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DUSTTRAK™ II AEROSOL MONITOR MODEL 8530/8530EP/8532

OPERATION AND SERVICE MANUAL

P/N 6001893, REVISION S JANUARY 2019



DustTrak II 8530 Desktop and 8532 Handheld



DustTrak II 8530EP Monitor



REGISTERING TODA

Thank you for your TSI instrument purchase. Occasionally, TSI releases information on software updates, product enhancements and new products. By registering your instrument. TSI will be able to send this important information to you.

http://register.tsi.com

As part of the registration process, you will be asked for your comments on TSI products and services. TSI's customer feedback program gives customers like you a way to tell us how we are doing.



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Limitation of Warranty and Liability (effective April 2014)

(For country-specific terms and conditions outside of the USA, please visit www.tsi.com.)

Seller warrants the goods, excluding software sold hereunder, under normal use and service as described in the operator's manual, shall be free from defects in workmanship and material for twenty-four (24) months, or if less, the length of time specified in the operator's manual, from the date of shipment to the customer. This warranty period is inclusive of any statutory warranty. This limited warranty is subject to the following exclusions and exceptions:

- Hot-wire or hot-film sensors used with research anemometers, and certain other components when indicated in specifications, are warranted for 90 days from the date of shipment;
- b. DustTrak internal pump for Models 8530 and 8533 is warranted for two (2) years or 4000 hours, whichever comes first;
- c. DustTrak external pump for Models 8530EP and 8533EP is warranted for two (2) years or 8760 hours, whichever comes first:
- DustTrak internal pump for Models 8530 and 8533 is warranted for operation within ambient temperatures between 5–45°C. Warranty is void when the internal pump is operating outside of this temperature range;
- e. Parts repaired or replaced as a result of repair services are warranted to be free from defects in workmanship and material, under normal use, for 90 days from the date of shipment:
- Seller does not provide any warranty on finished goods manufactured by others or on any fuses, batteries or other consumable materials. Only the original manufacturer's warranty applies;
- g. This warranty does not cover calibration requirements, and seller warrants only that the instrument or product is properly calibrated at the time of its manufacture. Instruments returned for calibration are not covered by this warranty;
- h. This warranty is **VOID** if the instrument is opened by anyone other than a factory authorized service center with the one exception where requirements set forth in the manual allow an operator to replace consumables or perform recommended cleaning:
- i. This warranty is VOID if the product has been misused, neglected, subjected to accidental or intentional damage, or is not properly installed, maintained, or cleaned according to the requirements of the manual. Unless specifically authorized in a separate writing by Seller, Seller makes no warranty with respect to, and shall have no liability in connection with, goods which are incorporated into other products or equipment, or which are modified by any person other than Seller.

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Buyer and all users are deemed to have accepted this LIMITATION OF WARRANTY AND LIABILITY, which contains the complete and exclusive limited warranty of Seller. This LIMITATION OF WARRANTY AND LIABILITY may not be amended, modified or its terms waived, except by writing signed by an Officer of Seller.

Service Policy

Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI's Customer Service department at (800) 680-1220 (USA) or (001 651) 490-2860 (International) or visit www.tsi.com.

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These Application Notes can also be found on TSI's web site: http://www.tsi.com

EXPMN-001 DustTrak II Theory of Operation.pdf EXPMN-003 DustTrak II Impactor.pdf

Safety Information

IMPORTANT

There are no user serviceable parts inside the instrument. Refer all repair and maintenance to a qualified factory-authorized technician. All maintenance and repair information in this manual is included for use by a qualified factory-authorized technician.

Laser Safety

- The Model 8530/8532 DustTrak II monitor is a Class I laser-based instrument.
- During normal operation, you will not be exposed to laser radiation.
- Precaution should be taken to avoid exposure to hazardous radiation in the form of intense, focused, visible light.
- Exposure to this light may cause blindness.

Take these precautions:

- DO NOT remove any parts from the DustTrak II monitor unless you are specifically told to do so in this manual
- DO NOT remove the housing or covers. There are no serviceable components inside the housing.



WARNING

The use of controls, adjustments, or procedures other than those specified in this manual may result in exposure to hazardous optical radiation.



WARNING

There are no user-serviceable parts inside this instrument. The instrument should only be opened by TSI or a TSI approved service technician.



WARNING

If the DustTrak monitor is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

When operated according to the manufacturer's instruction, this device is a Class I laser product as defined by U.S. Department of Health and Human Services standards under the Radiation Control for Health and Safety Act of 1968. A certification and identification label like the one shown below is affixed to each instrument.

Labels

Advisory labels and identification labels are attached to the instrument.

Serial Number Label (bottom)	DUSTTRAK TH II — Model 8530 SN 8530105101 MFD DECEMBER 2010 CLASS I LASER PRODUCT COMPLIES WITH 21 CFR 1040.10 AND 1040.11 TSI Inc. 500 Cardigan Road Shorzelew, MN 55126 U.S.A. www.tsi.com
2. Laser Radiation Label (internal)	DANGER! VISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM WARNING: NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL
3. Battery label	!!WARNING!! THIS INSTRUMENT WAS DESIGNED TO USE ONLY TSI SUPPLIED BATTERIES, PN 801680 or !!WARNING!! THIS INSTRUMENT WAS DESIGNED TO USE ONLY TSI SUPPLIED BATTERY, PN 801681
4. European symbol for non-disposable item. Item must be recycled.	X

Description of Caution/Warning Symbols

Appropriate caution/warning statements are used throughout the manual and on the instrument that require you to take cautionary measures when working with the instrument.

Caution



Caution

Failure to follow the procedures prescribed in this manual might result in irreparable equipment damage. Important information about the operation and maintenance of this instrument is included in this manual.

Warning



WARNING

Warning means that unsafe use of the instrument could result in serious injury to you or cause damage to the instrument. Follow the procedures prescribed.

Caution and Warning Symbols

The following symbols may accompany cautions and warnings to indicate the nature and consequences of hazards:



Warns that the instrument contains a laser and that important information about its safe operation and maintenance is included in the manual.



Warns that the instrument is susceptible to electro-static discharge (ESD) and ESD protection should be followed to avoid damage.



Indicates the connector is connected to earth ground and cabinet ground.

Reusing and Recycling



As part of TSI Incorporated's effort to have a minimal negative impact on the communities in which its products are manufactured and used:

- Do **not** dispose of used batteries in the trash. Follow local environmental requirements for battery recycling.
- If instrument becomes obsolete, return to TSI for disassembly and recycling.

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Chapter 1

Unpacking and Parts Identification

Carefully unpack the Model 8530/8532 DustTrak™ II Aerosol Monitor from the shipping container. Use the tables and illustrations below to make certain that there are no missing components. Contact TSI immediately if anything is missing or damaged.

Note

If you purchased a DustTrak II Model 8530-NA (no accessories) Aerosol Monitor, it only comes with the following items:

- DustTrak II Model 8530 Aerosol Monitor
- Operations manual
- TrakPro™ Data Analysis Software CD
- One-year calibration certificate
- Service paperwork
- 2-year warranty

All accessories for the DustTrak II Model 8530 Aerosol Monitor are sold separately. Contact TSI at (800) 680-1220 for information on accessories and how to purchase them through a TSI sales representative.

(continued on next page)

Unpacking the DustTrak II Aerosol Monitor

Compare all the components you received with those listed in the table below. If any parts are missing, contact TSI.

Item	Qty	Part Number	Description
or	1	8530	Desktop II
		8532	Handheld II
TE.	1	801670	Desktop II Carrying Case
		801669	Handheld II Carrying Case
	1.	1090014	Data Analysis Software CD-ROM
	1	800663	Zero Filter

Item	Qty	Part Number	Description
OF:	1	801680	7800 mAH Lithium Ion Rechargeable Battery (Desktop)
or		801681	Rechargeable lithium ion battery (Handheld)
	1	1303740	USB cable
	1	801652	Analog/alarm output cable (Desktop models only)
MODEL BOOKS SCEN PSSS	1	6001893	Operation and Service Manual
Properties long Research Statistics has finance. The statistics of the statistics o	1	N/A	Calibration Certificate

Item	Qty	Part Number	Description
	1	801688	Conductive Tubing
	1	801668	Filter removal tool (Spanner Driver)
	4	801673	Spare Internal Filter Elements Desktop Model Only
	2		37-mm filter includes: Filter body top Filter body bottom Mesh screen
	1		Comes with 37-mm cartridge opening tool
	8	801666	Spare Internal Filters Handheld Model Only
	1	801667	Impactor Kit
		PM _{2.5} assembled Top Bottom Impaction Plate PM _{1.0} Top PM _{4.0} Top PM ₁₀ Top Extra Impaction Plat	
	1	801691	Dorr-Oliver Cyclone

Item	Qty	Part Number	Description
	1	801684	Power Supply – Desktop
		801694	Power Supply – Handheld
	2	N/A	Stylus
		When shipped, one stylus will be in the accessory bag, the second stylus attached to instrument.	
TSI incorporated wave ball control	1	3012094	Screwdriver, dual ended. (For Handheld Models only)
	1	801674	Impactor Oil
•	2	801698	Inlet cap
	When shipped, one inle be in the accessory ba second inlet attached to instrument.		essory bag, the
	1	801675	External Pump Kit for 8530EP only

Item	Qty	Part Number	Description
		801797	External Pump Power Cable (to DustTrak monitor) for 8530EP only
		801798	External Pump Flow Tube (to DustTrak monitor) for 8530EP only
	1	-	Exhaust Adapter, DustTrak monitor for 8530EP only

Optional Accessories

The following photos and table list optional accessories. If you ordered optional accessories, make certain they have been received and are in working order.

Accessories	Qty	Part Number	Description
	F 1	801675	External Pump Kit
	2	801795	DustTrak II/DRX External Pump Service Kit for 8530EP only. Contains two filters for External Pump
ic.	1	801685	Battery Charger, 2-Bay, Battery 801680 for Desktop DustTrak monitor
	1	801686	Battery Charger, Battery 801681 for Handheld DustTrak monitor

Parts Identification for the DustTrak II Desktop Aerosol Monitor Models 8530

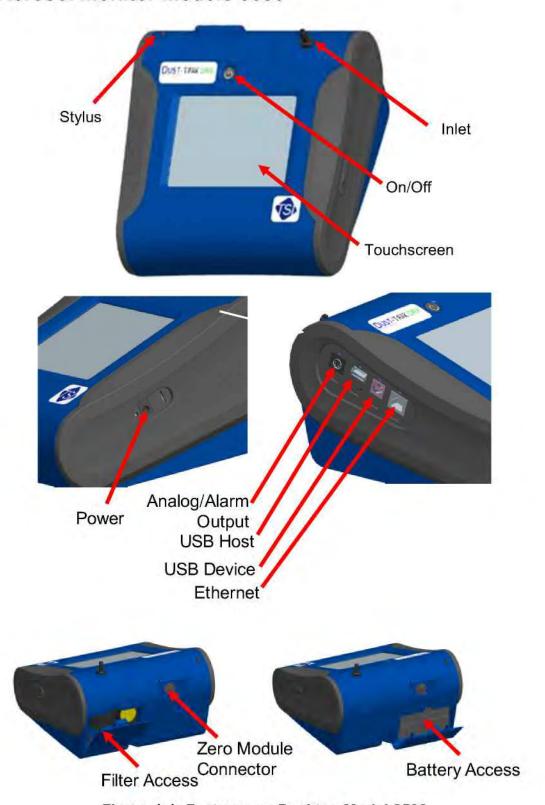
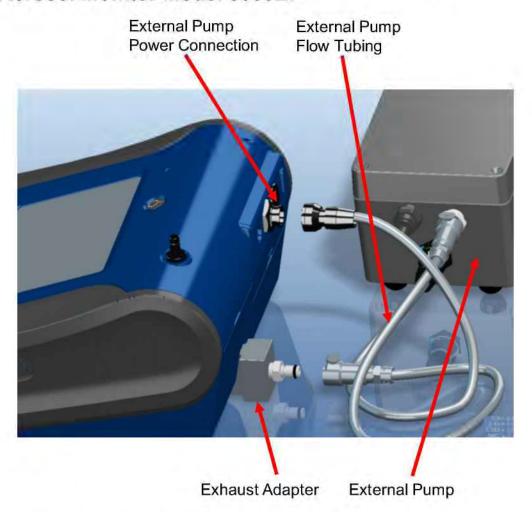


Figure 1-1: Features on Desktop Model 8530

Parts Identification for the DustTrak II Desktop Aerosol Monitor Model 8530EP



External Pump Module (8530EP only)

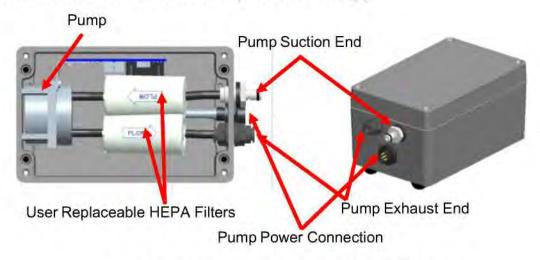


Figure 1-2: Features on Desktop Model 8530EP

Parts Identification for the DustTrak II Handheld Aerosol Monitor Model 8532

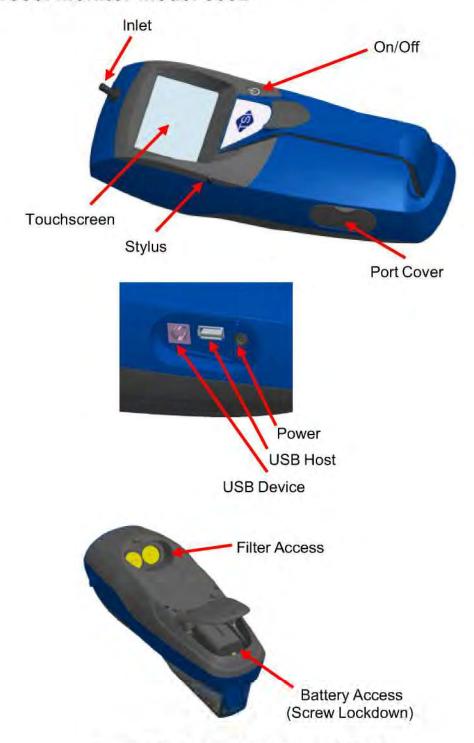


Figure 1-3: Features on Handheld Model

Setting Up

Supplying Power to the DustTrak II Aerosol Monitor

The DustTrak II Aerosol Monitor must be powered by either batteries or using the external AC adapter.



WARNING

The instrument has been design to be used with batteries supplied by TSI. **DO NOT** use a substitute.

Disposing of old batteries must be recycled in accordance with the local environmental regulations.



WARNING

DO NOT use non-rechargeable batteries in this instrument. Fire, explosions, or other hazards may result.

Installing the Batteries in Model 8530/8530EP Desktop

Remove the battery cover and slide one or two batteries into the battery slots. A single battery can be put into either slot. Orient the batteries with the label side facing up (see Figure 2-1).



Figure 2-1: Batteries into Desktop Unit

Installing the Batteries in Model 8532 Handheld

Remove the battery cover by loosening captured screw on the bottom of the unit. Orient battery with brass connectors facing forward. Insert battery into cavity and slide forward to engage into pins. Replace the battery cover and secure by tightening screw (see Figure 2-2).



Figure 2-2: Batteries into Handheld Unit

Connecting the External Pump to DustTrak Model 8530EP

The Model 8530EP is a Desktop DustTrak monitor with an external pump. This DustTrak has no internal pump and will not work with any other external pump other than the one provided by TSI (P/N 801675). The Model 8530EP is intended for applications where the DustTrak is operated continuously over extended periods (several days to months) under wide temperature fluctuations (0 to 50°C). The external pump is designed to be more robust for 24/7 operation of the DustTrak monitor and is warranted to operate continuously for one full year or 8760 hours. The Model 8530EP is ideal for fugitive dust monitoring.

The pump and the DustTrak monitor come separately and require assembly. Follow the steps below to connect the pump with the Model 8530EP DustTrak monitor.



WARNING

Turn the DustTrak monitor OFF before connecting the external pump. Turn the DustTrak monitor ON only after connecting the External Module.

 Connect the pump end of the quick connect to the pump module (see Figure 2-3).



Figure 2-3: Connect Pump End of Quick Connect to Pump Module

 Likewise, plug one end of the power connector to the pump module as shown above. Turn the power connector until it clicks and locks in place. This prevents the connector from disconnecting due to vibration or movement.



 Connect the exhaust adapter to the exhaust of the DustTrak monitor (see Figure 2-4).

Figure 2-4: Connect Exhaust
Adapter to Exhaust of
DustTrak Monitor

- 4. Connect the other end of the flow tubing to the exhaust adapter of the DustTrak monitor.
- Connect the other end of the power connector to the DustTrak monitor (see Figure 2-5).



Figure 2-5: Connect Power Connector to DustTrak Monitor

Setting Up 13



WARNING

The Pump module design does not allow for installation outdoors without any protection from the elements. Always operate it within an enclosure.

The DustTrak external pump module does not require an A/C adapter. It is always powered off the DustTrak monitor.

Notes

- The power connector and the flow quick connect "click" when securely connected. The power connector must be rotated clockwise past the locking pin.
- Do not hot-plug the External Pump Module when the DustTrak monitor is turned ON. Always connect the External Pump module first and then turn the DustTrak monitor ON.
- 3. TSI recommends that the DustTrak monitor with the external pump be operated in the Model 8535 Environmental Enclosure.
- 4. TSI recommends that the pump module be operated when mounted on its feet and avoid operating at other orientations as much as possible.
- 5. Pump module and the DustTrak monitor should be at the same electrical potential.
- 6. The additional port on the external pump module is where the pump exhausts the flow. For applications where the DustTrak monitor is sampling from a chamber or a duct at pressures significantly different from the ambient, TSI recommends plumbing the exhaust of the external pump back in to the chamber/duct.

Using the AC Adapter to Run Instrument

The AC adapter allows you to power the DustTrak monitor from an AC wall outlet. When using the AC adapter, the batteries (if installed) are bypassed.

Battery Charging

This instrument will charge the Lithium Ion battery packs. Insert the batteries into the battery compartment, plug the instrument into AC power, and turn the instrument on. Batteries will charge only when the instrument is on and in stand-by mode. Batteries will not charge if the instrument is turned off or is actively taken measurements. Charging will stop when the batteries are fully charged.



WARNING

When Charging Battery the ambient temp **MUST NOT** exceed 42°C.

Inlet Cap

When using the DustTrak monitor to sample environmental air, the inlet cap should be put over the instrument. This cap will keep large objects from dropping into and plugging the inlet. The cap will also keep direct light from shinning into the chamber and skewing the results.

The inlet cap can simply be pressed onto the instruments inlet.



Figure 2-6: Putting on Inlet Cap

Size-Selective Impactors

Size-selective impactors can be attached to the inlet of the DustTrak II instruments. Size-selective impactors can be used to pre-condition the size range of the particles entering the instrument. PM₁, PM_{2.5}, PM₄ (Respirable) and PM₁₀ impactors are available. The instrument must run at the factory default setting of 3.0 L/min for the impactors to achieve the correct cut points.

The size-selective impactor is composed of three parts; the cap, impaction plate and bottom. Selection of the cap will determine cut size of the impactor. Each cap is labeled with the particle cut size (1 µm, 2.5 µm, 4.0 µm or 10 µm). The same impaction plate and bottom are used on all impactor sizes.

The impactor assembly is attached to the instrument in place of the inlet cap. The inlet cap does not need to be used if an impactor is being used. See Chapter 4, "Maintenance," for instructions on how to add oil to the impaction plate.



Figure 2-7: Size-Selective Impactor

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Dorr-Oliver Cyclone

A Dorr-Oliver cyclone is shipped with the instrument. The Dorr-Oliver cyclone removes particles over 4.0 µm in size. The Dorr-Oliver cyclone is attached to the instrument by sliding the cyclone clip over the protruding catch. The tube from the Dorr-Oliver cyclone needs to be routed to the inlet of the instrument.





Figure 2-8: Installing Door-Oliver Cyclone

Do not use Inlet attachments (impactors or inlet cap) when using the Dorr-Oliver Cyclone. The instrument flow rate must be changed to 1.7 L/min when using the Dorr-Oliver Cyclone in order to achieve a 4 µm (respirable) cut-point. See the Flow Cal instructions in the Operations chapter for instructions on how to change the instruments flow rate.

Instrument Setup

The DustTrak II monitor can be connected to a computer to download data and upload sampling programs.

Connecting to the Computer

Connect the USB host port of a Microsoft Windows®-based computer to the USB device port on the side of the DustTrak monitor.

Installing TrakPro™ Data Analysis Software

TrakPro software can preprogram the DustTrak monitor, download data, view and create raw data and statistical reports, create graphs, and combine graphs with data from other TSI instruments that use TrakPro software. The following sections describe how to install the software and set up the computer.

Note

To use TrakPro software with the DustTrak Aerosol Monitor, the PC must be running Microsoft Windows® and the computer must have an available Universal Serial Bus (USB) port.

[®]Windows is a registered trademark of Microsoft Corporation.

[®]Microsoft and Windows are registered trademarks of Microsoft Corporation.

1. Insert the TrakPro Data Analysis Software CD into the CD-ROM drive. The install screen starts automatically.

Note

If the software does not start automatically after a few minutes, manually run the program listed on the label of the CD using the **Run** command on the Windows Start Menu.

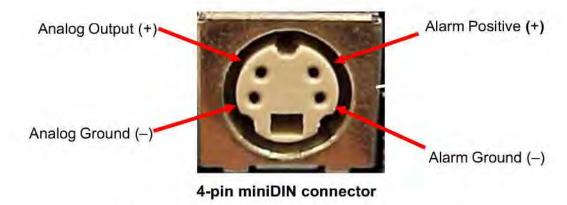
Follow the directions to install TrakPro software.

TrakPro software contains a comprehensive installation guide. TSI recommends printing out this guide prior to starting the TrakPro software installation on your computer, so it may be consulted during the installation. The TrakPro Software manual is located in the "Help" file in TrakPro software. There is no separately printed TrakPro Data Analysis software manual.

Connecting Analog/Alarm Output

The Analog/Alarm Output Cable plugs into the alarm connection on the side of the instrument. This feature is on the desktop model 8530 only.

The cable contains a 4-pin, mini-DIN connector. The pin-outs for the connector and the wiring for the cable are shown below.



Cable Wiring Diagram		
Brown Wire	Analog Ground	
Orange Wire	Analog Out	
Red Wire	Alarm (+)	
White Wire	Alarm (-)	
Black Wire	Shield	

Figure 2-9: Cable Wiring Diagram

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Wiring the Analog Output

System specifications:

- Output voltage: 0 to 5 VDC. With a maximum output of 15 mA.
- Output Current 4 mA to 20 mA with a maximum load impendence of 250 ohms.
- Correct polarity must be observed (see pin-outs above).

The output cable supplied by TSI (P/N 801652) is labeled with the pin-out wiring diagram. Additional equipment may be needed for making connections to the system that TSI does not supply. It is your responsibility to specify and supply all additional equipment.

Wiring the Alarm

System specifications:

- Maximum voltage: 15 VDC (DO NOT USE AC POWER)
- Maximum current: 1 Amp
- Correct polarity must be observed (see pin-outs above)
- The alarm switch, located inside the DustTrak monitor must be located on the ground side of the alarm system.



WARNING

The DustTrak monitor Alarm Output function **SHOULD NOT** be used to detect hazardous conditions or to provide an alarm for protecting human life, health or safety.



Caution

The alarm switch **MUST NOT** be wired to AC power! Failure to install the user alarm properly could damage the DustTrak instrument and/or void the instrument warranty! Please read and follow all instructions before wiring or operating the user alarm.



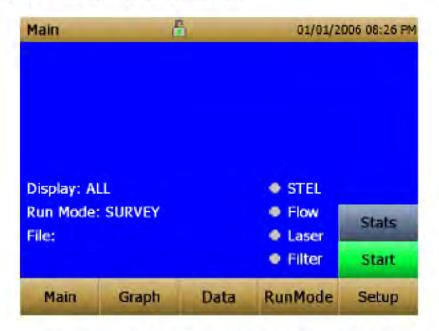
WARNING

When connected to the analog out and alarm out connector, you **MUST** use safety certified equipment and/or power sources.

Operation

Getting Started

The **START UP** screen is displayed initially when the instrument is turned on, following the initial TSI logo splash screen.



Use a stylus or fingertip, touch the "buttons" on the screen to activate different menus.

For Model DustTrak 8530EP only



WARNING

Always setup and operate the DustTrak monitor with External Pump Module with the External Pump Module connected to the DustTrak monitor. Failure to do so will result in communication errors.

Communication errors take place under four different scenarios as follows:

 When the unit is idle and is **not** connected to the External Pump Module, a warning displays on the Main screen.



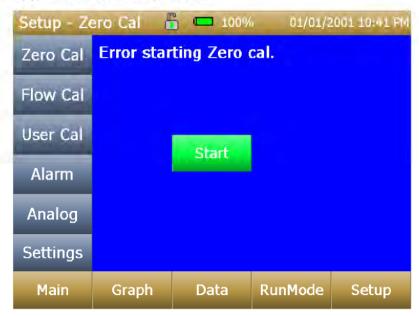
Note

"No Pump is Connected" is a sticky error. Even after the warning message, if the External Pump Module is connected to the DustTrak, the error will not disappear until the screen is refreshed. Refresh the screen by going into a different menu and returning to the Main menu.

When the unit is **not** connected to the External Pump Module and an attempt is made to start a run by selecting "Start", an error appears on the Main screen.



3. If the pump is **not** connected while attempting to perform a Zero Cal, an error appears on the Setup screen.

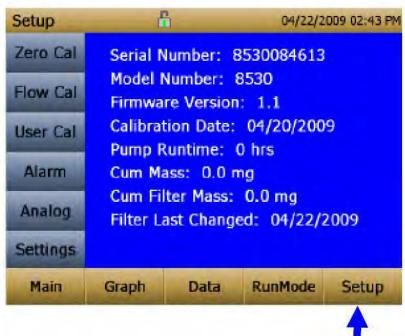


4. If the pump is **not** connected while attempting to perform a Flow Cal, an error appears on the Setup screen.



Operation 21

Setup Menu

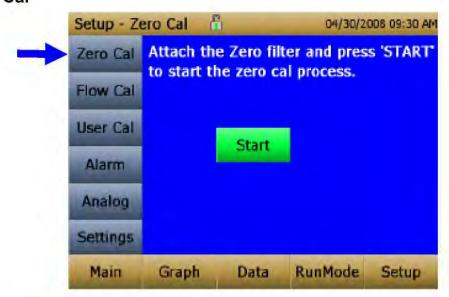


Pressing **Setup** activates the Setup Menu touchscreen buttons along the left edge of the screen. Setup is not accessible when the instrument is sampling.

The main screen of the **Setup** screen displays the following information:

Serial Number	The instruments serial number.
Model Number	The instruments model number.
Firmware Version	Instruments current version of firmware.
Calibration Date	Date of the last factory calibration.
Pump Run Time	Pump running time in hours.
Cum Mass Conc	Amount of mass run through instrument over life.
Cum Filter Conc	Amount of mass run through instrument since last filter change.
Filter Time	Date of last filter change.

Zero Cal



Run **Zero Cal** the first time the instrument is used and repeat prior to every use. Zero Cal requires that the zero filter be attached prior to running. Zero Cal must also be performed if the unit is reading negative concentrations. It is not possible for the DustTrak to read negative concentrations. Negative concentrations are a symptom of zero drift.

NEVER perform a zero cal without attaching a zero filter.

- 1. Press Zero Cal Button
- 2. Attach Zero Filter
- Press the Start button to start Zeroing process.
- 4. A count-down clock will appear indicating the time remaining. The screen with indicate "Zero Cal Complete" when done.

Remove filter after zeroing has been completed. The instrument is now zero calibrated and ready for use.

Operation 23

Flow Cal



Run **Flow Cal** to change the flow set point. The flow set point is factory set to 3 L/min total flow. 2 L/min of the total flow is measured aerosol flow. 1 L/min of total flow is split off, filtered, and used for sheath flow. There is an internal ΔP flowmeter in the DustTrak II instrument that controls flow rate to $\pm 5\%$ of the factory setpoint. TSI recommends checking the flow with an external flow reference meter, especially when collecting data. The pump will automatically start when entering the Flow Cal screen.

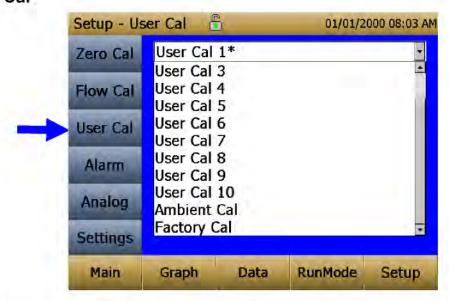
- Attach a flow calibrator (reference flow meter) to inlet port. You may use a bubble buret, mass flow meter, dry piston or rotameter as flow measurement devices.
- Move the arrows up or down to achieve desired flow rate on the reference flowmeter. Each up or down arrow will change the flow about 1%. Allow time between button presses to let pump change to the new flow rate.

Select **Save** once the desired flow rate is achieved. Select **Undo** to return to the factory set point.

Note

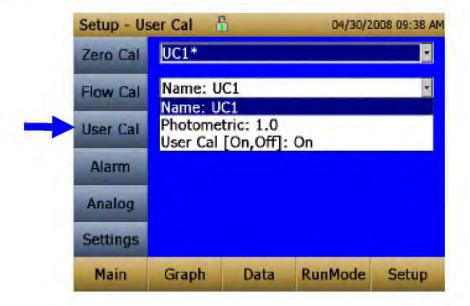
The flow rate can be adjusted from approximately 1.5 to 4.0 L/min. If needed, this feature can be used to adjust the flow rate to a value other than the factory set point, allowing for the use with the provided Dorr-Oliver Cyclone (1.7 L/min required) or 3rd party size selective inlets (cyclones or impactors) that may require a different flow rate.

User Cal



User Cal allows you to store and use 10 different calibration factors. In addition, there are two factory defaults, one is the "Ambient Cal" and the other is the "Factory Cal". The "Ambient Cal" is appropriate for outdoor ambient dust or fugitive dust monitoring. The "Factory Cal" is the calibration to ISO 12103-1, A1 Arizona test dust for which a calibration certificate is provided with the instrument. The "Factory Cal" is appropriate for most workplace aerosol monitoring. The currently active user calibration is highlighted with an asterisk "*".

Four variables can be set for each user calibration.



Operation 25

Name	User can rename calibration to a description name.
Photometric	Changes the factory calibration of particle signal, based on Arizona Road Dust, to actual aerosol being measured. See below for sets to set this calibration.
User Cal [on,off]	Selecting On will activate current user calibration and deactivate the previously selected user calibration.

Taking a Gravimetric Sample Using the DustTrak Monitor

When sampling with the DustTrak monitor, you can simultaneously take a gravimetric sample either for custom calibration of the DustTrak monitor or for collecting the sample on to the gravimetric filter downstream of the DustTrak monitor without a need for additional gravimetric sampling pump and filter assembly. To accomplish this, follow the instructions given below:

- Setup the DustTrak monitor to sample how long you want the sample run time to be. The following example shows a sample for 8 hours.
- Under RunMode menu, put the instrument in Manual Log (Manual Logging is reviewed later in this section), which will enable you to start and stop the pump at any time you choose.
- 3. Set the logging interval. One minute (i.e., "01:00") is a good choice.
- 4. Make sure you have a preweighed 37-mm gravimetric filter cassette loaded into the DustTrak monitor. See Chapter 4, "Replacing the Internal Filters" on how to access the filter (see figure 4-8) and replace it.

Note Use only the conductive plastic filter cassette holder (SKC Part# 225-308).

5. Under the Setup Menu, make sure the DustTrak monitor is set to the desired flow rate. For DustTrak II Model 8530, the flow can be varied from 1.7 to 4 L/min for use with various inlet conditioners. For DustTrak DRX Model 8533, the flow cannot be changed. The flows for DustTrak II monitor can be changed by changing the default flow calibration setpoint from 1.0 to any value between 0.5 to 1.5 in the span adjustment. An external flowmeter is needed to measure the total flow. Flow can be changed by clicking on the UP or DOWN arrow keys shown below:



- 6. Conduct a preflow calibration on the DustTrak monitor using the same kind of sample media you will sample with. Now, attach the sample media you intend to sample with and start sampling aerosol for the desired time. After the desired run time, stop the sampling. Remove the filter from the DustTrak monitor and follow your laboratory's criteria for filter post weight. Conduct a post-flow calibration with the same sample media done with the pre-flow calibration and determine if these flow calibrations are within ±5% of each other. If they are, use the following to calculate the actual flow rate for the DustTrak monitor. The laboratory will need the following information to calculate mass concentration in mg/m³:
 - Total sample time in minutes.
 - Flow rate—flow rate of the DustTrak monitor used for gravimetric analysis is only ²/₃ the total flow since ¹/₃ of the flow is used as sheath flow.
 - Total liters of air sampled = total sample time x flow rate.
- Using this information the laboratory can determine the concentration using the following formula:

$$concentration, \frac{mg}{m^3} = \frac{Filter\ Post\ Weight\ (mg) - Filter\ Pre\ Weight\ (mg)}{\frac{2}{3}*\frac{DustTrak^{TM}Monitor\ Flow\ Rate\ (\frac{L}{min})}{1000}*\ Total\ Sample\ Time\ (min)}$$

Note

The flow rate used for gravimetric analysis is only $^{2}/_{3}$ the total flow since $^{1}/_{3}$ of the flow is used as sheath flow.

 For instructions on how to calibrate the DustTrak monitor using this data, see section below on "<u>Determining the Calibration Factor for a Specific Aerosol</u>".

Photometric Calibration Factor

In most situations, the DustTrak monitor with its built-in data logging capability can provide very good information on how the concentration of an aerosol changes for different processes over time. Factory calibration to the respirable fraction of standard ISO 12103-1, A1 test dust is fairly representative of a wide variety of workplace aerosols. Because optical mass measurements are dependent upon particle size and material properties, there may be times in which a custom calibration would improve your accuracy for a specific aerosol.

Determining an aerosol specific photometric calibration requires that you determine a true mass concentration (e.g., gravimetric analysis) for the aerosol you want to measure. The true mass concentration is used to calculate the custom calibration factor for that aerosol. Once you have a custom calibration factor, you can reuse it each time you make measurements in the same aerosol environment.

Determining the Calibration Factor for a Specific Aerosol

The DustTrak II monitor is factory calibrated to the respirable fraction of standard ISO 12103-1, A1 test dust. The DustTrak monitor can be easily calibrated to any arbitrary aerosol by adjusting the custom calibration factor. The DustTrak monitor's custom calibration factor is assigned the value of 1.00 for the factory calibration to standard ISO test dust. This procedure describes how to determine the calibration factor for a specific aerosol. Using the value of 1.00 will always revert back to the factory calibration.

To determine a new calibration factor you need some way of accurately measuring the concentration of aerosol, hereafter referred to as the reference instrument. A gravimetric analysis is often the best choice, though it is limited to nonvolatile aerosols. The internal 37 mm filter cartridge, in the desktop units, can be used to collect the reference gravimetric reference sample.

To make an accurate calibration you must simultaneously measure the aerosol concentration with the DustTrak monitor and your reference instrument.

- Zero the DustTrak II monitor.
- 2. Put the instrument in Manual Log (Manual Logging is reviewed later in this section).
- 3. Set the logging interval. One minute (i.e., "01:00") is often a good choice.
- 4. Co-locate the DustTrak II monitor and the reference sampler together so that they are measuring from the same area. The 37-mm filter cartridge in the desktop unit can be used to collect the particles to be weighed for the gravimetric reference.
- 5. Start sampling aerosol with both instruments at the same time.

Note

Greater accuracy will be obtained with longer samples. The time you permit for sampling often depends on the reference instrument and characteristics of the measured aerosol. It may take some time to collect sufficient aerosol onto a filter cassette for accurate gravimetric analysis. Refer to instructions of your reference instrument for sampling times.

- 6. Stop sampling with both instruments at the same time.
- 7. Record the DustTrak monitor average concentration by viewing the sample average in the Data screen. (Data Screen is reviewed later in this chapter.)
- 8. Determine the mass concentration in mg/m³ from your reference instrument. For gravimetric sampling this means weighing the gravimetric sample.

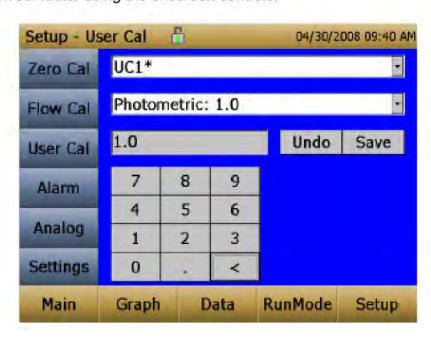
Note

If you used the internal gravimetric filter in the DustTrak Model 8530, the flow rate used to compute the concentration should be 2 L/min, not 3 L/min since only 2 L/min of aerosol flow reaches the filter.

9. Compute the new calibration constant, NewCal, using the following formula:

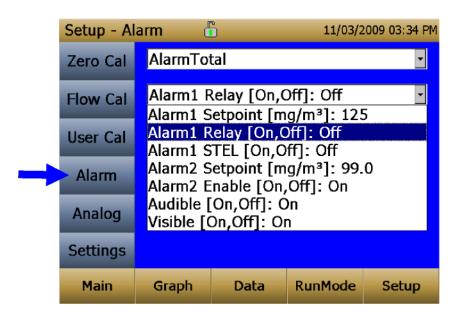
$$NewCal = \left(\frac{Reference\ Concentration}{DustTrak\ Concentration}\right) \cdot CurrentCal$$

 Select Photometric from the User Cal drop down selection and enter the NewCal factor using the onscreen controls.



Alarm

Alarm allows you to set an alarm level that will be triggered if the instrument's reading goes above the setpoint. However, the alarm functioning is determined by the logging interval. The alarm will turn ON only if the average concentration over the logging interval exceeds the set point. If the logging interval is too long and the concentration exceeds the set point and stays at that level, the alarm will not turn ON until after the logging interval has passed. Likewise, the alarm will not stop until after the concentration has dropped below 5% of the threshold and after the logging interval has passed.



Note

The Alarm is dependent on the logging interval. For the DustTrak to alarm as soon as the Alarm Setpoint is exceeded, the logging interval must be set as low as possible (i.e., 1 second or 2 seconds). If a long test duration does not permit setting such a short logging interval, use the STEL alarm instead. The STEL is always based on 1 second concentrations and is independent of the logging interval. For more details on the STEL alarm, see section below on STEL.

In Survey mode, the alarm is dependent on the time constant.

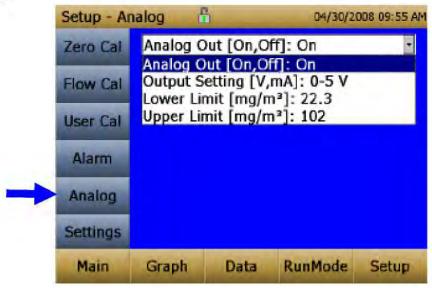
Alarm1 Setpoint [mg/m³]	The alarm1 setpoint is the mass concentration level upon which the alarm1 is triggered.
	Alarm will trigger if the mass concentration, taken at the logging interval, rises above the setpoint.
	Note
	Alarm 2 must be lower than Alarm 1 when both alarms are enabled.
Alarm1 Relay [On, Off]	When the relay alarm is turned on, unit will close relay switch when Alarm1 level is surpassed.
	Relay selection is available on the 8530 desktop model only.
Alarm1 STEL [On, Off]	When the STEL alarm is turned on, STEL data will be collected when Alarm1 level is surpassed.
	STEL selection is available on the 8530 desktop model only.
	See STEL Note below.
Alarm2 Setpoint [mg/m³]	The alarm2 setpoint is the mass concentration level upon which the alarm2 triggers.
	Alarm triggers if the mass concentration, taken at the logging interval, rises above the setpoint.
	Note
	Alarm 2 must be lower than Alarm 1 when both alarms are enabled.
Alarm2 Enable [On, Off]	Enables Alarm2 to be logged and will activate the Audible or Visible alarms if they are enabled.
Alarm Audible [On, Off]	When the audible alarm is turned on, the instrument will activate internal beeper when Alarm1 or Alarm2 level is surpassed.
Alarm1 Visible [On, Off]	When the visible alarm is turned on, unit will show the alarm icon (Alarm1 , Alarm 2) in title bar when Alarm1 or Alarm2 level is surpassed.

STEL Alarm

STEL stands for **S**hort **T**erm **E**xposure **L**imit. When a STEL alarm is selected, the instrument will inspect the data on a second by second basis, independent from the selected logging interval. If the mass exceeds the STEL limit, then a STEL event triggers and the following actions will be taken.

STEL indicator	The STEL indicator STEL will show Red on the main screen.
Data	Data will be taken of the STEL alarm channel at a 1 minute logging interval for 15 minutes .
	This data will be stored in a separate file named STEL_XXX, where XXX will be matched to the logged data file.
	The instrument will also continue to log the mass concentration data at the logging interval selected.
STEL Alarm repeat	If the instrument remains over the STEL limit after the 15 minute interval, or if the instrument exceeds the STEL limit later during the sample period, additional STEL files will be generated.

Analog



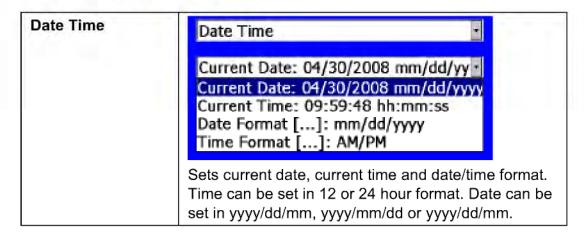
Analog setup screen sets the parameters that will drive the analog out port. Applies to the 8530 Desktop model only.

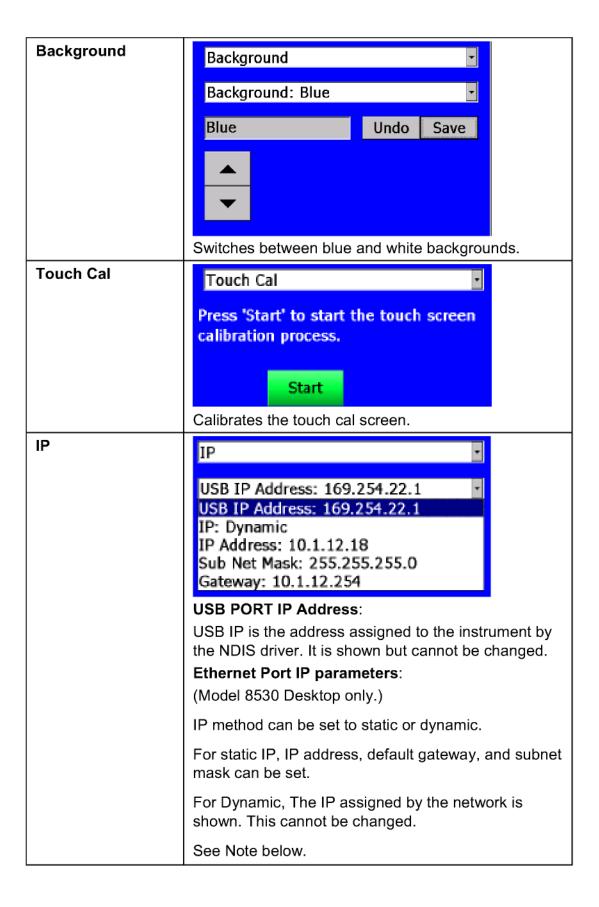
Analog out [On, Off]	Turns analog out port on.
Size Fraction	Selects the size channel that will drive the analog out.
Output Setting [V, mA]	Select between 0 to 5 V and 4 to 20 mA.
Lower Limit [mg/m³]	Mass concentration reading of the selected channel that will correspond to 0 V or 4 mA.
Upper Limit [mg/m³]	Mass concentration reading of the selected channel that will correspond to 5 V or 20 mA.

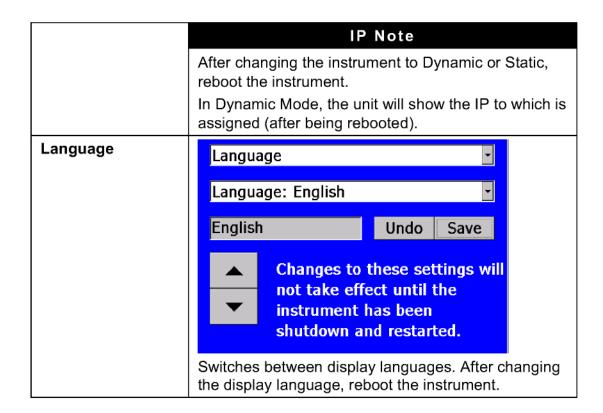
Settings



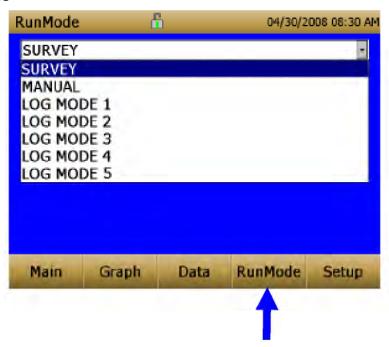
Settings screen sets basic unit parameters.







Run Mode

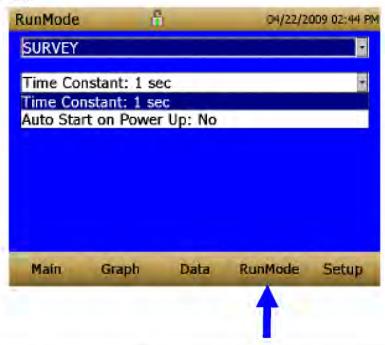


The **RunMode** tab brings up sampling mode options.

Sampling mode options include **Survey Mode**, **Manual Log**, and **Log Mode 1-5**.

Survey	Survey Mode runs a real time, continuous active sample, but does not log data.
Manual	Manual Log sets the instrument to log data for a specified run time.
Log Modes	Log Mode starts and stops the instrument at specified times, run for a specified test length, and perform multiple tests of the same length with a specified time period between tests.

Survey Mode



Time Constant	Time Constant can be set from 1 to 60 seconds. This will control the update rate of the main screen. It is the rolling average of data displayed on the main screen and is not linked to logged data in either Manual or Program Log modes.
Auto Start on Power Up	When set to "Yes", unit will start a measurement upon being powered on, if the unit was set to "Survey" when it was turned off. When set to "No", the unit will be in idle when it is powered on.

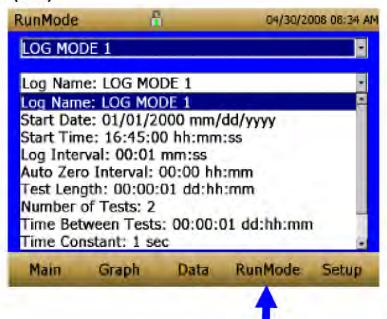
Manual Mode



Log Interval	The log interval can be set from 1 second to 60 minutes. It is the amount of time between logged data points.
Test Length	Test length can be set from 1 minute to the limit of the data storage.
Time Constant	Time Constant can be set from 1 to 60 seconds. This will control the update rate of the main screen. It is the rolling average of data displayed on the main screen and is not linked to logged data in either Manual or Program Log modes.

In Manual mode, data will be stored to a file named "Manual_XYZ" where XYZ is an incrementing integer.

Log Mode (1-5)

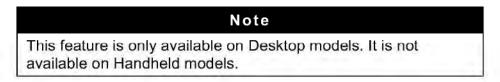


Log Name	Log Name, brings up a virtual keypad to name the Logged Data file.
Start Date	Start Date, select the date the test will start.
Start Time	Start Time, select the time the test will start.
Log Interval	The log interval can be set from 1 second to 60 minutes. It is the amount of time between logged data points.
Auto Zero Interval	Interval between re-zeroing the instrument using the Auto-Zero accessory. Model 8530 desktop only.
Test Length	From 1 minute to the limit of the data storage.
Number of Tests	Number of tests, 1 to 999.
Time between Tests	Time between tests, 1 minute to 30 days.
Time Constant	Time Constant can be set from 1 to 60 seconds. This will control the update rate of the main screen. It is the rolling average of data displayed on the main screen and is not linked to logged data in either Manual or Program Log modes.
Use Start Date	Use Start Date, option to use programmed start date or by pass programmed start date.
Use Start Time	Use Start Time, option to use programmed start time or bypass programmed start time.

In Log mode, data will be stored to a file named "LogName_XYZ" where LogName is the user entered log name and XYZ is an incrementing integer.

Locking Feature

The locking feature allows you to lock the screen at any time. This can be done during mass concentration measurements and while the instrument is idle.



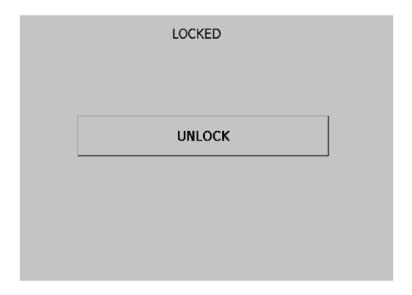
To enable this feature, touch the **Lock** button on the main screen.



Next enter the model of the instrument. For 8530EP models, 8530 should be used. After entering the model number, touch **OK**.



The screen is now locked.



To unlock, touch **UNLOCK** and re-enter the model number. For 8530EP models, 8530 should be used. After entering the model number, touch **OK**.

Note

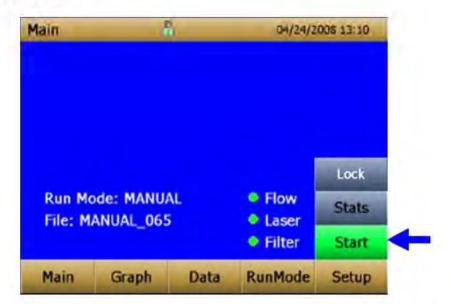
If you happen to enter the model number incorrectly and touch **OK**, you will be given another chance to enter it correctly. There is no limit to number of chances.



Taking Mass Concentration Measurements

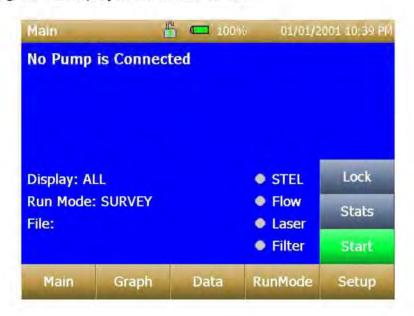
Measurements are started and controlled from the main screen.

Prior to starting a measurement the instrument should be zeroed from the **Setup** screen and the run mode should be configured and selected from the **RunMode** screen.



When the instrument is on, but not taking any mass measurements the start button will be green and instruments pump will not be running. To start taking a measurement, press the green start button.

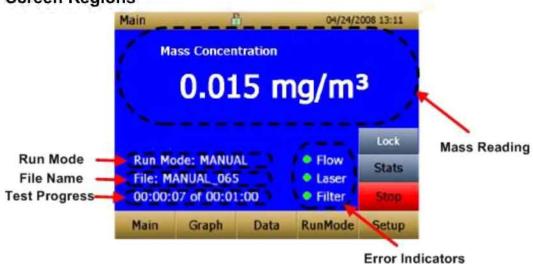
For the Model 8530EP DustTrak monitor with external pump, make sure the external pump is connected to the DustTrak monitor as described in Chapter 2. If the pump is not connected and the green start button is pressed, the DustTrak monitor will identify that the pump is not connected and a warning will be displayed as shown below:



Connect the External Pump Module to the DustTrak monitor and then try again. TSI recommends powering down the DustTrak monitor before connecting the External Pump Module to the DustTrak monitor. Connect the power cable and the flow tubing between the DustTrak monitor and the External pump module, as applicable.

While taking a measurement the screen will display the current measured mass concentration. The various regions of the screen are shown below.

Screen Regions



Mass Reading	Shows the instruments mass measurements.
Run Mode Region	Shows the run mode selected from the RunMode screen.
File Name Region	Displays the file name to which the data is currently being saved.
Test Progress Region	Shows the time-based progress of the test.
Error Indicator Region	Shows the current stats of the instrument STEL: Shows if STEL is in progress (desktop instruments only) Flow: Status of the flow control Laser: Status of the Laser Filter: Status of the Filter See Chapter 5, "Troubleshooting," to resolve any of these error conditions.

Stats

The Stats button shows the statistics of the mass measurement. When the Stats button is pressed, the main mass reading will reduce in font size, and the measurement statistics will show on the right side of the screen.



Graphing

During sampling, pressing the **Graph** button displays current readings in graphical form.

- During Survey Mode, five (5) minutes of running real-time data is displayed graphically.
- During Logging Mode, the entire log test time is displayed on the graph.

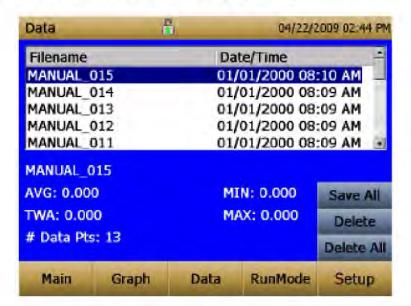


Time Display	Pressing the Time x-axis label on the graph screen switches between Time (s), Time (abs), and Time (rel)).
	Time (s): Elapsed time from first logged point (log interval) to the last logged point (test length).	
	Time (rel): Relative time from zero to last logged point (test length – log interval).	
	Time (abs): Absolute time from first logged point (test start + log interval) to last logged point (test stop).	
Scale Display	Pressing in the Scale Display area will bring up a dialog that will allow changing between auto scaling and user scaling of the Y-axis.	(ed
Data Region	Pressing the data region will bring up a dialog to show TWA or Average lines. TWA: Will show a secondary line on the graph showing the time weighted average of the data. This line will not show if test time is less than 15 minutes.	3
	Average: Show a secondary line on the graph of the running average of the data.	

In Graphing Mode, pressing **Main** returns the instrument to the Main Screen display.

Viewing Data

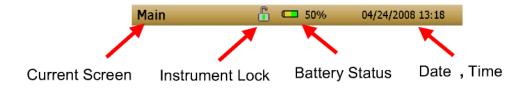
The **Data** button opens a list of data files for viewing.



Select File	Press the arrows on the right side of the screen to scroll up or down to the data file to be viewed.	
Data Statistics	Statistics on the selected file File Name Sample Average Sample TWA Sample Maximum Reading Sample Minimum Reading Number of Data Points in the File	
Save All Button	Downloads data to a USB thumb drive. The USB thumb drive must be attached to the USB host port. Data is saved as a .csv file that can be viewed in Microsoft® Excel® spreadsheet software.	
Delete Button	Deletes the currently highlighted file.	
Delete All Button	Deletes all the files stored on the instrument.	
Graph Button	Data can also be viewed in graphical form by pressing the Graph button while the data file is highlighted.	

Title Bar

The Title Bar shows common instrument information.



Current Screen	Title of the current screen that is being displayed.	
Instrument Lock	Icon shows if the instrument touchscreen is in an unlocked or locked condition.	
	Unlocked: 🛅	
	Locked:	
	To lock the touchscreen controls, touch the "lock" icon, immediately followed by three (3) quick touches on the current screen (Main) word along the top tool bar.	
	Repeat the process to unlock the screen.	
Battery Status	Show the current % life of the battery and show if the battery is currently being charged:	
	Charging: (unfilled portion of the icon is filled yellow as well as animated to indicate that the charging is in progress)	
	Not Charging: (unfilled portion of the icon transparent)	
Date and Time	Indicates the instruments current date and time.	
Alarm	If the instrument is in an alarm status, an alarm icon will appear in the title bar.	

Chapter 4

Maintenance

The DustTrak II aerosol monitor can be maintained in the field using the instructions below. Additionally, TSI recommends that you return your DustTrak II monitor to the factory for annual calibration. For a reasonable fee, we will quickly clean and calibrate the unit and return it to you in "as new" working condition, along with a Certificate of Calibration. This "annual checkup" helps ensure that the DustTrak II monitor is always in good operating condition.



WARNING

There are no user-serviceable parts inside this instrument. The instrument should only be opened by TSI or a TSI approved service technician.

Maintenance Schedule

The DustTrak II Aerosol Monitor requires maintenance on a regular basis. Table 4–1 lists the factory recommended maintenance schedule.

Some maintenance items are required each time the DustTrak monitor is used or on an annual basis. Other items are scheduled according to how much aerosol is drawn through the instrument. For example, TSI recommends cleaning the inlet sample tube after 350 hours of sampling a 1 mg/m³ concentration of aerosol. This recommendation should be pro-rated according to how the instrument is used. 350 hours at 1 mg/m³ is the same amount of aerosol as 700 hours at 0.5 mg/m³ or 175 hours at 2 mg/m³, etc.

Table 4-1. Recommended Maintenance Schedule

Item	Frequency
Perform zero check	Before each use.
Clean inlet	350 hr. at 1 mg/m ^{3*}
Clean 2.5 µm calibration impactor	Before every use.
Replace internal filters	350 hr. at 1 mg/m ^{3*} or when indicated by the main screen filter error indicator.
Return to factory for cleaning and calibration (For 8530EP, TSI recommends that both the DustTrak and the External Pump Module be returned to TSI)	Annually
Replace the internal HEPA filters in the External Pump module	Annually

^{*}Pro-rated, see discussion above.

The DustTrak monitor keeps track of the accumulated amount of aerosol drawn through it since its last cleaning. When the internal filter replacement is due, the filter error indicator will turn from green to red.

TSI recommends you perform a zero check prior to each use for the DustTrak monitor and certainly before running any extended tests, and after the instrument experiences a significant environmental change. Examples of significant environmental changes would be ambient temperature changes that exceed 15°F (8°C) or moving from locations with high aerosol concentrations to low concentrations.

Zeroing Instrument

1. Attach the zero filter to the inlet of the instrument.



Figure 4-1: Attach Zero Filter to Inlet

Follow zero calibration instructions detailed in the operations section of this manual.

Cleaning the Inlet

The inlet should be cleaned based on the schedule in Table 4-1.

- Turn the DustTrak monitor off.
- 2. Unscrew the inlet nozzle from the instrument (Figure 4-2).



Figure 4-2: Unscrew Inlet Nozzle

 Clean the inlet port. Use a cotton swab to clean the outside of the inlet port. You may dampen the swabs with water or a light solvent (e.g., isopropanol). Clean the inside of the sample tube by using a small brush, along with a light solvent. Dry the tube by blowing it out with compressed air, or let it air-dry thoroughly.

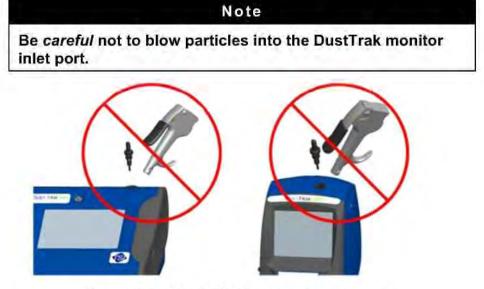


Figure 4-3: Do NOT Blow into Instrument

4. Screw (hand-tighten) inlet back into instrument.

Cleaning and Oiling Impactors

The calibration impactor should be cleaned prior to every use, using it to perform a Standard Calibration (size correction) on the instrument, as described in the Operations section.

- Unscrew Impactor. Check O-ring on the impactor base.
- Clean outside and inside of Impactor and the impactor plate using a clean brush and a light solvent. Dry impactor parts by blowing it out with compressed air, or let it air-dry thoroughly.
- Apply 2 drops of oil (included) to the impactor plate. **DO NOT** overfill impaction plate.
- 4. Screw (hand-tighten) impactor back together.



Figure 4-4: Apply 2 Drops of Oil to Impactor Plate

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Replacing the Internal Filters

Replace the internal filters based on the schedule in Table 4–1 or when the filter indicator on the main screen changes to red.

- Turn the instrument off.
- Remove old filters from the instrument.

Handheld Model

- Use the enclosed filter removal tool (PN 801668) tool to unscrew the two filter caps located on the bottom of the instrument.
- Pull the old filters out of the two filter wells. If filter wells are visibly dirty, blow out with compressed air.



Figure 4-5: Pull Filters Out of Two Filter Wells (Handheld Model)

 Put two (2) new filters (P/N 801666) into the filter wells and screw filter caps back into place.

Note

Replacement filters were shipped with the new instrument. Order additional filters from TSI under PN 801666.

Desktop Model

- a. Open filter access door on the back of the instrument.
- b. Use the enclosed filter removal tool (PN 801668) to unscrew filter cap.

 Pull out single cylindrical filter from filter well. If filter well is visibly dirty, blow out with compressed air.



Figure 4-6: Pull out Single Cylindrical Filter from Filter Well (Desktop Model)

- d. Put new filer (P/N 801673) back into filter well and screw filter cap back into place.
- e. Open blue retention clip by pinching ends inward and pushing down.



Figure 4-7: Open Blue Retention Clip

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f. Remove 37-mm filter cassette by pulling downward and outward.



Figure 4-8: Remove 37-mm Filter Cassette

g. Open filter cassette using enclosed tool PN 7001303.



Figure 4-9: Open Filter using Enclosed Tool

- Remove screen mesh from filter cassette and blow out using compressed air. Blow in reverse direction to remove captured particulate.
- Replace mesh in filter cassette and press halves together. Make sure filter has been fully closed. The filter tool PN 7001303 can be used to ensure the filter is fully closed.



Figure 4-10: Replace Mesh in Filter Holder

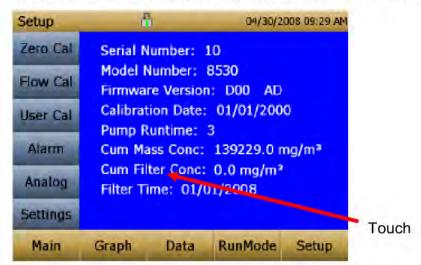
Place filter cassette back into position and close blue retaining clip.
 Make sure retaining clip snaps back into place.

Notes

Replacement filters (HEPA and 37-mm Filter Cassette with mesh filter) were shipped with the new instrument. Order additional filters from TSI under PN 801673.

TSI **does not** supply any filter media for the filter cassette. Any commercially available 37-mm filter media may be used with the DustTrak II or DRX desktop instruments to collect gravimetric reference samples.

- It is important to reset the instruments filter counter after replacing filters. Resetting the counter will clear the filter error condition shown on the main screen. Reset the counters by the following:
 - a. Turn on the instrument.
 - b. Press the **Setup** button to go into the setup screen.
 - c. Touch the **Cum Filter Conc**: (live key) to reset the aerosol mass.



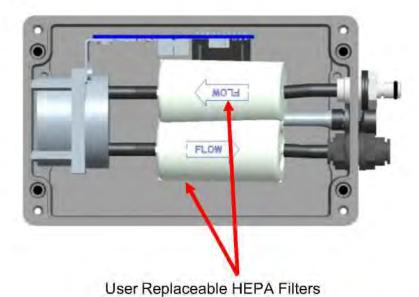
- d. Replace user serviceable filters? Dialog will appear. Press OK.
- e. Reset filter concentration? Dialog will appear. Press **Yes** to reset the cumulative filter concentration to zero.
- f. The Setup screen will now show zero for the Cum Filter Concentration and the current date for the Filter Time.

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Replacing the Filters in the External Pump Module

The external pump module provided with Model 8530EP is designed to run continuously for about a year (8760 hours). There are two HEPA filters that protect the pump from contamination—one on the suction side of the pump and the other on the discharge side of the pump. The discharge side of the pump collects particles shedding from the vanes of the pump and will turn black over time. The HEPA filters will have to be replaced once a year.

To access the filters open the top cover of the pump module. The two HEPA filters are identified in the figure below. The two filters can be replaced by disconnecting the soft tubing between the filters, pump, and the casing connectors.





Caution

When replacing the HEPA filters, make sure they are oriented in the correction direction as shown in the picture above.

Storage Precautions

When storing the DustTrak monitor for more than 30 days, you should charge and remove the batteries. This prevents damage due to battery leakage.

This instrument must be stored in a location where the temperature remains between –20 and 60°C (–4 and 140°F).

Chapter 5

Troubleshooting

The table below lists the symptoms, possible causes, and recommended solutions for common problems encountered with the DustTrak II monitor.

Symptom	Possible Cause	Corrective Action
Erratic zero reading.	Leak	Check connections for leaks Replace zero filter
	Dirty inlet port and/or sample tube	Clean inlet port. Clean or replace tubing
	Internal filter(s) not installed properly (leaking)	Inspect internal filter wells to make certain the filters and O-rings are seated properly. Replace internal filters if necessary
DustTrak	Zero Drift	Perform Zero Cal
reading negative concentrations	Zero Cal was performed without the Zero Filter in-line	Perform Zero Cal again and make sure the Zero Filter is attached to the DustTrak inlet
Error completing Zero Cal	Too much light scatter in the optics chamber due to dust deposits	Clean the inlet nozzle. Attach the zero filter and sample for about 2 minutes. During sampling, pulse the flow going into the DustTrak monitor by intermittently plugging the zero filter. Any dust in the optics chamber will break loose during flow pulsations and will be cleared out by the pump Perform Zero Cal again. If the Zero Cal still cannot be performed, factory service may be required
Run Mode Error: The start time has passed	The selected Run Mode program has "Use Start Date" selected, but the start date is prior to the current date	Correct or change the run mode program

Symptom	Possible Cause	Corrective Action
Run Mode Error: The selected log mode will exceed the allowed number of samples	The selected Run Mode program is programmed to save more samples then is room in memory	Reduce the number of samples by reducing the test length or increasing the logging interval
Instrument runs slow	Large amount of data in memory	Large data files or many small data files will cause instrument to slow, due to need to read and display large amounts of data
No display	Unit not switched on	Switch unit on
	Low or dead batteries	Recharge the batteries or plug in the AC adapter
No touch - screen response	Instrument currently busy	The instrument will take time to open large data files and save configuration information. During this time, the instrument will not respond to additional touchscreen touches
	Instrument Touchscreen is locked	If the lock in the title bar is red, unlock the instrument following the instructions in the Chapter 3, Operation: Title Bar section of this manual
Analog output does not work	Cable/connector not correctly installed	Make sure cable connector is fully seated
	Output wired with reverse polarity	Make sure analog out (+) and analog ground (-) are wired correctly to data-logger
Analog output is not in proportion to display	Analog output range in DustTrak monitor may be set incorrectly	Check analog output setting in the Setup->Analog screen. Make sure the channel of interest is selected. Make sure that the correct output (0 to 5V, 4 to 20 mA) is selected
	Data logger scaling factor may be set incorrectly	Review the scaling factor set in the Setup-Analog screen
Alarm output does not work	Alarm function not turned on	Turn the alarm function on in the Settings->Alarm screen

Symptom	Possible Cause	Corrective Action
Alarm does not turn on correctly	Alarm setting incorrect	Check the alarm settings in the Settings->Alarm screen
		Make sure the logging interval and time constant are set as short as possible (30 seconds or lower)
	Alarm output wired with reverse polarity	Alarm wires are polarized. Voltage input must be wired to alarm input (+)
Instrument	Memory is full	Delete or transfer historic data
does not store new data	Instrument is in Survey mode	The instrument does not store data in survey mode. Can to manual or program log mode
Flow Error is indicated on front screen	If sampling from a duct, instrument may have problems overcoming pressure differences	Attach both the input and the exhaust port into the duct
	Flow obstruction	Remove obstruction if still present. Press any key to bypass
	Internal pump failing, indicated by inability to adjust flow rate to full range	Factory service may be required
	Filter Cassette clogged or has mass loading	Replace the filter cassette. See the maintenance section of the manual

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Symptom	Possible Cause	Corrective Action
Flow Error is indicated on front screen	External pump module (for Model 8530EP only) is not connected to the DustTrak monitor	Make sure both the External Pump cable and the flow tubing connector are connected to the DustTrak monitor and the External pump module. Lock the External Pump Cable in place by rotating the connector clockwise until you hear it snap in place Make sure the tubing between the DustTrak monitor and the External pump module is not kinked and is free of any sharp bends Make sure the exhaust adapter is connected to the exhaust of the DustTrak monitor Make sure the External Pump module filters are not clogged. If found dirty, replace the two HEPA filters
Laser Error indicated on front screen	Laser background is too high	Remove and clean inlet nozzle. Pay close attention to the tip of the nozzle that is inserted into the instrument to ensure it is clear of any contamination
	Laser is failing	Factory service may be required
Filter Error indicated on front screen	Filters need to be replaced	Replaced the filters per instructions in the maintenance section of this manual. Make sure to reset the filter mass and date once the filters have been changed Note This is only a warning. The unit will continue to operate normally until the increase in
		pressure drop across the filter is so high that the pump can no longer maintain the set flow rate.

Symptom	Possible Cause	Corrective Action
System Error has Occurred!	The processor did not receive the input it expected. This can also happen if the optics chamber is saturated with light, or the External Pump Cable is accidentally disconnected during the middle of sampling	Reboot the instrument. If the error does not go away, factory service is required

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Appendix A

Specifications

Specifications are subject to change without notice.

Sensor Type	90° light scattering	
Range	8530 Desktop 0.001 to 400 mg/m ³	
	8532 Handheld 0.001 to 150 mg/m ³	
Resolution	±0.1% of reading or 0.001 mg/m³, whichever is greater	
Zero Stability	±0.002 mg/m³ 24 hours at 10 sec time constant	
Particle Size Range	Approximately 0.1 to 10 µm	
Flow Rate	3.0 L/min set at factory 1.4 to 3.0 L/min adjustable	
Flow Accuracy	±5% of factory set point Internal flow controlled	
Temperature Coefficient	+0.001 mg/m³ per °C	
Operational Temp	0 to 50°C	
Storage Temp	-20 to 60°C	
Operational Humidity	0-95% RH, non-condensing	
Time Constant	Adjustable 1 to 60 seconds	
Data Logging	45 days at 1 minute samples	
Log Interval	1 second to 1 hour	
Physical Size (HWD)	Handheld: 4.9 x 4.75 x 12.45 in.	
	Desktop: 5.3 x 8.5 x 8.8 in.	
	External Pump: 4.0 x 7.5 x 3.5 in.	
Weight	Handheld: 2.9 lb, 3.3 lb with battery	
	Desktop: 3.45 lb, 4.45 lb – 1 battery, 5.45 lb – 2 batteries	
	External Pump: 3.0 lb	
Communications	8530: USB (Host and Device) and Ethernet. Stored data accessible using thumb drive	
	8532: USB (Host and Device). Stored dada accessible using thumb drive.	
Power—DC	Handheld 12 VDC at 2A	
	Desktop 24 VDC at 2.5A	

Battery	8530: 8532:	Up to 2 Removable Li-Ion External and Internal charging Life, 1 battery: >6.5 hours (9 hours typical for a new battery) for both internal and external pump Desktop DustTrak monitors Life, 2 battery: >13 hours 1 Removable Li-Ion External and Internal charging Life: 5 hours typical	
Analog out		electable output 0 to 5 V or 4 to 20 mA electable scaling	
Alarm Out	8530: Relay or sound buzzer Relay No latching MOSFET User selectable set point 5% deadband Connector 4-pin, Mini-DIN connectors 8532: Sound buzzer		
Screen	8530: 8532:		
Gravimetric Sampling	8530:	Removable 37-mm Cartridge	
EMI/RF Immunity:	Complies with Emissions Directive Standard: EN50081-1:1992 Complies with Immunity Directive Standard: EN50082-1:1992*		

^{*}ESD Shock may require instrument reboot

62 Appendix A

Zero Module

The Zero Module (PN 801690) allows for automatic re-zeroing of the DustTrak Instrument during long sampling runs. The Zero Module works only with the 8530 desktop models.

Attach the AutoZero module to the main instrument in two steps.

 Place the Zero module over the instrument's inlet and press down. The Zero module has an O-ring seal that will engage with the instrument's inlet.

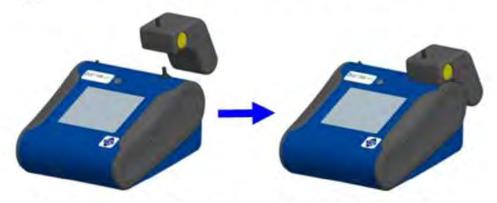


Figure B-1: Place Zero Module Over Inlet and Press Down

2. Attach the cable from the Zero module to the Zero module connector located on the back of the instrument.



Figure B-2: Zero Module Connector

The Zero Module can only be used in a program log mode. The Zero module function is controlled through these two program mode options:

Auto Zero Interval	Interval between re-zeroing the instrument using the Auto-Zero accessory.	
Use Auto Zero	Select Yes to use the Zero Module. Select No to not use the Zero Module.	

Important points on Zero Module operation:

- The Zero module will take one (1) minute to take a zero reading. The first 45 seconds of that period is used to clear the chamber of particles.
 Readings from last 15 second of the period, when the chamber is cleared of particles, will be averaged to determine the Zero offset.
- The log interval, when the Zero module is activated, must be two (2)
 minutes or greater. Data will not be recorded to the log file when the Zero
 module is activated.

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ATTACHMENT E-2

Air Monitoring Summary Sheet

Sampli Weath		chnician:						Job: Job #: Date:	
Time	Time		Wind				sults		
Start	End	Location	Direction	Activity/Operation	Background Readings	PID (ppm)	Background Readings	DUST (ug/m3)	Notes/Additional Monitoring
Addition	onal N	otes:							
Action Le				YES		X	NO		

Daily Instrument Calibration Log

			Sampling Technician:				
			Project Name:				
Instrumen	ts Used:			Inspection Notes:			
Station 1		SN:					
	Data Ram 1	SN:					
Station 2		SN:					
	Data Ram 2	SN:					
Station 3		SN:					
	Data Ram 3	SN:		-			
Hand	PID Model 580	SN:		-			
Held	Data Ram	SN:					
	ation/Standardization	on:		Repair Needed:			
PIDs:	<u>Zero</u>			Gas - 100 ppm			
-	YES	□ NO		1 ☐ YES ☐ NO			
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Data	Zero						
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GZA GeoEnvironmental of New York.



January 2024 101 East 150th Street, Bronx, NY Supplemental Interim Remedial Measures Work Plan Southern Extent File No. 41.0163097.00

APPENDIX H

CITIZEN PARTICIPATION PLAN



Brownfield Cleanup Program

Citizen Participation Plan for 101 East 150th Street

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New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so a le re le a le
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• Public forums, comment periods and contact with project managers rule have potential to influence decisions about a site's investigation and cleanup.

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3. Major Issues of Public Concern

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Appendix A - Project Contacts and Locations of Reports and Information

Project Contacts For main and according Site's more and according to the coording to the coordinate coordinate according to the coordinate coordina **New York State Department of Environmental Conservation (NYSDEC):** □r□e□□Ma□a□er NSSE Re NOSOEO Recordo Enamo en meno ne my mon **New York State Department of Health (NYSDOH):** A....Sa.W.R.....r□ Ne□ □ rk Sae □ e □ ar □ e □ □ □ □ e a □ □ El dre State dia caldir didio Toder (Rocci dodd AlliadydNo ddodd Elalleell leally llo **Locations of Reports and Information Bronx Community Board Four Woodstock Library 761 East 160th Street**, 1650 Selwyn Avenue, Suite 11A **Bronx, NY 10451 Bronx, NY 10457** ATTIMATTE TI ATTIE Amm Roer Gar e com A IIII a e I re III r □□ar □ e □□□r□□□ □□□rar e □ □a □k □□□ S II □□□□ Elamalemaameal cylmr Enamono my mon □□□r□□M□□□ay□Fr□□ay□□AM□□□M Fr ay Sa ray DAM DAM

Appendix B - Site Contact List

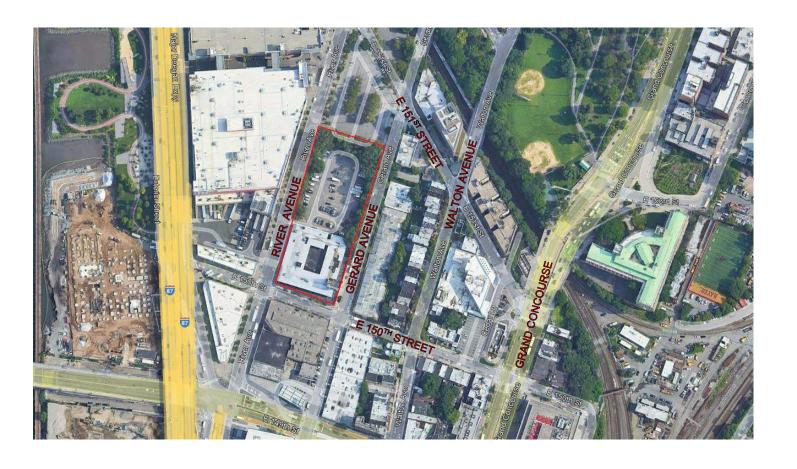
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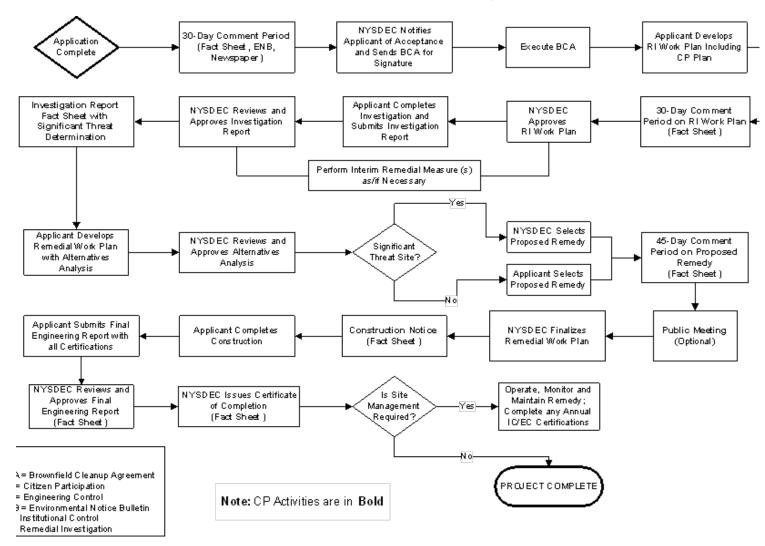
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Appendix C - Site Location Map



Appendix D – Brownfields Cleanup Program Process





Division of Environmental Remediation

Remedial Programs Scoping Sheet for Major Issues of Public Concern —ee —————

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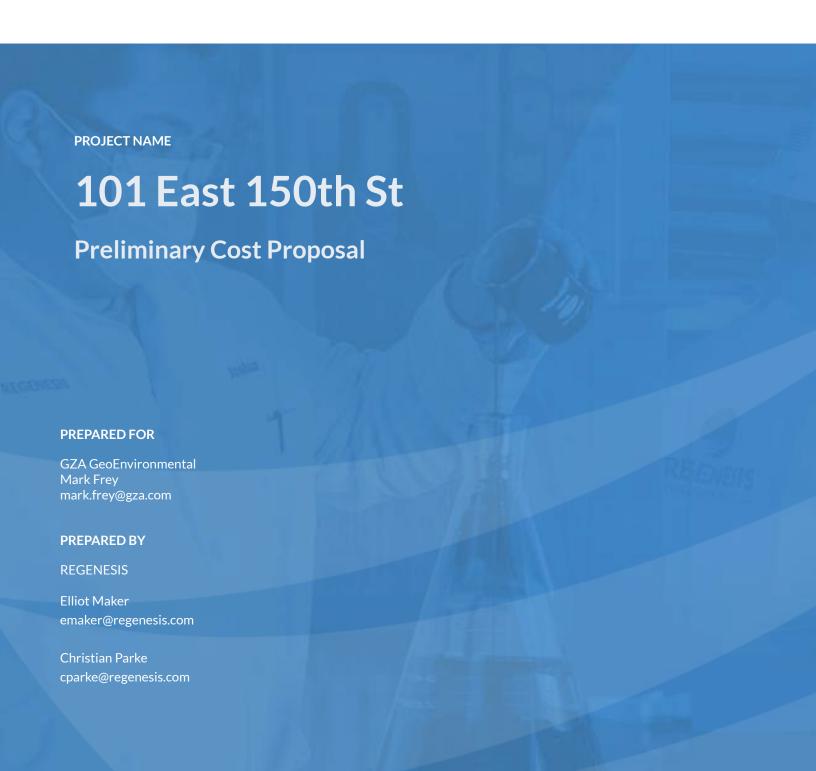
January 2024 101 East 150th Street, Bronx, NY Supplemental Interim Remedial Measures Work Plan Southern Extent File No. 41.0163097.00

APPENDIX I

IN-SITU TREATMENT TECHNICAL SPECIFICATIONS



Technology-Based Solutions for the Environment



Project Summary

REGENESIS appreciates the opportunity to provide GZA GeoEnvironmental our remedial design and cost estimate for the 101 East 150th St project. This proposal includes an overview of our proposed solution, the project goals, technologies proposed, application design summary table and a treatment area map.

Proposed Solution

We propose treatment with RegenOx to address residual petroleum hydrocarbon impacts within the target excavation. These reagents can be applied directly to the excavation in 1-foot lifts.

Project Goals

 Achieve reductions in petroleum hydrocarbon concentrations in saturated soils within the excavation area.

Technologies Proposed_

RegenOx®

Click above to access product specification sheets

Technical Resources

- RegenOx® Technical Bulletin: Compatibility with Underground Storage Structures and Pipes
- RegenOx® Excavation Application Instructions

Design Summary

Design Parameters	Unit	Value
Treatment Area	ft sq.	400
Top Treat Depth (ft. bgs)		8
Bottom Treat Depth (ft. bgs)		11
Vertical Treatment Interval	ft	3
Soil Type		silty sand
Porosity	cm3/cm3	0.40
Effective Porosity	cm3/cm3	0.20
Hydraulic Gradient	ft/ft	0.01
GW Velocity	ft/yr	91.31
Product Dosage		
RegenOx Part A	lbs	720
RegenOx Part B	lbs	720

Technical Approach

Our review of the site data indicates there is a significant amount of hydrocarbon contaminant mass present in the target treatment zone. RegenOx is an advanced chemical oxidation technology that destroys contaminants through powerful, yet controlled chemical reactions. This product maximizes *in-situ* performance while using a solid alkaline oxidant that employs a sodium percarbonate complex with a multi-part catalytic formula. RegenOx directly oxidizes contaminants while its unique catalytic component generates a range of highly oxidizing free radicals that rapidly and effectively destroy a range of target contaminants including both petroleum hydrocarbons and chlorinated compounds.

Performance Monitoring

To measure performance at your site, we recommend the following analytical parameters be collected at key wells within the treatment zone of influence and submitting the samples for analysis of the following parameters.

In-Situ Aerobic Bioremediation Performance Monitoring Parameters						
Analytical Parameter	Method					
Contaminants of Concern (COC's)	Varies					
pH Dissolved Oxygen (DO)	Meter reading taken in flow-through cell (DO can al					
Oxidation Reduction Potential (ORP)	be measured with a Hach kit)					
Total Fe						
Total Mn	Colorimetric Hach Method or EPA 6000 series with					
Dissolved Fe	filtered and unfiltered samples					
Dissolved Mn						
Sulfate	EPA 375.3 or EPA 9056					
Nitrate	EPA 353.1 or EPA 9056					
Total Organic Carbon (TOC)	EPA 415.1 or EPA 9060					
Chemical Oxygen Demand (COD)	EPA 410.12					
Biological Oxygen Demand (BOD)	EPA 5210B					
Alkalinity	EPA 310.2					
Methane, CO2	ASTM D1945					



Acknowledgement

This scope and associated costs are budgetary and should not be considered final. Listed below are the next steps to secure a final design and cost estimate from REGENESIS.

Steps to Final Design and Scope of Work

- 1. Signature notifying REGENESIS to proceed with final design.
- 2. REGENESIS technical team contacts GZA GeoEnvironmental to review final scope of work and provide detailed design and cost estimate
- 3. Provide Detailed Remediation Services Scope of Work, if applicable.
- 4. Confirm Implementation Schedule
- 5. Submit Detailed Design and Cost Estimate to GZA GeoEnvironmental for review and final approval

Signature below confirms signee accepts this preliminary scope of work and would like REGENESIS to proceed with a detailed design and cost estimate.



Not yet accepted

GZA GeoEnvironmental | Mark Frey,



Terms & Conditions

- 1. **PAYMENT TERMS.** Net 30 Days. Accounts outstanding after 30 days will be assessed 1.5% monthly interest. Volume discount pricing will be rescinded on all accounts outstanding over 90 days. An early payment discount of 1.5% Net 10 is available for cash or check payments only. We accept Master Card, Visa and American Express.
- 2. **RETURN POLICY.** A 15% re-stocking fee will be charged for all returned goods. All requests to return product must be pre-approved by seller. Returned product must be in original condition and no product will be accepted for return after a period of 90 days.
- 3. **FORCE MAJEURE.** Seller shall not be liable for delays in delivery or services or failure to manufacture or deliver due to causes beyond its reasonable control, including but not limited to acts of God, acts of buyer, acts of military or civil authorities, fires, strikes, flood, epidemic, war, riot, delays in transportation or car shortages, or inability to obtain necessary labor, materials, components or services through seller's usual and regular sources at usual and regular prices. In any such event Seller may, without notice to buyer, at any time and from time to time, postpone the delivery or service dates under this contract or make partial delivery or performance or cancel all or any portion of this and any other contract with buyer without further liability to buyer. Cancellation of any part of this order shall not affect Seller's right to payment for any product delivered or service performed hereunder.
- 4. **LIMITED WARRANTY.** Seller warrants the product(s) sold and services provided as specified on face of invoice, solely to buyer. Seller makes no other warranty of any kind respecting the product and services, and expressly DISCLAIMS ALL OTHER WARRANTIES OF WHATEVER KIND RESPECTING THE PRODUCT AND SERVICES, INCLUDING ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE AND NON-INFRINGEMENT.
- 5. **DISCLAIMER.** Where warranties to a person other than buyer may not be disclaimed under law, seller extends to such a person the same warranty seller makes to buyer as set forth herein, subject to all disclaimers, exclusions and limitations of warranties, all limitations of liability and all other provisions set forth in the Terms and Conditions herein. Buyer agrees to transmit a copy of the Terms and Conditions set forth herein to any and all persons to whom buyer sells, or otherwise furnishes the products and/or services provided buyer by seller and buyer agrees to indemnify seller for any liability, loss, costs and attorneys' fees which seller may incur by reason, in whole or in part, of failure by buyer to transmit the Terms and Conditions as provided herein.
- 6. **LIMITATION OF SELLER'S LIABILITY AND LIMITATION OF BUYER'S REMEDY.** Seller's liability on any claim of any kind, including negligence, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair or use of any goods or performance of any services covered by or furnished hereunder, shall in no case exceed the lesser of (1) the cost of repairing or replacing goods and repeating the services failing to conform to the foregoing warranty or the price of the goods and/or services or part thereof which gives rise to the claim. IN NO EVENT SHALL SELLER BE LIABLE FOR SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, OR FOR DAMAGES IN THE NATURE OF PENALTIES.
- 7. **INDEMNIFICATION.** Buyer agrees to defend and indemnify seller of and from any and all claims or liabilities asserted against seller in connection with the manufacture, sale, delivery, resale or repair or use of any goods, and performance of any services, covered by or furnished hereunder arising in whole or in part out of or by reason of the failure of buyer, its agents, servants, employees or customers to follow instructions, warnings or recommendations furnished by seller in connection with such goods and services, by reason of the failure of buyer, its agents, servants, employees or customers to comply with all federal, state and local laws applicable to such goods and services, or the use thereof, including the Occupational Safety and Health Act of 1970, or by reason of the negligence or misconduct of buyer, its agents, servants, employees or customers.



- 8. **EXPENSES OF ENFORCEMENT.** In the event seller undertakes any action to collect amounts due from buyer, or otherwise enforce its rights hereunder, Buyer agrees to pay and reimburse Seller for all such expenses, including, without limitation, all attorneys and collection fees.
- 9. **TAXES.** Liability for all taxes and import or export duties, imposed by any city, state, federal or other governmental authority, shall be assumed and paid by buyer. Buyer further agrees to defend and indemnify seller against any and all liabilities for such taxes or duties and legal fees or costs incurred by seller in connection therewith.
- 10. **ASSISTANCE AND ADVICE.** Upon request, seller in its discretion will furnish as an accommodation to buyer such technical advice or assistance as is available in reference to the goods and services. Seller assumes no obligation or liability for the advice or assistance given or results obtained, all such advice or assistance being given and accepted at buyer's risk.
- 11. SITE SAFETY. Buyer shall provide a safe working environment at the site of services and shall comply with all applicable provisions of federal, state, provincial and municipal safety laws, building codes, and safety regulations to prevent accidents or injuries to persons on, about or adjacent to the site.
- 12. **INDEPENDENT CONTRACTOR.** Seller and Buyer are independent contractors and nothing shall be construed to place them in the relationship of partners, principal and agent, employer/employee or joint ventures. Neither party will have the power or right to bind or obligate the other party except as may be expressly agreed and delegated by other party, nor will it hold itself out as having such authority.
- 13. **REIMBURSEMENT.** Seller shall provide the products and services in reliance upon the data and professional judgments provided by or on behalf of buyer. The fees and charges associated with the products and services thus may not conform to billing guidelines, constraints or other limits on fees. Seller does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where seller may serve as a supplier or subcontractor to an entity that seeks reimbursement from the Government for all or part of the services performed or products provided by seller, it is the sole responsibility of the buyer or other entity seeking reimbursement to ensure the products and services and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity that seeks reimbursement from the Government, seller does not knowingly present or cause to be presented any claim for payment to the Government.
- 14. APPLICABLE LAW/JURISDICTION AND VENUE. The rights and duties of the parties shall be governed by, construed, and enforced in accordance with the laws of the State of California (excluding its conflict of laws rules which would refer to and apply the substantive laws of another jurisdiction). Any suit or proceeding hereunder shall be brought exclusively in state or federal courts located in Orange County, California. Each party consents to the personal jurisdiction of said state and federal courts and waives any objection that such courts are an inconvenient forum.
- 15. **ENTIRE AGREEMENT.** This agreement constitutes the entire contract between buyer and seller relating to the goods or services identified herein. No modifications hereof shall be binding upon the seller unless in writing and signed by seller's duly authorized representative, and no modification shall be effected by seller's acknowledgment or acceptance of buyer's purchase order forms containing different provisions. Trade usage shall neither be applicable nor relevant to this agreement, nor be used in any manner whatsoever to explain, qualify or supplement any of the provisions hereof. No waiver by either party of default shall be deemed a waiver of any subsequent default.



Detailed Design Table

Project Information		RegenOx® Appli	cation Desi	gn Summary	
101 E 150th St	treet				
Bronx, New York Saturated Soils Prepared For: GZA GeoEnvironmental of NY		Saturated Soils		Field App. Instructions	
		Application Method	Excavation	Add RegenOx Part B to the excavation area, then	
					Target Treatment Zone (TTZ) Info
Treatment Area	ft ²	400			
Top Treat Depth	ft	8.0	Areal Extent (square ft)	400	
Bot Treat Depth	ft	11.0	Top Application Depth (ft bgs)	8	
Vertical Treatment Interval	ft	3.0	Bottom Application Depth (ft bgs)	11	
Treatment Zone Volume	ft ³	1,200	Total RegenOx to be Applied (lbs)	1,440	
Treatment Zone Volume	cy	44	RegenOx Part A (Ibs)	720	
Soil Type	***	silty sand	RegenOx Part B (Ibs)	720	
Porosity	cm3/cm3	0.40	RegenOx Part A Solution %	5%	
Effective Porosity	cm ³ /cm ³	0.20			
Treatment Zone Pore Volume	gals	3,591			
Treatment Zone Effective Pore Volume	gals	1,795			
Fraction Organic Carbon (foc)	g/g	0.003			
Soil Density	g/cm³	1.6			
Soil Density	lb/ft ³	100			
Soil Weight	lbs	1.2E+05			
Hydraulic Conductivity	ft/day	10.0			
Hydraulic Conductivity	cm/sec	3.53E-03			
Hydraulic Gradient	ft/ft	0.005	Technical	Notes/Discu	ssion
Application Do	sing				1000000
RegenOx to be Applied	lbs	1,440			
RegenOx Part A to be Applied	lbs	720			
RegenOx Part B to be Applied	lbs	720	Prepared By:	Christian Parke	- Design Specialist
			Date: 7	7/14/2023	NUMBER INFRIENCE PROPERTY OF THE PROPERTY OF T





RegenOx® Advanced Chemical Oxidation: Excavation Application

Purpose: Describe the preferred protocol for excavation application of RegenOx.

RegenOx[®] is a specialty groundwater and/or soil remediation product designed to chemically oxidize contaminants upon contact. It is a separately packaged, two-part product consisting of Part-A (the oxidizer complex powder) and Part-B (the activator complex gel). Each part is delivered in easy-to-handle pails. Part-A and Part-B can be readily mixed together without concern for excess heat or gas generation. RegenOx does not require special injection tools of patented injection processes. For source area contaminant treatment in the saturated zone, RegenOx is typically injected into the subsurface using standard application equipment readily available to the remediation contracting and drilling industry. When treating source area contamination in the vadose zone, RegenOx can be used in conjunction with an excavation removal treatment. The material can be easily applied into an excavation pit to extend source contamination removal from the saturated zone and laterally from the excavation walls into the vadose zone.

First, all personnel within the exclusion zone of the excavation application should have proper Personal Protection Equipment (PPE; Figure 1*). They should have PPE to protect the eyes, respiratory system and skin. Second, the recommended dose of RegenOx Part B activator gel should be re-suspended/mixed in the shipping container (Figure 1) and then applied to the excavation pit. The Part B should be distributed evenly and mixed into the soil as well as possible. Care should be taken not to splash the product out of the pit or on personnel. Third, the recommended dose of Part A oxidizer powder should be applied to the excavation pit. The Part A should be distributed evenly and mixed into the soil. Care should be taken to avoid fugitive dust emissions or depositing on personnel. Fourth, once Part A and B are applied to the excavation, water should be added to the treatment area until standing (saturated), this will enhance the distribution of the RegenOx material. As a final step, clean backfill can be added to the excavation pit.



Figure 1: Proper PPE for RegenOx handling and application.

Photos from a RegenOx excavation application are shown on the following page. RegenOx was added to the pit using a front-end loader (Figure 2) and the excavation was filled with clean backfill (Figure 3).

*All photos courtesy of URS of North Carolina







Figure 2: Application of RegenOx with a Front End Loader.

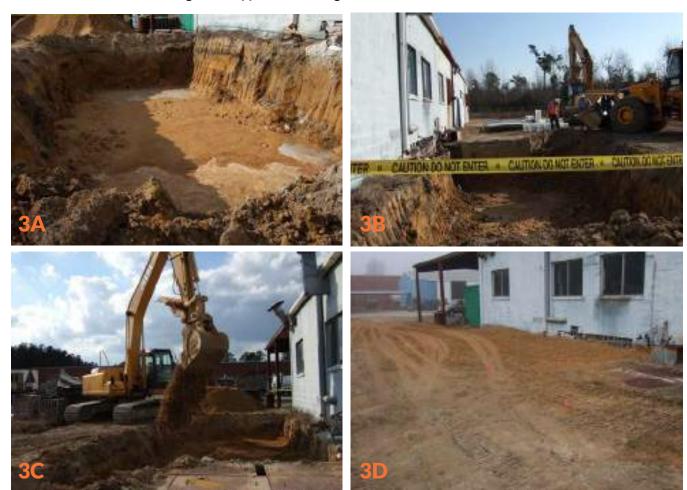


Figure 3: Photo Documentation of a RegenOx Excavation Application

3(a) the open excavation pit, (b) adding RegenOx with the front-end loader, (c) backfilling with clean soil, (d) the site after backfilling is complete.



RegenOx® Technical Description

RegenOx is an advanced chemical oxidation technology that destroys contaminants through powerful, yet controlled chemical reactions. This product maximizes *in situ* chemical oxidation (ISCO) performance through use of a two-part product system; a sodium percarbonate oxidizer complex activated by a patented surface catalyst system. The technology degrades pollutants through direct oxidation, as well as through the generation of a suite of free radical compounds which in turn oxidize recalcitrant contaminants. RegenOX rapidly and effectively destroys a range of target contaminants including petroleum hydrocarbons and chlorinated compounds.

RegenOx is especially effective in destroying target contaminants present in high concentration source areas within the saturated and vadose zones. For petroleum hydrocarbon treatment, RegenOx produces oxygen as a result of its reactions, providing seamless transition from ISCO to enhanced aerobic bioremediation.



Close up of RegenOx

RegenOx produces minimal heat when applied, and continues to destroy contaminants for up to 30 days on a single application. RegenOx is safe for use in direct contact with underground utilities, since it is non-corrosive to concrete and most metals.

```
C_2Cl_4 + 4/3 Na_2CO_3 \cdot 2H_2O_2 + 4NaOH \rightarrow 2CO_2 + 4NaCI + 4H_2O + 4/3 Na_2CO_3
```

. Free Radical Oxidation via production of:

- Perhydroxyl Radical (HO₂ •) - Hydroxyl Radical (OH •) - Superoxide Radical (O₂ •)

For a list of treatable contaminants with the use of RegenOx, view the Range of Treatable Contaminants Guide

Chemical Composition - Part A Oxidant

- Sodium Percarbonate CAS #15630-89-4
- Sodium Carbonate Monohydrate CAS #5968-11-6
- Silicic Acid CAS #7699-11-6
- Silica Gel CAS #63231

Chemical Composition - Part B Activator Complex

- Silicic Acid, Sodium Salt, Sodium Silicate CAS#1344-09-08
- Silica Gel CAS #63231
- Ferrous Sulfate CAS #7720-78-7
- Water CAS#7732-18-5

Properties

- Bulk Density Part A 0.9-1.2 g/cm3; Part B 1.39 g/cm3
- pH 10-11 per recommended mixing ratios (3-5% oxidant in solution)
- Solubility Oxidant 14.5 g/100 g water; Activator miscible in water
- Appearance Brown to orange-brown when mixed with water
- Odor Not detectable
- Vapor Pressure None
- Non-hazardous



RegenOx® Technical Description

Storage and Handling Guidelines

Storage

Store in a cool, dry place out of heat/direct sunlight Store at temperatures not to exceed 40°C/104°F

Store in original tightly closed container

Store in a well-ventilated place

Do not store near combustible materials

Store away from incompatible materials

Protect from contamination

Provide appropriate exhaust ventilation in places where dust is formed

Handling

Minimize dust generation and accumulation

Observe good industrial hygiene practices

Keep away from clothing and combustible materials

Take any precaution to avoid mixing with combustibles

Avoid contact with eyes

Do not taste or swallow

Do not eat, drink or smoke nearby

Wear appropriate personal protective equipment

Wash hands thoroughly after handling

Avoid release to the environment

Applications

RegenOx is applied using direct-injection techniques or wells. The application process enables the two- part product to be combined, then pressure-injected into the zone of contamination and moved out into the aquifer media. Application instructions for this product are contained in the RegenOx Application Instructions Guide.

Health and Safety

Material is relatively safe to handle; however, we recommend avoiding contact with eyes, skin and clothing. OSHA Level D personal protection equipment including vinyl or rubber gloves, eye protection and dust mask are recommended when handling this product. Please review the Material Safety Data Sheet for additional storage, packaging, usage, and handling requirements here: RegenOx Part A SDS and RegenOx Part B SDS





January 2024 101 East 150th Street, Bronx, NY Supplemental Interim Remedial Measures Work Plan Southern Extent File No. 41.0163097.00

APPENDIX J

VAPOR BARRIER SPECIFICATIONS

Preprufe® Waterproofing Membranes

For complete application instructions refer to the technical data sheet for Preprufe found at graceconstruction.com.



(1) Clean surface



(2) Apply membrane



(3) Remove liner



(4) Roll laps

1. Prepare Substrate

- Substrates must be sound and solid to eliminate movement during the concrete pour.
- Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm).
- Substrates must be free of loose aggregate and sharp protrusions. (Picture 1)
- Surface does not need to be dry, but standing water must be removed.
- Applications may require the use of Hydroduct Drainage Composite or plywood to provide a suitable substrate over the soil retention system.

2. Horizontal Application

- Apply Preprufe membrane with the HDPE film side facing the prepared substrate and the treated white coating surface facing the concrete to be poured. (Picture 2)
- Overlap succeeding sheets by a minimum of 3 in. (75 mm).
- Remove release liner. (Picture 3)
- Roll side lap. (Picture 4)
- Overlap ends of membrane a minimum of 3 in. (75 mm).
- Center Preprufe Tape over end laps and roll firmly. (Refer to Detail Drawings #31 & #32

 For vertical and horizontal applications in cool temperatures or damp conditions, gently warm side laps or use Preprufe Tape LT.

3. Vertical Application

- Apply Preprufe membrane in a convenient length with HDPE film side facing the prepared substrate.
- Fasten to substrate along the top edge with large head nails, roofing nails or staples. Top termination should be secured with termination bar and fasteners.
- For lengths greater than 8 ft (2.4 m), additional fastening at 2 ft (0.6 m) intervals along the uncoated edge prior to making the side lap is recommended. (Picture 6)
- Roll side lap.
- Overlap ends of membrane a minimum of 3 in. (75 mm).
- Center Preprufe Tape over end laps and roll firmly. If top termination is to be covered with concrete, a strip of tape should also be centered over the termination bar. (Refer to Detail Drawing #48 on page 138)
- · Remove release liner.

4. Visual Work Inspection

- Inspect the membrane for damage before placing of reinforcing steel, formwork and concrete.
- Repair slices and small punctures which are less than 0.5 in. (13 mm) by applying Preprufe Tape over the damages area and roll firmly.
- Repair holes and punctures greater than 0.5 in. (13 mm) by

- applying a patch of Preprufe membrane to extend 6 in. (150 mm) beyond the damaged area. Seal the terminations of the patch with Preprufe Tape.
- Ensure plastic release liner is removed from all areas of Preprufe membrane and tape.
- Any exposed Preprufe needs to be protected with an approved protection course prior to backfilling.

5. Concrete Placement

- Cast concrete within 56 days (42 days in hot climates) of application of the membrane.
- Concrete must be placed carefully to avoid damage to the membrane.
- For shotcrete placement, contact your local Grace sales representative.



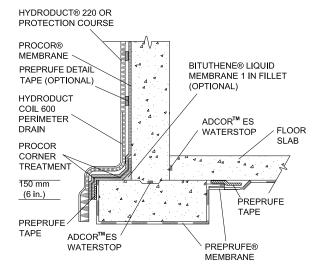
(5) Tape end laps



(6) Fasten to substrate

■ 1 Foundation Wall

Floor Slab at Footing Level (Option 1)



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

- 1. Over rough surfaces, install a 1 inch fillet of Bituthene® Liquid Membrane in inside corner at the base of the wall.
- Apply Preprufe® Tape at the termination of the Preprufe field membrane to ensure good adhesion with the Procor membrane.
- 3. Install a pre-treatment of 60 mils (1.5 mm) of Procor in the inside corner at the base of the wall, extending, at minimum, 6 in. (150 mm) onto the footing and 6 in. (150 mm) up the wall.
- 4. Install a pre-treatment of 60 mils (1.5 mm) of Procor on the outside corner of the footing, extending a down to completely cover the Preprufe Tape and a minimum of 6 in. (150 mm) onto the horizontal surface of the footing.
- Install the field membrane in accordance with the Procor Data Sheet section on Installation. Extend Procor completely over Preprufe tape detail
- 6. Apply Hydroduct 220 according to Hydroduct 220 Data Sheet.

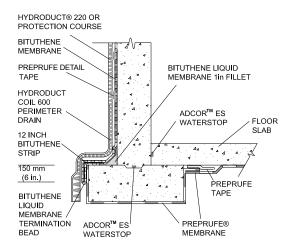
Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

Provide temporary protection for Preprufe at the tie-in location until the Procor tie-in is installed. The tie-in should be completed and backfilled as soon as possible. An approved protection course must be used over the exposed Preprufe and the Procor prior to backfilling.

■ 2 Foundation Wall

Floor Slab at Footing Level (Option 2)



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

- 1. Form a .75 in. (20 mm) fillet of Bituthene Liquid Membrane in corner extending 2.5 in. (65mm) onto wall and footing.
- Apply a 12 in. (300 mm) Bituthene Strip centered over the outside corner of the footing.
- 3. Apply Bituthene membrane down wall, onto horizontal surface of footing, and around outside corner of footing.
- Extend Bituthene a minimum of 6 in. (150 mm) down vertical surface of footing, lapping onto Preprufe membrane. Preprufe installation instructions can be found on the Preprufe Data Sheet at graceconstruction.com.
- 5. Apply bead of Liquid membrane or Mastic on all terminations.
- Apply Preprufe, Bituthene and Hydroduct according to the installation instructions found on the data sheet.

Special Notes

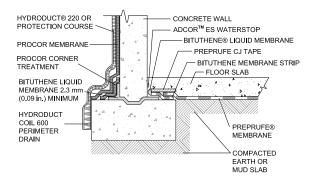
Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation

Provide temporary protection for Preprufe at the tie-in location until the Bituthene tie-in is installed. The tie-in should be completed and backfilled as soon as possible. An approved protection course must be used over the exposed Preprufe and the Bituthene prior to backfilling.

Prior to Membrane Installation, Review the Preprufe® Data Sheet

■ 3 Foundation Wall

Floor Slab at Footing Level (Option 3)



NOTE: THE FOOTING KEYWAY SHOULD BE FORMED TO CREATE A REGULAR AND UNIFORM SHAPE ALLOWING PROPER DETAILING OF THE BITUTHENE LIQUID MEMBRANE.

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

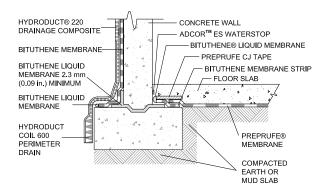
- Apply 90 mil (2.3 mm) thick Bituthene® Liquid Membrane on horizontal surface of footing in keyway. Extend Liquid Membrane a minimum of 2.5 in. (65 mm) onto horizontal surface of footing on each side of foundation wall, and up external foundation wall surface a minimum of 2.5 in. (65 mm).
- 2. Install a pre-treatment of 60 mils (1.5 mm) of Procor in the inside corner at the base of the wall, extending, at minimum, 3 in. (75 mm) onto the footing and 3 in. (75 mm) up the wall.
- 3. Install the field membrane in accordance with the Procor Data Sheet section on Installation
- Extend Procor field membrane over corner treatment and onto the horizontal surface of the footing.
- Apply Hydroduct 220 according to Hydroduct 220 Data Sheet. Hydroduct may be adhered directly to freshly applied Procor by simply placing the Hydroduct in the Procor.
- 6. Apply a strip of Bituthene membrane onto the Liquid Membrane that extends beyond the internal foundation wall surface.
- Install Preprufe® in accordance with the Preprufe Data Sheet. Overlap Preprufe onto the Bituthene Strip a minimum of 3 in. (75 mm).
- 8. Install Preprufe CJ Tape centered over the edge of the Preprufe and adhere to the Bituthene Strip and Preprufe.
- Apply a termination seal of Bituthene Liquid Membrane along Preprufe CJ Tape and Bituthene Strip termination.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

■ 4 Foundation Wall

Floor Slab at Footing Level (Option 4)



NOTE: THE FOOTING KEYWAY SHOULD BE FORMED TO CREATE A REGULAR AND UNIFORM SHAPE ALLOWING PROPER DETAILING OF THE BITUTHENE LIQUID MEMBRANE.

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

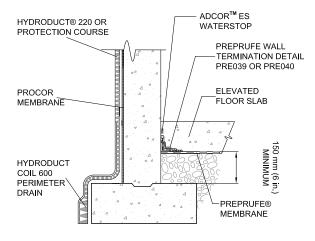
- Apply Bituthene Liquid Membrane to a thickness of 90 mil (2.3 mm) on the horizontal surface of the footing in the keyway. Extend the Liquid Membrane a minimum of 2.5 in. (65 mm) onto the horizontal surface of the footing on each side of the foundation wall, and extend up the external foundation wall surface a minimum of 2.5 in. (65 mm).
- 2. Apply a strip of Bituthene membrane onto the Liquid Membrane that extends beyond the internal foundation wall surface.
- 3. Apply Preprufe® membrane in accordance with the Preprufe data sheet and overlap the Preprufe membrane onto the Bituthene Strip a minimum of 3 in. (75 mm).
- Install Preprufe CJ Tape centered over the edge of the Preprufe membrane and adhere it to the Bituthene strip and Preprufe membrane.
- 5. Apply a termination seal of Bituthene Liquid Membrane along the Preprufe Tape and Bituthene Strip termination.
- 6. Install the Bituthene on the wall in accordance with the Bituthene Data Sheet section on installation.
- 7. Apply bead of Liquid Membrane or Mastic on all terminations.
- 8. Apply Preprufe and Hydroduct according to the installation instructions found on the data sheet.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Ensure Adcor™ ES is encapsulated with 76.2 mm (3 in.) of concrete cover minimum. Apply Adcor ES according to the installation instructions found on the data sheet.

■ 5 Foundation Wall

Elevated Floor Slab (Option 1)



NOTE: INTENDED FOR PROJECTS WITH PERMANENT DEWATERING OR NON-HYDROSTATIC CONDITIONS

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation. Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

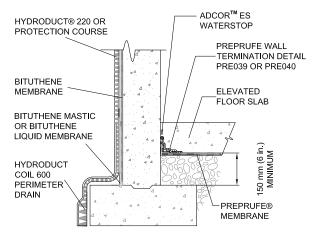
- 1. Install the Procor and Preprufe membranes in accordance with the Procor and Preprufe Data Sheet section on installation.
- Apply Hydroduct 220 according to Hydroduct 220 Data Sheet. Hydroduct may be adhered directly to freshly sprayed Procor by simply placing the Hydroduct in the wet Procor.
- 3. Terminate the Preprufe at the foundation wall.
- 4. Apply Preprufe Wall Termination detail PRE039.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Ensure Adcor™ ES is encapsulated with 76.2 mm (3 in.) of concrete cover minimum. Apply Adcor ES according to the installation instructions found on the data sheet.

■ 6 Foundation Wall

Elevated Floor Slab (Option 2)



NOTE: INTENDED FOR PROJECTS WITH PERMANENT DEWATERING OR NON-HYDROSTATIC CONDITIONS

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

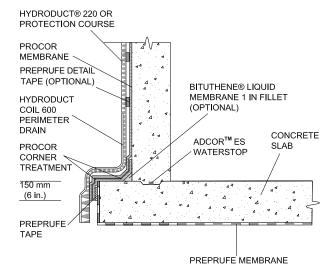
- 1. Install the field membrane in accordance with the Bituthene Data Sheet section on Installation.
- 2. Apply membrane to within 1 in. (25 mm) of base of wall.
- 3. Apply Bituthene Liquid membrane in corner, extending over membrane a minimum of 1 in. (25 mm).
- 4. Terminate the Preprufe at the foundation wall.
- 5. Apply Preprufe Wall Termination detail PRE039.
- 6. Apply Hydroduct 220 according to Hydroduct 220 Data Sheet.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

■ 7 Tie into Preprufe®

At Structural Slab



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation. Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

- Install Preprufe membrane in accordance with the Preprufe Data Sheet section on installation.
- 2. Over rough surfaces, apply a 1 in. (25 mm) fillet of Bituthene Liquid Membrane to inside corner at the base of the wall.
- Install a pre-treatment of 60 mils (1.5 mm) of Procor in the inside corner at the base of the wall, extending at minimum of 3 in.
 - (75 mm) onto the footing and 3 in. (75 mm) up the wall.
- 4. Apply Preprufe Tape at the termination of the Preprufe field membrane to ensure good adhesion of the Procor membrane.
- Install the field membrane in accordance with the Procor Data Sheet section on Installation. Extend Procor completely over Preprufe Tape detail.
- 6. Apply Hydroduct 220 according to Hydroduct 220 Data Sheet.

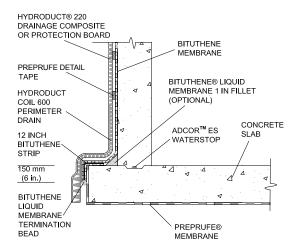
Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

Provide temporary protection for Preprufe at the tie-in location until the Procor tie-in is installed. The tie-in should be completed and backfilled as soon as possible. An approved protection course must be used over the exposed Preprufe and the Procor prior to backfilling.

■ 8 Foundation Wall

Structural Slab



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

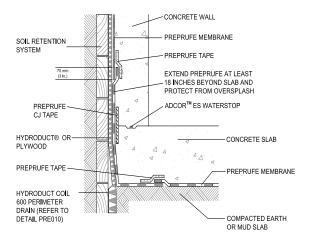
- Install Preprufe membrane in accordance with the Preprufe Data Sheet section on installation.
- Install a .75 in. (20 mm) fillet of Bituthene Liquid Membrane in corner extending 2.5 in. (65 mm) onto wall and footing. Allow to cure.
- Apply a 12 in. (300 mm) Bituthene strip centered over the outside corner of the footing.
- 4. Apply Bituthene membrane down wall, onto horizontal surface of the footing, and around the outside corner of the footing.
- Extend Bituthene a minimum of 6 in. (150 mm) down vertical surface of footing, lapping onto Preprufe membrane. Do not apply primer to the back of the Preprufe for installation of the Bituthene.
- 6. Apply a bead of Liquid Membrane or Mastic on all terminations.
- 7. Apply Hydroduct 220 according to Hydroduct 220 Data Sheet.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

Provide temporary protection for Preprufe at the tie-in location until the Bituthene tie-in is installed. The tie-in should be completed and backfilled as soon as possible. An approved protection course must be used over the exposed Preprufe and the Bituthene prior to backfilling.

■ 9 Blind Side Wall to Slab Tie-in



Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

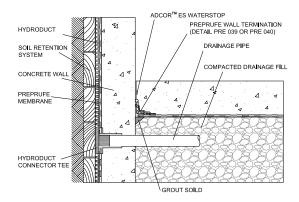
Detailing

- Install Preprufe Membrane over the mud slab or compacted earth as detailed in horizontal and vertical applications on the Preprufe Data Sheet.
- Continue onto the vertical surface of the prepared soil retention system a minimum of 18 in. (450 mm) above the finished elevation of the structural floor slab. It is good practice to extend the Preprufe above the height of the rebar from the slab.
- 3. Apply Preprufe CJ Tape to the Preprufe membrane centered over the finished elevation of the concrete slab.
- 4. Secure the top of the membrane to temporarily hold it in place on the vertical substrate. Care should be taken to prevent damage to this exposed membrane from concrete back-splash as well as slag from rebar welding in wall forms, by keeping the release liner on and protected with protection board, plywood or other material.
- If the exposed membrane above the slab is contaminated with concrete oversplash is the lap area, it must be cleaned down to good material before adhering Preprufe Tape.
- Install Preprufe Membrane over the prepared vertical soil retention system according to standard application instructions on the Preprufe Data Sheet.
- 7. Unfasten the vertical length of the Preprufe Membrane that extends above the slab and tuck the Preprufe 160R behind the 18 in. (450 mm) length of Preprufe 300R, ensuring a minimum 3 in. (75 mm) lap.
- 8. Install Preprufe Tape centered over the lap.
- 9. Remove release liner and roll tape to ensure good adhesion using steel or vinyl cylindrical and Vee roller.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

■ 10 Below Slab Drainage with Hydroduct® Connector Tee



NOTE: NOT INTENDED FOR HYDROSTATIC CONDITIONS

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

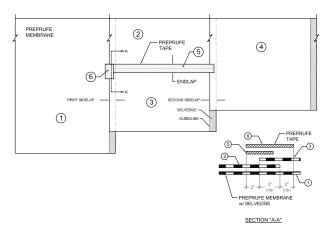
Detailing

- 1. Install Preprufe Membrane over the compacted drainage fill as detailed in horizontal applications in the Preprufe Data Sheet.
- Install Preprufe Membrane and Hydroduct on the soil retention system as detailed in vertical applications in the Preprufe Data Sheet.
- 3. Apply the Hydroduct Connector Tee to the face of the Hydroduct as described in the Hydroduct Coil 600 Data Sheet.
- 4. Connect a 4 in. drainage pipe on the connector tee and extend to an appropriate drainage area.
- Seal all joints of the drainage system with 3 in. underground tape.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Ensure Adcor™ ES is encapsulated with 76.2 mm (3 in.) of concrete cover minimum. Apply Adcor ES according to the installation instructions found on the data sheet.

■ 31 End Lap Detail for Wall or Slab (Option 1) Tape applied after installation of side laps



NOTE: INSTALL PREPRUFE® MEMBRANE AND TAPE IN ORDER AS SHOWN BY NUMBERS.

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

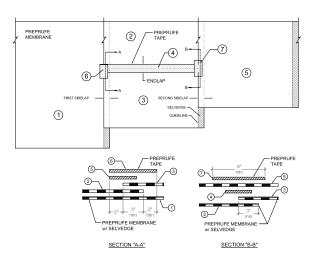
All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

- 1. Apply Hydroduct® according to Hydroduct Data Sheet.
- Install Preprufe Membrane and tape in order as shown by numbers.
- 3. Overlap the ends of the membrane a minimum of 3 in. (75 mm) and remove release liner from both membranes.
- 4. Apply Preprufe Tape over the end lap as shown and roll firmly.
- 5. Apply tape a minimum of 2 in. (50 mm) beyond all edges of membrane that are not sealed by the selvedge.
- 6. Remove release liner from tape and discard.

Special Notes

■ 32 End Lap Detail for Wall or Slab (Option 2) Tape applied before installation of 2nd side lap



NOTE: INSTALL PREPRUFE® MEMBRANE AND TAPE IN ORDER AS SHOWN BY NUMBERS.

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

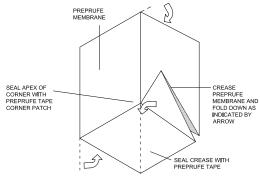
All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

- 1. Apply Hydroduct® according to Hydroduct Data Sheet.
- 2. Install Preprufe Membrane and tape in order as shown by numbers.
- 3. Overlap the ends of the membrane a minimum of 3 in. (75 mm) and remove release liner from both membranes.
- 4. Apply Preprufe Tape over the end lap as shown and roll firmly.
- 5. Apply tape a minimum of 2 in. (50 mm) beyond all edges of membrane that are not sealed by the selvedge.
- 6. Remove release liner from tape and discard.

Special Notes

■ 33 Inside Corner - Custom Formed



FOOTNOTES: A. DO NOT TAPE FOLD ONTO EITHER VERTICAL SURFACE B. FOR USE WHEN PREFORMED PREPRUFE CORNERS ARE NOT VIABLE, REFER TO DETAIL PRE053

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

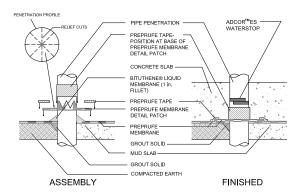
Detailing

- 1. Precut a square section of Preprufe membrane (minimum 12 in. [300 mm] x 12 in. [300 mm]).
- Fold membrane as indicated on detail drawing, with release liner on.
- 3. Crease the fold with nominal hand pressure to ensure a close fit to the substrate profile and avoid hollows.
- With the white coating facing towards the concrete, ensure that the apex of the corner is covered and sealed with Preprufe Tape.
- Remove release liner and roll tape firmly using steel or vinyl cylindrical or Vee roller.
- 6. Seal corner detail to Preprufe field membrane using Preprufe Tape and roll firmly.
- 7. Apply Hydroduct® according to Hydroduct Data Sheet.

Special Notes

■ 34 Pipe Penetration

(For Wall or Slab)



*FOOTNOTES:

- · ALL PENETRATIONS TO BE GROUTED.
- · A MINIMUM OF 6 IN. (150 MM) IS REQUIRED BETWEEN PENTRATIONS TO ENSURE PROPER DETAILING.
- · AVOID PLACEMENT OF MULTIPLE PENETRATIONS.
- · A MINIMUM OF 6 IN. (150 MM) OF PIPE NEEDS TO BE EXPOSED AND FREE OF CONNECTIONS, OBSTRUCTIONS, HANGERS, ETC. TO ENSURE PROPER EXECUTION OF THE DETAIL.

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm) The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

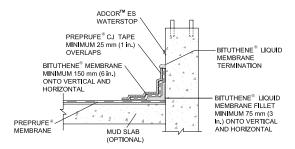
- All penetrations must be firmly secured and stable. Grout around all penetrations that are not stable. For compacted earth, extend grout a minimum of 3 in. (75 mm) in all directions. Clean loose dust or dirt from the penetration surface using a clean, dry cloth or brush.
- 2. Cut the field membrane tight to the penetration and remove release liner. If membrane is not within 0.5 in. (12 mm) of penetration and not more than 2 in. (50 mm) from penetration, apply Preprufe Tape to cover the gap. Roll firmly into place and remove release liner. If the membrane is greater than 2 in. (50 mm) from penetration, install more Preprufe Membrane to cover the gap repeating these instructions until Preprufe Membrane/Tape is within 0.5 in. (12 mm).
- 3. Mix and apply Bituthene Liquid Membrane around the penetration. Liquid Membrane should be placed to form a minimum 1 in. (25 mm) continuous fillet between the Preprufe Membrane/Tape and the base of the penetration. Cut "star" within trace of penetration to allow for patch to slide over penetration.
- 4. Cut a patch of Preprufe Membrane that is a minimum of 12 in. (300 mm) larger than the diameter or width of the penetration so that the patch extends 6 in. (150 mm) beyond the penetration in all directions. Remove the release liner and center the patch over penetration and trace/draw the penetration profile onto the patch. Using sheers or utility knife, make relief cuts through the membrane. Refer to relief cut figures on right. Triangles formed by making a relief cut is not to exceed 2 in. (50 mm) in height when placed over penetration, i.e. penetration diameters or widths greater than 4 in. (100 mm) need to be trimmed. Remove and discard release liner.
- 5. Slide the patch over penetration and press into the partially cured Liquid Membrane. Ensure that the patch is pressed firmly into the Liquid Membrane and is positioned directly onto the Preprufe Field Membrane/Tape below. Using a trowel, smooth out any Liquid Membrane that has flowed out of the relief cut.
- Apply Preprufe Tape centered over the edges of the patch and roll firmly to form a tight seal to the Preprufe Field Membrane. Remove release liner from tape and discard.
- 7. Wrap the penetration with Preprufe Tape, positioning the tape at the base of the patch. Remove enough release liner to overlap Tape on to itself and roll/ press firmly into place. Remove remaining release liner and discard. Repair small fishmouths by pressing firmly against penetration and repair large fishmouths by patching with Preprufe Tape.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

Prior to Membrane Installation, Review the Preprufe® Data Sheet

■ 35 Straight Edge Penetration



*FOOTNOTE: ALL PENETRATION TO BE GROUTED.

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

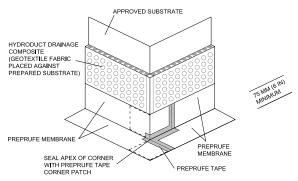
Detailing

- All penetrations must be firmly secured and stable. Grout around all penetrations that are not stable. Clean loose dust or dirt from the penetration and the surrounding substrate surface using a clean, dry cloth or brush.
- 2. Cut the Preprufe Field Membrane within 0.5 in. (13 mm) of the penetration and remove release liner.
- 3. Apply Liquid Membrane to form a minimum 1 in. (25 mm) continuous fillet between the Preprufe Membrane and the base of the penetration. Extend a 90 mil (2.2 mm) continuous coating of Liquid Membrane overlapping a minimum of 3 in. (75 mm) onto the surface of the Preprufe Membrane and 3 in. (75 mm) onto the penetration.
- 4. Install a minimum 12 in. (300 mm) strip of Bituthene Membrane centered over the Liquid Membrane fillet so that the Bituthene Membrane extends 6 in. (150 mm) onto the penetration and Preprufe Membrane. For concrete penetrations, apply Bituthene Primer as per standard Grace instructions prior to installation of Bituthene Membrane.
- 5. Apply a strip of Preprufe CJ Tape onto the Bituthene Membrane and overlap onto the Preprufe Field Membrane by a minimum of 2 in. (50 mm). Apply a second strip of Preprufe CJ Tape starting at the top leading edge of the Bituthene Membrane and overlap onto the firsts trip of Preprufe CJ Tape by a minimum of 2 in. (50 mm).
- Terminate the top leading edge of Preprufe CJ Tape and Bituthene Membrane with a bead of Bituthene Liquid Membrane.
- Seal apex of all outside corners with Preprufe Tape corner patch as necessary.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation Ensure Adcor™ ES is encapsulated with 76.2 mm (3 in.) of concrete cover minimum. Apply Adcor ES according to the installation instructions found on the data sheet.

■ 36 Outside Corner - Custom Formed



*FOOTNOTE: FOR USE WHEN PREPRUFE PREFORMED CORNERS
ARE NOT VIABLE, REFER TO DETAIL PRE054

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

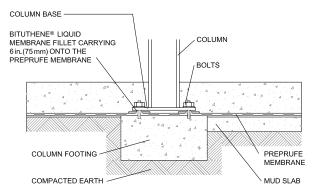
Detailing

- Fold the Preprufe membrane, ensuring a minimum 6 in. (75mm) return onto the horizontal, to allow tie-in to the Preprufe field membrane.
- Crease the fold with nominal hand pressure to ensure a close fit to the substrate profile and avoid hollows or draping of the membrane.
- Make relief cuts in the Preprufe Membrane in order to wrap around corner.
- 4. Seal the relief cuts with Preprufe Tape and ensure that the apex of the corner is covered and sealed with Preprufe Tape.
- 5. Remove release liner and roll tape to ensure good adhesion using steel or vinyl cylindrical or Vee roller.
- 6. Apply Hydroduct® according to Hydroduct Data Sheet.

Special Notes

■ 37 Column

(Option 1)



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

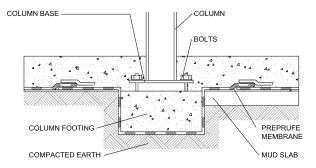
Detailing

- 1. Place Preprufe membrane over the column footing and directly under the column.
- Tie-in penetrations such as rebar and threaded rod that penetrate the membrane should be sealed with Bituthene Liquid Membrane.
- 3. Cut the membrane tight to the penetration and ensure the penetration is free from rust, dirt, dust, etc.
- 4. If membrane is not within 0.5 in. (13 mm) of penetration, apply Preprufe Tape to cover the gap.
- 5. Mix and apply Bituthene Liquid Membrane around the penetration.
- 6. Bituthene Liquid Membrane should be placed to form a minimum 1 in. (25 mm) continuous fillet around the penetration at the point of penetration.
- 7. Bituthene Liquid Membrane should be applied as a 90 mil (2.2 mm) continuous coating overlapping a minimum of 3 in. (75 mm) onto the surface of the Preprufe Membrane.
- 8. Apply Hydroduct® according to Hydroduct Data Sheet.

Special Notes

■ 38 Column

(Option 2)



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

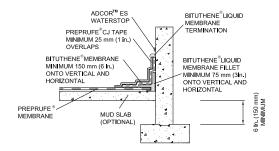
All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

- Install the membrane following the vertical and horizontal application instructions on the Preprufe data sheet found at graceconstruction.com.
- 2. Place the Preprufe membrane below the column footing before it is poured.
- 3. When placing the membrane it is important to leave sufficient length (typically 18 in. [300 mm]) of Preprufe 300R beyond the footing to allow for tie-in to the Preprufe membrane that will be laid to waterproof the general slab area.
- 4. Leave release liner on this extra length and protect it from damage until the tie-in details are completed.
- 5. Apply Hydroduct® according to Hydroduct Data Sheet.

Special Notes

■ 39 Wall Termination for Elevated Slab



*FOOTNOTES:

· NOT INTENDED FOR HYDROSTATIC CONDITIONS.

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

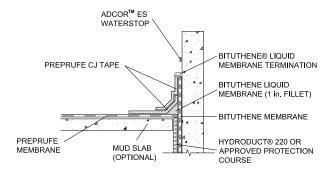
- 1. Install Preprufe 300R Membrane over mud slab.
- For compacted earth, proper compaction is required. If the wall area is too small to allow proper compaction, the base of the wall should be grouted solid. Areas to receive Bituthene Liquid Membrane MUST be grouted solid.
- Apply Bituthene Liquid Membrane on the mud slab from the base of the wall to a minimum of 0.5 in. (13 mm) under where the leading edge of the Preprufe Membrane will terminate.
- 4. Install Preprufe 300R Membrane within 0.5 in. (13 mm) of all vertical and horizontal intersections.
- 5. Apply Liquid Membrane to form a minimum 1 in. (25 mm) continuous fillet between the Preprufe Membrane and the wall. Extend a 90 mil (2.2 mm) continuous coating of Liquid Membrane overlapping a minimum of 3 in. (75 mm) onto the surface of the Preprufe Membrane and 3 in. (75 mm) onto the wall.
- 6. Install a minimum 12 in. (300 mm) strip of Bituthene Membrane centered over the Liquid Membrane fillet so that the Bituthene Membrane extends 6 in. (150 mm) onto the wall and 6 in. (150 mm) onto the Preprufe Membrane. Apply Bituthene Primer as per standard Grace instructions prior to installation of Bituthene Membrane.
- 7. Apply a strip of Preprufe CJ Tape onto the Bituthene Membrane and overlap onto the Preprufe Field Membrane by a minimum of 2 in. (50 mm). Apply a second strip of Preprufe CJ Tape starting at the top leading edge of the Bituthene Membrane and overlap onto the firsts trip of Preprufe CJ Tape by a minimum of 2 in. (50 mm).
- Terminate the top leading edge of Preprufe CJ Tape and Bituthene Membrane with a bead of Bituthene Liquid Membrane.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

[·] IF A MUDSLAB IS NOT USED, THE SUBSTRATE TO ACCEPT BITUTHENE LIQUID MEMBRANE MUST BE GROUTED SOILD TO PROVIDE AN ACCEPTABLE SUBSTRATE FOR THE LIQUID MEMBRANE.

■ 40 Wall Termination to Bituthene Membrane



Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than .05 in. (12 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation. Ensure the surface of the Bituthene Membrane is protected during Preprufe installation.

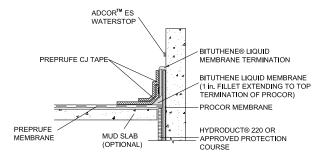
Detailing

- Install Preprufe 300R Membrane over the prepared substrate as outlined in the Preprufe Data Sheet found at graceconstruction.com.
- For compacted earth, proper compaction is required. If the wall area is too small to allow proper compaction, the base of the wall should be grouted solid.
- 3. Install Preprufe 300R Membrane tight to all vertical and horizontal intersections
- Apply Bituthene Liquid Membrane to form a minimum 1 in. (25 mm) continuous fillet between the Preprufe membrane and the Bituthene membrane.
- Starting a minimum of 4 in. (100 mm) from the edge of the Liquid Membrane fillet, apply Preprufe CJ Tape and extend it over the Liquid Membrane fillet and onto the Bituthene Membrane.
- Apply a second strip of Preprufe CJ Tape starting at the top leading edge of the Bituthene Membrane and overlap onto the first strip of Preprufe CJ Tape by a minimum of 2 in. (50 mm).
- Terminate the top leading edge of Preprufe CJ Tape and Bituthene Membrane with a bead of Bituthene Liquid Membrane.
- 8. Roll tape to ensure good adhesion using steel or vinyl cylindrical or Vee roller.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Ensure Adcor™ ES is encapsulated with 76.2 mm (3 in.) of concrete cover minimum. Apply Adcor ES according to the installation instructions found on the data sheet.

■ 41 Wall Termination to Procor Membrane



Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than .05 in. (12 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation. Ensure the surface of the Bituthene Membrane is protected during Preprufe installation.

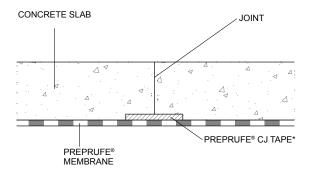
Detailing

- Install Preprufe 300R Membrane over the prepared substrate as outlined in the Preprufe Data Sheet found at graceconstruction.com.
- For compacted earth, proper compaction is required. If the wall area is too small to allow proper compaction, the base of the wall should be grouted solid.
- Install Preprufe 300R Membrane tight to all vertical and horizontal intersections.
- 4. Apply Bituthene® Liquid Membrane to form a minimum 1 in. (25 mm) continuous fillet in the corner where the Preprufe and Procor meet. Extend the Bituthene Liquid Membrane vertically to the top leading edge of the Procor Membrane.
- Starting a minimum of 4 in. (100 mm) from the edge of the Liquid Membrane fillet, apply Preprufe CJ Tape and extend it over the Liquid Membrane fillet and onto the Procor Membrane.
- 6. Apply a second strip of Preprufe CJ Tape starting at the top leading edge of the Procor Membrane and overlap onto the first strip of Preprufe CJ Tape by a minimum of 2 in. (50 mm).
- 7. Terminate the top leading edge of Preprufe CJ Tape and Procor Membrane with a bead of Bituthene Liquid Membrane.
- 8. Roll tape to ensure good adhesion using steel or vinyl cylindrical or Vee roller.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Ensure Adcor[™] ES is encapsulated with 76.2 mm (3 in.) of concrete cover minimum. Apply Adcor ES according to the installation instructions found on the data sheet.

■ 42 Joint Contraction (Control) and Construction Joints



*NOTE: FOR JOINTS WITH EXPECTED MOVEMENT NOT TO EXCEED 0.5 IN. (13MM).

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than ½ inch. The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

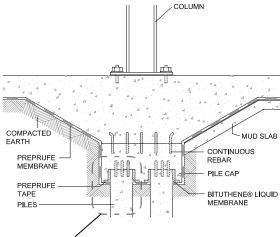
Detailing

- Install Preprufe membrane according to standard horizontal and vertical application instructions on the Preprufe data sheet found at graceconstruction.com.
- Preprufe CJ Tape should be applied to the surface of the Preprufe membrane and centered along the line of all contraction (control) and construction joints.
- 3. Remove release liner and roll tape to ensure good adhesion using steel or vinyl cylindrical Vee roller.
- 4. Ensure and damaged tape or membrane is repaired after removal of formwork or bulkhead.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

■ 43 Grade Beam Pile Cap (Option 1)



*NOTE: REFER TO PREPRUFE STRAIGHT EDGE PENETRATION DETAIL PRE 035 OR PREPRUFE PIPE PENETRATION DETAIL PRE 034 DEPENDING ON SHAPE OF PILE

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

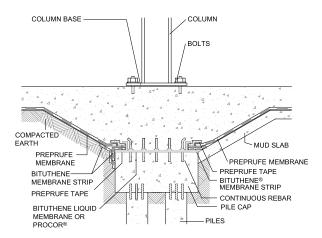
- 1. Install Preprufe Membrane over the prepared substrate in accord with standard installation instructions.
- 2. Preprufe Membrane is placed in the area formed for the pile cap before the concrete is poured.
- 3. When placing the membrane it is important to leave sufficient length (typically 12 in. [300 mm]) of Preprufe beyond the pile cap area to allow for tie-in to the Preprufe Membrane that will be laid to waterproof the general slab area.
- Cut membrane within 0.5 in. (13 mm) of each pile and complete detail around each pile in accordance with Detail PRE 035 or Detail PRE 034 depending on shape of pile.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Piles must extend a minimum of 6 in. (150 mm) above the substrate to ensure proper execution of the detail.

■ 44 Grade Beam Pile Cap

(Option 2)



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

 To allow for proper tie-in between Preprufe Field Membrane and pile cap, a 6 in. (150 mm) ledge/shelf along the pile cap's perimeter is required.

For Mud Slabs

- Clean loose dust or dirt from the pile cap and mud slab surface using a clean, dry cloth or brush.
- Apply a continuous 90 mil (2.2 mm) coating of Bituthene Liquid Membrane or Procor over the top of the pile cap.
- 3. Place a 1 in. (25 mm) bead of Liquid Membrane or Procor around all penetrations at the point of penetration through the pile cap.
- Prime along the edge of the mud slab a minimum of 6 in. (150 mm) from the edge of pile cap with a Bituthene Primer and allow to dry.
- Align a 9 in. (225 mm) strip of Bituthene Membrane centered over the edge of the pile cap. Remove release liner and roll firmly onto the Liquid Membrane and primed mud slab.
- 6. Install Preprufe Membrane over the prepared substrate and terminate it 2 in. (50 mm) onto the pile cap.
- 7. Apply Preprufe Tape centered over the Preprufe Membrane termination. Remove the release liner and roll firmly.
- 8. Seal Bituthene Membrane and Preprufe Tape edge with a termination bead of Liquid Membrane.

(Continued on next page)

For Compacted Earth

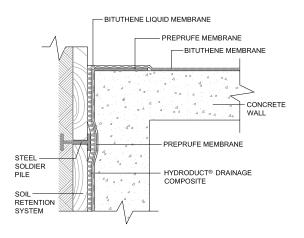
- Apply a continuous 90 mil (2.2 mm) coating of Bituthene Liquid Membrane or Procor over the top of the pile cap.
- 2. Place a 1 in. (25 mm) bead of Liquid Membrane or Procor around all penetrations at the point of penetration through the pile cap.
- Remove compacted earth away from sides of pile cap and remove formwork. Clean loose dust or dirt from the pile cap surface using a clean, dry cloth or brush.
- Prime the sides of the pile cap a minimum of 6 in. (150 mm) from the top of pile cap with a Bituthene Primer and allow to dry.
- Align a 9 in. (225 mm) strip of Bituthene Membrane centered over the outside edge (outside corner) of the pile cap. Remove release liner and roll firmly onto the Liquid Membrane and primed sides of pile cap.
- Align a 12 in. (300 mm) strip of Bituthene Membrane centered over the outside edge (outside corner) of the pile cap.
- Remove half of release liner by removing the RIPCORD® Split Release on Demand or by scoring release liner along the center of the strip.
- Roll firmly onto the sides of pile cap with the 9 in. (225 mm) strip of Bituthene Membrane and the remaining primed pile cap.
- Leave the other half of the 12 in. (300 mm) strip with the release liner still in tact in order to receive the Preprufe Membrane.
- Replace earth/fill and compact per standard back-filling instructions being careful not to damage the Bituthene strip including the non-bonded portion.
- Invert the Bituthene strip, and remove the remaining release liner to expose the adhesive portion of the Bituthene.
- 12. Install Preprufe Membrane over the prepared substrate and terminate it 2 in. (50 mm) onto the pile cap.

- 13. Roll firmly onto the inverted Bituthene strip.
- Apply Preprufe Tape centered over the Preprufe Membrane termination. Remove the release liner and roll firmly.
- 15. Seal Bituthene Membrane and Preprufe Tape edge with a termination bead of Liquid Membrane.
- 16. Apply Hydroduct® according to Hydroduct Data Sheet.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

■ 45 Tie Into Bituthene® Wall Waterproofing Plan View



*NOTE: HYDRODUCT OR APPROVED PROTECTION COURSE NOT SHOWN FOR CLARITY OVER BITUTHENE.

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

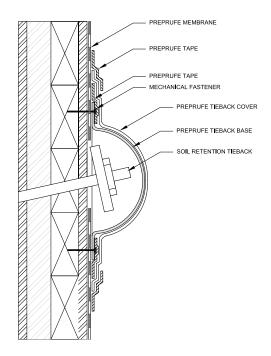
- 1. Install Preprufe 160R over the prepared vertical surface.
- 2. Extend the Preprufe 160R Membrane 6 in. (150 mm) beyond the end of the blind-side wall.
- As the foundation wall formwork is installed, fold the 12 in. (300 mm) piece of Preprufe 160R Membrane to form a sharp corner.
- 4. Secure it to the inside face of the exterior form panel using Preprufe Detail Tape or small head fasteners located close to the outer edge of the membrane.
- Once the wall is poured and cured for seven days, remove the formwork and install the post applied waterproofing according to the manufacturers standard installation procedures.
- 6. Apply Hydroduct® according to Hydroduct Data Sheet.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

Provide temporary protection for Preprufe at the tie-in location until the Bituthene tie-in is installed. The tie-in should be completed and backfilled as soon as possible.

■ 46 Preprufe Tie-Back Cover



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

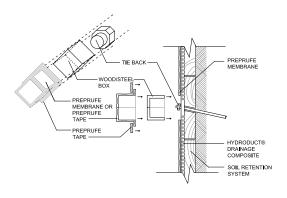
Detailing

- Install Preprufe Membrane within 2 in. (50 mm) of tieback as per standard installation instructions.
- Center the base over tieback head and secure base to soil retention system using appropriate fasteners. Fasteners should have a low profile head.
- Apply Preprufe Tape centered over the edge of the base flange and roll firmly to form a tight seal. Remove release liner and discard.
- 4. Position the membrane cover over the base taking care to ensure the cover flange sits flat onto the Preprufe Membrane.
- Apply Preprufe Tape centered over the edge of the cover flange and roll firmly to form a tight seal. Remove release liner and discard.
- All Preprufe Tape should overlap onto surfaces of tape, membrane, base, cover, etc. a minimum of 2 in. (50 mm).
- 7. Apply Hydroduct® according to Hydroduct Data Sheet.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

■ 47 Soil Retention Tie-Back Cover — Custom Box Cover



*NOTE: FOR USE WHEN PREPRUFE TIE-BACK COVER IS NOT VIABLE.

INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

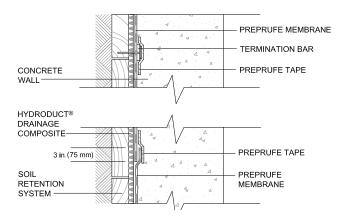
Detailing

- Install Preprufe Membrane within 2 in. (50 mm) of tieback as per standard installation instructions.
- Cover the tieback head with a box constructed of wood, steel or other material that will provide a sound, stable and smooth substrate for the Preprufe.
- Position the custom cover to allow concrete to shed during placement and to improve consolidation.
- 4. Firmly secure the cover to the soil retention system.
- 5. Apply Preprufe CJ Tape and/or Preprufe Tape over the box providing a continuous layer of tape that overlaps onto the field membrane by a minimum of 3 in. (75 mm). Remove the release liners and apply Preprufe Tape centered over all outside edges and corners of box to provide double layer at edges and corners.
- 6. Roll firmly and remove release liner.
- 7. Apply Hydroduct® according to Hydroduct Data Sheet.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

■ 48 Top Termination and End Lap



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

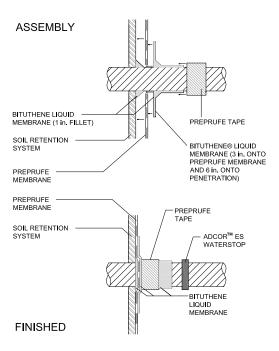
Detailing

- Apply Preprufe field membrane according to standard installation procedures.
- 2. Apply termination bar to Preprufe membrane.
- 3. Center Preprufe CJ Tape to cover termination bar and roll firmly.
- 4. Protect top of termination of membrane from exposure.
- 5. For end lap, overlap successive membrane rolls by 3 in. (75 mm).
- 6. Apply Preprufe Tape, centered over the lap. (Refer to PRE 031 and PRE 032)
- 7. Apply Hydroduct® according to Hydroduct Data Sheet.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

■ 49 Rebar, Dowel, and All-Thread Penetration



Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

- All penetrations must be firmly secured and stable. Grout around all penetrations that are not stable. Clean loose dust or dirt from the penetration and the surrounding substrate surface using a clean, dry cloth or brush.
- 2. Mix and apply Bituthene Liquid Membrane around the penetration. Liquid Membrane should be placed to form a minimum 1 in. (25 mm) continuous fillet between the substrate and the base of the penetration.
- 3. Cut the field membrane tight to the penetration and remove release liner. If membrane is not within 0.5 in. (12 mm) of penetration and not more than 2 in. (50 mm) from penetration, apply Preprufe Tape to cover the gap. Roll firmly into place and remove release. If the membrane is greater than 2 in. (50 mm) from penetration, install more Preprufe Membrane to cover the gap repeating these instructions until Preprufe Membrane/Tape is within 0.5 in. (12 mm).
- 4. Position the field membrane snug to the penetration so that it is a maximum of 0.5 in. (12 mm) from the base of the penetration and press firmly into the partially cured Liquid Membrane.
- 5. Apply Liquid Membrane to form a minimum 1 in. (25 mm) continuous fillet between the Preprufe Membrane and the base of the penetration. Extend a 90 mil (2.2 mm) continuous coating of Liquid Membrane overlapping a minimum of 3 in. (75 mm) onto the surface of the Preprufe Membrane and 6 in. (150 mm) onto the penetration.
- 6. Wrap the penetration with Preprufe Tape, positioning the tape at the base of the penetration. Remove enough release liner to overlap tape on to itself and roll/press firmly into place. Remove remaining release liner and discard.

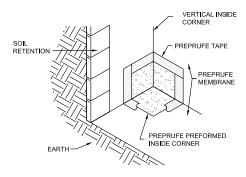
Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

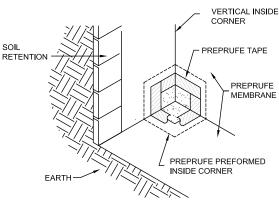
Ensure Adcor[™] ES is encapsulated with 76.2 mm (3 in.) of concrete cover minimum. Apply Adcor ES according to the installation instructions found on the data sheet.

■ 53 Preprufe® Preformed Corner Inside Corner (Options A and B)

Installation After Membrane - Option A



Installation Before Membrane - Option B



FOOTNOTE: USE DETAIL PRE033 WHEN PREPRUFE PREFORMED INSIDE CORNER IS NOT VIABLE

Prior to Membrane Installation, Review the Preprufe® Preformed Corners Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than ½ inch. The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

Installation After Membrane - Option A

- Install Preprufe membrane in accordance with the Preprufe data sheet section on installation.
- Remove release liner from both sides of Preprufe Inside Corner and install tight against Preprufe membrane.
- Ensure the Preprufe Preformed Inside Corner covers the Preprufe membrane by a minimum of 3 in. (75 mm) on all sides
- Apply Preprufe Tape centered over all edges of the Preprufe Preformed Inside Corner, roll firmly in place, remove release liner and discard.

Installation Before Membrane - Option B

- Install Preprufe Preformed Inside Corner tight against substrate, remove release liner and discard.
- Apply Preprufe membrane over Preprufe Preformed Inside Corner ensuring a 3-5 in. (75-125 mm) overlap onto corner.
- Apply Preprufe Tape centered over all edges of the Preprufe membrane, roll firmly in place, remove release liner and discard.

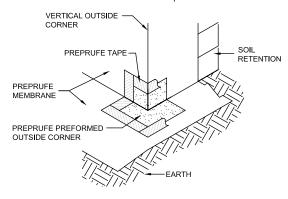
Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Preprufe Tape should overlap onto surfaces of tape, membrane, corner, etc. a minimum of 2 in. (50 mm).

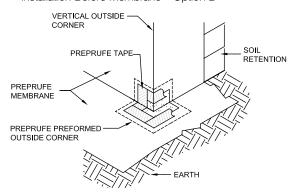
Prior to Membrane Installation, Review the Preprufe® Preformed

■ 54 Preprufe® Preformed Corner Outside Corner (Options A and B)

Installation After Membrane - Option A



Installation Before Membrane - Option B



FOOTNOTE: USE DETAIL PRE036 WHEN PREPRUFE PREFORMED OUTSIDE CORNER IS NOT VIABLE

Corners Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than ½ inch. The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

Installation After Membrane - Option A

- Install Preprufe membrane in accordance with the Preprufe data sheet section on installation.
- 2. Remove release liner from both sides of Preprufe Outside Corner and install tight against Preprufe membrane.
- Ensure the Preprufe Preformed Outside Corner covers the Preprufe membrane by a minimum of 3 in. (75 mm) on all sides
- Apply Preprufe Tape centered over all edges of the Preprufe Preformed Outside Corner, roll firmly in place, remove release liner and discard.

Installation Before Membrane – Option B

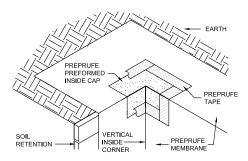
- Install Preprufe Preformed Outside Corner tight against substrate, remove release liner and discard.
- 2. Apply Preprufe membrane over Preprufe Preformed Outside Corner ensuring a 3-5 in. (75-125 mm) overlap onto corner.
- Apply Preprufe Tape centered over all edges of the Preprufe membrane, roll firmly in place, remove release liner and discard.

Special Notes

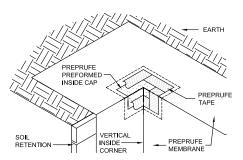
Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Preprufe Tape should overlap onto surfaces of tape, membrane, corner, etc. a minimum of 2 in. (50 mm).

■ 55 Preprufe® Preformed Corner Inside Cap (Options A and B)

Installation After Membrane - Option A



Installation Before Membrane - Option B



Prior to Membrane Installation, Review the Preprufe® Preformed Corners Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than ½ inch. The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

Installation After Membrane - Option A

- Install Preprufe membrane in accordance with the Preprufe data sheet section on installation.
- 2. Remove release liner from both sides of Preprufe Inside Cap and install tight against Preprufe membrane.
- 3. Ensure the Preprufe Preformed Inside Cap covers the Preprufe membrane by a minimum of 3 in. (75 mm) on all sides
- Apply Preprufe Tape centered over all edges of the Preprufe Preformed Inside Cap, roll firmly in place, remove release liner and discard.

Installation Before Membrane - Option B

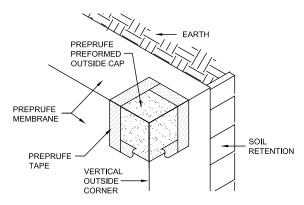
- Install Preprufe Preformed Inside Cap tight against substrate, remove release liner and discard.
- 2. Apply Preprufe membrane over Preprufe Preformed Inside Cap ensuring a 3-5 in. (75-125 mm) overlap onto cap.
- Apply Preprufe Tape centered over all edges of the Preprufe membrane, roll firmly in place, remove release liner and discard.

Special Notes

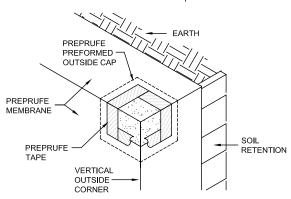
Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Preprufe Tape should overlap onto surfaces of tape, membrane, cap, etc. a minimum of 2 in. (50 mm).

■ 56 Preprufe® Preformed Corner Outside Cap (Options A and B)

Installation After Membrane - Option A



Installation Before Membrane - Option B



Prior to Membrane Installation, Review the Preprufe® Preformed Corners Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than ½ inch. The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

Installation After Membrane - Option A

- Install Preprufe membrane in accordance with the Preprufe data sheet section on installation.
- Remove release liner from both sides of Preprufe Outside Cap and install tight against Preprufe membrane.
- 3. Ensure the Preprufe Preformed Outside Cap covers the Preprufe membrane by a minimum of 3 in. (75 mm) on all sides
- Apply Preprufe Tape centered over all edges of the Preprufe Preformed Outside Cap, roll firmly in place, remove release liner and discard.

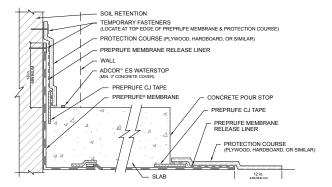
Installation Before Membrane – Option B

- Install Preprufe Preformed Outside Cap tight against substrate, remove release liner and discard.
- 2. Apply Preprufe membrane over Preprufe Preformed Outside Cap ensuring a 3-5 in. (75-125 mm) overlap onto corner.
- Apply Preprufe Tape centered over all edges of the Preprufe membrane, roll firmly in place, remove release liner and discard.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Preprufe Tape should overlap onto surfaces of tape, membrane, cap, etc. a minimum of 2 in. (50 mm).

■ 60 Temporary Protection During Construction Sequencing



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than ½ inch. The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

- Install Preprufe membrane in accordance with the Preprufe data sheet section on installation.
- 2. Extend the Preprufe a minimum of 12 in. (300 mm) past any steel extending from slab.
- 3. Cover exposed Preprufe membrane with release liner.
- Apply protection course over Preprufe and release liner, extending a minimum of 12 in. (300 mm) past Preprufe membrane.
- 5. Remove protection course, release liner and repair the membrane if necessary prior to concrete pour.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

Do not penetrate or damage the Preprufe during concrete placement, formwork and bulkhead erection and between construction phases.

Extend the Preprufe a minimum of 12 in. (300 mm) past any steel extending from slab.

Remove protection course and temporary fasteners just prior to tie-in to new Preprufe Membrane.

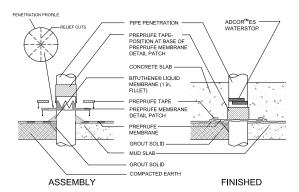
Ensure any fastener holes in the membrane are sealed with Preprufe Tape.

Hydroduct not shown for clarity.

Prior to Membrane Installation, Review the Preprufe® Data Sheet

■ 34 Pipe Penetration

(For Wall or Slab)



*FOOTNOTES:

- · ALL PENETRATIONS TO BE GROUTED.
- · A MINIMUM OF 6 IN. (150 MM) IS REQUIRED BETWEEN PENTRATIONS TO ENSURE PROPER DETAILING.
- · AVOID PLACEMENT OF MULTIPLE PENETRATIONS.
- · A MINIMUM OF 6 IN. (150 MM) OF PIPE NEEDS TO BE EXPOSED AND FREE OF CONNECTIONS, OBSTRUCTIONS, HANGERS, ETC. TO ENSURE PROPER EXECUTION OF THE DETAIL.

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm) The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

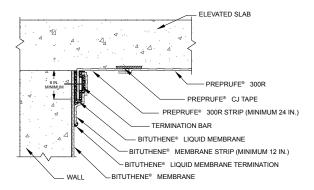
- All penetrations must be firmly secured and stable. Grout around all penetrations that are not stable. For compacted earth, extend grout a minimum of 3 in. (75 mm) in all directions. Clean loose dust or dirt from the penetration surface using a clean, dry cloth or brush.
- 2. Cut the field membrane tight to the penetration and remove release liner. If membrane is not within 0.5 in. (12 mm) of penetration and not more than 2 in. (50 mm) from penetration, apply Preprufe Tape to cover the gap. Roll firmly into place and remove release liner. If the membrane is greater than 2 in. (50 mm) from penetration, install more Preprufe Membrane to cover the gap repeating these instructions until Preprufe Membrane/Tape is within 0.5 in. (12 mm).
- 3. Mix and apply Bituthene Liquid Membrane around the penetration. Liquid Membrane should be placed to form a minimum 1 in. (25 mm) continuous fillet between the Preprufe Membrane/Tape and the base of the penetration. Cut "star" within trace of penetration to allow for patch to slide over penetration.
- 4. Cut a patch of Preprufe Membrane that is a minimum of 12 in. (300 mm) larger than the diameter or width of the penetration so that the patch extends 6 in. (150 mm) beyond the penetration in all directions. Remove the release liner and center the patch over penetration and trace/draw the penetration profile onto the patch. Using sheers or utility knife, make relief cuts through the membrane. Refer to relief cut figures on right. Triangles formed by making a relief cut is not to exceed 2 in. (50 mm) in height when placed over penetration, i.e. penetration diameters or widths greater than 4 in. (100 mm) need to be trimmed. Remove and discard release liner.
- 5. Slide the patch over penetration and press into the partially cured Liquid Membrane. Ensure that the patch is pressed firmly into the Liquid Membrane and is positioned directly onto the Preprufe Field Membrane/Tape below. Using a trowel, smooth out any Liquid Membrane that has flowed out of the relief cut.
- Apply Preprufe Tape centered over the edges of the patch and roll firmly to form a tight seal to the Preprufe Field Membrane. Remove release liner from tape and discard.
- 7. Wrap the penetration with Preprufe Tape, positioning the tape at the base of the patch. Remove enough release liner to overlap Tape on to itself and roll/ press firmly into place. Remove remaining release liner and discard. Repair small fishmouths by pressing firmly against penetration and repair large fishmouths by patching with Preprufe Tape.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

Ensure Adcor™ ES is encapsulated with 76.2 mm (3 in.) of concrete cover minimum. Apply Adcor ES according to the installation instructions found on the data sheet

■ 61 Bituthene Tie-In with Elevated Slab



INSTALLATION INSTRUCTIONS

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than ½ inch. The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

- Install Preprufe membrane in accordance with the Preprufe data sheet section on installation.
- Install Bituthene® Liquid Membrane from the top of the wall over the existing Bituthene® Membrane, extending down a minimum of 6 in. (150 mm).
- While the Bituthene Liquid Membrane is still "wet" (uncured), embed 6 in. (150 mm) of a min. 24 in. (0.6 m) Preprufe 300R strip.
- 4. Install a termination bar through the Preprufe 300R securely into the vertical wall.
- Re-flash over the edge of the Preprufe 300R with Bituthene Liquid Membrane and extend up over the termination bar ensuring the Preprufe 300R and the termination bar are fully encapsulated with Bituthene Liquid Membrane.
- Install a 12 in. (300 mm) strip of Bituthene Membrane from the top of the wall extending down over the Bituthene Liquid Membrane/termination bar and onto the existing Bituthene Membrane.
- 7. Terminate the bottom edge, top edge and all seams of the Bituthene strip with Bituthene Liquid Membrane.
- Protect the Preprufe 300R strip during backfill, placement and compaction
- Fold the Preprufe 300R strip back onto the compacted earth/ gravel for tie-in with Preprufe 300R underslab.
- Ensure that the Bituthene and vertically installed Preprufe are protected with an approved protection course prior to backfill.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation. Hydroduct or approved protection course not shown for clarity



January 2024 101 East 150th Street, Bronx, NY Supplemental Interim Remedial Measures Work Plan Southern Extent File No. 41.0163097.00

APPENDIX K

SUB-SLAB DEPRESSURIZATION PLANS AND DETAILS

9 5

NOTES:

SUMMARY OF WORK:

- 1. INSTALLATION OF A SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)
- 2. CREATION OF STRUCTURAL OPENING THROUGH THE BUILDING FOR VERTICAL RISERS AND ELECTRICAL CONDUITS.
- 3. VAPOR BARRIER/ WATER PROOFING COORDINATION DURING SSDS INSTALLATION.

GENERAL NOTES:

- 1. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND CONDITIONS OF THE SITE.
- 2. DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK SHALL BE INCLUDED IN THE WORK BY THE CONTRACTOR, AS IF HEREIN SPECIFIED OR INDICATED.
- 3. WORK SHALL BE EXECUTED IN FULL COMPLIANCE WITH THE APPLICABLE PROVISIONS OF ALL LAWS, BY-LAWS, STATUTES, ORDINANCES, CODES, RULES, REGULATIONS AND LAWFUL ORDERS OF PUBLIC AUTHORITIES BEARING ON THE PERFORMANCE AND EXECUTION OF THE WORK. THE CONTRACTOR SHALL PROMPTLY NOTIFY THE OWNER OF ANY PORTIONS OF THE WORK, IN THE CONTRACT DOCUMENTS THAT ARE AT VARIANCE WITH THE ABOVE.
- 4. THE CONTRACTOR SHALL PERFORM ALL CUTTING AND PATCHING REQUIRED TO COMPLETE THE WORK OR TO MAKE ITS PARTS FIT TOGETHER PROPERLY WITHOUT COMPROMISING THE QUALITY OF THE WORK.
- 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY BRACING AND PROTECTING ALL WORK DURING CONSTRUCTION AGAINST DAMAGE, BREAKAGE, COLLAPSE, DISTORTION, AND OFF ALIGNMENTS ACCORDING TO CODES AND STANDARDS OF GOOD PRACTICE.
- 6. THE CONTRACTOR SHALL COORDINATE OPENINGS IN THE FOUNDATION, INTERIOR AND EXTERIOR WALLS FOR THE INSTALLATION OF CONDUITS AND BOXES FOR ELECTRICAL EQUIPMENT.
- 7. WHERE MANUFACTURERS' NAMES AND PRODUCT NUMBERS ARE INDICATED ON THE DRAWINGS, IT SHALL BE CONSTRUED TO MEAN THE ESTABLISHING OF QUALITY AND PERFORMANCE STANDARDS OF SUCH ITEMS.
- 8. THE SUB-SLAB DEPRESSURIZATION SYSTEM COUPLES WITH THE REQUIREMENTS OF THE 2008 NYC MECHANICAL CODE SECTION 512, "SUBSLAB EXHAUST SYSTEMS".
- 9. THE SUB-SLAB DEPRESSURIZATION SYSTEM IS NOT A "HAZARDOUS EXHAUST SYSTEM" AS DEFINED BY THE 2008 NYC MECHANICAL CODE SECTION 510.

SSDS INSTALLATION NOTES:

- 1. IT IS THE INTENT OF THIS DRAWING TO INSTALL AN EFFECTIVE AND OPERABLE SUB-SLAB DEPRESSURIZATION SYSTEM IN GENERAL ACCORDANCE WITH THE CURRENT DEPARTMENT OF HEALTH VAPOR INTRUSION GUIDANCE DATED OCTOBER 2006, UPDATED 2017 TO MITIGATE THE POTENTIAL MIGRATION OF IMPACTED SOIL VAPORS INTO THE BUILDING.
- 2. SUB-SLAB VAPOR BARRIER SHOULD BE INSTALLED BENEATH THE ENTIRE BUILDING FOOTPRINT. THE VAPOR BARRIER WILL CONSIST OF A 46-MIL GCP VAPOR BARRIER (WPS-01) DIRECTLY BENEATH THE POURED FOUNDATION SLAB AND ABOVE AN UNDERLYING 12-INCH PERMEABLE AGGREGATE LAYER AND A 60-MIL GCP VAPOR BARRIER (WPS-02) ON THE EXTERIOR OF FOUNDATION WALL EXTENDING TO GROUND SURFACE.
- 3. INSTALLATION OF THE VAPOR BARRIER MATERIAL SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS. PERFORM/INSTALL SEALS AROUND PERMANENT PENETRATION COMPATIBLE WITH THE VAPOR BARRIER AND IN ACCORDANCE WITH THE MATERIAL MANUFACTURER.
- 4. USE OF A VAPOR BARRIER DIRECTLY BELOW THE SLAB-ON-GRADE MAY PROMOTE SLAB CURLING. THE MOISTURE CONTENT OF THE SLAB-ON-GRADE CONCRETE SHALL BE CONTROLLED DURING CURING TO LIMIT THE SLAB CURLING TO TOLERABLE MEASUREMENTS.
- 5. THE INSTALLER IS TO FIELD VERIFY AS-BUILT CONDITIONS FOR VAPOR BARRIER PVC PIPING, GALVANIZED STEEL PIPING AND OTHER EQUIPMENT INCLUDING MATERIALS LOCATED ON THE ROOF FOR THE PURPOSE OF VERIFYING THE SUB-SLAB VAPOR MITIGATION PIPING LAYOUT. THE LAYOUT SHOWN ON THESE DRAWINGS IS SHOWN AS THE BASIS OF DESIGN OF THE INSTALLATION. GAS COLLECTION PIPING LOCATIONS SHALL BE RELOCATED, AS NECESSARY, TO AVOID FOUNDATIONS AND MINIMIZE INTERFERENCE WITH OTHER UTILITIES. FLOOR SLAB AND GRADE BEAM PENETRATION LOCATIONS ARE APPROXIMATE AND SHALL BE CONFIRMED BY THE MECHANICAL ENGINEER AND/OR ARCHITECT.
- 6. A MINIMUM 12-INCH THICK, CONTINUOUS GAS PERMEABLE AGGREGATE LAYER WILL BE INSTALLED DIRECTLY BENEATH THE VAPOR BARRIER. THE GAS PERMEABLE AGGREGATE LAYER SHALL CONSIST OF STONE MEETING THE FOLLOWING GRADATION (SIMILAR TO AASHTO NO. 5 STONE):

SIEVE SIZE	PERCENT PASSING BY WEIGHT
1-1/2 INCH	100
1-INCH	90-100
3/4-INCH	20-55
1/2-INCH	0-5

- 7. GAS PERMEABLE AGGREGATE SHALL BE UNIFORM IN QUALITY AND FREE OF WOOD, LOAM, CLAY, DIRT, ROOTS, BARK, AND ANY OTHER EXTRANEOUS MATERIAL. MATERIAL SHALL NOT CONTAIN SALTS OR FOREIGN MATERIALS OF ANY KIND. NO ORGANIC MATERIALS WITH POTENTIAL FOR GROWTH (I.E.; SEEDS OR GRASSES) ARE ALLOWED ON THE PREPARED SUBGRADE. THE PREPARED SUBGRADE SURFACES TO BE LINED SHALL BE FREE OF ALL ROCKS, STICKS, ROOTS, SHARP OBJECTS, OR CONSTRUCTION DEBRIS OF ANY KIND. NO STANDING WATER, EXCESSIVE MOISTURE, OR FROZEN GROUND SHALL BE ALLOWED.
- 8. WITHIN THE GAS PERMEABLE AGGREGATE LAYER WILL BE ROWS OF PVC GAS COLLECTION PIPING (OR APPROVED EQUIVALENT) APPROXIMATELY WHERE SHOWN ON THE PLAN. THE FINAL LAYOUT OF THE PVC GAS COLLECTION PIPING WILL BE COORDINATED WITH FINAL UTILITY LOCATIONS PRIOR TO INSTALLATION.
- 9. THE SOLID PIPING CONNECTING TO THE VERTICAL RISERS SHALL BE SLOPED MINIMUM OF 1% UNIFORMLY AWAY FROM THE VERTICAL RISERS TO FACILITATE DRAINAGE OF CONDENSATION OR PRECIPITATION WHICH MAY COLLECT WITHIN THE SYSTEM.
- 10. ALL PENETRATIONS IN THE VAPOR BARRIER SHALL BE SEALED ACCORDING TO MANUFACTURER RECOMMENDATIONS AND THE VAPOR BARRIER SHALL BE INSTALLED BY A LICENSED GCP PREPRUFE INSTALLER WITH EXPERIENCE ON AT LEAST THREE SIMILARLY SIZED PROJECTS.
- 11. FLOOR DRAINS AND AIR CONDITIONING OR REFRIGERATION DRAINS THAT DISCHARGE DIRECTLY INTO THE SOIL BELOW THE FOUNDATION SHOULD BE AVOIDED.

PIPING NOTES:

- 1. THE CONTRACTOR IS TO FIELD VERIFY AS-BUILT SSDS COMPONENT INSTALLATION CONDITIONS WITH A SURVEY ACCURATE TO $\pm\,0.01$ FEET IN THE VERTICAL DIRECTION AND $\pm\,0.1$ FEET IN THE HORIZONTAL DIRECTION.
- 2. THE SSDS VENT PIPING IS NOT EXHAUSTING AN INDUSTRIAL PROCESS. THE SOIL VAPOR EXHAUST DOES NOT REPRESENT A CLASSIFIED OR EXPLOSIVE ATMOSPHERE.
- 3. FLOOR PENETRATIONS INSTALLED POST SLAB CONSTRUCTION SHALL BE SEALED WITH AIRTIGHT/WATERTIGHT FOAM AND NON-SHRINK GROUT SEALANT AFTER APPROVAL OF SHOP DRAWINGS AND METHODS.

SAFETY NOTES:

- 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE HEALTH AND SAFETY OF THEIR EMPLOYEES AND FOR PERFORMING THE WORK IN A SAFE MANNER IN ACCORDANCE WITH ALL APPLICABLE LAWS AND REGULATIONS, INCLUDING SAFE CONDITIONS FOR WORK DONE AT ELEVATIONS OF SIX (6) FEET OR MORE ABOVE AN ADJACENT SURFACE.
- 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING THE SITE DURING ALL NON-WORKING HOURS TO PREVENT
- UNAUTHORIZED ENTRY INTO THE WORK AREA AND DIRECTING VEHICULAR TRAFFIC AWAY OR AROUND THE WORK AREA.
- AS A SAFEGUARD, THE SSDS IS BEING INSTALLED TO MITIGATE THE POTENTIAL FOR VAPOR INTRUSION FROM VOLATILE ORGANIC COMPOUNDS IN SOIL VAPOR ENTERING THE BUILDING. DURING WORK ACTIVITIES THE CONTRACTOR MAY ENCOUNTER SOIL AND/OR SOIL VAPOR THAT IS IMPACTED BY VOLATILE ORGANIC COMPOUNDS.

SUBMITTALS

- 1. AT A MINIMUM, THE CONTRACTOR SHALL PROVIDE SUBMITTALS PRIOR TO THE START OF THE WORK FOR THE FOLLOWING ITEMS PROPOSED FOR USE:
 - a. SOURCE AND GRADATION RESULTS FOR THE GAS PERMEABLE AGGREGATE STONE
 - b. NON-WOVEN GEOTEXTILE (MIRAFI 160N, OR APPROVED EQUIVALENT)
 - c. RISER CLEANOUTS
- d. SUB-SLAB MONITORING POINTS
- e. EXHAUST FANS

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Sustainability consultant

Socotec

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arkaSpecs, Inc.
12 Phyllis Ln, Rock Tavern, NY 12575



SEAL

5 08/11/2023 ADDENDUM 5
4 07/14/2023 ADDENDUM 3
3 05/26/2023 ISSUED FOR CONSTRUCTION
2 03/31/2023 ISSUED FOR 80% CONSTRUCTION DOCUMENTS
1 11/18/2022 ISSUED FOR 30% CONSTRUCTION DOCUMENTS

2 03/31/2023 ISSUED FOR 80% CONSTRUCTION DOCUM
1 11/18/2022 ISSUED FOR 30% CONSTRUCTION DOCUM

NO. DATE DESCRIPTION

DRAWING TITLE

SUB-SLAB
DEPRESSURIZATION
SYSTEM (SSDS)
GENERAL NOTES

DRAWING NUMBER

H-001

NB APPLICATION NO.

#X006970361-I1

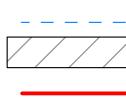
32' - 0" 16' - 0" 6' - 0" 16' - 0" 16' - 0" 16' - 0" 8' - 0" 8' - 0" 16' - 0" 16' - 0" 10' - 8" 16' - 0" 16' - 0" 16' - 0" SHEAR WALL PENETRATION THROUGH GRADE BEAM - / SEE DETAIL 11 ON H-006 05.2 WALL FOOTING 02.8 02.1 000000000 0 0 0 0 0 0 0 0 0 EJECTOR PIT APPROXIMATE LOCATION — OF PROPERTY LINE

NOTES

- 1. BASE MAP DEVELOPED FROM DRAWING "FO-100.00" TITLED "FLOOR PLAN FOUNDATION, PREPARED BY LERA CONSULTING STRUCTURAL ENGINEERS, R.L.L.P., ORIGINAL SCALE $\frac{1}{16}$ "=1',, DATED MAY 26, 2023.
- 2. THIS PLAN SHALL NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL OR OTHER REFERENCE PURPOSES EXCEPT FOR THE SUB-SLAB DEPRESSURIZATION
- 3. THE EXTENTS OF THE BUILDING CONSTRUCTION BENEATH THE GROUND SHALL BE LINED WITH VAPOR BARRIER.
- 4. SLOPE HORIZONTAL PIPE A MINIMUM OF 1% UNIFORMLY AWAY FROM THE SUB-SLAB DEPRESSURIZATION SYSTEM VERTICAL RISERS.
- 5. COORDINATE ALL WORK FOR SSDS INSTALLATION WITH OTHER TRADES BEFORE INSTALLATION.
- 6. REFER TO DRAWING H-005 FOR SECTION VIEW.
- 7. THE SSDS PIPING AND/OR GAS PERMEABLE BACKFILL SHALL NOT BE PLACED IN LOCATIONS WITH EXCAVATION BELOW THE WATER TABLE.

LEGEND

PROPOSED BUILDING LINE CONSISTING OF A 60-MIL GCP VAPOR BARRIER (WPS-02) APPLIED ON THE EXTERIOR OF FOUNDATION WALL EXTENDING TO GROUND SURFACE

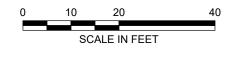


60-MIL GCP VAPOR BARRIER (WPS-02) APPLIED ON THE EXTERIOR OF ELEVATOR PIT SIDEWALLS HORIZONTAL EXTENT OF SSDS, 46-MIL GCP VAPOR BARRIER (WPS-01), AND 12" GAS PERMEABLE AGGREGATE



4-INCH DIAMETER SOLID SCHEDULE 80 PVC SSDS PIPE BENEATH BUILDING SLAB 6-INCH DIAMETER VERTICAL GALVANIZED STEEL RISER PIPE EXTENDS THROUGH CELLAR SLAB

SSDS PIT LOCATION (REFER TO DETAIL 1 & 2 ON DRAWING H-006)



VERTICAL RISER AND CONNECTED SSDS PIT TABLE

VERTICAL RISER ID	SUB-SLAB DEPRESSURIZATION PIT ID
VR-01	SSD-01, SSD-02, SSD-03
VR-02	SSD-04, SSD-05
VR-03	SSD-06, SSD-07, SSD-08
VR-04	SSD-09, SSD-10
VR-05	SSD-11, SSD-12
VR-06	SSD-13, SSD-14
VR-07	SSD-15, SSD-16

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MEPF ENGINEER Ventrop Engeneering Consulting Group, PLLC 369 W 34th Street, New York, NY 10001

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AV & IT

Align 55 Broad Street, New York, NY 10004

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SUSTAINABILITY CONSULTANT 151 W 42nd Street, New York, NY 10036

ACOUSTICS Cerami & Associates 1001 Avenue of the Americas, New York, NY 10018

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250 Park Avenue South, New York, NY 10003 SECURITY CONSULTANT Ross & Baruzzini

110 William Street, 29th Floor, New York, NY 10038 HARDWARE CONSULTANT

arkaSpecs, Inc.

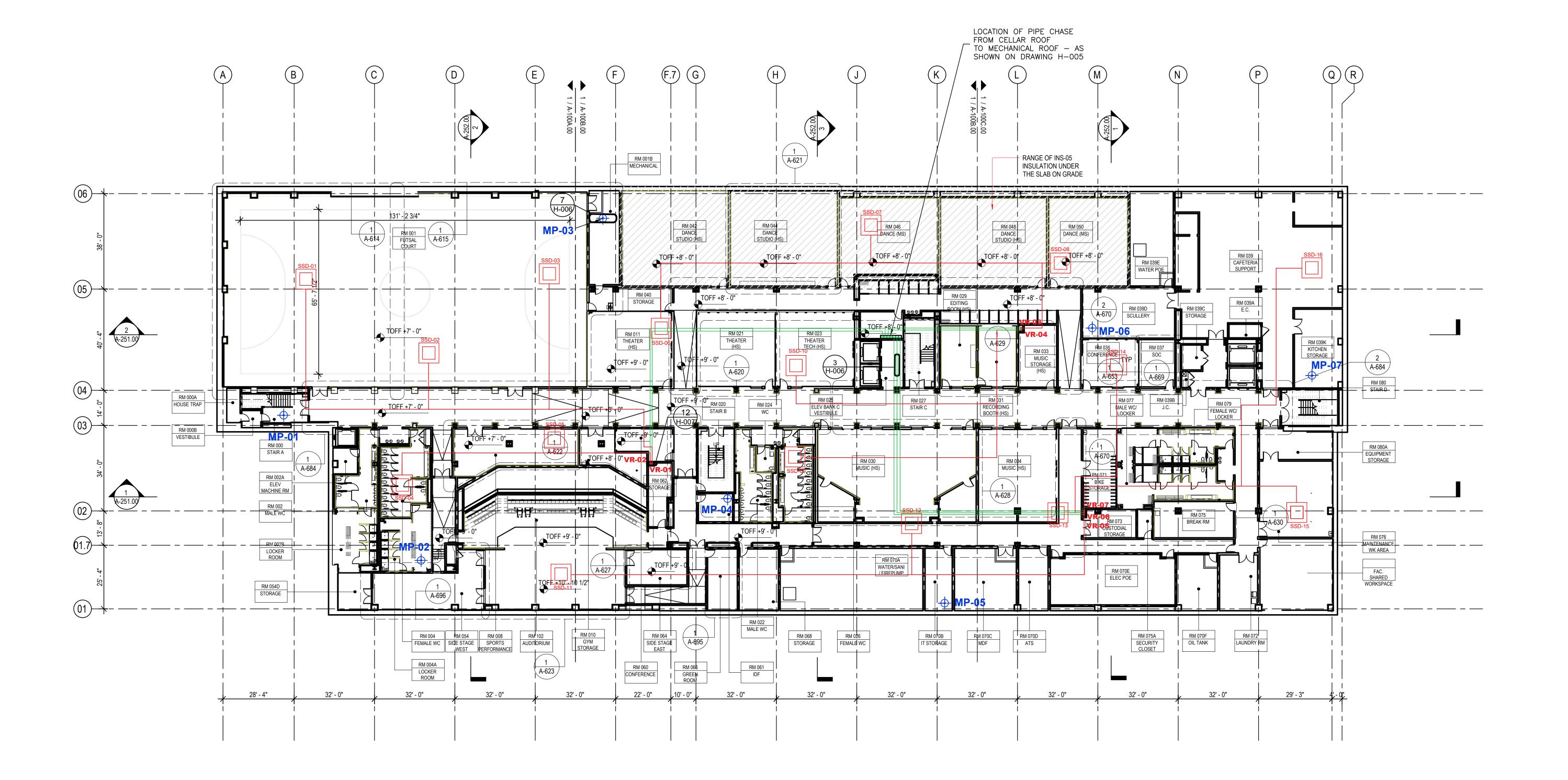
12 Phyllis Ln, Rock Tavern, NY 12575



SSDS PIT AND VAPOR BARRIER COVERAGE **PLAN**

H-002

NB APPLICATION NO. #X006970361-I1



NOTES

- 1. BASE MAP DEVELOPED FROM DRAWING "A-010" TITLED KEY PLAN CELLAR", PREPARED BY SKIDMORE, OWINGS & MERRILL LLP, ORIGINAL SCALE $\frac{1}{16}$ "=1',, DATED
- 2. THIS PLAN SHALL NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL OR OTHER REFERENCE PURPOSES EXCEPT FOR THE SUB-SLAB DEPRESSURIZATION
- 3. COORDINATE ALL WORK FOR SSDS AND RELATED COMPONENTS INSTALLATION WITH OTHER TRADES BEFORE INSTALLATION.

LEGEND

4-INCH DIAMETER SOLID PVC SSDS PIPE BENEATH BUILDING SLAB

CEILING LEVEL 6-INCH DIAMETER GALVANIZED STEEL PIPING WITH HANGERS LEADING TO PIPE CHASE FROM

6-INCH DIAMETER VERTICAL GALVANIZED STEEL RISER PIPE EXTENDS THROUGH CELLAR SLAB (REFER TO DETAIL 8 ON DRAWING H-006).

6-INCH DIAMETER GALVANIZED STEEL RISER WITH CLEAN OUT

SUB-SLAB MONITORING POINT (REFER TO DETAIL7 ON DRAWING H-006)



SSDS PIT LOCATION (REFER TO DETAIL 1 & 2 ON DRAWING H-006)

ID	ROOM LOCATION (CELLAR LEVEL)	CORRESPONDING VERTICAL RISER
MP-01	RM 000 - STAIR A	VR-01
MP-02	RM 004A - LOCKER ROOM	VR-02
MP-03	RM 001B - MECHANICAL	VR-03
MP-04	RM 061 - IDF	VR-04
MP-05	RM 070B - IT STORAGE	VR-05
MP-06	RM 039C - SCULLERY	VR-06
MD 07	RM 039D -	VR-07

KITCHEN STORAGE NOT USED

MP-08

VR-07

NOT USED

MONITORING POINT LOCATIONS

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40 Wall Street, New York, NY 10005 MEPF ENGINEER Ventrop Engeneering Consulting Group, PLLC 369 W 34th Street, New York, NY 10001

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Align 55 Broad Street, New York, NY 10004

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SBLD Studio 575 Bloomfield Ave, Montclair, NJ 07042 CODE CONSULTING

Code Consulting, Inc. 215 West 40th Street, New York, NY 10018

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Hatfield Group 285 W Broadway, New York, NY 10013 SUSTAINABILITY CONSULTANT

151 W 42nd Street, New York, NY 10036

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HARDWARE CONSULTANT arkaSpecs, Inc.

12 Phyllis Ln, Rock Tavern, NY 12575



6	09/29/2023	BULLETIN 01
6	09/29/2023 08/11/2023	BULLETIN 01 ADDENDUM 5
5		
-	08/11/2023	ADDENDUM 5
5	08/11/2023 07/14/2023	ADDENDUM 5 ADDENDUM 3

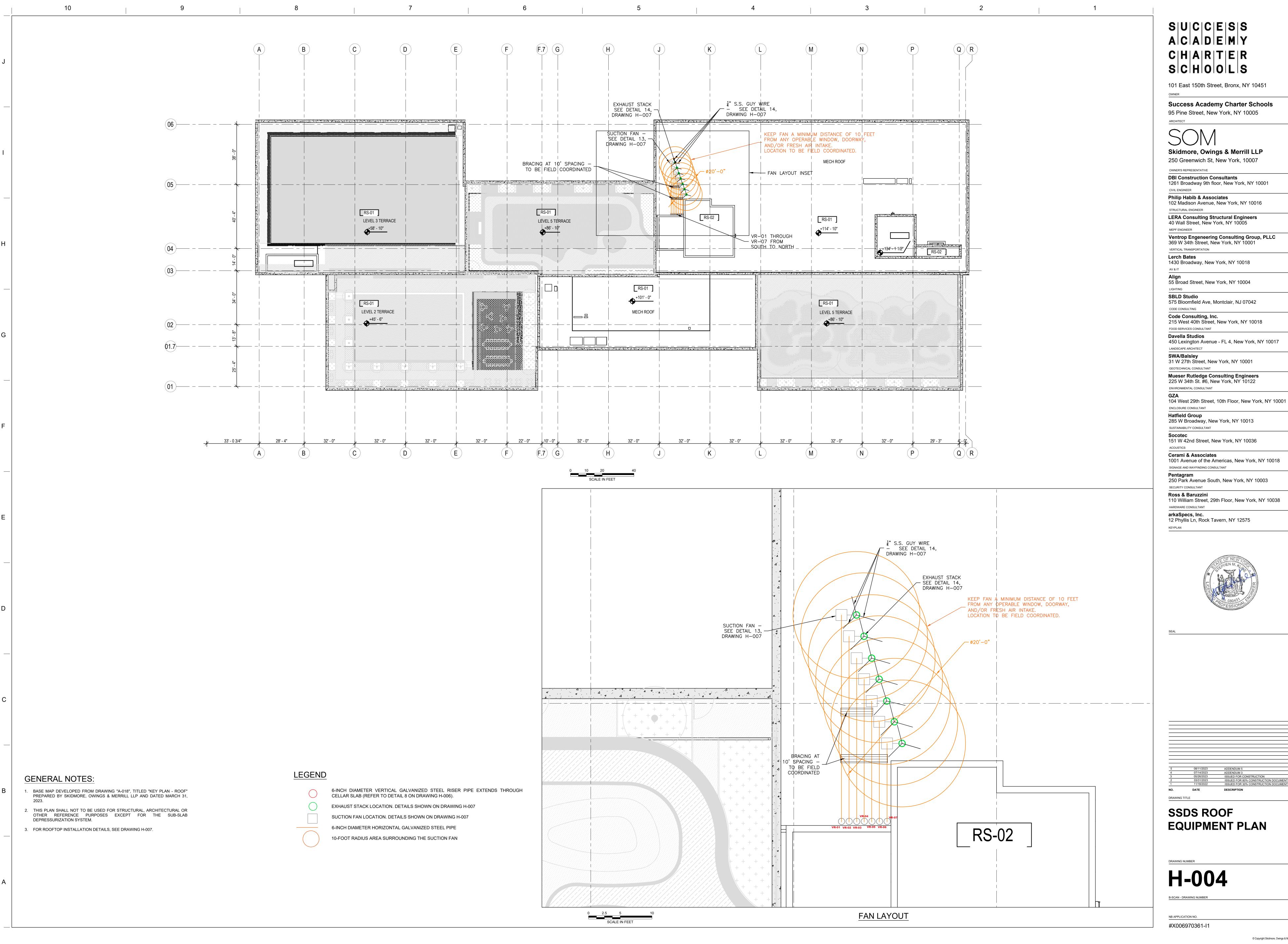
SSDS RISER AND **MONITORING POINT**

DRAWING NUMBER

PLAN

H-003

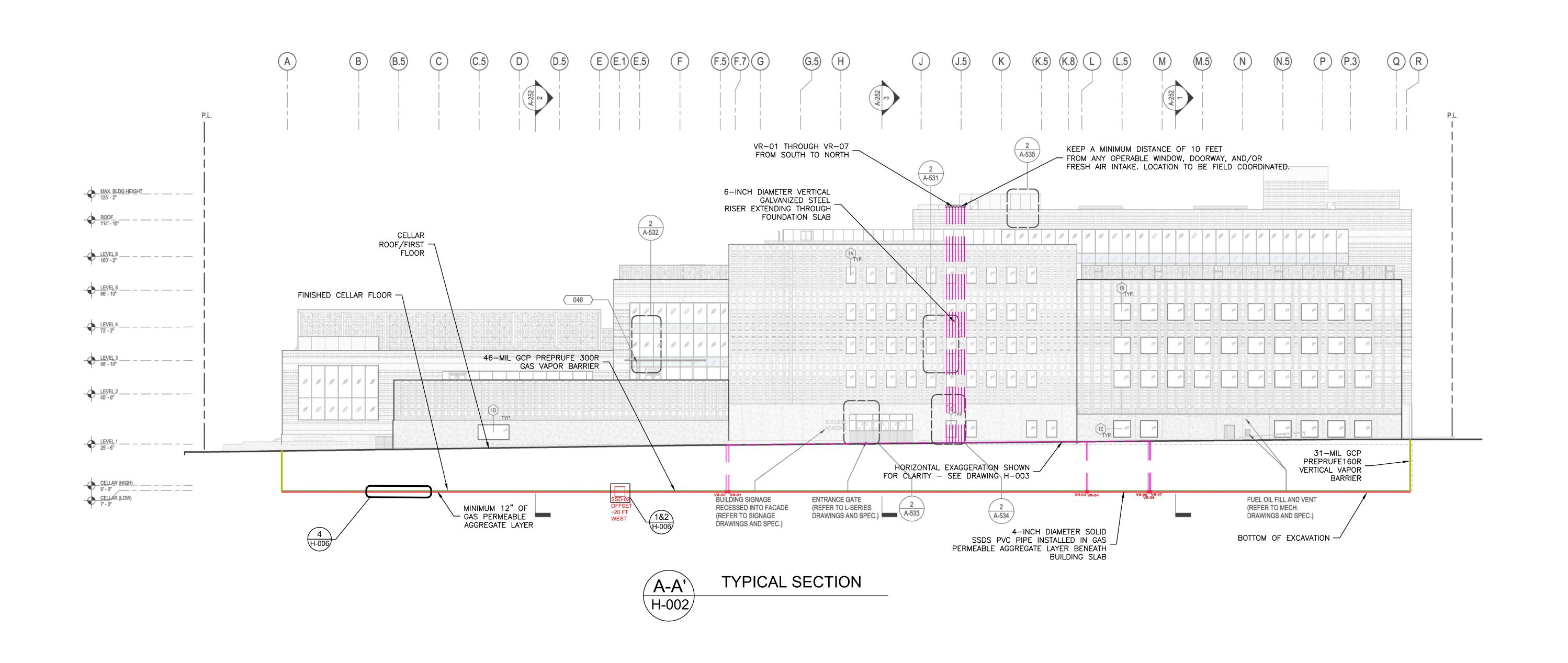
NB APPLICATION NO. #X006970361-I1



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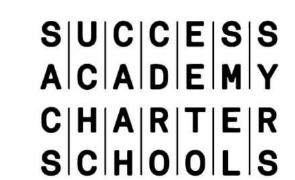
1001 Avenue of the Americas, New York, NY 10018



NOTES

- 1. BASE MAP DEVELOPED FROM DRAWING A-201 TITLED BUILDING ELEVATIONS EAST, PREPARED BY SKIDMORE, OWINGS & MERRILL LLP, ORIGINAL SCALE 1/16" =
- 1'0", DATED MARCH 31, 2023.
- 2. THE SSDS PIPING DOES NOT RUN ALONG THE ENTIRE LENGTH OF SECTION A-A, BUT IS SHOWN ON THE PROFILE VIEW FOR CLARITY.

LEGEND 6-INCH DIAMETER VERTICAL GALVANIZED STEEL RISER PIPE EXTENDING TO ROOF 46-MIL GCP HORIZONTAL VAPOR BARRIER (WPS-01) 4-INCH DIAMETER SOLID SSDS PVC PIPE INSTALLED IN TRENCH BENEATH BUILDING SLAB 60-MIL GCP VERTICAL VAPOR BARRIER (WPS-02) 6-INCH DIAMETER GALVANIZED STEEL RISER PIPE OUTLET LOCATION SSDS PIT LOCATION (REFER TO DETAIL 1 & 2 ON DRAWING H-006) SSD-02



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HARDWARE CONSULTANT

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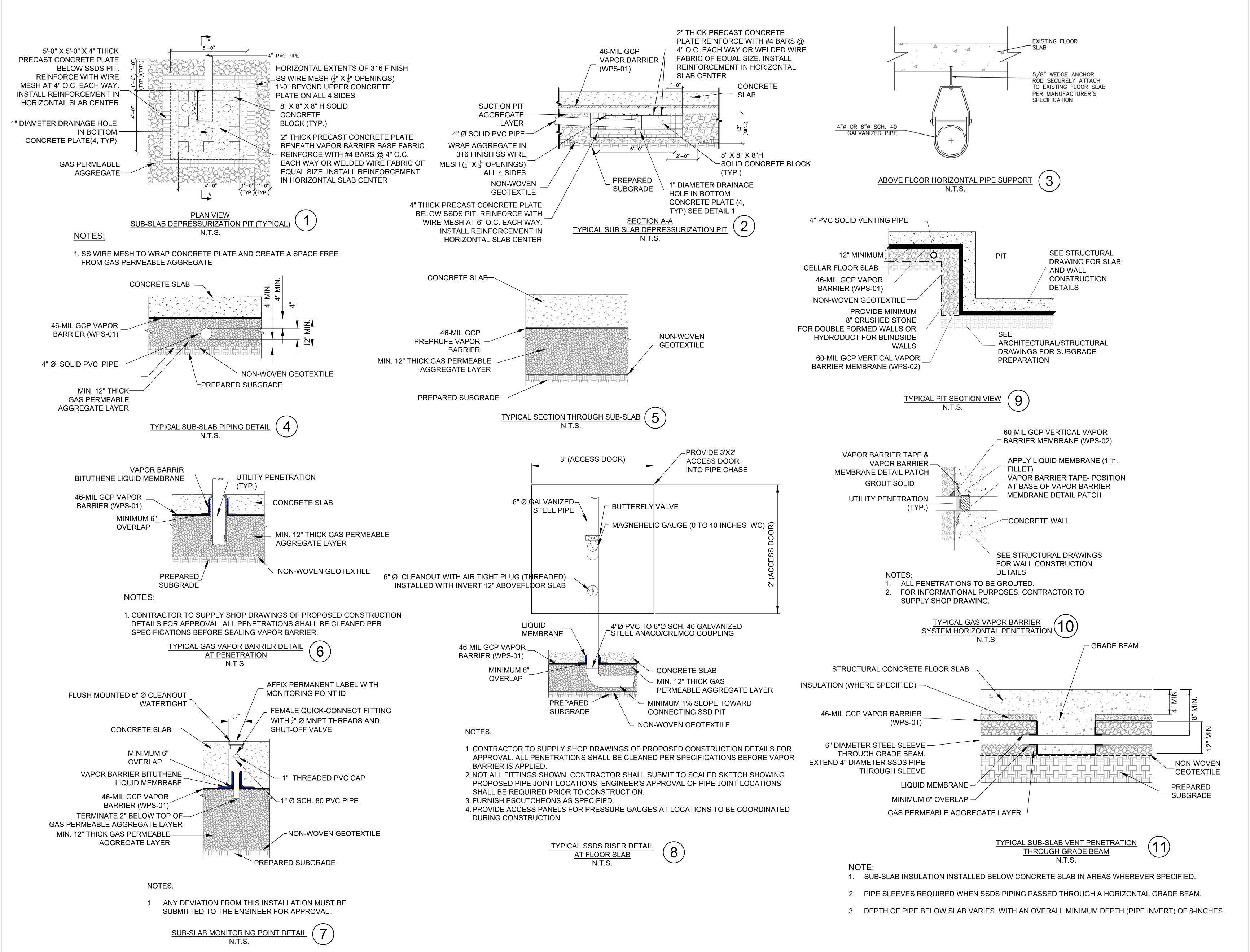


1	11/18/2022	ISSUED FOR 30% CONSTRUCTION DOCUMENT
2	03/31/2023	ISSUED FOR 80% CONSTRUCTION DOCUMENT
3	05/26/2023	ISSUED FOR CONSTRUCTION
4	07/14/2023	ADDENDUM 3
5	08/11/2023	ADDENDUM 5

SSDS ELEVATION PLAN

H-005

NB APPLICATION NO. #X006970361-I1



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arkaSpecs, Inc.

SECURITY CONSULTAN

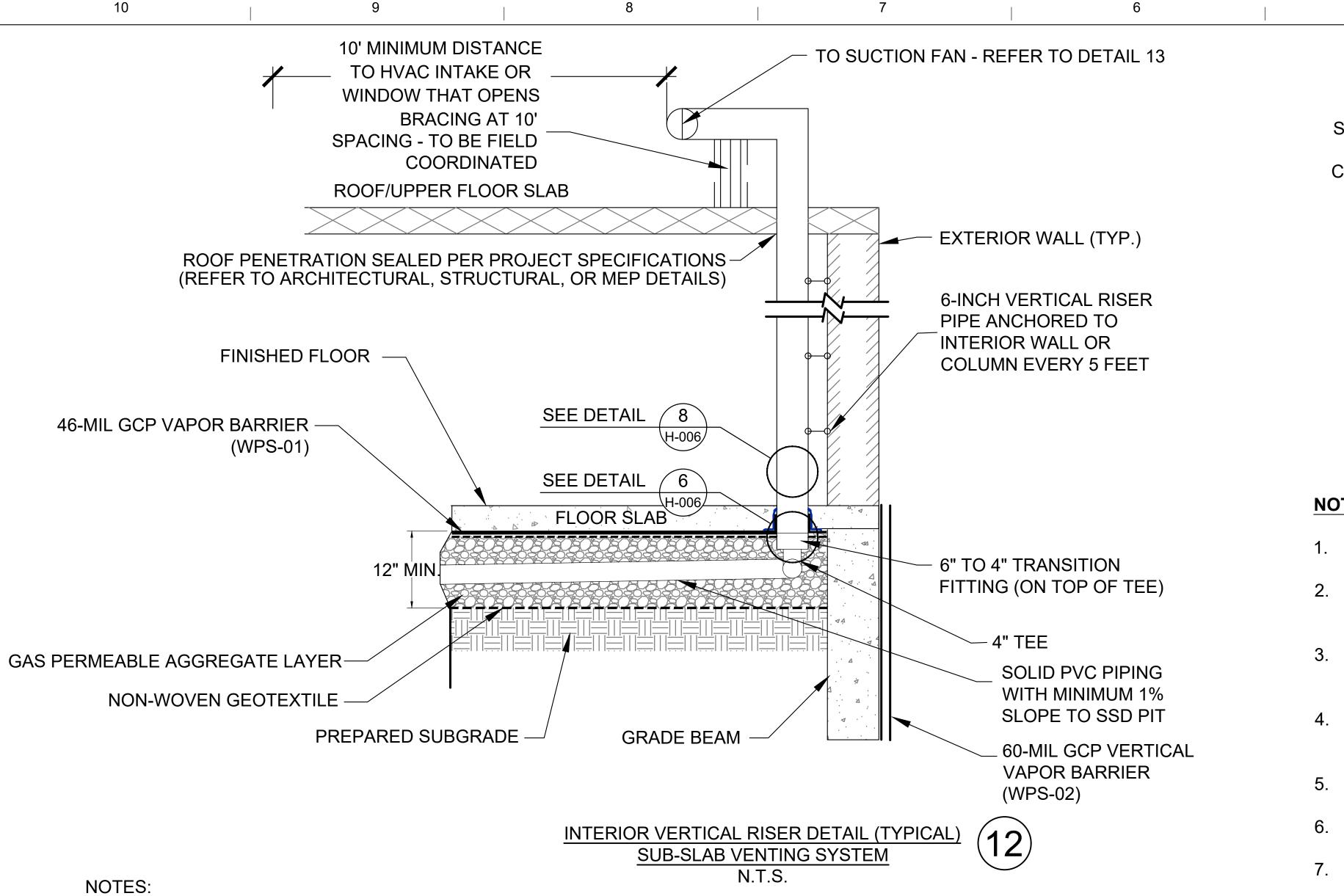
12 Phyllis Ln, Rock Tavern, NY 12575



SSDS AND CHEMICAL **VAPOR BARRIER DETAILS**

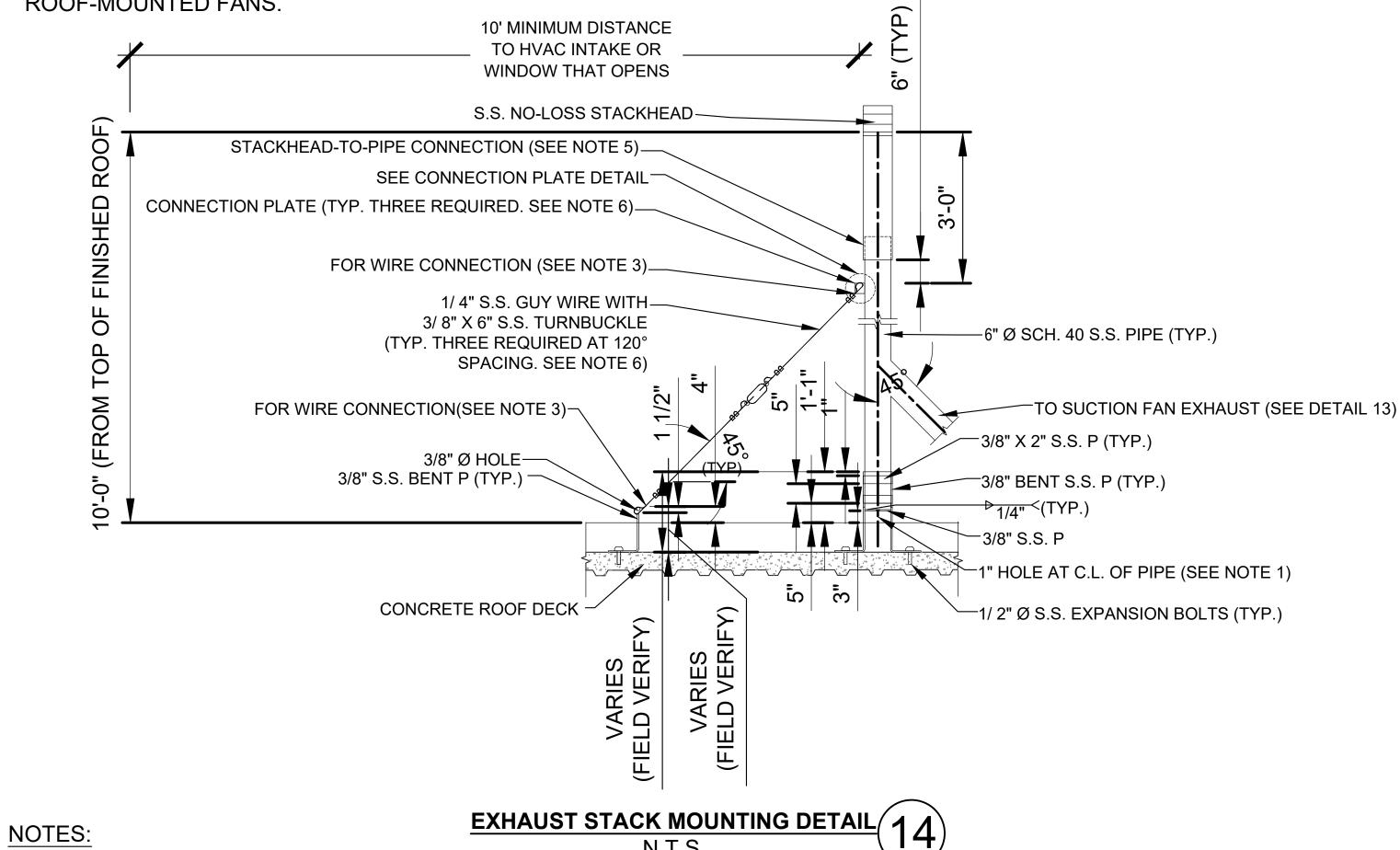
H-006

#X006970361-I1



1. CONTRACTOR TO SUPPLY SHOP DRAWINGS OF PROPOSED CONSTRUCTION DETAILS FOR APPROVAL. ALL PENETRATIONS SHALL BE CLEANED PER SPECIFICATIONS BEFORE VAPOR BARRIER INSTALLATION.

2. COORDINATE WITH HVAC CONTRACTOR RESPONSIBLE FOR INSTALLATION OF 6" PIPE ANCHORS AND CONNECTION TO ROOF-MOUNTED FANS.

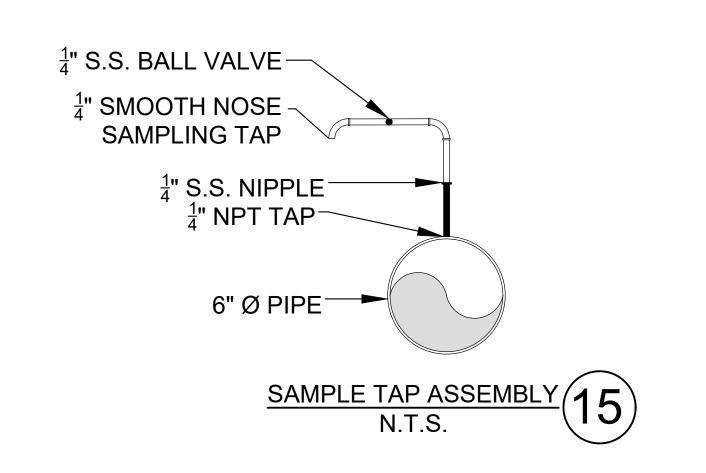


N.T.S.

EXHAUST STACK — SUCTION FAN FLEXIBLE CONNECTOR / REDUCER DIFFERENTIAL PRESSURE SWITCH (DPS) CONNECTED TO BMS COORDINATE **CONNECTION WITH OTHER TRADES** VACUUM GAUGE-SAMPLE TAP (REFER TO DETAIL 15)-REFER TO ARCHITECTURAL DRAWINGS FOR DETAIL FOR 6" Ø BLIND FLANGE MOUNTING TO CONCRETE PAD 6" Ø GALVANIZED STEEL PIPE – REFER TO ARCHITECTURAL DRAWINGS FOR-SUCTION FAN TO BE PIPE PENETRATION THROUGH ROOF **MOUNTED ON 18-INCH** CONCRETE PAD. SEE CONTRACT STRUCTURAL DRAWINGS (TYP). TO SUB-SLAB **NOTES:**

- NOT ALL REQUIRED ACCESSORIES ARE SHOWN. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- 2. ELECTRICAL WIRING AND EQUIPMENT NOT SHOWN. REFER TO ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR REQUIREMENTS.
- 3. PIPE AND EQUIPMENT ARRANGEMENT SHOWN FOR SCHEMATIC PURPOSES ONLY. SUBMIT SCALED DRAWING SHOWING PROPOSED ARRANGEMENT. CONTRACTOR IS REQUIRED TO OBTAIN APPROVAL OF ARRANGEMENT.
- 4. SUCTION FAN DETAIL AS SHOWN PROVIDED BY INDUSTRIAL PLASTIC FAN CMVECO 200 MODEL. SUCTION FAN SHALL BE INDUSTRIAL PLASTIC FAN CMVECO 200 OR APPROVED EQUIVALENT.
- 5. SUCTION FAN SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS
- 6. COORDINATE ALL ROOF PENETRATIONS WITH ALL OTHER TRADES TO ENSURE SEALED IN ACCORDANCE WITH WARRANTY.
- DIFFERENTIAL PRESSURE SWITCH CONNECTED TO BMS AND TESTED FOR PROPER OPERATION.
- 8. PROVIDE SHOP DRAWINGS FOR BLOWER AND ACCESSORY LAYOUT.
- 9. ATTACH TO EXHAUST STACK.





1. PROVIDE PITCH POCKET IN PLATE FOR DRAINAGE.

- 2. ADJUST DIMENSIONS TO PROVIDE A TIGHT FIT BETWEEN THE PIPE AND THE BENT PLATE.
- 3.1/4" S.S. GUY WIRE SHALL BE LOOPED THROUGH THE 3/8" Ø HOLES AT THE TOP AND BOTTOM CONNECTION PLATES AND THROUGH THE EYE AT EACH END OF THE TURNBUCKLE. EACH CONNECTION SHALL BE SECURED BY TWO 1/4" S.S. WIRE ROPE CLAMPS.
- 4. ALL PLATES, PIPES, GUY WIRES, TURNBUCKLES, AND CLIPS SHALL BE ASTM G304 STAINLESS STEEL.
- 5. PROVIDE CONNECTION PER MANUFACTURERS RECOMMENDATION OR USE (6) 1/4" ASTM G304 STAINLESS STEEL MACHINE SCREWS, DRILL AND TAP AS REQUIRED.
- 6. THREE GUY WIRE/CONNECTION PLATES ARE TO BE USED SPACED EVENLY AROUND THE CIRCUMFERENCE OF THE PIPE (120° SPACING).
- 7. PROVIDE LIGHTNING ROD AND GROUNDING WIRE AS PER ELECTRICAL REQUIREMENTS.
- 8. COORDINATE ALL ROOF PENETRATIONS FOR FAN SUPPORT WITH OTHER TRADES.

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SSDS FAN DETAILS

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