



April 14, 2023

Bryan Wong
NYSDEC – Region 2
1 Hunter's Point Plaza
47-40 21st Street,
Long Island City, NY 11101

RE: Remedial Design Workplan
1057 Atlantic Avenue, Brooklyn, NY
BCP #C224305

Dear Mr. Wong:

P.W. Grosser Consulting Engineer & Hydrogeologist, P.C. (PWGC) has prepared this Remedial Design Workplan for the above referenced Site to further detail the remedial elements identified in the Remedial Action Work Plan (RAWP) prepared by PWGC in February 2023 and approved by the New York State Department of Environmental Conservation (NYSDEC) in February 2023.

This Remedial Design Workplan is focused on the installation of a sub-slab depressurization system (SSDS) and soil vapor extraction (SVE) system, and the installation of a vapor barrier and waterproofing system.

A Site Location Map is included as **Figure 1** and a Site Plan is included as **Figure 2**. The SSDS, SVE, and vapor barrier design details are included as **Appendix A**. The waterproofing system, designed by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology D.P.C. (Langan), is included as **Appendix B**.

Sub-Slab Depressurization System:

A SSDS will be installed beneath the new building footprint to mitigate potential soil vapor intrusion into the new building. The SSDS will be installed in a trench format beneath the cellar and the portion of the first floor that is in contact with the soil and the riser will be routed through the building to above the roofline to vent the vapor space beneath the building.

The SSDS piping will consist of Geovent material placed within a 4-inch thick layer of 1/2-inch to 1-inch crushed stone beneath the basement slab and first floor slabs that are in contact with the soil. A non-woven geotextile fabric will be placed beneath the stone layer to reduce fines from entering the system. The Geovent will be connected to galvanized closed duct riser piping that will be routed through the building and to the roof. The sub-cellar Geovent will be connected to 6-inch diameter galvanized closed duct piping which increases to an 8-inch and then a 10-inch duct as it manifolds together. The sub-first-floor Geovent on the west side of the property will be connected to 8-inch diameter galvanized closed duct piping and on the east side of the property it will be connected to 6-inch diameter schedule 80 PVC beneath the ramp and then 8-inch diameter galvanized closed duct piping as it penetrates the cellar wall; this duct



piping will be routed through the top of the cellar and will be manifolded to the riser piping from the sub-cellar SSDS piping and will continue up to above the roofline through 10-inch diameter closed duct piping. The SSDS riser piping will be connected to a Cincinnati Fan model HP-8B18, 5.0 horse power, three-phase, 230 volt blower. The discharge point of the SSDS will be located above the eave of the roof, a minimum of 10 feet from any opening that is less than 2 feet below the exhaust point, and a minimum of 10 feet from any adjoining or adjacent buildings or HVAC intakes or supply registers.

Effluent sampling ports will be located on each riser section of the SSDS legs prior to their union and a combined effluent sampling point will be located on the riser pipe above the roof. A total of five vacuum monitoring points will be installed, three beneath the cellar and two beneath the first floor. The vacuum monitoring points will be constructed of a low profile stainless steel vapor pin which ties into the vapor barrier with a 1.5-inch diameter schedule 40 PVC open ended pipe the will terminate in the gravel layer.

The manufacturer specifications for the Cincinnati Fan blower are included as **Appendix C**.

Soil Vapor Extraction System:

A SVE system will be installed beneath the cellar and will be focused in the area of elevated chlorinated solvent impact observed in the soil vapor. Two of the SVE wells will be located in the suspected source area of the contamination and the other three wells will be located north of this area, spaced 40 feet on center from each other, to prevent off-site migration north of the subject property. The system has been designed to overcome the adsorption of the volatile contaminants of concern mainly through applying a vacuum of at least 0.1-inch of water column (w.c.) to the impacted soils. A radius of influence of approximately 25 feet was determined based on the soil characteristics of medium sands and the application of an average of 3-inch w.c. vacuum at each well. Verification of system effectiveness will be determined through effluent sampling analysis during system operation.

Each SVE well point will be installed to elevation 24 feet (approximately 56 feet below sidewalk grade). The SVE wells will be constructed of 4-inch diameter schedule 40 PVC with 35 feet of 20-slot screen and riser to just below the top of slab. Each well head will be finished with a j-plug and a flush mounted manhole cover at the slab. The well annulus will be backfilled with #00 gravel to 2-feet above the top of the well screen and then a bentonite seal to the bottom of the sub-slab gravel layer. The three north SVE wells will be interconnected to each other and the two middle SVE wells will be interconnected to each other with 6-inch diameter schedule 80 solid PVC and will then be manifolded together and connected to 8-inch diameter galvanized closed duct piping. The duct piping will be routed to above the roofline. The SVE will be connected to a Cincinnati fan model HP-8D22, 7.5 horse power, three-phase, 230 volt blower. Two 55-gallon drums of granulated activated carbon to filter will be plumbed in parallel on the effluent discharge for the SVE. The discharge point of the SVE will be located above the eave of the roof, a minimum of 10 feet from any opening that is less than 2 feet below the exhaust point, and a minimum of 10 feet from any adjoining or adjacent buildings or HVAC intakes or supply registers.

Effluent sampling ports will be located on each riser section of the SVE legs prior to their union and a combined effluent sampling point will be located on the riser pipe above the roof.

The manufacturer specifications for the SVE blower are included as **Appendix C**.

Vapor Barrier:

The vapor barrier will be constructed of two main materials. The majority of the horizontal installations will consist of Stego Wrap 20-mil, a Class A vapor barrier, as per ASTM E1745-17. At the request of the geotechnical/civil engineer, Langan, vertical installations will consist of a waterproofing vapor barrier, Grace Preprufe 160R, a 32 mil Class A vapor barrier, as per ASTM E1745-17. The vapor barriers will extend throughout the area occupied by the footprint of the new building and up the foundation sidewalls and will be installed in accordance with the manufacturers' specifications. At locations where a liquid mastic will be used, specifically between columns or foundation walls and their footings, Grace Liquid Bituthene will be utilized in accordance with ASTM E1993-98. The vapor barriers will be inspected by PWGC personnel for proper installation.

The vapor barrier specifications are included as **Appendix D**.

I, Michael Scanlon, PE, certify that I am currently a New York State registered professional engineer (PE) and that this Remedial Design Work Plan (RDWP) was prepared in accordance with applicable statutes and regulations and in substantial conformance with the New York State Department of Environmental Conservation's (NYSDEC's) Division of Environmental Remediation's (DER's) Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that the information and statements in this certification are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

103321

2023-04-14



New York State PE #

Date

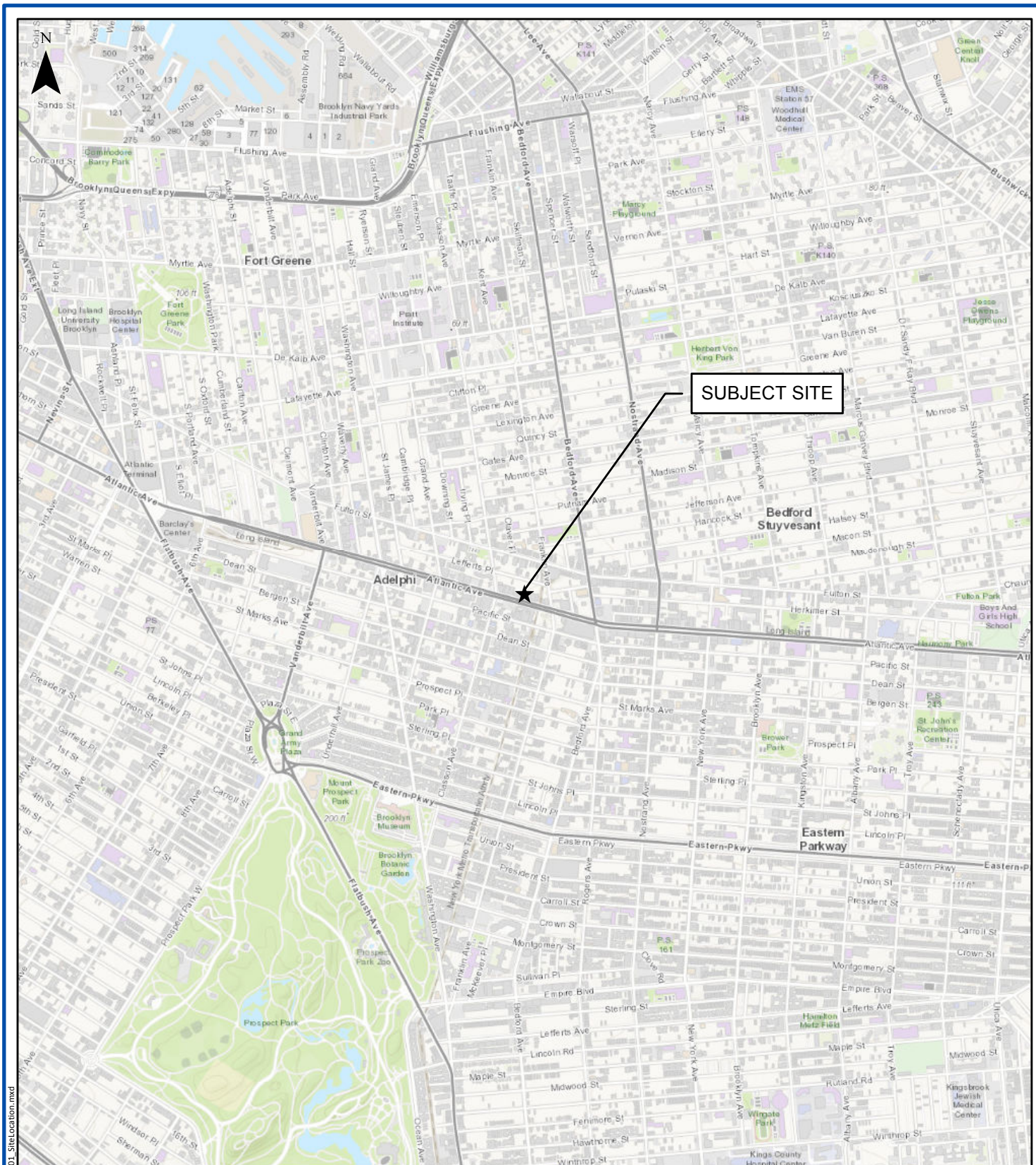
Signature

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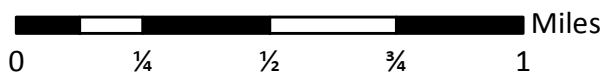
Figures





SITE LOCATION

1045 - 1065 Atlantic Avenue
Brooklyn, NY



Project:	TOT1903
Date:	2/11/2019
Designed by:	HRM
Drawn by:	TS
Approved by:	HRM
Figure No:	1



PWGC
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P.W. Grosser Consulting Engineer & Hydrogeologist, PC

630 Johnson Ave., Suite 7
Bohemia, NY 11716
Ph: 631-589-6353 • Fax: 631-589-8705
pwgc.info@pwgros.com



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DRAWING PREPARED FOR:

1065 Atlantic Avenue LLC
42-09 235th Street
Douglaston, New York 10363

REVISION	DATE	INITIAL	COMMENTS
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DRAWING INFORMATION:

Project:	TOT1903	Designed by:	JL
Date:	1/26/2023	Drawn by:	FT
Scale:	AS SHOWN	Approved by:	JL

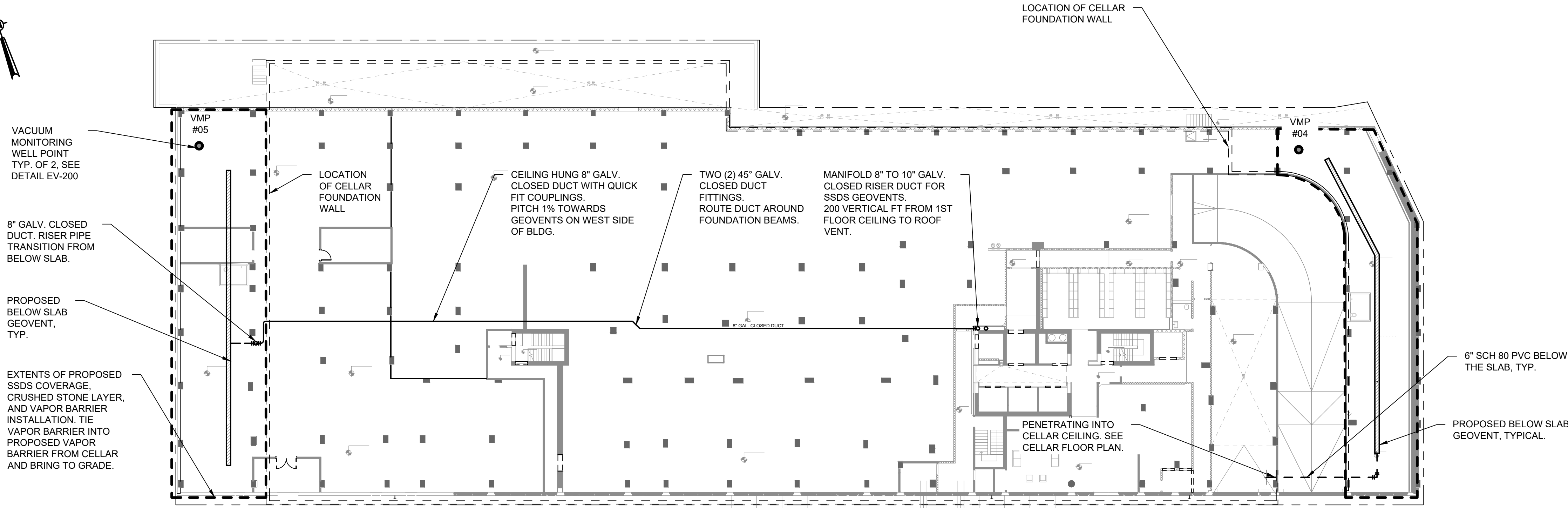
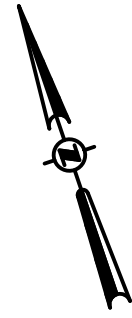
Site Plan

1045 - 1065 Atlantic Avenue
Brooklyn, NY

FIGURE NO:

Appendix A





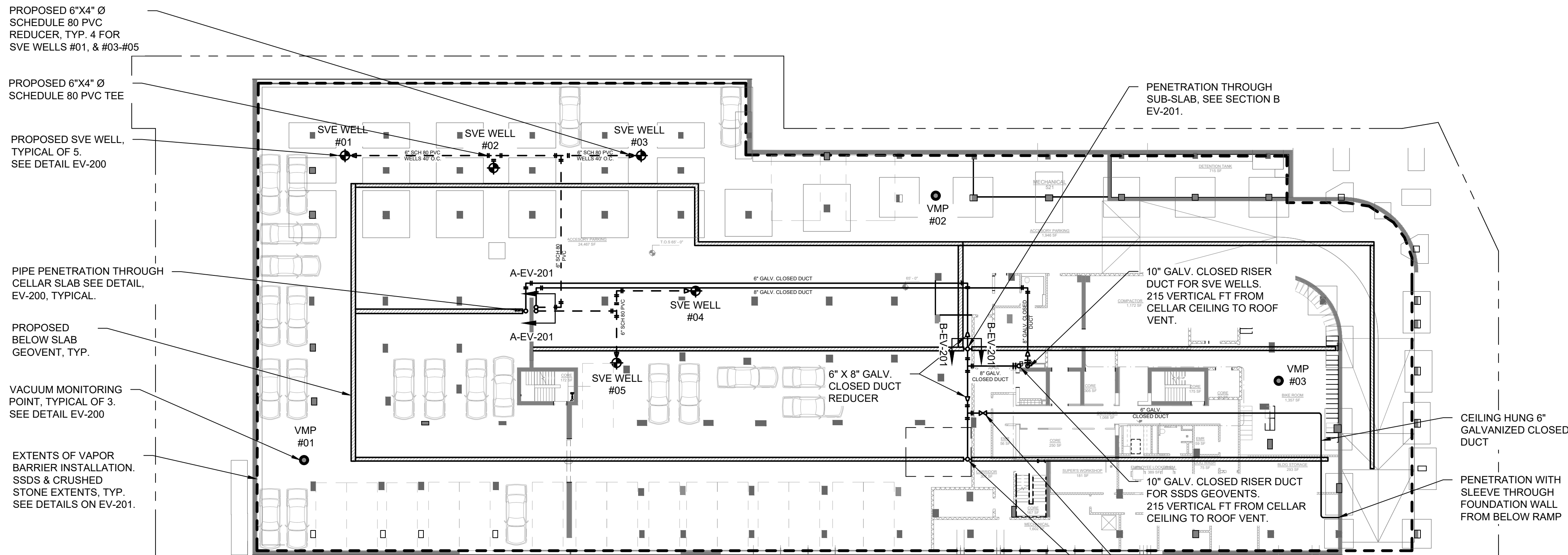
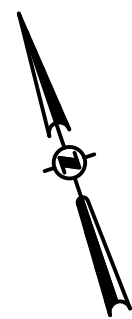
BASEMAP REFERENCE:
1041-1065 ATLANTIC AVE FLOOR PLANS
PREPARED ON OCTOBER 01, 2022
PREPARED BY DENCITY WORKS ARCHITECTS

PLAN VIEW - FIRST FLOOR

SCALE: 1" = 20'

0 20 40

SCALE: 1" = 20'



NOTE:
SLOPE ALL SOLID SVE & SSDS PIPING TOWARDS SVE
WELLS/GEOVENT AT MIN. $\frac{1}{16}$ " PER FOOT

PLAN VIEW - CELLAR FLOOR

SCALE: 1" = 20'

0 20 40

SCALE: 1" = 20'

BASEMAP REFERENCE:
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Scope of Work

INSTALLATION OF ACTIVE SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) AND SOIL VAPOR EXTRACTION SYSTEM (SVE) AT PROJECT SITE AS SHOWN ON THESE PLANS AND SPECIFICATIONS INCLUDING:

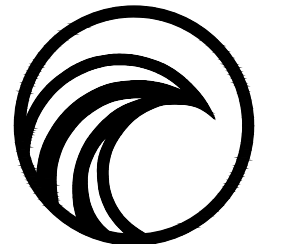
1. INSTALLATION OF SUB-SLAB PIPING AND MATERIAL
2. INSTALLATION OF SVE WELLS
3. INSTALLATION OF RISER PIPING AND EQUIPMENT
4. INSTALLATION OF FANS AND APPURTENANCES
5. INSTALLATION OF VAPOR BARRIER BELOW ENTIRE BUILDING SLAB TO GRADE
6. INSTALLATION OF CRUSHED STONE LAYER BELOW SLAB
7. INSTALLATION OF ELECTRICAL WORK
8. FACILITATION OF WORK AS SPECIFIED

General Notes

1. DRAWING NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL OR OTHER REFERENCE EXCEPT FOR SUB-SLAB DEPRESSURIZATION SYSTEM AND VAPOR BARRIER.
2. COORDINATE ALL WORK FOR SUB-SLAB DEPRESSURIZATION SYSTEM, VAPOR BARRIER AND ROOF PENETRATION WITH OTHER TRADES PRIOR TO INSTALLATION.
3. COORDINATE LOCATION OF RISER WITH ARCHITECT.
4. FIELD CONDITIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO ANY WORK.
5. SLOPE ALL SOLID PIPING DOWNWARD TOWARDS SSDS GEOVENT OR SVE WELLS AT MIN. $\frac{1}{16}$ " PER FT OF PIPING.
6. ALL DUCTING AND FITTINGS TO BE GALVANIZED CLOSED DUCTING NORDFAB WITH AIR TIGHT QUICK FIT COUPLINGS OR APPROVED EQUIVALENT. INSTALL APPROVED DUCT TAPE BELOW ALL FITTINGS.
7. SOIL VAPOR EXHAUST VENT SHALL BE:
 - 7.1. ABOVE THE EAVE OF THE ROOF (PREFERABLY, ABOVE THE HIGHEST EAVE OF THE BUILDING AT LEAST 12 INCHES ABOVE THE SURFACE OF THE ROOF),
 - 7.2. AT LEAST 10 FEET ABOVE GROUND LEVEL,
 - 7.3. AT LEAST 10 FEET AWAY FROM ANY OPENING THAT IS LESS THAN 2 FEET BELOW THE EXHAUST POINT, AND 10 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS, OR HVAC INTAKES OR SUPPLY REGISTERS.
8. ALL ELECTRICAL TO BE INSTALLED BY LICENSED ELECTRICIAN.
9. PROVIDE DESIGNATED CIRCUITS FOR BLOWERS AND APPURTENANCES.
10. ALL EXTERIOR PENETRATIONS FOR ELECTRICAL & PIPING TO BE BOOTED AND WATER TIGHT.
11. COMPACT CRUSHED STONE PER GEOTECHNICAL REQUIREMENTS.
12. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR ENGINEERS APPROVAL, INCLUDING BUT NOT LIMITED TO:
 - 12.1. PIPING MATERIALS AND FITTINGS
 - 12.2. FAN MAKE AND MANUFACTURER
 - 12.3. VACUUM MONITORING POINT & FITTINGS
 - 12.4. DUCT SUPPORTS
13. ELEVATIONS PROVIDED IN NAVD 88.

LEGEND

Proposed	Notes
	SUB-SLAB SOLID PIPING
	ABOVE-SLAB CLOSED DUCTING
	EXTENTS OF GRAVEL LAYER
	GEOVENT
	VACUUM MONITORING POINT
	SVE WELL
	REDUCER
	DAMPER
	SLAB PENETRATION
	90 DEGREE FITTING
	TEE FITTING



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3	DEC REVIEW	04/14/2023
2	FOUNDATION BID SET REVISIONS	11/18/2022
1	100% DESIGN DEVELOPMENT	10/01/2022
Number	Revision Description	Revision Date

Designed By	Date Submitted
Drawn By	Date Created
Approved By	Scale

Client:
1065 ATLANTIC AVENUE, LLC
7 PENN PLAZA, SUITE 600
NEW YORK, NY 10001

Project:
1041-1065 ATLANTIC AVE
BROOKLYN, NY 11238

Project Address:
1041-1065 ATLANTIC AVE
BROOKLYN, NY 11238

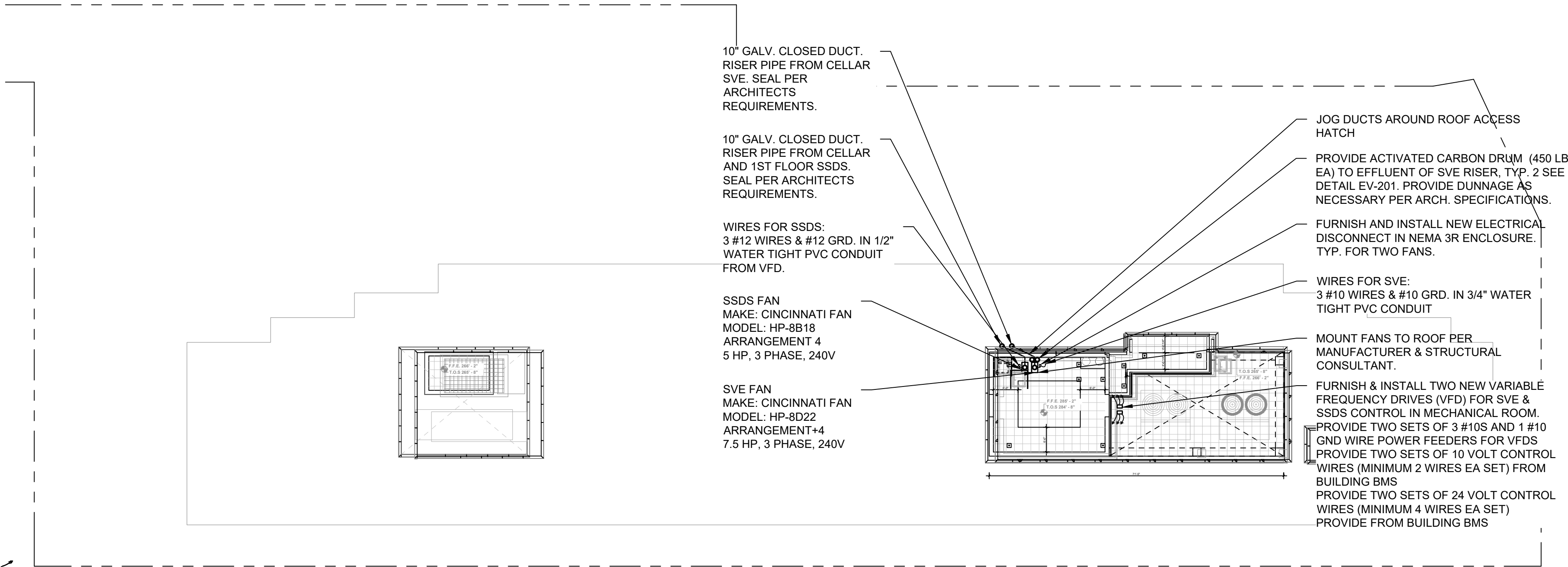
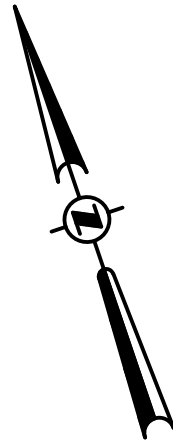
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Regulatory Reference Number	
Title of Drawing	

SSDS & SVE
PLANS



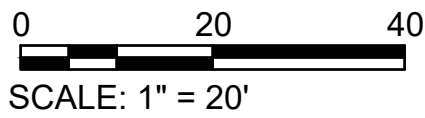
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PARTIAL PLAN VIEW - ROOF PLAN

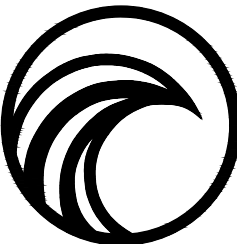
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BASEMAP REFERENCE:
1041-1065 ATLANTIC AVE FLOOR PLANS
PREPARED ON OCTOBER 01, 2022
PREPARED BY DENCITY WORKS ARCHITECTS

LEGEND

Proposed	Notes
SOIL VAPOR MITIGATION	
	SUB-SLAB SOLID PIPING
	ABOVE-SLAB CLOSED DUCTING
	EXTENTS OF GRAVEL LAYER
	GEOVENT
	VACUUM MONITORING POINT
	SVE WELL
	REDUCER
	DAMPER
	SLAB PENETRATION
	90 DEGREE FITTING
	TEE FITTING


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E-mail: INFO@PWGROSSER.COM

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Number	Revision Description	Revision Date

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Approved By	Scale


Client:
TOTEM BKLYN
55 WASHINGTON ST. SUITE #710
BROOKLYN, NY 11201
Project:
1041-1065 ATLANTIC AVE
BROOKLYN, NY 11238

Project Address:
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BROOKLYN, NY 11238

County Tax Map Number:	Contract Number:
Regulatory Reference Number:	

Title of Drawing:

SSDS & SVE
ROOF PLAN


MICHAEL SCANLON
LICENSED PROFESSIONAL ENGINEER
103321

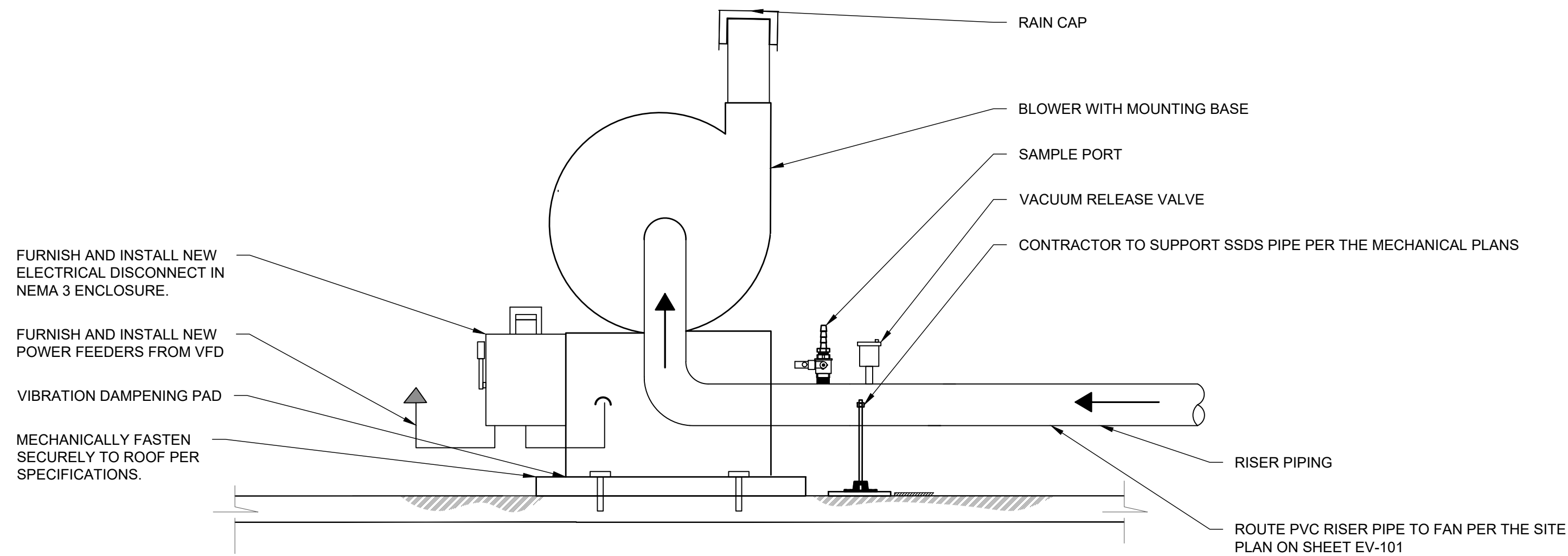
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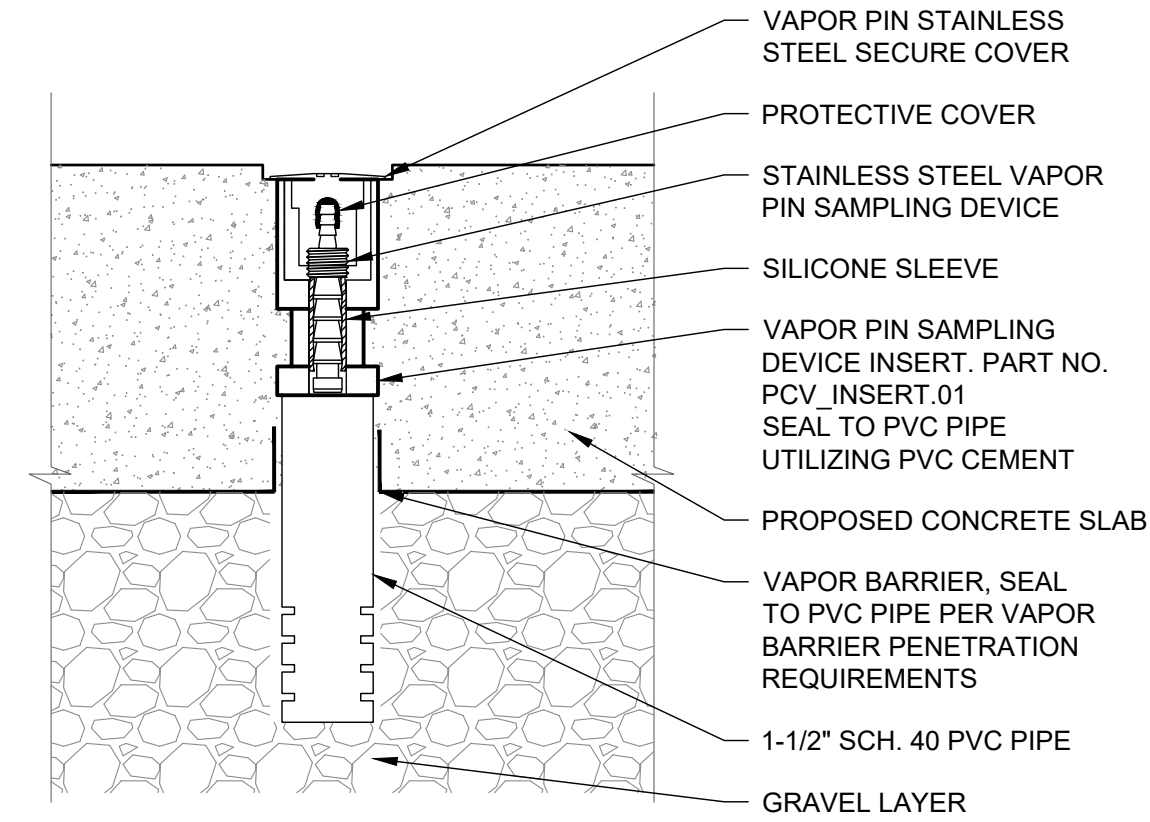
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2 of
7

PWGC Project Number:
TOT1903

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PLOT BY: J. Scanlon

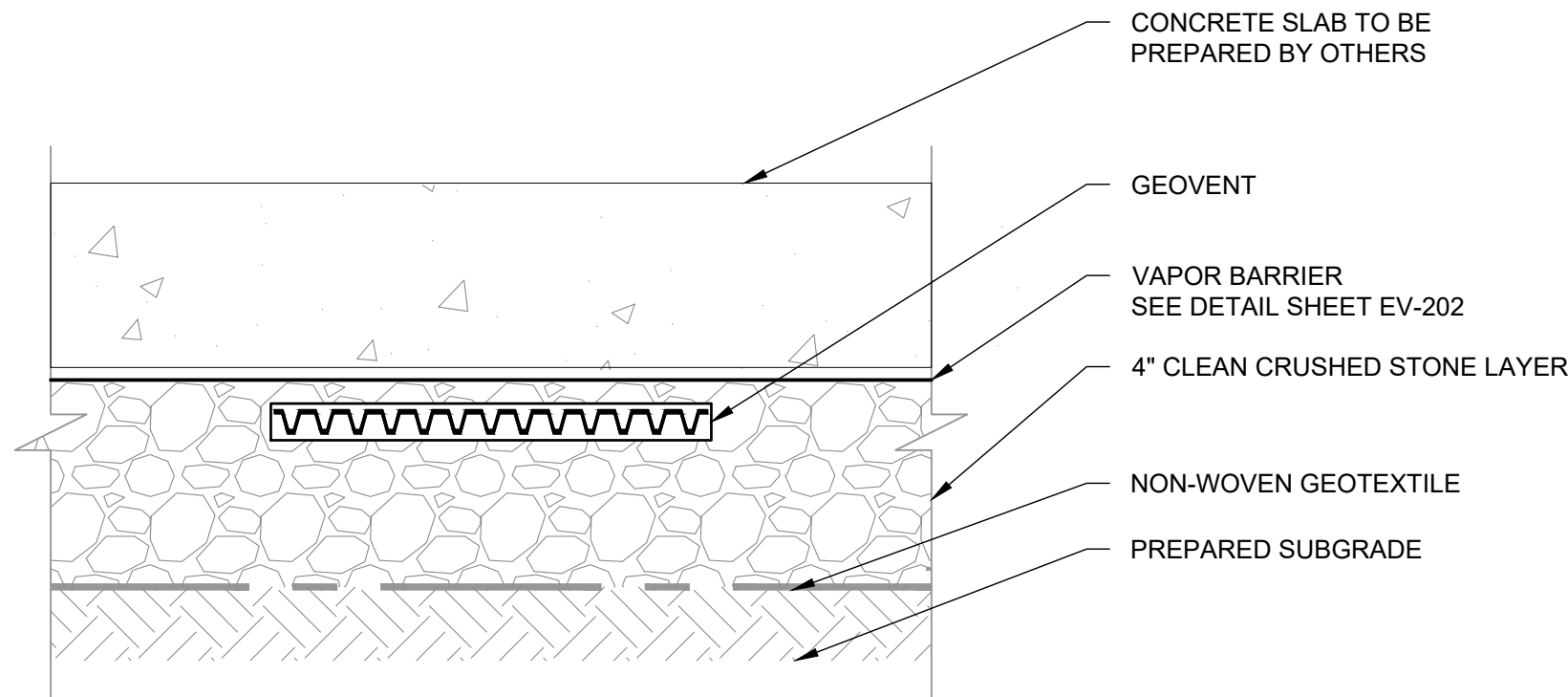


BLOWER DETAIL - TYPICAL OF TWO
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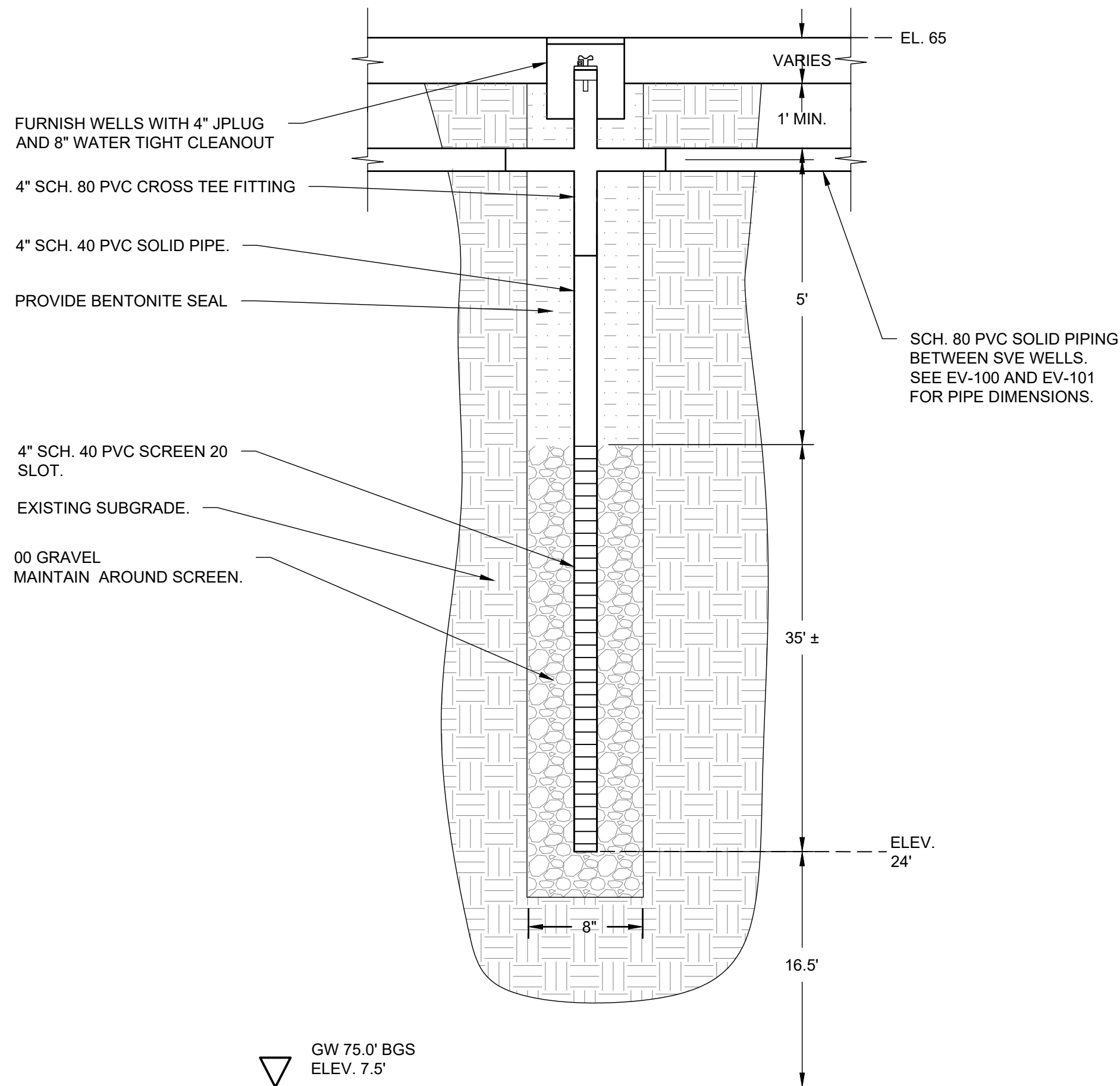


- NOTE(S):
1. REFER TO VAPOR PIN STANDARD OPERATING PROCEDURE INSTALLATION OF THE VAPOR PIN SAMPLING DEVICE INSERT FOR FULL INSTALLATION INSTRUCTIONS.
 2. VAPOR PIN SAMPLING DEVICE INSERT CAP (PART NO. PVC_INSERT_CAP.01) AND 1/4"-13 THREADED ROD MAY BE REQUIRED DURING INSTALLATION IF INSTALLED PRIOR TO NEW CONCRETE SLABS.

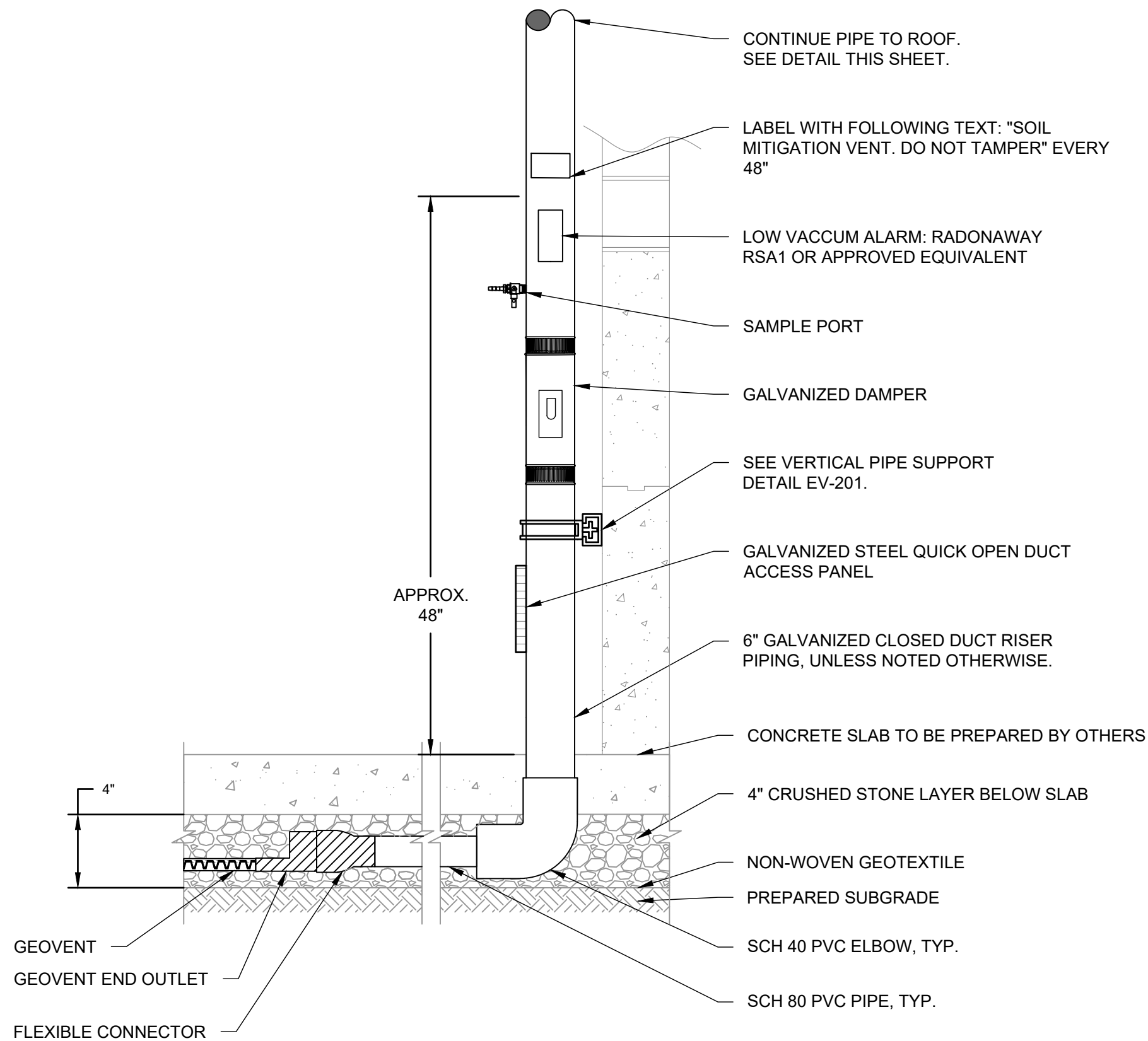
TYPICAL SUB-SLAB MONITORING POINT
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GEOVENT INSTALLATION DETAIL
SCALE: NOT TO SCALE



SVE WELL - INTERIOR OF BUILDING - DETAIL
SCALE: NOT TO SCALE



TYPICAL SUB-SLAB PENETRATION DETAIL
SCALE: NOT TO SCALE

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Regulatory Reference Number:

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**SSDS & SVE
DETAILS-1**



Drawing Number:

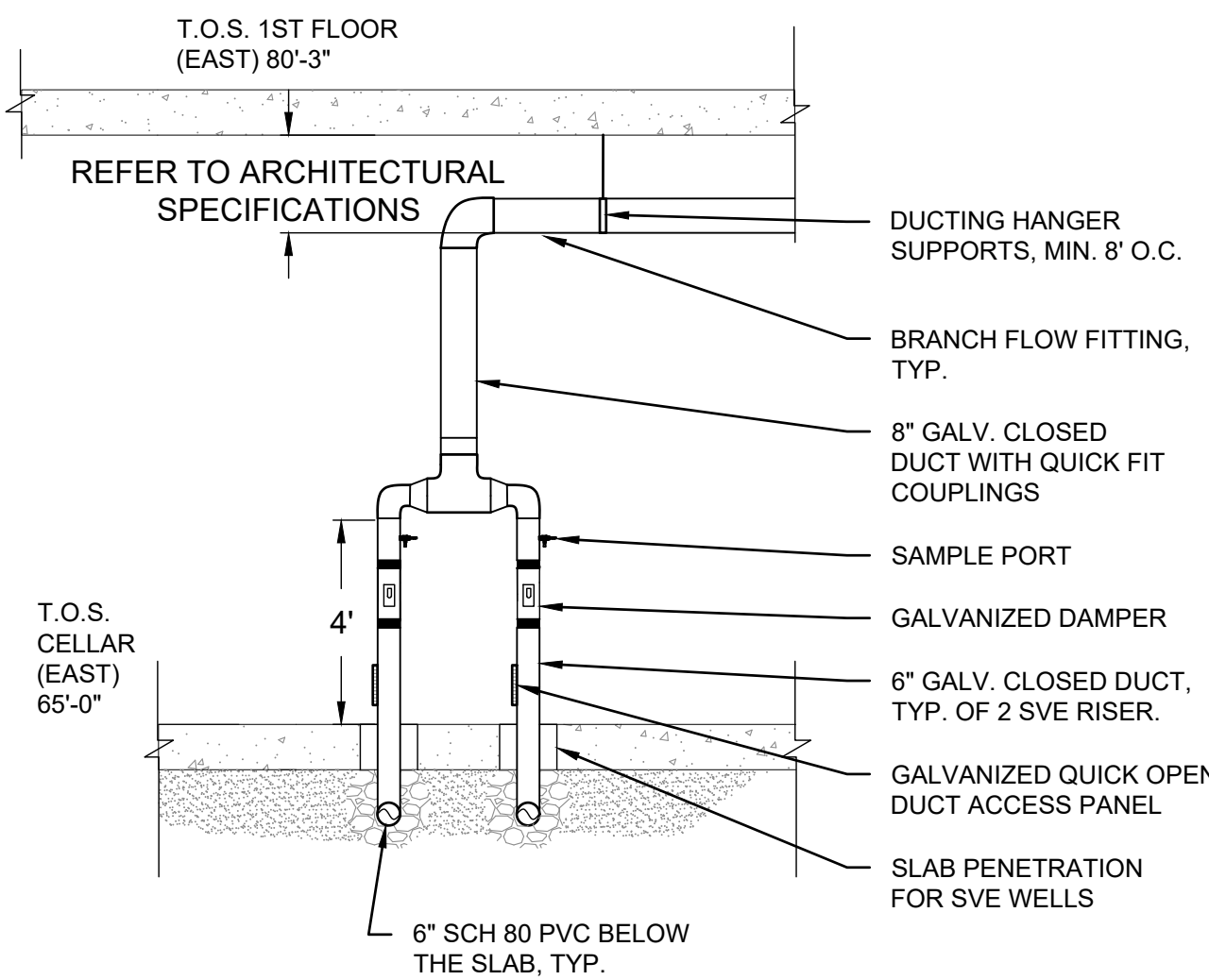
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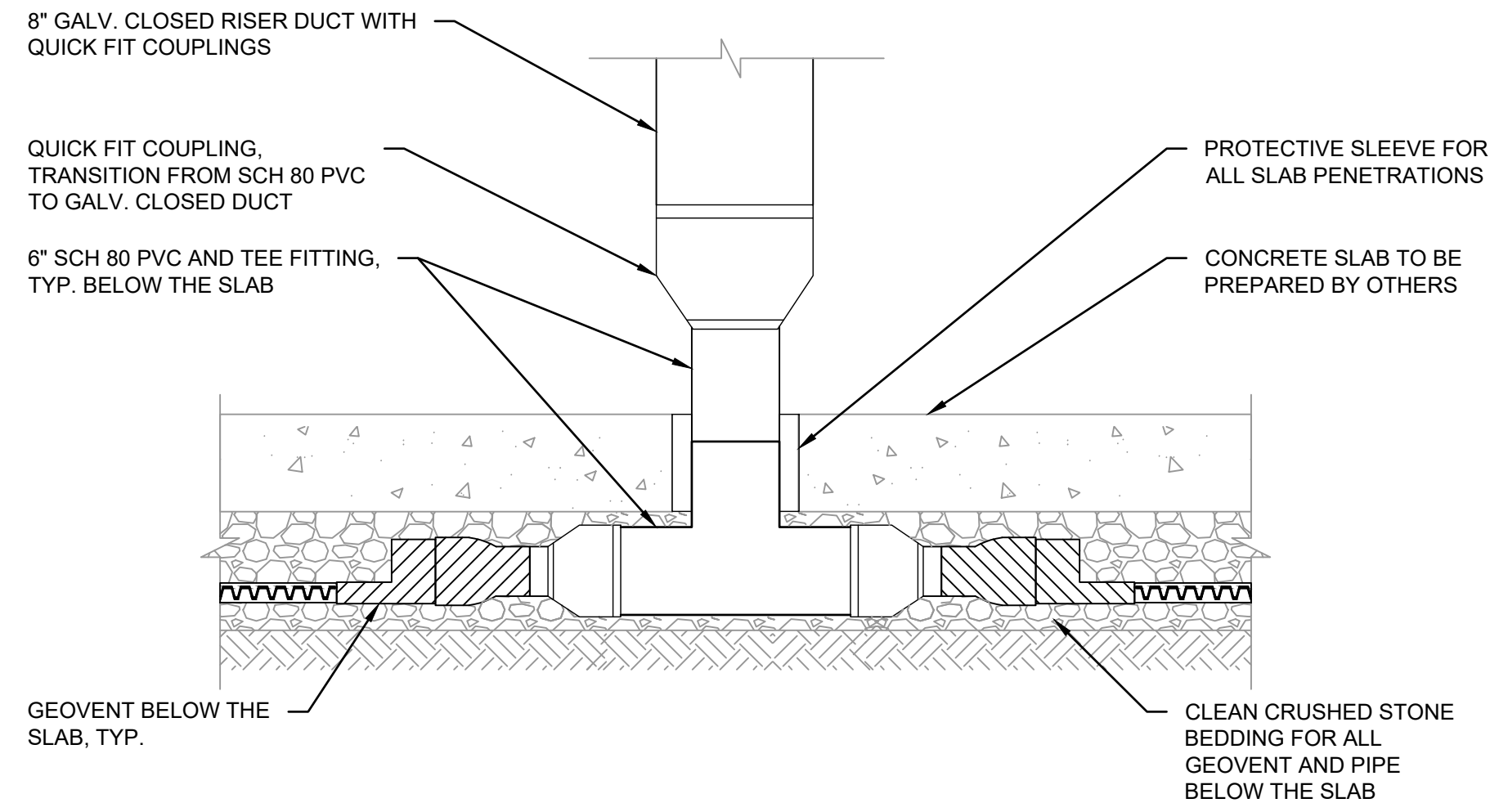
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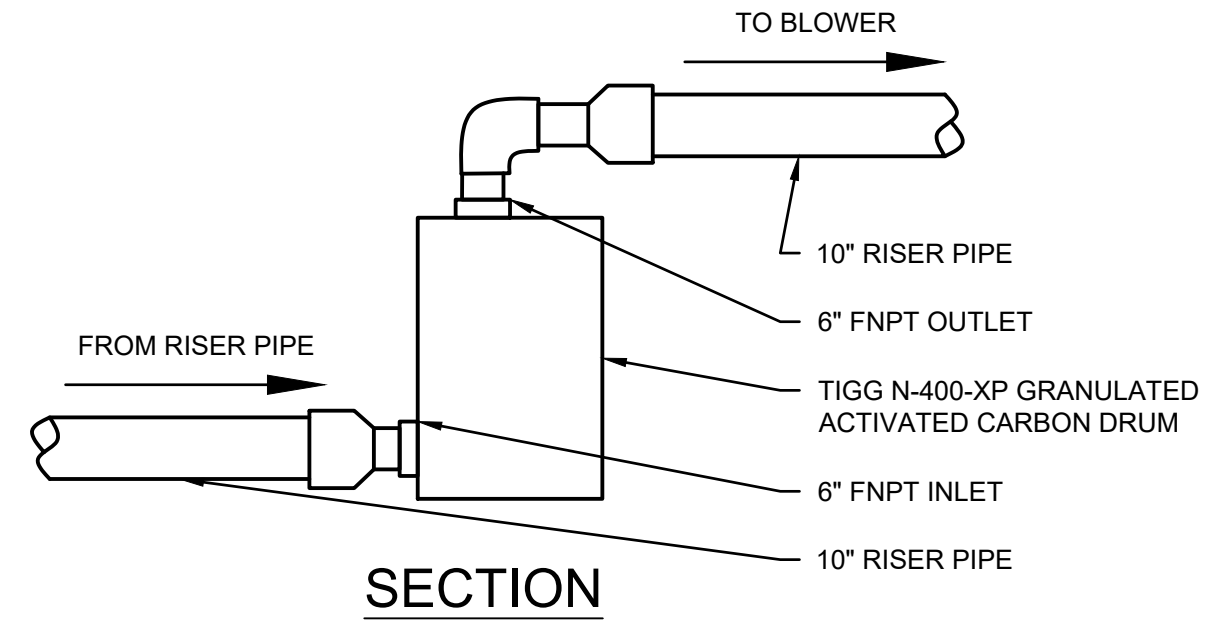
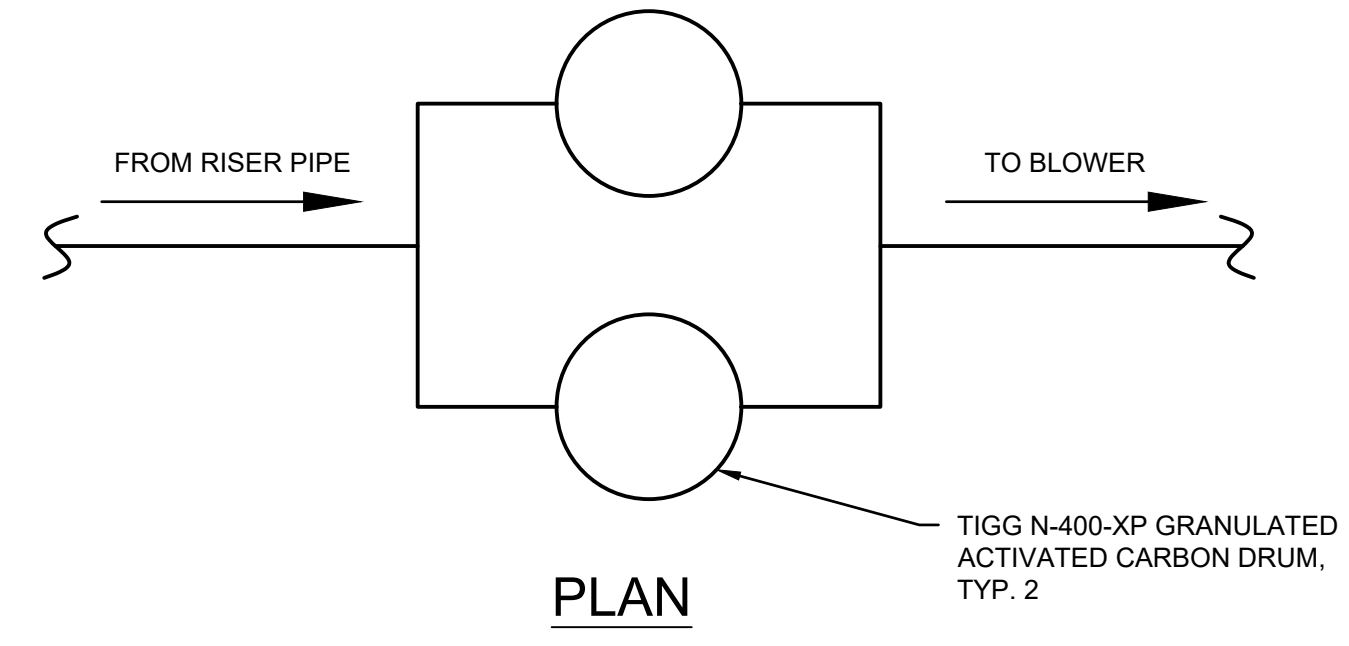
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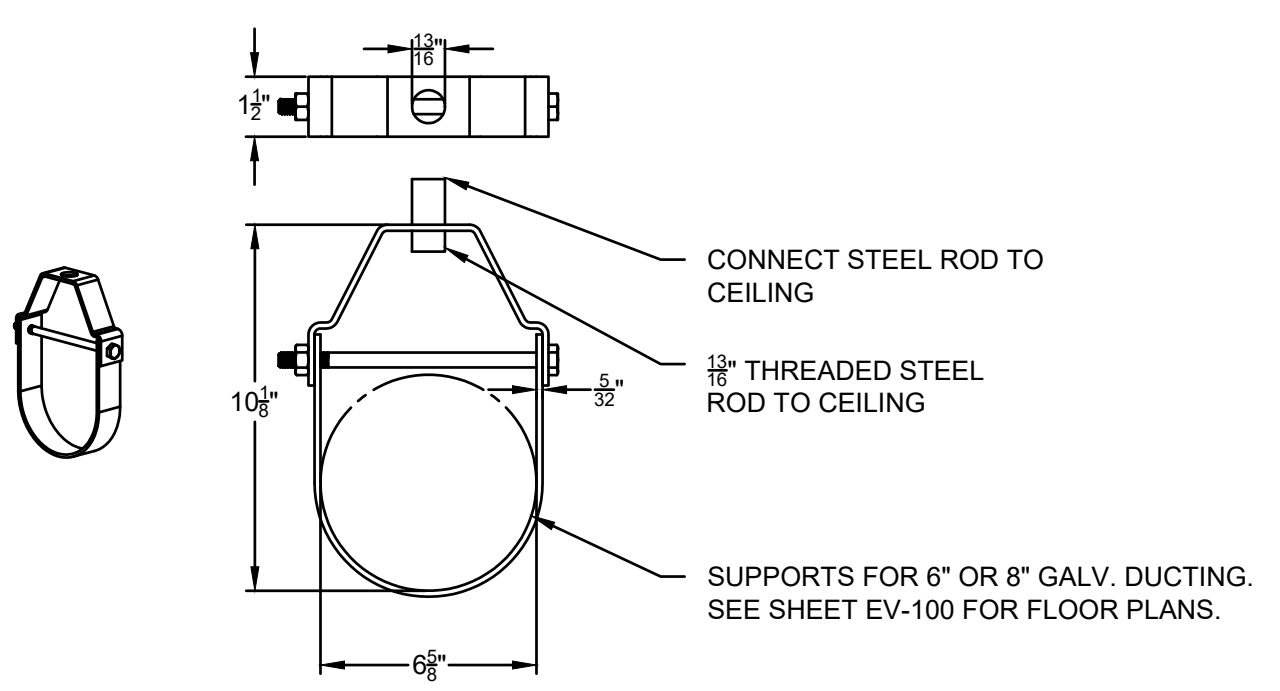
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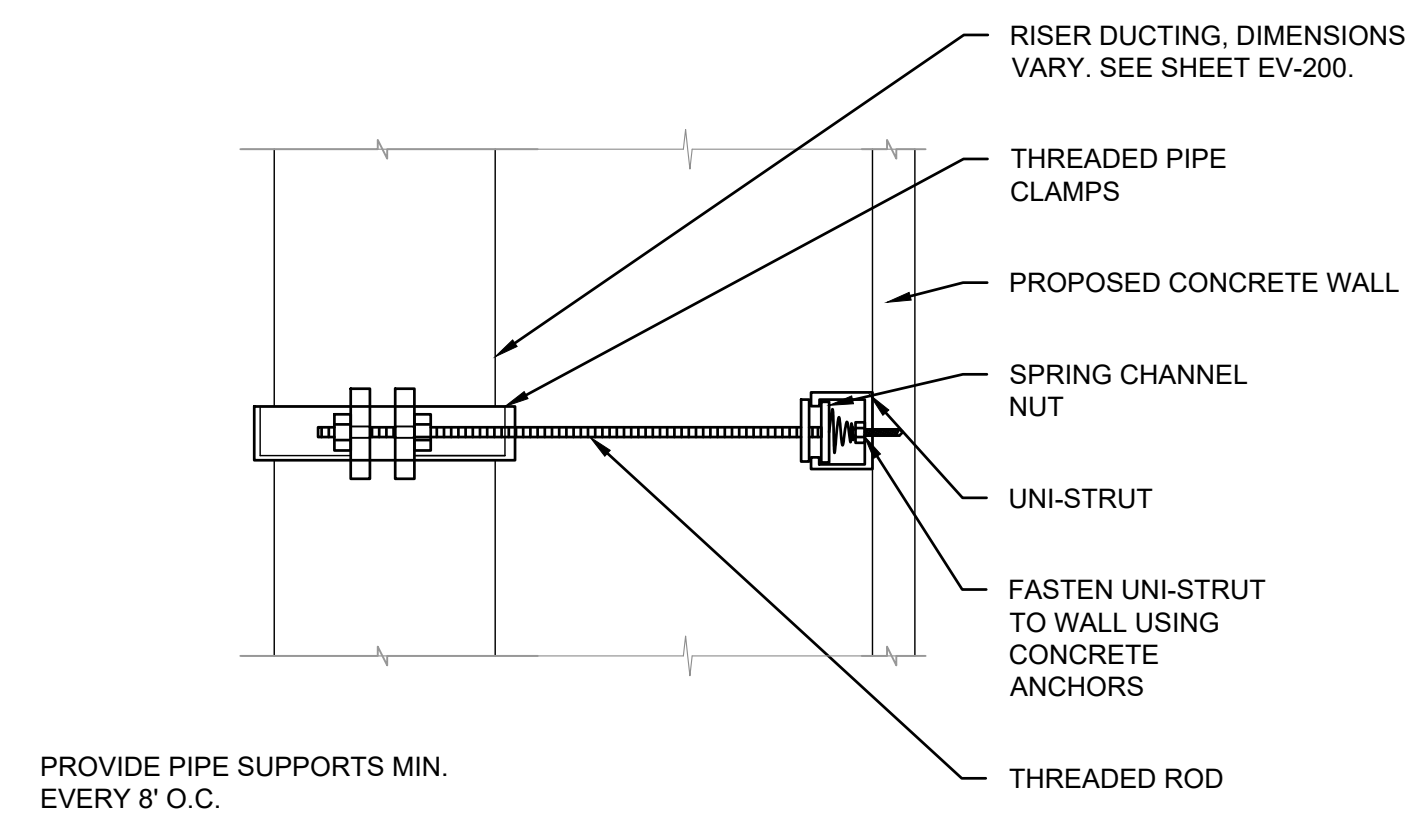
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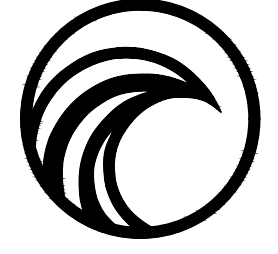


SVE CARBON FILTRATION DETAIL
SCALE: NOT TO SCALE



DUCT HANGER SUPPORT DETAILS
SCALE: NOT TO SCALE





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Title of Drawing:

SSDS & SVE DETAILS-2

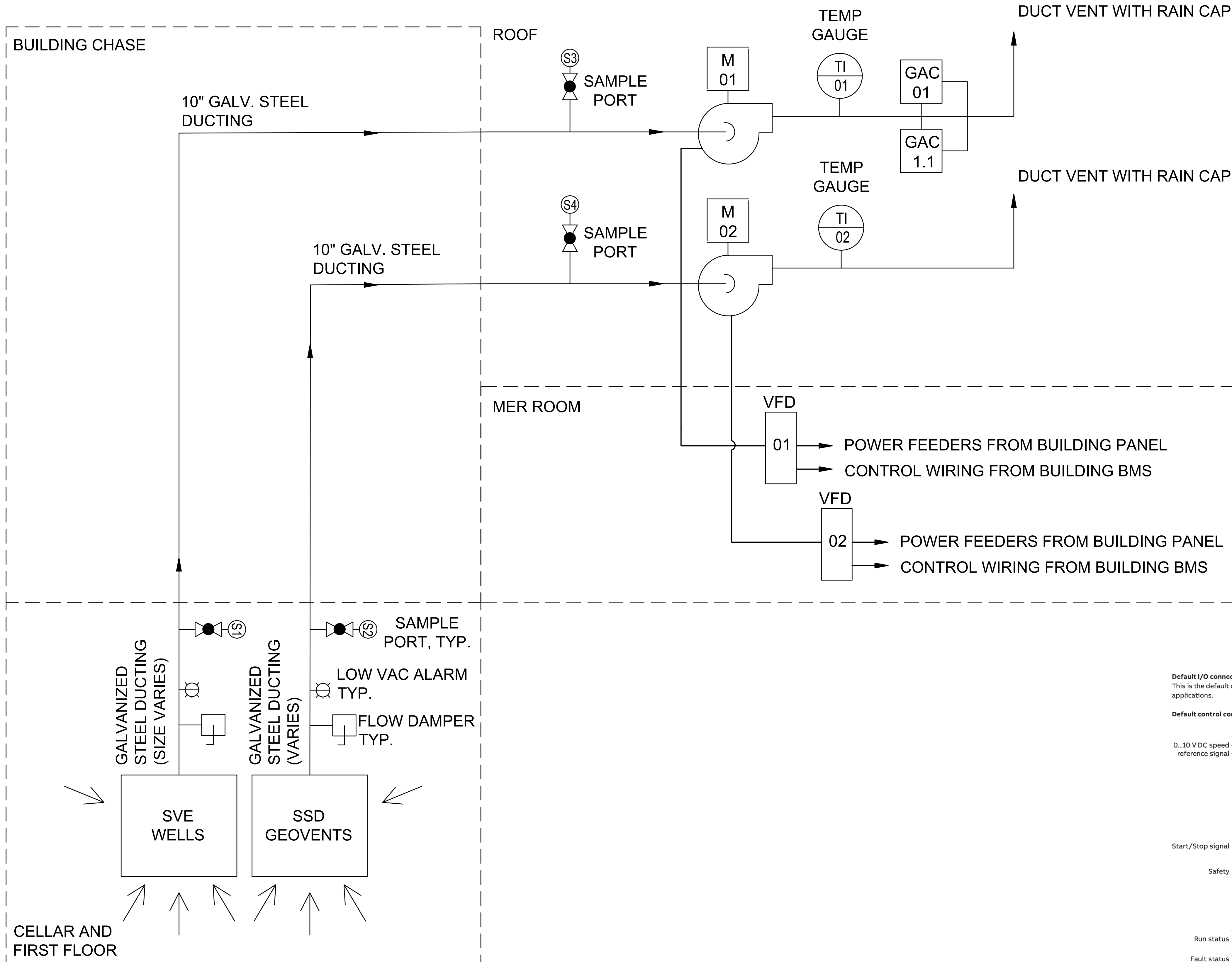


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PROCESS AND INSTRUMENTATION DIAGRAM
SCALE: NOT TO SCALE

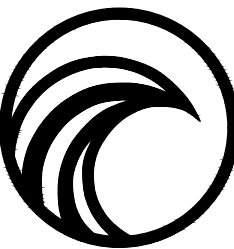
Default I/O connections
This is the default configuration of control connections for HVAC applications.

Default control connections for the HVAC default

	X1	Reference voltage and analog inputs and outputs		
	1	SCR	Signal cable shield (screen)	
	2	AI1	Output frequency/speed reference: 0 to 10 V	
	3	AGND	Analog input circuit common	
	4	+10 V	Reference voltage 10 V DC	
	5	AI2	Actual feedback: 0 to 20 mA	
	6	AGND	Analog input circuit common	
	7	AO1	Output frequency: 0 to 10 V	
	8	AO2	Output current: 0 to 20 mA	
	9	AGND	Analog output circuit common	
	X2 & X3	Aux. voltage output and programmable digital inputs		
	10	+24 V	Aux. voltage output +24 V DC, max. 250 mA	
	11	DGND	Aux. voltage output common	
	12	DCOM	Digital input common for all	
	13	DI1	Stop (0)/Start (1)	
	14	DI2	Not configured	
	15	DI3	Constant frequency/speed selection	
	16	DI4	Start interlock 1 (1 = allow start)	
	17	DI5	Not configured	
18	DI6	Not configured		
	X6, X7, X8	Relay outputs		
	19	RO1C	Damper control 250 V AC / 30 V DC 2 A	Energize damper 19 connected to 21
	20	RO1A		
	21	RO1B		
	22	RO2C	Running 250 V AC / 30 V DC 2 A	Running 22 connected to 24
	23	RO2A		
	24	RO2B		
	25	RO3C	Fault (-1) 250 V AC / 30 V DC 2 A	Fault condition 25 connected to 26
	26	RO3A		
	27	RO3B		
	X5	Embedded fieldbus		
	29	B+	Embedded fieldbus, EFB (EIA-485)	
	31	DGND		
	S4	TERM	Termination switch	
	S5	BIAS	Bias resistors switch	
	X4	Safe torque off		
	34	OUT1		
	35	OUT2		
	36	SGND	Safe torque off	
	37	IN1		
	38	IN2		
	X10	24 V AC/DC		
	40	24V AC/DC+ In	Ext. 24V AC/DC Input to power up the control unit when the main supply is disconnected.	
	41	24V AC/DC- In		

X10 (24 V AC/DC) applicable to ACH580-01 R6-R9 and ACH580-31/34 only.

VARIABLE FREQUENCY DRIVE (VFD) WIRING DIAGRAM



PWGC
CLIENT DRIVEN SOLUTIONS
P.W. GROSSER CONSULTING ENGINEER
AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue, Suite 7
Bohemia, NY 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

CONSULTANTS

FOR REGULATORY
REVIEW ONLY
NOT FOR
CONSTRUCTION

7		
6		
5		
4		
3	DEC REVIEW	04/14/2023
2	FOUNDATION BID SET REVISIONS	11/18/2022
1	100% DESIGN DEVELOPMENT	10/01/2022

Designed By

Date Submitted

Drawn By

Date Created

Approved By

Scale


Client:
TOTEM BKLYN
55 WASHINGTON ST. SUITE #710
BROOKLYN, NY 11201

Project:
1041-1065 ATLANTIC AVE
BROOKLYN, NY 11238

County Tax Map Number: Contract Number:

Regulatory Reference Number:

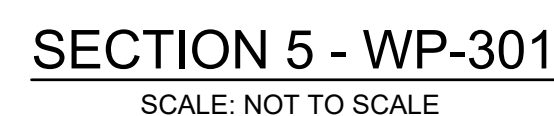
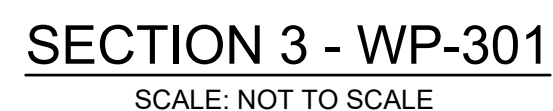
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PROCESS &
INSTRUMENTATION
DIAGRAM**



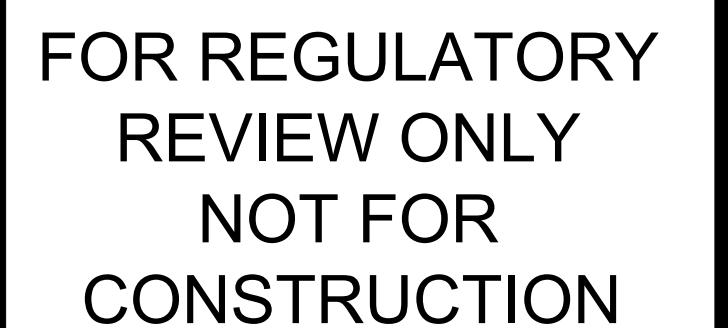
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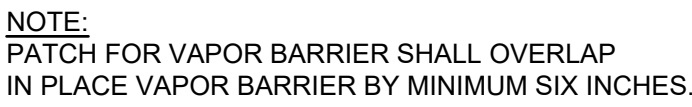
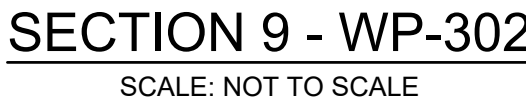
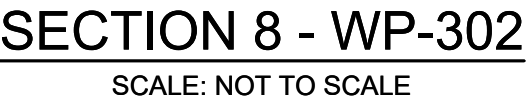
Sheet
5
of
7

PWGC Project Number:
TOT1903



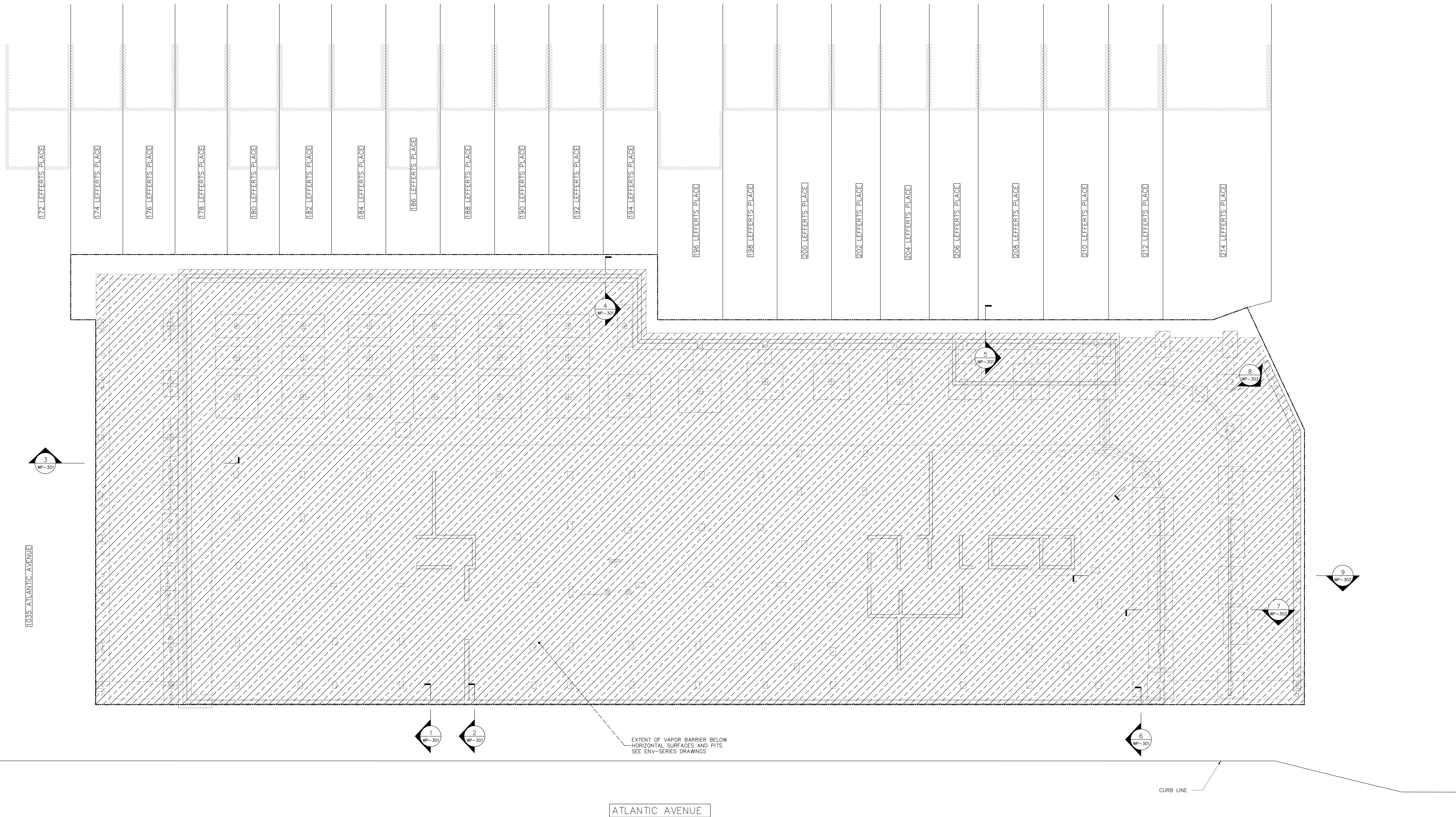
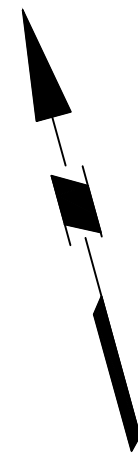
1. VAPOR BARRIER TO BE STEGO WRAP 20 MIL CLASS A VAPOR BARRIER, OR ENGINEER APPROVED EQUIVALENT .
2. LIQUID MASTIC TO BE STEGO MASTIC OR ENGINEER APPROVED EQUIVALENT.
3. VAPOR BARRIER PRODUCTS SHOULD BE INSTALLED PER ASTM E1993 - SPECIFICATION FOR BITUMINOUS WATER VAPOR RETARDERS USED IN CONTACT WITH SOIL OR GRANULAR FILL UNDER CONCRETE SLABS AND ASTM E1745-11 - STANDARD SPECIFICATION FOR PLASTIC WATER VAPOR RETARDERS USED IN CONTACT WITH SOIL OR GRANULAR FILL UNDER CONCRETE SLABS AND MEET THE SPECIFICATIONS OF A "CLASS A" VAPOR BARRIER, OR ENGINEER APPROVED EQUIVALENT.
4. WHERE THESE SPECIFICATIONS DIFFER WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS, THE MANUFACTURER'S INSTALLATION INSTRUCTIONS SHALL TAKE PRECEDENCE.
5. VAPOR BARRIER INSTALLATIONS SHALL BE INSPECTED BY ENVIRONMENTAL PROFESSIONAL OR ENGINEER PRIOR TO COVERING.
6. MINIMUM VAPOR BARRIER THICKNESS TO BE 20 MILS.
7. ALL DAMAGE, PUNCTURES, AND PENETRATIONS SHALL BE SEALED PER MANUFACTURER'S SPECIFICATIONS.
8. OVERLAP VAPOR BARRIER AND WATER PROOFING JOINTS BY MIN. 12".
9. REFER TO WATERPROOFING SET PROVIDED BY LANGAN FOR PLAN VIEW FOR SECTION REFERENCE.

OT1903



Appendix B





GENERAL NOTES

1. FOUNDATION BACKGROUND TAKEN FROM DRAWING TITLED "FOUNDATION FRAMING PLAN (CELLAR)", FILE NO. "FG-011.00", BY ROSENWASSER/GROSSMAN CONSULTING ENGINEERS, P.C., DATED 1 OCTOBER 2022.
2. SEE SOE-SERIES DRAWINGS FOR SUPPORT OF EXCAVATION DETAILS.
3. SEE FO- AND S-SERIES DRAWINGS FOR STRUCTURAL DETAILS.
4. SEE MEP DRAWINGS FOR PENETRATION LOCATIONS AND DETAILS.
5. SEE ENV-SERIES DRAWINGS FOR VAPOR BARRIER DETAILS.
6. SEE ARCHITECTURAL DRAWINGS FOR DETAILS ON INSULATION.

LEGEND:

PROPERTY LINE



TOTEM

OWNER
TOTEM BKLYN
55 Washington St Suite #710
Brooklyn NY 11201
T: 1.718.422.5403

OWNER
DOUGLSTON DEVELOPMENT
7 PENN PLAZA
New York NY 10001
T: 1.212.400.9282

ARCHITECT
DENSITYWORKS
55 Washington St Suite #713
Brooklyn NY 11201
T: 1.646.690.6333

GEOTECH ENGINEER
LANGAN
360 W 31st Street 8th Floor
New York, NY 10001
T: 1.212.479.5400

STRUCTURAL ENGINEER
ROSENWASSER/GROSSMAN
CONSULTING ENGINEERS, P.C.
519 Eighth Avenue 20th Fl
New York, NY 10018
T: 1.212.624.2424

EXPEDITING
WILLIAM VITACCO ASSOCIATE LTD
299 Broadway # 5
New York, NY 10007
T: 1.212.791.4578

ENVIRONMENTAL ENGINEER
P.W. GROSSER CONSULTING
630 JOHNSON AVE
BOHEMIA, NY 11716
T: 1.631.588.6323

CONSTRUCTION MANAGEMENT
LEVINE BUILDERS
42-09 235TH ST
Douglaston, NY 11363
T: 1.718.224.7147

MECHANICAL ENGINEER
CORENTINI ASSOCIATES
488 7th Avenue 19th Fl
New York, NY 10018
T: 1.212.615.3600

CIVIL & TRAFFIC ENGINEER
PHILIP HABIB & ASSOCIATES
102 Madison Avenue, 11th Fl
New York, NY 10016
T: 1.212.205.9559

LANDSCAPE ARCHITECT
MKM Landscape Architecture PC
271 North Avenue, #1006
New Rochelle, NY 10801
T: 1.212.629.9710

WATERPROOFING PLAN

1057 ATLANTIC AVE
BROOKLYN NY 11238

No.	DESCRIPTION	DATE
1	FOUNDATION BID SET	12/02/22
2	FOUNDATION BUY SET	01/16/23

SEAL & SIGNATURE

WATERPROOFING PLAN

DATE

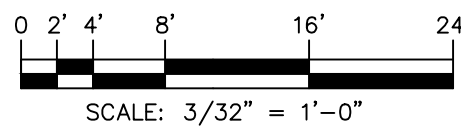
PROJECT No.

2104

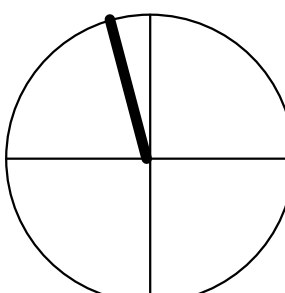
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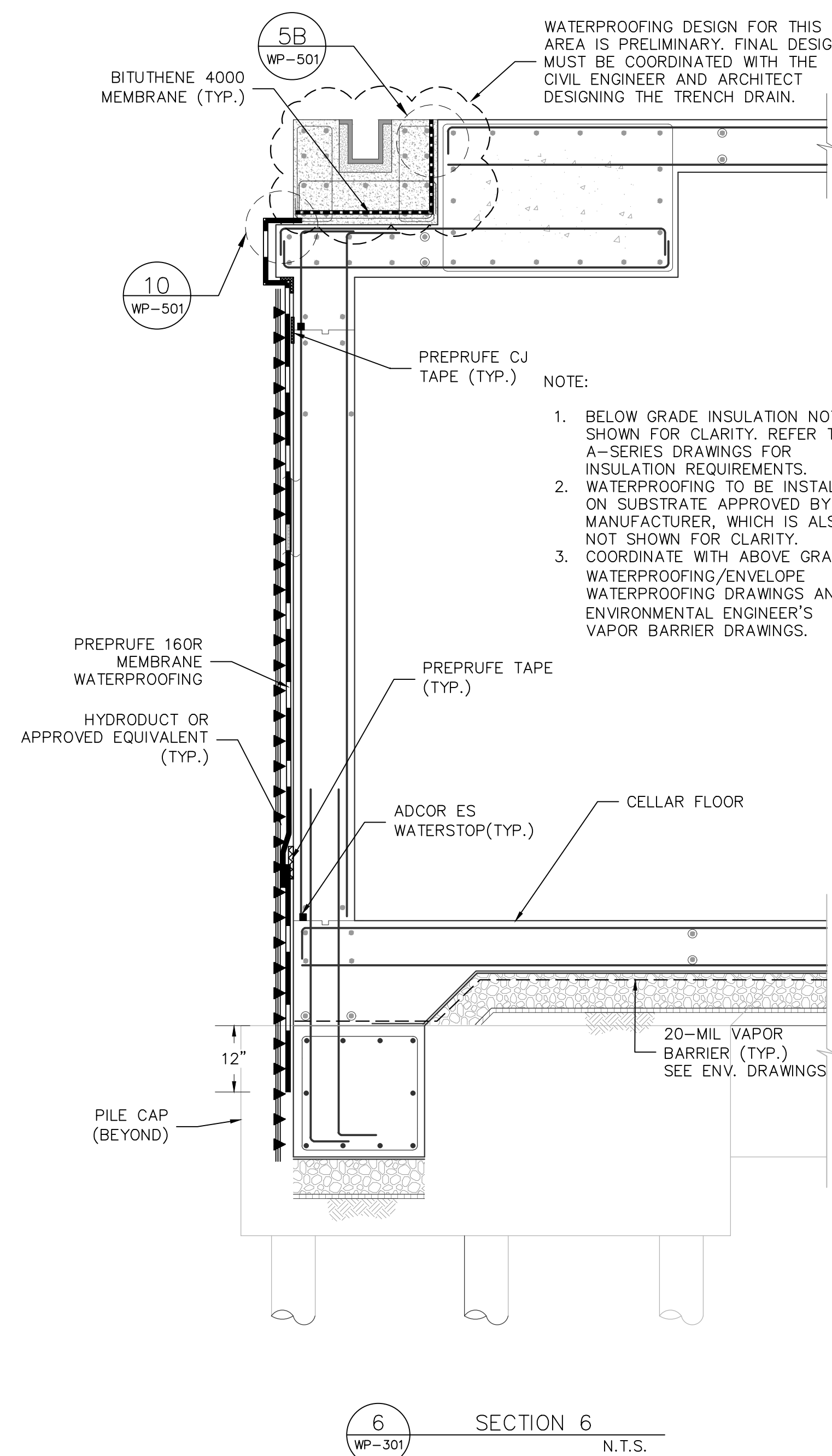
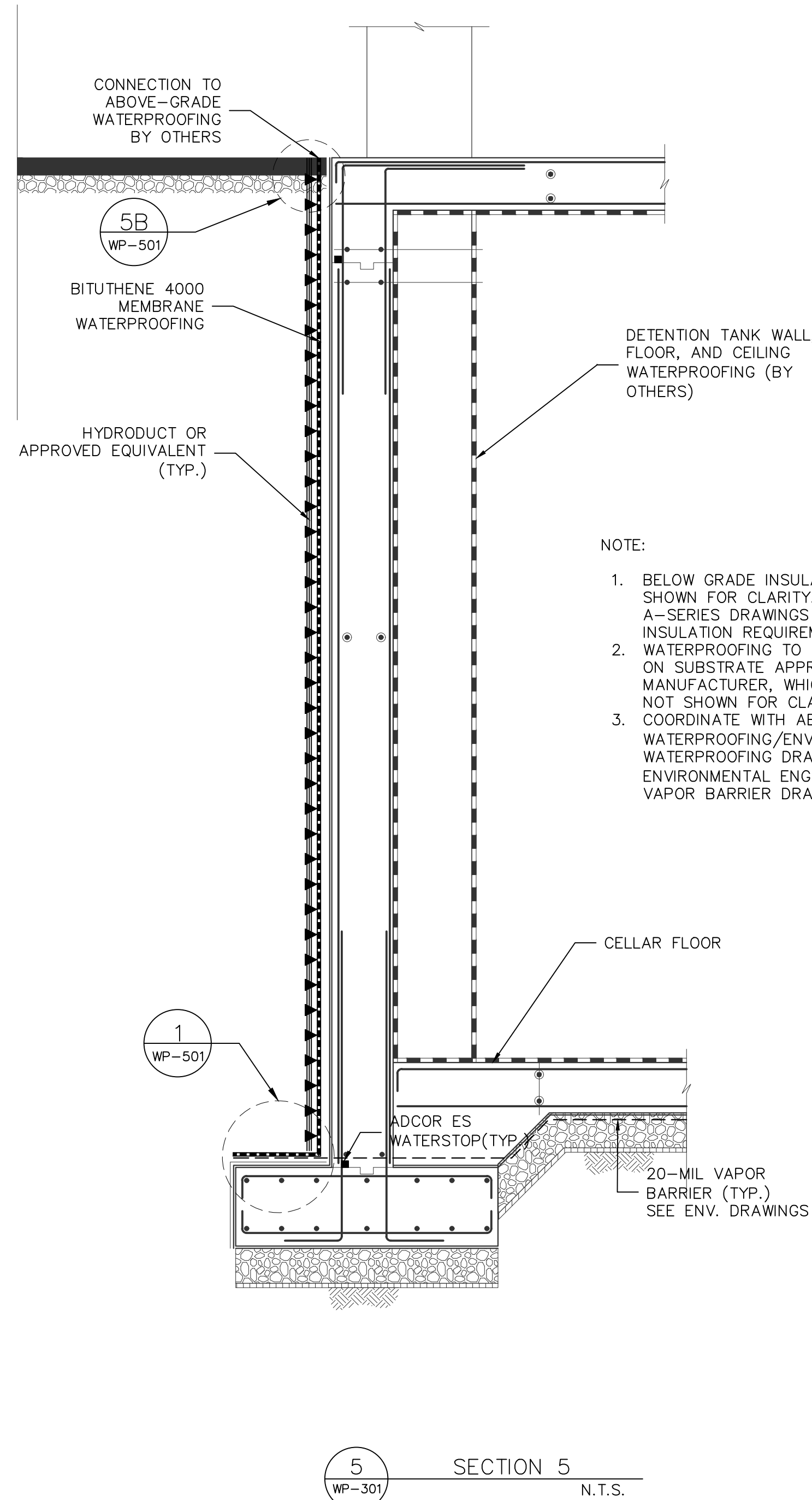
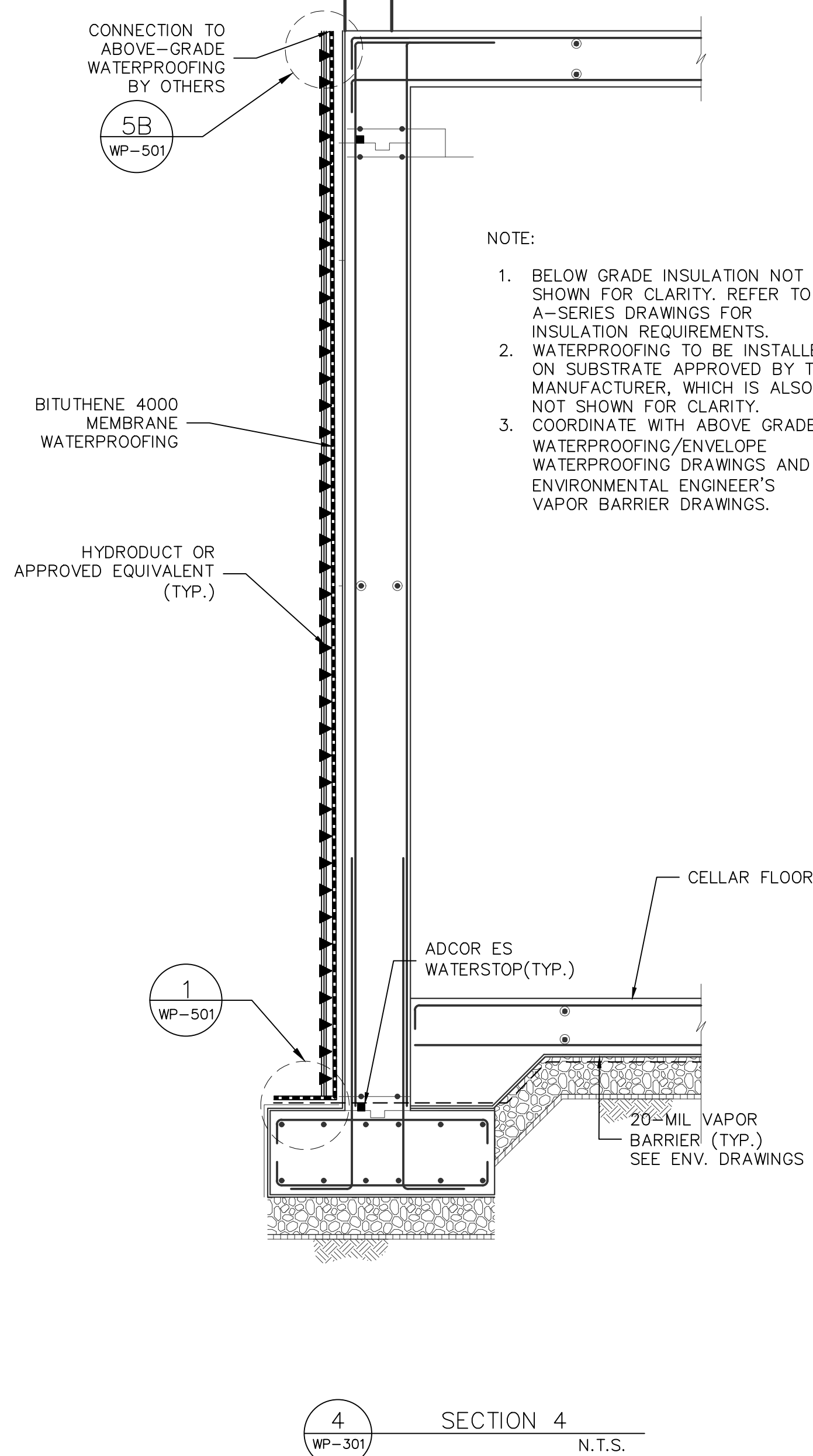
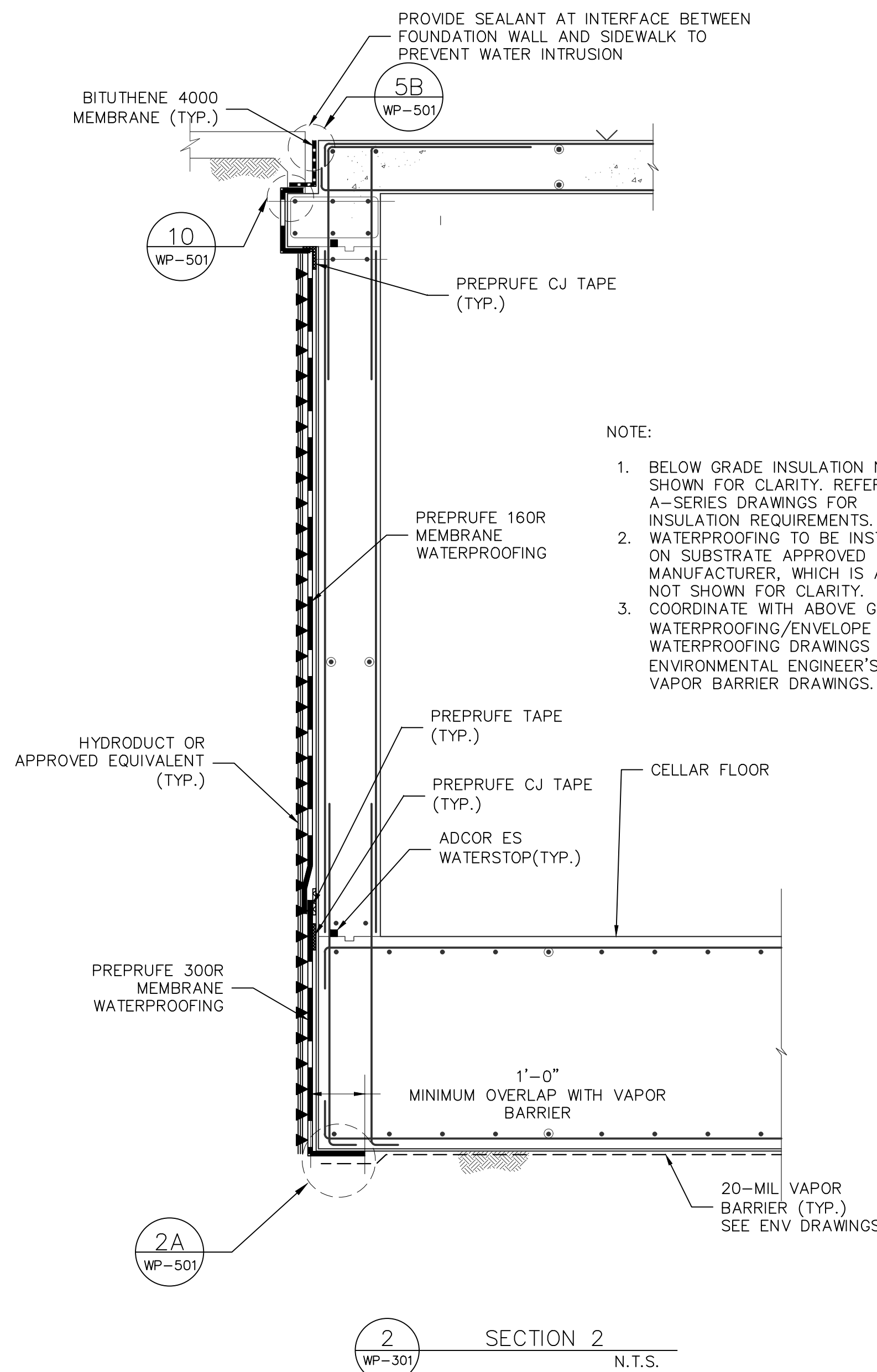
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DOB NOW #B0060335-S2 (SUPERSTRUCTURE)

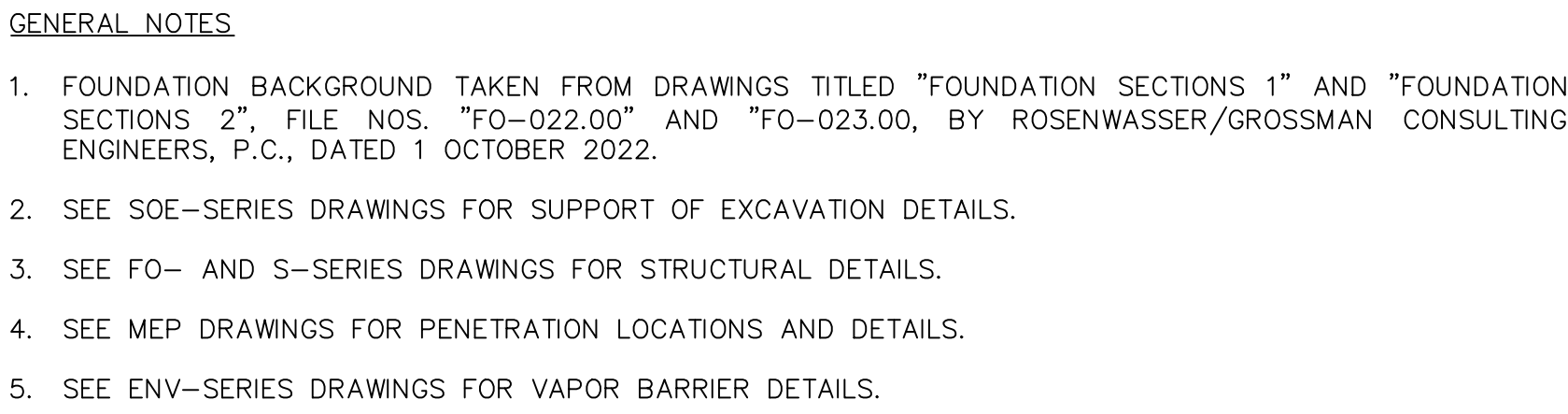
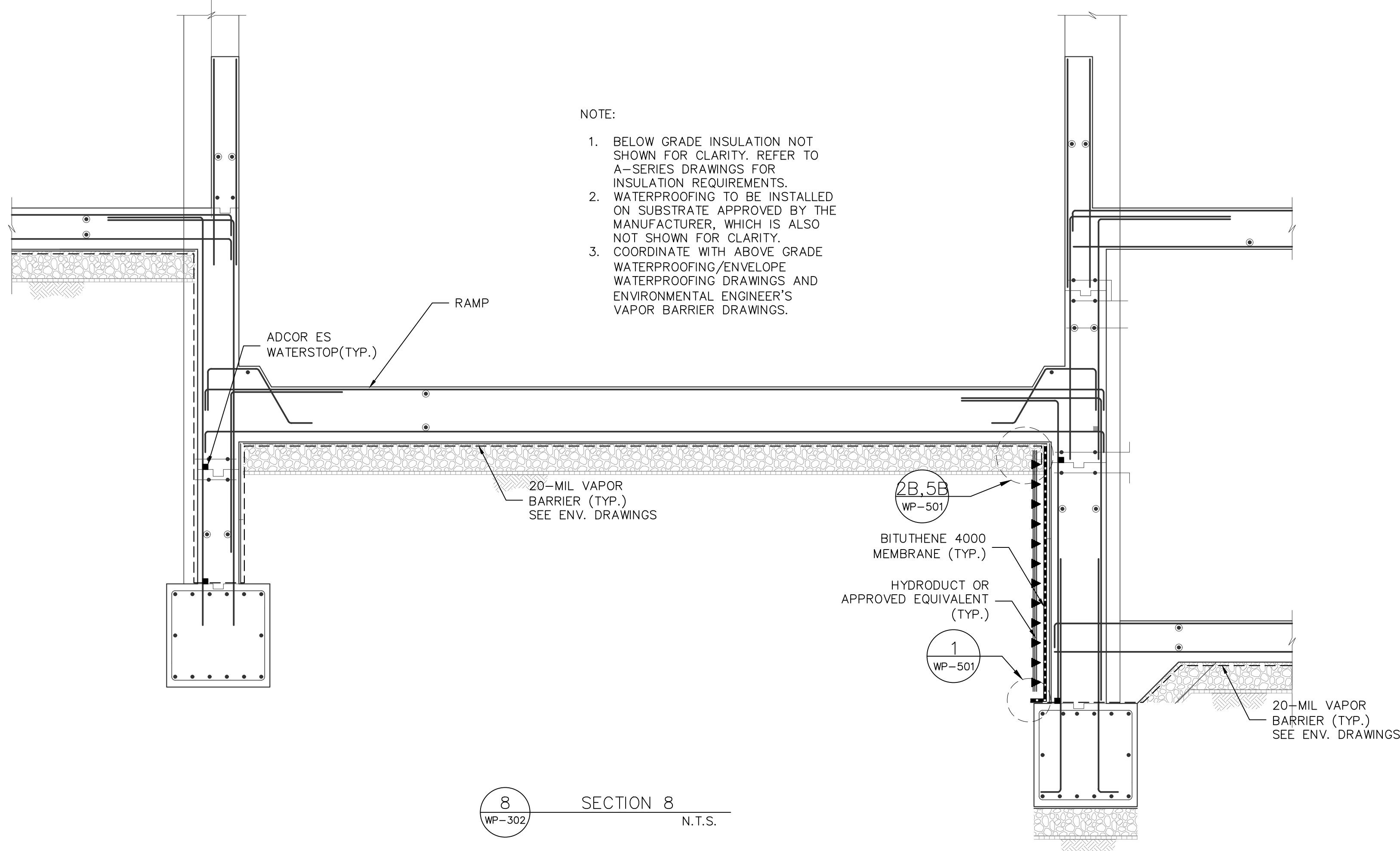


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SHOWN FOR REFERENCE ONLY. FOR
SUPERSTRUCTURE FILING: SEE DOB NOW #B0060335-S2.
SUPERSTRUCTURE IS FILED UNDER DOB NOW
#B0060335-S2. FOR SUPERSTRUCTURE FILING,
FOUNDATION SCOPE SHOWN FOR REFERENCE ONLY.
FOR FOUNDATION FILING: SEE DOB NOW #B0060335-S1.

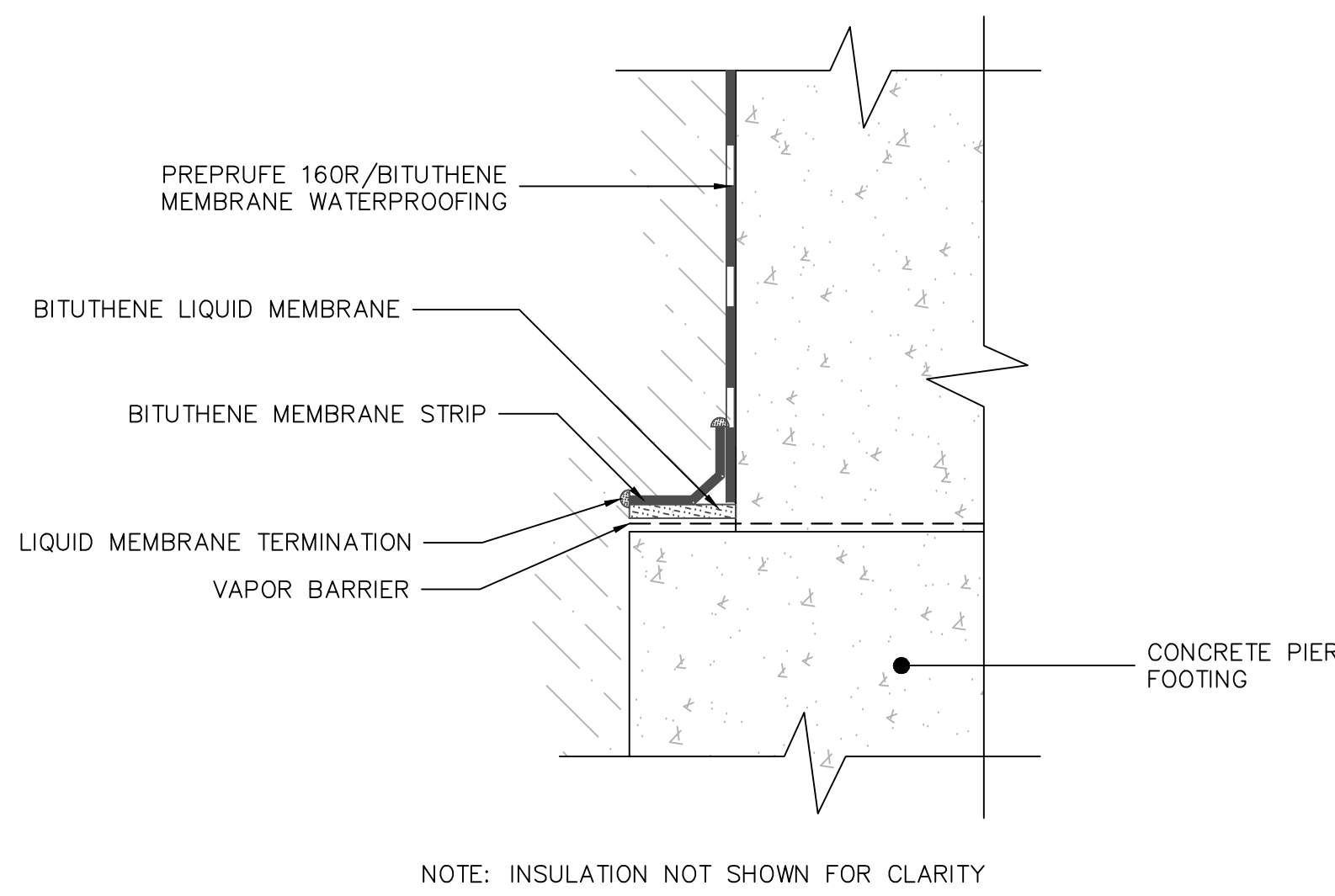




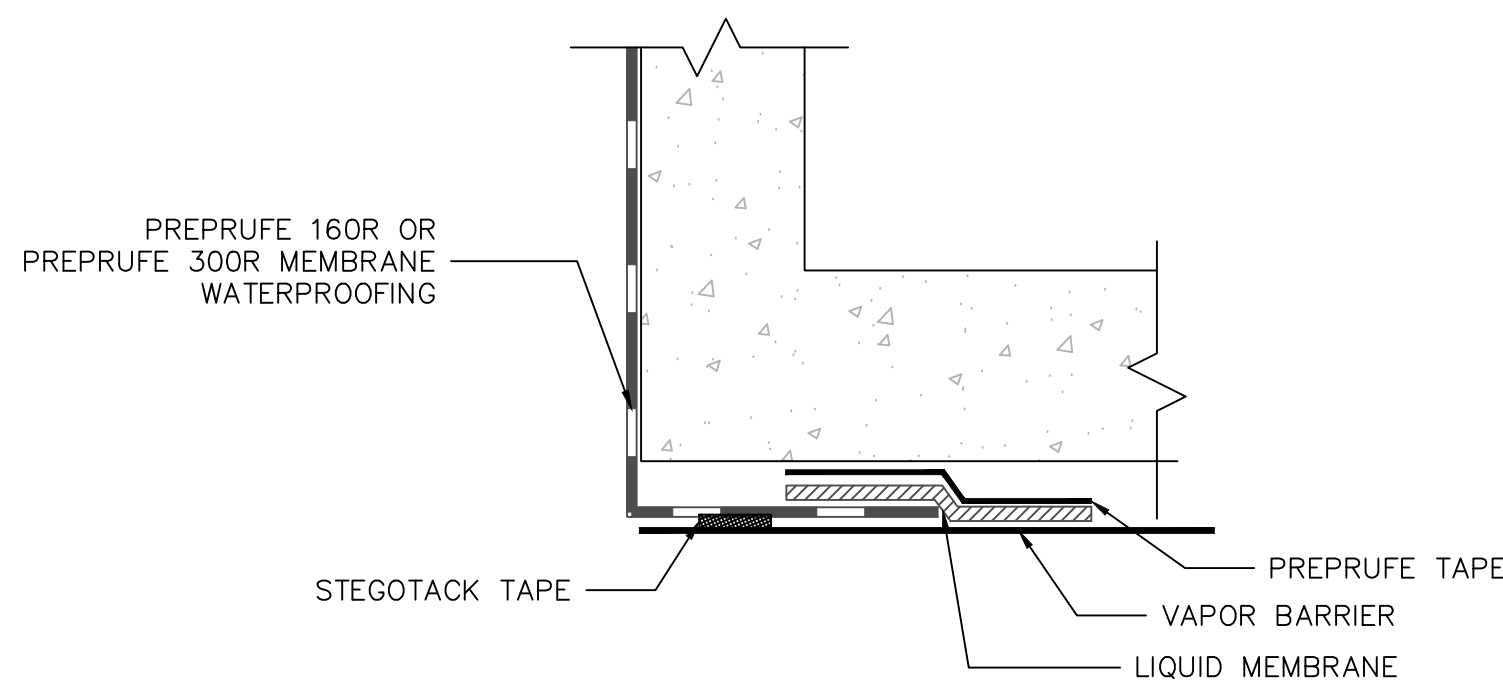
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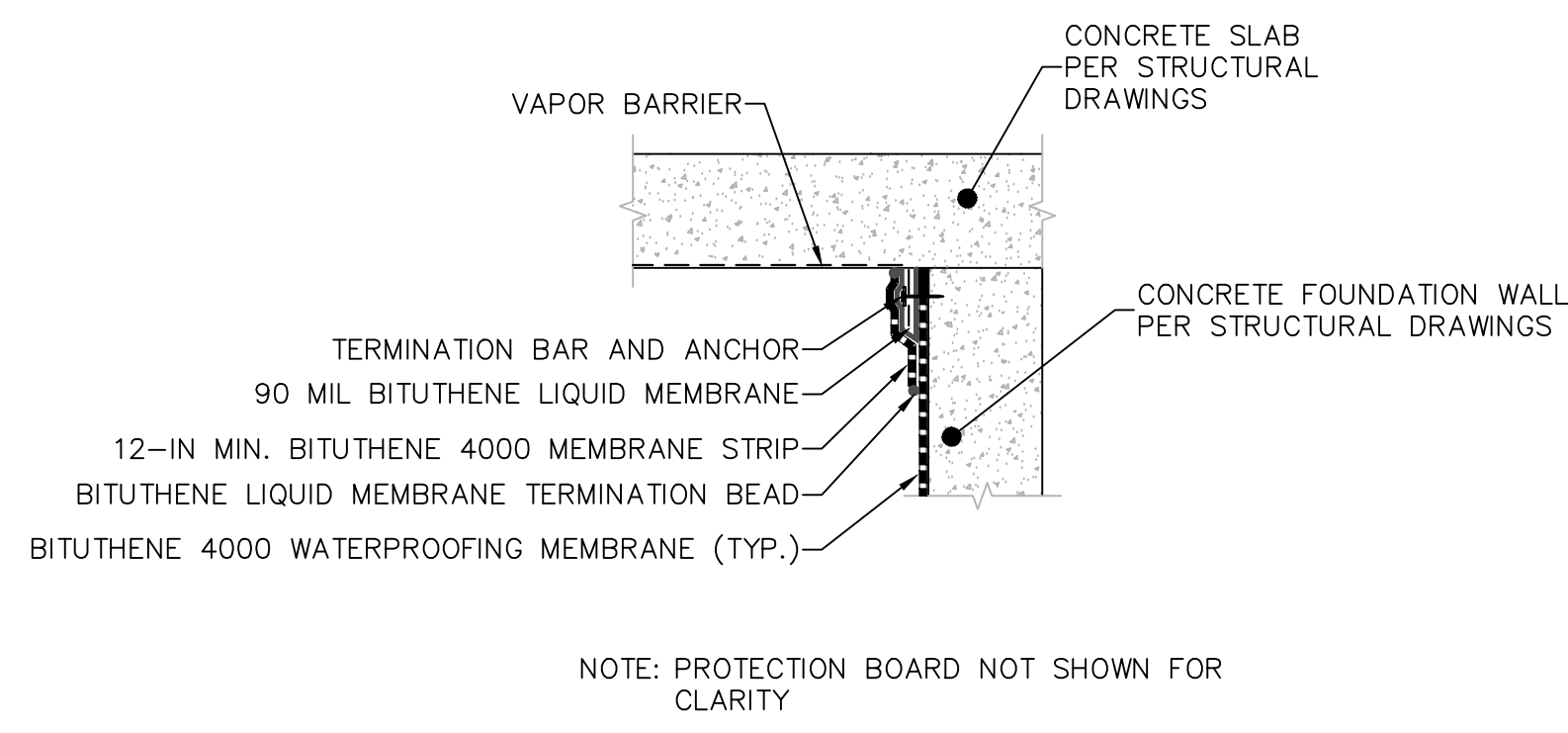
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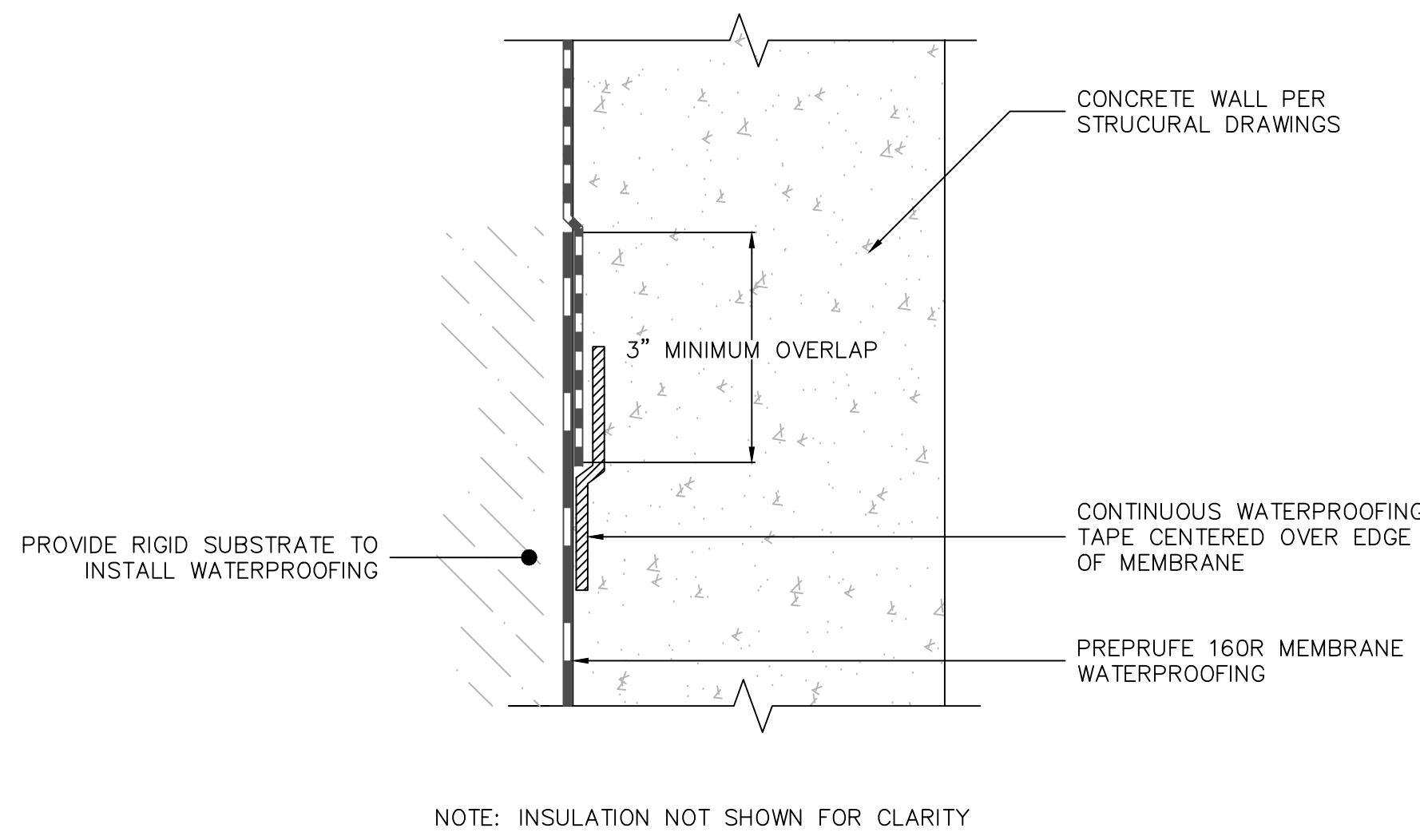
1 DETAIL AT NOTCH IN CONCRETE PIER FOOTING
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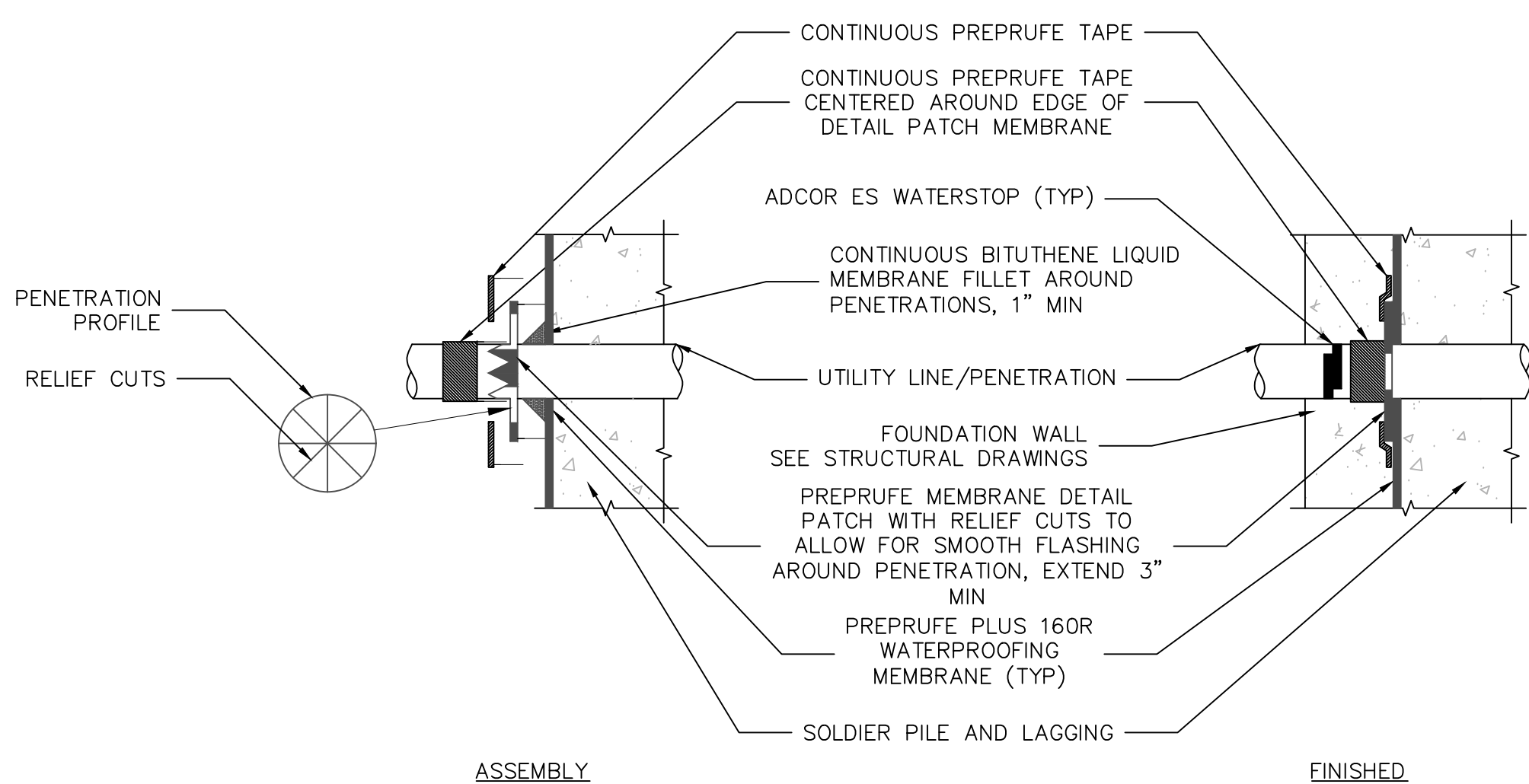
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N.T.S.



2B DETAIL AT WATERPROOFING TERMINATION BELOW GRADE
N.T.S.

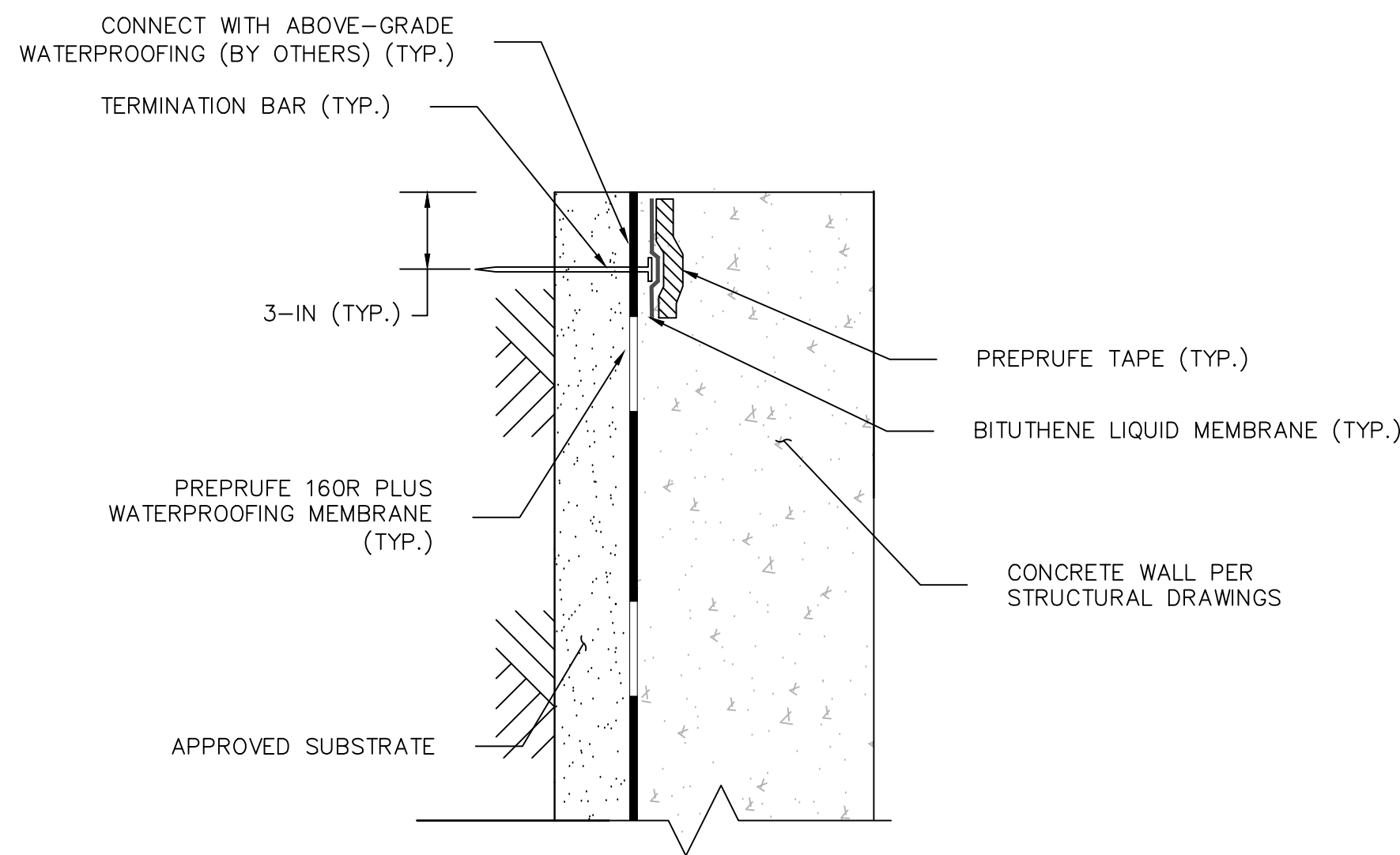


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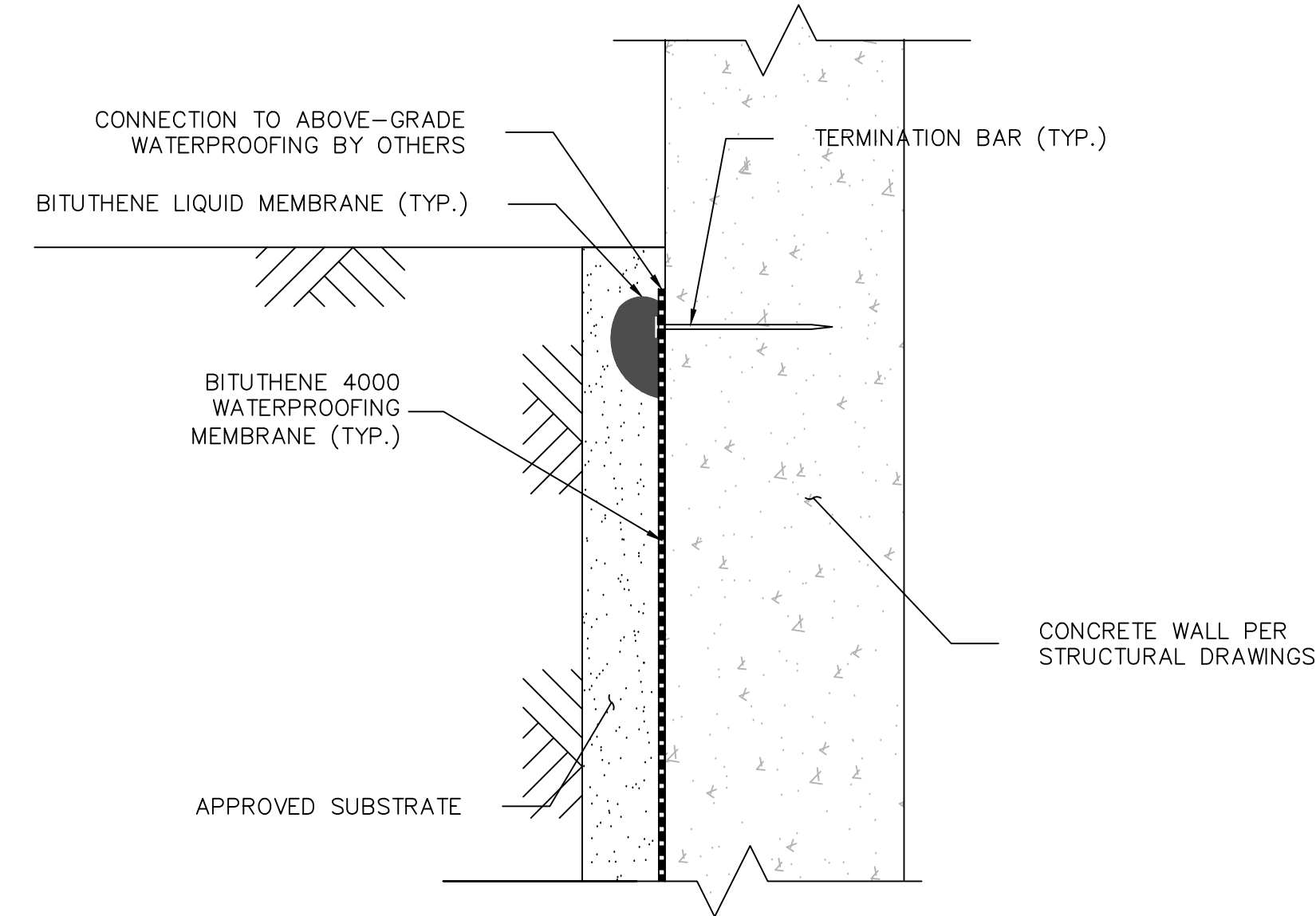


- NOTES:
- REFER TO PLUMBING DRAWINGS AND SPECIFICATIONS FOR PIPING AND CLEANOUT LOCATIONS.
 - A MINIMUM OF 6" IS REQUIRED BETWEEN PENETRATIONS TO ENSURE PROPER DETAILING.
 - AVOID PLACEMENT OF MULTIPLE PENETRATIONS.
 - A MINIMUM OF 6" OF PIPE NEEDS TO BE EXPOSED AND FREE OF CONNECTIONS, OBSTRUCTIONS, HANGERS, ETC. TO ENSURE PROPER EXECUTION OF DETAIL.
 - WATERPROOFING COMPONENTS EXCEPT MEMBRANE WATERPROOFING NOT SHOWN FOR CLARITY.

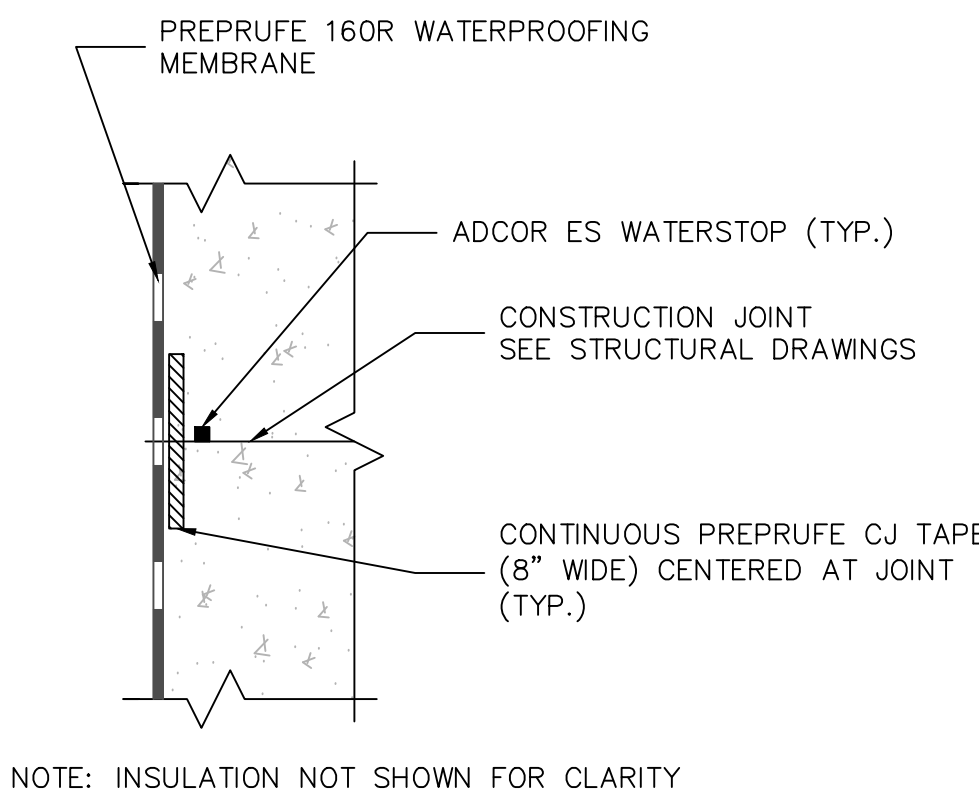
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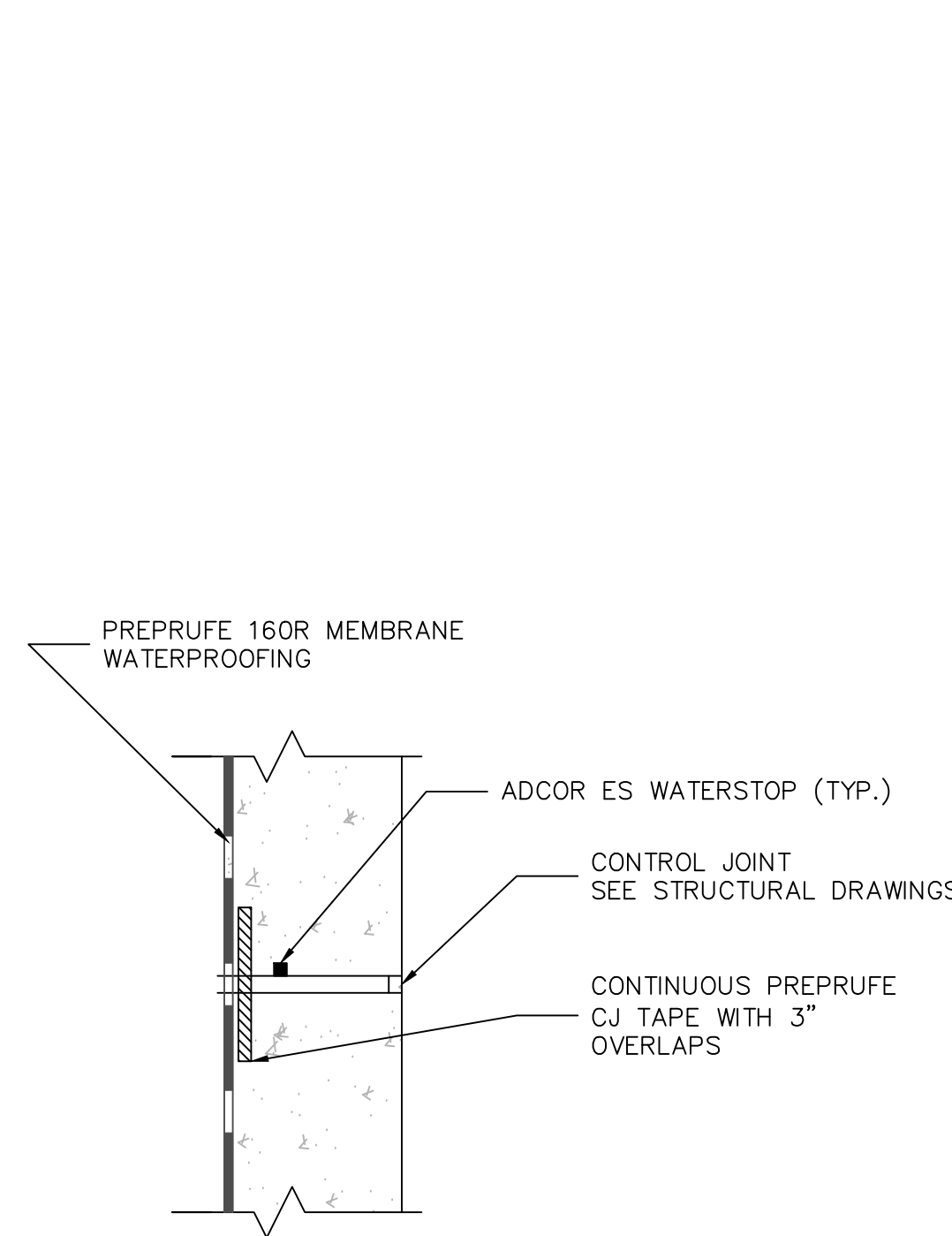
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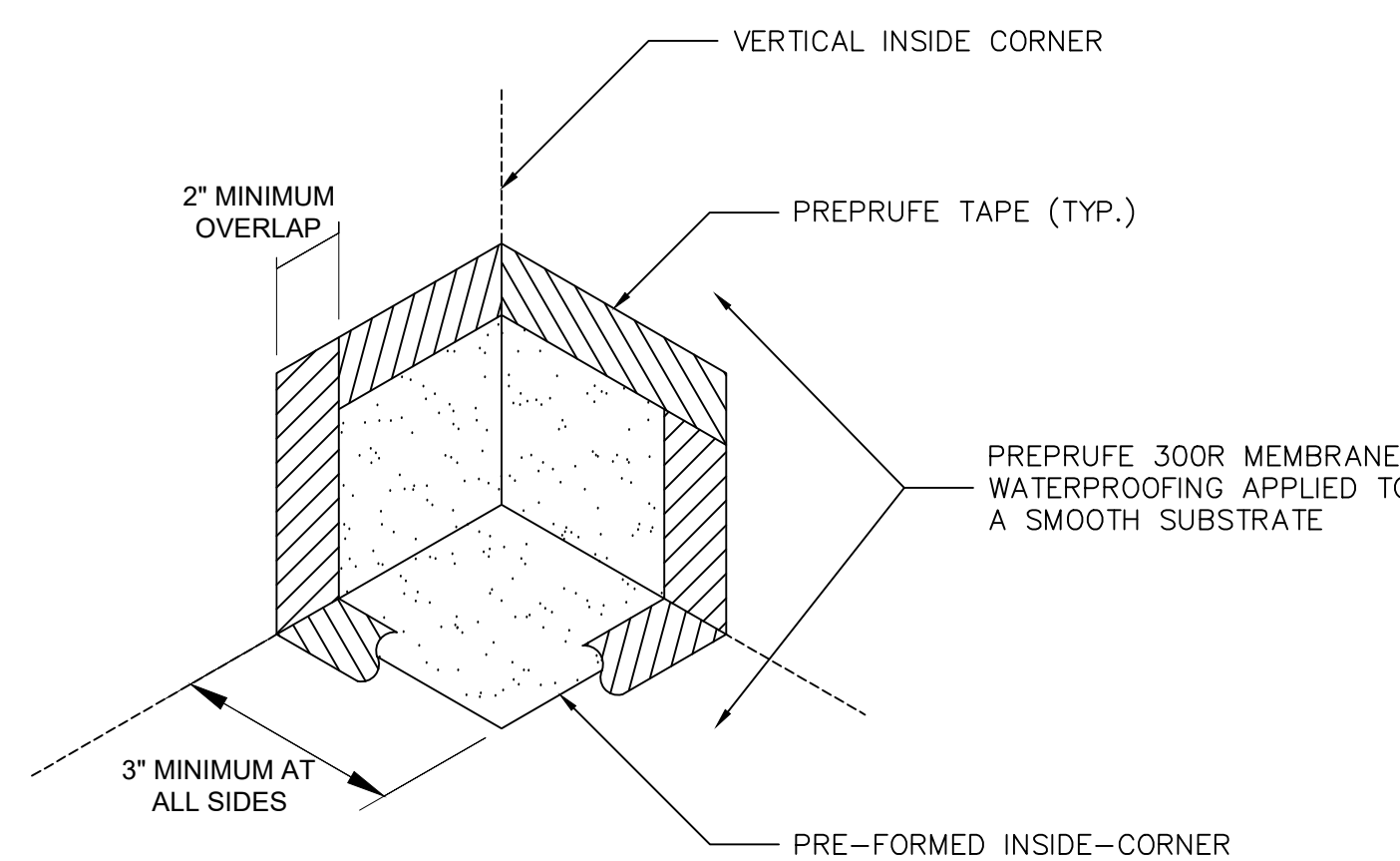
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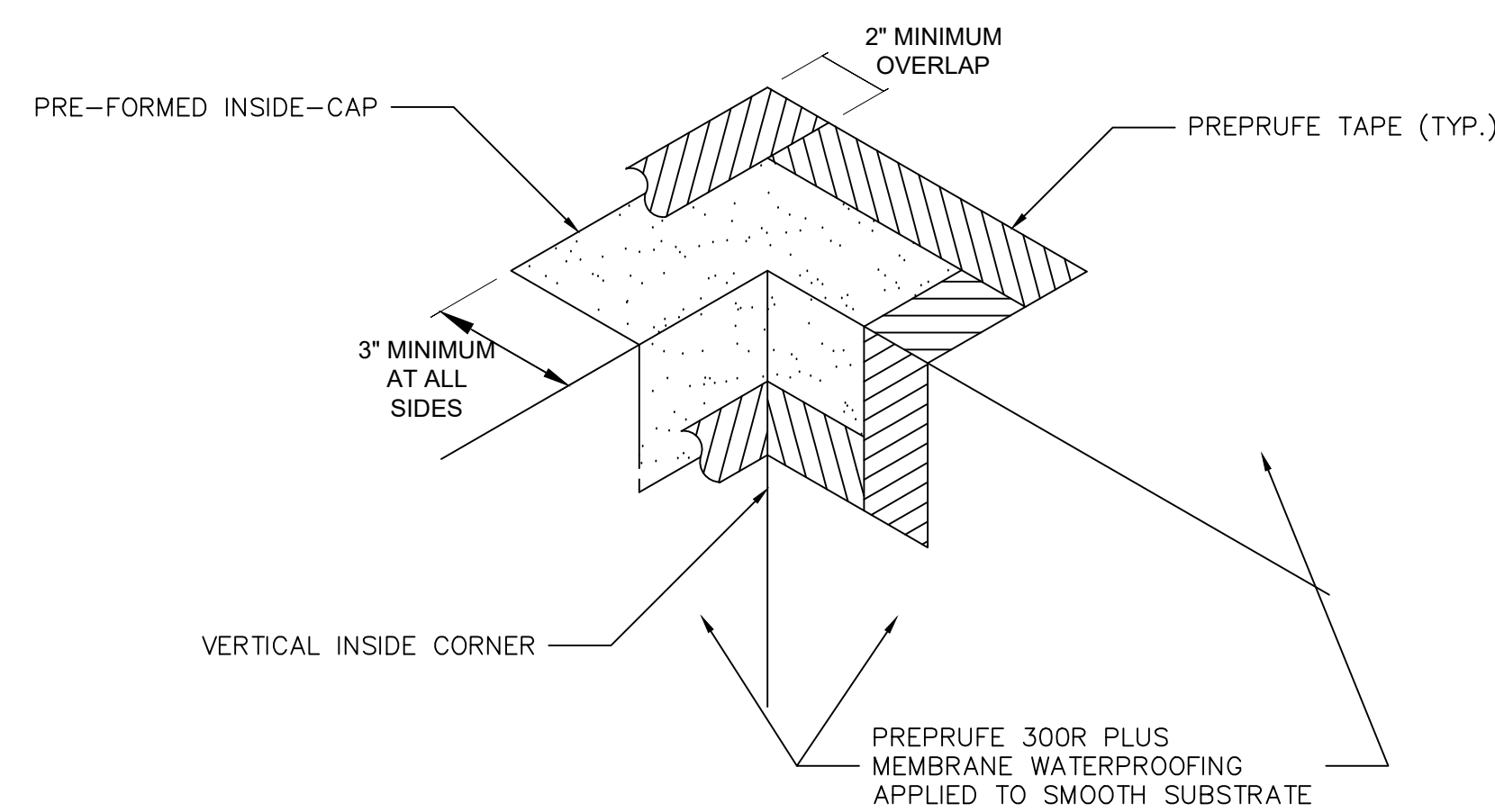
6 DETAIL AT CONSTRUCTION JOINT
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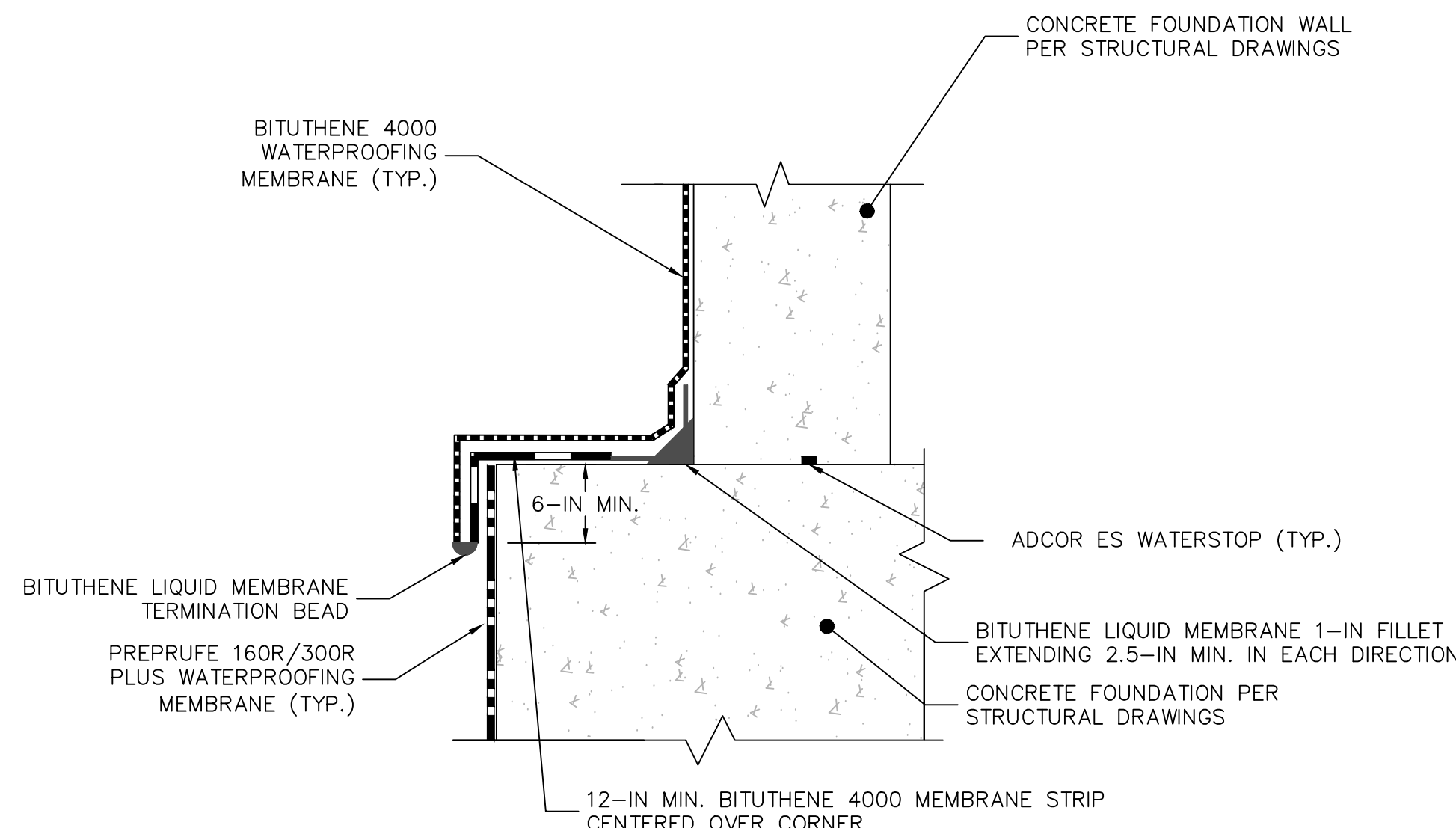
7 DETAIL AT CONTROL JOINT
N.T.S.



8 DETAIL AT INSIDE CORNERS
N.T.S.

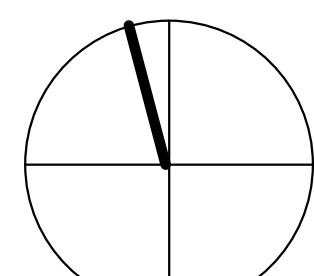


9 DETAIL AT OUTSIDE CORNERS
N.T.S.



10 FOUNDATION DETAIL
N.T.S.

FOUNDATIONS IS FILED UNDER DOB NOW #B0060335-S1.
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SHOWN FOR REFERENCE ONLY. FOR
SUPERSTRUCTURE FILING: SEE DOB NOW #B0060335-S2.
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FOR FOUNDATION FILING: SEE DOB NOW #B0060335-S1.



WATERPROOFING DETAILS

1057 ATLANTIC AVE
BROOKLYN NY 11238

No.	DESCRIPTION	DATE
1	FOUNDATION BID SET	12/02/22
2	FOUNDATION BUY SET	01/16/23

SEAL & SIGNATURE

WATERPROOFING DETAILS

DATE

PROJECT No.

2104

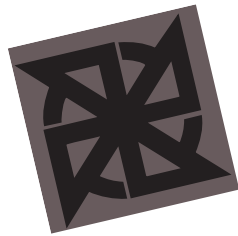
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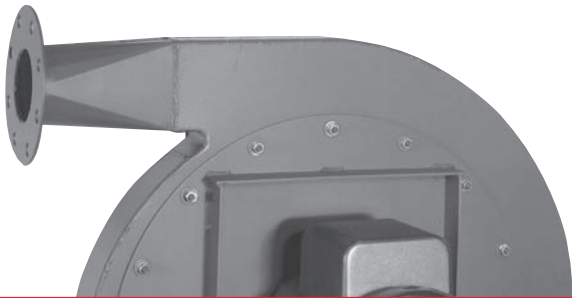
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DOB NOW #B0060335-S2 (SUPERSTRUCTURE)

Appendix C





cincinnati fan



HP SERIES II

HIGH PRESSURE BLOWERS

PWGC SVE FAN SELECTION:

HP-8D22

ARRANGEMENT 4

7.5 HP 240 Volts 3 phase

PWGC SSDS FAN SELECTION:

HP-8B18

ARRANGEMENT 4

5 HP 240 Volts 3 phase

***See page 14 for additional details**

7697 Snider Road, Mason, OH 45040-9135

Telephone: 513-573-0600

Visit us at www.cincinnati-fan.com for more information.

**Cat. No. HP-II-908
Supersedes HP-II-1104**



cincinnati fan

A Company That Stands Behind Its Product

Since the founding of **Cincinnati Fan** in 1956, the company's mission has been to provide quality products at competitive prices, backed by dependable service.

This mission is carried out by specializing in the market for industrial air handling products up to 125 HP. But specialization does not mean the product line is small. **Cincinnati Fan** offers a wide variety of standard and customized products, production flexibility, and customer responsiveness.

Cincinnati Fan has over 170 experienced sales engineers across the U.S. and Canada ready to serve your air handling needs.

Cincinnati Fan can provide:

- Technical evaluation for correct performance conditions.
- Review of air stream and ambient conditions that require special attention.
- Selection of proper components to meet required design specifications.
- Selection of proper accessories.

Cincinnati Fan operates in a modern facility specifically designed for world class manufacturing enabling us to build standard products to order, including accessories, and ship within 10-15 working days.

With support like this, you can be sure your **Cincinnati Fan** product will be well-built and will provide maximum dependability and longevity.

Visit us at www.cincinnati-fan.com for more information.

SPECIFICATIONS FOR HP SERIES II BLOWERS

Radial bladed pressure blowers shall be Cincinnati Fan HP, Series II, Model _____, Arrangement _____
Capacity: _____ CFM, _____ Static Pressure at standard conditions. Operating conditions:
_____ °F, _____ Ft. Altitude.

Wheels shall be dynamically balanced to assure smooth operation. Fan motor and bearing vibration levels shall not exceed 1.5 mils displacement at 3500 RPM. Shafts shall be turned, ground and polished steel (or stainless steel). All fan shafts shall receive a rust preventive coating prior to shipment. All fans shall be test run at factory before shipping.

All construction gauges shall be as shown in Cincinnati Fan's HP, Series II catalog, page 16. The blower housing shall be continuously welded and supported to minimize pulsation at all conditions. Fan bearings shall be grease-lubricated, heavy-duty, self-aligning ball bearings mounted in cast iron pillow blocks. V-belt drives shall be selected for a minimum of 1.3 times nominal horsepower.

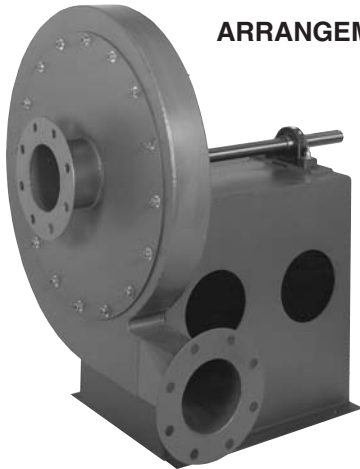
All parts in contact with airstream shall be standard steel, aluminum or stainless steel as specified.

Before painting, steel parts shall be cleaned by detergent wash, phosphatized and painted with oven cured gray enamel.

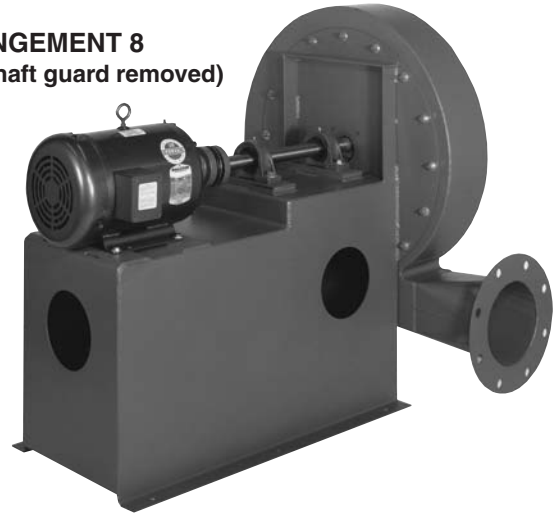
The following accessories shall be included: (See page 5 for optional accessories).

SIX STANDARD ARRANGEMENTS

ARRANGEMENT 1



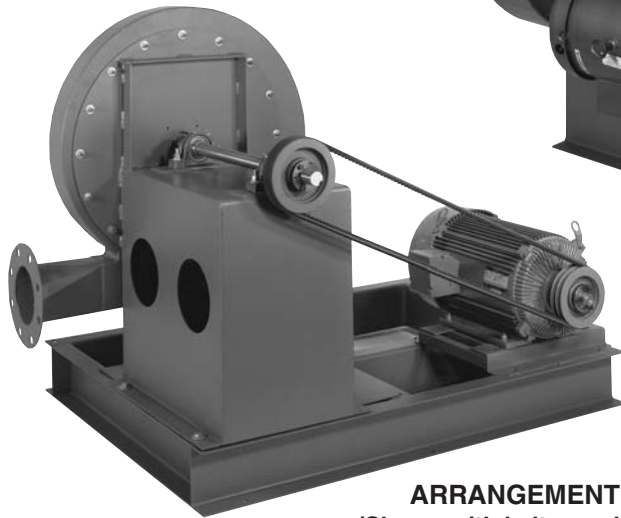
ARRANGEMENT 8
(Shown with shaft guard removed)



ARRANGEMENT 9
(Shown with optional
shaft guard)



ARRANGEMENT 9CB
(Shown with belt guard removed)



ARRANGEMENT 4
(Arrangement 4HM
not shown)



ARRANGEMENT 1 (V-BELT DRIVE)

- Motor not mounted on bearing base.
- Wheel mounted on fan shaft with two pillow block bearings.
- Maximum temperature of standard design: 300°F; high temperature design: 750°F.

ARRANGEMENT 8 (DIRECT DRIVE)

- Motor mounted on motor base extending beyond the bearing base.
- Wheel mounted on fan shaft with two pillow block bearings.
- Maximum temperature of standard design: 300°F; high temperature design: 750°F.
- For dimensions, contact your local Cincinnati Fan sales office.

ARRANGEMENT 9 (V-BELT DRIVE)

- Motor mounted on an adjustable slide base on the side of the bearing base.
- Wheel mounted on fan shaft with two pillow block bearings.
- Maximum temperature of standard design: 300°F; high temperature design: 750°F.

ARRANGEMENT 9CB (V-BELT DRIVE)

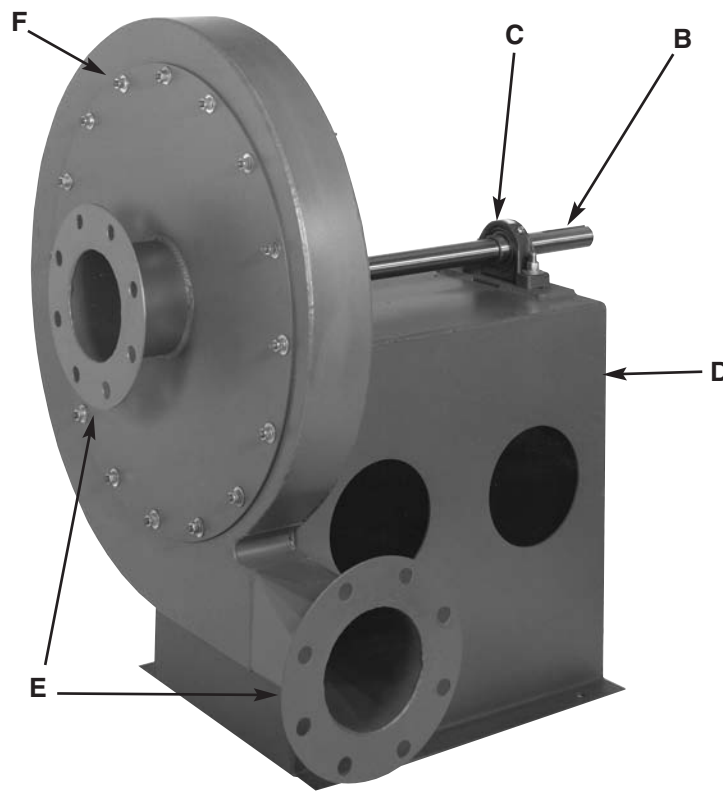
- Same as Arrangement 9 except motor and fan are mounted on a common channel base.
- Maximum temperature of standard design: 300°F; high temperature design: 750°F.

ARRANGEMENT 4 & 4HM (DIRECT DRIVE)

- Motor mounted on motor base.
- Wheel mounted on motor shaft.
- Maximum temperature of standard design: 200°F; high temperature design: 400°F.
- For arrangement 4HM, see page 16.

HP SERIES II FEATURES

- A) Wheels are fabricated of heavy-gauge, high-strength steel to assure long lasting, efficient operation. (Not shown.)
- B) Turned, ground and polished shafting assures smooth operation. A rust preventative coating is applied prior to shipment.
- C) Heavy-duty, self-aligning ball bearings in relubricatable cast-iron pillow blocks. Bearings are selected for optimal performance depending on fan size.
- D) Bearing base is heavy steel construction with internal supports to maximize rigidity and assure long equipment life. Arrangement #1 fans can be converted to Arrangement #9 with the addition of the motor slide base.
- E) Flanged inlet and outlet standard. Drilled per ANSI 125 pound and ASA 150 pound specifications with holes straddling centers. See ★ note on page 18.
- F) Reversible housing provides increased configuration flexibility. Removable side plates allow the wheel to be removed from the motor or inlet side of the housing. Housings are rotatable in 45 degree increments.
- G) Teflon shaft seal is standard. Ceramic seal is used for applications above 400°F. (Not shown.)



SPARK-RESISTANT CONSTRUCTION

- Type A:** All parts in contact with airstream are of nonferrous material. **Maximum temperature 200°F.** Consult factory.
- Type B:** Aluminum wheel and aluminum rubbing ring for motor shaft or fan shaft. **Maximum temperature 200°F.**
- Type C:** Consists of an aluminum plate on drive side of the fan and aluminum inlet plate assembly. **Maximum temperature 750°F.**

WARNING

The use of aluminum or aluminum alloys in the presence of steel which has been allowed to rust requires special consideration. Research by the U.S. Bureau of Mines and others has shown that aluminum impellers rubbing on rusty steel may cause high intensity sparking.

The use of the above construction in no way implies a guarantee of safety for any level of spark resistance. Spark resistant construction also does not protect against ignition of explosive gases caused by catastrophic failure or from any airstream material that may be present in a system.

OPTIONAL ACCESSORIES



Belt Guard

Belt guard standard on Arrangement 9 and 9CB only. **Painted safety yellow.**



Drain Connection

3/4" pipe coupling welded to lowest point of housing. Not required on BH discharge position.



Inspection Door

Inspection door available on all sizes except 4A, 4C and 6C. Rubber gasket standard to 250°F. Silicone gasket standard at temperatures of 250°F. to 750°F.



Inlet Bell

With OSHA type guard.



Outlet Guard

OSHA type.



Shaft and/or Heat Slinger Guard

Guard available on Arrangement 1, 9 and 9CB. Standard on Arrangement 8. Covers bearings and shaft between fan housing and belt guard. Bearings relubricatable through guard. **Painted safety yellow.**

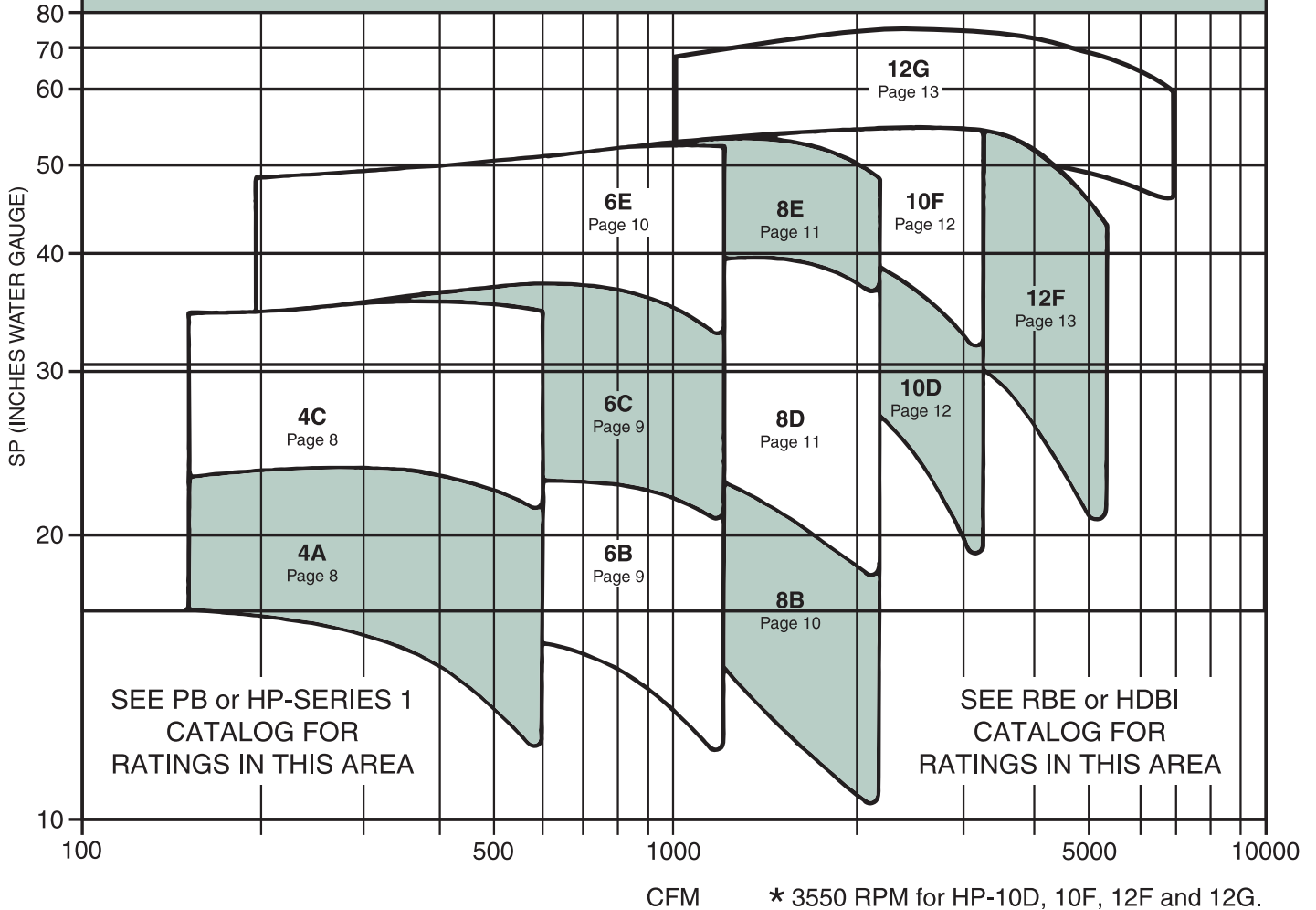
DANGER

All fans & blowers shown have rotating parts and pinch points. Severe personal injury can result if operated without guards. Stay away from rotating equipment unless it is disconnected or locked out from its power source.

Read operating instructions.

HP SERIES II MASTER SELECTION CHART

STANDARD AIR: 70°F, .075 LB./CU. FT., SEA LEVEL
3500 RPM* — SEE CURVES FOR WHEEL DIAMETERS.



HOW TO USE THE MASTER SELECTION CHART

The above chart is intended to guide you to the correct fan for a desired performance rating. This chart was prepared for standard air (70° F., 29.92" Hg barometric pressure and .075 lbs. per cubic foot density.)

All fans were tested with an inlet bell. All performance curves in this catalog are for standard air, at the fan inlet, entering the inlet (whether belled or ducted) with static pressure measured at the discharge.

Corrections are required for temperature and/or altitude and rarefaction. See page 7 for correction factors.

Rarefaction: When air is pulled into a blower inlet (negative pressure) the air molecules are "stretched out", or rarefied, and become less dense than at the blower discharge where the air is compressed.

Catalog ratings may be used directly, without correction, for static pressures defined at the fan discharge. For static pressures defined at the fan inlet (i.e., negative pressures), a correction is typically only made for inlet suction pressures greater than 15" W.G. See page 7 for details.

HIGH TEMPERATURE CONSTRUCTION

Arrangements 4 and 4 HM

Up to 200°F. Standard fan construction.

201°- 400°F. Standard fan with shaft seal, heat slinger, slinger guard and external hub on wheel.

Arrangements 1, 8, 9 and 9CB

Up to 300°F. Standard fan construction.

301°- 400°F. Standard fan with heat slinger and shaft/slinger guard.

401°- 600°F. Standard fan with heat slinger, shaft/slinger guard and high temperature shaft seal, gasketing and paint.

601°- 750°F. Standard fan with heat slinger, shaft/slinger guard, 316SS fan shaft and high temperature shaft seal, gasketing and paint.

TEMPERATURE RANGE	MAXIMUM RPM REDUCTION FACTOR†
Up to 175°F.	0%
176°-200°	2%
201°-300°	4%
301°-400°	7%
401°-500°	11%
501°-600°	15%
601°-700°	20%
701°-750°	30%

† Steel wheels only.

TEMPERATURE - ALTITUDE CONVERSIONS

AIR TEMP. °F	ALTITUDE IN FEET ABOVE SEA LEVEL										
	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
0°	.87	.91	.94	.98	1.01	1.05	1.09	1.13	1.17	1.22	1.26
40°	.94	.98	1.02	1.06	1.10	1.14	1.19	1.23	1.28	1.32	1.36
70°	1.00	1.04	1.08	1.12	1.16	1.20	1.25	1.30	1.35	1.40	1.45
80°	1.02	1.06	1.10	1.14	1.19	1.23	1.28	1.33	1.38	1.43	1.48
100°	1.06	1.10	1.14	1.19	1.23	1.28	1.33	1.38	1.43	1.48	1.54
120°	1.09	1.14	1.18	1.23	1.28	1.32	1.38	1.43	1.48	1.53	1.58
140°	1.13	1.18	1.22	1.27	1.32	1.37	1.42	1.48	1.54	1.58	1.65
160°	1.17	1.22	1.26	1.31	1.36	1.42	1.47	1.53	1.59	1.64	1.70
180°	1.21	1.26	1.30	1.36	1.41	1.46	1.52	1.58	1.64	1.70	1.75
200°	1.25	1.29	1.34	1.40	1.45	1.51	1.57	1.63	1.69	1.75	1.81
250°	1.34	1.39	1.45	1.50	1.56	1.62	1.68	1.74	1.82	1.88	1.94
300°	1.43	1.49	1.55	1.61	1.67	1.74	1.80	1.87	1.94	2.00	2.08
350°	1.53	1.59	1.65	1.72	1.78	1.85	1.92	2.00	2.07	2.14	2.22
400°	1.62	1.69	1.75	1.82	1.89	1.96	2.04	2.12	2.20	2.27	2.35
450°	1.72	1.79	1.86	1.93	2.00	2.08	2.16	2.24	2.33	2.41	2.50
500°	1.81	1.88	1.96	2.03	2.11	2.19	2.28	2.36	2.46	2.54	2.62
550°	1.91	1.98	2.06	2.14	2.22	2.30	2.40	2.49	2.58	2.68	2.77
600°	2.00	2.08	2.16	2.24	2.33	2.42	2.50	2.61	2.71	2.80	2.90
650°	2.10	2.18	2.26	2.35	2.44	2.54	2.63	2.74	2.84	2.94	3.04
700°	2.19	2.27	2.36	2.46	2.55	2.65	2.75	2.86	2.97	3.06	3.18
750°	2.28	2.37	2.47	2.56	2.66	2.76	2.87	2.98	3.10	3.19	3.31

Fan performance tables are developed using standard air which is 70°F., 29.92" barometric pressure and .075 lbs. per cubic foot. Density changes resulting from temperature or barometric pressure variations (such as high altitudes) must be corrected to standard conditions before selecting a fan based on standard performance data.

Temperature and/or altitude conversion factors are used in making corrections to standard conditions.

EXAMPLE:

Select an HP Series II fan to deliver 4800 CFM at 30" SP at 160°F., and 7000' altitude.

STEP 1. From the table, conversion factor is 1.53.

STEP 2. Correct static pressure is:
1.53 x 30" SP = 45.9" SP at standard conditions.

STEP 3. Check HP, Series II catalog for 4800 CFM at 45.9" SP. We select a HP12F with a 26" diameter wheel at 3500 RPM and 56 BHP.

STEP 4. Correct the BHP for the lighter air:
56 ÷ 1.53 = 36.6 BHP. A 40 HP motor will suffice at 160° F., and 7000' but not at standard conditions. Special motor insulation may be required above 3500 feet altitude. Consult factory.

SUCTION PRESSURE CORRECTIONS

The two tables at the right give corrected static pressures for suction pressure (rarefaction). These corrected static pressures are for standard air (70°F., 29.92" Hg barometric pressure and .075 lbs. per cubic foot density) at the blower inlet.

If the inlet air temperature and/or altitude are different, make those corrections as shown above and then correct for rarefaction.

Suction Pressure in Inches W.G.	Corrected Static Pressure
16	16.7
18	18.8
20	21.0
22	23.3
24	25.5
26	27.8
28	30.1
30	32.4
32	34.7
34	37.1
36	39.5
38	41.9
40	44.4
42	46.8

Suction Pressure in Inches W.G.	Corrected Static Pressure
44	49.3
46	51.9
48	54.4
50	57.0
52	59.6
54	62.2
56	64.9
58	67.6
60	70.4
62	73.2
64	75.9
66	78.8
68	81.6
70	84.5

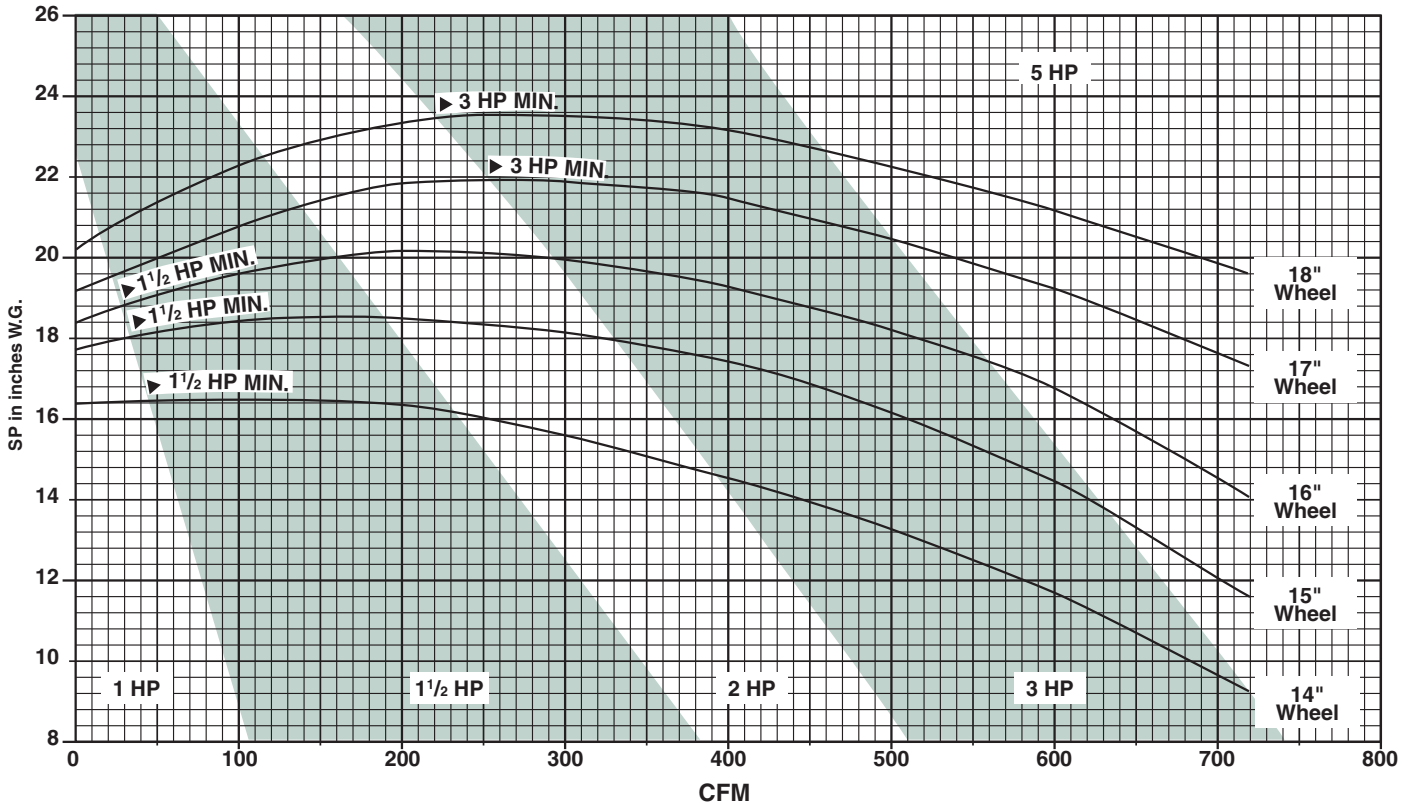
DIRECT DRIVE RATINGS @ 3500 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level



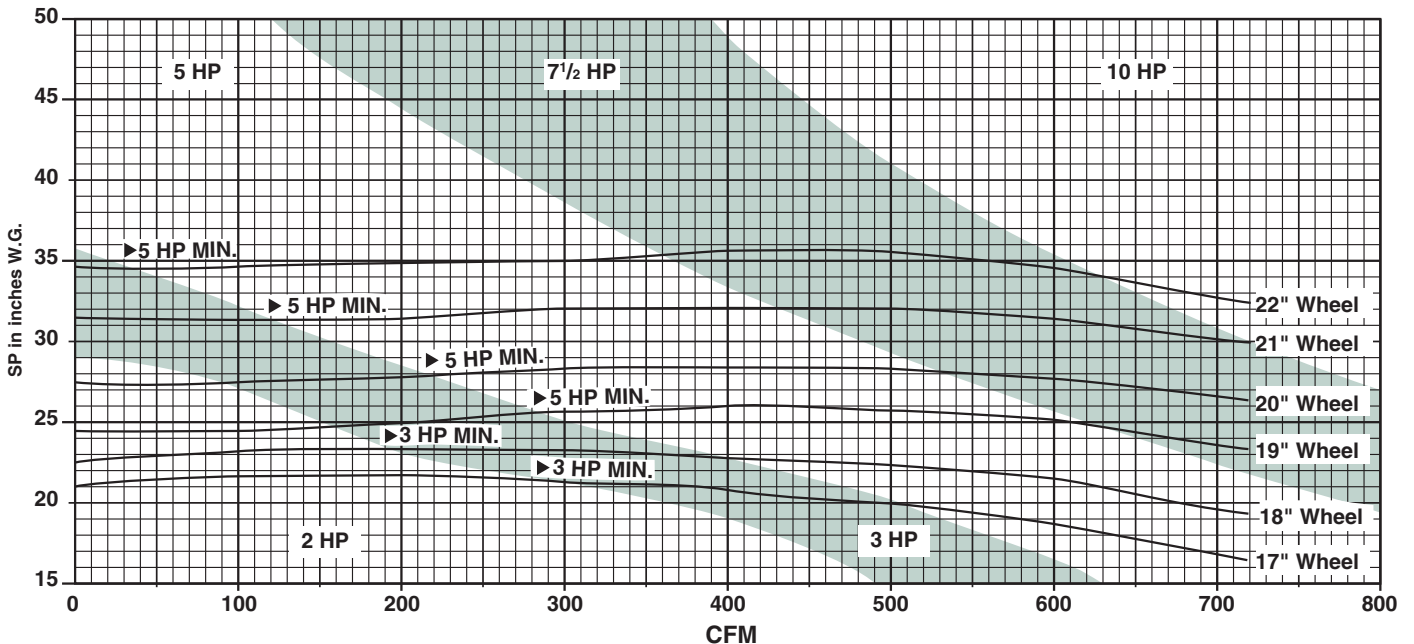
Model HP-4A

BHP values are shown. Note “▶” is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



Model HP-4C

BHP values are shown. Note “▶” is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



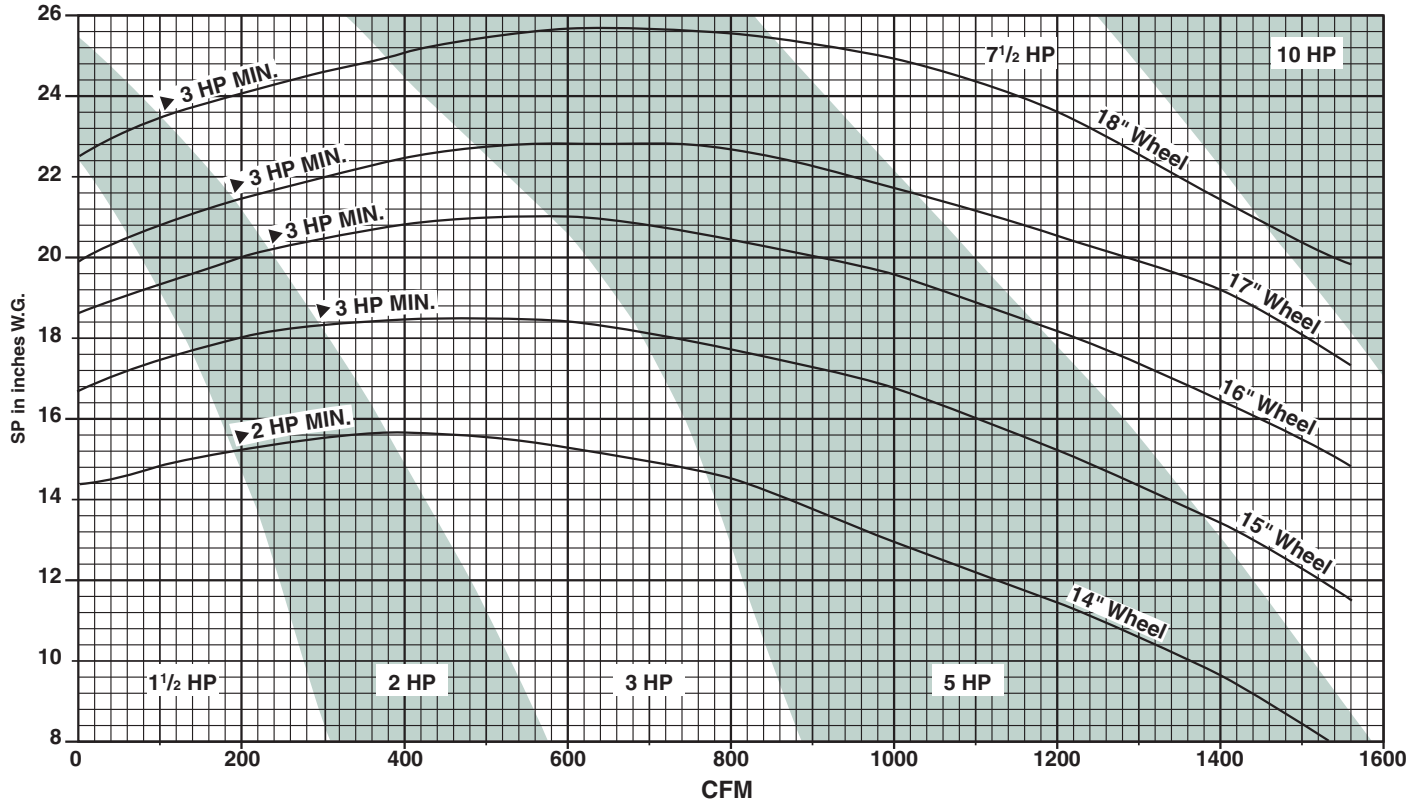
DIRECT DRIVE RATINGS @ 3500 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level



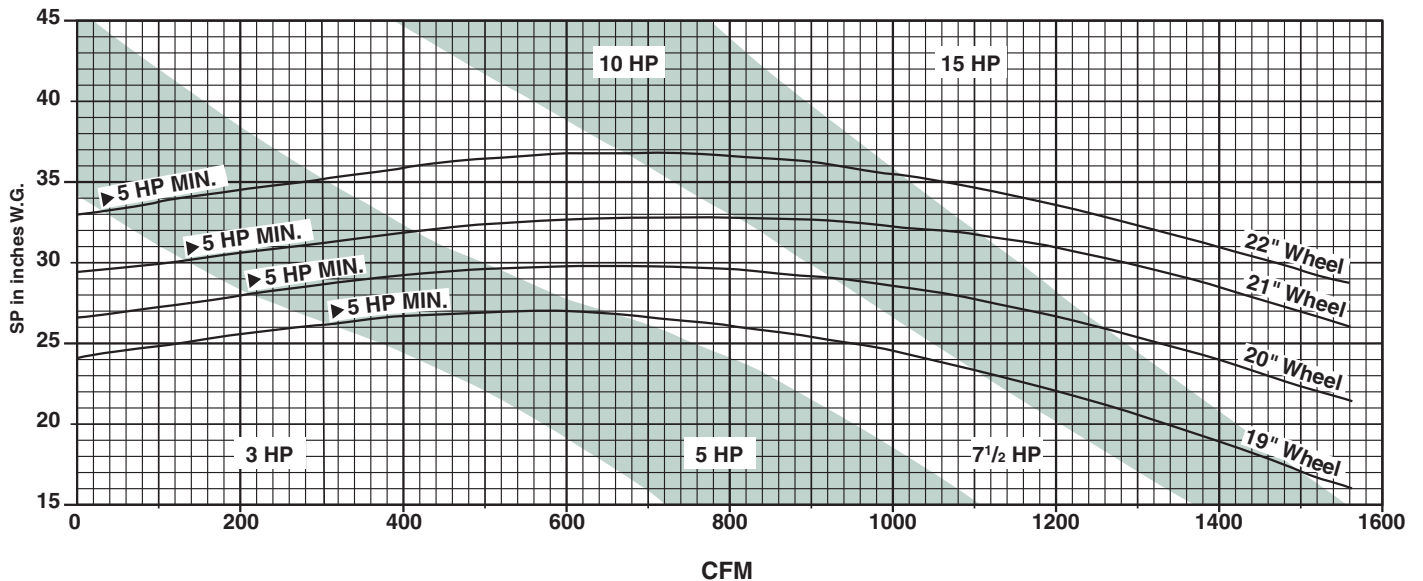
Model HP-6B

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



Model HP-6C

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



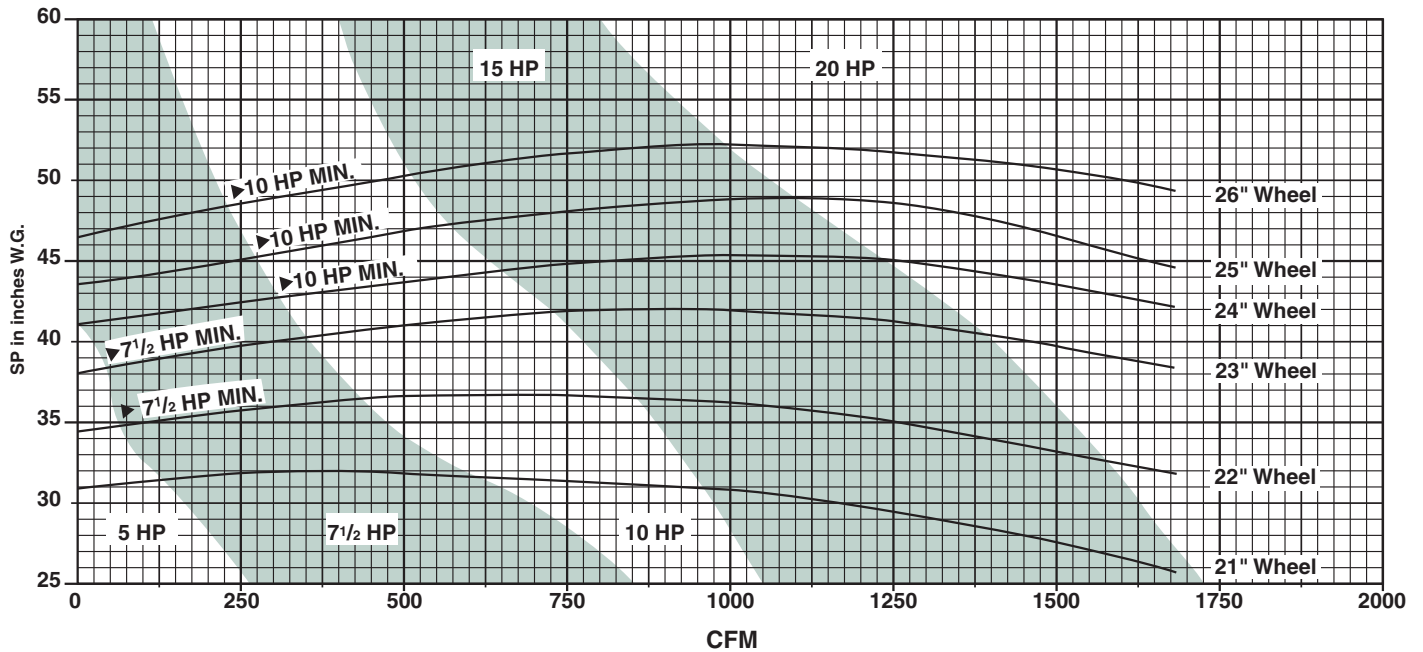
DIRECT DRIVE RATINGS @ 3500 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level



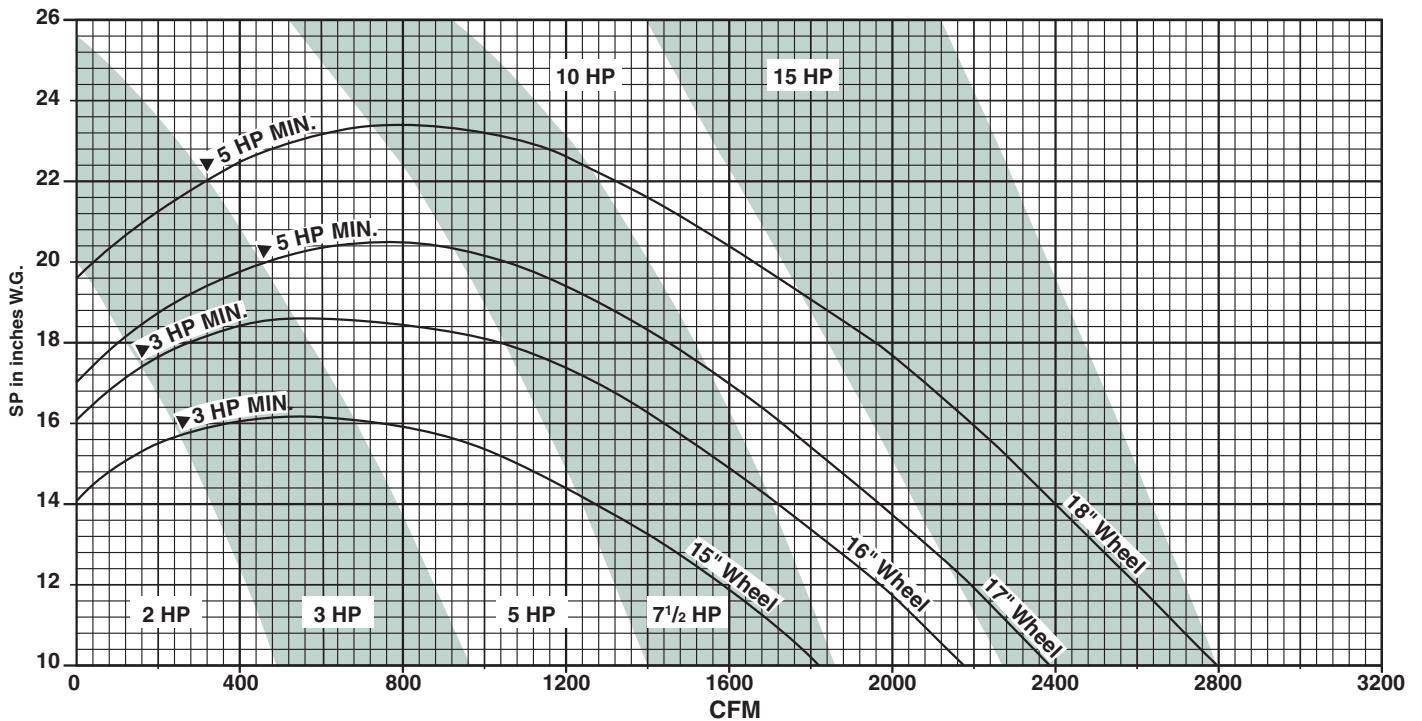
Model HP-6E

BHP values are shown. Note “▶” is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



Model HP-8B

BHP values are shown. Note “▶” is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



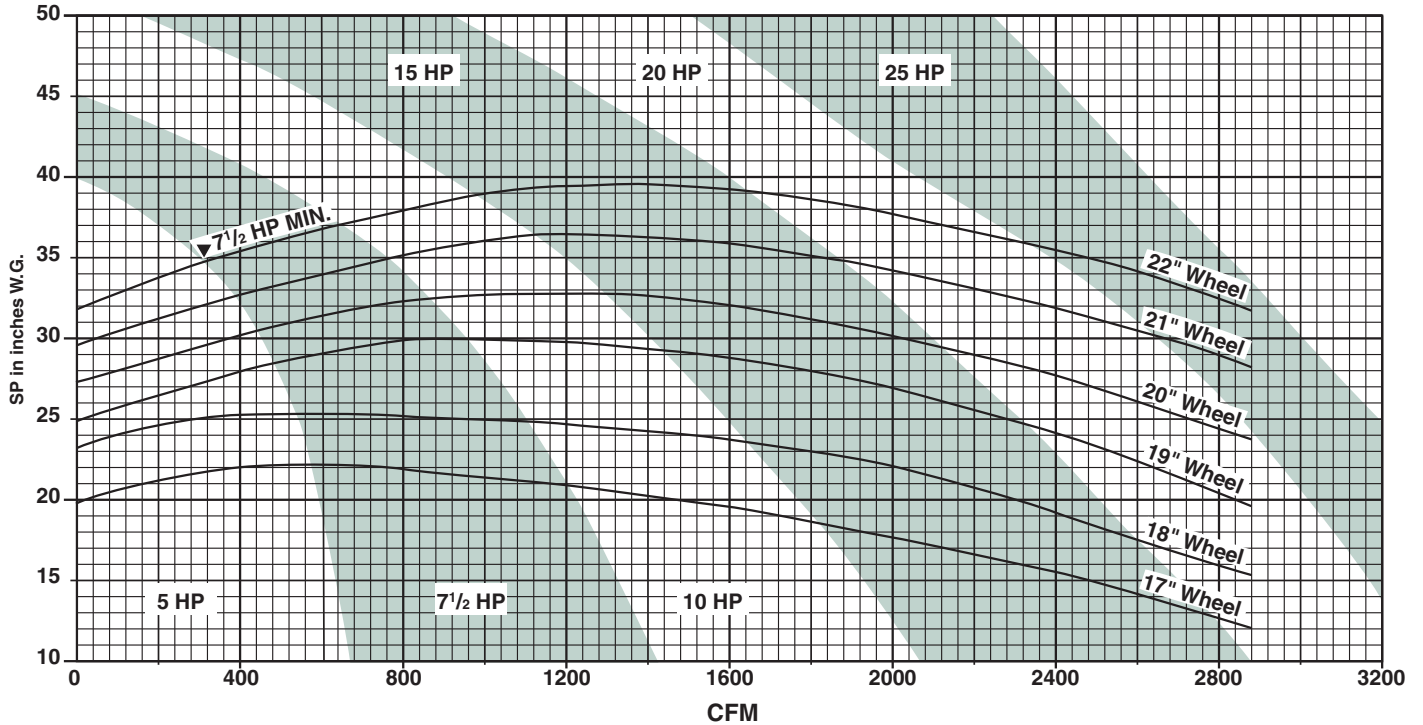
DIRECT DRIVE RATINGS @ 3500 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level



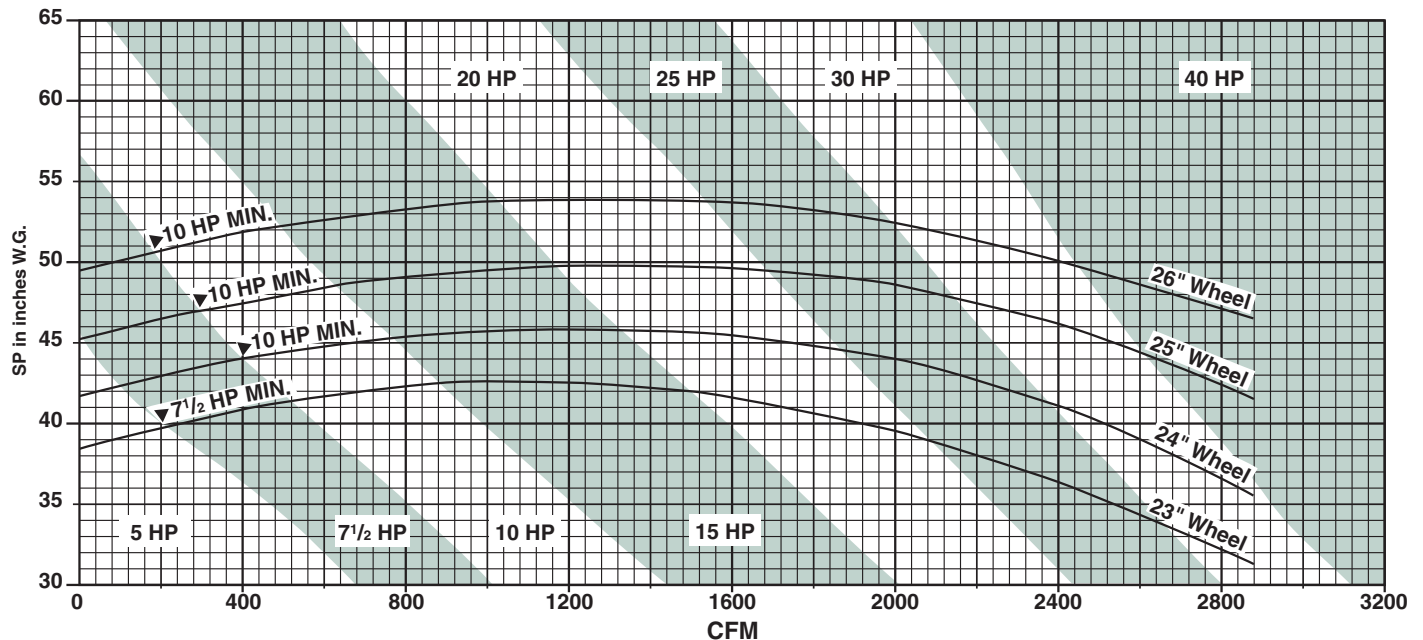
Model HP-8D

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



Model HP-8E

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



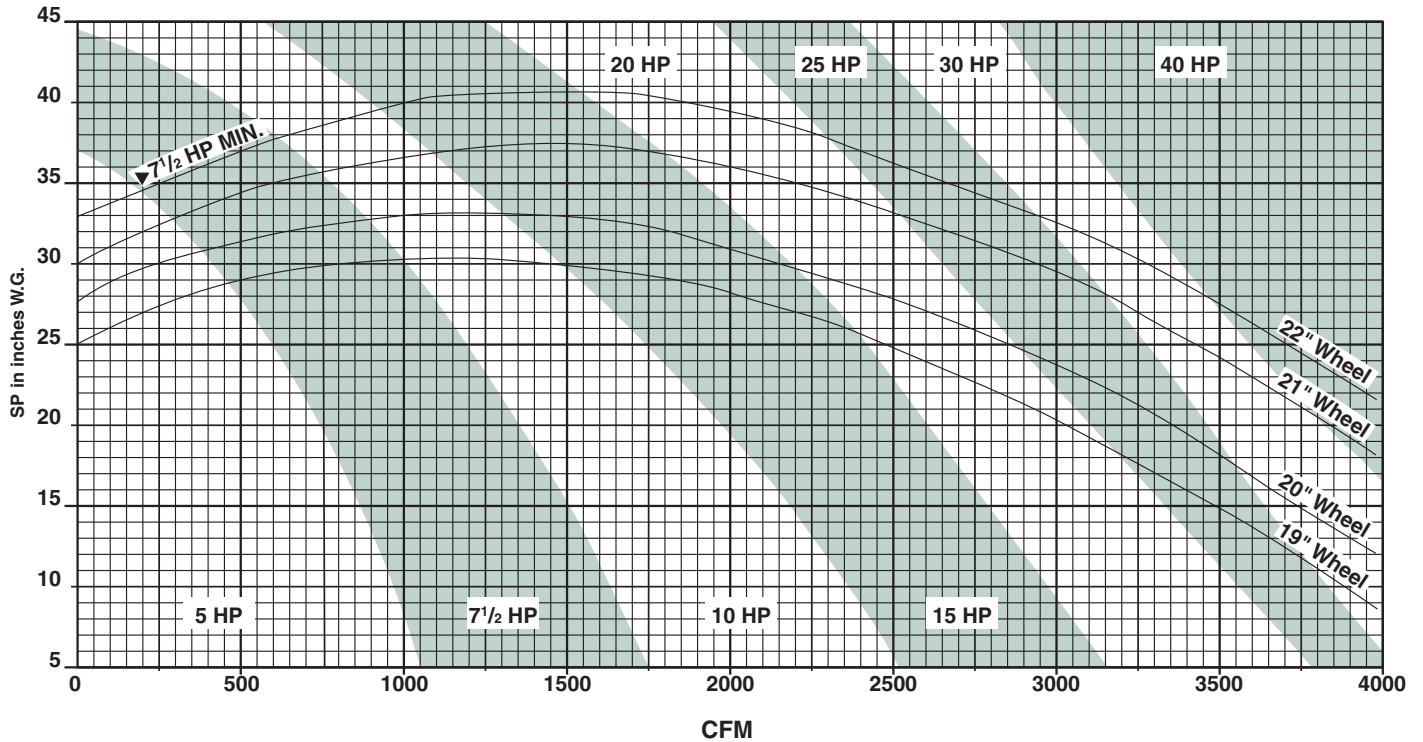
DIRECT DRIVE RATINGS @ 3550 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level



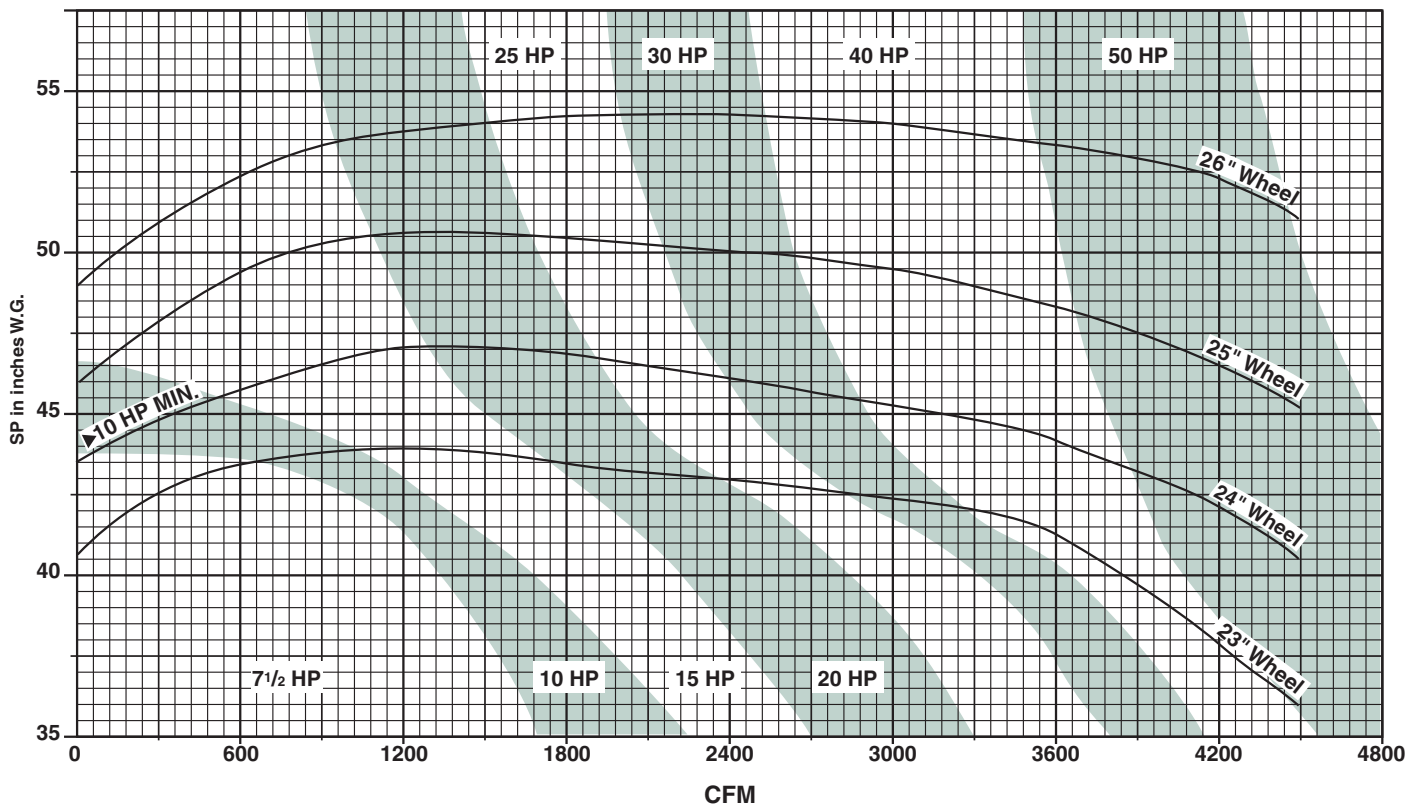
Model HP-10D

BHP values are shown. Note “▶” is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



Model HP-10F

BHP values are shown. Note “▶” is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



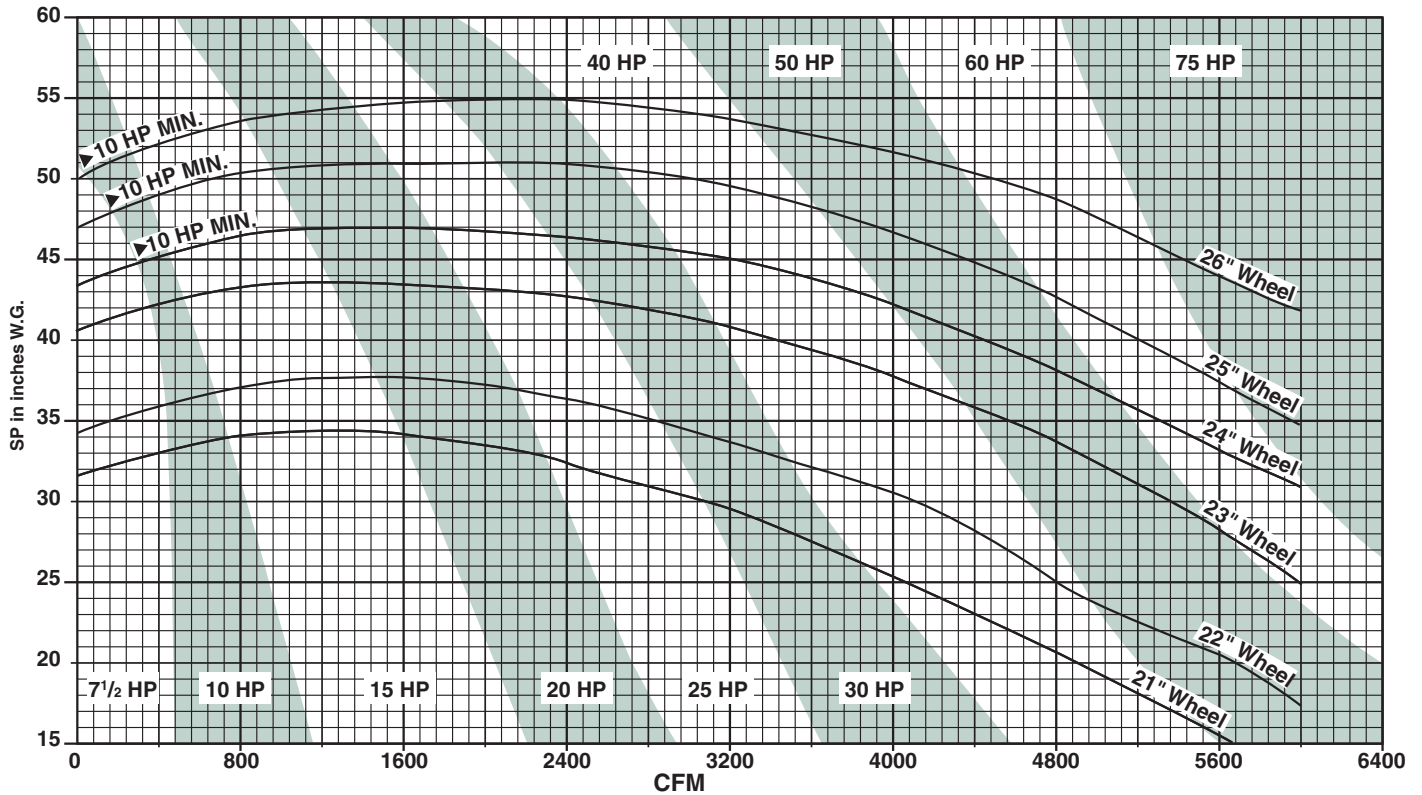
DIRECT DRIVE RATINGS @ 3550 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level



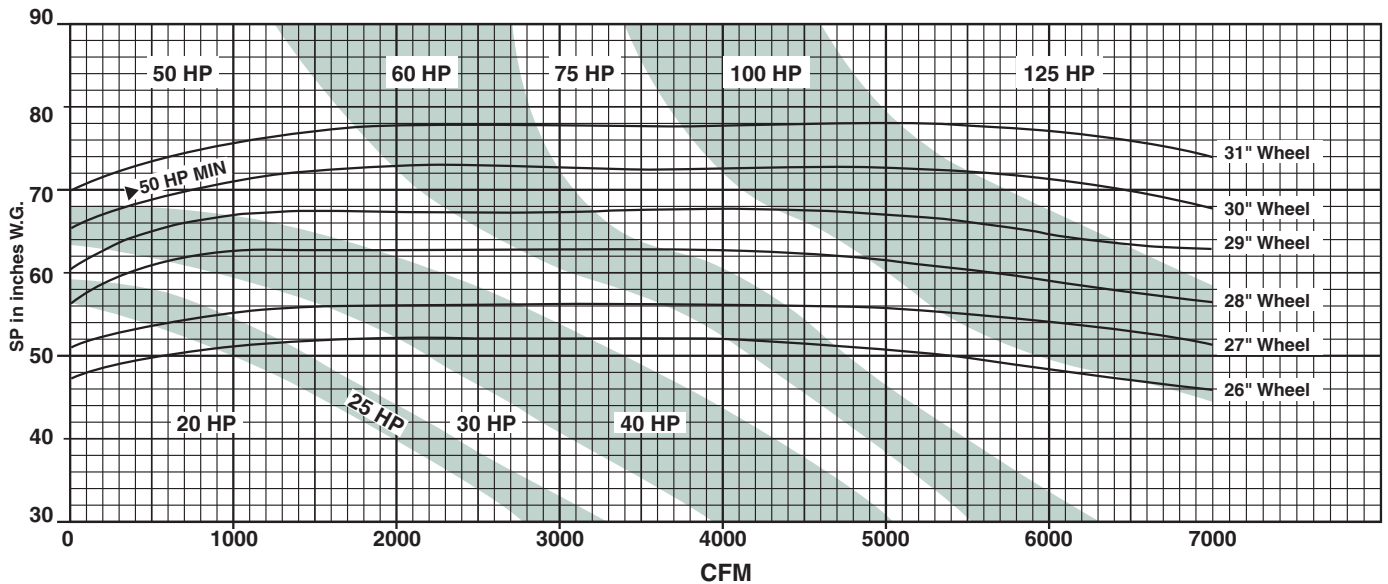
Model HP-12F

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



Model HP-12G

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR²) for steel wheels. See page 14.



DESIGN SPECIFICATIONS

HP STEEL WHEEL WR² VALUES AND MINIMUM MOTOR HORSEPOWER

Model	WR ² (lb.-FT. ²)	Min. HP*	Model	WR ² (lb.-FT. ²)	Min. HP*
HP-4A14	3.4	1 1/2	HP-8D17	7.6	5
HP-4A15	4.4	1 1/2	HP-8D18	9.6	5
HP-4A16	5.7	1 1/2	HP-8D19	11.9	5
HP-4A17	7.2	3	HP-8D20	14.5	5
HP-4A18	9.0	3	HP-8D21	17.6	5
HP-4C17	7.2	3	HP-8D22	21.0	7 1/2
HP-4C18	9.0	3	HP-8E23	23.8	7 1/2
HP-4C19	11.0	5	HP-8E24	28.0	10
HP-4C20	13.5	5	HP-8E25	32.9	10
HP-4C21	16.2	5	HP-8E26	38.3	10
HP-4C22	19.4	5	HP-10D19	11.9	5
HP-6B14	3.5	2	HP-10D20	14.5	5
HP-6B15	4.6	3	HP-10D21	17.6	5
HP-6B16	6.0	3	HP-10D22	21.1	7 1/2
HP-6B17	7.6	3	HP-10F23	26.7	7 1/2
HP-6B18	9.6	3	HP-10F24	31.5	10
HP-6C19	11.0	5	HP-10F25	36.8	10
HP-6C20	13.5	5	HP-10F26	42.7	15
HP-6C21	16.2	5	HP-12F21	19.0	5
HP-6C22	19.4	5	HP-12F22	23.0	7 1/2
HP-6E21	19.1	5	HP-12F23	26.7	7 1/2
HP-6E22	22.2	7 1/2	HP-12F24	31.5	10
HP-6E23	23.8	7 1/2	HP-12F25	36.8	10
HP-6E24	28.1	10	HP-12F26	42.7	15
HP-6E25	32.9	10	HP-12G26	72.0	20
HP-6E26	38.3	10	HP-12G27	83.0	20
HP-8B15	4.6	3	HP-12G28	95.0	20
HP-8B16	6.0	3	HP-12G29	108.0	25
HP-8B17	7.6	5	HP-12G30	123.0	50
HP-8B18	9.6	5	HP-12G31	138.0	50

***Min. HP:** This is the suggested minimum motor horsepower for Arrangement 4 fans with a nominal 3500 RPM motor speed. In a few situations motors suitable for the fan *operating point* BHP may not have sufficient torque to start the fan as *quickly* as desired. Therefore, use a motor horsepower at least as large as those listed in the tables to the left. The suggested motor horsepower values are based on typical Baldor three phase motors. Motor starting torques from other vendors will vary. These tables do not apply to Arrangement 4 fans with 1750 RPM and 2850 RPM motors, and any belt driven fans. A smaller horsepower motor may be acceptable for some of these applications.

DIMENSIONS and SPECIFICATIONS

NOTE: The table below contains blower housing dimensions common to all arrangements on pages 15, 17 and 18.

DIMENSIONS IN INCHES ± 1/8"

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL*	D	M	O	P	R	S	AA	DD①
HP-4A	4	11 3/4	18	13 9/16	14 3/8	12 3/4	6	4
HP-4C	4	14 13/16	17 7/8	16 7/16	17 7/16	15 7/16	6	4
HP-6B	6 3/8	11 3/4	18	13 9/16	14 3/8	12 3/4	8	6
HP-6C	4	14 13/16	17 7/8	16 7/16	17 7/16	15 7/16	6	6
HP-6E	5 3/8	17 7/16	19 1/8	19 3/8	20 9/16	18 3/16	8	6
HP-8B	6 3/8	11 3/4	19 13/16	13 9/16	14 3/8	12 3/4	8	8
HP-8D	6 3/8	14 13/16	19 3/4	16 7/16	17 7/16	15 7/16	8	8
HP-8E	5 3/8	17 7/16	21	19 3/8	20 9/16	18 3/16	8	8
HP-10D	6 3/8	14 13/16	21 3/4	16 7/16	17 7/16	15 7/16	8	10
HP-10F	7 3/8	17 7/16	23	19 3/8	20 9/16	18 3/16	10	10
HP-12F	7 3/8	17 7/16	23	19 3/8	20 9/16	18 3/16	10	12
HP-12G	9	20 3/4	24 15/16	23 1/16	24 7/16	21 5/8	14	12

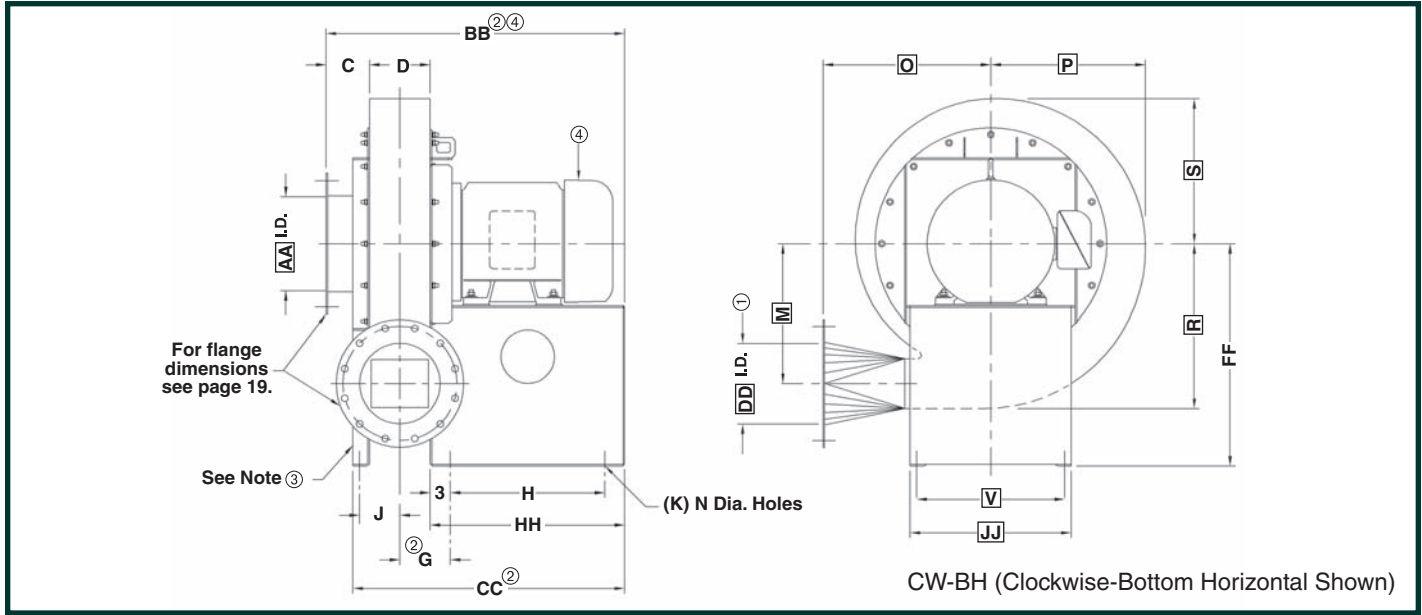
*COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER.

① Discharge flange not available with downblast discharge on models HP-8B, HP-10D, HP-12F and HP-12G.



DIMENSIONS and SPECIFICATIONS

Arrangement #4, Direct Drive



Note: For common boxed blower housing dimensions, see bottom of Page 14.

DIMENSIONS IN INCHES $\pm 1/8"$

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL*	MOTOR FRAME	C	⁽²⁾ G	H	⁽³⁾ J	K	N	V	^(2/4) BB	^(2/4) CC	FF	HH	JJ
HP-4A	143T-184T	4 1/2	5	6 3/4	—	9/16	4	14 3/4	21 1/4	—	21	12 3/4	16 3/4
HP-4C	143T-215T	4 1/2	5	9	—	9/16	4	17	23 1/2	—	25	15	19
	254T-256T			14					28 1/2			20	
HP-6B	143T-184T	4 1/2	6 3/16	6 3/4	—	9/16	4	14 3/4	23 5/8	—	21	12 3/4	16 3/4
	213T-215T			12 1/2					29 5/8			18 1/2	
HP-6C	143T-215T	4 1/2	5	9	—	9/16	4	17	23 1/2	—	25	15	19
	254T-256T			14					28 1/2			20	
HP-6E	184T-256T	4 1/2	5 11/16	13	—	9/16	4	19	28 7/8	—	29	19	21
HP-8B	143T-184T	4 1/2	6 3/16	6 3/4	—	9/16	4	14 3/4	23 5/8	—	21	12 3/4	16 3/4
	213T-256T			12 1/2					29 3/8			18 1/2	
HP-8D	182T-215T	4 1/2	6 3/16	9	—	9/16	4	17	25 7/8	—	25	15	19
	254T-286TS			14					30 7/8			20	
HP-8E	184T-256T	4 1/2	5 11/16	13	—	9/16	4	19	28 7/8	—	29	19	21
	284TS-286TS			15 1/2					31 3/8			21 1/2	
HP-10D	184T-215T	4 1/2	6 3/16	9	—	9/16	4	17	25 7/8	—	25	15	19
	254T-286TS			14					30 7/8			20	
HP-10F	215T-256T	4 1/2	6 11/16	13	—	9/16	4	19	30 7/8	—	29	19	21
	284TS-326TS			15 1/2					33 3/8			21 1/2	
	364TS-365TS			22					39 7/8			28	
HP-12F	184T-256T	4 1/2	6 11/16	13	—	9/16	4	19	30 7/8	—	29	19	21
	284TS-326TS			15 1/2					33 3/8			21 1/2	
	364TS-365TS			22					39 7/8			28	
HP-12G	254T-256T	6 1/2	7 1/2	13	6	3/4	6	22	34 1/2	30 1/2	33	19	24
	284T-326T			21					42 1/2	38 1/2		27	
	364T-365T			23					44 1/2	40 1/2		29	
	404T-405T			26					47 1/2	43 1/2		32	
	444TS			30					51 1/2	47 1/2		36	

* COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER.

Fan housings are reversible and rotatable in 45° increments.

① Discharge flange not available with Downblast (DB) discharge position on models HP-8B, HP-10D, HP-12F and HP-12G.

② For AMCA Type "C" spark resistant construction, add 1/8 inch to dimensions "G", "BB" and "CC".

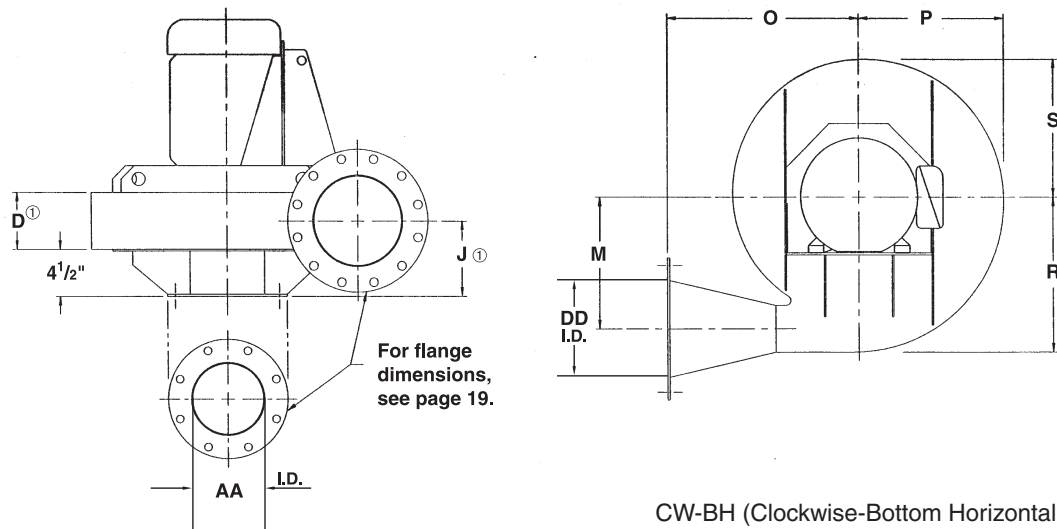
③ Inlet side support plate is only included on model HP-12G.

④ On some models, motor may extend past end of motor base.



DIMENSIONS and SPECIFICATIONS

Arrangement #4HM, Direct Connected



DIMENSIONS IN INCHES $\pm 1/8$ "

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL*	MOTOR FRAME	^① D	^① J	M	O	P	R	S	AA	DD
HP-4A	143T-184T	4	6 ^{1/2}	11 ^{3/4}	18	13 ^{9/16}	14 ^{3/8}	12 ^{3/4}	6	4
HP-4C	143T-256T	4	6 ^{1/2}	14 ^{13/16}	17 ^{15/16}	16 ^{7/16}	17 ^{7/16}	15 ^{7/16}	6	4
HP-6B	143T-215T	6 ^{3/8}	7 ^{11/16}	11 ^{3/4}	18	13 ^{9/16}	14 ^{3/8}	12 ^{3/4}	8	6
HP-6C	143-256T	4	6 ^{1/2}	14 ^{13/16}	17 ^{15/16}	16 ^{7/16}	17 ^{7/16}	15 ^{7/16}	6	6
HP-6E	184T-256T	5 ^{3/8}	7 ^{3/16}	17 ^{7/16}	19 ^{3/16}	19 ^{3/8}	20 ^{9/16}	18 ^{3/16}	8	6
HP-8B	143T-254T	6 ^{3/8}	7 ^{11/16}	11 ^{3/4}	19 ^{13/16}	13 ^{9/16}	14 ^{3/8}	12 ^{3/4}	8	8
HP-8D	182T-286TS	6 ^{3/8}	7 ^{11/16}	14 ^{13/16}	19 ^{3/4}	16 ^{7/16}	17 ^{7/16}	15 ^{7/16}	8	8
HP-8E	213T-286TS	5 ^{3/8}	7 ^{3/16}	17 ^{7/16}	21	19 ^{3/8}	20 ^{9/16}	18 ^{3/16}	8	8
HP-10D	184T-286TS	6 ^{3/8}	7 ^{11/16}	14 ^{13/16}	21 ^{3/4}	16 ^{7/16}	17 ^{7/16}	15 ^{7/16}	8	10
HP-10F	215T-326TS	7 ^{3/8}	8 ^{3/16}	17 ^{7/16}	23	19 ^{3/8}	20 ^{9/16}	18 ^{3/16}	10	10
HP-12F	184T-326TS	7 ^{3/8}	8 ^{3/16}	17 ^{7/16}	23	19 ^{3/8}	20 ^{9/16}	18 ^{3/16}	10	12

*COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER.

① For AMCA "C", add: 1/8 inch to dimension "J" and 1/4 inch to dimension "D".

FAN HOUSINGS ARE REVERSIBLE AND ROTATABLE IN 45° INCREMENTS.

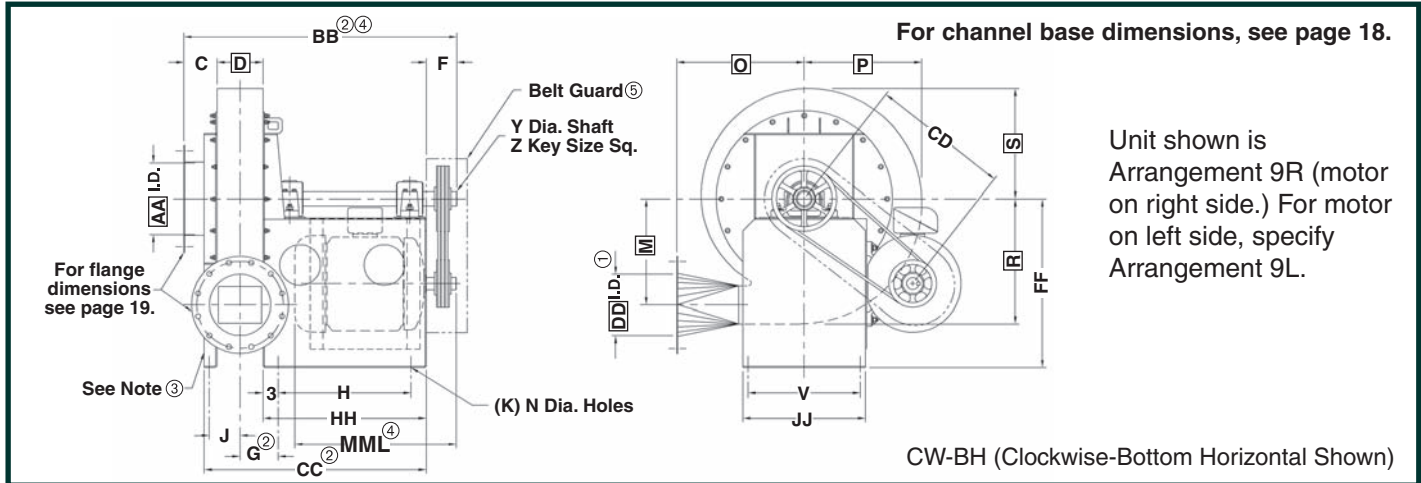
CONSTRUCTION GAUGES

MODEL	Inlet				Housing			Wheel			All Bases
	Side Plate	Inlet Collar	Inlet Flange	Outlet Flange	Side Plates	Scroll	Transition	Back Plate	Shroud	Blades	
HP-4A & HP-4C	7	10	10	10	7	10	14	7	7	10	7
HP-6B & HP-6E	7	10	7	10	7	10	14	7	7	10	7
HP-6C	7	10	10	10	7	10	14	7	7	10	7
HP-6E	7	10	7	10	7	10	14	7	7	10	7
HP-8B through HP-12F	7	10	7	10	7	10	14	7	7	10	7
HP-12G	1/4"	10	7	7	1/4"	10	14	1/4"	1/4"	10	7



DIMENSIONS and SPECIFICATIONS

Arrangement #1 and #9, Belt Drive (specify 9R or 9L)



Note: For common boxed blower housing dimensions, see bottom of Page 14.

DIMENSIONS IN INCHES $\pm 1/8"$

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL*	MOTOR FRAME	C	F	^② G	H	^{②③} J	K	N	V	Y	Z	^② BB	^② CC	FF	HH	JJ	^④ MML
HP-4A	143T-215T	4 ¹ / ₂	4	5	12 ¹³ / ₁₆	—	4	⁹ / ₁₆	14 ³ / ₄	1 ⁷ / ₁₆	³ / ₈	31 ⁵ / ₁₆	—	21	18 ¹³ / ₁₆	16 ³ / ₄	21 ¹ / ₂
HP-4C	143T-256T	4 ¹ / ₂	5	5	17 ¹ / ₁₆	—	4	⁹ / ₁₆	17	1 ⁷ / ₁₆	³ / ₈	36 ⁹ / ₁₆	—	25	23 ¹ / ₁₆	19	26 ¹ / ₄
HP-6B	143T-215T	4 ¹ / ₂	4	6 ³ / ₁₆	12 ¹³ / ₁₆	—	4	⁹ / ₁₆	14 ³ / ₄	1 ⁷ / ₁₆	³ / ₈	33 ¹¹ / ₁₆	—	21	18 ¹³ / ₁₆	16 ³ / ₄	21 ¹ / ₂
HP-6C	143T-256T	4 ¹ / ₂	5	5	17 ¹ / ₁₆	—	4	⁹ / ₁₆	17	1 ¹¹ / ₁₆	³ / ₈	36 ⁹ / ₁₆	—	25	23 ¹ / ₁₆	19	26 ¹ / ₄
HP-6E	184T-286T	4 ¹ / ₂	5	5 ¹¹ / ₁₆	21	—	4	⁹ / ₁₆	19	1 ¹⁵ / ₁₆	¹ / ₂	41 ⁷ / ₈	—	29	27	21	30 ¹ / ₄
HP-8B	143T-215T	4 ¹ / ₂	4	6 ³ / ₁₆	12 ¹³ / ₁₆	—	4	⁹ / ₁₆	14 ³ / ₄	1 ⁷ / ₁₆	³ / ₈	33 ¹¹ / ₁₆	—	21	18 ¹³ / ₁₆	16 ³ / ₄	21 ¹ / ₂
	254T-256T		5	5	17 ¹ / ₁₆					1 ¹¹ / ₁₆	³ / ₈	38 ¹⁵ / ₁₆					26 ¹ / ₄
HP-8D	184T-256T	4 ¹ / ₂	5	6 ³ / ₁₆	17 ¹ / ₁₆	—	4	⁹ / ₁₆	17	1 ¹¹ / ₁₆	³ / ₈	38 ¹⁵ / ₁₆	—	25	23 ¹ / ₁₆	19	26 ¹ / ₄
HP-8E	182T-286T	4 ¹ / ₂	5	5 ¹¹ / ₁₆	21	—	4	⁹ / ₁₆	19	1 ¹⁵ / ₁₆	¹ / ₂	41 ⁷ / ₈	—	29	27	21	30 ¹ / ₄
HP-10D	184T-256T	4 ¹ / ₂	5	6 ³ / ₁₆	17 ¹ / ₁₆	—	4	⁹ / ₁₆	17	1 ¹¹ / ₁₆	³ / ₈	38 ¹⁵ / ₁₆	—	25	23 ¹ / ₁₆	19	26 ¹ / ₄
HP-10F	215T-324T	4 ¹ / ₂	6	6 ¹¹ / ₁₆	21	—	4	⁹ / ₁₆	19	2 ³ / ₁₆	¹ / ₂	44 ⁷ / ₈	—	29	27	21	30 ¹ / ₄
HP-12F	215T-324T	4 ¹ / ₂	6	6 ¹¹ / ₁₆	21	—	4	⁹ / ₁₆	19	2 ³ / ₁₆	¹ / ₂	44 ⁷ / ₈	—	29	27	21	30 ¹ / ₄
HP-12G	213T-365T	6 ¹ / ₂	6	7 ¹ / ₂	26	6	6	³ / ₄	22	2 ¹¹ / ₁₆	⁵ / ₈	53 ¹ / ₂	43 ¹ / ₂	33	32	24	32 ¹ / ₈

*COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER.

FAN HOUSINGS ARE REVERSIBLE AND ROTATABLE IN 45° INCREMENTS.

① Discharge flange not available with Downblast (DB) discharge position on models HP-8B, HP-10D, HP-12F and HP-12G.

② For "AMCA Type "C" spark resistant construction, add 1/8 inch to dimensions "G", "BB" and "CC".

③ Inlet side support plate is only included on model HP-12G.

④ "MML" is the Maximum Motor Length (for maximum motor frame size listed) on customer supplied motor. Motor manufacturers "C" dimension cannot exceed "MML" without a special base.

⑤ Belt guard is standard on Arrangement 9 blowers. Arrangement 1 blowers do not include motor, motor slide base, belt guard, sheaves or belts.

C.D. BELT CENTER DISTANCE

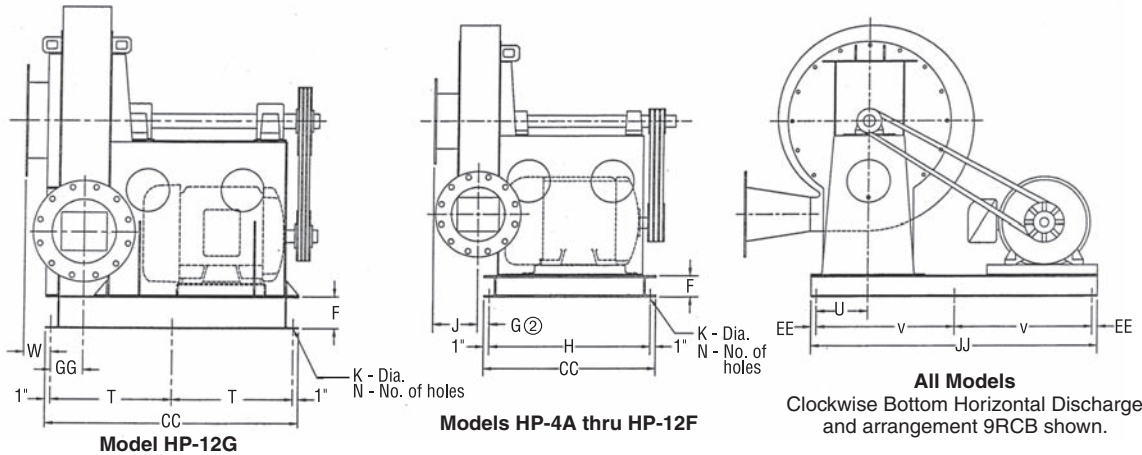
DIMENSIONS IN INCHES

MODEL	MOTOR FRAME SIZE													
	143T-145T		182T-184T		213T-215T		254T-256T		284T-286T		324T-326T		364T-365T	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
HP-4A & HP-6B	12 ⁵ / ₈	14 ¹ / ₁₆	14 ³ / ₈	15 ⁷ / ₈	15 ¹¹ / ₁₆	17 ³ / ₈	—	—	—	—	—	—	—	—
HP-4C & HP-6C	13 ¹¹ / ₁₆	15	15 ⁷ / ₁₆	16 ⁷ / ₈	16 ³ / ₄	18 ⁷ / ₁₆	18 ⁷ / ₈	20 ³ / ₄	—	—	—	—	—	—
HP-6E & HP-8E	—	—	15	16 ¹ / ₂	16 ³ / ₈	18 ³ / ₈	18	20 ⁷ / ₁₆	18 ¹⁵ / ₁₆	21 ¹⁵ / ₁₆	—	—	—	—
HP-8B	12 ⁵ / ₈	14 ¹ / ₁₆	14 ³ / ₈	15 ⁷ / ₈	15 ¹¹ / ₁₆	17 ¹ / ₂	17 ³ / ₈	19 ¹ / ₄	—	—	—	—	—	—
HP-8D & HP-10D	—	—	15 ⁷ / ₁₆	16 ⁷ / ₈	16 ³ / ₄	18 ⁷ / ₁₆	18 ⁷ / ₈	20 ³ / ₄	—	—	—	—	—	—
HP-10F & HP-12F	—	—	—	—	16 ³ / ₈	18 ³ / ₈	18	20 ⁷ / ₁₆	18 ¹⁵ / ₁₆	21 ¹⁵ / ₁₆	19 ⁵ / ₈	23 ¹ / ₄	—	—
HP-12G	—	—	—	—	19 ³ / ₄	21	21 ¹ / ₂	23	22 ¹ / ₂	24 ³ / ₈	24 ³ / ₈	26 ³ / ₄	25 ³ / ₄	27 ¹ / ₂



DIMENSIONS and SPECIFICATIONS

Arrangement #9RCB or #9LCB Channel Base, Belt Drive



Note: For common boxed blower housing dimensions, see bottom of Page 14.

DIMENSIONS IN INCHES $\pm 1/8"$

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL*	MOTOR FRAME	F	② G	H	J	K	N	T	U	V	W	CC	EE	GG	JJ
HP-4A	182T - 215T	4	3	16 ^{13/16}	6 ^{1/2}	9/16	6	--	7 ^{3/8}	21 ^{1/2}	—	18 ^{13/16}	1	—	45
HP-4C	182T - 256T	4	3	21 ^{1/16}	6 ^{1/2}	9/16	6	—	8 ^{1/2}	22 ^{1/2}	—	23 ^{1/16}	1	—	47
HP-6B	182T - 215T	4	4 ^{3/16}	16 ^{13/16}	7 ^{11/16}	9/16	6	—	7 ^{3/8}	21 ^{1/2}	—	18 ^{13/16}	1	—	45
HP-6C	213T - 256T	4	3	21 ^{1/16}	6 ^{1/2}	9/16	6	—	8 ^{1/2}	22 ^{1/2}	—	23 ^{1/16}	1	—	47
HP-6E	213T - 286T	4	1 ^{3/16}	30	7 ^{3/16}	9/16	6	—	9 ^{1/2}	25 ^{1/2}	—	32	1	—	53
HP-8B	213T - 256T	4	4 ^{3/16}	21 ^{1/16}	7 ^{11/16}	9/16	6	—	7 ^{3/8}	21 ^{1/2}	—	23 ^{1/16}	1	—	45
HP-8D	213T - 286T	4	4 ^{3/16}	21 ^{1/16}	7 ^{11/16}	9/16	6	—	8 ^{1/2}	22 ^{1/2}	—	23 ^{1/16}	1	—	47
HP-8E	213T - 326T	4	1 ^{3/16}	30	7 ^{3/16}	9/16	6	—	9 ^{1/2}	25 ^{1/2}	—	32	1	—	53
HP-10D	213T - 326T	4	4 ^{3/16}	21 ^{1/16}	7 ^{11/16}	9/16	6	—	8 ^{1/2}	22 ^{1/2}	—	23 ^{1/16}	1	—	47
HP-10F	213T - 364T	4	2 ^{3/16}	30	8 ^{3/16}	9/16	6	—	9 ^{1/2}	25 ^{1/2}	—	32	1	—	53
HP-12F	213T - 364T	4	2 ^{3/16}	30	8 ^{3/16}	9/16	6	—	9 ^{1/2}	25 ^{1/2}	—	32	1	—	53
HP-12G	284T - 444T	6	—	—	—	3/4	8	22 ^{1/2}	7	28 ^{3/16}	5	47	5	6	66 ^{3/8}

② For AMCA "C", add: 1/8 inch to dimensions "G".

* COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER.

16 DISCHARGE POSITIONS AVAILABLE. 45° DISCHARGE POSITIONS NOT SHOWN.

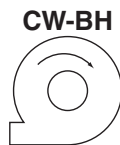
Discharges shown are determined by viewing fan from motor or drive side.



Clockwise Top Horizontal Discharge



Clockwise Down-Blast Discharge



Clockwise Bottom Horizontal Discharge



Clockwise Up-Blast Discharge



Counter-Clockwise Top Horizontal Discharge



Counter-Clockwise Down-Blast Discharge



Counter-Clockwise Bottom Horizontal Discharge



Counter-Clockwise Up-Blast Discharge

★ Discharge flange not available with downblast discharge on models HP-8B, HP-10D, HP-12F and HP-12G.

⚠ DANGER

All fans & blowers shown have rotating parts and pinch points. Severe personal injury can result if operated without guards. Stay away from rotating equipment unless it is disconnected or locked out from its power source.

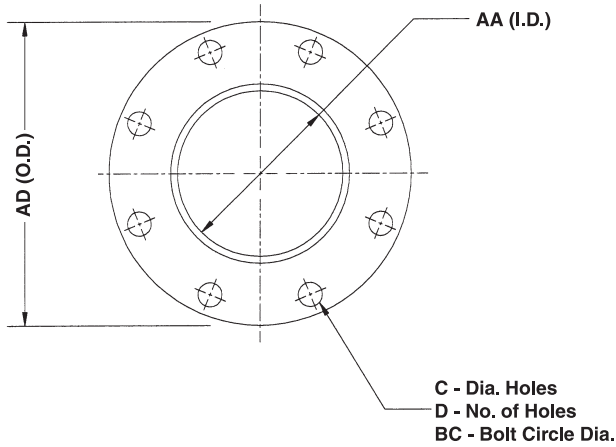
Read operating instructions.



DIMENSIONS and SPECIFICATIONS

INLET AND DISCHARGE FLANGES

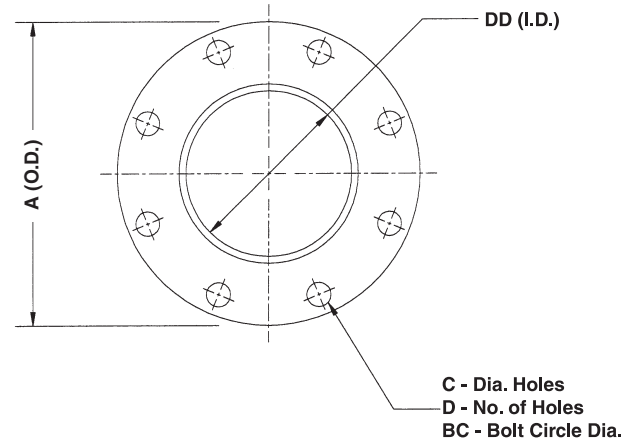
INLET FLANGE



DIMENSIONS IN INCHES $\pm 1/8"$

MODEL	AA I.D.	AD O.D.	BC B.C.	C Dia.	D
HP-4A, 4C and 6C	6	11	9 ^{1/2}	7/8	8
HP-6B, 6E, 8B, 8D, 8E and 10D	8	13 1/2	11 3/4	7/8	8
HP-10F and 12F	10	16	14 1/4	1	12
HP-12G	14	21	18 3/4	1 1/8	12

DISCHARGE FLANGE ★



DIMENSIONS IN INCHES $\pm 1/8"$

MODEL	DD I.D.	A O.D.	BD B.C.	C Dia.	D
HP-4A and 4C	4	9	7 1/2	3/4	8
HP-6B, 6C and 6E	6	11	9 1/2	7/8	8
HP-8B, 8D and 8E★	8	13 1/2	11 3/4	7/8	8
HP-10D and 10F★	10	16	14 1/4	1	12
HP-12F and 12G★	12	19	17	1	12

★See note under discharge positions available on page 18

All dimensions except flange thickness meet ANSI-125 lb. and ASA-150 lb. specifications. Standard orientation is holes straddling major center lines. Holes may be specified to be on center lines at no additional cost.

APPROXIMATE SHIPPING WEIGHTS LESS MOTOR

MODEL	MOTOR FRAME	Fan Arrangement			
		4	8	1 & 9	9CB
HP-4A	143T - 184T	190	265	—	—
	143T - 215T	—	—	220	—
	182T - 213T	—	—	—	315
HP-4C	143T - 215T	250	335	—	—
	254T	260	350	—	—
	143T - 256T	—	—	280	—
HP-6B	182T - 254T	—	—	—	380
	143T - 184T	210	285	—	—
	213T - 215T	240	315	—	—
HP-6C	143T - 215T	—	—	270	—
	182T - 215T	—	—	—	365
	143T - 215T	270	355	—	—
HP-6E	254T	300	385	—	—
	143T - 256T	—	—	310	—
	213T - 256T	—	—	—	410
HP-8B	184T - 256T	350	445	—	—
	184T - 286T	—	—	400	—
	213T - 286T	—	—	—	510
HP-8D	143T - 184T	215	—	—	—
	213T - 254T	245	—	—	—
	143T - 215T	—	290	275	—
HP-8E	254T - 256T	—	320	300	—
	213T - 256T	—	—	—	395
	182T - 215T	280	365	—	—
HP-8F	254T - 286TS	300	—	—	—
	254T - 256T	—	385	—	—
	184T - 256T	—	—	340	—
HP-8G	213T - 286T	—	—	—	440

MODEL	MOTOR FRAME	Fan Arrangement			
		4	8	1 & 9	9CB
HP-8E	213T - 256T	360	455	—	—
	284T - 324T	380	—	—	—
	284TS - 326TS	—	475	—	—
HP-10D	182T - 286T	—	—	430	—
	213T - 326T	—	—	—	540
	184T - 215T	290	375	—	—
HP-10F	184T - 256T	—	—	350	—
	254T - 286TS	310	395	370	—
	213T - 326T	—	—	—	470
HP-12F	215T - 256T	380	475	—	—
	284TS - 326TS	395	490	—	—
	215T - 324T	—	—	445	—
HP-12G	213T - 364T	—	—	—	565
	184T - 256T	380	—	—	—
	215T - 256T	—	475	—	—
HP-12H	284TS - 364TS	400	495	—	—
	215T - 324T	—	—	465	—
	213T - 364T	—	—	—	595
HP-12I	254T - 256T	712	—	—	—
	284T - 326T	766	—	—	—
	364T - 365T	787	—	—	—
HP-12J	404T - 405T	802	—	—	—
	444TS	856	—	—	—
	213T - 365T	—	—	1080	—
HP-12K	284T - 444T	—	—	—	1400

Appendix D





STEGO® WRAP 20-MIL VAPOR BARRIER

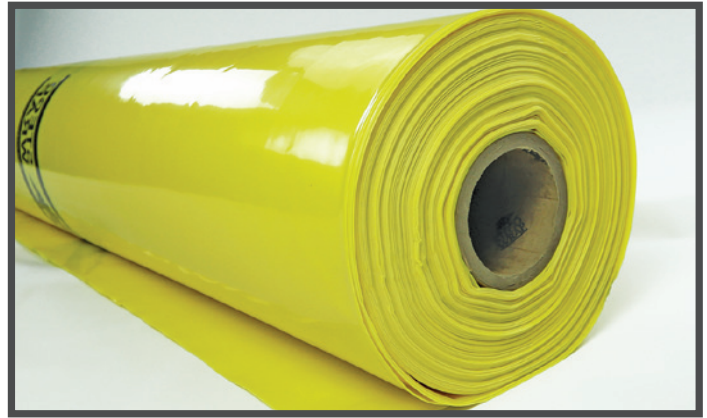
A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: DEC 8, 2022

1. PRODUCT NAME

STEGO WRAP 20-MIL VAPOR BARRIER

2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672 USA
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
stegoindustries.com



3. PRODUCT DESCRIPTION

USES: Stego Wrap 20-Mil Vapor Barrier is used as a below-slab vapor barrier.

COMPOSITION: Stego Wrap 20-Mil Vapor Barrier is a multi-layer plastic extrusion manufactured with only the highest grade of prime, virgin, polyolefin resins.

ENVIRONMENTAL FACTORS: Stego Wrap 20-Mil Vapor Barrier can be used in systems for the control of soil gases (radon, methane), soil poisons (oil by-products) and sulfates.

4. TECHNICAL DATA

TABLE 4.1: PHYSICAL PROPERTIES OF STEGO WRAP 20-MIL VAPOR BARRIER

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E1745 Class A, B & C – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0071 perms
Permeance After Conditioning (ASTM E1745 Sections 7.1.2 - 7.1.5)	ASTM E154 Section 8, F1249 – Permeance after wetting, drying, and soaking ASTM E154 Section 11, F1249 – Permeance after heat conditioning ASTM E154 Section 12, F1249 – Permeance after low temperature conditioning ASTM E154 Section 13, F1249 – Permeance after soil organism exposure	0.0088 perms 0.0081 perms 0.0084 perms 0.0077 perms
Methane Transmission Rate	ASTM D1434 - Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting	152.2 GTR* (mL(STPI)/m ² *day)
Radon Diffusion Coefficient	K124/02/95	9.9 x 10 ⁻¹² m ² /second
Puncture Resistance	ASTM D1709 – Test Method for Impact Resistance of Plastic Film by Free-Falling Dart Method	3500+ grams**
Tensile Strength	ASTM D882 – Test Method for Tensile Properties of Thin Plastic Sheeting	97.7 lbf/in
Thickness		20 mil
Roll Dimensions		width x length: area: 14' x 105' 1470 ft ²
Roll Weight		152 lb

Note: perm unit = grains/(ft²*hr*in-Hg)

*GTR = Gas Transmission Rate

**The material maxed out the testing equipment and did not fail at 3746 grams.

Continued...

Note – legal notice on page 2.

STEGO® WRAP 20-MIL VAPOR WRAP BARRIER

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5. INSTALLATION

UNDER SLAB: Unroll Stego Wrap 20-Mil Vapor Barrier over an aggregate, sand or tamped earth base. Overlap all seams a minimum of 6 inches and tape using Stego® Tape or Stego® Crete Claw® Tape. All penetrations must be sealed using a combination of Stego Wrap and Stego Accessories.

For additional information, please refer to Stego's complete installation instructions.

6. AVAILABILITY & COST

Stego Wrap 20-Mil Vapor Barrier is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided herein. Stego Industries, LLC does offer a limited warranty on Stego Wrap. Please see stegoindustries.com/legal

8. MAINTENANCE

None required.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Email: contact@stegoindustries.com

Contact Number: (877) 464-7834

Website: stegoindustries.com

10. FILING SYSTEMS: stegoindustries.com



(877) 464-7834 | stegoindustries.com

DATA SHEETS ARE SUBJECT TO CHANGE. FOR MOST CURRENT VERSION, VISIT [STEGOINDUSTRIES.COM](https://stegoindustries.com)

PREPRUFE® 300R/160R Plus & PREPRUFE® 300R/160R Plus LT Data Sheet

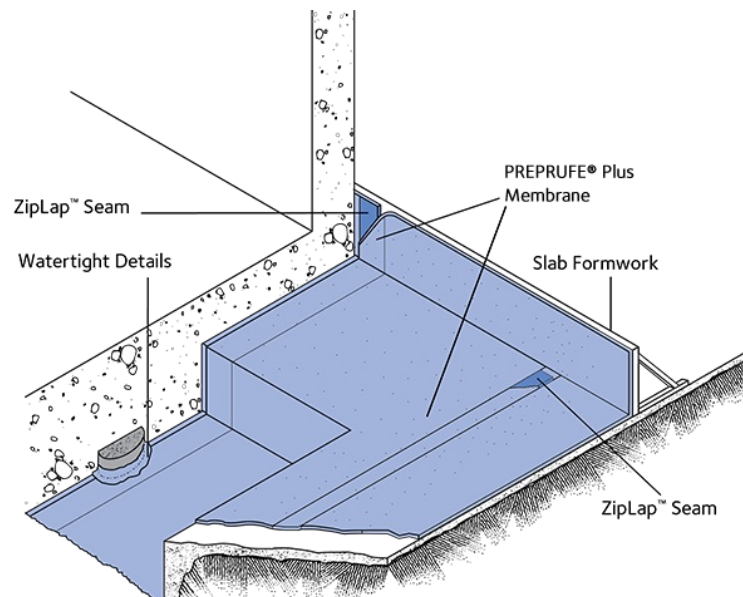
Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites.

View Sustainability Certifications: [300R Plus](#), [160R Plus](#), [300R Plus LT](#), [160R Plus LT](#)

Product Description

GCP PREPRUFE® 300R/160R Plus pre applied waterproofing membranes are unique composite sheets comprised of a thick HDPE film, pressure sensitive adhesive, and weather resistant protective coating. Designed with Advanced Bond Technology™ and dual adhesive ZipLap™ seams, PREPRUFE® 300R/160R Plus form a unique, integral bond to poured concrete. This integral bond is specifically designed to provide a robust barrier to water, moisture and gas and prevents both the ingress and lateral migration of water.

PREPRUFE® 300R/160R Plus are release liner free and designed for efficient, reliable installation. PREPRUFE® Plus ZipLap™ seams allow for an adhesive to adhesive bond at membrane sheet overlaps and deliver superior performance in harsh conditions without the need for specialized equipment, heat or power.



Drawings are for illustration purposes only.
Please refer to gcpat.com for specific application details.

Advantages

- The unique continuous adhesive bond to concrete poured against it prevents water migration and makes it unaffected by ground settlement beneath slabs.
- Designed with fully adhered adhesive to adhesive watertight ZipLap™ seams and easy to execute detailing. Provides a barrier to water, moisture and gas physically isolating the structure from the surrounding substrate. Easy roll/kick out installation reduces installation time and cost.
- Release liner free, expedites installation and reduces construction site waste.
- Simple and quick to install requiring no priming or fillets.
- Can be applied to permanent formwork – allows maximum use of confined sites
- Self-protecting – can be trafficked immediately after application and ready for immediate placing of reinforcement
- Membrane is unaffected by wet jobsite conditions – cannot activate prematurely
- Inherently waterproof as supplied. Passive non-reactive waterproofing system does not require water activation
- Waterproofing is not reliant on confining pressures or hydration
- PREPRUFE® 300R/160R Plus unaffected by freeze/thaw, wet/dry cycling
- Chemical resistance – designed to help protect structure from salt or sulphate attack effective in most types of soils and waters,
- Gas resistance – PREPRUFE® 300R/160R Plus will restrict the ingress of Methane, Radon, Benzene, Toluene, Gasoline & other VOCs Trichloroethylene & Tetrachloroethylene (TCE/PCE) into buildings from landfill and naturally occurring sources and satisfy the performance criteria for a gas-resistant membrane.

System Components:

Membrane

- PREPRUFE® 300R Plus/300R Plus LT— heavy-duty 46mil grade membrane designed for horizontal and vertical use. Designed for use below slabs and on rafts (i.e. mud slabs) and for vertical blind side applications. Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- PREPRUFE® 160R Plus/160R Plus LT — 32mil grade membrane designed for vertical use in blindside, zero property line applications against soil retention systems.

Ancillary Components (refer to the most current Data Sheets for all system components available on gcpat.com)

- PREPRUFE® Tape – 4 in. wide tape for covering cut edges, roll ends, penetrations and detailing
- PREPRUFE® CJ Tape – 8 in. wide tape for detailing, and may be used at construction joints for optional additional protection
- BITUTHENE® Liquid Membrane – for sealing around penetrations, etc.
- ADCOR® – hydrophilic waterstop for joints in concrete walls and floors
- PREPRUFE® Tieback Covers – preformed cover for soil retention wall tieback heads
- DE NEEF® INJECTO® Tube groutable Waterstop for non-moving concrete construction joints and penetrations

Limitations of Use

- Approved uses only include those uses specifically detailed in this Product Data Sheet and other current Product Data Sheets that can be found at gcpat.com
- PREPRUFE® 300R/160R Plus Membranes are not intended for any other use. Contact GCP Technical Services where any other use is anticipated or intended.
- PREPRUFE® 300R/160R Plus Membranes are designed for in-service temperatures below 120°F (49°C).
- PREPRUFE® 160R Plus/160R Plus LT membrane should not be used in horizontal applications.
- PREPRUFE® 300R/160R Plus Membranes should not be used with conventional two-sided formwork.
(See PREPRUFE® Technical Letter # 13 Forming Systems For Use with PREPRUFE® Membranes)

Special Note: When this information is printed from the gcpat.com global website, a footer appearing on this document will restrict its applicability to the United States. Note that the information and references in this document are hereby expanded and apply to North, Central and South America.

Safety and Handling

Users must read and understand the product label and Safety Data Sheets (SDS's) for each system component before use. All users should acquaint themselves with this information prior to working with the material. Carefully read detailed precaution statements on the product labels and SDS's before use. The most current SDS's can be obtained from the GCP web site at gcpat.com.

Storage

- Observe 1 year shelf life and use on a first in first out basis
- Store in dry conditions between 40°F (4.5°C)–90°F (32°C)
- Store off ground under tarps or otherwise protected from rain and ground moisture
- See PREPRUFE® Technical Letter #30 Shelf Life/Storage and Handling of GCP Waterproofing

Installation

Technical Support, Details and Technical Letters

The most up to date detail drawings and technical letters are available at gcpat.com. For complete application instructions, please refer to the current Literature on (www.gcpat.com). Documents in hardcopy as well as information found on websites other than www.gcpat.com may be out of date or in error. Before using this product it is important that information be confirmed by accessing www.gcpat.com and reviewing the most recent product information, including without limitation Product Data Sheets, Technical Bulletins, Detail Drawings and detailing recommendations. Please review all materials prior to installation of PREPRUFE® 300R/160R Plus.

Support is also available by full-time technically trained GCP field sales representatives and technical service personnel, backed by a central research and development technical services staff. For technical assistance with detailing and problem solving please contact your local representative. A GCP Representative locator is available at www.gcpat.com.

Temperature Requirements

- PREPRUFE® 160R Plus LT and PREPRUFE® 300R Plus LT membrane can be applied between temperature 25°F to 95°F. Use PREPRUFE® 300R Plus & PREPRUFE® 160R Plus membranes for application above 95°F.
- PREPRUFE® Tape LT and PREPRUFE® CJ Tape LT can be applied between temperature 25°F to 95°F. Use PREPRUFE® Tape HC and PREPRUFE® CJ Tape HC for application above 95°F.

Substrate Preparation

All surfaces – It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm). Grout around all penetrations such as utility conduits, etc. for stability.

Horizontal – The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. When installing over earth or crushed stone, ensure substrate is well compacted to avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but standing water must be removed.

Vertical – Use concrete, plywood, insulation or other approved facing over sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 0.5 in. (12 mm) out of alignment. HYDRODUCT® 220 drainage sheet can be used to bridge voids, gaps and out of alignment up to 2 in. (50mm) prior to PREPRUFE® 300R/160R Plus installation.

Membrane Application

PREPRUFE® 300R/160R Plus has a colored zip strips at the top and bottom of the seam area on the edge of the roll. Both zip strips cover an aggressive adhesive. Once the green zip strip on the top of the membrane and the blue zip strip on the bottom of the membrane are removed, a strong adhesive to adhesive bond is achieved in the overlap area. This PREPRUFE® ZipLap™ provides an enhanced sealing of the overlaps in harsh conditions combined with a fast and easy way of execution without specialized equipment, heat or power.

Horizontal substrates – (PREPRUFE® 300R Plus/ PREPRUFE® 300R Plus LT membrane only) – PREPRUFE® 300R Plus & PREPRUFE® 300R Plus LT membrane can be applied in horizontal applications to smooth prepared concrete, carton forms or well rolled and compacted earth or crushed stone substrate. Kick out or roll out the membrane HDPE film side to the substrate with the green zip strip facing towards the concrete pour. End laps should be staggered to avoid a build-up of layers. Leave green and blue zip strips on the membrane until overlap procedure is completed. When completed remove release liner. When installing over carton forms, contact your local GCP representative.

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with the blue zip strip on top of the green zip strip. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back and remove both the green and blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the overlap.

Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller.

- PREPRUFE® 300R Plus/300R Plus LT membrane can be returned up the inside face of slab formwork. To attain a fully bonded system and to allow a tie in with BITUTHENE® self-adhered membrane or PROCOR® fluid-applied membrane to all vertical structural surfaces after removal of formwork. Ensure to cut the length of the membrane (terminate) to height of formwork less 2 inches.
- Rebar Chairs: See PREPRUFE® Technical Letter #15 Rebar Chairs on PREPRUFE® Membranes.
- PREPRUFE® 160R Plus & 160R Plus LT membrane may not be used in horizontal applications.

Vertical substrates – PREPRUFE® 300R/160R Plus membranes can be applied vertically to permanent formwork or adjoining structures. Mechanically fasten the membrane vertically using fasteners appropriate for the substrate with the green zip strip facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge within 0.5 in. (50 mm) from the leading edge of the membrane using a small low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Accurately position each succeeding sheet to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with the blue zip strip on top of the green zip strip.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back and remove both the green and blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the overlap. Roll firmly to ensure a watertight seal.

Note that PREPRUFE® 300R/160R Plus membranes should not be used with conventional two-sided formwork. (See PREPRUFE® Technical Letter # 13 Forming Systems For Use with PREPRUFE® Membranes)

Roll ends and cut edges – Overlap all roll ends and cut edges by a minimum 3 in. (75 mm) and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow surface to dry and apply PREPRUFE® Tape centered over the lap edges and roll firmly. Immediately remove tinted plastic release liner from the tape.

Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by power washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and other contaminants and allow the membrane to dry. Repair small punctures and slices 0.5 in. (12 mm) or less by applying PREPRUFE® Tape centered over the damaged area. Repair punctures and holes larger than 0.5 in. (12mm) by applying a patch of PREPRUFE® Membrane. Extend the patch 6 in. (150 mm) beyond the damaged area. Seal all edges of the patch with PREPRUFE® Tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh PREPRUFE® Tape. Any areas of damaged adhesive should be covered with PREPRUFE® Tape. All PREPRUFE® Tape must be rolled firmly and the tinted release liner removed.

Slices or relief cuts can be butted or overlapped and repaired by applying PREPRUFE® Tape centered over the edge of the overlap or center of the butt joint. Where it is not possible to create a butt joint or overlap, repair with fresh membrane and PREPRUFE® Tape as detailed above.

Pouring of Concrete

Ensure the plastic release liner is removed from all PREPRUFE® Tapes.

Under most climatic conditions concrete should be poured within 56 days of membrane installation. Where ambient temperatures will exceed 100°F (38°C) for more than a total of 7 days, concrete should be placed within 42 days of installation of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

A minimum concrete compressive strength of 3000 psi (20 N/mm²) is required prior to stripping formwork supporting PREPRUFE® 300R/160R Plus Membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete. (see PREPRUFE® Technical Letter #17 Removal of Formwork Placed against PREPRUFE® 300R/160R Plus Membranes).

After removal of the formwork and prior to backfilling, all exposed PREPRUFE® 300R/160R Plus Membrane must be protected from damage with an approved protective course.

Supply

Dimensions (Nominal)	PREPRUFE® 300R Plus PREPRUFE® 300R Plus LT	PREPRUFE® 160R Plus PREPRUFE® 160R Plus LT
Roll size Note#1	3 ft. 10 in. X 102 ft. (392 ft ²) 1.17m x 31.15m (36.4 m ²)	3 ft. 10 in. X 120 ft. (460 ft ²) 1.17m x 36.6m (42.8 m ²)
Roll weight	108 lbs (49 kg)	92 lbs (42 kg)
Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)
Note: when calculating coverage account for the Minimum side/end laps		
Note#1 Individual roll length may vary +/- 1%		

Physical Properties

Property	PREPRUFE® 300R Plus & PREPRUFE® 300R Plus LT	PREPRUFE® 160R Plus & PREPRUFE® 160R Plus LT	Test Method
Color	white	white	
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	ASTM D3767
Lateral Water Migration Resistance	Pass at 231 ft (71 m) of hydrostatic head pressure	Pass at 231 ft (71 m) of hydrostatic head pressure	ASTM D5385 ¹
Low temperature flexibility	Unaffected at -20°F (-29°C)	Unaffected at -20°F (-29°C)	ASTM D1970
Resistance to hydrostatic head	231 ft (71 m)	231 ft (71 m)	ASTM D5385 ²
Elongation	400%	400%	ASTM D412 ³
Tensile strength, film	4000 psi (27.6 Mpa)	4000 psi (27.6 Mpa)	ASTM D412
Crack cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836 ⁴

Puncture resistance	200 lbs (890 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903 ⁵
Lap peel adhesion	8 lbs/in. (1408 N/m)	8 lbs/in. (1408 N/m)	ASTM D1876 ⁶
Permeance to water vapor transmission	<0.01 perms (0.6 ng/(Pa x s x m ²))	<0.01 perms (0.6 ng/(Pa x s x m ²))	ASTM E96, method B
VOC permeance	Not Detectable Membrane, Seam	Not Detectable Membrane, Seam	ASTM F 739 Open loop
Methane permeance	<40 ml/day.m ² .atm	-	ASTM D 1434
Radon diffusion coefficient, m ² /s	3.7 X 10 ⁻¹² Membrane, Seam	5.3 X 10 ⁻¹² Membrane, Seam	Method C of ISO/TS11665-1

Footnotes:

1. Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the membrane.
2. Hydrostatic head tests of PREPRUFE[®] Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
3. Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
4. Concrete is cast against the PREPRUFE[®] Membrane and allowed to cure (7 days minimum).
5. Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
6. The test is conducted 15 minutes after the lap is formed and run at a rate of 2 in. (50 mm) per minute at 72°F (22°C).

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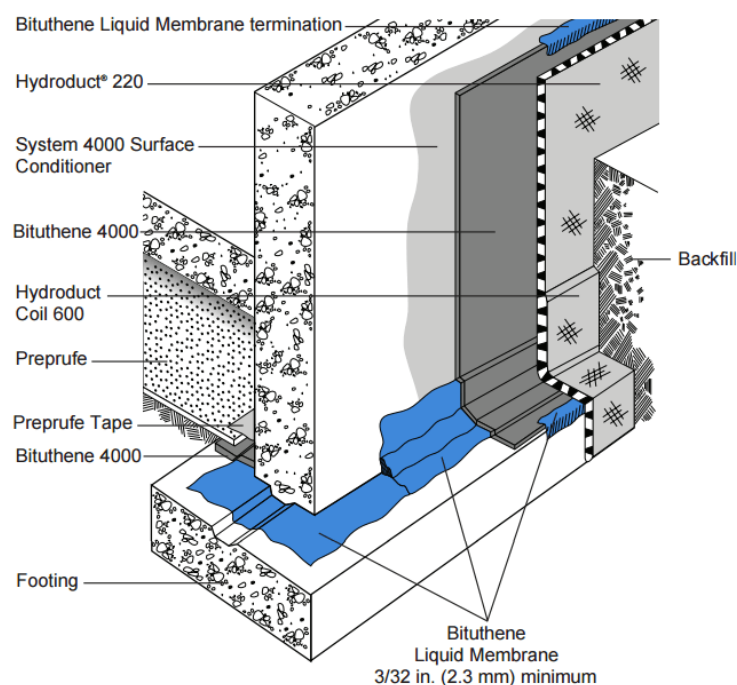
gcpat.com/solutions/products/preprufe-comprehensive-waterproofing-system/preprufe-300r160r-plus-preprufe

BITUTHENE® Liquid Membrane Data Sheet

Two component, elastomeric, liquid applied detailing compound for use with GCP waterproofing membranes

Product Description

BITUTHENE® Liquid Membrane is a two component, elastomeric, cold applied, trowel grade material designed for a variety of uses with the GCP waterproofing systems. The VOC (Volatile Organic Compound) content is 10 g/L. Architectural and industrial maintenance regulations limit the VOC content in products classified as architectural coatings. Refer to Technical Letters for the most current list of allowable limits.



Product Advantages

- Liquid applied
- Waterproof
- Tough, rubber-like
- Chemically cured
- Cold applied
- System compatible

Use

BITUTHENE® Liquid Membrane is ideally suited for the following uses:

- Fillet material at inside corners
- Reinforcement material at inside corners
- Flashing material around drains, protrusions, curbs and parapets
- Sealing material at terminations
- Repair material for defects on concrete surfaces
- Flashing material at corners

The two parts of BITUTHENE® Liquid Membrane are mixed on site and troweled on to provide a simple and quick waterproofing detailing aid in conjunction with BITUTHENE®, PREPRUFE® and PROCOR® systems.

Compatibility

BITUTHENE® Liquid Membrane is completely compatible with BITUTHENE®, PREPRUFE® and PROCOR®, and with existing asphalt or coal tar-based waterproofing materials. It is also compatible with cured silicone and polyurethane sealants. It is not compatible with creosote, pentachlorophenol, linseed oil or polysulfide-based sealants.

Supply

BITUTHENE® Liquid Membrane (Parts A & B)		
Unit size	1.5 gal (5.7 L)	4 gal (15.1 L)
Net weight per unit	16 lbs (8 kg)	44 lbs (20 kg)
Units per pallet	100	24

Physical Properties

PROPERTY	TYPICAL VALUE	TEST METHOD
Part A Color	Black	
Part B Color	Clear	
Mixture of Parts A and B Color	Black	
Solids content	100%	ASTM D1644
Elongation	250% minimum	ASTM D412
Peel strength	5 lbs/in. (880 N/m) minimum	ASTM D903
Flexibility, 180° bend over 1 in. (25 mm) mandrel at -25°F (-32°C)	Unaffected	ASTM D1970

Application Procedures

Safety, Storage and Handling Information

BITUTHENE® products must be handled properly. Vapors from solvent based primers and mastic are harmful and flammable. For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Safety Data Sheets (SDS) are available on the web site and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the SDS before use.

Surface Preparation

All surfaces must be dry and free from dirt, grease, oil, dust or other contaminants. BITUTHENE® Liquid Membrane may be applied at temperatures of 25 °F (-4 °C) or above. Store in a dry place above 40 °F.

Mixing

Add the entire contents of the Part B container to Part A and mix for 3 to 5 minutes until uniform. Part A is black and Part B is clear. Take care to scrape material from the side and bottom of the containers to ensure thorough mixing. A low speed (150 rpm) mechanical mixer with flat paddle blades is required. Do not apply any material if streaks can be seen due to insufficient mixing. Once mixed, BITUTHENE® Liquid Membrane must be applied by trowel within 1.5 hours. More time is available at lower temperatures.

At high temperatures, thickening and curing will be faster. Material that has thickened must be discarded. The material will cure to a very flexible rubber-like material.

BITUTHENE® Liquid Membrane must be applied at a minimum thickness of $\frac{3}{16}$ in. (2.3 mm) unless otherwise noted on details. In fillet applications, the face of the fillet should be a minimum of $\frac{3}{4}$ in. (20 mm). In corner flashing application details, it should extend 6 in. (150 mm) in each direction from the corner. BITUTHENE® Liquid Membrane will adhere to primed or unprimed concrete.

BITUTHENE® Liquid Membrane should be allowed to cure at least 24 hours before flood testing.

Coverage

As a fillet material, 1 gal (3.8 L) will cover approximately 100 linear feet (30 m). As a flashing material, 1 gal (3.8 L) will cover approximately 17 f² (1.6 m²). As a fillet and reinforcement, 1 gal (3.8 L) will cover approximately 14 linear feet (4.3 m).

Cleaning

Clean tools and equipment with mineral spirits before BITUTHENE® Liquid Membrane has cured. Mineral spirits is a combustible liquid and should be used only in accordance with the manufacturer's safety recommendations. Do not use solvents to clean hands or skin.

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