Watervliet Arsenal

Watervliet, New York

Construction Certification Report

Vapor Intrusion Interim Corrective Measures

Main Manufacturing Area
Watervliet Arsenal
Watervliet New York

September 2010

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1. Introduction

The Watervliet Arsenal (WVA) is a 140-acre government-owned installation under the command of the U.S. Army Tank-automotive and Armaments Command (TACOM) located in the City of Watervliet, New York. The WVA is located on the western shore of the Hudson River and approximately five miles north of the City of Albany (Figure 1-1). The WVA currently manufactures large caliber cannons and mortars.

The WVA consists of two primary areas: the Main Manufacturing Area (MMA), encompassing approximately 125 acres, where manufacturing and administrative operations occur, and the Siberia Area (SA), primarily used for the storage of raw and hazardous materials, finished goods, and supplies brought from the MMA (Figure 1-2). Broadway Street (New York State Route 32) and a six-lane interstate highway (Interstate 787) are located between the WVA and the Hudson River.

In accordance with the results and recommendations of the *Vapor Intrusion Investigation Report, Watervliet Arsenal, Watervliet, New York* (Malcolm Pirnie 2008), and subsequent discussions and agreements between the WVA, the New York State Department of Environmental Conservation (NYSDEC), and the New York State Department of Health (NYSDOH), the WVA implemented Interim Corrective Measures (ICMs) to mitigate vapor intrusion impacts at eight buildings within the Main Manufacturing Area of the WVA. The ICMs were implemented in accordance with the Administrative Order on Consent between the WVA, the NYSDEC, and the United States Environmental Protection Agency (USEPA), and consisted of the construction and operation of sub-slab depressurization systems (SSDSs) in eight buildings to prevent the intrusion of soil vapor containing chlorinated volatile organic compounds (VOCs). Malcolm Pirnie, Inc. (Malcolm Pirnie) was retained by the United States Army Corps of Engineers – Baltimore District (USACE) to implement the ICMs on behalf of the WVA.

This Construction Certification Report is intended to document and confirm that the MMA vapor intrusion corrective measures were completed in accordance with the approved ICM Work Plan (Malcolm Pirnie, 2009). Any deviations from the ICM Work Plan are noted in this Report.

2. Background

The WVA performed a vapor intrusion investigation within, and adjacent to, the Main Manufacturing Area (MMA), and adjacent to the Siberia Area of the WVA, in November 2007 and February 2008. The purpose of the investigation was to assess whether CVOCs were present in the sub-slab soil vapor beneath, and the indoor air within, buildings located in the MMA, including those that once contained degreasing operations, as well as three off-site private residences along the southeastern WVA property boundary. The evaluation also assessed whether soil vapor at the WVA southern property boundary and northern property boundary adjacent to the Siberia Area contained CVOCs.

A total of 25 buildings in the MMA were sampled during at least one of the two investigation phases. Based on the results of the investigations, no further action was required at the off-site residences, the WVA property boundary, and at WVA Buildings 9, 18, 19, 23, 24, 35, 38, 44, 108, 110, 112, 115, 124, and 126. Sub-slab VOC concentrations at Building 15 will require monitoring of the indoor air, but not corrective measures. VOCs detected in the sub-slab at Buildings 116 and 123 were also in the range where indoor air monitoring would be required. However, since Building 116 is not occupied and Building 123 is only periodically used for painting operations, no monitoring will be conducted at these buildings. Indoor air monitoring will be conducted at Buildings 116 and 123 if the use of either building changes in the future. The buildings that required interim corrective measures are summarized in Table 2-1 below.

Table 2-1 – Buildings Requiring Soil Vapor Interim Corrective Measures

Building	Impacted Media	Target Chlorinated VOCs
20	Sub-Slab Soil Vapor	PCE, TCE, TCA
21	Sub-Slab Soil Vapor	TCE
22	Sub-Slab Soil Vapor	TCE
25	Indoor Air, Sub-Slab Soil Vapor	TCE, TCA
114	Indoor Air, Sub-Slab Soil Vapor	PCE, TCE
120	Sub-Slab Soil Vapor	PCE, Carbon Tetrachloride
121	Sub-Slab Soil Vapor	TCE
130	Sub-Slab Soil Vapor	TCE

Notes:
PCE – Tetrachloroethene
TCE – Trichloroethene
TCA – 1,1,1-Trichloroethane

3. ICM Construction Summary

Construction and installation of the SSDSs was completed in accordance with the approved ICM Work Plan with minor deviations discussed below. Malcolm Pirnie retained Aztech Technologies (Aztech) to construct and install the SSDSs. As-built drawings for each system type (Type A, B, and C) and building installation are provided in Appendix A. Photographs documenting the installations of the SSDSs are provided in Appendix B.

3.1. Construction Schedule

A pre-construction meeting was held on July 23, 2009 and construction and installation of the SSDSs began on July 27, 2009. Major completion of the Type C system installations and startup testing was performed in December 2009. Finial SSDS construction and delivery of the Type A and B systems was completed on March 22, 2010. Installation for the Type A and B mechanical systems was completed on May 13, 2010, with incomplete items documented on a "punch-list". Major punch-list item and final system wiring and control panel programming was completed on July 22, 2010. A training session was held on August 5, 2010 to provide key personnel guidance on system operation. During the training session the Building 20 blower was found to be defective and was removed and returned to the manufacturer for service. Startup testing and effluent discharge sampling for the Type A and Building 25 Type B SSDSs was completed on August 12, 2010. The replacement blower for the Building 20 Type B SSDS was installed on September 2, 2010. Startup testing for the Building 20 SSDS was also completed on September 2, 2010 and effluent discharge samples were collected on September 10, 2010. As of September 3, 2010, all Type A, B, and C SSDSs were operating in accordance with the ICM Work Plan.

3.2. Type A SSDS

The Type A SSDSs were installed at Buildings 21 and 114 in accordance with the approved ICM Work Plan. The Type A SSDS is designed for buildings that required greater flow rates and vacuum pressures than can be supplied with traditional in-line fan systems. These systems were also used where off-gas treatment through GAC is required before discharge to the atmosphere, based on the sub-slab soil vapor concentrations measured during the investigation and effluent concentrations measures during the pilot studies. As shown in the As-built drawings, the Type A SSDSs is housed within an insulated enclosure. The enclosures are situated immediately adjacent to the building and are connected to the extraction wells via a wall penetration. The Type A SSDS includes the following major components:

- Regenerative blower equipped with a variable-speed drive;
- Remote-mounted control panel with alarms and automatic shutdown capability;
- Electrical panel;
- Programmable Logic Controller (PLC) with telemetry transmission;
- Vapor Knockout Tank;
- Critical Silencer;
- Air intake hood and dilution controls;
- In-series 200-pound or 400-pound GAC vessels;
- Vacuum/pressure gauges and sampling ports; and
- Environmental controls, including thermostat, exhaust fan, and lighting.

The enclosure is heated by radiant heat generated from the blower exhaust piping, which is allowed to radiate before leaving the enclosure. The Type A SSDS is used at the following buildings:

Building 21 (basement) (200-pound GAC vessels)

Building 114 (400-pound GAC vessels)

3.2.1. Design Changes

Design changes in the Type A SSDS final construction included:

- Variable frequency drives (VFDs) were added to regulate the speed of the exhaust fan for the SSDS enclosures. This was done to mitigate potential noise concerns of occupants in buildings adjacent to the SSDS enclosures by providing the capability to control the speed of the exhaust fans.
- Additional electrical disconnects were required at each Type A SSDS location to facilitate the installation of the VFD for the exhaust fan.

3.3. Type B SSDS

The Type B SSDS was installed at Buildings 20 and 25 in accordance with the ICM Work Plan. The Type B SSDS required the largest flow rates and vacuum pressures due to the size of the buildings and treatment areas. The system services both buildings from a single location and is equipped with large capacity GAC vessels to treat off-gas before discharge to the atmosphere. The Type B SSDS is housed within an insulated 20 foot by 8 foot enclosure that is approximately 9 feet high (i.e., shipping container). The enclosure is situated adjacent to Building 20 in the alleyway between the north side of Building 25 and the south side of Building 20 and is connected to the extraction wells via wall penetrations. The piping from Building 25 crosses the alleyway via an overhead pipe that is supported from the ground. The Type B SSDS includes the following components:

- Two positive-displacement blowers equipped with variable-speed drives with a design flow rate of 360 cfm for Building 20 and 450 cfm for Building 25;
- Control panel with alarms and automatic shutdown capability;
- Electrical room with panels;
- PLC with telemetry transmission;
- Vapor Knockout Tanks;
- Critical Silencers;
- Air intake louver and dilution controls;
- Two 2,000-pound GAC vessels, in-series;
- Vacuum/pressure gauges and sampling ports; and
- Environmental controls, including thermostat, heating, exhaust fan, and lighting.

3.3.1. Design Changes

Design changes in the Type B SSDS final construction included:

- The roof-mounted heat exchanger was not provided for the Type B SSDS. The heat exchanger was originally designed to reduce discharge temperatures of the air from the blower into the inlet of the carbon vessels; however, based on the selected blowers' operating efficiencies and anticipated discharge temperatures, the heat exchanger was not required and was deleted from the final design.

3.4. Type C SSDS

The Type C SSDSs were used for smaller buildings and/or smaller treatment areas where off-gas treatment is not required. The systems consist of an in-line fan connected directly to the extraction well through piping and are similar to a traditional radon mitigation system. The fans are located outside of the structures and are connected to the extraction well through wall penetrations.

The Type C SSDSs include the following components:

- In-line Fantech radon mitigation fan;
- Pressure gauge and sampling ports.

The Type C SSDS were installed at the following buildings:

1. Building 21 (eastern end)
2. Building 22 (two systems)
3. Building 120
4. Building 121

5. Building 130

3.4.1. Design Changes

Only one design change was required for the Type C SSDS installations. Since Building 120 required two extraction wells for mitigation, a higher capacity fan was needed to produce the required flow and sub-slab pressure differentials; therefore, a high suction radon mitigation fan (RadonAway model HS2000) was used based on its ability to generate greater pressures at the design flow. The maximum pressure of the HS2000 is18 inches of water (H_20) at 110 cfm.

4. SSDS Startup Testing

Startup testing was performed to evaluate the effectiveness of the SSDS and to optimize SSDS operation.

4.1. Startup Testing Procedure

System performance was monitored by measuring flow and vacuum pressures at the extraction wells. The radius of influence (ROI) for each system was evaluated by measuring sub-slab differential pressures with a digital manometer at sub-slab monitoring points. Startup testing for the Type C SSDSs was completed in December 2009; Type A and B (Building 25) SSDS startup testing was completed in August 2010.

4.2. Startup Testing Results

4.2.1. Building 20

As indicated in Section 3.3, a Type B SSDS was used for Building 20. As shown in the as-built drawings in Appendix A, three extraction wells (SSDS-B20-EW-1, EW-2, and EW-3) are located in the south east corner of the building. Based on the pilot test results, SSDS-B20-EW-1 had a radius of influence (ROI) of approximately 57 feet at a flow rate of approximately 120 cfm (Malcolm Pirnie, 2009). The maximum flow rate measured at SSDS-B20-EW-1 during the startup testing was 185 cfm. The maximum flow rates measured at extraction wells SSDS-B20-EW-2 and EW-3 were 85 cfm and 84 cfm, respectively.

Existing sub-slab pressure monitoring points were measured prior to the startup of the SSDS. Based on the readings, a positive sub-slab pressure was measured beneath the building slab ranging from 0.029 inches of H_20 to greater than 2 inches of H_20. Sub-slab pressures were re-measured approximately 30 minutes after the blower was started. As shown in the as-built drawings, sub-slab pressure readings in all but two of the monitoring points remained positive following startup of the blower, although a reduction in the positive pressure was noted. The reason for the positive pressure is not known, but could be potentially associated with leaks in the compressed air system that is present throughout the building. Based on the baseline and post-startup data, the Building 20 system has estimated ROI of at least 24 feet, but is likely greater. Additional pressure monitoring will be conducted during system operations and maintenance activities to further evaluate the area of influence for the extraction wells.

4.2.2. Building 21

As indicated in Section 3.3, Building 21 uses a Type C SSDS to mitigate the eastern portion of the first floor and a Type B system is used to mitigate the basement area.

4.2.2.1. Type A SSDS

As shown in the as-built drawings, the extraction well for the Type A SSDS (SSDS-B21-1) is located in the basement on the south side of the building. Based on the pilot test results, SSDS-B21-1 had a ROI of approximately 30 feet at a flow rate of approximately 27 cfm (Malcolm Pirnie, 2009). The maximum flow rate measured at SSDS-B21-1 during the startup testing was 43 cfm with a corresponding ROI of 52 feet.

4.2.2.2. Type C SSDS

Extraction well SSDS-B21-2 is located on the eastern side of Building 21 on the first floor (see as-built drawings in Appendix A). Following the installation of the SSDS, extraction well SSDS-B21-2 had a ROI of approximately 30 feet at a flow of 9 cfm, which is consistent with the design ROI.

4.2.3. Building 22

As indicated in Section 3.3, two Type C SSDSs were used for Building 22. As shown in the as-built drawings in Appendix A, extraction well SSDS-B22-1 is located in the eastern portion of the building in the rear of the vehicle garage area; SSDS-B22-2 is located in the basement portion of the building. Field pilot test results for Building 22 indicated that the pilot test well had a ROI of approximately 44 feet at a flow rate of approximately 120 cfm. Following installation of the Type C SSDSs, extraction wells SSDS-B22-1 and SSDS-B22-2 each had a ROI of approximately 45 feet at flow rates of 55 cfm and 12 cfm, respectively.

4.2.4. Building 25

As indicated in Section 3.3, a Type B SSDS was used for Building 25. Extraction well locations are presented in the as-built drawing in Appendix A. Based on the pilot test results, SSDS-B25-EW-1 had a ROI of approximately 37 feet at a flow rate of approximately 130 cfm (Malcolm Pirnie, 2009). The maximum flow rate measured at SSDS-B25-EW-1 during the startup testing was 162 cfm. The maximum flow rates measured at extraction wells SSDS-B25-EW-2, EW-3 and EW-4 were 117 cfm, 115 cfm, and 148 cfm, respectively. Pressure monitoring points measured during the startup testing confirmed that the SSDS ROI is greater than 37 feet, and up to 100 feet depending on the extraction point.

4.2.5. Building 114

As indicated in Section 3.3, a Type A SSDS was used for Building 114. As shown in the as-built drawings in Appendix A, two extraction wells (SSDS-B114-EW-1, EW-2, and EW-3) are located in the eastern and western portions of the building, respectively. Based on the pilot test results, SSDS-B114-EW-1 had a radius of influence (ROI) of approximately 23 feet at a flow rate of approximately 120 cfm (Malcolm Pirnie, 2009). The maximum flow rate for the startup testing was 69 cfm. A temporary sub-slab pressure monitoring point was installed approximately 23 feet from extraction well

SSDS-B114-EW-1. Based on the observed pressure (vacuum) measurement, the ROI was consistent with the pilot test results.

4.2.6. Building 120

As indicated in Section 3.3, a Type C SSDS was used for Building 120. As shown in the as-built drawings, two extraction wells (SSDS-B120-1 and SSDS-B120-2) are located in the southwest corner of the building. Based on the pilot test results, SSDS-B120-1 had a ROI of approximately 27 feet at a flow rate of approximately 140 cfm (Malcolm Pirnie, 2009). Following installation of the system, SSDS-B120-1 had a ROI of approximately 23 feet and SSDS-B120-2 had a ROI of approximately 32 feet. The flow rate measured at each extraction well during the startup testing was 32 cfm.

4.2.7. Building 121

As indicated in Section 3.3, a Type C SSDS was used for Building 121. As shown in the as-built drawings, extraction well SSDS-B121-1is located in the southwest corner of the building. Based on the pilot test results, SSDS-B120-1 had a ROI of approximately 45 feet at a flow rate of approximately 120 cfm (Malcolm Pirnie, 2009). Following installation of the system, startup testing measurements confirmed a ROI greater than 45 feet at a flow of 65 cfm.

4.2.8. Building 130

As indicated in Section 3.3, a Type C SSDS was used for Building 130. As shown in the as-built drawings, extraction well SSDS-B130-EW1is located in the northwestern corner of the building. Based on the pilot test results, SSDS-B130-EW1 had a ROI of approximately 25feet at a flow rate of approximately 160 cfm (Malcolm Pirnie, 2009). Following installation of the system, startup testing measurements confirmed a ROI greater than 25 feet at a flow of 51 cfm.

4.3. SSDS Controls

As indicated in Sections 3.2 and 3.3, the Type A and Type B SSDSs are controlled by PLCs. Each system has a touch-screen display monitor that provides system status and real-time system pressure and flow data. As shown in the As-built drawings, the control panels for the Type A SSDS are remote-mounted. The control panel for the Building 21 system is located in the basement of the building. The control panel for the Building 114 system is located on the east wall in Room 102. The As-built drawings show that a single display panel for the Building 20/25 Type B SSDS is located in the electrical room of the system enclosure.

The information from each system is transmitted via a 900 hertz radio telemetry system to a central display monitor located in Room 204 of Building 10. From the central display monitor, the user can access the Type A and B systems remotely and view the same information (pressure, flow, and alarm conditions) that is available at each system's display monitor.

5. ICM Performance Monitoring

Performance monitoring will be conducted in accordance with the approved ICM Work Plan (Malcolm Pirnie, 2009). Annual monitoring of the indoor air was conducted in March 2010. A letter report summarizing the results of the sampling event was submitted to the NYSDEC and NYSDOH on June 24, 2010 (Malcolm Pirnie, 2010). A copy of the letter report is provided in Appendix C.

5.1. Effluent Sampling

Pre- and post-carbon effluent samples were collected on August 12, 2010 from the Type A SSDSs (Building 21 and 114), and the Building 25 Type B SSDS. Pre-carbon effluent samples were collected from the Building 20 Type B SSDS in September, 2010 after installation of the repaired blower. The purpose of the sampling was to evaluate VOC discharge mass and assess removal efficacy of the SSDS GAC vessels.

5.1.1. Sampling Procedures

Effluent samples were collected from the SSDS pre- and post-carbon sampling ports using 6 liter Summa Canisters equipped with a thirty minute flow controllers. The samples were submitted to Air Toxics LTD, Folsom, California, following chain-of-custody procedures for analysis of VOCs by United States Environmental Protection Agency (USEPA) Method TO-15. Analytical reporting forms are provided in Appendix D.

5.1.2. Sampling Results

Effluent sample results are summarized in Table 5-1.

5.1.2.1. Building 20

As shown in Table 5-1, the September 10, 2010 pre-carbon effluent sample from the Building 20 SSDS contained 1,1,1-trichloroethane (1,1,1-TCA), trichloroethene (TCE), and tetrachloroethene (PCE) at concentrations of 6.4 micrograms per cubic meter (ug/m^3), 250 ug/m^3, and 54 ug/m^3, respectfully.

5.1.2.2. Building 21

As shown in Table 5-1, the pre-carbon effluent sample from the Building 21 SSDS contained cis-1,2-dichloroethene (cDCE), TCE, and PCE at concentrations of 44 ug/m^3, 270 ug/m^3, and 63 ug/m^3, respectfully. Table 5-1 shows that chloromethane was detected in the post-carbon effluent sample at a concentration of 11 ug/m^3. The detection of chloromethane in the post-carbon sample is considered to be anomalous since it was not detected in the influent samples from the SSDS.

5.1.2.3. Building 25

As shown in Table 5-1, the pre-carbon effluent sample from the Building 25 SSDS contained cDCE, 1,1,1-TCA, TCE, and PCE at concentrations of 23 ug/m^3, 100 ug/m^3, 6,200 ug/m^3, and 58 ug/m^3, respectfully. As shown in Table 5-1, no VOCs were detected in the Building 25 SSDS post-carbon effluent samples.

5.1.2.4. Building 114

As shown in Table 5-1, the pre-carbon effluent sample from the Building 114 SSDS contained TCE, and PCE at concentrations of 6 ug/m^3 and 7.1 ug/m^3, respectfully. Table 5-1 shows that PCE (6.6 ug/m^3) was also detected in the post-carbon effluent sample. Based on the relatively low influent CVOC concentrations and the length of time the SSDS has operated, "breakthrough" is not likely to have occurred; therefore, the presence of this compound is considered to be anomalous and will be evaluated during the next effluent sampling event.

5.1.3. Estimated VOC Removal Mass

Table 5-2 provides a summary of the estimated VOC removal mass for the Type A and B SSDSs.

5.1.3.1. Building 20

Table 5-1 shows that the total VOC concentration in the September 10, 2010 Building 20 Type B SSDS pre-carbon effluent sample was 310 ug/m3. As shown in Table 5-2, based on a flow of 353 cfm, the Type B SSDS was removing CVOCS at a rate of approximately 3.5 pounds per year (lb/year).

5.1.3.2. Building 21

As shown in Table 5-1, the total VOC concentration in the August 12, 2010 pre-carbon effluent sample from the Building 21 Type A SSDS was 377 ug/m^3. Table 5-2 shows that flow from the SSDS was approximately 43 cfm. As shown in Table 5-2, this corresponds to a total estimated VOC removal mass of 0.53 lb/year.

5.1.3.3. Building 25

As shown in Table 5-1, the August 12, 2010 pre-carbon effluent sample from the Building 25 SSDS contained a total VOC concentration of 6,381 ug/m^3. Table 5-2 shows that, at a flow of 565 cfm, the system was removing COVCs at a rate of approximately 118 lb/year.

5.1.3.4. Building 114

Table 5-1 shows that the total VOC concentration in the August 14, 2010 pre-carbon effluent sample from the Building 114 SSDS was 13.1ug/m^3. As shown in Table 5-2, based on a flow of 90 cfm, the Type A SSDS was removing CVOCs at a rate of approximately 0.039 lb/year.

5.2. Performance Assessment

Based on the results of the startup testing, the SSDSs are operating at, or greater, than their design parameters.

6. References

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NYSDOH 2006. *New York State Department of Health Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, October 2006.

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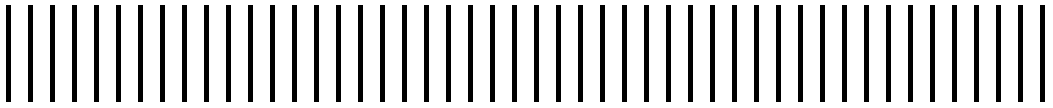
Figures



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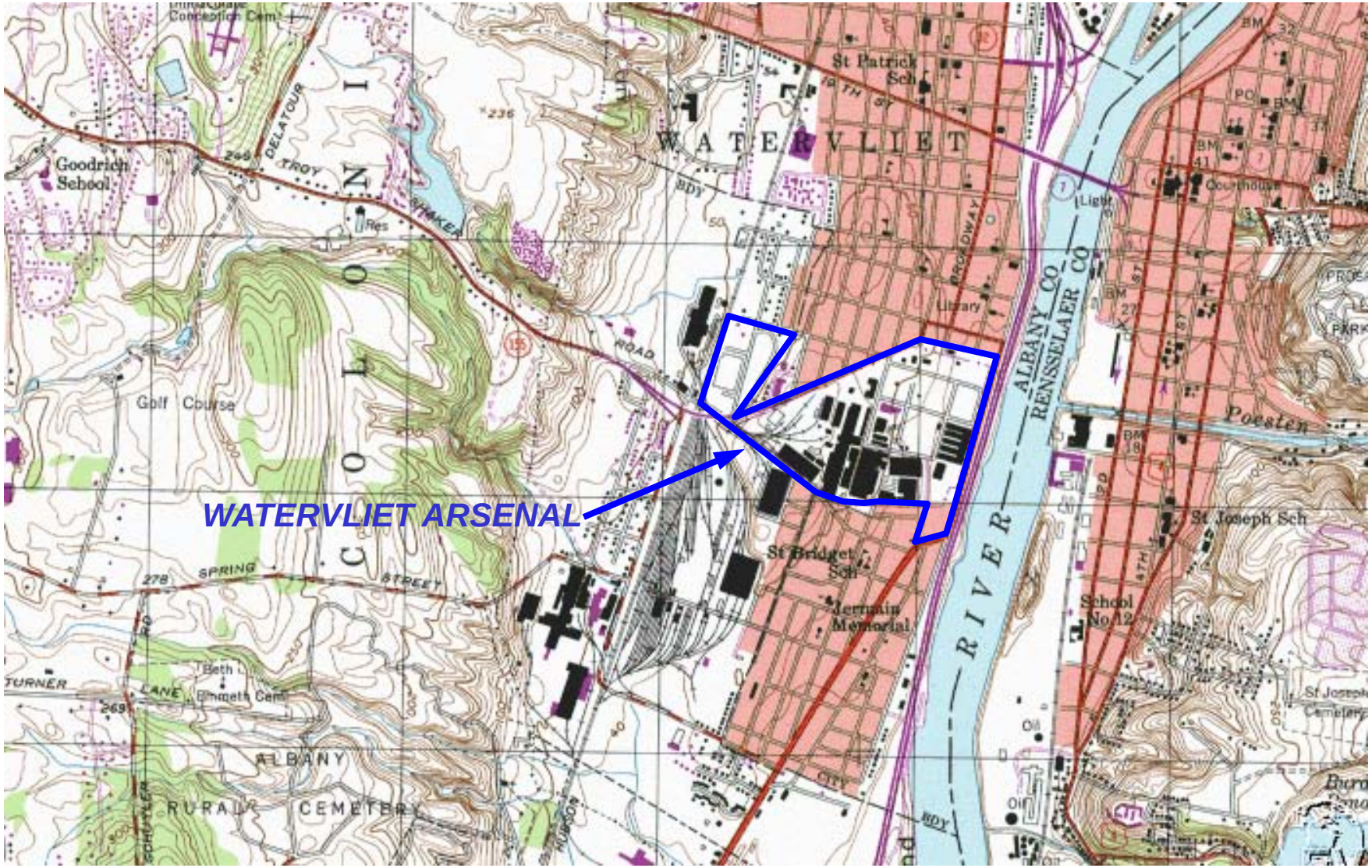

SOURCE: U.S.G.S 7.5 MIN. TROY SOUTH QUADRANGLE

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WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SITE LOCATION

FIGURE 1-1

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WATERVLIET ARSENAL MAIN MANUFACTURING AREA
WATERVLIET, NEW YORK
VAPOR INTRUSION INTERIM CORRECTIVE MEASURES SITE MAP

MALCOLM PIRNIE, INC.

FIGURE 1-2

Watervliet Arsenal
Vapor Intrusion Interim Corrective Measures Construction Certification Report

Tables

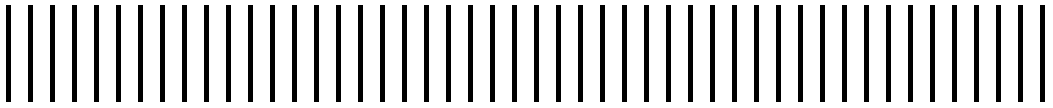

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Table 5-1
SSDS Effluent Sample Results Summary
Watervliet Arsenal
Watervliet, New York

Building	**20**	**21**	
Sample ID	**B20-Pre-carbon**	**B21-Pre-carbon**	**B21-Post-carbon**
Sample Type	**Effluent**	**Effluent**	**Effluent**
Date	**9/10/2010**	**8/12/2010**	**8/12/2010**
Units	**ug/m^3**	**ug/m^3**	**ug/m^3**
VOCs (TO-15)			
Chloromethane	ND	ND	**11**
Vinyl Chloride	ND	ND	ND
Chloroethane	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND
cis-1,2-Dichloroethene	ND	**44**	ND
1,1,1-Trichloroethane	**6.4**	ND	ND
Carbon Tetrachloride	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND
Trichloroethene	**250**	**270**	ND
1,1,2-Trichloroethane	ND	ND	ND
Tetrachloroethene	**54**	**63**	ND
Chlorobenzene	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND
Total CVOCs	**310.4**	**377**	

Notes:
ND - Compound not dectected
ug/m^3 - micrograms per cubic meter

Table 5-1
SSDS Effluent Sample Results Summary
Watervliet Arsenal
Watervliet, New York

Building	**25**		**114**	
Sample ID	**B25-Pre-carbon**	**B25-Post-carbon**	**B114-Pre-carbon**	**B114-Post-carbon**
Sample Type	**Effluent**	**Effluent**	**Effluent**	**Effluent**
Date	**8/12/2010**	**8/12/2010**	**8/12/2010**	**8/12/2010**
Units	**ug/m^3**	**ug/m^3**	**ug/m^3**	**ug/m^3**
VOCs (TO-15)				
Chloromethane	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
cis-1,2-Dichloroethene	**23**	ND	ND	ND
1,1,1-Trichloroethane	**100**	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
Trichloroethene	**6200**	ND	**6**	ND
1,1,2-Trichloroethane	ND	ND	ND	ND
Tetrachloroethene	**58**	ND	**7.1**	**6.6**
Chlorobenzene	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
Total CVOCs	**6381**		**13.1**	

Notes:
ND - Compound not dectected
ug/m^3 - micrograms per cubic meter

Table 5-2
VOC Mass Removal Summary
Watervliet Arsenal
Watervliet, New York

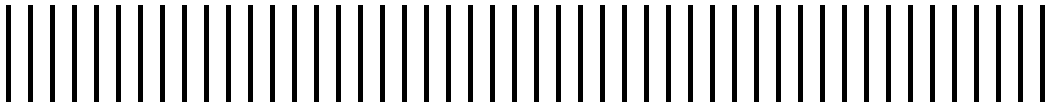
Building	**20**	**21**	**25**	**114**
Date	**9/10/2010**	**8/12/2010**	**8/12/2010**	**8/12/2010**
SSDS Flow Rate (cfm)	**353**	**43**	**565**	**90**
Units	**lb/year**	**lb/year**	**lb/year**	**lb/year**
cis-1,2-Dichloroethene	ND	0.062	0.4	ND
1,1,1-Trichloroethane	0.07	ND	1.8	ND
Trichloroethene	2.89	0.380	114.6	0.018
Tetrachloroethene	0.62	0.089	1.1	0.021
Total CVOC Mass	**3.59**	**0.530**	**118.0**	**0.039**

Notes:
SSDS - Sub-slab depressurization system
ND - Compound not detected
ug/m^3 - Micrograms per cubic meter
lb/year- Pounds per year

Conversion Factors:
2.2 E-09 lb/ug
0.0283 m^3/ft^3
525,600 min/year

Watervliet Arsenal
Vapor Intrusion Interim Corrective Measures Construction Certification Report

Appendix A: As-Built Drawings



2118163

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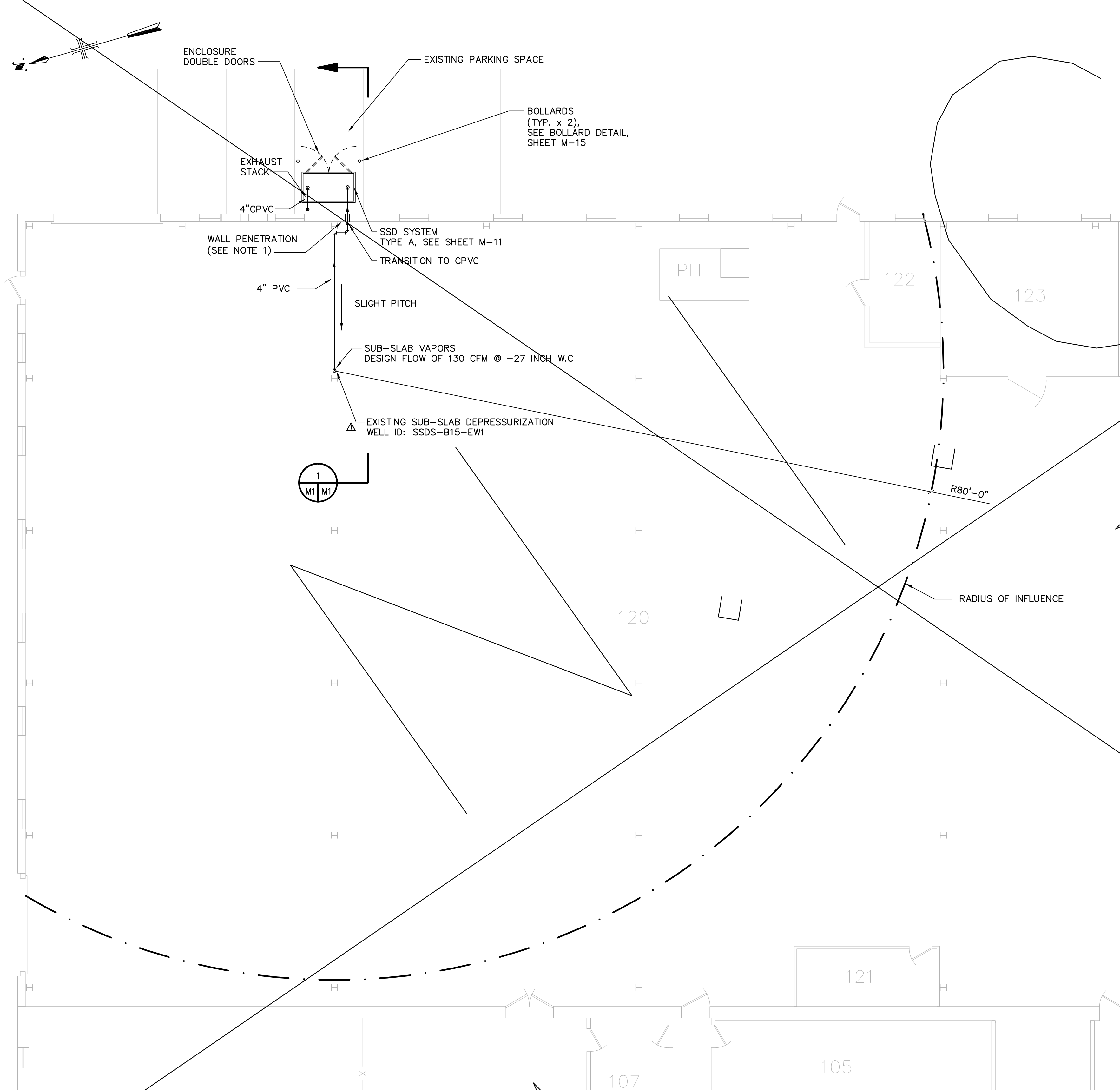
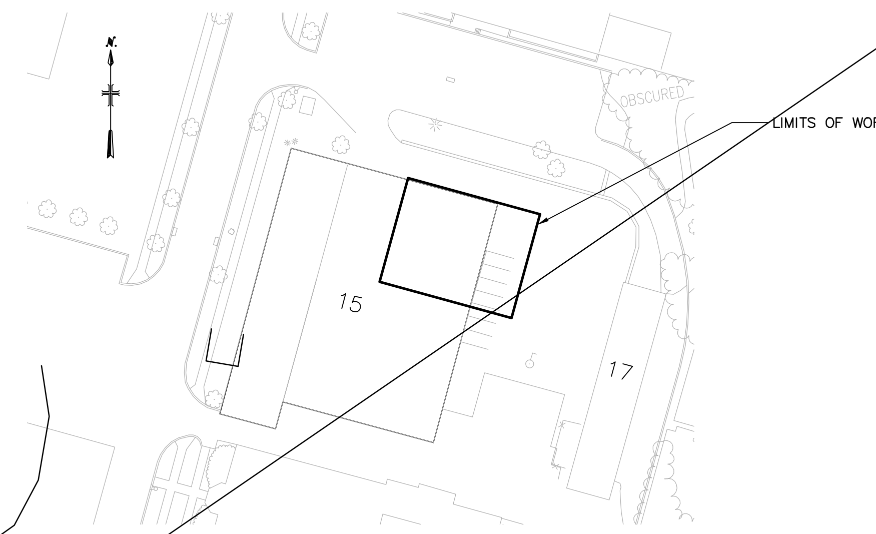


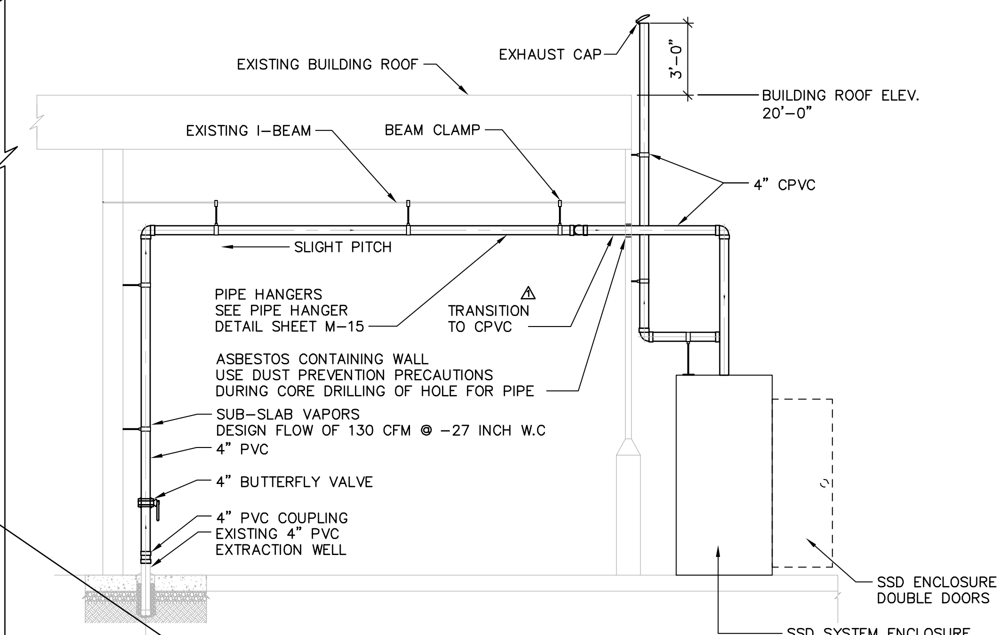
BUILDING 15
PARTIAL PLAN VIEW

4 0 4 8
SCALE: 1/8" = 1'–0"



BUILDING 15
PLAN VIEW

NOT TO SCALE



SECTION 1 M1 M1

2 0 6
SCALE: 1/4" = 1'–0"

NOTES:

1. EXISTING WALL CONTAINS ASBESTOS. CONTRACTOR SHALL PREPARE WALL AND AREA TO PREVENT THE CREATION OF DUST DURING CORE DRILLING OF PENETRATION THOUGH THE WALL.
2. CONTRACTOR SHALL PLACE SSD SYSTEM WITHIN THE AREA OF A SINGLE EXISTING PARKING SPACE.
3. CARBON VESSELS NOT REQUIRED FOR BUILDING 15.
4. CONTRACTOR SHALL ROUTE PIPING IN BUILDING TO PREVENT INTERFERENCE WITH THE BUILDINGS INTENDED USE. HANG PIPE FROM I–BEAMS AND MAINTAIN SLIGHT PITCH FOR CONDENSATION TO FLOW BACK TO THE EXTRACTION WELL.

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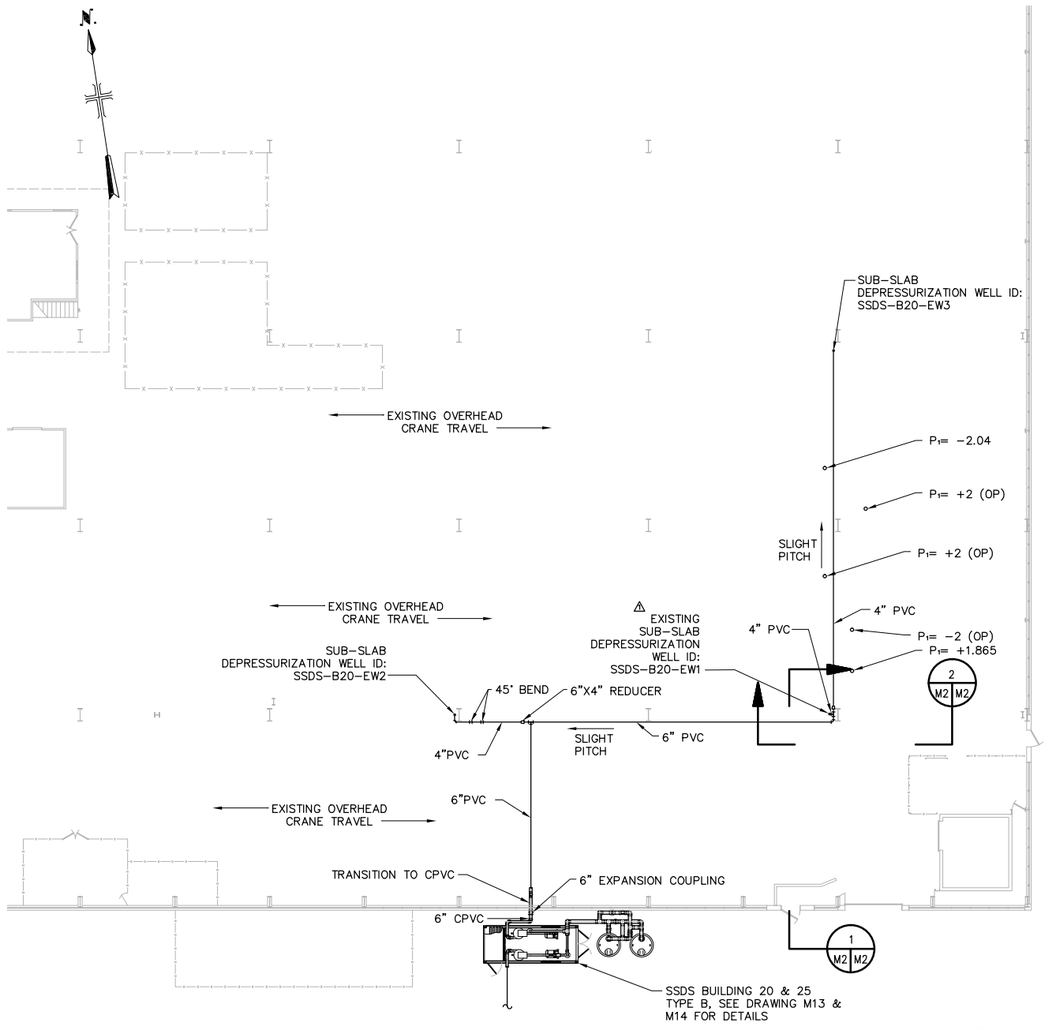
WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
BUILDING 15
PLAN AND SECTION VIEW

M-1

SHEET 1 OF 15

XREFS: I:\ACAD\PROJ\2118136\Contract Drawings\60% SUBMISSION\XREF\BASE–MAP.dwg I:\ACAD\PROJ\2118136\Contract Drawings\60% SUBMISSION\XREF\2118–B15.dwg I:\ACAD\PROJ\2118136\Contract Drawings\AS BUILT\XREF\2118136–TB.dwg IMAGES: None
User: Lewandowski Spec: PIRNIE STANDARD File: I:\ACAD\PROJ\2118136\Contract Drawings\AS BUILT\MECH\2118136M001.DWG Scale: 1:1 Date: 08/31/2010 Time: 11:32 Layout: M1

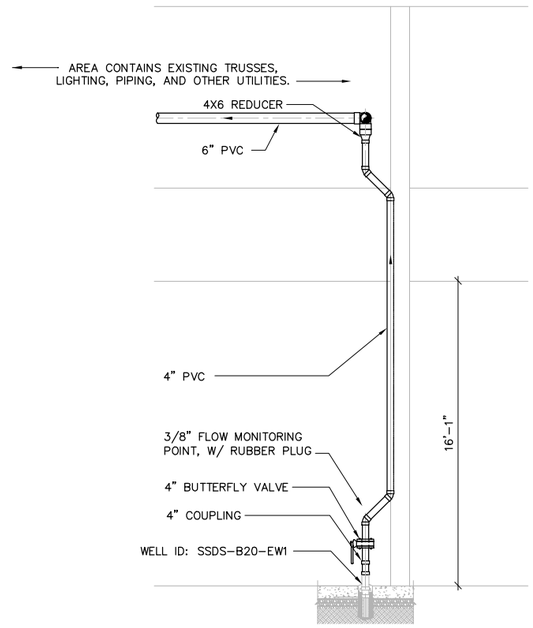


* OP = OVER PRESSURE

BUILDING 20 PLAN VIEW

8 0 8 16

SCALE: 1/16" = 1'-0"



SECTION

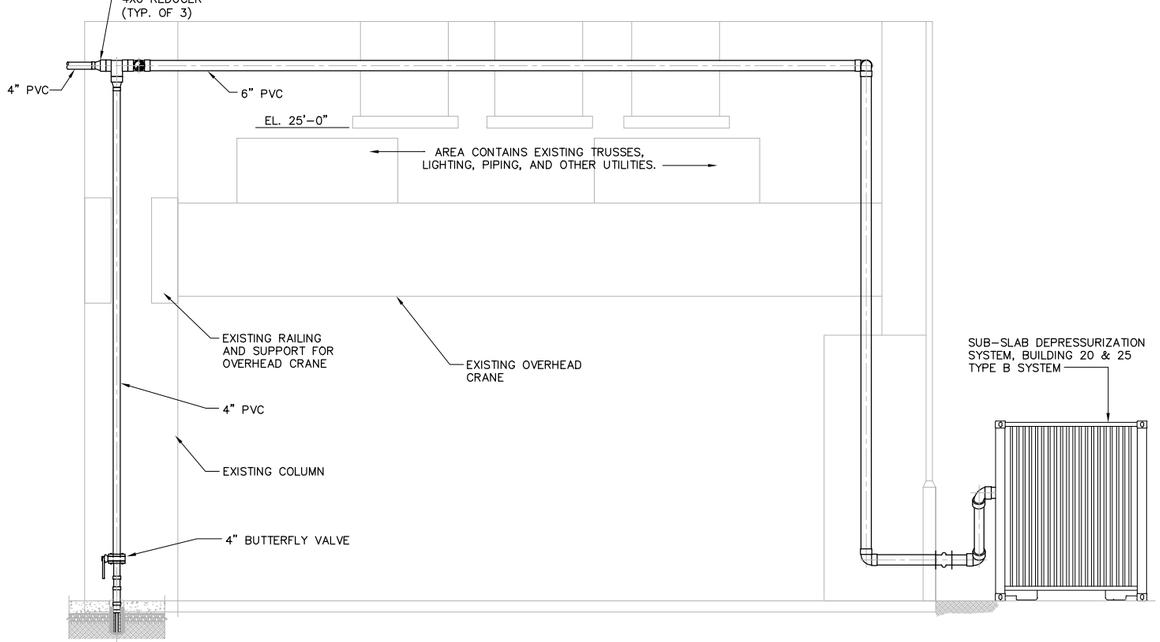
2 0 6

SCALE: 1/4" = 1'-0"

2 M2 M2

BUILDING 20 PLAN VIEW

NOT TO SCALE



SECTION

2 0 6

SCALE: 1/4" = 1'-0"

1 M2 M2

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TAL	APRIL 2009		211815MA002
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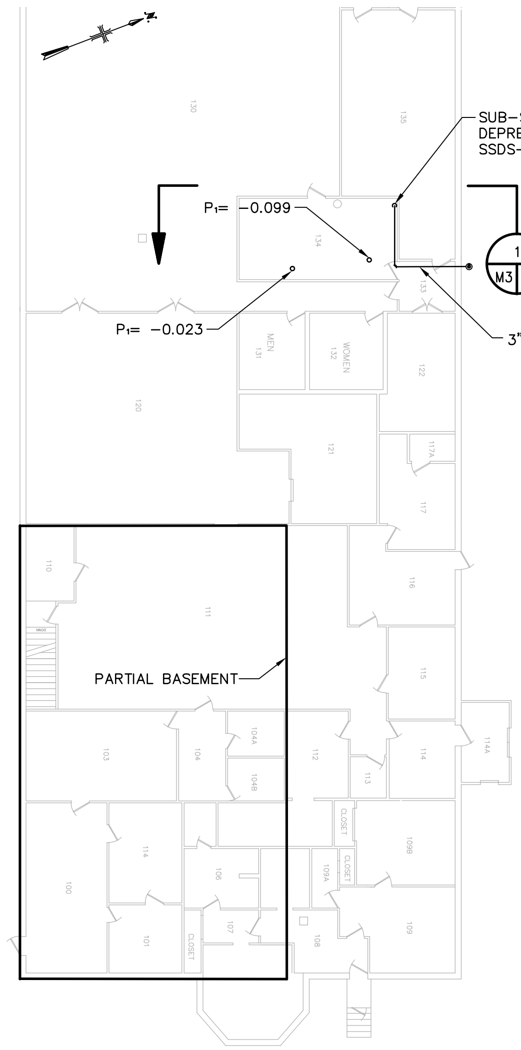
VAPOR INTRUSION MITIGATION

MECHANICAL
BUILDING 20
PLAN AND SECTION VIEW

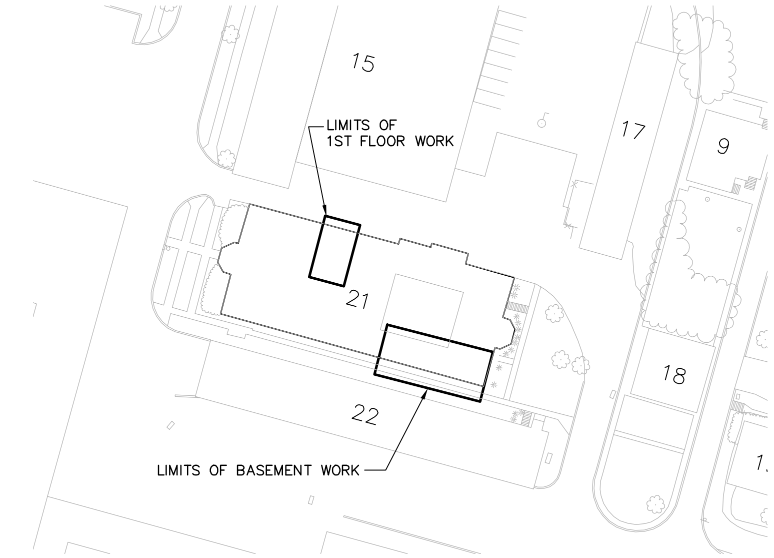
M-2

SHEET 2 OF 15



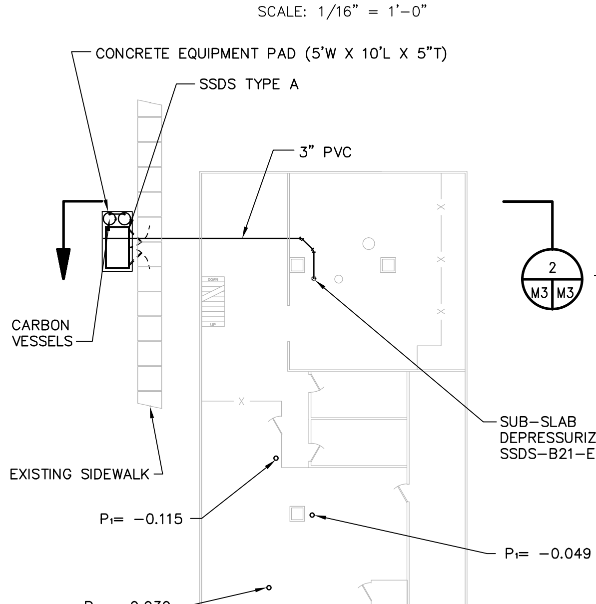
BUILDING 21 – 1ST FLOOR
PLAN VIEW

SCALE: 1/16" = 1'-0"



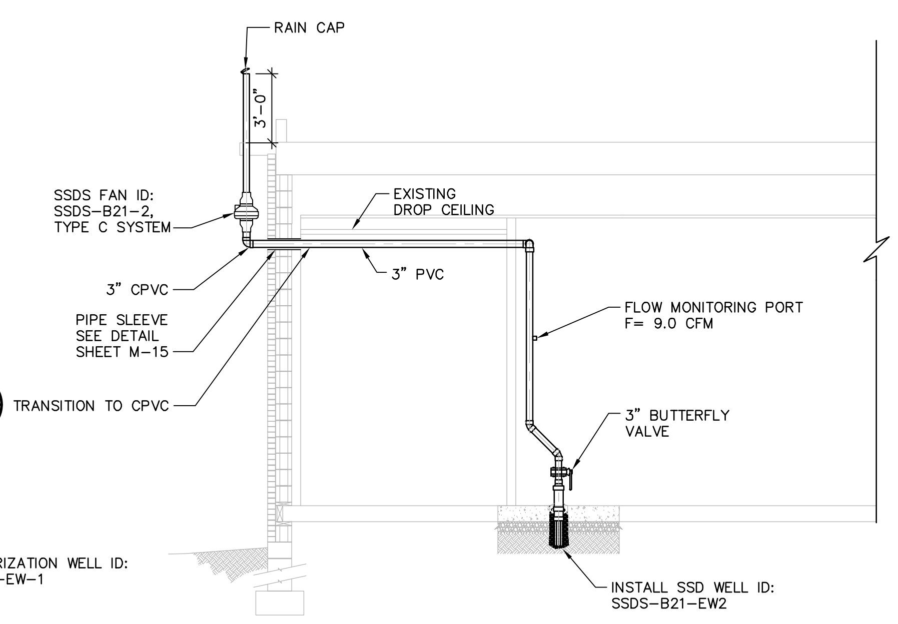
BUILDING 21
PLAN VIEW

NOT TO SCALE



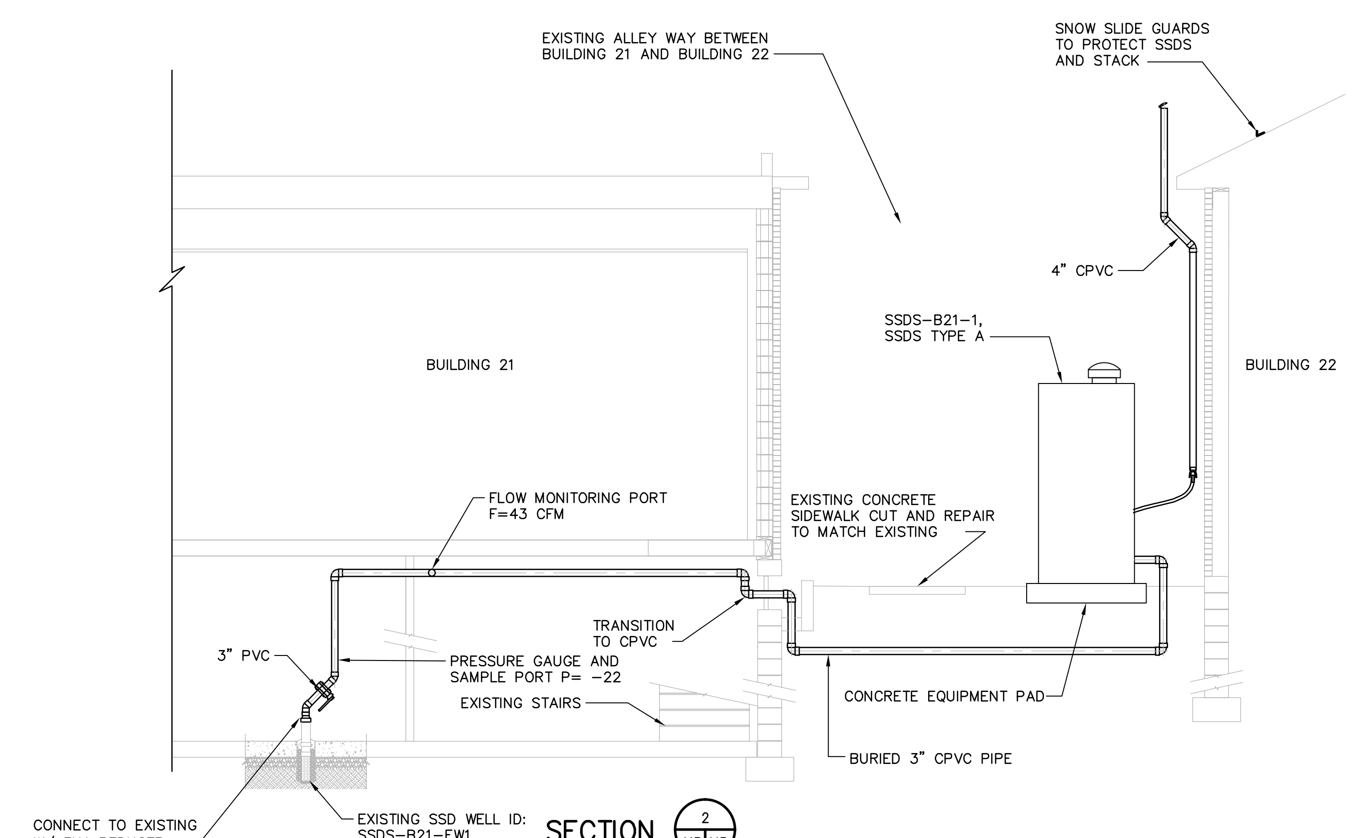
BUILDING 21 – BASEMENT
PLAN VIEW

SCALE: 1/16" = 1'-0"



SECTION 1 (M3 | M3)

SCALE: 1/4" = 1'-0"



SECTION 2 (M3 | M3)

SCALE: 1/4" = 1'-0"

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WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
BUILDING 21
PLAN AND SECTION VIEW

M-3

SHEET 3 OF 15

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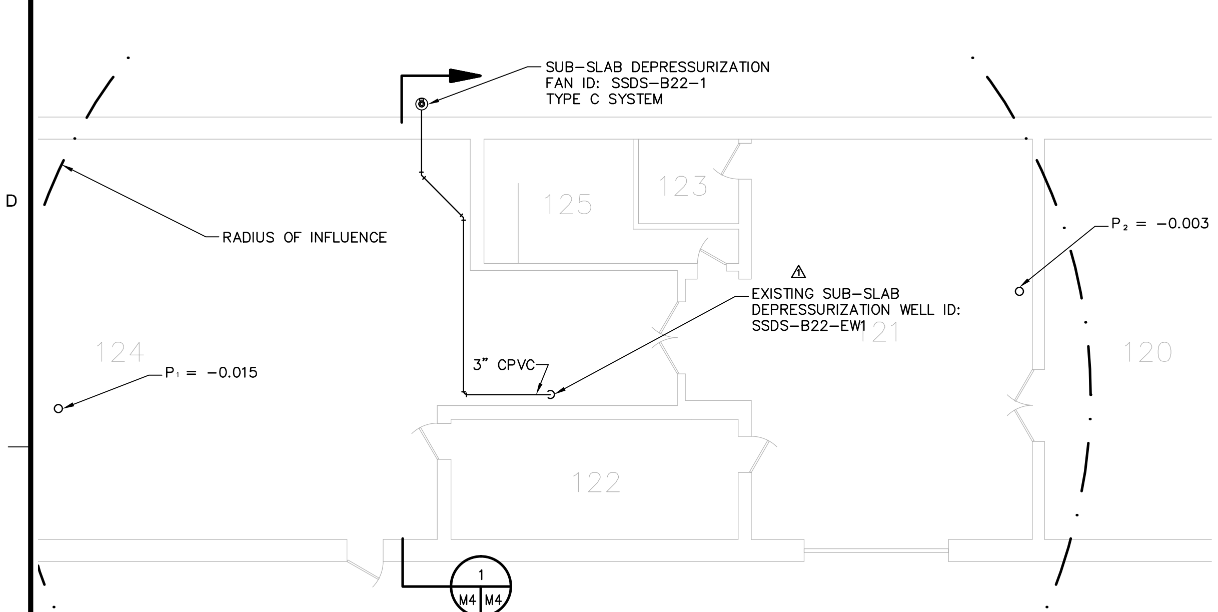
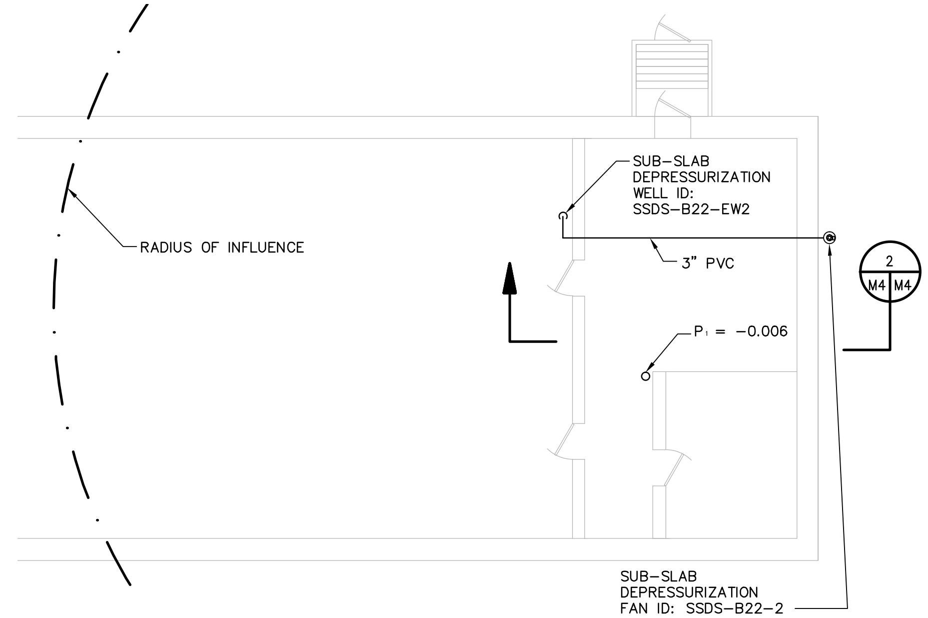


BUILDING 22 – 1ST FLOOR PLAN VIEW

4 0 4 8

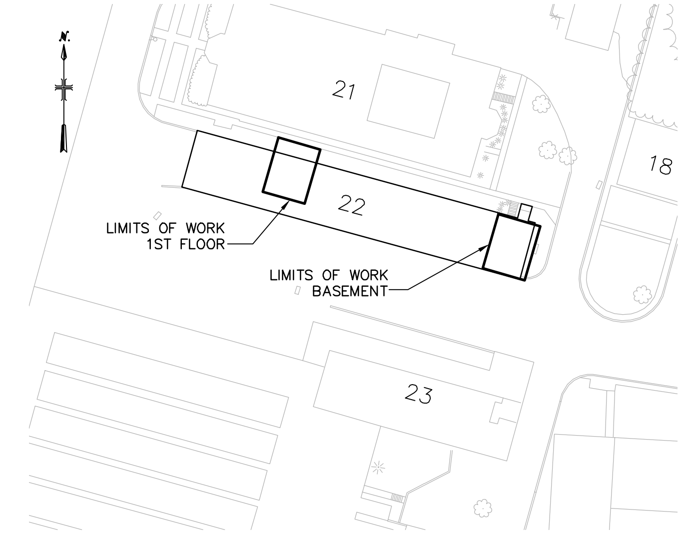
SCALE: 1/8" = 1'-0"



BUILDING 22 –BASEMENT PLAN VIEW

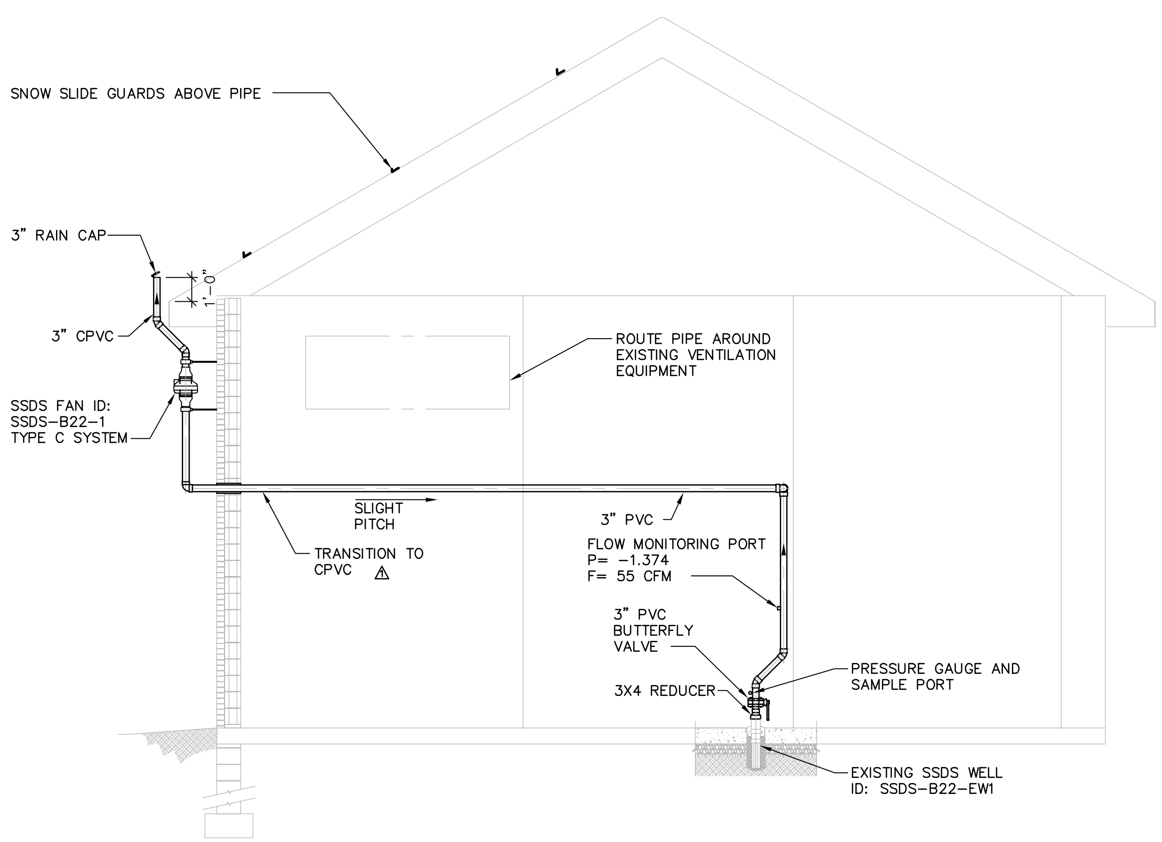
4 0 4 8

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



BUILDING 22 PLAN VIEW

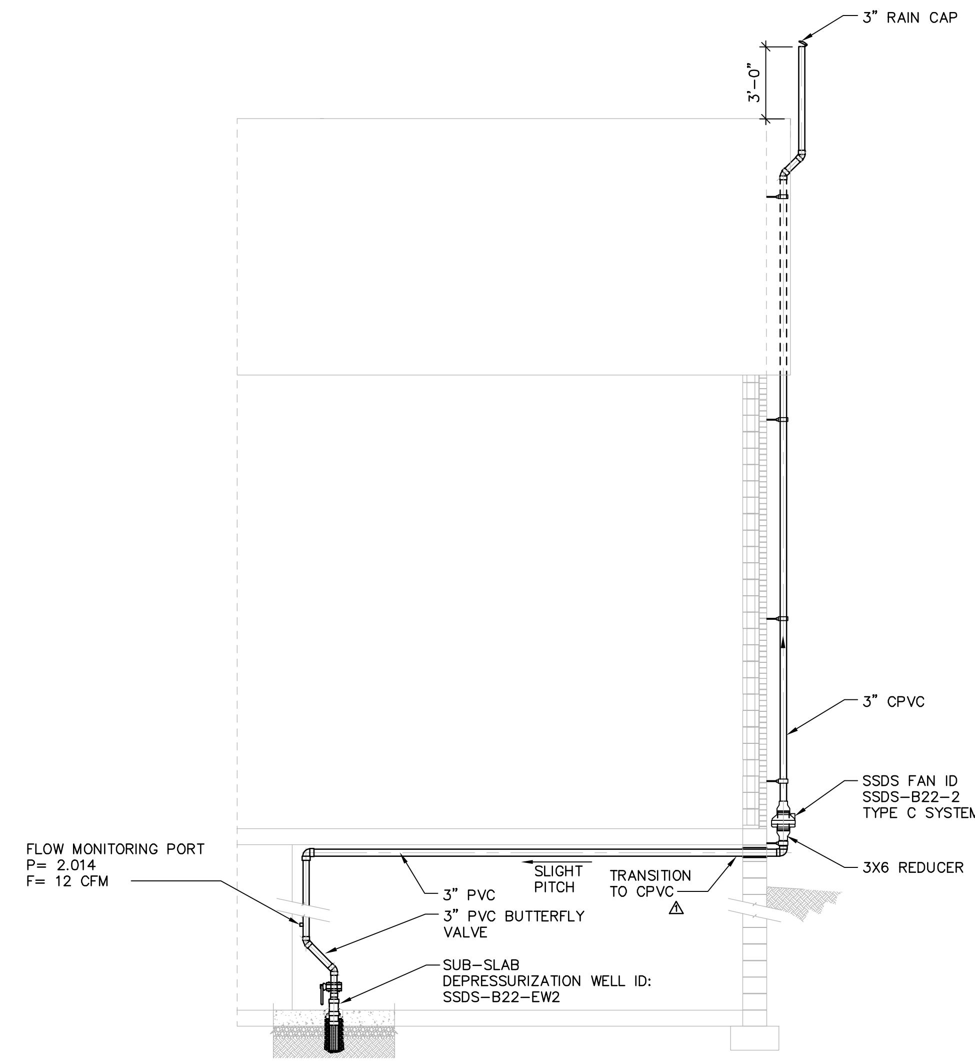
NOT TO SCALE



SECTION 1 M4 M4

2 0 6

SCALE: 1/4" = 1'-0"



SECTION 2 M4 M4

2 0 6

SCALE: 1/4" = 1'-0"

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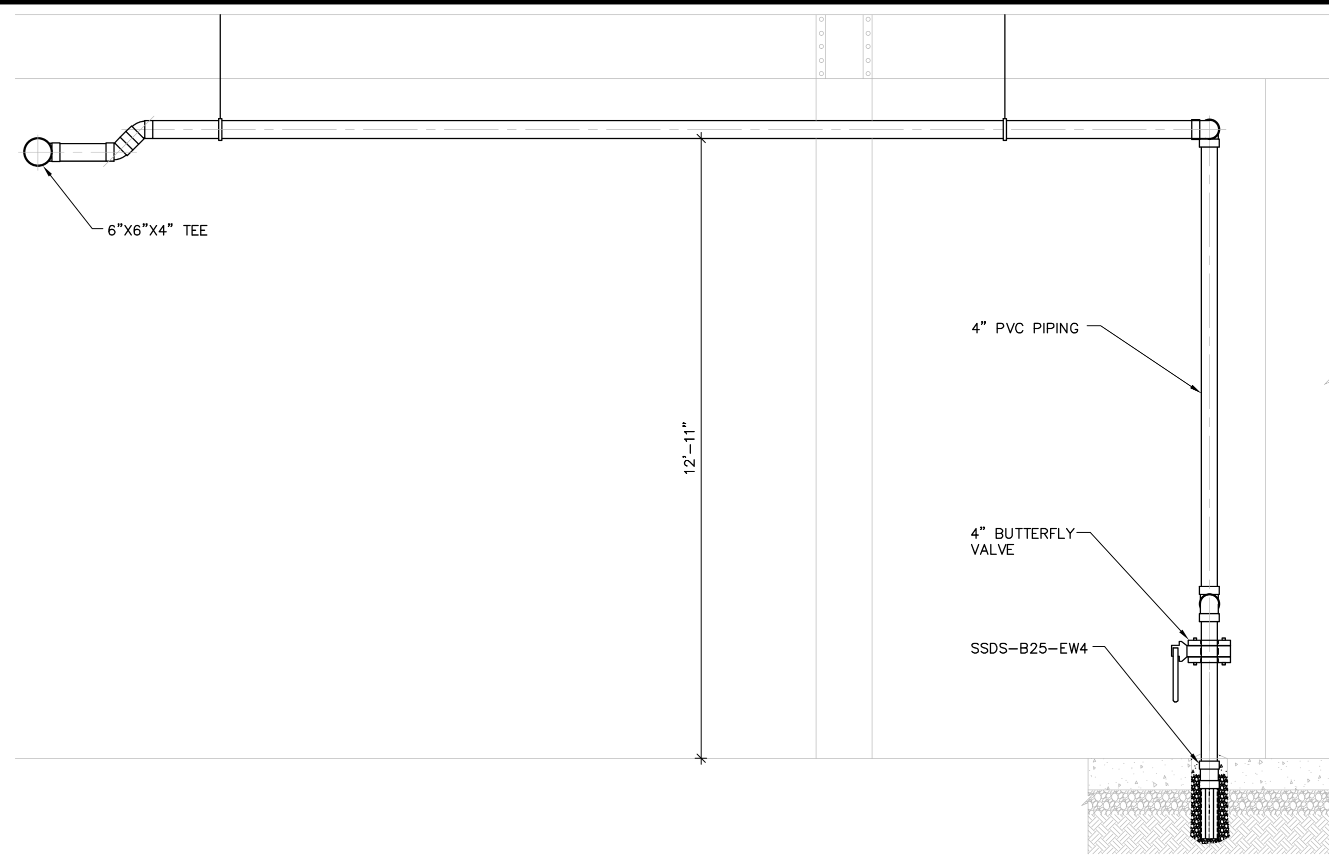
MECHANICAL
BUILDING 22
PLAN AND SECTION VIEW

M-4

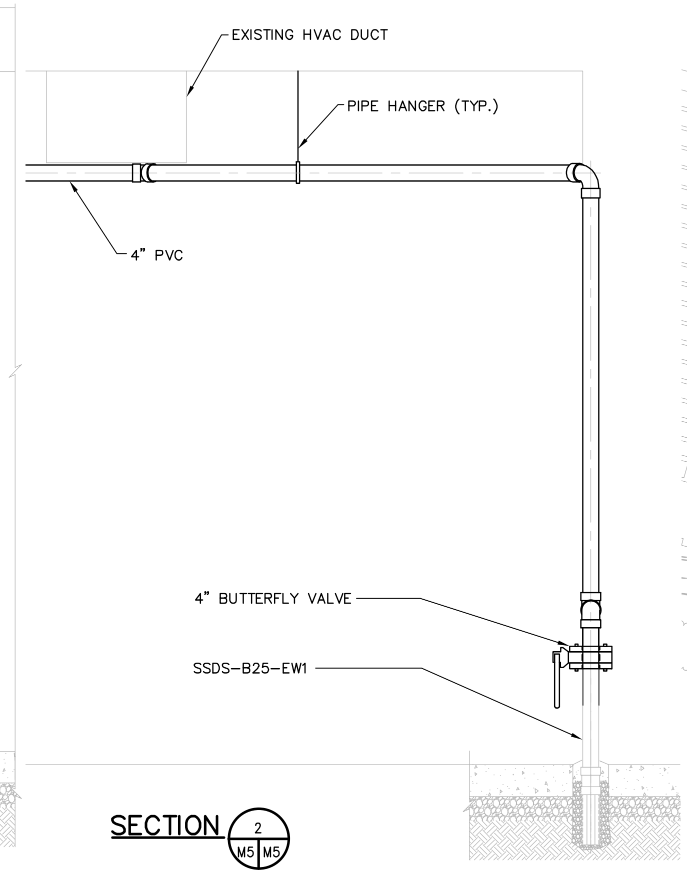
SHEET 4 OF 15



SECTION 1 M5 M5

2 0 2

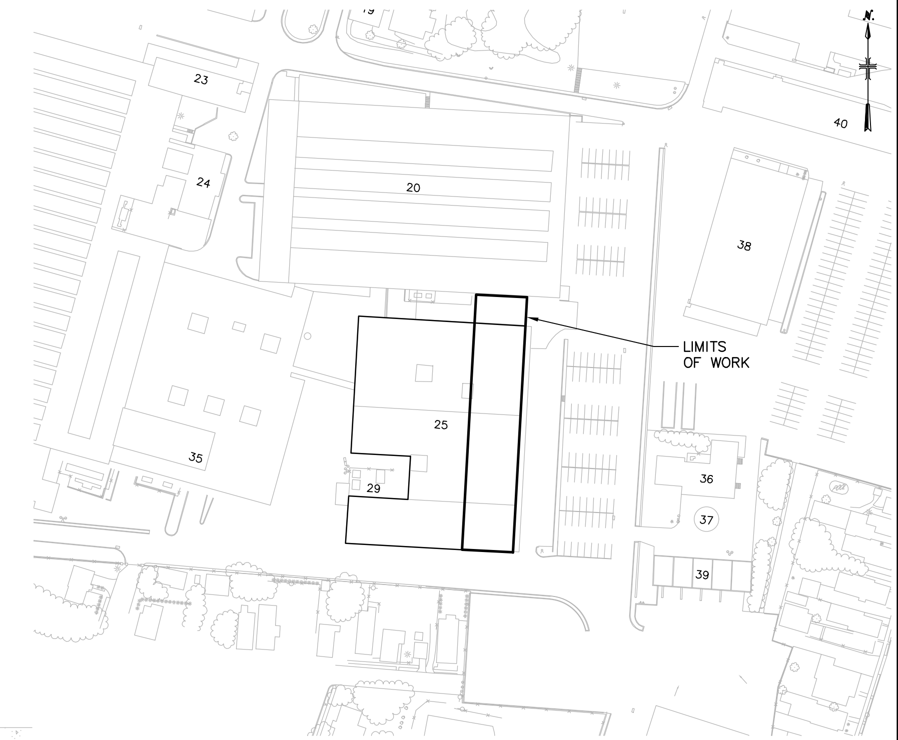
SCALE: 1/2" = 1'–0"



SECTION 2 M5 M5

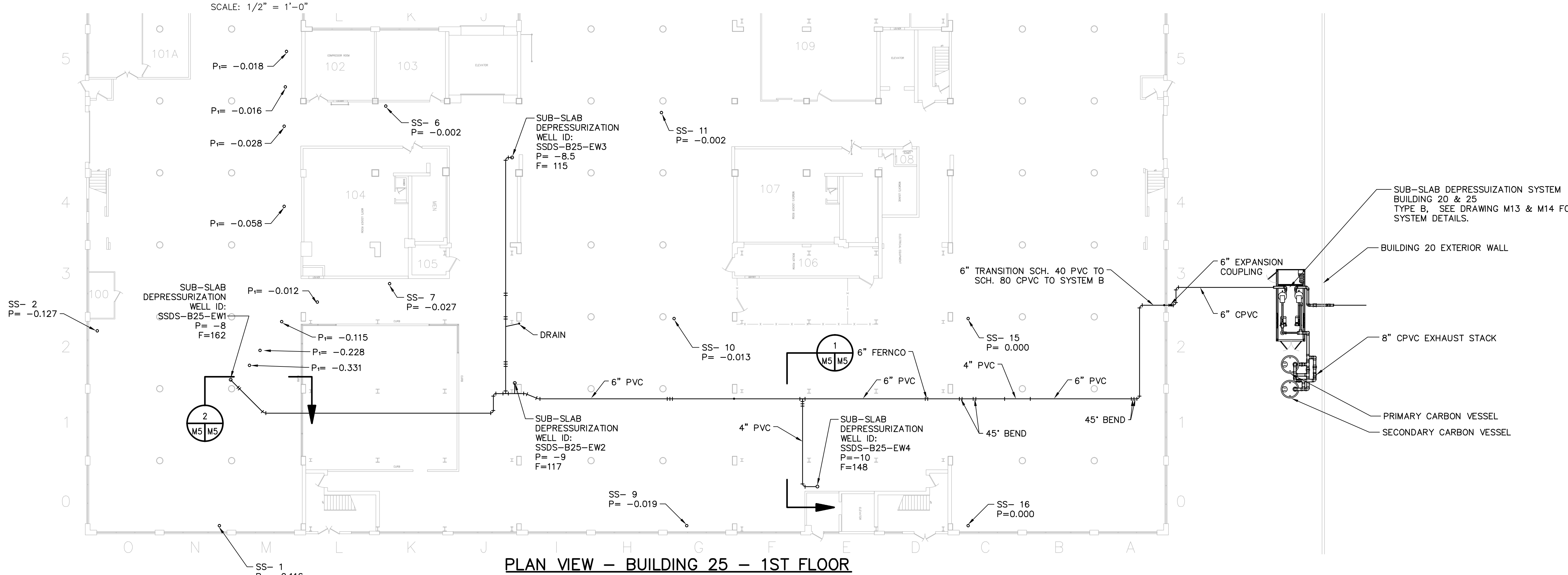
2 0 2

SCALE: 1/2" = 1'–0"



BUILDING 25 PLAN VIEW

NOT TO SCALE



PLAN VIEW – BUILDING 25 – 1ST FLOOR

8 0 8 16

SCALE: 1/16" = 1'–0"

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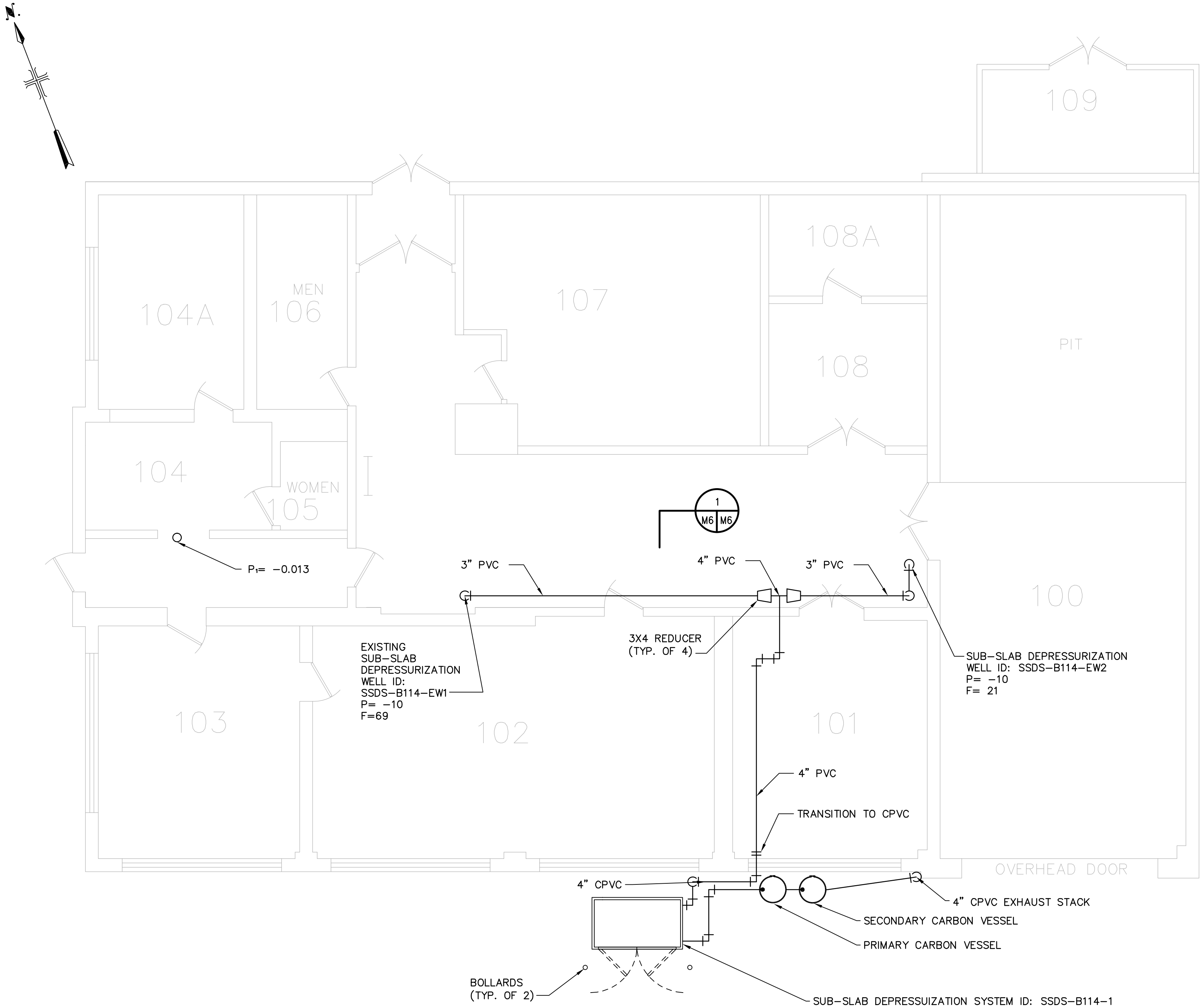
VAPOR INTRUSION MITIGATION

MECHANICAL
BUILDING 25
PLAN AND SECTION VIEW

M-5

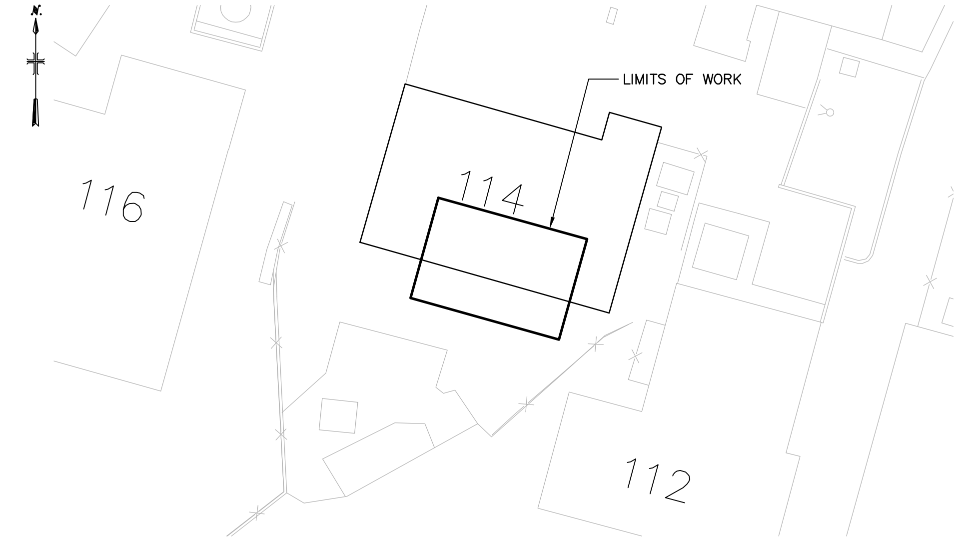
SHEET 5 OF 15



BUILDING 114 – 1ST FLOOR

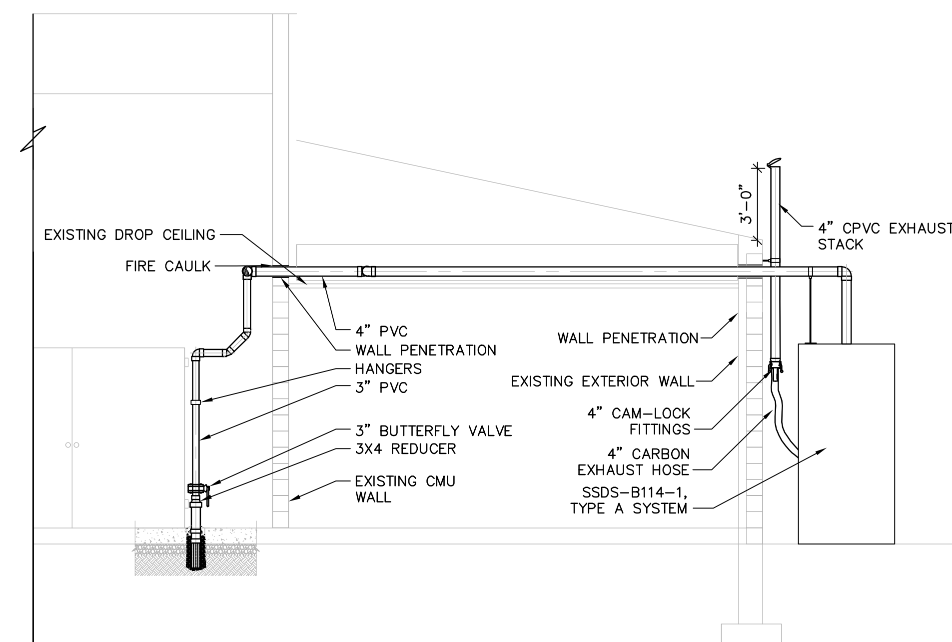
0 4 12

SCALE: 3/16" = 1'-0"



BUILDING 114 PLAN VIEW

NOT TO SCALE



SECTION 1 M6 M6

2 0 6

SCALE: 1/4" = 1'-0"

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FILE NAME: 2118136M006

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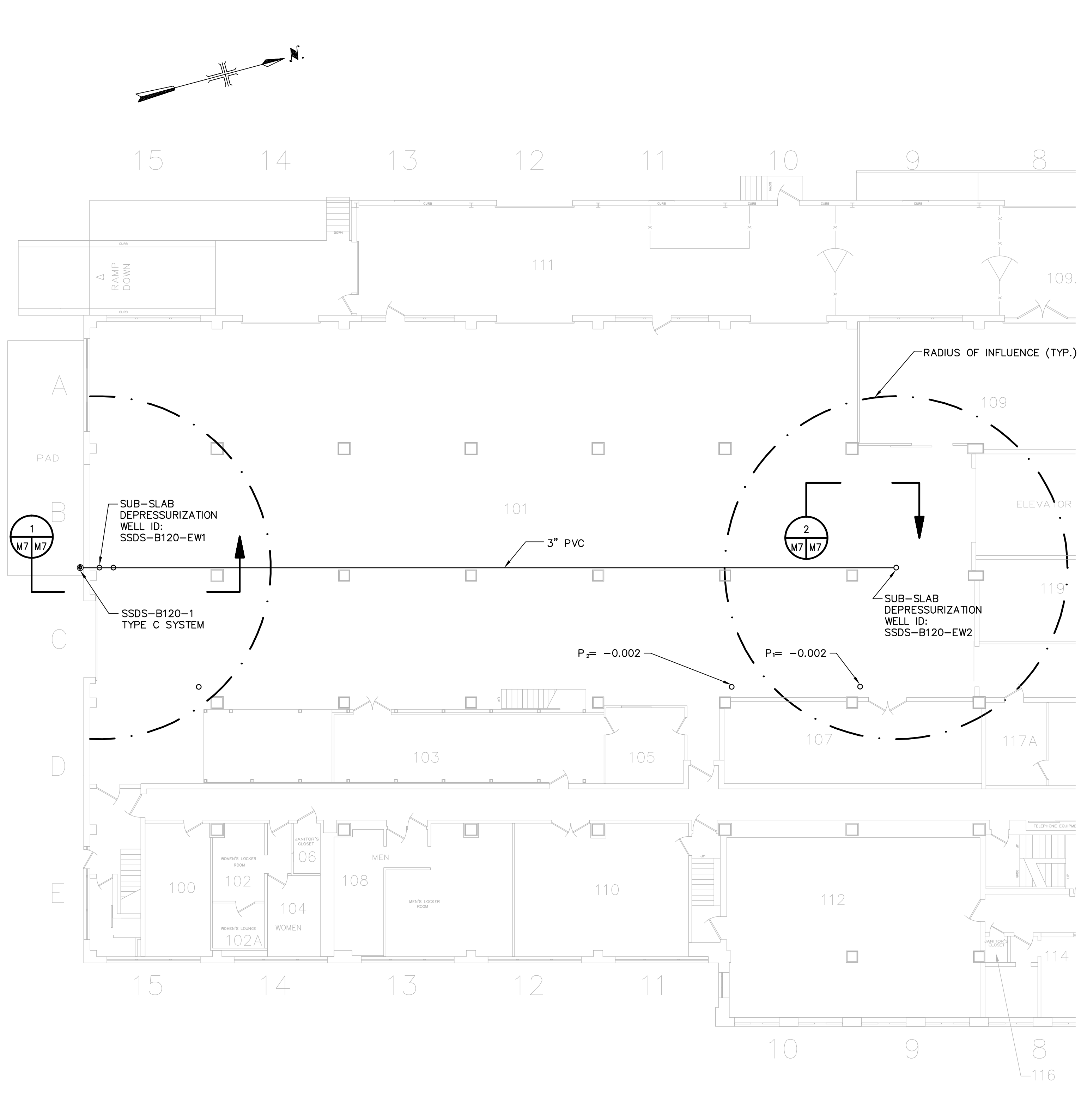
VAPOR INTRUSION MITIGATION

MECHANICAL
BUILDING 114
PLAN AND SECTION VIEW

M-6

SHEET 6 OF 15



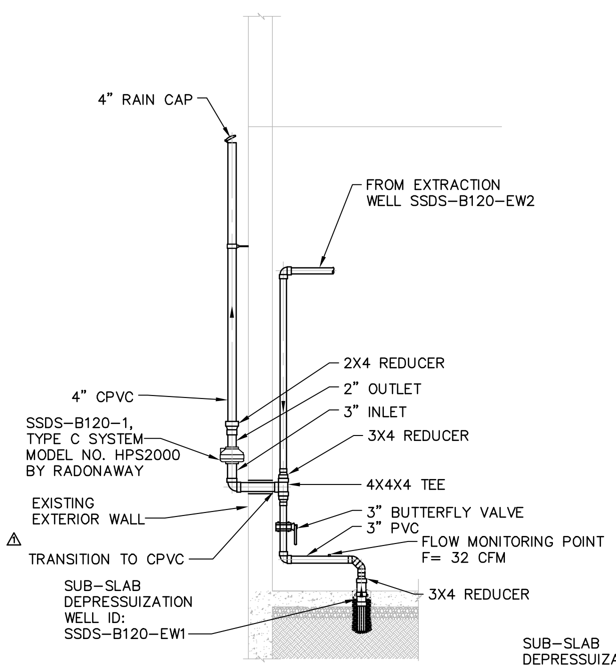
BUILDING 120 – 1ST FLOOR

6 0 6 12

SCALE: 3/32" = 1'-0"

BUILDING 120 PLAN VIEW

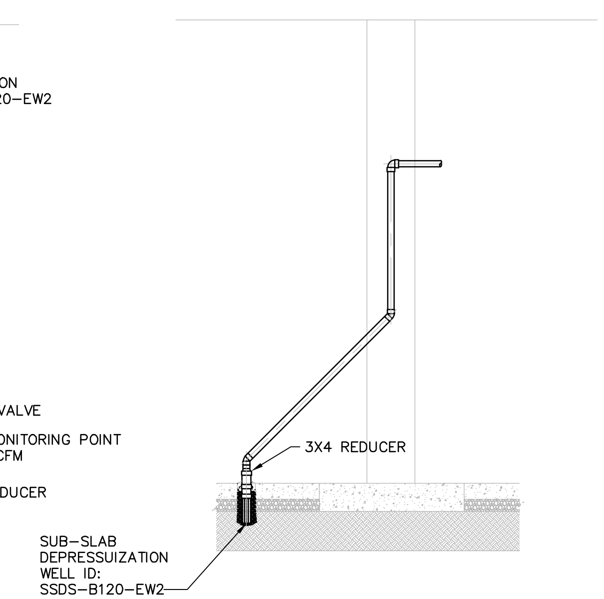
NOT TO SCALE



SECTION 1 M7 M7

2 0 6

SCALE: 1/4" = 1'-0"



SECTION 2 M7 M7

2 0 6

SCALE: 1/4" = 1'-0"

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DATE:..................

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WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
BUILDING 120
PLAN AND SECTION VIEW

M-7

SHEET 7 OF 15

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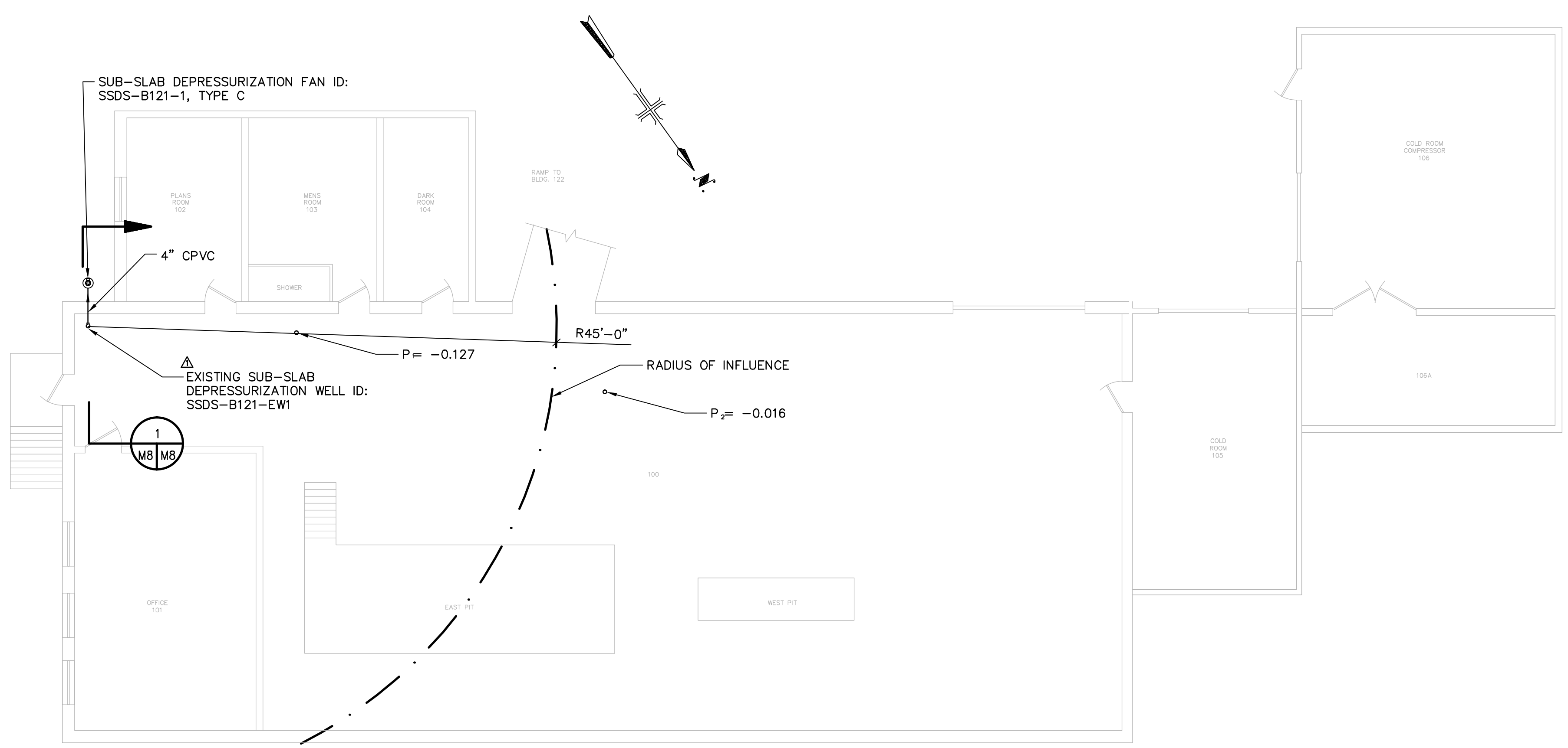
BUILDING 121 PLAN VIEW

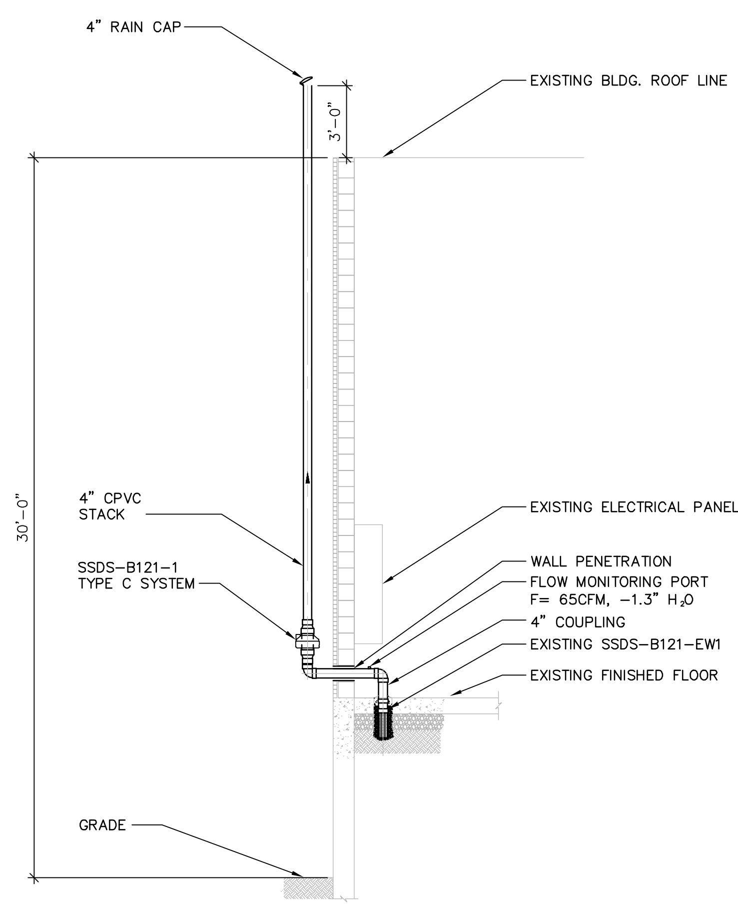
NOT TO SCALE



BUILDING 121 – 1ST FLOOR

4 0 4 8

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



SECTION 1 (M8 M8)

2 0 6

SCALE: 1/4" = 1'-0"

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DATE:

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APPROVED BY: - — DATE: -
FILE NAME: 2118136M008

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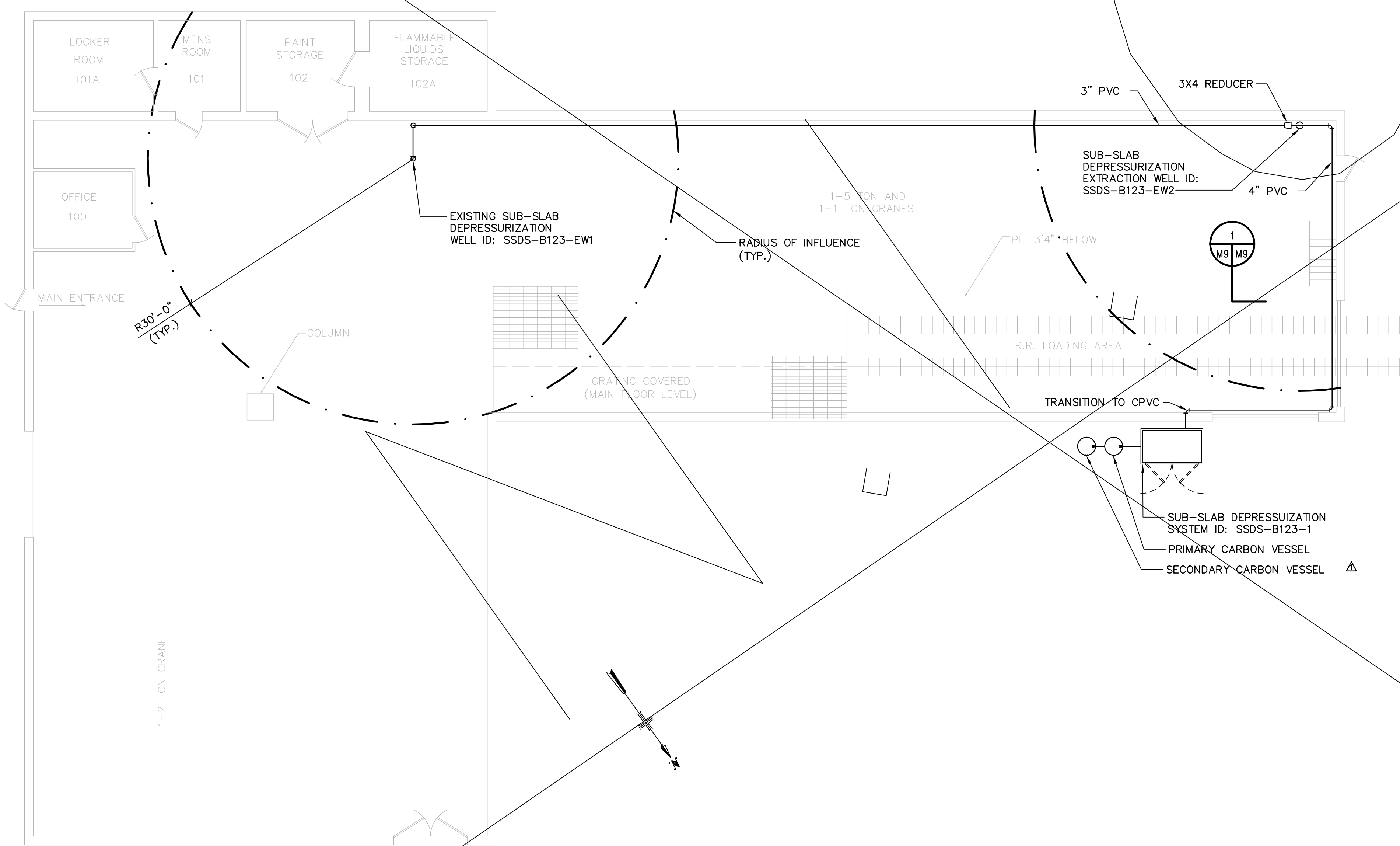
WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
BUILDING 121
PLAN AND SECTION VIEW

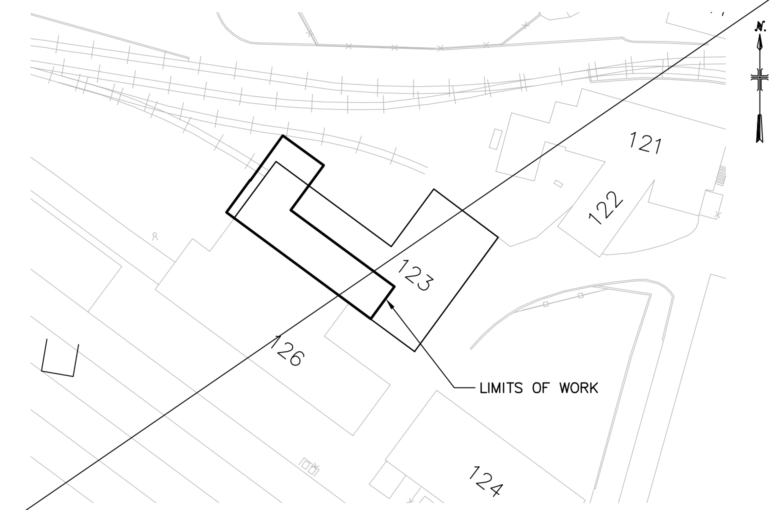
M-8

SHEET 8 OF 15



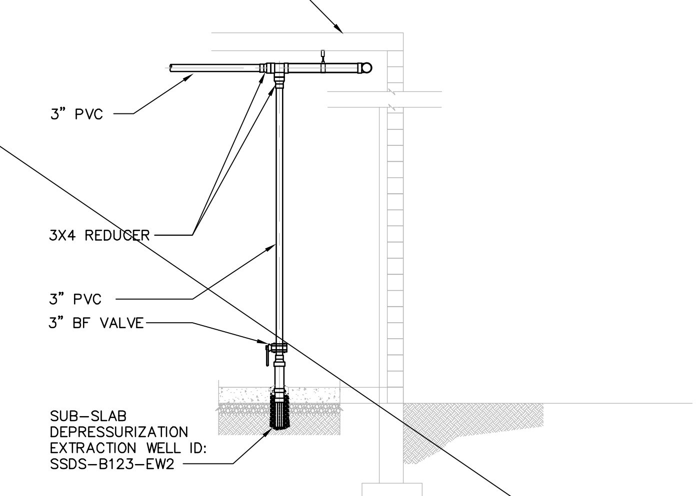
BUILDING 123 – 1ST FLOOR

4 0 4 8
SCALE: 1/8" = 1'-0"



BUILDING 123
PLAN VIEW

NOT TO SCALE



SECTION 1 M9 M9

2 0 6
SCALE: 1/4" = 1'-0"

US Army Corps of Engineers®
BALTIMORE DISTRICT

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DATE:

AS-BUILT DRAWINGS

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APPROVED BY: - DATE: -
FILE NAME: 2118136M009

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WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
BUILIDNG 123
PLAN AND SECTION VIEW

M-9

SHEET 15 OF Y

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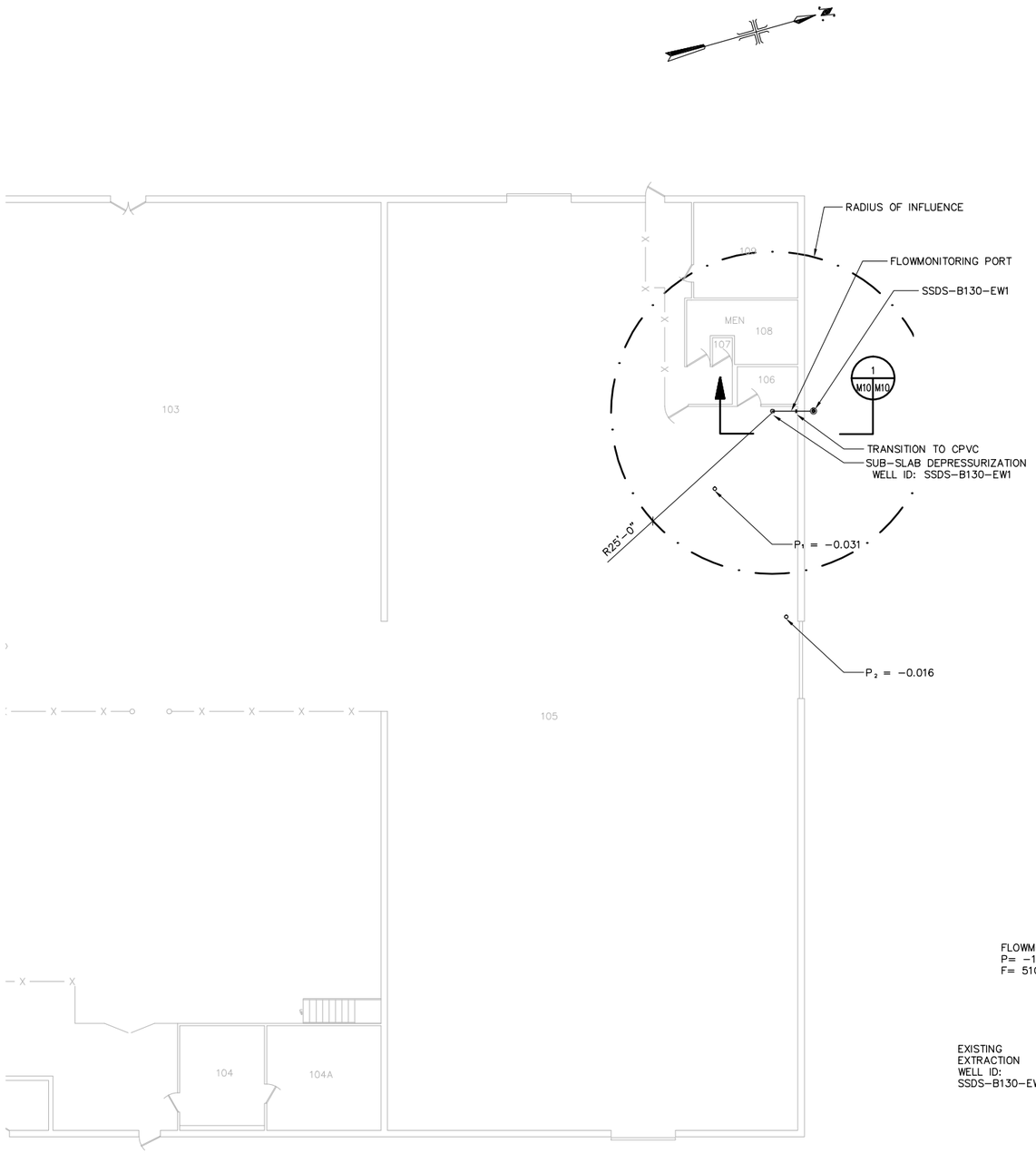
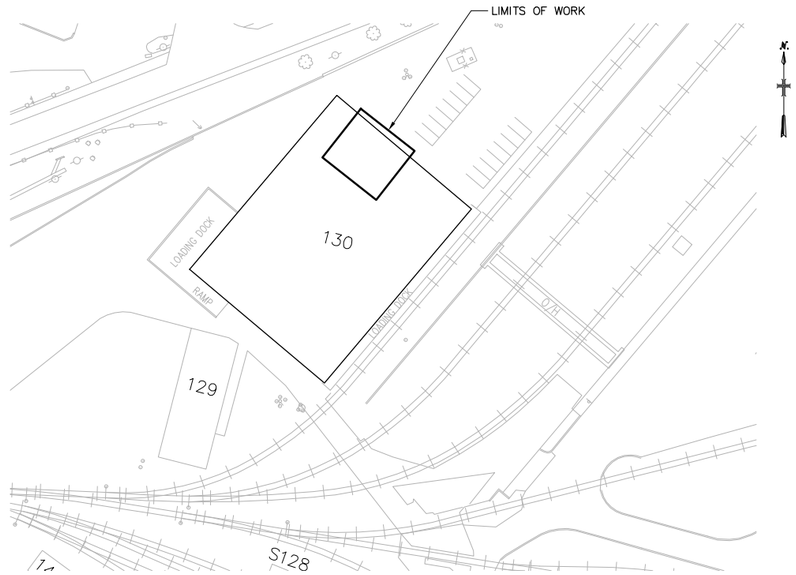


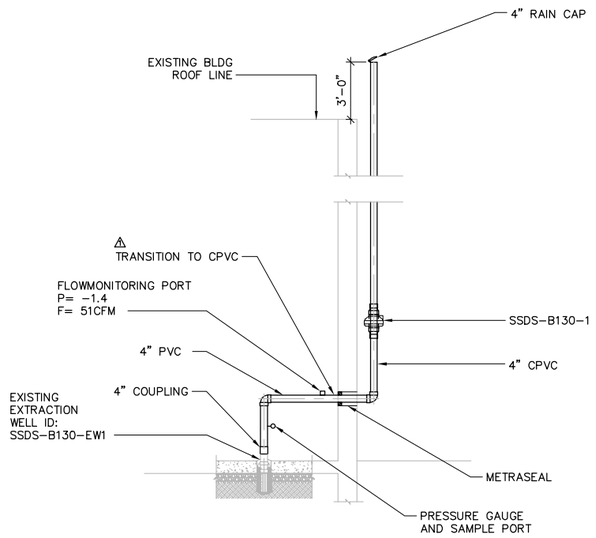
BUILDING 130 – 1ST FLOOR

6 0 6 12
SCALE: 3/32" = 1'-0"



BUILDING 130
PLAN VIEW

NOT TO SCALE



SECTION 1/M10 M10

2 0 6
SCALE: 1/4" = 1'-0"

US Army Corps of Engineers
BALTIMORE DISTRICT

MARK	DESCRIPTION	DATE	APPR.

DATE:.....

AS-BUILT DRAWINGS

DESIGNED BY: MHJ — DATE: APRIL 2009 — APPROVED BY: - — DATE: -
DRAWN BY: TAL — DATE: APRIL 2009 — REVIEWED BY: - — DATE: -
FILE NAME: 211813SM010

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
BALTIMORE DISTRICT
BALTIMORE, MARYLAND

MALCOLM PIRNIE, INC.
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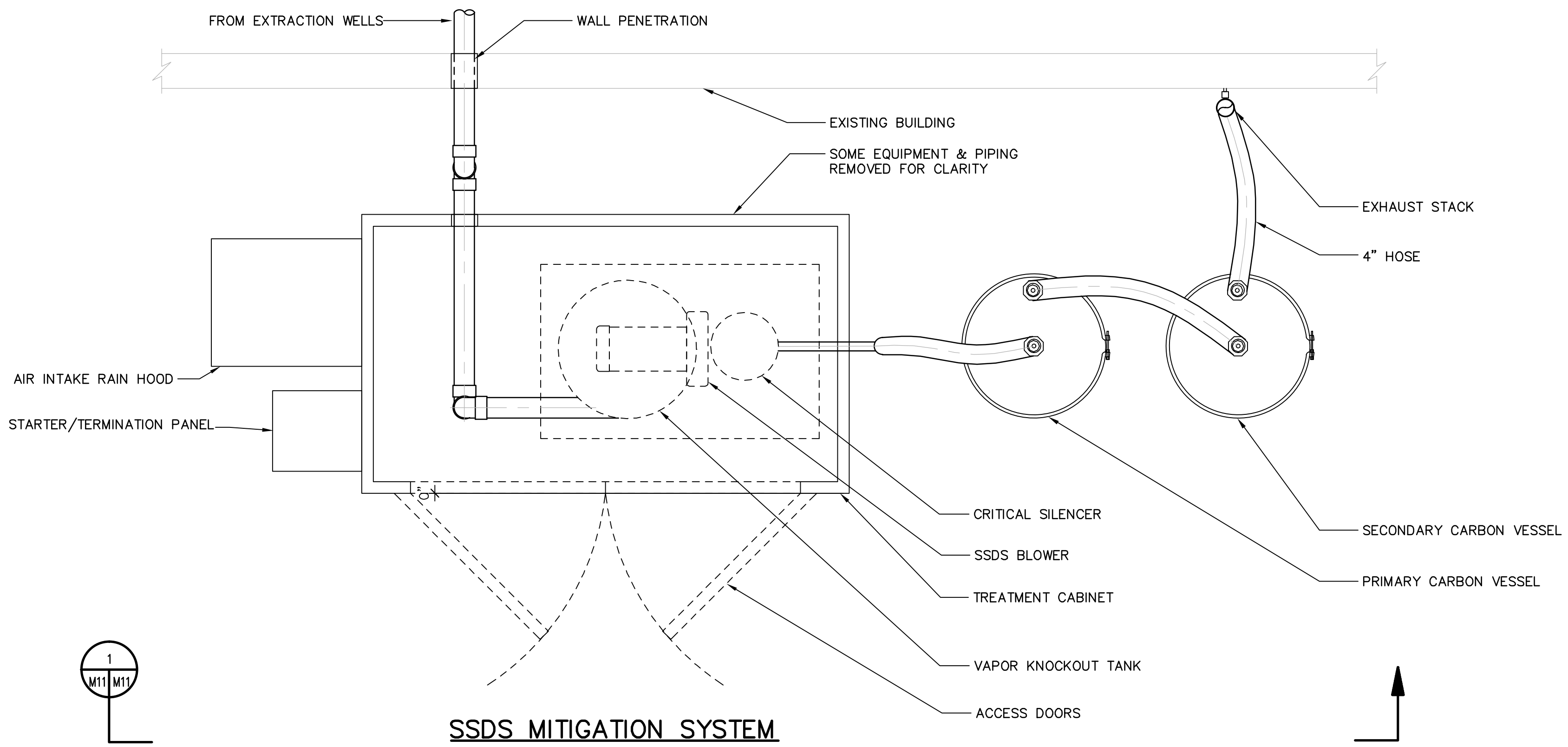
CLIFTON PARK, NEW YORK 12065
245A27971200

WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
BUILDING 130
PLAN AND SECTION VIEW

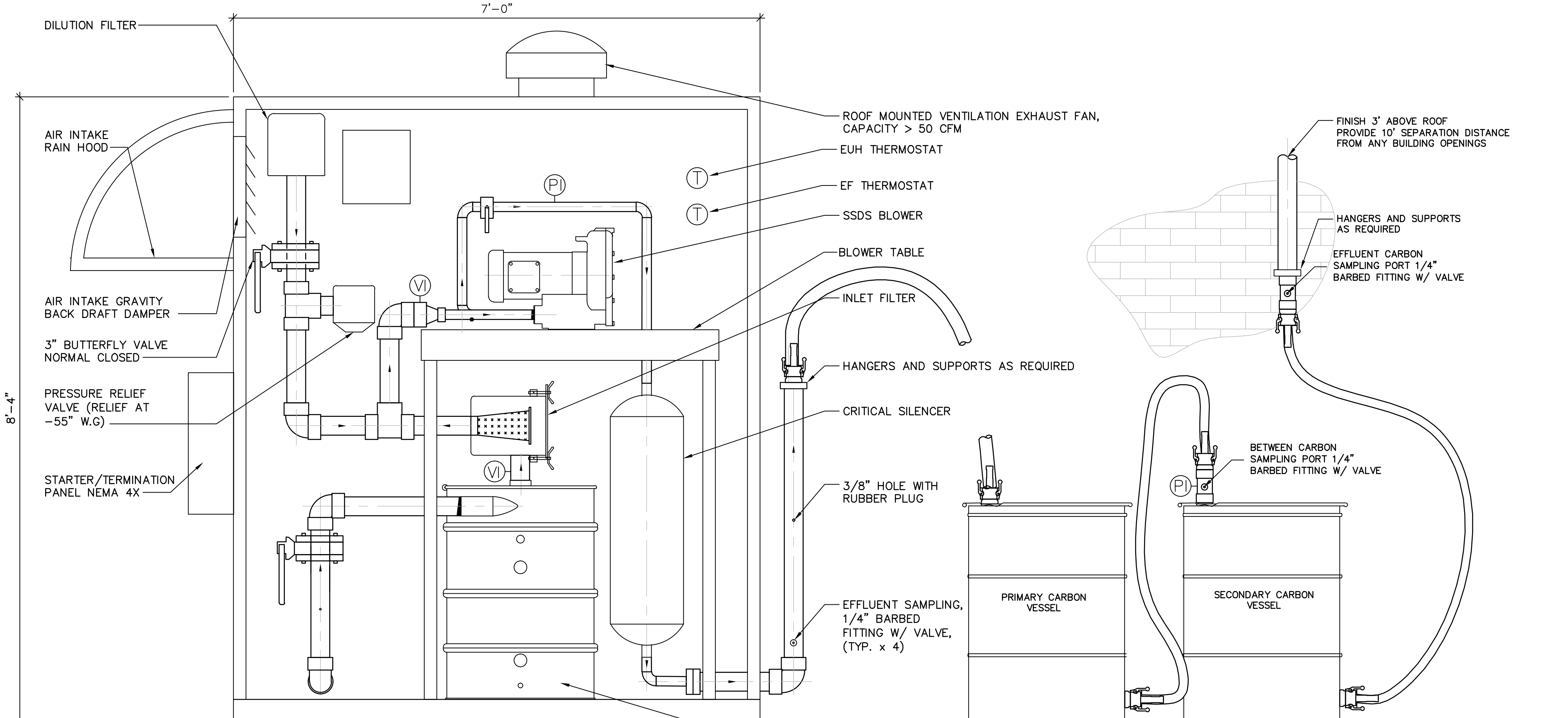
M-10

SHEET 10 OF 15



SSDS MITIGATION SYSTEM TYPE A PLAN VIEW

SCALE: NOT TO SCALE



SECTION 1 M11 M11

SCALE: NOT TO SCALE

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AS-BUILT DRAWINGS

DESIGNED BY: MRJ | DATE: APRIL 2009
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REVIEWED BY: - | DATE: -
APPROVED BY: - | DATE: -
FILE NAME: 2118136M011

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CORPS OF ENGINEERS
BALTIMORE DISTRICT
BALTIMORE, MARYLAND

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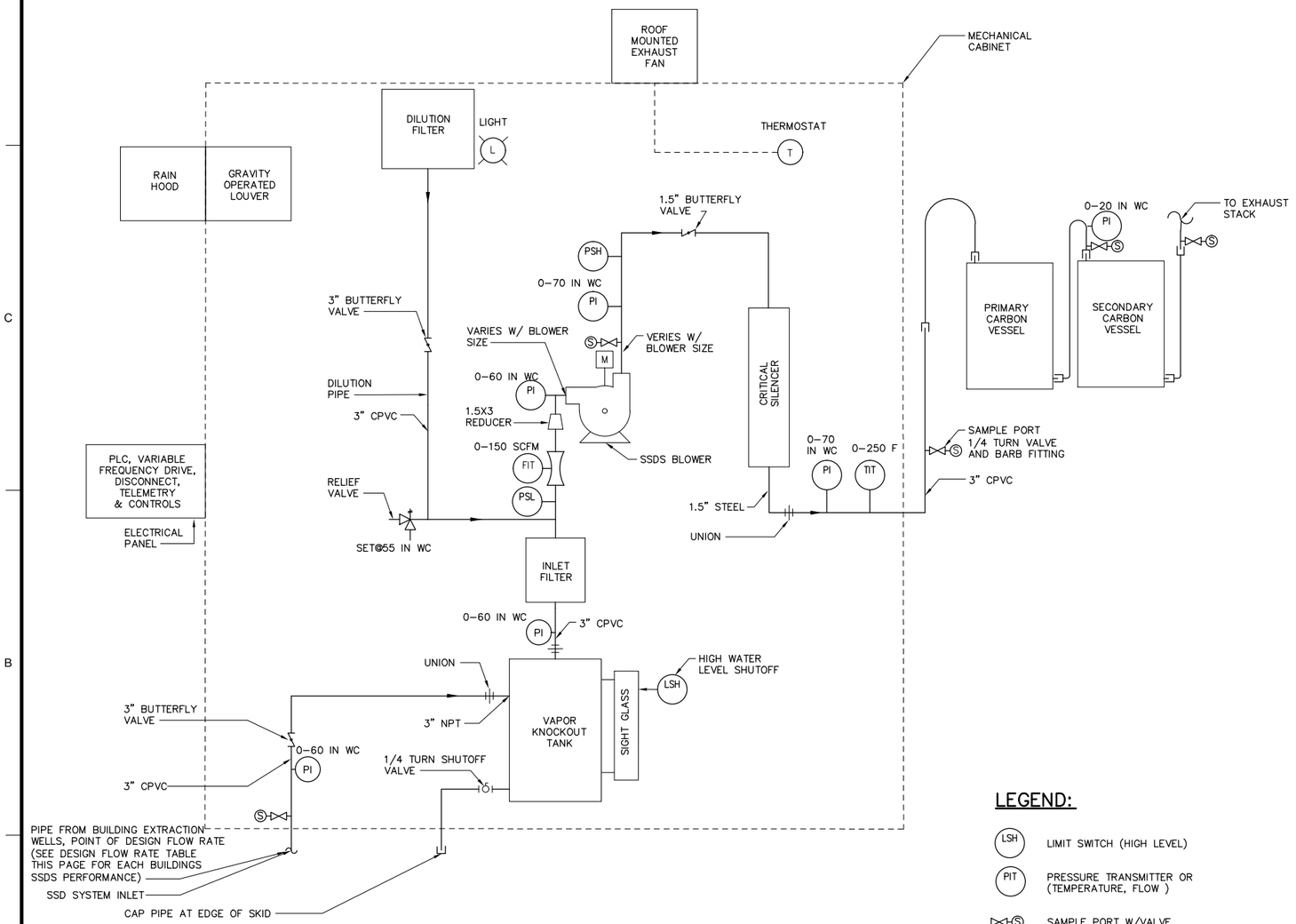
WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
SSD SYSTEM TYPE A
PLAN AND SECTION VIEW

M-11

SHEET 11 OF 15



SSD SYSTEM PROCESS PIPING DETAIL – TYPE A

NOT TO SCALE

LEGEND:

- LSH — LIMIT SWITCH (HIGH LEVEL)
- PIT — PRESSURE TRANSMITTER OR (TEMPERATURE, FLOW)
- SAMPLE PORT W/VALVE
- T — THERMOSTAT
- L — LIGHT
- PI — PRESSURE INDICATOR
- M — MOTORIZED
- VENTURI
- UNION

SPECIFICATIONS – TYPE A:

SSDS BLOWER:

1. TYPE: REGENERATIVE BLOWER
2. PRODUCT: AMETEK ROTRON MODEL NO. EN 454M, SEALED REGENERATIVE BLOWER W/ EXPLOSION–PROOF MOTOR, OR EQUAL.
3. ELECTRICAL: SEE ELECTRICAL SHEETS FOR VOLTAGE AND PHASE
4. PERFORMANCE: SEE DESIGN FLOW RATE TABLE BELOW. PERFORMANCE SHALL BE AT SSD SYSTEM INLET.
5. CONNECTION: FEMALE THREAD INLET AND OUTLET PORTS
6. ACCESSORIES: VAPOR KNOCKOUT TANK, INLET FILTER, PRESSURE GAUGES, VACUUM GAUGES & RELIEF VALVE, EXTERNAL CRITICAL SILENCER, AND VARIABLE FREQUENCY DRIVE PACKAGE.

DESIGN FLOW RATE		
BUILDINGS	DESIGN FLOW	DESIGN PRESSURE
	(SCFM)	(IN.WC)
21	105	–18
114	100	–22

VAPOR KNOCKOUT TANK:

1. TYPE: HIGH EFFICIENCY CYCLONIC
2. PRODUCT: AMETEK ROTRON MOISTURE SEPARATOR MODEL NO. MS200DS, OR EQUAL
3. SIGHT GLASS INDICATOR: LIQUID LEVEL INDICATOR – KROHNE BM26, AND STAINLESS STEEL GUIDE TUBE WITH FLAP INDICATOR AND EXPLOSION PROOF LIMIT SWITCH ADJUSTED FOR HIGH LEVEL ALARM. COORDINATE FLANGE MATERIAL AND MOUNTING WITH TANK
4. PERFORMANCE: CONTINUOUS OPERATION WITH A PRESSURE DROP OF LESS THAN 6 IN.WC AT THE RATED FLOW OF 200 SCFM
5. CAPACITY: LIQUID HOLDING CAPACITY 10 GALLONS
6. CONNECTION: 2 INCH INLET & 4.5 INCH OD OUTLET
7. MATERIAL: STEEL

INLET FILTER:

1. TYPE: DUAL CONNECTION REPLACEABLE MEDIA TYPE
2. PRODUCT: AMETEK ROTRON INLET FILTER MODEL NO. 515254, OR EQUAL
3. PERFORMANCE: 97–98% EFFICIENCY (8 TO 10 MICRON PARTICLE SIZE)
4. FILTER ELEMENT: REPLACEABLE: MODEL 516434
5. CONNECTION: 1.5 INCH NPSC INLET AND OUTLET
6. MATERIALS: HOUSING – STEEL, MEDIA – POLYESTER

CRITICAL SILENCER:

1. TYPE: CRITICAL SILENCER
2. PRODUCT: NELSON EXHAUST SILENCER SERIES 300, OR EQUAL
3. PERFORMANCE: REDUCE NOISE 25 dB, <12 IN.WC @ 100 SCFM
4. CONNECTION: 1.5 INCH NPT MALE INLET AND OUTLET
5. MATERIALS: STEEL

CARBON VESSELS:

1. TYPE: VAPOR PHASE GRANULAR ACTIVATED CARBON
2. PRODUCT: SIEMENS, WESTATES® COCONUT SHELL BASED GRANULAR ACTIVATED CARBON – VOCARB® 48C, OR EQUAL
3. SIZE: SEE CARBON SIZE CHART BELOW
4. MATERIAL: STEEL

CARBON VESSEL			
BUILDINGS	SIEMENS MOD. NO.	INLET/OUTLET	SHIPPING WT.
		(IN.)	(LBS)
21	VSC 200	2 NPT	250
114	VSC 400	4 NPT	480

MECHANICAL CABINET:

1. RATING: NEC CLASS 1 DIVISION 1 AREA
2. SIZE: 7 FT. LONG X 4 FT. WIDE X 8.33 FT TALL
3. MATERIAL: STEEL CONSTRUCTION
4. ACCESS: LOCKABLE STEEL DOUBLE DOORS
5. SOUND ATTENUATION: 55 dB @ 3 FT.
6. FAN: 6 ACH MIN.
7. ELECTRIC UNIT HEATER
8. FINISH: TWO COAT EPOXY COATED STEEL, COLOR FOREST GREEN

US Army Corps of Engineers®
BALTIMORE DISTRICT

MARK	DESCRIPTION	DATE	APPR.

DATE:.....

AS-BUILT DRAWINGS

APPROVED BY: - DATE: -

DESIGNED BY: MRJ DATE: APRIL 2009

DRAWN BY: TAL DATE: APRIL 2009

REVIEWED BY: - DATE: -

FILE NAME: 21181306M012

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
BALTIMORE DISTRICT
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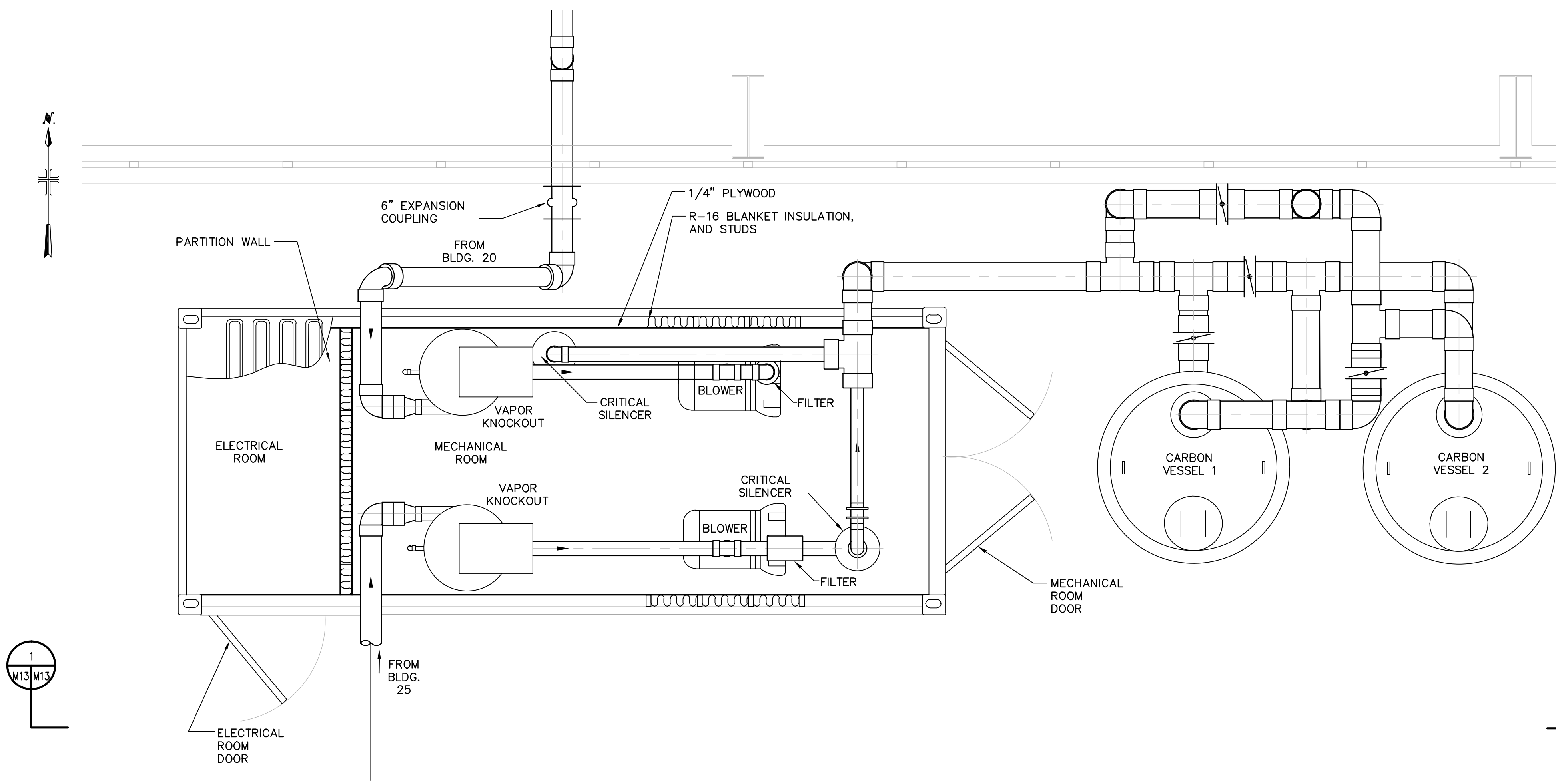
WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
SSD SYSTEM TYPE A
P&ID

M-12

SHEET 12 OF 15



BUILDING 20 AND 25 SSD SYSTEM PLAN VIEW

2 0 2
SCALE: 1/2" = 1'-0"

SPECIFICATIONS – TYPE B:

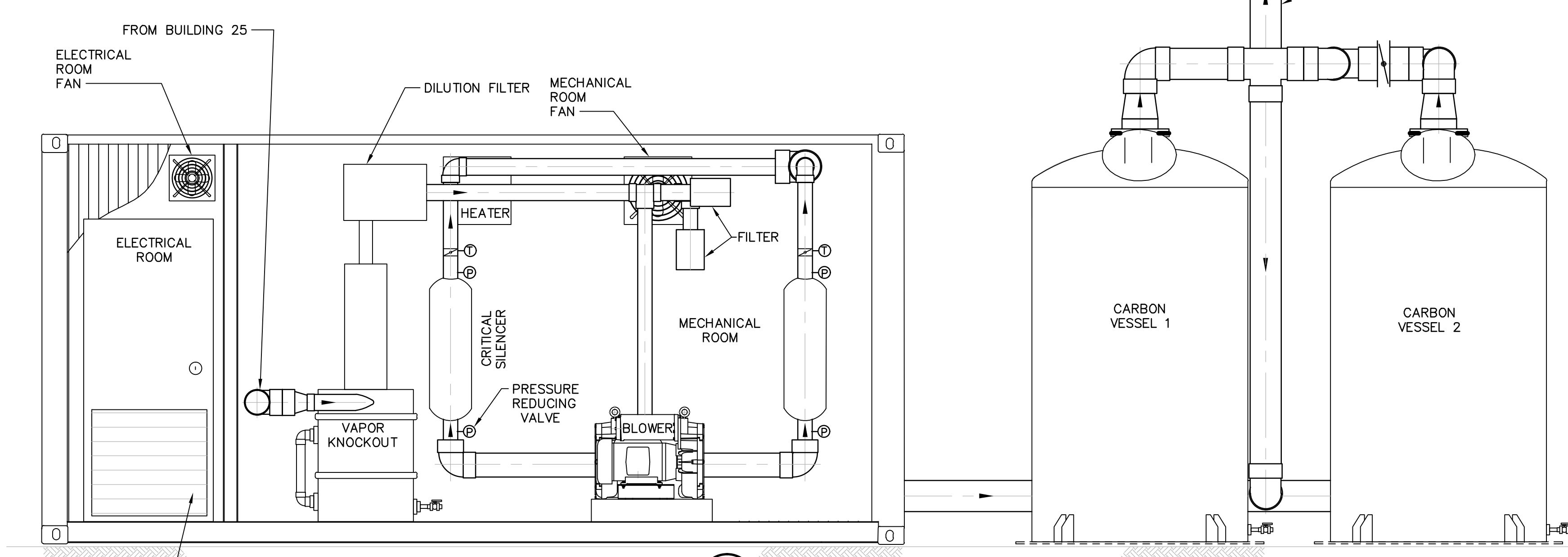
CARBON VESSELS:

1. TYPE: VAPOR PHASE GRANULAR ACTIVATED CARBON
2. SIZE: PROVIDE A MINIMUM OF 2 X 2000 LB CARBON VESSELS. VESSELS SHALL BE CAPABLE OF OPERATING IN SERIES AT A TOTAL MAXIMUM DESIGN FLOW OF 1000 CFM AND A MINIMUM DESIGN FLOW OF 300 CFM.
3. PRODUCT: SIEMANS WESTATES COCONUT SHELL BASED GRANUALR ACTIVATED CARBON – VOCARB 46C, OR EQUAL
4. PRESSURE LOSES AT MAXIMUM DESIGN FLOW OF 1000 CFM SHALL NOT EXCEED –15"W.C.
5. MATERIAL: STEEL
6. COATING: INTERIOR: EPOXY TWO COATS, THICKNESS: 10 MIL MIN COLOR: WHITE
   EXTERIOR:
   PRIMER COAT: EPOXY THICKNESS 4 MILS DFT MIN – COLOR: GRAY
   FINISH COAT: POLYURETHANE PROTECTIVE FINISH THICKNESS 3 MILS DFT MIN – COLOR: WHITE

CARBON VESSELS			
BUILDINGS	QTY.	DESIGN FLOW	INLET/OUTLET
		CFM	(IN.)
20 & 25	2	300–1000	10 FLG

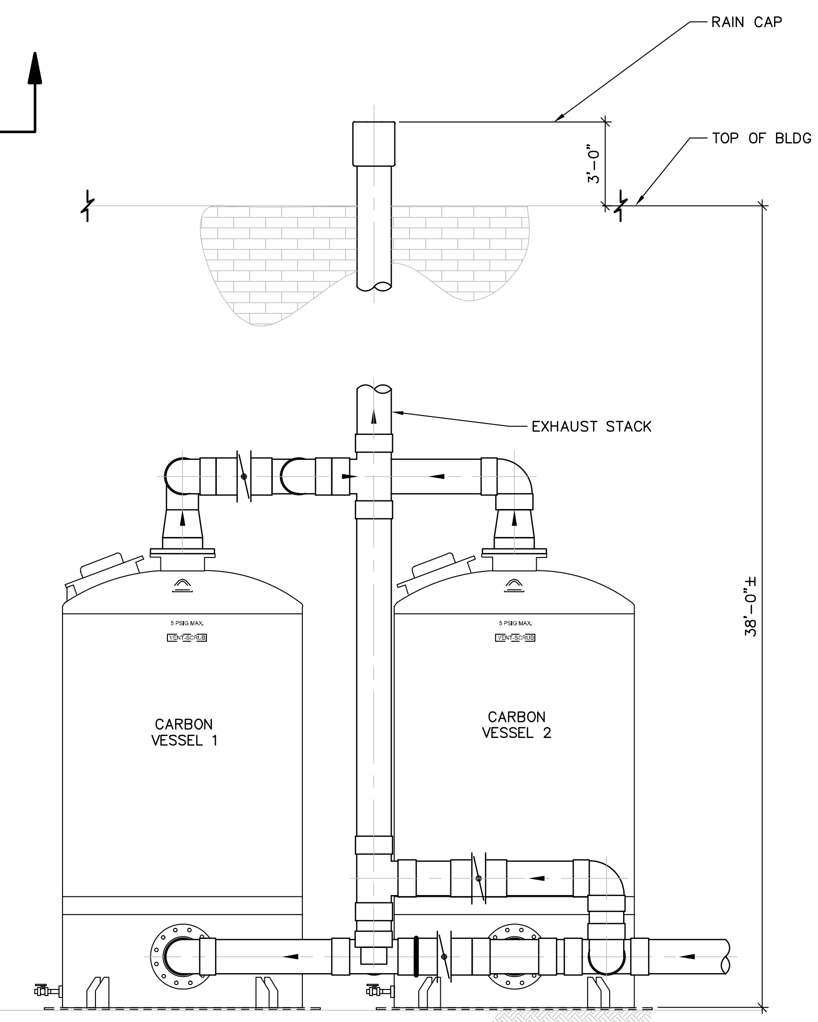
TREATMENT SYSTEM:

1. MECHANICAL ROOM: NEC CLASS 1 DIVISION 1 AREA
2. ELECTRICAL ROOM: NEC NON-RATED
3. SHIPPING CONTAINER SIZE: 20 FT. LONG X 8 FT–6 IN WIDE X 9 FT – 6 IN HIGH
4. MATERIAL: STEEL CONSTRUCTION
5. ACCESS: LOCKABLE STEEL DOORS
6. SOUND ATTENUATION: 55 dB @ 3 FT.
7. FAN: 6 ACH MIN.
8. ELECTRIC UNIT HEATER
9. FINISH: TWO COAT EPOXY COATED STEEL, COLOR FOREST GREEN



SECTION 1 M13 M13

2 0 2
SCALE: 1/2" = 1'-0"



SECTION 2 M13 M13

2 0 2
SCALE: 1/2" = 1'-0"

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MARK	DESCRIPTION	DATE	APPR.

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DESIGNED BY: MRJ DATE: APRIL 2009
DRAWN BY: TAL DATE: APRIL 2009
REVIEWED BY: - DATE: -
APPROVED BY: - DATE: -
FILE NAME: 2118136M013

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
BALTIMORE DISTRICT
BALTIMORE, MARYLAND

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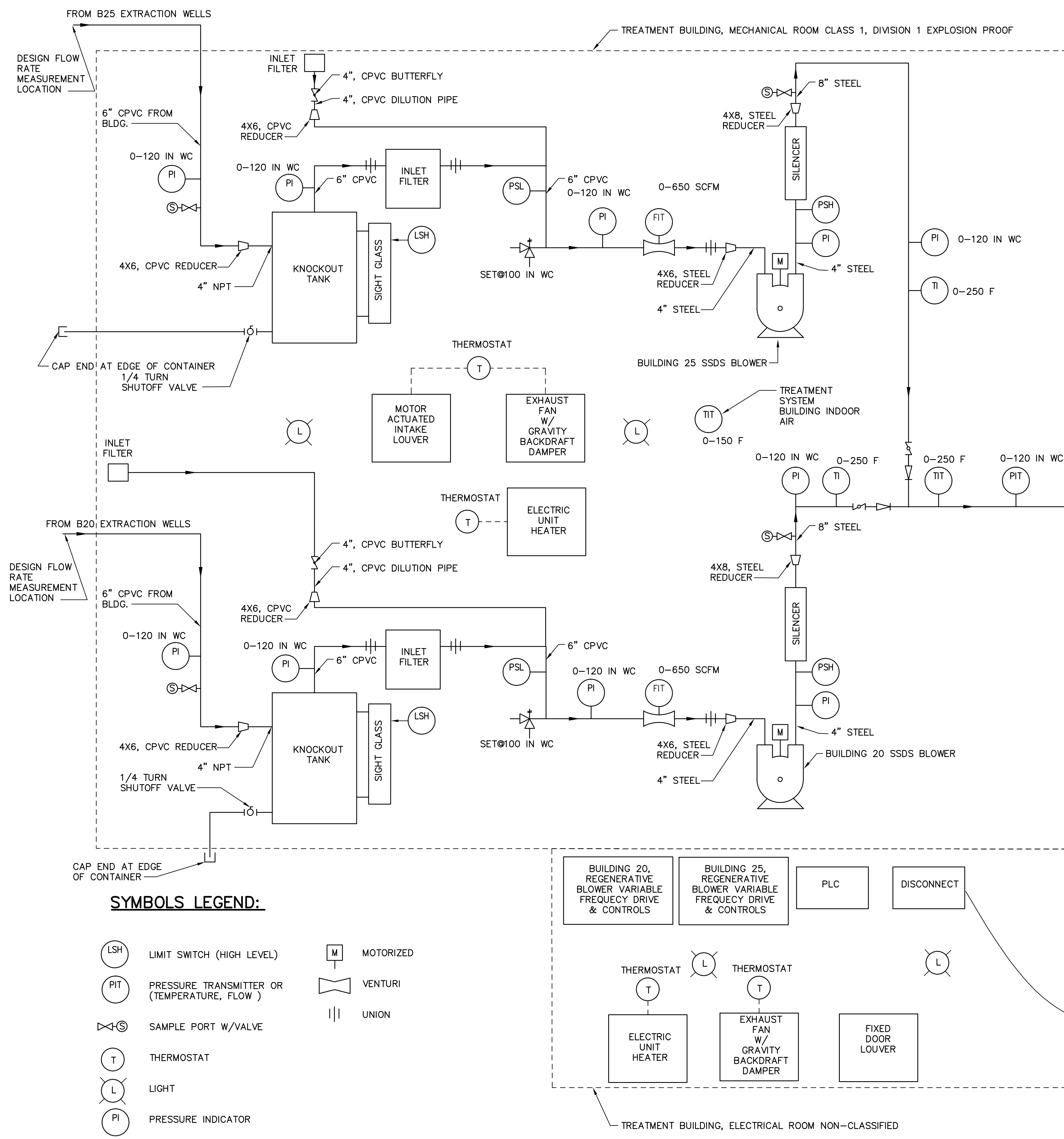
WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
SSD SYSTEM TYPE B
PLAN AND SECTION VIEW

M-13

SHEET 13 OF 15



SYMBOLS LEGEND:

LSH	LIMIT SWITCH (HIGH LEVEL)
PIT	PRESSURE TRANSMITTER OR (TEMPERATURE, FLOW)
S	SAMPLE PORT W/VALVE
T	THERMOSTAT
L	LIGHT
PI	PRESSURE INDICATOR
M	MOTORIZED
	VENTURI
	UNION

SPECIFICATIONS – TYPE B:

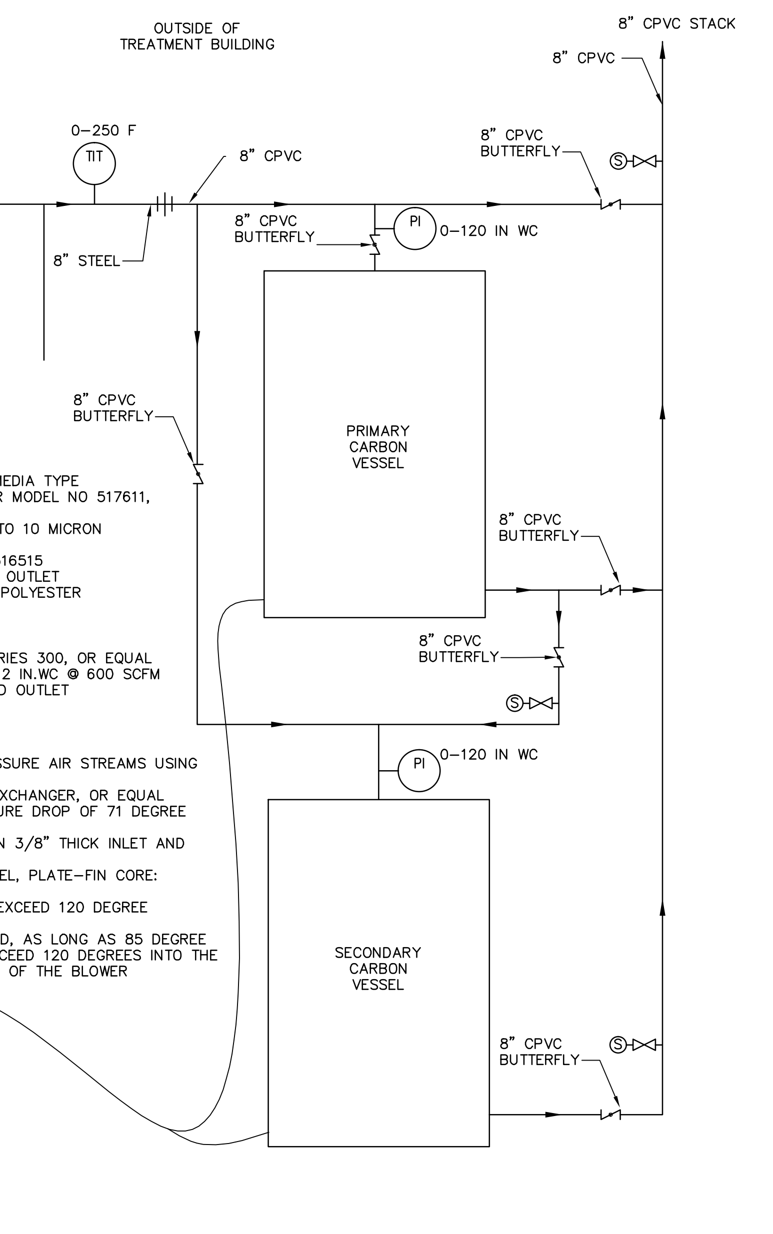
SSDS BLOWER:

1. TYPE: REGENERATIVE TYPE OR POSSITIVE DISPLACEMENT TYPE BLOWER ARE ACCEPTABLE
2. REGENERATIVE TYPE: AMETECK ROTRON MODEL OR POSSITIVE DISPLACEMENT: GARDNER DENVER SUITOR BUILT
3. ELECTRICAL: SEE ELECTRICAL DRAWINGS FOR VOLTAGE AND PHASE
4. PERFORMANCE: SEE BLOWER DESIGN FLOW RATE TABLE BELOW. DESIGN FLOW RATE SHALL BE AT THE INLET TO THE SSDS SYSTEM.
5. CONNECTION: 4" – 8 NPSC FEMALE THREAD INLET AND OUTLET PORTS
6. ACCESSORIES: VAPOR KNOCKOUT TANK, INLET FILTER, PRESSURE GAUGES, VACUUM GAUGES & RELIEF VALVE, EXTERNAL CRITICAL SILENCER, AND VARIABLE FREQUENCY DRIVE PACKAGE.

BLOWER DESIGN FLOW RATE		
BUILDINGS	DESIGN FLOW	DESIGN VACCUM
	(SCFM)	(IN.WC)
20	360	–70
25	450	–50

VAPOR KNOCKOUT TANK:

1. TYPE: HIGH EFFICIENCY CYCLONIC
2. PRODUCT: AMETEK ROTRON MOISTURE SEPARATOR MODEL NO. MS600BSM, OR EQUAL.
3. SIGHT GLASS INDICATOR: LIQUID LEVEL INDICATOR – KROHNE BM26, AND STAINLESS STEEL GUIDE TUBE WITH FLAP INDICATOR AND EXPLOSION PROOF LIMIT SWITCH ADJUSTED FOR HIGH LEVEL ALARM.COORDINATE FLANGE MATERIAL AND MOUNTING WITH TANK.
4. PERFORMANCE: CONTINUOUS OPERATION WITH A PRESSURE DROP OF LESS THAN 6 IN.WC AT THE RATED FLOW OF 200 SCFM
5. CAPACITY: LIQUID HOLDING CAPACITY 40 GALLONS
6. CONNECTION: 4 INCH INLET & 6.63 INCH ID OUTLET
7. MATERIAL: STEEL



INLET FILTER:

1. TYPE: DUAL CONNECTION REPLACEABLE MEDIA TYPE
2. PRODUCT: AMETECK ROTRON INLET FILTER MODEL NO 517611, OR EQUAL
3. PERFORMANCE: 97–98% EFFICIENCY (8 TO 10 MICRON PARTICLE SIZE)
4. FILTER ELEMENT: REPLACEABLE: MODEL 516515
5. CONNECTION: 6 INCH NPT–M INLET AND OUTLET
6. MATERIALS: HOUSING – STEEL, MEDIA – POLYESTER

CRITICAL SILENCER:

1. TYPE: CRITICAL SILENCER
2. PRODUCT: NELSON EXHAUST SILENCER SERIES 300, OR EQUAL
3. PERFORMANCE: REDUCE NOISE 25 dB, <12 IN.WC @ 600 SCFM
4. CONNECTION: 4 INCH NPT MALE INLET AND OUTLET
5. MATERIALS: STEEL

HEAT EXCHANGER:

1. TYPE: HEAT EXCHANGER COOL LOW PRESSURE AIR STREAMS USING FAN–DRAFTED AMBIENT AIR.
2. PRODUCT: XCHANGER AA SERIES HEAT EXCHANGER, OR EQUAL
3. PERFORMANCE: 1300 SCFM @ TEMPERATURE DROP OF 71 DEGREE FAHRENHEIT
4. CONNECTION:10 IN. 150 LB ANSI PATTERN 3/8" THICK INLET AND OUTLET
5. MATERIALS: FAN HOOD: GALVANIZED STEEL, PLATE–FIN CORE: ALUMINUM
6. PROCESS AIR INTO CARBON SHALL NOT EXCEED 120 DEGREE FAHRENHEIT.
7. NO HEAT EXCHANGER SHALL BE REQUIRED, AS LONG AS 85 DEGREE FAH. SUB–SLAB INLET AIR DOES NOT EXCEED 120 DEGREES INTO THE CARBON DUE TO THE TEMPERATURE RISE OF THE BLOWER

US Army Corps of Engineers® BALTIMORE DISTRICT

MARK	DESCRIPTION	DATE	APPR.

DATE:

AS-BUILT DRAWINGS

DESIGNED BY: MRJ DATE: APRIL 2009
DRAWN BY: TAL DATE: APRIL 2009
REVIEWED BY: - DATE: -
APPROVED BY: - DATE: -
FILE NAME: 2118136M014

U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS BALTIMORE DISTRICT BALITMORE, MARYLAND

MALCOLM PIRNIE
MALCOLM PIRNIE, INC. 855 ROUTE 146, SUITE 210 CLIFTON PARK, NEW YORK 12065
24GA27971200

WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL
SSD SYSTEM TYPE B
P&ID

M-14

SHEET 14 OF 15

XREFS:I:\ACAD\PROJ\2118136\Contract Drawings\AS BUILT\XREF\2118136-TB.dwg IMAGES:None
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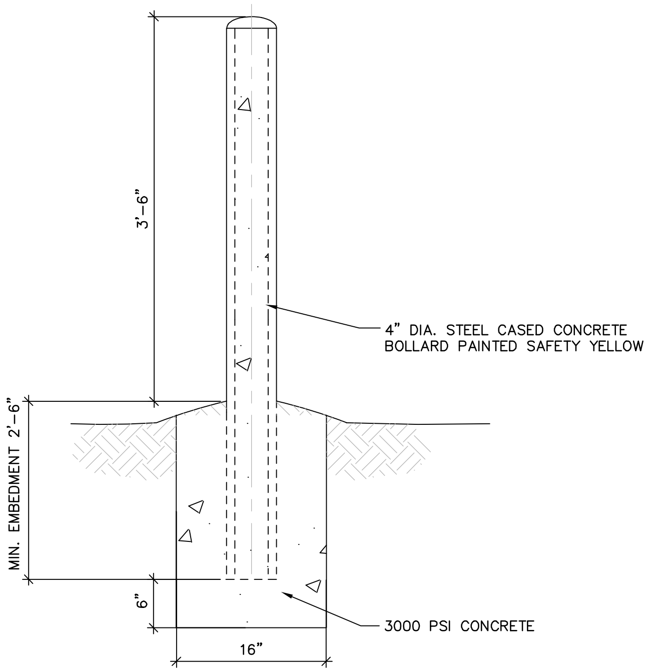
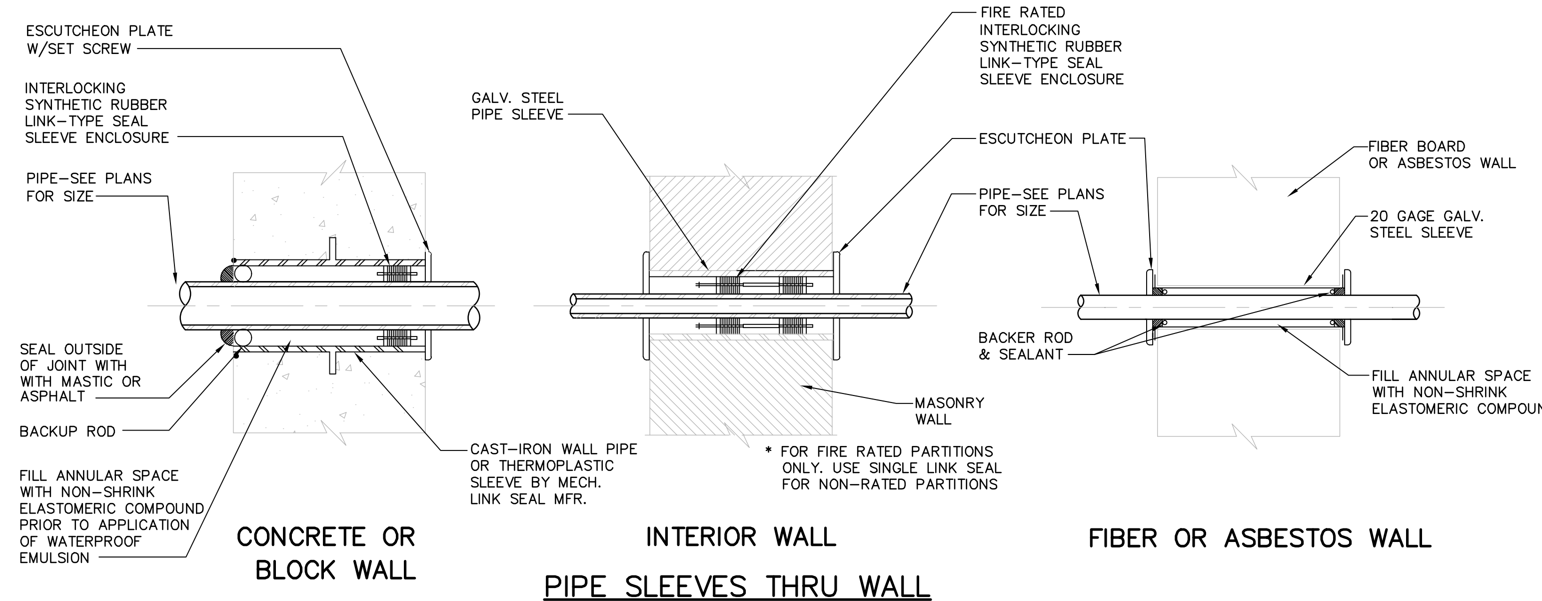
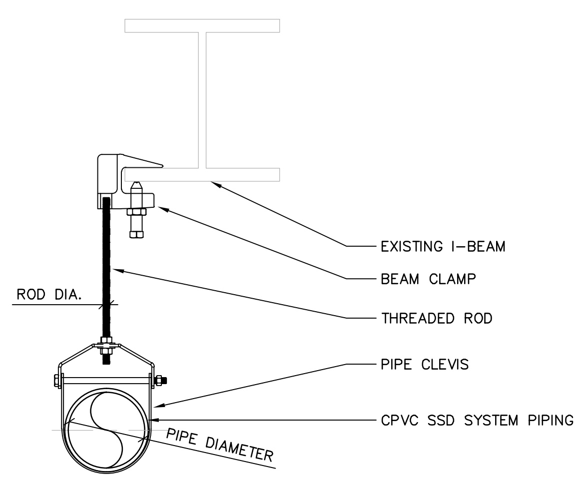


BOLLARD DETAIL
NOT TO SCALE

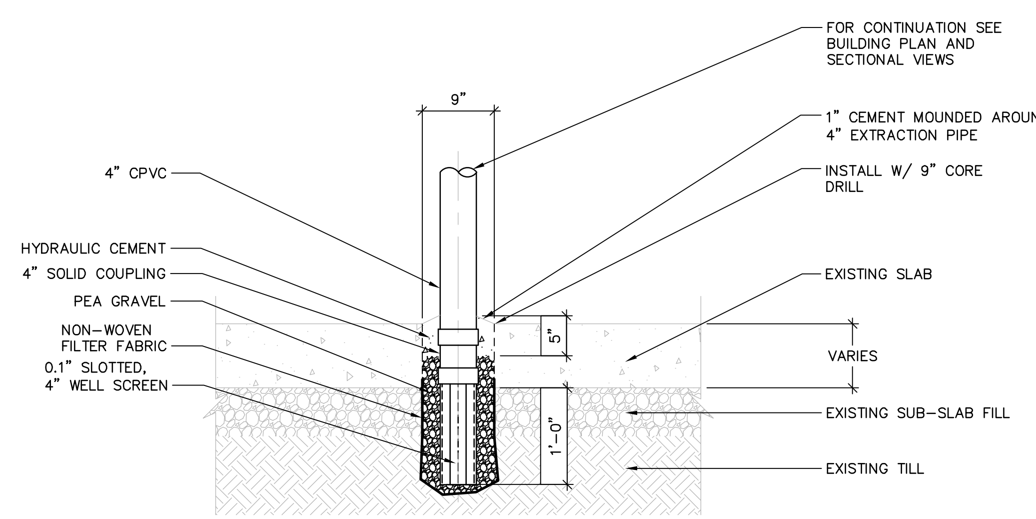


PIPE SLEEVES THRU WALL
NOT TO SCALE

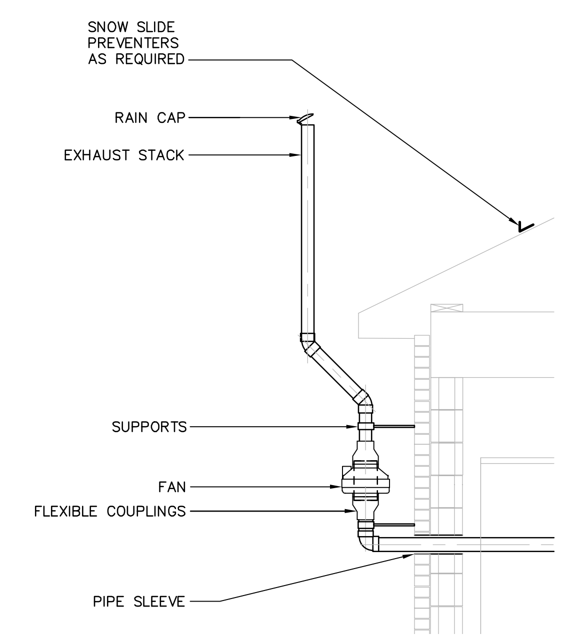


PIPE HANGER DETAIL
NOT TO SCALE

PIPE HANGER SCHEDULE			
PIPE DIAMETER	SPACING	ROD DIA.	CLAMP AND CLEVIS LOAD.
(INCH)	MIN. (FEET)	MIN. (INCH)	MIN. (POUND)
3	8	1/4	150
4	8	1/4	150
6	8	3/8	250
8	8	3/8	250



SUB-SLAB EXTRACTION WELL DETAIL
NOT TO SCALE



SSD SYSTEM – TYPE C DETAIL
NOT TO SCALE

SPECIFICATIONS – TYPE C:

1. TYPE: INLINE RADON MITIGATION FAN
2. PRODUCT: FANTECH MODEL NO. HP 220
3. PERFORMANCE DATA: 58 CFM @ 1.5 IN.WC
4. CONNECTIONS: 6 1/4 IN. OD INLET AND OUTLET
5. ELECTRICAL: 115V, 85 –152 WATTS

US Army Corps of Engineers® BALTIMORE DISTRICT

MARK | DESCRIPTION | DATE | APPR.

DATE:

AS-BUILT DRAWINGS
DESIGNED BY: MRJ DATE: APRIL 2009
DRAWN BY: TAL DATE: APRIL 2009
REVIEWED BY: - DATE: -
APPROVED BY: - DATE: -
FILE NAME: 2118136M015

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CORPS OF ENGINEERS
BALTIMORE DISTRICT
BALITMORE, MARYLAND

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WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

MECHANICAL DETAILS

M-15
SHEET 15 OF 15

XREFS:I:\ACAD\PROJ\2118136\Contract Drawings\60% SUBMISSION\XREF\BASE-MAP.dwg I:\ACAD\PROJ\2118136\Contract Drawings\60% SUBMISSION\XREF\2118-B15.dwg I:\ACAD\PROJ\2118136\Contract Drawings\AS BUILT\XREF\2118136-TB.dwg IMAGES:None
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SYMBOLS AND LEGEND:

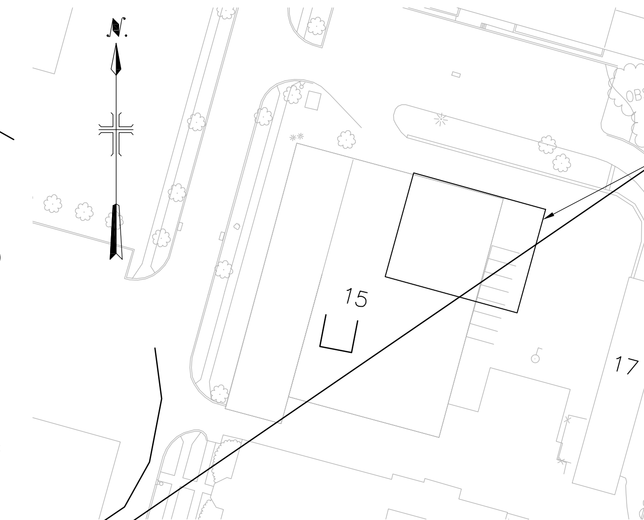
- S — POWER ON-OFF SNAP SWITCH, 2 POLE, 240 VOLTS, 20A
- PUSH-BUTTON STATION WITH LOCK-OUT FEATURE
- F 60/40 — DISCONNECT SWITCH – 480V 3POLE UNFUSED OR FUSED UNLESS OTHERWISE NOTED. F DENOTES FUSING, ONLY WHERE INDICATED. FIRST NUMBER DENOTES SWITCH AMP RATING. SECOND NUMBER DENOTES FUSE SIZE WHEN PROVIDED.
- J OR J — JUNCTION BOX; SIZE AS REQUIRED BY N.E.C.
- T OR T — TERMINAL BOX; SIZE AS REQUIRED BY N.E.C. AND TO ACCOMODATE ALL TERMINATIONS ON TERMINAL BLOCKS. TERMINATIONS TO INCLUDE SPARE WIRING.
- M 5 — ELECTRIC MOTOR (NUMBER INDICATES HORSEPOWER).
- I-2 GF/WP — DUPLEX CONVENIENCE RECEPTACLE, 2 POLE, 3 WIRE, 120 VOLTS A.C. 20 AMP RECEPTACLE DESIGNATIONS, FIRST NUMBER DENOTES PANEL, SECOND NUMBER DENOTES CIRCUIT NUMBER. GF-DENOTES GROUND FAULT TYPE. WP-DENOTES WEATHERPROOF "WHILE IN USE" ENCLOSURE
- INDICATES NEW EQUIPMENT/EXPOSED CONDUIT
- INDICATES EXISTING EQUIPMENT/CONDUIT
- INDICATES CONCEALED OR UNDERGROUND EQUIPMENT/CONDUIT
- GROUND ROD
- GROUND GRID CABLE CONNECTION
- GROUND
- #4 AWG GROUND CABLE BURIED 2'-6" BELOW FINISHED GRADE
- LP1-2, J, 10 — LETTERS AND NUMBERS INDICATE PANEL AND CIRCUIT NUMBER (LP1-2). CROSS LINES INDICATE NUMBER OF CONDUCTORS. HALF HASH MARKS INDICATES NEUTRAL. NUMBER (10) DENOTES WIRE SIZE WHEN NOT #12 AWG. CONTINUE CONDUIT AND WIRE RUN FROM BOX TO DEVICE IN ROOM OR AREA AS NOTED BY BRANCH CIRCUIT NUMBER. #10 AWG WIRING SHALL BE USED FOR RUNS BETWEEN PANEL AND FIRST LIGHTING FIXTURE OR RECEPTACLE EXCEEDING 50 FEET, UNLESS OTHERWISE NOTED ON DRAWING.
- INDICATES GROUND CONDUCTOR

INSTRUMENTS:

- PS 123 — INSTRUMENT DEVICE: LETTERS IDENTIFY DEVICE FUNCTION, NUMBERS WHERE INDICATED DENOTE LOOP NUMBER
- PC — PRESSURE CONTROLLER
- PS — PRESSURE SWITCH (PSH DENOTES PRESSURE SWITCH HIGH AND PSL DENOTES PRESSURE LOW)
- TS — TEMPERATURE SWITCH (TSH DENOTES TEMPERATURE SWITCH HIGH AND TSL DENOTES TEMPERATURE SWITCH LOW)
- LS — LEVEL SWITCH (LSH DENOTES LEVEL SWITCH HIGH AND LSL DENOTES LEVEL SWITCH LOW. LE DENOTES LEVEL ELEMENT)
- VS — VIBRATION SWITCH (VE INDICATES VIBRATION ELEMENT)

NOTES:

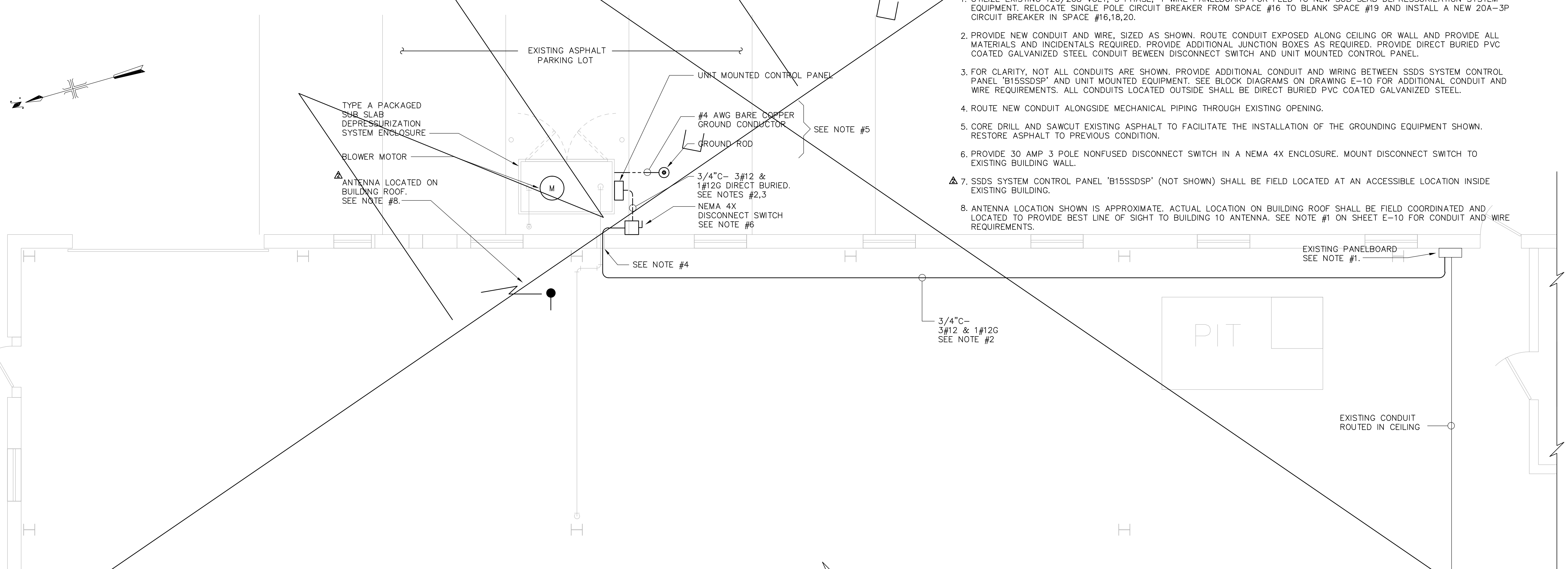
1. ALL MATERIALS AND EQUIPMENT SHALL CONFORM TO THE AREA CLASSIFICATION REQUIREMENTS NOTED. ALL OUTDOOR AREAS ARE CORROSIVE LOCATIONS. ALL INDOOR AREAS WITHIN THE BUILDINGS ARE DUSTY LOCATIONS. TYPE B SYSTEM MECHANICAL ROOM IS A HAZARDOUS CLASS 1 DIVISION 1 LOCATION AND ELECTRIC ROOM IS A DUSTY LOCATION. MATERIALS AND EQUIPMENT SHALL MEET NEC AND NEMA REQUIREMENTS IN ACCORDANCE WITH THE FOLLOWING:
   A: CORROSIVE LOCATIONS: NEMA 4X
   B: DUSTY LOCATIONS: NEMA 12
   C: HAZARDOUS LOCATIONS: NEMA 7
2. ALL CONDUIT ROUTING SHOWN ON THE PLAN DRAWINGS IS DIAGRAMMATIC. ACTUAL ROUTING AND LOCATION OF CONDUITS SHALL BE ESTABLISHED BY THE CONTRACTOR IN THE FIELD.



BUILDING 15
PLAN VIEW
NOT TO SCALE

NOTES:

1. UTILIZE EXISTING 120/208 VOLT, 3 PHASE, 4 WIRE PANELBOARD FOR FEED TO NEW SUB SLAB DEPRESSURIZATION SYSTEM EQUIPMENT. RELOCATE SINGLE POLE CIRCUIT BREAKER FROM SPACE #16 TO BLANK SPACE #19 AND INSTALL A NEW 20A-3P CIRCUIT BREAKER IN SPACE #16,18,20.
2. PROVIDE NEW CONDUIT AND WIRE, SIZED AS SHOWN. ROUTE CONDUIT EXPOSED ALONG CEILING OR WALL AND PROVIDE ALL MATERIALS AND INCIDENTALS REQUIRED. PROVIDE ADDITIONAL JUNCTION BOXES AS REQUIRED. PROVIDE DIRECT BURIED PVC COATED GALVANIZED STEEL CONDUIT BEWEEN DISCONNECT SWITCH AND UNIT MOUNTED CONTROL PANEL.
3. FOR CLARITY, NOT ALL CONDUITS ARE SHOWN. PROVIDE ADDITIONAL CONDUIT AND WIRING BETWEEN SSDS SYSTEM CONTROL PANEL 'B15SSDSP' AND UNIT MOUNTED EQUIPMENT. SEE BLOCK DIAGRAMS ON DRAWING E-10 FOR ADDITIONAL CONDUIT AND WIRE REQUIREMENTS. ALL CONDUITS LOCATED OUTSIDE SHALL BE DIRECT BURIED PVC COATED GALVANIZED STEEL.
4. ROUTE NEW CONDUIT ALONGSIDE MECHANICAL PIPING THROUGH EXISTING OPENING.
5. CORE DRILL AND SAWCUT EXISTING ASPHALT TO FACILITATE THE INSTALLATION OF THE GROUNDING EQUIPMENT SHOWN. RESTORE ASPHALT TO PREVIOUS CONDITION.
6. PROVIDE 30 AMP 3 POLE NONFUSED DISCONNECT SWITCH IN A NEMA 4X ENCLOSURE. MOUNT DISCONNECT SWITCH TO EXISTING BUILDING WALL.
7. (2) SSDS SYSTEM CONTROL PANEL 'B15SSDSP' (NOT SHOWN) SHALL BE FIELD LOCATED AT AN ACCESSIBLE LOCATION INSIDE EXISTING BUILDING.
8. ANTENNA LOCATION SHOWN IS APPROXIMATE. ACTUAL LOCATION ON BUILDING ROOF SHALL BE FIELD COORDINATED AND LOCATED TO PROVIDE BEST LINE OF SIGHT TO BUILDING 10 ANTENNA. SEE NOTE #1 ON SHEET E-10 FOR CONDUIT AND WIRE REQUIREMENTS.



BUILDING 15
PARTIAL PLAN VIEW

2 0 6
SCALE: 1/4" = 1'-0"

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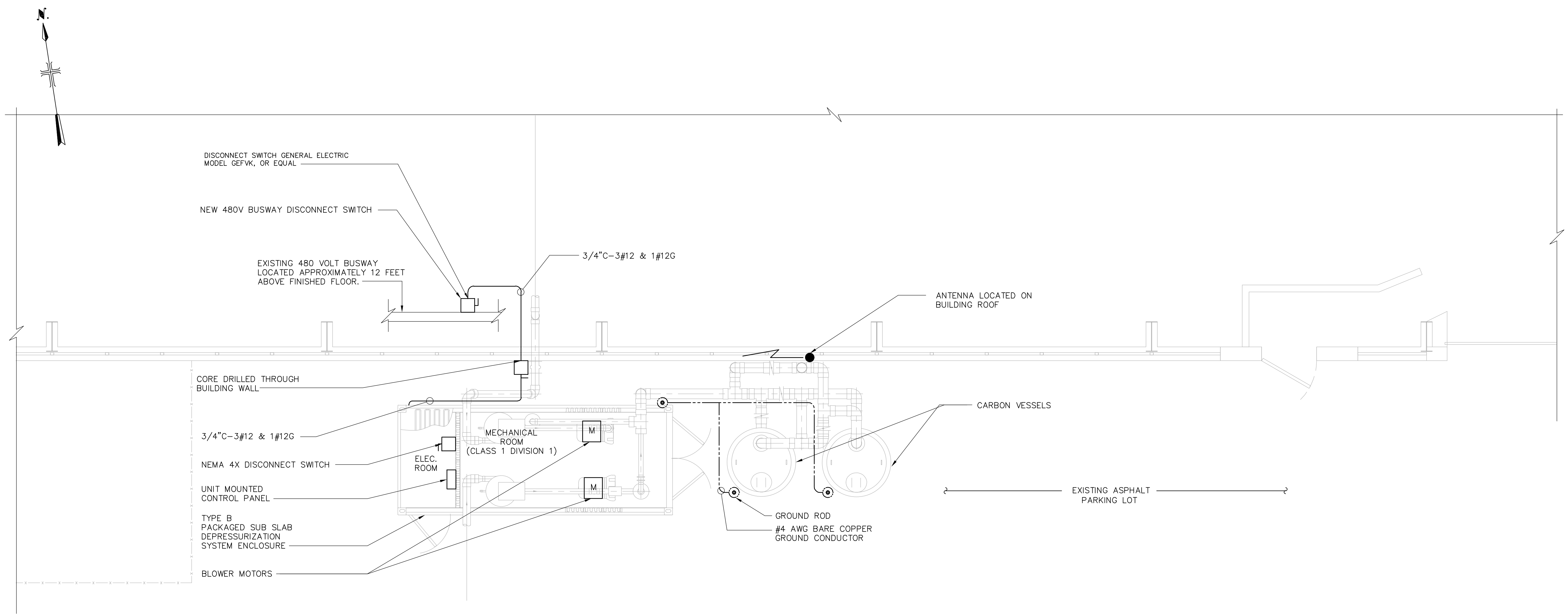
VAPOR INTRUSION MITIGATION

ELECTRICAL
BUILDING 15
PLAN VIEW

E-1

SHEET 1 OF 10

BUILDING 20
PLAN VIEW
NOT TO SCALE



BUILDING 20
PLAN VIEW

2 0 6
SCALE: 1/4" = 1'–0"

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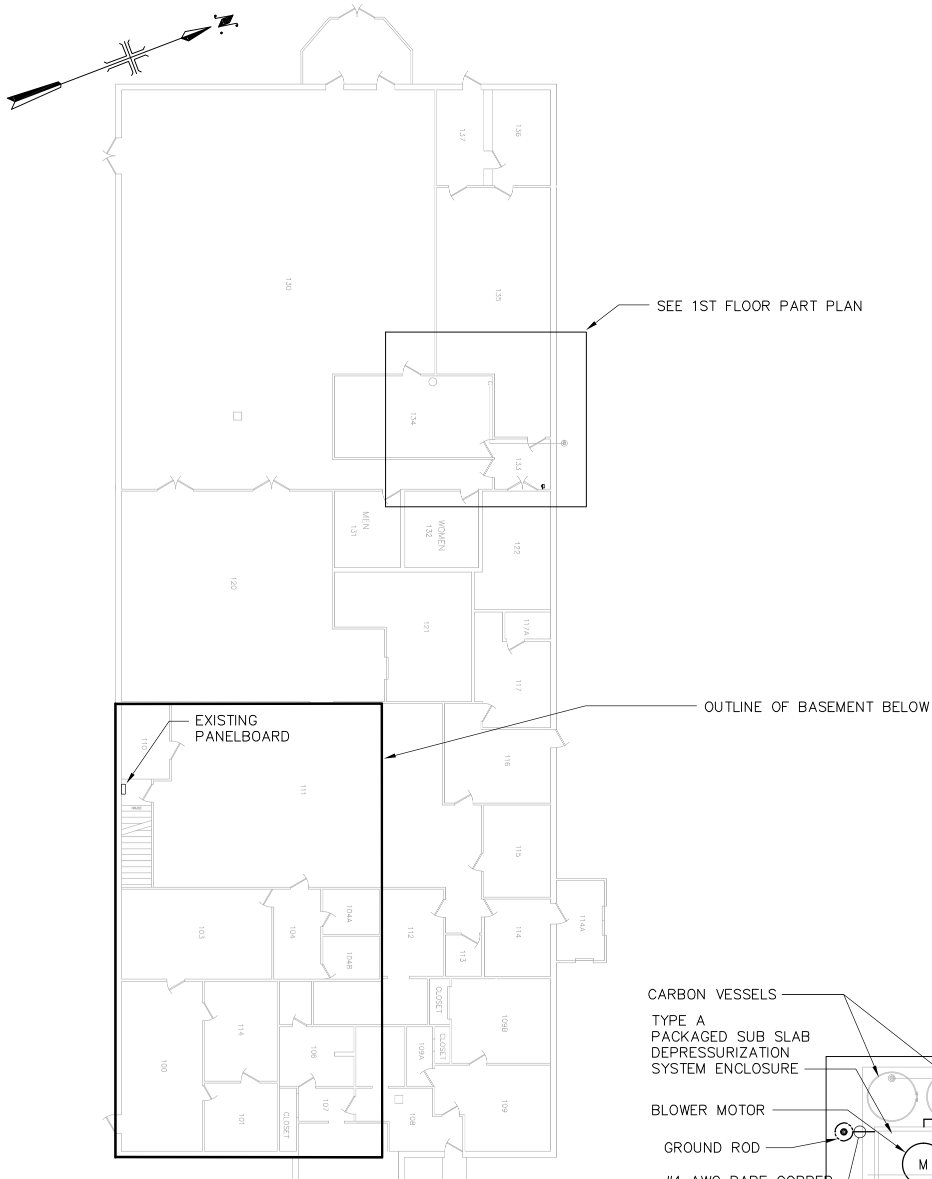
ELECTRICAL
BUILDING 20
PLAN AND SECTION VIEW

E-2

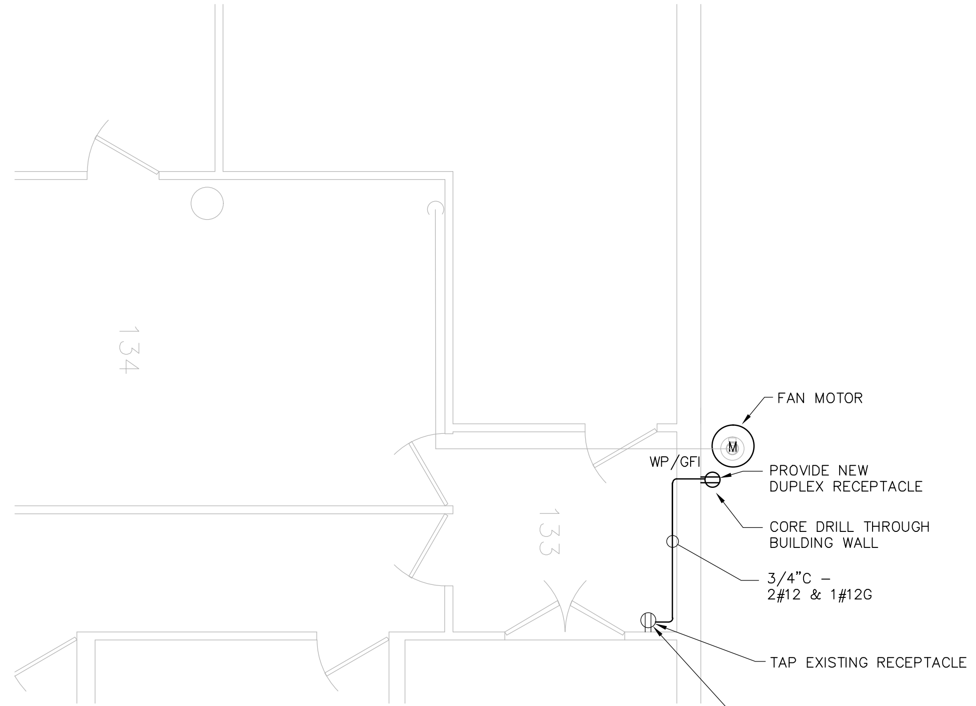
SHEET 2 OF 10

XREFS:I:\ACAD\PROJ\2118136\Contract Drawings\60% SUBMISSION\XREF\BASE-MAP.dwg I:\ACAD\PROJ\2118136\Contract Drawings\60% SUBMISSION\XREF\bldg 21.dwg I:\ACAD\PROJ\2118136\Contract Drawings\60% SUBMISSION\XREF\bldg 21 basement.dwg I:\ACAD\PROJ\2118136\Contract Drawings\AS BUILT\XREF\2118136-TB.dwg IMAGES:None
User:Lewandowski Spec:PIRNIE STANDARD File:I:\ACAD\PROJ\2118136\Contract Drawings\AS BUILT\ELEC\2118E003.DWG Scale:1:1 Date:09/01/2010 Time:10:14 Layout:E3



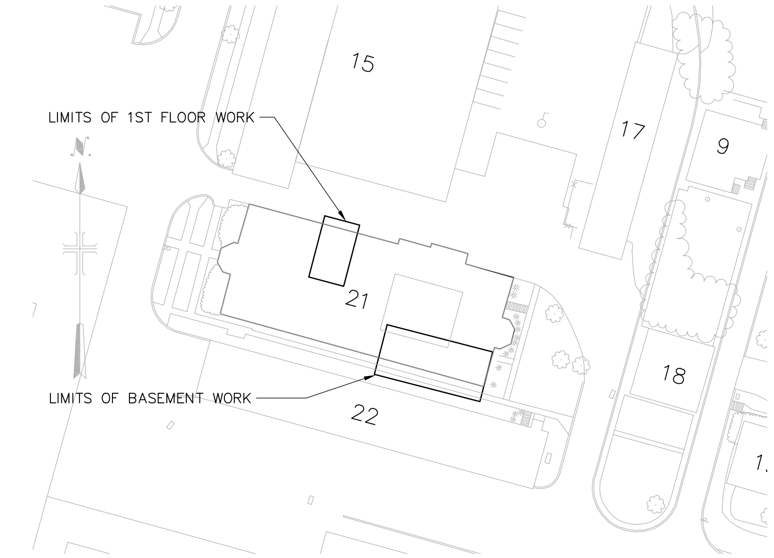
BUILDING 21 – 1ST FLOOR PLAN VIEW

SCALE: 1/16" = 1'–0"



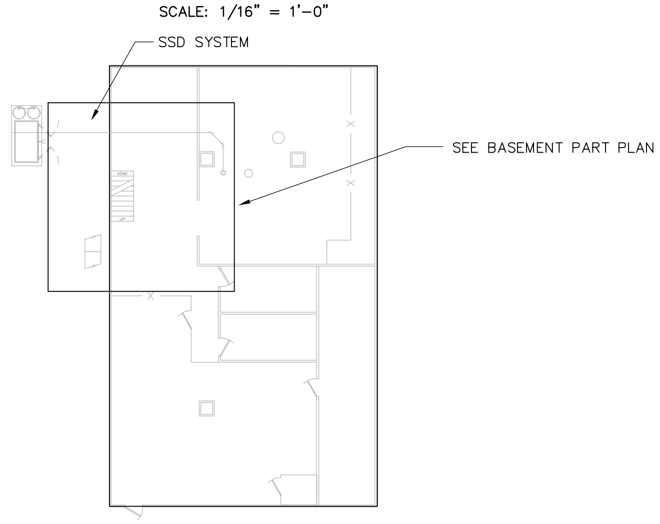
BUILDING 21 – 1ST FLOOR PART PLAN

SCALE: 1/4" = 1'–0"



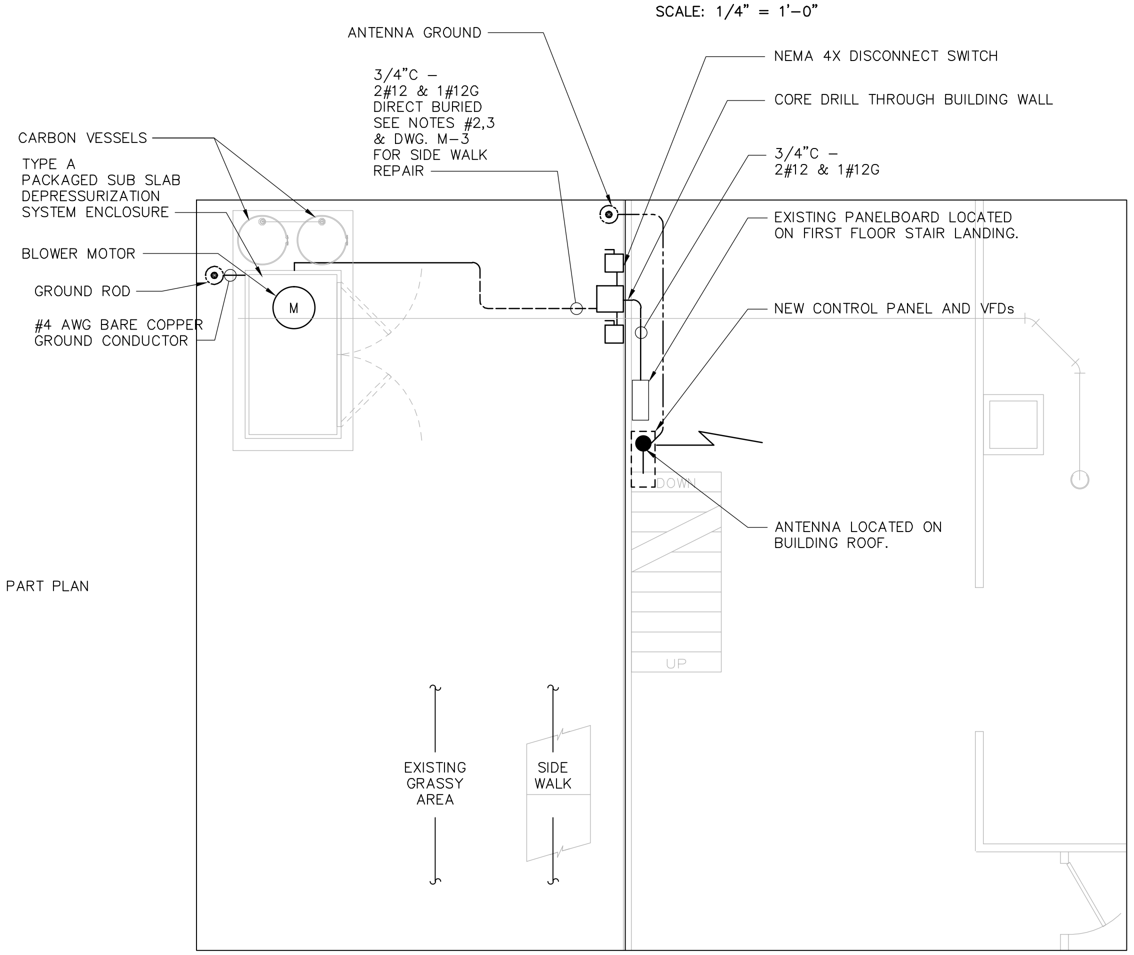
BUILDING 21 PLAN VIEW

NOT TO SCALE



BUILDING 21 – BASEMENT PLAN VIEW

SCALE: 1/16" = 1'–0"



BUILDING 21 – BASEMENT PART PLAN

SCALE: 1/4" = 1'–0"

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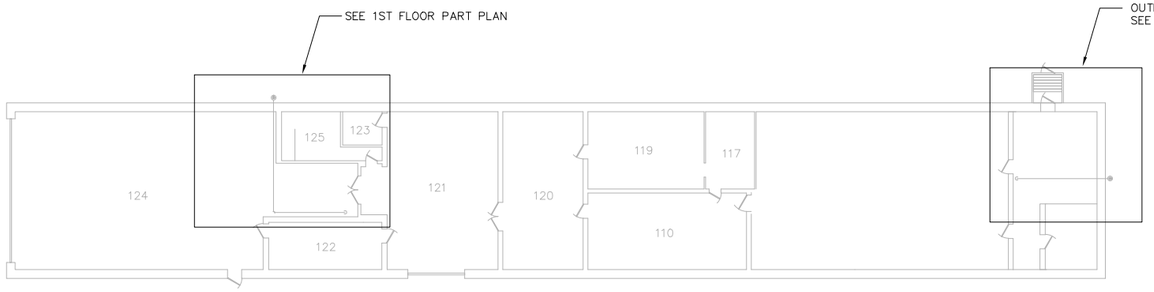
VAPOR INTRUSION MITIGATION

ELECTRICAL
BUILDING 21
PLAN AND SECTION VIEW

E-3

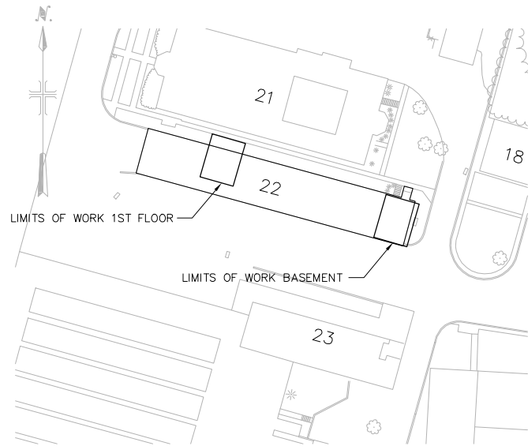
SHEET 3 OF 10



BUILDING 22 – 1ST FLOOR PLAN VIEW

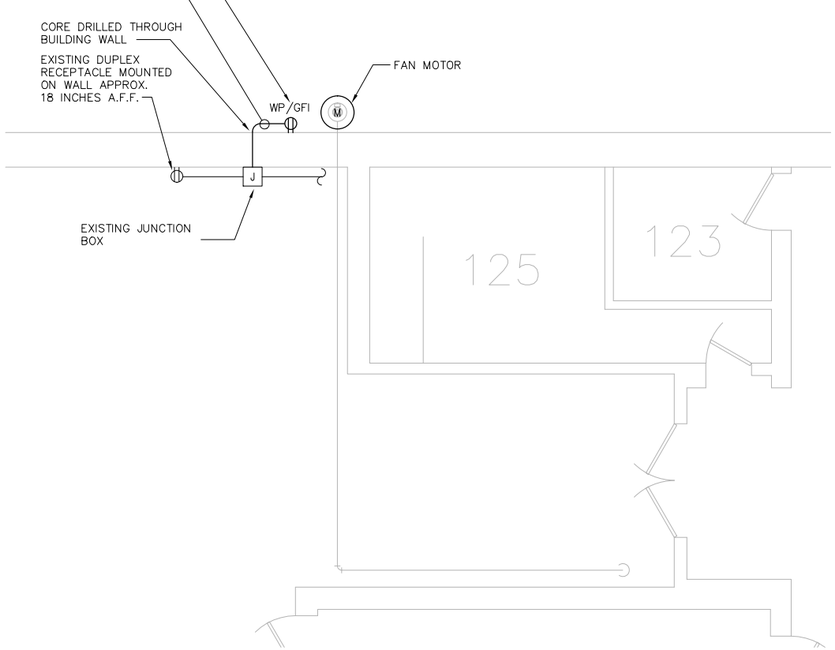
8 0 8 16

SCALE: 1/16" = 1'-0"



BUILDING 22 PLAN VIEW

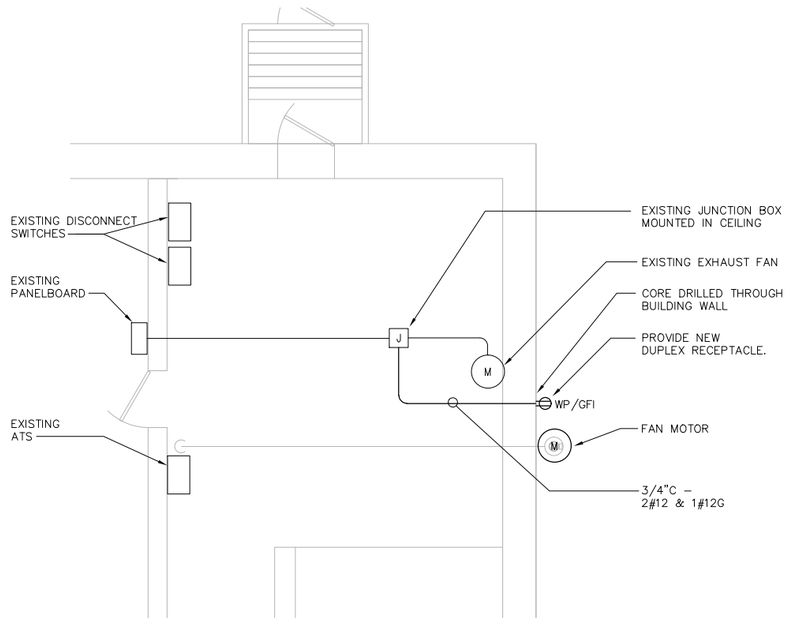
NOT TO SCALE



BUILDING 22 – 1ST FLOOR PART PLAN

2 0 6

SCALE: 1/4" = 1'-0"



BUILDING 22 –BASEMENT PARTIAL PLAN

2 0 6

SCALE: 1/4" = 1'-0"

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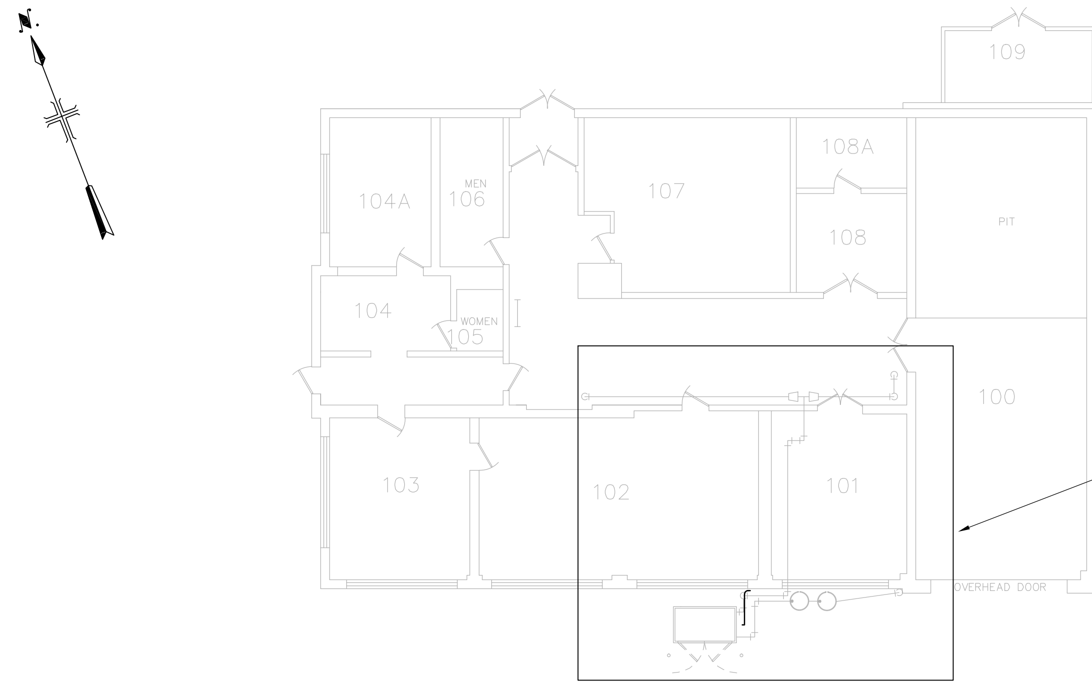
VAPOR INTRUSION MITIGATION

ELECTRICAL
BUILDING 22
PLAN AND SECTION VIEW

E-4

SHEET 4 OF 10



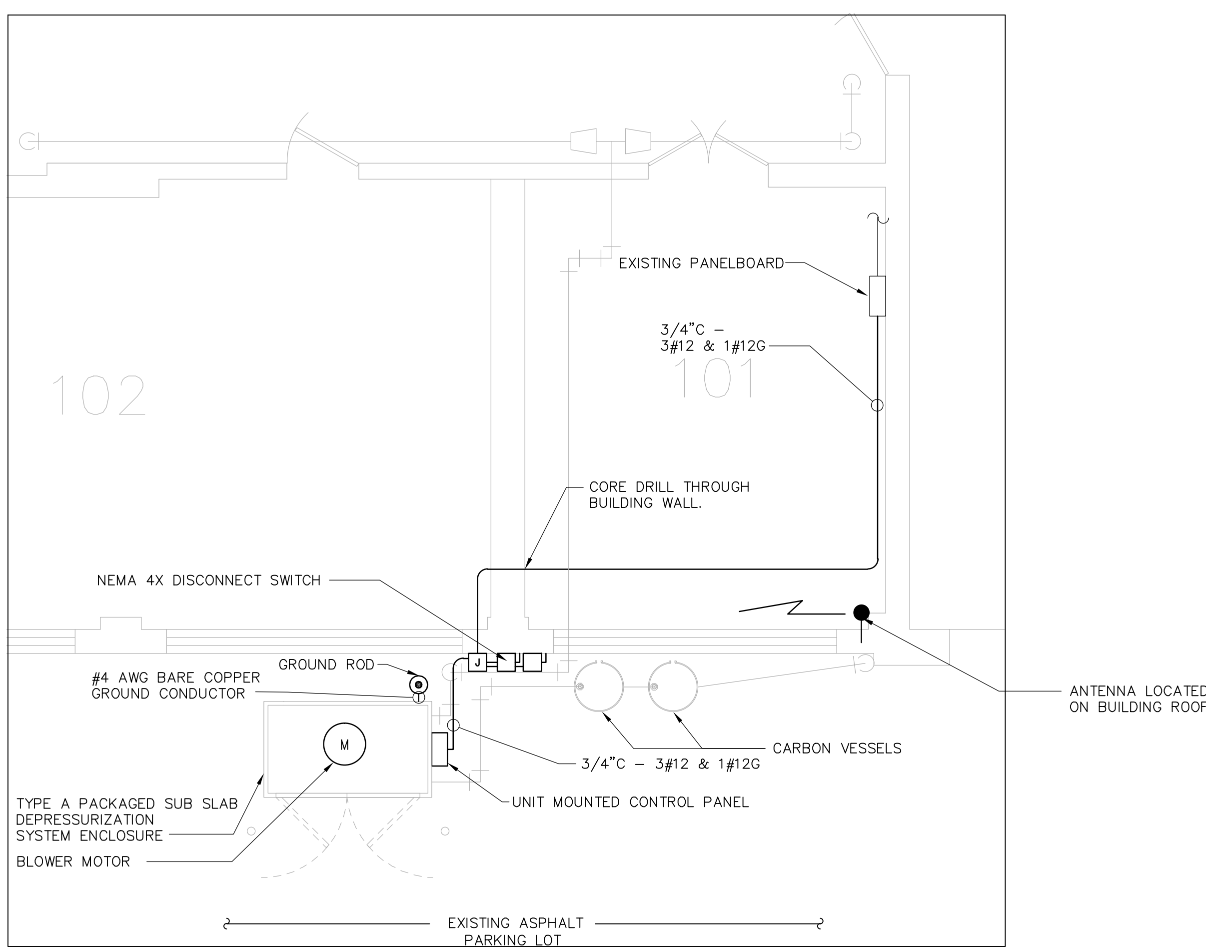
BUILDING 114 – 1ST FLOOR

6 0 6 12

SCALE: 3/32" = 1'–0"

BUILDING 114 PLAN VIEW

NOT TO SCALE



BUILDING 114 – 1ST FLOOR PART PLAN

2 0 6

SCALE: 1/4" = 1'–0"

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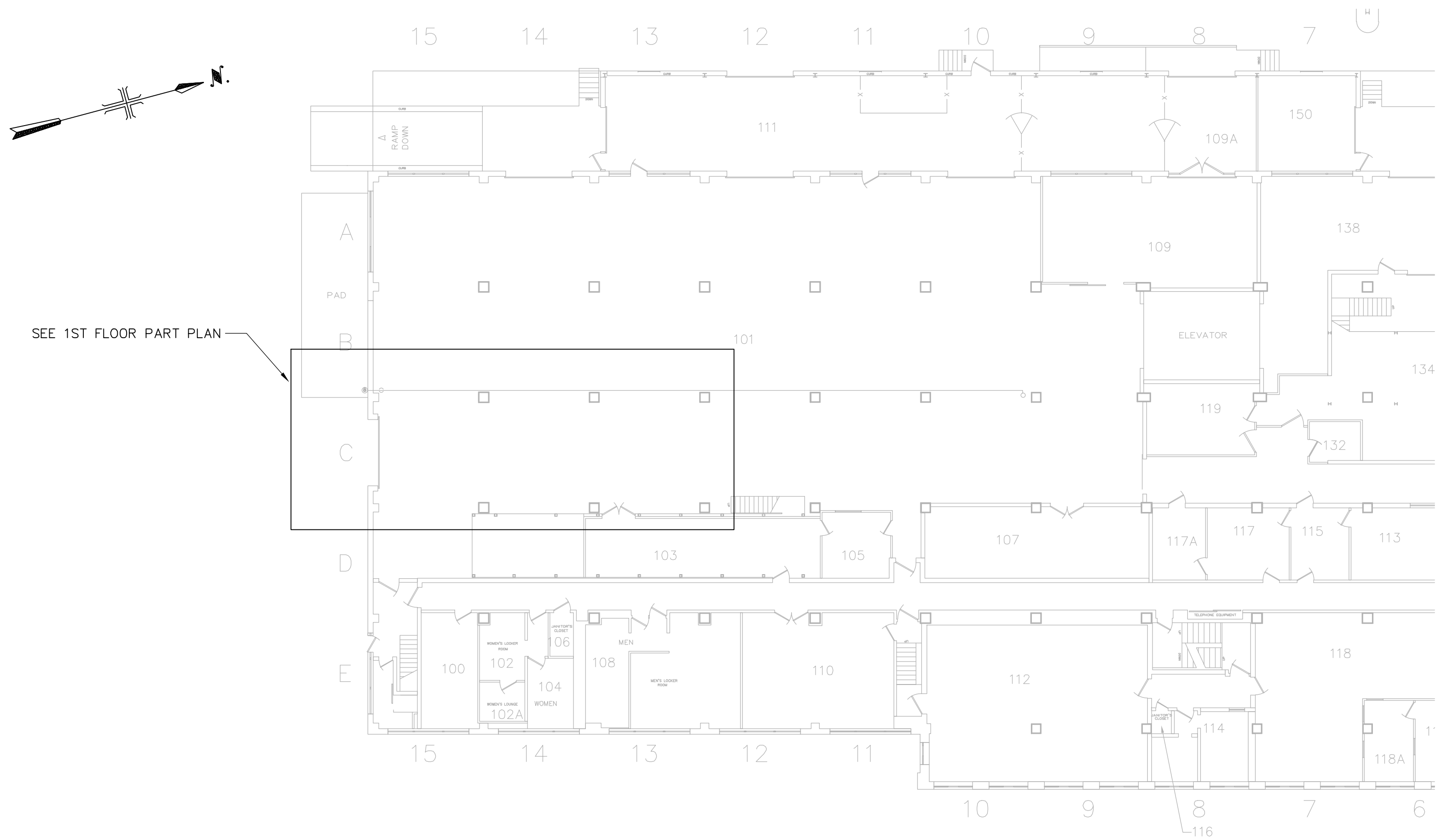
VAPOR INTRUSION MITIGATION

ELECTRICAL
BUILDING 114
PLAN AND SECTION VIEW

E-5

SHEET 5 OF 10



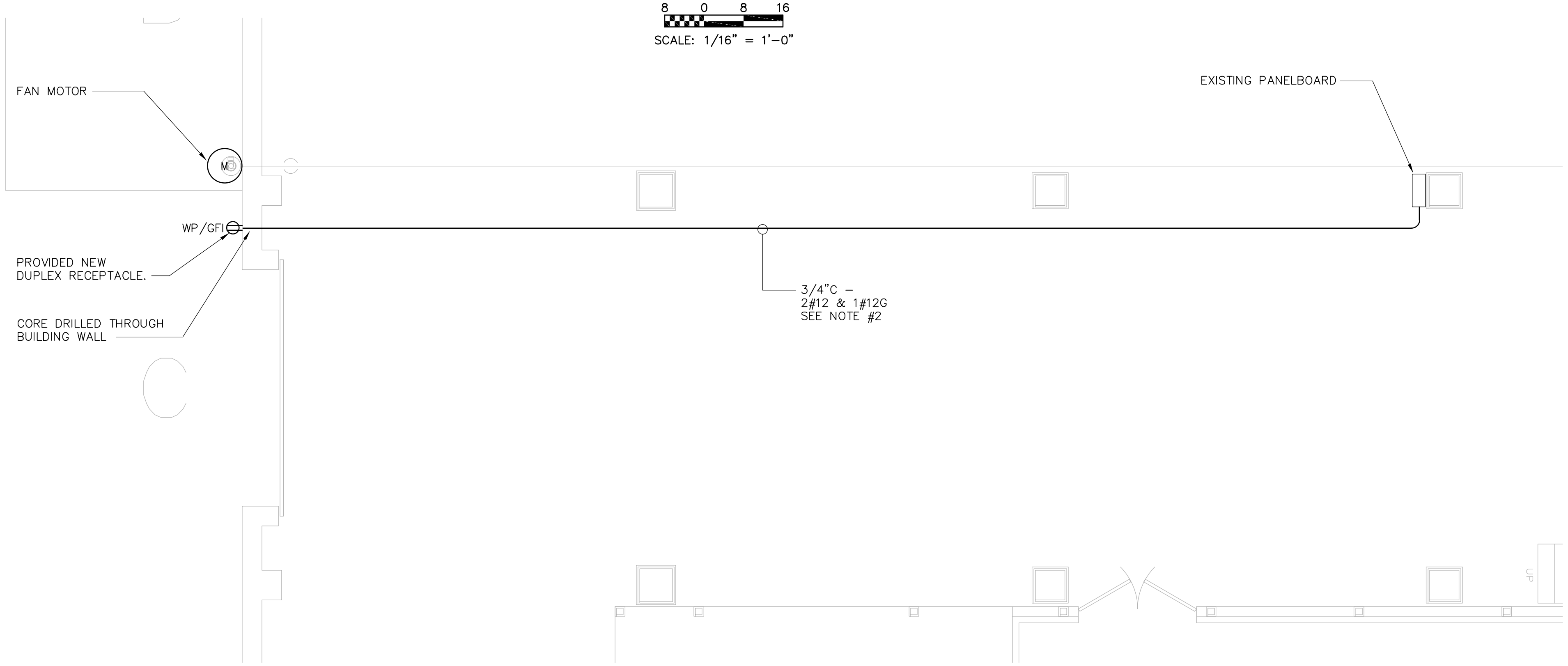
BUILDING 120 – 1ST FLOOR

8 0 8 16

SCALE: 1/16" = 1'-0"

BUILDING 120 PLAN VIEW

NOT TO SCALE



BUILDING 120 – 1ST FLOOR PART PLAN

2 0 6

SCALE: 1/4" = 1'-0"

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VAPOR INTRUSION MITIGATION

ELECTRICAL
BUILDING 120
PLAN AND SECTION VIEW

E-6

SHEET 6 OF 10

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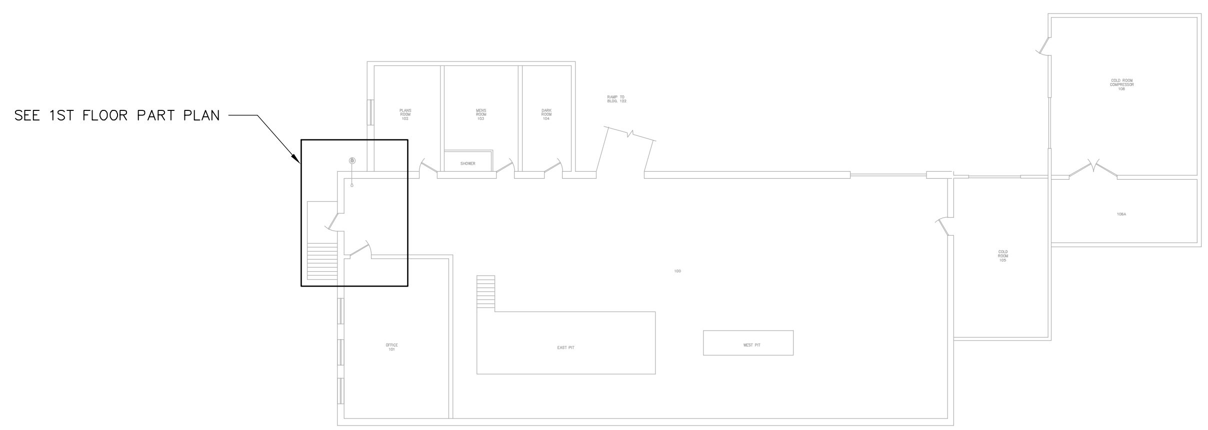
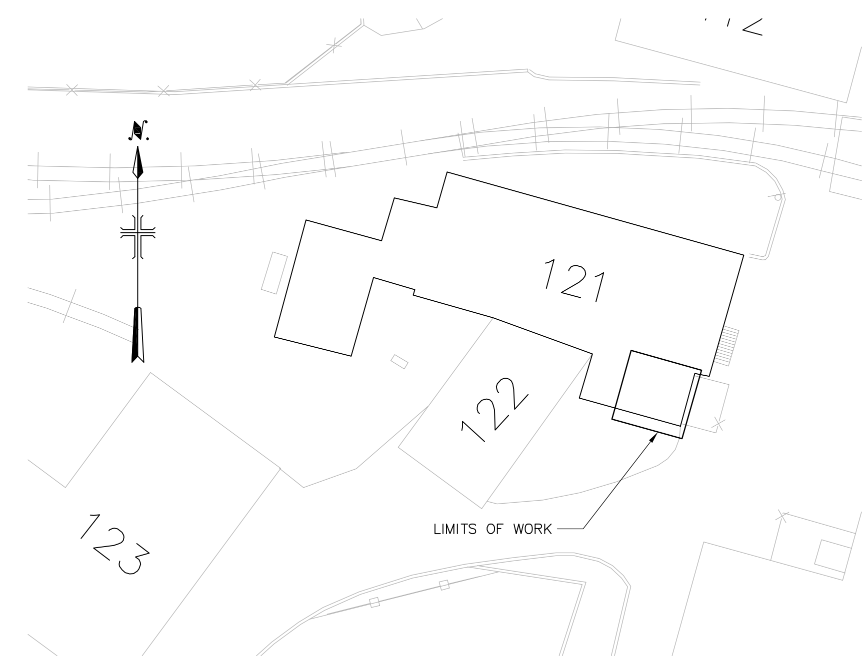
User: Lewandowski Spec: PIRNIE STANDARD File: I:\ACAD\PROJ\2118136\Contract Drawings\AS BUILT\ELEC\2118E006.DWG Scale: 1:1 Date: 08/31/2010 Time: 13:59 Layout: E6



BUILDING 121 – 1ST FLOOR

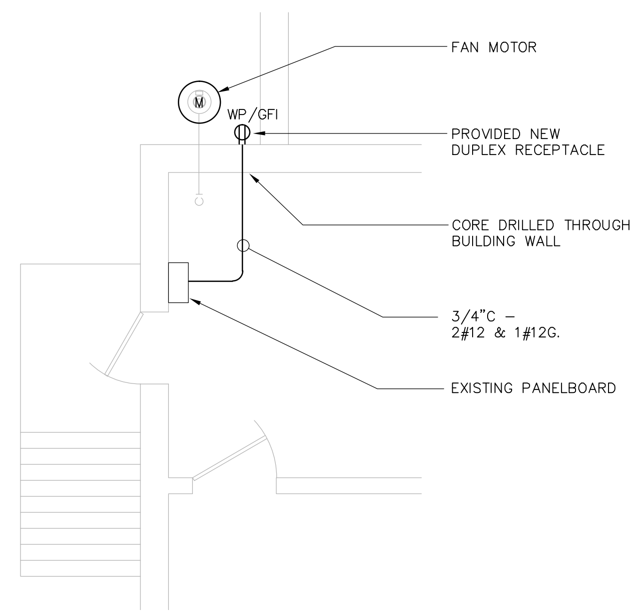
8 0 8 16

SCALE: 1/16" = 1'-0"



BUILDING 121 PLAN VIEW

NOT TO SCALE



BUILDING 121 – 1ST FLOOR PART PLAN

2 0 6

SCALE: 1/4" = 1'-0"

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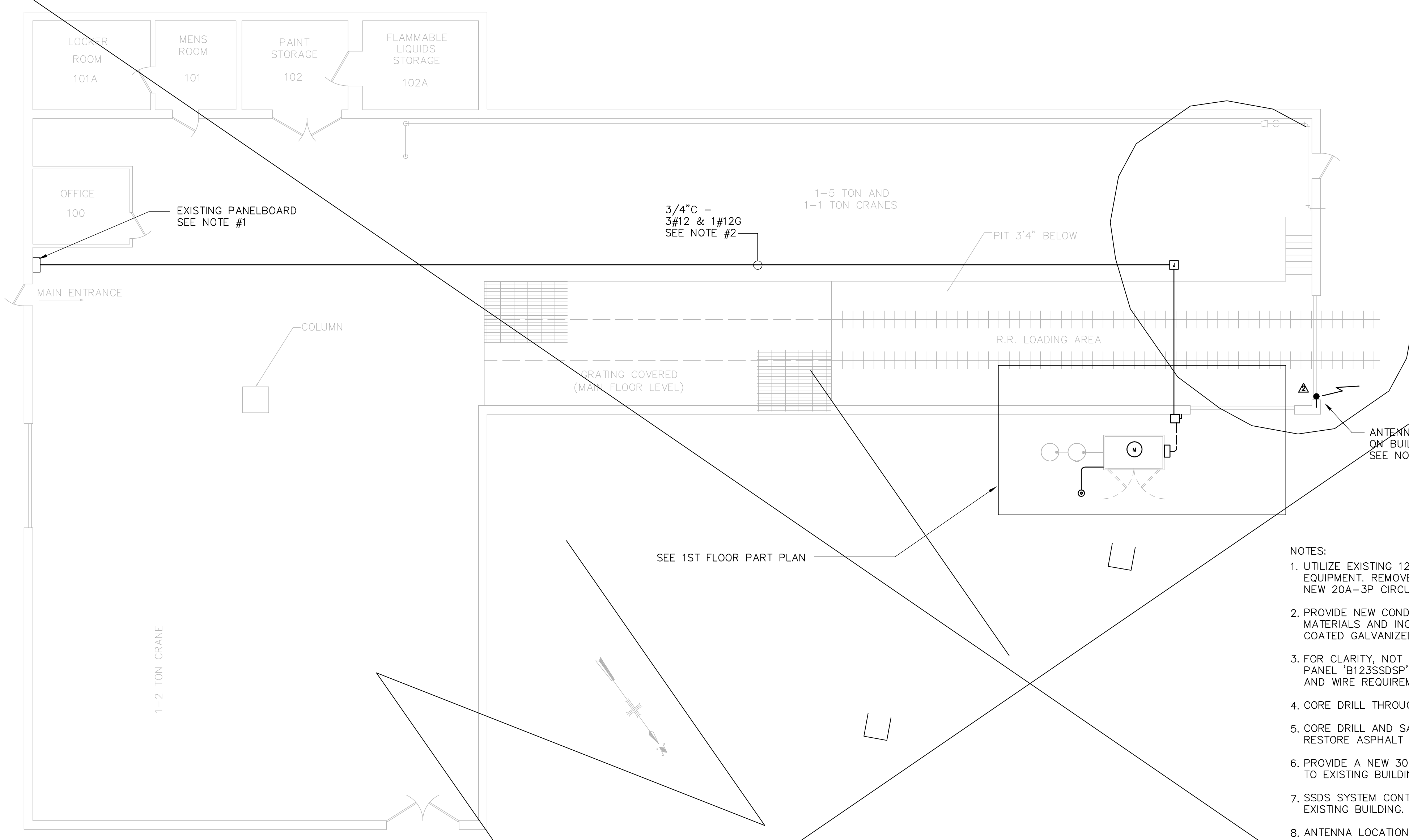
VAPOR INTRUSION MITIGATION

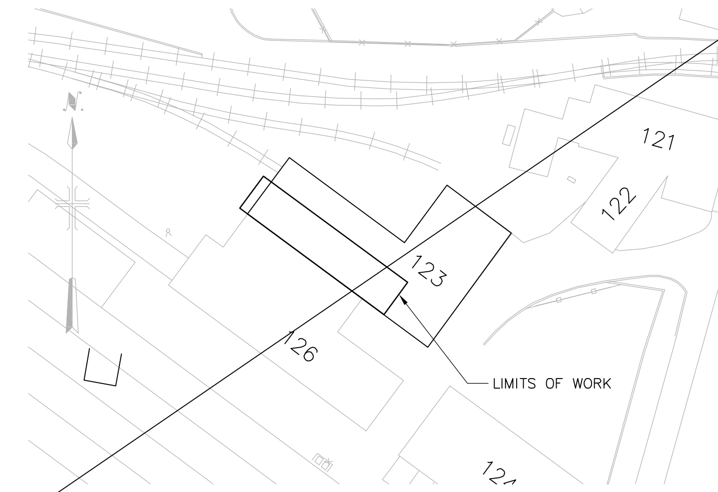
ELECTRICAL
BUILDING 121
PLAN AND SECTION VIEW

E-7



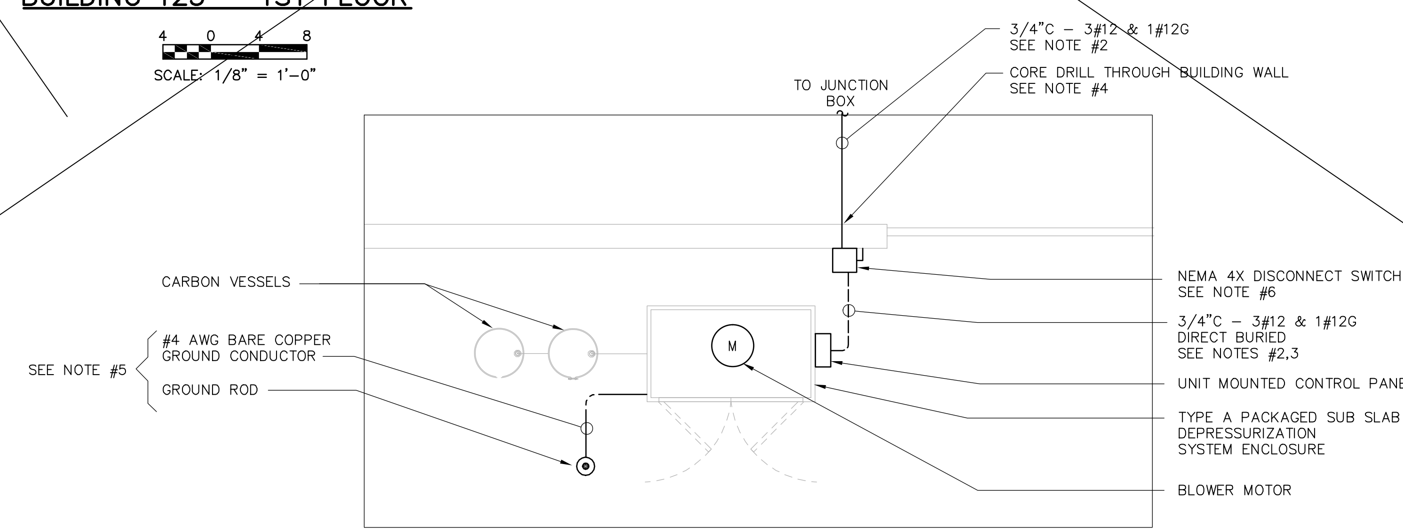
BUILDING 123 – 1ST FLOOR

SCALE: 1/8" = 1'–0"



BUILDING 123
PLAN VIEW

NOT TO SCALE



BUILDING 123 – 1ST FLOOR PART PLAN

SCALE: 1/4" = 1'–0"

NOTES:

1. UTILIZE EXISTING 120/208 VOLT, 3 PHASE, 4 WIRE PANELBOARD FOR FEED TO NEW SUB SLAB DEPRESSURIZATION SYSTEM EQUIPMENT. REMOVE A TOTAL OF THREE EXISTING 20A–1P CIRCUIT BREAKERS AND TURN OVER TO THE ARSENAL. PROVIDE A NEW 20A–3P CIRCUIT BREAKER. EXISTING PANELBOARD IS BY SIEMENS TYPE S1.
2. PROVIDE NEW CONDUIT AND WIRE, SIZED AS SHOWN. ROUTE CONDUIT EXPOSED ALONG CEILING OR WALL AND PROVIDE ALL MATERIALS AND INCIDENTALS REQUIRED. PROVIDE ADDITIONAL JUNCTION BOXES AS REQUIRED. PROVIDE DIRECT BURIED PVC COATED GALVANIZED STEEL CONDUIT BETWEEN DISCONNECT SWITCH AND UNIT MOUNTED CONTROL PANEL.
3. FOR CLARITY, NOT ALL CONDUITS ARE SHOWN. PROVIDE ADDITIONAL CONDUIT AND WIRING BETWEEN SSDS SYSTEM CONTROL PANEL 'B123SSDSP' AND UNIT MOUNTED EQUIPMENT. SEE BLOCK DIAGRAMS ON DRAWING E–10 FOR ADDITIONAL CONDUIT AND WIRE REQUIREMENTS. ALL CONDUITS LOCATED OUTSIDE SHALL BE DIRECT BURIED PVC COATED GALVANIZED STEEL.
4. CORE DRILL THROUGH EXISTING BUILDING WALL AND SEAL CONDUITS.
5. CORE DRILL AND SAWCUT EXISTING ASPHALT TO FACILITATE THE INSTALLATION OF THE GROUNDING EQUIPMENT SHOWN. RESTORE ASPHALT TO PREVIOUS CONDITION.
6. PROVIDE A NEW 30 AMP 3 POLE NON–FUSED DISCONNECT SWITCH IN A NEMA 4X ENCLOSURE. MOUNT DISCONNECT SWITCH TO EXISTING BUILDING WALL.
7. SSDS SYSTEM CONTROL PANEL 'B123SSDSP' (NOT SHOWN) SHALL BE FIELD LOCATED AT AN ACCESSIBLE LOCATION INSIDE EXISTING BUILDING.
8. ANTENNA LOCATION SHOWN IS APPROXIMATE. ACTUAL LOCATION ON BUILDING ROOF SHALL BE FIELD COORDINATED AND LOCATED TO PROVIDE BEST LINE OF SIGHT TO BUILDING 10 ANTENNA. SEE NOTE #1 ON SHEET E–10 FOR CONDUIT AND WIRE REQUIREMENTS.

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WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

ELECTRICAL
BUILIDNG 123
PLAN AND SECTIONAL VIEW

E-8

SHEET 8 OF 10

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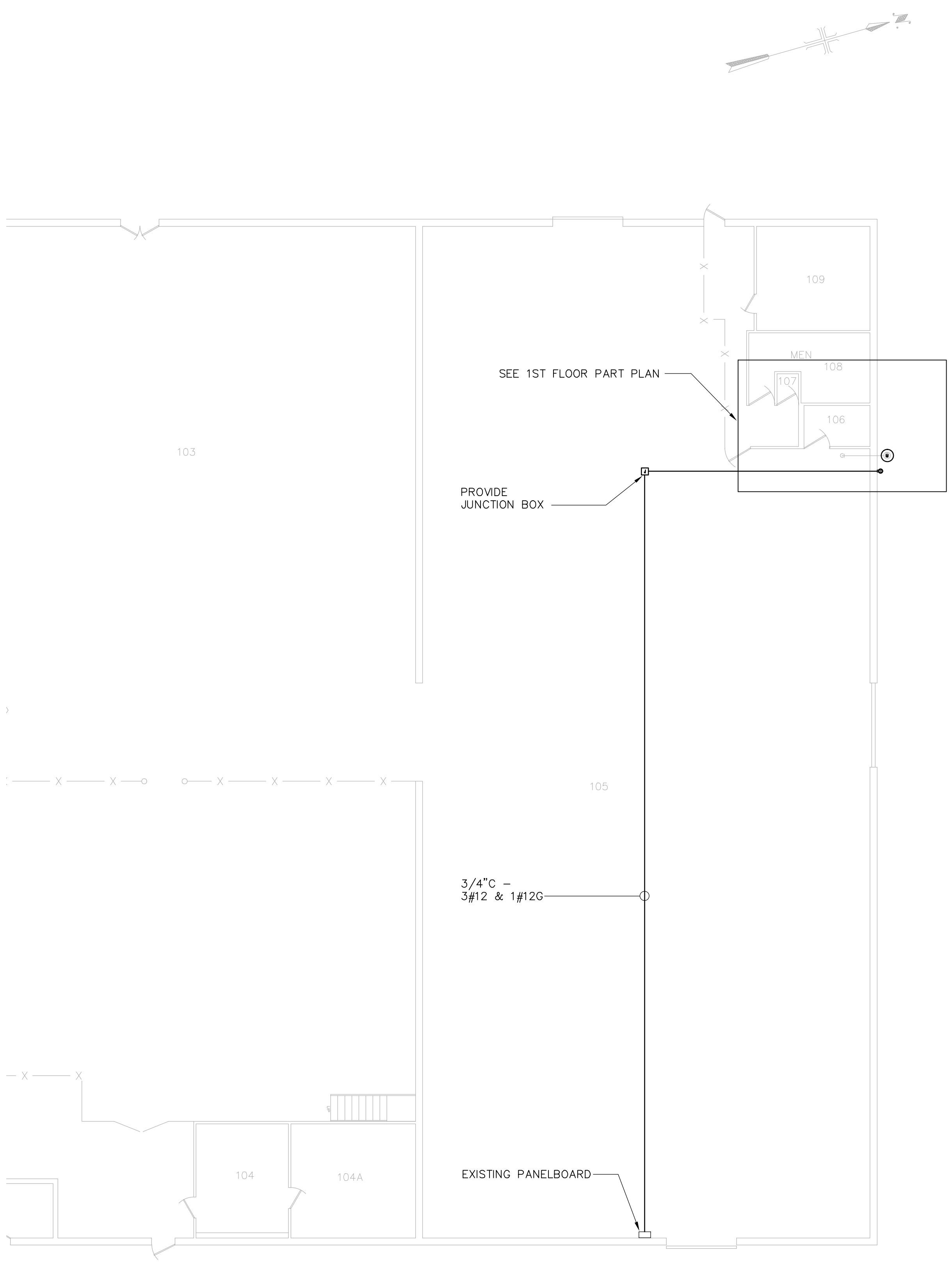
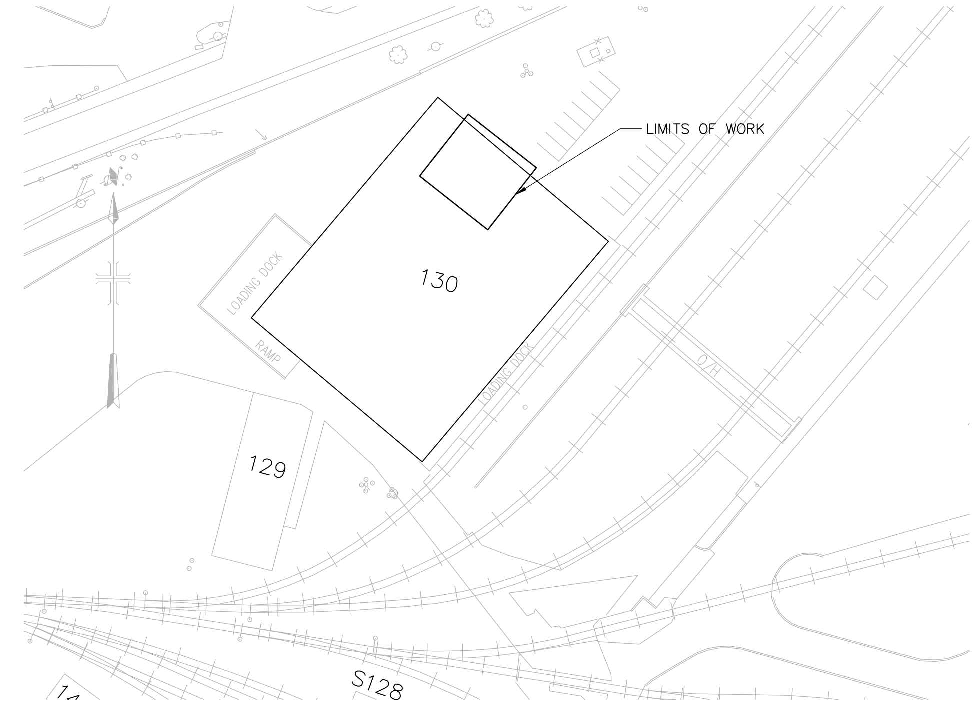
User:Lewandowski Spec:PIRNIE STANDARD File:I:\ACAD\PROJ\2118136\Contract Drawings\AS BUILT\ELEC\2118E008.DWG Scale:1:1 Date:09/15/2010 Time:13:11 Layout:E8



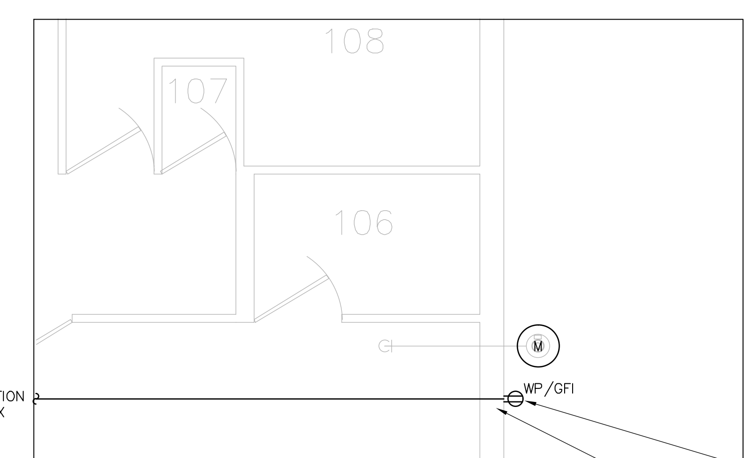
BUILDING 130 – 1ST FLOOR

SCALE: 3/32" = 1'–0"



BUILDING 130 PLAN VIEW

NOT TO SCALE



BUILDING 130 – 1ST FLOOR PART PLAN

SCALE: 1/4" = 1'–0"

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WATERVLIET ARSENAL
VAPOR INTRUSION MITIGATION

ELECTRICAL
BUILDING 130
PLAN AND DETAILS

E-9

SHEET 9 OF 10

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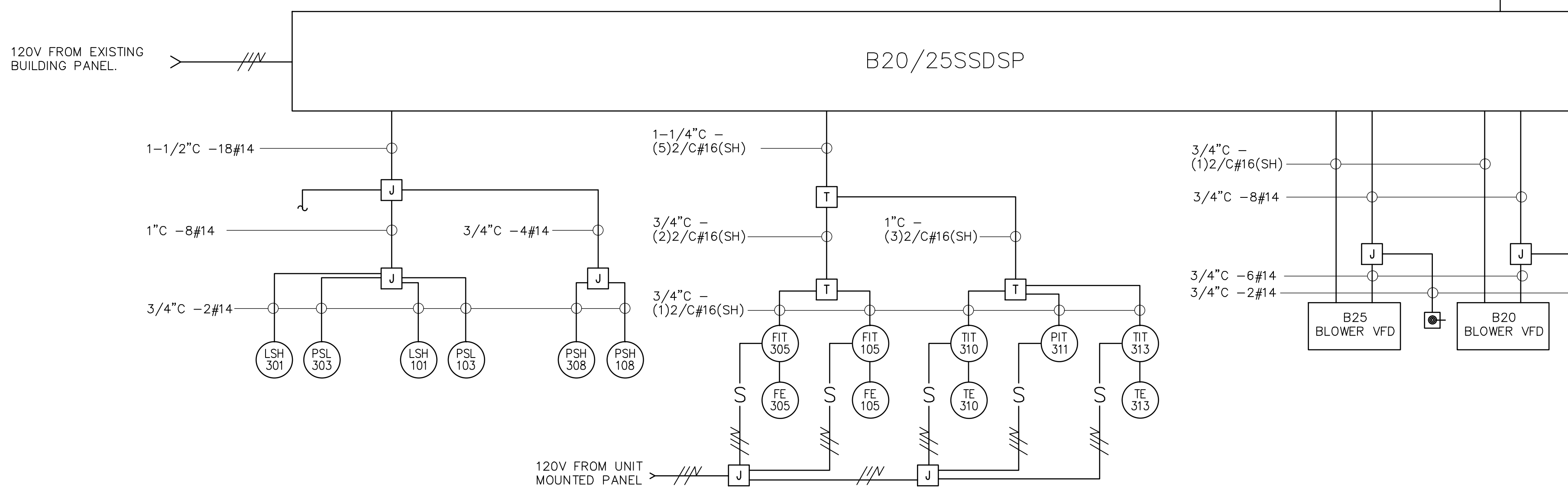
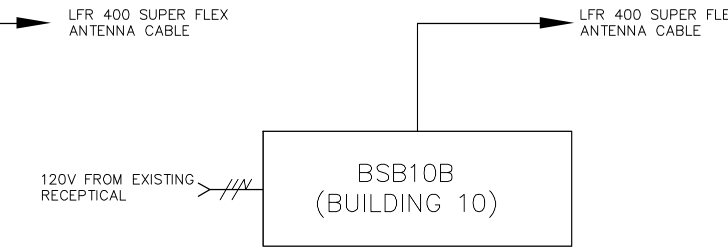


TYPE B SSDS SYSTEM BLOCK DIAGRAM

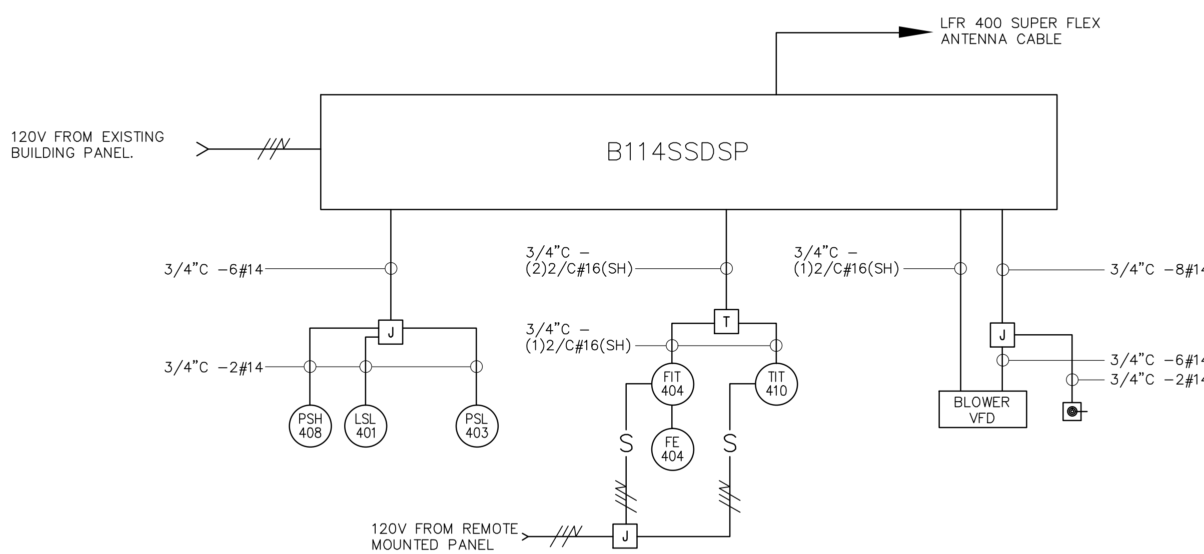
SCALE: NOT TO SCALE



BUILDING 10 RADIO SYSTEM PANEL

NOT TO SCALE

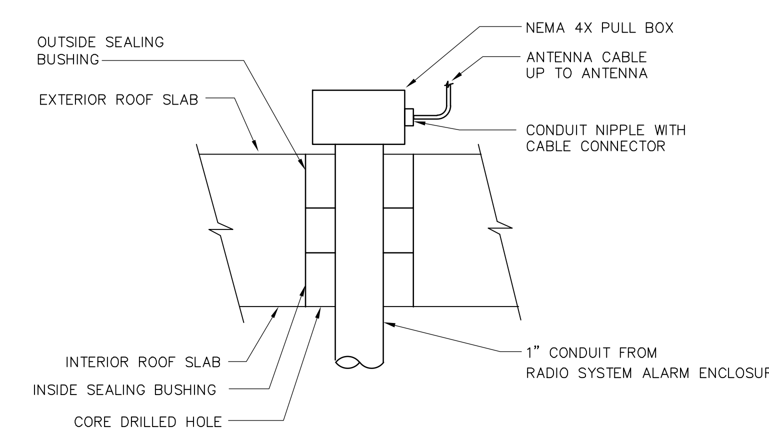
NOTE:
BUILDING 10 ANTENNA GROUND LOCATED IN ROOM 203 IN 200 A BREAKER PANEL



NOTE:
SSDS-B114-1 TYPE "A" SYSTEM SHOWN IS TYPICAL FOR SSDS-B123-1, SSDS-B21-1 AND SSDS-B15-1 SYSTEMS.

TYPE A SSDS SYSTEM BLOCK DIAGRAM

SCALE: NOT TO SCALE



TYPICAL ANTENNA SYSTEM CONDUIT THRU FLOOR OR ROOF SLABS EXISTING CONSTRUCTION

NOT TO SCALE

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WATERVLIET ARSENAL
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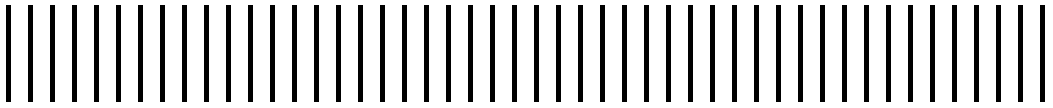
ELECTRICAL
DETAILS AND BLOCK DIAGRAMS

E-10

SHEET 10 OF 10

Watervliet Arsenal
Vapor Intrusion Interim Corrective Measures Construction Certification Report

Appendix B: Construction Photographs



2118163

MALCOLM PIRNIE

Photograph 1. Type A SSDSs being delivered to site.

Photograph 2. Positioning Type A SSDS enclosure at Building 114.

Photograph 3. Initial placement of Type A SSDS at Building 21.

Photograph 4. Disconnect switches for Building 21 Type A SSDS.

Photograph 3. Type A SSDS enclosure contents (Building 114).

Photograph 4. Remote-mount control panel for Type A SSDS (Building 21 installation shown).

Photograph 5. Completed Building 21 Type A SSDS.

Photograph 6. Completed Building 114 Type A SSDS.

Photograph 7. Delivery truck with Type B SSDS.

Photograph 8. Securing Building 25 suction line to pipe bridge. Type B SSDS and carbon vessels in background.

Photographs 9 and 10. Building 20/25 Type B SSDS discharge piping.

Photographs 11 and 12. Building 20/25 Type B SSDS mechanical room enclosure contents.

Photographs 13 and 14. Building 20/25 Type B SSDS electrical room enclosure contents.

Watervliet Arsenal
Vapor Intrusion Interim Corrective Measures Construction Certification Report

Appendix C:
June 24, 2010 Letter Report – Annual Vapor Intrusion Monitoring Results

2118163

MALCOLM PIRNIE

DEPARTMENT OF THE ARMY
WATERVLIET ARSENAL
1 Buffington Street
WATERVLIET, NY 12189-4000

June 24, 2010

REPLY TO
ATTENTION OF:

Public Works

Ms. Alicia Barraza
New York State Department of Environmental Conservation
Bureau of Radiation & Hazardous Site Management
8th Floor
625 Broadway
Albany, N.Y. 12233-7050

Re: Annual Vapor Intrusion Monitoring Results
Main Manufacturing Area
Watervliet Arsenal, Watervliet, New York

Dear Ms. Barraza:

Enclosed please find the results of the annual indoor air performance monitoring samples collected in March 2010 from the Watervliet Arsenal (WVA). As required by the approved *Vapor Intrusion Interim Corrective Measures Work Plan, Main Manufacturing Area, Watervliet Arsenal, Watervliet, New York*, dated August 2009 (Work Plan), the indoor air samples were collected from the following buildings:

- Building 15
- Building 20
- Building 21
- Building 22
- Building 25
- Building 114
- Building 120
- Building 121
- Building 130

All samples were collected and analyzed in accordance with the Work Plan.

Please contact JoAnn Kellogg of the Watervliet Arsenal at (518) 266-5286, or Emily Schiffmacher of the United States Army Corps of Engineers at (410) 962-6731, if you have any questions concerning these reports.

6/25/2010

X David G. Roe

DAVID G. ROE
A/Chief, Public Works

Enclosures

Copies Furnished:

Mr. Francis Coulters
U.S. Army Environmental Center, ERD, Bldg 4480
Aberdeen Proving Ground
Aberdeen, Maryland 21010-5401

New York State Department of Environmental Conservation
Bureau of Radiation & Hazardous Site Management-8th Floor
625 Broadway-Albany, N.Y. 12233-7050
ATTN: Mr. Larry Rosenmann

Samuel I. Ezekwo
RCRA Programs Branch
U.S. Environmental Protection Agency
290 Broadway, 22nd Floor
New York, New York 10007

Ms. Charlotte M. Bethoney
Bureau of Environmental Exposure Investigation
New York State Department of Health
Flanigan Square
547 River Street, Room 300
Troy, NY 12180

U.S. Army Corps of Engineers
Baltimore District

10 South Howard Street, Baltimore, MD 21201
ATTN: Ms. Emily Schiffmacher

Table 1
Summary of Indoor Air Sampling Results
2010 Vapor Intrusion Performance Monitoring
Watervliet Arsenal, Watervliet, New York

Building	Building 25					Building 20
Sample ID	IA-B25-1	IA-B25-2	IA-B25-3	IA-B25-4	IA-B25-5	IA-B20-1
Sample Date	3/31/2010	3/31/2010	3/31/2010	3/31/2010	3/31/2010	3/31/2010
Dilution	2.06	1.79	1.68	1.79	1.79	1.75
Units	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
COMPOUND						
Vinyl Chloride	0.053 U	0.046 U	0.043 U	0.046 U	0.046 U	0.045 U
1,1-Dichloroethene	0.082 U	0.071 U	0.067 U	0.071 U	0.071 U	0.069 U
1,1-Dichloroethane	0.17 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
cis-1,2-Dichloroethene	0.3	0.14 U	0.13 U	0.14 U	0.14 U	0.14 U
1,1,1-Trichloroethane	0.22 U	0.2 U	0.18 U	0.2 U	0.2 U	0.19 U
1,2-Dichloroethane	0.17 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Trichloroethene	0.22 U	0.25	0.22	0.19 U	0.19 U	0.19 U
1,1,2-Trichloroethane	0.22 U	0.2 U	0.18 U	0.2 U	0.2 U	0.19 U
Tetrachloroethene	0.28 U	0.24 U	0.24	0.24 U	0.24 U	0.24 U
1,1,2,2-Tetrachloroethane	0.28 U	0.24 U	0.23 U	0.24 U	0.24 U	0.24 U
trans-1,2-Dichloroethene	0.82 U	0.71 U	0.67 U	0.71 U	0.71 U	0.69 U
Chloromethane	1	1.2	1.1	1.2	1	1.1
Chloroethane	0.27 U	0.24 U	0.22 U	0.24 U	0.24 U	0.23 U
Chlorobenzene	0.19 U	0.16 U	0.15 U	0.16 U	0.16 U	0.16 U
Carbon Tetrachloride	0.42	0.44	0.43	0.45	0.46	0.41

Notes:
ug/m3 - micrograms per cubic meter
U - not detected at concentration greater than reporting limit

Table 1
Summary of Indoor Air Sampling Results
2010 Vapor Intrusion Performance Monitoring
Watervliet Arsenal, Watervliet, New York

Building	Building 22		Building 15		Building 21	
Sample ID	IA-B22-1	IA-B22-2	IA-B15-1	IA-B15-2	IA-B21-1	IA-B21-2
Sample Date	3/31/2010	3/31/2010	3/31/2010	3/31/2010	3/31/2010	3/31/2010
Dilution	1.75	1.75	2.12	1.58	1.52	1.68
Units	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
COMPOUND						
Vinyl Chloride	0.3	0.045 U	0.054 U	0.04 U	0.039 U	0.043 U
1,1-Dichloroethene	0.069 U	0.069 U	0.084 U	0.063 U	0.06 U	0.067 U
1,1-Dichloroethane	0.14 U	0.14 U	0.17 U	0.13 U	0.12 U	0.14 U
cis-1,2-Dichloroethene	1.1	0.14 U	0.17 U	0.12 U	0.12 U	0.13 U
1,1,1-Trichloroethane	0.19 U	0.33	0.23 U	0.17 U	0.16 U	0.18 U
1,2-Dichloroethane	0.14 U	0.14 U	0.17 U	0.14	0.12 U	0.14 U
Trichloroethene	0.19 U	0.19 U	0.23 U	0.51	0.52	0.18 U
1,1,2-Trichloroethane	0.19 U	0.19 U	0.23 U	0.17 U	0.16 U	0.18 U
Tetrachloroethene	0.25	0.3	0.29 U	16	0.31	0.23 U
1,1,2,2-Tetrachloroethane	0.24 U	0.24 U	0.29 U	0.22 U	0.21 U	0.23 U
trans-1,2-Dichloroethene	0.69 U	0.69 U	0.84 U	0.63 U	0.6 U	0.67 U
Chloromethane	1.1	1.1	1.8	1.6	1.5	1.6
Chloroethane	0.23 U	0.23 U	0.28 U	0.21 U	0.2 U	0.22 U
Chlorobenzene	0.16 U	0.16 U	0.2 U	0.14 U	0.14 U	0.15 U
Carbon Tetrachloride	0.4	0.43	0.43	0.42	0.43	0.42

Notes:
ug/m3 - micrograms per cubic meter
U - not detected at concentration greater than reporting limit

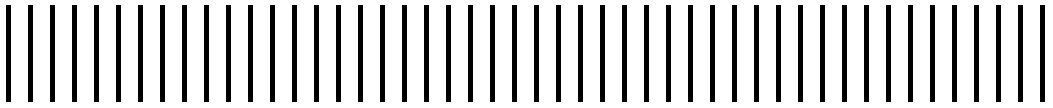
Table 1
Summary of Indoor Air Sampling Results
2010 Vapor Intrusion Performance Monitoring
Watervliet Arsenal, Watervliet, New York

Building	Building 120		Building 114	Building 121		Building 130
Sample ID	IA-B120-1	IA-B120-2	IA-B114-1	IA-B121-1	*IA-B121-1 Duplicate*	IA-B130-1
Sample Date	4/1/2010	4/1/2010	4/1/2010	4/1/2010	4/1/2010	4/1/2010
Dilution	1.75	1.75	1.87	1.75	1.75	1.64
Units	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
COMPOUND						
Vinyl Chloride	0.045 U	0.045 U	0.048 U	0.045 U	0.045 U	0.042 U
1,1-Dichloroethene	0.069 U	0.069 U	0.074 U	0.069 U	0.069 U	0.065 U
1,1-Dichloroethane	0.14 U	0.14 U	0.15 U	0.14 U	0.14 U	0.13 U
cis-1,2-Dichloroethene	0.14 U	0.14 U	0.32	0.14 U	0.14 U	0.13 U
1,1,1-Trichloroethane	0.19 U	0.19 U	0.59	0.24	0.26	0.18 U
1,2-Dichloroethane	0.14 U	0.14 U	0.15 U	0.14 U	0.14 U	0.13 U
Trichloroethene	0.19 U	0.19 U	3.7	0.19 U	0.19 U	0.19
1,1,2-Trichloroethane	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.18 U
Tetrachloroethene	0.24 U	1.1	14	0.24 U	0.24 U	0.32
1,1,2,2-Tetrachloroethane	0.24 U	0.24 U	0.26 U	0.24 U	0.24 U	0.22 U
trans-1,2-Dichloroethene	0.69 U	0.69 U	0.74 U	0.69 U	0.69 U	0.65 U
Chloromethane	1.7	1.5	1.5	1.6	1.7	1.6
Chloroethane	0.23 U	0.23 U	0.25 U	0.23 U	0.23 U	0.22 U
Chlorobenzene	0.16 U	0.16 U	0.17 U	0.16 U	0.17	0.15 U
Carbon Tetrachloride	0.45	0.4	0.42	0.4	0.43	0.43

Notes:
ug/m3 - micrograms per cubic meter
U - not detected at concentration greater than reporting limit

Watervliet Arsenal
Vapor Intrusion Interim Corrective Measures Construction Certification Report

Appendix D:
Analytical Reporting Forms



2118163

Air Toxics LTD.
Laboratory Services Since 1989

8/24/2010
Mr. Andy Vitolins
Malcolm Pirnie
855 Route 146
Suite 210
Clifton Park NY 12065

Project Name: WVA
Project #: 2118163
Workorder #: 1008322

Dear Mr. Andy Vitolins

The following report includes the data for the above referenced project for sample(s) received on 8/13/2010 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1008322

Work Order Summary

CLIENT:	Mr. Andy Vitolins Malcolm Pirnie 855 Route 146 Suite 210 Clifton Park, NY 12065	**BILL TO:**	Ms. Accounts Payable Malcolm Pirnie P.O. Box 1240 White Plains, NY 10602-1240
PHONE:	518-782-2139	**P.O. #**	
FAX:	(518) 250-7300	**PROJECT #**	2118163 WVA
DATE RECEIVED:	08/13/2010	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/24/2010		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	B25 Pre-Carbon	Modified TO-15	3.5 "Hg	5 psi
02A	B25 Post-Carbon	Modified TO-15	5.5 "Hg	5 psi
03A	B114 Pre-Carbon	Modified TO-15	5.0 "Hg	5 psi
04A	B114 Post-Carbon	Modified TO-15	3.5 "Hg	5 psi
05A	B21 Pre-Carbon	Modified TO-15	7.0 "Hg	5 psi
06A	B21 Post-Carbon	Modified TO-15	4.5 "Hg	5 psi
07A	Lab Blank	Modified TO-15	NA	NA
08A	CCV	Modified TO-15	NA	NA
09A	LCS	Modified TO-15	NA	NA

CERTIFIED BY: Linda D. Frumarn DATE: 08/24/10

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/10
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
Malcolm Pirnie
Workorder# 1008322

Six 6 Liter Summa Canister (100% Certified) samples were received on August 13, 2010. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

The Chain of Custody (COC) information for sample B21 Post-Carbon did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: B25 Pre-Carbon

Lab ID#: 1008322-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	3.4	5.9	13	23
1,1,1-Trichloroethane	3.4	19	18	100
Trichloroethene	3.4	1200	18	6200
Tetrachloroethene	3.4	8.5	23	58

Client Sample ID: B25 Post-Carbon

Lab ID#: 1008322-02A

No Detections Were Found.

Client Sample ID: B114 Pre-Carbon

Lab ID#: 1008322-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Trichloroethene	0.80	1.1	4.3	6.0
Tetrachloroethene	0.80	1.0	5.5	7.1

Client Sample ID: B114 Post-Carbon

Lab ID#: 1008322-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.76	0.97	5.2	6.6

Client Sample ID: B21 Pre-Carbon

Lab ID#: 1008322-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.88	11	3.5	44
Trichloroethene	0.88	50	4.7	270
Tetrachloroethene	0.88	9.4	5.9	63

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: B21 Post-Carbon

Lab ID#: 1008322-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	3.2	5.3	6.5	11

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: B25 Pre-Carbon

Lab ID#: 1008322-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**x082019**	**Date of Collection: 8/12/10 12:30:00 PM**	
Dil. Factor:	**6.76**	**Date of Analysis: 8/20/10 09:05 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	14	Not Detected	28	Not Detected
Vinyl Chloride	3.4	Not Detected	8.6	Not Detected
Chloroethane	3.4	Not Detected	8.9	Not Detected
1,1-Dichloroethene	3.4	Not Detected	13	Not Detected
trans-1,2-Dichloroethene	3.4	Not Detected	13	Not Detected
1,1-Dichloroethane	3.4	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	3.4	5.9	13	23
1,1,1-Trichloroethane	3.4	19	18	100
Carbon Tetrachloride	3.4	Not Detected	21	Not Detected
1,2-Dichloroethane	3.4	Not Detected	14	Not Detected
Trichloroethene	3.4	1200	18	6200
1,1,2-Trichloroethane	3.4	Not Detected	18	Not Detected
Tetrachloroethene	3.4	8.5	23	58
Chlorobenzene	3.4	Not Detected	16	Not Detected
1,1,2,2-Tetrachloroethane	3.4	Not Detected	23	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	117	70-130
4-Bromofluorobenzene	99	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: B25 Post-Carbon

Lab ID#: 1008322-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**x082020**	**Date of Collection: 8/12/10 12:40:00 PM**	
Dil. Factor:	**1.64**	**Date of Analysis: 8/20/10 09:41 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	3.3	Not Detected	6.8	Not Detected
Vinyl Chloride	0.82	Not Detected	2.1	Not Detected
Chloroethane	0.82	Not Detected	2.2	Not Detected
1,1-Dichloroethene	0.82	Not Detected	3.2	Not Detected
trans-1,2-Dichloroethene	0.82	Not Detected	3.2	Not Detected
1,1-Dichloroethane	0.82	Not Detected	3.3	Not Detected
cis-1,2-Dichloroethene	0.82	Not Detected	3.2	Not Detected
1,1,1-Trichloroethane	0.82	Not Detected	4.5	Not Detected
Carbon Tetrachloride	0.82	Not Detected	5.2	Not Detected
1,2-Dichloroethane	0.82	Not Detected	3.3	Not Detected
Trichloroethene	0.82	Not Detected	4.4	Not Detected
1,1,2-Trichloroethane	0.82	Not Detected	4.5	Not Detected
Tetrachloroethene	0.82	Not Detected	5.6	Not Detected
Chlorobenzene	0.82	Not Detected	3.8	Not Detected
1,1,2,2-Tetrachloroethane	0.82	Not Detected	5.6	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	109	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	104	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: B114 Pre-Carbon

Lab ID#: 1008322-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**x082021**	**Date of Collection: 8/12/10 2:25:00 PM**	
Dil. Factor:	**1.61**	**Date of Analysis: 8/20/10 10:16 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	3.2	Not Detected	6.6	Not Detected
Vinyl Chloride	0.80	Not Detected	2.0	Not Detected
Chloroethane	0.80	Not Detected	2.1	Not Detected
1,1-Dichloroethene	0.80	Not Detected	3.2	Not Detected
trans-1,2-Dichloroethene	0.80	Not Detected	3.2	Not Detected
1,1-Dichloroethane	0.80	Not Detected	3.2	Not Detected
cis-1,2-Dichloroethene	0.80	Not Detected	3.2	Not Detected
1,1,1-Trichloroethane	0.80	Not Detected	4.4	Not Detected
Carbon Tetrachloride	0.80	Not Detected	5.1	Not Detected
1,2-Dichloroethane	0.80	Not Detected	3.2	Not Detected
Trichloroethene	0.80	1.1	4.3	6.0
1,1,2-Trichloroethane	0.80	Not Detected	4.4	Not Detected
Tetrachloroethene	0.80	1.0	5.5	7.1
Chlorobenzene	0.80	Not Detected	3.7	Not Detected
1,1,2,2-Tetrachloroethane	0.80	Not Detected	5.5	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	98	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: B114 Post-Carbon

Lab ID#: 1008322-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**x082022**	**Date of Collection: 8/12/10 2:30:00 PM**	
Dil. Factor:	**1.52**	**Date of Analysis: 8/20/10 11:01 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	3.0	Not Detected	6.3	Not Detected
Vinyl Chloride	0.76	Not Detected	1.9	Not Detected
Chloroethane	0.76	Not Detected	2.0	Not Detected
1,1-Dichloroethene	0.76	Not Detected	3.0	Not Detected
trans-1,2-Dichloroethene	0.76	Not Detected	3.0	Not Detected
1,1-Dichloroethane	0.76	Not Detected	3.1	Not Detected
cis-1,2-Dichloroethene	0.76	Not Detected	3.0	Not Detected
1,1,1-Trichloroethane	0.76	Not Detected	4.1	Not Detected
Carbon Tetrachloride	0.76	Not Detected	4.8	Not Detected
1,2-Dichloroethane	0.76	Not Detected	3.1	Not Detected
Trichloroethene	0.76	Not Detected	4.1	Not Detected
1,1,2-Trichloroethane	0.76	Not Detected	4.1	Not Detected
Tetrachloroethene	0.76	0.97	5.2	6.6
Chlorobenzene	0.76	Not Detected	3.5	Not Detected
1,1,2,2-Tetrachloroethane	0.76	Not Detected	5.2	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	108	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: B21 Pre-Carbon

Lab ID#: 1008322-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**x082023**	**Date of Collection: 8/12/10 4:00:00 PM**	
Dil. Factor:	**1.75**	**Date of Analysis: 8/20/10 11:37 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	3.5	Not Detected	7.2	Not Detected
Vinyl Chloride	0.88	Not Detected	2.2	Not Detected
Chloroethane	0.88	Not Detected	2.3	Not Detected
1,1-Dichloroethene	0.88	Not Detected	3.5	Not Detected
trans-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.88	Not Detected	3.5	Not Detected
cis-1,2-Dichloroethene	0.88	11	3.5	44
1,1,1-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Carbon Tetrachloride	0.88	Not Detected	5.5	Not Detected
1,2-Dichloroethane	0.88	Not Detected	3.5	Not Detected
Trichloroethene	0.88	50	4.7	270
1,1,2-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Tetrachloroethene	0.88	9.4	5.9	63
Chlorobenzene	0.88	Not Detected	4.0	Not Detected
1,1,2,2-Tetrachloroethane	0.88	Not Detected	6.0	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	106	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: B21 Post-Carbon

Lab ID#: 1008322-06A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**x082024**	**Date of Collection: 8/12/10 4:00:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 8/21/10 12:19 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	3.2	5.3	6.5	11
Vinyl Chloride	0.79	Not Detected	2.0	Not Detected
Chloroethane	0.79	Not Detected	2.1	Not Detected
1,1-Dichloroethene	0.79	Not Detected	3.1	Not Detected
trans-1,2-Dichloroethene	0.79	Not Detected	3.1	Not Detected
1,1-Dichloroethane	0.79	Not Detected	3.2	Not Detected
cis-1,2-Dichloroethene	0.79	Not Detected	3.1	Not Detected
1,1,1-Trichloroethane	0.79	Not Detected	4.3	Not Detected
Carbon Tetrachloride	0.79	Not Detected	5.0	Not Detected
1,2-Dichloroethane	0.79	Not Detected	3.2	Not Detected
Trichloroethene	0.79	Not Detected	4.2	Not Detected
1,1,2-Trichloroethane	0.79	Not Detected	4.3	Not Detected
Tetrachloroethene	0.79	Not Detected	5.4	Not Detected
Chlorobenzene	0.79	Not Detected	3.6	Not Detected
1,1,2,2-Tetrachloroethane	0.79	Not Detected	5.4	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1008322-07A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**x082006**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/20/10 09:20 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	2.0	Not Detected	4.1	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	94	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1008322-08A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**x082002**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/20/10 05:53 AM**	

Compound	%Recovery
Chloromethane	94
Vinyl Chloride	91
Chloroethane	88
1,1-Dichloroethene	95
trans-1,2-Dichloroethene	93
1,1-Dichloroethane	91
cis-1,2-Dichloroethene	91
1,1,1-Trichloroethane	100
Carbon Tetrachloride	103
1,2-Dichloroethane	101
Trichloroethene	98
1,1,2-Trichloroethane	95
Tetrachloroethene	91
Chlorobenzene	94
1,1,2,2-Tetrachloroethane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	107	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	107	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1008322-09A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**x082003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/20/10 06:29 AM**	

Compound	%Recovery
Chloromethane	88
Vinyl Chloride	91
Chloroethane	88
1,1-Dichloroethene	81
trans-1,2-Dichloroethene	91
1,1-Dichloroethane	87
cis-1,2-Dichloroethene	91
1,1,1-Trichloroethane	93
Carbon Tetrachloride	98
1,2-Dichloroethane	91
Trichloroethene	93
1,1,2-Trichloroethane	93
Tetrachloroethene	90
Chlorobenzene	92
1,1,2,2-Tetrachloroethane	96

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	102	70-130

Air Toxics LTD.
Laboratory Services Since 1989

9/14/2010
Mr. Andy Vitolins
Malcolm Pirnie
855 Route 146
Suite 210
Clifton Park NY 12065

Project Name: WVA
Project #: 2118063
Workorder #: 1009247

Dear Mr. Andy Vitolins

The following report includes the data for the above referenced project for sample(s) received on 9/13/2010 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1009247

Work Order Summary

CLIENT:	Mr. Andy Vitolins Malcolm Pirnie 855 Route 146 Suite 210 Clifton Park, NY 12065	**BILL TO:**	Ms. Accounts Payable Malcolm Pirnie P.O. Box 1240 White Plains, NY 10602-1240
PHONE:	518-782-2139	**P.O. #**	
FAX:	(518) 250-7300	**PROJECT #**	2118063 WVA
DATE RECEIVED:	09/13/2010	**CONTACT:**	Ausha Scott
DATE COMPLETED:	09/14/2010		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	BLDG. 20 PRE-CARBON	Modified TO-15	3.5 "Hg	5 psi
02A	Lab Blank	Modified TO-15	NA	NA
03A	CCV	Modified TO-15	NA	NA
04A	LCS	Modified TO-15	NA	NA
04AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Linda D. Frumarn DATE: 09/14/10

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/10
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

Air Toxics LTD.
Laboratory Services Since 1989

LABORATORY NARRATIVE
EPA Method TO-15
Malcolm Pirnie
Workorder# 1009247

One 6 Liter Summa Canister sample was received on September 13, 2010. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

The Chain of Custody (COC) information for sample BLDG. 20 PRE-CARBON did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: BLDG. 20 PRE-CARBON

Lab ID#: 1009247-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	0.76	1.2	4.1	6.4
Trichloroethene	0.76	47	4.1	250
Tetrachloroethene	0.76	8.0	5.2	54

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: BLDG. 20 PRE-CARBON

Lab ID#: 1009247-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6091329**	**Date of Collection: 9/10/10 1:59:00 PM**	
Dil. Factor:	**1.52**	**Date of Analysis: 9/14/10 11:25 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	3.0	Not Detected	6.3	Not Detected
Vinyl Chloride	0.76	Not Detected	1.9	Not Detected
Chloroethane	0.76	Not Detected	2.0	Not Detected
1,1-Dichloroethene	0.76	Not Detected	3.0	Not Detected
trans-1,2-Dichloroethene	0.76	Not Detected	3.0	Not Detected
1,1-Dichloroethane	0.76	Not Detected	3.1	Not Detected
cis-1,2-Dichloroethene	0.76	Not Detected	3.0	Not Detected
1,1,1-Trichloroethane	0.76	1.2	4.1	6.4
Carbon Tetrachloride	0.76	Not Detected	4.8	Not Detected
1,2-Dichloroethane	0.76	Not Detected	3.1	Not Detected
Trichloroethene	0.76	47	4.1	250
1,1,2-Trichloroethane	0.76	Not Detected	4.1	Not Detected
Tetrachloroethene	0.76	8.0	5.2	54
Chlorobenzene	0.76	Not Detected	3.5	Not Detected
1,1,2,2-Tetrachloroethane	0.76	Not Detected	5.2	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	98	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1009247-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6091328c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/14/10 10:41 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	2.0	Not Detected	4.1	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	96	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1009247-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6091318a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/13/10 06:01 PM**	

Compound	%Recovery
Chloromethane	86
Vinyl Chloride	116
Chloroethane	92
1,1-Dichloroethene	102
trans-1,2-Dichloroethene	104
1,1-Dichloroethane	105
cis-1,2-Dichloroethene	103
1,1,1-Trichloroethane	103
Carbon Tetrachloride	104
1,2-Dichloroethane	108
Trichloroethene	106
1,1,2-Trichloroethane	106
Tetrachloroethene	108
Chlorobenzene	106
1,1,2,2-Tetrachloroethane	104

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	104	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1009247-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6091324**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/13/10 08:57 PM**	

Compound	%Recovery
Chloromethane	89
Vinyl Chloride	94
Chloroethane	94
1,1-Dichloroethene	86
trans-1,2-Dichloroethene	98
1,1-Dichloroethane	96
cis-1,2-Dichloroethene	96
1,1,1-Trichloroethane	100
Carbon Tetrachloride	102
1,2-Dichloroethane	101
Trichloroethene	105
1,1,2-Trichloroethane	109
Tetrachloroethene	109
Chlorobenzene	108
1,1,2,2-Tetrachloroethane	111

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	102	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1009247-04AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6091325**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/14/10 08:19 AM**	

Compound	%Recovery
Chloromethane	100
Vinyl Chloride	103
Chloroethane	102
1,1-Dichloroethene	92
trans-1,2-Dichloroethene	102
1,1-Dichloroethane	99
cis-1,2-Dichloroethene	103
1,1,1-Trichloroethane	102
Carbon Tetrachloride	102
1,2-Dichloroethane	103
Trichloroethene	107
1,1,2-Trichloroethane	112
Tetrachloroethene	112
Chlorobenzene	112
1,1,2,2-Tetrachloroethane	112

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	95	70-130