ADDENDUM 1

To Contract Documents for

EYECARE MEDICAL GROUP

53 SEWALL STREET
PORTLAND, ME 04102

E.M.G. - Phase 2 Addition & Renovation

This Addendum modifies, amends and supplements designated parts of the Contract Documents, Project Manual and Drawings for **E.M.G. - Phase 2 - Addition and Renovation – Site and Foundation Package – June 13, 2013.**and is hereby made a part thereof by reference and shall be as binding as though inserted in its entirety in the locations specified herein. It shall be the responsibility of the Contractor to notify all Subcontractors and Suppliers he proposes to use for the various parts of the work of any changes or modifications contained in this Addendum.

Architecture ■ Interior Design ■ Planning

49 Dartmouth Street
Portland, Maine 04101
207-775-1059 ■

www.pdtarchs.com

EYECARE MEDICAL GROUP
PHASE 2 ADDITION AND RENOVATION
ADDENDUM NO. 1
JUNE 26, 2013

This Addendum modifies, amends and supplements designated parts of the Contract Documents, Project Manual and Drawings for
E.M.G. - Phase 2 - Addition and Renovation – Site and Foundation Package – June 13, 2013.
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INDEX

GENERAL INFORMATION

1. Aaron Klein will be handling questions and requests for interpretations for this project.
Phone : 207-775-1059 x351
Email : klein@pdtarchs.com

2. Any contractor wanting to visit the project site and building please contact E.M.G. Facilities Director Terry Wogan (207) 828-2020 to coordinate such visit. Visitors must always check-in.

3. The for the purpose of expediting this project, the Contract Documents are being released in 3 packages:
(1.) Site and Foundation Package, (2.) Steel Package, and (3.) the complete Contract Documents, including but not limited Civil, Architectural, Structural, Mechanical, Plumbing, & Electrical construction documents.
The intent of the documents is to describe a complete work or improvement. The contract documents are complimentary, and what is called for by one shall be as binding as if called for by all.

PART I- ADDENDUM FOR CIVIL SPECIFICATIONS AND DRAWINGS:

CHANGES TO PROJECT DRAWINGS:

SHEET 2.0 – SITE LAYOUT PLAN

1. ADA tactile warning strips/tiles have been added to the plan along in two locations along the westerly edge of the proposed addition adjacent to the two proposed doors.

2. Two notes indicating 'Landscape area' have been removed from the plan.

3. The note for the bituminous repair near the southerly edge of the proposed building addition has been revised from "replace bituminous walk (disturbed by construction during installation of proposed utilities" to "replace bituminous walk if disturbed during construction of proposed building addition".

4. The note associated with the existing oil tank removal has been revised from "Existing oil tank scheduled for removal" to "Existing oil tank to be removed. See contract documents (AddendumNº1) or correct documentation, removal and oversight requirements".

OTHER ITEMS:

1. Notes regarding the removal of the existing oil tank are attached.

2. The domestic water service has been revised from three (3) inch diameter to four (4) inch diameter.

3. The laydown/staging area on Central Maine Power land shall be constructed by clearing and grubbing existing vegetation, placing a separation fabric geotextile and placing 8" min, 10" average layer of gravel suitable for the staging/laydown activities anticipated. Note: perimeter erosion controls should be installed prior to grubbing.

4. Portland Water District are comfortable with shifting the location of the blow off on the northerly side of the building so as to eliminate service shutdown for abutting landowner's.

PART II- ADDENDUM FOR STRUCTURAL SPECIFICATIONS AND DRAWINGS:

1. ADD SKS-01 RADON PIPE LAYOUT PLAN

2. E8/SB-500 - ADD SKS-02 REVISED TYPICAL FOUNDATION WALL DETAIL

3. PARTIAL FOUNDATION PLAN - ADD SKS-03 - REVISE COLUMN BASE PLATE TYPES AS SHOWN

4. ADD SKS-04 REVISED BASE PLATES "B-4" AND "B-5"

PART III- ADDENDUM FOR ARCHITECTURAL PROJECT MANUALS AND DRAWINGS:

Not Used

PART IV- ADDENDUM FOR MECHANICAL SPECIFICATIONS AND DRAWINGS:

CHANGES TO PROJECT SPECIFICATIONS

1. Section 230700 – Mechanical Insulation: ADD the section, attached, in its entirety.

CHANGES TO PROJECT DRAWINGS

1. Sheet PL-100: CHANGE the size for the domestic water service, where located below grade and/or below slab, from 3" to 4".

2. Sheet PL-100: CHANGE Key Note №2 to read as follows:

   "4" domestic water service shall transition to 3" above the floor slab. Rise into ceiling space, extend to existing sprinkler room, and connect, temporarily to the existing 2" service. The existing service will be upgraded as required under the Phase 2 interior fit-out package. All above floor domestic water piping shall be insulated as specified."

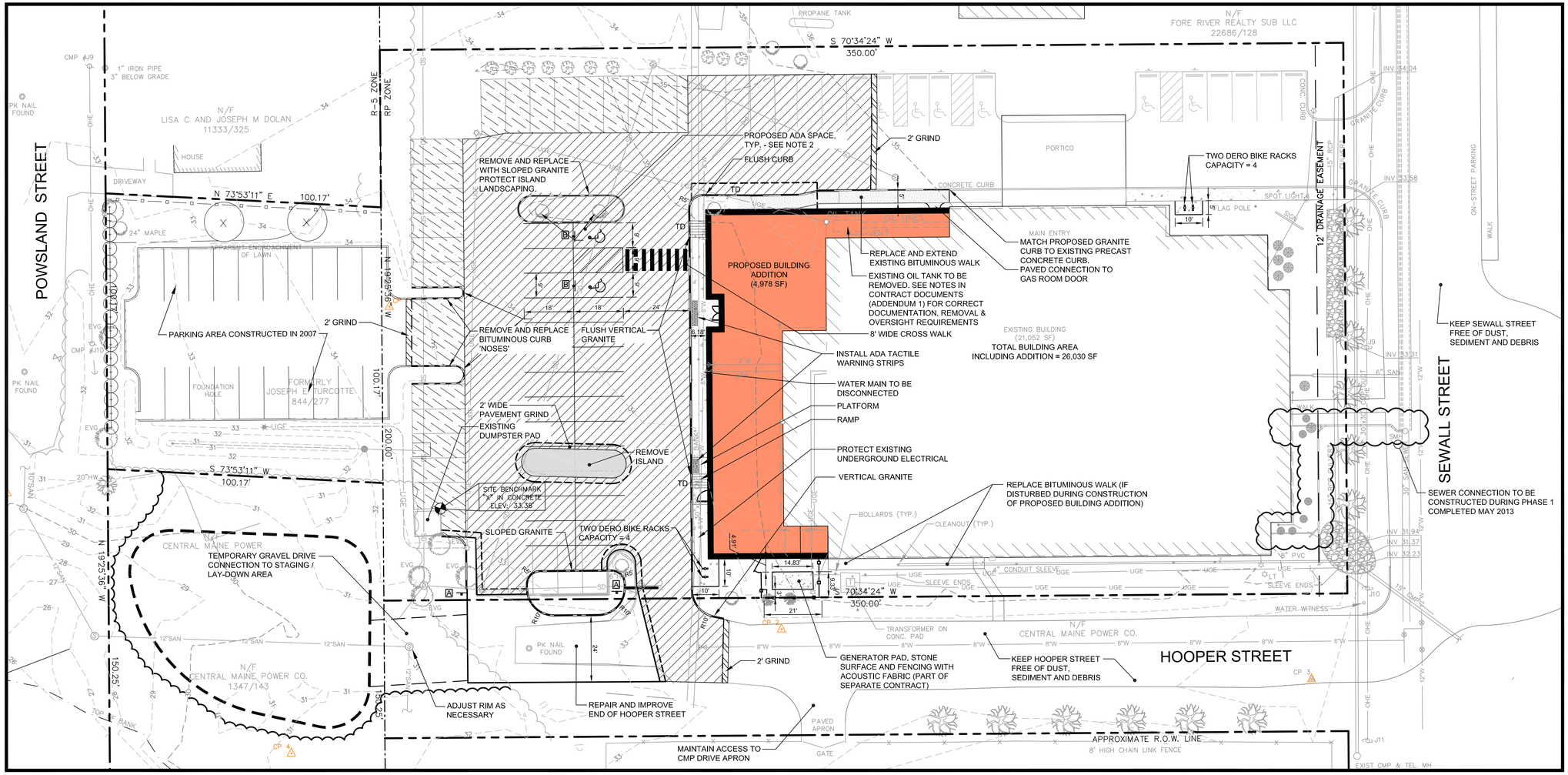
3. SHEET PL-102: ADD the following note to the sprinkler pipe as it enters the facility:

   "All sprinkler service piping, where located above the future ORN№3, ORN№4, Autoclave B119, and Clean B118 spaces (scheduled for hard, non-accessible ceilings) shall be joint free or welded pipe to minimize the chance for leakage."

PART V- ADDENDUM FOR ELECTRICAL SPECIFICATIONS AND DRAWINGS:

Not Used

END OF ADDENDUM



PARKING SUMMARY TABLE

PROPOSED TOTAL BUILDING AREA	26,030 SF
REQUIRED PARKING	65 SPACES
EXISTING PARKING	94 SPACES
PARKING LOSS	9 SPACES
NET PROPOSED PARKING	85 SPACES

LEGEND

- PROPOSED BUILDING ADDITION
- FULL DEPTH STANDARD DUTY PAVEMENT - MEETING CITY STREET STANDARDS
- NEW PAVEMENT OVER RECLAIMED BASE MATERIAL
- 1.25" BITUMINOUS OVERLAY
- PROPOSED CONCRETE SIDEWALK
- VERTICAL GRANITE CURB
- SLOPED GRANITE CURB
- BITUMINOUS CONCRETE CURB
- TD — TIPDOWN

SIGN LEGEND

R1-1 (24"x24") A

R7-8 (12"x18") B

ZONING: RP ZONE

DESCRIPTION	REQUIRED / ALLOWED	PROPOSED
PROFESSIONAL OFFICE USE	PERMITTED	PERMITTED
MIN LOT SIZE	6,000 SF	70,000 SF
MIN FRONTAGE	60 FT	200 FT
LOT WIDTH	60 FT	200 FT
SETBACKS		
- FRONT	20 FT	20 FT
- SIDE (1 STORY CORNER)	15 FT	15 FT
- REAR	20 FT	112 FT
MAX IMPERVIOUS SURFACE RATIO	80%	77%
FLOOR AREA RATIO	65%	37%
PARKING SPACE SIZE	9' X 18'	9' X 18' AND
		9' X 19'
PARKING RATIO (1 SPACE/400 SF FOR PROFESSIONAL OFFICE	65 (BASED ON 26,030 SF BUILDING)	85
HANDICAPPED PARKING SPACES	3	8

NOTES:

1. THE GENERATOR PAD WILL BE INSTALLED PRIOR TO THIS PROJECT. HOWEVER THE FENCE AND ACOUSTIC FABRIC WILL NOT BE INSTALLED UNTIL THE BUILDING CONSTRUCTION IS COMPLETE.
2. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ADA COMPLIANT GRADING AND ACCESS ROUTE INTO BUILDING.
3. ALL PAVEMENT AREA DISTURBED BY PROJECT TO BE RE-STRIPED TO MATCH PLAN.

PLAN VIEW

SCALE" 1" = 20'

NORTH

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)

1 inch = 20 ft.

REV	DATE	DESCRIPTION
		REVISIONS
4	06.25.13	REVISED PER ADDENDUM #1
3	06.13.13	RELEASED FOR BID
2	06.03.13	LEVEL II SITE PLAN SUBMISSION
1	05.22.13	DESIGN DEVELOPMENT

STATE OF MAINE — STEPHEN R. BUSHEY — No. 7429 — LICENSED PROFESSIONAL ENGINEER

P.E. STEPHEN BUSHEY
LIC. #7429

PROJECT
EYECARE MEDICAL GROUP PHASE 2 - ADDITION & RENOVATION

SHEET TITLE
SITE LAYOUT PLAN

CLIENT
PDT ARCHITECTS

DeLUCA-HOFFMAN ASSOCIATES, INC.
778 MAIN STREET, SUITE 8
SOUTH PORTLAND, ME 04106
207.775.1121
WWW.DELUCAHOFFMAN.COM

DRAWN:	LA	DATE:	MAY 2013
DESIGNED:	RJW	SCALE:	1" = 20'
CHECKED:	SRB	JOB NO.	3165
FILE NAME:	3165-SP		
SHEET	C-2.0		

The removal of the 1,000 gallon underground fuel oil tank and underground piping must be conducted in accordance with the Rules for Underground Oil Storage Facilities, Chapter 691.

A minimum of ten days prior to the removal the fuel oil tank must be registered, if not previously registered with the MEDEP:

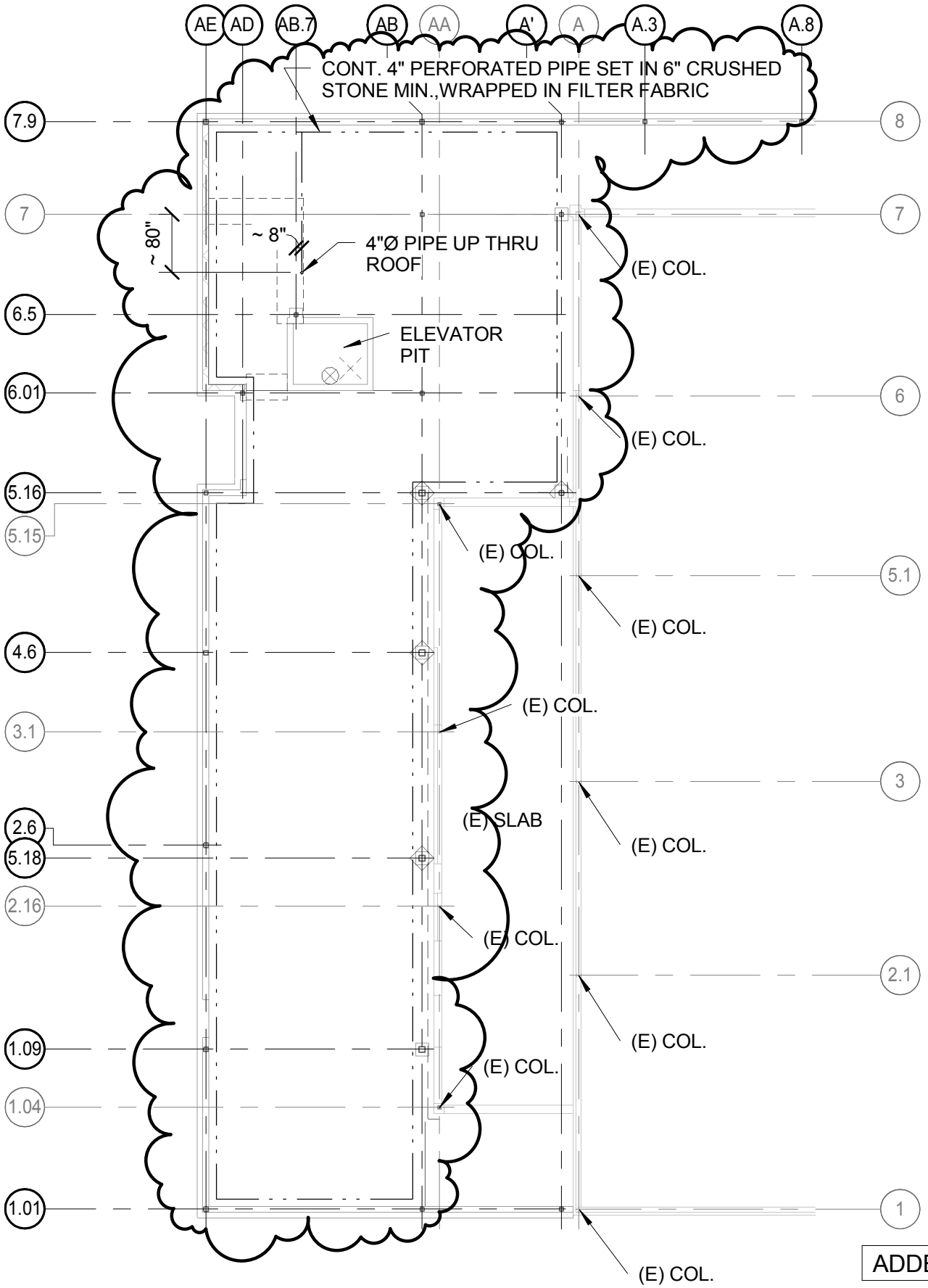
Send the registration form to: ATTN: Tank Registration, MDEP-BRWM, 17 State House Station, Augusta, ME 04333-0017. A copy must also be filed with the local fire department, or if the facility is located in an unorganized township, with the Land Use Regulation Commission. Keep a copy for your own records.

At the same time, the "Notice of Intent to Remove an Underground Oil Storage Tank Facility or Underground Product Piping" form to notify the Department of Environmental Protection (DEP) and the local fire department of the intent to remove an underground oil storage facility. The notice requirement applies to removal of components of an underground oil storage facility and removal of underground piping at an aboveground oil storage facility. Maine law requires that notice be made at least 10 days prior to the commencement of removal work. If the Department has determined that the tank or piping may be abandoned in place, this notification must also be provided before initiating the permanent abandonment.[1]

If you need to reschedule the removal or abandonment to a later date after filing the notice, please call DEP Tank Registration staff at (207) 287-2651 (Augusta); or call the Department's regional Division of Response Services: Portland, (207) 822-6300; Augusta, (207) 287-7800; Bangor, (207) 941-4570; or Presque Isle, (207) 764-0477.

At the same time, please notify the environmental engineer of the anticipated date of the removal of the UST. Contact: Hoffman Engineering, Inc. 401-294-9032. E-Mail Hoffmanengineering@verizon.net. HEI will be witnessing the closure on behalf of the owner, collect bottom soil samples for soil screening, and prepare a letter report.

Although, not anticipated, if impacted soils are encountered they must be stockpiled on and under 6 mil polyethylene as directed by the engineer, for eventual off-site disposal.



ADDENDUM-1

Checker

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P D T
ARCHITECTS

ARCHITECTURE
INTERIOR DESIGN
PLANNING

49 DARTMOUTH STREET
PORTLAND, MAINE 04101
www.pdtarchs.com

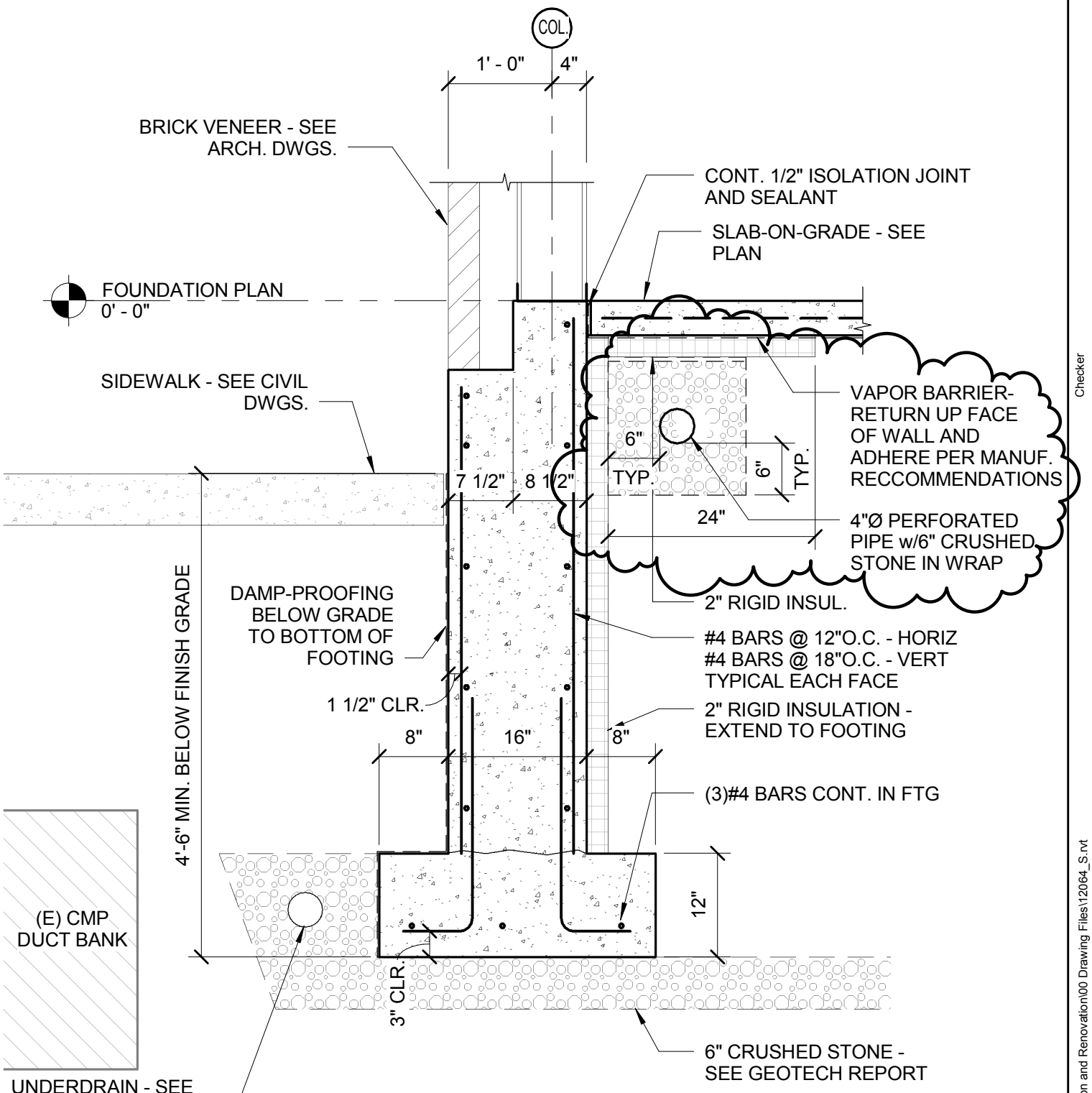
E.M.G.-PHASE 2-ADDTION & RENOVATION

53 Sewall Street, Portland, Maine 04102

TITLE
RADON PIPE LAYOUT PLAN

JOB #	12084
DATE	06-25-2013
SCALE	1/16" = 1'-0"

SHEET
SKS-01



ADDENDUM-1

PDT ARCHITECTS

ARCHITECTURE
INTERIOR DESIGN
PLANNING

49 DARTMOUTH STREET
PORTLAND, MAINE 04101
www.pdtarchs.com

E.M.G.-PHASE 2-ADDTION & RENOVATION

53 Sewall Street, Portland, Maine 04102

TITLE
REVISED TYPICAL FOUNDATION WALL DETAIL (E8/SB-500)

JOB #	12084
DATE	06-25-2013
SCALE	3/4" = 1'-0"

SHEET
SKS-02

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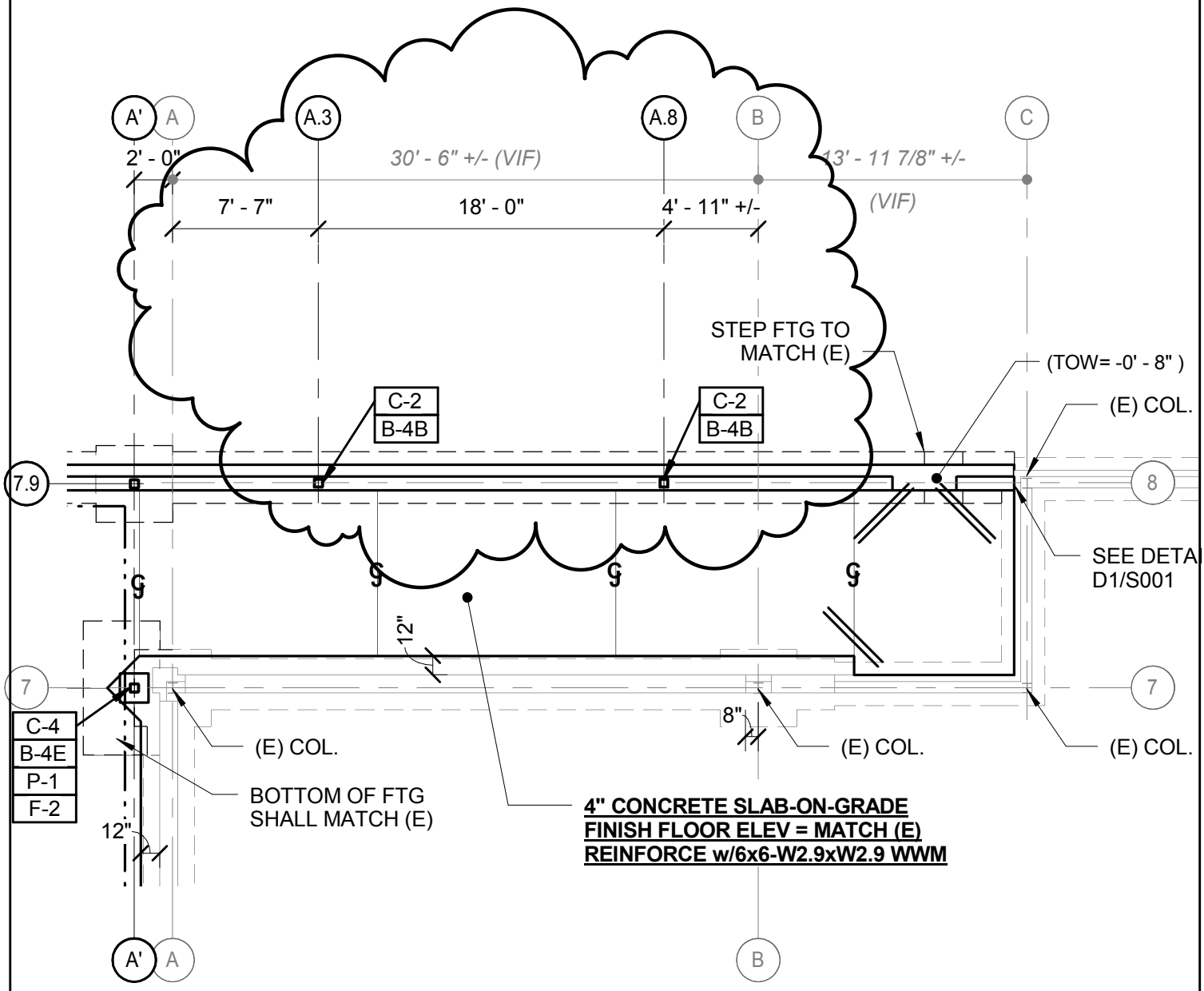

NOTE:

REVISE COLUMN BASE PLATE TYPES TO THE FOLLOWING:
COLUMN AB/1.01 AND AB/7.9 SHALL BE TYPE "B-4B"

ADDENDUM-1

P D T ARCHITECTS

ARCHITECTURE
INTERIOR DESIGN
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49 DARTMOUTH STREET
PORTLAND, MAINE 04101
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E.M.G.-PHASE 2-ADDTION & RENOVATION

53 Sewall Street, Portland, Maine 04102

TITLE
PARTIAL FOUNDATION PLAN

JOB #	12084
DATE	06-25-2013
SCALE	1/8" = 1'-0"

SHEET
SKS-03

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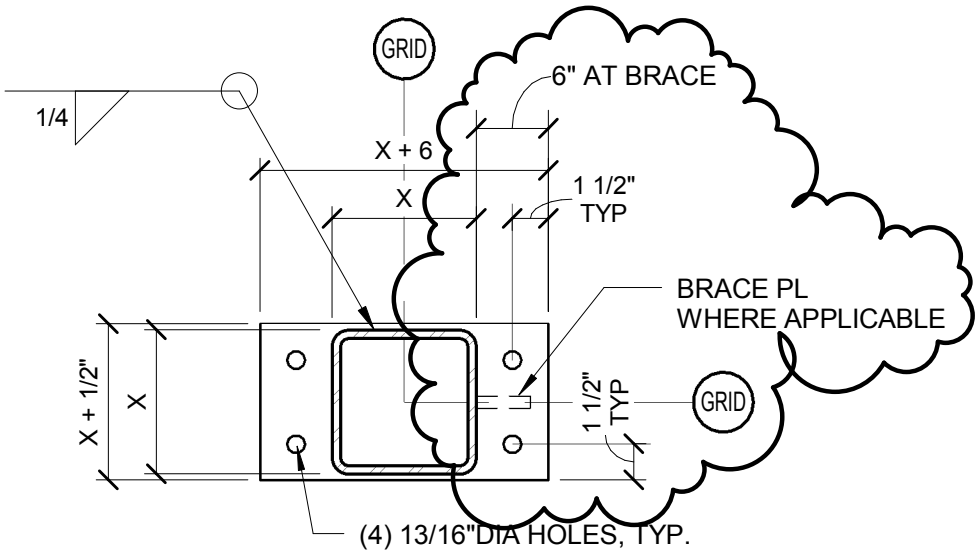
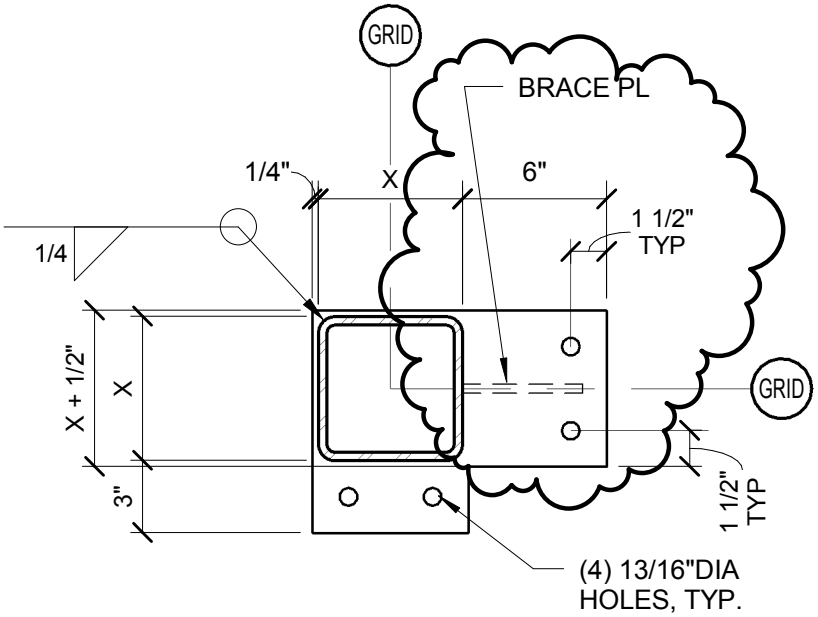


BASE PLATE TYPE "B-4"



BASE PLATE TYPE "B-5"

ADDENDUM-1

PDT ARCHITECTS
ARCHITECTURE
INTERIOR DESIGN
PLANNING

49 DARTMOUTH STREET
PORTLAND, MAINE 04101
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E.M.G.-PHASE 2-ADDTION & RENOVATION
53 Sewall Street, Portland, Maine 04102

TITLE
REVISED BASE PLATES "B-4" AND "B-5"

JOB #	12084
DATE	06-25-2013
SCALE	1 1/2" = 1'-0"

SHEET
SKS-04

Checker

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SECTION – 230700 - MECHANICAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Division 7 for firestopping materials and requirements for penetrations through fire and smoke barriers.

1.2 SUMMARY

A. This Section includes insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.

1.3 ACTION SUBMITTALS

A. Product Data: Identify thermal conductivity, Greenguard Certification, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the U.S. Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

B. All of the insulation materials and accessories covered by this specification shall be delivered to the job site and stored in a safe, dry place with appropriate labels and/or other product identification.

C. Store tapes, adhesives, mastics, cements, and insulation materials in ambient conditions in accordance with the recommendations of the manufacturer.

D. Follow manufacturer's recommended handling practices.

E. The contractor shall use whatever means are necessary to protect the insulation materials and accessories before, during, and after installation. No insulation material shall be installed that has become damaged in any way. The contractor shall also use all means necessary to protect work and materials installed by other trades.

F. Fiber Glass and Mold: Contractor shall take precaution to protect insulation. Any fiber glass insulation that becomes wet or torn should be replaced at no additional cost. Air handling insulation used in the air stream must be discarded if exposed to water.

1.6 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields. Coordinate clearance requirements with other trades for insulation application.

B. Schedule insulation application after testing systems. Insulation application may begin on segments of systems that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Certainteed
2. Knauf
3. Owens-Corning
4. John Mansville
5. Armstrong
6. Aeroflex USA
7. Nomaco K-Flex
8. Pabco.

2.2 PIPING INSULATION MATERIALS

A. General

1. Supply fiber glass products that have achieved GREENGUARD Children & Schools Certification.
2. Surface Burning Characteristics: Insulation and related materials shall have surface burning characteristics determined by test performed on identical products per ASTM E 84 mounted and installed as per ASTM E 2231. All testing shall be performed by a testing and inspecting agency acceptable to authorities having jurisdiction. Insulation, jacket materials, adhesives, mastics, tapes and cement material containers shall be labeled with appropriate markings of applicable testing and inspecting agency. Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
3. Supply fiber glass products that are manufactured using a certified 25 % minimum recycled content.

B. Provide thermal hanger shields as specified in Section 230529.

C. Glass Fiber:

1. Knauf 1000° Pipe Insulation with ECOSE Technology meeting ASTM C547 Type IV Grade A, ASTM C585, and ASTM C795; rigid, molded, noncombustible per ASTM E136; k value: ASTM C335, 0.23 at 75°F mean temperature. Maximum Service Temperature: 1000°F, or Johns Manville's Micro-Lok® *HP* meeting ASTM C547, Type I, maximum service temperature of 850°F meeting the other requirements. Vapor Retarder Jacket: ASJ/SSL conforming to ASTM C1136 Type I, secured with self-sealing longitudinal laps and butt strips.
2. PVC Fitting Covers: The Proto Fitting Cover System or Johns Manville Zeston® polyvinyl chloride (PVC) parts shall consist of one piece and two piece pre-molded high impact UV-resistant PVC fitting covers with fiberglass inserts and accessories, which include elbows, tee/valves, end caps, mechanical line couplings, and specialty fittings. Fittings shall be made of Zeston® or LoSMOKE® grade PVC, 25/50 rated per ASTM E-84. Thermal Value of fiberglass insert: K value of 0.26 at 75°F; resistance to fungi and bacteria. (ASTM G 21, ASTM G 22): does not promote growth of fungi or bacteria.

D. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
3. Materials shall have a maximum thermal conductivity of 0.27 Btu-in/h-ft2- °F at a 75°F mean temperature when tested in accordance with ASTM C 177 or ASTM C 518, latest revisions.
4. Materials shall have a maximum water vapor transmission of 0.08 perm-inches when tested in accordance with ASTM E 96, Procedure-A, latest revision.
5. Materials shall have a flame spread index of less than 25 and a smoke developed index of less than 50 when tested in accordance with ASTM E 84, latest revision.
6. Provide Armaflex WB finish for outdoor exposed piping.

E. Calcium Silicate Insulation: Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I. IIG's Thermo-12 Gold

F. Closed Cell Pipe Insulation: Pittsburgh Corning Foamglas, or approved equal; a lightweight, rigid insulating material composed of millions of completely sealed glass cells, each an insulating space. ASTM C 552-00 "Specification for Cellular Glass Thermal Insulation"' operating temperatures from -450°F to +900°F; water permeability 0.00 perm-inch.

G. Removable/reusable Insulation Blankets: Auburn Manufacturing EverGreen Cut 'n Wrap, or approved equal; engineered insulating composite with a fiberglass inner core and high-performance polymer coated woven glass fiber fabric outer layer on both sides. Kits contain a 4'x 8' modularized blanket rated to 500°F and a roll of double sided hook and loop fastener making onsite fabrication of removable/reusable insulation blankets quick and easy. Up to 500°F; Weight, oz/ft2 7.65; Effective Thickness, in. 1.25 ± 0.25; Surface Burning Characteristics: Does not exceed 25 Flame Spread, 50 Smoke Developed when tested in accordance with ASTM E-84. Materials shall have a maximum thermal conductivity of 0.372 Btu-in/h-ft2- °F at a 100°F mean temperature when tested in accordance with ASTM C335.

2.3 FIELD-APPLIED JACKETS FOR PIPING

A. General: ASTM C 921, Type 1, unless otherwise indicated.

B. PVC: Johns Manville's Zeston® PVC fittings, jacketing, and accessories or Proto Corporation 25/50 or Indoor/Outdoor, UV-resistant fittings, jacketing and accessories, white. Fitting cover system consists of pre-molded, high-impact PVC materials with fiber glass inserts. Fiber glass insert has a thermal conductivity (k value) of 0.26 at 75° F mean temperature. Closures: stainless steel tacks, matching PVC tape, or PVC adhesive per manufacturer's recommendations.

C. Aluminum Jacket: Factory cut and rolled to required size. Comply with ASTM B 209, 3003 alloy, and H-14 temper. Finish and Thickness: Corrugated finish, 0.010 inch thick. Moisture Barrier: 1-mil- thick, heat-bonded polyethylene and Kraft paper. Elbows: Preformed, 45- and 90-degree, short- and long-radius elbows; same material, finish, and thickness as jacket.

D. Stainless-Steel Jacket: ASTM A666, Type 304 or 316; 0.10 inch thick; and factory cut and rolled to required size. Moisture Barrier: 3-mil- thick, heat-bonded polyethylene and Kraft paper. Elbows: Gore type, for 45- and 90-degree elbows in same material, finish, and thickness as jacket. Jacket Bands: Stainless steel, Type 304, 3/4 inch wide.

2.4 ACCESSORY MATERIALS

A. Accessory materials installed as part of insulation work under his section shall include (but not be limited to):

1. Closure Materials - Butt strips, bands, wires, staples, mastics, adhesives; pressure-sensitive tapes.

2. Adhesive: As recommended by insulation material manufacturer. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated
3. Support Materials - Hanger straps, hanger rods, saddles, support rings

B. All accessory materials shall be installed in accordance with manufacturer's instructions.

C. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION & PREPARATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application. Verify that systems to be insulated have been tested and are free of defects. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.

D. Ensure that all pipe and fitting surfaces over which insulation is to be installed are clean and dry. Ensure that insulation is clean, dry, and in good mechanical condition with all factory-applied vapor or weather barriers intact and undamaged. Wet, dirty, or damaged insulation shall not be acceptable for installation. Ensure that pressure testing of piping and fittings has been completed prior to installing insulation.

3.2 GENERAL APPLICATION REQUIREMENTS

A. Provide insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout, including the length of ducts and fittings, valves, and specialties.

B. Provide insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each system as specified in insulation system schedules.

C. Provide accessories compatible with insulation materials and suitable for the service. Provide accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Provide insulation with longitudinal seams at top and bottom of horizontal pipe runs and equipment.

E. Provide multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

H. Keep insulation materials dry during application and finishing.

I. Provide insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

J. Provide insulation over fittings, valves, and specialties, with continuous thermal and least number of joints practical.

K. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and specialties around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

L. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

M. Provide insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

N. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

O. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

P. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.3 PENETRATIONS

A. Insulation Installation at Roof or Aboveground Exterior Wall Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof/wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof/wall flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof/wall flashing with flashing sealant.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

C. Insulation Installation at Fire-Rated Penetrations:

1. Fire Dampers: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
2. Pipe or duct penetrations (no fire damper): Install insulation continuously through penetrations of fire-rated walls and partitions. Comply with requirements in Division 7 for firestopping and fire-resistive joint sealers.

3.4 INSTALLATION OF PIPING INSULATION

A. Metal shields shall be installed between hangers or supports and the piping insulation. Provide in accordance with Section 230529.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.

3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

C. Insulate instrument connections for specialties (examples: thermometers, sensors, etc.) on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at fittings and equipment that require servicing and locations with service requirements.

E. Glass Fiber Piping Insulation

1. Locate seams in the least visible location.
2. Insulation installed on piping operating below ambient temperatures must have a continuous vapor retarder. All joints, seams and fittings must be sealed. On systems operating above ambient, the butt joints should not be sealed.

F. Flexible Elastomeric Insulation

1. Seal longitudinal seams and end joints with manufacturers recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

2. Insulation Installation on Pipe Flanges: Install pipe insulation to outer diameter of pipe flange. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation. Secure insulation to flanges and seal seams with manufacturers recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
3. Insulation Installation on Pipe Fittings and Elbows: Install mitered sections of pipe insulation. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
4. Insulation Installation on Valves and Pipe Specialties: Install preformed valve covers manufactured of same material as pipe insulation when available. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. Install insulation to flanges as specified for flange insulation application. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
5. After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating. Prior to applying the finish, the insulation shall be wiped clean with denatured alcohol. The finish shall not be tinted. To insure good adhesion, the temperature should be above 50 °F during application and drying. Outdoor exposed piping shall have the seams located on the lower half of the pipe.
6. Outdoor exposed piping shall be painted with two coats of Armaflex WB Finish. Prior to applying the Finish, the insulation shall be wiped clean with denatured alcohol. The Finish shall not be tinted. Outdoor exposed piping shall have the seams located on the lower half of the pipe.

3.5 FIELD-APPLIED JACKET INSTALLATION

A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturers recommended adhesive. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.6 FINISHES

A. Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

    a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

C. Do not field paint aluminum or stainless-steel jackets.

D. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

3.7 PIPING INSULATION APPLICATION SCHEDULE

A. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements. For piping systems not indicated, insulate to with a similar thickness and type as those specified.

B. All cold surfaces that may “sweat” must be insulated. Vapor barrier must be maintained, insulation shall be applied with a continuous, unbroken moisture and vapor seal. All hangers, supports, anchors, or other projections that are secured to cold surfaces shall be insulated and vapor sealed to prevent condensation.

C. For above-ambient services, do not install insulation to the following: testing agency labels and stamps, nameplates, and cleanouts.

D. Insulation thicknesses and installations shall meet or exceed the requirements of ASHRAE Standard 90.1-2007, or thicknesses indicated, whichever is of superior insulating performance.

E. If piping type is omitted from list below, provide insulation as per similar duty.

F. Provide PVC jackets in the following locations:

1. For piping exposed in mechanical rooms within 6 feet above finished floor or high traffic areas.

G. Domestic cold water

1. Pipe size 1-1/4” and less: Glass Fiber, 1” thickness.
2. Pipe size 1-1/2 and larger: Glass Fiber, 1.5” thickness.

END OF SECTION 230700