*, and Contract Laboratory Program*, National Functional Guidelines for Inorganic Data Review*.

6.1.1 Procedures Used to Evaluate Field Data Usability

The performance of field activities, calibration checks on field instruments at the beginning of each day of use, manual checks of field calculations, checking for transcription errors and review of field log books is the shared responsibility of the Field Team Manager and Head Field Technician.

6.1.2 Procedures Used to Evaluate Laboratory Data Usability

The data review guidance will be used only to the extent that it is applicable to the SW-846 methods. SW-846 methodologies will be followed primarily and given preference over CLP when differences occur. Also, results of blanks, surrogate spikes, MS/MSDs, and laboratory control samples will be reviewed / evaluated by the data validator. Sample analytical data for each sample matrix will be evaluated. The third-party data validation expert will also evaluate the overall completeness of the data package. Completeness checks will be administered on all data to determine whether deliverables specified in this QAPP are present. The reviewer will determine whether all required items are present and request copies of missing deliverables.

6.2 Data Reporting

6.2.1 Field Data Reporting

All field documents will be accounted for when they are completed. Accountable documents include items such as field notebooks, sample logs, field data records, photographs, data packages, computer disks, and reports.

6.2.2 Laboratory Data Reporting

Analytical data will be summarized in tabular format with such information as sample identification, sample matrix description, parameters analyzed and their corresponding detected concentrations, and the detection limit. Analytical results will be incorporated into reports as data tables, maps showing sampling locations and analytical results, and supporting text.

7.0 CORRECTIVE ACTION

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or out of quality control performance that can affect data quality. Corrective action can occur during field activities, laboratory analyses, data validation, and data assessment. Corrective actions proposed and implemented should be documented in the regular quality assurance reports to management. Corrective action should be implemented only after approval by the Project Manager, or his/her designee. If immediate corrective action is required, approvals secured by telephone from the Project Manager should be documented in an additional memorandum.

7.1 Field Corrective Action

If errors in field procedures are discovered during the observation or review of field activities by the Project QA Officer or his/her designee, corrective action will be initiated. Nonconformance to the QA/QC requirements of the field operating procedures will be identified by field audits or immediately by project staff who know or suspect that a procedure is not being performed in accordance with the requirements. The Project QA Officer or his/her designee will be informed immediately upon discovery of all deficiencies. Timely action will be taken if corrective action is necessary.

Corrective action in the field may be needed when the sample network is changed (i.e., more/less samples, sampling locations other than those specified in the Work Plan, etc.) or when sampling procedures and/or field analytical procedures require modification due to unexpected conditions. In general, the Project Manager and QA Officer may identify the need for corrective action. The Project Manager will approve the corrective measure that will be implemented by the field team. It will be the responsibility of the Project Manager to ensure that corrective action has been implemented.

If the corrective action will supplement the existing sampling using approved procedures in the QAPP, the corrective action approved by the Project Manager will be documented. If the corrective actions result in less samples (or analytical fractions), alternate locations, etc., which may result in non-achievement of project QA objectives, it will be necessary that all levels of project management, including the NYSDEC Project Coordinator, concur with the proposed action.

Corrective actions will be implemented and documented in the project field record book. No staff member will initiate corrective action without prior communication of findings through the proper channels. If corrective actions are insufficient, work may be stopped by the NYSDEC Project Coordinator.

If at any time a corrective action issue is identified which directly impacts project data quality objectives, the NYSDEC Project Coordinator will be notified immediately.

7.2 Laboratory Corrective Action

Corrective actions may be initiated if the quality assurance goals are not achieved. The initial step in a corrective action is to instruct the analytical laboratory to examine its procedures to assess whether analytical or computational errors caused the anomalous result. If no error in laboratory procedures or sample collection and handling procedures can be identified, then the Project Manager will assess whether reanalysis or resampling is required or whether any protocol should be modified for future sampling events.

7.3 Data Validation & Assessment Corrective Action

The need for corrective action may be identified during the data validation or assessment processes. Potential types of corrective action may include resampling by the field team, or reinjection / reanalysis of samples by the laboratory.

These actions are dependent upon the ability to mobilize the field team, whether the data to be collected is necessary to meet the QA objectives (the holding time for samples is not exceeded, etc.). If the data validator identifies a corrective action situation, the Project Manager will be responsible for approving the corrective action implementation. All required corrective actions will be documented by the laboratory Quality Assurance Coordinator.

ATTACHMENT A

Data Quality Objectives Forms

DATA QUALITY OBJECTIVES FORM:
SOIL SAMPLES (NOT ANTICIPATED DURING REMEDIAL ACTIVITIES)

Site Name/Location: The Smith Restaurant Building (BCP Site # C734148)
500 Erie Boulevard East, City of Syracuse, Onondaga County, New York

Sample Objectives: To collect data that will supplement previous characterization of Site soils.

Sampling Procedures: Sampling Procedures are described within the Field Sampling Plan.

Data Quality Factors: Analytical Detection Limits will be consistent with ASP-Contract Required Quantization Limits (CRQLs).

Sampled Media:

☑ Soils ☐ Sediment ☐ Groundwater ☐ Surface Water ☐ Soil Vapor

☐ Waste Material ☐ Building Materials ☐ Dust/Surfaces ☐ Air

Data Use:

☑ Site Characterization ☐ Monitoring ☐ Health & Safety ☑ Risk Assessment ☐ Disposal

☐ Remedial Design ☑ Confirmation ☐ Evaluate Remedial Alternatives

Field Parameters:

☑ VOCs (ppmv) ☐ Temperature ☐ Turbidity ☐ Dissolved Oxygen ☐ pH

☐ RedOx Potential ☐ Specific Conductivity ☐ Other:

Data Types:

☑ SW-846 ☐ TCLP ☐ SCLP ☐ Other:

Analyses:

☑ TCL VOCs ☑ TCL SVOCs ☐ STARS VOCs ☐ STARS SVOCs ☐ TICs

☐ TO-15 VOCs ☑ TAL Metals ☐ PCBs ☐ Herbicides ☑ Pesticides

☐ PFAS ☐ 1,4-Dioxane ☐ Asbestos ☐ Lead ☐ Mold

☐ Other:

QA/QC Samples:

☑ Duplicate (Split) ☑ Equipment Blank ☑ Field Blank ☐ Trip Blank (VOCs, Aqueous) ☑ MS/MSD

☐ Other:

Level of Analysis:

☑ Level I: Field Screening (portable instruments providing real-time data):

☑ Photoionization Device (PID) ☐ Groundwater Multi-Meter ☐ Dust Monitor

☐ Level II: Field Analysis (portable analytical instruments in an on-site laboratory)

☐ Level III: ASP Analytical Methods (samples to be analyzed in accordance with NYSDEC-ASP 1995)

☑ Level IV: ASP Reportables/Deliverables (NYSDEC-ASP 1995 Category B Reportables/Deliverables)

DATA QUALITY OBJECTIVES FORM:
GROUNDWATER SAMPLES (NOT ANTICIPATED DURING REMEDIAL ACTIVITIES)

Site Name/Location: The Smith Restaurant Building (BCP Site # C734148)
500 Erie Boulevard East, City of Syracuse, Onondaga County, New York

Sample Objectives: To collect data that will supplement previous characterization of Site groundwater.

Sampling Procedures: Sampling Procedures are described within the Field Sampling Plan.

Data Quality Factors: Analytical Detection Limits will be consistent with ASP-Contract Required Quantization Limits (CRQLs).

Sampled Media:

☐ Soils ☐ Sediment ☑ Groundwater ☐ Surface Water ☐ Soil Vapor

☐ Waste Material ☐ Building Materials ☐ Dust/Surfaces ☐ Air

Data Use:

☑ Site Characterization ☐ Monitoring ☐ Health & Safety ☑ Risk Assessment ☐ Disposal

☐ Remedial Design ☑ Confirmation ☐ Evaluate Remedial Alternatives

Field Parameters (if collected from groundwater monitoring wells):

☑ VOCs (ppmv) ☑ Temperature ☑ Turbidity ☑ Dissolved Oxygen ☑ pH

☑ RedOx Potential ☑ Specific Conductivity ☐ Other:

Data Types:

☑ SW-846 ☐ TCLP ☐ SCLP ☐ Other:

Analyses:

☑ TCL VOCs ☑ TCL SVOCs ☐ STARS VOCs ☐ STARS SVOCs ☐ TICs

☐ TO-15 VOCs ☑ TAL Metals ☐ PCBs ☐ Herbicides ☑ Pesticides

☐ PFAS ☐ 1,4-Dioxane ☐ Asbestos ☐ Lead ☐ Mold

☐ Other:

QA/QC Samples:

☑ Duplicate (Split) ☑ Equipment Blank ☑ Field Blank ☑ Trip Blank (VOCs, Aqueous) ☑ MS/MSD

☐ Other:

Level of Analysis:

☑ Level I: Field Screening (portable instruments providing real-time data):

☐ Photoionization Device (PID) ☑ Groundwater Multi-Meter ☐ Dust Monitor

☐ Level II: Field Analysis (portable analytical instruments in an on-site laboratory)

☐ Level III: ASP Analytical Methods (samples to be analyzed in accordance with NYSDEC-ASP 1995)

☑ Level IV: ASP Reportables/Deliverables (NYSDEC-ASP 1995 Category B Reportables/Deliverables)

DATA QUALITY OBJECTIVES FORM:
WASTE CHARACTERIZATION SAMPLES - SOILS

Site Name/Location: The Smith Restaurant Building (BCP Site # C734148)
500 Erie Boulevard East, City of Syracuse, Onondaga County, New York

Sample Objectives: To collect data to assist with the characterization and disposal / re-use of soils.

Sampling Procedures: Sampling Procedures are described within the Field Sampling Plan.

Data Quality Factors: Analytical Detection Limits will be consistent with ASP-Contract Required Quantization Limits (CRQLs).

Sampled Media:

☑ Soils ☐ Sediment ☐ Groundwater ☐ Surface Water ☐ Soil Vapor

☐ Waste Material ☐ Building Materials ☐ Dust/Surfaces ☐ Air

Data Use:

☐ Site Characterization ☐ Monitoring ☐ Health & Safety ☐ Risk Assessment ☑ Disposal

☐ Remedial Design ☐ Confirmation ☐ Evaluate Remedial Alternatives

Field Parameters:

☑ VOCs (ppmv) ☐ Temperature ☐ Turbidity ☐ Dissolved Oxygen ☐ pH

☐ RedOx Potential ☐ Specific Conductivity ☐ Other:

Data Types:

☐ SW-846 ☑ TCLP ☐ SCLP ☐ Other:

Analyses:

☐ TCL VOCs ☐ TCL SVOCs ☐ STARS VOCs ☐ STARS SVOCs ☐ TICs

☐ TO-15 VOCs ☐ TAL Metals ☐ PCBs ☐ Herbicides ☐ Pesticides

☐ PFAS ☐ 1,4-Dioxane ☐ Asbestos ☐ Lead ☐ Mold

☑ Other: As requested by the selected disposal / receiving facility with NYSDEC Project Manager approval

QA/QC Samples:

☐ Duplicate (Split) ☐ Equipment Blank ☐ Field Blank ☐ Trip Blank (VOCs, Aqueous) ☐ MS/MSD

☑ Other: As requested by the selected disposal / receiving facility with NYSDEC Project Manager approval

Level of Analysis:

☑ Level I: Field Screening (portable instruments providing real-time data):

☑ Photoionization Device (PID) ☐ Groundwater Multi-Meter ☐ Dust Monitor

☐ Level II: Field Analysis (portable analytical instruments in an on-site laboratory)

☑ Level III: ASP Analytical Methods (samples to be analyzed in accordance with NYSDEC-ASP 1995)

☐ Level IV: ASP Reportables/Deliverables (NYSDEC-ASP 1995 Category B Reportables/Deliverables)

DATA QUALITY OBJECTIVES FORM:
WASTE CHARACTERIZATION SAMPLES – LEAD-BASED PAINT

Site Name/Location: The Smith Restaurant Building (BCP Site # C734148)
500 Erie Boulevard East, City of Syracuse, Onondaga County, New York

Sample Objectives: To collect data to assist with the characterization and disposal of lead-based paint waste.

Sampling Procedures: Collect a representative sample(s) of the waste.

Data Quality Factors: Analysis by an ELAP-certified laboratory.

Sampled Media:

☐ Soils ☐ Sediment ☐ Groundwater ☐ Surface Water ☐ Soil Vapor
☑ Waste Material ☐ Building Materials ☐ Dust/Surfaces ☐ Air

Data Use:

☐ Site Characterization ☐ Monitoring ☐ Health & Safety ☐ Risk Assessment ☑ Disposal
☐ Remedial Design ☐ Confirmation ☐ Evaluate Remedial Alternatives

Field Parameters:

☐ VOCs (ppmv) ☐ Temperature ☐ Turbidity ☐ Dissolved Oxygen ☐ pH
☐ RedOx Potential ☐ Specific Conductivity ☐ Other:

Data Types:

☐ SW-846 ☑ TCLP ☐ SCLP ☐ Other:

Analyses:

☐ TCL VOCs ☐ TCL SVOCs ☐ STARS VOCs ☐ STARS SVOCs ☐ TICs
☐ TO-15 VOCs ☐ TAL Metals ☐ PCBs ☐ Herbicides ☐ Pesticides
☐ PFAS ☐ 1,4-Dioxane ☐ Asbestos ☑ Lead ☐ Mold
☑ Other: As requested by the selected disposal facility

QA/QC Samples:

☐ Duplicate (Split) ☐ Equipment Blank ☐ Field Blank ☐ Trip Blank (VOCs, Aqueous) ☐ MS/MSD
☑ Other: As requested by the selected disposal facility

Level of Analysis:

☐ Level I: Field Screening (portable instruments providing real-time data):
    ☐ Photoionization Device (PID) ☐ Groundwater Multi-Meter ☐ Dust Monitor
☐ Level II: Field Analysis (portable analytical instruments in an on-site laboratory)
☑ Level III: ASP Analytical Methods (samples to be analyzed in accordance with NYSDEC-ASP 1995)
    ☐ Level IV: ASP Reportables/Deliverables (NYSDEC-ASP 1995 Category B Reportables/Deliverables)

DATA QUALITY OBJECTIVES FORM:
WASTE CHARACTERIZATION SAMPLES - GROUNDWATER

Site Name/Location: The Smith Restaurant Building (BCP Site # C734148)
500 Erie Boulevard East, City of Syracuse, Onondaga County, New York

Sample Objectives: To collect data to assist with the characterization and disposal of removed groundwater.

Sampling Procedures: Sampling Procedures are described within the Field Sampling Plan.

Data Quality Factors: Analytical Detection Limits will be consistent with ASP-Contract Required Quantization Limits (CRQLs).

Sampled Media:

☐ Soils ☐ Sediment ☑ Groundwater ☐ Surface Water ☐ Soil Vapor
☐ Waste Material ☐ Building Materials ☐ Dust/Surfaces ☐ Air

Data Use:

☐ Site Characterization ☐ Monitoring ☐ Health & Safety ☐ Risk Assessment ☑ Disposal
☐ Remedial Design ☐ Confirmation ☐ Evaluate Remedial Alternatives

Field Parameters:

☐ VOCs (ppmv) ☐ Temperature ☐ Turbidity ☐ Dissolved Oxygen ☐ pH
☐ RedOx Potential ☐ Specific Conductivity ☐ Other:

Data Types:

☑ SW-846 ☐ TCLP ☐ SCLP ☐ Other:

Analyses:

☐ TCL VOCs ☐ TCL SVOCs ☐ STARS VOCs ☐ STARS SVOCs ☐ TICs
☐ TO-15 VOCs ☐ TAL Metals ☐ PCBs ☐ Herbicides ☐ Pesticides
☐ PFAS ☐ 1,4-Dioxane ☐ Asbestos ☐ Lead ☐ Mold
☑ Other: As requested by the selected disposal facility

QA/QC Samples:

☐ Duplicate (Split) ☐ Equipment Blank ☐ Field Blank ☐ Trip Blank (VOCs, Aqueous) ☐ MS/MSD
☑ Other: As requested by the selected disposal facility

Level of Analysis:

☐ Level I: Field Screening (portable instruments providing real-time data):
 ☐ Photoionization Device (PID) ☐ Groundwater Multi-Meter ☐ Dust Monitor

☐ Level II: Field Analysis (portable analytical instruments in an on-site laboratory)

☑ Level III: ASP Analytical Methods (samples to be analyzed in accordance with NYSDEC-ASP 1995)

☐ Level IV: ASP Reportables/Deliverables (NYSDEC-ASP 1995 Category B Reportables/Deliverables)

DATA QUALITY OBJECTIVES FORM:
IMPORTED SOILS / MATERIALS

Site Name/Location: The Smith Restaurant Building (BCP Site # C734148)
500 Erie Boulevard East, City of Syracuse, Onondaga County, New York

Sample Objectives: To collect data that will verify that imported soils / materials are not contaminated.

Sampling Procedures: Sampling Procedures are described within the Field Sampling Plan.

Data Quality Factors: Analytical Detection Limits will be consistent with ASP-Contract Required Quantization Limits (CRQLs).

Sampled Media:

☑ Soils ☐ Sediment ☐ Groundwater ☐ Surface Water ☐ Soil Vapor

☐ Waste Material ☐ Building Materials ☐ Dust/Surfaces ☐ Air

Data Use:

☐ Site Characterization ☐ Monitoring ☐ Health & Safety ☐ Risk Assessment ☐ Disposal

☐ Remedial Design ☑ Confirmation ☐ Evaluate Remedial Alternatives

Field Parameters:

☐ VOCs (ppmv) ☐ Temperature ☐ Turbidity ☐ Dissolved Oxygen ☐ pH

☐ RedOx Potential ☐ Specific Conductivity ☐ Other:

Data Types:

☑ SW-846 ☐ TCLP ☐ SCLP ☐ Other:

Analyses:

☑ TCL VOCs ☑ TCL SVOCs ☐ STARS VOCs ☐ STARS SVOCs ☐ TICs

☐ TO-15 VOCs ☑ TAL Metals ☑ PCBs ☑ Herbicides ☑ Pesticides

☑ PFAS ☑ 1,4-Dioxane ☐ Asbestos ☐ Lead ☐ Mold

☐ Other:

QA/QC Samples:

☑ Duplicate (Split) ☑ Equipment Blank ☑ Field Blank ☑ Trip Blank (VOCs, Aqueous) ☑ MS/MSD

☐ Other:

Level of Analysis:

☐ Level I: Field Screening (portable instruments providing real-time data):

☐ Photoionization Device (PID) ☐ Groundwater Multi-Meter ☐ Dust Monitor

☐ Level II: Field Analysis (portable analytical instruments in an on-site laboratory)

☐ Level III: ASP Analytical Methods (samples to be analyzed in accordance with NYSDEC-ASP 1995)

☑ Level IV: ASP Reportables/Deliverables (NYSDEC-ASP 1995 Category B Reportables/Deliverables)

APPENDIX C

Health and Safety Plan

HEALTH AND SAFETY PLAN

Remedial Action Work Plan
The Smith Restaurant Building
City of Syracuse, New York

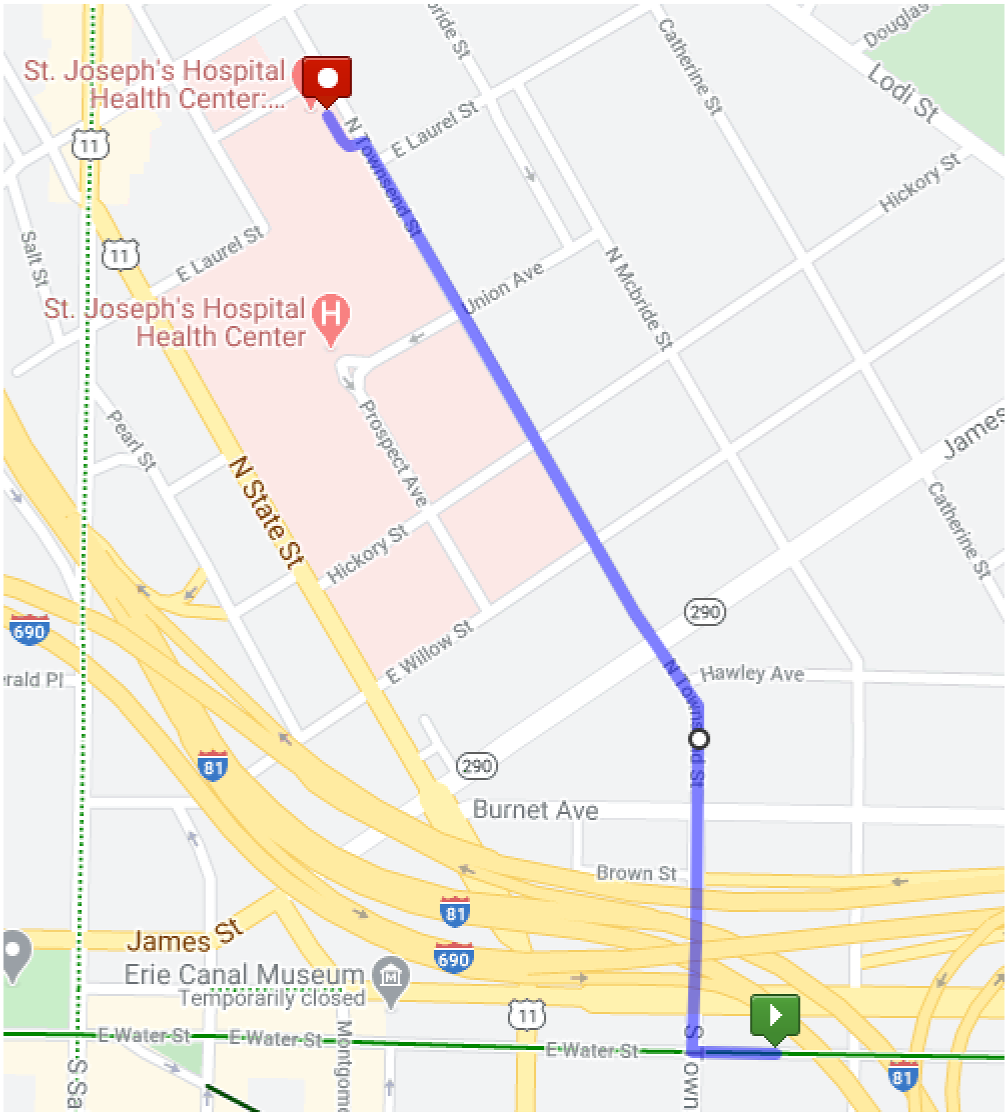
<table>
<tr><th colspan="3">EMERGENCY CONTACT NUMBERS</th></tr>
<tr><td>Emergency Response Number</td><td colspan="2">911</td></tr>
<tr><td>Poison Control Center</td><td colspan="2">(800) 222-1222</td></tr>
<tr><td>State Police (North Syracuse)</td><td colspan="2">(315) 455-2826</td></tr>
<tr><th colspan="3">NEAREST HOSPITAL</th></tr>
<tr><td>St. Joseph’s Hospital
301 Prospect Avenue
Syracuse, New York 13203</td><td colspan="2">(315) 448-5111</td></tr>
<tr><th colspan="3">OWNER</th></tr>
<tr><td>Smith Building, LLC
(315) 481-1552</td><td>Owner Representative</td><td>Matthew Paulus:
(315) 416-9566 (cell)</td></tr>
<tr><th colspan="3">ENVIRONMENTAL CONSULTANT</th></tr>
<tr><td>Bradford Engineering, DPC
(315) 529-0482</td><td>Field Team Manager</td><td>H. Nevin Bradford, P.E.</td></tr>
<tr><td rowspan="3">Asbestos & Environmental Consulting Corporation (AECC)
(315) 432-9400</td><td>Project Manager</td><td>Richard McKenna</td></tr>
<tr><td>Safety Coordinator</td><td>Bryan Airel:
(315) 416-9290 (cell)</td></tr>
<tr><td>Head Field Technician</td><td>Drew Brantner</td></tr>
<tr><th colspan="3">SITE CONTRACTOR</th></tr>
<tr><td rowspan="3">TBD</td><td>HSO</td><td>TBD</td></tr>
<tr><td>Supervisor</td><td>TBD</td></tr>
<tr><td>Operator</td><td>TBD</td></tr>
</table>

September 2020

REVISION #	DATE	SUMMARY OF REVISION

Directions to Nearest Hospital (St. Joseph's Hospital; Distance ~0.6 miles; Time ~4 minutes)

1. Travel west on East Water Street
2. Right onto South Townsend Street (road becomes North Townsend Street after crossing Erie Boulevard)
3. In approximately 0.4 mile, continue straight on North Townsend Street. **DO NOT TURN LEFT ON UNION AVENUE TO MAIN HOSPITAL FACILITY**.
4. Approximately 0.1 mile after Union Avenue, St. Joseph's Hospital Emergency Room will be on left



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ATTACHMENTS

1.0 INTRODUCTION

A Brownfield Cleanup Program site investigation is being performed at the Site (See Figure 1) as a result of the detection of petroleum compounds, chlorinated solvents, metals, and pesticides in Site soils, groundwater, and soil vapor.

This project-specific Health and Safety Plan (HASP) sets forth requirements for maintaining the health and safety of workers at the Site. This HASP addresses general health and safety issues related to the presence of specific chemical and physical hazards that may be encountered during performance of the work activities at the Site. Contractors and Subcontractors are required to prepare and maintain their own project-specific HASP that incorporates the minimum requirements of this HASP.

An Emergency Response Plan is included at the end of this Plan, which presents the procedures to be followed in the event of an emergency situation.

2.0 GENERAL DEFINITIONS

The following definitions shall apply to and are used throughout the HASP:

Contamination Reduction Zone – Area between the Exclusion Zone and Support Zone that provides a transition between contaminated and clean areas. Decontamination stations are located in this zone.

Contractor – Any contractor responsible for performing work that will disturb contaminated Site soils or involve management of other contaminated waste streams such as decontamination residues.

Environmental Consultant – A consultant to the Owner that will specialize in the environmental aspects of the project, namely preparation and implementation of the Remedial Investigation Work Plan, collection of soil samples, collection of groundwater samples, oversight of contractor activities, and decontamination of equipment at the end of the project.

Exclusion Zone – Any portion of the Site where hazardous substances are present, or may reasonably be suspected to be present, in the air, water, or soil.

HSO – The Health & Safety Officer is a qualified professional designated by the Consultant who is responsible for the execution and maintenance of the HASP.

Monitoring – The use of field instrumentation to measure the levels of contaminants. Monitoring will be conducted, if deemed necessary (i.e., excessive airborne dust and particulates), to evaluate potential exposures to chemical and physical hazards.

On-site personnel – All consultant, contractor, and subcontractor personnel working at the Site.

PPE – Personal Protective Equipment; clothing / gear worn by personnel within the work area that is designed to reduce exposure to chemical and / or physical hazards.

Project – All on-site work performed at the Site involving potentially contaminated soil disturbance (i.e., investigations and potential interim remedial measures).

Site – The subject property where the disturbance of potentially contaminated soil may occur.

Subcontractor – All subcontractors to the Contractor hired to work on this project.

Support Zone – The remainder of the Site outside of the Contamination Reduction Zone and Exclusion Zone. Support equipment is located in this zone.

Visitor – All other personnel, excluding the on-site personnel.

3.0 RESPONSIBILITIES

Implementation of the HASP will be accomplished through an integrated team effort. The following key personnel will be involved with this project:

OWNER		
Smith Building, LLC (315) 481-1552	Owner Representative	Matthew Paulus: (315) 416-9566 (cell)
ENVIRONMENTAL CONSULTANTS		
Bradford Engineering, DPC (315) 529-0482	Field Team Manager	H. Nevin Bradford, P.E.
Asbestos & Environmental Consulting Corporation (AECC) (315) 432-9400	Project Manager	Richard McKenna
	Safety Coordinator	Bryan Airel: (315) 416-9290 (cell)
	Head Field Technician	Drew Brantner
SITE CONTRACTOR		
TBD	HSO	TBD
	Supervisor	TBD
	Operator	TBD
GOVERNMENTAL AGENCIES		
NYS Department of Environmental Conservation (NYSDEC) (607) 775-2545		Gary Priscott
NYS Department of Health (NYSDOH) (518) 402-7860		Stephanie Selmer
Onondaga County Health Department (315) 435-3252		TBD

This HASP will be periodically reviewed by all parties during the project to verify that it is in accordance with the operations conducted at the Site. Changes in Site conditions or changes in the work tasks at the Site will necessitate a review and modification of the HASP. The Contractor's HSO shall contact the Environmental Consultant if site conditions change that warrant modifications to the HASP, and vise versa. Changes, modifications, and amendments to the HASP will be made in the form of addenda, and will be attached to the HASP.

All parties to the project will perform their duties in a manner consistent with generally accepted practices, and will be responsible for the following (of their own employees) during the project:

- Verification that medical examinations and training requirements for all personnel are current
- Reviewing the HASP with all on-site personnel
- Implementation and maintenance of the HASP
- Providing all on-site personnel with proper PPE
- Compliance with applicable state and federal health and safety standards

The HSO for this project is designated with the following responsibilities:

- Maintain a daily log book for recording all significant health and safety activities
- Have authority to suspend work due to health or safety-related concerns
- Provide on-site technical assistance and conduct health and safety briefings at the Site
- Verify that first aid kits, eye wash kits, and fire extinguishers are at the Site
- Verify that on-site personnel have received the necessary training and physical examinations
- Verify that on-site personnel have been provided with and are using the required PPE
- Review of the adequacy of the HASP and amend the HASP as necessary during the project
- Prepare addenda to the HASP and maintain required documents for recordkeeping purposes

4.0 SITE HAZARDS EVALUATION

4.1 CHEMICAL HAZARDS

The Site soils and groundwater have been sampled and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), pesticides, herbicides, and perfluorinated compounds (PFCs), and asbestos. In addition, soil vapor has been sampled and analyzed for VOCs; and suspect asbestos-containing building materials (ACBMs) and lead-based paints (LBPs) have been sampled and analyzed. The associated laboratory analysis and on-site observations revealed that the following chemicals / materials of concern exist at the Site:

<u>Soil / Groundwater</u>

- Petroleum compounds (VOCs and SVOCs)
- Chlorinated solvents (primarily Tetrachloroethene [PCE, Perc], Trichloroethene [TCE], and chloroform)
- Metals (primarily arsenic and lead)
- Pesticides (primarily DDT and DDD)

<u>Building Components and Miscellaneous Materials</u>

- Asbestos (limited areas)
- Lead-Based Paint
- PCB-containing caulks (2 areas, low concentrations [~1 ppm])
- Miscellaneous materials (fluorescent light tubes/ballasts, automotive products, etc.)

Applicable fact sheets and Safety Data Sheets are presented in Appendix A. For details regarding hazardous building components, refer to the Hazardous Materials Survey provided under separate cover.

Except for possible lead-based paints, concentrations of identified contaminants are not above the threshold for hazardous (TSCA) waste.

The contaminants at the Site may enter the human body in a variety of ways. The chemical routes of exposure anticipated from the remedial activities at this Site include:

<u>Absorption</u> - Dermal (skin) contact with impacted soil on-site resulting in absorption of chemicals of concern through the skin and into the blood stream. Proper use of PPE as specified later in this Plan will minimize risks of exposure at the Site.

<u>Ingestion</u> - Chemicals / materials of concern can come in direct contact with the mouth from soil or other contaminated areas (PPE, skin, tools, etc.) and enter the bloodstream through the stomach lining. Proper care in handling PPE and tools, refraining from eating and drinking at the Site, and frequent hand washing with soap and water will minimize risks of exposure.

Inhalation – Volatile vapors and/or contaminants attached to dust and particulates can be entrained by wind and become airborne across the Site and be subsequently inhaled through the nose and / or mouth. This exposure route is the most likely way for worker exposure to occur. The Contractor shall employ methods that minimize the creation of dust and utilize dust suppression techniques to minimize dust and particulates. Respirators with appropriate organic cartridges should be available to on-site workers in case volatile compounds become a nuisance or health hazard. The Contractor is responsible for any personal air monitoring of employees, as deemed necessary.

4.2 PHYSICAL HAZARDS

Based upon the anticipated field activities, the following potential hazardous conditions may exist:

- The use of typical mechanical equipment such as drill rigs and sampling vehicles can create a potential for crushing and pinching hazards due to movement and positioning of the equipment, movement of lever arms and hydraulics, and entanglement of clothing and appendages in exposed drives and tracks. Mechanical equipment can also create a potential for impact of steel tools, masts, and cables should equipment rigging fail, or other structural failures occur during hydraulic equipment operation. Heavy equipment work must be conducted only by trained, experienced personnel. If possible, personnel must remain outside the turning radius of large, moving equipment. At a minimum, personnel must maintain visual contact with the equipment operator. When not operational, equipment must be set and locked so that it cannot be activated, released, dropped, etc. The mechanical equipment stated above represents typical equipment that is ordinarily used during this scope of work, but is not meant to be an all-inclusive list. Similar precautions should be used around other mechanical equipment deployed to the Site that is not listed above.

- The contractor is responsible for ensuring compliance with OSHA’s construction standard for excavations (29 CFR 1926 Subpart P), and for designating the Competent Person responsible for selecting and implementing the appropriate protective system(s), assuring appropriate means of access and egress for excavations greater than four (4) feet in depth, and for ensuring that potential atmospheric and physical hazards associated with any excavation / trenching activities are completed in accordance with Subpart P and other applicable OSHA Standards as applicable.

- Work around large equipment often creates excessive noise. Noise can cause workers to be startled, annoyed, or distracted; cause pain, physical damage to the ear, and temporary and / or permanent hearing loss; and can interfere with communication. If workers are subjected to noise exceeding an 8-hour time-weighted average sound level of 85 dBA, hearing protection will be required with an appropriate noise reduction rating to comply with 29 CFR 1910.95 and to reduce noise levels below levels of concern.

- Personnel may be injured during physical lifting and handling of heavy equipment, construction materials, or containers.

- Personnel may encounter slip, trip, and fall hazards associated with excavations, manways, and construction debris and materials. Precautionary measures should be taken by identifying and removing slip, trip, and fall hazards prior to commencing work. In the event slip, trip, and fall hazards cannot be removed or minimized, site workers will be shown the location of the physical hazard and be asked to avoid it during work activities.

- The potential for fire and / or explosion emergencies is always present on the Site. Field vehicles will be equipped with a fire extinguisher. Employees must be trained in the proper use of fire suppression equipment. However, large fires that cannot be controlled with a fire extinguisher shall be handled by professionals. The proper authorities shall be notified in these instances.

- Persons working outdoors in temperatures at or below freezing may be subject to frostbite. Extreme cold for a short time may cause injury to exposed body surfaces or result in a profound generalized cooling which can cause death. Areas of the body such as fingers, toes, and ears, are the most susceptible to cold stress. Ambient air temperature and wind velocity are two factors which influence the development of a cold weather injury. Local injury resulting from exposure to cold temperatures is known as "frostbite." There are several degrees of damage in which frostbite of the extremities can be categorized, as follows:
  - Frost nip or incipient frostbite is characterized by sudden bleaching or whitening of the skin.
  - Superficial frostbite occurs when the skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
  - Deep frostbite is characterized by tissues that are cold, pale, and solid; this is an extremely serious injury.

- Heat stress is another potential hazard condition that may arise. Heat stress can result from a number of contributing factors, including environmental conditions, clothing, and workload as well as the physical condition of the individual. Since heat stress is one of the most common injuries / symptoms associated with outdoor work conducted with direct solar load, and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Signs and symptoms of heat-related illnesses which all on-site personnel should be aware, include the following:
  - Heat rash may result from continuous exposure to heat or humid air.
  - Heat cramps are caused by heavy sweating and may include muscle spasms and pain in the hands, feet, and abdomen.
  - Heat exhaustion is indicated by pale, cool, and moist skin; heavy sweating; dizziness; nausea; and fainting.
  - Heat stroke is indicated by red, hot, and unusually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; rapid pulse; and coma. Immediate action must be taken to cool the body before serious injury or death occurs.

- Overhead and underground utilities exist within the Work Area, which may expose workers to electrocution hazards, explosive hazards, and volatile vapors. A utility location report is provided in Attachment B.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Personnel will be required to wear Level D and Modified Level D PPE ensembles, at a minimum. The following PPE ensembles shall be worn by on-site personnel for the following tasks:

Level D Protection, as listed below, shall be worn by on-site personnel at all times when tasks are performed which DO NOT INVOLVE dermal exposure, or contact with chemical hazards:

- Standard outer garments (i.e. long pants and long-sleeve shirt)
- Durable leather steel-toed work boots

- Rubber boots worn over work boots
- Durable leather gloves
- Eye protection
- Hard hat
- Hearing protection

Modified Level D Protection, as listed below, shall be worn by on-site personnel at all times when tasks are performed which involve dermal exposure or contact with chemical hazards and/or during excavation/handling of soils or groundwater deemed hazardous waste (not currently anticipated for this project):

- Disposable coveralls worn over standard outer garments. Personnel will frequently verify the integrity of their coveralls by checking for holes or tears.
- Durable leather steel-toed work boots
- Disposable nitrile gloves. Personnel will frequently verify the integrity of their gloves by checking for holes or tears.
- Rubber boots worn over work boots
- Eye protection
- Hard hat
- Hearing protection

Respirator use is not anticipated on this project, except during abatement of asbestos and lead-based paint. In order to obtain certification, abatement workers are trained in the use of respirators on an annual basis in accordance with their employers respirator safety program. Therefore, this HASP will not cover respirator use for abatement workers.

If respiratory protection becomes necessary for other activities, a determination shall be made regarding each person’s physical ability to wear a respirator. Consequently, persons required to wear respirators must provide the Contractor’s HSO with current documentation (not older than 6 months) regarding their physical condition and ability to wear a respirator, as certified by a qualified physician. Failure to provide current, complete respirator certification documentation will be sufficient grounds to preclude personnel from conducting work activities where respiratory protection is required.

6.0 PERSONNEL TRAINING

Note that this HASP does not cover training requirements for the handling of asbestos or lead-based paint, as training for these hazards are incorporated under separate programs governed by the USEPA, NYSDOH, and NYSDOL.

6.1 REQUIREMENTS AND RESPONSIBILITIES

All on-site personnel and visitors will be trained commensurate with their job responsibilities and in accordance with Occupational Safety and Health Administration (OSHA) training and medical surveillance requirements as specified in 29 CFR 1910.120. The Contractor is responsible for providing such training prior to personnel being allowed to engage in activities that could expose them to health and safety hazards. The HSO has the responsibility to assure that this training is provided for the site-conditions and such training is updated, as needed. The HSO and Contractor’s on-site Supervisor will be trained in basic first aid, and at least one of these individuals will be present during each work shift while personnel are at the Site.

6.2 SITE ORIENTATION MEETING

The Contractor will be responsible for notifying all on-site personnel of required attendance at a site orientation meeting, which will be organized by the Contractor's HSO. Any subcontractor personnel will also be required to attend the site orientation meeting as well as any other periodic health and safety meeting specified by the HSO. Personnel attending the site orientation meeting are to sign a Site Orientation Meeting Attendance Acknowledgment Form. The following is a listing of general site orientation training topics:

- Names and responsibilities of key personnel
- Safe work practices
- Personal protective equipment
- Chemical and physical hazards
- Site equipment Medical surveillance
- Site hazards
- Site control measures
- Decontamination procedures
- Standard operating procedures
- Emergency response plan

6.3 DOCUMENTATION / RECORDKEEPING

OSHA regulations require medical surveillance in the form of annual medical examinations for certain types of work involving exposure to hazardous or toxic substances. All on-site personnel, visitors, and subcontractors are required to have documented proof on file of OSHA training and medical surveillance requirements as specified in 29 CFR 1910.120 to demonstrate compliance with the training requirements specified in this Section. The HSO is responsible to check all personnel to ensure training is kept current during the project.

7.0 MEDICAL CLEARANCE

Medical clearance refers to OSHA requirements for annual physical reports performed by a licensed physician, which document a worker's physical ability to perform specific job duties. Medical clearance is not required for on-site personnel or visitors at the Site, except for OSHA medical surveillance requirements for workers within the Exclusion Zone or Contamination Reduction Zone.

8.0 STANDARD OPERATING PROCEDURES

Potential chemical and physical hazards exist at the Site. This Section presents Standard Operating Procedures (SOPs) that will be followed during the project. Specific precautions to avoid the potential hazards for each task are presented herein.

8.1 GENERAL SOPS

Workers shall adhere to the established SOP for their respective specialties. Work at the Site will be conducted according to established procedures and guidelines for the safety and health of all involved. General SOPs at the Site include the following:

- All questions should be referred to the Contractor's HSO or Project Manager.

- All on-site personnel will be trained and briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.
- Inspections of the Site will be conducted to ensure compliance with the HASP, and if any change in operation occurs, the HASP will be modified to reflect any change.
- Be observant of not only one's own immediate surrounding but also that of others.
- On-site personnel in the work zone will act as safety backup to each other, and on-site personnel outside the work zone will provide emergency assistance when necessary.
- Use extra precautions when working near heavy equipment.
- Communications using hand signals or other means will be maintained between on-site personnel, the HSO, and the Project Manager at all times.
- Breaks should be planned to prevent heat, cold, stresses, accidents, and fatigue.
- Work areas for various operational activities will be established.
- Strict pedestrian and vehicular traffic control will be maintained on-site.
- Entrance / exit locations and emergency escape routes will be designated and delineated.
- On-site personnel and equipment in each Work Area will be minimized to maintain effective Site operations.
- Required PPE ensembles must be worn by all on-site personnel entering work areas designated for wearing PPE. At minimum, hard hat, safety glasses, steel-toe boots, durable leather gloves, and hearing protection will be worn on the project Site.
- Work Areas and decontamination procedures will be established based on expected Site conditions.
- Plan work procedures and decontamination areas to minimize contamination exposure.
- Contaminated equipment shall not be placed on unprotected surfaces.
- Procedures for leaving a Work Area will be planned prior to entering the Site.
- All electrical equipment (power tools, extension cords, instruments, etc.) will conform to 29 CFR 1926.400 Subpart K.
- Fire prevention and protection (appropriate signs for flammable liquids, smoking areas, storage areas of combustible or flammable materials, etc.) will be in accordance with OSHA 29 CFR 1926.150 Subpart F.
- Workers shall not enter areas containing asbestos debris, or handle/disturb asbestos-containing materials
- Workers shall not handle/disturb known or potential lead-based paints

Violation of these SOPs may result in immediate dismissal from the Site.

8.2 SITE CONTROL MEASURES

Site control measures will minimize potential contamination of on-site personnel, protect the public from potential on-site hazards, and prevent vandalism of equipment and materials. Site control measures also enhance response in emergency situation. For this project, the primary site control measure will be a temporary fence or other barrier installed along the Site boundary for the duration of the project.

Areas where intrusive work will occur will be routinely divided into three distinct areas: an Exclusion Zone, a Contamination Reduction Zone (CRZ), and a Support Zone.

Exclusion Zone

The Exclusion Zone will be designated as the area where the highest potential for exposure by dermal or inhalation routes exists. The Exclusion Zone coincides with areas being excavated. PPE is required and a daily log will be kept of all personnel entering this zone.

The Exclusion Zone for work areas will be demarcated with barrier tape. Approval for entry into the Exclusion Zone will require compliance with OSHA training and medical surveillance requirements (29 CFR 1910.120). Subcontractor and vendor equipment will not be permitted to enter the Exclusion Zone without prior authorization and will be subject to Site decontamination procedures. All personnel and equipment shall be decontaminated when leaving the Exclusion Zone. No eating, drinking, or smoking will be permitted in the Exclusion Zone.

Contamination Reduction Zone (CRZ)

The Contractor will establish the CRZ in an area between the Exclusion Zone and Support Zone. Approval for entry into the CRZ will require compliance with OSHA training and medical surveillance requirements (29 CFR 1910.120). Access to the Exclusion Zone will be through the CRZ. The CRZ will be designated as the area immediately adjacent to and surrounding the Exclusion Zone. The probability of dermal and inhalation exposure is lower in the CRZ than in the Exclusion Zone. The CRZ includes facilities for personnel and equipment decontamination. PPE worn in the Exclusion Zone may not be worn outside the CRZ, except during emergencies. No eating, drinking, or smoking will be permitted in the CRZ.

Support Zone

The Support Zone includes all areas outside the CRZ and Loading Zone. The exposure potential in the Support Zone is minimal. The Support Zone provides a changing area for personnel entering the CRZ and Exclusion Zone, as well as an area for the storage of clean equipment and materials. Protective clothing worn in the Exclusion Zone will not be allowed to be worn in the Support Zone, except in emergencies. It is the responsibility of the Project Manager to control access to the Site and to assure proper security. Any evidence of unauthorized entry will be noted in the daily log.

Under no circumstances will the general public be permitted to access the work area. All preapproved visitors will be briefed on the HASP, and shall sign the Daily Site Sign-In / Sign-Out Log. Pre-approved visitors will be permitted in the immediate area of active operations only with approval from the Contractor's HSO or Project Manager. All personal vehicles are restricted to the Support Zone.

8.3 COMMUNICATION PROCEDURES

Personnel in the Exclusion Zone will remain within sight of other project personnel. The commonly used international hand and arm signals are listed below, and will be used when necessary:

Signal	**Meaning**
Right hand thumbs up	OK, I'm All Right
Right hand thumbs down	No, Negative
Rotating both hands at sides	Situation Under Control
Rotating both hands above head	Need Assistance
Hand gripping throat	Out of Air, Cannot Breathe
Both hands placed on hips	Leave Area Immediately
Rotating both hands at knees	Situation Grave, Evacuate Immediately
Both hands placed on top of head	Returning to Support Zone

8.4 DECONTAMINATION PROCEDURES

On-site personnel performing remediation tasks under the Modified Level D PPE ensemble will perform decontamination operations in accordance with the following steps:

- Remove re-usable boot covers, or discard disposable boot covers.
- Remove coveralls first (if applicable), then remove nitrile gloves and place in the disposal container staged in the CRZ. All disposable PPE (gloves, coveralls), rags, cloths, etc. will be containerized separately from general refuse, and disposed of in accordance with the applicable regulations.
- Remove and discard inner gloves.
- Proceed to the Support Zone bringing decontaminated tools and sampling containers.
- Wash hands, face, and other exposed skin with soap and water. Shower and shampoo as soon as possible at the end of the work day, before any social activities.
- Place non-disposable coveralls in plastic bags prior to leaving the Site and prior to entering any vehicle.
- Launder non-disposable clothing worn in Exclusion Zone prior to reuse, separately from other laundry items. Impermeable items such as vinyl boots do not need to be laundered prior to reuse; however, they should either be kept in the CRZ or placed in a sealed container prior to leaving the CRZ.

8.5 PERIODIC HEALTH AND SAFETY MEETINGS

The HSO will conduct weekly health and safety meetings. These meetings will be a review of existing protocols as well as a means to update personnel on new Site conditions. The meetings will also provide an opportunity for on-site personnel to discuss health and safety concerns. Topics for discussion may include, but are not limited to, the following:

- Review of the type and frequency of environmental and personal monitoring
- Task-specific levels of protection and anticipated potential for upgrading
- Review of existing and new health and safety issues
- Review of emergency procedures

9.0 ACCIDENT AND EMERGENCY RESPONSE PLAN

This Section includes procedures and methods of evaluating and addressing medical, fire, and other emergency situations which may occur at the Site. In any unknown situation, always assume the worst conditions and plan responses accordingly. All emergency situations require concise and timely actions conducted in a manner that minimizes the health and safety risks to on-site personnel and to the public. All on-site personnel shall be familiar with the Emergency Response Plan.

9.1 RESPONSIBILITIES

The Contractor's HSO has the responsibility for directing response activities in the event of an emergency or accident, and will be responsible for the following:

- Assess the situation
- Determine required response measures
- Notify appropriate response teams
- Direct on-site personnel during the emergency

The Contractor's HSO will coordinate the response activities of on-site personnel with those of public agencies. A list of agencies to be contacted and who may, depending on the nature of the situation, assume authority for emergency response is presented in Section 9.6. This table includes names and telephone numbers of local hospitals, ambulance service, fire and police departments, and other applicable agencies. The HSO will notify emergency response agencies and establish emergency procedures prior to commencing remedial activities at the Site.

9.2 EMERGENCY PROCEDURES

Due to the nature of the tasks to be conducted at the Site, the emergency situations that may occur are most likely limited to personnel accidents (i.e., slip, trip, and fall accidents; equipment related accidents, etc.) requiring first aid. The following procedures shall be followed in the event of an emergency:

- On-site personnel shall report all accidents and unusual events to the HSO.
- The HSO will assess the situation. If off-site assistance and medical treatment is required, the HSO will designate a person to call the proper authorities.
- First-aid or other applicable treatment will be provided by properly trained individuals.

The HSO will inform the Owner of the injury/accident, and an Accident Report Form detailing the causes and consequences of the injury/accident will be submitted to the Project Manager within 48 hours of the incident. The Accident Report Form shall include:

- Names and social security numbers of accident victims and witnesses
- Date and time of accident
- Location, cause, and duration of accident
- A description of corrective actions implemented
- Off-site persons and agencies notified and time of arrival at the Site.

Personnel shall make all reasonable attempts to conduct themselves in a calm manner in the event of an accident.

9.3 ACCIDENT AND INJURIES

Every accident is a unique event that must be dealt with by trained personnel working in a calm, controlled manner. In the event of an accident, the prime consideration is to provide the appropriate initial response to assist those in jeopardy without placing additional personnel at unnecessary risk. Several types of emergencies are outlined in the following subsections. These are not intended to cover all emergency situations.

If a person working on the Site is physically injured, basic first-aid procedures will be followed. Depending on the severity of the injury, outside medical assistance may be sought. If the person can be moved, the person will be taken outside of the Work Area, PPE will be removed, and first aid administered. If necessary, transportation to a medical facility will be provided. If the person can only be moved by emergency medical personnel, the HSO will decide what type of PPE (if any) will be required to be worn by emergency personnel.

If the injury to on-site personnel involves chemical exposure, the following first aid procedures will be initiated as soon as possible:

Eye Exposure - If solid or liquid gets into the eyes, wash eyes immediately at the emergency eyewash station using water and lifting the lower and upper lids occasionally. This emergency eyewash station shall be a portable station provided by the Contractor and set up within the CRZ. If an acute exposure is identified, then obtain medical attention immediately. Otherwise, consultation with a doctor shall be discretionary based on the severity of the incident.

Skin Exposure - If solid or liquid gets on the skin causing irritation or pain, wash skin immediately at the emergency eyewash station using water. If an acute exposure is identified, then obtain medical attention immediately. Otherwise, consultation with a doctor shall be discretionary based on the severity of the incident.

Inhalation – In the rare event that a person inhales large amounts of organic vapor or dust, and is overcome, move the person to fresh air at once. Obtain medical attention immediately. If breathing has stopped, appropriately trained personnel and/or medical personnel should perform cardiopulmonary resuscitation. Keep the affected person warm and at rest.

Ingestion - If solid or liquid is swallowed, medical attention must be obtained immediately and the Poison Control Center consulted.

9.4 FIRE

On-site personnel will be knowledgeable in fire-extinguishing techniques. They will be instructed in proper use and maintenance of the fire extinguishers supplied at the work areas. Fire extinguishers should be used only for small fires which are in the early stages of development. Where the fire cannot be controlled through extinguisher use, the area should be evacuated immediately, and the local fire department should be called to extinguish the fire. Fire extinguishers shall be provided by the Contractor.

9.5 EMERGENCY EVACUATION

In extraordinary circumstances, emergency evacuation of the Site may be necessary. On-site personnel will be notified of the need to evacuate verbally or by signaling with an air horn or similar signaling device. If the situation is deemed an emergency, personnel will be instructed to leave the Site immediately, using the closest available evacuation route; otherwise, personnel will be expected to go through normal decontamination procedures before leaving the Site.

In either case, personnel will be instructed to meet at a central location to be determined by the HSO prior to the start of Work. A head count will be made to ensure that all personnel are safe and accounted for.

The HSO will contact appropriate response agencies, as warranted. Motorized equipment / machinery will be shut off before the Site is evacuated.

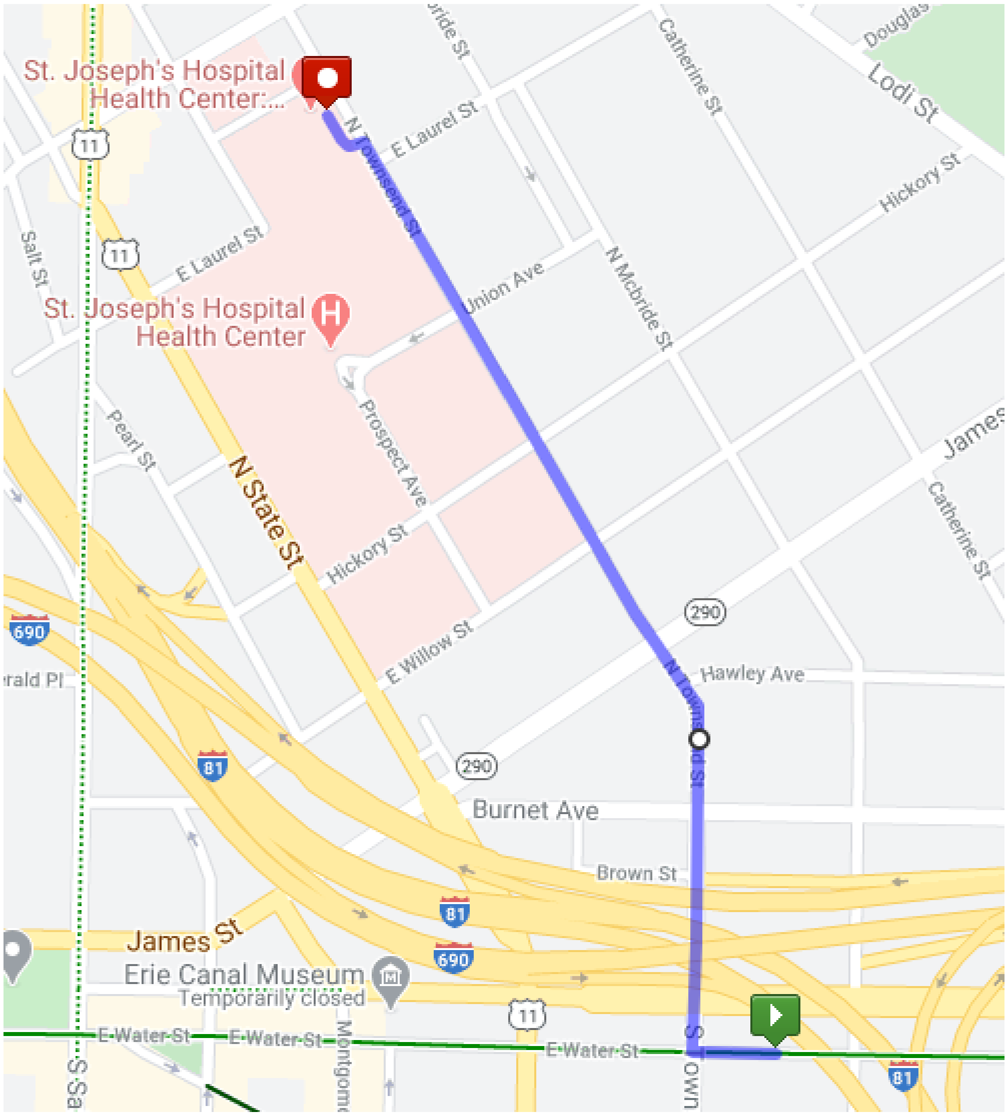
9.6 EMERGENCY RESPONSE AND AREA HOSPITALS

In case of emergency, call 911 or the appropriate individual authority:

EMERGENCY CONTACT NUMBERS	
Nearest Hospital	St. Joseph’s Hospital 301 Prospect Avenue Syracuse, New York 13203
Emergency Response Number	911
Poison Control Center	(800) 222-1222
State Police (North Syracuse)	(315) 455 2826

Directions to Nearest Hospital (St. Joseph's Hospital; Distance ~0.6 miles; Time ~4 minutes)

5. Travel west on East Water Street
6. Right onto South Townsend Street (road becomes North Townsend Street after crossing Erie Boulevard)
7. In approximately 0.4 mile, continue straight on North Townsend Street. **DO NOT TURN LEFT ON UNION AVENUE TO MAIN HOSPITAL FACILITY**.
8. Approximately 0.1 mile after Union Avenue, St. Joseph's Hospital Emergency Room will be on left



ATTACHMENT A

Fact Sheets and Safety Data Sheets

Benzene - ToxFAQs™

CAS # 71-43-2

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHTLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 1,000 of the 1,684 National Priority List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is benzene?

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and other synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include emissions from volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.
- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

How might I be exposed to benzene?

- Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- Vapors (or gases) from products that contain benzene, such as glues, paints, furniture wax, and detergents, can also be a source of exposure.
- Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- Working in industries that make or use benzene.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effect of benzene from long-term exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection. Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries, but we do not know for certain that benzene caused the effects. It is not known whether benzene will affect fertility in men.

How likely is benzene to cause cancer?

Long-term exposure to high levels of benzene in the air can cause leukemia, particularly acute myelogenous leukemia, often referred to as AML. This is a cancer of the bloodforming organs. The Department of Health and Human Services (DHHS) has determined that benzene is a known carcinogen. The International Agency for Research on Cancer (IARC) and the EPA have determined that benzene is carcinogenic to humans.

How can benzene affect children?

Children can be affected by benzene exposure in the same ways as adults. It is not known if children are more susceptible to benzene poisoning than adults.

Benzene can pass from the mother's blood to a fetus. Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How can families reduce the risks of exposure to benzene?

Benzene exposure can be reduced by limiting contact with gasoline and cigarette smoke. Families are encouraged not to smoke in their house, in enclosed environments, or near their children.

Is there a medical test to determine whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is a test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood; however, since benzene disappears rapidly from the blood, this test is only useful for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. The metabolite S-phenylmercapturic acid in urine is a sensitive indicator of benzene exposure. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 5 parts benzene per billion parts of water (5 ppb).

The Occupational Safety and Health Administration (OSHA) has set limits of 1 part benzene per million parts of workplace air (1 ppm) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR) 2007. Toxicological Profile for Benzene (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636

ToxFAQs^{TM} Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Chloroform - ToxFAQs™

CAS # 67-66-3

This fact sheet answers the most frequently asked health questions (FAQs) about chloroform. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to chloroform can occur when breathing contaminated air or when drinking or touching the substance or water containing it. Breathing chloroform can cause dizziness, fatigue, and headaches. Breathing chloroform or ingesting chloroform over long periods of time may damage your liver and kidneys. It can cause sores if large amounts touch your skin. This substance has been found in at least 717 of the 1,430 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is chloroform?

(Pronounced klôr′ə-fôrm′)

Chloroform is a colorless liquid with a pleasant, nonirritating odor and a slightly sweet taste. It will burn only when it reaches very high temperatures.

In the past, chloroform was used as an inhaled anesthetic during surgery, but it isn't used that way today. Today, chloroform is used to make other chemicals and can also be formed in small amounts when chlorine is added to water.

Other names for chloroform are trichloromethane and methyl trichloride.

What happens to chloroform when it enters the environment?

- Chloroform evaporates easily into the air.
- Most of the chloroform in air breaks down eventually, but it is a slow process.
- The breakdown products in air include phosgene and hydrogen chloride, which are both toxic.
- It doesn't stick to soil very well and can travel through soil to groundwater.
- Chloroform dissolves easily in water and some of it may break down to other chemicals.
- Chloroform lasts a long time in groundwater.
- Chloroform doesn't appear to build up in great amounts in plants and animals.

How might I be exposed to chloroform?

- Drinking water or beverages made using water containing chloroform.
- Breathing indoor or outdoor air containing it, especially in the workplace.
- Eating food that contains it.
- Skin contact with chloroform or water that contains it, such as in swimming pools.

How can chloroform affect my health?

Breathing about 900 parts of chloroform per million parts air (900 ppm) for a short time can cause dizziness, fatigue, and headache. Breathing air, eating food, or drinking water containing high levels of chloroform for long periods of time may damage your liver and kidneys. Large amounts of chloroform can cause sores when chloroform touches your skin.

It isn't known whether chloroform causes reproductive effects or birth defects in people.

Animal studies have shown that miscarriages occurred in rats and mice that breathed air containing 30 to 300 ppm chloroform during pregnancy and also in rats that ate chloroform during pregnancy. Offspring of rats and mice that breathed chloroform during pregnancy had birth defects. Abnormal sperm were found in mice that breathed air containing 400 ppm chloroform for a few days.

Chloroform

CAS # 67-66-3

How likely is chloroform to cause cancer?

The Department of Health and Human Services (DHHS) has determined that chloroform may reasonably be anticipated to be a carcinogen.

Rats and mice that ate food or drank water with chloroform developed cancer of the liver and kidneys.

Is there a medical test to show whether I've been exposed to chloroform?

Although the amounts of chloroform in the air that you exhale and in blood, urine, and body tissues can be measured, there is no reliable test to determine how much chloroform you have been exposed to or whether you will experience any harmful effects.

The measurement of chloroform in body fluids and tissues may help to determine if you have come into contact with large amounts of chloroform, but these tests are useful for only a short time after you are exposed. Chloroform in your body might also indicate that you have come into contact with other chemicals.

Has the federal government made recommendations to protect human health?

The current EPA drinking water limit for total trihalomethanes, a class of chemicals that includes chloroform, is 80 micrograms per liter of water (80µg/L).

The EPA requires that spills or accidental releases of 10 pounds or more of chloroform into the environment be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set the maximum allowable concentration of chloroform in workroom air during an 8-hour workday in a 40-hour workweek at 50 ppm.

Glossary

Carcinogenicity: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Ingesting: Taking food or drink into your body.

Microgram (µg): One millionth of a gram.

Miscarriage: Pregnancy loss.

ppm: Parts per million.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1997. Toxicological Profile for Chloroform. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Lead - ToxFAQs™

What is lead?

Lead is a naturally occurring metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment, including air, water and soil. Lead can exist in many different chemical forms.

Lead is used in the production of batteries, ammunition, and metal products (solder and pipes). Because of health concerns, use of lead in paints, ceramic products, caulking, and pipe solder has been dramatically reduced. The use of lead as an additive to automobile gasoline was banned in 1996 in the United States.

What happens to lead in the environment?

- Lead is an element and, therefore, it does not break down.
- When lead is released to the air, it may be transported long distances before it deposits onto the ground.
- Once deposited, lead often adheres to soil particles.
- Lead in soil can be transported into groundwater, but the amount of lead that moves into groundwater will depend on the chemical form of lead and soil type.

How can I be exposed to lead?

- Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder which can leach into the water.
- Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can form lead dust which can be ingested.
- Spending time in areas where the soil is contaminated with lead.
- Working in a job where lead is used or participating in certain hobbies in which lead is used, such as making stained glass.
- Using health-care products or folk remedies that contain lead.

> Lead can affect almost every organ and system in your body

How can lead affect my health?

The effects of lead are the same whether it enters the body through inhalation or ingestion. Lead can affect almost every organ and system in your body. The nervous system is the main target for lead toxicity in adults and children. Long-term exposure can result in decreased learning, memory, and attention and weakness in fingers, wrists, or ankles. Lead exposure can cause anemia and damage to kidneys. It can also cause increases in blood pressure, particularly in middle-aged and older individuals. Exposure to high lead levels can severely damage the brain and kidneys and can cause death. In pregnant women, exposure to high levels of lead may cause a miscarriage. High-level exposure in men can damage reproductive organs.

Lead

How can lead affect children?

Children are more vulnerable to lead poisoning than adults because their nervous system is still developing. Children can be exposed to lead in their environment and prior to birth from lead in their mother's body. At lower levels of exposure, lead can decrease mental development, with effects on learning, intelligence and behavior. Physical growth may also be decreased. A child who swallows large amounts of lead may develop anemia, severe stomachache, muscle weakness, and brain damage. Exposure to lead during pregnancy can result in premature births. Some effects of lead may persist into adulthood.

Can lead cause cancer?

There have been several agencies and organizations both in the United States and internationally that have reviewed studies and made an assessment about whether lead can cause cancer.

- The Department of Health and Human Services (HHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens
- The U.S. Environmental Protection Agency (EPA) has classified lead as a probable human carcinogen.
- The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans, and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

Can I get a medical test to check for lead?

A blood test is available to measure the amount of lead in your blood. Blood tests are commonly used to screen children for lead poisoning. Your doctor can draw blood samples and send them to appropriate laboratories for analysis.

How can I protect my family from lead exposure?

- Avoid exposure to sources of lead.
- Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.
- If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Want more information?

Go to ATSDR's Toxicological Profile for Lead

CDC Lead Poisoning Prevention Program https://www.cdc.gov/nceh/lead/default.htm

Environmental Protection Agency https://www.epa.gov/lead/protect-your-family-exposures-lead

Call **CDC-INFO** at 1-800-232-4636, or submit your question online at https://wwwn.cdc.gov/dcs/ContactUs/Form

Go to ATSDR's Toxic Substances Portal: http://www.atsdr.cdc.gov/substances/index.asp

If you have any more questions or concerns, you can also find & contact your ATSDR Regional Representative at http://www.atsdr.cdc.gov/DRO/dro_org.html

Tetrachloroethylene - ToxFAQs™

CAS # 127-18-4

This fact sheet answers the most frequently asked health questions (FAQs) about tetrachloroethylene. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Tetrachloroethylene is a manufactured chemical used for dry cleaning and metal degreasing and in the aerospace industry. Exposure to very high concentrations of tetrachloroethylene can cause dizziness headaches, sleepiness, incoordination confusion, nausea, unconsciousness, and even death. Tetrachloroethylene has been found in at least 949 of the 1,854 National Priorities List sites identified by U.S. Environmental Protection Agency (EPA).

What is tetrachloroethylene?

Tetrachloroethylene is a nonflammable colorless liquid. Other names for tetrachloroethylene include perchloroethylene, PCE, perc, tetrachloroethene, and perchlor. Most people can smell tetrachloroethylene when it is present in the air at a level of 1 part in 1 million parts of air (1 ppm) or more.

Tetrachloroethylene is used as a dry cleaning agent and metal degreasing solvent. It is also used as a starting material (building block) for making other chemicals and is used in some consumer products.

What happens to tetrachloroethylene when it enters the environment?

- Tetrachloroethylene can be released into air, water, and soil at places where it is produced or used.
- Tetrachloroethylene breaks down very slowly in the air and so it can be transported long distances in the air. Half of the amount in the air will degrade in approximately 100 days.
- Tetrachloroethylene evaporates quickly from water into air. It is generally slow to break down in water.
- Tetrachloroethylene may evaporate quickly from shallow soils or may filter through the soil and into the groundwater below. It is generally slow to break down in soil.

How might I be exposed to tetrachloroethylene?

- When you bring clothes from the dry cleaners, they will release small amounts of tetrachloroethylene into the air.
- When you drink water containing tetrachloroethylene, you are exposed to it. You might also be exposed to tetrachloroethylene that is released into the air during showering and bathing.
- People residing near contaminated sites or dry cleaning locations may be exposed to higher levels than the general population.
- People working in the dry cleaning industries or using metal degreasing products may be exposed to elevated levels of tetrachloroethylene.

How can tetrachloroethylene affect my health?

Breathing high levels of tetrachloroethylene for a brief period may cause dizziness or drowsiness, headache, and incoordination; higher levels may cause unconsciousness and even death.

Exposure for longer periods to low levels of tetrachloroethylene may cause changes in mood, memory, attention, reaction time, and vision.

Studies in animals exposed to tetrachloroethylene have shown liver and kidney effects, and changes in brain chemistry, but we do not know what these findings mean for humans.

Tetrachloroethylene

CAS # 127-18-4

How likely is tetrachloroethylene to cause cancer?

Studies in humans suggest that exposure to tetrachloroethylene might lead to a higher risk of getting bladder cancer, multiple myeloma, or non-Hodgkin's lymphoma.

In animals, tetrachloroethylene has been shown to cause cancers of the liver, kidney, and blood system.

The Department of Health and Human Services (DHHS) considers tetrachloroethylene to be reasonably anticipated to be a human carcinogen. EPA considers tetrachloroethylene likely to be carcinogenic to humans by all routes of exposure. The International Agency for Research on Cancer (IARC) considers tetrachloroethylene probably carcinogenic to humans.

How can tetrachloroethylene affect children?

It is not known whether children are more susceptible than adults to the effects of tetrachloroethylene.

A few studies in humans have suggested that exposure to tetrachloroethylene increased the numbers of babies with birth defects, but these studies were not large enough to clearly answer the question. Studies in animals exposed by inhalation or stomach tube have not shown clear evidence of specific birth defects.

How can families reduce the risk of exposure to tetrachloroethylene?

- Tetrachloroethylene has been found in low levels in some food. You can minimize the risk of your family's exposure by peeling and thoroughly washing fruits and vegetables before cooking.
- Use bottled water if you have concerns about the presence of tetrachloroethylene in your tap water. You may also contact local drinking water authorities and follow their advice.
- Prevent children from playing in dirt or eating dirt if you live near a waste site that has tetrachloroethylene.
- Tetrachloroethylene is widely used as a scouring solvent that removes oils from fabrics, as a carrier solvent, as a fabric finish or water repellant, and as a metal degreaser/cleaner. Follow instructions on product labels to minimize exposure to tetrachloroethylene.

Is there a medical test to determine whether I've been exposed to tetrachloroethylene?

Tetrachloroethylene and its breakdown products (metabolites) can be measured in blood and urine. However, the detection of tetrachloroethylene or its metabolites cannot predict the kind of health effects that might develop from that exposure. Because tetrachloroethylene and its metabolites leave the body fairly rapidly, the tests need to be conducted within days after exposure.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set an 8-hour time weighted average permissible exposure limit of 100 ppm, an acceptable ceiling exposure limit of 200 ppm, and a maximum peak of 300 ppm (not to be exceeded for more than 5 minutes of any 3-hour period).

The National Institute for Occupational Safety and Health (NIOSH) recommends that workplace exposure to tetrachloroethylene be minimized due to concerns about its carcinogenicity.

Reference

This ToxFAQs™ information is taken from the 2019 Toxicological Profile for Tetrachloroethylene produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636

ToxFAQs™ on the web: www.atsdr.cdc.gov/ToxFAQs

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Trichloroethylene - ToxFAQs™

CAS # 79-01-6

This fact sheet answers the most frequently asked health questions (FAQs) about trichloroethylene. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Trichloroethylene is used as a solvent for cleaning metal parts. Exposure to very high concentrations of trichloroethylene can cause dizziness headaches, sleepiness, incoordination, confusion, nausea, unconsciousness, and even death. Trichloroethylene has been found in at least 1,051 of the 1,854 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is trichloroethylene?

Trichloroethylene is a colorless, volatile liquid. Liquid trichloroethylene evaporates quickly into the air. It is nonflammable and has a sweet odor.

The two major uses of trichloroethylene are as a solvent to remove grease from metal parts and as a chemical that is used to make other chemicals, especially the refrigerant, HFC-134a.

What happens to trichloroethylene when it enters the environment?

- Trichloroethylene can be released to air, water, and soil at places where it is produced or used.
- Trichloroethylene is broken down quickly in air.
- Trichloroethylene breaks down very slowly in soil and water and is removed mostly through evaporation to air.
- It is expected to remain in groundwater for long time since it is not able to evaporate.
- Trichloroethylene does not build up significantly in plants or animals.

How might I be exposed to trichloroethylene?

- Breathing trichloroethylene in contaminated air.
- Drinking contaminated water.
- Workers at facilities using this substance for metal degreasing are exposed to higher levels of trichloroethylene.
- If you live near such a facility or near a hazardous waste site containing trichloroethylene, you may also have higher exposure to this substance.

How can trichloroethylene affect my health?

Trichloroethylene was once used as an anesthetic for surgery. Exposure to moderate amounts of trichloroethylene may cause headaches, dizziness, and sleepiness; large amounts may cause coma and even death. Eating or breathing high levels of trichloroethylene may damage some of the nerves in the face. Exposure to high levels can also result in changes in the rhythm of the heartbeat, liver damage, and evidence of kidney damage. Skin contact with concentrated solutions of trichloroethylene can cause skin rashes. There is some evidence exposure to trichloroethylene in the work place may cause scleroderma (a systemic autoimmune disease) in some people. Some men occupationally-exposed to trichloroethylene and other chemicals showed decreases in sex drive, sperm quality, and reproductive hormone levels.

How likely is trichloroethylene to cause cancer?

There is strong evidence that trichloroethylene can cause kidney cancer in people and some evidence for trichloroethylene-induced liver cancer and malignant lymphoma. Lifetime exposure to trichloroethylene resulted in increased liver cancer in mice and increased kidney cancer and testicular cancer in rats.

The Department of Health and Human Services (DHHS) considers trichloroethylene to be a known human carcinogen. The International Agency for Research on Cancer (IARC) classified trichloroethylene as carcinogenic to humans. The EPA has characterized trichloroethylene as carcinogenic to humans by all routes of exposure.

Trichloroethylene

CAS # 79-01-6

How can trichloroethylene affect children?

It is not known whether children are more susceptible than adults to the effects of trichloroethylene.

Some human studies indicate that trichloroethylene may cause developmental effects such as spontaneous abortion, congenital heart defects, central nervous system defects, and small birth weight. However, these people were exposed to other chemicals as well.

In some animal studies, exposure to trichloroethylene during development caused decreases in body weight, increases in heart defects, changes to the developing nervous system, and effects on the immune system.

How can families reduce the risk of exposure to trichloroethylene?

- Avoid drinking water from sources that are known to be contaminated with trichloroethylene. Use bottled water if you have concerns about the presence of chemicals in your tap water. You may also contact local drinking water authorities and follow their advice.
- Prevent children from playing in dirt or eating dirt if you live near a waste site that has trichloroethylene.
- Trichloroethylene is used in many industrial products. Follow instructions on product labels to minimize exposure to trichloroethylene.

Is there a medical test to determine whether I've been exposed to trichloroethylene?

Trichloroethylene and its breakdown products (metabolites) can be measured in blood and urine. However, the detection of trichloroethylene or its metabolites cannot predict the kind of health effects that might develop from that exposure. Because trichloroethylene and its metabolites leave the body fairly rapidly, the tests need to be conducted within days after exposure.

Has the federal government made recommendations to protect human health?

The EPA set a maximum contaminant goal (MCL) of 0.005 milligrams per liter (mg/L; 5 ppb) as a national primary drinking standard for trichloroethylene.

The Occupational Safety and Health Administration (OSHA) set a permissible exposure limit (PEL) of 100 ppm for trichloroethylene in air averaged over an 8-hour work day, an acceptable ceiling concentration of 200 ppm provided the 8 hour PEL is not exceeded, and an acceptable maximum peak of 300 ppm for a maximum duration of 5 minutes in any 2 hours.

The National Institute for Occupational Safety and Health (NIOSH) considers trichloroethylene to be a potential occupational carcinogen and established a recommended exposure limit (REL) of 2 ppm (as a 60-minute ceiling) during its use as an anesthetic agent and 25 ppm (as a 10-hour TWA) during all other exposures.

Reference

This ToxFAQs™ information is taken from the 2019 Toxicological Profile for Trichloroethylene produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636

ToxFAQs^{TM} on the web: www.atsdr.cdc.gov/ToxFAQs

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

DDT, DDE, and DDD - ToxFAQs™

CAS # 50-29-3, 72-55-9, 72-54-8

This fact sheet answers the most frequently asked health questions (FAQs) about DDT, DDE, and DDD. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to DDT, DDE, and DDD occurs mostly from eating foods containing small amounts of these compounds, particularly meat, fish and poultry. High levels of DDT can affect the nervous system causing excitability, tremors and seizures. In women, DDE can cause a reduction in the duration of lactation and an increased chance of having a premature baby. DDT, DDE, and DDD have been found in at least 442 of the 1,613 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What are DDT, DDE, and DDD?

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that contaminate commercial DDT preparations. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned. One form of DDD has been used medically to treat cancer of the adrenal gland.

What happens to DDT, DDE, and DDD when they enter the environment?

- DDT entered the environment when it was used as a pesticide; it still enters the environment due to current use in other countries.
- DDE enters the environment as contaminant or breakdown product of DDT; DDD also enters the environment as a breakdown product of DDT.
- DDT, DDE, and DDD in air are rapidly broken down by sunlight. Half of what's in air breaks down within 2 days.
- They stick strongly to soil; most DDT in soil is broken down slowly to DDE and DDD by microorganisms; half the DDT in soil will break down in 2–15 years, depending on the type of soil.
- Only a small amount will go through the soil into groundwater; they do not dissolve easily in water.
- DDT, and especially DDE, build up in plants and in fatty tissues of fish, birds, and other animals.

How might I be exposed to DDT, DDE, and DDD?

- Eating contaminated foods, such as root and leafy vegetables, fatty meat, fish, and poultry, but levels are very low.
- Eating contaminated imported foods from countries that still allow the use of DDT to control pests.
- Breathing contaminated air or drinking contaminated water near waste sites and landfills that may contain higher levels of these chemicals.
- Infants fed on breast milk from mothers who have been exposed.
- Breathing or swallowing soil particles near waste sites or landfills that contain these chemicals.

How can DDT, DDE, and DDD affect my health?

DDT affects the nervous system. People who accidentally swallowed large amounts of DDT became excitable and had tremors and seizures. These effects went away after the exposure stopped. No effects were seen in people who took small daily doses of DDT by capsule for 18 months. A study in humans showed that women who had high amounts of a form of DDE in their breast milk were unable to breast feed their babies for as long as women who had little DDE in the breast milk. Another study in humans showed that women who had high amounts of DDE in the blood had an increased chance of having premature babies. In animals, short-term exposure to large amounts of DDT in food affected the nervous system, while long-term exposure to smaller amounts affected the liver. Also in animals, short-term oral exposure to small amounts of DDT or its breakdown products may also have harmful effects on reproduction.

DDT, DDE, and DDD - ToxFAQs™

CAS # 50-29-3, 72-55-9, 72-54-8

How likely are DDT, DDE, and DDD to cause cancer?

Studies in DDT-exposed workers did not show increases in cancer. Studies in animals given DDT with the food have shown that DDT can cause liver cancer.

The Department of Health and Human Services (DHHS) determined that DDT may reasonable be anticipated to be a human carcinogen.

The International Agency for Research on Cancer (IARC) determined that DDT may possibly cause cancer in humans. The EPA determined that DDT, DDE, and DDD are probable human carcinogens.

How can DDT, DDE, and DDD affect children?

There are no studies on the health effects of children exposed to DDT, DDE, or DDD. We can assume that children exposed to large amounts of DDT will have health effects similar to the effects seen in adults. However, we do not know whether children differ from adults in their susceptibility to these substances.

There is no evidence that DDT, DDE, or DDD cause birth defects in people. A study showed that teenage boys whose mothers had higher DDE amounts in the blood when they were pregnant were taller than those whose mothers had lower DDE levels. However, a different study found the opposite in preteen girls. The reason for the discrepancy between these studies is unknown.

Studies in rats have shown that DDT and DDE can mimic the action of natural hormones and in this way affect the development of the reproductive and nervous systems. Puberty was delayed in male rats given high amounts of DDE as juveniles. This could possibly happen in humans.

A study in mice showed that exposure to DDT during the first weeks of life may cause neurobehavioral problems later in life.

How can families reduce the risk of exposure to DDT,DDE, and DDE?

- Most families will be exposed to DDT by eating food or drinking liquids contaminated with small amounts of DDT.
- Cooking will reduce the amount of DDT in fish.
- Washing fruit and vegetables will remove most DDT from their surface.
- Follow health advisories that tell you about consumption of fish and wildlife caught in contaminated areas.

Is there a medical test to show whether I've been exposed to DDT, DDE, and DDD?

Laboratory tests can detect DDT, DDE, and DDD in fat, blood, urine, semen, and breast milk. These tests may show low, moderate, or excessive exposure to these compounds, but cannot tell the exact amount you were exposed to, or whether you will experience adverse effects. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 1 milligram of DDT per cubic meter of air (1 mg/m^3) in the workplace for an 8-hour shift, 40-hour workweek.

The Food and Drug Administration (FDA) has set limits for DDT, DDE, and DDD in foodstuff at or above which the agency will take legal action to remove the products from the market.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for DDT/DDE/DDD (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

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ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

NAPHTHALENE
CAS # 91-20-3

1-METHYLNAPHTHALENE
CAS # 90-12-0

2-METHYLNAPHTHALENE
CAS # 91-57-6

Division of Toxicology ToxFAQs™ **August 2005**

This fact sheet answers the most frequently asked health questions (FAQs) about naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene happens mostly from breathing air contaminated from the burning of wood, tobacco, or fossil fuels, industrial discharges, or moth repellents. Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. Naphthalene has caused cancer in animals. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene have been found in at least 687, 36, and 412, respectively, of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What are naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Naphthalene is a white solid that evaporates easily. Fuels such as petroleum and coal contain naphthalene. It is also called white tar, and tar camphor, and has been used in mothballs and moth flakes. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell. The major commercial use of naphthalene is in the manufacture of polyvinyl chloride (PVC) plastics. Its major consumer use is in moth repellents and toilet deodorant blocks.

1-Methylnaphthalene and 2-methylnaphthalene are naphthalene-related compounds. 1-Methylnaphthalene is a clear liquid and 2-methylnaphthalene is a solid; both can be smelled in air and in water at very low concentrations.

1-Methylnaphthalene and 2-methylnaphthalene are used to make other chemicals such as dyes and resins. 2-Methylnaphthalene is also used to make vitamin K.

What happens to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene when they enter the environment?

❏ Naphthalene enters the environment from industrial and domestic sources, and from accidental spills.

❏ Naphthalene can dissolve in water to a limited degree and may be present in drinking water from wells close to hazardous waste sites and landfills.

❏ Naphthalene can become weakly attached to soil or pass through soil into underground water.

❏ In air, moisture and sunlight break it down within 1 day. In water, bacteria break it down or it evaporates into the air.

❏ Naphthalene does not accumulate in the flesh of animals or fish that you might eat.

❏ 1-Methylnaphthalene and 2-methylnaphthalene are expected to act like naphthalene in air, water, or soil because they have similar chemical and physical properties.

How might I be exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

❏ Breathing low levels in outdoor air.

❏ Breathing air contaminated from industrial discharges or smoke from burning wood, tobacco, or fossil fuels.

❏ Using or making moth repellents, coal tar products, dyes or inks could expose you to these chemicals in the air.

❏ Drinking water from contaminated wells.

❏ Touching fabrics that are treated with moth repellents containing naphthalene.

❏ Exposure to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene from eating foods or drinking beverages is unlikely.

How can naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene affect my health?

Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. This could cause you to have too few red blood cells until your body replaces the destroyed cells. This condition is called hemolytic anemia. Some symptoms of hemolytic anemia are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Animals sometimes develop cloudiness in their eyes after swallowing high amounts of naphthalene. It is not clear whether this also develops in people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. It is unclear if naphthalene causes reproductive effects in animals; most evidence says it does not.

There are no studies of humans exposed to 1-methylnaphthalene or 2-methylnaphthalene.

Mice fed food containing 1-methylnaphthalene and 2-methylnaphthalene for most of their lives had part of their lungs filled with an abnormal material.

How likely are naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene to cause cancer?

There is no direct evidence in humans that naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene cause cancer. However, cancer from naphthalene exposure has been seen in animal studies. Some female mice that breathed naphthalene vapors daily for a lifetime developed lung tumors. Some male and female rats exposed to naphthalene in a similar manner also developed nose tumors.

Based on the results from animal studies, the Department of Health and Humans Services (DHHS) concluded that naphthalene is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) concluded that naphthalene is possibly carcinogenic to humans. The EPA determined that naphthalene is a possible human carcinogen (Group C) and that the data are inadequate to assess the human carcinogenic potential of 2-methylnaphthalene.

How can naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene affect children?

Hospitals have reported many cases of hemolytic anemia in children, including newborns and infants, who either ate naphthalene mothballs or deodorants cakes or who were in close contact with clothing or blankets stored in naphthalene mothballs. Naphthalene can move from a pregnant woman's blood to the unborn baby's blood. Naphthalene has been detected in some samples of breast milk from the general U.S. population, but not at levels that are expected to be of concern.

There is no information on whether naphthalene has affected development in humans. No developmental abnormalities were observed in the offspring from rats, mice, and rabbits fed naphthalene during pregnancy.

We do not have any information on possible health effects of 1-methylnaphthalene or 2-methylnaphthalene on children.

How can families reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

❑ Families can reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene by avoiding smoking tobacco, generating smoke during cooking, or using fireplaces or heating appliances in the their homes.

❑ If families use naphthalene-containing moth repellents, the material should be enclosed in containers that prevent vapors from escaping, and kept out of the reach from children.

❑ Blankets and clothing stored with naphthalene moth repellents should be aired outdoors to remove naphthalene odors and washed before they are used.

❑ Families should inform themselves of the contents of air deodorizers that are used in their homes and refrain from using deodorizers with naphthalene.

Is there a medical test to determine whether I've been exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Tests are available that measure levels of these chemicals and their breakdown products in samples of urine, feces, blood, maternal milk, or body fat. These tests are not routinely available in a doctor's office because they require special equipment, but samples can be sent to special testing laboratories. These tests cannot determine exactly how much naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene you were exposed to or predict whether harmful effects will occur. If the samples are collected within a day or two of exposure, then the tests can show if you were exposed to a large or small amount of naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene.

Has the federal government made recommendations to protect human health?

The EPA recommends that children not drink water with over 0.5 parts per million (0.5 ppm) naphthalene for more than 10 days or over 0.4 ppm for any longer than 7 years. Adults should not drink water with more than 1 ppm for more than 7 years. For water consumed over a lifetime (70 years), the EPA suggests that it contain no more than 0.1 ppm naphthalene.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for the level of naphthalene in workplace air during an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) considers more than 500 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to impair a worker's ability to leave a contaminate area and therefore, results in permanent health problems or death.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Polycyclic Aromatic Hydrocarbons (PAHs) - ToxFAQs™

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl′ĭ-sī′klĭk ăr′ə-măt′ĭk hī′drə-kar′bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.
- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636.

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

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AUTOMOTIVE GASOLINE

CAS # 8006-61-9

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1996**

This fact sheet answers the most frequently asked health questions (FAQs) about automobile gasoline. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to automotive gasoline most likely occurs from breathing its vapor at a service station while filling a car's fuel tank. At high levels, automotive gasoline is irritating to the lungs when breathed in and irritating to the lining of the stomach when swallowed. Exposure to high levels may also cause harmful effects to the nervous system. Automotive gasoline has been found in at least 23 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is automotive gasoline?

(Pronounced ô′tə-mō′tĭv găs′ə-lēn′)

The gasoline discussed in this fact sheet is automotive used as a fuel for engines in cars. Gasoline is a colorless, pale brown, or pink liquid, and is very flammable.

Gasoline is a manufactured mixture that does not exist naturally in the environment. Gasoline is produced from petroleum in the refining process.

Typically, gasoline contains more than 150 chemicals, including small amounts of benzene, toluene, xylene, and sometimes lead. How the gasoline is made determines which chemicals are present in the gasoline mixture and how much of each is present. The actual composition varies with the source of the crude petroleum, the manufacturer, and the time of year.

What happens to automotive gasoline when it enters the environment?

- ☐ Small amounts of the chemicals present in gasoline evaporate into the air when you fill the gas tank in your car or when gasoline is accidentally spilled onto surfaces and soils or into surface waters.
- ☐ Other chemicals in gasoline dissolve in water after spills to surface waters or underground storage tank leaks into the groundwater.
- ☐ In surface releases, most chemicals in gasoline will probably evaporate; others may dissolve and be carried away by water; a few will probably stick to soil.
- ☐ The chemicals that evaporate are broken down by sunlight and other chemicals in the air.
- ☐ The chemicals that dissolve in water also break down quickly by natural processes.

How might I be exposed to automotive gasoline?

- ☐ Breathing vapors at a service station when filling the car's fuel tank is the most likely way to be exposed.
- ☐ Working at a service station.
- ☐ Using equipment that runs on gasoline, such as a lawn mower.
- ☐ Drinking contaminated water.
- ☐ Being close to a spot where gasoline has spilled or leaked into the soil.

How can automotive gasoline affect my health?

Many of the harmful effects seen after exposure to gasoline are due to the individual chemicals in the gasoline mixture, such as benzene and lead. Inhaling or swallowing large amounts of gasoline can cause death.

Inhaling high concentrations of gasoline is irritating to the lungs when breathed in and irritating to the lining of the stomach when swallowed. Gasoline is also a skin irritant. Breathing in high levels of gasoline for short periods or swallowing large amounts of gasoline may also cause harmful effects on the nervous system.

Serious nervous system effects include coma and the inability to breathe, while less serious effects include dizziness and headaches.

There is not enough information available to determine if gasoline causes birth defects or affects reproduction.

How likely is automotive gasoline to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified automotive gasoline for carcinogenicity. Automotive gasoline is currently undergoing review by the EPA for cancer classification.

Some laboratory animals that breathed high concentrations of unleaded gasoline vapors continuously for 2 years developed liver and kidney tumors. However, there is no evidence that exposure to gasoline causes cancer in humans.

Is there a medical test to show whether I've been exposed to automotive gasoline?

Laboratory tests are available that can measure elevated blood or urine levels of lead (as an indication of exposure to leaded gasoline only), benzene, or other substances that may result from exposure to gasoline or other sources. These methods are sensitive enough to measure background levels and levels where health effects may occur. These tests aren't available in most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has established many regulations to control air pollution. These are designed to protect the public from the possible harmful health effects of gasoline.

The American Conference of Governmental Industrial Hygienists (ACGIH) set a maximum level of 890 milligrams of gasoline per cubic meter of air (890 mg/m^3) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Crude petroleum: Petroleum that has not been processed.

Dissolve: To disappear gradually.

Evaporate: To change into a vapor or a gas.

Irritant: A substance that causes an abnormal reaction.

Mixture: A combination of two or more components.

Refining process: The process by which petroleum is purified to form gasoline.

Tumor: An abnormal mass of tissue.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for automotive gasoline. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

FUEL OILS

CAS # 8008-20-6, 70892-10-3, 68476-30-2, 68476-34-6, 68476-31-3

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1996**

This fact sheet answers the most frequently asked health questions (FAQs) about fuel oils. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Fuel oils are liquid mixtures produced from petroleum, and their use mostly involves burning them as fuels. Drinking or breathing fuel oils may cause nausea or nervous system effects. However, exposure under normal use conditions is not likely to be harmful. Fuel oils have been found in at least 26 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are fuel oils?
(Pronounced fyo͞o′əl oilz)

Fuel oils are a variety of yellowish to light brown liquid mixtures that come from crude petroleum. Some chemicals found in fuel oils may evaporate easily, while others may more easily dissolve in water.

Fuel oils are produced by different petroleum refining processes, depending on their intended uses. Fuel oils may be used as fuel for engines, lamps, heaters, furnaces, and stoves, or as solvents.

Some commonly found fuel oils include kerosene, diesel fuel, jet fuel, range oil, and home heating oil. These fuel oils differ from one another by their hydrocarbon compositions, boiling point ranges, chemical additives, and uses.

What happens to fuel oils when they enter the environment?

☐ Some chemicals found in fuel oils may evaporate into the air from open containers or contaminated soil or water.

☐ Some chemicals found in fuel oils may dissolve in water after spills to surface waters or leaks from underground storage tanks.

☐ Some chemicals found in fuel oils may stick to particles in water, which will eventually cause them to settle to the bottom sediment.

☐ Some of the chemicals found in fuel oils may be broken down slowly in air, water, and soil by sunlight or small organisms.

☐ Some of the chemicals found in fuel oils may build up significantly in plants and animals.

How might I be exposed to fuel oils?

☐ Using a home kerosene heater or stove, or using fuel oils at work.

☐ Breathing air in home or building basements that has been contaminated with fuel oil vapors entering from the soil.

☐ Drinking or swimming in water that has been contaminated with fuel oils from a spill or a leaking underground storage tank.

☐ Touching soil contaminated with fuel oils.

☐ Using fuel oils to wash paint or grease from skin or equipment.

How can fuel oils affect my health?

Little information is available about the health effects that may be caused by fuel oils. People who use kerosene stoves for cooking do not seem to have any health problems related to their exposure.

Breathing some fuel oils for short periods may cause nausea, eye irritation, increased blood pressure, headache, light-headedness, loss of appetite, poor coordination, and difficulty concentrating. Breathing diesel fuel vapors for long periods may cause kidney damage and lower your blood's ability to clot.

Drinking small amounts of kerosene may cause vomiting, diarrhea, coughing, stomach swelling and cramps, drowsiness, restlessness, painful breathing, irritability, and unconsciousness. Drinking large amounts of kerosene may cause convulsions, coma, or death. Skin contact with kerosene for short periods may cause itchy, red, sore, or peeling skin.

How likely are fuel oils to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that some fuel oils (heavy) may possibly cause cancer in humans, but for other fuel oils (light) there is not enough information to make a determination. IARC has also determined that occupational exposures to fuel oils during petroleum refining are probably carcinogenic in humans.

Some studies with mice have suggested that repeated contact with fuel oils may cause liver or skin cancer. However, other mouse studies have found this not to be the case. No studies are available in other animals or in people on the carcinogenic effects of fuel oils.

Is there a medical test to show whether I've been exposed to fuel oils?

There is no medical test that shows if you have been exposed to fuel oils. Tests are available to determine if some of the chemicals commonly found in fuel oils are in your blood. However, the presence of these chemicals in blood may not necessarily mean that you have been exposed to fuel oils.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) and the Air Force Office of Safety and Health (AFOSH) have set a permissible exposure level (PEL) of 400 parts of petroleum distillates per million parts of air (400 ppm) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that average workplace air levels not exceed 350 milligrams of petroleum distillates per cubic meter of air (350 mg/m^3) for a 40-hour workweek.

The Department of Transportation (DOT) lists fuel oils as hazardous materials and, therefore, regulates their transportation.

Glossary

Carcinogenic: Able to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

Hydrocarbon: Any compound made up of hydrogen and carbon.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for fuel oils. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Ethylbenzene- ToxFAQs™

CAS # 100-41-4

This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Breathing lower levels has resulted in hearing effects and kidney damage in animals. Ethylbenzene has been found in at least 829 of 1,699 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is ethylbenzene?

Ethylbenzene is a colorless, flammable liquid that smells like gasoline.

It is naturally found in coal tar and petroleum and is also found in manufactured products such as inks, pesticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

What happens to ethylbenzene when it enters the environment?

- Ethylbenzene moves easily into the air from water and soil.
- It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- Ethylbenzene can move through soil into groundwater.
- In soil, it is broken down by bacteria.

How might I be exposed to ethylbenzene?

- If you live in a city or near many factories or heavily traveled highways, you may be exposed to ethylbenzene in air.
- Releases of ethylbenzene into the air occur from burning oil, gas, and coal and from industries using ethylbenzene.
- Ethylbenzene is not often found in drinking water. Higher levels may be found in residential drinking water wells near landfills, waste sites, or leaking underground fuel storage tanks.
- Exposure can occur if you work in an industry where ethylbenzene is used or made.
- Exposure can occur if you use products containing it, such as gasoline, carpet glues, varnishes, and paints.

How can ethylbenzene affect my health?

Exposure to high levels of ethylbenzene in air for short periods can cause eye and throat irritation. Exposure to higher levels can result in dizziness.

Irreversible damage to the inner ear and hearing has been observed in animals exposed to relatively low concentrations of ethylbenzene for several days to weeks.

Exposure to relatively low concentrations of ethylbenzene in air for several months to years causes kidney damage in animals.

How likely is ethylbenzene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that ethylbenzene is a possible human carcinogen.

CAS # 100-41-4

How does ethylbenzene affect children?

There are no studies evaluating the effects of ethylbenzene exposure on children or immature animals. It is likely that children would have the same health effects as adults. We do not know whether children would be more sensitive than adults to the effects of ethylbenzene.

We do not know if ethylbenzene will cause birth defects in humans. Minor birth defects and low birth weight have occurred in newborn animals whose mothers were exposed to ethylbenzene in air during pregnancy.

How can families reduce the risk of exposure to ethylbenzene?

- Use adequate ventilation to reduce exposure to ethylbenzene vapors from consumer products such as gasoline, pesticides, varnishes and paints, and newly installed carpeting.
- Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.
- Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers that children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Is there a medical test to show whether I've been exposed to ethylbenzene?

Ethylbenzene is found in the blood, urine, breath, and some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. Because these substances leave the body very quickly, this test needs to be done within a few hours after exposure occurs.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to ethylbenzene in drinking water at concentrations of 30 mg/L for 1 day or 3 mg/L for 10 days is not expected to cause any adverse effects in a child.

The EPA has determined that lifetime exposure to 0.7 mg/L ethylbenzene is not expected to cause any adverse effects.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 100 ppm for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2010. Toxicological Profile for Ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30329-4027.

Phone: 1-800-232-4636

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

TOTAL PETROLEUM HYDROCARBONS (TPH)

Agency for Toxic Substances and Disease Registry ToxFAQs August 1999

This fact sheet answers the most frequently asked health questions (FAQs) about total petroleum hydrocarbons (TPH). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: TPH is a mixture of many different compounds. Everyone is exposed to TPH from many sources, including gasoline pumps, spilled oil on pavement, and chemicals used at home or work. Some TPH compounds can affect your nervous system, causing headaches and dizziness. TPH has been found in at least 23 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are total petroleum hydrocarbons?

(Pronounced tōt′l pə-trō′lē-əm hī′drə-kär′bənz)

Total petroleum hydrocarbons (TPH) is a term used to describe a large family of several hundred chemical compounds that originally come from crude oil. Crude oil is used to make petroleum products, which can contaminate the environment. Because there are so many different chemicals in crude oil and in other petroleum products, it is not practical to measure each one separately. However, it is useful to measure the total amount of TPH at a site.

TPH is a mixture of chemicals, but they are all made mainly from hydrogen and carbon, called hydrocarbons. Scientists divide TPH into groups of petroleum hydrocarbons that act alike in soil or water. These groups are called petroleum hydrocarbon fractions. Each fraction contains many individual chemicals.

Some chemicals that may be found in TPH are hexane, jet fuels, mineral oils, benzene, toluene, xylenes, naphthalene, and fluorene, as well as other petroleum products and gasoline components. However, it is likely that samples of TPH will contain only some, or a mixture, of these chemicals.

What happens to TPH when it enters the environment?

- ☐ TPH may enter the environment through accidents, from industrial releases, or as byproducts from commercial or private uses.
- ☐ TPH may be released directly into water through spills or leaks.
- ☐ Some TPH fractions will float on the water and form surface films.
- ☐ Other TPH fractions will sink to the bottom sediments.
- ☐ Bacteria and microorganisms in the water may break down some of the TPH fractions.
- ☐ Some TPH fractions will move into the soil where they may stay for a long time.

How might I be exposed to TPH?

- ☐ Everyone is exposed to TPH from many sources.
- ☐ Breathing air at gasoline stations, using chemicals at home or work, or using certain pesticides.
- ☐ Drinking water contaminated with TPH.
- ☐ Working in occupations that use petroleum products.
- ☐ Living in an area near a spill or leak of petroleum products.
- ☐ Touching soil contaminated with TPH.

How can TPH affect my health?

Some of the TPH compounds can affect your central nervous system. One compound can cause headaches and dizziness at high levels in the air. Another compound can cause a nerve disorder called "peripheral neuropathy," consisting of numbness in the feet and legs. Other TPH compounds can cause effects on the blood, immune system, lungs, skin, and eyes.

Animal studies have shown effects on the lungs, central nervous system, liver, and kidney from exposure to TPH compounds. Some TPH compounds have also been shown to affect reproduction and the developing fetus in animals.

How likely is TPH to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that one TPH compound (benzene) is carcinogenic to humans. IARC has determined that other TPH compounds (benzo[a]pyrene and gasoline) are probably and possibly carcinogenic to humans. Most of the other TPH compounds are considered not to be classifiable by IARC.

Is there a medical test to show whether I've been exposed to TPH?

There is no medical test that shows if you have been exposed to TPH. However, there are methods to determine if you have been exposed to some TPH compounds. Exposure to kerosene can be determined by its smell on the breath or clothing. Benzene can be measured in exhaled air and a breakdown product of benzene can be measured in urine. Other TPH compounds can be measured in blood, urine, breath, and some body tissues.

Has the federal government made recommendations to protect human health?

There are no regulations or advisories specific to TPH. The following are recommendations for some of the TPH fractions and compounds:

The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration has set an exposure limit of 500 parts of petroleum distillates per million parts of air (500 ppm) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Immune system: Body organs and cells that fight disease.

Pesticides: Chemicals used to kill pests.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for total petroleum hydrocarbons (TPH). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATTACHMENT B

Utility Location Report

NYLD Infrastructure

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

Field Report – Utility Location

Date(s) on site: 10/11/19

Technician: Sonny Kentile **Other Technicians on site**:

Customer: Paulus Development

Site Address: Smith Restaurant Supply Building Site -- 500 Erie Blvd East Syracuse, NY

Contact Person: John Sheffield **Phone**: 315-559-4034

Scope of Work: Utility Location Services – locate potential utilities and UST. Less than 1 acre. Area is asphalt & concrete. Active retail site, former foundry.

Type of Service: *mark all that apply*

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

Type of Equipment Used: *mark all that apply*

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

Marking Used: *mark all that apply*

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

Field Report – Utility Location

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

Ground Cover/Weather Conditions: Asphalt & Concrete / 50's & Sunny

Instructions from Onsite Contact: We are investigating to see if there are any possible sources of contamination throughout the property. Clear all utilities and search for UST's throughout areas specified (see provided mapping and overview below).

Information Transfer:

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

☒ *Information relayed on site to:*

John Sheffield

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

Notes/Testing Results:

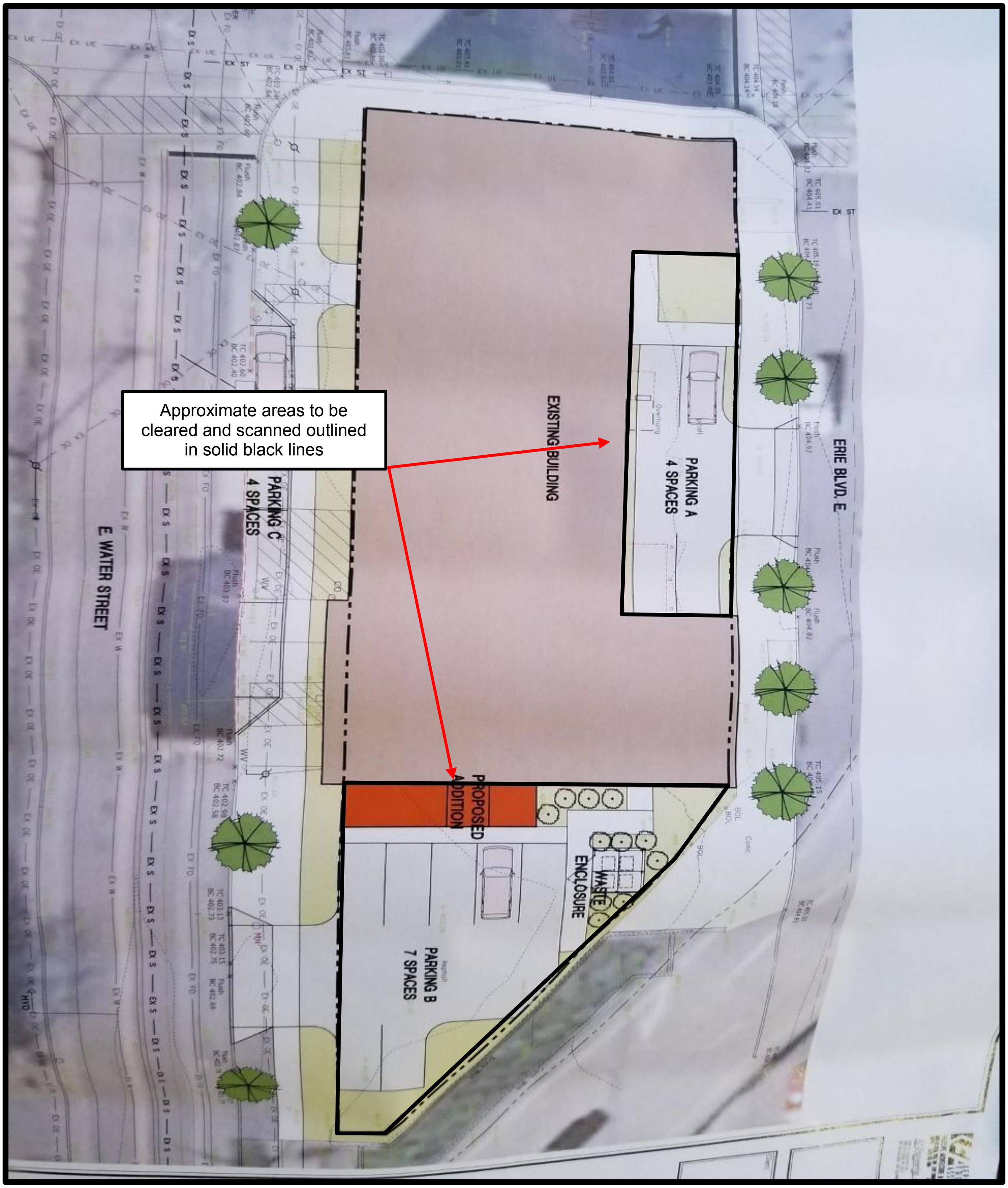
A visual inspection was performed in the area of concern to assess for utility structures. Utilizing the RD8000 in conductive, inductive, and power/radio modes, located and marked out utilities as shown in the area below. Sonde/Locatable Rodder was used within applicable utilities. Additional confirmation performed with the Noggin using the 250 and/or 500 MHz antenna. GPR signal reception varies depending upon soil conditions. Therefore, it is utilized in combination with various other geophysical tools for the most accurate verification of known/unknown utilities and/or structures.

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

Vehicle congestion as well as dumpster and pallet locations in the side parking area severely restricted scanning abilities. Noted in google overview.

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

Provided Mapping



Approximate areas to be cleared and scanned outlined in solid black lines

NYLD Infrastructure

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

Field Report – Utility Location

Key

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

Unknown concrete structures

Approximate areas to be cleared outlined with black

Manhole filled with dirt, contact sewer/water department.

Areas severely limited by parked vehicles and dumpster/pallet congestion delineated with dashed lines. See images below.


SMITH
SMITH RESTAURANT SUPPLY
Hyman Smith Coffee Roaster
Smith RESTAURANT SUPPLY


Smith
CAMBRO
TRUSTED FOR GENERATIONS
www.SmithRestaurantSupply.com
US DOT 2152673

Field Report – Utility Location

Subsurface Limitations

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

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

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

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

APPENDIX D

Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

Remedial Action Work Plan
The Smith Restaurant Building
City of Syracuse, New York

September 2020

TABLE OF CONTENTS

FIGURES

1.0 INTRODUCTION

A Community Air Monitoring Plan (CAMP) requires real-time observation / monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites.

The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and / or work shutdown.

2.0 APPLICABILITY

Continuous monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) will be required for all ground intrusive activities, including but not limited to, soil excavation, handling, and trenching.

CAMP monitoring is not required when using hand tools for shallow / surface soil activities, provided that activities do not occur during extremely dry or windy conditions to minimize any off-site migration of contaminated soil particles.

CAMP monitoring will not be required for an area after a demarcation barrier is placed over the area and secured, unless further intrusive activities occur that penetrate the barrier.

3.0 GENERAL SITE CONDITIONS

The prevailing wind generally blows from west to east. However, monitoring locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least one downwind monitoring station. The attached Figure 1 illustrates the likely location of monitoring stations associated with the site.

At this time, the primary chemicals of concern include the following:

- Gasoline-related compounds
- Diesel-related compounds
- Oil-related compounds
- Metals (primarily Lead)
- Chlorinated solvents
- Pesticides (primarily DDT and DDD)

4.0 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e. – exclusion zone) on a continuous basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring of VOCs will be performed using a photo-ionization detector (PID), which will be calibrated daily. The PID will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level half the distance to the nearest potential receptor or residential / commercial structure (but not less than 20 feet), is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down.

All 15-minute readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

5.0 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work area or exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using a DUSTTRAK™ Aerosol Monitor Model 8520 (or similar). The device will be capable of measuring particulate matter less than 10 micrometers in size (PM-10), integrating over a period of 15 minutes for comparison to the airborne particulate action level, and equipped with an audible alarm to indicate exceedance of the following action levels:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level, and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will be stopped and an evaluation of activities will be initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

In addition, fugitive dust migration will be visually assessed during all work activities.

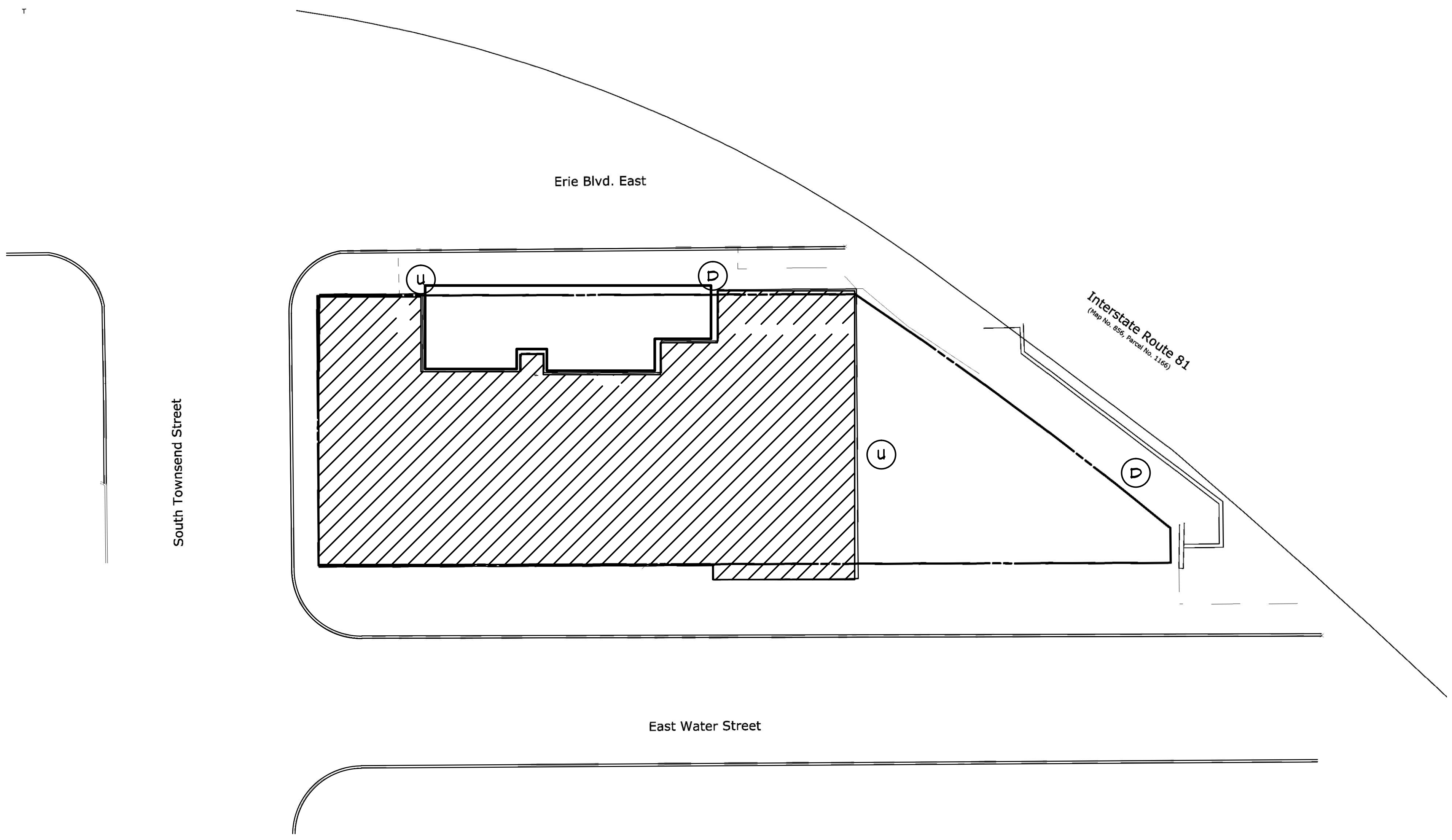
All readings will be recorded and be available for NYSDEC and NYSDOH review.

6.0 MONITORING DURING NON-INTRUSIVE ACTIVITIES

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of groundwater samples from monitoring wells. Periodic monitoring during groundwater sample collection will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap, monitoring during well baling/purging, and taking a reading prior to leaving a sample location.

FIGURE 1

Example Air Monitoring Locations



LEGEND:

— - - —	APPROXIMATE PROPERTY LINE / BROWNFIELD AREA EXTENT
▨	APPROXIMATE BUILDING FOOTPRINT
▭	APPROXIMATE / EXAMPLE WORK AREA BOUNDARY
Ⓤ	EXAMPLE UPWIND MONITORING LOCATION
Ⓓ	EXAMPLE DOWNWIND MONITORING LOCATION

NOTES:

1. PROPERTY LINE AND BUILDING PER ENGINEERING DOCUMENT PG 47 SITE PLAN, DATED JULY 2019 .
2. ALL LOCATIONS ARE APPROXIMATE.
3. MONITORING LOCATIONS SHOWN ARE INTENDED FOR EXAMPLE PURPOSES ONLY. ACTUAL MONITORING LOCATIONS WILL BE DETERMINED BY THE AIR SAMPLING TECHNICIAN AT THE TIME OF WORK ACTIVITIES AND BE INFLUENCED BY WORK AREA LAYOUT, WIND DIRECTION, BUILDING STRUCTURES WITH POTENTIAL TO INFLUENCE AIR FLOW, ACCESSIBILITY, AND WITH CONSIDERATION FOR TRAFFIC RELATED DUST, THE SAFETY OF ON-SITE PERSONNEL AND THE PUBLIC. THE EXAMPLE MONITORING LOCATIONS DEPICTED ASSUME WESTERLY WINDS.
4. ONE DOWNWIND MONITORING STATION PER ACTIVE WORK AREA IS EXPECTED TO BE ADEQUATE, BASED ON THE SIZE OF THE SITE AND ANTICIPATED WORK AREAS.

0 32'6"' 75'

GRAPHIC SCALE

AECC
ENVIRONMENTAL CONSULTING
Asbestos & Environmental
Consulting Corporation

6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.	20-032
DRAWN:	JUNE 2020
DRAWN BY:	DB
CHECKED BY:	RDM

Example Air Monitoring Locations

The Smith Restaurant Building
500 Erie Boulevard East
Syracuse, New York 13202

FIGURE

CAMP-1

APPENDIX E

Site Development Plans and Specifications

2020
SITE PLAN REVIEW DOCUMENTS
SMITH BUILDING - 500 W. WATER ST.
CITY OF SYRACUSE PLANNING COMMISSION
CITY OF SYRACUSE, ONONDAGA COUNTY, NY

LIST OF DRAWINGS- 02/05/2020

L-001	TITLE SHEET
L-100	SITE PREPARATION PLAN
L-101	EROSION CONTROL PLAN
L-200	GRADING DRAINAGE & UTILITIES PLAN
L-201	GRADING DETAILS PLAN
L-300	LAYOUT AND PLANTING PLAN
L-400	DETAILS
L-401	DETAILS
L-402	DETAILS
L-403	DETAILS
L-500	LIGHTING PLAN

MAYOR
BEN WALSH

DEPUTY MAYOR
SHARON OWENS

PLANNING COMMISION
STEVEN KULICK - CHAIRPERSON
REBECCA LIVENGOOD
CHRISTINE CAPELLA-PETERS
WALTER BOWLER
GEORGE LYNCH

DEPT. OF ZONING ADMINISTRATOR
HEATHER LAMENDOLA

DEPARTMENT OF ENGINEERING
MARY E. ROBISON, P.E.

LOCATION PLAN

N

NOT TO SCALE

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FREEMAN
ASSOCIATES
LANDSCAPE ARCHITECTURE & LAND PLANNING
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RZ ENGINEERING, PLLC
CIVIL ENGINEER
6320 FLY RD. SUITE 109,
East Syracuse, New York 13057
Phone: (315)432-1089

APPROVED BY AUTHORIZATION
OF THE PLANNING BOARD

STEVEN KULICK - CHAIRMAN DATE

SANITARY SEWER SYSTEM
APPROVED BY ONONDAGA COUNTY
DEPARTMENT
OF WATER ENVIRONMENT PROTECTION

COMMISSIONER DATE

KEPLINGER
FREEMAN
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LANDSCAPE ARCHITECTURE & LAND PLANNING
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SCOTT LEE FREEMAN
001479

RUDY L. ZONA
079543

UTILIZED FOR STORMWATER
AND SANITARY DESIGN

SMITH MIXED USE BUILDING and
SITE REDEVELOPMENT
500 E. ERIE BLVD., CITY OF SYRACUSE, NY

REVISIONS

Drawn By: V.E.R.
Checked By: S.L.F.
KFA Proj. No.: 39075
Date: FEBRUARY 05, 2020
Scale: AS NOTED
Title:

TITLE SHEET

L-001

IMPERVIOUS PAVEMENT SUMMARY

NOTES:

1. EXISTING ASPHALT WILL BE FILLED AND SEALED. PER CITY GUIDELINES, PARKING AREA WILL HAVE 10' SCREENED BUFFER AREA.

CALCULATIONS:

- EXISTING ASPHALT IMPERVIOUS SURFACE=34,030.3 SF/ .78 Ac.
- PROPOSED ASPHALT IMPERVIOUS SURFACE=32,152.8 SF/ .74 Ac.
- PERCENT REDUCTION= 5.52%

LEGEND

X-SMITH-LEGEND

EXISTING	PROPOSED	DESCRIPTION
—100—		CONTOUR
+377.7		SPOT ELEVATION
	CT/CE	CURB TAPER/END
	TC/BC	TOP/BOTTOM OF CURB
	HP/LP	HIGH / LOW POINT
	TP-2	TEST PIT
	B-1	BORING (SEE SPECIFICATIONS FOR BORING INFO)
		FENCE
		UTILITY POLE
— W —		WATER LINE
		FIRE HYDRANT
— EX ST —	ST	STORM PIPE
	UD	UNDERDRAIN
— EX SAN —		SANITARY PIPE
— E/T —		OVERHEAD ELECTRIC
— E —		UNDERGROUND ELECTRIC
— T —		TELEPHONE
○ □	ST MH	STORM STRUCTURE
	DI	INLET
○	CB MH	CATCH BASIN/MANHOLE
ⓢⓢ	∘ CO	CLEAN OUT
Ⓢ		SANITARY MANHOLE
	▒	ASPHALT PAVEMENT-PARKING
	░	ASPHALT PAVEMENT-DRIVE
	▦	CONCRETE PAVEMENT
	▨	SAFETY SURFACING
		TRAFFIC SIGN
		TRAFFIC SIGN - SET IN BOLLARD
		TRAFFIC SIGN - MOVABLE
		LIGHT POLE (SEE ELECTRICAL PLANS FOR WIRING)
		CURB
		CURB FLUSH (1" REVEAL UNLESS OTHERWISE NOTED)
	— SF —	SILT FENCE
		TREE
		SHRUB
	QUANTITY PLANT TYPE	PLANT KEY
		VEGETATION

EXISTING CONDITIONS & SITE PREPARATION NOTES

X-SMITH-SITE-PREP-NOTES

CLL — CONTRACT LIMIT LINE

▨ REMOVE EXISTING PAVEMENTS - SEE NOTES 3 & 4 BELOW.

1. SAWCUT ASPHALT OR CONCRETE PAVEMENT. SAWCUT ASPHALT IN NEAT STRAIGHT LINE AND SAWCUT CONCRETE PAVEMENT AT NEAREST SCORE JOINT.
2. REMOVE EXISTING CONCRETE PAVEMENT.
3. REMOVE ASPHALT PAVEMENT INCLUDING BASE MATERIAL AND DISPOSE OF OFF SITE.
4. REMOVE EXISTING GRANITE CURBING.
5. REMOVE EXISTING CONCRETE STAIRS, FOOTINGS AND RAILINGS.
6. ADJUST EXISTING STRUCTURES FRAME AND COVER/GRATE TO FINISH GRADE PER GRADING PLAN.
7. UTILITY POLE TO REMAIN, PROTECT.
8. REMOVE EXISTING BOLLARDS AND FOOTINGS.
9. SITEWORK CONTRACTOR TO PERFORM ALL REMOVALS NOTED BELOW BUILDING AS DIRECTED BY GENERAL CONTRACTOR.
10. REMOVE EXISTING VEGETATION AND ROOTS IN THEIR ENTIRETY.
11. SITE WORK CONTRACTOR TO COORDINATE REMOVALS WITH ARCHITECTURAL DRAWINGS.
12. GAS METER TO BE REMOVED AND RELOCATED PER MEP DRAWINGS.

GENERAL NOTES

X-SMITH-GEN NOTES

1. TOPOGRAPHIC AND BOUNDARY SURVEY PREPARED BY C.T. MALE ASSOCIATES SURVEYORS, D.P.C. SYRACUSE, NY, DATED JUNE 13, 2019.

OWNER AND ARCHITECT DO NOT CONFIRM THE COMPLETENESS OR ACCURACY OF SUCH INFORMATION. CONTRACTOR IS RESPONSIBLE FOR THOROUGH EXAMINATION AND VERIFICATION OF ALL EXISTING SURFACE AND SUBSURFACE CONDITIONS AFFECTING THE NATURE, SCOPE, COMPLEXITY AND COST OF THE CONTRACT WORK. ADDITIONAL INFORMATION ON EXISTING CONDITIONS HAS BEEN ADDED TO THE DRAWINGS BASED ON THE LANDSCAPE ARCHITECT'S OBSERVATIONS BUT IS NOT INTENDED TO AND DOES NOT ALTER THE SURVEY INFORMATION. REFER TO SURVEY NOTES FOR ADDITIONAL INFORMATION.

2. COORDINATE REMOVALS WITH PHASING PLANS AND ARCHITECTURAL PLANS WHICH SHOW BUILDING DEMOLITION, RECONSTRUCTION, AND ADDITIONS.

3. SAW CUT FOR PAVING REMOVALS. EXTEND REMOVAL LINES TO INCLUDE ANY ADJOINING BROKEN OR DETERIORATING PAVING. CAREFULLY REMOVE, STOCKPILE AND PROTECT ANY ITEMS NOTED FOR SALVAGE. ALL DEMOLITION RUBBLE, DEBRIS AND EXCESS SOILS TO BE PROMPTLY REMOVED FROM SITE. STRIP AND STOCKPILE SUFFICIENT EXISTING ORGANIC TOPSOILS FOR RESPREADING AS REQUIRED ON DISTURBED AND REGRADED AREAS TO BE ESTABLISHED AS LAWN AND FOR REPAIR OF DISTURBED EXISTING LAWNS TO REMAIN. STOCKPILE ALL MATERIALS IN APPROVED LOCATIONS WITHOUT INTERFERING WITH OTHER CONTRACTOR WORK, SCHOOL TRAFFIC OR DRAINAGE.

4. ALL FILL/BACKFILL OF EXCAVATIONS AND VOIDS RESULTING FROM REMOVALS AND RELATED WORK UNDER PROPOSED OR REPLACEMENT PAVING AREAS SHALL ONLY BE COARSE AGGREGATE FILL OR SUBBASE COURSE MATERIAL THOROUGHLY COMPACTED.

5. PROTECT ALL FACILITIES AND IMPROVEMENTS ON AND ADJOINING THE PROPERTY WHICH ARE NOT SPECIFICALLY IDENTIFIED FOR REMOVAL. VERIFY LOCATIONS AND DEPTHS OF ALL SUBSURFACE UTILITIES TO REMAIN PRIOR TO ANY ADJACENT REMOVAL AND EXCAVATION WORK.

6. ALL EXISTING FEATURES SHALL REMAIN UNLESS OTHERWISE NOTED. IF THE CONTRACTOR DAMAGES ANY OF THE EXISTING ON-SITE FACILITIES TO REMAIN (TREES, PAVEMENTS, UNDERGROUND UTILITIES, STRUCTURES, ETC...) WHETHER SHOWN ON THE PLANS OR NOT, THE CONTRACTOR SHALL REPAIR AND/OR REPLACE SUCH ITEMS AT HIS OWN EXPENSE AND ASSUME ALL RESPONSIBILITY FOR SUCH DAMAGE WITHOUT ANY ADDITIONAL COST TO THE OWNER. REPLACEMENT MATERIAL SHALL BE SAME QUALITY AND QUANTITY AS ORIGINAL.

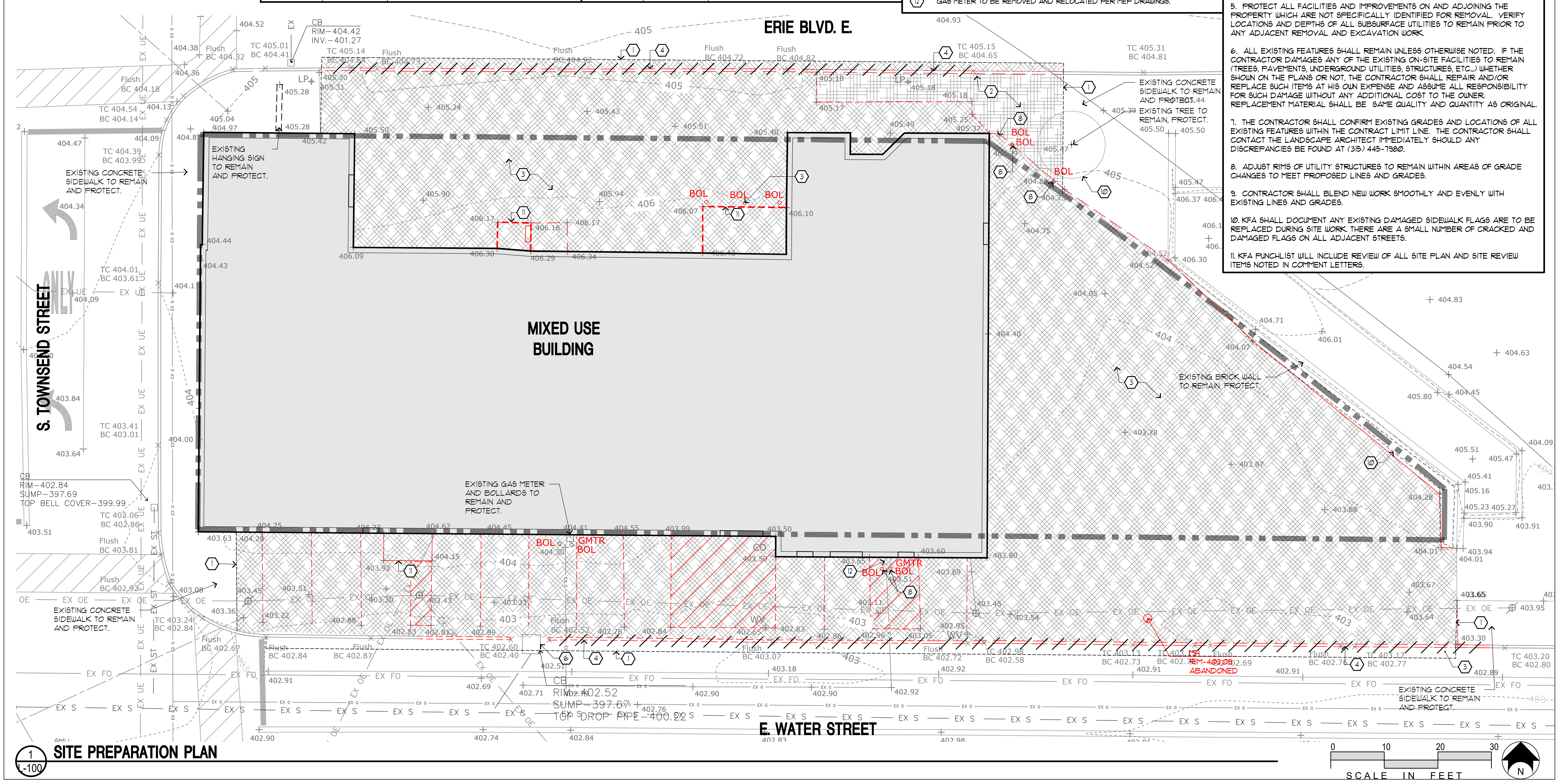
7. THE CONTRACTOR SHALL CONFIRM EXISTING GRADES AND LOCATIONS OF ALL EXISTING FEATURES WITHIN THE CONTRACT LIMIT LINE. THE CONTRACTOR SHALL CONTACT THE LANDSCAPE ARCHITECT IMMEDIATELY SHOULD ANY DISCREPANCIES BE FOUND AT (315) 445-7980.

8. ADJUST RIMS OF UTILITY STRUCTURES TO REMAIN WITHIN AREAS OF GRADE CHANGES TO MEET PROPOSED LINES AND GRADES.

9. CONTRACTOR SHALL BLEND NEW WORK SMOOTHLY AND EVENLY WITH EXISTING LINES AND GRADES.

10. KFA SHALL DOCUMENT ANY EXISTING DAMAGED SIDEWALK FLAGS ARE TO BE REPLACED DURING SITE WORK. THERE ARE A SMALL NUMBER OF CRACKED AND DAMAGED FLAGS ON ALL ADJACENT STREETS.

11. KFA PUNCHLIST WILL INCLUDE REVIEW OF ALL SITE PLAN AND SITE REVIEW ITEMS NOTED IN COMMENT LETTERS.



1
L-100
SITE PREPARATION PLAN

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REGISTERED LANDSCAPE ARCHITECT
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001473
STATE OF NEW YORK

STATE OF NEW YORK
RUDY L. ZONA
079543
LICENSED PROFESSIONAL ENGINEER
UTILIZED FOR STORMWATER AND SANITARY DESIGN

SMITH MIXED USE BUILDING and
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500 E. ERIE BLVD., CITY OF SYRACUSE, NY

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SITE PREPARATION PLAN

L-100

NOT FOR CONSTRUCTION – CITY OF SYRACUSE SITE PLAN REVIEW

GRADING, DRAINAGE & UTILITY GENERAL NOTES

1. ANY/ALL FILL REQUIRED BELOW PAVING SUBGRADE SHALL ONLY BE COARSE AGGREGATE FILL OR SUBBASE COURSE MATERIALS.

2. WHEREVER EXISTING STORM STRUCTURES ARE TO BE ABANDONED AND REMOVED, CUT AND PLUG CONNECTING PIPES AND/OR REMOVE PORTIONS OF PIPES WHICH MAY INTERFERE WITH OTHER WORK.

3. ALL CONCRETE PAVING AT ALL EXISTING AND NEW DOORS SHALL BE FLUSH WITH BUILDING FLOOR ELEVATION. CONCRETE PAVEMENT SHALL BE DOWELED TO FOUNDATION WALL PER DETAILS.

GRADING, DRAINAGE & UTILITY NOTES

SMITH-GRADING-NOTES

① MEET EXISTING LINE AND GRADE.

② ALIGN PROPOSED CURB TO MEET TOP AND FACE OF EXISTING GRANITE CURB.

③ CORE OPENING INTO EXISTING PIPE WITH WATER TIGHT CONNECTION.

④ EXISTING GAS LATERAL, METER, AND BOLLARDS TO REMAIN, PROTECT (MEP CONFIRM?)

⑤ EXISTING SANITARY LATERAL VENT AND TRAP TO REMAIN, PROTECT (MEP CONFIRM?, LOCATION?).

⑥ CONNECT TO EXISTING x" COMBINED SANITARY PIPE.

⑦ SANITARY LATERALS PER MEP PLUMBING PLANS.

⑧ ROOF LEADERS PER MEP PLUMBING PLANS.

⑨ INSTALL ROOF LEADER CLEANOUT PER DETAIL x/L-401?

⑩ INSTALL SANITARY VENT & TRAP PER DETAIL X/L-400?

⑪ INSTALL SANITARY CLEANOUT PER DETAIL X/L-400?

⑫ INSTALL 4" WATER LINE. SHOWN FOR COORDINATION PURPOSES ONLY. REFER TO MEP DRAWINGS FOR LOCATION AT BUILDING OR EXISTING WATER?

⑬ INSTALL PROPOSED 2" GAS AND CONNECT TO EXISTING GAS LATERAL AS SHOWN. REFER TO MEP DRAWINGS FOR LOCATION AT BUILDING. COORDINATE CONNECTION WITH NATIONAL GRID?

⑭ INSTALL CURB STOP OR GATE VALVE (PENDING MEP DESIGN) PER DETAIL 2/L-402. MEP TO PROVIDE CONNECTION REQUIREMENTS FOR DOMESTIC WATER AND FIRE PROTECTION?

⑮ COORDINATE WATER CONNECTION WITH CITY OF SYRACUSE DEPARTMENT OF WATER (315-448-8340)?

⑯ INSTALL FIRE DEPT. CONNECTION AT BUILDING PER CITY OF SYRACUSE AND MEP. LOCATION SHOWN FOR COORDINATION PURPOSES ONLY. SYRACUSE FIRE DEPARTMENT TO APPROVE FINAL LOCATION (ELTON DAVIS - 315-448-4777).

⑰ FIRE DEPARTMENT TO INSPECT "DRIVE THRU" PRIOR TO FINAL PAVING AND CURBING INSTALLTION. CONTACT CITY FIRE DEPARTMENT (ELTON DAVIS - 315-448-4777).

⑱ INSTALL KNOX BOX PER ARCHITECTURAL DRAWINGS. SYRACUSE FIRE DEPARTMENT TO APPROVE FINAL LOCATION (ELTON DAVIS - 315-448-4777).

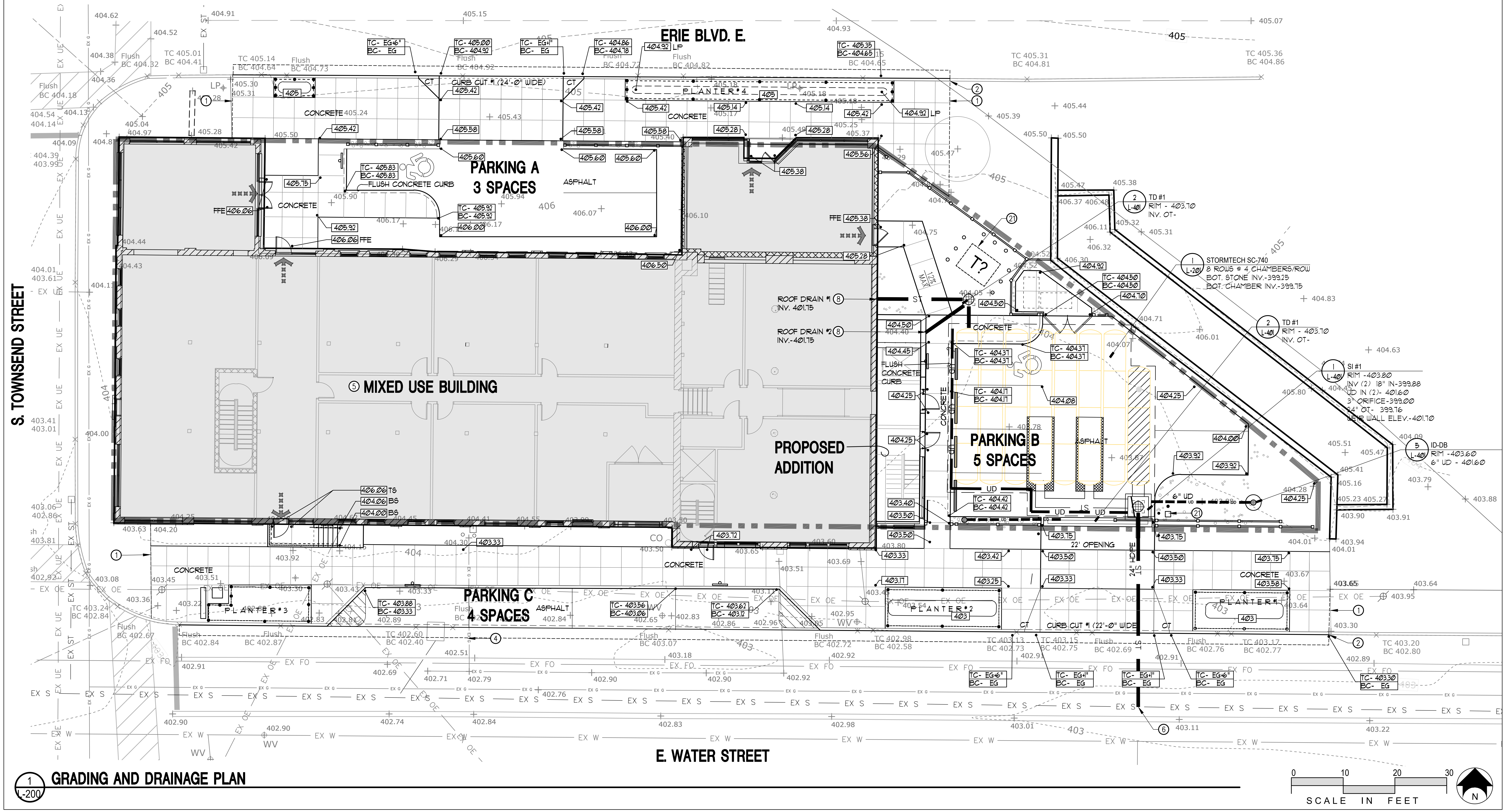
⑲ INSTALL LIGHTING POLES, BASES, WIRING, AND POWER PER ELECTRICAL PLANS.

⑳ SITEWORK CONTRACTOR TO COORDINATE AND INSTALL GATE OPERATOR, POWER SUPPLY, GATE LOOPS, AND OTHER ACCESSORIES PER ELECTRICAL AND LIGHTING DRAWINGS.

㉑ TRANSFORMER PAD AND BOLLARDS ARE SHOWN FOR COORDINATION PURPOSES ONLY. REFER TO ELECTRICAL/ MEP DRAWINGS. (MEP CONFIRM?)

㉒ CONTRACTOR TO PROVIDE CITY OF SYRACUSE APPROVED TRAFFIC CONTROL MEASURES AND FLAGGING.

㉓ INSTALL 'BEE-HIVE' GRATE (MODEL # OR APPROVED EQUAL) FOR STORM INLET LOCATION.



1 L-200 **GRADING AND DRAINAGE PLAN**

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REGISTERED LANDSCAPE ARCHITECT SCOTT LEE FREEMAN 001473 STATE OF NEW YORK

STATE OF NEW YORK RUDY L. ZONA 079543 LICENSED PROFESSIONAL ENGINEER
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GRADING AND
DRAINAGE PLAN

L-200

NOT FOR CONSTRUCTION – CITY OF SYRACUSE SITE PLAN REVIEW

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	IAN KUCHMAN 585-472-1312 IAN.KUCHMAN@ADS-PIPE.COM
ADS SALES REP:	CHRIS PHELPS 315-715-5683 CHRIS.PHELPS@ADS-PIPE.COM
PROJECT NO:	S163717

ADVANCED DRAINAGE SYSTEMS, INC.

FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

500 E. ERIE BLVD - SMITH BUILDING

SYRACUSE, NY

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

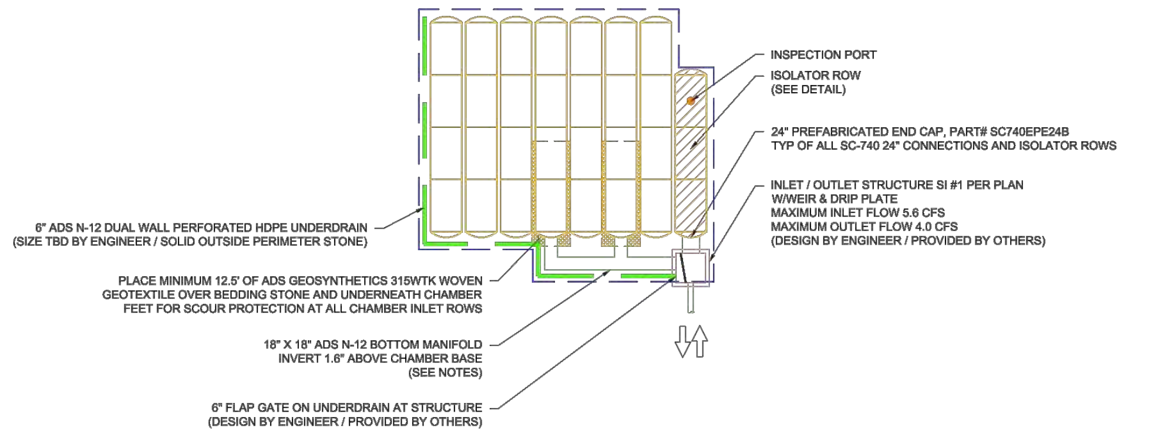
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

CONCEPTUAL LAYOUT	
31	STORMTECH SC-740 CHAMBERS
16	STORMTECH SC-740 END CAPS
6	STONE ABOVE (in)
6	STONE BELOW (in)
40	% STONE VOID
2705	**INSTALLED SYSTEM VOLUME @ 399.40 (UNDERDRAIN INVERT) (CF) (PERIMETER STONE INCLUDED)**
1380	SYSTEM AREA (ft²)
154	SYSTEM PERIMETER (ft)

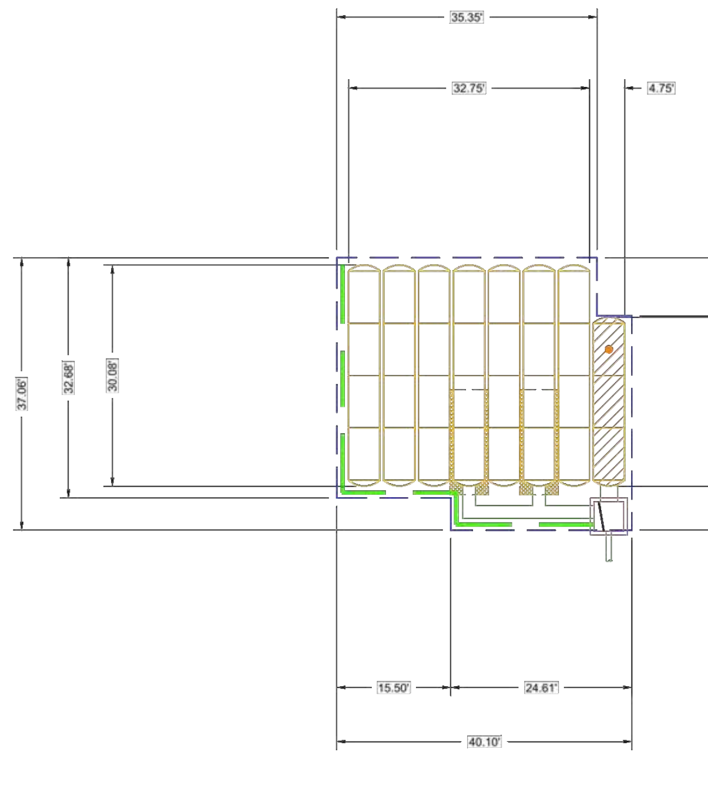
CONCEPTUAL ELEVATIONS	
410.25	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)
404.25	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)
403.75	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
403.75	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)
403.75	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT)
402.75	TOP OF STONE
402.25	TOP OF SC-740 CHAMBER
399.88	18" BOTTOM MANIFOLD INVERT
399.76	24" ISOLATOR ROW CONNECTION INVERT
399.75	BOTTOM OF SC-740 CHAMBER
399.40	UNDERDRAIN INVERT
399.25	BOTTOM OF STONE

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- THE SITE DESIGN ENGINEER MUST REVIEW THE PROXIMITY OF THE CHAMBERS TO THE BUILDING/STRUCTURE. NO FOUNDATION LOADS SHALL BE TRANSMITTED TO THE CHAMBERS. THE SITE DESIGN ENGINEER MUST CONSIDER EFFECTS OF POSSIBLE SATURATED SOILS ON BEARING CAPACITY OF SOILS AND SEEPAGE INTO BASEMENTS.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.



SHEET 2 OF 6

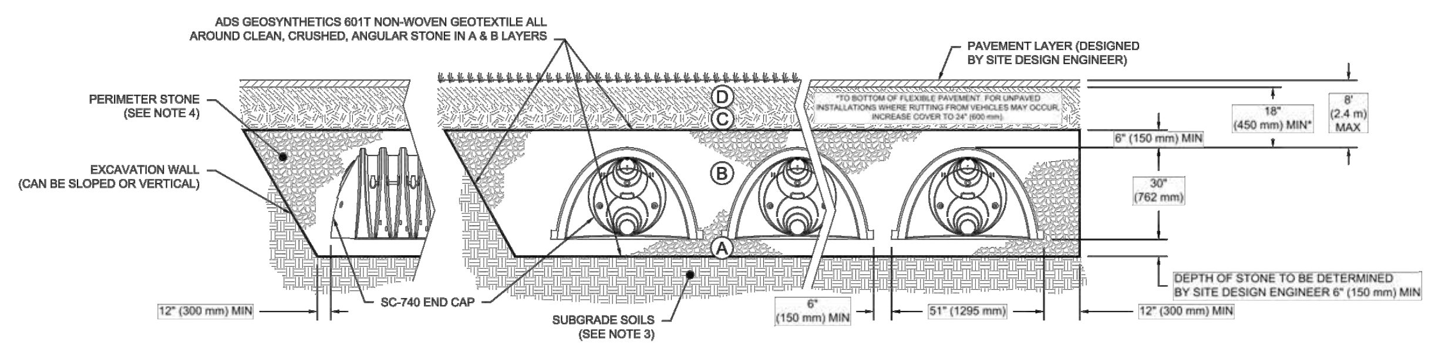


SHEET 3 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145¹ A-1, A-2-4, A-3 OR AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.^{2,3}

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

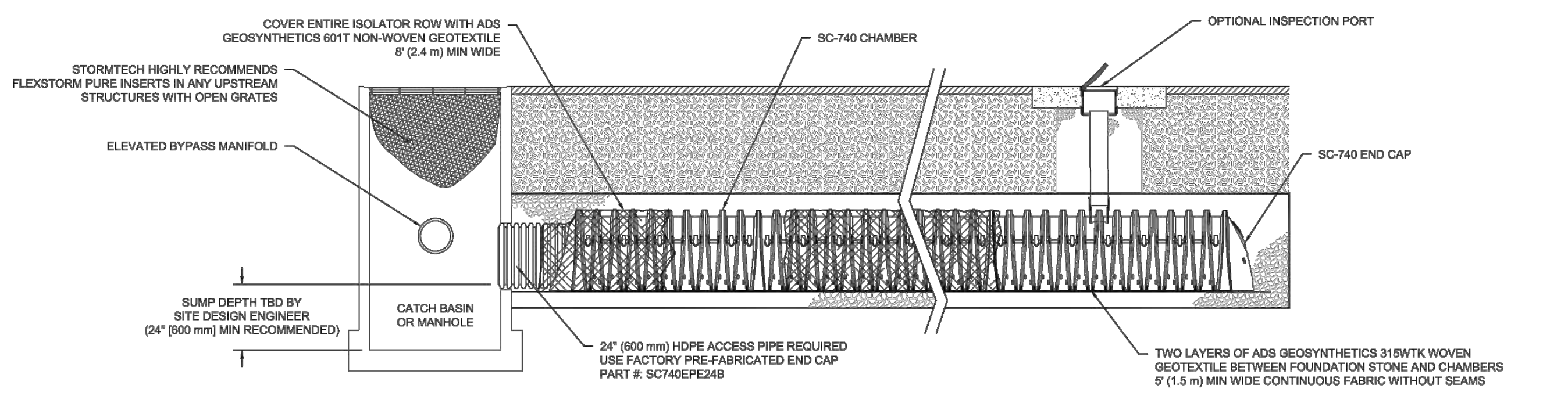
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

500 E. ERIE BLVD - SMITH BUILDING
SYRACUSE, NY
DATE: 01/06/20 DRAWN: TSG
PROJECT #: S163717 CHECKED: JDL

4640 TRUEMAN BLVD
HILLIARD, OH 43026

520 CROMWELL AVENUE | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

SHEET 4 OF 6



SC-740 ISOLATOR ROW DETAIL

NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

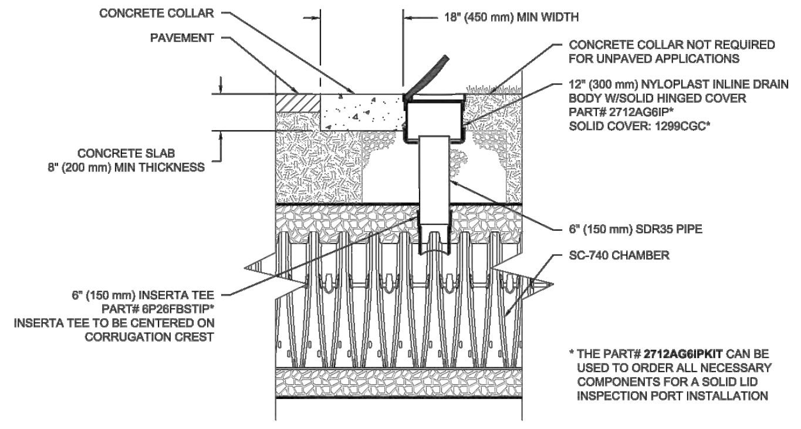
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



* THE PART# **2712AG6IPKIT** CAN BE USED TO ORDER ALL NECESSARY COMPONENTS FOR A SOLID LID INSPECTION PORT INSTALLATION

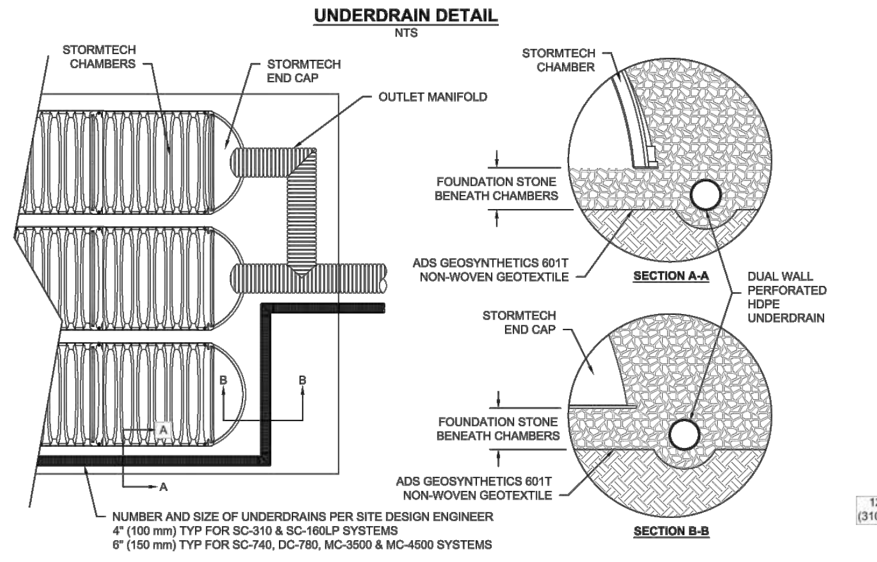
SC-740 6" (150 mm) INSPECTION PORT DETAIL

NTS

SHEET 5 OF 6

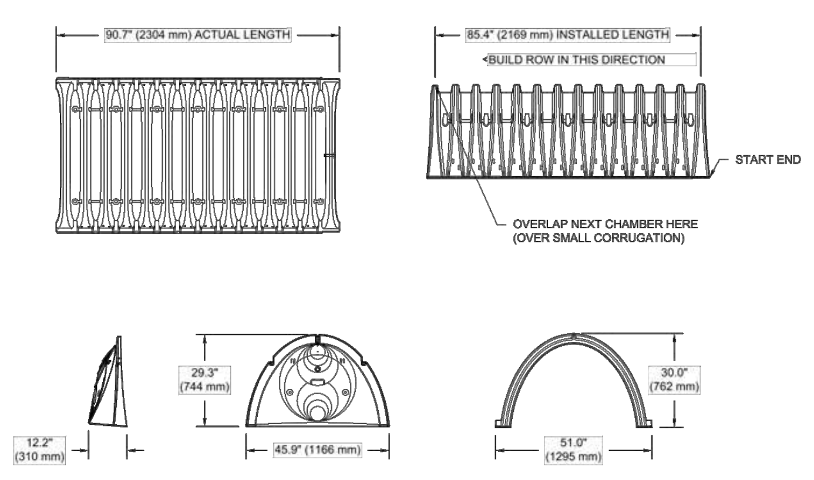
UNDERDRAIN DETAIL

NTS



SC-740 TECHNICAL SPECIFICATION

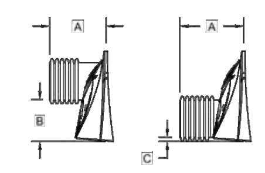
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

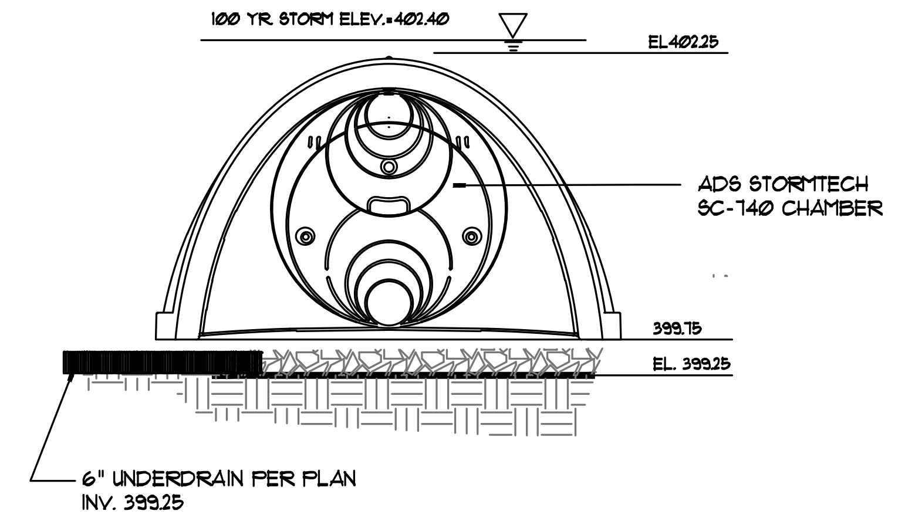
PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	—
SC740EPE06B / SC740EPE06BPC			—	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	—
SC740EPE08B / SC740EPE08BPC			—	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	—
SC740EPE10B / SC740EPE10BPC			—	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	—
SC740EPE12B / SC740EPE12BPC			—	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	—
SC740EPE15B / SC740EPE15BPC			—	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	—
SC740EPE18B / SC740EPE18BPC			—	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	—	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

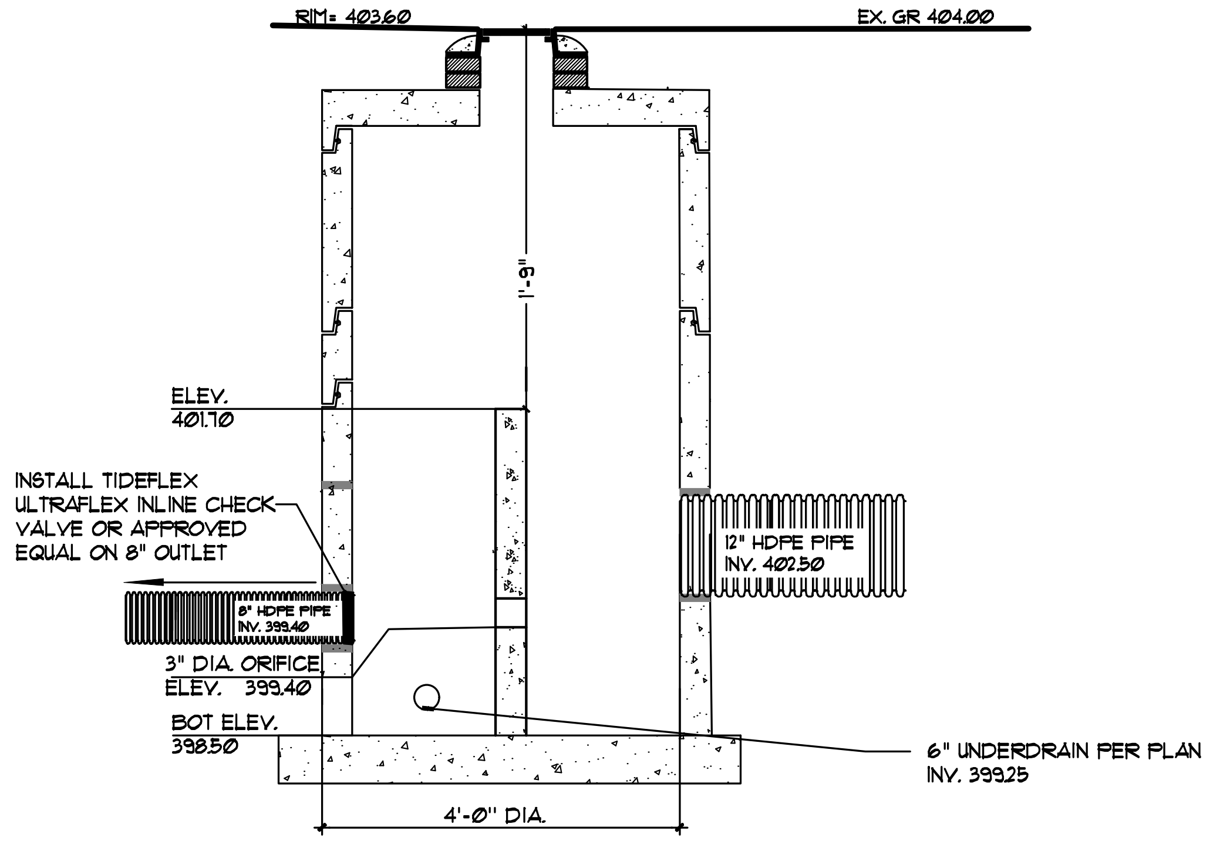
* FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

SHEET 6 OF 6



SECTION-INFILTRATION BASIN



*NOTE: SECTION SHOWN FOR SCHEMATIC PURPOSES ONLY

SECTION

1 L-201 OUTLET CONTROL/OVERFLOW STRUCTURE

NOT TO SCALE

KEPLINGER FREEMAN ASSOCIATES
LANDSCAPE ARCHITECTURE & LAND PLANNING
6320 FLY ROAD, SUITE 109 EAST SYRACUSE, NEW YORK 13057
PHONE: (315) 445-7980 FAX: (315) 445-7981

RZ Engineering, PLLC
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6320 FLY ROAD SUITE 109
EAST SYRACUSE, NY 13057
PH: 315.432.1089 FAX: 315.445.7981

SCOTT LEE FREEMAN 001473

RUDY L. ZONA 079543

UTILIZED FOR STORMWATER AND SANITARY DESIGN

SMITH MIXED USE BUILDING and SITE REDEVELOPMENT

500 E. ERIE BLVD., CITY OF SYRACUSE, NY

REVISIONS

Drawn By: V.E.R.
Checked By: S.L.F.
KFA Proj. No.: 39075
Date: FEBRUARY 05, 2020
Scale: AS NOTED
Title:

GRADING PLAN DETAILS

L-201

NOT FOR CONSTRUCTION – CITY OF SYRACUSE SITE PLAN REVIEW

LAYOUT CONSTRUCTION NOTES

SMITH-LAYOUT-NOTES

1. PAINT 4" WIDE YELLOW LINES (TYP.)
2. PAINT 4" WIDE YELLOW LINES 2'-0" O.C. @ 45°
3. BUILDING ADDITION LAYOUT SHALL BE PARALLEL AND PERPENDICULAR TO PROPERTY LINE.
4. PAINT RESERVED PARKING STALLS PER DETAIL 10/L-401.
5. INSTALL SIGN BOLLARDS PER DETAIL 9/L-401.
6. INSTALL CITY OF SYRACUSE ASPHALT PAVEMENT DETAIL PER X/L-401.
7. INSTALL CITY OF SYRACUSE CONCRETE PAVEMENT (PEDESTRIAN) PER DETAIL 13/L-400.
8. INSTALL CITY OF SYRACUSE CONCRETE PAVEMENT (VEHICULAR) PER DETAIL 12/L-400.
9. INSTALL POST AND CHAIN PER DETAIL 2/L-402.
10. INSTALL BIKE RACKS PER DETAIL 7/L-401 FOR VISITOR USE. BIKE RACKS TO BE INSTALLED ON INSIDE OF BUILDING FOR TENANT USE.
11. INSTALL VINYL 6' FENCE PER DETAIL 4/L-402.
12. INSTALL ASPHALT PAVEMENT PER DETAIL 7/L-400.
13. INSTALL CONCRETE PAD AT ENTRY PER DETAIL 17/L-400.
14. OMITTED
15. INSTALL CONCRETE PAVEMENT W/ FLUSH CURB PER DETAIL 14/L-400.
16. INSTALL BENCH PER DETAIL 3/L-402.
17. INSTALL BUILDING SIGNAGE PER ARCHITECTURAL DRAWINGS.
18. INSTALL BICYCLE REPAIR STATION PER DETAIL X.XX.
19. INSTALL CITY OF SYRACUSE ASPHALT REPLACEMENT PER DETAIL 9/L-400.
20. INSTALL CITY OF SYRACUSE GRANITE CURB REPLACEMENT PER DETAIL X.XX.
21. INSTALL BOLLARD PER DETAIL XXX.
22. INSTALL AMERISTAR ECHELON PLUS PER DETAIL XXX.
23. INSTALL WHEEL STOP PER DETAIL XXX.

PLANT LIST

KEY	COMMON NAME	BOTANICAL NAME	CALIPER	TREE HT	BRANCH HT	CONDITION
TREES						
Ac	SHADBUSH SERVICEBERRY	AMELANCHIER CANADENSIS	2.5" CAL.	–	6' – 8'	–
Gtd	STREETKEEPER COLUMNAR HONEYLOCUST	GLEDITSIA TRIACANTHOS INERMIS 'DRAVES'	2.5" CAL.	–	6' – 8'	–
Qb	SWAMP WHITE OAK	QUERCUS BICOLOR	2.5" CAL.	–	6' – 8'	–
EVERGREENS						
Tm	'DENSIFORMIS' YEW	TAXUS MEDIA 'DENSIFORMIS'	–	3 GAL.	–	--
To	'EMERALD GREEN' ARBORVITAE	THUJA OCCIDENTALIS 'EMERALD GREEN'	–	4'–5'	–	--
SHRUBS						
Cs	'KELSEY' RED OSIER DOGWOOD	CORNUS SERICEA 'KELSEYLL'	--	2 GAL.	–	--
Hpl	LITTLE LIME HYDRANGEA	HYDRANGEA PANICULATA 'LITTLE LIME'	3.5' – 4.5'	3 GAL.	–	--
Mp	MORTON NORTHERN BAYBERRY	MYRICA PENSYLVANICA SILVER SPRITE 'MORTON'	--	2 GAL.	–	--
Sj	GOLDFLAME SPIREA	SPIREA JAPONICA 'GOLDFLAME'	--	2 GAL.	–	--
PERENNIALS and GRASSES						
G–Av	BROOMSEDGE	ANDROPOGON VIRGINICUS	--	1. GAL	–	–
G–Cl	NORTHERN SEA OATS	CHASMANTHIUM LATIFOLIUM	--	1. GAL	–	–
G–Cv	FOX SEDGE	CAREX VULPINOIDEA	--	1. GAL	–	–
Lm	LILYTURF	LIRIOPE MUSCARI	--	1. GAL	–	–
Pa	RUSSIAN SAGE	PEROVSKIA ATRIPLICIFOLIA	--	1. GAL	–	–
Rh	BLACK EYED SUSAN	RUDEBECKIA HIRTA	--	1. GAL	–	–

PLANT NOTES

△1 3" DEPTH SHREDDED BARK MULCH WITH 18" OF SCREENED TOPSOIL.

△2 INSTALL 3'-0" DEPTH SCREENED TOPSOIL.

△3 INSTALL SODDED LAWN PER DETAIL 7/L-500.

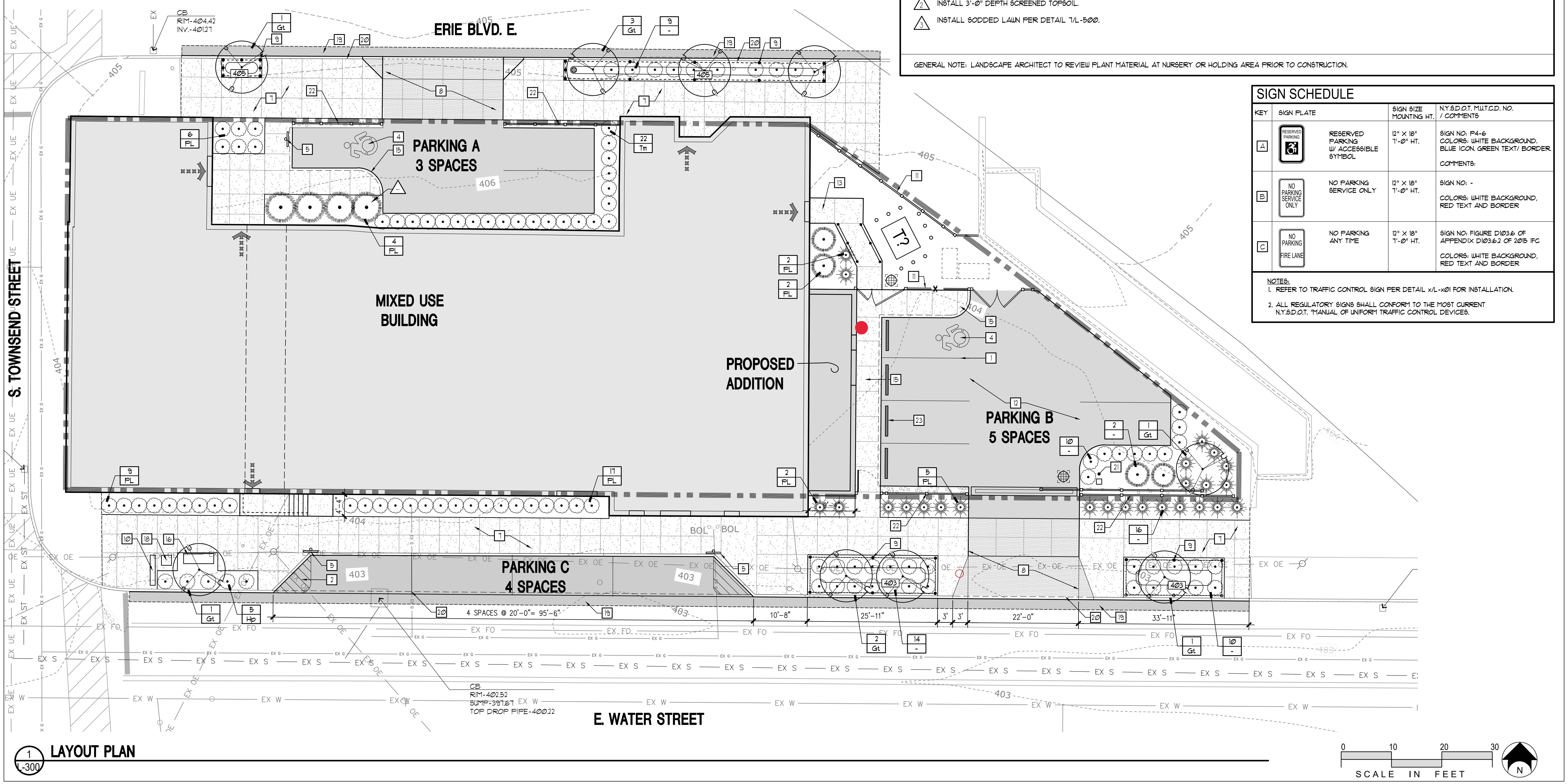
△4 INSTALL TREE PIT PER DETAIL 9/L-500. CONTRACTOR TO COORDINATE TREE INSTALLATION WITH CITY ARBORIST, STEVE HARRIS.

GENERAL NOTE: LANDSCAPE ARCHITECT TO REVIEW PLANT MATERIAL AT NURSERY OR HOLDING AREA PRIOR TO CONSTRUCTION.

SIGN SCHEDULE

KEY	SIGN PLATE		SIGN SIZE MOUNTING HT.	N.Y.S.D.O.T. M.U.T.C.D. NO. / COMMENTS
A	RESERVED PARKING	RESERVED PARKING W/ ACCESSIBLE SYMBOL	12" X 18" 7'-0" HT.	SIGN NO: P4-6 COLORS: WHITE BACKGROUND. BLUE ICON. GREEN TEXT/ BORDER. COMMENTS:
B	NO PARKING SERVICE ONLY	NO PARKING SERVICE ONLY	12" X 18" 7'-0" HT.	SIGN NO: - COLORS: WHITE BACKGROUND, RED TEXT AND BORDER
C	NO PARKING FIRE LANE	NO PARKING ANY TIME	12" X 18" 7'-0" HT.	SIGN NO: FIGURE D103.6 OF APPENDIX D103.6.2 OF 2015 IFC COLORS: WHITE BACKGROUND, RED TEXT AND BORDER

NOTES:
1. REFER TO TRAFFIC CONTROL SIGN PER DETAIL x/L-x01 FOR INSTALLATION.
2. ALL REGULATORY SIGNS SHALL CONFORM TO THE MOST CURRENT N.Y.S.D.O.T. "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.



1 L-300 LAYOUT PLAN

KEPLINGER FREEMAN ASSOCIATES
LANDSCAPE ARCHITECTURE & LAND PLANNING
6320 FLY ROAD, SUITE 109 EAST SYRACUSE, NEW YORK 13057
PHONE: (315) 445-7980 FAX: (315) 445-7981

RZ Engineering, PLLC
STORMWATER SANITARY WATER ENVIRONMENTAL TRANSPORTATION
6320 FLY ROAD SUITE 109
EAST SYRACUSE, NY 13057
PH: 315.432.1089 FAX: 315.445.7981

Client:

SMITH MIXED USE BUILDING and
SITE REDEVELOPMENT
500 E. ERIE BLVD., CITY OF SYRACUSE, NY

REVISIONS

Drawn By: V.E.R.
Checked By: S.L.F.
KFA Proj. No.: 39075
Date: JANUARY 20, 2020
Scale: AS NOTED

Title:

LAYOUT PLAN

L-300

NOT FOR CONSTRUCTION – PROGRESS PLAN

SIGN SCHEDULE

KEY	SIGN PLATE		SIGN SIZE MOUNTING HT.	N.Y.S.D.O.T. M.U.T.C.D. NO. / COMMENTS
A	RESERVED PARKING ♿	RESERVED PARKING W/ ACCESSIBLE SYMBOL	12" X 18" 7'-0" HT.	SIGN NO: P4-6 COLORS: WHITE BACKGROUND. BLUE ICON. GREEN TEXT/ BORDER. COMMENTS:
B	NO PARKING SERVICE ONLY	NO PARKING SERVICE ONLY	12" X 18" 7'-0" HT.	SIGN NO: - COLORS: WHITE BACKGROUND, RED TEXT AND BORDER
C	NO PARKING FIRE LANE	NO PARKING ANY TIME	12" X 18" 7'-0" HT.	SIGN NO: FIGURE D103.6 OF APPENDIX D103.6.2 OF 2015 IFC COLORS: WHITE BACKGROUND, RED TEXT AND BORDER

NOTES:

1. REFER TO TRAFFIC CONTROL SIGN PER DETAIL 9/L-401 FOR INSTALLATION.
2. ALL REGULATORY SIGNS SHALL CONFORM TO THE MOST CURRENT N.Y.S.D.O.T. "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

LAYOUT CONSTRUCTION NOTES

SMITH-LAYOUT-NOTES

1 PAINT 4" WIDE YELLOW LINES (TYP.)
2 PAINT 4" WIDE YELLOW LINES 2'-0" O.C. @ 45°
3 BUILDING ADDITION LAYOUT SHALL BE PARALLEL AND PERPENDICULAR TO PROPERTY LINE.
4 PAINT RESERVED PARKING STALLS PER DETAIL 10/L-401.
5 INSTALL SIGN PER DETAIL 9/L-401.
6 INSTALL CITY OF SYRACUSE ASPHALT PAVEMENT DETAIL PER 8/L-400.
7 INSTALL CITY OF SYRACUSE CONCRETE PAVEMENT (PEDESTRIAN) PER DETAIL 13/L-400.
8 INSTALL CITY OF SYRACUSE CONCRETE PAVEMENT (VEHICULAR) PER DETAIL 12/L-400.
9 INSTALL POST AND CHAIN PER DETAIL 3/L-402.
10 INSTALL BIKE RACKS PER DETAIL 7/L-401 FOR VISITOR USE. BIKE RACKS TO BE INSTALLED ON INSIDE OF BUILDING FOR TENANT USE.
11 INSTALL VINYL 6' FENCE PER DETAIL 4/L-402.
12 INSTALL ASPHALT PAVEMENT PER DETAIL 7/L-400.
13 INSTALL CONCRETE PAD AT ENTRY PER DETAIL 17/L-400.
14 INSTALL WALL MOUNT RAILING PER DETAIL 7/L-402.
15 INSTALL CONCRETE PAVEMENT W/ FLUSH CURB PER DETAIL 14/L-400.
16 REFER TO WATER ST. STAIR DETIAL 1/L-402.
17 MOUNT TRAFFIC SIGNAGE TO BUILDING FACE.
18 INSTALL BICYCLE REPAIR STATION PER DETAIL 6/L-402.
19 INSTALL CITY OF SYRACUSE ASPHALT REPLACEMENT PER DETAIL 9/L-400.
20 INSTALL CITY OF SYRACUSE GRANITE CURB REPLACEMENT PER DETAIL 10/L-400.
21 INSTALL BOLLARD PER DETAIL 8/L-401.
22 INSTALL 6' ORNAMENTAL FENCE PER DETAIL 15/L-401.
23 INSTALL WHEEL STOP PER DETAIL 5/L-402.
24 INSTALL VEHICULAR AUTOMATIC SLIDE GATE PER DETAIL 1/L-403. REFER TO MEP DRAWINGS FOR POWER SUPPLY. ACCESSIBILITY OPTIONS SHALL BE REVIEWED WITH OWNER AND DOCUMENTED WITHIN A SUBMITTAL FOR REVIEW PRIOR TO CONSTRUCTION. CONTRACTOR TO PROVIDE MANUFACTURER'S PRODUCT DATA AND SHOP DRAWINGS SUBMITTALS FOR REVIEW. REFER TO SPECIFICATIONS. (CONTACT JOESPH KISELICA - 315-635-0098)
25 INSTALL 6' HT. PEDESTRIAN AUTOMATIC CLOSE SWING GATE PER DETAIL 2/L-403. REFER TO MEP DRAWINGS FOR POWER SUPPLY. ACCESSIBILITY OPTIONS SHALL BE REVIEWED WITH OWNER AND DOCUMENTED WITHIN A SUBMITTAL FOR REVIEW PRIOR TO CONSTRUCTION. CONTRACTOR TO PROVIDE MANUFACTURER'S PRODUCT DATA AND SHOP DRAWINGS SUBMITTALS FOR REVIEW. REFER TO SPECIFICATIONS. (CONTACT JOESPH KISELICA - 315-635-0098).
26 GATE CONTROLLER SUPPLIED BY FENCE INSTALLER. MEP TO PROVIDE POWER AND COORDINATE ACCESS OPTIONS. FULL SUBMITTAL REQUIRED FOR REVIEW WITH PAULUS DEVELOPMENT PRIOR TO CONSTRUCTION. REFER TO SPECIFICATIONS. (CONTACT JOESPH KISELICA - 315-635-0098)

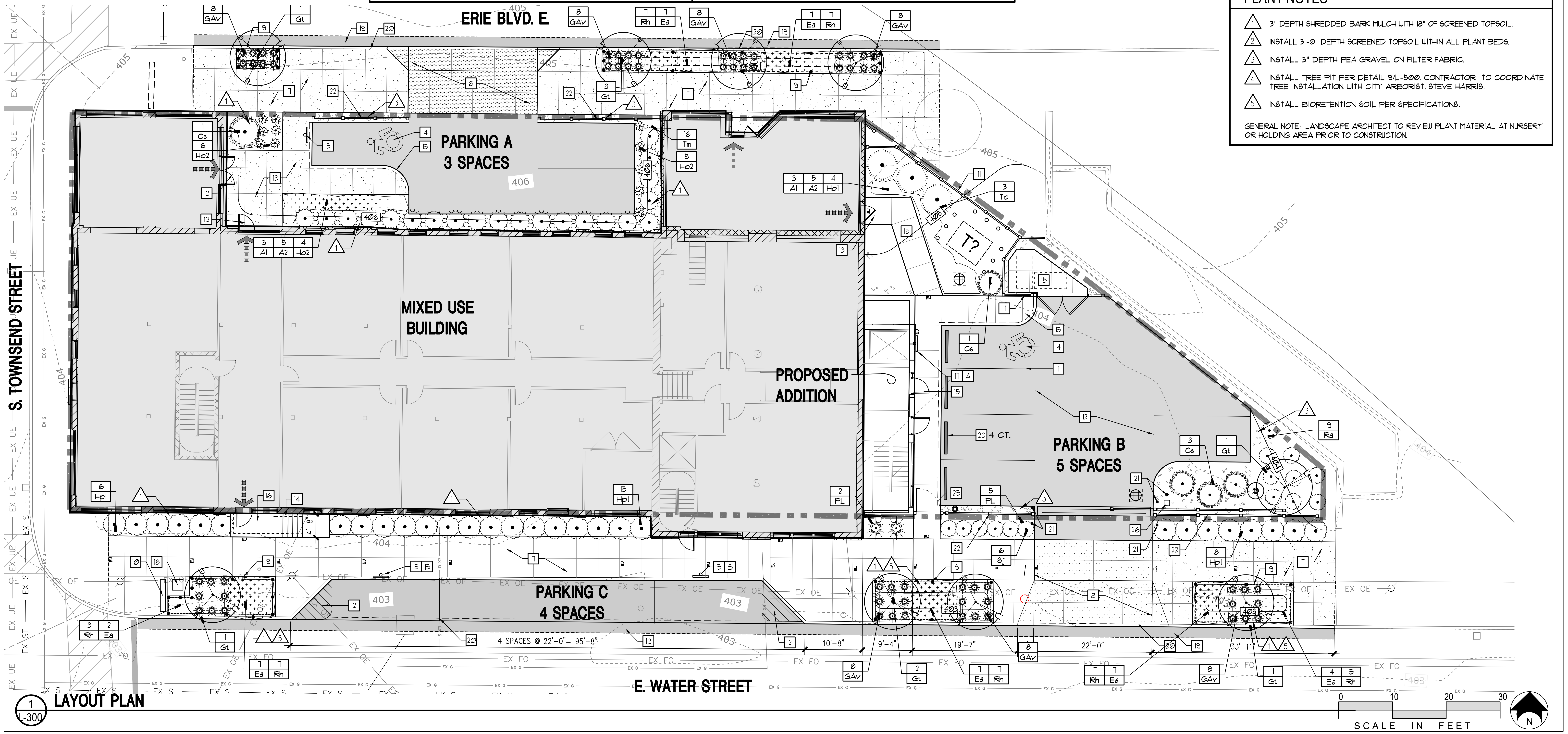
PLANT LIST

KEY	COMMON NAME	BOTANICAL NAME	CALIPER	TREE HT
TREES				
Ac	SHADBUSH SERVICEBERRY	AMELANCHIER CANADENSIS	2.5" CAL.	6'–8'
Gtd	STREETKEEPER COLUMNAR HONEYLOCUST	GLEDITSIA TRIACANTHOS INERMIS 'DRAVES'	2.5" CAL.	6'–8'
Qb	SWAMP WHITE OAK	QUERCUS BICOLOR	2.5" CAL.	6'–8'
EVERGREENS				
Tm	'DENSIFORMIS' YEW	TAXUS MEDIA 'DENSIFORMIS'	–	3 GAL.
To	'EMERALD GREEN' ARBORVITAE	THUJA OCCIDENTALIS 'EMERALD GREEN'	–	4'–5'
SHRUBS				
Cs	'KELSEY' RED OSIER DOGWOOD	CORNUS SERICEA 'KELSEYLL'	--	2 GAL.
Hpl	LITTLE LIME HYDRANGEA	HYDRANGEA PANICULATA 'LITTLE LIME'	3.5' – 4.5'	3 GAL.
Mp	MORTON NORTHERN BAYBERRY	MYRICA PENSYLVANICA SILVER SPRITE 'MORTON'	--	2 GAL.
Ra	'GRO–LOW' SUMAC	RHUS AROMATICA 'GRO–LOW'	--	2 GAL.
Sj	GOLDFLAME SPIREA	SPIREA JAPONICA 'GOLDFLAME'	--	2 GAL.
PERENNIALS and GRASSES				
G–Av	BROOMSEDGE	ANDROPOGON VIRGINICUS	--	1. GAL
G–Cl	NORTHERN SEA OATS	CHASMANTHIUM LATIFOLIUM	--	1. GAL
G–Cv	FOX SEDGE	CAREX VULPINOIDEA	--	1. GAL
As1	ASTIBLE	ASTIBLE 'DEUTCHLAND'	--	1. GAL
As2	ASTIBLE	ASTIBLE 'FANAL'	--	1. GAL
Ep	PURPLE CONEFLOWER	ECHINACEA PURPUREA	--	1. GAL
Ho1	HOSTA (part shade)	HOSTA 'AUGUST MOON'	--	1. GAL
Ho2	HOSTA (deep shade)	HOSTA 'FRANCES WILLIAMS'	--	1. GAL
Lm	LILYTURF	LIRIOPE MUSCARI	--	1. GAL
Rh	BLACK EYED SUSAN	RUDEBECKIA HIRTA	--	1. GAL

PLANT NOTES

1 3" DEPTH SHREDDED BARK MULCH WITH 18" OF SCREENED TOPSOIL.
2 INSTALL 3'-0" DEPTH SCREENED TOPSOIL WITHIN ALL PLANT BEDS.
3 INSTALL 3" DEPTH PEA GRAVEL ON FILTER FABRIC.
4 INSTALL TREE PIT PER DETAIL 9/L-500. CONTRACTOR TO COORDINATE TREE INSTALLATION WITH CITY ARBORIST, STEVE HARRIS.
5 INSTALL BIORETENTION SOIL PER SPECIFICATIONS.

GENERAL NOTE: LANDSCAPE ARCHITECT TO REVIEW PLANT MATERIAL AT NURSERY OR HOLDING AREA PRIOR TO CONSTRUCTION.



1
L-300
LAYOUT PLAN

KEPLINGER FREEMAN ASSOCIATES
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6320 FLY ROAD, SUITE 109 EAST SYRACUSE, NEW YORK 13057
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REGISTERED LANDSCAPE ARCHITECT
SCOTT LEE FREEMAN
001473
STATE OF NEW YORK

STATE OF NEW YORK
RUDY L. ZONA
079543
LICENSED PROFESSIONAL ENGINEER
UTILIZED FOR STORMWATER AND SANITARY DESIGN

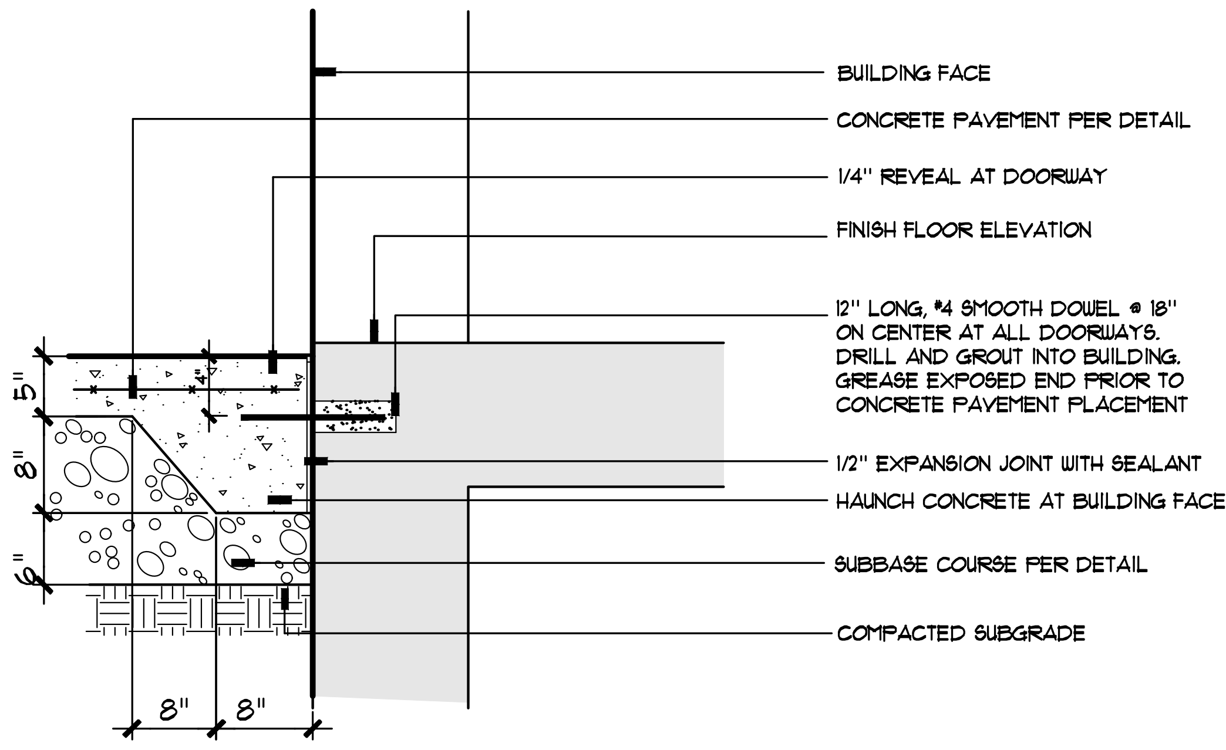
SMITH MIXED USE BUILDING and SITE REDEVELOPMENT
500 E. ERIE BLVD., CITY OF SYRACUSE, NY

REVISIONS

Drawn By: V.E.R.
Checked By: S.L.F.
KFA Proj. No.: 39075
Date: FEBRUARY 05, 2020
Scale: AS NOTED
Title:
LAYOUT AND PLANTING PLAN

L-300

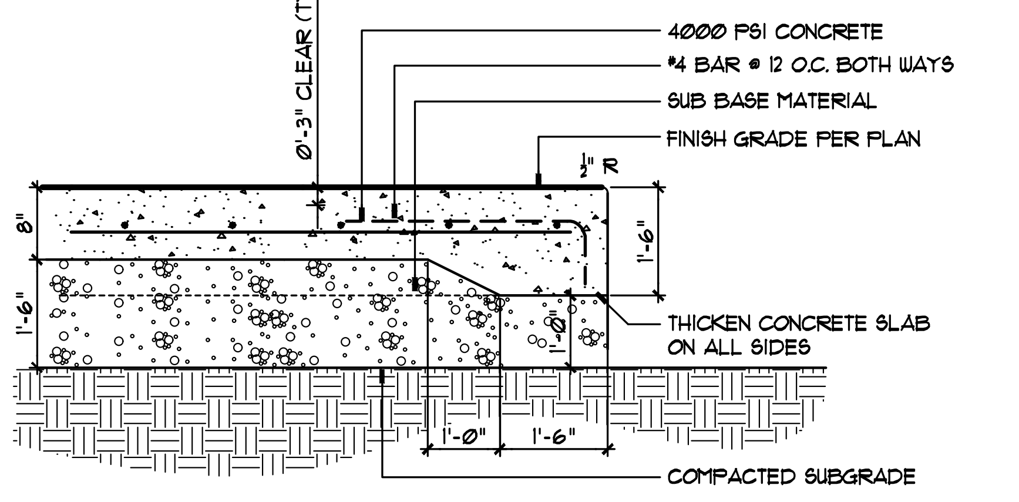
NOT FOR CONSTRUCTION – CITY OF SYRACUSE SITE PLAN REVIEW



SECTION

CONCRETE PAVEMENT W/ DOWEL @ CONCRETE THRESHOLD

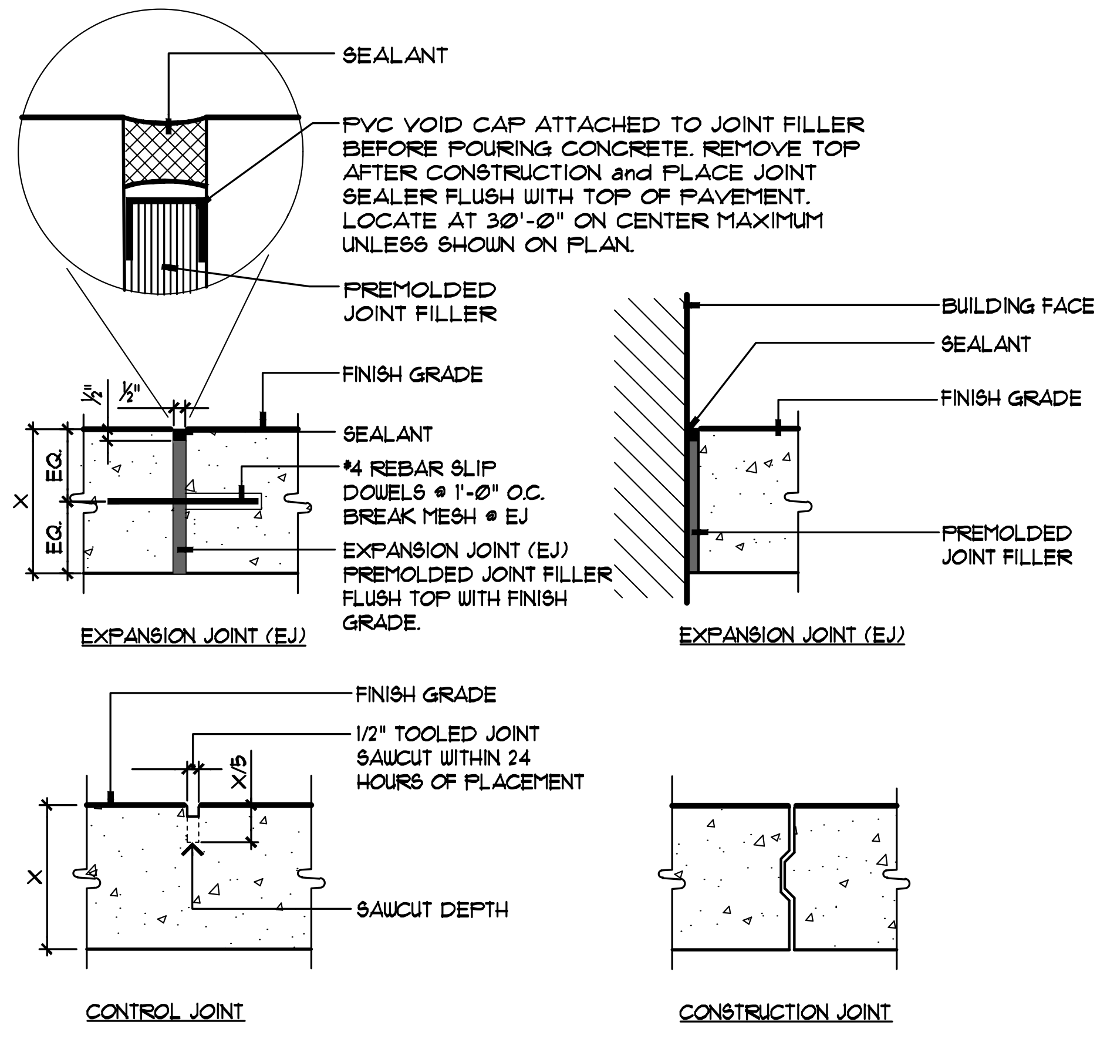
17
L-400
NOT TO SCALE
32-1313-10A



SECTION

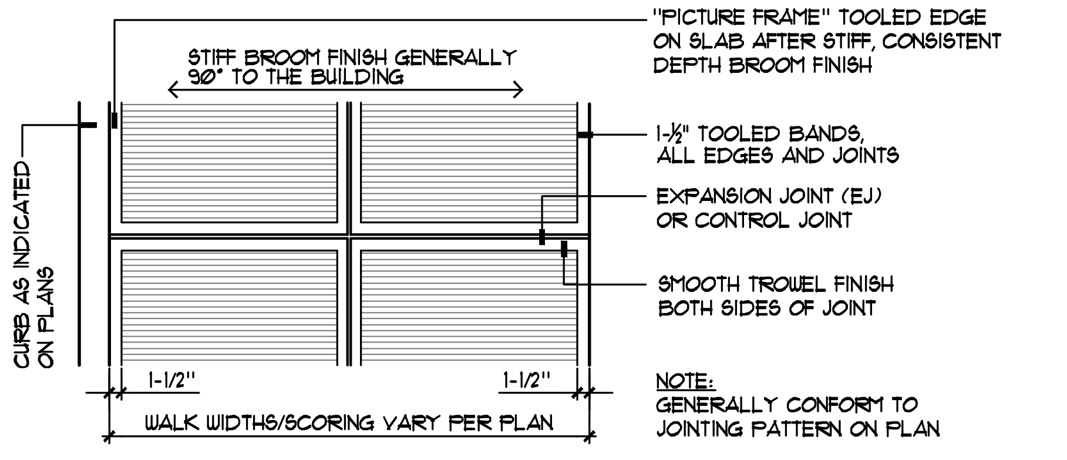
CONCRETE PAD - HEAVY DUTY

16
L-400
NOT TO SCALE:
32-1313-13A



NOTE: WHERE NEW CONCRETE WALK PAVEMENT ABUTS EXISTING CONCRETE WALK PAVEMENT, CORE DRILL AND EPOXY REBAR SIMILAR TO EXPANSION JOINT SECTION.

SECTION- CONCRETE JOINTS

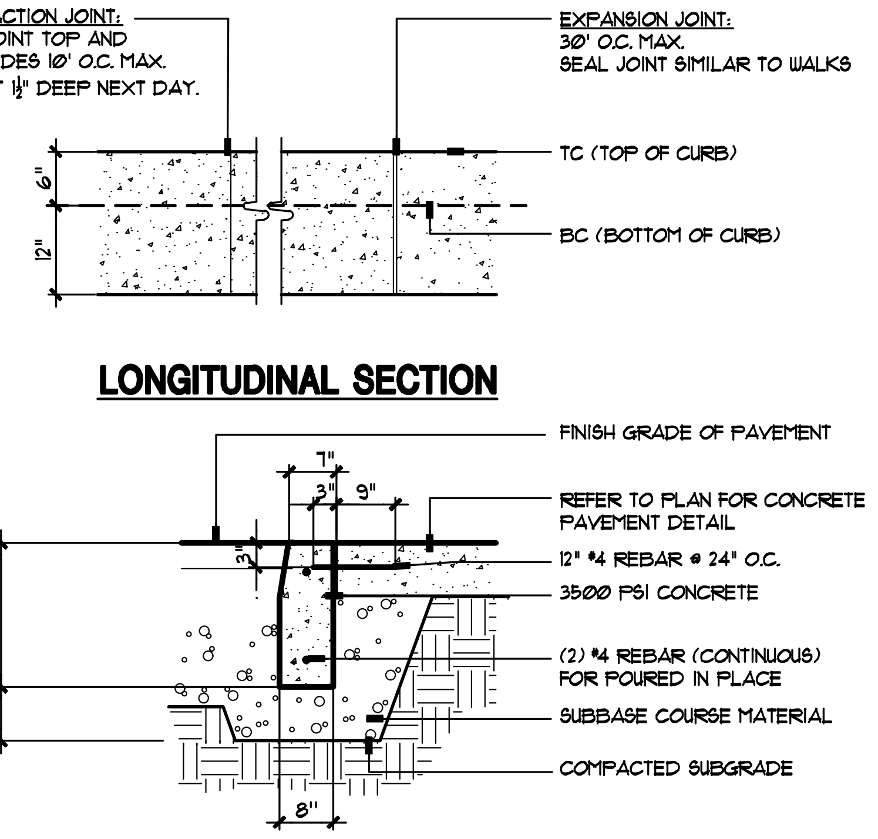


NOTE:
GENERALLY CONFORM TO JOINTING PATTERN ON PLAN

PLAN

CONCRETE FINISH AND JOINTS

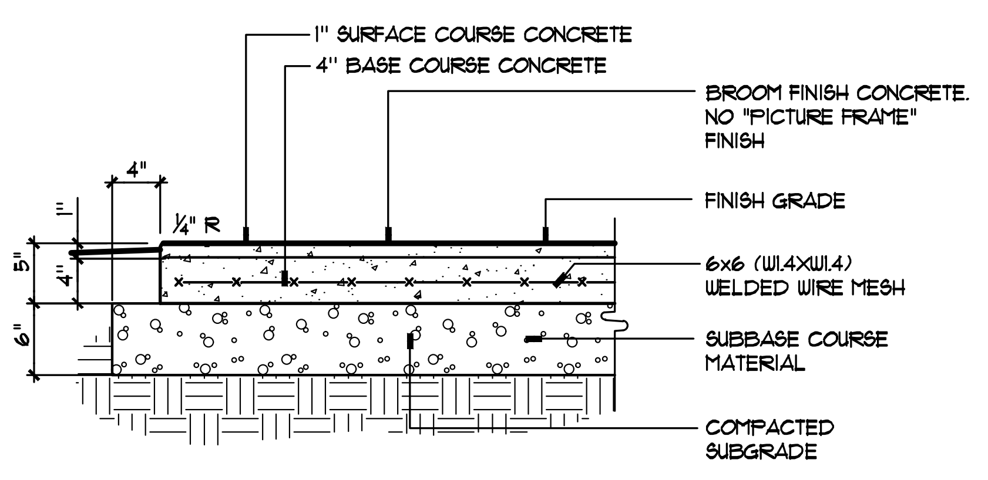
15
L-400
NOT TO SCALE
32-1313-03



SECTION

CONCRETE CURB and FLUSH SIDEWALK

14
L-400
NOT TO SCALE
32-1313-04C

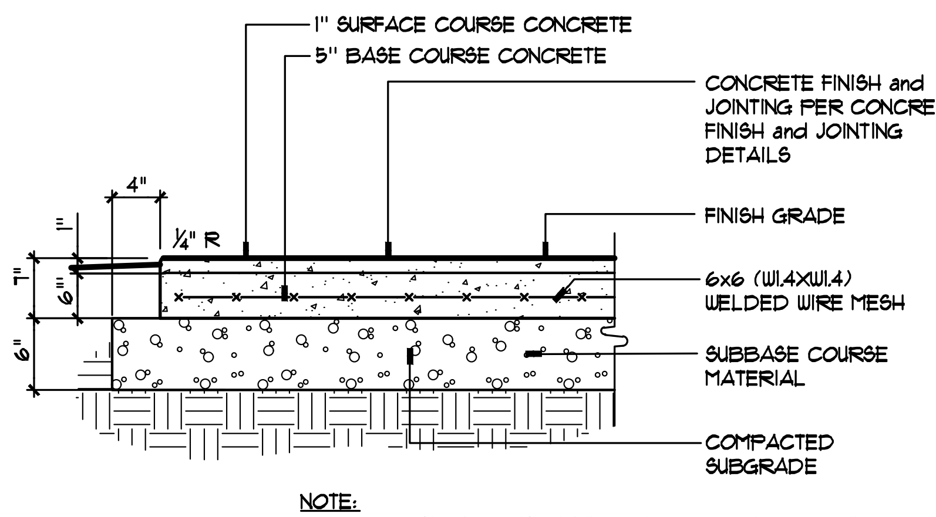


SECTION-SIDEWALK

NOTE:
1. TWO COURSE FIBROUS REINFORCED CONCRETE REQUIRED IN ALL CONCRETE PAVING.
2. ALL CONCRETE WORK SHALL COMPLY WITH CITY OF SYRACUSE STANDARDS.

CITY OF SYRACUSE CONCRETE PAVEMENT- 2 POUR

13
L-400
NOT TO SCALE
32-1313-02A

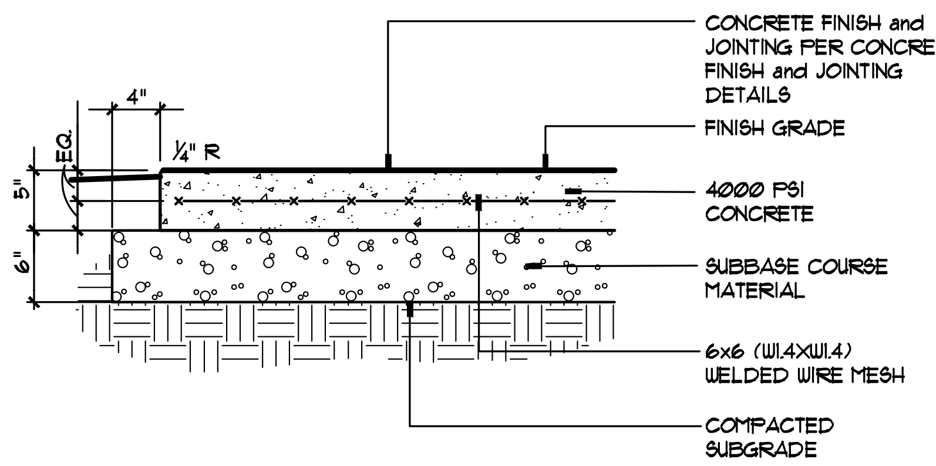


NOTE:
1. TWO COURSE FIBROUS REINFORCED CONCRETE REQUIRED IN ALL CONCRETE PAVING.

SECTION

CITY OF SYRACUSE CONCRETE PAVEMENT - 2 POUR HEAVY DUTY (7")

12
L-400
NOT TO SCALE
32-1313-02B



SECTION

CONCRETE PAVEMENT

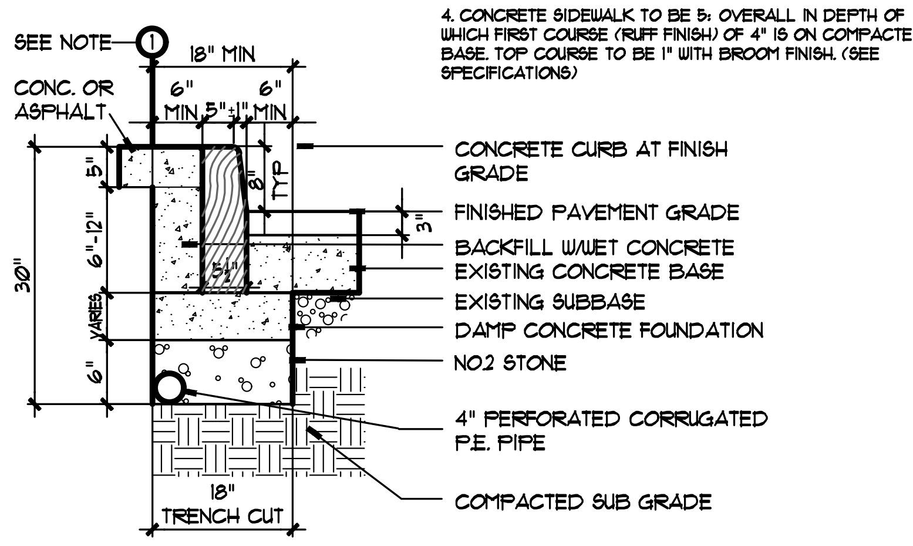
11
L-400
NOT TO SCALE
32-1313-01A

NOTES:
1. SIDEWALK OR DRIVEWAY WITH CONCRETE OR ASPHALT SURFACE TO BE SAWCUT 11" BACK FROM FACE OF CURB.

2. REMOVAL AND RESTORATION OF EXISTING AND NEW MATERIAL RESPECTIVELY TO BE AS DIRECTED BY CITY'S ENGINEER.

3. 8" DIMENSION FROM TOP OF CURB TO BOTTOM OF CURB IS OPTIMAL DESIGN DIMENSION.
THIS DIMENSION WILL VERY DUE TO CHANGES IN PAVEMENT GRADES AS PER DETAIL PLANS OF THE CITY'S ENGINEER.

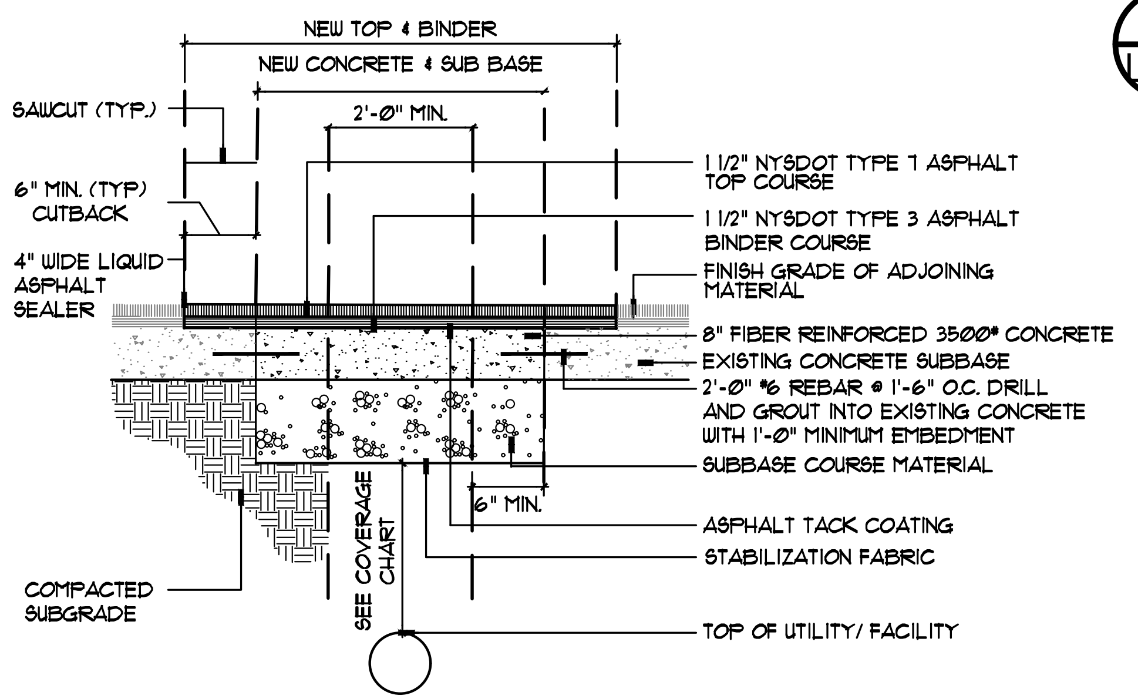
4. CONCRETE SIDEWALK TO BE 5: OVERALL IN DEPTH OF WHICH FIRST COURSE (RUFF FINISH) OF 4" IS ON COMPACTED BASE. TOP COURSE TO BE 1" WITH BROOM FINISH. (SEE SPECIFICATIONS)



SECTION

CITY OF SYRACUSE GRANITE CURB REPLACEMENT

10
L-400
NOT TO SCALE



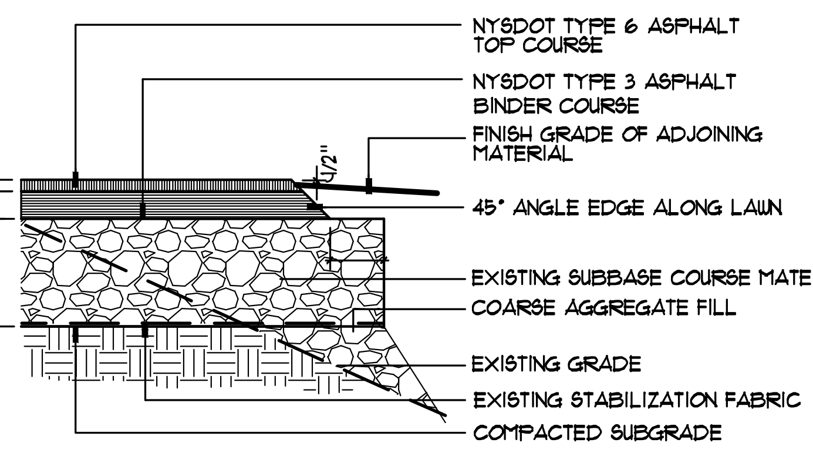
MINIMUM COVER	
3'-0"	GAS, ELECTRIC, CABLE, TV, TELECOMMUNICATIONS
5'-0"	WATER
3'-0"+ AS DIRECTED BY CITY'S ENGINEER	ALL OTHERS

NOTE:
1. IN NO CASE SHALL THE TOP OF CONCRETE BASE BE HIGHER THAN THAT OF THE SURROUNDING EXISTING CONCRETE
2. IF PAVEMENT MARKINGS OR SIGNAL LOOPS ARE DISTURBED OR DESTROYED THEY SHALL BE REPLACED IN ACCORDANCE WITH THE CITY OF SYRACUSE STANDARDS.
3. MATCH EXISTING PAVEMENT SLOPE.
4. IF, IN THE OPINION OF THE CONTRACTOR, THE EXISTING CONCRETE FOUNDATION IS IN POOR CONDITION, THE ENGINEER SHALL BE CONTACTED FOR PRIOR APPROVAL TO ELIMINATE DOWELS.

SECTION

ASPHALT REPAIR- CONCRETE BASE CITY OF SYRACUSE

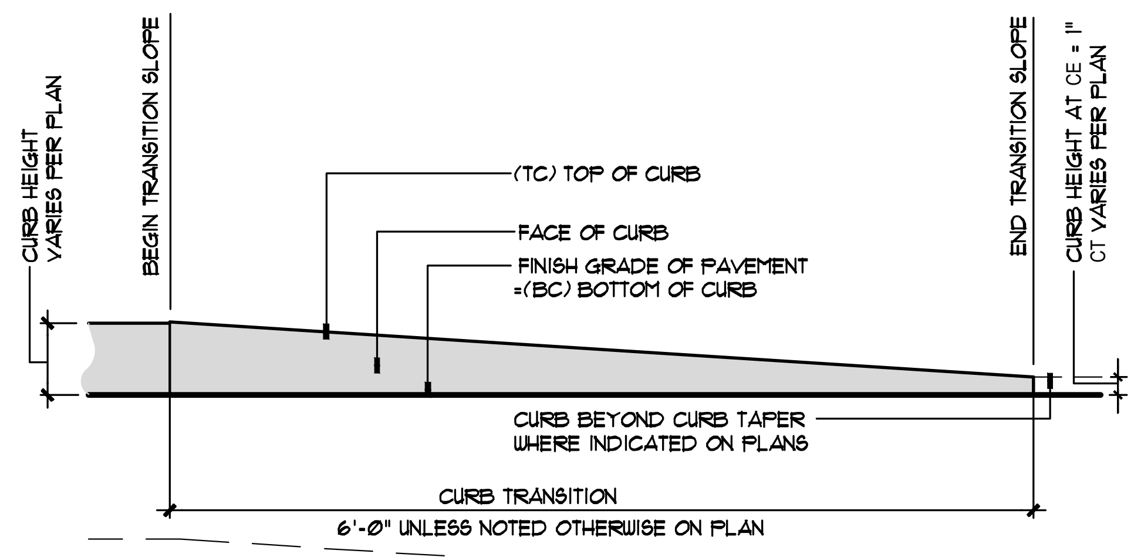
9
L-400
NOT TO SCALE
32-1216-03C



SECTION

ASPHALT PAVEMENT - 2 COURSE

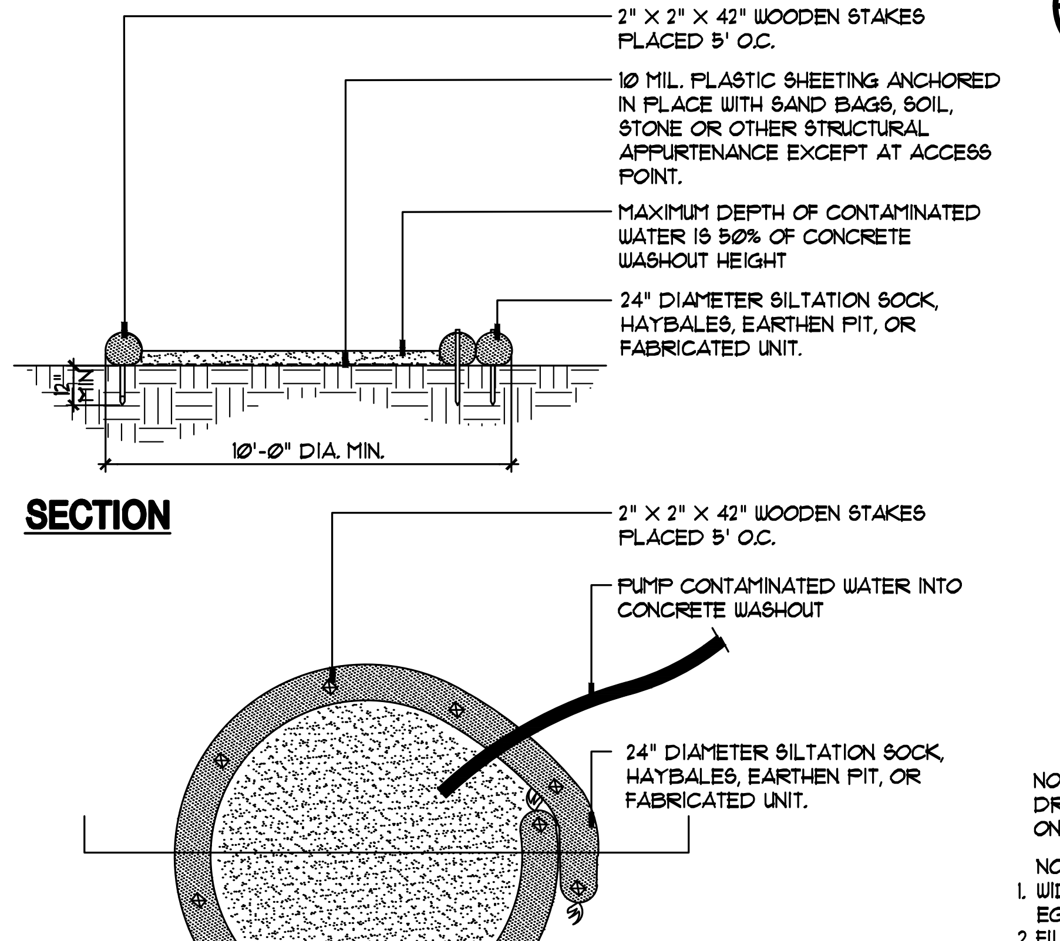
8
L-400
NOT TO SCALE
32-1216-02



ELEVATION

CURB ENDING/TAPER (CE/CT)

6
L-400
NOT TO SCALE
32-1313-07

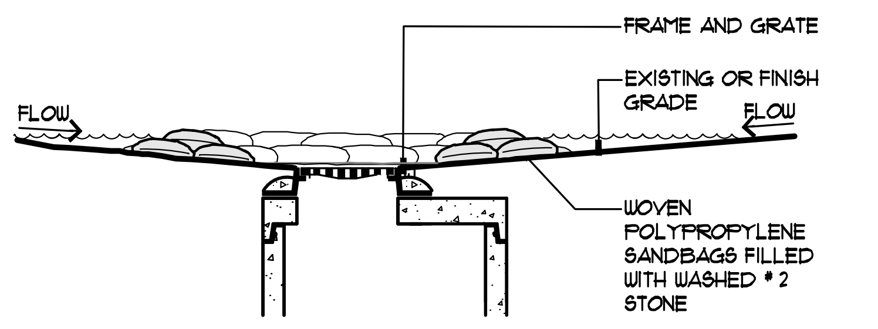


PLAN

NOTES:
1. INSTALL ON FLAT GRADE FOR OPTIMUM PERFORMANCE.
2. ALL CONCRETE WASHOUT FACILITIES SHALL BE INSPECTED DAILY. DAMAGED OR LEAKING FACILITIES SHALL BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY. EXCESS RAINWATER THAT HAS ACCUMULATED OVER HARDENED CONCRETE SHOULD BE PUMPED TO A STABILIZED AREA, SUCH AS GRASS FILTER STRIP.
3. ACCUMULATED HARDENED MATERIAL SHALL BE REMOVED WHEN 75% OF STORAGE CAPACITY OF THE STRUCTURE IS FILLED. ANY EXCESS WASH WATER SHALL BE PUMPED INTO A CONTAINMENT VESSEL AND PROPERLY DISPOSED OF OFF SITE.
4. DISPOSE OF HARDENED MATERIAL OFF SITE IN A CONSTRUCTION/DEMOLITION FILL LANDFILL. ON-SITE DISPOSAL MAY BE ALLOWED IF THIS HAS BEEN APPROVED AND ACCE¾TED AS PART OF THE SWPPP. IN THE CASE, THE MATERIAL SHOULD BE RECYCLED AS SPECIFIED, OR BURIED AND COVERED WITH A MINIMUM OF 2 FEET OF CLEAN COMPACTED EARTHFILL THAT IS PERMANENTLY STABILIZED TO PREVENT EROSION.
5. THE PLASTIC LINER SHALL BE REPLACED WITH EACH CLEANING OF WASHOUT FACILITY.
6. INSPECT THE PROJECT SITE FREQUENTLY TO ENSURE THAT NO CONCRETE DISCHARGES ARE TAKING PLACE IN NON-DESIGNATED AREAS.

CONCRETE WASHOUT

5
L-400
NOT TO SCALE
31-3001-10



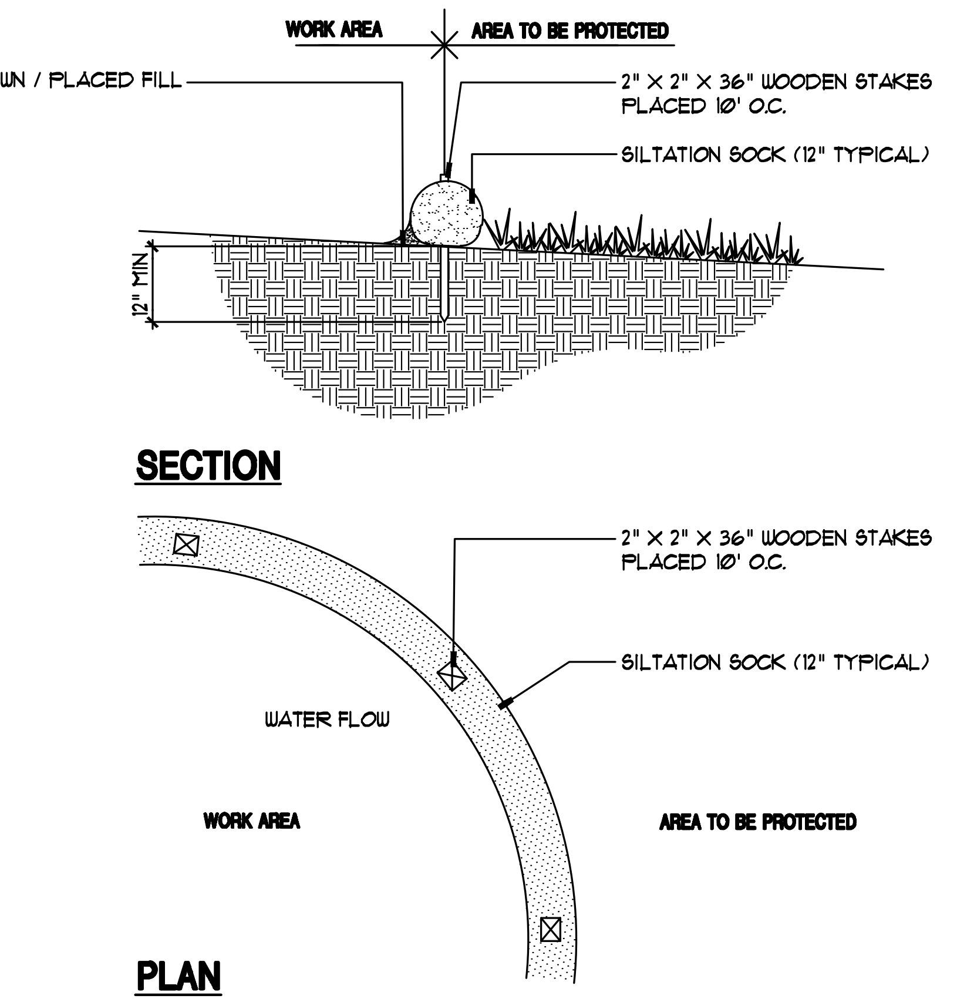
NOTES:

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER SANDBAG PLACEMENT.
2. SANDBAGS TO BE PLACED ON EXISTING GRADE AND STACKED IF NECESSARY TO ELIMINATE DEBRIS FROM ENTERING STRUCTURE.
3. CONTRACTOR SHALL USE A WOVEN POLYPROPYLENE SANDBAG FILLED WITH DRAINAGE FILL (WASHED #2 STONE), OR AN APPROVED EQUAL.
4. CONTRACTOR SHALL MAINTAIN, REPAIR and REPLACE DAMAGED OR WORN SANDBAGS.

SECTION - PAVED AREAS

DRAINAGE STRUCTURE PROTECTION

4
L-400
NOT TO SCALE
31-1001-02

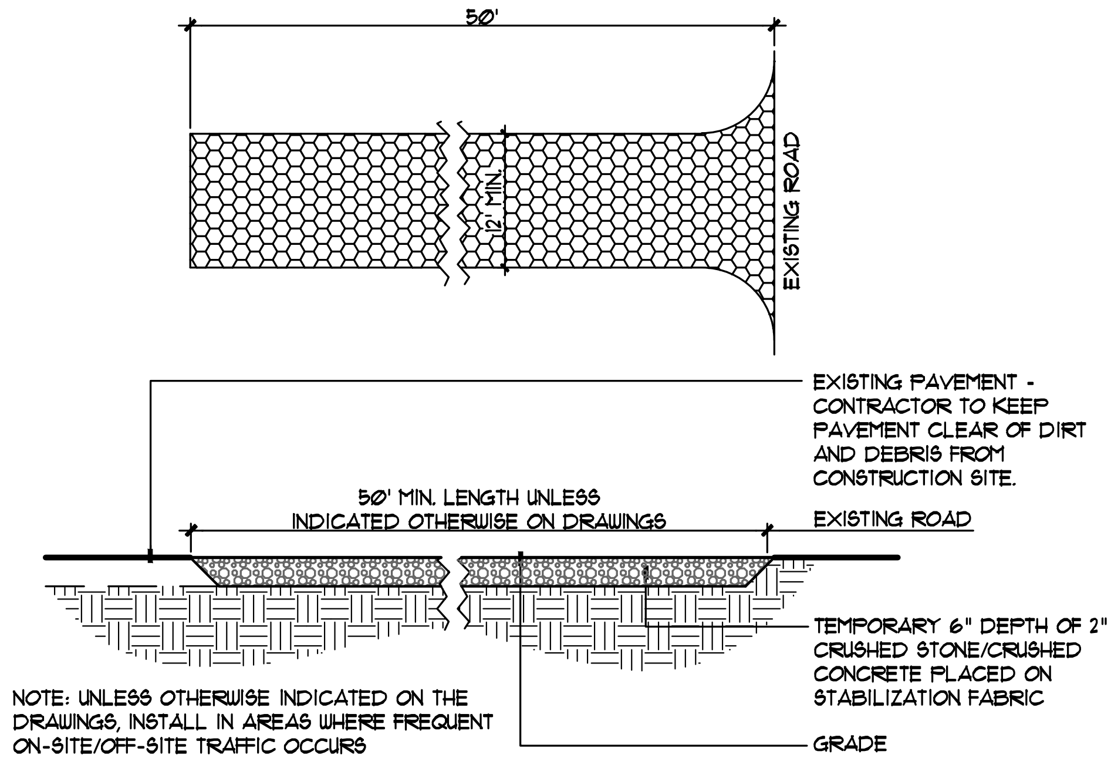


PLAN

NOTES:
1. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
2. FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

SILTATION SOCK SEDIMENT CONTROL

3
L-400
NOT TO SCALE
31-2500-01



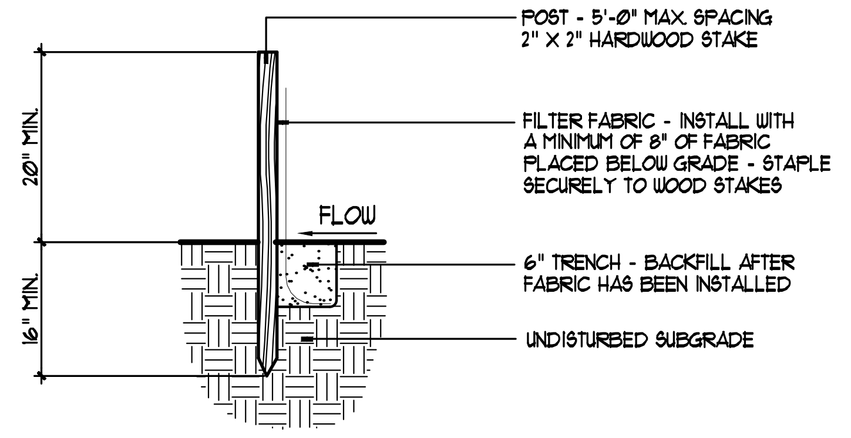
NOTE: UNLESS OTHERWISE INDICATED ON THE DRAWINGS, INSTALL IN AREAS WHERE FREQUENT ON-SITE/OFF-SITE TRAFFIC OCCURS

NOTES:
1. WIDTH-TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
2. FILTER CLOTH-WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
3. SURFACE WATER-ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
4. MAINTENANCE-THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY.
WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
5. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
6. REFER TO SWPPP, SECTION 7 FOR NYS STANDARDS AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ENTRANCE.

SECTION

CONSTRUCTION ENTRANCE (MUDRACK)

2
L-400
NOT TO SCALE
31-1001-04



NOTES:
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX (6) INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE. FENCING SHALL BE INSPECTED MONTHLY, AND FOLLOWING MAJOR RAINFALLS.
5. THE FOLLOWING MATERIALS SHALL BE USED FOR CONSTRUCTION OF THE SILT FENCE:
    POSTS: STEEL EITHER "T" OR "U" TYPE OR 2" HARDWOOD
    FENCE: WOVEN WIRE 14-1/2 GA., 6" MAX. MESH OPENING.
    FILTER CLOTH: FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL.
    PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.
6. REFER TO NYS STANDARDS & SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROLS FOR ADDITIONAL GUIDANCE.

SECTION

SILT FENCE (SF)

1
L-400
NOT TO SCALE
31-1001-01

KEPLINGER
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ASSOCIATES
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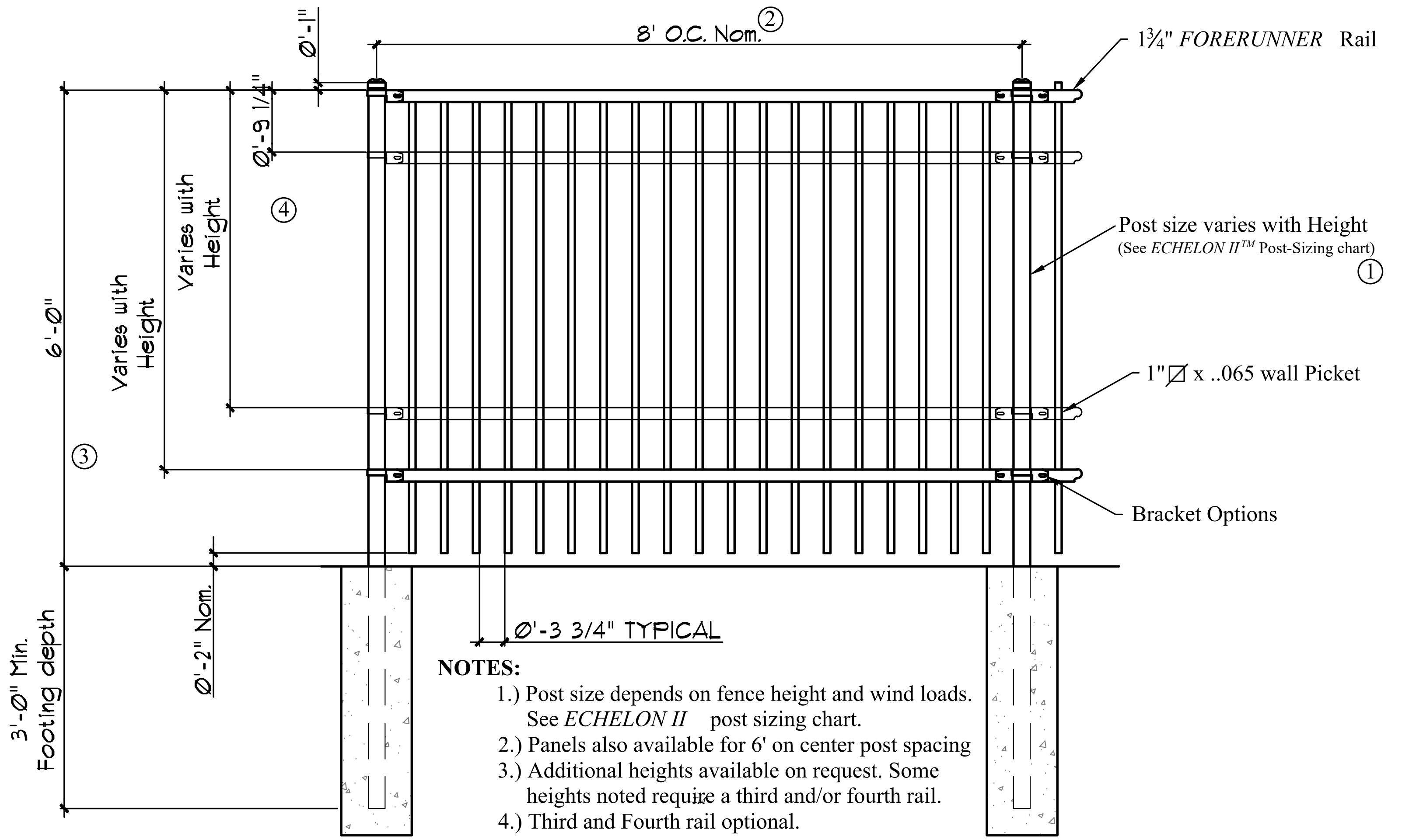
REVISIONS

Drawn By:	V.E.R.
Checked By:	S.L.F.
KFA Proj. No.:	39075
Date:	FEBRUARY 05, 2020
Scale:	AS NOTED
Title:	DETAILS

L-400

NOT FOR CONSTRUCTION – CITY OF SYRACUSE SITE PLAN REVIEW

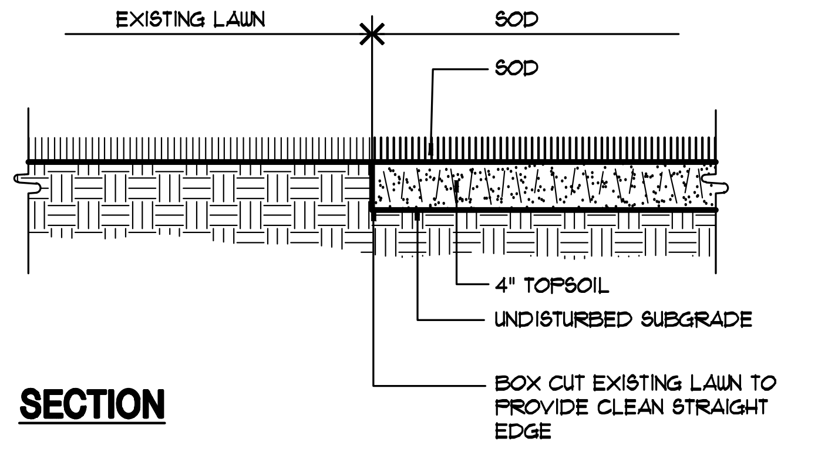


NOTES:
1.) Post size depends on fence height and wind loads. See *ECHELON II* post sizing chart.
2.) Panels also available for 6' on center post spacing
3.) Additional heights available on request. Some heights noted require a third and/or fourth rail.
4.) Third and Fourth rail optional.

NOTES:
1. ECHELON II MAJESTIC RAIL FENCE WITH 2.5" POST 12 GA. POSTS TO BE UTILIZED FOR 4' HT. FENCE.
2. CONTRACTOR TO INSTALL RAIL FENCE AS MANUFACTURED BY AMERISTAR www.ameristarfence.com OR APPROVED EQUAL. COLOR: BLACK.
3. CONTRACTOR TO PROVIDE MANUFACTURER'S PRODUCT DATA and SHOP DRAWINGS SUBMITTALS FOR REVIEW. REFER TO SPECIFICATIONS. (CONTACT JOESPH KISELICA - 315-635-0098)

15 L-401 ORNAMENTAL FENCE - MANUFACTURED - ECHELON II MAJESTIC

NOT TO SCALE 32-3119-21A

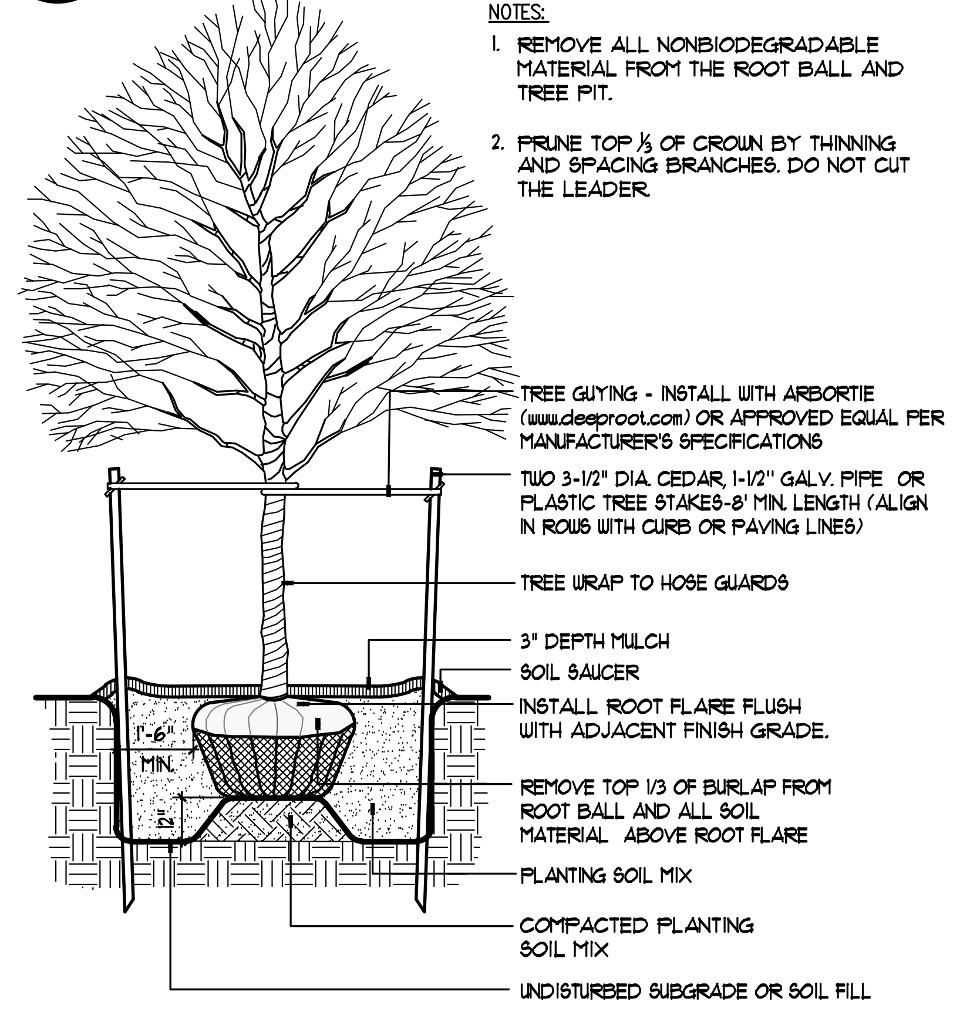


SECTION

14 L-401 SODDED LAWN

NOT TO SCALE 32-9200-01B

NOTES:
1. REMOVE ALL NONBIODEGRADABLE MATERIAL FROM THE ROOT BALL AND TREE PIT.
2. PRUNE TOP ⅓ OF CROWN BY THINNING AND SPACING BRANCHES. DO NOT CUT THE LEADER.

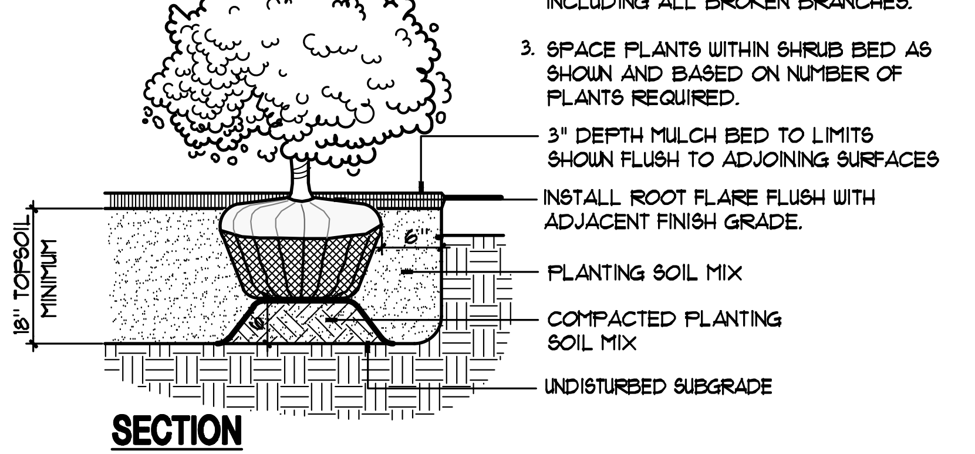


SECTION

13 L-401 TREE PLANTING

NOT TO SCALE 32-9300-01

NOTES:
1. REMOVE ALL NONBIODEGRADABLE MATERIAL FROM THE ROOT BALL AND TREE PIT.
2. PRUNE TOP ⅓ OF ALL TOP GROWTH INCLUDING ALL BROKEN BRANCHES.
3. SPACE PLANTS WITHIN SHRUB BED AS SHOWN AND BASED ON NUMBER OF PLANTS REQUIRED.

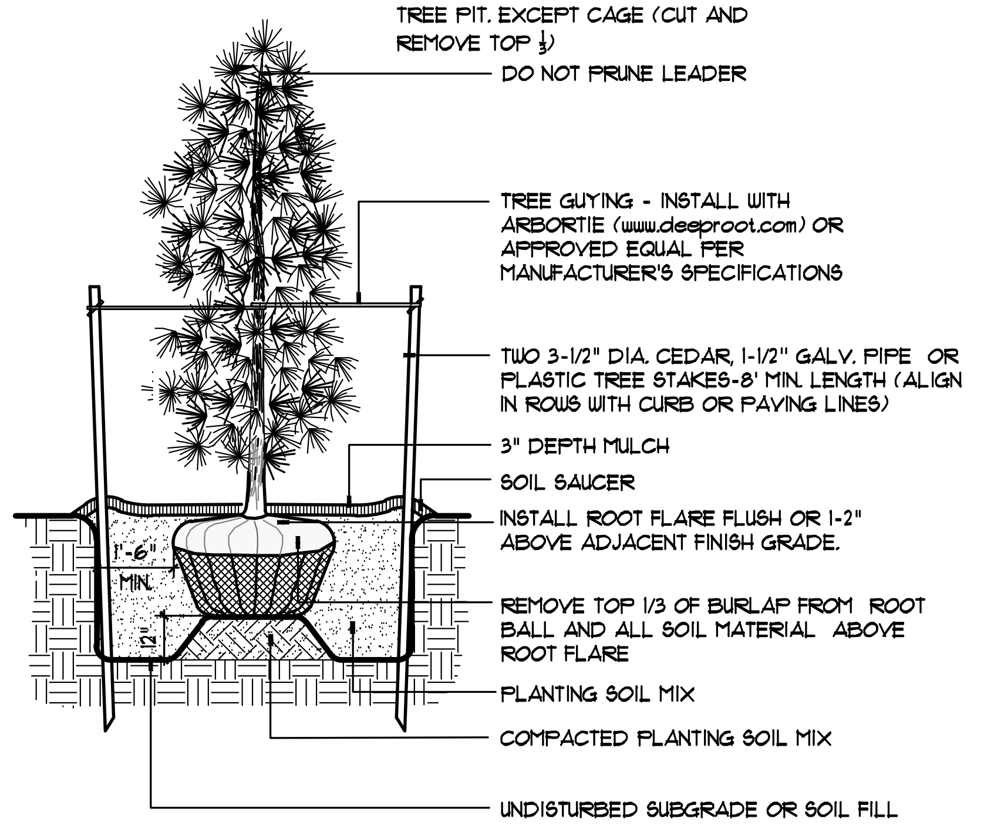


SECTION

12 L-401 SHRUB PLANTING

NOT TO SCALE 32-9300-02

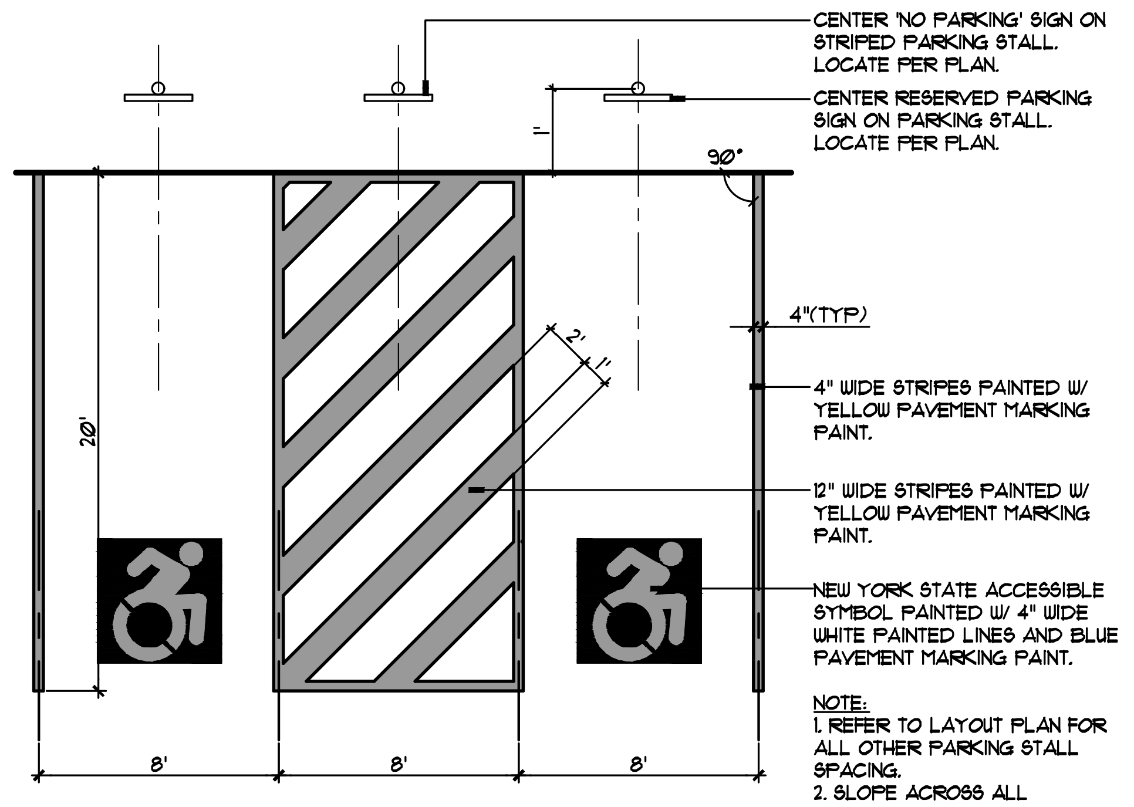
NOTES:
1. REMOVE ALL NONBIODEGRADABLE MATERIAL FROM THE ROOT BALL AND TREE PIT. EXCEPT CAGE (CUT AND REMOVE TOP ⅓)



SECTION

11 L-401 EVERGREEN PLANTING

NOT TO SCALE 32-9300-03

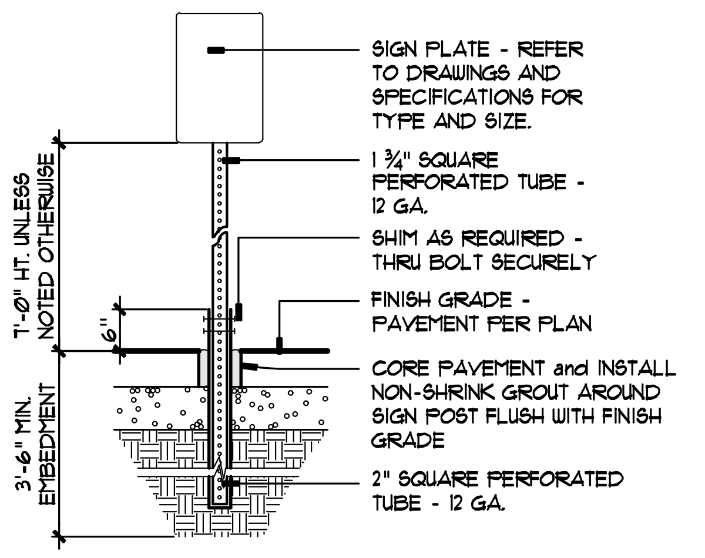


NOTE:
1. REFER TO LAYOUT PLAN FOR ALL OTHER PARKING STALL SPACING.
2. SLOPE ACROSS ALL RESERVED SPACES SHALL NOT EXCEED 2%.

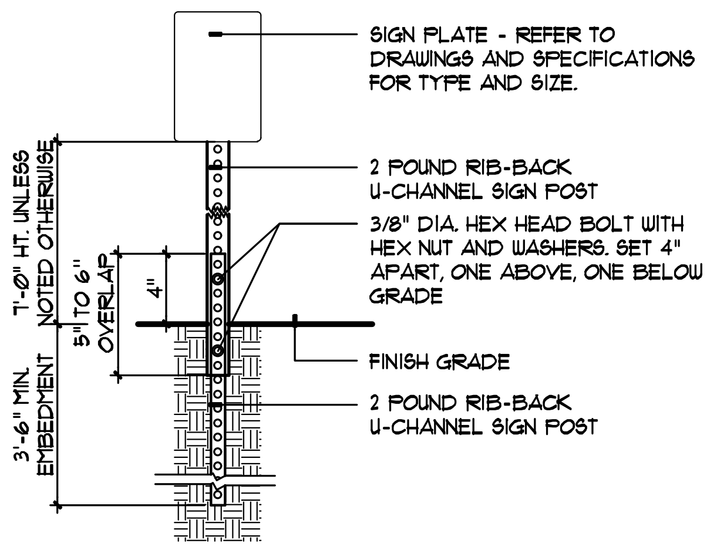
PLAN

10 L-401 RESERVED PARKING STALL

NOT TO SCALE 32-1723-01



SECTION - PAVED AREAS



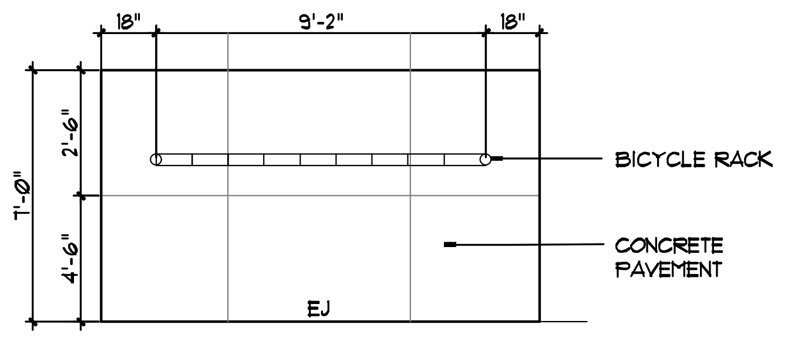
SECTION - NON-PAVED AREAS

NOTES:
1. FABRICATE SIGN PANELS OF .080 ALUMINUM.
2. ALL SIGNS SHALL BE FASTENED TO OR MOUNTED ON POST WITH GALVANIZED BOLTS, NUTS AND WASHERS.
3. FOR FURTHER INFORMATION, REFER TO THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.
4. COORDINATE SIGN LOCATION TO AVOID UTILITIES.

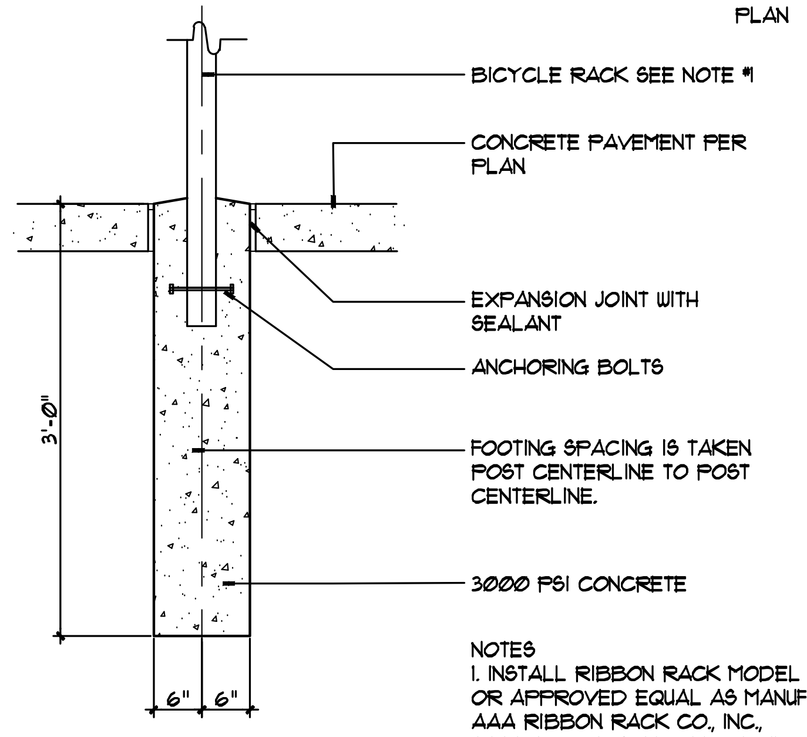
9 L-401 TRAFFIC CONTROL SIGN

NOT TO SCALE 32-4000-01

8 L-401 DETAIL OMITTED



PLAN

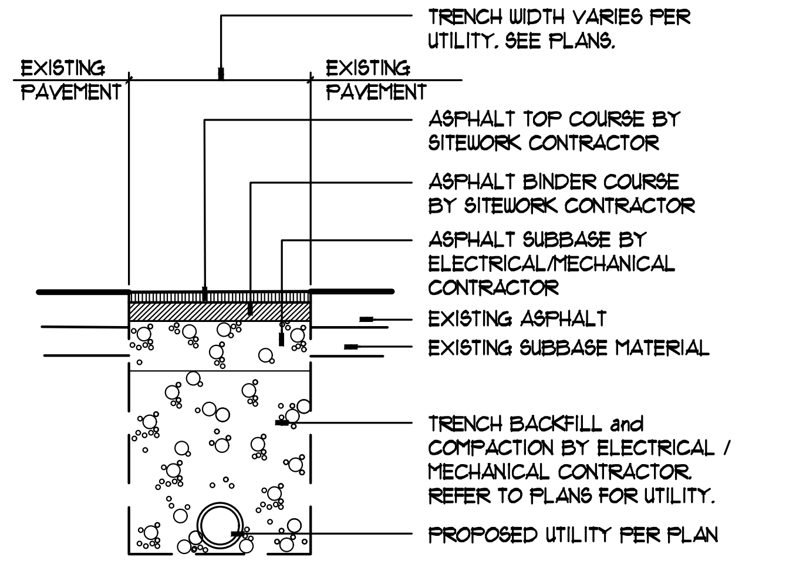


NOTES
1. INSTALL RIBBON RACK MODEL #RB - 11 - 1 - G OR APPROVED EQUAL AS MANUFACTURED BY AAA RIBBON RACK CO., INC., (WWW.RIBBONRACK.COM, PHONE 800-849-3488)

SECTION

7 L-401 BICYCLE RACK

N.T.S. 32-4000-41



SECTION

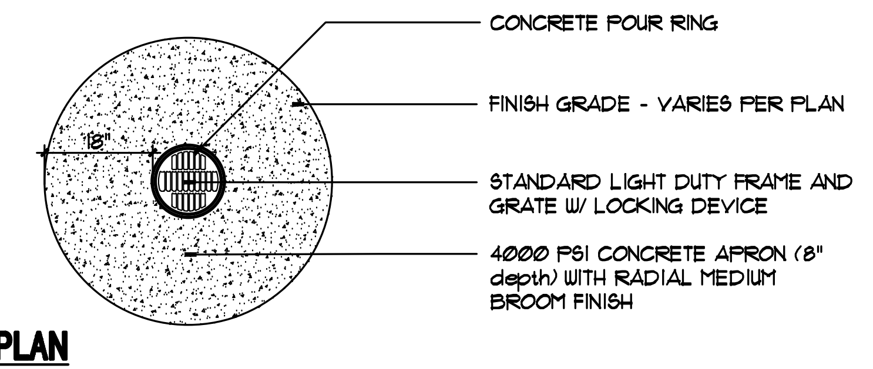
NOTES:
1. TOTAL THICKNESS OF TOP AND BINDER REPLACEMENT SHALL MATCH EXISTING, BUT BE NO LESS THAN LISTED IN TABLE.
2. ELECTRICAL/MECHANICAL CONTRACTOR SHALL BRING COMPACTED BACKFILL MATERIAL FLUSH WITH ADJACENT EXISTING ASPHALT.

TYPICAL COURSE THICKNESS (MINIMUM REPLACEMENT THICKNESS)

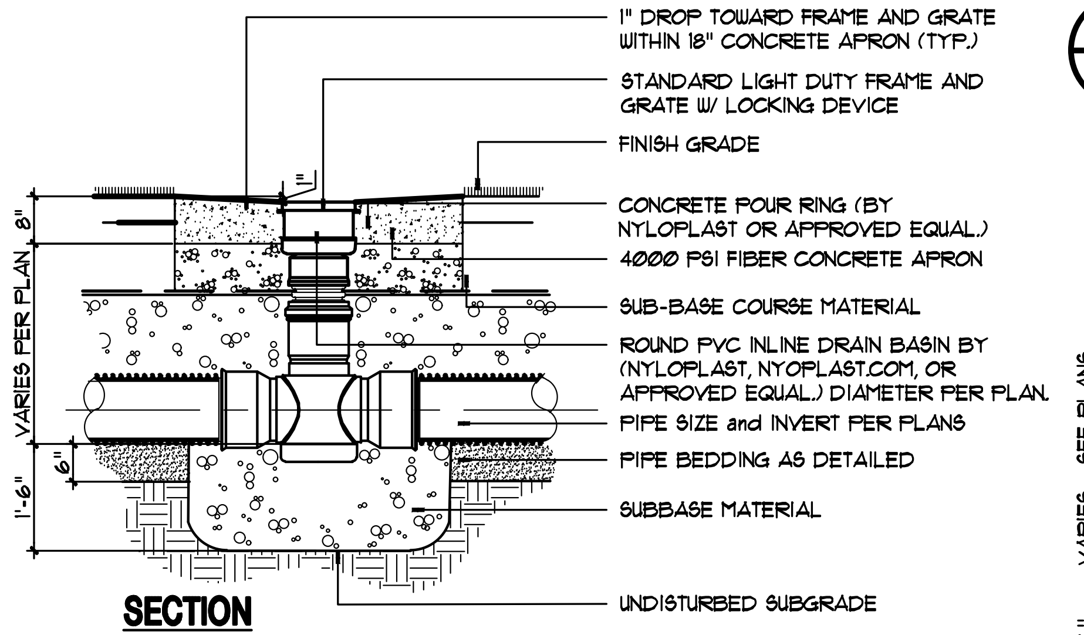
COURSE	MAT'L	NYSDOT SPEC	THICK
ASPHALT TOP	TYPE 7	SECT 401-2.02	1-1/2"
ASPHALT BINDER	TYPE 3	SECT 401-2.02	1-1/2"
BASE	TYPE 1	SECT 401-2.02	8"
SUB-BASE	TYPE 4	SECT 401-2.02	12"

6 L-401 ASPHALT PAVEMENT @ UTILITY TRENCHES

NOT TO SCALE 31-2333-01



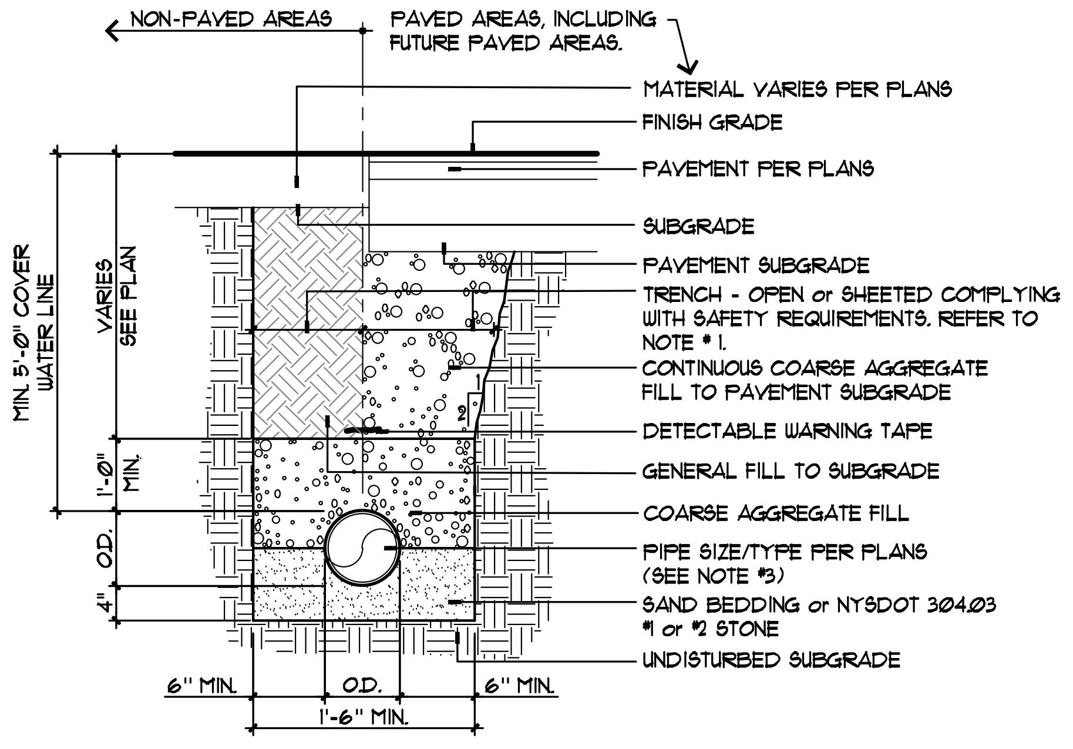
PLAN



SECTION

5 L-401 INLINE BASIN- LIGHT DUTY

NOT TO SCALE 33-4000-06C



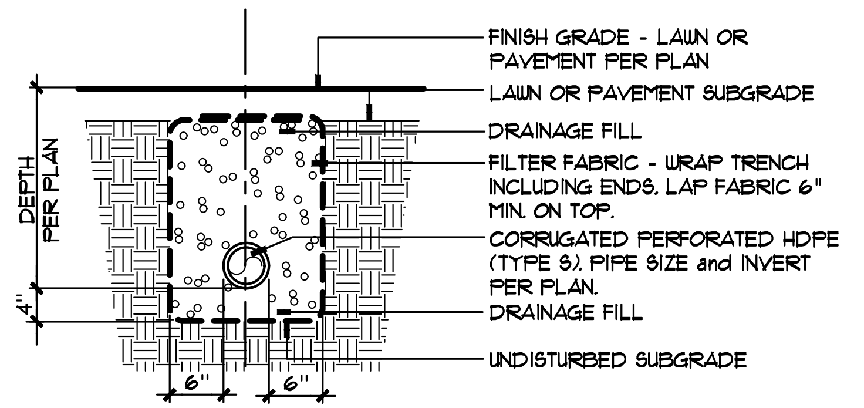
SECTION

NOTES:
1. TRENCH DEPTHS, WIDTHS, SHEETING, SHORING, BRACING and CUTBACK SLOPES TO BE DETERMINED BY THE CONTRACTOR and COMPLY WITH O.S.H.A., NEW YORK STATE DEPARTMENT OF LABOR, NEW YORK STATE INDUSTRIAL CODE and ALL OTHER APPLICABLE SAFETY STANDARDS.
2. REFER TO PLAN FOR PAVED and NON PAVED DETAILS.
3. INSTALL TRACER WIRE AROUND WATER LINE. TRACE WIRE SHALL BE #12 AWG COPPER CLAD STEEL, HIGH STRENGTH, WITH MINIMUM 450 LB BREAK LOAD WITH MINIMUM 30 MIL. HDPE INSULATION THICKNESS.

4 L-401 PIPE BEDDING

FOR STORM, SANITARY, AND WATER PIPE

NOT TO SCALE 33-4000-20A

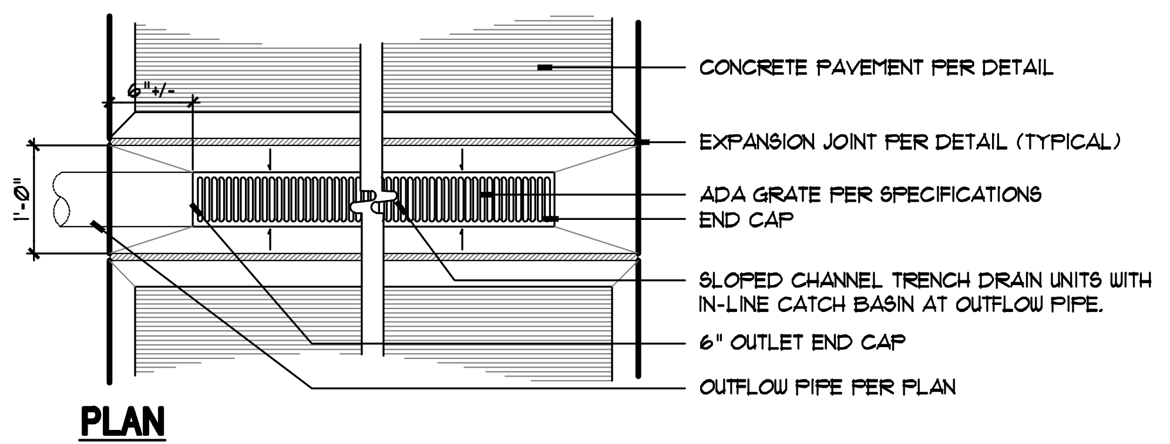


NOTES:
1. DRAIN FOR FOOTING/WEEPS SIMILAR.
2. CAP ALL FREE ENDS.
3. (UD) FOR USE IN ALL CATCH BASINS and STORM INLETS.

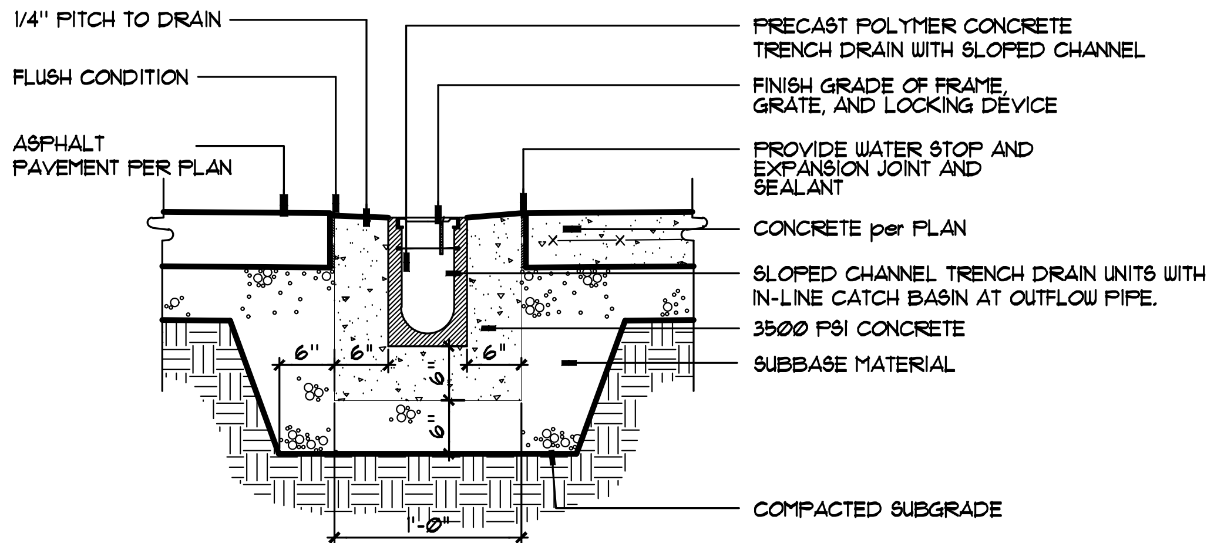
SECTION

3 L-401 PERFORATED STORM PIPE OR UNDERDRAIN (UD)

NOT TO SCALE 33-4000-21



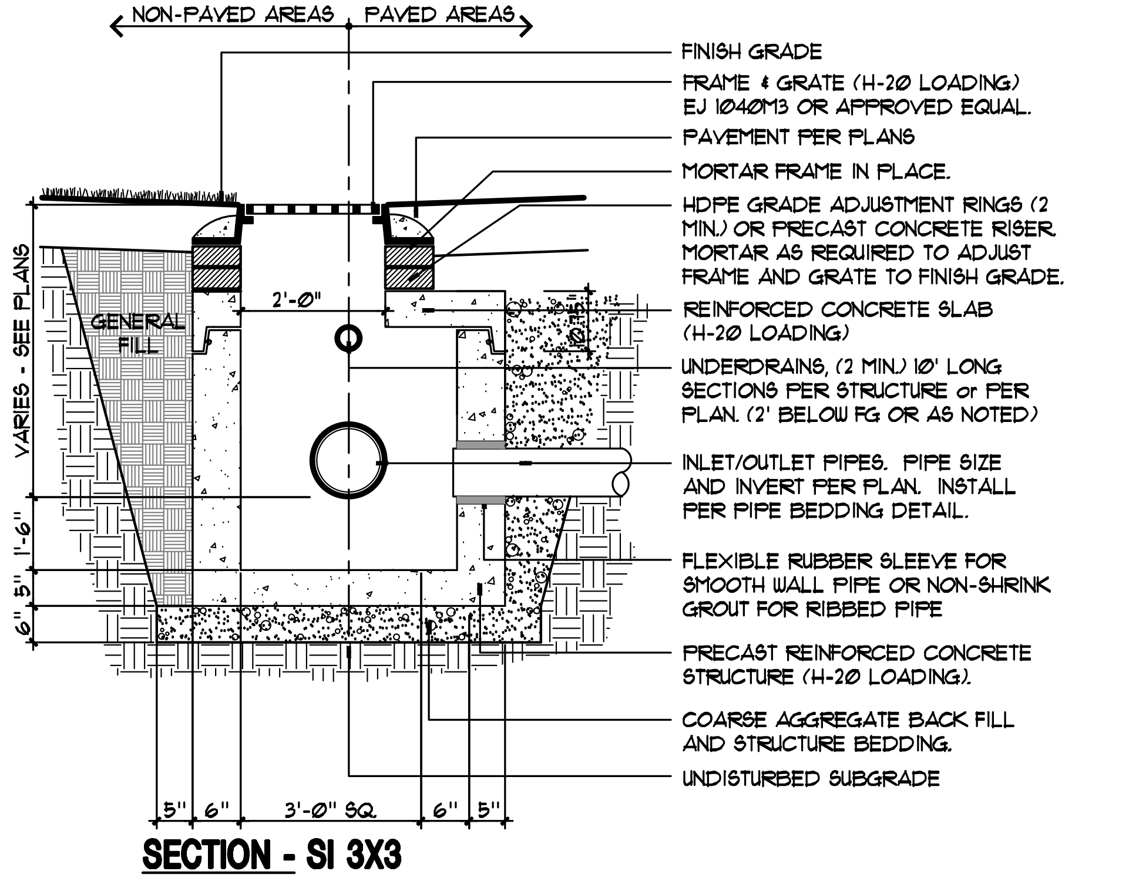
PLAN



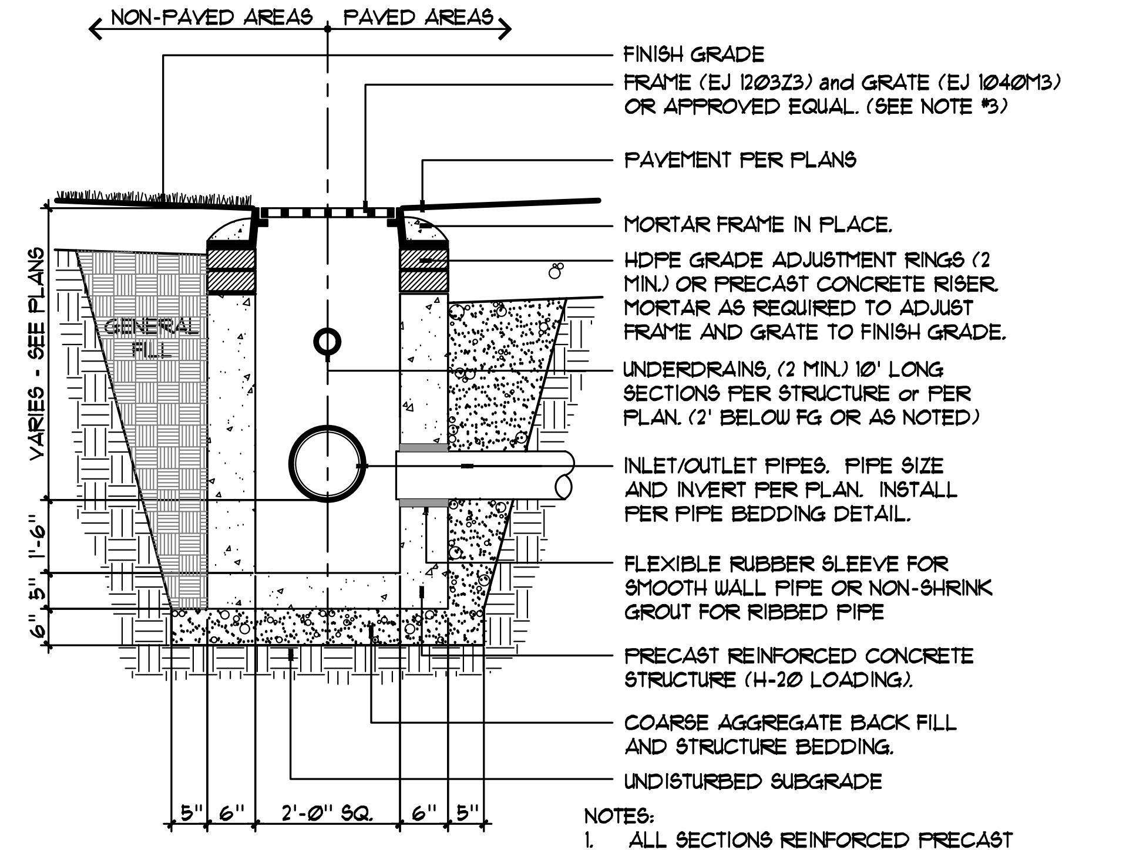
SECTION

2 L-401 TRENCH DRAIN - FORMED CONCRETE

NOT TO SCALE 33-4000-31



SECTION - SI 3X3



SECTION - SI 2X2

NOTES:
1. ALL SECTIONS REINFORCED PRECAST CONCRETE DESIGNED FOR H-20 LOADING.
2. ADD PRECAST CONCRETE RISER(S) AS REQUIRED.
3. PROVIDE SOLID COVER WHERE INDICATED ON PLANS.

1 L-401 STORM INLET (SI)

NOT TO SCALE 33-4000-01A

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REGISTERED LANDSCAPE ARCHITECT SCOTT LEE FREEMAN 001473 STATE OF NEW YORK

STATE OF NEW YORK RUDY L. ZONA 079543 LICENSED PROFESSIONAL ENGINEER

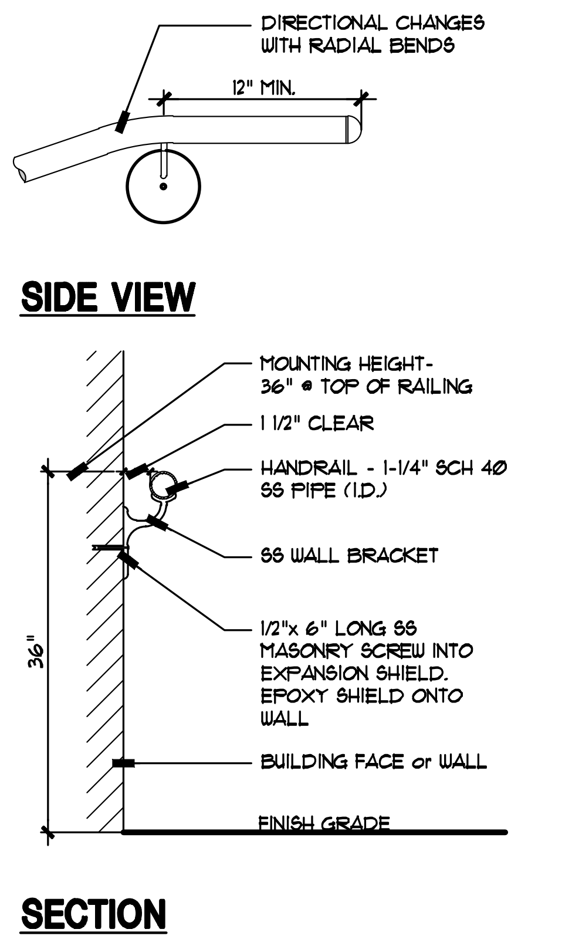
UTILIZED FOR STORMWATER AND SANITARY DESIGN

SMITH MIXED USE BUILDING and
SITE REDEVELOPMENT
500 E. ERIE BLVD., CITY OF SYRACUSE, NY

REVISIONS

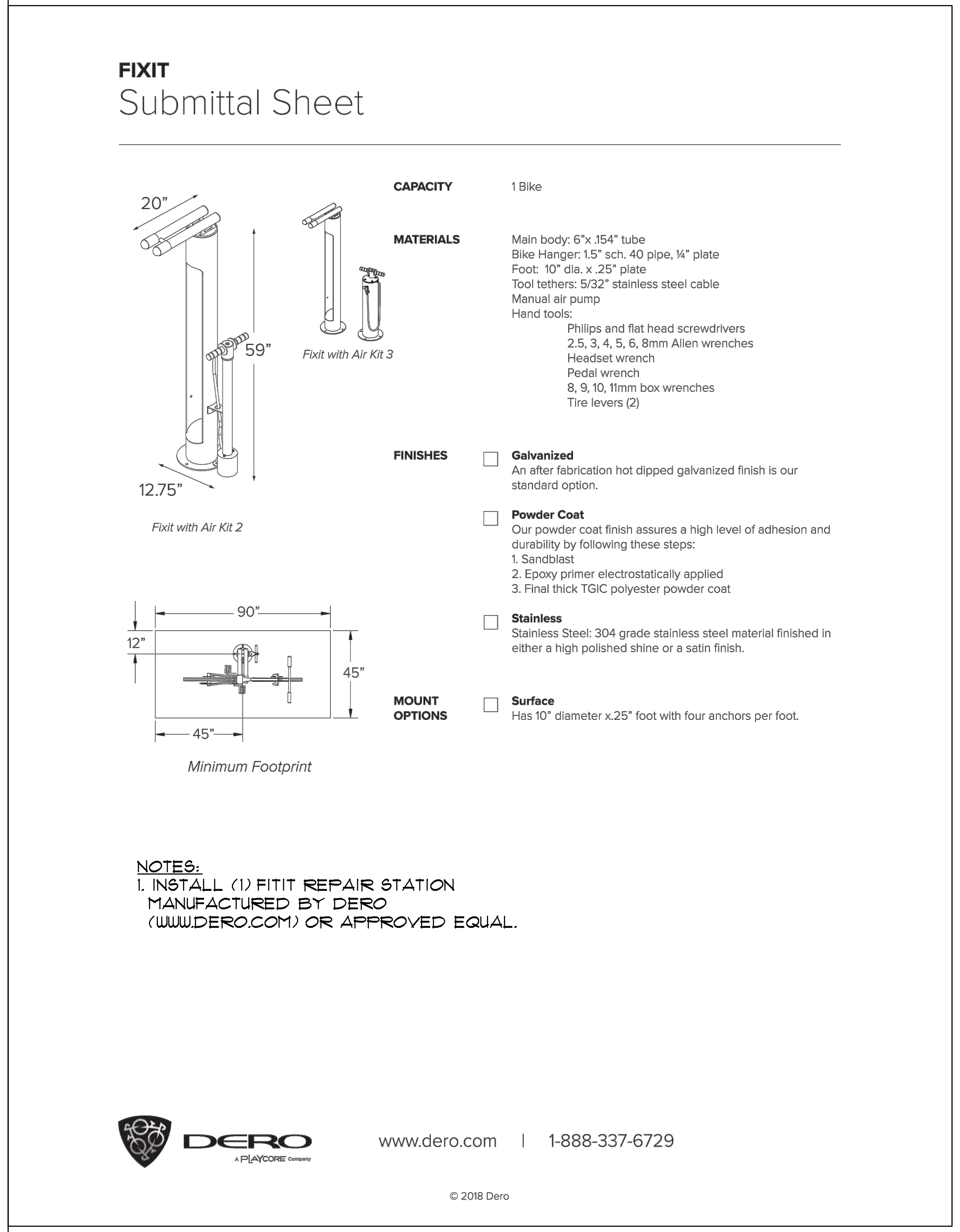
Drawn By: V.E.R.
Checked By: S.L.F.
KFA Proj. No.: 39075
Date: FEBRUARY 05, 2020
Scale: AS NOTED
Title: DETAILS

L-401



7 / L-402 HANDRAIL WALL BRACKET

NOT TO SCALE 32-3119-02



FIXIT

Submittal Sheet

Fixit with Air Kit 2

Fixit with Air Kit 3

Minimum Footprint

CAPACITY 1 Bike

MATERIALS
Main body: 6"x .154" tube
Bike Hanger: 1.5" sch. 40 pipe, ¼" plate
Foot: 10" dia. x .25" plate
Tool tethers: 5/32" stainless steel cable
Manual air pump
Hand tools:
- Philips and flat head screwdrivers
- 2.5, 3, 4, 5, 6, 8mm Allen wrenches
- Headset wrench
- Pedal wrench
- 8, 9, 10, 11mm box wrenches
- Tire levers (2)

FINISHES

☐ **Galvanized**
An after fabrication hot dipped galvanized finish is our standard option.

☐ **Powder Coat**
Our powder coat finish assures a high level of adhesion and durability by following these steps:
1. Sandblast
2. Epoxy primer electrostatically applied
3. Final thick TGIC polyester powder coat

☐ **Stainless**
Stainless Steel: 304 grade stainless steel material finished in either a high polished shine or a satin finish.

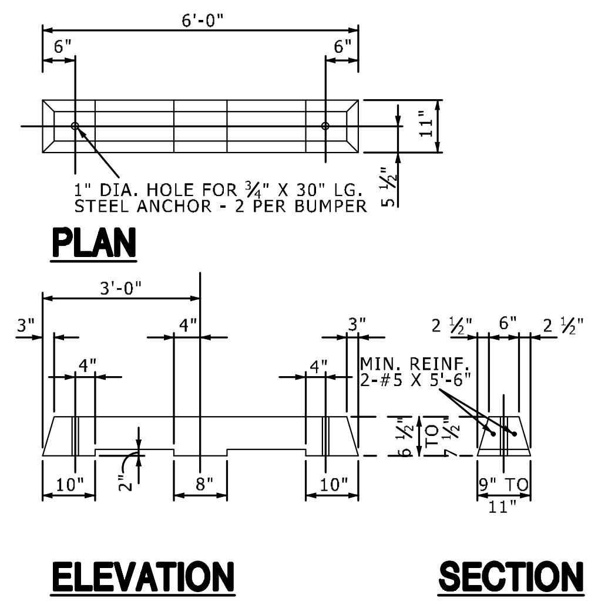
MOUNT OPTIONS

☐ **Surface**
Has 10" diameter x.25" foot with four anchors per foot.

www.dero.com | 1-888-337-6729

NOTES:
1. INSTALL (1) FITIT REPAIR STATION MANUFACTURED BY DERO (WWW.DERO.COM) OR APPROVED EQUAL.

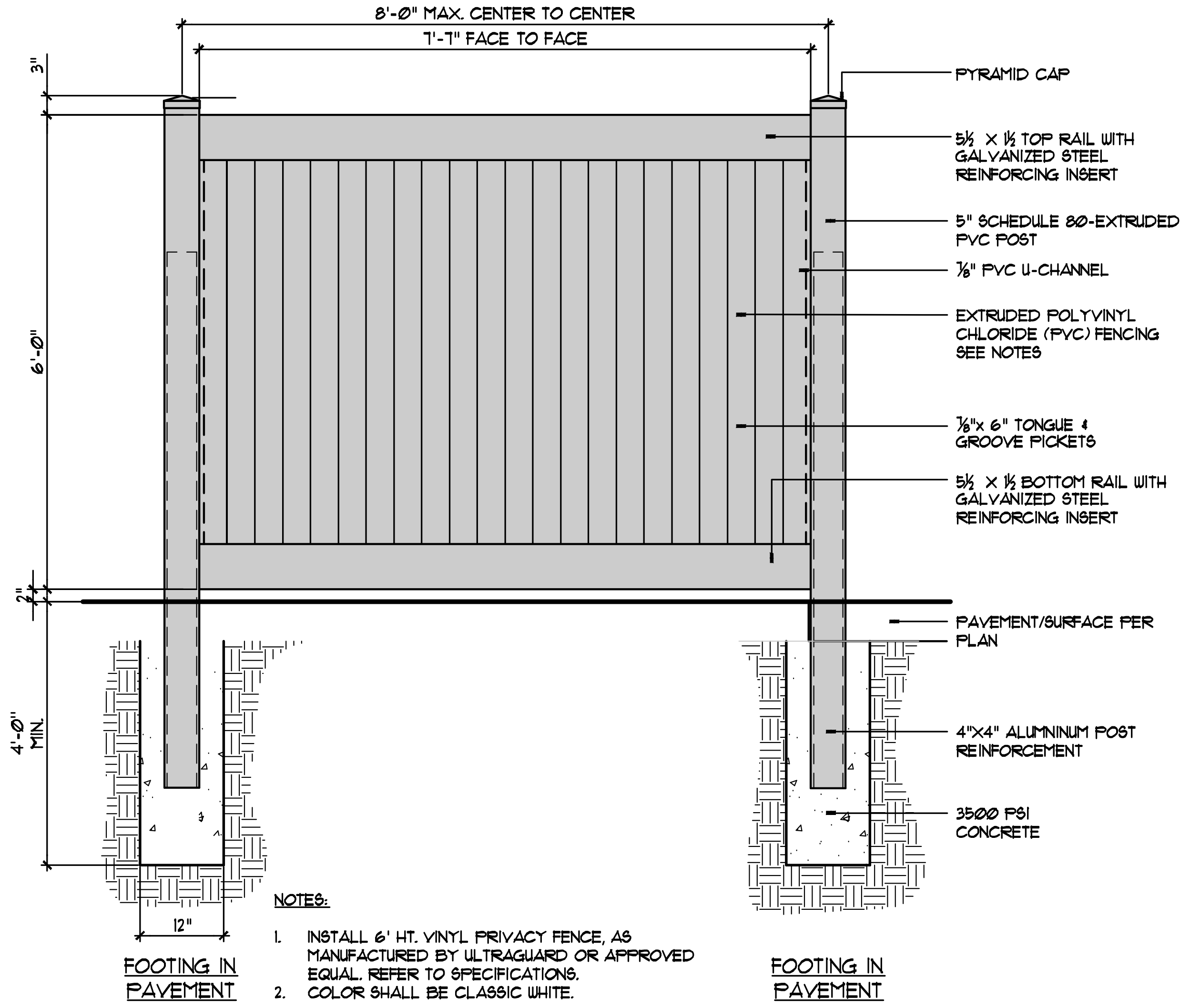
6 / L-402 BICYCLE REPAIR STATION



NOTES:
1.

5 / L-402 6' CONCRETE WHEEL STOP

NOT TO SCALE 32-4000-0X

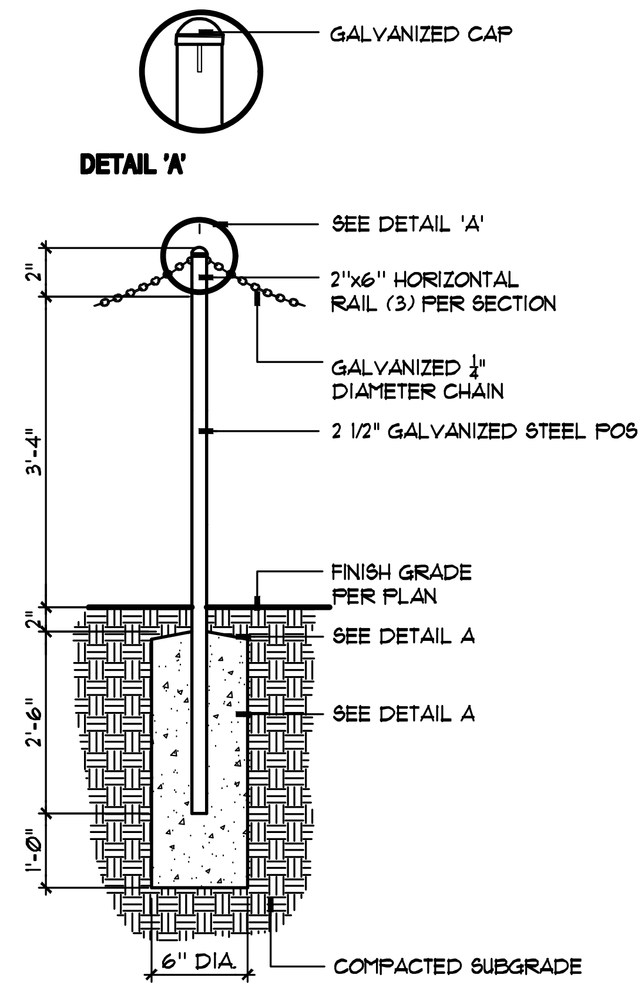


NOTES:
1. INSTALL 6' HT. VINYL PRIVACY FENCE, AS MANUFACTURED BY ULTRAGUARD OR APPROVED EQUAL. REFER TO SPECIFICATIONS.
2. COLOR SHALL BE CLASSIC WHITE.

ELEVATION

4 / L-402 6' HT. PRIVACY PVC FENCE

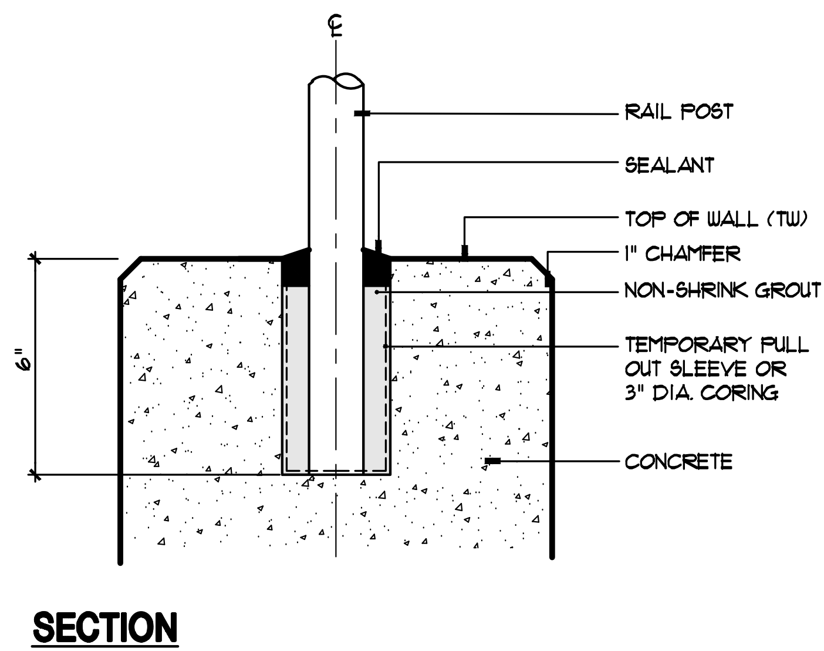
NOT TO SCALE 32-3123-02



NOTES:
1. ALL FASTENERS ARE TO BE GALVANIZED.

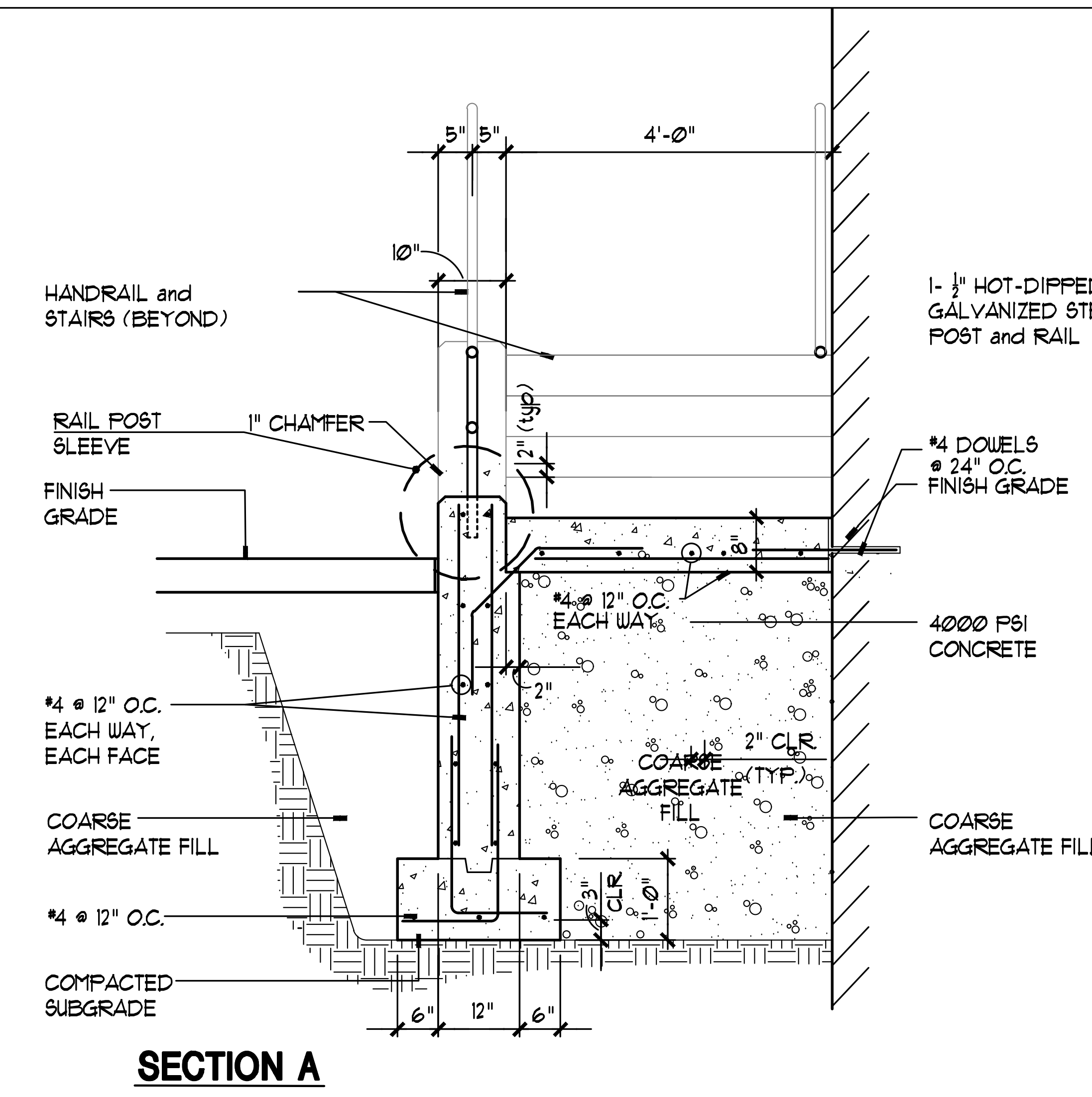
3 / L-402 POST AND CHAIN FENCE

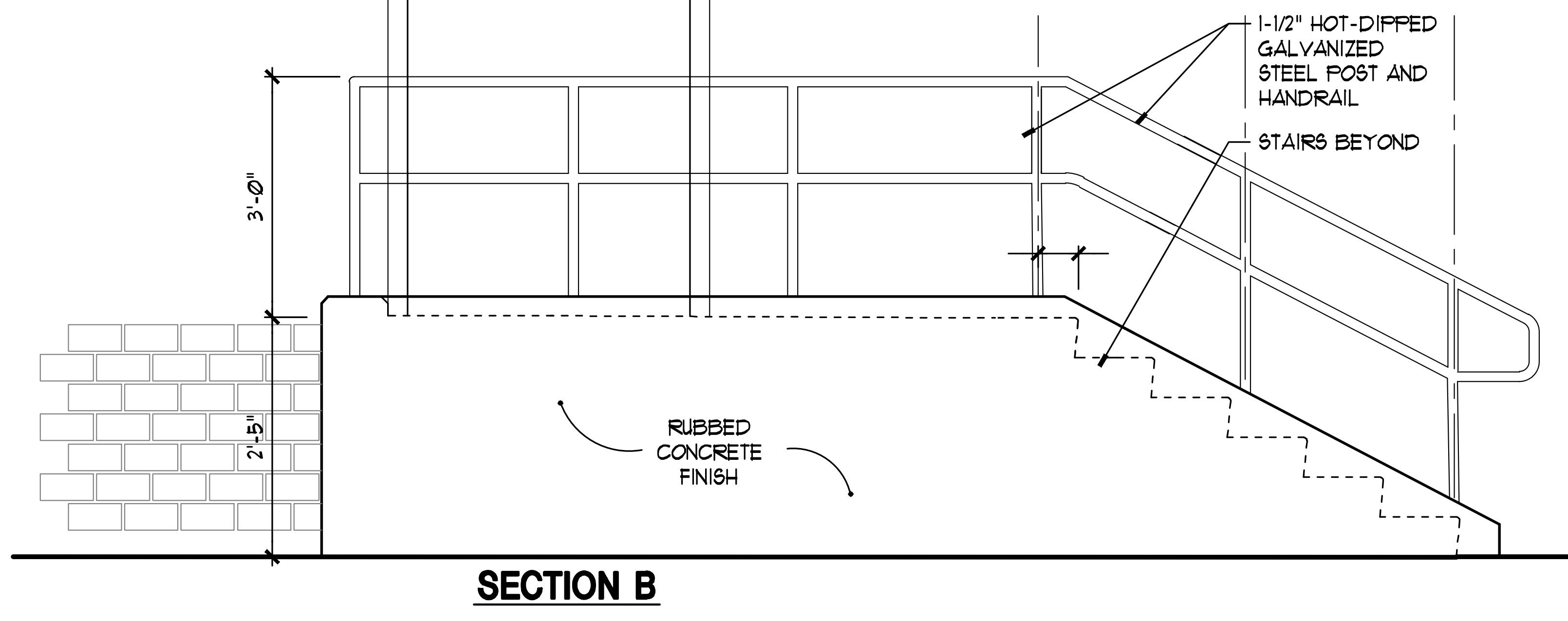
NOT TO SCALE 32-4000-10

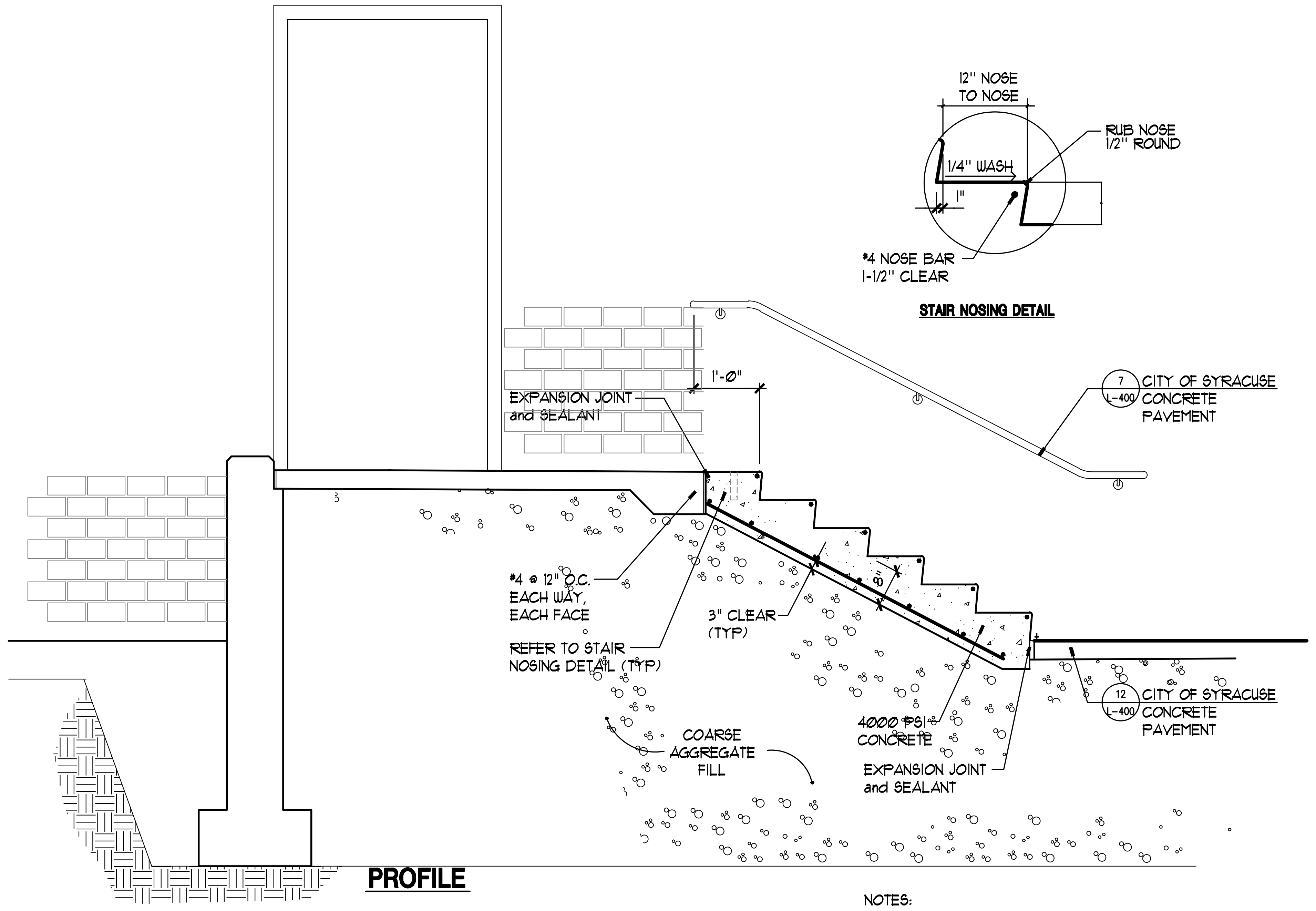


2 / L-402 RAIL POST DETAIL

NOT TO SCALE 32-3119-06







NOTES:
1 - STRUCTURAL ENGINEER TO REVIEW REBAR
2 -

1 / L-402 WATER STREET STAIR DETAIL

SCALE : 1/2" = 1'-0"

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SCOTT LEE FREEMAN 001473

RUDY L. ZONA 079543

UTILIZED FOR STORMWATER AND SANITARY DESIGN

SMITH MIXED USE BUILDING and SITE REDEVELOPMENT
500 E. ERIE BLVD., CITY OF SYRACUSE, NY

REVISIONS

Drawn By: V.E.R.
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KFA Proj. No.: 39075
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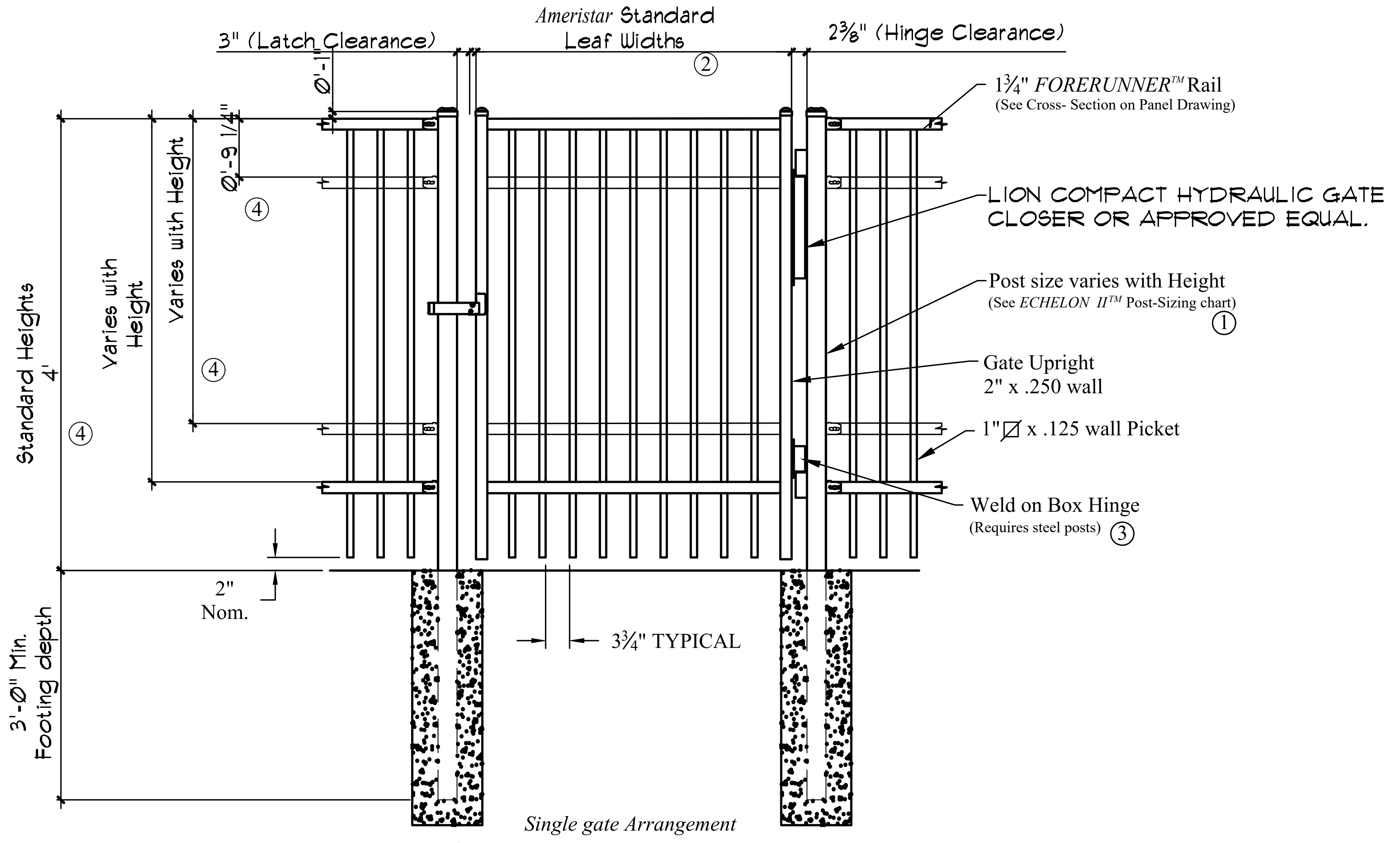
L-402



Single gate Arrangement

NOTES:

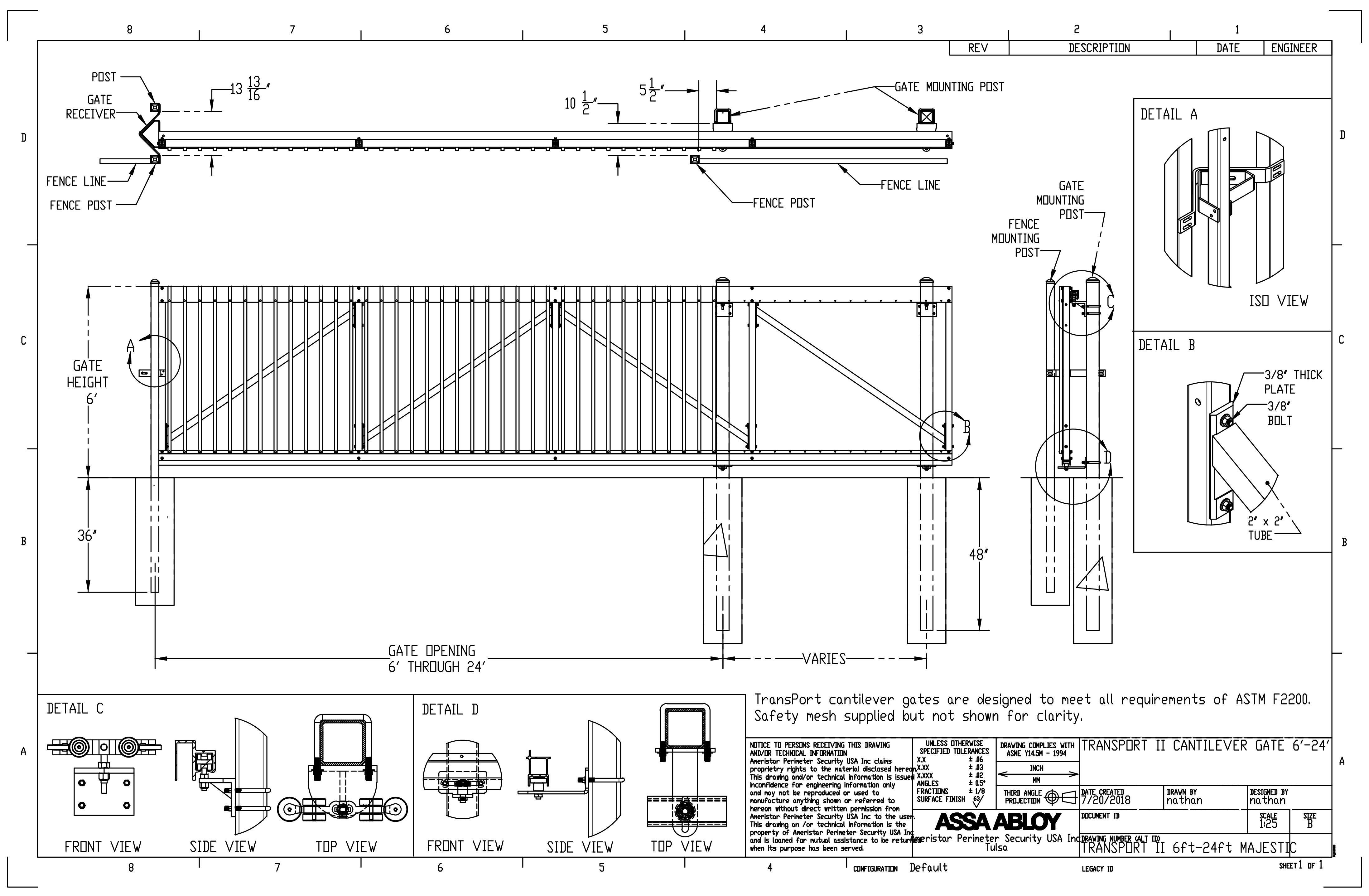
1.) Post size depends on fence height, weight and wind loads. See *ECHELON II* ™ post sizing chart.
2.) See *Ameristar* gate table for standard out to outs. Custom gate openings available for special out to out/leaf widths.
3.) Additional styles of gate hardware are available on request This could change the Latch & Hinge Clearance.
4.) Third and Fourth rail optional. Some heights noted required a third and/or fourth rail.

NOTES:

1. ECHELON II MAJESTIC RAIL GATE WITH 2.5" POST 12 GA. POSTS TO BE UTILIZED FOR 6' HT. FENCE.
2. CONTRACTOR TO INSTALL RAIL FENCE AS MANUFACTURED BY AMERISTAR www.ameristarfence.com OR APPROVED EQUAL. COLOR: BLACK.
3. CONTRACTOR TO PROVIDE MANUFACTURER'S PRODUCT DATA and SHOP DRAWINGS SUBMITTALS FOR REVIEW. REFER TO SPECIFICATIONS. (CONTACT JOESPH KISELICA - 315-635-0098)
4. REFER TO ELECTRICAL DRAWING FOR POWER TO GATE. GATE CONTROLLER TO BE PROVIDED BY FENCE GATE INSTALLER. SUBMITTAL FOR GATE CONTROLLER, POWER, GATE ACCESSORIES AND PLAN LAYOUT REQUIRED FOR REVIEW PRIOR TO CONSTRUCTION.

2 L-403 ORNAMENTAL GATE - MANUFACTURED - ECHELON II MAJESTIC

NOT TO SCALE



TransPort cantilever gates are designed to meet all requirements of ASTM F2200. Safety mesh supplied but not shown for clarity.

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UNLESS OTHERWISE SPECIFIED TOLERANCES	
X.X	± .06
X.XX	± .03
X.XXX	± .02
ANGLES	± 0.5°
FRACTIONS	± 1/8
SURFACE FINISH	63

DRAWING COMPLIES WITH ASME Y14.5M - 1994
INCH
MM
THIRD ANGLE PROJECTION

ASSA ABLOY
Ameristar Perimeter Security USA Inc
Tulsa

TRANSPORT II CANTILEVER GATE 6'-24'

DATE CREATED	DRAWN BY	DESIGNED BY
7/20/2018	nathan	nathan

DOCUMENT ID
SCALE 1:25
SIZE B
DRAWING NUMBER (ALT ID) TRANSPORT II 6ft-24ft MAJESTIC
CONFIGURATION Default
LEGACY ID
SHEET 1 OF 1

1 L-403 CANTILEVER ACCESS GATE

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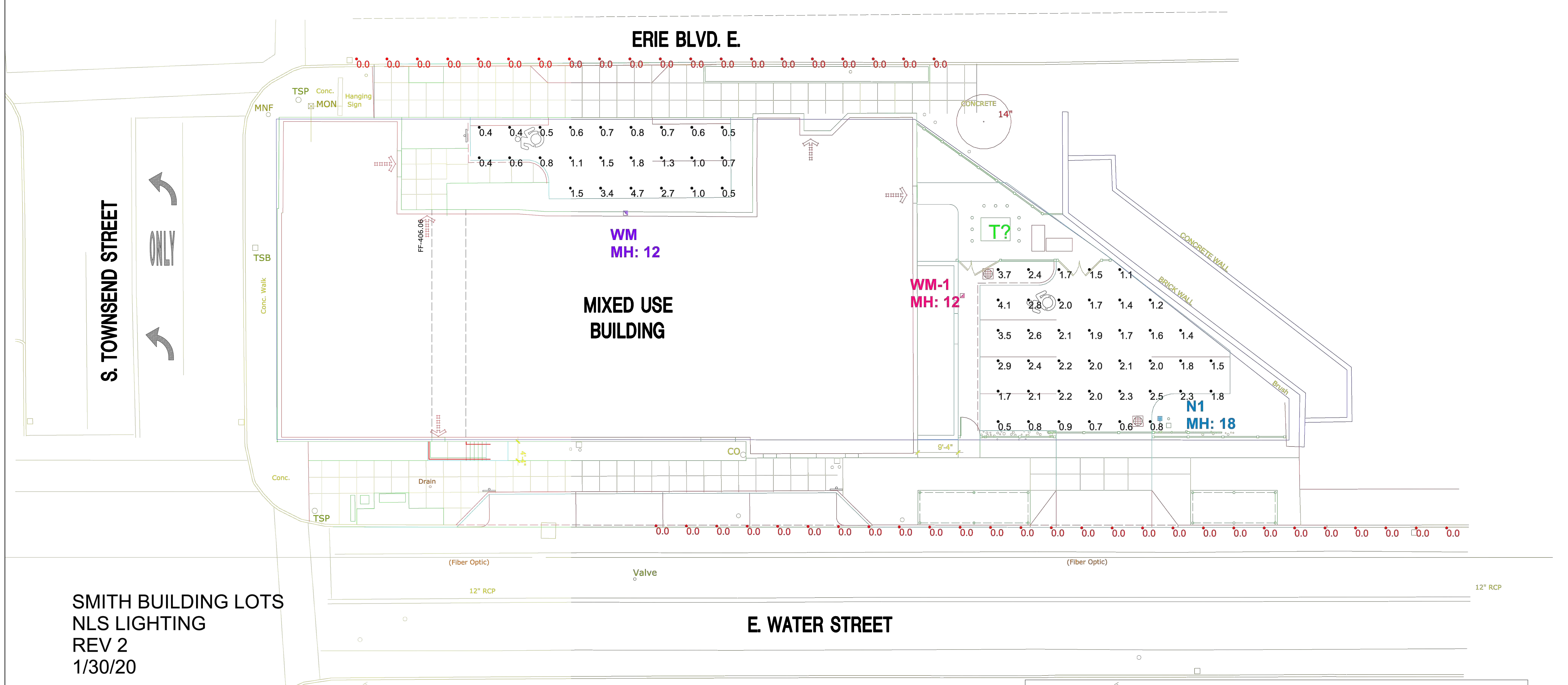
DETAILS

L-403



SMITH BUILDING LOTS
NLS LIGHTING
REV 2
1/30/20

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Watts
◩	1	WM	SINGLE	0.950	NV-W-T3-16L-35-50K-WM @ 12' MTG.HT	19
▣	1	N1	SINGLE	0.950	NV-1-T4-16L-1-50K-HSS-SINGLE @ 18' MTG.HT	56
◩	1	WM-1	SINGLE	0.950	NV-W-T4-16L-7-50K-WM @ 12' MTG.HT	37

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
EAST LOT	Illuminance	Fc	1.91	4.1	0.5	3.82	8.20
ERIE BLVD SPILL	Illuminance	Fc	0.00	0.0	0.0	N.A.	N.A.
NORTH LOT	Illuminance	Fc	1.18	4.7	0.4	2.95	11.75
WATER ST SPILL	Illuminance	Fc	0.00	0.0	0.0	N.A.	N.A.

1
L-500
LIGHTING PLAN

NOT TO SCALE

N

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FREEMAN
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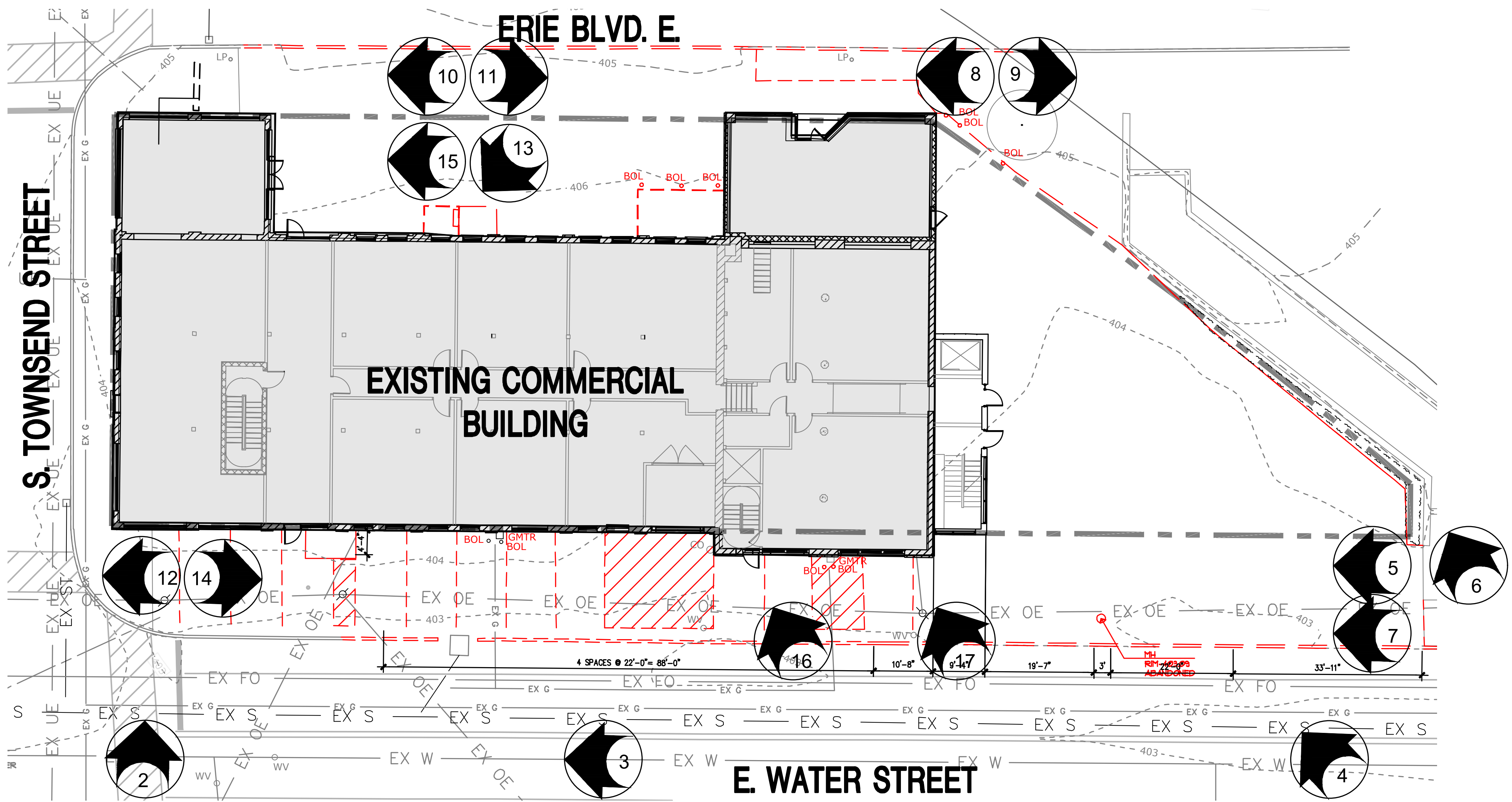
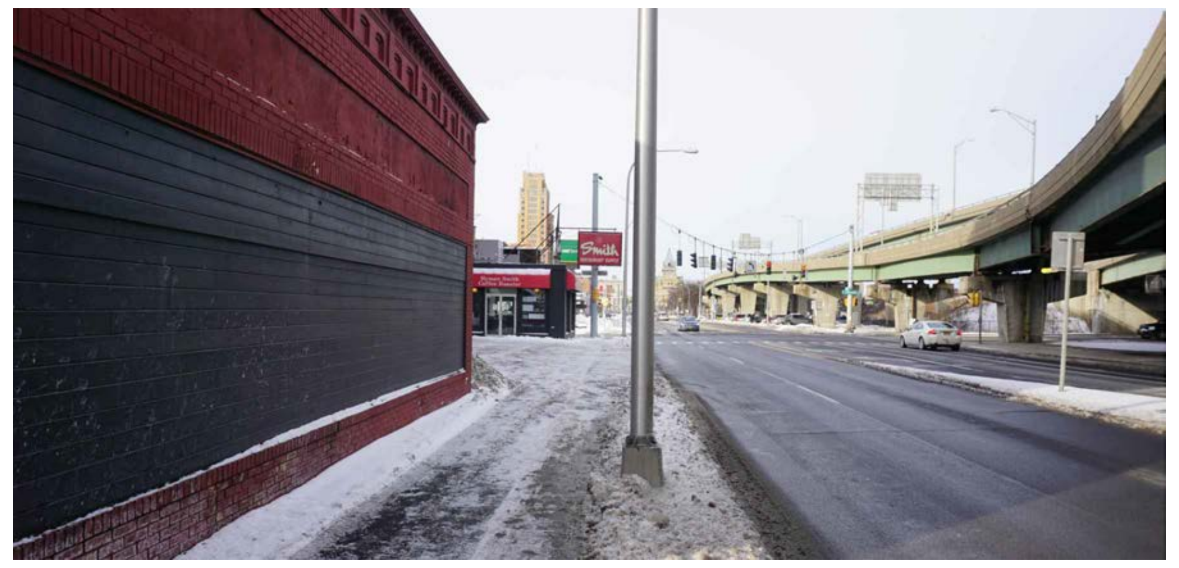
LIGHTING PLAN

L-500

NOT FOR CONSTRUCTION – CITY OF SYRACUSE SITE PLAN REVIEW



1 P-100 SITE PHOTO LOCATION PLAN

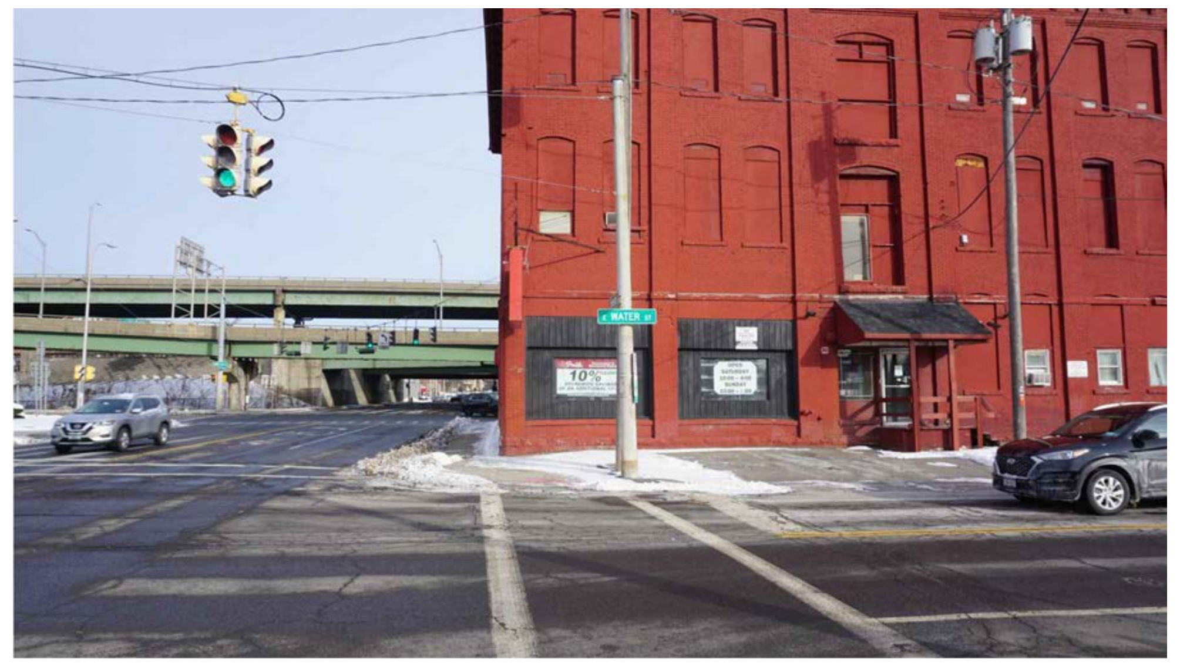


8 P-100 LOOKING WEST ON ERIE

13 P-100 EXISTING STORE ENTRANCE @ ERIE

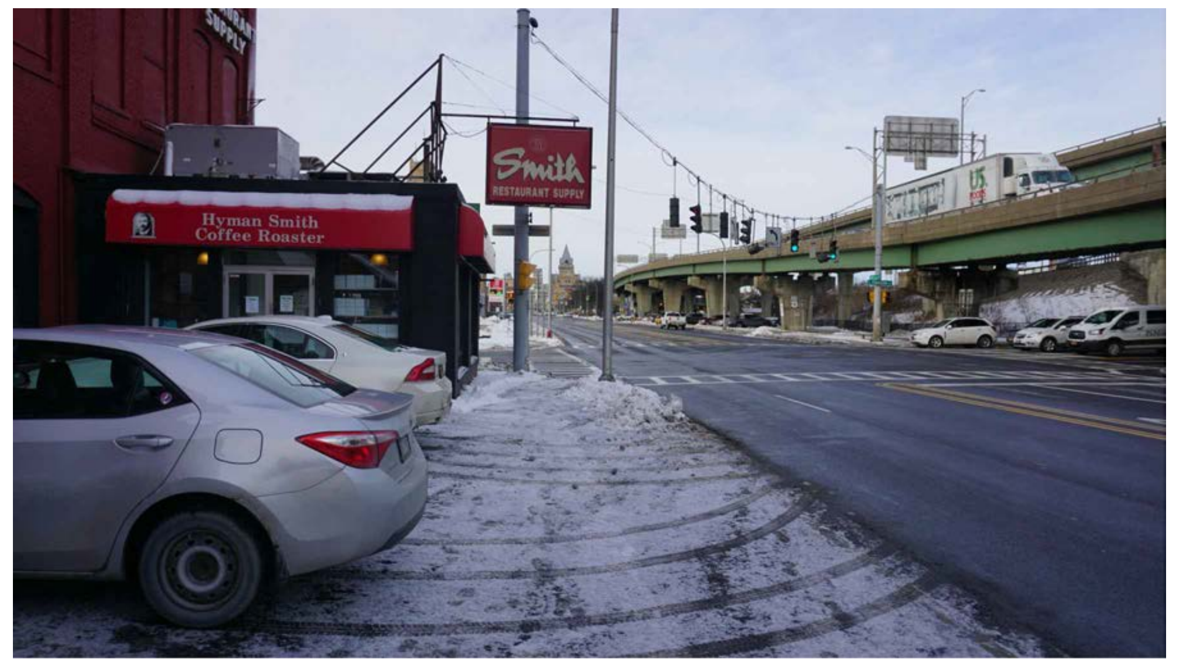
9 P-100 LOOKING EAST ON ERIE

14 P-100 ENTRANCE AT WATER



2 P-100 CORNER OF WATER AND TOWNSEND

5 P-100 EXISTING ENTRANCE



10 P-100 EXISTING ERIE ENTRANCE AREA

15 P-100 PROPOSED ENTRANCES

3 P-100 LOOKING WEST ON WATER

6 P-100 DOT WALL

11 P-100 LOOKING EAST ALONG ERIE

16 P-100 STAIR ENTRANCE ALONG WATER

4 P-100 BUILDING FROM ACROSS WATER

7 P-100 LOOKING UP SIDEWALK

12 P-100 CORNER OF WATER AND TOWNSEND

17 P-100 ENTRANCES TO BE REMOVED

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SITE PHOTO PLAN

P-100

NOT FOR CONSTRUCTION – CITY OF SYRACUSE SITE PLAN REVIEW

SECTION 02220 – EXCAVATION, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.1 Summary

A. Section Includes:

1. Excavation.
2. Filling and backfilling.
3. Stabilization fabric.
4. Sand and fill materials.
5. Compaction requirements.

B. Related Sections:

1. Section 01400 - Quality Control Services
2. Section 02211 - Rough Grading.
3. Section 02212 - Fine Grading.
4. Section 02230 - Base Courses.

1.2 Examination of Existing Grades

A. Examine grades and notify Architect of discrepancies, if any, before proceeding. Start of work implies acceptance of existing grades.

1.3 Submittals

A. Material Certificates (MC) including a certified laboratory sieve analysis (LA) bearing name and location of quarry. Sample (S) of material required (approximate volume 1 cu. ft.) in a waterproof container permanently labeled to show source. Submit for the following materials:

1. Subbase Material: (MC), (LA) including moisture/density curves and (S)
2. Coarse Aggregate Fill: (MC) and (S)
3. Drainage Fill (#1 Crushed Stone): (MC), (LA) and (S)
4. Drainage Sand: (MC) and (S)

B. Manufacturers data (MD) and product sample (S) required for the following materials:

1. Stabilization Fabric: (MD) and (S)
2. Demarcation Barrier Fabric

1.4 Settlement

A. Repair to proper grade any slab, pavement, utility, structure or lawn adversely affected by settlement or heaving within two-years after the date of substantial completion at no expense to the owner.

1.5 Timing

A. Install drainage system prior to or concurrent with road excavation to prevent/limit downstream flooding and erosion/sedimentation, to allow trench or general fill settlement, and to allow installation of subbase materials for construction.

1.6 General Dewatering

A. The Contractor shall dewater all excavations when water has entered the excavation or at the direction of the Engineer. The Contractor shall provide all equipment necessary to complete the work.

PART 2 - PRODUCTS

2.1 Materials

A. General Fill (Excavated Subsoil/Soil Fill): Approved, free of frost trash, stumps, trees, roots, sod, muck, etc. If suitable excavated material is insufficient to meet fill requirements, furnish additional material at contractor’s expense, subject to approval by architect. Thoroughly break up and condition soils for layered placement and compaction in fill areas.

B. Drainage Fill (#1 Crushed Stone): Crushed stone or washed crushed gravel. NYSDOT #1, Table 703-4. Clean, durable, of uniform quality throughout. 100% passing 1" sieve, 90-100% passing 1/2" sieve, 0-15% passing 1/4" sieve.

C. Stabilization Fabric: Polypropylene fiber Mirafi Celanese Fibers 500x, Amoco 2002, Carthage Mills FX-55 or approved equal.

D. Coarse Aggregate Fill: Clean run-of-bank gravel, 3" maximum size, not less than 30% by weight passing 1/4" sieve, not more than 70% by weight passing #40 sieve, not more than 10% by weight passing #200 sieve. Able to be compacted to compaction standards herein and free from organic and other deleterious materials. Where any such fill is deeper than 24-inches, a coarser, well-graded run-of-bank material with particle sizes ranging up to 6-inches may be used in the lower layers.

E. Subbase Course Material: Crushed limestone conforming to NYSDOT Section 304-2.02 Subbase Course Type 2 well graded from coarse to fine to produce tightly bonded material when compacted, and free from soil, organic materials or other contamination.

Standard ASTM Sieve Size	Percent Passing by Weight
2 inch (50 mm)	100
¼ (6.3 mm)	25-65
No. 40 (.425 mm)	5-40
No. 200 (.075 mm)	0-10

F. Drainage Sand: Clean, free draining, well graded, coarse manufactured or natural sand, free of organic materials, conforming to (ASTM C33) meeting the following gradation:

Standard ASTM Sieve Size	Percent Passing by Weight
3/8 inch	100
4	95-100
8	80-100
16	50-85
30	25-60
50	5-30
100	0-10
200	0-3

G. Topsoil: Refer to Section 02205 - Topsoil.

H. All fill, subbase, sand, and topsoil materials must meet the following environmental criteria:

1. Soil which exists at, or is imported to, a site which is used to construct a soil cover, site cap system or as excavation backfill must meet the requirements of 6 NYCRR 375-6.7(d) and shall:

    a. Comply with any Remedial Action Objectives which may be identified for a soil cover or the soil comprising a cap.
    b. Be free of extraneous debris or solid waste.

   c. Be recognizable soil or other unregulated material as set forth in 6 NYCRR Part 360 and materials for which DEC has issued a beneficial use determination.
   d. Not exceed the allowable constituent levels for imported fill or soil unless a site-specific exemption is provided by DER.
   e. Be tested as described in Item 2.1.H.2 of this Section.

2. The Owner will hire a third-party Environmental Consultant to coordinate the sampling of analysis of fill being imported to or exported from the site. Sampling and analysis is required for all imported soil for use as backfill or cover material. Sampling frequency of the material will be determined by the Interim Remedial Measure Work Plan or Remedial Action Work Plan.

   a. Sampling shall be conducted in accordance with Table 5.4(e)10 of NYSDEC document DER-10 / Technical Guidance for Site Investigation and Remediation with a minimum one sample analyzed from every new source. For soil or sand imported from a virgin mine/pit, at least one round of characterization samples for the initial 100 cubic yards of material.
   b. Samples will be a combination of discrete and composite samples, handled as follows:

      i. For VOCs only, grab samples are allowed. These grab samples are one or more discrete samples taken from the fill, with the number as specified in the volatile column of Table 5.4(e)10 of NYSDEC document DER-10 / Technical Guidance for Site Investigation and Remediation for the soil quantity in question, and analyzed for the VOCs identified by the Interim Remedial Measure Work Plan or Remedial Action Work Plan.
      ii. For SVOCs, inorganics and PCBs/pesticides:

         1. One or more composite samples are collected from the volume of soil identified in Table 5.4(e)10 of NYSDEC document DER-10 / Technical Guidance for Site Investigation and Remediation for analysis, with each composite from a different location in the fill volume.
         2. Each composite is prepared by collecting discrete samples from 3 to 5 random locations from the volume of soil to be tested
         3. The discrete samples are mixed, and after mixing, a sample of the mixture is analyzed for the SVOCs, inorganic and PCBs/pesticide constituents identified by the Interim Remedial Measure Work Plan or Remedial Action Work Plan.
3. Soil originating on the site may be reused on the site or exported for reuse provided sampling demonstrates compliance with Standards, Criteria, and

Guidance as detailed in Table 5.4(e)4 of NYSDEC document DER-10 / Technical Guidance for Site Investigation and Remediation.

4. The following material may be imported, without chemical testing, to be used as backfill beneath pavement, buildings or as part of the final site cover, provided that conforms to the other requirements of this Part, contains less than 10% by weight material which would pass through a size 80 sieve, and consists of:

    a. Gravel, rock or stone, consisting of virgin material from a permitted mine or quarry.
    b. Recycled concrete or brick from a DEC registered construction and demolition debris processing facility if the material conforms to the requirements of Section 304 of the New York State Department of Transportation Standard Specifications Construction and Materials Volume 1 (2002).

5. The contractor must provide documentation of the source of fill and any sampling to the Owner’s Representative for approval of the source of the material before it is used on the site (NYSDEC Request to Import/Reuse Fill or Soil form).

6. Bills of lading shall be provided to the Owner’s Representative to document that the fill delivered was from a DER-approved source(s).

7. Excavated soil which is not being reused on-site will be disposed in a permitted treatment, storage or disposal facility, unless the soil is tested and meets the criteria for such export. For soil that is being exported from a site to locations other than permitted disposal facilities:

    a. Levels of contamination must not exceed the lower of the groundwater and residential use levels, absent a beneficial use determination issued by DEC.
    b. Prior to the start of the remedial action, the Contractor and Environmental Consultant will coordinate with the Division of Solid & Hazardous Materials (DSHM) to determine whether the exported soil can be used beneficially in accordance with 6 NYCRR 360-1.
    c. The sampling and analysis requirements are set forth in paragraph 5.4(e)10 of NYSDEC document DER-10 / Technical Guidance for Site Investigation and Remediation.

I. Demarcation Barrier: US Fabrics 65HVO Orange Warning Barrier or similar Engineer-approved fabric

PART 3 EXECUTION

3.1 General

A. Banks and sides: Angle of recline or sheathing, shoring, and bracing as required for safety and conforming to all applicable laws, rules, regulations and codes.

B. Protection: Provide lights and barricades to properly protect persons and property. Assume full responsibility for all accidents during the course of work.

3.2 Unclassified Excavation

A. Includes all earth and miscellaneous material encountered.

B. Cut to exact elevations and grade. If soil becomes saturated and loses its structure in an area, cease work in that area, after establishing positive surface drainage, until surface dries. When the area has stabilized, continue excavation. Transport to fill areas.

C. Excess excavated material and excavated material not suitable for use as general fill may be placed in on-site fill area. Location and placement methods to be approved.

D. If stockpiled, pile in manner and location that will not impede the work of any other contractor, as directed by the Architect.

E. Excavation Classifications - The following classifications of excavations will be made when rock is encountered:

1. Earth excavation includes excavation of pavements and other obstructions visible on surface: underground structures, utilities, and other items indicated to be demolished and removed: together with earth and other materials that are not classified as rock excavation.
2. Rock excavation for trenches and pits includes removal & disposal of materials and obstructions encountered that cannot be excavated with a track-mounted power excavator, equivalent to Caterpillar Model No. 215c LC, and rated at not less than 115 HP flywheel power and 32,000-pound drawbar pull and equipped with a short stick and a 42 inch wide, short tip radius rock bucket rated at 0.81 cubic yard (heaped) capacity. Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as open excavation.

   Rock excavation in open excavation includes removal and disposal of materials and obstructions encountered that cannot be dislodged and excavated with modern track mounted, heavy duty excavating equipment without drilling, blasting, or ripping. Rock excavation equipment is defined as caterpillar model No. 973 or equivalent track mounted loader, rated at not less than 210 HP flywheel power and developing minimum of 45,000- pound breakout force(measured in accordance with SAE J732).

    a. Typical of materials classified as rock are boulders ½ cu. yard or more in volume, solid rock, rock in ledges, and rock hard cementitious aggregate deposits.
    b. Intermittent drilling or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

F. Do not perform rock excavation work until material to be excavated has been cross sectioned and classified by architect. Such excavation will be paid on basis of contract conditions relative to changes in work.

G. Rock payment lines are limited to the following:

    1. Two feet outside of concrete work for which forms are required, except footings.
    2. One foot outside perimeter of footings.
    3. In pipe trenches, 6 inched below invert elevation of pipe and 2 feet wider than inside diameter of pipe, but not less than 3-foot minimum trench width.
    4. Outside dimensions of concrete work where no forms are required.
    5. Under slabs on grade, 6 inches below bottom of concrete slab.

3.3 Unclassified Excavation for Structures

A. Includes all earth and miscellaneous material encountered.

B. Excavate to depth as shown on drawings. Transport to fill areas.

C. Excess depth: Backfill to proper elevations with Coarse Aggregate Fill at Contractor's expense.

D. Clearance sufficient for form work to be performed. Banks and sides - angle of recline or sheeting, shoring, and bracing as required for safety and conforming to all applicable laws, rules, regulations and codes. Remove before backfilling.

E. Remove loose material and debris from excavation so all footings rest on solid, undisturbed soil.

F. Remove water during excavation for foundations by ditching or pumping so that no water stands.

G. Insure that movement of equipment in the excavation does not cause working and pumping of the underlying soil which is not to be excavated. Should the equipment used cause excessive working, use other methods of excavation to maintain the design bearing capacity of the soil.

3.4 Unclassified Trench Excavation

A. Includes all earth and miscellaneous material encountered.

B. Excavate to exact depth and grade allowing clearance for pipe bedding as required.

C. Transport excess to fill areas.

D. Report wet or unstable trench bottom to Architect. Should Architect deem unsuitable, excavate to depth as directed and backfill with #1 crushed stone to trench bottom or as otherwise directed.

E. Do not excavate over 12 inches wider than outside diameter of pipe below spring line.

F. Pump as required to dewater excavation.

3.5 General Filling Requirements

A. Start after approval by Architect.

B. The subgrade to receive fill shall be firm and stable and should not exhibit mud, organic material, topsoil, standing water, debris or frozen material. Where applicable, subgrade should be proofrolled and remediated (if necessary). Approved subgrade should be immediately protected by placement of the planned fill.

C. The demarcation barrier shall be placed along the walls and bottom of the excavation.

D. Fill material shall be placed on a satisfactory and approved subgrade in a manner to minimize segregation. The fill should be placed in nearly horizontal lifts commencing at the lowest fill area elevation and proceeding with each lift upward and outward from the lower lift. The moisture content of the material shall be adjusted prior to application of compaction such that it is within 2% of the Optimum Moisture Content. The first lift shall be placed to a loose thickness not to exceed 8 inches (12'' in mass fill areas). This first lift shall then be compacted to an in place density not to less than 95% of the maximum dry density, unless noted otherwise in this specification section.

E. No subsequent lift shall be placed until the underlying lift has been adequately compacted to a stable and uniform mass.

F. All subsequent lifts shall not exceed 8 inches (12" in mass fill areas) in compacted thickness, shall be moisture conditioned prior to compaction to within 2% of Optimum Moisture Content, and shall be compacted uniformly to an in-place field density field density of not less than 95% of Maximum Dry Density, unless noted otherwise in this specification section.

G. When the test results indicate that insufficient compaction has been obtained in any layer , the Contractor shall take such action as the engineer may direct to modify or alter the moisture content of the soil, to provide additional compaction or otherwise to increase the in-place soil density. If the contractor cannot obtain satisfactory compaction due to material properties, he shall remove the unsatisfactory material and replace with new material. Materials contaminated by mud, debris, organics and/or any other deleterious materials shall be removed and replaced with uncontaminated specified material.

H. Where a structural fill abuts an existing earthen embankment or slope, each lift shall be stepped or benched into the existing slope and each subsequent lift shall overlap appropriately (at least 12 inches) the underlying step or bench.

I. Each lift and the final grade shall be graded or sloped to promote positive drainage off the fill and out of the limit lines. The extent of backfill and fill, upon completion, shall conform to the lines and grades given on the plans.

3.6 Trench Backfill

A. Materials:

1. Under lawns and under planting beds: Approved excavated subsoil material.
2. Under pavements: Subbase material or coarse aggregate fill, refer to drawings.

B. Start after approval of Architect.

C. Place: Do not place on frozen ground. Place in 6" layers from cushion sand or filter material to subgrade. No boulders or stones over 4". Tamp each 6" layer with mechanical tamper. Adjust fill to smooth subgrade.

D. Compaction: Uniformly spread each layer, moisten or dry as required, and then compact so unit dry weight of the compacted material meets or exceeds 95% of the maximum modified proctor density based on ASTM D1557 procedures.

3.7 Fill at Structures

A. Materials:

1. Fill under pavement subgrade - coarse aggregate fill or subbase course material.
2. Site structures backfill to subgrade where pavement occurs and no footing drains occur-coarse aggregate fill.
3. Demolition backfill to subgrade where no pavements occur - excavated subsoil material.
4. Demolition backfill to bottom of new construction where pavements occur - coarse aggregate fill.

B. Start after approval by Architect.

C. Place: Do not place on frozen ground. Place in 6-inch layers. Compact by approved mechanical equipment. Remove construction debris from excavation.

D. Compaction: Uniformly spread each layer, moisten or dry as required, and then compact so unit dry weight of the compacted material meets or exceeds 95% of the maximum modified proctor density based on ASTM D1557 procedures.

3.8 Stabilization Fabric and Demarcation Barrier

A. Place Stabilization fabric and demarcation barrier in lengths and widths as large as possible. Lap seams per manufacturer's instructions or 6" minimum.

B. Cover using methods that will not damage or displace stabilization fabric or demarcation barrier.

C. Time operations to avoid trenching by any contractor in areas where stabilization fabric or demarcation barrier has been placed.

3.9 Excess Excavated Material

A. All excess earth excavated material not required to meet on site fill requirements shall be promptly removed from the site and legally disposed of at contractors expense.

3.10 Field Quality Control

A. Proofrolling - immediately prior to placing general base material for pavements or slabs on grade, proofroll subgrade with 10 ton minimum loaded smooth drum self- propelled vibratory roller. Undercut all areas which show pumping or weaving and replace with acceptable fill materials compacted to 95% of the maximum modified proctor density based on ASTM D1557 procedures.

B. Quality Control Testing during Construction:

1. Owner shall provide and pay for services of independent testing service to inspect and test final cut and fill subgrades, utility trenching and subbase course compaction prior to paving. Additional tests will be taken as required for full coverage of paved areas.
2. Provide timely notice to Architect to inspect and approve subgrades and fill layers before further construction work is performed.
3. Compaction: ASTM D1557, latest edition: 1 test initially and 1 test for each significant change in fill material.
4. Field density or in place density tests: Sand-cone method or other method approved by Architect in accordance with ASTM D1556, latest edition.

    a. Trench Backfill
    One test for each 20 linear feet of trench and for each two feet vertical depth of backfill. Architect may require additional tests to verify results of each test which fails to meet results specified. If tests verify compaction below that specified, recompact and/or remove, replace and retest material at the same rate until specified compaction is achieved.

    b. Paved Areas

At least 1 test for each 2,000 square feet of paved area. Architect may require additional tests to verify results of each test which fails to meet results specified. If tests verify compaction below that specified, remove, replace and retest material at the rate of one test per 1000 square feet of paved area until specified compaction is achieved.

3.11 Dewatering

A. Details of the dewatering are left to the Contractor's discretion. The Contractor shall submit a dewatering plan of his proposed dewatering system to the Engineer for review. No excavation in the wet shall proceed until the Contractor receives notice the review of the dewatering plan has been completed by the Engineer.

B. The Contractor shall at all times during construction, provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations, and shall remove all water as fast as it may collect, in such manner as shall not interfere with the prosecution of the work or the proper placing of soil, granular material, sewers, concrete, masonry or other work.

C. Removal of water includes the construction and removal of cofferdams, sheeting and bracing, the excavation and maintenance of ditches and sluice-ways, furnishing and operation of pumps, well points, and furnishing all labor, material and equipment needed to maintain thorough drainage of the work in a satisfactory manner.

D. Water shall not be allowed to rise over or come in contact with any masonry, concrete or mortar and no water shall be allowed to flow over such work until such time as the Engineer may permit.

E. Water pumped or drained from excavations, or any sewers, drains, or water courses encountered in the work, shall be disposed of in a suitable manner without injury to adjacent property, the work under construction, to pavements, roads and drives and must comply with the requirements of the Stormwater Pollution Prevention Plan.. No water, including sediments, shall be discharged to sanitary sewers, adjoining properties, water courses or wetlands. Any damage caused by improper handling of water shall be repaired by the Contractor at his own expense.

3.12 Removal of Contaminated Material

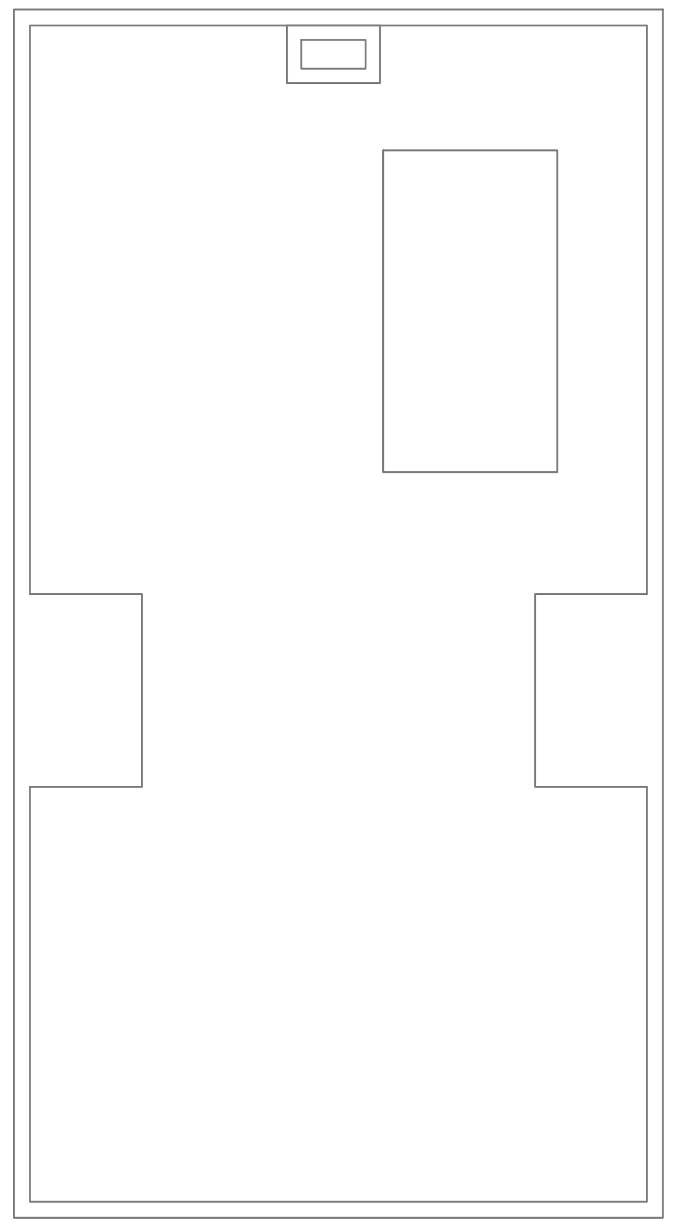
A. Contractor shall be responsible for excavation and removal from the site of any soils or other materials which become contaminated by spills or dumping on the site of petroleum, solvent, chemical or other hazardous products and materials occurring during and as a result of the work of the contractor or any subcontractor, as observed and ordered by the Owner, Architect or others having jurisdiction. Contractor shall bear the cost of such work and any fees, fines, penalties or other costs levied against any parties by agencies having jurisdiction. Excavation, removal, storage and disposal of such contaminated materials shall be conducted in accordance with all applicable laws and regulations, including notification and other requirements of the New York State Department of Environmental

Conservation and other agencies having jurisdiction. Replacement of removed materials shall be consistent with original material, placement and compaction requirements, and related work.

END

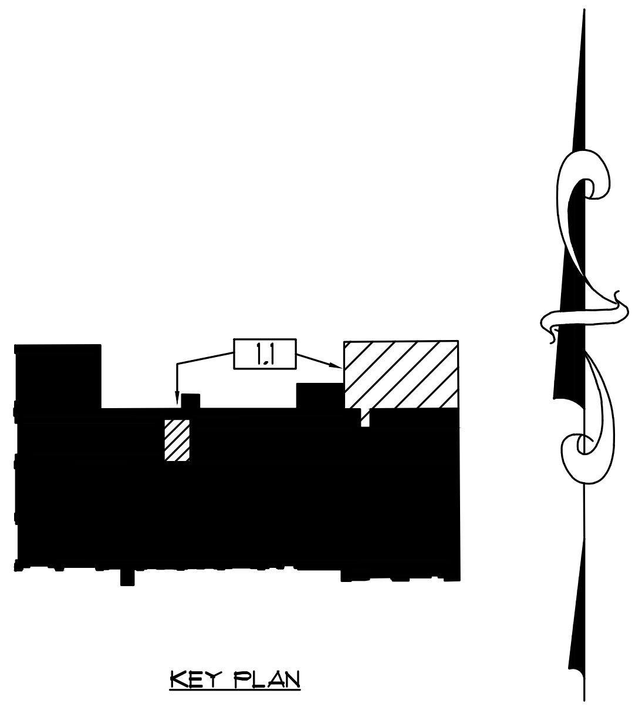
APPENDIX F

Vapor Mitigation System Plans



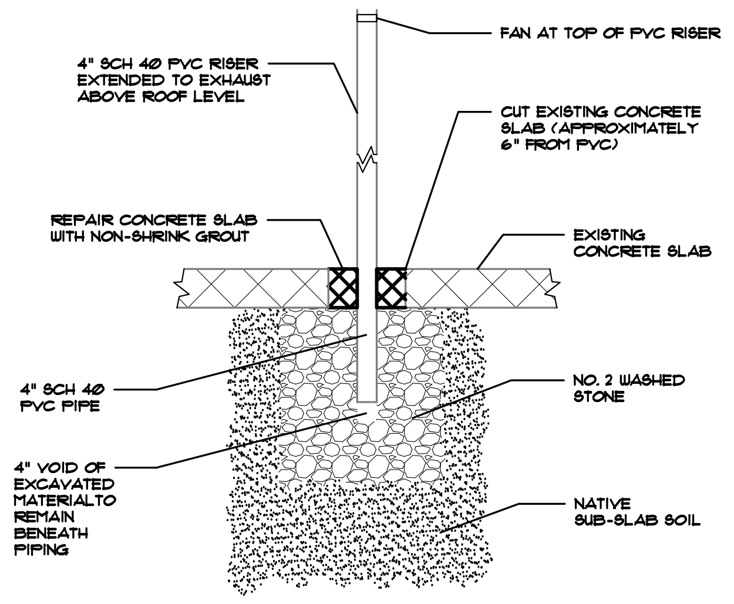
WEST BUILDING - COAL PIT

EAST BUILDING - BASEMENT

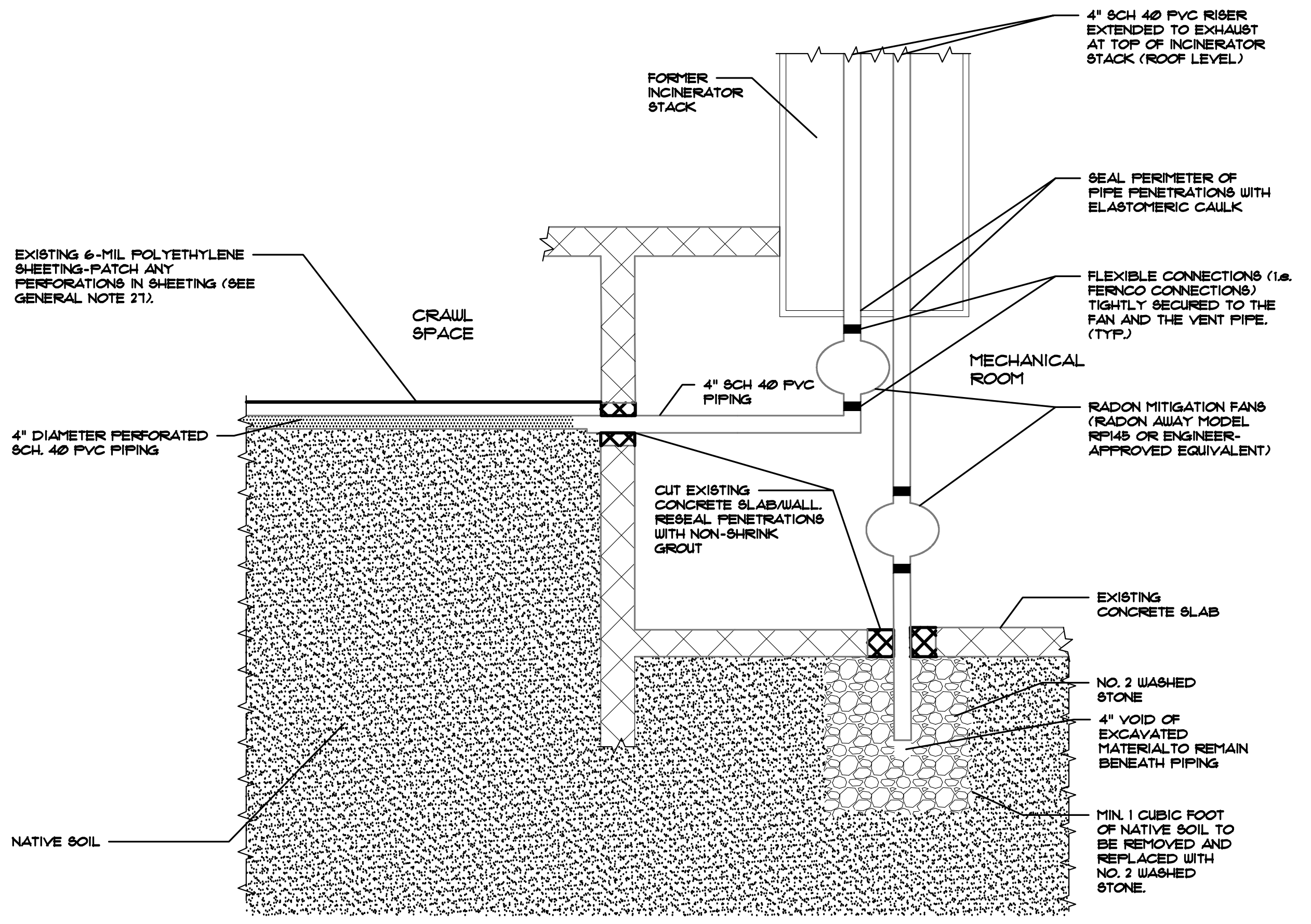


KEY PLAN

SUB-SLAB EXTRACTION POINT DETAIL:



1 / HM 1.1 Extraction Point Detail
Not to Scale



2 / HM 1.1 Extraction Point Detail
Not to Scale

NOTES

1. THE MITIGATION SYSTEM INSTALLATION CONTRACTOR ("CONTRACTOR") ASSUMES THE RESPONSIBILITY FOR THE MEANS AND METHODS, COORDINATION, SUPERVISION, AND MANAGEMENT UTILIZED TO COMPLETE THE PROJECT IN A TIMELY, PROFESSIONAL, LEGAL, AND SAFE MANNER.
2. THE CONTRACTOR SHALL COORDINATE/SCHEDULE ALL WORK WITH THE CONSTRUCTION MANAGER AND ENVIRONMENTAL CONSULTANT.
3. THE CONTRACTOR SHALL PROVIDE THEIR EMPLOYEES WITH ADEQUATE PERSONAL PROTECTIVE EQUIPMENT AT ALL TIMES WHEN PERFORMING WORK ON THIS PROJECT.
4. THE CONTRACTOR ACKNOWLEDGES THAT PORTIONS OF THE BUILDING MAY BE OCCUPIED BY OTHER TRADES DURING SYSTEM INSTALLATION ACTIVITIES. THE CONTRACTOR SHALL COORDINATE PHASING/SEQUENCING OF WORK WITH THE CONSTRUCTION MANAGER.
5. ALL COMPONENTS OF RADON MITIGATION SYSTEMS INSTALLED SHALL BE IN COMPLIANCE WITH APPLICABLE MECHANICAL, ELECTRICAL, BUILDING, PLUMBING, ENERGY AND FIRE PREVENTION CODES, STANDARDS, AND REGULATIONS OF THE LOCAL JURISDICTION.
6. THE CONTRACTOR SHALL PROTECT ALL EXISTING ARCHITECTURAL FINISHES, MECHANICAL, ELECTRICAL AND PLUMBING SYSTEMS, AND OTHER BUILDING AND SITE FEATURES THAT ARE NOT TO BE IMPACTED BY THE SYSTEM INSTALLATION. SHOULD DAMAGE OCCUR, THE CONTRACTOR SHALL BE LIABLE FOR THE COSTS ASSOCIATED WITH THEIR REPAIR, RESTORATION, AND/OR REPLACEMENT.
7. TO ENHANCE PRESSURE FIELD EXTENSION AND IMPROVE OVERALL SYSTEM PERFORMANCE, ONE CUBIC FOOT OF SUB-SLAB MATERIAL SHALL BE REMOVED FROM BELOW AND AROUND EACH SUCTION / EXTRACTION POINT PIPE. THE EXCAVATION SHALL BE BACKFILLED WITH WASHED NO. 2 CRUSHED STONE, WHILE LEAVING A 4" VOID DIRECTLY BELOW THE END OF THE SUCTION PIPING TO PREVENT BLOCKAGE OF AIR FLOW INTO THE BOTTOM OF SUCTION / EXTRACTION POINT PIPES. THE VERTICAL PIPES SHALL BE SUPPORTED AND SECURED IN A PERMANENT MANNER THAT PREVENTS THEIR DOWNWARD MOVEMENT TO THE BOTTOM OF SUCTION PITS.
8. SUCTION / EXTRACTION POINT, VERTICAL RISER, AND MANIFOLD PIPING SHALL BE RIGID 4" DIAMETER SCHEDULE 40 PVC.
9. THE SLAB PENETRATION SHALL BE REPAIRED AND SEALED TO THE OUTSIDE OF THE PVC RISER PIPE WITH NON-SHRINK GROUT.
10. ALL PIPE JOINTS AND CONNECTIONS SHALL BE SEALED PERMANENTLY, WITH THE EXCEPTION OF THE AREA OF INSTALLATION OF THE RADON FANS.
11. RADON SYSTEM PIPING INSTALLED IN THE INTERIOR OF THE BUILDING SHALL BE INSULATED SO THAT CONDENSATION ON THE PIPE'S EXTERIOR DOES NOT DRIP AND DAMAGE OTHER BUILDING COMPONENTS, AND INSULATED ON THE EXTERIOR OF THE BUILDING SO THAT CONDENSATION INSIDE THE PIPE DOES NOT FREEZE AND CREATE A BLOCKAGE IN THE SOIL-GAS EXHAUST.
12. SUPPORTS FOR RADON SYSTEM PIPING SHALL BE INSTALLED AT LEAST EVERY 6 FEET ON HORIZONTAL RUNS. VERTICAL RUNS SHALL BE SECURED ABOVE OR BELOW THE POINTS OF PENETRATION THROUGH FLOORS, CEILINGS, AND ROOFS, AND AT LEAST EVERY 8 FEET ON RUNS THAT DO NOT PENETRATE FLOORS, CEILINGS, OR ROOFS.
13. HORIZONTAL RUNS IN RADON SYSTEM PIPING SHALL BE SLOPED TO PROMOTE DRAINAGE OF WATER FROM RAIN OR CONDENSATION DOWNWARD INTO THE SOIL BENEATH THE SLAB.
14. HORIZONTAL RUNS COMPRISING THE SUB-MEMBRANE DEPRESSURIZATION SYSTEM IN THE CRAWLSPACE AREAS SHOULD BE COMPRISED OF 4" PERFORATED PVC PIPING, AND BE INSERTED BENEATH THE EXISTING POLYETHYLENE SHEETING / BARRIER.
15. TO REDUCE THE RISK OF VENT STACK BLOCKAGE DUE TO HEAVY SNOWFALL, AND TO REDUCE THE RISK OF RE-ENTRAINMENT OF RADON INTO THE LIVING SPACES OF THE BUILDING, THE DISCHARGE FROM VENT STACK PIPES SHALL EXTEND VERTICAL AND UPWARD A MINIMUM OF 10 FEET ABOVE THE EDGE OF THE ROOF, AND SHALL BE AT LEAST 12 INCHES ABOVE THE SURFACE OF THE ROOF. THE DISCHARGE / EXHAUST POINT(S) SHALL ALSO BE 10 FEET OR MORE AWAY FROM ANY WINDOW, DOOR, AIR INTAKES, OR OTHER OPENING INTO CONDITIONED / OCCUPIED BUILDING SPACE, AND 10 FEET OR MORE AWAY FROM SIMILAR OPENINGS OF ADJACENT BUILDINGS.
16. RADON MITIGATION FANS SHALL BE INSTALLED EITHER OUTSIDE OF THE BUILDING, OR INSIDE OF THE BUILDING BUT OUTSIDE OF OCCUPIABLE SPACE AND ABOVE THE CONDITIONED SPACES OF THE BUILDING. THIS LOCATION IS NECESSARY TO MINIMIZE THE RISK OF RADON ENTRY INTO LIVING SPACES WHICH COULD RESULT FROM LEAKS IN RADON FAN HOUSINGS OR IN VENT STACK PIPING ABOVE THE RADON FAN. RADON FANS MOUNTED ON THE EXTERIOR OF BUILDINGS MUST BE RATED FOR OUTDOOR USE OR INSTALLED IN A WEATHER PROOF PROTECTIVE HOUSING.
17. RADON MITIGATION FANS SHALL BE MOUNTED AND SECURED IN A MANNER THAT MINIMIZES TRANSFER OF VIBRATION TO THE STRUCTURAL FRAMING OF THE BUILDING.
18. MITIGATION FANS SHALL BE RADONAWAY MODEL RP145 SERIES FAN(S), OR ENGINEER-APPROVED EQUIVALENT. FANS SHALL BE MOUNTED VERTICALLY PLUMB AND LEVEL WITH OUTLET POINTED UP. FANS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
19. TO FACILITATE MAINTENANCE AND FUTURE REPLACEMENT, RADON MITIGATION FANS SHALL BE INSTALLED IN THE VENT PIPE USING REMOVABLE COUPLINGS OR FLEXIBLE CONNECTIONS (I.E. "FERNCO" CONNECTIONS, OR SIMILAR) THAT CAN BE TIGHTLY SECURED TO BOTH THE FAN AND THE VENT PIPE. OTHER FITTINGS / CONNECTIONS SHALL BE PERMANENTLY CEMENTED / SEALED.
20. OUTSIDE AIR INTAKE VENTS SHALL BE SCREENED TO PREVENT THE INTAKE OF DEBRIS AND ALLOW FOR PERIODIC CLEANING BY THE BUILDING OWNER.
21. EACH VERTICAL RISER SHALL BE EQUIPPED WITH A MANOMETER OR OTHER SUITABLE SYSTEM MONITOR THAT IS LOCATED IN A READILY VISIBLE LOCATION TO ALLOW FOR ROUTINE VERIFICATION OF SYSTEM OPERATIONS. THE MANOMETER SHALL BE SIMPLE TO READ OR INTERPRET AND BE LOCATED WHERE IT CAN BE EASILY SEEN OR HEARD.
22. A SYSTEM DESCRIPTION LABEL SHALL BE PLACED ON EACH VERTICAL RISER IN A PROMINENT AND READILY VISIBLE LOCATION. THE LABEL SHALL READ "RADON REDUCTION SYSTEM", OR SIMILAR.
23. MITIGATION SYSTEM CONTRACTOR SHALL PROVIDE AN EXTRA MITIGATION FAN UNIT OF THE SAME TYPE AND MODEL AS THOSE INSTALLED TO THE OWNER TO SERVE AS A BACKUP IN THE EVENT OF FAN FAILURE.
24. SEAL ALL PENETRATIONS FROM ALL BASEMENT AREAS TO OTHER HABITABLE SPACES USING FIRE-RETARDANT EXPANDABLE FOAM, NON-SHRINK GROUT, FIRE-RETARDANT CAULK, OR SIMILAR PRODUCT.

VIP
ARCHITECTURE

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PAULUS
DEVELOPMENT

500 ERIE BLVD E,
SYRACUSE, NY 13021

HAZARDOUS MATERIAL ABATEMENT ACTIVITIES

Former Smith
Housewares & Resturant
Supply
500 Erie Boulevard East
Syracuse, New York
13202

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MK	**DATE**	**DESCRIPTION**

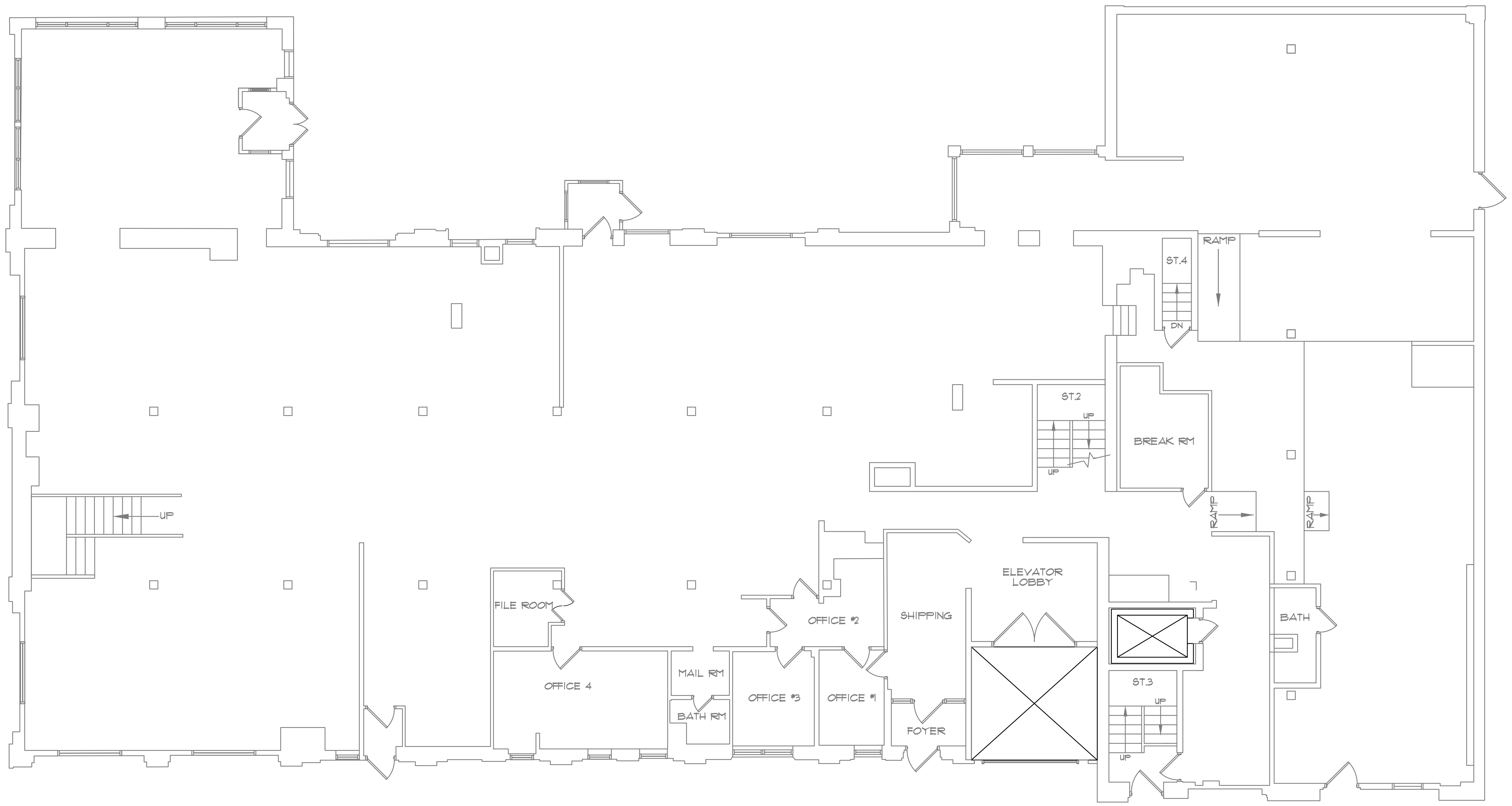
SHEET ISSUES

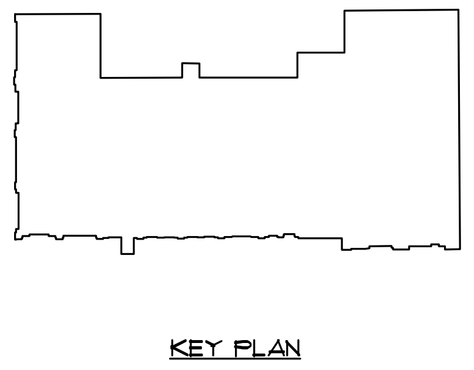
VIP PROJECT NO.	19-2516
FILE NAME	20-057 Design HM-1.1
DRAWN BY	NP
CHECKED BY	NB

Sub-Slab Depessurization
System Plan and Details

SHEET NUMBER

HM-1.1




KEY PLAN

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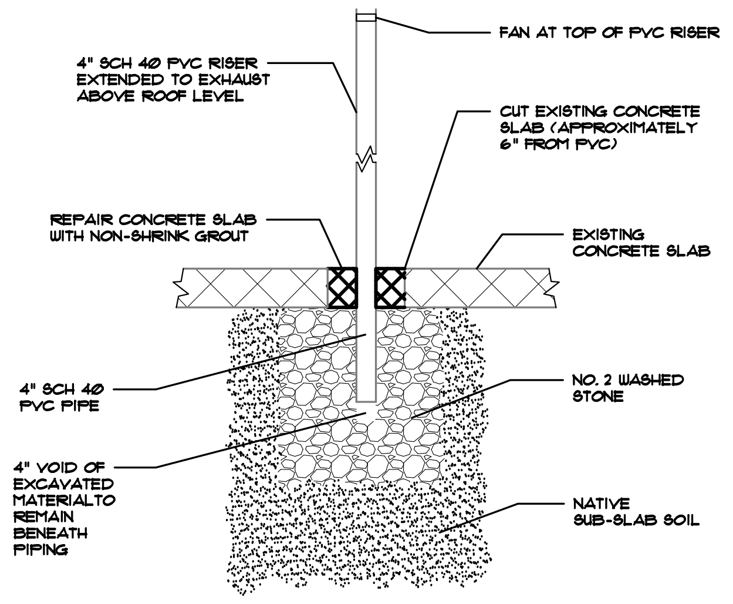

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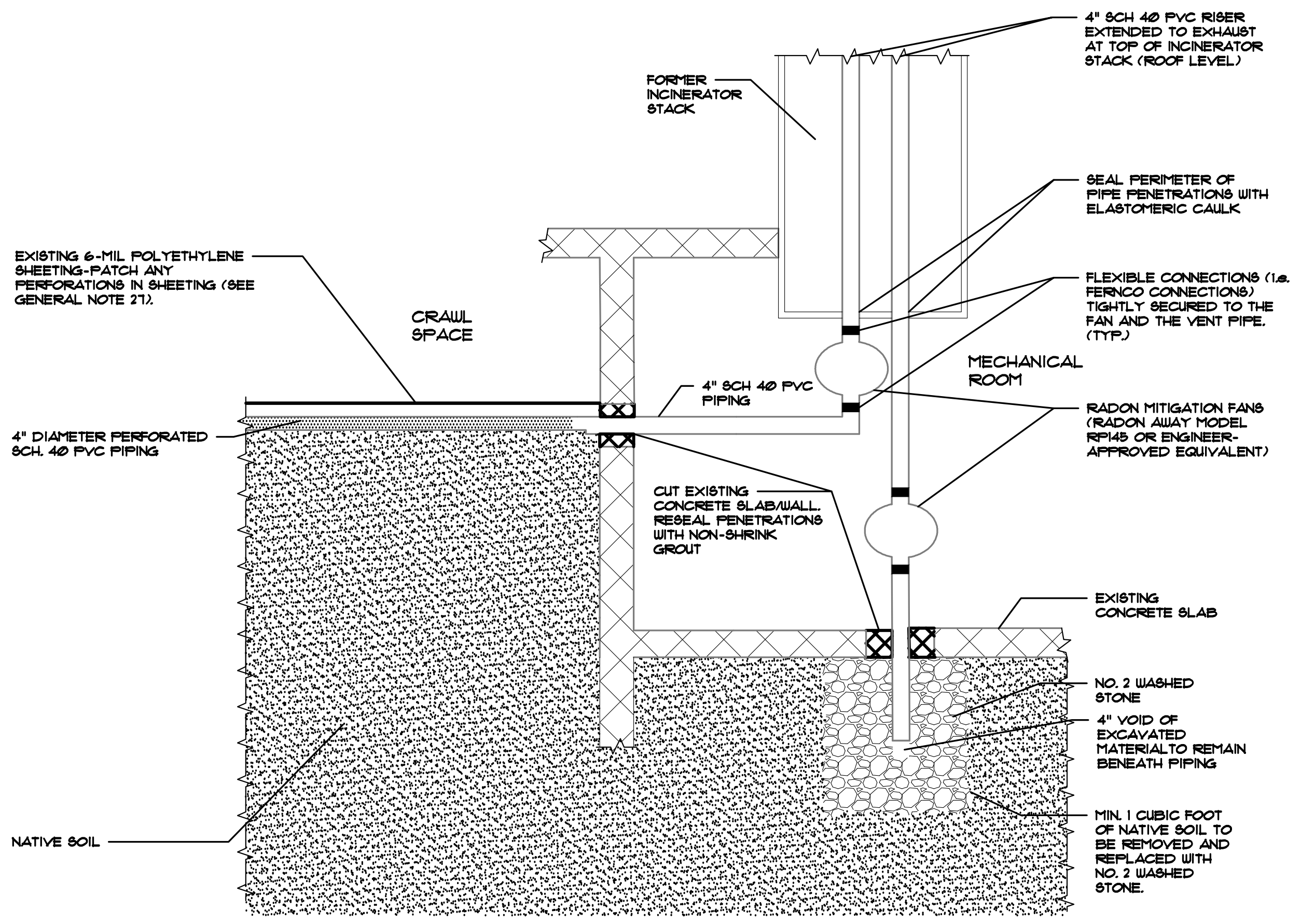

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7. TO ENHANCE PRESSURE FIELD EXTENSION AND IMPROVE OVERALL SYSTEM PERFORMANCE, ONE CUBIC FOOT OF SUB-SLAB MATERIAL SHALL BE REMOVED FROM BELOW AND AROUND EACH SUCTION / EXTRACTION POINT PIPE. THE EXCAVATION SHALL BE BACKFILLED WITH WASHED NO. 2 CRUSHED STONE, WHILE LEAVING A 4" VOID DIRECTLY BELOW THE END OF THE SUCTION PIPING TO PREVENT BLOCKAGE OF AIR FLOW INTO THE BOTTOM OF SUCTION / EXTRACTION POINT PIPES. THE VERTICAL PIPES SHALL BE SUPPORTED AND SECURED IN A PERMANENT MANNER THAT PREVENTS THEIR DOWNWARD MOVEMENT TO THE BOTTOM OF SUCTION PITS.
8. SUCTION / EXTRACTION POINT, VERTICAL RISER, AND MANIFOLD PIPING SHALL BE RIGID 4" DIAMETER SCHEDULE 40 PVC.
9. THE SLAB PENETRATION SHALL BE REPAIRED AND SEALED TO THE OUTSIDE OF THE PVC RISER PIPE WITH NON-SHRINK GROUT.
10. ALL PIPE JOINTS AND CONNECTIONS SHALL BE SEALED PERMANENTLY, WITH THE EXCEPTION OF THE AREA OF INSTALLATION OF THE RADON FANS.
11. RADON SYSTEM PIPING INSTALLED IN THE INTERIOR OF THE BUILDING SHALL BE INSULATED SO THAT CONDENSATION ON THE PIPE'S EXTERIOR DOES NOT DRIP AND DAMAGE OTHER BUILDING COMPONENTS, AND INSULATED ON THE EXTERIOR OF THE BUILDING SO THAT CONDENSATION INSIDE THE PIPE DOES NOT FREEZE AND CREATE A BLOCKAGE IN THE SOIL-GAS EXHAUST.
12. SUPPORTS FOR RADON SYSTEM PIPING SHALL BE INSTALLED AT LEAST EVERY 6 FEET ON HORIZONTAL RUNS. VERTICAL RUNS SHALL BE SECURED ABOVE OR BELOW THE POINTS OF PENETRATION THROUGH FLOORS, CEILINGS, AND ROOFS, AND AT LEAST EVERY 8 FEET ON RUNS THAT DO NOT PENETRATE FLOORS, CEILINGS, OR ROOFS.
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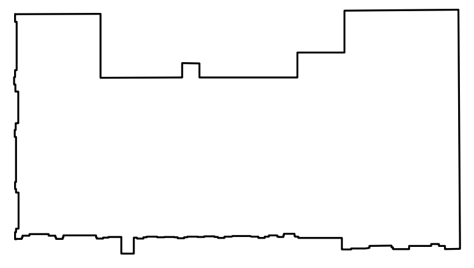
MK	DATE	DESCRIPTION

SHEET ISSUES

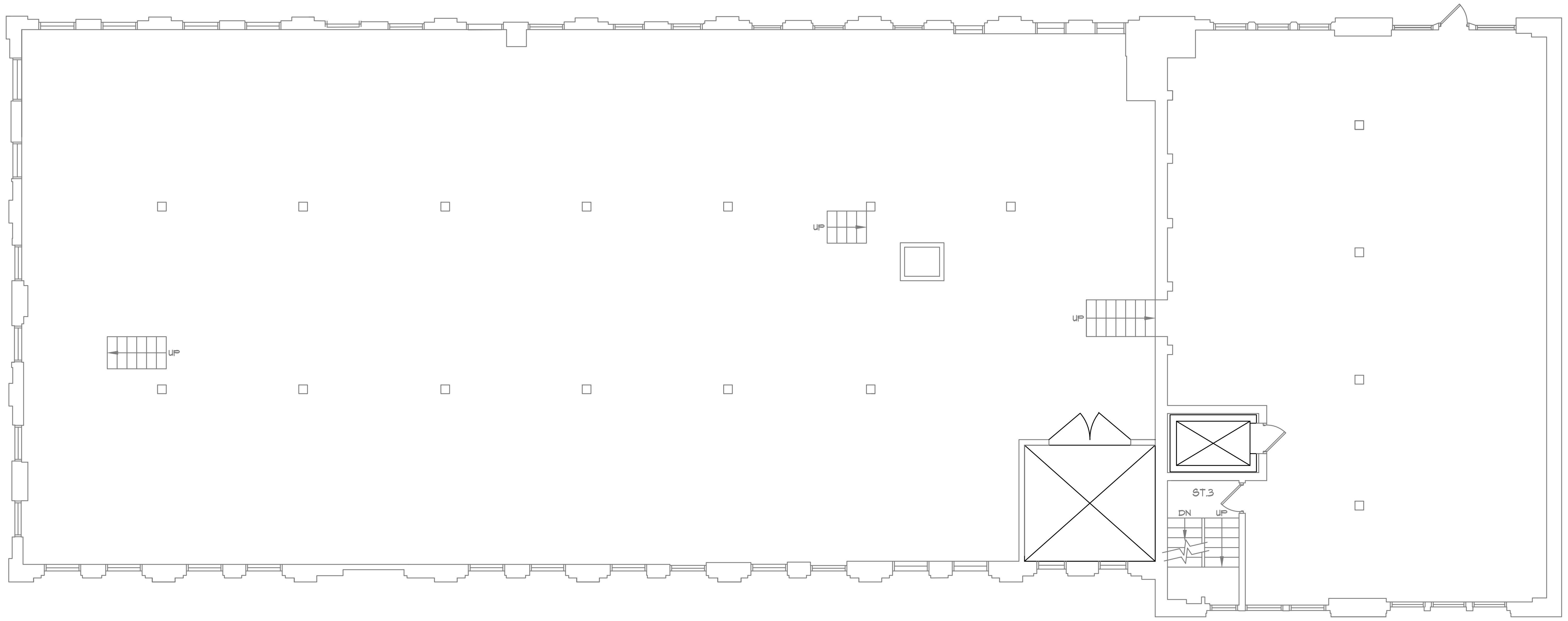
VIP PROJECT NO.	19-2516
FILE NAME	20-057 Design HM-1.1
DRAWN BY	NP
CHECKED BY	NB

First Floor Plan A

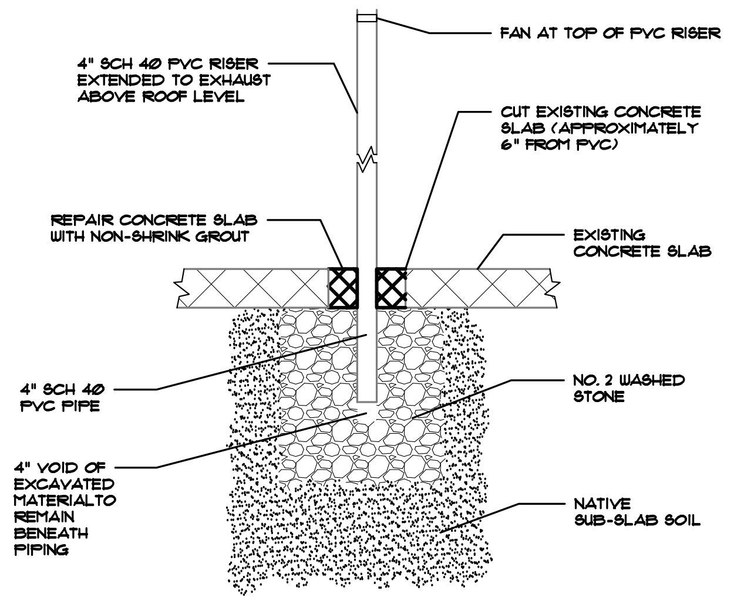
SHEET NUMBER
HM-1.2



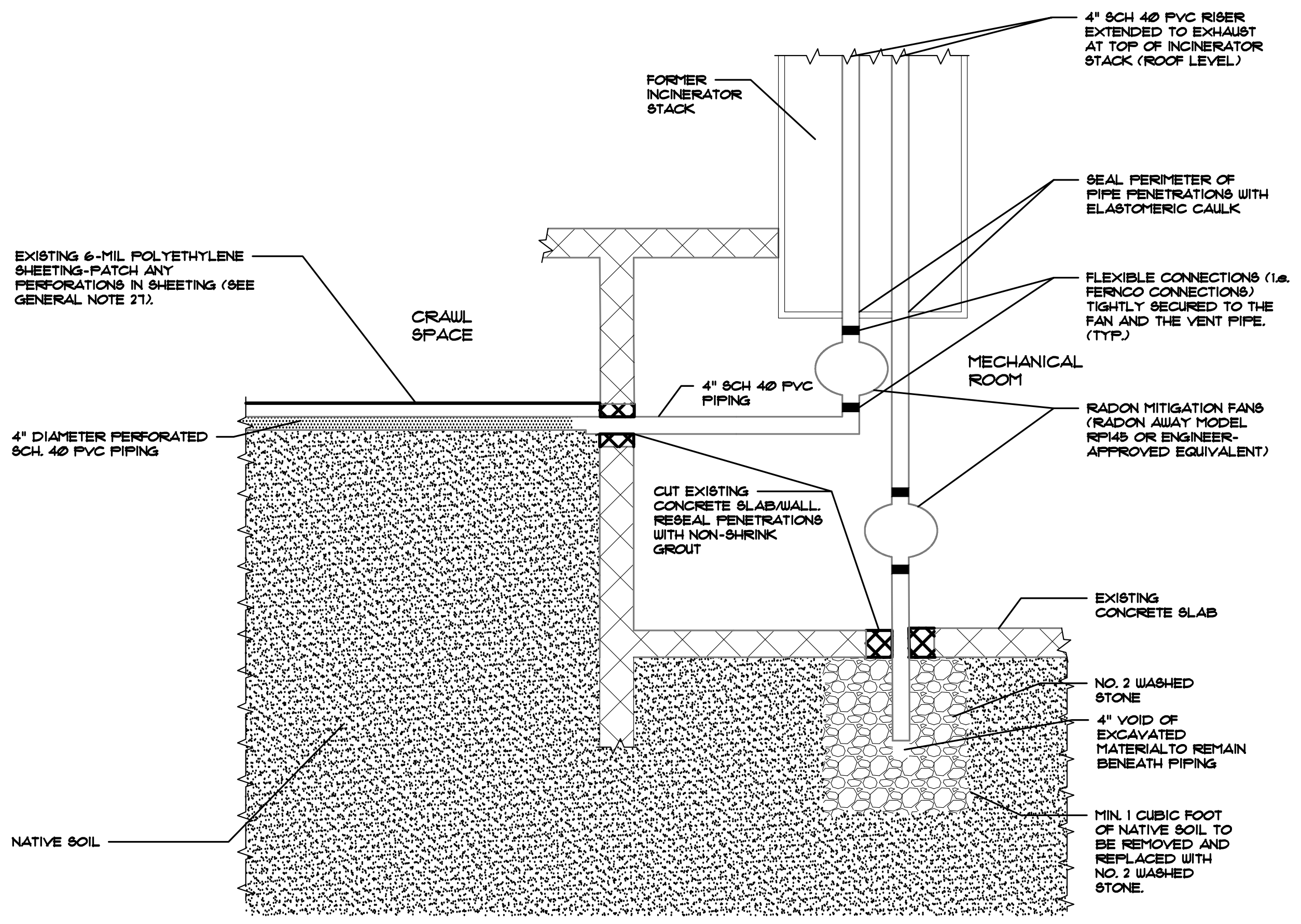
KEY PLAN



SUB-SLAB EXTRACTION POINT DETAIL:



1 / HM 1.1 Extraction Point Detail
Not to Scale



2 / HM 1.1 Extraction Point Detail
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MK	**DATE**	**DESCRIPTION**

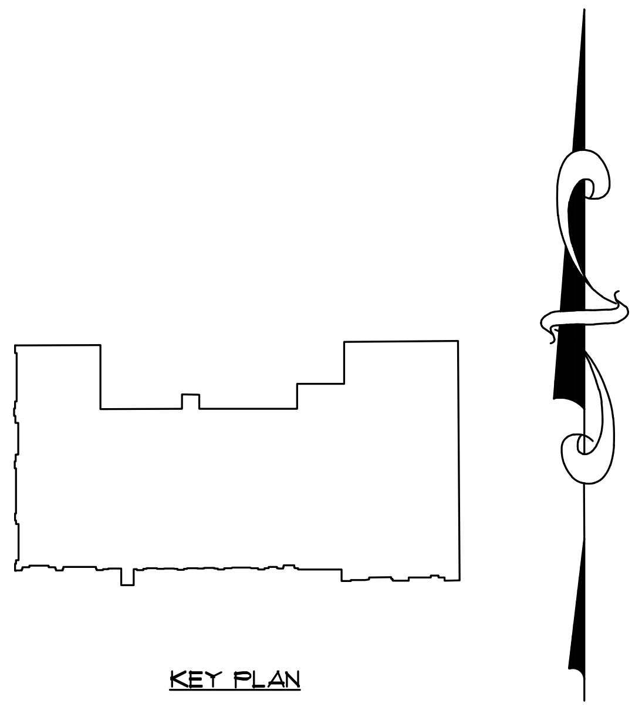
SHEET ISSUES

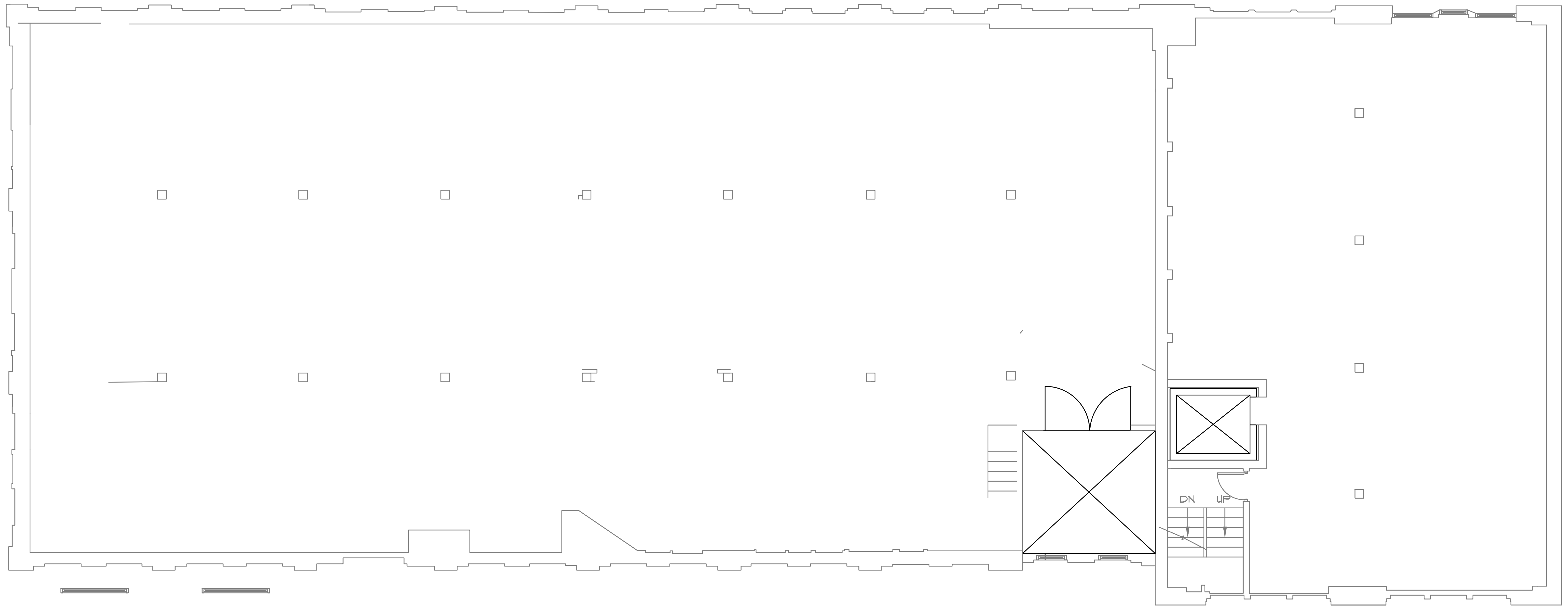
VIP PROJECT NO.	19-2516
FILE NAME	20-057 Design HM-1.1
DRAWN BY	NP
CHECKED BY	NB

Third Floor Plan A

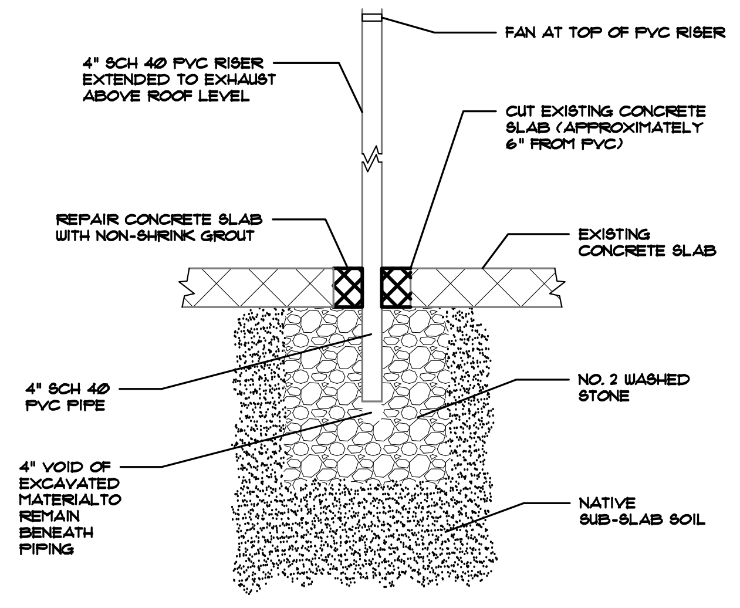
SHEET NUMBER

HM-1.3

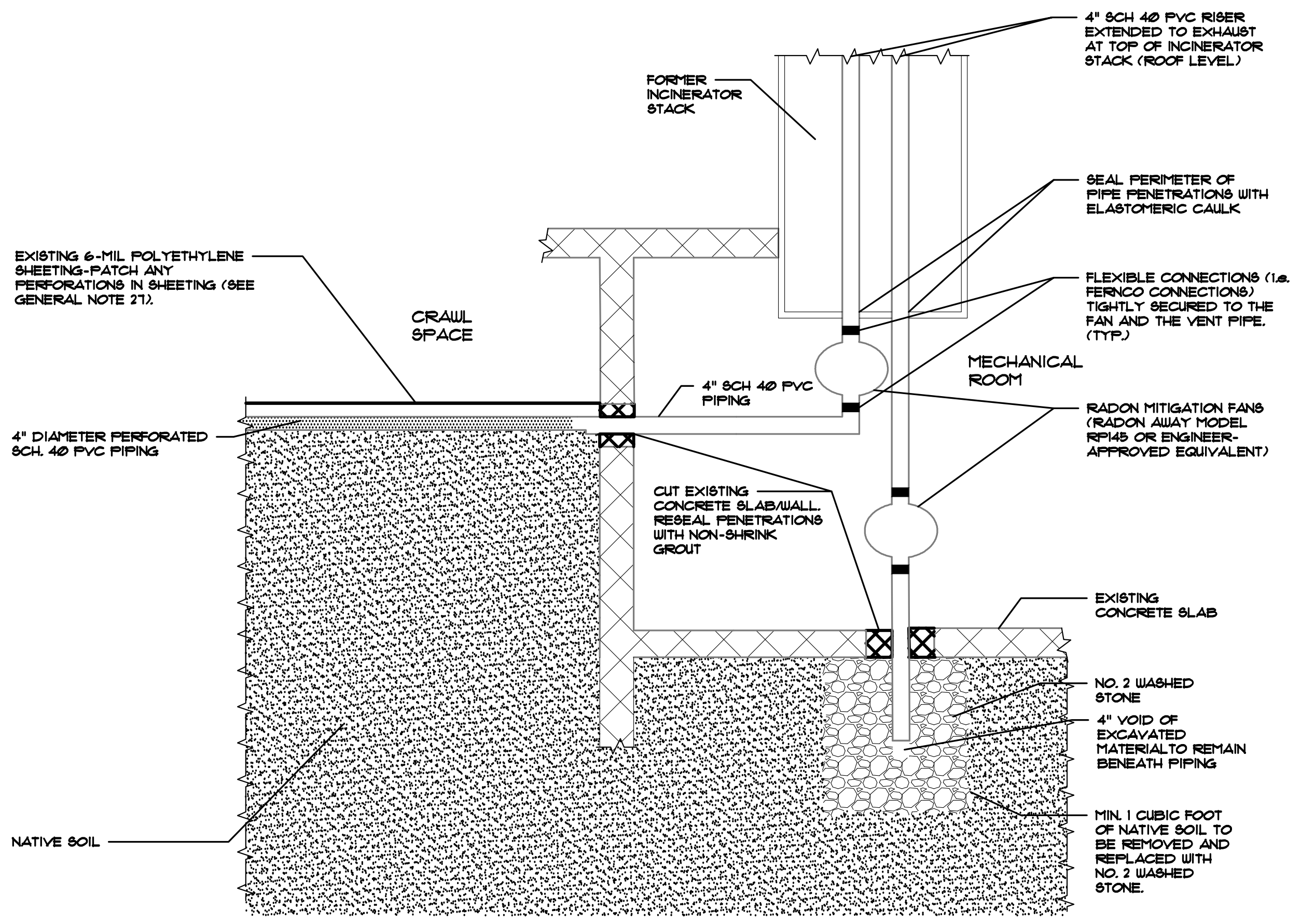




SUB-SLAB EXTRACTION POINT DETAIL:



1 / HM 1.1 Extraction Point Detail
Not to Scale



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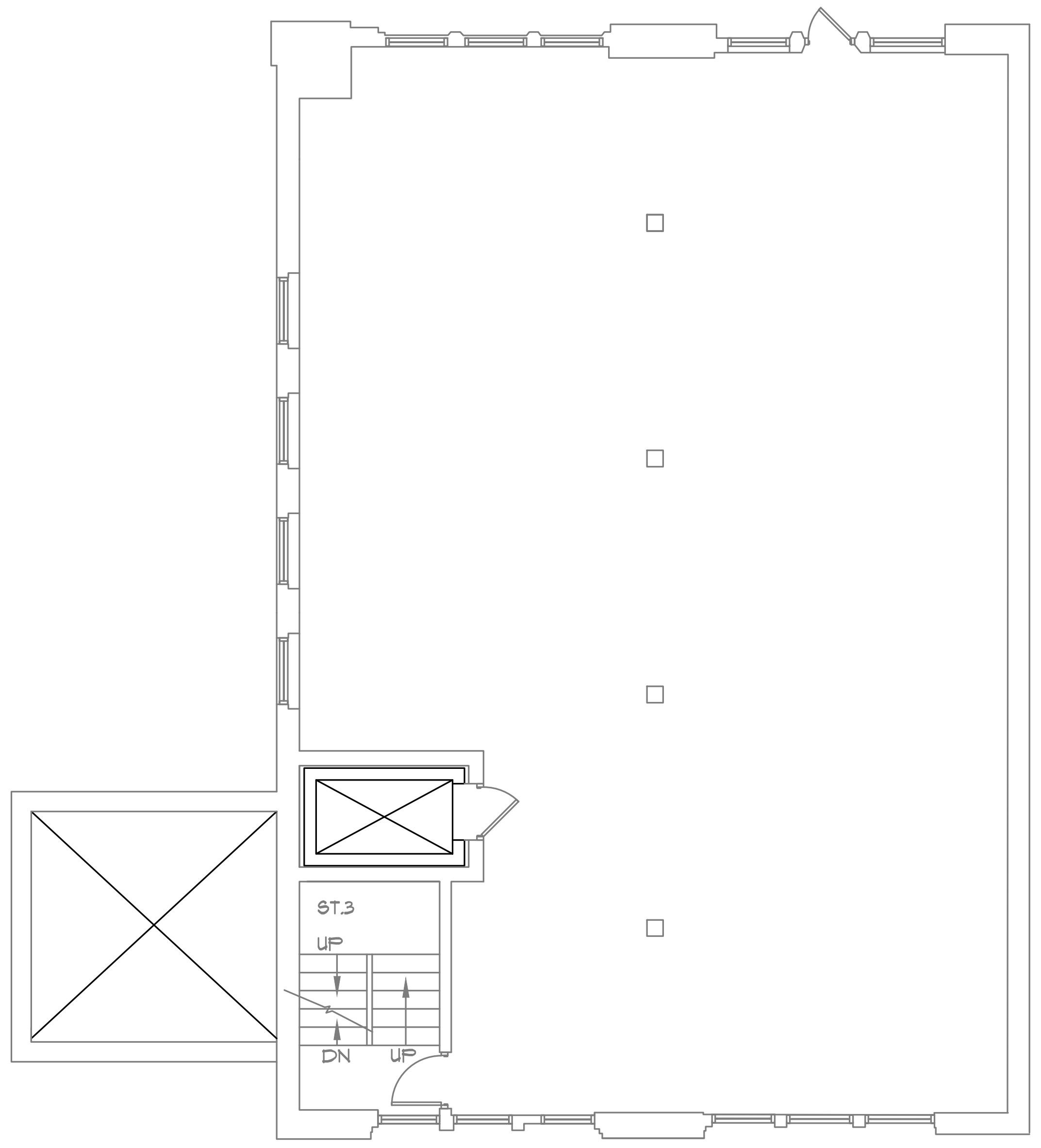
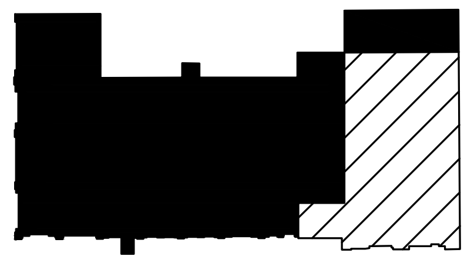
FILE NAME	20-057 Design HM-1.1
DRAWN BY	NP
CHECKED BY	NB

Fourth Floor Plan A

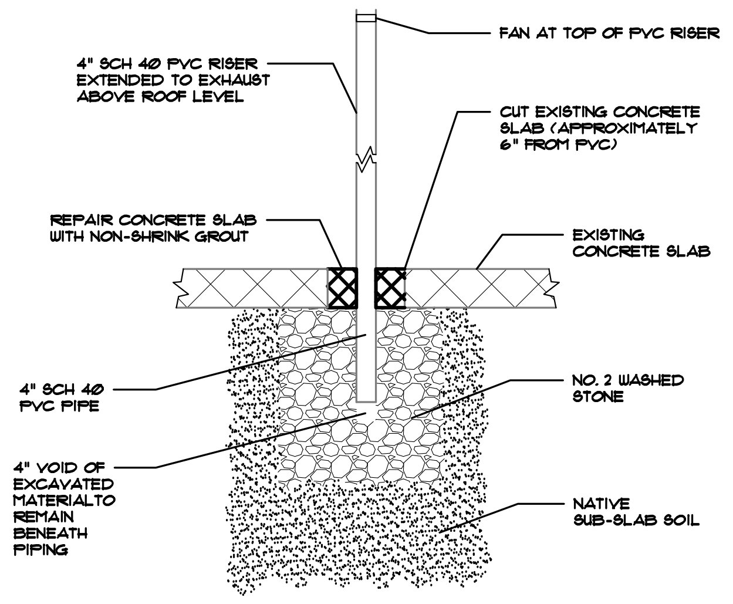
SHEET NUMBER
HM-1.4



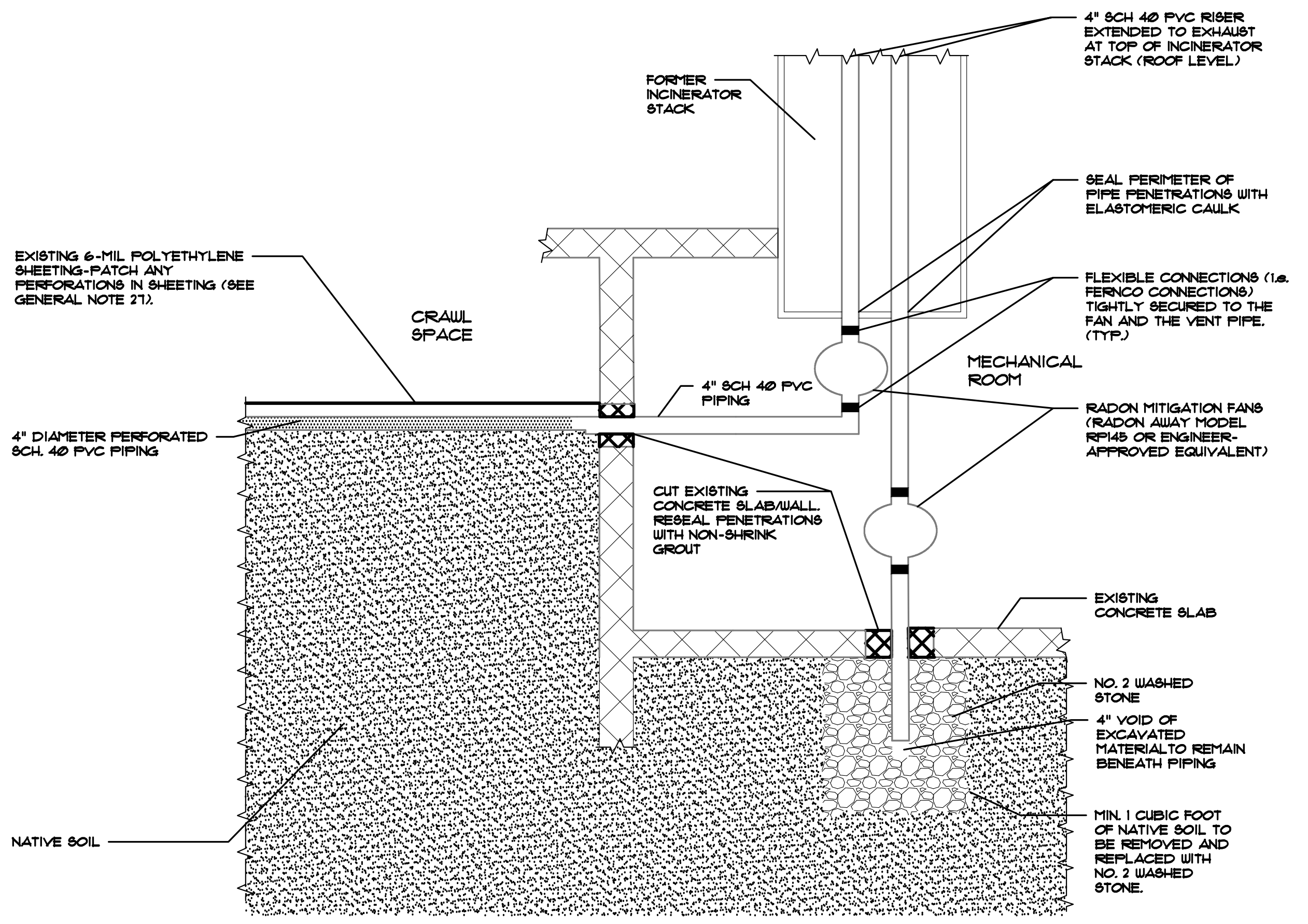


KEY PLAN

SUB-SLAB EXTRACTION POINT DETAIL:



1 / HM 1.1 Extraction Point Detail
Not to Scale



2 / HM 1.1 Extraction Point Detail
Not to Scale

NOTES

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3. THE CONTRACTOR SHALL PROVIDE THEIR EMPLOYEES WITH ADEQUATE PERSONAL PROTECTIVE EQUIPMENT AT ALL TIMES WHEN PERFORMING WORK ON THIS PROJECT.
4. THE CONTRACTOR ACKNOWLEDGES THAT PORTIONS OF THE BUILDING MAY BE OCCUPIED BY OTHER TRADES DURING SYSTEM INSTALLATION ACTIVITIES. THE CONTRACTOR SHALL COORDINATE PHASING/SEQUENCING OF WORK WITH THE CONSTRUCTION MANAGER.
5. ALL COMPONENTS OF RADON MITIGATION SYSTEMS INSTALLED SHALL BE IN COMPLIANCE WITH APPLICABLE MECHANICAL, ELECTRICAL, BUILDING, PLUMBING, ENERGY AND FIRE PREVENTION CODES, STANDARDS, AND REGULATIONS OF THE LOCAL JURISDICTION.
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7. TO ENHANCE PRESSURE FIELD EXTENSION AND IMPROVE OVERALL SYSTEM PERFORMANCE, ONE CUBIC FOOT OF SUB-SLAB MATERIAL SHALL BE REMOVED FROM BELOW AND AROUND EACH SUCTION / EXTRACTION POINT PIPE. THE EXCAVATION SHALL BE BACKFILLED WITH WASHED NO. 2 CRUSHED STONE, WHILE LEAVING A 4" VOID DIRECTLY BELOW THE END OF THE SUCTION PIPING TO PREVENT BLOCKAGE OF AIR FLOW INTO THE BOTTOM OF SUCTION / EXTRACTION POINT PIPES. THE VERTICAL PIPES SHALL BE SUPPORTED AND SECURED IN A PERMANENT MANNER THAT PREVENTS THEIR DOWNWARD MOVEMENT TO THE BOTTOM OF SUCTION PITS.
8. SUCTION / EXTRACTION POINT, VERTICAL RISER, AND MANIFOLD PIPING SHALL BE RIGID 4" DIAMETER SCHEDULE 40 PVC.
9. THE SLAB PENETRATION SHALL BE REPAIRED AND SEALED TO THE OUTSIDE OF THE PVC RISER PIPE WITH NON-SHRINK GROUT.
10. ALL PIPE JOINTS AND CONNECTIONS SHALL BE SEALED PERMANENTLY, WITH THE EXCEPTION OF THE AREA OF INSTALLATION OF THE RADON FANS.
11. RADON SYSTEM PIPING INSTALLED IN THE INTERIOR OF THE BUILDING SHALL BE INSULATED SO THAT CONDENSATION ON THE PIPE'S EXTERIOR DOES NOT DRIP AND DAMAGE OTHER BUILDING COMPONENTS, AND INSULATED ON THE EXTERIOR OF THE BUILDING SO THAT CONDENSATION INSIDE THE PIPE DOES NOT FREEZE AND CREATE A BLOCKAGE IN THE SOIL-GAS EXHAUST.
12. SUPPORTS FOR RADON SYSTEM PIPING SHALL BE INSTALLED AT LEAST EVERY 6 FEET ON HORIZONTAL RUNS. VERTICAL RUNS SHALL BE SECURED ABOVE OR BELOW THE POINTS OF PENETRATION THROUGH FLOORS, CEILINGS, AND ROOFS, AND AT LEAST EVERY 8 FEET ON RUNS THAT DO NOT PENETRATE FLOORS, CEILINGS, OR ROOFS.
13. HORIZONTAL RUNS IN RADON SYSTEM PIPING SHALL BE SLOPED TO PROMOTE DRAINAGE OF WATER FROM RAIN OR CONDENSATION DOWNWARD INTO THE SOIL BENEATH THE SLAB.
14. HORIZONTAL RUNS COMPRISING THE SUB-MEMBRANE DEPRESSURIZATION SYSTEM IN THE CRAWLSPACE AREAS SHOULD BE COMPRISED OF 4" PERFORATED PVC PIPING, AND BE INSERTED BENEATH THE EXISTING POLYETHYLENE SHEETING / BARRIER.
15. TO REDUCE THE RISK OF VENT STACK BLOCKAGE DUE TO HEAVY SNOWFALL, AND TO REDUCE THE RISK OF RE-ENTRAINMENT OF RADON INTO THE LIVING SPACES OF THE BUILDING, THE DISCHARGE FROM VENT STACK PIPES SHALL EXTEND VERTICAL AND UPWARD A MINIMUM OF 10 FEET ABOVE THE EDGE OF THE ROOF, AND SHALL BE AT LEAST 12 INCHES ABOVE THE SURFACE OF THE ROOF. THE DISCHARGE / EXHAUST POINT(S) SHALL ALSO BE 10 FEET OR MORE AWAY FROM ANY WINDOW, DOOR, AIR INTAKES, OR OTHER OPENING INTO CONDITIONED / OCCUPIED BUILDING SPACE, AND 10 FEET OR MORE AWAY FROM SIMILAR OPENINGS OF ADJACENT BUILDINGS.
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21. EACH VERTICAL RISER SHALL BE EQUIPPED WITH A MANOMETER OR OTHER SUITABLE SYSTEM MONITOR THAT IS LOCATED IN A READILY VISIBLE LOCATION TO ALLOW FOR ROUTINE VERIFICATION OF SYSTEM OPERATIONS. THE MANOMETER SHALL BE SIMPLE TO READ OR INTERPRET AND BE LOCATED WHERE IT CAN BE EASILY SEEN OR HEARD.
22. A SYSTEM DESCRIPTION LABEL SHALL BE PLACED ON EACH VERTICAL RISER IN A PROMINENT AND READILY VISIBLE LOCATION. THE LABEL SHALL READ "RADON REDUCTION SYSTEM", OR SIMILAR.
23. MITIGATION SYSTEM CONTRACTOR SHALL PROVIDE AN EXTRA MITIGATION FAN UNIT OF THE SAME TYPE AND MODEL AS THOSE INSTALLED TO THE OWNER TO SERVE AS A BACKUP IN THE EVENT OF FAN FAILURE.
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HAZARDOUS MATERIAL ABATEMENT ACTIVITIES

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Syracuse, New York
13202

MK	DATE	DESCRIPTION
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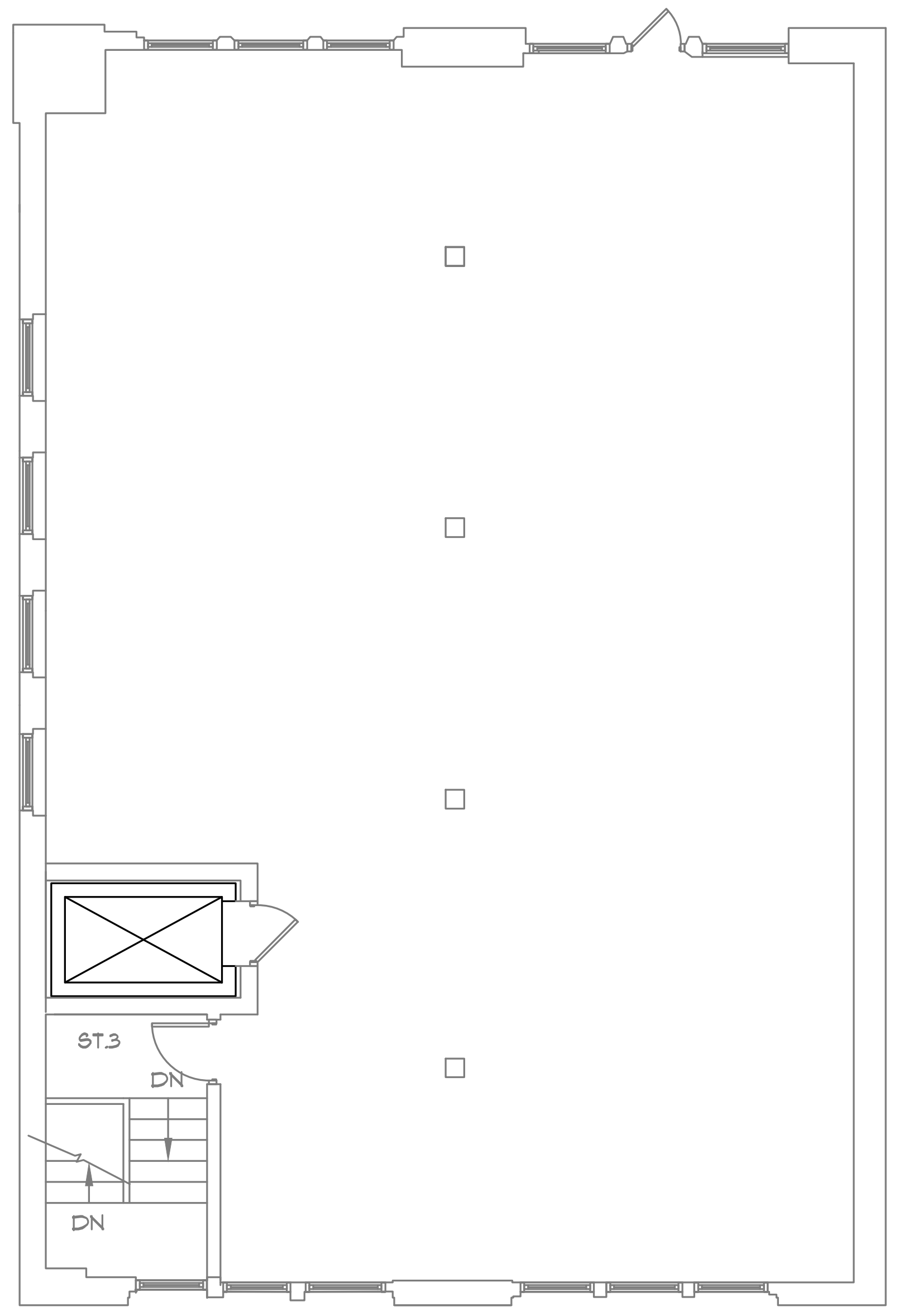
SHEET ISSUES

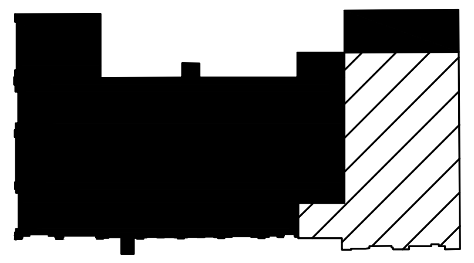
VIP PROJECT NO.	19-2516
FILE NAME	20-057 Design HM-1.1
DRAWN BY	NP
CHECKED BY	NB

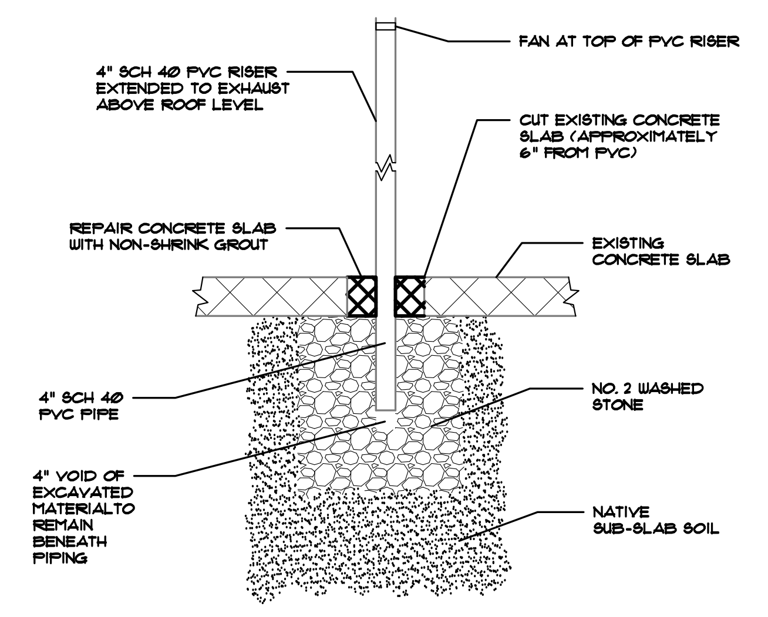
Fifth Floor Plan A

SHEET NUMBER

HM-1.5




KEY PLAN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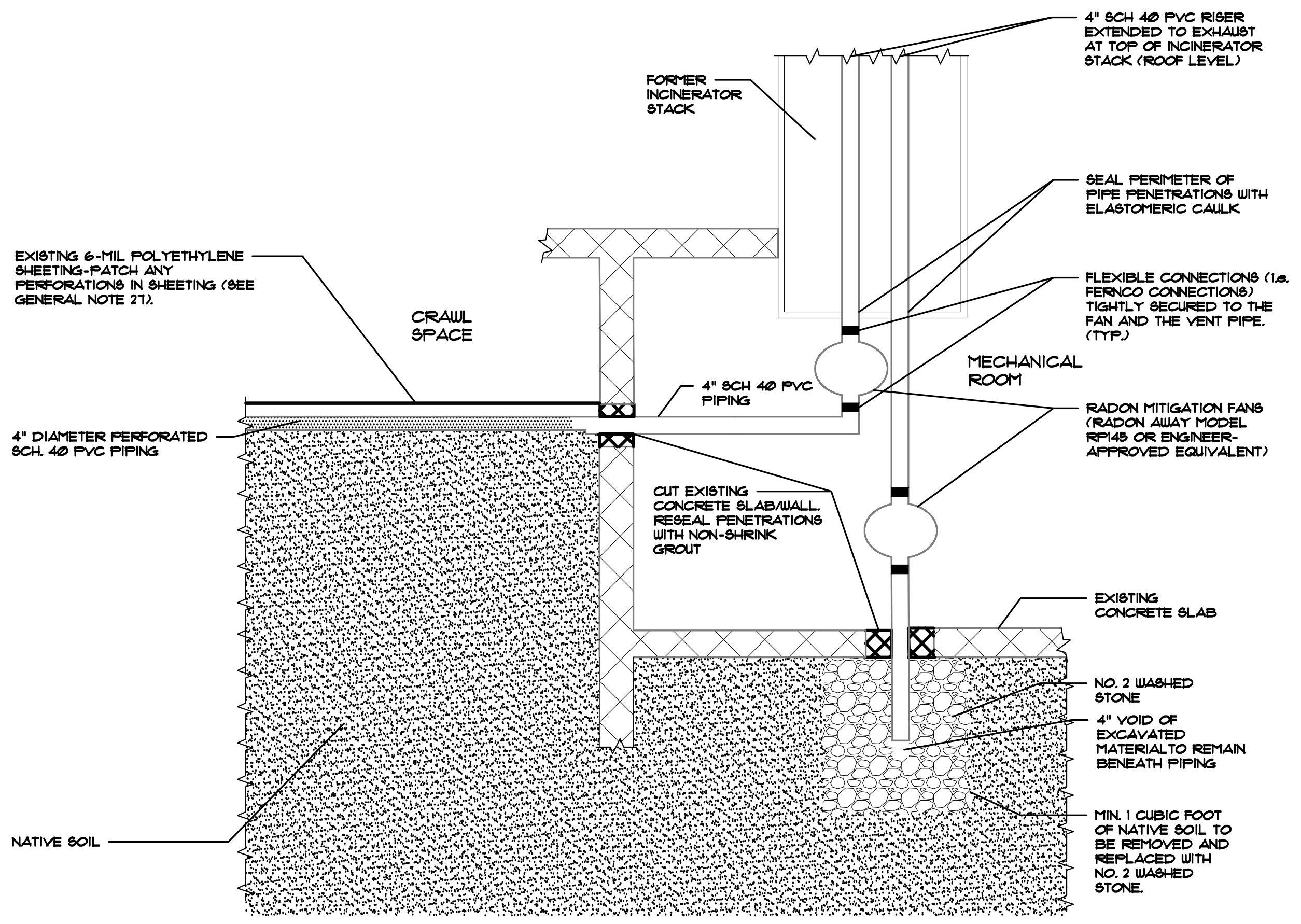

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MK	DATE	DESCRIPTION
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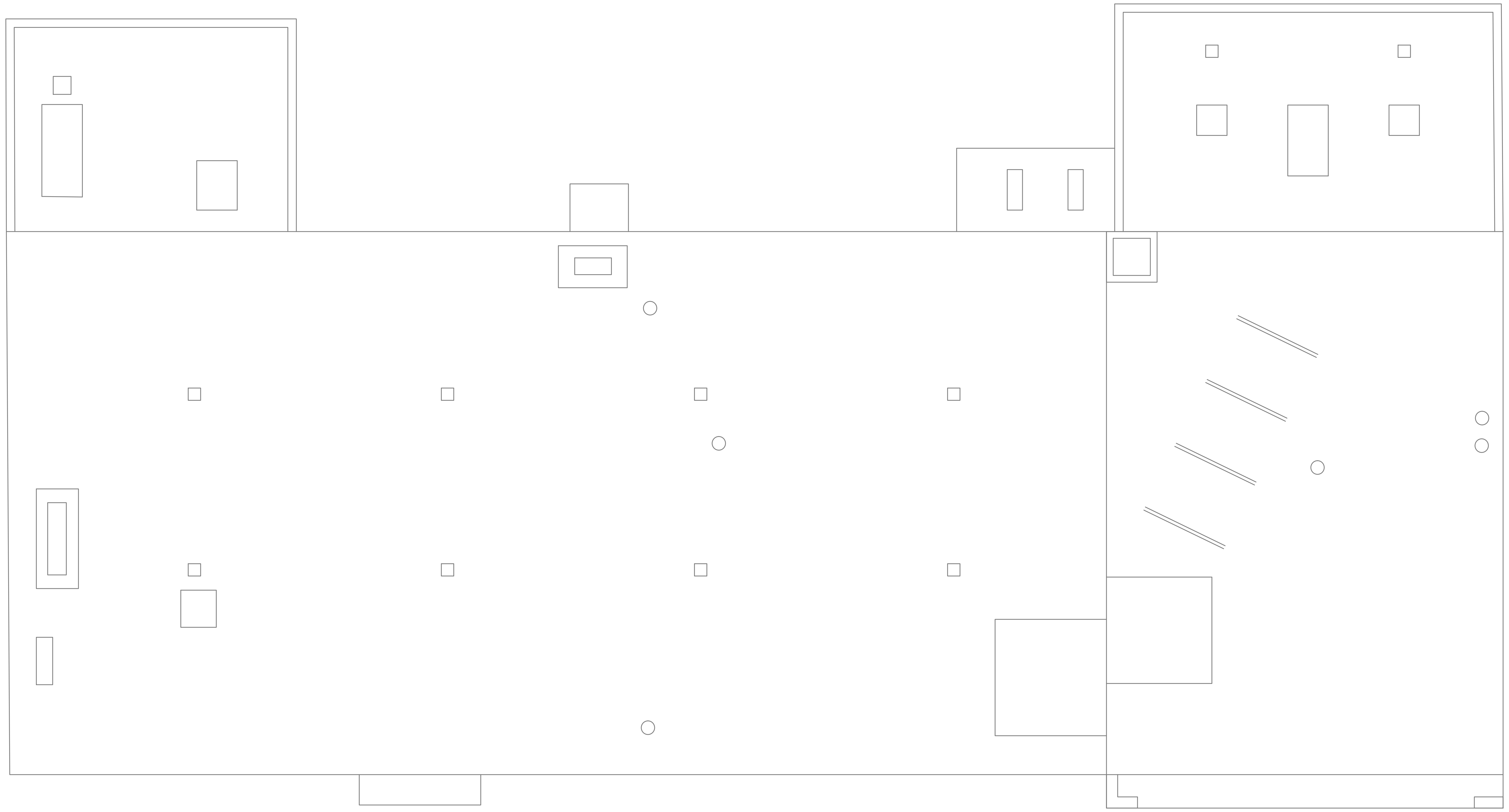
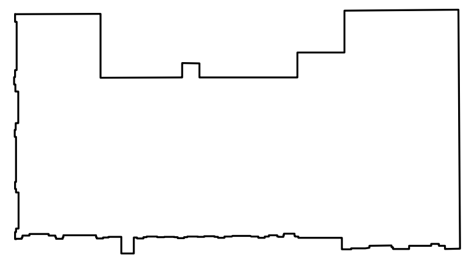
SHEET ISSUES

VIP PROJECT NO.	19-2516
FILE NAME	20-057 Design HM-1.1
DRAWN BY	NP
CHECKED BY	NB

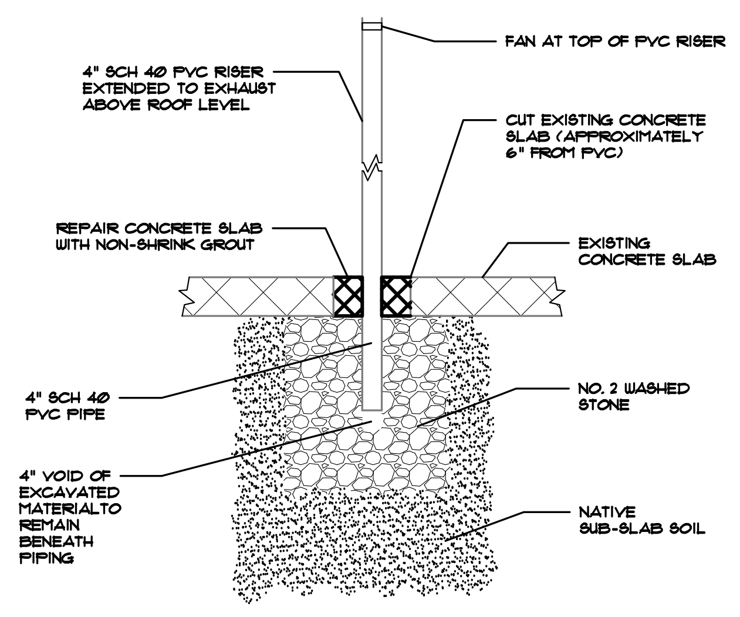
Sixth Floor Plan A

SHEET NUMBER
HM-1.6





KEY PLAN



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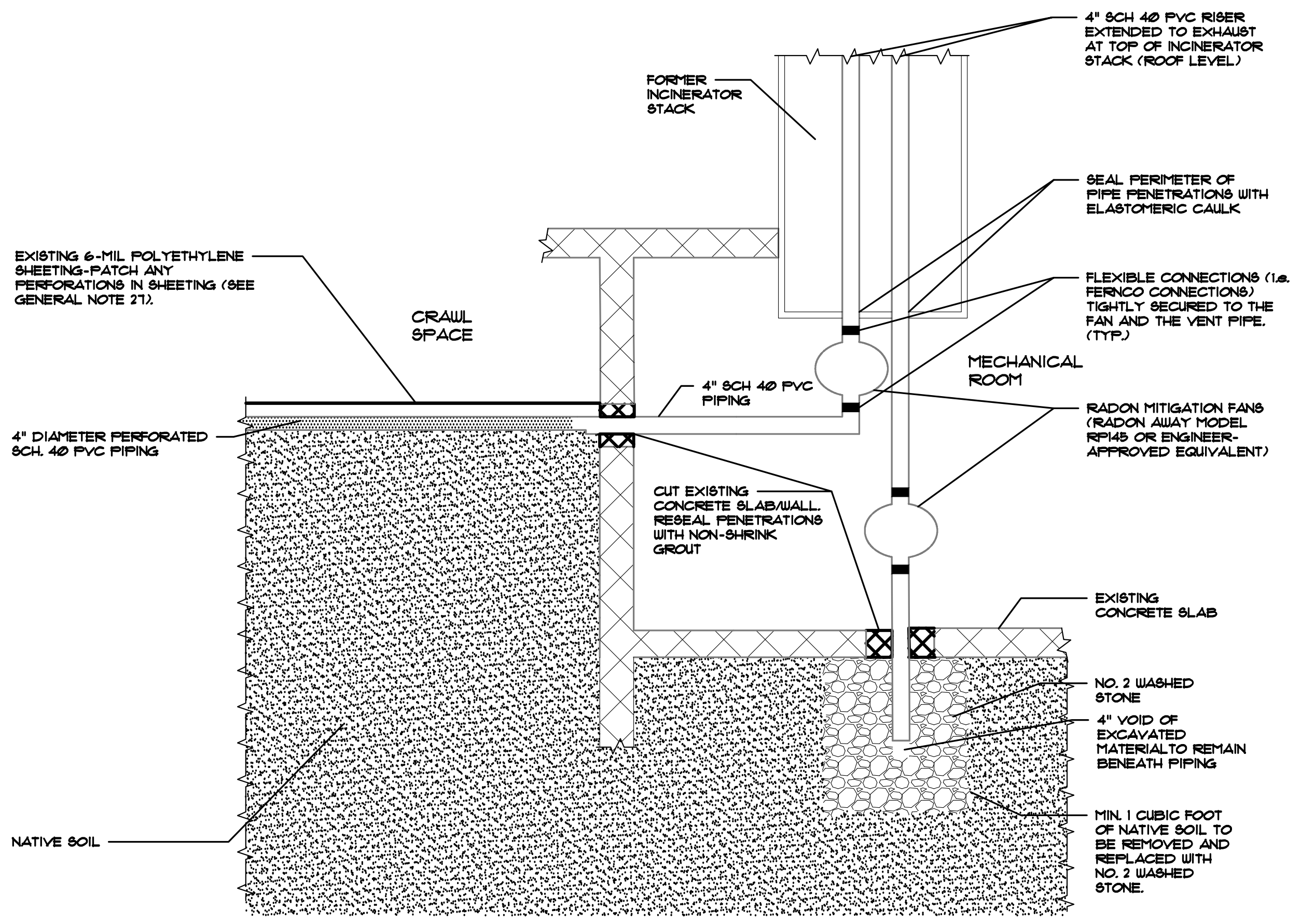

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500 ERIE BLVD E,
SYRACUSE, NY 13021

HAZARDOUS MATERIAL ABATEMENT ACTIVITIES

Former Smith
Housewares & Resturant
Supply
500 Erie Boulevard East
Syracuse, New York
13202

MK	DATE	DESCRIPTION
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SHEET ISSUES

VIP PROJECT NO.	19-2516
FILE NAME	20-057 Design HM-1.1
DRAWN BY	NP
CHECKED BY	NB

Roof Plan

SHEET NUMBER

HM-1.7