585 22nd Street, LLC
2030 Manzanita Dr.
Oakland, CA 94611

Matt Ticknor
415-990-6944
matt@sqftventures.com

Charles A. Long
775-742-9166
charlesalong@gmail.com

RECEIVED
By Alameda County Environmental Health 9:55 am, Aug 02, 2017

July 29, 2017

Subject: Site Development
Review
585 22nd Street
Oakland, California
Alameda County Department of Environmental Health
Case RO0003187

We 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 SWRCB's GeoTracker website.

Charles A. Long
Principal

Matt Ticknor
Principal

ADVANTAGE
ENVIRONMENTAL
CONSULTANTS, LLC.

July 29, 2017

Mark Detterman
Senior Hazardous Materials Specialist, PG, CEG
1131 Harbor Bay Parkway
Alameda, CA 94502

Re: Site Development Review
585 22nd Street
Oakland, California
Alameda County Department of Environmental Health
Case RO0003187

Dear Mr. Detterman:

On behalf of 585 22nd Street, LLC, Advantage Environmental Consultants, LLC (AEC) has prepared this *Site Development Review* pertaining to the above referenced property identified as 585 22nd Street in the City of Oakland, Alameda County, California (Site). The Site is comprised of an approximately 23,000 square foot (0.53-acre) area located at the physical addresses of 600 21st Street, 572 21st Street and 585 22nd Street. The Site is further identified by Alameda County Assessor's Parcel Numbers 008-0647-014, 008-0647-013 and 008-0647-028-04. The current land uses at the Site are as follows:

- 600 21st Street - Law office and historical house to be relocated.
- 572 21st Street – Five-unit apartment building and historical house to be relocated
- 585 22nd Street – Asphalt paved lot used for the parking of United States Postal Service vehicles

The Site is a proposed multifamily development project. Site development will require conventional grading (removal and recompaction of soil) to depths that are expected to be range from less than five to eight feet from existing grades except for the areas required for the mechanical parking pits. Following the completion of grading activities, there will be a reported 2,615 cubic yards of soil exported from the Site. Such soil will be derived from preparing subgrade for the future structural slab, footing excavations, excavations for future automobile stacker systems and excavations for future elevators and other utility vaults. Site development plans will include a residential development constructed on a concrete slab-on-grade foundation system. There will be 78 residential units constructed at the Site. None of the residential units will be located on the ground floor of the future structure. The ground floor of the future structure will include parking areas, utility/mechanical rooms and enclosures, storage rooms, trash enclosures, bicycle lockers a lobby and a leasing area/lounge. The three above referenced parcels will be merged into one single parcel (parcel number yet to be determined) prior to the start of

construction. The future physical address of the development will be 570 21st Street. The two historical houses at 572 21st Street and 600 21st Street will be relocated to the adjacent property located at 610 21st prior to the start of construction of the 78 unit apartment building. Based on a review of various historical and regulatory resources including aerial photographs, fire insurance maps, city directories and Federal, State and local regulatory databases, none of the three parcels associated with the house relocation activities has sustained land uses of historical environmental concern.

The future Site building will consist of four stories of wood frame construction over a 15 foot high ground floor concrete podium with a total building height of 55 feet. This will be Type III construction over a podium. The ground floor podium will accommodate parking stalls, ground floor elevator entrances, lobbies and other common area spaces. The podium area is ventilated with an exhaust fan that takes air from the podium and exhausts it in a vent on the roof. The elevator shafts will require excavation to 5 feet 9 inches and will be lined with a vapor barrier to prevent any residual volatile organic compounds (VOCs) at the Site from venting into the shaft. The project will be parked with 78 parking stalls configured in 26 stackers of three parking platforms each with the bottom platform of each stacker requiring pits to a depth of 5 feet 9 inches.

AEC completed the following prior environmental documents pertaining to the Site, all which are in the possession of the Alameda County Department of Environmental Health (ACDEH):

- Phase II Environmental Site Assessment, 585 22nd Street, Oakland, California dated August 13, 2015
- Phase I Environmental Site Assessment, 585 22nd Street, Oakland, California dated August 14, 2015
- Site Investigation Report, 585 22nd Street, Oakland, California - Alameda County Department of Environmental Health Case RO0003187 dated February 17, 2016
- Site Investigation Report Addendum, 585 22nd Street, Oakland, California - Alameda County Department of Environmental Health Case RO0003187 dated October 4, 2016
- Soil Management Plan, 585 22nd Street, Oakland, California - Alameda County Department of Environmental Health Case RO0003187 dated June 7, 2017

AEC and 585 22nd Street, LLC have worked with ACDEH to finalize the closure process for the Site. As part of this process, two meetings were held at ACDEH offices and one of the requests from ACDEH was the submittal of this *Site Development Review* document so that the ACDEH could have a final plan set for the project readily available in its regulatory file for the Site.

Multiple appendices are attached to this document which serve as the additional information regarding the proposed Site development. The content of the appendices includes the following (in order of presentation):

- Owner provided project description
- City approved plan set
- City approved vapor barrier system for elevator pits
- Project schedule

If you should have any questions regarding this submittal, please contact us at (760) 744-3363.

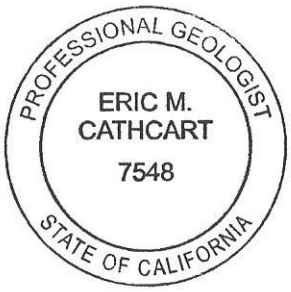
Sincerely,

Advantage Environmental Consultants, LLC

Daniel Weis, R.E.H.S.
Branch Manager
Western Regional Office

Eric M. Cathcart, MS, PG
Senior Geologist
California Professional Geologist #7548

Appendices



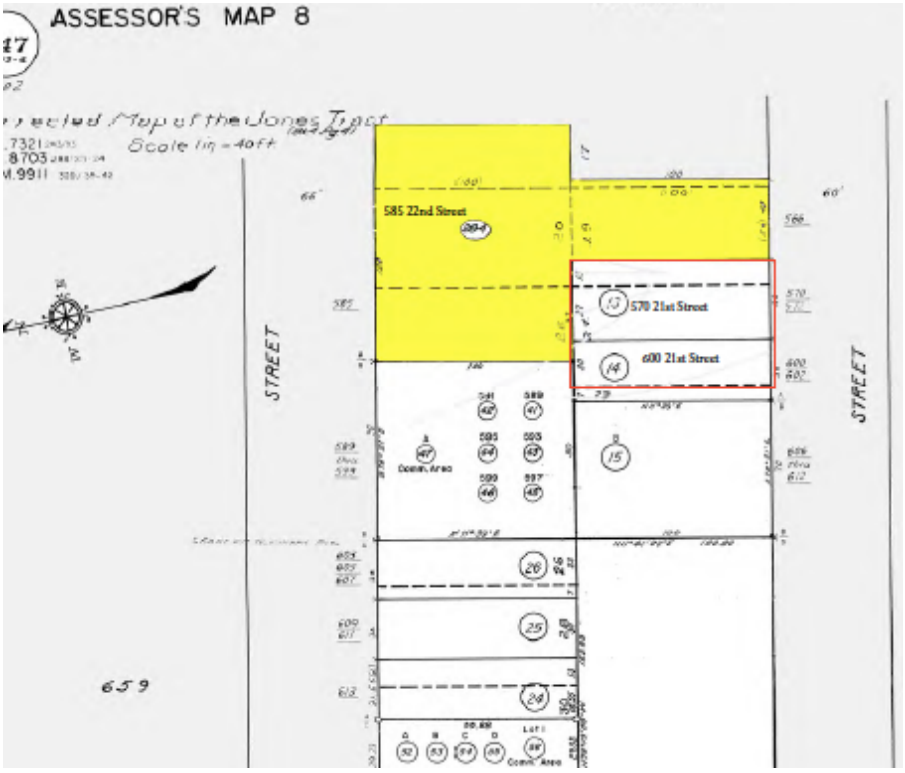
OWNER PROVIDED PROJECT DESCRIPTION

Project Description 570 21st Street, Oakland, CA

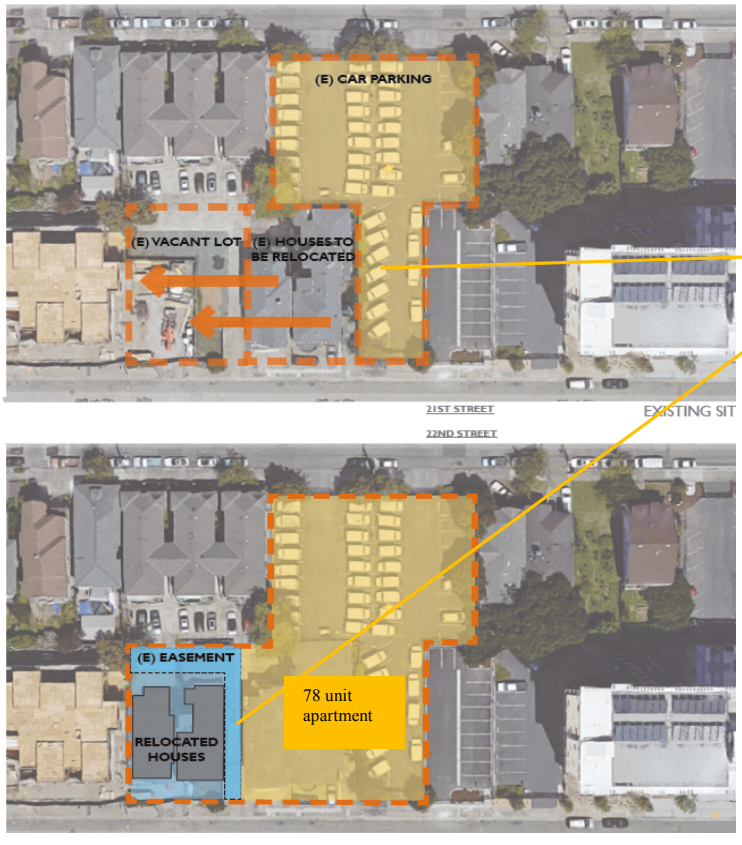
The development of 78 apartments at 570 21st Street will occur on three parcels shown in the assessor parcel map below. The parcels are:

- 585 22nd Street
  - Parcel number 008-0647-028-04.
  - Total area 16,000 sf.
  - CURRENT USE: Postal service parking lot.
- 572 21st Street
  - Parcel number 008-0647-013.
  - Total area 3,000 sf
  - Current use: 5-unit apartment building. Historical house to be relocated.
- 600 21st Street.
  - Parcel number 008-0647-014
  - Total area 4,000
  - Current use: Law office-Historical house to be relocated.

These three parcels will be merged into one parcel prior to the start of construction.



Currently, two historical houses occupy 572 21st Street and 600 21st Street. As shown in the maps and pictures on the next page, these two houses will be relocated to the adjacent parcel of 610 21st prior to the start of construction on the 78-unit apartment building.



The diagram shows the relocation of the historical houses to expand the development site to 23,000 sf.

The houses will be relocated to the adjacent vacant lot at 610 21st St. owned by the current owner of the houses.

The zoning code allows 78 units on the 23,000 sf site.

Below are renderings of the 78-unit apartment building showing the elevations from 21st Street and 22nd Street.

The building is 4 stories of wood frame construction over a 15-foot-high ground floor concrete podium with a total building height of 55 feet. This is typically categorized as Type 5 construction over a podium.

The ground floor podium will accommodate parking stalls, ground floor elevator entrances, lobbies, and other common area. The podium area is ventilated with an exhaust fan that takes air from the podium and exhausts it in a vent on the roof.

The elevator shafts will require excavation to 5 feet 9 inches and will be lined with vapor barrier to prevent soil volatiles from venting into the shaft.

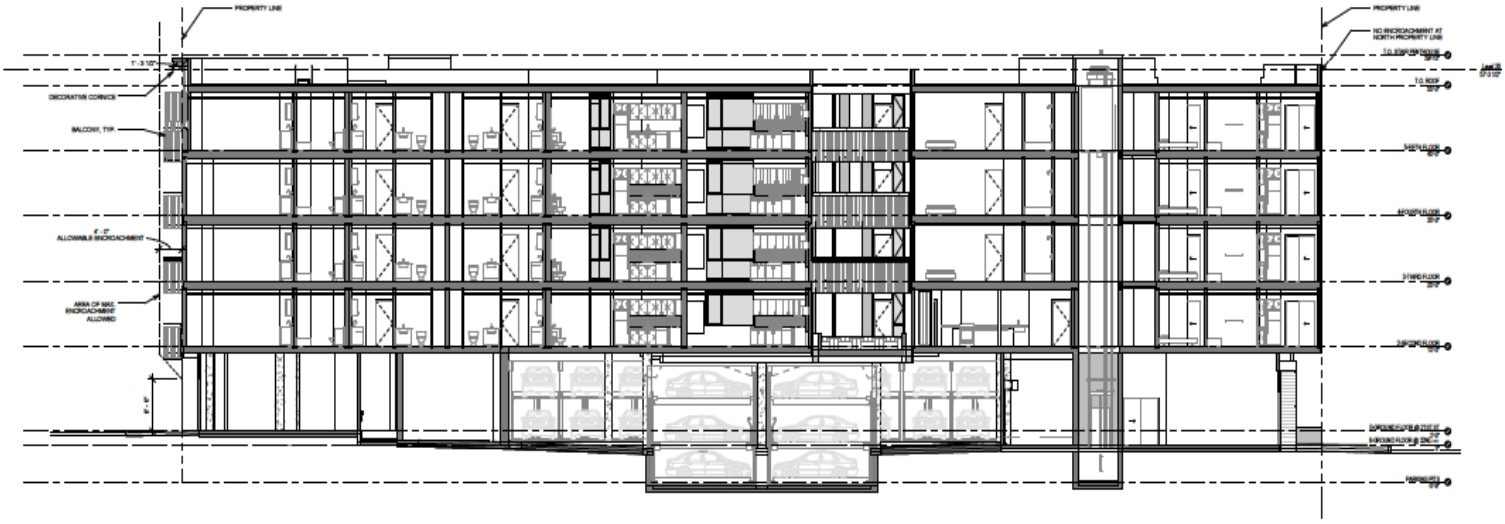
The project will be parked with 78 parking stalls configured in 26 stackers of three stalls each with the bottom 3 stalls of each stacker requiring pits to a depth of 5 feet 9 inches as shown on the building side view and the ground floor plan below.

1 FRONT ELEVATION AT 21ST ST. - LOOKING NORTH

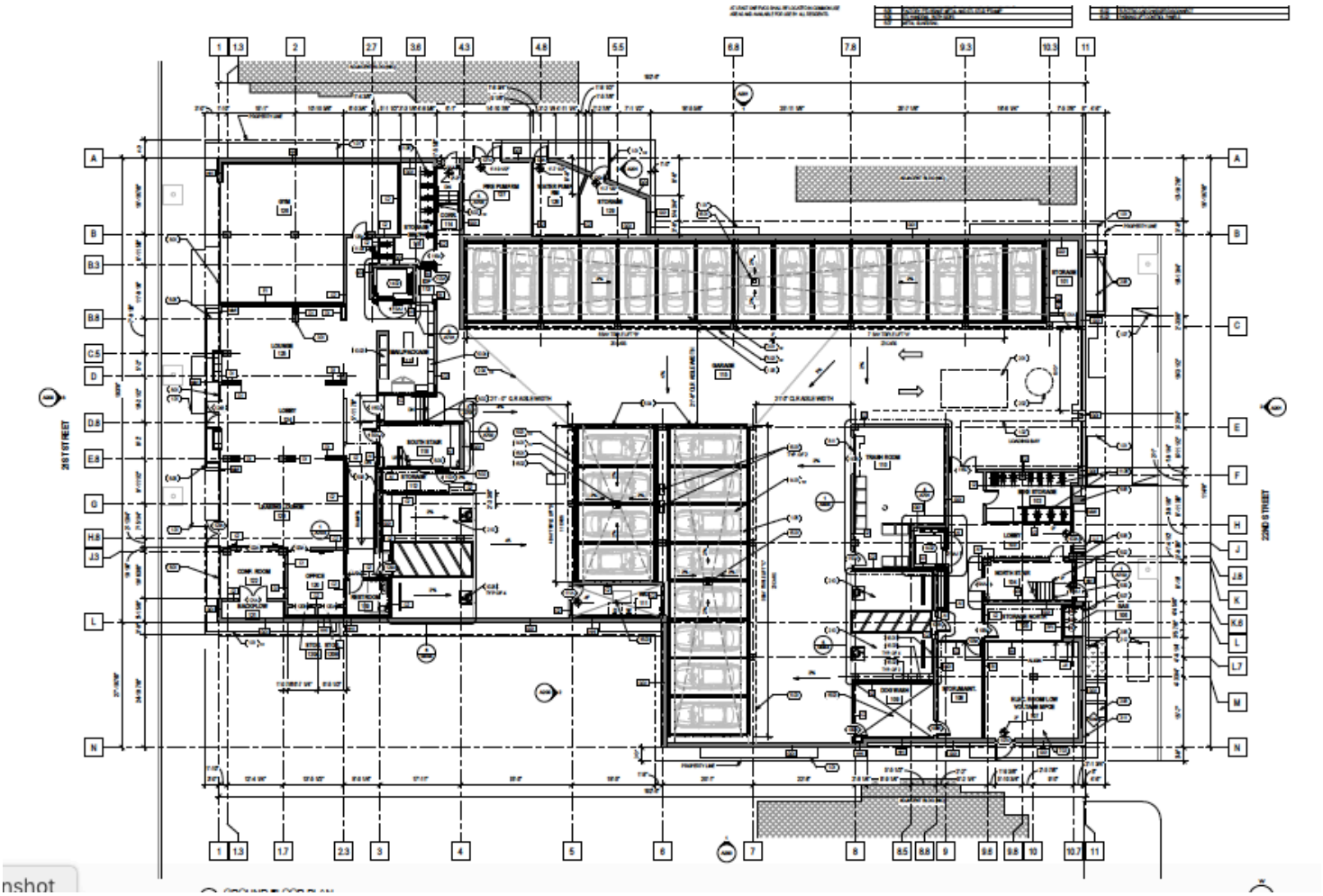
2 FRONT ELEVATION AT 21ST ST. - LOOKING WEST

3 REAR ELEVATION AT 22ND ST. - LOOKING SOUTH

Side view of building looking east



Ground Floor plan showing parking stackers and elevator locations



APPROVED PLANS FOR THE PROPOSED SITE DEVELOPMENT

(INCLUDED AS A SEPARATE FILE)

APPROVED VAPOR BARRIER SYSTEM FOR ELEVATOR PITS

Dan Weis

Subject: FW: 570 21st Street - Sheet A053 vapor barrier mitigation for the elevator shafts.
Attachments: 570 21st_A053.pdf

---------- Forwarded message ----------
From: **Wong, Jing** <JFWong@oaklandnet.com>
Date: Mon, Apr 24, 2017 at 5:32 PM
Subject: FW: 570 21st Street - SheetA053
To: Ana Blomeier <ana@studiokda.com>
Cc: Buddy Williams <buddy@studiokda.com>

Hi Ana,

The design use as shown on Sheet A053 is approvable with regards to the codes applicable in the 2013 CBC.

Thank you,

Jing Wong, P.E.

Plan Check Engineer

Planning and Building Department

City of Oakland

From: Ana Blomeier [mailto:ana@studiokda.com]
Sent: Monday, April 24, 2017 5:29 PM
To: Wong, Jing
Cc: Buddy Williams
Subject: 570 21st Street - SheetA053

Jing,

As a follow-up to our conversation/meeting, please find attached Sheet A053 for your review and approval regarding the vapor barrier mitigation for the elevator shafts.

Please let us know if you have any questions. If you can get back to us as soon as possible, we'd appreciate it.

Thank you,

Ana Blomeier
x 318

studioKDA

510.841.3555 | studiokda.com
1810 6th Street, Berkeley, CA 94710

From: Mike [mailto:mike@ralphrayconstruction.com]
Sent: Friday, August 26, 2016 1:16 PM
To: Joe Stamates <Joe@jsbuilders.com>
Cc: estimating@ralphrayconstruction.com; dennis@ralphrayconstruction.com
Subject: RE: JS Builders - 570 21st Street - Vapor Barrier SF price

Good Afternoon Joe,

I have put together a more complete submittal for this project that includes some additional information for VOC mitigation. Please take note of the addition of the letter from Tremco with regards to the types of VOC that have been tested on the membrane.
Currently we are working on several VOC projects where this product is approved and is being installed. Here are two that we are currently on.

1. 5119 District Blvd, Vernon Ca 90058. Project Name : District Industrial Center. DTSC was involved.
2. Marriott Residence Inn San Carlos. Project address: 595 Industrial Rd, San Carlos Ca 94070.

Best Regards,

Michael Aldrich

Project Manager

RalphRay Construction

5384 Maricopa Drive

Simi Valley Ca. 93063

www.RalphRayConstruction.com

p. 805.624.7717

f. 805.527.7090

e. Mike@RalphRayConstruction.com

SUBMITTAL

-Project name here-

Prepared For:

-JS Builders-

Table of Contents

1. Impervious Carrier Fabric: Viper VaporCheck

VIPER

VAPORCHECK
HD UNDER SLAB VAPOR BARRIERS

HD UNDER SLAB VAPOR BARRIER

VIPER VAPORCHECK is a triple ply, extrusion coated, virgin polyethylene membrane. VIPER VAPORCHECK is manufactured using woven, high-density fibers yielding the highest strength to weight ratio, tensile strength, tear resistance, bursting strength and puncture resistance of any product produced of its kind.

The outstanding strength qualities of VIPER VAPORCHECK allow it to hold up against harsh construction traffic. Along with the strength characteristics, VIPER VAPORCHECK has a superior water vapor permeance value that places it in the "VAPOR BARRIER" category.

VIPER VAPORCHECK provides an inexpensive insurance policy to protect floors and other moisture sensitive equipment within the building's interior. By inhibiting moisture and soil gas migration, VIPER VAPORCHECK greatly reduces condensation, mold growth and poor breathing conditions within a building and aids in controlling structural degradation.

The physical characteristics of a vapor retarder consist of high puncture resistance, high tensile strength and low water vapor permeance. VIPER VAPORCHECK has virtually zero water vapor permeance, making it a "VAPOR BARRIER" rather than a "vapor retarder."

PRODUCTS
VAPORCHECK 16-MIL
VAPORCHECK 10-MIL

DIMENSIONS
12' X 200'
(2400 SQFT)

CLASSIFICATION
EXCEEDS ALL
ASTM E 1745 "CLASS A"
REQUIREMENTS

PROTECT YOUR FLOOR

VIPER VAPORCHECK is designed to prevent moisture migration through slab-on-grade applications. Moisture migration has been known to cause the following:

- Poor indoor air quality (IAQ)
- Mold, mildew and fungus
- Failures to the flooring system
  [Adhesive Failure, Distortion, Discoloration, Deterioration, Degradation, Rust Stains, Odors]
- Damage to the slab-on-grade and its components
- Heat loss through increased thermal conductivity caused by moisture in the slab

APPLICATIONS
UNDER SLAB VAPOR BARRIER
CRAWL SPACES
WATERPROOFING PROTECTION
RADON MITIGATION

VIPER®

10-MIL REINFORCED "CLASS A" VAPOR BARRIER

SPECIFICATION INFORMATION VAPOR RETARDERS DIVISIONS: 033000, 072600

Revised: 03-01-10

1.0 PRODUCT NAME

VIPER® VAPORCHECK® 10-mil
ASTM E 1745 "CLASS A"
Reinforced Under-Slab Vapor Barrier

2.0 MANUFACTURER

InsulationSolutions®

Insulation Solutions Inc.
401 Truck Haven Road
East Peoria, IL 61611

Engineering Assistance
Toll Free: 866-698-6562
Fax: 309-698-0065
www.insulationsolutions.com

3.0 PRODUCT DESCRIPTION

3.1 Basic Use:

VIPER® VAPORCHECK® 10-mil is a unique high strength, high performance, cross-woven reinforced polyethylene based under-slab vapor barrier specifically designed for preventing moisture migration through concrete slabs-on-grade. The superior strength properties of **VIPER® VAPORCHECK® 10-mil** greatly restrict punctures and tears that come with extensive jobsite traffic. **VIPER® VAPORCHECK® 10-mil** reduces water vapor emission transfer and moisture migration from entering the building envelope on commercial, industrial and residential applications. **VIPER® VAPORCHECK® 10-mil** may be used to reduce radon and methane gas migration and is resistant to other adverse soil conditions.

VIPER® VAPORCHECK® 10-mil is also designed to control condensation, mold, mildew, degradation and prevents costly flooring failures and damage to moisture sensitive furnishings within a building's interior.

3.2 Composition & Materials:

VIPER® VAPORCHECK® 10-mil is manufactured using the latest generation of prime virgin (non-recycled) polyethylene resin, constructed in a triple-ply extrusion coated process and engineered with physical properties that maintain long term performance. The extrusion coated process bonds woven high-density fibers together, using HD molten polyethylene, creating an excellent balance of high puncture and tensile strength while maintaining very low water vapor permeance characteristics. The cross-woven high-density fibers, used as the reinforcing layer, yield the highest strength to weight ratio, tensile strength, tear resistance, bursting strength and puncture resistance of any product produced of its kind.

3.3 Product Dimensions & Weight:

VIPER® VAPORCHECK® 10-mil is available in 2400 sq. ft. rolls (12' X 200'). Each roll weighs approximately 98 lbs.

3.4 Benefits:

- Unsurpassed Puncture Resistance
- Maintains long term performance after exposure to adverse soil conditions
- Exceeds ASTM E 1745 "Class A" Requirements
- Vapor Barrier rather than Vapor Retarder
- Resistant to alkali salts, moisture & other soil degrading chemicals
- Greatly reduces moisture migration through slab-on-grade applications

4.0 TECHNICAL DATA

4.1 Applicable Standards:

- *American Society for Testing & Materials* (ASTM)
- *American Concrete Institute* (ACI)

- ***ASTM E 1745*** *Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs*

- ***ASTM E 154*** *Standard Test Methods for Water Vapor Retarders used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover*

- ***ASTM D 1709*** *Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method*

- ***ASTM D 5602*** *Standard Test Methods for Static Puncture Resistance of Roofing/Under Slab Membrane Specimens*

- ***ASTM E 96*** *Standard Test Methods for Water Vapor Transmission of Materials*

- ***ASTM D 882*** *Standard Test Method for Tensile Properties of Thin Plastic Sheeting*

- ***ASTM D 751*** *Standard Test Method for Coated Fabrics*

- ***ASTM E 1643*** *Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs*

- ***ACI 302.2R-06*** *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials*

PROPERTIES	TEST METHOD	VIPER® VAPORCHECK® 10-MIL	
Test Procedure - Independent Test Facility	*Applicable Standards*	*IP Units*	*SI Units*
Thickness, Nominal		10-mil	0.25 mm
Weight Per MSF		36 lbs.	16.3 kg
Classification	ASTM E 1745	CLASS A, B & C	
Puncture Resistance	ASTM D 1709	15839 grams	
Puncture Resistance	ASTM D 5602	76 lbs.	34,473 grams
Tensile Strength (New Material)	ASTM E 154, Sec. 9	136 lbf/in (MD), 134 lbf/in (TD)	23.8 kN/m (MD), 23.5 kN/m (TD)
Tensile Strength (After Soaking)	ASTM E 154, Sec. 9	140 lbf/in (MD), 133 lbf/in (TD)	24.5 kN/m (MD), 23.3 kN/m (TD)
Tear Strength	ASTM D 751, Tongue	54 lbs (Warp), 57 lbs (Weft)	24.5 kg (Warp), 25.8 kg (Weft)
Bursting Strength	ASTM D 751, Mullen	318 lbs.	144 kg
Operating Temperature Range		-70° F to 180° F	-57° C to 82° C
Water Vapor Permeance	ASTM E 96 / 154 Sec. 7	0.0016 perms (U.S.)	0.0010 perms (Metric)
Water Vapor Transmission Rate	ASTM E 96 / 154 Sec. 7	0.0006 grains/ft²*hr	0.0004 grams/m²*hr
Chemical Resistance	ASTM E 154	Unaffected	Unaffected
Life Expectancy	ASTM E 154	Indefinite	Indefinite

4.2 Environmental Considerations:

VIPER® VAPORCHECK® 10-mil can be used for controlling soil gas and poisons such as methane, radon, sulfates and petroleum contaminated soil.

4.3 Physical Properties:

VIPER® VAPORCHECK® 10-mil exceeds all ASTM E 1745 "Class A" requirements for under-slab vapor retarders.

5.0 INSTALLATION

5.1 Sub-Grade Preparation:

Level and tamp or roll granular base as specified by the architectural or structural drawings.

5.2 Vapor Barrier Placement:

Unroll **VIPER® VAPORCHECK® 10-mil** with the longest dimension parallel with the direction of the pour. Unfold **VIPER® VAPORCHECK® 10-mil** to full 12' width.

Lap **VIPER® VAPORCHECK® 10-mil** over the footings and seal to the vertical foundation walls with either **WHITE POLYETHYLENE TAPE**, **VIPER® DOUBLE BOND TAPE**, **VIPER® VAPORPATCH** or **VAPORCHECK® MASTIC.**

5.3 Seams and Penetrations:

Seal around pipes, support columns or any other penetration with **VIPER® VAPORPATCH**, **VAPORCHECK® MASTIC** or at minimum a combination of **VIPER® VAPORCHECK® 10-mil** and **WHITE POLYETHYLENE TAPE**. Doing so creates a monolithic membrane between the surface of the slab and moisture sources below.

Holes or openings through **VIPER® VAPORCHECK® 10-mil** should be effectively sealed with **WHITE POLYETHYLENE TAPE**, **VIPER® VAPORPATCH** or **VAPORCHECK® MASTIC** to maintain the integrity of the vapor barrier. Overlap joints a minimum of six inches. Seal overlap together with **WHITE POLYETHYLENE TAPE** and/or **VIPER® DOUBLE BOND TAPE.**

5.4 Protection:

When installing reinforcing steel and utilities, in addition to the placement of concrete, take precaution to protect **VIPER® VAPORCHECK® 10-mil**. Carelessness during installation can damage the most puncture-resistant vapor barriers. Provide for additional protection in high-traffic areas.

Place standard reinforcing bar supports on **VIPER® VAPORCHECK® 10-mil**. The strength characteristics of **VIPER® VAPORCHECK® 10-mil** will help guard against possible punctures caused by reinforcing bar supports.

Avoid driving stakes through **VIPER® VAPORCHECK® 10-mil**. If this cannot be avoided, each individual hole must be repaired.

If a cushion or blotter layer is required in the design between the vapor barrier and the slab, additional care should be taken, especially if sharp crushed rock is used. Washed rock will provide less chance of damage during placement.

These are very general installation instructions. Instructions on architectural or structural drawings should be reviewed and followed as well. Detailed installation instructions are available online at **www.insulationsolutions.com**. ASTM E 1643 also provides valuable installation information for under-slab vapor retarders.

6.0 AVAILABILITY & COST

VIPER® VAPORCHECK® 10-mil is sold through construction supply houses across the United States and Canada.

VIPER® VAPORCHECK® 10-mil current cost information can be obtained by calling our Corporate Office at 866-698-6562.

7.0 WARRANTY

INSULATION SOLUTIONS INC.® MAKES NO WARRANTIES AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS REFERRED TO, NO GUARANTEE OF SATISFACTORY RESULTS FROM RELIANCE UPON CONTAINED INFORMATION OR RECOMMENDATIONS AND DISCLAIMS ALL LIABILITY FOR RESULTING LOSS OR DAMAGE.

8.0 MAINTENANCE

VIPER® VAPORCHECK® 10-mil requires no maintenance once installed.

9.0 TECHNICAL SERVICES

Technical Information and detailed test results can be obtained by calling our Corporate Office at 866-698-6562.

10.0 FILING SYSTEMS

Additional Information can be obtained by calling our Corporate Office at 866-698-6562 or online at **www.insulationsolutions.com**.

Note: To the best of our knowledge, the specification chart on page one lists typical property values and are intended as guides only, not as specification limits. Insulation Solutions Inc.® makes no warranties as to the fitness for a specific use or merchantability of products referred to, no guarantee of satisfactory results from reliance upon contained information or recommendations and disclaims all liability for resulting loss or damage.

InsulationSolutions®

An Affiliate of Meyer Enterprises

401 Truck Haven Rd.
East Peoria, Illinois 61611
Toll Free 866 698 6562
Phone 309 698 0062
Fax 309 698 0065

www.insulationsolutions.com

Material Safety Data Sheet

Product Name: Viper® Vapor Check® **HMIS Codes: H F R P**

Product: HDPE Yarn + LDPE Coating + Color Additive **0 1 0**

Section I - Manufacturer Identification

Manufacturer: Insulation Solutions, Inc.

Address: 401 Truck Haven Road, East Peoria, IL 61611

Emergency Phone: 309-698-0062

Date Prepared: January 25, 2007

Section II - Hazardous Ingredients/Identity Information

Under normal conditions of storage and handling, this product is not likely to cause adverse health effects.

Section III - Physical/Chemical Characteristics

Boiling Point:	Not measured	**Specific Gravity**:	Available upon request
Vapor Density:	Not measured		
Evaporation Rate:	N/A	**Solubility in Water**:	None
Appearance and Odor:	Plastic sheeting, no odor		

Section IV - Fire and Explosion Hazard Data

Flash Point: > 300°C (572°F)

Flammable Limits in Air by Volume: **Lower:** Not Known **Upper**: Not Known

Extinguishing Media: Water spray, water fog, CO2, dry chemical

Special Firefighting Procedures:
For fires involving this material do not enter any closed or confined space without proper protection equipment, including self-contained breathing apparatus.

Unusual Fire and Explosion Hazards:
In its present form, this product offers no unusual fire and explosion hazards.

Section V - Reactivity Data

Stability:	Stable
Conditions to Avoid:	Temperatures above 260°C (500°F)
Incompatibility (Materials to Avoid):	N/A
Hazardous Decomposition or Byproducts:	N/A
Hazardous Polymerization:	Will not occur.

Section VI - Health Hazard Data

This product, in plastic sheet form, is not expected to cause adverse health effects under normal handling and storage conditions.

Potential Acute Health Effects, Inhalation Health Risks and Symptoms of Exposure:	N/A
Skin and Eye Contact Health Risks and Symptoms of Exposure:	Refer to Emergency & First Aid Procedures for more details.
Skin Absorption Health Risks and Symptoms of Exposure:	Refer to Emergency & First Aid Procedures for more details.
Ingestion Health Risks and Symptoms of Exposure:	N/A
Potential Chronic Health Effects Target Organs:	N/A
Reproductive/Developmental Effects:	N/A
Carcinogenicity: NTP?	No
IARC Monographs?	No
OSHA Regulated?	No
Persistent Bioaccumulative Toxin (PBT)?	No
Medical Conditions Generally Aggravated by Exposure:	N/A
Toxicological Information: Acute Oral LD50:	Not Tested
Primary Skin Irritation Test:	Not Tested
Primary Eye Irritation:	Not Tested
Human Dermal Exposure:	Not Tested

Emergency and First Aid Procedures:
If hot melted material gets on skin, quickly cool in water. Consult a physician for extensive burns. Do not try to peel solidified material from the skin or use solvents or thinner to dissolve it.

Section VII - Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled: N/A

Waste Disposal Method:
Place in suitable container or disposal. Ensure conformity to local, state and federal regulations.

Precautions to Be Taken in Handling and Storing:
Do not store near heat or flame.

Section VIII - Control Measures

Respiratory Protection:	Not Needed
Ventilation:	Normal
Protective Gloves:	Not Needed
Eye Protection:	Not Needed
Other Protective Clothing or Equipment:	Not Needed
Work/Hygienic Practices:	Wash thoroughly after handling & before eating/drinking or using tobacco products.

Section IX - Regulatory

TSCA:	All components of this product are exempt from the TSCA listing.
California Propositions 65:	This product does not contain any substance on the California List of Known Carcinogens and Reproductive Toxins.
SARA/Title III:	This product does not contain toxic chemical for routine annual toxic chemical release.
Transportation DOT Classification:	Not Regulated

This information must be included in all MSDS that are copied and distributed for this material.

Section X - Disclaimer

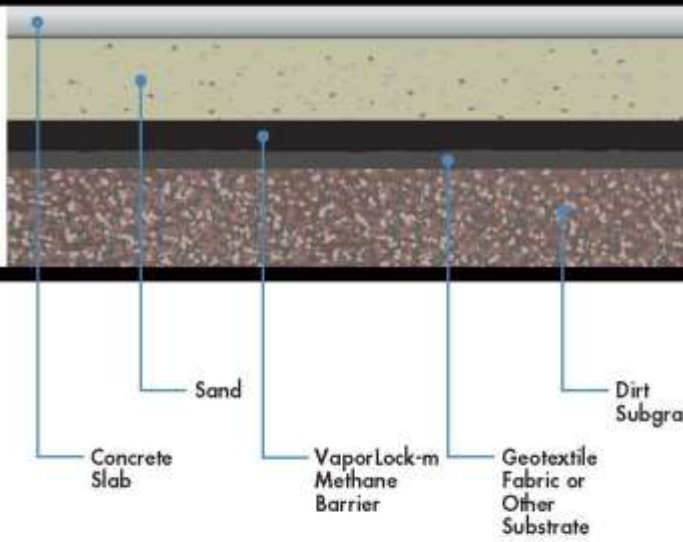
To the best of our knowledge, the information contained herein is accurate. It is obtained from sources such as raw material suppliers and is believed to be true. This material safety data sheet will supersede any that was previously received as it contains the most up to date information.

2. Impervious Gas Membrane : VaporLock-m

VAPORLOCK-m: YOUR SOLUTION TO METHANE MITIGATION

When soil reports indicate a need for methane mitigation for your site, VaporLock™ Methane Barrier [VaporLock-m] provides an impermeable, easy to install barrier solution to methane infiltration. What's more, VaporLock-m may help you remediate methane contamination at a lower installed cost than other applications available in your area - giving you greater opportunities for profitability or increased flexibility in your selling prices.

VaporLock-m
METHANE BARRIER



SEAMLESS METHANE BARRIER

- VaporLock-m is an independently-tested and City of Los Angeles approved (LA City #RR 25546) methane barrier membrane that is applied to a tough geotextile fabric or other substrate to prevent methane from entering the building through the foundation slab or other treated surfaces.
- VaporLock-m is a polymer-enhanced asphalt barrier that is seamlessly spray-applied to the substrate at a highly-protective thickness of at least 44 mils dry. The barrier's flexibility enables it to with stand thermal expansion and contraction with no compromise in performance.
- The impermeability and ease-of-application make VaporLock-m a reliable, cost-effective alternative for methane mitigation.

FROM THE LEADERS IN SPRAY-APPLIED BARRIER TECHNOLOGY

VaporLock-M comes to you from Tremco Barrier Solutions, with a heritage in spray-applied barrier technology stretching back more than 20 years. Since 1983, our team has sparked innovations in fluid membrane formulations and performance. And we offer more than two decades of experience installing spray-applied barriers – including TUFF-N-DRI® Basement Waterproofing System, the #1 brand of new basement waterproofing in North America.

INSTALLED BY TRAINED PROFESSIONALS

VaporLock-m is reliably installed by select contractors, trained by Tremco Barrier Solutions. Count on our contractors to professionally, promptly and courteously install VaporLock-m to your specifications and schedule.

SITE PREPARATION

- Provide a minimum 24 inches of clearance around the area to receive VaporLock-m.
- To avoid staining, apply masking or otherwise protect all adjacent areas or fixtures not to receive VaporLock-m.
- Moisture-condition and compact the subgrade to a minimum relative compaction of 90 percent or as specified by a civil engineer. Make sure the subgrade surface is free of debris and all dirt clods or stones larger than 1/4 inch, so that the finished surface is smooth and uniform.
- Properly secure all plumbing, electrical, mechanical and structural items that will penetrate VaporLock-m.

For more details about VaporLock-m™, call your local Barrier Solutions Contractor:

VaporLock-m
METHANE BARRIER

VAPORLOCK-m SPECIFICATIONS

Barrier Membrane

Membrane Description

Type	Polymer-enhanced asphalt liquid-applied membrane
Color	Black
Solids	63 +/- 3 [percent by weight]
Density	8.1 lbs/gal
Application	Airless Spray
Application Temperature	Minimum 20°F
Coating Cure Time	16–24 hrs
Application Thickness	44 mils [dry][1] solid surface 60 mils [dry][1] geotextile fabric (including fabric)

Membrane Properties

Properties	Typical Results	Test Methods
Adhesion to Concrete	Exceeds	ASTM C-836
Elongation	>2000 percent	ASTM D-412
Low Temperature Flexibility	Flexible to -10°F	See[2]
Crack Bridging Ability	Exceeds 10 cycles to 1/8" at -15°F	ASTM C-836
Water Vapor Permeance	0.08 perms for 40-mil dry coating [grain/sf/hr in Hg]	ASTM E-96 Dry Method
Liquid Water Absorption	0.3% [wt]	ASTM D-1228[3]
Resistance to Degradation in Soil	Good	ASTM E-154
Mold Growth and Bacterial Attack	No degradation	ASTM D-3273 ASTM D-3274

[1] Membrane mil thickness based upon local code or engineering consideration
[2] Bend membrane compound around 1" mandrel
[3] 72 hour water soak 1" x 2" x 0.40" samples of membrane compound

Geotextile Fabric

Mechanical [MARV][1]	Typical Results	Test Methods
Grab Tensile Strength	250 lbs	ASTM D-4632
Grab Elongation	60%	ASTM D-4632
Trapezoidal Tear Strength	90 lbs	ASTM D-4533
Puncture Strength	81 lbs	ASTM D-4833

Endurance [MARV][1]	Typical Results	Test Methods
UV Resistance @500 hrs	70%	ASTM D-4355

Physical [MARV][1]	Typical Results
Unit Weight	6.0 oz/sq yd

[1] Minimum average roll values (MARV) in the weaker principal direction

TREMCO Barrier Solutions
Makers of TUFF-N-DRY and WATCHDOG WATERPROOFING

Rev. 05/05 TBS-0365

CITY OF LOS ANGELES
CALIFORNIA

Tremco Barrier Solutions, Inc.
6402 East Main Street, Suite 201
Reynoldsburg, OH 43068

Attn: Michael Wait
(800) 876-5624

RESEARCH REPORT: RR 25546
(CSI # 07120)

Expires: May 1, 2017
Issued Date: June 1, 2015
Code: 2014 LABC

GENERAL APPROVAL – Renewal - VaporLock-m™ Methane Barrier System for Below-Grade Water Proofing and Gas Barrier.

DETAIL

VaporLock-m™ Methane Barrier System is composed of Tuff-N-Dri or Tuff-N-Dri MV installed over a geotextile fabric or a Class A Vapor Barrier consisting a 10 mil thick polyolefin geomembrane. Tuff-N-Dri® or Tuff-N-Dri MV is a fluid-applied, single component, polymer-modified asphalt emulsion. The VaporLock-m-system is designed for applications on grade, over a sand substrate, or over unusually irregular substrata such as wood lagging. Tuff-n-Dri is applied directly to substrata such as cast in place (CIP) concrete or concrete masonry units (CMU), and on decks. The minimum thickness of the system is 60 mils total, when measuring the composite of geotextile fabric and applied cured polymer-modified asphalt emulsion; the thickness of the applied cured film shall be no less than 50 mils. The minimum thickness of the system is 55 mils, when measuring the composite of polyolefin membrane and applied cured polymer modified asphalt emulsion; the thickness of the applied cured film shall be no less than 50 mils. For applications directly to solid substrate, a 70 mil wet film thickness shall be applied as per the application instructions. Geotextile fabrics are adjoined by seams overlapping minimum 4 inches in which the bottom geotextile fabric is sprayed with 65 mil thick coating (40 mil dry, minimum) of the Tuff-N-Dri or Tuff-N-Dri MV, as applicable and the top (geotextile) press bonded to it manually. Polyolefin geomembranes are adjoined by seams overlapping minimum 5 inches in which the bottom polyolefin geomembrane is sprayed with 65 mil thick coating (40 mil dry, minimum) of the Tuff-N-Dri MV, as applicable and the top (Polyolefin geomembrane) press bonded to it manually.

The repair procedures for the VaporLok-m™ Methane Barrier System are outlined below:

1. Voids found after the membrane has cured may be repaired by spraying the void and 2 inches surrounding the void with Tuff-N-Dri (MV)the 70 mils wet(44 dry) required. Alternately, the Tuff-N-Dri (MV) membrane may be troweled or brushed into the void and the surrounding 2 inches. Multiple troweled or brushed coats may be required to achieve the required thickness.

2. Small areas (up to 8 inch square areas) of barrier membrane that have to be repaired due to faulty installation or because of thickness sampling shall be repaired in the following manner. First a tack coat of Tuff-N-Dri shall be applied to cover the repair area and a minimum of 3 inches beyond the borders of the repair area. Next, a piece of geotextile or polyolefin geomembrane, depending on the original carrier fabric used is placed so that it extends over the repair area and 2 inches beyond the borders of the area. Then apply a 70 mil wet (44 mil) dry coat of Tuff-N-Dri over the patch.

3. Large patches shall be handled in the same manner as the original installation of the methane barrier membrane, e.g. seams with 4 inch overlaps adhered with 60 wet mils of Tuff-N-Dri MV on installations using geotextile fabric, seams with 5 inch overlap adhered with 60 wet mils of Tuff-N-Dri MV for installations using polyolefin geomembranes, and the fabric field sprayed to achieve 44 dry mil membrane thickness

This product is approved for below-grade gas barrier subject to the following conditions:

1. VaporLock-m™ Methane Barrier System shall be supplied in clearly marked containers bearing the brand name and product identification.

2. The manufacturer shall provide quality assurance of the materials supplied as to their formulation.

3. Application of the product shall be accomplished by an applicator approved by the manufacturer. A written statement by the manufacturer stating that the applicator is an approved applicator is required prior to use of the product.

4. All surfaces to receive membrane shall be free of laitance, sharp projections, oil, dirt or other contaminants. Prepare surfaces in accordance with the manufacturer's instructions.

5. Installation of the materials shall be in accordance with the manufacturer's instructions, a copy of which shall be kept at the job site. All carrier materials (geotextile and polyolefin) used by the installer must meet the basic

requirements in this report and be on the Approved Carrier Material List provided by Tremco Barrier Solutions.

6. Complete details for the membrane system are submitted for plan check and a building permit is obtained.

7. The following field tests in accordance with the Tremco Barrier Solutions Field Installation and Repair Procedure are required: (A copy of the Installation and Repair Procedures is on file with Engineering Research Section.)

   a. Perform Thickness Sample Test at every 500 square feet.
   b. Perform Smoke Test for the entire site at the interval not more than 50,000 sq. ft. each.

8. Protection for the membrane shall be provided in accordance with the written instructions by the engineer of the record.

9. Prior to placing the concrete slab over the membrane, the membrane installer shall certify the membrane to be installed and tested in accordance with the manufacturer's specifications and to be free of leaks.

10. The membrane is not to be placed under the building footings.

11. For gas membrane installation, continuous inspection by a registered deputy inspector certified by Tremco Barrier Solutions, Inc., and registered in accordance with the requirements specified in Section 1704.2 of the Los Angeles City Building Code for special inspection is required.

DISCUSSION

The report is in compliance with the 2014 Los Angeles City Building Code.

The use of VaporLock-™ Methane Barrier System for water-proofing and gas barrier is based on tests in accordance with below-grade water proofing and the methane barrier test criteria.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

QUAN NGHIEM, Chief
Engineering Research Section
201 N. Figueroa St., Room 880
Los Angeles, CA 90012
Phone- 213-202-9812
Fax- 213-202-9943

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TREMCO Barrier Solutions

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Reynoldsburg, OH 43068
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Fax: 614-322-4753
Toll Free: 800-876-5624

April 29, 2014

To Whom It May Concern,

Per our conversation, TBS has conducted testing to determine the effect of separate vapors of the following chemicals on our Tuff-N-Dri membrane (VaporLock-m): Hydrogen Sulfide, Benzene, Toluene, Ethylene, Xylene, Gasoline, Hexane, Perchloroethylene, per ASTM D-1434. The membrane was subjected to these chemicals and tested for permeance. Generally, a membrane is considered impermeable if the permeance rating is below 1.0. The permeance rating for the vapors of these chemicals is listed below:

Hydrogen Sulfide	N/D
Benzene	0.04
Toluene	0.06
Ethylene	0.09
Xylene	0.13
Gasoline	0.15
Hexane	0.05
Perchloroethylene	N/D
Trichloroethylene	0.01

As you can see our VaporLock-m membrane is totally impermeable to hydrogen sulfide and perchlorpethylene (diffusion = 0.00), and only slightly permeable to the other hydrocarbons listed, i.e. very low diffusion rates.

The following should help put this into a realistic perspective:

Even if the site had soil gas concentrations of 100% of the hydrocarbons above, and the soil gas pressure was everywhere equal to the maximum observed at any probe site (0.5 inches of water), then the diffusion of the gas mixture through the VaporLock-m membrane would still only result in the transmission of 0.05 cubic feet of gas per 1,000 square feet of surface area per day. Adjusting the value above for the average soil gas pressure for all locations on the site, reduces the result to 0.006 cubic feet of gas per 1,000 square feet of surface area per day. Of course the actual concentration of the hydrocarbons is far less than 100%, which would further reduce the transmitted volume.

To further put this in perspective, consider a building having 1,000 square feet of floor area and an 8-foot ceiling. The tightest construction allowed by building codes with adding mechanical ventilation is 0.2 ACPH. The building would typically have 38,400 cubic feet of air passing through the structure daily. The 0.006 cubic feet of gas from the paragraph above, which is a significant overstatement, represents only 0.000016 percent of the daily air exchange volume (or 0.016 ppm). It could be stated that the VaporLock-m membrane is more than 99.9999 percent effective at preventing any accumulation of hydrocarbon gases due to diffusion through the VaporLock-m membrane.

Sincerely,

James R. Wells
Technical Director

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Toll Free: 800-876-5624

Certificate of Approval

Ralph Ray Construction Corporation
5384 Maricopa Drive
Simi Valley, CA 93063
805-624-7717

This document is to certify that Ralph Ray Construction Corporation is hereby approved by Tremco Barrier Solutions, Inc. to install our products and systems including VaporLock-m® methane barrier system, Tuff-N-Dri® and Watchdog® waterproofing systems.

Tremco Barrier Solutions, Inc. has provided Ralph Ray Construction Corporation with the education and training, required for Raycon to provide the aforementioned services. Ralph Ray Construction Corporation employees approved to apply our products are listed below:

Antonio Espinosa
Jose Cortez
Jose Mejorada
Alberto Casillas
Ezequiel Flores
Martin Barajas
Michael Paynter
Raymond Pinon
Mauro Javana
Danny Gonzales
Jesus Soltero
Ralph Ray
Dennis Ray

Ryan Newth
Tremco Barrier Solutions
March 20, 2015

TUFF-N DRI BULK

Version *1.1*
REVISION DATE: 08/31/2006

Print Date 08/06/2008

SECTION 1 - PRODUCT IDENTIFICATION / PREPARATION INFORMATION

Product Information

Trade name	:	TUFF-N DRI BULK
Product code	:	TBS100
Supplier	:	Tremco Canada division 220 Wicksteed Avenue Toronto, ON M4H 1G7
Telephone	:	(416) 421-3300
Emergency Phone:	:	(613) 996-6666

Preparation Information

Prepared by:	:	Sewnauth Raghunandan
Date:	:	08/31/2006
Telephone	:	(416) 421-3300

SECTION 2 - HAZARDS IDENTIFICATION

Emergency Overview

Brown. Liquid. May cause slight irritation to the respiratory system. Leave area to breathe fresh air. Avoid further overexposure. If symptoms persist, get medical attention.

Acute Potential Health Effects/ Routes of Entry

Inhalation	:	May cause slight irritation to the respiratory system.
Eyes	:	Direct contact may cause mild irritation.
Ingestion	:	May cause gastrointestinal irritation, nausea, and vomiting.
Skin	:	May cause mild irritation. May cause sensitization resulting in irritation, itching and redness. May cause a rash.

Aggravated Medical Conditions

Pre-existing eye, skin and respiratory disorders may be aggravated by exposure.

Chronic Health Effects

Prolonged or repeated skin contact with asphalt may result in skin sensitivity, such as irritation, rashes, and dermatitis. Prolonged or repeated exposure to polycyclic aromatic hydrocarbons and other volatiles which are contained in trace amounts in asphalt have been shown to cause cancer or respiratory damage in animals. Fillers are encapsulated and not expected to be released from product under normal conditions of use. Prolonged or repeated exposure to mineral spirits (petroleum naphtha or stoddard solvent) may cause defatting, drying, and irritation of the skin, dermatitis, central nervous system (CNS) effects, and adverse liver, kidney, and lung effects.

Target Organs: Skin, Eye, Lung

SECTION 3 : HAZARDOUS INGREDIENTS

Chemical Name	CAS-No.	Weight % Range
Asphalt	8052-42-4	40.0 - 70.0
Stoddard solvent (Mineral Spirits)	8052-41-3	5.0 - 10.0
1,2,4-Trimethylbenzene	95-63-6	0.1 - 1.0

The ingredients listed above are hazardous as defined in the controlled products regulation. (CPR).

SECTION 4 - FIRST AID MEASURES

Get immediate medical attention for any significant overexposure.

Inhalation	:	Leave area to breathe fresh air. Avoid further overexposure. If symptoms persist, get medical attention.
Eye contact	:	Flush with water for at least 15 minutes while holding eye lids apart. Get medical attention immediately.
Skin contact	:	Clean area of contact thoroughly using soap and water. If irritation, rash or other disorders develop, get medical attention immediately.
Ingestion	:	Do not induce vomiting unless advised by a physician. Call nearest Poison Control Center or Physician immediately.

SECTION 5: FIRE / EXPLOSION HAZARDS

Flash point Method	: :	> 212 °F, > 100 °C Pensky-Martens Closed Cup
Lower explosion limit	:	Not available.
Upper explosion limit	:	Not available.
Autoignition temperature	:	Not available.
Extinguishing media	:	If water fog is ineffective, use carbon dioxide, dry chemical or foam.
Hazardous combustion products	:	Carbon monoxide and carbon dioxide can form.Oxides of sulfur can form.
Protective equipment for firefighters	:	Not applicable. Product is not expected to burn.
Fire and explosion conditions	:	Not applicable, not expected to burn.

SECTION 6 - SPILLS / LEAKS / ACCIDENTAL RELEASE MEASURES

Use appropriate protective equipment. Avoid contact with material. Stop flow. Contain spill. Keep out of water courses. Absorb spill in sand, earth or other suitable material. Transfer to appropriate container for disposal.

SECTION 7 - HANDLING AND STORAGE

Prevent inhalation of vapor, ingestion, and contact with skin eyes and clothing. Keep container closed when not in use. Precautions also apply to emptied containers. Store in sealed containers in a dry, ventilated warehouse location above freezing.

SECTION 8 - PREVENTIVE MEASURES/EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection equipment

Respiratory protection	:	Not required under normal conditions of use.
Hand protection	:	Use suitable impervious rubber or vinyl gloves and protective apparel to reduce exposure.
Eye protection	:	Wear chemical safety goggles and/or face shield to prevent eye contact. Do

not wear contact lenses. Do not touch eyes with contaminated body parts or materials. Have eye washing facilities readily available.

Protective measures : Use professional judgment in the selection, care, and use.Other equipment not normally required.

Engineering measures : General ventilation is sufficient.Use local exhaust when the general ventilation is inadequate.

Exposure Limits

Chemical Name	CAS Number	Regulation	Limit	Form
Asphalt	8052-42-4	ACGIH TWA: benzene solubles	0.5 mg/m3	Inhalable fraction.as
		Ontario TWA: benzene solubles	0.5 mg/m3	Inhalable fumeas
Stoddard solvent (Mineral Spirits)	8052-41-3	Ontario TWA: ACGIH TWA:	525 mg/m3 100 ppm	
1,2,4-Trimethylbenzene	95-63-6	Ontario TWA: ACGIH TWA:	123 mg/m3 25 ppm	

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State	: Liquid
Form	: Liquid
Color	: Brown
Odor	: Asphalt
pH	: 8 - 12
Vapour pressure	: Not available.
Vapor density	: Heavier than air
Melting point/range	: Not available.
Freezing point	: Not available.
Boiling point/range	: 212 °F, 100 °C
Water solubility	: Dispersible
Evaporation Rate:	: Not available.
Specific Gravity	: 1
% Volatile Weight	: 30 %

SECTION 10 - REACTIVITY / STABILITY

Substances to avoid	: Oxidizing agents.
Stability	: Material is stable under normal storage, handling, and use.
Hazardous polymerization	: Will not occur under normal conditions.

SECTION 11 - TOXICOLOGICAL INFORMATION

No Data Available

SECTION 12 - ECOLOGICAL INFORMATION

No Data Available

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Disposal Method : Dispose as hazardous waste according to all local, state, federal and provincial regulations.

SECTION 14 - TRANSPORTATION / SHIPPING DATA

TDG / DOT Shipping Description:

NOT REGULATED

SECTION 15 - REGULATORY INFORMATION

North American Inventories:
All components are listed or exempt from the TSCA inventory.
This product or its components are listed on, or exempt from the Canadian Domestic Substances List.

Canadian Regulations:
WHMIS Classification : D2A

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Other Regulations:
Regulatory VOC (less water and exempt solvent) : 87 g/l

SECTION 16 - OTHER INFORMATION

HMIS Rating :

Health	2
Flammability	1
Reactivity	0
PPE	

0 = Minimum
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Further information:

For Industrial Use Only. Keep out of Reach of Children. The hazard information herein is offered solely for the consideration of the user, subject to their own investigation of compliance with applicable regulations, including the safe use of the product under every foreseeable condition.

Prepared by: Sewnauth Raghunandan

Legend

ACGIH - American Conference of Governmental Hygienists
DOT - Department of Transportation
DSL - Domestic Substance List
EPA - Environmental Protection Agency
HMIS - Hazardous Materials Information System
IARC - International Agency for Research on Cancer
MSHA - Mine Safety Health Administration
NDSL - Non-Domestic Substance List
NIOSH - National Institute for Occupational Safety and Health
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit
RCRA - Resource Conservation and Recovery Act
STEL - Short Term Exposure Limit
TLV - Threshold Limit Value
TSCA - Toxic Substances Control Act
TWA - Time Weighted Average
V - Volume
VOC - Volatile Organic Compound
WHMIS - Workplace Hazardous Materials Information System

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5. Seams: Overlap joints 6-inches or greater if required by vapor barrier manufacturer and seal with pressure sensitive tape.
6. Seal penetrations, including pipes, with pipe boot.
   a. Single pipe penetrations may be sealed using pipe boot constructed from the product. Cut a piece of plastic 12-inches wide x 1-1/2 times the circumference of the pipe. With scissors, cut slits half the width of the film Wrap boot around pipe; tape onto pipe and completely tape the base to the vapor barrier.
   b. Multiple pipe penetrations in close proximity and very small pipes shall be sealed using mastic. Cut out a small area around pipes. Cut a patch of vapor barrier extending at least 6-inches past the cut out in all directions. Cut X's or small circles in the patch and install over pipes. Overlap at least 6-inches and tape. Build up 40- to 60-mils of mastic or as required to completely fill voids between the pipe and the vapor barrier.
7. Penetrations through vapor barrier sheeting except for reinforcing steel and permanent utilities are not permitted.
8. Repair damaged areas by cutting patches of vapor barrier sheeting, overlapping damaged area 6-inches and taping all four sides with pressure sensitive tape.
9. Lay vapor barrier membrane smooth with no fishmouths or bunches of material.
10. Inspect and repair vapor barrier prior to application of concrete slab; tape tears and repair damage.

B. Impervious Gas Membrane:

1. Apply Tremco VaporLock-m in accordance with manufacturer's recommendations and installation instructions and in accordance with ASTM E1643; comply with most restrictive where conflicts occur.
2. Provide a minimum 24 inches of clearance around the area to receive VaporLock-m.
3. Moisture condition and compact subgrade to a min. relative compaction of 90 percent or as specified by engineer. Make sure subgrade surface is free of debris and all dirt clods or stones larger than ¼" so that the finish surface is smooth and uniform.
4. Properly secure all plumbing, electrical, mechanical, and structural items that will penetrate VaporLock-m.
5. Rollo out geotextile fabric on prepared surface so that the head rolled side of the fabric is facing up. Overlap seams a minimum of five inches. Make sure the geotextile is tight at all inside corners.
6. Spray TUFF-N-DRI over the entire area of geotextile at a rate not to exceed 20 sq. ft. per gallon coverage, or a min. of 70 mils wet thickness measured on top of the geotextile.

07 26 19 - 3 Below-Grade Vapor Barriers

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7. Careful attention must be taken during the application process to ensure a consistent homogenous membrane.
8. Inspect the sprayed membrane geotextile composite carefully for pin holes, blisters or other voids in the membrane. If any are detected, lightly re-spray until a monolithic coating is achieved.

3.3 CONSTRUCTION WASTE MANAGEMENT

A. General: Comply with the requirements of Section 01 50 00 Temporary Facilities and Controls relating to waste management for removal and disposal of construction debris and waste.

B. Separate and recycle waste materials to the maximum extent possible.

END OF SECTION

07 26 19 - 4 Below-Grade Vapor Barriers

KAHN DESIGN ASSOCIATES **570 21ST STREET, OAKLAND, CA**

SECTION 07 26 19

BELOW-GRADE VAPOR BARRIER/ VOC BARRIER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide vapor barrier system for below grade and slab-on-grade concrete, including sealing joints and protrusions through vapor barrier. (Stegowrap 15mil)

B. At Elevator Pits: Install Impervious Gas Membrane following manufacturer's detailed application instructions. (Tremco VaporLock-m)

1.2 RELATED SECTIONS

A. Section 01 74 19: Construction Waste Management

B. Section 03 30 00: Cast-In-Place Concrete

1.3 SUBMITTALS

A. General: Comply with Section 01 33 00.

B. Product Data: Include independent laboratory test results showing compliance with ASTM and ACI Standards. Include manufacturer's installation instructions for placement, seaming, and pipe boot installation.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. General: Comply with Section 01 61 00.

B. Protect products against damage during field handling and installation.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Vapor Barrier sheeting (at all horizontal slab conditions excluding the elevator pits): Stego Industries, Inc./Stego Wrap (15 mil), reinforced plastic, Class A.

B. Impervious Gas Membrane (to be used at elevator pits only): Tremco VaporLock-m, methane barrier membrane applied to geotextile fabric, at least 44 dry mils total.

C. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description Includes: Provide vapor retarder system for below grade and slab-on-grade concrete, including sealing joints and protrusions through vapor retarder and sand bed below vapor retarder.

07 26 19 - 1 Below-Grade Vapor Barriers

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B. Vapor Barrier Sheeting:

1. Water After-Conditioning Water Vapor Permeance: 0.01-perms, ASTM E1745 Section 7.1 sub-paragraphs 7.1.2-5.
2. Water Vapor Barrier: Meets or exceeds Class A, ASTM E1745.
3. Thickness: Not less than 15-mils.

C. Seam Tape: High density polyethylene tape with pressure sensitive adhesive, minimum 4-inches wide. Tape shall have a water vapor transmission rate of 0.3-perms or less in accordance with ASTM E96

D. Mastic: As recommended by vapor barrier manufacturer. Mastic shall have a water vapor transmission rate of 0.3-perms or less in accordance with ASTM E96.

E. Pipe Boots: Construct from vapor barrier sheeting material and pressure sensitive tape in accordance with manufacturer's instructions.

F. Perimeter/Edge Seal: Stego "Crete Claw" or approved equal.

G. At elevator pits, install Tremco VaporLock in accordance with manufacture's detailed application instructions.

PART 3 - EXECUTION

3.1 INSPECTION

A. Below-grade and grading work and items penetrating vapor barrier shall be complete prior to start of installation.

B. Ensure substrate is free of projections and irregularities that may be detrimental to proper installation of vapor barrier.

3.2 INSTALLATION

A. Vapor Barrier Sheeting:

1. Apply vapor retarder in accordance with manufacturer's recommendations and installation instructions and in accordance with ASTM E1643; comply with most restrictive where conflicts occur.
2. Unroll with the longest dimension parallel with the direction of the pour.
3. Lap vapor barrier over footings and seal to foundation walls.
4. Seal vapor barrier to slab perimeter/edge using specified seal and remove dirt, debris, and mud from seal material prior to concrete placement. Seal vapor barrier to footing/grade beam with double sided tape, termination bar, or both.

07 26 19 - 2 Below-Grade Vapor Barriers

TREMCO Barrier Solutions

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April 29, 2014

To Whom It May Concern,

Per our conversation, TBS has conducted testing to determine the effect of separate vapors of the following chemicals on our Tuff-N-Dri membrane (VaporLock-m): Hydrogen Sulfide, Benzene, Toluene, Ethylene, Xylene, Gasoline, Hexane, Perchloroethylene, per ASTM D-1434. The membrane was subjected to these chemicals and tested for permeance. Generally, a membrane is considered impermeable if the permeance rating is below 1.0. The permeance rating for the vapors of these chemicals is listed below:

Hydrogen Sulfide	N/D
Benzene	0.04
Toluene	0.06
Ethylene	0.09
Xylene	0.13
Gasoline	0.15
Hexane	0.05
Perchloroethylene	N/D
Trichloroethylene	0.01

As you can see our VaporLock-m membrane is totally impermeable to hydrogen sulfide and perchlorpethylene (diffusion = 0.00), and only slightly permeable to the other hydrocarbons listed, i.e. very low diffusion rates.

The following should help put this into a realistic perspective:

Even if the site had soil gas concentrations of 100% of the hydrocarbons above, and the soil gas pressure was everywhere equal to the maximum observed at any probe site (0.5 inches of water), then the diffusion of the gas mixture through the VaporLock-m membrane would still only result in the transmission of 0.05 cubic feet of gas per 1,000 square feet of surface area per day. Adjusting the value above for the average soil gas pressure for all locations on the site, reduces the result to 0.006 cubic feet of gas per 1,000 square feet of surface area per day. Of course the actual concentration of the hydrocarbons is far less than 100%, which would further reduce the transmitted volume.

To further put this in perspective, consider a building having 1,000 square feet of floor area and an 8-foot ceiling. The tightest construction allowed by building codes with adding mechanical ventilation is 0.2 ACPH. The building would typically have 38,400 cubic feet of air passing through the structure daily. The 0.006 cubic feet of gas from the paragraph above, which is a significant overstatement, represents only 0.000016 percent of the daily air exchange volume (or 0.016 ppm). It could be stated that the VaporLock-m membrane is more than 99.9999 percent effective at preventing any accumulation of hydrocarbon gases due to diffusion through the VaporLock-m membrane.

Sincerely,

James R. Wells
Technical Director

An RPM Company

For more details about VaporLock-m™, call your local Barrier Solutions Contractor:

VaporLock-m METHANE BARRIER

VAPORLOCK-m SPECIFICATIONS

Barrier Membrane

Membrane Description

Type	Polymer-enhanced asphalt liquid-applied membrane
Color	Black
Solids	63 +/- 3 [percent by weight]
Density	8.1 lbs/gal
Application	Airless Spray
Application Temperature	Minimum 20°F
Coating Cure Time	16–24 hrs
Application Thickness	44 mils [dry][1] solid surface 60 mils [dry][1] geotextile fabric (including fabric)

Membrane Properties

Properties	Typical Results	Test Methods
Adhesion to Concrete	Exceeds	ASTM C-836
Elongation	>2000 percent	ASTM D-412
Low Temperature Flexibility	Flexible to -10°F	See[2]
Crack Bridging Ability	Exceeds 10 cycles to 1/8" at -15°F	ASTM C-836
Water Vapor Permeance	0.08 perms for 40-mil dry coating [grain/sf/hr in Hg]	ASTM E-96 Dry Method
Liquid Water Absorption	0.3% [wt]	ASTM D-1228[3]
Resistance to Degradation in Soil	Good	ASTM E-154
Mold Growth and Bacterial Attack	No degradation	ASTM D-3273 ASTM D-3274

Geotextile Fabric

Mechanical [MARV][1]	Typical Results	Test Methods
Grab Tensile Strength	250 lbs	ASTM D-4632
Grab Elongation	60%	ASTM D-4632
Trapezoidal Tear Strength	90 lbs	ASTM D-4533
Puncture Strength	81 lbs	ASTM D-4833

Endurance [MARV][1]	Typical Results	Test Methods
UV Resistance @500 hrs	70%	ASTM D-4355

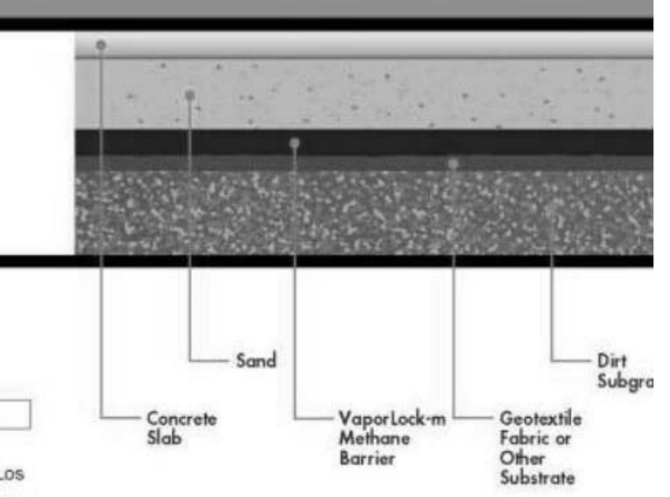
Physical [MARV][1]	Typical Results
Unit Weight	6.0 oz/sq yd

TREMCO Barrier Solutions

VAPORLOCK-m: YOUR SOLUTION TO METHANE MITIGATION

When soil reports indicate a need for methane mitigation for your site, VaporLock™ Methane Barrier [VaporLock-m] provides an impermeable, easy to install barrier solution to methane infiltration. What's more, VaporLock-m may help you remediate methane contamination at a lower installed cost than other applications available in your area - giving you greater opportunities for profitability or increased flexibility in your selling prices.

VaporLock-m METHANE BARRIER



SEAMLESS METHANE BARRIER

- VaporLock-m is an independently-tested and City of Los Angeles approved (LA City #RR 25546) methane barrier membrane that is applied to a tough geotextile fabric or other substrate to prevent methane from entering the building through the foundation slab or other treated surfaces.
- VaporLock-m is a polymer-enhanced asphalt barrier that is seamlessly spray-applied to the substrate at a highly-protective thickness of at least 44 mils dry. The barrier's flexibility enables it to with stand thermal expansion and contraction with no compromise in performance.
- The impermeability and ease-of-application make VaporLock-m a reliable, cost-effective alternative for methane mitigation.

FROM THE LEADERS IN SPRAY-APPLIED BARRIER TECHNOLOGY

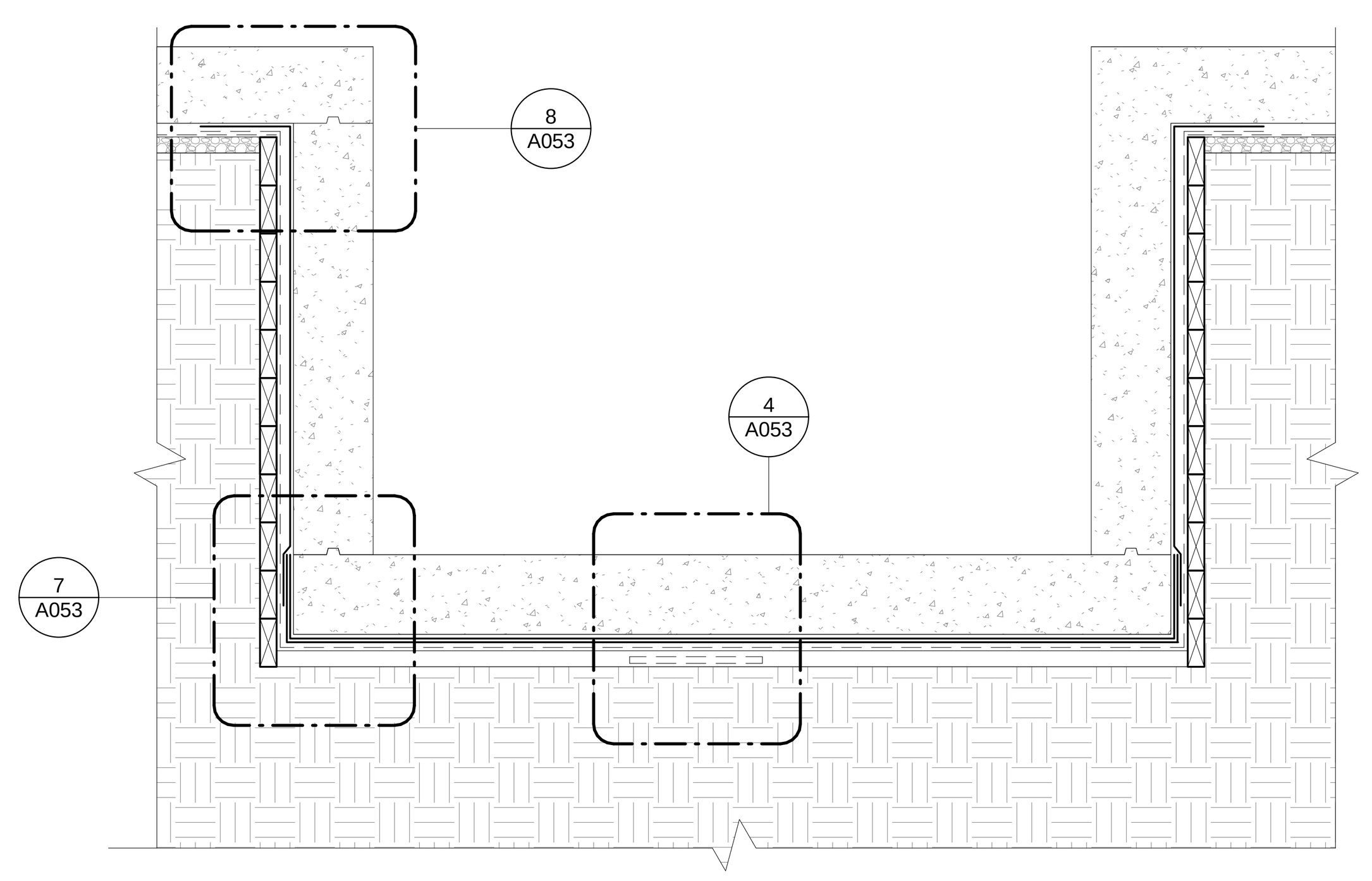
VaporLock-M comes to you from Tremco Barrier Solutions, with a heritage in spray-applied barrier technology stretching back more than 20 years. Since 1983, our team has sparked innovations in fluid membrane formulations and performance. And we offer more than two decades of experience installing spray-applied barriers – including TUFF-N-DRI® Basement Waterproofing System, the #1 brand of new basement waterproofing in North America.

INSTALLED BY TRAINED PROFESSIONALS

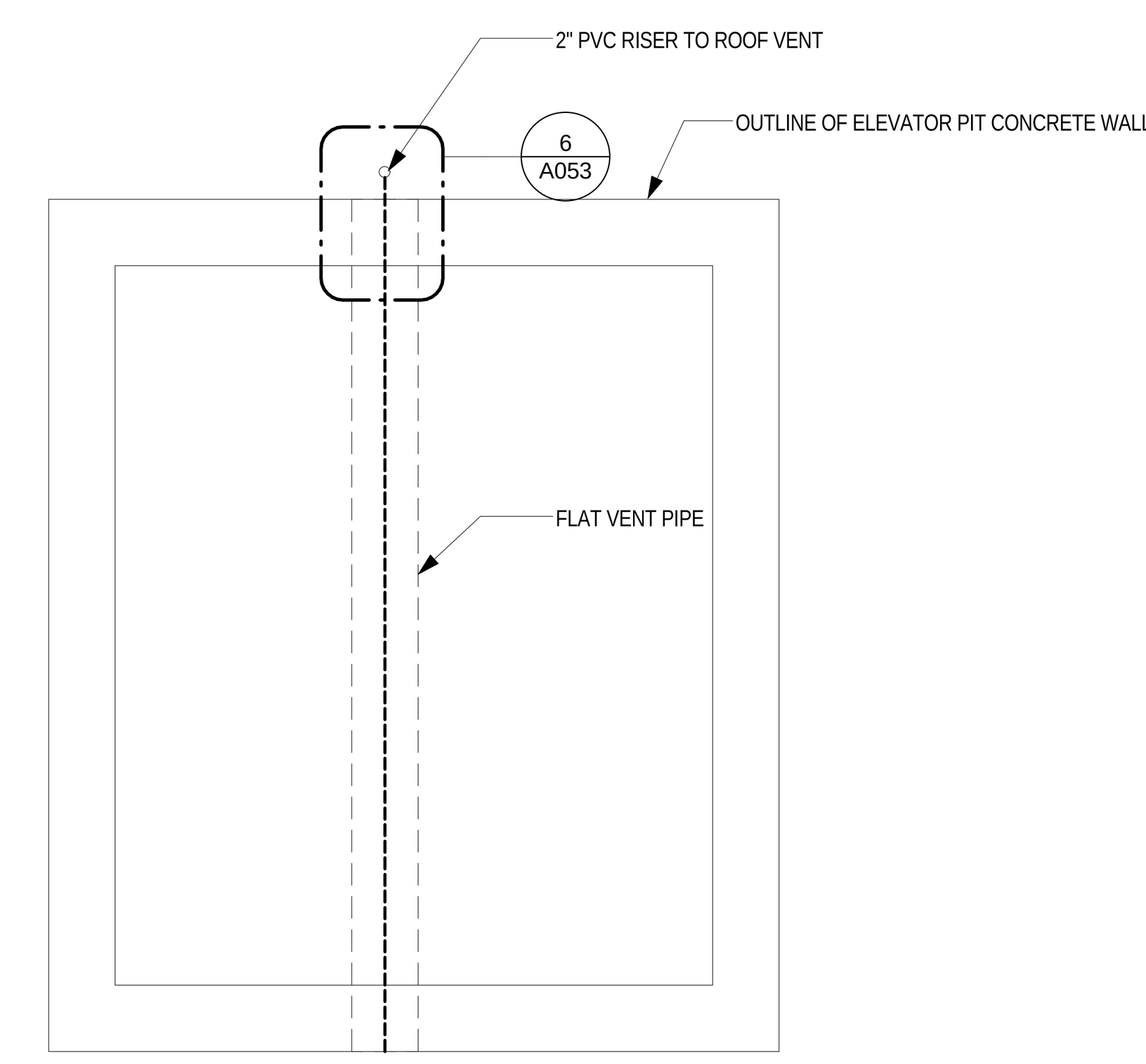
VaporLock-m is reliably installed by select contractors, trained by Tremco Barrier Solutions. Count on our contractors to professionally, promptly and courteously install VaporLock-m to your specifications and schedule.

SITE PREPARATION

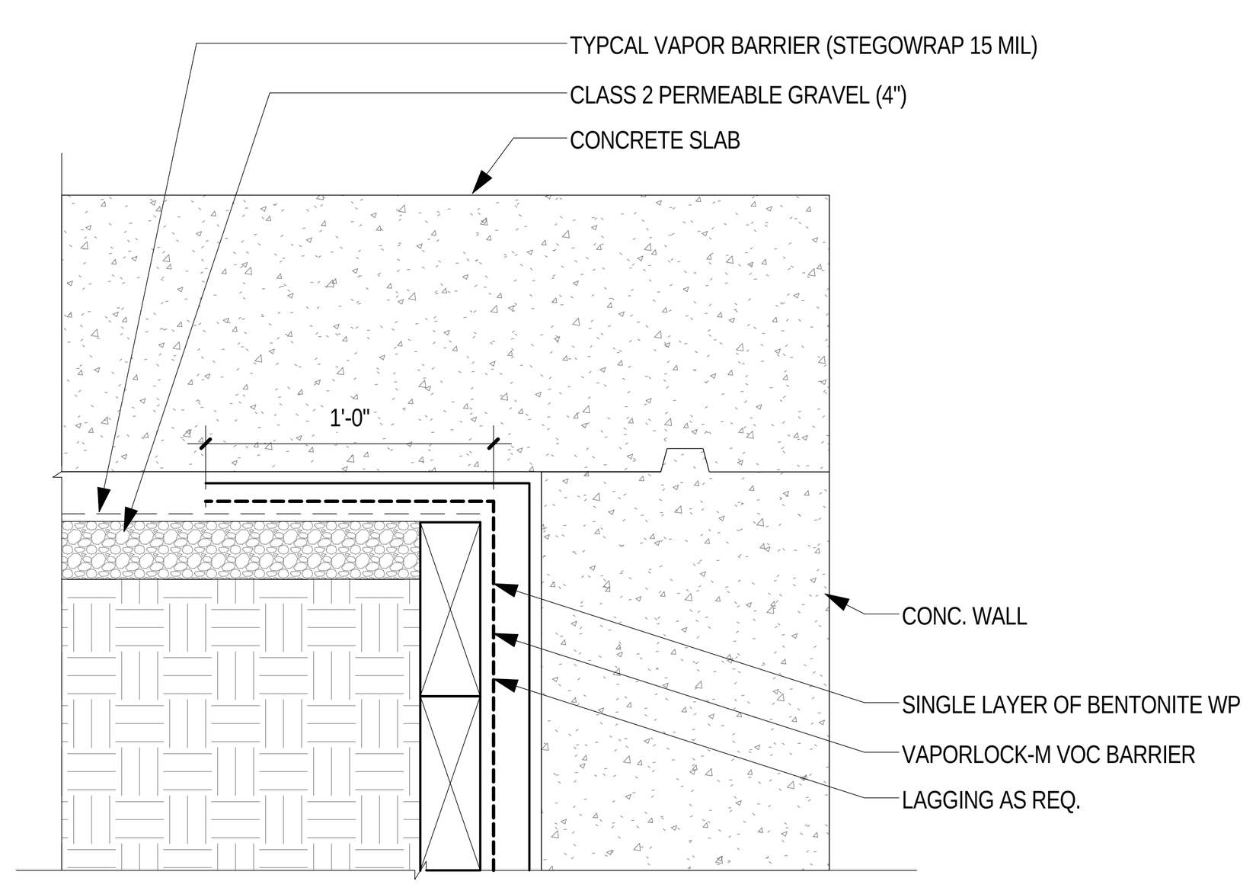
- Provide a minimum 24 inches of clearance around the area to receive VaporLock-m.
- To avoid staining, apply masking or otherwise protect all adjacent areas or fixtures not to receive VaporLock-m.
- Moisture-condition and compact the subgrade to a minimum relative compaction of 90 percent or as specified by a civil engineer. Make sure the subgrade surface is free of debris and all dirt clods or stones larger than 1/4 inch, so that the finished surface is smooth and uniform.
- Properly secure all plumbing, electrical, mechanical and structural items that will penetrate VaporLock-m.



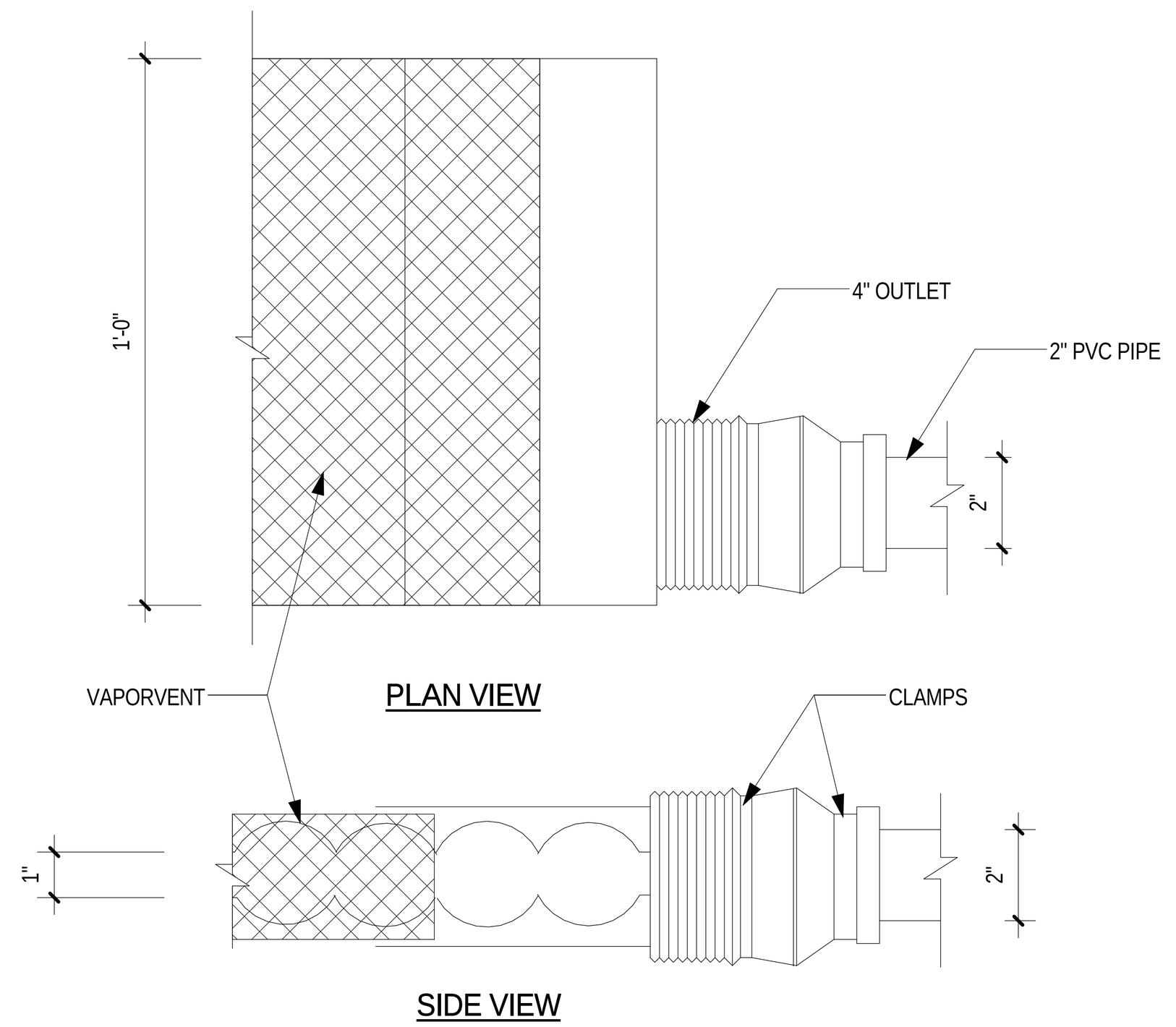
3 SECTION OF ELEVATOR PIT
1/2" = 1'-0"



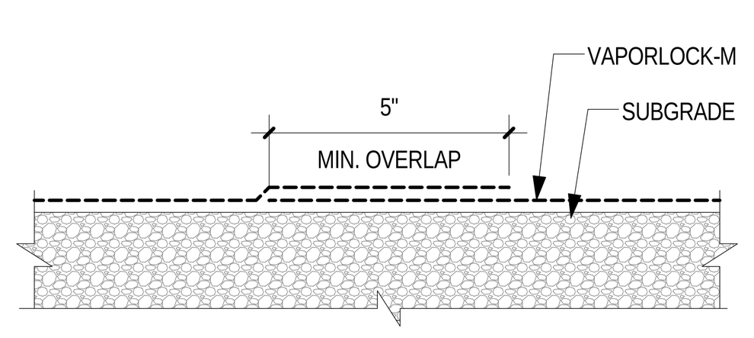
2 PLAN OF UNDERSLAB VENT
3/8" = 1'-0"



8 TOP OF ELEVATOR PIT
1 1/2" = 1'-0"



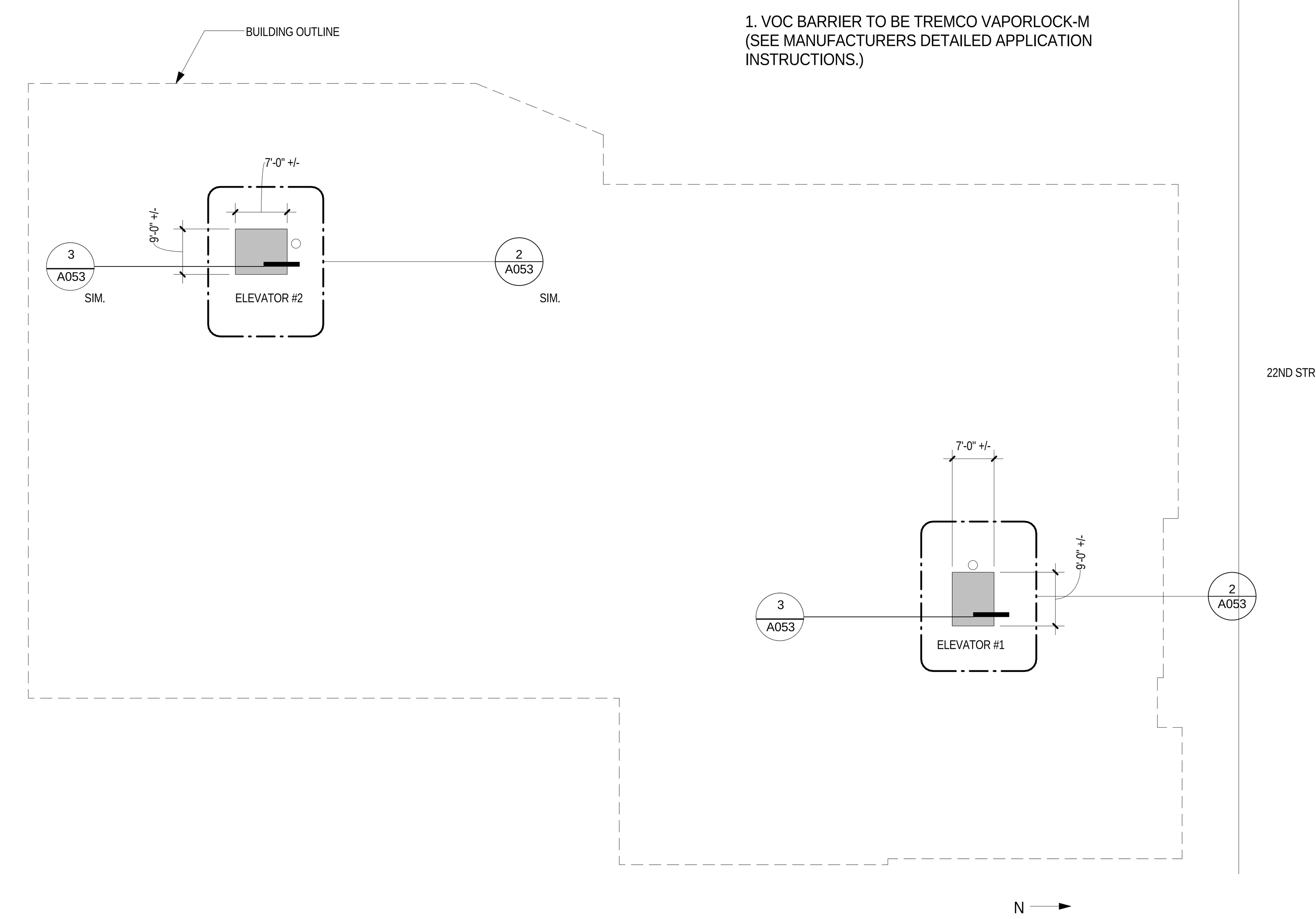
6 FLAT TO ROUND PIPE CONNECTION
3" = 1'-0"

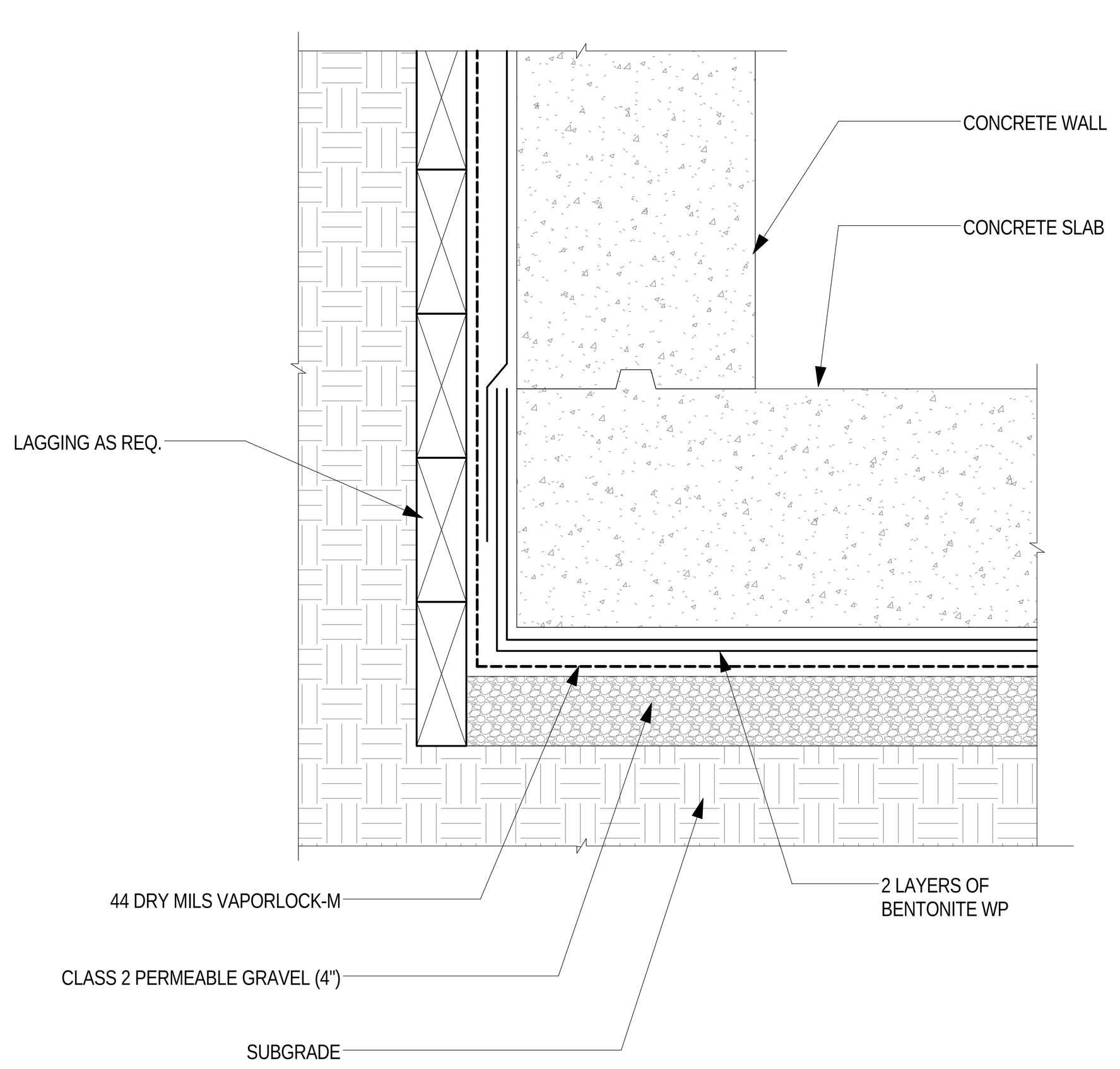


5 TYPICAL LAP DETAL
3" = 1'-0"

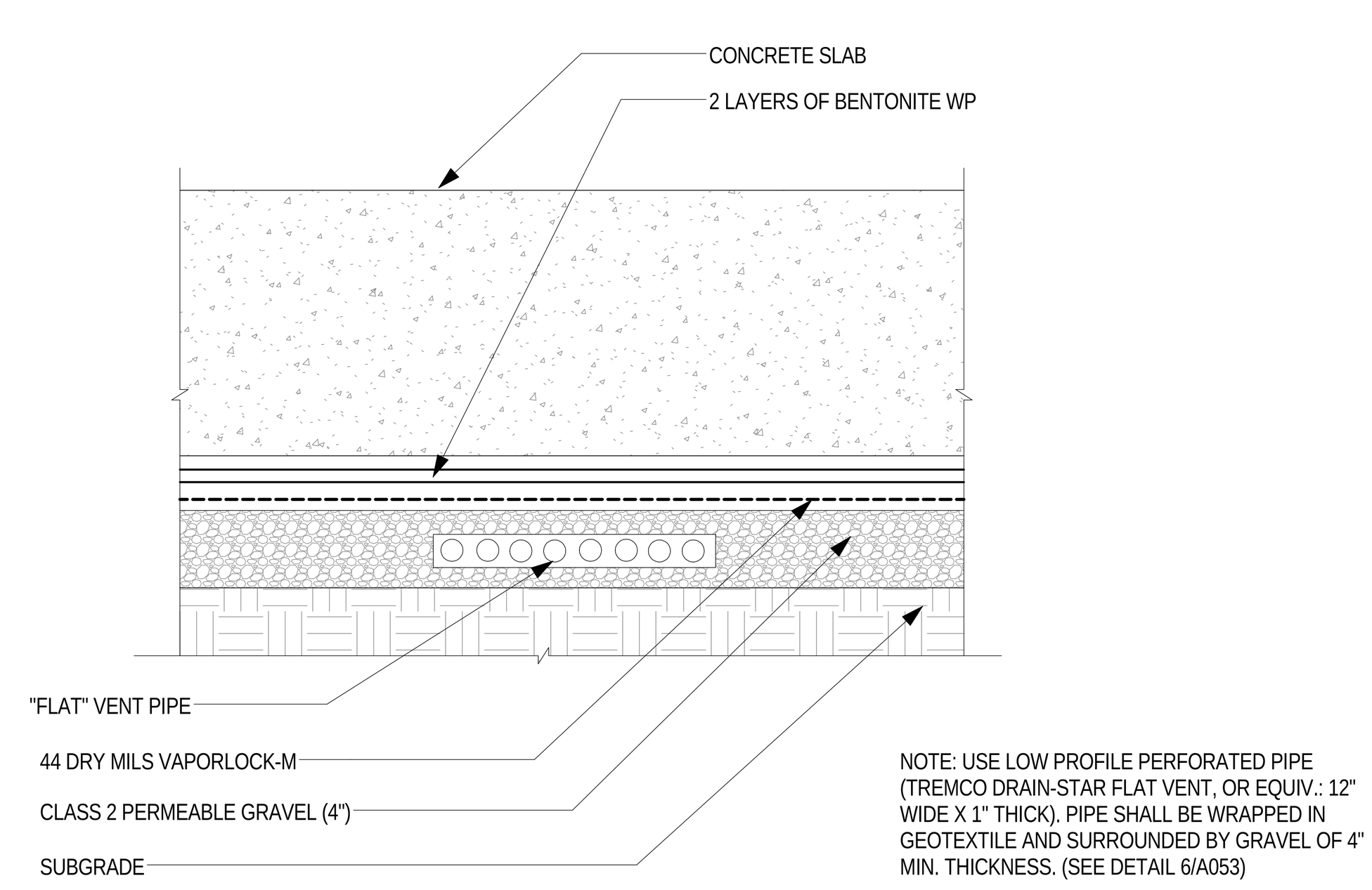
GENERAL NOTES:

1. VOC BARRIER TO BE TREMCO VAPORLOCK-M (SEE MANUFACTURERS DETAILED APPLICATION INSTRUCTIONS.)





7 BOTTOM OF ELEVATOR PIT
1 1/2" = 1'-0"



NOTE: USE LOW PROFILE PERFORATED PIPE (TREMCO DRAIN-STAR FLAT VENT, OR EQUIV.; 12" WIDE X 1" THICK). PIPE SHALL BE WRAPPED IN GEOTEXTILE AND SURROUNDED BY GRAVEL OF 4" MIN. THICKNESS. (SEE DETAIL 6/A053)

4 FLAT VENT PIPE DETAIL
1 1/2" = 1'-0"

1 ELEVATOR LOCATIONS
3" = 1'-0"

studio KDA

570 21ST STREET
570 21ST STREET
OAKLAND, CA
94612

SEAL

STATE OF CALIFORNIA · CHARLES FEIDELSON KAHN · REN.01/31/2017 · # C016027 · LICENSED ARCHITECT

CONSTRUCTION DOCUMENTS

PROJECT ISSUE REVIEW:

160617	100% DD
160822	PERMIT SET
161130	MODIFIED PERMIT SET
170120	BID SET

CITY PERMIT RECORD:

PROJECT
TLP01

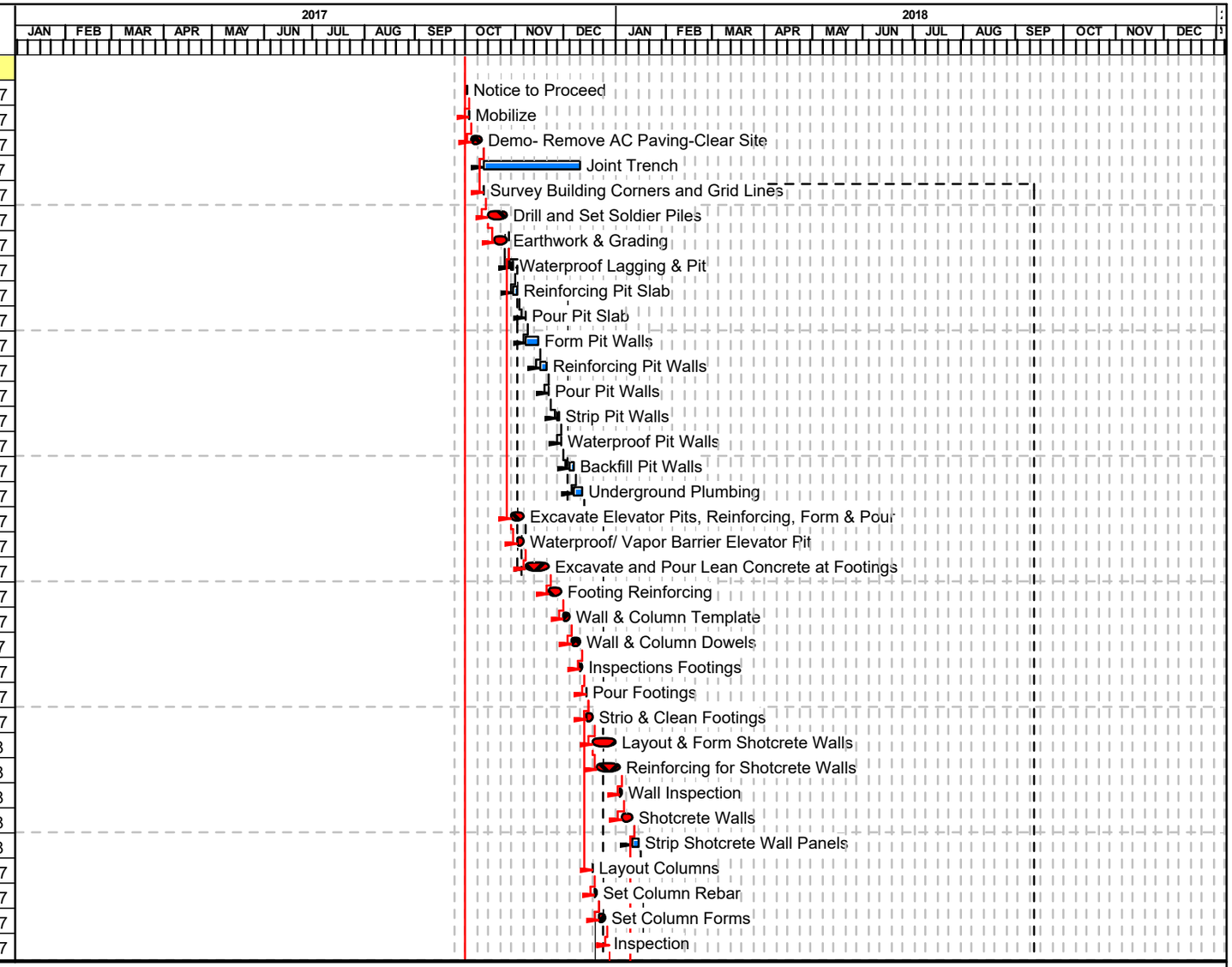
TITLE
UNDERSLAB BARRIER

SHEET
A053

2/1/2017 9:13:30 AM

PROJECT SCHEDULE

Act ID	Description	Orig Dur	Early Start	Early Finish
100	Notice to Proceed	1	03OCT17	03OCT17
110	Mobilize	2	04OCT17	05OCT17
120	Demo- Remove AC Paving-Clear Site	5	06OCT17	12OCT17
130	Joint Trench	35	13OCT17	11DEC17
140	Survey Building Corners and Grid Lines	1	13OCT17	13OCT17
150	Drill and Set Soldier Piles	10	16OCT17	27OCT17
160	Earthwork & Grading	6	20OCT17	27OCT17
170	Waterproof Lagging & Pit	2	30OCT17	31OCT17
180	Reinforcing Pit Slab	3	31OCT17	03NOV17
190	Pour Pit Slab	2	07NOV17	08NOV17
200	Form Pit Walls	6	08NOV17	16NOV17
210	Reinforcing Pit Walls	3	16NOV17	20NOV17
215	Pour Pit Walls	2	21NOV17	22NOV17
220	Strip Pit Walls	2	27NOV17	28NOV17
225	Waterproof Pit Walls	2	29NOV17	30NOV17
230	Backfill Pit Walls	3	04DEC17	07DEC17
240	Underground Plumbing	4	07DEC17	12DEC17
255	Excavate Elevator Pits, Reinforcing, Form & Pour	5	30OCT17	07NOV17
260	Waterproof/ Vapor Barrier Elevator Pit	3	02NOV17	07NOV17
265	Excavate and Pour Lean Concrete at Footings	10	08NOV17	22NOV17
280	Footing Reinforcing	5	22NOV17	30NOV17
290	Wall & Column Template	3	30NOV17	05DEC17
300	Wall & Column Dowels	4	05DEC17	11DEC17
310	Inspections Footings	2	11DEC17	12DEC17
320	Pour Footings	2	14DEC17	15DEC17
325	Strio & Clean Footings	2	15DEC17	18DEC17
330	Layout & Form Shotcrete Walls	8	18DEC17	02JAN18
335	Reinforcing for Shotcrete Walls	7	21DEC17	04JAN18
340	Wall Inspection	2	04JAN18	05JAN18
345	Shotcrete Walls	5	05JAN18	12JAN18
346	Strip Shotcrete Wall Panels	3	12JAN18	16JAN18
350	Layout Columns	1	18DEC17	18DEC17
355	Set Column Rebar	2	19DEC17	21DEC17
360	Set Column Forms	2	22DEC17	26DEC17
365	Inspection	1	28DEC17	28DEC17



Start date	02OCT17
Finish date	08APR19
Data date	02OCT17
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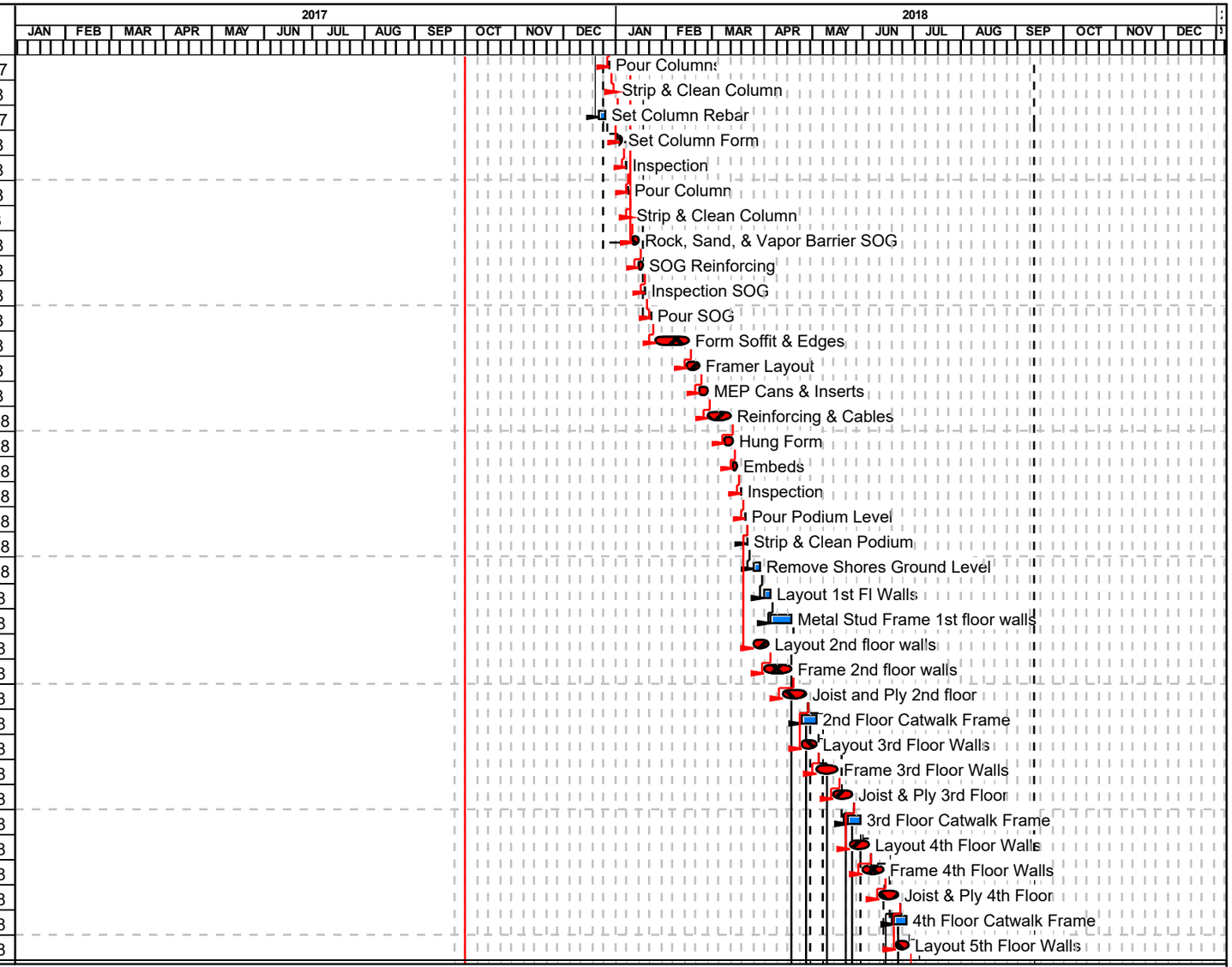
JS Builders, LLC
Moran Uptown
Exhibit A
Draft 1

Early bar
Progress bar
Critical bar
Summary bar
Start milestone point
Finish milestone point

BUILDERS LLC

Act ID	Description	Orig Dur	Early Start	Early Finish
370	Pour Columns	1	29DEC17	29DEC17
375	Strip & Clean Column	1	02JAN18	02JAN18
385	Set Column Rebar	2	22DEC17	26DEC17
390	Set Column Form	2	04JAN18	05JAN18
395	Inspection	1	08JAN18	08JAN18
400	Pour Column	1	09JAN18	09JAN18
405	Strip & Clean Column	1	11JAN18	11JAN18
410	Rock, Sand, & Vapor Barrier SOG	2	12JAN18	15JAN18
415	SOG Reinforcing	3	15JAN18	18JAN18
420	Inspection SOG	1	19JAN18	19JAN18
425	Pour SOG	1	23JAN18	23JAN18
450	Form Soffit & Edges	11	25JAN18	15FEB18
455	Framer Layout	4	14FEB18	21FEB18
460	MEP Cans & Inserts	5	21FEB18	27FEB18
475	Reinforcing & Cables	9	26FEB18	12MAR18
485	Hung Form	3	09MAR18	14MAR18
490	Embeds	3	14MAR18	16MAR18
500	Inspection	1	19MAR18	19MAR18
510	Pour Podium Level	1	21MAR18	21MAR18
520	Strip & Clean Podium	2	22MAR18	23MAR18
530	Remove Shores Ground Level	5	26MAR18	30MAR18
533	Layout 1st Fl Walls	4	02APR18	06APR18
535	Metal Stud Frame 1st floor walls	8	06APR18	19APR18
560	Layout 2nd floor walls	7	26MAR18	04APR18
570	Frame 2nd floor walls	10	02APR18	18APR18
575	Joist and Ply 2nd floor	10	13APR18	27APR18
577	2nd Floor Catwalk Frame	7	25APR18	04MAY18
580	Layout 3rd Floor Walls	7	25APR18	04MAY18
590	Frame 3rd Floor Walls	10	03MAY18	16MAY18
595	Joist & Ply 3rd Floor	10	14MAY18	25MAY18
600	3rd Floor Catwalk Frame	7	22MAY18	31MAY18
605	Layout 4th Floor Walls	7	24MAY18	04JUN18
610	Frame 4th Floor Walls	10	31MAY18	13JUN18
620	Joist & Ply 4th Floor	10	11JUN18	22JUN18
630	4th Floor Catwalk Frame	7	20JUN18	28JUN18
640	Layout 5th Floor Walls	7	21JUN18	29JUN18



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JS Builders, LLC
Moran Uptown
Exhibit A
Draft 1

Early bar
Progress bar
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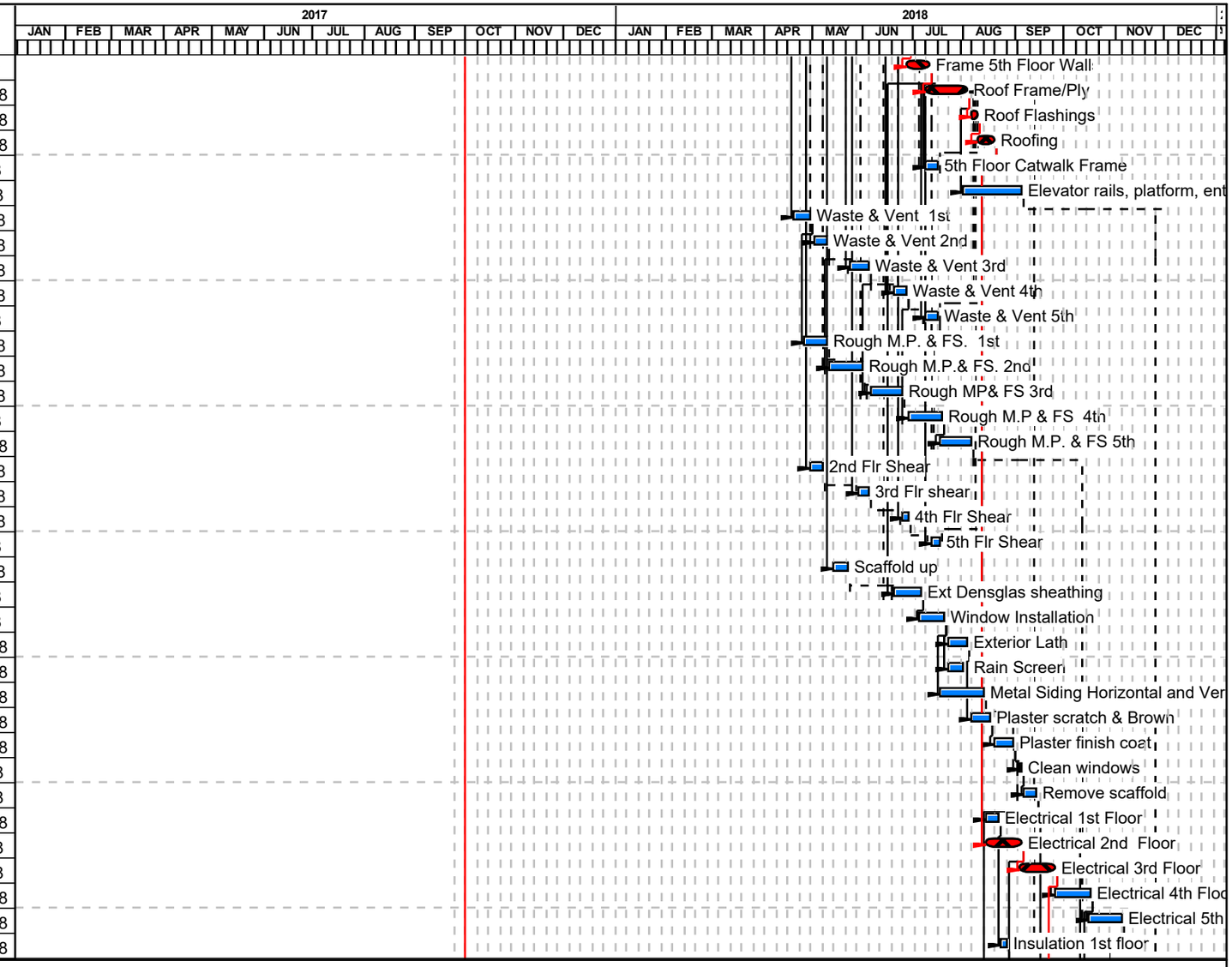
Start milestone point
Finish milestone point

BUILDERS LLC

Act ID	Description	Orig Dur	Early Start	Early Finish
650	Frame 5th Floor Walls	10	27JUN18	11JUL18
660	Roof Frame/Ply	20	09JUL18	03AUG18
662	Roof Flashings	5	06AUG18	10AUG18
664	Roofing	7	10AUG18	20AUG18
665	5th Floor Catwalk Frame	7	09JUL18	17JUL18
675	Elevator rails, platform, entrances	25	01AUG18	05SEP18
680	Waste & Vent 1st	7	20APR18	30APR18
690	Waste & Vent 2nd	7	02MAY18	10MAY18
700	Waste & Vent 3rd	7	24MAY18	04JUN18
710	Waste & Vent 4th	7	19JUN18	27JUN18
715	Waste & Vent 5th	7	09JUL18	17JUL18
720	Rough M.P. & FS. 1st	10	26APR18	10MAY18
730	Rough M.P.& FS. 2nd	15	11MAY18	01JUN18
740	Rough MP& FS 3rd	15	05JUN18	25JUN18
750	Rough M.P & FS 4th	15	28JUN18	19JUL18
755	Rough M.P. & FS 5th	15	17JUL18	06AUG18
760	2nd Flr Shear	5	30APR18	07MAY18
770	3rd Flr shear	5	29MAY18	04JUN18
780	4th Flr Shear	5	25JUN18	29JUN18
785	5th Flr Shear	5	12JUL18	18JUL18
790	Scaffold up	8	14MAY18	23MAY18
880	Ext Densglas sheathing	12	20JUN18	06JUL18
885	Window Installation	12	05JUL18	20JUL18
890	Exterior Lath	10	23JUL18	03AUG18
900	Rain Screen	8	23JUL18	01AUG18
905	Metal Siding Horizontal and Veritcal	20	18JUL18	14AUG18
910	Plaster scratch & Brown	10	06AUG18	17AUG18
920	Plaster finish coat	10	20AUG18	31AUG18
930	Clean windows	3	04SEP18	06SEP18
940	Remove scaffold	6	07SEP18	14SEP18
950	Electrical 1st Floor	8	14AUG18	23AUG18
955	Electrical 2nd Floor	15	15AUG18	05SEP18
960	Electrical 3rd Floor	17	04SEP18	26SEP18
965	Electrical 4th Floor	17	25SEP18	17OCT18
970	Electrical 5th Floor	15	16OCT18	05NOV18
975	Insulation 1st floor	2	24AUG18	27AUG18



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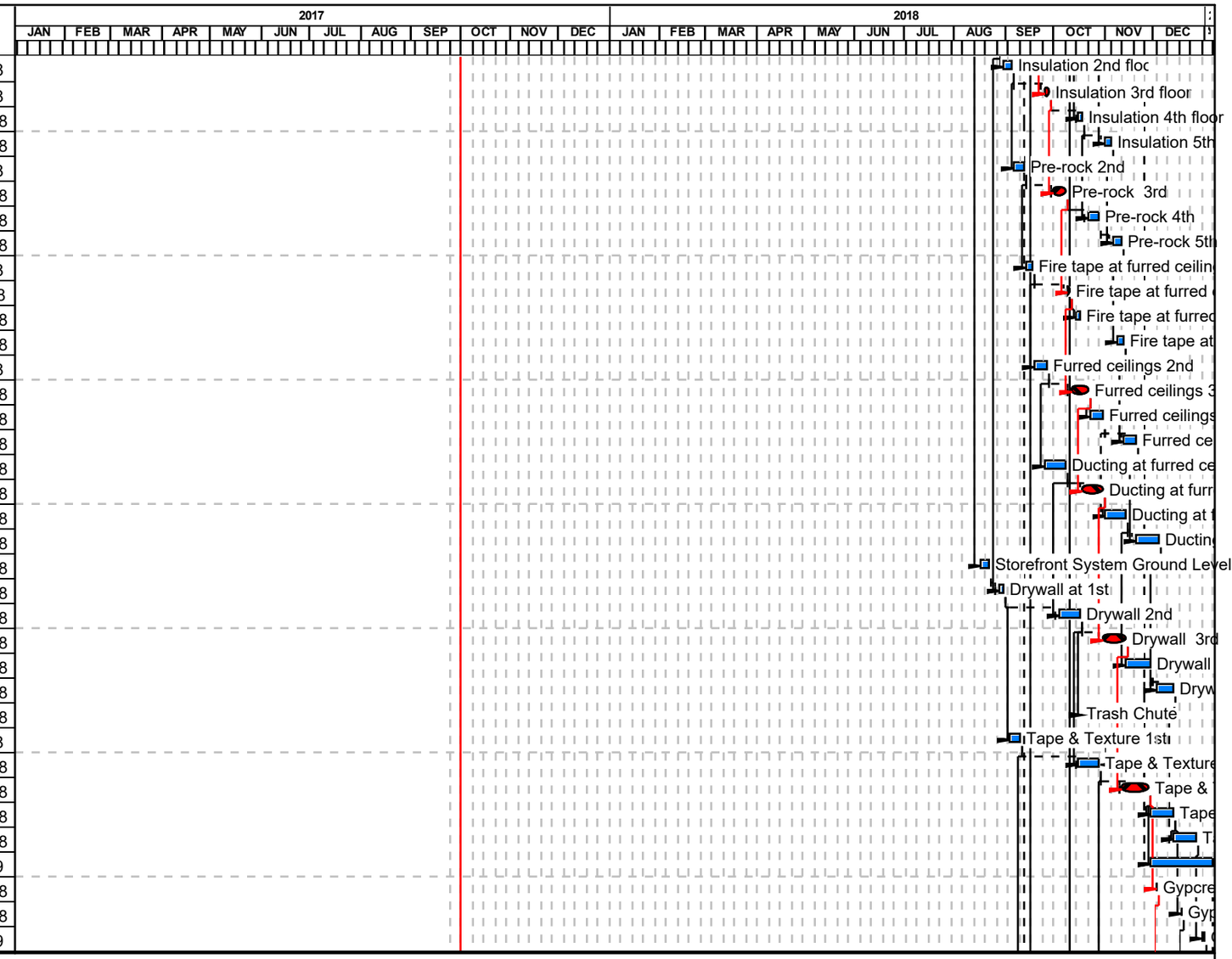
JS Builders, LLC
Moran Uptown
Exhibit A
Draft 1

Early bar
Progress bar
Critical bar
Summary bar
Start milestone point
Finish milestone point

BUILDERS LLC

Act ID	Description	Orig Dur	Early Start	Early Finish
980	Insulation 2nd floor	4	31AUG18	06SEP18
985	Insulation 3rd floor	4	25SEP18	28SEP18
990	Insulation 4th floor	4	16OCT18	19OCT18
992	Insulation 5th Floor	4	01NOV18	06NOV18
995	Pre-rock 2nd	5	07SEP18	13SEP18
1000	Pre-rock 3rd	6	01OCT18	08OCT18
1010	Pre-rock 4th	6	22OCT18	29OCT18
1015	Pre-rock 5th	5	06NOV18	12NOV18
1020	Fire tape at furred ceilings 2nd	3	14SEP18	18SEP18
1030	Fire tape at furred ceilings 3rd	3	09OCT18	11OCT18
1040	Fire tape at furred ceilings 4th	3	15OCT18	17OCT18
1045	Fire tape at furred ceilings 5th	3	09NOV18	13NOV18
1050	Furred ceilings 2nd	7	19SEP18	27SEP18
1060	Furred ceilings 3rd	7	12OCT18	22OCT18
1070	Furred ceilings 4th	7	23OCT18	31OCT18
1075	Furred ceilings 5th	7	13NOV18	21NOV18
1080	Ducting at furred ceilings - 2nd	10	25SEP18	08OCT18
1090	Ducting at furred ceilings - 3rd	10	19OCT18	01NOV18
1100	Ducting at furred ceilings - 4th	10	02NOV18	15NOV18
1105	Ducting at furred ceilings- 5th	10	20NOV18	05DEC18
1106	Storefront System Ground Level	4	17AUG18	22AUG18
1108	Drywall at 1st	4	28AUG18	31AUG18
1110	Drywall 2nd	10	04OCT18	17OCT18
1120	Drywall 3rd	11	31OCT18	14NOV18
1130	Drywall 4th	11	14NOV18	30NOV18
1140	Drywall 5th	10	03DEC18	14DEC18
1150	Trash Chute	5	18OCT18	18OCT18
1155	Tape & Texture 1st	5	04SEP18	10SEP18
1160	Tape & Texture 2nd	10	16OCT18	29OCT18
1170	Tape & Texture 3rd	12	12NOV18	29NOV18
1180	Tape & Texture 4th	12	29NOV18	14DEC18
1190	Tape & Texture 5th	10	14DEC18	28DEC18
1200	Elevator cabs	25	30NOV18	07JAN19
1205	Gypcrete 3rd	2	03DEC18	04DEC18
1210	Gypcrete 4th	2	18DEC18	19DEC18
1215	Gypcrete 5th	2	31DEC18	02JAN19



Start date	02OCT17
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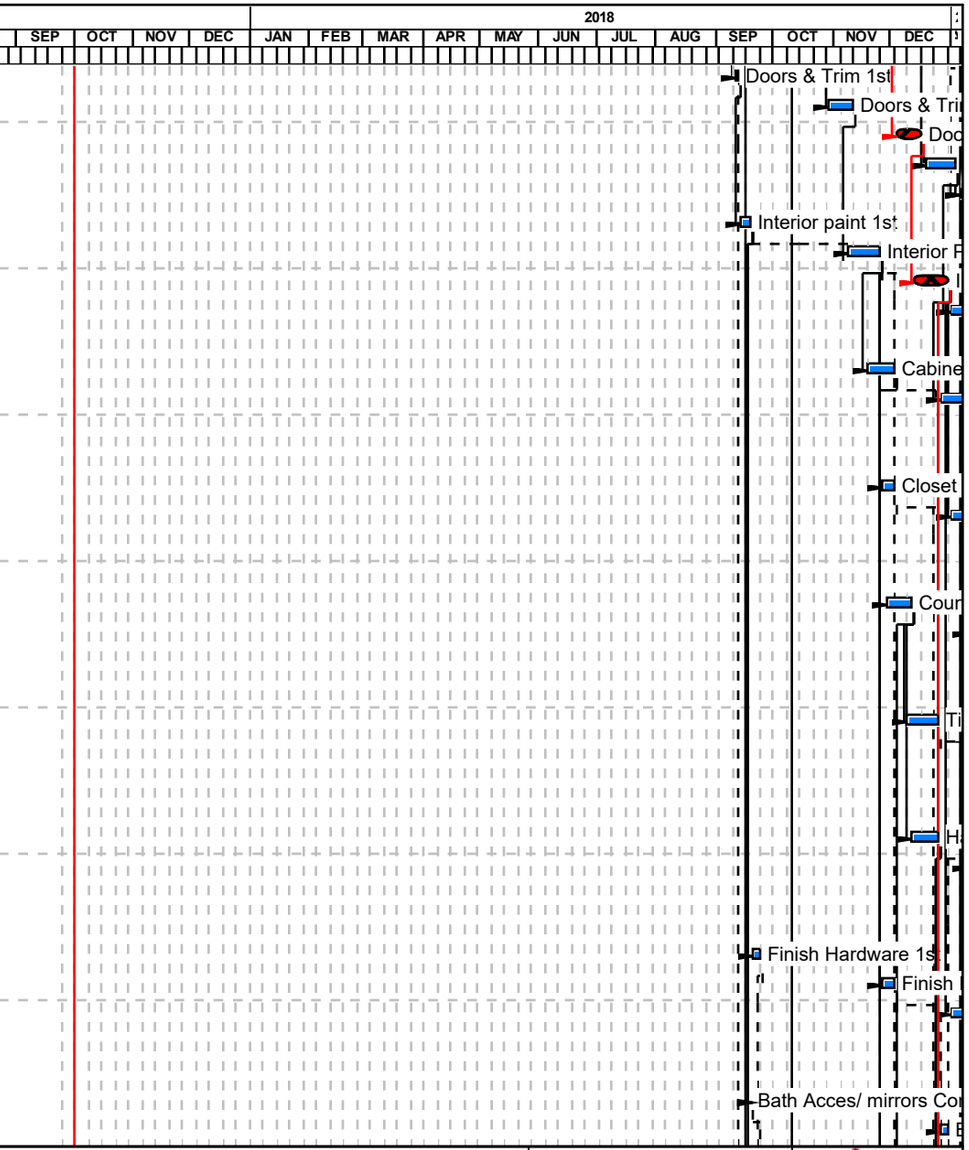
JS Builders, LLC
Moran Uptown
Exhibit A
Draft 1

Early bar
Progress bar
Critical bar
Summary bar
Start milestone point
Finish milestone point

BUILDERS LLC

Act ID	Description	Orig Dur	Early Start	Early Finish
1216	Doors & Trim 1st	3	11SEP18	13SEP18
1217	Doors & Trim 2nd	10	30OCT18	12NOV18
1218	Doors & Trim 3rd	10	05DEC18	18DEC18
1219	Doors & Trim 4th	10	20DEC18	04JAN19
1220	Doors & Trim 5th	10	07JAN19	18JAN19
1230	Interior paint 1st	4	14SEP18	19SEP18
1235	Interior Paint 2nd	10	09NOV18	26NOV18
1240	Interior Paint 3rd	11	14DEC18	31DEC18
1250	Interior Paint 4th	11	02JAN19	16JAN19
1260	Interior Paint 5th	10	17JAN19	30JAN19
1310	Cabinets 2nd	10	19NOV18	04DEC18
1320	Cabinets 3rd	11	27DEC18	11JAN19
1330	Cabinets 4th	11	14JAN19	28JAN19
1335	Cabinets 5th	10	29JAN19	11FEB19
1370	Closet Shelving 2nd	5	27NOV18	03DEC18
1380	Closet Shelving 3rd	5	02JAN19	08JAN19
1390	Closet Shelving 4th	5	17JAN19	23JAN19
1395	Closet shelving 5th	5	31JAN19	06FEB19
1400	Countertops 2nd	10	29NOV18	12DEC18
1405	Countertops 3rd	10	10JAN19	23JAN19
1410	Countertops 4th	10	29JAN19	11FEB19
1415	Countertops 5th	10	11FEB19	22FEB19
1418	Tile Backsplash 2nd floor	9	10DEC18	27DEC18
1420	Tile Backsplash 3rd floor	10	21JAN19	01FEB19
1425	Tile Backsplash 4th floor	10	07FEB19	20FEB19
1428	Tile Backsplash 5th floor	9	25FEB19	07MAR19
1430	Hard Surface Flooring 2nd	10	12DEC18	26DEC18
1440	Hard Surface Flooring 3rd	10	10JAN19	23JAN19
1450	Hard Sureface Flooring 4th	10	25JAN19	07FEB19
1455	Hardsfurface Flooring 5th	10	12FEB19	25FEB19
1457	Finish Hardware 1st	4	20SEP18	25SEP18
1460	Finish Hardware 2nd	5	27NOV18	03DEC18
1470	Finish Hardware 3rd	5	02JAN19	08JAN19
1480	Finish Hardware 4th	5	17JAN19	23JAN19
1490	Finish Hardware 5th	5	31JAN19	06FEB19
1495	Bath Acces/ mirrors Common 1st	1	20SEP18	20SEP18
1500	Bath Accs/Mirrors 2nd	3	27DEC18	31DEC18



Start date	02OCT17
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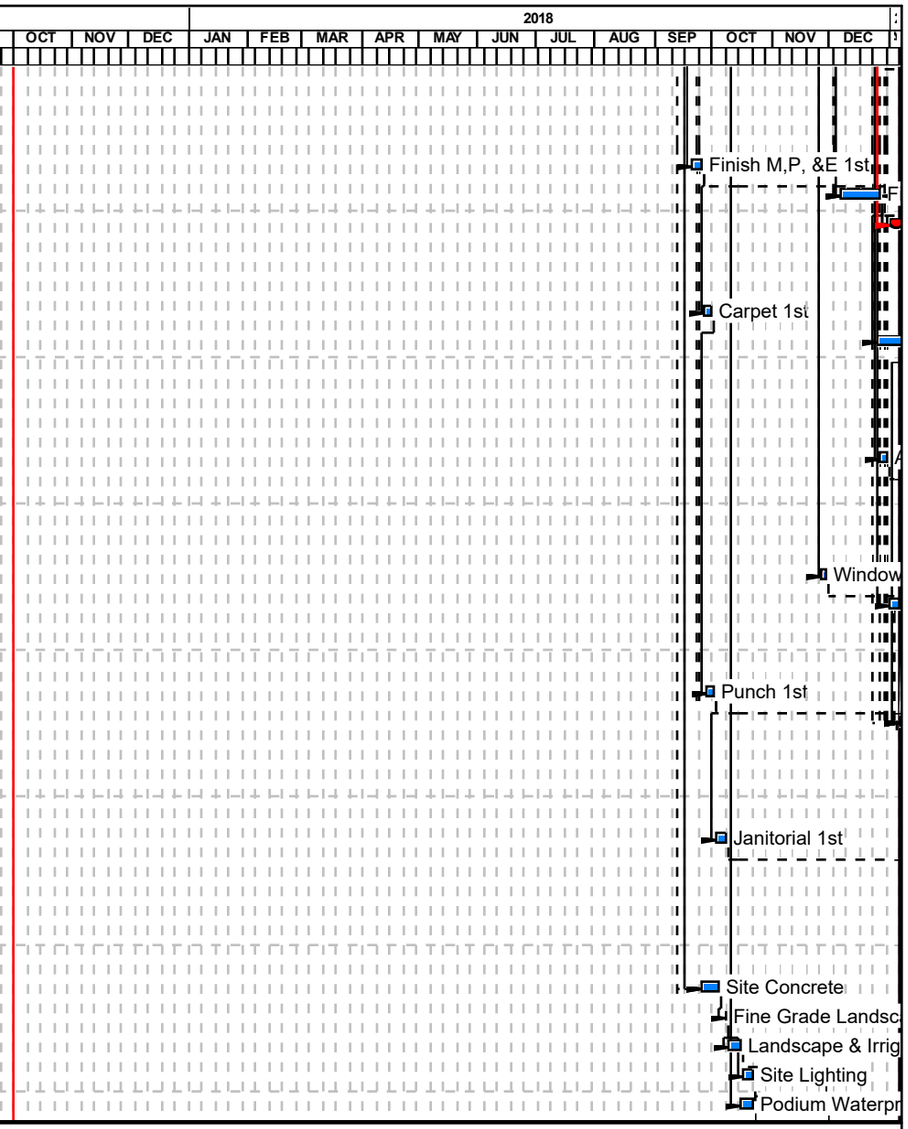
JS Builders, LLC
Moran Uptown
Exhibit A
Draft 1

Early bar
Progress bar
Critical bar
Summary bar
Start milestone point
Finish milestone point

BUILDERS LLC

Act ID	Description	Orig Dur	Early Start	Early Finish
1510	Bath Accs./ Mirrors 3rd	3	24JAN19	28JAN19
1520	Bath Accs./ Mirrors 4th	3	17JAN19	21JAN19
1530	Bath Accs/Mirrors 5th	3	22JAN19	24JAN19
1535	Finish M,P, &E 1st	5	20SEP18	26SEP18
1540	Finish M, P, & E 2nd	15	07DEC18	28DEC18
1550	Finish M,P,&E 3rd	18	02JAN19	25JAN19
1560	Finish M,P,&E 4th	18	28JAN19	20FEB19
1570	Finish M, P, & E 5th	15	21FEB19	13MAR19
1575	Carpet 1st	3	27SEP18	01OCT18
1580	Carpet 2nd	10	26DEC18	09JAN19
1585	Carpet 3rd	12	23JAN19	07FEB19
1590	Carpet 4th	12	18FEB19	05MAR19
1605	Carpet 5th	10	08MAR19	21MAR19
1610	Appliance 1st & 2nd floor	3	27DEC18	31DEC18
1615	Appliance 3rd	3	24JAN19	28JAN19
1620	Appliance 4th	3	08FEB19	12FEB19
1625	Appliance 5th	3	26FEB19	28FEB19
1628	Window Coverings 1st & 2nd Floors	4	27NOV18	30NOV18
1633	Window Coverings 3rd Fl	4	02JAN19	07JAN19
1634	Window Coverings 4th Fl	4	17JAN19	22JAN19
1637	Window Coverings 5th Fl	4	04FEB19	07FEB19
1640	Punch 1st	3	28SEP18	02OCT18
1645	Punch 2nd	10	07JAN19	18JAN19
1650	Punch 3rd	10	05FEB19	18FEB19
1660	Punch 4th	10	01MAR19	14MAR19
1670	Punch 5th	10	18MAR19	29MAR19
1675	Janitorial 1st	4	03OCT18	08OCT18
1680	Janitorial 2nd	10	17JAN19	30JAN19
1690	Janitorial 3rd	10	15FEB19	28FEB19
1700	Janitorial 4th	10	13MAR19	26MAR19
1710	Janitorial 5th	10	26MAR19	08APR19
1720	Site Concrete	8	25SEP18	05OCT18
1730	Fine Grade Landscape Area	2	08OCT18	09OCT18
1740	Landscape & Irrigation	5	10OCT18	16OCT18
1750	Site Lighting	4	17OCT18	22OCT18
1770	Podium Waterproofing	5	16OCT18	22OCT18



Start date	02OCT17
Finish date	08APR19
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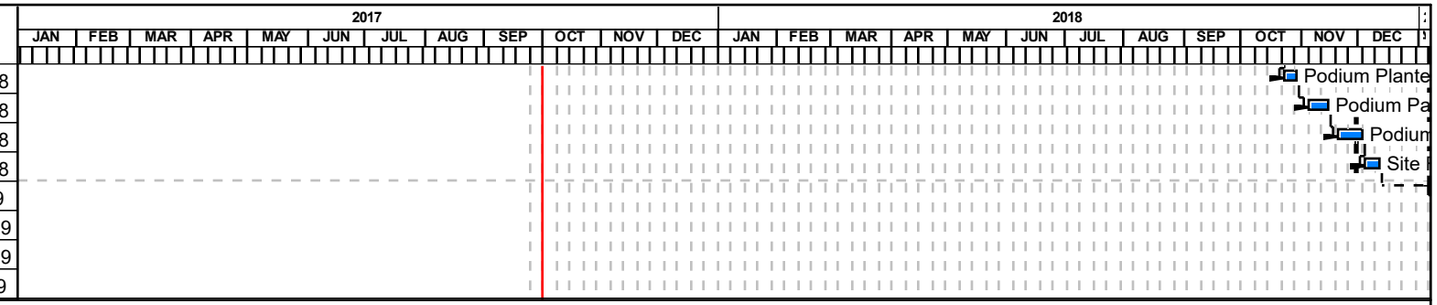
JS Builders, LLC
Moran Uptown
Exhibit A
Draft 1

Early bar
Progress bar
Critical bar
Summary bar
Start milestone point
Finish milestone point

BUILDERS LLC

Act ID	Description	Orig Dur	Early Start	Early Finish
1775	Podium Planter Walls	6	23OCT18	30OCT18
1780	Podium Pavers	8	05NOV18	16NOV18
1790	Podium Landscape & Planting	8	20NOV18	03DEC18
1795	Site Furnishings	5	04DEC18	13DEC18
1800	State Elevator Inspection	2	29JAN19	30JAN19
1810	Equipment Start-Ups	5	13MAR19	19MAR19
1820	Final Inspections	5	20MAR19	26MAR19
1830	Building Complete	0		08APR19



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Moran Uptown
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