# UNION STATION REDEVELOPMENT CORPORATION

50 MASSACHUSETTS AVE NE,
WASHINGTON, DC 20002

# UNION STATION GARAGE

## PM SUPPORT SERVICES
## GENERATOR ROOM UPGRADES
## DOMESTIC WATER WINTERIZATION

WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

MEPFPT Engineer:

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Architect:

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Structural Engineer:

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| | | |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |
| NO. | REVISION | DATE |

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
PM SUPPORT SERVICES GENERATOR ROOM DOMESTIC WATER WINTERIZATION

TITLE
COVER SHEET

PROJECT NO.: US-WSP-192801E
DATE: 08/27/2025
DWN. BY: Author
CKD. BY: Checker
SCALE: 12" = 1'-0"

CS0.0

| APPLICABLE CODE | |
|---|---|
| BUILDING CODE | IBC 2021 |
| ENERGY CODE | IECC 2021 |
| MECHANICAL CODE | IMC 2021 |
| PLUMBING CODE | IPC 2021 |
| ELECTRICAL CODE | NFPA 70/NATIONAL ELECTRIC CODE 2021 |
| DESIGN LOAD CODE | ASCE/SEI 7 - 10 (ASCE) |
| PROJECT DEVELOPMENT PROCEDURE | PDP 2022 |

# GENERATOR ROOM

| ARCHITECTURAL DRAWING LIST - GRU | |
|---|---|
| DRAWING NO. | DESCRIPTION |
| CS0.1 | COVER SHEET |
| A4.00 | ARCHITECTURAL - ENLARGED VIEW |
| A4.01 | ARCHITECTURAL - ELEVATION AND DETAILS |
| A9.01 | ARCHITECTURAL SPECIFICATIONS 1 |
| A9.02 | ARCHITECTURAL SPECIFICATIONS 2 |
| A9.03 | ARCHITECTURAL SPECIFICATIONS 3 |
| A9.04 | ARCHITECTURAL SPECIFICATIONS 4 |

| MECHANICAL DRAWING LIST - GRU | |
|---|---|
| DRAWING NO. | DESCRIPTION |
| M0.01 | MECHANICAL LEGENDS AND ABBREVIATIONS |
| M0.02 | MECHANICAL SCHEDULES DETAILS AND CONTROLS |
| M4.00 | MECHANICAL - ENLARGED VIEWS |
| M9.01 | MECHANICAL SPECS |
| M9.02 | MECHANICAL SPECS |

| PLUMBING DRAWING LIST - GRU | |
|---|---|
| DRAWING NO. | DESCRIPTION |
| P0.10 | PLUMBING - COVER SHEET |
| P2.02N | PLUMBING - BUS LEVEL - NEW WORK - NORTH |
| P4.00 | PLUMBING - ENLARGED VIEWS |
| P6.01 | PLUMBING SPECIFICATIONS |

| ELECTRICAL DRAWING LIST - GRU | |
|---|---|
| DRAWING NO. | DESCRIPTION |
| E0.10 | ELECTRICAL - LEGENDS AND ABBREVIATIONS |
| E0.20 | ELECTRICAL - SCHEDULES |
| E2.02N | ELECTRICAL - BUS LEVEL - NEW WORK - NORTH |
| E4.00 | ELECTRICAL - ENLARGED VIEWS |
| E7.00 | ELECTRICAL - SPECS |
| E7.01 | ELECTRICAL - SPECS |
| E7.02 | ELECTRICAL - SPECS |

# DOMESTIC WATER WINTERIZATION

| ELECTRICAL DRAWING LIST - DWW | |
|---|---|
| DRAWING NO. | DESCRIPTION |
| E0.10 | ELECTRICAL - LEGENDS AND ABBREVIATIONS |
| E0.20 | ELECTRICAL - SCHEDULES |
| E2.02N | ELECTRICAL - BUS LEVEL - NEW WORK - NORTH |
| E4.00 | ELECTRICAL - ENLARGED VIEWS |
| E7.00 | ELECTRICAL - SPECS |
| E7.01 | ELECTRICAL - SPECS |
| E7.02 | ELECTRICAL - SPECS |

| PLUMBING DRAWING LIST - DWW | |
|---|---|
| DRAWING NO. | DESCRIPTION |
| P0.001-4 | PLUMBING - LEGENDS & ABBREVIATIONS |
| P2.00N-4 | PLUMBING - UPPER TRACK LEVEL - NEW WORK - NORTH |
| P2.00S-4 | PLUMBING - UPPER TRACK LEVEL - NEW WORK - SOUTH |
| P2.02N-4 | PLUMBING - BUS LEVEL - NEW WORK - NORTH |
| P2.02S-4 | PLUMBING - BUS LEVEL - NEW WORK - SOUTH |
| P2.03N-4 | PLUMBING - MEZZANINE LEVEL - NEW WORK - NORTH |
| P2.04N-4 | PLUMBING - FIRST LEVEL - NEW WORK - NORTH |
| P2.05N-4 | PLUMBING - SECOND LEVEL - NEW WORK - NORTH |
| P2.06N-4 | PLUMBING - THIRD LEVEL - NEW WORK - NORTH |
| P5.01-4 | PLUMBING DOMESTIC WATER DIAGRAM |
| P6.01-4 | PLUMBING SPECIFICATIONS |
| P6.02-4 | PLUMBING SPECIFICATIONS |
| P6.03-4 | PLUMBING SPECIFICATIONS |
| P6.04-4 | PLUMBING SPECIFICATIONS |
| P6.05-4 | PLUMBING SPECIFICATIONS |

STRUCTURAL NOTES:

A. EXAMINATION REQUIRED PRIOR TO CUTTING, DRILLING, CORING OR ANCHORING INTO THE EXISTING STRUCTURE.
   1. DO NOT CUT, DRILL, CORE OR ANCHOR INTO ANY STRUCTURAL ELEMENT WITHOUT PRIOR WRITTEN APPROVAL FROM USRC'S ENGINEER OF RECORD (USRC'S EOR), UNLESS NOTED OTHERWISE.
   2. THE CONTRACTOR SHALL SCAN THE CONCRETE AT ALL LOCATIONS OF PROPOSED CUTS, PENETRATIONS OR ANCHORAGES TO LOCATE AND MARK ALL EMBEDDED OBJECTS INCLUDING BUT NOT LIMITED TO EMBEDDED REINFORCEMENT, PRESTRESS OR POST-TENSION STRANDS, EMBEDDED CONNECTIONS, ELECTRICAL CONDUIT, AND ANY OTHER EMBEDDED HARDWARE/EQUIPMENT. SCANNING SHALL BE PERFORMED BY A CERTIFIED TECHNICIAN USING A GROUND PENETRATING RADAR (GPR) CONCRETE SCANNING SYSTEM SUCH AS CONQUEST BY SENSORS & SOFTWARE INC. OR EQUAL. CALIBRATE AND RECALIBRATE THE SCANNER IN ACCORDANCE WITH. CALIBRATIONS MUST BE PERFORMED AT THE BEGINNING OF EACH SHIFT AND WHEN CONDITIONS CHANGE. PROVE THE CALIBRATION OF EACH SCANNER ON A TEST LOCATION OR TEST PIECE ACCEPTED BY USRC'S EOR. LOCATING AT LEAST THREE REINFORCING BARS USING THE SCANNER AND HAMMER DRILLED TEST HOLES TO DETERMINE DEPTH OF COVER. DO NOT CALIBRATE AT POST-TENSION STRANDS SINCE THE HAMMER DRILL BIT WILL DAMAGE THE POST-TENSION SHEATHING AND STRAND.
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| | PERMIT / BID | OCT 3, 2025 |

PROJECT

PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER

UNION STATION REDEVELOPMENT CORPORATION

TITLE

COVER SHEET

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: Author
CKD. BY: Checker
SCALE: 12" = 1'-0"

CS0.1


10/22/2025 4:32:46 PM Autodesk Docs://ARP200-PM Support Services- Gen Rm - R25 - C25PM SUPPORT SERVICES - GENERATOR ROOM_WSP_MEP_r2025.rvt

# UNION STATION REDEVELOPMENT CORPORATION

50 MASSACHUSETTS AVE NE,
WASHINGTON, DC 20002

# UNION STATION GARAGE

PM SUPPORT SERVICES
GENERATOR ROOM UPGRADES

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| NO. | REVISION | DATE |
|---|---|---|
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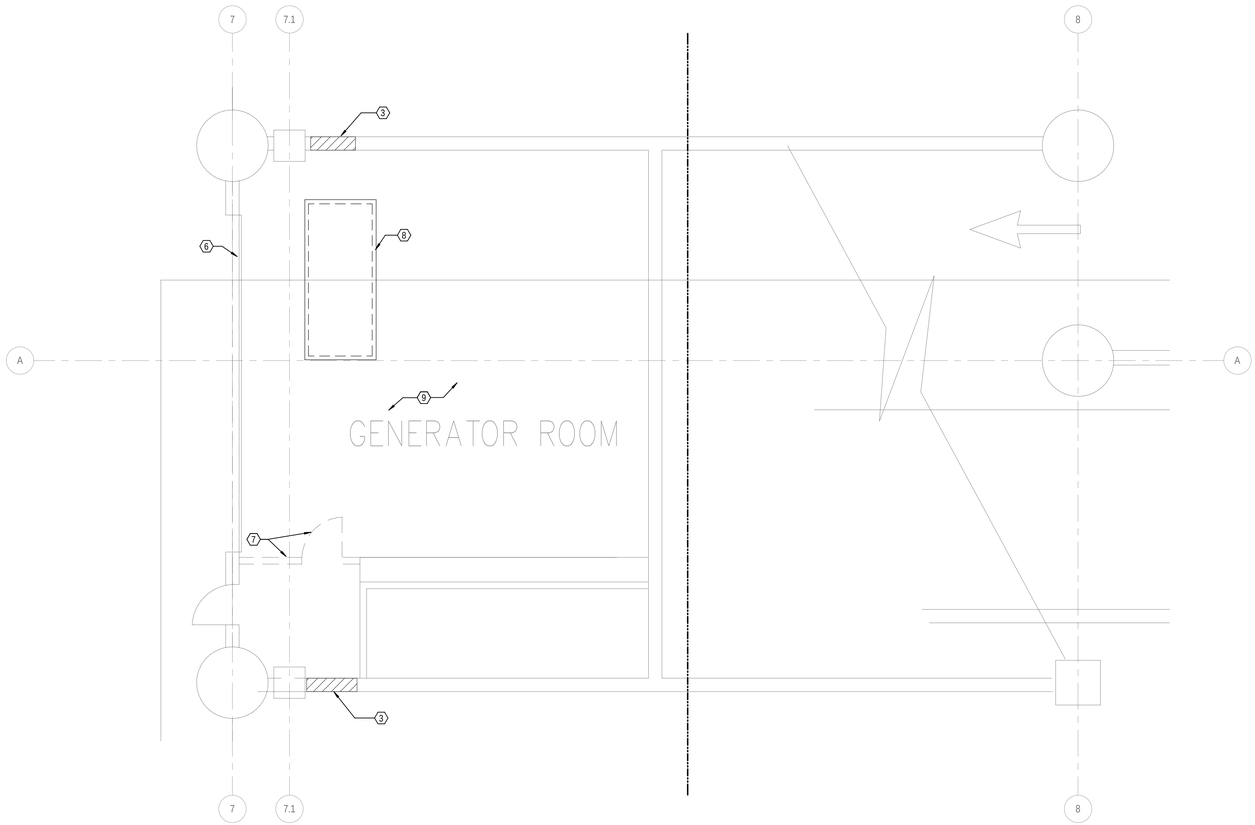
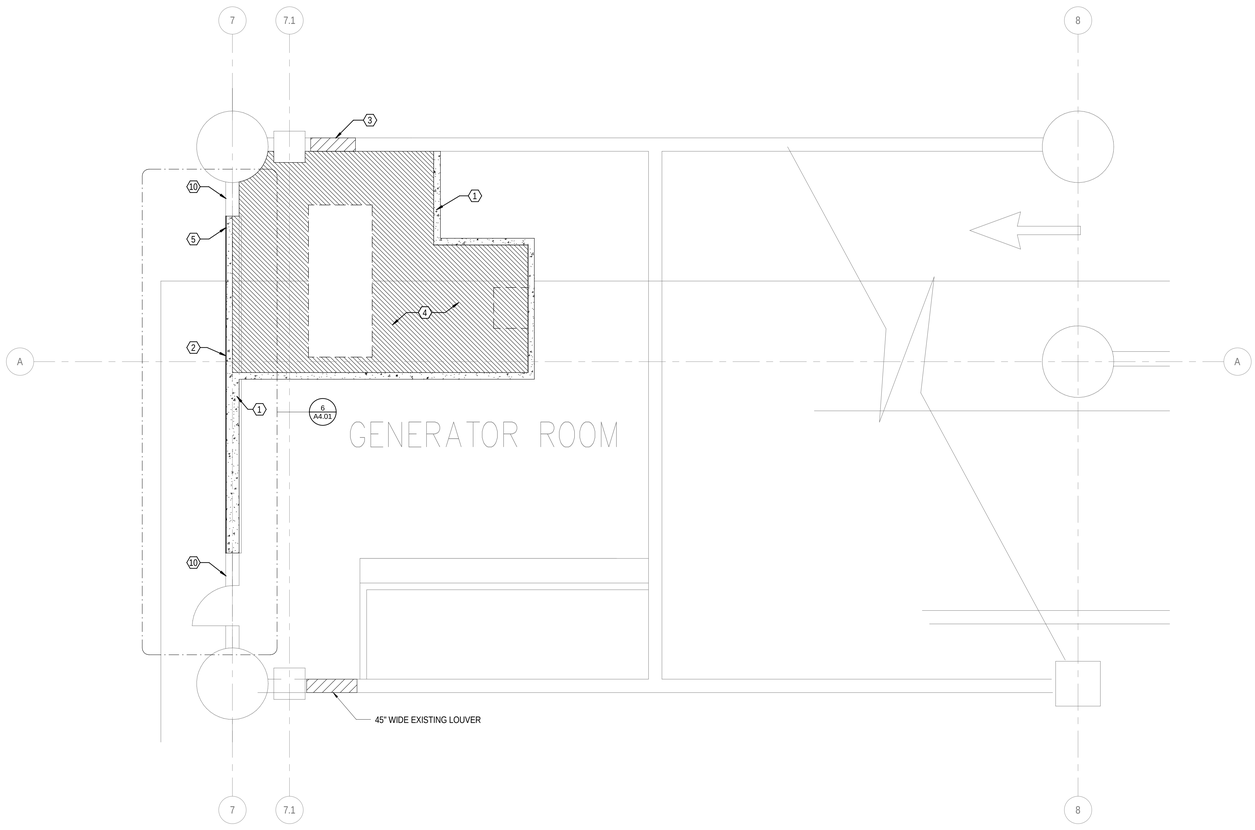
| | | |
| | | |
| 1 | PERMIT / BID | 10/03/2025 |




1 ARCHITECTURAL - BUS LEVEL ENLARGED GENERATOR ROOM PLAN - DEMOLITION
1/4" = 1'-0"




2 ARCHITECTURAL - BUS LEVEL ENLARGED GENERATOR ROOM PLAN - NEW WORK
1/4" = 1'-0"

GRAPHIC SCALE
4' 2' 0 4' 8' 12'
SCALE: 1/4" = 1' - 0"

10/23/2025 11:26:16 AM Autodesk Docs://ARP 200 PM Support Services Gen Rm - R25 - CS/PM SUPPORT SERVICES - GENERATOR ROOM_WSP_MEP_r2025.rvt

STRUCTURAL NOTES:

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## SHEET NOTES

1 FURNISH AND INSTALL NEW 6"X6" CURB. EXACT LAYOUT TO BE COORDINATED WITH NEW FUEL TANK AND EXISTING EQUIPMENT TO REMAIN. SEE A401 FOR ADDITIONAL DETAILS.
2 FURNISH AND INSTALL 2' ARCHITECTURAL LOUVERS INSTALLED IN EXISTING OPENING. SEE A401 FOR ADDITIONAL DETAIL.
3 EXISTING TO REMAIN LOUVER.
4 FURNISH AND INSTALL EPOXY FLOORING SYSTEM ACCORDING TO MANUFACTURER REQUIREMENTS.
5 CAULK AND SEAL ACCORDING TO MANUFACTURER'S REQUIREMENTS TO ACHIEVE A WATERTIGHT ENCLOSURE.
6 REMOVE AND DISPOSE OF EXISTING OVERHEAD DOOR AND RELATED COMPONENTS. CLEAN OPENING AND PREPARE FOR NEW WORK AS REQUIRED.
7 REMOVE EXISTING WALL, MAN DOOR AND CLEAN TO SUBSTRATE.
8 DEMO CONCRETE AROUND EXISTING TO REMAIN EQUIPMENT. SEE A401 FOR ADDITIONAL DETAILS.
9 CLEAN EXISTING CONCRETE FLOORS AND PREPARE TO RECEIVE NEW CONCRETE CURB AND FLOORING SYSTEM.
10 CLEAN EXISTING WALL, BOTH INTERIOR AND EXTERIOR. PATCH ANY HOLES LEFT BY SELECTIVE DEMOLITION. PREPARE SURFACE FOR PAINTING. UTILIZE SHERWIN WILLIAMS STANDARD COMMERICAL PAINT OR SIMILAR MANUFACTURER. SUBMIT TO OWNER PRODUCTS COMPATIBLE WITH EXISTING SYSTEM. COLOR SHALL BE SUBMITTED TO OWNER FOR SELECTION. PAINTING SCOPE IS LIMITED TO AREAS WHERE SELECTIVE DEMOLITION, PATCH AND REPAIR WAS COMPLETED.

## GENERAL NOTES

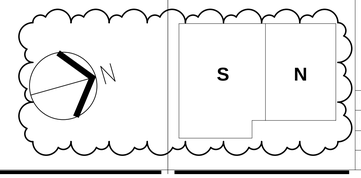
DEMOLITION NOTES

1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO COMMENCEMENT OF DEMOLITION.
2. REMOVE ALL ITEMS INDICATED ON THE DRAWINGS AND AS REQUIRED FOR NEW CONSTRUCTION WHETHER SPECIFICALLY NOTED OR NOT.
3. PROTECT EXISTING STRUCTURE, UTILITIES, AND FINISHES TO REMAIN.
4. COORDINATE DISCONNECTION, CAPPING, AND REMOVAL OF EXISTING UTILITIES WITH OWNER AND AUTHORITIES HAVING JURISDICTION.
5. MAINTAIN LIFE SAFETY AND EMERGENCY EGRESS PATHS DURING DEMOLITION OPERATIONS.
6. PROVIDE DUST CONTROL, NOISE CONTROL, AND VIBRATION CONTROL MEASURES THROUGHOUT DEMOLITION.
7. CONTRACTOR IS RESPONSIBLE FOR LEGAL DISPOSAL OF ALL DEMOLITION DEBRIS OFF-SITE.
8. HAZARDOUS MATERIALS (ASBESTOS, LEAD PAINT, ETC.) SHALL BE HANDLED AND REMOVED IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.
9. ANY UNFORESEEN CONDITIONS OR DISCREPANCIES SHALL BE REPORTED TO THE ARCHITECT/ENGINEER IMMEDIATELY.

CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE LATEST EDITION OF APPLICABLE CODES AND REGULATIONS INCLUDING LOCAL, STATE, AND FEDERAL REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS IN FIELD PRIOR TO COMMENCEMENT OF WORK.
3. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS SHALL GOVERN.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYOUT AND ACCURACY OF ALL WORK.
5. PROVIDE ADEQUATE SHORING, BRACING, AND PROTECTION FOR ALL NEW AND EXISTING STRUCTURE AS REQUIRED.
6. COORDINATE ALL TRADES TO AVOID CONFLICTS IN CONSTRUCTION.
7. MATERIALS AND WORKMANSHIP SHALL CONFORM TO INDUSTRY STANDARDS AND MANUFACTURER'S RECOMMENDATIONS.
8. CONTRACTOR SHALL PROVIDE TEMPORARY UTILITIES, WEATHER PROTECTION, AND SITE SECURITY DURING CONSTRUCTION.
9. ALL CHANGES TO THE CONTRACT DOCUMENTS MUST BE APPROVED BY ARCHITECT/ENGINEER PRIOR TO IMPLEMENTATION.
10. MAINTAIN CLEAN WORK SITE; REMOVE WASTE AND DEBRIS REGULARLY.
11. PROVIDE FIRESTOPPING, SMOKE SEALS, AND FIREPROOFING WHERE REQUIRED BY CODE.
12. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES AS REQUIRED FOR REVIEW AND APPROVAL.

KEY PLAN

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

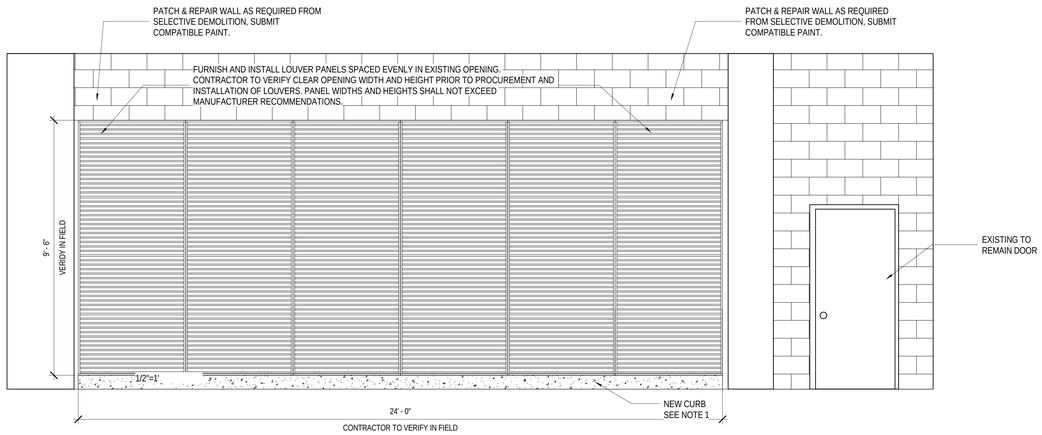
DISTRICT OF COLUMBIA
ANDREW TE KNOWLES
40000753
LICENSED
ARCHITECT
DATE: 10/3/2025

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

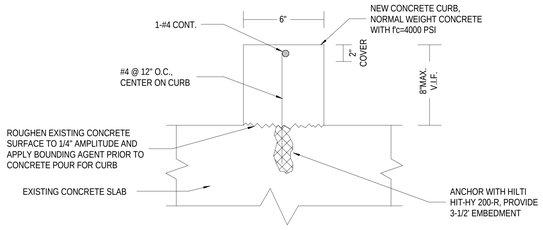
OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## ARCHITECTURAL - ENLARGED VIEWS

| | | |
|---|---|---|
| PROJECT NO.: | US-WSP-192801E | A4.00 |
| DATE: | 10/03/2025 | |
| DWN. BY: A.JOY | CKD. BY: ZMM | |
| SCALE: | 1/4" = 1'-0" | |

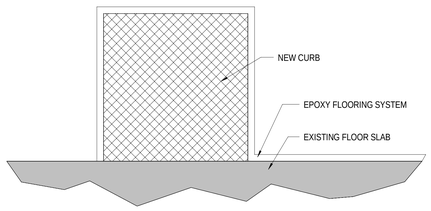



1 ELEVATION DETAIL
NOT TO SCALE

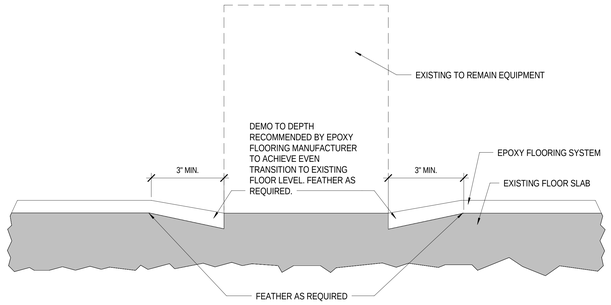



A. Examination required prior to cutting, drilling, coring or anchoring into the existing structure.
1. Do not cut, drill, core or anchor into any structural element without prior written approval from USRC's Engineer of Record (USRC's EOR), unless noted otherwise.
2. The contractor shall scan the concrete at all locations of proposed cuts, penetrations or anchorages to locate and mark all embedded objects including but not limited to embedded reinforcement, prestress or post-tension strands, embedded connections, electrical conduit, and any other embedded hardware/equipment. Scanning shall be performed by a certified technician using a Ground Penetrating Radar (GPR) concrete scanning system such as Conquest by Sensors & Software Inc. or equal. Calibrate and recalibrate the scanner in accordance with . Calibrations must be performed at the beginning of each shift and when conditions change. Prove the calibration of each scanner on a test location or test piece accepted by USRC's EOR, locating at least three reinforcing bars using the scanner and hammer drilled test holes to determine depth of cover. Do not calibrate at post-tension strands since the hammer drill bit will damage the post-tension sheathing and strand.
3. Adjust locations of cuts, penetrations and anchorages as required to avoid embedded objects by a minimum of 3", unless noted otherwise by USRC's EOR.
4. Submit scanning reports including photographs and scaled drawings and/or sketches, to USRC's EOR and applicable design team to review and approve or comment on proposed cuts, penetrations and anchorages. Adjust the locations as directed by USRC's EOR and/or design team. Review time is 7 to 14 days depending upon the quality and complexity of the submission.
5. Use hammer drills when possible; do not core drill unless the scanning operation has clearly shown that the area is free of embedded objects.
6. Do not cut through or damage the embedded reinforcing, prestress or post-tension strands, embedded objects/connections, electrical conduit, and any other embedded hardware/equipment. If prestress strands, post-tension strands, or other embedded objects are inadvertently damaged, the Tenant/Contractor must notify the Landlord (USRC) and USRC's EOR immediately.

5 CONCRETE CURB DETAIL
NOT TO SCALE




3 CURB / EPOXY DETAIL
NOT TO SCALE




4 EQUIPMENT / EPOXY DETAIL
NOT TO SCALE

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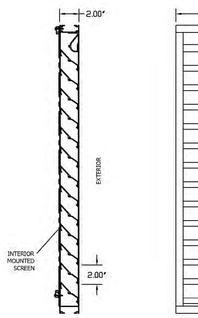
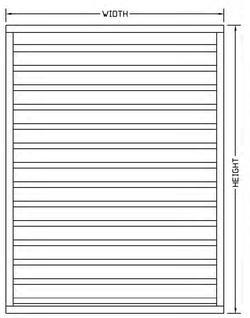
6. DO NOT CUT THROUGH OR DAMAGE THE EMBEDDED REINFORCING, PRESTRESS OR POST-TENSION STRANDS, EMBEDDED OBJECTS/CONNECTIONS, ELECTRICAL CONDUIT, AND ANY OTHER EMBEDDED HARDWARE/EQUIPMENT. IF PRESTRESS STRANDS, POST-TENSION STRANDS, OR OTHER EMBEDDED OBJECTS ARE INADVERTENTLY DAMAGED, THE TENANT/CONTRACTOR MUST NOTIFY THE LANDLORD (USRC) AND THE USRC'S EOR IMMEDIATELY.

## E2JS - 2" DEEP 45 DEGREE STANDARD J BLADE EXTRUDED ALUMINUM STATIONARY LOUVER




SECTION VIEW




ELEVATION VIEW

BLADE - 0.063" THICKNESS TYPE 6063-T5 EXTRUDED ALUMINUM

FRAME - 0.063" THICKNESS TYPE 6063-T5 EXTRUDED ALUMINUM

WIND LOAD - DESIGNED FOR 30 PSF LOAD

MINIMUM SIZE - 8" WIDE X 8" HIGH

MAXIMUM SIZE - UNLIMITED WITH JOINED PANELS

MAXIMUM PANEL SIZE: 60" WIDE X 120" HIGH OR 120" WIDE X 60" HIGH

OPTIONS:

MOUNTING FOR VARIOUS OPENING TYPES (SEE FRAME STYLES BELOW)

ARCHITECTURAL SHAPES (SEE SPECIAL SHAPES TECH SHEET)

HIGHER WIND LOAD RATINGS

ARCHITECTURAL FINISHES

VARIOUS SCREENS

* SEE MOUNTING OPTIONS TECHNICAL SHEET FOR MORE FRAME STYLES:

1. J-CHANNEL FOR SIDING OR STUCCO

2. G-CHANNEL FOR GLAZING INTO STOREFRONT OR CURTAINWALL

| CONSTRUCTION | FRAME STYLE * | STIFFENER | VERTICAL MULLION (MULTIPLE PANELS WIDE) | HORIZONTAL MULLION (MULTIPLE PANELS HIGH) |
|---|---|---|---|---|
| STANDARD | CHANNEL "C" FRAME | BLADE STIFFENER | EXPOSED | EXPOSED |
| OPTIONAL | FLANGE "F" FRAME | BLADE STIFFENER | HIDDEN | HIDDEN |

ARCHITECTURAL LOUVERS
266 W Mitchell Ave - Cincinnati, OH 45232
PH: (888) 568-8371 Fax: (888) 568-8370

| | |
|---|---|
| PROJECT | |
| CONTRACTOR | |
| ARCHITECT | |
| DRAWN BY: JRR | DATE: 09/2020 |
| DRAWING TYPE: TECHNICAL SHEET | DRAWING TITLE: E2JS |

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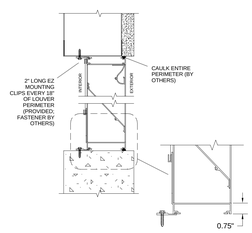
Harray, LLC dba Architectural Louvers

2 LOUVER BOD
NOT TO SCALE

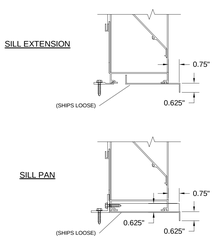
Pg 1 of 2

## MOUNTING OPTIONS EXTRUDED ALUMINUM STATIONARY LOUVER

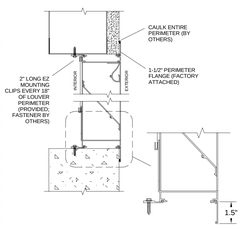
CHANNEL "C" FRAME (STANDARD) — FOR ALL WALL TYPES



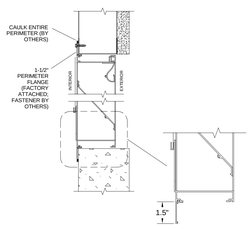

CHANNEL "C" FRAME (OPTIONS) — FOR ALL WALL TYPES




FLANGE "F" FRAME — FOR ALL WALL TYPES




REAR FLANGE "R" FRAME — FOR ALL WALL TYPES

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| | |
|---|---|
| PROJECT | |
| CONTRACTOR | |
| ARCHITECT | |
| DRAWN BY: JMC | DATE: 08/2014 |
| DRAWING TYPE: TECHNICAL SHEET | DRAWING TITLE: MOUNTING OPTIONS |

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## SHEET NOTES

1. 6"X6" CONCRETE CURB. CONTRACTOR TO COORDINATE FINAL CURB HEIGHT WITH FINAL LOUVER DIMENSIONS AND FIELD OPENING DIMENSIONS.

## GENERAL NOTES

## KEY PLAN

MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA · CONSTRUCTION TECHNOLOGY · A0000753 · LICENSED ARCHITECT

DATE: 10/3/2025

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

OWNER
# UNION STATION REDEVELOPMENT CORPORATION

TITLE
# ARCHITECTURAL - ELEVATION AND DETAILS

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: A.JOY | CKD. BY: ZMM |
| SCALE: | As indicated |

A4.01

10/2/2025 3:00:40 PM Autodesk Docs://REP200 PM Support Services Gen Rm - R25 - C25/PM SUPPORT SERVICES - GENERATOR ROOM_WSP_MEP_r2025.rvt

**SECTION 02 41 19**

**SELECTIVE DEMOLITION**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Washington Union Station, 50 Massachusetts Ave NE, Washington, DC 20002.

1.4 INFORMATIONAL SUBMITTALS

A. Engineering Survey: Submit engineering survey of condition of building.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property **for dust control and for noise control**. Indicate proposed locations and construction of barriers.

C. Schedule of selective demolition activities with starting and ending dates for each activity.

D. Predemolition photographs or video.

E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

1.5 CLOSEOUT SUBMITTALS

A. Inventory of items that have been removed and salvaged.



1.6 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.



PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. **Perform** an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

C. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
   a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
   b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
   c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
   d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
   e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
   f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
   g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.



3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly. **Comply with requirements in Section 017419 "Construction Waste Management and Disposal."**

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area **designated by Owner**.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.



3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition **and cleaned** and reinstalled in their original locations after selective demolition operations are complete.

3.6 CLEANING

A. Remove demolition waste materials from Project site **and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."**

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

**END OF SECTION 02 41 19**



**SECTION 03 30 53**

**MISCELLANEOUS CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture.

1.4 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

**PART 2 - PRODUCTS**

2.1 CONCRETE, GENERAL

A. Comply with the following sections of ACI 301 (ACI 301M) unless modified by requirements in the Contract Documents:

1. "General Requirements."
2. "Formwork and Formwork Accessories."
3. "Reinforcement and Reinforcement Supports."
4. "Concrete Mixtures."
5. "Handling, Placing, and Constructing."
6. "Lightweight Concrete."

B. Comply with ACI 117 (ACI 117M).

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.



B. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.

C. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

D. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.

CONCRETE MATERIALS

E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

F. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I.
2. Fly Ash: ASTM C 618, Class C or F.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

G. Normal-Weight Aggregate: ASTM C 33/C 33M, 1-1/2-inch (38-mm) nominal maximum aggregate size.

H. Lightweight Aggregate: ASTM C 330/C 330M, 1-inch (25-mm) nominal maximum aggregate size.

I. Air-Entraining Admixture: ASTM C 260/C 260M.

J. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

K. Water: ASTM C 94/C 94M.

2.3 RELATED MATERIALS

A. Vapor Retarder: Plastic sheet, ASTM E 1745, Class A or B.

B. Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick; or plastic sheet, ASTM E 1745, Class C.

C. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.



2.4 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.5 CONCRETE MIXTURES

A. Comply with ACI 301 (ACI 301M).

B. Normal-Weight Concrete:

1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
2. Maximum W/C Ratio: 0.40.
3. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
4. Slump Limit: [4 inches (100 mm)] [5 inches (125 mm)] [8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture] <Insert dimension>, plus or minus 1 inch (25 mm).
5. Air Content: Maintain within range permitted by ACI 301 (ACI 301M). Do not allow air content of trowel-finished floor slabs to exceed 3 percent.

C. Structural Lightweight Concrete Mix: ASTM C 330/C 330M, proportioned to produce concrete with a minimum compressive strength of 3000 psi (20.7 MPa) at 28 days and a calculated equilibrium unit weight of 110 lb/cu. ft. (1762 kg/cu. m) >plus or minus 3 lb/cu. ft. (48.1 kg/cu. m), as determined by ASTM C 567/C 567M. Concrete slump at point of placement shall be the minimum necessary for efficient mixing, placing, and finishing.

1. Limit slump to 5 inches (125 mm) for troweled slabs and 4 inches (100 mm) for other slabs.

D. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than a rate of 1.0 lb/cu. yd. (0.60 kg/cu. m).

2.6 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116 and furnish batch ticket information.



1. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

**PART 3 - EXECUTION**

3.1 FORMWORK INSTALLATION

A. Design, construct, erect, brace, and maintain formwork according to ACI 301 (ACI 301M).

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR-RETARDER INSTALLATION

A. Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended adhesive or joint tape.

3.4 STEEL REINFORCEMENT INSTALLATION

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.



1. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
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A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.



2. Grout-cleaned finish.
3. Cork-floated finish.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.

1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. Slip-Resistive Broom Finish: Apply a slip-resistive finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 (ACI 301M) for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.



C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Tests: Perform according to ACI 301 (ACI 301M).

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

**END OF SECTION 03 30 53**



**SECTION 07 84 13**

**PENETRATION FIRESTOPPING**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.

B. Related Requirements:

1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 ALLOWANCES

A. Penetration firestopping Work is part of an allowance.

1.4 UNIT PRICES

A. Work of this Section is affected by unit prices.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer.



B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.8 QUALITY ASSURANCE

A. Option 1: Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

B. Option 2: A firm with two years minimum experience in installing penetration firestopping systems, who employs at least one individual with a demonstrated knowledge of the FCIA Firestop Manual of Practice, and is approved by the penetration firestopping manufacturer to install their products.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.10 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:



   a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
      1) UL in its "Fire Resistance Directory."
      2) Intertek Group in its "Directory of Listed Building Products."
      3) FM Global in its "Building Materials Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. 3M Fire Protection Products.
   b. Hilti, Inc.
   c. Nelson Firestop Products.
   d. Specified Technologies, Inc.
   e. Tremco, Inc.

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.

D. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.

E. VOC Content: Sealants and sealant primers shall comply with the following:

1. Sealant shall have a VOC content of 250 g/L or less.
2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," CDPH standard method version 1.2.

F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components



MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA — REGISTERED — AD000753 — LICENSED — ARCHITECT

DATE: 10/3/2025

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

OWNER
# UNION STATION REDEVELOPMENT CORPORATION

TITLE
# ARCHITECTURAL SPECIFICATIONS 1

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: A.JOY | CKD. BY: ZMM |
| SCALE: | |

A9.01

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specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

1. Permanent forming/damming/backing materials.
2. Substrate primers.
3. Collars.
4. Steel sleeves.

2.3 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

K. Fire Rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for re-penetration.

L. Drop-In Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants in cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to on end for fastening to concrete floor, and neoprene gasket.



M. Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in re-penetration of openings. Blocks shall allow up to 12-inches of unreinforced annular space.

2.4 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings.



1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.



3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion.

3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under "Firestop Systems."

C. Where FM Global-approved systems are indicated, they refer to design numbers listed in FM Global's "Building Materials Approval Guide" under "Wall and Floor Penetration Fire Stops."

D. Penetration Firestopping Systems with No Penetrating Items FS-01:

1. UL-Classified Systems: C-AJ-0001-0999.
2. Intertek Group-Listed Systems: As Indicated.
3. FM Global-Approved Systems: As Indicated.
4. F-Rating: 2 hours
5. T-Rating: 2 hours.
6. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
7. L-Rating at 400 Deg F (204 Deg C): Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. W-Rating: No leakage of water at completion of water leakage testing.
9. Type of Fill Materials: One of the following:

   a. Latex sealant.
   b. Silicone sealant.
   c. Intumescent putty.

E. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing FS-02:

1. UL-Classified Systems: C-AJ-0001-0999.
2. Intertek Group-Listed Systems: As Indicated.
3. FM Global-Approved Systems: As Indicated.
4. F-Rating: 2 hours.
5. T-Rating: 2 hours.
6. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.



7. L-Rating at 400 Deg F (204 Deg C): Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. W-Rating: No leakage of water at completion of water leakage testing.
9. Type of Fill Materials: One of the following:

   a. Latex sealant.
   b. Silicone sealant.
   c. Intumescent putty.
   d. Firestop device.

F. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing FS-03:

1. UL-Classified Systems: C-AJ-2001-2999.
2. Intertek Group-Listed Systems: As indicated.
3. FM Approval-Approved Systems: As indicated.
4. F-Rating: 2 hours.
5. T-Rating: 2 hours.
6. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
7. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. W-Rating: No leakage of water at completion of water leakage testing.
9. Type of Fill Materials: One of the following:

   a. Latex sealant.
   b. Silicone sealant.
   c. Intumescent putty.
   d. Intumescent wrap strips.
   e. Firestop device.

G. Penetration Firestopping Systems for Electrical Cables FS-04:

1. UL-Classified Systems: C-AJ-3001-3999.
2. Intertek Group-Listed Systems As Indicated.
3. FM Global-Approved Systems: As indicated.
4. F-Rating: 2 hours.
5. T-Rating: 2 hours.
6. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
7. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. W-Rating: No leakage of water at completion of water leakage testing.
9. Type of Fill Materials: One of the following:

   a. Latex sealant.
   b. Silicone sealant.
   c. Intumescent putty.
   d. Silicone foam.
   e. Pillows/bags.
   f. Firestop device.
   g. Firestop blocks/plugs.



H. Penetration Firestopping Systems for Insulated Pipes FS-05:

1. UL-Classified Systems: C-AJ-5001-5999.
2. Intertek Group-Listed Systems As indicated.
3. FM Global-Approved Systems: As indicated.
4. F-Rating: 2 hours.
5. T-Rating: 2 hours.
6. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
7. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. W-Rating: No leakage of water at completion of water leakage testing.
9. Type of Fill Materials: One of the following:

   a. Latex sealant.
   b. Silicone sealant.
   c. Intumescent putty.
   d. Silicone foam.
   e. Pillows/bags.
   f. Firestop device.
   g. Firestop blocks/plugs

I. Penetration Firestopping Systems for Miscellaneous Electrical Penetrants FS-06:

1. UL-Classified Systems: C-AJ-6001-6999.
2. Intertek Group-Listed Systems As indicated.
3. FM Global-Approved Systems: As indicated.
4. F-Rating: 2 hours.
5. T-Rating: 2 hours.
6. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
7. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. W-Rating: No leakage of water at completion of water leakage testing.
9. Type of Fill Materials: One of the following:

   a. Latex sealant.
   b. Silicone sealant.
   c. Intumescent putty.
   d. Silicone foam.
   e. Pillows/bags.
   f. Firestop device.
   g. Firestop blocks/plugs

J. Penetration Firestopping Systems for Miscellaneous Mechanical Penetrants FS-07:

1. UL-Classified Systems: C-AJ-7001-7999.
2. Intertek Group-Listed Systems As indicated.
3. FM Global-Approved Systems: As indicated.
4. F-Rating: 2 hours.
5. T-Rating: 2 hours.
6. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.



K. Penetration Firestopping Systems for Groupings of Penetrants FS-08:

1. UL-Classified Systems: C-AJ-8001-8999.
2. Intertek Group-Listed Systems As indicated.
3. FM Global-Approved Systems: As indicated.
4. F-Rating: 2 hours.
5. T-Rating: 2 hours.
6. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
7. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through-penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. W-Rating: No leakage of water at completion of water leakage testing.
9. Type of Fill Materials: One of the following:

   a. Latex sealant.
   b. Silicone sealant.
   c. Intumescent wrap strips.
   d. Firestop device.
   e. Intumescent composite sheet.
   f. Firestop blocks/plugs.

**END OF SECTION 07 84 13**

**SECTION 07 84 33**

**JOINT FIRESTOPPING**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers and for wall identification.
2. Section 079513.13 "Interior Expansion Joint Cover Assemblies" for fire-resistive manufactured expansion-joint cover assemblies for interior floors, walls, and ceilings.
3. Section 079513.16 "Exterior Expansion Joint Cover Assemblies" for fire-resistive manufactured expansion-joint cover assemblies for exterior building walls, soffits, and parapets.
4. Section 092216 "Non-Structural Metal Framing" for firestop tracks for metal-framed partition heads.

C. Single Subcontract Responsibilities:

1. Refer to Section 084413 "Window and Curtain Walls" for requirements of single subcontract responsibilities for perimeter fire-resistive joint systems used in conjunction with window and curtain walls.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each joint firestopping system, show each kind of construction condition in which joints are installed; also show relationships to adjoining construction. Include joint firestopping system design designation of testing and inspecting agency



acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.

C. Product Schedule: For each joint each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall comply with the qualifications in Option 1 or Option 2 as follows:

1. Option 1: Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."
2. Option 2: A firm with two years' minimum experience in installing joint firestopping systems, who employs at least one individual with a demonstrated knowledge of the FCIA Firestop Manual of Practice and is approved by the joint firestopping manufacturer to install their products.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation



1.9 COORDINATION

A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.

B. Coordinate the sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
3. Joint firestopping systems shall bear classification marking of a qualified testing agency.

   a. UL in its "Fire Resistance Directory."
   b. Intertek Group in its "Directory of Listed Building Products."
   c. FM Global in its "Building Materials Approval Guide."

2.2 JOINT FIRESTOPPING SYSTEMS

A. Joint Firestopping Systems: Systems that resist the spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E1966 or UL 2079.

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



a. 3M Fire Protection Products.
b. A/D Fire Protection Systems Inc.
c. Hilti, Inc.
d. Nelson Firestop; a brand of Emerson Industrial Automation.
e. RectorSeal.
f. Rockwool International.
g. Specified Technologies, Inc.
h. Thermafiber, Inc.; an Owens Corning company.
i. Tremco, Inc.

1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.

A. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.

1. Sealant shall have a VOC content of 250 g/L or less.
2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," CDPH standard method version 1.2.

B. Accessories: Provide components of joint firestopping systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain the required ratings. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Surface Cleaning: Before installing joint firestopping systems, clean joints immediately to comply with fire- resistive joint system manufacturer's written instructions and the following requirements:

1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.



B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

C. Install elastomeric fill materials for joint firestopping systems by proven techniques to produce the following results:

1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire- resistance ratings indicated.
2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name



3.5 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2393.

B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint firestopping systems immediately and install new materials to produce joint firestopping systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.

B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under product category Expansion/Seismic Joints or Firestop Systems.

C. Where FM Approval-approved systems are indicated, they refer to design numbers listed in FM Approval's "Approval Guide."

D. Floor-to-Floor, Joint Firestopping Systems FRJS-01:

1. UL-Classified Systems: FF-D-0000-0999.
2. Intertek Group-Listed Systems: As indicated.
3. FM Approval-Approved Systems: As indicated.
4. Assembly Rating: Hour rating equal to or exceeding the fire-resistance rating of the floor.
5. Nominal Joint Width: As indicated, but less than or equal to 2 inches.
6. Movement Capabilities: Class II - 25 percent compression or extension, unless otherwise indicated.
7. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
9. W-Rating: No leakage of water at completion of water leakage testing.

E. Wall-to-Wall, Joint Firestopping Systems FRJS-02:

1. UL-Classified Systems: WW-D-0000-0999.
2. Intertek Group-Listed Systems: As indicated.
3. FM Approval-Approved Systems: As indicated.
4. Assembly Rating: Hour rating equal to or exceeding the fire-resistance rating of the wall.
5. Nominal Joint Width: As indicated, but less than or equal to 2 inches.
6. Movement Capabilities: Class II - 25 percent compression or extension, unless otherwise indicated.
7. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.

F. Floor-to-Wall, Joint Firestopping Systems FRJS-03:

1. UL-Classified Systems: FW-D-0000-0999.
2. Intertek Group-Listed Systems: As indicated.
3. FM Approval-Approved Systems: As indicated.
4. Assembly Rating: Hour rating equal to or exceeding the fire-resistance rating of the wall.
5. Nominal Joint Width: As indicated, but less than or equal to 2 inches.
6. Movement Capabilities: Class II - 25 percent compression or extension, unless otherwise indicated.
7. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.



9. W-Rating: No leakage of water at completion of water leakage testing.

E. Wall-to-Wall, Joint Firestopping Systems FRJS-02:

1. UL-Classified Systems: WW-D-0000-0999.
2. Intertek Group-Listed Systems: As indicated.
3. FM Approval-Approved Systems: As indicated.
4. Assembly Rating: Hour rating equal to or exceeding the fire-resistance rating of the wall.
5. Nominal Joint Width: As indicated, but less than or equal to 2 inches.
6. Movement Capabilities: Class II - 50 percent compression or extension, unless otherwise indicated.
7. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
9. W-Rating: No leakage of water at completion of water leakage testing.

F. Floor-to-Wall, Joint Firestopping Systems FRJS-03:

1. UL-Classified Systems: FW-D-0000-0999.
2. Intertek Group-Listed Systems: As indicated.
3. FM Approval-Approved Systems: As indicated.
4. Assembly Rating: Hour rating equal to or exceeding the fire-resistance rating of the wall.
5. Nominal Joint Width: As indicated, but less than or equal to 2 inches.
6. Movement Capabilities: Class II - 25 percent compression or extension, unless otherwise indicated.
7. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.

G. Head-of-Wall, Fire-Resistive Joint Firestopping Systems FRJS-04:

1. UL-Classified Systems: HW-D-0000-0999.
2. Intertek Group-Listed Systems: As indicated.
3. FM Approval-Approved Systems: As indicated.
4. Assembly Rating: Hour rating equal to or exceeding the fire-resistance rating of the wall.
5. Nominal Joint Width: As indicated, but less than or equal to 2 inches.
6. Movement Capabilities: Class II - 25 percent compression or extension, unless otherwise indicated.
7. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.
8. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.

I. Wall-to-Wall, Joint Firestopping Systems Intended for Use as Corner Guards FRJS-06:

1. UL-Classified Systems: CG-D-0000-0999.



MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA — DISTRICT OF — A0000753 — LICENSED — ARCHITECT

DATE: 10/3/2025

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ARCHITECTURAL SPECIFICATIONS 2

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: A.JOY | CKD. BY: ZMM |
| SCALE: | |

A9.02

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2. Intertek Group-Listed Systems: As indicated.

3. FM Approval-Approved Systems: As indicated.

4. Assembly Rating: Hour rating equal to or exceeding the fire-resistance rating of the wall.

5. Nominal Joint Width: As indicated, but less than or equal to 2 inches.

6. Movement Capabilities: Class II - 25 percent compression or extension, unless otherwise indicated.

7. L-Rating at Ambient: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.

8. L-Rating at 400 Deg F: Less than 5.0 cfm per square foot of penetration opening for each through- penetration firestop system, or a total cumulative leakage of 50 cfm for any 100 square feet of wall area or floor area.

**JOINT FIRESTOPPING 07 84 33**



**SECTION 07 92 00**

**JOINT SEALANTS**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Silyl-terminated polyether joint sealants.
4. Mildew-resistant joint sealants.
5. Polysulfide joint sealants.
6. Butyl joint sealants.
7. Latex joint sealants.

B. Related Requirements:

1. Section 079100 "Preformed Joint Seals" for preformed compressible foam and precured joint seals.
2. Section 079219 "Acoustical Joint Sealants" for sealing joints in sound-rated construction.
3. Section 321373 "Concrete Paving Joint Sealants" for sealing joints in paved roads, parking lots, walkways, and curbing.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.



C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.
4. Proposed test.
5. Number of samples required.

D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion-Test Reports: For each sealant application tested.

G. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.



1.7 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: **Two** years from date of Substantial Completion.

B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

**PART 2 - PRODUCTS**

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As indicated by manufacturer's designations.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

2.3 SILYL-TERMINATED POLYETHER (STPE) JOINT SEALANTS

A. STPE, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

2.4 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer



for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.
b. Masonry.



3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

a. Metal.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.



3. Provide concave joint profile per *Figure* 8A in ASTM C 1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

a. Perform one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

a. Whether sealants filled joint cavities and are free of voids.
b. Whether sealant dimensions and configurations comply with specified requirements.
c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.



3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Construction joints in cast-in-place concrete.
b. Control and expansion joints in unit masonry.
c. Perimeter joints between materials listed above and frames of doors and louvers.
d. Control and expansion joints in ceilings and walls.
e. Other joints as indicated on Drawings.

2. Joint Sealant: STPE, S, NS, 50, NT.
3. Joint-Sealant Color: As indicated by manufacturer's designations.

B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:

a. Control joints on exposed interior surfaces of exterior walls.
b. Perimeter joints between interior wall surfaces and frames of interior doors and louvers.
c. Other joints as indicated on Drawings.

2. Joint Sealant: STPE, S, NS, 50, NT.
3. Joint-Sealant Color: As indicated by manufacturer's designations.

**END OF SECTION 07 92 00**



**SECTION 08 91 19**

**FIXED LOUVERS**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTSS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum louvers.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).

C. Vertical Louver: Louver with vertical blades (i.e., the axes of the blades are vertical).

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.



1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

B. Sample warranties.

1.1 WARRANTY

A. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

1.2 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
2. Wind Loads: Determine loads based on a uniform pressure of 30 lbf/sq. ft. (1436 Pa) acting inward or outward.

B. Windborne-Debris-Impact Resistance: Louvers located within 30 feet (9.1 m) of grade shall pass basic-protection, large-missile testing requirements in ASTM E 1996 for Wind Zone 2 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than louvers indicated for use on Project.



C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient.

E. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Products:
1. Basis of Design: Architectural Louvers model E2Js – 2" Deep 45 Degree Standard J Blade Extruded Aluminum Station Louvers
2. Substitutions: Permitted

B. Horizontal Non-drainable-Blade Louver, Extruded Aluminum:
1. Louver Depth: 2 inches
2. Blade Profile: Plain blade without center baffle.
3. Frame and Blade Nominal Thickness: Not less than 0.060 inch for blades and for frames.
4. Mullion Type: Fully recessed.
5. Louver Performance Ratings:

a. Free Area: Not less than 54%.
b. Point of Beginning Water Penetration: Not less than 700 fpm (3.6 m/s).
c. Air Performance: Not more than 0.10-inch wg (25-Pa) pressure drop at 800-fpm (4.0-m/s) free-area intake velocity.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Insect screening.

B. Louver Screen Frames: Same type and form of metal as indicated for louver to which screens are attached.

C. Louver Screening for Aluminum Louvers:
1. Insect Screening, Aluminum: 18-by-16 (1.4-by-1.6-mm) mesh, 0.012-inch (0.30-mm) wire.

2.5 BLANK-OFF PANELS

A. Uninsulated, Blank-Off Panels: Metal sheet attached to back of louver.

1. Aluminum sheet for aluminum louvers, not less than 0.050-inch (1.27-mm) nominal thickness.
2. Panel Finish: Same finish applied to louvers.



3. Attach blank-off panels with sheet metal screws.

2.6 MATERIALS

A. Aluminum Extrusions: ASTM B221, Alloy 6063-T5, T-52, or T6.

B. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use screws for exposed fasteners as indicated by the selected Manufacturer.
2. For fastening aluminum, use aluminum or 300 series stainless steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

C. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, fabricated from stainless steel components, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing according to ASTM E488/E488M conducted by a qualified testing agency.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

2.7 FABRICATION

A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

B. Join frame members to each other and to fixed louver blades with threaded fasteners, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.8 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

B. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
4. For fastening stainless steel, use 300 series stainless-steel fasteners.
5. For color-finished louvers, use fasteners with heads that match color of louvers.

C. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed for masonry, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.



2.9 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.
2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

1. Frame Type: Channel flange unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.
1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

G. Provide subsills made of the same material as louvers or extended sills for recessed louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view , threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.1 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.



**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.



**END OF SECTION 08 91 19**



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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA · STATE OF FLORIDA · A0000753 · LICENSED · ARCHITECT

DATE: 10/3/2025

PROJECT

PM SUPPORT SERVICES GENERATOR ROOM

OWNER

UNION STATION REDEVELOPMENT CORPORATION

TITLE

ARCHITECTURAL SPECIFICATIONS 3

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: A.JOY | CKD. BY: ZMM |
| SCALE: | |

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**SECTION 09 97 26**

**CEMENTITIOUS COATINGS**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section includes surface preparation and application of cementitious coating systems on concrete.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: In each color and gloss of topcoat.
1. Submit Samples on rigid backing, not less than 4 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.

1.3 INFORMATIONAL SUBMITTALS

A. Material certificates. (including Quality Assurance confirmation)

B. Product test reports.

C. Cleaning Instructions and Guides. Owner may request in person and/or video demonstration.

1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of at least 100 sq. ft. of coating system indicated and each color and finish selected.

B. Product shall be applied to protect substrate of fuel and oil spillage. Written confirmation from manufacturer shall be provided to owner of this intended use.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to manufacturers noted in "Cementitious Coating Schedule"



2.2 CEMENTITIOUS COATINGS

A. Polymer-Modified Cementitious Coating: Containing portland cement, polymer, and hydrated lime or aggregates.

1. Compressive Strength: Not less than 3500 psi at 28 days according to ASTM C109/C109M.
2. Tensile Strength: Not less than 350 psi at 28 days according to ASTM C109/C109M.
3. Flexural Strength: adhering to manufacturer requirements.
4. Adhesion: adhering to manufacturer requirements.
5. Permeance: adhering to manufacturer requirements.
6. Accelerated Weathering: adhering to manufacturer requirements.
7. UV Resistance: adhering to manufacturer requirements.
8. Salt-Spray Resistance: adhering to manufacturer requirements.

B. Performance: Product shall protect substrate from fuel and oil leakage and facilitate easy clean up.

C. Colors: as selected by owner.

D. Other Materials: Provide crack fillers, block fillers, and related materials that are compatible with cementitious finish-coat materials and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements and other conditions affecting performance of the Work.

B. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for mixing and preparing materials and as applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.



C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, incompatible coatings, and loose substrate materials.

D. Cementitious and Masonry Surfaces: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Crack Repair: Fill cracks according to manufacturer's written instructions before coating surfaces.

3.3 APPLICATION

A. Apply coatings according to manufacturer's written instructions. Use applicators and techniques suited for coating and substrate indicated.

B. Apply coating to achieve material thickness as recommended in writing by manufacturer, but not less than the following:

1. First Coat: Apply polymer-modified cementitious coating material at the rate of 2 lb/sq. yd. to achieve a total cured thickness of 25 mils.
2. Second Coat: Apply polymer-modified cementitious coating material at the rate of 1 lb/sq. yd to achieve a total cured thickness of 15 mils.

C. On previously coated surfaces, apply coating to achieve material thickness as recommended in writing by manufacturer, but not less than the following:

1. Apply polymer-modified cementitious coating material at the rate of 1 lb/sq. yd. to achieve a total cured thickness of 15 mils.

3.4 CEMENTITIOUS COATING SCHEDULE

A. Above-Grade Concrete and Masonry:

1. Polymer-Modified Cementitious Coating:

a. Prime Coat: As recommended in writing by topcoat manufacturer.
b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
c. Topcoat: Polymer-modified cementitious coating.

1) Stonhard.

2) Sherwin Williams.

**END OF SECTION 09 97 26**



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DATE: 10/3/2025

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ARCHITECTURAL SPECIFICATIONS 4

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: A.JOY CKD. BY: ZMM
SCALE:

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# MECHANICAL LEGEND & ABBREVIATIONS

## ABBREVIATIONS - MECHANICAL

| | |
|---|---|
| ABV | ABOVE |
| AC | AIR CONDITIONING UNIT |
| ACC | AIR COOLED CONDENSER |
| ACD | AUTOMATIC CONTROL DAMPER |
| AD | ACCESS DOOR |
| AHU | AIR HANDLING UNIT |
| AL | ACOUSTICAL LINING |
| ARCH | ARCHITECTURAL |
| ATC | AUTOMATIC TEMPERATURE CONTROL |
| B | BOILER |
| BD | BALANCING DAMPER |
| BDD | BACK DRAFT DAMPER |
| BMS | BUILDING MANAGEMENT SYSTEM |
| BO | BLANK OFF |
| BHP | BRAKE HORSE POWER |
| BTU | BRITISH THERMAL UNIT |
| CA | COMPRESSED AIR |
| CC | COOLING COIL |
| CD | CEILING DIFFUSER |
| CFF | CAP FOR FUTURE |
| CFM | CUBIC FEET PER MINUTE |
| CG | CEILING GRILLE |
| CH | CHILLER |
| CO | CLEAN OUT |
| COMP | COMPRESSOR |
| CONV | CONVECTOR |
| CR | CEILING REGISTER |
| CT | COOLING TOWER |
| CU | CONDENSING UNIT |
| CW | CONDENSER WATER |
| DB | DRY BULB |
| DEC | DIRECT EVAPORATIVE COOLER |
| DF | DUCT FURNACE |
| DIA | DIAMETER |
| DN | DOWN |
| DRX | CLOTHES DRYER EXHAUST |
| DX | DIRECT EXPANSION |
| (E) | EXISTING TO REMAIN |
| EA | EXHAUST AIR |
| EAT | ENTERING AIR TEMPERATURE |
| ECH | ELECTRIC CABINET HEATER |
| EC | EVAPORATIVE CONDENSER |
| EDB | ENTERING DRY BULB |
| EF | EXHAUST FAN |
| EFF | EFFICIENCY |
| ELEV | ELEVATOR |
| EHC | ELECTRIC HEATING COIL |
| EUH | ELECTRIC UNIT HEATER |
| EWB | ENTERING WET BULB |
| EWT | ENTERING WATER TEMPERATURE |
| °F | DEGREES FAHRENHEIT |
| F | FILTER |
| FBO | FURNISHED BY OTHERS |
| FC | FLEXIBLE CONNECTION (DUCT OR PIPE) |
| FCC | FIRE CONTROL CENTER |
| FCU | FAN COIL UNIT |
| FD | FUSIBLE LINK FIRE DAMPER W/ DUCT ACCESS DOOR |
| FHX | FUME HOOD EXHAUST |
| FLR | FLOOR |
| FLA | FULL LOAD AMPS |
| FPB | FAN POWERED BOX |
| FPI | FINS PER INCH |
| FRE | FIRE RATED ENCLOSURE |
| FSD | COMBINATION FIRE AND SMOKE DAMPER |
| FT | FEET |
| FTR | FIN TUBE RADIATOR |
| GLY | GLYCOL |
| GPM | GALLONS PER MINUTE |
| GX | GENERAL EXHAUST |
| H | HUMIDIFIER |
| HC | HEATING COIL |
| HTP | HEAT PUMP |
| HP | HORSE POWER |
| HR | HOUR |
| HRU | HEAT RECOVERY UNIT |
| HTW | HEATWHEEL |
| HV | HEATING AND VENTILATING UNIT |
| HW | HOT WATER |
| HX | HEAT EXCHANGER |
| ID | INSIDE DIMENSION |
| IDEC | INDIRECT EVAPORATIVE COOLER |
| KW | KILOWATT |
| KWH | KILOWATT HOURS |
| KX | KITCHEN EXHAUST |
| KRX | KITCHEN RANGE HOOD EXHAUST (RESIDENTIAL) |
| LAT | LEAVING AIR TEMPERATURE |
| LBS | POUNDS |
| LD | LINEAR DIFFUSER (CEILING, WALL, SILL OR FLOOR) |
| LRA | LOCK ROTOR AMPS |
| LWS | LOUVER WITH WIRE SCREEN |
| LWT | LEAVING WATER TEMPERATURE |
| MAT | MIXED AIR TEMPERATURE |
| MAX | MAXIMUM |
| MBH | THOUSAND BTU PER HOUR |
| MCC | MOTOR CONTROL CENTER |
| MFG | MANUFACTURER |

## ABBREVIATIONS - MECHANICAL

| | |
|---|---|
| MFS | MAXIMUM FUSE SIZE |
| MIN | MINIMUM |
| MUA | MAKE UP AIR UNIT |
| MOCP | MAXIMUM OVERCURRENT PROTECTION |
| (N) | NEW |
| NC | NORMALLY CLOSED |
| NFA | NET FREE AREA |
| NIC | NOT IN THIS CONTRACT |
| NK | NECK |
| NO | NORMALLY OPEN |
| NTS | NOT TO SCALE |
| OAI | OUTSIDE AIR INTAKE |
| OBD | OPPOSED BLADE DAMPER |
| OD | OUTSIDE DIMENSION |
| P | PUMP |
| PD | PRESSURE DROP |
| PHC | PRE-HEAT COIL |
| PHX | PLATE HEAT EXCHANGER |
| PRV | PRESSURE REDUCING VALVE |
| PSI | POUNDS PER SQUARE INCH (GAUGE) |
| PSIA | POUNDS PER SQUARE INCH ABSOLUTE |
| (R) | EXISTING TO BE RELOCATED |
| RA | RETURN AIR |
| RF | RETURN FAN |
| RH | RELATIVE HUMIDITY |
| RHC | REHEAT COIL |
| RPM | REVOLUTIONS PER MINUTE |
| SA | SUPPLY AIR |
| SAD | SEE ARCHITECTURAL DRAWINGS |
| SD | SMOKE DAMPER |
| SF | SUPPLY FAN |
| SED | SEE ELECTRICAL DRAWINGS |
| SENS | SENSIBLE |
| SM | SHEET METAL |
| SP | STATIC PRESSURE |
| STP | STAIR PRESSURIZATION |
| SQFT | SQUARE FEET |
| ST | SOUND TRAP |
| SX | SMOKE EXHAUST |
| TF | TRANSFER FAN |
| TRD | TRANSFER DUCT |
| TRG | TRANSFER GRILLE |
| TX | TOILET EXHAUST |
| TYP | TYPICAL |
| UFAD | UNDERFLOOR AIR DISTRIBUTION |
| UH | UNIT HEATER |
| UON | UNLESS OTHERWISE NOTED |
| VAR | VARIABLE |
| VAV | VARIABLE AIR VOLUME |
| VD | VOLUME DAMPER |
| VFD | VARIABLE FREQUENCY DRIVE |
| VX | VAPOR HOOD EXHAUST |
| W/ | WITH |
| WB | WET BULB |
| WG | WATER GAUGE |
| WMS | WIRE MESH SCREEN |
| WO-SIZE | WALL OPENING - [SIZE] |
| (X) | EXISTING TO BE DEMOLISHED |
| | |
| (300) | CUBIC FEET OF AIR PER MINUTE OR GALLONS PER MINUTE |

## PIPING LEGEND

| | |
|---|---|
| | DIRT POCKET |
| | REFRIGERANT EXPANSION VALVE |
| | SIGHT GLASS |
| | VALVE IN VERTICAL |
| A | MANUAL AIR VENT |
| A | AUTOMATIC AIR VENT |
| | THERMOMETER |
| | PIPE SENSOR WELL (THERMOMETER) |
| | PRESSURE GAUGE AND COCK |
| | PRESSURE GAUGE WITH LOOP |
| | TEMPERATURE-PRESSURE TEST FITTING |
| | CENTER LINE |
| | HEAT TRACED PIPING |
| | PIPE SLEEVE |
| | BEAM PENETRATION |
| | PIPE GUIDE |
| | PIPE CAP |
| | PIPE BLIND FLANGE |

## PIPING LEGEND (CONTINUED)

| | |
|---|---|
| RS / RS | REFRIGERANT SUCTION PIPING |
| R-SV / R-SV | REFRIGERANT-SAFETY VALVE RELIEF LINE |
| HG / HG | HOT GAS PIPING |
| | ARROW INDICATES DIRECTION OF FLOW |
| | PITCH PIPE DOWN IN DIRECTION OF ARROW |
| D / D | DRAIN LINE |
| | PIPE ANCHOR |
| | PIPE GUIDE |
| | EXPANSION COMPENSATOR |
| (3'-0"x6'-0") / (3'-0"x6'-0") A B | EXPANSION LOOP (SIZE AxB) |
| | FLEXIBLE BALL JOINT EXPANSION COMPENSATOR |
| | CONCENTRIC REDUCER (INCREASER) |
| | ECCENTRIC REDUCER (INCREASER) |
| | UNION |
| | CAPPED PIPE WITH SHUT-OFF VALVE |
| | "Y" TYPE STRAINER WITH HOSE END BLOW OFF VALVE |
| | "Y" TYPE STRAINER |
| | BASKET TYPE STRAINER |
| | DUPLEX STRAINER |
| | ELBOW TURNED UP |
| | ELBOW TURNED DOWN |
| | BOTTOM PIPE CONNECTION |
| | TOP PIPE CONNECTION |
| | SLOPED CHANGE IN PIPE ELEVATION |
| | FLEXIBLE CONNECTION |
| | SHUT-OFF VALVE |
| | AUTOMATIC FLOW CONTROL VALVE |
| | CALIBRATED BALANCE VALVE |
| | GLOBE VALVE |
| | CHECK VALVE |
| | AUTOMATIC THREE-WAY CONTROL VALVE |
| | AUTOMATIC TWO-WAY CONTROL VALVE |
| | RELIEF VALVE |
| | ANGLE RELIEF VALVE |
| | PRESSURE REDUCING VALVE (PRV) |
| | LUBRICATED PLUG VALVE |
| | LOCKSHIELD GLOBE VALVE |
| | SOLENOID VALVE |
| | BUTTERFLY VALVE (MANUAL) |
| | BUTTERFLY VALVE (MOTORIZED) |
| | BALL VALVE |
| | PUMP |

## PIPING LEGEND (CONTINUED)

| | |
|---|---|
| CWS | CONDENSER WATER SUPPLY |
| CWR | CONDENSER WATER RETURN |
| MTHR | MEDIUM TEMPERATURE HOT WATER RETURN |
| HWS | HOT WATER SUPPLY |
| HWR | HOT WATER RETURN |
| RL | REFRIGERANT LIQUID PIPING |

## DUCTWORK LEGEND

| | |
|---|---|
| 16x8 / 8x6 | DUCT SPLIT WITH SPLIT SIZE |
| | RADIUS ELBOW |
| | ELBOW WITH TURNING VANES |
| | RECTANGULAR BRANCH TAKEOFF WITH BALANCING DAMPER |
| | RECTANGULAR SUPPLY DUCT UP |
| | RECTANGULAR SUPPLY DUCT DOWN |
| | RECTANGULAR RETURN OR EXHAUST DUCT UP |
| | RECTANGULAR RETURN OR EXHAUST DUCT DOWN |
| | ROUND DUCT, UP |
| | ROUND DUCT, DOWN |
| | BEAM PENETRATION |
| R | SLOPING RISE IN DUCTWORK |
| D | SLOPING DROP IN DUCTWORK |
| 18x12 | DUCT SIZE (CLEAR INSIDE DIMENSION) FIRST FIGURE INDICATES PLAN SIZE |
| 18 ϕ | ROUND DUCT DIAMETER SIZE (CLEAR INSIDE DIMENSION) |
| 18/8 | OVAL DUCT SIZE |
| | SIDE, TOP OR BOTTOM DUCT ACCESS DOOR |
| | ACOUSTIC LINING IN DUCT (DUCT SIZE NOTED INDICATES INSIDE DIMENSIONS) |
| | TRANSITION |
| | FLEXIBLE CONNECTION |
| | FLEXIBLE DUCT |
| | DUCT COIL WITH ACCESS DOOR |
| | VOLUME DAMPER IN DUCT |
| | AUTOMATIC CONTROL DAMPER |
| | FUSIBLE LINK FIRE DAMPER WITH DUCT ACCESS DOOR |

## DUCTWORK LEGEND (CONTINUED)

| | |
|---|---|
| | SMOKE DAMPER WITH DUCT ACCESS DOOR |
| | COMBINATION FIRE AND SMOKE DAMPER WITH DUCT ACCESS DOOR |
| | BACK DRAFT DAMPER WITH DUCT ACCESS DOOR |
| | LINEAR RETURN |
| | LINEAR DIFFUSER WITH PLENUM |
| | CEILING DIFFUSER: 1-WAY BLOW, 2-WAY BLOW, 3-WAY BLOW, 4-WAY BLOW |
| | CEILING DIFFUSER WITH FLEXIBLE DUCT CONNECTION |
| | RETURN/EXHAUST REGISTER OR GRILLE |
| | RETURN/EXHAUST REGISTER OR GRILLE WITH FLEXIBLE DUCT CONNECTION |
| | ROUND CEILING DIFFUSER WITH FLEXIBLE DUCT CONNECTION |
| | ROUND CEILING DIFFUSER |
| | FLOOR SWIRL DIFFUSER |
| | FIRE RATED ENCASED DUCT |
| | TRANSFER GRILLES ON BOTH SIDES OF PARTITION OR WALL (SIZE) |
| W/O-SIZE | WALL OPENING ABOVE HUNG CEILING (SIZE) |
| SR-A 12x8 (200) | SUPPLY REGISTER WITH AIR OUTLET DEVICE DESIGNATION |
| ER-C 12x8 (200) | RETURN OR EXHAUST REGISTER OR GRILLE WITH AIR INLET DEVICE DESIGNATION |
| ACCESS AREA | TERMINAL UNIT WITH/WITHOUT HEATING COIL |
| ACCESS AREA | FAN POWERED TERMINAL UNIT WITH/WITHOUT HEATING COIL |

## CONTROLS LEGEND

| | |
|---|---|
| B / B | TOTALIZING BTU METER |
| E | EMERGENCY BREAK GLASS SWITCH FOR EQUIPMENT SHUT-DOWN |
| F / F | FLOW MEASURING STATION |
| | FLOW SWITCH |
| CM # | CARBON MONOXIDE SENSOR WITH ZONE DESIGNATION |
| CD # | CARBON DIOXIDE SENSOR WITH ZONE DESIGNATION |
| ND # | NITROGEN DIOXIDE SENSOR WITH ZONE DESIGNATION |
| T # | TEMPERATURE SENSOR/THERMOSTAT WITH ZONE OR EQUIPMENT DESIGNATION |
| TM SLAB # | COMBINATION TEMPERATURE/MOISTURE SENSOR INSTALLED IN SLAB WITH ZONE DESIGNATION |
| H # | HUMIDISTAT/HUMIDITY SENSOR WITH HUMIDIFIER DESIGNATION |
| TH # | COMBINATION TEMPERATURE/HUMIDITY SENSOR |
| S | DUCT SMOKE DETECTOR SUPPLIED BY ELECTRICAL TRADE, INSTALLED BY MECHANICAL TRADE |
| P # | STATIC PRESSURE SENSOR WITH DESIGNATION |
| R # | REFRIGERANT SENSOR WITH DESIGNATION |

## MISCELLANEOUS (CONTINUED)

| | |
|---|---|
| HW 1 | RISER DESIGNATION — RISER SERVICE, RISER NUMBER |
| 2 M3.1 | SECTION DESIGNATION — SECTION NUMBER, DRAWING NUMBER |
| 1 M2.1 | DETAIL DESIGNATION — DETAIL NUMBER, DRAWING NUMBER |
| CT 1-1 | EQUIPMENT DESIGNATION — EQUIPMENT TYPE, EQUIPMENT FLOOR AND NUMBER |
| VAV-01-01 | TERMINAL DESIGNATION — VAV-01-01: NUMBER ON THE FLOOR, FLOOR OR LEVEL, TYPE OF TERMINAL |
| CD-A 8"ø (200) | AIR OUTLET/INLET DEVICE DESIGNATION — CD-A 8"ø (200): TYPE, NECK SIZE, CFM |
| LD-A 48" .8" (300) | LINEAR DIFFUSER DEVICE DESIGNATION — LD-A 48" .8" (300): TYPE, LENGTH, PLENUM INLET SIZE, CFM |

## MISCELLANEOUS

| | |
|---|---|
| DP | DIFFERENTIAL PRESSURE SENSOR |
| DP | DIFFERENTIAL PRESSURE SWITCH |
| | NEW WORK |
| | EXISTING WORK |
| | EXISTING WORK TO BE REMOVED |
| | POINT OF NEW CONNECTION TO EXISTING WORK |

## MECHANICAL DRAWING LIST

| DRAWING NO. | DESCRIPTION |
|---|---|
| M0.01 | MECHANICAL LEGENDS AND ABBREVIATIONS |
| M0.02 | MECHANICAL SCHEDULES DETAILS AND CONTROLS |
| M4.00 | MECHANICAL - ENLARGED VIEWS |
| M9.01 | MECHANICAL SPECS 1 |
| M9.02 | MECHANICAL SPECS 2 |

MECHANICAL NEW WORK GENERAL NOTES:

1. DEVICE ELEVATIONS AND LOCATIONS ARE SHOWN FOR REFERENCE. REFER TO ARCHITECTURAL TYPICAL MOUNTING DIAGRAMS AND NOTES FOR ADDITIONAL INFORMATION.
2. CONTRACTOR SHALL COORDINATE ANY AND ALL ACCESS PANELS.

MECHANICAL DEMO GENERAL NOTES:

1. THE SCOPE OF DEMOLITION AS DOCUMENTED IS SCHEMATIC IN NATURE AND ANY ADDITIONAL COORDINATION BETWEEN THIS SCOPE OF DEMOLITION AND THE EXISTING SYSTEMS IN THE SPACE SHALL BE DETERMINED IN THE FIELD.

STRUCTURAL NOTES:

A. EXAMINATION REQUIRED PRIOR TO CUTTING, DRILLING, CORING OR ANCHORING INTO THE EXISTING STRUCTURE.
   1. DO NOT CUT, DRILL, CORE OR ANCHOR INTO ANY STRUCTURAL ELEMENT WITHOUT PRIOR WRITTEN APPROVAL FROM USRC'S ENGINEER OF RECORD (USRC'S EOR), UNLESS NOTED OTHERWISE.
   2. THE CONTRACTOR SHALL SCAN THE CONCRETE AT ALL LOCATIONS OF PROPOSED CUTS, PENETRATIONS OR ANCHORAGES TO LOCATE AND MARK ALL EMBEDDED OBJECTS INCLUDING BUT NOT LIMITED TO EMBEDDED REINFORCEMENT, PRESTRESS OR POST-TENSION STRANDS, EMBEDDED CONNECTIONS, ELECTRICAL CONDUIT, AND ANY OTHER EMBEDDED HARDWARE/EQUIPMENT. SCANNING SHALL BE PERFORMED BY A CERTIFIED TECHNICIAN USING A GROUND PENETRATING RADAR (GPR) CONCRETE SCANNING SYSTEM SUCH AS CONQUEST BY SENSORS & SOFTWARE INC. OR EQUAL. CALIBRATE AND RECALIBRATE THE SCANNER IN ACCORDANCE WITH . CALIBRATIONS MUST BE PERFORMED AT THE BEGINNING OF EACH SHIFT AND WHEN CONDITIONS CHANGE. PROVE THE CALIBRATION OF EACH SCANNER ON A TEST LOCATION OR TEST PIECE ACCEPTED BY USRC'S EOR, LOCATING AT LEAST THREE REINFORCING BARS USING THE SCANNER AND HAMMER DRILLED TEST HOLES TO DETERMINE DEPTH OF COVER. DO NOT CALIBRATE AT POST-TENSION STRANDS SINCE THE HAMMER DRILL BIT WILL DAMAGE THE POST-TENSION SHEATHING AND STRAND.
   3. ADJUST LOCATIONS OF CUTS, PENETRATIONS AND ANCHORAGES AS REQUIRED TO AVOID EMBEDDED OBJECTS BY A MINIMUM OF 3", UNLESS NOTED OTHERWISE BY USRC'S EOR.
   4. SUBMIT SCANNING REPORTS INCLUDING PHOTOGRAPHS AND SCALED DRAWINGS AND/OR SKETCHES, TO USRC'S EOR AND APPLICABLE DESIGN TEAM TO REVIEW AND APPROVE OR COMMENT ON PROPOSED CUTS, PENETRATIONS AND ANCHORAGES. ADJUST THE LOCATIONS AS DIRECTED BY USRC'S EOR AND/OR DESIGN TEAM. REVIEW TIME IS 7 TO 14 DAYS DEPENDING UPON THE QUALITY AND COMPLEXITY OF THE SUBMISSION.
   5. USE HAMMER DRILLS WHEN POSSIBLE; DO NOT CORE DRILL UNLESS THE SCANNING OPERATION HAS CLEARLY SHOWN THAT THE AREA IS FREE OF EMBEDDED OBJECTS.
   6. DO NOT CUT THROUGH OR DAMAGE THE EMBEDDED REINFORCING, PRESTRESS OR POST-TENSION STRANDS, EMBEDDED OBJECTS/CONNECTIONS, ELECTRICAL CONDUIT, AND ANY OTHER EMBEDDED HARDWARE/EQUIPMENT. IF PRESTRESS STRANDS, POST-TENSION STRANDS, OR OTHER EMBEDDED OBJECTS ARE INADVERTENTLY DAMAGED, THE TENANT/CONTRACTOR MUST NOTIFY THE LANDLORD (USRC) AND USRC'S EOR IMMEDIATELY.


MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:



WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.


| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA — CHRISTOPHER G. ARNOLD — 10/3/2025 — No. PE 906013 — MECHANICAL — PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

OWNER
# UNION STATION REDEVELOPMENT CORPORATION

TITLE
# MECHANICAL LEGENDS AND ABBREVIATIONS

| | | |
|---|---|---|
| PROJECT NO.: | US-WSP-192801E | M0.01 |
| DATE: | 10/03/2025 | |
| DWN. BY: Author | CKD. BY: Checker | |
| SCALE: | 12" = 1'-0" | |


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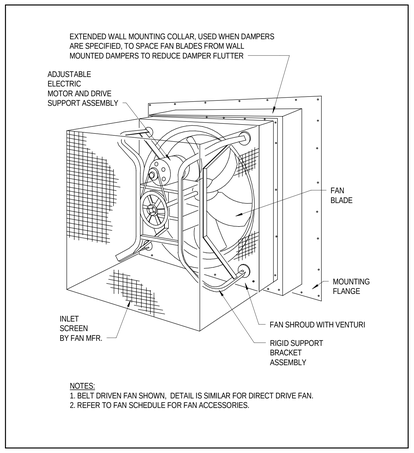



1 WALL MOUNTED PROPELLER FAN
NOT TO SCALE

**FANS**

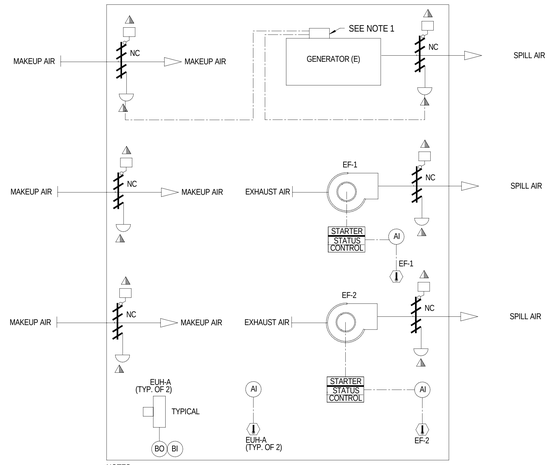
| DESIGNATION | MANUFACTURER MODEL NUMBER | LOCATION/ SERVICE | TYPE | | AIRFLOW | | ESP (IN WG) | RPM | MOTOR | | | | | | DISCONNECT | | VFD (Y/N) | EMERG. POWER (Y/N) | OPER. WEIGHT (LBS) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FAN | WHEEL | MAX (CFM) | MIN (CFM) | | | BRAKE HP | MOTOR HP | VOLTAGE/ PHASE | FLA | MCA | MOP | DIV. 23 | DIV. 26 | | | | |
| EF-1 | GREENHECK AER-20-02-0626 | GENERATOR ROOM | WALL MOUNT | FC | 6,000 | 6,000 | 0.3 | 1,750 | 1.4 | 1.5 | 460/3 | 6 | 7.5 | 15 | X | | Y | Y | 87 | |
| EF-2 | GREENHECK AER-20-02-0626 | GENERATOR ROOM | WALL MOUNT | FC | 6,000 | 6,000 | 0.3 | 1,750 | 1.4 | 1.5 | 460/3 | 6 | 7.5 | 15 | X | | Y | Y | 87 | |
| | | | | | | | | | | | | | | | | | | | | |

GENERAL NOTES:
A) ALL FANS SHALL BE PROVIDED BY A SINGLE APPROVED MANUFACTURER.
B) ALL FANS SHALL BE CERTIFIED TO BEAR THE AMCA SEAL FOR AIR AND SOUND.

**ELECTRIC UNIT HEATER**

| DESIGNATION | MANUFACTURER MODEL NUMBER | SERVICE / LOCATION | TYPE | HEATING | | | FAN | | | VOLTAGE/ PHASE | EMERG. POWER (Y/N) | OPER. WEIGHT (LBS) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | CAPACITY (KW) | EAT (°F) | LAT (°F) | CFM | HP | RPM | | | | |
| EUH-A | TRANE UHEC | SEE PLANS | HORIZONTAL | 3.3 | 40.0 | 66.0 | 400 | FRAC | 1,550 | 277/1 | N | 50 | NOTES 1, 2, 3 |
| | | | | | | | | | | | | | |

NUMBERED NOTES:
1. PROVIDE WITH MANUFACTURER MOUNTING BRACKET FOR SINGLE-POINT MOUNTING.
2. PROVIDE WITH ON/OFF DISCONNECT SWITCH WITH OVERLOAD PROTECTION.
3. PROVIDE WITH INTEGRAL UNIT MOUNTED THERMOSTAT, IF BMS TEMPERATURE SENSOR IS NOT SHOWN ON PLANS.




NOTES:

1.INTERLOCK NEW INTAKE AND RADIATOR EXHAUST DAMPERS WITH GENERATOR CONTROL TO OPEN, AND CONFIRM PRIOR TO GENSET START. PROVIDE ALL REQUIRED WIRING AND GENSET CONTROL INTERCONNECTION COMPONENTS COORDINATED AND AS REQUIRED BASED ON GENSET-IOM.

GENERATOR ROOM VENTILATION AND HEATING

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wsp.com

Architect:

Structural Engineer:

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
CHRISTOPHER G. KRAUSE
10/3/2025
No PE 906013
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
MECHANICAL SCHEDULES DETAILS AND CONTROLS

| | | |
|---|---|---|
| PROJECT NO.: US-WSP-192801E | | M0.02 |
| DATE: 10/03/2025 | | |
| DWN. BY: Author | CKD. BY: Checker | |
| SCALE: As indicated | | |

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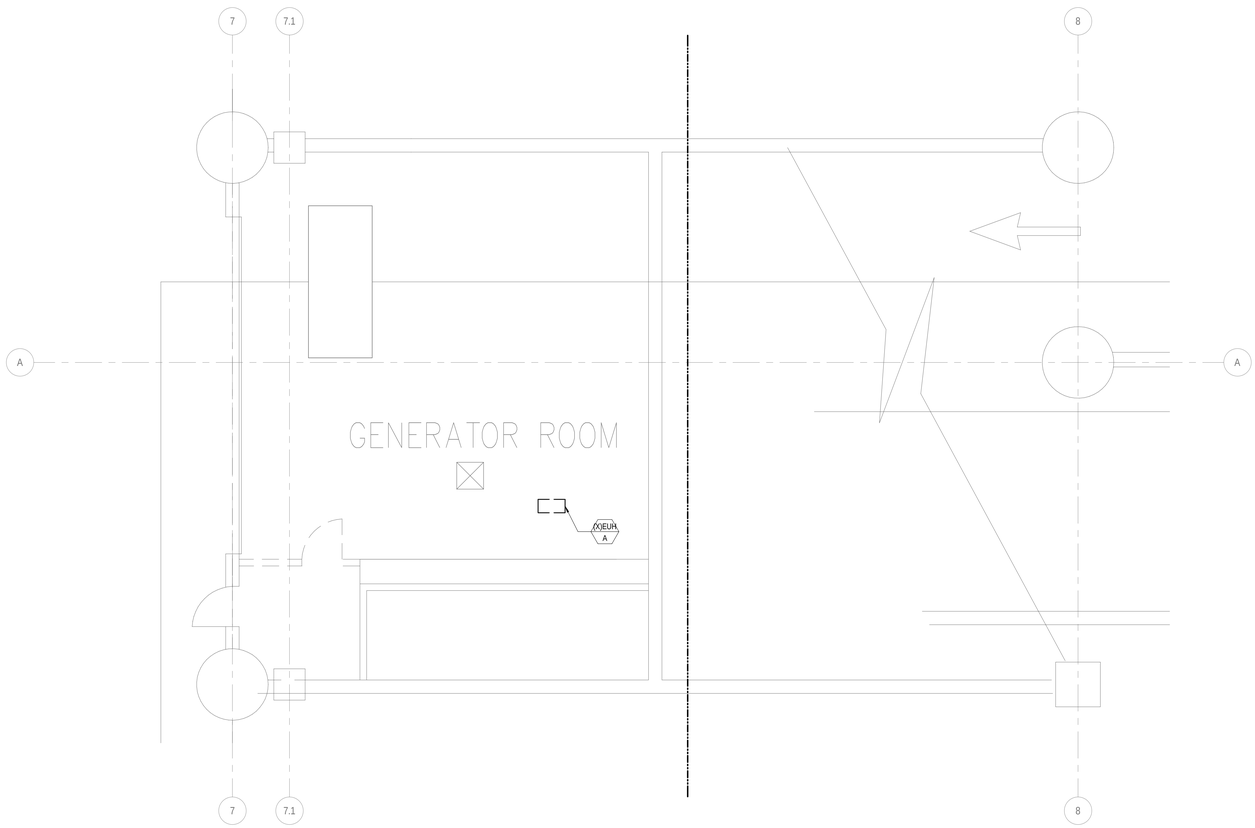
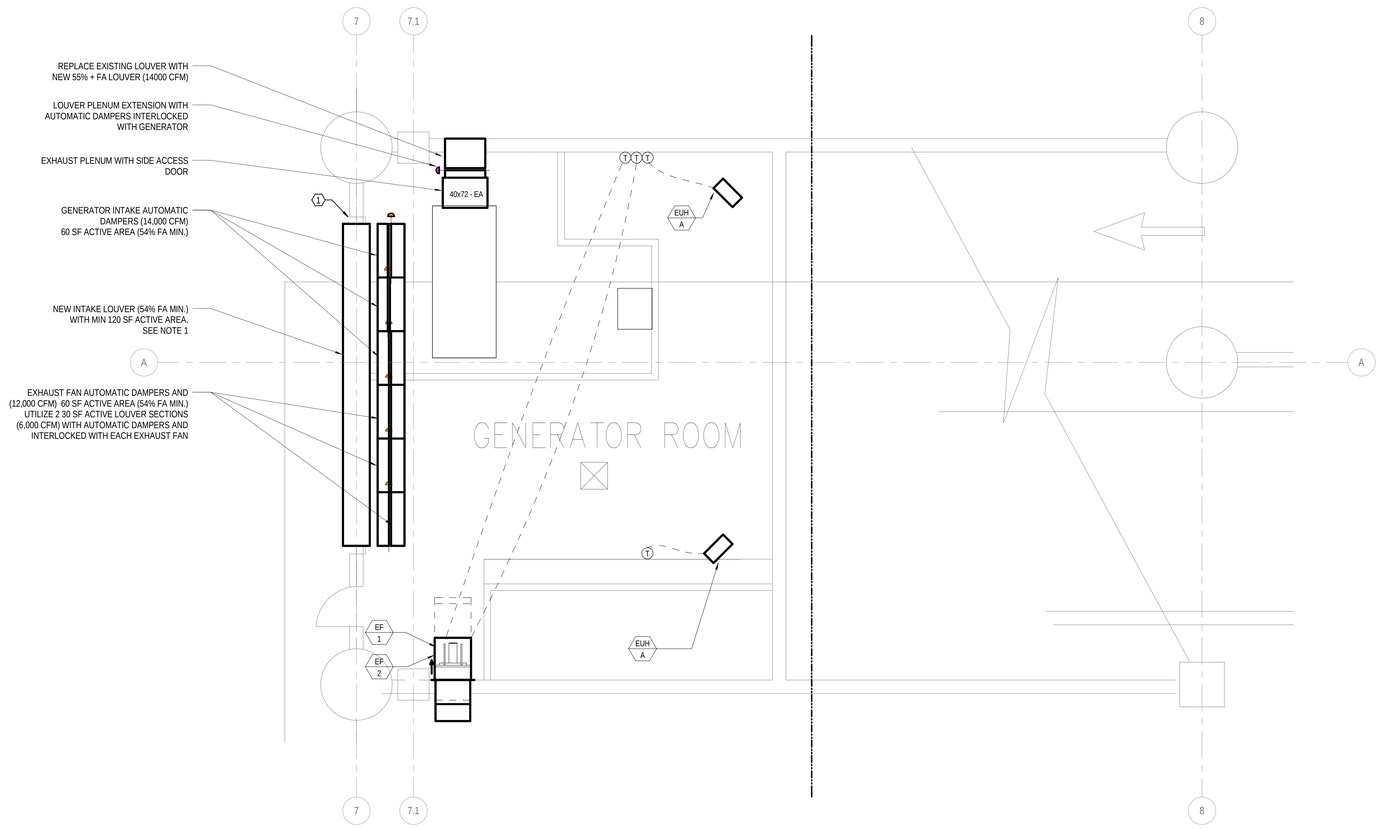



1 MECHANICAL - BUS LEVEL ENL - DEMO - GENERATOR ROOM
1/4" = 1'-0"




2 MECHANICAL - BUS LEVEL ENL - NEW WORK - GENERATOR ROOM
1/4" = 1'-0"

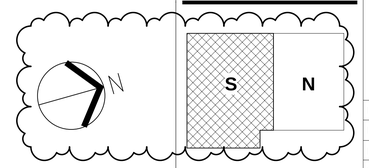
GRAPHIC SCALE
4' 2' 0 4' 8' 12'
SCALE: 1/4" = 1' - 0"

## SHEET NOTES

1 FINAL LOUVER SELECTION AND DAMPER SIZES TO BE CONTRACTOR COORDINATED WITH THE EXISTING OPENING DIMENSIONS AND ARCHITECTURAL CURB. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

## GENERAL NOTES

KEY PLAN

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| NO. | REVISION | DATE |
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| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
CHRISTOPHER G. ARNOLDS
10/3/2025
No.PE 906013
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
# MECHANICAL - ENLARGED VIEWS

| | | |
|---|---|---|
| PROJECT NO.: | US-WSP-192801E | |
| DATE: | 10/03/2025 | |
| DWN. BY: Author | CKD. BY: Checker | |
| SCALE: | 1/4" = 1'-0" | |

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**SECTION 23 05 01**

**MECH GENERAL PROVISIONS**

**PART 1 - GENERAL**

1.1 DESCRIPTION

A. The General, Supplementary Conditions and any architectural specifications are a part of the requirements for the work under this Division of the Specification.

B. Provide labor and materials required to install, test and place into operation the heating, ventilating, air conditioning, as called for in the Contract Documents, and according to Washington, D.C. codes and regulations.

C. Applicable equipment and materials to be listed by Underwriters' Laboratories and manufactured in accordance with ASME, AWWA, or ANSI standards, and as approved by authorities having jurisdiction. The Energy using products shall be certified for use in District of Columbia and meet State energy efficient standards.

D. Submit shop drawings, manufacturer's data, samples and test reports (three copies minimum). Contractor shall allow five working days minimum review from the time it is received by the Engineer.

E. The Contract Documents show the general arrangement of equipment, ductwork, piping and accessories. Follow these drawings as closely as the actual construction and the work of other trades will permit. Provide offsets, fittings, and accessories which may be required but not shown on the Drawings. Investigate the site and review drawings of other trades to determine conditions affecting the work and provide such work and accessories as may be required to accommodate such conditions.

F. Install firestopping around all pipes, conduits, ducts, etc. which pass through rated walls, partitions and floors in strict accordance with the manufacturer's published approval listing and rating.

G. Before commencing work, examine adjoining work on which this work is in any way dependent and report conditions which prevent performance of the work. Become thoroughly familiar with actual existing conditions to which connections must be made or which must be changed or altered.

H. Wherever the word "Provide" is used, it shall mean "Furnish and install complete and ready for use".

I. Evaluate existing conditions which may affect methods or cost of performing the work, based on examination of the site or other information. Failure to examine the Drawings, this document or other information does not relieve the Contractor of responsibility for satisfactory completion of the work.

J. Provide two (2) copies of operating instructions and maintenance manuals for all equipment and materials furnished under this Division upon two (2) weeks after completion of project.

K. Maintain on a daily basis at the project site a complete set of Record Drawings, reflecting an accurate dimensional record of all deviations between work shown on Drawings and that actually installed.



L. Coordinate, with building management, the requirements for after-hours work needed for tenant tie-ins to base building systems.

M. Locate all equipment needing service in accessible locations and on one side of the unit when possible. Coordinate with general contractors to provide access panels in inaccessible ceilings. Minor deviations from drawings can be made in order to provide better accessibility.

N. Select appropriate State and Code

O. Contractor shall allow for testing and rebalancing of all existing to be reused equipment as well as new.

P. Coordinate all work with existing structure, piping on conduits.

Q. Obtain and pay for all required fees, permits and inspections.

R. Obtain written permission of Owner before cutting or patching of structural systems.

S. Guarantee work for one (1) year from date of filing Notice of Completion.

T. Remove all abandoned mechanical equipment and associated ductwork, piping, etc., unless otherwise specified by Owner.

U. Pressure test each system of piping and ductwork as specified.

V. Edit list to suit project requirements.

W. Submittals: Prior to construction submit for approval the following materials and equipment. Submittal should be submitted in a binder and should include equipment cut sheets, dimensions, capacities, wiring diagram and electrical loads, special installation details, etc.
1. Duct specialties
2. Fans
3. Other miscellaneous equipment as specified and or scheduled on drawings.
4. Vibration isolation and seismic restraints.

X. Provide a complete set of as-builts for the entire project in Autocad 2025 format within one month after the completion of project. Submit one disk containing electronic files as well as one set of prints for review prior to issuance of final as-builts

**END OF SECTION 23 05 01**



**SECTION 23 05 13**

**ELECTRIC MOTORS**

**PART 1 - GENERAL**

1.1 DESCRIPTION

A. One-half horsepower and larger motors shall be rated 460 Volts Alternating Current (VAC) and suitable for operation on a 480 VAC (□5 %), 3-phase, 60 Hz nominal electricity supply system.

B. One-third horsepower and smaller motors shall be rated 120 VAC, single-phase, 60 Hz, and shall be provided with integral thermal overload protection.

C. Motors shall be generally constant speed, squirrel-cage type, open drip-proof or totally enclosed fan cooled (TEFC) design. Single phase motors shall be high efficiency capacitor start, induction run, or split phase type as approved for the service.

D. Provide motors having minimum certification by NEMA Table 12-6D. Two-speed motors, motors, driven by variable frequency drives and special duty motors (i.e., explosion proof) are not required to meet efficiencies listed in the following table (in %):

| Motor Horsepower | Nominal Efficiency (%) | Motor Horsepower | Nominal Efficiency (%) |
|---|---|---|---|
| ½ and ¾ | 84.0 | 25 and 30 | 93.6 |
| 1 | 85.5 | 40 and 50 | 94.1 |
| 1½ | 86.5 | 60 | 94.5 |
| 2 | 87.5 | 75 | 95.0 |
| 3 | 89.5 | 100 and 125 | 95.4 |
| 5 | 90.2 | 150 and 200 | 95.8 |
| 7½ and 10 | 91.0 | Over 200 | 96.2 |
| 15 and 20 | 92.4 | – | – |

E. Provide thermal overload/disconnect switch.

F. Provide single-phase manual motor starter with quick-make, quick-break toggle mechanism and field-adjustable overload heater element. Manual motor starters shall be sized for the motors served and specified under Division 23.

G. Individual motor controller in a self-contained unit in a NEMA 1 enclosure (NEMA 3R gasketed where installed outdoors or where exposed to water spray, dust or dirt), externally operable from the front.

**END OF SECTION 23 05 13**



**SECTION 23 09 00**

**AUTOMATIC CONTROL**

**PART 1 - GENERAL**

1.1 DESCRIPTIONS

A. Automatic control work shall include all needed unit controllers, temperature sensors, alternators, actuators, etc. necessary to achieve the intended control of the indicated equipment and the sequences. Control contactor is responsible for final sequences and providing all necessary components, interfaces, etc. to achieve a working system.

B. All controls work shall include wiring and complete testing.

C. Standalone Direct Digital Control (DDC) controller and field panels, including sensors, and control devices as required.

D. Complete electrical installation including wiring, raceways and power wiring, except as noted.

E. Software as required to effect a complete and operational control system as specified herein.

F. Complete operating and maintenance manuals and field training of operators and maintenance personnel.

G. System commissioning and acceptance tests.

H. Review of fire alarm shop drawing for acceptance by BMS contractor to ensure proper coordination of scope of work, wiring and operating sequences.

I. Miscellaneous control wiring including, but not limited to:

1. Wiring of thermostats
2. Interlock wiring and all necessary control components to support operation of the generator related dampers and the start / stop sequence.
3. Power wiring from designated Division 16 outlets to BMS components that require power.

**PART 2 - SENSORS AND SWITCHES**

A. Temperature Sensors:

1. Temperature sensor assemblies shall consist of a 100- or 1,000-OHM platinum RTD sensor and a solid state, 2-wire, 4 to 20 milliamp transmitter protected in a housing suitable for the environment in which it is installed.
2. Sensor accuracy shall be plus or minus 1° F.

B. Damper End Switch:

1. Shall be oil-tight, roller type, single pole double throw snap-acting switch. Mechanism to provide ample overtravel to prevent stress on damper and control equipment.



2. Acceptable Manufacturers: Furnas Electric, Allen Bradley, Telemechanique.

C. Automatic Dampers:

1. Provide automatic dampers as indicated on Contract Drawings.
2. Dampers shall be low leakage type, with published leakage data certified under the AMCA Certified. Leakage through a 48-inch by 48-inch damper at 4 inches water gauge pressure difference shall be less than 6.2 cubic feet per minute per square foot of damper.

D. Electric Damper Operators:

1. Damper actuator shall stroke by rotating motion of a silently operating, reversible, overload protected synchronous motor. Crank arm shall be actuated directly with no intermediate linkage.
2. Provide one actuator for 16 square feet of damper area or as recommended by the manufacturer, whichever is the more stringent. Provide additional actuators to meet the damper leakage requirement. Damper actuator shall stroke from fully open to close or vice versa in less than 2 minutes.
3. Modulating actuator shall be the push-pull type. Two position damper shall have spring return.

**END OF SECTION 23 09 00**



**SECTION 23 09 93**

**AUTOMATIC CONTROL SEQUENCES**

**PART 1 - GENERAL**

1.1 DESCRIPTION

A. Supply and install necessary software, programming, sensing, controlling and controlled devices, piping, wiring and commissioning of automatic control systems, so as to provide a complete control system, meet requirements of control sequences specified.

1.2 GENERAL

A. Contractor shall provide customized control strategies and control sequences and be able to define appropriate control loop algorithms and choose the optimum loop parameters for loop control. All control loops shall be tuned to stabilize within □1% of setpoint within 5 minutes of setpoint change or startup.

B. Safety devices shall be hardware interlocked with "hand" and "automatic" positions in series with motor controller holding circuit.

C. Smoke control, fire and life safety sequences shall override other automatic control sequences including hardwired safety devices.

D. Reset schedules and setpoints shown in sequences are for initial programming and start up, during system commissioning the reset schedules and setpoints shall be fine tuned to obtain desired comfort, energy and life safety system results.

E. The output of the reset schedules should be limited between maximum and minimum values. The intent of the reset schedules indicated is that the range of the output be limited between the minimum and maximum values indicated in the reset schedules.

F. All functions which use analog points to switch equipment on and off (e.g., fans, pumps) must be programmed with dead bands, and if necessary, time delays to prevent short cycling of equipment.

1.3 EXHAUST FANS

A. Design Setpoint
1. Summer: 95 °F
2. Winter: 70 °F

B. Start Stop Control:
1. Exhaust fans shall be started automatically based on space temperature from the associated space thermostat.

C. Operation:
1. The fan shall be based on space temperature and the exhaust and inlet air damper shall be open.

D. Warm Up/Cool Down Staging:



1. Exhaust fans shall stage on in a lead lag series to maintain the space temperature set point. The lead fan shall start when the space temperature is 5 deg F above set point for 2 minutes (adj.). With the lead fan operating, if the space temperature is rising above set point for 2 minutes (adj.) the second fan shall start and run until the space temperature is at or below set point with a minimum run time for 2 minutes (adj.). The first fan shall continue to run until the space temperature is at or below set point for 5 minutes (adj.)

1.4 SPACE TERMINAL HEATING UNITS

A. Setpoints:
1. Summer/ Winter: 65 °F

B. Start Stop Control:
1. Start: Automatically when generator starts
2. Stop: Space temperature sensor at or above heating setpoint

C. Operation:
1. Upon a call for heating, the electric heater shall energize to maintain space temperature heating setpoint.
2. When the system is called to stop, the system shall revert to "Off" state.

1.5 GENERATOR OPERATION

A. System Off:
1. Exhaust dampers and inlet air dampers closed.
2. Exhaust fans stopped and exhaust fan dampers closed.

B. System Start:
1. Automatically when generator starts.

C. System Operation:
1. When the emergency generator is energized, the exhaust air dampers and inlet dampers shall open.
2. Exhaust fan dampers to open and exhaust fans to start and run.

D. System Stop:
1. Automatically after generator stops AND when space temperature is at or below setpoint described in Exhaust Fan automatic control sequence.
2. When the system is called to stop, the system shall revert to that "Off" state as described above.

E. Safeties:
1. In the event of a BMS component failure or loss of control power:
2. Exhaust and make-up air dampers shall fail open.

**END OF SECTION 23 09 93**



**SECTION 23 31 00**

**DUCTWORK**

**PART 1 - GENERAL**

1.1 STANDARDS

A. Published specifications standards, tests or recommended methods of trade, industry or governmental organizations apply to work in this section where cited below:
1. ASHRAE – American Society of Heating, Refrigeration and Air Conditioning Engineers Handbooks (Latest Editions).
2. SMACNA – Sheet Metal and Air Conditioning Contractors National Association, Inc.
3. HVAC Duct Construction Standards, Metal and Flexible, Second Edition, 1995.
4. Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems, Fourth Edition, 1992.
5. HVAC Systems Testing Adjusting and Balancing.
6. Seismic Restraint Manual.

1.2 DUCT CLASSIFICAITON

A. Duct classification is based on pressure classification as scheduled in Table 1-1 and as described in the 2005 SMACNA HVAC Duct Construction Standards (Metal and Flexible). Comply with NFPA 90A when ducts traverse through smoke zones. Comply with UBC/UMC when more stringent than NFPA 90A or SMACNA standards.

B. Minimum operating pressure for each duct system:
1. Scheduled external static pressure for each fan or HVAC unit, positive or negative.
2. Adjust upward to nearest pressure class tabulated in SMACNA HVAC Duct Construction Standards.

C. Duct classification is applicable to all ductwork, including but not limited to the following:
1. Outside air supply systems (+1" w.g.).
2. Relief, return and exhaust systems (-2" w.g.).

1.3 MATERIALS

A. Sheet Metal:
1. Steel sheets:
a. Cold rolled steel sheets, lock forming quality.
b. Meeting ASTM A-653 and A-653M.
c. Black or galvanized as specified.
d. Galvanizing: 1⅛ ounce per sq. ft., total both sides.
2. Stainless steel sheets:
a. ANSI Type 316 as specified.
b. Concealed: Finish No. 2B or No. 3.
c. Exposed: Finish No. 4.

B. Miscellaneous Products:



1. Duct Sealants:
a. Sealing compound: shall be flexible after based adhesive for use in all pressures, UV resistant, NFPA Class 7 ductwork.
b. Gaskets:
1) Continuous, reinforced, inert self-conforming type.
2) 1/8-inch thick.
3) Width; to match angle connection.
4) Ductmate Industries Model 440, or equal.
2. Hard-setting joint tape:
a. Two-part tape:
1) Mineral impregnated woven fiber tape.
2) Impregnated with activator/adhesive of polyvinyl acetate type.
b. UL listed:
1) Flame spread: 10.
2) Smoke developed: 0.
c. Similar to Hardcast□.

C. Slide-on Transverse Joint Connectors:
1. Prefabricated slide-on transverse duct connectors and components shall be accepted. Ducts constructed using prefabricated systems shall refer to the manufacturer guidelines for sheet gauge, intermediate reinforcement size and spacing, and proper joint reinforcement. Ductmate Industries, Ward, Nexus, or approved equal.
2. Formed-on flanges shall be constructed as T-25 A/B flanges, of which the construction guidelines are given in Figure 1-4 of the 1995 SMACNA HVAC Duct Construction Standards, Metal and Flexible, Second Edition. No other construction standards pertaining to formed-on flanges shall be accepted.
3. Formed-on flanges shall include the use of corners, bolts, cleat and gasket.
4. All components shall be metal unless other materials are required by code or specified.

D. Flexible Connections:
1. With metal edges at each end:
a. No. 24 USSG galvanized steel.
2. 2 inch slack in fabric.
3. Install to allow minimum movement of 1 inch.
4. Length of fabric connections:
a. Minimum: 2 inches.
b. Maximum: 6 inches.
5. Materials:
a. Indoor installations shall be a UL listed, fire retardant neoprene or vinyl coated woven fiberglass fabric. Minimum density 30 ounces per square yard and rated to 200□ F.
b. Outdoor installations shall be a UL listed ultra violet light resistant Hypalon coated woven fiberglass fabric. Minimum density 24 ounces per square yard and rated to 250□ F.
c. Flame spread rating: 25 maximum, smoke developed rating: 50 maximum
d. Insulated connections:
e. Two layers of fabric with 1-inch thick fiberglass, 1.5 pound density.
f. Performance as previously specified in 2.2-C-5-b.
g. Provide wire embedded uncoated glass fabric with sewn seams for air temperature over 150□ F.



1.4 ACCESS DOORS

A. In accordance with SMACNA – Duct Construction Standards except as noted.

B. In ductwork:
1. Insulated or non-insulated, same as duct.
2. Hinged, except where sliding or removable type required. Latch, equal to Ventlok No. 100.
3. Size:
a. 36 inches x 36 inches.
4. Provide in following locations:
a. Exhaust Plenum
5. Make completely accessible.

1.5 DUCTWORK INSTALLATION

A. General:
1. Duct dimensions indicated are net, inside, clear, dimensions:
2. For internally lined ducts, add lining thickness to determine metal duct for dimensions.
3. At exposed duct penetrations of walls, floors and ceilings, provide sheet metal angle type escutcheons.
4. Transitions:
a. Pitch sides of duct in "diverging" or "converging" airflow maximum of 15□ including angle.
5. Duct openings:
a. Provide openings where required to accommodate thermometers, smoke detectors, controllers, etc.
1) Insert through airtight rubber grommets.
b. At fire dampers allow adequate length of duct to install access door.

B. Rectangular Duct Joints:
1. Standing seams, except where flush drive slip seam called for.
2. Use flush, drive-slip, for:
a. Exposed ducts.
b. Where required for clearance.
3. "Ductmate" system joints, may be used in lieu of standing seams. (PLASTIC CLIPS ARE NOT ALLOWED).

C. Joint Sealing:
1. Seal all transverse, longitudinal and spiral joints of all sheet metal ducts by one of following methods:
a. Six ounce canvas strip, six inches wide.
1) Adhere with lagging adhesive. Hardcast PS-S tape (DUCT TAPE NOT ALLOWED).
b. United Hi-Velocity sealer.
c. Applications as recommended by manufacturer.
2. Seal punched holes and corner cracks (DUCT TAPE NOT ALLOWED).
3. After installation and testing reseal joints found to be leaking.



1.6 Installation of Wiring:

A. Provide wiring for control devices, monitoring devices, instrumentation, and interlocks as required for a complete system. Coordinate with Division 21, 22, 23, 26 and 27 specifications for devices requiring wiring under this Section.

B. Run all wiring in compliance with the requirements of the electrical specifications (Division 26) and in accordance with authorities and codes having jurisdiction. Provide separate conduit for control wiring under this Section.

C. Control wiring, power or signal shall be run in metallic conduit.

D. Provide all BMS wiring, including power wiring to DDCs and BMS equipment. All power wiring for control system shall be from an emergency power panel.

1.7 Fire Dampers:

A. Provide static and dynamic fire dampers at exhaust fan inlets. Dampers shall be factory marked for static or dynamic use.

1.8 Automatic Dampers

A. Install automatic control dampers of louver pattern including smoke dampers and fire/smoke dampers, as indicated on the DPrawings or as specified in intake ducts and/or plenums, discharge ducts and plenums from fans, etc. These dampers shall be provided by the automatic control contractor.

**END OF SECTION 23 31 00**



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Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

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DISTRICT OF COLUMBIA
CHRISTOPHER G. KIRCHNER
10/3/2025
No. PE 906013
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## MECHANICAL SPECS 1

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**SECTION 23 33 13**

**DAMPERS**

**PART 1 - GENERAL**

1.1 Fire Dampers:

A. Provide static and dynamic fire dampers at exhaust fan inlets. Dampers shall be factory marked for static or dynamic use.

1.2 Automatic Dampers

A. Install automatic control dampers of louver pattern including smoke dampers and fire/smoke dampers, as indicated on the Drawings or as specified in intake ducts and/or plenums, discharge ducts and plenums from fans, etc. These dampers shall be provided by the automatic control contractor.

**END OF SECTION 23 33 13**



**SECTION 23 34 00**

**FANS**

**PART 1 - GENERAL**

1.1 ALL FANS

A. Provide fans that are quiet operating and non-overloading the entire range of operation.

B. Statically and dynamically balance fan wheels/impellers at the factory and certify balance.

C. Provide precision self-aligning bearings designed to prevent leakage of oil or grease. Provide cups, oil chambers, Zerk or Alemite lubrication fittings in accessible locations for ease of lubrication.

D. Provide copper lubrication leads, for lubrication of internal motors and bearings, extending to a capped termination point external to the fan casing or air handling unit.

E. Extend wire leads on fans driven by direct motor drive from the motor junction box in air light rigid walled conduit, to a junction box mounted external to the fan casing.

F. On fans driven by belt drive provide standard "V-groove" type belts and sheaves suitable for the service intended. Fan sheaves are non-adjustable type with removable machined bushings. Provide adjustable pitch type with removable machined bushings. Provide adjustable pitch type motor sheaves with double locking feature, to 10 % above and below the rated fan speed. Dynamically balance sheaves with over three grooves. Provide at least two belts and sheaves each capable of carrying the entire load with one belt broken.

G. Provide performed expanded metal or sheet metal belt guards, with grommeted tachometer ports at the fan and motor shafts, for all exposed sheaves and belts. Belt guard shall comply with OSHA requirements and be easily removable.

H. Construct wheels/impellers exposed to normal atmospheres of cast aluminum or hot dip galvanized steel and finished with two layers of factory applied non-scaling paint.

I. Electrically ground all fans and drives to prevent accumulation of static charge. Indicate grounding method in fan submittals.

J. Provided threaded drain plugs at fan housing low points.

K. Fan wheels/impellers and housings shall be relieved of residual stresses produced in the forming process.

L. Provide housings with integral inlet and discharge flanges, complete with bolt holes for flexible or hard duct connections. Shop fabricate any companion flanges required for connections to sound attenuators. Companion flanges shall be rolled angles matched to both fan housing and sound attenuators.

1.2 ACCEPTABLE MANUFACTURERS

A. Propeller Fans: Twin City, Bayley, Woods, Loren Cook, Greenheck



1.3 AXIAL FAN

A. Propeller Type:

B. Include propeller type impellers, complete with motors, and panel- or ring-mountings.

C. Vary fan blades in camber and twist from base to tip.

D. Construct impellers of die-formed steel or aluminum with a welded reinforcing gusset on the backside for added rigidity, attached to a central hub mounted on the fixed drive shaft. Fan shall be of welded and bolted construction utilizing corrosion-resistant fasteners.

E. Rotate fan hub on the fixed drive shaft using sealed ball bearings with a L10 life of 100,000 hours.

F. To eliminate overhang load on belted fans, design to apply belt load to the hub in the same plane as the bearings.

G. Direct drive fans are only acceptable where belt-driven units do not meet the performance criteria or direct drive is specified.

H. Provide panels or rings with spun venturi inlets suitable for wall-mounting and structural angle supports of welded steel construction.

I. Provide basket type fan guards for exposed inlets and discharges.

J. Provide TEFC motors on all fans.

K. Provide factory-fabricated wall sleeves.

L. Provide factory-fabricated 45 deg exhaust hood.

**END OF SECTION 23 34 00**



**SECTION 23 82 05**

**SPACE TERMINAL HEATING UNITS**

**PART 1 - GENERAL**

1.1 ACCEPTABLE MANUFACTURERS

A. Electric Cabinet Heaters and Unit Heaters: Trane, Markel, Brasch, Marley

1.2 UNIT HEATERS – PROPELLER FAN TYPE

A. Provide propeller type unit heaters with heater elements, motor-driven propeller type fans, all installed in a minimum 20-gauge formed steel casing, finished with baked enamel paint.

B. Motor speeds shall not exceed 1,500 high-speed revolutions per minute. Remove and replace any unit heaters, which are objectionably noisy.

C. Provide an "On/Off" switch, overload protection and a 120-volt thermostat.

D. The heaters shall be controlled automatically by means of thermostats, to start and stop the fans. The thermostats shall be adjustable and designed to operate on a 3-degree F differential over a temperature range of approximately 20 degrees F to 75 degrees F.

E. Each unit heater shall be properly isolated and supported from building construction and be provided with seismic restraints to prevent sway.

F. Hydronic Heating Units: Provide copper tube/aluminum fin heating elements. Install an aquastat in the supply connection to each heater, wired to prevent the fan from operating when there is no heat available. Unit heaters shall be supported independently of the piping to which they are connected.

G. Electric Heating Units: Provide heating elements of sheathed nickel-chromium wire.

1.3 INSTALLATION

A. Provide shut-off and isolation valves, balancing cocks and manual air vent for each radiator, convector, cabinet/unit heaters or finned tube element.

B. Install radiators, convectors and cabinet/unit heaters as detailed on the architectural drawings and follow manufacturer's instructions.

C. All piping and control valves serving radiators, convectors and cabinet/unit heaters shall be concealed or installed within empty sections of radiator cabinet.

**END OF SECTION 23 82 05**



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Architect:

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DISTRICT OF COLUMBIA
CHRISTOPHER G. NOLAN
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PROJECT

PM SUPPORT SERVICES GENERATOR ROOM

OWNER

UNION STATION REDEVELOPMENT CORPORATION

TITLE

MECHANICAL SPECS 2

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## PLUMBING GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT LOCAL CODES, AND PROJECT SPECIFICATIONS.
2. PLUMBING CONTRACTOR SHALL COORDINATE ALL PIPING WITH MECHANICAL, ELECTRICAL, ARCHITECTURAL, AND STRUCTURAL TRADES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS.
3. PROVIDE ACCESS PANELS FOR ALL CONCEALED VALVES, WATER HAMMER ARRESTORS, TRAP PRIMERS, ETC.
4. PLUMBING CONTRACTOR SHALL CONNECT ALL ITEMS OF EQUIPMENT FURNISHED BY OTHERS AND UNDER OTHER SECTIONS OF THE SPECIFICATIONS. CONTRACTOR SHALL PROVIDE ALL ITEMS NECESSARY TO COMPLETE THE PLUMBING INSTALLATION.
5. REFER TO ARCHITECTURAL DRAWING FOR ROUGH-IN DIMENSIONS AND MOUNTING HEIGHTS OF PLUMBING FIXTURES .
6. PROVIDE UNIONS FOR ALL PIPING CONNECTIONS TO EQUIPMENT.
7. ALL PLUMBING FIXTURES AND EQUIPMENT SHALL BE IN COMPLIANCE WITH CURRENT APPLICABLE ENERGY CONSERVATION CODES.
8. ALL PIPING AND EQUIPMENT SHOWN DIAGRAMMATICALLY ONLY. EXACT LOCATION SHALL BE DETERMINED IN FIELD. MAINTAIN HEAD ROOM AND SPACE CONDITIONS AT ALLTIMES. ALL WORK SHALL BE COORDINATED WITH ALL TRADES BEFORE PROCEEDING WITH INSTALLATION. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL NOTIFY ARCHITECT AND ENGINEER OF ANY DISCREPANCIES. PRIOR TO EQUIPMENT SUBMITTALS, CONTRACTOR SHALL VERIFY PROPOSED CONDITIONS TO ENSURE SPECIFIED EQUIPMENT CAN BE PROPERLY INSTALLED.
9. INSTALL PIPING CLOSE TO WALLS, PARTITIONS, CEILINGS, ETC. OFFSET ONLY WHERE NECESSARY TO FOLLOW WALLS, AS INDICATED. PROVIDE ALL NECESSARY FITTINGS, OFFSETS, VALVES AND OTHER DEVICES REQUIRED FOR A COMPLETE INSTALLATION.
10. INSTALL PIPING IN A CONCEALED MANNER, STRAIGHT, PLUMB AND AS DIRECT AS POSSIBLE. FORM RIGHT ANGLES PARALLEL WITH BUILDING WALLS. LOCATE GROUPS OF PIPES PARALLEL TO EACH OTHER. PIPE SHALL BE LOCATED TO PERMIT ACCESS FOR SERVICE VALVES.
11. CONCRETE PADS, PITS, AND FLASHING FOR PLUMBING EQUIPMENT SHALL BE AS INDICATED ON THE STRUCTURAL AND ARCHITECTURAL PLANS, UNLESS NOTED OTHERWISE. COORDINATE EXACT SIZES OF REQUIRED OPENINGS AND SUPPORTS FOR FURNISHED EQUIPMENT.
12. ALL PIPING SHALL BE REAMED TO BE FREE OF BURRS. KEEP PIPING FREE FROM SCALE AND DIRT. PROTECT OPEN PIPE ENDS WHENEVER WORK IS SUSPENDED DURING CONSTRUCTION TO PREVENT FOREIGN MATERIAL ENTERING AND CAP ALL OPEN ENDS DURING CONSTRUCTION WITH APPROVED TEMPORALLY CAPS OR MATERIALS..
13. MAINTENANCE AND IDENTIFYING LABELS SHALL BE AFFIXED TO ALL PIPING AND PLUMBING EQUIPMENT. OPERATIONS AND MAINTENANCE MANUALS SHALL BE PROVIDED TO OWNER UPON PROJECT COMPLETION.
14. INSTALL WELDED OR THREADED PIPE IN AREAS WHERE SPACE IS CRITICAL BETWEEN FINISHED CEILING AND STRUCTURAL SURFACE. INSTALL ALL VENTS THRU ROOF 10'-0" MINIMUM FROM EDGE OF ROOF, FRESH AIR INTAKES, DOORS, OR OPERABLE WINDOWS.
15. SUBMIT ALL REQUIRED PLUMBING DOCUMENTS TO LOCAL PLUMBING OFFICIAL FOR APPROVAL.
16. ALL WALL, CEILING, AND FLOOR PENETRATIONS CONVEYING PLUMBING, DRAINS, AND SPRINKLER PIPING, SHALL BE FULLY SEALED AND CAULKED AROUND THE PENETRATING FEATURE TO RESTORE THE REQUIRED FIRE OR SMOKE BARRIER RATING OF THE WALL, CEILING OR FLOOR PENETRATED. AS A MINIMUM, AT ALL LOCATIONS, A TWENTY (20) MINUTE FIRE/SMOKE RESISTANCE SHALL BE MAINTAINED. WHERE REQUIRED BY CODE, THE PENETRATING FEATURES SHALL ALSO BE SUPPLIED AND INSTALLED WITH A MECHANISM OR MATERIAL WHICH WILL MAINTAIN THE WALL, CEILING OR FLOOR RATING IN THE CASE OF A FIRE.
17. PLUMBING OR SPRINKLER RELATED PIPE SHALL NOT PENETRATE INTO OR PASS THROUGH STAIRWAYS UNLESS IT IS REQUIRED FOR SERVICING THE STAIRWAY OR IT IS SEGREGATED FROM THE STAIRWAY PASSAGEWAY BY AN ENCLOSURE SYSTEM RATED EQUAL TO OR GREATER THAN THE REQUIRED STAIRWAY RATING.
18. PROVIDE FLUSH TYPE ACCESS DOORS OR PANELS NO SMALLER THAN 12"x12" FOR ALL VALVES OR APPARATUS LOCATED IN CHASES, WALLS, NON-ACCESSIBLE CEILINGS, OR FLOORS.
19. CLEANOUTS SHALL BE PROVIDED AS INDICATED ON PLANS AND AS REQUIRED BY THE LOCAL CODES. CLEANOUTS SHALL BE PROVIDED ON HORIZONTAL DRAINAGE PIPE A MAXIMUM OF EVERY 100', AS WELL AS AT EVERY FITTING GREATER THAN 45 DEGREES THAT DOES NOT HAVE AN CLEANOUT WITHIN 40'. CLEANOUTS SHALL BE PROVIDED AT THE BASE OF EVERY DRAINAGE STACK.
20. PRIOR TO INSTALLING ANY PIPING, VERIFY INVERT ELEVATIONS, LOCATIONS AND PIPE SIZES. INSTALL ALL SANITARY, WASTE, AND STORM MAINS BEGINNING AT LOW POINT OF EACH SYSTEM AND CONTINUE WITH UNBROKEN CONTINUITY OF INVERT. LOW POINT OF EACH SYSTEM SHALL BE COORDINATED WITH SITE UTILITIES CONTRACTOR. REFER TO SITE UTILITY PLANS FOR REFERENCE.
21. UNLESS OTHERWISE NOTED ALL FLOOR DRAINS SHALL FITTED WITH TRAP PRIMER CONNECTION AND 1/2" TRAP PRIMER LINE FROM AN APPROVED AUTOMATIC OR MECHANICAL PRIMER DEVICE. TRAP PRIMERS MAY NOT BE SHOWN IN THE PLAN VIEW. CONTRACTOR SHALL INSTALL ALL TRAP PRIMER DEVICES IN A CONCEALED BUT FULLY ACCESSIBLE LOCATION.

## FIRE PROTECTION GENERAL NOTES

1. SCOPE: PROVIDE AND INSTALL ALL FIRE PROTECTION WORK AS INDICATED FOR A COMPLETE WORKING SYSTEM.
2. INFORMATION ON THE PLANS IS DIAGRAMMATIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING FINAL PIPE ROUTING, PIPE SIZING, AND SPRINKLER HEAD LOCATIONS.
3. PERMITS, LICENSES AND FEES: THIS CONTRACTOR SHALL PAY ALL REQUIRED FEES AND SHALL OBTAIN ALL NECESSARY PERMITS AND LICENSES FOR INSTALLATION OF THE WORK TO COMPLETION.
4. APPLICABLE CODES AND REGULATIONS: ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING CODES AND REGULATIONS:
   - 4.1 INTERNATIONAL BUILDING CODE. WITH LOCAL AMENDMENTS
   - 4.2 INTERNATIONAL FIRE CODE WITH LOCAL AMENDMENTS
   - 4.3 NFPA 13.
5. COORDINATE WORK WITH ALL TRADES. PROVIDE A COMPLETE HYDRAULICALLY CALCULATED WET PIPE AUTOMATIC SYSTEM FOR TENANT SPACE, WHICH SHALL BE FULLY SPRINKLERED. ALL PIPING AND EQUIPMENT SHALL BE ADEQUATELY SIZED BASED ON HYDRAULIC CALCULATIONS.
6. IN GENERAL, BUILDING SPRINKLER SYSTEM SHALL REMAIN OPERATIONAL THROUGHOUT CONSTRUCTION. SYSTEM OUTAGES SHALL BE COORDINATED WITH FACILITY MANAGEMENT AND SHALL REQUIRE WRITTEN APPROVAL PRIOR TO SHUTTING DOWN ANY SYSTEM ZONES. EXTENDED OUTAGES LASTING LONGER THAN 4 HOURS SHALL REQUIRE AN APPROVERD FIREWATCH. UNDER NO CIRCUMSTANCES SHALL SYSTEMS BE LEFT INOPERABLE OVERNIGHT OR WEEKENDS.
7. GENERAL NOTES, DRAWINGS AND SPECIFICATIONS BY THE ARCHITECT SHALL APPLY TO THIS PROJECT.
8. ALL MATERIAL NOT TO BE USED AND ALL DEBRIS SHALL BE REMOVED FROM SITE AND THE AREA OF WORK SHALL BE LEFT IN CLEAN CONDITION.
9. INSTALLATION OF ALL PIPING, INSULATION, SPRINKLER HEADS AND EQUIPMENT SHALL BE PERFORMED IN A NEAT AND WORKMANLIKE MANNER, SHALL CONFORM TO THE LATEST TRADE PRACTICES AND SHALL BE FULLY COORDINATED WITH THE WORK OF ALL OTHER TRADES.
10. ALL PIPING SHALL BE INSTALLED AS HIGH AS POSSIBLE UNLESS OTHERWISE NOTED WHILE MAINTAINING PROPER SLOPES AND ALLOWING FOR DUCTWORK, LIGHTING, STRUCTURAL BEAMS, ETC.
11. FLEXIBLE CONNECTIONS SHALL BE PROVIDED FOR PIPING CROSSING EXPANSION JOINTS WHERE INSUFFICIENT FLEXIBILITY EXISTS.
12. PIPE SLEEVES: PIPE SLEEVES AND PIPING INSTALLED IN FIRE SEPARATIONS SHALL BE SEALED WITH DCRA FIRE PROTECTION DIVISION APPROVED FIRE STOPPING METHODS AND MATERIALS.
13. ALL FIRE PROTECTION PIPING INSTALLED SHALL BE TESTED AS REQUIRED BY ALL THE AUTHORITIES HAVING JURISDICTION AND TO THE SATISFACTION OF THE OWNER.
14. ALL FIRE PROTECTION WORK SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF THE FINAL INSTALLATION BY OWNER.
15. ALL AREAS OF THE BUILDING SHALL BE FULLY SPRINKLERED IN ACCORDANCE WITH THE REGULATIONS OF ALL AUTHORITIES HAVING JURISDICTION. THE SPRINKLER SYSTEMS SHALL BE HYDRAULICALLY CALCULATED. THE SPRINKLER CONTRACTOR SHALL VERIFY THE ACTUAL WATER SUPPLY AND PRESSURE AVAILABLE FROM THE WATER SUPPLY SYSTEM BEFORE DESIGN. THE ACTUAL WATER SUPPLY AND PRESSURE SHALL BE VERIFIED BY A FLOW TEST, AS REQUIRED BY DCRA FIRE PROTECTION DIVISION.
16. FIRE SPRINKLER ZONES SHALL BE AS INDICATED ON DRAWINGS. EACH SYSTEM ZONE MUST BE FULLY COORDINATED AS NECESSARY WITH FIRE ALARM CONTRACTOR.
17. SUBMIT SHOP DRAWINGS TO ARCHITECT/ENGINEER AND DCRA FIRE PROTECTION DIVISION FOR REVIEW AND APPROVAL PRIOR TO STARTING WORK. ALL FIRE PROTECTION SHOP DRAWING AND CALCULATIONS SHALL BE STAMPED AND SIGNED BY A REGISTERED PROFESSIONAL ENGINEER.
18. INSTALL SPRINKLER HEADS IN THE CENTER OF CEILING TILE UNLESS NOTED OTHERWISE.
19. ALL FIRE PROTECTION WORK SHALL BE BY AN ACCREDITED FIRE PROTECTION CONTRACTOR REGULARLY ENGAGED IN THE BUSINESS FOR AT LEAST FIVE YEARS AND FAMILIAR WITH THIS WORK AND THE REQUIREMENT OF THE APPROVING JURISDICTION.
20. SPRINKLER SHOP DRAWING SHALL INDICATE PROXIMATE AND SPATIAL RELATIONSHIPS WITH ALL BUILDING CHARACTERISTICS AND COMPONENTS AS REQUIRED TO PRODUCE FULLY COORDINATED DRAWINGS. THE SPRINKLER CONTRACTOR SHALL ALSO REVIEW ARCHITECTURAL REFLECTED CEILING PLANS AS NECESSARY TO COORDINATE WITH SPECIAL ARCHITECTURAL FEATURES AND/OR LIGHTING LAYOUTS IN VARIOUS AREAS. SHOULD BE APPROVED BY FIRE MARSHALL.
21. THE SPRINKLER SYSTEM DESIGN FOR THE VARIOUS HAZARDS WITHIN THE BUILDING SHALL BE DETERMINED USING NFPA 13 DESIGN CRITERIA.

SPRINKLER DESIGN CRITERIA:
•REFER TO FM GLOBAL DATA SHEETS FOR HAZARD CATEGORIES BASED ON OCCUPANCY AND ADDITIONAL SYSTEM REQUIREMENTS.
•QUICK RESPONSE TYPE SPRINKLERS SHALL BE USED FOR WET SYSTEMS ONLY.
•PROVIDE DRY SPRINKLER HEADS FOR AREAS SUBJECT TO TEMPERATURES BELOW 40F (GARAGE).

HAZARD CATEGORY HC-1:
-DENSITY = 0.1 GPM/S.F. FOR MOST REMOTE 1,500 S.F.
-SPRINKLER COVERAGE 225 S.F. (MAX.)

HAZARD CATEGORY HC-2:
-DENSITY = 0.15 GPM/S.F. FOR MOST REMOTE 2,500 S.F.
-SPRINKLER COVERAGE 130 S.F. (MAX.)
-REMOTE AREAS WITH DRY SPRINKLER COVERAGE SHALL USE 3,500 S.F. DESIGN AREA.

HAZARD CATEGORY HC-3:
-DENSITY = 0.3 GPM/S.F. FOR MOST REMOTE 2,500 S.F.
-SPRINKLER COVERAGE 130 S.F. (MAX.)
-REMOTE AREAS WITH DRY SPRINKLER COVERAGE SHALL USE 3,500 S.F. DESIGN AREA.

SPRINKLER WORK NOTES

1. THE FIRE PROTECTION CONTRACT DRAWINGS ARE THE "PRELIMINARY PLANS" DEFINED BY NFPA 13, PREPARED FOR PRELIMINARY SUBMISSION TO THE AUTHORITIES HAVING JURISDICTION TO OBTAIN A PERMIT. THE CONTRACT DRAWINGS INDICATE A PARTIAL DESIGN AND SPECIFY THE DESIGN CRITERIA TO BE USED BY THE INSTALLING CONTRACTOR WHO FINALIZES THE SYSTEM LAYOUT AND PROVIDES HYDRAULIC CALCULATIONS. THE PRELIMINARY PLANS ONLY SHOW THE "TENTATIVE LOCATION OF MAJOR PIPING INCLUDING MAINS, RISERS, OVERHEAD MAINS AND FIRE DEPARTMENT CONNECTIONS." THE SPRINKLER AND PIPING LAYOUTS AND PIPE SIZES SHOWN ON THE CONTRACT DRAWINGS ARE TO DEFINE THE BASIC SCOPE FOR PERMITTING AND ARE NOT INTENDED TO BE COMPLETE TAKE OFF BID DOCUMENTS FOR COMPETITIVE BIDDING. THE DRAWINGS ARE DIAGRAMMATIC AND SHALL BE USED IN CONJUNCTION WITH THE SPECIFIED REQUIREMENTS TO PROVIDE COMPLETE, FULLY FUNCTIONAL AND CODE COMPLIANT SYSTEMS.

2. THE WORK OF THE FIRE PROTECTION CONTRACT INCLUDES:
-PREPARTION OF WORKING (FABRICATION) DRAWINGS AS DEFINED AS NFPA 13.
-COMPLETE SPRINKLER PROTECTION IN COMPLIANCE WITH NFPA 13.
-HYDRAULIC CALCULATIONS FOR THE ACTUAL INSTALLATION CONDITIONS BASED ON THE COORDINATION DRAWINGS.
-COORDINATION WITH OTHER TRADES.
-ON SITE FIELD SURVEY, MEASUREMENT, DESIGN, AND FABRICATION.

PLUMBING FUEL OIL FILL PORT SCHEDULE

| DESIGNATION | | MANUFACTURER | MODEL | VOLTAGE | PHASE | AMPS | DIMENSIONS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| TYPE | NUMBER | | | | | | WIDTH | HEIGHT | DEPTH | |
| FOFP | 1 | SIMPLEX | COMPACT AUTOMATIC FUELPORT | 120 V | 1 | 30 A | 25" | 26 1/4" | 20 1/2" | FUEL PORT WITH LOCKABLE STEEL ENCLOSURE. INTEGRAL 7-GALLON SPILL CONTAINMENT WITH MANUAL PUMP. OVERFLOW PROTECTION VALVE DOWNSTREAM OF PORT TIED TO LEVEL FLOATS WITHIN FOT-1. INTEGRAL CONTROL PANEL WITH REMOTE LEVEL READOUT AND ALARMS. |

PLUMBING FUEL OIL STORAGE TANK SCHEDULE

| DESIGNATION | | MANUFACTURER | MODEL | CAPACITY | DIMENSIONS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|
| TYPE | NUMBER | | | | LENGTH | WIDTH | HEIGHT | |
| FOT | 1 | SIMPLEX | STS 150 | 150.0 gal | 47 1/2" | 30" | 49 1/2" | STS 150 DAY TANK WITH DUPLEX 2 GPM PUMPS WITH 1/3 HP MOTOR. STANDARD LEVEL FLOAT SWITCH ASSEMBLY. SRS CONTROL PCB SECONDARY CONTAINMENT LEAK FLOAT. CHECK VALVE 3/4" NPT |

## ABBREVIATIONS - PLUMBING

| | |
|---|---|
| AD | AREA DRAIN |
| AFF | ABOVE FINISHED FLOOR |
| AP | ACCESS PANEL |
| BFP | BACKFLOW PREVENTER |
| BLDG | BUILDING |
| BOB | BOTTOM OF BEAM |
| BOP | BOTTOM OF PIPE |
| BV | BALANCING VALVE |
| CA | COMPRESSED AIR |
| CD | CONDENSATE DRAIN |
| CFH | CUBIC FEET PER HOUR |
| CI | CAST IRON |
| CLG | CEILING |
| CO | CLEANOUT |
| COTG | CLEANOUT TO GRADE |
| CONN | CONNECTION |
| CONT | CONTINUATION |
| CP | CIRCULATING PUMP |
| CV | CHECK VALVE |
| CW | COLD WATER |
| CWFU | COLD WATER FIXTURE UNIT |
| DF | DRINKING FOUNTAIN |
| DFU | DRAINAGE FIXTURE UNIT |
| DIA | DIAMETER |
| DN | DOWN |
| DR | DRAIN |
| DWG | DRAWING |
| (E) | EXISTING |
| EEW | EMERGENCY EYE WASH |
| EL | ELEVATION |
| ET | EXPANSION TANK |
| EWC | ELECTRIC WATER COOLER |
| EWH | ELECTRIC WATER HEATER |
| FCO | FLOOR CLEANOUT |
| FD | FLOOR DRAIN |
| FS | FLOOR SINK |
| FT | FEET |
| G | NATURAL GAS |
| GAL | GALLONS |
| GPM | GALLONS PER MINUTE |
| GWH | GAS WATER HEATER |
| GV | GATE VALVE |
| HB | HOSE BIBB |
| HD | HUB DRAIN |
| HT | HEAT TRACING |
| HW | DOMESTIC HOT WATER |
| HWR | DOMESTIC HOT WATER RETURN |
| HWFU | DOMESTIC HOT WATER FIXTURE UNITS |
| IE | INVERT ELEVATION |
| IE | INVERT ELEVATION |
| IN | INCH |
| IW | INDIRECT WASTE |
| JS | JANITOR SINK |
| L | LAVATORY |
| MAX | MAXIMUM |
| MIN | MINIMUM |
| MS | MOP SINK |
| (N) | NEW |
| NC | NORMALLY CLOSED |
| NIC | NOT IN CONTRACT |
| NO | NORMALLY OPEN |
| NPW | NON-POTABLE WATER |
| OD | OVERFLOW DRAIN |
| OST | OVERFLOW STORM PIPING |
| OS&Y | OUTSIDE SCREW & YOKE GATE VALVE |
| PDR | PLANTER DRAIN |
| PD | PUMP DISCHARGE |
| POC | POINT OF CONNECTION |
| PRV | PRESSURE REDUCING VALVE |
| PSI | POUNDS PER SQUARE INCH |
| PSIG | POUNDS PER SQUARE INCH (GAUGE) |
| RD | ROOF DRAIN |
| RPZ | REDUCED PRESSURE ZONE ARRESTOR |
| SA | SHOCK ABSORBER |
| SAN | SANITARY |
| SH | SHOWER |
| SK | SINK |
| ST | STORM PIPING |
| TDH | TOTAL DYNAMIC HEAD |
| TMV | TEMPERATURE MIXING VALVE |
| TOS | TOP OF SLAB |
| TP | TRAP PRIMER |
| TPV | TRAP PRIMER VALVE |
| TYP | TYPICAL |
| UNO | UNLESS NOTED OTHERWISE |
| UR | URINAL |
| V | VENT |
| VB | VACUUM BREAKER |
| VTR | VENT THROUGH ROOF |
| WC | WATER CLOSET |
| WCO | WALL CLEANOUT |
| WH | WALL HYDRANT |
| WF | WATER FILTER |
| WSFU | WATER SUPPLY FIXTURE UNIT |
| Z | ZONE |

## SYMBOL LEGEND

| | |
|---|---|
| | FLEXIBLE CONNECTION |
| (H) (X) (L) | EXPANSION LOOP SIZE |
| | SHOCK ABSORBER |
| | VACUUM BREAKER |
| A | AUTOMATIC AIR VENT |
| | PRESSURE GAUGE AND COCK |
| | THERMOMETER |
| | VALVE (SPECIFICATION FOR TYPE) |
| | CHECK VALVE |
| | CHECK VALVE WITH ABD |
| | SOLENOID VALVE |
| | PRESSURE REDUCING VALVE |
| | OS&Y (OUTSIDE SCREW & YOKE) VALVE |
| | BUTTERFLY VALVE (MANUAL) |
| | BALANCING VALVE |
| | GAS COCK VALVE |
| | RELIEF VALVE |
| | ANGLE RELIEF VALVE |
| | TEMPERATURE MIXING VALVE LOCAL |
| | UNION |
| | REDUCER |
| | ECCENTRIC REDUCER (E.R.) |
| | SLEEVE |
| | PUMP |
| M | METER |
| | HOSE BIBB |
| | WATER HAMMER ARRESTER |
| | BACKWATER VALVE |
| | BALL VALVE |
| | CALIBRATED BALANCING VALVE |
| | BACKFLOW PREVENTER |
| | GATE VALVE |
| | GLOBE VALVE |
| | SEISMIC VALVE |
| MXV | TEMPERATURE MIXING VALVE |
| | STRAINER |
| | STRAINER WITH BLOW OFF VALVE |
| | DRAIN |
| | FLOOR SINK |
| | ROOF DRAIN; PLANTER DRAIN |
| | OVERFLOW ROOF DRAIN |
| | BOTTOM PIPE CONNECTION |
| | TOP PIPE CONNECTION |
| | VALVE IN VERTICAL |
| | P-TRAP |
| | FLOOR CLEANOUT/GRADE CLEANOUT |
| | INSULATED AND HEAT TRACED PIPING |
| | CLEANOUT/PLUG |
| | PIPE DOWN |
| | PIPE UP |
| | CAP |
| | CHANGE IN PIPE ELEVATION |
| | ARROW INDICATES DIRECTION OF FLOW |
| | PITCH PIPE DOWN IN DIRECTION OF ARROW |
| T | PLUMBING FIXTURE STOP VALVE |

## MISCELLANEOUS

| | |
|---|---|
| P 1 | RISER DESIGNATION |
| | RISER SYSTEM TYPE |
| | RISER NO. |
| CP 1 | EQUIPMENT DESIGNATION |
| | EQUIPMENT |
| | EQUIPMENT NO. |
| 1 P2.1 | DETAIL DESIGNATION |
| | DETAIL NUMBER |
| | DWG. SHEET NO. |
| 1 | SHEET NOTE NUMBER |
| 1 | REVISION NUMBER |

## PIPING LEGEND

### POTABLE WATER

| | |
|---|---|
| | DOMESTIC COLD WATER PIPING |
| | DOMESTIC HOT WATER PIPING |
| | DOMESTIC HOT WATER RETURN PIPING |

### NON-POTABLE / INDUSTRIAL WATER

| | |
|---|---|
| TP | TRAP PRIMER |
| NPW | NON-POTABLE WATER |

### NATURAL GAS / FUEL OIL

| | |
|---|---|
| G | NATURAL GAS PIPING |
| GV | NATURAL GAS VENT PIPING |
| FOV | FUEL OIL VENT PIPING |
| FOF | FUEL OIL FILL PIPING |
| FOS | FUEL OIL SUPPLY PIPING |
| FOR | FUEL OIL RETURN PIPING |

### WASTE / VENT / STORM

| | |
|---|---|
| SAN | SANITARY (ABOVE FLOOR) |
| SAN | SANITARY (BELOW FLOOR) |
| V | VENT PIPING |
| ST | STORM DRAIN PIPING |
| OST | OVERFLOW STORM PIPING |
| IW | INDIRECT WASTE PIPING |
| CD | CONDENSATE DRAIN PIPING |
| GW | GREASE WASTE PIPING |
| PD | PUMP DISCHARGE |
| GW | GREASE WASTE (BELOW FLOOR) |
| C | CENTER LINE |

STRUCTURAL NOTES:
A. EXAMINATION REQUIRED PRIOR TO CUTTING, DRILLING, CORING OR ANCHORING INTO THE EXISTING STRUCTURE.
1. DO NOT CUT, DRILL, CORE OR ANCHOR INTO ANY STRUCTURAL ELEMENT WITHOUT PRIOR WRITTEN APPROVAL FROM USRC'S ENGINEER OF RECORD (USRC'S EOR), UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL SCAN THE CONCRETE AT ALL LOCATIONS OF PROPOSED CUTS, PENETRATIONS OR ANCHORAGES TO LOCATE AND MARK ALL EMBEDDED OBJECTS INCLUDING BUT NOT LIMITED TO EMBEDDED REINFORCEMENT, PRESTRESS OR POST-TENSION STRANDS, EMBEDDED CONNECTIONS, ELECTRICAL CONDUIT, AND ANY OTHER EMBEDDED HARDWARE/EQUIPMENT. SCANNING SHALL BE PERFORMED BY A CERTIFIED TECHNICIAN USING A GROUND PENETRATING RADAR (GPR) CONCRETE SCANNING SYSTEM SUCH AS CONQUEST BY SENSORS & SOFTWARE INC. OR EQUAL. CALIBRATE AND RECALIBRATE THE SCANNER IN ACCORDANCE WITH . CALIBRATIONS MUST BE PERFORMED AT THE BEGINNING OF EACH SHIFT AND WHEN CONDITIONS CHANGE. PROVE THE CALIBRATION OF EACH SCANNER ON A TEST LOCATION OR TEST PIECE ACCEPTED BY USRC'S EOR, LOCATING AT LEAST THREE REINFORCING BARS USING THE SCANNER AND HAMMER DRILLED TEST HOLES TO DETERMINE DEPTH OF COVER. DO NOT CALIBRATE AT POST-TENSION STRANDS SINCE THE HAMMER DRILL BIT WILL DAMAGE THE POST-TENSION SHEATHING AND STRAND.
3. ADJUST LOCATIONS OF CUTS, PENETRATIONS AND ANCHORAGES AS REQUIRED TO AVOID EMBEDDED OBJECTS BY A MINIMUM OF 3", UNLESS NOTED OTHERWISE BY USRC'S EOR.
4. SUBMIT SCANNING REPORTS INCLUDING PHOTOGRAPHS AND SCALED DRAWINGS AND/OR SKETCHES, TO USRC'S EOR AND APPLICABLE DESIGN TEAM TO REVIEW AND APPROVE OR COMMENT ON PROPOSED CUTS, PENETRATIONS AND ANCHORAGES. ADJUST THE LOCATIONS AS DIRECTED BY USRC'S EOR AND/OR DESIGN TEAM. REVIEW TIME IS 7 TO 14 DAYS DEPENDING UPON THE QUALITY AND COMPLEXITY OF THE SUBMISSION.
5. USE HAMMER DRILLS WHEN POSSIBLE; DO NOT CORE DRILL UNLESS THE SCANNING OPERATION HAS CLEARLY SHOWN THAT THE AREA IS FREE OF EMBEDDED OBJECTS.
6. DO NOT CUT THROUGH OR DAMAGE THE EMBEDDED REINFORCING, PRESTRESS OR POST-TENSION STRANDS, EMBEDDED OBJECTS/CONNECTIONS, ELECTRICAL CONDUIT, AND ANY OTHER EMBEDDED HARDWARE/EQUIPMENT. IF PRESTRESS STRANDS, POST-TENSION STRANDS, OR OTHER EMBEDDED OBJECTS ARE INADVERTENTLY DAMAGED, THE TENANT/CONTRACTOR MUST NOTIFY THE LANDLORD (USRC) AND USRC'S EOR IMMEDIATELY.

## PLUMBING DRAWING LIST GRU

| DRAWING NO. | DESCRIPTION |
|---|---|
| P0.10 | PLUMBING - COVER SHEET |
| P2.02N | PLUMBING - BUS LEVEL - NEW WORK - NORTH |
| P4.00 | PLUMBING - ENLARGED VIEWS |
| P6.01 | PLUMBING SPECIFICATIONS |

MEPFPT Engineer:

WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN

PERMIT / BID — OCT 3, 2025

| NO. | REVISION | DATE |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE906987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
PLUMBING - COVER SHEET

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: WSP | CKD. BY: WSP
SCALE: 12" = 1'-0"

P0.10

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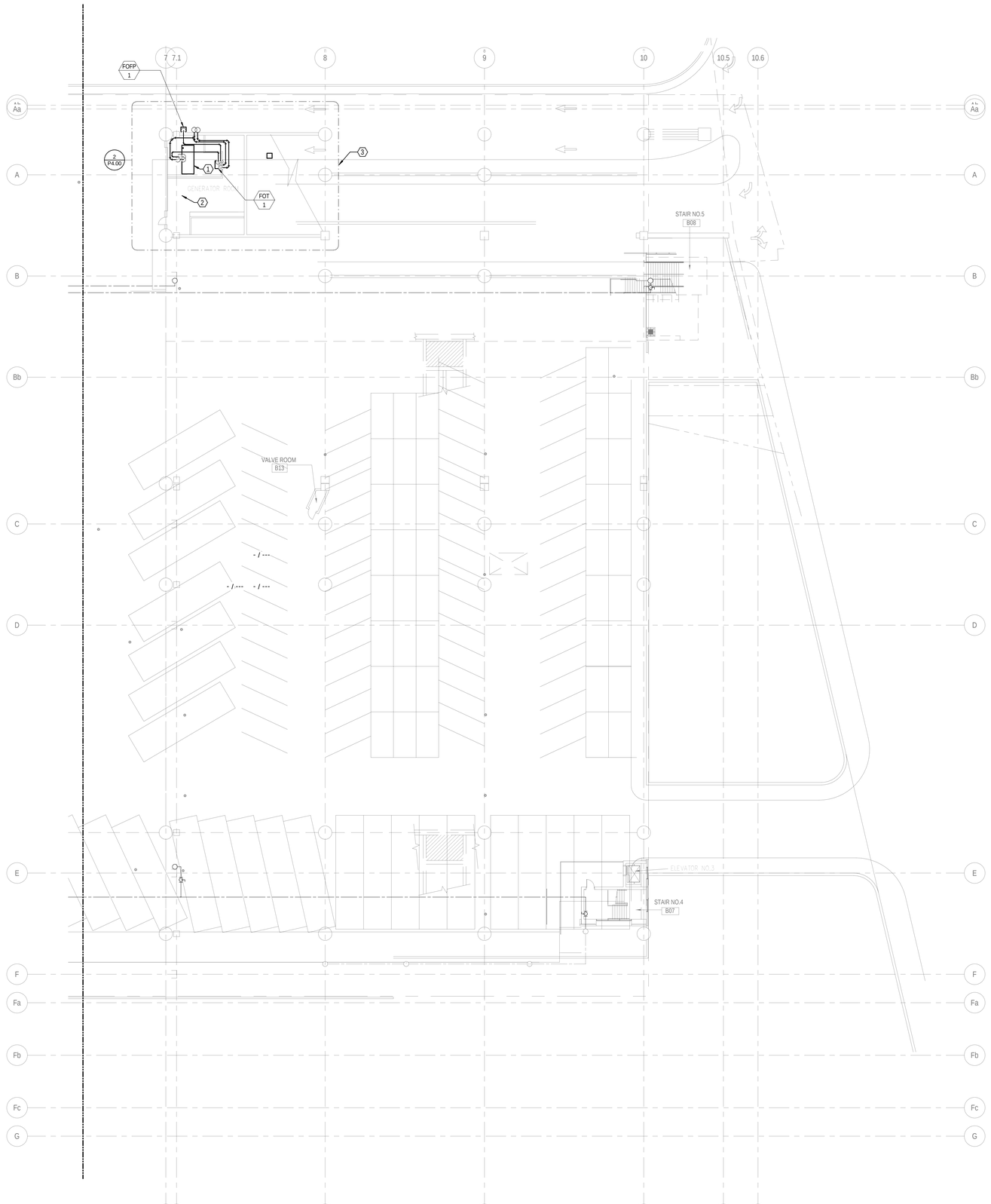



1 PLUMBING - BUS LEVEL - NEW WORK - NORTH
1/16" = 1'-0"

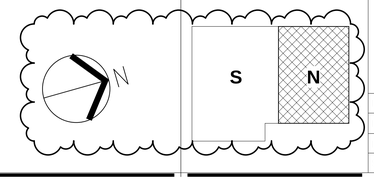
GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1' - 0"

## SHEET NOTES

1. EXISTING BELLY TANK BELOW EXISTING GENERATOR.
2. EXTEND DRY SPRINKLER PROTECTION FROM THE ADJACENT GARAGE AREA INTO THE GENERATOR ROOM AND PROVIDE NFPA 13-COMPLIANT SPRINKLER COVERAGE WITH HIGH-TEMPERATURE HEADS WITHIN THE ROOM.
3. THIS PLAN IS INCLUDED FOR REFERENCE ONLY. FOR FURTHER DETAIL OF ALL WORK WITHIN THIS AREA, REFER TO SHEET P4.00.

## GENERAL NOTES

## KEY PLAN

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## PLUMBING - BUS LEVEL - NEW WORK - NORTH

| | | |
|---|---|---|
| PROJECT NO.: US-WSP-192801E | | P2.02N |
| DATE: 10/03/2025 | | |
| DWN. BY: WSP | CKD. BY: WSP | |
| SCALE: 1/16" = 1'-0" | | |

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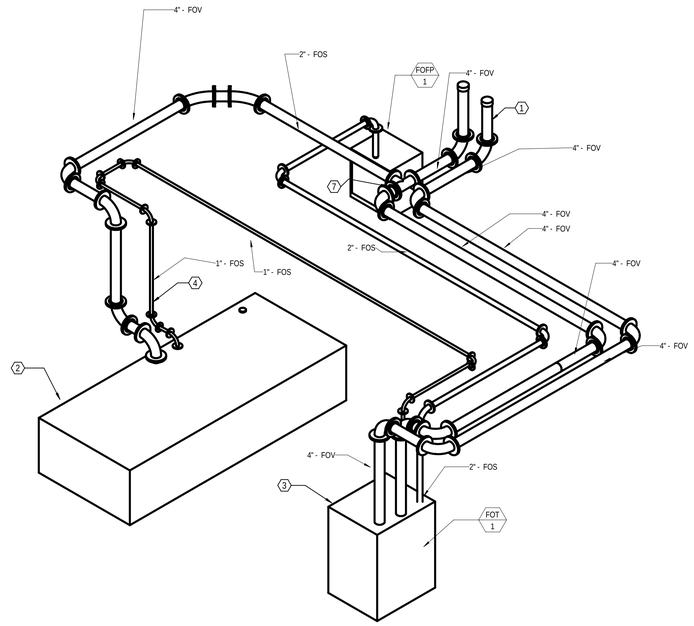
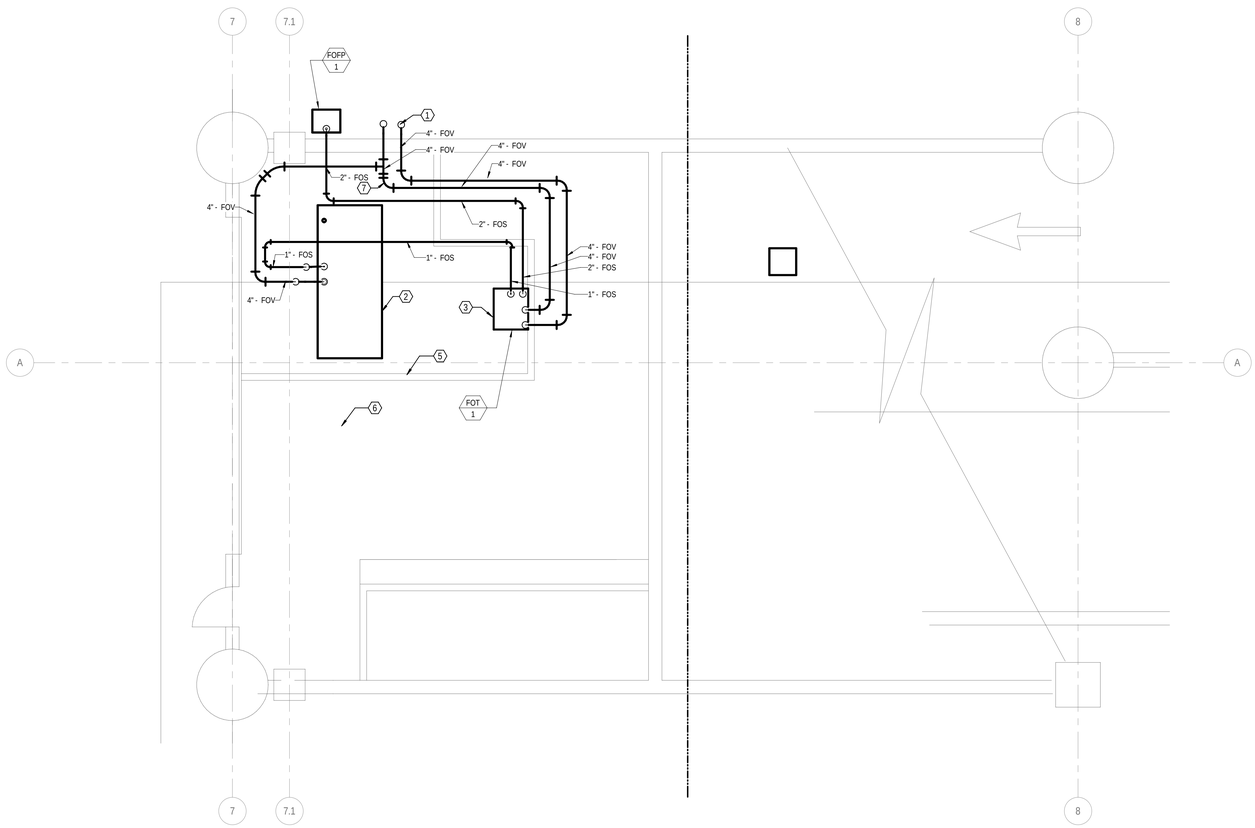



1 Fuel Oil 3D Riser




2 PLUMBING - BUS LEVEL ENL - NEW WORK - GENERATOR ROOM
1/4" = 1'-0"

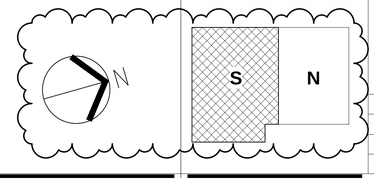
GRAPHIC SCALE
4' 2' 0 4' 8' 12'
SCALE: 1/4" = 1' - 0"

## SHEET NOTES

1. NORMAL AND EMERGENCY FUEL OIL TANK VENTS (2 TOTAL). TERMINATE EACH VENT AT RAIN CAP A MINIMUM OF 12' ABOVE THE ADJACENT GARAGE FINISHED FLOOR LEVEL.
2. EXISTING BELLY TANK BELOW EXISTING GENERATOR.
3. MOUNT FLOAT SWITCHES FOR PUMPS INTEGRAL TO FOT-1 WITHIN EXISTING BELLY TANK, AND WIRE FLOAT SWITCH TO FOT-1 INTEGRAL CONTROL PANEL.
4. CONNECT NORMAL FUEL TANK VENT PIPING AND FUEL OIL SUPPLY PIPING TO EXISTING BELLY TANK.
5. CONTAINMENT CURB. SEE MECHANICAL DRAWINGS FOR DETAILS.
6. EXTEND DRY SPRINKLER PROTECTION FROM THE ADJACENT GARAGE AREA INTO THE GENERATOR ROOM AND PROVIDE NFPA 13-COMPLIANT SPRINKLER COVERAGE WITH HIGH-TEMPERATURE HEADS WITHIN THE ROOM.
7. MANIFOLD NORMAL VENT PIPING FROM THE NEW DAY TANK AND THE EXISTING BELLY TANK INTO SINGLE 4' VENT.

## GENERAL NOTES

KEY PLAN

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE905987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## PLUMBING - ENLARGED VIEWS

| | | |
|---|---|---|
| PROJECT NO.: | US-WSP-192801E | P4.00 |
| DATE: | 10/03/2025 | |
| DWN. BY: WSP | CKD. BY: WSP | |
| SCALE: | 1/4" = 1'-0" | |

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**SECTION 22 13 13**

**FUEL OIL SYSTEMS**

**PART 1 – GENERAL**

1.01 WORK INCLUDED

A. Provide an integrated fuel system. This Specification requires the detailed system design, equipment, installation, start-up, and training to be the responsibility of a single specialized fuel system supplier. The Section includes responsibility for mechanical, electrical, and control systems.

B. Provide complete, in-place fuel storage system as indicated on the Drawings and specified herein, including but not necessarily limited to:

1. Fuel storage tanks and accessories
2. Fuel distribution pipe, valves and fittings
3. Fuel transfer and control – day tanks
4. Fuel transfer and control – duplex pump sets
5. Tank level and leak monitoring
6. Installation of tanks and piping system
7. All required permits, certifications, and inspection

1.02 RELATED DOCUMENTS

A. Section 22 05 01 - Plumbing General Provisions

B. Section 22 05 13 - Electric Motors for Plumbing

C. Section 22 05 29 – Hangers and Supports for Plumbing

D. Division 26 - Electric Specifications

1.03 REFERENCE STANDARDS

A. ANSI B31 – Standards of Pressure Piping

B. API 650 – Welded Steel Tanks for Oil Storage

C. API 2000 – Venting Atmospheric and Low Pressure Storage Tanks

D. NFPA 30 – Flammable and Combustible Liquids Code

E. National Electric Code

1.04 QUALITY ASSURANCE

A. Materials, Installation and Workmanship:

1. Except as modified by governing codes, comply with the applicable provisions of the following:



a. Installation shall be in compliance with Petroleum Equipment Institute Publications RP100, and RP300; NFPA 30; and all manufacturers' current installation instructions.
b. Comply with NFPA 70 "National Electric Code" for equipment, wiring, and conduit installed under this Section.
c. Provide listing/approval stamp, label, or other marking on equipment made to specified standards.

B. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.

1.05 SUBMITTALS

A. Provide manufacturer's published data and product characteristics as indicated on the Drawings and as specified for all equipment.

B. Submit with shop Drawings a list that indicates use, operating range, total range and location of all equipment.

C. Product Data: Submit manufacturer's product literature, including material specifications and installation requirements to demonstrate compliance with specified requirements for following items:

1. Fuel tank
2. Fill boxes
3. Overfill prevention valves
4. Vent heads
5. Extractor fittings
6. Overfill alarm sign

D. Shop Drawings: Submit tank shop Drawings for approval showing locations of all fittings, valves, devices, accessories, electrical diagrams and critical dimensions.

E. Shop Drawings: Indicate system layout, pipe sizes, location of supports, elevations, and equipment-mounting details. For fuel tank, indicate dimensions, vent sizes and location of all accessories including fill pipe, manways, tank supports, inventory sensor, and leak sensors.

F. Product Data: Provide data on pipe materials. pipe fittings, valves and accessories. Provide manufacturer's catalog information for all equipment.

G. Electrical System Design: Provide drawings and specifications that include the proposed conduit layout and wiring diagrams for equipment covered in this Section that requires electrical connections. Indicate conduit size and material, number and size of wires, location of wiring in classified areas and location of intrinsically safe circuits and conduits.

H. Provide a piping and instrument diagram for the system including a complete bill of material / equipment list.

I Control System Design: Provide control system designs including electrical schematics, panel physical, and field wiring diagrams. Control panels shall include power conditioners.



J. Structural Design: Provide drawings of reinforced concrete tank foundation slabs. Provide drawings of structural steel for walkways or pipe trestles where required.

K. Calculations: Provide calculations for pump selection, pipe sizes, and pipe support requirements.

L. Equipment Data: Provide manufacturer's information for all equipment.

M. Permit Applications: Provide copies of all permit applications.

N. Schedule: Provide a design and installation schedule.

1.06 PROJECT RECORD DOCUMENTS

A. Record and submit actual location of piping system, storage tanks, wiring, conduit runs and system components.

1.07 OPERATION AND MAINTENANCE

A. Operation Data: Include installation instructions and exploded assembly views.

B. Maintenance Data: Include maintenance and inspection data, replacement part numbers and availability, and service depot location and telephone number.

1.08 REGULATORY REQUIREMENTS

A. Equipment and installation necessary to accomplish the work specified herein shall comply with the latest revisions of the applicable federal, state, and local codes and regulations concerning fuel storage and pumping/piping systems.

B. All work specified herein shall conform to or exceed the requirements of the Reference Standards and with the requirements of applicable codes, regulations and standards specified herein. Whenever the provisions of said publications are in conflict, the more stringent requirement shall apply.

1.09 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five (5) years' documented experience.

B. Installer: Company specializing in performing the work of this Section with minimum five (5) years' documented experience.

C. Only workmen who have a minimum of two (2) years' continuous experience installing this type equipment and who have attended a training seminar put on by the tank manufacturer in the past two years shall perform installation of equipment.

D. The Contractor shall be International Fire Code Institute certified in the installation of storage tank equipment.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.



B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

**PART 2 – PRODUCTS**

2.01 ACCEPTABLE MANUFACTURERS

A. Aboveground Fuel Oil Storage Tank: Con Vault, Highland Tank

B. Leak Detection Panel: MSA Instruments, Pollulert, Veeder Root, Red Jacket

C. Fuel Oil Fill Accessories: Simplex, OPW, Wheaton

D. Tank Gauges: Pneumercator, Hersey, Levelometer

E. Solenoid Valves: Pryco, Simplex, Johnson Controls

F. Pressure Relief Valves: Pryco, Simplex

G. Field Control Panel: Hershey, Pryco

H. Float Switches: Pryco, Simplex

I. Leak Sensors: MSA Instruments, Owens-Corning, Pryco 209RB, R&G Sloane, Pollulert

J. Fuel Oil Pumps: Simplex, Viking

2.02 FUEL DISTRIBUTION PIPE, PIPE FITTINGS AND BALL VALVES

A. General: Provide and install steel piping as indicated on the Drawings.

B. Design Criteria:

1. Steel Pipe: ASTM A53 or ASME B36.10, Schedule 40 black.
2. Fittings: ASTM B16.3, 300-pound threaded malleable iron, or ASTM A234, forged steel welding type.
3. Finish: Prime and finish paint with industrial enamel.
4. Accessory equipment.
5. Unions: 300-pound malleable iron threaded unions.
6. Ball Valves: Stainless steel two-piece body, stainless steel ball, Teflon seats and stuffing box ring, lever handle and balancing stops, threaded ends with union.

2.03 DAY TANK

A. General:

1. Provide and install a pre-engineered above ground day tank complete with gauges, vents, level switches, piping and valves and other accessories specified herein as a completely assembled system. The primary tank shall have a total volume as noted on the Drawings.

B. Design Criteria:



1. Day tank shall be constructed in accordance with UL Standard 2080. The day tank shall also be constructed in accordance with Flammable and Combustible Liquids Code, NFPA 30; and the Standard for Installation and Use of Stationary Combustible Engine and Gas Turbines, NFPA 37. System shall provide for 2-hour fire protection in accordance with NFPA 30.
2. Integral secondary containment shall provide at minimum 150 percent containment of the primary storage tank. A leak detection access tube shall be located in the interstitial space between the inner tank and the secondary barrier.
3. The day tank system shall be factory-insulated utilizing closed cell polyurethane foam completely filling the annulus between the primary and secondary tank.
4. Insulation Mechanical Properties:

a. Core Density: 21.7 PCF, ASTM D-1622
b. Closed Cell Content: 90 to 95 percent, ASTM D-2826
c. "K" Factor: (BTU/hour inch/foot²/degree F at 73 degrees F), 14, ASTM C-518

5. Internal and External Finish:

a. The tank shall have an internal epoxy liner to inhibit internal corrosion. The complete tank system shall include an epoxy-based high-gloss epoxy exterior finish. The final coat shall be a clear fuel-resistant coating. Color of finish to be selected by Owner.

6. Venting:

a. The tank shall be provided with atmospheric (normal) vent cap with screen and appropriately sized zinc-plated emergency vent cap for both the primary and secondary tanks. Emergency vent cap shall be spring-pressure operated. Opening pressure shall be 0.5 psig, full opening pressure 2.5 psig. Limits shall be marked on top of each vent.

**PART 3 – EXECUTION**

3.01 EXAMINATION

A. Verification of Conditions (by Installer): Examine conditions under which work is to be installed and notify Prime Contractor in writing of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 PREPARATION

A. Regulatory Approvals:

1. Documents submitted to jurisdictional authorities by Architect.
2. Contractor responsible for obtaining permit for construction and for paying all fees and costs for all permits.



3.03 INSTALLATION

A. Comply with manufacturer's printed instructions and recommendations for tank installation in addition to requirements listed at "Quality Assurance" in Paragraph 1.04 above.

B. Coordinate with Owner's Representative to allow witnessing of all aspects of installation and testing.

3.04 TANK MONITORING SYSTEM

A. Provide fuel level control panel near fuel inlet fill box. Panel shall have indicating lights and/or horns as described for annunciation at each fuel level alarm condition. Mount panel on wall as indicated on the Drawings or as directed by Owner.

B. Provide water-proof remote overfill alarm box with horn and flashing light and overfill sign. Install on exterior wall 10 feet-0 inches above grade where shown on the Drawings. Mount overfill acknowledgment switch on exterior wall 4 feet-0 inches above grade near fuel tank as shown on the Drawings.

C. Route wiring and cables in rigid conduit with water-tight junction boxes and cable manifolds. Ensure penetrations of piping containment chamber are water-sight.

D. Provide power wiring from electrical panel to new tank monitoring panel, including wiring between panel and remote sensors and alarm panel.

E. Install monitor cables in 1-inch rigid conduit from monitor panel to leak detection probes and to tank level sensor in tank. Provide sealing fittings in conduit at exterior building wall penetrations.

F. Provide extractor manhole at interstitial space probe for access to monitor cable connections.

3.05 COLOR CODING OF FILLPORT

A. Permanently mark all fillports to identify product inside tank in manner consistent with color and symbol code of American Petroleum Institute as follows:

1. #2 Fuel Oil: Green

3.06 FUEL TANK INSTALLATION

A. Install tanks in strict accordance with the manufacturer's recommendations, PEI/RP200-92, and applicable fire and environmental codes. State and local permits shall be obtained prior to installation.

B. Aboveground – Tank shall be clearly marked on all sides with warning signs: "FLAMMABLE" or "COMBUSTIBLE", "NO SMOKING", tank volume, product identification, and other signs as required by the applicable codes.

C. Electrical work shall be in accordance with applicable codes and shall be rated for hazardous area as required. Tanks shall be electrically grounded in accordance with NFPA 78.



D. The tank installation shall be inspected and approved by the tank supplier or its certified contractor. The tank supplier shall submit a comprehensive checklist of quality and safety items critical to the system and verify that the installation has been in accordance with these standards and applicable fire and environmental codes.

3.07 PIPING INSTALLATION

A. Install in accordance with the manufacturer's instructions and PEI/RP200-92.

B. Inspect all materials for signs of damage, and confirm compliance with specifications.

C. Avoid damage to piping materials or coatings during handling, installation and testing.

D. Provide non-conducing dielectric connections wherever joining dissimilar metals. Install to NACE RP-01-69.

E. Slope fuel-oil and diesel-oil piping down toward tank one inch per ten feet.

F. Provide adequate support for piping on 10-inch centers minimum.

G. Group piping whenever practical at common elevations.

H. Install piping to allow for expansion and contraction so that pipe, joints, or connected equipment will not be stressed.

I. Provide clearance for access to valves and fittings.

J. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of the completed system.

K. Install unions, couplings, valves, and flexible connectors in accordance with manufacturers' recommendations.

3.08 TANK LEVEL AND LEAK MONITORING SYSTEM INSTALLATION

A. Install in strict accordance with the manufacturer's recommendations, National Electrical Code NFPA 70, and NFPA 30A.

B. Electrical work shall be rated for hazardous area as required.

C. Install the monitoring system control panel as indicated on the Drawings.

D. Install the tank level probe and the interstitial leak probe in the proper locations in the fuel tank. Install the piping sump sensor in the piping sump.

E. Install the overfill alarm and acknowledgment switch as shown in the plan.

F. The leak monitoring system installation shall be inspected and approved by the equipment supplier or its certified contractor. The leak monitoring system supplier shall submit a comprehensive checklist of quality and safety items critical to the system and verify that the installation has been in accordance with these standards and applicable fire and environmental codes.



3.09 FIELD QUALITY CONTROL

A. Final Tightness Test: Perform tightness test acceptable to local jurisdictional authority prior to placing new tank system in service.

B. Test fuel distribution system according to NFPA 30.

C. Replace leaking joints and connections with new materials.

D. Perform test with capabilities of detecting tank or piping leak as small as five hundredths (0.05) of one gallon in one hour accounting for variables such as vapor pockets, thermal expansion of product, temperature stratifications, ground water level, evaporation, pressure, and end deflection.

E. Ensure all tightness tests are performed by technician with understanding of variables affecting test, who is trained in performance of test, meets qualifications, and adheres to procedures as set forth by local governing authorities.

F. Ensure report of tightness test is sent by technician to Architect and Owner no later than 30 days after performance of test.

G. Ensure all test reports are in a form satisfactory to local governing authorities and include the following minimum information:

1. Facility registration number
2. Identification number used on application form required for tank and piping system tested
3. Date of test
4. Results of test
5. Test method
6. Address of technician
7. Signature of technician

H. Final Installation Inspection:

1. Contact local governing authorities of installation completion and make arrangements for final inspection by local governing authorities consisting of the following:

a. Measurement of final tank internal diameter with tank filled completely with water for accurate measurement.
b. Testing alarm systems for proper functions.
c. Verification proper color coding has been applied to conform to local governing design standards.

2. Perform all corrections identified by local governing authorities during final inspection and notify local governing authorities when any corrective work is scheduled to be completed to allow re-inspection by local governing authorities to confirm corrective work and complete installation are satisfactory.

I. Submit reports of test and procedures in writing to the Engineer.



3.10 COMMISSIONING

A. Before activating the system, perform these steps:

1. Flush system piping with grade of fuel to be used by Owner to remove any debris and foreign matter in piping prior to filling tank for the first time. Service all system filters and screens and dispose of fuel in accordance with EPA and NFPA regulations after flushing.
2. Open valves to correct position for system operation.

B. Pumps:

1. Clean strainers
2. Verify proper voltage

END OF SECTION



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Architect:

Structural Engineer:

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE906987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
PLUMBING SPECIFICATIONS

| | |
|---|---|
| PROJECT NO.: US-WSP-192801E | P6.01 |
| DATE: 10/03/2025 | |
| DWN. BY: WSP / CKD. BY: WSP | |
| SCALE: | |

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## POWER LEGEND

| | |
|---|---|
| | SURFACE MOUNTED POWER PANEL: SIZE APPROXIMATELY AS SHOWN |
| | BUSWAY RISER WITH PLUG IN UNIT, FUSE |
| | BUSWAY RISER WITH PLUG IN UNIT, BREAKER |
| T F | STEP DOWN TRANSFORMER |
| G | GENERATOR |
| | AUTOMATIC TRANSFER SWITCH |
| | HEAVY DUTY DISCONNECT SWITCH, FUSED TYPE |
| M | MOTOR CONNECTION |
| J | JUNCTION BOX, CEILING MOUNTED |
| | CIRCUIT BREAKER |
| 2 1 | SHEET NOTE |
| FOFP 1 | MECHANICAL EQUIPMENT TAG; SEQUENTIAL UNIT NUMBER |

## RACEWAY LEGEND

| | |
|---|---|
| | CONDUIT CONCEALED ABOVE CEILING OR WITHIN WALL |
| | CONDUIT BELOW GRADE OR EMBEDDED WITHIN SLAB |
| | CONDUIT UP |
| | CONDUIT DOWN |
| | CONDUIT STUBBED OUT WITH BUSHING NOTE: PROVIDE PULLSTRING IN EACH EMPTY RACEWAY |
| E | CONDUIT STUBBED OUT AND CAPPED NOTE: PROVIDE PULLSTRING IN EACH EMPTY RACEWAY |
| | PHASE CONDUCTOR(S) |
| | GROUNDING CONDUCTOR |
| | ISOLATED GROUNDING CONDUCTOR |
| | NEUTRAL CONDUCTOR |

## FIRE ALARM LEGEND

| | |
|---|---|
| P | MANUAL PULL STATION |
| 2 | AREA SMOKE DETECTOR, CEILING MOUNTED (SMOKE DETECTOR, SEMI-FLUSH MOUNTED IN CEILING) |
| A | HEAT DETECTOR, CEILING MOUNTED |
| W | SPRINKLER WATER FLOW MONITOR MODULE |
| T | SPRINKLER TAMPER MONITOR MODULE |
| P | PRESSURE SWITCH WITH HI/LO SUPERVISORY SWITCH. |
| S | COMBINATION FIRE ALARM SPEAKER/VISUAL ALARM; WALL MOUNTED |
| H | FIRE ALARM HORN; CEILING MOUNTED |
| H | FIRE ALARM HORN; WALL MOUNTED |
| H | COMBINATION FIRE ALARM HORN/VISUAL ALARM; WALL MOUNTED |
| | VISUAL ALARM; CEILING MOUNTED |
| | VISUAL ALARM; WALL MOUNTED |
| FACP | FIRE ALARM AND CONTROL PANEL |
| FARP | FIRE ALARM REMOTE PANEL |
| FATC | FIRE ALARM TERMINAL CABINET |
| FAAP | FIRE ALARM ANNUNCIATOR PANEL |
| FARA | FIRE ALARM REMOTE ANNUNCIATOR |
| GSP | GENERATOR REMOTE STATUS PANEL |

## EQUIPMENT NAMING LEGEND

E O S U — ATS BUS DPH DPL DSH DSL LP LPH LRC MCC MP MS PDU T TB TC — - 2 N A / 1,3,5

- 1,3,5 — CIRCUIT NUMBER(S)
- A — FIRST OF THIS TYPE ON FLOOR
- N — NORTH, EAST, SOUTH OR WEST
- 2 — FLOOR LEVEL

| | |
|---|---|
| ATS | AUTOMATIC TRANSFER SWITCH |
| BUS | BUSWAY |
| DPH | DISTRIBUTION PANEL 277/480V |
| DPL | DISTRIBUTION PANEL 120/208V |
| DSH | DISTRIBUTION SWITCHBOARD 277/480V |
| DSL | DISTRIBUTION SWITCHBOARD 120/208V |
| LP | BRANCH CIRCUIT PANELBOARD 120/208V |
| LPH | BRANCH CIRCUIT PANELBOARD 277/480V |
| LRC | LIGHTING RELAY CABINET |
| MCC | MOTOR CONTROL CENTER |
| MP | MECHANICAL EQUIPMENT PANELBOARD 120/208V |
| MPH | MECHANICAL EQUIPMENT PANELBOARD 277/480V |
| MS | MAIN SWITCHBOARD |
| PDU | POWER DISTRIBUTION UNIT |
| T | TRANSFORMER |
| TB | TELECOM BACKBOARD |
| TC | TELECOM CABINET |

| | |
|---|---|
| E | EMERGENCY LIFE SAFETY |
| O | OPTIONAL STANDBY POWER |
| S | LEGALLY REQUIRED STANDBY POWER |
| U | UNINTERRUPTIBLE POWER SUPPLY |

## ABBREVIATIONS

| | |
|---|---|
| A | AMPERES |
| AF/AS | AMPERE RATING OF FUSE/SWITCH |
| AIC | AMPERES INTERRUPTING CAPACITY |
| AT/AF | AMPERE RATING OF CIRCUIT, BREAKER TRIP/FRAME |
| ATS | AUTOMATIC TRANSFER SWITCH |
| C | CONDUIT (GENERIC TERM FOR RACEWAY - PROVIDE AS SPECIFIED) |
| CB | CIRCUIT BREAKER |
| CKT | CIRCUIT |
| CU | COPPER |
| ELEV | ELEVATOR |
| FA | FIRE ALARM |
| FP | FIRE PROTECTION |
| GC | GENERAL CONTRACTOR |
| JB | JUNCTION BOX |
| KCMIL | THOUSAND CIRCULAR MILS |
| KVA | KILO-VOLT AMPERE |
| KW | KILO-WATT |
| MCB | MAIN CIRCUIT BREAKER |
| MLO | MAIN LUGS ONLY |
| MS | MANUAL SWITCH |
| MTD | MOUNTED |
| MTG | MOUNTING |
| (N) | NEW |
| NTS | NOT TO SCALE |
| P | POLE |
| PB | PULL BOX |
| PH | PHASE |
| PWR | POWER |
| UON | UNLESS OTHERWISE NOTED |
| WP | WEATHERPROOF |
| (X) | EXISTING TO BE REMOVED |

## CODES AND STANDARDS

THE SCOPE OF THE WORK SHALL INCLUDE THE FURNISHING AND INSTALLATION OF THE NECESSARY MATERIAL AND LABOR TO ACCOMPLISH THE WORK INDICATED BY THE DRAWINGS AND HEREIN SPECIFIED. ALL WORK BY CONTRACTOR SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL BUILDING CODES AND STANDARDS INCLUDING BUT NOT LIMITED TO:

A. STATE, COUNTY, AND CITY HEALTH AND BUILDING CODES
B. NFPA 13, 2016 EDITION
C. NFPA 70, 2020 EDITION
D. NFPA 72, 2016 EDITION
E. NFPA 99, STANDARD FOR HEALTHCARE FACILITIES, 2018 EDITION
F. NFPA 101: LIFE SAFETY CODE, 2018 EDITION
G. OTHER NFPA CODES AS REFERENCED BY STANDARD CODES
H. ANSI A117.1-2017, ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
I. THE AMERICANS WITH DISABILITIES ACT (ADA), ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES, 2010 EDITION

Structural Notes:

A. Examination required prior to cutting, drilling, coring or anchoring into the existing structure.
1. Do not cut, drill, core or anchor into any structural element without prior written approval from USRC's Engineer of Record (USRC's EOR), unless noted otherwise.
2. The contractor shall scan the concrete at all locations of proposed cuts, penetrations or anchorages to locate and mark all embedded objects including but not limited to embedded reinforcement, prestress or post-tension strands, embedded connections, electrical conduit, and any other embedded hardware/equipment. Scanning shall be performed by a certified technician using a Ground Penetrating Radar (GPR) concrete scanning system such as Conquest by Sensors & Software Inc. or equal. Calibrate and recalibrate the scanner in accordance with . Calibrations must be performed at the beginning of each shift and when conditions change. Prove the calibration of each scanner on a test location or test piece accepted by USRC's EOR, locating at least three reinforcing bars using the scanner and hammer drilled test holes to determine depth of cover. Do not calibrate at post-tension strands since the hammer drill bit will damage the post-tension sheathing and strand.
3. Adjust locations of cuts, penetrations and anchorages as required to avoid embedded objects by a minimum of 3", unless noted otherwise by USRC's EOR.
4. Submit scanning reports including photographs and scaled drawings and/or sketches, to USRC's EOR and applicable design team to review and approve or comment on proposed cuts, penetrations and anchorages. Adjust the locations as directed by USRC's EOR and/or design team. Review time is 7 to 14 days depending upon the quality and complexity of the submission.
5. Use hammer drills when possible; do not core drill unless the scanning operation has clearly shown that the area is free of embedded objects.
6. Do not cut through or damage the embedded reinforcing, prestress or post-tension strands, embedded objects/connections, electrical conduit, and any other embedded hardware/equipment. If prestress strands, post-tension strands, or other embedded objects are inadvertently damaged, the Tenant/Contractor must notify the Landlord (USRC) and USRC's EOR immediately.

## ELECTRICAL DRAWING LIST - DWW

| DRAWING NO. | DESCRIPTION |
|---|---|
| E0.10 | ELECTRICAL LEGENDS AND ABBREVIATIONS |
| E0.20 | ELECTRICAL - SCHEDULES |
| E2.02N | BUS LEVEL - ELECTRICAL PLAN - NEW WORK - NORTH |
| E4.00 | ELECTRICAL - ENLARGED VIEWS |
| E7.00 | ELECTRICAL - SPECS |
| E7.01 | ELECTRICAL - SPECS |
| E7.02 | ELECTRICAL - SPECS |

## EQUIPMENT SCHEDULE - MECHANICAL / PLUMBING

NOTES: ELECTRICAL CONTRACTOR SHALL PROVIDE WIRING BETWEEN THE ELECTRICAL DISCONNECT AND THE MECHANICAL/PLUMBING EQUIPMENT POWER CONNECTION. ELECTRICAL CONTRACTOR SHALL COORDINATE FINAL ELECTRICAL CONNECTION WITH MECHANICAL SHOP DRAWINGS AND/OR SUBMITTALS. ALL WIRE SIZES BASED ON "NG" TYPE AS OUTLINED IN WIRING SCHEDULE. '*= DESIGNATES NOT APPLICABLE

| EQUIPMENT DESIGNATION | | ELECTRICAL DATA | | | | | S =Motor Rated Switch*, TO = Thermal Overload Switch FD = Fused Disconnect, NFD = Non-Fused Disconnect VFD = Variable Frequency Drive, MS = Motor Starter MSD = Motor Starter Disconnect, SP = Single Point Connection* VFDD = Variable Frequency Drive with Disconnect DISCONNECT TYPE | SWITCH SIZE (AS)* | FUSE SIZE (AF)* | WIRE SIZE | VFD REQUIRED (BY DIV 22/23) | EM POWER | NOTES | PANEL NAME | CIRCUIT NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TYPE | NUMBER | HP | FLA | VA | VOLTAGE | PHASE | | | | | | | | |
| EF | 1&2 | | 7 | 5565 VA | 460 V | 3 | FD | 30 | 10 | 20 | N | Y | | ELDP | 31,33,35 |
| | | | | | | | | | | | | | | | |
| EUH | A | | 16 | 3300 VA | 208 V | 1 | FD | 30 | 20 | 20 | N | Y | MULTIPLE UNITS ON THE FLOOR PLAN | EPNB | <varies> |
| | | | | | | | | | | | | | | | |
| FOFP | 1 | | 0 | 50 VA | 120 V | 1 | FD | 30 | 1 | 20 | N | Y | | EPNB | 19 |

MEPFPT Engineer:

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wsp.com

Architect:

Structural Engineer:

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA · JIANFENG SUN · No. PE40000573 · 10/3/2025 · ELECTRICAL · PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ELECTRICAL LEGENDS AND ABBREVIATIONS

| | | |
|---|---|---|
| PROJECT NO.: | US-WSP-192801E | E0.10 |
| DATE: | 10/03/2025 | |
| DWN. BY: Author | CKD. BY: Checker | |
| SCALE: | 12" = 1'-0" | |

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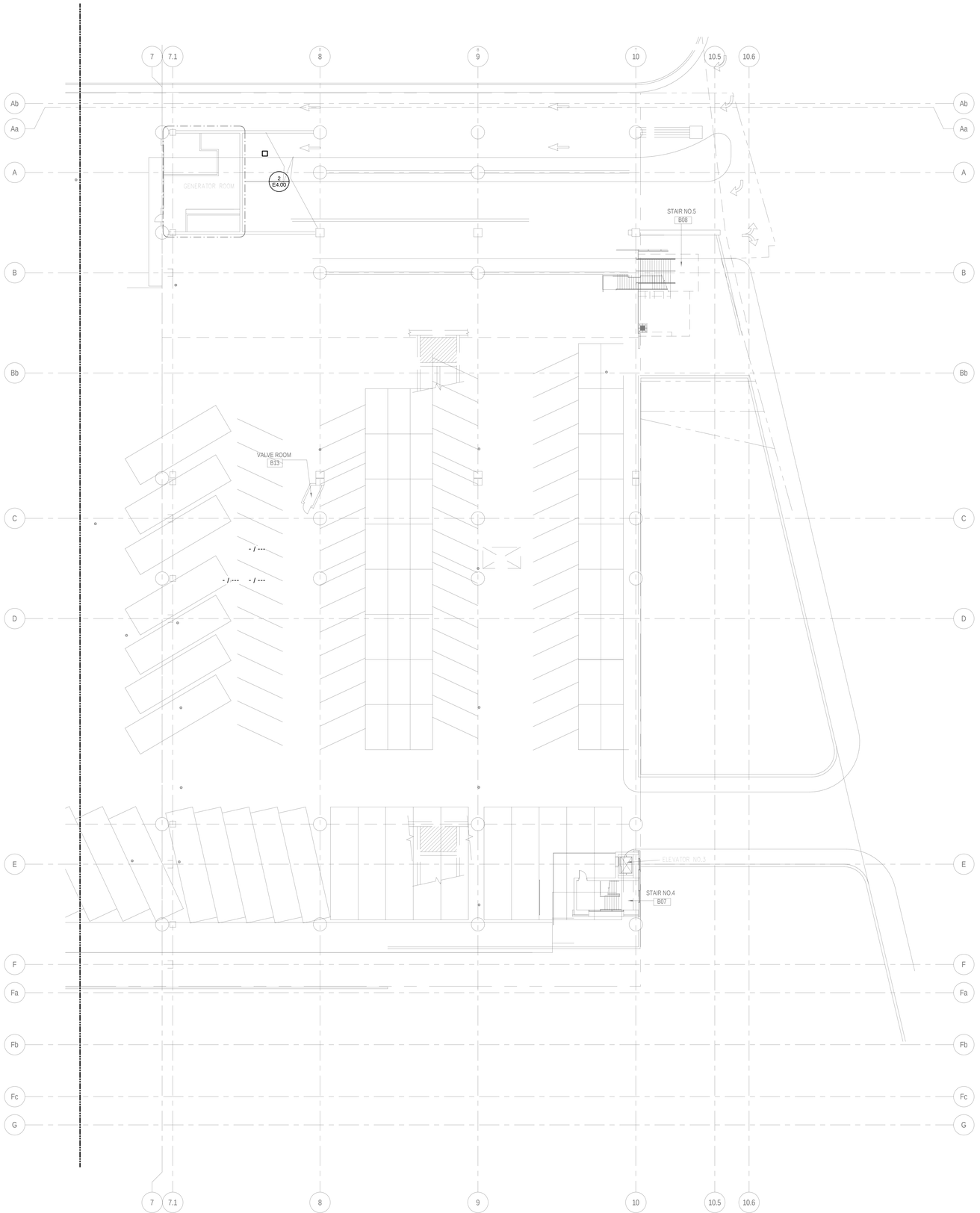



1 ELECTRICAL - BUS LEVEL - NEW WORK - NORTH
1/16" = 1'-0"

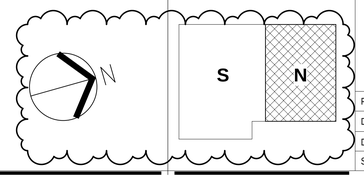
GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1' - 0"

## SHEET NOTES

## GENERAL NOTES

A. PROVIDE CONDUIT, WIRE, OVERCURRENT PROTECTION, ETC. FOR A COMPLETE ELECTRICAL DEVICE INSTALLATION AS DEFINED ON PLANS, RISER DIAGRAMS, AND SPECIFICATIONS.
B. FIELD COORDINATE EXACT ROUTING OF ALL NEW FEEDERS AND BRANCH CIRCUITS.
C. ALL PENETRATIONS THROUGH FLOOR SLABS AND FIRE RATED WALLS SHALL BE PROPERLY FIRE-STOPPED. REFER TO ARCHITECTURAL FIRE STOP DETAILS FOR ADDITIONAL INFORMATION.
D. ALL CONDUITS, WIRING, ETC. MOUNTED ALONG CEILING SHALL BE MOUNTED AS CLOSE TO THE SLAB AS POSSIBLE AND SHALL FOLLOW THE SLOPE OF THE CEILING.
E. MC CABLE IS NOT PERMITTED TO BE USED IN ELECTRICAL OR MECHANICAL ROOMS.
F. SHADED REGIONS INDICATE AREAS OUT OF CONTRACT/SCOPE.
G. CONTRACTOR TO INCLUDE SCOPE TO RELOCATE/MODIFY ANY EXISTING WIRING OR CONDUIT IN OPEN CEILING AREAS.
H. (N) DESIGNATION INDICATES NEW EQUIPMENT.
I. (E) DESIGNATION INDICATES EXISTING EQUIPMENT.

## KEY PLAN

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Architect:

Structural Engineer:

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| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JIANFENG SUN
10/3/2025
No. PE40000573
ELECTRICAL
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

OWNER
# UNION STATION REDEVELOPMENT CORPORATION

TITLE
# BUS LEVEL - ELECTRICAL PLAN - NEW WORK - NORTH

| | | |
|---|---|---|
| PROJECT NO.: | US-WSP-192801E | E2.02N |
| DATE: | 10/03/2025 | |
| DWN. BY: Author | CKD. BY: Checker | |
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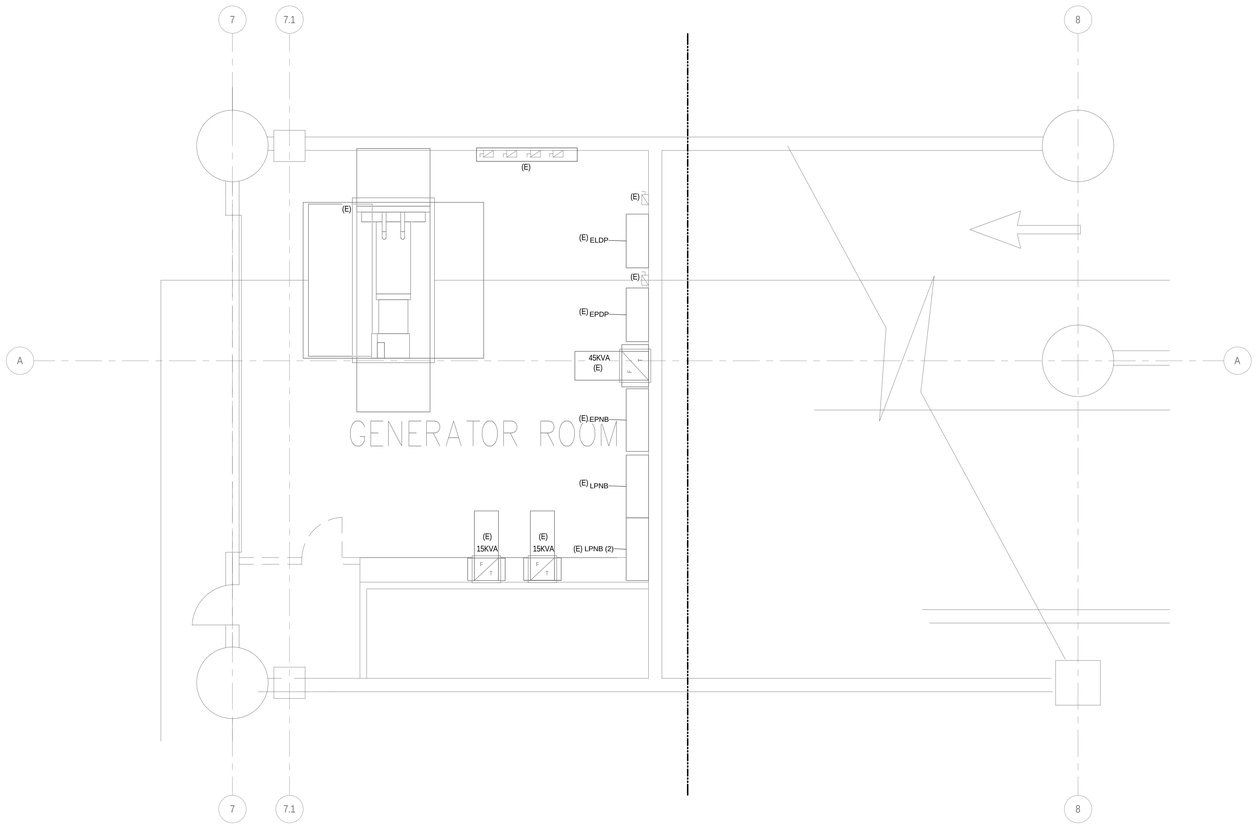
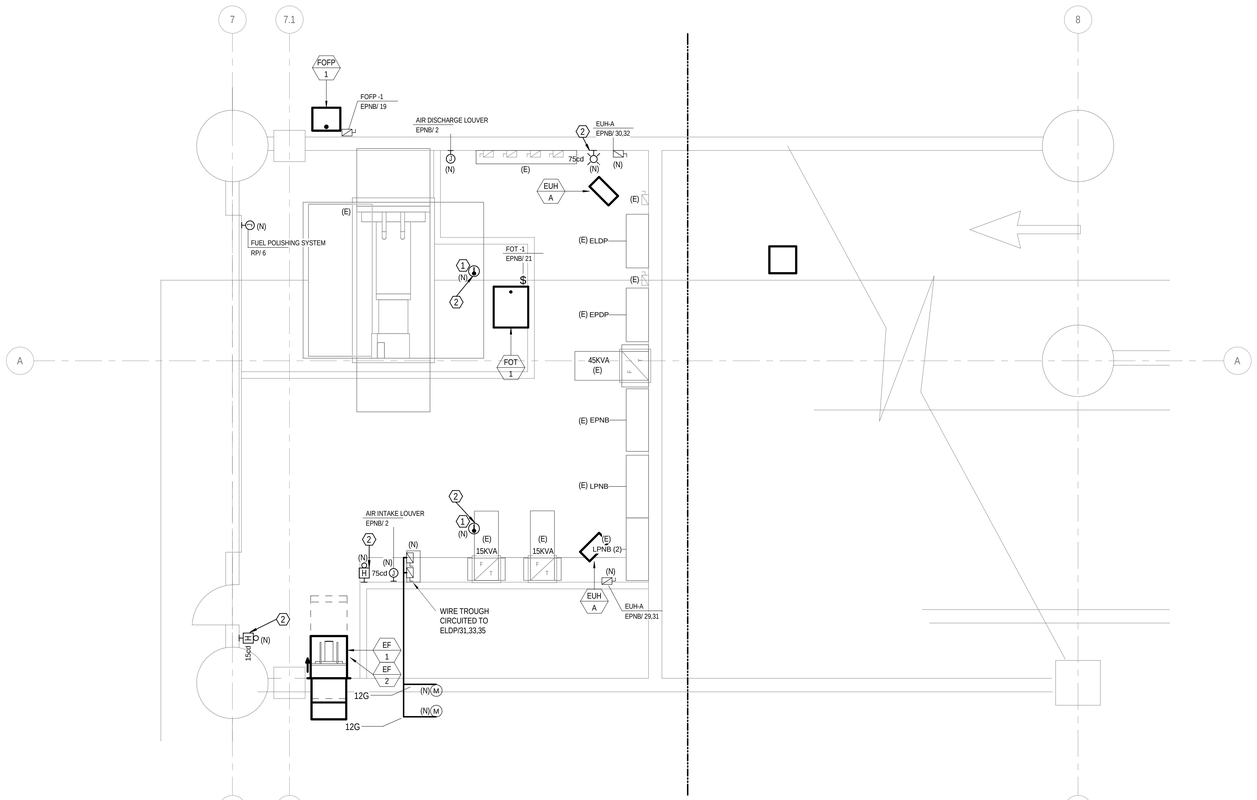



1 ELECTRICAL - BUS LEVEL ENL - DEMO - GENERATOR ROOM
1/4" = 1'-0"




2 ELECTRICAL - BUS LEVEL ENL - NEW WORK - GENERATOR ROOM
1/4" = 1'-0"

GRAPHIC SCALE
4' 2' 0 4' 8' 12'
SCALE: 1/4" = 1' - 0"

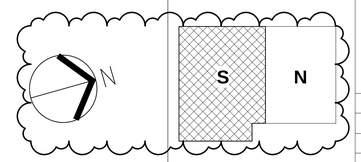
## SHEET NOTES

1 COMBINATION RATE OF RISE FIXED TEMPERATURE 165 DEGREES.
2 CONNECT TO THE FIRE ALARM SYSTEM IN THE SECURITY ROOM IN THE MEZZANINE LEVEL. INCLUDE REPROGRAMMING OF THE CONTROL PANEL FOR THE NEW DEVICE. ALL NEW FIRE ALARM CONDUCTORS SHALL BE RUN IN ELECTRIC METAL TUBING..

## GENERAL NOTES

A. PROVIDE CONDUIT, WIRE, OVERCURRENT PROTECTION, ETC. FOR A COMPLETE ELECTRICAL DEVICE INSTALLATION AS DEFINED ON PLANS, RISER DIAGRAMS, AND SPECIFICATIONS.
B. FIELD COORDINATE EXACT ROUTING OF ALL NEW FEEDERS AND BRANCH CIRCUITS.
C. ALL PENETRATIONS THROUGH FLOOR SLABS AND FIRE RATED WALLS SHALL BE PROPERLY FIRE-STOPPED. REFER TO ARCHITECTURAL FIRE STOP DETAILS FOR ADDITIONAL INFORMATION.
D. ALL CONDUITS, WIRING, ETC. MOUNTED ALONG CEILING SHALL BE MOUNTED AS CLOSE TO THE SLAB AS POSSIBLE AND SHALL FOLLOW THE SLOPE OF THE CEILING.
E. MC CABLE IS NOT PERMITTED TO BE USED IN ELECTRICAL OR MECHANICAL ROOMS.
F. SHADED REGIONS INDICATE AREAS OUT OF CONTRACT/SCOPE.
G. CONTRACTOR TO INCLUDE SCOPE TO RELOCATE/MODIFY ANY EXISTING WIRING OR CONDUIT IN OPEN CEILING AREAS.
H. (N) DESIGNATION INDICATES NEW EQUIPMENT.
I. (E) DESIGNATION INDICATES EXISTING EQUIPMENT.

KEY PLAN




MEPFPT Engineer:

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JIANFENG SUN
10/3/2025
No. PE40000573
ELECTRICAL
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES GENERATOR ROOM

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## ELECTRICAL - ENLARGED VIEWS

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: Author | CKD. BY: Checker |
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**SECTION 26 05 01**

**ELECTRICAL GENERAL PROVISIONS**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. The General and Supplementary Conditions and other Divisions are a part of the requirements for the work under this Division of the Specifications.

B. It is the intent of these Specifications to provide complete systems. Completeness shall mean that all materials, equipment, and systems as installed and operating on this project have been installed properly with the best practices of the trade; are suitable for the intended purpose, location, and environment; properly fit within the physical space limitations for the project; are in conformance with applicable codes and reference standards, have been started-up, tested, adjusted, and commissioned for the intended use; have maintained applicable UL Listings; are in compliance with manufacturer's recommendations and warranty requirements; ready for the Owner's use, and in the opinion of the engineer, performing as designed.

1.2 WORK INCLUDED

A. Provide labor and materials required to install, test and place into operation the electrical systems as called for in the Contract Documents, in accordance with applicable codes and regulations and in accordance with the equipment manufacturers written directions.

B. Provide labor, materials, and accessories required to provide complete, operating electrical systems. Labor, materials, or accessories not specifically called for in the Contract Documents, but required to provide complete, operating electrical systems shall be provided without additional cost.

1.3 QUALITY ASSURANCE

A. Comply with the current applicable codes, ordinances, and regulations of the Authority or Authorities Having Jurisdiction, the rules, regulations, and requirements of the utility companies serving the project, and the Owner's insurance underwriter.

B. Drawings, specifications, codes and standards are minimum installation requirements. Where requirements differ, the most stringent apply.

C. Should any change in drawings or specifications be required to comply with governing regulations, notify the Engineer prior to submitting bid.

D. All electrical equipment, materials, devices, and installations shall meet or exceed minimum requirements of ADA, ANSI, ASTM, IEEE, IES, NEC, NEMA, NETA, NFPA, OSHA, SMACNA and UL.

E. Execute work in strict accordance with the best practices of the trades in a thorough, substantial, workperson-like manner by competent workpeople. Provide a competent, experienced, full-time Superintendent who is authorized to make decisions on behalf of the Contractor.



F. Equipment shall be certified for use in the District of Columbia and shall meet the local energy code.

1.4 ABBREVIATIONS AND DEFINITIONS

A. Abbreviations:

| | | |
|---|---|---|
| 1. | ADA | Americans with Disabilities Act |
| 2. | ANSI | American National Standards Institute |
| 3. | ASA | Acoustical Society of America |
| 4. | ASTM | American Society for Testing and Materials |
| 5. | BIL | Basic Impulse Level |
| 6. | CBM | Certified Ballast Manufacturers |
| 7. | ECC | Engineer's Control Center |
| 8. | EIA | Electronic Industries Alliance |
| 9. | ETL | Electrical Testing Laboratories, Inc. |
| 10. | FCC | Fire Control Center |
| 11. | FM | Factory Mutual |
| 12. | IEEE | Institute of Electrical and Electronic Engineers |
| 13. | IES | Illuminating Engineering Society |
| 14. | IPCEA | International Power Cable Engineers Association |
| 15. | LED | Light Emitting Diode |
| 16. | NEC | National Electrical Code |
| 17. | NEMA | National Electrical Manufacturers Association |
| 18. | NETA | National Electrical Testing Association |
| 19. | NFPA | National Fire Protection Association |
| 20. | OEM | Original Equipment Manufacturer |
| 21. | OSHA | Occupational Safety and Health Administration |
| 22. | SCC | Security Control Center |
| 23. | SMACNA | Sheet Metal and Air Conditioning Contractors National Association |
| 24. | TIA | Telecommunications Industry Association |
| 25. | UL | Underwriters Laboratories Inc. |

B. Definitions:

1. Where it is stated in these specifications to submit to the Engineer for review, refer to General and Supplementary Conditions for proper procedures.
2. FURNISH means to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories, and all other items customarily required for the proper and complete application.
3. INSTALL means to join, unite, fasten, link, attach, set up or otherwise connect together before testing and turning over to Owner; complete and ready for regular operation.
4. PROVIDE means to FURNISH and INSTALL.
5. AS DIRECTED means as directed by the Engineer, or the Engineer's Representative.
6. CONCEALED means embedded in masonry or other construction, installed behind wall furring or within drywall partitions, or installed above suspended ceilings.
7. SUBMIT means submit to Engineer for review.

1.5 GUARANTEE

A. Submit a single guarantee stating that the work is in accordance with the Contract Documents. Guarantee work against faulty and improper material and workmanship for a



period of one year from the date of final acceptance by the Owner, except that where guarantees or warranties for longer terms are provided or specified herein, the longer term shall apply. Correct any deficiencies, which occur during the guarantee period, within 24 hours of notification, without additional cost. Obtain similar guarantees from subcontractors, manufacturers, suppliers and sub-trade specialists.

1.6 USE OF THE ENGINEER'S AND ENGINEER'S DRAWINGS

A. The Contractor may obtain from the Engineer a set of 3D BIM or compatible format engineering drawings on electronic media where desired by the Contractor and/or required by the Specifications for use in preparing the shop drawings, coordination drawings, and record drawings. The Contractor shall provide to the Engineer a written or electronic release of liability acceptable to the Engineer prior to receiving the electronic media.

**PART 2 – PRODUCTS**

2.1 EQUIPMENT AND MATERIALS

A. Provide products and materials that are new, clean, free of defects, and free of damage and corrosion.

B. Products and materials shall not contain lead, asbestos, PCB, or any other material that is considered hazardous by the Environmental Protection Agency or any other Authority Having Jurisdiction.

C. Replace materials of less than specified quality and relocate work incorrectly installed as directed by the Engineer at no additional cost.

D. Provide name / data plates on major components of equipment with manufacturer's name, model number, serial number, capacity data and electrical characteristics attached in a conspicuous place.

E. Install materials and equipment with qualified trades people.

F. Maintain uniformity of manufacturer for equipment used in similar applications and sizes.

G. Fully lubricate equipment where required.

H. Follow manufacturer's instructions for installing, connecting, and adjusting equipment. Provide a copy of such instructions at the equipment during installation.

I. Equipment capacities, ratings, etc., are scheduled or specified for job site operating conditions. Equipment sensitive to altitude shall be derated with the method of derating identified on the submittals.

J. Enclosures for electrical equipment installed indoors in mechanical or electrical equipment rooms shall be NEMA type 1. Enclosures for electrical equipment installed outdoors shall be NEMA type 3R – gasketed or as specified on the drawings.

K. Energy consuming equipment shall be certified for use in the District of Columbia and shall meet the local energy code and local energy ordinances.



2.2 SUBSTITUTIONS

A. Contract Documents are based on equipment manufacturers as called out in the Specifications and indicated on the Drawings. Contract documents include a basis of design in which the design in centered. Other manufacturers listed in the specification are acceptable if the equipment fits in the designated area without altering the engineering design and meets other clauses in the specifications. Acceptance of substitute equipment manufacturers does not relieve Contractor of the responsibility to provide equipment and materials, which meet the performance as, stated or implied in the Contract Documents.

B. Submit proposals for review and approval, to provide substitute materials or equipment, in writing, fifteen business days prior to submission of bid Substituted materials or equipment received after that time will not be acceptable or reviewed. Reimburse Owner for costs associated with the review of the proposed substitution whether substitution is accepted or rejected.

C. Indicate revisions required to adapt substitutions including revisions by other trades. Substitutions that increase the cost of the work and related trades are not permitted or shall be paid for by the contractor.

D. The proposed substitution shall conform to the size, ratings, and operating characteristics of the equipment or systems as specified and shown on the Drawings. The substitution must fit into available space conditions and must function properly in coordination with the rest of the system.

E. Proposals for substitutions shall include the following information:

1. A description of the difference between the Contract Document requirements and that of the substitution, the comparative features of each, and the effect of the change on the end result performance. Include the impact of all changes on other contractors and acknowledge the inclusion of additional costs to the other trades.
2. Schematic drawings and details.
3. List of revisions to the Contract Documents that must be made if the substitution is accepted.
4. Estimate of added or reduced costs the Contractor may incur in implementing the substitution, such as test, evaluation, operating and support costs.
5. Statement of the time by which a Contract modification accepting the substitution must be issued, noting any effect on the Contract completion time or the delivery schedule.
6. A statement indicating the reduction to the Contract price if the Owner accepts the substitution. Include required modifications to all related trades.

**PART 3 – EXECUTION**

3.1 FEES AND PERMITS

A. Pay all required fees and obtain all required permits related to the electrical installation.

B. Pay royalties or fees in connection with the use of patented devices and systems.

C. Provide controlled inspection where required by Authorities Having Jurisdiction or by these specifications.



3.2 SUBMITTALS AND REVIEWS

A. Submit shop drawings, manufacturer's product data sheets, samples, and test reports as specified.

B. Submit a complete typed list of all electrical equipment manufacturers and material suppliers for the equipment proposed to be provided on this project, as well as names of all subcontractors.

C. Prepare an index of all submittals for the project. Include a submittal identification number, a cross-reference to the Specification sections or Drawing number, and an item description. Prefix the submittal identification number by the Specification sections to which they apply. Indicate on each submittal, the submittal identification number in addition to the other data specified. All subcontractors shall utilize the assigned submittal identification number.

D. After the Contract is awarded, obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all subcontractors, for all materials and equipment as specified. Submit data and details of such materials and equipment for review. Prior to submission, certify that the shop drawings, product data and samples are in compliance with the Contract Documents. Include as part of the Shop Drawing the specification section. Provide a compliance / non-compliance specification attached to the front of every submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place. Submittals without the required compliance / non-compliance specification attached will not be reviewed and will be returned "Review and Resubmit". Check all materials and equipment upon their arrival on the job site and verify their compliance with the Contract Documents. Modify any work, which proceeds prior to receiving accepted shop drawings as required to comply with the Contract Documents and the shop drawings.

E. Non applicable items in the specifications shall be clearly stricken out. Applicable items shall be clearly highlighted. Submittals lacking the clarity of stricken or highlighted information shall be returned marked Revise and Resubmit.

F. Review of submittals is for general compliance with the design concept and Contract Documents. Comments or absence of comments shall not relieve the Contractor from compliance with the Contract Documents. The Contractor remains solely responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of construction, for performing the work in a safe manner, and for coordinating the work with that of other trades.

G. No part of the work shall be started in the shop or in the field until the shop drawings and samples for that portion of the work have been submitted reviewed, and returned with either "No Exceptions Noted" or "Exceptions Noted" marked on the submission.

H. A minimum period of ten working days, exclusive of transmittal time, will be required in the Engineer's office each time a shop drawing, product data and/or samples are submitted for review. This period must be considered by the Contractor in the scheduling of the work.

I. Submit electronic submittals of the shop drawing or product data as PDF electronic files in compliance with the Division 1 requirements. All electronic submittals shall include the



associated cover sheet and submittal number. Submit all material samples with the appropriate cover sheet and sample number.

J. Submissions will be stamped as follows:

| Stamp | | Interpretation |
|---|---|---|
| ☐ | No Exceptions Noted | Fabrication, manufacture, or construction may proceed providing submittal complies with the Contract Documents. |
| ☐ | Exceptions Noted: Resubmit for Record | Fabrication, manufacture, or construction may proceed providing submittal complies with both the Contract Documents and the Engineer's notations. Resubmit revised submittal for record only. |
| ☐ | Exceptions Noted: No Resubmission Required | Fabrication, manufacture, or construction may proceed providing submittal complies with both the Contract Documents and the Engineer's notations. |
| ☐ | Revise and Resubmit | Submittal does not comply with the Contract Documents. Do not proceed with fabrication, manufacture, or construction. The work and/or shop drawings are not permitted at the job site. |
| ☐ | For Review Only | Informational Submittal: Submittal does not require the Engineer's responsive action. |

K. Submit materials and equipment by manufacturer, trade name, and model number. Include copies of applicable brochure or catalog material. Maintenance and operating manuals are not acceptable substitutes for shop drawings.

L. Identify each sheet of printed submittal pages (using arrows, highlighting, underlining or circling) to show applicable sizes, types, model numbers, ratings, capacities and options actually being proposed. Cross out non-applicable information. Note specified features such as materials or paint finishes. Cross out all references to "options". Cross out statements such as "subject to change without notice" or "not for construction". Anything not specifically excluded is assumed to be included. Submittals that do not clearly indicate excluded information will not be reviewed and will be returned marked "Revise and Resubmit".

M. Include dimensional data for roughing in and installation and technical data sufficient to verify that equipment meets the requirements of the Contract Documents. Include wiring, conduit routing and service connection data.

N. Maintain a complete set of reviewed and stamped shop drawings and product data on site.

O. For each room or area of the building containing electrical equipment, submit the following:

1. Floor Plans: Plan and elevation layout drawings indicating the equipment in the exact location in which it is intended to be installed. These plans shall be of a scale not less than 1/4 inch to 1 foot. They shall be prepared in the following manner:
   a. Indicate the physical boundaries of the space including door swings and ceiling heights and ceiling types (as applicable).



   b. Illustrate all electrical equipment proposed to be contained therein. Include top and bottom elevations of all electrical equipment. The Drawings shall be prepared utilizing the dimensions contained in the individual equipment submittals. Indicate code and manufacturer's required clearances and access points.
   c. Illustrate all other equipment therein such as conduits, detectors, luminaries, ducts, registers, pull boxes, wireways, structural elements, etc.
   d. Indicate the operating weight of each piece of equipment.
   e. Indicate the heat release from each piece of electrical equipment in terms of BTU per hour. This information shall be that which is supplied by the respective manufacturers.
   f. Illustrate concrete housekeeping pads and curbs.
   g. Indicate dimensions to confirm compliance with code-required clearances.
   h. Indicate maximum normal allowable operating temperature for each piece of equipment (as per each respective manufacturer's recommendation).
   i. Equipment removal routes.

2. Provide ¼" = 1'-0" plans of point-to-point routing of conduits with size and function between switchboards, transformers, panelboards, distribution boards, transfer switches, maintenance panels, generators, protective relaying, generator control cabinets etc. All conduit 2" in diameter and greater shall be indicated in the model.

P. The work described in shop drawing submissions shall be carefully checked by all trades for clearances (including those required for maintenance and servicing), field conditions, maintenance of engineering conditions and coordination with other trades on the job. Each submitted shop drawing shall include a certification that related job conditions have been checked by the Contractor and each Subcontractor and that conflicts do not exist.

Q. The Contractor is not relieved of the responsibility for dimensions or errors that may be contained on submissions, or for deviations from the requirements of the Contract Documents. The noting of some errors but overlooking others does not grant the Contractor permission to proceed in error.

R. Inadequate or incomplete shop drawings, product data and/or samples will not be reviewed and will be returned to the Contractor marked "Revise and Resubmit" for resubmittal.

S. Indicate the following on the lower right-hand corner of each shop drawing and on the front cover of each product data brochure cover: The submittal identification number; title of the sheet or brochure; name and location of the project; names of the Engineer, Engineer, Contractor, Subcontractor, manufacturer, supplier, and vendor; the date of submittal; and the date of each correction, version and revision. Number all pages and drawings in product data brochures consecutively from beginning to end. Unless the above information is included, the submittal will be returned for resubmission. Resubmittals of product data or brochures shall include a cover letter summarizing the corrections made in response to the review comments.

3.3 COORDINATION OF WORK

A. The Contract Documents establish scope, materials and quality but are not detailed installation instructions. Drawings are diagrammatic.



B. Coordinate work with related trades and furnish, in writing, any information necessary to permit the work of related trades to be installed satisfactorily and with the least possible conflict or delay.

C. The electrical drawings show the general arrangement of equipment and appurtenances. Follow these drawings as closely as the actual construction and the work of other trades will permit. Provide offsets, fittings, and accessories, which may be required but not shown on the Drawings. Investigate the site, note construction conditions, wall materials, ceiling heights and review drawings of other trades to determine conditions affecting the work and provide such work and accessories as may be required to accommodate such conditions. Additional costs as a result of the failure to investigate the site will not be paid.

D. The locations of receptacles, outlets, panels and other equipment indicated on the Drawings are approximately correct, but they are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed in consequence of increase or reduction of the number of outlets, or in order to meet field conditions, or to coordinate with modular requirements of ceilings, or to simplify the work, or for other legitimate causes.

E. Exercise particular caution with reference to the location of panels, receptacles, outlets, switches, fire alarm devices, and have precise and definite locations accepted by the Engineer before proceeding with the installation.

F. The Drawings show only the general run of large raceways and approximate locations of receptacles and outlets. Any significant changes in location of receptacles and outlets, cabinets, etc., necessary in order to meet field conditions shall be brought to the immediate attention of the Engineer for review before such alterations are made. Modifications shall be made at no additional cost.

G. Verify with the Engineer the exact location and mounting height of outlets and equipment not dimensionally located on the Drawings prior to installation.

H. Circuit tags in the form of numbers are used where shown to indicate the circuit designation numbers in electrical panels. Show the actual circuit numbers on the as-built Record Drawings and on the associated typed panelboard directory card. Where circuiting is not indicated, provide required circuiting in accordance with the loading indicated on the Drawings and/or as directed.

I. The Drawings generally do not indicate the quantity of wires in conduit for the branch circuit wiring of fixtures and outlets, or the actual circuiting. Provide the correct conductor size and quantity as required by the indicated circuiting and/or circuit numbers indicated, the control intent, referenced wiring diagrams (if any), the specified voltage drop or maximum distance limitations, and the applicable requirements of the NEC.

J. Carefully check space requirements with other trades to ensure that equipment can be installed in the spaces allotted.

K. Wherever work interconnects with work of other trades, coordinate with other trades to ensure that they have the information necessary so that they may properly install the necessary connections and equipment. Identify pull boxes requiring access in order that the ceiling trade will know where to install access doors and panels.

L. Consult with other trades regarding equipment so that, wherever possible, motor controls and distribution equipment are of the same manufacturer.



M. Furnish and set sleeves for passage of electrical risers through structural masonry and concrete walls and floors and elsewhere as required for the proper protection of each electrical riser passing through building surfaces.

N. Provide firestopping matching the wall or partition rating around all pipes, conduits, ducts, sleeves, etc. which pass through rated walls, partitions and floors.

O. Provide detailed information on openings and holes required in precast members for electrical work.

P. Provide required supports and hangers for conduit and equipment, designed so as not to exceed allowable loadings of structures.

Q. Examine and compare the Contract Documents with the drawings and specifications of other trades and report any discrepancies between them to the Engineer and obtain written instructions for changes necessary in the work. Install and coordinate the work in cooperation with other related trades. Before installation, make proper provisions to avoid interferences.

R. Wherever the work is of sufficient complexity, prepare additional detail drawings to scale to coordinate the work with the work of other trades. Detailed work shall be clearly identified on the Drawings as to the area to which it applies. Submit these drawings to the Engineer for review. At completion include a set of these drawings with each set of Record Drawings.

S. Furnish services of an experienced Superintendent, who shall be in constant charge of all work, and who shall coordinate work with the work of other trades. No work shall be installed before coordinating with other trades.

T. Before commencing work, examine adjoining work on which this work is in any way affected and report conditions, which prevent performance of the work. Become thoroughly familiar with actual existing conditions to which connections must be made or which must be changed or altered.

U. Adjust location of conduits, panels, equipment, etc., to accommodate the work to prevent interferences, both anticipated and encountered. Determine the exact route and location of each conduit prior to fabrication.

1. Right-of-Way: Lines which pitch have the right-of-way over those which do not pitch. For example: condensate, steam, and plumbing drains normally have right-of-way. Lines whose elevations cannot be changed have right-of-way over lines whose elevations can be changed.
2. Provide offsets, transitions and changes in direction of conduit as required to maintain proper headroom and pitch on sloping lines.

V. In cases of doubt as to the work intended, or in the event of need for explanation, request supplementary instructions from the Engineer.

W. Reflected Ceiling Plans: ceiling plans, sections, and other necessary details showing dimensioned layouts for equipment located in or on the ceiling plane. Base dimensions on exact dimensioned data obtained from product submittals for products to be included in the Work. Differentiate between field measurements and assumed dimensions. Include the following items coordinated with each other, based on input from installers of the items involved:



1. Suspended ceiling components.
2. Structural members
3. Sprinklers, sprinkler mains.
4. Fire Alarm initiating and indicating devices.

3.4 CONTRACTOR'S COORDINATION DRAWINGS

A. The Contractor shall coordinate efforts of all trades and shall provide (in writing, with copies to the Engineer) any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. The Contractor and all trade contractors shall prepare a complete set of construction Coordination Drawings indicating the equipment actually purchased and the exact routing for all lines such as conduit, piping, ductwork, etc., The Coordination Drawings shall be submitted complete to the Engineer, in compliance with the construction schedule for the project. The sheet metal drawings, at a scale of not less than 1/4 inch to 1 foot, shall serve as the base drawings to which all other Contractors shall add their work. Each separate trade contractor shall draw their work on separate layers or worksets with different color assignments to facilitate coordination. Each Coordination Drawing shall be completed and signed off by the other Trade Contractors and the Contractor prior to the installation of the mechanical, plumbing, electrical and fire protection and sprinkler work in the area covered by the specific drawing. The Contractor's work shall be installed according to the shop drawings and coordination drawings. If the Contractor allows one trade to install their work before coordination with the work of other trades, the Contractor shall make all necessary changes to correct the condition at no additional cost.

C. The Contractors' Coordination Drawings shall indicate structural loads at support points for all piping 10 inch and larger, racked piping, racked conduit, busway, and suspended electrical equipment. Submit to Structural Engineer for review and approval. The elevation, location, support points, static, dynamic and expansion forces and loads imposed on the structure at support and anchor points shall be indicated. All beam penetrations and slab penetrations shall be indicated and sized and shall be coordinated. Work routed underground or embedded in concrete shall be indicated by dimension to column and building lines and shall be coordinated. Coordination Drawings shall document all required structural penetrations for initial construction. Penetrations shall be dimensioned for walls and floors. These structural coordination requirements require review and approval by the Structural Engineer prior to completion and submittal of the Drawings.

D. This requirement for Coordination Drawings shall not be construed as authorization for the Contractor or trade contractors to make any unauthorized changes to the Contract Documents. Contract document space allocations shall be maintained such as ceiling height, designated clearance for future construction and flexibility, chase walls, equipment room size, unless prior written authorization is received from the Engineer to change them.

E. Prior to final acceptance of the work, the Contractor shall submit the Coordination Drawings as part of the Record Drawings submittal.

3.5 EXAMINATION OF SITE

A. Prior to the submitting of bids, visit the project site and become familiar with all conditions affecting the proposed installation and make provisions as to the cost thereof.



B. All electrical equipment shall be thoroughly vacuumed and wiped clean prior to energizing and at the completion of the project. Equipment shall be opened for observation by the Engineer as required.

3.9 WATERPROOFING

A. Avoid, if possible, the penetration of any waterproof membranes such as roofs, machine room floors, basement walls, and the like. If such penetration is necessary, make penetration prior to the waterproofing and furnish all sleeves or pitch-pockets required. Advise the Engineer and obtain written permission before penetrating any waterproof membrane, even where such penetration is shown on the Drawings.

B. Restore waterproofing integrity of walls or surfaces after they have been penetrated without additional cost.

3.10 SUPPORTS

A. Support work in accordance with the best industry practice. Provide supports, hangers, auxiliary structural members and supplemental hardware required for support of the work.

B. Provide supporting frames or racks extending from floor slab to ceiling slab for work indicated as being supported from walls where the walls are incapable of supporting the weight. In particular, provide such frames or racks in electric closets and mechanical equipment rooms.

C. Provide supporting frames or racks for equipment which is to be installed in a freestanding position.

D. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members, rigidly bolted or welded together and adequately braced to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.

E. Adequate support of equipment (including outlet, pull and junction boxes and fittings) shall not depend on electric conduits, raceways, or cables for support.

F. Electrical equipment or raceway shall not rest on or depend for support on suspended ceiling media (tiles, lath, plaster, as well as splines, runners, bars and the like in the plane of the ceiling). Provide independent support of electrical equipment. Do not attach to supports provided for ductwork, piping or work of other trades.

G. Provide required supports and hangers for conduit, equipment, etc., so that loading will not exceed allowable loadings of structure. Electrical equipment and supports shall not come in contact with work of other trades.

3.11 FASTENINGS

A. Fasten equipment to building structure in accordance with the best industry practice.

B. Where weight applied to building attachment points is 100 pounds or less, conform to the following as a minimum:

1. Wood: Wood screws.
2. Concrete and solid masonry: Bolts and expansion shields.
3. Hollow construction: Toggle bolts.



4. Solid metal: Machine screws in tapped holes or with welded studs.
5. Steel decking or sub-floor: Fastenings as specified below for applied weights in excess of 100 pounds.

C. Where weight applied to building attachment points exceeds 100 pounds, but is 300 pounds or less, conform to the following as a minimum:

1. At concrete slabs provide 24-inch by 24-inch by 1/2-inch steel fishplates on top with through bolts. Fishplate assemblies shall be chased in and grouted flush with the top of slab screed line, where no fill is to be applied.
2. At steel decking or sub-floor for all fastenings, provide through bolts or threaded rods. The tops of bolts or rods shall be set at least one inch below the top fill screed line and grouted in. Suitable washers shall be used under bolt heads or nuts. In cases where the decking or sub-floor manufacturer produces specialty hangers to work with their decking or sub-floor, such hangers shall be provided.

D. Where weight applied to building attachment points exceeds 300 pounds, coordinate with and obtain the approval of Engineer and conform to the following as a minimum:

1. Provide suitable auxiliary channel or angle iron bridging between building structural steel elements to establish fastening points. Bridging members shall be suitably welded or clamped to building steel. Provide threaded rods or bolts to attach to bridging members.

E. For items, which are shown, as being ceiling-mounted at locations where fastening to the building construction element above is not possible, provide suitable auxiliary channel or angle iron bridging tying to the building structural elements.

F. Wall-mounted equipment may be directly secured to wall by means of steel bolts. Groups or arrays of equipment may be mounted on adequately sized steel angles, channels, or bars. Prefabricated steel channels as manufactured by Kindorf or Unistrut are acceptable.

3.12 IDENTIFICATION

A. Identify electrical equipment with permanently attached phenolic nameplates with 1/2-inch high white engraved lettering. Identification shall include equipment name or load served as appropriate. Nameplates shall be attached with zinc-plated screws Peel-and-stick tape or glue-on type nameplates are prohibited.

1. Nameplates for equipment connected to the normal power system shall be black with white lettering.
2. Nameplates for equipment connected to the emergency power system shall be red with white lettering.
3. Nameplates for equipment connected to the UPS system shall be orange with white lettering.
4. Equipment labels to indicate voltage, conductor phasing color code and power source (fed from) information.

B. Cable tags shall be flameproof secured with flameproof non-metallic cord.

C. Provide an engraved nameplate for each switch controlling loads, which are not local to the switch.



D. Wherever raceways for future use are terminated outside of the building, stake the location with a 8-foot long, 4-inch by 4-inch clear pressure treated post a minimum of 4' below grade and 4' above grade.

E. See individual Sections for additional identification requirements.

3.13 PROHIBITED LABELS AND IDENTIFICATIONS

A. In all public areas, tenant areas, and similar locations within the project, the inclusion or installation of any equipment or assembly which bears on any exposed surface any name, trademark, or other insignia which is intended to identify the manufacturer, the vendor, or other source(s) from which such object has been obtained, is prohibited, unless otherwise approved by the Engineer.

B. Required UL labels shall not be removed nor shall identification specifically required under the various technical sections of the Specifications be removed.

3.14 EQUIPMENT PADS AND ANCHOR BOLTS

A. Provide concrete pads under all floor-mounted electrical equipment. Equipment pads shall conform to the shape of the piece of equipment it serves with a minimum 1-inch margin around the equipment and supports. Pads shall be a minimum of 4 inches high and made of a minimum 28 day, 2500 psi concrete reinforced with 6-inch by 6-inch 6/6 gauge welded wire mesh. Trowel tops and sides of pad to smooth finishes, equal to those of the floors, with all external corners bullnosed to a 3/4-inch radius. Seal concrete pads where not painted. Paint pads same as surrounding floor areas. Shop drawings stamped "NO EXCEPTIONS NOTED" shall be used for dimensional guidance in sizing pads.

B. Provide galvanized anchor bolts for all equipment placed on concrete equipment pads, inertia blocks, or on concrete slabs. Provide bolts of the size and number recommended by the manufacturer of the equipment and locate by means of suitable templates. Equipment installed on vibration isolators shall be secured to the isolator. Secure the isolator to the floor, pad, or support as recommended by the vibration isolation manufacturer.

C. Where equipment is mounted on gypsum board partitions, the mounting screws shall pass through the gypsum board and securely attach to the partition studs. As an alternative, the mounting screws may pass through the gypsum board and be securely attached to 6 inches square, 18 gauge galvanized metal backplates, which are attached to the gypsum board with an approved non-flammable adhesive. Toggle bolts installed in gypsum board partitions are not allowed.

3.15 DELIVERY, DRAYAGE AND HAULING

A. Provide drayage, hauling, hoisting, shoring and placement in the building of equipment specified and be responsible for the timely delivery and installation of equipment as required by the construction schedule. If any item of equipment is received prior to the time that it is required, the Contractor shall be responsible for its proper storage and protection until the time it is required. Pay for all costs of drayage or storage.

B. If equipment is not delivered or installed at the project site in a timely manner as required by the project construction schedule, the Contractor shall be responsible for resulting disassembly, re-assembly, manufacturer's supervision, shoring, general construction modification, delays, overtime costs, etc., at no additional cost.



3.16 EQUIPMENT AND MATERIAL PROTECTION

A. Protect the work, equipment, and material of other trades from damage by work or workmen of this trade, and correct damaged caused without additional cost.

B. Take responsibility for work, materials, and equipment until finally inspected, tested and accepted. Protect work against theft, injury, or damage, and carefully store material and equipment received on site, which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing material. Cover and protect equipment and materials from damage due to water, spray-on fireproofing, construction debris, etc. Store equipment sensitive to moisture damage in dry, heated spaces.

C. Provided adequate means for fully protecting finished parts of materials and equipment against damage from whatever cause during the progress of the work until final acceptance. Protect materials and equipment in storage and during construction in such a manner that no finished surfaces will be damaged or marred, and moving parts are kept clean and dry. Do not install damaged items; take immediate steps to obtain replacement or repair.

D. Lighting fixture troffers with parabolic reflectors shall be installed with factory-mounted plastic protective bags around parabolic reflector assembly. Remove protective bag just prior to occupancy.

3.17 TESTING OF ELECTRICAL SYSTEMS

A. Comply with the project construction schedule for the date of final performance and acceptance testing, and complete work sufficiently in advance of the Contract completion date to permit the execution of the testing prior to occupancy and Contract close-out. Complete any adjustments and/or alterations, which the final acceptance tests indicate as necessary for the proper functioning of all equipment prior to the completion date. See individual Sections for extent of testing required.

B. Provide a detailed schedule of completion indicating when each system is to be completed and outlining when field testing will be performed. Submit completion schedule for review within six months after the notice to proceed by Owner's Representative has been given. Update this schedule periodically as the project progresses.

3.18 OPERATING INSTRUCTIONS

A. Provide the services of factory-trained specialists to provide an operating instructions seminar for equipment and systems. The seminar shall be conducted over a five-day (consecutive) period. Instruction time is defined as straight time working hours and does not include nights, weekends, or travel time to and from the project. Ownership has the right to video record the seminars.

B. Submit seminar agenda, schedule and list of representatives to the Engineer for approval 30 days prior to suggested date of seminar. Do not commence seminar until the Engineer has issued a written acceptance of the starting time and attendees. Confirm attendance of seminar by written notification to participants.

C. Instruct Owner's operating personnel in proper starting sequences, operation, shut-down, general maintenance and preventative maintenance procedures, including normal and emergency procedures.



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WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
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Architect:

Structural Engineer:

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA JAMFENG SUN 10/3/2025 No. PE40000573 PROFESSIONAL ENGINEER ELECTRICAL

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ELECTRICAL - SPECS

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: Author | CKD. BY: Checker |
| SCALE: | |

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D. Submit final copies of Record Drawings and Operating and Maintenance Manuals to Owner at seminar.

E. Submit a written record of minutes and attendees of the seminar to the Owner.

3.19 OPERATING AND MAINTENANCE MANUALS

A. Provide Operating and Maintenance Manuals for equipment and materials furnished under this Division.

B. Submit electronic copies of all operating and maintenance data books for review at least ten (10) weeks before the completion date. Assemble data in a completely indexed volume or volumes and identify the size, model, and features indicated for each item.

C. Maintenance manuals shall include complete cleaning and servicing data compiled in a clear and easily understandable format. Show model numbers of each piece of equipment, complete lists of replacement parts, capacity ratings, and actual loads.

D. Provide the following information where applicable:

1. Identifying name and mark number
2. Locations (where several similar items are used, provide a list)
3. Complete nameplate data
4. Certified Record Drawings and Final Reviewed submittals
5. Parts list
6. Performance curves and data
7. Wiring diagrams
8. Manufacturer's recommended operating and maintenance instructions with all non-applicable information deleted
9. List of spare parts recommended for normal service requirements
10. Assembly and disassembly instructions with exploded-view drawings where necessary
11. Test reports
12. Trouble shooting diagnostic instructions, where applicable

E. After the Engineer's and Engineer's review, and any required Contractor revisions, submit a complete electronic copy, along with three (3) final hard copies of operating and maintenance data books for the following systems:

1. Transformers
2. Switchboards
3. Panelboards
4. Disconnect Switches
5. Fire Management System



3.20 RECORD DRAWINGS

A. The Contractor shall maintain, on a daily basis, at the Project site a complete set of Record Drawings. The Record Drawings shall initially consist of a set of black line plots or 3D BIM files of the Contractor's Coordination Drawings. The prints shall be marked or the 3D BIM files electronically updated to show the precise location of all buried or concealed work and equipment, including embedded conduit, raceways and boxes, and all changes and deviations in the Electrical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite written instructions from the Engineer or Engineer. The updated Coordination Drawings shall be used to produce the final Record Drawings that shall be delivered to the Owner in electronic format media upon Project completion.

B. The Contractor shall conduct monthly/quarterly walk-throughs of the project site with the Owner for verification of as-built conditions with the record drawings being maintained by the Contractor. Walk-throughs shall be scheduled by the Contractor prior to close-ins. Notify the Owner in writing at least three (3) days before walk-through.

C. Record dimensions clearly and accurately to delineate the work as installed. Suitably identify locations of all equipment by at least two dimensions to permanent structures.

D. The Contractor and Subcontractor shall mark all in-progress Record Drawings on the front lower right hand corner with a rubber stamp impression or an electronic image similar to the following:

RECORD DRAWING
(3/8-inch high letters)

To be used for recording Field Deviations and Dimensional Data Only
(5/16-inch high letters)

E. Upon completion of the work, the Contractor and Subcontractor(s) shall certify all Record Drawings on the front lower right hand corner adjacent to the above marking with a rubber stamp impression or an electronic image similar to the following:

RECORD DRAWING
CERTIFIED CORRECT
(3/8-inch high letters)

(Printed Name of General Contractor)
(5/16-inch high letters)
Date:

(Printed Name of Subcontractor)
(5/16-inch high letters)
Date:

F. Prior to final acceptance of the Work of this Division, the Contractor shall submit properly certified Record Drawings to the Engineer and Engineer for review and shall make



changes, corrections, or additions as the Engineer and/or Engineer may require to the Record Drawings. After the Engineer's and Engineer's review, and any required Contractor revisions, the Record Drawings shall be delivered to the Owner on electronic media in. Three (3) complete and bound hard copies shall be provided to the Owner. The Engineer and Engineer do not assume any responsibility for the accuracy or completeness of the Record Drawings.

3.21 FINAL PUNCHLIST

A. Prior to the Final Punchlist, certify that systems and equipment are complete, operational, and are in compliance with the Contract Documents.

B. During the Final Punchlist, provide personnel with access keys, hand held radios or other communication devices, and necessary expertise to operate each system and piece of equipment to demonstrate operational compliance with the Contract Documents.

C. Any deficiencies noted on the Final Punchlist shall be expeditiously corrected and certified in writing.

3.22 EARLY OCCUPANCY

A. Complete those systems which are necessary to allow partial early occupancy of the building.

B. Verify and comply with requirements for temporary occupancy with the local Building and Fire Departments.

**END OF SECTION 26 05 01**



**SECTION 26 05 02**

**EQUIPMENT CONNECTIONS AND COORDINATION**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide equipment connections and coordination in accordance with the Contract Documents.

1.2 SUBMITTALS

A. Fusible and non fusible safety switches

B. Thermal over loads

C. Variable frequency drives specified under Division 23

D. Magnetic across the lie starters

**PART 2 – PRODUCTS**

NOT APPLICABLE

**PART 3 – EXECUTION**

3.1 GENERAL

A. Provide equipment connections and coordination in accordance with manufacturer's recommendations and product submittals.

B. Provide disconnect switches for equipment. Where equipment nameplate requires fuse protection, provide fusible type disconnect switches with fuses rated in accordance with equipment manufacturer's requirements. Circuit breakers rated HACR and recognized by the manufacturer of the equipment as suitable for fuse protection will suffice. Disconnect switches for single-phase equipment shall be thermal overload type. Locate disconnect switches in coordination with the layout of equipment. Provide supports for a free-standing installation if required to allow access to disconnect switch and/or proximity to equipment served.

C. Provide final connections to hard-wired equipment with a minimum of two feet of flexible metal conduit or liquid-tight flexible metal conduit where required by code and in damp or wet locations.

D. Where equipment is fed from overhead, support conduit on flanged floor type fitting.

3.2 EQUIPMENT CONNECTION TYPES

A. Provide equipment connection types as indicated on the equipment connection schedule.

B. Equipment Connection Types.



1. Type DP: Duplex pump system with controller provided under Division 23. Provide connection to controller and connections from controller to pumps in accordance with the controller manufacturer's installation instructions. Provide connections for local controls and alarms in accordance with the controller manufacturer's installation instructions.
2. Type FR: Fractional horsepower single-phase motor. Provide thermal overload/disconnect switch and motor connection.
3. Type FWS: Equipment furnished with starter. Install starter and provide connection to starter and connection from starter to equipment.
4. Type M: Motor with starter provided under Division 26. Provide disconnect switch and motor connection.
5. Type SPC: Single point connection. Provide single point connection to equipment provided with factory-mounted starter/controller listed for single point power connection. Where required by code or the equipment manufacturer, provide fusible disconnect switch with fuses sized in accordance with equipment nameplate requirements.
6. Type VFD: Variable frequency drive furnished under Division 23. Install VFD and provide connection to VFD and connection from VFD to equipment.

3.3 MECHANICAL AND PLUMBING EQUIPMENT

A. Provide electrical connections to mechanical, plumbing and fire protection equipment.

B. Where motor controllers are furnished by others, provide connections at line side of controllers.

C. Where reduced voltage, multiple speed, duplex, triplex, lead-lag, pony motor or other unusual controller types are utilized, coordinate specific requirements of motor(s) and controller and provide connections at line side of controllers.

D. Provide branch circuits and connections for control power as required by controls contractor.

E. Where electric unit heaters are provided with remote power panels, provide branch circuits between remote panel and duct heater elements in accordance with the equipment manufacturer's recommendations.

F. Provide final connections between controller and equipment.

G. Provide a separate light and graphics on the fire alarm graphic annunciator for each pre-action control panel.

H. Provide audible, visual and combination audible visual devices in the protected area that are connected to the fire suppression pre-action control panel. Provide a laminated placard for each device identifying its connection to the pre-action system.

**END OF SECTION 26 05 02**



**SECTION 26 05 19**

**600V WIRE AND CABLE**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide 600V wire and cable in accordance with the Contract Documents.

B. Related work specified in other divisions of these specifications.

1. Raceways and Boxes

1.2 REFERENCE STANDARDS

A. Rubber Insulated Wire and Cable; ICEA S-19-81, NEMA WC 3, and UL 44.

B. Thermoplastic Insulated Wire and Cable; ICEA S-61-402, NEMA WC 3, and UL 83.

C. Cross-Linked Thermosetting Polyethylene Insulated Wire and Cable: ICEA S-66-524, NEMA WC 7, and UL 44.

D. Service Entrance Cable; UL 854.

E. Annealed Copper Wire for Conductors: ASTM B-3.

F. Aluminum wire: AA8176 Prohibited.

G. Terminal Blocks: UL 1059.

1.3 QUALITY ASSURANCE

A. Wire and cable shall be of the same manufacturer.

1.4 SUBMITTALS

A. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

B. Field test reports.

C. Building wire. Copper

D. Metal Clad Cable.

E. Armored Clad (AC) Cable, Prohibited.

F. Underground Feeder (UF) cable. Prohibited.



G. Non Metallic (NM) cable. Prohibited.

1.5 FIELD TESTING

A. Inspect splices and terminations and make mechanically and electrically tight during the 15-day period immediately prior to final acceptance of the work.

B. Feeder insulation shall be tested after installation, and before final connection.

1. Tests shall be performed with a 500 volt megger, and conductors shall test free from short circuits and grounds.
2. Conductors shall be tested phase-to-phase and phase-to-ground, phase-to-neutral.
3. Furnish the instruments, materials, and labor required.

C. Demonstration: Subsequent to wire and cable installation and connection, energize circuits and demonstrate functioning in accordance with contract requirements. Correct deficiencies and retest to demonstrate compliance.

D. Record and document testing and submit to owner. Documentation shall include project name and address, testing agency name and address, testers name and employee number, feeder origin, destination, size, length, conduit size and material, anticipated testing result range and actual test results. In the event the feeder fails the test, include a corrective action and anticipated time line for completion. All feeders shall be tested and retested until all feeders pass and results are documented.

**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. Wire and Cable:

1. Copper:

a. Southwire 600 Volts. Copper Conductor. Thermoplastic Insulation/Nylon Sheath, Heat, Moisture, Gasoline and Oil Resistant II. All sizes rated both THHN and either THWN (sizes 14, 12, and 10 AWG) or THWN-2 (sizes 8 AWG and larger and 14, 12, 10 AWG
b. 600 Volts & 1000 Volts Copper Conductor. Cross-Linked Polyethylene (XLPE) Insulation. High-Heat and Moisture Resistant.
c. Underground Service Entrance Cable. 600 Volt Copper conductors. Cross-Linked Polyethylene (XLP) Insulation. High-Heat, Moisture, and Sunlight Resistant. RHH, RHW-2, USE-2.
d. SIMpull® THHN THWN-2 MTW / cULTM T90 Nylon TWN75 Copper Conductor, 600V, Thermoplastic-Insulated Cable.
e. Alcan, Triangle, Anaconda, Brand-Rex, National, Okonite, Simplex meeting the specifications will be considered.

B. Connectors:

1. Wire size AWG number 12 through AWG number 6:



a. Hand applied: Piggy (Thomas & Betts), Scotchlock (3M), or Wing Nut (Ideal).
b. Tool applied: Burndy HYDENT, or Thomas & Betts Stakon.
c. WAGO's 221 Series Splicing Lever Nuts Connectors connect solid, stranded and fine-stranded conductors ranging from 24–10 AWG.

2. Copper Wire size number 4 through number 1000 kcmil.

a. Iisco NIMBUS PBT INS BLK SPL / OFFSET; UL Listed and CSA Certified.
b. 600 volt at 90 Deg C.
c. Dual rated for copper and aluminum.
d. Removable port and screw plugs.

3. For feeder ampacity as rated.

C. Electrical Tape:

1. Insulating type, Johns-Manville or 3M, UL Listed for the use.

2.2 WIRE AND CABLE

A. General:

1. 600V minimum insulating rating.

B. Conductor:

1. Electrical grade, annealed copper, tinned if rubber insulated, and fabricated in accordance with ASTM and ICEA standards. Minimum size number 12 for branch circuits; number 14 for control wiring. Switch legs are not considered control wiring.

C. Stranding and Number of Conductors:

1. Number 12 and number 10 shall be solid.
2. Larger than number 10, stranded ASTM Class B.
3. Control wires stranded in accordance with ASTM Class B stranding designations.
4. Cables for low-voltage systems shall be specified in other sections.

D. Insulation:

1. 600 volts, PVC insulation, nylon jacket, surface-printed identification, listed as type THHN,THWN, THHW, THW-2, THWN-2,XHHW, XHHW-2per UL 83.

E. Color Coding:

1. Wiring shall be color coded as follows:

| Conductor | 120/208V System | 277/480V System |
|---|---|---|
| Phase A | Black | Brown |
| Phase B | Red | Orange |
| Phase C | Blue | Yellow |
| Neutral | White | Gray |
| Ground | Green | Green |



| Conductor | 120/208V System | 277/480V System |
|---|---|---|
| Isolated Ground | Green/Yellow Stripe | |

2. Wire number 8 and smaller shall be factory-color coded the entire length. Wire number 6 and larger shall be color coded by color taping entire length of exposed conductor at all accessible locations or factory-color coded where available.

3. Control wiring shall be color coded in accordance with manufacturer's recommendations and as elsewhere specified

2.3 MC FEEDER CABLE – COPPER CONDUCTORS

A. Prohibited

2.4 SERVICE ENTRANCE CABLE SE TYPE R

A. Prohibited

2.5 NM-B COPPER CONDUCTOR-600V

A Prohibited

2.6 Shielded variable frequency drive cable:

A. Shielded conductor and signal cable with symmetric bare grounds and overall shield to block emi and rfi interference.

B. Conductor Material: stranded tinned copper

C. Shield: Foil tape and tinned copper braid shield

D. Comply with 2000V UL 1277 Type TC-ER per 2005 NEC Article 336

E. Rated for 90°C wet/dry

F. Suitable for Class I & II: Division 2 hazardous location

G. Comply with UL 1685 vertical tray flame test

H. Comply with IEEE 1202 vertical tray flame test at 70,000 BTU/hour

I. Comply with CSA FT4

J. Comply with Oil & Sunlight resistant

K. RoHS compliant and CE approved.



2.7

**PART 3 – EXECUTION**

1.1 GENERAL



A. Maximum of three branch circuits in one conduit unless otherwise indicated.

B. Do not install wire until raceway systems are complete.

C. Provide cable supports for vertical risers as required by all applicable codes

D. Wire size shall be uniform for the entire length of the circuit unless noted otherwise.

E. Do not splice feeders or dedicated branch circuits unless otherwise indicated.

F. Make connections, splices, taps, and joints with solderless devices, mechanically and electrically secure.

G. Lubricate cables to facilitate pulling as required by cable manufacturer. Lubrication material shall be inert to cable insulation and raceways.

H. Where compression connectors are used, provide connectors with hydraulic die, embossing die code into connector. Connect to bus with Belleville type washers for positive pressure over complete contact area. Insulate with heat shrink tubing.

I. Provide a separate neutral for ground fault interrupter branch circuits.

J. Exposed feeders and branch circuits shall be electric metal tubing.

1.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Feeders: Type THHN-THWN, THW-2, THWN-2, XHHW-2 single conductors in raceway.

B. Exposed Branch Circuits: Type THHN-THWN, THW-2, THWN-2, XHHW, XHHW-2 single conductors in raceway

1.4 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal raceways and cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Exposed raceways and cables permitted in utility rooms.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

1.5 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.



B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack conductor extending past the front of the box.

1.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

**END OF SECTION 26 05 19**



**SECTION 26 05 26**

**GROUNDING SYSTEM**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide electrical grounding systems in accordance with the Contract Documents and as specified herein.

1.2 REFERENCE STANDARDS

A. UL 467.

B. ANSI C-1.

C. IEEE 142.

D. NEC.

E. National Electrical Safety Code.

F. All equipment and material to be furnished and installed on this project shall be UL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this project.

1.3 SUBMITTALS

A. Field test report.

B. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

1.4 FIELD TESTING

A. Resistance testing of ground rod system indicating maximum 5 ohms resistance to ground.

1.5 IDENTIFICATION

A. Label each end of each grounding electrode conductor, identifying the connection point of the opposite end of the conductor.

**PART 2 – PRODUCTS**

2.1 GENERAL

A. Grounding connections shall be brazed, molded exothermic welded, bolted clamp terminal bars, or listed pressure connector type.



B. All equipment and materials provided under this section of the Specifications shall be new, UL listed and bear the UL label.

C. All disconnects shall be provided with a copper equipment ground bar bolted, brazed or riveted to the associated enclosure or cabinet. Refer to each individual equipment Specification section for additional grounding requirements

D. All receptacles, switches, disconnects and devices shall be provided with a grounding terminal connected to the device frame and the enclosure. Refer to each individual equipment Specification section for additional grounding requirements.

E. All conduit, raceways, junction boxes, pull boxes, etc., shall be made electrically continuous by means of grounding conductors, bonding jumpers, grounding bushings, etc., as required by the NEC and the authorities having jurisdiction.

**PART 3 – EXECUTION**

3.1 GENERAL

A. Metallic raceways, enclosures, equipment frames, fittings, and other metallic noncurrent-carrying equipment parts and surfaces shall be effectively bonded to the grounding system. Nonconductive paint, enamel, or similar coating shall be removed at threads and contact surfaces to preserve grounding continuity or fittings shall be provided to make such removal unnecessary.

B. Neutral wiring shall be grounded at the system point of origin only and shall be isolated from downstream grounding systems.

C. Provide an insulated grounding conductor for all segments of branch circuits.

D. Receptacles shall be grounded to the outlet box by means of a bonding jumper between the outlet box and the receptacle grounding terminal.

E. Branch circuits shall be provided with an insulated grounding conductor run with the circuit conductors. This grounding conductor shall be in addition to the ground path provided by the continuously grounded metallic raceway system that encloses the phase and neutral conductors.

F. Provide bolted clamp terminal connectors where connected to removable equipment.

**END OF SECTION 26 05 26**



**SECTION 26 05 33**

**RACEWAYS AND BOXES**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

B. Provide raceways and boxes in accordance with the Contract Documents.

1.2 SUBMITTALS

A. Conduit, Boxes:

B. Manufacturer's product data sheets, volume dimensions, physical dimensions, Listing agencies, and weights.

1.3 IDENTIFICATION

A. Mark junction box covers with permanent stencil identification of panelboard and circuit numbers of wiring contained within.

B. Paint fire alarm raceways and red. Pre-painted raceways will be acceptable.

**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. Conduit and Boxes:

1. UL Listed and labeled products of any manufacturer meeting the specified performance requirements are acceptable.

B. Wireways and Auxiliary Gutters:

1. Siemens, Square D, or equal.
2. Wireways and auxiliary gutters shall be UL Listed and labeled.

2.2 CONDUIT AND FITTINGS

A. Rigid Steel Conduit:

1. Rigid conduit, heavy wall, hot-dipped galvanized inside and out, threaded ends.
2. Threaded type fittings.
3. Schedule 40

B. Electrical Metallic Tubing



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Architect:

Structural Engineer:

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JIANFENG SUN
10/3/2025
No. PE40000573
ELECTRICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ELECTRICAL - SPECS

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: Author | CKD. BY: Checker
SCALE:

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1. Continuous, seamless steel tubing galvanized or sherardized on exterior, coated on interior with smooth hard finish of lacquer, varnish or enamel.
2. Steel, set screw or compression fittings. Cast connectors and coupling are prohibited.
3. Provide concrete type fittings where required.
4. Conduits shall be color coded and identified as required by code or the local authority having jurisdiction and as specified herein.
5. Conforming to NEC Article 358

C. Flexible Metal Conduit:

1. Single strip, continuous, flexible interlocked double-wrapped steel, hot-dip galvanized inside and out forming smooth internal wiring channel.
2. Steel, compression type fittings.
3. Conforming to NEC Article 348.

D. Liquid Tight Flexible Conduit:

1. Same as flexible metal conduit except with tough, inert, watertight plastic outer jacket.
2. Fittings shall be cast malleable iron body and gland nut, zinc-plated with one-piece brass grounding bushings threaded to interior of conduit. Spiral molded vinyl sealing ring between gland nut and bushing and nylon-insulated throat.
3. Conforming to NEC Article 350.

E. Flexible non-metallic conduit

1. Prohibited

F. Electric Non Metallic Tubing

1. Prohibited

2.3 WIREWAYS AND AUXILIARY GUTTERS

A. Sizes and shapes as indicated and/or as required.

B. Provide necessary elbows, tees, connectors, adapters, etc.

C. Continuous removable cover secured with screws and keyhole slots. Hinged cover where installed above suspended ceiling.

D. Provide wire retainers at not greater than 12 inches on center.

2.4 OUTLET, JUNCTION, AND PULL BOXES

A. Cast Type Boxes:

1. Ferrous alloy box with inside threaded hubs for rigid steel conduit.
2. Ferrous alloy box with compression or inside threaded hubs with adapter for electrical metallic tubing.
3. Cast raised cover, size matched to contour of box.
4. Tapered threads for hubs.

B. Galvanized Pressed Steel Type Boxes:



1. General:

a. Pressed steel, galvanized or cadmium-plated, 4 inches minimum octagonal or square with galvanized cover or extension ring as required.

C. Sheet Steel Boxes:

1. No. 12 gauge sheet steel for boxes with maximum side less than 40 inches, and maximum area not exceeding 1,000 square inches; riveted or welded 3/4-inch flanges at exterior corners.
2. No. 10 gauge sheet steel for boxes with maximum side 40 to 60 inches, and maximum area 1,000 to 1,500 square inches; riveted or welded 3/4-inch flanges at exterior corners.
3. No. 10 gauge sheet steel riveted or welded to 1.5 inch by 1.5 inch by 1/4-inch welded angle iron framework for boxes with maximum side exceeding 60 inches and more than 1,500 square inches in area.
4. Covers:

a. Same gauge steel as box.
b. Subdivided single covers so no section of cover exceeds 50 pounds
c. Machine bolts or machine screws threaded into tapped holes.

5. Paint:

a. Rust inhibiting primer, ANSI 61 grey enamel finish coat.

**PART 3 – EXECUTION**

3.1 GENERAL

A. 277/480V or 265/460V wiring shall be kept independent of 120/208V wiring. Emergency system wiring shall be kept independent of other wiring systems. Provide insulated grounding conductor in all feeder and branch circuit raceways. Minimum conduit size shall be 3/4-inch, including conduit for low-voltage cabling. Wiring of each type and system shall be installed in separate raceways.

B. Protect metallic raceway in earth or fill from corrosion with two coats of corrosion-resistant paint or tape wrap.

C. Locate raceways so that the integrity of structural members is not affected, and they do not conflict with the services of other trades. Draw up couplings and fittings full and tight. Protect threads from corrosion after installation with zinc chromate or equivalent protection.

D. Conceal raceways except at surface-mounted cabinets and freestanding equipment. Install minimum of 6 inches from flues, steam pipes, or other heated lines. Route exposed raceways parallel or perpendicular to building lines with right-angle turns and symmetrical bends. Provide sleeves in concrete walls, floor slabs and partitions. Waterproof sleeved raceways where required.

E. Provide raceway expansion joints for exposed and concealed raceways at expansion joints and between structures to compensate for differential movement. Provide bonding conductor.



F Clear raceway of all obstructions and dirt prior to pulling in wires or cables. Use ball mandrel (diameter approximately 85 percent of conduit insider diameter) followed by close-fitting wire brush and wad of felt or similar material. This assembly may be pulled with, but ahead of cable being installed. Clean empty raceways similarly. Clear or replace any raceway which rejects ball mandrel.

G. Secure raceways clamps or supports to masonry materials with toggle bolts, expansion bolts, or steel inserts. Install raceway on steel construction with approved clamps which do not depend on friction or set-screw pressure alone.

H. Provide independent support of raceways larger than 3/4 inch. Provide uni-strut support and threaded rod to structure above for multiple suspended raceways run together. Use of lathe channels or other miscellaneous steel to support raceways is not permitted. Use listed supports such as uni-strut or similar systems for support.

3.2 WIREWAYS AND AUXILIARY GUTTERS

A. Install wireways such that cover will hinge upward from side.

3.3 OUTLET, JUNCTION, AND PULL BOXES

A. Provide outlet, junction, and pull boxes as indicated and as required for a complete installation and to facilitate proper pulling of wires and cables. Boxes shall be sized per National Electrical Code as minimum. Plug open knock outs.

B. The exact location of outlets and equipment is governed by field conditions. Where necessary, relocate outlets so that fixtures and equipment are symmetrically located in accordance with the room layout and will not interfere with other work or equipment. Verify final location of outlets, fixtures, and equipment with engineer.

C. Provide pull boxes so that an individual run of conduit does not contain more than the equivalent of four 90-degree bends (360 degrees total).

D. Where boxes are installed outside exposed to the elements, weatherproof in-use covers shall be provided.

3.4 APPLICATION OF RACEWAYS

A. Electrical Metallic Tubing:

1. General purpose feeders and branch circuits rated greater that 100A, except where another conduit type is specifically required.
2. Exposed indoor installations in branch electrical closets and telecommunications rooms below ten feet above finished floor.

B. Metal Clad Cable:

1. Prohibited

C. Flexible Metal Conduit:

1. Dry locations only.
2. Connections to equipment where vibration isolation is needed.
3. Maximum length shall be six feet.



D. Liquid-Tight Flexible Steel Conduit:

1. Same as Flexible Metal Conduit in damp or wet locations.
2. Motor connections.

E. Liquid-Tight Flexible Non-metallic Conduit:

1. Prohibited.

F. Rigid Polyvinyl Conduit:

1. Prohibited

G. Electric Non Metallic Tubing

1. Prohibited

H. Wireways and Auxiliary Gutters:

1. Where indicated.
2. Above and below panelboards, lighting relay cabinets, fire alarm panels, and terminal cabinets to accommodate large concentrations of wires.

3.5 APPLICATION OF BOXES OUTLET, JUNCTION AND PULL BOXES

A. Galvanized Pressed Steel Type Boxes:

1. Where connected to electrical metallic tubing and flexible steel conduit, 1.25 inches and smaller.
2. Dry locations.
3. Where concealed in walls and above suspended ceilings.

B. Sheet Steel Boxes:

1. Where connected to conduit larger than 1.25 inches.

**END OF SECTION 26 05 33**



**SECTION 26 27 26**

**WIRING DEVICES**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide wiring devices in accordance with the Contract Documents.

1.2 QUALITY ASSURANCE

A. Switches, receptacles and wall plates shall be of the same manufacturer.

B. Equipment shall be certified for use in the District of Columbia and shall meet the Local Energy Code and local energy ordinances.

1.3 REFERENCE STANDARDS

A. Switches: Federal Specification WS-896E.

B. Receptacles: Federal Specification WC-596D, NEMA WD-1, and UL 498.

C. Ground Fault Circuit Interrupter Receptacles: UL 943 Class A.

D. Arc Fault Circuit Interrupter Receptacles: UL 1699

E. Wall Dimmers: ANSI C62.41, UL 20.

1.4 SUBMITTALS

A. Wiring Devices complete with physical dimensions, materials, connector details, voltage and current ratings, installation details, etc.

B. Samples of each receptacle, switch, wall plate and cover plate intended for use on this Project. All device samples must be reviewed by and approved by the Architect and Owner prior to ordering.

C. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

1.5 COLORS

A. Device and coverplate colors shall ivory. Catalog numbers, where included in this Specification, are not to be used to determine colors of devices and coverplates.

B. Coordinate device color with all coverplate colors and shall match.



**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. Catalog numbers shall not be used to determine colors of devices and cover plates. Catalog numbers are used to establish minimum acceptable standard.

B. Switches and Receptacles: Leviton, Cooper, Hubbell, or Legrand Pass & Seymour.

2.2 SWITCHES

A. General:

1. Switches shall be of the type indicated on the Drawings.
2. Switches shall be commercial specification grade, 20A, 120/277V, 1HP rated at 120V, 2HP rated at 240V, back- and side-wired, silent handle operation.
3. Pre-terminated plug style switches and sensors are permitted.

B. Weatherproof Switches:

1. Weatherproof handle/coverplate.

2.3 RECEPTACLES

A. General:

1. GFCI receptacles shall be installed per NEC 2020 210.8.
2. AFCI receptacles shall be installed per NEC 2020 210.12.
3. Receptacles shall be of the type indicated on the Drawings.
4. Receptacles shall be 20A, commercial specification grade, 125V, grounding type, back- and side-wired. Residential grade receptacles are acceptable within dwelling units.
5. Receptacles shall have a single piece, heavy duty brass ground contact and mounting strap.
6. Receptacles shall have a nylon face and heat resistant base.
7. Pre-terminated plug style receptacles are permitted.

B. Special Purpose Receptacles: Rating as indicated on the Drawings.

C. Weatherproof Receptacles:

1. Duplex, weatherproof while-in-use rated coverplate with hinged door.
2. All 15- and 20-ampere, 125- and 250-volt non-locking receptacles located in damp or wet locations shall be a listed weather-resistant type. Listed devices shall bear a "WR" marking on the face that is visible when installed.

2.4 COVER PLATES

A. Provide cover plates for wiring devices. Provide multiple gang cover plates where multiple devices are installed in a common location. Coordinate gang's with architectural and interiors elevations and details.

B. Provide polished stainless steel, smooth-face cover plates in equipment rooms. Thermoset coverplates are not acceptable.



C. Labeling: Receptacles located in the following rooms shall be labeled with panel and circuit number feeding the device:

1. Utility Rooms

**PART 3 – EXECUTION**

3.1 GENERAL

A. General:

1. Verify the exact location of wiring devices with Architect.
2. Provide a number 12 grounding conductor from the device grounding terminal to the panelboard ground bus. Bond wiring device to the outlet box.
3. Provide a number 12 grounding conductor from the device grounding terminal to the outlet box.
4. Receptacles mounted in boxes shall be installed so that the mounting yoke or strap of the receptacle is held rigidly against the surface of the wall.
5. Receptacle faces shall project a minimum of 0.015 inches [0.4 millimeters] from the faceplate. Faceplates shall be installed so as to completely cover the opening and seat against the mounting surface.

B. Switches:

1. Mount switches vertically with the ON position on top.
2. Mount switches on the strike side of doors.
3. Provide toggle handle type lighting switches in equipment rooms. Provide rocker handle type lighting switches in other areas.

C. Receptacles:

1. Mount receptacles vertically with the grounding pin down.
2. Provide conventional style duplex receptacles in equipment rooms.
3. Receptacles shall be mounted 15" to the bottom of the box for general convenience receptacles.

**END OF SECTION 26 27 26**



**SECTION 26 28 16**

**DISCONNECT SWITCHES AND INDIVIDUAL MOTOR CONTROLLERS**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide disconnect switches and individual motor controllers in accordance with the Contract Documents.

1.2 QUALITY ASSURANCE

A. Disconnects shall be of the same manufacturer.

1.3 REFERENCE STANDARDS

A. Disconnect Switches:

1. Federal Specification W-S-865C.
2. NEMA KS1
3. UL 98 (File #4778) and 508

B. Individual Motor Controllers:

1. NEMA ICS 2-321
2. UL 547, 945 and 1004

1.4 SUBMITTALS

A. All disconnect ratings and voltages.

B. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

C. Submittal shall include highlighted equipment specific for the project. Irrelevant information not pertaining to the project shall be stricken accordingly.

1.5 FIELD TESTING

A. Test each individual motor controller circuit and verify proper operation.

1.6 IDENTIFICATION

A. Provide an identification nameplate for each disconnect switch and individual motor controller.



**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. Siemens, Square D, Cutler Hammer (Eaton), or General Electric (ABB).

2.2 DISCONNECT SWITCHES

A. Heavy duty for 800A or less, horsepower rated, quick-make, quick-break, dead-front type. Self-contained unit in a NEMA 1 enclosure (NEMA 3R, gasketed where installed outdoors or where exposed to water spray, dust or dirt), externally operable from the front.

B. Defeatable interlock to prevent opening the door when the switch is in the ON position. Handle shall be capable of being padlocked in the OFF position.

C. Fusible switches shall be equipped with rejecting type clips suitable for UL Class R fuses up to 600A, suitable for UL Class L fuses above 600A. Interrupting rating shall be 200,000 RMS-symmetrical amperes.

D. Voltage, ampacity, horsepower rating, and number of poles shall be appropriate for system and load served. Provide neutral pad for circuits with neutral conductors. Provide ground lug.

**PART 3 – EXECUTION**

3.1 GENERAL

A. Disconnect switches and individual motor controller shall be installed within ten feet of load served and installed within sight of the motor.

B. Provide independent support; do not mount on the housing of the equipment served

C. Conduit connected between disconnect switch or individual motor controller and load served shall be flexible metal conduit where used indoors and liquid-tight flexible metal conduit where used outdoors or connected to a NEMA 3R rated device, 24 inches minimum length, 36 inches maximum length.

**END OF SECTION 26 28 16**



MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JIANFENG SUN
10/3/2025
No. PE4000573
ELECTRICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES GENERATOR ROOM

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ELECTRICAL - SPECS

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: Author | CKD. BY: Checker
SCALE:

E7.02

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# UNION STATION REDEVELOPMENT CORPORATION

50 MASSACHUSETTS AVE NE,
WASHINGTON, DC 20002

# UNION STATION GARAGE

PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
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| NO. | REVISION | DATE |
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| 1 | PERMIT / BID | 10/03/2025 |

## POWER LEGEND

| | |
|---|---|
| | SURFACE MOUNTED POWER PANEL:<br>SIZE APPROXIMATELY AS SHOWN |
| F | BUSWAY RISER WITH PLUG IN UNIT,<br>FUSE |
| CB | BUSWAY RISER WITH PLUG IN UNIT,<br>BREAKER |
| T / E | STEP DOWN TRANSFORMER |
| G | GENERATOR |
| ATS | AUTOMATIC TRANSFER SWITCH |
| | HEAVY DUTY DISCONNECT SWITCH, FUSED TYPE |
| M | MOTOR CONNECTION |
| J | JUNCTION BOX, CEILING MOUNTED |
| | CIRCUIT BREAKER |
| 1 / 1 | SHEET NOTE |
| EOPP 1 | MECHANICAL EQUIPMENT TAG<br>SEQUENTIAL UNIT NUMBER |

## RACEWAY LEGEND

| | |
|---|---|
| | CONDUIT CONCEALED ABOVE CEILING OR WITHIN WALL |
| | CONDUIT BELOW GRADE OR EMBEDDED WITHIN SLAB |
| | CONDUIT UP |
| | CONDUIT DOWN |
| | CONDUIT STUBBED OUT WITH BUSHING<br>NOTE: PROVIDE PULLSTRING IN EACH EMPTY RACEWAY |
| | CONDUIT STUBBED OUT AND CAPPED<br>NOTE: PROVIDE PULLSTRING IN EACH EMPTY RACEWAY |

PHASE CONDUCTOR(S)
GROUNDING CONDUCTOR
ISOLATED GROUNDING CONDUCTOR
NEUTRAL CONDUCTOR

## FIRE ALARM LEGEND

| | |
|---|---|
| P | MANUAL PULL STATION |
| 2 | AREA SMOKE DETECTOR, CEILING MOUNTED<br>(SMOKE DETECTOR, SEMI-FLUSH MOUNTED IN CEILING) |
| A | HEAT DETECTOR, CEILING MOUNTED |
| W | SPRINKLER WATER FLOW MONITOR MODULE |
| T | SPRINKLER TAMPER MONITOR MODULE |
| P | PRESSURE SWITCH WITH HI/LO SUPERVISORY SWITCH. |
| S | COMBINATION FIRE ALARM SPEAKER/VISUAL ALARM; WALL MOUNTED |
| H | FIRE ALARM HORN; CEILING MOUNTED |
| H | FIRE ALARM HORN; WALL MOUNTED |
| H | COMBINATION FIRE ALARM HORN/VISUAL ALARM; WALL MOUNTED |
| | VISUAL ALARM; CEILING MOUNTED |
| | VISUAL ALARM; WALL MOUNTED |
| FACP | FIRE ALARM AND CONTROL PANEL |
| FARP | FIRE ALARM REMOTE PANEL |
| FATC | FIRE ALARM TERMINAL CABINET |
| FAAP | FIRE ALARM ANNUNCIATOR PANEL |
| FARA | FIRE ALARM REMOTE ANNUNCIATOR |
| GSP | GENERATOR REMOTE STATUS PANEL |

## EQUIPMENT NAMING LEGEND

E O S U - ATS BUS DPH DPL DSH DSL LP LPH LRC MCC MP MS PDU T TB TC - 2 N A / 1,3,5

- 1,3,5 — CIRCUIT NUMBER(S)
- A — FIRST OF THIS TYPE ON FLOOR
- N — NORTH, EAST, SOUTH OR WEST
- 2 — FLOOR LEVEL

| | |
|---|---|
| ATS | AUTOMATIC TRANSFER SWITCH |
| BUS | BUSWAY |
| DPH | DISTRIBUTION PANEL 277/480V |
| DPL | DISTRIBUTION PANEL 120/208V |
| DSH | DISTRIBUTION SWITCHBOARD 277/480V |
| DSL | DISTRIBUTION SWITCHBOARD 120/208V |
| LP | BRANCH CIRCUIT PANELBOARD 120/208V |
| LPH | BRANCH CIRCUIT PANELBOARD 277/480V |
| LRC | LIGHTING RELAY CABINET |
| MCC | MOTOR CONTROL CENTER |
| MP | MECHANICAL EQUIPMENT PANELBOARD 120/208V |
| MPH | MECHANICAL EQUIPMENT PANELBOARD 277/480V |
| MS | MAIN SWITCHBOARD |
| PDU | POWER DISTRIBUTION UNIT |
| T | TRANSFORMER |
| TB | TELECOM BACKBOARD |
| TC | TELECOM CABINET |

| | |
|---|---|
| E | EMERGENCY LIFE SAFETY |
| O | OPTIONAL STANDBY POWER |
| S | LEGALLY REQUIRED STANDBY POWER |
| U | UNINTERRUPTIBLE POWER SUPPLY |

## ABBREVIATIONS

| | |
|---|---|
| A | AMPERES |
| AF/AS | AMPERE RATING OF FUSE/SWITCH |
| AIC | AMPERES INTERRUPTING CAPACITY |
| AT/AF | AMPERE RATING OF CIRCUIT, BREAKER TRIP/FRAME |
| ATS | AUTOMATIC TRANSFER SWITCH |
| C | CONDUIT (GENERIC TERM FOR RACEWAY - PROVIDE AS SPECIFIED) |
| CB | CIRCUIT BREAKER |
| CKT | CIRCUIT |
| CU | COPPER |
| ELEV | ELEVATOR |
| FA | FIRE ALARM |
| FP | FIRE PROTECTION |
| GC | GENERAL CONTRACTOR |
| JB | JUNCTION BOX |
| KCMIL | THOUSAND CIRCULAR MILS |
| KVA | KILO-VOLT AMPERE |
| KW | KILO-WATT |
| MCB | MAIN CIRCUIT BREAKER |
| MLO | MAIN LUGS ONLY |
| MS | MANUAL SWITCH |
| MTD | MOUNTED |
| MTG | MOUNTING |
| (N) | NEW |
| NTS | NOT TO SCALE |
| P | POLE |
| PB | PULL BOX |
| PH | PHASE |
| PWR | POWER |
| UON | UNLESS OTHERWISE NOTED |
| WP | WEATHERPROOF |
| (X) | EXISTING TO BE REMOVED |

## CODES AND STANDARDS

THE SCOPE OF THE WORK SHALL INCLUDE THE FURNISHING AND INSTALLATION OF THE NECESSARY MATERIAL AND LABOR TO ACCOMPLISH THE WORK INDICATED BY THE DRAWINGS AND HEREIN SPECIFIED. ALL WORK BY CONTRACTOR SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL BUILDING CODES AND STANDARDS INCLUDING BUT NOT LIMITED TO:

A. STATE, COUNTY, AND CITY HEALTH AND BUILDING CODES
B. NFPA 13, 2016 EDITION
C. NFPA 70, 2020 EDITION
D. NFPA 72, 2016 EDITION
E. NFPA 99: STANDARD FOR HEALTHCARE FACILITIES, 2018 EDITION
F. NFPA 101: LIFE SAFETY CODE, 2018 EDITION
G. OTHER NFPA CODES AS REFERENCED BY STANDARD CODES
H. ANSI A117.1-2017: ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
I. THE AMERICANS WITH DISABILITIES ACT (ADA), ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES, 2010 EDITION

Structural Notes:

A. Examination required prior to cutting, drilling, coring or anchoring into the existing structure.
1. Do not cut, drill, core or anchor into any structural element without prior written approval from USRC's Engineer of Record (USRC's EOR), unless noted otherwise.
2. The contractor shall scan the concrete at all locations of proposed cuts, penetrations or anchorages to locate and mark all embedded objects including but not limited to embedded reinforcement, prestress or post-tension strands, embedded connections, electrical conduit, and any other embedded hardware/equipment. Scanning shall be performed by a certified technician using a Ground Penetrating Radar (GPR) concrete scanning system such as Conquest by Sensors & Software Inc. or equal. Calibrate and recalibrate the scanner in accordance with . Calibrations must be performed at the beginning of each shift and when conditions change. Prove the calibration of each scanner on a test location or test piece accepted by USRC's EOR, locating at least three reinforcing bars using the scanner and hammer drilled test holes to determine depth of cover. Do not calibrate at post-tension strands since the hammer drill bit will damage the post-tension sheathing and strand.
3. Adjust locations of cuts, penetrations and anchorages as required to avoid embedded objects by a minimum of 3", unless noted otherwise by USRC's EOR.
4. Submit scanning reports including photographs and scaled drawings and/or sketches, to USRC's EOR and applicable design team to review and approve or comment on proposed cuts, penetrations and anchorages. Adjust the locations as directed by USRC's EOR and/or design team. Review time is 7 to 14 days depending upon the quality and complexity of the submission.
5. Use hammer drills when possible; do not core drill unless the scanning operation has clearly shown that the area is free of embedded objects.
6. Do not cut through or damage the embedded reinforcing, prestress or post-tension strands, embedded objects/connections, electrical conduit, and any other embedded hardware/equipment. If prestress strands, post-tension strands, or other embedded objects are inadvertently damaged, the Tenant/Contractor must notify the Landlord (USRC) and USRC's EOR immediately.

## ELECTRICAL DRAWING LIST - DWW

| DRAWING NO. | DESCRIPTION |
|---|---|
| E0.10 | ELECTRICAL LEGENDS AND ABBREVIATIONS |
| E0.20 | ELECTRICAL - SCHEDULES |
| E2.02N | BUS LEVEL - ELECTRICAL PLAN - NEW WORK - NORTH |
| E4.00 | ELECTRICAL - ENLARGED VIEWS |
| E7.00 | ELECTRICAL - SPECS |
| E7.01 | ELECTRICAL - SPECS |
| E7.02 | ELECTRICAL - SPECS |

MEPFPT Engineer:

WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA — 10/3/2025 — No. PE400000573 — ELECTRICAL — PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ELECTRICAL LEGENDS AND ABBREVIATIONS

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: Author | CKD. BY: Checker
SCALE: 12" = 1'-0"

E0.10-4

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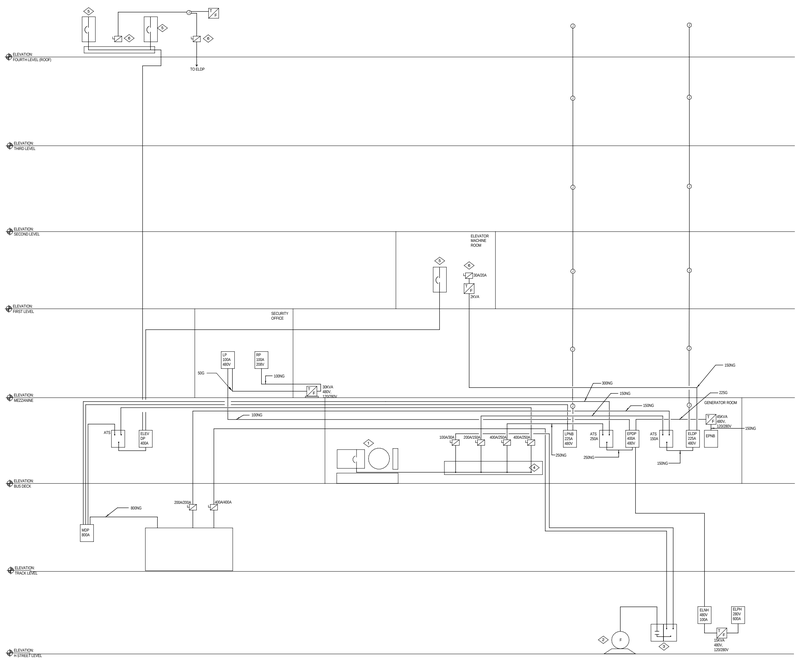



**SHEET NOTES**

1. EXISTING 300KW/375KVA, 600A, 460V, 3 PHASE, 4 WIRE GENERATOR.
2. EXISTING FIRE PUMP 460V, 3 PHASE.
3. CONTROLLER AND ATS.
4. GENERATOR OUTPUT DISTRIBUTION TROUGH 12" x 12" x 72".
5. ELEVATOR MAIN POWER SWITCH - SHUNT TRIP CIRCUIT BREAKER. 100A, 3 POLES, 480V.
6. TRANSFORMER AND SWITCH FOR ELEVATOR CAB LIGHTS AND FAN.

**GENERAL NOTES**

1. ALL EQUIPMENT SHOWN IS EXISTING AND FOR REFERENCE ONLY.
2. ALL EQUIPMENT NOT SHOWN IS EXISTING TO REMAIN AND NOT IN THE SCOPE OF WORK.

② RISER DIAGRAM Copy 1
Not to Scale

# SINGLE PHASE CONDUCTORS

### WIRING SCHEDULE - COPPER CONDUCTORS (0-600V)

| CIRCUIT RATING | CONDUIT SIZE (INCHES) | | | | | CONDUCTOR SIZE | |
|---|---|---|---|---|---|---|---|
| | G | NG | NGI | NNG | NNGI | PHASE/ NEUTRAL | GND/* IG |
| 20 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 12 | 12 |
| 30 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 10 | 10 |

### SUBSCRIPT KEY

| SUBSCRIPT | CONDUCTORS PER CONDUIT |
|---|---|
| G | SINGLE PHASE CONDUCTOR, 1 GROUNDING CONDUCTOR |
| NG | SINGLE PHASE CONDUCTOR, 1 NEUTRAL CONDUCTOR, 1 GROUNDING CONDUCTOR |
| NGI | SINGLE PHASE CONDUCTOR, 1 NEUTRAL CONDUCTOR, 1 GROUNDING CONDUCTOR, 1 ISOLATED GROUNDING CONDUCTOR |
| NNG | SINGLE PHASE CONDUCTOR, 2 NEUTRAL CONDUCTORS*, 1 GROUNDING CONDUCTOR |
| NNGI | SINGLE PHASE CONDUCTOR, 2 NEUTRAL CONDUCTORS*, 1 GROUNDING CONDUCTOR, 1 ISOLATED GROUNDING CONDUCTOR |

### EXAMPLES


### TYPICAL RUNS FOR BRANCH CIRCUIT MAXIMUM VOLTAGE DROP OF 3% BASED ON COPPER:

| CONDUCTOR SIZE | VOLTAGE | PHASE | CURRENT IN AMPS | MAXIMUM DISTANCE IN FEET |
|---|---|---|---|---|
| #12 | 120 | 1 | 12 | 90 |
| #10 | 120 | 1 | 18 | 100 |
| #8 | 120 | 1 | 30 | 95 |
| #6 | 208 | 3 | 40 | 230 |
| #4 | 208 | 3 | 50 | 290 |
| #3 | 208 | 3 | 60 | 305 |
| #2 | 208 | 3 | 70 | 325 |
| #12 | 277 | 1 | 12 | 215 |
| #10 | 277 | 1 | 18 | 230 |
| #8 | 277 | 1 | 30 | 220 |
| #6 | 480 | 3 | 40 | 525 |
| #4 | 480 | 3 | 50 | 660 |
| #3 | 480 | 3 | 60 | 700 |
| #2 | 480 | 3 | 70 | 760 |

### TYPICAL RUNS FOR BRANCH CIRCUIT MAXIMUM VOLTAGE DROP OF 2% BASED ON COPPER:

| CONDUCTOR SIZE | VOLTAGE | PHASE | CURRENT IN AMPS | MAXIMUM DISTANCE IN FEET |
|---|---|---|---|---|
| #3 | 208 | 3 | 60 | 200 |
| #2 | 208 | 3 | 70 | 220 |
| #1 | 208 | 3 | 80 | 240 |
| #1/0 | 208 | 3 | 90 | 270 |
| #2/0 | 208 | 3 | 105 | 290 |
| #3/0 | 208 | 3 | 120 | 320 |
| #4/0 | 208 | 3 | 140 | 350 |
| #3 | 480 | 3 | 60 | 470 |
| #2 | 480 | 3 | 70 | 510 |
| #1 | 480 | 3 | 80 | 555 |
| #1/0 | 480 | 3 | 90 | 625 |
| #2/0 | 480 | 3 | 105 | 675 |
| #3/0 | 480 | 3 | 120 | 745 |
| #4/0 | 480 | 3 | 140 | 805 |

# THREE PHASE CONDUCTORS

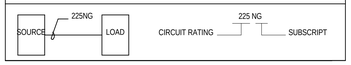
### WIRING SCHEDULE - COPPER CONDUCTORS (0-600V)

| CIRCUIT RATING | CONDUIT SIZE (INCHES) | | | | | CONDUCTOR SIZE | |
|---|---|---|---|---|---|---|---|
| | G | NG | NGI | NNG | NNGI | PHASE/ NEUTRAL | GND/* IG |
| 20 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 12 | 12 |
| 30 | 0.5 | 0.5 | 0.75 | 0.75 | 0.75 | 10 | 10 |
| 40 | 0.75 | 0.75 | 0.75 | 1 | 1 | 8 | 10 |
| 45 | 0.75 | 0.75 | 0.75 | 1 | 1 | 8 | 10 |
| 50 | 0.75 | 0.75 | 0.75 | 1 | 1 | 8 | 10 |
| 60 | 0.75 | 1 | 1 | 1 | 1.25 | 6 | 10 |
| 70 | 1 | 1.25 | 1.25 | 1.25 | 1.5 | 4 | 8 |
| 80 | 1 | 1.25 | 1.25 | 1.25 | 1.5 | 4 | 8 |
| 90 | 1.25 | 1.25 | 1.25 | 1.5 | 1.5 | 3 | 8 |
| 100 | 1.25 | 1.25 | 1.25 | 1.5 | 1.5 | 3 | 8 |
| 110 | 1.25 | 1.25 | 1.5 | 1.5 | 2 | 2 | 6 |
| 125 | 1.25 | 1.5 | 2 | 2 | 2 | 1 | 6 |
| 150 | 1.5 | 2 | 2 | 2 | 2.5 | 1/0 | 6 |
| 175 | 2 | 2 | 2 | 2.5 | 2.5 | 2/0 | 6 |
| 200 | 2 | 2.5 | 2.5 | 2.5 | 2.5 | 3/0 | 6 |
| 225 | 2 | 2.5 | 2.5 | 2.5 | 3 | 4/0 | 4 |
| 250 | 2.5 | 2.5 | 2.5 | 3 | 3 | 250 | 4 |
| 300 | 2.5 | 2.5 | 3 | 3 | 3 | 350 | 4 |
| 350 | 3 | 3 | 3.5 | 4 | 4 | 500 | 3 |
| 400 | 2@2 | 2@2.5 | 2@2.5 | 2@2.5 | 2@2.5 | 3/0 | 3 |
| 450 | 2@2 | 2@2.5 | 2@2.5 | 2@2.5 | 2@3 | 4/0 | 2 |
| 500 | 2@2.5 | 2@2.5 | 2@2.5 | 2@3 | 2@3 | 250 | 2 |
| 600 | 2@2.5 | 2@2.5 | 2@3 | 2@3 | 2@3 | 350 | 1 |
| 700 | 2@3 | 2@3 | 2@3.5 | 2@4 | 2@4 | 500 | 1/0 |
| 800 | 3@2.5 | 3@2.5 | 3@3 | 3@3 | 3@3.5 | 300 | 1/0 |

### SUBSCRIPT KEY

| SUBSCRIPT | CONDUCTORS PER CONDUIT |
|---|---|
| G | 3 PHASE CONDUCTORS, 1 GROUNDING CONDUCTOR |
| NG | 3 PHASE CONDUCTORS, 2 NEUTRAL CONDUCTORS*, 1 GROUNDING CONDUCTOR, 1 ISOLATED GROUNDING CONDUCTOR |
| NGI | 3 PHASE CONDUCTORS, 1 NEUTRAL CONDUCTOR, 1 GROUNDING CONDUCTOR |
| NNG | 3 PHASE CONDUCTORS, 1 NEUTRAL CONDUCTOR, 1 GROUNDING CONDUCTOR, 1 ISOLATED GROUNDING CONDUCTOR |
| NNGI | 3 PHASE CONDUCTORS, 2 NEUTRAL CONDUCTORS*, 1 GROUNDING CONDUCTOR |

### EXAMPLES




TYPICAL COPPER SCHEDULE NOTES:

1. SCHEDULE IS BASED ON 2020 EDITION OF THE NATIONAL ELECTRICAL CODE.
2. CURRENT CARRYING CONDUCTOR AMPACITY IS BASED ON TABLE 310.15(B) (16) 3 CURRENT CARRYING CONDUCTORS IN RACEWAY, CABLE OR EARTH AT AMBIENT AIR TEMPERATURE OF 30 DEGREES C (86 DEGREES F).
3. CURRENT CARRYING CONDUCTOR AMPACITY IS BASED ON TABLE 310.15(B)(16), COPPER WITH INSULATION VALUE OF 75 DEGREES C (167 DEGREES F) TYPES RHW, THHW, THW, THWN, XHHW, USE, ZW.
4. RACEWAY FILL SCHEDULE IS BASED ON USING COPPER CONDUCTORS WITH THHN, THWN OR THWN-2.
5. MAXIMUM FILL FOR RACEWAY IS BASED ON TABLE 1 CHAPTER 9 AND TABLE C.1 FOR ELECTRIC METAL TUBING (EMT). ADJUST FILL FOR DIFFERENT RACEWAY TYPES INCLUDING TABLE C.4 INTERMEDIATE METAL CONDUIT, (IMC), TABLE C.8 RIGID METAL CONDUIT (RMC), TABLE C.10 RIGID PVC CONDUIT -SCHEDULE 40 AS REQUIRED FOR APPLICATION AND IN ACCORDANCE WITH THE SPECIFICATIONS.
6. IN ACCORDANCE WITH CHAPTER 9 TABLES, NOTE 3, THE GROUND CONDUCTOR IS INCLUDED IN THE FILL CALCULATION. FOR THE PURPOSE OF THE FILL CALCULATION, THE GROUND CONDUCTOR IS ASSUMED THE SAME SIZE AS THE CURRENT CARRYING CONDUCTOR.
7. FOR THE PURPOSE OF FILL CALCULATION AND CONDUCTOR RATING, THE NEUTRAL CONDUCTOR IS NOT CONSIDERED A CURRENT CARRYING CONDUCTOR AS REFERENCED IN 310.15(B)(5).
8. CONDUCTORS RUN IN PARALLEL ARE PERMITTED IN SIZE 1/0 AND LARGER AND ONLY IF RUN IN SEPARATE RACEWAYS. PARALLELED CONDUCTORS SHALL NOT BE PERMITTED TO BE RUN IN THE SAME RACEWAY EVEN IF ALLOWED BY THE CONDUIT FILL TABLES.
9. EQUIPMENT GROUNDING CONDUCTOR RATING IS BASED ON TABLE 250.122.
10. THE MAXIMUM ALLOWABLE CONDUCTOR SIZE SHALL BE 500KCMIL.
11. OTHER CONDUCTOR MATERIALS, INSULATION VALUES AND RACEWAY TYPES ARE SUITABLE FOR THE USE IF THEY MEET THE INTENT AND CURRENT CARRYING AMPACITY SPECIFIED. IN THE EVENT THAT OTHER INSULATION VALUES OR OTHER RACEWAY MATERIALS ARE USED, PROVIDE A RISER DIAGRAM WITH PROPOSED METHODS FOR REVIEW.
12. BRANCH CIRCUITS ARE SIZED FOR A MAXIMUM VOLTAGE DROP OF 3%. FEEDERS ARE SIZED FOR A MAXIMUM VOLTAGE DROP OF 2%

## Branch Panel: EPNB

**Location:** GENERATOR ROOM
**Supply From:** 45KVA XFMR
**Mounting:** Surface
**Enclosure:** Type 1

**Volts:** 120/208 WYE
**Phases:** 3
**Wires:** 4

**A.I.C. Rating:** 10KAIC
**Mains Type:** MCB
**Mains Rating:** 225 A
**MCB Rating:** 150 A

**Notes:**
EXISTING PANEL TO REMAIN.

| CKT | Circuit Description | Trip | Poles | A | | B | | C | | Poles | Trip | Circuit Description | CKT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | (E) RCPTS | 20 A | 1 | 1000 VA | 200 VA | | | | | 1 | 20 A | AIR IN. AND DISCHRGE. LVRS. - GEN. RM. | 2 |
| 3 | (E) RCPTS | 20 A | 1 | | | 1200 VA | 500 VA | | | 1 | 20 A | DRY VALVE - B10 - SCOPE 2 | 4 |
| 5 | (E) RCPTS | 30 A | 1 | | | | | 1000 VA | 100 VA | 1 | 20 A | DRY VALVE - B11 - SCOPE 2 | 6 |
| 7 | (E) RCPTS | 30 A | 1 | 1000 VA | 1560 VA | | | | | 2 | 30 A | (E) SUMP PUMP | 8 |
| 9 | (E) RCPTS | 20 A | 1 | | | 1000 VA | 1560 VA | | | -- | -- | -- | 10 |
| 11 | (E) UNIT HEATER | 20 A | 2 | | | | | 1040 VA | 100 VA | 1 | 20 A | DRY VALVE - B12 - SCOPE 2 | 12 |
| 13 | -- | -- | -- | 1040 VA | 1040 VA | | | | | 2 | 20 A | (E) UNIT HEATER | 14 |
| 15 | (E) UNIT HEATER | 20 A | 2 | | | 1040 VA | 1040 VA | | | -- | -- | -- | 16 |
| 17 | -- | -- | -- | | | | | 1040 VA | 2080 VA | 2 | 40 A | (E) HEAT PUMP | 18 |
| 19 | FOFP-1 - GEN. RM. | 20 A | 1 | 50 VA | 1740 VA | | | | | -- | -- | -- | 20 |
| 21 | FOT-1 - GEN. RM. | 20 A | 1 | | | 1060 VA | 1740 VA | | | 3 | 50 A | (E) HEAT PUMP | 22 |
| 23 | SPARE | 20 A | 1 | | | | | 0 VA | 1740 VA | -- | -- | -- | 24 |
| 25 | (E) HEAT PUMP INDOOR | 50 A | 2 | 2600 VA | 2600 VA | | | | | -- | -- | -- | 26 |
| 27 | -- | -- | -- | | | 2600 VA | 100 VA | | | 1 | 20 A | DRY VALVE - B13 - SCOPE 2 | 28 |
| 29 | *EUH-A GENERATOR ROOM | 20 A | 2 | | | | | 1650 VA | 1650 VA | 2 | 20 A | *EUH-A GENERATOR ROOM | 30 |
| 31 | -- | -- | -- | 1650 VA | 1650 VA | | | | | -- | -- | -- | 32 |
| 33 | SPARE | 20 A | 1 | | | 0 VA | 0 VA | | | 1 | 20 A | SPARE | 34 |
| 35 | (E) HEAT PUMP OUTDOOR | 50 A | 2 | | | | | 2600 VA | 1040 VA | 2 | 20 A | (E) UNIT HEATER | 36 |
| 37 | -- | -- | -- | 2600 VA | 1040 VA | | | | | -- | -- | -- | 38 |
| 39 | SPARE | 20 A | 1 | | | 0 VA | 1040 VA | | | 2 | 20 A | (E) UNIT HEATER | 40 |
| 41 | SPARE | 20 A | 1 | | | | | 0 VA | 1040 VA | -- | -- | -- | 42 |
| | | | | **Total Load:** | 19770 VA | | 12880 VA | | 15080 VA | | | | |
| | | | | **Total Amps:** | 168 A | | 107 A | | 128 A | | | | |

**Legend:**
* INDICATES NEW BREAKER REQUIRED.

| Load Classification | Connected Load | Demand Factor | Estimated Demand | Panel Totals | |
|---|---|---|---|---|---|
| Power | 8710 VA | 100.00% | 8710 VA | | |
| Spare | 39020 VA | 100.00% | 39020 VA | **Total Conn. Load:** | 47730 VA |
| | | | | **Total Est. Demand:** | 47730 VA |
| | | | | **Total Conn. Current:** | 132 A |
| | | | | **Total Est. Demand Current:** | 132 A |

**Notes:**
ALL "SPARE" LOAD CLASSIFICATIONS INDICATE EXISTING LOAD VALUES.

## Branch Panel: ELDP

**Location:** GENERATOR ROOM
**Supply From:** 150A ATS TO GENERATOR
**Mounting:** Surface
**Enclosure:** Type 1

**Volts:** 460/265 WYE
**Phases:** 3
**Wires:** 4

**A.I.C. Rating:** 22KAIC
**Mains Type:** MCB
**Mains Rating:** 225 A
**MCB Rating:** 150 A

**Notes:**
EXISTING PANEL TO REMAIN.

| CKT | Circuit Description | Trip | Poles | A | | B | | C | | Poles | Trip | Circuit Description | CKT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | (E) LTS STAIR 6,7 | 20 A | 1 | 600 VA | 100 VA | | | | | 1 | 20 A | HEAT TRACE - B10 - SCOPE 2 | 2 |
| 3 | (E) LTS BUS LEVEL | 20 A | 1 | | | 600 VA | 100 VA | | | 1 | 20 A | HEAT TRACE - B11 - SCOPE 2 | 4 |
| 5 | (E) LTS BUS LEVEL | 20 A | 1 | | | | | 600 VA | 600 VA | 1 | 20 A | (E) LTS ELEC/GEN RM | 6 |
| 7 | (E) LTS BUS LEVEL | 20 A | 1 | 600 VA | 600 VA | | | | | 1 | 20 A | (E) LTS MEZZ | 8 |
| 9 | (E) LTS BUS LEVEL | 20 A | 1 | | | 600 VA | 600 VA | | | 1 | 20 A | (E) LTS MEZZ | 10 |
| 11 | (E) ACCENT LTS MEZZ. | 20 A | 1 | | | | | 600 VA | 600 VA | 1 | 20 A | (E) LTS 1ST LVL | 12 |
| 13 | (E) ELEV #3 | 30 A | 3 | 1700 VA | 600 VA | | | | | 1 | 20 A | (E) LTS 2ND LVL | 14 |
| 15 | -- | -- | -- | | | 1700 VA | 600 VA | | | 1 | 20 A | (E) LTS 3RD LVL | 16 |
| 17 | -- | -- | -- | | | | | 1700 VA | 100 VA | 1 | 20 A | HEAT TRACE - B12 - SCOPE 2 | 18 |
| 19 | (E) ELEV #1,2 | 30 A | 3 | 1700 VA | 100 VA | | | | | 1 | 20 A | HEAT TRACE - B13 - SCOPE 2 | 20 |
| 21 | -- | -- | -- | | | 1700 VA | 3330 VA | | | 3 | 60 A | (E) CAR CHARGER #2 | 22 |
| 23 | -- | -- | -- | | | | | 1700 VA | 3330 VA | -- | -- | -- | 24 |
| 25 | SPARE | 20 A | 1 | 0 VA | 3330 VA | | | | | -- | -- | -- | 26 |
| 27 | SPARE | 20 A | 1 | | | 0 VA | 0 VA | | | 1 | 20 A | SPARE | 28 |
| 29 | (E) EAST WALKWAY LEDS | 20 A | 1 | | | | | 600 VA | 1400 VA | 1 | 30 A | *HEAT TRACE - UPPER TRACK LVL - SCOPE 4 | 30 |
| 31 | *EF GENERATOR ROOM | 20 A | 3 | 3710 VA | 0 VA | | | | | 1 | 20 A | SPARE | 32 |
| 33 | -- | -- | -- | | | 3710 VA | 0 VA | | | 1 | 20 A | SPARE | 34 |
| 35 | -- | -- | -- | | | | | 3710 VA | 0 VA | 1 | 20 A | SPARE | 36 |
| 37 | SPARE | 20 A | 1 | 0 VA | 600 VA | | | | | 3 | 20 A | (E) EM PANEL | 38 |
| 39 | SPARE | 20 A | 1 | | | 0 VA | 600 VA | | | -- | -- | -- | 40 |
| 41 | SPARE | 20 A | 1 | | | | | 0 VA | 600 VA | -- | -- | -- | 42 |
| | | | | **Total Load:** | 13640 VA | | 13540 VA | | 15540 VA | | | | |
| | | | | **Total Amps:** | 52 A | | 51 A | | 59 A | | | | |

**Legend:**
* INDICATES NEW BREAKER REQUIRED.

| Load Classification | Connected Load | Demand Factor | Estimated Demand | Panel Totals | |
|---|---|---|---|---|---|
| Power | 29790 VA | 100.00% | 29790 VA | | |
| Spare | | | | **Total Conn. Load:** | 42720 VA |
| | | | | **Total Est. Demand:** | 42720 VA |
| | | | | **Total Conn. Current:** | 54 A |
| | | | | **Total Est. Demand Current:** | 54 A |

**Notes:**
ALL "SPARE" LOAD CLASSIFICATIONS INDICATE EXISTING LOAD VALUES.

## Branch Panel: RP

**Location:** SECURITY OFFICE
**Supply From:** 30KVA XFMR TO LP
**Mounting:** Surface
**Enclosure:** Type 1

**Volts:** 120/208 WYE
**Phases:** 3
**Wires:** 4

**A.I.C. Rating:** 10KAIC
**Mains Type:** MCB
**Mains Rating:** 100 A
**MCB Rating:** 100 A

**Notes:**
EXISTING PANEL TO REMAIN.

| CKT | Circuit Description | Trip | Poles | A | | B | | C | | Poles | Trip | Circuit Description | CKT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | (E) RCPT UNDER COUNTER | 20 A | 1 | 500 VA | 500 VA | | | | | 1 | 20 A | (E) RCPTS WIREMOLD | 2 |
| 3 | (E) RCPT UNDER COUNTER | 20 A | 1 | | | 500 VA | 500 VA | | | 1 | 20 A | (E) RCPTS WIREMOLD | 4 |
| 5 | (E) RCPT UNDER COUNTER | 20 A | 1 | | | | | 500 VA | 500 VA | 1 | 20 A | FUEL POLISHING SYSTEM- GEN. RM. | 6 |
| 7 | (E) PARKING EQUIP MEZZ | 20 A | 1 | 500 VA | 1200 VA | | | | | 2 | 50 A | (E) PARKING EQUIP NORTH MEZZ | 8 |
| 9 | (E) PARKING EQUIP MEZZ | 20 A | 1 | | | 500 VA | 1200 VA | | | -- | -- | -- | 10 |
| 11 | (E) PARKING EQUIP BOOTH | 20 A | 1 | | | | | 500 VA | 2000 VA | 2 | 60 A | (E) PARKING EQUIP NORTH MEZZ | 12 |
| 13 | (E) MEZZ UNIT LVL 2 ENTRANCE | 60 A | 2 | 3000 VA | 2000 VA | | | | | -- | -- | -- | 14 |
| 15 | -- | -- | -- | | | 3000 VA | 500 VA | | | 1 | 20 A | (E) PARKING EQUIP MEZZ | 16 |
| 17 | (E) PARKING EQUIP LVL 2 | 20 A | 1 | | | | | 500 VA | 500 VA | 1 | 20 A | (E) PARKING EQUIP MEZZ | 18 |
| 19 | (E) PARKING EQUIP LVL 3 | 20 A | 1 | 500 VA | 500 VA | | | | | 1 | 20 A | (E) PARKING EQUIP MEZZ | 20 |
| 21 | (E) PARKING EQUIP LVL 3 | 20 A | 1 | | | 500 VA | 500 VA | | | 1 | 20 A | (E) PARKING EQUIP MEZZ | 22 |
| 23 | (E) FIRE ALARM PANEL | 20 A | 1 | | | | | 500 VA | 500 VA | 1 | 20 A | (E) CAMERAS | 24 |
| 25 | (E) CCTV SOUTH MEZZ | 20 A | 1 | 500 VA | 500 VA | | | | | 1 | 20 A | (E) PARKING EQUIP LVL 1 | 26 |
| 27 | (E) CCTV NORTH MEZZ | 20 A | 1 | | | 500 VA | 500 VA | | | 1 | 20 A | (E) CONTROL PNL LVL 1 | 28 |
| 29 | (E) SIGNS MEZZ | 20 A | 1 | | | | | 500 VA | 500 VA | 1 | 20 A | (E) RCPTS WIREMOLD | 30 |
| 31 | (E) PARKING EQUIP LVL 3 | 20 A | 1 | 500 VA | 1000 VA | | | | | 3 | 30 A | (E) CONDENSING UNIT | 32 |
| 33 | (E) PARKING EQUIP LVL 3 | 20 A | 1 | | | 500 VA | 1000 VA | | | -- | -- | -- | 34 |
| 35 | (E) SECURITY SYSTEM | 20 A | 1 | | | | | 500 VA | 1000 VA | -- | -- | -- | 36 |
| 37 | (E) PARKING EQUIP LVL 1 | 20 A | 1 | 500 VA | 1040 VA | | | | | 2 | 20 A | (E) FAN COIL UNIT | 38 |
| 39 | (E) RCPTS SECURITY | 20 A | 1 | | | 500 VA | 1040 VA | | | -- | -- | -- | 40 |
| 41 | (E) RCPTS SECURITY | 20 A | 1 | | | | | 500 VA | 500 VA | 1 | 20 A | (E) CCTV MONITORS | 42 |
| | | | | **Total Load:** | 12740 VA | | 11240 VA | | 9000 VA | | | | |
| | | | | **Total Amps:** | 109 A | | 97 A | | 75 A | | | | |

**Legend:**

| Load Classification | Connected Load | Demand Factor | Estimated Demand | Panel Totals | |
|---|---|---|---|---|---|
| Power | 500 VA | 100.00% | 500 VA | | |
| Spare | 32480 VA | 100.00% | 32480 VA | **Total Conn. Load:** | 32980 VA |
| | | | | **Total Est. Demand:** | 32980 VA |
| | | | | **Total Conn. Current:** | 92 A |
| | | | | **Total Est. Demand Current:** | 92 A |

**Notes:**
ALL "SPARE" LOAD CLASSIFICATIONS INDICATE EXISTING LOAD VALUES.


MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
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Architect:

Structural Engineer:



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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA JIANFENG SUN 10/3/2025 No. PE40000573 PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ELECTRICAL - SCHEDULES

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: Author | CKD. BY: Checker |
| SCALE: | 6" = 1'-0" |

E0.20-4


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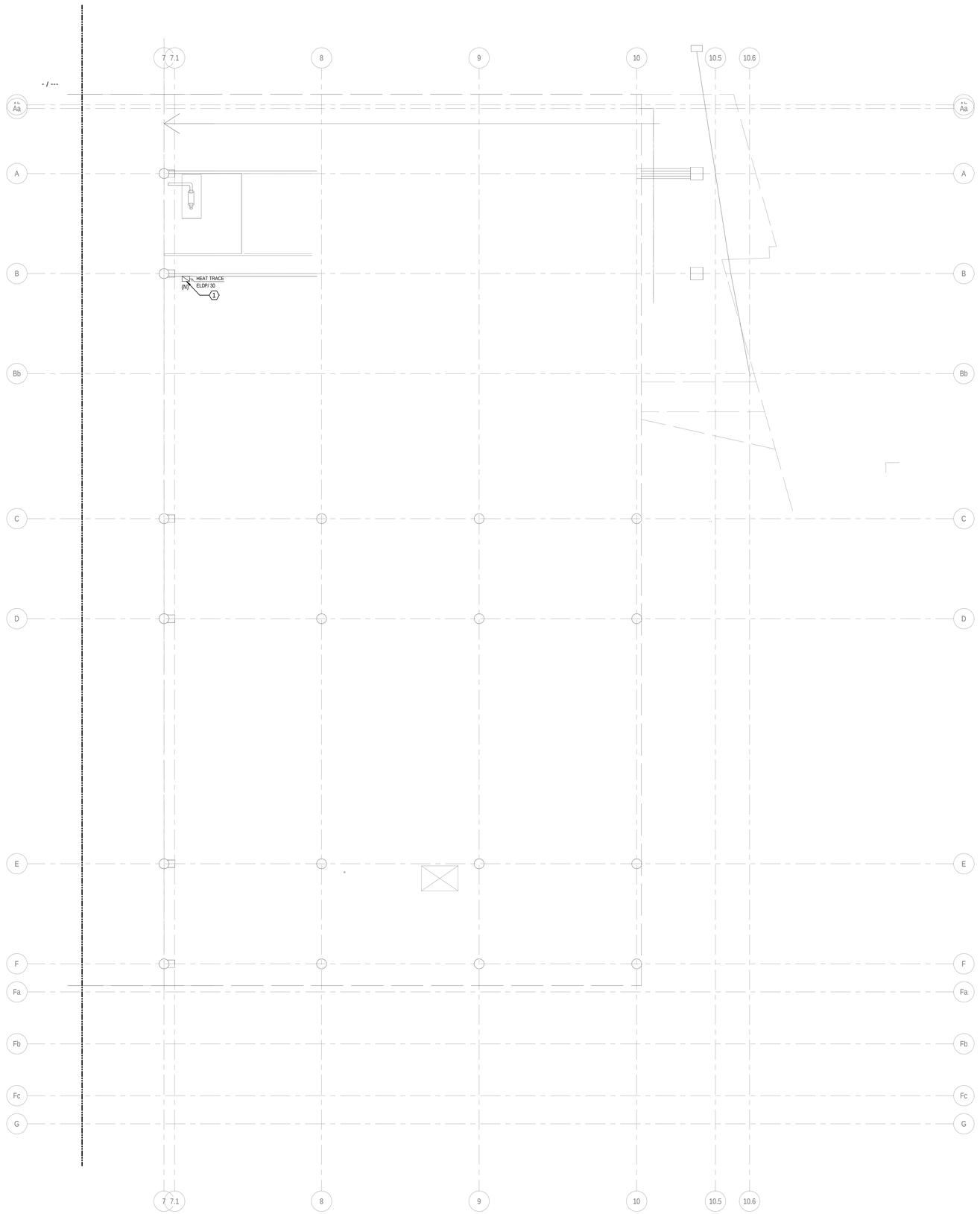



1 ELECTRICAL - UPPER TRACK LEVEL - NEW WORK - DWW - NORTH
1/16" = 1'-0"

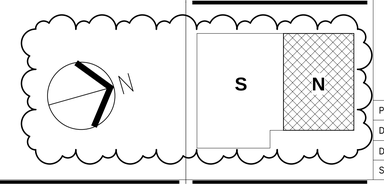
GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1' - 0"

## SHEET NOTES

1 HEAT TRACE CONTROLLER SPECIFIED BY OTHERS WILL BE EQUIPPED WITH GROUND FAULT CIRCUIT INTERRUPTER.

## GENERAL NOTES

KEY PLAN




MEPFPT Engineer:

WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

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|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JIANFENG SUN
10/3/2025
No. PE40000573
ELECTRICAL
PROFESSIONAL ENGINEER

PROJECT

# PM SUPPORT SERVICES DOMESTIC WATER WINTERIZATION

OWNER

## UNION STATION REDEVELOPMENT CORPORATION

TITLE

# UPPER TRACK LEVEL - ELECTRICAL PLAN - NEW WORK - NORTH

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: Author | CKD. BY: Checker |
| SCALE: | 1/16" = 1'-0" |

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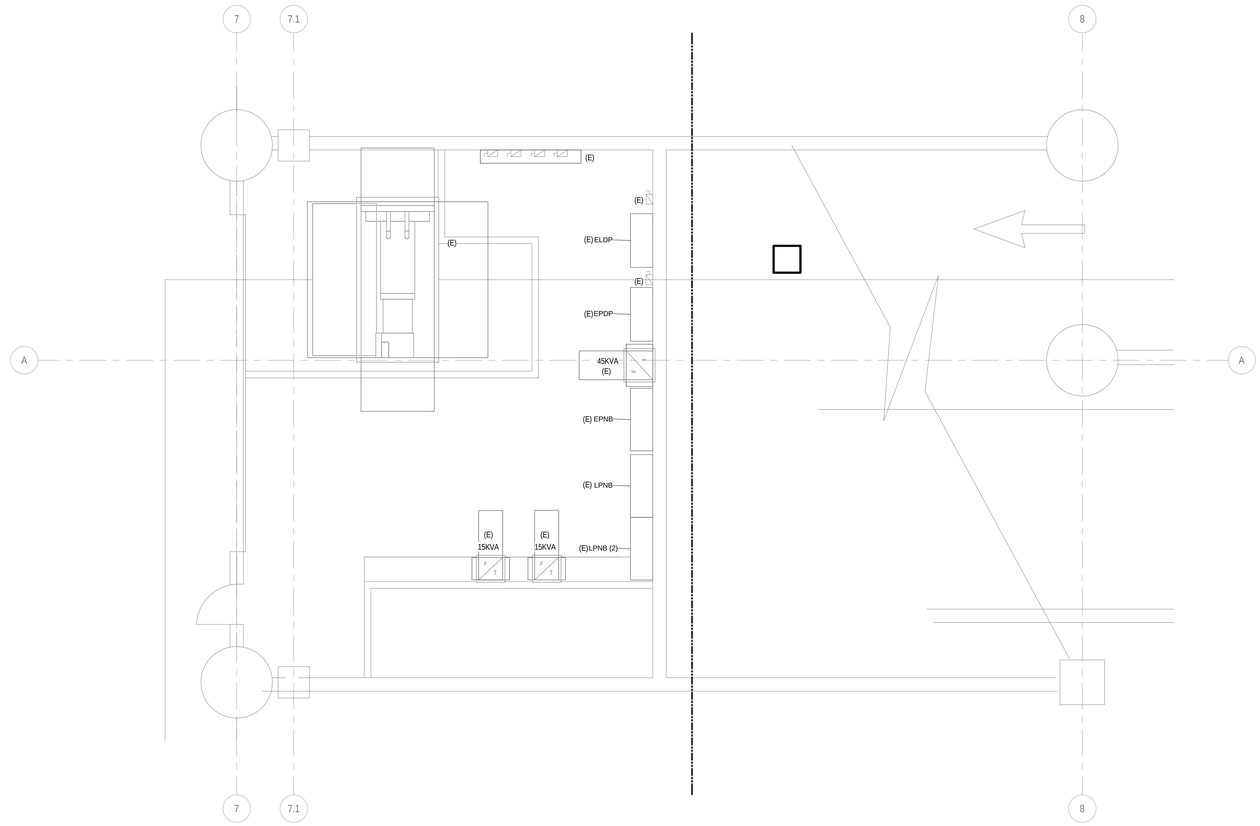


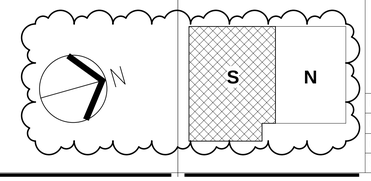

2 ELECTRICAL - BUS LEVEL ENL - NEW WORK - DWW - GENERATOR ROOM
1/4" = 1'-0"

## SHEET NOTES

## GENERAL NOTES

A. PROVIDE CONDUIT, WIRE, OVERCURRENT PROTECTION, ETC. FOR A COMPLETE ELECTRICAL DEVICE INSTALLATION AS DEFINED ON PLANS, RISER DIAGRAMS, AND SPECIFICATIONS.
B. FIELD COORDINATE EXACT ROUTING OF ALL NEW FEEDERS AND BRANCH CIRCUITS.
C. ALL PENETRATIONS THROUGH FLOOR SLABS AND FIRE RATED WALLS SHALL BE PROPERLY FIRE-STOPPED. REFER TO ARCHITECTURAL FIRE STOP DETAILS FOR ADDITIONAL INFORMATION.
D. ALL CONDUITS, WIRING, ETC. MOUNTED ALONG CEILING SHALL BE MOUNTED AS CLOSE TO THE SLAB AS POSSIBLE AND SHALL FOLLOW THE SLOPE OF THE CEILING.
E. MC CABLE IS NOT PERMITTED TO BE USED IN ELECTRICAL OR MECHANICAL ROOMS.
F. SHADED REGIONS INDICATE AREAS OUT OF CONTRACT/SCOPE.
G. CONTRACTOR TO INCLUDE SCOPE TO RELOCATE/MODIFY ANY EXISTING WIRING OR CONDUIT IN OPEN CEILING AREAS.
H. (N) DESIGNATION INDICATES NEW EQUIPMENT.
I. (E) DESIGNATION INDICATES EXISTING EQUIPMENT.

## KEY PLAN




GRAPHIC SCALE
4' 2' 0 4' 8' 12'
SCALE: 1/4" = 1'- 0"

MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JIANFENG SUN
10/3/2025
No. PE40000573
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES
# DOMESTIC WATER WINTERIZATION

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## ELECTRICAL - ENLARGED VIEWS

| | | |
|---|---|---|
| PROJECT NO.: US-WSP-192801E | | E4.00-4 |
| DATE: 10/03/2025 | | |
| DWN. BY: Author | CKD. BY: Checker | |
| SCALE: As indicated | | |

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**SECTION 26 05 01**

**ELECTRICAL GENERAL PROVISIONS**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. The General and Supplementary Conditions and other Divisions are a part of the requirements for the work under this Division of the Specifications.

B. It is the intent of these Specifications to provide complete systems. Completeness shall mean that all materials, equipment, and systems as installed and operating on this project have been installed properly with the best practices of the trade; are suitable for the intended purpose, location, and environment; properly fit within the physical space limitations for the project; are in conformance with applicable codes and reference standards; have been started-up, tested, adjusted, and commissioned for the intended use; have maintained applicable UL Listings; are in compliance with manufacturer's recommendations and warranty requirements; ready for the Owner's use, and in the opinion of the engineer, performing as designed.

1.2 WORK INCLUDED

A. Provide labor and materials required to install, test and place into operation the electrical systems as called for in the Contract Documents, in accordance with applicable codes and regulations and in accordance with the equipment manufacturers written directions.

B. Provide labor, materials, and accessories required to provide complete, operating electrical systems. Labor, materials, or accessories not specifically called for in the Contract Documents, but required to provide complete, operating electrical systems shall be provided without additional cost.

1.3 QUALITY ASSURANCE

A. Comply with the current applicable codes, ordinances, and regulations of the Authority or Authorities Having Jurisdiction, the rules, regulations, and requirements of the utility companies serving the project, and the Owner's insurance underwriter.

B. Drawings, specifications, codes and standards are minimum installation requirements. Where requirements differ, the most stringent apply.

C. Should any change in drawings or specifications be required to comply with governing regulations, notify the Engineer prior to submitting bid.

D. All electrical equipment, materials, devices, and installations shall meet or exceed minimum requirements of ADA, ANSI, ASTM, IEEE, IES, NEC, NEMA, NETA, NFPA, OSHA, SMACNA and UL.

E. Execute work in strict accordance with the best practices of the trades in a thorough, substantial, workperson-like manner by competent workpeople. Provide a competent, experienced, full-time Superintendent who is authorized to make decisions on behalf of the Contractor.



F. Equipment shall be certified for use in the District of Columbia and shall meet the local energy code.

1.4 ABBREVIATIONS AND DEFINITIONS

A. Abbreviations:

| | | |
|---|---|---|
| 1. | ADA | Americans with Disabilities Act |
| 2. | ANSI | American National Standards Institute |
| 3. | ASA | Acoustical Society of America |
| 4. | ASTM | American Society for Testing and Materials |
| 5. | BIL | Basic Impulse Level |
| 6. | CBM | Certified Ballast Manufacturers |
| 7. | ECC | Engineer's Control Center |
| 8. | EIA | Electronic Industries Alliance |
| 9. | ETL | Electrical Testing Laboratories, Inc. |
| 10. | FCC | Fire Control Center |
| 11. | FM | Factory Mutual |
| 12. | IEEE | Institute of Electrical and Electronic Engineers |
| 13. | IES | Illuminating Engineering Society |
| 14. | IPCEA | International Power Cable Engineers Association |
| 15. | LED | Light Emitting Diode |
| 16. | NEC | National Electrical Code |
| 17. | NEMA | National Electrical Manufacturers Association |
| 18. | NETA | National Electrical Testing Association |
| 19. | NFPA | National Fire Protection Association |
| 20. | OEM | Original Equipment Manufacturer |
| 21. | OSHA | Occupational Safety and Health Administration |
| 22. | SCC | Security Control Center |
| 23. | SMACNA | Sheet Metal and Air Conditioning Contractors National Association |
| 24. | TIA | Telecommunications Industry Association |
| 25. | UL | Underwriters Laboratories Inc. |

B. Definitions:

1. Where it is stated in these specifications to submit to the Engineer for review, refer to General and Supplementary Conditions for proper procedures.
2. FURNISH means to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories, and all other items customarily required for the proper and complete application.
3. INSTALL means to join, unite, fasten, link, attach, set up or otherwise connect together before testing and turning over to Owner, complete and ready for regular operation.
4. PROVIDE means to FURNISH and INSTALL.
5. AS DIRECTED means as directed by the Engineer, or the Engineer's Representative.
6. CONCEALED means embedded in masonry or other construction, installed behind wall furring or within drywall partitions, or installed above suspended ceilings.
7. SUBMIT means submit to Engineer for review.

1.5 GUARANTEE

A. Submit a single guarantee stating that the work is in accordance with the Contract Documents. Guarantee work against faulty and improper material and workmanship for a



period of one year from the date of final acceptance by the Owner, except that where guarantees or warranties for longer terms are provided or specified herein, the longer term shall apply. Correct any deficiencies, which occur during the guarantee period, within 24 hours of notification, without additional cost. Obtain similar guarantees from subcontractors, manufacturers, suppliers and sub-trade specialists.

1.6 USE OF THE ENGINEER'S AND ENGINEER'S DRAWINGS

A. The Contractor may obtain from the Engineer a set of 3D BIM or compatible format engineering drawings on electronic media where desired by the Contractor and/or required by the Specifications for use in preparing the shop drawings, coordination drawings, and record drawings. The Contractor shall provide to the Engineer a written or electronic release of liability acceptable to the Engineer prior to receiving the electronic media.

**PART 2 – PRODUCTS**

2.1 EQUIPMENT AND MATERIALS

A. Provide products and materials that are new, clean, free of defects, and free of damage and corrosion.

B. Products and materials shall not contain lead, asbestos, PCB, or any other material that is considered hazardous by the Environmental Protection Agency or any other Authority Having Jurisdiction.

C. Replace materials of less than specified quality and relocate work incorrectly installed as directed by the Engineer at no additional cost.

D. Provide name / data plates on major components of equipment with manufacturer's name, model number, serial number, capacity data and electrical characteristics attached in a conspicuous place.

E. Install materials and equipment with qualified trades people.

F. Maintain uniformity of manufacturer for equipment used in similar applications and sizes.

G. Fully lubricate equipment where required.

H. Follow manufacturer's instructions for installing, connecting, and adjusting equipment. Provide a copy of such instructions at the equipment during installation.

I. Equipment capacities, ratings, etc., are scheduled or specified for job site operating conditions. Equipment sensitive to altitude shall be derated with the method of derating identified on the submittals.

J. Enclosures for electrical equipment installed indoors in mechanical or electrical equipment rooms shall be NEMA type 1. Enclosures for electrical equipment installed outdoors shall be NEMA type 3R, – gasketed or as specified on the drawings.

K. Energy consuming equipment shall be certified for use in the District of Columbia and shall meet the local energy code and local energy ordinances.



2.2 SUBSTITUTIONS

A. Contract Documents are based on equipment manufacturers as called out in the Specifications and indicated on the Drawings. Contract documents include a basis of design in which the design in centered. Other manufacturers listed in the specification are acceptable if the equipment fits in the designated area without altering the engineering design and meets other clauses in the specifications. Acceptance of substitute equipment manufacturers does not relieve Contractor of the responsibility to provide equipment and materials, which meet the performance as, stated or implied in the Contract Documents.

B. Submit proposals for review and approval, to provide substitute materials or equipment, in writing, fifteen business days prior to submission of bid Substituted materials or equipment received after that time will not be acceptable or reviewed. Reimburse Owner for costs associated with the review of the proposed substitution whether substitution is accepted or rejected.

C. Indicate revisions required to adapt substitutions including revisions by other trades. Substitutions that increase the cost of the work and related trades are not permitted or shall be paid for by the contractor.

D. The proposed substitution shall conform to the size, ratings, and operating characteristics of the equipment or systems as specified and shown on the Drawings. The substitution must fit into available space conditions and must function properly in coordination with the rest of the system.

E. Proposals for substitutions shall include the following information:

1. A description of the difference between the Contract Document requirements and that of the substitution, the comparative features of each, and the effect of the change on the end result performance. Include the impact of all changes on other contractors and acknowledge the inclusion of additional costs to the other trades.
2. Schematic drawings and details.
3. List of revisions to the Contract Documents that must be made if the substitution is accepted.
4. Estimate of added or reduced costs the Contractor may incur in implementing the substitution, such as test, evaluation, operating and support costs.
5. Statement of the time by which a Contract modification accepting the substitution must be issued, noting any effect on the Contract completion time or the delivery schedule.
6. A statement indicating the reduction to the Contract price if the Owner accepts the substitution. Include required modifications to all related trades.

**PART 3 – EXECUTION**

3.1 FEES AND PERMITS

A. Pay all required fees and obtain all required permits related to the electrical installation.

B. Pay royalties or fees in connection with the use of patented devices and systems.

C. Provide controlled inspection where required by Authorities Having Jurisdiction or by these specifications.



3.2 SUBMITTALS AND REVIEWS

A. Submit shop drawings, manufacturer's product data sheets, samples, and test reports as specified.

B. Submit a complete typed list of all electrical equipment manufacturers and material suppliers for the equipment proposed to be provided on this project, as well as names of all subcontractors.

C. Prepare an index of all submittals for the project. Include a submittal identification number, a cross-reference to the Specification sections or Drawing number, and an item description. Prefix the submittal identification number by the Specification sections to which they apply. Indicate on each submittal, the submittal identification number in addition to the other data specified. All subcontractors shall utilize the assigned submittal identification number.

D. After the Contract is awarded, obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all subcontractors, for all materials and equipment as specified. Submit data and details of such materials and equipment for review. Prior to submission, certify that the shop drawings, product data and samples are in compliance with the Contract Documents. Include as part of the Shop Drawing the specification section. Provide a compliance / non-compliance specification attached to the front of every submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place. Submittals without the required compliance / non-compliance specification attached will not be reviewed and will be returned "Review and Resubmit". Check all materials and equipment upon their arrival on the job site and verify their compliance with the Contract Documents. Modify any work, which proceeds prior to receiving accepted shop drawings as required to comply with the Contract Documents and the shop drawings.

E. Non applicable items in the specifications shall be clearly stricken out. Applicable items shall be clearly highlighted. Submittals lacking the clarity of stricken or highlighted information shall be returned marked Revise and Resubmit.

F. Review of submittals is for general compliance with the design concept and Contract Documents. Comments or absence of comments shall not relieve the Contractor from compliance with the Contract Documents. The Contractor remains solely responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of construction, for performing the work in a safe manner, and for coordinating the work with that of other trades.

G. No part of the work shall be started in the shop or in the field until the shop drawings and samples for that portion of the work have been submitted reviewed, and returned with either "No Exceptions Noted" or "Exceptions Noted" marked on the submission.

H. A minimum period of ten working days, exclusive of transmittal time, will be required in the Engineer's office each time a shop drawing, product data and/or samples are submitted for review. This period must be considered by the Contractor in the scheduling of the work.

I. Submit electronic submittals of the shop drawing or product data as PDF electronic files in compliance with the Division 1 requirements. All electronic submittals shall include the



associated cover sheet and submittal number. Submit all material samples with the appropriate cover sheet and sample number.

J. Submissions will be stamped as follows:

| Stamp | | Interpretation |
|---|---|---|
| ☐ | No Exceptions Noted | Fabrication, manufacture, or construction may proceed providing submittal complies with the Contract Documents. |
| ☐ | Exceptions Noted: Resubmit for Record | Fabrication, manufacture, or construction may proceed providing submittal complies with both the Contract Documents and the Engineer's notations. Resubmit revised submittal for record only. |
| ☐ | Exceptions Noted: No Resubmission Required | Fabrication, manufacture, or construction may proceed providing submittal complies with both the Contract Documents and the Engineer's notations. |
| ☐ | Revise and Resubmit | Submittal does not comply with the Contract Documents. Do not proceed with fabrication, manufacture, or construction. The work and/or shop drawings are not permitted at the job site. |
| ☐ | For Review Only | Informational Submittal: Submittal does not require the Engineer's responsive action. |

K. Submit materials and equipment by manufacturer, trade name, and model number. Include copies of applicable brochure or catalog material. Maintenance and operating manuals are not acceptable substitutes for shop drawings.

L. Identify each sheet of printed submittal pages (using arrows, highlighting, underlining or circling) to show applicable sizes, types, model numbers, ratings, capacities and options actually being proposed. Cross out non-applicable information. Note specified features such as materials or paint finishes. Cross out all references to "options". Cross out statements such as "subject to change without notice" or "not for construction". Anything not specifically excluded is assumed to be included. Submittals that do not clearly indicate excluded information will not be reviewed and will be returned marked "Revise and Resubmit".

M. Include dimensional data for roughing in and installation and technical data sufficient to verify that equipment meets the requirements of the Contract Documents. Include wiring, conduit routing and service connection data.

N. Maintain a complete set of reviewed and stamped shop drawings and product data on site.

O. For each room or area of the building containing electrical equipment, submit the following:

1. Floor Plans: Plan and elevation layout drawings indicating the equipment in the exact location in which it is intended to be installed. These plans shall be of a scale not less than 1/4 inch to 1 foot. They shall be prepared in the following manner:
   a. Indicate the physical boundaries of the space including door swings and ceiling heights and ceiling types (as applicable).



B. The Contract Documents do not make representations regarding the character or extent of the existing structural, mechanical and electrical installations, above or below ground, or other sub-surface conditions which may be encountered during the work. Evaluate existing conditions, which may affect methods or cost of performing the work, based on examination of the site or other information. Failure to examine the Drawings or other information does not relieve the Contractor of responsibility for the satisfactory completion of the work.

3.6 CUTTING AND PATCHING

A. Where cutting, channeling, chasing or drilling of floors, walls, partitions, ceilings or other surfaces is necessary for the proper installation, support or anchorage of conduit or other equipment, lay out the work carefully in advance. Repair any damage to the building, piping, equipment or defaced finished plaster, woodwork, metalwork, etc., using skilled tradespeople of the trades required at no additional cost.

B. Do not cut, channel, chase or drill unfinished masonry, tile, etc., unless permission from the Engineer is obtained. If permission is granted, perform this work in a manner acceptable to the Engineer.

C. Where conduit or equipment are mounted on a painted finished surface, or a surface to be painted, paint to match the surface. Cold galvanize bare metal whenever support channels are cut.

D. Provide slots, chases, openings and recesses through floors, walls, ceilings, and roofs as required. Where these openings are not provided, provide cutting and patching to accommodate penetrations at no additional cost.

3.7 MOUNTING HEIGHTS

A. Mounting heights shall conform to ADA requirements.

B. Verify exact locations and mounting heights with the Engineer before installation.

C. Electrical receptacles and outlets shall be mounted no higher than 48 inches above finished floor to top of the outlet box and no lower than 15 inches above finished floor to bottom of the outlet box.

D. Electrical switches shall be mounted no higher than 48 inches above finished floor to top of the outlet box and no lower than 36 inches above finished floor to bottom of the outlet box.

E. Fire alarm manual pull stations shall be mounted no higher than 48 inches above finished floor to top of the outlet box and no lower than 36 inches above finished floor to bottom of the outlet box.

F. Visual Alarms: When not ceiling mounted, not less than 80 inches to the bottom or 96 inches to the top of the device.

3.8 CLEANING UP

A. Avoid accumulation of debris, boxes, loose materials, crates, etc., resulting from the installation of this work. Remove from the premises each day all debris, boxes, etc., and keep the premises clean and free of dust and debris.



b. Illustrate all electrical equipment proposed to be contained therein. Include top and bottom elevations of all electrical equipment. The Drawings shall be prepared utilizing the dimensions contained in the individual equipment submittals. Indicate code and manufacturer's required clearances and access points.
c. Illustrate all other equipment therein such as conduits, detectors, luminaries, ducts, registers, pull boxes, wireways, structural elements, etc.
d. Indicate the operating weight of each piece of equipment.
e. Indicate the heat release from each piece of electrical equipment in terms of BTU per hour. This information shall be that which is supplied by the respective manufacturers.
f. Illustrate concrete housekeeping pads and curbs.
g. Indicate dimensions to confirm compliance with code-required clearances.
h. Indicate maximum normal allowable operating temperature for each piece of equipment (as per each respective manufacturer's recommendation).
i. Equipment removal routes.

2. Provide ¼" = 1'-0" plans of point-to-point routing of conduits with size and function between switchboards, transformers, panelboards, distribution boards, transfer switches, maintenance panels, generators, protective relaying, generator control cabinets etc. All conduit 2" in diameter and greater shall be indicated in the model.

P. The work described in shop drawing submissions shall be carefully checked by all trades for clearances (including those required for maintenance and servicing), field conditions, maintenance of engineering conditions and coordination with other trades on the job. Each submitted shop drawing shall include a certification that related job conditions have been checked by the Contractor and each Subcontractor and that conflicts do not exist.

Q. The Contractor is not relieved of the responsibility for dimensions or errors that may be contained on submissions, or for deviations from the requirements of the Contract Documents. The noting of some errors but overlooking others does not grant the Contractor permission to proceed in error.

R. Inadequate or incomplete shop drawings, product data and/or samples will not be reviewed and will be returned to the Contractor marked "Revise and Resubmit" for resubmittal.

S. Indicate the following on the lower right-hand corner of each shop drawing and on the front cover of each product data brochure cover: The submittal identification number; title of the sheet or brochure; name and location of the project; names of the Engineer, Engineer, Contractor, Subcontractor, manufacturer, supplier, and vendor; the date of submittal; and the date of each correction, version and revision. Number all pages and drawings in product data brochures consecutively from beginning to end. Unless the above information is included, the submittal will be returned for resubmission. Resubmittals of product data or brochures shall include a cover letter summarizing the corrections made in response to the review comments.

3.3 COORDINATION OF WORK

A. The Contract Documents establish scope, materials and quality but are not detailed installation instructions. Drawings are diagrammatic.



B. Coordinate work with related trades and furnish, in writing, any information necessary to permit the work of related trades to be installed satisfactorily and with the least possible conflict or delay.

C. The electrical drawings show the general arrangement of equipment and appurtenances. Follow these drawings as closely as the actual construction and the work of other trades will permit. Provide offsets, fittings, and accessories, which may be required but not shown on the Drawings. Investigate the site, note construction conditions, wall materials, ceiling heights and review drawings of other trades to determine conditions affecting the work and provide such work and accessories as may be required to accommodate such conditions. Additional costs as a result of the failure to investigate the site will not be paid.

D. The locations of receptacles, outlets, panels and other equipment indicated on the Drawings are approximately correct, but they are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed in consequence of increase or reduction of the number of outlets, or in order to meet field conditions, or to coordinate with modular requirements of ceilings, or to simplify the work, or for other legitimate causes.

E. Exercise particular caution with reference to the location of panels, receptacles, outlets, switches, fire alarm devices, and have precise and definite locations accepted by the Engineer before proceeding with the installation.

F. The Drawings show only the general run of large raceways and approximate locations of receptacles and outlets. Any significant changes in location of receptacles and outlets, cabinets, etc., necessary in order to meet field conditions shall be brought to the immediate attention of the Engineer for review before such alterations are made. Modifications shall be made at no additional cost.

G. Verify with the Engineer the exact location and mounting height of outlets and equipment not dimensionally located on the Drawings prior to installation.

H. Circuit tags in the form of numbers are used where shown to indicate the circuit designation numbers in electrical rooms. Show the actual circuit numbers on the as-built Record Drawings and on the associated typed panelboard directory card. Where circuiting is not indicated, provide required circuiting in accordance with the loading indicated on the Drawings and/or as directed.

I. The Drawings generally do not indicate the quantity of wires in conduit for the branch circuit wiring of fixtures and outlets, or the actual circuiting. Provide the correct conductor size and quantity as required by the indicated circuiting and/or circuit numbers indicated, the control intent, referenced wiring diagrams (if any), the specified voltage drop or maximum distance limitations, and the applicable requirements of the NEC.

J. Carefully check space requirements with other trades to ensure that equipment can be installed in the spaces allotted.

K. Wherever work interconnects with work of other trades, coordinate with other trades to ensure that they have the information necessary so that they may properly install the necessary connections and equipment. Identify pull boxes requiring access in order that the ceiling trade will know where to install access doors and panels.

L. Consult with other trades regarding equipment so that, wherever possible, motor controls and distribution equipment are of the same manufacturer.



M. Furnish and set sleeves for passage of electrical risers through structural masonry and concrete walls and floors and elsewhere as required for the proper protection of each electrical riser passing through building surfaces.

N. Provide firestopping matching the wall or partition rating around all pipes, conduits, ducts, sleeves, etc. which pass through rated walls, partitions and floors.

O. Provide detailed information on openings and holes required in precast members for electrical work.

P. Provide required supports and hangers for conduit and equipment, designed so as not to exceed allowable loadings of structures.

Q. Examine and compare the Contract Documents with the drawings and specifications of other trades and report any discrepancies between them to the Engineer and obtain written instructions for changes necessary in the work. Install and coordinate the work in cooperation with other related trades. Before installation, make proper provisions to avoid interferences.

R. Wherever the work is of sufficient complexity, prepare additional detail drawings to scale to coordinate the work with the work of other trades. Detailed work shall be clearly identified on the Drawings as to the area to which it applies. Submit these drawings to the Engineer for review. At completion include a set of these drawings with each set of Record Drawings.

S. Furnish services of an experienced Superintendent, who shall be in constant charge of all work, and who shall coordinate work with the work of other trades. No work shall be installed before coordinating with other trades.

T. Before commencing work, examine adjoining work on which this work is in any way affected and report conditions, which prevent performance of the work. Become thoroughly familiar with actual existing conditions to which connections must be made or which must be changed or altered.

U. Adjust location of conduits, panels, equipment, etc., to accommodate the work to prevent interferences, both anticipated and encountered. Determine the exact route and location of each conduit prior to fabrication.

1. Right-of-Way: Lines which pitch have the right-of-way over those which do not pitch. For example: condensate, steam, and plumbing drains normally have right-of-way. Lines whose elevations cannot be changed have right-of-way over lines whose elevations can be changed.
2. Provide offsets, transitions and changes in direction of conduit as required to maintain proper headroom and pitch on sloping lines.

V. In cases of doubt as to the work intended, or in the event of need for explanation, request supplementary instructions from the Engineer.

W. Reflected Ceiling Plans: ceiling plans, sections, and other necessary details showing dimensioned layouts for equipment located in or on the ceiling plane. Base dimensions on exact dimensioned data obtained from product submittals for products to be included in the Work. Differentiate between field measurements and assumed dimensions. Include the following items coordinated with each other, based on input from installers of the items involved:



1. Suspended ceiling components
2. Structural members
3. Sprinklers, sprinkler mains.
4. Fire Alarm initiating and indicating devices,

3.4 CONTRACTOR'S COORDINATION DRAWINGS

A. The Contractor shall coordinate efforts of all trades and shall provide (in writing, with copies to the Engineer) any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. The Contractor and all trade contractors shall prepare a complete set of construction Coordination Drawings indicating the equipment actually purchased and the exact routing for all lines such as conduit, piping, ductwork, etc., The Coordination Drawings shall be submitted complete to the Engineer, in compliance with the construction schedule for the project. The sheet metal drawings, at a scale of not less than 1/4 inch to 1 foot, shall serve as the base drawings to which all other Contractors shall add their work. Each separate trade contractor shall draw their work on separate layers or worksets with different color assignments to facilitate coordination. Each Coordination Drawing shall be completed and signed off by the other Trade Contractors and the Contractor prior to the installation of the mechanical, plumbing, electrical and fire protection and sprinkler work in the area covered by the specific drawing. The Contractor's work shall be installed according to the shop drawings and coordination drawings. If the Contractor allows one trade to install their work before coordination with the work of other trades, the Contractor shall make all necessary changes to correct the condition at no additional cost.

C. The Contractors' Coordination Drawings shall indicate structural loads at support points for all piping 10 inch and larger, racked piping, racked conduit, busway, and suspended electrical equipment. Submit to Structural Engineer for review and approval. The elevation, location, support points, static, dynamic and expansion forces and loads imposed on the structure at support and anchor points shall be indicated. All beam penetrations and slab penetrations shall be indicated and sized and shall be coordinated. Work routed underground or embedded in concrete shall be indicated by dimension to column and building lines and shall be coordinated. Coordination Drawings shall document all required structural penetrations for initial construction. Penetrations shall be dimensioned for walls, floors and roofs. These structural coordination requirements require review and approval by the Structural Engineer prior to completion and submittal of the Drawings.

D. This requirement for Coordination Drawings shall not be construed as authorization for the Contractor or trade contractors to make any unauthorized changes to the Contract Documents. Contract document space allocations shall be maintained such as ceiling height, designated clearance for future construction and flexibility, chase walls, equipment room size, unless prior written authorization is received from the Engineer to change them.

E. Prior to final acceptance of the work, the Contractor shall submit the Coordination Drawings as part of the Record Drawings submittal.

3.5 EXAMINATION OF SITE

A. Prior to the submitting of bids, visit the project site and become familiar with all conditions affecting the proposed installation and make provisions as to the cost thereof.



B. All electrical equipment shall be thoroughly vacuumed and wiped clean prior to energizing and at the completion of the project. Equipment shall be opened for observation by the Engineer as required.

3.9 WATERPROOFING

A. Avoid, if possible, the penetration of any waterproof membranes such as roofs, machine room floors, basement walls, and the like. If such penetration is necessary, make penetration prior to the waterproofing and furnish all sleeves or pitch-pockets required. Advise the Engineer and obtain written permission before penetrating any waterproof membrane, even where such penetration is shown on the Drawings.

B. Restore waterproofing integrity of walls or surfaces after they have been penetrated without additional cost.

3.10 SUPPORTS

A. Support work in accordance with the best industry practice. Provide supports, hangers, auxiliary structural members and supplemental hardware required for support of the work.

B. Provide supporting frames or racks extending from floor slab to ceiling slab for work indicated as being supported from walls where the walls are incapable of supporting the weight. In particular, provide such frames or racks in electric closets and mechanical equipment rooms.

C. Provide supporting frames or racks for equipment which is to be installed in a freestanding position.

D. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members, rigidly bolted or welded together and adequately braced to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.

E. Adequate support of equipment (including outlet, pull and junction boxes and fittings) shall not depend on electric conduits, raceways, or cables for support.

F. Electrical equipment or raceway shall not rest on or depend for support on suspended ceiling media (tiles, lath, plaster, as well as splines, runners, bars and the like in the plane of the ceiling). Provide independent support of electrical equipment. Do not attach to supports provided for ductwork, piping or work of other trades.

G. Provide required supports and hangers for conduit, equipment, etc., so that loading will not exceed allowable loadings of structure. Electrical equipment and supports shall not come in contact with work of other trades.

3.11 FASTENINGS

A. Fasten equipment to building structure in accordance with the best industry practice.

B. Where weight applied to building attachment points is 100 pounds or less, conform to the following as a minimum:

1. Wood: Wood screws.
2. Concrete and solid masonry: Bolts and expansion shields.
3. Hollow construction: Toggle bolts.



4. Solid metal: Machine screws in tapped holes or with welded studs.
5. Steel decking or sub-floor: Fastenings as specified below for applied weights in excess of 100 pounds.

C. Where weight applied to building attachment points exceeds 100 pounds, but is 300 pounds or less, conform to the following as a minimum:

1. At concrete slabs provide 24-inch by 24-inch by 1/2-inch steel fishplates on top with through bolts. Fishplate assemblies shall be chased in and grouted flush with the top of slab screed line, where no fill is to be applied.
2. At steel decking or sub-floor for all fastenings, provide through bolts or threaded rods. The tops of bolts or rods shall be set at least one inch below the top fill screed line and grouted in. Suitable washers shall be used under bolt heads or nuts. In cases where the decking or sub-floor manufacturer produces specialty hangers to work with their decking or sub-floor, such hangers shall be provided.

D. Where weight applied to building attachment points exceeds 300 pounds, coordinate with and obtain the approval of Engineer and conform to the following as a minimum:

1. Provide suitable auxiliary channel or angle iron bridging between building structural steel elements to establish fastening points. Bridging members shall be suitably welded or clamped to building steel. Provide threaded rods or bolts to attach to bridging members.

E. For items, which are shown, as being ceiling-mounted at locations where fastening to the building construction element above is not possible, provide suitable auxiliary channel or angle iron bridging tying to the building structural elements.

F. Wall-mounted equipment may be directly secured to wall by means of steel bolts. Groups or arrays of equipment may be mounted on adequately sized steel angles, channels, or bars. Prefabricated steel channels as manufactured by Kindorf or Unistrut are acceptable.

3.12 IDENTIFICATION

A. Identify electrical equipment with permanently attached phenolic nameplates with 1/2-inch high white engraved lettering. Identification shall include equipment name or load served as appropriate. Nameplates shall be attached with zinc-plated screws Peel-and-stick tape or glue-on type nameplates are prohibited.

1. Nameplates for equipment connected to the normal power system shall be black with white lettering.
2. Nameplates for equipment connected to the emergency power system shall be red with white lettering.
3. Nameplates for equipment connected to the UPS system shall be orange with white lettering.
4. Equipment labels to indicate voltage, conductor phasing color code and power source (fed from) information.

B. Cable tags shall be flameproof secured with flameproof non-metallic cord.

C. Provide an engraved nameplate for each switch controlling loads, which are not local to the switch.



D. Wherever raceways for future use are terminated outside of the building, stake the location with a 8-foot long, 4-inch by 4-inch clear pressure treated post a minimum of 4' below a grade of 100 pounds.

E. See individual Sections for additional identification requirements.

3.13 PROHIBITED LABELS AND IDENTIFICATIONS

A. In all public areas, tenant areas, and similar locations within the project, the inclusion or installation of any equipment or assembly which bears on any exposed surface any name, trademark, or other insignia which is intended to identify the manufacturer, the vendor, or other source(s) from which such object has been obtained, is prohibited, unless otherwise approved by the Engineer.

B. Required UL labels shall not be removed nor shall identification specifically required under the various technical sections of the Specifications be removed.

3.14 EQUIPMENT PADS AND ANCHOR BOLTS

A. Provide concrete pads under all floor-mounted electrical equipment. Equipment pads shall conform to the shape of the piece of equipment it serves with a minimum 1-inch margin around the equipment and supports. Pads shall be a minimum of 4 inches high and made of a minimum 28 day, 2500 psi concrete reinforced with 6-inch by 6-inch 6/6 gauge welded wire mesh. Trowel tops and sides of pad to smooth finishes, equal to those of the floors, with all external corners bullnosed to a 3/4-inch radius. Seal concrete pads where not painted. Paint pads same as surrounding floor areas. Shop drawings stamped "NO EXCEPTIONS NOTED" shall be used for dimensional guidance in sizing pads.

B. Provide galvanized anchor bolts for all equipment placed on concrete equipment pads, inertia blocks, or on concrete slabs. Provide bolts of the size and number recommended by the manufacturer of the equipment and locate by means of suitable templates. Equipment installed on vibration isolators shall be secured to the isolator. Secure the isolator to the floor, pad, or support as recommended by the vibration isolation manufacturer.

C. Where equipment is mounted on gypsum board partitions, the mounting screws shall pass through the gypsum board and securely attach to the partition studs. As an alternative, the mounting screws may pass through the gypsum board and be securely attached to 6 inches square, 18 gauge galvanized metal backplates, which are attached to the gypsum board with an approved non-flammable adhesive. Toggle bolts installed in gypsum board partitions are not allowed.

3.15 DELIVERY, DRAYAGE AND HAULING

A. Provide drayage, hauling, hoisting, shoring and placement in the building of equipment specified and be responsible for the timely delivery and installation of equipment as required by the construction schedule. If any item of equipment is received prior to the time that it is required, the Contractor shall be responsible for its proper storage and protection until the time it is required. Pay for all costs of drayage or storage.

B. If equipment is not delivered or installed at the project site in a timely manner as required by the project construction schedule, the Contractor shall be responsible for resulting disassembly, re-assembly, manufacturer's supervision, shoring, general construction modification, delays, overtime costs, etc., at no additional cost.



3.16 EQUIPMENT AND MATERIAL PROTECTION

A. Protect the work, equipment, and material of other trades from damage by work or workmen of this trade, and correct damaged caused without additional cost.

B. Take responsibility for work, materials, and equipment until finally inspected, tested and accepted. Protect work against theft, injury, or damage, and carefully store material and equipment received on site, which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing material. Cover and protect equipment and materials from damage due to water, spray-on fireproofing, construction debris, etc. Store equipment sensitive to moisture damage in dry, heated spaces.

C. Provided adequate means for fully protecting finished parts of materials and equipment against damage from whatever cause during the progress of the work until final acceptance. Protect materials and equipment in storage and during construction in such a manner that no finished surfaces will be damaged or marred, and moving parts are kept clean and dry. Do not install damaged items; take immediate steps to obtain replacement or repair.

D. Lighting fixture troffers with parabolic reflectors shall be installed with factory-mounted plastic protective bags around parabolic reflector assembly. Remove protective bag just prior to occupancy.

3.17 TESTING OF ELECTRICAL SYSTEMS

A. Comply with the project construction schedule for the date of final performance and acceptance testing, and complete work sufficiently in advance of the Contract completion date to permit the execution of the testing prior to occupancy and Contract close-out. Complete any adjustments and/or alterations, which the final acceptance tests indicate as necessary for the proper functioning of all equipment prior to the completion date. See individual Sections for extent of testing required.

B. Provide a detailed schedule of completion indicating when each system is to be completed and outlining when field testing will be performed. Submit completion schedule for review within six months after the notice to proceed by Owner's Representative has been given. Update this schedule periodically as the project progresses.

3.18 OPERATING INSTRUCTIONS

A. Provide the services of factory-trained specialists to provide an operating instructions seminar for equipment and systems. The seminar shall be conducted over a five-day (consecutive) period. Instruction time is defined as straight time working hours and does not include nights, weekends, or travel time to and from the project. Ownership has the right to video record the seminars.

B. Submit seminar agenda, schedule and list of representatives to the Engineer for approval 30 days prior to suggested date of seminar. Do not commence seminar until the Engineer has issued a written acceptance of the starting time and attendees. Confirm attendance of seminar by written notification to participants.

C. Instruct Owner's operating personnel in proper starting sequences, operation, shut-down, general maintenance and preventative maintenance procedures, including normal and emergency procedures.



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Architect:

Structural Engineer:

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| NO. | REVISION | DATE |
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DISTRICT OF COLUMBIA
JIANFENG SUN
10/3/2025
No. PE40000573
ELECTRICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ELECTRICAL - SPECS

| | |
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| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: Author | CKD. BY: Checker |
| SCALE: | |

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3.16 EQUIPMENT AND MATERIAL PROTECTION

A. Protect the work, equipment, and material of other trades from damage by work or workmen of this trade, and correct damaged caused without additional cost.

B. Take responsibility for work, materials, and equipment until finally inspected, tested and accepted. Protect work against theft, injury, or damage, and carefully store material and equipment received on site, which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing material. Cover and protect equipment and materials from damage due to water, spray-on fireproofing, construction debris, etc. Store equipment sensitive to moisture damage in dry, heated spaces.

C. Provided adequate means for fully protecting finished parts of materials and equipment against damage from whatever cause during the progress of the work until final acceptance. Protect materials and equipment in storage and during construction in such a manner that no finished surfaces will be damaged or marred, and moving parts are kept clean and dry. Do not install damaged items; take immediate steps to obtain replacement or repair.

D. Lighting fixture troffers with parabolic reflectors shall be installed with factory-mounted plastic protective bags around parabolic reflector assembly. Remove protective bag just prior to occupancy.

3.17 TESTING OF ELECTRICAL SYSTEMS

A. Comply with the project construction schedule for the date of final performance and acceptance testing, and complete work sufficiently in advance of the Contract completion date to permit the execution of the testing prior to occupancy and Contract close-out. Complete any adjustments and/or alterations, which the final acceptance tests indicate as necessary for the proper functioning of all equipment prior to the completion date. See individual Sections for extent of testing required.

B. Provide a detailed schedule of completion indicating when each system is to be completed and outlining when field testing will be performed. Submit completion schedule for review within six months after the notice to proceed by Owner's Representative has been given. Update this schedule periodically as the project progresses.

3.18 OPERATING INSTRUCTIONS

A. Provide the services of factory-trained specialists to provide an operating instructions seminar for equipment and systems. The seminar shall be conducted over a five-day (consecutive) period. Instruction time is defined as straight time working hours and does not include nights, weekends, or travel time to and from the project. Ownership has the right to video record the seminars.

B. Submit seminar agenda, schedule and list of representatives to the Engineer for approval 30 days prior to suggested date of seminar. Do not commence seminar until the Engineer has issued a written acceptance of the starting time and attendees. Confirm attendance of seminar by written notification to participants.

C. Instruct Owner's operating personnel in proper starting sequences, operation, shut-down, general maintenance and preventative maintenance procedures, including normal and emergency procedures.



D. Submit final copies of Record Drawings and Operating and Maintenance Manuals to Owner at seminar.

E. Submit a written record of minutes and attendees of the seminar to the Owner.

3.19 OPERATING AND MAINTENANCE MANUALS

A. Provide Operating and Maintenance Manuals for equipment and materials furnished under this Division.

B. Submit electronic copies of all operating and maintenance data books for review at least ten (10) weeks before the completion date. Assemble data in a completely indexed volume or volumes and identify the size, model, and features indicated for each item.

C. Maintenance manuals shall include complete cleaning and servicing data compiled in a clear and easily understandable format. Show model numbers of each piece of equipment, complete lists of replacement parts, capacity ratings, and actual loads.

D. Provide the following information where applicable:

1. Identifying name and mark number
2. Locations (where several similar items are used, provide a list)
3. Complete nameplate data
4. Certified Record Drawings and Final Reviewed submittals
5. Parts list
6. Performance curves and data
7. Wiring diagrams
8. Manufacturer's recommended operating and maintenance instructions with all non-applicable information deleted
9. List of spare parts recommended for normal service requirements
10. Assembly and disassembly instructions with exploded-view drawings where necessary
11. Test reports
12. Trouble shooting diagnostic instructions, where applicable

E. After the Engineer's and Engineer's review, and any required Contractor revisions, submit a complete electronic copy, along with three (3) final hard copies of operating and maintenance data books for the following systems:

1. Transformers
2. Switchboards
3. Panelboards
4. Disconnect Switches
5. Fire Management System



3.20 RECORD DRAWINGS

A. The Contractor shall maintain, on a daily basis, at the Project site a complete set of Record Drawings. The Record Drawings shall initially consist of a set of black line plots or 3D BIM files of the Contractor's Coordination Drawings. The prints shall be marked or the 3D BIM files electronically updated to show the precise location of all buried or concealed work and equipment, including embedded conduit, raceways and boxes, and all changes and deviations in the Electrical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite written instructions from the Engineer or Engineer. The updated Coordination Drawings shall be used to produce the final Record Drawings that shall be delivered to the Owner in electronic format media upon Project completion.

B. The Contractor shall conduct monthly/quarterly walk-throughs of the project site with the Owner for verification of as-built conditions with the record drawings being maintained by the Contractor. Walk-throughs shall be scheduled by the Contractor prior to close-ins. Notify the Owner in writing at least three (3) days before walk-through.

C. Record dimensions clearly and accurately to delineate the work as installed. Suitably identify locations of all equipment by at least two dimensions to permanent structures.

D. The Contractor and Subcontractor shall mark all in-progress Record Drawings on the front lower right hand corner with a rubber stamp impression or an electronic image similar to the following:

RECORD DRAWING
(3/8-inch high letters)

To be used for recording Field Deviations and Dimensional Data Only
(5/16-inch high letters)

E. Upon completion of the work, the Contractor and Subcontractor(s) shall certify all Record Drawings on the front lower right hand corner adjacent to the above marking with a rubber stamp impression or an electronic image similar to the following:

RECORD DRAWING
CERTIFIED CORRECT
(3/8-inch high letters)

(Printed Name of General Contractor)
(5/16-inch high letters)
Date:

(Printed Name of Subcontractor)
(5/16-inch high letters)
Date:

F. Prior to final acceptance of the Work of this Division, the Contractor shall submit properly certified Record Drawings to the Engineer and Engineer for review and shall make



changes, corrections, or additions as the Engineer and/or Engineer may require to the Record Drawings. After the Engineer's and Engineer's review, and any required Contractor revisions, the Record Drawings shall be delivered to the Owner on electronic media in. Three (3) complete and bound hard copies shall be provided to the Owner. The Engineer and Engineer do not assume any responsibility for the accuracy or completeness of the Record Drawings.

3.21 FINAL PUNCHLIST

A. Prior to the Final Punchlist, certify that systems and equipment are complete, operational, and are in compliance with the Contract Documents.

B. During the Final Punchlist, provide personnel with access keys, hand held radios or other communication devices, and necessary expertise to operate each system and piece of equipment to demonstrate operational compliance with the Contract Documents.

C. Any deficiencies noted on the Final Punchlist shall be expeditiously corrected and certified in writing.

3.22 EARLY OCCUPANCY

A. Complete those systems which are necessary to allow partial early occupancy of the building.

B. Verify and comply with requirements for temporary occupancy with the local Building and Fire Departments.

**END OF SECTION 26 05 01**



**SECTION 26 05 02**

**EQUIPMENT CONNECTIONS AND COORDINATION**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide equipment connections and coordination in accordance with the Contract Documents.

1.2 SUBMITTALS

A. Fusible and non fusible safety switches

B. Thermal over loads

C. Variable frequency drives specified under Division 23

D. Magnetic across the lie starters

**PART 2 – PRODUCTS**

NOT APPLICABLE

**PART 3 – EXECUTION**

3.1 GENERAL

A. Provide equipment connections and coordination in accordance with manufacturer's recommendations and product submittals.

B. Provide disconnect switches for equipment. Where equipment nameplate requires fuse protection, provide fusible type disconnect switches with fuses rated in accordance with equipment manufacturer's requirements. Circuit breakers rated HACR and recognized by the manufacturer of the equipment as suitable for fuse protection will suffice. Disconnect switches for single-phase equipment shall be thermal overload type. Locate disconnect switches in coordination with the layout of equipment. Provide supports for a free-standing installation if required to allow access to disconnect switch and/or proximity to equipment served.

C. Provide final connections to hard-wired equipment with a minimum of two feet of flexible metal conduit or liquid-tight flexible metal conduit where required by code and in damp or wet locations.

D. Where equipment is fed from overhead, support conduit on flanged floor type fitting.

3.2 EQUIPMENT CONNECTION TYPES

A. Provide equipment connection types as indicated on the equipment connection schedule.

B. Equipment Connection Types:



1. Type DP: Duplex pump system with controller provided under Division 23. Provide connection to controller and connections from controller to pumps in accordance with the controller manufacturer's installation instructions. Provide connections for local controls and alarms in accordance with the controller manufacturer's installation instructions.
2. Type FR: Fractional horsepower single-phase motor. Provide thermal overload/disconnect switch and motor connection.
3. Type FWS: Equipment furnished with starter. Install starter and provide connection to starter and connection from starter to equipment.
4. Type M: Motor with starter provided under Division 26. Provide disconnect switch and motor connection.
5. Type SPC: Single point connection. Provide single point connection to equipment provided with factory-mounted starter/controller listed for single point power connection. Where required by code or the equipment manufacturer, provide fusible disconnect switch with fuses sized in accordance with equipment nameplate requirements.
6. Type VFD: Variable frequency drive furnished under Division 23. Install VFD and provide connection to VFD and connection from VFD to equipment.

3.3 MECHANICAL AND PLUMBING EQUIPMENT

A. Provide electrical connections to mechanical, plumbing and fire protection equipment.

B. Where motor controllers are furnished by others, provide connections at line side of controllers.

C. Where reduced voltage, multiple speed, duplex, triplex, lead-lag, pony motor or other unusual controller types are utilized, coordinate specific requirements of motor(s) and controller and provide connections at line side of controllers.

D. Provide branch circuits and connections for control power as required by controls contractor.

E. Where electric unit heaters are provided with remote power panels, provide branch circuits between remote panel and duct heater elements in accordance with the equipment manufacturer's recommendations.

F. Provide final connections between controller and equipment.

G. Provide a separate light and graphics on the fire alarm graphic annunciator for each pre-action control panel.

H. Provide audible, visual and combination audible visual devices in the protected area that are connected to the fire suppression pre-action control panel. Provide a laminated placard for each device identifying its connection to the pre-action system.

**END OF SECTION 26 05 02**



**SECTION 26 05 19**

**600V WIRE AND CABLE**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide 600V wire and cable in accordance with the Contract Documents.

B. Related work specified in other divisions of these specifications.

1. Raceways and Boxes

1.2 REFERENCE STANDARDS

A. Rubber Insulated Wire and Cable: ICEA S-19-81, NEMA WC 3, and UL 44.

B. Thermoplastic Insulated Wire and Cable: ICEA S-61-402, NEMA WC 3, and UL 83.

C. Cross-Linked Thermosetting Polyethylene Insulated Wire and Cable: ICEA S-66-524, NEMA WC 7, and UL 44.

D. Service Entrance Cable: UL 854.

E. Annealed Copper Wire for Conductors: ASTM B-3.

F. Aluminum wire: AA8176 Prohibited

G. Terminal Blocks: UL 1059.

1.3 QUALITY ASSURANCE

A. Wire and cable shall be of the same manufacturer.

1.4 SUBMITTALS

A. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

B. Field test reports.

C. Building wire. Copper

D. Metal Clad Cable.

E. Armored Clad (AC) Cable. Prohibited.

F. Underground Feeder (UF) cable. Prohibited.



G. Non Metallic (NM) cable. Prohibited.

1.5 FIELD TESTING

A. Inspect splices and terminations and make mechanically and electrically tight during the 15-day period immediately prior to final acceptance of the work.

B. Feeder insulation shall be tested after installation, and before final connection.

1. Tests shall be performed with a 500 volt megger, and conductors shall test free from short circuits and grounds.
2. Conductors shall be tested phase-to-phase and phase-to-ground, phase-to-neutral.
3. Furnish the instruments, materials, and labor required.

C. Demonstration: Subsequent to wire and cable installation and connection, energize circuits and demonstrate functioning in accordance with contract requirements. Correct deficiencies and retest to demonstrate compliance.

D. Record and document testing and submit to owner. Documentation shall include project name and address; testing agency name and address, testers name and employee number, feeder origin, destination, size, length, conduit size and material, anticipated testing result range and actual test results. In the event the feeder fails the test, include a corrective action and anticipated time line for completion. All feeders shall be tested and retested until all feeders pass and results are documented.

**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. Wire and Cable:

1. Copper:

a. Southwire 600 Volts. Copper Conductor. Thermoplastic Insulation/Nylon Sheath, Heat, Moisture, Gasoline and Oil Resistant II. All sizes rated both THHN and either THWN (sizes 14, 12, and 10 AWG) or THWN-2 (sizes 8 AWG and larger and 14, 12, 10 AWG
b. 600 Volts & 1000 Volts Copper Conductor. Cross-Linked Polyethylene (XLPE) Insulation. High-Heat and Moisture Resistant.
c. Underground Service Entrance Cable. 600 Volt. Copper conductors. Cross-Linked Polyethylene (XLP) Insulation. High-Heat, Moisture, and Sunlight Resistant. RHH, RHW-2, USE-2.
d. SIMpull® THHN THWN-2 MTW / cULus T90 Nylon TWN75 Copper Conductor, 600V, Thermoplastic-Insulated Cable.
e. Alcan, Triangle, Anaconda, Brand-Rex, National, Okonite, Simplex meeting the specifications will be considered.

B. Connectors:

1. Wire size AWG number 12 through AWG number 6:



a. Hand applied: Piggy (Thomas & Betts), Scotchlock (3M), or Wing Nut (Ideal).
b. Tool applied: Burndy HYDENT, or Thomas & Betts Stakon.
c. WAGO's 221 Series Splicing Lever Nuts Connectors connect solid, stranded and fine-stranded conductors ranging from 24–10 AWG.

2. Copper Wire size number 4 through number 1000 kcmil.

a. Iisco NIMBUS PBT INS BLK SPL / OFFSET: UL Listed and CSA Certified.
b. 600 volt at 90 Deg C.
c. Dual rated for copper and aluminum.
d. Removable port and screw plugs.

3. For feeder ampacity as rated.

C. Electrical Tape:

1. Insulating type, Johns-Manville or 3M, UL Listed for the use.

2.2 WIRE AND CABLE

A. General:

1. 600V minimum insulating rating.

B. Conductor:

1. Electrical grade, annealed copper, tinned if rubber insulated, and fabricated in accordance with ASTM and ICEA standards. Minimum size number 12 for branch circuits; number 14 for control wiring. Switch legs are not considered control wiring.

C. Stranding and Number of Conductors:

1. Number 12 and number 10 shall be solid.
2. Larger than number 10, stranded ASTM Class B.
3. Control wires stranded in accordance with ASTM Class B stranding designations.
4. Cables for low-voltage systems shall be specified in other sections.

D. Insulation:

1. 600 volts, PVC insulation, nylon jacket, surface-printed identification, listed as type THHN,THWN, THHW, THW-2, THWN-2,XHHW, XHHW-2per UL 83.

E. Color Coding:

1. Wiring shall be color coded as follows:

| Conductor | 120/208V System | 277/480V System |
|---|---|---|
| Phase A | Black | Brown |
| Phase B | Red | Orange |
| Phase C | Blue | Yellow |
| Neutral | White | Gray |
| Ground | Green | Green |



| Conductor | 120/208V System | 277/480V System |
|---|---|---|
| Isolated Ground | Green/Yellow Stripe | |

2. Wire number 8 and smaller shall be factory-color coded the entire length. Wire number 6 and larger shall be color coded by color taping entire length of exposed conductor at all accessible locations or factory-color coded where available.

3. Control wiring shall be color coded in accordance with manufacturer's recommendations and as elsewhere specified

2.3 MC FEEDER CABLE – COPPER CONDUCTORS

A. Prohibited

2.4 SERVICE ENTRANCE CABLE SE TYPE R

A. Prohibited

2.5 NM-B COPPER CONDUCTOR-600V

A Prohibited

2.6 Shielded variable frequency drive cable:

A. Shielded conductor and signal cable with symmetric bare grounds and overall shield to block emi and rfi interference.

B. Conductor Material: stranded tinned copper

C. Shield: Foil tape and tinned copper braid shield

D. Comply with 2000V UL 1277 Type TC-ER per 2005 NEC Article 336

E. Rated for 90°C wet/dry

F. Suitable for Class I & II, Division 2 hazardous location

G. Comply with UL 1685 vertical tray flame test

H. Comply with IEEE 1202 vertical tray flame test at 70,000 BTU/hour

I. Comply with CSA FT4

J. Comply with Oil & Sunlight resistant

K. RoHS compliant and CE approved.



2.7

**PART 3 – EXECUTION**

1.1 GENERAL



A. Maximum of three branch circuits in one conduit unless otherwise indicated.

B. Do not install wire until raceway systems are complete.

C. Provide cable supports for vertical risers as required by all applicable codes

D. Wire size shall be uniform for the entire length of the circuit unless noted otherwise.

E. Do not splice feeders or dedicated branch circuits unless otherwise indicated.

F. Make connections, splices, taps, and joints with solderless devices, mechanically and electrically secure.

G. Lubricate cables to facilitate pulling as required by cable manufacturer. Lubrication material shall be inert to cable insulation and raceways.

H. Where compression connectors are used, provide connectors with hydraulic die, embossing die code into connector. Connect to bus with Bellville type washers for positive pressure over complete contact area. Insulate with heat shrink tubing.

I. Provide a separate neutral for ground fault interrupter branch circuits.

J. Exposed feeders and branch circuits shall be electric metal tubing.

1.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHOODS

A. Exposed Feeders: Type THHN-THWN, THW-2, THWN-2, XHHW-2 single conductors in raceway.

B. Exposed Branch Circuits: Type THHN-THWN, THW-2, THWN-2, XHHW, XHHW-2 single conductors in raceway.

1.4 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal raceways and cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Exposed raceways and cables permitted in utility rooms.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

1.5 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.



B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack conductor extending past the front of the box.

1.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

**END OF SECTION 26 05 19**



**SECTION 26 05 26**

**GROUNDING SYSTEM**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide electrical grounding systems in accordance with the Contract Documents and as specified herein.

1.2 REFERENCE STANDARDS

A. UL 467.

B. ANSI C-1.

C. IEEE 142.

D. NEC.

E. National Electrical Safety Code.

F. All equipment and material to be furnished and installed on this project shall be UL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this project.

1.3 SUBMITTALS

A. Field test report.

B. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

1.4 FIELD TESTING

A. Resistance testing of ground rod system indicating maximum 5 ohms resistance to ground.

1.5 IDENTIFICATION

A. Label each end of each grounding electrode conductor, identifying the connection point of the opposite end of the conductor.

**PART 2 – PRODUCTS**

2.1 GENERAL

A. Grounding connections shall be brazed, molded exothermic welded, bolted clamp terminal bars, or listed pressure connector type.



B. All equipment and materials provided under this section of the Specifications shall be new, UL listed and bear the UL label.

C. All disconnects. shall be provided with a copper equipment ground bar bolted, brazed or riveted to the associated enclosure or cabinet. Refer to each individual equipment Specification section for additional grounding requirements.

D. All receptacles, switches, disconnects and devices shall be provided with a grounding terminal connected to the device frame and the enclosure. Refer to each individual equipment Specification section for additional grounding requirements

E. All conduit, raceways, junction boxes, pull boxes, etc., shall be made electrically continuous by means of grounding conductors, bonding jumpers, grounding bushings, etc., as required by the NEC and the authorities having jurisdiction.

**PART 3 – EXECUTION**

3.1 GENERAL

A. Metallic raceways, enclosures, equipment frames, fittings, and other metallic noncurrent-carrying equipment parts and surfaces shall be effectively bonded to the grounding system. Nonconductive paint, enamel, or similar coating shall be removed at threads and contact surfaces to preserve grounding continuity or fittings shall be provided to make such removal unnecessary.

B. Neutral wiring shall be grounded at the system point of origin only and shall be isolated from downstream grounding systems.

C. Provide an insulated grounding conductor for all segments of branch circuits.

D. Receptacles shall be grounded to the outlet box by means of a bonding jumper between the outlet box and the receptacle grounding terminal.

E. Branch circuits shall be provided with an insulated grounding conductor run with the circuit conductors. This grounding conductor shall be in addition to the ground path provided by the continuously grounded metallic raceway system that encloses the phase and neutral conductors.

F. Provide bolted clamp terminal connectors where connected to removable equipment.

**END OF SECTION 26 05 26**



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Structural Engineer:

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| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JIANFENG SUN
10/3/2025
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PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
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TITLE
ELECTRICAL - SPECS

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: Author | CKD. BY: Checker
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**SECTION 26 05 33**

**RACEWAYS AND BOXES**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

B. Provide raceways and boxes in accordance with the Contract Documents.

1.2 SUBMITTALS

A. Conduit, Boxes:

B. Manufacturer's product data sheets, volume dimensions, physical dimensions, Listing agencies, and weights.

1.3 IDENTIFICATION

A. Mark junction box covers with permanent stencil identification of panelboard and circuit numbers of wiring contained within.

B. Paint fire alarm raceways and red. Pre-painted raceways will be acceptable.

**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. Conduit and Boxes:

1. UL Listed and labeled products of any manufacturer meeting the specified performance requirements are acceptable.

B. Wireways and Auxiliary Gutters:

1. Siemens, Square D, or equal.
2. Wireways and auxiliary gutters shall be UL Listed and labeled.

2.2 CONDUIT AND FITTINGS

A. Rigid Steel Conduit:

1. Rigid conduit, heavy wall, hot-dipped galvanized inside and out, threaded ends.
2. Threaded type fittings.
3. Schedule 40

B. Electrical Metallic Tubing:



1. Continuous, seamless steel tubing galvanized or sherardized on exterior, coated on interior with smooth hard finish of lacquer, varnish or enamel.
2. Steel, set screw or compression fittings. Cast connectors and coupling are prohibited.
3. Provide concrete type fittings where required.
4. Conduits shall be color coded and identified as required by code or the local authority having jurisdiction and as specified herein.
5. Conforming to NEC Article 358

C. Flexible Metal Conduit:

1. Single strip, continuous, flexible interlocked double-wrapped steel, hot-dip galvanized inside and out forming smooth internal wiring channel.
2. Steel, compression type fittings.
3. Conforming to NEC Article 348.

D. Liquid Tight Flexible Conduit:

1. Same as flexible metal conduit except with tough, inert, watertight plastic outer jacket.
2. Fittings shall be cast malleable iron body and gland nut, zinc-plated with one-piece brass grounding bushings threaded to interior of conduit. Spiral molded vinyl sealing ring between gland nut and bushing and nylon-insulated throat.
3. Conforming to NEC Article 350.

E. Flexible non-metallic conduit

1. Prohibited

F. Electric Non Metallic Tubing

1. Prohibited

2.3 WIREWAYS AND AUXILIARY GUTTERS

A. Sizes and shapes as indicated and/or as required.

B. Provide necessary elbows, tees, connectors, adapters, etc.

C. Continuous removable cover secured with screws and keyhole slots. Hinged cover where installed above suspended ceiling.

D. Provide wire retainers at not greater than 12 inches on center.

2.4 OUTLET, JUNCTION, AND PULL BOXES

A. Cast Type Boxes:

1. Ferrous alloy box with inside threaded hubs for rigid steel conduit.
2. Ferrous alloy box with compression or inside threaded hubs with adapter for electrical metallic tubing.
3. Cast raised cover, size matched to contour of box.
4. Tapered threads for hubs.

B. Galvanized Pressed Steel Type Boxes:



1. General:

a. Pressed steel, galvanized or cadmium-plated, 4 inches minimum octagonal or square with galvanized cover or extension ring as required.

C. Sheet Steel Boxes:

1. No. 12 gauge sheet steel for boxes with maximum side less than 40 inches, and maximum area not exceeding 1,000 square inches; riveted or welded 3/4-inch flanges at exterior corners.
2. No. 10 gauge sheet steel for boxes with maximum side 40 to 60 inches, and maximum area 1,000 to 1,500 square inches; riveted or welded 3/4-inch flanges at exterior corners.
3. No. 10 gauge sheet steel riveted or welded to 1.5 inch by 1.5 inch by 1/4-inch welded angle iron framework for boxes with maximum side exceeding 60 inches and more than 1,500 square inches in area.
4. Covers:

a. Same gauge steel as box.
b. Subdivided single covers so no section of cover exceeds 50 pounds.
c. Machine bolts or machine screws threaded into tapped holes.

5. Paint:

a. Rust inhibiting primer, ANSI 61 grey enamel finish coat.

**PART 3 – EXECUTION**

3.1 GENERAL

A. 277/480V or 265/460V wiring shall be kept independent of 120/208V wiring. Emergency system wiring shall be kept independent of other wiring systems. Provide insulated grounding conductor in all feeder and branch circuit raceways. Minimum conduit size shall be 3/4-inch, including conduit for low-voltage cabling. Wiring of each type and system shall be installed in separate raceways.

B. Protect metallic raceway in earth or fill from corrosion with two coats of corrosion-resistant paint or tape wrap.

C. Locate raceways so that the integrity of structural members is not affected, and they do not conflict with the services of other trades. Draw up couplings and fittings full and tight. Protect threads from corrosion after installation with zinc chromate or equivalent protection.

D. Conceal raceways except at surface-mounted cabinets and freestanding equipment. Install minimum of 6 inches from flues, steam pipes, or other heated lines. Route exposed raceways parallel or perpendicular to building lines with right-angle turns and symmetrical bends. Provide sleeves in concrete walls, floor slabs and partitions. Waterproof sleeved raceways where required.

E. Provide raceway expansion joints for exposed and concealed raceways at expansion joints and between structures to compensate for differential movement. Provide bonding conductor.



F. Clear raceway of all obstructions and dirt prior to pulling in wires or cables. Use ball mandrel (diameter approximately 85 percent of conduit insider diameter) followed by close-fitting wire brush and wad of felt or similar material. This assembly may be pulled with, but ahead of cable being installed. Clean empty raceways similarly. Clear or replace any raceway which rejects ball mandrel.

G. Secure raceways clamps or supports to masonry materials with toggle bolts, expansion bolts, or steel inserts. Install raceway on steel construction with approved clamps which do not depend on friction or set-screw pressure alone.

H. Provide independent support of raceways larger than 3/4 inch. Provide uni-strut support and threaded rod to structure above for multiple suspended raceways run together. Use of lathe channels or other miscellaneous steel to support raceways is not permitted. Use listed supports such as uni-strut or similar systems for support.

3.2 WIREWAYS AND AUXILIARY GUTTERS

A. Install wireways such that cover will hinge upward from side.

3.3 OUTLET, JUNCTION, AND PULL BOXES

A. Provide outlet, junction, and pull boxes as indicated and as required for a complete installation and to facilitate proper pulling of wires and cables. Boxes shall be sized per National Electrical Code as minimum. Plug open knock outs.

B. The exact location of outlets and equipment is governed by field conditions. Where necessary, relocate outlets so that fixtures and equipment are symmetrically located in accordance with the room layout and will not interfere with other work or equipment. Verify final location of outlets, fixtures, and equipment with engineer.

C. Provide pull boxes so that an individual run of conduit does not contain more than the equivalent of four 90-degree bends (360 degrees total).

D. Where boxes are installed outside exposed to the elements, weatherproof in-use covers shall be provided.

3.4 APPLICATION OF RACEWAYS

A. Electrical Metallic Tubing:

1. General purpose feeders and branch circuits rated greater that 100A, except where another conduit type is specifically required.
2. Exposed indoor installations in branch electrical closets and telecommunications rooms below ten feet above finished floor.

B. Metal Clad Cable:

1. Prohibited

C. Flexible Metal Conduit:

1. Dry locations only.
2. Connections to equipment where vibration isolation is needed.
3. Maximum length shall be six feet.



D. Liquid-Tight Flexible Steel Conduit:

1. Same as Flexible Metal Conduit in damp or wet locations.
2. Motor connections.

E. Liquid-Tight Flexible Non-metallic Conduit:

1. Prohibited.

F. Rigid Polyvinyl Conduit:

1. Prohibited

G. Electric Non Metallic Tubing

1. Prohibited

H. Wireways and Auxiliary Gutters:

1. Where indicated.
2. Above and below panelboards, lighting relay cabinets, fire alarm panels, and terminal cabinets to accommodate large concentrations of wires.

3.5 APPLICATION OF BOXES OUTLET, JUNCTION AND PULL BOXES

A. Galvanized Pressed Steel Type Boxes:

1. Where connected to electrical metallic tubing and flexible steel conduit, 1.25 inches and smaller.
2. Dry locations.
3. Where concealed in walls and above suspended ceilings.

B. Sheet Steel Boxes:

1. Where connected to conduit larger than 1.25 inches.

**END OF SECTION 26 05 33**



**SECTION 26 27 26**

**WIRING DEVICES**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide wiring devices in accordance with the Contract Documents.

1.2 QUALITY ASSURANCE

A. Switches, receptacles and wall plates shall be of the same manufacturer.

B. Equipment shall be certified for use in the District of Columbia and shall meet the Local Energy Code and local energy ordinances.

1.3 REFERENCE STANDARDS

A. Switches: Federal Specification WS-896E.

B. Receptacles: Federal Specification WC-596D, NEMA WD-1, and UL 498.

C. Ground Fault Circuit Interrupter Receptacles: UL 943 Class A.

D. Arc Fault Circuit Interrupter Receptacles: UL 1699

E. Wall Dimmers: ANSI C62.41, UL 20.

1.4 SUBMITTALS

A. Wiring Devices complete with physical dimensions, materials, connector details, voltage and current ratings, installation details, etc.

B. Samples of each receptacle, switch, wall plate and cover plate intended for use on this Project. All device samples must be reviewed by and approved by the Architect and Owner prior to ordering.

C. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

1.5 COLORS

A. Device and coverplate colors shall ivory. Catalog numbers, where included in this Specification, are not to be used to determine colors of devices and coverplates.

B. Coordinate device color with all coverplate colors and shall match.



**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. Catalog numbers shall not be used to determine colors of devices and cover plates. Catalog numbers are used to establish minimum acceptable standard.

B. Switches and Receptacles: Leviton, Cooper, Hubbell, or Legrand Pass & Seymour

2.2 SWITCHES

A. General:

1. Switches shall be of the type indicated on the Drawings.
2. Switches shall be commercial specification grade, 20A, 120/277V, 1HP rated at 120V, 2HP rated at 240V, back- and side-wired, silent handle operation.
3. Pre-terminated plug style switches and sensors are permitted.

B. Weatherproof Switches:

1. Weatherproof handle/coverplate.

2.3 RECEPTACLES

A. General:

1. GFCI receptacles shall be installed per NEC 2020 210.8.
2. AFCI receptacles shall be installed per NEC 2020 210.12.
3. Receptacles shall be of the type indicated on the Drawings.
4. Receptacles shall be 20A, commercial specification grade, 125V, grounding type, back- and side-wired. Residential grade receptacles are acceptable within dwelling units.
5. Receptacles shall have a single piece, heavy duty brass ground contact and mounting strap.
6. Receptacles shall have a nylon face and heat resistant base.
7. Pre-terminated plug style receptacles are permitted.

B. Special Purpose Receptacles: Rating as indicated on the Drawings.

C. Weatherproof Receptacles:

1. Duplex, weatherproof while-in-use rated coverplate with hinged door.
2. All 15- and 20-ampere, 125- and 250-volt non-locking receptacles located in damp or wet locations shall be a listed weather-resistant type. Listed devices shall bear a "WR" marking on the face that is visible when installed.

2.4 COVER PLATES

A. Provide cover plates for wiring devices. Provide multiple gang cover plates where multiple devices are installed in a common location. Coordinate gang's with architectural and interiors elevations and details.

B. Provide polished stainless steel, smooth-face cover plates in equipment rooms. Thermoset coverplates are not acceptable.



C. Labeling: Receptacles located in the following rooms shall be labeled with panel and circuit number feeding the device:

1. Utility Rooms

**PART 3 – EXECUTION**

3.1 GENERAL

A. General:

1. Verify the exact location of wiring devices with Architect.
2. Provide a number 12 grounding conductor from the device grounding terminal to the panelboard ground bus. Bond wiring device to the outlet box.
3. Provide a number 12 grounding conductor from the device grounding terminal to the outlet box.
4. Receptacles mounted in boxes shall be installed so that the mounting yoke or strap at the receptacle is held rigidly against the surface of the wall.
5. Receptacle faces shall project a minimum of 0.015 inches [0.4 millimeters] from the faceplate. Faceplates shall be installed so as to completely cover the opening and seat against the mounting surface.

B. Switches:

1. Mount switches vertically with the ON position on top.
2. Mount switches on the strike side of doors.
3. Provide toggle handle type lighting switches in equipment rooms. Provide rocker handle type lighting switches in other areas.

C. Receptacles:

1. Mount receptacles vertically with the grounding pin down.
2. Provide conventional style duplex receptacles in equipment rooms.
3. Receptacles shall be mounted 15" to the bottom of the box for general convenience receptacles.

**END OF SECTION 26 27 26**



**SECTION 26 28 16**

**DISCONNECT SWITCHES AND INDIVIDUAL MOTOR CONTROLLERS**

**PART 1 – GENERAL**

1.1 DESCRIPTION

A. Provide disconnect switches and individual motor controllers in accordance with the Contract Documents.

1.2 QUALITY ASSURANCE

A. Disconnects shall be of the same manufacturer.

1.3 REFERENCE STANDARDS

A. Disconnect Switches:

1. Federal Specification W-S-865C
2. NEMA KS1
3. UL 98 (File #4778) and 508

B. Individual Motor Controllers:

1. NEMA ICS 2-321
2. UL 547, 945 and 1004

1.4 SUBMITTALS

A. All disconnect ratings and voltages.

B. Provide a compliance / non-compliance specification attached to the front of the submittal. Identify each paragraph stating the submittal complies with the specification or does not comply. For every statement of non-compliance, include clear language as to the reason for the non-compliance and the submitted provisions that are intended to operate in its place.

C. Submittal shall include highlighted equipment specific for the project. Irrelevant information not pertaining to the project shall be stricken accordingly.

1.5 FIELD TESTING

A. Test each individual motor controller circuit and verify proper operation.

1.6 IDENTIFICATION

A. Provide an identification nameplate for each disconnect switch and individual motor controller.



**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. Siemens, Square D, Cutler Hammer (Eaton), or General Electric (ABB).

2.2 DISCONNECT SWITCHES

A. Heavy duty for 600A or less, horsepower rated, quick-make, quick-break, dead-front type. Self-contained unit in a NEMA 1 enclosure (NEMA 3R, gasketed where installed outdoors or where exposed to water spray, dust or dirt), externally operable from the front.

B. Defeatable interlock to prevent opening the door when the switch is in the ON position. Handle shall be capable of being padlocked in the OFF position.

C. Fusible switches shall be equipped with rejecting type clips suitable for UL Class R fuses up to 600A, suitable for UL Class L fuses above 600A. Interrupting rating shall be 200,000 RMS-symmetrical amperes.

D. Voltage, ampacity, horsepower rating, and number of poles shall be appropriate for system and load served. Provide neutral bad for circuits with neutral conductors. Provide ground lug.

**PART 3 – EXECUTION**

3.1 GENERAL

A. Disconnect switches and individual motor controller shall be installed within ten feet of load served and installed within sight of the motor.

B. Provide independent support; do not mount on the housing of the equipment served.

C. Conduit connected between disconnect switch or individual motor controller and load served shall be flexible metal conduit where used indoors and liquid-tight flexible metal conduit where used outdoors or connected to a NEMA 3R rated device, 24 inches minimum length, 36 inches maximum length.

**END OF SECTION 26 28 16**



MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JUNFENG SUN
10/3/2025
No. PE40000573
ELECTRICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
ELECTRICAL - SPECS

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: Author | CKD. BY: Checker
SCALE:

E7.02-4

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## PLUMBING GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT LOCAL CODES, AND PROJECT SPECIFICATIONS.
2. PLUMBING CONTRACTOR SHALL COORDINATE ALL PIPING WITH MECHANICAL, ELECTRICAL, ARCHITECTURAL, AND STRUCTURAL TRADES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS.
3. PROVIDE ACCESS PANELS FOR ALL CONCEALED VALVES, WATER HAMMER ARRESTORS, TRAP PRIMERS, ETC.
4. PLUMBING CONTRACTOR SHALL CONNECT ALL ITEMS OF EQUIPMENT FURNISHED BY OTHERS AND UNDER OTHER SECTIONS OF THE SPECIFICATIONS. CONTRACTOR SHALL PROVIDE ALL ITEMS NECESSARY TO COMPLETE THE PLUMBING INSTALLATION.
5. REFER TO ARCHITECTURAL DRAWING FOR ROUGH-IN DIMENSIONS AND MOUNTING HEIGHTS OF PLUMBING FIXTURES .
6. PROVIDE UNIONS FOR ALL PIPING CONNECTIONS TO EQUIPMENT.
7. ALL PLUMBING FIXTURES AND EQUIPMENT SHALL BE IN COMPLIANCE WITH CURRENT APPLICABLE ENERGY CONSERVATION CODES.
8. ALL PIPING AND EQUIPMENT SHOWN DIAGRAMMATICALLY ONLY. EXACT LOCATION SHALL BE DETERMINED IN FIELD. MAINTAIN HEAD ROOM AND SPACE CONDITIONS AT ALLTIMES. ALL WORK SHALL BE COORDINATED WITH ALL TRADES BEFORE PROCEEDING WITH INSTALLATION. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL NOTIFY ARCHITECT AND ENGINEER OF ANY DISCREPANCIES. PRIOR TO EQUIPMENT SUBMITTALS, CONTRACTOR SHALL VERIFY PROPOSED CONDITIONS TO ENSURE SPECIFIED EQUIPMENT CAN BE PROPERLY INSTALLED.
9. INSTALL PIPING CLOSE TO WALLS, PARTITIONS, CEILINGS, ETC. OFFSET ONLY WHERE NECESSARY TO FOLLOW WALLS, AS INDICATED. PROVIDE ALL NECESSARY FITTINGS, OFFSETS, VALVES AND OTHER DEVICES REQUIRED FOR A COMPLETE INSTALLATION.
10. INSTALL PIPING IN A CONCEALED MANNER, STRAIGHT, PLUMB AND AS DIRECT AS POSSIBLE. FORM RIGHT ANGLES PARALLEL WITH BUILDING WALLS. LOCATE GROUPS OF PIPES PARALLEL TO EACH OTHER. PIPE SHALL BE LOCATED TO PERMIT ACCESS FOR SERVICE VALVES.
11. ALL PIPING SHALL BE REAMED TO BE FREE OF BURRS. KEEP PIPING FREE FROM SCALE AND DIRT. PROTECT OPEN PIPE ENDS WHENEVER WORK IS SUSPENDED DURING CONSTRUCTION TO PREVENT FOREIGN MATERIAL ENTERING AND CAP ALL OPEN ENDS DURING CONSTRUCTION WITH APPROVED TEMPORALLY CAPS OR MATERIALS.
12. INSULATE COLD WATER PIPING PER SPECIFICATIONS. DO NOT INSTALL JOINTS BELOW SLAB.
13. MAINTENANCE AND IDENTIFYING LABELS SHALL BE AFFIXED TO ALL PIPING AND PLUMBING EQUIPMENT. OPERATIONS AND MAINTENANCE MANUALS SHALL BE PROVIDED TO OWNER UPON PROJECT COMPLETION.
14. INSTALL WELDED OR THREADED PIPE IN AREAS WHERE SPACE IS CRITICAL BETWEEN FINISHED CEILING AND STRUCTURAL SURFACE. INSTALL ALL VENTS THRU ROOF 10'-0" MINIMUM FROM EDGE OF ROOF, FRESH AIR INTAKES, DOORS, OR OPERABLE WINDOWS.
15. SUBMIT ALL REQUIRED PLUMBING DOCUMENTS TO LOCAL PLUMBING OFFICIAL FOR APPROVAL.
16. SUBMIT APPROVED PRESSURE REDUCING VALVES & BACKFLOW PREVENTION DEVICES TO WATER AUTHORITY. CONTRACTOR SHALL PROVIDE ALL NECESSARY DEVICES PER WATER AUTHORITY REQUIREMENTS AND MANUFACTURER RECOMMENDATIONS.
17. ALL WALL, CEILING AND FLOOR PENETRATIONS CONVEYING PLUMBING, DRAINS, SPRINKLER PIPING, SHALL BE FULLY SEALED AND CAULKED AROUND THE PENETRATING FEATURE TO RESTORE THE REQUIRED FIRE OR SMOKE BARRIER RATING OF THE WALL, CEILING OR FLOOR PENETRATED. AS A MINIMUM, AT ALL LOCATIONS, A TWENTY (20) MINUTE FIRE/SMOKE RESISTANCE SHALL BE MAINTAINED. WHERE REQUIRED BY CODE, THE PENETRATING FEATURES SHALL ALSO BE SUPPLIED AND INSTALLED WITH A MECHANISM OR MATERIAL WHICH WILL MAINTAIN THE WALL, CEILING OR FLOOR RATING IN THE CASE OF A FIRE.
18. PLUMBING OR SPRINKLER RELATED PIPE SHALL NOT PENETRATE INTO OR PASS THROUGH STAIRWAYS UNLESS IT IS REQUIRED FOR SERVICING THE STAIRWAY OR IT IS SEGREGATED FROM THE STAIRWAY PASSAGEWAY BY AN ENCLOSURE SYSTEM RATED EQUAL TO OR GREATER THAN THE REQUIRED STAIRWAY RATING.
19. PROVIDE FLUSH TYPE ACCESS DOORS OR PANELS NO SMALLER THAN 12"x12" FOR ALL VALVES OR APPARATUS LOCATED IN CHASES, WALLS, NON-ACCESSIBLE CEILINGS, OR FLOORS.
20. INSTALL WATER HAMMER ARRESTORS IN COMPLIANCE WITH ALL APPLICABLE CODES AND AS INDICATED IN THE DOCUMENTS. SIZE OF WATER HAMMER ARRESTOR SHALL BE PER PDI GUIDELINES AND MANUFACTURER'S RECOMMENDATIONS.
21. CLEANOUTS SHALL BE PROVIDED AS INDICATED ON PLANS AND AS REQUIRED BY THE LOCAL CODES. CLEANOUTS SHALL BE PROVIDED ON HORIZONTAL DRAINAGE PIPE A MAXIMUM OF EVERY 100', AS WELL AS AT EVERY FITTING GREATER THAN 45 DEGREES THAT DOES NOT HAVE AN CLEANOUT WITHIN 40'. CLEANOUTS SHALL BE PROVIDED AT THE BASE OF EVERY DRAINAGE STACK.
22. PRIOR TO INSTALLING ANY PIPING, VERIFY INVERT ELEVATIONS, LOCATIONS AND PIPE SIZES. INSTALL ALL SANITARY, WASTE, AND STORM MAINS BEGINNING AT LOW POINT OF EACH SYSTEM AND CONTINUE WITH UNBROKEN CONTINUITY OF INVERT. LOW POINT OF EACH SYSTEM SHALL BE COORDINATED WITH SITE UTILITIES CONTRACTOR. REFER TO SITE UTILITY PLANS FOR REFERENCE.
23. UNLESS OTHERWISE NOTED ALL FLOOR DRAINS SHALL FITTED WITH TRAP PRIMER CONNECTION AND 1/2" TRAP PRIMER LINE FROM AN APPROVED AUTOMATIC OR MECHANICAL PRIMER DEVICE. TRAP PRIMERS MAY NOT BE SHOWN IN THE PLAN VIEW. CONTRACTOR SHALL INSTALL ALL TRAP PRIMER DEVICES IN A CONCEALED BUT FULLY ACCESSIBLE LOCATION.
24. DRAIN VALVES ON LOWEST POINT OF DOMESTIC WATER RISERS TO BE PROVIDED AS FOLLOWS: 1-1/2" OR SMALLER RISER PROVIDE 1/2" DRAIN VALVE. 2" OR LARGER PROVIDE 3/4" DRAIN VALVE.
25. PROVIDE FULL PORT BALL-TYPE ISOLATION VALVES ON ALL DOMESTIC WATER BRANCH LINES, AS WELL AS ON THE INDIVIDUAL FEED LINES TO ALL FIXTURES OR EQUIPMENT.
26. ALL WORK SHALL BE PROPERLY TESTED, BALANCED AND CLEANED. PROVIDE A ONE YEAR WARRANTY FROM DATE OF FINAL INSPECTION ON ALL PARTS AND LABOR.
27. PLUMBING CONTRACTOR SHALL INSTALL GAS VENTS FOR ALL GAS REGULATORS. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL REVIEW THE EXISTING CONDITIONS TO DETERMINE THE MOST ECONOMICAL ROUTE FOR MANIFOLD VENTS BEGINNING AT EQUIPMENT AND EXTENDING THROUGH ROOF.
28. ALL GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL. SHUT-OFF VALVES, DRIP LEGS, AND FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT ALL CONNECTIONS TO GAS-FIRED EQUIPMENT.
29. ALL DOMESTIC WATER PIPING SHALL BE SEAMLESS COPPER TYPE "L" (ASTM B32) WITH GROOVED-END FITTINGS ASTM B75 FOR PIPE SIZES 2" AND LARGER, WHILE WATER PIPING SHALL BE BRAZED FOR PIPE SIZES 2" AND BELOW.
30. ALL ABOVE GROUND STORM, SANITARY WASTE, AND VENT PIPING TO BE CAST IRON SOIL PIPE. JOINTS ON HUBLESS CAST IRON SOIL PIPE SHALL BE MADE WITH NEOPRENE GASKETS COUPLINGS AND 4 BAND STAINLESS STEEL CLAMPS. SCHEDULE 40 SOLID WALL PVC MAY BE USED FOR ABOVE GROUND VENT PIPING (IN NON-RETURN AIR PLENUM AREAS) AND FOR GARAGE DRAINAGE PIPING (NOT SANITARY AND STORM WITHIN THE GARAGE; ONLY THE GARAGE DRAINAGE SYSTEM) AT CONTRACTOR'S OPTION. TYPE "DWV" COPPER MAY BE USED FOR ABOVE GROUND VENT PIPING AT CONTRACTOR'S OPTION.
31. ALL STORM, CONDENSATE AND SANITARY WASTE PIPING MUST SLOPE TO A MINIMUM OF 1/8" PER FOOT FOR PIPE SIZES 3" AND ABOVE, AND A MINIMUM OF 1/4" PER FOOT FOR PIPE SIZES 2-1/2" AND BELOW.
32. ALL SANITARY VENT PIPING MUST SLOPE TO A MINIMUM OF 0.5% TOWARDS THE SANITARY PIPING.
33. PLUMBING SYSTEM INSULATION COVERING PIPING INSTALLED WITHIN HVAC RETURN PLENUM AREAS SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE DEVELOPMENT INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E84.

NOT ALL SYMBOLS AND ABBREVIATIONS NECESSARILY USED

## ABBREVIATIONS - PLUMBING

| | |
|---|---|
| AD | AREA DRAIN |
| AFF | ABOVE FINISHED FLOOR |
| AP | ACCESS PANEL |
| BFP | BACKFLOW PREVENTER |
| BLDG | BUILDING |
| BOB | BOTTOM OF BEAM |
| BOP | BOTTOM OF PIPE |
| BT | BATH TUB |
| BV | BALANCING VALVE |
| CA | COMPRESSED AIR |
| CD | CONDENSATE DRAIN |
| CFH | CUBIC FEET PER HOUR |
| CI | CAST IRON |
| CLG | CEILING |
| CO | CLEANOUT |
| COTG | CLEANOUT TO GRADE |
| CONN | CONNECTION |
| CONT | CONTINUATION |
| CP | CIRCULATING PUMP |
| CTR | COOLING TOWER RECEPTOR |
| CV | CHECK VALVE |
| CW | COLD WATER |
| CWFU | COLD WATER FIXTURE UNIT |
| (D) | DEMOLITION |
| DFU | DRAINAGE FIXTURE UNIT |
| DIA | DIAMETER |
| DN | DOWN |
| DR | DRAIN |
| DWG | DRAWING |
| (E) | EXISTING |
| EEW | EMERGENCY EYE WASH |
| EL | ELEVATION |
| ET | EXPANSION TANK |
| EWC | ELECTRIC WATER COOLER |
| EWH | ELECTRIC WATER HEATER |
| FCO | FLOOR CLEANOUT |
| FD | FLOOR DRAIN |
| FS | FLOOR SINK |
| FT | FEET |
| G | NATURAL GAS |
| GAL | GALLONS |
| GD | GARAGE DRAIN |
| GPM | GALLONS PER MINUTE |
| GWH | GAS WATER HEATER |
| GV | GATE VALVE |
| HB | HOSE BIBB |
| HD | HUB DRAIN |
| HT | HEAT TRACING |
| HW | DOMESTIC HOT WATER |
| HWR | DOMESTIC HOT WATER RETURN |
| HWFU | DOMESTIC HOT WATER FIXTURE UNITS |
| IE | INVERT ELEVATION |
| IE | INVERT ELEVATION |
| IN | INCH |
| IW | INDIRECT WASTE |

## ABBREVIATIONS - PLUMBING

| | |
|---|---|
| JS | JANITOR SINK |
| L | LAVATORY |
| LDR | LEADER |
| MAX | MAXIMUM |
| MH | MANHOLE |
| MIN | MINIMUM |
| MS | MOP SINK |
| (N) | NEW |
| NC | NORMALLY CLOSED |
| NIC | NOT IN CONTRACT |
| NO | NORMALLY OPEN |
| NPW | NON-POTABLE WATER |
| OTD | OUTSIDE DIAMETER |
| OD | OVERFLOW DRAIN |
| OST | OVERFLOW STORM PIPING |
| OS&Y | OUTSIDE SCREW & YOKE GATE VALVE |
| PDR | PLANTER DRAIN |
| PD | PUMP DISCHARGE |
| PIV | POST INDICATING VALVE |
| POC | POINT OF CONNECTION |
| PRV | PRESSURE REDUCING VALVE |
| PSI | POUNDS PER SQUARE INCH |
| PSIG | POUNDS PER SQUARE INCH (GAUGE) |
| RC | ROOF RECEPTOR |
| RD | ROOF DRAIN |
| RPZ | REDUCED PRESSURE ZONE |
| SA | SHOCK ABSORBER |
| SAN | SANITARY |
| SE | SEWAGE EJECTOR |
| SED | SEWAGE EJECTOR DISCHARGE |
| SF | SQUARE FEET |
| SH | SHOWER |
| SK | SINK |
| SP | SUMP PUMP |
| SPD | SUMP PUMP DISCHARGE |
| ST | STORM PIPING |
| TD | TRENCH DRAIN |
| TDH | TOTAL DYNAMIC HEAD |
| TMV | TEMPERATURE MIXING VALVE |
| TOS | TOP OF SLAB |
| TP | TRAP PRIMER |
| TPV | TRAP PRIMER VALVE |
| TYP | TYPICAL |
| UNO | UNLESS NOTED OTHERWISE |
| UP | UP (PENETRATES FLOOR SLAB) |
| UR | URINAL |
| V | VENT |
| VB | VACUUM BREAKER |
| VTR | VENT THROUGH ROOF |
| WC | WATER CLOSET |
| WCO | WALL CLEANOUT |
| WH | WALL HYDRANT |
| WF | WATER FILTER |
| WSFU | WATER SUPPLY FIXTURE UNIT |
| Z | ZONE |

## SYMBOL LEGEND

- FLEXIBLE CONNECTION
- (H) (X) (L) EXPANSION LOOP SIZE
- SHOCK ABSORBER
- VACUUM BREAKER
- AUTOMATIC AIR VENT
- PRESSURE GAUGE AND COCK
- THERMOMETER
- BASKET STRAINER
- VALVE (SPECIFICATION FOR TYPE)
- CHECK VALVE
- CHECK VALVE WITH ABD
- SOLENOID VALVE
- PRESSURE REDUCING VALVE
- OS&Y (OUTSIDE SCREW & YOKE) VALVE
- BUTTERFLY VALVE (MANUAL)
- BALANCING VALVE
- GAS COCK VALVE
- RELIEF VALVE
- ANGLE RELIEF VALVE
- TEMPERATURE MIXING VALVE LOCAL
- UNION
- REDUCER
- ECCENTRIC REDUCER (E.R.)
- SLEEVE
- PUMP
- M METER
- HOSE BIBB
- WATER HAMMER ARRESTER
- BACKWATER VALVE
- BALL VALVE
- CALABRATED BALANCING VALVE
- CHECK VALVE WAFER
- DOUBLE CHECK VALVE BACKFLOW
- DRY PIPE VALVE
- GATE VALVE
- GLOBE VALVE
- BACKFLOW PREVENTER
- SEISMIC VALVE
- MXV TEMPERATURE MIXING VALVE
- STRAINER
- STRAINER WITH BLOW OFF VALVE
- POINT OF DISCONNECTION
- POINT OF CONNECTION
- DRAIN
- FLOOR SINK
- ROOF DRAIN, PLANTER DRAIN
- OVERFLOW ROOF DRAIN
- DCVA DOUBLE CHECK VALVE ASSEMBLY
- DDCA DOUBLE DETECTOR CHECK ASSEMBLY
- RPBP REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY
- BOTTOM PIPE CONNECTION
- TOP PIPE CONNECTION
- VALVE IN VERTICAL
- P-TRAP
- FLOOR CLEANOUT/GRADE CLEANOUT
- ABANDONED PIPING
- INSULATED AND HEAT TRACED PIPING
- CLEANOUT/PLUG
- PIPE DOWN
- PIPE UP
- CAP
- CHANGE IN PIPE ELEVATION
- ARROW INDICATES DIRECTION OF FLOW
- PITCH PIPE DOWN IN DIRECTION OF ARROW
- PLUMBING FIXTURE STOP VALVE

## PIPING LEGEND

| POTABLE WATER | |
|---|---|
| ——— – ——— | DOMESTIC COLD WATER PIPING |

## MISCELLANEOUS

- P 1 — RISER DESIGNATION — RISER SYSTEM TYPE / RISER NO.
- CP 1 — EQUIPMENT DESIGNATION — EQUIPMENT / EQUIPMENT NO.
- 1 P2.1 — DETAIL DESIGNATION — DETAIL NUMBER / DWG. SHEET NO.
- 1 — SHEET NOTE NUMBER
- 1 — REVISION NUMBER

PLUMBING FIXTURE SCHEDULE

| DESIGNATION | MANUFACTURER | MODEL | SIZE | REMARKS |
|---|---|---|---|---|
| HB-1 | WOODFORD | B17 | 3/4" | FREEZELESS, ANTI-SIPHON. PROVIDE TEE KEY. |

HEAT TRACE SCHEDULE

| DESIGNATION | MANUFACTURER | MODEL | FT | REMARKS |
|---|---|---|---|---|
| HEAT TRACE-1 | THERMON | 5 FLX - 2 | 400 | HEAT TRACE 3/4" PIPING, 277 V, (1) 30A or (2)20A BREAKERS. PROVIDE S1 (HEAT TRACE CONTROLLER) & MOUNT NEAR THE CIRCUITS. INSTALL PER MANUFACTURER INSTRUCTIONS |

## SCOPE OF WORK NARRATIVE

WATER WINTERIZATION SCOPE

ABANDON THE EXITING WATER MAIN ON UPPER TRACK LEVEL. PROVIDE NEW WATER MAIN ON BUS LEVEL FOR A NEW CAR WASH RISER AND EXISTING WATER RISERS.

OTHER SCOPES

REPAIR TWO DAMAGED WATER PIPING BRANCHES INCLUDING PIPING, HEAT TRACE AND INSULATION AT BUS LEVEL. SEE PHOTOS 1 & 2.

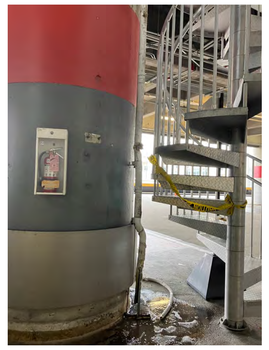

PHOTO 1: REPAIR THE WATER HOSE BIB BRANCH

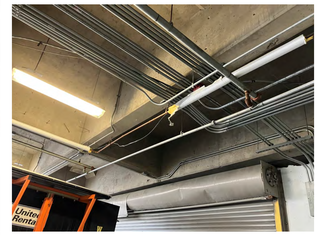

PHOTO 2: REPAIR THE WATER HOSE BIB BRANCH

## PLUMBING DRAWING LIST

| DRAWING NO. | DESCRIPTION |
|---|---|
| P0.001-4 | PLUMBING - LEGENDS & ABBREVIATIONS |
| P2.00N-4 | PLUMBING - UPPER TRACK LEVEL - NEW WORK - NORTH |
| P2.00S-4 | PLUMBING - UPPER TRACK LEVEL - NEW WORK - SOUTH |
| P2.02N-4 | PLUMBING - BUS LEVEL - NEW WORK - NORTH |
| P2.02S-4 | PLUMBING - BUS LEVEL - NEW WORK - SOUTH |
| P2.03N-4 | PLUMBING - MEZZANINE LEVEL - NEW WORK - NORTH |
| P2.04N-4 | PLUMBING - FIRST LEVEL - NEW WORK - NORTH |
| P2.05N-4 | PLUMBING - SECOND LEVEL - NEW WORK - NORTH |
| P2.06N-4 | PLUMBING - THIRD LEVEL - NEW WORK - NORTH |
| P5.01-4 | PLUMBING DOMESTIC WATER RISER DIAGRAM |
| P6.01-4 | PLUMBING SPECIFICATIONS |
| P6.02-4 | PLUMBING SPECIFICATIONS |
| P6.03-4 | PLUMBING SPECIFICATIONS |
| P6.04-4 | PLUMBING SPECIFICATIONS |
| P6.05-4 | PLUMBING SPECIFICATIONS |

Total Sheets: 15


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DISTRICT OF COLUMBIA — JONATHAN R GILLESPIE — No. PE906987 — MECHANICAL — PROFESSIONAL ENGINEER

PROJECT

PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER

UNION STATION REDEVELOPMENT CORPORATION

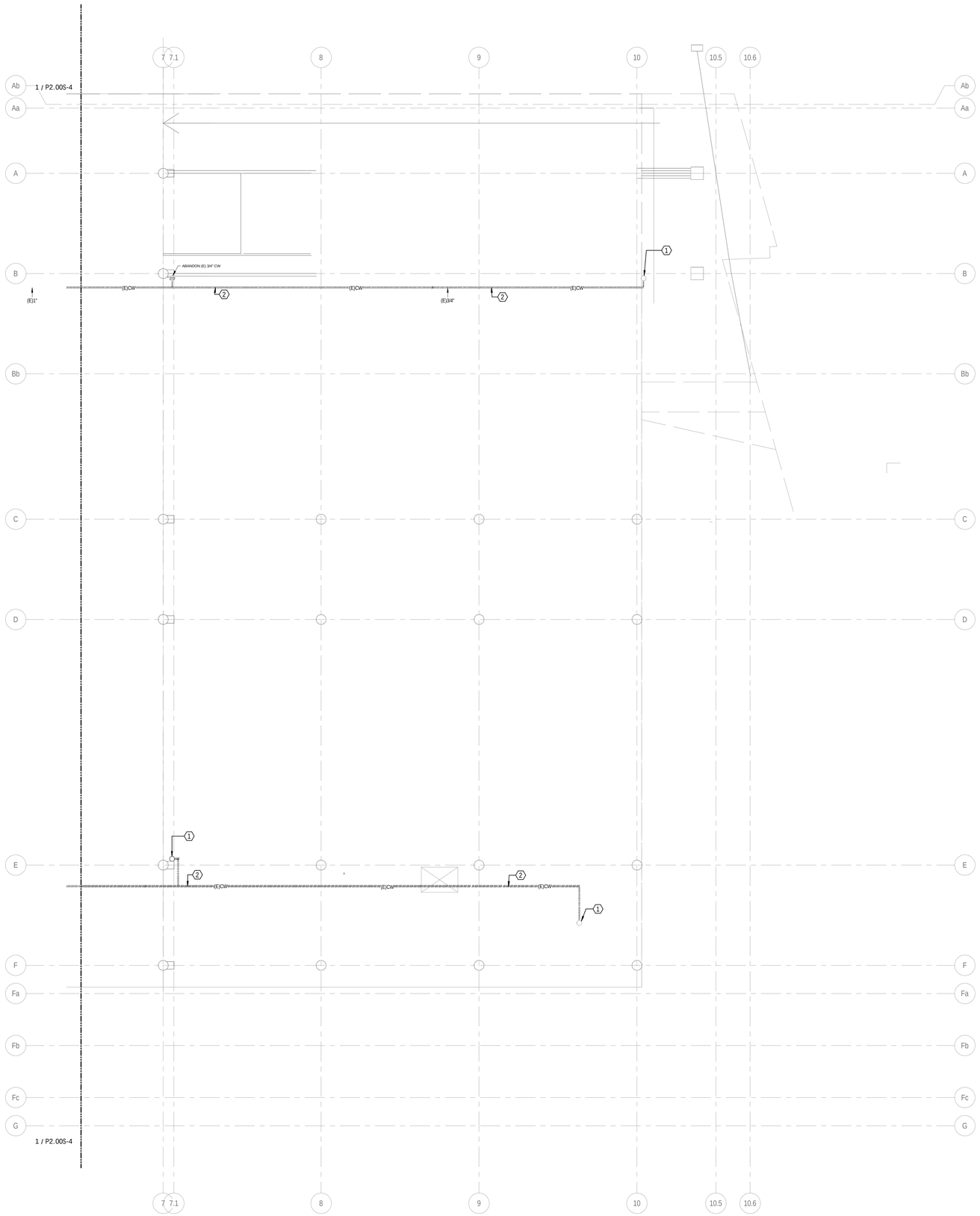
TITLE

PLUMBING - LEGENDS & ABBREVIATIONS

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: WSP | CKD. BY: WSP |
| SCALE: | 12" = 1'-0" |

P0.001-4


10/22/2025 3:18:57 PM Autodesk Docs://ARP200-PM Support Services- Gen Rm - R25 - C2SPM SUPPORT SERVICES - GENERATOR ROOM_WSP_MEP_r2025.rvt




1 PLUMBING - UPPER TRACK LEVEL - NEW WORK - DWW - NORTH
1/16" = 1'-0"

GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1' - 0"

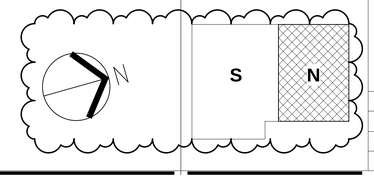
## SHEET NOTES

1 ABANDON EXISTING 3/4" COLD WATER AND DRAIN VALVE AT THE BOTTOM OF THE RISER.
2 ABANDON EXISTING PIPING AND FITTINGS.

## GENERAL NOTES

A. REFER TO P0.001-4 FOR LEGEND & ABBREVIATIONS.
B. REFER TO P5.01-4 RISER FOR PIPING ACCESSORIES.

## KEY PLAN

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DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE906987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES DOMESTIC WATER WINTERIZATION

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## PLUMBING - UPPER TRACK LEVEL - NEW WORK - NORTH

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: WSP | CKD. BY: WSP |
| SCALE: | As indicated |

P2.00N-4

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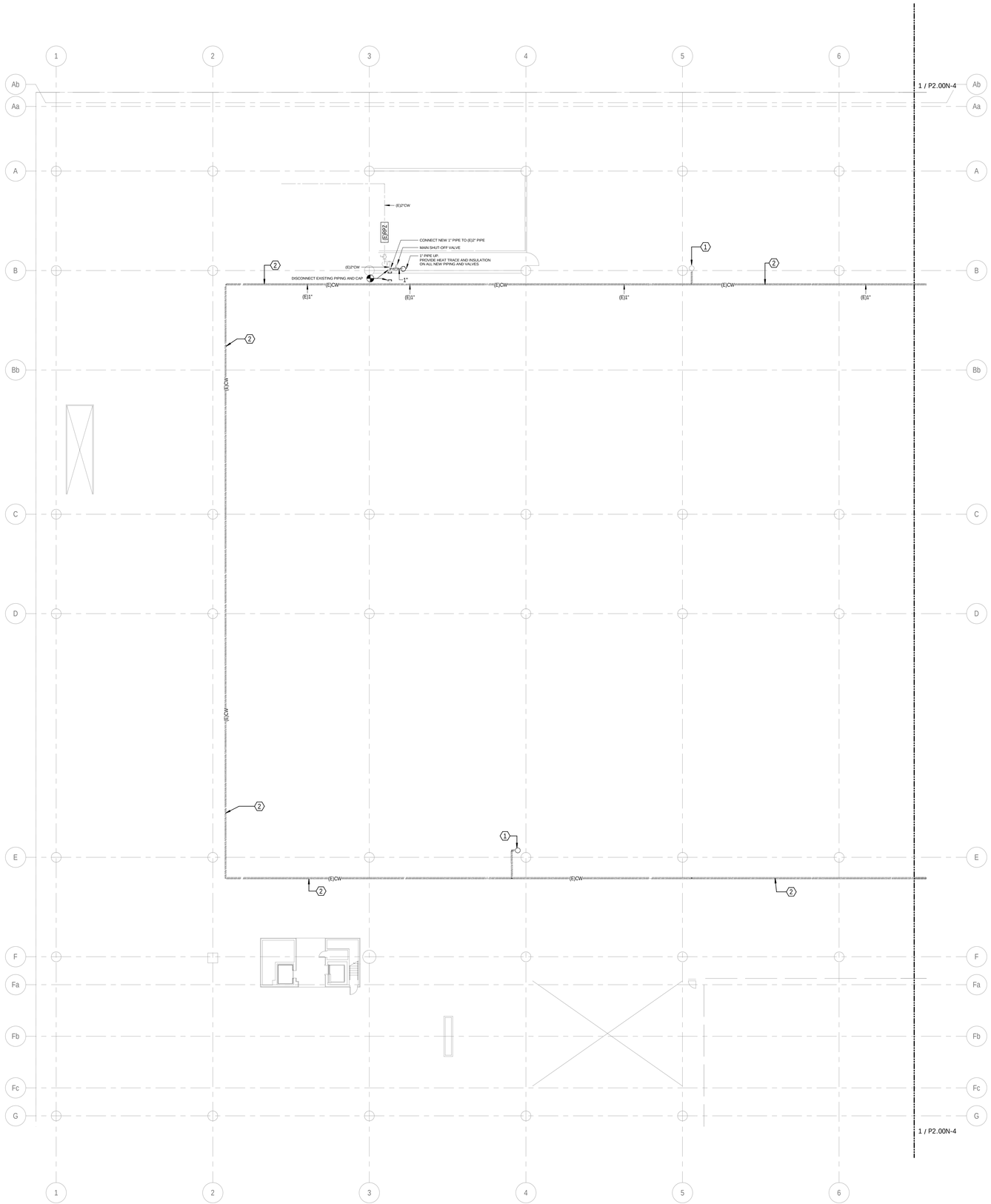



1 PLUMBING - UPPER TRACK LEVEL - NEW WORK - DWW - SOUTH
1/16" = 1'-0"

GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1'- 0"

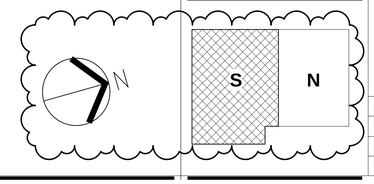
## SHEET NOTES

1 ABANDON EXISTING 3/4" COLD WATER AND DRAIN VALVE AT THE BOTTOM OF THE RISER.
2 ABANDON EXISTING PIPING AND FITTINGS.

## GENERAL NOTES

A. REFER TO P0.001-4 FOR LEGEND & ABBREVIATIONS.
B. REFER TO P5.01-4 RISER FOR PIPING ACCESSORIES.

KEY PLAN

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DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE905987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES DOMESTIC WATER WINTERIZATION

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## PLUMBING - UPPER TRACK LEVEL - NEW WORK - SOUTH

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: WSP
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P2.00S-4

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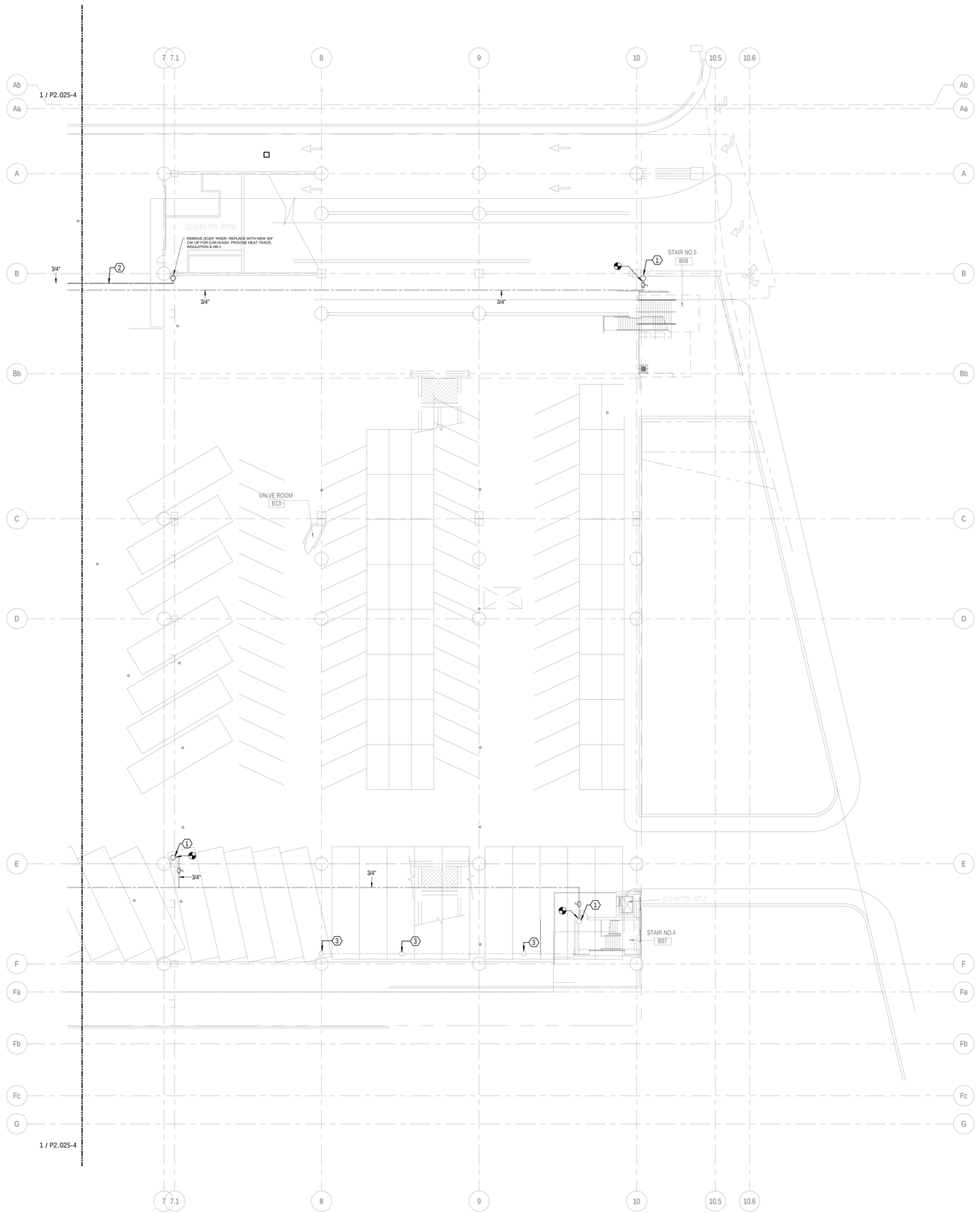



1 PLUMBING - BUS LEVEL - NEW WORK - DWW - NORTH
1/16" = 1'-0"

GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1' - 0"

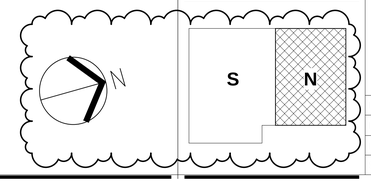
## SHEET NOTES

1. CUT EXISTING 3/4" RISER. CAP ABANDONED EXISTING 3/4" COLD WATER AT 3" ABOVE FLOOR. EXISTING COLD WATER AND HOSE BIB TO REMAIN. PROVIDE DRAIN VALVE AT THE BOTTOM OF THE RISER.
2. PROVIDE HEAT TRACE-1 AND INSULATION.
3. EXISTING 3/4" COLD WATER UP.

## GENERAL NOTES

A. REFER TO P0.001-4 FOR LEGEND & ABBREVIATIONS.
B. REFER TO P5.01-4 RISER FOR PIPING ACCESSORIES.

## KEY PLAN

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JONATHAN R GILLESPIE
No. PE905987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
PLUMBING - BUS LEVEL - NEW WORK - NORTH

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: WSP | CKD. BY: WSP |
| SCALE: | As indicated |

P2.02N-4

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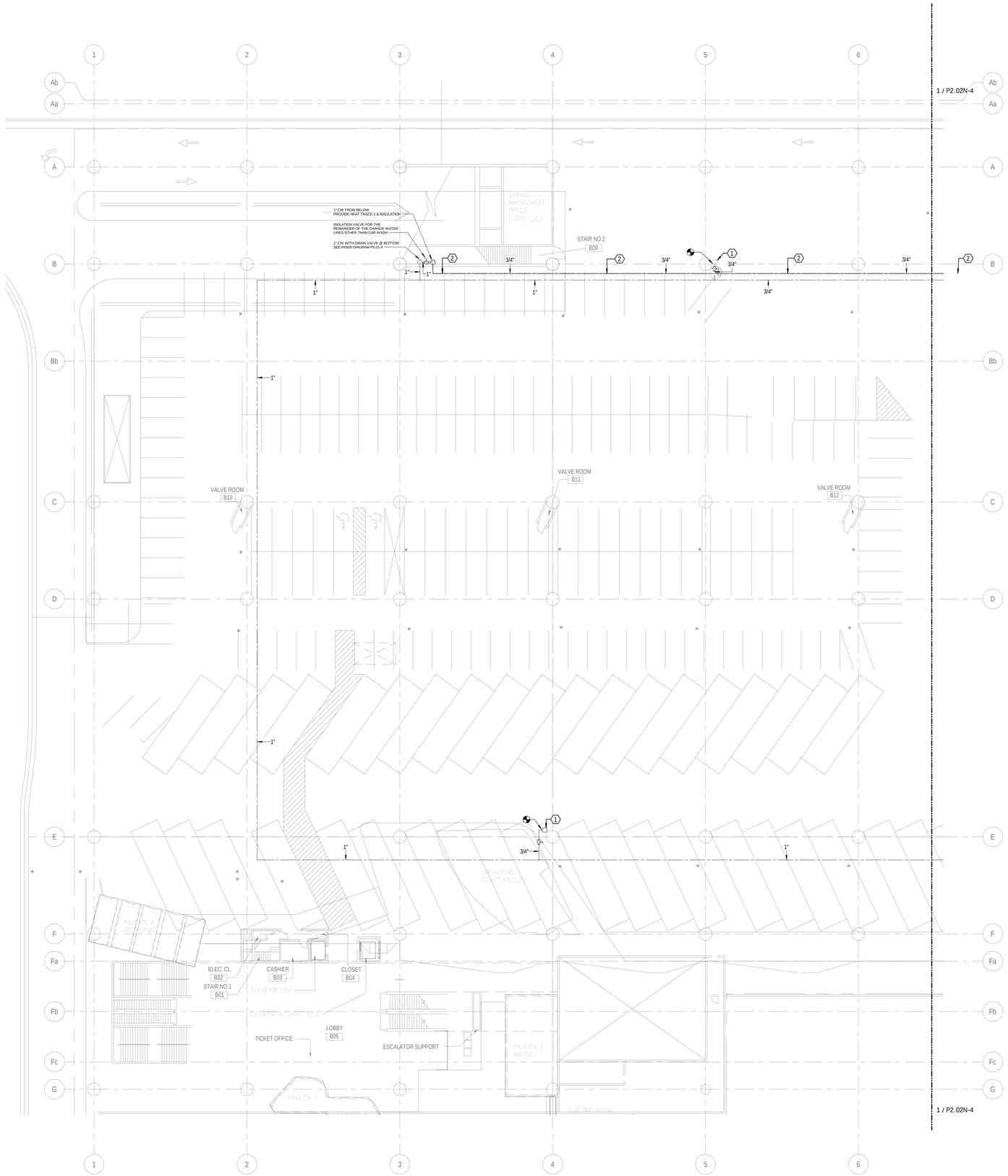



1 PLUMBING - BUS LEVEL - NEW WORK - DWW - SOUTH
1/16" = 1'-0"

GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1' - 0"

## SHEET NOTES

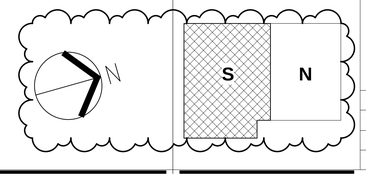
1 CUT EXISTING 3/4" RISER. CAP ABANDONED EXISTING 3/4" COLD WATER AT 3" ABOVE FLOOR. EXISTING COLD WATER AND HOSE BIB TO REMAIN. PROVIDE DRAIN VALVE AT THE BOTTOM OF THE RISER.

2 PROVIDE HEAT TRACE-1 AND INSULATION.

## GENERAL NOTES

A. REFER TO P0.001-4 FOR LEGEND & ABBREVIATIONS.
B. REFER TO P5.01-4 RISER FOR PIPING ACCESSORIES.

## KEY PLAN

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DISTRICT OF COLUMBIA
GRAHAM R GILLESPIE
No. PE9069871
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES DOMESTIC WATER WINTERIZATION

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## PLUMBING - BUS LEVEL - NEW WORK - SOUTH

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
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P2.02S-4

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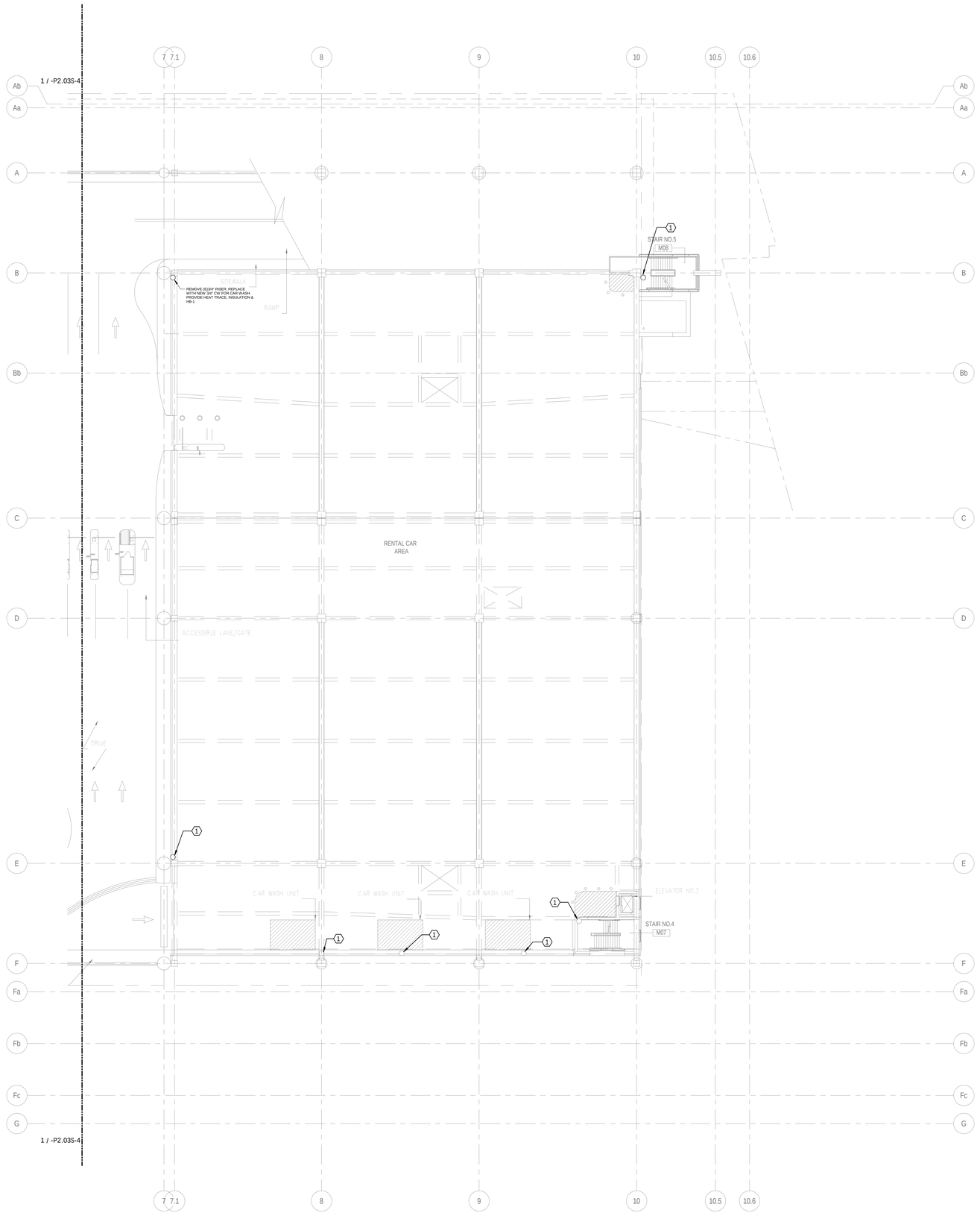



1 PLUMBING - MEZZANINE LEVEL - NEW WORK - DWW - NORTH
1/16" = 1'-0"

GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1' - 0"

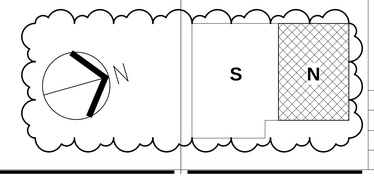
## SHEET NOTES

1 EXISTING 3/4" COLD WATER RISER.

## GENERAL NOTES

A. REFER TO P0.001-4 FOR LEGEND & ABBREVIATIONS.
B. REFER TO P5.01-4 RISER FOR PIPING ACCESSORIES.

## KEY PLAN

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DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE905987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
PLUMBING - MEZZANINE LEVEL - NEW WORK - NORTH

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: WSP | CKD. BY: WSP |
| SCALE: | As indicated |

P2.03N-4

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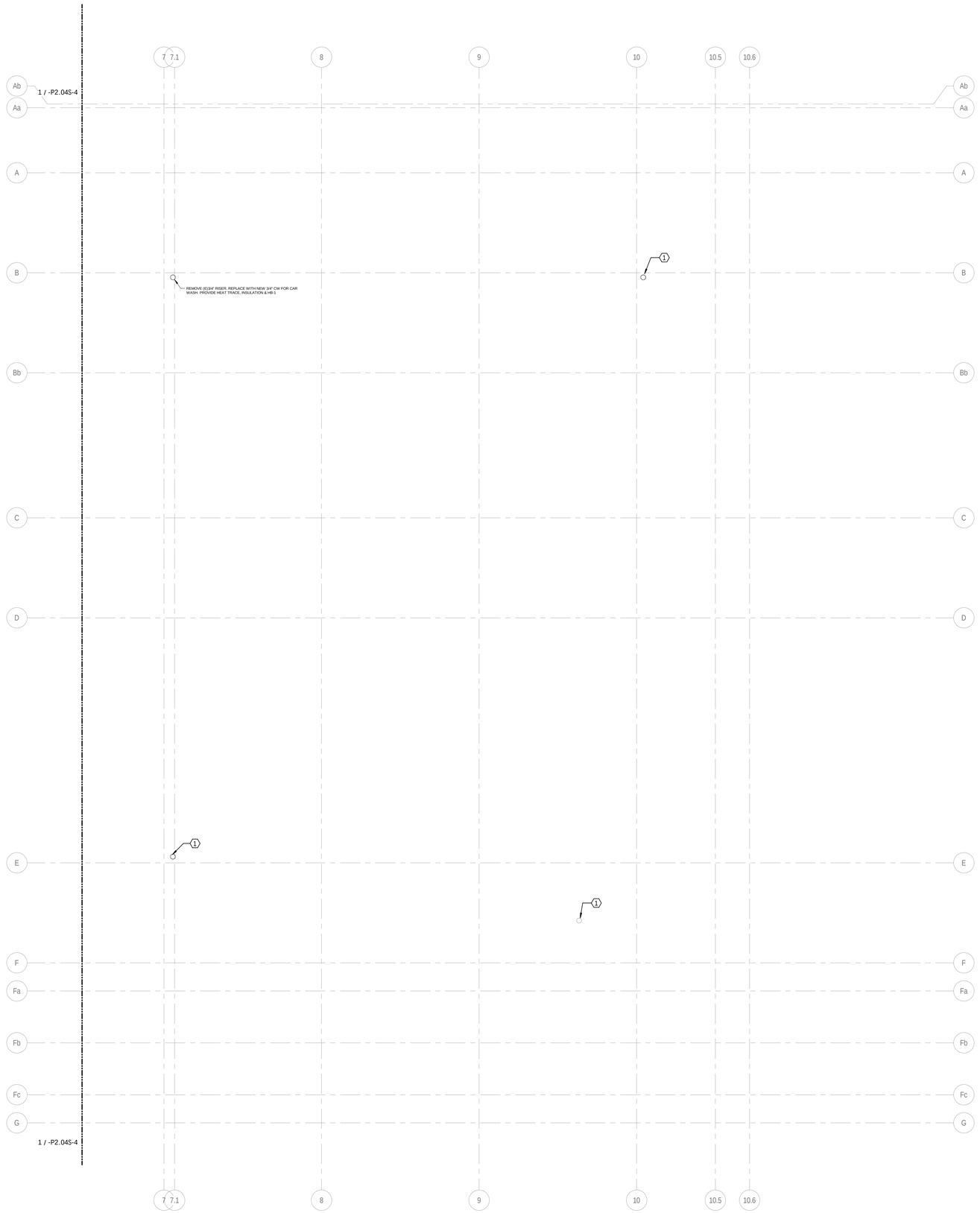


1 PLUMBING - FIRST LEVEL - NEW WORK - DWW - NORTH
1/16" = 1'-0"

GRAPHIC SCALE
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SCALE: 1/16" = 1' - 0"

## SHEET NOTES

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## GENERAL NOTES

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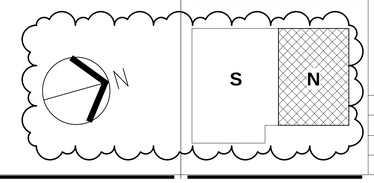
## KEY PLAN

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PROJECT
# PM SUPPORT SERVICES DOMESTIC WATER WINTERIZATION

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## PLUMBING - FIRST LEVEL - NEW WORK - NORTH

| | |
|---|---|
| PROJECT NO.: | US-WSP-192801E |
| DATE: | 10/03/2025 |
| DWN. BY: WSP | CKD. BY: WSP |
| SCALE: | As indicated |

P2.04N-4

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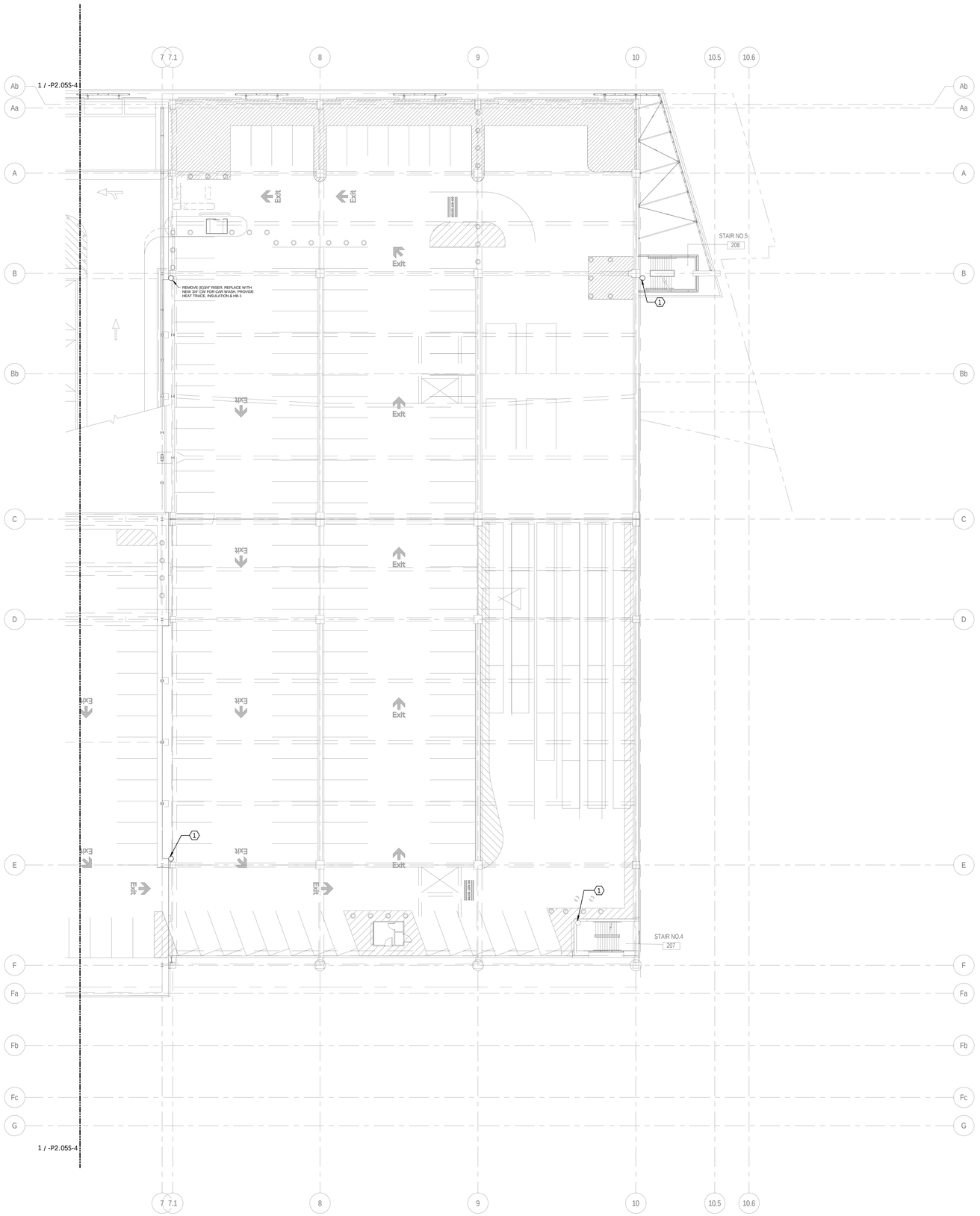



1 PLUMBING - SECOND LEVEL - NEW WORK - DWW - NORTH
1/16" = 1'-0"

GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1' - 0"

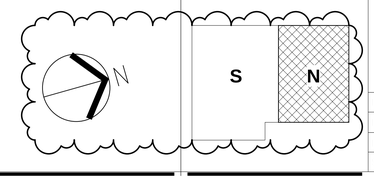
## SHEET NOTES

1 EXISTING 3/4" COLD WATER RISER UP AND DOWN.

## GENERAL NOTES

A. REFER TO P0.001-4 FOR LEGEND & ABBREVIATIONS.
B. REFER TO P5.01-4 RISER FOR PIPING ACCESSORIES.

## KEY PLAN




MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE906987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
# PM SUPPORT SERVICES DOMESTIC WATER WINTERIZATION

OWNER
## UNION STATION REDEVELOPMENT CORPORATION

TITLE
## PLUMBING - SECOND LEVEL - NEW WORK - NORTH

| | |
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P2.05N-4

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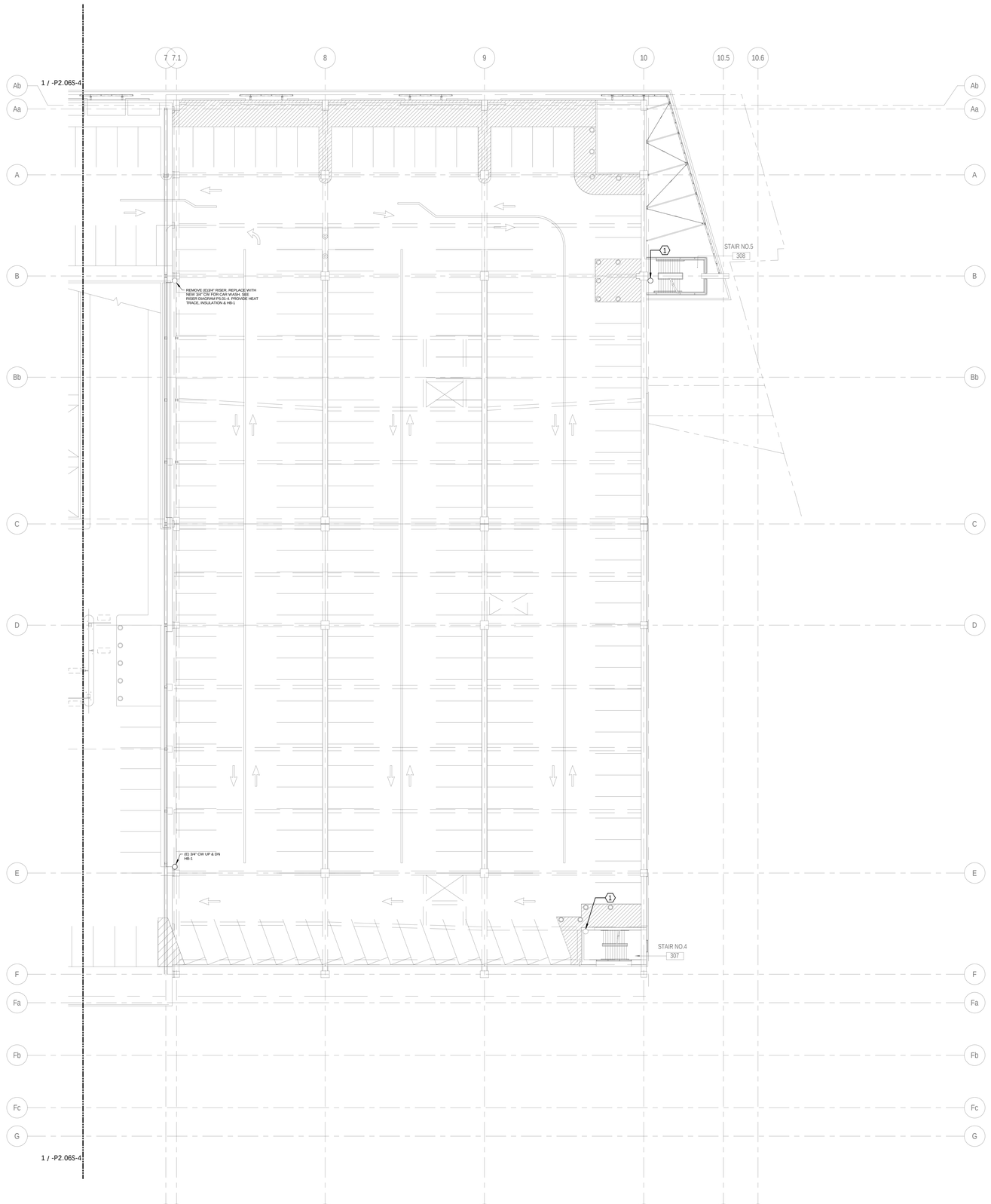


1 PLUMBING - THIRD LEVEL - NEW WORK - DWW - NORTH
1/16" = 1'-0"

GRAPHIC SCALE
16' 8' 0 16' 32' 48'
SCALE: 1/16" = 1' - 0"

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## GENERAL NOTES

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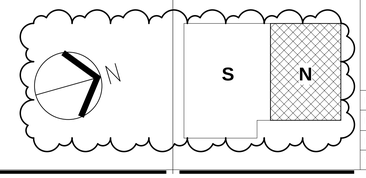
## KEY PLAN

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DOMESTIC WATER WINTERIZATION

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| DATE: | 10/03/2025 |
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| SCALE: | As indicated |

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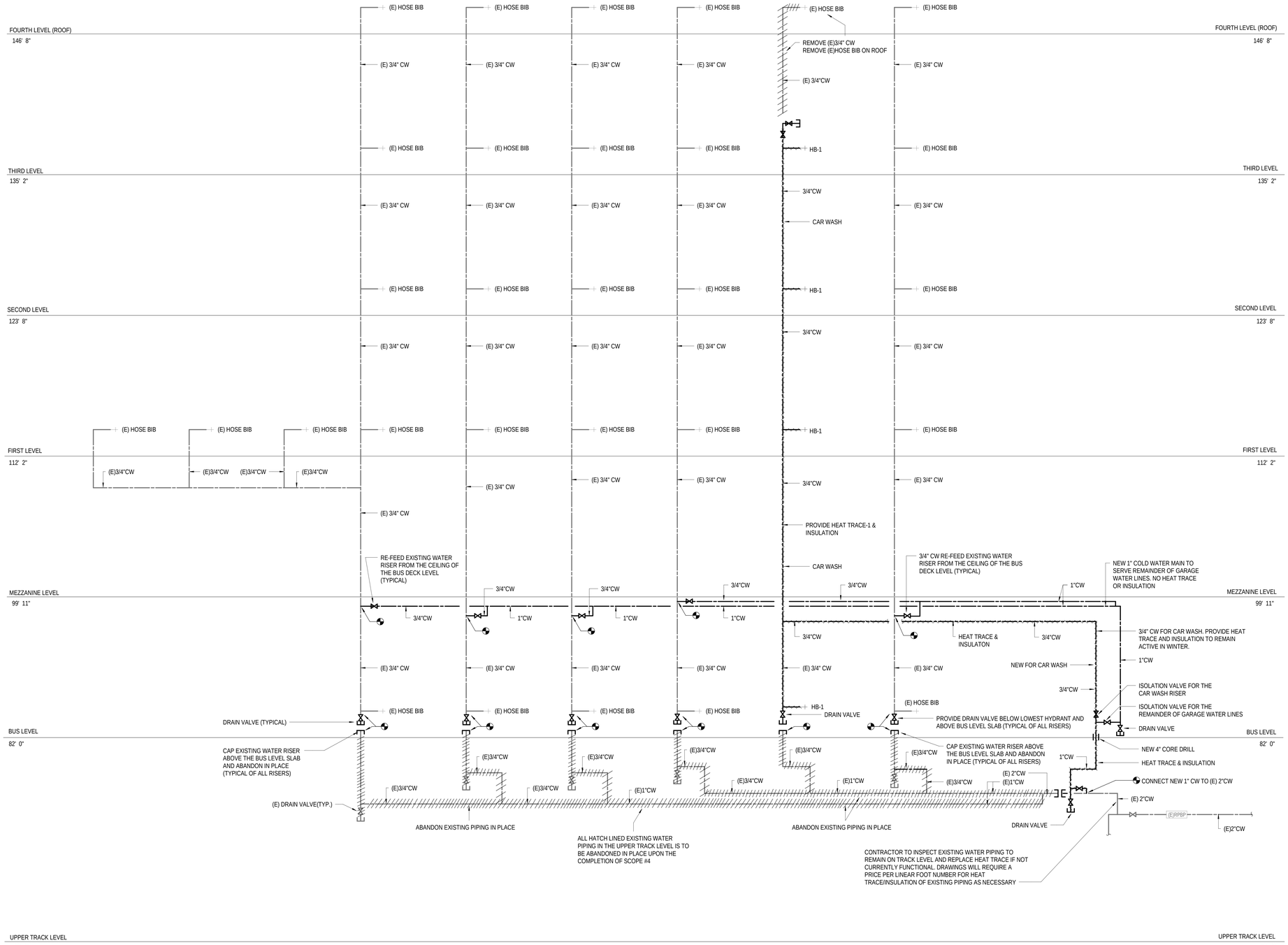
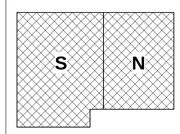



## SHEET NOTES

## GENERAL NOTES

## KEY PLAN

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DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE906987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT

# PM SUPPORT SERVICES DOMESTIC WATER WINTERIZATION

OWNER

## UNION STATION REDEVELOPMENT CORPORATION

TITLE

# PLUMBING DOMESTIC WATER RISER DIAGRAM

| | | |
|---|---|---|
| PROJECT NO.: | US-WSP-192801E | P5.01-4 |
| DATE: | 10/03/2025 | |
| DWN. BY: WSP | CKD. BY: WSP | |
| SCALE: | NOT TO SCALE | |

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**SECTION 22 0500**

**COMMON WORK RESULTS FOR PLUMBING**

**PART 1- GENERAL**

1.1 RELATED REQUIREMENTS

A. All conditions imposed by these documents shall be applicable to all portions of the Work under this Division. These references are intended to point out specific items to the Contractor, but in no way relieve him of the responsibility of reading and complying with all relevant parts of the entire Specification.

B. The Contractor shall examine and coordinate with all Contract Drawings and Specifications, and all Addenda issued. Failure to comply shall not relieve them of responsibility. The omission of details of other portions of the Work from this Division shall not be used as a basis for a request for additional compensation.

C. The specific features and details for other portions of the Work related to the construction in progress or to the existing building(s) shall be determined by examination at the site.

1.2 SUMMARY

A. This Section includes the following:

1. Scope of work.
2. Piping materials and installation instructions common to most piping systems.
3. Transition fittings.
4. Dielectric fittings.
5. Sleeves.
6. Escutcheons.
7. Grout.
8. Plumbing demolition.
9. Equipment installation requirements common to equipment sections.
10. Supports and anchorages.

1.3 DEFINITIONS

A. Products and Materials: Components and assemblies for the construction of the systems as indicated in the Documents including, but not limited to pipes, tubes, valves, and equipment.

B. Products or Materials: See "Products and Materials".

C. Provide: The materials and equipment described shall be furnished, installed and connected under this Division, complete for operation, unless specifically noted to the contrary. Identical to the phrase "furnish and install".



D. Furnish: The material, equipment, etc. to be supplied, but not installed by the supplier.

1.4 SCOPE OF WORK

A. Inspection Of Site

1. The Contractor shall visit the site, inspect the installations and ascertain the conditions to be met and the work.
2. Failure to comply with an inspection of the site shall not constitute ground for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work under this Division.
3. Review construction details of the existing portion of the building during the site inspection and include all work required to modify the existing plumbing installations and install new materials, comprising a part of the plumbing installation, within the present structure.
4. Review all construction details of the new portion of the building as illustrated on the architectural and structural drawings and be guided thereby.

B. Products and Materials Description
1. Where two or more units of the same kind or class of a specific item are required, these shall be the products of a single manufacturer; however, the component parts of the item need not be the products of one manufacturer.
2. In describing the various products and materials, in general each item will be described singularly, even though there may be a multiplicity of identical items. Also, where the description is only general in nature, exact sizes, duties, space arrangements, horsepower requirements and other data shall be determined by reference to the Documents.

C. The Work shall include modifications and extensions to existing systems, and the modification of the existing structure as required accommodating the installation of the Work.

D. Refer to other Divisions of the Specifications for related Work.

E. It is the intent, unless otherwise indicated, that all products and materials described and specified under this Division, shall be provided for a complete working system irrespective of use of the phrases "install", "furnish", "furnish and install", or "provide" as described above has been actually included.

F. The Contractor shall be responsible for all Work of every description in connection with this Division of the Specifications.

G. The Contractor shall specifically and distinctly assume, and does so assume, all risk for damage or injury from whatever cause to property or person used or employed on or in connection with this Work and of all damages or injury to any person or property wherever located, resulting from an action or operation under the Contract in connection with the Work, and undertake the promise to defend the Owner against all claims on account of any such damage or injury.

H. The Contractor will be held responsible for the satisfactory execution and completion of the Work in accordance with the true intent of the Documents.



I. The Contractor shall provide without extra charge all incidental items required as part of the Work, even though it may not be specifically indicated. If the Contractor has reason for objecting to the use of any material, equipment, device or method of construction as indicated, he shall make report of such objections to the Owner's Representative, obtain proper approval and adjustment to the Contract, and shall proceed with the Work.

J. Electric wiring
1. All electric wiring shall be installed under Division 26, except for such equipment items as are prewired at their point of manufacture and so delivered to the project, and except for the following:
a. Temperature Control Wiring and Power Wiring provided by controls contractor.
2. Prepare and submit for review wiring diagrams for all equipment furnished under this Division. Show on these diagrams all power, interlock, and control circuits. When the Architect takes no exception to these drawings, they shall become installation drawings for the Contractor.
3. All domestic cold and hot water piping shall be heat traced when routed external to the building or in areas susceptible to freezing conditions.

1.5 ORDINANCES, PERMITS AND CODES

A. It shall be the Contractor's duty to perform the work and provide the materials covered by these specifications in conformance with all ordinances and regulations of all authorities having jurisdiction.

B. All work herein shall conform to all applicable laws, ordinances, and regulations of the local utility companies.

C. The work shall be in accordance with, but not limited to, the requirements of:
1. National Fire Protection Association
2. National Safety Code
3. State and Local Building Codes
4. District of Columbia Safety Code

D. Codes and standards referred to are minimum standards. Where the requirements of these specifications or drawings exceed those of the codes and regulations, the drawings, and specifications govern.

E. The Contractor shall obtain permits, plan checks, connection and specification fees, inspections, and approvals applicable to the Work as required by the regulatory authorities.

F. Fees and costs of any nature whatsoever incidental to permits, inspections, and approvals shall be assumed and paid by the Contractor.

G. The pro-rata costs, if any, for utilities serving this property will be paid for by the Owner and shall not be included as part of this Contract.

1.6 DRAWINGS AND SPECIFICATIONS

A. The inter-relation of the specifications, the drawings, and the schedules are as follows:
1. The specifications provide the written requirements for the quality, standard, nature of the materials, equipment and construction systems.



2. The drawings establish the quantities, approximate dimensions, details and location of equipment.
3. The schedules give the capacities, characteristics and components.

B. For any individual project, if there is conflict between the drawings and or specifications, they are equivalent in authority and priority. Should they disagree in themselves, or with each other, prices shall be based on the most expensive combination of quality and quantity of work indicated. In the event of the above mentioned disagreements the resolution shall be determined by the Architect.

C. Contractor is responsible to bring any conflicts in drawings and/or specifications to the attention of the Architect, immediately, prior to any work being done.

D. Where the specifications do not fully agree with the schedules, the schedules shall govern. Figures give on drawings govern scale measurements and large scale details govern small scale drawings.

E. Review all construction details illustrated on the architectural and structural drawings and be guided thereby.

1.7 SUBSTITUTIONS

A. Where the product of a single manufacturer is mentioned by trade name or manufacturer's name in this Division, it is the only acceptable manufacturer.

B. Where two or more manufacturers are named, only those manufacturers will be considered or approved.

C. Manufacturers not listed will be considered for substitution prior to bid only. The substitute manufacturer shall submit a complete copy of the appropriate technical specification section minimum ten (10) business days prior to bid with each sub-paragraph noted with the comment, "compliance", "deviation", "alternate" or "not applicable". In the case of non-primary, vendor-supplied items, the name of the sub-vendor supplying said item, including model number, shall be indicated.
1. By noting the term "compliance" or "C", it shall be understood that the manufacturer is in full compliance with the item specified and will provide exactly the same with no deviations.
2. By noting the term "deviation" or "D", it shall be understood that the manufacturer prefers to provide a different component in lieu of that specified. Manufacturer shall indicate all deviations.
3. By noting the term "alternate" or "A", it shall be understood that the manufacturer proposes to provide the same operating function but prefers to do it in a different manner. An alternate shall be fully described as to what the manufacturer proposes to provide.
4. By noting the term "not applicable" or "N/A", it shall be understood that the specified item is not applicable to the project.

D. It shall be understood that space allocations have been made on the basis of present and known future requirements and the dimensions of items of equipment or devices of a particular manufacturer whether indicated or not.

E. Any product or material offered in substitution which differs in dimension or configuration from the Documents, the Contractor shall provide as part of the submittal a drawing, minimum 1/4" = 1'-0" scale, showing that the substitution can be installed in the space



available without interfering with other portions of the work or with access for operations and maintenance in the completed project.

F. Where substitute products or materials requiring different arrangement or connections from that indicated is accepted by the Owner's Representative, install the equipment or devices to operate properly and in harmony with the intent of the Documents, making all incidental changes in piping or wiring resulting from the substitution without any additional cost to the Owner.

G. The Contractor shall pay all additional costs incurred by other portions of the work in connection with all substitutions.

H. The Owner's Representative reserves the right to call for samples of any item of product or material offered in substitution, together with a sample of the specific item when, in their opinion, the quality of the item and/or the appearance is involved, and it is deemed that an evaluation of the item may be better made by visual inspection.

I. When any request for a substitution of a product or material is submitted and rejected, the item named in the Documents shall be furnished. Repetitive submittal of substitutions for the same item will not be considered.

1.8 QUALITY ASSURANCE

A. All Work shall be performed by properly licensed technicians skilled in their respective trades. All materials, equipment and devices shall be installed in accordance with the recommendations of the manufacturer and in the best standard practice to bring about results of a first class condition.

B. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

C. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

D. Electrical Characteristics for Plumbing Equipment:
1. Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.
2. Where variable frequency drives are provided for equipment, whether installed separately or integral to the equipment, the VFDs shall conform to Division 26 16 section, "Variable Frequency Motor Controllers".

E. Wherever a UL standard has been established for a particular type of material, equipment or device, each item of such material, equipment or device provided on this project shall meet the requirements of the UL standard in every way, and shall be UL listed and labeled.

F. Products and materials shall be of the best quality customarily applied in quality commercial practice, and shall be by reputable manufacturers.



G. Each major component shall bear a nameplate giving the name and address of the manufacturer, and the catalog number or designation of the component.

H. Products and materials provided under this Division of the Specifications shall be essentially the standard item, unless otherwise noted, of the specified manufacturer, or where allowed, an alternate manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver products and materials with factory-applied end caps or "heat shrink" wrappings to protect openings. Maintain opening protection through shipping, storage, and handling to prevent damage and the entrance of dirt, debris, and moisture.

B. Store light sensitive products and materials away from and protected against direct sunlight.

C. Support products and materials at all times to prevent sagging and bending.

D. The area provided for product and material storage at the jobsite shall be clean, dry and exposure to dust minimized.

E. Responsibility for the protection of products and materials shall extend to existing equipment, systems, and products and materials. Erect temporary sheltering structures, provide temporary bracing and supports, or cover existing equipment, systems, and products and materials to prevent damage and the entrance of dirt, debris, and moisture.

F. Failure on the part of the Contractor to comply with the above to the satisfaction of the Architect, Engineer, or either's authorized representative shall be sufficient cause for the rejection of products and materials in question.

1.10 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces.

D. Installation Drawings
1. Prepare special drawings as called for elsewhere herein or directed by the Architect to coordinate this work with the work of other Divisions, to illustrate changes in this work to facilitate its concealment in finished spaces, to avoid obstructions, or to illustrate the installation of a substitute equipment item.
2. Use these drawings in the field for the installation of the work. Unless otherwise directed, do not submit these drawings for review, but provide 3 copies to the Architect for information.

E. Schedule And Sequence Of Work
1. The Contractor shall meet and cooperate with the Owner and Owner's Representative to schedule and sequence Work so as to ensure meeting



scheduled completion dates and avoid delaying other portions of the Work. Work requiring special sequencing shall be at no additional cost to the Owner and shall have no impact on the schedule.
2. Work schedules and completion dates as established shall be rigidly adhered to. Cooperate in establishing these schedules and perform the work under this Division at such times as directed so as to ensure meeting scheduled dates and avoid delaying any other Contractor.
3. The facility will continue to be in use throughout the construction period, and the schedule contemplates working in designated areas in the present facility while other adjacent areas are occupied. Execute work in this Division to minimize disturbance to occupants in adjacent areas.
4. When any work affects any services to any occupied area new permanent or temporary services, or a combination of both, shall be installed to enable occupied areas to function properly. Additional valves required shall be installed without added cost to the Owner.
5. Perform no work in the present facility that interferes with normal hours of occupancy, unless special permission is granted by the Owner. Included are operations which would cause objectionable noise or service interruptions. Each discipline shall coordinate their work with the established phases of construction.
6. Any work involving a service suspension shall be scheduled in advance with the Owner.
7. Should it be necessary to perform certain operations on an "overtime" basis in order not to interrupt the normal usage of the facility, include the costs of such overtime without change in the Contract amount.
8. The Contractor shall be responsible for coordinating the demolition and tie-in of the central plant system with the Owner and construction manager.

**PART 2- PRODUCTS**

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

C. All piping and tubing shall be American manufactured, unless otherwise indicated.

2.3 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.



B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated.

F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

G. Solvent Cements for Joining Plastic Piping:
1. CPVC Piping: ASTM F 493.
2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

H. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.4 TRANSITION FITTINGS

A. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

B. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

C. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.

2.5 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C).



D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.

E. Dielectric Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

1. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig (1035- or 2070-kPa) minimum working pressure where required to suit system pressures.

F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

2.6 SLEEVES

A. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 10, galvanized, plain ends.

2.7 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Cast-Brass Type: With set screw.

1. Finish: Polished chrome-plated and rough brass, pending approval by Architect.

C. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated and rough brass, pending approval by Architect.

D. One-Piece, Floor-Plate Type: Cast-iron floor plate.

E. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.8 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
3. Packaging: Premixed and factory packaged.



**PART 3- EXECUTION**

3.1 PLUMBING DEMOLITION

A. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

B. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 SALVAGED MATERIALS

A. Reuse no salvaged material except as noted on the Drawings, specified herein, or directed by the Architect. Remove from the premises all present materials falling under this Division, which are removed from the existing building. Upon completion, leave no "dead" line or equipment installed in any portion of the area being remodeled.

3.3 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.



H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons, after Architect's final approval of finish, for penetrations of walls, ceilings, and floors according to the following:
1. New piping penetrations shall be one-piece escutcheons.
2. Existing piping penetrations shall be two-piece escutcheons.
3. All sleeved penetrations shall be deep-drawn to allow flush installation between escutcheon and finished surface.

M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level to prevent water entrance to the sleeved hole. Vertical pipe supports must be extended to and supported by the floor and not the sleeve.

b. Strike above subparagraph and retain subparagraph below when a pipe curb is required at all floor penetrations in lieu of extended sleeves.

c. Provide concrete pipe curb in floors of mechanical equipment areas or other wet areas 4 inches (100 mm) above finished floor level.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.

3. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.



N. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.

O. Verify final equipment locations for roughing-in.

P. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.4 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
4. PVC Nonpressure Piping: Join according to ASTM D 2855.



J. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.5 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

B. Field Welding: Comply with AWS D1.1.

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.8 GROUTING

A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.



3.9 INSTALLATION, INSPECTIONS AND CERTIFICATIONS

A. The Contractor shall obtain timely inspections of the installation by the constituted authorities. Remedy any deficiencies to the satisfaction of the inspecting authority.

B. Upon final completion of the work, obtain certificates of acceptance from the constituted authorities. Deliver the certificates to the Architect for transmission to the Owner.

3.10 OPERATION PRIOR TO COMPLETION

A. When any piece of mechanical or electrical equipment is operable and it is to the advantage of the contractor to operate the equipment, he may do so with permission of Owner, providing that he properly supervises the operation, retains full responsibility for the equipment operated, and protects against dirt accumulations during operation. The warranty period shall, however, not commence until such time as the equipment is operated for the beneficial use of the Owner or until final acceptance by the Owner.

B. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, install clean filter media, and properly adjust the operation of the equipment before final acceptance by the Owner.

3.11 INSTRUCTION OF OWNER'S PERSONNEL

A. Provide the services of competent engineers and/or technicians acceptable to the Owner's Representative to instruct other representatives of the Owner in the complete and detailed operation of each item of equipment or device of all the various electrical systems. These instructions shall be provided for whatever periods may be necessary to accomplish the desired results.

B. Upon completion of these instructions, the Contractor shall obtain a letter of release, acknowledged by the Owner or his authorized representative, stating the dates on which the various kinds of instruction were given, and the personnel to whom the instructions were given.

C. The Contractor shall be fully responsible for proper maintenance of equipment and systems until the instructions have been given the Owner's personnel and the letter of release acknowledged.

D. In providing the instructions to the Owner's personnel, the written operating and maintenance manuals shall be followed in all instances, and the Owner's personnel shall be familiarized with such manuals.

E. Operating and maintenance manuals used for instructions shall include wiring diagrams, manufacturer's operating and maintenance instructions, parts lists (with sources identified), and other data as appropriate for each system.

3.12 SEALANT

A. Apply sealant to penetrations of all floor and wall assemblies to maintain pressure differentials required by AIA, DSHS, CDC, CMC for all pressure sensitive rooms including: Isolation rooms, Protective Environment rooms, Operating rooms, C-section rooms, and Pharmacy including Chemo Prep, Sterile Prep and Ante rooms. Sealant



materials and installation requirements are specified in Division 07 Section "Joint Sealants" and Division 09 Section "Gypsum Board Assemblies.

**END OF SECTION 22 0500**



MEPFPT Engineer:
WSP USA Buildings Inc
1300 N 17TH ST, SUITE 1000
ARLINGTON VA, 22209
(202) 362-2800
wsp.com

Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

PERMIT / BID OCT 3, 2025

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DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE906987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
PLUMBING SPECIFICATIONS

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: WSP CKD. BY: WSP
SCALE: 12" = 1'-0"

P6.01-4

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**SECTION 22 0523**

**GENERAL-DUTY VALVES FOR PLUMBING PIPING**

**PART 1- GENERAL**

1.1 SUMMARY

A. Provide piping, valves, fittings and related products as listed on Drawings and described herein.

B. This Section includes the following general-duty valves:
1. Copper-alloy ball valves.

C. Related Sections include the following:
1. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and charts.

1.2 DEFINITIONS

A. The following are standard abbreviations for valves:

1. CWP: Cold working pressure.
2. EPDM: Ethylene-propylene-diene terpolymer rubber.
3. NBR: Acrylonitrile-butadiene rubber.
4. PTFE: Polytetrafluoroethylene plastic.
5. TFE: Tetrafluoroethylene plastic.
6. NRS: Nonrising stem.
7. OS&Y: Outside screw and yoke.

1.3 SUBMITTALS

A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; furnished specialties; and accessories.

1.4 QUALITY ASSURANCE

A. NSF Compliance: NSF 61-G for valve materials for potable-water service.

B. Bronze valves shall be made with dezincification-resistant materials. All valves shall comply with the current edition of recognized industry standards for design, materials and testing. These standards include but are not limited to MSS SP-80 and MSS SP-110.



1.5 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set ball and plug valves open to minimize exposure of functional surfaces.
4. Set butterfly valves closed or slightly open.
5. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

**PART 2- PRODUCTS**

2.1 VALVES, GENERAL

A. Refer to Part 3 "Valve Applications" Article for applications of valves.

B. Bronze Valves: NPS 2 (DN 50) and smaller with threaded ends, unless otherwise indicated.

C. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

D. Valve Sizes: Same as upstream pipe, unless otherwise indicated.

E. Valve Actuators:
1. Lever Handle: For quarter-turn valves NPS 6 (DN 150) and smaller, except plug valves.
2. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug head.

F. Extended Valve Stems: On insulated valves. Valves shall have 2-inch (50-mm) stem extensions and the following features:

1. Ball Valves: Shall have extended operating handle of non-thermal-conductive material, protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation, and memory stops that are fully adjustable after insulation is applied.

1) NIBCO Nib-seal handle extension
2) Conbraco Industries, Inc.; Apollo Div.
3) Jamesbury, Inc.
4) Kitz Insulated Stem Extension Model #ISE 1 thru 4
5) Milwaukee Valve; The Insulator/MS

2. Butterfly Valves: Shall have extended necks.



G. Valve Flanges: ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves, and ASME B16.24 for bronze valves.

H. Solder Joint: With sockets according to ASME B16.18.

1. Caution: Use solder with melting point below 840 deg F (454 deg C) for check valves; below 421 deg F (216 deg C) for ball valves.

I. Threaded: With threads according to ASME B1.20.1.

J. Valve Bypass and Drain Connections: MSS SP-45.

2.2 COPPER-ALLOY BALL VALVES

A. Brass Ball Valves, General: MSS SP-110 and have a brass body complying with ASTM B 283.

B. Bronze Ball Valves, General: MSS SP-110 and have a copper alloy body complying with ASTM B 584, except for Class 250 which shall comply with ASTM B 61, full-depth ASME B1.20.1 threaded or solder or press connection ends, and blowout-proof stems.

C. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: Chrome-plated bronze ball and bronze stem and; reinforced TFE seats; threaded body packnut design (no threaded stem designs allowed) with adjustable stem packing, threaded ends; and 150 psig (1034 kPa) SWP 600-psig (4140-kPa)CWP rating.

1. NIBCO Model S-585-80-LF or T-585-80-LF
2. Conbraco Industries, Inc.; Apollo Div.
3. Crane Co.
4. Watts Model
5. Kitz Model 868 or 869
6. Milwaukee UPBA450 or UPBA400
7. Hammond UP8311A or UP88301A

D. Two-Piece, Full-Port, Copper-alloy Ball Valves with Stainless-Steel Trim: Type 316 stainless-steel vented ball and stem, reinforced TFE seats, threaded body packnut design (no threaded stem designs allowed) with adjustable stem packing, threaded ends; 150 psig (1034 kPa) SWP and 600-psig (4140-kPa) CWP ratings.

1. NIBCO Model S-585-66-LF or T-585-66-LF
2. Conbraco Industries, Inc.; Apollo Div.
3. Crane Co. Model
4. Watts Model
5. Kitz Model 868M or 896M
6. Milwaukee UPBA400S, UPBA450S
7. Hammond UP8303A, UP8313A



**PART 3- EXECUTION**

3.1 EXAMINATION

A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.

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

B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

D. Examine threads on valve and mating pipe for form and cleanliness.

E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

F. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball or butterfly valves.

B. If valves with specified CWP ratings are not available, the same types of valves with higher CWP ratings may be substituted.

C. Domestic Water Piping: Use the following types of valves:

1. Ball Valves, NPS 2 (DN 50) and Smaller: Two -piece, full port, stainless-steel trim, bronze.
2. Butterfly Valves, NPS 2 to NPS 12 (DN 50 to DN 300): Single-flange, full lug, 200-psig (1380-kPa) CWP rating, bronze disc, EPDM liner, ductile iron.

D. Select valves, except wafer and flangeless types, with the following end connections:

1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Solder-joint or threaded or press connection ends.
2. For Copper Tubing, NPS 2-1/2 (DN 65) and larger: Flanged ends.

3.3 VALVE INSTALLATION

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.



B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

C. Locate valves for easy access and provide separate support where necessary.

D. Install valves in horizontal piping with stem at or above center of pipe.

E. Install valves in position to allow full stem movement.

3.4 JOINT CONSTRUCTION

A. Refer to Division 22 Section "Common Work Results for Plumbing" for basic piping joint construction.

B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

**END OF SECTION 22 0523**



**SECTION 22 05 53**

**IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1- GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Pipe labels.
3. Valve tags.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.3 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

**PART 2- PRODUCTS**

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:



1. Material and Thickness: Multilayer, multicolor, laminated phenolic with a black surface and white substrate for mechanical engraving, 1/16 inch (1.6 mm) Minimum thick, and having predrilled holes for attachment hardware and beveled edges.
2. Letter Color: White
3. Background Color: Black
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/2 inch (13 mm). Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, as directed by the owner. Secondary lettering shall indicate date of installation.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

D. Punched plastic tape for labels is not acceptable.

2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction. Labels shall conform to ANSI A13.1 and the following table:

| Outside Diameter of Pipe of Covering | Height of Letters |
|---|---|
| ¾" to 1-1/4" | ½" |
| 1-1/2" to 2" | ¾" |
| 2-1/2" to 6" | 1-1/4" |

B. Available Manufacturers: Seton, Brady, or Westline.

C. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover or cover full circumference of pipe.

D. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

E. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.



2.3 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers.

1. Tag Material: Brass, 0.032-inch (0.8-mm) minimum thickness and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link and S-hook or beaded chain

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

**PART 3- EXECUTION**

3.1 PREPARATION

A. Clean piping and equipment surface of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
7. In no case shall an exposed line enter or leave a room without being identified.
8. Secure identification markers to piping by firmly pressing markers in place, following removal of protective covering. Additionally secure by banding ends of markers in place using 1/2 inch wide aluminum bands of the type normally used to secure insulation in place.



B. Pipe Label Color Schedule: CORDINATE WITH OWNER

1. Domestic Water Piping:

a. Background Color: Green.
b. Letter Color: White.

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

**END OF SECTION 22 05 53**



**SECTION 22 0700**

**PLUMBING INSULATION**

**PART 1 – GENERAL**

1.1 WORK INCLUDED

A. The work of this Section shall include, but is not limited to, the following:

1. Piping insulation, jackets

1.2 REFERENCE STANDARDS

Published specifications standards, tests or recommended methods of trade, industry or governmental organizations apply to work in this Section where cited below:

A. ASTM – American Society for Testing and Materials

B. NFPA – National Fire Protection Association

C. UL – Underwriters Laboratories Inc.

D. International Plumbing Code

E. International Building Code

1.3 QUALITY ASSURANCE

A. All insulation shall be in accordance with ASHRAE Standard 90, the IECC and all applicable codes.

B. Insulation supplier and insulation installer shall have a minimum of 5 years' successful installation experience on projects of similar scope to this project.

1.4 SUBMITTALS

A. Product Data: Provide product description, current Product Data Sheets, list of materials and thickness for each service or equipment scheduled, locations, and manufacturer's installation instructions.

B. Submit details of sheet metal boxes for pieces of insulated equipment. Refer to sub-Clause 2.05, A.6.

C. Quality Assurance / Control Submittals:

1. Certificates: Submit manufacturer's certificate that product(s) meet or exceed specified requirements.



1.5 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions during storage and installation of all products required by manufacturers of adhesives, mastics, and insulation cements.

B. Protect insulation from contact with water.

**PART 2 – PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. Fiberglass: Johns Manville; Knauf; Owens Corning.

B. Calcium Silicate: Johns Manville; Extol of Ohio, Inc.

C. Elastomeric: Armacell; Aeroflex.

D. Cellular Glass: Pittsburgh Corning.

E. Adhesives and Sealers: Ductmate; Benjamin Foster (BF); 3M; Childers.

F. Jackets:

1. Metal: Childers; RPR Products.
2. PVC: Ceel-Co; PIC Plastics.
3. Other: Venture Tape; Polyguard.

G. Pre-Molded Fittings, Valves, Strainers and Equipment Insulation: Insul-Therm International; Extol of Ohio, Inc.; or approved equal.

2.2 GENERAL

A. Conform to application schedule for type and thickness of insulation.

B. Insulation, jacket, facing and adhesives shall be non-combustible material meeting Code requirements and fire and smoke hazard ratings as tested by procedure ASTM E 84, National Fire Protection Association 225, and UL 723, not exceeding Flame Spread 25 and Smoke Developed 50.

C. Adhesive, mastic or insulating material shall not contain asbestos.

D. Vapor jacket permeance shall be 0.02 perms or less.

E. Jacket puncture resistance shall be 50 units (Beach) or greater.

2.3 PIPE INSULATION MATERIALS

A. Glass Fiber: ASTM C 547; rigid molded, non-combustible.

1. Installed 'K' Value: 0.23 BTU-inch per hour-foot²-degree F at 75 degrees F.



2. Maximum Service Temperature: 850 degrees F.
3. Vapor Retarder Jacket: White kraft paper, vinyl coated, embossed and reinforced with glass fiber yarn and bonded to aluminum foil, secure with self-sealing longitudinal laps and butt strips.

B. Hydrous Calcium Silicate: ASTM C 533; rigid molded pipe.

1. Installed 'K' Value: 0.40 BTU-inch per hour-foot²-degree F at 300 degrees F.
2. Maximum Service Temperature: 1200 degrees F.
3. Tie Wire: 16-gauge stainless steel with twisted ends on maximum 12-inch centers.

C. Elastomeric Foam: ASTM C 534/C 534M flexible cellular elastomeric, molded or sheet.

1. Installed 'K' Value: 0.27 BTU-inch per hour-foot²-degree F at 75 degrees F.
2. Maximum Service Temperature: 220 degrees F.

D. Cellular Glass:

1. Inorganic, foamed or cellulated glass, annealed, rigid, hermetically sealed cells, incombustible.
2. Preformed Pipe Insulation with Jacket: Comply with ASTM C 552, Type II, Class 2.

E. Field-Applied Jackets:

1. PVC Plastic (PVC): One-piece molded type fitting covers and sheet material, gloss white. Connections shall be pressure-sensitive color-matching vinyl tape.
2. Canvas Jacket (CJ): UL Listed fabric, 6 ounce per square yard, plain weave cotton treated with dilute fire-retardant lagging adhesive.
3. Aluminum Jacket (AL): 0.016-inch thick sheet, stippled finish, with longitudinal slip joints and 2-inch laps, die-shaped fitting covers with factory-attached protective liner.
4. Stainless Steel Jacket (SSJ): Type 304 stainless steel, 0.010 inch, smooth finish.

2.4 PIPE INSULATION SCHEDULES

A. Insulation Schedules:

| Service | Temperature Range (degrees F) | Insulation Thickness (inches) for Pipe Sizes: | | |
|---|---|---|---|---|
| | | 1 and less | 1.25 to 2 | 2.5 to 4 |
| Domestic Cold Water | All | 1.5 | 1.5 | 1.5 |



B. Fittings, Valves and Flanges:

1. Use factory pre-molded fittings of the same materials and thickness as the adjacent pipe insulation. Such fittings shall be applied to all 90°s, 45°s, Tee's, flanges, and valves.
2. Where pre-molded insulation fittings are not manufactured, insulate fittings, flanges, strainers and valves with mitered segments of the same density as the adjoining pipe covering. Vaporseal for cold (below dew point) applications using adhesive with open weave glass mesh lay in while wet. Provide a final coat of adhesive. Overlap glass mesh and outer coat adjacent covering by a minimum of 2 inches. Adhesive shall be IC 501 or BF 30-35.
3. Provide insulation for the removable covers and flanges of pipe strainers on cold services with built-up sections of glass fiber pipe covering, arranged to facilitate servicing of the strainer. Complete applications with vaporseals as specified above. Vapor barriers shall be sealed and continuous through guides, hangers, walls, sleeves, etc. Adhesives and coatings shall be as noted herein.

C. Jacketing Schedule:

| Service | Location | Jacket Type |
|---|---|---|
| Domestic cold water | All locations | ASJ |
| Outdoor piping | All locations | AL |

**PART 3 – EXECUTION**

3.1 EXAMINATION AND PREPARATION

A. Verify that all surfaces are clean, dry and free of dirt, duct, debris, moisture or foreign material.

3.2 INSTALLATION

A. Install materials in accordance with manufacturer's recommendations, building codes and industry standards.

B. Verify piping has been pressure-tested as specified in Section 22 11 10 – Plumbing Piping and Accessories before applying insulation materials to pipe joints.

C. Continue insulation and vapor barrier through penetrations.

D. Piping, Valve and Accessories Insulation:

1. Insulate domestic water supply lines inside chases and up to the plumbing fixture supply stop.



2. Locate insulation and cover seams in least visible locations where exposed.
3. Neatly finish insulation at supports, protrusions, and interruptions.
4. Provide insulated pipes, fittings, valves and accessories conveying fluids below ambient temperature with continuous vapor retarder jackets with self-sealing laps. Insulate complete system and provide molded flexible polyvinyl chloride jacket(s) for all fittings and valves. Vaporseal all jacket seams as recommended by the insulation manufacturer.
5. For insulated pipes, fittings, valves and accessories conveying fluids above ambient temperature, secure jackets with self-sealing lap. Bevel and seal ends of insulation at equipment, flanges and unions.
6. Protect pipe insulation at hangers, guides, and rollers with 20-gauge galvanized metal shields, one-third the insulation circumference in width and minimum 10 inches in length up to 2½-inch pipe size, 12 inches in length on pipes 3-inch and larger, on the outside of the insulation and vapor barrier or jacket. Center shield on hanger and hold shield in place by straps or by manufactured centering tabs or channels on the shield itself. Do not pierce the insulation with hangers.
7. Provide insert between support shield and piping. Fabricate of calcium silicate, rigid phenolic or other heavy density non-deforming insulating material suitable for temperature. Length of insulation inserts shall match support shield length as specified.
8. For exterior applications or locations where abrasion or damage may occur, provide weather protection jacket. Insulated pipe, fittings, accessories joints, and valves shall be covered with ultra-violet light-resistant painted polyvinyl chloride or aluminum jacket. Jacket seams shall be located on bottom side of horizontal piping.
9. Apply prefabricated sectional insulation for straight pipes neatly fitted around the piping, and sealed with adhesive. Apply adhesive to only one side of each joint and not to pipe surface.
10. Seal all joints with BF 30-35 fire-resistant vapor barrier mastic. Oversized pipe sections or board type insulation may be used to fabricate and install insulation around pipe specialties. All void spaces shall be firmly filled with flexible insulation to support oversized pipe insulation.
11. Secure sectional insulation with 0.02-inch thick by 1/2-inch wide aluminum bands manufactured by Childers, or RPR Products nylon ties, on 24-inch centers for pipe sizes 2 inches and larger. Install at least two (2) bands per section of insulation.
12. Insulate domestic cold water vertical riser support clamps.
13. Insulate and thoroughly vaporseal control valve bodies where the valve actuator penetrates the insulation.
14. Thoroughly vaporseal the ends of all domestic cold water pipe, valve and fitting insulation sections to prevent condensation from wicking between sections.



15. Replace any self-sealing insulation or lap that is found to be not sealing properly. Do not use staples to secure the insulation or coverings.

**END OF SECTION 22 0700**



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Architect:

Structural Engineer:

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PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
PLUMBING SPECIFICATIONS

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: WSP
CKD. BY: WSP
SCALE: 12" = 1'-0"

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**SECTION 22 05 29**

**HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1- GENERAL**

1.1 SUMMARY

A. This Section includes the following hangers and supports for plumbing system piping and equipment:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Fastener systems.
5. Pipe positioning systems.

1.2 DEFINITIONS

A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.

B. Terminology: As defined in MSS SP-90. "Guidelines on Terminology for Pipe Hangers and Supports."

1.3 PERFORMANCE REQUIREMENTS

A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.

B. Pipe hangers and supports shall conform to the recommendations of ASHRAE, ASPE, ANSI, and MSS, unless otherwise indicated.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Metal pipe hangers and supports.
2. Thermal-hanger shield inserts.
3. Pipe positioning systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers. Include Product Data for components.
2. Metal framing systems. Include Product Data for components.



1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel.", AWS D1.4, "Structural Welding Code--Reinforcing Steel.", ASME Boiler and Pressure Vessel Code: Section IX.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
4. ASME Boiler and Pressure Vessel Code: Section IX.

**PART 2- PRODUCTS**

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. Available Manufacturers:

1. AAA Technology & Specialties Co., Inc.
2. Bergen-Power Pipe Supports.
3. B-Line Systems, Inc.; a division of Cooper Industries.
4. Carpenter & Paterson, Inc.
5. Empire Industries, Inc.
6. ERICO/Michigan Hanger Co.
7. Globe Pipe Hanger Products, Inc.
8. Grinnell Corp.
9. GS Metals Corp.
10. National Pipe Hanger Corporation.
11. PHD Manufacturing, Inc.
12. PHS Industries, Inc.
13. Piping Technology & Products, Inc.
14. Tolco Inc.
15. Anvil International

C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.



2.3 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Available Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co., ERISTRUT Div.
3. GS Metals Corp.
4. Power-Strut Div.; Tyco International, Ltd.
5. Thomas & Betts Corporation.
6. Tolco Inc.
7. Unistrut Corp.; Tyco International, Ltd.
8. Anvil International

C. Coatings: Manufacturer's standard finish unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.4 FASTENER SYSTEMS

A. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated or stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Available Manufacturers:

a. B-Line Systems, Inc.; a division of Cooper Industries.
b. Empire Industries, Inc.
c. Hilti, Inc.
d. ITW Ramset/Red Head.
e. MKT Fastening, LLC.
f. Powers Fasteners.

2.5 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.

B. Manufacturers:

1. C & S Mfg. Corp.
2. HOLDRITE Corp.; Hubbard Enterprises.
3. Samco Stamping, Inc.

2.6 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.



B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

**PART 3- EXECUTION**

3.1 PREPARATION

A. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including, but not limited to proper placement of inserts, anchors and other building structural attachments.

3.2 HANGER AND SUPPORT APPLICATIONS

A. Use only one type hangers and supports, by one manufacturer, for each piping service.

B. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

C. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.

D. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.

E. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

F. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing or provide copper-plated hangers and supports for copper piping systems where hangers are in contact with bare pipe.

G. Use padded hangers for piping that is subject to scratching.

H. Horizontal-Piping Hangers and Supports: Select size of hangers and supports to exactly fit pipe size for bare piping, and around piping insulation with saddle or shield for insulated piping. Unless otherwise indicated and except as specified in piping system Sections, install the following types. Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F (49 to 232 deg C) pipes, NPS 4 to NPS 16 (DN 100 to DN 400), requiring up to 4 inches (100 mm) of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24 (DN 20 to DN 600), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.



4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24 (DN 15 to DN 600), if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4 (DN 15 to DN 100), to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8 (DN 20 to DN 200).
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2 (DN 15 to DN 50).
10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8 (DN 10 to DN 200).
11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3 (DN 10 to DN 80).
12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36 (DN 65 to DN 900), if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30 (DN 25 to DN 750), from 2 rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20 (DN 65 to DN 500), from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42 (DN 50 to DN 1050), if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.



20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24 (DN 50 to DN 600), if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30 (DN 50 to DN 750), if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

I. Vertical-Piping Clamps: Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500), if longer ends are required for riser clamps.

J. Hanger-Rod Attachments: Select size of hanger rod attachments to suit hanger rods. Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.

K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.



5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

a. Light (MSS Type 31): 750 lb (340 kg).
b. Medium (MSS Type 32): 1500 lb (680 kg).
c. Heavy (MSS Type 33): 3000 lb (1360 kg).

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

M. Spring Hangers and Supports: Select spring hangers and supports to suit pipe size and loading. Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.



2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

a. Horizontal (MSS Type 54): Mounted horizontally.
b. Vertical (MSS Type 55): Mounted vertically.
c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

N. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

O. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.

P. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.3 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required by the following table to properly support piping from building structure.



| Pipe Size (in) | Max. Hanger Spacing (ft) | Min. Rod Size (in) | Max. Alternate Hanger Spacing (ft) | Min. Alternate Rod Size (in) |
|---|---|---|---|---|
| 1/2 | 6 | 3/8 | -- | -- |
| 3/4 | 6 | 3/8 | -- | -- |
| 1 | 7 | 3/8 | -- | -- |
| 1-1/4 | 8 | 3/8 | -- | -- |
| 1-1/2 | 9 | 3/8 | -- | -- |
| 2 | 10 | 3/8 | -- | -- |
| 2-1/2 | 11 | 1/2 | -- | -- |
| 3 | 12 | 1/2 | 8 | 3/8 |

B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:
1. Verify suitability of fasteners in two subparagraphs below for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 Section "Plumbing Fixtures" for plumbing fixtures.

G. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

H. Install hangers and supports to allow controlled thermal of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete



inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.

M. Insulated Piping: Comply with the following:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

| Pipe Size (in) | Shield Length (in) | Minimum Gauge |
|---|---|---|
| 1/2 to 1-1/2 | 4 | 26 |
| 2 to 6 | 6 | 20 |
| 8 to 10 | 9 | 16 |
| 12 to 18 | 12 | 16 |
| 20 and larger | 18 | 16 |

5. Pipes NPS 8 (DN 200) and Larger: Include wood inserts.
6. Insert Material: Length at least as long as protective shield.
7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.



3.4 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1 inch (25 mm).

3.6 PAINTING

A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**END OF SECTION 22 0529**



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Architect:

Structural Engineer:

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|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

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No. PE905987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
PLUMBING SPECIFICATIONS

PROJECT NO.: US-WSP-192801E
DATE: 10/03/2025
DWN. BY: WSP
CKD. BY: WSP
SCALE: 12" = 1'-0"

P6.03-4

**SECTION 22 11 16**

**DOMESTIC WATER PIPING**

**PART 1- GENERAL**

1.1 SUMMARY

A. Provide piping, valves, fittings and related products as listed on Drawings and described herein. All products to be purchased from Ferguson Enterprises.

B. Section Includes:
1. Aboveground domestic water pipes, tubes, fittings, and specialties inside the building,

C. Related Section:
1. Division 22 Section "Domestic Water Piping Specialties".

1.2 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing domestic water piping systems with 80 psig (550 kPa), unless otherwise indicated.

1.3 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. Water Sample Reports: Specified in Part 3 "Cleaning" Article.

C. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 61 and NSF 372 for potable domestic water piping and components.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Architect, Construction Manager and Owner no fewer than two days in advance of proposed interruption of water service.



2. Do not proceed with interruption of water service without Owner's written permission.

**PART 2 - PRODUCTS**

2.1 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B) water tube, drawn temper.
1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.

2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.

4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.2 PIPING JOINING MATERIALS

A. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

B. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.3 SPECIALTY VALVES

A. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

2.4 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.

2. Pressure rating at least equal to pipes to be joined.

3. End connections compatible with pipes to be joined.

B. Sleeve-Type Transition Coupling: AWWA C219.

1. Manufacturers:

a. Cascade Waterworks Manufacturing.
b. Dresser, Inc.; Dresser Piping Specialties.



c. Ford Meter Box Company, Inc. (The).
d. JCM Industries.
e. Romac Industries, Inc.
f. Smith-Blair, Inc; a Sensus company.
g. Viking Johnson; c/o Mueller Co.

2.5 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

B. Dielectric Unions:

1. Manufacturers:

a. EPCO Sales, Inc.
b. Hart Industries International, Inc.
c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
d. Zurn Plumbing Products Group; Wilkins Water Control Products.

2. Description:

a. Pressure Rating: 150 psig (1035 kPa) at 180 deg F (82 deg C).
b. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric-Flange Kits:

1. Manufacturers:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Central Plastics Company.
d. Pipeline Seal and Insulator, Inc.

2. Description:

a. Nonconducting materials for field assembly of companion flanges.
b. Pressure Rating: 150 psig (1035 kPa).
c. Gasket: Neoprene or phenolic.
d. Bolt Sleeves: Phenolic or polyethylene.
e. Washers: Phenolic with steel backing washers.

D. Dielectric Couplings:

1. Manufacturers:

a. Calpico, Inc.
b. Lochinvar Corporation.

2. Description:

a. Galvanized-steel coupling.
b. Pressure Rating: 300 psig (2070 kPa) at 225 deg F (107 deg C).



c. End Connections: Female threaded.
d. Lining: Inert and noncorrosive, thermoplastic.

E. Dielectric Nipples:

1. Manufacturers:

a. Perfection Corporation; a subsidiary of American Meter Company.
b. Precision Plumbing Products, Inc.
c. Victaulic Company.

2. Description:

a. Copper-Silicon nipple complying with ASTM F 1545.
b. Pressure Rating: 300 psig (2070 kPa) at 225 deg F (107 deg C)
c. End Connections: Male threaded or grooved.

**PART 3- EXECUTION**

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install shutoff valve, hose-end drain valve, strainer and pressure gage inside the building at each domestic water service entrance. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages and Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.

D. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.

E. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

F. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

G. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

H. Install piping adjacent to equipment and specialties to allow service and maintenance.

I. Install piping to permit valve servicing.

J. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.

K. Install piping free of sags and bends.



L. Install fittings for changes in direction and branch connections.

M. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

N. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Common Work Results for Plumbing."

O. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Common Work Results for Plumbing."

3.2 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems and provide Dielectric isolator.

3.3 VALVE INSTALLATION

A. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball valves for piping NPS 2 (DN 50) and smaller. Use butterfly valves for piping NPS 2-1/2 (DN 65) and larger.

3.4 TRANSITION FITTING INSTALLATION

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Underground Domestic Water Piping:

1. NPS 2 (DN 50) and Larger: Sleeve-type coupling.

3.5 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric couplings, nipples or unions.



C. Dielectric Fittings for NPS 2-1/2 (DN 65) and Larger: Use dielectric flange kits.

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment and machines to allow service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

3.8 IDENTIFICATION

A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Piping Inspections:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.

2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

C. Piping Tests:



1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

4. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.

6. Prepare reports for tests and for corrective action required.

D. Domestic water piping will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.

2. Open shutoff valves to fully open position.

3. Open throttling valves to proper setting.

4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.

5. Remove and clean strainer screens. Close drain valves and replace drain plugs.

6. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable and non-potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:



a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Fill and isolate system according to either of the following:
1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
d. Submit water samples for testing in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

3.12 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Aboveground domestic water piping, NPS 2 (DN 50) and smaller, shall be one of the following:
1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B) ASTM B 88; cast- or wrought- copper solder-joint fittings; and soldered joints.

3.13 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball valves for piping NPS 2 (DN 50) and smaller.
2. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

**END OF SECTION 22 11 16**



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Architect:

Structural Engineer:

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

| NO. | REVISION | DATE |
|---|---|---|
| | PERMIT / BID | OCT 3, 2025 |

DISTRICT OF COLUMBIA
JONATHAN R GILLESPIE
No. PE905987
MECHANICAL
PROFESSIONAL ENGINEER

PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
PLUMBING SPECIFICATIONS

| | |
|---|---|
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P6.04-4

**SECTION 22 0710**

**HEAT TRACING FOR PLUMBING**

**PART 1 - GENERAL**

1.1 WORK INCLUDED

A. Provide a UL-listed system of electric self-regulating heating cable, control panels and components to prevent pipes from freezing at the locations where indicated on the drawings. The cable shall utilize a radiation-cross linked conductive polymer as the heating element, and the cable shall be specifically designed, manufactured, and UL listed for freeze protection of pipes.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

A. Section includes plumbing piping heat tracing for freeze prevention of domestic water piping with the following electric heating cables:

1. Self-regulating, parallel resistance.

1.4 SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, and furnished specialties and accessories.
2. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.

B. Shop Drawings: For electric heating cable.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring.

C. Field quality-control reports.

D. Sample Warranty: For special warranty.

E. Operation and Maintenance Data: For electric heating cables to include in operation and maintenance manuals.



1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace electric heating cable that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

**PART 2 - PRODUCTS**

2.1 SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES

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

1. Thermon Americas Inc.

B. Comply with IEEE 515.1.

C. Heating Element: Pair of parallel No. 16 AWG, nickel-coated, stranded copper bus wires embedded in cross-linked conductive polymer core, which varies heat output in response to temperature along its length. Terminate with waterproof, factory-assembled, nonheating leads with connectors at one end, and seal the opposite end watertight. Cable shall be capable of crossing over itself once without overheating.

D. Electrical Insulating Jacket: Flame-retardant polyolefin.

E. Cable Cover: 14 AWG Tinned Copper Metallic braid and polyolefin outer jacket with ultraviolet inhibitor.

F. Maximum Operating Temperature (Power On): 150 deg F.

G. Maximum Exposure Temperature (Power Off): 185 deg F.

H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

I. Capacities and Characteristics:

1. Maximum Heat Output: 3W/ft., 5W/ft, or 8 W/ft as required by the manufacturer's design guide.
2. Piping Diameter: (size as indicated on drawings) NPS.
3. Number of Parallel Cables: As required by the manufacturer's design guide.
4. Electrical Characteristics for Single-Circuit Connection:

a. Volts: 277.



2.2 CONTROLS

A. Local Digital Controller and Monitoring Module with Ground Fault Protection and Alarm:

1. The system shall be field-mounted and shall have FM or CSA approval.
2. The system shall be preprogrammed for freeze protection applications. The controller shall sense ambient temperature in the general area of the traced pipe and turn heat tracing on when outside temperature is below 40°F and turn the heat tracing off when outside temperature is above 42°F.
3. The system shall provide the user with the option of line-sensing control with a user-selectable dead band, ambient sensing, proportional ambient sensing (PASC), and power limiting control modes.
4. The system must have a programmable auto cycle heating cable test feature to alert the panel of electrical problems.
5. The system has an alarm relay to provide annunciation back to a Distributed Control System (DCS).
6. Electric code-approved ground-fault detection (GFPD) equipment shall be integral to the controller to simplify installation, maintenance, and reduce total cost.
7. Enclosure type shall be NEMA 4X fiberglass-reinforced plastic (FRP).
8. The controller will be used in conjunction with remote temperature device RTD-500-3.
9. The system shall provide real time data for temperature, heater current, and ground leakage current. Monitoring and alarm shall be provided for low temperature, high temperature, low heater current, high heater current, ground leakage current, and damaged RTD sensor(s).
10. Controller shall support the Modbus™ RTU or ASCII/HTCBus communications protocol and be supplied complete with RS-485 communications interface capability and shall have the available option of a multi-protocol gateway for protocol translation between Building Management Systems (BMS) using, BACnet.

2.3 ACCESSORIES

A. Connection Kits: All heating cable connection kits shall be UL Listed, CSA Certified and FM Approved for use as part of the system to maintain hot water temperature and pipe freeze protection. Component enclosures shall be rated NEMA 4X to prevent water ingress and corrosion. Installation shall not require the installing contractor to cut into the heating cable core to expose the bus wires. Connection systems requiring the installing contractor strip the bus wires, or which use crimps or terminal blocks, shall not be acceptable. All connection kits except for the power connection shall be installed under the thermal insulation. The end seal shall use silicone gel.

B. Cable Installation Accessories: Fiberglass tape, heat-conductive putty, cable ties, silicone end seals and splice kits, and installation clips all furnished by manufacturer, or as recommended in writing by manufacturer.



C. Warning Labels: Refer to Section 22 05 53, "Systems Identification for Plumbing".

D. Warning Tape: Continuously printed "Electrical Tracing"; vinyl, at least 3 mils thick, and with pressure-sensitive, permanent, waterproof, self-adhesive back.

1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Examine surfaces and substrates to receive electric heating cables for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Ensure surfaces and pipes in contact with electric heating cables are free of burrs and sharp protrusions.

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

3.2 APPLICATIONS

A. Install the following types of electric heating cable for the applications described:

1. Freeze protection for plumbing piping: Self-regulating, parallel-resistance heating cable.

3.3 INSTALLATION

A. Install electric heating cable across expansion, construction, and control joints according to manufacturer's written instructions; use cable-protection conduit and slack cable to allow movement without damage to cable.

B. Electric Heating-Cable Installation for Freeze Protection for Piping:

1. Install electric heating cables after piping has been tested and before insulation is installed.
2. Install electric heating cables according to IEEE 515.1.
3. Install insulation over piping with electric cables according to Section 220700 "Plumbing Piping Insulation."
4. Install warning tape on piping insulation where piping is equipped with electric heating cables.



C. Set field-adjustable switches and circuit-breaker trip ranges.

3.4 CONNECTIONS

A. Ground equipment per Division 26 specifications.

B. Connect wiring per Division 26 specifications.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Perform tests after cable installation but before application of coverings such as insulation, wall or ceiling construction, or concrete.
2. Test cables for electrical continuity and insulation integrity before energizing.
3. Test cables to verify rating and power input. Energize and measure voltage and current simultaneously.

D. Repeat tests for continuity, insulation resistance, and input power after applying thermal insulation on pipe-mounted cables.

E. Prepare test and inspection reports.

3.6 PROTECTION

A. Protect installed heating cables, including nonheating leads, from damage during construction.

B. Remove and replace damaged heat-tracing cables.

**END OF SECTION 22 0710**



**SECTION 22 11 19**

**DOMESTIC WATER PIPING SPECIALTIES**

**PART 1- GENERAL**

1.1 SUMMARY

A. Provide plumbing fixtures and drains as listed on Drawings and described herein.

B. This Section includes the following domestic water piping specialties:

1. Drain valves.
2. Hose bibbs.

C. Related Sections include the following:

1. Division 22 Section "Domestic Water Piping".

1.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig (860 kPa), unless otherwise indicated.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For domestic water piping specialties to include operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. NSF Compliance:
1. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."
2. NSF Compliance: NSF 61-G for valve materials for potable-water service.



**PART 2- PRODUCTS**

2.1 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig (2760-kPa) minimum CWP.
3. Body: Copper alloy.
4. Ball: Chrome-plated brass.
5. Seats and Seals: Replaceable.
6. Handle: Vinyl-covered steel.
7. Inlet: Threaded or solder joint.
8. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.2 HOSE BIBBS

A. Anti-Siphon Wall Faucets: See Plumbing Schedule on P0.001-4.

**PART 3- EXECUTION**

3.1 INSTALLATION

A. Install water control valves with inlet and outlet shutoff valves and bypass with globe valve. Install pressure gages on inlet and outlet.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.

B. Ground equipment according to Division 26 Section.

3.3 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:

1. Drain valves.

B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and prepare test reports:



1. Test each drain valve.

B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

**END OF SECTION 22 11 19**



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WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. THESE DRAWING SHALL BE COPIED FROM THE ORIGINAL BLUEPRINTS AND ARE APPROXIMATELY TO SCALE. IT IS THE CONTRACTORS' RESPONSIBILITY TO VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND SHALL NOTIFY THE ENGINEER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN.

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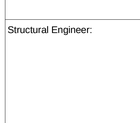


PROJECT
PM SUPPORT SERVICES
DOMESTIC WATER WINTERIZATION

OWNER
UNION STATION REDEVELOPMENT CORPORATION

TITLE
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PROJECT NO.: US-WSP-192801E
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