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July 31, 2017

Ms. Dilan Roe
Chief – Land Water Division
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94501-6577

Subject: **Operations, Maintenance, and Monitoring Plan for Vapor Mitigation System**
Aster Apartments
6775 Golden Gate Drive
Dublin, California
Assessor's Parcel No. 941-1500-015-09
Post-Closure O&M Document Repository No. RO0003252

Dear Ms. Roe:

Enclosed please find the *Operations, Maintenance, and Monitoring Plan for Vapor Mitigation System* for the Aster Apartments site at 6775 Golden Gate Drive, in Dublin, California (Post-Closure O&M Document Repository RO0003252, GeoTracker Global ID T10000010517). This document was prepared by Amec Foster Wheeler Environment & Infrastructure, Inc., on behalf of Dublin Apartment Properties, LLC. The document was prepared to aid operators in operating, maintaining, and monitoring a vapor mitigation system at the site.

I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH's FTP server and the State Water Resources Control Board's GeoTracker website.

Please contact me at (408) 680-4938 or Avery Whitmarsh of Amec Foster Wheeler at (510) 663-4154 if you have any questions regarding this document.

Sincerely yours,

Pete Beritzhoff
Dublin Apartment Properties, LLC

Attachment: Operations, Maintenance, and Monitoring Plan for Vapor Mitigation System

cc: Colleen Winey, Zone 7 Water Agency (electronic copy only)
Gregory Shreeve, City of Dublin (electronic copy only)

OPERATIONS, MAINTENANCE, AND MONITORING PLAN FOR VAPOR MITIGATION SYSTEM

Aster Apartments
6775 Golden Gate Drive
Dublin, California

Prepared for:

Dublin Apartment Properties, LLC
Dublin, California

Prepared by:

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July 2017

Project No. 8617170810.1.2

OPERATIONS, MAINTENANCE, AND MONITORING PLAN FOR VAPOR MITIGATION SYSTEM
Aster Apartments
6775 Golden Gate Drive
Dublin, California

July 31, 2017
Project 8617170810

This document was prepared by the staff of Amec Foster Wheeler under the supervision of the Geologist whose signature appears hereon.

The findings, recommendations, specifications, or professional opinions are presented within the limits described by the client, in accordance with generally accepted professional engineering and geologic practice. No warranty is expressed or implied.

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Aster Apartments
6775 Golden Gate Drive
Dublin, California

1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, Inc. (“Amec Foster Wheeler”) has prepared this *Operations, Maintenance, and Monitoring Plan for Vapor Mitigation System* (“OMM Plan”) on behalf of Dublin Apartment Properties, LLC, to aid operators in operating, maintaining, and monitoring the vapor mitigation system (VMS) for the indoor air program at the Aster Apartments site, located at 6775 Golden Gate Drive, Dublin, California (the “site;” Figure 1).[1]

This OMM Plan was developed to meet the requirements set forth in an August 16, 2013 letter from Alameda County Department of Environmental Health (ACDEH, 2013), the *Final Feasibility Study and Corrective Action Plan* (FS/CAP; AMEC, 2014a), and the *Vapor Mitigation and Permeable Reactive Barrier Basis of Design Report* (“Design Report;” Amec Foster Wheeler, 2015a). The accepted corrective action for the site included installation of a VMS and a permeable reactive barrier (PRB), maintenance and performance monitoring, and long-term site management and institutional controls (IC). The operations, maintenance, and performance monitoring (OMM) of the VMS are discussed in this document. The OMM of the PRB is discussed in the *Operations, Maintenance, and Monitoring Plan for Permeable Reactive Barrier* (Amec Foster Wheeler, 2017c), long term site management is discussed in the *Site Management Plan* (SMP; Amec Foster Wheeler, 2017d), and the *Institutional Controls Plan* summarizes the ICs for the site, which includes a deed restriction (Amec Foster Wheeler, 2017b).

1.1 PROJECT BACKGROUND

This section presents a summary of the current site conditions, historical site uses, historical investigations, previous remediation, and redevelopment. More detailed site background information is presented in the Design Report.

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[1] The site was formerly known as the Crown Chevrolet North Parcel, with an address at 7544 Dublin Boulevard, Dublin California. The site was previously associated with Site Cleanup Program Case No. RO0003014 and GeoTracker Site ID T10000001616.

1.1.1 Site Current Conditions

The site is bounded by Dublin Boulevard to the north, Golden Gate Drive to the west, St. Patrick Way to the south, and retail businesses to the east. Three residential buildings (Buildings A, C, and D, consisting of four floors of residential apartments) and two mixed-use buildings (Buildings E and F, consisting of ground-floor retail units, with four floors of residential apartments above) are present, in addition to associated hardscape, landscaping, and a pool.

1.1.2 Historical Uses

The site was developed in 1968 as Crown Chevrolet, a car dealership with auto body and service shops, on land that appears to have been previously used for agricultural purposes. Operations as a car dealership and auto body/repair facility occurred from 1968 until 2013; operations were significantly reduced in the last several years of operation. In December 2014, the four historical site buildings were demolished.

The site originally consisted of one approximately 6.33-acre parcel, but was divided into north (4.97-acre) and south (1.36-acre) parcels in approximately 2000, when a new street, St. Patrick Way, was constructed. The environmental case for the south parcel was closed in 2014. In June 2017, the site acreage was further reduced (to 4.73 acres) by a right-of-way dedication that allowed for the City of Dublin to widen Golden Gate Drive.

1.1.3 Historical Investigations

Multiple investigations were conducted at the site from 2009 through 2015, as summarized in the FS/CAP; these investigations were performed to address regulatory concerns as well as in support of site property transaction and redevelopment activities.

The investigations identified two main environmental issues at the site. First, VOCs, primarily tetrachloroethene (PCE) and trichloroethene (TCE), have been detected in shallow groundwater and soil vapor throughout the northern portion of the site. Second, chlorobenzenes and related compounds (e.g., 1,2-dichlorobenzene and 1,4-dichlorobenzene) have been detected in soil, shallow groundwater, and soil vapor below former the former auto service building in the central portion of the site. Additionally, a soil investigation was performed during building demolition in 2014 and early 2015 that identified limited areas beneath the former building slabs that were primarily impacted by petroleum hydrocarbons.

Remedial activities were performed to address the chlorobenzenes and petroleum hydrocarbons beneath the historical site buildings. These included excavation of historical sumps and surrounding soil in 2011 (AMEC, 2011) and removal of other subsurface features and impacted soils in 2015 (Amec Foster Wheeler, 2015b). Additionally, a former underground storage tank was removed in 2012 (ENGEO, 2012). The remedial activities successfully addressed the soil impacts to concentrations consistent with protection of human health.

1.1.4 Corrective Actions for Redevelopment

The FS/CAP and Design Report detailed recommendations for a PRB to treat VOC-impacted groundwater as it enters the Site from the west, and a VMS to mitigate potential risks to future building occupants from VOC-impacted soil vapor. The PRB was installed in 2015 (Amec Foster Wheeler, 2016), and was designed to provide a permeable treatment zone to facilitate dechlorination of PCE-impacted groundwater that flows though the permeable barrier and onto the site.

The VMS, which includes a vapor barrier and passive sub-slab venting (SSV) system beneath mixed-use commercial and residential buildings at the site, was installed in 2016 during building construction and began operation in May 2017. The VMS construction was certified by Amec Foster Wheeler in the *Vapor Mitigation System Construction Completion Certification* (Amec Foster Wheeler, 2017a). The specific objectives of the VMS are as follows:

- Mitigate the potential for soil vapor beneath future building slabs to contribute to unacceptable risk in indoor air by installing a robust vapor membrane beneath the new foundations, and installing vapor collection piping below the membrane to passively vent sub-slab vapors above the roofline.
- Maintain vapor concentrations within the buildings below long-term indoor air quality objectives for PCE and its breakdown products and short-term action levels for TCE.
- Provide a mitigation system that is passive and requires minimal operations and maintenance.
- Allow for conversion from a passive system to an active system, if needed.

The performance of the VMS is monitored by 15 vent risers accessed from the roof of the site buildings.

OMM of this VMS is discussed in the following sections of this document. The OMM of the PRB is discussed in the *Operations, Maintenance, and Monitoring Plan for Permeable Reactive Barrier* (Amec Foster Wheeler, 2017c).

1.2 KEY PERSONNEL

Multiple personnel are involved in the OMM of the PRB; a list of key personnel, their primary responsibilities with respect to the OMM, and specific contact information are provided in Appendix A. Appendix A will be updated as needed when any key personnel (or their contact information) change. Subsequent references to these roles within this OMM Plan will refer to the personnel roles by title only, so that changes to the assigned roles require only that Appendix A be updated. The primary entities referenced in this Plan include the following:

- Owner – Current property owner or their agent responsible for managing the property at any given time. The Site is currently owned and operated by Dublin Apartment Properties, LLC.

- OMM Contractor – Party retained by Owner responsible for managing and performing OMM activities.

1.3 PROCEDURE FOR REVISING OMM PLAN

This OMM Plan will be updated to ensure that all information is accurate and fully describe all OMM procedures. The evaluation checklist will be completed annually and the OMM Plan updated as necessary.

	Evaluation Checklist	Yes	No
1.	Have the contacts listed in the original OMM Manual Appendix A changed?		
2.	Has there been a change to the process?		
3.	Have additional tasks been added to the project, which were not originally addressed in the plan?		
4.	Have new contaminants or higher than anticipated levels of original contaminants been encountered?		
5.	Have other safety, equipment, activity or environmental hazards been encountered that are not addressed in the manual?		

The OMM Contractor shall perform OMM Plan updates as follows:

1. Determine need to update OMM Plan based on Evaluation Checklist above.
2. Prepare changes and updates for review.
3. Provide to Owner for review.
4. Sign off, finalize and reissue modified sections.
5. Distribute addenda to all holders for insertion and/or replacement, with instructions to dispose of all outdated sections or copies where appropriate.

1.4 HEALTH AND SAFETY

The OMM Contractor is responsible for maintaining a site-specific Health and Safety Plan (HASP) related to the OMM activities. The HASP will include activity hazard analyses for the tasks required by this OMM Plan. Any additional subcontractors that perform work related to OMM activities are responsible for maintaining a separate HASP related to, at a minimum, general site safety and the work the contractor has been hired to perform. The site HASP shall be the primary source for current health and safety requirements. A copy of the HASP must be kept on site at the designated on-site record storage location and must be accessible to personnel performing the tasks described herein.

1.5 SITE ENTRY AND EXIT PROCEDURES

Vehicle parking and access into the buildings and onto rooftops is arranged with the Owner. OMM activities requiring access into occupied tenant units, if necessary, will require additional coordination and advance notice.

1.6 PERSONNEL TRAINING AND LICENSE REQUIREMENTS

Field personnel are required to have 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training, as outlined in 29 Code of Federal Regulations (CFR) Part 1910.120. This includes initial training and 8 hours of current annual refresher training and medical surveillance.

OMM report documents will be prepared under the direction of and reviewed by a California Professional Engineer. There are no license requirements to perform OMM for the VMS.

2.0 VMS DESIGN DESCRIPTION

The VMS consists of a vapor membrane and a passive SSV system that were installed during construction of the building foundations. The VMS was installed beneath the entirety of Buildings D, E, and F, and partially beneath Buildings A and C (Figure 2 and Appendix B). The vapor membrane provides the primary mitigation measure for the VMS by creating a physical barrier that has an extremely low permeability to soil vapor. Correct installation of a properly designed vapor membrane should be sufficient to mitigate the risks of vapor intrusion to indoor air. As an added mitigation measure, the sub-slab area is passively vented to limit the accumulation of soil vapors beneath the slab, reducing the concentration gradient across the vapor membrane and therefore further reducing the risk to indoor air.

The VMS design consists of the following main elements:

- Approximately 45,000 square feet of vapor membrane with a minimum 60 mil-thick, spray-applied Geo-Seal® Core below Buildings A, C, D, E, and F (Figure 2); and
- Sub-slab vapor collection piping within a permeable base layer beneath the membrane, which is passively vented through a total of 15 CSR Edmonds Hurricane Model H-150 wind powered turbine ventilators located at the termination of the vent riser piping along the corresponding rooflines (Figure 3).

As part of, and supplemental to the VMS, utility trench plugs are installed along the building foundations where utilities enter the building footprints to establish an impermeable collar. The trench plugs are intended to prevent preferential flow of potentially contaminated soil vapor from areas outside the building footprint to the sub-slab area, as well as a geotechnical measure (Rockridge Geotechnical, 2015) to prevent water from entering the sub-slab area. The plugs consist of a concrete sand slurry backfill material that is installed at each location over a length of 3 feet along the trench axis.

As-built drawings of the constructed VMS are presented in Appendix B, and include vapor vent details. Additional details related to the VMS design, including the design basis, are included in the Design Report.

3.0 PERFORMANCE MONITORING

The performance monitoring for the VMS consists of the following activities:

1. Inspection of the physical integrity of the SSV system components;
2. Flow parameter monitoring at each SSV system vent riser; and
3. Sample collection at each SSV system vent riser and laboratory analysis for selected VOCs.
4. Permit-required sampling and monitoring.[2]

The following subsections include details on the monitoring program objectives and monitoring methodology and frequency.

3.1 OBJECTIVES

The specific objectives of the VMS performance monitoring program are to:

1. Assess the physical integrity of the vapor mitigation membrane;
2. Ensure the SSV system is functioning as designed and inspect its physical integrity; and
3. Monitor and assess the venting of sub-slab vapors.

3.2 SYSTEM OPERATIONS

The VMS, specifically the SSV system, operates passively though a combination of stack effect (i.e., warmer air naturally rising) and the wind driven turbines. Although actual operations may vary and are dependent on temperature differential and wind conditions, the SSV system is designed to operate continuously. Therefore, the system does not require specific startup and shutdown procedures.

3.3 PHYSICAL INSPECTIONS

The OMM contractor will conduct physical inspections during each routine monitoring event to assess the condition of visible portions of the SSV system. The methodology for the physical inspections is included in Appendix C. Documentation, notification, and reporting of routine inspections, damages and/or repairs will be performed as outlined in Section 7.0.

The Owner/Operator must notify the OMM Contractor of any planned foundation penetrations. However, physical inspections of the building surroundings will also be performed by the OMM Contractor as part of the annual inspection that is a requirement of the SMP. Building surroundings will be inspected for indications of underground utility construction or trenching

[2] Bay Area Air Quality Management District (BAAQMD) air permit requirements are specified on the Permit to Operate issued for the system (Appendix E).

activities that may be associated with building foundation penetrations or interior penetrations, and documented as described in the SMP.

If potential damage to the vapor mitigation membrane is identified during a VMS inspection or the annual inspection per the SMP, the OMM Contractor will notify the Owner/Operator of the observations. The Owner/Operator will provide documentation of the activity that occurred in the area to confirm that the vapor mitigation membrane was not disturbed.

If physical inspections performed by the OMM Contractor indicate that a component of the VMS has been damaged, the damaged component will be repaired in accordance with vapor membrane manufacturer's requirements or replaced to its original condition as documented in the as-built drawings (Appendix B). All construction work that includes cutting or drilling through the floor slab, walls, and/or ceiling shall be overseen by a third-party professional engineer retained by the Owner/Operator or OMM Contractor to ensure compliance with the OMM Plan. More information regarding VMS repairs is included in Sections 5.1 and 5.2 of this report.

3.4 FLOW MONITORING REQUIREMENTS

To evaluate the effectiveness of the VMS, SSV system performance data will be collected at each vent riser during each routine monitoring event. The vent riser flow monitoring will be performed in accordance with the methods included in Appendix C.

3.5 SAMPLING

The OMM Contractor will collect vapor samples from the vent risers to evaluate SSV system performance during each routine monitoring event. Depending on vent riser sampling results, indoor air samples may be collected near typical vapor intrusion pathways to verify that the VMS is meeting its objectives. Details regarding the routine vent riser sampling and potential indoor air monitoring are provided in the following subsections.

3.5.1 Vent Riser Sampling

In addition to collection of flow monitoring data (Section 3.4) from each vent riser, total VOC concentrations will be measured and vent riser samples will be collected. The vent riser sampling will be performed in accordance with the methods included in Appendix C.

The collected sub-slab vapor samples will be sent to a California Environmental Laboratory Accreditation Program–accredited laboratory for analysis of the site constituents of concern (COCs) using U.S. Environmental Protection Agency (U.S. EPA) Method TO-15 or the currently approved method at the time of sampling. The site COCs include the following VOCs[3]:

- PCE,
- TCE,
- cis-1,2-Dichloroethene (cis-1,2-DCE),
- trans-1,2-Dichloroethene (trans-1,2-DCE),
- 1,1-Dichloroethene (1,1-DCE),
- Vinyl chloride,
- Benzene,
- Chlorobenzene,
- 1,2-Dichlorobenzene (1,2-DCB), and
- 1,4-Dichlorobenzene (1,4-DCB).

The sample collection method and equipment (e.g., Tedlar® bags or SUMMA canisters) will be selected by the OMM Contractor, taking into consideration the holding time limitations, based on the estimated VOC concentrations and the reporting limits required for compliance (for example, laboratory reporting limits will be higher using smaller-volume Tedlar bags than larger-volume SUMMA canisters).

With ACDEH concurrence, monitoring after the first year may be simplified to rely on PID readings rather than laboratory analyses if the results demonstrate steady or decreasing concentrations over time.

3.5.2 Indoor Air Sampling

An evaluation included in the FS/CAP indicated that the vapor mitigation membrane would be protective against soil vapor concentrations up to four orders of magnitude greater than the maximum detected on-site concentrations of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. Table 1, below, presents the current indoor air screening level (as of publication of this document), maximum detected on-site concentration in soil vapor, and the calculated level of protection of the vapor barrier for each of the COCs.

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[3] Additional VOCs may be analyzed, as needed, to comply with the conditions set forth in the by Bay Area Air Quality Management District (BAAQMD)–issued Permit to Operate (Appendix E).

TABLE 1

CURRENT INDOOR AIR SCREENING LEVEL

COC1	Indoor Air Screening Level2 (µg/m3)	Maximum Detected On-Site Concentration (µg/m3)	Maximum Concentration Allowable beneath Vapor Barrier per FS/CAP (µg/m3)	One Order of Magnitude Greater than Maximum Detected On-Site Concentration (µg/m3)
PCE	0.48	35,000	2.5 x 107	350,000
TCE	0.48 2 / 63	12,000	3.5 x 107	120,000
cis-1,2-DCE	8.3	1,300	2.2 x 109	13,000
trans-1,2-DCE	83	3,600	3.8 x 109	36,000
1,1-DCE	73	840	--	8,400
Vinyl chloride	0.0095	510	1.9 x 106	5,100
Benzene	0.097	1,300	--	13,000
Chlorobenzene	52	860	--	8,600
1,2-DCB	210	32,000	--	320,000
1,4-DCB	0.26	3,300	--	33,000

Notes

1. Table extracted from FS/CAP (AMEC, 2014a) and amended to present relevant information. Maximum detected on-site concentrations are extracted from the 2012 Soil, Groundwater, and Soil Vapor Investigation Report (AMEC, 2012).
2. Indoor Air Screening Levels from Table IA-1 of the February 2016 Environmental Screening Level (ESL) Workbook (Water Board, 2016). Current ESLs can be found here: http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.shtml.
3. Accelerated and Urgent Response Action Levels for TCE promulgated by the California Department of Toxic Substances Control in Human and Ecological Risk Office (HERO) Human Health Risk Assessment Note 5 (DTSC, 2014).

Abbreviations

ESL = Environmental Screening Level
FS/CAP = Final Feasibility Study and Corrective Action Plan
µg/m3 = micrograms per cubic meter
-- = Not available. No value was determined for this chemical.

Although the vapor mitigation membrane is designed to be protective against concentrations up to four orders of magnitude greater than those previously detected on-site, indoor air sampling is conservatively planned if concentrations in the vent riser samples show a significantly increasing trend. Specifically, if the results for any individual COC in samples collected from the vent risers exceed one order of magnitude greater than the maximum concentration of that COC detected during historical soil vapor sampling at the site for two consecutive sampling events within one building, indoor air sampling will be conducted throughout that building to confirm the effectiveness of the VMS.

The indoor air sample locations will be chosen so that samples are collected from living and working spaces as well as typical vapor intrusion pathways, such as bathrooms and kitchens.

Access to these areas will be coordinated with the Owner/Operator prior to sampling. One ambient air sample will be collected from an upwind, outdoor location represent background concentrations (likely from the roof near an intake for the heating, ventilation, and air conditioning system [HVAC]). The HVAC system will remain on during sampling to represent typical living conditions.

The indoor air samples will be collected over a 24-hour period using laboratory-provided sampling equipment and analyzed for the same suite of COCs provided above in Section 3.5.1 using U.S. EPA Method TO-15 (or the currently approved method at the time of sampling). The indoor air samples will be collected in accordance with the methods presented in Appendix D.

3.6 MONITORING FREQUENCY

The VMS monitoring and sampling will be conducted monthly for the first year of VMS operation (from May 2017 through April 2018). The monitoring will be conducted quarterly for years two through five (i.e., May 2018 through April 2021).[4]

The VMS monitoring will be conducted as part of two separate phases, as follows:

- The performance monitoring phase is anticipated to occur during the first year of monitoring.
- Based on the results during the performance monitoring phase, the monitoring may transition into an operations and maintenance (O&M) phase following confirmation of one year of effective mitigation. The confirmation of effective mitigation and the transition to the O&M phase are subject to ACDEH approval.

The OMM Contractor in coordination with the Owner/Operator will determine if a transition to O&M phase is appropriate, based on the performance data collected, and seek approval from ACDEH.

Indoor air sampling may be conducted, if needed, depending on the results of vent riser monitoring, as discussed in Section 3.5.2.

3.7 RECORD MANAGEMENT

Monitoring and inspection activities will be documented on the Vapor Mitigation System Inspection Form (included in Appendix C). All completed Vapor Mitigation System Inspection Forms will be retained by the OMM Contractor. The OMM Contractor will provide copies of maintenance and monitoring records to be maintained on site.

A copy of this OMM Plan, inclusive all updates or addenda, will be maintained on site. The on-site storage area for these documents and other environmental records is located within the

[4] Additional monitoring may be performed, as needed, to comply with the conditions set forth in the BAAQMD-issued Permit to Operate (Appendix E).

leasing office. Additionally, all relevant environmental documents for the site will be retained in ACDEH's Post-Closure O&M Document Repository No. RO0003252.

4.0 DATA EVALUATION

Data evaluation will occur following each routine monitoring event and following any required indoor air sampling, as described below.

4.1 ROUTINE EVALUATION

The data collected during each monthly inspection will be evaluated to determine system performance at time of inspection and will be compared to prior site data to evaluate performance over time.

Measured flow rates and sub-slab vapor VOC concentrations will be used to estimate the emissions from each vent riser. Actual flow rates and concentrations will vary with atmospheric conditions due to the passive VMS design; therefore, the emission estimates should be evaluated over time as an average to confirm the total combined emissions (aggregate of all vents) of less than 1 pound per day as required by BAAQMD regulations for unabated sources, as discussed in the Design Report.

As noted in Section 3.5.2 above, if the results for any individual COC in samples collected from the vent risers exceed one order of magnitude greater than the maximum concentration of that COC detected during historical soil vapor sampling at the site for two consecutive sampling events within one building, indoor air sampling will be conducted throughout that building to confirm the effectiveness of the VMS.

4.2 EVALUATION OF INDOOR AIR SAMPLING RESULTS

VMS performance may be further evaluated by indoor air sampling if the routine vent riser monitoring results indicate the need for indoor air monitoring, as described in Section 3.5.2, above.

The indoor air results will be compared to Environmental Screening Levels (ESL) for indoor air (in a residential land use scenario) published by the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board, 2016). If indoor air results are below ESLs (those listed in Table 1 or those currently in effect at the time), then the effectiveness of the VMS will be considered confirmed and no additional indoor air sampling will be required as a response to future vent riser sampling results that exceed one order of magnitude greater than the maximum detected on-site concentration. However, if future vent riser sample results of the same VOC in that building's riser(s) increase to one order of magnitude greater than the maximum concentration of the VOC detected during historical soil vapor sampling at the site, the potential need for additional indoor air sampling will be discussed with ACDEH.

If any indoor air sample results exceed their respective ESLs, ACDEH will be notified and a confirmation sample will be collected as soon as practical near the sampling location(s) where screening level(s) was exceeded. Additionally, an evaluation will be performed to confirm that the detected VOC is related to vapor intrusion and not an indoor source (e.g., dry cleaning). If the confirmation sample results exceed the same screening level and the presence of the VOC(s) is related to vapor intrusion, ACDEH will be contacted to discuss the conversion of the passive SSV system into an active sub-slab depressurization system. More information on this conversion process is included in Section 5.3.

If any indoor air sample results exceed the Urgent or Accelerated Response Action Levels (URALs or ARAL) for TCE (or if any other short-term action levels that may be promulgated following publication of this document), ACDEH will be immediately notified. Interim measures may be taken, including increasing building pressurization and/or ventilation, treating indoor air via filtration or air purifiers, or temporarily relocating occupants. ACDEH will be contacted to discuss the conversion of the passive SSV system into an active sub-slab depressurization system.

5.0 NON-ROUTINE ACTIVITIES

Non-routine activities may include repairs to the SSV system components, modifications made to the buildings that may affect vapor barrier integrity, and conversion of the passive SSV into an active sub-slab depressurization system.

5.1 SSV COMPONENT REPAIRS

If any physical inspection of the VMS reveals a damaged SSV system component, the Owner will repair or replace the component to its original condition as documented in the as-built record drawings (Appendix B) as soon as practicable. Any corrective actions will be determined by a Professional Engineer licensed in the State of California in consultation with, and following approval by, ACDEH.

Any work done to repair the VMS piping will be carried out while preventing vapors from being vented into enclosed areas. The exposed end of the pipe connected to the sub-slab vapor vent piping will remain routed to the roof vent or capped at all times during repair activities.

5.2 PENETRATION REPAIRS

If any building modifications that penetrate through the foundation and vapor barrier occur, the Owner must repair the vapor barrier under the oversight of a Professional Engineer licensed in the State of California in consultation with, and following approval by, ACDEH. All penetrations must be repaired in accordance with manufacturer requirements and specifications, as stated in the ICs. The Owner will confirm with the OMM Contractor that no building modifications to the building slab have occurred since the time of the last physical inspection.

If any physical inspection of the VMS reveals that an undocumented penetration of the vapor barrier may have occurred, the Owner must contact ACDEH and inform them of the potential non-compliance.

5.3 CONVERSION TO ACTIVE SUB-SLAB VENTING SYSTEM

The VMS is designed so that it can be converted to an active sub-slab depressurization system, with the addition of powered ventilators, if performance monitoring results indicate that the passive VMS is not performing as intended. If indoor air samples are collected and indicate that the passive SSV system is not providing adequate protection to the building tenants, the Owner will come to an agreement with ACDEH regarding system conversion.

6.0 PROTECTION PLAN

The following best management practices are intended to prevent reductions in VMS longevity and effectiveness resulting from ordinary site practices:

- As-built record drawings of the VMS are maintained at the site as part of this OMM Plan. These drawings will be referenced in the event that subsurface excavations or repairs are conducted in the vicinity of the VMS at a future date to minimize the potential for inadvertently damaging the any VMS components.
- Visual inspections of the VMS will be conducted during performance monitoring site inspections and during the annual SMP inspection, as described in Section 3.3 and Appendix C.
- The VMS inspection results will be reported to ACDEH. The need for any repairs or maintenance will first be discussed with ACDEH and any repairs or maintenance performed will be documented, as described below.

7.0 REPORTING

Requirements for both routine and non-routine reporting are discussed in the following sections.

7.1 ROUTINE REPORTING TO ACDEH

Following completion of each site inspection and performance monitoring event, the Owner or OMM Contractor will provide ACDEH via email a copy of the site inspection reports, tabulated analytical data, and a statement certifying IC compliance indicating that all IC objectives have been maintained. The email will include confirmation that the VMS is operating as intended or note if any performance issues have been identified.

Comprehensive monitoring reports, including the analytical results from the VMS performance monitoring and an evaluation of system performance, will be submitted on an annual basis. The submittals for the VMS will be coordinated with the submittals for the PRB to simplify reporting.

7.2 NON-ROUTINE REPORTING TO ACDEH

Additional reporting requirements beyond routine reporting will apply when any site conditions out of compliance with ICs or the requirements of this OMM plan are identified. Upon determining lack of compliance with IC restrictions, the Owner will notify ACDEH with a written explanation that describes the nature of the specific, inconsistent action, and the efforts or measures that have been or will be taken to correct the action. The associated time frame to correct the inconsistent action will also be provided.

If any corrective actions are required to address performance issues with the VMS, a work plan for the corrective action will be provided to ACDEH for review and approval prior to implementation. Additionally, a report documenting the corrective action will be provided to ACDEH following implementation.

7.3 ROUTINE REPORTING TO BAAQMD

The SSV system is operated under a Permit to Operate from the BAAQMD (Appendix E). Reporting for construction, start-up, and routine OMM will follow the permit conditions specified by the BAAQMD. If actual flow rates or concentrations are less than anticipated and result in calculated yearly emissions below chronic trigger levels, BAAQMD may be petitioned to rescind the Permit to Operate requirement for the site.

8.0 REFERENCES

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AMEC, 2014a. Final Feasibility Study and Corrective Action Plan, Crown Chevrolet Cadillac Isuzu, 7544 Dublin Boulevard and 6707 Golden Gate Drive, Dublin, California, May 1.

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2015a, Vapor Mitigation and Permeable Reactive Barrier Basis of Design Report, Crown Chevrolet Cadillac Isuzu, 7544 Dublin Boulevard, Dublin, California, March (date to be updated).

Amec Foster Wheeler, 2015b, Post-Demolition Investigation and Remediation Report, Crown Chevrolet Cadillac Isuzu, 7544 Dublin Boulevard, Dublin, California, May (date to be updated).

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Amec Foster Wheeler, 2017a. Vapor Mitigation System Construction Completion Certification, Aster Apartments, 6775 Golden Gate Drive, Dublin, California, July 17.

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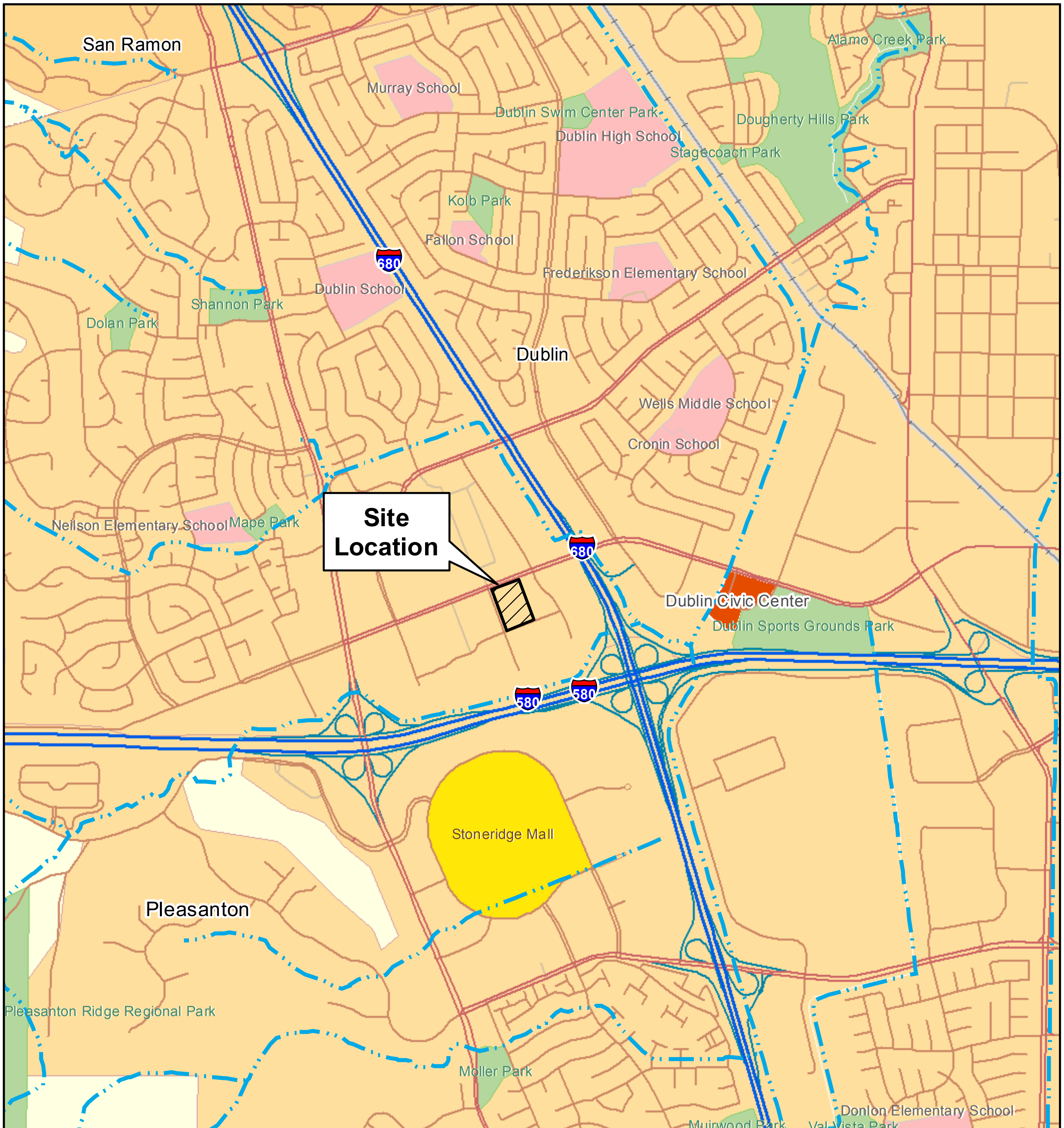
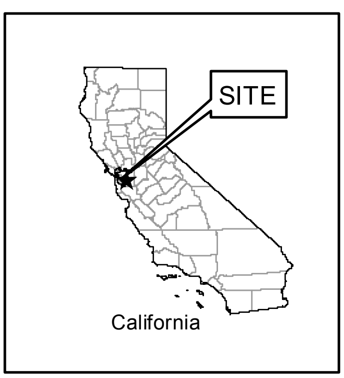
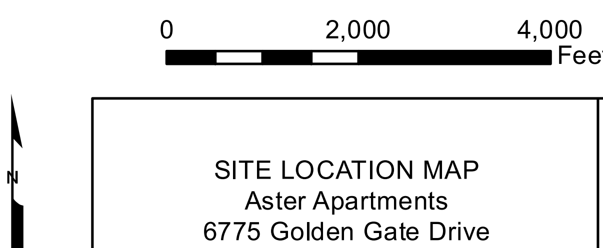
San Francisco bay Regional Water Quality Control Board (Water Board). 2016. Environmental Screening Levels, February. http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.shtml

FIGURES



Street map from ESRI, 2007.





SITE LOCATION MAP Aster Apartments 6775 Golden Gate Drive Dublin, California		amec foster wheeler
Date: 07/17/2017	Project No. 8617170810	Figure 1

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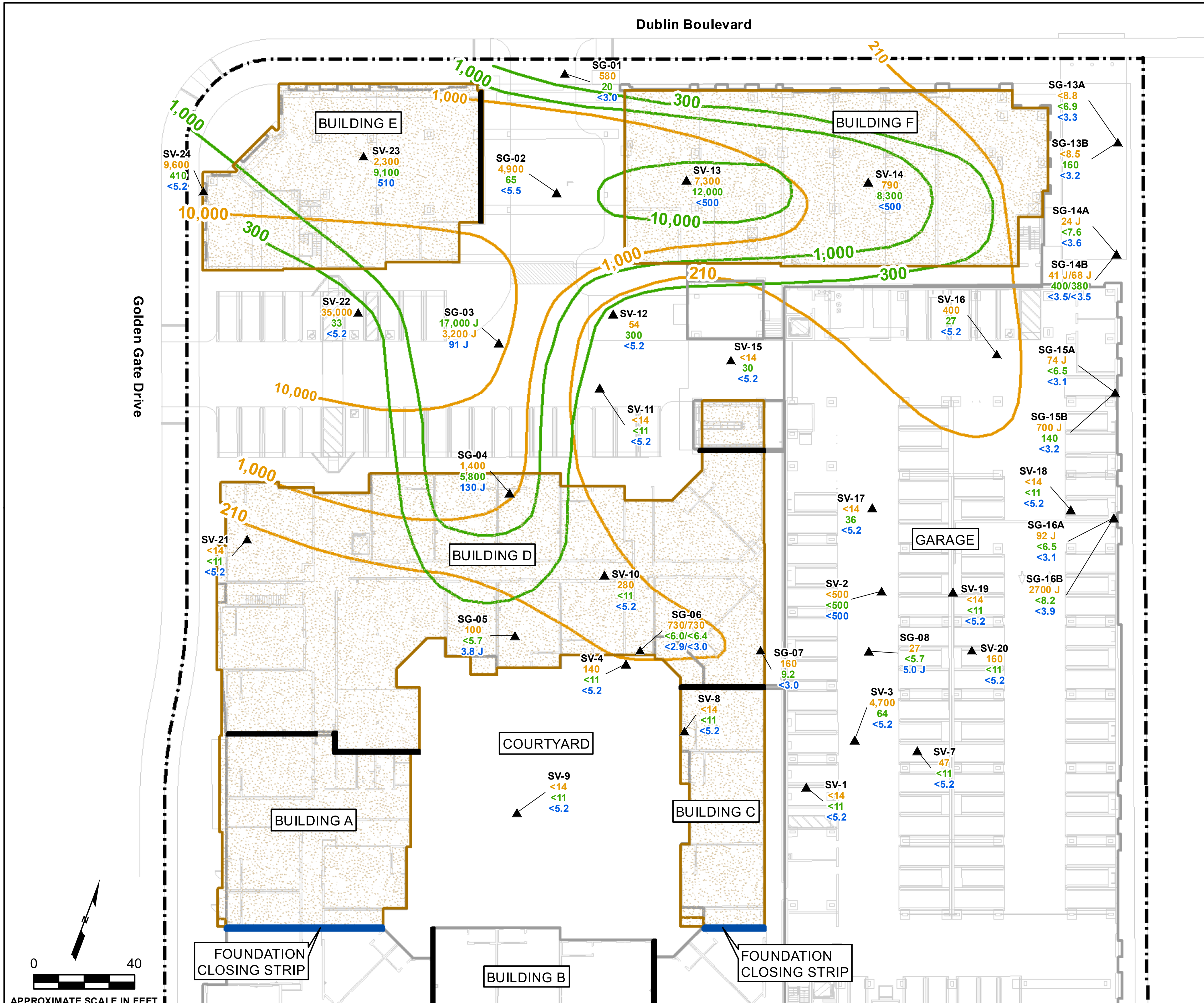

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Explanation

210 Approximate line of equal PCE concentration

1,000 Approximate line of equal TCE concentration

"A" indicates sample from 4 feet bgs;
"B" indicates sample from 8 feet bgs.

SG-14B ← Well/Boring ID
41 J/68 J ← PCE concentration in µg/m³
400/380 ← TCE concentration in µg/m³
<3.5/<3.5 ← VC concentration in µg/m³

Duplicate data

Soil Vapor ESLs (µg/m³) (Residential Land Use)	
PCE	210
TCE	300
Vinyl chloride	16

Soil vapor mitigation membrane extents

Building boundary (fire wall)

Soil vapor sample location

Approximate property line

Abbreviations:
bgs = below ground surface
ESL = Environmental Screening Level
PCE = tetrachloroethene
TCE = trichloroethene
UST = underground storage tank
VC = vinyl chloride
µg/m³ = micrograms per cubic meter
< = not detected at or above laboratory reporting limit shown
J = estimated value

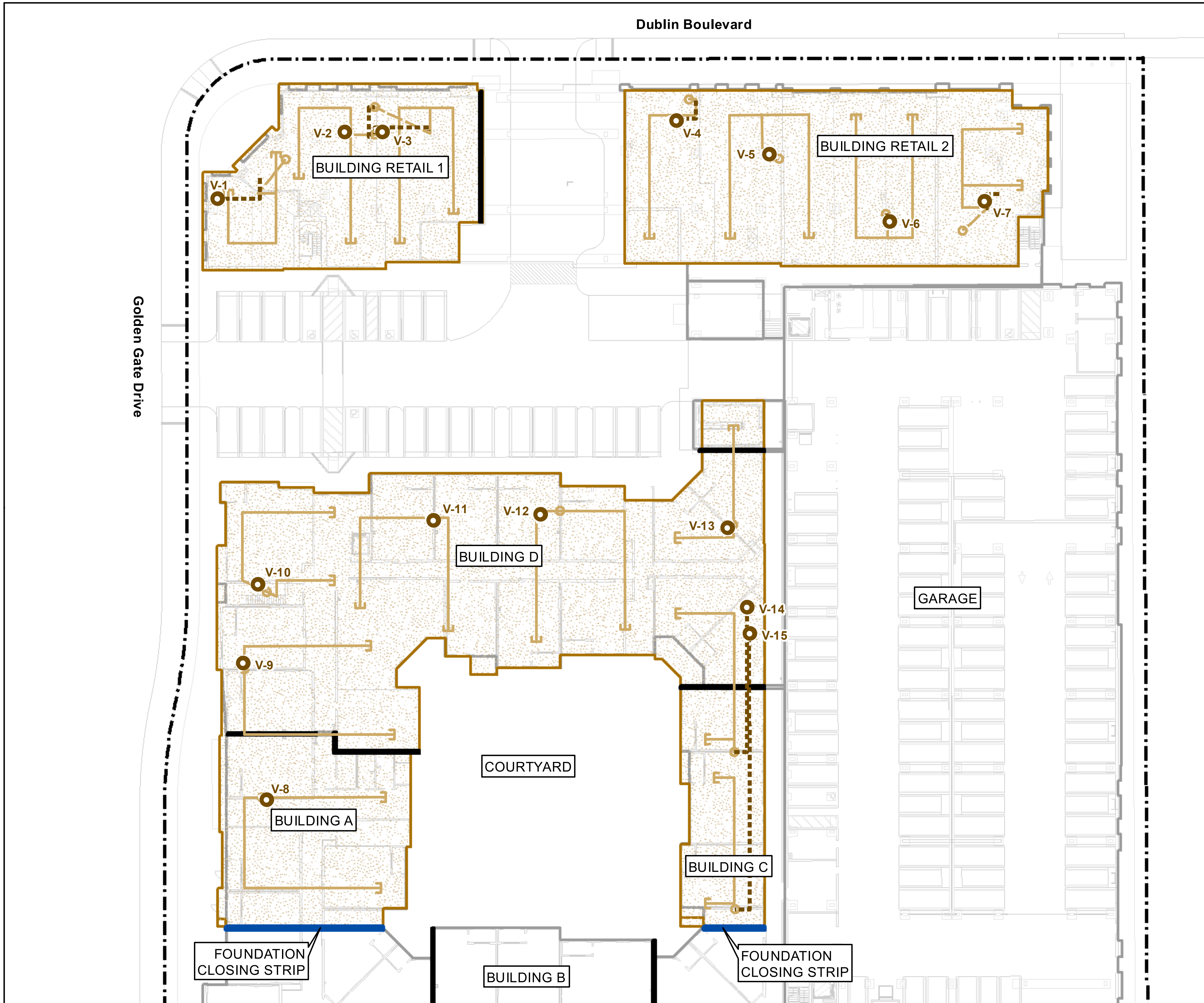
Notes:
1. SV-3 was not used in contouring, as the sample was collected within a concrete pit that has since been removed. PCE data from the shallow ports of SG-13 through SG-16 (i.e., 4 feet below ground surface) were used in contouring. Data from the deeper "B" ports of SG-13 through SG-16 (i.e., 8 feet below ground surface) were not used in contouring.
2. Locations of structures and foundation layouts provided by Carlon, Barbee, & Gibson, Inc., and BDE Architecture in January 2015.
3. ESLs from California Regional Water Quality Control Board, San Francisco Region, 2013, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Table E2, Soil Gas Screening Levels for Evaluation of Potential Vapor Intrusion.

SOIL VAPOR MITIGATION MEMBRANE AND SOIL VAPOR CONCENTRATIONS
Aster Apartments
6775 Golden Gate Drive
Dublin, California

amec foster wheeler

Date: 07/17/2017 | Project No. 8617170810

Figure 2



Abbreviation:
VMS = vapor mitigation system

Note:
1. Locations of structures and foundation layouts provided by Carlson, Barbee, & Gibson, Inc., and BDE Architecture in January 2015.

SUB-SLAB VENTING SYSTEM
Aster Apartments
6775 Golden Gate Drive
Dublin, California

amec foster wheeler

Date: 07/20/2017 | Project No. 8617170810

Figure 3

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APPENDIX A

Key Personnel

APPENDIX A

KEY PERSONNEL

Aster Apartments
6775 Golden Gate Drive
Dublin, California

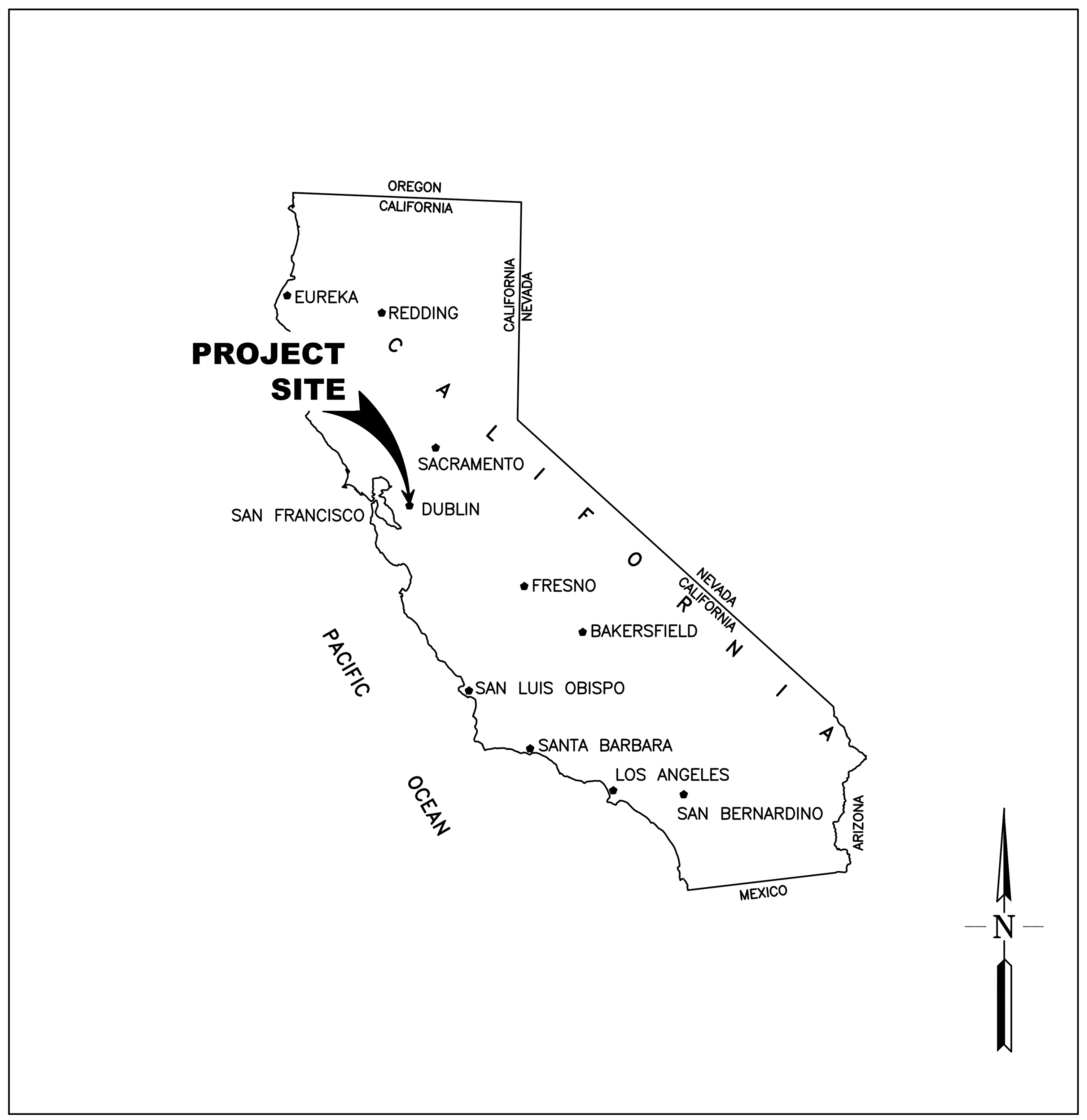
Project Role	Entity	Title	Contact	Primary Responsibilities
Owner	Dublin Apartment Properties, LLC	Project Manager	Pete Beritzoff (408) 680-4938 (cell)	• Report directly to ACDEH • Ensure that OMM activities are conducted according to the Plan • Coordinate site access between OMM Manager and Site Manager
		Site Manager	Adam Lambert (415) 509-1441 (cell)	• Provide site access for OMM Manager
OMM Contractor	Amec Foster Wheeler Environment & Infrastructure, Inc.	Project Manager	Avery Whitmarsh (510) 663-4154 (office) (415) 378-3912 (cell)	• Report directly to Owner • Ensure that OMM activities are conducted according to the Plan
		OMM Manager	Hilary Nevis (510) 663-4152 (office) (510) 301-4943 (cell)	• Oversee and/or perform OMM activities according to the Plan
Regulator	Alameda County Department of Environmental Health	Chief – Land Water Division	Dilan Roe (510) 567-6767 (office)	• Provide regulatory oversight for environmental work at the site.

Note
1. This table will be updated as responsible entities and/or contact information changes.

APPENDIX B

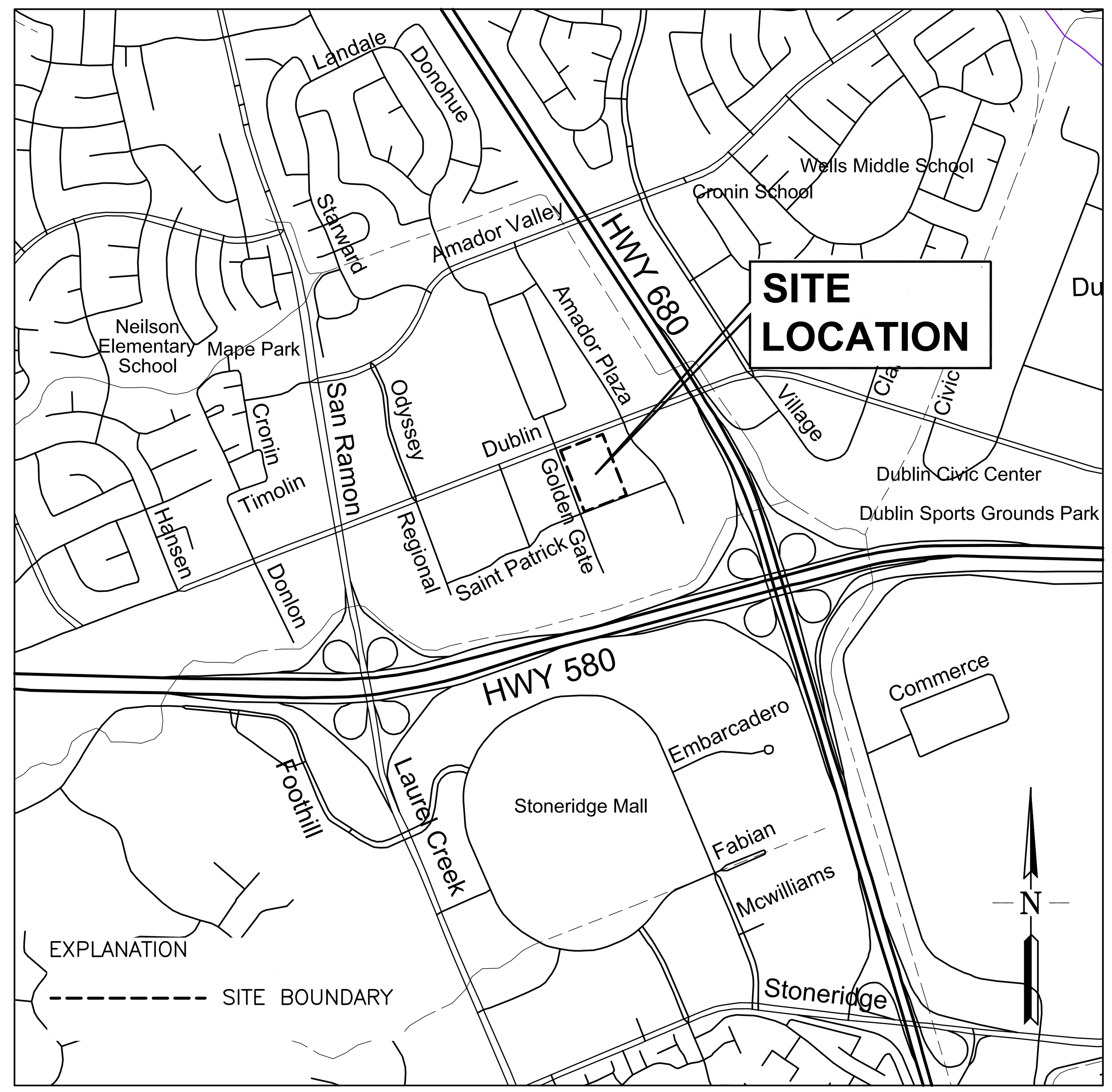
As-Built Record Drawings

VAPOR MITIGATION SYSTEM (VMS)
DUBLIN APARTMENTS - CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA



SITE LOCATION MAP

NOT TO SCALE



SITE VICINITY MAP

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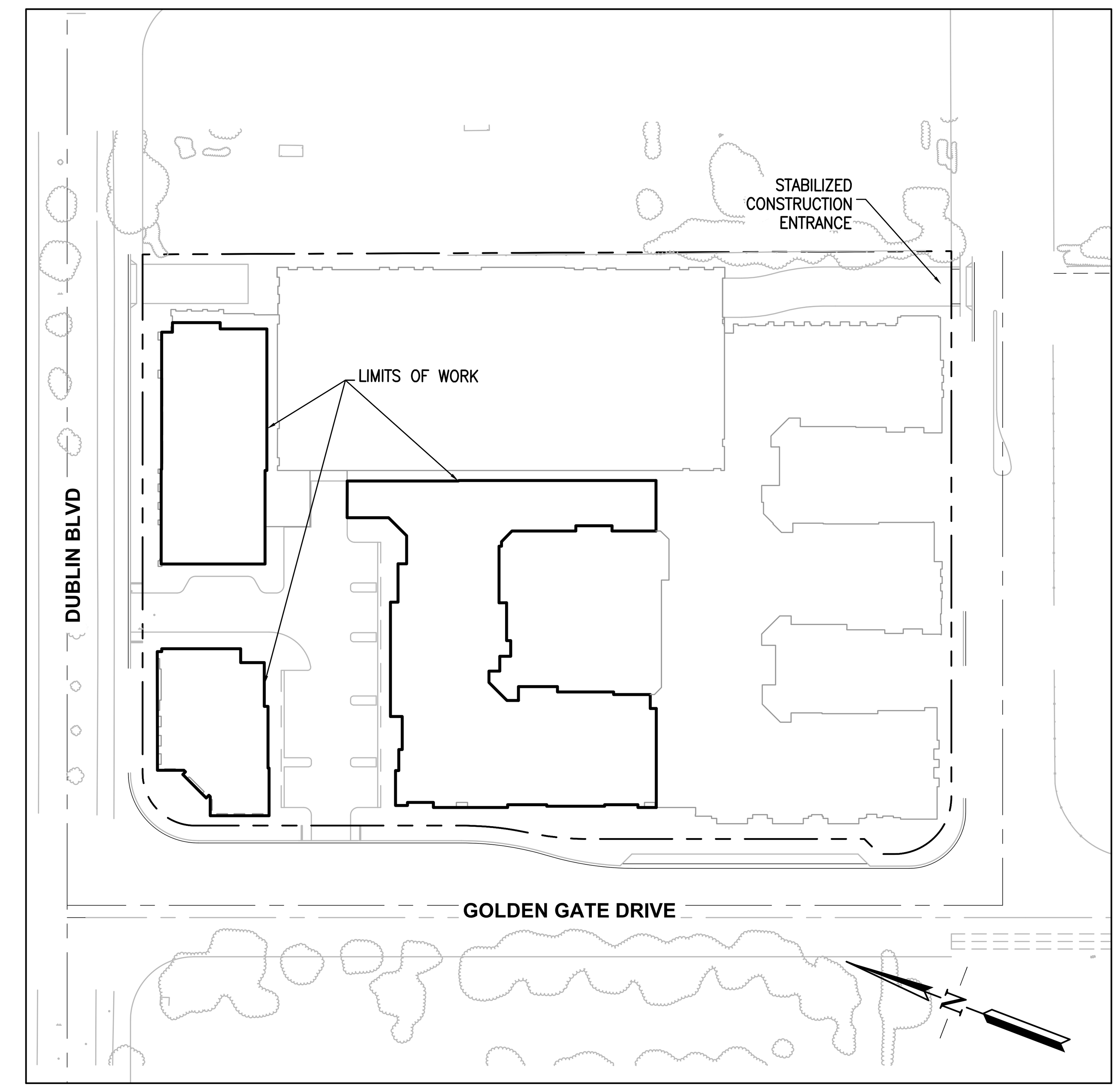
APPROXIMATE SCALE IN FEET



SITE MAP

60 0 60 120

APPROXIMATE SCALE IN FEET

LIST OF DRAWINGS

SHT NO.	DWG NO.	DWG NAME
1	G–1	LIST OF DRAWINGS, SITE VICINITY, AND LOCATION MAPS
2	G–2	GENERAL NOTES AND ABBREVIATIONS
3	VMS–1A	MEMBRANE AND SUB–SLAB VENTING SYSTEM PLAN
4	VMS–1B	RISER VENT PLAN – 1st FLOOR
5	VMS–1C	RISER VENT PLAN – 2nd FLOOR
6	VMS–2	PODIUM MEMBRANE INSTALLATION DETAILS
7	VMS–3	PT SLAB MEMBRANE INSTALLATION DETAIL
8	VMS–4	SUB–SLAB VENTING SYSTEM DETAILS
9	VMS–5	SUB–SLAB VENTING SYSTEM DETAILS

100% DESIGN SUBMITTAL JUNE 2015

ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

REGISTERED PROFESSIONAL ENGINEER DOUGLAS C. BABLITCH No. C64096 EXP. 09-30-16 CIVIL STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APVD

DSGN A. ANG DRFT J. GRAUL CHK F. SZERDY APVD D. BABLITCH

SOIL VAPOR MITIGATION SYSTEM
DUBLIN APARTMENTS
CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA

LIST OF DRAWINGS
SITE VICINITY
AND SITE LOCATION MAPS

amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, Inc.
180 GRAND AVENUE, SUITE 1100
OAKLAND, CALIFORNIA 94612

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	06/08/15
PROJECT NO.	OD14170800
DWG	G-1
SHEET	1 OF 9

GENERAL NOTES

GENERAL NOTES:

1. FOR THE PURPOSE OF THE VAPOR MITIGATION SYSTEM (VMS) DRAWING SET, THE FOLLOWING DEFINITIONS APPLY:

   A. OWNER / CONSTRUCTION MANAGER:
   BAY WEST DEVELOPMENT (BWD DUBLIN)
   2 HENRY ADAMS STREET, SUITE 450
   SAN FRANCISCO, CA 94103

   B. VMS ENGINEER:
   AMEC FOSTER WHEELER
   180 GRAND AVENUE, SUITE 1100
   OAKLAND, CA 94612

   C. CIVIL ENGINEER:
   CARLSON, BARBEE & GIBSON, INC
   2633 CAMINO RAMON, SUITE 350
   SAN RAMON, CA 94583

   D. ARCHITECT:
   BDE ARCHITECTURE
   950 HOWARD STREET
   SAN FRANCISCO, CA 94103

2. COORDINATE USE OF SITE WITH OWNER AND CONSTRUCTION MANAGER.
3. THE CONTRACTOR SHALL VISUALLY INSPECT THE SITE TO ASCERTAIN THE CONDITION OF EXISTING FEATURES AND FAMILIARIZE THEMSELVES WITH THE PROPOSED WORK.
4. THE CONTRACTOR SHALL VERIFY THAT ALL NECESSARY PERMITS FROM THE CITY OF DUBLIN AND ALAMEDA COUNTY ENVIRONMENTAL HEALTH (ACEH) FOR THE INSTALLATION OF THE VAPOR MITIGATION SYSTEM (VMS) HAVE BEEN SECURED.
5. RELEVANT KNOWN AND PROPOSED UNDERGROUND UTILITIES AND STRUCTURES ARE SHOWN ON THE DRAWINGS. THE LOCATION OF THESE EXISTING AND PROPOSED UTILITIES SHOULD BE CONSIDERED APPROXIMATE. PRIOR TO THE COMMENCEMENT OF SITE ACTIVITIES, THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES OR STRUCTURES IN THE AREAS OF WORK AND NOTIFY UNDERGROUND SERVICES ALERT ([USA ALERT] 811; 800-227-2600) AT LEAST TWO BUSINESS DAYS PRIOR TO COMMENCEMENT OF WORK.
6. CONTRACTOR SHALL BE REQUIRED TO MAINTAIN THE INTEGRITY OF STRUCTURES, UTILITIES AND OTHER SITE FEATURES AND REPAIR ANY DAMAGE AT NO ADDITIONAL COST.
7. THE CONTRACTOR SHALL COMPLY WITH THE RULES AND REGULATIONS OF THE STATE CONSTRUCTION SAFETY ORDER.
8. ALL SPECIFIED WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS AND ORDINANCES.
9. COORDINATE WORK WITH OTHER TRADES. DRAWINGS ARE DIAGRAMMATIC. INDICATED LOCATIONS OF PENETRATIONS, OFF-SETS, BENDS, OR UNIONS ARE NOT EXACT.
10. THE CONTRACTOR SHALL NOT BLOCK EXISTING ACCESS ROADS DURING CONSTRUCTION.
11. PROPOSED BUILDING CONDITIONS SHOWN IN DRAWINGS ARE BASED ON INFORMATION PROVIDED BY THE CIVIL ENGINEER AND THE ARCHITECT. A COMPLETE DUBLIN APARTMENTS DESIGN SET, INCLUDING ALL TRADES AND PROPOSED BUILDING CONSTRUCTION, IS AVAILABLE FROM THE OWNER.
12. THE VMS ENGINEER ASSUMES NO RESPONSIBILITY BEYOND THE ADEQUACY OF VMS DESIGN CONTAINED HEREIN.

VAPOR MITIGATION MEMBRANE NOTES

1. VAPOR MITIGATION SYSTEM MEMBRANE SHALL BE GEO-SEAL MANUFACTURED BY LAND SCIENCE TECHNOLOGIES OR APPROVED EQUIVALENT.
2. THE CONTRACTOR SHALL BE A LAND SCIENCE TECHNOLOGIES CERTIFIED INSTALLER FOR THE INSTALLATION OF THE VAPOR MITIGATION MEMBRANE.
3. THE CONTRACTOR SHALL INSTALL THE VMS MEMBRANE IN ACCORDANCE WITH THESE DRAWINGS, RELEVANT SPECIFICATIONS, AND AS RECOMMENDED BY THE MEMBRANE MANUFACTURER. THE CONTRACTOR SHALL INFORM THE OWNER AND VMS ENGINEER OF DISCREPANCIES BETWEEN THESE DRAWINGS, THE SPECIFICATIONS, OR THE MANUFACTURE'S RECOMMENDATIONS PRIOR TO COMMENCING WORK.
4. VMS MEMBRANE GEO-SEAL CORE SHALL BE APPLIED TO A MINIMUM THICKNESS OF 60 MIL.
5. THE CONTRACTOR SHALL CONDUCT QUALITY CONTROL (QC) TESTING IN ACCORDANCE WITH THE PROJECT CONSTRUCTION QUALITY ASSURANCE PLAN, THE CONTRACTOR'S CONSTRUCTION QUALITY CONTROL PLAN SPECIFICATIONS AND MANUFACTURER RECOMMENDATIONS. QC TESTING SHALL INCLUDE, BUT NOT LIMITED TO, SMOKE TESTING OF THE INSTALLED VAPOR MITIGATION MEMBRANE. IDENTIFIED DEFICIENCIES IN THE MEMBRANE SHALL BE REPAIRED FOLLOWING MANUFACTURER'S RECOMMENDED REPAIR PROCEDURES.
6. GRADATION REQUIREMENTS FOR PERMEABLE BASE MATERIAL ARE AS FOLLOWS (PER GEOTECHNICAL REPORT):

SIEVE SIZE	PERCENTAGE PASSING SIEVE
GRAVEL OR CRUSHED ROCK	
1 INCH	90-100
3/4 INCH	30-100
1/2 INCH	5-25
3/8 INCH	0-6

SUB-SLAB VENTING SYSTEM NOTES

1. VAPOR COLLECTION PIPING SHALL BE VAPOR-VENT MANUFACTURED BY LAND SCIENCE TECHNOLOGIES OR APPROVED EQUIVALENT.
2. THE CONTRACTOR SHALL INSTALL THE VAPOR COLLECTION PIPING IN ACCORDANCE WITH THESE DRAWINGS, RELEVANT SPECIFICATIONS, AND AS RECOMMENDED BY THE PIPING MANUFACTURER. THE CONTRACTOR SHALL INFORM THE OWNER AND VMS ENGINEER OF DISCREPANCIES BETWEEN THESE DRAWINGS, THE SPECIFICATIONS, AND THE MANUFACTURER'S RECOMMENDATIONS PRIOR TO COMMENCING WORK.
3. COORDINATE WITH STRUCTURAL SECTION OF WORK FOR PIPING THROUGH CONCRETE FOUNDATIONS.
4. VENT RISER VERTICAL PIPING SHALL BE CENTERED IN THE PARTY/DEMISING WALL AIR GAP
5. FOR VENT RISER PLACED WITHIN NON-STRUCTURAL WALLS; THE PIPE SHALL BE ATTACHED TO THE FRAMING OF THE NON-STRUCTURAL WALL IT IS LOCATED IN.
6. INSTALL VENT RISER GUARDS AS NECESSARY TO PROTECT EXPOSED VERTICAL PIPING NOT INSTALLED WITHIN WALLS
7. DO NOT ALLOW THE PIPING, PIPE CONNECTORS, PIPE HANGERS OR STRAPS TO DIRECTLY TOUCH THE STRUCTURE, STUDS, GYPSUM BOARD, OR OTHER PIPES.
8. SUPPORT PIPING AS REQUIRED BY 2013 CALIFORNIA PLUMBING CODE OR AS SPECIFIED BY PIPE SUPPORT MANUFACTURER WHICHEVER IS MORE STRINGENT.
9. LOCATION OF ROOF VENTS SHALL COMPLY WITH MINIMUM CLEARANCES AND SETBACKS AS REQUIRED BY 2013 CALIFORNIA PLUMBING CODE, SECTION 906.2.
10. VENT RISER MAY BE RELOCATED TO SUIT FIELD CONDITIONS. CONTRACTOR SHALL OBTAIN THE OWNER AND THE VMS ENGINEER APPROVAL PRIOR TO ANY RELOCATION.
11. BUILDING FOUNDATION FEATURES SHOWN ON THESE DRAWINGS ARE DIAGRAMMATIC ONLY AND DO NOT REFLECT ACTUAL FOUNDATION DIMENSIONS.

ABBREVIATIONS

A.B.	ANCHOR BOLT
APVD	APPROVED
ARCH.	ARCHITECTURAL
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BWD	BAY WEST DEVELOPMENT
CHCK	CHECKED
CLR.	CLEARANCE
DSGN	DESIGNED
DRFT	DRAFTED
DWG	DRAWING
FTG.	FOOTING
HD	HIGH DENSITY
HR	HOUR
ID	INNER DIAMETER
LLC	LIMITED LIABILITY COMPANY
MAX	MAXIMUM
MIN	MINIMUM
NO	NUMBER
NOM	NOMINAL
OD	OUTER DIAMETER
PT	POST-TENSIONING
PVC	POLYVINYL CHLORIDE
QC	QUALITY CONTROL
REINF.	REINFORCEMENT
SCH	SCHEDULE
S.O.G.	SLAB ON GRADE
STRUCT.	STRUCTURAL
THK.	THICK
TYP	TYPICAL
VMS	VAPOR MITIGATION SYSTEM

REGISTERED PROFESSIONAL ENGINEER DOUGLAS C BABLITCH No. C64096 EXP. 09-30-16 CIVIL STATE OF CALIFORNIA

REVISION — NO. | DATE | BY | APVD; DSGN A. ANG; DRFT J. GRAUL; CHK F. SZERDY; APVD D. BABLITCH

SOIL VAPOR MITIGATION SYSTEM
DUBLIN APARTMENTS
CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA

GENERAL NOTES AND ABBREVIATIONS

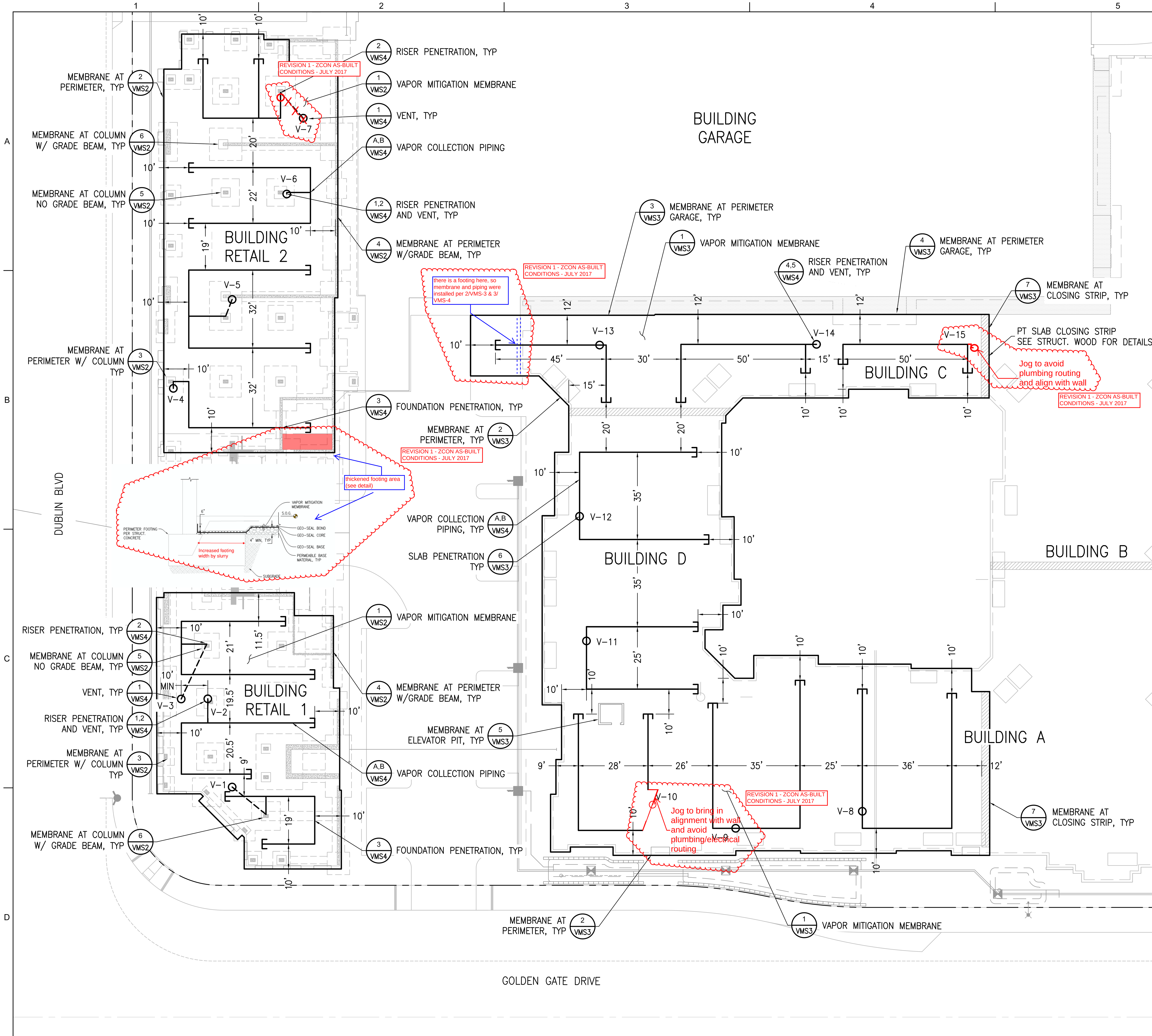
amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, Inc.
180 GRAND AVENUE, SUITE 1100
OAKLAND, CALIFORNIA 9461208619
TELEPHONE: (510) 663-4100
FAX: (510) 663-4141

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

100% DESIGN SUBMITTAL JUNE 2015

ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

DATE	06/08/15
PROJECT NO.	OD14170800
DWG	G-2
SHEET	2 OF 9



LEGEND

- SUB–SLAB VENTING SYSTEM PIPE AND END CAP
- ABOVE GROUND RISER PIPING AND VENT
- VAPOR MITIGATION MEMBRANE, LIMITS OF WORK
- PROPERTY LINE
- BUILDING FOUNDATION
- PODIUM COLUMN AND FOOTING
- FIRE HYDRANT
- SD CATCH BASIN
- SD FIELD INLET
- SS MANHOLE
- ELECTRICAL
- WATER VALVE BOX
- BACKFLOW PREVENTOR

NOTE

1. ALL DIMENSIONS AND VENT RISER LOCATIONS ARE APPROXIMATE. FINAL LOCATION OF VAPOR COLLECTION PIPING, SLAB PENETRATIONS, AND VENT RISER VERTICAL ROUTING SHALL BE COORDINATED WITH OTHER TRADES TO CONFIRM ABSENCE OF CONFLICTS BETWEEN VMS PIPING AND OTHER NEW/PROPOSED CONSTRUCTION.
2. VENT LOCATIONS SHOWN ARE REPRESENTATIVE OF FOUNDATION ELEVATION.
3. VERTICAL VENT RISER PIPES SHALL BE CENTERED IN THE PARTY WALL AIR GAP.

ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

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REGISTERED PROFESSIONAL ENGINEER DOUGLAS C BABLITCH No. C64096 EXP. 09-30-16 CIVIL STATE OF CALIFORNIA

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DSGN A. ANG | DRFT J. GRAUL | CHK F. SZERDY | APVD D. BABLITCH

SOIL VAPOR MITIGATION SYSTEM
DUBLIN APARTMENTS
CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA

MEMBRANE AND SUB-SLAB VENTING SYSTEM PLAN

amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, Inc.
180 GRAND AVENUE, SUITE 1100
OAKLAND, CALIFORNIA 946120619
TELEPHONE: (510) 663-4100
FAX: (510) 663-4141

VERIFY SCALE
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DATE 06/08/15
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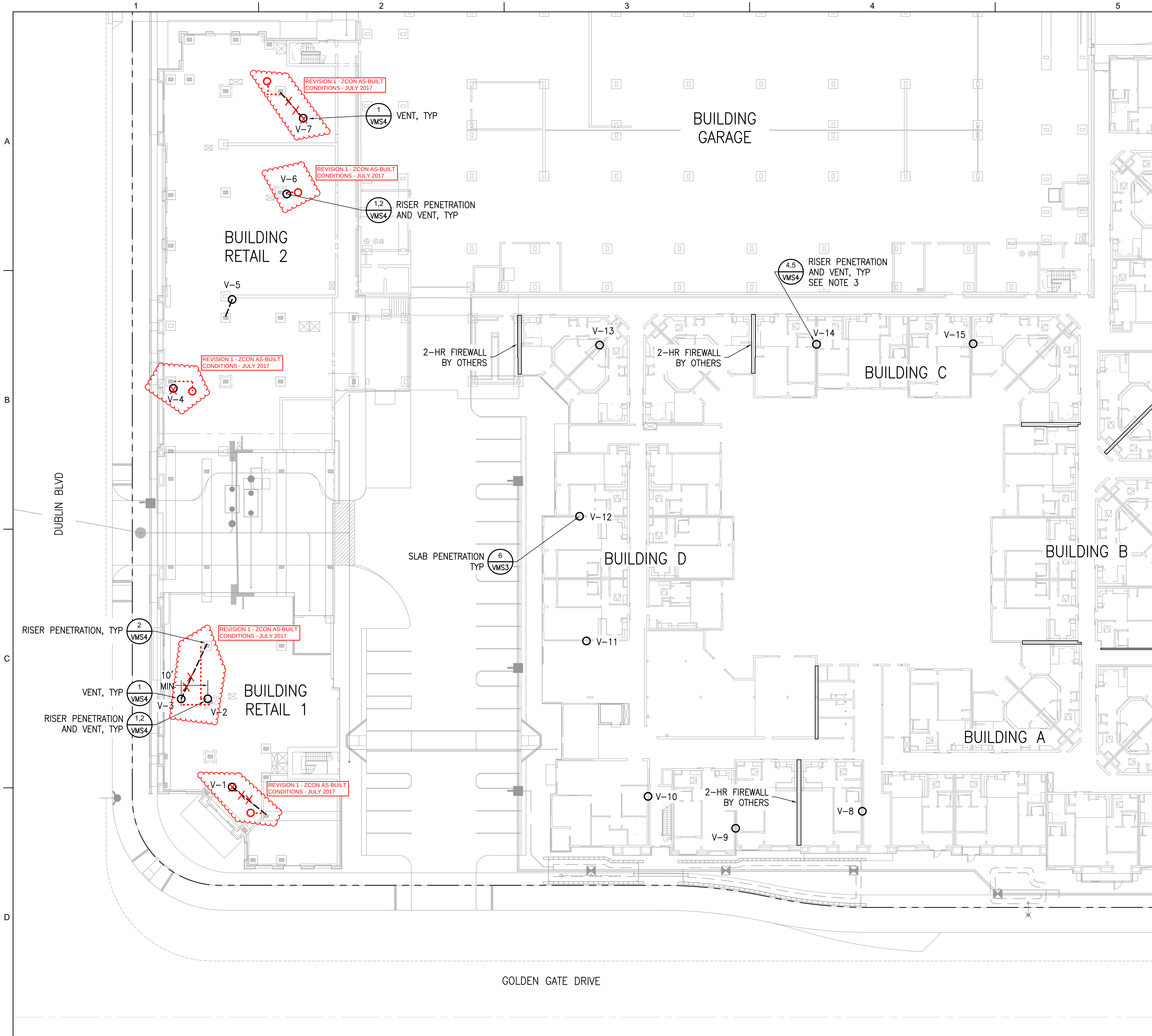

LEGEND

- V-1 ABOVE GROUND RISER PIPING AND VENT
- PROPERTY LINE
- PODIUM COLUMN
- FIRE HYDRANT
- SD CATCH BASIN
- SD FIELD INLET
- SS MANHOLE
- ELECTRICAL
- WATER VALVE BOX
- BACKFLOW PREVENTOR

NOTE

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2. VENT LOCATIONS SHOWN ARE REPRESENTATIVE OF FIRST FLOOR ELEVATION.
3. VERTICAL VENT RISER PIPES SHALL BE CENTERED TO THE PARTY WALL AIR GAP.

ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

0 10 20 40
SCALE IN FEET

100% DESIGN SUBMITTAL JUNE 2015

REGISTERED PROFESSIONAL ENGINEER DOUGLAS C. BABLITCH No. C64096 EXP. 09-30-16 CIVIL STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APVD
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DSGN A. ANG DRFT J. GRAUL CHK F. SZERDY APVD D. BABLITCH

SOIL VAPOR MITIGATION SYSTEM
DUBLIN APARTMENTS
CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA

RISER VENT PLAN
1st FLOOR

amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, Inc.
180 GRAND AVENUE, SUITE 1100
OAKLAND, CALIFORNIA 94612-3066

VERIFY SCALE
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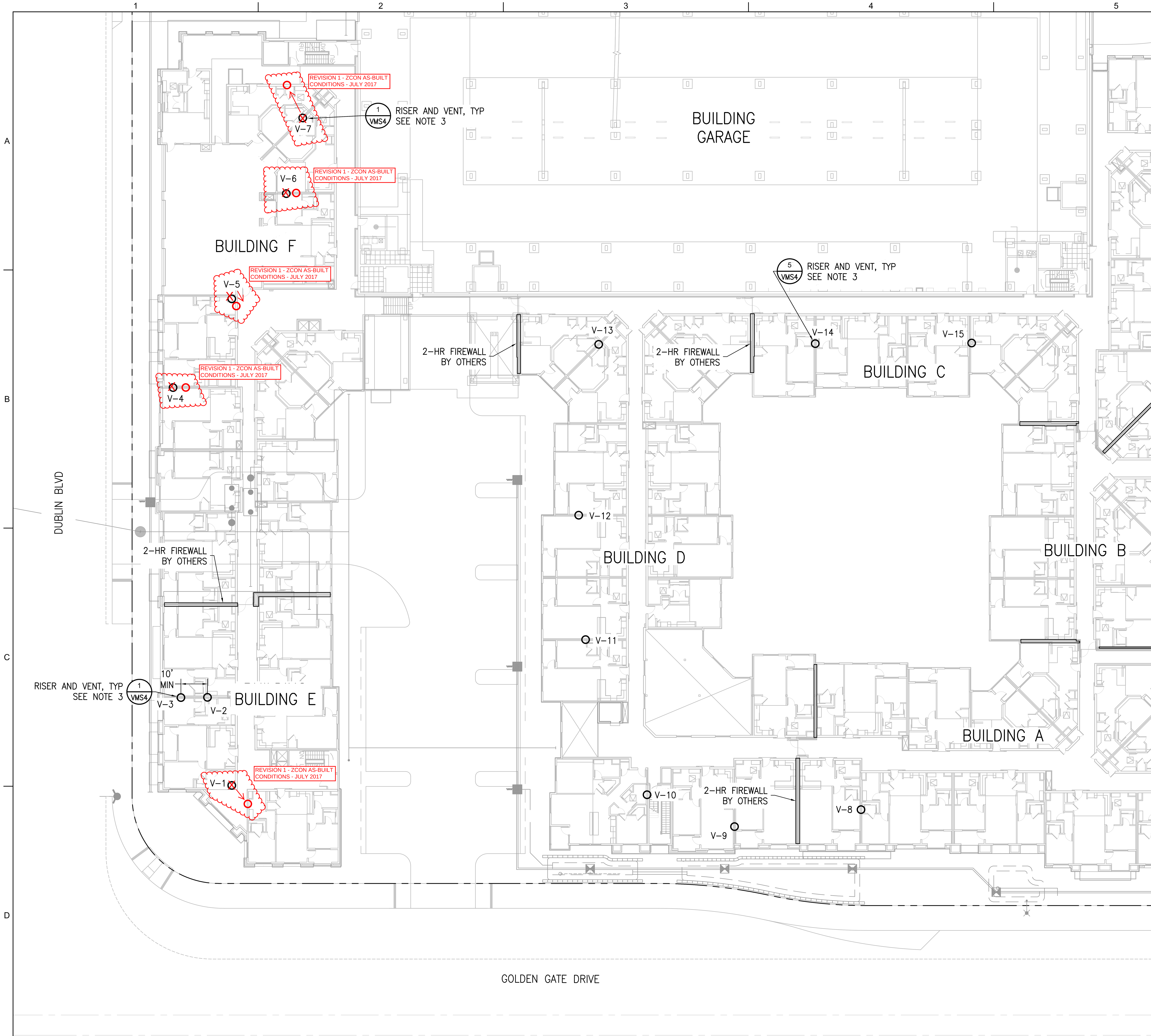
DATE	06/08/15
PROJECT NO.	OD14170800
DWG	VMS-1B
SHEET	4 OF 9



LEGEND

- V-1 RISER AND VENT
- PROPERTY LINE
- FIRE HYDRANT
- SD CATCH BASIN
- SD FIELD INLET
- SS MANHOLE
- ELECTRICAL
- WATER VALVE BOX
- BACKFLOW PREVENTOR

NOTE

1. ALL DIMENSIONS AND VENT RISER LOCATIONS ARE APPROXIMATE. FINAL LOCATION OF VAPOR COLLECTION PIPING, SLAB PENETRATIONS, AND VENT RISER VERTICAL ROUTING SHALL BE COORDINATED WITH OTHER TRADES TO CONFIRM ABSENCE OF CONFLICTS BETWEEN VMS PIPING AND OTHER NEW/PROPOSED CONSTRUCTION.
2. VENT LOCATIONS SHOWN ARE REPRESENTATIVE OF SECOND FLOOR AND ROOF ELEVATIONS.
3. VERTICAL VENT RISER PIPES SHALL BE CENTERED TO THE PARTY WALL AIR GAP.

ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

0 10 20 40
SCALE IN FEET

100% DESIGN SUBMITTAL JUNE 2015

REGISTERED PROFESSIONAL ENGINEER DOUGLAS C BABLITCH No. C64096 EXP. 09-30-16 CIVIL STATE OF CALIFORNIA

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DSGN A. ANG | DRFT J. GRAUL | CHK F. SZERDY | APVD D. BABLITCH

SOIL VAPOR MITIGATION SYSTEM
DUBLIN APARTMENTS
CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA

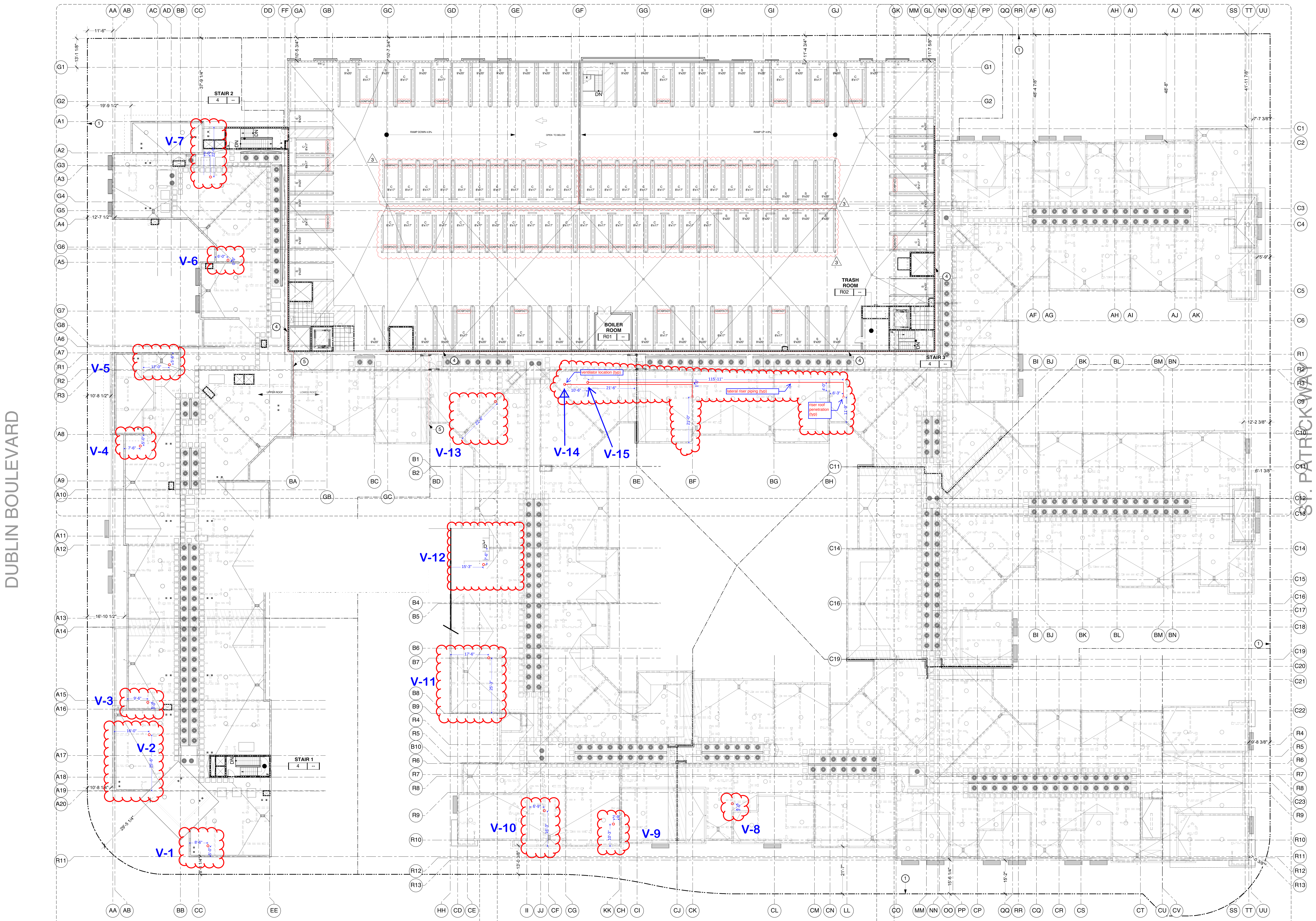
RISER VENT PLAN 2nd FLOOR

amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, Inc.
180 GRAND AVENUE, SUITE 1100
OAKLAND, CALIFORNIA 946126819

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	06/08/15
PROJECT NO.	OD14170800
DWG	VMS-1C
SHEET	5 OF 9

FILE NAME: S:\OD14\170800\task_03\15_0601-100desgn\SHTS-VMS\VMS-01 ABC.dwg PLOT DATE: Wed, 10 Jun 2015 PLOT TIME: 12:22 PM



ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

SHEET NOTES

NOTE: NOT ALL NOTES ARE USED ON EVERY SHEET

1. PROPERTY LINE
2. FIRE DEPARTMENT KEY BOX LOCATION
3. 2-HR FIRE WALL, SEE WALL TYPE 'J' ON A10.0. -PER CBC 706.2, EACH PORTION OF A BUILDING SEPERATED BY ONE OR MORE FIRE WALLS THAT COMPLY WITH THE PROVISIONS OF THIS SECTION SHALL BE CONSIDERED A SEPERATE BUILDING. THE EXTENT AND LOCATION OF SUCH FIRE WALLS SHALL PROVIDE A COMPLETE SEPERATION.
4. 10" SEISMIC JOINT, SEE DETAILS ON A8.14
5. 12" SEISMIC JOINT, SEE DETAILS ON A8.14
6. ASSUMED PROPERTY LINE
7. FIRE DEPARTMENT ACCESS
8. STANDARD ADA PARKING STALL
9. VAN ADA PARKING STALL

PARKING NOTES

VEHICLE PARKING:

EXTERIOR PARKING SPACES PROVIDED ASSIGNED (TENANTS,VISITORS): 24

ACCESSIBLE SPACES REQUIRED (2%): 14

ACCESSIBLE SPACES PROVIDED: 14

TOTAL PARKING (ASSIGNED/UNASSIGNED): 617

FOR ASSIGNED PARKING, SIGNAGE REQUIRED BY SECTION 1109A.8.8 DOES NOT APPLY PER CBC SECTION 1109A.4

LEGEND

EXIT PASSAGEWAY PER CBC 1023
A. EXIT PASSAGEWAY ENCLOSURES SHALL HAVE WALLS, FLOORS, CEILINGS OF NOT LESS THAN 1-HOUR FIRE RATING IN ACCORDANCE WITH CBC 1023.3

B. EXIT PASSAGEWAY OPENING PROTECTIVES (IE DOORS) WILL BE OF 1-HOUR FIRE RATING PER CBC 1021.5

ACCESSIBLE PATH OF TRAVEL PER CBC CHAPTER 11

ACCESSIBLE POINT OF ENTRY PER CBC CHAPTER 11

SEISMIC JOINT, SSD 3

MAINTAIN 8'-2" VERT CLR WITHIN SHADED AREA

HATCHING INDICATES 4'-0" ZONE MEASURED FROM CENTERLINE OF 2-HR FIRE WALL WHERE SUCH WALL IS PERMITTED TO TERMINATE AT THE UNDERSIDE OF THE ROOF SHEATHING IN WHICH THERE ARE NO OPENINGS IN THE ROOF WITHIN 4 FEET OF THE FIRE WALL, THE ROOF IS COVERED WITH A MINIMUM CLASS B ROOF COVERING AND THE ROOF SHEATHING IS CONSTRUCTED OF FIRE-RETARDANT-TREATED PLYWOOD FOR A MINIMUM DISTANCE OF 4 FEET ON BOTH SIDES OF THE FIRE WALL PER CBC 706.6, EXCEPTION 4. SEE WALL TYPE 'J' ON SHEET A10.0 FOR ASSEMBLY AND A9.0 FOR SECTION AND PLAN DETAILS

GENERAL NOTES

A. 1/16" PLANS ARE FOR GENERAL BUILDING LAYOUT AND ORIENTATION. SEE SHEETS A2.0A-A2.6D 1/8"/FT PLANS FOR WALL TYPES, WALL FIRE RATINGS, DOOR TAGS, WINDOW TAGS, STC RATINGS, AND ENLARGED PLAN REFERENCES.

B. SEE A0.6 FOR ACCESSIBILITY INFORMATION.

C. SEE A10.0 FOR WALL TYPES AND TYPICAL FLOOR/CEILING ASSEMBLIES.

D. ALL DWELLING UNIT ENTRY DOORS IN RESIDENTIAL CORRIDORS SHALL BE 20-MINUTE SMOKE SEALED. RESIDENTIAL DOORS LOCATED IN EXIT PASSAGEWAYS SHALL BE 1-HR RATED

E. ALL COMMON AREA AND CORRIDOR WALLS SHALL BE OF 1-HR FIRE RATED CONSTRUCTION; PENETRATIONS THROUGH SUCH WALLS SHALL HAVE FIRE/SMOKE DAMPERS. COMMON AREA DOORS SHALL ALSO HAVE 1-HR FIRE RATING. SEE ALSO DOOR SCHEDULE.

F. ELEVATORS TO BE OTIS GEN-2 MRL GEARLESS TRACTION ELEVATOR WITH REMOTE CONTROL PANEL MOUNTED IN SEPARATE CONTROL ROOM - SEE PLANS FOR LOCATIONS.

G. PER CBC SECTION 1007.8, PROVIDE A TWO-WAY COMMUNICATION SYSTEM AT EACH ELEVATOR LANDING THAT IS ONE OR MORE STORIES ABOVE OR BELOW THE STORY OF EXIT DISCHARGE. 2

H. PERMANENTLY INSTALLED EMERGENCY ACCESS KEY BOX (KNOX-BOX) TO BE PROVIDED, CONFORMING TO FIRE DEPARTMENT STANDARD DETAILS AND PROVISIONS FOR EMERGENCY ACCESS SET FORTH BY THE CITY OF DUBLIN 7.32.300 SEC 1010(F) . AT TIME OF FINAL INSPECTION, ACCESS KEYS SHALL BE PROVIDED TO THE FIRE DEPARTMENT.

I. GC TO REFER TO A0.90 NON-RESIDENTIAL BUILDING SECURITY CODE 7.32.300 SECTION 1010 (F) AND ADHERE TO ALL REQUIREMENTS RELATING TO EMERGENCY ACCESS

J. GC IS TO INCLUDE SPRINKLER HEADS AT VOIDS AT FURRED EXTERIOR POP-OUTS

0 8 16 32

PROJECT NORTH

TRUE NORTH

BDE ARCHITECTURE

950 HOWARD STREET
SAN FRANCISCO
CA 94103
P. (415)677-0966

CLIENT

BAYWEST DEVELOPMENT

CONSULTANT

DUBLIN APARTMENTS

7544 DUBLIN BOULEVARD
DUBLIN, CA 94568

ISSUE	DATE
DD Prog. Check Set	10.17.14
100% DD Set	10.31.14
25% CD Set	11.14.14
50% CD Set	12.12.14
Permit Set	01.09.15
Pricing Set 1	02.03.15
Permit Rev. 1	03.27.15
Permit Rev. 2	06.08.15
Permit Rev. 3	08.05.15
Permit Rev. 4	08.20.15
Construction Set 5	09.23.15

Rooftop Ventilators

STAMP

SHEET TITLE

BUILDING PLANS ROOF

SCALE 1/16"=1'-0"

PROJECT NO. 1429 DRAWN BY AG

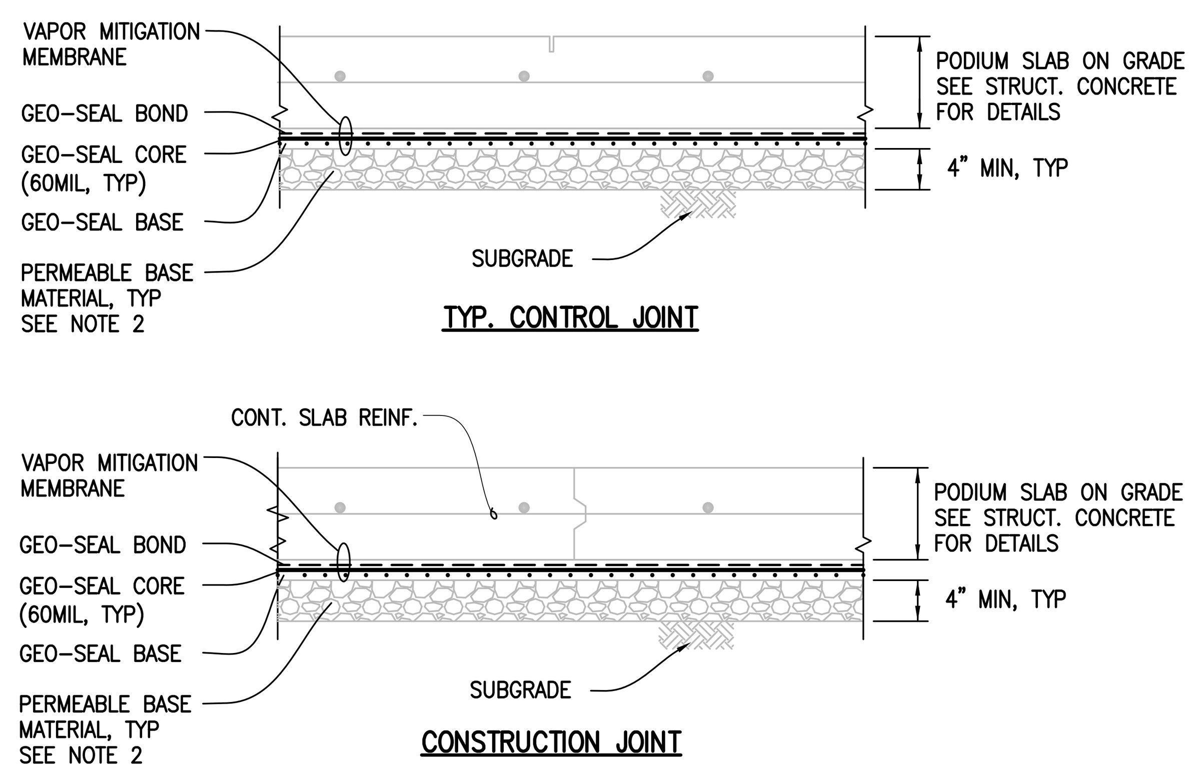
SHEET SIZE: 30 x 42

A1.6

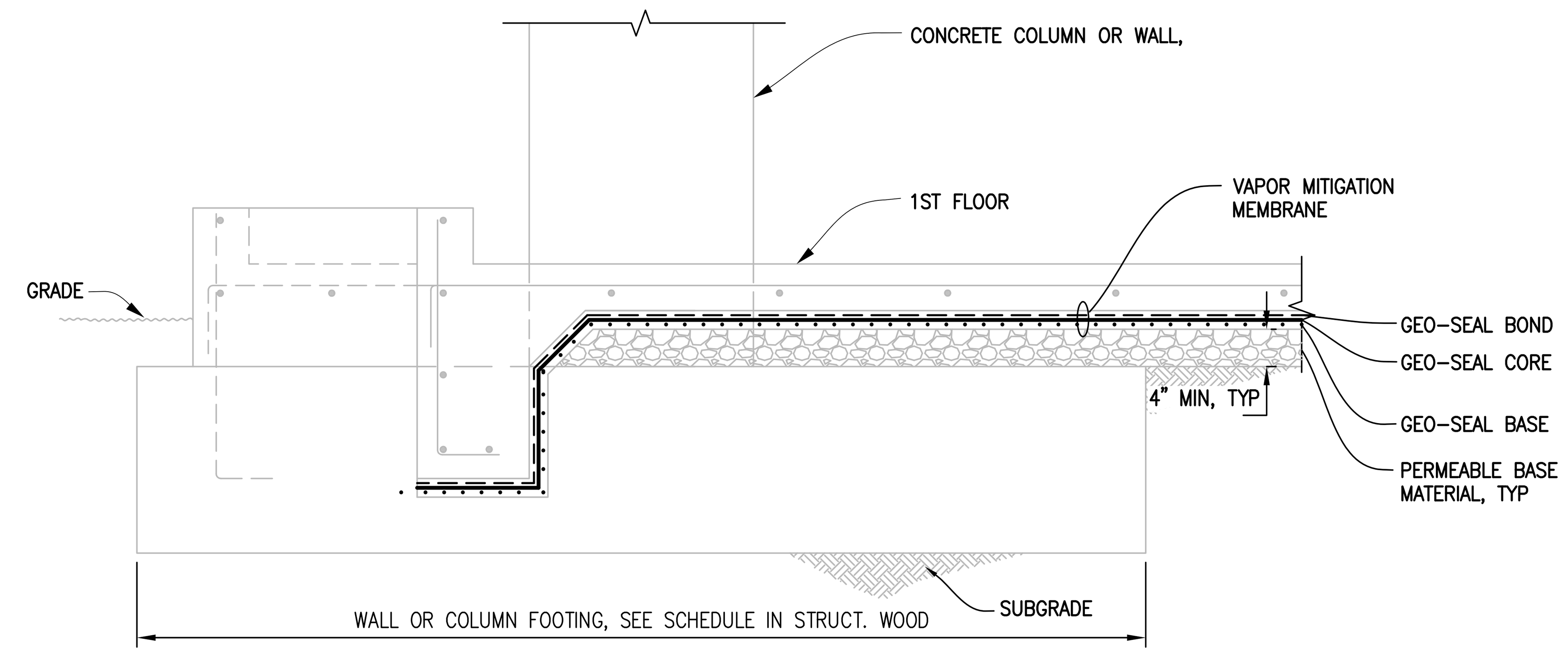
NOTES

1. GEO-SEAL CORE MEMBRANE SHALL BE INSTALLED AT A MIN. 60 MIL THICKNESS AT ALL LOCATIONS.

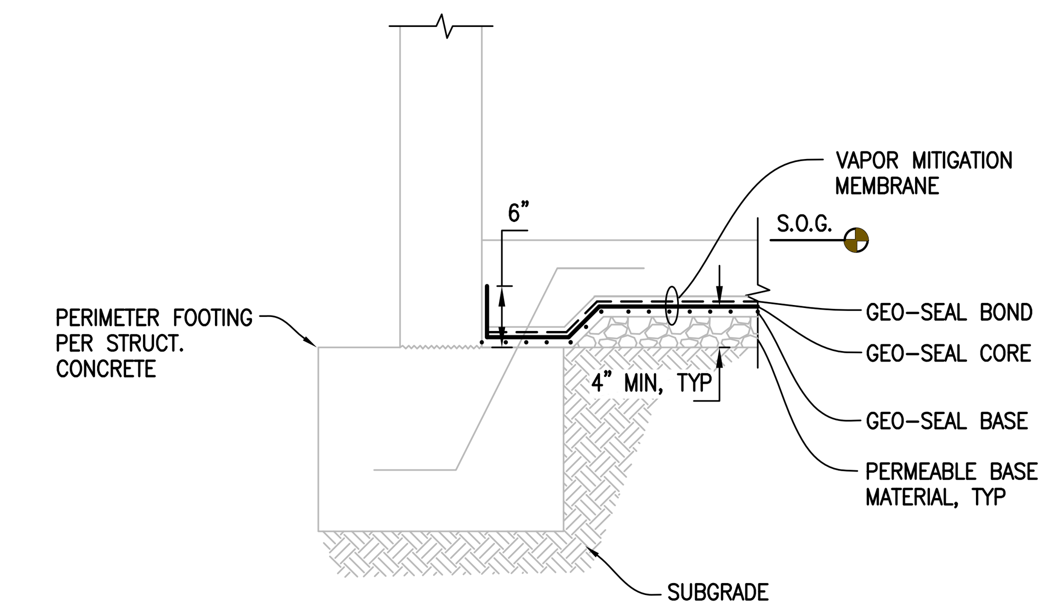
2. FOR PERMEABLE BASE MATERIAL SPECIFICATIONS, SEE VAPOR MITIGATION MEMBRANE NOTES, DWG G-2. 4" MINIMUM THICKNESS PER GEOTECHNICAL REPORT. SEE BUILDING DRAWINGS FOR ACTUAL SECTION REQUIREMENTS.



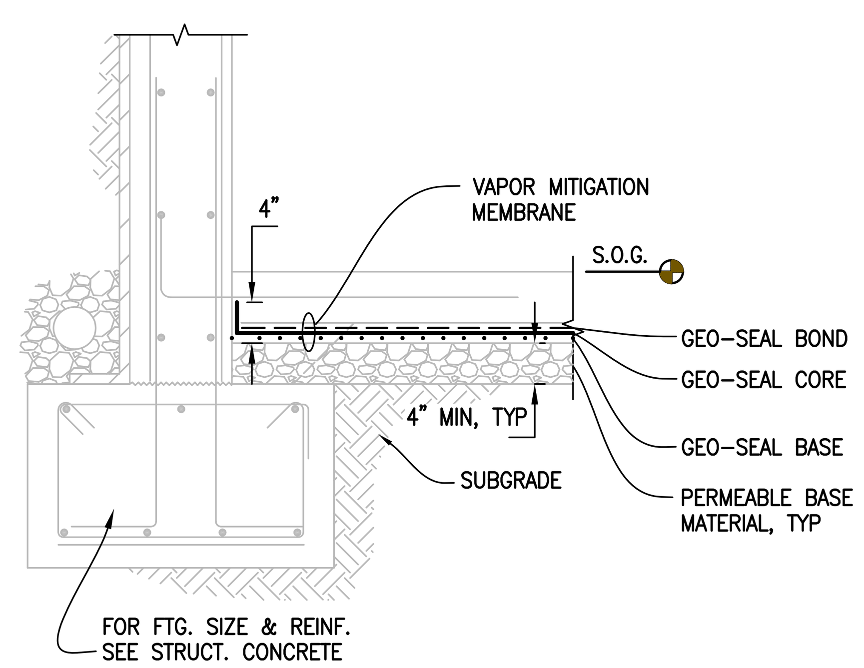
MEMBRANE BELOW PODIUM SLAB 1 VMS1A
NOT TO SCALE



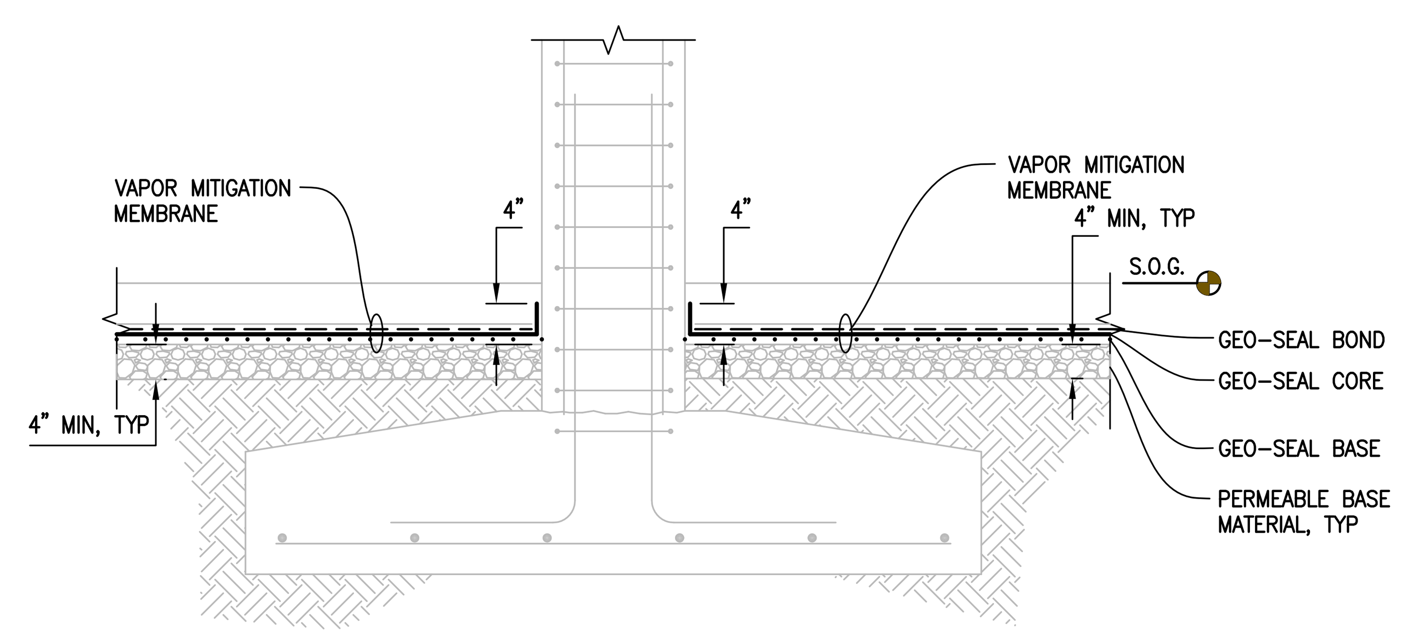
MEMBRANE AT PODIUM PERIMETER FOOTING 2 VMS1A
NOT TO SCALE



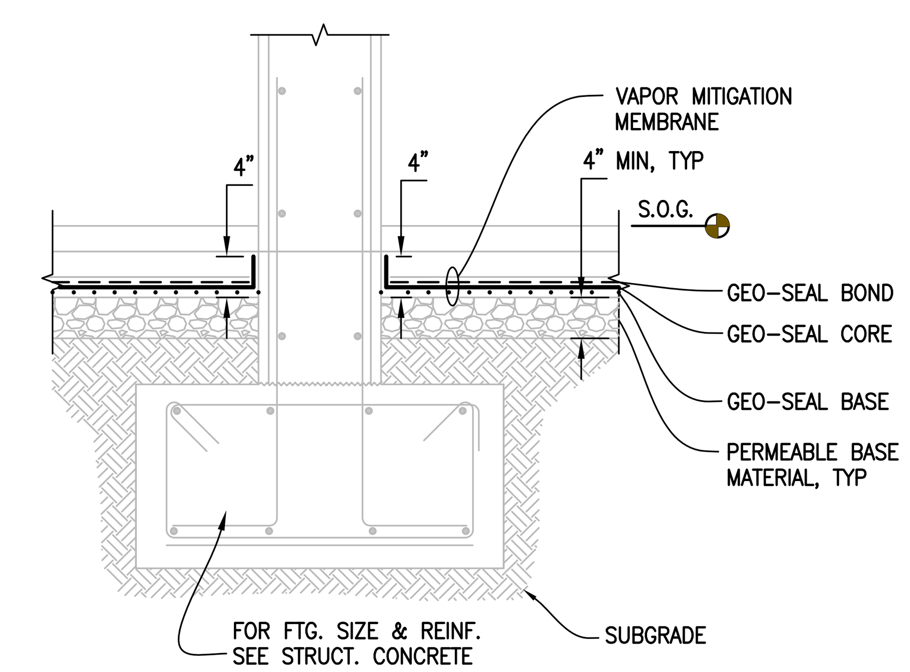
MEMBRANE AT PODIUM PERIMETER FOOTING WITH COLUMN 3 VMS1A
NOT TO SCALE



MEMBRANE AT PODIUM PERIMETER WITH COLUMN AND GRADE BEAM 4 VMS1A
NOT TO SCALE



MEMBRANE AT PODIUM CONCENTRIC COLUMN (NO GRADE BEAM) 5 VMS1A
NOT TO SCALE



MEMBRANE AT PODIUM CONCENTRIC COLUMN AND GRADE BEAM 6 VMS1A
NOT TO SCALE

ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

100% DESIGN SUBMITTAL JUNE 2015

REGISTERED PROFESSIONAL ENGINEER DOUGLAS C BABLITCH No. C64096 EXP. 09-30-16 CIVIL STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APVD
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DSGN A.ANG DRFT J. GRAUL CHK F. SZERDY APVD D. BABLITCH

SOIL VAPOR MITIGATION SYSTEM
DUBLIN APARTMENTS
CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA

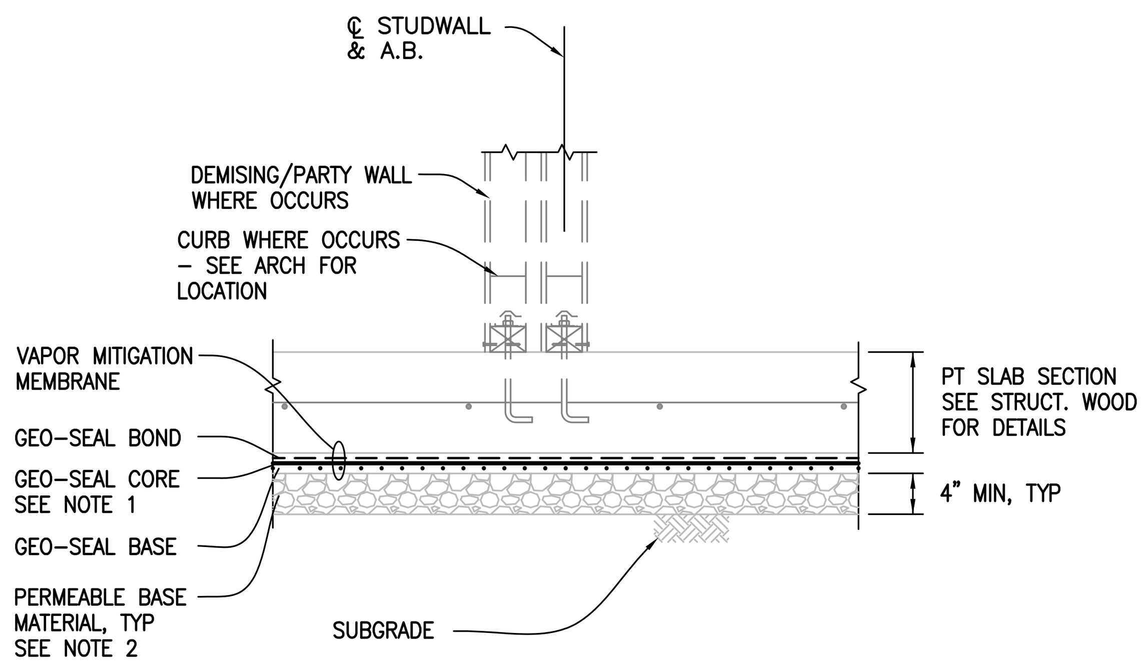
PODIUM MEMBRANE INSTALLATION DETAILS

amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, Inc.
180 GRAND AVENUE, SUITE 1100
OAKLAND, CALIFORNIA 946120619

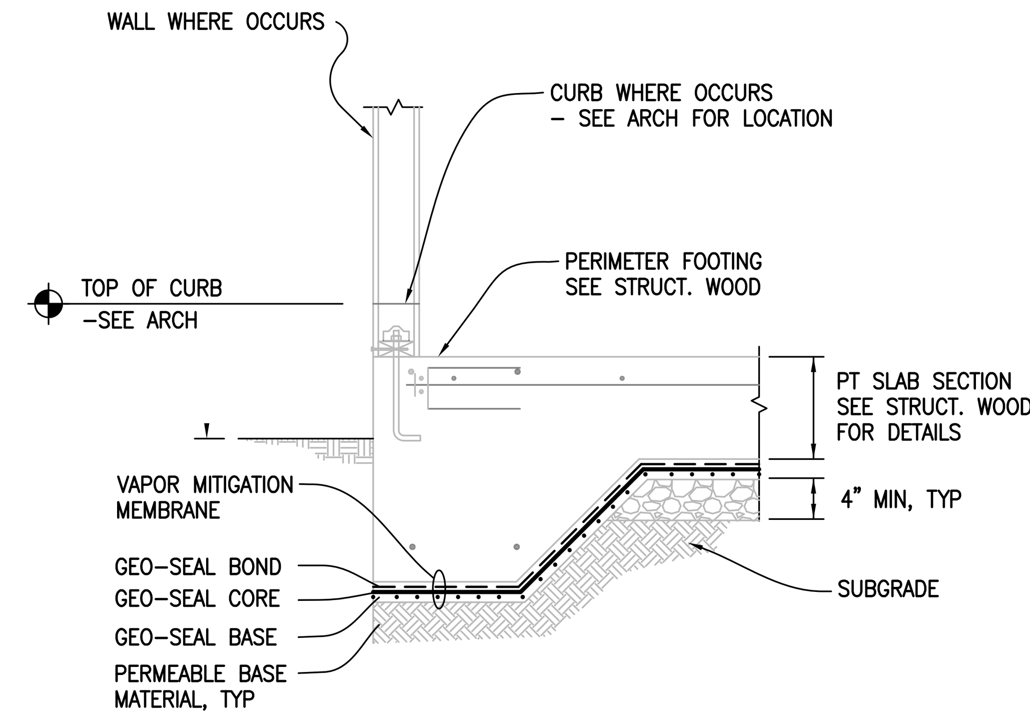
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE 06/08/15
PROJECT NO. OD14170800
DWG VMS-2
SHEET 6 OF 9

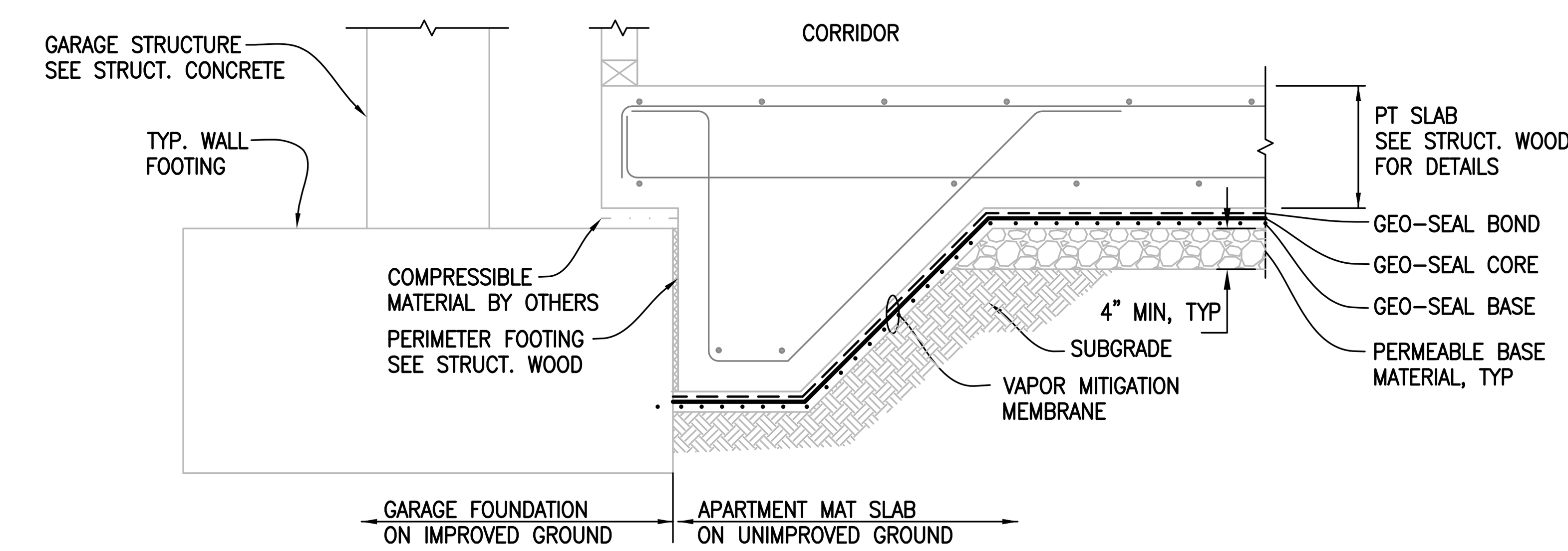
FILE NAME: S:\OD14\170800\task_03\15_0601-100desgn\SHTS-VMS\VMS-02-05-details.dwg PLOT DATE: Wed, 10 Jun 2015 PLOT TIME: 12:20 PM



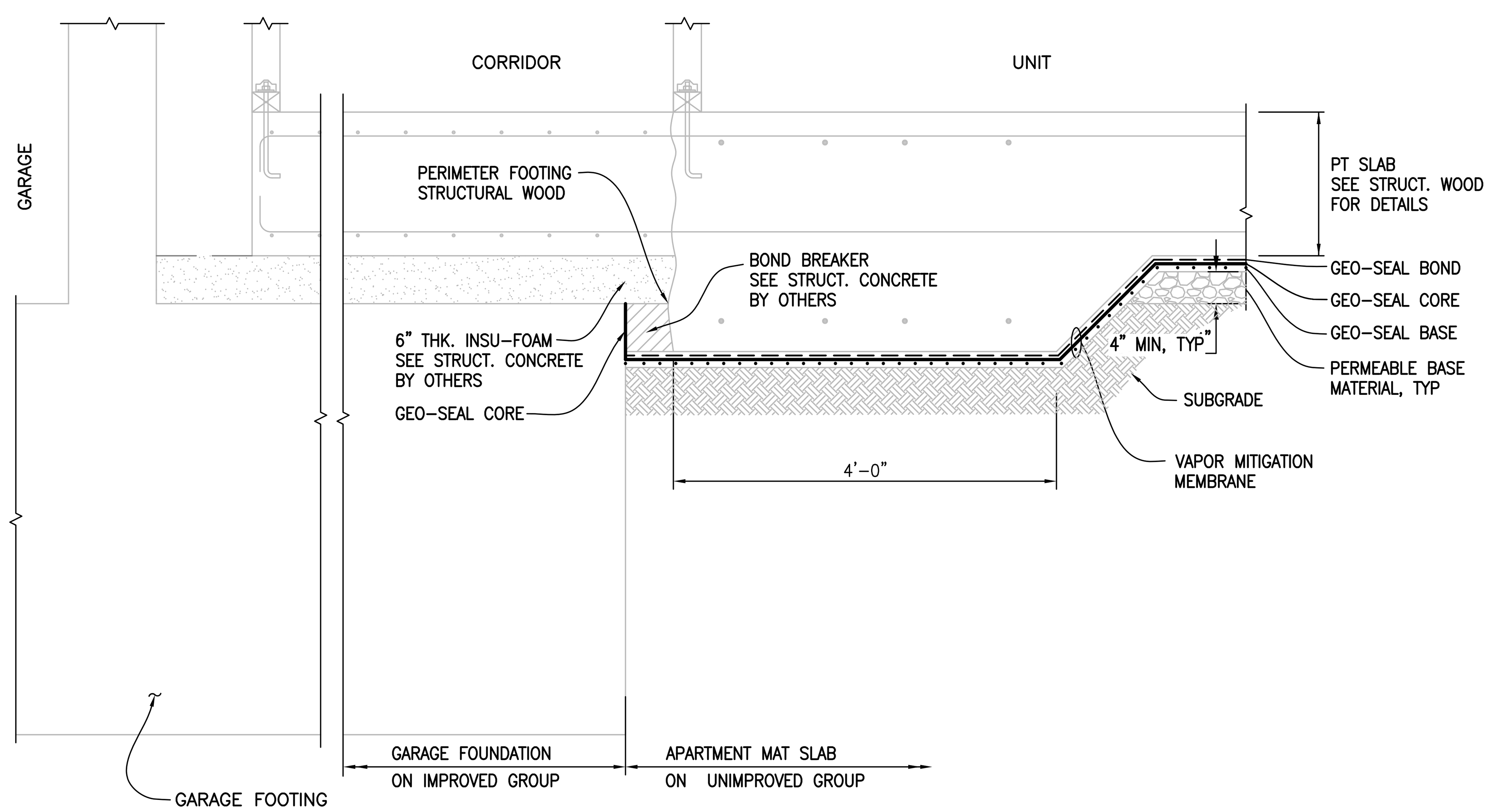
MEMBRANE BELOW PT SLAB
1 / VMS1A
NOT TO SCALE



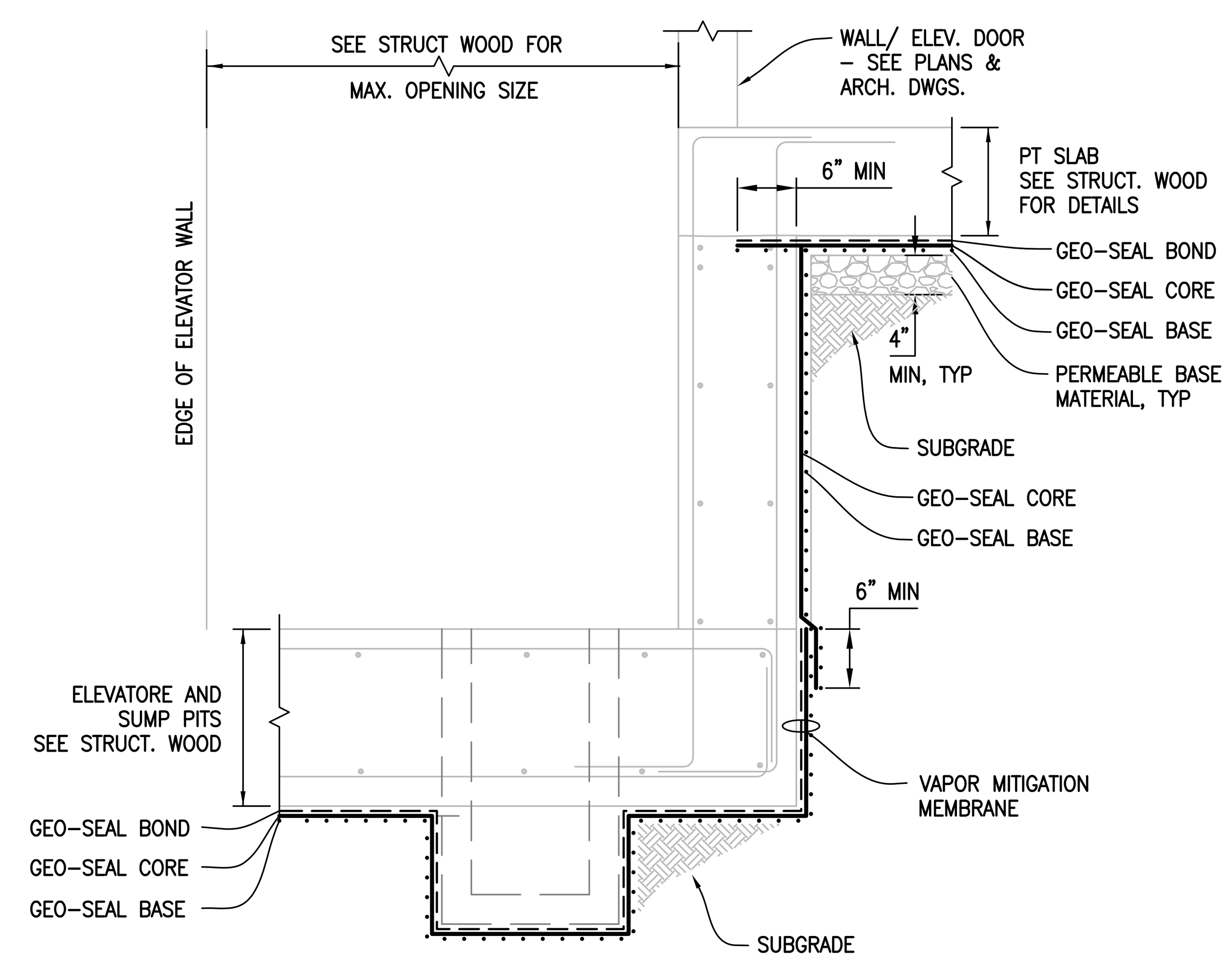
MEMBRANE AT PERIMETER FOOTING
2 / VMS1A
NOT TO SCALE



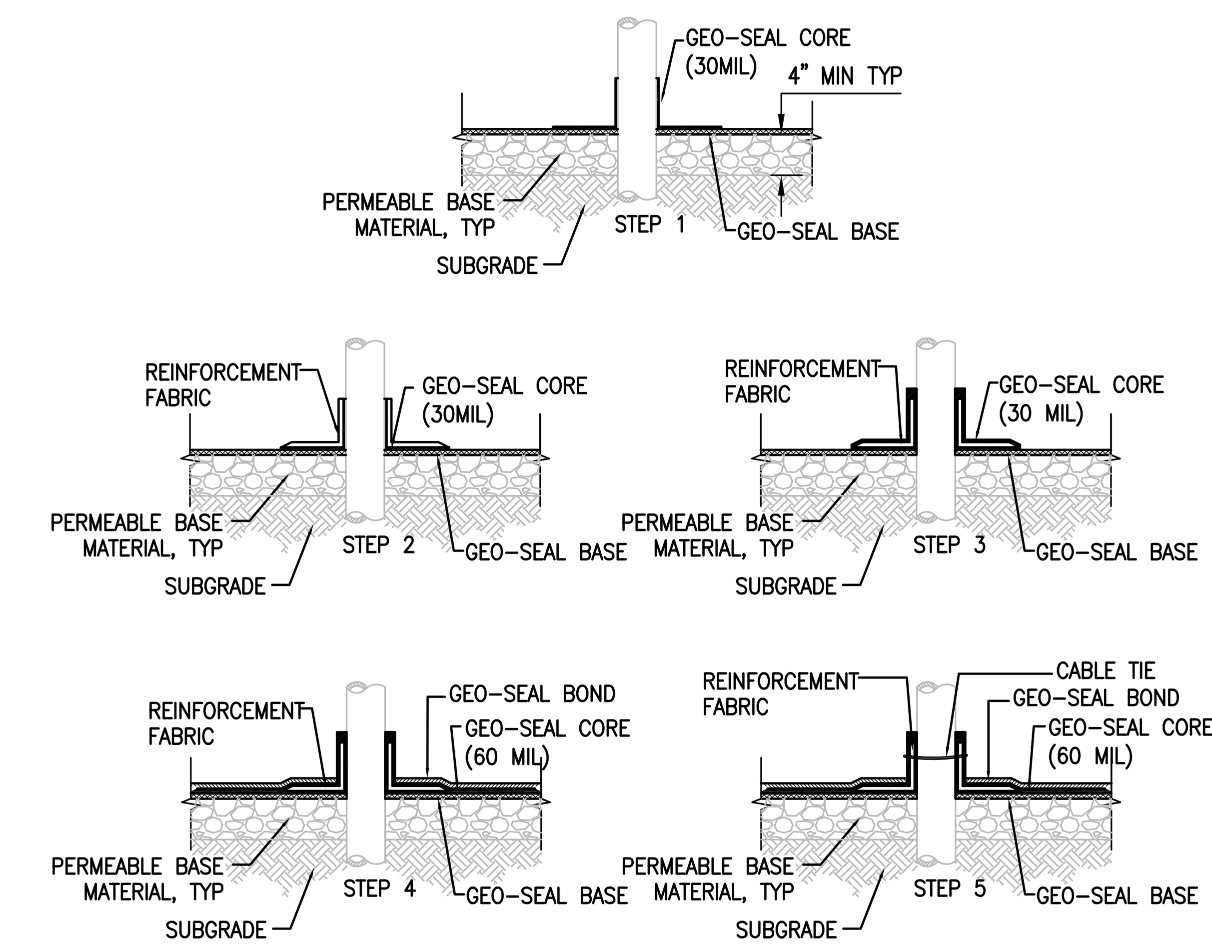
MEMBRANE AT GARAGE PERIMETER FOOTING
3 / VMS1A
NOT TO SCALE



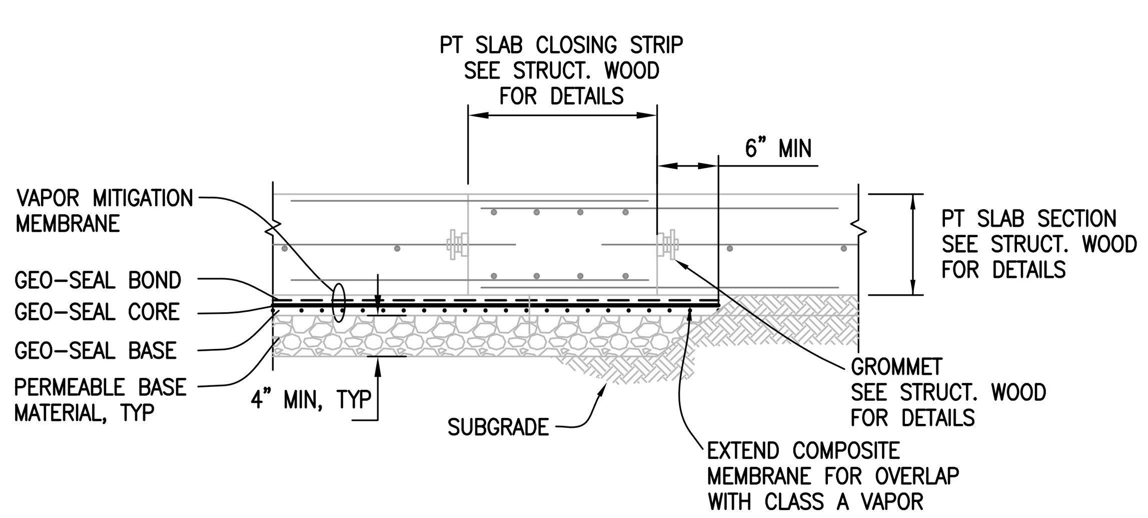
MEMBRANE AT GARAGE PERIMETER FOOTING
4 / VMS1A
NOT TO SCALE



MEMBRANE AT ELEVATOR PIT
5 / VMS1A
NOT TO SCALE



MEMBRANE INSTALLATION AT PENETRATIONS
6 / VMS1A,1B VMS4
NOT TO SCALE



MEMBRANE AT CLOSING STRIP
7 / VMS1A
NOT TO SCALE

NOTES

1. GEO-SEAL CORE MEMBRANE SHALL BE INSTALLED AT A MIN. 60 MIL THICKNESS AT ALL LOCATIONS.
2. FOR PERMEABLE BASE MATERIAL SPECIFICATIONS, SEE VAPOR MITIGATION MEMBRANE NOTES, DWG G-2. 4" MINIMUM THICKNESS PER GEOTECHNICAL REPORT. SEE BUILDING DRAWINGS FOR ACTUAL SECTION REQUIREMENTS.

ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

100% DESIGN SUBMITTAL JUNE 2015

REGISTERED PROFESSIONAL ENGINEER DOUGLAS C BABLITCH No. C64096 EXP. 09-30-16 CIVIL STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APVD

DSGN A. ANG | DRFT J. GRAUL | CHK F. SZERDY | APVD D. BABLITCH

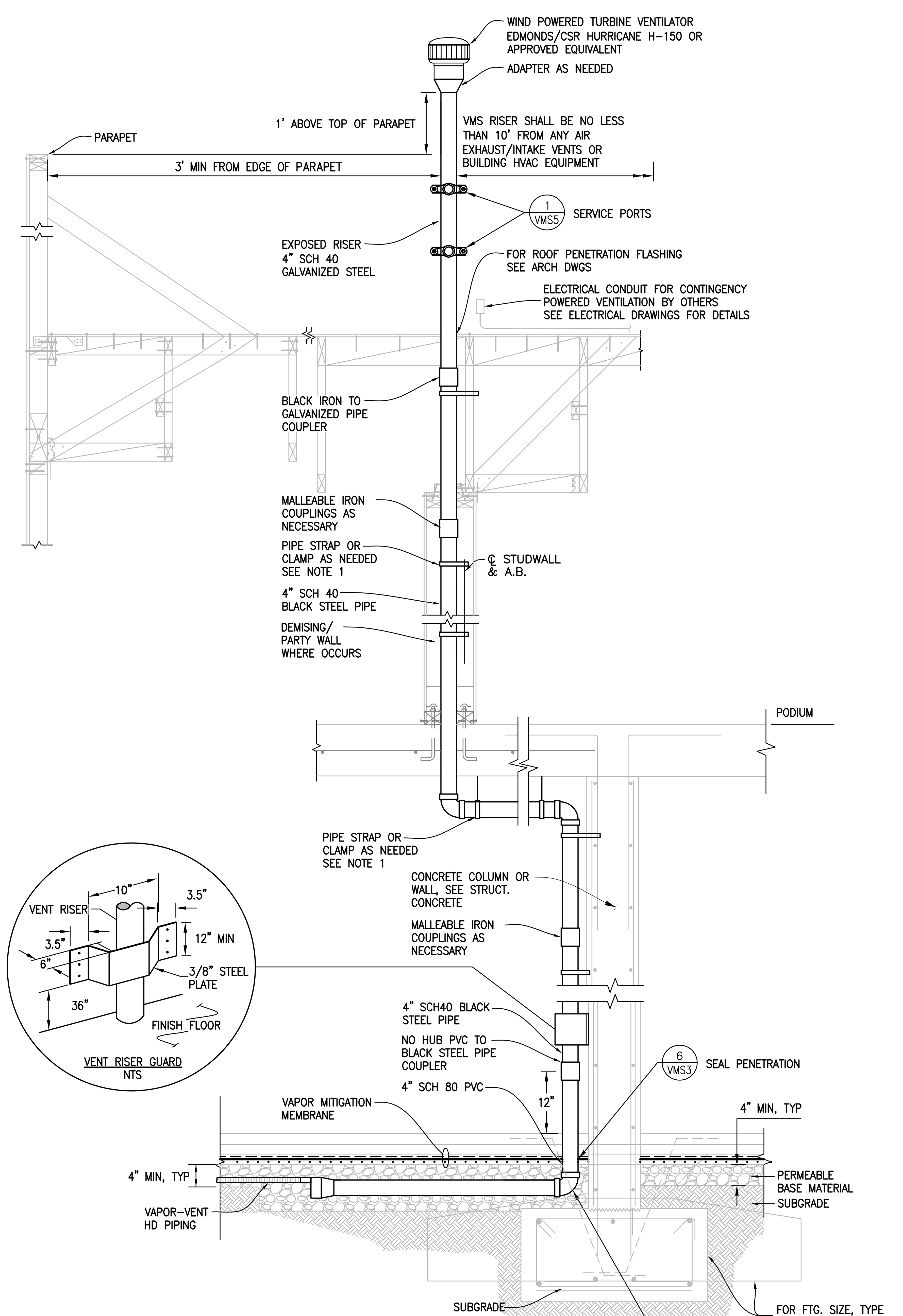
SOIL VAPOR MITIGATION SYSTEM
DUBLIN APARTMENTS
CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA

PT SLAB
MEMBRANE INSTALLATION
DETAILS

amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, Inc.
180 GRAND AVENUE, SUITE 1100
OAKLAND, CALIFORNIA 94612-3066

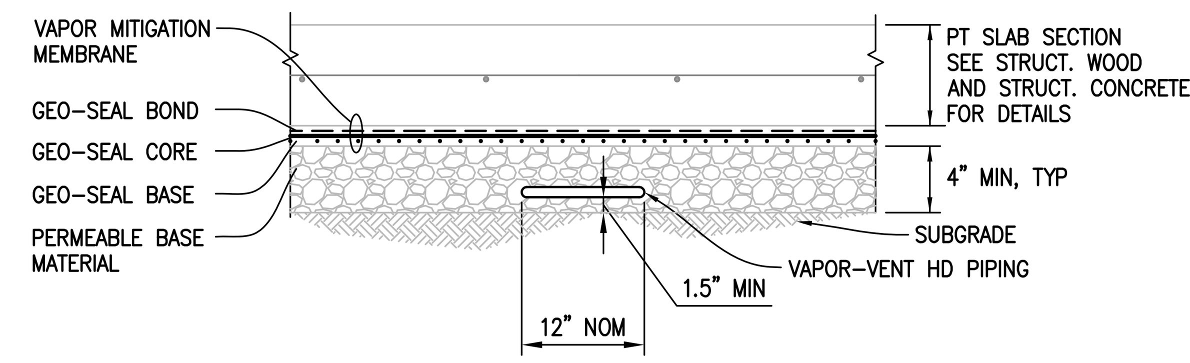
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	06/08/15
PROJECT NO.	OD14170800
DWG	VMS-3
SHEET	7 OF 9

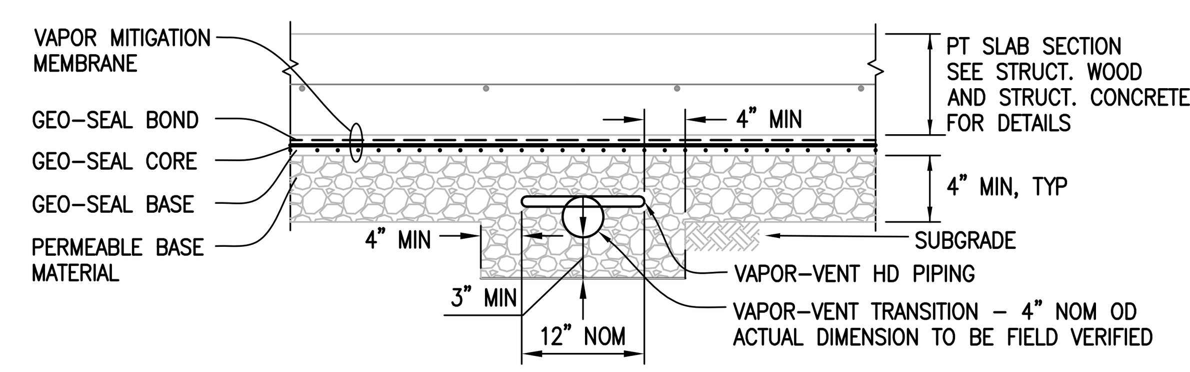


NOTES
1. FOR PIPE SUPPORT / BRACING REQUIREMENTS SEE NOTE 8 OF SUB-SLAB VENTING SYSTEM NOTES IN DWG G-2.

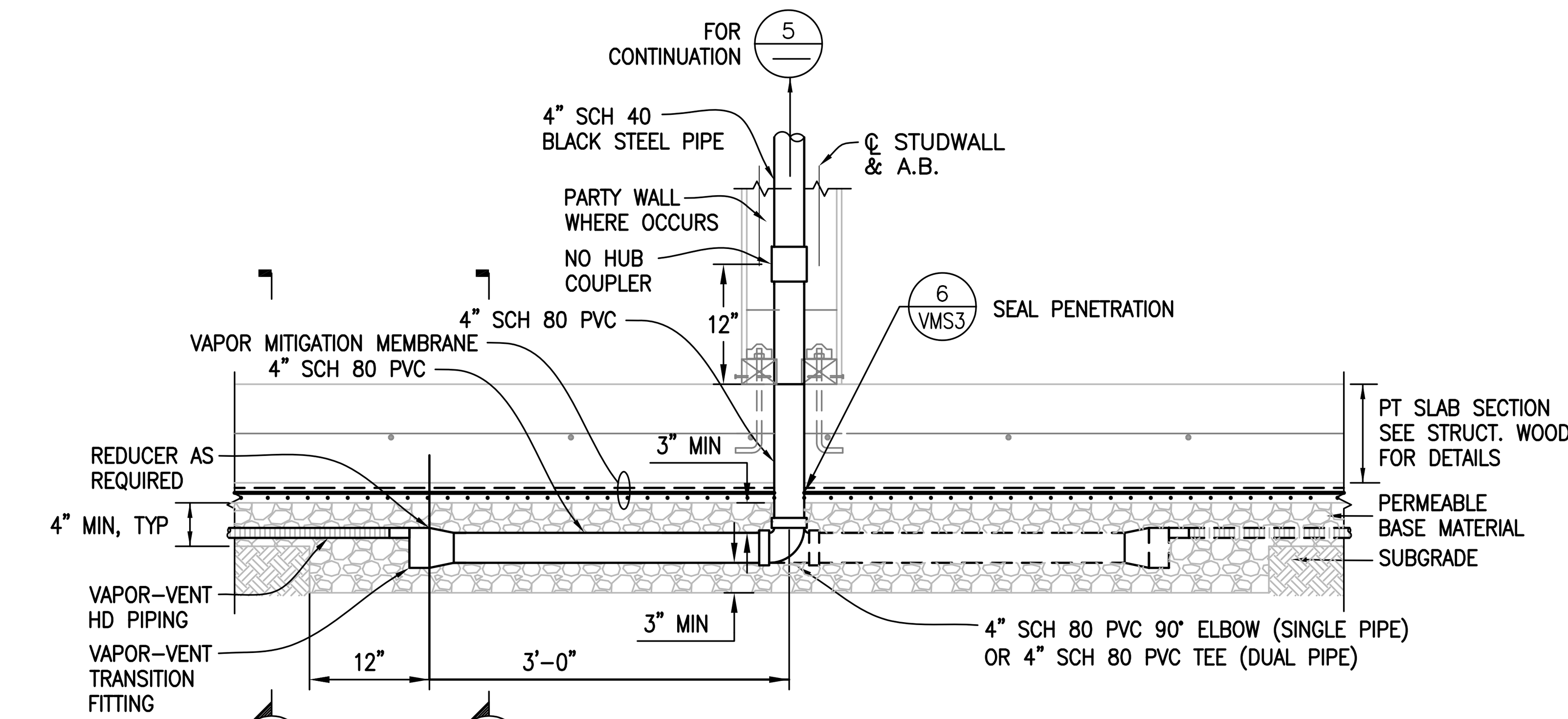
PODIUM SOIL VAPOR COLLECTION VENT RISER
NOT TO SCALE
1 VMS1A,1B,1C



SOIL VAPOR COLLECTION
NOT TO SCALE
A –

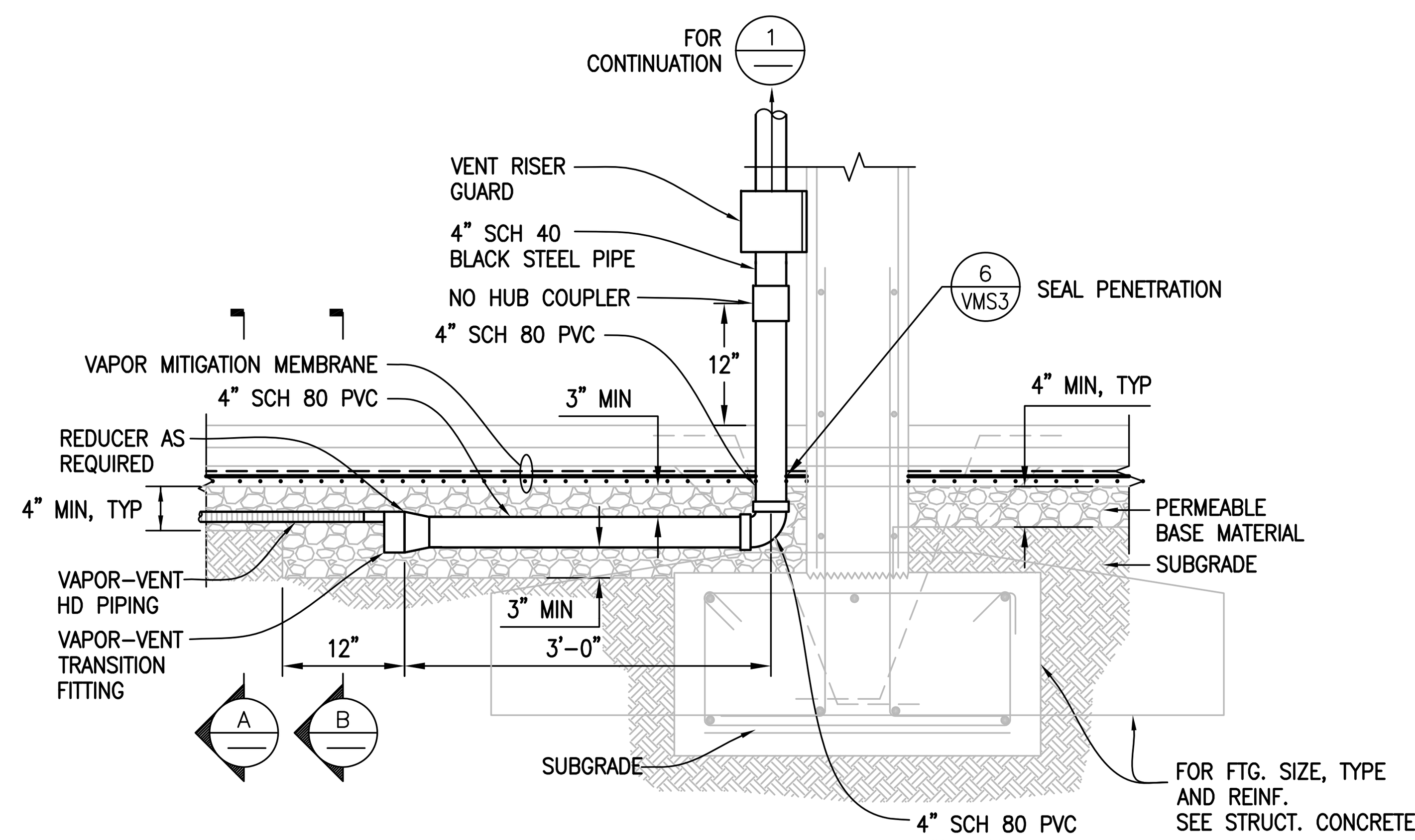


SOIL VAPOR COLLECTION END CONNECTION
NOT TO SCALE
B –

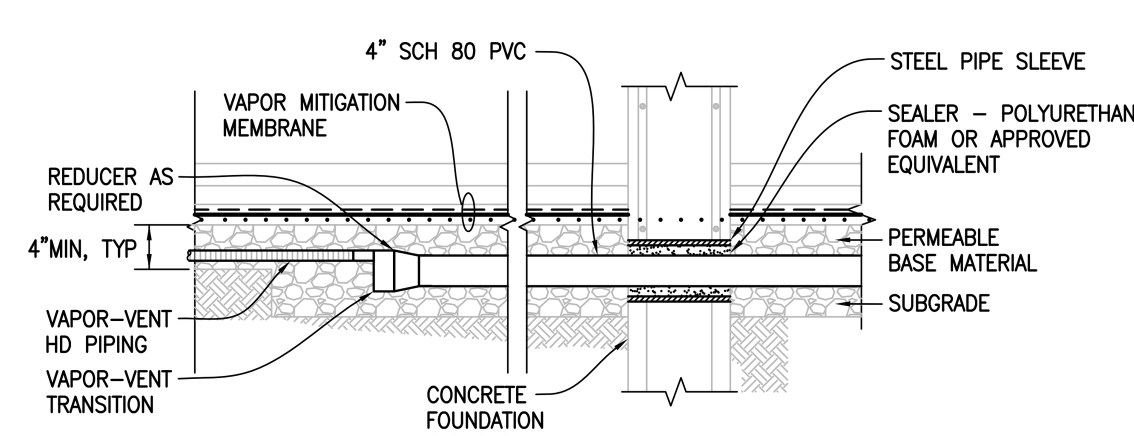


NOTES
1. LOCATION OF UNDERGROUND TO ABOVE GROUND PIPING SHALL BE COORDINATED WITH FOUNDATION INSTALLATION AS TO NOT INTERFERE WITH PARTY WALL ANCHORAGE TO PT SLAB.
2. VERTICAL RISER PIPES SHALL BE CENTERED IN THE PARTY WALL AIR GAP.

PT SLAB SOIL VAPOR COLLECTION PIPE TRANSITION
NOT TO SCALE
4 VMS1A,1B

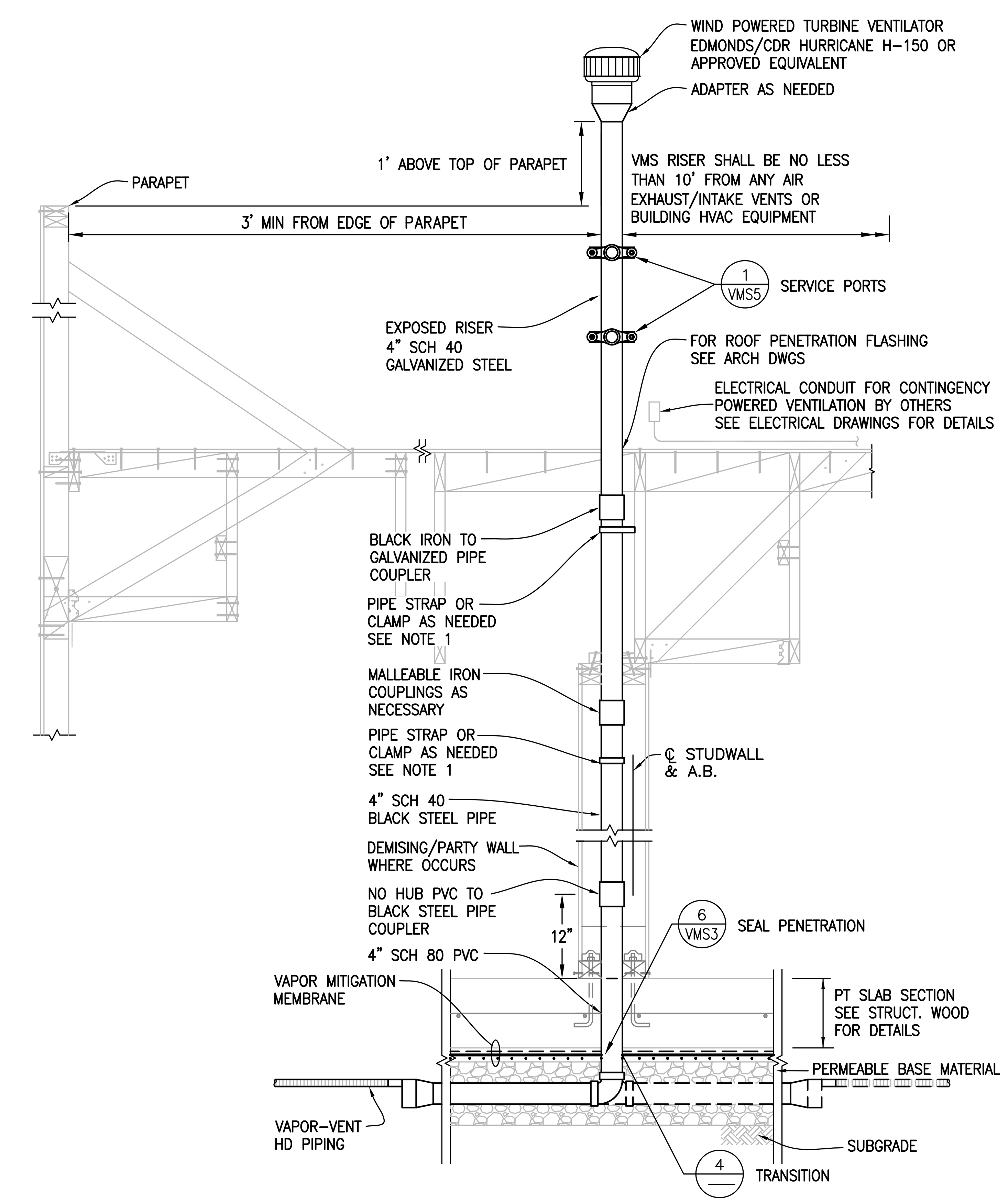


PODIUM SOIL VAPOR COLLECTION PIPE TRANSITION
NOT TO SCALE
2 VMS1A,1B



NOTES
1. SLEEVE ID MUST BE NOMINALLY 2 INCHES GREATER THAN PIPE OD.
2. SLEEVES SHALL BE STEEL PIPE MEETING ASTM A53, TYPE E, GRADE A, SCH 40, GALVANIZED WITH PLAIN ENDS.

VAPOR COLLECTION PIPING THROUGH FOUNDATION ELEMENT
NOT TO SCALE
3 VMS1A



NOTES
1. FOR PIPE SUPPORT / BRACING REQUIREMENTS SEE NOTE 8 OF SUB-SLAB VENTING SYSTEM IN DWG G-2.
2. VERTICAL RISER PIPES SHALL BE CENTERED IN THE PARTY WALL AIR GAP.

ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

PT SLAB SOIL VAPOR COLLECTION VENT RISER
NOT TO SCALE
5 VMS1A,1B,1C

100% DESIGN SUBMITTAL JUNE 2015

REGISTERED PROFESSIONAL ENGINEER
DOUGLAS C BABLITCH
No. C64096
EXP. 09-30-16
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APVD
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

DSGN	DRFT	CHK	APVD
A. ANG	J. GRAUL	F. SZERDY	D. BABLITCH

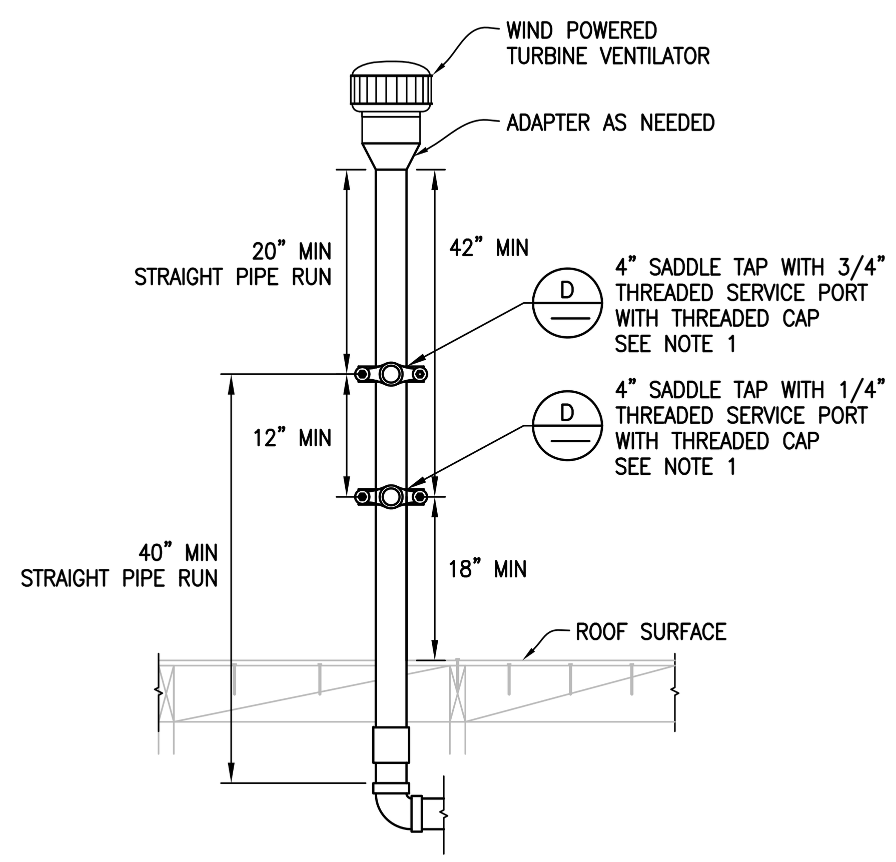
SOIL VAPOR MITIGATION SYSTEM
DUBLIN APARTMENTS
CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA

SUB-SLAB VENTING SYSTEM DETAILS

amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, Inc.
180 GRAND AVENUE, SUITE 1100
OAKLAND, CALIFORNIA 946120619
TELEPHONE: (510) 663-4100
FAX: (510) 663-4141

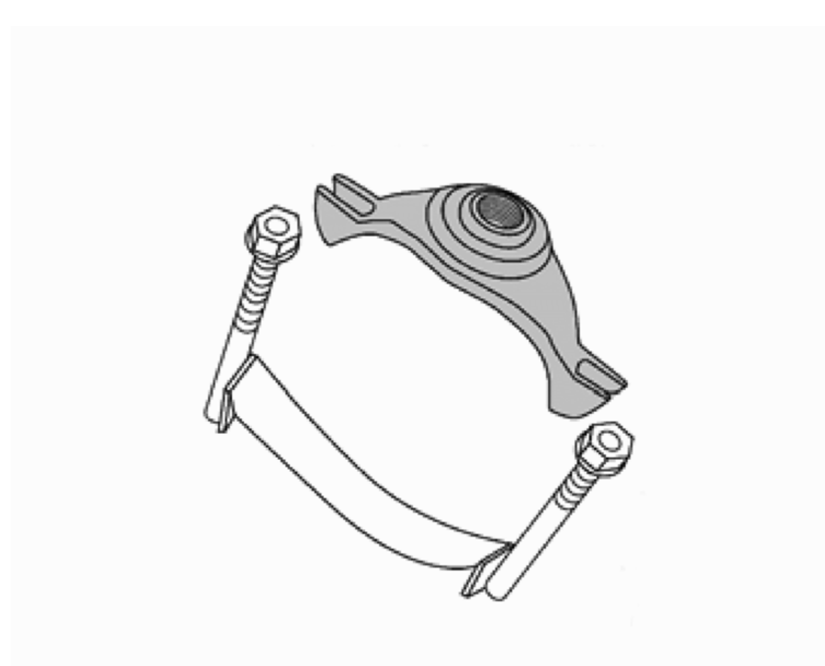
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	06/08/15
PROJECT NO.	OD14170800
DWG	VMS-4
SHEET	8 OF 9

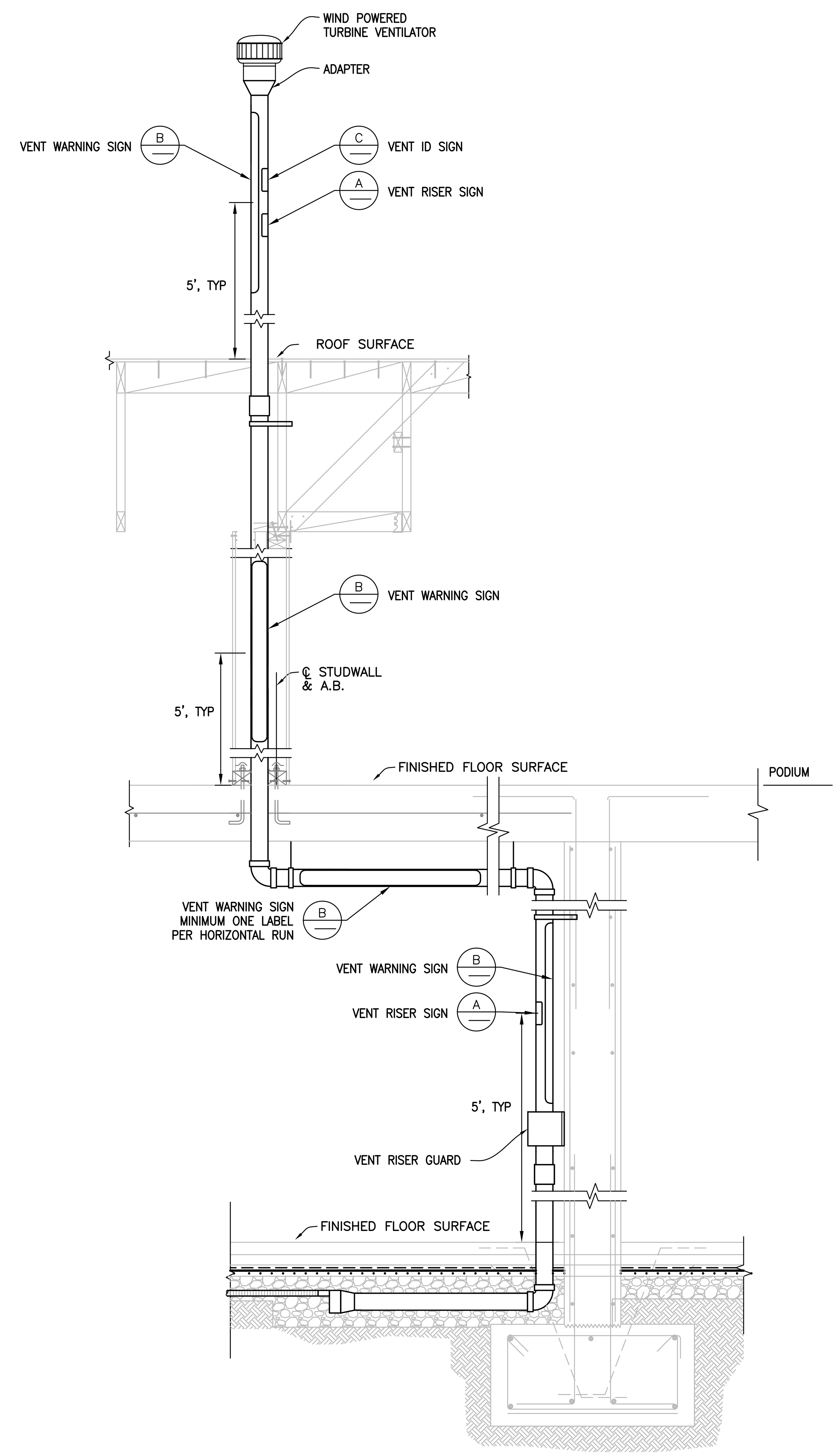


NOTES
1. SADDLE BODY SHALL BE NYLON COATED DUCTILE IRON WITH STAINLESS STEEL STRAP AND BOLTING HARDWARE, ROMAC OR APPROVED EQUIVALENT.

RISER VENT SERVICE PORTS 1
NOT TO SCALE



SADDLE TAP, TYP D
NOT TO SCALE



NOTES
1. VENT RISER SHOWN FOR PODIUM INSTALLATION. SIMILAR SIGNAGE REQUIRED FOR PT SLAB VENT INSTALLATION.
2. SIGNS INSTALLED AT ROOF LEVEL ON EXPOSED PIPING SHALL HAVE ADDITIONAL LAMINATION TO REDUCE ULTRAVIOLET LIGHT INDUCED FADING.

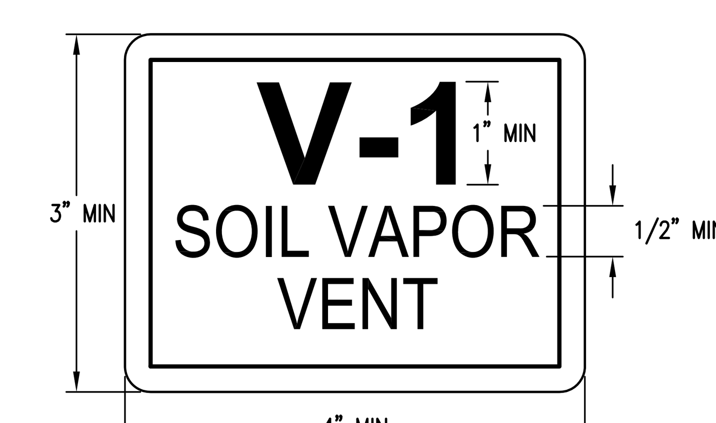
VENT RISER SIGNAGE 2
NOT TO SCALE

NOTES
1. ALL SIGNS SHALL BE ADHESIVE BACKED PLASTIC AND A MINIMUM 3" HIGH X 4" WIDE. LETTERING SHALL BE A MINIMUM 1/4" HIGH, BLACK LETTER ON SAFETY YELLOW BACKGROUND.
2. THE SIGN SHALL BE APPLIED TO EACH VENT RISER NEAR THE TOP (ABOVE ROOF LEVEL) AND ALSO NEAR THE BASE OF EXPOSED RISERS.

VENT RISER SIGN A
NOT TO SCALE

NOTES
1. ALL SIGNS SHALL BE ADHESIVE BACKED PLASTIC AND A MINIMUM 6" HIGH. LETTERING SHALL BE A MINIMUM 1" HIGH, BLACK LETTERING ON SAFETY YELLOW BACKGROUND.
2. THE SIGN SHALL BE APPLIED TO EACH VENT RISER INCLUDING THOSE ENCASED IN PARTY WALLS OR OTHER ENCLOSURES.
3. THE SIGN SHALL BE APPLIED TO THE FRONT AND BACK OF EACH VENT RISER PIPE AT EACH FLOOR AND AT ROOF LEVEL.
4. THE SIGN SHALL BE CENTERED FIVE FEET ABOVE THE FLOOR/ROOF SURFACE.

VENT WARNING SIGN B
NOT TO SCALE



NOTES
1. ALL SIGNS SHALL BE ADHESIVE BACKED PLASTIC AND A MINIMUM 3" HIGH X 4" WIDE. LETTERING SHALL BE A MINIMUM 1/2" HIGH, WHITE LETTERS ON BLUE BACKGROUND.
2. THE SIGN SHALL BE APPLIED TO EACH VENT RISER NEAR THE TOP (ABOVE ROOF LEVEL).
3. REFER TO PLAN VMS-1A FOR VENT RISER LOCATION AND NUMBER.

VENT IDENTIFICATION SIGN C
NOT TO SCALE

100% DESIGN SUBMITTAL JUNE 2015

ZCON BUILDERS' AS-BUILT DRAWINGS - JULY 2017

REGISTERED PROFESSIONAL ENGINEER
DOUGLAS C. BABLITCH
No. C64096
EXP. 09-30-16
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	APVD
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DSGN A. ANG | DRFT J. GRAUL | CHK F. SZERDY | APVD D. BABLITCH

SOIL VAPOR MITIGATION SYSTEM
DUBLIN APARTMENTS
CROWN CHEVROLET NORTH PARCEL
7544 DUBLIN BLVD., DUBLIN, CALIFORNIA

SUB-SLAB VENTING SYSTEM DETAILS

amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, Inc.
180 GRAND AVENUE, SUITE 1100
OAKLAND, CALIFORNIA 9461208619
TELEPHONE: (510) 663-4100
FAX: (510) 663-4141

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	06/08/15
PROJECT NO.	OD14170800
DWG	VMS-5
SHEET	9 OF 9

APPENDIX C

Vent Riser Monitoring and Sampling

APPENDIX C

VENT RISER MONITORING AND SAMPLING
Aster Apartments
6775 Golden Gate Drive
Dublin, California

TABLE OF CONTENTS

ATTACHMENTS

APPENDIX C

VENT RISER MONITORING AND SAMPLING

Aster Apartments
6775 Golden Gate Drive
Dublin, California

Amec Foster Wheeler Environment & Infrastructure, Inc. ("Amec Foster Wheeler") has prepared this Appendix to the *Operations, Maintenance, and Monitoring Plan for Vapor Mitigation System* ("OMM Plan") to aid in operating, maintaining, and monitoring a vapor mitigation system (VMS) at the property located at 6775 Golden Gate Drive, Dublin, California (the "site;" OMM Plan Figure 1). This Appendix describes the methods by which the routine VMS vent riser monitoring, sampling, and inspections will be conducted.

C1.0 VISUAL INSPECTIONS

During each monitoring event, inspections will be conducted to assess the condition of visible portions of the VMS.

The visual inspections will check for signs of physical damage, such as loose pipe supports, damaged riser guards, inoperable sample ports, or cracking resulting from impact. The wind turbines will also be inspected for damage, any obstructions that impede the flow of the turbine, and whether the wind turbine bearings need additional lubrication. The observations will be documented on the Vapor Mitigation System Inspection Form ("VMS Inspection Form"; Attachment C-1).

C2.0 PROCEDURES FOR VENT RISER MONITORING

During each monitoring event, flow parameter readings monitored at the vent risers will include flow velocity, volumetric flow rate, and temperature.

Each vent riser is equipped with two sample ports (one 3/8-inch NPT female x 3/8-inch NPT male on/off valve with lever handle, and one 1/4-inch NPT female x 1/4-inch NPT male on/off valve with t-handle connected to a barbed tube fitting for 1/4-inch inner diameter tubing). The vent risers are located on the buildings' roofs and are accessed from stairwells.

Flow parameter data will be collected using field measurement instruments. A multi-parameter ventilation meter, such as a Dwyer 471B Thermo-Anemometer or similar, will be used to collect average flow rates from the lever handle on/off valve. The following additional parameters may also be recorded to evaluate system performance: average air velocity, temperature within the riser, and ambient air temperature and wind speed.

Alternative field measurement equipment may be selected and utilized by the OMM Contractor as long as the selected instrument is capable of recording flow velocities, volumetric flow rate, and temperature. The following procedures are specific to the Dwyer 471B Thermo-Anemometer and will be used to collect the flow velocity, volumetric flow rate, and temperature readings within each vent riser:

- Turn on the ventilation meter and ensure the flow velocity is zero prior to removing the sleeve covering the filament.
- Slide the sleeve to fully expose the filament.
- Set the ventilation meter so that readings shown on the screen are an average of readings collected over 60 seconds.
- Open the monitoring port by rotating lever handle on/off valve to the open position.
- Insert the probe for the ventilation meter so the filament is centered in the vent riser and perpendicular to the direction of flow. Monitor readings for at least 60 seconds and record the values on the VMS Inspection Form (Attachment C-1).
- Remove the probe from the monitoring port and close the lever handle on/off valve. Replace the sleeve for the probe filament.

C3.0 PROCEDURES FOR SAMPLING

During each monitoring event, samples will be collected from the vent risers for laboratory analysis using the procedures described in the following sections.

C3.1 FIELD SCREENING

Prior to sampling, a photoionization detector (“PID”), such as a RAE Systems ppbRAE 3000 with 10.6 electron-Volt lamp, will be used to measure total volatile organic compound (VOC) concentrations within each vent riser through the lever handle on/off valve. The PID readings will be documented on the VMS Inspection Form (Attachment C-1).

C3.2 SAMPLE COLLECTION

Following the field screening, a sample of vented soil vapor will be collected from each riser into laboratory-provided sampling equipment. The vapor samples will be collected into Tedlar bags from the barbed fitting at the t-handle on/off valve.

Prior to sampling, each Tedlar bag will be inspected to check the integrity of the sampling device. The following will be performed on each back prior to use:

- Check the valve for each Tedlar bag to confirm it is closed during transport.
- Visually inspect the bag to determine if the Tedlar bag has any visible damage.

If any of the items listed are noticed during the inspection, then the Tedlar bag is considered compromised and will not be used for sample collection.

The following procedures will be implemented during the collection of vent riser air samples:

- Place a Tedlar bag within a lung box, and connect the Tedlar bag to the lung box in accordance with the manufacturer's instructions (instructions for an SKC-West Vac-U-Chamber are included in Attachment C-2).
- Attach a length of 1/4-inch-outside-diameter Teflon™ tubing to the lung box and connect it to the sample port of the vent riser. If needed, additional materials may be used to create an air tight seal (e.g., silicone tubing).
- Purge stagnant air from the sample line using the instructions provided in Attachment C-2; however, it is not necessary to use nitrogen or purified air. Purge a total of approximately 2 liters from the sample tubing and vent riser to confirm all stagnant air has been removed. Maintain a flow rate of less than 5 liters per minute.
- Following purging, collect a sample using the instructions provided in Attachment C-2, at a flow rate of less than 5 liters per minute. When the Tedlar bag is approximately 80% full, close the valve to the Tedlar bag and the sampling port. Disconnect the Tedlar bag from the tubing. Gently press on the Tedlar bag to ensure there are no leaks.
- Disconnect the tubing from the sample port and discard.

C3.3 QUALITY CONTROL SAMPLES

The following procedures will be implemented during the collection of vent riser air samples:

- Field quality control (QC) samples will consist of one blind field duplicate sample that will be collected simultaneously with the primary samples and labeled with a false identifier and time.
- The QC sample will be analyzed for the same suite of compounds as investigation samples.

C3.4 SAMPLE DOCUMENTATION AND SHIPMENT

The following sample documentation and shipment procedures will be implemented to document and track samples collected during the sampling program:

- Document the date, time, and location on the Tedlar bag. Add notes to the VMS Inspection log regarding conditions that could potentially affect the sample.
- Fill out the sample label using ink. Attach the completed sample label to the Tedlar bag and record the sample information on a chain-of-custody form.
- Deviations from the work plan that occur during sampling will be recorded in the sample collection documentation, along with notes that indicate whether, and in what manner, the deviation may affect results.

Store the Tedlar bags in a cardboard box before transfer to the analytical laboratory following Amec Foster Wheeler chain-of-custody procedures. Tedlar bags will be stored at ambient temperature, avoiding temperature extremes and direct sunlight.

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ATTACHMENT C-1

Vapor Mitigation Inspection Form

VAPOR MITIGATION SYSTEM INSPECTION FORM
Aster Apartments
6775 Golden Gate Drive
Dublin, California

GENERAL INFORMATION

Field staff: ______________________ Others on site: ______________________

Ambient Temperature (start/end): ________ / ________ °F Precipitation? Yes / No

Estimated Wind Speed (start/end): ________ / ________ MPH Cloud Cover: Yes / No

Equipment Used and Calibration Details: ______________________

VENT RISER MONITORING

Vent Riser ID	Date (MMDDYY)	Time (HHMM)	Velocity (FPM)	Temp (°F)	PID Reading (PPMV)	Sample ID	Comments
V-1							
V-2							
V-3							
V-4							
V-5							
V-6							
V-7							
V-8							
V-9							
V-10							
V-11							
V-12							
V-13							
V-14							
V-15							

Notes: FPM = feet per minute ID = identification
PID = photoionization detector PPMV = parts per million by volume

VISUAL INSPECTION

1. Are the sample taps and valves in good condition? Y N

2. Are the vent riser labels visible? Y N

3. Are the rooftop ventilators functional and in good working condition? Y N

Comments/Other Observations:

ATTACHMENT C-2

SKC-West Vac-U-Chamber Operating Instructions

2380 East Walnut Ave., Fullerton, CA 92834 USA
Tel: 714-992-2780 Fax: 714-870-9634
e-mail: custserv@skcwest.com

Vac-U-Chamber
Cat. Nos. 231-939 and 231-940
Operating Instructions

Introduction

Vac-U-Chamber is suitable for the following applications:

- U.S. EPA Methods 18 (VOCs—industrial sources) and 0040 (POHCs—stationary sources)
- Soil/gas vapor sampling (U.S. EPA SOP 2042)
- Indoor air remediation system monitoring petroleum constituents (U.S. EPA SOPs 2102, 2103, and 2104)
- Groundwater testing
- Stack sampling
- Ventilation studies
- Hazmat testing
- Preparation of standards/gas mixes

Description

The Vac-U-Chamber is a rigid, airtight case with connector fittings on three ports:

1. Vacuum port—to inflate the sample bag
2. Purge port—to evacuate the sample bag before sampling, to sample, and to make a standard
3. Sample inlet port—1/4-inch OD fitting to connect the sample line or gas source

The Small Vac-U-Chamber has the vacuum and sample inlet ports on the front and the purge port on the side; the Large Vac-U-Chamber has all three ports on the front *(Figure 1)*. ***Note:*** *Designed to contain SKC sample bags.*

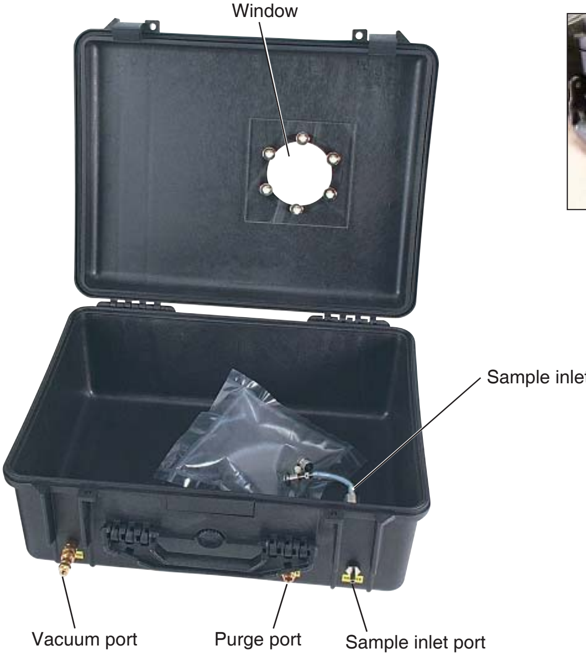


Figure 1. Large Vac-U-Chamber and Ports

Purge port on side of small model

Vac-U-Chamber Contents

If You Have Cat. No.	Your Package Should Contain
231-940	Small Vac-U-Chamber with polypropylene fittings (supplied without pump) and ¼-inch ID Tygon tubing with polypropylene quick coupling; suitable for use with SKC 1-liter sample bags
231-939	Large Vac-U-Chamber with stainless steel fittings (supplied without pump) and ¼-inch ID Tygon tubing with stainless steel quick coupling; suitable for use with SKC 8-liter bags

See Accessories/Replacement Parts on page 7.

Required Equipment

☑ **Sample pump** such as the SKC Universal XR Series, AirChek® TOUCH, or AirChek XR5000

☑ **¼-inch ID (5/16-inch OD) PTFE tubing** for sample line

☑ **Sample bags:** 1 liter for use with Small Vac-U-Chamber, 8 liter for use with Large Vac-U-Chamber; *see options below*

Bag Material	1 Liter Cat. No.	8 Liter Cat. No.
Tedlar®	**232-01**	**232-939**
SamplePro® FlexFilm	**236-001**	**236-004**
Standard FlexFoil®	**262-01**	**262-08**
FlexFoil PLUS	**252-01**	**252-08**

Operation

Set/Calibrate Pump Flow Rate

- *If using a Universal XR Series sample pump, ensure that it is in high flow mode. See pump operating instructions.*
- *Before sampling, allow pump to equilibrate after moving it from one temperature extreme to another.*

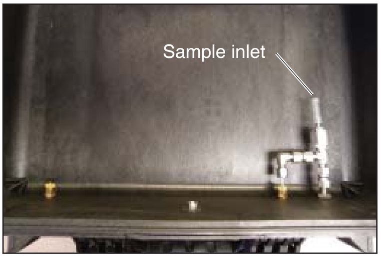
Set the pump for a flow rate sufficient to sample in the required time. *See Timed Sampling and pump operating instructions for details on setting flow*.

Calibrate pump flow rate if required by the method used.

1. Run the pump for 5 minutes before calibrating.
2. Use flexible tubing to connect the pump inlet to the outlet (suction) port of a calibrator.
3. Calibrate the pump to the flow rate specified in the method used. *See pump and calibrator operating instructions for details*.

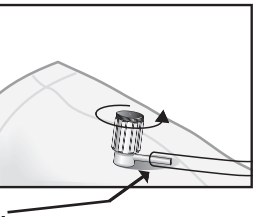
Install Sample Bag in Vac-U-Chamber

1. Inside the Vac-U-Chamber, insert the inlet stem of the sample bag into the chamber's sample inlet (short piece of PTFE tubing, *see below*).



Sample inlet inside Vac-U-Chamber

2. Open the valve on the bag by turning the entire upper portion (septum body and cap) of the fitting **counterclockwise** one revolution.



Do not turn the side stem.

Fill Sample Bag with a Sample (Grab or Timed)

Setup

1. Install the sample bag properly. *See Install Sample Bag in Vac-U-Chamber*.
2. Purge the sample bag and/or sample line if required. *See Purge Sample Bag/ Sample Line*.

3. Outside the Vac-U-Chamber, push the quick coupling on the end of the supplied Tygon tubing into the vacuum port; *see right.* Press the open end of the Tygon tubing securely onto the pump inlet. ***Note:*** *Ensure that the red cap plug is removed from the sample inlet port.*

4. Close the Vac-U-Chamber and secure both latches. Perform grab or timed sampling. *See below.*

Grab Sampling

1. Turn on the pump and monitor bag inflation through the window in the chamber's lid. Run the pump until the bag is approximately 80% full. **Do not overinflate the bag** *(Figure 2).*
2. Turn off the pump when sampling is complete. Immediately open the Vac-U-Chamber. ***Note:*** *Disconnect the pump to release the vacuum.*
3. Close the valve on the sample bag by turning the entire upper portion (septum body and cap) of the fitting **clockwise** one revolution.
4. Pull the bag fitting from the chamber's sample inlet (short piece of PTFE tubing).

Timed Sampling

The Vac-U-Chamber is not a perfect vacuum, but its leak rate is low and allows efficient sample collection, even at lower flow rates (10 ml/min), for a full 8-hour sample. To collect 1 liter of sample into a 1-liter bag, use a vacuum source at approximately 1 L/min for 1 minute. Use similar flows to determine filling times.

1. Set/Calibrate the pump flow rate to collect enough sample in the time required in the analytical method.
2. Turn on the pump and record the start time. Sample for the time specified in the analytical method. **Do not overinflate the bag** *(Figure 2).*
3. Turn off the pump, record the stop time, and immediately open the Vac-U-Chamber. ***Note:*** *Disconnect the pump to release the vacuum.*
4. Close the valve on the sample bag by turning the entire upper portion (septum body and cap) of the fitting **clockwise** one revolution.
5. Pull the bag fitting from the chamber's sample inlet (short piece of PTFE tubing).

Purge Sample Bag/Sample Line

Purge Sample Bag

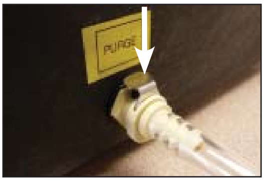
1. Ensure that the sample bag is installed properly inside the Vac-U-Chamber. *See Install Sample Bag in Vac-U-Chamber*.
2. Outside the Vac-U-Chamber, connect a source of 99.99% nitrogen OR purified air to the sample inlet port (¼-inch OD fitting). If desired, insert a charcoal filter between the cylinder and the bag.
3. Push the quick coupling on the end of the supplied Tygon tubing into the purge port *(Figure 1)*, and press the open end of the Tygon tubing securely onto the pump inlet.

4. Turn on the sample pump and run it until the bag is completely deflated. ***Note:*** *If the sample pump used has a flow fault feature, the pump may go into flow fault during this operation. If the pump does not reset automatically, see the flow fault section in the pump operating instructions.*

Direct the vented air to a safe location. Do NOT breathe the exhaust air from the bag being purged.

5. Turn off the pump and use the quick coupling to detach the Tygon tubing from the purge port as follows, depending on the model. *See below.*

On the Large Vac-U-Chamber, grip the release ring and push toward the chamber.



On the Small Vac-U-Chamber, press down on the release tab.

6. Open the valve on the regulator. Nitrogen will flow into the bag at approximately 500 ml/min. Fill a 1-liter bag for approximately 2 minutes or an 8-liter bag for approximately 16 minutes.

Use the window in the lid of the chamber to monitor bag inflation. Do not fill the bag more than 80% of its maximum volume *(Figure 2)*.

7. Close the valve on the regulator.
8. Evacuate the sample bag: with the red cap on the sample inlet port, push the quick coupling on the end of the supplied Tygon tubing into the purge port *(Figure 1)* and press the open end of the tubing securely on the pump inlet. Turn on the sample pump and run it until the bag is completely deflated.
9. Repeat Steps 3 through 8 at least two more times before sampling. After purging the sample bag, purge the sample line if desired. *See Purge Sample Line.*

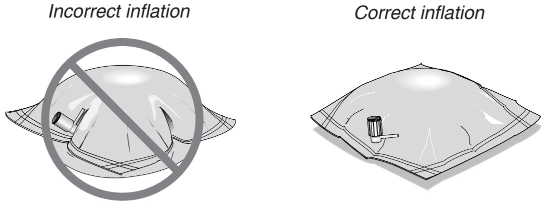


Figure 2. Bag Inflation

Purge Sample Line

1. Remove the red cap from the sample inlet port *(Figure 1)*. Press a long length of PTFE tubing (the sample line) onto the sample inlet port. Connect the loose end of the PTFE tubing to a clean air source.
2. Align and push the quick coupling on the end of the supplied Tygon tubing into the purge port *(Figure 1)*. Press the open end of the Tygon tubing securely onto the pump inlet.
3. Turn on the pump and let it run long enough to purge the line. Repeat the process as many times as desired.
4. Turn off the pump and use the quick coupling to detach the Tygon tubing from the purge port.

How to Handle Sample Bags Post-sampling

- *Keep bags containing samples out of direct sunlight.*
- *If a sample bag was partially evacuated onto an instrument (gas chromatography) or into a color detector tube, evacuate the remaining sample before disposing of the bag. See Purge Sample Bag, Step 8.*
- *Direct the vented air to a safe location. Do NOT breathe the exhaust air from the bag being evacuated.*
- *Pack sample bags loosely and with padding to minimize possible puncturing during shipment.*
- *Do not ship sample bags by air unless the cargo cabin is pressurized; a significant decrease in barometric pressure may cause sample bags to burst.*

Special Application

Make Standard Gas Samples

1. To use your Vac-U-Chamber to make a standard, connect a source of 99.99% nitrogen OR purified air to the sample inlet port *(Figure 1)*.
2. Meter into the sample bag an exact amount of nitrogen or air sample. One liter of nitrogen or air is admitted into the bag by flowing 500 ml/min for 120 seconds.
3. Close the valve on the sample bag and remove the bag from the chamber.
4. Inject the proper amount of chemical through the septum fitting. For example, to make a standard of 1 part per million of vinyl chloride, inject 1 microliter of vinyl chloride through the septum into a bag containing 1 liter of nitrogen.
5. Knead the bag to mix.

Accessories/Replacement Parts

Description		Cat. No.
PTFE Tubing, ¼-inch ID (5/16-inch OD), for sample line	50 feet 10 feet	**231-924** **231-937**
Nitrogen Cylinder, 103 liters, 99.99% pure, *requires regulator*		**804-9B0994**
Regulator for cylinder, 500 ml/min, *requires cylinder*		**804-R713050**
Charcoal Tubes, pk/50		**226-09**
Telescoping Sample Probe, stainless steel	16 inches to 6 feet 5 inches 14.5 inches to 4 feet 5 inches	**805-10545** **805-10546**
Digital Stopwatch		**303-01-1**
Accessories/Replacement Parts		
Quick Coupling Male Insert, stainless steel, connected to 3 feet of Tygon tubing, for Large Vac-U-Chamber		**P231941**
Quick Coupling Male Insert, polypropylene, connected to 3 feet of Tygon tubing, for Small Vac-U-Chamber		**P231941M**
Quick Coupling Female Connector, polypropylene, for Small Vac-U-Chamber		**P231942**
Quick Coupling Female Connector, stainless steel, for Large Vac-U-Chamber		**P231943**
Sample Bags		
Tedlar Bags with Dual Stainless Steel Fitting		
1 Liter		**231-01**
Tedlar Bags with Single Polypropylene Fitting		
1 Liter		**232-01**
8 Liter		**232-939**
Standard FlexFoil with Single Polypropylene Fitting		
1 Liter		**262-01**
8 Liter		**262-08**
FlexFoil PLUS with Single Polypropylene Fitting		
1 Liter		**252-01**
8 Liter		**252-08**
SamplePRO FlexFilm with Single Polypropylene Fitting		
1 Liter		**236-001**
8 Liter		**236-004**
Replacement Septa		
Septa for Dual Stainless Steel Fittings		**231-9-04**
Septa for Single Polypropylene Fittings		**232-01-RS**

SKC Limited Warranty and Return Policy

SKC products are subject to the SKC Limited Warranty and Return Policy, which provides SKC's sole liability and the buyer's exclusive remedy. To view the complete SKC Limited Warranty and Return Policy, go to http://www.skcinc.com/warranty.asp.

Appendix

Performance Profile

Sampling Media:	1 or 8-liter bag
Sampling Rate:	User selectable
Sample Time:	Varies *Do not fill bag more than 80% of its maximum volume*
Sample Pump:	AirChek TOUCH, AirChek XR5000, or Universal XR — 1 to 5 L/min
Analysis:	Varies

APPENDIX D

Indoor Air Sample Collection Procedures

APPENDIX D

INDOOR AIR SAMPLE COLLECTION PROCEDURES

Aster Apartments
6775 Golden Gate Drive
Dublin, California

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ATTACHMENTS

APPENDIX D

INDOOR AIR SAMPLE COLLECTION PROCEDURES

Aster Apartments
6775 Golden Gate Drive
Dublin, California

Amec Foster Wheeler Environment & Infrastructure, Inc. ("Amec Foster Wheeler") has prepared this Appendix to the *Operations, Maintenance, and Monitoring Plan for Vapor Mitigation System* ("OMM Plan") to aid in operating, maintaining, and monitoring a vapor mitigation system (VMS) at the property located at 6775 Golden Gate Drive, Dublin, California (the "site;" OMM Plan Figure 1). This Appendix describes the methods by which indoor air samples will be collected by the OMM Contractor on behalf of the Owner/Operator.

D1.0 BUILDING SURVEY AND PRE-FIELD PROCEDURES

Prior to conducting indoor air sampling, the OMM Contractor will perform the following activities:

- A preliminary building survey will be conducted to confirm the sample locations and identify potential sources of VOCs that could cause false positive detections. A low-level photoionization detector (PID), such as a ppbRAE, will used during the walkthrough to identify potential sources of VOCs. The results from the building survey and PID screening will be documented on a Building Survey Form (a template is provided in Attachment D-1) and on a site map that depicts the proposed sampling locations.
- The OMM Contractor will coordinate with the Owner/Operator to remove, if possible, chemicals present within the building that could interfere with the interpretation of the indoor air sampling results. If it is not possible to remove sources of chemicals in the immediate vicinity of the proposed sampling locations, alternative representative locations may be selected.

Building survey results and any associated sample location changes will be reported to the Owner/Operator and discussed with Alameda County Department of Environmental Health, if necessary.

D2.0 INDOOR AIR SAMPLING PROCEDURES

Specific procedures to follow for the sampling program are described below and include activities before, during, and after the samples are collected. The methods outlined below are in accordance with those in the *Advisory—Active Soil Vapor Investigations* (DTSC, 2015).

D2.1 SUMMA CANISTER VACUUM GUIDELINES

The following Summa™ canister vacuum guidelines will be implemented to ensure that the collected samples yield valid data for the VI evaluation:

- If the initial vacuum gauge reads less than -28.5 inches of mercury (in. Hg), the canister may be leaking and will be replaced before sample collection.
- If the canister is not under vacuum at the conclusion of sample collection, the sample will be considered a grab sample (i.e., not an integrated sample).
- If the final vacuum gauge reads greater than –20 in. Hg, the sample will be rejected.

D2.2 PRIOR TO SAMPLE COLLECTION

The following procedures will be implemented before sample collection:

- Check that the valve on the canister is closed, then remove the Swagelok® nut cap from each 6-liter Summa canister using a 9/16-inch wrench, or equivalent. Attach the designated laboratory-supplied flow controller to the canister; and then fit the Swagelok nut cap to the top of the flow controller. The valve adjustment on the flow controller should not be touched. Finger-tighten the flow controller fitting to the Summa canister first, and then tighten gently (1/16 turn) with a 9/16-inch wrench, or equivalent. It is essential that all connections between the canister and the flow controller be tight enough so that the pieces cannot be rotated by hand. Replace the Swagelok nut cap onto the inlet of the flow controller.
- To test the vacuum in the canister and to confirm that there are no leaks in the fittings, perform a “shut-in” test by briefly opening and then closing the valve on each canister, creating a vacuum within the flow controller. If the vacuum gauge on the canister indicates less vacuum than -28.5 in Hg when the valve is opened (e.g., gauge reading –28.0 in. Hg), then do not use the canister. Monitor the vacuum on the gauge on the flow controller for several minutes to confirm that the vacuum is stable. If the vacuum is not stable, retighten the fittings and perform the test again.
- Remove the Swagelok nut from the inlet of each flow controller.
- Place the Summa canister in its designated location within and/or outside of the building. Place indoor air sample canisters on boxes and/or other features so that the sampling port is located at a height of approximately 3–5 feet above floor level (i.e., breathing zone of a worker). Place outdoor air sample at ground level.

D2.3 SAMPLE COLLECTION

The following procedures will be implemented during the collection of indoor and outdoor air samples:

- When ready, open the Summa canister valve(s). Turn the knob counterclockwise until there is no resistance (approx. 1¼ turns), then turn clockwise slightly until resistance is felt. Record the initial pressure and start time on the Air Sampling Log (Attachment D-1).

- Approximately 30 minutes to 1 hour after the start of sample collection, check the canister to ensure that it is operating properly.
- After the sample has been collected for the designated sampling period, close the canister valve by rotating the knob clockwise until it will no longer turn by hand. Record the final pressure and stop time on the Air Sampling Log (Attachment D-1). The final canister pressure should be between –2 in. Hg and –7 in. Hg in order to meet project analytical reporting limits.
- Remove the flow controller and replace the Swagelok nut on the canister.

D2.4 SAMPLE DOCUMENTATION AND SHIPMENT

The following sample documentation and shipment procedures will be implemented to document and track samples collected during the sampling program:

- Document the date, time, location, serial numbers of the Summa canister and flow controller. Document the Summa canister pressure on the Air Sampling Log once sampling begins and again when it is completed. Record the stop time on the Air Sampling Log and add notes to the Air Sampling Log regarding conditions that could potentially affect the sample. The Air Sampling Log is provided as Attachment C.
- Fill out the provided sample label using ink. Attach the completed sample label to the Summa canister and record the sample on a chain-of-custody form.
- Deviations from the work plan that occur during sampling will be recorded in the sample collection documentation, along with notes that indicate whether, and in what manner, the deviation may affect results.
- Store the Summa canister in a cardboard box before transfer to the analytical laboratory following Amec Foster Wheeler chain-of-custody procedures. Canisters will be stored at ambient temperature, avoiding temperature extremes and direct sunlight.

D3.0 REFERENCES

Department of Toxic Substances Control (DTSC), Los Angeles Regional Water Quality Control Board, and San Francisco Regional Water Quality Control Board, 2015. Advisory: Active Soil Gas Investigations. July.

ATTACHMENT D-1

Building Survey Form

BUILDING SURVEY FORM*

Preparer's Name: ______________________________ Date/Time Prepared: __________
Affiliation: ______________________________ Phone Number: __________

Occupant Information

Occupant Name: ______________________________ Interviewed: ☐ Yes ☐ No
Mailing Address: ______________________________
City: ____________________ State: ____________ Zip Code: __________
Phone: ____________________ Email: ______________________________

Owner/Landlord Information (Check if same as occupant ☐)

Occupant Name: ______________________________ Interviewed: ☐ Yes ☐ No
Mailing Address: ______________________________
City: ____________________ State: ____________ Zip Code: __________
Phone: ____________________ Email: ______________________________

Building Type (Check appropriate boxes)

☐ Residential ☐ Residential Duplex ☐ Apartment Building ☐ Mobile Home ☐ Commercial (office)
☐ Commercial (warehouse) ☐ Industrial ☐ Strip Mall ☐ Split Level ☐ Church ☐ School

Building Characteristics

Approximate Building Age (years): __________ Number of Stories: __________
Approximate Building Area (square feet): __________ Number of Elevators: __________

Foundation Type (Check appropriate boxes)

☐ Slab-on-Grade ☐ Crawl Space ☐ Basement

Basement Characteristics (Check appropriate boxes)

☐ Dirt Floor ☐ Sealed ☐ Wet Surfaces ☐ Sump Pump ☐ Concrete Cracks ☐ Floor Drains

Factors Influencing Indoor Air Quality

Is there an attached garage? ☐ Yes ☐ No
Is there smoking in the building? ☐ Yes ☐ No
Is there new carpet or furniture? ☐ Yes ☐ No Describe: __________
Have clothes or drapes been recently dry cleaned? ☐ Yes ☐ No Describe: __________
Has painting or staining been done with the last six months? ☐ Yes ☐ No Describe: __________
Has the building been recently remodeled? ☐ Yes ☐ No Describe: __________
Has the building ever had a fire? ☐ Yes ☐ No
Is there a hobby or craft area in the building? ☐ Yes ☐ No Describe: __________
Is gun cleaner stored in the building? ☐ Yes ☐ No
Is there a fuel oil tank on the property? ☐ Yes ☐ No
Is there a septic tank on the property? ☐ Yes ☐ No
Has the building been fumigated or sprayed for pests recently? ☐ Yes ☐ No Describe: __________
Do any building occupants use solvents at work? ☐ Yes ☐ No Describe: __________

* Developed based guidelines set forth in the Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (DTSC, 2011).

Sampling Locations

Draw the general floor plan of the building and denote locations of sample collection. Indicate locations of doors, windows, indoor air contaminant sources and field instrument readings.

Primary Type of Energy Used (Check appropriate boxes)

☐ Natural Gas ☐ Fuel Oil ☐ Propane ☐ Electricity ☐ Wood ☐ Kerosene

Meteorological Conditions

Describe the general weather conditions during the indoor air sampling event.

____

General Comments

Provide any other information that may be of importance in understanding the indoor air quality of this building.

____
____
____
____
____

* Developed based guidelines set forth in the Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (DTSC, 2011).

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ATTACHMENT D-2

Air Sampling Log

AIR SAMPLING LOG

Project Name: ______________________ **Project Number:** ______________________

Start Date: ______________________ **Building IDs:** ______________________

FIRST DAY OF SAMPLING

Sampler Name:		**Weather:**	
Temperature:		**Barometric Pressure:**	
Notes:			

SECOND DAY OF SAMPLING

Sampler Name:		**Weather:**	
Temperature:		**Barometric Pressure:**	
Notes:			

Sample ID	Sample Type	Building ID	Summa Canister ID	Flow Controller ID	Sampling Start			Sampling End		
					Start Canister Vacuum	Start Time	Start Date	End Canister Vacuum	End Time	End Date

Sample ID	Sample Type	Building ID	Summa Canister ID	Flow Controller ID	Sampling Start			Sampling End		
					Start Canister Vacuum	Start Time	Start Date	End Canister Vacuum	End Time	End Date

APPENDIX E

BAAQMD Permit to Operate

BAAQMD Permit to Operate

PENDING