DORE + WHITTIER

OWNER
TOWN OF WILMINGTON
WILMINGTON PUBLIC SCHOOLS
121 GLEN ROAD
WILMINGTON, MA 01887
P: 978.658.3311

OWNER'S PROJECT MANAGER
LEFTFIELD
101 FEDERAL STREET, SUITE 1900
BOSTON, MA 02110
P: 617.737.6400

ARCHITECT
DORE & WHITTIER ARCHITECTS, INC.
260 MERRIMAC STREET
BUILDING 7, 2nd FLOOR
NEWBURYPORT, MA 01950
P: 978.499.2999

212 BATTERY STREET
BURLINGTON, VT 05401
P: 802.863.1428

TRAFFIC + SITE SURVEY CONSULTANT
NITSCH ENGINEERING
2 CENTER PLAZA #430
BOSTON, MA 02108
P: 617.338.0063

CIVIL + SITE CONSULTANT
CDW CONSULTANTS, INC.
4 CALIFORNIA AVENUE, SUITE 301
FRAMINGHAM, MA 01701
P: 508.875.2657

LANDSCAPE CONSULTANT
TERRAINK
7 CENTRAL STREET, SUITE 150
ARLINGTON, MA 02476
P: 781.316.1595

STRUCTURAL CONSULTANT
ENGINEERS DESIGN GROUP, INC.
389 MAIN ST., SUITE 401
MALDEN, MA 02148
P: 781.396.9007

HVAC + ELECTRICAL CONSULTANT
GGD CONSULTING ENGINEERS, INC.
375 FAUNCE CORNER ROAD, SUITE D
DARTMOUTH, MA 02747
P: 508.998.5700

PLUMBING + FIRE PROT. CONSULTANT
AKAL ENGINEERING, INC.
44 CENTRAL STREET, UNIT 4
BERLIN, MA 01503
P: 508.869.0403

TECHNOLOGY / AUDIO-VISUAL / SECURITY CONSULTANT
EDVANCE TECHNOLOGY DESIGN, INC.
300 BRICKSTONE SQUARE, SUITE 201
ANDOVER, MA 01810
P: 978.256.9900

CONSTRUCTION MANAGER
FONTAINE BROS., INC.
510 COTTAGE STREET
SPRINGFIELD, MA 01104
P: 413.781.2020
F: 413.734.1881

FOODSERVICE CONSULTANT
CRABTREE MCGRATH ASSOCIATES, INC.
161 WEST MAIN STREET
GEORGETOWN, MA 01833
P: 978.352.8500

GEOTECHNICAL CONSULTANT
LAHLAF GEOTECHNICAL CONSULTING, INC.
100 CHELMSFORD ROAD, SUITE 2
BILLERICA, MA 01862
P: 978.330.5912

GEOENVIRONMENTAL CONSULTANT
PEER CONSULTANTS, P.C.
67 SOUTH BEDFORD STREET, SUITE 400 WEST
BURLINGTON, MA 01803
P: 781.238.8880

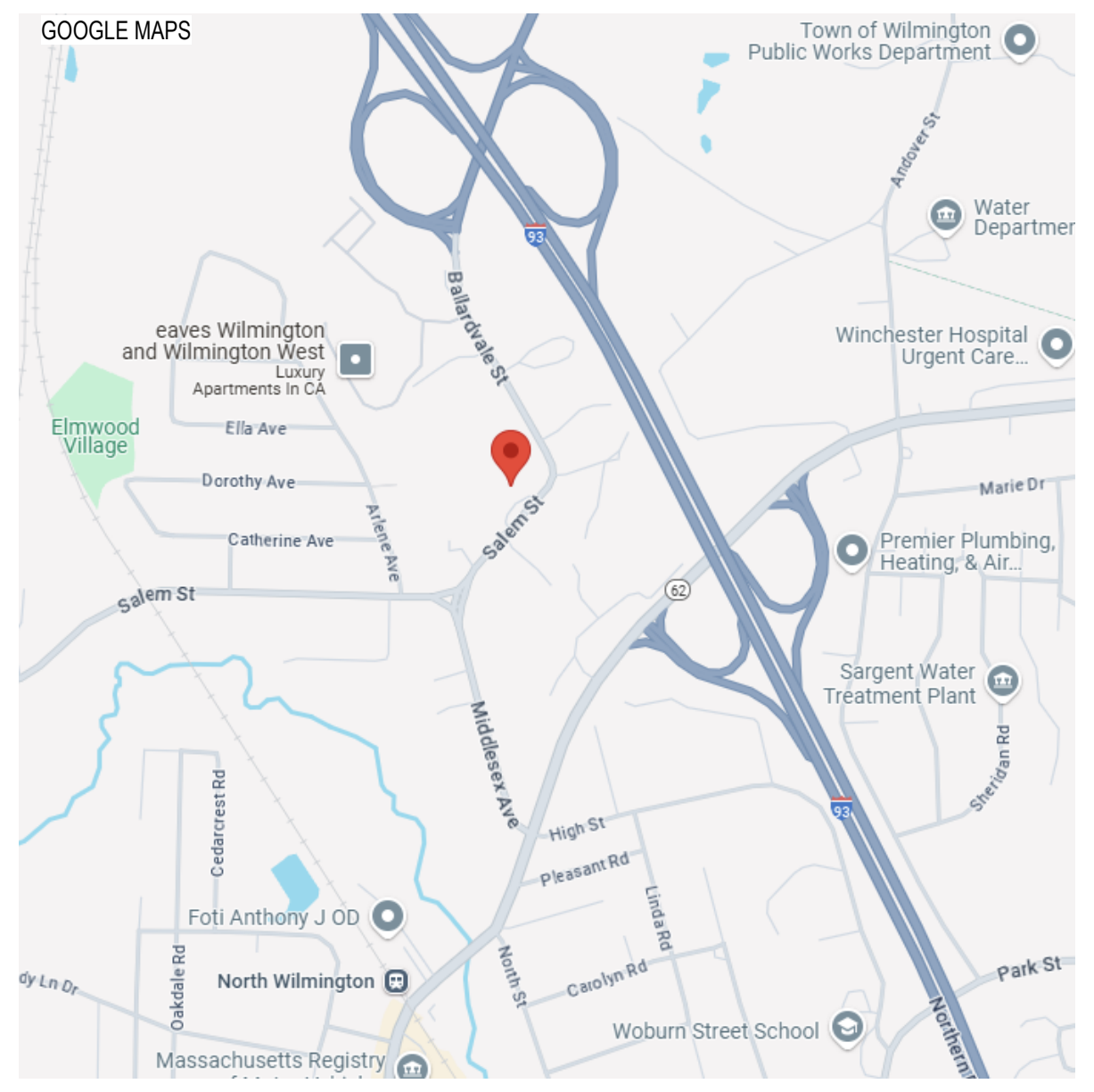
ENVIRONMENTAL / HAZMAT CONSULTANT
UNIVERSAL ENVIRONMENTAL CONSULTANTS
12 BREWSTER ROAD
FRAMINGHAM, MA 01702
P: 508.628.5486

SUSTAINABLE DESIGN CONSULTANT
THE GREEN ENGINEER
23 BRADFORD STREET
CONCORD, MA 01742
P: 978.369.8978

ACOUSTICAL CONSULTANT
ACENTECH
33 MOULTON STREET
CAMBRIDGE, MA 02138
P: 617.499.8000

COST ESTIMATING
PM&C COST ESTIMATING
20 DOWNER AVE SUITE 5
HINGHAM, MA 02043
P: 781.740.8007

LOCATION MAP


GOOGLE MAPS
Town of Wilmington Public Works Department
Water Department
Winchester Hospital Urgent Care...
Marie Dr
Premier Plumbing, Heating, & Air...
Sargent Water Treatment Plant
Sheridan Rd
Park St
Salem St
North Wilmington
Woburn Street School

VOLUME 1

SHEET NUMBER	SHEET NAME	MILESTONE
GENERAL		
G0.00	COVER SHEET	
GC1.00	CODE SUMMARY	
GC1.10	CODE PLANS	
GC1.11	CODE PLANS	
GD1.01	DEMOLITION - OVERALL PLANS	
GD1.02	DEMOLITION - OVERALL PLANS	
GD1.03	DEMOLITION - OVERALL PLANS	
GD1.04	DEMOLITION - BUILDING IMAGES	
GD1.05	DEMOLITION - BUILDING IMAGES	
GP1.10	PHASING PLANS	
SURVEY		
EX-1.0	EXISTING CONDITIONS PLAN	(ISSUED IN ERP1)
EX-1.1	EXISTING CONDITIONS PLAN	(ISSUED IN ERP1)
CIVIL		
C1.00	DEMOLITION AND EROSION CONTROL PLAN	(ISSUED IN ERP1)
C1.01	DEMOLITION AND EROSION CONTROL PLAN	(ISSUED IN ERP1)
C1.02	DEMOLITION AND EROSION CONTROL PLAN	(ISSUED IN ERP1)
C2.00	LAYOUT AND MATERIALS PLAN	(ISSUED IN ERP1)
C2.01	LAYOUT AND MATERIALS PLAN	(ISSUED IN ERP1)
C2.02	LAYOUT AND MATERIALS PLAN	(ISSUED IN ERP1)
C3.00	GRADING AND DRAINAGE PLAN	(ISSUED IN ERP1)
C3.01	GRADING AND DRAINAGE PLAN	(ISSUED IN ERP1)
C3.02	GRADING AND DRAINAGE PLAN	(ISSUED IN ERP1)
C4.00	UTILITIES PLAN	(ISSUED IN ERP1)
C4.01	UTILITIES PLAN	(ISSUED IN ERP1)
C4.02	UTILITIES PLAN	(ISSUED IN ERP1)
C5.00	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
C5.01	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
C5.02	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
C5.03	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
C5.04	CONSTRUCTION DETAILS	(ISSUED IN ERP1)
LANDSCAPE		
L0.01	TREE PROTECTION AND REMOVAL PLAN	(ISSUED IN ERP1)
L0.02	LAYOUT AND MATERIALS - SOUTHEAST	(ISSUED IN ERP1)
L0.03	TEMPORARY FENCE AND GATES	
L0.04	LAYOUT AND MATERIALS - KEY PLAN, NOTES, AND LEGENDS	(ISSUED IN ERP2)
L0.05	LAYOUT AND MATERIALS - WEST	(ISSUED IN ERP2)
L0.06	LAYOUT AND MATERIALS - SOUTHEAST	(ISSUED IN ERP2)
L0.07	ENLARGEMENT - K-2ND GRADE PLAYGROUND	(ISSUED IN ERP2)
L0.08	ENLARGEMENT - PRE-K PLAYGROUND	(ISSUED IN ERP2)
L0.09	ENLARGEMENT - COURTYARD AND OUTDOOR CLASSROOM	(ISSUED IN ERP2)
L0.10	ENLARGEMENT - ARRIVAL COURT PLAZA	(ISSUED IN ERP2)
L0.11	ENLARGEMENT - 3RD AND 5TH GRADE PLAYGROUND	(ISSUED IN ERP2)
L0.12	DETAILS	(ISSUED IN ERP2)
L0.13	DETAILS	(ISSUED IN ERP2)
L0.14	DETAILS	(ISSUED IN ERP2)
L0.15	DETAILS	(ISSUED IN ERP2)
L0.16	DETAILS	(ISSUED IN ERP2)
L0.17	DETAILS	(ISSUED IN ERP2)
L0.18	DETAILS - SOIL CELLS	(ISSUED IN ERP2)
L0.19	DETAILS - PLANTING	(ISSUED IN ERP2)
L1.00	LAYOUT AND MATERIALS - KEY PLAN, NOTES, AND LEGENDS	
L1.01	LAYOUT AND MATERIALS - WEST	
L1.02	LAYOUT AND MATERIALS - SOUTHEAST	
L1.03	ENLARGEMENT - K-2ND GRADE PLAYGROUND	
L1.04	ENLARGEMENT - K-2ND GRADE PLAYGROUND	
L1.05	ENLARGEMENT - PRE-K PLAYGROUND	
L1.06	ENLARGEMENT - PRE-K PLAYGROUND	
L1.07	ENLARGEMENT - COURTYARD AND OUTDOOR CLASSROOM	
L1.08	ENLARGEMENT - ARRIVAL COURT PLAZA	
L1.09	ENLARGEMENT - 3RD AND 5TH GRADE PLAYGROUND	
L1.10	ENLARGEMENT - 3RD AND 5TH GRADE PLAYGROUND	
L1.11	ENLARGEMENT - SOUTHERN AND NORTHERN BASKETBALL COURTS AND SOCCER FIELD	
L1.12	SITE FURNISHINGS - WEST	
L1.13	SITE FURNISHINGS - NORTHEAST	
L1.14	SITE FURNISHINGS - SOUTHEAST	
L1.15	PLAYGROUND EQUIPMENT	
L1.16	SECTION ELEVATIONS - SOUTHERN BASKETBALL COURT AND EASTERN SOCCER FIELD EDGES	
L1.17	STONE SCHEDULE	
L1.18	STONE SCHEDULE	
L1.19	FENCES AND GATES LAYOUT KEY PLAN	
L2.00	GRADING - KEY PLAN, NOTES, AND LEGENDS	
L2.01	GRADING - WEST	
L2.02	GRADING - SOUTHEAST	
L2.03	ENLARGEMENTS - WESTERN PLAYGROUNDS, AND COURTYARD	
L2.04	ENLARGEMENTS - 3RD AND 5TH GRADE PLAYGROUND, AND ARRIVAL COURT PLAZA	
L3.00	PLANTING - TREES AND TURF	
L3.01	PROPERTY LINE SCREEN PLANTING - WEST	
L3.02	PROPERTY LINE SCREEN PLANTING - SOUTHEAST	
L3.03	ENLARGEMENT - K-2ND AND PRE-K PLAYGROUNDS	
L3.04	ENLARGEMENT - ARRIVAL COURT PLAZA AND 3RD-5TH GRADE PLAYGROUND	
L4.01	DETAILS	
L4.02	DETAILS	
L4.03	DETAILS	
L4.04	DETAILS	
L4.05	DETAILS	
L4.06	DETAILS	
L4.07	DETAILS - SOIL CELLS	
L4.08	DETAILS - PLANTING	
IR-100	OVERALL UNDERDRAIN LAYOUT PLAN	(ISSUED IN ERP1)
IR-101	WEST UNDERDRAIN LAYOUT PLAN	(ISSUED IN ERP1)
IR-102	CENTRAL UNDERDRAIN LAYOUT PLAN	(ISSUED IN ERP1)
IR-103	EAST UNDERDRAIN LAYOUT PLAN	(ISSUED IN ERP1)
IR-200	UNDERDRAIN DETAILS	(ISSUED IN ERP1)
IR-300	IRRIGATION LAYOUT PLAN	
IR-301	IRRIGATION LAYOUT PLAN	
IR-400	IRRIGATION DETAILS	
STRUCTURAL		
S0.01	GENERAL NOTES	(ISSUED IN ERP2)
S0.02	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.03	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.04	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.05	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.06	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.07	TYPICAL DETAILS	(ISSUED IN ERP2)
S0.08	TYPICAL DETAILS	(ISSUED IN ERP2)
S1.11	FOUNDATION PLAN - AREA A	(ISSUED IN ERP2)
S1.12	FOUNDATION PLAN - AREA B	(ISSUED IN ERP2)
S1.21	LEVEL 2 FRAMING PLAN - AREA A	(ISSUED IN ERP2)
S1.22	LEVEL 2 FRAMING PLAN - AREA B	(ISSUED IN ERP2)
S1.31	LEVEL 3 FRAMING PLAN - AREA A	(ISSUED IN ERP2)
S1.32	LEVEL 3 FRAMING PLAN - AREA B	(ISSUED IN ERP2)
S1.41	ROOF FRAMING PLAN - AREA A	(ISSUED IN ERP2)
S1.42	ROOF FRAMING PLAN - AREA B	(ISSUED IN ERP2)
S1.51	ROOF SCREEN FRAMING PLAN - AREA A	(ISSUED IN ERP2)
S1.52	ROOF SCREEN FRAMING PLAN - AREA B	(ISSUED IN ERP2)
S2.01	DETAILS	(ISSUED IN ERP2)
S2.02	DETAILS	(ISSUED IN ERP2)
S3.01	DETAILS	(ISSUED IN ERP2)
S3.02	DETAILS	(ISSUED IN ERP2)
S3.03	DETAILS	(ISSUED IN ERP2)
S3.04	DETAILS	(ISSUED IN ERP2)
S4.01	BRACED FRAME ELEVATIONS - AREA A	(ISSUED IN ERP2)
S4.02	BRACED FRAME ELEVATIONS AND SHEAR WALLS - AREA B	(ISSUED IN ERP2)
S4.03	SHEAR WALLS - AREA B	(ISSUED IN ERP2)
S4.04	BRACED FRAME DETAILS	(ISSUED IN ERP2)
S4.05	BRACED FRAME DETAILS	(ISSUED IN ERP2)
S5.01	TRUSS ELEVATIONS AND DETAILS	(ISSUED IN ERP2)
ARCHITECTURAL		
AG0.01	ABBREVIATIONS SYMBOLS MATERIALS AND LEGEND	
AG0.02	WALL TYPES, NOTES AND DETAILS	
AG0.03	LEVEL 1, 2 AND 3 ACOUSTICAL SEPARATION DIAGRAMS	
AG0.04	ENTRY SIGN PLAN, ELEVATIONS, SECTIONS, DETAILS	
AG0.05	CONSTRUCTION MOCKUP	
A0.11	HORIZONTAL CONTROL PLAN - LEVEL 1 - AREA A	(ISSUED IN ERP2)
A0.12	HORIZONTAL CONTROL PLAN - LEVEL 1 - AREA B	(ISSUED IN ERP2)
A0.21	HORIZONTAL CONTROL PLAN - LEVEL 2 - AREA A	(ISSUED IN ERP2)
A0.22	HORIZONTAL CONTROL PLAN - LEVEL 2 - AREA B	(ISSUED IN ERP2)
A0.31	HORIZONTAL CONTROL PLAN - LEVEL 3 - AREA A	(ISSUED IN ERP2)
A0.32	HORIZONTAL CONTROL PLAN - LEVEL 3 - AREA B	(ISSUED IN ERP2)
A1.10	LEVEL 1 OVERALL PLAN	
A1.11	LEVEL 1 - AREA A	
A1.12	LEVEL 1 - AREA B	
A1.20	LEVEL 2 OVERALL PLAN	
A1.21	LEVEL 2 - AREA A	
A1.22	LEVEL 2 - AREA B	
A1.30	LEVEL 3 OVERALL PLAN	
A1.31	LEVEL 3 - AREA A	
A1.32	LEVEL 3 - AREA B	
A1.50	TYPICAL PLAN DETAILS	
A1.51	PLAN DETAILS	
A1.52	PLAN DETAILS	
A1.53	PLAN DETAILS	
A1.54	PLAN DETAILS	
A1.55	PLAN DETAILS	
A1.56	PLAN DETAILS	
A1.60	PLAN DETAILS - INTERIOR	
A1.61	PLAN DETAILS - INTERIOR	
A1.62	PLAN DETAILS - INTERIOR	
A1.70	ENLARGED TOILET ROOM PLANS	
A1.71	ENLARGED TOILET ROOM PLANS	
A1.72	ENLARGED TOILET ROOM PLANS	
A1.73	ENLARGED TOILET ROOM PLANS	
A1.74	ENLARGED TOILET ROOM PLANS	
A1.75	ENLARGED TOILET ROOM PLANS	
A1.80	ENLARGED PLANS	
A2.11	LEVEL 1 REFLECTED CEILING PLAN - AREA A	
A2.12	LEVEL 1 REFLECTED CEILING PLAN - AREA B	
A2.21	LEVEL 2 REFLECTED CEILING PLAN - AREA A	
A2.22	LEVEL 2 REFLECTED CEILING PLAN - AREA B	
A2.31	LEVEL 3 REFLECTED CEILING PLAN - AREA A	
A2.32	LEVEL 3 REFLECTED CEILING PLAN - AREA B	
A2.50	CEILING DETAILS	
A2.51	CEILING DETAILS	
A3.10	OVERALL ROOF PLAN	
A3.11	ROOF PLAN - AREA A	
A3.12	ROOF PLAN - AREA B	
A3.13	PARTIAL ROOF PLANS	
A3.50	ROOF DETAILS	
A4.00	EXTERIOR AXONS	
A4.10	OVERALL EXTERIOR ELEVATIONS	
A4.11	EXTERIOR ELEVATIONS	
A4.12	EXTERIOR ELEVATIONS	
A4.13	EXTERIOR ELEVATIONS	
A4.14	EXTERIOR ELEVATIONS	
A4.15	EXTERIOR ELEVATIONS	
A5.10	BUILDING SECTIONS	
A5.11	BUILDING SECTIONS	
A5.12	BUILDING SECTIONS	
A5.13	BUILDING SECTIONS	
A6.10	WALL SECTIONS	
A6.11	WALL SECTIONS	
A6.12	WALL SECTIONS	
A6.13	WALL SECTIONS	
A6.14	WALL SECTIONS	
A6.15	WALL SECTIONS	
A6.16	WALL SECTIONS	
A6.17	WALL SECTIONS	
A6.18	WALL SECTIONS	
A6.19	WALL SECTIONS	
A6.20	WALL SECTIONS	
A6.50	BASE OF WALL DETAILS	
A6.51	BASE OF WALL DETAILS	
A6.60	MID WALL DETAILS	
A6.61	MID WALL DETAILS	
A6.62	MID WALL DETAILS	
A6.63	MID WALL DETAILS	
A6.70	TOP OF WALL DETAILS	
A6.71	TOP OF WALL DETAILS	
A6.72	TOP OF WALL DETAILS	
A6.73	TOP OF WALL DETAILS	
A7.01	ELEVATOR PLANS, SECTIONS, AND DETAILS	(ISSUED IN ERP2)
A7.10	STAIR PLANS AND SECTIONS	
A7.11	STAIR PLANS AND SECTIONS	
A7.12	STAIR PLANS AND SECTIONS	
A7.13	STAIR PLANS AND SECTIONS	
A7.14	STAIR PLANS AND SECTIONS	
A7.50	STAIR DETAILS	
A7.51	STAIR AND RAMP DETAILS	
A7.52	STAIR AND RAILING DETAILS	
A7.53	LADDER AND MISC. DETAILS	
A7.54	SHAFT ENCLOSURES AND DETAILS	
A8.10	DOOR SCHEDULE, DOOR AND BL TYPES	
A8.11	DOOR SCHEDULE AND DOOR TYPES	
A8.20	CURTAINWALL TYPES	
A8.30	WINDOW AND STOREFRONT TYPES	
A8.50	DOOR AND BL FRAME DETAILS	
A8.51	DOOR AND LOUVER DETAILS	
A8.60	WINDOW DETAILS	
A8.70	CURTAINWALL DETAILS	
A8.71	CURTAINWALL DETAILS	
A8.80	STOREFRONT DETAILS	
A9.11	LEVEL 1 FINISH PLAN - AREA A	
A9.12	LEVEL 1 FINISH PLAN - AREA B	
A9.21	LEVEL 2 FINISH PLAN - AREA A	
A9.22	LEVEL 2 FINISH PLAN - AREA B	
A9.31	LEVEL 3 FINISH PLAN - AREA A	
A9.32	LEVEL 3 FINISH PLAN - AREA B	
A9.50	INTERIOR DETAILS	
A9.51	INTERIOR DETAILS	
A9.52	INTERIOR DETAILS	
A9.53	INTERIOR DETAILS	
A9.60	INTERIOR SIGNAGE TYPES AND DETAILS	
A9.90	FINISH SCHEDULE - LEVEL 1	
A9.91	FINISH SCHEDULE - LEVEL 2 AND 3	
A10.11	LEVEL 1 EQUIPMENT PLANS - AREA A	
A10.12	LEVEL 1 EQUIPMENT PLANS - AREA B	
A10.21	LEVEL 2 EQUIPMENT PLANS - AREA A	
A10.22	LEVEL 2 EQUIPMENT PLANS - AREA B	
A10.31	LEVEL 3 EQUIPMENT PLANS - AREA A	
A10.32	LEVEL 3 EQUIPMENT PLANS - AREA B	
A10.50	CASEWORK PLANS AND ELEVATIONS	
A10.51	CASEWORK PLANS AND ELEVATIONS	
A10.52	CASEWORK PLANS AND ELEVATIONS	
A10.53	CASEWORK PLANS AND ELEVATIONS	
A10.54	CASEWORK PLANS AND ELEVATIONS	
A10.55	CASEWORK PLANS AND ELEVATIONS	
A10.56	CASEWORK PLANS AND ELEVATIONS	
A10.57	CASEWORK PLANS AND ELEVATIONS	
A10.58	CASEWORK PLANS AND ELEVATIONS	
A10.59	CASEWORK PLANS AND ELEVATIONS	
A10.60	CASEWORK PLANS AND ELEVATIONS	
A10.61	CASEWORK PLANS AND ELEVATIONS	
A10.62	CASEWORK PLANS AND ELEVATIONS	
A10.63	CASEWORK PLANS AND ELEVATIONS	
A10.64	CASEWORK PLANS AND ELEVATIONS	
A10.65	CASEWORK PLANS AND ELEVATIONS	
A10.66	CASEWORK PLANS AND ELEVATIONS	
A10.67	CASEWORK PLANS AND ELEVATIONS	
A10.71	INTERIOR ELEVATIONS	
A10.72	INTERIOR ELEVATIONS	
A10.73	INTERIOR ELEVATIONS	
A10.74	INTERIOR ELEVATIONS	
A10.80	MILLWORK DETAILS	
A10.81	MILLWORK DETAILS	
A10.82	MILLWORK DETAILS	
A10.90	CASEWORK SCHEDULE	
A10.91	CASEWORK SCHEDULE	

VOLUME 2

SHEET NUMBER	SHEET NAME	MILESTONE
FOODSERVICE		
FS1.12	LEVEL 1 - AREA B FOODSERVICE EQUIPMENT PLAN	
FS2.01	ENLARGED FOODSERVICE EQUIPMENT PLAN	
FS3.01	FOODSERVICE EQUIPMENT ROUGH-IN PLAN	
FS4.01	FOODSERVICE EQUIPMENT VENTILATION ROUGH-IN PLAN	
FS5.01	FOODSERVICE EQUIPMENT SPECIAL CONDITIONS PLAN	
FIRE PROTECTION		
FP0.01	FIRE PROTECTION LEGENDS, NOTES & ABBREVIATIONS	
FP0.02	FIRE PROTECTION DETAILS	
FP1.11	FIRE PROTECTION LEVEL 1 - AREA A	
FP1.12	FIRE PROTECTION LEVEL 1 - AREA B	
FP2.11	FIRE PROTECTION LEVEL 2 - AREA A	
FP2.12	FIRE PROTECTION LEVEL 2 - AREA B	
FP3.11	FIRE PROTECTION LEVEL 3 - AREA A	
FP3.12	FIRE PROTECTION LEVEL 3 - AREA B	
PLUMBING		
P0.01	PLUMBING LEGEND AND SCHEDULES	
P1.00A	RADON PIPING AREA A	
P1.00B	RADON PIPING AREA B	
P1.01	UNDERSLAB PLUMBING- LEVEL 1 - AREA A	
P1.02	UNDERSLAB PLUMBING- LEVEL 1 - AREA B	
P1.11	PLUMBING- LEVEL 1 - AREA A	
P1.12	PLUMBING- LEVEL 1 - AREA B	
P1.21	PLUMBING- LEVEL 2 - AREA A	
P1.22	PLUMBING- LEVEL 2 - AREA B	
P1.31	PLUMBING- LEVEL 3 - AREA A	
P1.32	PLUMBING- LEVEL 3 - AREA B	
P1.33	PLUMBING KITCHEN UNDERSLAB	
P1.34	PLUMBING KITCHEN ABOVESLAB	
P1.41	PLUMBING ROOF PLAN	
P2.01	PLUMBING WASTE AND VENT RISER DIAGRAM	
P2.02	PLUMBING DOMESTIC WATER RISER DIAGRAM	
P3.01	PLUMBING DETAILS	
P3.02	PLUMBING DETAILS 2	
P3.03	PLUMBING DETAILS 3	
MECHANICAL		
M0.11	LEGEND, NOTES & DETAILS I	
M0.12	DETAILS II	
M0.13	DETAILS III	
M0.14	DETAILS IV	
M0.15	DETAILS V	
M0.16	DETAILS VI	
M0.17	DETAILS VII	
M0.18	AIRFLOW RISER DIAGRAM	
M0.19	HYDRONIC RISER DIAGRAM	
M0.20	SCHEDULES I	
M0.21	SCHEDULES II	
M1.11	LEVEL 1 AREA A - DUCTWORK	
M1.12	LEVEL 1 AREA B - DUCTWORK	
M1.21	LEVEL 2 AREA A - DUCTWORK	
M1.22	LEVEL 2 AREA B - DUCTWORK	
M1.31	LEVEL 3 AREA A - DUCTWORK	
M1.32	LEVEL 3 AREA B - DUCTWORK	
M2.11	LEVEL 1 AREA A - PIPING	
M2.12	LEVEL 1 AREA B - PIPING	
M2.21	LEVEL 2 AREA A - PIPING	
M2.22	LEVEL 2 AREA B - PIPING	
M2.31	LEVEL 3 AREA A - PIPING	
M2.32	LEVEL 3 AREA B - PIPING & ENLARGED MECH RM	
M3.11	ROOF AREA A	
M3.12	ROOF AREA B	
M4.11	CONTROLS I	
M4.12	CONTROLS II	
M4.13	CONTROLS III	
M4.14	CONTROLS IV	
M4.15	CONTROLS V	
M4.16	CONTROLS VI	
M4.17	CONTROLS VII	
M4.18	CONTROLS VIII	
VS1.11	VIBRATION & SEISMIC	
ELECTRICAL		
E0.01	ELECTRICAL SYMBOL LIST	
E0.02	LIGHTING FIXTURE SCHEDULE	
E0.03	ALCS RISER & DETAILS	
E0.04	ELECTRICAL SITE PLAN	
E0.05	ELECTRICAL SITE DETAILS	
E0.06	ELECTRICAL SITE DETAILS	
E1.11	LEVEL 1 AREA A - LIGHTING	
E1.12	LEVEL 1 AREA B - LIGHTING	
E1.21	LEVEL 2 AREA A - LIGHTING	
E1.22	LEVEL 2 AREA B - LIGHTING	
E1.31	LEVEL 3 AREA A - LIGHTING	
E1.32	LEVEL 3 AREA B LIGHTING	
E2.11	LEVEL 1 AREA A - POWER	
E2.12	LEVEL 1 AREA B - POWER	
E2.21	LEVEL 2 AREA A - POWER	
E2.22	LEVEL 2 AREA B - POWER	
E2.31	LEVEL 3 AREA A - POWER	
E2.32	LEVEL 3 AREA B - POWER	
E2.40	ROOF PLAN	
E3.00	ELECTRICAL ROOM PART PLANS	
E3.01	ELECTRICAL ONE LINE RISER	
E3.02	ELECTRICAL PANEL SCHEDULES	
E3.03	ELECTRICAL DETAILS	
E3.04	ELECTRICAL DETAILS	
E3.05	MECHANICAL EQUIPMENT SCHEDULE	
E3.06	PLUMBING EQUIPMENT SCHEDULE	
E3.07	KITCHEN SCHEDULE	
E3.08	TELECOM RISER DIAGRAM	
E3.09	BDA SYSTEM DIAGRAM	
E3.10	LIGHTNING PROTECTION DETAILS	
E4.01	FIRE ALARM RISER	
E4.11	LEVEL 1 AREA A - FIRE ALARM	
E4.12	LEVEL 1 AREA B - FIRE ALARM	
E4.21	LEVEL 2 AREA A - FIRE ALARM	
E4.22	LEVEL 2 AREA B - FIRE ALARM	
E4.31	LEVEL 3 AREA A - FIRE ALARM	
E4.32	LEVEL 3 AREA B - FIRE ALARM	
E5.01	EARLY RELEASE RISER DIAGRAM	(ISSUED IN ERP2)
E5.02	EARLY RELEASE SWITCHBOARD SCHEDULES	(ISSUED IN ERP2)
TECHNOLOGY		
T0.01	SITE PLAN EXTERIOR CAMERAS TECHNOLOGY	
T1.11	LEVEL 1 - AREA A TECHNOLOGY	
T1.12	LEVEL 1 - AREA B TECHNOLOGY	
T1.21	LEVEL 2 - AREA A TECHNOLOGY	
T1.22	LEVEL 2 - AREA B TECHNOLOGY	
T1.31	LEVEL 3 - AREA A TECHNOLOGY	
T1.32	LEVEL 3 - AREA B TECHNOLOGY	
T1.41	ROOF - AREA A TECHNOLOGY	
T1.42	ROOF - AREA B TECHNOLOGY	
T2.01	DETAIL SHEET TECHNOLOGY	
T2.02	DETAIL SHEET TECHNOLOGY	
T2.03	DETAIL SHEET TECHNOLOGY	
T2.04	DETAIL SHEET TECHNOLOGY	
T2.05	DETAIL SHEET TECHNOLOGY	
T2.06	DETAIL SHEET TECHNOLOGY	
T2.07	DETAIL SHEET TECHNOLOGY	
T2.08	DETAIL SHEET TECHNOLOGY	
T2.09	DETAIL SHEET TECHNOLOGY	
T2.10	DETAIL SHEET TECHNOLOGY	
T2.11	DETAIL SHEET TECHNOLOGY	
T2.12	DETAIL SHEET TECHNOLOGY	

WILMINGTON ELEMENTARY SCHOOL

D&W PROJECT # 23-0847

320 SALEM STREET
WILMINGTON, MA 01887

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VOLUME 2

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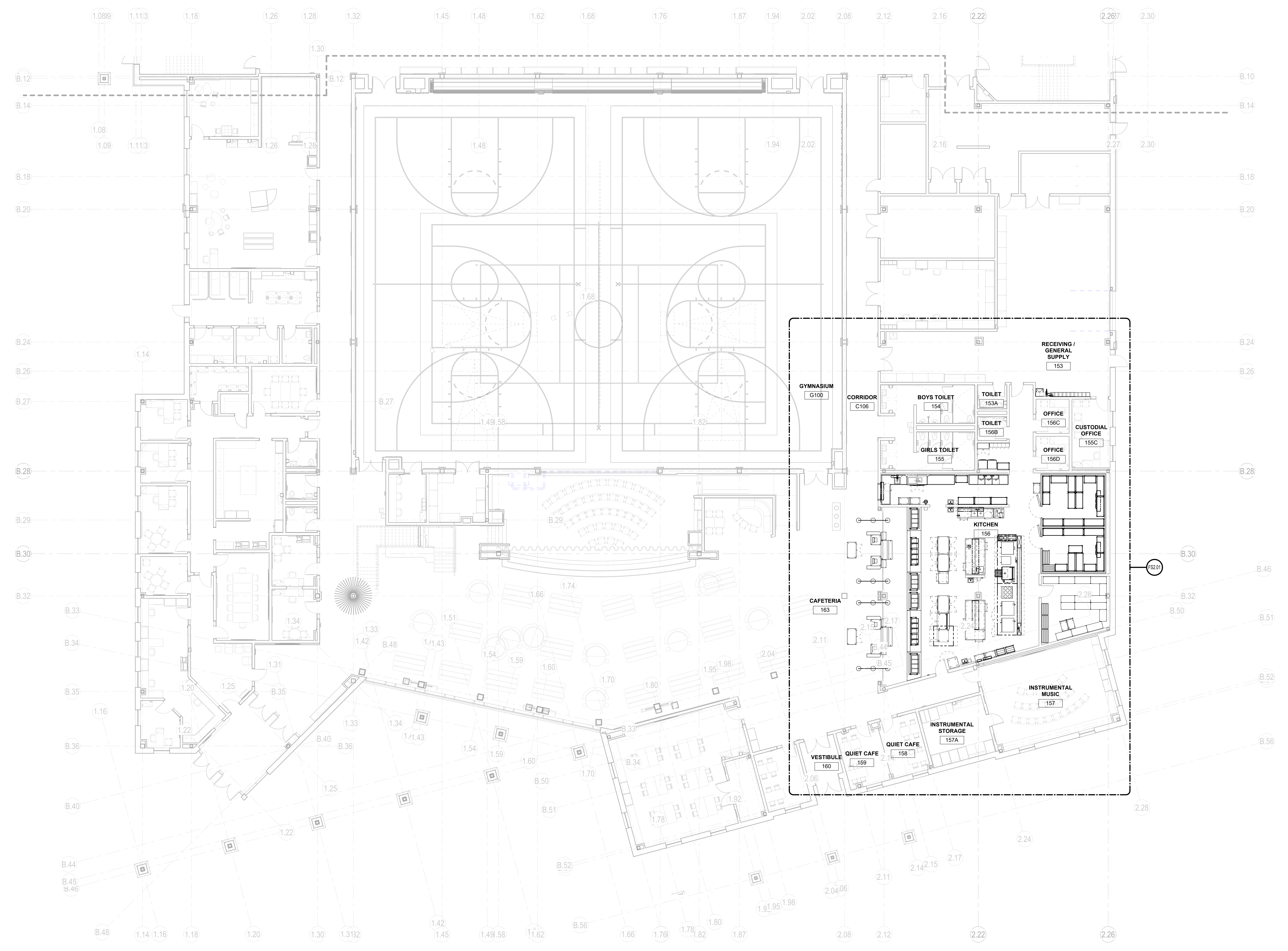

LEVEL 1 - AREA C FOODSERVICE EQUIPMENT PLAN

1/8" = 1'-0"

DORE + WHITTIER

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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM STREET
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

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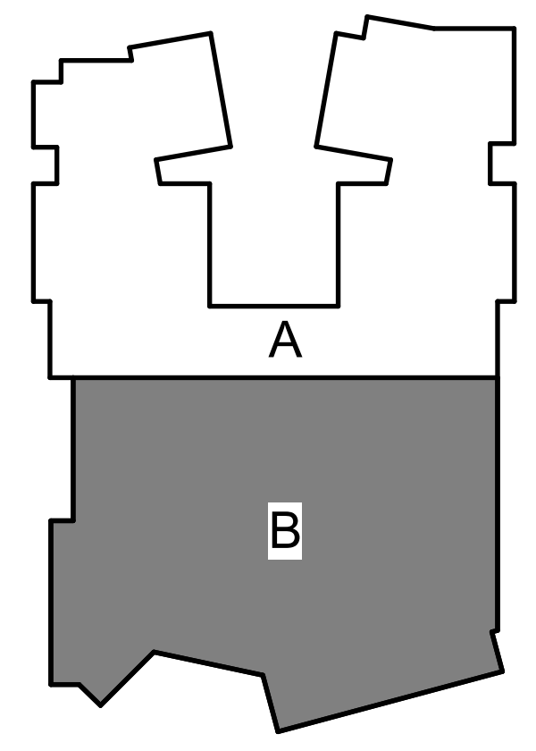
KEY PLAN



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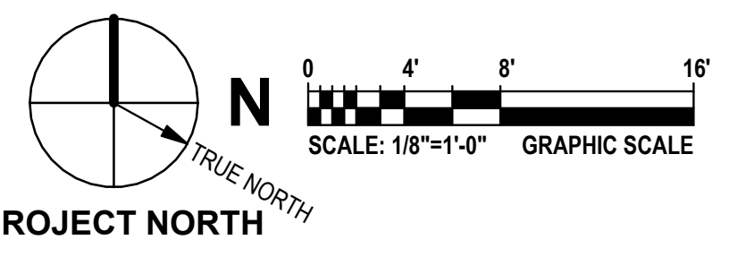

SHEET TITLE:

LEVEL 1 - AREA B
FOODSERVICE
EQUIPMENT PLAN

SHEET NUMBER:

FS1.12

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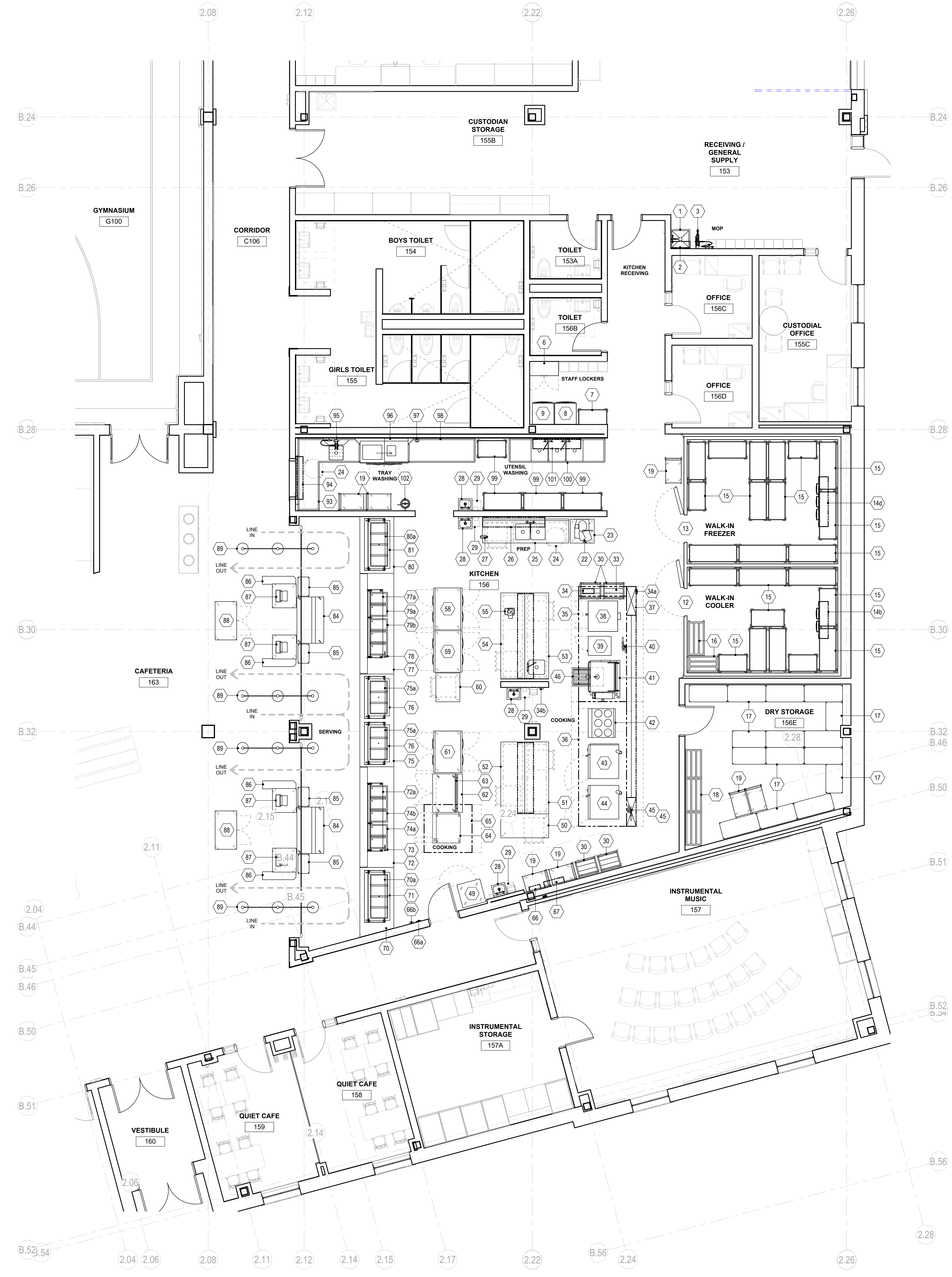
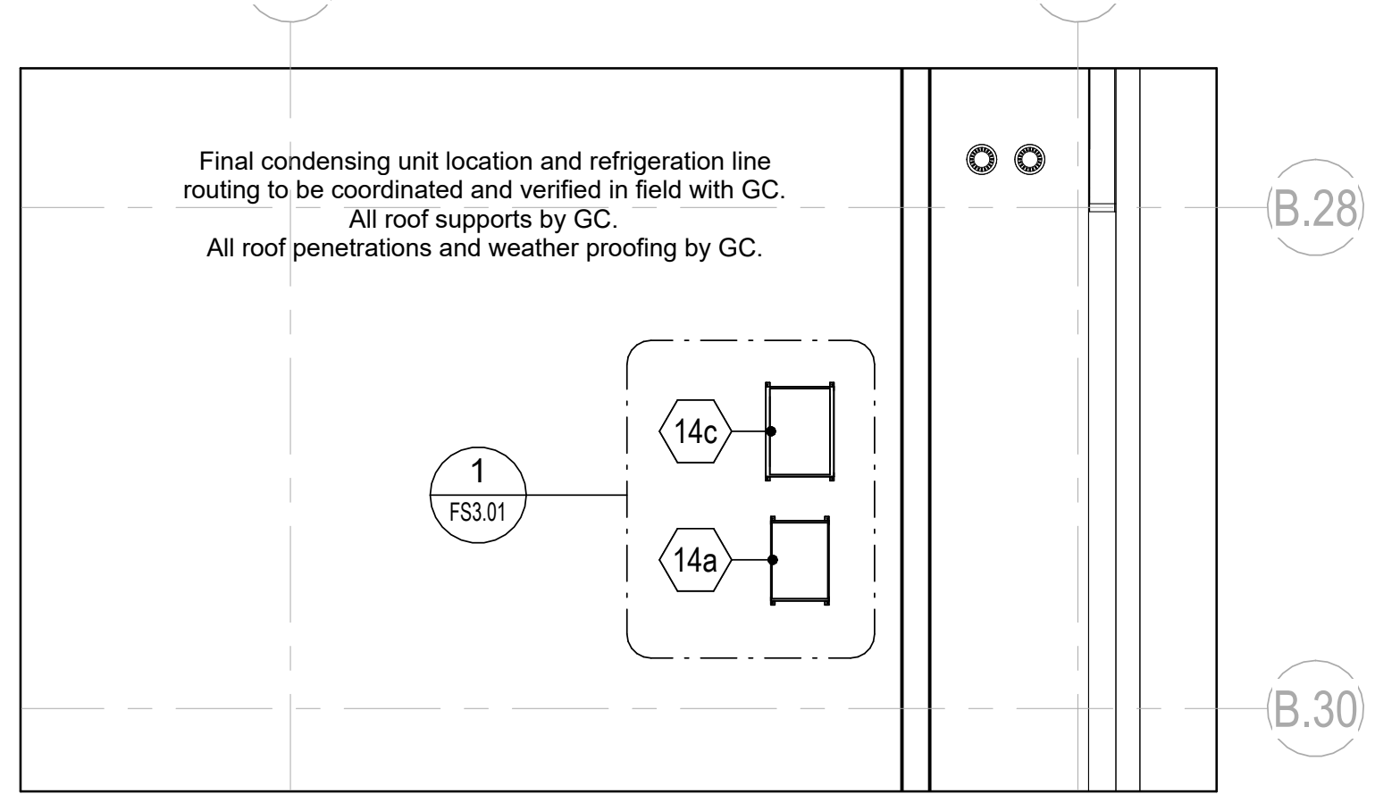


ENLARGED FOODSERVICE EQUIPMENT PLAN

1/4" = 1'-0"

SCHEDULE OF FOODSERVICE EQUIPMENT & CONNECTIONS

Item	Qty	Description	Plumbing	Electrical	Mechanical / Equipment Remarks
1	1	Mop Sink & Service Faucet (by PC)	1/2" H&CW; Drain in floor		Install mop sink (by PC) on sub-floor prior to finished floor. GC to install finished floor with sanitary coved base at exposed sides of mop sink
2	1	Mop Rack Utility Shelf			Requires wall blocking by GC in non-masonry walls
3	1	Hose Reel Assembly (35' Hose with Spray Gun)	1/2" H&CW		Requires wall blocking by GC in non-masonry walls
4	1	-Spare Number-			
5	1	-Spare Number-			
6	1	Detergent Storage Cabinet			Requires wall blocking by GC in non-masonry walls
7	1	Mobile Shelving Unit, Four-Tier			
8	1	Front Load Clothes Washer	1/2" H&CW; 1-1/4" IW to Standpipe	20 A circuit - 120/1 - C&P	
9	1	Front Load Clothes Dryer		30 A circuit - 120/240/1 - C&P	4" diameter dryer vent
10	1	-Spare Number-			
11	1	-Spare Number-			
12	1	Walk-in Cooler		1.1 KW - 120/1 (lights, temp. monitor/alarm, etc); Low voltage wiring from temperature monitor to BMS	Requires floor recess by GC
13	1	Walk-in Freezer		1.3 KW - 120/1 (lights, temp. monitor/alarm, etc); Low voltage wiring from temperature monitor to BMS; 20 A circuit - 120/1 DR (drain line heat trace)	Requires floor recess by GC
14a	1	Cooler Condensing Unit		9.7 A - 1.5 HP - 208/3	Located on Roof per Detail 1/FS2.01
14b	1	Cooler Evaporator Coil	1" IW (by KEC) to FD	1.8 A - 120/1; Low voltage wiring from evaporator coil controller to BMS; Low voltage wiring from coil leak sensor to refrigerant shut-off valve	Remote refrigeration from Item 14a
14c	1	Freezer Condensing Unit		15.4 A - 4.5 HP - 208/3	Located on Roof per Detail 1/FS2.01
14d	1	Freezer Evaporator Coil	1" IW (by KEC) to FD	13.7 A - 208/1; Low voltage wiring from evaporator coil controller to BMS; Low voltage wiring from coil leak sensor to refrigerant shut-off valve	Remote refrigeration from Item 14c
15	23	Mobile Shelving Unit, Four-Tier			
16	2	Dunnage Rack, Mobile			
17	15	Storage Shelving, Five-Tier			
18	3	Dunnage Rack			
19	7	Utility Cart			
20	1	-Spare Number-			
21	1	-Spare Number-			
22	1	Automatic Slicer		5.6 A - 120/1 - C&P	
23	1	Mobile Equipment Stand			
24	2	Waste Barrel (by Owner)			
25	1	Prep Table with Sinks	1/2" H&CW; (2) 2" IW to FS	(2) 20 A circuit - 120/1 wall mounted convenience DR	
26	1	Wall Shelf			Requires wall blocking by GC in non-masonry walls
27	1	Manual Can Opener			
28	4	Hand Sink	1/2" H&CW; 1-1/2" W		Requires wall blocking by GC in non-masonry walls
29	4	Waste Bin (by Owner)			
30	4	Pan Rack, Mobile			
31	1	-Spare Number-			
32	1	-Spare Number-			
33	1	Fire Suppression System		120/1; J-box for connection to building alarm system & equipment shutdown	Protection for Items 35 & 36; Mounted in hood utility cabinet
34	1	Demand Control Ventilation System		15 A circuit - 120/1 (see Note E-34/FS3.01)	Control for Items 35 & 36; System includes VFD for exhaust fan; Mounted in hood utility cabinet
34a	1	Ventilator Control Interface Screen		Cable from Item 34	Cable provided with system
34b	1	Room Temperature Sensor		Wiring from Item 34	
35	1	Exhaust Ventilator		Power to lights from Item 34	EXH: 2,475 CFM thru a 16" diameter collar @ -0.872" SP; MUA: 2,100 total CFM thru (6) 28" x 6" collars @ 0.101" SP; Coordinate support from structure above for hood hangers by KEC
36	1	Exhaust Ventilator		Power to lights from Item 34	EXH: 2,925 total CFM thru (2) 12" diameter collars @ -0.749" SP; MUA: 2,300 total CFM thru (6) 28" x 6" collars @ 0.120" SP; Coordinate support from structure above for hood hangers by KEC
37	1	Utility Distribution System (UDS)	3/4" HW; 1" CW	250 A circuit - 480/3	All electrical connectors and flexible water connectors to associated equipment provided with system by KEC. (Field connections by Related Trades); Coved floor base (by GC) at UDS risers (both ends)
38	1	Double Convection Oven		(2) 14 A - 11.0 KW - 480/3 (from Item 37)	
39	1	Ten-Pan Steamer	3/8" filtered CW (from Item 37); 1-1/2" IW to FS	24.1 A - 20.0 KW - 480/3 (from Item 37)	
40	1	Water Filter Assembly	3/4" CW (from Item 37)		Mounted in UDS riser
41	1	Forty-Gallon Tilting Braising Pan	1/2" H&CW (from Item 37)	19 A - 15.3 KW - 480/3 (from Item 37)	
42	1	Six-Burner Range with Oven		23.5 A - 17.0 - 480/3 (from Item 37)	
43	1	Double Combination Oven	3/4" filtered CW (from Item 37); 2" IW to FS	(2) 26.9 A - 22.4 KW - 480/3 (from Item 37)	Provided with heat shield on left end
44	1	Double Combination Oven	3/4" filtered CW (from Item 37); 2" IW to FS	(2) 26.9 A - 22.4 KW - 480/3 (from Item 37)	
45	2	Water Filter Assembly	3/4" CW (from Item 37)		Mounted in UDS riser
46	1	Floor Pan & Grate	4" W conn 7" BFF		Requires floor recess by GC
47	1	-Spare Number-			
48	1	-Spare Number-			
49	1	Mobile Hot Food Holding Cabinet		13.8 A - 120/1 - C&P	
50	1	Mobile Work Table			
51	1	Work Table with Overshelf		(3) 20 A circuit - 120/1 mounted DR by KEC (stub-up)	Mounted receptacles pre-wired by KEC to mounted J-Box below table undershelf
52	1	Work Table		(3) 20 A circuit - 120/1 mounted DR by KEC (stub-up)	Mounted receptacles pre-wired by KEC to mounted J-Box below table undershelf
53	1	Cook's Work Table with Sink and Overshelf	1/2" H&CW (stub-up); 2" IW to FS	(2) 20 A circuit - 120/1 mounted DR by KEC (stub-up)	Mounted receptacles pre-wired by KEC to mounted J-Box below table undershelf
54	1	Work Table		(3) 20 A circuit - 120/1 mounted DR by KEC (stub-up)	Mounted receptacles pre-wired by KEC to mounted J-Box below table undershelf
55	1	Food Processor		12 A - 120/1 - C&P (from mounted DR at Item 54)	
56	1	-Spare Number-			
57	1	-Spare Number-			
58	1	Refrigerator, Pass-Thru		6.4 A - 120/1 - C&P	
59	1	Hot Food Holding Cabinet, Pass-Thru		10.6 A - 208/1 - C&P (NEMA 6-20P)	
60	1	Mobile Work Table			
61	1	Refrigerator, Pass-Thru		6.4 A - 120/1 - C&P	
62	1	Stainless Steel Electrical Chase		20 A circuit - 120/1 mounted DR by KEC (stub-up); 50 A circuit - 208/3 mounted NEMA 15-50R by KEC (stub-up)	
63	1	Refrigerator, Worktop		3 A - 120/1 - C&P (from mounted DR at Item 62)	
64	1	Griddle with Mobile Stand		40 A - 208/3 - C&P (from mounted NEMA 15-50R at Item 62)	
65	1	Exhaust Ventilator		Power to lights from Item 66	EXH: 1,375 CFM thru a 12" diameter collar @ -0.774" SP; MUA: 1,100 total CFM thru (2) 28" x 10" collars @ 0.121" SP; Coordinate support from structure above for hood hangers by KEC
66	1	Demand Control Ventilation System		15 A circuit - 120/1 (see Note E-66/FS3.01)	Control for Item 65; System includes VFD for exhaust fan; Requires wall blocking by GC in non-masonry walls
66a	1	Ventilator Control Interface Screen		Cable from Item 66	Cable provided with system
66b	1	Room Temperature Sensor		Wiring from Item 66	
67	1	Fire Suppression System		120/1; J-box for connection to building alarm system & equipment shutdown	Protection for Item 65; Requires wall blocking by GC in non-masonry walls
68	1	-Spare Number-			
69	1	-Spare Number-			
70	1	Serving Counter		20 A circuit - 120/1 mounted DR by KEC (stub-up)	
70a	1	Self-Service Glass Display Case			
71	1	Refrigerated Cold Pan, Drop-in	1" IW to FS	5 A - 120/1 - C&P (from mounted DR at Item 70)	
72	1	Serving Counter		(2) 20 A circuit - 120/1 mounted DR by KEC (stub-up)	
72a	1	Full Service Glass Food Protector			
73	1	Fill Faucet	1/2" CW (stub-up)		
74a	2	Hot Food Wells, Drop-in (mounted in group of two)	1" IW to FS (both groups manifolded to one drain)	1.8 KW - 208/1 (stub-up) (total for group)	
74b	3	Hot Food Wells, Drop-in (mounted in group of three)	1" IW to FS (both groups manifolded to one drain)	2.7 KW - 208/1 (stub-up) (total for group)	
75	1	Serving Counter		(2) 20 A circuit - 120/1 mounted DR by KEC (stub-up)	
75a	2	Self-Service Glass Display Case			
76	2	Refrigerated Cold Pan, Drop-in	1" IW to FS	5 A - 120/1 - C&P (from mounted DR at Item 75)	
77	1	Serving Counter		(2) 20 A circuit - 120/1 mounted DR by KEC (stub-up)	
77a	1	Full Service Glass Food Protector			
78	1	Fill Faucet	1/2" CW (stub-up)		
79a	2	Hot Food Wells, Drop-in (mounted in group of two)	1" IW to FS (both groups manifolded to one drain)	1.8 KW - 208/1 (stub-up) (total for group)	
79b	3	Hot Food Wells, Drop-in (mounted in group of three)	1" IW to FS (both groups manifolded to one drain)	2.7 KW - 208/1 (stub-up) (total for group)	
80	1	Serving Counter		20 A circuit - 120/1 mounted DR by KEC (stub-up)	
80a	1	Self-Service Glass Display Case			
81	1	Refrigerated Cold Pan, Drop-in	1" IW to FS	5 A - 120/1 - C&P (from mounted DR at Item 80)	
82	1	-Spare Number-			
83	1	-Spare Number-			
84	2	Milk Cooler		3.3 A - 120/1 - C&P	
85	4	Snack Rack (by Owner's Vendor)			
86	4	Mobile Cashier Stand			
87	4	Cashier Terminal (by Owner)		120/1 - C&P; Data Cable	
88	2	Mobile Condiment Counter			
89	4	Portable Traffic Stanchions (set of three)			
91	1	-Spare Number-			
92	1	-Spare Number-			
93	1	Soiled Ware Table with Integral Pass-Thru Frame	2" W		Requires rough opening in wall by GC
94	1	Roll-Down Shutter			Requires wall blocking by GC in non-masonry walls
95	1	Hose Reel Assembly	1/2" H&CW		Requires wall blocking by GC in non-masonry walls
96	1	Warewasher, Conveyor Type, Ventless	1/2" HW; 1/2" filtered CW (50°F min, from Item 97); 1/2" CW (drain tempering); 1-1/4" IW to FS	35 A - 480/3 (Tank Heat); 26 A - 480/3 (Booster Heater); J-Box for wiring to table limit switch at Item 98	
97	1	Water Filter Assembly, Waswasher	3/4" CW (50°F min)		
98	1	Clean Ware Table		J-Box for wiring to table limit switch from Item 96	
99	4	Mobile Shelving Unit, Four-Tier			
100	1	Three-Compartment Sink	(2) 3/4" 120°F H&CW; (3) 2" W manifold thru GI by PC		
101	1	Wall Shelf			Requires wall blocking by GC in non-masonry walls
102	1	Eye/Face Wash, Wall Mounted	1/2" H&CW; 1-1/4" W		Includes thermostatic mixing valve



Final condensing unit location and refrigeration line routing to be coordinated and verified in field with GC.
All roof supports by GC.
All roof penetrations and weather proofing by GC.

1 FS2.01 Detail - Level 2 Remote Condensing Unit Plan

1/8" = 1'-0"

PLAN NOTES

1) IT IS THE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR TO FIELD VERIFY THE DELIVERY PATH OF ALL EQUIPMENT WITHIN THEIR SCOPE WITH BUILDING CONDITIONS PRIOR TO ORDERING TO CONFIRM ALL EQUIPMENT FITS WITHIN THE DESIGNATED SPACE AS LOCATED ON PLANS.

2) KITCHEN EQUIPMENT CONTRACTOR SHALL COORDINATE WITH THE GENERAL CONTRACTOR AS NECESSARY FOR OPENINGS IN BUILDING, WALL LEAVE OUTS, DOOR WIDTHS AND HEADER HEIGHTS REQUIRED FOR DELIVERY AND INSTALLATION MEANS.

3) FINISHES TO ALL WALLS, FLOORS AND CEILINGS ARE TO BE PROVIDED BY THE GENERAL CONTRACTOR AS SPECIFIED BY THE PROJECT ARCHITECT TO MEET THE REQUIREMENTS OF THE LOCAL HEALTH DEPARTMENT.

4) REVISIONS TO THESE PLANS DUE TO FIELD CONDITIONS MUST BE SUBMITTED TO THE PROJECT DESIGN TEAM FOR REVIEW AND APPROVAL PRIOR TO PROCEEDING WITH CONSTRUCTION.

5) FLOORING MATERIAL SPECIFIED BY THE ARCHITECT MUST BE PROVIDED WITH A COVED BASE AT ALL WALLS TO INCLUDE THE INTERIOR AND EXTERIOR OF WALK-IN REFRIGERATED ROOMS.

6) ALL FOODSERVICE EQUIPMENT AND CUSTOM FABRICATED ITEMS MUST MEET THE STANDARDS OF THE NATIONAL SANITATION FOUNDATION AND SHALL BE LABELED ACCORDINGLY.

SCHEDULE NOTES

1) UTILITIES SHOWN IN THESE SCHEDULES ARE SPECIFIC TO THE PRIME MANUFACTURER LISTED IN THE WRITTEN SPECIFICATION SECTION 114000. IF EQUIPMENT FROM AN ALTERNATE MANUFACTURER IS PROVIDED, IT IS THE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR TO COORDINATE AND SUBMIT TO THE PROJECT DESIGN TEAM FOR REVIEW.

2) UTILITIES LISTED ON THIS SCHEDULE FOR OWNER FURNISHED OR VENDOR SUPPLIED EQUIPMENT ARE ESTIMATES ASSUMED FOR ENGINEERING PURPOSES ONLY. IT IS THE RESPONSIBILITY OF THE OWNER TO PROVIDE EQUIPMENT CUT SHEETS OF THIS EQUIPMENT TO CRABTREE-MCGRATH ASSOCIATES PRIOR TO CONSTRUCTION.

3) INSTALLING SUB-CONTRACTORS MUST NOTIFY CRABTREE-MCGRATH ASSOCIATES IF A UTILITY REQUIREMENT LISTED ON THIS EQUIPMENT SCHEDULE IS NOT AVAILABLE.

4) REFER TO THE ABBREVIATIONS NOTES PROVIDED ON THIS SHEET FOR CLARIFICATION OF ABBREVIATIONS USED WITHIN THIS EQUIPMENT SCHEDULE.

Abbreviations used:

A	Amperes	DR	Duplex receptacle	IW	Indirect Waste
AFF	Above finished floor	EC	Electrical contractor	KEC	Kitchen Equip. Contractor
ATC	Automatic Temp. Controls Contractor	EXH	Exhaust	KW	Kilowatt
		FD	Floor drain	MBTU	BTU per hour/1000
BFF	Below finished floor	FFD	Funnel floor drain	MC	Mechanical Contractor
BMS	Building Management System	FHW	Fahrenheit hot water	MUA	Make-up air
		FS	Floor sink	NIC	Not In Contract
BTC	Branch to connection	G	Gas	PC	Plumbing Contractor
C&P	Cord & plug provided	GC	General Contractor	QD	Quick disconnect
CFM	Cubic feet per minute	GI	Grease interceptor	SP	Static pressure (WG)
CR	Condensate return	HP	Horsepower	SR	Single receptacle
CW	Cold water	HW	Hot water	SS	Steam supply
DFA	Drop from above	H&CW	Hot & cold water	W	Waste (direct conn.)

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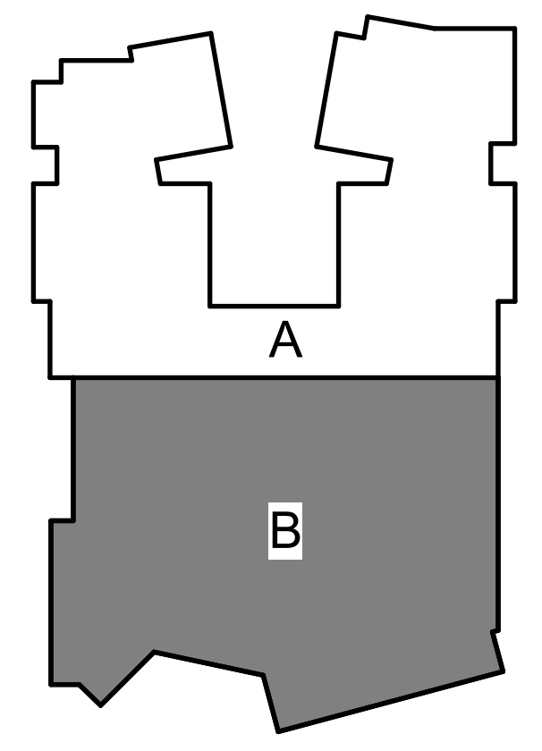
KEY PLAN



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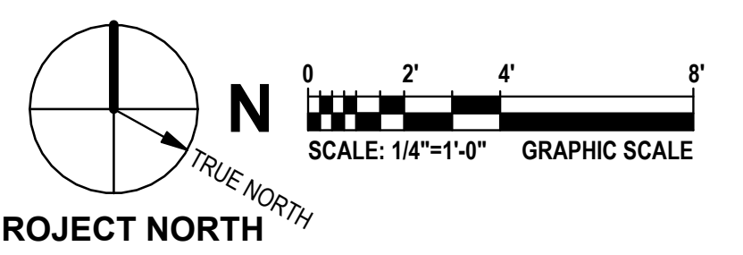
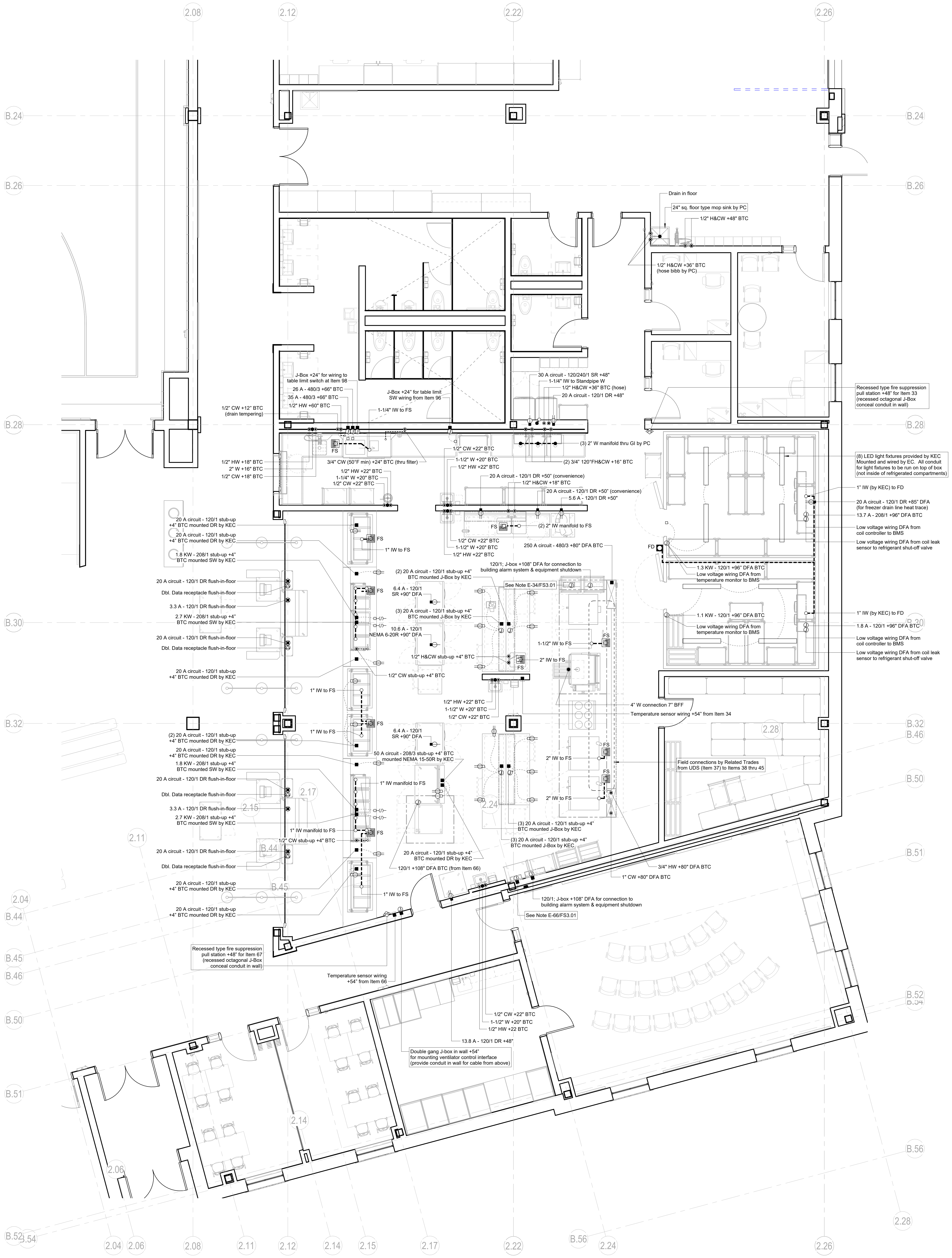


SHEET TITLE:

ENLARGED
FOODSERVICE
EQUIPMENT PLAN

SHEET NUMBER:

FS2.01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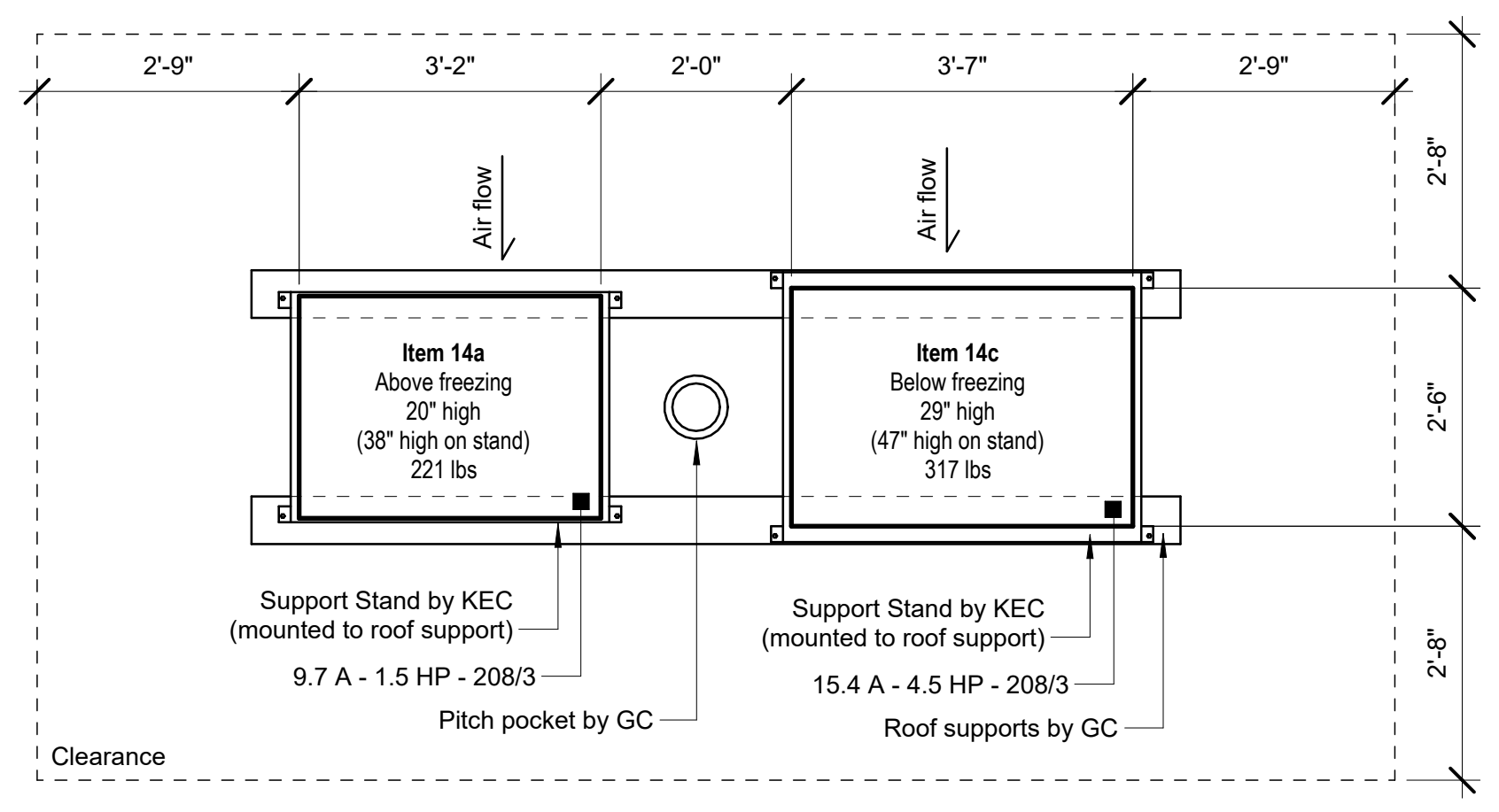
Drain in floor
24" sq. floor type mop sink by PC
1/2" H&CW +48" BTC
1/2" H&CW +36" BTC (hose bibb by PC)
J-Box +24" for wiring to table limit switch at Item 98
26 A - 480/3 +66" BTC
35 A - 480/3 +66" BTC
1/2" HW +60" BTC
1/2" CW +12" BTC (drain tempering)
J-Box +24" for table limit SW wiring from Item 96
1-1/4" IW to FS
30 A circuit - 120/240/1 SR +48"
1-1/4" IW to Standpipe W
1/2" H&CW +36" BTC (hose)
20 A circuit - 120/1 DR +48"
Recessed type fire suppression pull station +48" for Item 33 (recessed octagonal J-Box conceal conduit in wall)
(3) 2" W manifold thru GI by PC
1/2" HW +18" BTC
2" W +16" BTC
1/2" CW +18" BTC
3/4" CW (50°F min) +24" BTC (thru filter)
1/2" CW +22" BTC
1-1/2" W +20" BTC
1/2" HW +22" BTC
(2) 3/4" 120°FH&CW +16" BTC
1/2" HW +22" BTC
1-1/4" W +20" BTC
1/2" CW +22" BTC
20 A circuit - 120/1 DR +50" (convenience)
1/2" H&CW +18" BTC
20 A circuit - 120/1 DR +50" (convenience)
5.6 A - 120/1 DR +50"
(8) LED light fixtures provided by KEC Mounted and wired by EC. All conduit for light fixtures to be run on top of box (not inside of refrigerated compartments)
1" IW (by KEC) to FD
20 A circuit - 120/1 DR +85" DFA (for freezer drain line heat trace)
13.7 A - 208/1 +96" DFA BTC
Low voltage wiring DFA from coil controller to BMS
Low voltage wiring DFA from coil leak sensor to refrigerant shut-off valve
FS
(2) 2" IW manifold to FS
1/2" CW +22" BTC
1-1/2" W +20" BTC
1/2" HW +22" BTC
250 A circuit - 480/3 +80" DFA BTC
FD
1.3 KW - 120/1 +96" DFA BTC
Low voltage wiring DFA from temperature monitor to BMS
20 A circuit - 120/1 stub-up +4" BTC mounted DR by KEC
20 A circuit - 120/1 stub-up +4" BTC mounted DR by KEC
1.8 KW - 208/1 stub-up +4" BTC mounted SW by KEC
1" IW to FS
120/1; J-box +108" DFA for connection to building alarm system & equipment shutdown
(2) 20 A circuit - 120/1 stub-up +4" BTC mounted J-Box by KEC
See Note E-34/FS3.01
20 A circuit - 120/1 DR flush-in-floor
Dbl. Data receptacle flush-in-floor
3.3 A - 120/1 DR flush-in-floor
2.7 KW - 208/1 stub-up +4" BTC mounted SW by KEC
6.4 A - 120/1 SR +90" DFA
(3) 20 A circuit - 120/1 stub-up +4" BTC mounted J-Box by KEC
10.6 A - 120/1 NEMA 6-20R +90" DFA
20 A circuit - 120/1 DR flush-in-floor
Dbl. Data receptacle flush-in-floor
1-1/2" IW to FS
1.1 KW - 120/1 +96" DFA BTC
Low voltage wiring DFA from temperature monitor to BMS
1" IW (by KEC) to FD
1.8 A - 120/1 +96" DFA BTC
Low voltage wiring DFA from coil controller to BMS
Low voltage wiring DFA from coil leak sensor to refrigerant shut-off valve
1/2" H&CW stub-up +4" BTC
2" IW to FS
1/2" CW stub-up +4" BTC
20 A circuit - 120/1 stub-up +4" BTC mounted DR by KEC
1" IW to FS
1/2" HW +22" BTC
1-1/2" W +20" BTC
1/2" CW +22" BTC
4" W connection 7" BFF
Temperature sensor wiring +54" from Item 34
1" IW to FS
(2) 20 A circuit - 120/1 stub-up +4" BTC mounted DR by KEC
20 A circuit - 120/1 stub-up +4" BTC mounted DR by KEC
1.8 KW - 208/1 stub-up +4" BTC mounted SW by KEC
6.4 A - 120/1 SR +90" DFA
50 A circuit - 208/3 stub-up +4" BTC mounted NEMA 15-50R by KEC
2" IW to FS
Field connections by Related Trades from UDS (Item 37) to Items 38 thru 45
20 A circuit - 120/1 DR flush-in-floor
Dbl. Data receptacle flush-in-floor
1" IW manifold to FS
2" IW to FS
3.3 A - 120/1 DR flush-in-floor
2.7 KW - 208/1 stub-up +4" BTC mounted SW by KEC
1" IW manifold to FS
1/2" CW stub-up +4" BTC
(3) 20 A circuit - 120/1 stub-up +4" BTC mounted J-Box by KEC
(3) 20 A circuit - 120/1 stub-up +4" BTC mounted J-Box by KEC
20 A circuit - 120/1 DR flush-in-floor
Dbl. Data receptacle flush-in-floor
20 A circuit - 120/1 stub-up +4" BTC mounted DR by KEC
20 A circuit - 120/1 stub-up +4" BTC mounted DR by KEC
20 A circuit - 120/1 stub-up +4" BTC mounted DR by KEC
120/1 +108" DFA BTC (from Item 66)
3/4" HW +80" DFA BTC
1" CW +80" DFA BTC
1" IW to FS
120/1; J-box +108" DFA for connection to building alarm system & equipment shutdown
See Note E-66/FS3.01
Recessed type fire suppression pull station +48" for Item 67 (recessed octagonal J-Box conceal conduit in wall)
Temperature sensor wiring +54" from Item 66
1/2" CW +22" BTC
1-1/2" W +20" BTC
1/2" HW +22 BTC
13.8 A - 120/1 DR +48"
Double gang J-box in wall +54" for mounting ventilator control interface (provide conduit in wall for cable from above)
FS

FOODSERVICE EQUIPMENT ROUGH-IN PLAN

1/4" = 1'-0"

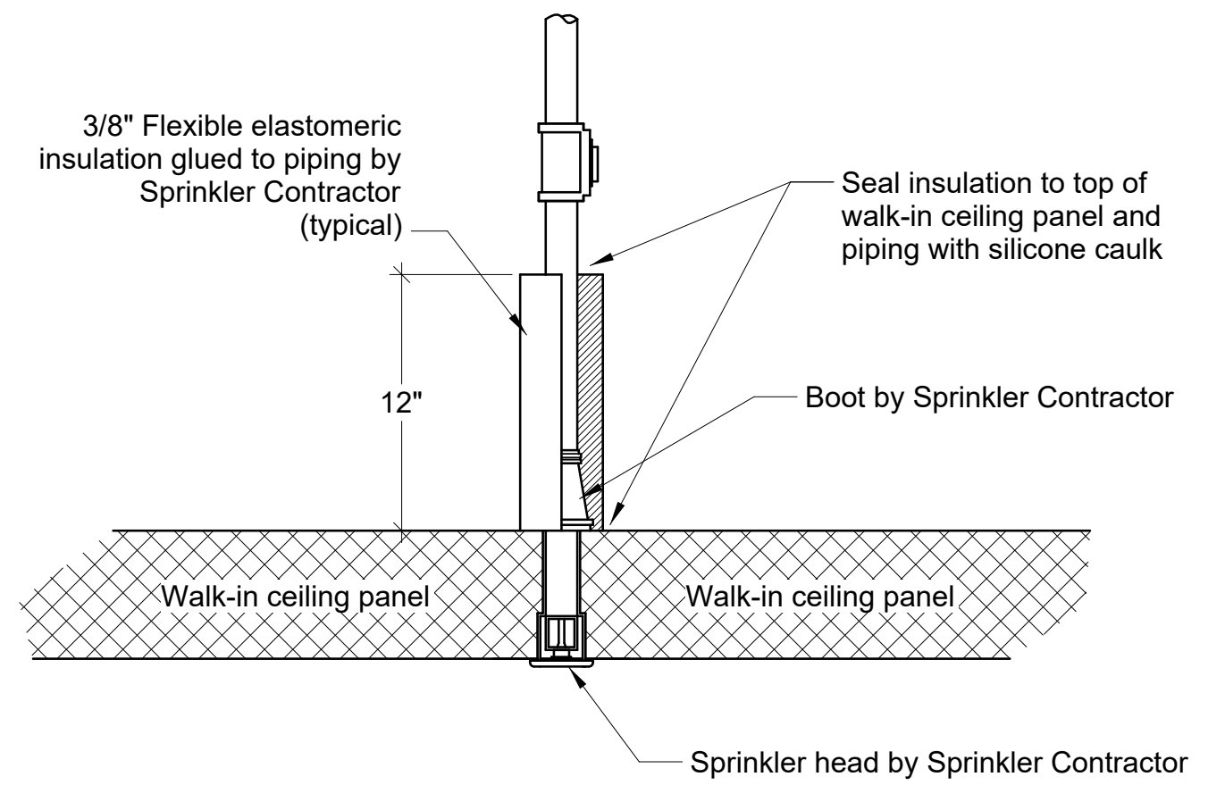
Mount on roof (Location to be coordinated)

Maximum refrigeration line run = 100' (including a 55' maximum vertical run)



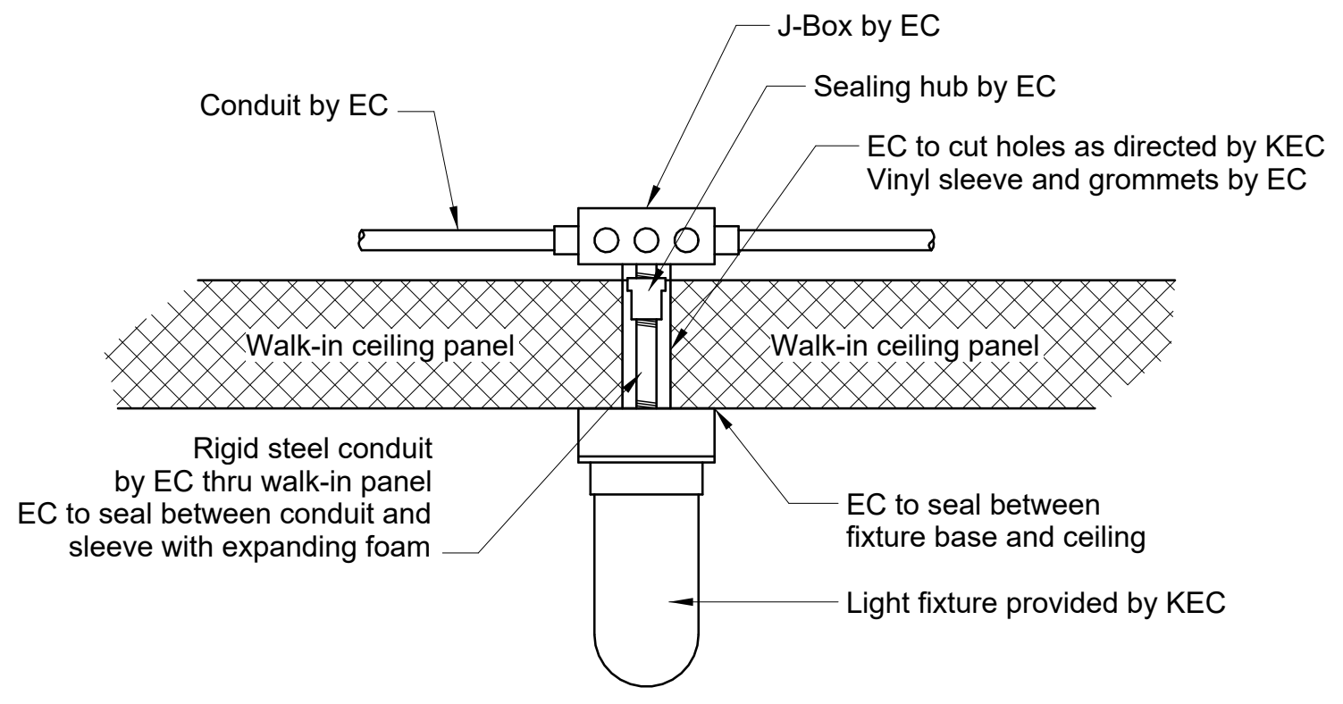
1 FS3.01 Detail - Remote Condensing Units

NTS


3/8" Flexible elastomeric insulation glued to piping by Sprinkler Contractor (typical)
Seal insulation to top of walk-in ceiling panel and piping with silicone caulk
12"
Boot by Sprinkler Contractor
Walk-in ceiling panel
Walk-in ceiling panel
Sprinkler head by Sprinkler Contractor

Typical Detail - Refrigerated Room Fire Sprinkler

NTS


J-Box by EC
Sealing hub by EC
Conduit by EC
EC to cut holes as directed by KEC
Vinyl sleeve and grommets by EC
Walk-in ceiling panel
Walk-in ceiling panel
Rigid steel conduit by EC thru walk-in panel
EC to seal between conduit and sleeve with expanding foam
EC to seal between fixture base and ceiling
Light fixture provided by KEC

Notes:
1. All light fixtures to be furnished by KEC
2. Mounting light fixtures, all conduit and interwiring by EC
3. All conduit to be on exterior of walk-in by EC
4. All penetrations thru walk-in panels to be thoroughly sealed by EC

Typical Detail - Refrigerated Room Light Fixture

NTS

Note E-34

15 A circuit - 120/1 DFA for conn to ventilator control & hood lights at Items 35 & 36.
Microswitch wiring from fire suppression system (Item 33);
EC to provide CAT5 connection to remote touch screen (Item 34a - cable supplied with system);
EC to provide high voltage conns from VFD to EHX fan;
MC/ATC to provide wiring to temp sensors at hood;
MC/ATC to provide wiring to room temp sensors (Item 34b);
MC/ATC to provide wiring from building management system remote control

Note E-66

15 A circuit - 120/1 DFA for conn to ventilator control & hood lights at Item 65.
Microswitch wiring from fire suppression system (Item 67);
EC to provide CAT5 connection to remote touch screen (Item 66a - cable supplied with system);
EC to provide high voltage conns from VFD to EHX fan;
MC/ATC to provide wiring to temp sensors at hood;
MC/ATC to provide wiring to room temp sensors (Item 66b);
MC/ATC to provide wiring from building management system remote control

PLUMBING ROUGH-IN LEGEND	
⊛	HOT WATER
◉	COLD WATER
●	WASTE - DIRECT CONNECTED
○	WASTE - INDIRECT
⊗	GAS
◍	AREA FD (SUGGESTED LOCATION)
◙	FLOOR DRAIN
◙	FUNNEL FLOOR DRAIN
▥	FLOOR SINK
▥	FLOOR SINK (3/4 GRATE)
▥	FLOOR SINK (1/2 GRATE)
∘	FIELD CONNECTION
▬▬▬	FIELD PIPING (WASTE)
-------	FIELD PIPING (WATER)

ELECTRICAL ROUGH-IN LEGEND	
■⊖=	DUPLEX RECEPTACLE
□⊖=	DUPLEX RECEPTACLE (TABLE MOUNTED)
■⊖–	SIMPLEX RECEPTACLE
□⊖–	SIMPLEX RECEPTACLE (TABLE MOUNTED)
◁	SPECIAL PURPOSE RECEPTACLE
⊠	FLOOR RECEPTACLE
Ⓙ	JUNCTION BOX
Ⓓ	DROP CORD
■	ELECTRICAL CONDUIT
□	FIELD CONNECTION
□–S–	SWITCH
◻	LIGHT FIXTURE
◇PS	FIRE PULL STATION
~~	FIELD WIRING

PLUMBING NOTES

1) DIMENSIONS ON THIS PLAN ARE PROVIDED FOR DESIGN INTENT. IT IS THE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR TO VERIFY AND COORDINATE ALL DIMENSIONS AND HEIGHTS LISTED IN THE FIELD WITH THE EQUIPMENT BEING PROVIDED.

2) PLUMBING CONTRACTOR IS RESPONSIBLE FOR ALL FINAL CONNECTIONS TO EQUIPMENT THAT REQUIRE A BRANCH TO CONNECTION (BTC), OR WHERE PLUMBING INTERCONNECTION IS INDICATED ON THE PLAN WITH A DASHED LINE.

3) PLUMBING CONTRACTOR IS RESPONSIBLE FOR REVIEWING ALL MANUFACTURER'S SHOP DRAWINGS AND EQUIPMENT CUT SHEETS SUBMITTED TO CONFIRM SCOPE REQUIREMENTS AND INSTALLATION EXPECTATIONS.

4) ALL FLOOR SINKS AND DRAINS MUST BE PROVIDED AND INSTALLED BY THE PLUMBING CONTRACTOR. AREA DRAINS, IF LOCATED LOCATED ON THESE PLANS, ARE TO BE CONSIDERED RECOMMENDED AREAS. IT IS THE RESPONSIBILITY OF THE PLUMBING CONTRACTOR TO CONFIRM QUANTITIES AND LOCATIONS OF AREA DRAINS WITH THE LOCAL AUTHORITY HAVING JURISDICTION.

5) FLOOR SINKS LOCATED UNDER COUNTERS WITH LIMITED ACCESSIBILITY MUST BE INSTALLED 50% EXPOSED AND EASILY ACCESSIBLE FOR CLEANING. IF A FLOOR SINK CAN NOT BE INSTALLED 50% EXPOSED, THE UNDER SHELF OF THE CABINET MUST BE FULLY REMOVABLE OR BE PROVIDED WITH AN ACCESS PANEL LARGE ENOUGH TO REMOVE THE DRAIN GRATE FOR CLEANING.

6) CONDENSATE DRAIN LINES FROM WALK-IN REFRIGERATED ROOM EVAPORATOR COILS SHALL BE INSTALLED BY THE KITCHEN EQUIPMENT CONTRACTOR. DRAIN LINES MUST BE COPPER AND INSTALLED 1" OFF THE WALLS WITH A MINIMUM PITCH OF 1/2" PER FOOT. KITCHEN EQUIPMENT CONTRACTOR TO PROVIDE AND INSTALL A COPPER UNION WITHIN 24" OF THE CONNECTION TO THE EVAPORATOR COIL. FOR INSTALLATION OF DRAIN LINES IN A FREEZER, THE DRAIN SHALL EXIT THE FREEZER AT THE EARLIEST DISTANCE POSSIBLE. DRAIN PENETRATIONS THROUGH THE WALK-IN REFRIGERATED ROOM WALL PANEL MUST BE APPROPRIATELY SEALED TO INCLUDE A VAPOR SEAL AND PROVIDED WITH CHROME ESCUTCHEON PLATES AT ALL EXPOSED POINTS WHERE PIPING PENETRATES THE WALL. DRAINS MUST BE "P" TRAPPED OUTSIDE OF THE REFRIGERATED ROOM WALL TO AVOID ENTRANCE OF WARM AIR AND TERMINATED 1" ABOVE THE FLOOR DRAIN OR AS REQUIRED BY LOCAL CODE.

7) PLUMBING CONTRACTOR TO INSTALL UTILITIES CONCEALED IN WALLS AND STUB-OUT AT TERMINATION POINTS.

8) PLUMBING CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ALL DRAINS, FAUCETS, PIPING TRAPS, VALVES, SHUT-OFFS, GAUGES, WATER PRESSURE REDUCERS, REGULATORS AND BACKFLOW PREVENTION, ETC. AS REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION.

9) IT IS THE RESPONSIBILITY OF THE PLUMBING CONTRACTOR TO FLUSH ALL WATER LINES PRIOR TO FINAL CONNECTION TO FOODSERVICE EQUIPMENT.

10) THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR LOCATION OF GREASE TRAPS AS REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION. GREASE TRAPS MUST BE LOCATED IN A MANNER THAT DOES NOT INTERFERE WITH FOODSERVICE EQUIPMENT LAYOUT.

ELECTRICAL NOTES

1) DIMENSIONS ON THIS PLAN ARE PROVIDED FOR DESIGN INTENT. IT IS THE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR TO VERIFY AND COORDINATE ALL DIMENSIONS AND HEIGHTS LISTED IN THE FIELD WITH THE EQUIPMENT BEING PROVIDED.

2) ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL FINAL CONNECTIONS TO EQUIPMENT THAT REQUIRES A BRANCH TO CONNECTION (BTC), OR WHERE INTER-WIRING IS INDICATED ON THE PLAN IN A DASHED LINE.

3) ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR REVIEWING ALL MANUFACTURER'S SHOP DRAWINGS AND EQUIPMENT CUT SHEETS SUBMITTED TO CONFIRM SCOPE REQUIREMENTS AND EXPECTATIONS.

4) ELECTRICAL PANELS PROVIDED SHALL BE DESIGNED WITH A MINIMUM OF 20% SPARE CAPACITY FOR FUTURE EXPANSION UNLESS OTHERWISE APPROVED BY THE OWNER.

5) ELECTRICAL CONTRACTOR TO INSTALL DROP CORDS AS LOCATED ON PLANS WITH THE CORD ADJUSTED TO HANG 78" ABOVE FINISH FLOOR. PLASTIC WIRE TIES ARE NOT ACCEPTABLE FOR THIS WORK. DROP CORDS MUST BE PROVIDED WITH STRAIN RELIEF.

6) ELECTRICAL CONNECTIONS ON THIS PLAN ARE PROVIDED AS IT RELATES SPECIFICALLY TO FOOD SERVICE EQUIPMENT. CONVENIENCE OUTLETS ARE PROVIDED IN SPECIFIC LOCATIONS AS REQUESTED BY OWNER. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PROVIDE AND INSTALL ANY OTHER ELECTRICAL OUTLETS AS REQUIRED TO MEET CODE REQUIREMENTS BY LOCAL AUTHORITY HAVING JURISDICTION.

7) WALK-IN REFRIGERATED ROOM LIGHT FIXTURES ARE TO BE PROVIDED BY THE KITCHEN EQUIPMENT CONTRACTOR. LIGHTS ARE TO BE MOUNTED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

8) IT IS THE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR TO CONFIRM WITH THE WALK-IN REFRIGERATED ROOM MANUFACTURER THAT THE QUANTITY AND LOCATIONS OF THE LIGHTING LAYOUT WILL MEET 20 FOOT CANDLES OF LIGHT AT A DISTANCE OF 30" ABOVE FINISH FLOOR AS REQUIRED IN WALK-IN REFRIGERATED ROOMS BY THE NATIONAL FOOD CODE.

9) DRAIN PIPING WITHIN A WALK-IN FREEZER SHALL BE PROVIDED WITH A DRAIN LINE HEATER AND INSULATION. FINAL CONNECTION OF THE DRAIN LINE HEATER MUST BE PROVIDED BY THE ELECTRICAL CONTRACTOR.

10) ELECTRICAL CONTRACTOR TO INSTALL UTILITIES CONCEALED IN WALLS AND STUB-OUT AT TERMINATION POINTS.

11) ELECTRICAL CONTRACTOR TO PROVIDE AND INSTALL WIRING BETWEEN EXHAUST VENTILATORS, AND ASSOCIATED FAN SYSTEMS, CONTROL PANELS, MAGNETIC STARTERS, FIRE SUPPRESSION SYSTEMS, PULL STATIONS AND SWITCHES AS REQUIRED.

12) CONTROL AND POWER WIRING BETWEEN CONTROL PANELS AND GARBAGE DISPOSALS, WASTE PULPERS, TROUGH COLLECTORS ETC. ARE TO BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

13) ELECTRICAL CONTRACTOR MUST PROVIDE ELECTRICAL POWER TO ANY COOKING EQUIPMENT THROUGH A SHUNT TRIP SYSTEM.

14) FOOD PREPARATION AREAS MUST BE PROVIDED WITH 50 FOOT CANDLES OF LIGHTING AS REQUIRED BY THE NATIONAL FOOD CODE.

15) ELECTRICAL CONTRACTOR MUST VERIFY REMOTE FIRE SUPPRESSION PULL STATION LOCATIONS WITH THE LOCAL FIRE INSPECTOR PRIOR TO INSTALLATION.

16) FOODSERVICE EQUIPMENT CAN NOT BLOCK ACCESS TO GFI RECEPTACLES. CRABTREE-MCGRATH ASSOCIATES STRONGLY RECOMMENDS THAT THE ELECTRICAL CONTRACTOR PROVIDE GFI PROTECTION AT THE CIRCUIT BREAKER PANEL. THIS WILL ALSO LIMIT NUISANCE TRIPPING THAT IS COMMON WITH COMMERCIAL FOODSERVICE EQUIPMENT.

Abbreviations used:

A	Amperes	DR	Duplex receptacle	IW	Indirect Waste
AFF	Above finished floor	EC	Electrical contractor	KEC	Kitchen Equip. Contractor
ATC	Automatic Temp. Controls Contractor	EXH	Exhaust	KW	Kilowatt
		FD	Floor drain	MBTU	BTU per hour/1000
BFF	Below finished floor	FFD	Funnel floor drain	MC	Mechanical Contractor
BMS	Building Management System	FHW	Fahrenheit hot water	MUA	Make-up air
		FS	Floor sink	NIC	Not In Contract
BTC	Branch to connection	G	Gas	PC	Plumbing Contractor
C&P	Cord & plug provided	GC	General Contractor	QD	Quick disconnect
CFM	Cubic feet per minute	GI	Grease interceptor	SP	Static pressure (WG)
CR	Condensate return	HP	Horsepower	SR	Single receptacle
CW	Cold water	HW	Hot water	SS	Steam supply
DFA	Drop from above	H&CW	Hot & cold water	W	Waste (direct conn.)

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ELEMENTARY SCHOOL

320 SALEM STREET
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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

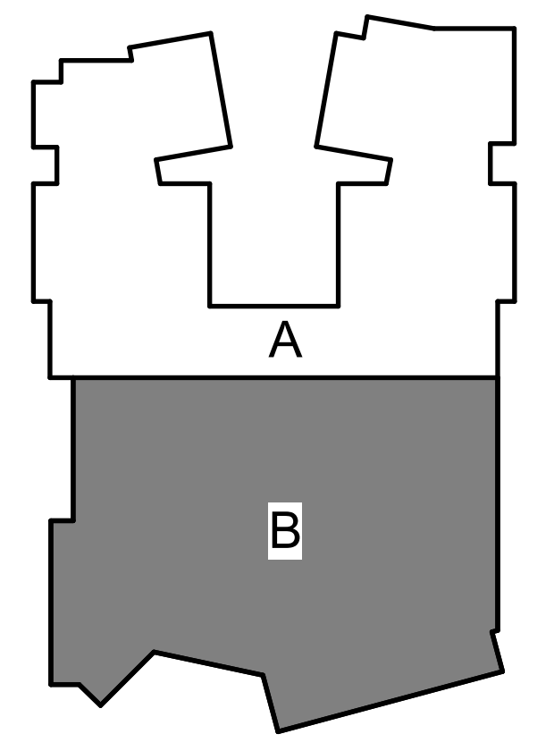
REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:
FOODSERVICE
EQUIPMENT
ROUGH-IN PLAN

SHEET NUMBER:
FS3.01

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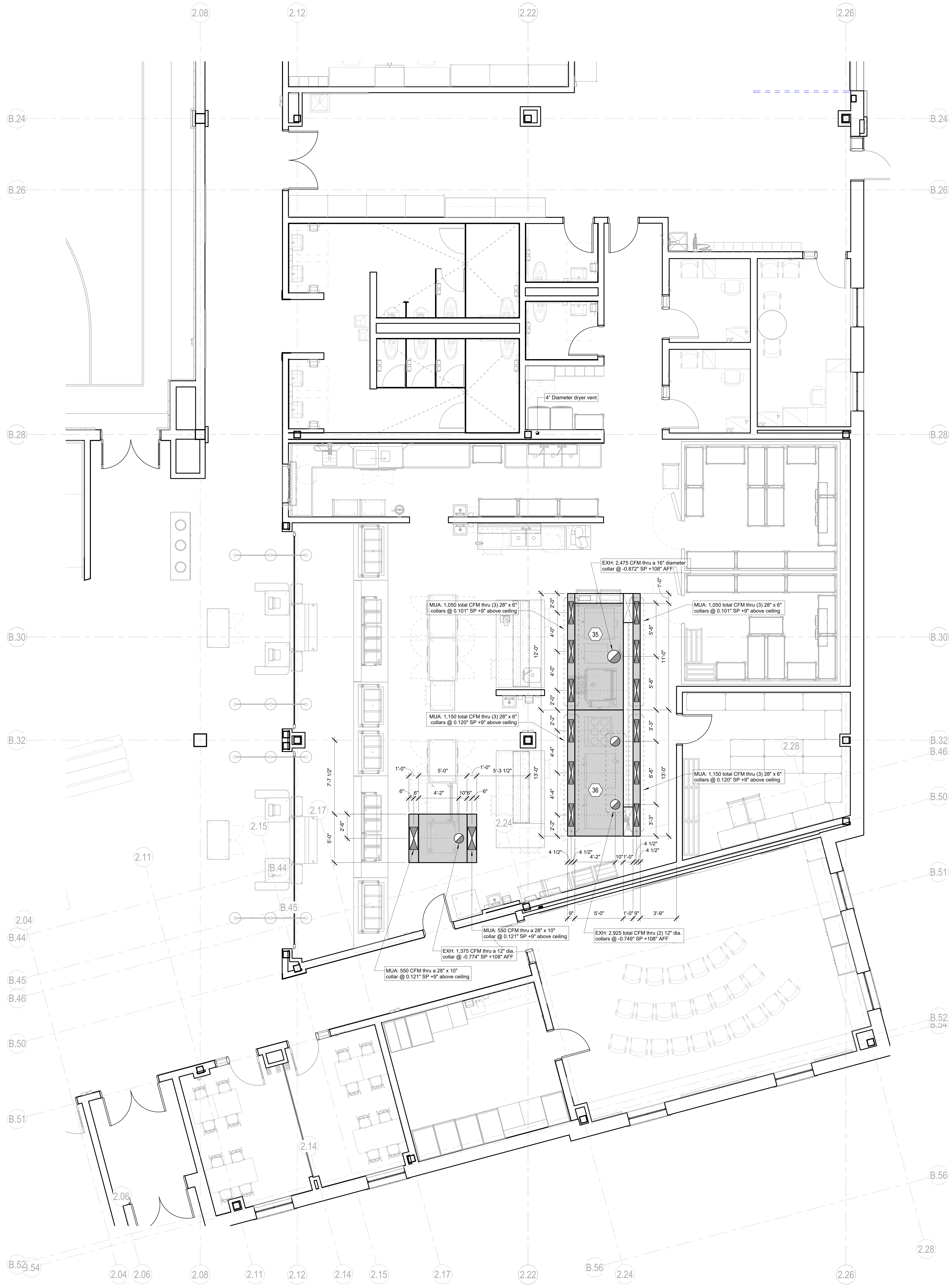
4" Diameter dryer vent
EXH: 2,475 CFM thru a 16" diameter collar @ -0.872" SP +108" AFF
MUA: 1,050 total CFM thru (3) 28" x 6" collars @ 0.101" SP +9" above ceiling
MUA: 1,050 total CFM thru (3) 28" x 6" collars @ 0.101" SP +9" above ceiling
MUA: 1,150 total CFM thru (3) 28" x 6" collars @ 0.120" SP +9" above ceiling
MUA: 1,150 total CFM thru (3) 28" x 6" collars @ 0.120" SP +9" above ceiling
35
36
MUA: 550 CFM thru a 28" x 10" collar @ 0.121" SP +9" above ceiling
EXH: 2,925 total CFM thru (2) 12" dia. collars @ -0.749" SP +108" AFF
EXH: 1,375 CFM thru a 12" dia. collar @ -0.774" SP +108" AFF
MUA: 550 CFM thru a 28" x 10" collar @ 0.121" SP +9" above ceiling
2.08
2.12
2.22
2.26
B.24
B.26
B.28
B.30
B.32
B.46
B.50
B.51
B.52
B.56
2.28
2.24
2.17
2.15
2.11
2.04
B.44
B.45
2.14
2.06
2.06
2.11
2.15
B.52
2.54

FOODSERVICE EQUIPMENT VENTILATION ROUGH-IN PLAN

1/4" = 1'-0"

VENTILATION NOTES

1) DIMENSIONS ON THIS PLAN ARE PROVIDED FOR DESIGN INTENT. IT IS THE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR TO VERIFY AND COORDINATE ALL DIMENSIONS AND HEIGHTS LISTED IN THE FIELD WITH THE EQUIPMENT BEING PROVIDED.

2) EXHAUST HOODS MUST BE HUNG AND MOUNTED WITH THE BOTTOM OF THE HOOD AT 6'-8" ABOVE FINISH FLOOR. HVAC CONTRACTOR IS RESPONSIBLE FOR FINAL CONNECTIONS FROM THE EXHAUST HOOD COLLAR TO THE DUCTWORK. FINAL CONNECTIONS SHALL BE FULLY WELDED AND LIQUID TIGHT.

3) HVAC CONTRACTOR TO PROVIDE AND INSTALL ALL FANS, DUCTWORK AND CURBS AS REQUIRED FOR A COMPLETE AND FUNCTIONING VENTILATION SYSTEM. START-UP AND AIR BALANCING OF THESE SYSTEMS MUST BE COMPLETED BY THE HVAC CONTRACTOR.

Abbreviations used:

A	Amperes	DR	Duplex receptacle	IW	Indirect Waste
AFF	Above finished floor	EC	Electrical contractor	KEC	Kitchen Equip. Contractor
ATC	Automatic Temp. Controls Contractor	EXH	Exhaust	KW	Kilowatt
		FD	Floor drain	MBTU	BTU per hour/1000
BFF	Below finished floor	FFD	Funnel floor drain	MC	Mechanical Contractor
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		FS	Floor sink	NIC	Not In Contract
BTC	Branch to connection	G	Gas	PC	Plumbing Contractor
C&P	Cord & plug provided	GC	General Contractor	QD	Quick disconnect
CFM	Cubic feet per minute	GI	Grease interceptor	SP	Static pressure (WG)
CR	Condensate return	HP	Horsepower	SR	Single receptacle
CW	Cold water	HW	Hot water	SS	Steam supply
DFA	Drop from above	H&CW	Hot & cold water	W	Waste (direct conn.)

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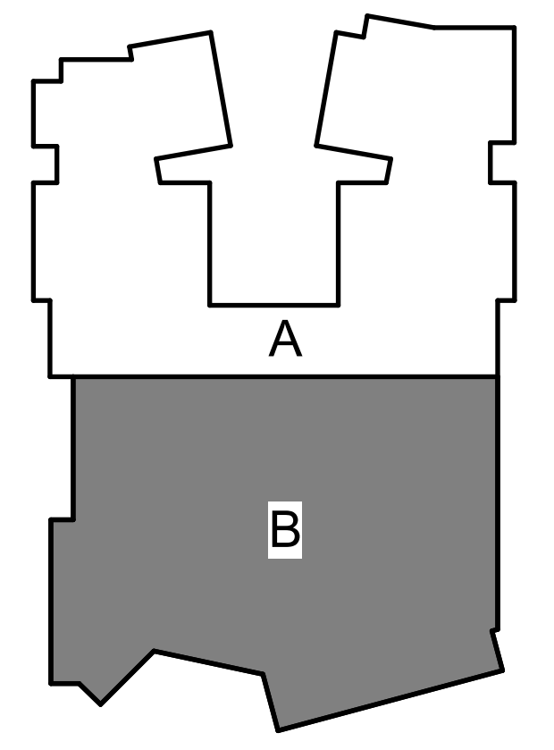

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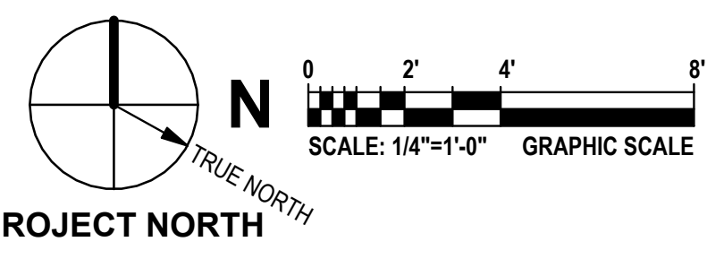
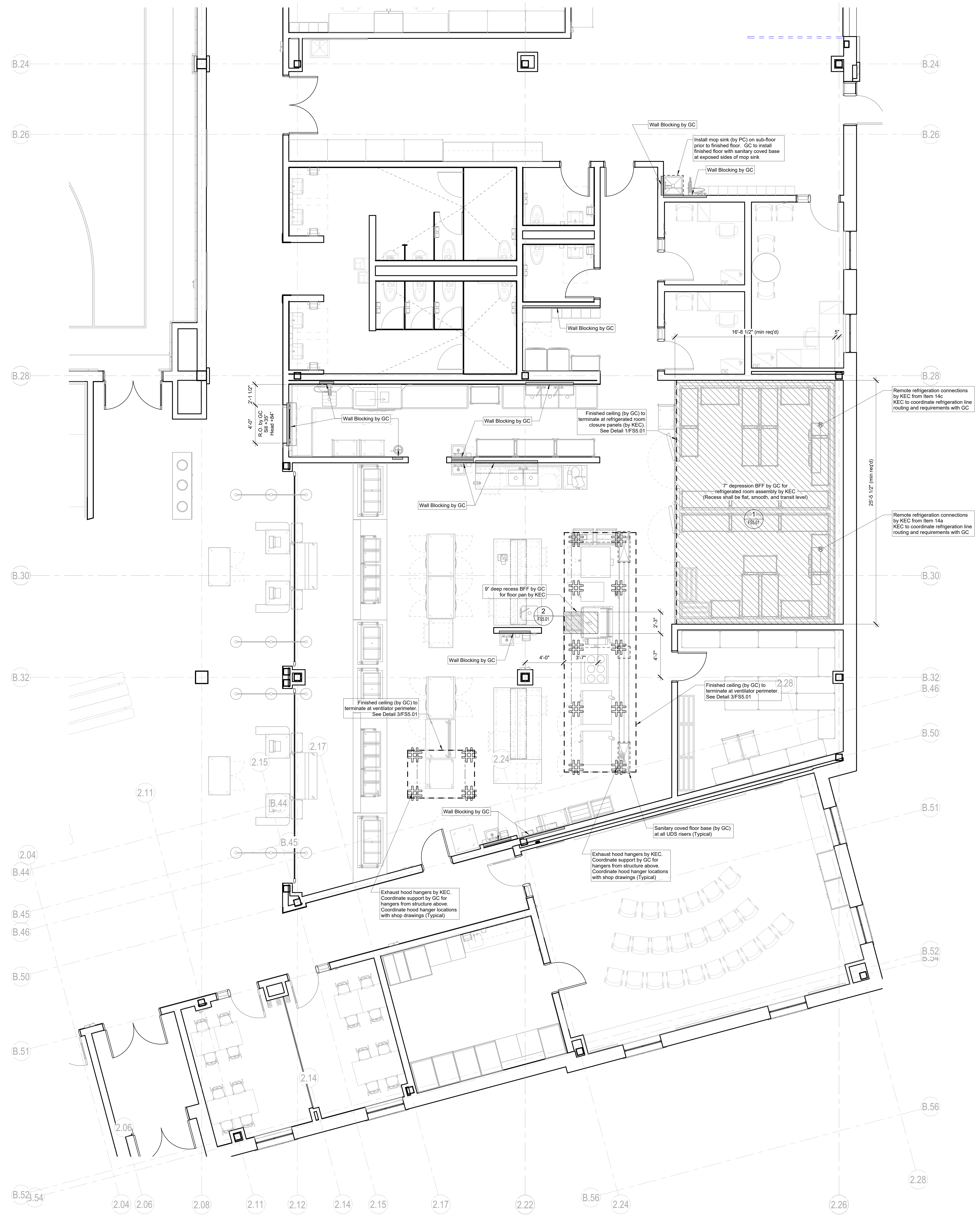


SHEET TITLE:

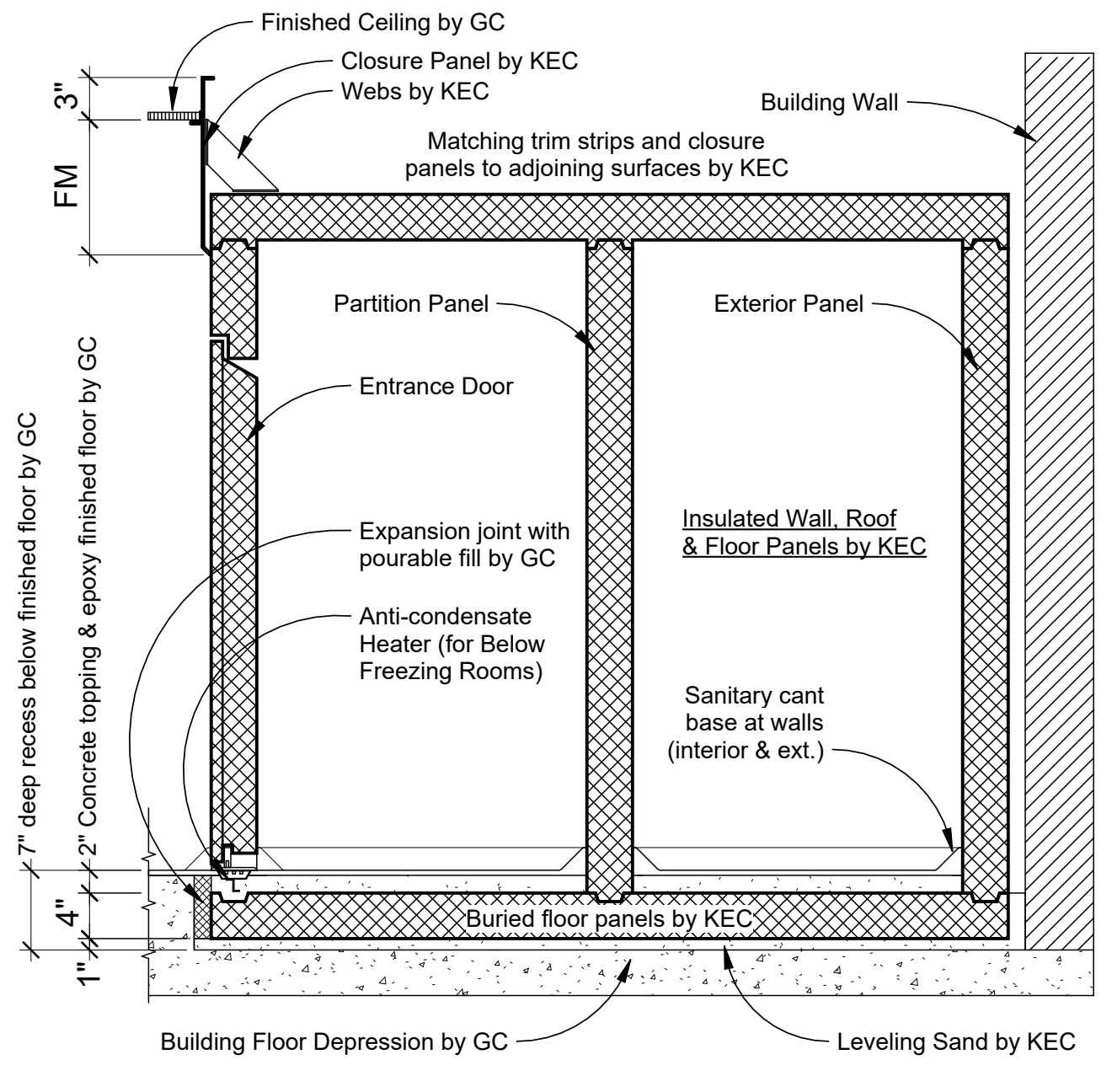
FOODSERVICE
EQUIPMENT
VENTILATION
ROUGH-IN PLAN

SHEET NUMBER:

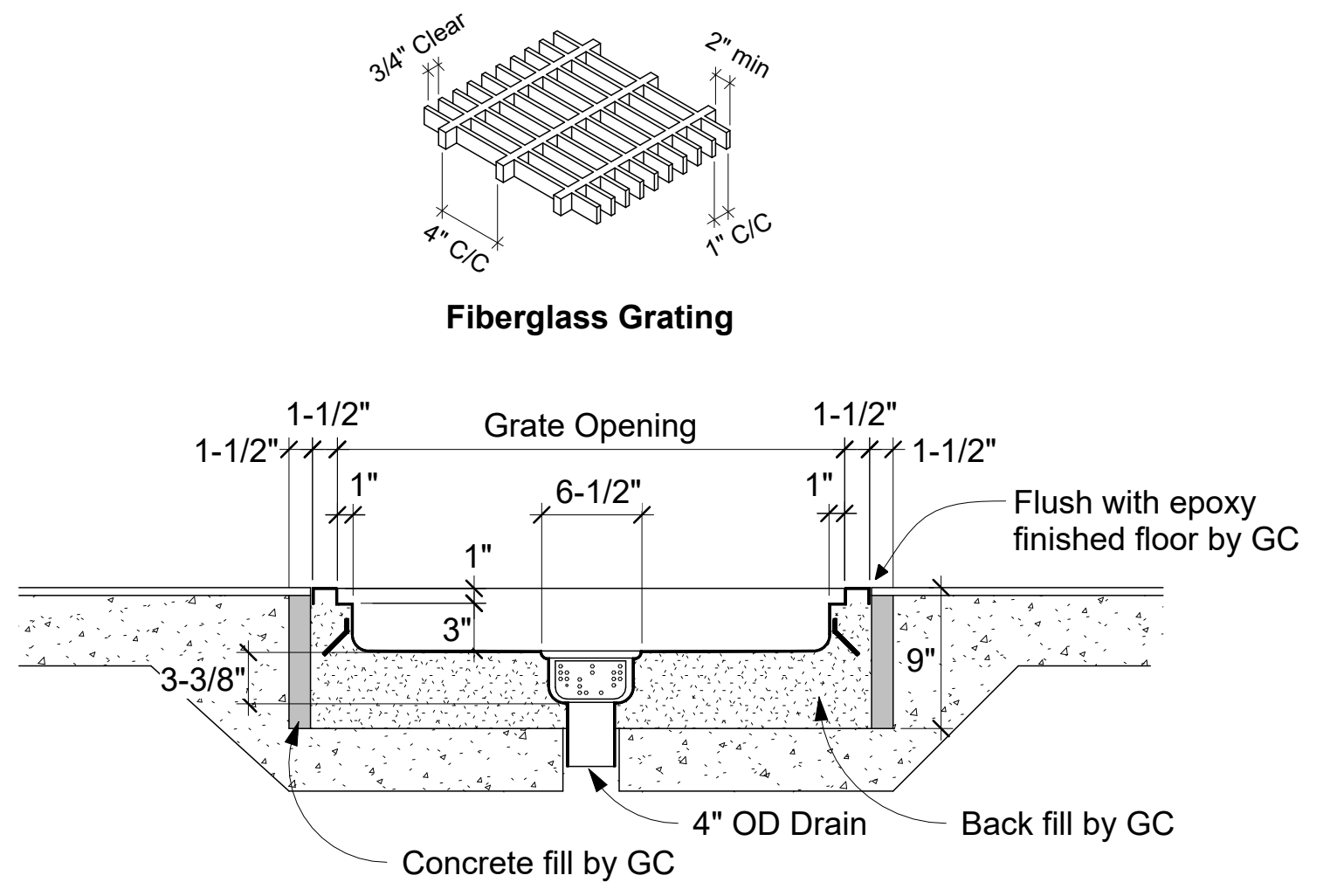
FS4.01


Wall Blocking by GC
Install mop sink (by PC) on sub-floor prior to finished floor. GC to install finished floor with sanitary coved base at exposed sides of mop sink
Wall Blocking by GC
Wall Blocking by GC
16'-8 1/2" (min req'd)
5"
2'-1 1/2"
4'-0"
R.O. by GC Sill +35" Head +84"
Wall Blocking by GC
Wall Blocking by GC
Finished ceiling (by GC) to terminate at refrigerated room closure panels (by KEC). See Detail 1/FS5.01
Remote refrigeration connections by KEC from Item 14c KEC to coordinate refrigeration line routing and requirements with GC
Wall Blocking by GC
7" depression BFF by GC for refrigerated room assembly by KEC (Recess shall be flat, smooth, and transit level)
1 FS5.01
25'-5 1/2" (min req'd)
Remote refrigeration connections by KEC from Item 14a KEC to coordinate refrigeration line routing and requirements with GC
9" deep recess BFF by GC for floor pan by KEC
2 FS5.01
2'-3"
4'-7"
4'-0"
3'-7"
Wall Blocking by GC
Finished ceiling (by GC) to terminate at ventilator perimeter. See Detail 3/FS5.01
Finished ceiling (by GC) to terminate at ventilator perimeter. See Detail 3/FS5.01
Wall Blocking by GC
Sanitary coved floor base (by GC) at all UDS risers (Typical)
Exhaust hood hangers by KEC. Coordinate support by GC for hangers from structure above. Coordinate hood hanger locations with shop drawings (Typical)
Exhaust hood hangers by KEC. Coordinate support by GC for hangers from structure above. Coordinate hood hanger locations with shop drawings (Typical)

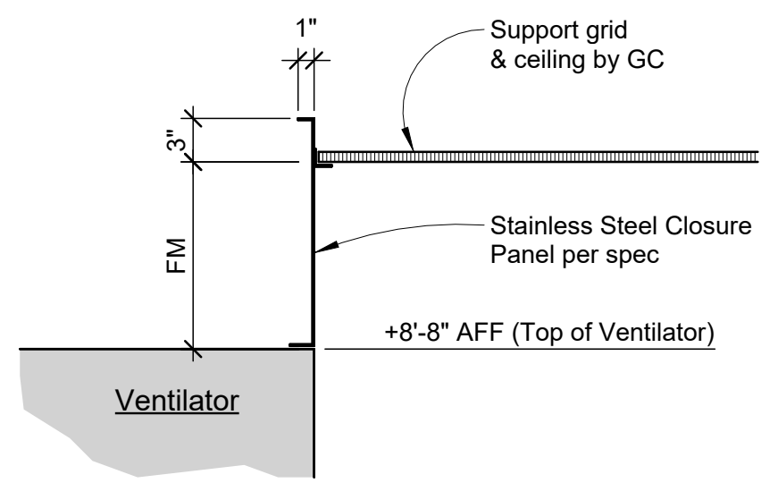
FOODSERVICE EQUIPMENT SPECIAL CONDITIONS PLAN
1/4" = 1'-0"


Finished Ceiling by GC
Closure Panel by KEC
Webs by KEC
Building Wall
Matching trim strips and closure panels to adjoining surfaces by KEC
3"
FM
Partition Panel
Exterior Panel
Entrance Door
Expansion joint with pourable fill by GC
Insulated Wall, Roof & Floor Panels by KEC
Anti-condensate Heater (for Below Freezing Rooms)
Sanitary cant base at walls (interior & ext.)
7" deep recess below finished floor by GC
2" Concrete topping & epoxy finished floor by GC
4"
1"
Buried floor panels by KEC
Building Floor Depression by GC
Leveling Sand by KEC

1 FS5.01 Detail - Refrigerated Rooms
NTS



2 FS5.01 Detail - Floor Pan & Grate
NTS


1"
Support grid & ceiling by GC
3"
FM
Stainless Steel Closure Panel per spec
+8'-8" AFF (Top of Ventilator)
Ventilator

3 FS5.01 Detail - Ventilator Ceiling Closure
NTS

SPECIAL CONDITIONS NOTES

1) DIMENSIONS ON THIS PLAN ARE PROVIDED FOR DESIGN INTENT. IT IS THE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR TO VERIFY AND COORDINATE ALL DIMENSIONS AND HEIGHTS LISTED IN THE FIELD WITH THE EQUIPMENT BEING PROVIDED.

2) WALK-IN REFRIGERATED ROOM SLAB DEPRESSIONS MUST BE SMOOTH AND LEVEL, SIZED AS SHOWN ON PLAN.

3) THE GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING WALL BLOCKING AS INDICATED FOR SUPPORTING WALL MOUNTED EQUIPMENT. KITCHEN EQUIPMENT CONTRACTOR SHALL VERIFY AND COORDINATE ALL LOCATIONS AND HEIGHTS PROVIDED IN THE FIELD.

4) WALL FLASHING, WHERE SPECIFIED, MUST BE A MINIMUM OF 20 GAUGE STAINLESS STEEL, PROVIDED AND INSTALLED BY THE KITCHEN EQUIPMENT CONTRACTOR. STAINLESS STEEL TO BE CUT IN THE LARGEST SHEETS POSSIBLE TO MINIMIZE JOINTS. ALL SEAMS TO BE COVERED WITH BATTEN STRIPS AND CAP STRIPS PROVIDED AT FLASHING ENDS. PROVIDE CAREFULLY PUNCHED HOLES AT SERVICE LOCATIONS. ALL WALL FLASHING DIMENSIONS MUST BE FIELD VERIFIED BY THE KITCHEN EQUIPMENT CONTRACTOR PRIOR TO FABRICATION.

5) CORNER GUARDS, WHERE SPECIFIED, MUST BE A MINIMUM OF 14 GAUGE STAINLESS STEEL PROVIDED AND INSTALLED BY THE KITCHEN EQUIPMENT CONTRACTOR. BREAK LONG EDGES SO THAT THE GUARDS "HUG" THE WALL AND SECURE TO THE WALL WITH A SUITABLE ADHESIVE. ALL CORNER GUARD DIMENSIONS AND ANGLES MUST BE FIELD VERIFIED BY THE KITCHEN EQUIPMENT CONTRACTOR PRIOR TO FABRICATION.

6) KITCHEN EQUIPMENT CONTRACTOR IS RESPONSIBILE FOR THE INSTALLATION OF THE REMOTE REFRIGERATION LINE RUNS AND COORDINATION OF THE COMPLETE REMOTE REFRIGERATION SYSTEM WITH THE GENERAL CONTRACTOR.

Abbreviations used:

A	Amperes	DR	Duplex receptacle	IW	Indirect Waste
AFF	Above finished floor	EC	Electrical contractor	KEC	Kitchen Equip. Contractor
ATC	Automatic Temp. Controls Contractor	EXH	Exhaust	KW	Kilowatt
		FD	Floor drain	MBTU	BTU per hour/1000
BFF	Below finished floor	FFD	Funnel floor drain	MC	Mechanical Contractor
BMS	Building Management System	FHW	Fahrenheit hot water	MUA	Make-up air
		FS	Floor sink	NIC	Not In Contract
BTC	Branch to connection	G	Gas	PC	Plumbing Contractor
C&P	Cord & plug provided	GC	General Contractor	QD	Quick disconnect
CFM	Cubic feet per minute	GI	Grease interceptor	SP	Static pressure (WG)
CR	Condensate return	HP	Horsepower	SR	Single receptacle
CW	Cold water	HW	Hot water	SS	Steam supply
DFA	Drop from above	H&CW	Hot & cold water	W	Waste (direct conn.)

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320 SALEM STREET
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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

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NO.	DATE	TITLE

ISSUE TITLE AND DATE:

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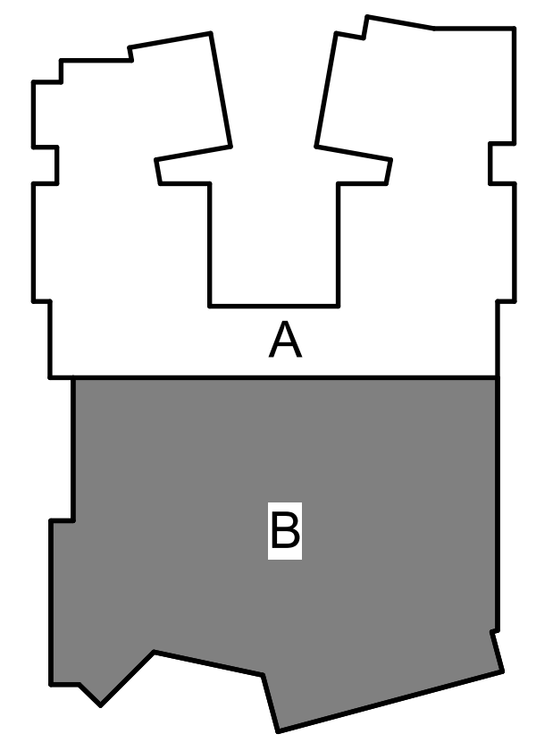
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:

FOODSERVICE
EQUIPMENT SPECIAL
CONDITIONS PLAN

SHEET NUMBER:

FS5.01

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FIRE PROTECTION NOTES

1. FOLLOW THE LATEST REQUIREMENTS OF 2019 NFPA 13, THE MASSACHUSETTS STATE BUILDING CODE 10TH EDITION, INSURANCE UNDERWRITER'S, THOSE OF THE TOWN OF WILMINGTON, MA AND THOSE OF ANY OTHER CITY, STATE OR FEDERAL AGENCY HAVING JURISDICTION OVER THIS PROJECT.
2. PLANS INDICATE GENERAL SCOPE OF WORK. REFER TO CONTRACT DOCUMENTS AND SPECIFICATIONS FOR DETAILS ON ENTIRE SCOPE OF WORK. LOCATIONS OF SPRINKLER OUTLETS, BRANCH LINES AND FEED MAINS ARE DIAGRAMMATIC. THE DRAWINGS ARE NOT MEANT TO SHOW ALL OFFSETS AND PIPING ELEVATION CHANGES. THE CONTRACTOR SHALL VERIFY ALL NEEDED OFFSETS AND PIPE ELEVATIONS TO INSTALL THE PROPOSED SPRINKLER SYSTEM.
3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE WORK WITH THAT OF ALL OTHER TRADES. THE INSTALLING CONTRACTOR SHALL COORDINATE ALL WORK TO THE EXISTING AND/OR NEW FIELD CONDITIONS.
4. ANY INTERFERENCE SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE AND SHALL BE RESOLVED PRIOR TO THE INSTALLATION OF WORK. ANY SIZES OF NEW PIPING SHOWN ON THE PLAN ARE MEANT TO BE A GUIDE FOR ESTIMATING THE WORK.
5. PROVIDE A NEW FLOW TEST AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION & NFPA-13. USE THE RESULTS OF THE NEW HYDRANT FLOW TEST TO HYDRAULICALLY DESIGN THE SPRINKLER SYSTEMS WITHIN THE BUILDING. THE CONTRACTOR SHALL PERFORM THE HYDRAULIC CALCULATIONS TO VERIFY THE PIPE SIZES ARE ADEQUATE TO PROVIDE THE NECESSARY SYSTEM DEMANDS.
6. THE SPRINKLER CONTRACTOR SHALL COORDINATE PIPE HEIGHTS WITH THE BEAM PENETRATIONS AND PIPE HEIGHTS REQUIRED THROUGHOUT TO ALLOW FOR PROPER AND ADEQUATE SYSTEM DRAINING ON ALL LEVELS. PROVIDE LOW POINT DRAINS AND DRUM DRIPS THROUGHOUT WHERE REQUIRED BY 2019 NFPA 13.
7. THE SPRINKLER CONTRACTOR SHALL PROVIDE AS PART OF THIS CONTRACT SPRINKLERS BELOW FIXED OBSTRUCTIONS 48" AND LARGER AS REQUIRED BY 2019 NFPA 13, 10.2.7.3.2. IT IS THE RESPONSIBILITY OF THE SPRINKLER CONTRACTOR TO PROVIDE THE REQUIRED SPRINKLERS AND ALL ASSOCIATED PIPING, FITTINGS, HANGERS, ETC. FOR A COMPLETE INSTALLATION.
8. THE SPRINKLER CONTRACTOR SHALL PROVIDE AS PART OF HIS CONTRACT AN INSPECTOR'S TEST STATION ON EACH SPRINKLER ZONE. THE INSPECTOR'S TEST STATION WILL BE LOCATED AT THE MOST HYDRAULICALLY REMOTE PART OF EACH ZONE AND SHALL BE IDENTIFIED ON THE SPRINKLER SHOP DRAWINGS.
9. REFER TO 2019 NFPA 13 TABLE 9.4.2.5(a) FOR TEMPERATURE RATING OF SPRINKLERS BASED ON DISTANCE FROM HEAT SOURCES SUCH AS HEATING DUCTS, DIFFUSERS AND UNIT HEATERS.
10. PROVIDE AUXILIARY DRAINS AT ALL LOW POINTS PER 2019 NFPA 13, SECTION 16.10.5.
11. SPRINKLER HEADS SHALL BE LOCATED IN THE CENTER OF THE CEILING TILES. WHEN THE CEILING TILE IS DIVIDED INTO SECTIONS BY GROOVED DEPRESSIONS, THE SPRINKLER HEAD SHALL BE LOCATED IN THE CENTER OF ONE OF THE PANELS.
12. COORDINATE LOCATION OF PIPING AND SPRINKLERS IN ELECTRIC AND NETWORK ROOMS. PIPING AND SPRINKLERS NOT TO BE LOCATED ABOVE ELECTRICAL EQUIPMENT.
13. COMPLETED AND SIGNED CONTRACTOR'S MATERIAL AND TEST CERTIFICATE(S) AS INDICATED IN 2019 NFPA 13 FIGURE 28.1, INCLUDING HYDROSTATIC TESTING, IN ACCORDANCE WITH 2019 NFPA 13 SECTION 28.2.1 WILL BE REQUIRED PRIOR TO RELEASE OF FINAL AFFIDAVITS.
14. REFER TO CIVIL UTILITY DRAWINGS, INCLUDING UTILITY PLANS AND DETAILS, AND WATER UTILITY SPECIFICATIONS FOR MATERIALS AND INSTALLATION OF BURIED ON SITE FIRE PROTECTION SERVICE MAINS.
15. SPRINKLER SYSTEMS SHALL BE HYDRAULICALLY DESIGNED AND CALCULATED BY THE FIRE PROTECTION CONTRACTOR. THE FIRE PROTECTION CONTRACTOR SHALL SUBMIT ALL REQUIRED HYDRAULIC CALCULATIONS TO PROVE THE HYDRAULICALLY MOST REMOTE AREAS ARE BEING PROTECTED PER SYSTEM AND OCCUPANCY HAZARD. FABRICATION DRAWINGS AND HYDRAULIC CALCULATIONS SHALL BE SUBMITTED TO THE AUTHORITY HAVING JURISDICTION AND INSURANCE UNDERWRITERS (IF REQUIRED) PRIOR TO SUBMITTING TO THE ARCHITECT FOR REVIEW. FABRICATION DRAWINGS AND HYDRAULIC CALCULATIONS SHALL BEAR THE SEAL OF REGISTRATION OF A QUALIFIED REGISTERED PROFESSIONAL FIRE PROTECTION ENGINEER. MAINTAIN A MINIMUM OF 10 PSI CUSHION BETWEEN REQUIRED PRESSURE AND AVAILABLE PRESSURE. COMPLY WITH ALL UNDERWRITERS' AND CODE AUTHORITIES REQUIREMENTS INCLUDING MAXIMUM WATER FLOW VELOCITY IN THE FIRE PROTECTION SYSTEM.

FIRE PROTECTION LEGEND

—WS—	WS	WET SPRINKLER PIPE
—SD—	SD	SPRINKLER DRAIN
—SP—	SP	STAND PIPE
—FDC—	FDC	FIRE DEPARTMENT CONNECTION
⬡ #		HYDRAULIC REFERENCE POINT
○		UPRIGHT SPRINKLER HEAD
●		CONCEALED PENDENT SPRINKLER HEAD
◓		PENDENT SPRINKLER HEAD
◎		INTERMEDIATE LEVEL PENDENT SPRINKLER HEAD
◉		UPRIGHT SPRINKLER HEAD BELOW DUCTWORK
● DRY		CONCEALED PENDENT SPRINKLER HEAD DRY - INDICATES DRY TYPE SPRINKLER HEAD
●☆		CONCEALED PENDENT SPRINKLER HEAD (☆) - INDICATES UP & DN TYPE SPRINKLER HEAD
◁		HORIZONTAL SIDEWALL SPRINKLER HEAD DRY - INDICATES DRY TYPE SPRINKLER HEAD
◀		HORIZONTAL EXTENDED COVERAGE SIDEWALL SPRINKLER HEAD DRY - INDICATES DRY TYPE SPRINKLER HEAD
AB	AB	ELECTRIC ALARM BELL
DC	DC	DRESSER COUPLING
	WTS	WATER TIGHT SLEEVE
⊗		RISER PIPE (THRU FLOOR OR CEILING)
	CAP	CAPPED PIPE
TS	OSY	OS&Y VALVE WITH SUPERVISORY TAMPER SWITCH
	CV	CHECK VALVE
(FS)	FS	FLOW SWITCH
	DCVA	DOUBLE CHECK VALVE ASSEMBLY
⋈	FCVA	FLOOR CONTROL VALVE ASSEMBLY
▼	WRCV	WET RISER CHECK VALVE
◆	DACV	DRY ALARM CHECK VALVE
⊤	FDC	FIRE DEPARTMENT CONNECTION
⋈	FDV	FIRE DEPARTMENT VALVE
◇ NS		NO SPRINKLERS
AP ⊠		ACCESS PANEL
	NTS	NOT TO SCALE
	TYP	TYPICAL
	AFF	ABOVE FINISHED FLOOR
	AFG	ABOVE FINISHED GRADE
	GC	GENERAL CONTRACTOR
	FPC	FIRE PROTECTION CONTRACTOR
	C&C	CUT & CAP
	UG	UNDERGROUND
	DS	DRY SPRINKLERS
	ZCV	ZONE CONTROL VALVE

SPRINKLER SYSTEM DESIGN CRITERIA

	ART CLASS ROOMS, CORRIDORS, LEARNING CENTER, OFFICE, SMALL GROUP, TEACH WELLNESS, LIBRARY, VESTIBULE, STRIDES, TOILETS, MUSIC, CHORUS, CAFETERIA, ETC.	ART STORAGE, CUST CLOSET, MECHANICAL PUMP ROOM, KITCHEN, MAIN ELECTRICAL ROOM,STORAGE ROOM, STE CLASSROOM, ETC.
CLASSIFICATION	LIGHT HAZARD	ORDINARY HAZARD GP-1
DENSITY	0.10 GPM/SQ.FT	0.15 GPM/SQ.FT
DESIGN AREA	1500 SQ.FT	1500 SQ.FT
MAX. COVERAGE	225 SQ.FT	130 SQ.FT
HOSE ALLOWANCE	100 GPM	250 GPM

FLOW TEST DATA

STATIC PRESSURE	82 PSI
RESIDUAL PRESSURE	78 PSI
FLOW	1070 GPM
DATE & TIME	10/20/2025, 11:00 AM @ 320 SALEM STREET, WILMINGTON, MA

DORE + WHITTIER
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KEY PLAN

ORIENTATION AND SCALE:

SHEET TITLE:

FIRE PROTECTION LEGENDS, NOTES & ABBREVIATIONS

SHEET NUMBER:

FP0.01

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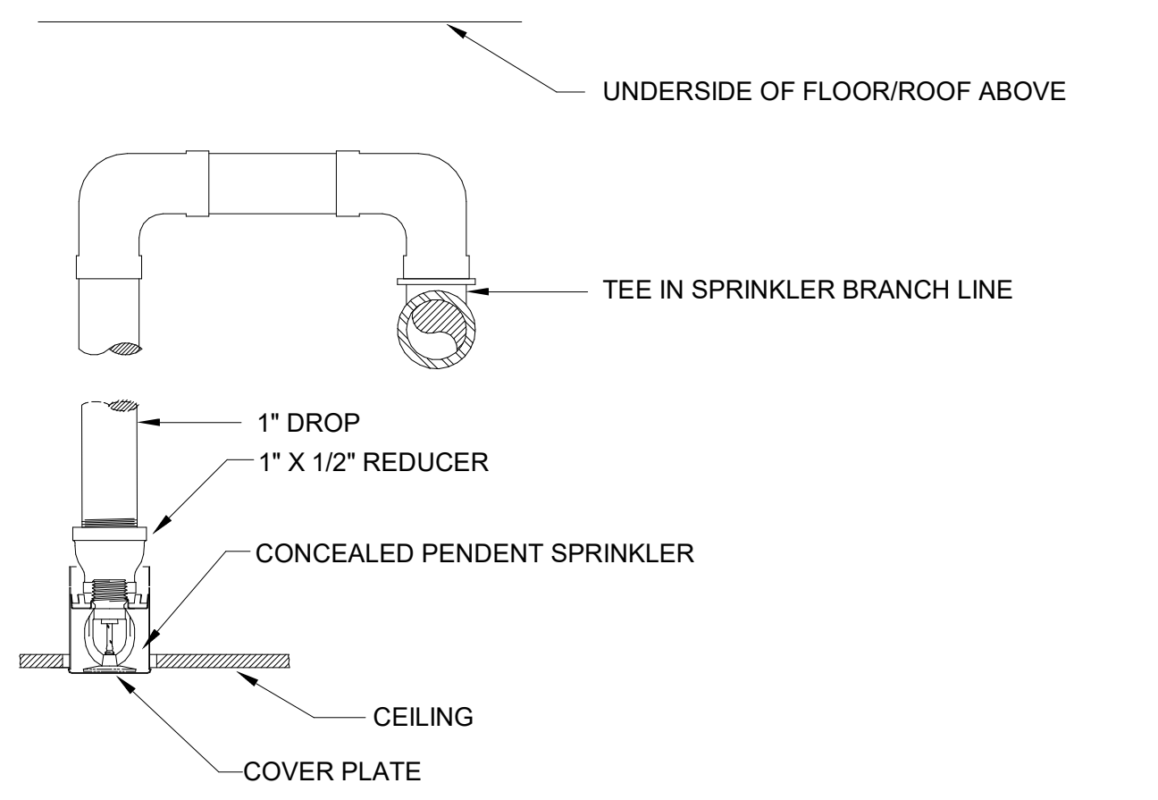
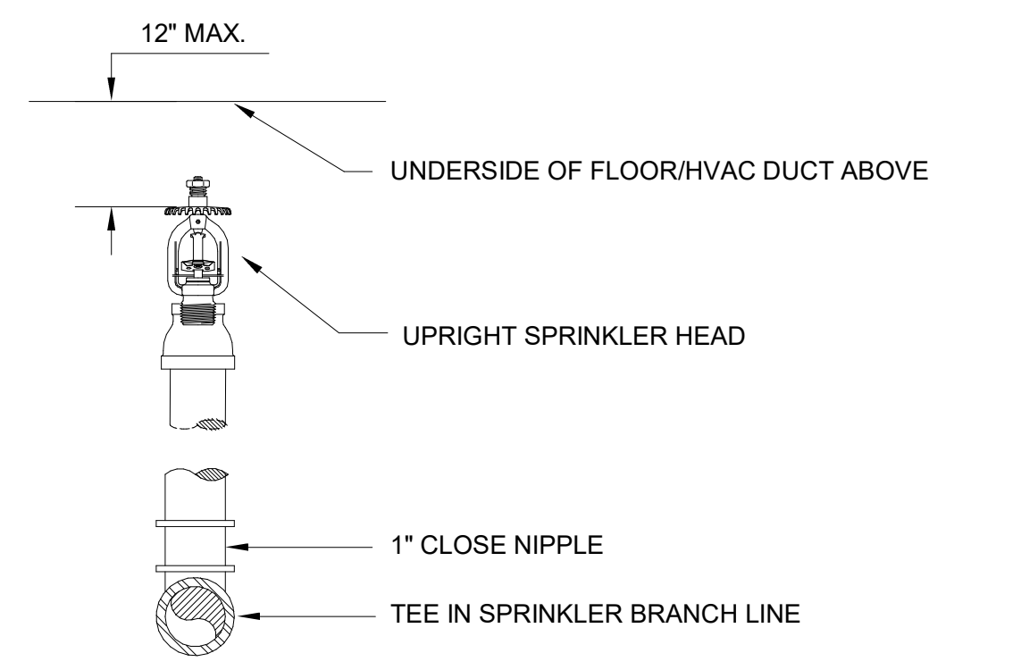

UNDERSIDE OF FLOOR/ROOF ABOVE
TEE IN SPRINKLER BRANCH LINE
1" DROP
1" X 1/2" REDUCER
CONCEALED PENDENT SPRINKLER
CEILING
COVER PLATE

(1) PENDENT SPRINKLER CONNECTION (CONCEALED)

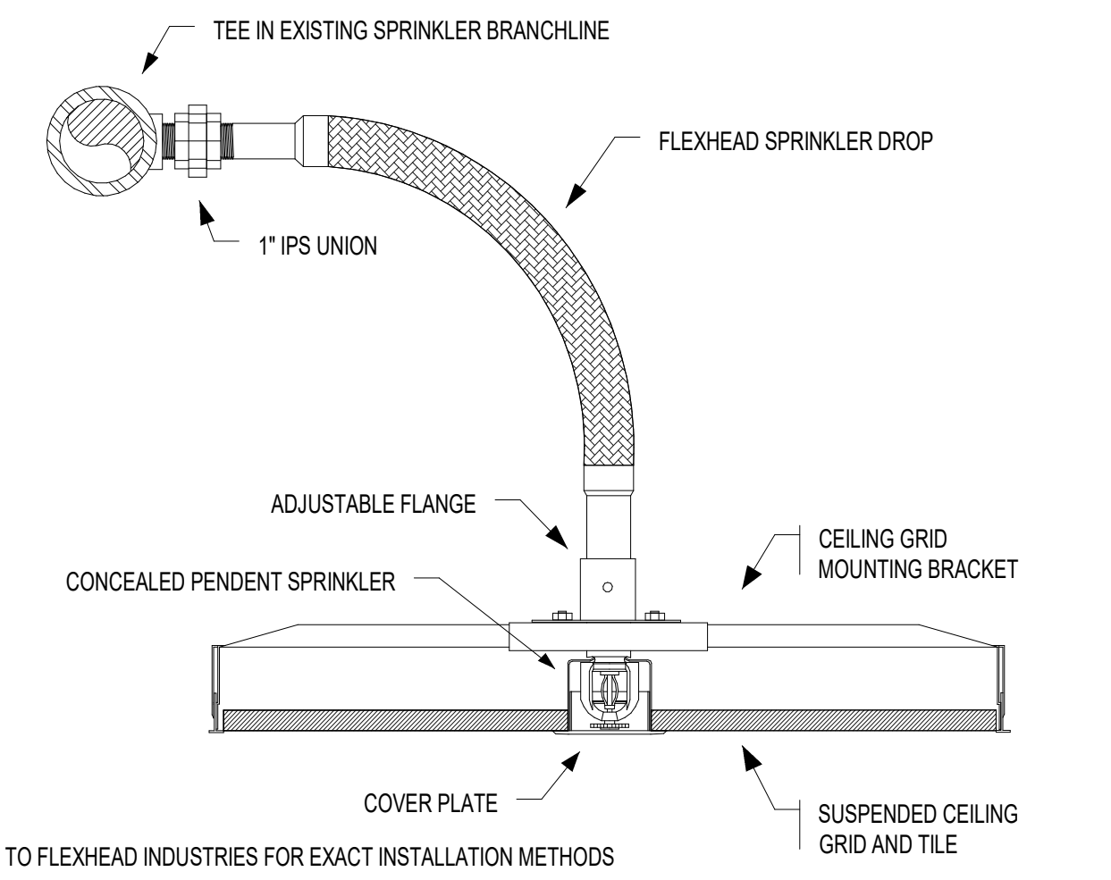
NO SCALE


12" MAX.
UNDERSIDE OF FLOOR/HVAC DUCT ABOVE
UPRIGHT SPRINKLER HEAD
1" CLOSE NIPPLE
TEE IN SPRINKLER BRANCH LINE

NOTE:
METAL CAGES TO BE INSTALLED FOR UPRIGHTS LOCATED IN MECHANICAL ROOM & GYM.

(2) UPRIGHT SPRINKLER CONNECTION

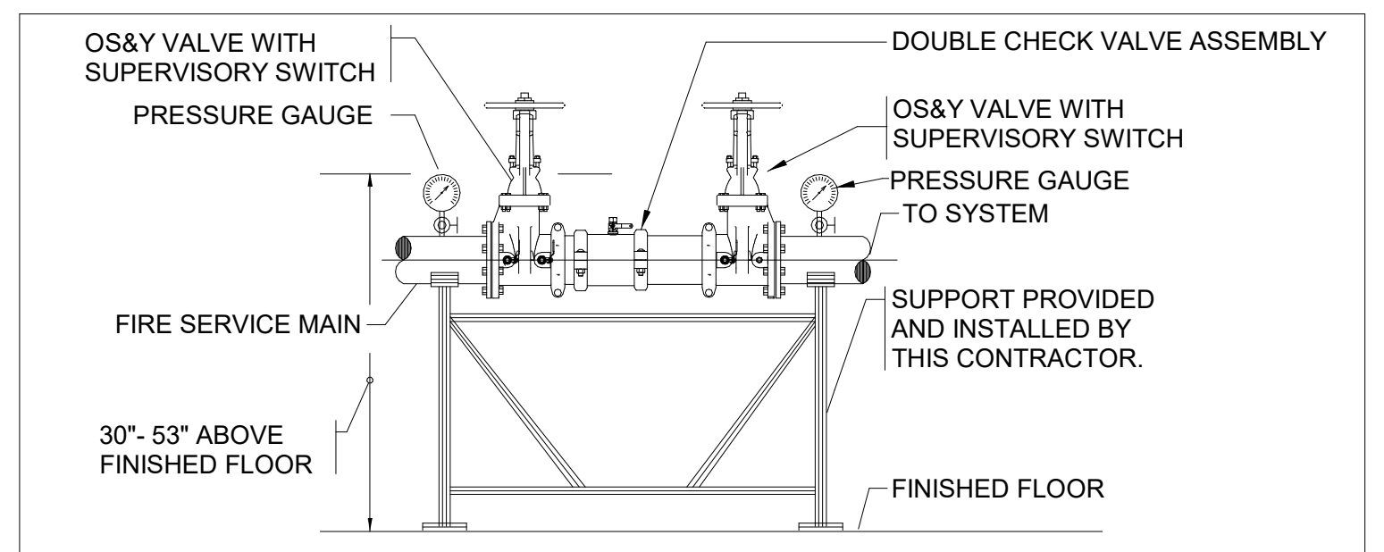
NO SCALE


TEE IN EXISTING SPRINKLER BRANCHLINE
FLEXHEAD SPRINKLER DROP
1" IPS UNION
ADJUSTABLE FLANGE
CEILING GRID MOUNTING BRACKET
CONCEALED PENDENT SPRINKLER
COVER PLATE
SUSPENDED CEILING GRID AND TILE

* REFER TO FLEXHEAD INDUSTRIES FOR EXACT INSTALLATION METHODS

(3) FLEXHEAD - CONCEALED

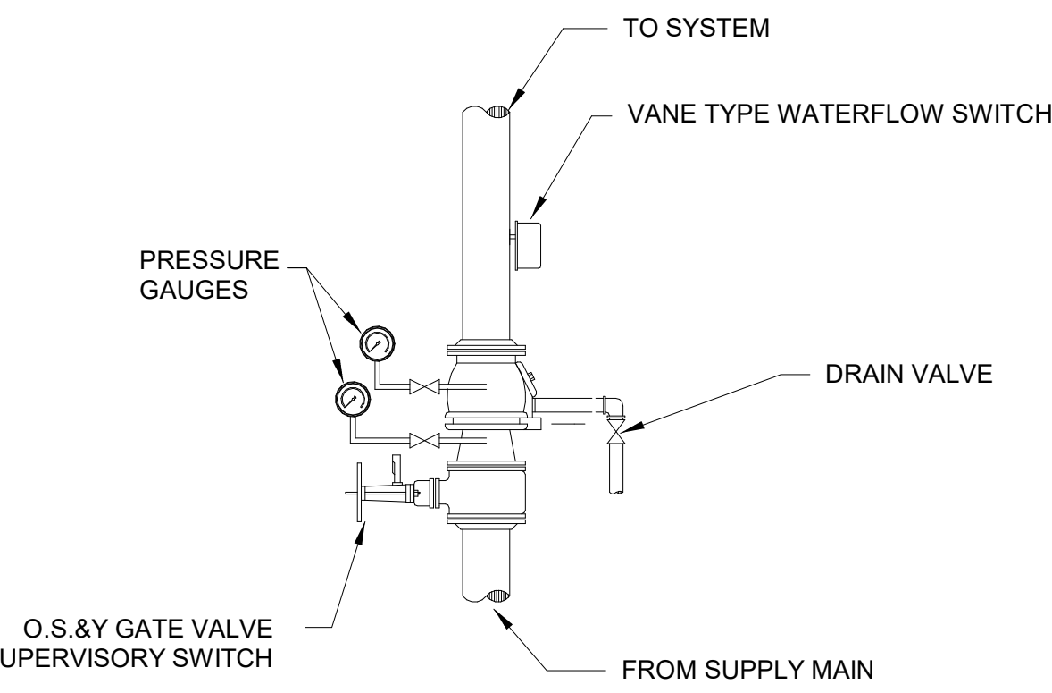
NO SCALE


OS&Y VALVE WITH SUPERVISORY SWITCH
PRESSURE GAUGE
DOUBLE CHECK VALVE ASSEMBLY
OS&Y VALVE WITH SUPERVISORY SWITCH
PRESSURE GAUGE
TO SYSTEM
FIRE SERVICE MAIN
SUPPORT PROVIDED AND INSTALLED BY THIS CONTRACTOR.
30"- 53" ABOVE FINISHED FLOOR
FINISHED FLOOR

NOTES:
1. FURNISH TO OWNER ONE TEST KIT AND SPARE PARTS KIT.
2. THIS CONTRACTOR SHALL ACT AS THE OWNERS AGENT IN SEEKING APPROVAL FROM ALL LOCAL AND STATE AUTHORITIES. THIS CONTRACTOR SHALL SUBMIT ALL PLANS, SPECS. AND APPLICATIONS REQUIRED FOR APPROVAL AND PAY ALL FEES.
3. SEE FLOOR PLANS FOR SIZES.
4. MAINTAIN 1'-0" CLEARANCE FROM WALL.
5. TEST AND CERTIFY EACH INSTALLATION.

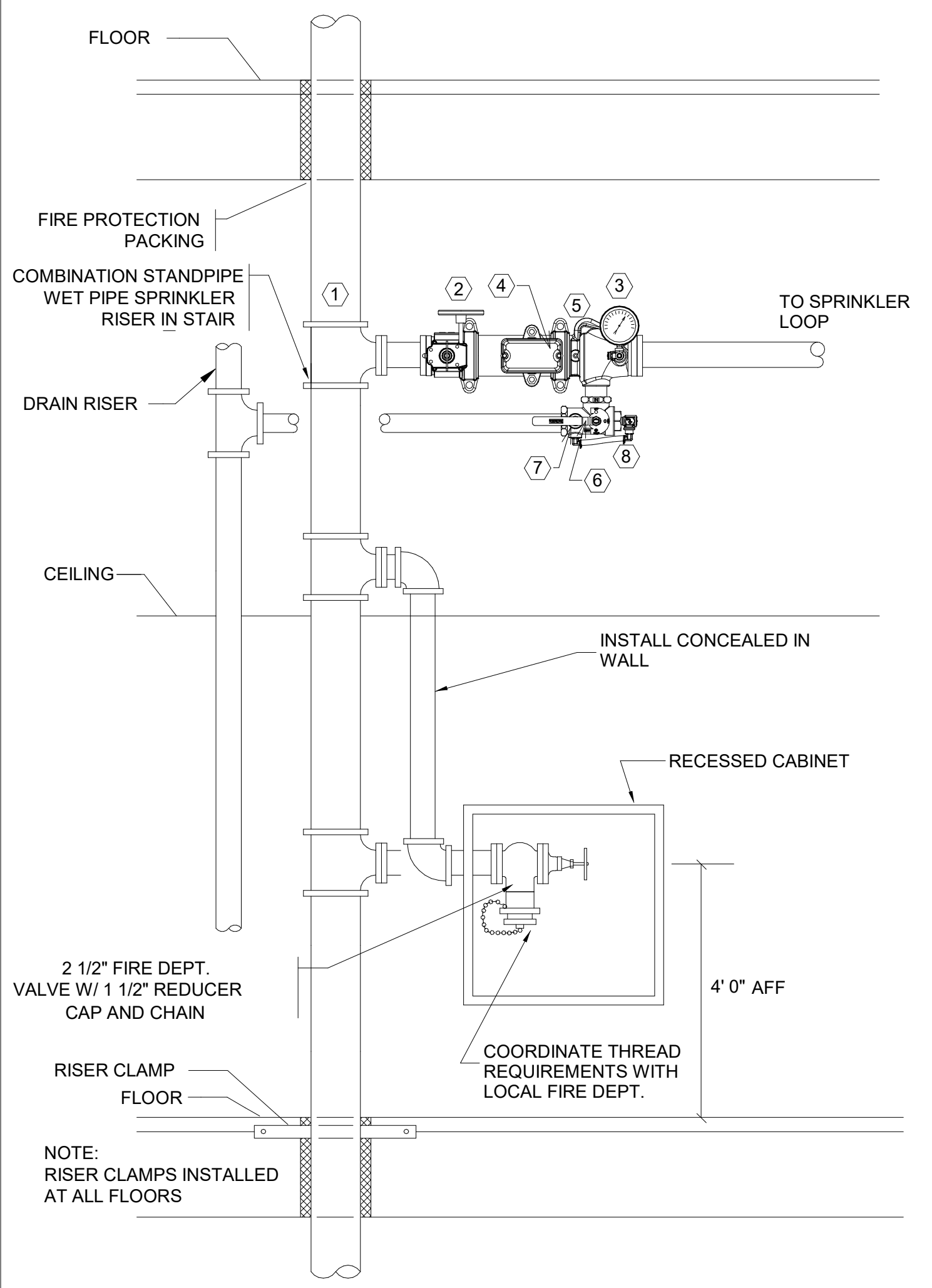
(4) DOUBLE CHECK BACKFLOW PREVENTER DIAGRAM

NO SCALE


TO SYSTEM
VANE TYPE WATERFLOW SWITCH
PRESSURE GAUGES
DRAIN VALVE
O.S.&Y GATE VALVE W/SUPERVISORY SWITCH
FROM SUPPLY MAIN

(5) WET RISER CHECK VALVE

NO SCALE

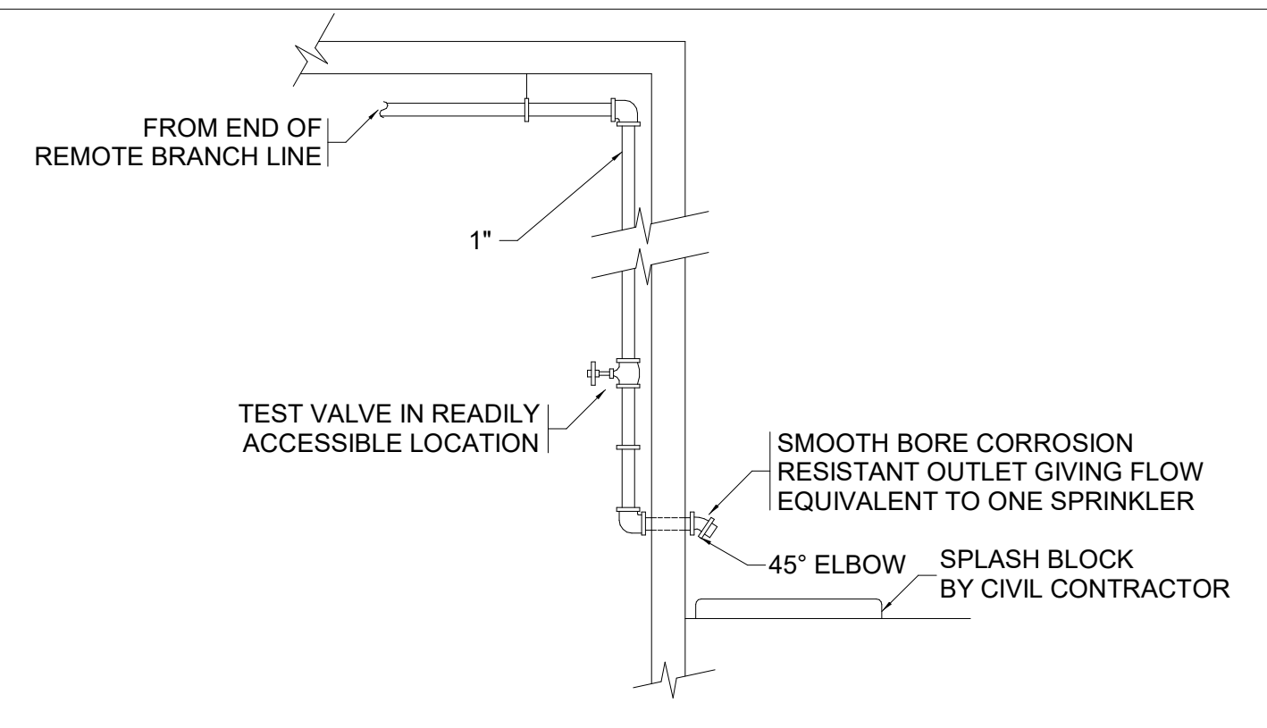

FLOOR
FIRE PROTECTION PACKING
COMBINATION STANDPIPE WET PIPE SPRINKLER RISER IN STAIR
DRAIN RISER
1
2
4
5
3
TO SPRINKLER LOOP
7
6
8
CEILING
INSTALL CONCEALED IN WALL
RECESSED CABINET
2 1/2" FIRE DEPT. VALVE W/ 1 1/2" REDUCER CAP AND CHAIN
4' 0" AFF
COORDINATE THREAD REQUIREMENTS WITH LOCAL FIRE DEPT.
RISER CLAMP
FLOOR

NOTE:
RISER CLAMPS INSTALLED AT ALL FLOORS

①	RISER	⑤	CHECK VALVE
②	BUTTERFLY VALVE W/SUPERVISORY SWITCH	⑥	INSPECTORS TEST / AUXILIARY DRAIN VALVE
③	PRESSURE GAUGE W/SHUT-OFF VALVE	⑦	1" SIGHT GLASS
④	WATER FLOW SWITCH	⑧	PRESSURE RELIEF VALVE SET AT 175 PSI

(6) FIRE DEPARTMENT AND FLOOR CONTROL VALVES

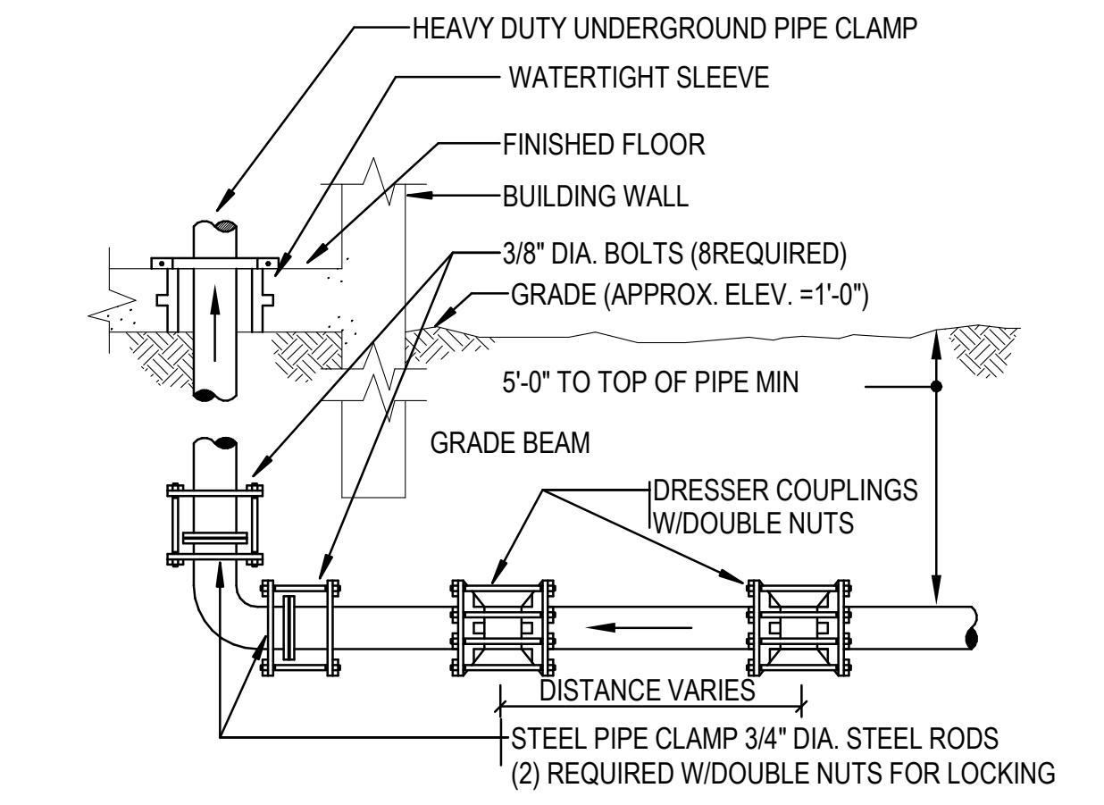
NO SCALE


FROM END OF REMOTE BRANCH LINE
1"
TEST VALVE IN READILY ACCESSIBLE LOCATION
SMOOTH BORE CORROSION RESISTANT OUTLET GIVING FLOW EQUIVALENT TO ONE SPRINKLER
45° ELBOW
SPLASH BLOCK BY CIVIL CONTRACTOR

NOTE: NOT LESS THAN 4 FEET OF EXPOSED TEST PIPE IN WARM ROOM BEYOND VALVE WHERE PIPE EXTENDS THROUGH WALL TO OUTSIDE.

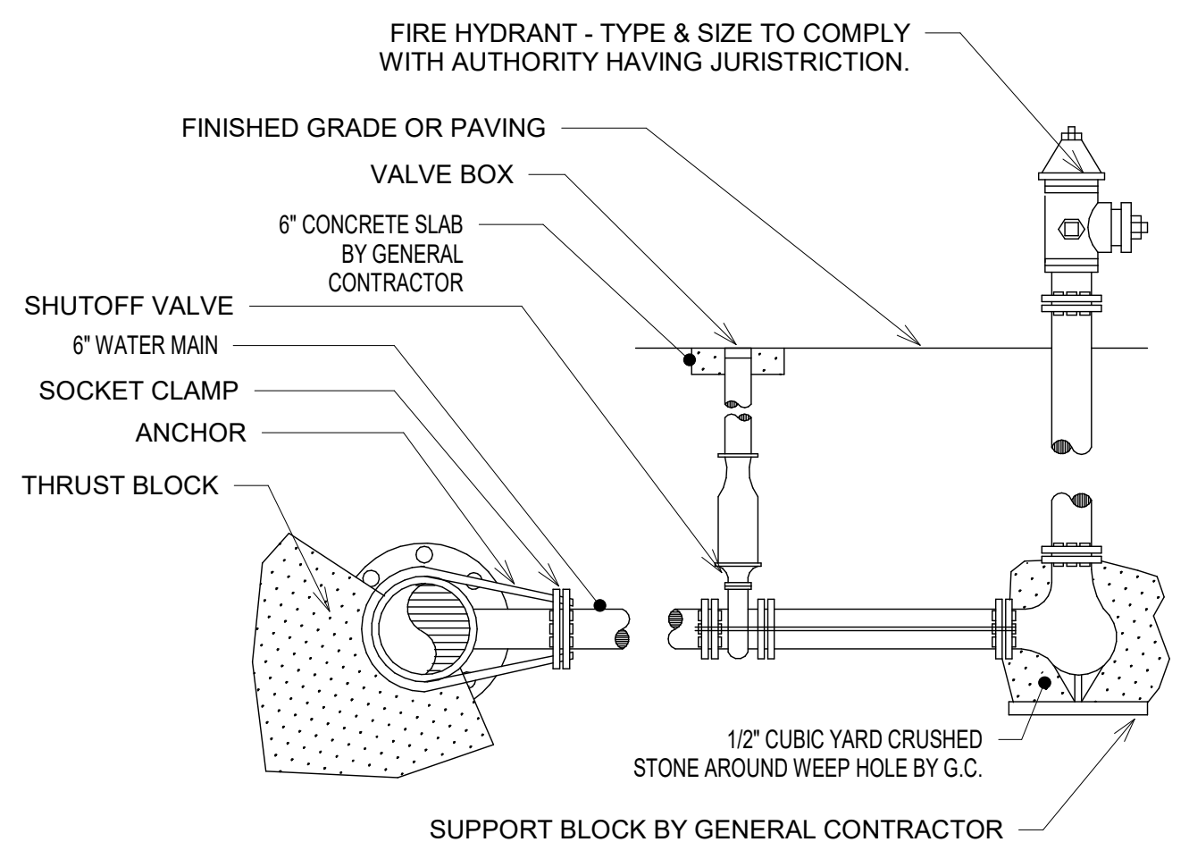
(7) INSPECTOR'S TEST CONNECTION (WET PIPE)

NO SCALE


HEAVY DUTY UNDERGROUND PIPE CLAMP
WATERTIGHT SLEEVE
FINISHED FLOOR
BUILDING WALL
3/8" DIA. BOLTS (8REQUIRED)
GRADE (APPROX. ELEV. =1'-0")
5'-0" TO TOP OF PIPE MIN
GRADE BEAM
DRESSER COUPLINGS W/DOUBLE NUTS
DISTANCE VARIES
STEEL PIPE CLAMP 3/4" DIA. STEEL RODS (2) REQUIRED W/DOUBLE NUTS FOR LOCKING

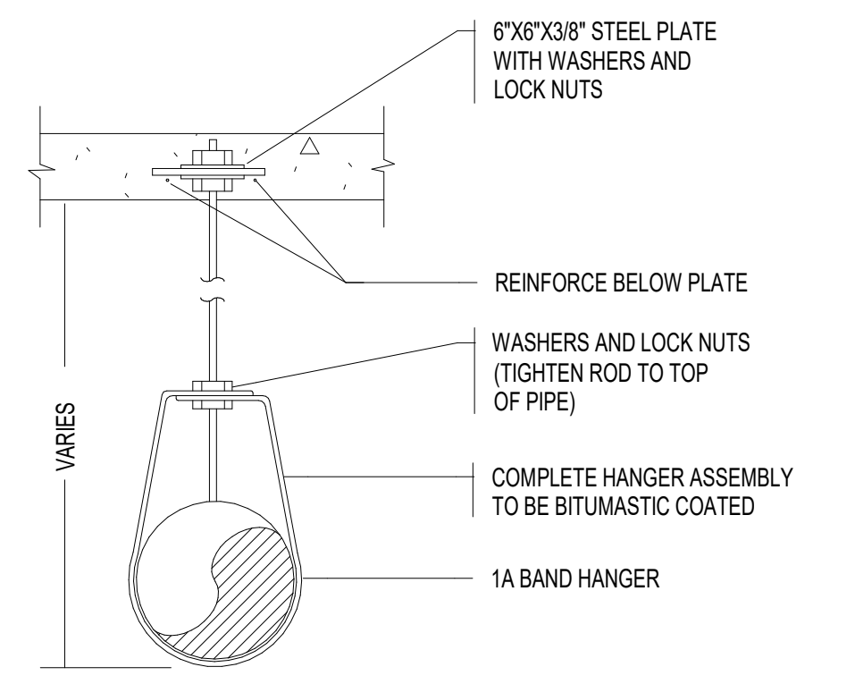
(8) WATER SERVICE ENTRANCE

NO SCALE


FIRE HYDRANT - TYPE & SIZE TO COMPLY WITH AUTHORITY HAVING JURISTRICTION.
FINISHED GRADE OR PAVING
VALVE BOX
6" CONCRETE SLAB BY GENERAL CONTRACTOR
SHUTOFF VALVE
6" WATER MAIN
SOCKET CLAMP
ANCHOR
THRUST BLOCK
1/2" CUBIC YARD CRUSHED STONE AROUND WEEP HOLE BY G.C.
SUPPORT BLOCK BY GENERAL CONTRACTOR

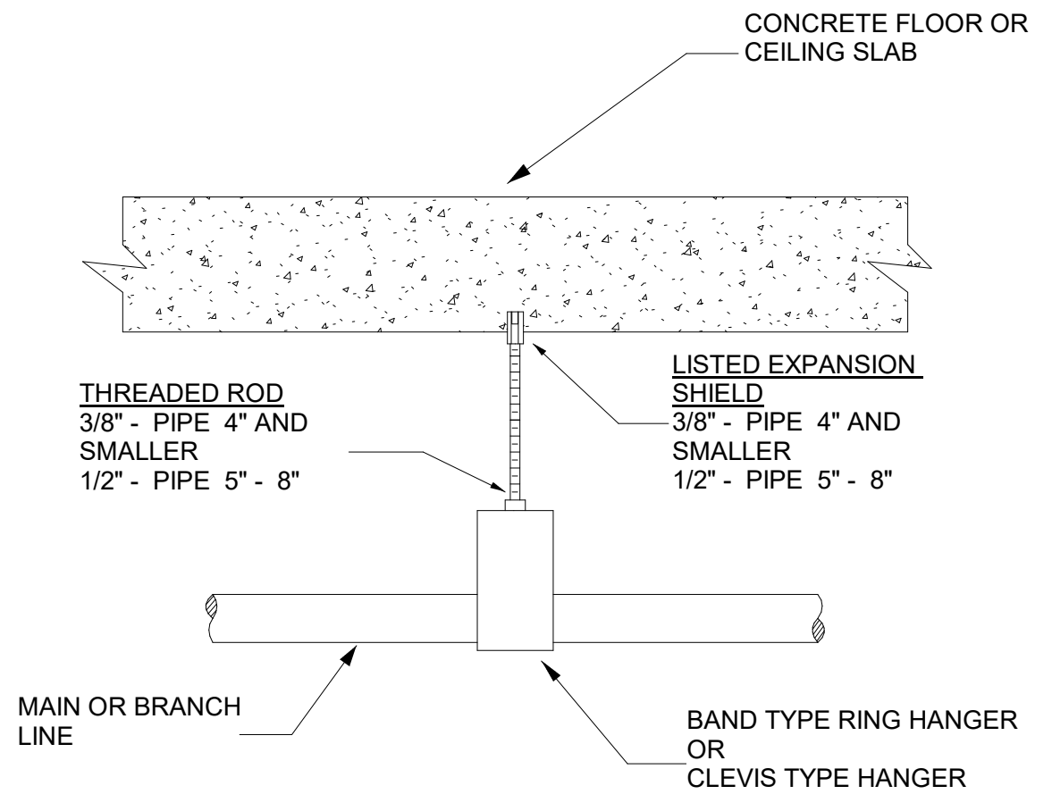
(9) FIRE HYDRANT

NO SCALE


6"X6"X3/8" STEEL PLATE WITH WASHERS AND LOCK NUTS
REINFORCE BELOW PLATE
WASHERS AND LOCK NUTS (TIGHTEN ROD TO TOP OF PIPE)
COMPLETE HANGER ASSEMBLY TO BE BITUMASTIC COATED
1A BAND HANGER
VARIES

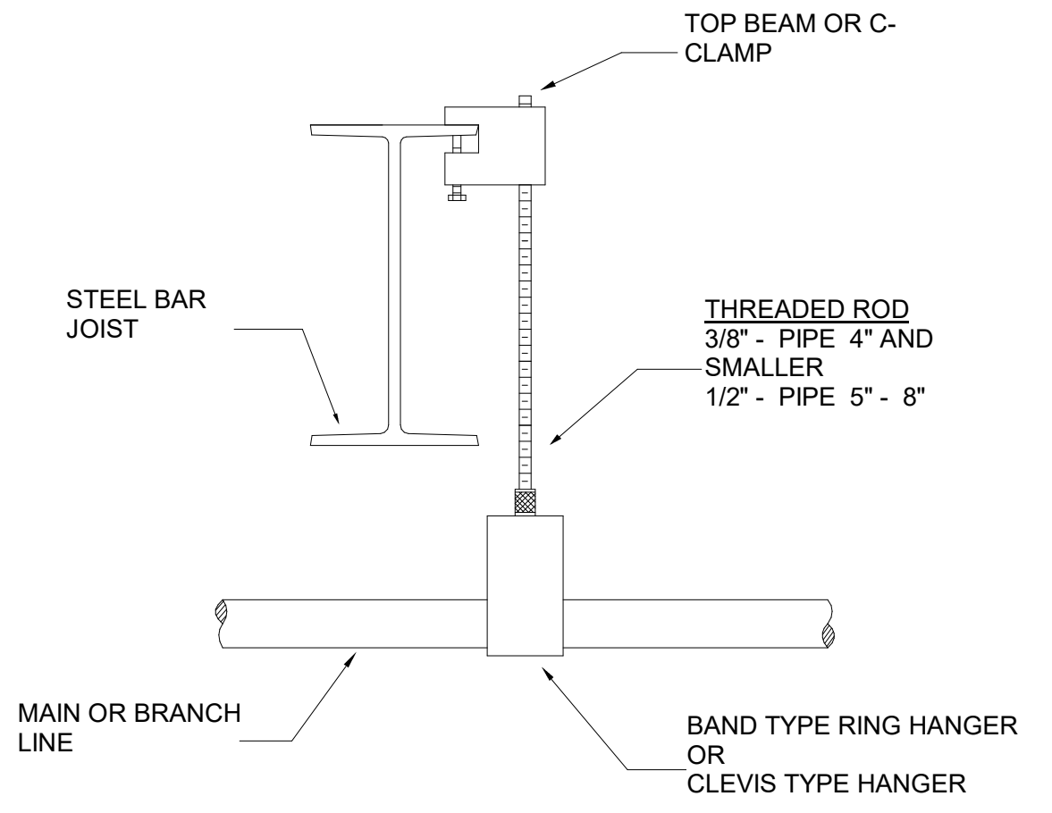
(10) UNDERSLAB HANGER DIAGRAM

NO SCALE


CONCRETE FLOOR OR CEILING SLAB
THREADED ROD
3/8" - PIPE 4" AND SMALLER
1/2" - PIPE 5" - 8"
LISTED EXPANSION SHIELD
3/8" - PIPE 4" AND SMALLER
1/2" - PIPE 5" - 8"
MAIN OR BRANCH LINE
BAND TYPE RING HANGER OR CLEVIS TYPE HANGER

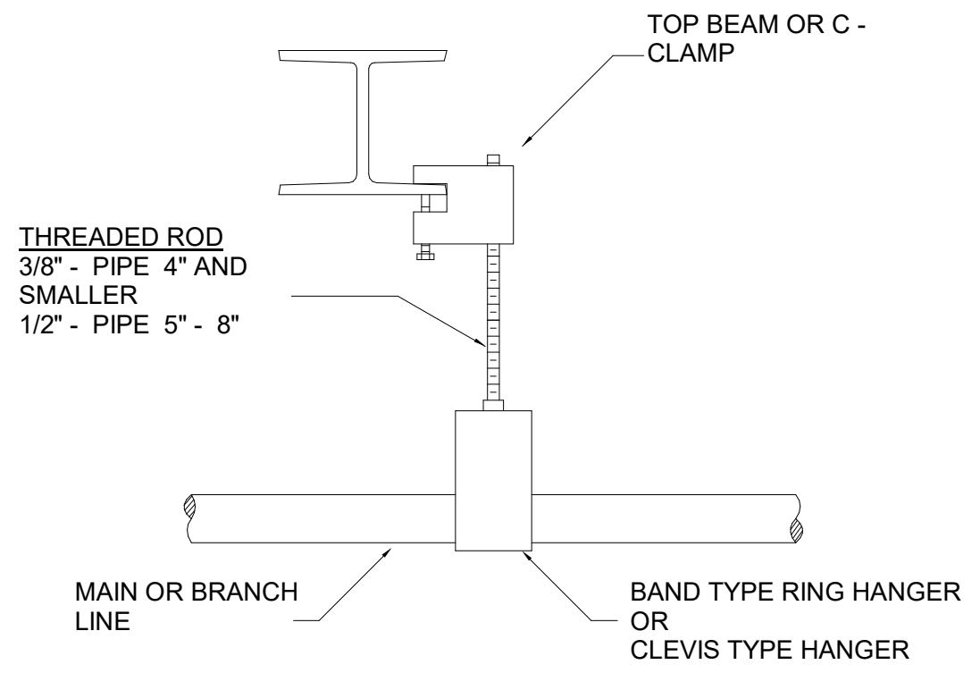
(11) TYPICAL HANGER DETAIL TO CONCRETE

NO SCALE



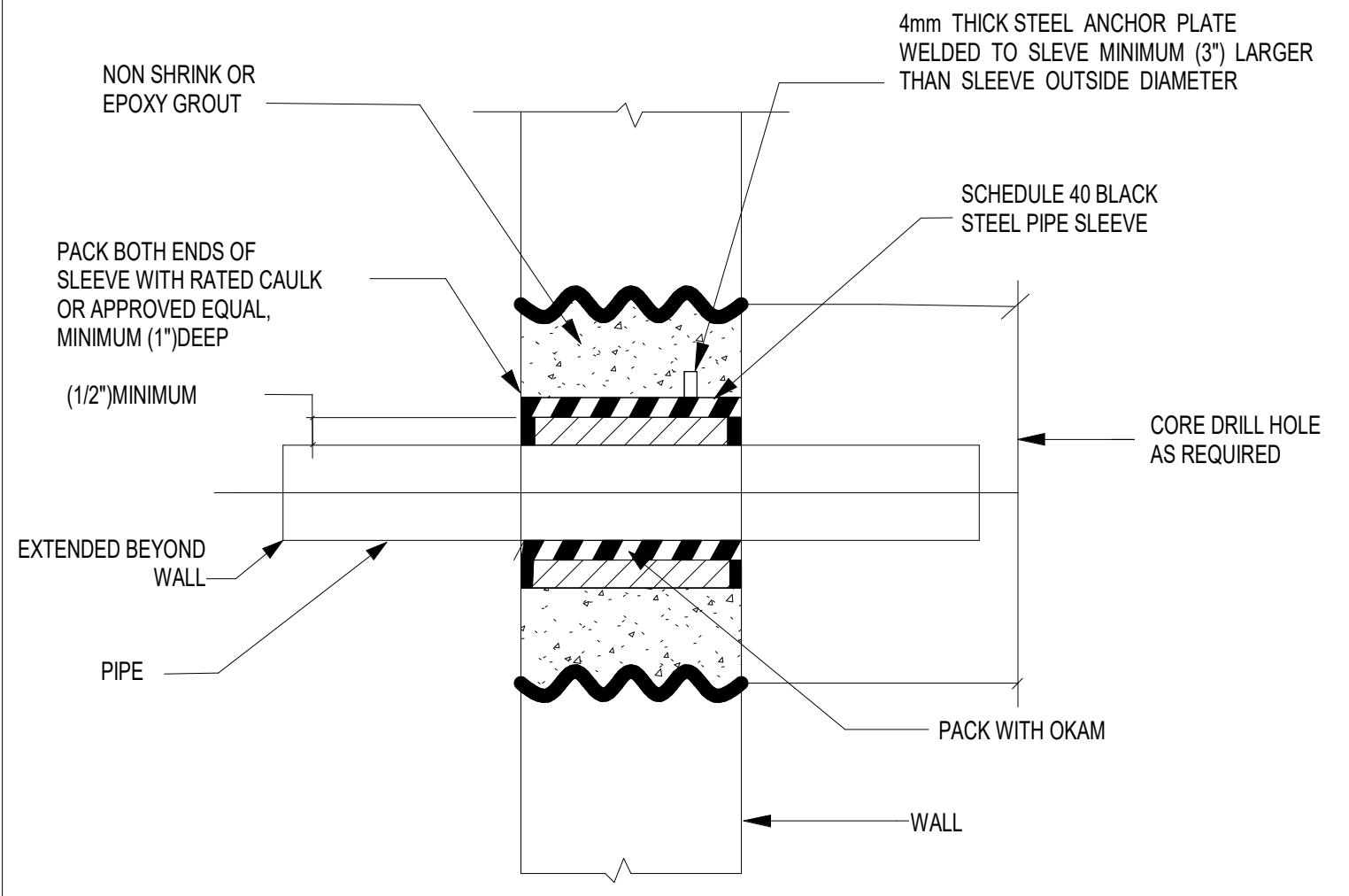
(12) TYPICAL HANGER DETAIL TO BAR JOIST

NO SCALE



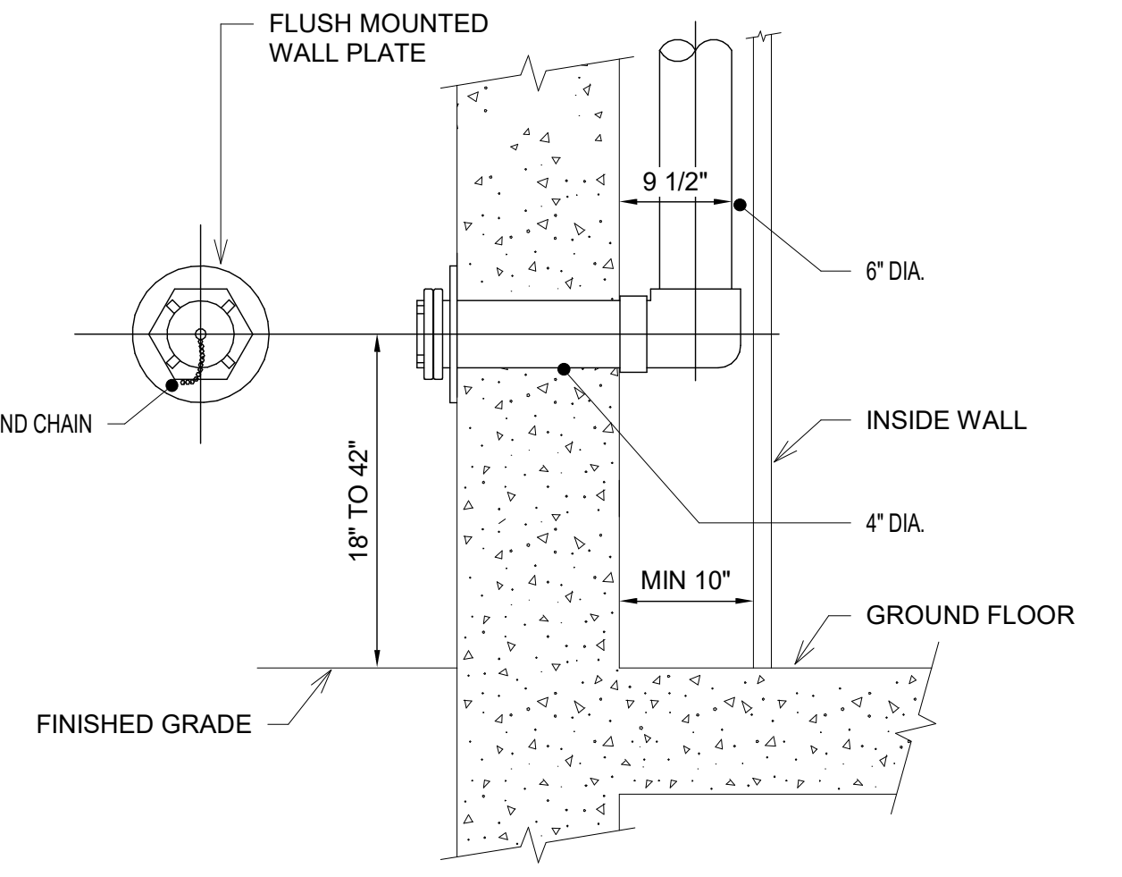
(13) TYPICAL HANGER DETAIL TO STEEL

NO SCALE


NON SHRINK OR EPOXY GROUT
4mm THICK STEEL ANCHOR PLATE WELDED TO SLEVE MINIMUM (3") LARGER THAN SLEEVE OUTSIDE DIAMETER
SCHEDULE 40 BLACK STEEL PIPE SLEEVE
PACK BOTH ENDS OF SLEEVE WITH RATED CAULK OR APPROVED EQUAL, MINIMUM (1")DEEP
(1/2")MINIMUM
CORE DRILL HOLE AS REQUIRED
EXTENDED BEYOND WALL
PIPE
PACK WITH OKAM
WALL

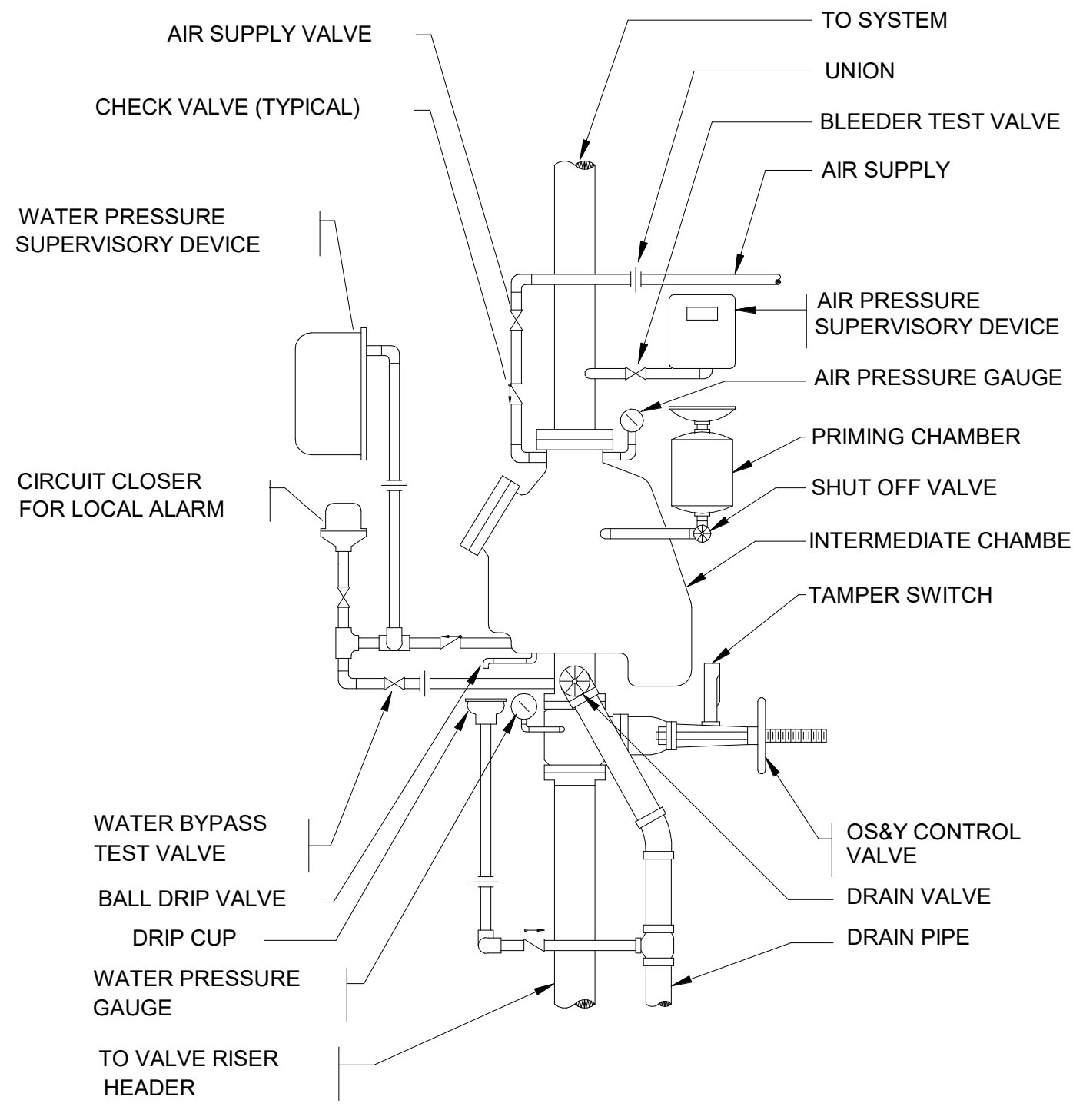
(14) PIPE SLEEVE THROUGH DETAIL

NO SCALE



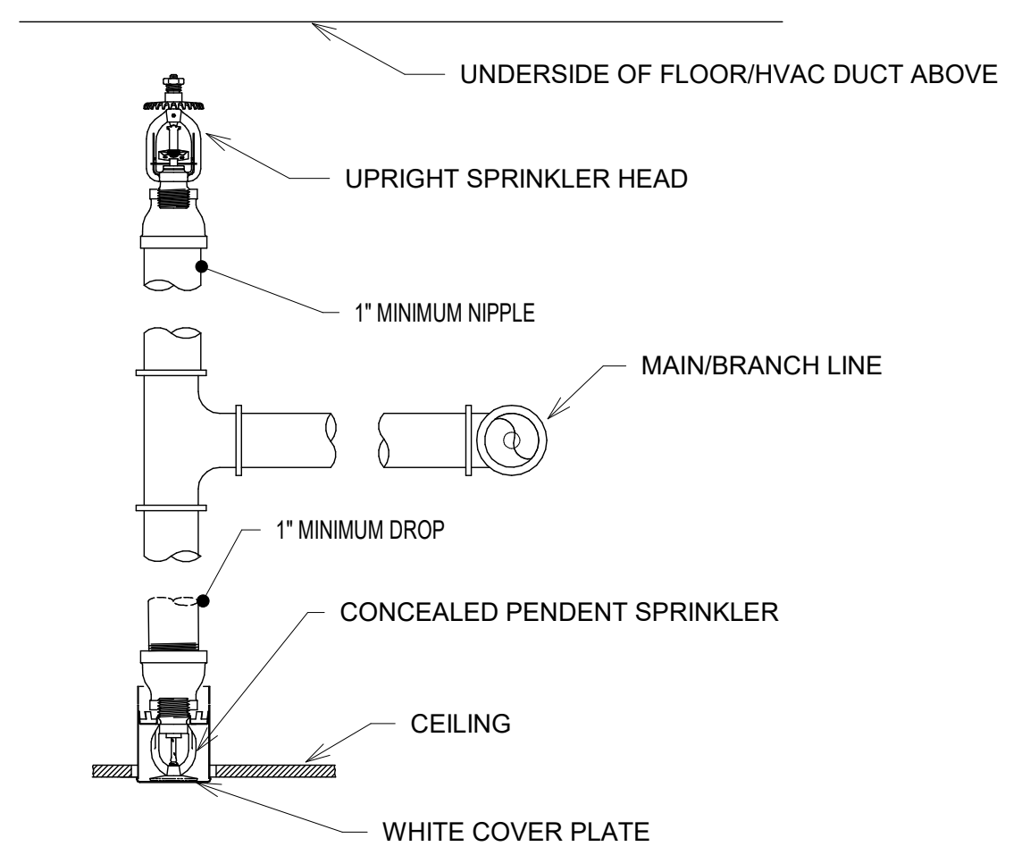
(15) FIRE DEPARTMENT CONNECTION - STORZ

NO SCALE



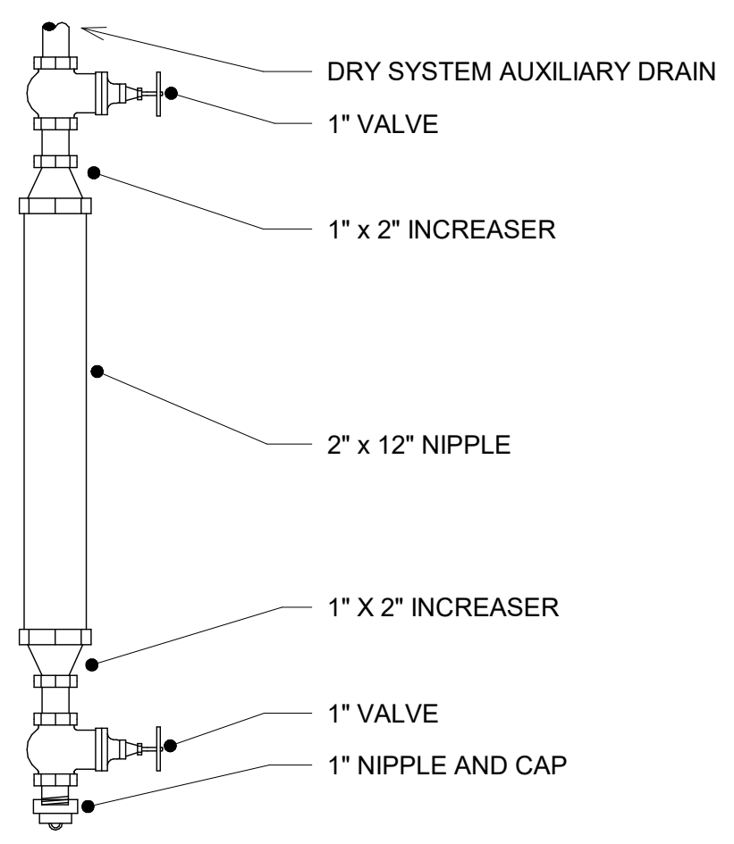
(16) DRY ALARM CHECK VALVE

NO SCALE



(17) UP & DOWN SPRINKLER CONNECTION

NO SCALE



(18) DRY SYSTEM DRAIN CONNECTION

NO SCALE

DORE + WHITTIER

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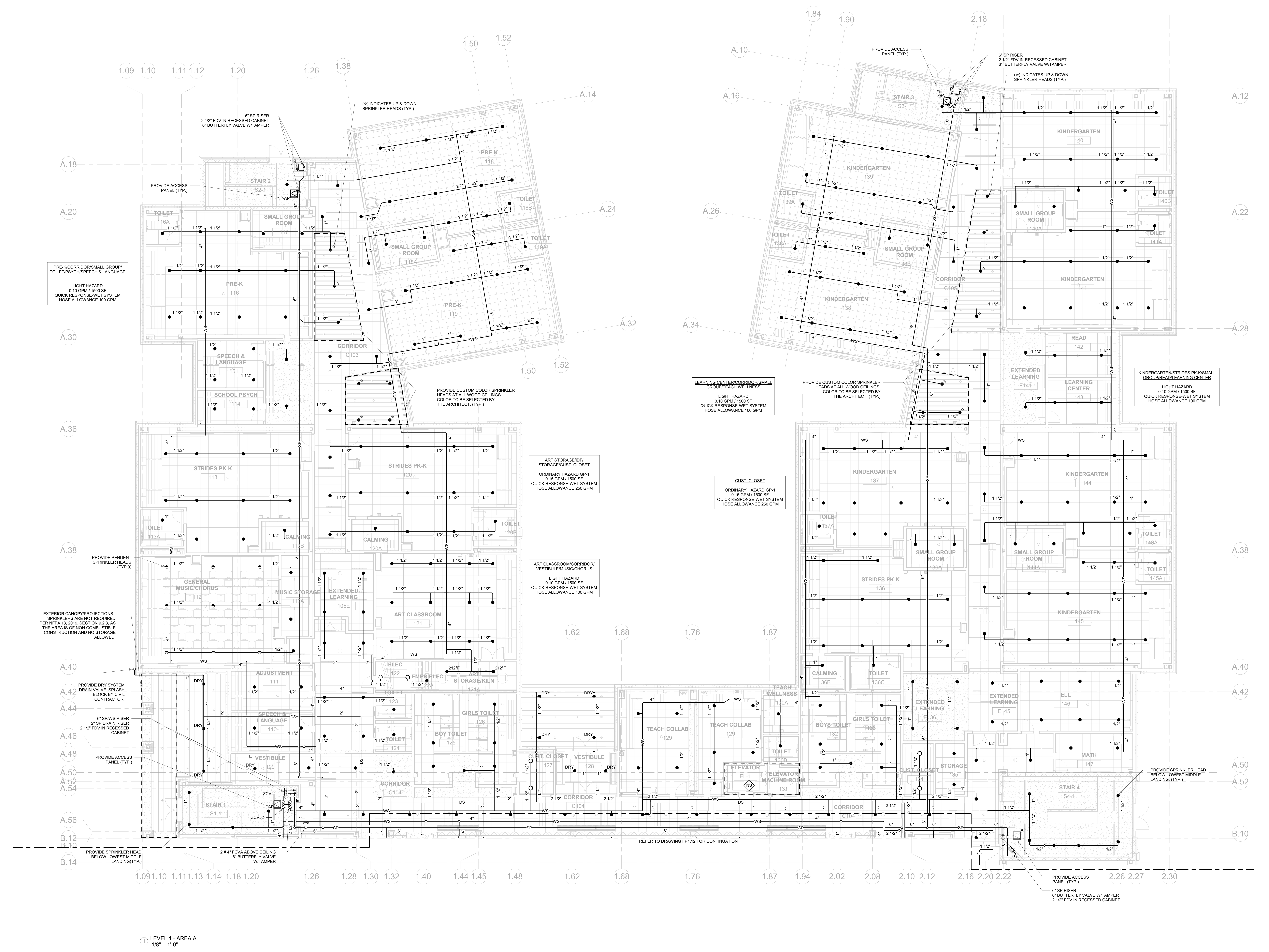
KEY PLAN

ORIENTATION AND SCALE:

SHEET TITLE:
FIRE PROTECTION DETAILS

SHEET NUMBER:
FP0.02



PRE-K/CORRIDOR/SMALL GROUP/TOILET/PSYCH/SPEECH & LANGUAGE

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

ART STORAGE/IDF/STORAGE/CUST. CLOSET

ORDINARY HAZARD GP-1
0.15 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 250 GPM

ART CLASSROOM/CORRIDOR/VESTIBULE/MUSIC/CHORUS

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

EXTERIOR CANOPY/PROJECTIONS:- SPRINKLERS ARE NOT REQUIRED PER NFPA 13, 2019, SECTION 9.2.3, AS THE AREA IS OF NON COMBUSTIBLE CONSTRUCTION AND NO STORAGE ALLOWED.

LEARNING CENTER/CORRIDOR/SMALL GROUP/TEACH WELLNESS

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

CUST. CLOSET

ORDINARY HAZARD GP-1
0.15 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 250 GPM

KINDERGARTEN/STRIDES PK-K/SMALL GROUP/READ/LEARNING CENTER

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

① LEVEL 1 - AREA A
1/8" = 1'-0"

DORE + WHITTIER
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WILMINGTON ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

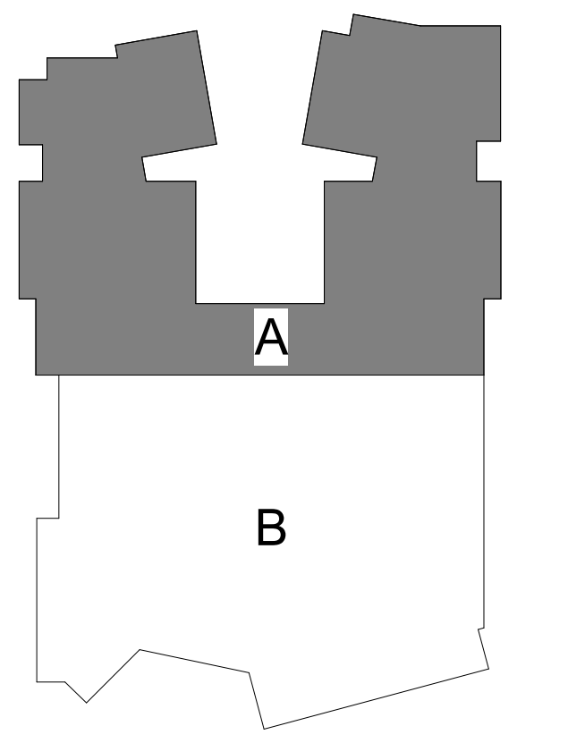
REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



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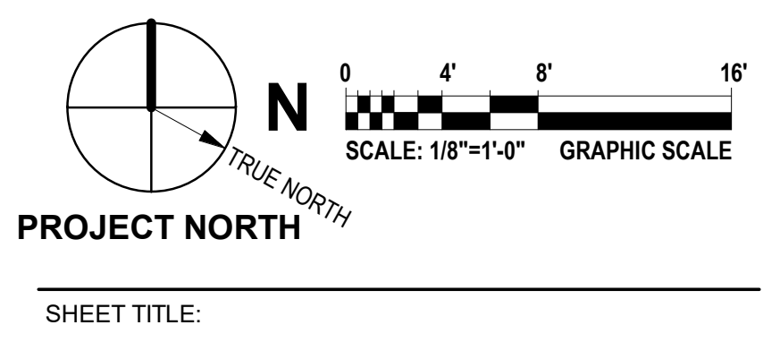

SHEET TITLE:

FIRE PROTECTION LEVEL 1 - AREA A

SHEET NUMBER:

FP1.11

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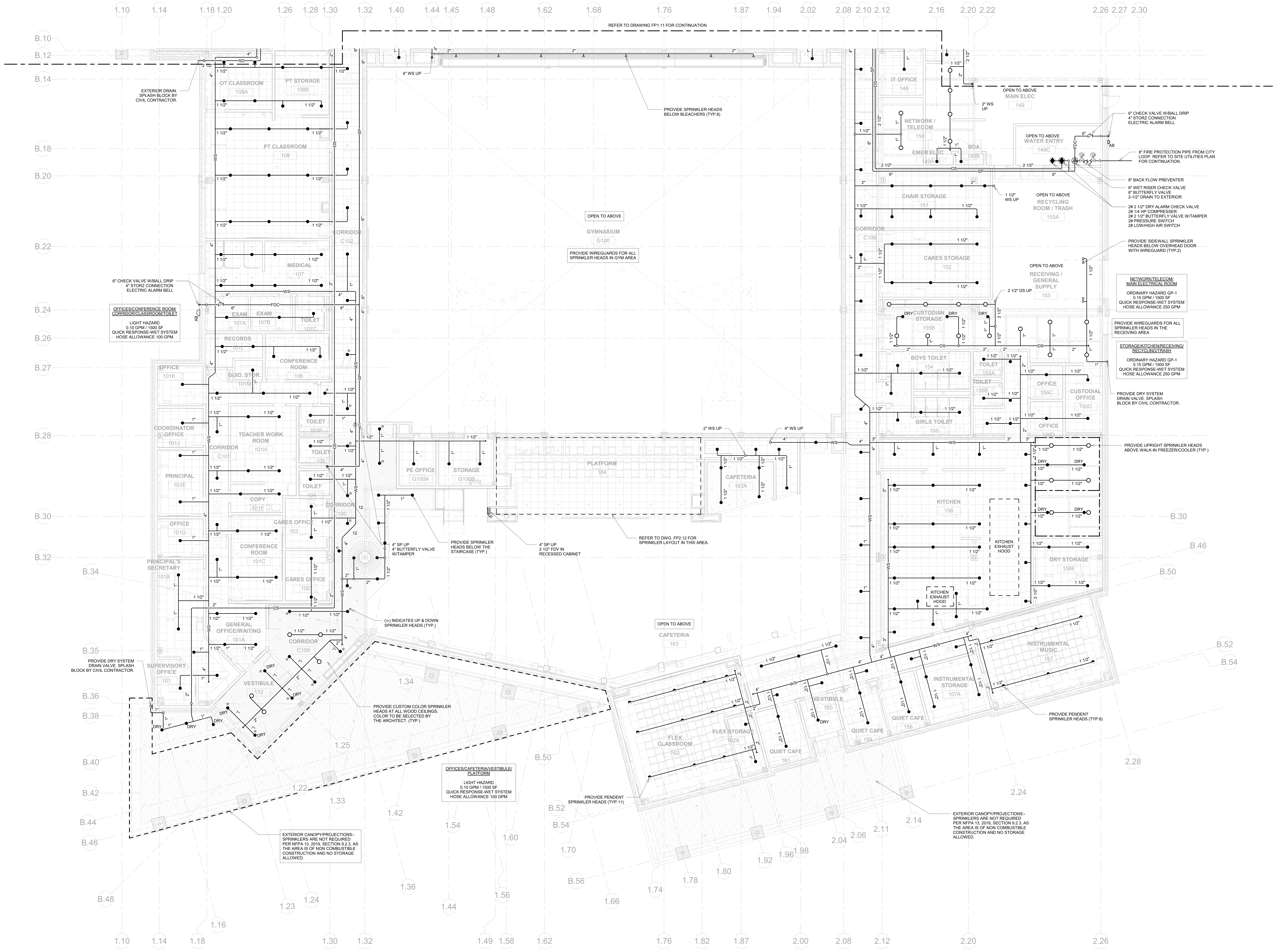

REFER TO DRAWING FP1.11 FOR CONTINUATION

4" WS UP

PROVIDE SPRINKLER HEADS BELOW BLEACHERS (TYP.8)

EXTERIOR DRAIN. SPLASH BLOCK BY CIVIL CONTRACTOR.

OPEN TO ABOVE

PROVIDE WIREGUARDS FOR ALL SPRINKLER HEADS IN GYM AREA

6" CHECK VALVE W/BALL DRIP
4" STORZ CONNECTION
ELECTRIC ALARM BELL

OFFICES/CONFERENCE ROOM/ CORRIDOR/CLASSROOM/TOILET

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

2" WS UP

2" WS UP

4" WS UP

4" SP UP
4" BUTTERFLY VALVE W/TAMPER

PROVIDE SPRINKLER HEADS BELOW THE STAIRCASE (TYP.)

4" SP UP
2 1/2" FDV IN RECESSED CABINET

REFER TO DWG. FP2.12 FOR SPRINKLER LAYOUT IN THIS AREA.

(☆) INDICATES UP & DOWN SPRINKLER HEADS (TYP.)

PROVIDE DRY SYSTEM DRAIN VALVE. SPLASH BLOCK BY CIVIL CONTRACTOR.

PROVIDE CUSTOM COLOR SPRINKLER HEADS AT ALL WOOD CEILINGS. COLOR TO BE SELECTED BY THE ARCHITECT. (TYP.)

OFFICES/CAFETERIA/VESTIBULE/ PLATFORM

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

EXTERIOR CANOPY/PROJECTIONS:- SPRINKLERS ARE NOT REQUIRED PER NFPA 13, 2019, SECTION 9.2.3, AS THE AREA IS OF NON COMBUSTIBLE CONSTRUCTION AND NO STORAGE ALLOWED.

PROVIDE PENDENT SPRINKLER HEADS (TYP.11)

PROVIDE PENDENT SPRINKLER HEADS (TYP.6)

EXTERIOR CANOPY/PROJECTIONS:- SPRINKLERS ARE NOT REQUIRED PER NFPA 13, 2019, SECTION 9.2.3, AS THE AREA IS OF NON COMBUSTIBLE CONSTRUCTION AND NO STORAGE ALLOWED.

2" WS UP

1 1/2" WS UP

2 1/2" DS UP

6" CHECK VALVE W/BALL DRIP
4" STORZ CONNECTION
ELECTRIC ALARM BELL

8" FIRE PROTECTION PIPE FROM CITY LOOP. REFER TO SITE UTILITIES PLAN FOR CONTINUATION.

8" BACK FLOW PREVENTER

6" WET RISER CHECK VALVE
6" BUTTERFLY VALVE
2-1/2" DRAIN TO EXTERIOR

2# 2 1/2" DRY ALARM CHECK VALVE
2# 1/4 HP COMPRESSER
2# 2 1/2" BUTTERFLY VALVE W/TAMPER
2# PRESSURE SWITCH
2# LOW/HIGH AIR SWITCH

PROVIDE SIDEWALL SPRINKLER HEADS BELOW OVERHEAD DOOR WITH WIREGUARD (TYP.2)

NETWORK/TELECOM/ MAIN ELECTRICAL ROOM

ORDINARY HAZARD GP-1
0.15 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 250 GPM

PROVIDE WIREGUARDS FOR ALL SPRINKLER HEADS IN THE RECEIVING AREA

STORAGE/KITCHEN/RECEIVING/ RECYCLING/TRASH

ORDINARY HAZARD GP-1
0.15 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 250 GPM

PROVIDE DRY SYSTEM DRAIN VALVE. SPLASH BLOCK BY CIVIL CONTRACTOR.

PROVIDE UPRIGHT SPRINKLER HEADS ABOVE WALK-IN FREEZER/COOLER (TYP.)

1 LEVEL 1 - AREA B
1/8" = 1'-0"

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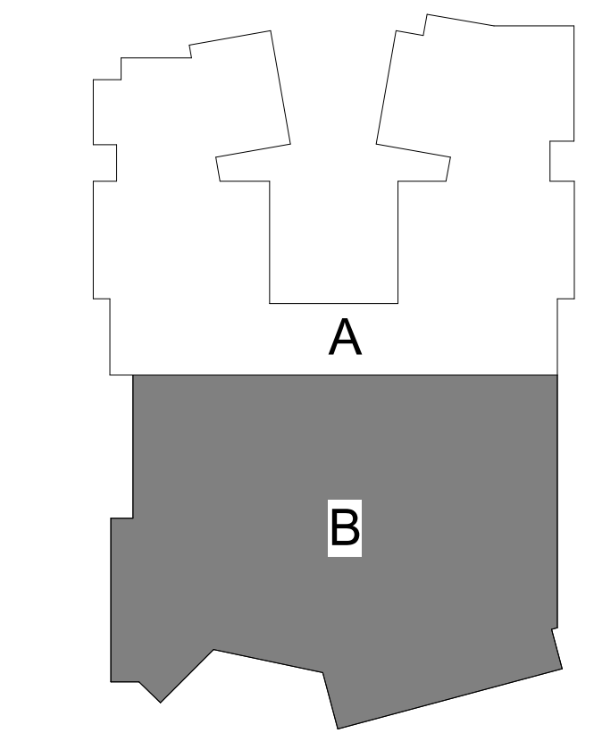

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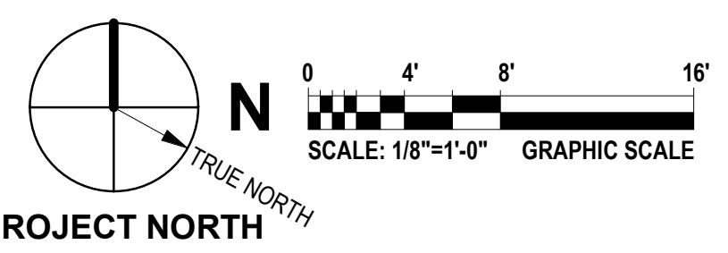
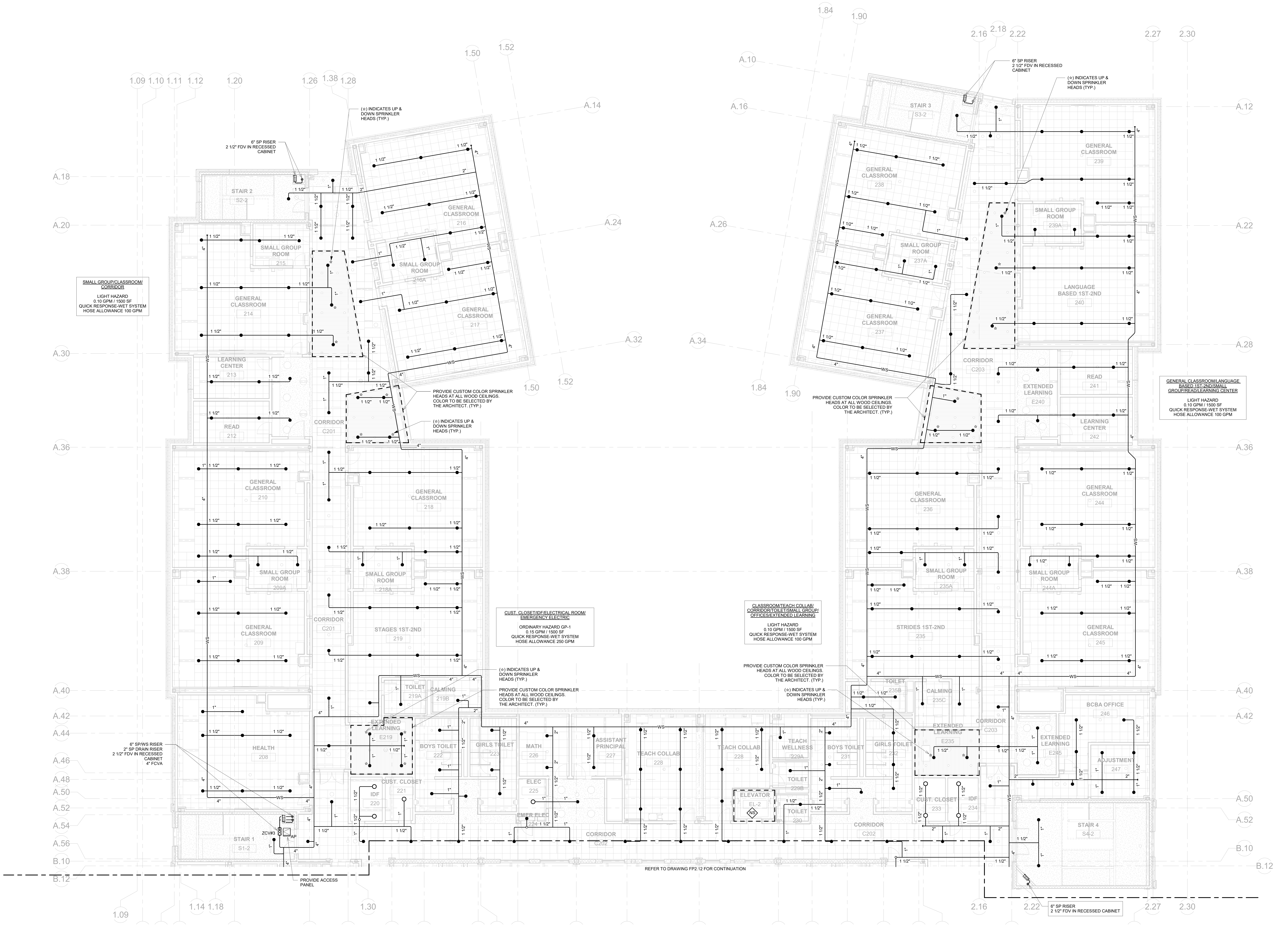


SHEET TITLE:

FIRE PROTECTION LEVEL 1 - AREA B

SHEET NUMBER:

FP1.12



6" SP RISER
2 1/2" FDV IN RECESSED CABINET

(☆) INDICATES UP & DOWN SPRINKLER HEADS (TYP.)

SMALL GROUP/CLASSROOM/CORRIDOR

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

PROVIDE CUSTOM COLOR SPRINKLER HEADS AT ALL WOOD CEILINGS. COLOR TO BE SELECTED BY THE ARCHITECT. (TYP.)

GENERAL CLASSROOM/LANGUAGE BASED 1ST-2ND/SMALL GROUP/READ/LEARNING CENTER

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

CUST. CLOSET/IDF/ELECTRICAL ROOM/EMERGENCY ELECTRIC

ORDINARY HAZARD GP-1
0.15 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 250 GPM

CLASSROOM/TEACH COLLAB/CORRIDOR/TOILET/SMALL GROUP/OFFICES/EXTENDED LEARNING

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

6" SP/WS RISER
2" SP DRAIN RISER
2 1/2" FDV IN RECESSED CABINET
4" FCVA

PROVIDE ACCESS PANEL

REFER TO DRAWING FP2.12 FOR CONTINUATION

6" SP RISER
2 1/2" FDV IN RECESSED CABINET

1 LEVEL 2 - AREA A
1/8" = 1'-0"

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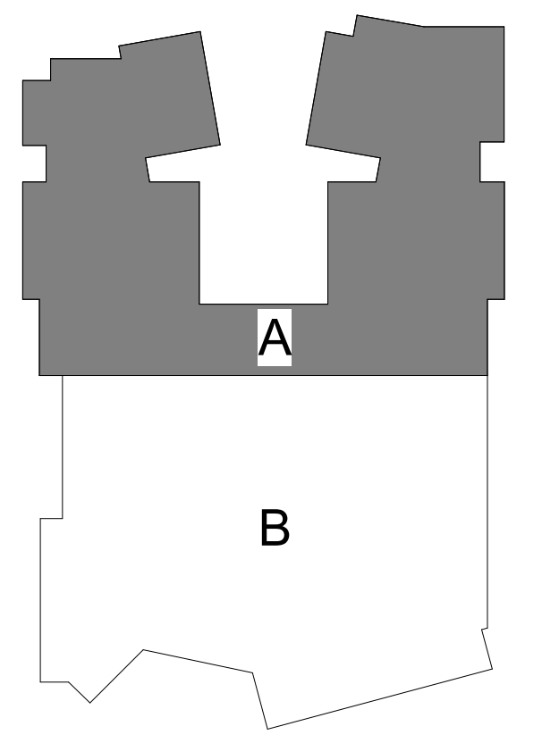


ORIENTATION AND SCALE:

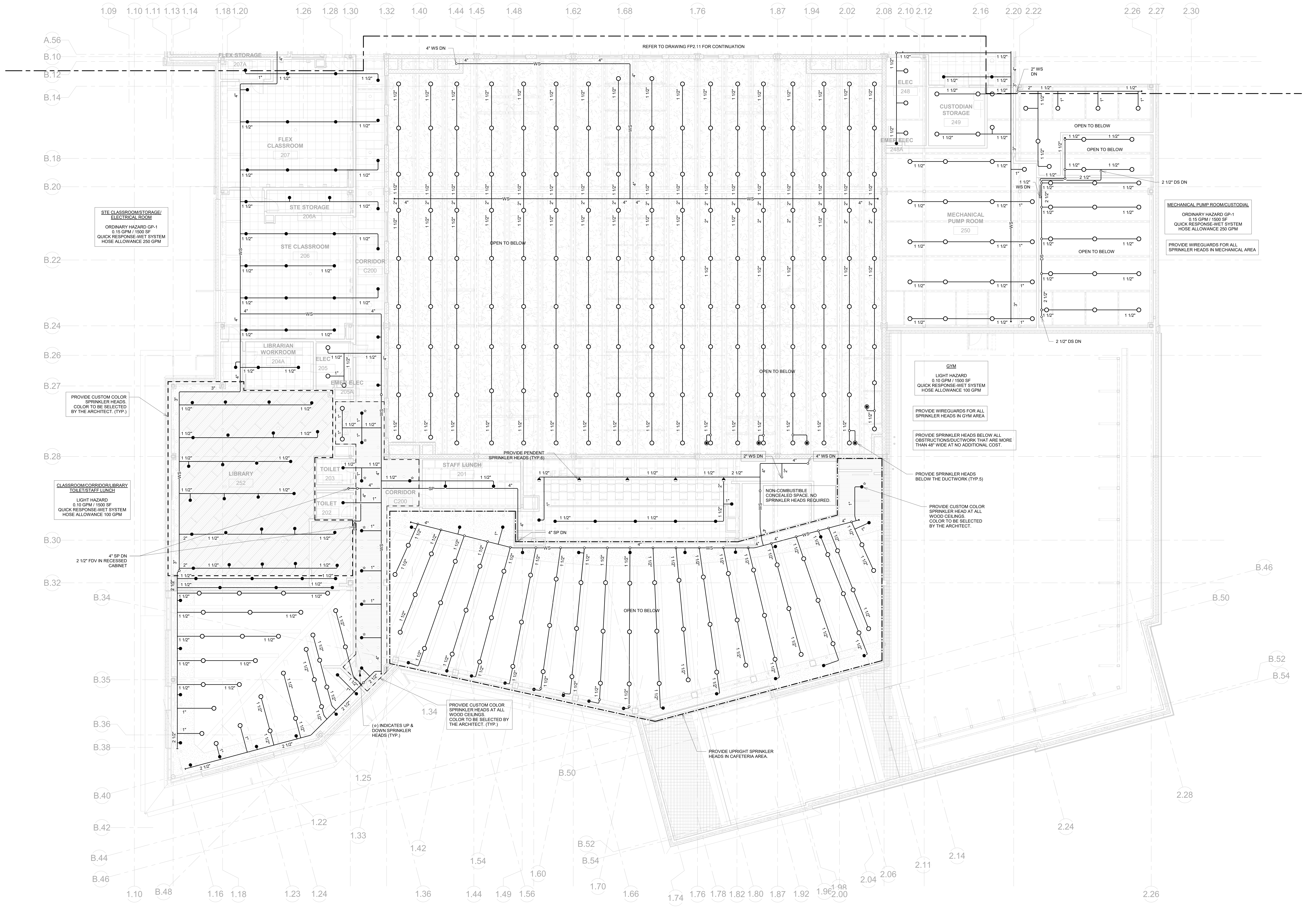
N
TRUE NORTH
PROJECT NORTH
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

FIRE PROTECTION
LEVEL 2 - AREA A

SHEET NUMBER:

FP2.11



STE CLASSROOM/STORAGE/
ELECTRICAL ROOM

ORDINARY HAZARD GP-1
0.15 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 250 GPM

PROVIDE CUSTOM COLOR SPRINKLER HEADS. COLOR TO BE SELECTED BY THE ARCHITECT. (TYP.)

CLASSROOM/CORRIDOR/LIBRARY
TOILET/STAFF LUNCH

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

4" SP DN
2 1/2" FDV IN RECESSED CABINET

PROVIDE PENDENT SPRINKLER HEADS (TYP.6)

NON-COMBUSTIBLE CONCEALED SPACE. NO SPRINKLER HEADS REQUIRED.

PROVIDE SPRINKLER HEADS BELOW THE DUCTWORK (TYP.5)

PROVIDE CUSTOM COLOR SPRINKLER HEAD AT ALL WOOD CEILINGS. COLOR TO BE SELECTED BY THE ARCHITECT.

(☆) INDICATES UP & DOWN SPRINKLER HEADS (TYP.)

PROVIDE CUSTOM COLOR SPRINKLER HEADS AT ALL WOOD CEILINGS. COLOR TO BE SELECTED BY THE ARCHITECT. (TYP.)

PROVIDE UPRIGHT SPRINKLER HEADS IN CAFETERIA AREA.

GYM

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

PROVIDE WIREGUARDS FOR ALL SPRINKLER HEADS IN GYM AREA

PROVIDE SPRINKLER HEADS BELOW ALL OBSTRUCTIONS/DUCTWORK THAT ARE MORE THAN 48" WIDE AT NO ADDITIONAL COST.

MECHANICAL PUMP ROOM/CUSTODIAL

ORDINARY HAZARD GP-1
0.15 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 250 GPM

PROVIDE WIREGUARDS FOR ALL SPRINKLER HEADS IN MECHANICAL AREA

① LEVEL 2 - AREA B
1/8" = 1'-0"

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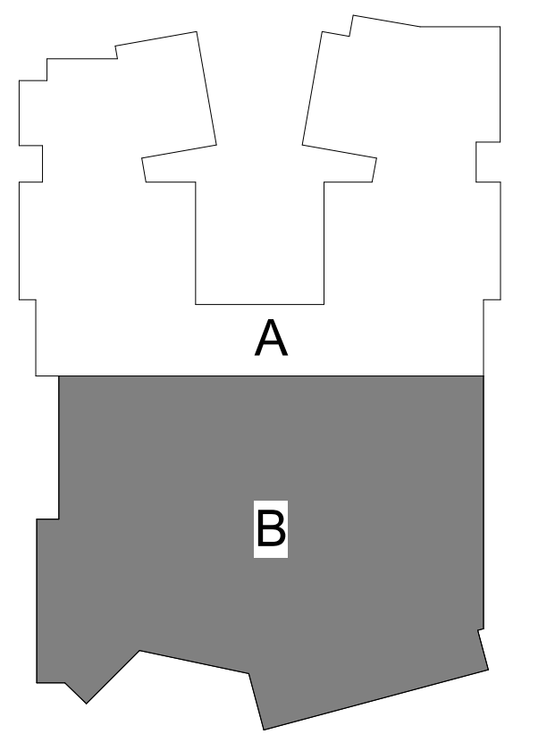

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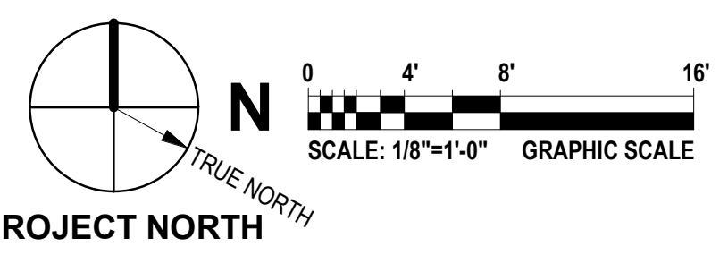

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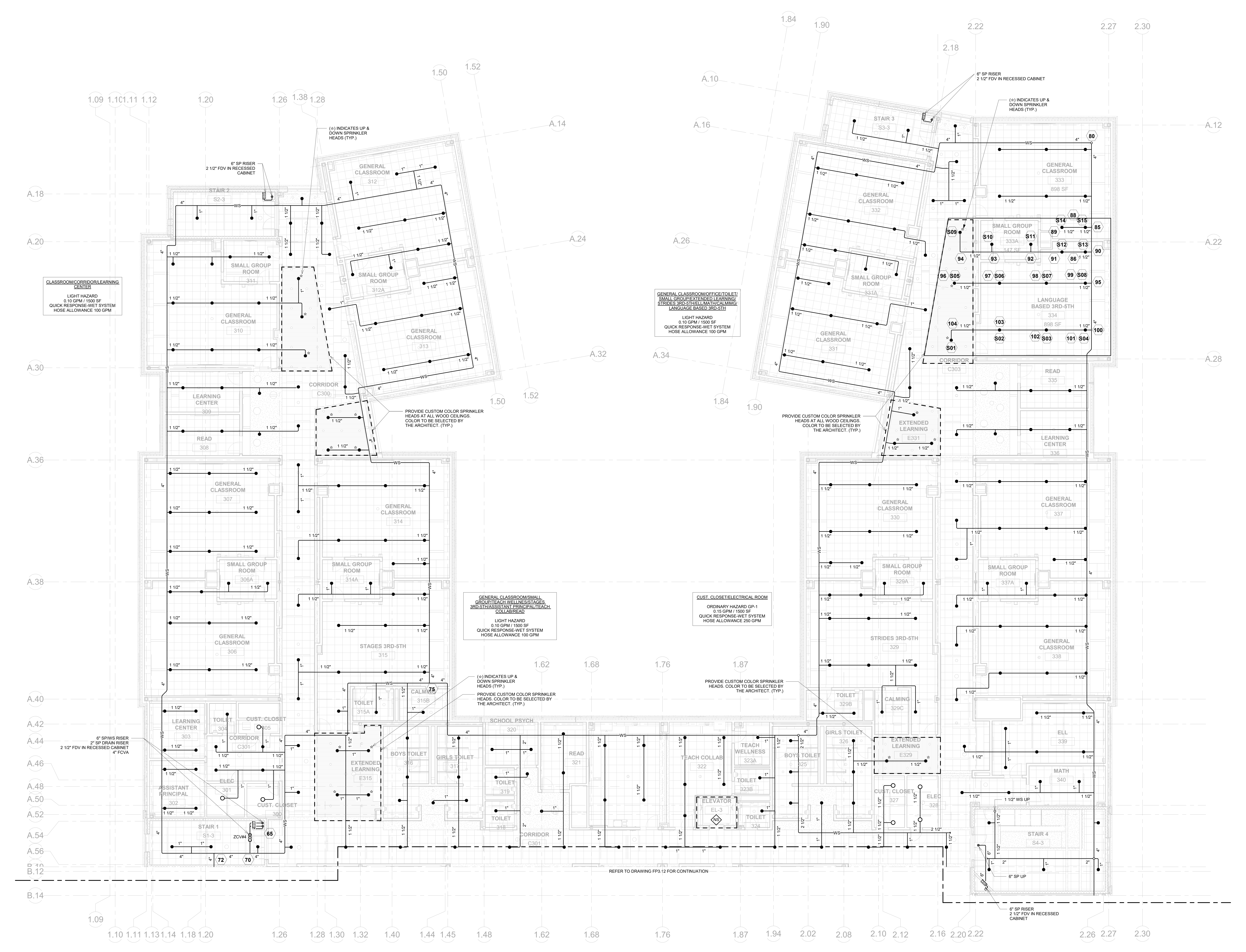
FIRE PROTECTION LEVEL 2 - AREA B

SHEET NUMBER:

FP2.12



CLASSROOM/CORRIDOR/LEARNING CENTER

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

GENERAL CLASSROOM/OFFICE/TOILET/SMALL GROUP/EXTENDED LEARNING/STRIDES 3RD-5TH/ELL/MATH/CALMIMG/LANGUAGE BASED 3RD-5TH

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

GENERAL CLASSROOM/SMALL GROUP/TEACH WELLNES/STAGES 3RD-5TH/ASSISTANT PRINCIPAL/TEACH COLLAB/READ

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

CUST. CLOSET/ELECTRICAL ROOM

ORDINARY HAZARD GP-1
0.15 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 250 GPM

6" SP RISER
2 1/2" FDV IN RECESSED
CABINET

(☆) INDICATES UP &
DOWN SPRINKLER
HEADS (TYP.)

PROVIDE CUSTOM COLOR SPRINKLER
HEADS AT ALL WOOD CEILINGS.
COLOR TO BE SELECTED BY
THE ARCHITECT. (TYP.)

6" SP RISER
2 1/2" FDV IN RECESSED CABINET

(☆) INDICATES UP &
DOWN SPRINKLER
HEADS (TYP.)

PROVIDE CUSTOM COLOR SPRINKLER
HEADS AT ALL WOOD CEILINGS.
COLOR TO BE SELECTED BY
THE ARCHITECT. (TYP.)

(☆) INDICATES UP &
DOWN SPRINKLER
HEADS (TYP.)

PROVIDE CUSTOM COLOR SPRINKLER
HEADS. COLOR TO BE SELECTED BY
THE ARCHITECT. (TYP.)

PROVIDE CUSTOM COLOR SPRINKLER
HEADS. COLOR TO BE SELECTED BY
THE ARCHITECT. (TYP.)

6" SP/WS RISER
2" SP DRAIN RISER
2 1/2" FDV IN RECESSED CABINET
4" FCVA

1 1/2" WS UP

6" SP UP

6" SP RISER
2 1/2" FDV IN RECESSED
CABINET

REFER TO DRAWING FP3.12 FOR CONTINUATION

① LEVEL 3 - AREA A
1/8" = 1'-0"

DORE + WHITTIER

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260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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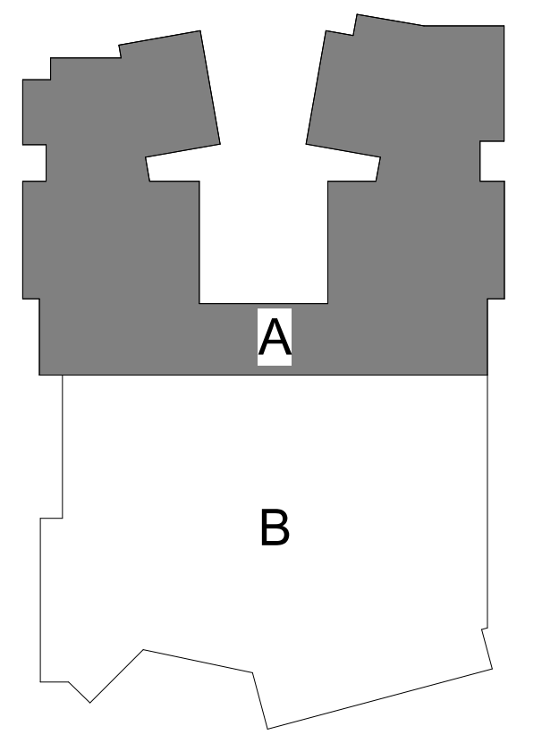

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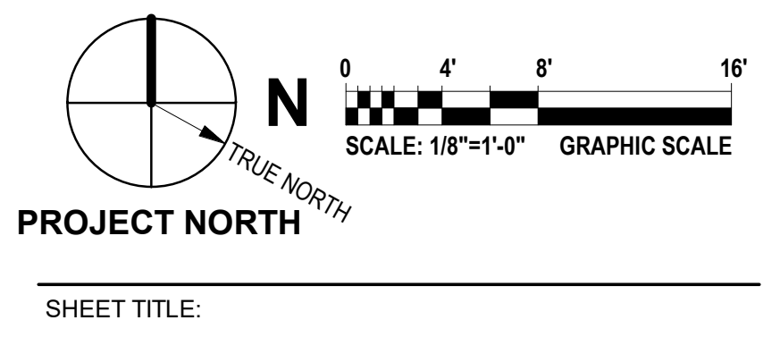

SHEET TITLE:
FIRE PROTECTION
LEVEL 3 - AREA A

SHEET NUMBER:
FP3.11

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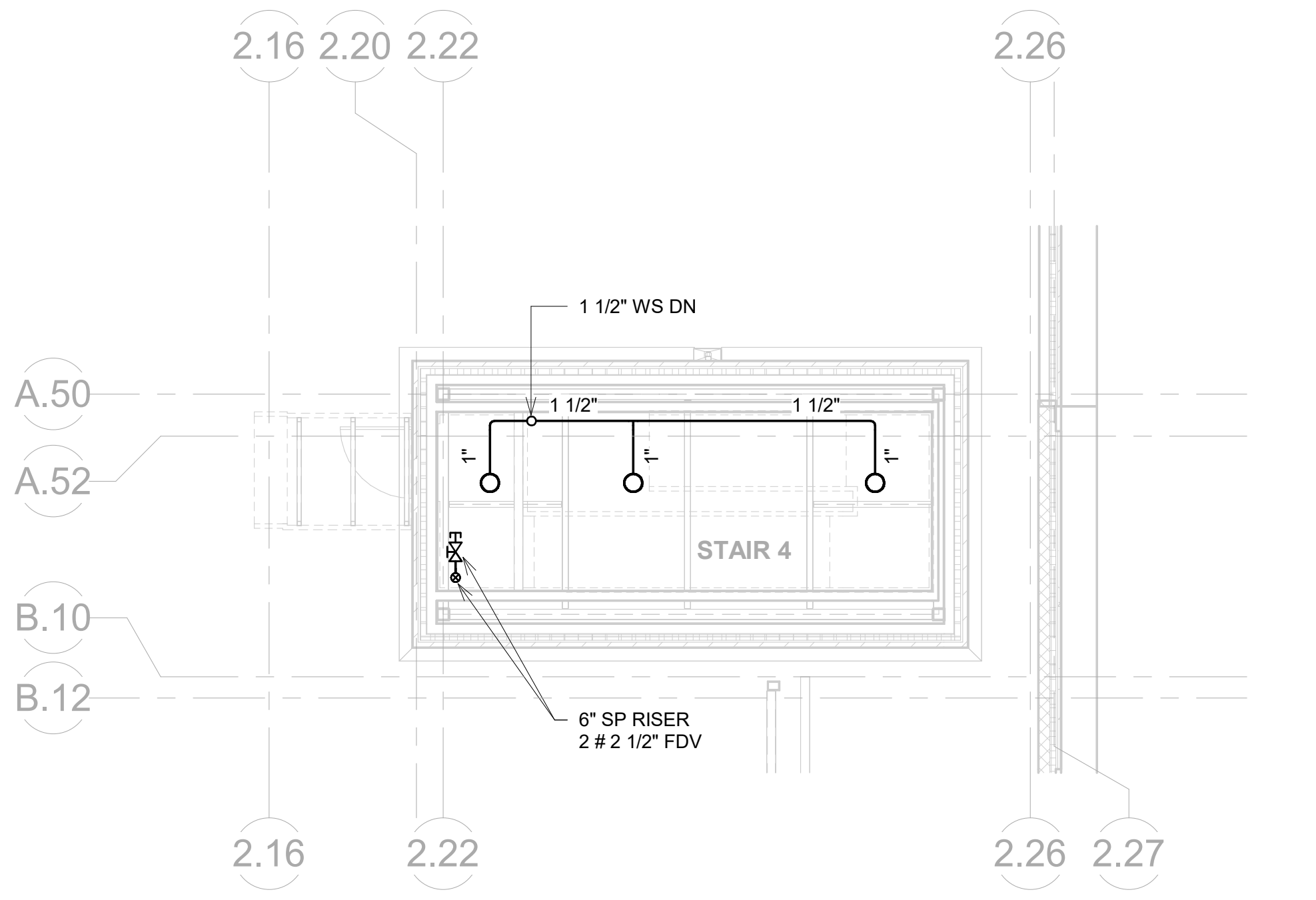
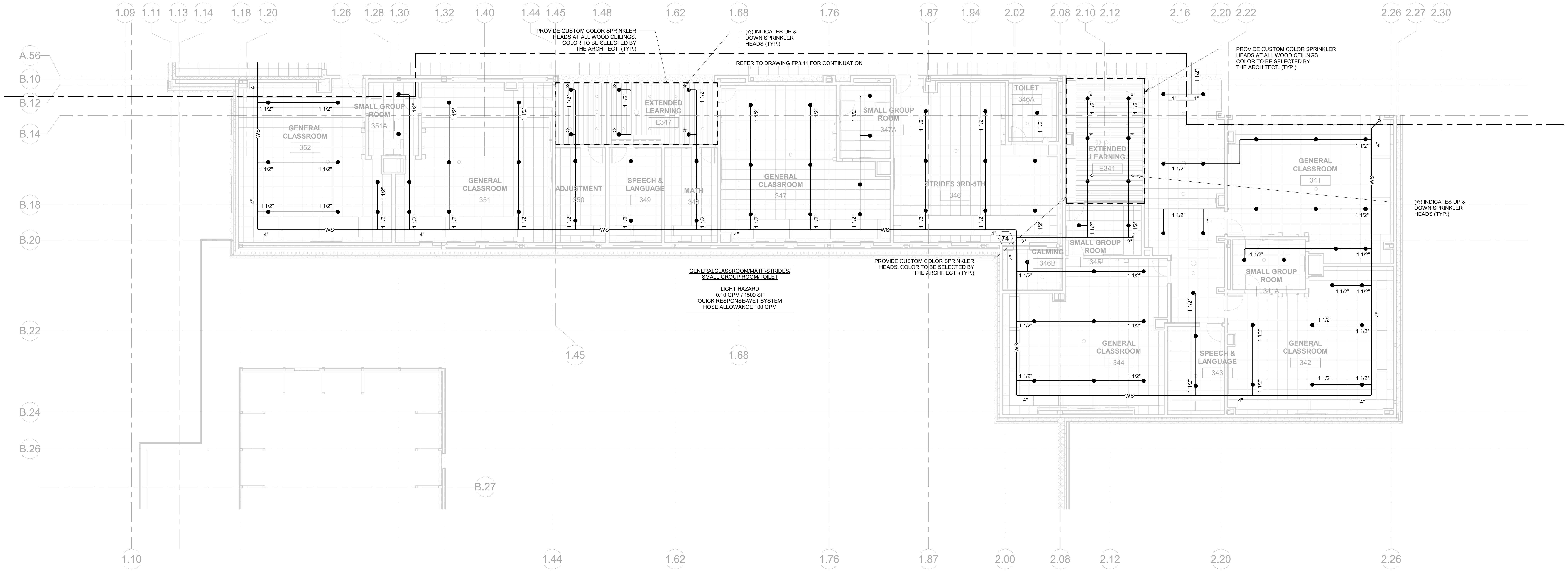


② ROOF STAIR
1/8" = 1'-0"



PROVIDE CUSTOM COLOR SPRINKLER HEADS AT ALL WOOD CEILINGS. COLOR TO BE SELECTED BY THE ARCHITECT. (TYP.)

(☆) INDICATES UP & DOWN SPRINKLER HEADS (TYP.)

REFER TO DRAWING FP3.11 FOR CONTINUATION

PROVIDE CUSTOM COLOR SPRINKLER HEADS AT ALL WOOD CEILINGS. COLOR TO BE SELECTED BY THE ARCHITECT. (TYP.)

(☆) INDICATES UP & DOWN SPRINKLER HEADS (TYP.)

PROVIDE CUSTOM COLOR SPRINKLER HEADS. COLOR TO BE SELECTED BY THE ARCHITECT. (TYP.)

GENERALCLASSROOM/MATH/STRIDES/ SMALL GROUP ROOM/TOILET

LIGHT HAZARD
0.10 GPM / 1500 SF
QUICK RESPONSE-WET SYSTEM
HOSE ALLOWANCE 100 GPM

① LEVEL 3 - AREA B
1/8" = 1'-0"

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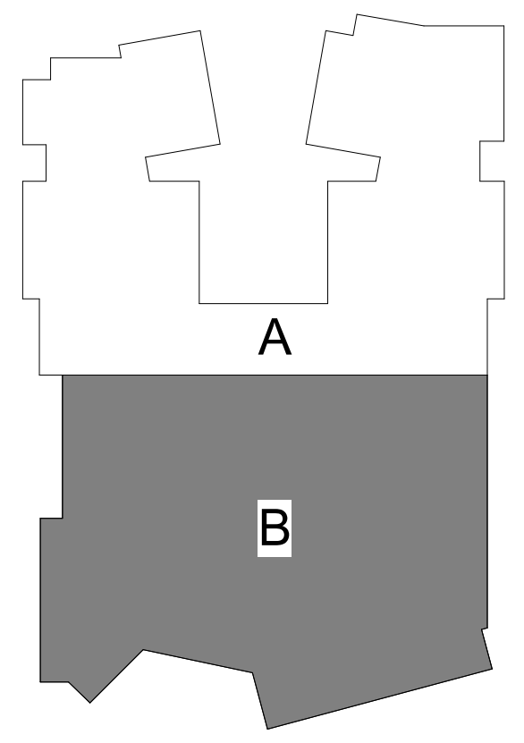

ORIENTATION AND SCALE:

N
TRUE NORTH
PROJECT NORTH
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

FIRE PROTECTION LEVEL 3 - AREA B

SHEET NUMBER:

FP3.12

LEGEND

═══	-	DOUBLE LINE INDICATES PIPING BELOW GRADE
—SAN—	SAN	SANITARY OR WASTE ABOVE GRADE
— W —	W	WASTE ABOVE GRADE
— ST —	ST	STORM PIPE
— KW —	KW	KITCHEN GREASE WASTE
— KV —	KV	KITCHEN VENT
= = = =	V	VENT PIPNG BELOW GRADE
- - V - -	V	VENT PIPING ABOVE GRADE
- - AV - -	AV	ACID VENT PIPING
—CW—	CW	COLD WATER
—HW—	HW	HOT WATER
—140HW—	HW	HOT WATER AT 140°F
— HWR —	HWR	HOT WATER RETURN
—HHWR—	HHWR	HOT WATER HEATING RETURN
—HHWS—	HHWS	HOT WATER HEATING SUPPLY
—NPCW—	NPCW	NON-POTABLE COLD WATER SUPPLY
—RWPS—	RWPS	RAIN WATER PUMPED SUPPLY
—RWRD—	RWRD	RAIN WATER RETURN DRAIN
— TWS —	TWS	TEPID WATER SUPPLY
— TWR —	TWS	TEPID WATER RETURN
— G —	G	NATURAL GAS
— OD —	OD	OVERFLOW DRAIN
— O/W —	OW	OIL WATER WASTE
	FCO	FLUSH FLOOR CLEANOUT
	CO	CLEANOUT
	WCO	WALL CLEANOUT
	UP	PIPE RISES UP
	DN	PIPE DROPS DOWN
	W&T	WASTE AND TRAP
		BALANCING VALVE AND CHECK VALVE IN HWR PIPING
SM	SM	SUBMETER IN PIPE
— CA —	CA	COMPRESSED AIR
—VAC—	VAC	VACUUM AIR
— D-CA —	D-CA	DENTAL COMPRESSED AIR
— D-VAC —	D-VAC	DENTAL VACUUM AIR
		BALANCING VALVE AND CHECK VALVE
		SHUT-OFF BALL VALVE
		FLOOR DRAIN TRAP WITH VENT AND TRAP PRIMER CONNECTION.
		COMPRESSED AIR SHUT OFF VALVE
		GAS SHUT OFF VALVE
		PRESSURE REDUCING VALVE
	TM	THERMOSTATIC MIXING VALVE
	RD-	ROOF DRAIN
	FD	FLOOR DRAIN
	TP	TRAP PRIMER
	SA	SHOCK ABSORBER (WATER HAMMER ARRESTOR (W/ BALL VALVE SHUT OFF VALVE)
		THERMOMETER
	-	
	P-	INDICATES PLUMBING FIXTURE (SEE SCHEDULE)
	INV.	INVERT ELEVATION
	VTR	VENT THRU ROOF
	ATC	AUTOMATIC TEMPERATURE CONTROL CONTRACTOR
	M.C	MECHANICAL CONTRACTOR
	P.C.	PLUMBING CONTRACTOR
	E.C.	ELECTRICAL CONTRACTOR
	G.C.	GENERAL CONTRACTOR
	K.C	KITCHEN CONTRACTOR
		EXPANSION LOOP W/ PIPE GUIDE
		WATER SUB METER
	ETP	ELECTRIC TRAP PRIMER
	A/P	ACCESS PANEL
	T&P	TEMPERATURE AND PRESSURE RELIEF VALVE

ABBREVIATIONS

AFF	ABOVE FINISH FLOOR
ATF	AUTOMATIC TRANSMISSION FLUID
A/P OR AP	ACCESS PANEL (FURNISH BY P.C AND INSTALLED BY G.C)
AVTR	ACID WASTE VENT THROUGH ROOF
AQ	AQUASTAT
BWV	BACK WATER VALVE
CFH	CUBIC FEET PER HOUR
CO	CLEANOUT
CW	COLD WATER
CV	CHECK VALVE
CA	COMPRESSED AIR
DBFP	DOUBLE CHECK BACKFLOW PREVENTOR
DN	DOWN
DSN	DOWN SPOUT NOZZLE
EO	ENGINE OIL
EC	ENGINE COOLANT
EEH	EMERGENCY ELECTRIC HEATER
ETP	ELECTRIC TRAP PRIMER
FD	FLOOR DRAIN
FLEX	FLEXIBLE
FPHB	FROST PROOF HOSE BIBB
FS	FLOOR SINK
GM	GAS FLOW METER
HB	HOSE BIBB
HW	HOT WATER
HWH	HOT WATER HEATER
KV	KITCHEN VENT
KVTR	KITCHEN VENT THRU ROOF
LCW	LAB COLD WATER
LHW	LAB HOT WATER
LHWR	LAB HOT WATER RETURN
LI	LINT INTERCEPTOR
GMB	GAS MASTER BOX FOR VALVE
N.I.C.	NOT IN CONTRACT
OD	OVERFLOW DRAIN
OXY	OXYGEN
RD	ROOF DRAIN
RBFP	REDUCED PRESSURE BACKFLOW PREVENTOR
SA	SHOCK ABSORBER (WATER HAMMER ARRESTER)
SI	SOLID INTERCEPTOR
SM	WATER SUBMETER
ST	STORM PIPE
SV	GAS PIPE SLEEVE VENT
TP	TRAP PRIMER
TMV	THERMOSTATIC MIXING VALVE
TM-ES	THERMOSTATIC MIXING VALVE FOR EMERGENCY SHOWER
TM-EE	THERMOSTATIC MIXING VALVE FOR EMERGENCY EYE WASH
TWS	TEPID WATER SUPPLY
TWR	TEPID WATER -RECIRCULATION
T&P	TEMPERATURE AND PRESSURE VALVE
UEO	USED ENGINE OIL
UPS	UNINTERRUPTED POWER SUPPLY
WCO	WALL CLEANOUT
WHA	WATER HAMMER ARRESTER
WWF	WINDSHIELD WASHER FLUID
W & T	WASTE AND TRAP
V	VENT
V(ST)	STORM VENT PIPE
VB	VACUUM BREAKER
VAC	VACUUM
VTR	VENT THRU ROOF
AVTR	ACID WASTE VENT THRU ROOF

PLUMBING FIXTURE SCHEDULE

FIXTURE NUMBER	SYMBOL	DESCRIPTION	WASTE	VENT	COLD	HOT	REMARKS
P-1		WATER CLOSET	4"	2"	1 ¼"	-	
P-1A		WATER CLOSET (ADA)	4"	2"	1 ¼"	-	ADA COMPLIANT
P-1B		WATER CLOSET	4"	2"	-	-	ADA COMPLIANT
P-2A		URINAL	4"	2"	¼"	-	ADA COMPLIANT
P-3A P-3B		LAVATORY	1½"	1½"	½"	½"	ADA COMPLIANT, SENSOR ACTIVATED
P-5		SINK	1½"	1½"	½"	½"	INTERGRAL BUBBLER W/ SINK FAUCET REQUIRED AT CHILD HEIGHT SINK
P-5A		SINK	1½"	1½"	½"	½"	P-5 TO BE ADA COMPLIANT.
P-6		DRINKING WATER COOLER	1½"	1½"	½"	-	ADA COMPLIANT WITH BOTTLE FEEDER
P-7		MOP SINK	3"	1½"	½"	½"	
P-8		SINK	2"	1½"	½"	½"	CONNECT DRAIN TO SOLID INTERCEPTOR SEE NOTE 1.
P-8A		LARGE SINK	2"	1½"	½"	½"	
P-8B		UTILITY SINK	2"	1½"	½"	½"	
P-9		EYE WASH / SHOWER - FLOOR MTD			3"	3"	FURNISH WITH TEMPERING VALVE- TM2A
P-9A		EYE WASH / SHOWER - FLOOR MTD			1½"	1½"	FURNISH WITH TEMPERING VALVE- TM2A
P-11		WASHER OUTLET BOX	2"	1½"	½" 4	½" 4	STAND PIPE W/VENTED P-TRAP
P-11A		ICE MAKER OUTLET BOX			½"		
P-11B		REFRIGERATOR OUTLET BOX			½"		
FD1		FLOOR DRIAN	2"	2"			PROVIDE TRAP PRIMER
FD2		FLOOR DRIAN	3"	2"			
FD1A				2"			
FD2A			4"	2"			
FPHB					3/4"		HOSE BIBB
HB					1/2"		
RH		ROOF HYDRANT			3/4"		
A/P							ACCESS PANEL (FURNISH BY P.C AND INSTALLED BY G.C.)

NOTE:

1. SINK WILL BE PART OF THE CASEWORK BY OTHERS. P.C SHALL FURNISH AND INSTALL FAUCETS, DRAIN FITTINGS, AND CONNECTION TO WATER, WASTE AND VENT. SEE SPECIFICATION

EXPANSION TANK

ET
1

TAG NO.	SERVICE	MANUFACTURER AND MODEL NO. OR EQUAL	TYPE	TANK VOLUME (GAL)	MAX ACCEPT VOLUME. (GAL)	REMARKS
ET 1	EWH-1	AMTROL ST-40VC	STAND MODEL	20	35	1

1. ASME TANK, NSF/ ANSI 61

ACCEPTABLE MANUFACTURER:
AMTROL, TACO, BELL & GOSSET OR APPROVED EQUAL.

CIRCULATION PUMP SCHEDULE

RP
X

TAG NO.	MANUFACTURER AND MODEL NO. OR EQUAL	SERVICE	TYPE	FLOW RATE (GPM)	HEAD (FT)	ELECTRICAL DATA				REMARKS
						AMPS	HP	VOLT	PHASE	
RP-1	TACO 0034E PLUS	HOT WATER RECIRCULATION	INLINE	15	20	0.76	1/4	115	1	1 , 2
RP-2	TACO 0024E PLUS	HOT WATER RECIRCULATION (140HWR)	INLINE	5	15	0.4	1/6	115	1	1 , 2

1. STAINLESS STEEL PUMP HOUSING, NSF /ANSI 61 CLASSIFIED.
2. ECM CONTROL

ACCEPTABLE MANUFACTURER:
GRUNDFOS, AMTROL, TACO, BELL & GOSSET OR APPROVED EQUAL.

ELECTRONIC TRAP PRIMER

ETP NO	ETP LOCATION	FLOOR	MIN. MANIFOLD PORTS	AREA SERVED FOR FLOOR DRAINS	MANUF. / #MODEL	REMARK	LOCATION SHEET NO.
ETP-1	CUST. CLOSET 303	LEVEL 3 AREA A	8	GILRS TOILET (322, 223, 126), BOYS TOILET (323, 222, 125)	PPP # PT4	①	P1.31
ETP-2	GIRLS TOILET 331	LEVEL 3 AREA A	8	GILRS TOILET (330, 232, 133), BOYS TOILET (329, 231, 132)	PPP # PT4	①	P1.31
ETP-3	MECH PUMP ROOM 250	LEVEL 2 AREA B	8	MECH PUMP ROOM 250	PPP # PT4	①	P1.22
ETP-4	RECYCLING / TRASH ROOM 155A	LEVEL 1 AREA B	5	WATER ENTRY 149C	PPP # PT4	①	P1.12
ETP-5	BOYS TOILET 154, GIRLS TOILET 155	LEVEL 1 AREA B	5	BOYS TOILET 154, GIRLS TOILET 155	PPP # PT4	①	P1.12
ETP-6	KITCHEN 156	LEVEL 1 AREA B	5	KITCHEN 156	PPP # PT4	①	P1.34
ETP-7	KITCHEN 156	LEVEL 1 AREA B	5	KITCHEN 156	PPP # PT4	①	P1.34

GENERAL PLUMBING NOTES

1. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE GENERAL CONTRACTOR.
2. REFER TO ARCHITECTURAL PLANS FOR HEIGHT OF CEILING AND COORDINATE ALL WORK WITH ALL OTHER CONTRACTORS PRIOR TO START.
3. COORDINATE WITH ARCHITECT FOR PLUMBING FIXTURES LOCATION.
4. GENERAL NOTES, SYMBOLS LIST AND DETAILS ARE APPLICABLE TO ALL DRAWINGS.
5. DRAWINGS ARE DIAGRAMMATIC: THIS CONTRACTOR SHALL DETERMINE EXACT LOCATIONS AND SIZES OF SYSTEMS AND COMPONENTS IN FIELD.
6. ALL PLUMBING WORK SHALL BE IN ACCORDANCE WITH THE LASTEST PLUMBING CODE AND ALL APPLICABLE LOCAL CODES. ALL WORK SHALL CONFORM TO THE AMERICANS WITH DISABILITIES ACT (ADA)
7. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE THEIR WORK WITH THAT OF ALL OTHER TRADES, INCLUDING BUT NOT LIMITED TO, ELECTRICAL, HVAC, SPRINKLER, STRUCTURAL AND GENERAL ARCHITECTURE.
8. ANY INTERFERENCE SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER, AND SHALL BE RESOLVED PRIOR TO THE INSTALLATION OF WORK.
9. NO WORK SHALL BE INSTALLED IN VIOLATION OF ANY GOVERNING CODES. ANY WORK SHOWN ON THE DRAWINGS WHICH IS IN VIOLATION OF SUCH CODES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND SHALL BE RESOLVED PRIOR TO THE INSTALLATION OF THE WORK.
10. ALL PIPING PENETRATING CEILINGS AND WALLS SHALL BE INSTALLED WITH ESCUTCHEONS AT THE PENETRATION. ALL PIPING PENETRATING EXTERIOR WALLS AND ROOFS SHALL BE FLASHED IN AN APPROVED MANNER AND SHALL BE SEALED WEATHERTIGHT. PIPING PENETRATING FIRE RATED PARTITIONS SHALL BE PROVIDED WITH FIRE RATED SEALS AS REQUIRED BY LOCAL CODE AUTHORITY.
11. MANUFACTURERS' MODEL NUMBERS ARE SPECIFIED SOLELY TO ESTABLISH STANDARDS OF QUALITY FOR PERFORMANCE AND MATERIALS. INSTALLATION SHALL ADHERE TO MANUFACTURERS' RECOMMENDATIONS.
12. TOP OF ALL FLOOR DRAINS SHALL BE SET FLUSH WITH FINISHED FLOOR. ALL PIPING ABOVE GRADE SHALL BE PROPERLY SUPPORTED BY THE BUILDING STRUCTURE AND SHALL NOT REST ON CEILING STRUCTURE OR COMPONENTS.
13. ALL PLUMBING EQUIPMENT, PIPING, INSULATION, ETC., INSTALLED IN HVAC PLENUM SPACES SHALL MEET CODE REQUIREMENTS FOR SMOKE AND COMBUSTIBILITY.
14. PROVIDE SHUTOFF VALVES ON ALL BRANCH PIPING AND ON ALL SUPPLIES TO INDIVIDUAL FIXTURES AND EQUIPMENT. PROVIDE BALL VALVES ON ALL WATER MAIN BRANCHES IN CORRIDORS AND WHERE INDICATED ON DRAWINGS.
15. PROVIDE BALANCING VALVES, BALL VALVES AND CHECK VALVES ON ALL HOT WATER RETURN BRANCHES, AS REQUIRED, TO BALANCE RETURN SYSTEM.
16. PROVIDE CLAMPS, OFFSETS, EXPANSION JOINTS, ANCHORS AND GUIDES AS NECESSARY TO PREVENT STRESS ON PIPING.
17. PROVIDE VENTS AT HIGH POINTS IN PIPING SYSTEMS AND DRAIN VALVES AT LOW POINTS.
19. PROVIDE GAUGE FITTINGS AT PUMP INLETS AND OUTLETS. PROVIDE THERMOMETER WELLS ON MIXING VALVE OUTLETS AND DOMESTIC WATER HEATER OUTLETS.
20. PITCH DOWN PRESSURE PIPING TO DOMESTIC WATER HEATERS.
21. VERIFY EXACT SIZES, LOCATIONS, INVERTS AND ELEVATIONS PRIOR TO RUNNING ANY PIPING.
22. ALL EXPOSED WATER, WASTE AND VENT PIPING SHALL BE PAINTED (COLOR TO BE SELECTED BY ARCHITECT). INSTALL WATER SHOCK ARRESTORS AT EACH FIXTURE OR BATTERY OF FIXTURES. ALL INDIRECT WASTE PIPING SHALL BE COPPER AND CHROME PLATED BRASS WHERE EXPOSED.
23. ALL PLUMBING VENTS THRU ROOF SHALL BE INSTALLED MINIMUM 25' AWAY FROM ADJOINING HVAC UNIT AIR INTAKES.
24. ALL FLOOR DRAIN SHALL BE PROVIDE WITH TRAP PRIMER. THE TRAP PRIMER SHALL BE LOCATED IN ACCESSIBLE LOCATION.
25. TRAP PIPING BELOW SLAB SHALL BE TYPE “K”SOFT ROLLED BRAZED COPPER ENCASED IN SUITABLE SIZE PEX TUBING. THE PEX TUBING SHALL BE LISTED FOR BURIAL IN SOIL & CONCRETE. THERE SHALL BE NO JOINTS IN COPPER OR PEX BELOW SLAB.
26. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING 24V POWER WIRING AND CONTROL MODULE ETC. TO ALL SENSOR ACTIVATED FIXTURES. COORDINATE WORK WITH ELECTRICAL CONTRACTOR. REFER TO ELECTRICAL DRAWING NUMBER 10.3.03 FOR DETAIL SCOPE OF WORK.
27. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF KITCHEN WASTE AND CHAMBER VENT PIPING BACK TO THE OUTDOOR GREASE INTERCEPTOR. THE PIPING SHALL BE CAST IRON AND SHALL BE INSTALLED IN ACCORDANCE TO 248CMR 10.09. REFER TO SITE UTILITY PLAN FOR THE OUTDOOR GREASE INTERCEPTOR.
28. KITCHEN EQUIPMENT SUCH DISHWASHER, GARBAGE DISPOSER, FIXTURE WITH HOSE ATTACHMENT ETC. PROVIDE BACKFLOW PREVENTER AT CROSS CONNECTIONS TO POTABLE WATER.

STORAGE TYPE ELECTRIC WATER HEATER SCHEDULE

EWH
X

TAG NO.	MANUFACTURER AND MODEL NO. OR EQUAL	LOCATION	SERVICE	MIN. STORAGE (GAL)	FUEL TYPE	HEATER INPUT (kW)	RECOVERY RATE (GPH) AT 90° F RISE	EWT (°F)	LWT (°F)	ELECTRICAL DATA		REMARKS
										VOLT	PHASE	
EWH-1	A.O SMITH DSE-120	MECH ROOM	BUILDING	120	ELECT	90	369	50	140	480	3	①
EWH-2	A.O SMITH DSE-120	MECH ROOM	BUILDING	120	ELECT	90	369	50	140	480	3	①
EWH-3	A.O SMITH DVE-120	MECH ROOM	KITCHEN	120	ELECT	90	369	50	140	480	3	①

① WATER HEATER SHALL BE CONSTRUCTED AND STAMPED IN ACCORDANCE WITH ASME STANDARD REQUIREMENT

ELEVATOR SUMP PUMP - SIMPLEX

TAG NO.	TYPE	MANUFACTURER AND MODEL NO. OR EQUAL	SERVICE	FLOW RATE (GPM)	HEAD (FT)	ELECTRICAL DATA			REMARKS	STAND BY POWER
						HP	AMPS	VOLT		
SP-1	SIMPLEX	ZOELLER G294	ELEVATOR PUMP	50	38	0.75	3	208 V-1PH	1,2	YES

1 PUMP FLOAT TO START/STOP PUMP.

2 OTHER EQUAL MANUFACTURES ARE STANCOR, LIBERTY PUMP.

SUB METER SCHEDULE

TAG NO.	SERVICE	TYPE	PIPE SIZE	LOCATION	MANUFACTURER/ MODEL	REMARKS
SM-1	DOMESTIC COLD WATER	ULTRA SONIC	4"	WATER SUPPLY ROOM	SPIRE METERING TECH. 280W-CI	1,2,3
SM-2	DOMESTIC HOT WATER	ULTRA SONIC	3"	WATER SUPPLY ROOM	SPIRE METERING TECH. 280W-CI	1,2,3
SM-3	KITCHEN HOT WATER	ULTRA SONIC	2 "	KITCHEN MECH. ROOM	SPIRE METERING TECH. 280W-CI	1,2,3
SM-4	IRRIGATION	ULTRA SONIC	1.5"	WATER SUPPLY ROOM	SPIRE METERING TECH. 280W-CI	1,2,3

1 REFER TO SPECIFICATION SECTION.

2 PROVIDE FLANGE CONNECTION.

3 INSTALL PER THE MANUFACTURERS INSTRUCTION.

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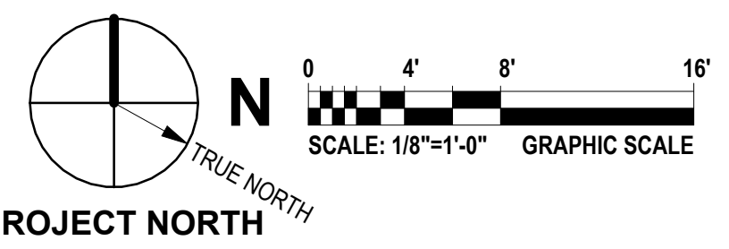
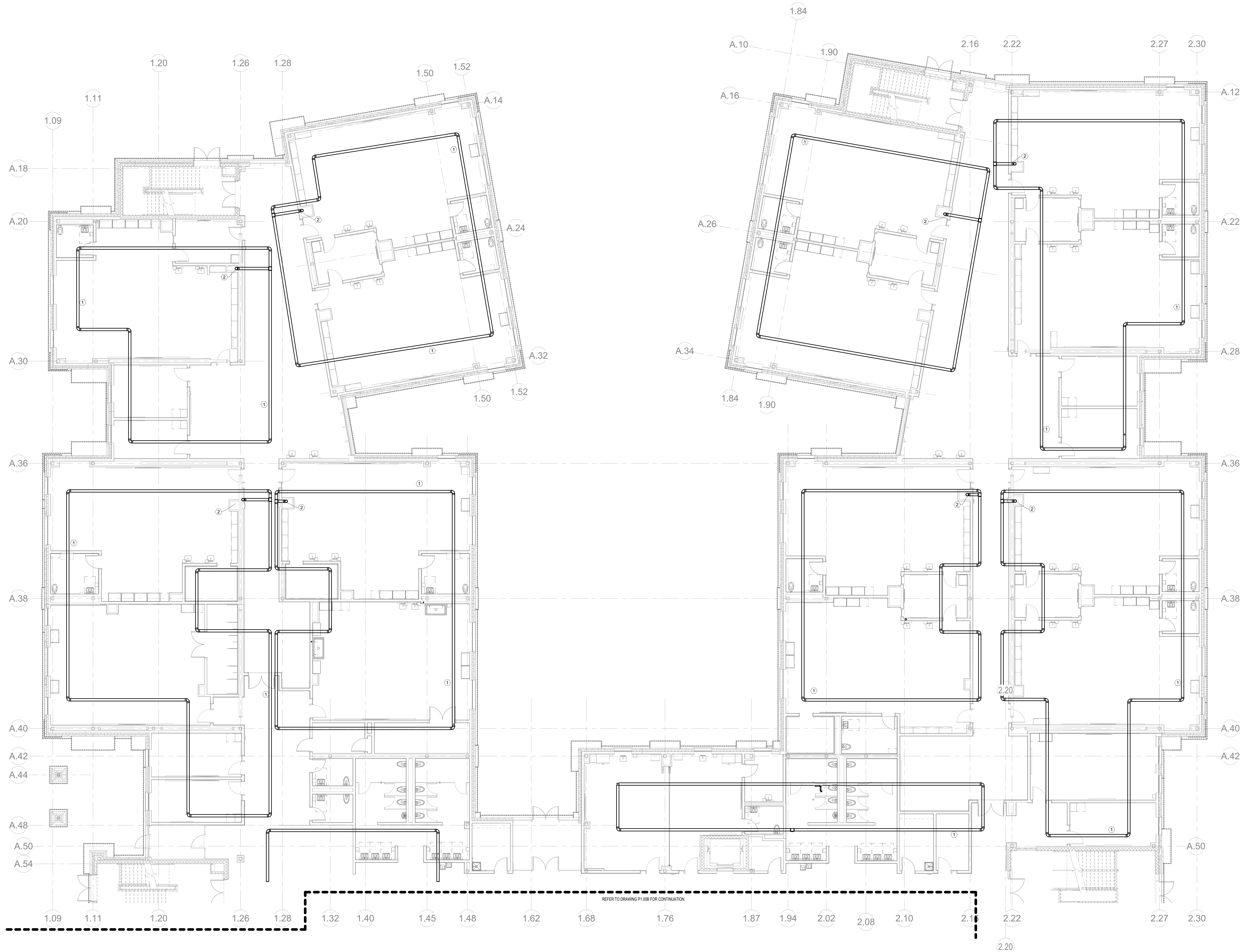


PROJECT NORTH

SHEET TITLE:
PLUMBING LEGEND
AND SCHEDULES

SHEET NUMBER:
P0.01



REFER TO DRAWING P1.00B FOR CONTINUATION

① 6" RADON PIPE
② 6" PIPE RISER FOR RADON VENTILATION UP.

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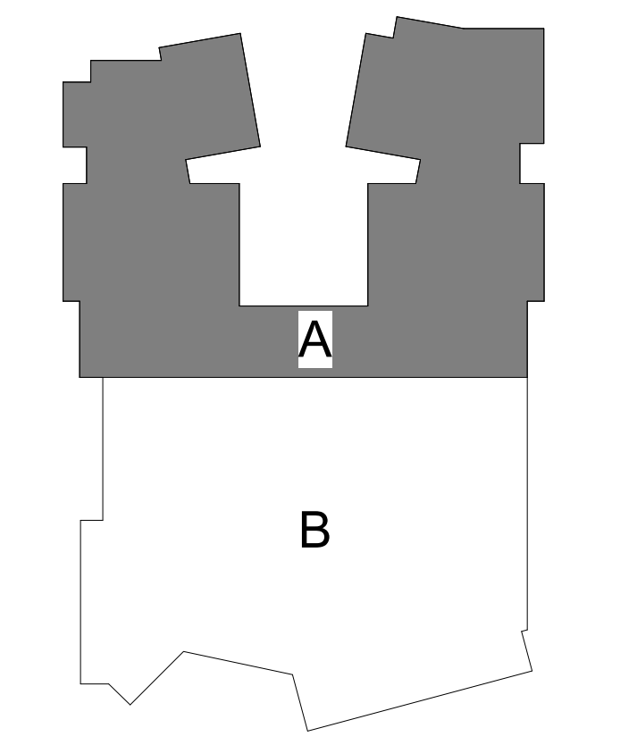

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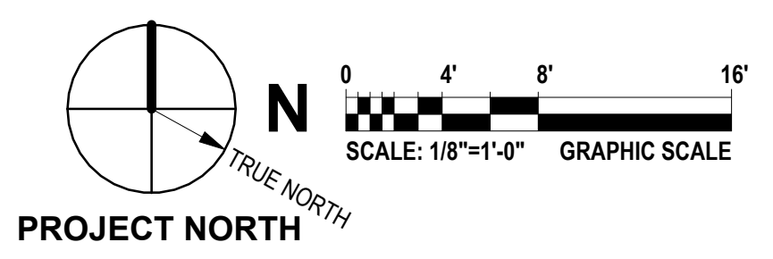

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RADON PIPING AREA A

SHEET NUMBER:

P1.00A

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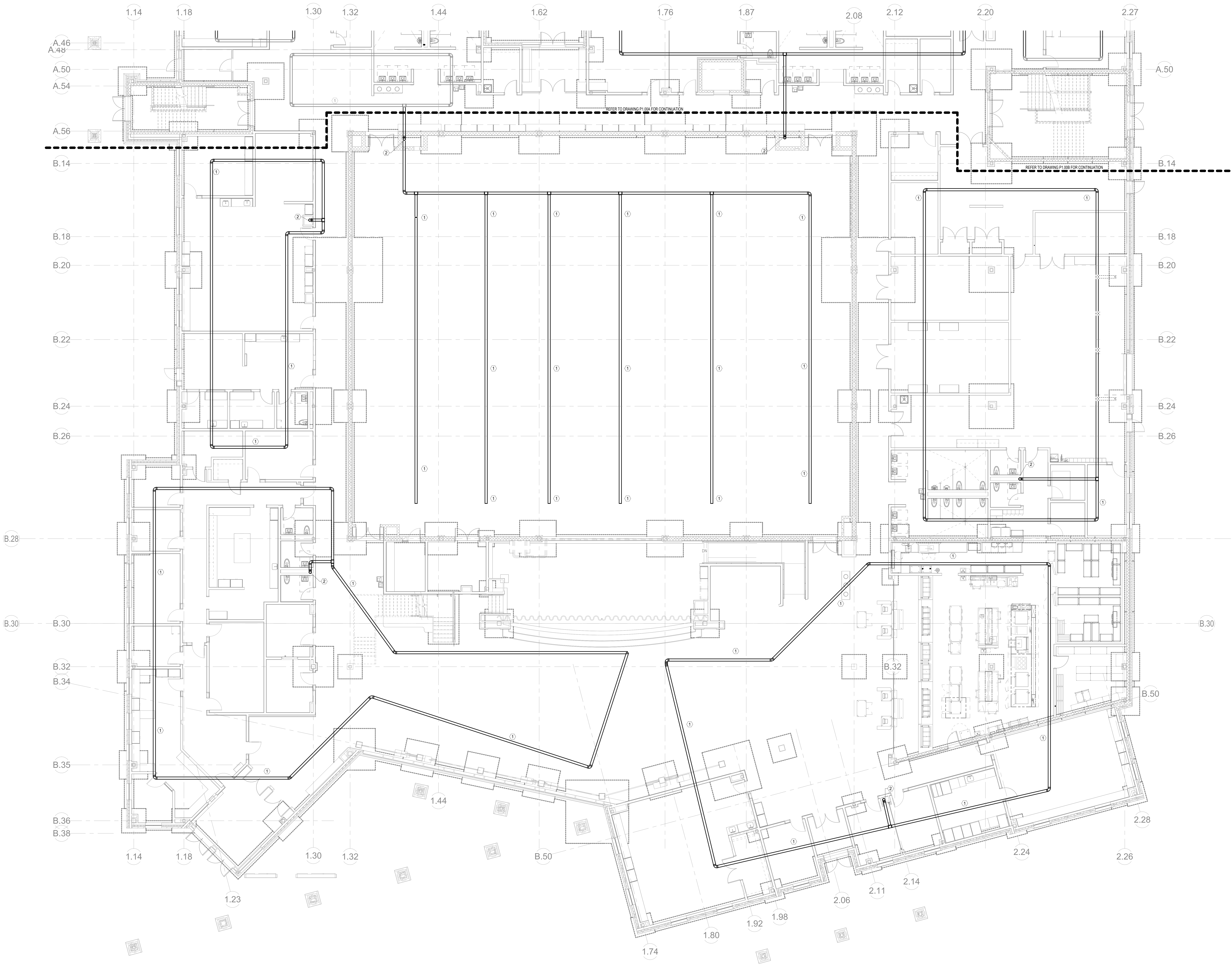

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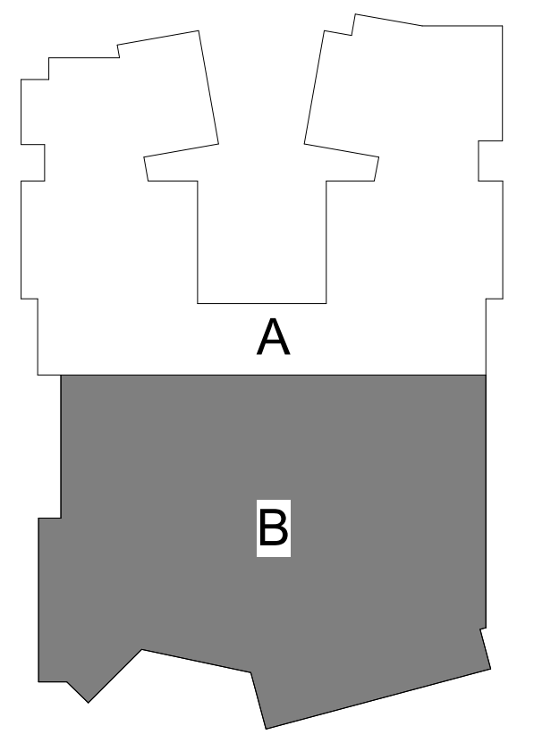

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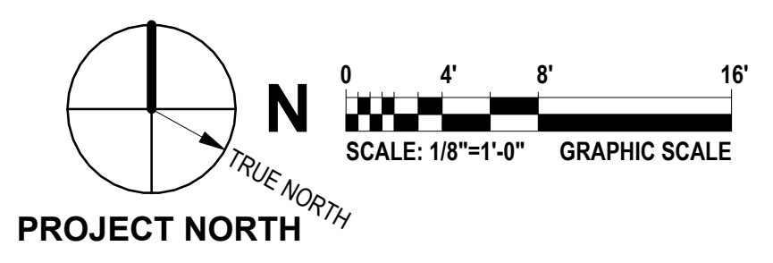

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RADON PIPING AREA B

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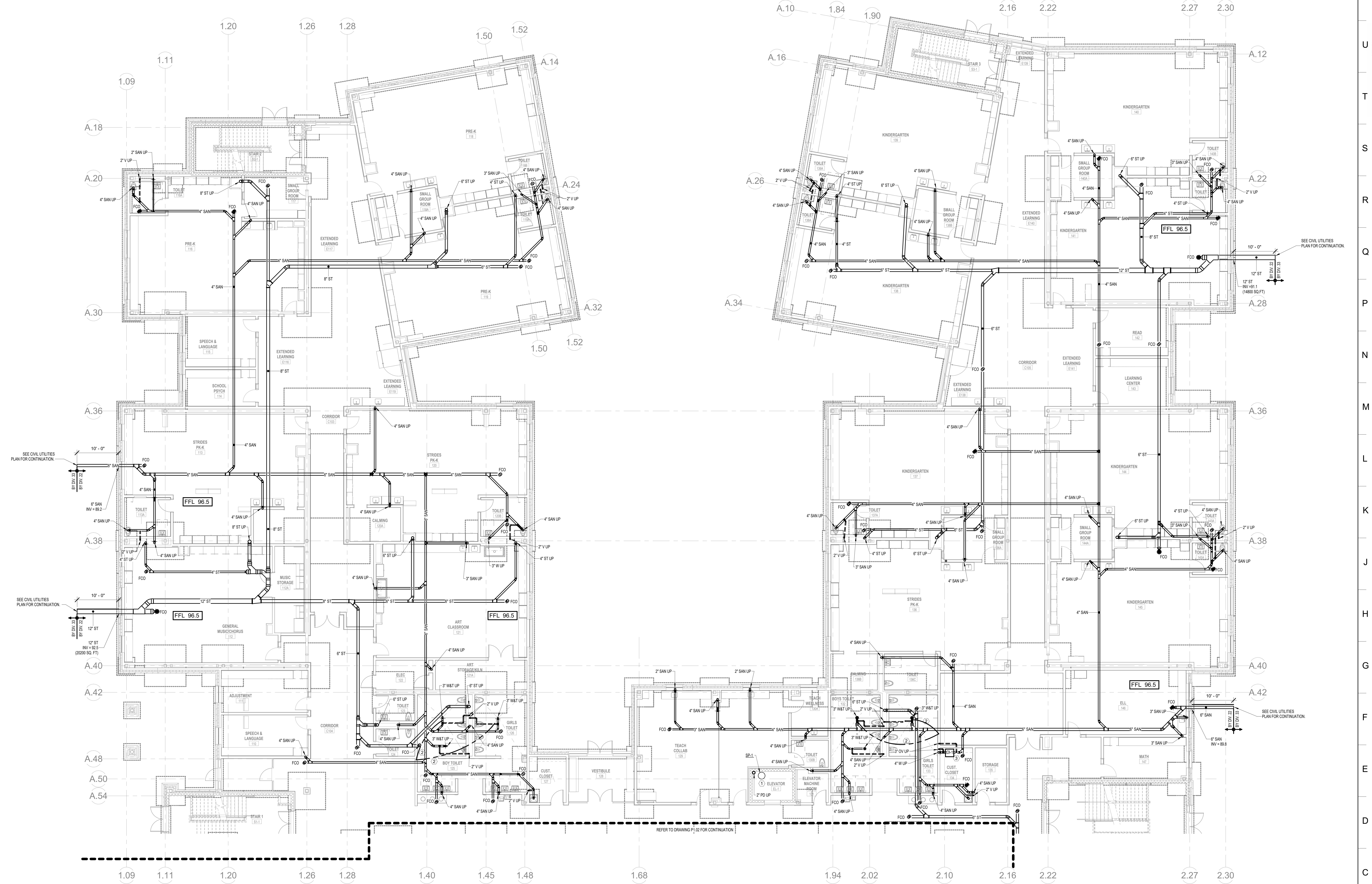

PLAN NOTES:

1. PROVIDE NEW ELEVATOR SUMP PUMP IN A PIT. REFER TO DETAIL #10 ON P3.01.
COORDINATE LOCATION WITH ELEVATOR SHOP DRAWINGS.
2. RUN 1/2" COPPER TUBING FOR TRAP PRIMER. REFER TO DETAIL #11 ON P3.02
3. OIL INTERCEPTOR. REFER TO DETAIL #9 ON P3.03.
4. COORDINATE WITH ELECTRIC CONTRACTOR FOR THE LOCATION OF UNDERGROUND ELECTRIC CONDUITS.
5. OUTDOOR GREASE INTERCEPTOR. REFER TO DETAIL#11 ON P3.01.

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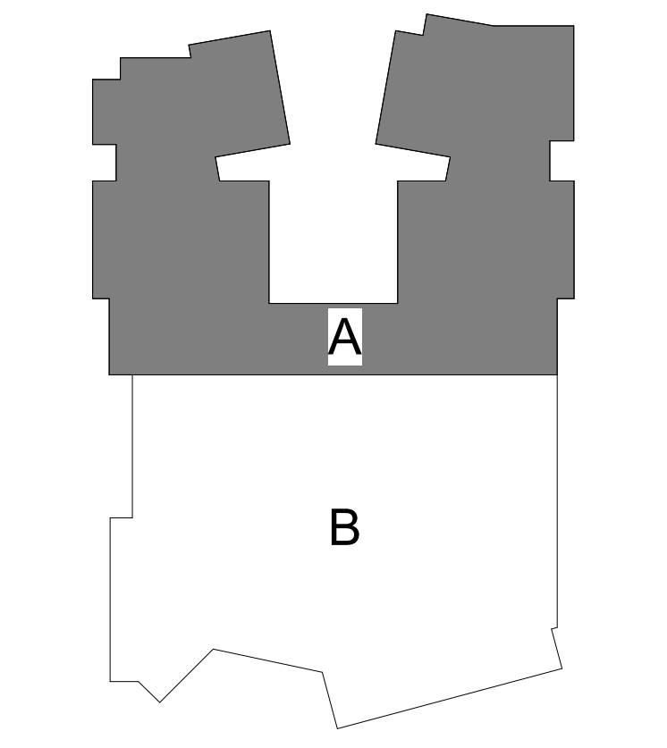

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P1.01

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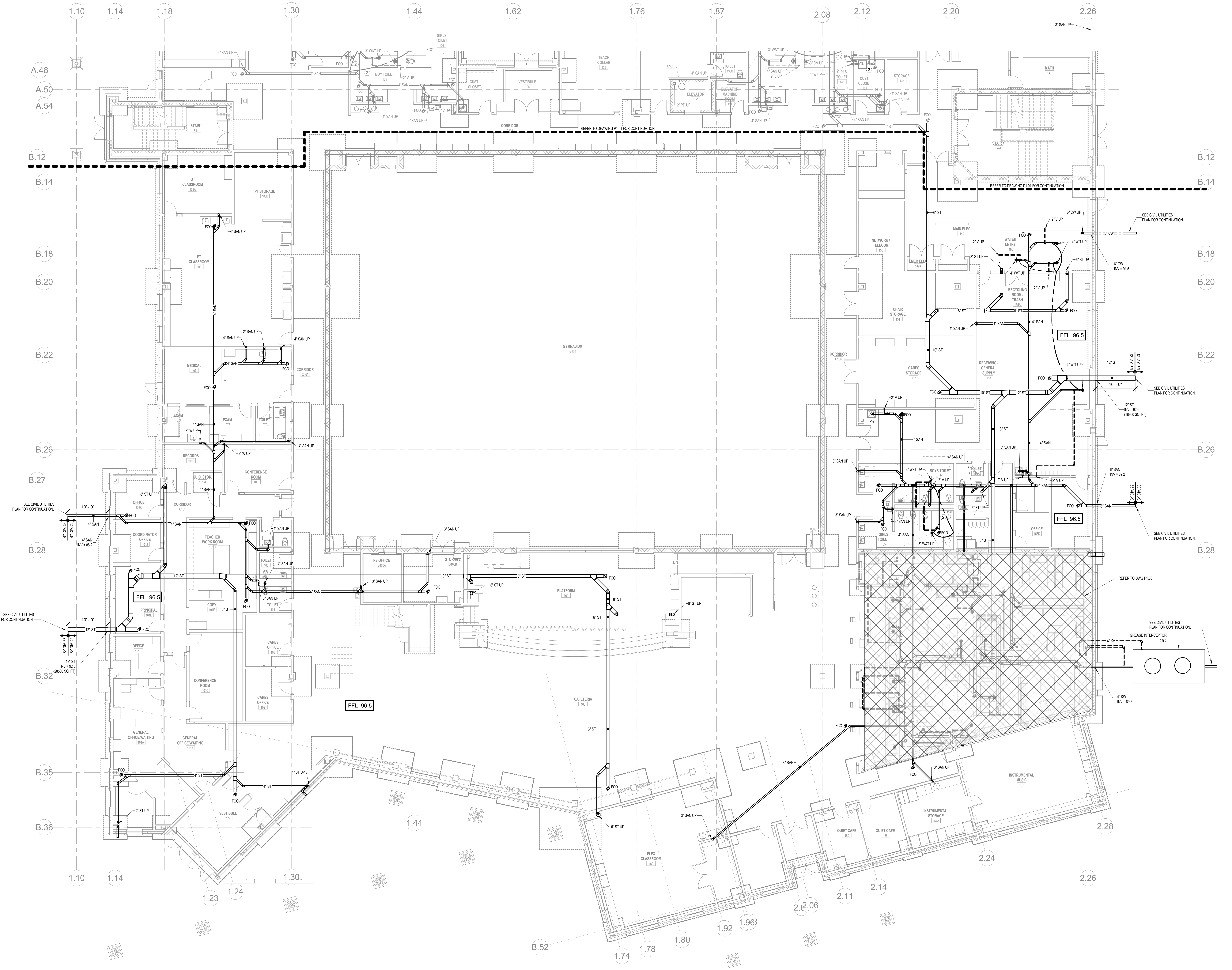

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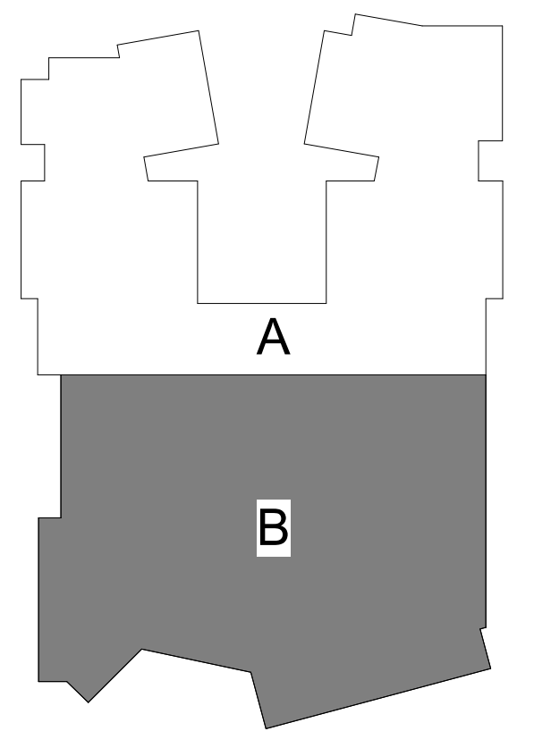
90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



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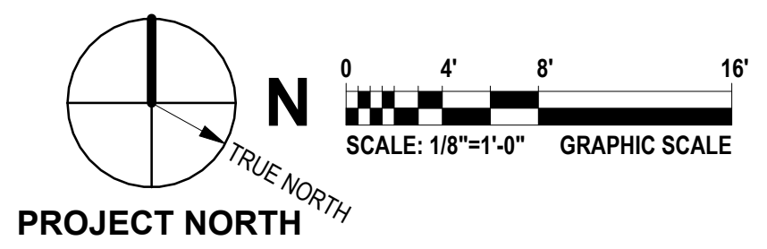
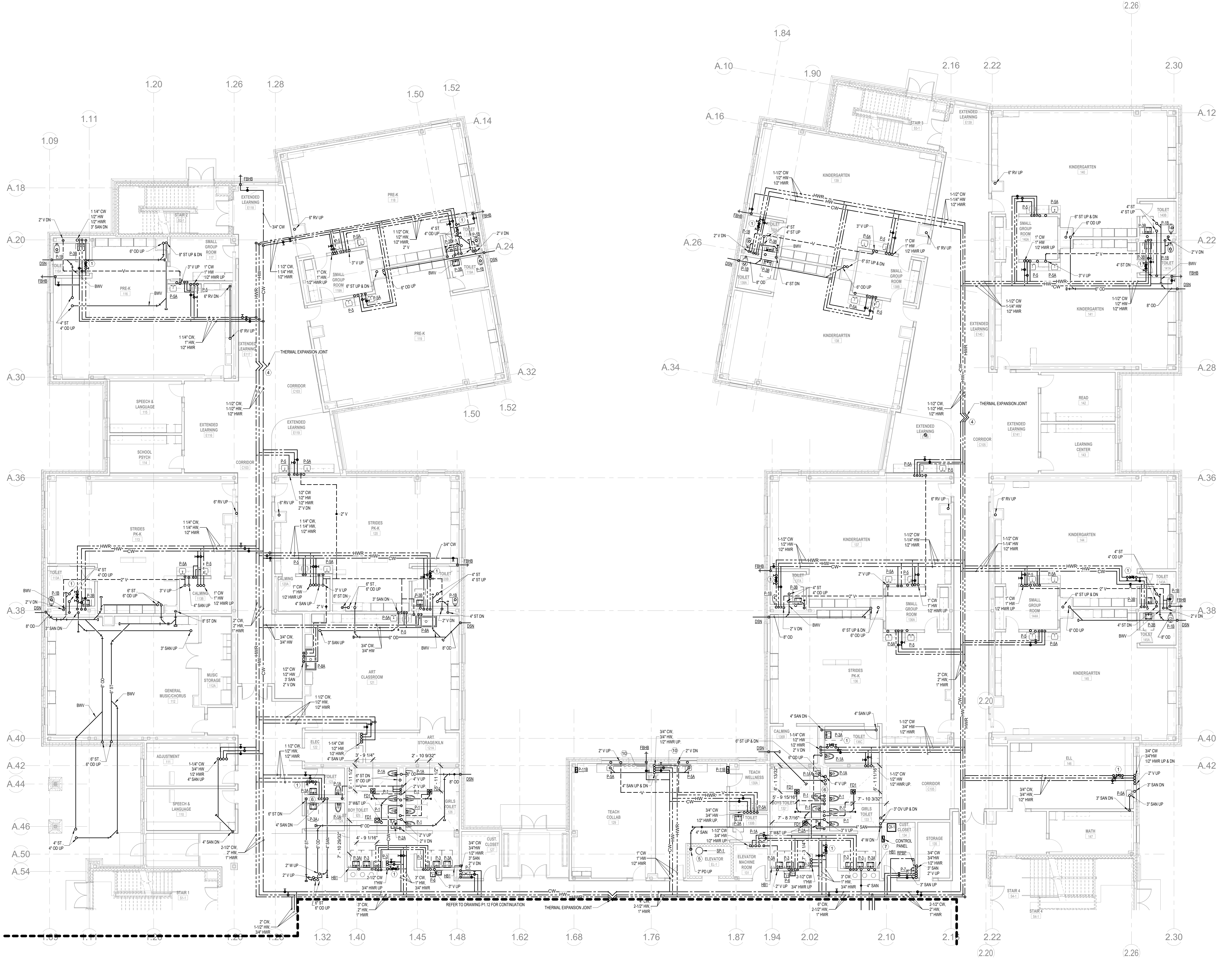


SHEET TITLE:

UNDERSLAB PLUMBING- LEVEL 1 - AREA B

SHEET NUMBER:

P1.02



PLAN NOTES:

1. BALANCING VALVE AT RECIRCULATION LOOP. REFER TO DETAIL #1 ON P3.03.
2. RUN 1/2" COPPER TUBING FOR TRAP PRIMER. REFER TO DETAIL #11 ON P3.02
3. PROVIDE STORM CLEANOUT 24" AFF. PROVIDE MIN. 10"x10" ACCESS PANEL FOR WALL CONCEALED CLEANOUTS.
4. THERMAL EXPANSION JOINT. REFER TO DETAIL #12 ON P3.03.
5. 2" PD DROP AND CONNECT TO ELEVATOR SUMP PUMP.REFER TO DETAIL #10 ON P3.01.
6. INDIRECT CONDENSATE DRAIN CONNECTION TO STORM PIPING. REFER TO DETAIL #8 ON P3.02.
7. ELEVATOR SUMP PUMP CONTROL PANEL.
8. FLOOR RECESSED OIL SEPARATOR OS-1 .REFER TO DETAIL #9 ON P3.03.
9. STORM PIPING WITHIN CANOPY TO BE ELECTRIC HEAT TRACED FOR FREEZE PROTECTION.
10. RUN 1/2"CW, 1/2"HW,1/2"HWR PIPING BEHIND CASEWORK.
11. NOT USED.
12. REFER TO ARCHITECTURE PLANS FOR FLOOR DRAIN LOCATIONS IN TOILETS.
13. RUN PIPING WITHIN CASEWORK.

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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER:
23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

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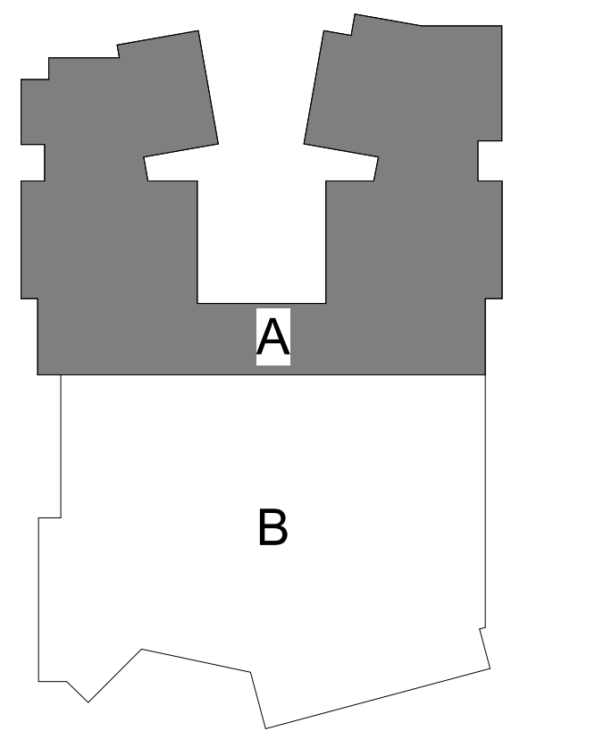
09/25/2026

KEY PLAN



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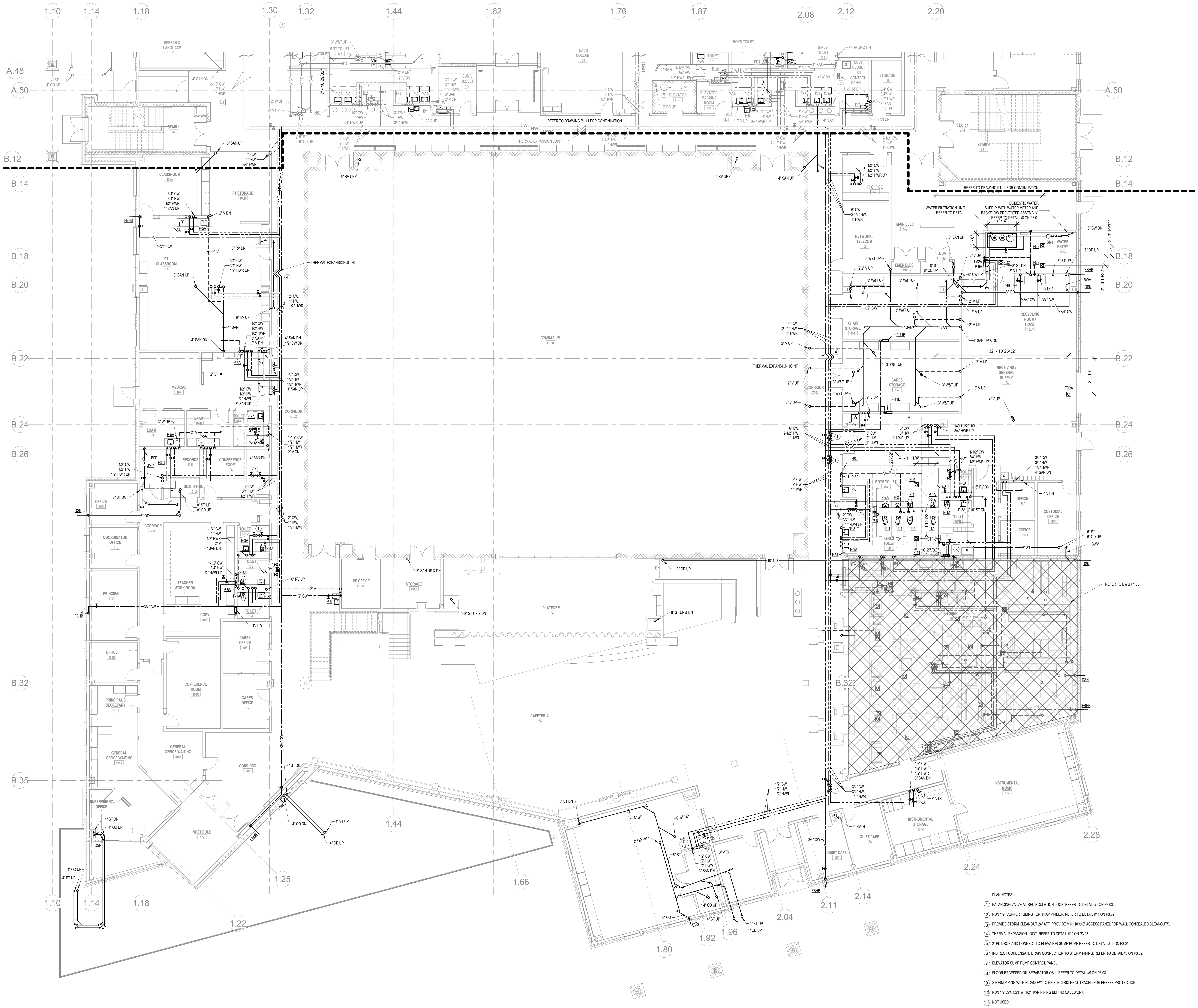
SHEET TITLE:

PLUMBING- LEVEL 1 - AREA A

SHEET NUMBER:

P1.11



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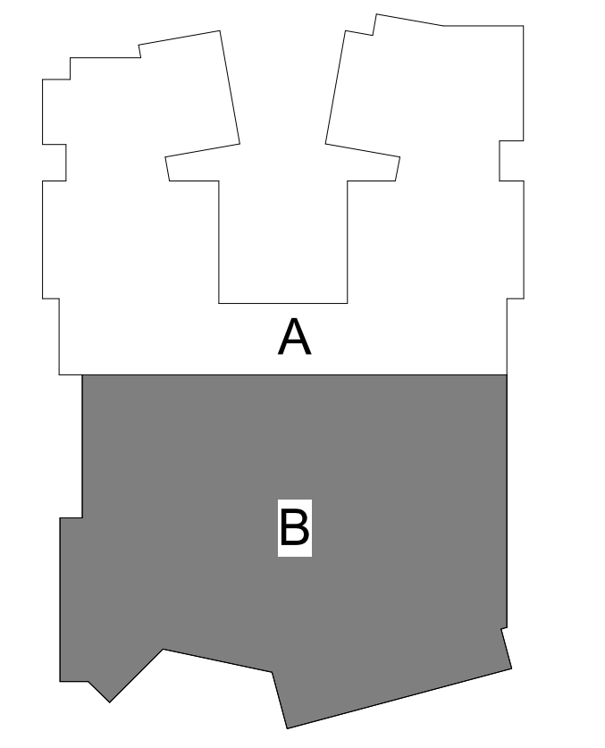

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PROJECT NORTH
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SHEET TITLE:

PLUMBING- LEVEL 1 - AREA B

SHEET NUMBER:

P1.12

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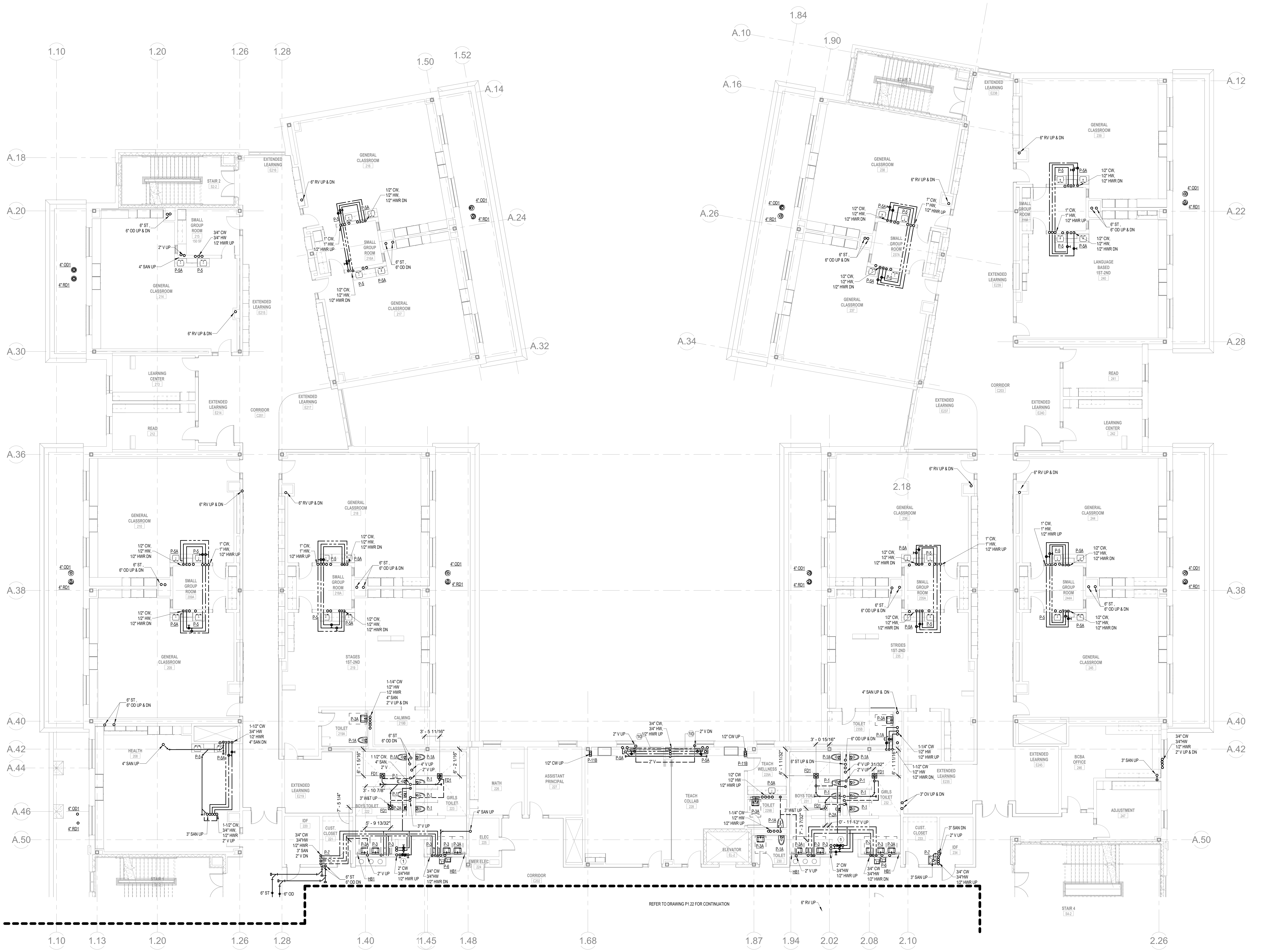

PLAN NOTES:

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11. NOT USED.
12. REFER TO ARCHITECTURE PLANS FOR FLOOR DRAIN LOCATIONS IN TOILETS.
13. RUN PIPING WITHIN CASEWORK.

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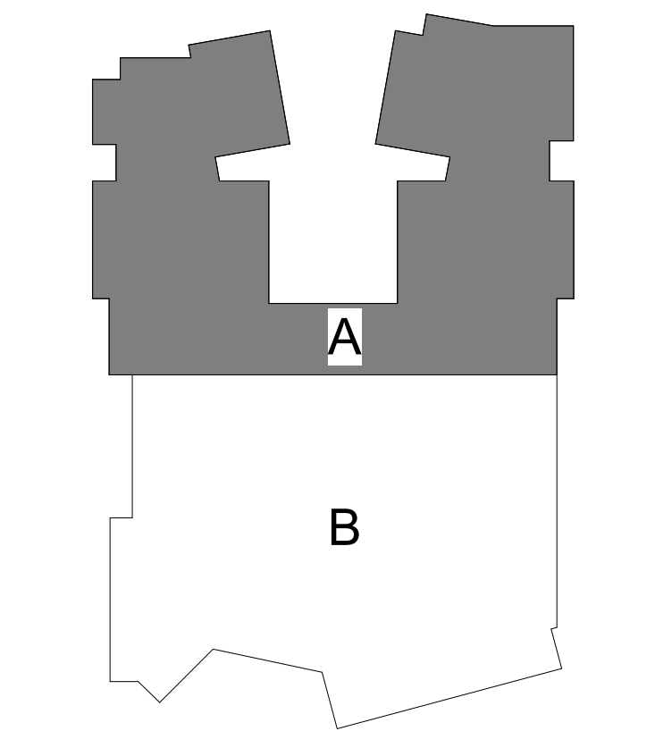

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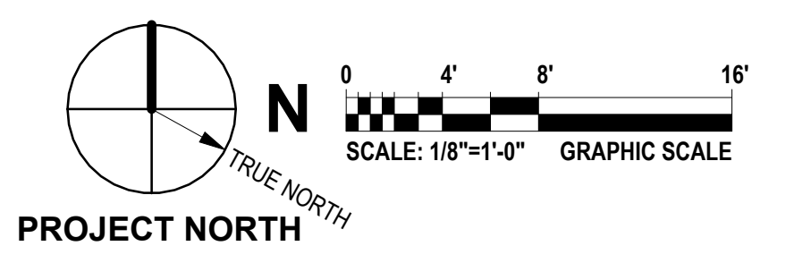
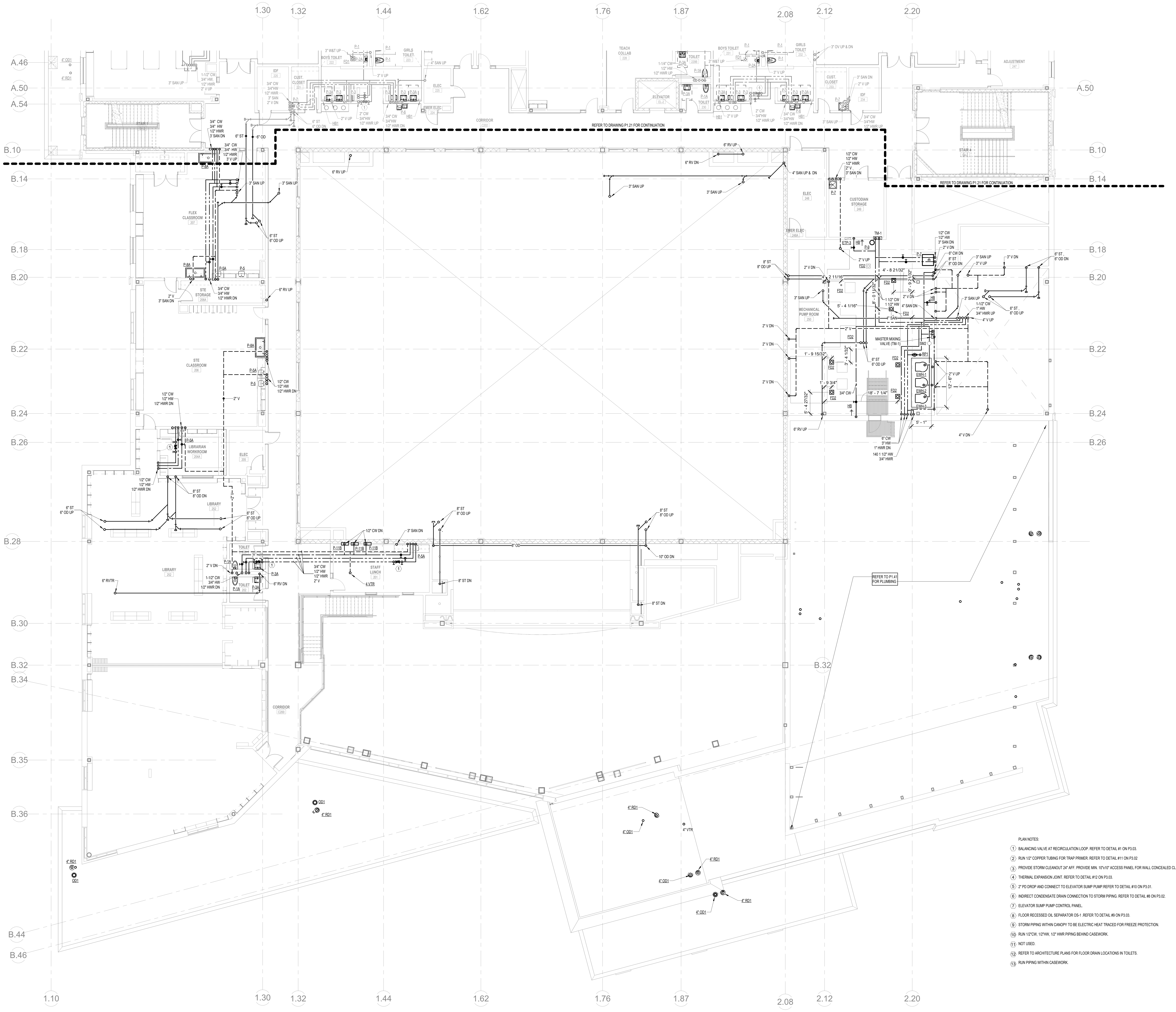


SHEET TITLE:

PLUMBING- LEVEL 2 - AREA A

SHEET NUMBER:

P1.21



PLAN NOTES:

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6. INDIRECT CONDENSATE DRAIN CONNECTION TO STORM PIPING. REFER TO DETAIL #8 ON P3.02.
7. ELEVATOR SUMP PUMP CONTROL PANEL.
8. FLOOR RECESSED OIL SEPARATOR OS-1 .REFER TO DETAIL #9 ON P3.03.
9. STORM PIPING WITHIN CANOPY TO BE ELECTRIC HEAT TRACED FOR FREEZE PROTECTION.
10. RUN 1/2"CW, 1/2"HW, 1/2" HWR PIPING BEHIND CASEWORK.
11. NOT USED.
12. REFER TO ARCHITECTURE PLANS FOR FLOOR DRAIN LOCATIONS IN TOILETS.
13. RUN PIPING WITHIN CASEWORK.

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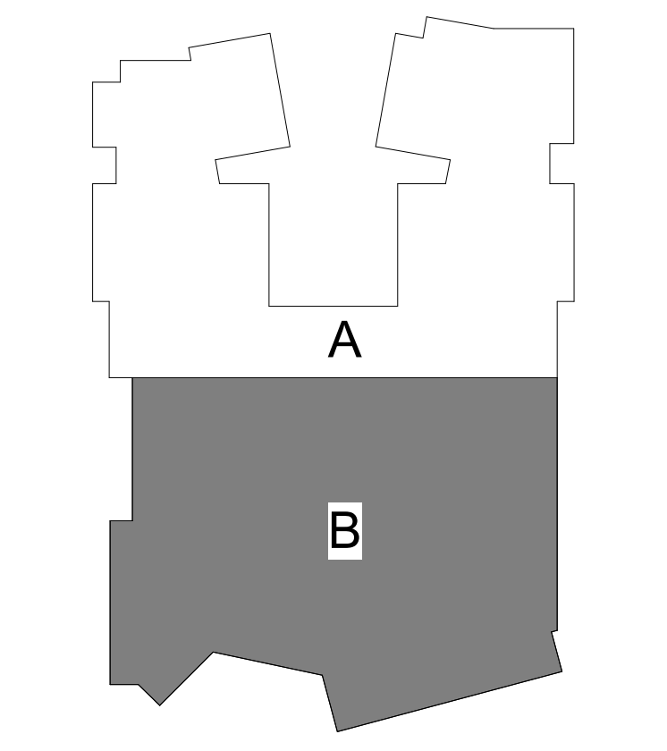

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SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

PLUMBING- LEVEL 2 - AREA B

SHEET NUMBER:

P1.22

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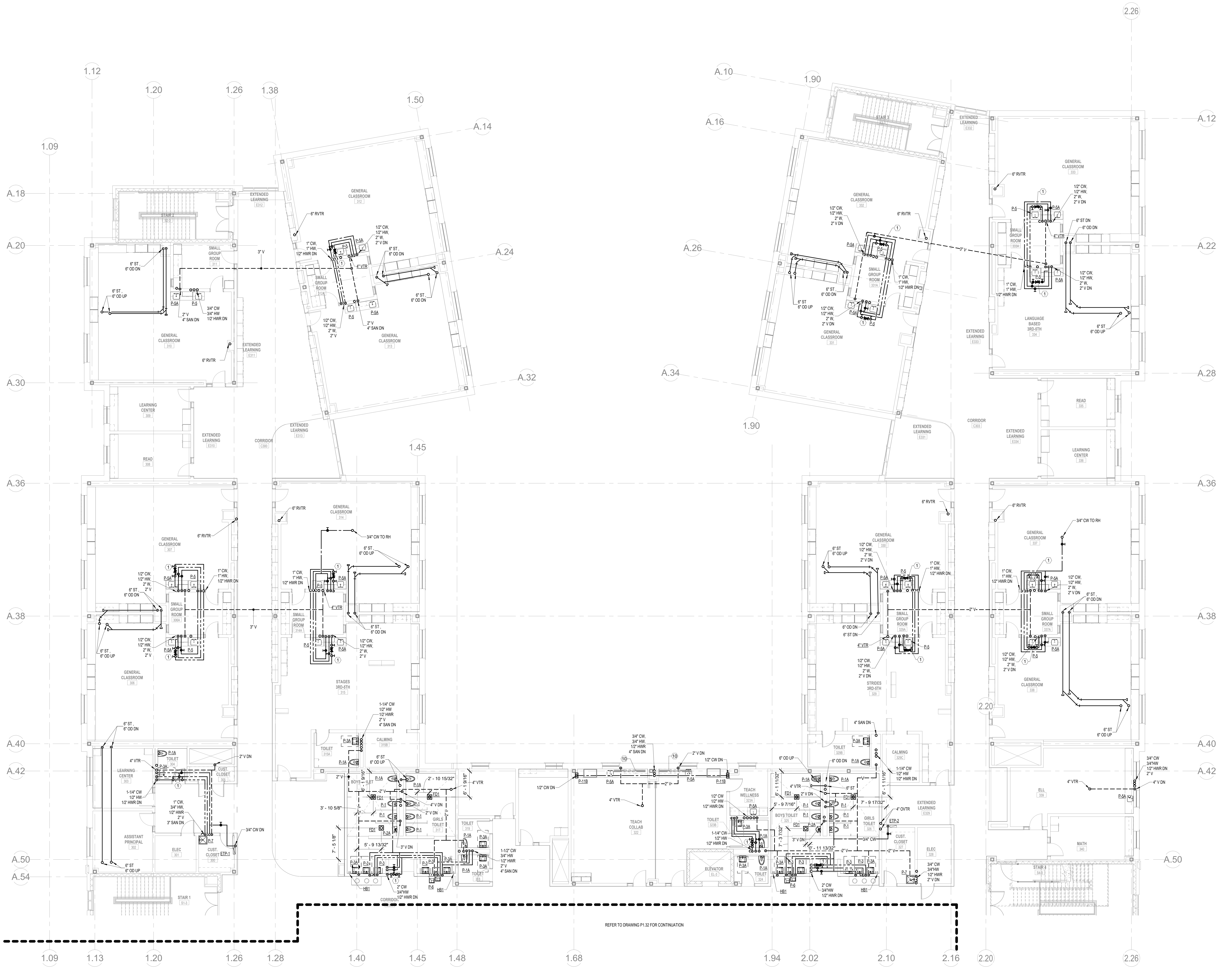

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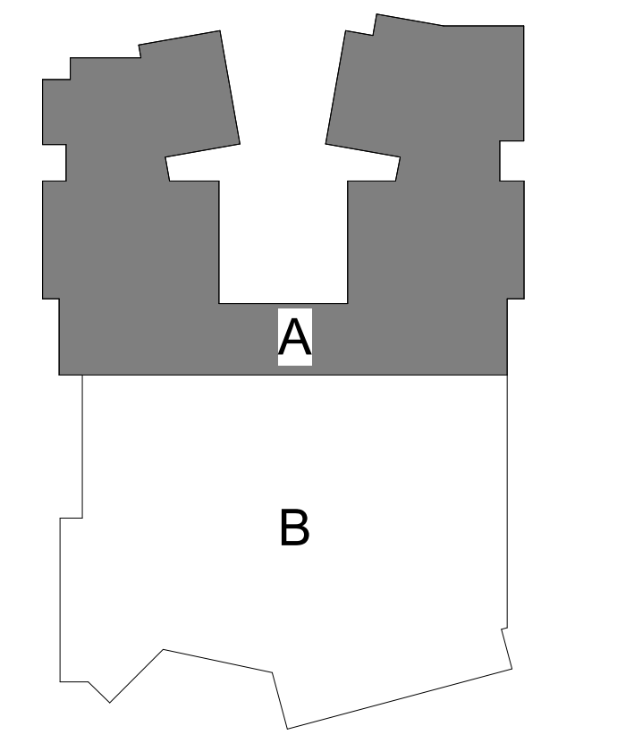


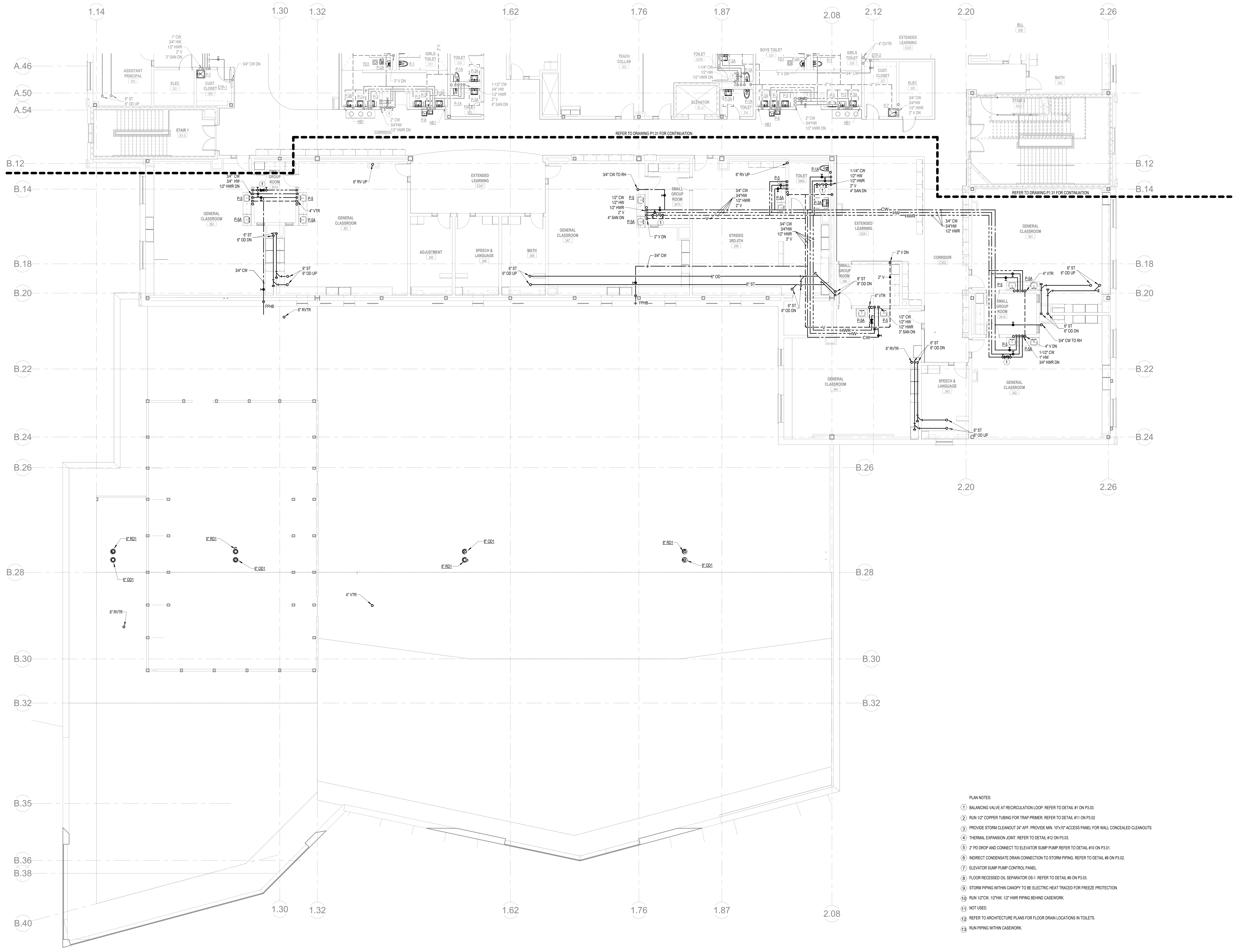
ORIENTATION AND SCALE:

SHEET TITLE:

PLUMBING- LEVEL 3 -
AREA A

SHEET NUMBER:

P1.31



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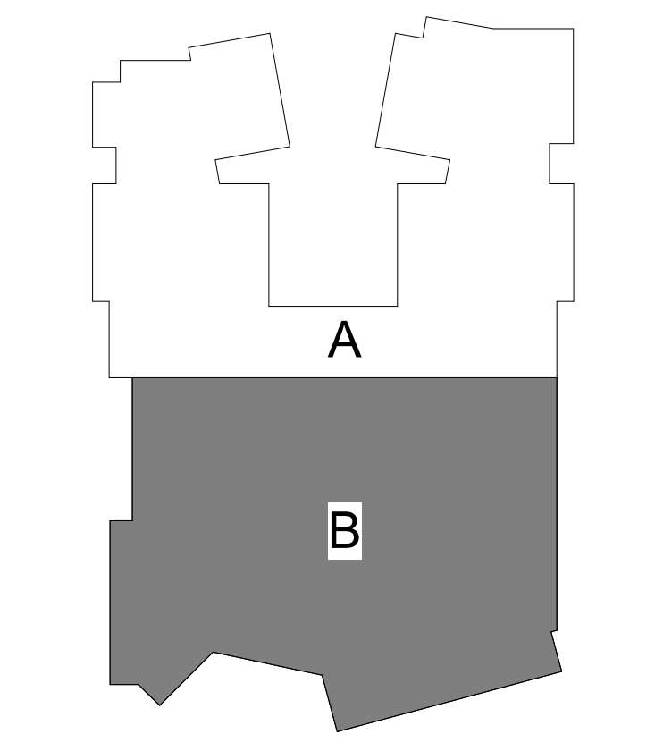

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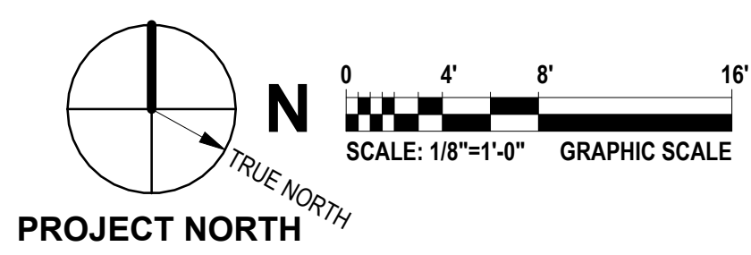

SHEET TITLE:

PLUMBING- LEVEL 3 -
AREA B

SHEET NUMBER:

P1.32

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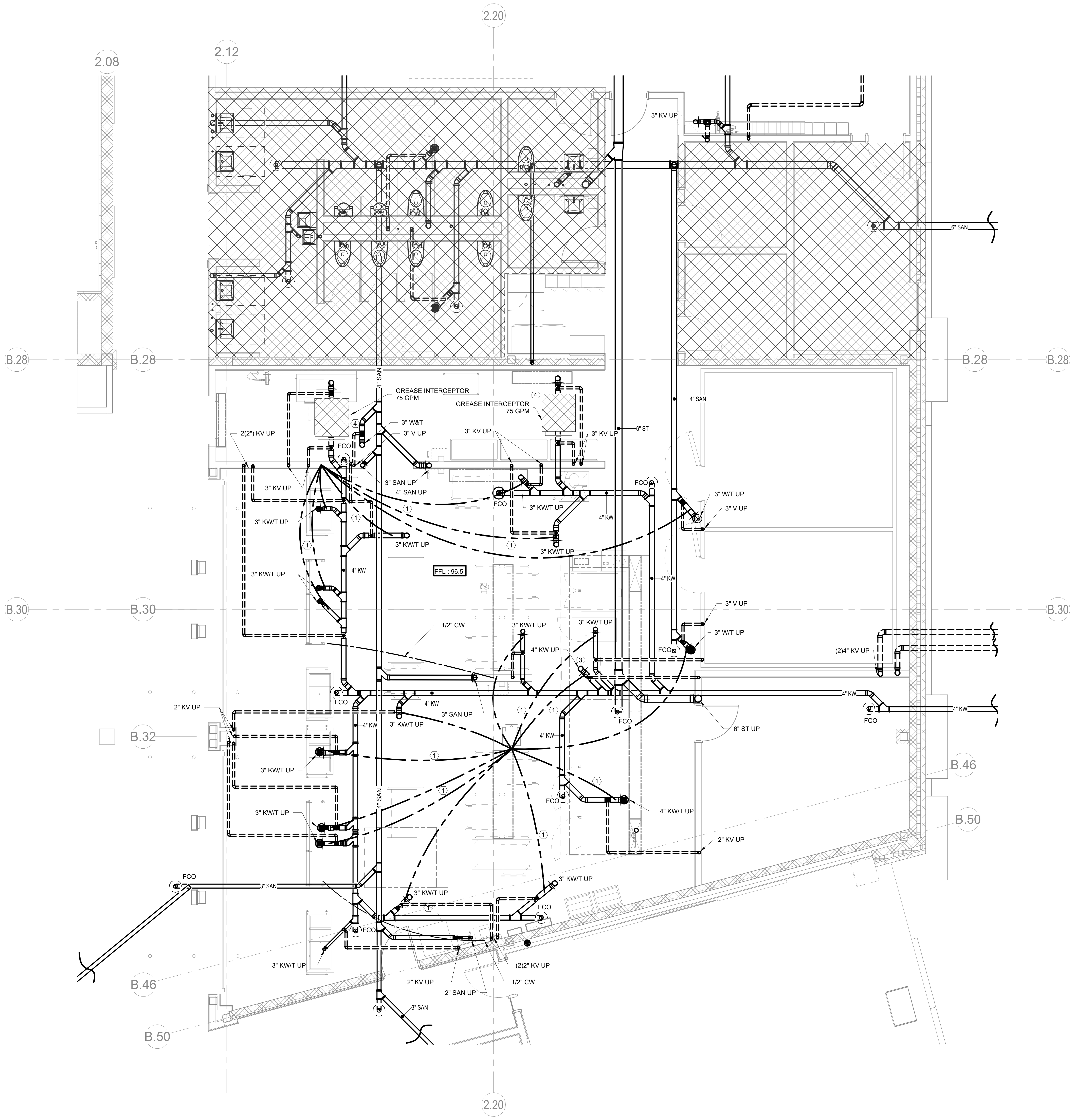

PLAN NOTES:

1. RUN 1/2" COPPER TUBING FOR TRAP PRIMER. REFER TO DETAIL #11 ON P3.02
2. 3" WASTE WITH TRAP TO FLOOR SINKS FS.
3. 4" WASTE WITH TRAP TO FLOOR TROUGH.
4. FLOOR RECESSED GREASE INTERCEPTOR. REFER TO DETAIL #2 ON P3.01

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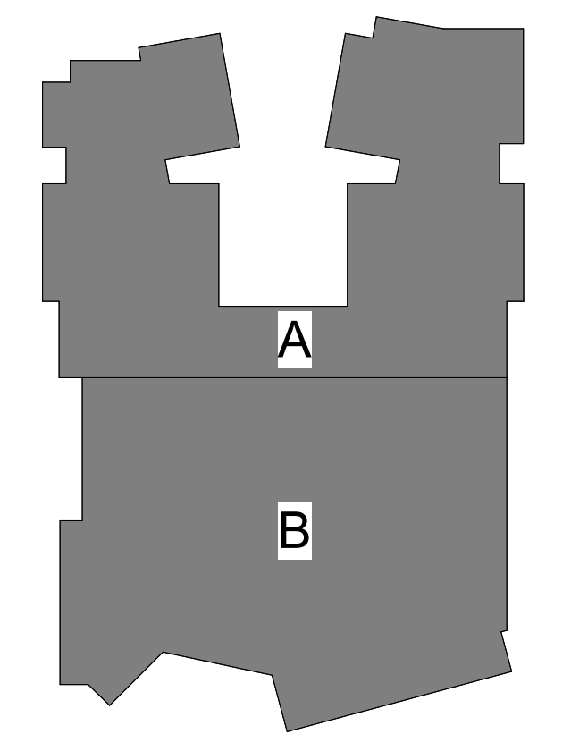

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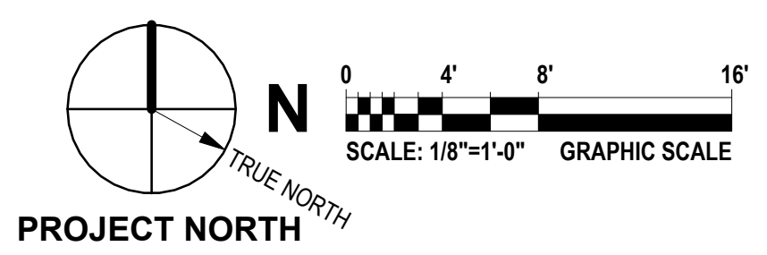

SHEET TITLE:

PLUMBING KITCHEN
UNDERSLAB

SHEET NUMBER:

P1.33

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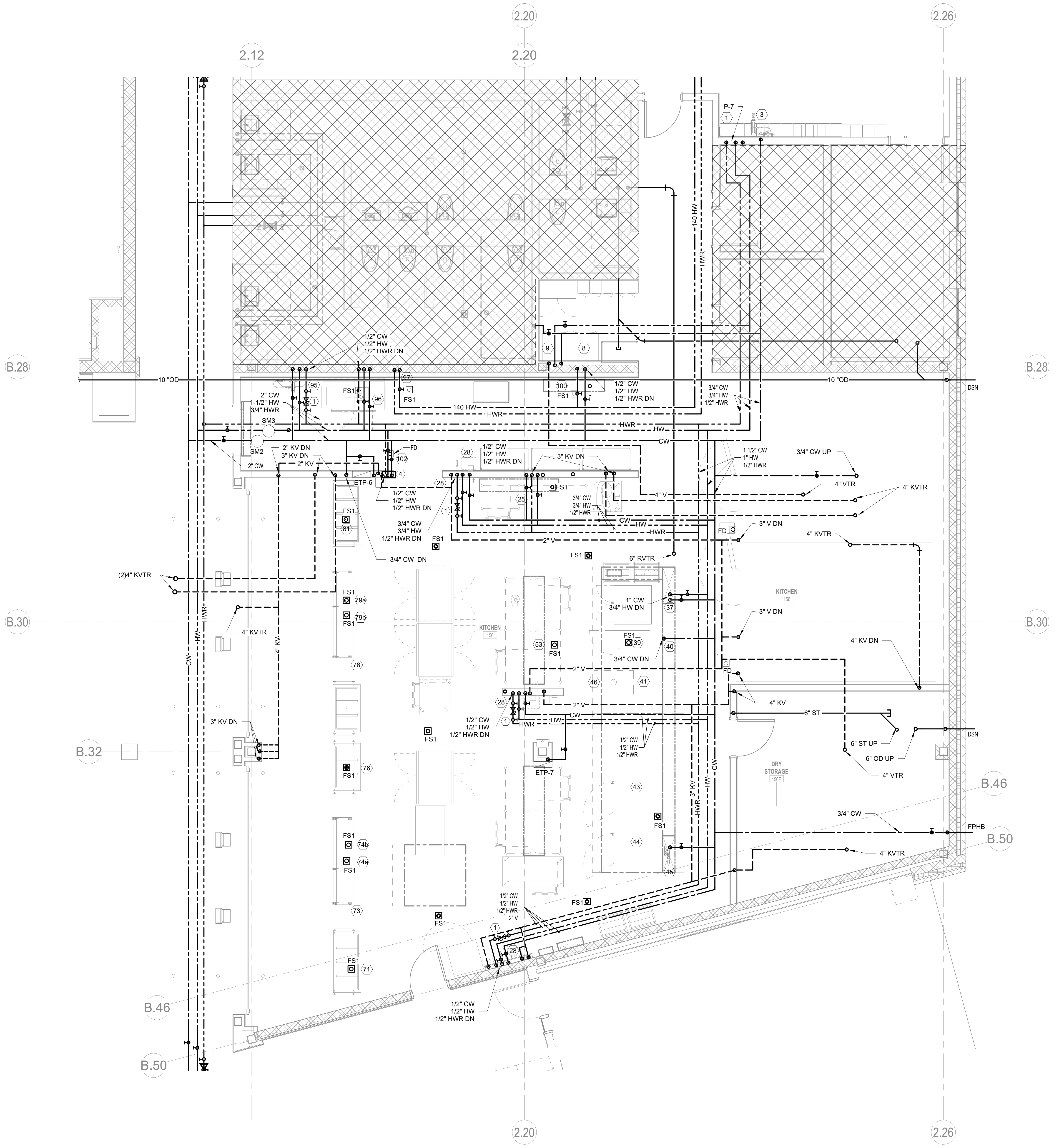

SCHEDULE OF FOODSERVICE EQUIPMENT AND CONNECTIONS

ITEM	QTY	DESCRIPTION	PLUMBIMG	REMARK
1	1	MOP SINK & SERVICE FAUCET (BY PC)	1/2" H&CW; DRAIN IN FLOOR	INSTALL MOP SINK (BY PC) ON SUB-FLOOR PRIOR TO FINISHED FLOOR. GC TO INSTALL FINISHED FLOOR WITH SANITARY COVED BASE AT EXPOSED SIDES OF MOP SINK.
3	1	HOSE REEL ASSEMBLY (35' HOSE WITH SPRAY GUN)	1/2" H&CW	
8	1	FRONT LOAD CLOTHES WASHER	1/2" H&CW; 1-1/4" IW TO STANDPIPE	
9	1	FRONT LOAD CLOTHES DRYER		4" DIAMETER DRYER VENT.
14b	1	COOLER EVAPORATOR COIL	1" IW (BY KEC) TO FD	
14d	1	FREEZER EVAPORATOR COIL	1" IW (BY KEC) TO FD	
25	1	PREP TABLE WITH SINKS	1/2" H&CW; (2) 2" IW TO FS	
28	4	HAND SINK	1/2" H&CW; 1-1/2" W	
37	1	UTILITY DISTRIBUTION SYSTEM (UDS)	3/4" HW; 1" CW	
39	1	TEN-PAN CONVECTION STEAMER	3/4" FILTERED CW (FROM ITEM 40) 3/4" CW (FROM ITEM 37); 1-1/2" IW TO FS	
40	1	WATER FILTER ASSEMBLY	3/4" CW (FROM ITEM 37)	
41	1	FORTY-GALLON TILTING BRAINING PAN	1/2" H&CW (FROM ITEM 37)	
43	1	DOUBLE COMBINATION OVEN	3/4" FILTERED CW (FROM ITEM 37); 2" IW TO ITEM 33	
44	1	DOUBLE COMBINATION OVEN	3/4" FILTERED CW (FROM ITEM 37); 2" IW TO ITEM 33	
45	2	WATER FILTER ASSEMBLY	3/4" CW (FROM ITEM 37)	
46	1	FLOOR PAN & GRATE	4" W CONN 7" BFF	
53	1	COOK'S WORK TABLE WITH SINK AND OVERSHELF	1/2 " H&CW (STUB-UP); 2" IW TO FS	
71	1	REFRIGERATED COLD PAN, DROP-IN	1" IW TO FS	
73	1	FILL FAUCET	1/2" CW (STUB-UP)	
74a	2	HOT FOOD WELLS, DROP-IN (MOUNTED IN GROUP OF TWO)	1" IW TO FS	
74b	3	HOT FOOD WELLS, DROP-IN (MOUNTED IN GROUP OF THREE)	1" IW TO FS	
76	2	REFRIGERATED COLD PAN, DROP-IN	1" IW TO FS	
78	1	FILL FAUCET	1/2" CW	
79a	2	HOT FOOD WELLS, DROP-IN (MOUNTED IN GROUP OF TWO)	1" IW TO FS	
79b	3	HOT FOOD WELLS, DROP-IN (MOUNTED IN GROUP OF THREE)	1" IW TO FS	
81	1	REFRIGERATED COLD PAN, DROP-IN	1" IW TO FS	
95	1	HOSE REEL ASSEMBLY	1/2" H&CW	
96	1	WAREWASHER, CONVEYOR TYPE, VENTLESS	1-1/4" IW TO FS	
97	1	WATER FILTER ASSEMBLY, WASWASHER	1" IW TO FS	
100	1	THREE - COMPARTMENT SINK	(2) 3/4" 120 F H&CW; (3) 2" W MANIFOLD THRU GI BY PC	
102	1	EYE / FACE WASH, WALL MOUNTED	1/2" H&CW; 1-1/4" W	INCLUDES THERMOSTATIC MIXING VALVE.

PLAN NOTES:

1. BALANCING VALVE AT RECIRCULATION LOOP. REFER TO DETAIL #1 ON P3.03.
2. PROVIDE STORM CLEANOUT 24" AFF. PROVIDE MIN. 10"x10" ACCESS PANEL FOR WALL CONCEALED CLEANOUTS.
3. INDIRECT CONDENSATE DRAIN CONNECTION TO STORM PIPING. REFER TO DETAIL #8 ON P3.02.
4. PIPING FOR EMERGENCY EYE WASH/FACE WASH. PROVIDE TM2A MIXING VALVE.

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PROJECT NUMBER: 23-0847

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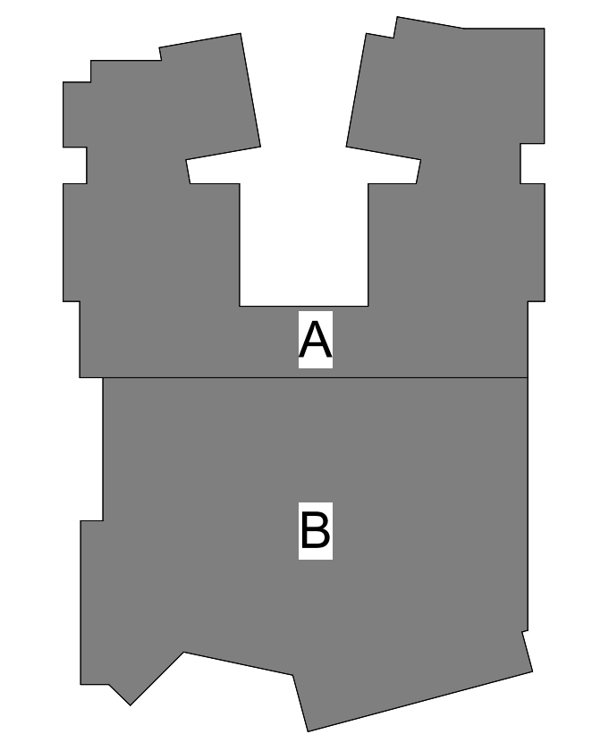

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SHEET NUMBER:

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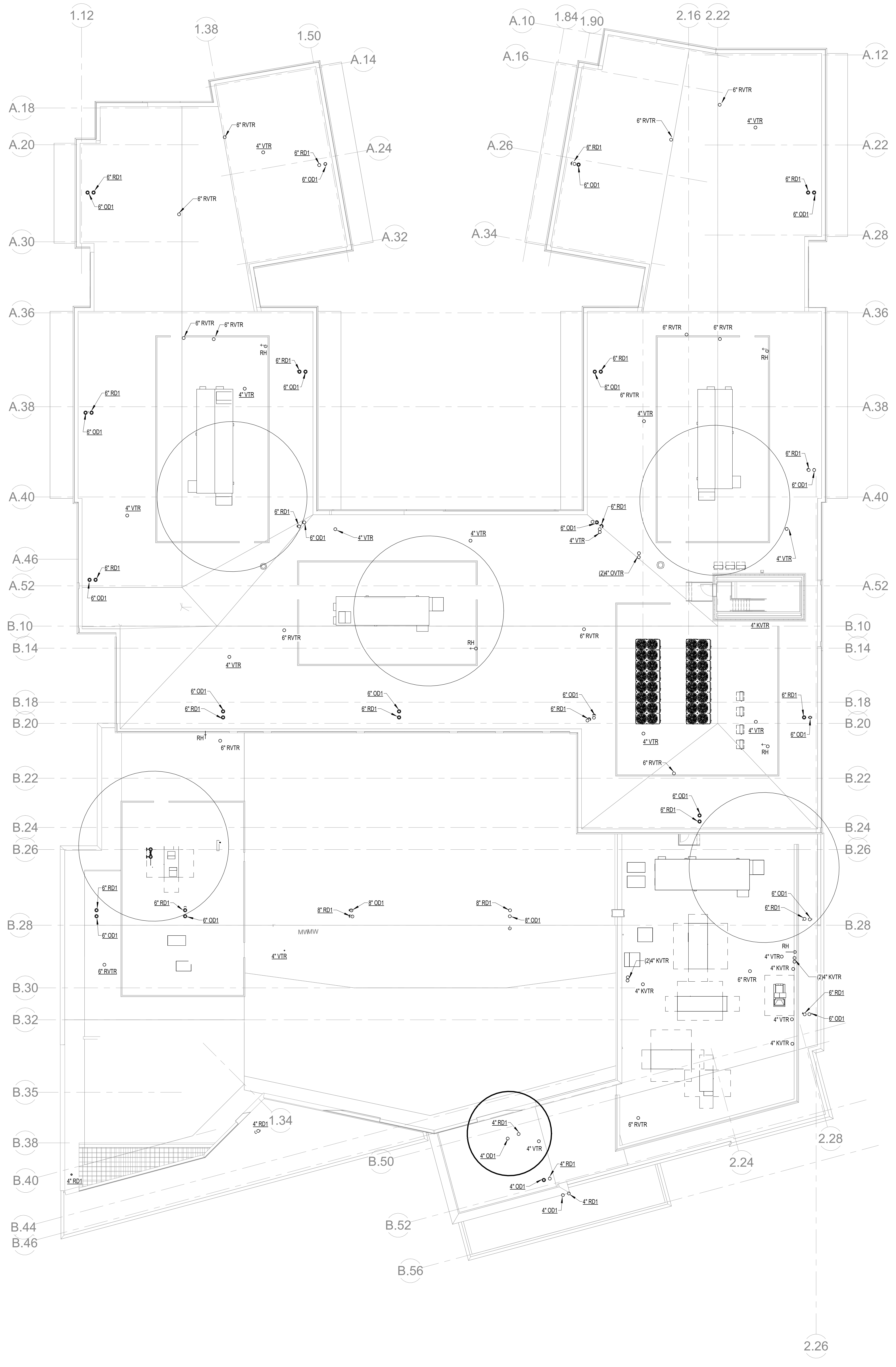

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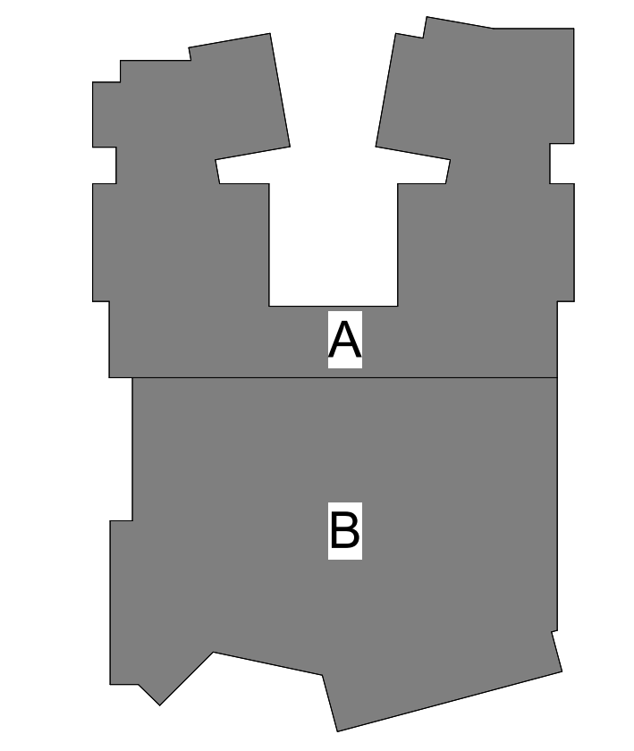

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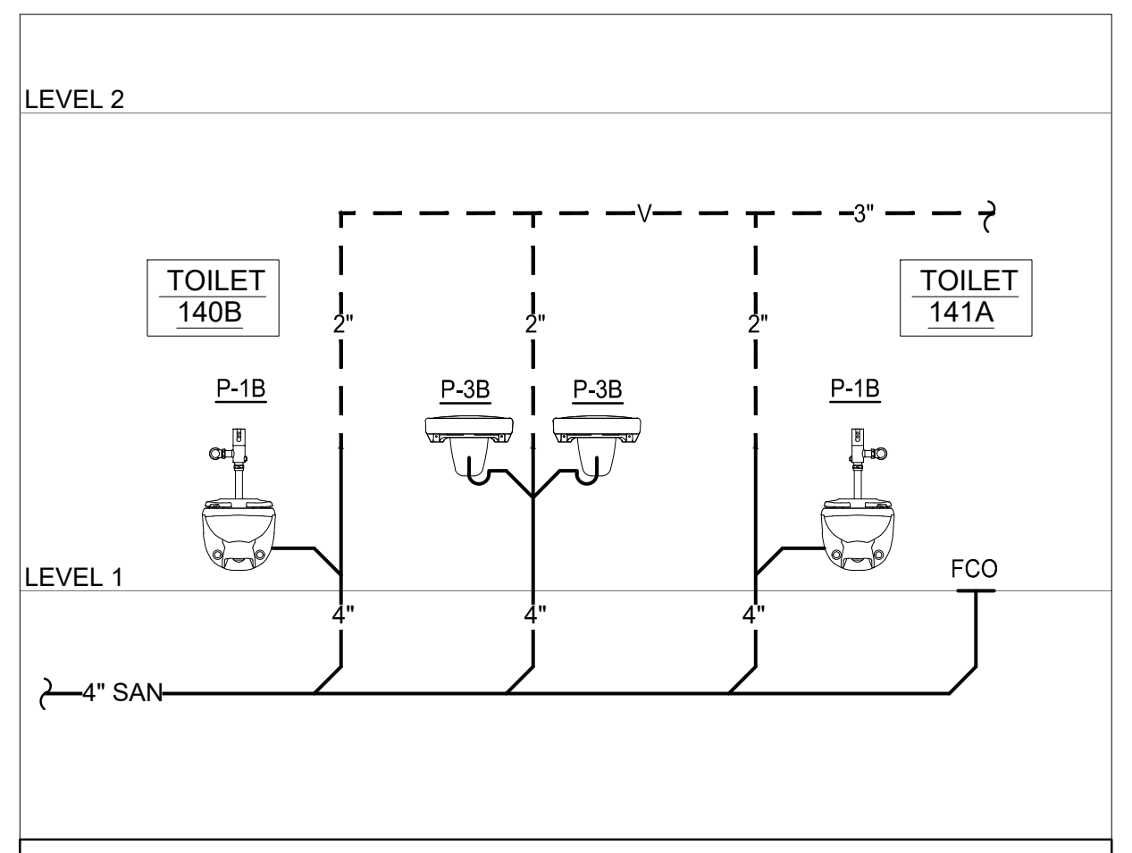

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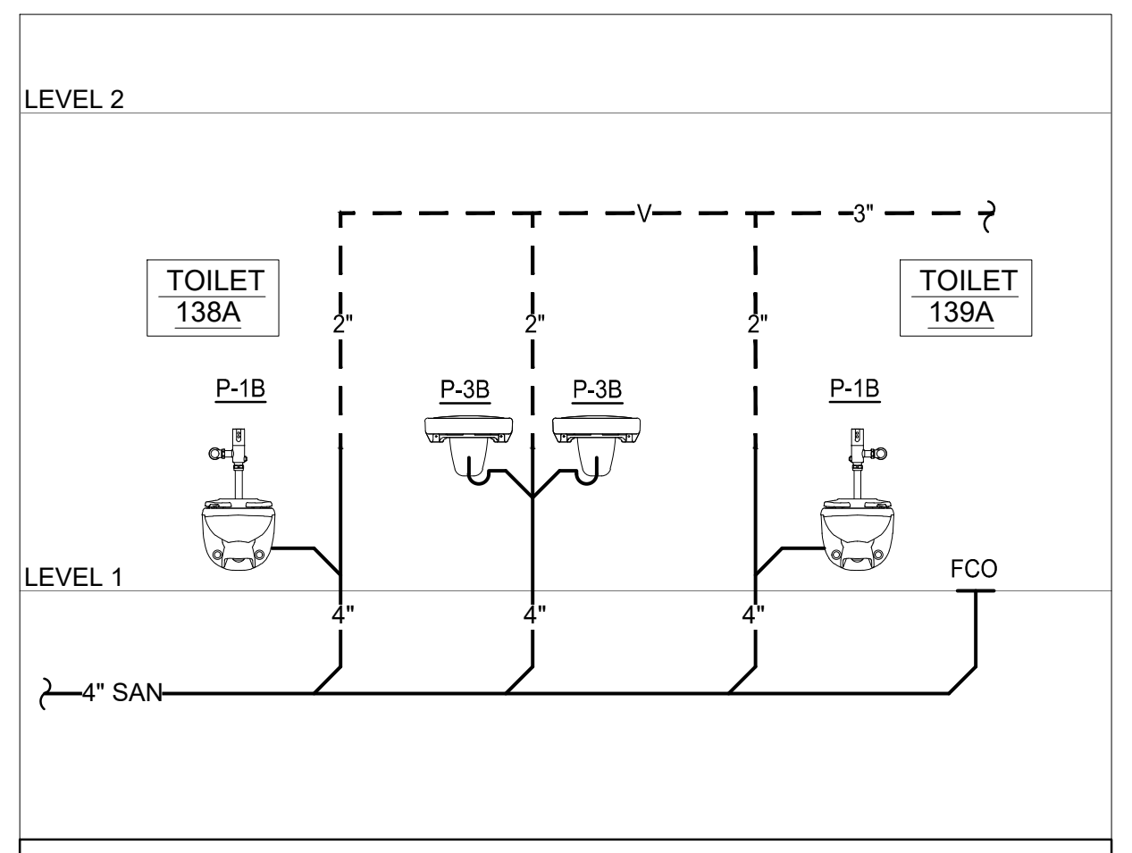

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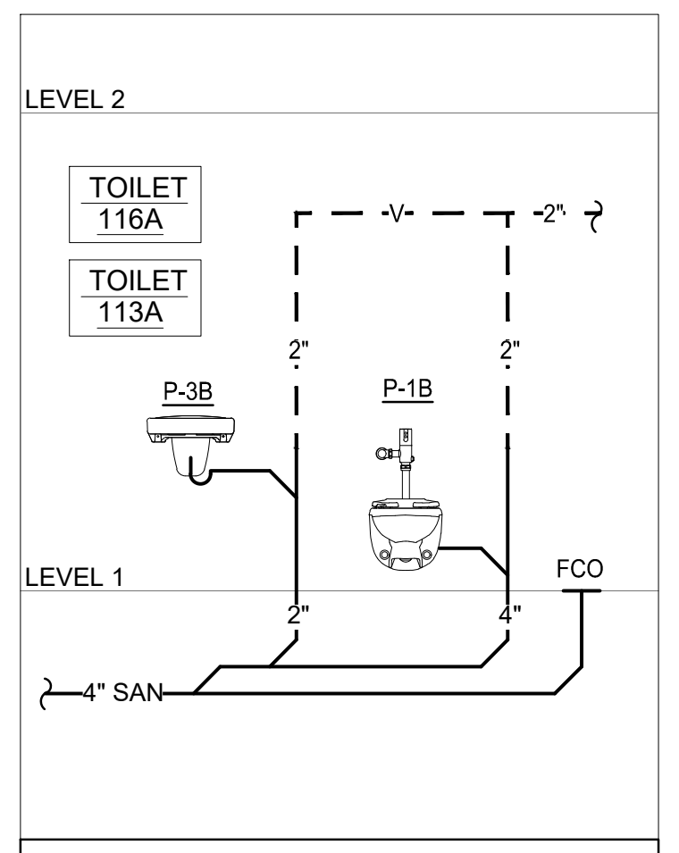

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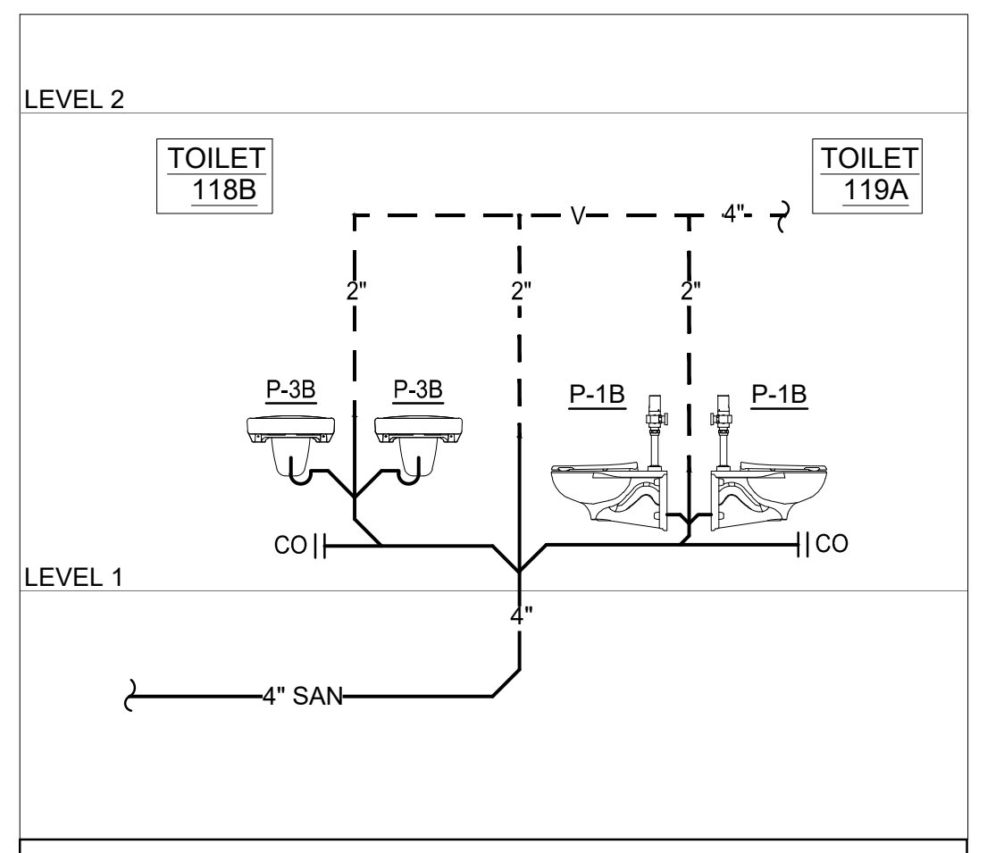

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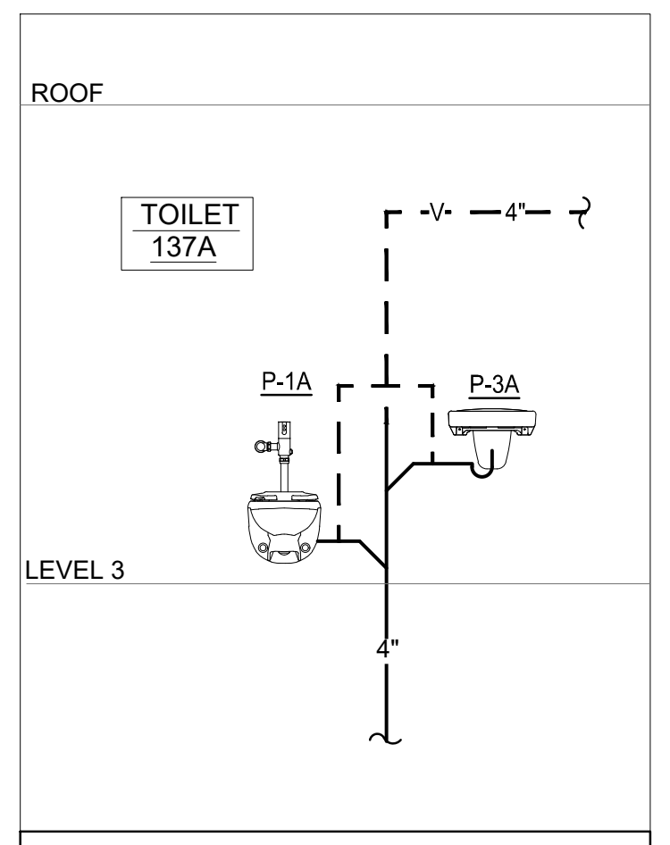

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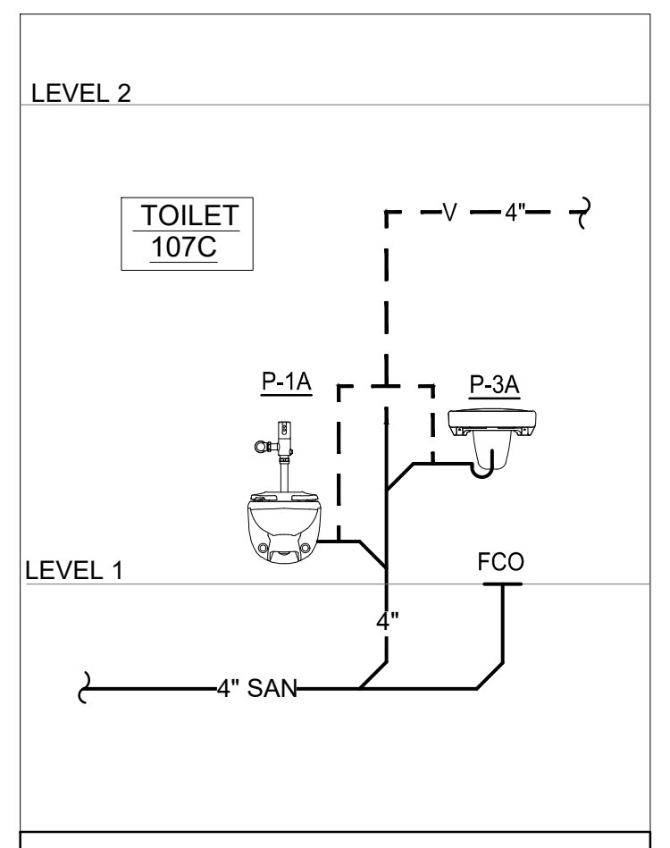

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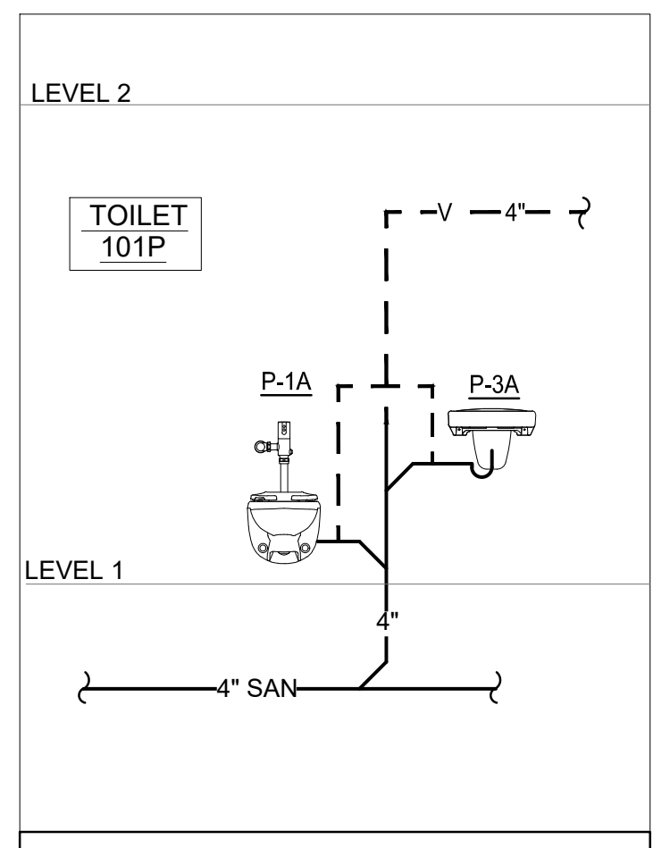

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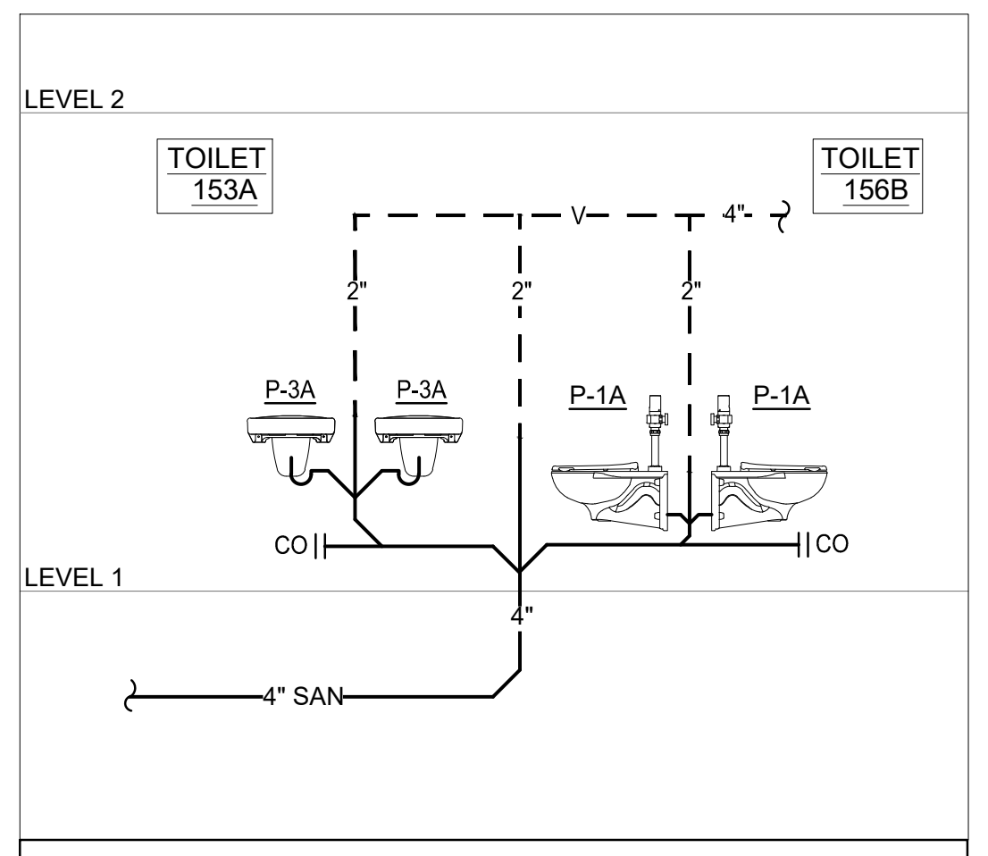

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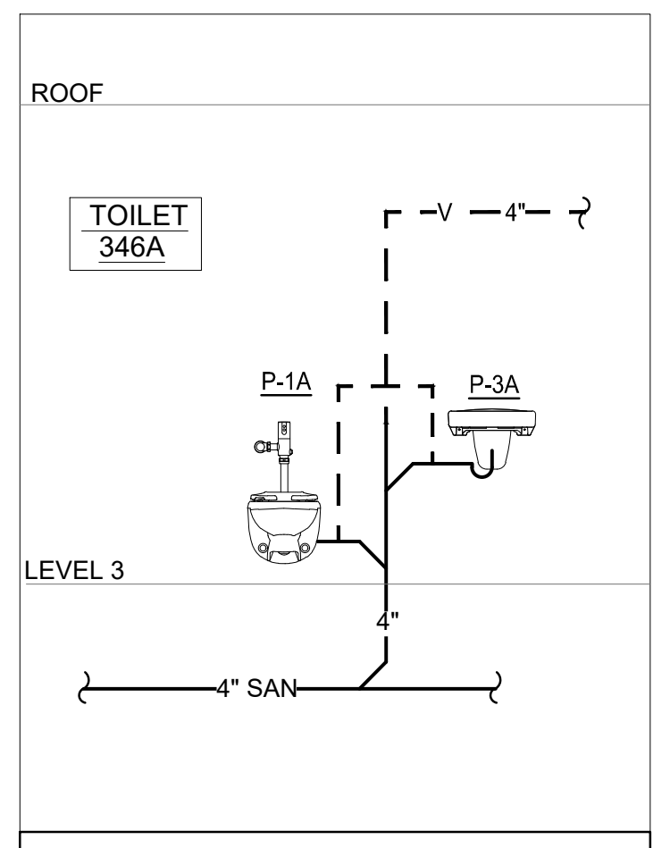

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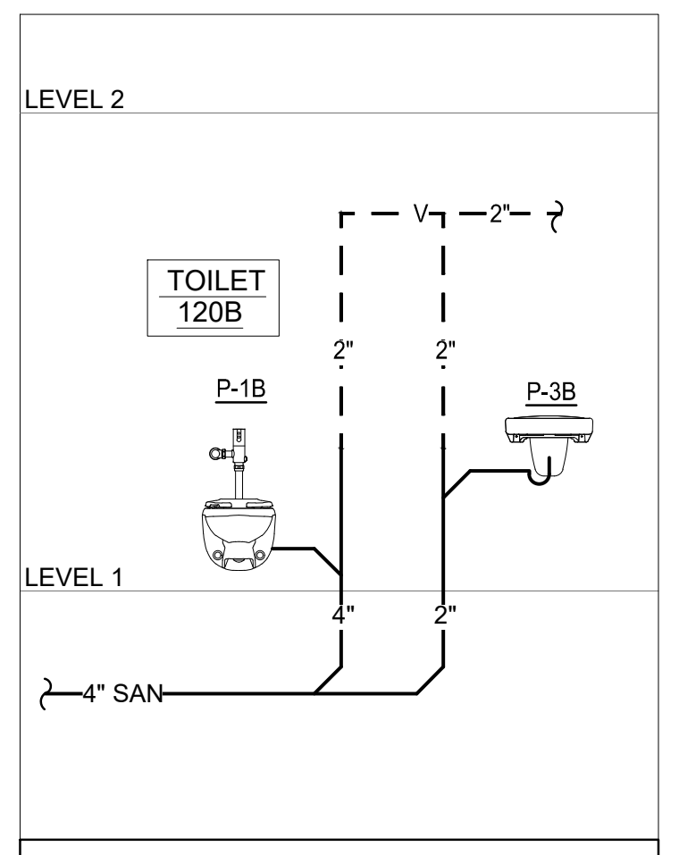

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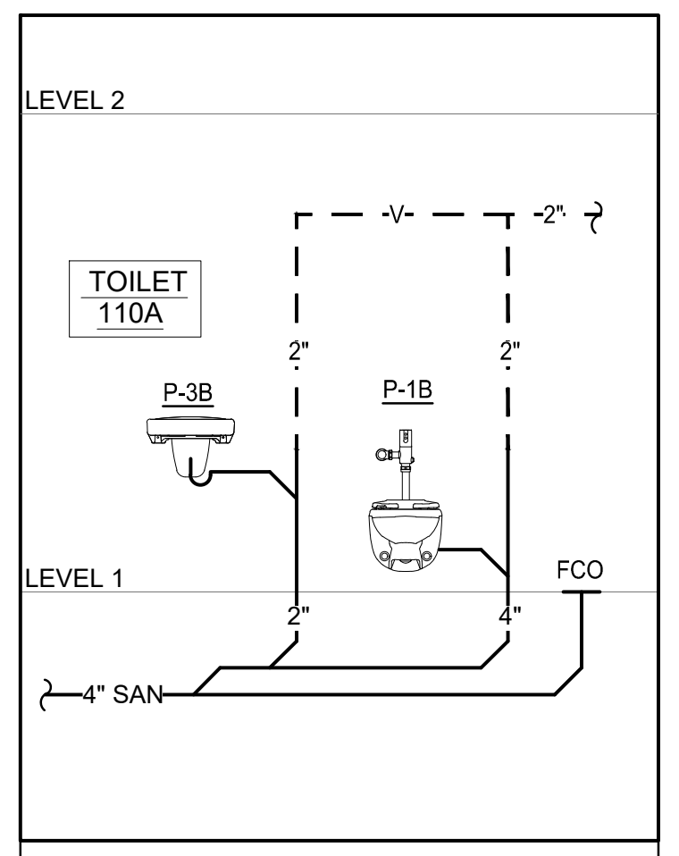

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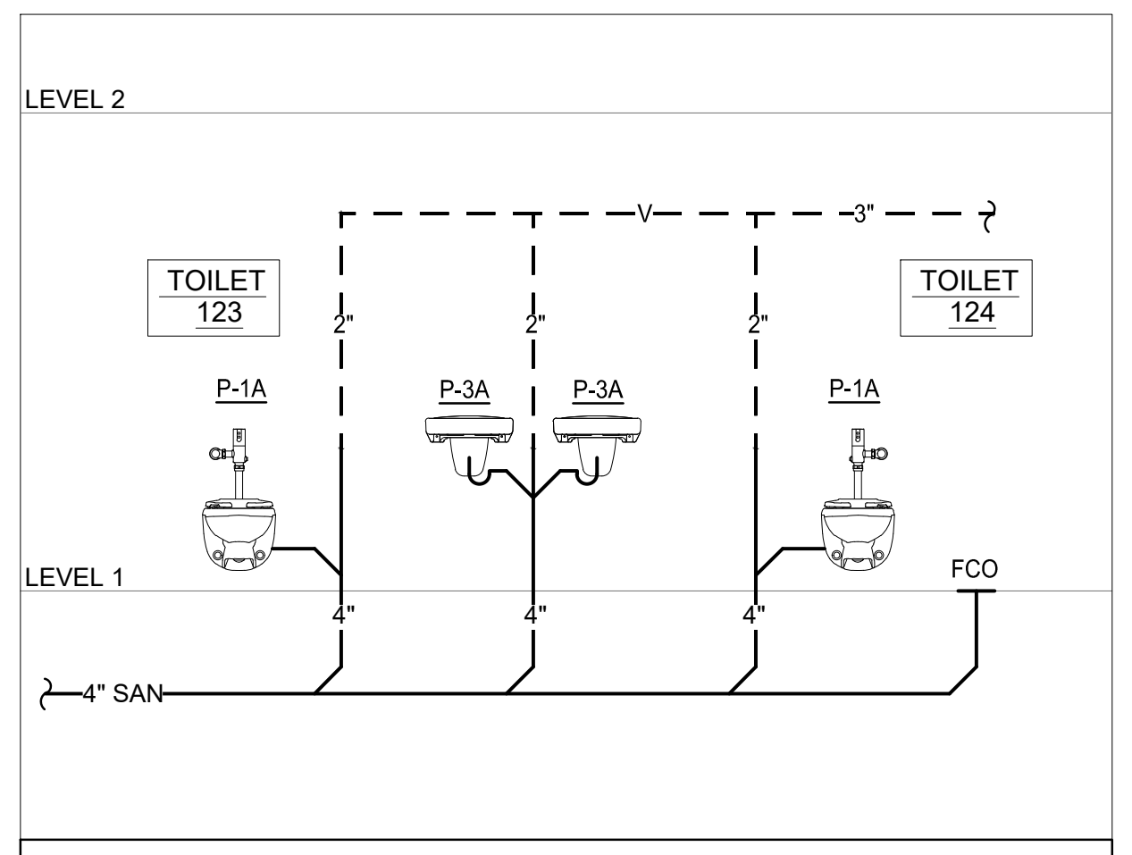

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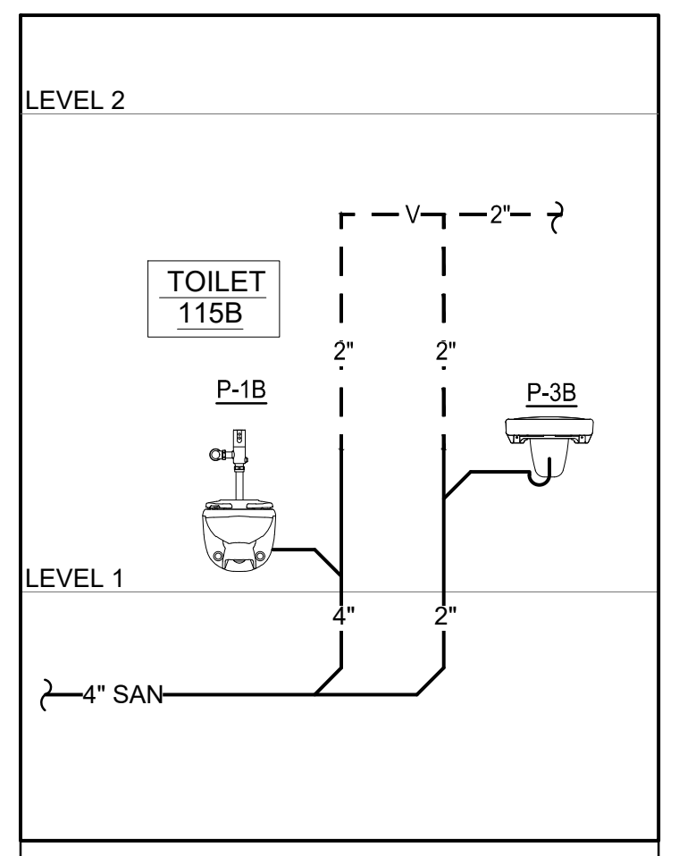

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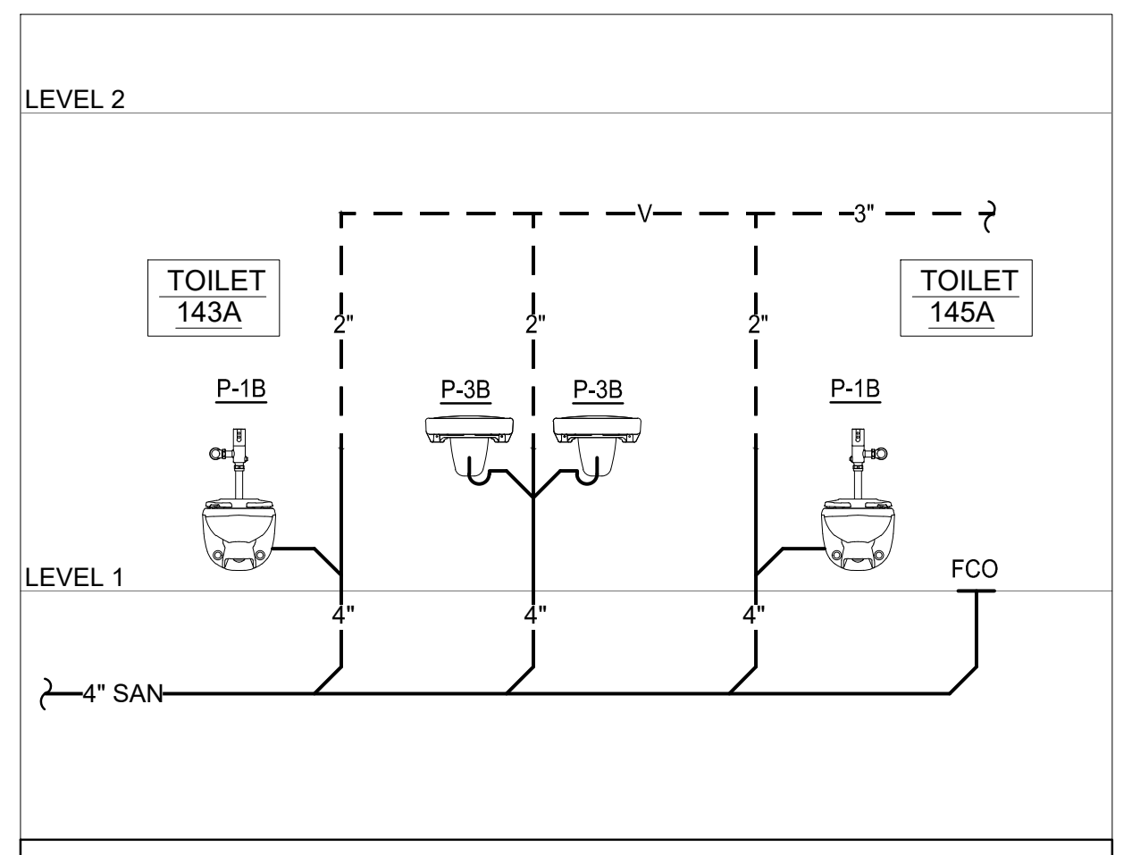

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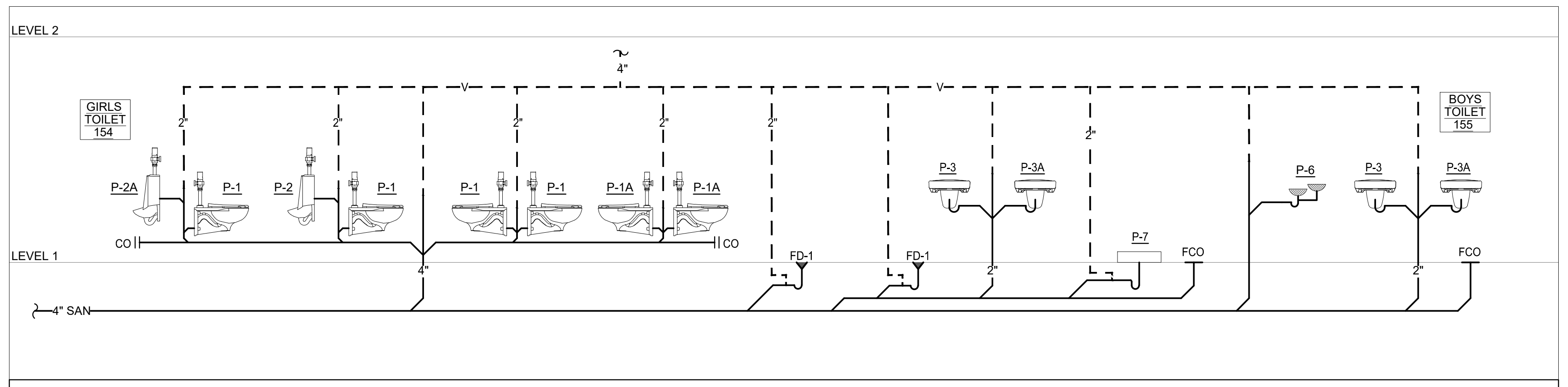

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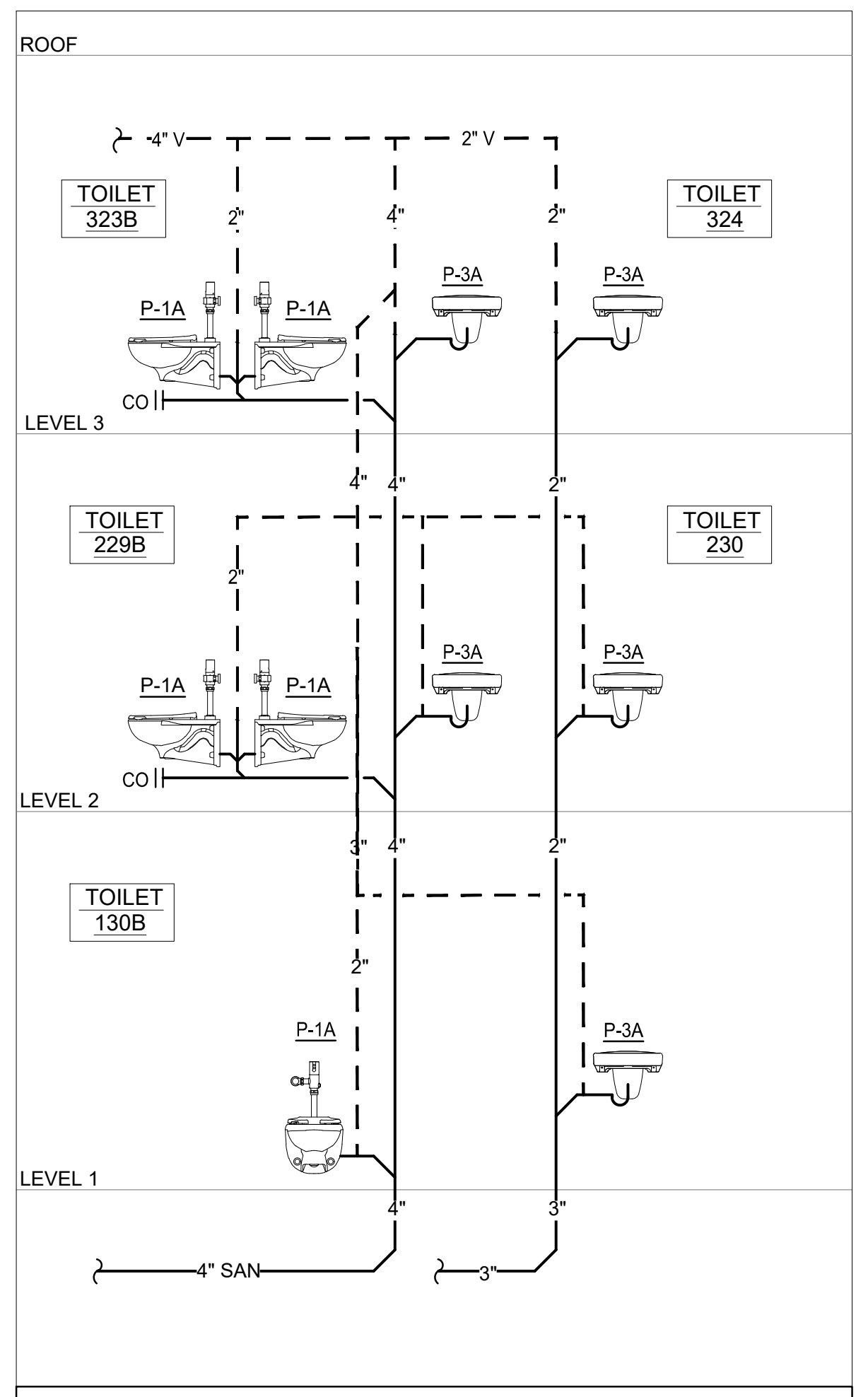

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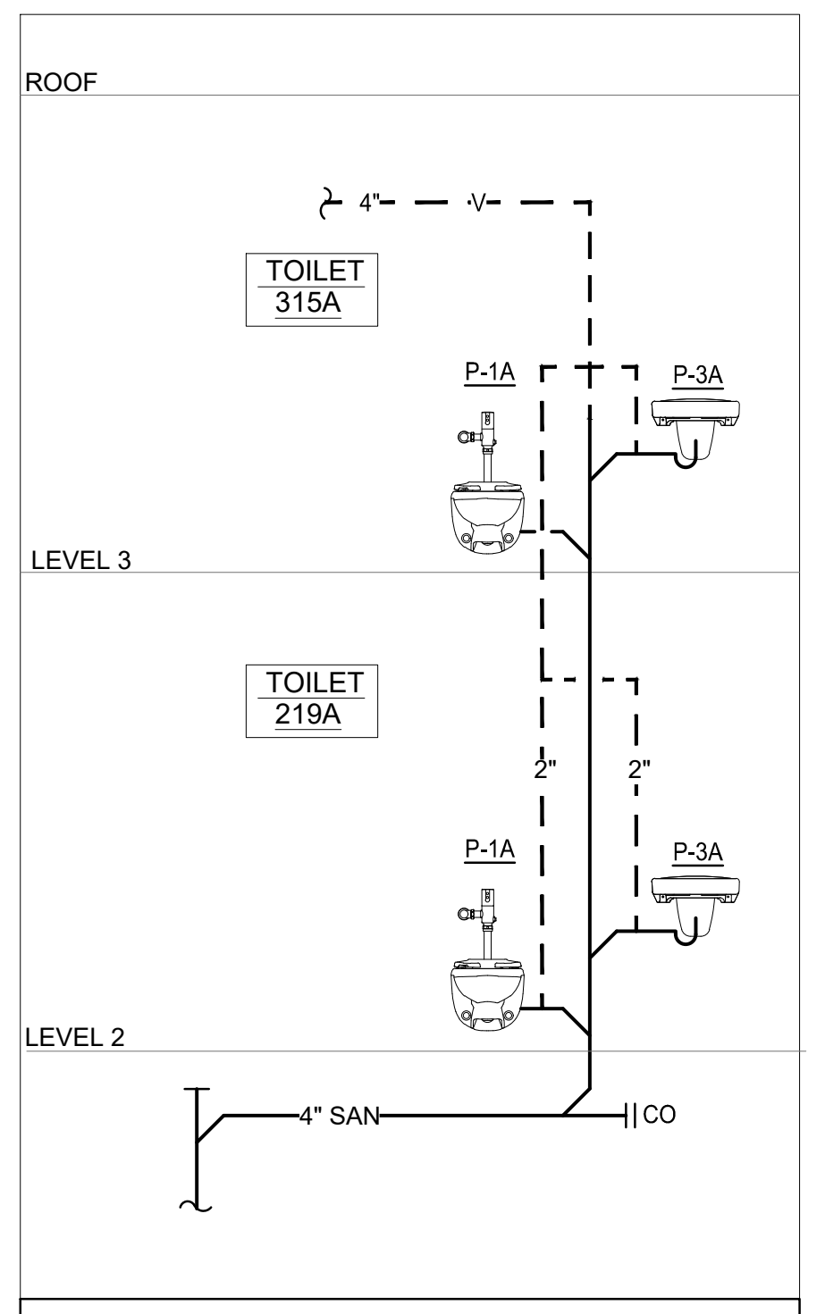

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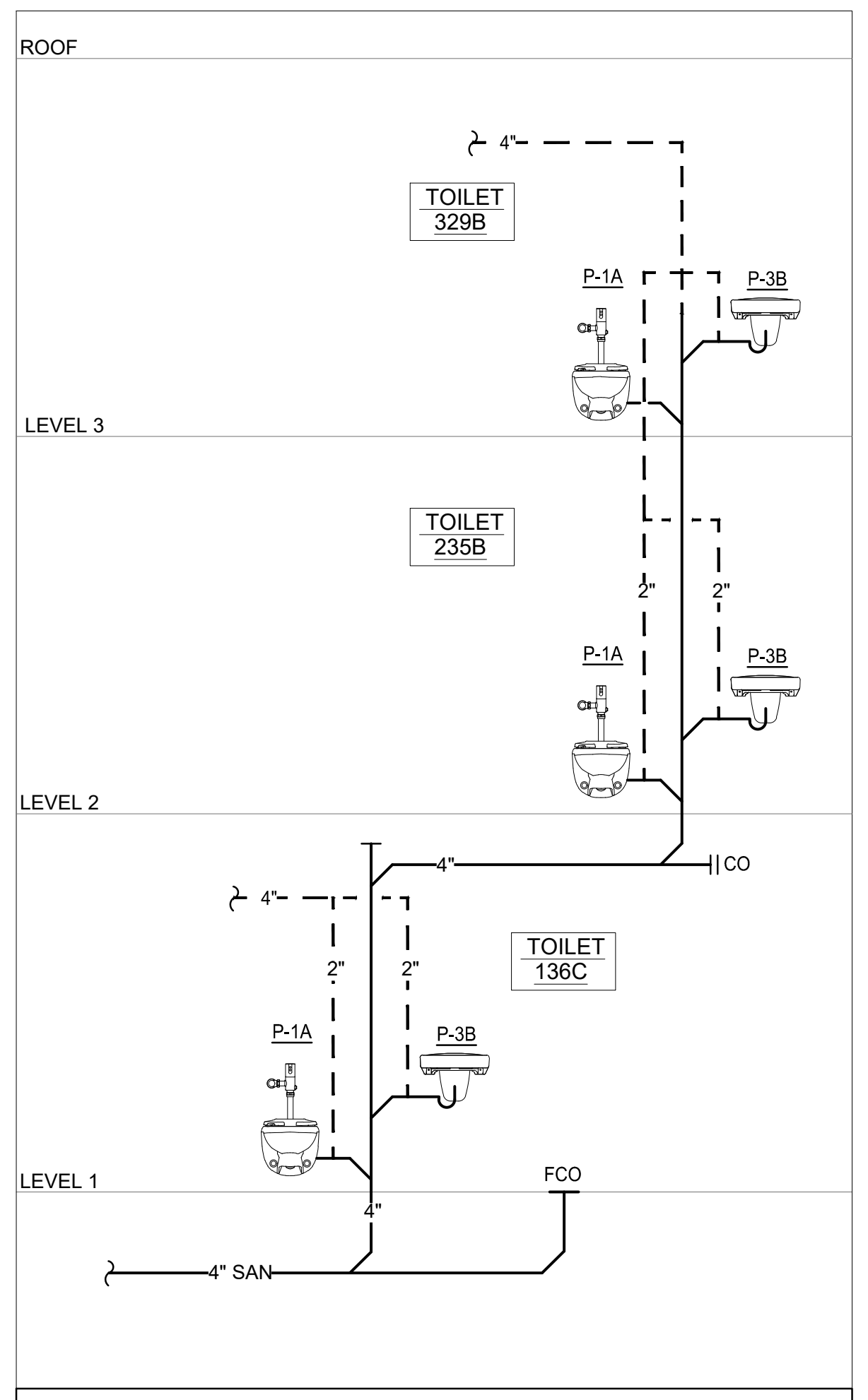

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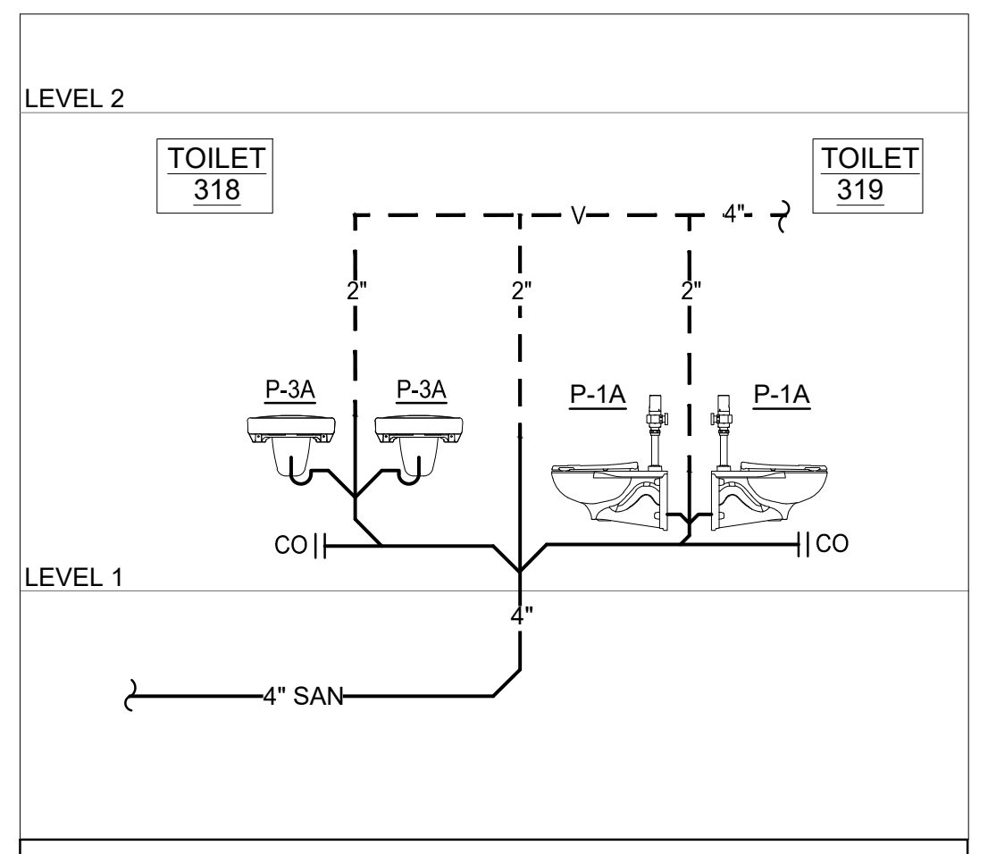

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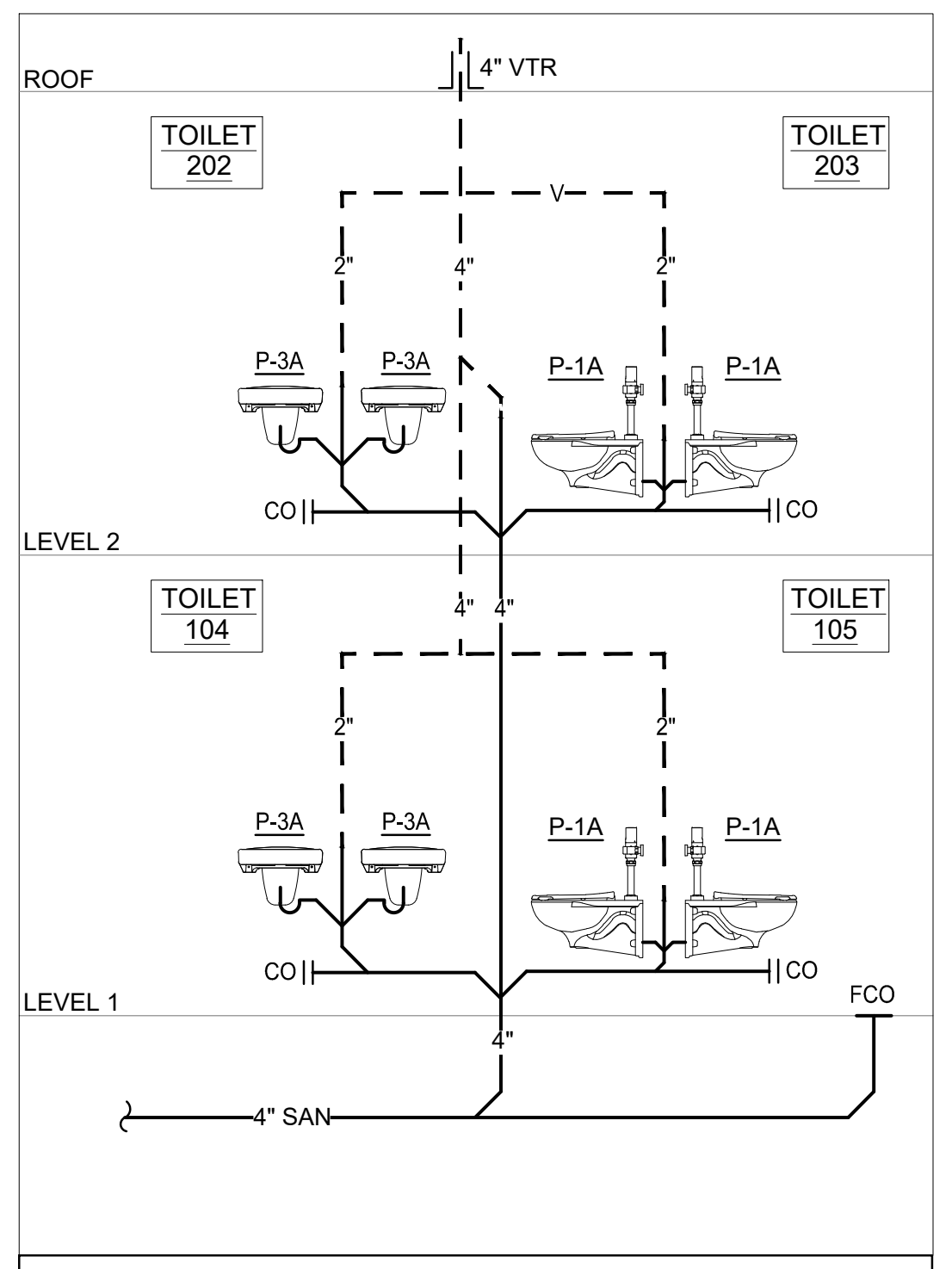

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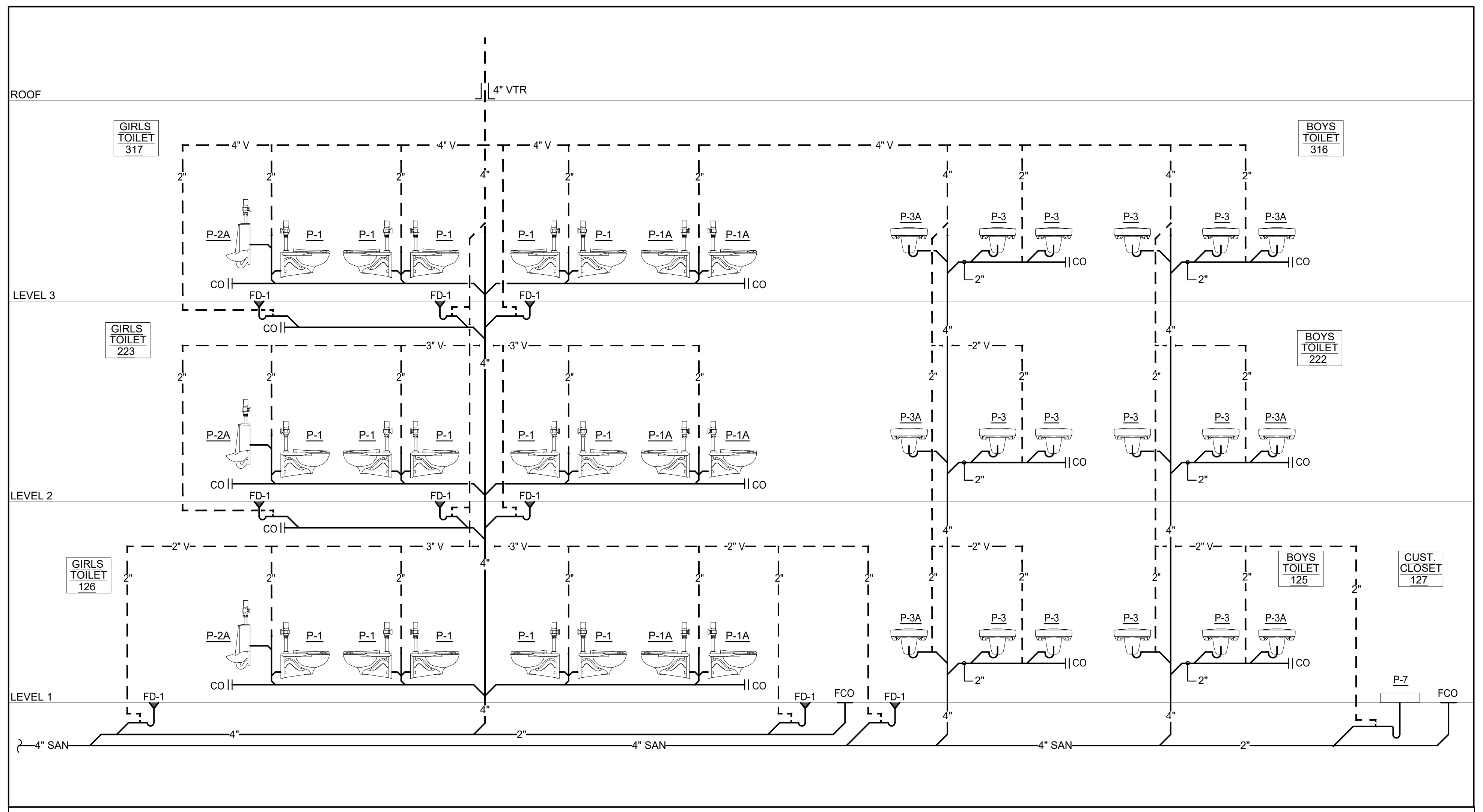

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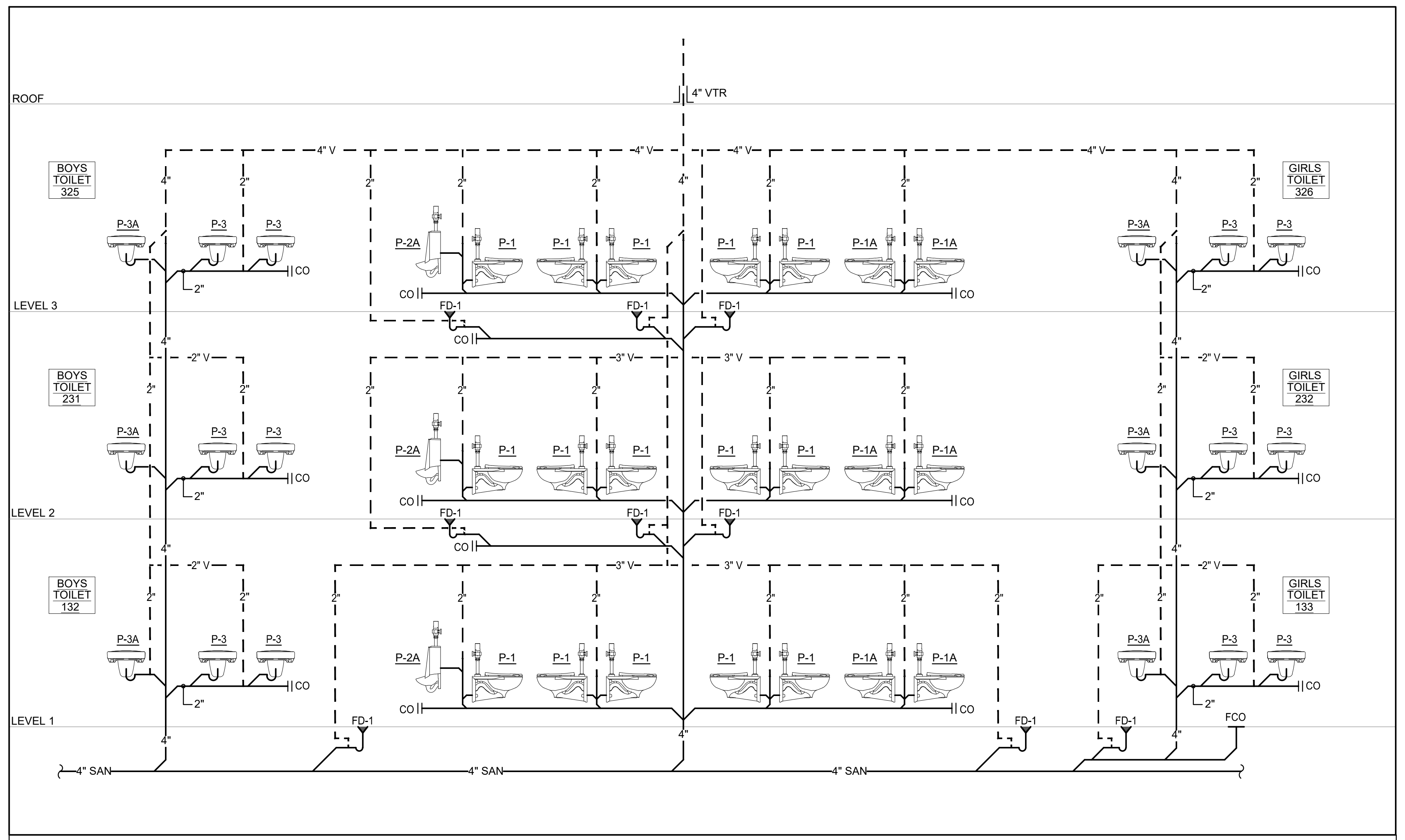

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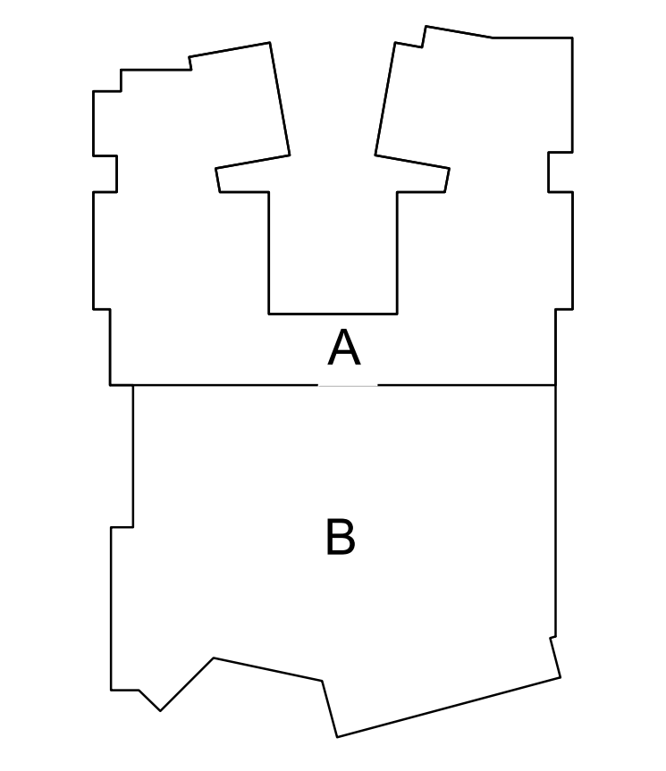

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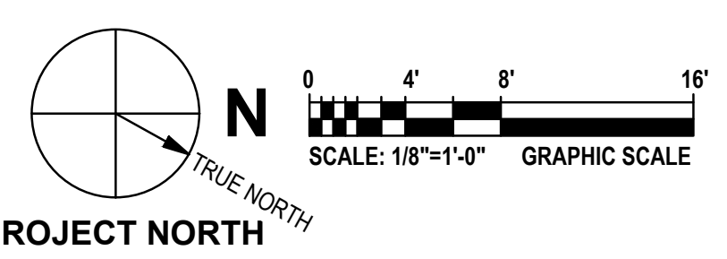

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WASTE AND VENT
RISER DIAGRAM

SHEET NUMBER:

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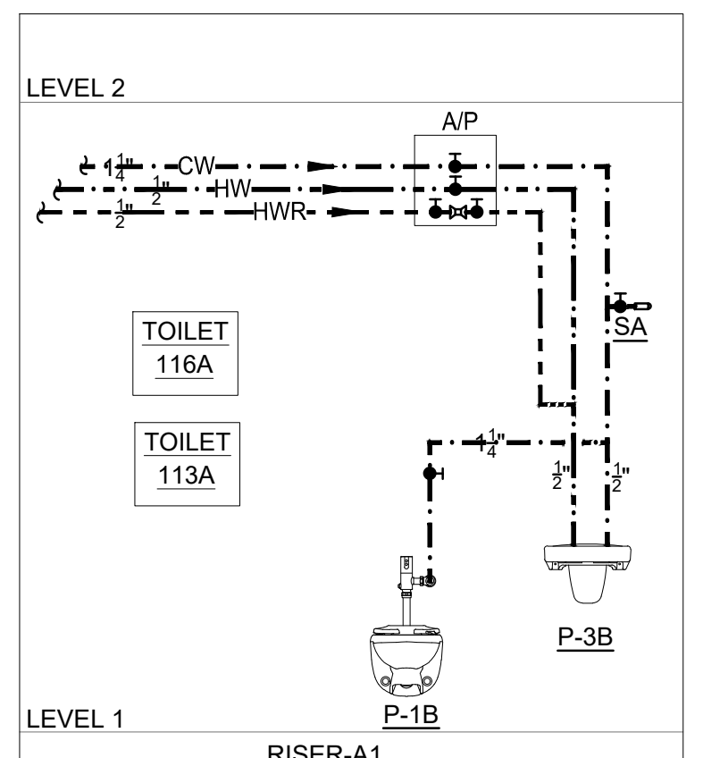

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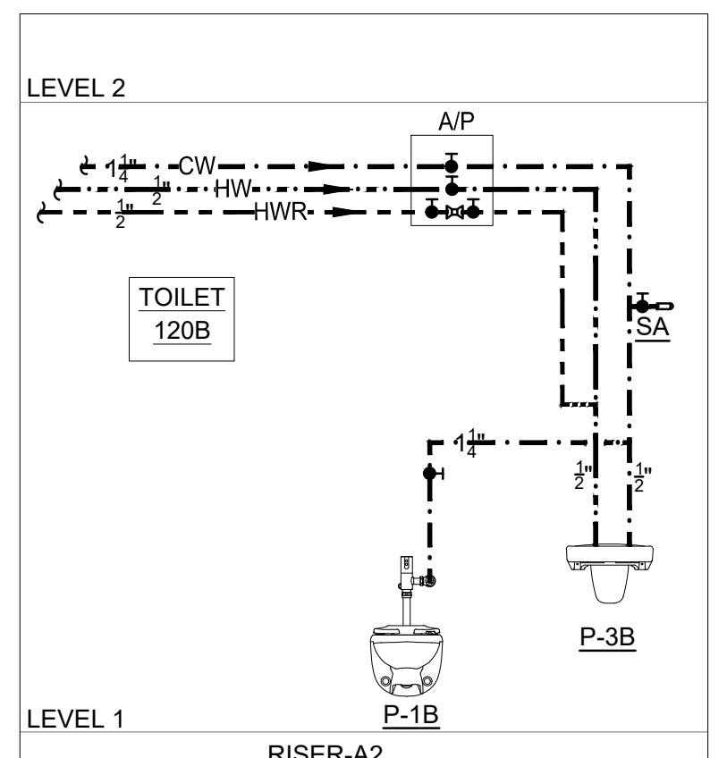

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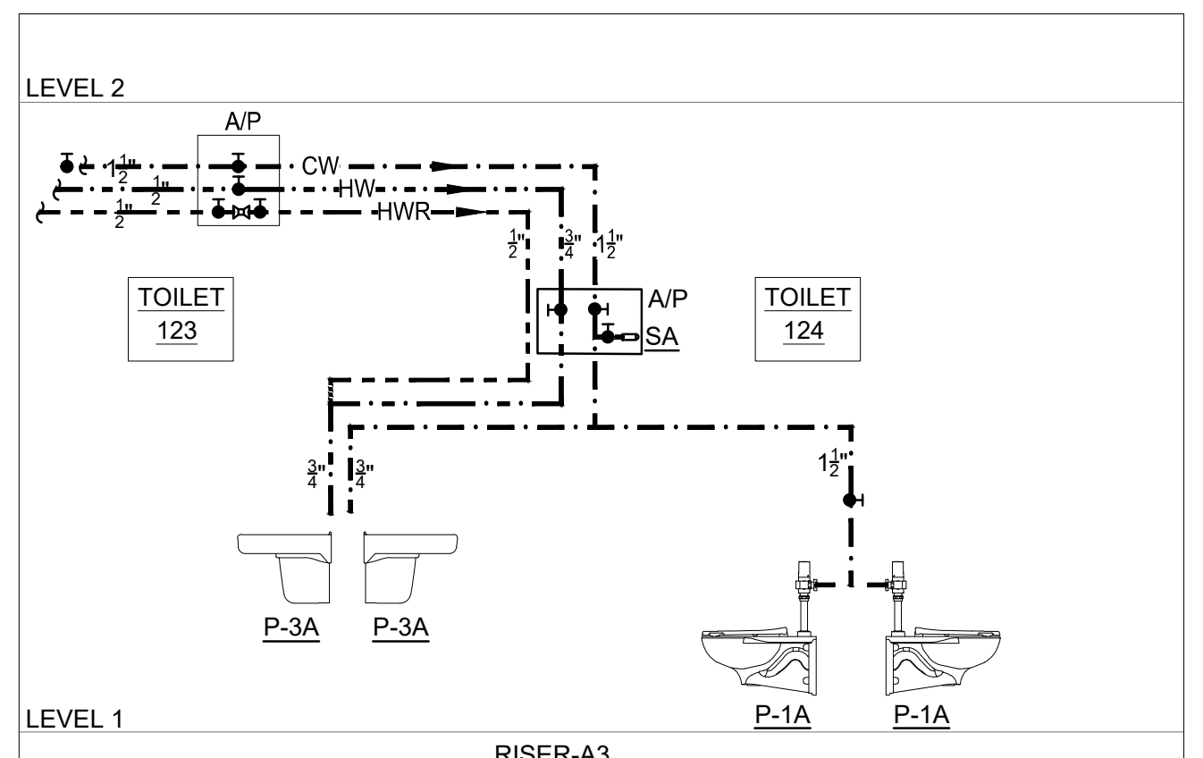

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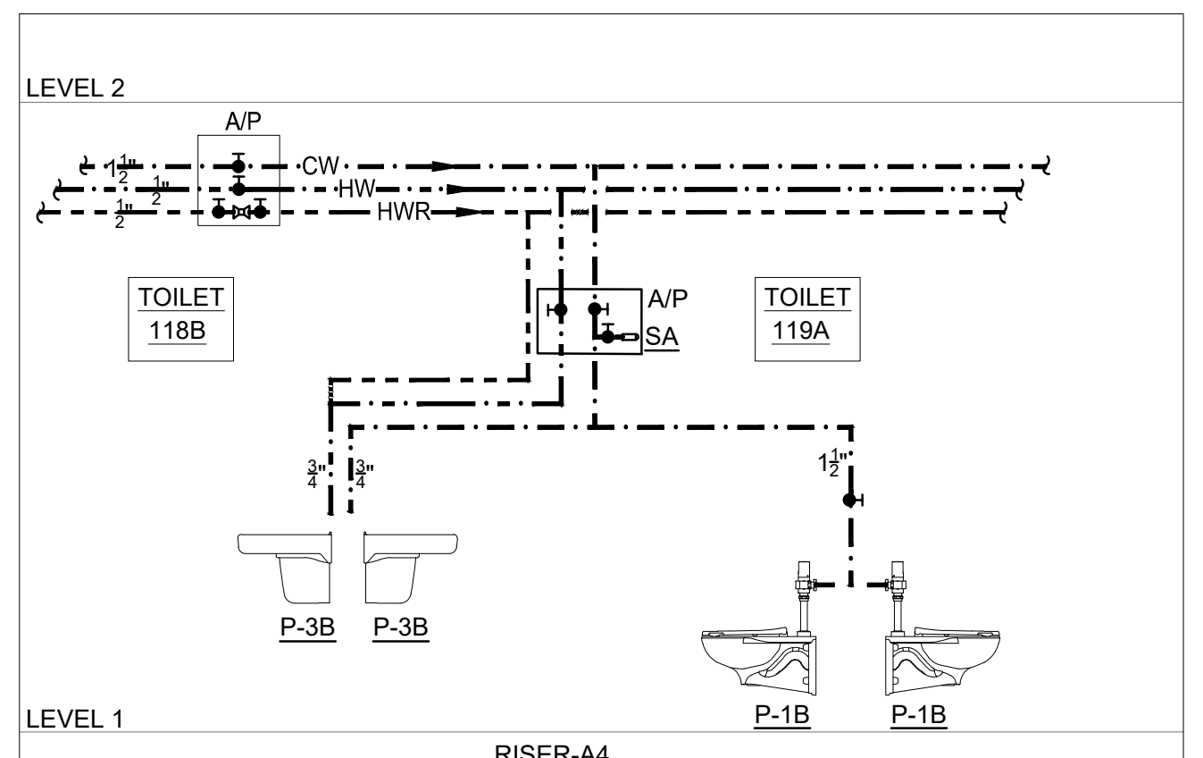

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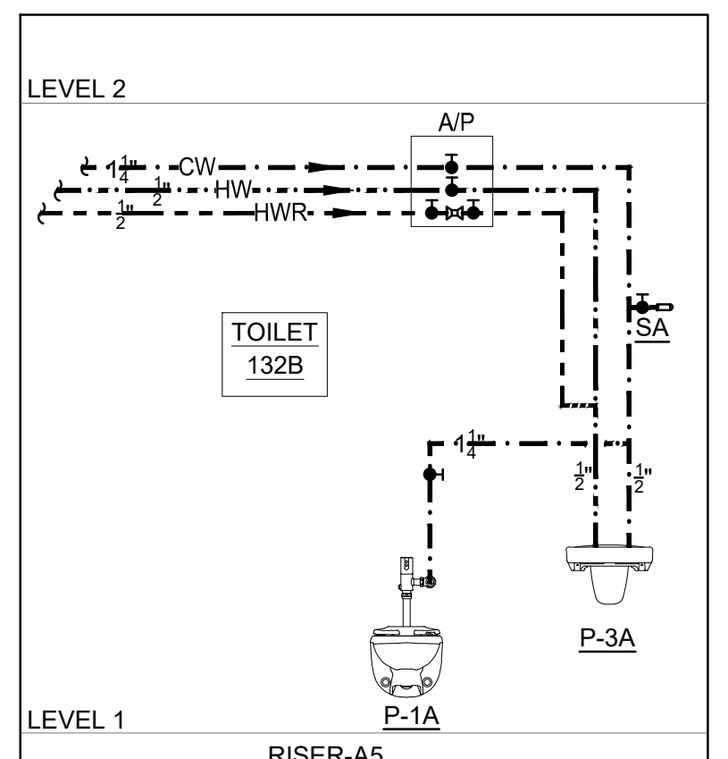

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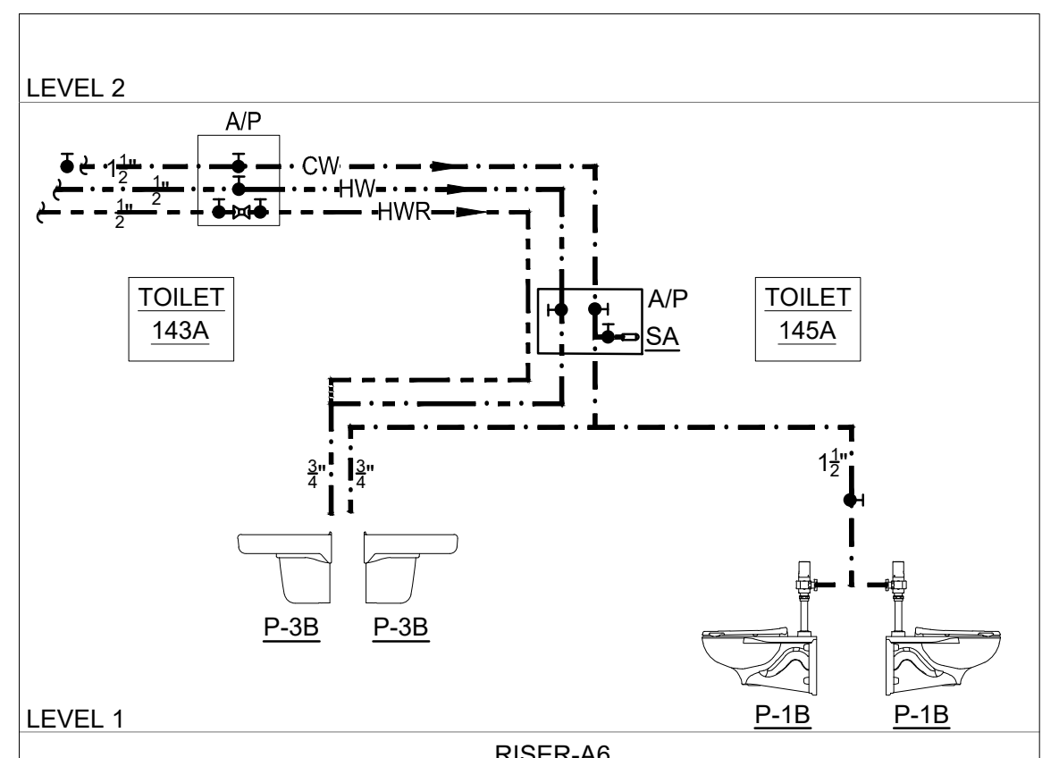

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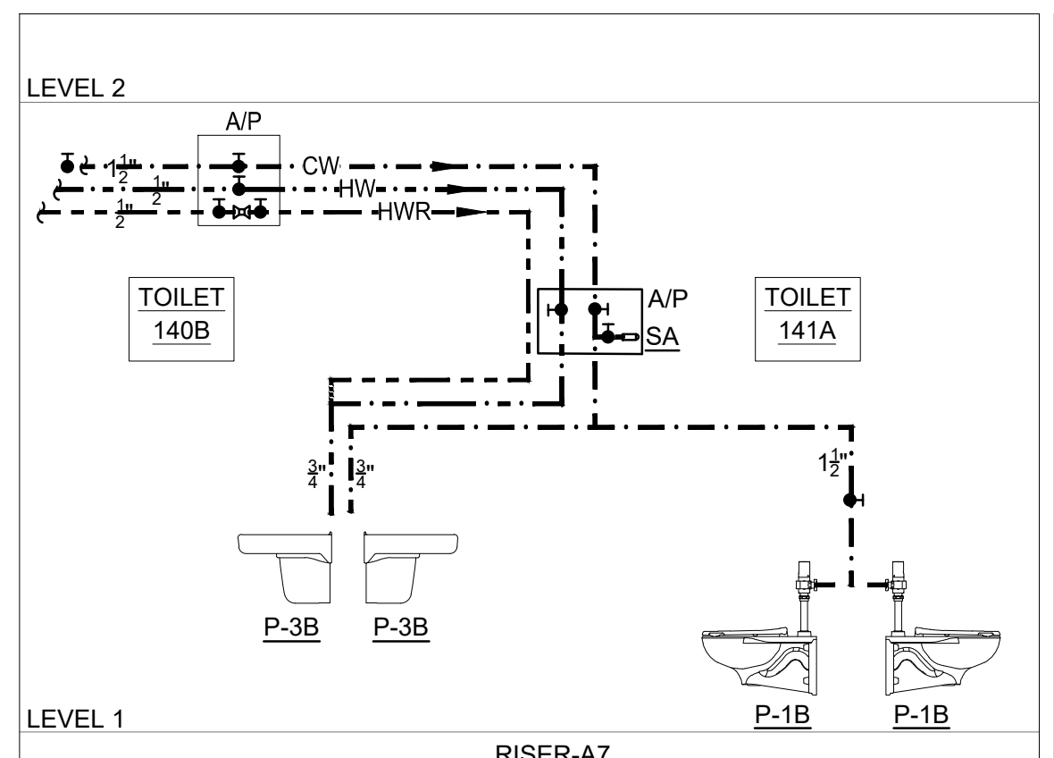

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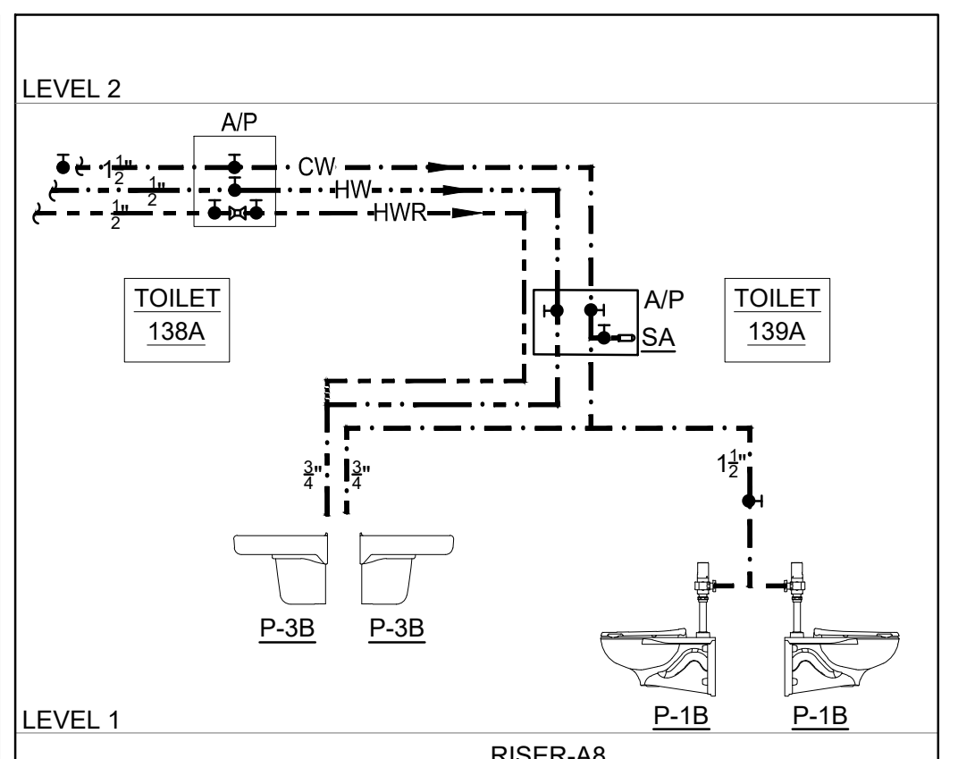

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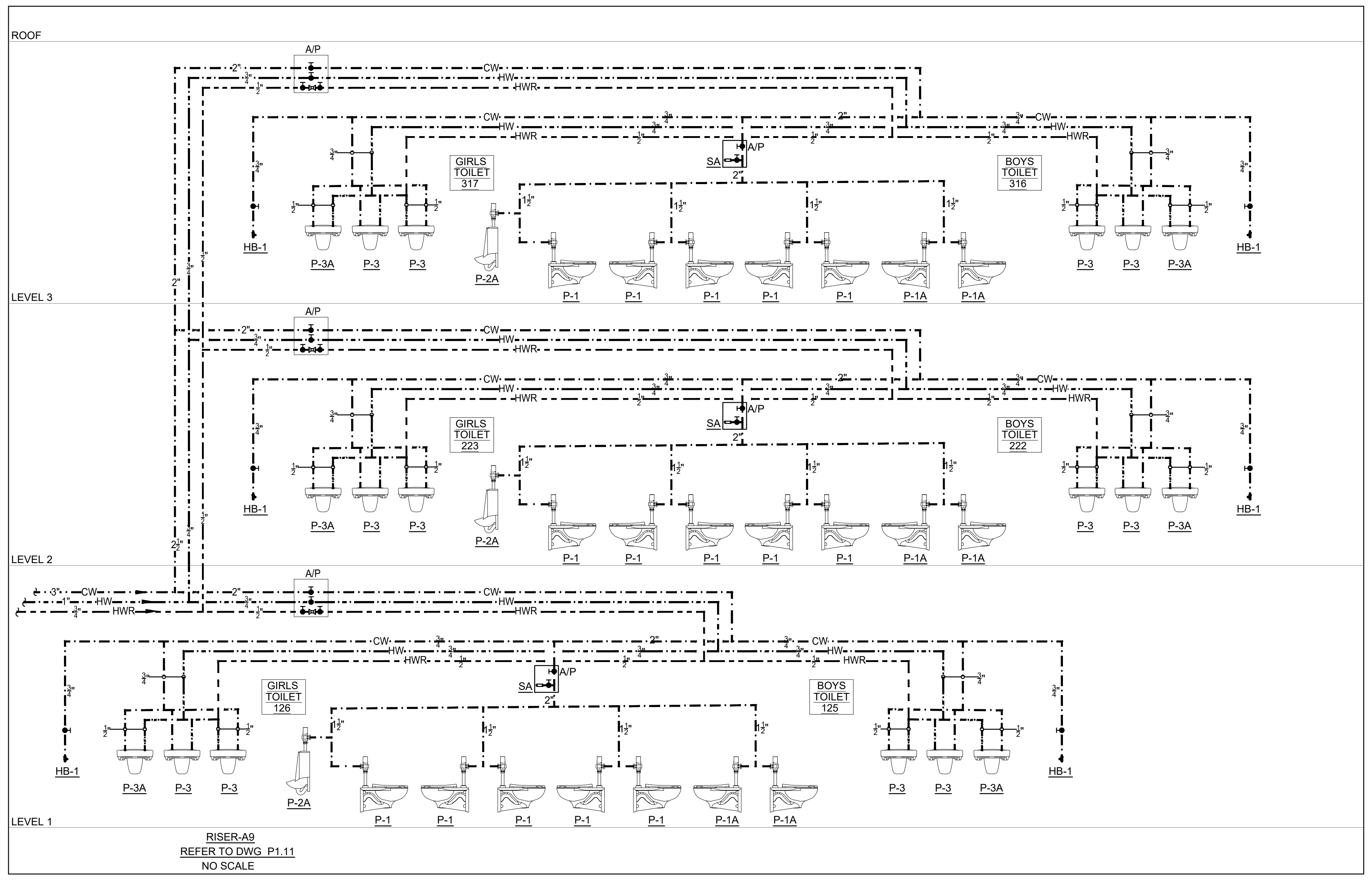

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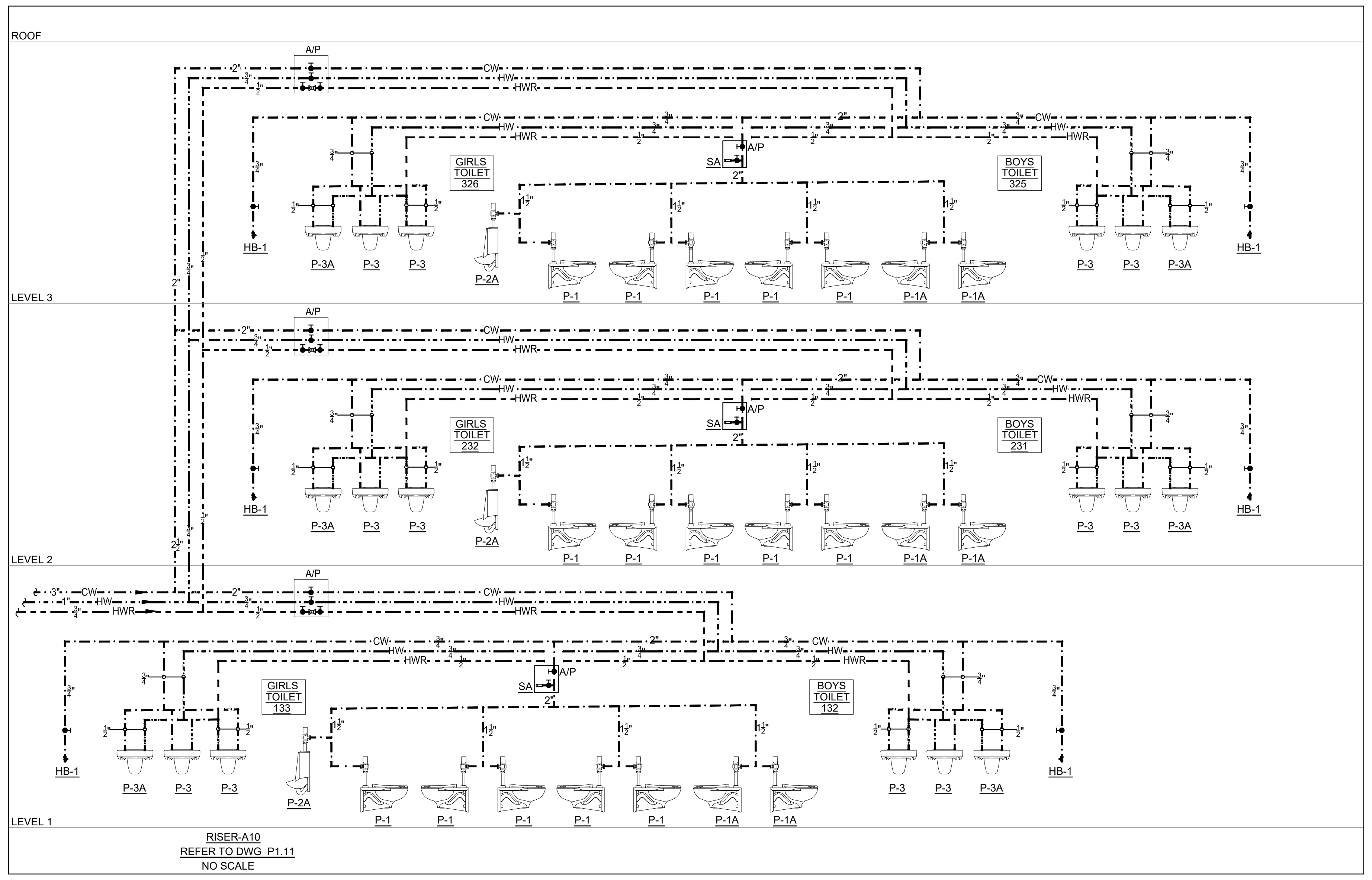

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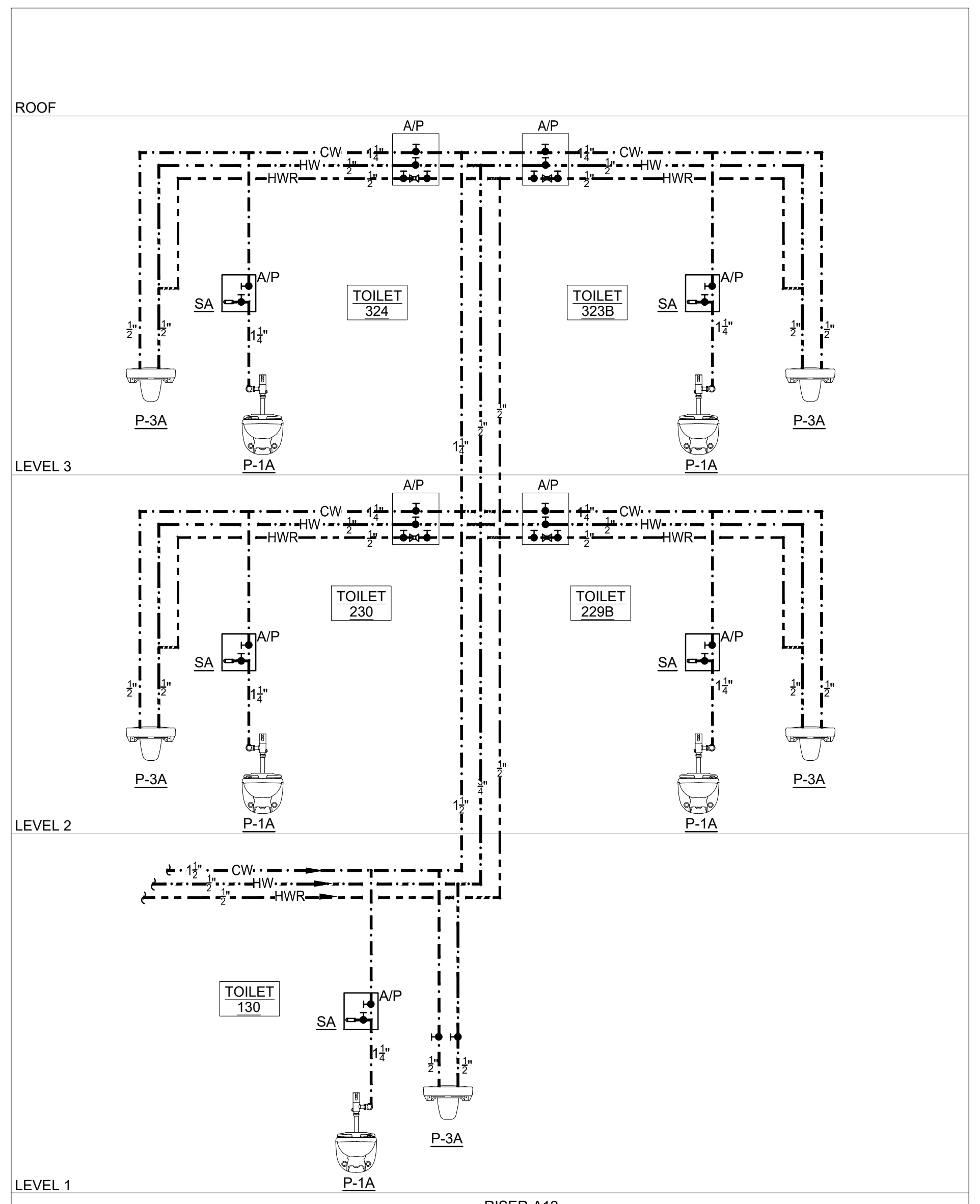

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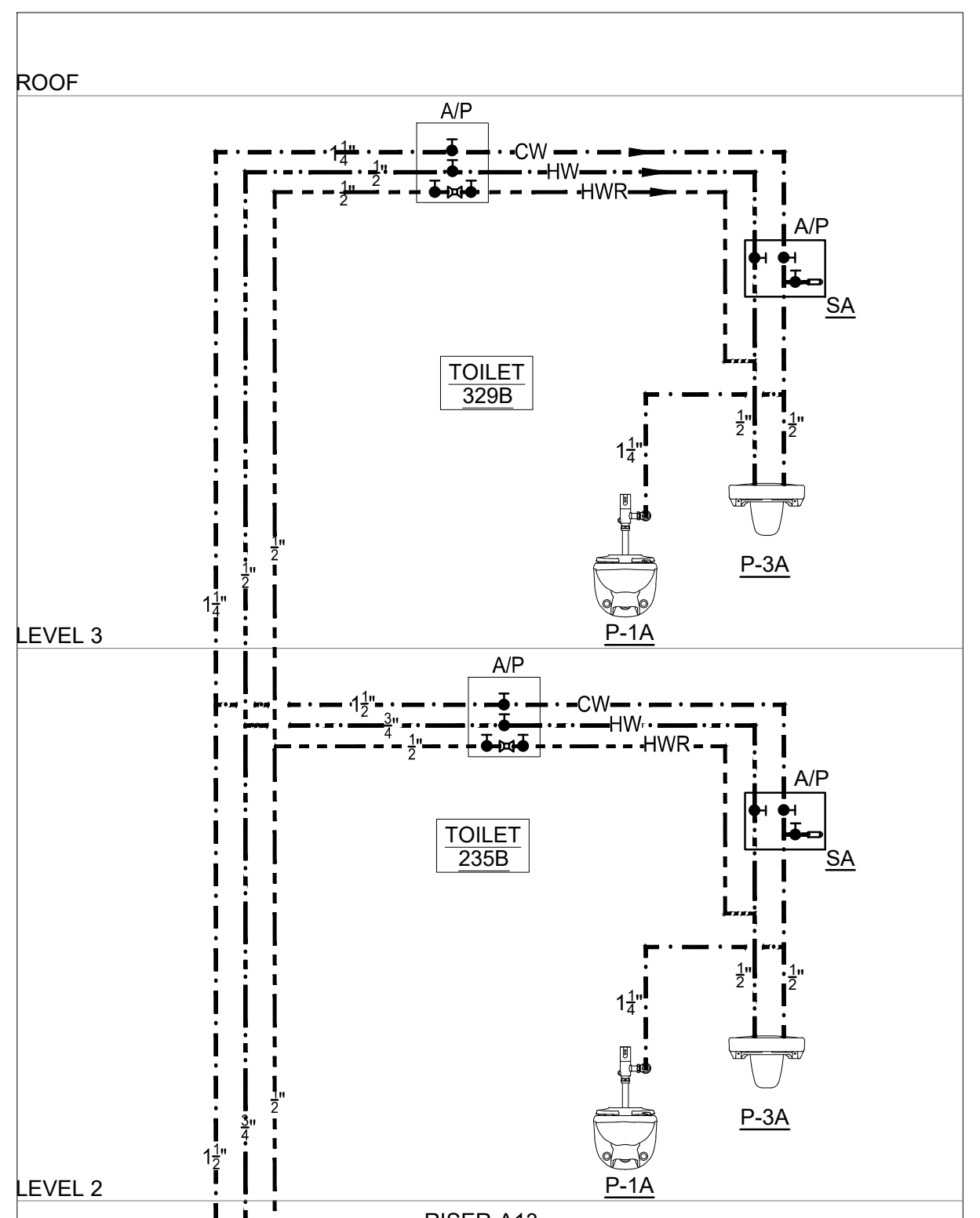

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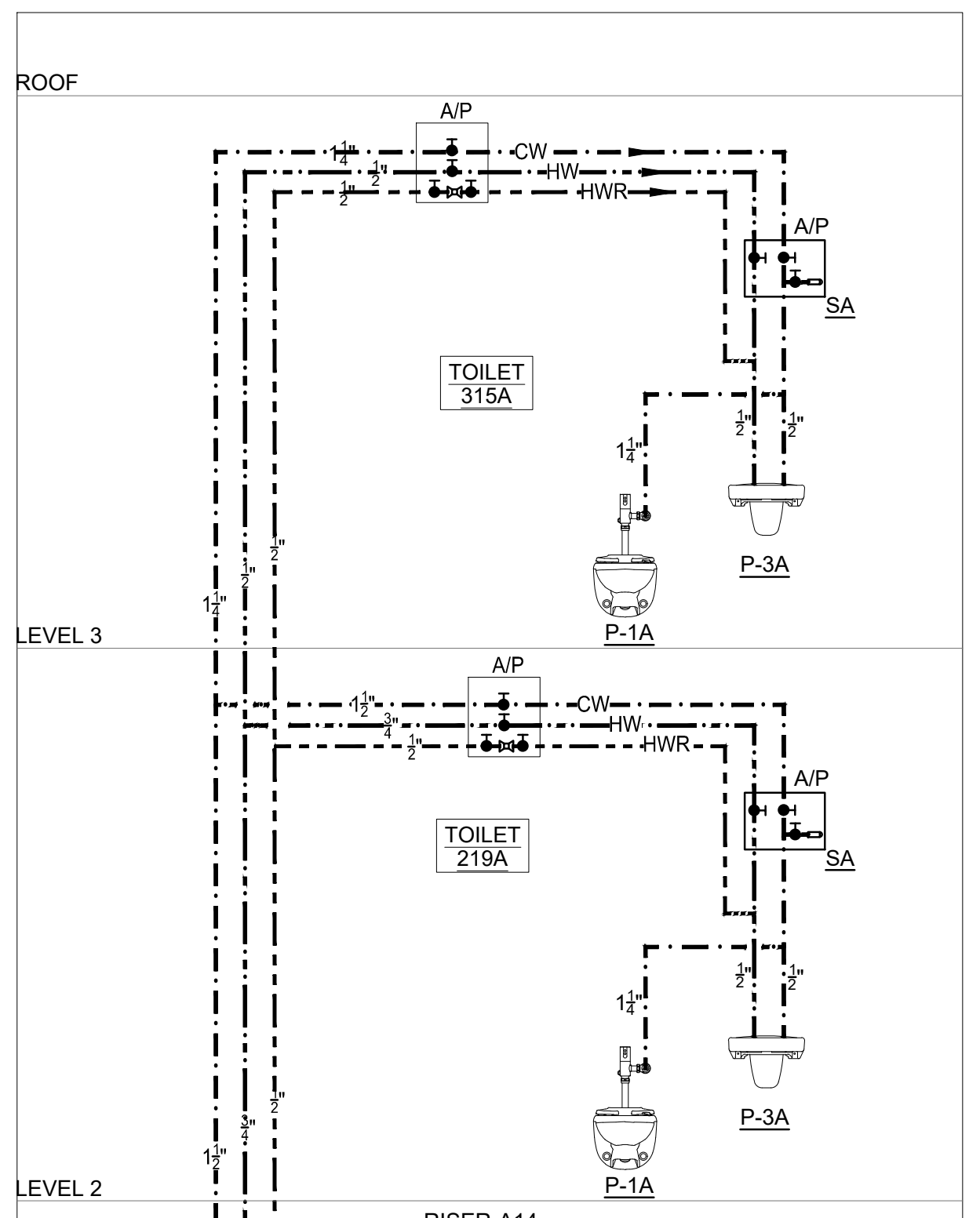

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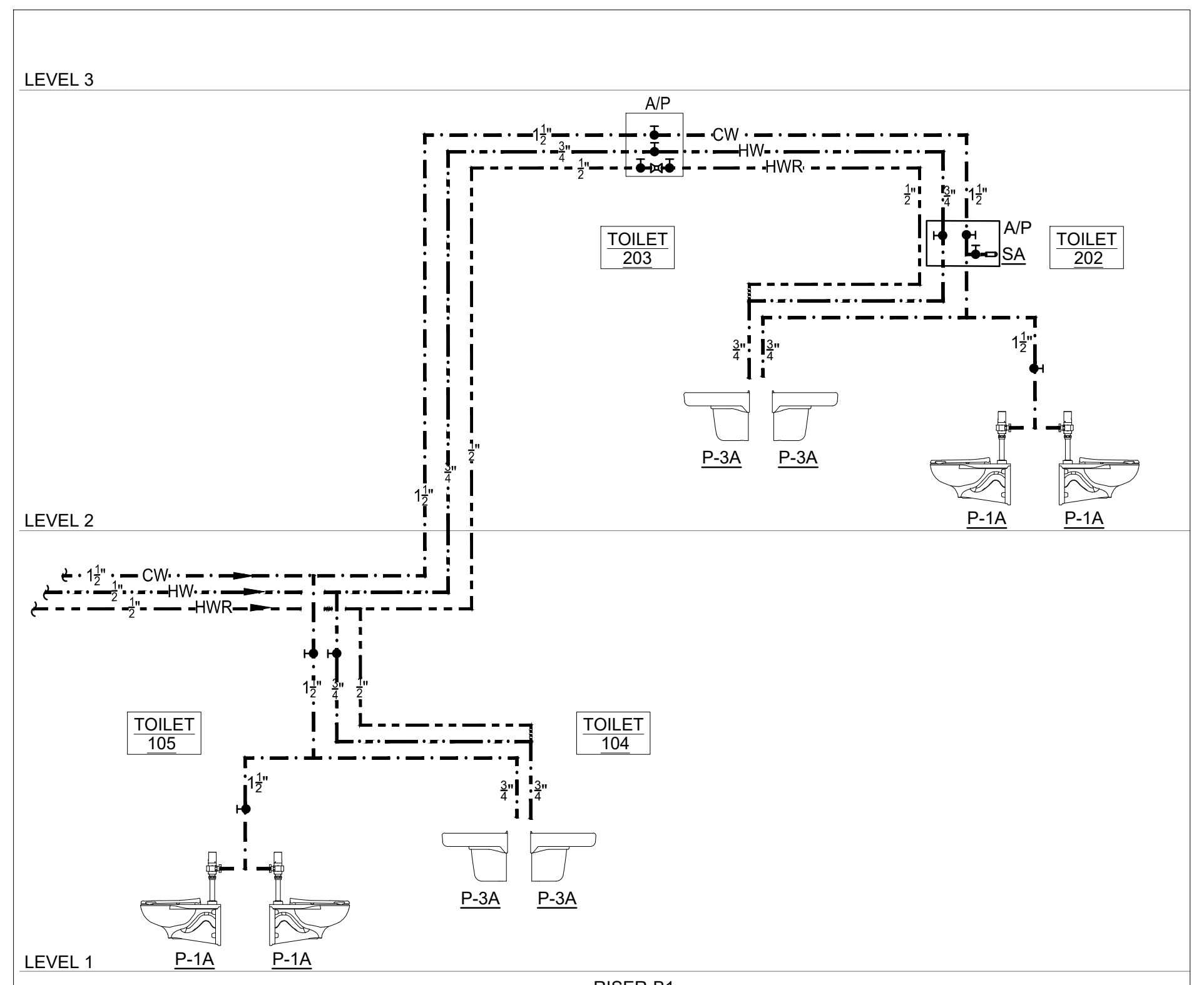

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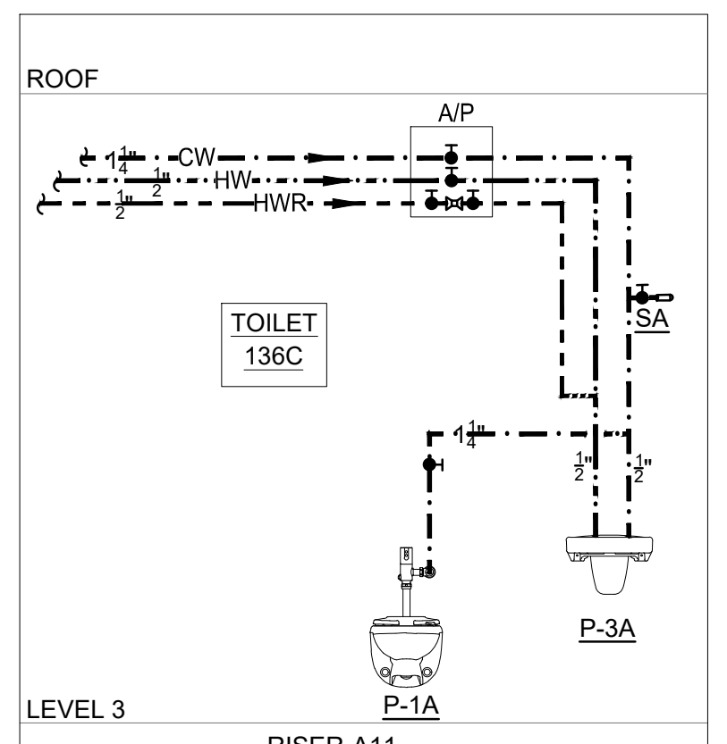

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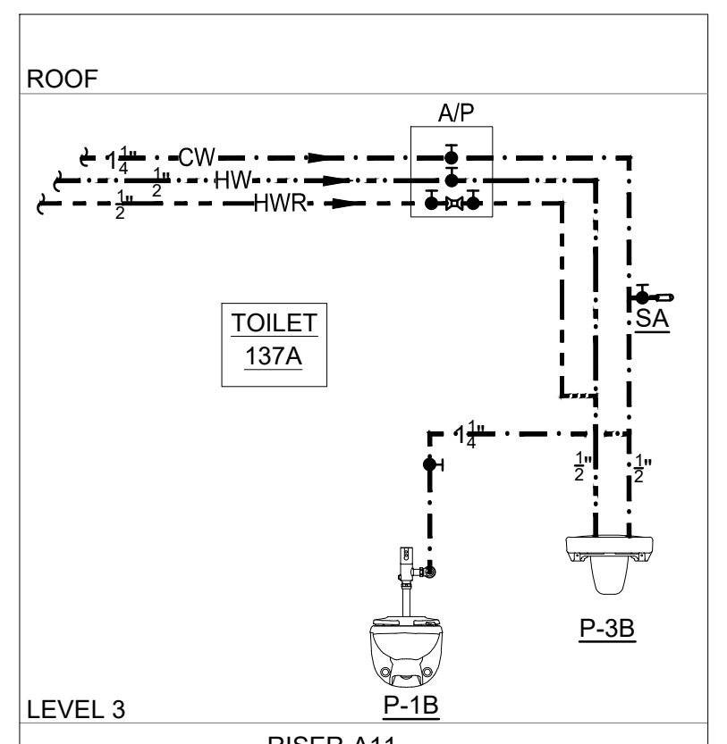

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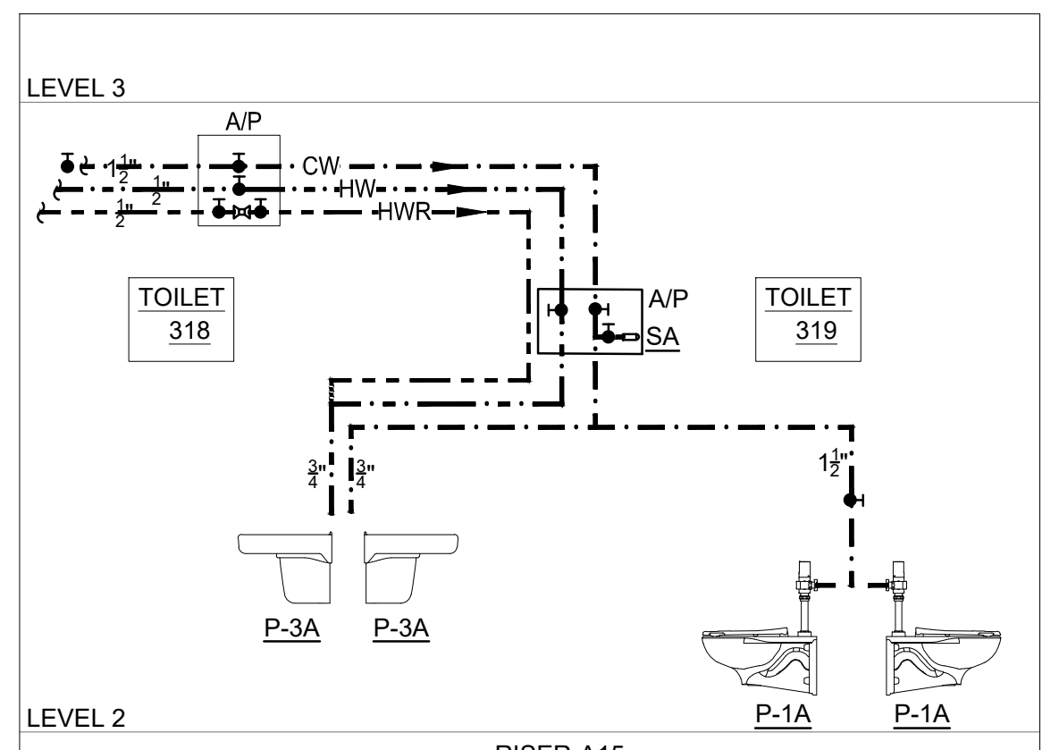

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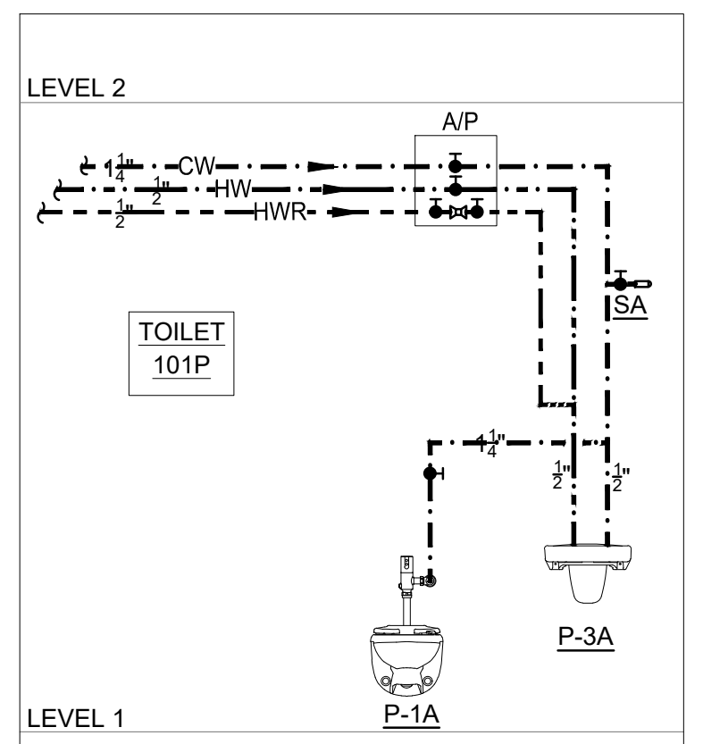

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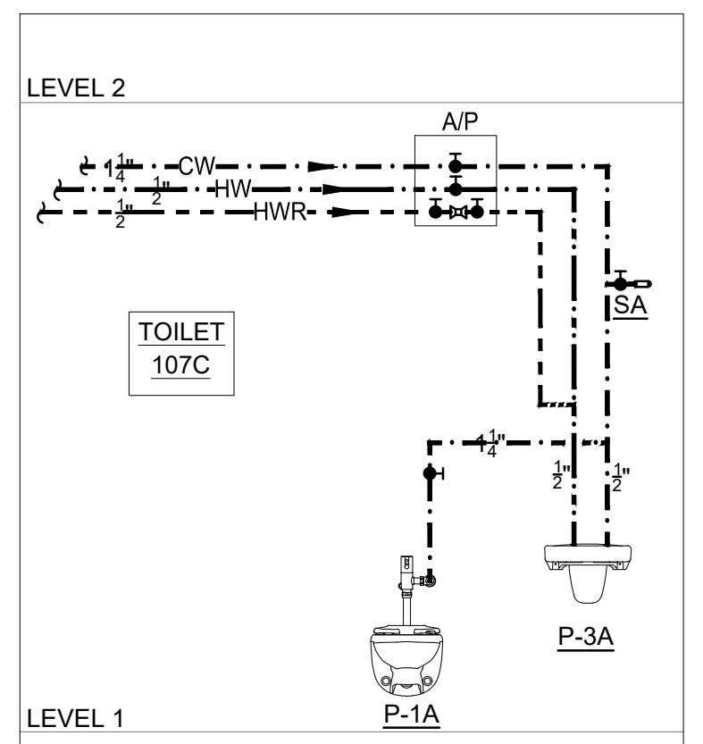

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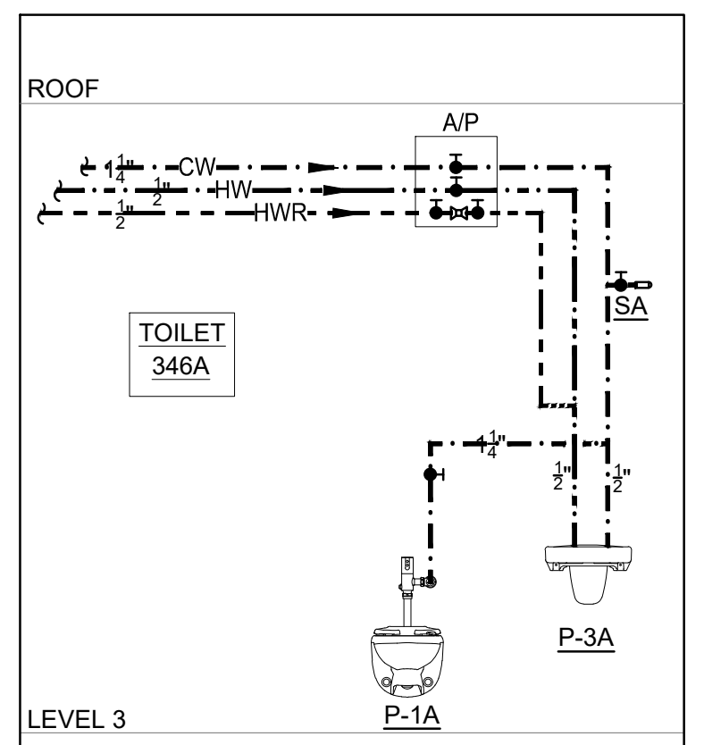

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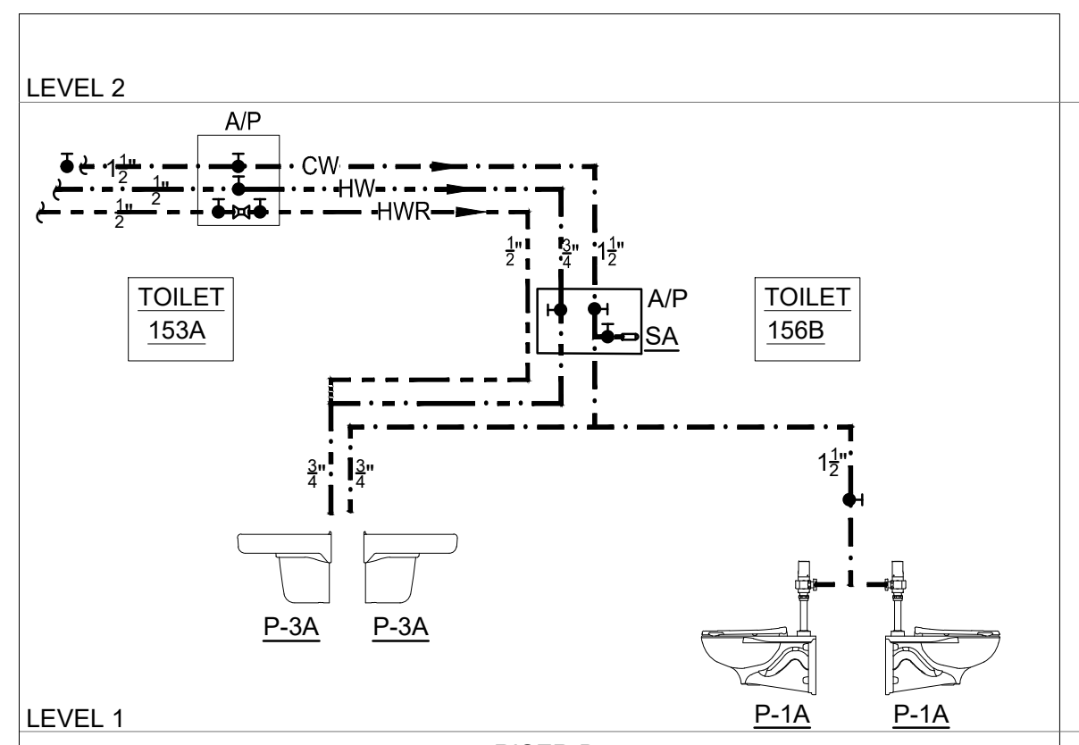

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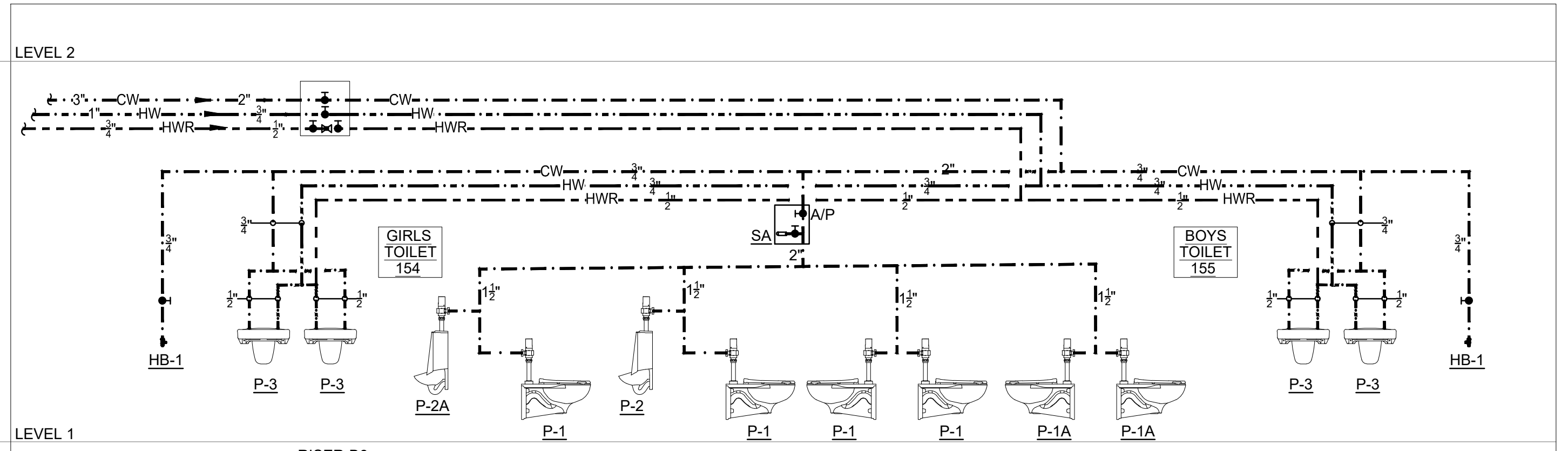

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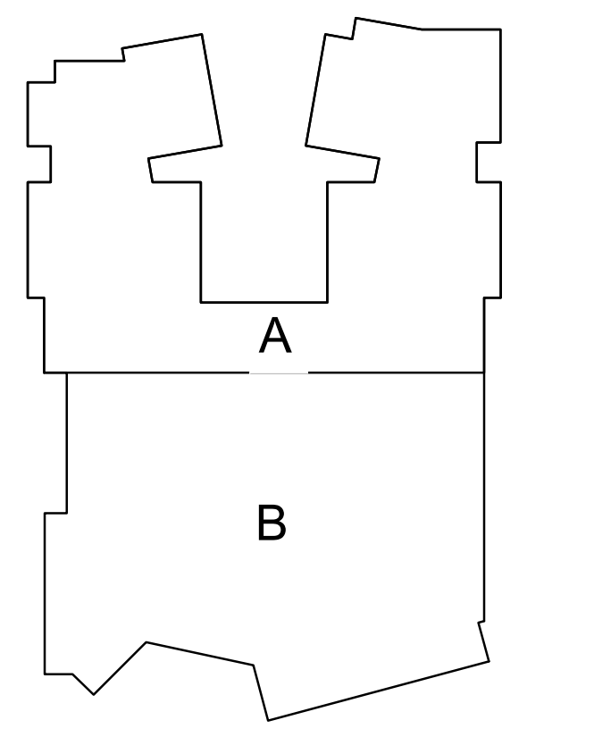

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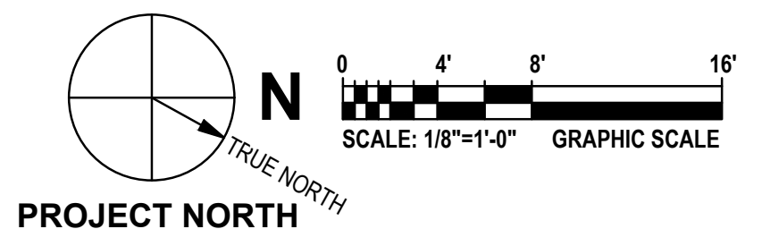

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PLUMBING DOMESTIC WATER RISER DIAGRAM

SHEET NUMBER:

P2.02

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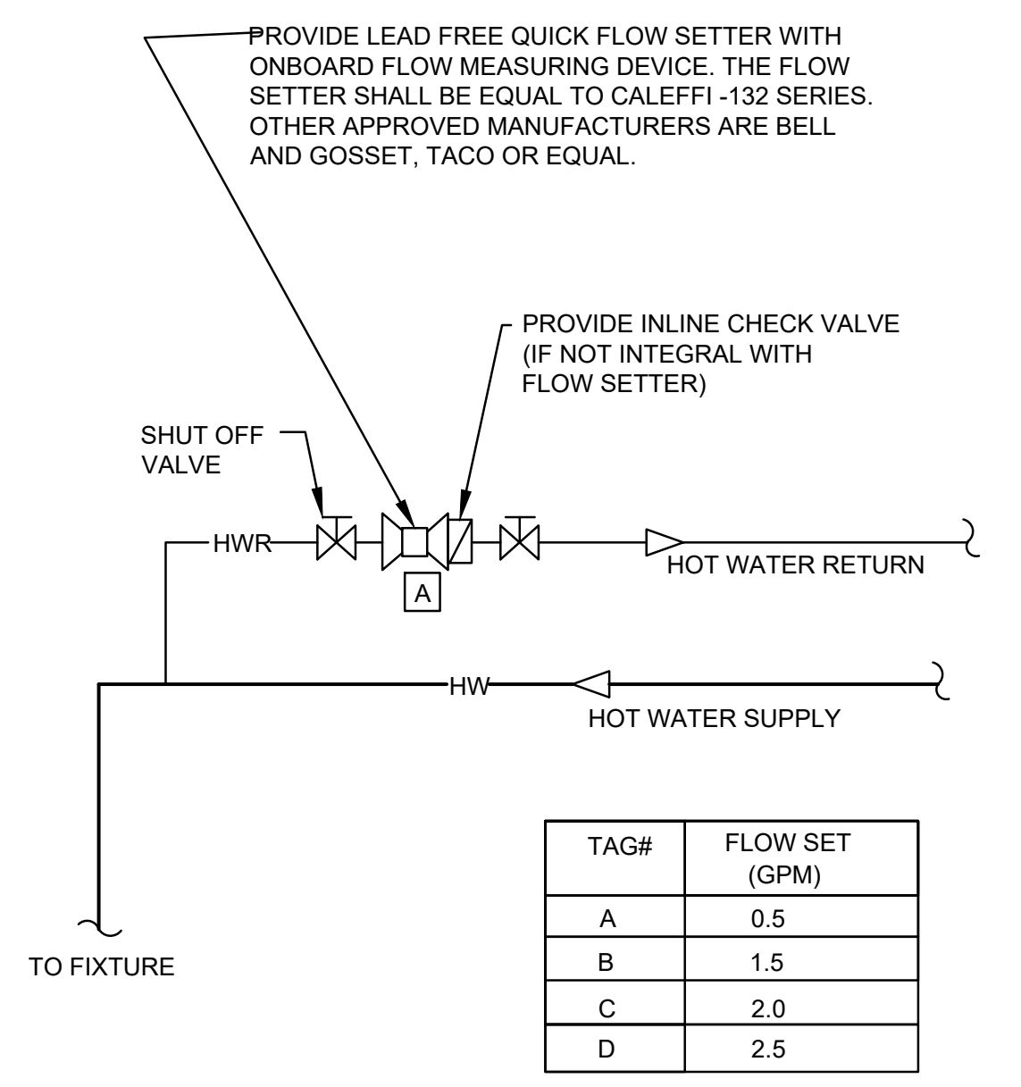
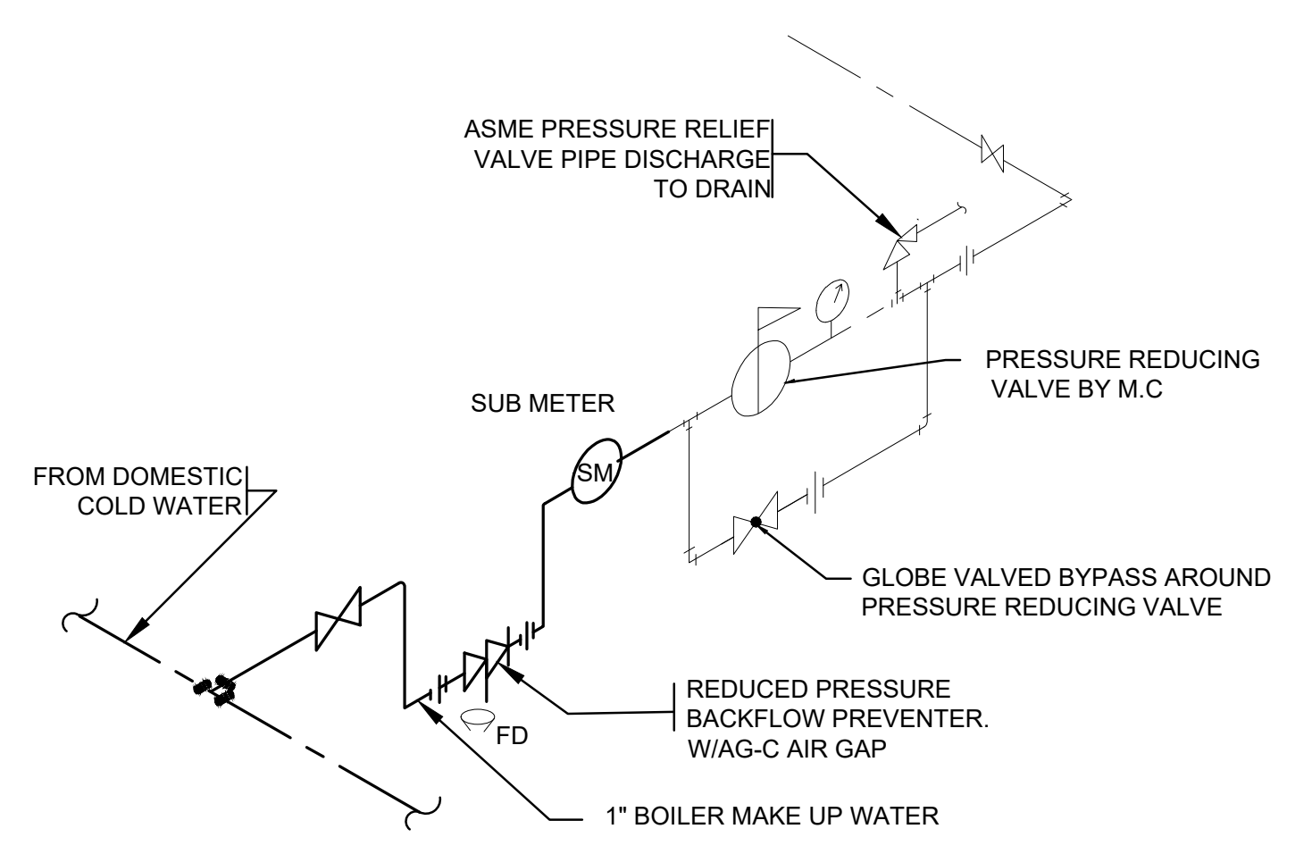
03-02-2026 23:14:44

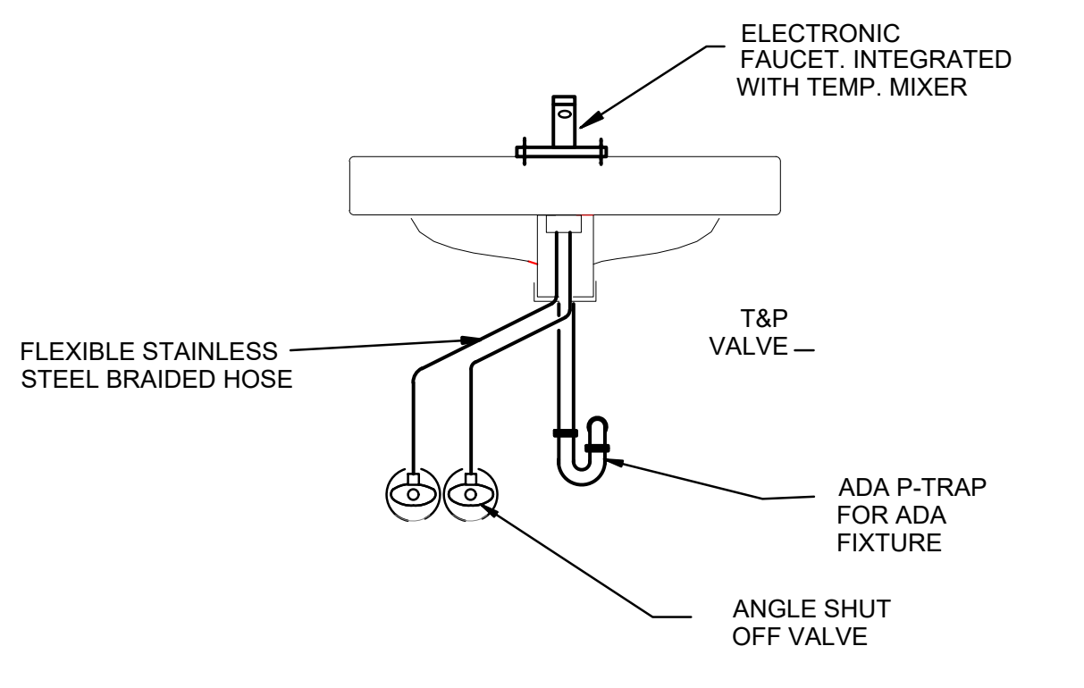

PROVIDE LEAD FREE QUICK FLOW SETTER WITH ONBOARD FLOW MEASURING DEVICE. THE FLOW SETTER SHALL BE EQUAL TO CALEFFI -132 SERIES. OTHER APPROVED MANUFACTURERS ARE BELL AND GOSSET, TACO OR EQUAL.
PROVIDE INLINE CHECK VALVE (IF NOT INTEGRAL WITH FLOW SETTER)
SHUT OFF VALVE
HWR
A
HOT WATER RETURN
HW
HOT WATER SUPPLY
TO FIXTURE

TAG#	FLOW SET (GPM)
A	0.5
B	1.5
C	2.0
D	2.5

1 HOT WATER RECIRULATION LOOP DETAIL
NOT TO SCALE

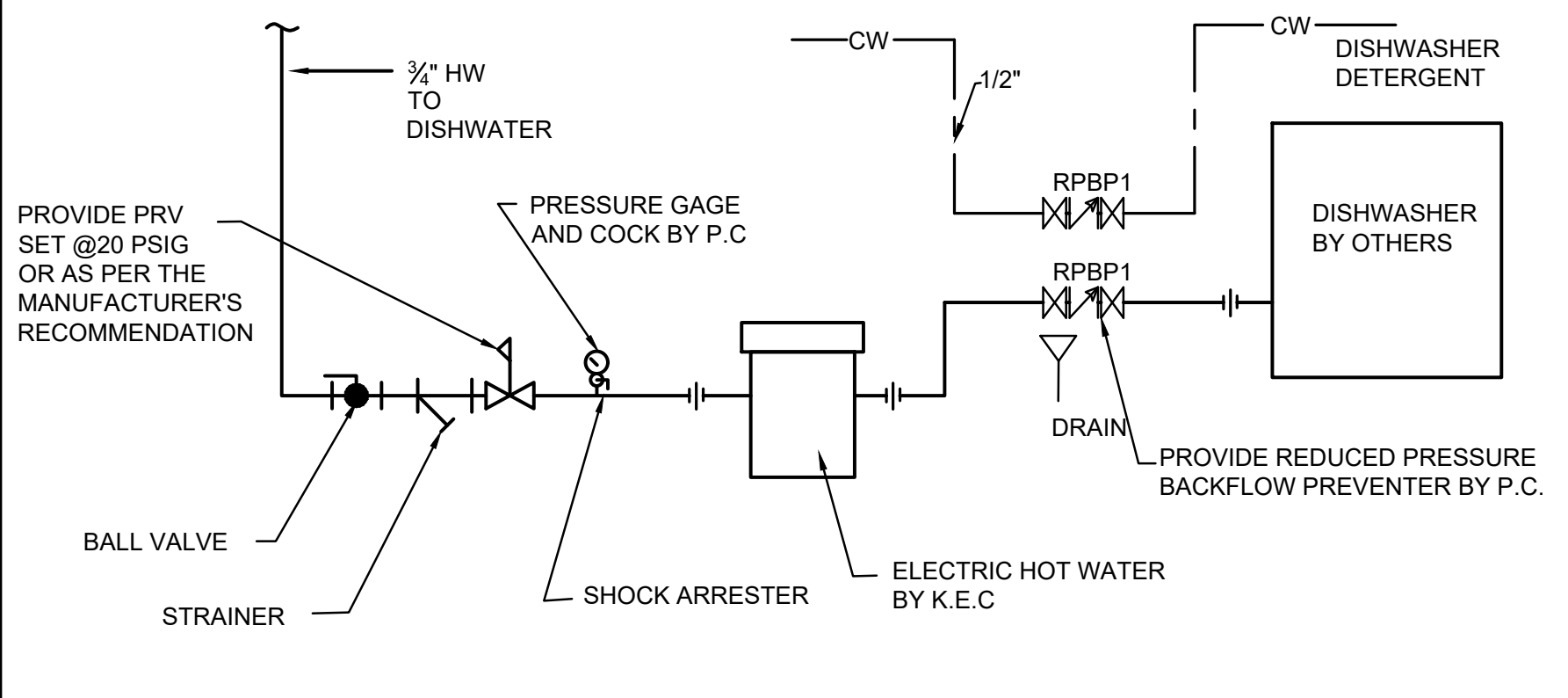

ASME PRESSURE RELIEF VALVE PIPE DISCHARGE TO DRAIN
PRESSURE REDUCING VALVE BY M.C
SUB METER
SM
FROM DOMESTIC COLD WATER
GLOBE VALVED BYPASS AROUND PRESSURE REDUCING VALVE
REDUCED PRESSURE BACKFLOW PREVENTER. W/AG-C AIR GAP
FD
1" BOILER MAKE UP WATER

2 MECHANICAL MAKE UP WATER LINE
NOT TO SCALE

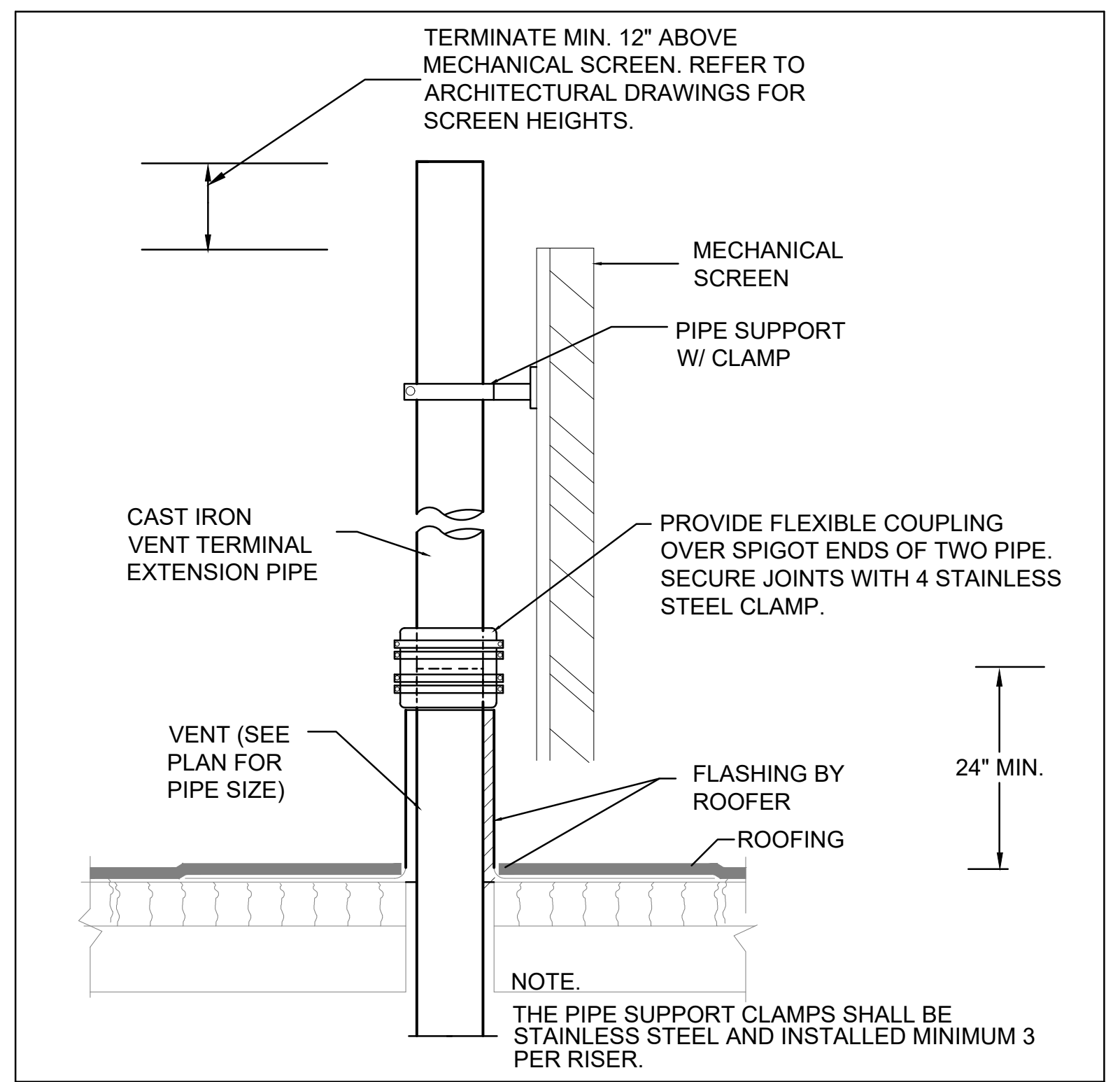

ELECTRONIC FAUCET. INTEGRATED WITH TEMP. MIXER
FLEXIBLE STAINLESS STEEL BRAIDED HOSE
T&P VALVE
ADA P-TRAP FOR ADA FIXTURE
ANGLE SHUT OFF VALVE

NOTE:
ALL LOW VOLTAGE WIRING SHALL BE HARD WIRED TO THE FAUCET (BY P.C). 120V POWER WIRING SHALL BE BY ELECTRICAL CONTRACTOR. COORDINATE WORK WITH ELECTRICAL DWG.

3 LAVATORY- (SINGLE AND MULTI LAV.)
NOT TO SCALE

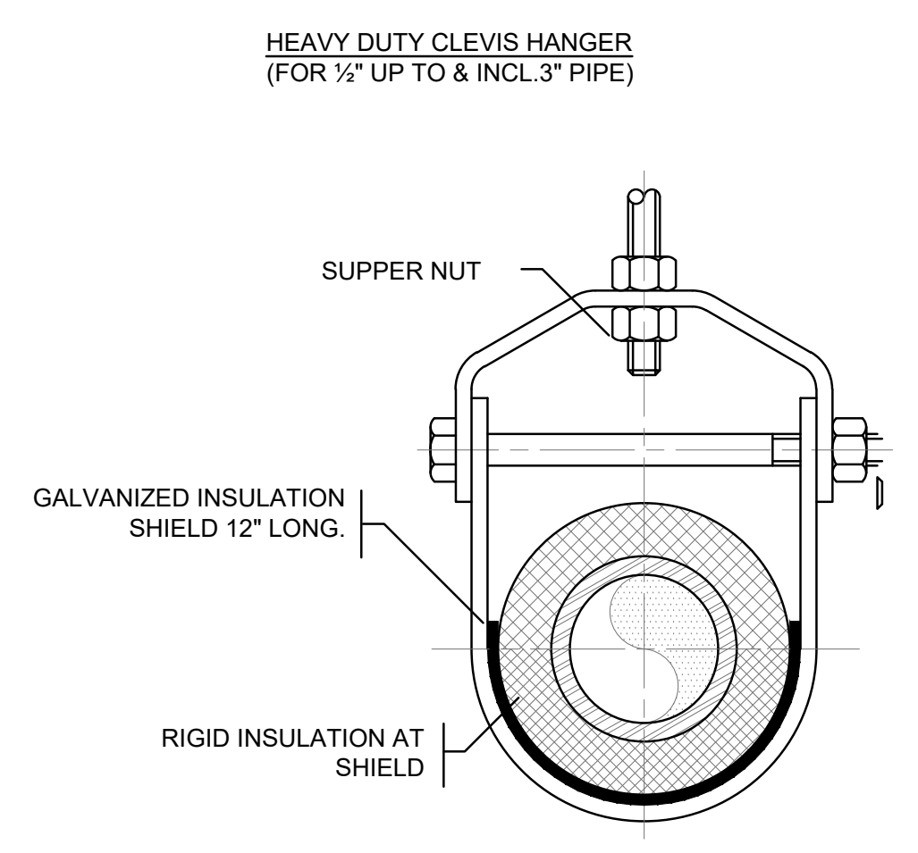

¾" HW TO DISHWATER
CW
1/2"
CW
DISHWASHER DETERGENT
PROVIDE PRV SET @20 PSIG OR AS PER THE MANUFACTURER'S RECOMMENDATION
PRESSURE GAGE AND COCK BY P.C
RPBP1
RPBP1
DISHWASHER BY OTHERS
DRAIN
PROVIDE REDUCED PRESSURE BACKFLOW PREVENTER BY P.C.
BALL VALVE
STRAINER
SHOCK ARRESTER
ELECTRIC HOT WATER BY K.E.C

4 WAREWASHER HOT WATER PIPING DETAIL
NOT TO SCALE


TERMINATE MIN. 12" ABOVE MECHANICAL SCREEN. REFER TO ARCHITECTURAL DRAWINGS FOR SCREEN HEIGHTS.
MECHANICAL SCREEN
PIPE SUPPORT W/ CLAMP
CAST IRON VENT TERMINAL EXTENSION PIPE
PROVIDE FLEXIBLE COUPLING OVER SPIGOT ENDS OF TWO PIPE. SECURE JOINTS WITH 4 STAINLESS STEEL CLAMP.
VENT (SEE PLAN FOR PIPE SIZE)
FLASHING BY ROOFER
24" MIN.
ROOFING

NOTE.
THE PIPE SUPPORT CLAMPS SHALL BE STAINLESS STEEL AND INSTALLED MINIMUM 3 PER RISER.

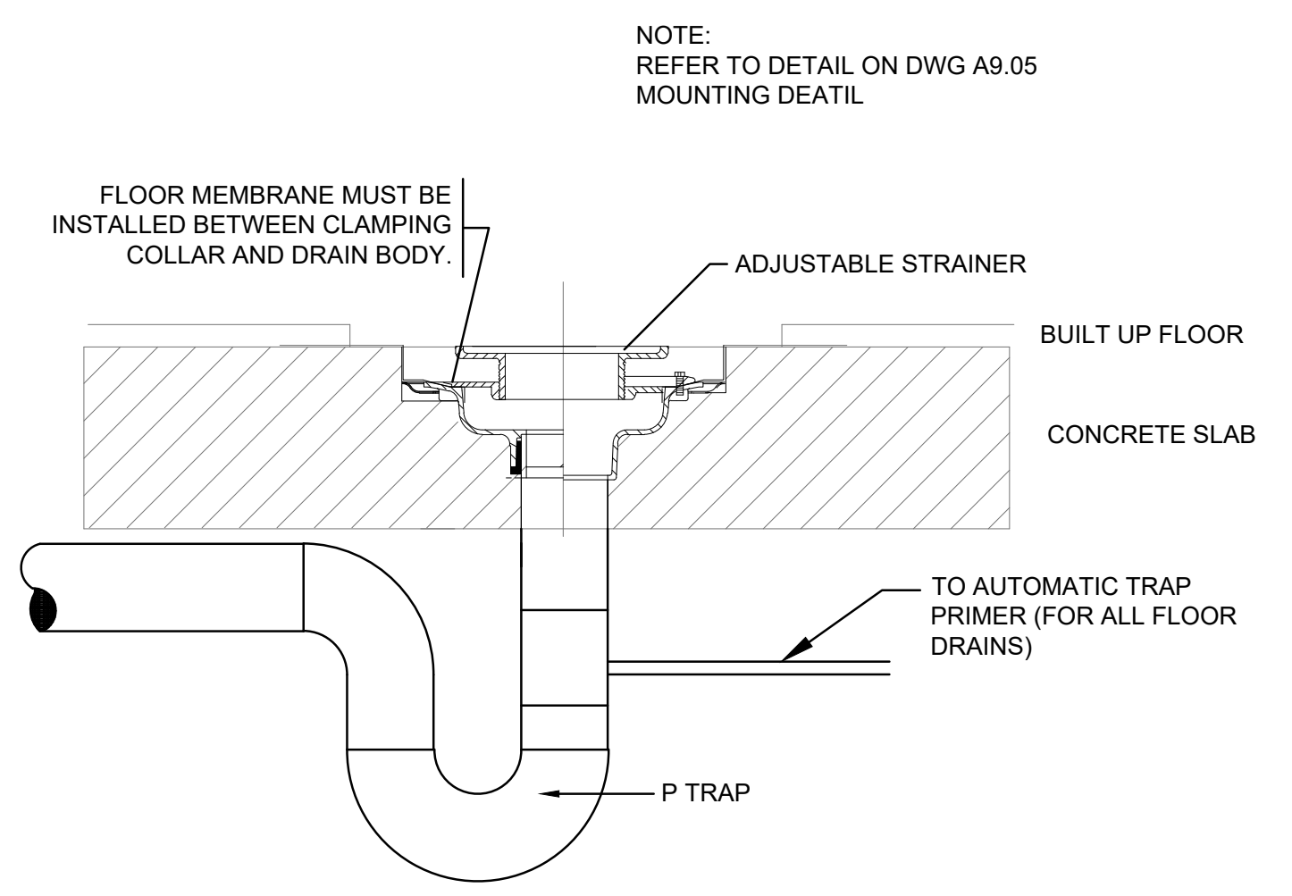
5 VENT THROUGH ROOF WITH EXTENSION
NOT TO SCALE


HEAVY DUTY CLEVIS HANGER (FOR ½" UP TO & INCL.3" PIPE)
SUPPER NUT
GALVANIZED INSULATION SHIELD 12" LONG.
RIGID INSULATION AT SHIELD

NOTES:

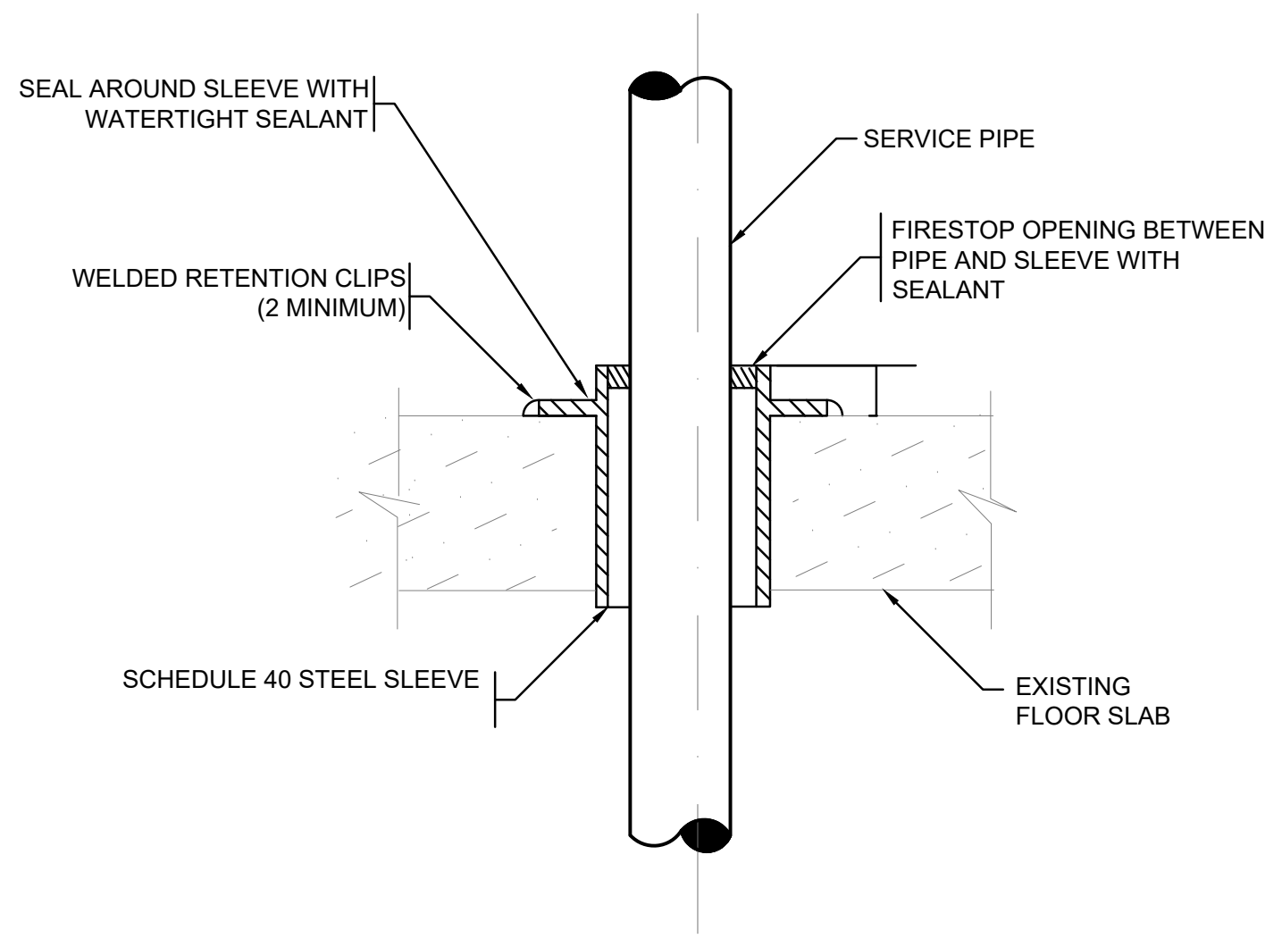
1. SEE SPECIFICATION FOR HANGER SIZES.

6 PIPE HANGER SUPPORT
NOT TO SCALE

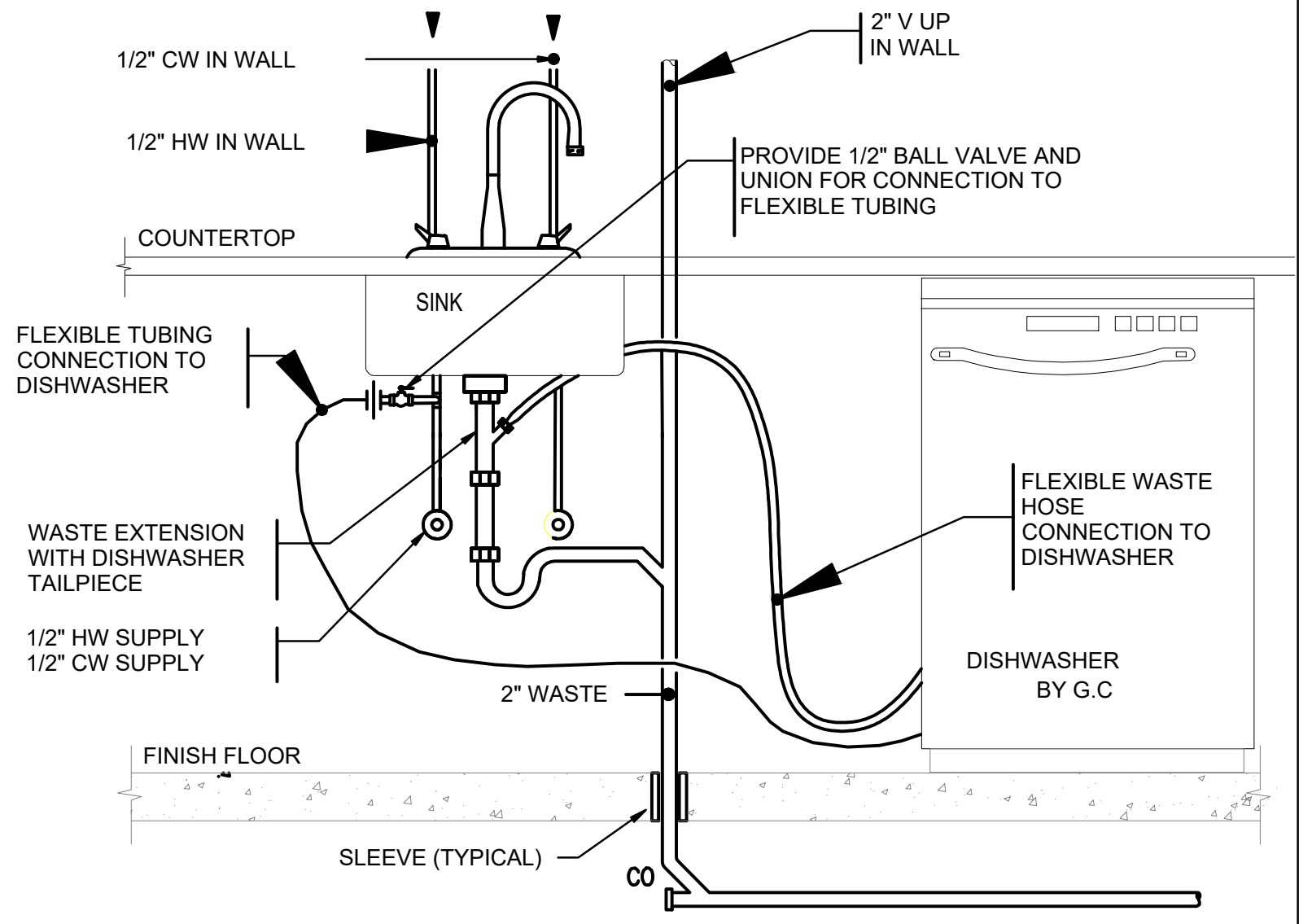

FLOOR MEMBRANE MUST BE INSTALLED BETWEEN CLAMPING COLLAR AND DRAIN BODY.
ADJUSTABLE STRAINER
BUILT UP FLOOR
CONCRETE SLAB
TO AUTOMATIC TRAP PRIMER (FOR ALL FLOOR DRAINS)
P TRAP

NOTE:
REFER TO DETAIL ON DWG A9.05 MOUNTING DEATIL

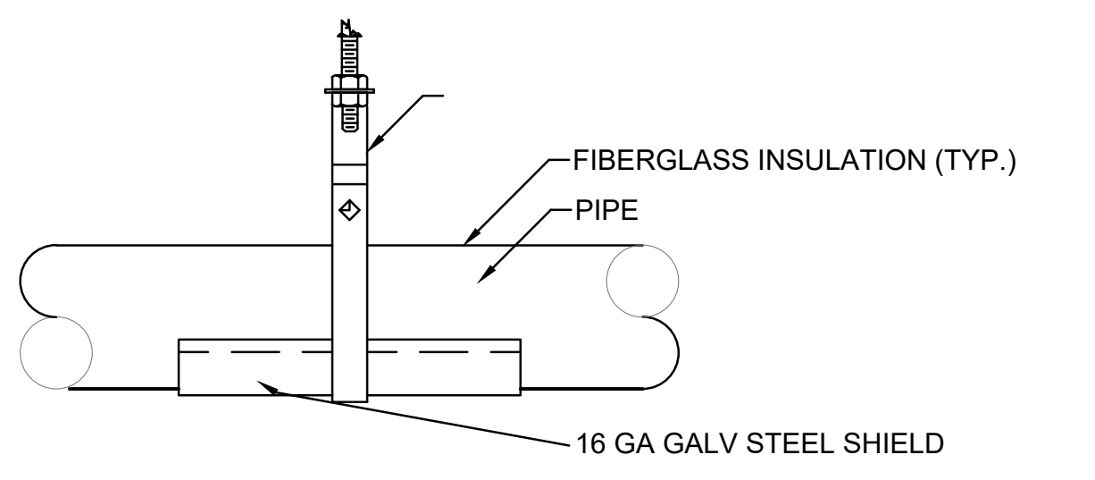
7 FLOOR DRAIN
NOT TO SCALE


SEAL AROUND SLEEVE WITH WATERTIGHT SEALANT
SERVICE PIPE
WELDED RETENTION CLIPS (2 MINIMUM)
FIRESTOP OPENING BETWEEN PIPE AND SLEEVE WITH SEALANT
SCHEDULE 40 STEEL SLEEVE
EXISTING FLOOR SLAB

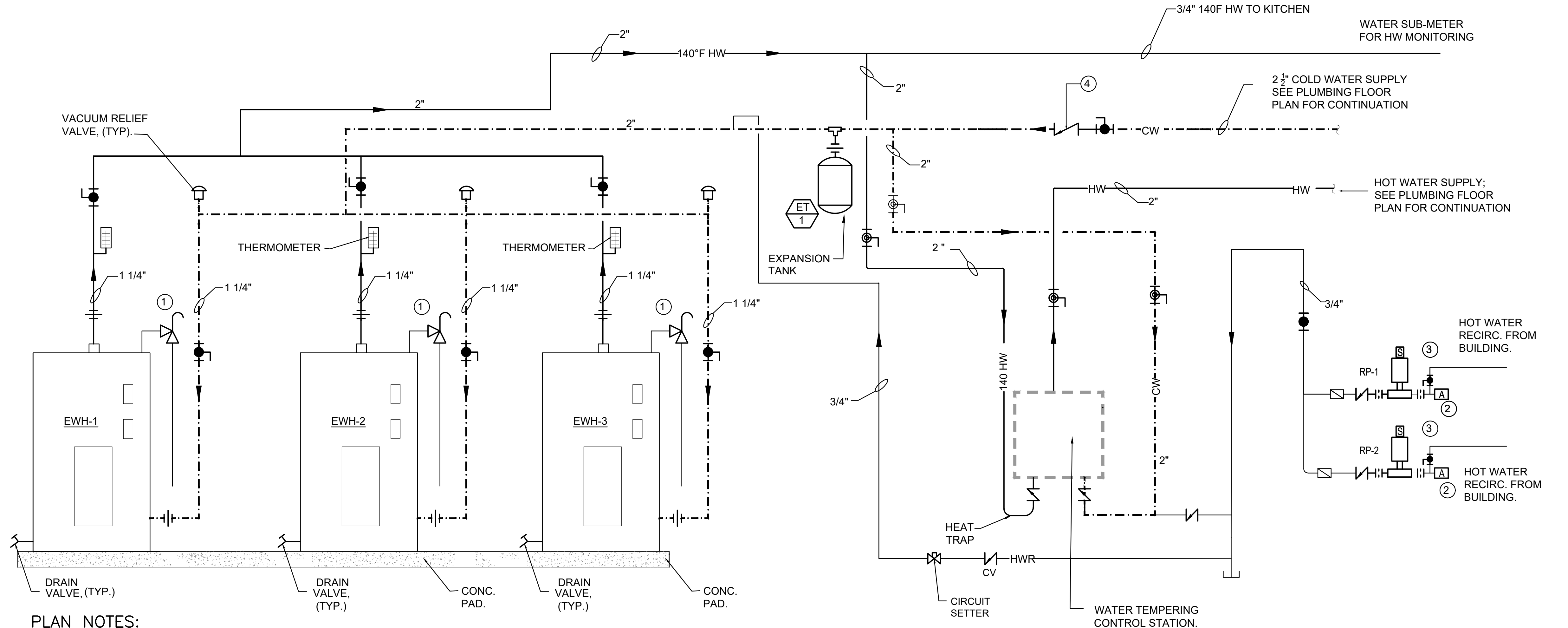
8 PIPE SLEEVE PENETRATION AT FLOOR
NOT TO SCALE


1/2" CW IN WALL
1/2" HW IN WALL
2" V UP IN WALL
PROVIDE 1/2" BALL VALVE AND UNION FOR CONNECTION TO FLEXIBLE TUBING
COUNTERTOP
SINK
FLEXIBLE TUBING CONNECTION TO DISHWASHER
FLEXIBLE WASTE HOSE CONNECTION TO DISHWASHER
WASTE EXTENSION WITH DISHWASHER TAILPIECE
1/2" HW SUPPLY
1/2" CW SUPPLY
DISHWASHER BY G.C
2" WASTE
FINISH FLOOR
SLEEVE (TYPICAL)
CO

9 DISHWASHER AND SINK WASTE CONNECTION
NOT TO SCALE



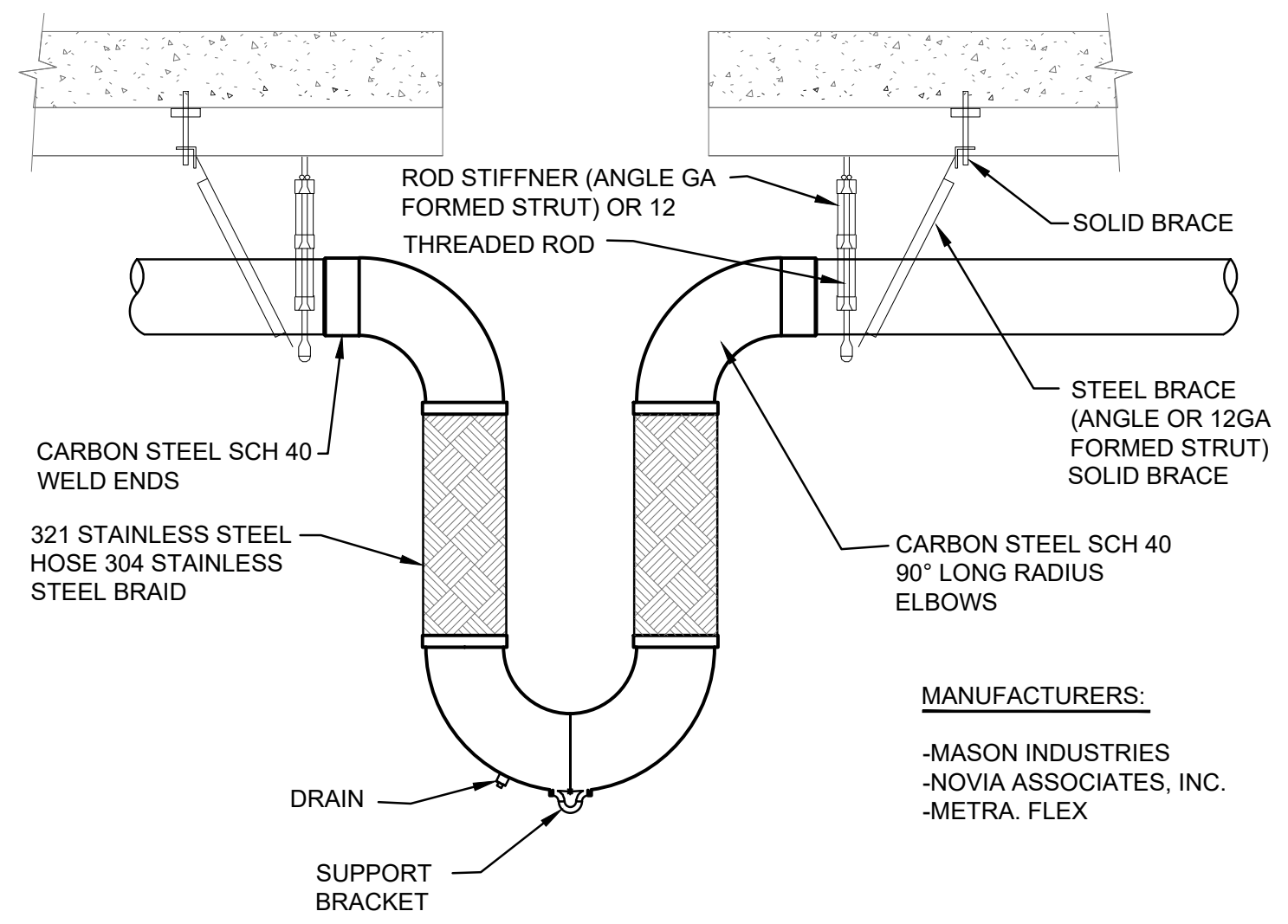
10 PIPE HANGER
NOT TO SCALE


3/4" 140F HW TO KITCHEN
WATER SUB-METER FOR HW MONITORING
2"
140°F HW
2"
2"
2"
4
2 ½" COLD WATER SUPPLY SEE PLUMBING FLOOR PLAN FOR CONTINUATION
CW
VACUUM RELIEF VALVE, (TYP).
2"
HW
2"
HW
HOT WATER SUPPLY; SEE PLUMBING FLOOR PLAN FOR CONTINUATION
THERMOMETER
THERMOMETER
ET 1
EXPANSION TANK
2 "
1 1/4"
1 1/4"
1 1/4"
1 1/4"
1 1/4"
1 1/4"
1
1
1
3/4"
3/4"
140 HW
CW
2"
HOT WATER RECIRC. FROM BUILDING.
3
RP-1
A
2
3
RP-2
A
2
HOT WATER RECIRC. FROM BUILDING.
EWH-1
EWH-2
EWH-3
HEAT TRAP
HWR
CV
CIRCUIT SETTER
WATER TEMPERING CONTROL STATION. SEE DETAIL # 5 DWG P-004
DRAIN VALVE, (TYP.)
DRAIN VALVE, (TYP.)
CONC. PAD.
DRAIN VALVE, (TYP.)
CONC. PAD.

PLAN NOTES:

① PRESSURE/TEMPERATURE RELIEF VALVE. DISCHARGE AT 6" AFF
② LOOP AQUSTAT SET AT 105 F ON/120 F OFF. WIRE TO HOT WATER RECIRCULATING PUMP MOTOR STARTER
③ PUMP OPERATION TO INTERLOCK WITH BUILDING MANAGEMENT CONTROL THROUGH DDC SYSTEM (BY ATC).
④ CHECK VALVE WITH $\frac{1}{8}$" DRILL HOLE IN CLAPPER.

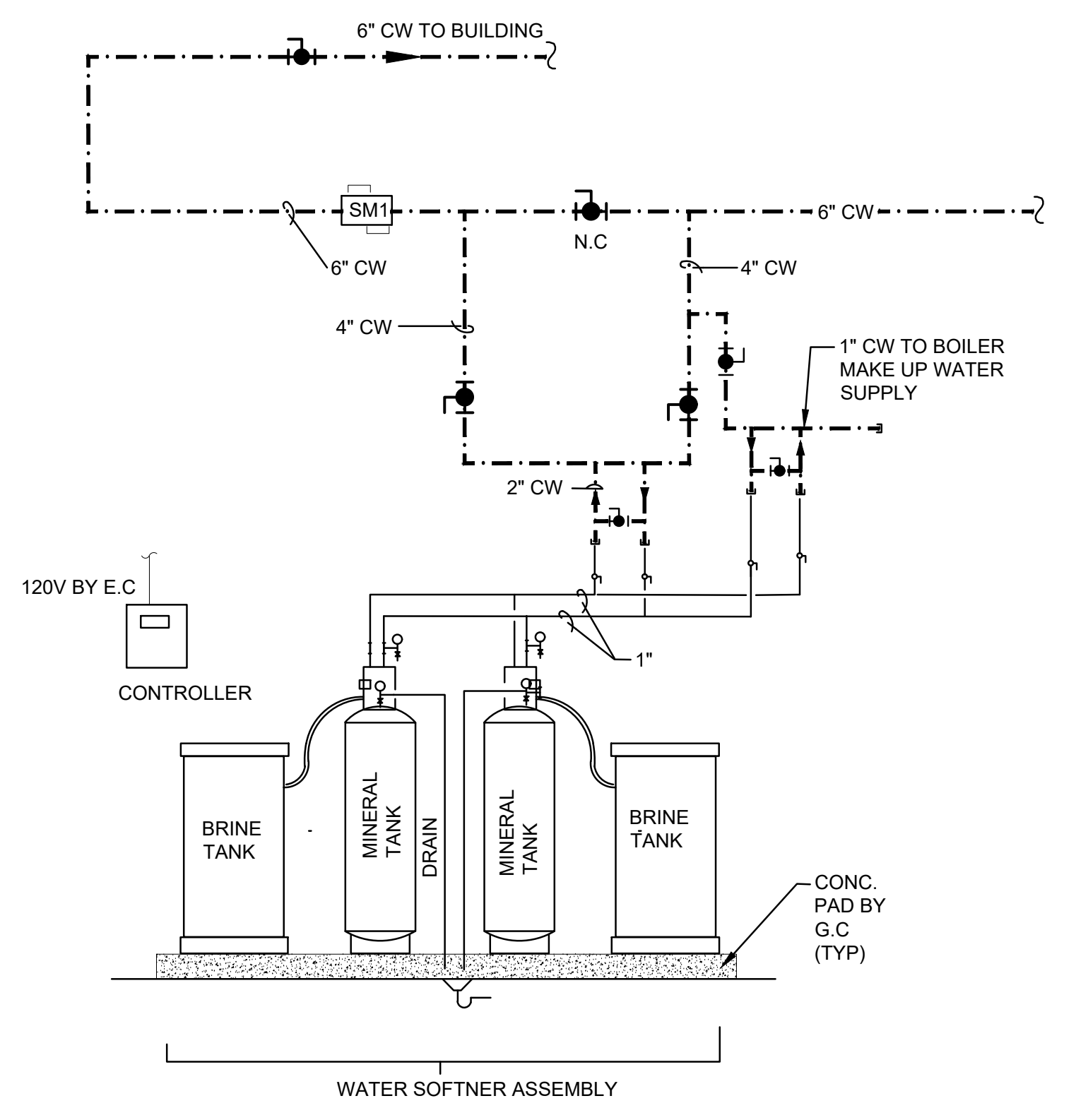
11 HOT AND COLD CONNECTION TO DOMESTIC WATER HEATER
NOT TO SCALE


ROD STIFFNER (ANGLE GA FORMED STRUT) OR 12 THREADED ROD
SOLID BRACE
STEEL BRACE (ANGLE OR 12GA FORMED STRUT) SOLID BRACE
CARBON STEEL SCH 40 WELD ENDS
321 STAINLESS STEEL HOSE 304 STAINLESS STEEL BRAID
CARBON STEEL SCH 40 90° LONG RADIUS ELBOWS
DRAIN
SUPPORT BRACKET

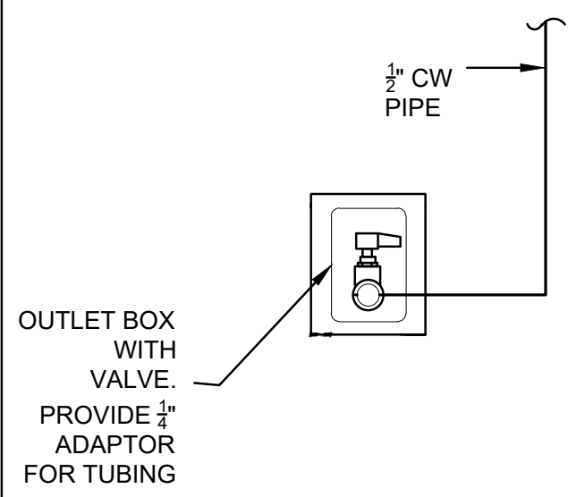
MANUFACTURERS:

-MASON INDUSTRIES
-NOVIA ASSOCIATES, INC.
-METRA. FLEX

12 EXPANSION LOOP DETAIL
NOT TO SCALE



13 WATER SOFTNER
NOT TO SCALE



14 CW DROP FOR REFRIGERATOR
NOT TO SCALE

DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

AKAL Engineering Inc.
44 Central Street. Unit # 4
Berlin, MA. 01503
Telephone - (508) 869-0403
Fax - (508) 869-2891
www.akalengineering.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

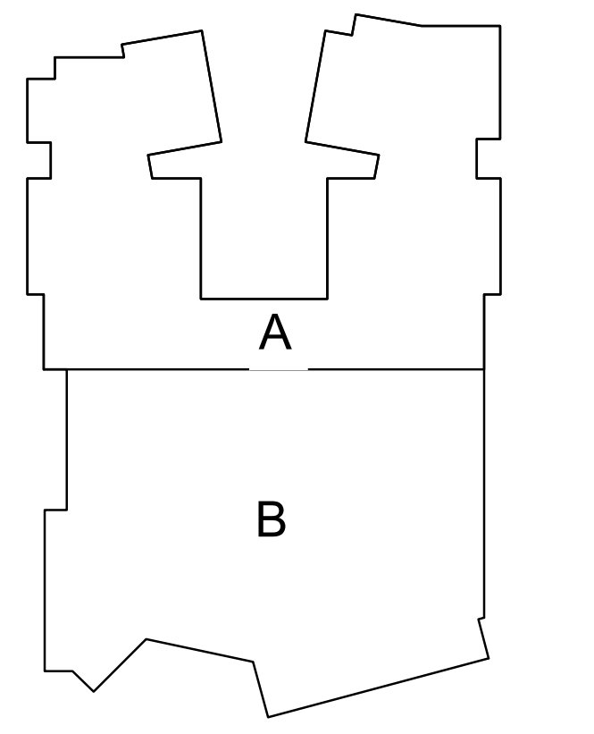
REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENT
09/25/2026

KEY PLAN



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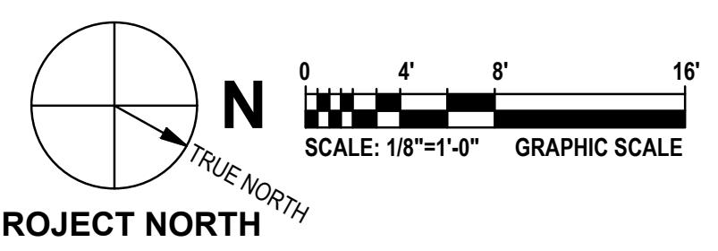

SHEET TITLE:

PLUMBING DETAILS 1

SHEET NUMBER:

P3.01

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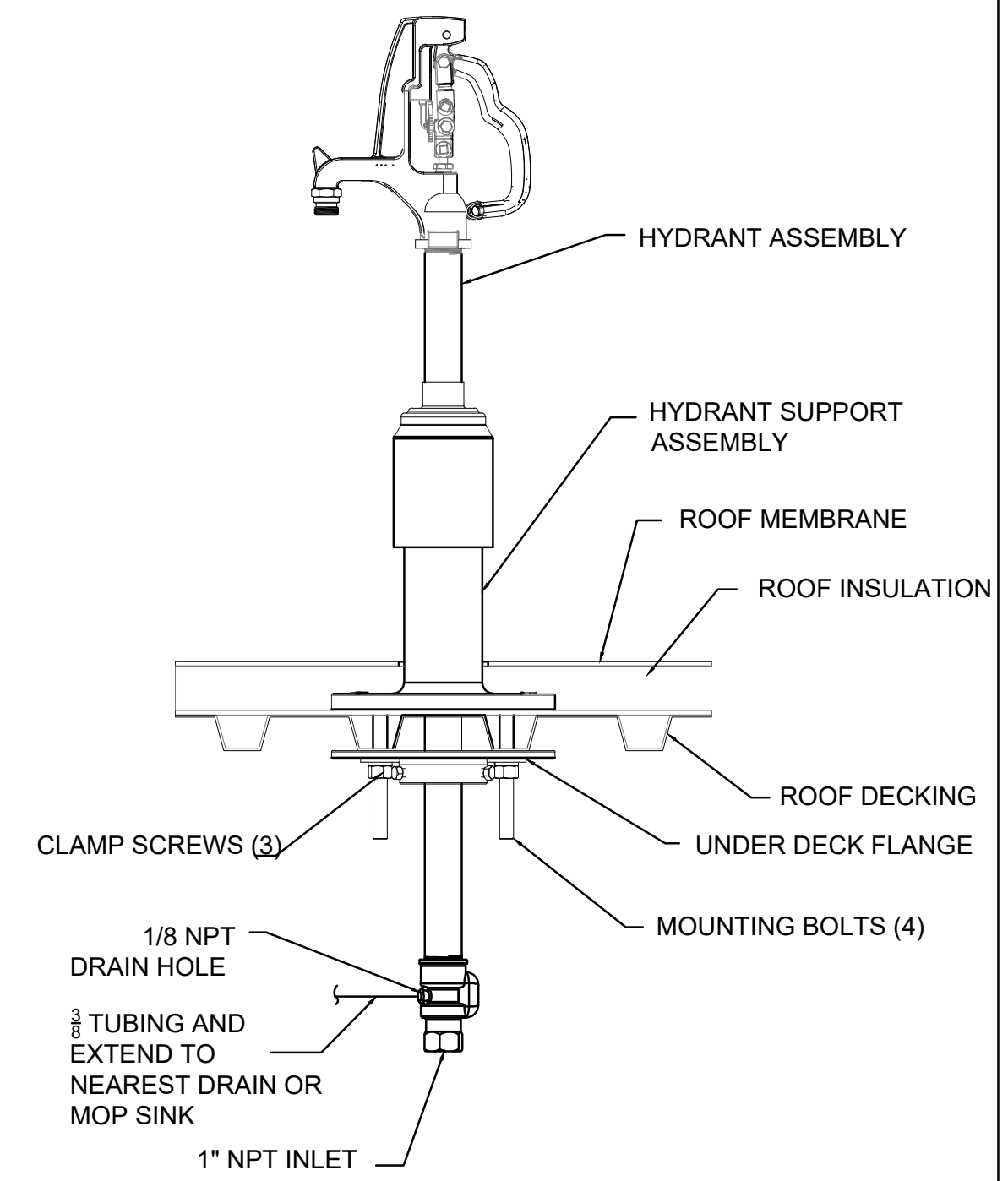
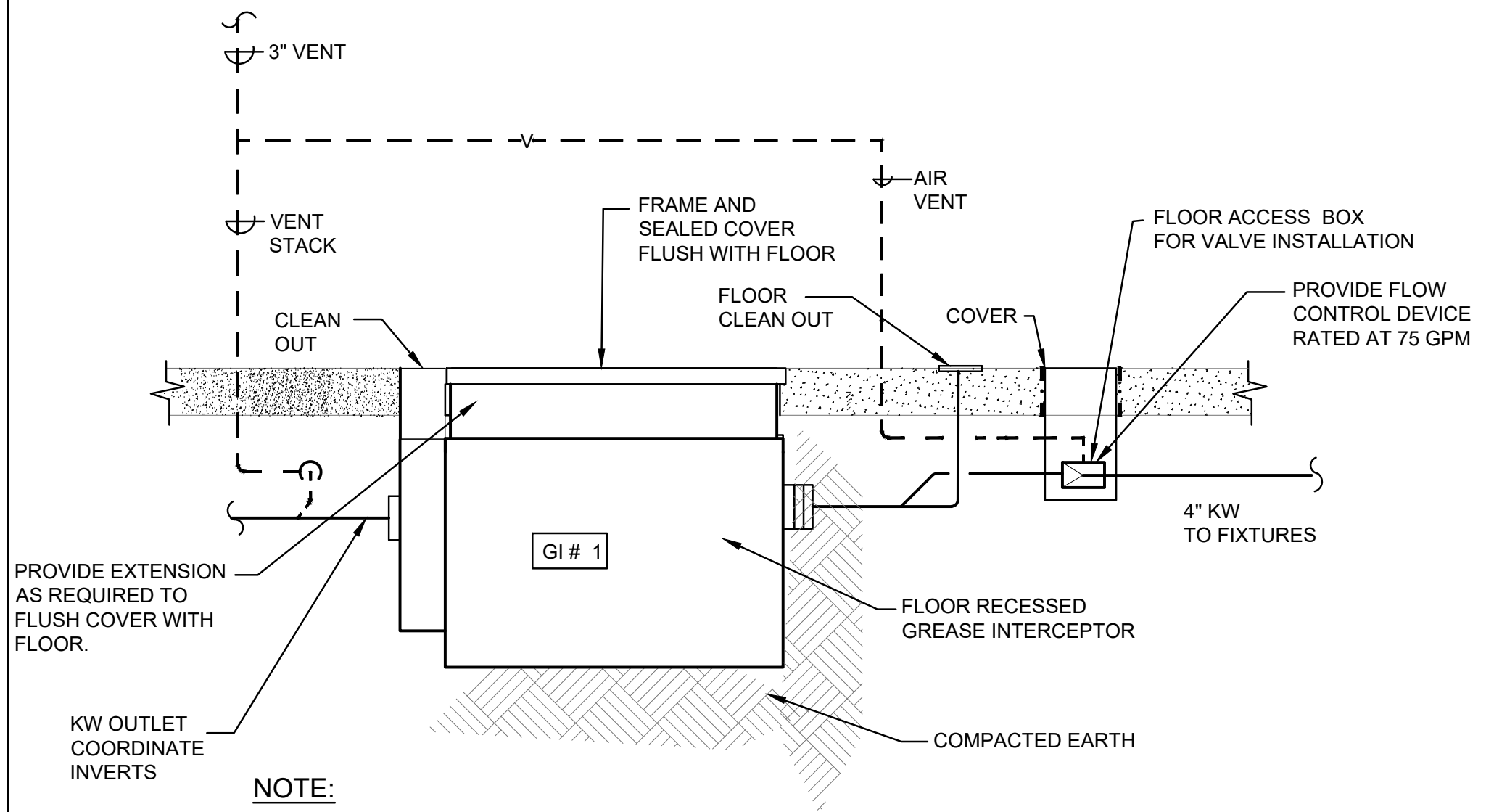


1 NON-FREEZE ROOF HYDRANT

N.T.S.

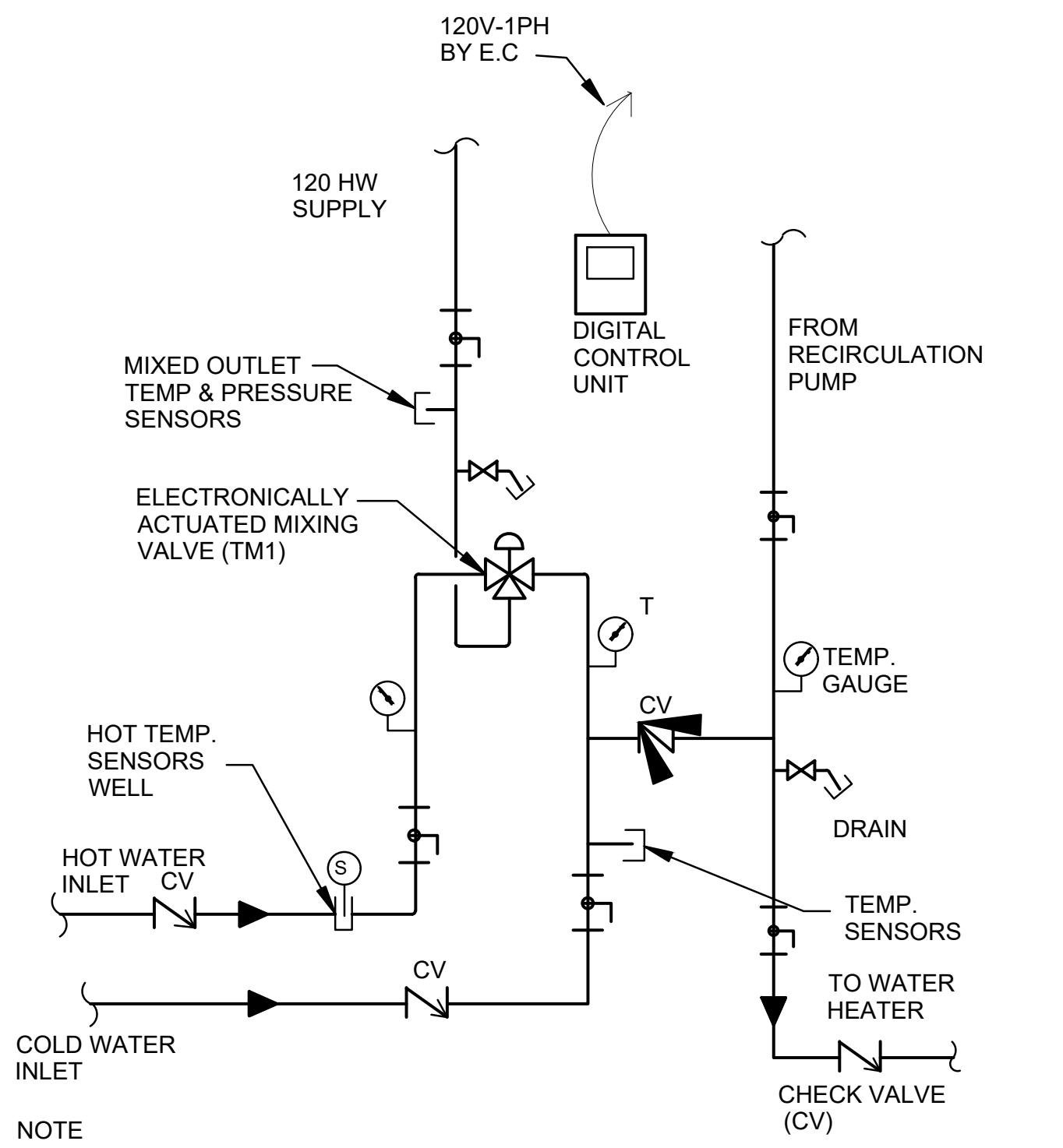

3" VENT
V
AIR VENT
VENT STACK
FRAME AND SEALED COVER FLUSH WITH FLOOR
FLOOR ACCESS BOX FOR VALVE INSTALLATION
FLOOR CLEAN OUT
COVER
PROVIDE FLOW CONTROL DEVICE RATED AT 75 GPM
CLEAN OUT
4" KW TO FIXTURES
GI # 1
PROVIDE EXTENSION AS REQUIRED TO FLUSH COVER WITH FLOOR.
FLOOR RECESSED GREASE INTERCEPTOR
KW OUTLET COORDINATE INVERTS
COMPACTED EARTH

NOTE:

1. PROVIDE FLOW CONTROL DEVICE BETWEEN FIXTURE AND INTERCEPTOR PER THE MANUFACTURER INSTALLATION INSTRUCTION.
2. EXTERIOR FLOW CONTROL DEVICE TO BE INSTALLED PER THE MANUFACTURER AND CODE REQUIREMENT. THE FLOW CONTROL SHALL BE VENTED OR BE OF INTEGRAL NON- VENTED DESIGN.

2 GREASE INTERCEPTOR PIPING DETAIL (FLOOR RECESSED)

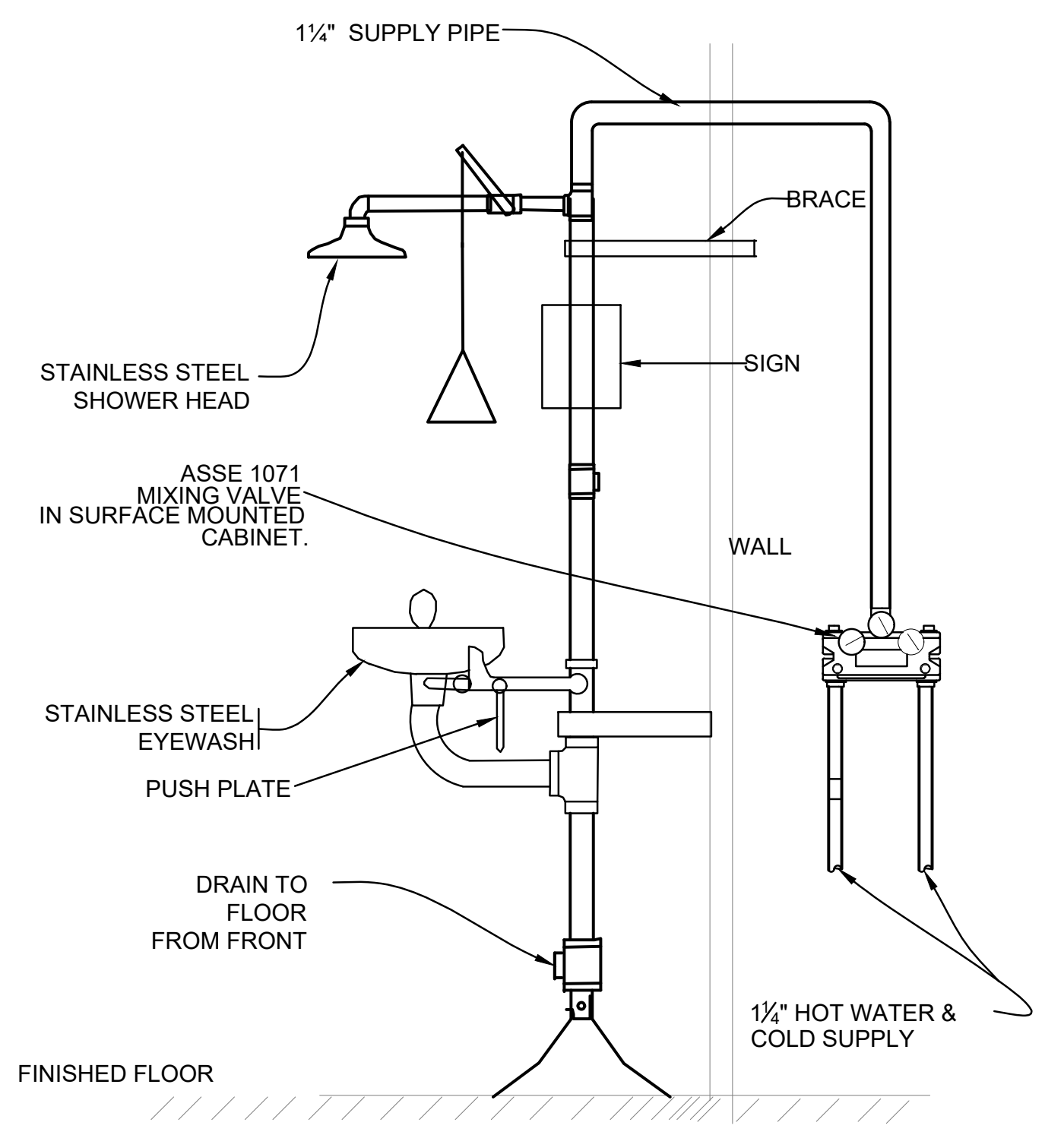
NOT TO SCALE



NOTE
PROVIDE SUPPORT BRACKETS AS REQUIRED TO SUPPORT PIPING

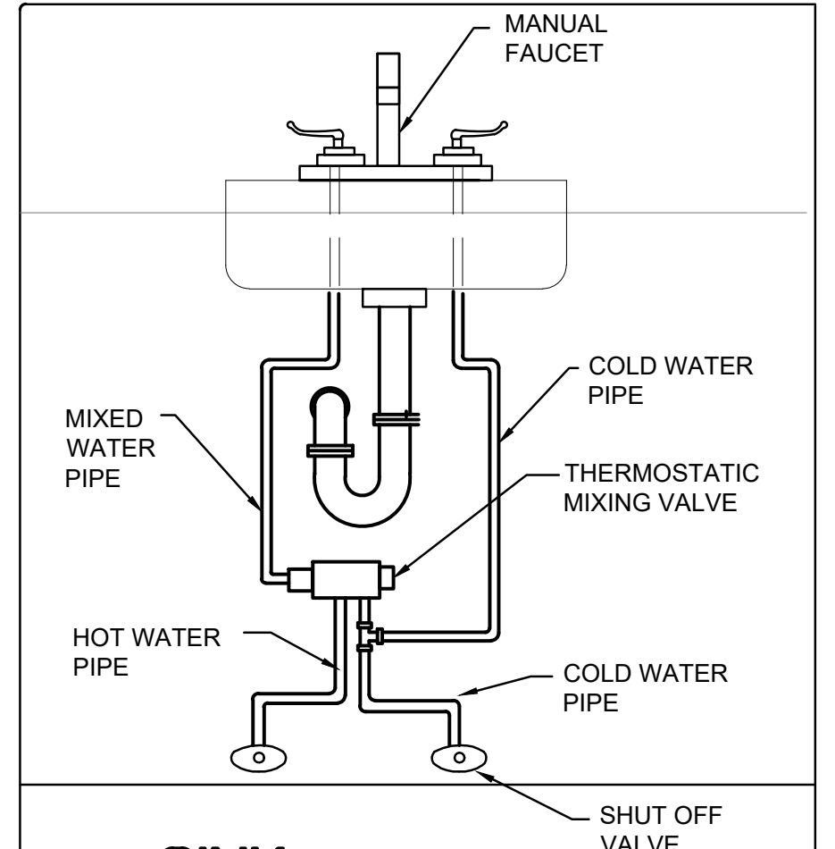
3 MAIN WATER TEMPRATURE CONTROL STATION

NOT TO SCALE


1¼" SUPPLY PIPE
BRACE
STAINLESS STEEL SHOWER HEAD
SIGN
ASSE 1071 MIXING VALVE IN SURFACE MOUNTED CABINET.
WALL
STAINLESS STEEL EYEWASH
PUSH PLATE
DRAIN TO FLOOR FROM FRONT
1¼" HOT WATER & COLD SUPPLY
FINISHED FLOOR

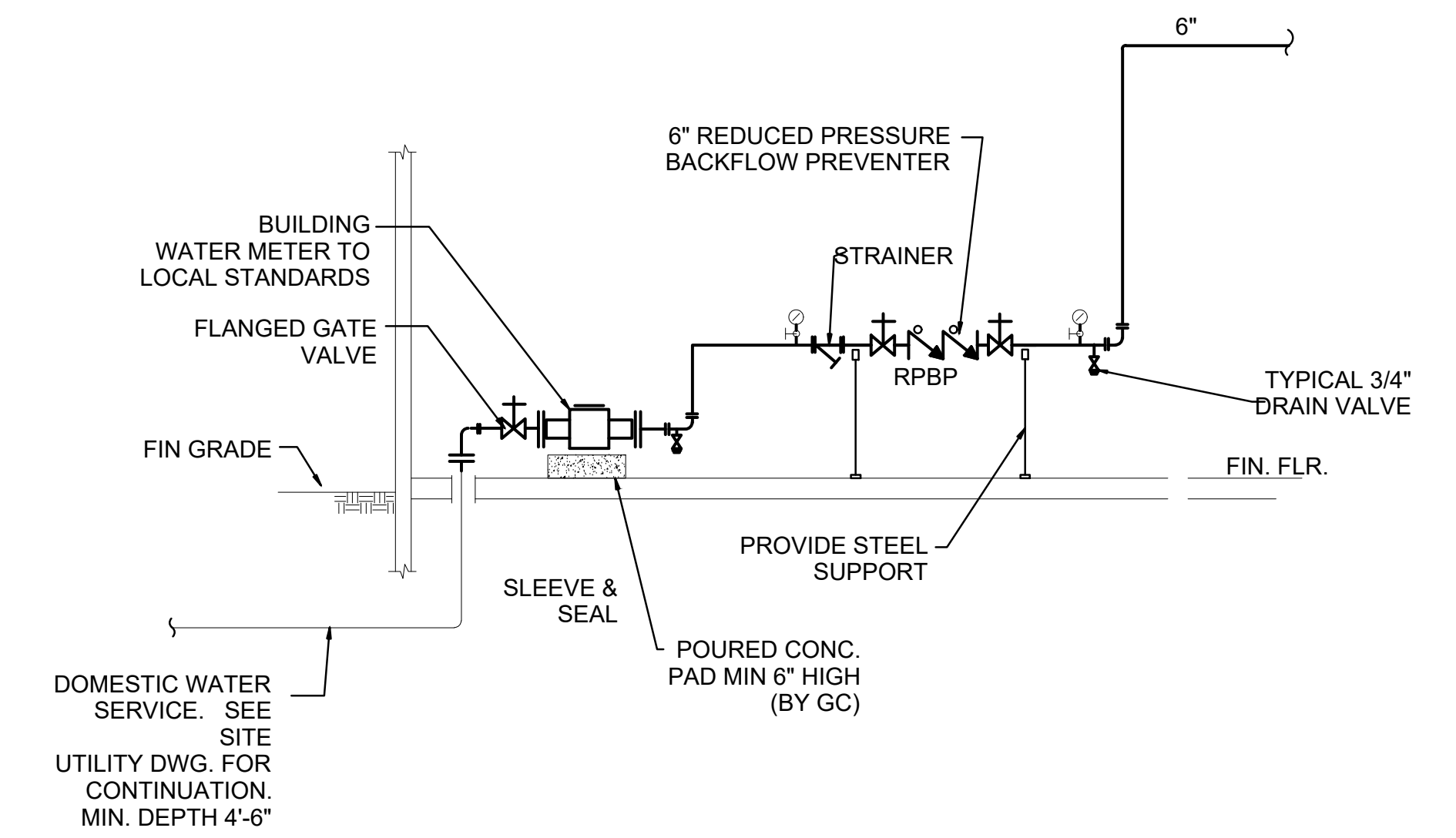
4 EMERGENCY EYEWASH- FLOOR MOUNTED

NOT TO SCALE



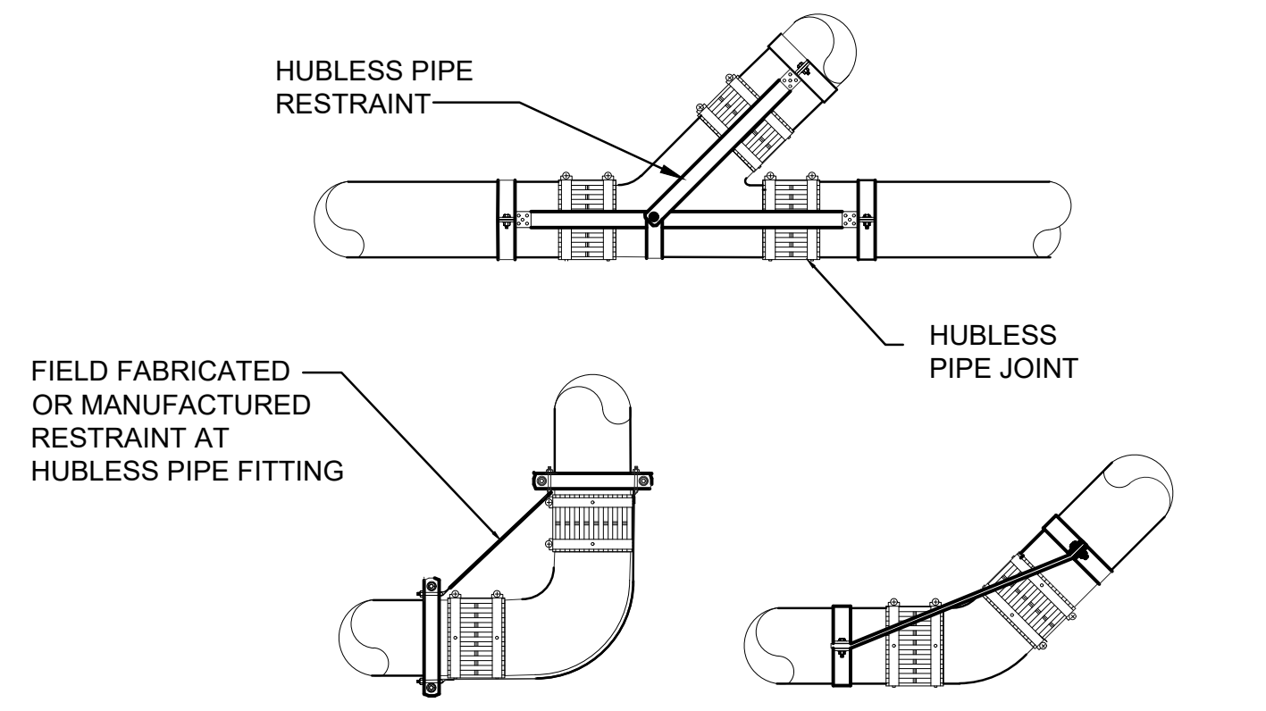
5 SINK

NOT TO SCALE


6"
6" REDUCED PRESSURE BACKFLOW PREVENTER
BUILDING WATER METER TO LOCAL STANDARDS
STRAINER
FLANGED GATE VALVE
RPBP
TYPICAL 3/4" DRAIN VALVE
FIN GRADE
FIN. FLR.
PROVIDE STEEL SUPPORT
SLEEVE & SEAL
POURED CONC. PAD MIN 6" HIGH (BY GC)
DOMESTIC WATER SERVICE. SEE SITE UTILITY DWG. FOR CONTINUATION. MIN. DEPTH 4'-6"

6 WATER SERVICE ENTERANCE

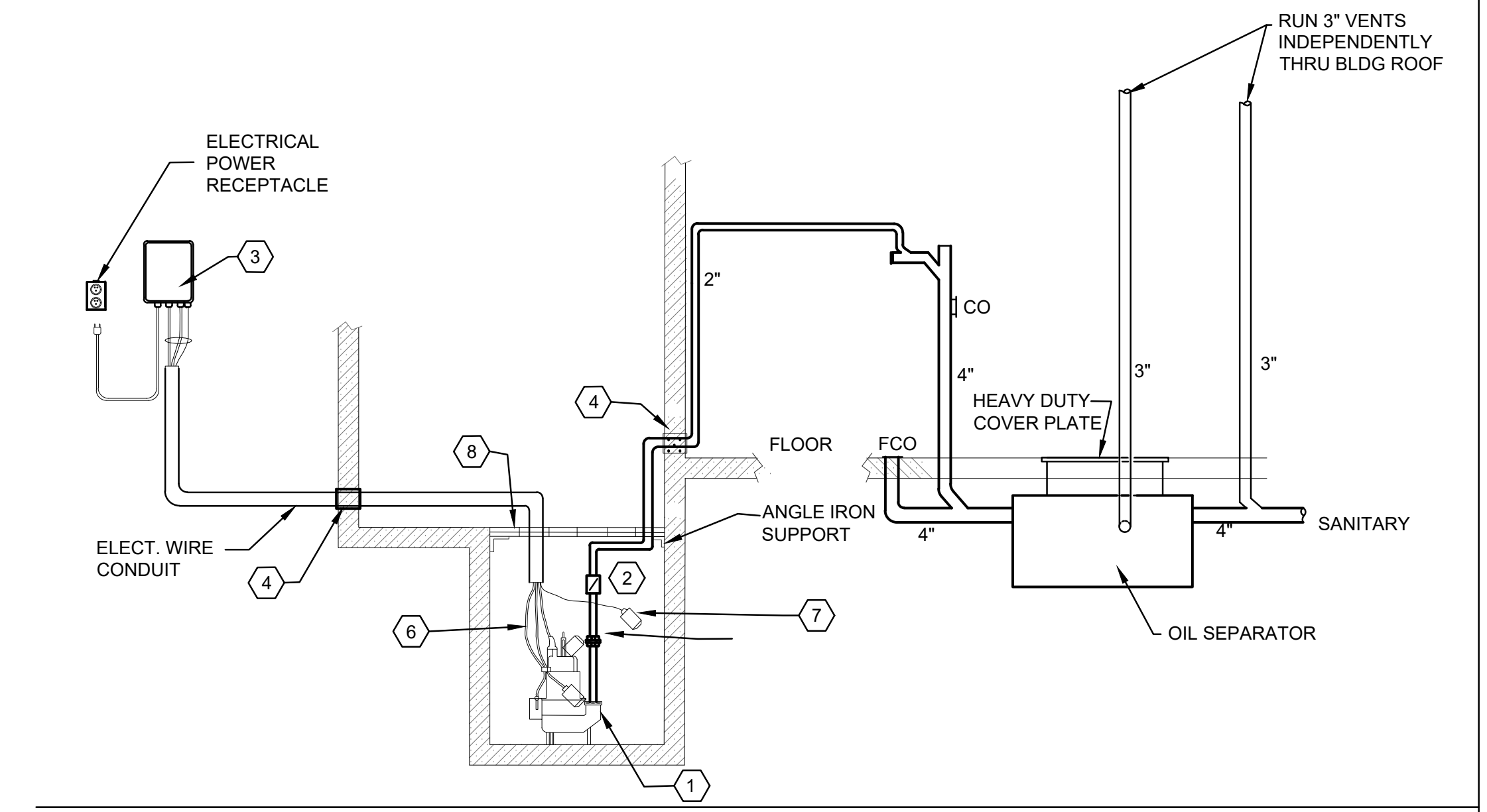
NOT TO SCALE


HUBLESS PIPE RESTRAINT
HUBLESS PIPE JOINT
FIELD FABRICATED OR MANUFACTURED RESTRAINT AT HUBLESS PIPE FITTING

NOTE:
HORIZONTAL PIPE AND FITTINGS 5" AND LARGER SHALL BE SUITABLY BRACED TO PREVENT HORIZONTAL MOVEMENT. THIS MUST BE DONE AT EVERY BRANCH OPENING OR CHANGE IN DIRECTION BY THE USE OF BRACES, BLOCKS, RODDING OR OTHER SUITABLE METHOD, TO PREVENT MOVEMENT OR JOINT SEPARATION. THIS BRACING MAY BE FIELD FABRICATED OR A MANUFACTURED SYSTEM SIMILAR TO HOLDRITE 117, ANVIL, METRACLAMP OR EQUAL. THE DETAILS SHOWN ON THIS PAGE ILLUSTRATES SEVERAL METHODS OF BRACING.

7 HUBLESS PIPE JOINT BRACING DETAIL

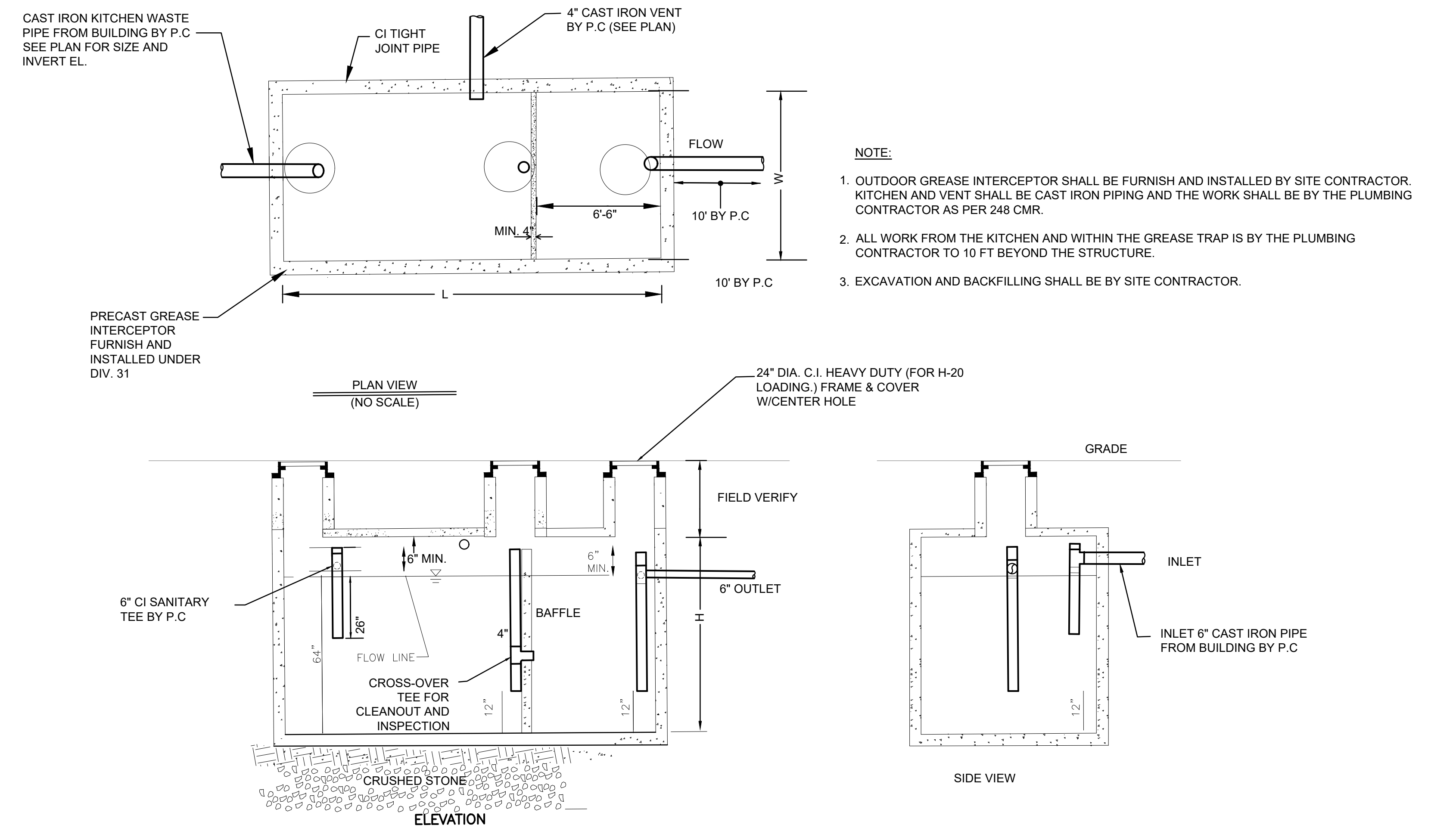
NOT TO SCALE



- ⟨1⟩ SUBMERSIBLE EFFLUENT PUMP IN ELEVATOR. SEE PUMP SCHEDULE
- ⟨2⟩ CHECK VALVE
- ⟨3⟩ CONTROL PANEL WITH BUILT-IN AUDIBLE AND VISUAL ALARM IN A EVENT PUMP RUN DUE TO HIGH LIQUID CONDITION. PROVIDE SILENCING BUTTON FOR AUDIBLE ALARM BUILT INTO PANEL. PANEL SHALL HAVE ADDITIONAL CONTACT FOR A REMOTE ALARM LOCATION
- ⟨4⟩ WATERTIGHT SLEEVE
- ⟨5⟩ 2" PUMP DISCHARGE TO HUB DRAIN
- ⟨6⟩ POWER CABLE, PROBE CABLE, AND HIGH LIQUID ALARM CABLE IN CONDUIT
- ⟨7⟩ HIGH LIQUID ALARM FLOAT WITH CLAMP DEVICE TO MOUNT TO PUMP DISCHARGE PIPING
- ⟨8⟩ OPEN GRATING WITH CUT-OUT FOR DISCHARGE & ELECTRICAL CONDUIT

8 ELEVATOR SUMP PUMP SYSTEM DETAIL

NOT TO SCALE

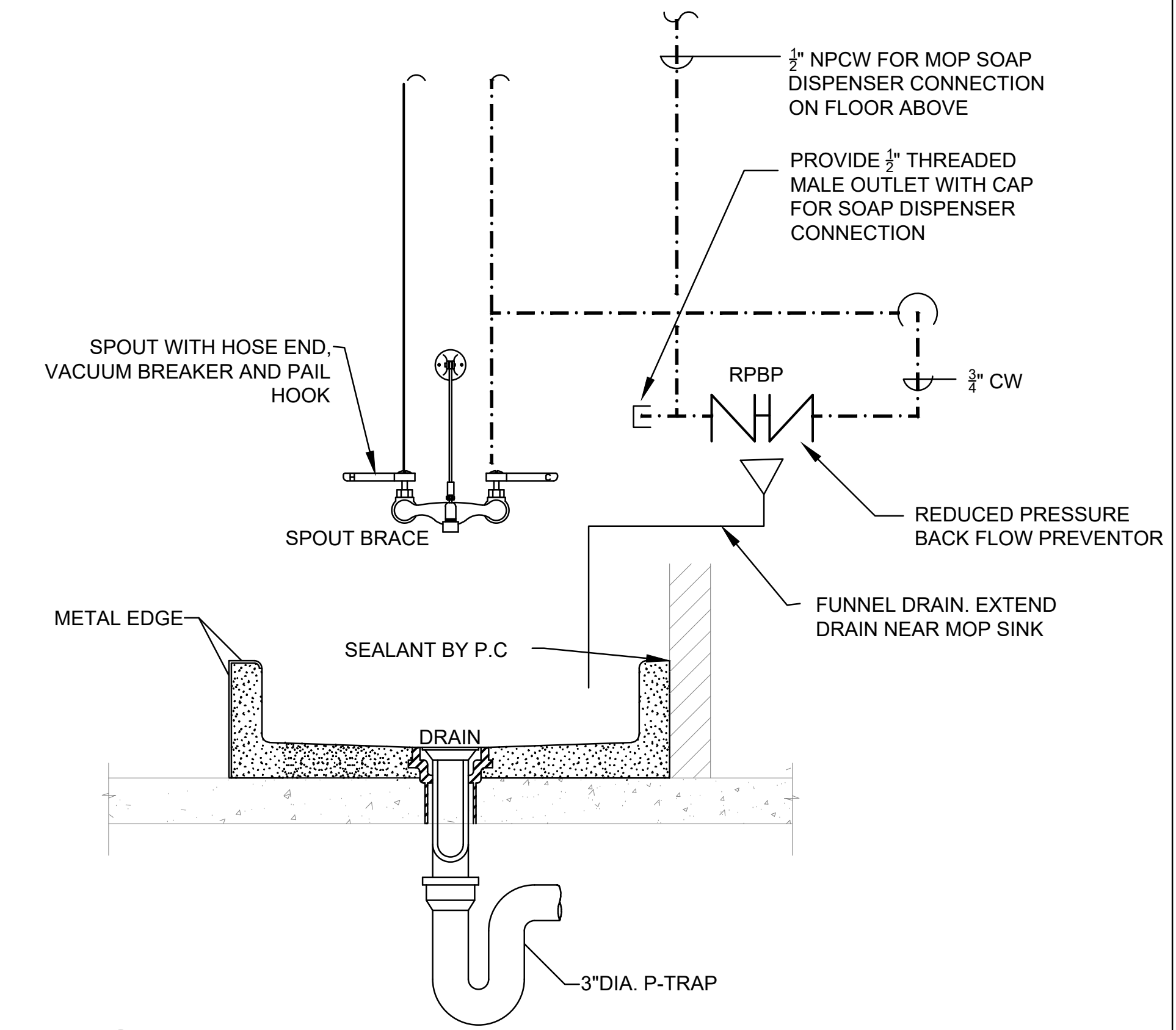

CAST IRON KITCHEN WASTE PIPE FROM BUILDING BY P.C SEE PLAN FOR SIZE AND INVERT EL.
CI TIGHT JOINT PIPE
4" CAST IRON VENT BY P.C (SEE PLAN)
FLOW
W
6'-6"
10' BY P.C
MIN. 4"
10' BY P.C
L
PRECAST GREASE INTERCEPTOR FURNISH AND INSTALLED UNDER DIV. 31
PLAN VIEW
(NO SCALE)
24" DIA. C.I. HEAVY DUTY (FOR H-20 LOADING.) FRAME & COVER W/CENTER HOLE
GRADE
FIELD VERIFY
6" MIN.
6" MIN.
6" OUTLET
INLET
6" CI SANITARY TEE BY P.C
BAFFLE
26"
4"
64"
H
FLOW LINE
CROSS-OVER TEE FOR CLEANOUT AND INSPECTION
12"
12"
INLET 6" CAST IRON PIPE FROM BUILDING BY P.C
CRUSHED STONE
ELEVATION
SIDE VIEW

NOTE:

1. OUTDOOR GREASE INTERCEPTOR SHALL BE FURNISH AND INSTALLED BY SITE CONTRACTOR. KITCHEN AND VENT SHALL BE CAST IRON PIPING AND THE WORK SHALL BE BY THE PLUMBING CONTRACTOR AS PER 248 CMR.
2. ALL WORK FROM THE KITCHEN AND WITHIN THE GREASE TRAP IS BY THE PLUMBING CONTRACTOR TO 10 FT BEYOND THE STRUCTURE.
3. EXCAVATION AND BACKFILLING SHALL BE BY SITE CONTRACTOR.

9 OUTDOOR GREASE TRAP PIPING DETAIL (OGI)

NOT TO SCALE


1/2" NPCW FOR MOP SOAP DISPENSER CONNECTION ON FLOOR ABOVE
PROVIDE 1/2" THREADED MALE OUTLET WITH CAP FOR SOAP DISPENSER CONNECTION
SPOUT WITH HOSE END, VACUUM BREAKER AND PAIL HOOK
RPBP
3/4" CW
SPOUT BRACE
REDUCED PRESSURE BACK FLOW PREVENTOR
METAL EDGE
SEALANT BY P.C
FUNNEL DRAIN. EXTEND DRAIN NEAR MOP SINK
DRAIN
3"DIA. P-TRAP

10 MOP SINK

NOT TO SCALE

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
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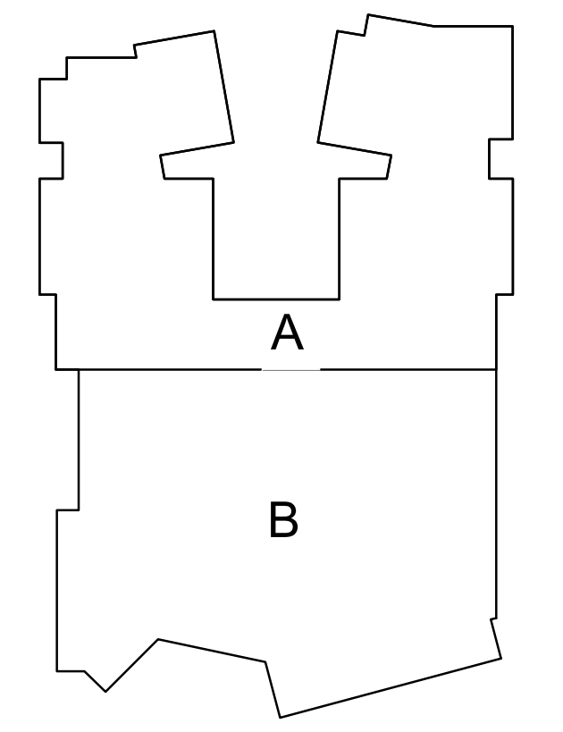
KEY PLAN



ORIENTATION AND SCALE:

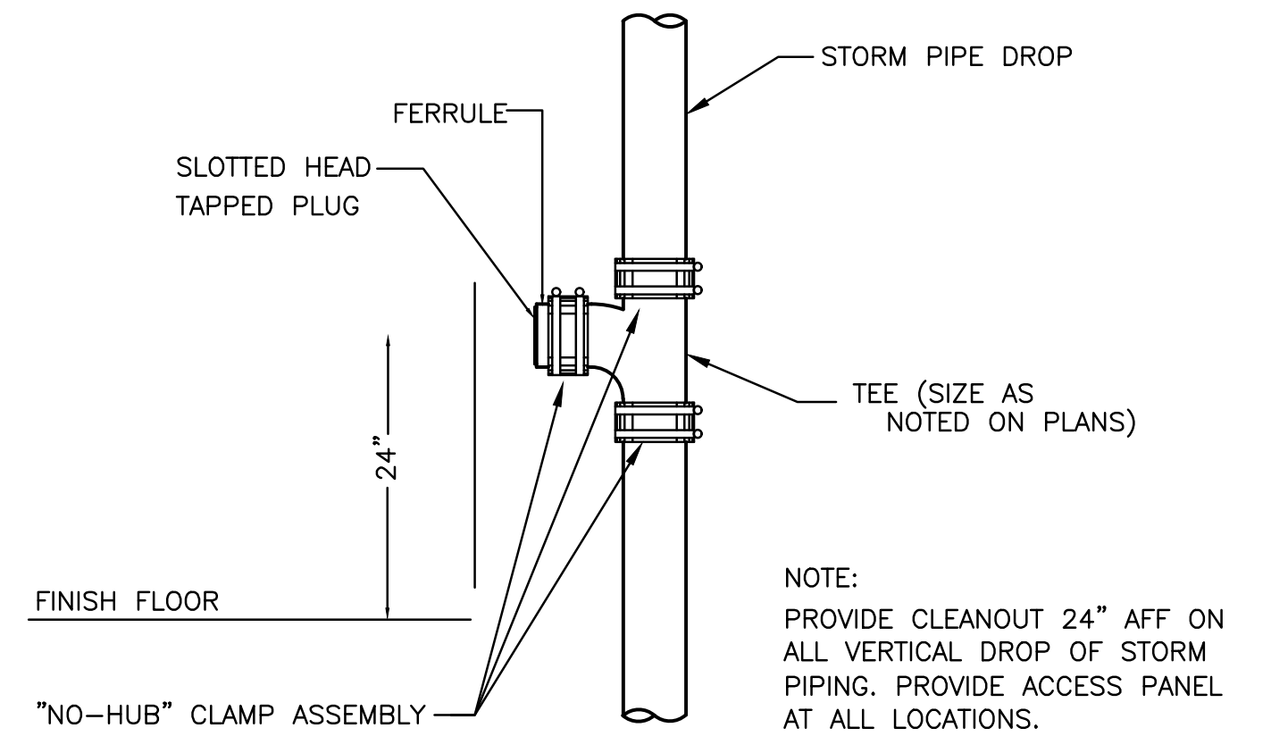
N
TRUE NORTH
PROJECT NORTH
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

PLUMBING DETAILS 2

SHEET NUMBER:

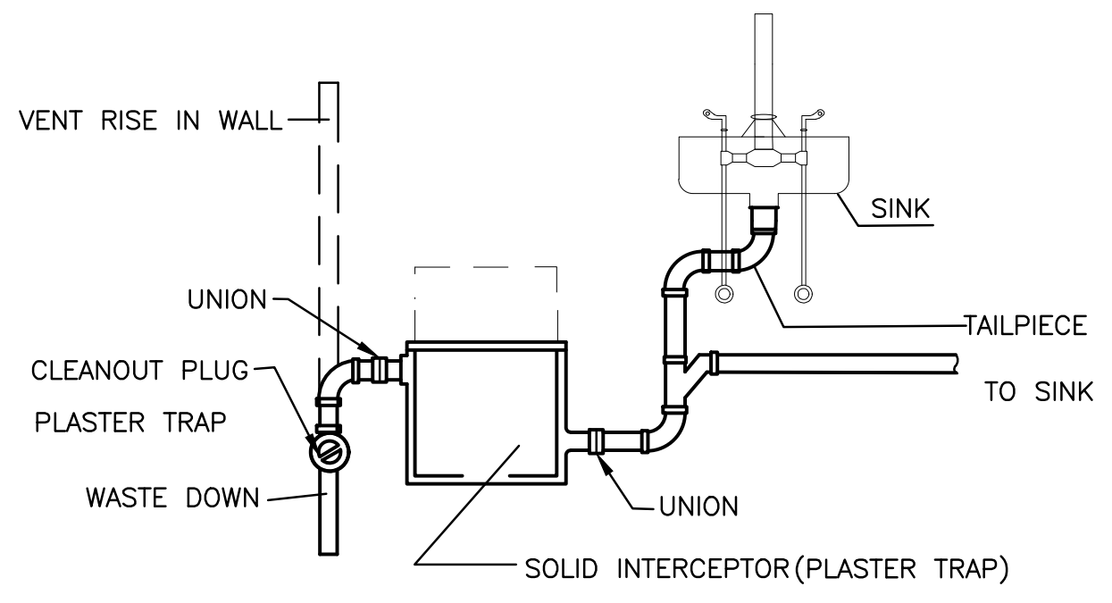
P3.02



NOTE:
PROVIDE CLEANOUT 24" AFF ON ALL VERTICAL DROP OF STORM PIPING. PROVIDE ACCESS PANEL AT ALL LOCATIONS.

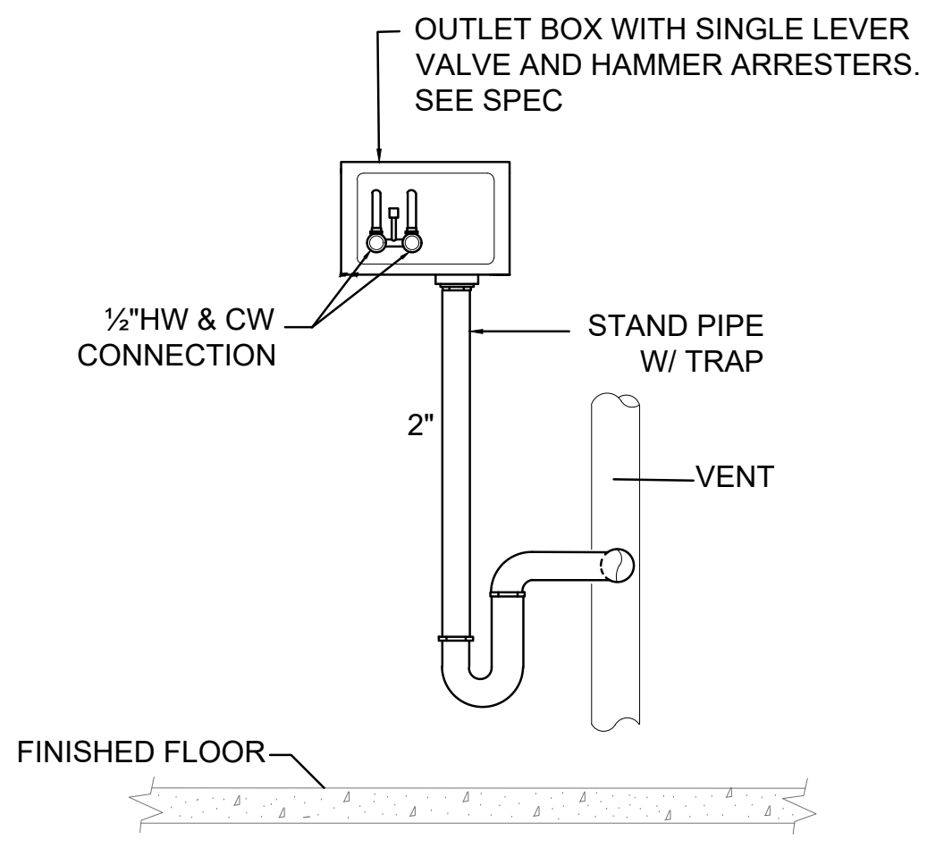
1 VERTICAL STORM PIPE CLEANOUT DETAIL (TYP)

NOT TO SCALE



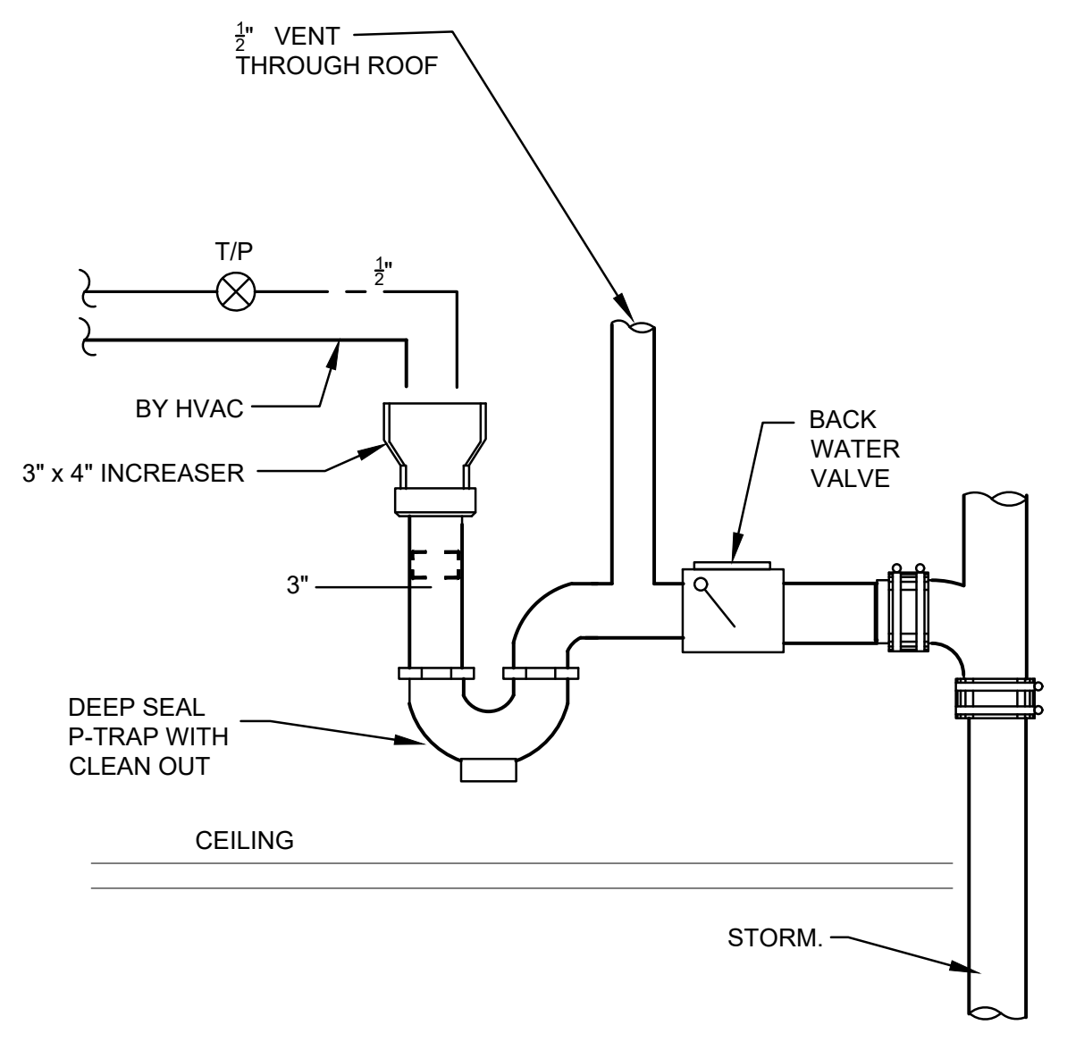
2 ART SINK PIPE CONN. DETAIL

NOT TO SCALE


OUTLET BOX WITH SINGLE LEVER VALVE AND HAMMER ARRESTERS. SEE SPEC
½"HW & CW CONNECTION
STAND PIPE W/ TRAP
2"
VENT
FINISHED FLOOR

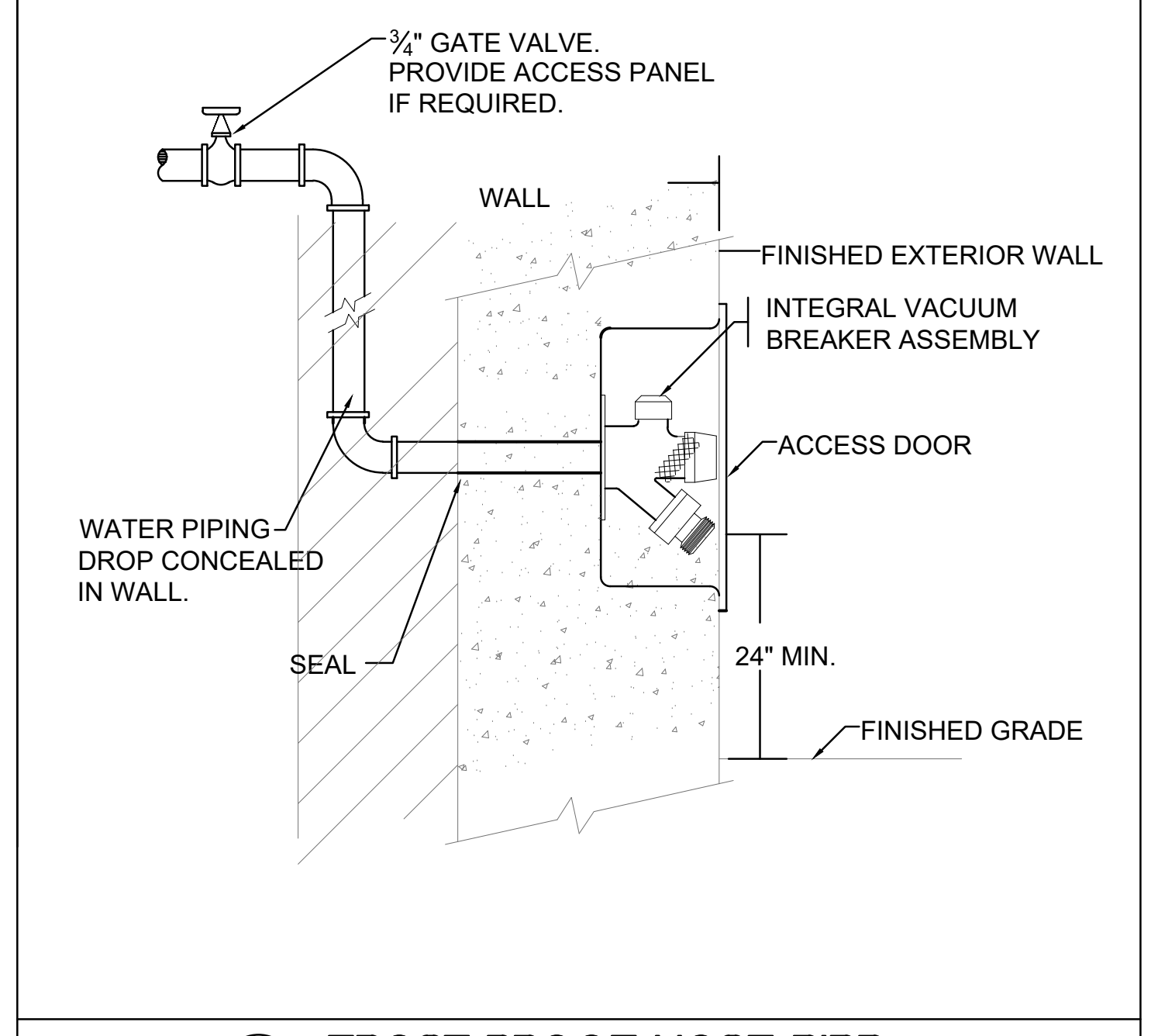
3 WASHING MACHINE SUPPLY

NOT TO SCALE



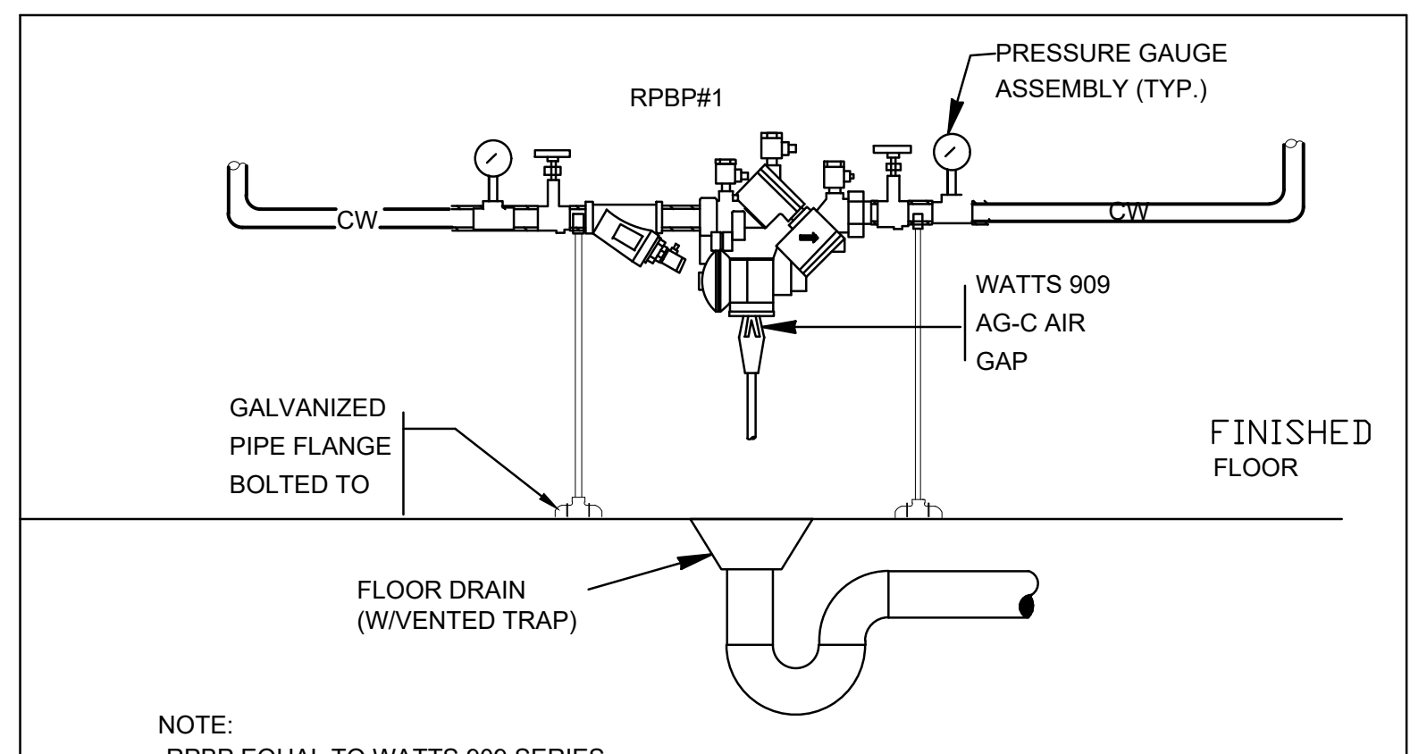
4 OPEN END DRAIN PIPING DIAGRAM

NOT TO SCALE


¾" GATE VALVE. PROVIDE ACCESS PANEL IF REQUIRED.
WALL
FINISHED EXTERIOR WALL
INTEGRAL VACUUM BREAKER ASSEMBLY
ACCESS DOOR
WATER PIPING DROP CONCEALED IN WALL.
SEAL
24" MIN.
FINISHED GRADE

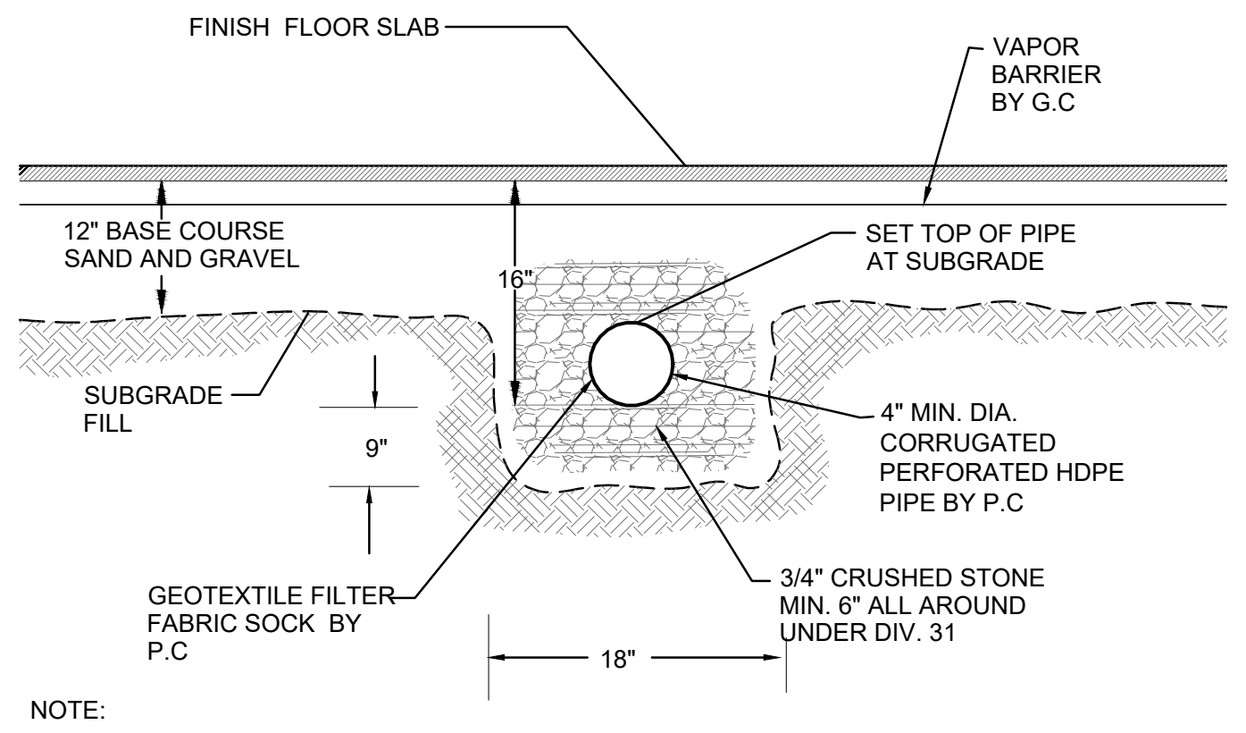
5 FROST PROOF HOSE BIBB

NOT TO SCALE


RPBP#1
PRESSURE GAUGE ASSEMBLY (TYP.)
CW
CW
WATTS 909 AG-C AIR GAP
GALVANIZED PIPE FLANGE BOLTED TO
FINISHED FLOOR
FLOOR DRAIN (W/VENTED TRAP)

NOTE:
-RPBP EQUAL TO WATTS 909 SERIES
-INSTALL PER MASSACHUSETTS DEPT. OF ENVIRONMENTAL PROTECTION REGULATION 310 CMR 22.22

6 REDUCED PRESSURE BACKFLOW PREVENTOR MECHANICAL ROOM

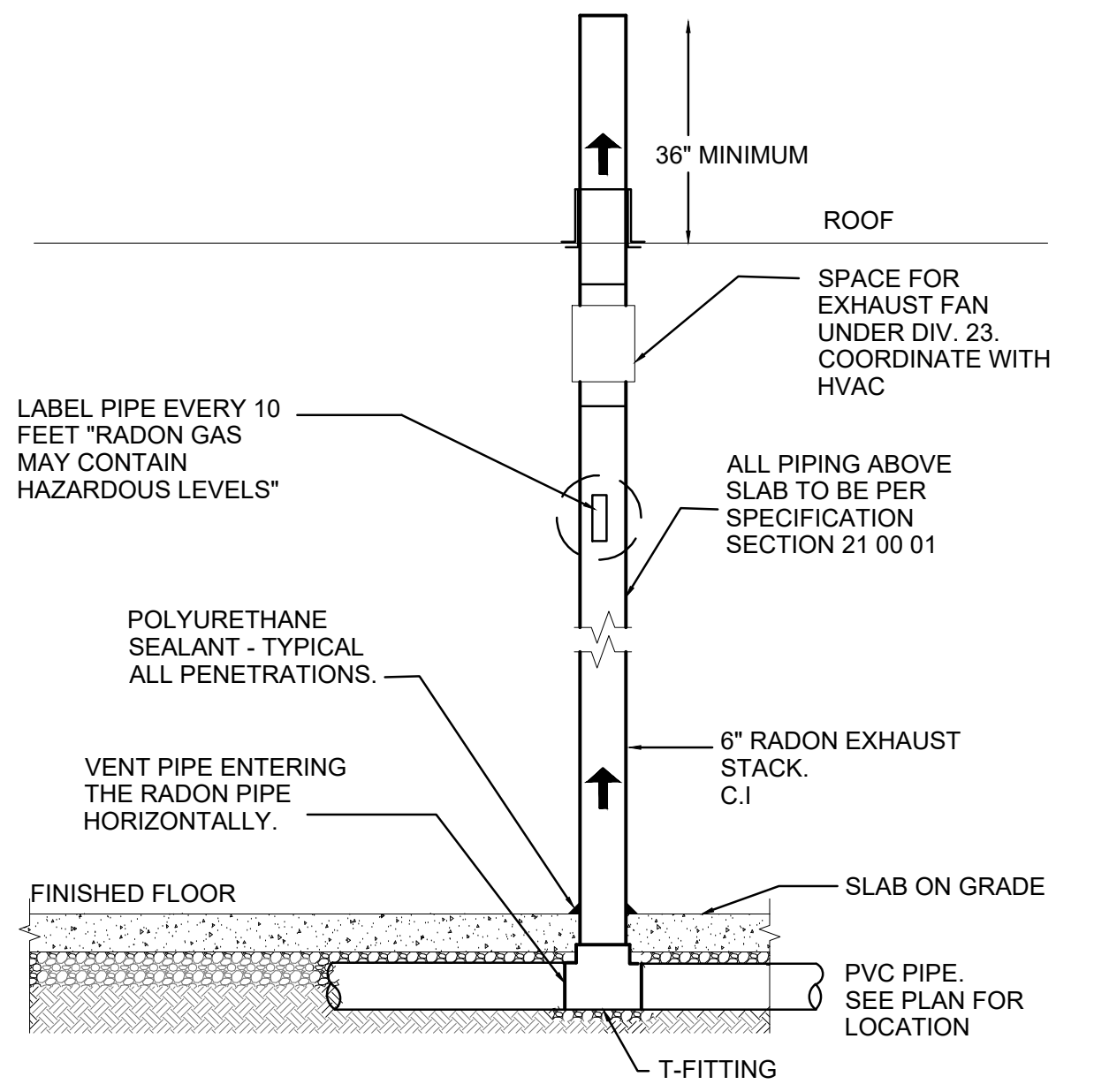

FINISH FLOOR SLAB
VAPOR BARRIER BY G.C
12" BASE COURSE SAND AND GRAVEL
16"
SET TOP OF PIPE AT SUBGRADE
SUBGRADE FILL
9"
4" MIN. DIA. CORRUGATED PERFORATED HDPE PIPE BY P.C
GEOTEXTILE FILTER FABRIC SOCK BY P.C
3/4" CRUSHED STONE MIN. 6" ALL AROUND UNDER DIV. 31
18"

NOTE:

1. EXCAVATION AND BACKFILL OF MATERIAL BY. DIV 31 20 00

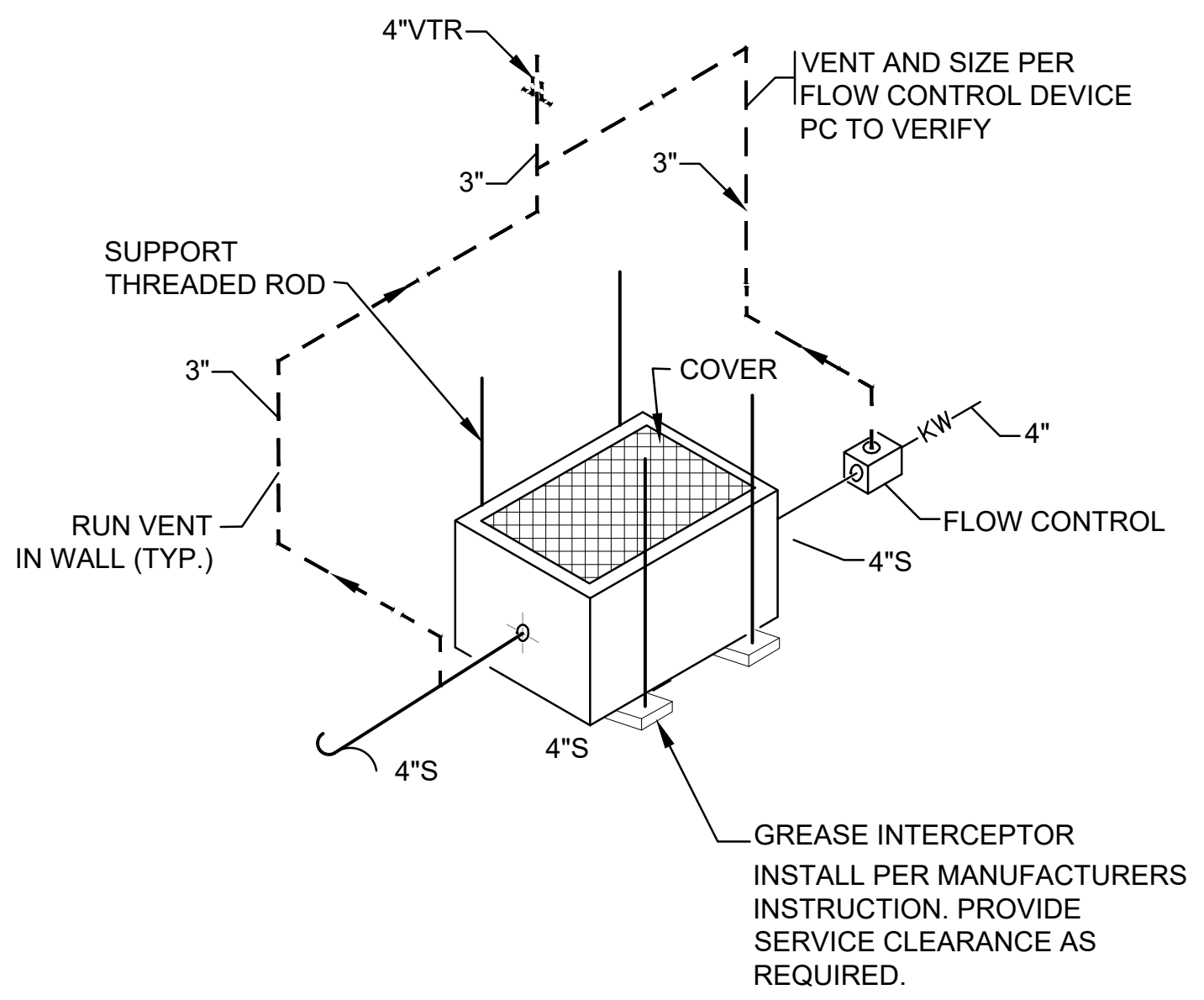
7 UNDER SLAB SUB DRAIN PIPING

SCALE: NONE


36" MINIMUM
ROOF
SPACE FOR EXHAUST FAN UNDER DIV. 23. COORDINATE WITH HVAC
LABEL PIPE EVERY 10 FEET "RADON GAS MAY CONTAIN HAZARDOUS LEVELS"
ALL PIPING ABOVE SLAB TO BE PER SPECIFICATION SECTION 21 00 01
POLYURETHANE SEALANT - TYPICAL ALL PENETRATIONS.
6" RADON EXHAUST STACK. C.I
VENT PIPE ENTERING THE RADON PIPE HORIZONTALLY.
FINISHED FLOOR
SLAB ON GRADE
PVC PIPE. SEE PLAN FOR LOCATION
T-FITTING

8 SUBSLAB RADON AIR PIPING DETAIL

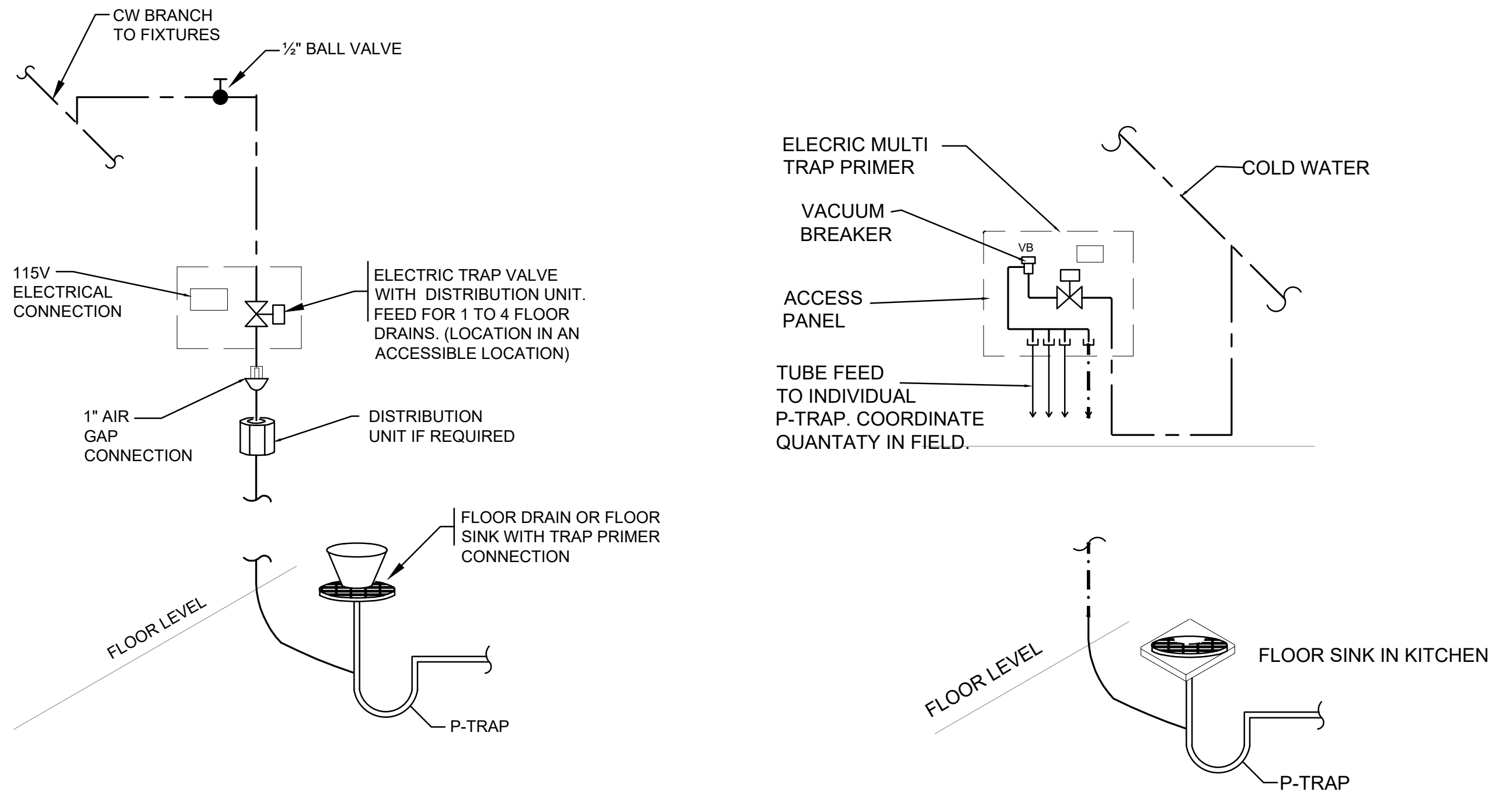
SCALE: NONE



GREASE INTERCEPTOR INSTALL PER MANUFACTURERS INSTRUCTION. PROVIDE SERVICE CLEARANCE AS REQUIRED.

9 GREASE INTERCEPTOR PIPING DETAIL

NOT TO SCALE

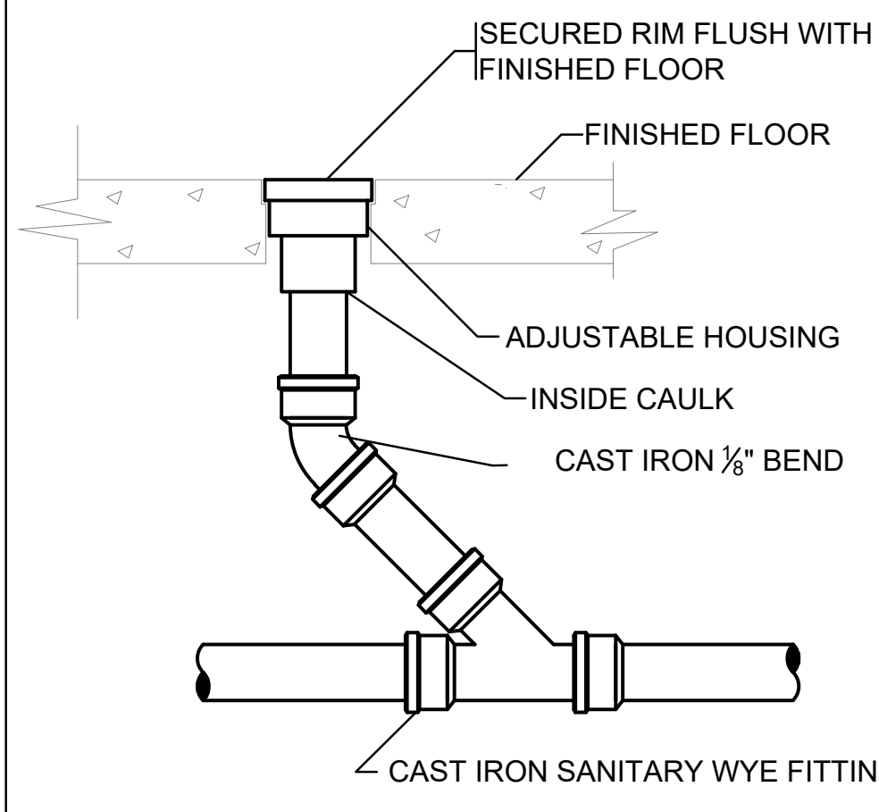

CW BRANCH TO FIXTURES
½" BALL VALVE
115V ELECTRICAL CONNECTION
ELECTRIC TRAP VALVE WITH DISTRIBUTION UNIT. FEED FOR 1 TO 4 FLOOR DRAINS. (LOCATION IN AN ACCESSIBLE LOCATION)
1" AIR GAP CONNECTION
DISTRIBUTION UNIT IF REQUIRED
FLOOR DRAIN OR FLOOR SINK WITH TRAP PRIMER CONNECTION
FLOOR LEVEL
P-TRAP
ELECRIC MULTI TRAP PRIMER
VACUUM BREAKER
VB
COLD WATER
ACCESS PANEL
TUBE FEED TO INDIVIDUAL P-TRAP. COORDINATE QUANTATY IN FIELD.
FLOOR LEVEL
FLOOR SINK IN KITCHEN
P-TRAP

P-TRAP PRIMER (TYP. TO ALL FLOOR DRAINS)

UNDERSLAB COPPER TUBE SHALL BE ENCASED IN PIPE SLEEVE. SEE NOTE 29 ON P0.01

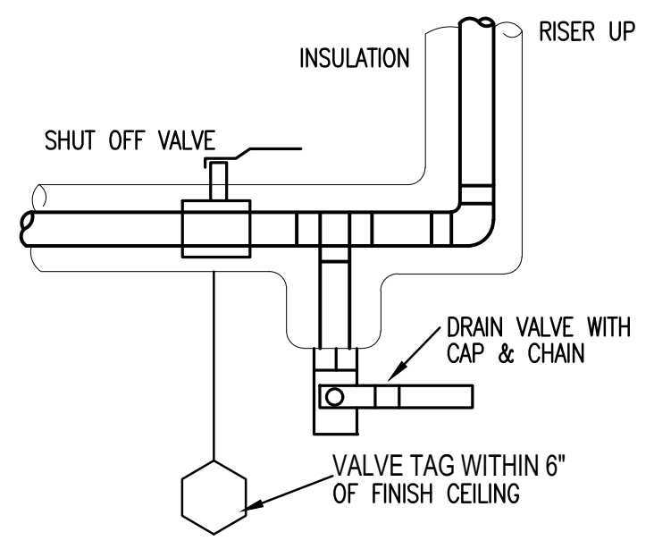
10 P-TRAP PRIMER (TYP. TO ALL FLOOR DRAINS)

NOT TO SCALE


SECURED RIM FLUSH WITH FINISHED FLOOR
FINISHED FLOOR
ADJUSTABLE HOUSING
INSIDE CAULK
CAST IRON ⅛" BEND
CAST IRON SANITARY WYE FITTING

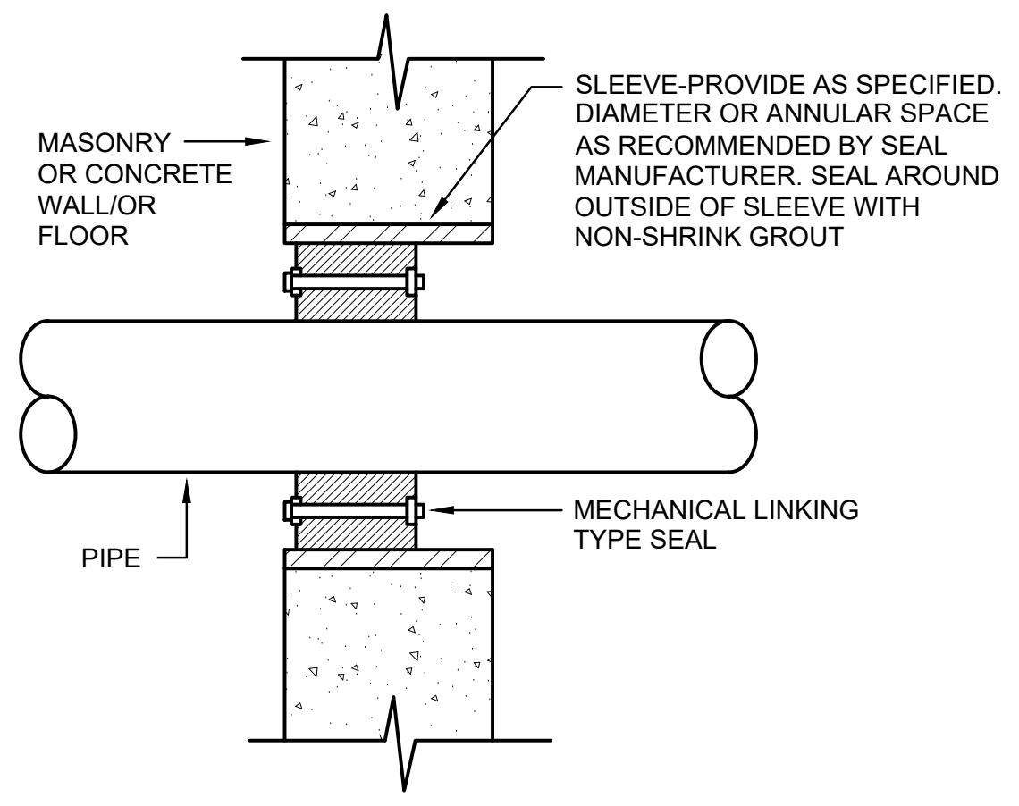
11 FLOOR CLEANOUT DETAIL

NOT TO SCALE


INSULATION
RISER UP
SHUT OFF VALVE
DRAIN VALVE WITH CAP & CHAIN
VALVE TAG WITHIN 6" OF FINISH CEILING

12 RISER CONTROL AND DRAIN VALVE

NOT TO SCALE

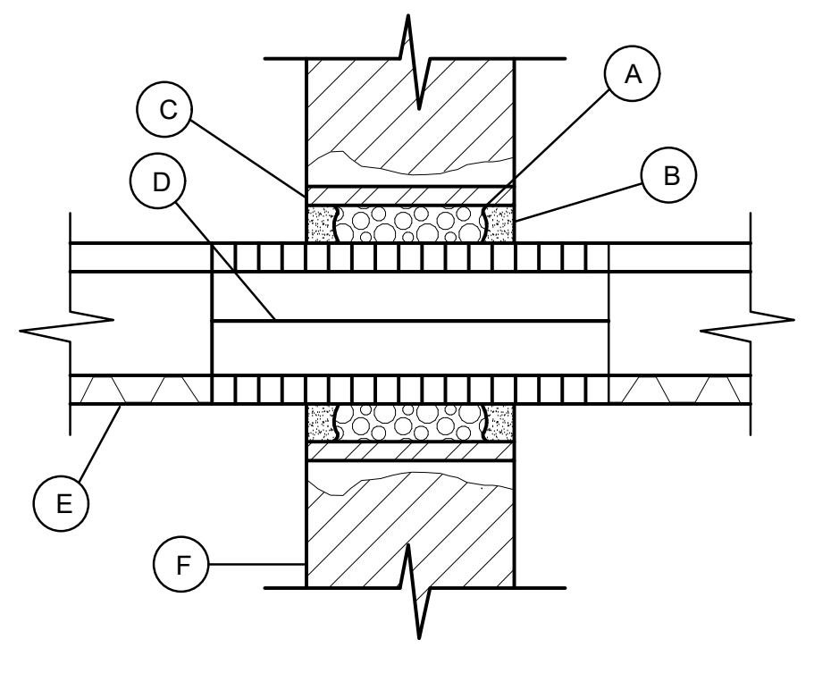

MASONRY OR CONCRETE WALL/OR FLOOR
SLEEVE-PROVIDE AS SPECIFIED. DIAMETER OR ANNULAR SPACE AS RECOMMENDED BY SEAL MANUFACTURER. SEAL AROUND OUTSIDE OF SLEEVE WITH NON-SHRINK GROUT
PIPE
MECHANICAL LINKING TYPE SEAL

NOTES:

1. WHERE PIPE AND/OR TUBING SIZE IS TOO SMALL TO PERMIT THE USE OF MECHANICAL LINKING TYPE SEALS, PACK ANNULAR SPACE WITH MINERAL WOOL AND SEAL PENETRATION WITH NON-SHRINK GROUT, EXTERIOR GRADE CAULK, OR APPROVED EQUAL. IN SUCH INSTANCES, MULTIPLE SMALL PIPE AND /OR TUBING IS PERMITTED TO PASS THROUGH A SINGLE HOLE FOR HOLE SIZES UP TO 2" INSIDE DIAMETER SUBJECT TO THE APPROVAL OF THE ENGINEER.

13 PIPE PENETRATION THROUGH EXTERIOR WALL DETAIL (NEW BLDG ONLY)

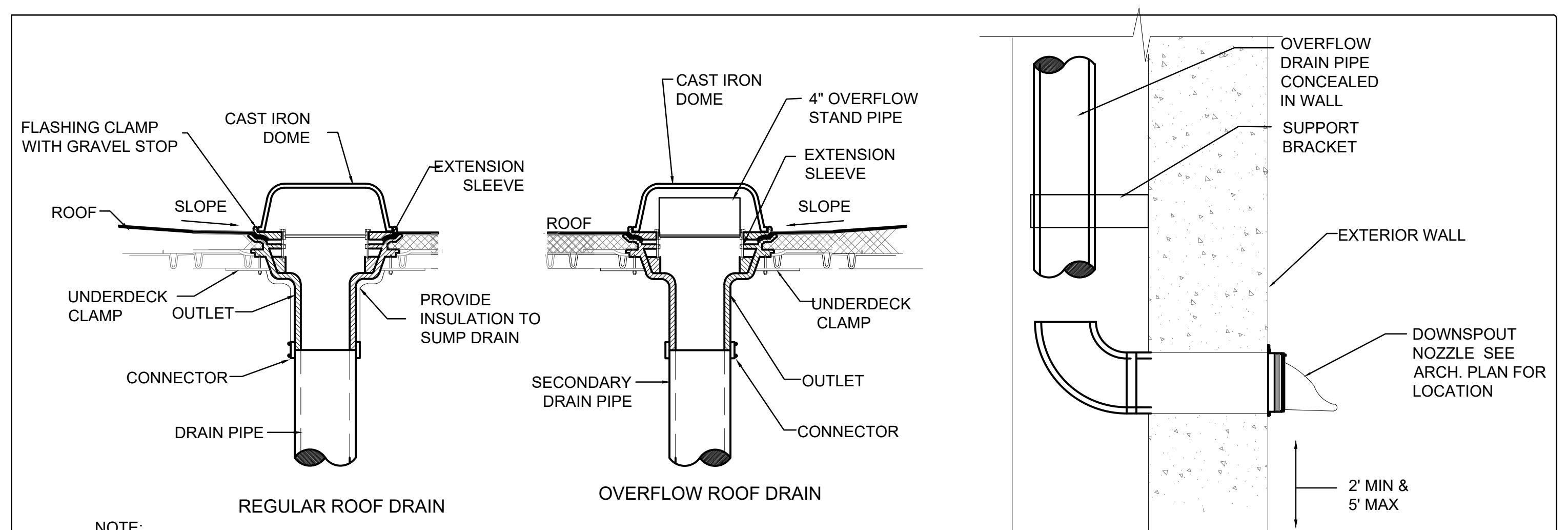
NOT TO SCALE



- (A) PROVIDE 1/4" CLEARANCE BETWEEN PIPE SLEEVE OR CORE DRILLED HOLE AND PIPE. PACK CLEARANCE SPACE WITH SPECIFIED INSULATION
- (B) PROVIDE SPECIFIED END SEALANT
- (C) SLEEVE-PROVIDE AS SPECIFIED. SLEEVE MAY BE OMITTED AND CORE DRILLED HOLE PROVIDED IN CONCRETE AS SPECIFIED. EXTEND FLOOR PIPE SLEEVES 2" ABOVE FLOOR.
- (D) CALCIUM SILICATE OR APPROVED EQUAL INSULATION THRU PENETRATION AND EXTENDED 2" ON BOTH SIDES OF WALL OR FLOOR; PROVIDE METAL JACKET AS SPECIFIED OVER INSULATION
- (E) SPECIFIED INSULATION
- (F) WALL OR FLOOR (MAX 6" PENETRATION) SEE ALT DETAIL & PROJECT REQUIREMENTS FOR LARGER THAN 6" PENETRATION AT EXISTING BLDG.

14 PIPE PENETRATION THROUGH INTERIOR WALL/FLOOR DETAIL

NOT TO SCALE



REGULAR ROOF DRAIN

OVERFLOW ROOF DRAIN

EXTERIOR DOWNSPOUT NOZZLE

NOTE:

1. SEE ARCHITECTURAL DWG. FOR ROOFING DETAIL.
2. PROVIDE EXTENSION SLEEVE TO ACCOMMODATE INSULATION THICKNESS. COORDINATE WITH ROOFER

15 ROOF DRAIN

NOT TO SCALE

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

AKAL Engineering Inc.
44 Central Street. Unit # 4
Berlin, MA. 01503
Telephone - (508) 869-0403
Fax - (508) 869-2891
www.akalengineering.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

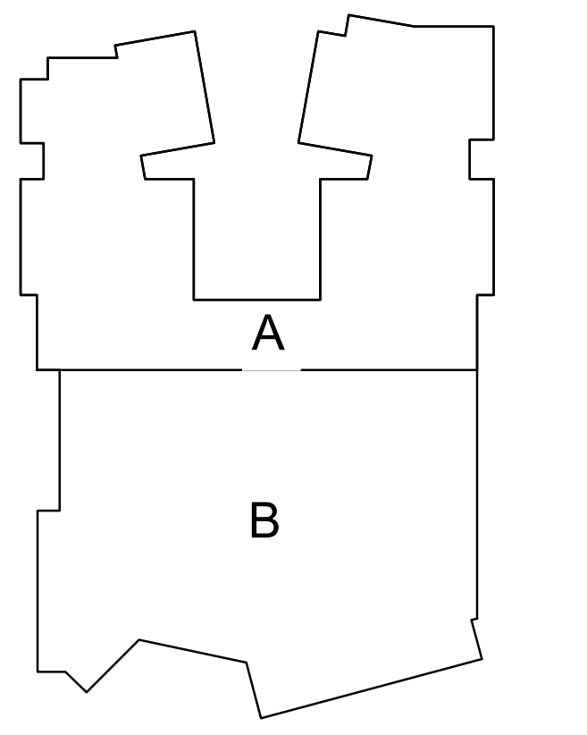
REVISIONS:

NO.	DATE	TITLE

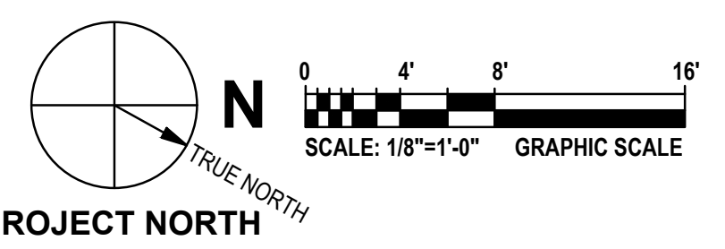
ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENT
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:



SHEET TITLE:

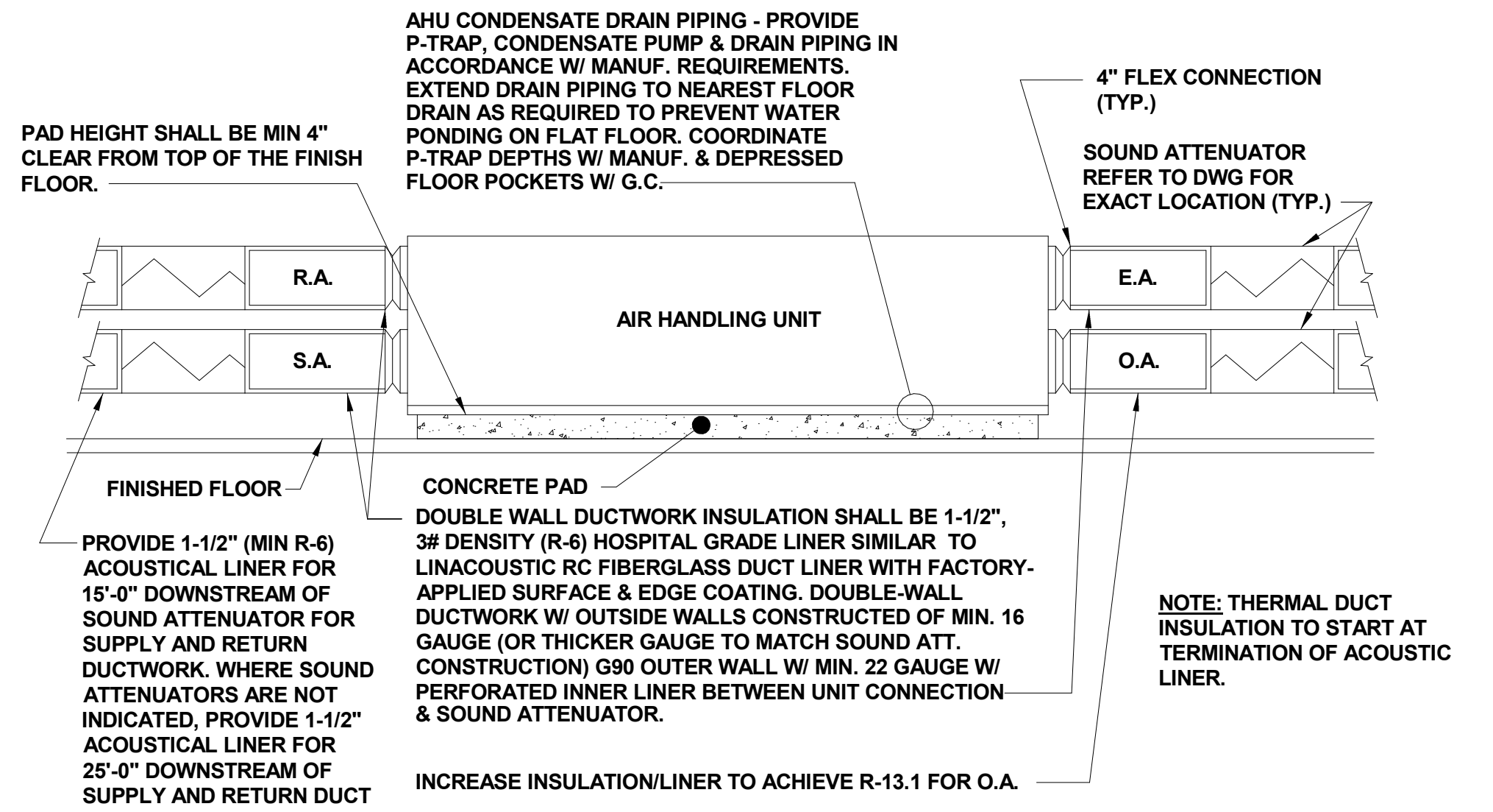
PLUMBING DETAILS 3

SHEET NUMBER:

P3.03

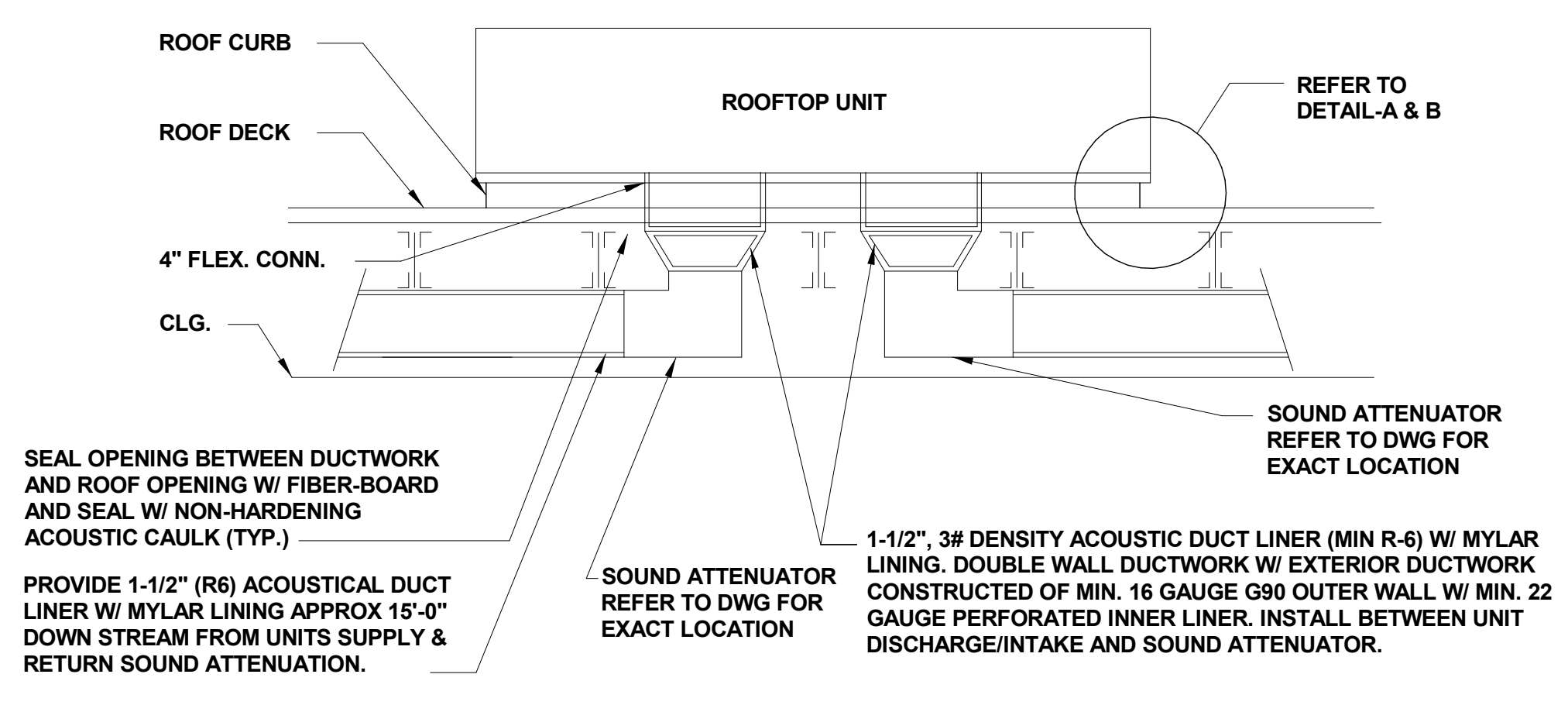
Autodesk Docs://Wilmington Elementary School/PL - 847 - Wilmington ES.rvt

03-02-2026 23:14:44


AHU CONDENSATE DRAIN PIPING - PROVIDE P-TRAP, CONDENSATE PUMP & DRAIN PIPING IN ACCORDANCE W/ MANUF. REQUIREMENTS. EXTEND DRAIN PIPING TO NEAREST FLOOR DRAIN AS REQUIRED TO PREVENT WATER PONDING ON FLAT FLOOR. COORDINATE P-TRAP DEPTHS W/ MANUF. & DEPRESSED FLOOR POCKETS W/ G.C.
PAD HEIGHT SHALL BE MIN 4" CLEAR FROM TOP OF THE FINISH FLOOR.
4" FLEX CONNECTION (TYP.)
SOUND ATTENUATOR REFER TO DWG FOR EXACT LOCATION (TYP.)
R.A.
S.A.
AIR HANDLING UNIT
E.A.
O.A.
FINISHED FLOOR
CONCRETE PAD
PROVIDE 1-1/2" (MIN R-6) ACOUSTICAL LINER FOR 15'-0" DOWNSTREAM OF SOUND ATTENUATOR FOR SUPPLY AND RETURN DUCTWORK. WHERE SOUND ATTENUATORS ARE NOT INDICATED, PROVIDE 1-1/2" ACOUSTICAL LINER FOR 25'-0" DOWNSTREAM OF SUPPLY AND RETURN DUCT CONNECTIONS.
DOUBLE WALL DUCTWORK INSULATION SHALL BE 1-1/2", 3# DENSITY (R-6) HOSPITAL GRADE LINER SIMILAR TO LINACOUSTIC RC FIBERGLASS DUCT LINER WITH FACTORY-APPLIED SURFACE & EDGE COATING. DOUBLE-WALL DUCTWORK W/ OUTSIDE WALLS CONSTRUCTED OF MIN. 16 GAUGE (OR THICKER GAUGE TO MATCH SOUND ATT. CONSTRUCTION) G90 OUTER WALL W/ MIN. 22 GAUGE W/ PERFORATED INNER LINER BETWEEN UNIT CONNECTION & SOUND ATTENUATOR.
NOTE: THERMAL DUCT INSULATION TO START AT TERMINATION OF ACOUSTIC LINER.
INCREASE INSULATION/LINER TO ACHIEVE R-13.1 FOR O.A.

TYPICAL AIR HANDLING UNIT DETAIL

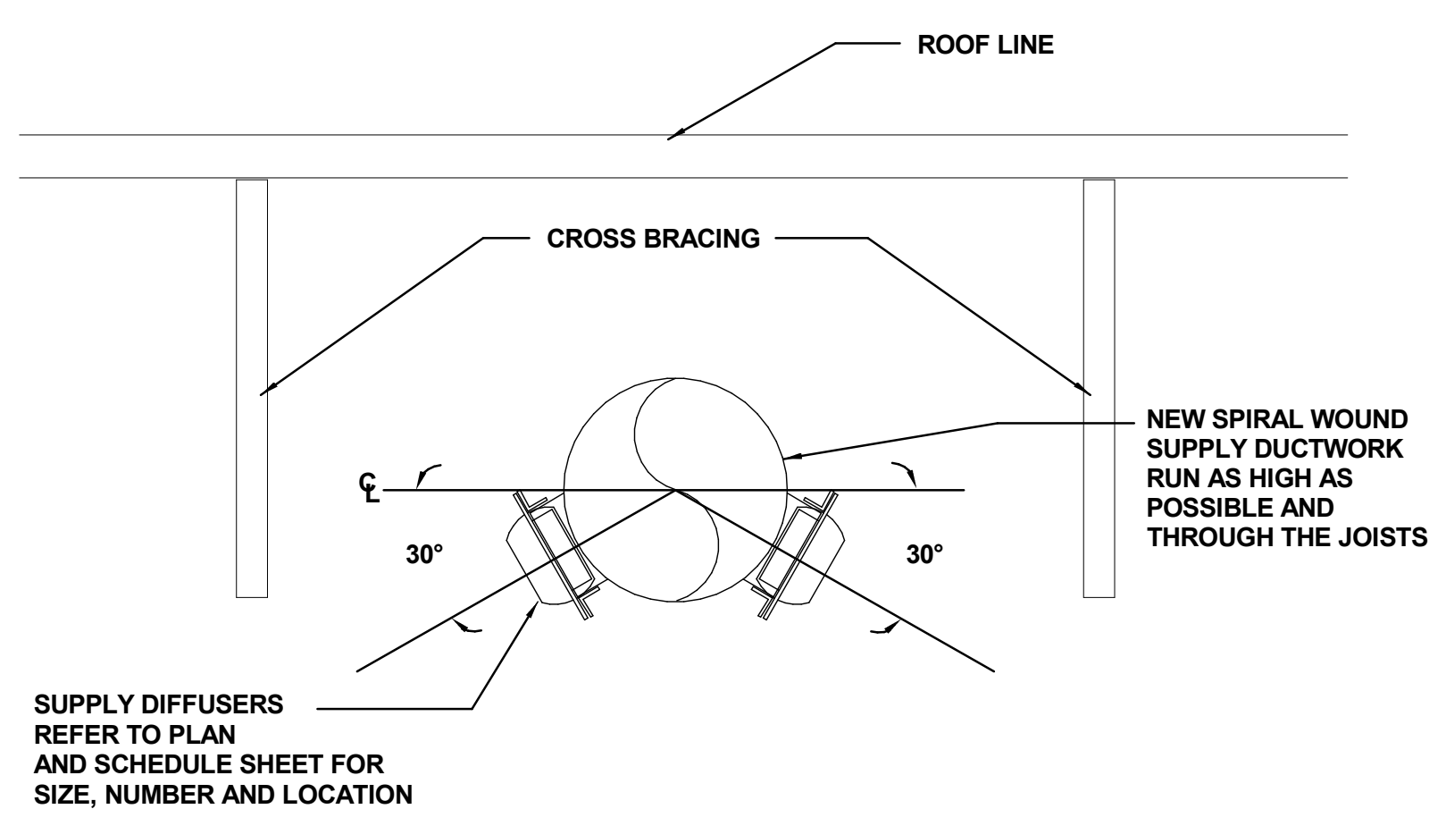
(NOT TO SCALE)


ROOF CURB
ROOF DECK
ROOFTOP UNIT
REFER TO DETAIL-A & B
4" FLEX. CONN.
CLG.
SOUND ATTENUATOR REFER TO DWG FOR EXACT LOCATION
SEAL OPENING BETWEEN DUCTWORK AND ROOF OPENING W/ FIBER-BOARD AND SEAL W/ NON-HARDENING ACOUSTIC CAULK (TYP.)
PROVIDE 1-1/2" (R6) ACOUSTICAL DUCT LINER W/ MYLAR LINING APPROX 15'-0" DOWN STREAM FROM UNITS SUPPLY & RETURN SOUND ATTENUATION.
SOUND ATTENUATOR REFER TO DWG FOR EXACT LOCATION
1-1/2", 3# DENSITY ACOUSTIC DUCT LINER (MIN R-6) W/ MYLAR LINING. DOUBLE WALL DUCTWORK W/ EXTERIOR DUCTWORK CONSTRUCTED OF MIN. 16 GAUGE G90 OUTER WALL W/ MIN. 22 GAUGE PERFORATED INNER LINER. INSTALL BETWEEN UNIT DISCHARGE/INTAKE AND SOUND ATTENUATOR.

NOTE: THERMAL DUCT INSULATION TO START AT TERMINATION OF ACOUSTIC INSUL. LINING

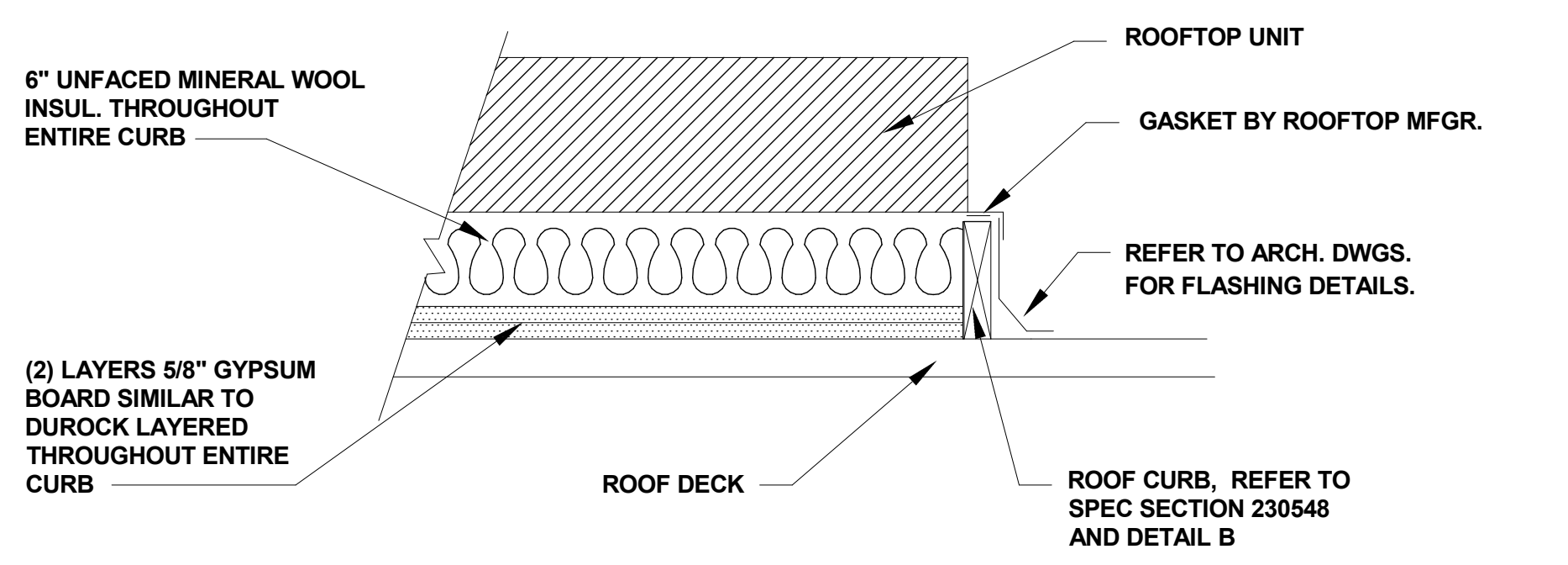
ROOFTOP UNIT DETAIL

(NOT TO SCALE)


ROOF LINE
CROSS BRACING
NEW SPIRAL WOUND SUPPLY DUCTWORK RUN AS HIGH AS POSSIBLE AND THROUGH THE JOISTS
30°
30°
SUPPLY DIFFUSERS REFER TO PLAN AND SCHEDULE SHEET FOR SIZE, NUMBER AND LOCATION

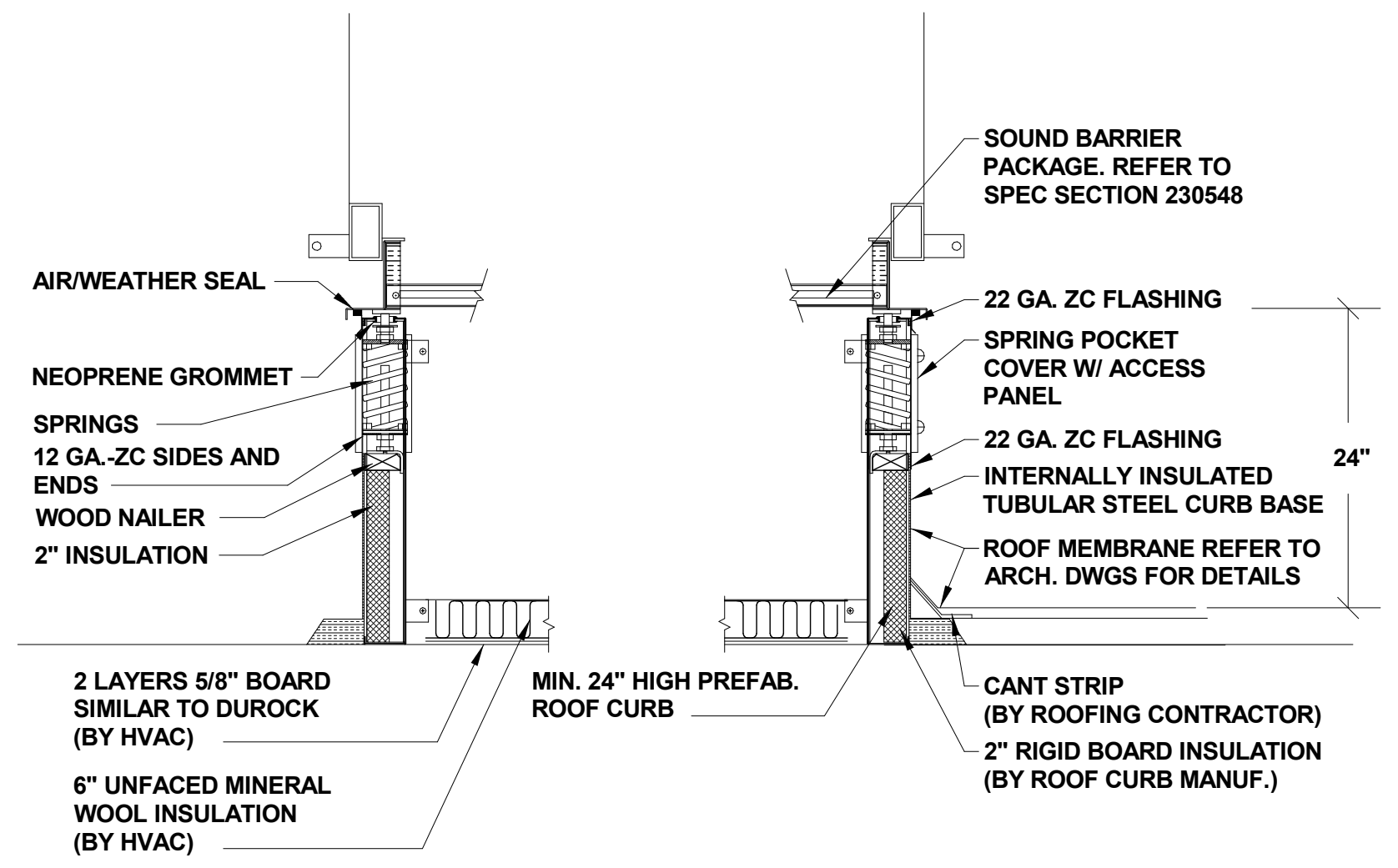
DETAIL OF HIGH-BAY SPIRAL DUCT DIFFUSERS

(NOT TO SCALE)


ROOFTOP UNIT
6" UNFACED MINERAL WOOL INSUL. THROUGHOUT ENTIRE CURB
GASKET BY ROOFTOP MFGR.
REFER TO ARCH. DWGS. FOR FLASHING DETAILS.
(2) LAYERS 5/8" GYPSUM BOARD SIMILAR TO DUROCK LAYERED THROUGHOUT ENTIRE CURB
ROOF DECK
ROOF CURB, REFER TO SPEC SECTION 230548 AND DETAIL B

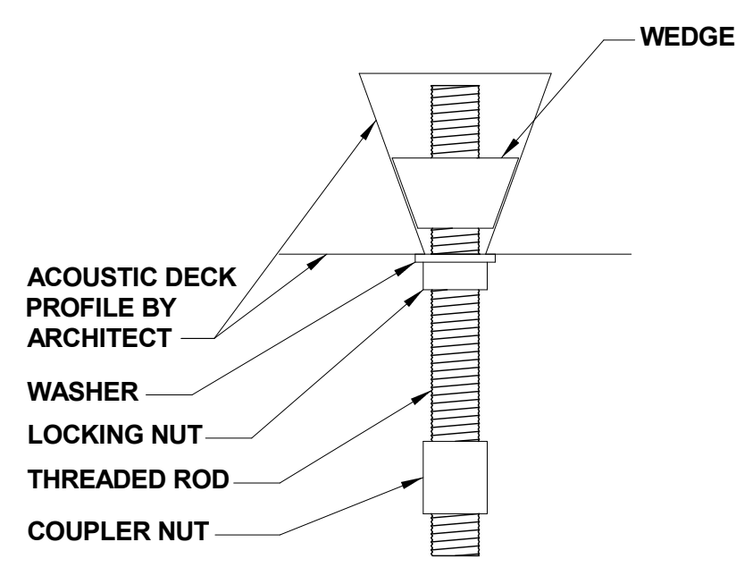
ROOFTOP CURB DETAIL A

(NOT TO SCALE)


SOUND BARRIER PACKAGE. REFER TO SPEC SECTION 230548
AIR/WEATHER SEAL
22 GA. ZC FLASHING
NEOPRENE GROMMET
SPRING POCKET COVER W/ ACCESS PANEL
SPRINGS
12 GA.-ZC SIDES AND ENDS
22 GA. ZC FLASHING
24"
WOOD NAILER
INTERNALLY INSULATED TUBULAR STEEL CURB BASE
2" INSULATION
ROOF MEMBRANE REFER TO ARCH. DWGS FOR DETAILS
2 LAYERS 5/8" BOARD SIMILAR TO DUROCK (BY HVAC)
MIN. 24" HIGH PREFAB. ROOF CURB
CANT STRIP (BY ROOFING CONTRACTOR)
6" UNFACED MINERAL WOOL INSULATION (BY HVAC)
2" RIGID BOARD INSULATION (BY ROOF CURB MANUF.)

SPRING ROOF CURB DETAIL - DETAIL B

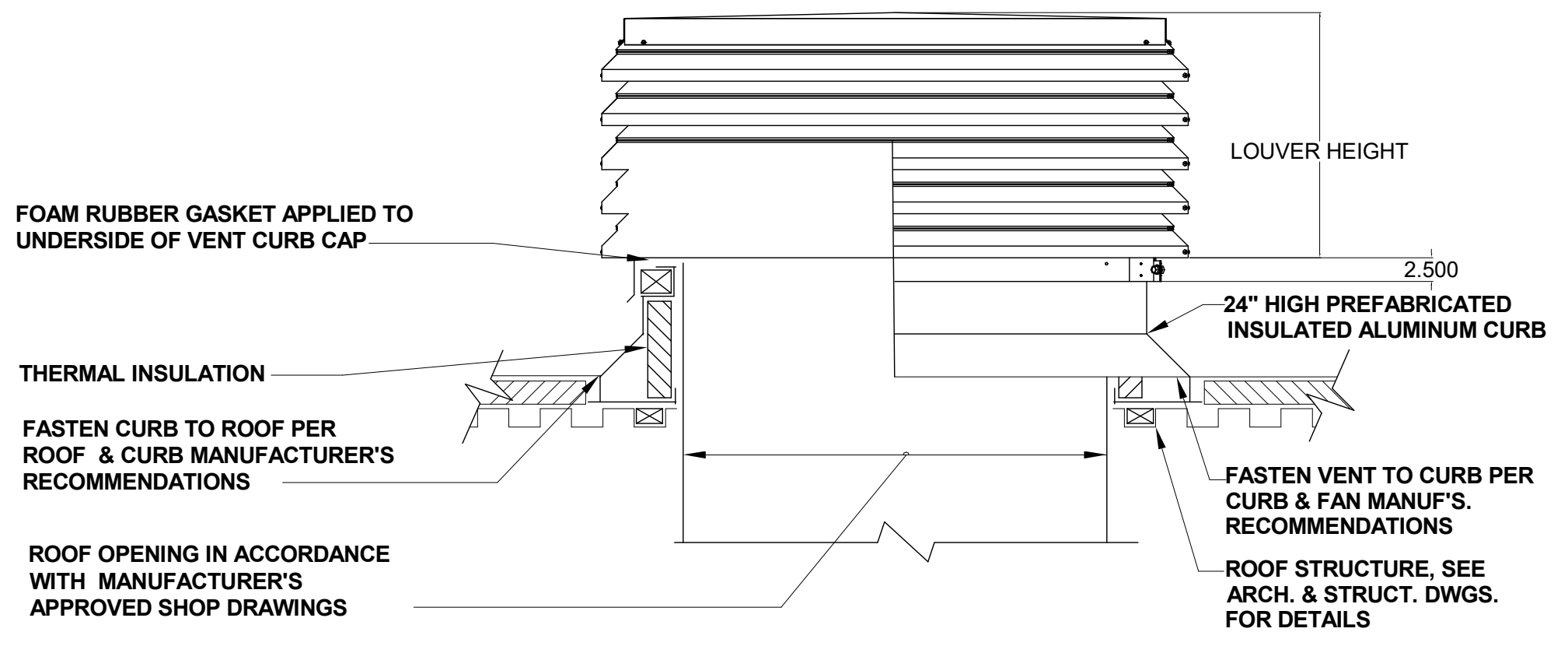
(NOT TO SCALE)



1. PROVIDE DOVETAIL RIB LOCKING HANGERS TO SUPPORT ALL PIPING, DUCTWORK AND OTHER MECHANICAL AND UTILITY COMPONENTS FROM ACOUSTICAL DECK.
2. THE LOCKING HANGERS SHALL BE INSERTED PARALLEL TO THE RIBS AND PLACED CONTINUOUSLY, SPACED EVERY 6-8" INCHES ACROSS THE WIDTH OF THE PROFILE.
3. HANGERS SHALL BE CAPABLE OF BEING UNLOCKED AND RELOCATED, INSERTED, OR REMOVED AND REUSED.
4. COMPONENTS SHALL INCLUDE WEDGE NUT SHAPED FOR APPROPRIATE DECK PROFILE 3/8" X 12" ALL THREAD, 3/8" WASHER, 3/8" LOCKING NUT AND 3/8" TO 3/8" COUPLER NUT.
5. HANGER TYPE SHALL BE COMPATIBLE WITH THE PROPOSED ARCHITECTURAL ACOUSTICAL DECK. REFER TO ARCHITECTURAL PLANS FOR ACOUSTIC DECK LOCATIONS.

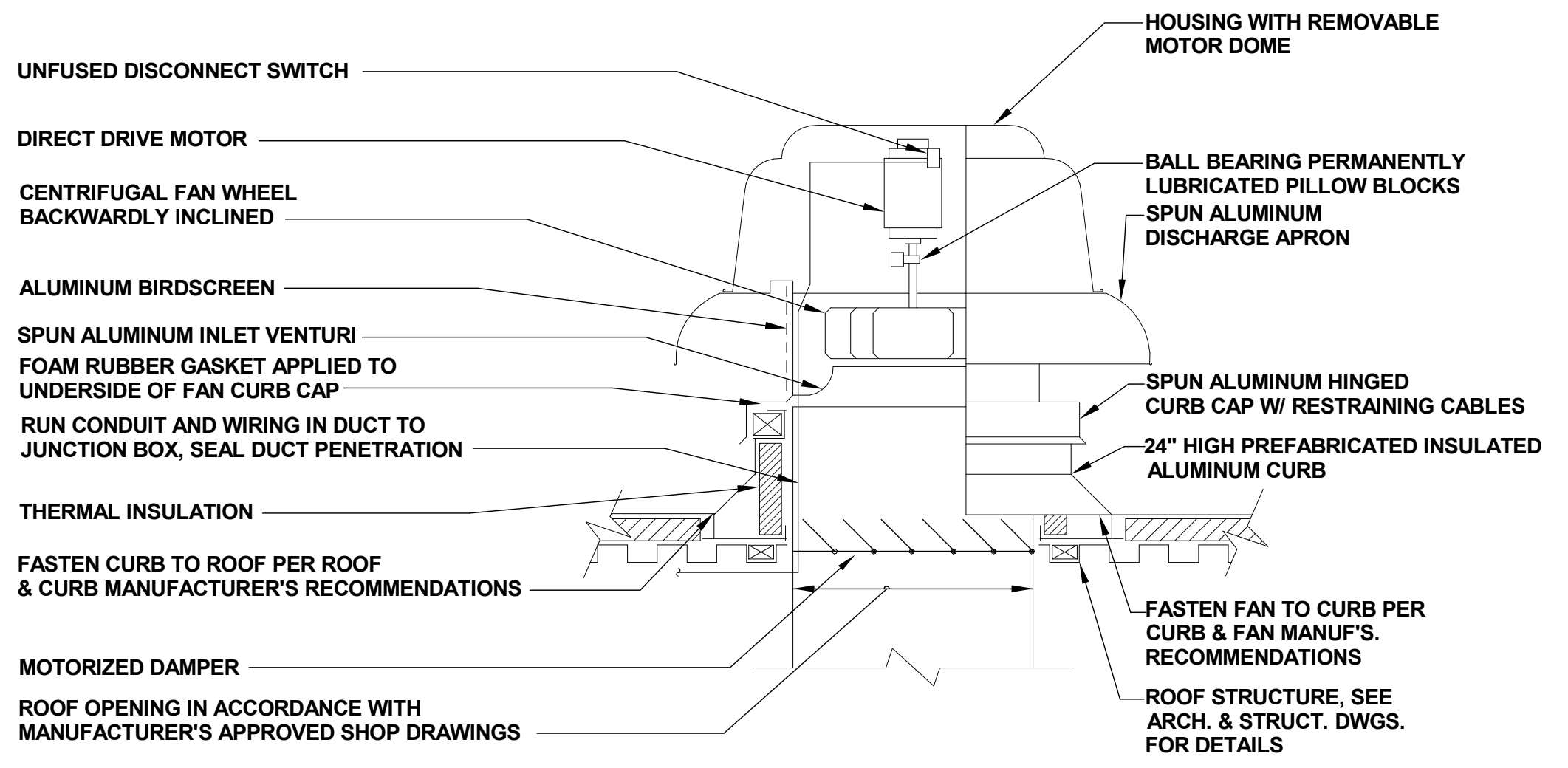
ACOUSTIC DECK HANGER DETAIL

(NOT TO SCALE)


LOUVER HEIGHT
FOAM RUBBER GASKET APPLIED TO UNDERSIDE OF VENT CURB CAP
2.500
THERMAL INSULATION
24" HIGH PREFABRICATED INSULATED ALUMINUM CURB
FASTEN CURB TO ROOF PER ROOF & CURB MANUFACTURER'S RECOMMENDATIONS
FASTEN VENT TO CURB PER CURB & FAN MANUF'S. RECOMMENDATIONS
ROOF OPENING IN ACCORDANCE WITH MANUFACTURER'S APPROVED SHOP DRAWINGS
ROOF STRUCTURE, SEE ARCH. & STRUCT. DWGS. FOR DETAILS

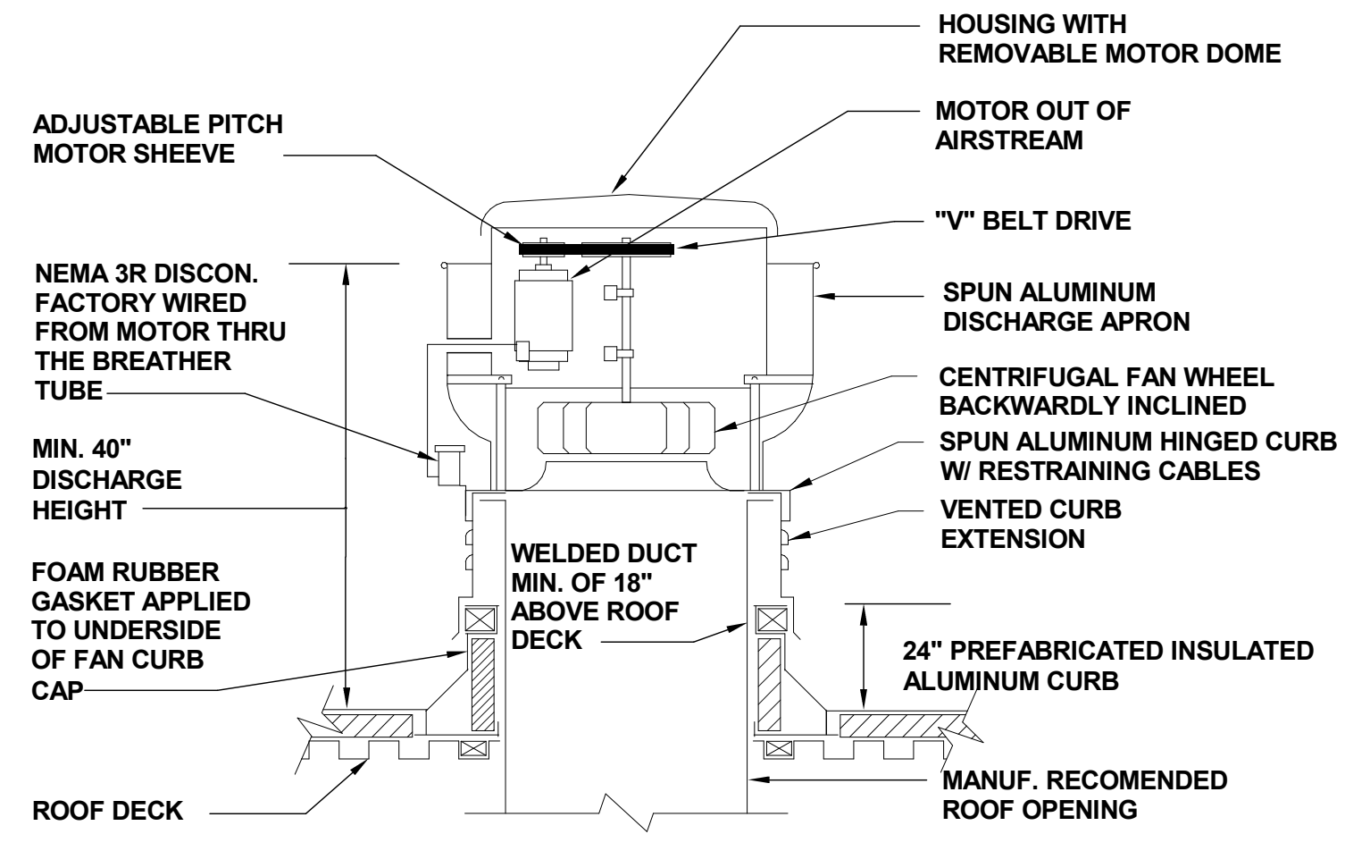
TYPICAL LOUVERED PENTHOUSE VENTILATION DETAIL

(NOT TO SCALE)


UNFUSED DISCONNECT SWITCH
HOUSING WITH REMOVABLE MOTOR DOME
DIRECT DRIVE MOTOR
BALL BEARING PERMANENTLY LUBRICATED PILLOW BLOCKS
CENTRIFUGAL FAN WHEEL BACKWARDLY INCLINED
SPUN ALUMINUM DISCHARGE APRON
ALUMINUM BIRDSCREEN
SPUN ALUMINUM INLET VENTURI
FOAM RUBBER GASKET APPLIED TO UNDERSIDE OF FAN CURB CAP
SPUN ALUMINUM HINGED CURB CAP W/ RESTRAINING CABLES
RUN CONDUIT AND WIRING IN DUCT TO JUNCTION BOX, SEAL DUCT PENETRATION
24" HIGH PREFABRICATED INSULATED ALUMINUM CURB
THERMAL INSULATION
FASTEN CURB TO ROOF PER ROOF & CURB MANUFACTURER'S RECOMMENDATIONS
FASTEN FAN TO CURB PER CURB & FAN MANUF'S. RECOMMENDATIONS
MOTORIZED DAMPER
ROOF STRUCTURE, SEE ARCH. & STRUCT. DWGS. FOR DETAILS
ROOF OPENING IN ACCORDANCE WITH MANUFACTURER'S APPROVED SHOP DRAWINGS

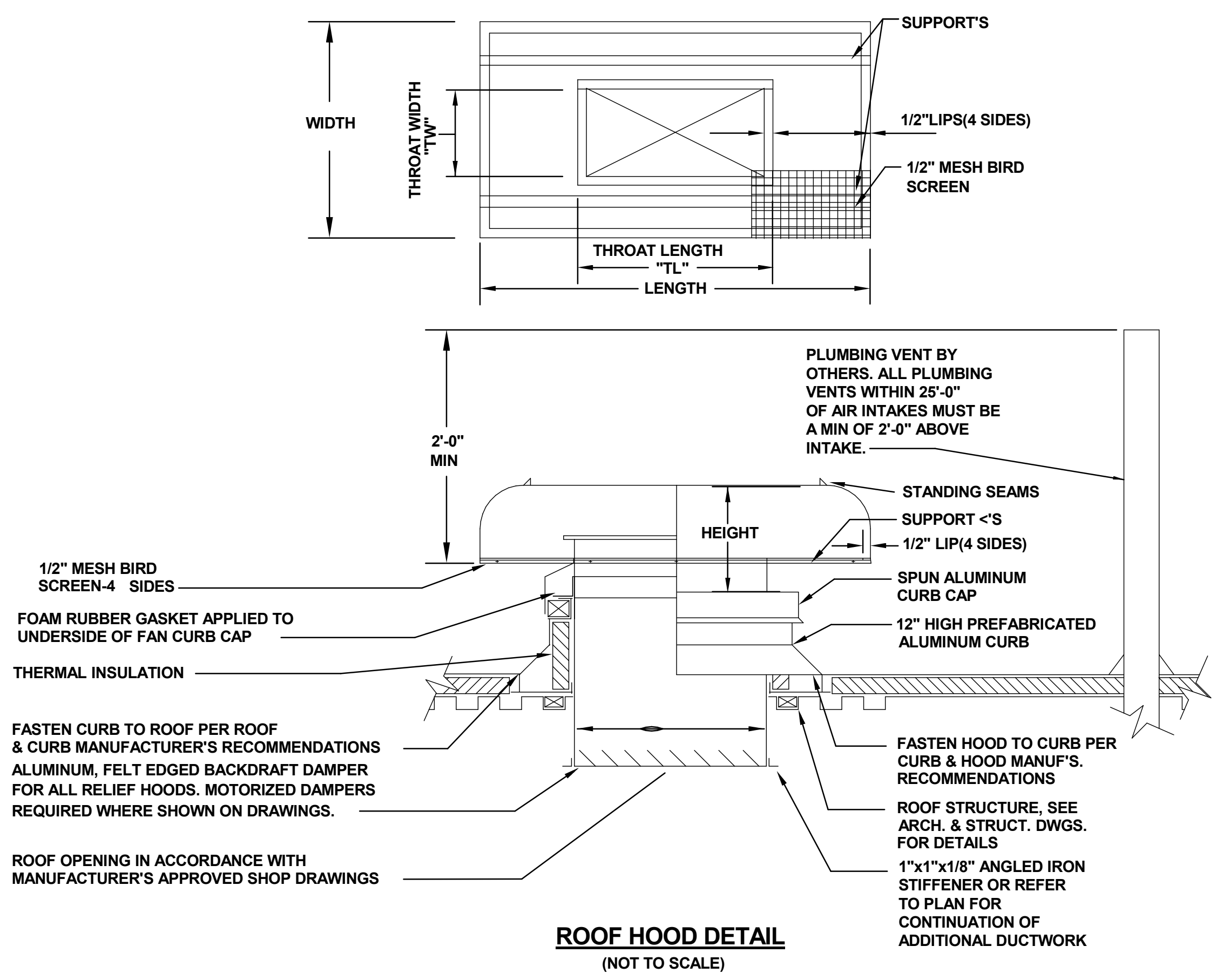
TYPICAL ROOF MOUNTED EXHAUST FAN DETAIL

(NOT TO SCALE)


HOUSING WITH REMOVABLE MOTOR DOME
ADJUSTABLE PITCH MOTOR SHEEVE
MOTOR OUT OF AIRSTREAM
"V" BELT DRIVE
NEMA 3R DISCON. FACTORY WIRED FROM MOTOR THRU THE BREATHER TUBE
SPUN ALUMINUM DISCHARGE APRON
CENTRIFUGAL FAN WHEEL BACKWARDLY INCLINED
SPUN ALUMINUM HINGED CURB CAP W/ RESTRAINING CABLES
MIN. 40" DISCHARGE HEIGHT
VENTED CURB EXTENSION
FOAM RUBBER GASKET APPLIED TO UNDERSIDE OF FAN CURB CAP
WELDED DUCT MIN. OF 18" ABOVE ROOF DECK
24" PREFABRICATED INSULATED ALUMINUM CURB
ROOF DECK
MANUF. RECOMENDED ROOF OPENING

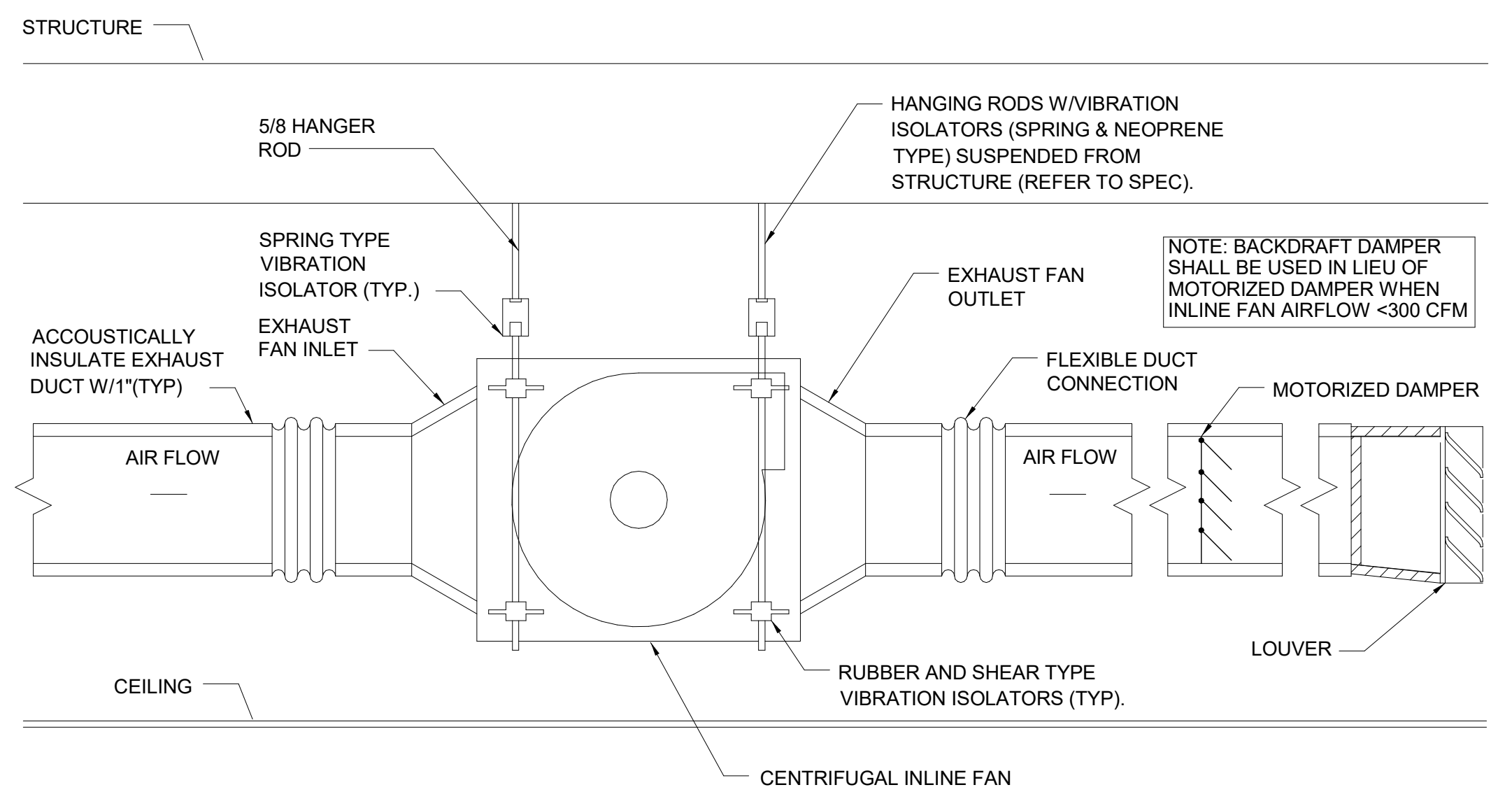
TYPICAL UPBLAST ROOF EXHAUST

(NOT TO SCALE)


SUPPORT'S
WIDTH
THROAT WIDTH "TW"
1/2"LIPS(4 SIDES)
1/2" MESH BIRD SCREEN
THROAT LENGTH "TL"
LENGTH
PLUMBING VENT BY OTHERS. ALL PLUMBING VENTS WITHIN 25'-0" OF AIR INTAKES MUST BE A MIN OF 2'-0" ABOVE INTAKE.
2'-0" MIN
STANDING SEAMS
HEIGHT
SUPPORT <'S
1/2" LIP(4 SIDES)
SPUN ALUMINUM CURB CAP
1/2" MESH BIRD SCREEN-4 SIDES
12" HIGH PREFABRICATED ALUMINUM CURB
FOAM RUBBER GASKET APPLIED TO UNDERSIDE OF FAN CURB CAP
THERMAL INSULATION
FASTEN CURB TO ROOF PER ROOF & CURB MANUFACTURER'S RECOMMENDATIONS
FASTEN HOOD TO CURB PER CURB & HOOD MANUF'S. RECOMMENDATIONS
ALUMINUM, FELT EDGED BACKDRAFT DAMPER FOR ALL RELIEF HOODS. MOTORIZED DAMPERS REQUIRED WHERE SHOWN ON DRAWINGS.
ROOF STRUCTURE, SEE ARCH. & STRUCT. DWGS. FOR DETAILS
ROOF OPENING IN ACCORDANCE WITH MANUFACTURER'S APPROVED SHOP DRAWINGS
1"x1"x1/8" ANGLED IRON STIFFENER OR REFER TO PLAN FOR CONTINUATION OF ADDITIONAL DUCTWORK

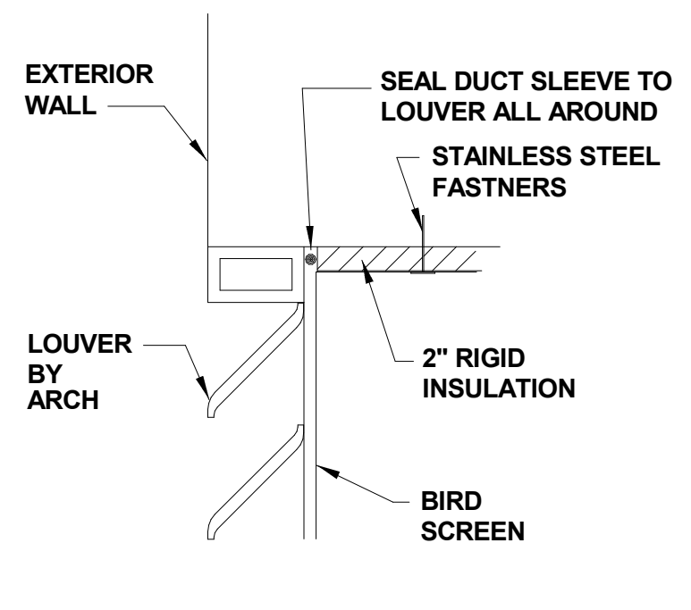
ROOF HOOD DETAIL

(NOT TO SCALE)

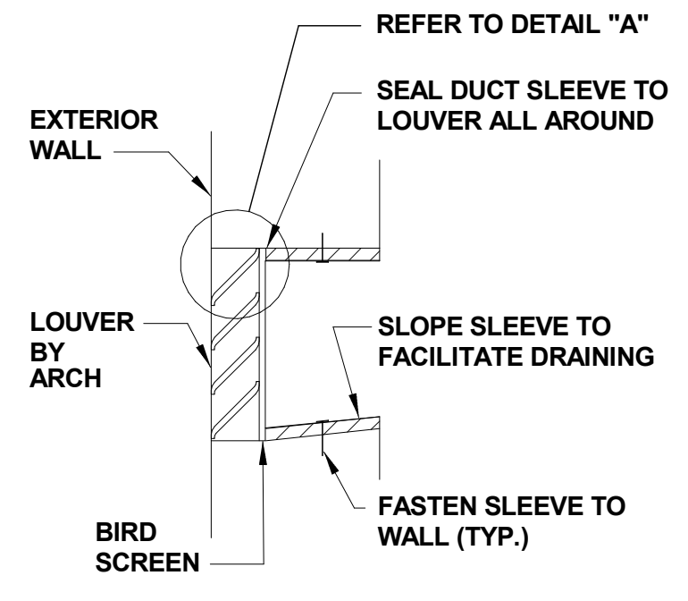

STRUCTURE
5/8 HANGER ROD
HANGING RODS W/VIBRATION ISOLATORS (SPRING & NEOPRENE TYPE) SUSPENDED FROM STRUCTURE (REFER TO SPEC).
NOTE: BACKDRAFT DAMPER SHALL BE USED IN LIEU OF MOTORIZED DAMPER WHEN INLINE FAN AIRFLOW <300 CFM
SPRING TYPE VIBRATION ISOLATOR (TYP.)
EXHAUST FAN OUTLET
ACCOUSTICALLY INSULATE EXHAUST DUCT W/1"(TYP)
EXHAUST FAN INLET
FLEXIBLE DUCT CONNECTION
MOTORIZED DAMPER
AIR FLOW
AIR FLOW
CEILING
RUBBER AND SHEAR TYPE VIBRATION ISOLATORS (TYP.)
LOUVER
CENTRIFUGAL INLINE FAN

INLINE FAN MOUNTING DETAIL

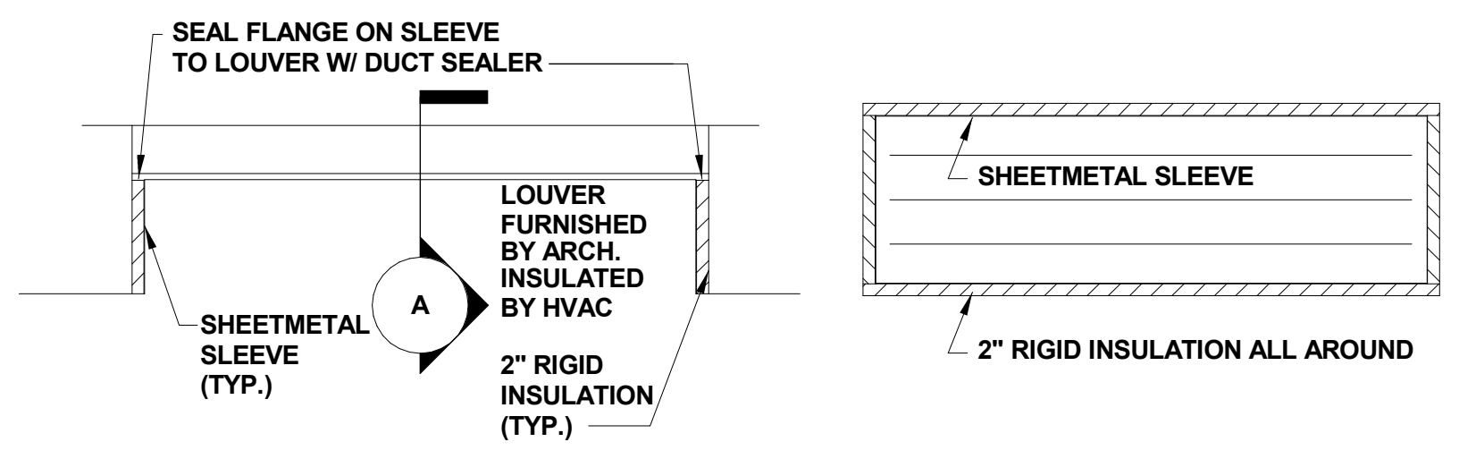
NO SCALE



DETAIL A


REFER TO DETAIL "A"
EXTERIOR WALL
SEAL DUCT SLEEVE TO LOUVER ALL AROUND
LOUVER BY ARCH
SLOPE SLEEVE TO FACILITATE DRAINING
FASTEN SLEEVE TO WALL (TYP.)
BIRD SCREEN

SECTION A


SEAL FLANGE ON SLEEVE TO LOUVER W/ DUCT SEALER
LOUVER FURNISHED BY ARCH. INSULATED BY HVAC
A
SHEETMETAL SLEEVE (TYP.)
2" RIGID INSULATION (TYP.)
SHEETMETAL SLEEVE
2" RIGID INSULATION ALL AROUND

DETAIL OF LOUVER AND SLEEVE

NOT TO SCALE

LEGEND

SYMBOL	ABBREV	DESCRIPTION
Ø	DIA	DIAMETER
	HHWS	HEATING HOT WATER SUPPLY
	HHWR	HEATING HOT WATER RETURN
	CHWS	CHILLED WATER SUPPLY
	CHWR	CHILLED WATER RETURN
	RL	REFRIGERANT LIQUID
	RS	REFRIGERANT SUCTION
	HG	HOT GAS LINE
	D	DRAIN
		PRESSURE REDUCING VALVE
		GATE VALVE
		GLOBE VALVE
		CHECK VALVE
		BUTTERFLY VALVE
		BALL VALVE
		THREE-WAY CONTROL VALVE
		TWO-WAY CONTROL VALVE
		FLOW METERING ELEMENT
		CIRCUIT SETTER VALVE
		TRIPLE DUTY VALVE
		DRAIN VALVE
		PLUG VALVE
		SAFETY VALVE
		STRAINER
		UNION
		AUTOMATIC AIR VENT
		SAFETY RELIEF
		PIPE UP (ELBOW)
		PIPE DOWN (ELBOW)
		PRESSURE GAGE WITH GAGE COCK
		THERMOMETER
		BRANCH CONNECTION OUT OF TOP
		BRANCH CONNECTION OUT OF BOTTOM
		BRANCH CONNECTION OUT OF SIDE
		CAP ON END OF PIPE
		FLOW IN DIRECTION OF ARROW
Ⓣ		TEMPERATURE, CARBON DIOXIDE, & HUMIDITY SENSOR
Ⓣ		VRF/DCU MANUF'S TEMPERATURE & HUMIDITY SENSOR
Ⓒ		CARBON DIOXIDE SENSOR (DUCT MOUNTED)
⊠		SUPPLY AIR DUCT SECTION
		RETURN AIR DUCT SECTION
		EXHAUST AIR DUCT SECTION
→		SUPPLY AIR
		RETURN/EXHAUST AIR
	SD	SMOKE DAMPER
	MD	MOTORIZED DAMPER
	FD	FIRE DAMPER
	VD	VOLUME DAMPER
	BD	BACKDRAFT DAMPER
	FSD	COMBINATION SMOKE AND FIRE DAMPER
Ⓢ		SMOKE DETECTOR
	TYP.	TYPICAL
	HV	HEATING & VENTILATING UNIT
	RH	ROOF HOOD
	ET	EXPANSION TANK
	A.H.U.	AIR HANDLING UNIT
	R.T.U.	ROOF TOP UNIT
	EF	EXHAUST FAN
	UH	UNIT HEATER (CABINET OR HORIZONTAL)
	O.A.	OUTSIDE AIR
	CFM	CUBIC FEET PER MINUTE
	VEL	VELOCITY
	E.A.T.	ENTERING AIR TEMPERATURE
	L.A.T.	LEAVING AIR TEMPERATURE
	D.B.	DRY BULB
	W.B.	WET BULB
	E.D.B.	ENTERING DRY BULB
	E.W.B.	ENTERING WET BULB
	L.D.B.	LEAVING DRY BULB
	E.W.T.	ENTERING WATER TEMPERATURE
	L.W.B.	LEAVING WET BULB
	L.W.T.	LEAVING WATER TEMPERATURE
	ERR	ENTHALPY RECOVERY RATIO
	T.S.P.	TOTAL STATIC PRESSURE
	E.S.P.	EXTERNAL STATIC PRESSURE
	T.D.H.	TOTAL DYNAMIC HEAD
	P.D.	PRESSURE DROP
	C.P.	CONDENSATE PUMP
	RP	RADIANT PANEL
	A.S.	AIR SEPERATOR
	HP	HORSEPOWER
	CAF	COMBUSTION AIR FAN
	UH	UNIT HEATER
	V	VOLTS
	PH	PHASE
	MANUF	MANUFACTURER
	T'STAT	THERMOSTAT
	A.F.F.	ABOVE FINISHED FLOOR
	DG	DOOR GRILLE
	MAU	MAKE-UP AIR UNIT
	U.D.	UNDERCUT DOOR
	N.T.S.	(NOT TO SCALE)
	CO	CLEANOUT
	B	BOILER
	DD	DISPLACEMENT DIFFUSER
	H.V.A.C.	HEATING,VENTILATING AND AIR COND.
	A.T.C.	AUTOMATIC TEMP. CONTROL
	G.C.	GENERAL CONTRACTOR
	P.C.	PLUMBING CONTRACTOR
	E.C.	ELECTRICAL CONTRACTOR
	P	PUMP
	CH	CHILLER
	EUH	ELECTRIC UNIT HEATER
	EXH.	EXHAUST
	DCU	DUCTLESS COOLING UNIT
	DCUc	DUCTLESS COOLING UNIT CONDENSER (OUTDOOR)
	DCUe	DUCTLESS COOLING UNIT EVAPORATOR (INDOOR)
	R.A.	RETURN AIR
	HV	HEATING AND VENTILATING UNIT
	S.A.	SUPPLY AIR
	RHC	REHEAT COIL
	CLG.	CEILING
	O.C.	ON CENTER
	MBH	1000 BTUH
	WTD	WATER TEMPERATURE DROP
	CFH	CUBIC FEET PER HOUR
	FRPM	FAN RPM
	VFD	VARIABLE FREQUENCY DRIVE
	WPD	WATER PRESSURE DROP
	GFS	GLYCOL FEED STATION
	OED	OPEN ENDED DUCT
	WMS	WIRE MESH SCREEN
	WRU	WALL RADIATION UNIT
	HSAG	HIGH SPEED ABORT GATE
##		EQUIPMENT TYPE
#		EQUIPMENT NUMBER
S-A		GRD DESIGNATION (REFER TO SCHEDULE)
12x12		GRD SIZE
500		GRD CFM
DD-1		DD DESIGNATION (REFER TO SCHEDULE)
400		DD CFM
RP-1		TERMINAL DESIGNATION (REFER TO SCHEDULES)
4'-0"		TERMINAL LENGTH
0.5		TERMINAL GPM

GENERAL NOTES

1. ALL DUCTWORK & PIPING ON THE CONTRACT DRAWINGS IS SHOWN DIAGRAMMATICALLY & DO NOT SHOW EVERY FITTING, OFFSET, ELBOW, TRANSITION, ETC. THE DRAWINGS ARE PROVIDED TO SHOW THE DESIGN INTENT & ROUTING OF ALL MAJOR SYSTEMS. THE HVAC CONTRACTOR SHALL FIELD VERIFY & COORDINATE WITH ALL TRADES & BUILDING COMPONENTS TO PROVIDE A COMPLETE & FUNCTIONING SYSTEM AS IT RELATES TO HVAC. THE HVAC CONTRACTOR SHALL PROVIDE ALL NECESSARY FITTINGS, TRANSITIONS, OFFSETS, ELBOWS, ETC. AS REQUIRED FOR A COMPLETE, OPERATIONAL & CODE COMPLIANT SYSTEM(S) UTILIZING INDUSTRY STANDARDS. EXACT LOCATION SHALL BE DETERMINED IN FIELD AFTER COORDINATING WITH OTHER WORK.
2. FOR TYPICAL PIPING DIAGRAMS AND CONNECTIONS AT EQUIPMENT, SEE DETAIL DRAWINGS.
3. EXACT LOCATION OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES SHALL BE COORDINATED WITH LIGHTING FIXTURES, SPRINKLERS, & OTHER FIXTURES. REFER TO REFLECTED CEILING PLAN. CONTACT A&E IN WRITING PRIOR TO INSTALLATION IF AN ITEM IS NOT INDICATED ON REFLECTED CEILING PLAN.
4. FOR DETAILS OF ROOF CURBS, FLASHING, PIPING, AND VENTS THRU ROOF REFER TO ARCHITECTURAL DRAWINGS.
5. FOR LOCATION OF OPENINGS IN ROOF AND FLOORS REFER TO STRUCTURAL AND ARCHITECTURAL DRAWINGS.
6. AUTOMATIC VENTS, VALVES, ETC. THAT MUST BE SERVICED SHALL BE LOCATED IN ACCESSIBLE POSITIONS & ACCESS DOORS/PANELS PROVIDED WHERE REQUIRED.
7. THE GENERAL CONTRACTOR SHALL PROVIDE CONCRETE BASES A 4" MINIMUM HEIGHT. LOCATION AND DIMENSIONS ARE APPROXIMATE. PROVIDE TO SUIT EQUIPMENT & ALLOW A MIN. OF 6" ALL AROUND EQUIPMENT.
8. THE HVAC CONTRACTOR SHALL PROVIDE REMOVABLE PANELS AT LOCATIONS WHERE ACCESS TO VALVES, DAMPERS, FIRE DAMPERS, ETC. ARE REQUIRED.
9. ALL DUCTWORK SHALL HAVE JOINTS AND SEAMS FILLED WITH SEALANT FOR AIR TIGHT INSTALLATIONS.
10. PROVIDE SWING JOINTS AT ALL PIPING TAKEOFFS FROM MAINS (MINIMUM OF 3 ELBOWS), AND PROVIDE ISOLATION VALVES ON SUPPLY AND RETURN PIPING TAKEOFFS.
11. ALL AIR VENTS & PRESSURE GAUGES SHALL BE INSTALLED WITH COCKS SUCH THAT THE DEVICE CAN BE REMOVED WITHOUT DRAINING PIPING SYSTEM.
12. PROVIDE DUCT ACCESS DOORS FOR ALL FIRE AND CONTROL DAMPERS LOCATED IN DUCTWORK RUNS.
13. H.V.A.C. CONTRACTOR SHALL COORDINATE ALL WORK WITH PLUMBING AND ELECTRICAL CONTRACTORS.
14. H.V.A.C. CONTRACTOR SHALL INFORM G.C. AS TO THE LOCATION AND SIZE OF ALL ACCESS PANELS.
15. ALL DOOR GRILLES SHALL BE BY G.C.
16. ALL SUPPORT STEEL UNLESS SHOWN ON STRUCTURAL DRAWINGS SHALL BE PROVIDED BY H.V.A.C. CONTRACTOR.
17. ALL DUCT ELBOWS SHALL BE LONG RADIUS (R=1.5), OR SQUARE TYPE WITH DOUBLE THICKNESS TURNING VANES.
18. DUCT SMOKE DETECTORS INDICATED ARE TO BE FURNISHED & INSTALLED IN THE DUCT BY HVAC CONTRACTOR. POWER WIRING AND FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR TO PROVIDE BMS INTERLOCK TO SHUT ASSOCIATED UNIT DOWN AND INITIATE AN ALARM UPON ACTIVATION.
19. FOR ALL CONNECTIONS TO BUILDING STEEL REFER TO STRUCTURAL DRAWINGS.
20. TOTAL DYNAMIC HEAD AND STATIC PRESSURE INDICATED IN THE SCHEDULES IS BASED ON ENGINEERING ANALYSIS AND MAY NOT NECESSARILY MATCH ACTUAL INSTALLED CONDITIONS. THIS CONTRACTOR SHALL PROVIDE REQUIRED SHEEVES, BELTS AND DRIVES TO MEET VOLUME FLOW CHARACTERISTICS SPECIFIED. ACTUAL INSTALLED CONDITIONS SHALL BE DETERMINED BY THE TAB CONTRACTOR
21. PROVIDE 4" FLEXIBLE CONNECTION AT EACH DUCT CONNECTION TO FAN OR AIR HANDLING UNIT.
22. THE MANUFACTURER LISTED IN THE SCHEDULES REFLECTS THE BASIS OF DESIGN AS INDICATED ON THE CONTRACT DRAWINGS AND IS NOT INTENDED TO SUGGEST THE REQUIRED PROVIDER. REFER TO THE SPECIFICATIONS FOR A COMPLETE DESCRIPTION OF EACH PRODUCT REQUIRED AND REFERENCE "OR EQUAL" REQUIREMENTS.
23. DUCTWORK DIMENSIONS INDICATED ARE CLEAR INSIDE DIMENSIONS.
24. PROVIDE ISOLATION VALVES AT THE BASE OF ALL PIPE RISERS AND ON ALL LATERAL BRANCHES FROM THE RISER, AND ALL BRANCH AND MAIN PIPING SUPPLY & RETURN LINES WHICH SERVE MORE THAN TWO PIECES OF TERMINAL HVAC EQUIPMENT.
25. CONDENSATE PENETRATING EXTERIOR WALL TO BE FURNISHED WITH ESCUTCHEON.
26. ALL KITCHEN/FUME HOOD EXHAUST DUCT SHALL BE 2-HOUR CONSTRUCTION WELDED BLACK STEEL OR EQUIVALENT PER NFPA 96 REQUIREMENTS.
27. ALL SMOKE DAMPERS SHALL BE COMBINATION SMOKE/FIRE DAMPERS, SHALL BE FURNISHED & INSTALLED BY HVAC CONTRACTOR, AND POWER WIRED BY ATC CONTRACTOR. DAMPERS SHALL BE MOTOR OPERATED WITH 24 VOLT / 120 VOLT ACTUATOR BY HVAC CONTRACTOR. FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR SHALL PROVIDE THE NECESSARY WIRING, PROGRAMMING, & COMPONENTS FOR BMS INTEGRATION. ASSOCIATED EQUIPMENT SHALL BE SHUT DOWN UPON ACTIVATION OF THE DAMPER/SMOKE DETECTOR.
28. ALL LOCKER ROOM, SHOWER ROOM, AND DISHWASHER EXHAUST DUCTWORK SHALL BE ALUMINUM.
29. ALL DRYER DUCTWORK TO BE FRICTION FIT W/ TAPED JOINTS. NO MECHANICAL FASTENERS. PROVIDE NECESSARY FITTINGS FROM DRYER TO OUTSIDE WALL CAP.
30. REFER TO ARCHITECTS RCP'S AND CEILING DETAILS FOR LOCATION AND COMPOSITION OF ACOUSTIC ISOLATION CEILINGS. COORDINATE USE OF COMPATIBLE EQUIPMENT HANGERS WITH GC IN THESE LOCATIONS.
31. ALL DOUBLE WALL DUCTWORK INDICATED ON DRAWINGS SHALL BE 16-GA. OUTER WALL, PERFORATED INNER WALL, W/ 2" ACOUSTIC LINER TO EXTENT SHOWN ON DRAWINGS.
32. PROVIDE PERFORATED DOUBLE WALL DUCT W/ 2" ACOUSTIC SOUND LINER, SIMILAR TO PERMACOATE LINECOUSTIC ON ALL S.A., R.A., O.A. & E.A. (WHERE APPLICABLE) DUCTWORK FROM THE UNIT TO THE SOUND ATTENUATOR. PROVIDE SINGLE WALL DUCT WITH 1 1/2" INTERNAL LINER FOR AN ADDITIONAL 15'-0" (MIN.) DOWNSTREAM OF THE SOUND ATTENUATOR. DUCTWORK SHALL ALSO BE EXTERNALLY INSULATED WHERE NECESSARY TO ACHIEVE IECC 2021 MINIMUM ASSMEBLY INSULATION VALUE OF R-6.
33. ALL AIR HANDLING UNITS >2000 CFM SHALL HAVE A DUCT MOUNTED SMOKE DETECTOR INSTALLED IN THE AIRSTREAM.
34. ALL EQUIPMENT SHALL BE INSTALLED PER THE MANUFACTURE'S RECOMMENDATIONS & INSTALLATION INSTRUCTIONS. PROVIDE ALL NECESSARY COMPONENTS, FITTINGS, ACCESSORIES, WIRING, ETC. FOR A COMPLETE FUNCTIONAL SYSTEM.
35. ALL ATC CONTROLS SHALL BE POWER WIRED FROM THE CORRESPONDING MAIN ATC PANEL, OR SUB ATC PANEL. EACH ATC PANEL WILL BE FED BY EMERGENCY POWER. THEREFORE, ALL CONTROLS SHALL BE ON EMERGENCY POWER. ALL PANELS SHALL BE PROVIDED BY ATC CONTRACTOR. ALL UNIT CONTROLS SHALL BE FED BY THE MAIN ATC PANEL OR, SUB ATC PANEL, & NOT THROUGH THE UNIT'S MAIN POWER SOURCE. ATC CONTRACTOR SHALL PROVIDE EMERGENCY POWER FEEDER FROM THE ELECTRICAL EMERGENCY POWER PANELS TO ANY AND ALL ATC PANELS/SUB PANELS. ATC CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR TO DETERMINE WHERE EMERGENCY POWER MAY BE DERIVED FROM.
36. ALL DUCTLESS COOLING UNITS AND HEAT PUMP UNITS SHALL BE PROVIDED W/ CONDENSATE PUMPS. THE HVAC CONTRACTOR SHALL FIELD DETERMINE IF A GRAVITY FED SYSTEM CAN BE ACCOMPLISHED. WHERE POSSIBLE THE HVAC CONTRACTOR SHALL SLOPE THE CONDENSATE PIPING SYSTEM TO ALLOW FOR A GRAVITY FED SYSTEM. HOWEVER, THE CONDENSATE PUMP SHALL STILL BE PROVIDED, ALONG W/ AN OVERFLOW SAFETY ALARM WHICH SHALL BE TIED INTO BMS SYSTEM.
37. ALL OCCUPIED SPACES SHALL BE PROVIDED W/ MULTIFUNCTION SENSORS W/ TEMPERATURE, HUMIDITY & CO2 CONTROL. THIS SHALL BE PROVIDED IN COMPLIANCE WITH LEED v.4 CREDIT IEQC1.
38. ALL RADIANT PANELS WHETHER MODULAR OR LINEAR SHALL BE FED W/ ONE SET OF INSULATED 3/4" HHWS & HHWR PIPES. RADIANT PANEL MANUFACTURER AND/OR HVAC CONTRACTOR SHALL PROVIDE ALL HEADERS AND/OR CIRCUITS REQUIRED FOR LINEAR PANELS W/ HIGH PRESSURE DROPS OVER 8 FEET W.C. ALONG W/ ANY TRIM CONNECTORS, INTERCONNECTING PIPES, END PIECES, MOUNTING ARMS & SUPPORTS FOR A COMPLETE & OPERATIONAL SYSTEM WHILE MAINTAINING A SEAMLESS APPEARANCE. MOUNTING ARMS WILL BE UTILIZED FOR ALL RADIANT LIGHT SHELVES UNLESS OTHERWISE INDICATED.
39. ALL REFRIGERANT LIQUID AND REFRIGERANT SUCTION LINES SHALL BE SIZED AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
40. PROVIDE ALL NECESSARY DUCT TRANSITIONS, OFFSET, FASTENERS, ELBOWS & CLIPS FOR A COMPLETE CONNECTION FROM THE DUCT MAIN TO THE VAV BOX THEN TO THE DISPLACEMENT DIFFUSER. UTILIZE DUCT SEALANT & MECHANICAL FASTENERS FOR AN AIRTIGHT SEAL. PROVIDE SUPPLEMENTAL STRUCTURAL SUPPORTS AS REQUIRED FOR THE INSTALLATION OF VAV BOX & ANY TYPE OF DISPLACEMENT DIFFUSER INCLUDING WALL BRACING IF NECESSARY.
41. ALL EXPOSED DUCTWORK SHALL BE PAINTED UNLESS NOTED OTHERWISE. FINISH COLOR BY ARCHITECT.
42. ALL AHU'S, RTU's & MAU'S SHALL BE PROVIDED W/ SUPPLY & RETURN AIR DUCT MOUNTED SMOKE DETECTORS. THE DUCT MOUNTED SMOKE DETECTORS SHALL BE INSTALLED BY THE HVAC CONTRACTOR. FIRE ALARM INTERLOCK, POWER, WIRING, & FURNISHING OF THE DETECTOR SHALL BE BY THE ELECTRICAL CONTRACTOR. UNIT SHUT DOWN UPON ACTIVATION WILL BE PROVIDED BY THE ATC CONTRACTOR, PROVIDE NECESSARY WIRING, PROGRAMMING, & COMPONENTS TO ACHIEVE THE DESIRED SEQUENCE.
43. ALL KILN HOOD DUCTWORK SHALL BE STAINLESS STEEL CONSTRUCTION. PROVIDE ALL REQUIRED TRANSITIONS TO KILN CONNECTION & TO ROOF-MOUNTED EXHAUST FAN.
44. ALL DUCTWORK MAINS SHALL BE INSTALLED TIGHT TO STEEL TO ACCOMMODATE OTHER TRADES. COORDINATE ALL DUCTWORK WITH ALL NECESSARY TRADES.
45. ALL VAV BOXES WILL BE PROVIDED W/ 120V POWER WIRING BY ELECTRICAL CONTRACTOR. POWER WIRING SHALL TERMINATE IN JUNCTION BOX PROVIDED BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR SHALL PROVIDE TRANSFORMER IN SEPARATE JUNCTION BOX & THEN 24 V CONTROL WIRING TO VAV CONTROL PANEL. REFER TO CONTROL DWGS.
46. VOLUME DAMPERS INDICATED ON DUCTWORK DRAWINGS REPRESENT LOCATIONS WHERE THESE ARE REQUIRED & INTENDED. HOWEVER IT DOES NOT REPRESENT ALL NECESSARY LOCATIONS. REFER TO DUCT/BRANCH DETAILS FOR FURTHER VOLUME DAMPER REQUIREMENTS IN ALL BRANCH/DIFFUSER DUCTS.
47. ALL WRU UNITS SHALL BE INSTALLED RECESSED WITHIN PROVIDED ARCHITECTURAL NICHES UNLESS OTHERWISE NOTED. COORDINATE WITH ARCHITECTURAL PLANS AND WALL SECTIONS FOR LOCATIONS AND DIMENSIONS OF WALL NICHES.
48. ALL DUCT PENETRATIONS THROUGH FLOORS SHALL BE INSTALLED WITH SUITABLE FIRE DAMPER AT THE FLOOR PENETRATION RATED TO MATCH THE RATING OF THE FLOOR.
49. VERTICAL DUCTS IN WALLS/CHASES TO DISPLACEMENT DIFFUSERS SHALL MATCH THE CONNECTION SIZE LISTED IN THE DD SCHEDULE FOR THE ASSOCIATED DISPLACEMENT DIFFUSER UNLESS OTHERWISE NOTED.
50. ALL THERMOSTATS SHALL BE MOUNTED 48" A.F.F.
51. ALL LOUVERS SHALL BE FURNISHED BY THE G.C. AND INSTALLED BY THE HVAC CONTRACTOR UNDER G.C. SUPERVISION. HVAC CONTRACTOR SHALL FULL REVIEW BOTH HVAC DRAWINGS AND ARCHITECTURAL DRAWINGS FOR LOUVER SIZES.
52. ALL RADIANT PANELS SHALL BE CONTINUOUS. CONTRACTOR TO COORDINATE PANELS TO BE INSTALLED AROUND COLUMNS. PANELS SHALL BE CUT AS REQUIRED FOR A CONTINUOUS APPEARANCE. PROVIDE RADIANT CEILING SHOP DRAWINGS CLEARLY INDICATING WHAT IS PROVIDED.
53. UTILIZE TRAPEZE HANGER/UNISTRUT WHERE MULTIPLE PIPING SYSTEMS ARE TRAVELING TO MINIMIZE CONGESTION. REFER TO DETAIL FOR FURTHER INFORMATION. PROVIDE INSULATION SHIELDS AT EACH POINT OF CONTACT BETWEEN PIPE INSULATION & ANY STYLE HANGER.
54. PROVIDE INSULATED BACKING FOR THERMOSTATS LOCATED IN GYMNASIUMS, RESTROOMS, VESTIBULES, AND ANY SPACE WHERE THERMOSTATS ARE MOUNTED ON BLOCK WALL.

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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

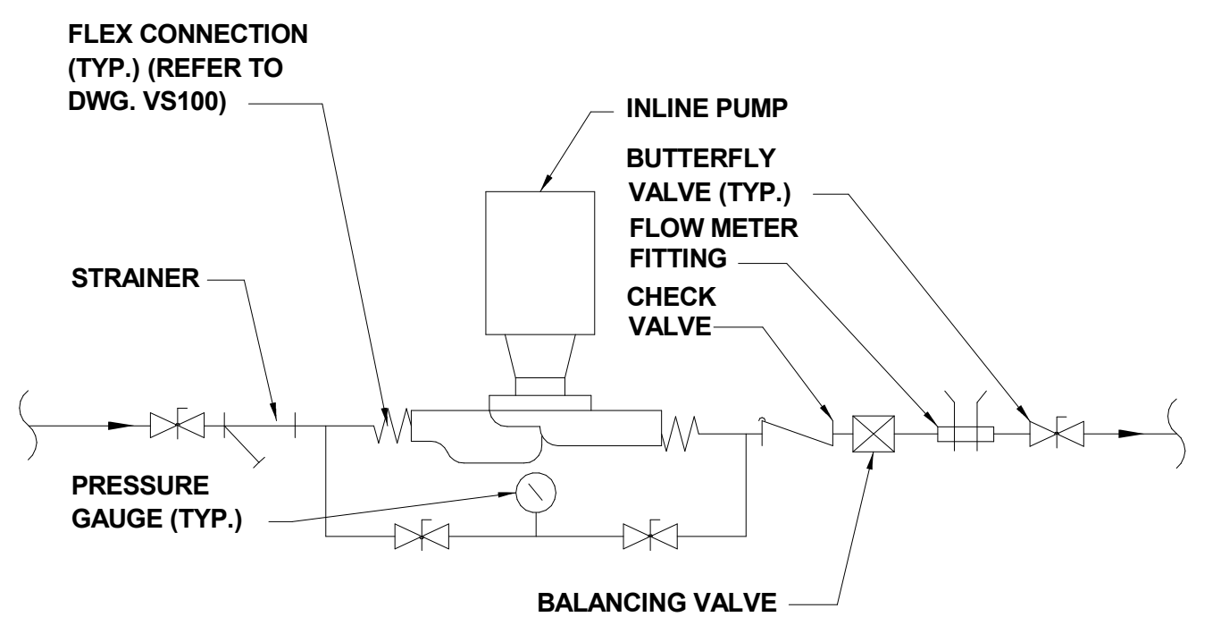
SCALE: AS INDICATED

SHEET TITLE:

LEGEND, NOTES & DETAILS I

SHEET NUMBER:

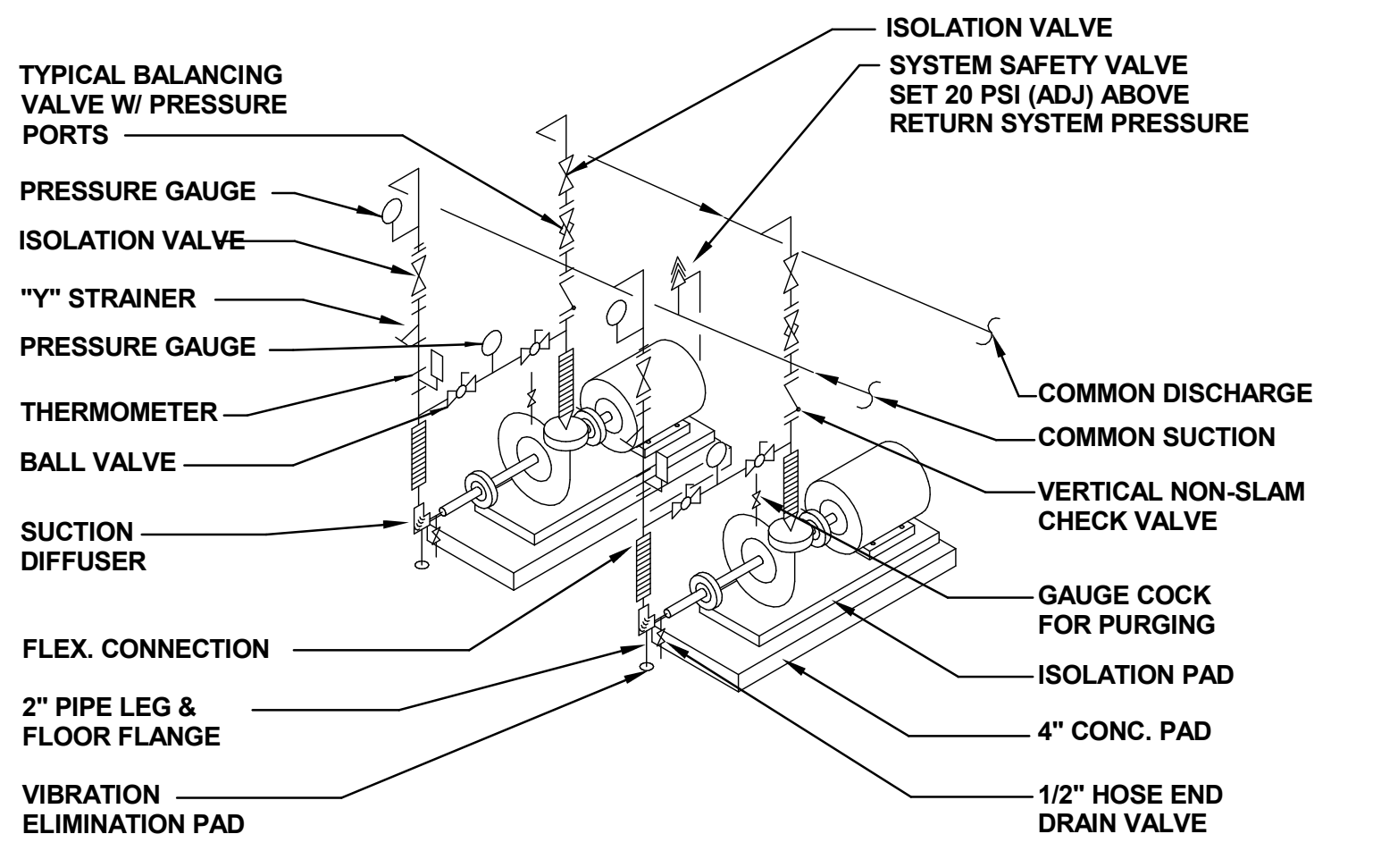
M0.11



INLINE PUMP PIPING DETAIL

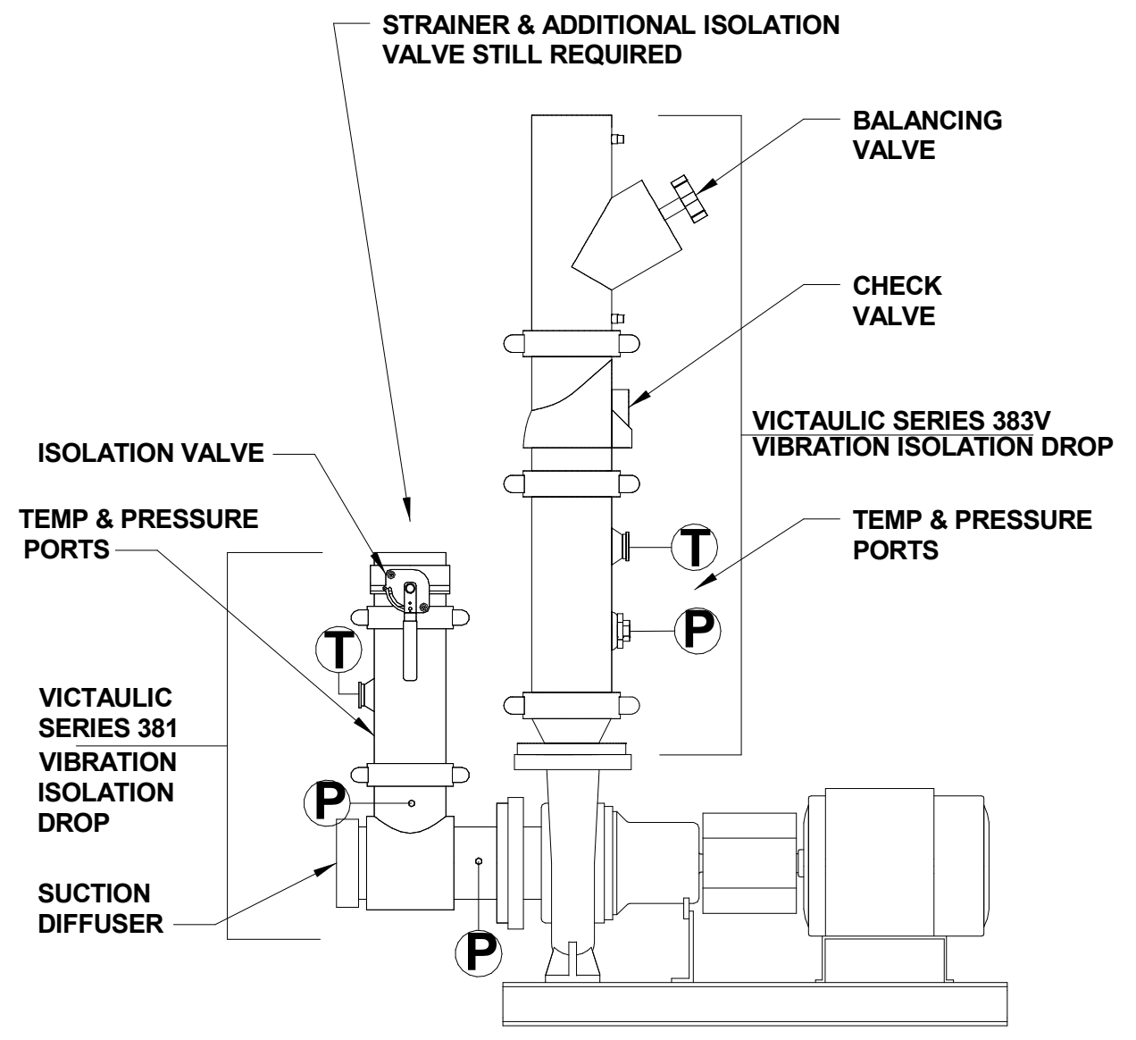
(NOT TO SCALE)

NOTE: ADDITIONAL PUMPS AS REQUIRED FOR PARALLEL PUMPING ARRANGEMENT SHALL FOLLOW THEPIPING ARRANGEMENT INDICATED IN THIS DETAIL


ISOLATION VALVE
SYSTEM SAFETY VALVE SET 20 PSI (ADJ) ABOVE RETURN SYSTEM PRESSURE
TYPICAL BALANCING VALVE W/ PRESSURE PORTS
PRESSURE GAUGE
ISOLATION VALVE
"Y" STRAINER
PRESSURE GAUGE
THERMOMETER
BALL VALVE
SUCTION DIFFUSER
FLEX. CONNECTION
2" PIPE LEG & FLOOR FLANGE
VIBRATION ELIMINATION PAD
COMMON DISCHARGE
COMMON SUCTION
VERTICAL NON-SLAM CHECK VALVE
GAUGE COCK FOR PURGING
ISOLATION PAD
4" CONC. PAD
1/2" HOSE END DRAIN VALVE

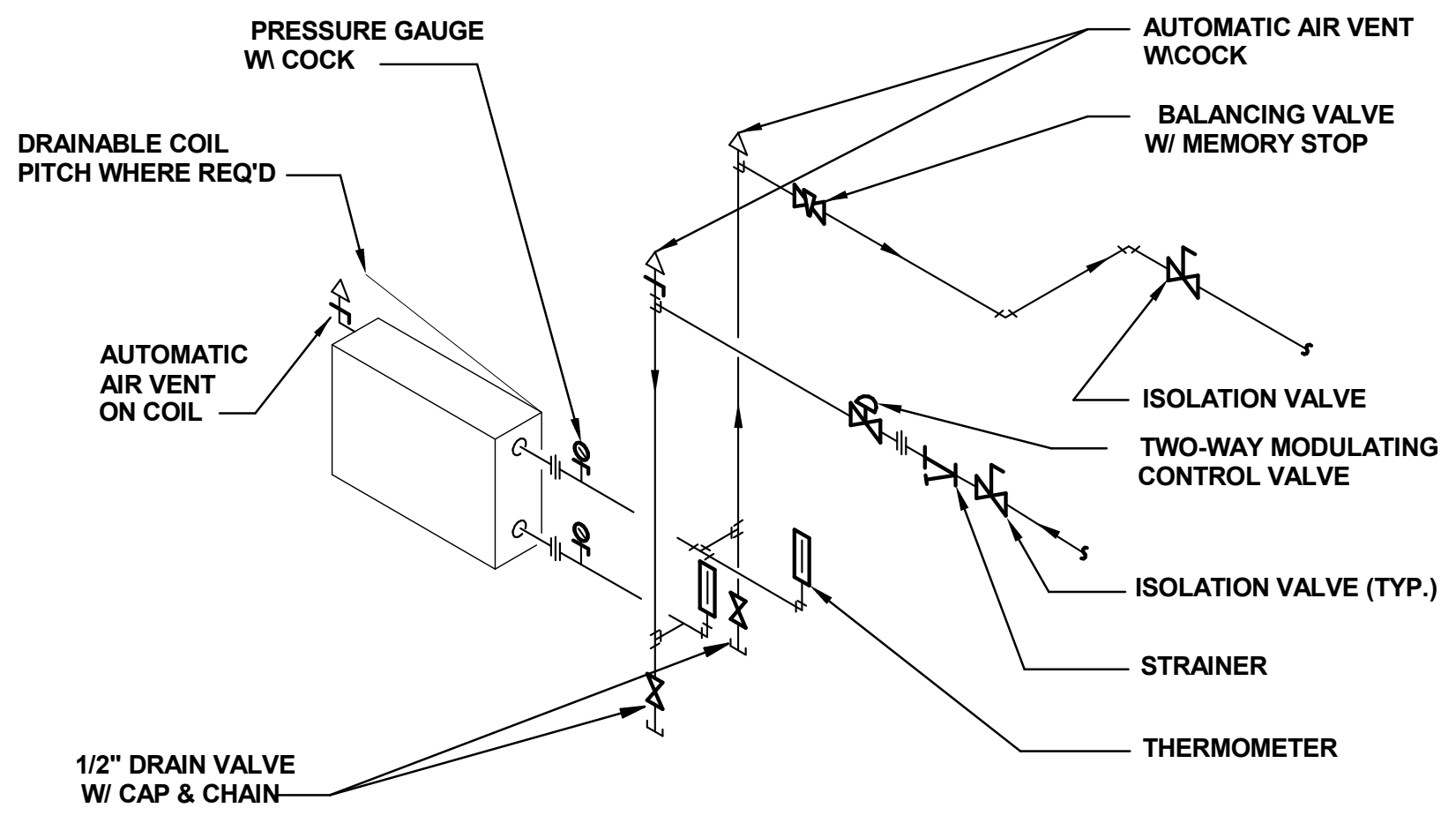
PIPING DETAILS AT WATER PUMPS

NO SCALE


STRAINER & ADDITIONAL ISOLATION VALVE STILL REQUIRED
BALANCING VALVE
CHECK VALVE
VICTAULIC SERIES 383V VIBRATION ISOLATION DROP
ISOLATION VALVE
TEMP & PRESSURE PORTS
TEMP & PRESSURE PORTS
T
P
VICTAULIC SERIES 381 VIBRATION ISOLATION DROP
SUCTION DIFFUSER
P
P

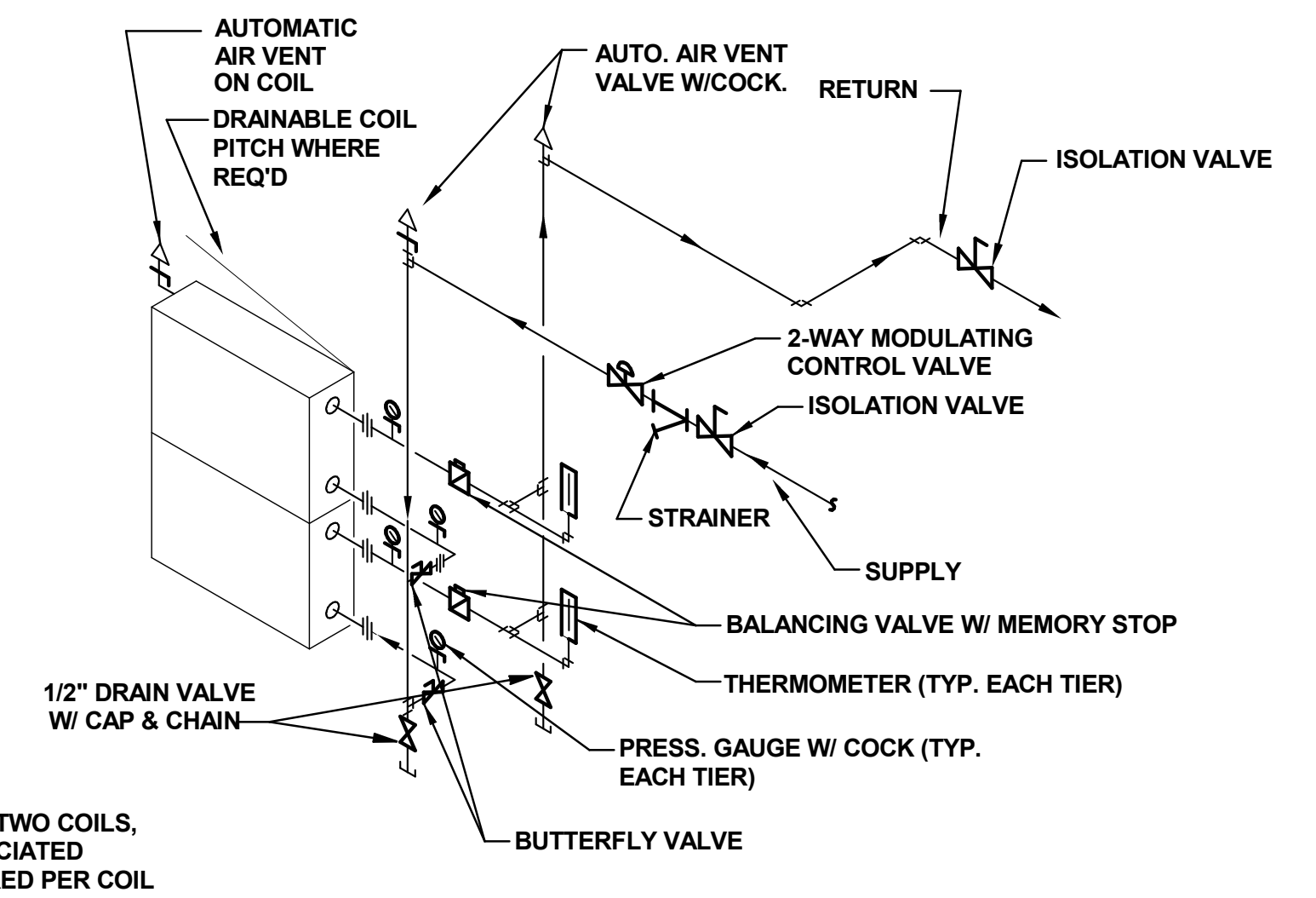
VICTAULIC SERIES 381/383V VIBRATION ISOLATION PUMP DROP - END SUCTION

(NOT TO SCALE)


PRESSURE GAUGE W\ COCK
DRAINABLE COIL PITCH WHERE REQ'D
AUTOMATIC AIR VENT ON COIL
AUTOMATIC AIR VENT W\COCK
BALANCING VALVE W/ MEMORY STOP
ISOLATION VALVE
TWO-WAY MODULATING CONTROL VALVE
ISOLATION VALVE (TYP.)
STRAINER
THERMOMETER
1/2" DRAIN VALVE W/ CAP & CHAIN

HOT WATER HEATING & REHEATING COIL PIPING W/ 2-WAY MODULATING CONTROL VALVE - SINGLE COIL

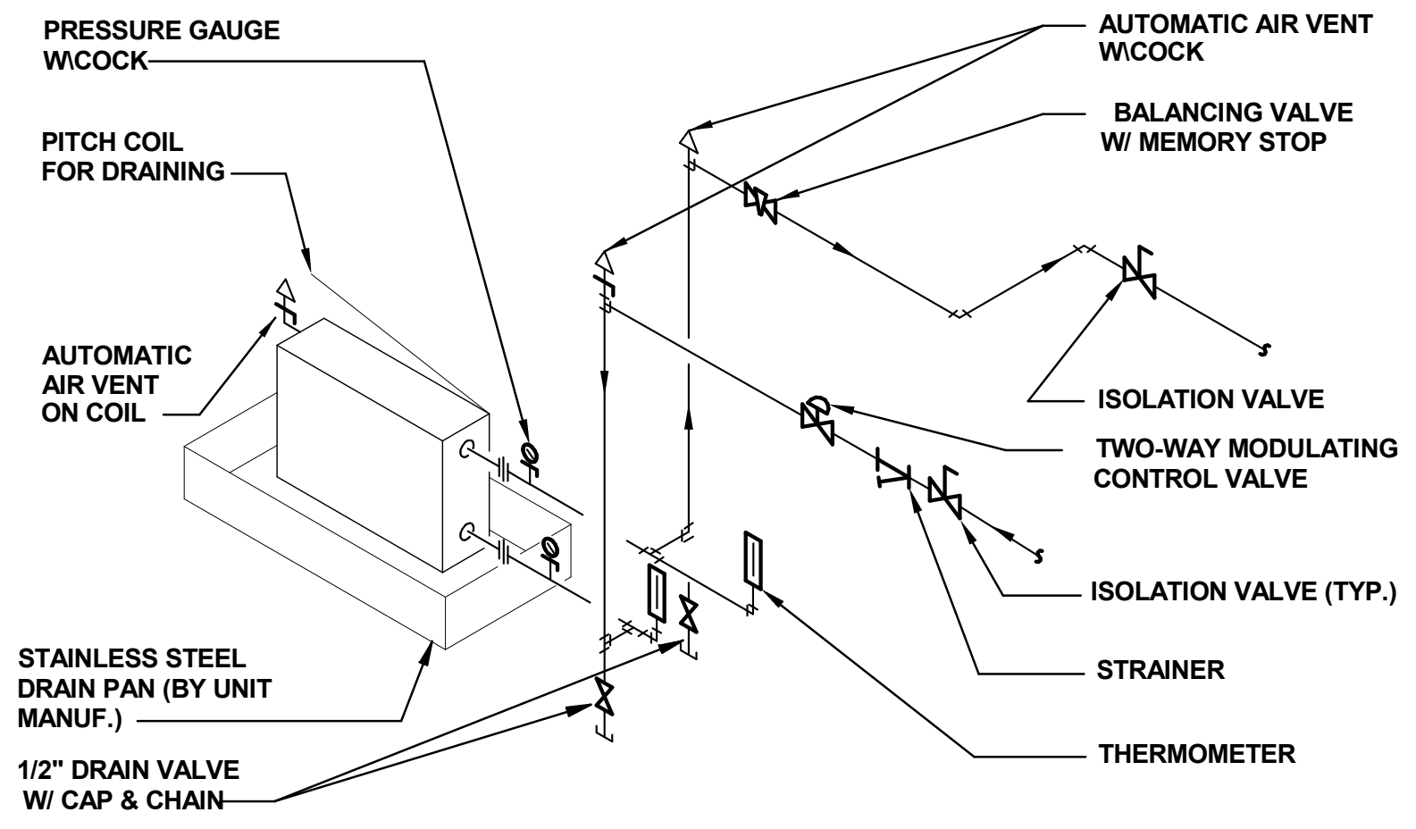
(NOT TO SCALE)


AUTOMATIC AIR VENT ON COIL
DRAINABLE COIL PITCH WHERE REQ'D
AUTO. AIR VENT VALVE W/COCK.
RETURN
ISOLATION VALVE
2-WAY MODULATING CONTROL VALVE
ISOLATION VALVE
STRAINER
SUPPLY
BALANCING VALVE W/ MEMORY STOP
THERMOMETER (TYP. EACH TIER)
1/2" DRAIN VALVE W/ CAP & CHAIN
PRESS. GAUGE W/ COCK (TYP. EACH TIER)
BUTTERFLY VALVE

FOR UNITS W/ MORE THAN TWO COILS, INDIVIDUAL PIPING & ASSOCIATED COMPONENTS ARE REQUIRED PER COIL INCLUDING BUT NOT LIMITED TO PRESSURE GAUGES, TEMPERATURE GAUGES, BALANCING VALVE & AIR VENT.

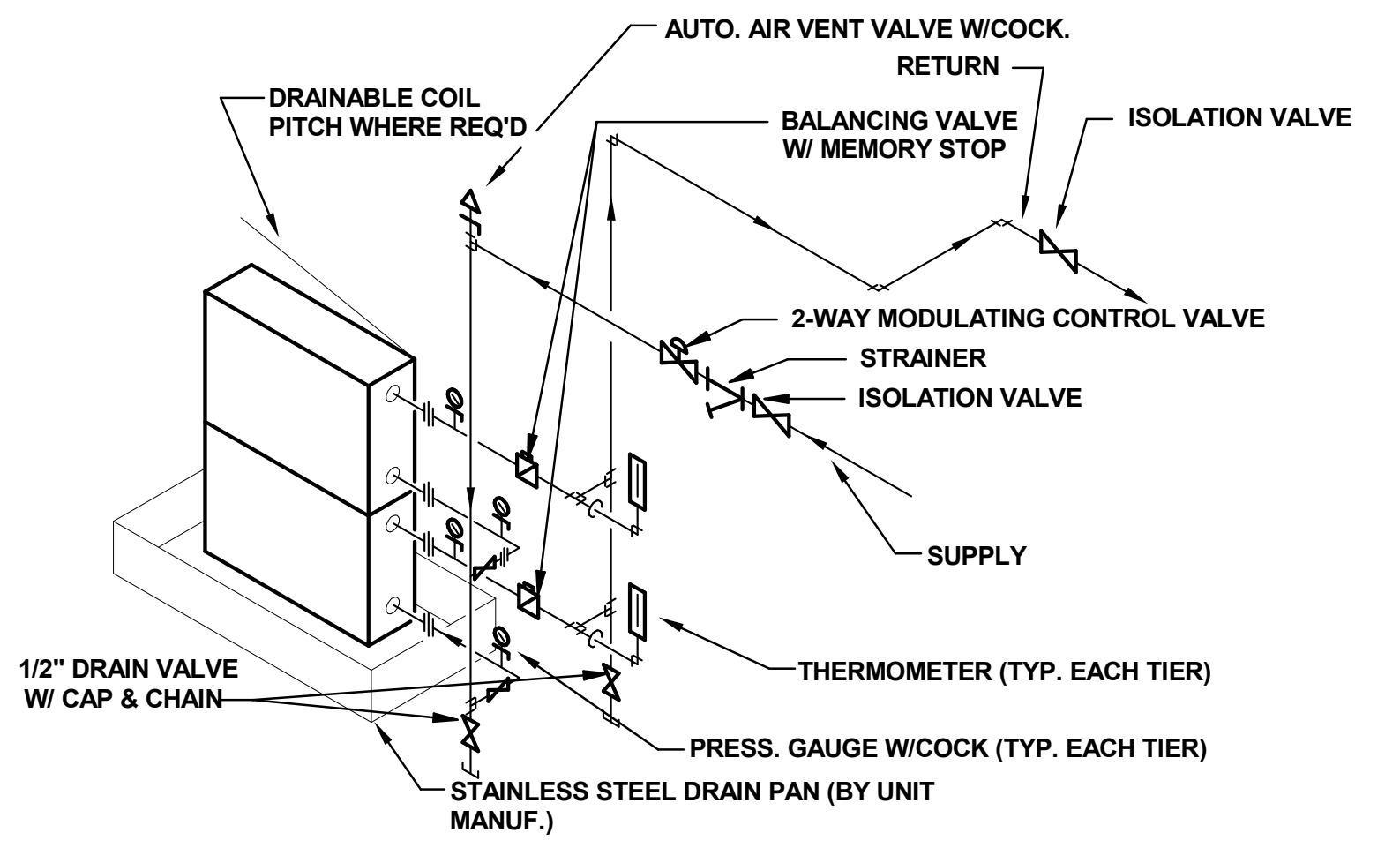
MULTI-COIL HOT WATER HEATING COIL PIPING W/ 2-WAY MODULATING CONTROL VALVE

(NOT TO SCALE)


PRESSURE GAUGE W\COCK
PITCH COIL FOR DRAINING
AUTOMATIC AIR VENT ON COIL
STAINLESS STEEL DRAIN PAN (BY UNIT MANUF.)
1/2" DRAIN VALVE W/ CAP & CHAIN
AUTOMATIC AIR VENT W\COCK
BALANCING VALVE W/ MEMORY STOP
ISOLATION VALVE
TWO-WAY MODULATING CONTROL VALVE
ISOLATION VALVE (TYP.)
STRAINER
THERMOMETER

CHILLED WATER COIL PIPING W/ 2-WAY MODULATING CONTROL VALVE - SINGLE COIL

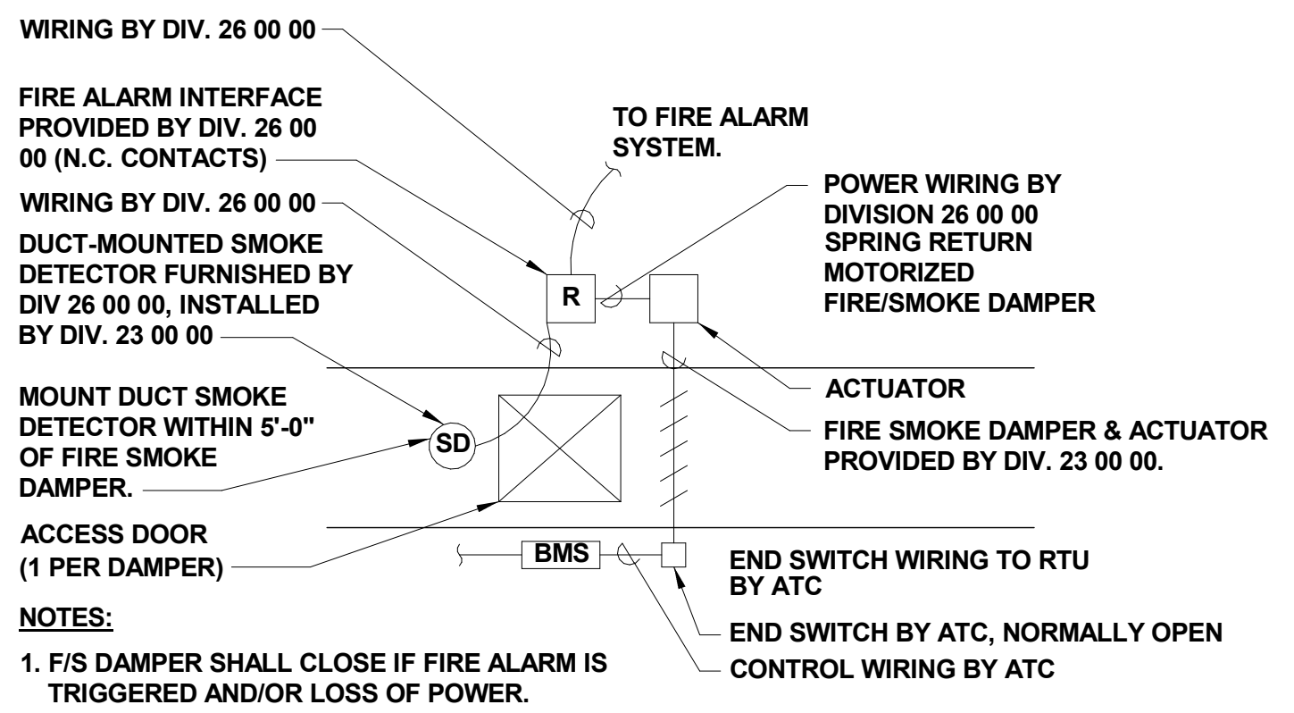
(NOT TO SCALE)


AUTO. AIR VENT VALVE W/COCK.
RETURN
DRAINABLE COIL PITCH WHERE REQ'D
BALANCING VALVE W/ MEMORY STOP
ISOLATION VALVE
2-WAY MODULATING CONTROL VALVE
STRAINER
ISOLATION VALVE
SUPPLY
THERMOMETER (TYP. EACH TIER)
1/2" DRAIN VALVE W/ CAP & CHAIN
PRESS. GAUGE W/COCK (TYP. EACH TIER)
STAINLESS STEEL DRAIN PAN (BY UNIT MANUF.)

FOR UNITS W/ MORE THAN TWO COILS, INDIVIDUAL PIPING & ASSOCIATED COMPONENTS ARE REQUIRED PER COIL INCLUDING BUT NOT LIMITED TO PRESSURE GAUGES, TEMPERATURE GAUGES, BALANCING VALVE & AIR VENT.

MULTI-COIL CHILLED WATER COIL PIPING W/2-WAY MODULATING CONTROL VALVE

(NOT TO SCALE)

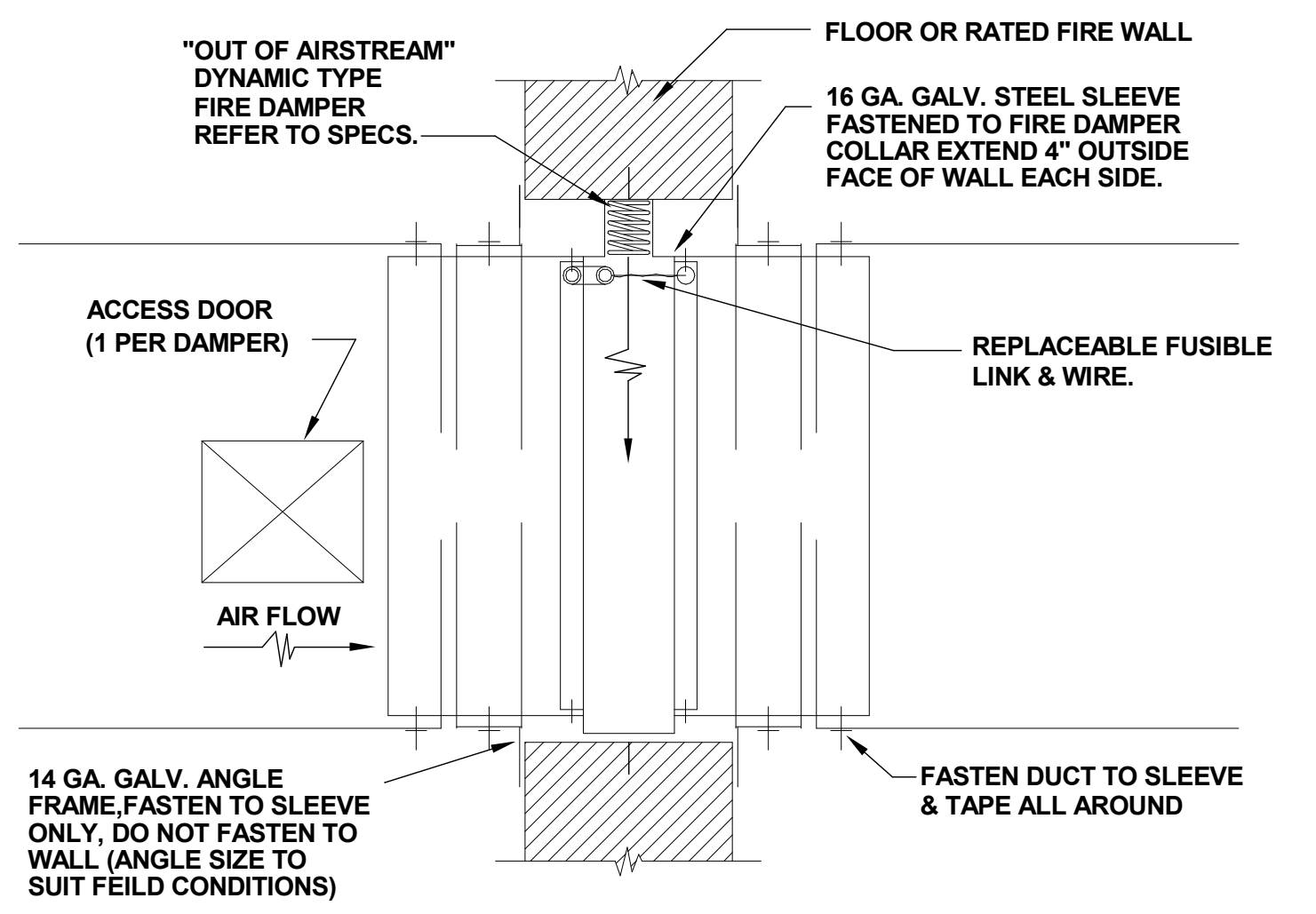

WIRING BY DIV. 26 00 00
FIRE ALARM INTERFACE PROVIDED BY DIV. 26 00 00 (N.C. CONTACTS)
WIRING BY DIV. 26 00 00
DUCT-MOUNTED SMOKE DETECTOR FURNISHED BY DIV 26 00 00, INSTALLED BY DIV. 23 00 00
MOUNT DUCT SMOKE DETECTOR WITHIN 5'-0" OF FIRE SMOKE DAMPER.
ACCESS DOOR (1 PER DAMPER)
TO FIRE ALARM SYSTEM.
R
POWER WIRING BY DIVISION 26 00 00 SPRING RETURN MOTORIZED FIRE/SMOKE DAMPER
ACTUATOR
FIRE SMOKE DAMPER & ACTUATOR PROVIDED BY DIV. 23 00 00.
SD
BMS
END SWITCH WIRING TO RTU BY ATC
END SWITCH BY ATC, NORMALLY OPEN
CONTROL WIRING BY ATC

NOTES:

1. F/S DAMPER SHALL CLOSE IF FIRE ALARM IS TRIGGERED AND/OR LOSS OF POWER.
2. ACTIVATED END SWITCH SHALL SHUT DOWN ASSOCIATED RTU.

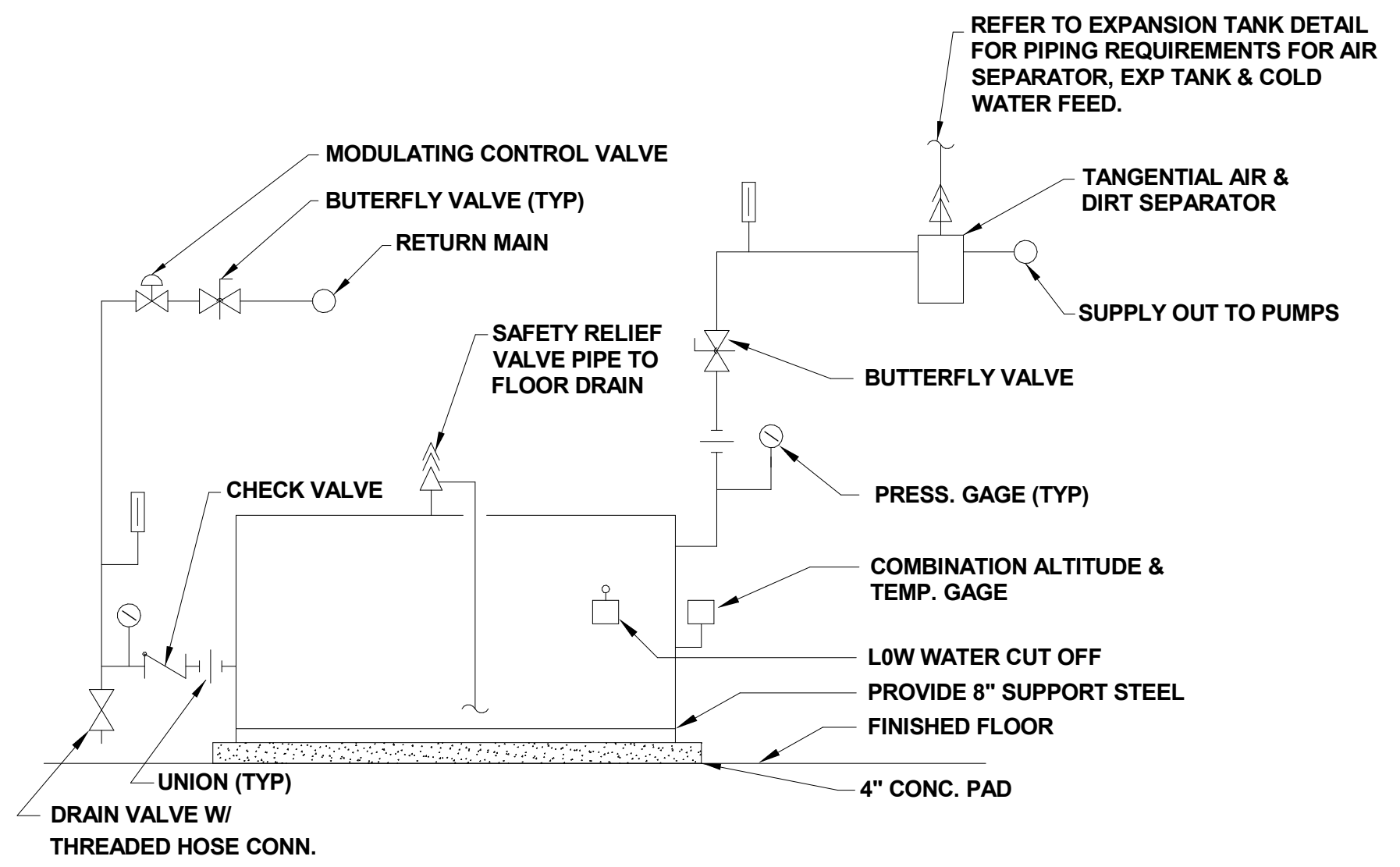
FIRE/SMOKE DAMPER DETAIL

(NOT TO SCALE)


"OUT OF AIRSTREAM" DYNAMIC TYPE FIRE DAMPER REFER TO SPECS.
FLOOR OR RATED FIRE WALL
16 GA. GALV. STEEL SLEEVE FASTENED TO FIRE DAMPER COLLAR EXTEND 4" OUTSIDE FACE OF WALL EACH SIDE.
ACCESS DOOR (1 PER DAMPER)
REPLACEABLE FUSIBLE LINK & WIRE.
AIR FLOW
14 GA. GALV. ANGLE FRAME,FASTEN TO SLEEVE ONLY, DO NOT FASTEN TO WALL (ANGLE SIZE TO SUIT FEILD CONDITIONS)
FASTEN DUCT TO SLEEVE & TAPE ALL AROUND

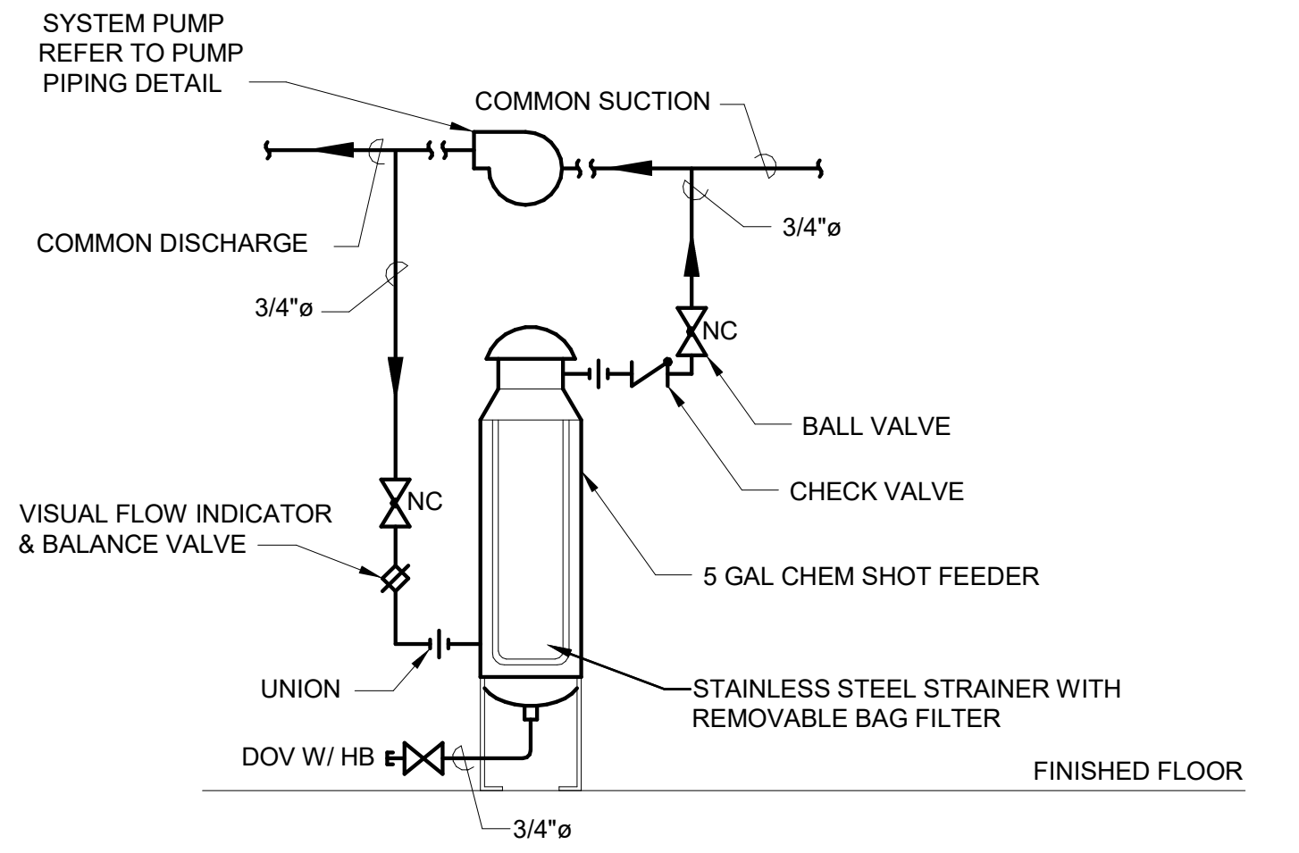
AUTOMATIC FIRE DAMPER

(NOT TO SCALE)


REFER TO EXPANSION TANK DETAIL FOR PIPING REQUIREMENTS FOR AIR SEPARATOR, EXP TANK & COLD WATER FEED.
MODULATING CONTROL VALVE
BUTERFLY VALVE (TYP)
RETURN MAIN
TANGENTIAL AIR & DIRT SEPARATOR
SUPPLY OUT TO PUMPS
SAFETY RELIEF VALVE PIPE TO FLOOR DRAIN
BUTTERFLY VALVE
PRESS. GAGE (TYP)
CHECK VALVE
COMBINATION ALTITUDE & TEMP. GAGE
L0W WATER CUT OFF
PROVIDE 8" SUPPORT STEEL
FINISHED FLOOR
UNION (TYP)
4" CONC. PAD
DRAIN VALVE W/ THREADED HOSE CONN.

TYPICAL ELECTRIC BOILER PIPING DETAIL

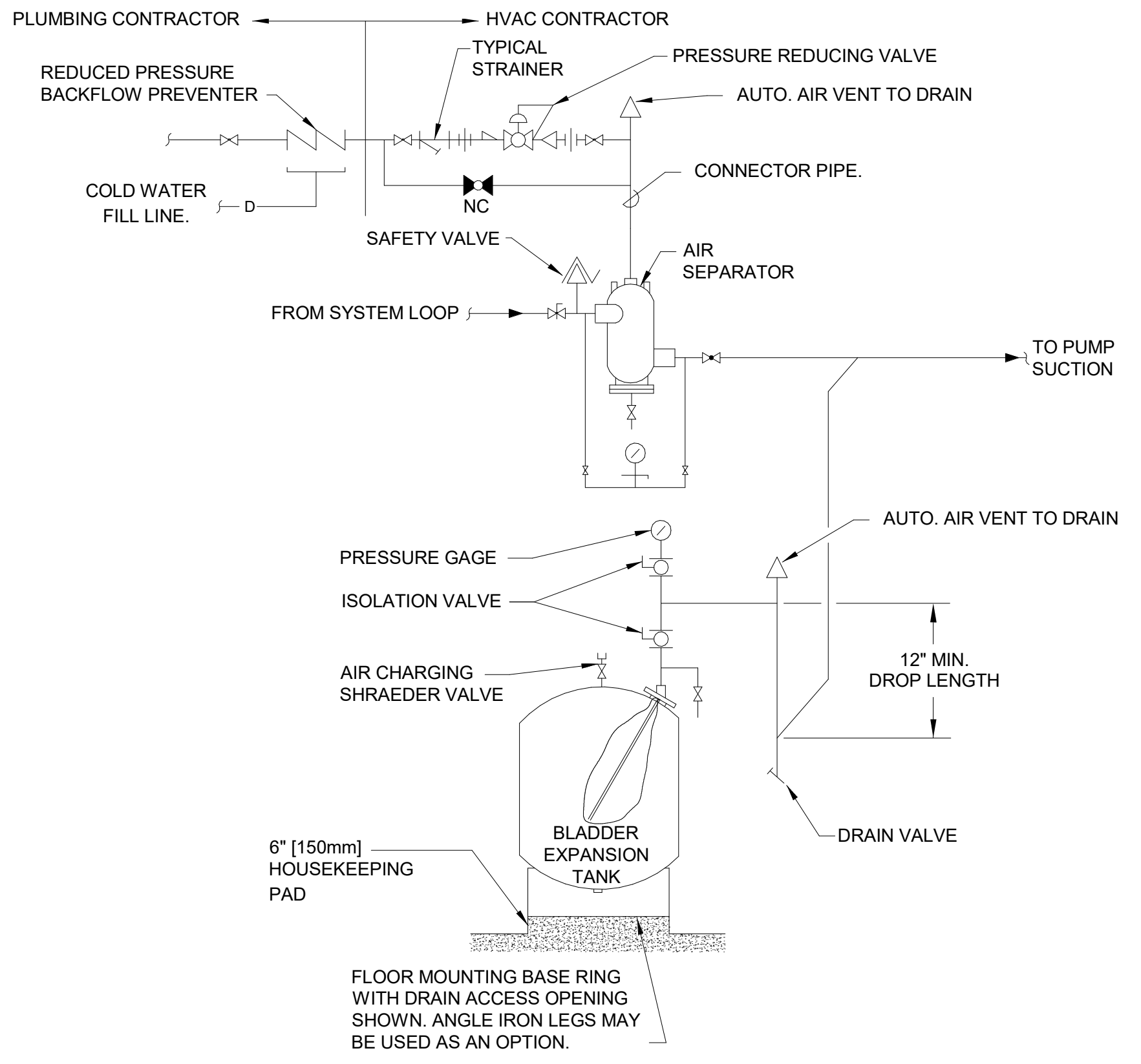
(NOT TO SCALE)


SYSTEM PUMP REFER TO PUMP PIPING DETAIL
COMMON SUCTION
COMMON DISCHARGE
3/4"ø
3/4"ø
NC
BALL VALVE
CHECK VALVE
VISUAL FLOW INDICATOR & BALANCE VALVE
NC
5 GAL CHEM SHOT FEEDER
UNION
STAINLESS STEEL STRAINER WITH REMOVABLE BAG FILTER
DOV W/ HB
FINISHED FLOOR
3/4"ø

1. PROVIDE FOR CLOSED LOOP CONDENSER WATER (ALTERNATE 1 - GEOTHERMAL GROUND SOURCE), CHILLED, & HOT WATER SYSTEMS
2. VISUAL FLOW INDICATOR AND BALANCE VALVE COULD BE TWO DIFFERENT COMPONENTS

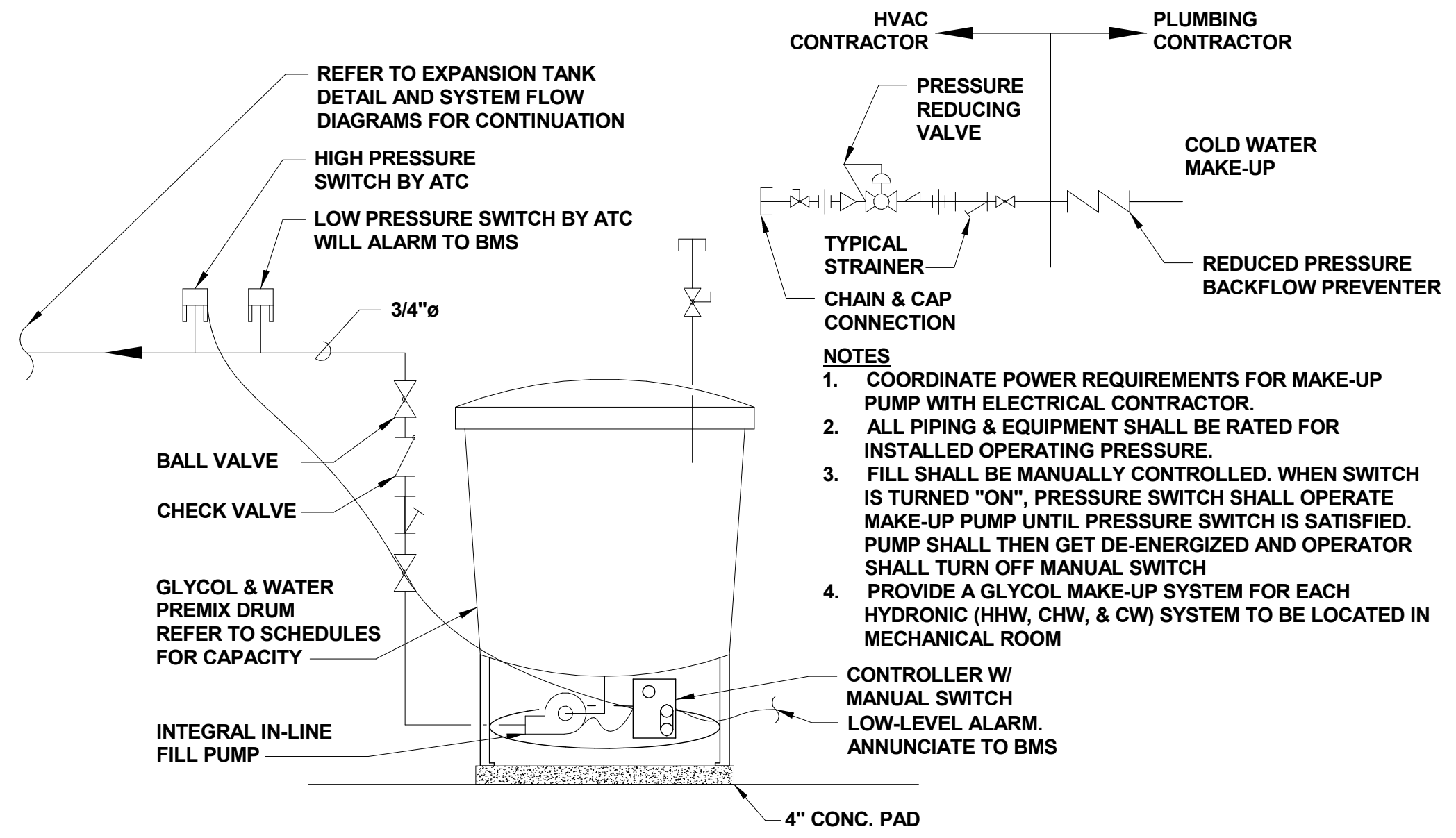
CHEMICAL SHOT FEEDER PIPING DETAIL

(NOT TO SCALE)



EXPANSION TANK & AIR SEPARATOR PIPING DETAIL

(NOT TO SCALE)

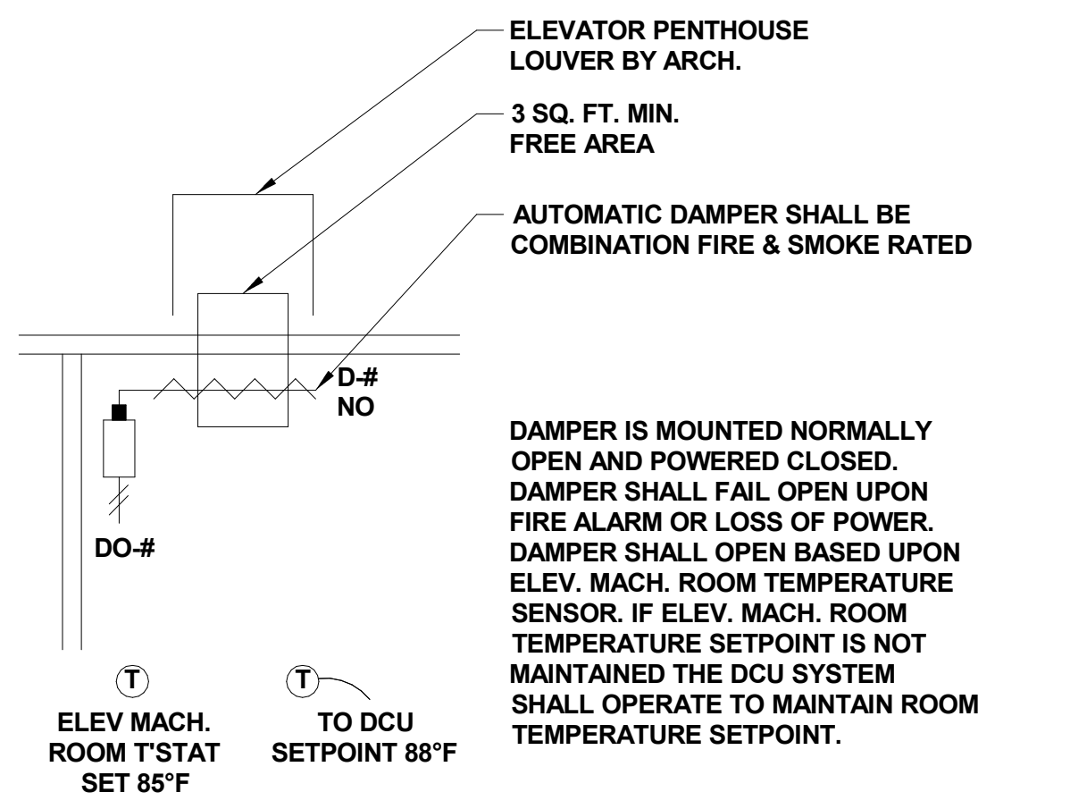

REFER TO EXPANSION TANK DETAIL AND SYSTEM FLOW DIAGRAMS FOR CONTINUATION
HIGH PRESSURE SWITCH BY ATC
LOW PRESSURE SWITCH BY ATC WILL ALARM TO BMS
3/4"ø
HVAC CONTRACTOR
PLUMBING CONTRACTOR
PRESSURE REDUCING VALVE
COLD WATER MAKE-UP
TYPICAL STRAINER
CHAIN & CAP CONNECTION
REDUCED PRESSURE BACKFLOW PREVENTER
BALL VALVE
CHECK VALVE
GLYCOL & WATER PREMIX DRUM REFER TO SCHEDULES FOR CAPACITY
INTEGRAL IN-LINE FILL PUMP
CONTROLLER W/ MANUAL SWITCH
LOW-LEVEL ALARM. ANNUNCIATE TO BMS
4" CONC. PAD

NOTES

1. COORDINATE POWER REQUIREMENTS FOR MAKE-UP PUMP WITH ELECTRICAL CONTRACTOR.
2. ALL PIPING & EQUIPMENT SHALL BE RATED FOR INSTALLED OPERATING PRESSURE.
3. FILL SHALL BE MANUALLY CONTROLLED. WHEN SWITCH IS TURNED "ON", PRESSURE SWITCH SHALL OPERATE MAKE-UP PUMP UNTIL PRESSURE SWITCH IS SATISFIED. PUMP SHALL THEN GET DE-ENERGIZED AND OPERATOR SHALL TURN OFF MANUAL SWITCH
4. PROVIDE A GLYCOL MAKE-UP SYSTEM FOR EACH HYDRONIC (HHW, CHW, & CW) SYSTEM TO BE LOCATED IN MECHANICAL ROOM

GLYCOL MAKE-UP UNIT

(NOT TO SCALE)


ELEVATOR PENTHOUSE LOUVER BY ARCH.
3 SQ. FT. MIN. FREE AREA
AUTOMATIC DAMPER SHALL BE COMBINATION FIRE & SMOKE RATED
D-# NO
DO-#
T
ELEV MACH. ROOM T'STAT SET 85°F
T
TO DCU SETPOINT 88°F

DAMPER IS MOUNTED NORMALLY OPEN AND POWERED CLOSED. DAMPER SHALL FAIL OPEN UPON FIRE ALARM OR LOSS OF POWER. DAMPER SHALL OPEN BASED UPON ELEV. MACH. ROOM TEMPERATURE SENSOR. IF ELEV. MACH. ROOM TEMPERATURE SETPOINT IS NOT MAINTAINED THE DCU SYSTEM SHALL OPERATE TO MAINTAIN ROOM TEMPERATURE SETPOINT.

ELEVATOR SHAFT & MACHINE ROOM VENT DETAIL

(NOT TO SCALE)

DORE + WHITTIER

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GGD CONSULTING ENGINEERS, INC.
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WILMINGTON
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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

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ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

SCALE: AS INDICATED

SHEET TITLE:
DETAILS II

SHEET NUMBER:
M0.12

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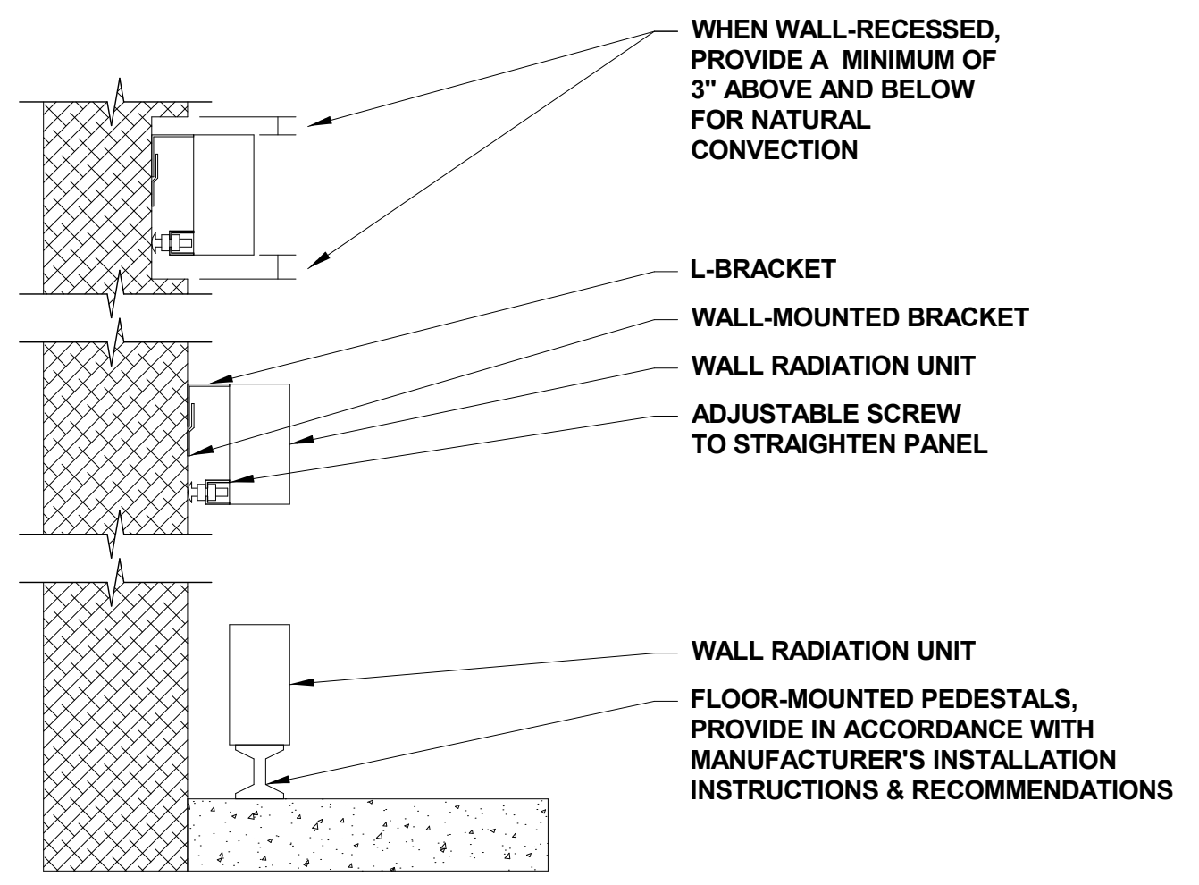
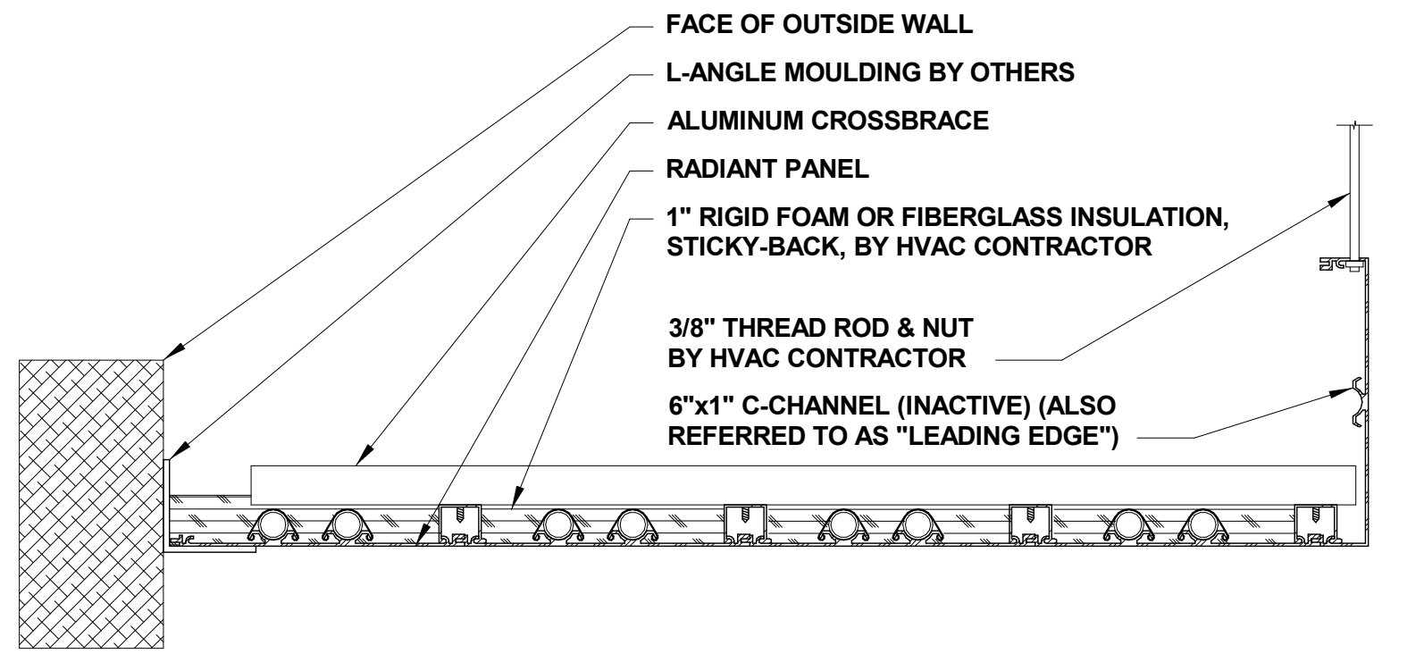
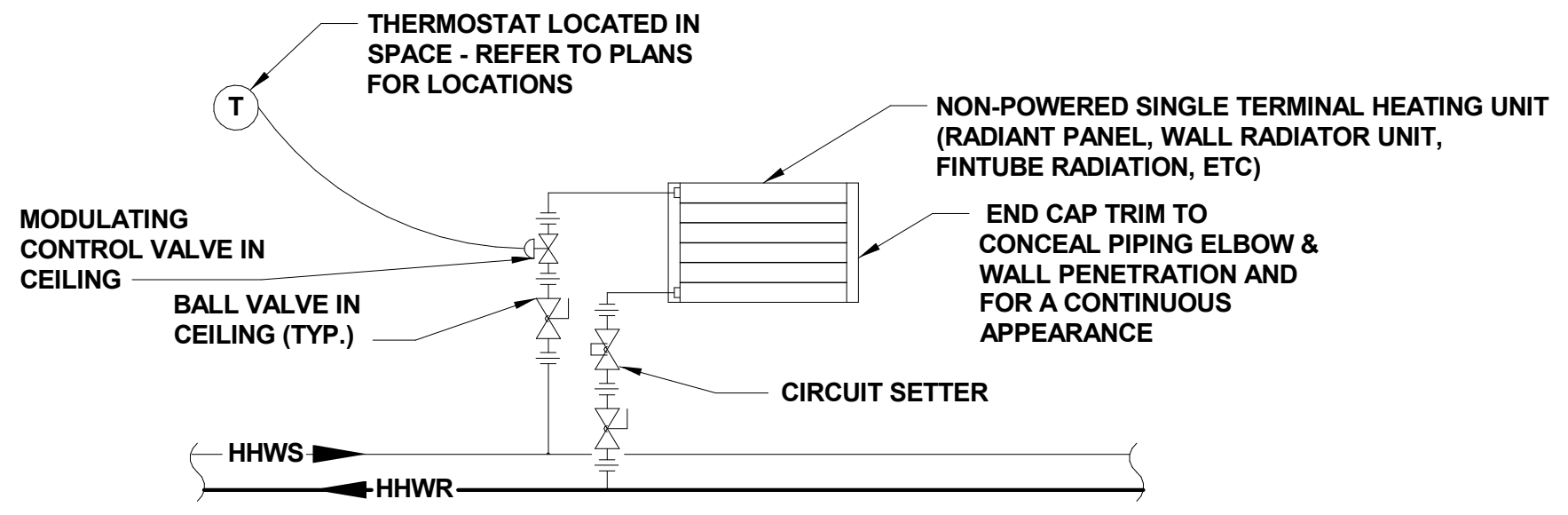

WHEN WALL-RECESSED, PROVIDE A MINIMUM OF 3" ABOVE AND BELOW FOR NATURAL CONVECTION
L-BRACKET
WALL-MOUNTED BRACKET
WALL RADIATION UNIT
ADJUSTABLE SCREW TO STRAIGHTEN PANEL
WALL RADIATION UNIT
FLOOR-MOUNTED PEDESTALS, PROVIDE IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS & RECOMMENDATIONS

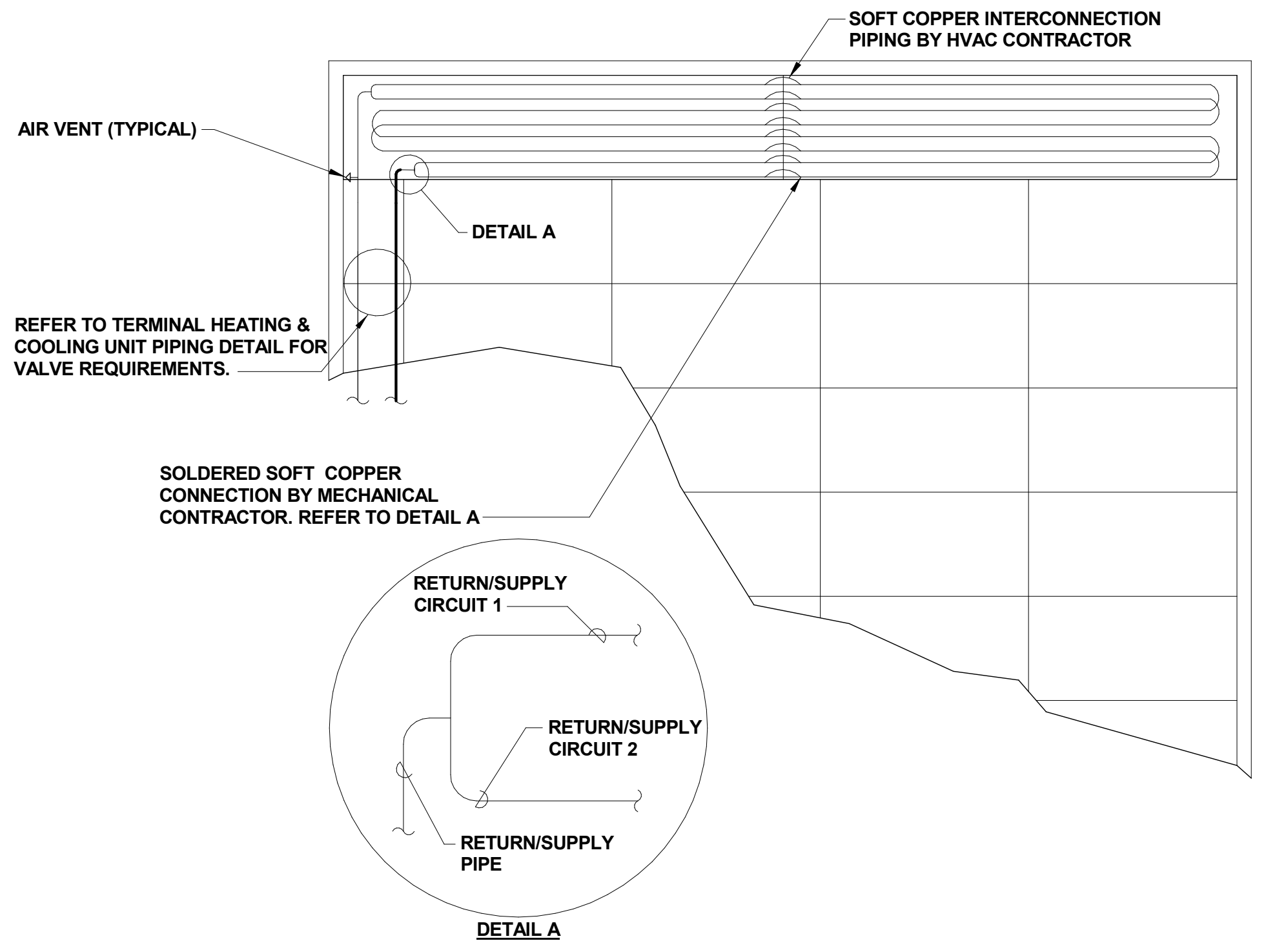
TYPICAL WALL RADIATION UNIT INSTALLATION DETAIL
(NOT TO SCALE)


FACE OF OUTSIDE WALL
L-ANGLE MOULDING BY OTHERS
ALUMINUM CROSSBRACE
RADIANT PANEL
1" RIGID FOAM OR FIBERGLASS INSULATION, STICKY-BACK, BY HVAC CONTRACTOR
3/8" THREAD ROD & NUT BY HVAC CONTRACTOR
6"x1" C-CHANNEL (INACTIVE) (ALSO REFERRED TO AS "LEADING EDGE")

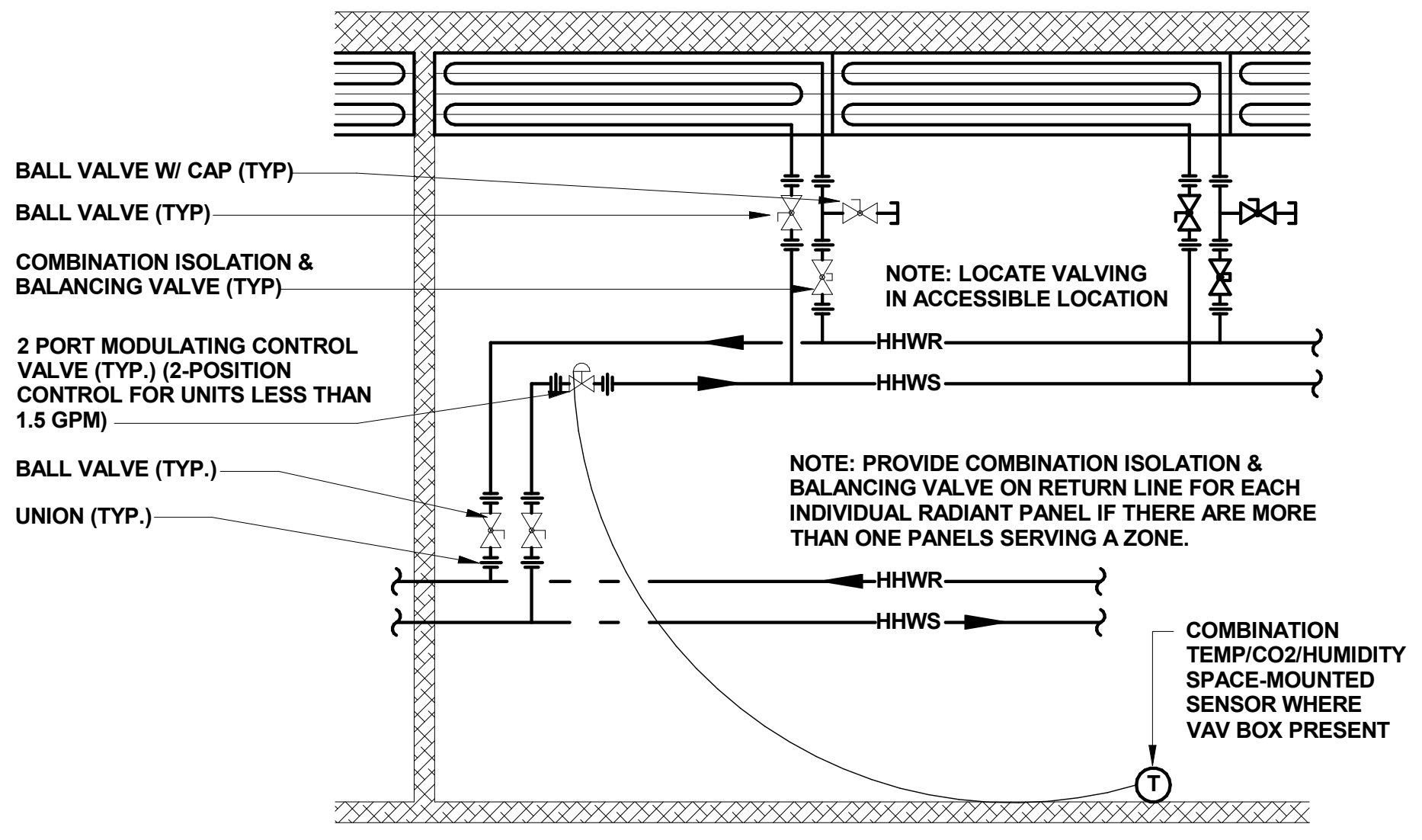
RADIANT PANEL AT EXTERIOR WALL WITH ONE SIDE EXPOSED DETAIL
(NOT TO SCALE)


THERMOSTAT LOCATED IN SPACE - REFER TO PLANS FOR LOCATIONS
T
NON-POWERED SINGLE TERMINAL HEATING UNIT (RADIANT PANEL, WALL RADIATOR UNIT, FINTUBE RADIATION, ETC)
MODULATING CONTROL VALVE IN CEILING
BALL VALVE IN CEILING (TYP.)
END CAP TRIM TO CONCEAL PIPING ELBOW & WALL PENETRATION AND FOR A CONTINUOUS APPEARANCE
CIRCUIT SETTER
HHWS
HHWR

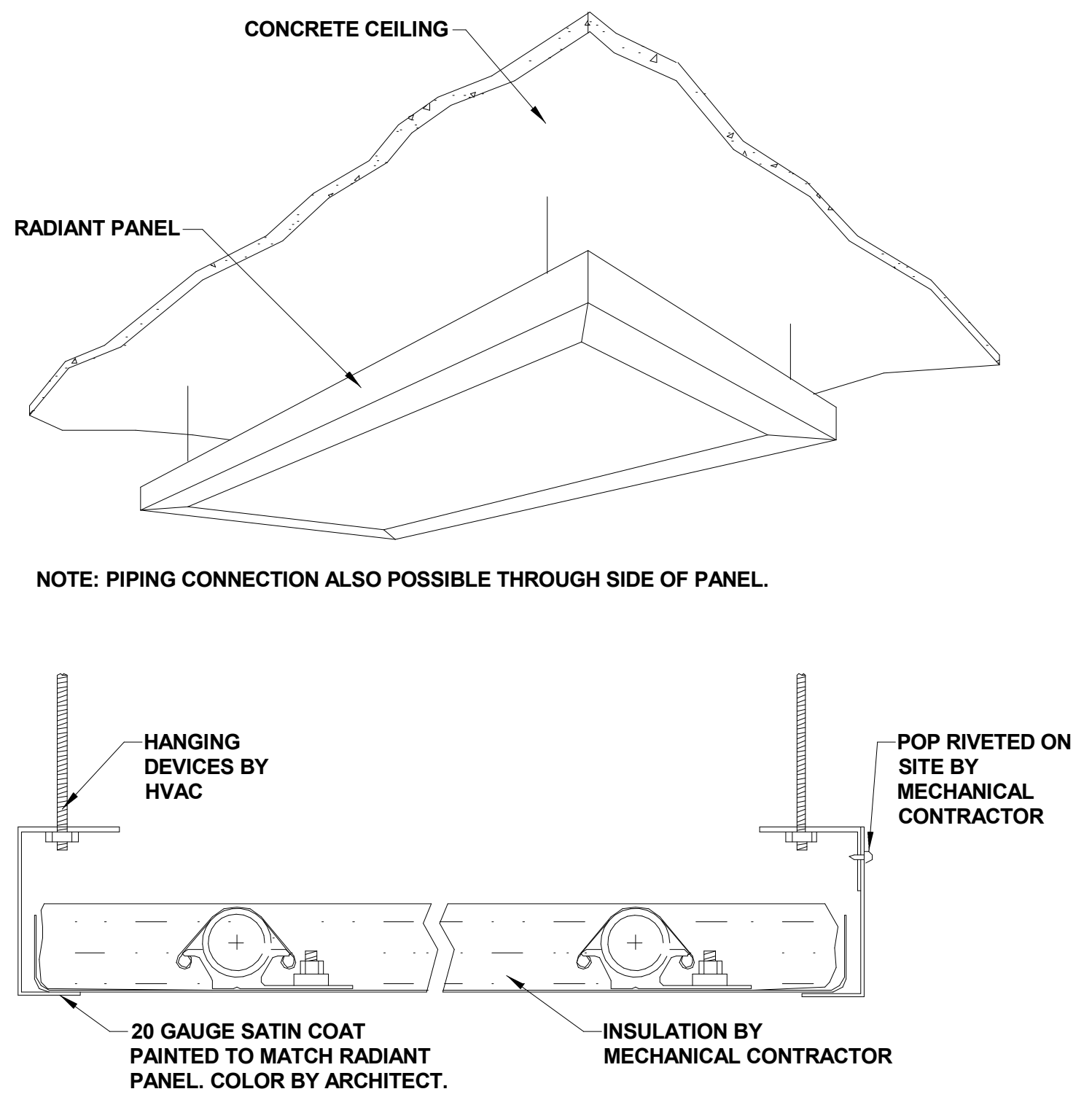
TERMINAL HEATING UNIT PIPING DETAIL
(NOT TO SCALE)


SOFT COPPER INTERCONNECTION PIPING BY HVAC CONTRACTOR
AIR VENT (TYPICAL)
DETAIL A
REFER TO TERMINAL HEATING & COOLING UNIT PIPING DETAIL FOR VALVE REQUIREMENTS.
SOLDERED SOFT COPPER CONNECTION BY MECHANICAL CONTRACTOR. REFER TO DETAIL A
RETURN/SUPPLY CIRCUIT 1
RETURN/SUPPLY CIRCUIT 2
RETURN/SUPPLY PIPE
DETAIL A

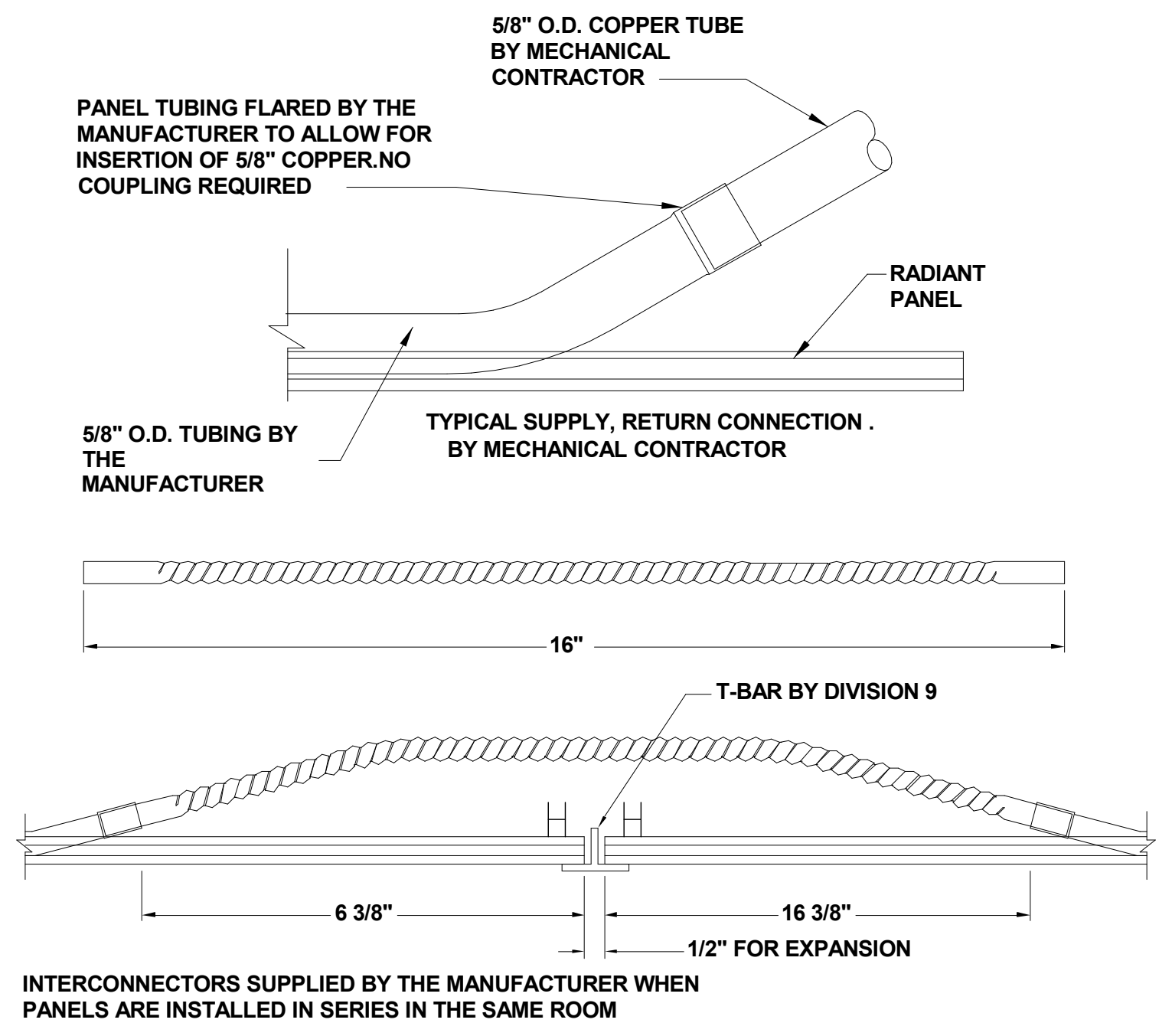
DOUBLE CIRCUIT RADIANT HEATING PANEL PIPING DETAIL
(NOT TO SCALE)


BALL VALVE W/ CAP (TYP)
BALL VALVE (TYP)
COMBINATION ISOLATION & BALANCING VALVE (TYP)
2 PORT MODULATING CONTROL VALVE (TYP.) (2-POSITION CONTROL FOR UNITS LESS THAN 1.5 GPM)
BALL VALVE (TYP.)
UNION (TYP.)
NOTE: LOCATE VALVING IN ACCESSIBLE LOCATION
HHWR
HHWS
NOTE: PROVIDE COMBINATION ISOLATION & BALANCING VALVE ON RETURN LINE FOR EACH INDIVIDUAL RADIANT PANEL IF THERE ARE MORE THAN ONE PANELS SERVING A ZONE.
HHWR
HHWS
COMBINATION TEMP/CO2/HUMIDITY SPACE-MOUNTED SENSOR WHERE VAV BOX PRESENT
T

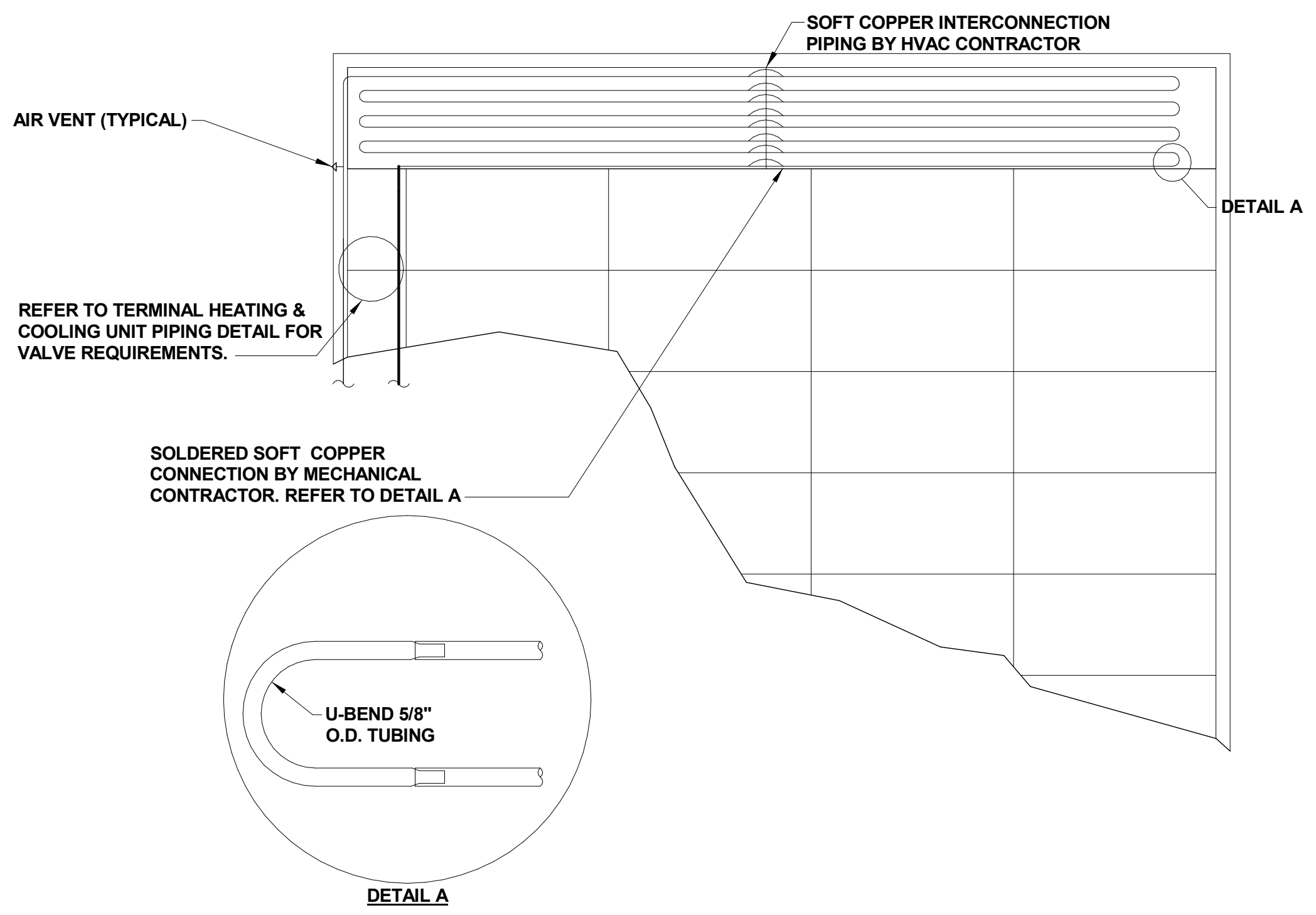
MULTIPLE HEATING RADIANT PANEL PIPING DETAIL
(NOT TO SCALE)


CONCRETE CEILING
RADIANT PANEL
NOTE: PIPING CONNECTION ALSO POSSIBLE THROUGH SIDE OF PANEL.
HANGING DEVICES BY HVAC
POP RIVETED ON SITE BY MECHANICAL CONTRACTOR
20 GAUGE SATIN COAT PAINTED TO MATCH RADIANT PANEL. COLOR BY ARCHITECT.
INSULATION BY MECHANICAL CONTRACTOR

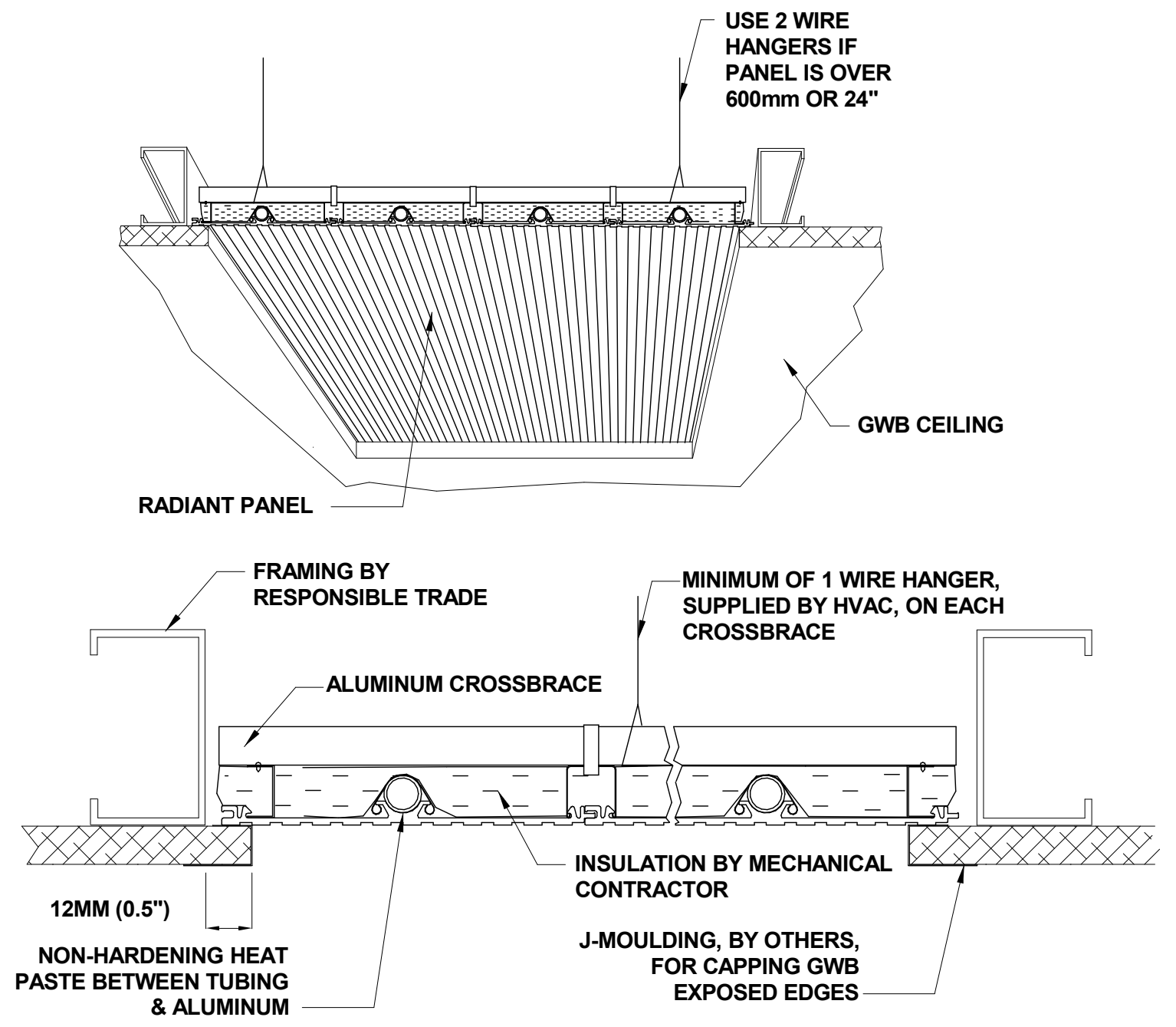
FREE HANGING MODULAR PANEL
(NOT TO SCALE)


5/8" O.D. COPPER TUBE BY MECHANICAL CONTRACTOR
PANEL TUBING FLARED BY THE MANUFACTURER TO ALLOW FOR INSERTION OF 5/8" COPPER.NO COUPLING REQUIRED
RADIANT PANEL
5/8" O.D. TUBING BY THE MANUFACTURER
TYPICAL SUPPLY, RETURN CONNECTION . BY MECHANICAL CONTRACTOR
16"
T-BAR BY DIVISION 9
6 3/8"
16 3/8"
1/2" FOR EXPANSION
INTERCONNECTORS SUPPLIED BY THE MANUFACTURER WHEN PANELS ARE INSTALLED IN SERIES IN THE SAME ROOM

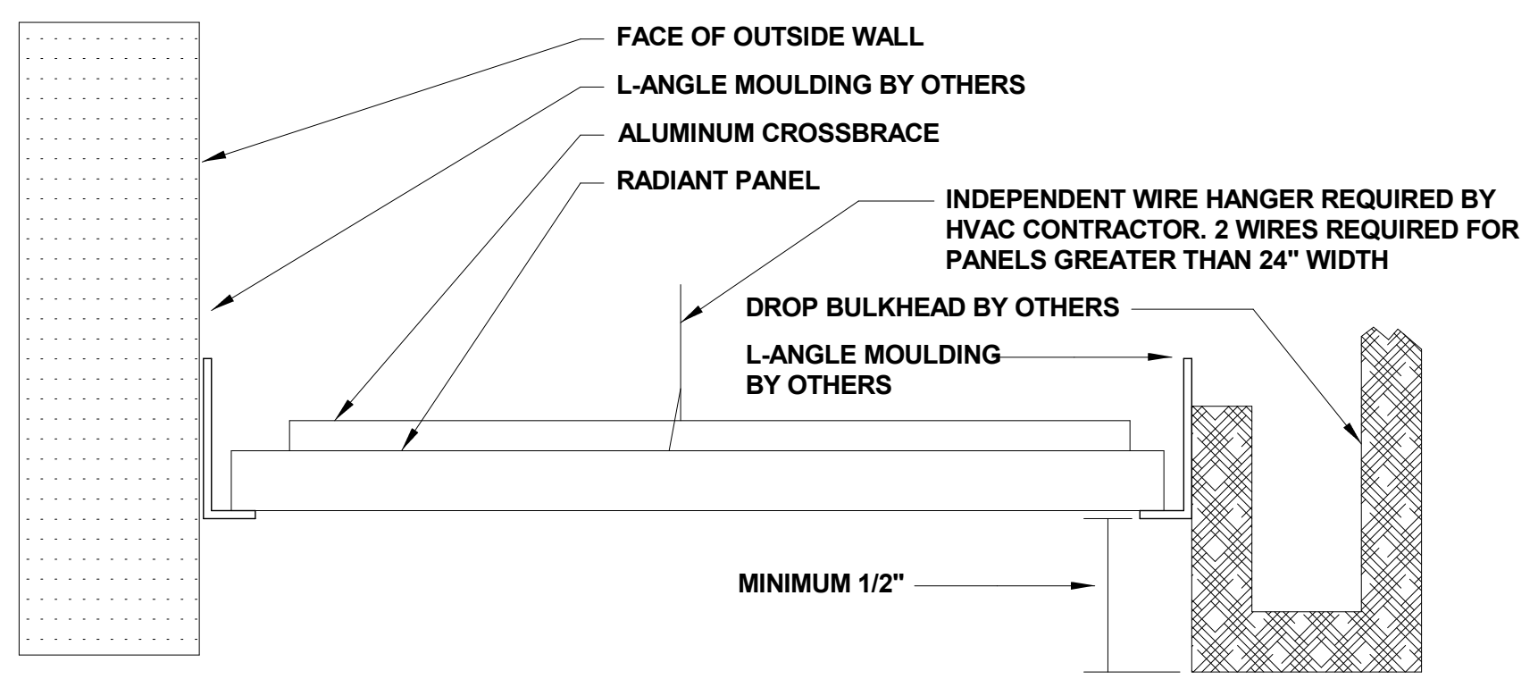
COPPER CONNECTION DETAILS
(NOT TO SCALE)


SOFT COPPER INTERCONNECTION PIPING BY HVAC CONTRACTOR
AIR VENT (TYPICAL)
DETAIL A
REFER TO TERMINAL HEATING & COOLING UNIT PIPING DETAIL FOR VALVE REQUIREMENTS.
SOLDERED SOFT COPPER CONNECTION BY MECHANICAL CONTRACTOR. REFER TO DETAIL A
U-BEND 5/8" O.D. TUBING
DETAIL A

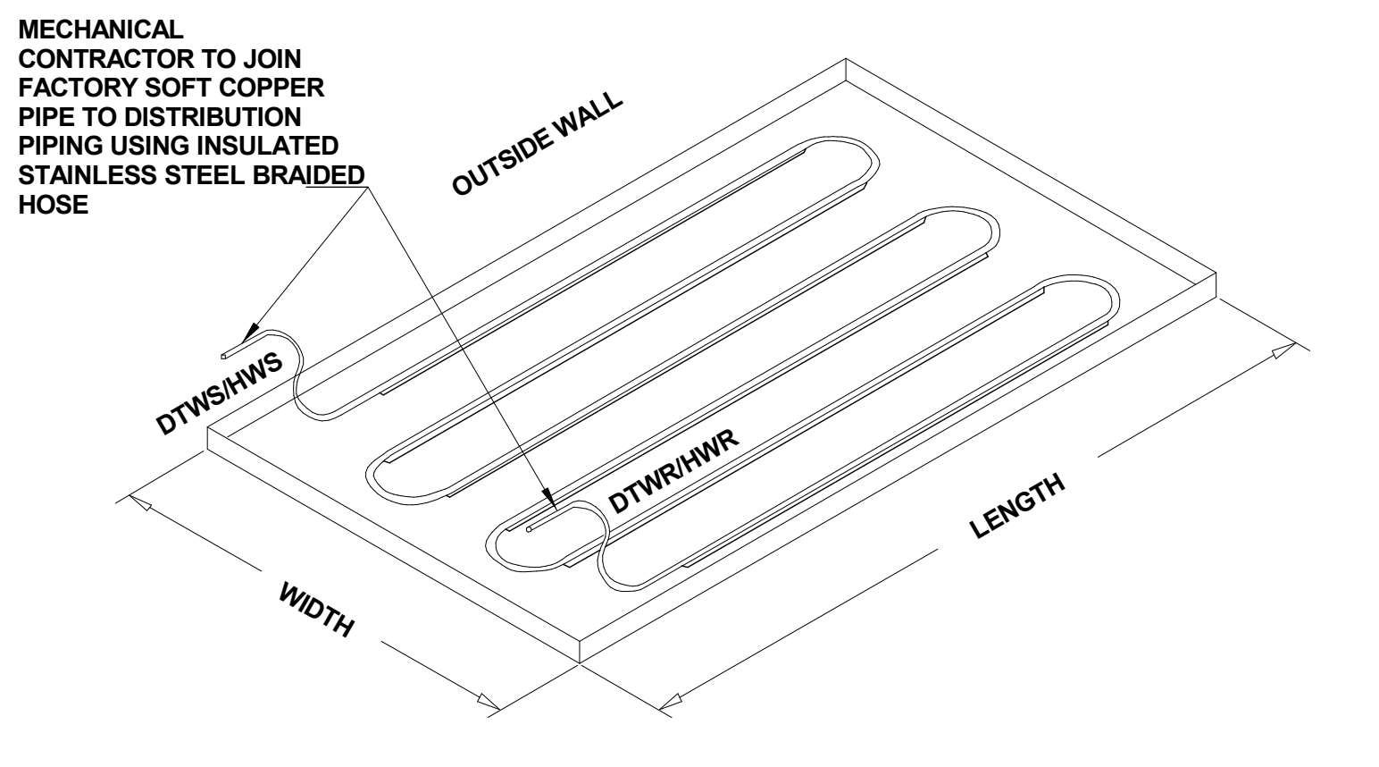
SINGLE CIRCUIT RADIANT HEATING PANEL PIPING DETAIL
(NOT TO SCALE)


USE 2 WIRE HANGERS IF PANEL IS OVER 600mm OR 24"
GWB CEILING
RADIANT PANEL
FRAMING BY RESPONSIBLE TRADE
MINIMUM OF 1 WIRE HANGER, SUPPLIED BY HVAC, ON EACH CROSSBRACE
ALUMINUM CROSSBRACE
INSULATION BY MECHANICAL CONTRACTOR
12MM (0.5")
NON-HARDENING HEAT PASTE BETWEEN TUBING & ALUMINUM
J-MOULDING, BY OTHERS, FOR CAPPING GWB EXPOSED EDGES

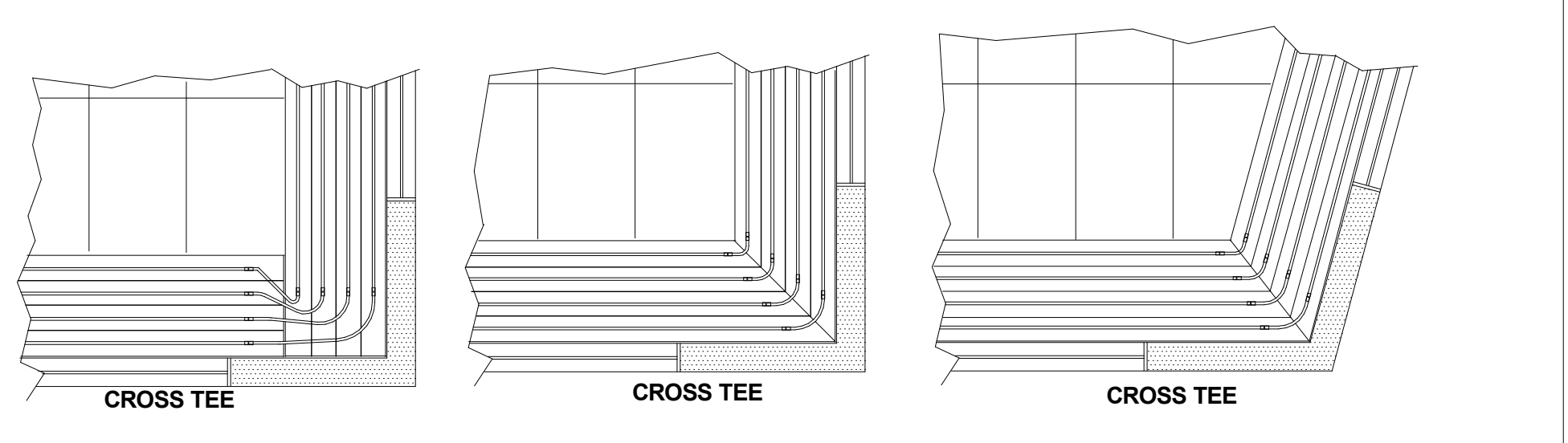
TYPICAL RADIANT PANEL WITHIN A GYP-BOARD CEILING
(NOT TO SCALE)


FACE OF OUTSIDE WALL
L-ANGLE MOULDING BY OTHERS
ALUMINUM CROSSBRACE
RADIANT PANEL
INDEPENDENT WIRE HANGER REQUIRED BY HVAC CONTRACTOR. 2 WIRES REQUIRED FOR PANELS GREATER THAN 24" WIDTH
DROP BULKHEAD BY OTHERS
L-ANGLE MOULDING BY OTHERS
MINIMUM 1/2"

RADIANT PANEL BULKHEAD-STYLE INSTALLATION DETAIL
(NOT TO SCALE)

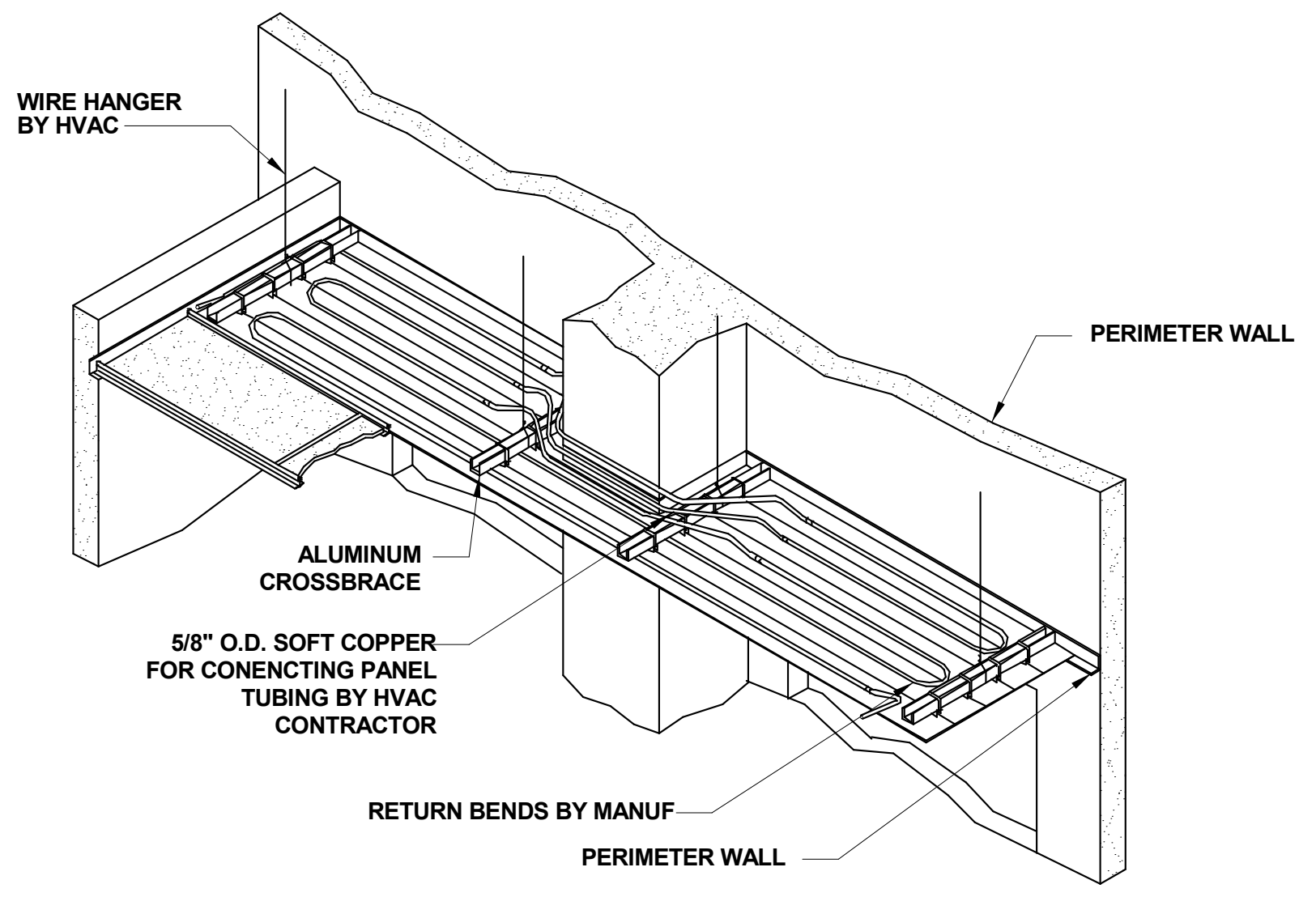

MECHANICAL CONTRACTOR TO JOIN FACTORY SOFT COPPER PIPE TO DISTRIBUTION PIPING USING INSULATED STAINLESS STEEL BRAIDED HOSE
OUTSIDE WALL
DTWS/HWS
DTWR/HWR
WIDTH
LENGTH

RADIANT HEATING PANEL SUPPLY, RETURN CONNECTION DETAIL
(NOT TO SCALE)

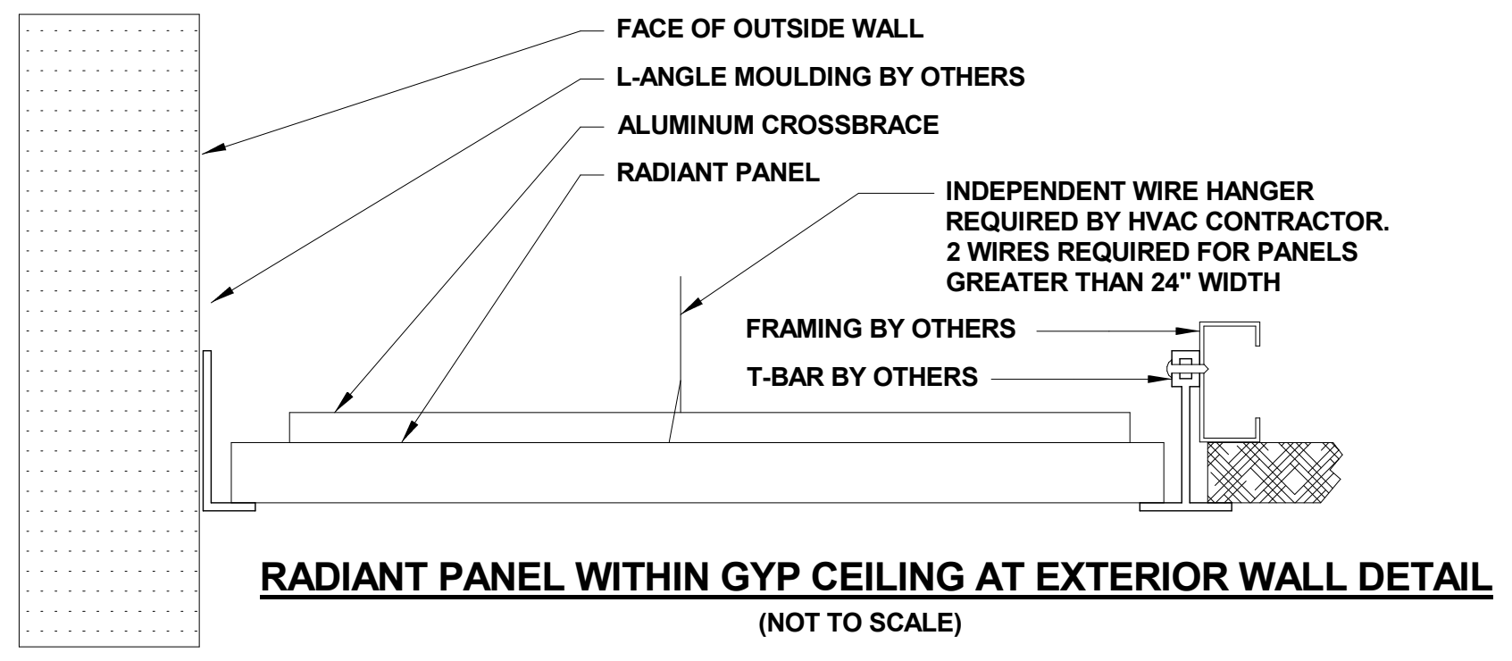


5/8" (16 mm) O.D. SOFT COPPER FOR CONNECTING PANELS BY MECHANICAL CONTRACTOR

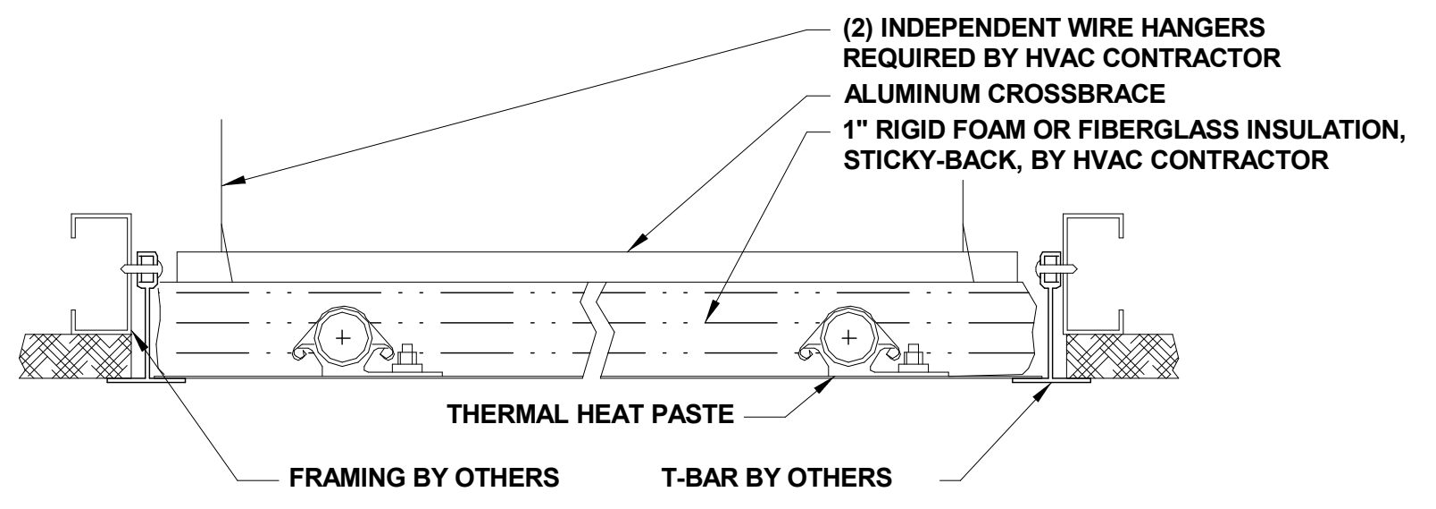
CORNER DETAILS
(NOT TO SCALE)



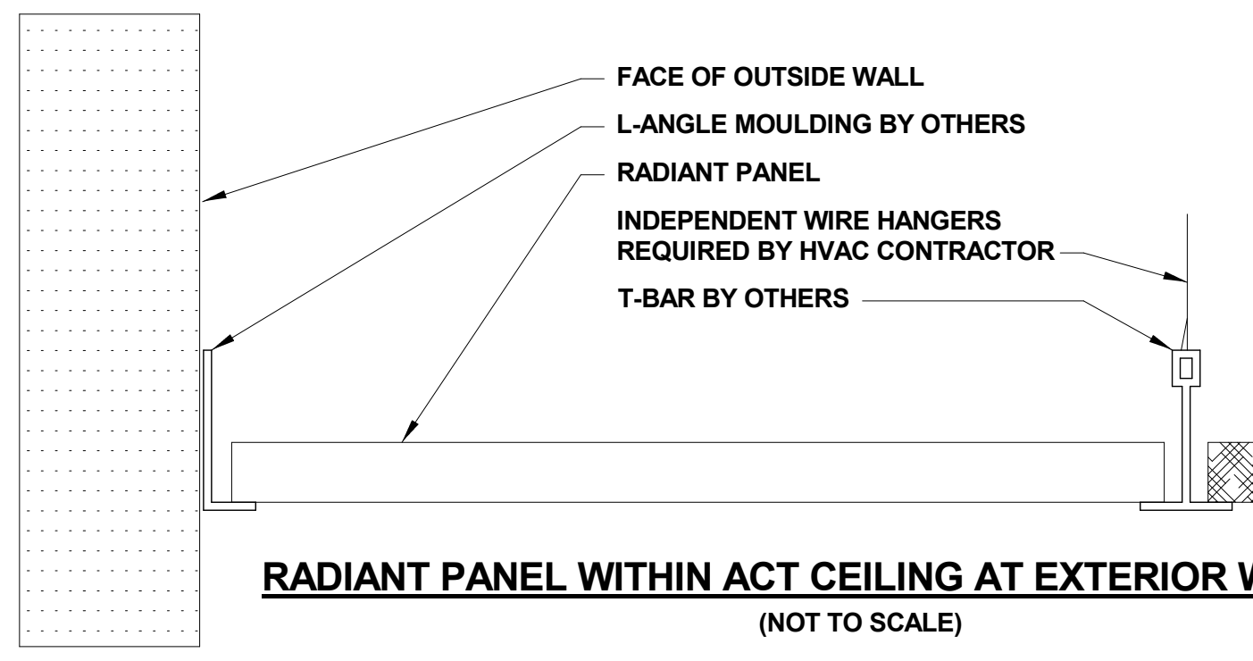
SERPENTINE CIRCUITING AROUND COLUMN
NO SCALE


FACE OF OUTSIDE WALL
L-ANGLE MOULDING BY OTHERS
ALUMINUM CROSSBRACE
RADIANT PANEL
INDEPENDENT WIRE HANGER REQUIRED BY HVAC CONTRACTOR. 2 WIRES REQUIRED FOR PANELS GREATER THAN 24" WIDTH
FRAMING BY OTHERS
T-BAR BY OTHERS

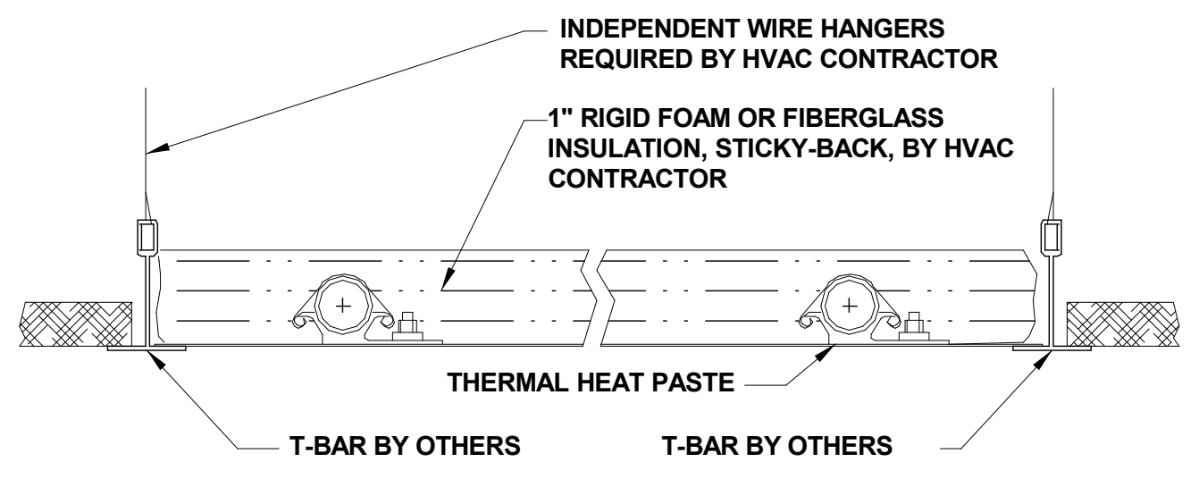
RADIANT PANEL WITHIN GYP CEILING AT EXTERIOR WALL DETAIL
(NOT TO SCALE)


(2) INDEPENDENT WIRE HANGERS REQUIRED BY HVAC CONTRACTOR
ALUMINUM CROSSBRACE
1" RIGID FOAM OR FIBERGLASS INSULATION, STICKY-BACK, BY HVAC CONTRACTOR
THERMAL HEAT PASTE
FRAMING BY OTHERS
T-BAR BY OTHERS

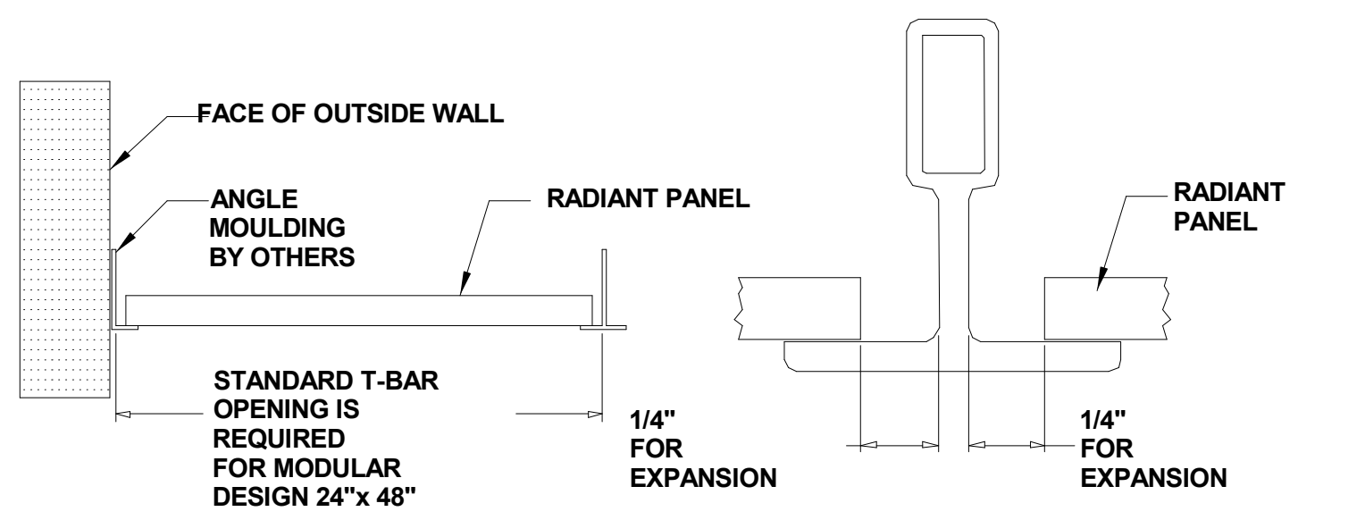
RADIANT PANEL WITHIN GYP CEILING DETAIL
(NOT TO SCALE)


FACE OF OUTSIDE WALL
L-ANGLE MOULDING BY OTHERS
RADIANT PANEL
INDEPENDENT WIRE HANGERS REQUIRED BY HVAC CONTRACTOR
T-BAR BY OTHERS

RADIANT PANEL WITHIN ACT CEILING AT EXTERIOR WALL DETAIL
(NOT TO SCALE)


INDEPENDENT WIRE HANGERS REQUIRED BY HVAC CONTRACTOR
1" RIGID FOAM OR FIBERGLASS INSULATION, STICKY-BACK, BY HVAC CONTRACTOR
THERMAL HEAT PASTE
T-BAR BY OTHERS
T-BAR BY OTHERS

RADIANT PANEL WITHIN ACT CEILING DETAIL
(NOT TO SCALE)



RADIANT HEATING PANEL EXPANSION GAP DETAIL
(NOT TO SCALE)

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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

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90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

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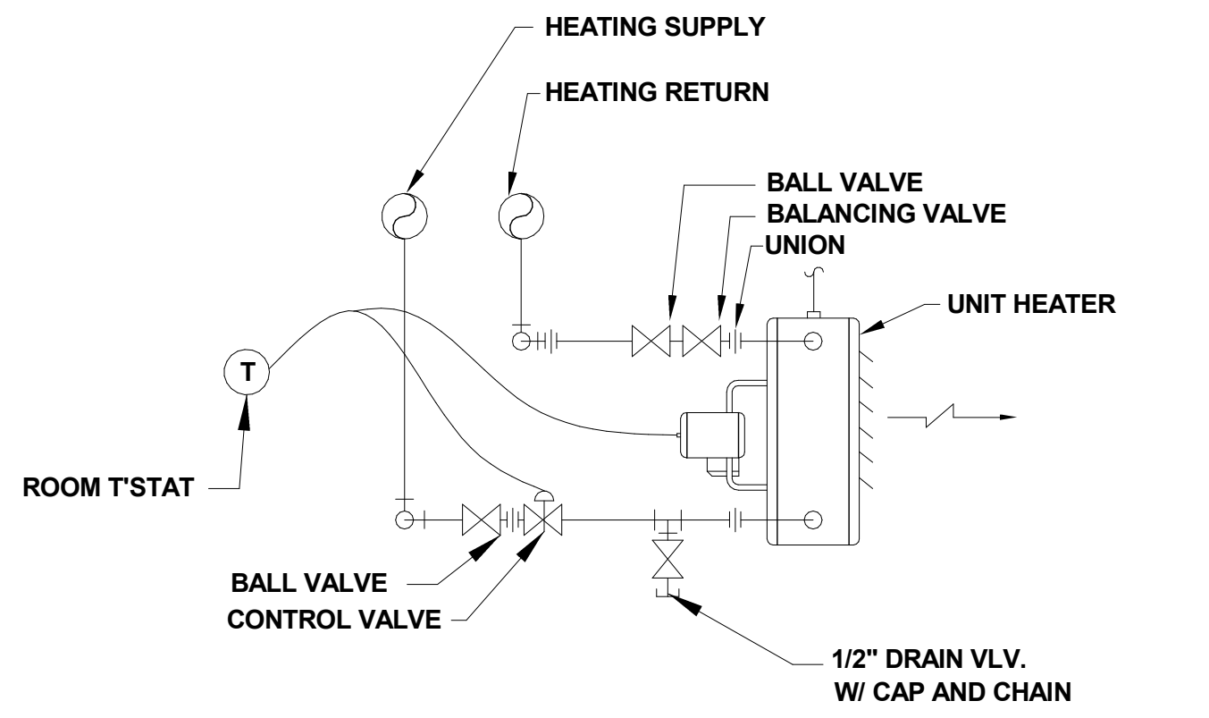
SCALE: AS INDICATED

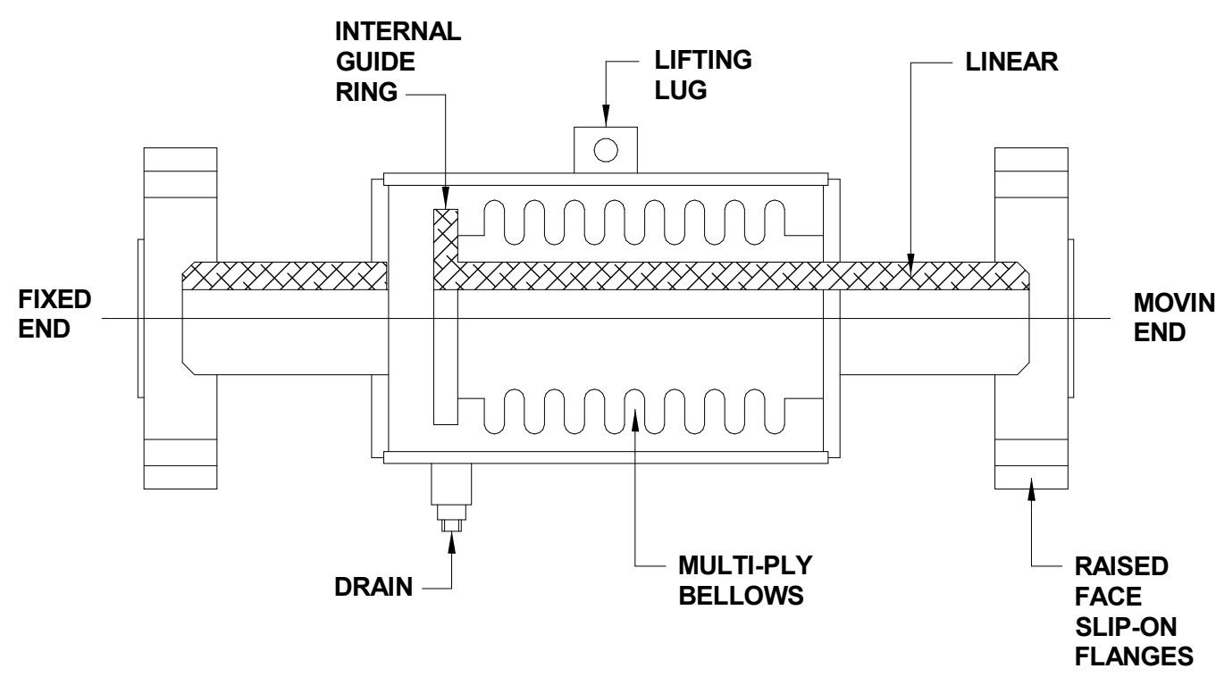
SHEET TITLE:
DETAILS III

SHEET NUMBER:
M0.13



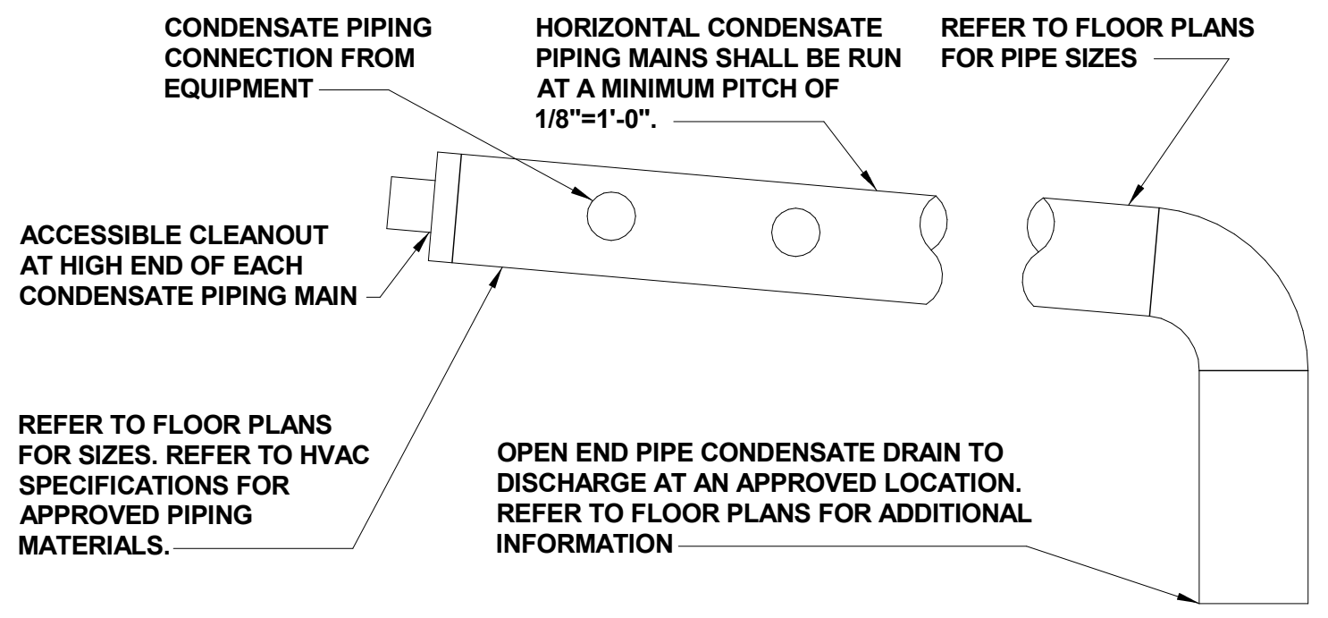
TYPICAL HORIZONTAL UNIT HEATER PIPING DETAIL-HEATING-HOT WATER

(NOT TO SCALE)



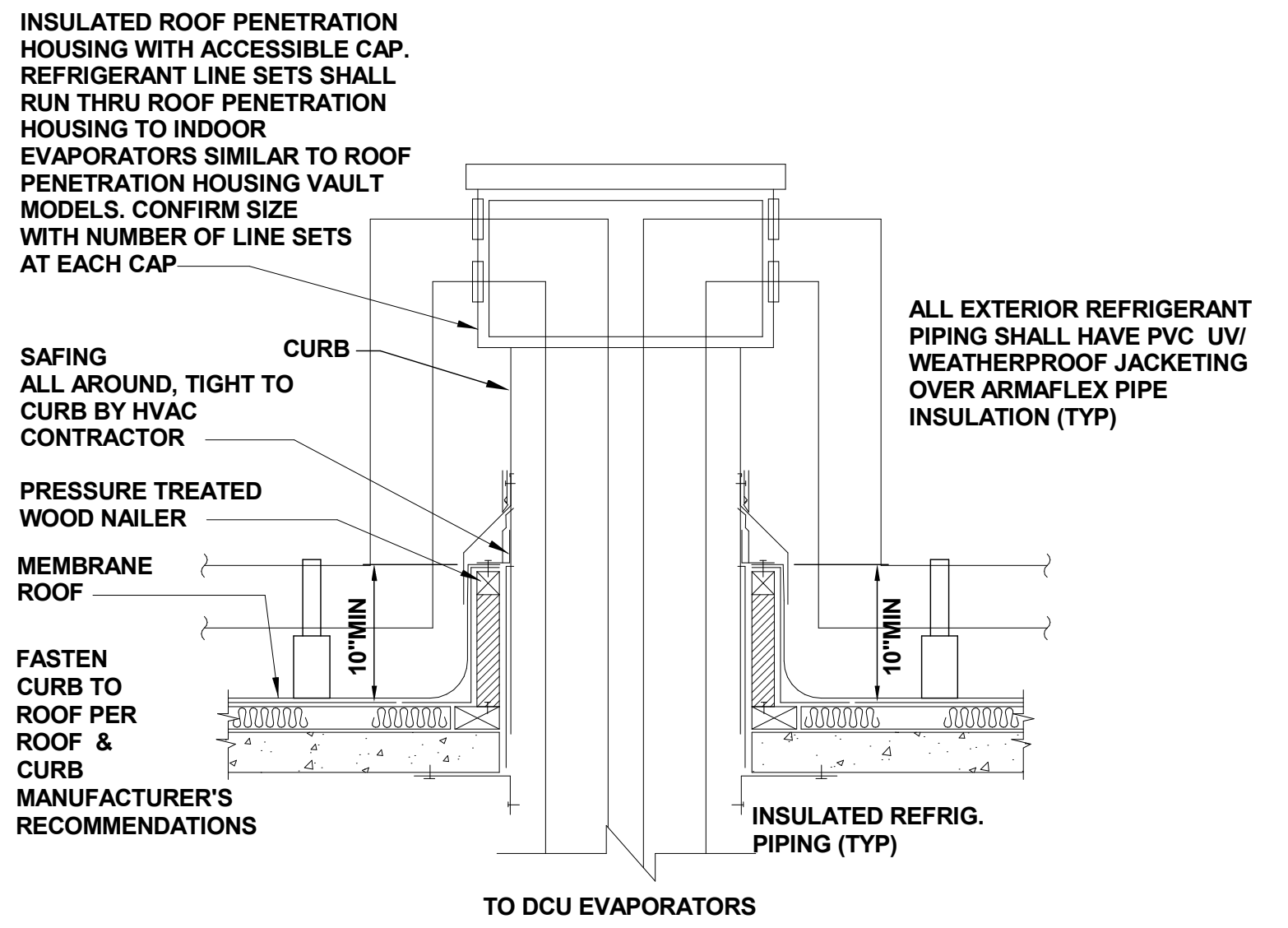
EXTERNALLY-PRESSURIZED INLINE EXPANSION JOINT DETAIL

(NOT TO SCALE)



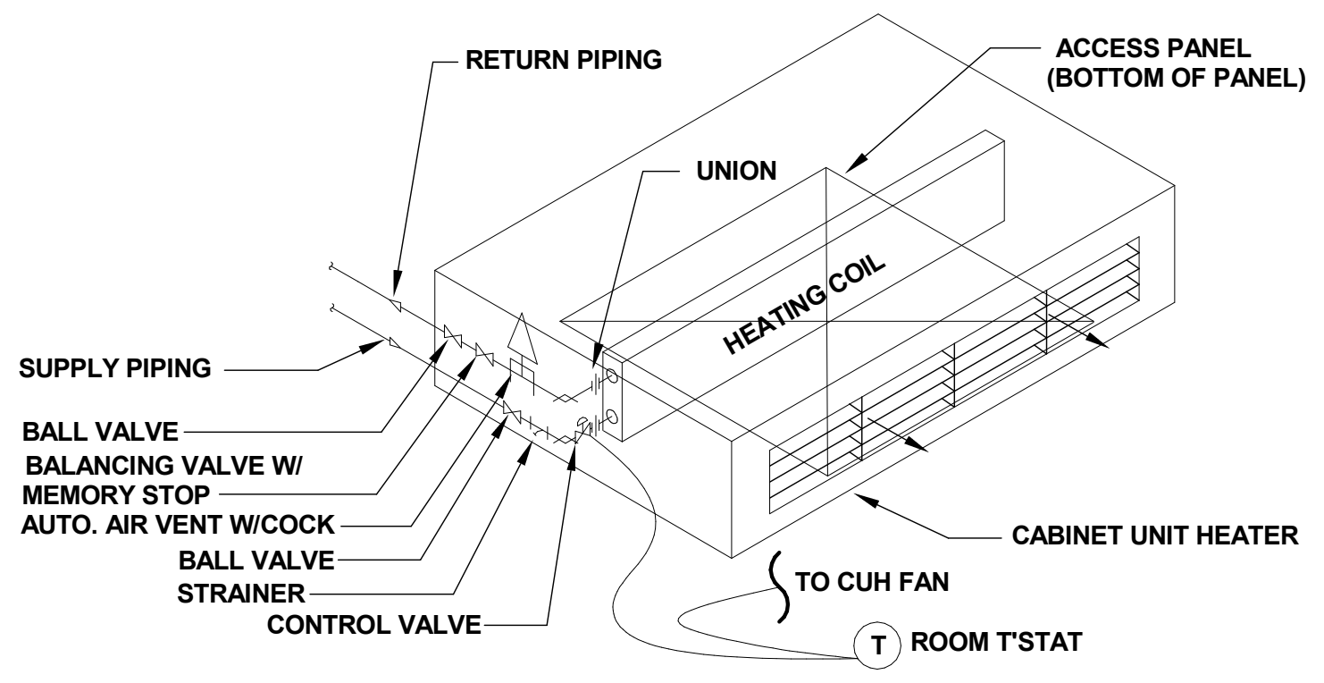
CONDENSATE PIPING DETAIL

NO TO SCALE



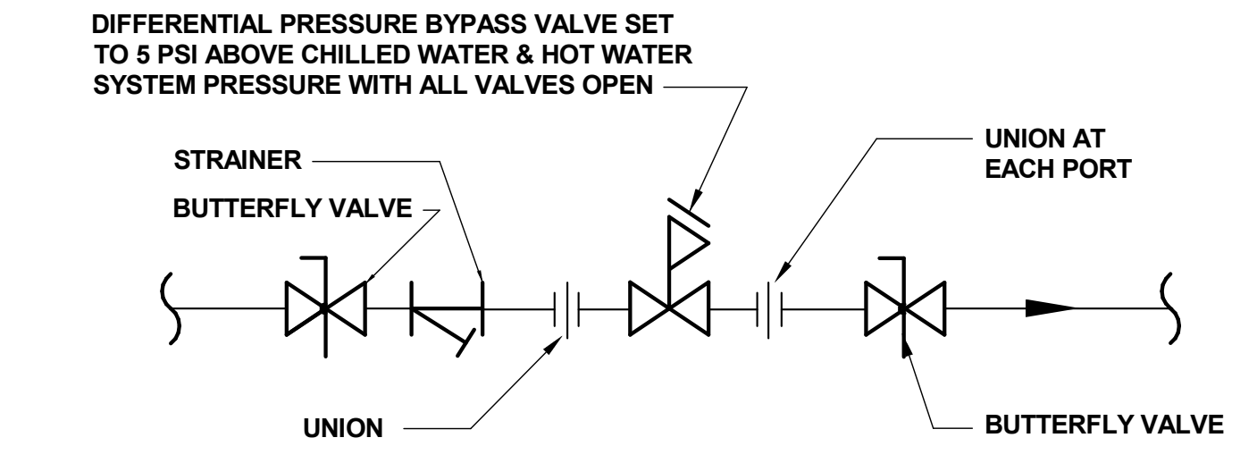
REFRIGERANT PIPE ROOF PENETRATION HOUSING

(NOT TO SCALE)



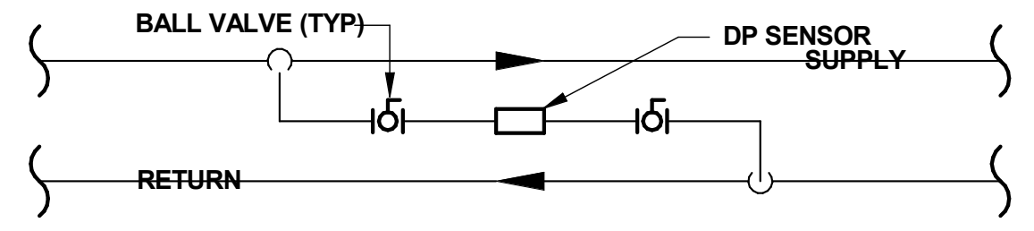
TYPICAL CABINET UNIT HEATER CEILING TYPE-PIPING DETAIL-HOT WATER

(NOT TO SCALE)


DIFFERENTIAL PRESSURE BYPASS VALVE SET
TO 5 PSI ABOVE CHILLED WATER & HOT WATER
SYSTEM PRESSURE WITH ALL VALVES OPEN
STRAINER
BUTTERFLY VALVE
UNION AT
EACH PORT
UNION
BUTTERFLY VALVE

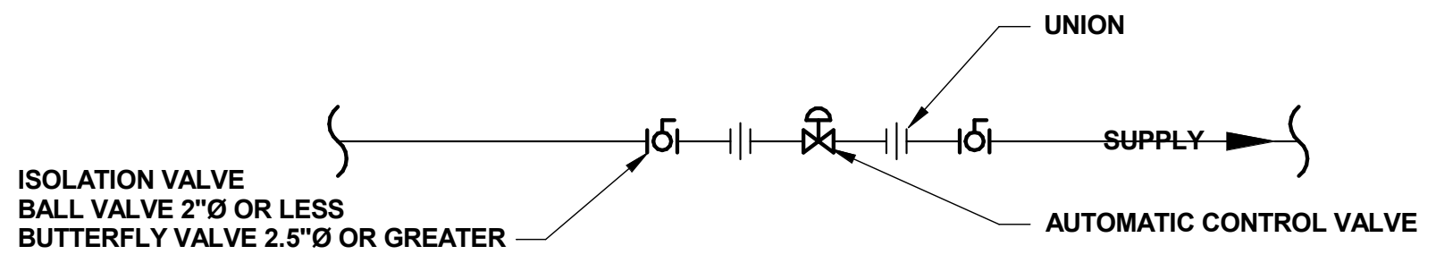
DIFFERENTIAL PRESSURE BYPASS VALVE PIPING

NO SCALE



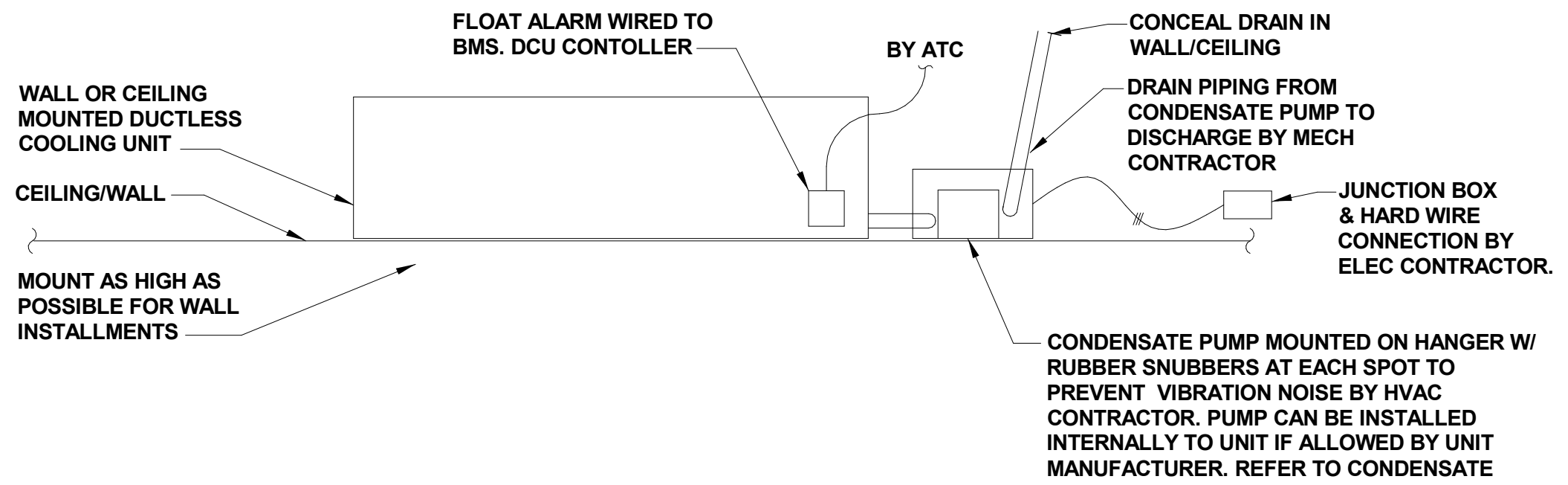
DIFFERENTIAL PRESSURE SENSOR DETAIL

NO SCALE



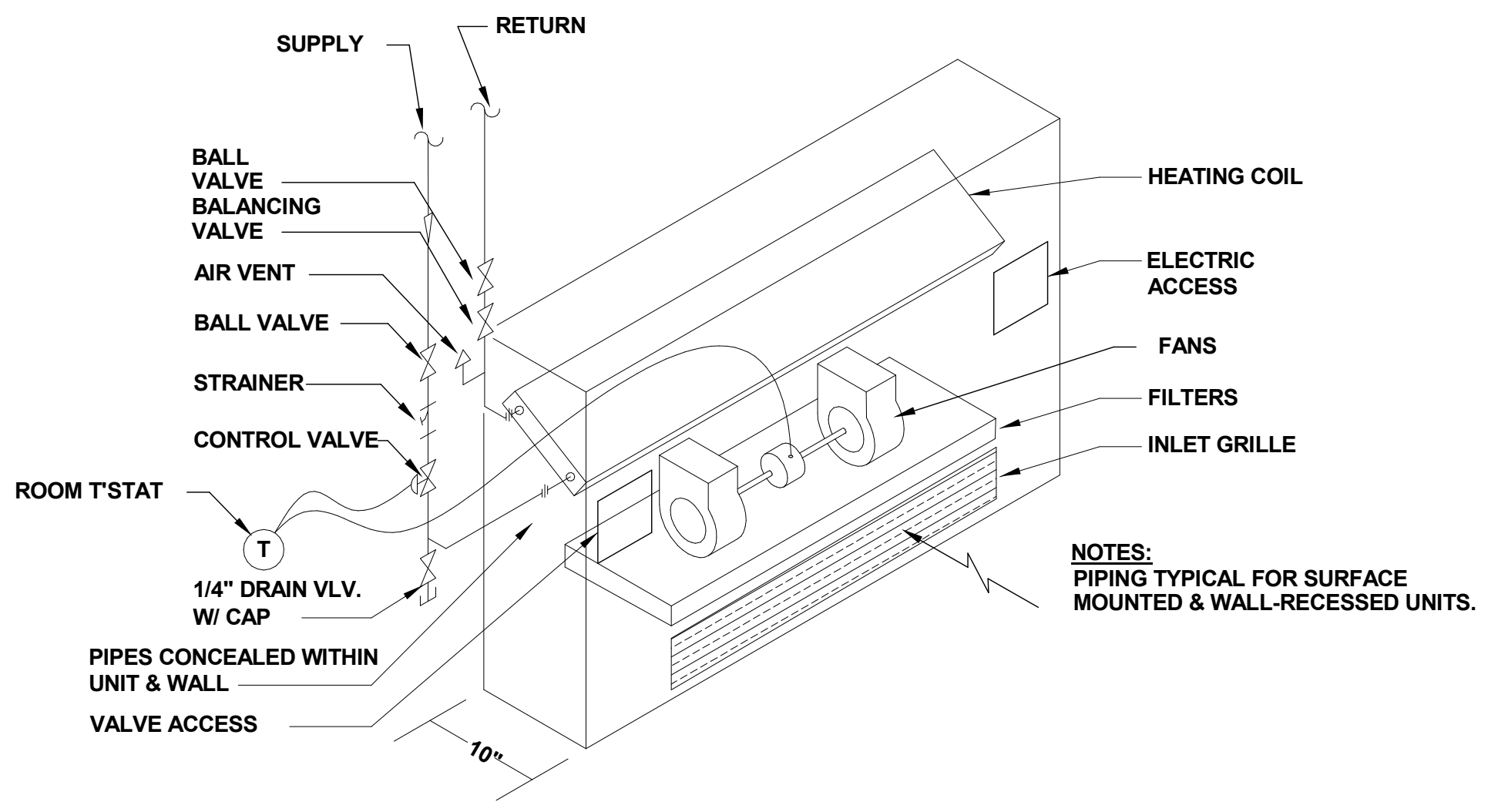
AUTOMATIC CONTROL VALVE DETAIL

NO SCALE



DUCTLESS COOLING UNIT DRAIN DETAIL(DCU)

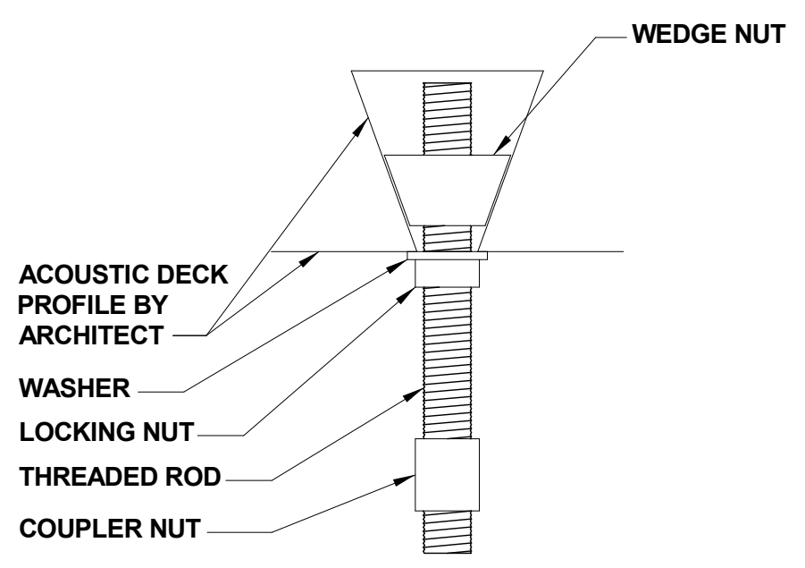
(NOT TO SCALE)



NOTES:
PIPING TYPICAL FOR SURFACE MOUNTED & WALL-RECESSED UNITS.

TYPICAL CABINET UNIT HEATER PIPING DETAIL (FLOOR MOUNT & WALL-RECESSED)

NO SCALE



1. PROVIDE DOVETAIL RIB LOCKING HANGERS TO SUPPORT ALL PIPING, DUCTWORK AND OTHER MECHANICAL AND UTILITY COMPONENTS FROM ACOUSTICAL DECK.

2. THE LOCKING HANGERS SHALL BE INSERTED PARALLEL TO THE RIBS AND PLACED CONTINUOUSLY, SPACED EVERY 6-8" INCHES ACROSS THE WIDTH OF THE PROFILE.

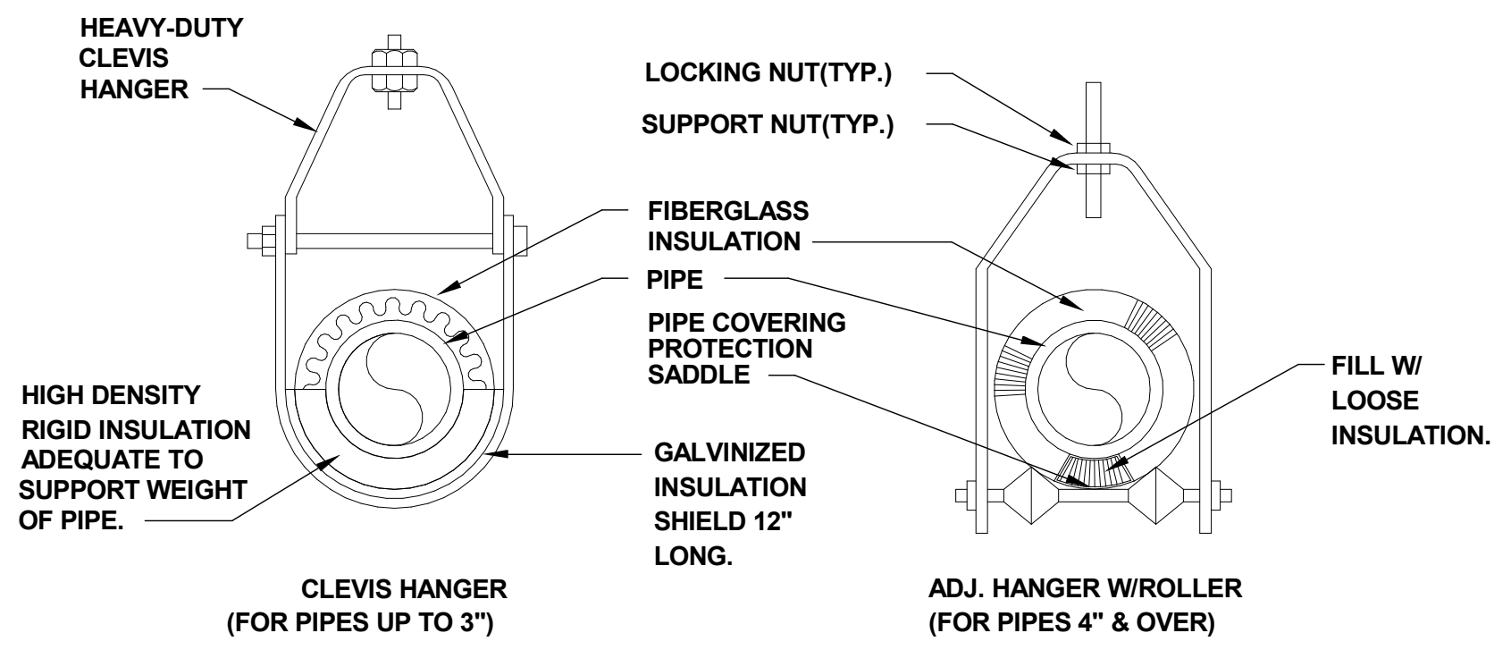
3. HANGERS SHALL BE CAPABLE OF BEING UNLOCKED AND RELOCATED, INSERTED, OR REMOVED AND REUSED.

4. COMPONENTS SHALL INCLUDE WEDGE NUT SHAPED FOR APPROPRIATE DECK PROFILE 3/8" X 12" ALL THREAD, 3/8" WASHER, 3/8" LOCKING NUT AND 3/8" TO 3/8" COUPLER NUT.

5. HANGER TYPE SHALL BE COMPATIBLE WITH THE PROPOSED ARCHITECTURAL ACOUSTICAL DECK. REFER TO ARCHITECTURAL PLANS FOR ACOUSTIC DECK LOCATIONS.

ACOUSTIC DECK HANGER DETAIL

(NOT TO SCALE)



CLEVIS HANGER
(FOR PIPES UP TO 3")

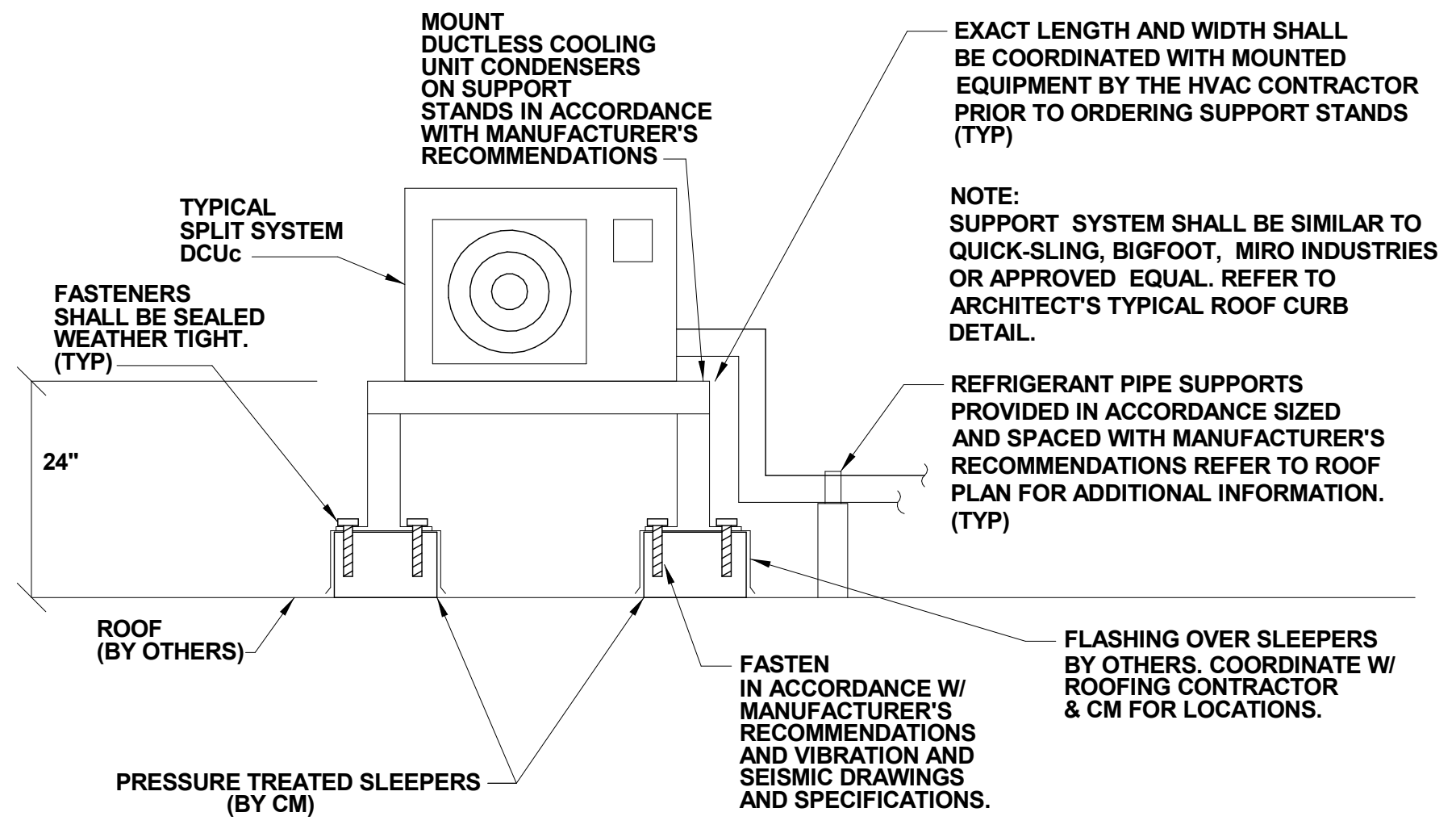
ADJ. HANGER W/ROLLER
(FOR PIPES 4" & OVER)

TYPICAL PIPE HANGER DETAIL

NOTE:

REFER TO SPECIFICATIONS FOR HANGER ROD SIZE & SPACING.

REFER TO SPEC FOR SEISMIC & VIBRATION ISOLATION REQUIREMENTS.



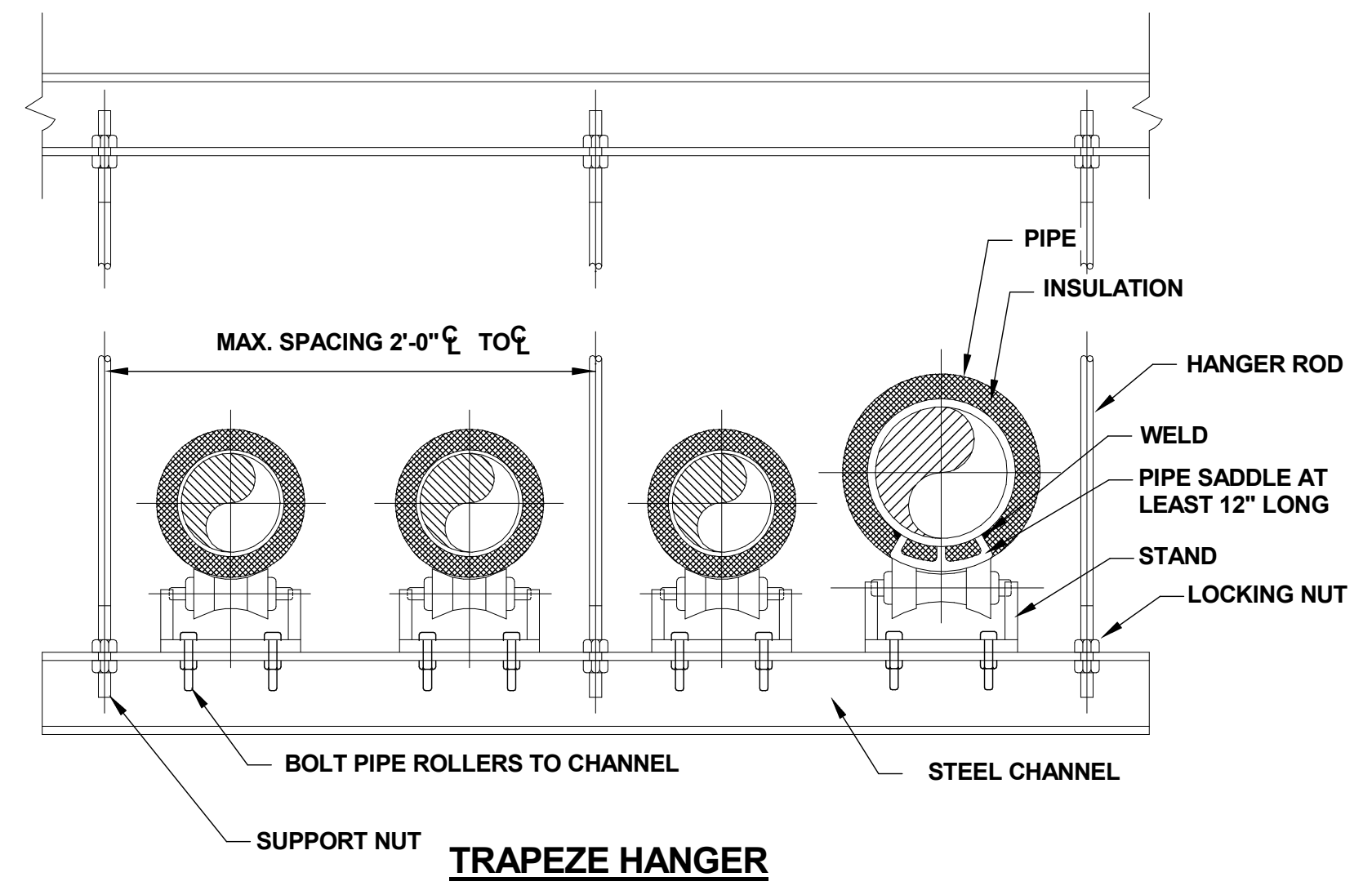
EXACT LENGTH AND WIDTH SHALL BE COORDINATED WITH MOUNTED EQUIPMENT BY THE HVAC CONTRACTOR PRIOR TO ORDERING SUPPORT STANDS (TYP)

NOTE:
SUPPORT SYSTEM SHALL BE SIMILAR TO QUICK-SLING, BIGFOOT, MIRO INDUSTRIES OR APPROVED EQUAL. REFER TO ARCHITECT'S TYPICAL ROOF CURB DETAIL.

REFRIGERANT PIPE SUPPORTS PROVIDED IN ACCORDANCE SIZED AND SPACED WITH MANUFACTURER'S RECOMMENDATIONS REFER TO ROOF PLAN FOR ADDITIONAL INFORMATION. (TYP)

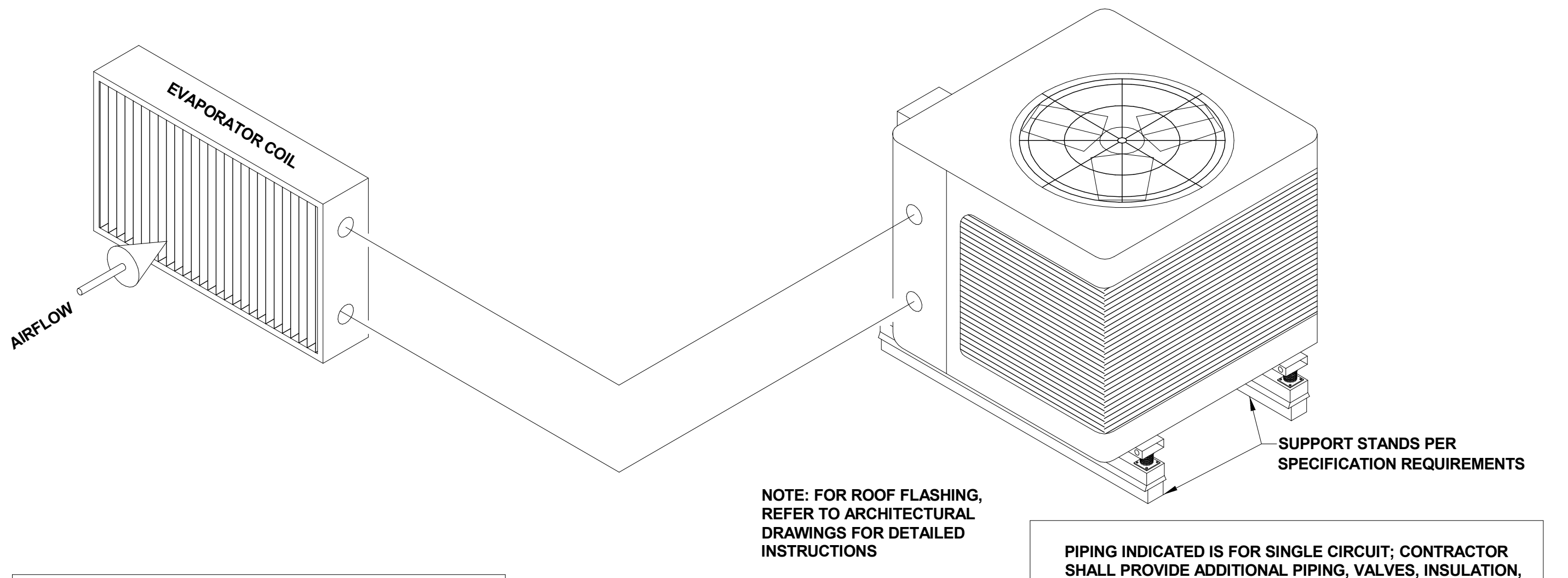
ROOF-MOUNTED CONDENSER SUPPORT DETAIL

(NOT TO SCALE)



TRAPEZE HANGER

(NOT TO SCALE)



NOTE: FOR ROOF FLASHING, REFER TO ARCHITECTURAL DRAWINGS FOR DETAILED INSTRUCTIONS

REFRIGERANT PIPING: PROVIDE SUCTION LINES WITH ISOLATION VALVE, SUCTION ACCUMULATOR AND CHARGING CONNECTION. LIQUID LINE WITH SITE GLASS HAVING DOUBLE PORTS WITH CAPS, FILTER DRYER, ISOLATION VALVES AND CHARGING CONNECTION. INSULATE PER SPECIFICATIONS. SIZING PER MANUFACTURER. PROVIDE ALUMINUM JACKET ON EXTERIOR PIPING.

PIPING INDICATED IS FOR SINGLE CIRCUIT; CONTRACTOR SHALL PROVIDE ADDITIONAL PIPING, VALVES, INSULATION, ETC FOR ADDITIONAL CIRCUITS & HOT GAS BYPASS IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS AND GUIDELINE REQUIREMENTS. CONFIRM, VERIFY & COORDINATE W/ UNIT MANUFACTURER FOR ALL PIPING & INSTALLATION REQUIREMENTS.

DUCTLESS COOLING UNIT AND REFRIGERANT PIPING DIAGRAM

(NOT TO SCALE)

DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

SCALE: AS INDICATED

SHEET TITLE:
DETAILS IV

SHEET NUMBER:
M0.14

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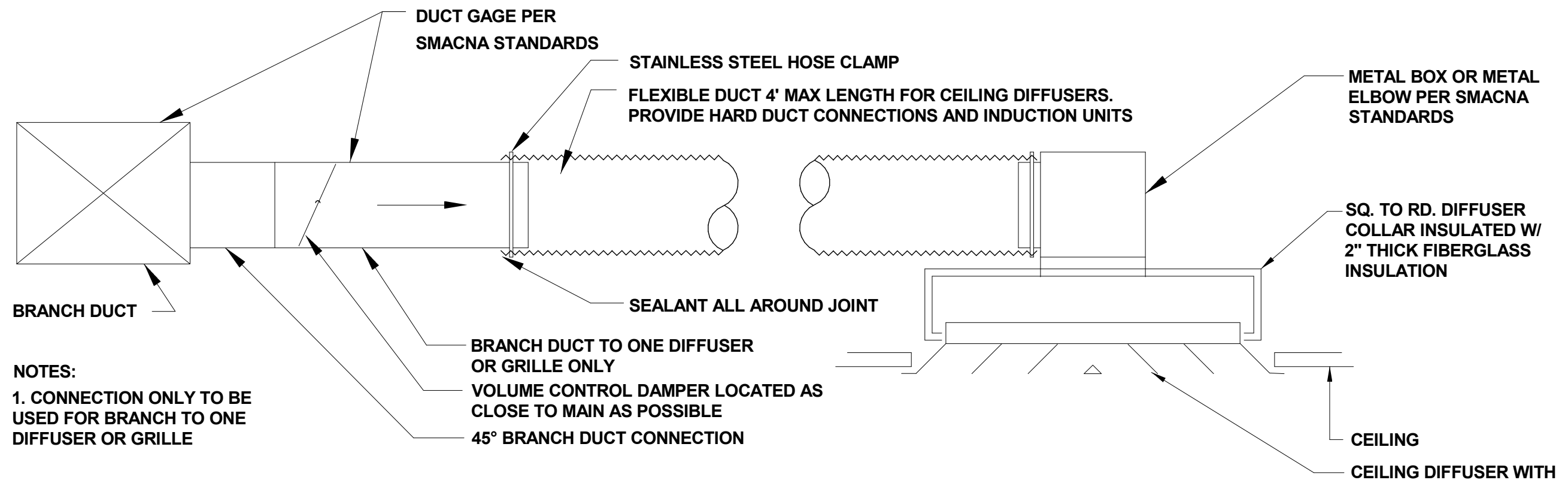
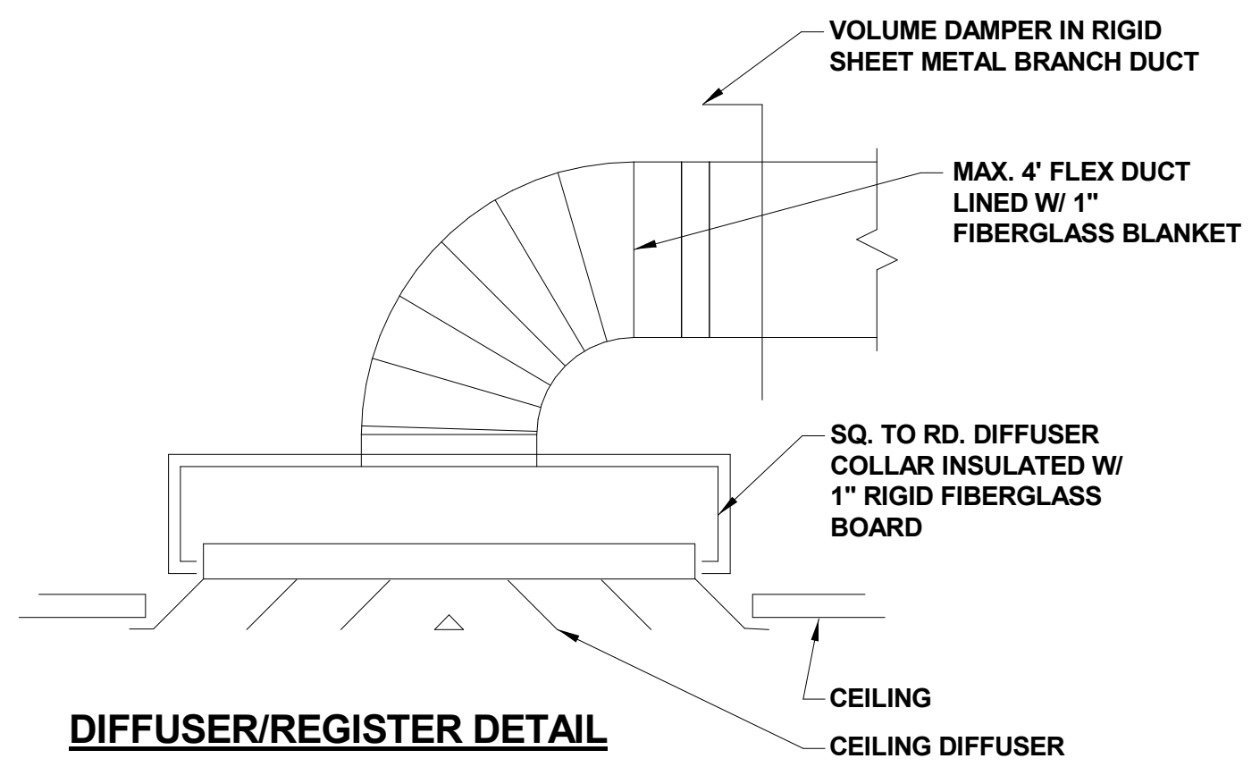
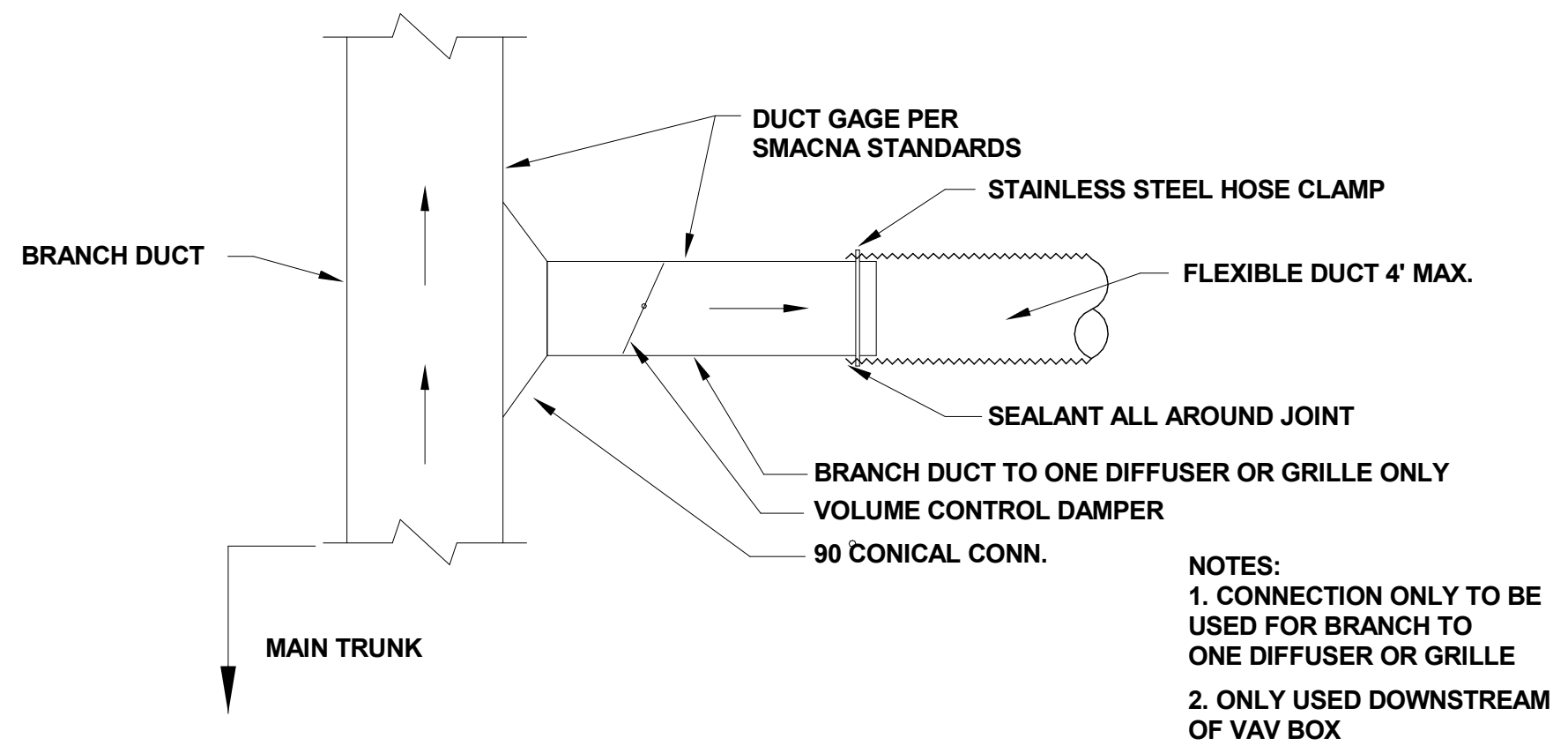

DUCT GAGE PER
SMACNA STANDARDS
STAINLESS STEEL HOSE CLAMP
FLEXIBLE DUCT 4' MAX LENGTH FOR CEILING DIFFUSERS.
PROVIDE HARD DUCT CONNECTIONS AND INDUCTION UNITS
METAL BOX OR METAL ELBOW PER SMACNA STANDARDS
SQ. TO RD. DIFFUSER COLLAR INSULATED W/ 2" THICK FIBERGLASS INSULATION
BRANCH DUCT
SEALANT ALL AROUND JOINT
BRANCH DUCT TO ONE DIFFUSER OR GRILLE ONLY
VOLUME CONTROL DAMPER LOCATED AS CLOSE TO MAIN AS POSSIBLE
45° BRANCH DUCT CONNECTION
CEILING
CEILING DIFFUSER WITH RADIATION DAMPER

NOTES:
1. CONNECTION ONLY TO BE USED FOR BRANCH TO ONE DIFFUSER OR GRILLE

DIFFUSER/GRILLE CONNECTION TO BRANCH
(NOT TO SCALE)

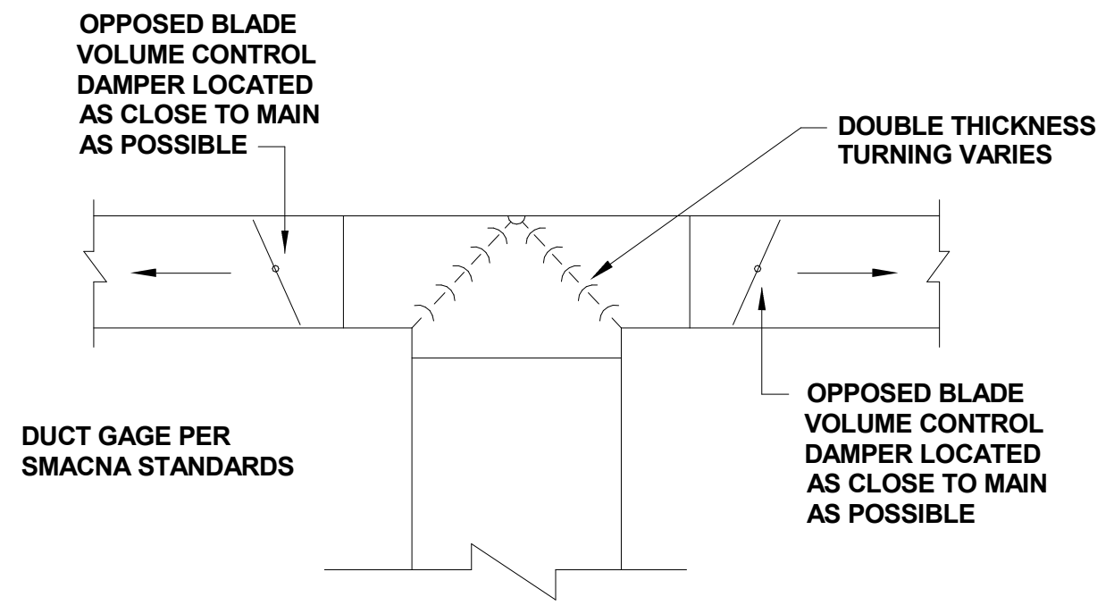

VOLUME DAMPER IN RIGID SHEET METAL BRANCH DUCT
MAX. 4' FLEX DUCT LINED W/ 1" FIBERGLASS BLANKET
SQ. TO RD. DIFFUSER COLLAR INSULATED W/ 1" RIGID FIBERGLASS BOARD
CEILING
CEILING DIFFUSER

DIFFUSER/REGISTER DETAIL
NOT TO SCALE

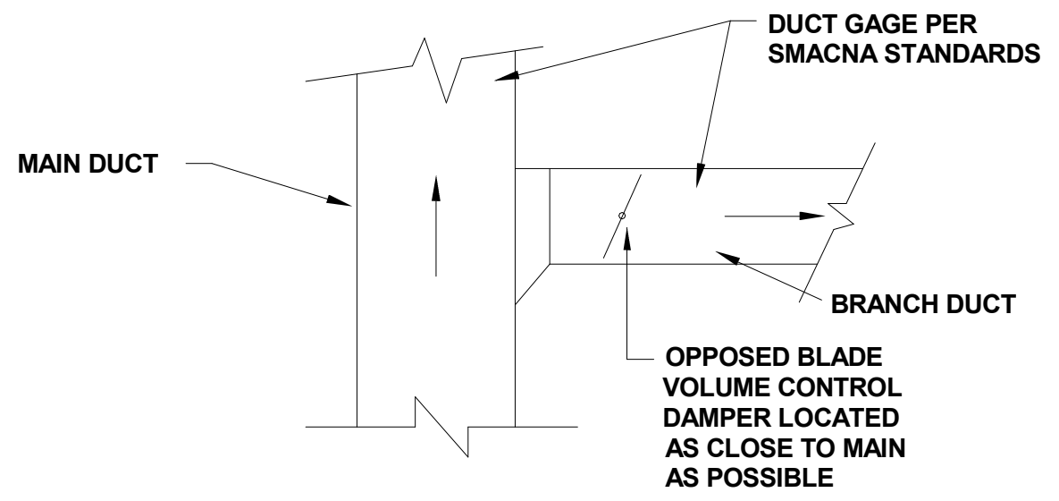


NOTES:
1. CONNECTION ONLY TO BE USED FOR BRANCH TO ONE DIFFUSER OR GRILLE
2. ONLY USED DOWNSTREAM OF VAV BOX

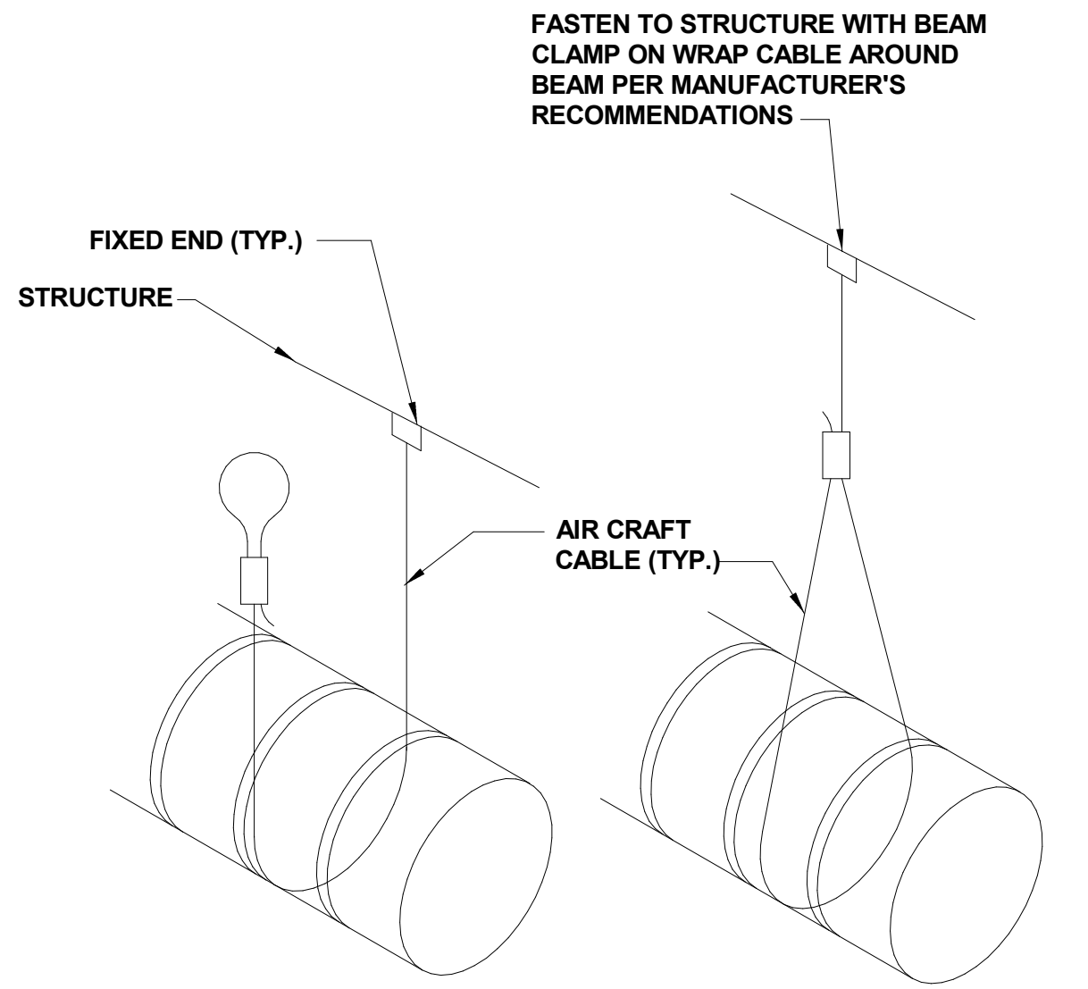
DIFFUSER/GRILLE CONNECTION TO BRANCH
(NOT TO SCALE)


OPPOSED BLADE VOLUME CONTROL DAMPER LOCATED AS CLOSE TO MAIN AS POSSIBLE
DOUBLE THICKNESS TURNING VARIES
DUCT GAGE PER SMACNA STANDARDS
OPPOSED BLADE VOLUME CONTROL DAMPER LOCATED AS CLOSE TO MAIN AS POSSIBLE

TYPICAL TEE DUCT CONNECTION
(NOT TO SCALE)

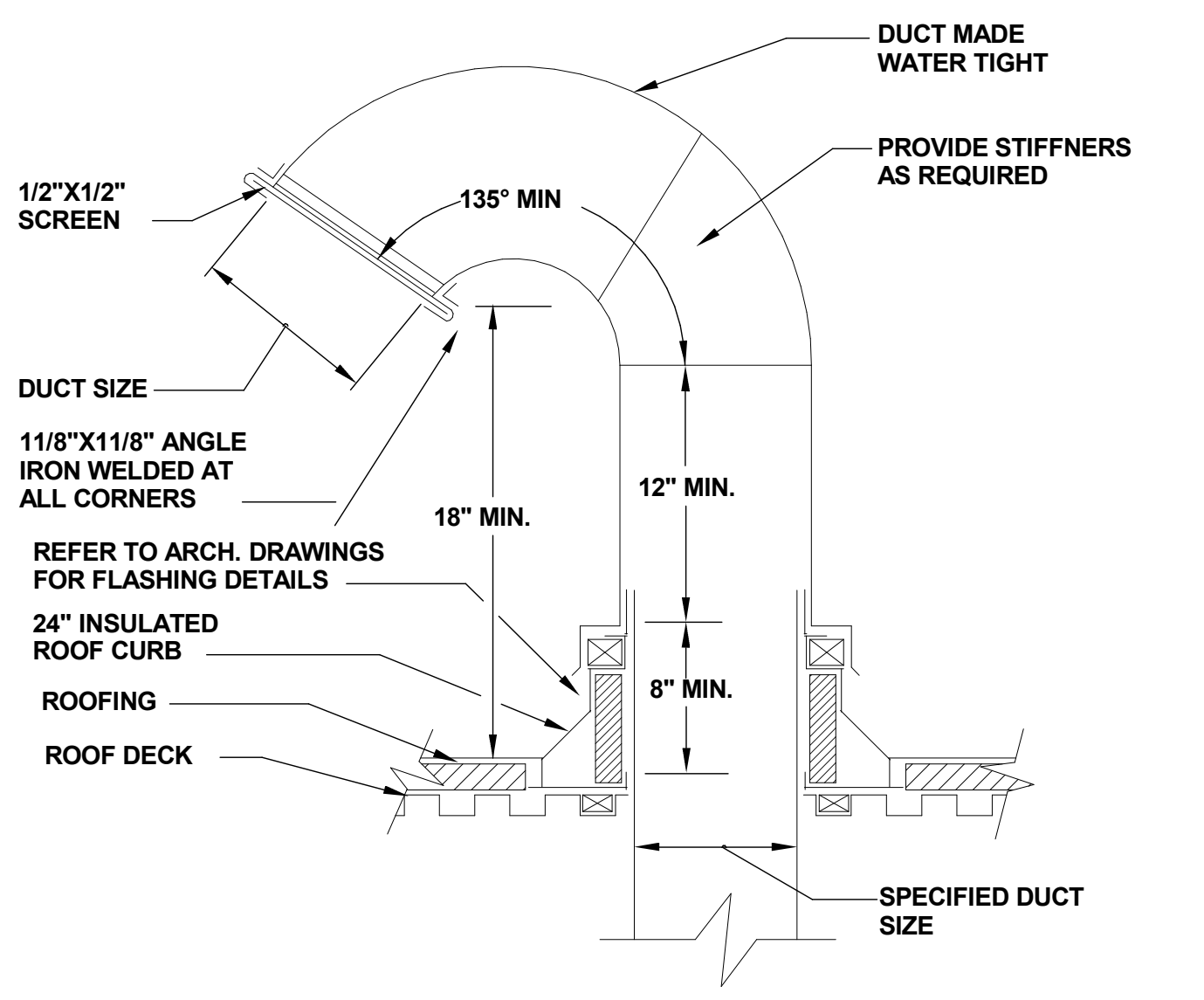

DUCT GAGE PER SMACNA STANDARDS
MAIN DUCT
BRANCH DUCT
OPPOSED BLADE VOLUME CONTROL DAMPER LOCATED AS CLOSE TO MAIN AS POSSIBLE

BRANCH DUCT CONNECTION TO MAIN
(NOT TO SCALE)

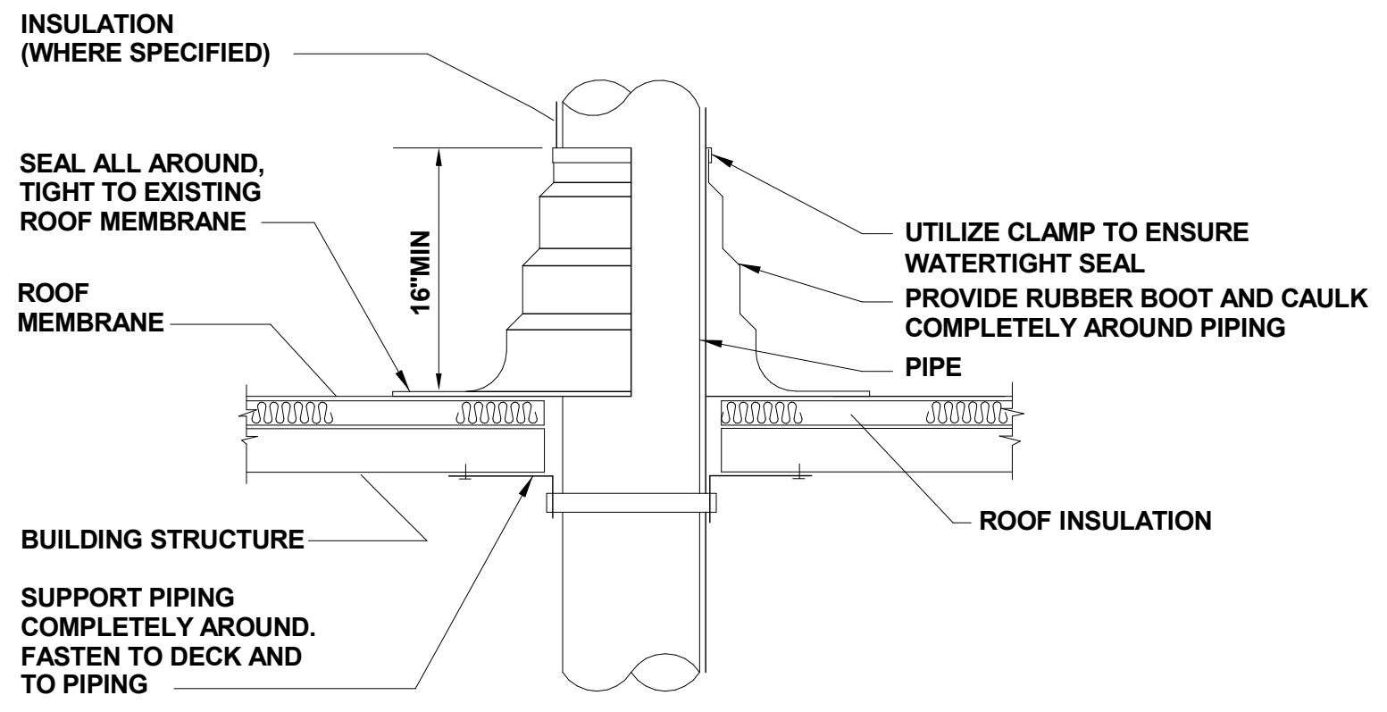

FASTEN TO STRUCTURE WITH BEAM CLAMP ON WRAP CABLE AROUND BEAM PER MANUFACTURER'S RECOMMENDATIONS
FIXED END (TYP.)
STRUCTURE
AIR CRAFT CABLE (TYP.)

NOTES:
1. THIS DETAIL APPLIES TO ALL DUCTWORK IN EXPOSED LOCATIONS INCLUDING AREAS WITH PERFORATED METAL CEILING
2. INSTALL PER MANUFACTURER'S REQUIREMENTS.
3. PROVIDE HANGER SPACING PER MANUFACTURER'S WEIGHT LOADING ALLOWABLE CAPACITY.

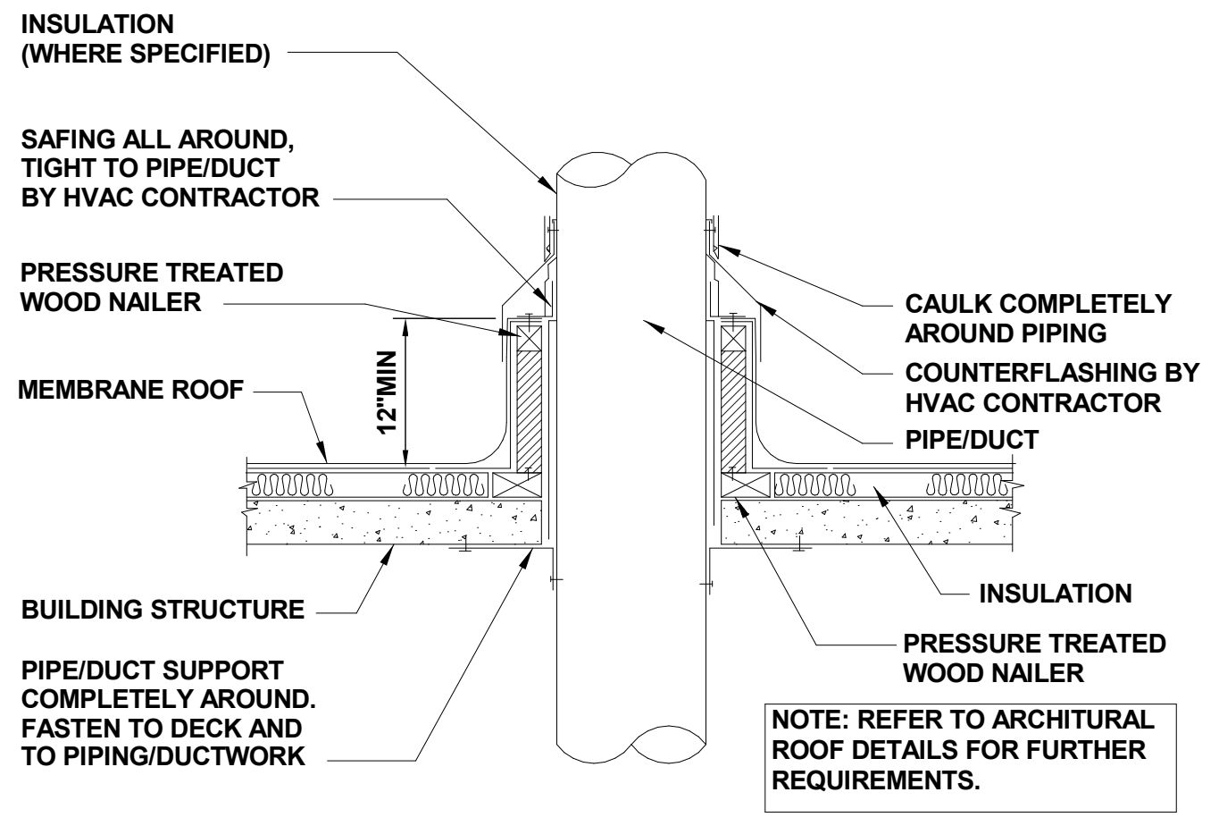
ROUND DUCTWORK HANGING DETAIL
(NOT TO SCALE)



RECTANGULAR GOOSENECK DETAIL
(NOT TO SCALE)

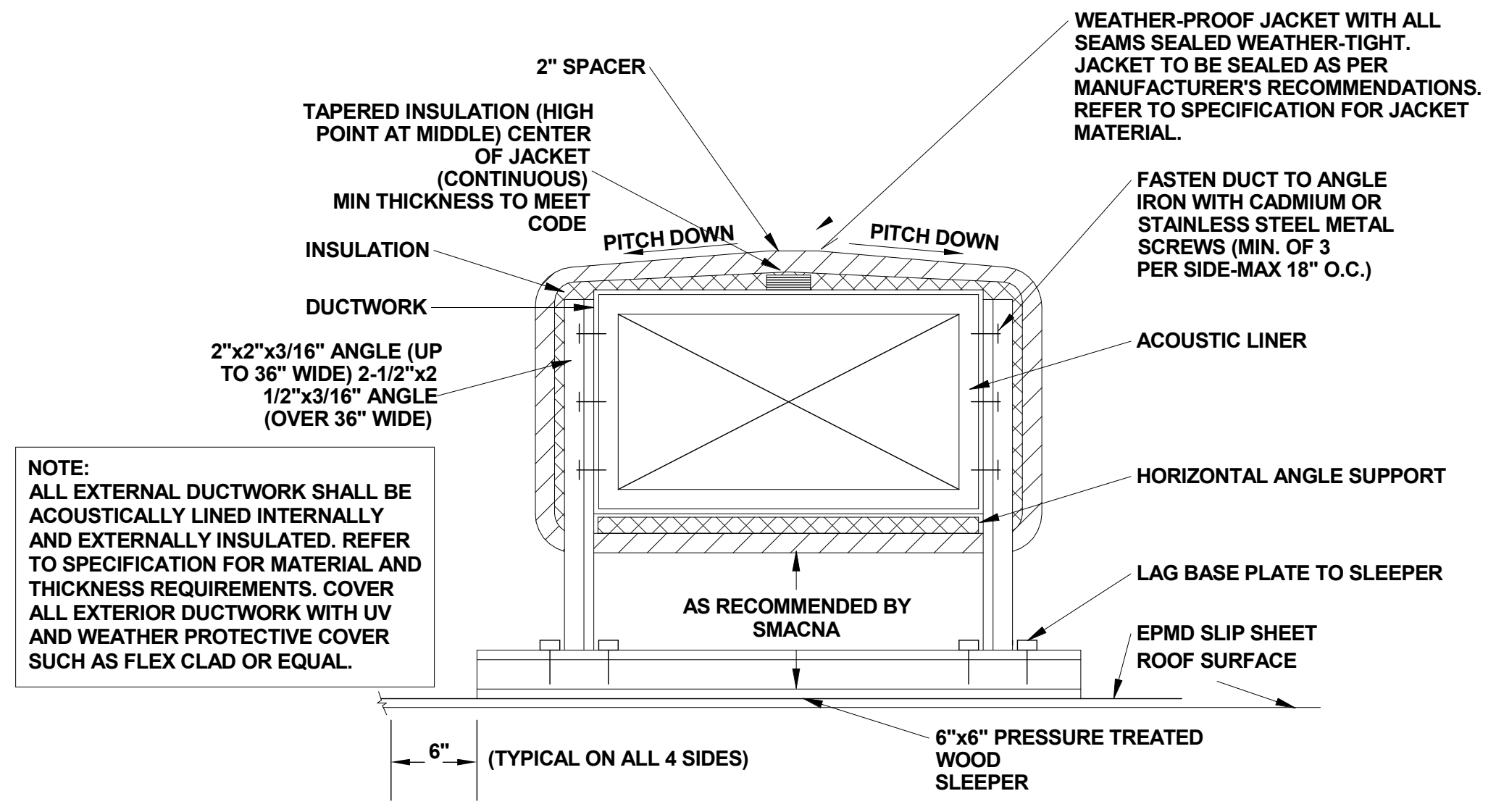

INSULATION (WHERE SPECIFIED)
SEAL ALL AROUND, TIGHT TO EXISTING ROOF MEMBRANE
16"MIN
ROOF MEMBRANE
UTILIZE CLAMP TO ENSURE WATERTIGHT SEAL
PROVIDE RUBBER BOOT AND CAULK COMPLETELY AROUND PIPING
PIPE
BUILDING STRUCTURE
ROOF INSULATION
SUPPORT PIPING COMPLETELY AROUND. FASTEN TO DECK AND TO PIPING

PIPE PENETRATION THROUGH ROOF DETAIL
(NOT TO SCALE)


INSULATION (WHERE SPECIFIED)
SAFING ALL AROUND, TIGHT TO PIPE/DUCT BY HVAC CONTRACTOR
PRESSURE TREATED WOOD NAILER
12"MIN
MEMBRANE ROOF
CAULK COMPLETELY AROUND PIPING
COUNTERFLASHING BY HVAC CONTRACTOR
PIPE/DUCT
BUILDING STRUCTURE
INSULATION
PRESSURE TREATED WOOD NAILER
PIPE/DUCT SUPPORT COMPLETELY AROUND. FASTEN TO DECK AND TO PIPING/DUCTWORK

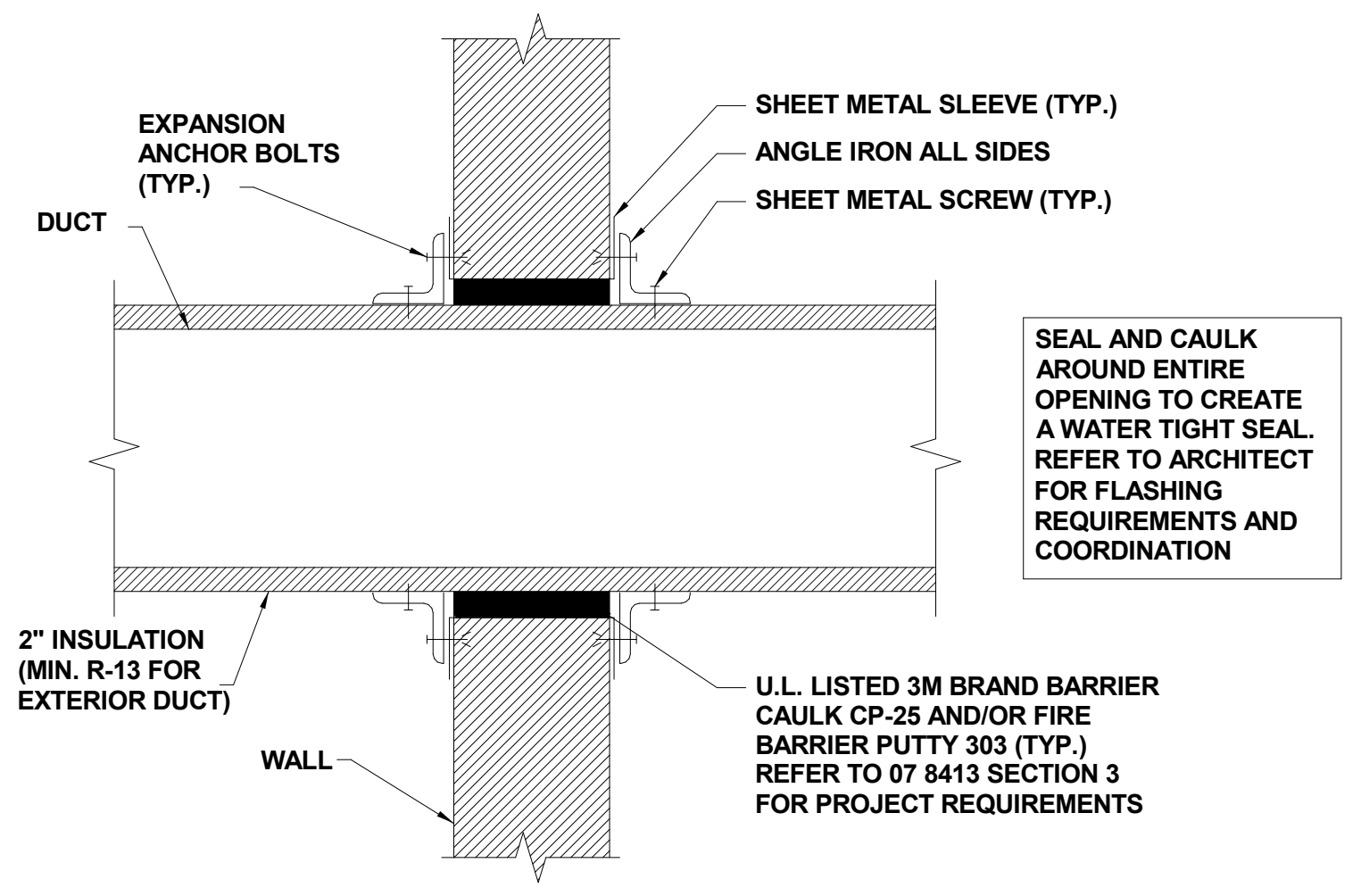
NOTE: REFER TO ARCHITURAL ROOF DETAILS FOR FURTHER REQUIREMENTS.

DUCT PENETRATION THROUGH ROOF DETAIL
(NOT TO SCALE)


2" SPACER
TAPERED INSULATION (HIGH POINT AT MIDDLE) CENTER OF JACKET (CONTINUOUS) MIN THICKNESS TO MEET CODE
WEATHER-PROOF JACKET WITH ALL SEAMS SEALED WEATHER-TIGHT. JACKET TO BE SEALED AS PER MANUFACTURER'S RECOMMENDATIONS. REFER TO SPECIFICATION FOR JACKET MATERIAL.
PITCH DOWN
PITCH DOWN
INSULATION
DUCTWORK
FASTEN DUCT TO ANGLE IRON WITH CADMIUM OR STAINLESS STEEL METAL SCREWS (MIN. OF 3 PER SIDE-MAX 18" O.C.)
2"x2"x3/16" ANGLE (UP TO 36" WIDE) 2-1/2"x2 1/2"x3/16" ANGLE (OVER 36" WIDE)
ACOUSTIC LINER
HORIZONTAL ANGLE SUPPORT
AS RECOMMENDED BY SMACNA
LAG BASE PLATE TO SLEEPER
EPMD SLIP SHEET
ROOF SURFACE
6" (TYPICAL ON ALL 4 SIDES)
6"x6" PRESSURE TREATED WOOD SLEEPER

NOTE:
ALL EXTERNAL DUCTWORK SHALL BE ACOUSTICALLY LINED INTERNALLY AND EXTERNALLY INSULATED. REFER TO SPECIFICATION FOR MATERIAL AND THICKNESS REQUIREMENTS. COVER ALL EXTERIOR DUCTWORK WITH UV AND WEATHER PROTECTIVE COVER SUCH AS FLEX CLAD OR EQUAL.

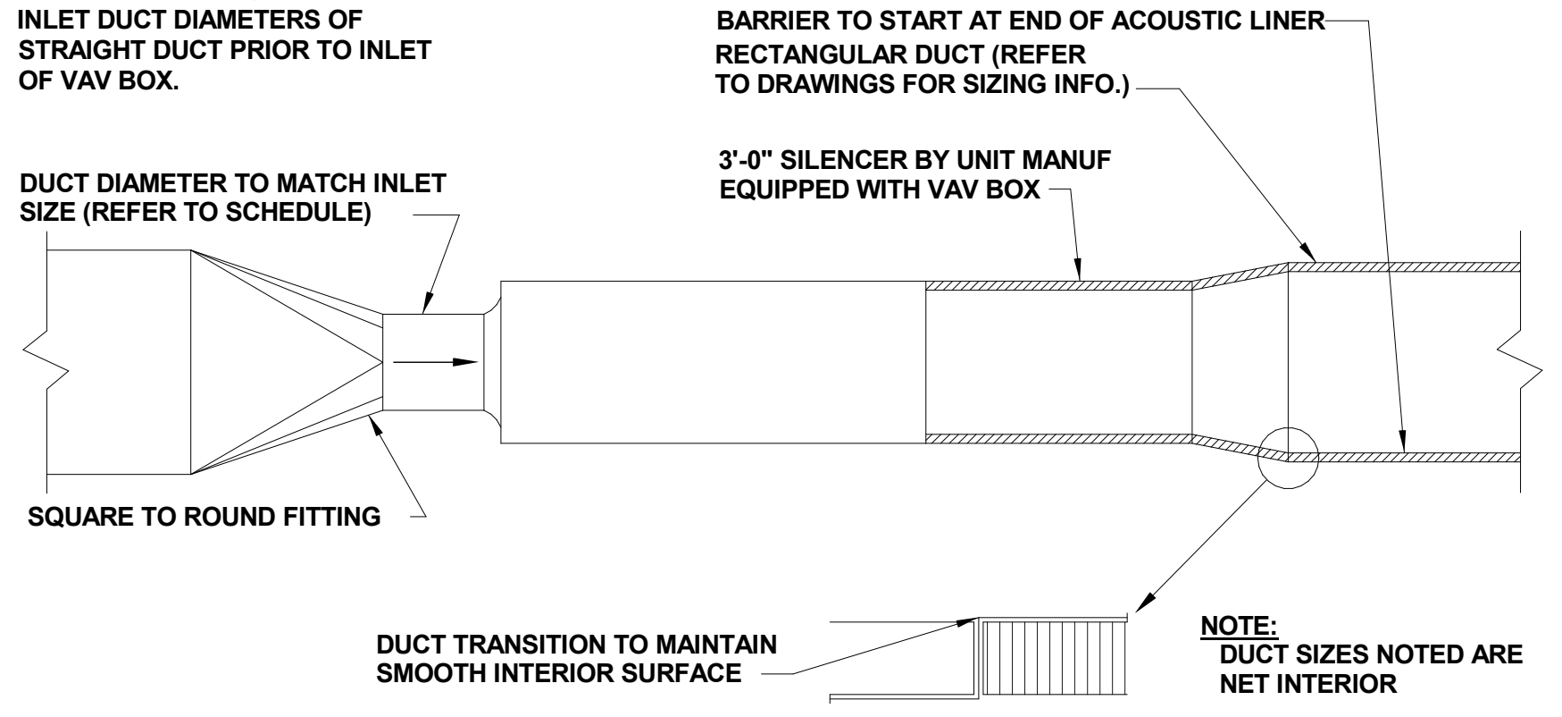
ROOF MOUNTED EXTERIOR DUCTWORK DETAIL
(NOT TO SCALE)


EXPANSION ANCHOR BOLTS (TYP.)
DUCT
SHEET METAL SLEEVE (TYP.)
ANGLE IRON ALL SIDES
SHEET METAL SCREW (TYP.)
2" INSULATION (MIN. R-13 FOR EXTERIOR DUCT)
WALL
U.L. LISTED 3M BRAND BARRIER CAULK CP-25 AND/OR FIRE BARRIER PUTTY 303 (TYP.) REFER TO 07 8413 SECTION 3 FOR PROJECT REQUIREMENTS

SEAL AND CAULK AROUND ENTIRE OPENING TO CREATE A WATER TIGHT SEAL. REFER TO ARCHITECT FOR FLASHING REQUIREMENTS AND COORDINATION

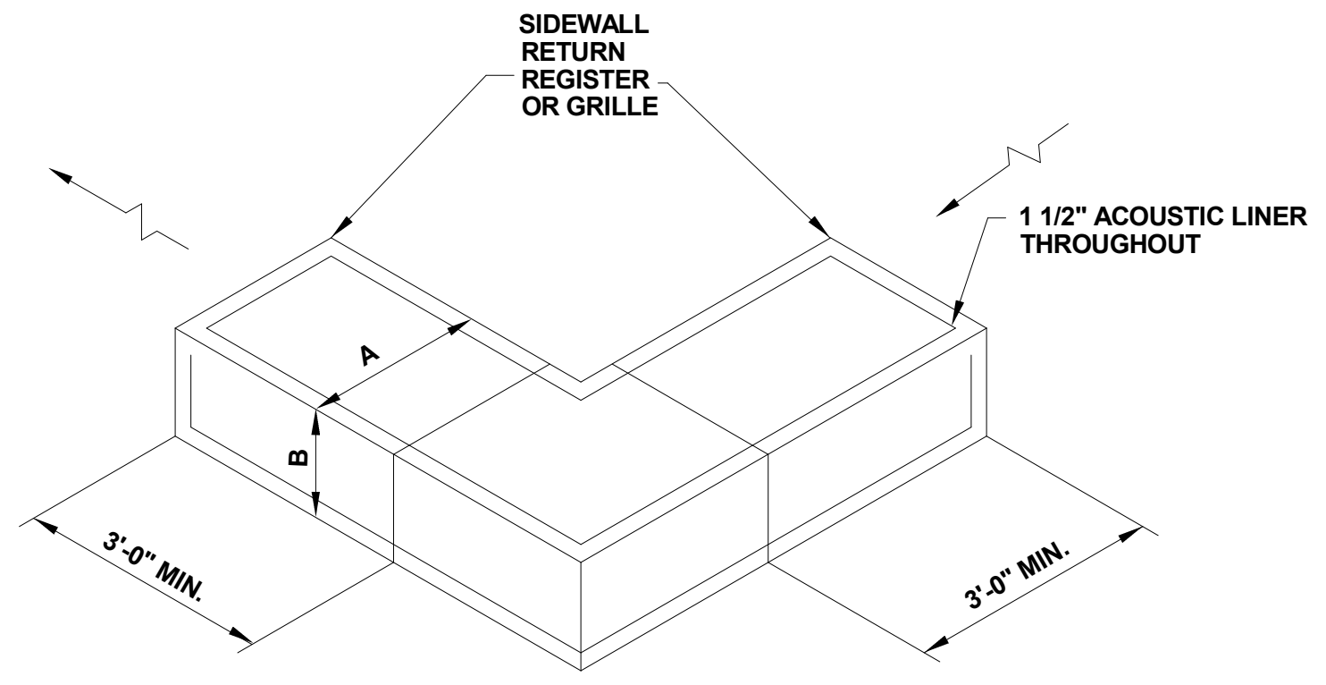
DUCT THRU EXTERIOR WALL DETAIL
(NOT TO SCALE)

NOTE:
PROVIDE MIN. 3 EQUIVALENT INLET DUCT DIAMETERS OF STRAIGHT DUCT PRIOR TO INLET OF VAV BOX.

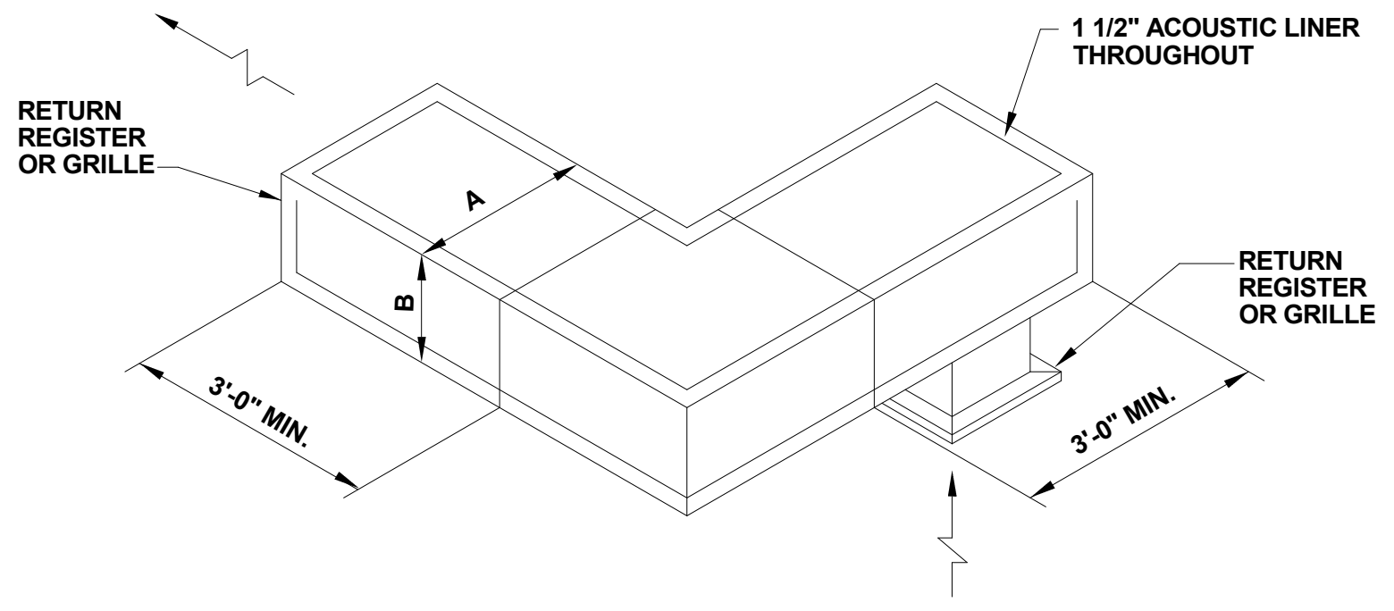

1-1/2" (MIN. R-6) ACOUSTIC LINER FOR A MAX LENGTH OF 10'-0" THEN 2" THERMAL INSULATION W/ VAPOR BARRIER TO START AT END OF ACOUSTIC LINER
RECTANGULAR DUCT (REFER TO DRAWINGS FOR SIZING INFO.)
DUCT DIAMETER TO MATCH INLET SIZE (REFER TO SCHEDULE)
3'-0" SILENCER BY UNIT MANUF EQUIPPED WITH VAV BOX
SQUARE TO ROUND FITTING
DUCT TRANSITION TO MAINTAIN SMOOTH INTERIOR SURFACE

NOTE:
DUCT SIZES NOTED ARE NET INTERIOR

TYPICAL VARIABLE AIR VOLUME DUCT DETAIL
(NOT TO SCALE)


SIDEWALL RETURN REGISTER OR GRILLE
1 1/2" ACOUSTIC LINER THROUGHOUT
A
B
3'-0" MIN.
3'-0" MIN.

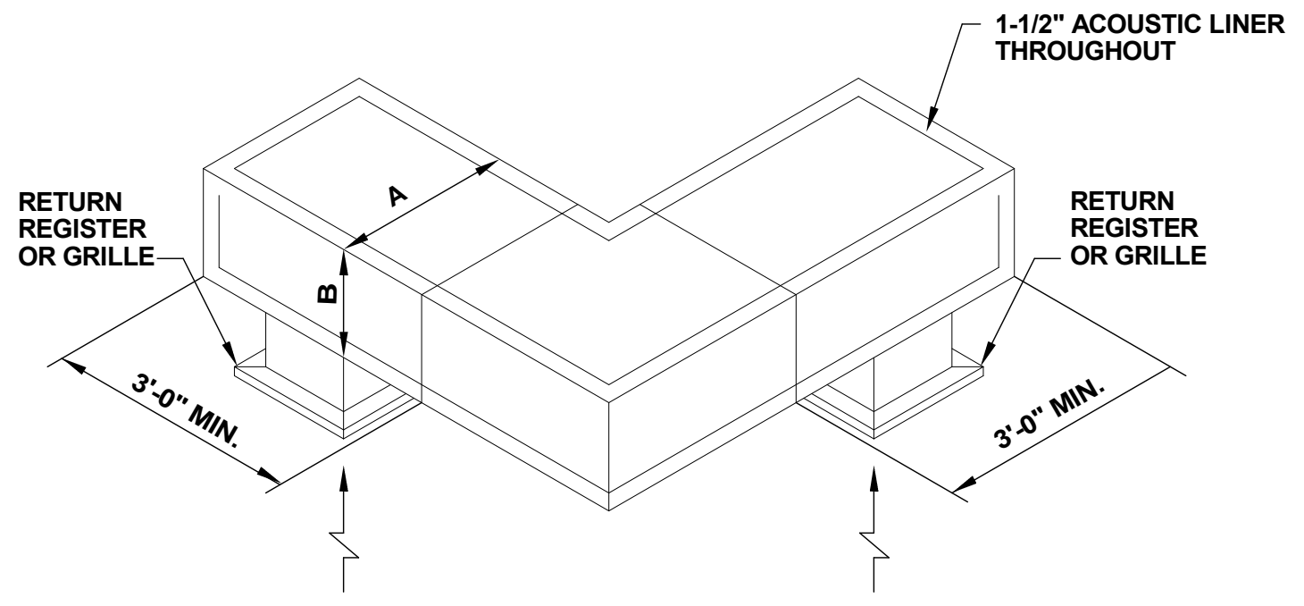
TYPICAL SIDEWALL TO SIDEWALL DETAIL
NO SCALE


RETURN REGISTER OR GRILLE
1 1/2" ACOUSTIC LINER THROUGHOUT
A
B
3'-0" MIN.
RETURN REGISTER OR GRILLE
3'-0" MIN.

CLG RETURN REG. SIZE	DUCT SIZE (*)	
	A	B
8x8	12	6
10x10	12	8
12x12	16	10
14x14	20	10
16x16	24	10
18x18	24	14

* - DUCT SIZES ARE INSIDE CLEAR DIMENSIONS.

TYPICAL RETURN/TRANSFER DETAIL
NO SCALE


1-1/2" ACOUSTIC LINER THROUGHOUT
RETURN REGISTER OR GRILLE
RETURN REGISTER OR GRILLE
A
B
3'-0" MIN.
3'-0" MIN.

RETURN REG. SIZE	MAXIMUM CFM	DUCT SIZE (*)	
		A	B
8x8	200	10	6
10x10	300	14	6
12x12	450	14	8
14x14	590	18	8
16x16	800	16	10

* - DUCT SIZES ARE INSIDE CLEAR DIMENSIONS.

TYPICAL RETURN/TRANSFER DETAIL
NO SCALE

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DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
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212 BATTERY STREET
BURLINGTON, VT 05401
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GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

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NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

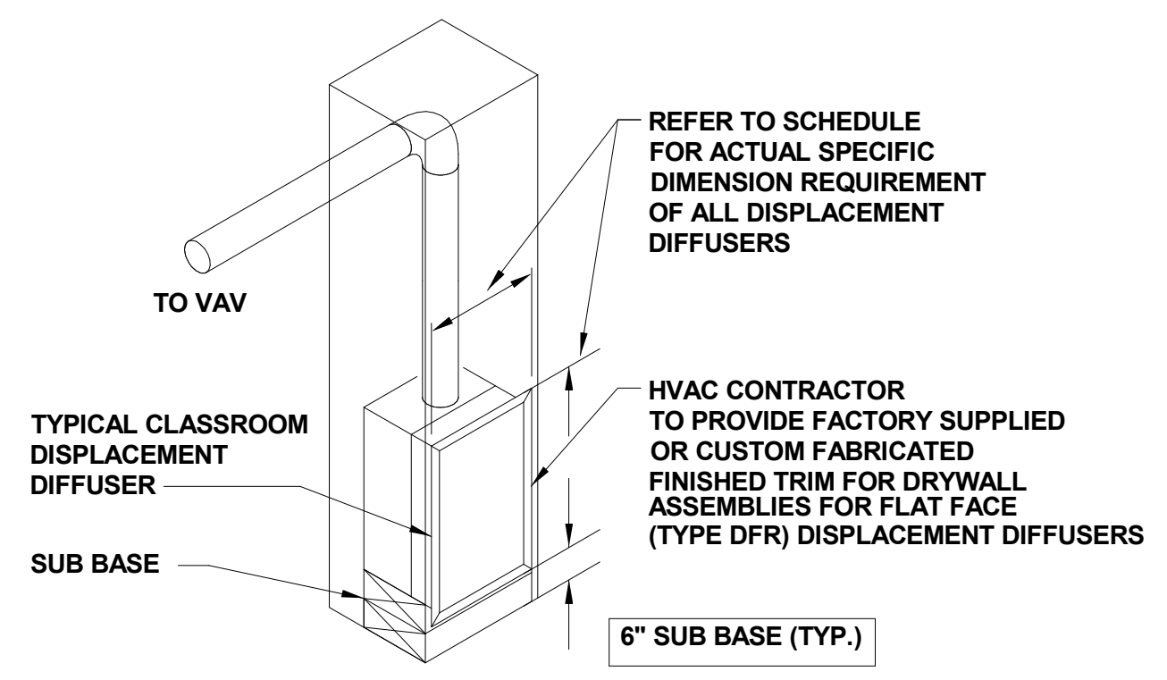
KEY PLAN

ORIENTATION AND SCALE:

SCALE: AS INDICATED

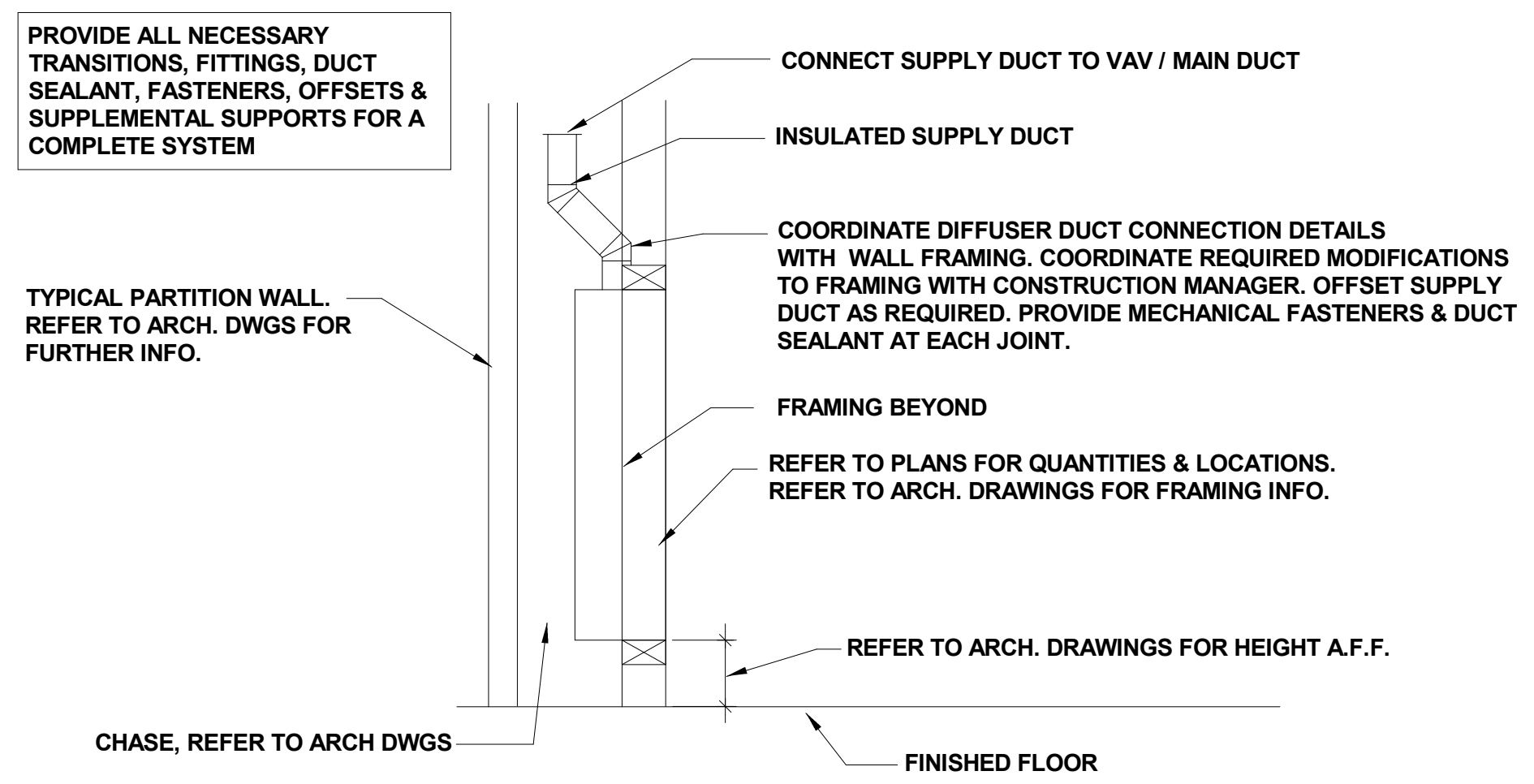
SHEET TITLE:
DETAILS V

SHEET NUMBER:
M0.15



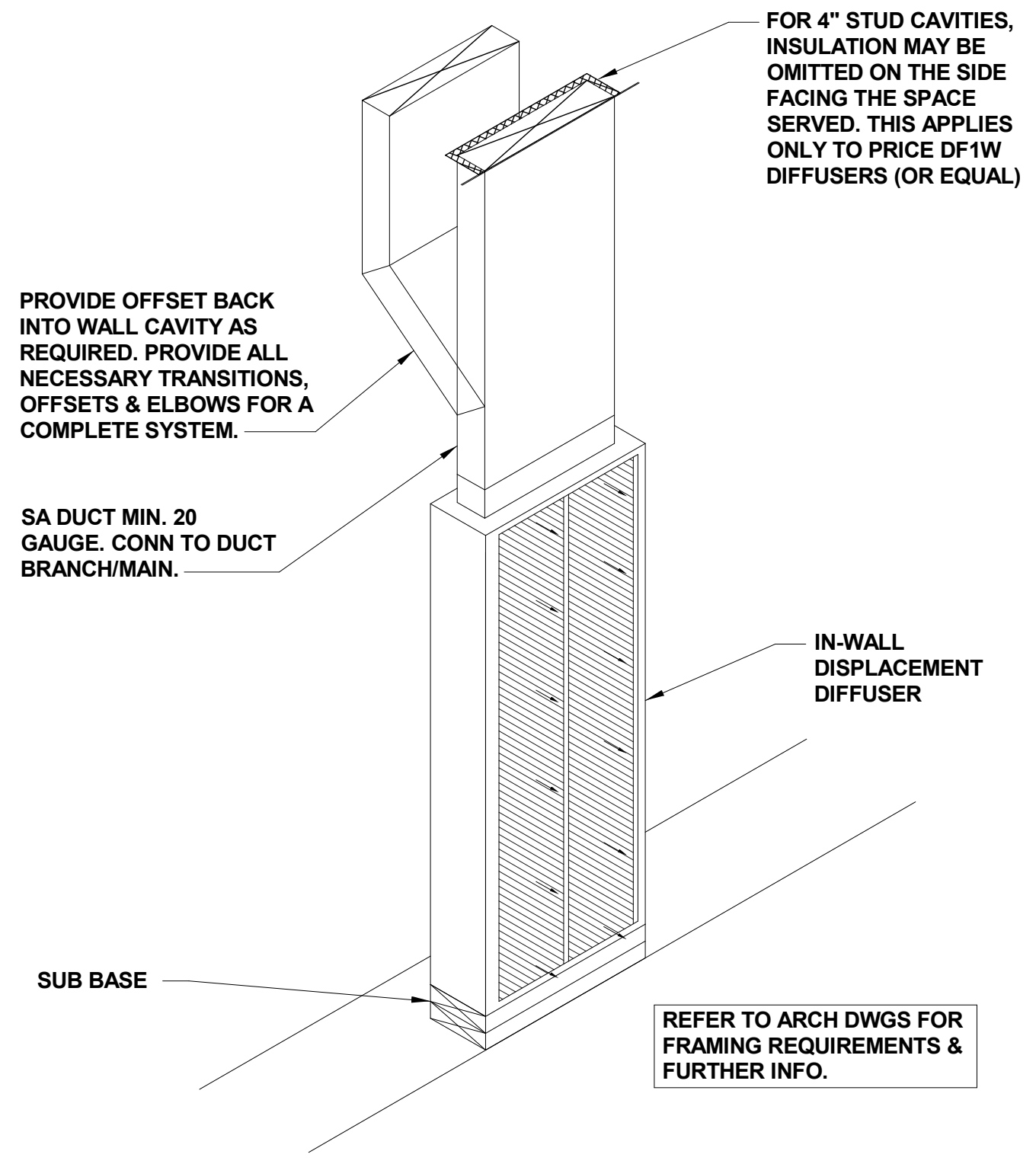
REFER TO SCHEDULE FOR ACTUAL SPECIFIC DIMENSION REQUIREMENT OF ALL DISPLACEMENT DIFFUSERS
TO VAV
TYPICAL CLASSROOM DISPLACEMENT DIFFUSER
SUB BASE
HVAC CONTRACTOR TO PROVIDE FACTORY SUPPLIED OR CUSTOM FABRICATED FINISHED TRIM FOR DRYWALL ASSEMBLIES FOR FLAT FACE (TYPE DFR) DISPLACEMENT DIFFUSERS
6" SUB BASE (TYP.)

TYPICAL CLASSROOM DISPLACEMENT DIFFUSER DETAIL - TOP CONNECTION
NOT TO SCALE



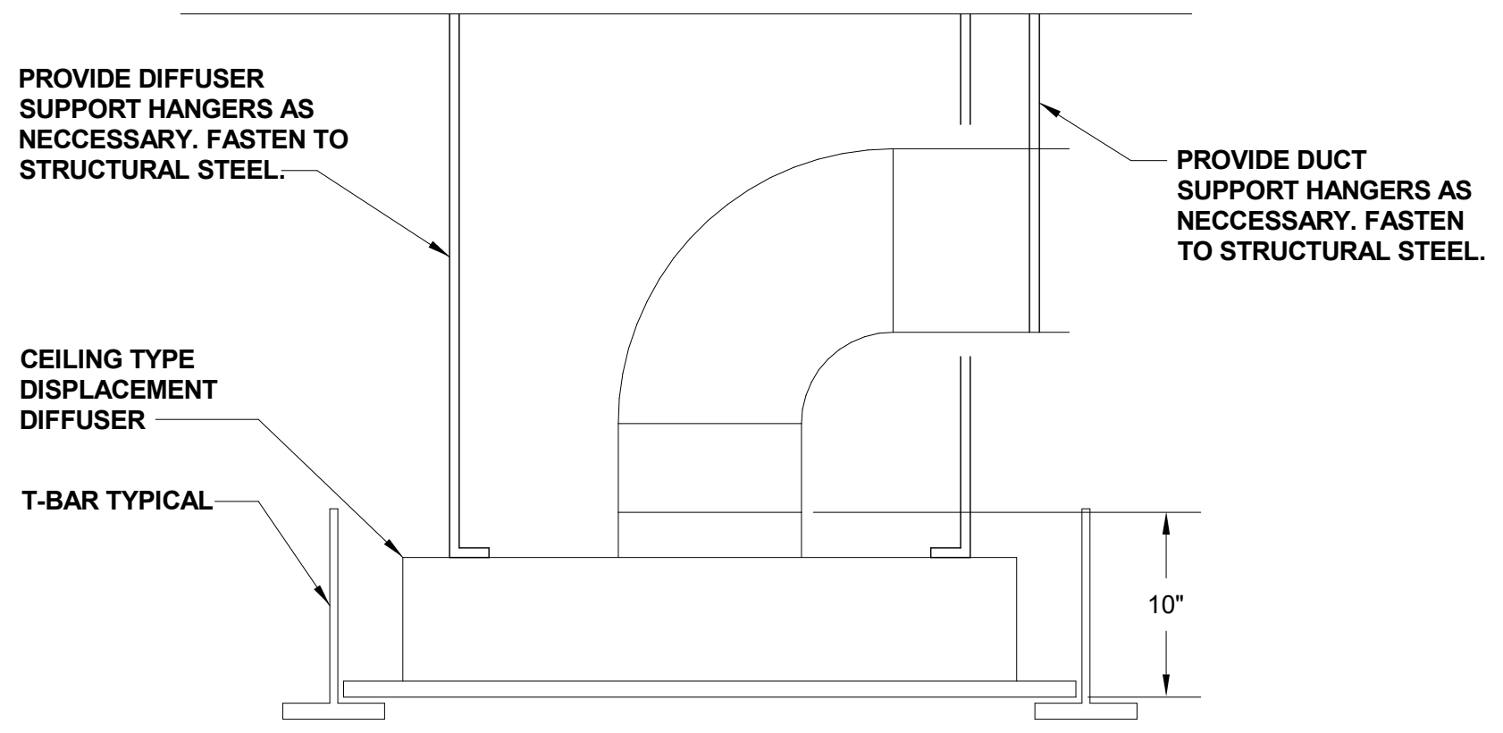
PROVIDE ALL NECESSARY TRANSITIONS, FITTINGS, DUCT SEALANT, FASTENERS, OFFSETS & SUPPLEMENTAL SUPPORTS FOR A COMPLETE SYSTEM
CONNECT SUPPLY DUCT TO VAV / MAIN DUCT
INSULATED SUPPLY DUCT
COORDINATE DIFFUSER DUCT CONNECTION DETAILS WITH WALL FRAMING. COORDINATE REQUIRED MODIFICATIONS TO FRAMING WITH CONSTRUCTION MANAGER. OFFSET SUPPLY DUCT AS REQUIRED. PROVIDE MECHANICAL FASTENERS & DUCT SEALANT AT EACH JOINT.
TYPICAL PARTITION WALL. REFER TO ARCH. DWGS FOR FURTHER INFO.
FRAMING BEYOND
REFER TO PLANS FOR QUANTITIES & LOCATIONS. REFER TO ARCH. DRAWINGS FOR FRAMING INFO.
REFER TO ARCH. DRAWINGS FOR HEIGHT A.F.F.
CHASE, REFER TO ARCH DWGS
FINISHED FLOOR

TYPICAL WALL MOUNTED DISPLACEMENT DIFFUSER DETAIL
(NOT TO SCALE)



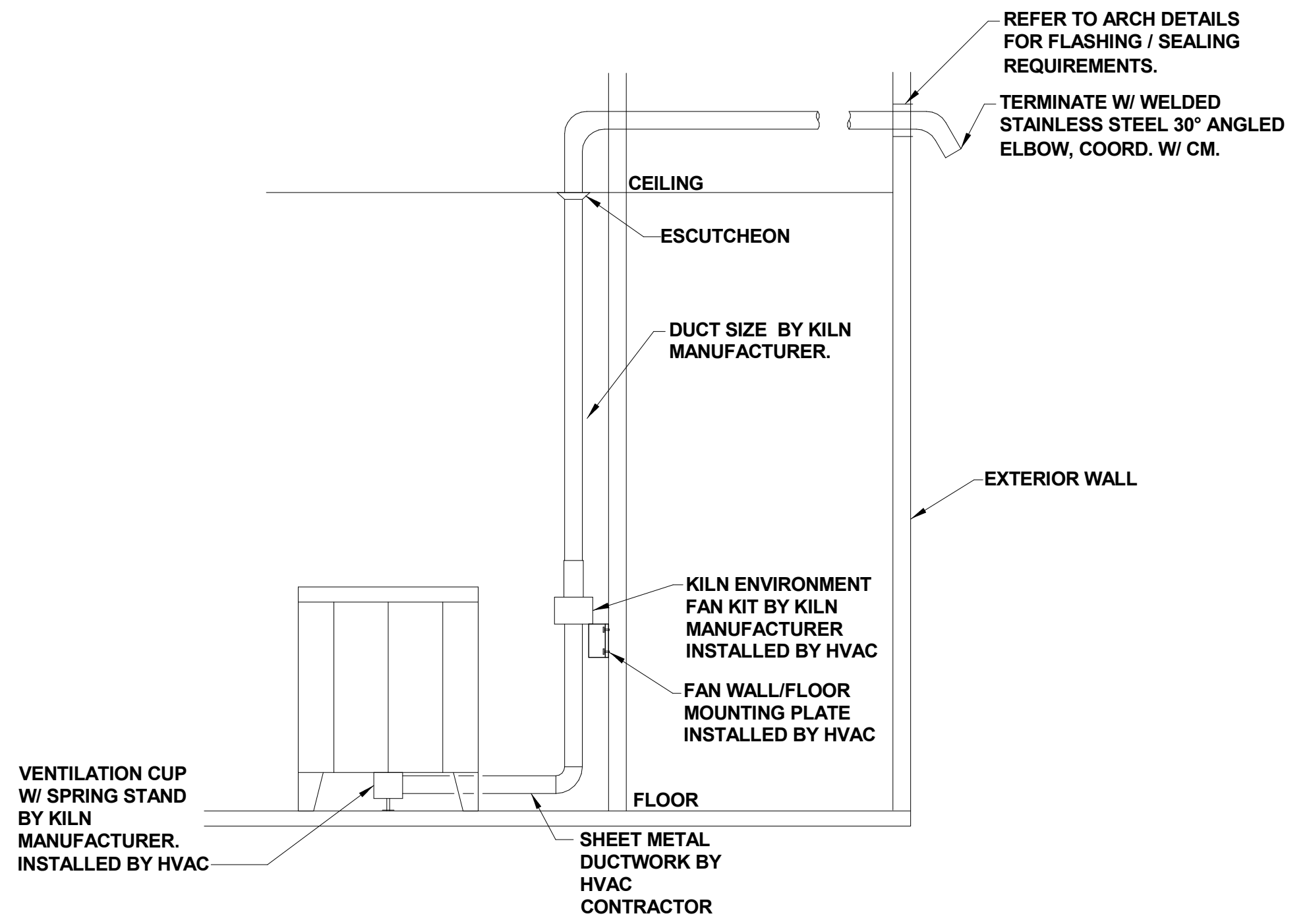
FOR 4" STUD CAVITIES, INSULATION MAY BE OMITTED ON THE SIDE FACING THE SPACE SERVED. THIS APPLIES ONLY TO PRICE DF1W DIFFUSERS (OR EQUAL)
PROVIDE OFFSET BACK INTO WALL CAVITY AS REQUIRED. PROVIDE ALL NECESSARY TRANSITIONS, OFFSETS & ELBOWS FOR A COMPLETE SYSTEM.
SA DUCT MIN. 20 GAUGE. CONN TO DUCT BRANCH/MAIN.
IN-WALL DISPLACEMENT DIFFUSER
SUB BASE
REFER TO ARCH DWGS FOR FRAMING REQUIREMENTS & FURTHER INFO.

TYPICAL IN-WALL DISPLACEMENT DIFFUSER
(NOT TO SCALE)



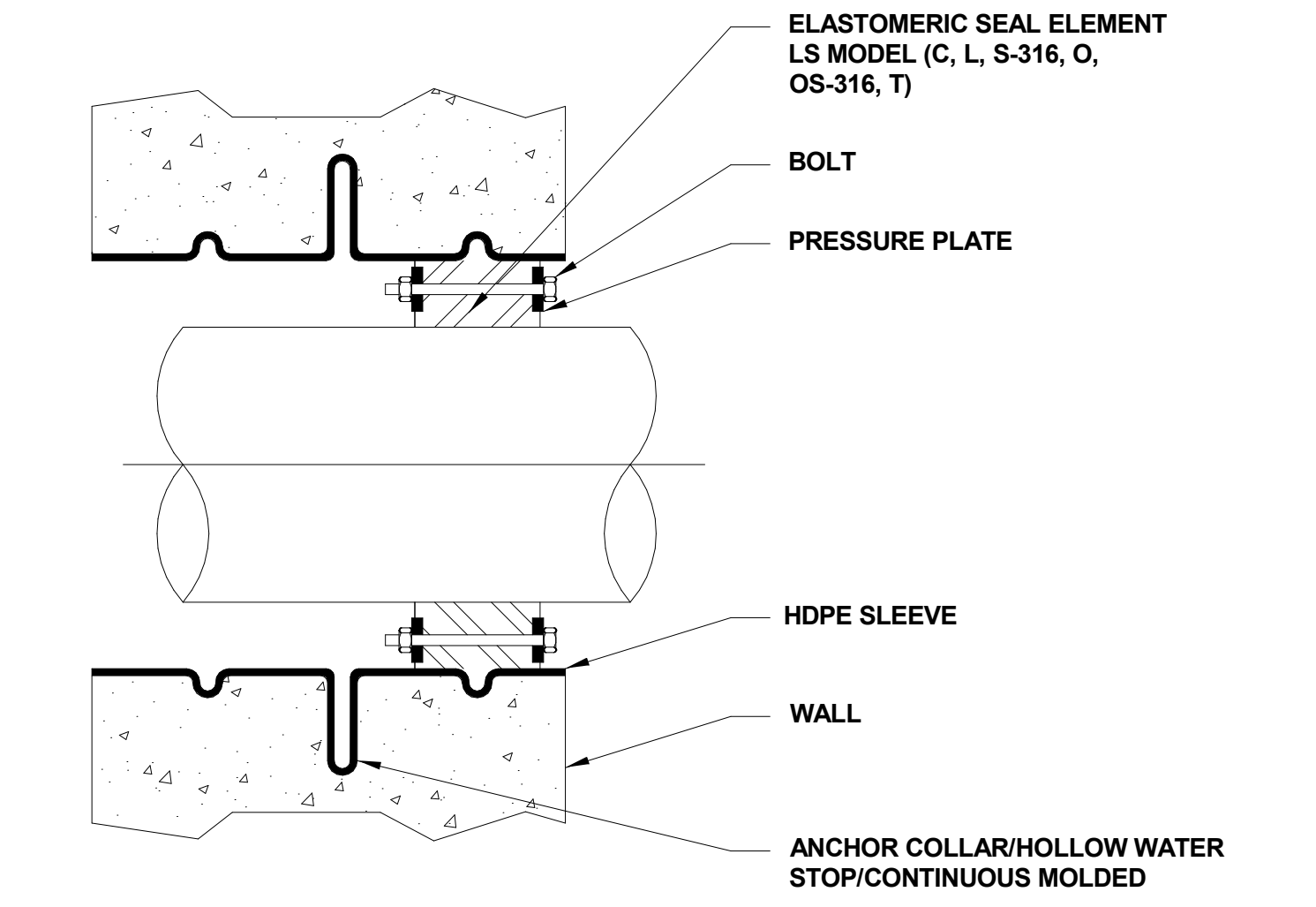
PROVIDE DIFFUSER SUPPORT HANGERS AS NECCESSARY. FASTEN TO STRUCTURAL STEEL.
PROVIDE DUCT SUPPORT HANGERS AS NECCESSARY. FASTEN TO STRUCTURAL STEEL.
CEILING TYPE DISPLACEMENT DIFFUSER
T-BAR TYPICAL
10"

CEILING DISPLACMENT DIFFUSER IN T-BAR DETAIL
(NOT TO SCALE)



REFER TO ARCH DETAILS FOR FLASHING / SEALING REQUIREMENTS.
TERMINATE W/ WELDED STAINLESS STEEL 30° ANGLED ELBOW, COORD. W/ CM.
CEILING
ESCUTCHEON
DUCT SIZE BY KILN MANUFACTURER.
EXTERIOR WALL
KILN ENVIRONMENT FAN KIT BY KILN MANUFACTURER INSTALLED BY HVAC
FAN WALL/FLOOR MOUNTING PLATE INSTALLED BY HVAC
VENTILATION CUP W/ SPRING STAND BY KILN MANUFACTURER. INSTALLED BY HVAC
FLOOR
SHEET METAL DUCTWORK BY HVAC CONTRACTOR

KILN DUCT DETAIL
(NOT TO SCALE)



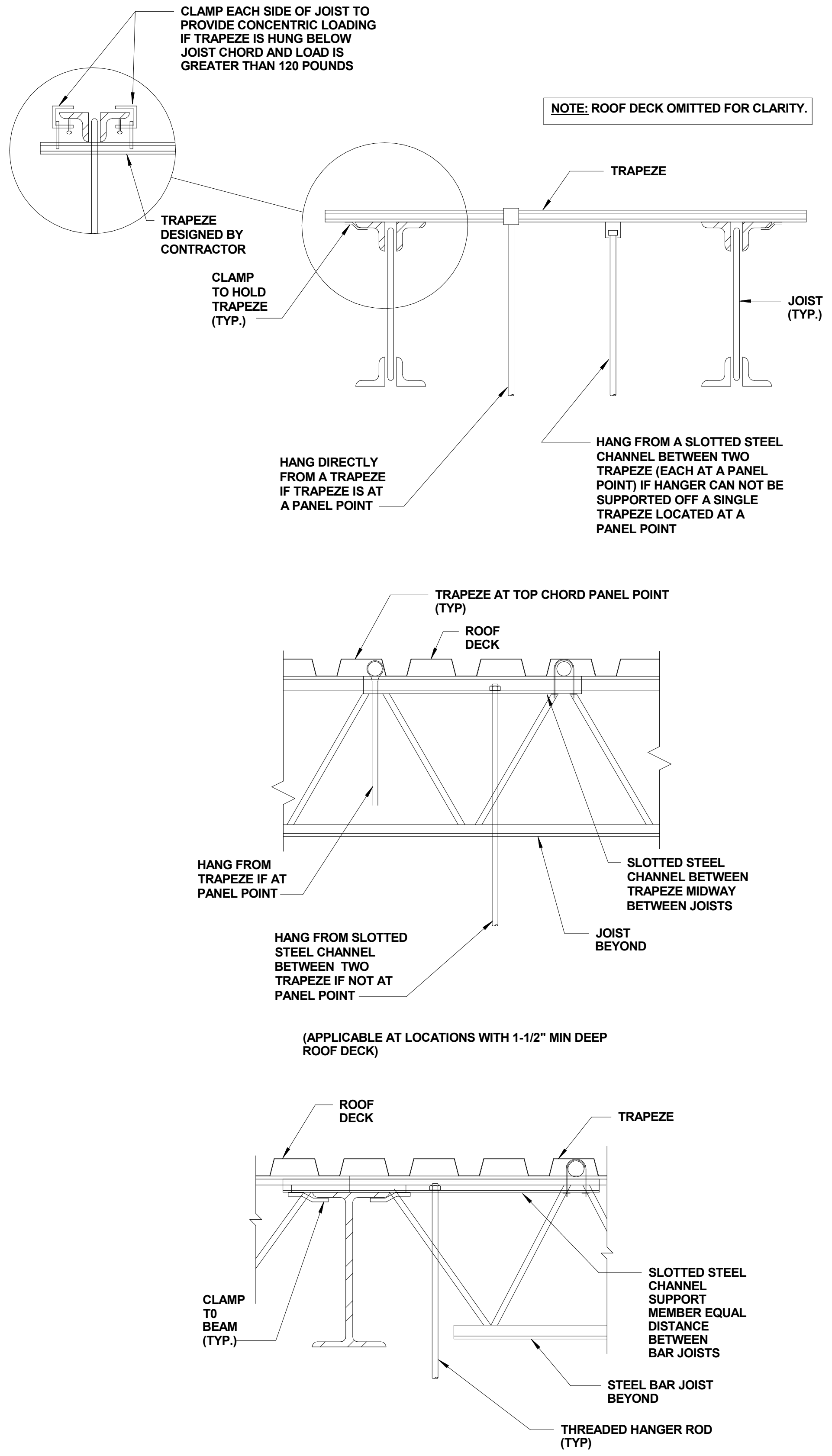
ELASTOMERIC SEAL ELEMENT LS MODEL (C, L, S-316, O, OS-316, T)
BOLT
PRESSURE PLATE
HDPE SLEEVE
WALL
ANCHOR COLLAR/HOLLOW WATER STOP/CONTINUOUS MOLDED

LS Model	Seal Element	Bolts/Nuts	Pressure Plate
C	EPDM (Black)	Zinc Dichromate/Organic Coated Carbon Steel Bolt	Reinforced Nylon Polymer
L	EPDM (Blue)	Zinc Dichromate/Organic Coated Carbon Steel Bolt	Reinforced Nylon Polymer
O	Nitrile	Zinc Dichromate/Organic Coated Carbon Steel Bolt	Reinforced Nylon Polymer
T	Silicone	Zinc Dichromate/Organic Coated Carbon Steel Bolt	Steel Zinc Dichromate
(C,L,O)+S-316	(see model options)	316 Stainless Steel	Reinforced Nylon Polymer

Sleeve Model	Description	Material
CS	Century-Line Sleeve	HDPE
WS	Steel Wall Sleeve	Steel

For more Material Property Information, see literature at www.linkseal.com

MODULAR SEALS SIMILAR TO LINK-SEAL® WITH CENTURY-LINE® SLEEVES
(NOT TO SCALE)



CLAMP EACH SIDE OF JOIST TO PROVIDE CONCENTRIC LOADING IF TRAPEZE IS HUNG BELOW JOIST CHORD AND LOAD IS GREATER THAN 120 POUNDS
NOTE: ROOF DECK OMITTED FOR CLARITY.
TRAPEZE
TRAPEZE DESIGNED BY CONTRACTOR
CLAMP TO HOLD TRAPEZE (TYP.)
JOIST (TYP.)
HANG DIRECTLY FROM A TRAPEZE IF TRAPEZE IS AT A PANEL POINT
HANG FROM A SLOTTED STEEL CHANNEL BETWEEN TWO TRAPEZE (EACH AT A PANEL POINT) IF HANGER CAN NOT BE SUPPORTED OFF A SINGLE TRAPEZE LOCATED AT A PANEL POINT
TRAPEZE AT TOP CHORD PANEL POINT (TYP)
ROOF DECK
HANG FROM TRAPEZE IF AT PANEL POINT
SLOTTED STEEL CHANNEL BETWEEN TRAPEZE MIDWAY BETWEEN JOISTS
HANG FROM SLOTTED STEEL CHANNEL BETWEEN TWO TRAPEZE IF NOT AT PANEL POINT
JOIST BEYOND
(APPLICABLE AT LOCATIONS WITH 1-1/2" MIN DEEP ROOF DECK)
ROOF DECK
TRAPEZE
CLAMP T0 BEAM (TYP.)
SLOTTED STEEL CHANNEL SUPPORT MEMBER EQUAL DISTANCE BETWEEN BAR JOISTS
STEEL BAR JOIST BEYOND
THREADED HANGER ROD (TYP)

JOIST HANGING

DETAIL "C" HANGING FROM TOP CHORD
(NOT TO SCALE)

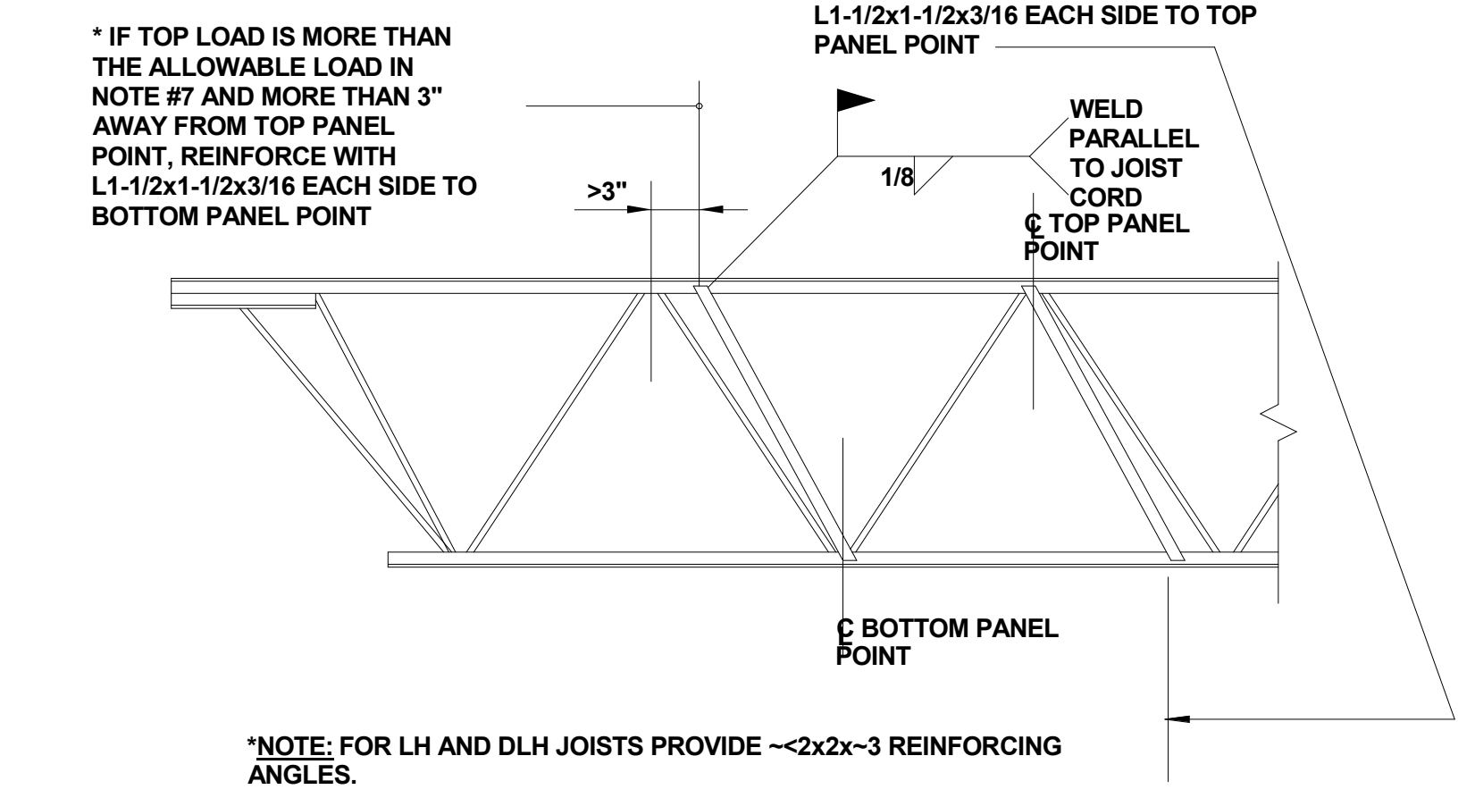
JOIST HANGING NOTES:

1. DO NOT HANG PIPES AND EQUIPMENT FROM STEEL DECK OR FROM BRIDGING ANGLES.
2. WHERE POSSIBLE SUSPEND HANGERS FROM WIDE-FLANGED BEAMS, NOT FROM BAR JOISTS.
3. UTILITIES, INCLUDING PIPING, DUCTWORK AND CONDUIT RUNNING PARALLEL TO BAR JOISTS, WHERE THE LOAD IS 25 POUNDS PER LINEAR FOOT OR LESS, MAY BE HUNG FROM A SINGLE JOIST.
4. UTILITIES, INCLUDING PIPING, DUCTWORK AND CONDUIT, RUNNING PARALLEL TO BAR JOISTS, WHERE THE LOAD IS GREATER THAN 25 POUNDS PER LINEAR FOOT, SHALL BE SUPPORTED MID-WAY BETWEEN TWO JOISTS.
5. WHERE PAIRS OF PIPES RUN PERPENDICULAR TO BAR JOISTS, STAGGER HANGERS BETWEEN ALTERNATE JOISTS, OR HANG FROM EVERY JOIST.
6. THE TOTAL WEIGHT OF ALL UTILITIES, SERVICES, PIPING, DUCTWORK AND CONDUIT HANGING FROM A SINGLE POINT SHALL NOT EXCEED 200 LBS FOR K-SERIES JOISTS AND 400 LBS FOR LH AND DLH SERIES JOISTS UNLESS OTHERWISE NOTED ON THE STRUCTURAL DRAWINGS. WHEN THIS WEIGHT IS EXCEEDED, SUBMIT A DETAIL OF PROPOSED METHOD OF HANGING TO THE ARCHITECT FOR APPROVAL.
7. HANGERS MAY BE LOCATED BETWEEN PANEL POINTS PROVIDED THAT THEY DO NOT EXCEED THE FOLLOWING LOADS:

	K-SERIES JOISTS	LH & DLH-SERIES JOISTS
BETWEEN TOP CHORD PANEL POINTS	100 LBS	200 LBS
BETWEEN BOTTOM CHORD PANEL POINTS	50 LBS	100 LBS

8. ECCENTRIC HANGERS (C-CLAMPS) WILL BE ALLOWED FOR PIPING AND OTHER TRADES WHERE THE HANGER SPACING LIMITS THE TOTAL POINT LOAD TO 120 LBS OR LESS. C-CLAMPS FOR LOADS GREATER THAN 30 LBS, BUT NOT MORE THAN 120 LBS, MUST BE LOCATED AT JOIST PANEL POINTS UNLESS THE JOIST CHORD IS REINFORCED WITH AN ANGLE SIMILAR TO DETAIL "D".
9. WELDING OF JOISTS SHALL ONLY BE IN A DIRECTION PARALLEL TO JOIST CHORDS.

NOTE:
ALL FIELD WELDING OF JOISTS MUST OCCUR IN A DIRECTION PARALLEL TO THE CHORDS, NOT PERPENDICULAR.

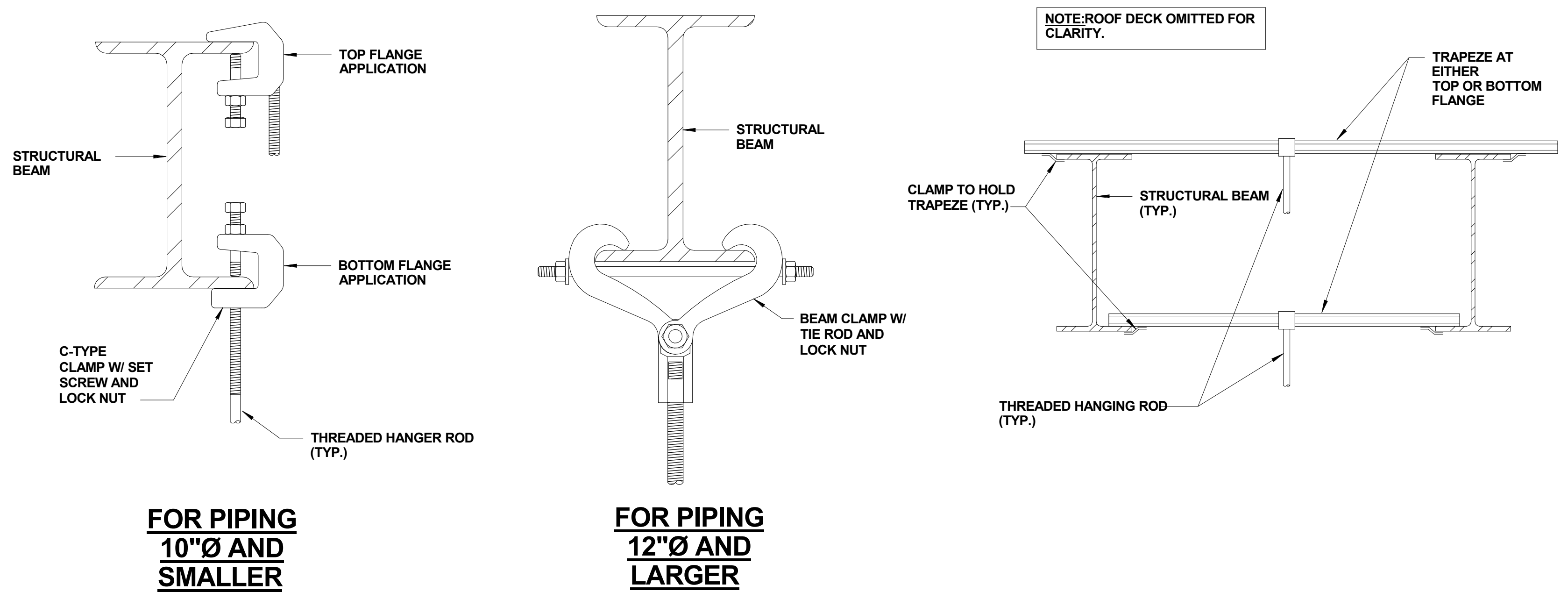


* IF BOTTOM LOAD IS MORE THAN THE ALLOWABLE LOAD IN NOTE #7 AND IS NOT AT BOTTOM CHORD PANEL POINT (OR HANGER IS NOT TOUCHING DIAGONAL WEB MEMBER), REINFORCE WITH L1-1/2x1-1/2x3/16 EACH SIDE TO TOP PANEL POINT
* IF TOP LOAD IS MORE THAN THE ALLOWABLE LOAD IN NOTE #7 AND MORE THAN 3" AWAY FROM TOP PANEL POINT, REINFORCE WITH L1-1/2x1-1/2x3/16 EACH SIDE TO BOTTOM PANEL POINT
>3"
1/8
WELD PARALLEL TO JOIST CORD
℄ TOP PANEL POINT
℄ BOTTOM PANEL POINT

*NOTE: FOR LH AND DLH JOISTS PROVIDE ~<2x2x~3 REINFORCING ANGLES.

(FOR LOADS NOT AT PANEL POINTS)

DETAIL "D" TYPICAL JOIST REINFORCING
(NOT TO SCALE)

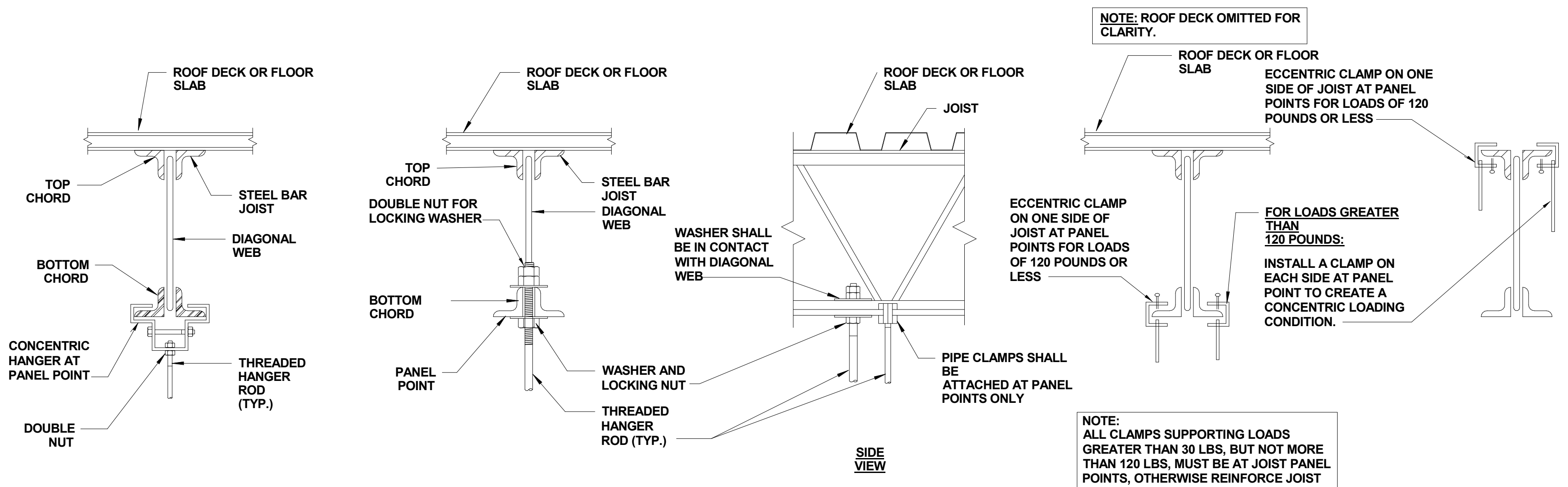


TOP FLANGE APPLICATION
STRUCTURAL BEAM
BOTTOM FLANGE APPLICATION
C-TYPE CLAMP W/ SET SCREW AND LOCK NUT
THREADED HANGER ROD (TYP.)
STRUCTURAL BEAM
BEAM CLAMP W/ TIE ROD AND LOCK NUT
NOTE: ROOF DECK OMITTED FOR CLARITY.
TRAPEZE AT EITHER TOP OR BOTTOM FLANGE
CLAMP TO HOLD TRAPEZE (TYP.)
STRUCTURAL BEAM (TYP.)
THREADED HANGING ROD (TYP.)

FOR PIPING 10"Ø AND SMALLER

FOR PIPING 12"Ø AND LARGER

BEAM HANGING
(NOT TO SCALE)

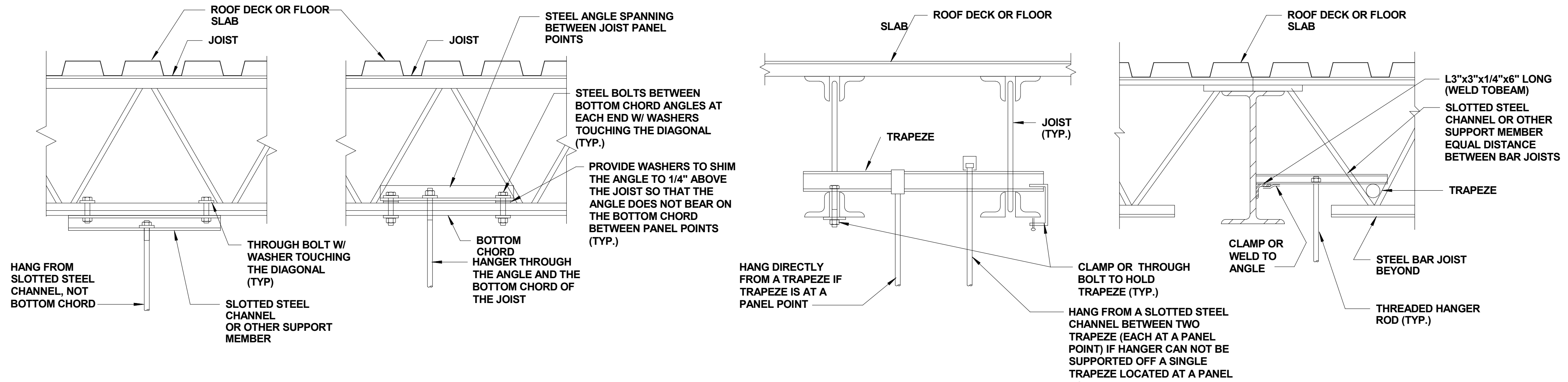


ROOF DECK OR FLOOR SLAB
TOP CHORD
STEEL BAR JOIST
DIAGONAL WEB
BOTTOM CHORD
CONCENTRIC HANGER AT PANEL POINT
THREADED HANGER ROD (TYP.)
DOUBLE NUT
ROOF DECK OR FLOOR SLAB
TOP CHORD
DOUBLE NUT FOR LOCKING WASHER
STEEL BAR JOIST DIAGONAL WEB
BOTTOM CHORD
PANEL POINT
WASHER AND LOCKING NUT
THREADED HANGER ROD (TYP.)
ROOF DECK OR FLOOR SLAB
JOIST
WASHER SHALL BE IN CONTACT WITH DIAGONAL WEB
PIPE CLAMPS SHALL BE ATTACHED AT PANEL POINTS ONLY
SIDE VIEW
NOTE: ROOF DECK OMITTED FOR CLARITY.
ROOF DECK OR FLOOR SLAB
ECCENTRIC CLAMP ON ONE SIDE OF JOIST AT PANEL POINTS FOR LOADS OF 120 POUNDS OR LESS
ECCENTRIC CLAMP ON ONE SIDE OF JOIST AT PANEL POINTS FOR LOADS OF 120 POUNDS OR LESS
FOR LOADS GREATER THAN 120 POUNDS:
INSTALL A CLAMP ON EACH SIDE AT PANEL POINT TO CREATE A CONCENTRIC LOADING CONDITION.

NOTE:
ALL CLAMPS SUPPORTING LOADS GREATER THAN 30 LBS, BUT NOT MORE THAN 120 LBS, MUST BE AT JOIST PANEL POINTS, OTHERWISE REINFORCE JOIST PER DETAIL "D" OR REVISE HANGING CONFIGURATION.

(ECCENTRIC HANGERS ONLY ALLOWED FOR LOADS OF 120 POUNDS OR LESS)

DETAIL "A" CONCENTRIC (AND ECCENTRIC) HANGERS
(NOT TO SCALE)



ROOF DECK OR FLOOR SLAB
JOIST
HANG FROM SLOTTED STEEL CHANNEL, NOT BOTTOM CHORD
THROUGH BOLT W/ WASHER TOUCHING THE DIAGONAL (TYP)
SLOTTED STEEL CHANNEL OR OTHER SUPPORT MEMBER
JOIST
STEEL ANGLE SPANNING BETWEEN JOIST PANEL POINTS
STEEL BOLTS BETWEEN BOTTOM CHORD ANGLES AT EACH END W/ WASHERS TOUCHING THE DIAGONAL (TYP.)
PROVIDE WASHERS TO SHIM THE ANGLE TO 1/4" ABOVE THE JOIST SO THAT THE ANGLE DOES NOT BEAR ON THE BOTTOM CHORD BETWEEN PANEL POINTS (TYP.)
BOTTOM CHORD
HANGER THROUGH THE ANGLE AND THE BOTTOM CHORD OF THE JOIST
SLAB
ROOF DECK OR FLOOR
TRAPEZE
JOIST (TYP.)
HANG DIRECTLY FROM A TRAPEZE IF TRAPEZE IS AT A PANEL POINT
CLAMP OR THROUGH BOLT TO HOLD TRAPEZE (TYP.)
HANG FROM A SLOTTED STEEL CHANNEL BETWEEN TWO TRAPEZE (EACH AT A PANEL POINT) IF HANGER CAN NOT BE SUPPORTED OFF A SINGLE TRAPEZE LOCATED AT A PANEL POINT
ROOF DECK OR FLOOR SLAB
L3"x3"x1/4"x6" LONG (WELD TOBEAM)
SLOTTED STEEL CHANNEL OR OTHER SUPPORT MEMBER EQUAL DISTANCE BETWEEN BAR JOISTS
TRAPEZE
CLAMP OR WELD TO ANGLE
STEEL BAR JOIST BEYOND
THREADED HANGER ROD (TYP.)

DETAIL "B" HANGING FROM BOTTOM CHORD
(NOT TO SCALE)

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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

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ORIENTATION AND SCALE:
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DETAILS VI

SHEET NUMBER:
M0.16

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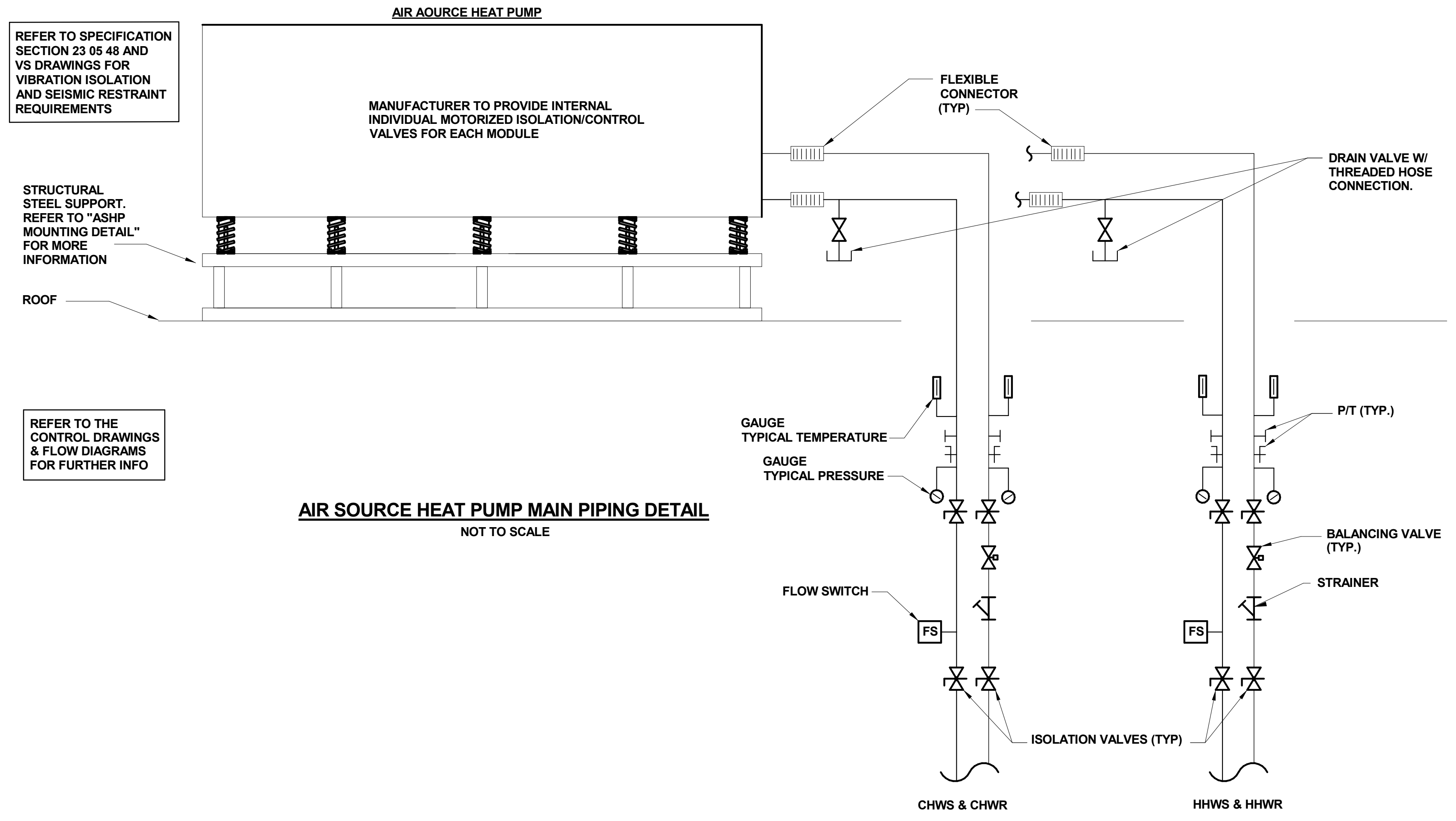
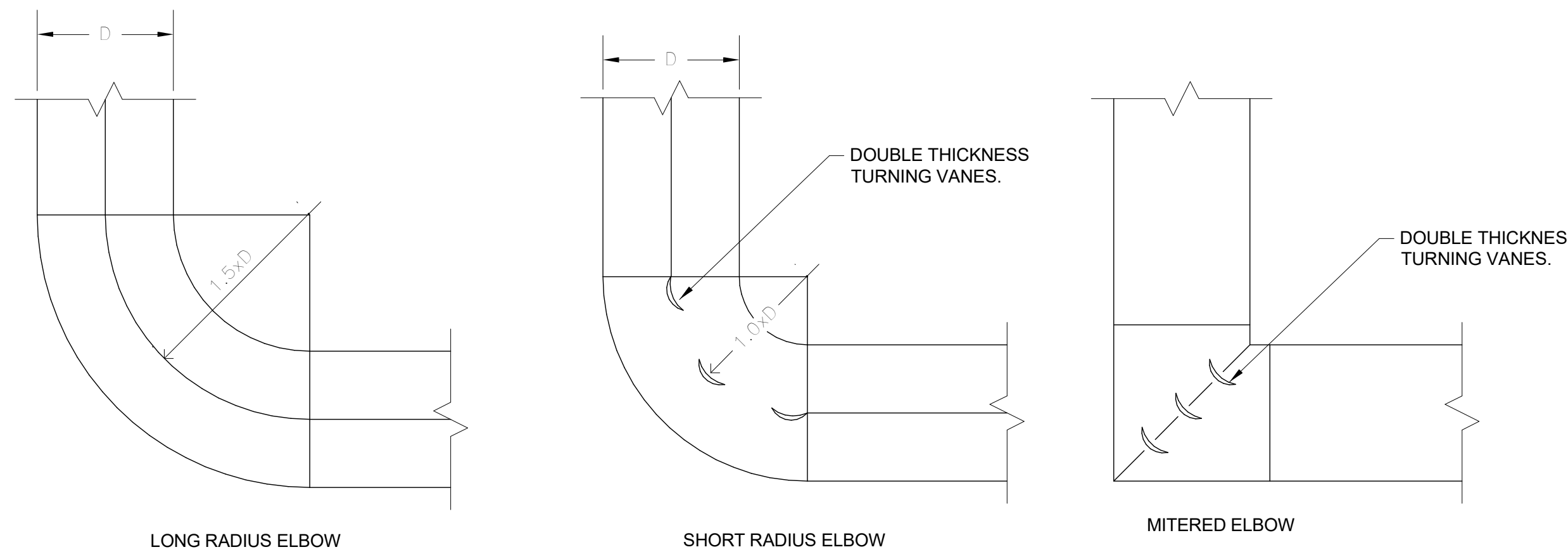

AIR AOURCE HEAT PUMP
REFER TO SPECIFICATION SECTION 23 05 48 AND VS DRAWINGS FOR VIBRATION ISOLATION AND SEISMIC RESTRAINT REQUIREMENTS
MANUFACTURER TO PROVIDE INTERNAL INDIVIDUAL MOTORIZED ISOLATION/CONTROL VALVES FOR EACH MODULE
STRUCTURAL STEEL SUPPORT. REFER TO "ASHP MOUNTING DETAIL" FOR MORE INFORMATION
ROOF
REFER TO THE CONTROL DRAWINGS & FLOW DIAGRAMS FOR FURTHER INFO
FLEXIBLE CONNECTOR (TYP)
DRAIN VALVE W/ THREADED HOSE CONNECTION.
GAUGE TYPICAL TEMPERATURE
GAUGE TYPICAL PRESSURE
P/T (TYP.)
BALANCING VALVE (TYP.)
STRAINER
FLOW SWITCH
FS
FS
ISOLATION VALVES (TYP)
CHWS & CHWR
HHWS & HHWR

AIR SOURCE HEAT PUMP MAIN PIPING DETAIL

NOT TO SCALE


D
1.5xD
LONG RADIUS ELBOW
D
DOUBLE THICKNESS TURNING VANES.
1.0xD
SHORT RADIUS ELBOW
DOUBLE THICKNESS TURNING VANES.
MITERED ELBOW

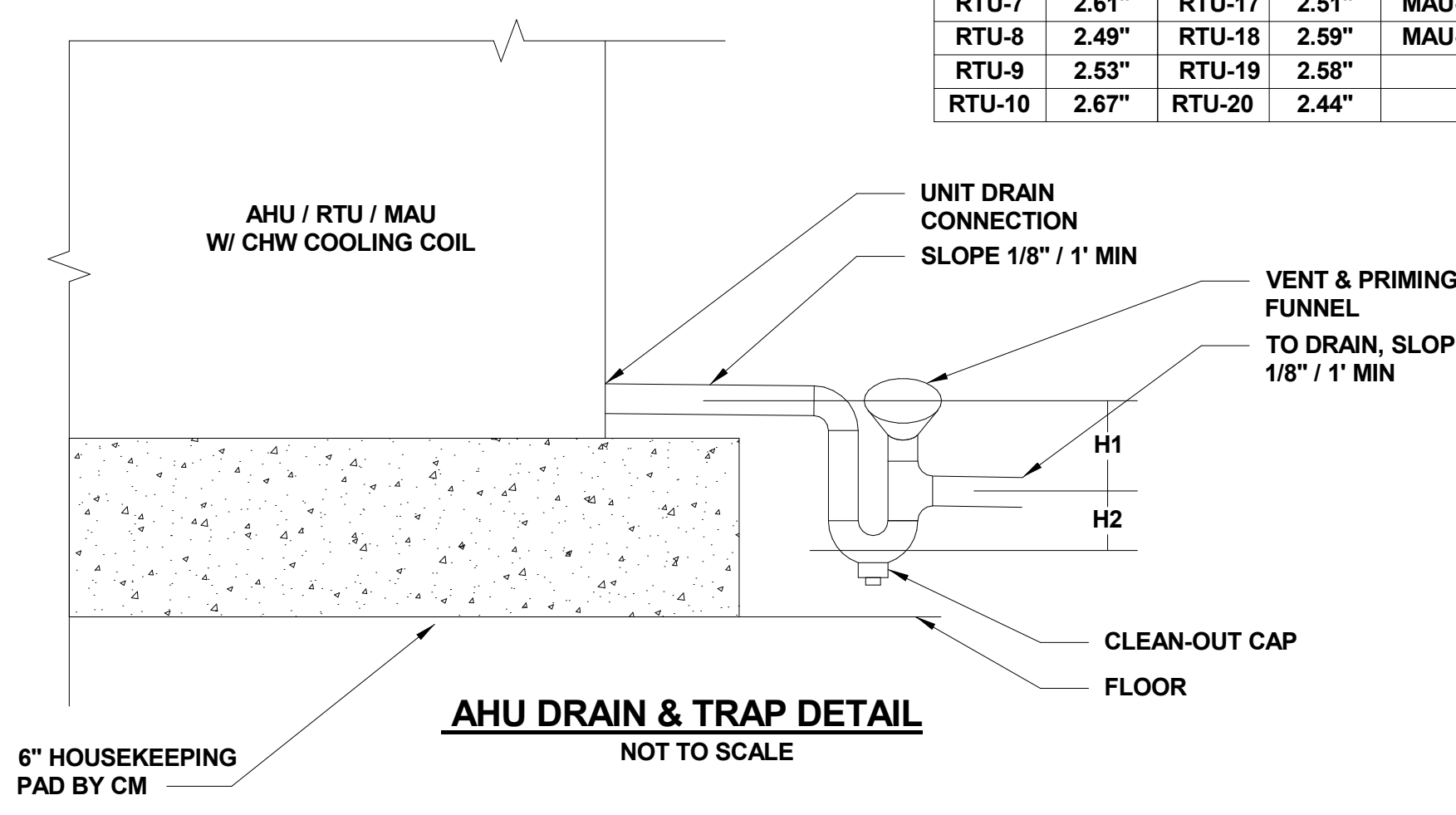
WHEREVER POSSIBLE, EVEN IF NOT INDICATEDF ON FLOOR PLANS, LONG RADIUS ELBOWS SHALL BE USED IN ALL SUPPLY, RETURN, AND EXHAUST DUCT SYSTEMS. WHERE LONG RADIUS IS NOT POSSIBLE, SHORT RADIUS ELBOWS WITH DOUBLE THICKNESS TURNING VANES SHALL BE USED. WHERE NEITHER RADIUS ELBOW USE IS POSSIBLE DUE TO CONFLICTS, MITERED RECTANGULAR ELBOWS WITH DOUBLE THICKNESS TURNING VANES SHALL BE INSTALLED.

TYPICAL DUCT ELBOW AND TURNING VANES DETAIL

(NOT TO SCALE)

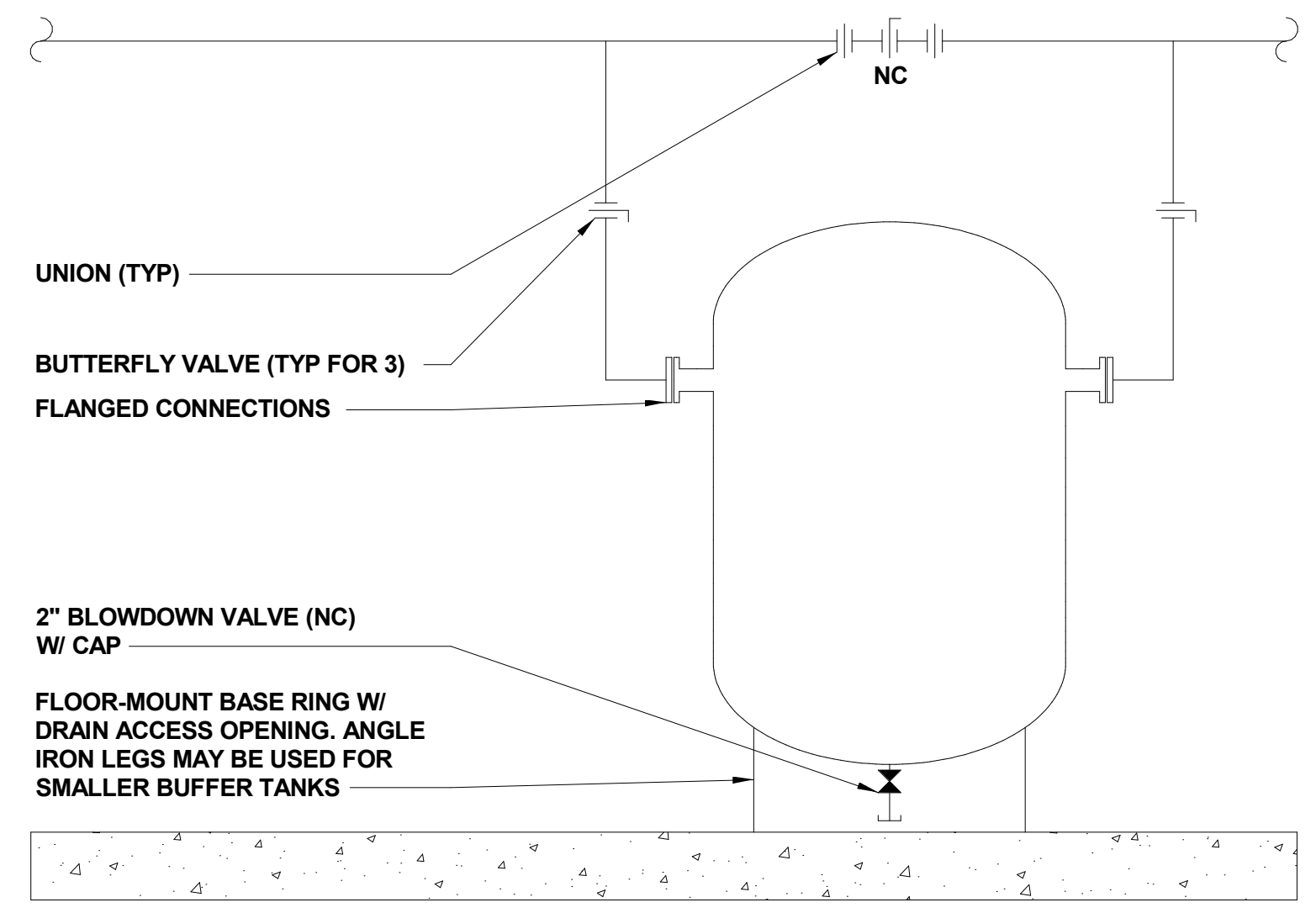
FOR NEGATIVE PLENUM PRESSURE:
H1 = PLENUM PRESSURE + 1"
H2 = 0.5 * PLENUM PRESSURE + 1"
TOTAL HEIGHT = 1.5 * PLENUM PRESSURE + 2"
NOTE: PLENUM PRESSURES ARE PROVIDED FOR REFERENCE ONLY, BASED ON ENGINEERING CALCULATIONS & SHALL BE FIELD-VERIFIED AS INSTALLED TSP WILL VARY

UNIT	PLENUM PRESS.	UNIT	PLENUM PRESS.	UNIT	PLENUM PRESS.
RTU-1	2.67"	RTU-11	2.53"	RTU-21	2.25"
RTU-2	2.67"	RTU-12	2.67"	RTU-22	2.25"
RTU-3	2.81"	RTU-13	2.69"	RTU-23	2.11"
RTU-4	2.72"	RTU-14	2.54"	RTU-24	2.18
RTU-5	2.26"	RTU-15	2.51"	RTU-25	2.18"
RTU-6	2.57"	RTU-16	2.28"	RTU-26	2.18"
RTU-7	2.61"	RTU-17	2.51"	MAU-1	2.01"
RTU-8	2.49"	RTU-18	2.59"	MAU-2	2.09"
RTU-9	2.53"	RTU-19	2.58"		
RTU-10	2.67"	RTU-20	2.44"		


AHU / RTU / MAU W/ CHW COOLING COIL
UNIT DRAIN CONNECTION
SLOPE 1/8" / 1' MIN
VENT & PRIMING FUNNEL
TO DRAIN, SLOPE 1/8" / 1' MIN
H1
H2
CLEAN-OUT CAP
FLOOR
6" HOUSEKEEPING PAD BY CM

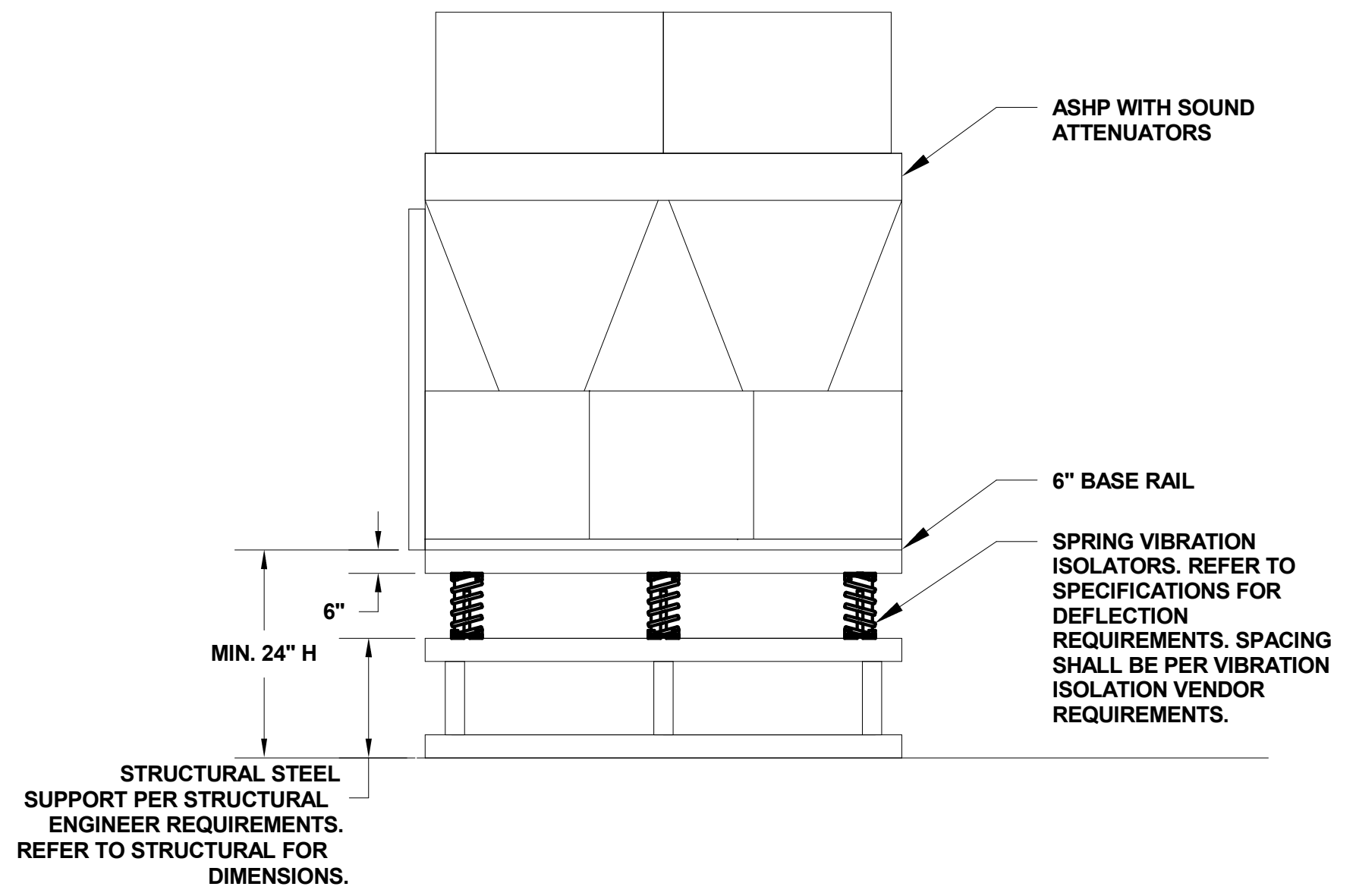
AHU DRAIN & TRAP DETAIL

NOT TO SCALE


NC
UNION (TYP)
BUTTERFLY VALVE (TYP FOR 3)
FLANGED CONNECTIONS
2" BLOWDOWN VALVE (NC) W/ CAP
FLOOR-MOUNT BASE RING W/ DRAIN ACCESS OPENING. ANGLE IRON LEGS MAY BE USED FOR SMALLER BUFFER TANKS

BUFFER TANK PIPING DETAIL

NOT TO SCALE


ASHP WITH SOUND ATTENUATORS
6" BASE RAIL
SPRING VIBRATION ISOLATORS. REFER TO SPECIFICATIONS FOR DEFLECTION REQUIREMENTS. SPACING SHALL BE PER VIBRATION ISOLATION VENDOR REQUIREMENTS.
6"
MIN. 24" H
STRUCTURAL STEEL SUPPORT PER STRUCTURAL ENGINEER REQUIREMENTS. REFER TO STRUCTURAL FOR DIMENSIONS.

ASHP MOUNTING DETAIL

(NOT TO SCALE)

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WILMINGTON
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PROJECT NUMBER: 23-0847

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KEY PLAN

ORIENTATION AND SCALE:

SCALE: AS INDICATED

SHEET TITLE:
DETAILS VII

SHEET NUMBER:
M0.17

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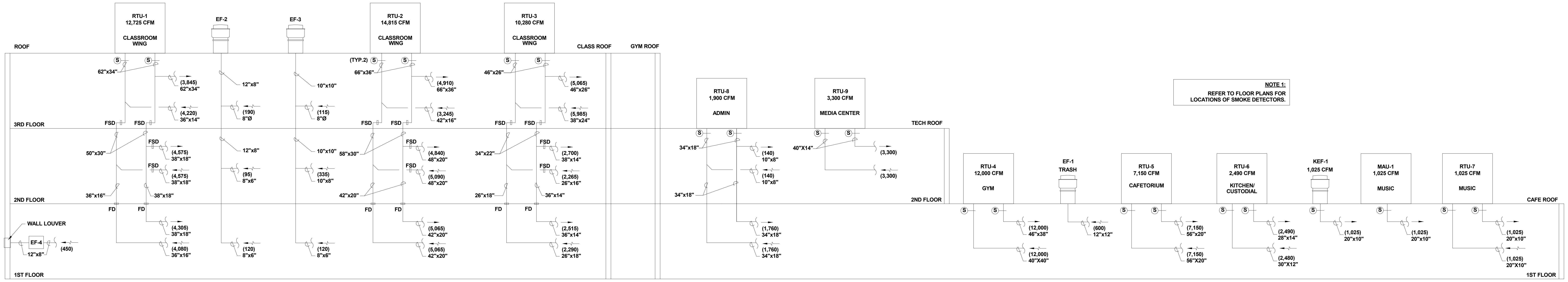

NOTE 1:

REFER TO FLOOR PLANS FOR LOCATIONS OF SMOKE DETECTORS.

AIRFLOW DIAGRAM

(NOT TO SCALE)

DORE + WHITTIER

MASSACHUSETTS
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SCALE: AS INDICATED

SHEET TITLE:
AIRFLOW RISER DIAGRAM

SHEET NUMBER:
M0.18

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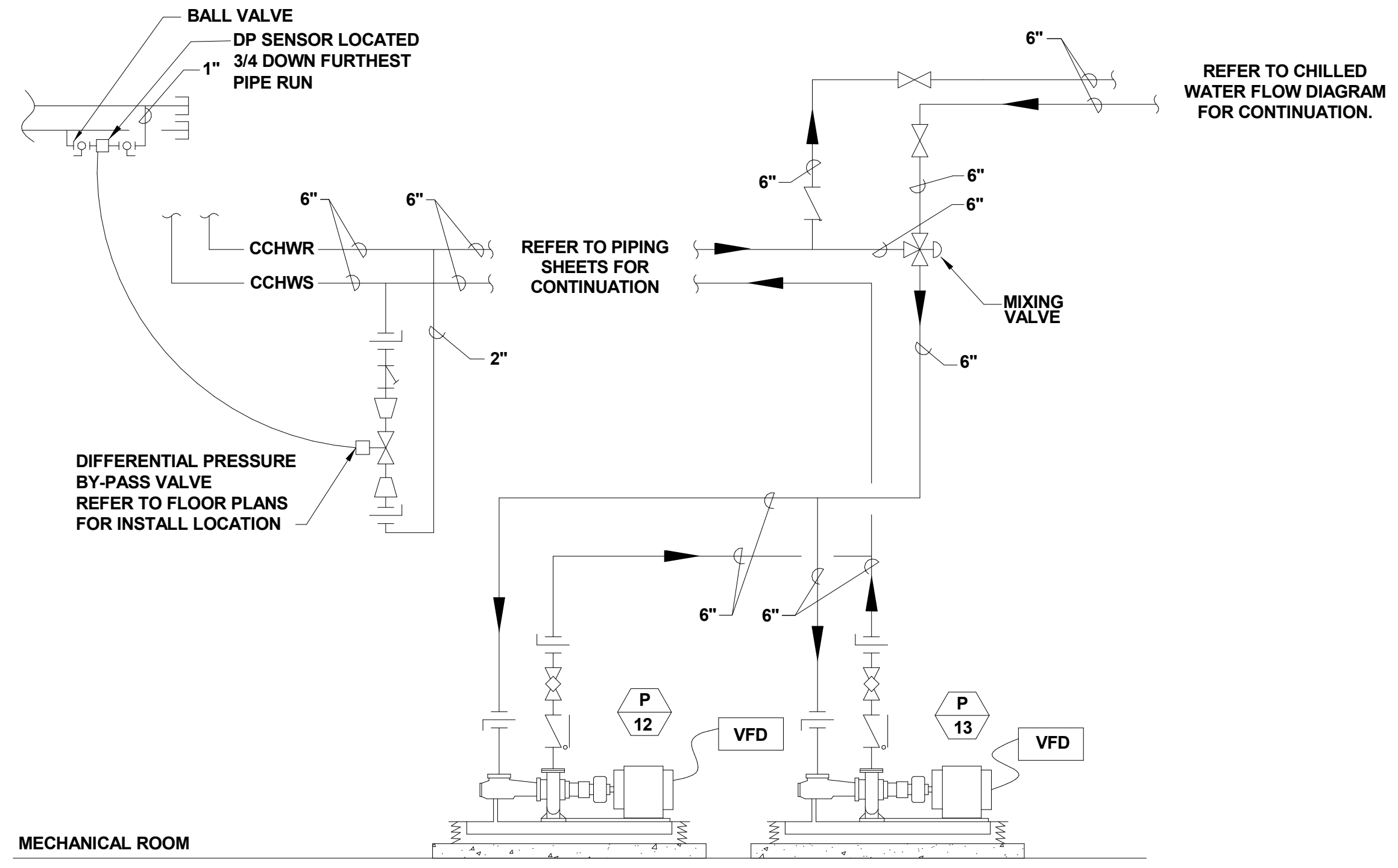
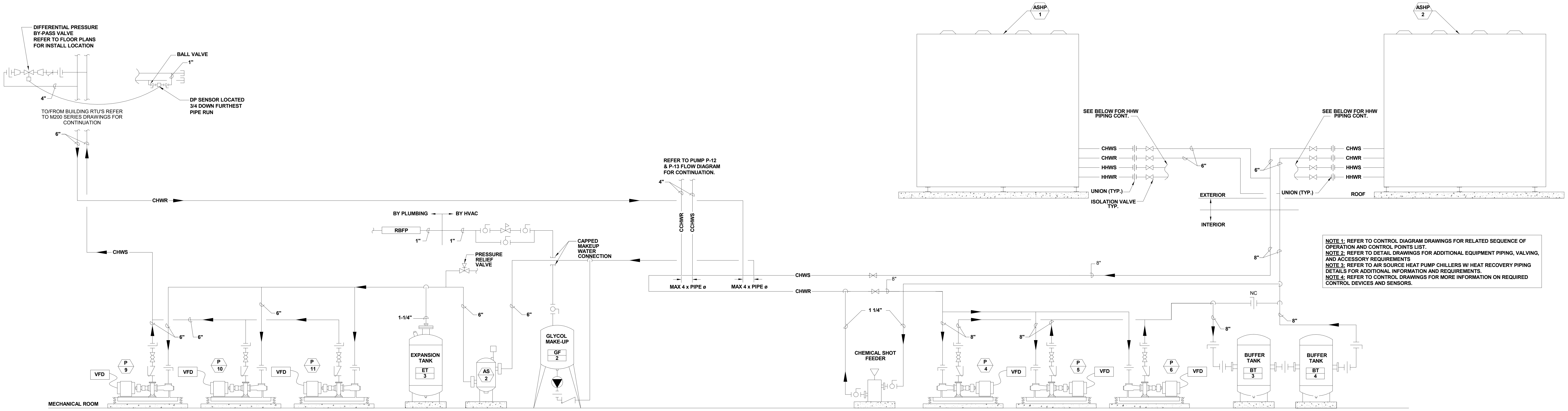

BALL VALVE
DP SENSOR LOCATED 3/4 DOWN FURTHEST PIPE RUN
1"
6"
6"
CCHWR
CCHWS
2"
DIFFERENTIAL PRESSURE BY-PASS VALVE REFER TO FLOOR PLANS FOR INSTALL LOCATION
REFER TO PIPING SHEETS FOR CONTINUATION
6"
6"
6"
6"
MIXING VALVE
6"
REFER TO CHILLED WATER FLOW DIAGRAM FOR CONTINUATION.
6"
6"
P 12
VFD
P 13
VFD
MECHANICAL ROOM

COMPENSATED CHILLED WATER FLOW DIAGRAM

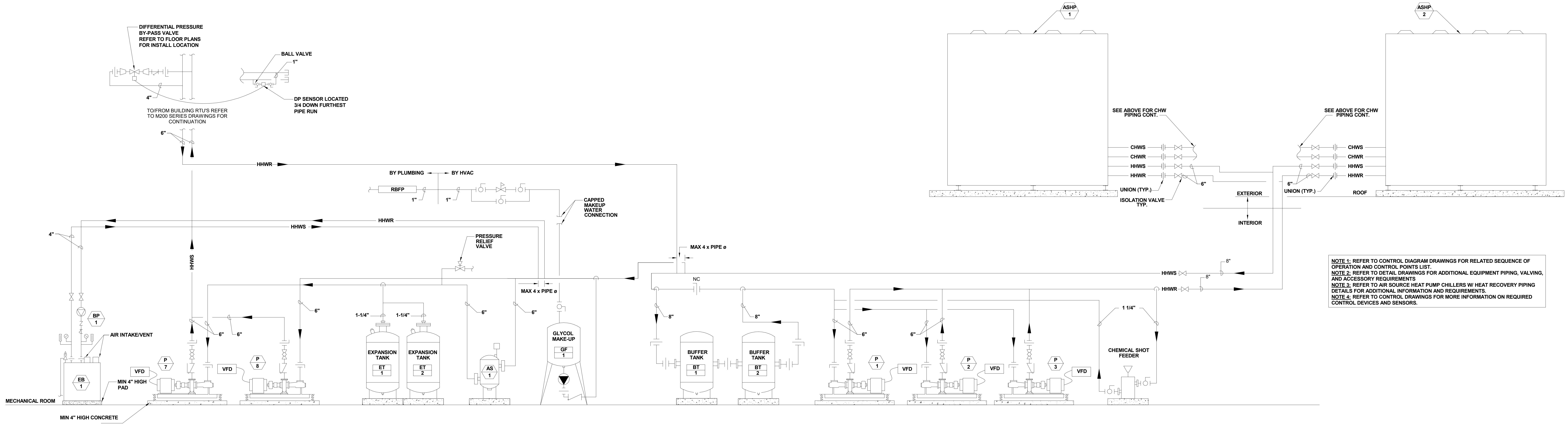
(NOT TO SCALE)



NOTE 1: REFER TO CONTROL DIAGRAM DRAWINGS FOR RELATED SEQUENCE OF OPERATION AND CONTROL POINTS LIST.
NOTE 2: REFER TO DETAIL DRAWINGS FOR ADDITIONAL EQUIPMENT PIPING, VALVING, AND ACCESSORY REQUIREMENTS
NOTE 3: REFER TO AIR SOURCE HEAT PUMP CHILLERS W/ HEAT RECOVERY PIPING DETAILS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
NOTE 4: REFER TO CONTROL DRAWINGS FOR MORE INFORMATION ON REQUIRED CONTROL DEVICES AND SENSORS.

CHILLED WATER FLOW DIAGRAM

(NOT TO SCALE)



NOTE 1: REFER TO CONTROL DIAGRAM DRAWINGS FOR RELATED SEQUENCE OF OPERATION AND CONTROL POINTS LIST.
NOTE 2: REFER TO DETAIL DRAWINGS FOR ADDITIONAL EQUIPMENT PIPING, VALVING, AND ACCESSORY REQUIREMENTS
NOTE 3: REFER TO AIR SOURCE HEAT PUMP CHILLERS W/ HEAT RECOVERY PIPING DETAILS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
NOTE 4: REFER TO CONTROL DRAWINGS FOR MORE INFORMATION ON REQUIRED CONTROL DEVICES AND SENSORS.

HOT WATER FLOW DIAGRAM

(NOT TO SCALE)

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KEY PLAN

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SCALE: AS INDICATED

SHEET TITLE:
HYDRONIC RISER DIAGRAM

SHEET NUMBER:
M0.19

AIR HANDLING UNITS

UNIT NO.	MANUF. NO.	AREA SERVED	SUPPLY CFM	O.A. CFM	R.A. CFM	E.A. CFM	MIN. OCC OUTSIDE AIR	MAX. COIL VEL.	HEATING HOT WATER COILS (25% PROP GLYCOL, 130°F EWT, 110° LWT) TYPE	ENT. AIR°F	LVG. AIR°F	S.A. AIR°F	HHW MBH	HHW GPM	HHW WPD	CHILLED WATER COOLING COILS (25% PROP GLYCOL, 43°F EWT, 55° LWT) TYPE	ENT. COND. COIL D.B.°F	ENT. COND. COIL W.B.°F	LVG. COND. COIL D.B.°F	LVG. COND. COIL W.B.°F	LVG. COND. UNIT D.B.°F	LVG. COND. UNIT W.B.°F	M.B.H. SENS.	M.B.H. TOTAL	CHW GPM	CHW WPD
RTU-1	CUSTOM	CLASSROOM WING	13,500	13,500	13,500	13,500		400	HHW	63.4	83.7	68	357	37.0	3.0'	CHW	76.7	65.3	49.8	49.8	63.0	54.6	478.6	731.4	153.2	12.2'
RTU-2	CUSTOM	CLASSROOM WING	14,835	14,835	14,835	14,835		400	HHW	63.4	83.4	68	331	34.4	2.6'	CHW	76.7	65.3	49.9	49.9	63.0	54.6	450.7	687.8	144.0	11.6'
RTU-3	CUSTOM	CLASSROOM WING	11,140	11,140	10,165	10,165		400	HHW	62.1	82.6	68	240	25	4.1'	CHW	77.0	65.5	50.0	50.0	63.0	54.6	321.0	491.6	103.0	17.4'
RTU-4	CUSTOM	GYM	12,000	9,500	12,000	9,500		400	HHW	63.4	91.4	68	365	37.9	12.0'	CHW	76.7	65.3	50.0	50.0	63.0	54.6	351.8	536.3	112.3	21.6'
RTU-5	DAHA21A	CAFETORIUM	7,040	5,400	7,040	5,400	1,500	580	HHW	54.8	83.7	68	225.6	23.5	2.4'	CHW	78.3	65.4	50.0	49.8	63.0	54.6	221.4	324.7	80	18.2'
RTU-6	DAHA11A	KITCHEN/CUSTODIAL	2,905	2,905	2,905	2,905	--	420	HHW	50.6	73.6	70	56.4	5.9	0.7'	CHW	79.1	66.0	50.0	49.6	55.0	54.6	71.0	106.9	38.0	9.5'
RTU-7	DAHA05A	MUSIC	1,025	1,025	1,025	1,025		440	HHW	46.4	80.4	68	40.9	8.0	2.3'	CHW	80.1	66.7	50.0	49.7	63.0	54.6	35.9	54.6	28.0	11.2
RTU-8	DAHA11A	ADMIN	2,110	2,110	1,200	1,200			HHW	60.6	81.8	68	78.8	10.0	1.7'	CHW	77.0	64.1	50.7	50.0	63.0	54.6	97.1	136.0	57.0	20.1
RTU-9	DAHA05A	MEDIA CENTER	3,250	1,500	3,250	1,500		520	HHW							CHW										

UNIT NO.	SUPPLY AIR FAN VFD/ECM	E.S.P. IN.W.G.	H.P.	NORMAL DESIGN B.H.P.	R.P.M	RETURN/EXHAUST AIR FAN VFD/ECM	E.S.P.	H.P.	NORMAL DESIGN B.H.P.	R.P.M	ELECTRICAL DATA MCA	MOP	VOLTAGE	PH	LOW VOLTAGE TERMINAL STRIP ELECTRICAL DATA MCA	MOP	VOLTAGE	PH
RTU-1	VFD	2.0"	(2) 15	20.4	2432	VFD	2.0"	(2) 15	13.7	1847	69.4	80	460	3	15	15	120	1
RTU-2	VFD	2.0"	(2) 15	19.0	2364	VFD	2.0"	(2) 7.5	12.8	1795	69.4	80	460	3	15	15	120	1
RTU-3	VFD	2.0"	(2) 10	13.6	1800	VFD	2.0"	(2) 5.0	8.4	1871	45.2	50	460	3	15	15	120	1
RTU-4	VFD	2.0"	(2) 10	15.4	1800	VFD	2.0	(2) 7.5	9.9	1800	50.8	60	460	3	15	15	120	1
RTU-5	VFD	1.5"	15	9.67	1763	ECM	1.5"	(2) 4.0	5.99	3135	31.5	45	460	3				
RTU-6	ECM	1.5"	4.0	1.77	2563	ECM	1.5"	4.3	1.27	1811	9.1	15	460	3				
RTU-7	ECM	1.5"	8.0	4.57	2302	ECM	1.0"	4.0	0.54	1760	10	15	460	3				
RTU-8	ECM	1.50"	8.0	4.57	2302	ECM	1.5"	4.3	2.11	2187	13.1	15	460	3				
RTU-9	ECM	1.25"				ECM	1.0"						460	3				

UNIT NO.	TOTAL ENERGY RECOVERY DEVICE Y/N	DEVICE TYPE	SUMMER RA INPUTS DB F	SUMMER RA INPUTS WB F	SUMMER OA LVG DB F	SUMMER OA LVG WB F	WINTER RA INPUTS DB F	WINTER RA INPUTS WB F	WINTER OA LVG DB F	WINTER OA LVG WB F	SUMMER HEAT RECOVERY (MBH) SENSIBLE	LATENT	TOTAL	WINTER HEAT RECOVERY (MBH) SENSIBLE	LATENT	TOTAL	REMARKS
RTU-1	YES	BLOCK	75.0	62.5	76.7	65.3	70.0	54.4	63.4	49.4							NOTE: 1,2,3,4,5,6,8,9
RTU-2	YES	BLOCK	75.0	62.5	76.7	65.3	70.0	54.4	63.4	49.4							NOTE: 1,2,3,4,5,6,8,9
RTU-3	YES	BLOCK	75.0	62.5	77.0	65.5	70.0	54.4	62.1	48.7							NOTE: 1,2,3,4,5,6,8,9
RTU-4	YES	BLOCK	75.0	62.5	76.7	65.3	70.0	54.4	63.4	49.4							NOTE: 1,2,3,4,5,6,8,9
RTU-5	YES	WHEEL	75.0	62.5	79.4	66.32	70.0	54.4	49.9	41.5			379.0			164.6	NOTE: 1,2,3,4,5,6,9
RTU-6	YES	WHEEL	75.0	62.5	79.1	66.0	70.0	54.4	50.6	42.2			66.6			160.4	NOTE: 1,2,3,4,5,6,9
RTU-7	YES	WHEEL	75.0	62.5	80.1	66.7	70.0	54.4	46.4	39.3			29.9			72.1	NOTE: 1,2,3,4,5,6,9
RTU-8	YES	WHEEL	78.0	65.0	78.6	65.3	70.0	54.4	53.2	43.9			53.4			142.8	NOTE: 1,2,3,4,5,6,9
RTU-9	YES	WHEEL															NOTE: 1,2,3,4,5,6,9

SELECTIONS BASED ON "INNOVENT" FOR RTU-1, 2, 3 & 4. "DAIKIN" FOR RTU-5, 6, 7, 8 & 9

NOTES:
1. AHU MANUFACTURER SHALL PROVIDE VARIABLE FREQUENCY DRIVES FOR SUPPLY AND RETURN AIR FANS AND ENERGY RECOVERY WHEELS (IF APPLICABLE) FOR EACH UNIT IN ACCORDANCE WITH DIV. 260000 REQUIREMENTS.
2. PROVIDE SHAFT GROUNDING RINGS SIMILAR TO "AEGIS" ON ALL VFD DRIVEN MOTORS
3. UNITS TO BE INSTALLED & MOUNTED ON EQUIPMENT CURBS
4. PROVIDE FAN QUANTITIES SCHEDULED ABOVE AT A MINIMUM
5. PROVIDE SINGLE POINT 480V AND SINGLE POINT 120V GFI CONNECTIONS FOR ALL ROOFTOP UNITS.
6. ALL FANS PROVIDED IN A FAN ARRAY ORIENTATION SHALL BE PROVIDED WITH BACKDRAFT DAMPERS.
7. UNIT SHALL BE PROVIDED WITH EMERGENCY POWER.
8. ENERGY RECOVERY BLOCKS TO BE SIMILIAR TO ACCUBLOC OR EQUAL.
9. ENERGY RECOVERY DATA BASED ON SUMMER ENTERING CONDITIONS OF 91°F DB, 74°F WB, AND WINTER ENTERING CONDITIONS OF 2.6°F DB & 0.9°F WB.

AIR HANDLING UNITS (CONT.)

UNIT NO.	TOTAL ENERGY RECOVERY DEVICE EFFECTIVENESS COOLING TOT,	COOLING SENS.	HEATING TOT.	HEATING SENS.	WEIGHT (DRY)	REMARKS
RTU-1					18,400 LBS	NOTE: 1,2,3,4,5,6,8,9
RTU-2					17,400 LBS	NOTE: 1,2,3,4,5,6,8,9
RTU-3					12,900 LBS	NOTE: 1,2,3,4,5,6,8,9
RTU-4					13,900 LBS	NOTE: 1,2,3,4,5,6,8,9
RTU-5	0.65		0.71		3,700 LBS	NOTE: 1,2,3,4,5,6,9
RTU-6	0.70	0.73	0.72	0.73	1,600 LBS	NOTE: 1,2,3,4,5,6,9
RTU-7	0.65	0.67	0.67	0.68	1,100 LBS	NOTE: 1,2,3,4,5,6,9
RTU-8	0.74	0.77	0.76	0.77	1,600 LBS	NOTE: 1,2,3,4,5,6,9
RTU-9	0.64	0.66	0.66	0.67	1,100 LBS	NOTE: 1,2,3,4,5,6,9

NOTES:
1. AHU MANUFACTURER SHALL PROVIDE VARIABLE FREQUENCY DRIVES FOR SUPPLY AND RETURN AIR FANS AND ENERGY RECOVERY WHEELS (IF APPLICABLE) FOR EACH UNIT IN ACCORDANCE WITH DIV. 260000 REQUIREMENTS.
2. PROVIDE SHAFT GROUNDING RINGS SIMILAR TO "AEGIS" ON ALL VFD DRIVEN MOTORS
3. UNITS TO BE INSTALLED & MOUNTED ON EQUIPMENT CURBS
4. PROVIDE FAN QUANTITIES SCHEDULED ABOVE AT A MINIMUM
5. PROVIDE SINGLE POINT 480V AND SINGLE POINT 120V GFI CONNECTIONS FOR ALL ROOFTOP UNITS.
6. ALL FANS PROVIDED IN A FAN ARRAY ORIENTATION SHALL BE PROVIDED WITH BACKDRAFT DAMPERS.
7. UNIT SHALL BE PROVIDED WITH EMERGENCY POWER.
8. ENERGY RECOVERY BLOCKS TO BE SIMILIAR TO ACCUBLOC OR EQUAL.
9. ENERGY RECOVERY DATA BASED ON SUMMER ENTERING CONDITIONS OF 91°F DB, 74°F WB, AND WINTER ENTERING CONDITIONS OF 2.6°F DB & 0.9°F WB.

MAKEUP AIR UNITS

UNIT NO.	MANUF. NO.	AREA SERVED	SUPPLY C.F.M.	O.A. C.F.M.	MAX. COIL VEL.	HEATING HOT WATER COILS (25% PROP GLYCOL, 130°F EWT, 110° LWT) ENT. AIR°F	LVG. AIR°F	HEATING M.B.H.	GPM	FLUID PD (FT H2O)	CHILLED WATER COOLING COILS (25% PROP GLYCOL, 44°F EWT, 53° LWT) ENT. COND. COIL D.B.°F	ENT. COND. COIL W.B.°F	LVG. COND. COIL D.B.°F	LVG. COND. COIL W.B.°F	LVG. COND. UNIT D.B.°F	LVG. COND. UNIT W.B.°F	M.B.H. SENS.	M.B.H. TOTAL	CHW GPM	CHW WPD	SUPPLY AIR FAN VFD	E.S.P. IN.W.G.	H.P.	B.H.P.	ELECTRICAL DATA MCA	MOP	VOLTAGE	PH	WEIGHT (DRY)	REMARKS
MAU-1	DAHA15A	KITCHEN	5,500	5,500	400	2.6	74.2	344.6	35.9	5.5	91.0	74.0	54.8	54.6	54.8	54.6	174.0	287.0	67.0	11.0	YES	2.0"	5.0	3.33	9.2	15	460	3	3,100 LBS	NOTE: 1,2,3,4,5

SELECTIONS BASED ON "DAIKIN"

NOTES:
1. AHU MANUFACTURER SHALL PROVIDE VARIABLE FREQUENCY DRIVES FOR SUPPLY FANS FOR EACH UNIT IN ACCORDANCE WITH DIV. 260000 REQUIREMENTS.
2. PROVIDE SHAFT GROUNDING RINGS SIMILAR TO "AEGIS" ON ALL VFD DRIVEN MOTORS
3. UNITS TO BE INSTALLED & MOUNTED ON EQUIPMENT CURBS
4. PROVIDE FAN QUANTITIES SCHEDULED ABOVE AT A MINIMUM
5. PROVIDE SINGLE POINT 480V AND SINGLE POINT 120V GFI CONNECTIONS FOR ALL ROOFTOP UNITS.

AIR CONDITIONING DESIGN DATA

DESIGN AREA	SUMMER OUT D.B.	SUMMER OUT W.B.	SUMMER IN D.B.	SUMMER IN W.B.	WINTER OUT D.B.	WINTER OUT W.B.	WINTER IN D.B.
WILMINGTON, MA	91	74	75	63	2.6	0.9	70

AIR HANDLING EQUIPMENT MAX SOUND POWER LEVELS

UNIT NO.	R.A. INLET SOUND POWER LEVELS (dB) 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	S.A. DISCHARGE SOUND POWER LEVELS (dB) 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
RTU-1	91	88	95	89	84	84	79	84	94	93	94	98	96	93	88	84
RTU-2	90	88	94	88	83	83	78	74	93	93	93	97	95	92	87	83
RTU-3	81	84	90	85	80	79	76	72	94	93	94	98	96	93	88	84
RTU-4	84	83	92	86	83	81	78	74	95	95	96	99	97	94	89	85
RTU-5	81	80	88	80	75	74	69	66	87	86	91	86	84	81	76	71
RTU-6	76	75	83	78	80	79	74	69	76	78	86	83	86	85	82	77
RTU-7	80	79	87	82	84	83	78	73	80	82	90	87	90	89	86	81
RTU-8	88	86	94	89	91	85	80	74	88	89	97	94	97	91	88	82
RTU-9	79	78	86	81	83	82	77	72	79	81	89	86	89	88	85	80
MAU-1	75	74	82	74	69	68	63	60	81	80	85	80	78	75	70	65

UNIT NO.	O.A. INLET SOUND POWER LEVELS (dB) 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	E.A. DISCHARGE SOUND POWER LEVELS (dB) 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	RADIATED SOUND POWER LEVELS (dB) 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	REMARKS
RTU-1	85	86	90	93	87	86	82	78	88	88	98	98	95	90	86	80									AT 100% UNIT CAPACITY
RTU-2	84	85	89	93	86	85	81	77	88	89	97	97	93	89	85	79									AT 100% UNIT CAPACITY
RTU-3	84	86	90	93	87	85	81	78	86	87	91	92	90	82	79	74									AT 100% UNIT CAPACITY
RTU-4	86	88	92	94	88	87	83	79	86	85	93	93	93	85	83	77									AT 100% UNIT CAPACITY
RTU-5																									AT 100% UNIT CAPACITY
RTU-6																									AT 100% UNIT CAPACITY
RTU-7																									AT 100% UNIT CAPACITY
RTU-8																									AT 100% UNIT CAPACITY
RTU-9																									AT 100% UNIT CAPACITY
MAU-1																									AT 100% UNIT CAPACITY

AIR SOURCE HEAT PUMP CHILLER

UNIT NO.	MANUF. SERIES	CHILLED WATER EWT	LWT	GPM	P.D. FT.H20	EER @ 95°F	TONS	HEATING HOT WATER EWT	LWT	GPM	P.D. FT.H20	COP @ 2.6°F	MBH	SIMULTANEOUS COOLING EWT	LWT	GPM	P.D. FT.H20	EER	TONS	SIMULTANEOUS HEATING EWT	LWT	GPM	P.D. FT.H20	COP	MBH	EFFICIENCIES COOLING IPLV (EER) 100%	75%	50%	25%	IPLV EER	ELECTRICAL DATA MCA	MOCP	V	PH	HZ	REMARKS
ASHP-1	ARA30	52	42	552.8	6.0	8.8	223.2	120	130	382.4	3.0	1.66	1871.0	52	42	471.2	4.5	21.2	190.4	120	130	629.6	7.0	6.21	3076.0	9.27	14.95	20.34	31.1	19.21	588	600	460	3	60	PROVIDE (8) 30 TON MODULES
ASHP-2	ARA30	52	42	552.8	6.0	8.8	223.2	120	130	382.4	3.0	1.66	1871.0	52	42	471.2	4.5	21.2	190.4	120	130	629.6	7.0	6.21	3076.0	9.27	14.95	20.34	31.1	19.21	588	600	460	3	60	PROVIDE (8) 30 TON MODULES

SELECTION BASED ON "MULTISTACK"
UNITS SHALL BE MOUNTED ON SPRING ISOLATORS TO ACHIEVE A MINIMUM 2" DEFLECTION UNDER LOADING.
25% GLYCOL
EACH (8) MODULE BANK SHALL HAVE A SINGLE POINT POWER CONNECTION.

VIBRATION ISOLATION SCHEDULE

UNIT(S)	ISOLATOR TYPE *	MIN. STATIC DEFLECTION (IN.)	BASE TYPE *	REMARKS
RTU's & MAU				
AIR SOURCE HEAT PUMP CHILLER				
UNIT HEATERS (UH)				
CABINET UNIT HEATERS (CUH)				
ROOFTOP CENT. EXHAUST FANS				
INLINE EXHAUST FANS				
SMOKE EXHAUST FAN				
DCU/FCU UNITS				
BASE MOUNTED PUMPS				

*NOTES:
1. REFER TO ISOLATOR TYPES AND BASE TYPES INDICATED IN THE VIBRATION & SEISMIC CONTROL SPECIFICATION (SECTION 230548) FOR THE PROJECT. SELECTION BASED ON MASON INDUSTRIES MODELS.
2. MINIMUM STATIC DEFLECTION LISTED IS UNDER LOAD CONDITIONS.

SOUND ATTENUATORS

UNIT NO.	MANUF. NO.	CFM	SYSTEM	AIRSTREAM	MAX PD	SIZE	LEG LENGTHS (INLET/OUTLET)	CENTER LENGTH	MAX VELOCITY	DYNAMIC INSERTION LOSS (dB) 63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz	REMARKS
SA-1S	ERM	16,200	RTU-1	SUPPLY	0.25"	62"x34"	42/52	60	1107	7	12	21	30	38	37	32	26	VERTICAL
SA-1R	ERM	16,200	RTU-1	RETURN	0.25"	62"x34"	48/58	72	1107	10	17	29	37	45	40	35	27	VERTICAL, HTL 1
SA-2S	ERM	15,300	RTU-2	SUPPLY	0.25"	66"x34"	42/52	60	982	8	14	24	33	40	39	33	28	VERTICAL, HTL 1
SA-2R	ERM	15,300	RTU-2	RETURN	0.25"	66"x34"	42/42	50	982	9	14	18	24	26	22	18	15	VERTICAL
SA-3S	ERM	10,800	RTU-3	SUPPLY	0.25"	46"x26"	48/48	70	1300	8	13	19	27	31	29	25	21	VERTICAL
SA-3R	ERM	10,800	RTU-3	RETURN	0.25"	46"x26"	42/42	58	1300	7	13	26	33	42	39	33	26	VERTICAL
SA-4S	RM	12,000	RTU-4	SUPPLY	0.25"	46"x38"	--	72	989	8	14	24	41	45	41	28	19	
SA-4R	RM	12,000	RTU-4	RETURN	0.25"	40"x40"	--	72	1080	8	14	25	45	52	45	27	20	
SA-5S	RL	7,150	RTU-5	SUPPLY	0.25"	56"x20"	--	60	919	7	13	20	31	28	21	16	11	
SA-5R	ERM	7,150	RTU-5	RETURN	0.25"	56"x20"	42/62	84	919	13	21	35	44	49	43	37	29	VERTICAL
SA-6S	RL	2,250	RTU-6	SUPPLY	0.25"	28"x14"	--	48	827	7	12	20	31	28	22	16	12	
SA-6R	RL	2,250	RTU-6	RETURN	0.25"	28"x14"	--	48	827	6	8	14	22	18	13	10	9	
SA-7S	RL	1,100	RTU-7	SUPPLY	0.25"	20"x10"	--	54	792	9	14	19	27	22	17	13	11	
SA-7R	ERM	1,100	RTU-7	RETURN	0.25"	20"x10"	48/28	56	792	9	16	26	33	41	36	30	25	HORIZONTAL
SA-8S	ERM	2,110	RTU-8	SUPPLY	0.25"	34"x18"	36/36	54	447	9	14	18	24	27	23	19	17	VERTICAL, HTL 1
SA-8R	ERM	2,110	RTU-8	RETURN	0.25"	30"x12"	30/30	48	844	8	13	20	25	31	27	24	19	VERTICAL, HTL 1
SA-9S	RH	3,300	RTU-9	SUPPLY	0.25"	40"x14"	--	60	849	7	12	23	37	40	31	23	16	
SA-9R	RH	3,300	RTU-9	RETURN	0.25"	40"x14"	--	72	849	8	16	29	44	46	36	25	16	
SA-10S	ERM	4,400	MAU-1	SUPPLY	0.25"	38"x16"	42/42	68	1042	8	14	24	34	42	41	36	29	VERTICAL

SELECTION BASED ON "PRICE." GALVANIZED, W/ 22 GA PERF LINER, FIBERGLASS, 2" SLIP INLET & OUTLET

GLYCOL MAKE-UP

UNIT NO.	MODEL	SYSTEM	MAKE-UP CAP. (GPM @ PSI)	DIMENSIONS	PRESURE RANGE(PSI)	ELECTRICAL DATA AMPS	VOLTS	PH
GF-1	SF100	HHW	1.0 @ 50	24"Øx49"H	5 - 55	0.7	115	1
GF-2	SF100	CHW	1.0 @ 50	24"Øx49"H	5 - 55	0.7	115	1
GF-3	SF100	HHW	1.0 @ 50	24"Øx49"H	5 - 55	0.7	115	1
GF-4	SF100	CHW	1.0 @ 50	24"Øx49"H	5 - 55	0.7	115	1

SELECTION BASED ON "AXIOM."

CHEMICAL SHOT FEEDER

UNIT NO.	MANUF. NO.	LOCATION	SERVICE	PIPE CONN.	VOLUME	DIMENSIONS DIA.	HEIGHT	REMARKS
CSF-1	FTF-5DB	MECH ROOM	HHW	3/4"Ø	7.5 GAL	10"	31.75"	--
CSF-2	FTF-5DB	MECH ROOM	CHW	3/4"Ø	7.5 GAL	10"	31.75"	--
CSF-3	FTF-5DB	MECH ROOM	HHW	3/4"Ø	7.5 GAL	10"	31.75"	--
CSF-4	FTF-5DB	MECH ROOM	CHW	3/4"Ø	7.5 GAL	10"	31.75"	--

SELECTION BASED ON "WESSELS."

BUFFER TANK

UNIT NO.	MANUF. NO.	LOCATION	SERVICE	PIPE CONN.	VOLUME	DIMENSIONS DIA.	HEIGHT	REMARKS
BT-1	CBT	MECH ROOM	HHW	8"Ø	700 GAL	48"	100"	--
BT-2	CBT	MECH ROOM	HHW	8"Ø	700 GAL	48"	100"	--
BT-3	CBT	MECH ROOM	CHW	8"Ø	1,040 GAL	60"	96"	--
BT-4	CBT	MECH ROOM	CHW	8"Ø	1,040 GAL	60"	96"	--

SELECTION BASED ON "WESSELS."

AIR SEPARATOR

UNIT NO.	MANUF. NO.	SERVICE	GPM	SIZE	WPD (FT H2O)	REMARKS
AS-1	R-6F	HP - HHW	650	6"		
AS-2	R-8F	HP - CHW	1,130	8"		
AS-3	R-6F	BLDG - HHW	600	6"		
AS-4	R-8F	BLDG - CHW	1,060	8"		

SELECTION BASED ON "BELL & GOSSETT."

EXPANSION TANKS

UNIT NO.	MANUF. NO.	SERVICE	TOTAL VOL.	MAX ACCEPT VOL.	PRESSURE (PSI) MIN.	MAX.	RELIEF
ET-1	B500	HHW	132	132	15	45	50
ET-2	B500	HHW	132	132	15	45	50
ET-3	B500	CHW	132	132	15	45	50

SELECTION BASED ON "BELL & GOSSETT."

WATER PUMPS

UNIT NO.	MANUF. NO.	SERVICE	G.P.M.	T.D.H. FT. WATER	MOTOR HP.	VOLT	PH.	REMARKS
P-1	e-1510	HP - HHW	325	45	7.5	460	3	NOTE #1, 2, 3, 4
P-2	e-1510	HP - HHW	325	45	7.5	460	3	NOTE #1, 2, 3, 4
P-3	e-1510	HP - HHW	325	45	7.5	460	3	NOTE #1, 2, 3, 4
P-4	e-1510	HP - CHW	565	45	10	460	3	NOTE #1, 2, 4
P-5	e-1510	HP - CHW	565	45	10	460	3	NOTE #1, 2, 4
P-6	e-1510	HP - CHW	565	45	10	460	3	NOTE #1, 2, 4
P-7	e-1510	BLDG. HHW	600	80	20	460	3	NOTE #1, 2, 3, 4
P-8	e-1510	BLDG. HHW	600	80	20	460	3	NOTE #1, 2, 3, 4
P-9	e-1510	BLDG. CHW	530	80	20	460	3	NOTE #1, 2, 4
P-10	e-1510	BLDG. CHW	530	80	20	460	3	NOTE #1, 2, 4
P-11	e-1510	BLDG. CHW	530	80	20	460	3	NOTE #1, 2, 4
P-12	e-1510	CCHW	340	60	10	460	3	NOTE #1, 2, 4
P-13	e-1510	CCHW	340	60	10	460	3	NOTE #1, 2, 4
BP-1	ECOCIRC	EB-1	165		3	460	3	NOTE #2, 3

PUMPS P-1, P-2, & P-5 SELECTIONS BASED ON "BELL & GOSSETT". PUMPS P-3a, 3b, 4a & 4b SELECTIONS BASED ON "BELL & GOSSETT". PUMPS BP-1 & BP-2 SELECTIONS BASED ON "BELL & GOSSETT".

NOTE #1: PROVIDE PUMPS WITH MAX NON-OVERLOADING IMPELLER TRIM & SHAFT GROUNDING RINGS.
NOTE #2: SELECTION BASED ON 25% PROPYLENE GLYCOL
NOTE #3: PROVIDE EMERGENCY POWER FOR THIS PUMP
NOTE #4: ATC CONTRACTOR TO PROVIDE VFD.

ELECTRIC HOT WATER BOILERS

UNIT NO.	MANUF. NO.	RATED MBH OUTPUT	MIN TURN DOWN	HW GPM	POWER KW	FLA/MCA	V	PH.	REMARKS
EB-1	EZE-600	2,047	100:1	220	600	723/904	480	3	

SELECTION BASED ON "FULTON."

DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:
90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

SCALE: AS INDICATED

SHEET TITLE:
SCHEDULES I

SHEET NUMBER:
M0.20

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VARIABLE AIR VOLUME BOXES

UNIT NO.	MANUF. NO.	SPACE SERVED	NORMAL COOLING (CFM)	MIN. FLOW (CFM)	DIFF. PD	INLET DIA	OctaveBands Radiated						OctaveBands Discharge						REMARKS
							2	3	4	5	6	7	2	3	4	5	6	7	
VAV-1-1	SDVQ	118 PRE-K	410	95	1.5"	7"	57	47	41	37	35	34	64	60	52	41	26	29	RTU-1
VAV-1-2	SDVQ	E118 EXTENDED LEARNING	190	60	1.5"	5"	52	43	38	35	34	32	59	54	47	39	21	29	RTU-1
VAV-1-3	SDVQ	117 SMALL GROUP RM.	85	45	1.5"	4"	41	33	32	28	27	30	49	45	40	33	19	26	RTU-1
VAV-1-4	SDVQ	116 PRE-K	410	95	1.5"	7"	57	47	41	37	35	34	64	60	52	41	26	29	RTU-1
VAV-1-5	SDVQ	115 SPEECH & LANGUAGE	115	45	1.5"	4"	47	40	36	32	30	32	54	51	44	37	19	27	RTU-1
VAV-1-6	SDVQ	114 SCHOOL PSYCH	80	45	1.5"	4"	40	32	31	27	26	30	48	44	39	32	19	26	RTU-1
VAV-1-7	SDVQ	113 STRIDES PK-K	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-1
VAV-1-8	SDVQ	112 MUSIC/CHORUS	520	95	1.5"	7"	61	51	44	40	37	35	68	64	55	45	31	33	RTU-1
VAV-1-9	SDVQ	C103 CORR/105E EXT	50	45	1.5"	4"	36	29	26	22	22	29	40	36	34	25	19	56	RTU-1
VAV-1-10	SDVQ	121 ART CLASSROOM	730	160	1.5"	9"	61	53	48	43	42	42	68	63	58	48	35	42	RTU-1
VAV-1-11	SDVQ	120 STRIDES PK-K	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-1
VAV-1-12	SDVQ	E119 EXTENDED LEARNING	370	65	1.5"	6"	59	51	43	39	34	31	66	62	52	44	28	29	RTU-1
VAV-1-13	SDVQ	119 PRE-K	410	95	1.5"	7"	57	47	41	37	35	34	64	60	52	41	26	29	RTU-1
VAV-1-14	SDVQ	118A SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-1
VAV-1-15	SDVQ	216 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-1
VAV-1-16	SDVQ	E216 EXTENDED LEARNING	150	45	1.5"	4"	52	45	40	35	32	33	58	55	47	41	20	28	RTU-1
VAV-1-17	SDVQ	215 SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-1
VAV-1-18	SDVQ	214 GENERAL CLASSROOM	420	95	1.5"	7"	57	47	42	37	35	35	65	60	52	42	27	30	RTU-1
VAV-1-19	SDVQ	213 LEARNING CENTER	125	45	1.5"	4"	48	42	37	33	30	32	55	52	45	38	19	28	RTU-1
VAV-1-20	SDVQ	212 READ	145	45	1.5"	4"	51	45	39	35	32	32	57	55	47	40	20	28	RTU-1
VAV-1-21	SDVQ	210 GENERAL CLASSROOM	410	95	1.5"	7"	57	47	41	37	35	34	64	60	52	41	26	29	RTU-1
VAV-1-22	SDVQ	209A SMALL GROUP	60	45	1.5"	4"	36	29	27	23	23	29	43	39	36	28	19	24	RTU-1
VAV-1-23	SDVQ	209 GENERAL CLASSROOM	400	95	1.5"	7"	56	46	41	37	35	34	64	59	51	41	26	29	RTU-1
VAV-1-24	SDVQ	208 HEALTH	370	65	1.5"	6"	59	51	43	39	34	31	66	62	52	44	28	29	RTU-1
VAV-1-25	SDVQ	C201 CORRIDOR/E219 EXT	300	65	1.5"	6"	57	49	42	38	34	31	62	58	49	41	26	27	RTU-1
VAV-1-26	SDVQ	219 STAGES 1ST-2ND	400	95	1.5"	7"	56	46	41	37	35	34	64	59	51	41	26	29	RTU-1
VAV-1-27	SDVQ	218A SMALL GROUP	60	45	1.5"	4"	36	29	27	23	23	29	43	39	36	28	19	24	RTU-1
VAV-1-28	SDVQ	218 GENERAL CLASSROOM	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-1
VAV-1-29	SDVQ	E215 & E217 EXT LEARNING	290	65	1.5"	6"	56	48	42	38	34	31	61	57	49	40	25	27	RTU-1
VAV-1-30	SDVQ	217 GENERAL CLASSROOM	390	65	1.5"	6"	60	52	43	39	34	31	66	63	53	45	29	29	RTU-1
VAV-1-31	SDVQ	216A SMALL GROUP	95	45	1.5"	4"	43	36	33	29	28	31	50	47	41	34	19	26	RTU-1
VAV-1-32	SDVQ	312 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-1
VAV-1-33	SDVQ	E312 EXTENDED LEARNING	150	45	1.5"	4"	52	45	40	35	32	33	58	55	47	41	20	28	RTU-1
VAV-1-34	SDVQ	311 SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-1
VAV-1-35	SDVQ	310 GENERAL CLASSROOM	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-1
VAV-1-36	SDVQ	309 LEARNING CENTER	105	45	1.5"	4"	45	38	35	31	29	31	52	49	43	36	19	27	RTU-1
VAV-1-37	SDVQ	308 READ	150	45	1.5"	4"	52	45	40	35	32	33	58	55	47	41	20	28	RTU-1
VAV-1-38	SDVQ	307 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-1
VAV-1-39	SDVQ	306A SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-1
VAV-1-40	SDVQ	306 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-1
VAV-1-41	SDVQ	315 STAGES 3RD-5TH	410	95	1.5"	7"	57	47	41	37	35	34	64	60	52	41	26	29	RTU-1
VAV-1-42	SDVQ	314A SMALL GROUP	60	45	1.5"	4"	36	29	27	23	23	29	43	39	36	28	19	24	RTU-1
VAV-1-43	SDVQ	314 GENERAL CLASSROOM	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-1
VAV-1-44	SDVQ	E311 & E313 EXT LEARNING	290	65	1.5"	6"	56	48	42	38	34	31	61	57	49	40	25	27	RTU-1
VAV-1-45	SDVQ	313 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-1
VAV-1-46	SDVQ	312A SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-1
VAV-1-47	SDVQ	C300 CORRIDOR	85	45	1.5"	4"	41	33	32	28	27	30	49	45	40	33	19	26	RTU-1
VAV-1-48	SDVQ	303 LEARNING CENTER	120	45	1.5"	4"	48	41	36	32	30	32	54	51	44	37	19	27	RTU-1
VAV-1-49	SDVQ	302 ASSISTANT OFFICE	120	45	1.5"	4"	48	41	36	32	30	32	54	51	44	37	19	27	RTU-1
VAV-2-1	SDVQ	140 KINDERGARTEN	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-2	SDVQ	E139 EXTENDED LEARNING	200	60	1.5"	5"	53	44	38	36	34	32	60	55	47	39	21	30	RTU-2
VAV-2-3	SDVQ	139 KINDERGARTEN	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-4	SDVQ	138B SMALL GROUP	75	45	1.5"	4"	39	31	30	26	26	30	47	43	38	31	19	25	RTU-2
VAV-2-5	SDVQ	138 KINDERGARTEN	400	95	1.5"	7"	56	46	41	37	35	34	64	59	51	41	26	29	RTU-2
VAV-2-6	SDVQ	E138/E140 EXT LEARNING	390	65	1.5"	6"	60	52	43	39	34	31	66	63	53	45	29	29	RTU-2
VAV-2-7	SDVQ	137 KINDERGARTEN	420	95	1.5"	7"	57	47	42	37	35	35	65	60	52	42	27	30	RTU-2
VAV-2-8	SDVQ	136A SMALL GROUP	75	45	1.5"	4"	39	31	30	26	26	30	47	43	38	31	19	25	RTU-2
VAV-2-9	SDVQ	136 STRIDES PK-K	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-2
VAV-2-10	SDVQ	C105 CORRIDOR	240	60	1.5"	5"	56	47	41	38	36	33	63	58	50	42	23	30	RTU-2
VAV-2-11	SDVQ	146 ELL	240	60	1.5"	5"	56	47	41	38	36	33	63	58	50	42	23	30	RTU-2
VAV-2-12	SDVQ	147 MATH	105	45	1.5"	4"	45	38	35	31	29	31	52	49	43	36	19	27	RTU-2
VAV-2-13	SDVQ	145 KINDERGARTEN	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-14	SDVQ	144A SMALL GROUP	75	45	1.5"	4"	39	31	30	26	26	30	47	43	38	31	19	25	RTU-2
VAV-2-15	SDVQ	144 KINDERGARTEN	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-16	SDVQ	143 LEARNING CENTER	80	45	1.5"	4"	40	32	31	27	26	30	48	44	39	32	19	26	RTU-2
VAV-2-17	SDVQ	142 READ	80	45	1.5"	4"	40	32	31	27	26	30	48	44	39	32	19	26	RTU-2
VAV-2-18	SDVQ	141 KINDERGARTEN	120	45	1.5"	4"	48	41	36	32	30	32	54	51	44	37	19	27	RTU-2
VAV-2-19	SDVQ	140A SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-2
VAV-2-20	SDVQ	E238 EXTENDED LEARNING	220	60	1.5"	5"	55	46	40	37	35	32	61	57	48	41	22	30	RTU-2
VAV-2-21	SDVQ	238 GENERAL CLASSROOM	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-2
VAV-2-22	SDVQ	237A SMALL GROUP	70	45	1.5"	4"	38	29	29	25	25	30	46	42	38	30	19	25	RTU-2
VAV-2-23	SDVQ	237 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-24	SDVQ	C203 CORR/E237 ELA/E240	460	95	1.5"	7"	59	49	43	38	36	35	66	62	53	43	28	31	RTU-2
VAV-2-25	SDVQ	236 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-26	SDVQ	235A SMALL GROUP	75	45	1.5"	4"	39	31	30	26	26	30	47	43	38	31	19	25	RTU-2
VAV-2-27	SDVQ	235 STRIDES 1ST-2ND	410	95	1.5"	7"	57	47	41	37	35	34	64	60	52	41	26	29	RTU-2
VAV-2-28	SDVQ	E235 / E245 EXT LEARNING	220	60	1.5"	5"	55	46	40	37	35	32	61	57	48	41	22	30	RTU-2
VAV-2-29	SDVQ	247 ADJUSTMENT	95	45	1.5"	4"	43	36	33	29	28	31	50	47	41	34	19	26	RTU-2
VAV-2-30	SDVQ	246 BCBA OFFICE	205	60	1.5"	5"	53	44	39	36	35	32	60	55	48	40	22	30	RTU-2
VAV-2-31	SDVQ	245 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-32	SDVQ	243 SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-2
VAV-2-33	SDVQ	244 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-34	SDVQ	242 LEARNING CENTER	90	45	1.5"	4"	42	35	33	29	27	31	50	46	41	34	19	26	RTU-2
VAV-2-35	SDVQ	241 READ	80	45	1.5"	4"	40	32	31	27	26	30	48	44	39	32	19	26	RTU-2
VAV-2-36	SDVQ	240 LANGUAGE 1ST-2ND	310	65	1.5"	6"	57	49	42	38	34	31	62	58	50	41	26	27	RTU-2
VAV-2-37	SDVQ	239A SMALL GROUP	70	45	1.5"	4"	38	29	29	25	25	30	46	42	38	30	19	25	RTU-2
VAV-2-38	SDVQ	239 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-39	SDVQ	332 GENERAL CLASSROOM	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-2
VAV-2-40	SDVQ	E332 EXTENDED LEARNING	170	45	1.5"	4"	54	48	41	37	33	33	60	57	49	42	22	29	RTU-2
VAV-2-41	SDVQ	331A SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-2
VAV-2-42	SDVQ	331 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-43	SDVQ	C303 CORR/E331/E334 EXT	480	95	1.5"	7"	60	49	43	39	36	35	67	63	54	44	29	32	RTU-2
VAV-2-44	SDVQ	329A SMALL GROUP	70	45	1.5"	4"	38	29	29	25	25	30	46	42	38	30	19	25	RTU-2
VAV-2-45	SDVQ	330 GEN CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-46	SDVQ	329 STRIDES 3RD-5TH	410	95	1.5"	7"	57	47	41	37	35	34	64	60	52	41	26	29	RTU-2
VAV-2-47	SDVQ	339 ELL	175	45	1.5"	5"	50	41	36	34	33	31	57	53	46	38	20	29	RTU-2
VAV-2-48	SDVQ	E338 EXT LEARNING	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-2
VAV-2-49	SDVQ	340 MATH	105	45	1.5"	4"	45	38	35	31	29	31	52	49	43	36	19	27	RTU-2
VAV-2-50	SDVQ	338 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-51	SDVQ	337A SMALL GROUP	60	45	1.5"	4"	36	29	27	23	23	29	43	39	36	28	19	24	RTU-2
VAV-2-52	SDVQ	337 GENERAL CLASSROOM	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-2
VAV-2-53	SDVQ	336 LEARNING CENTER	90	45	1.5"	4"	42	35	33	29	27	31	50	46	41	34	19	26	RTU-2
VAV-2-54	SDVQ	335 READ	90	45	1.5"	4"	42	35	33	29	27	31	50	46	41	34	19	26	RTU-2
VAV-2-55	SDVQ	344 LANGUAGE 3-5TH	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-2
VAV-2-56	SDVQ	333A SMALL GROUP	60	45	1.5"	4"	36	29	27	23	23	29	43	39	36	28	19	24	RTU-2
VAV-2-57	SDVQ	333 GENERAL CLASSROOM	440	95	1.5"	7"	58	48	42	38	36	35	65	61	53	42	28	30	RTU-2
VAV-3-1	SDVQ	108A OT CLASSROOM	140	45	1.5"	4"	51	44	39	34	32	32	57	54	46	40	20	28	RTU-3
VAV-3-2	SDVQ	108 PT CLASSROOM	305	65	1.5"	6"	57	49	42	38	34	31	62	58	50	41	26	27	RTU-3
VAV-3-3	SDVQ	110 SPEECH & LANGUAGE	80	45	1.5"	4"	40	32	31	27	26	30	48	44	39	32	19	26	RTU-3
VAV-3-4	SDVQ	111 ADJUSTMENT	85	45	1.5"	4"	41	33	32	28	27	30	49	45	40	33	19	26	RTU-3
VAV-3-5	SDVQ	C104 CORRIDOR	645	125	1.5"	8"	63	53	48	44	42	37	66	63	56	44	33	38	RTU-3
VAV-3-6	SDVQ	129 TEACH COLLAB	190	60	1.5"	5"	52	43	38	35	34	32	59	54	47	39	21	29	RTU-3
VAV-3-7	SDVQ	129 TEACH COLLAB	190	60	1.5"	5"	52	43	38	35	34	32	59	54	47	39	21	29	RTU-3
VAV-3-8	SDVQ	130A TEACH WELLNESS	90	45	1.5"	4"	42	35	33	29	27	31	50	46	41	34	19	26	RTU-3
VAV-3-9	SDVQ	C104 / C106 CORRIDORS	1095	300	1.5"	12"	65	52	50	45	43	38	69	61	54	42	32	44	RTU-3
VAV-3-10	SDVQ	148 IT OFFICE	45	45	1.5"	4"	36	29	26	22	21	28	38	34	32	24	19	23	RTU-3
VAV-3-11	SDVQ	206 STE CLASSROOM	410	95	1.5"	7"	57	47	41	37	35	34	64	60	52	41	26	29	RTU-3
VAV-3-12	SDVQ	207 FLEX CLASSROOM	390	65	1.5"	6"	60	52	43	39	34	31	66	63	53	45	29	29	RTU-3
VAV-3-13	SDVQ	C202 CORRIDOR	510	95	1.5"	7"	61	50	44	39	37	35	67	64	54	45	31	33	RTU-3
VAV-3-14	SDVQ	C202 CORRIDOR	780	160	1.5"	9"	62	54	49	44	42	43	69	64	58	49	37	43	RTU-3
VAV-3-15	SDVQ	227 ASSISTANT PRINCIPAL	50	45	1.5"	4"	36	29	26	22	22	29	40	36	34	25	19	56	RTU-3
VAV-3-16	SDVQ	226 MATH	60	45	1.5"	4"	36	29	27	23	23	29	43	39	36	28	19	24	RTU-3
VAV-3-17	SDVQ	228 TEACH COLLAB	160	45	1.5"	4"	53	47	40	36	33	33	59	56	48	41	21	29	RTU-3
VAV-3-18	SDVQ	228 TEACH COLLAB	180	60	1.5"	5"	50	42	37	34	34	32	58	53	46	38	21	29	RTU-3
VAV-3-19	SDVQ	229A TEACH WELLNESS	60	45	1.5"	4"	36	29	27	23	23	29	43	39	36	28	19	24	RTU-3
VAV-3-20	SDVQ	352 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-3
VAV-3-21	SDVQ	351A SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-3
VAV-3-22	SDVQ	351 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-3
VAV-3-23	SDVQ	350 ADJUSTMENT	95	45	1.5"	4"	43	36	33	29	28	31	50	47	41	34	19	26	RTU-3
VAV-3-24	SDVQ	C301 CORR/E315 EX LEARN	810	160	1.5"	9"	62	54	49	45	43	44	69	65	59	49	38	43	RTU-3
VAV-3-25	SDVQ	320 SCHOOL PSYCH	70	45	1.5"	4"	38	29	29	25	25	30	46	42	38	30	19	25	RTU-3
VAV-3-26	SDVQ	321 READ	95	45	1.5"	4"	43	36	33	29	28	31	50	47	41	34	19	26	RTU-3
VAV-3-27	SDVQ	322 TEACH COLLAB	300	65	1.5"	6"	57	49	42	38	34	31	62	58	49	41	26	27	RTU-3
VAV-3-28	SDVQ	323A TEACH WELLNESS	50	45	1.5"	4"	36	29	26	22	22	29	40	36	34	25	19	56	RTU-3
VAV-3-29	SDVQ	348 MATH	95	45	1.5"	4"	43	36	33	29	28	31	50	47	41	34	19	26	RTU-3
VAV-3-30	SDVQ	349 SPEECH & LANGUAGE	95	45	1.5"	4"	43	36	33	29	28	31	50	47	41	34	19	26	RTU-3
VAV-3-31	SDVQ	347 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-3
VAV-3-32	SDVQ	346 STRIDES 3RD-5TH	400	95	1.5"	7"	56	46	41	37	35	34	64	59	51	41	26	29	RTU-3
VAV-3-33	SDVQ	347A SMALL GROUP	60	45	1.5"	4"	36	29	27	23	23	29	43	39	36	28	19	24	RTU-3
VAV-3-34	SDVQ	E341 EXT LEARN/C301CORR	760	160	1.5"	9"	61	54	49	44	42	43	68	64	58	48	36	42	RTU-3
VAV-3-35	SDVQ	341 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-3
VAV-3-36	SDVQ	345 SMALL GROUP	65	45	1.5"	4"	36	29	28	24	24	29	44	41	37	29	19	25	RTU-3
VAV-3-37	SDVQ	344 GENERAL CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-3
VAV-3-38	SDVQ	341A SMALL GROUP	60	45	1.5"	4"	36	29	27	23	23	29	43	39	36	28	19	24	RTU-3
VAV-3-39	SDVQ	342 GEN CLASSROOM	430	95	1.5"	7"	58	47	42	37	36	35	65	61	52	42	27	30	RTU-3
VAV-3-40	SDVQ	343 SPEECH & LANGUAGE	50	45	1.5"	4"	36	29	26	22	22	29	40	36	34	25	19	56	RTU-3
VAV-5-1	SDVQ	163 CAFETERIA / C100 CORR	2900	575	1.5"	16"	70	64	59	53	50	46	73	64	61	53	49	53	RTU-5
VAV-5-2	SDVQ	164 PLATFORM	960	210	1.5"	10"	64	55	52	47	44	40	70	64	59	49	38	46	RTU-5
VAV-5-3	SDVQ	163 CAFETERIA	3200	575	1.5"	16"	71	66	60	54	50	47	74	65	62	54	51	55	RTU-7
VAV-7-1	SDVQ	162 FLEX CLASSROOM	400	95	1.5"	7"	56	46	41	37	35	34	64	59	51	41	26	29	RTU-7
VAV-7-2	SDVQ	161 QUIET CAFE	95	45	1.5"	4"	43	36	33	29	28	31	50	47	41	34	19	26	RTU-7
VAV-7-3	SDVQ	159 QUIET CAFE	95	45	1.5"	4"	43	36	33	29	28	31	50	47	41	34	19	26	RTU-7
VAV-7-4	SDVQ	158 QUIET CAFE	95	45	1.5"	4"	43	36	33	29	28	31	50	47	41	34	19	26	RTU-7
VAV-7-5	SDVQ	157 INSTRUMENTAL MUSIC	340	65	1.5"	6"	58	50	43	39	34	31	64	60	51	43	27	28	RTU-8
VAV-8-1	SDVQ	101A GEN OFFICE/WAITING	115	45	1.5"	4"	47	40	36	32	30	32	54	51	44	37	19	27	RTU-8

SELECTION BASED ON "PRICE" W/ POLYMER LINER IN ATTENUATOR & FIBER FREE FOAM TERMINAL LINER.
CONTROLS SHALL BE PROVIDED BY ATC CONTRACTOR & FIELD INSTALLED. ALL MODELS SHALL INCLUDE UNIT MANUFACTURER'S ATTENUATOR UNLESS NOTED OTHERWISE.

CONDENSATE PUMPS

UNIT NO.	MANUF. NO.	SERVICE	G.P.H.	T.D.H. FT WATER	MOTOR			REMARKS
					WATTS	VOLT	PH.	
CP-1	SI-10	DCU/FCU	5	33'	14	120	1	

CP-1 SELECTION BASED ON "SAUERMANN," CP-2 SELECTION BASED ON "LITTLE GIANT." PROVIDE OVERFLOW SAFETY SWITCH FOR EACH PUMP W/ ALARM, ALSO EACH PUMP SHALL BE FURNISHED WITH PROVISIONS FOR DIRECT CONNECTION (HARD WIRE) WITH PIGTAIL READY FOR CONNECTION BY ELECTRICAL CONTRACTOR.

WALL RADIATION UNITS

UNIT NO.	MANUF NO.	PANEL HEIGHT	PANEL LENGTH	BTU/ LIN. FT.	REMARKS
WRU-1	R3F-6	8-5/8"	VARIES	279	SEE FLOOR PLAN FOR LENGTH

SELECTION BASED ON "RUNTAL," 130° EWT, 20° WTD, 120° AWT, 25% PROPYLENE GLYCOL.
NOTE 1: CONFIRM MOUNTING LOCATIONS WITH RCP ELEMENTS & ARCHITECT.
NOTE 2: PROVIDE MANUFACTURER'S END AND INTER-CONNECTION TRIM PIECES TO PROVIDE A CONTINUOUS APPEARANCE.
NOTE 3: PROVIDE A MINIMUM OF 0.5 GPM FOR EACH GROUP OF WALL RADIATION UNITS WITHIN EACH INDIVIDUAL SPACE.
NOTE 4: ALL UNITS SHALL BE PROVIDED AS MANUFACTURER'S HIGH-PRESSURE OPTION
NOTE 5: REFER TO FLOOR PLANS FOR PANEL LENGTHS.
NOTE 6: FURNISH UNIT AS CUSTOM COLOR PAINT MATCH OPTION. COLOR TO BE SELECTED BY ARCHITECT.
NOTE 7: WALL MOUNTED
NOTE 8: PEDESTAL MOUNTED

RADIANT COOLING/HEATING PANELS

UNIT NO.	MANUF NO.	NO. OF PASSES	PANEL WIDTH	PANEL LENGTH	COOLING BTU/ SQ. FT.	HEATING BTU/ LIN. FT.	GPM	REMARKS
RP-1	LINEAR	8	24"	SEE PLANS	24/28	190	SEE PLANS	LINEAR PANEL, ACT/ GYP INSTALL, HEATING & COOLING
RP-2	LINEAR	8	24"	SEE PLANS	-	190	SEE PLANS	LINEAR PANEL, ACT/ GYP INSTALL, HEATING ONLY
RP-3	LINEAR	3	18"	SEE PLANS	-	109	SEE PLANS	LINEAR PANEL, ACT/ GYP INSTALL, HEATING & COOLING

SELECTION BASED ON "TWA", 25% PROP. GLYCOL, 130° EWT, 20° WTD, 120° AWT (HEATING); 58°F EWT, 4°F WTD, 60° AWT (COOLING). CONFIRM MOUNTING LOCATIONS WITH RCP ELEMENTS & ARCHITECT. PROVIDE A MINIMUM OF 1.0 GPM FOR EACH CIRCUIT OF RADIANT PANELS.
PROVIDE TUBING, HEADERS, DUAL CIRCUITS, FITTINGS, BRACKETS, ETC FOR A COMPLETE CONNECTION BETWEEN PANELS.
HEADERS SHALL BE PROVIDED FROM THE MANUFACTURER TO ENSURE THE PRESSURE DROP IN NO CIRCUITS EXCEEDS 8' WC.
ALL HEADERS AND RETURN BENDS SHALL BE FACTORY INSTALLED AND TESTED. PROVIDE CEILING MOUNTED UNITS AS A SMOOTH WHITE FINISH, ARCHITECT TO REVIEW
HVAC CONTRACTOR TO BE RESPONSIBLE FOR FIELD MEASUREMENT AND PROVISION OF INACTIVE TRIM PANELS, COVERS, END CAPS, JOINT COVERS & ALL NECESSARY COMPONENTS FOR A SEAMLESS & CONTINUOUS LOOK FROM WALL TO WALL, TYPICAL FOR ALL ROOMS.
PROVIDE ANY EXPOSED HANGING UNITS WITH FINISHED FRONT EDGE AND END CAPS.
ACTIVE ELEMENT LENGTHS SHOWN ON PLANS. REFER TO PLAN NOTATION AND LEGEND FOR PANELS REQUIRING CUSTOM COLORS.
RP-1 COOLING CAPACITY LOWER VALUE IS BASED ON PANEL LOCATED 10' OR MORE AWAY FROM EXTERIOR WALL. UPPER VALUE IS WITHIN 10' OF EXTERIOR WALL.

VARIABLE AIR VOLUME BOXES (CONT.)

UNIT NO.	MANUF. NO.	SPACE SERVED	NORMAL COOLING (CFM)	MIN. FLOW (CFM)	INLET APD	INLET DIA	OctaveBands Radiated						OctaveBands Discharge						REMARKS
							2	3	4	5	6	7	2	3	4	5	6	7	
VAV-8-2	SDVQ	101B PRINCIPAL SEC.	185	60	1.5"	5"	51	42	37	35	34	32	58	54	46	38	21	29	RTU-8
VAV-8-3	SDVQ	101 SUPERVISORY OFFICE	50	45	1.5"	4"	36	29	26	22	22	29	40	36	34	25	19	56	RTU-8
VAV-8-4	SDVQ	102 CARES OFFICE	75	45	1.5"	4"	39	31	30	26	26	30	47	43	38	31	19	25	RTU-8
VAV-8-5	SDVQ	101C CONFERENCE ROOM	135	45	1.5"	4"	50	43	38	34	31	32	56	53	46	39	19	28	RTU-8
VAV-8-6	SDVQ	101D/E/J/K OFFICES	85	45	1.5"	4"	41	33	32	28	27	30	49	45	40	33	19	26	RTU-8
VAV-8-7	SDVQ	103 CARES OFFICE	85	45	1.5"	4"	41	33	32	28	27	30	49	45	40	33	19	26	RTU-8
VAV-8-8	SDVQ	101G/H TEACH WORK & MAIL	280	60	1.5"	6"	56	48	42	38	34	31	61	56	48	40	25	27	RTU-8
VAV-8-9	SDVQ	C101 CORRIDOR	135	45	1.5"	4"	50	43	38	34	31	32	56	53	46	39	19	28	RTU-8
VAV-8-10	SDVQ	106 CONFERENCE ROOM	90	45	1.5"	4"	42	35	33	29	27	31	50	46	41	34	19	26	RTU-8
VAV-8-11	SDVQ	107A EXAM	55	35	1.5"	4"	36	29	26	22	22	29	42	38	35	27	19	24	RTU-8
VAV-8-12	SDVQ	107B EXAM	55	35	1.5"	4"	36	29	26	22	22	29	42	38	35	27	19	29	RTU-8
VAV-8-13	SDVQ	107 MEDICAL	125	45	1.5"	4"	48	42	37	33	30	32	55	52	45	38	19	28	RTU-8
VAV-8-14	SDVQ	C102 CORRIDOR	230	60	1.5"	5"	56	46	41	37	35	32	62	57	49	41	23	30	RTU-8
VAV-8-15	SDVQ	G100A PE OFFICE	70	45	1.5"	4"	38	29	29	25	25	30	46	42	38	30	19	25	RTU-8
VAV-8-16	SDVQ	201 STAFF LUNCH	140	45	1.5"	4"	51	44	39	34	32	32	57	54	46	40	20	28	RTU-8
VAV-9-1	SDVQ	252 LIBRARY	1080	650	1.5"	10"	65	57	53	48	46	41	71	66	60	50	41	48	RTU-9
VAV-9-2	SDVQ	204A LIBRARY WKRM	160	95	1.5"	4"	53	47	40	36	33	33	59	56	48	41	21	29	RTU-9
VAV-9-3	SDVQ	252 LIBRARY	1500	900	1.5"	12"	68	56	53	48	47	43	73	65	57	46	39	49	RTU-9
VAV-9-4	SDVQ	C200 CORRIDOR	510	305	1.5"	7"	61	50	44	39	37	35	67	64	54	45	31	30	RTU-9

SELECTION BASED ON "PRICE" W/ POLYMER LINER IN ATTENUATOR & FIBER FREE FOAM TERMINAL LINER.
CONTROLS SHALL BE --PROVIDED BY ATC CONTRACTOR & FIELD INSTALLED. ALL MODELS SHALL INCLUDE UNIT MANUFACTURER'S ATTENUATOR UNLESS NOTED OTHERWISE.

FANS

UNIT NO.	MANUF. NO.	BUILDING LOCATION	SERVICE	DRIVE TYPE	SP	CFM	RPM	SONES (SND PWR)	MOTOR			CONTROL		REMARKS
									HP	V	PH	TYPE	SYST.	
KEF-1	CUBE	ROOF	KITCHEN HOODS	BELT	2.0"	6,800	962	6.4	5.0	460	3	--	KITCHEN	NOTES #1, 3, 4
EF-1	G-VG	ROOF	TOILETS	DIRECT	0.75"	2,040	1,659	6.4	1/6	115	1	I	BLDG	NOTE #6
EF-2	G-VG	ROOF	TOILETS	DIRECT	0.75"	2,220	1,309	6.4	1/2	115	1	I	BLDG	NOTE #6
EF-3	SQ-VG	INLINE	ART ROOM	DIRECT	0.50"	450	1,404	6.4	1/10	115	1	I	BLDG	NOTE #2, 6
BF-4	LB-2	CUSTODIAN LAUNDRY	DRYER	DIRECT	0.75"	150	N/A	N/A	65W	120	1	VII	PRS SWTCH	NOTE #7
BF-5	LB-2	KITCHEN LAUNDRY	DRYER	DIRECT	0.75"	150	N/A	N/A	65W	120	1	VII	PRS SWTCH	NOTE #7

SELECTION BASED ON "GREENHECK", EF-10 SELECTION BASED ON "CAR-MON"
NOTE #1: UL-762 RATED FOR CONTAMINATED OR GREASE-LADEN AIR.
NOTE #2: CONSTRUCTED OF ALUMINUM FOR WET ENVIRONMENT PROTECTION.
NOTE #3: PROVIDE EXTENDED/VENTED CURB AND WINDBAND EXTENSION.
NOTE #4: KITCHEN/HOOD CONSULTANT'S PACKAGE SHALL PROVIDE VARIABLE FREQUENCY DRIVES. COORDINATE FINAL VFD LOCATION WITH POWER WIRING BY DIV 26 00 00. PROVIDE SHAFT GROUNDING SIMILAR TO "AEGIS."
NOTE #5: FAN SHALL OPERATE 24/7
NOTE #6: ATC CONTRACTOR SHALL PROVIDE SPEED CONTROL BMS INTEGRATION, FOR ALL VG (ECM) MOTORS.
NOTE #7: SELECTION BASED ON "TJERNLUND"

UNIT HEATERS (HEATING HOT WATER)

UNIT NO.	MANUF. NO.	BUILDING LOCATION	C.F.M.	M.B.H.	G.P.M.	W.P.D. (FT H2O)	MOTOR			E.D.B.	L.D.B.	REMARKS
							HP.	V	PH.			
UH-01	RH	149C WATER ENTRY	400	13.0	1.3	0.49	1/4	120	1	65	90.0	--
UH-02	RH	155A RECYCLING RM /TRASH	630	24.5	2.5	0.12	1/4	120	1	65	96.0	--
UH-03	RH	153 RECEIVING/GEN SUPPLY	630	24.5	2.5	0.12	1/4	120	1	65	96.0	--
UH-04	RH	250 MECH PUMP RM	630	24.5	2.5	0.12	1/4	120	1	65	96.0	--
UH-05	RH	250 MECH PUMP RM	630	24.5	2.5	0.12	1/4	120	1	65	96.0	
CUH-01	RC	S3-1 STAIR 3	230	16.4	1.64	0.3	1/4	120	1	65	85.2	NOTE #1
CUH-02	RC	S4-1 STAIR 4	335	22.8	2.28	0.3	1/4	120	1	65	104.4	NOTE #1
CUH-03	RC	128 VESTIBULE	230	16.4	1.64	0.3	1/4	120	1	65	85.4	NOTE #1
CUH-04	RC	S1-1 STAIR 1	335	22.8	2.28	0.3	1/4	120	1	65	104.4	NOTE #1
CUH-05	RC	109 VESTIBULE	230	16.4	1.64	0.3	1/4	120	1	65	105.2	NOTE #1
CUH-06	RC	S2-1 STAIR 2	230	16.4	1.64	0.3	1/4	120	1	65	105.2	NOTE #1
CUH-07	RC	160 VESTIBULE	230	16.4	1.64	0.3	1/4	120	1	65	106.8	NOTE #1
CUH-08	RC	172 VESTIBULE	230	16.4	1.64	0.3	1/4	120	1	65	103.5	NOTE #1
CUH-09	RC	172 VESTIBULE	230	16.4	1.64	0.3	1/4	120	1	65	103.5	NOTE #1
CUH-10	RC	S3-3 STAIR 3	230	16.4	1.64	0.3	1/4	120	1	65	104.0	NOTE #1
CUH-11	RC	S4-3 STAIR 4	335	22.8	2.28	0.3	1/4	120	1	65	104.4	NOTE #1
CUH-12	RC	S1-3 STAIR 1	230	16.4	1.64	0.3	1/4	120	1	65	106.8	NOTE #1
CUH-13	RC	S2-3 STAIR 2	230	16.4	1.64	0.3	1/4	120	1	65	88.6	NOTE #1
CUH-14	RC	S4-2 STAIR 4	230	16.4	1.64	0.3	1/4	120	1	65	106.8	NOTE #1

SELECTION BASED ON "RITTLING", 130° EWT, 20° WTD MEDIUM FAN SPEED (UNLESS NOTED OTHERWISE).

NOTE #1: PROVIDE W/ HIGH STATIC EC MOTORS.

REGISTERS

NO.	DESCRIPTION	REMARKS
E/R-1	80	NOTE #1
E/R-2	96	NOTE #1
E/R-3	RECG	NOTE #1

SELECTION BASED ON "PRICE."
ALL LOCKER ROOM R/G/D SHALL BE ALUMINUM.

NOTE #1: REFER TO DRAWINGS FOR THROW DIRECTION, SIZE & CFM.

DIFFUSERS

NO.	DESCRIPTION	REMARKS
S-A	AMX	NOTE #1
S-B	910	NOTE #1
S-C	HCD	NOTE #1,2

SELECTION BASED ON "PRICE"

NOTE #1: REFER TO DRAWINGS FOR THROW DIRECTION, SIZE & CFM. ALL LOCKER ROOM R/G/D SHALL BE ALUMINUM

NOTE #2: SET AT 15° BLADE DEFLECTION ANGLE

CONSTANT VOLUME DAMPER

UNIT NO.	MANUF. NO.	DIA. (INCHES)	MIN. VOL.	MAX. VOL.	REMARKS	IDEAL CFM @ 885 FPM
CVR-1	MR. MAX	4	40	130		77
CVR-2	MR. MAX	5	60	165		120
CVR-3	MR. MAX	6	100	265		173
CVR-4	MR. MAX	8	150	530		309
CVR-5	MR. MAX	10	295	940		482
CVR-6	MR. MAX	12	470	1,650		695
CVR-7	MR. MAX	14	530	1,885		946
CVR-8	MR. MAX	16	590	2,355		1,235

SELECTION BASED ON "ALDES"
REFER TO FLOOR PLANS FOR QUANTITIES.

DISPLACEMENT DIFFUSERS

UNIT NO.	MANUF. NO.	SIZE W x H x D	MAX FACE VELOCITY	DUCT CONNECTION	REMARKS
DD-1	DFC	24"W x 24"L	40 FPM	8"ø TOP	
DD-2	DFC	24"W x 48"L	40 FPM	10"ø TOP	
DD-3	DFW	15"W x 30"H x 3.5"D	40 FPM	12"x2.5" TOP	NOTE # 3
DD-4	DFW	23"W x 48"H x 3.5"D	40 FPM	18"x2.5" TOP	NOTE # 3
DD-5	DFW	24"W x 48"H x 13"D	40 FPM	10"Ø TOP	NOTE #1, 2
DD-6	DFW	24"W x 60"H x 13"D	40 FPM	14"x8" TOP	NOTE #1, 2
DD-7	DFW	36"W x 60"H x 13"D	40 FPM	18"x10" TOP	NOTE #1, 2
DD-8	DFW	36"W x 72"H x 13"D	50 FPM	20"x10" TOP	NOTE #1, 2

SELECTIONS BASED ON "PRICE." REFER TO FLOOR PLANS FOR CFM & QTYs.
NOTE #1: PROVIDE 4" SUB BASE
NOTE #2: PROVIDE CUSTOM PLENUMS & FACE-FASTENED TRIM FOR DIFFUSERS
NOTE #3: DIFFUSER SHALL BE INSTALLED IN MIN. 6" STUD WALL.
NOTE #4: FURNISH DIFFUSER AS CUSTOM COLOR PAINT MATCH OPTION

DUCTLESS COOLING UNIT SYSTEMS

UNIT NO.	MANUF. NO.	EVAP. LOCATION	COND. PUMP	EVAPORATOR UNITS					CONDENSER UNITS						MIN. SEER	REMARKS
				CFM	COOLING MBH	V	PH	MCA	TAG	MODEL	COOLING MBH	V	PH	MCA/MOCP		
DCUe-1	FTXM18	149 MAIN ELEC	CP-1	430	18.0	208	1	1A	DCUc-1	RXM18	18.0	208	1	18.8/20	22.7	--
DCUe-2	FTXM18	149 MAIN ELEC	CP-1	430	18.0	208	1	1A	DCUc-2	RXM18	18.0	208	1	18.8/20	22.7	--
DCUe-3A	FXFA54	150 MDF (NETWORK TELECOM)	CP-1	740	54.0	208	1	1A	DCUc-3A	RXTA60	57.5	208	1	34.6/35	20.5	--
DCUe-3B	FXFA54	150 MDF (NETWORK TELECOM)	CP-1	740	54.0	208	1	1A	DCUc-3B	RXTA60	57.5	208	1	34.6/35	20.5	--
DCUe-3C	FXFA54	150 MDF (NETWORK TELECOM)	CP-1	740	54.0	208	1	1A	DCUc-3B	RXTA60	57.5	208	1	34.6/35	20.5	--
DCUe-4	FTXM09	248 ELEC	CP-1	220	9.0	208	1	1A	DCUc-4	RXM09	9.0	208	1	12.3/15	27.4	--
DCUe-5	FTXM09	225 ELEC	CP-1	220	9.0	208	1	1A	DCUc-5	RXM09	9.0	208	1	12.3/15	27.4	--
DCUe-6	FTXM09	205 ELEC	CP-1	220	9.0	208	1	1A	DCUc-6	RXM09	9.0	208	1	12.3/15	27.4	--
DCUe-7	FTXM09	328 ELEC	CP-1	220	9.0	208	1	1A	DCUc-7	RXM09	9.0	208	1	12.3/15	27.4	--
DCUe-8	FTXM18	131 ELEV MACHINE	CP-1	430	18.0	208	1	1A	DCUc-8	RXM18	18.0	208	1	18.8/20	22.7	--
DCUe-9	FTXM09	301 ELEC	CP-1	220	9.0	208	1	1A	DCUc-9	RXM09	9.0	208	1	12.3/15	27.4	--
DCUe-10	FTXM09	122 ELEC	CP-1	220	9.0	208	1	1A	DCUc-10	RXM09	9.0	208	1	12.3/15	27.4	--
DCUe-11	FCA36	220 IDF	CP-1	670	36.0	208	1	1A	DCUc-11	RZA36	36.0	208	1	34.6/35	20.0	--
DCUe-12	FCA36	234 IDF	CP-1	670	36.0	208	1	1A	DCUc-12	RZA36	36.0	208	1	34.6/35	20.0	--

SELECTION BASED ON "DAIKIN", PROVIDE REMOTE T'STAT, LOW AMBIENT CONTROL AND INTERNAL MOUNTED CONDENSATE PUMP OF MODEL LISTED ABOVE. CFM BASED ON FANS SET AT LOW SPEED. PROVIDE WITH MATCHING AIR COOLED CONDENSING UNIT AS SCHEDULED. ALL REFRIGERANT TUBING SHALL BE SIZED BY UNIT MANUFACTURER. PROVIDE ALL NECESSARY JOINT KITS, FITTINGS AND ACCESSORIES FOR A COMPLETE OPERATING SYSTEM PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE BACNET GATEWAY FOR BMS INTERFACE. PROVIDE MANUFACTURER WITH ALL FIELD VERIFIED PIPE LENGTHS FOR PROPER PIPE SIZE & REFRIGERANT CHARGE REQUIREMENTS.

FAN COILS

UNIT NO.	MANUF NO.	AREA SERVED	CFM	SIZE	HEATING							COOLING										FAN		
					ENT. AIR	LVG. AIR	MBH	EWT	LWT	GPM	WPD	EDB	EWB	LDB	LWB	SEN.	TOTAL	EWT	LWT	GPM	WPD	HP	VOLTS	PH
FCU-1-1	MHCFC4W	156 KITCHEN	155	4	55.0	81.0	4.5	130.0	112.7	0.6	0.5	75.0	67.0	53.5	50.1	3.5	6.3	45	55.2	1.3	1.9	1/4	115	1
FCU-1-2	MHCFC4W	156 KITCHEN	155	4	55.0	80.0	4.3	130.0	111.6	0.5	0.4	75.0	67.0	53.5	50.1	3.5	6.3	45	55.2	1.3	1.9	1/4	115	1
FCU-1-3	MHCFC4W	156 KITCHEN	310	4	55.0	75.0	6.8	130.0	110.7	0.8	0.8	75.0	67.0	54.7	52.4	6.3	10.9	45	54.9	2.4	5.3	1/4	115	1

SELECTION BASED ON "MULTIAQUA", 25% PROPYLENE GLYCOL.
PROVIDE MANUFACTURER'S OPTIONAL EC MOTOR FOR ALL UNITS. MOTOR ESP FOR UNIT SHALL BE 0.5".

FIN-TUBE RADIATION SCHEDULE

TAG NO.	MANUFACTURER MODEL NUMBER	ENCLOSURE HEIGHT	BTU PER FT	GPM PER FT	EWT (°F)	LWT (°F)	PIPE SIZE (IN)	PIPE MTRL	FIN SIZE	FINS PER FOOT	FIN MTRL	ROWS/ TIERS	REMARKS
FTR- 1	JVB-SS25	25" DOUBLE SLOPE	460	.08	130	110	1-1/4"	COPPER	3-5/8" x 4-1/4"	50	ALUM.	1	ACTIVE LENGTH ON PLANS
FTR- 2	JVB-2PM	6.75" PEDESTAL	702	.08	130	110	3/4"	COPPER	3-5/8" x 4-1/4"	50	ALUM.	2	ACTIVE LENGTH ON PLANS

SELECTION BASED ON "STERLING". CAPACITY BASED 120°F AWT.
ENCLOSURE SHALL BE 14 GA. STEEL, FINISH SHALL BE APPROVED BY THE ARCHITECT
PROVIDE MANUFACTURERS END AND INTER-CONNECTION TRIM PIECES TO PROVIDE A CONTINUOUS APPEARANCE.

TYPE
LENGTH
GPM

PENTHOUSE ELEVATOR VENT

UNIT NO.	MANUF. NO.	BUILDING LOCATION	REMARKS
PEV-1	PEV-400	ELEVATOR ROOF	

SELECTION BASED ON "GREENHECK"

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WILMINGTON
ELEMENTARY SCHOOL

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REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

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09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

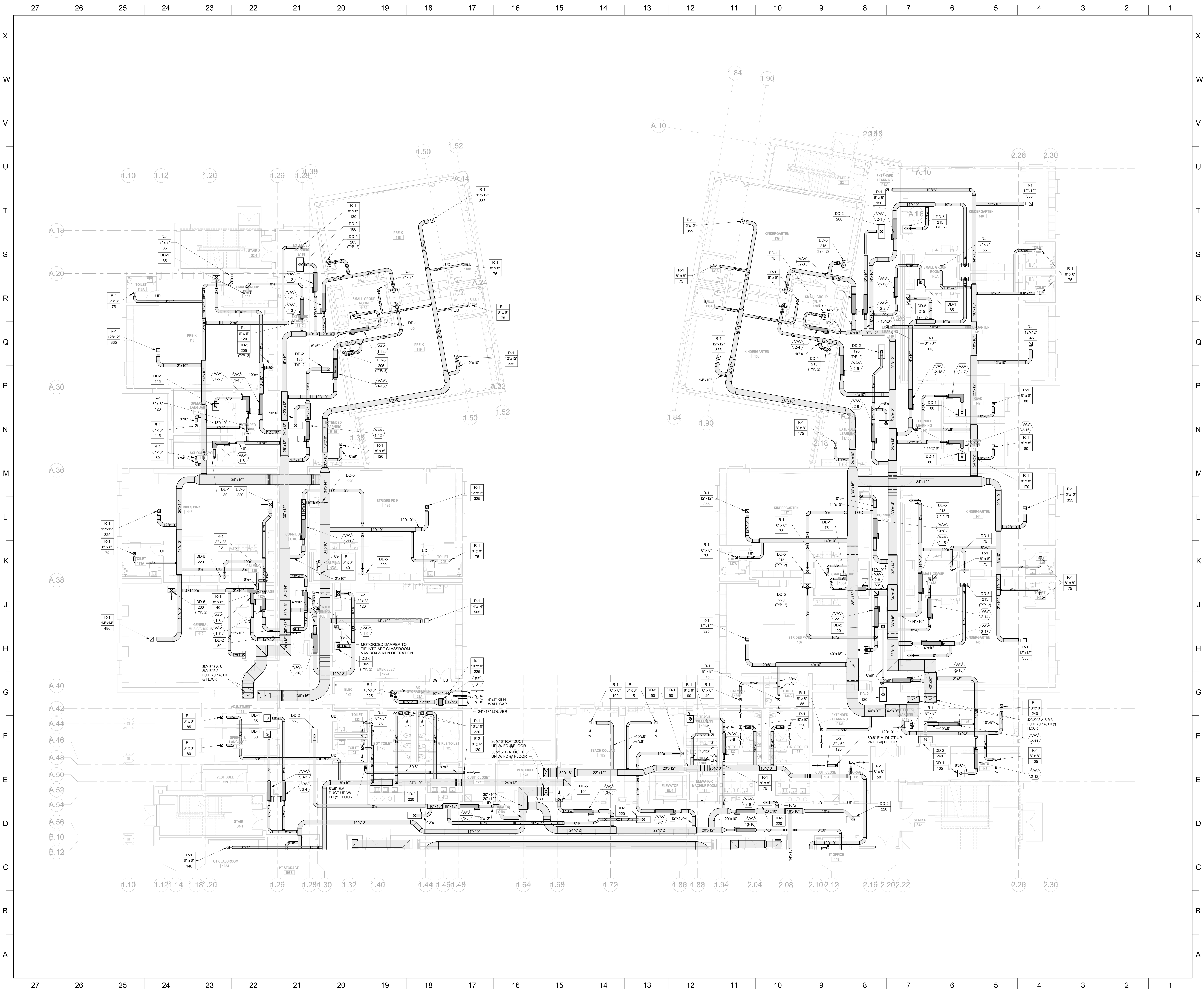
SCALE: AS INDICATED

SHEET TITLE:

SCHEDULES II

SHEET NUMBER:

M0.21



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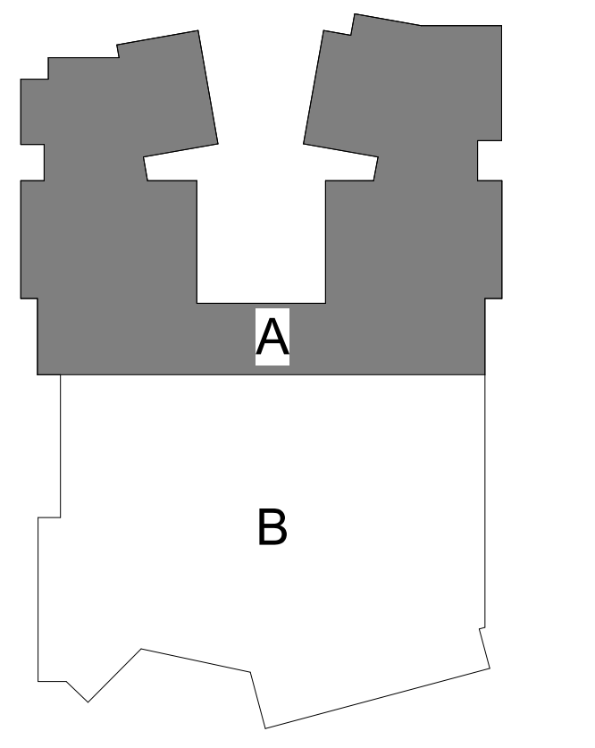
KEY PLAN



ORIENTATION AND SCALE:

SCALE: 1/8"=1'-0" GRAPHIC SCALE
PROJECT NORTH

SHEET TITLE:

LEVEL 1 AREA A - DUCTWORK

SHEET NUMBER:

M1.11

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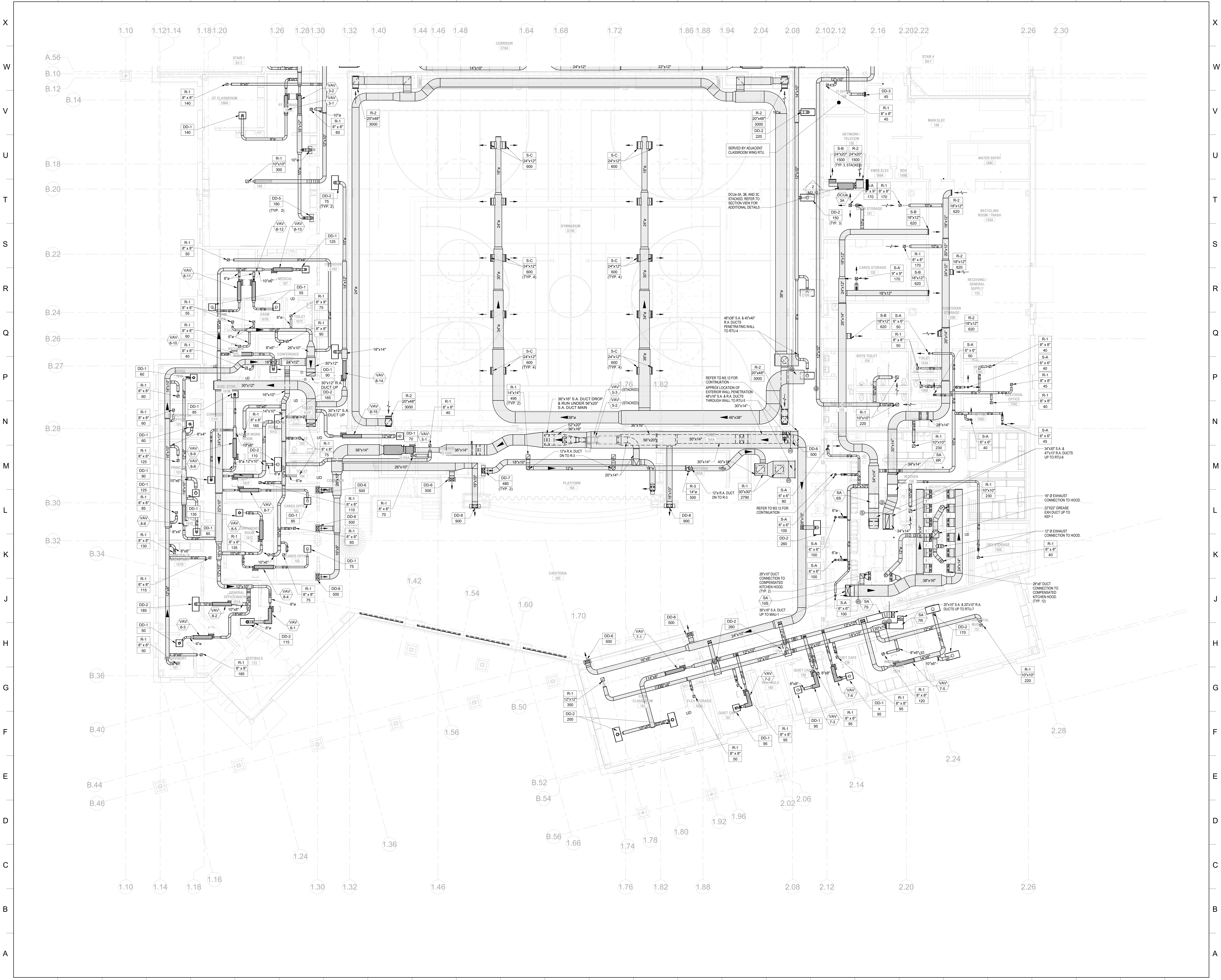
GYMNASIUM
G100
PLATFORM
164
CAFETERIA
163
KITCHEN
156
CORRIDOR
C106
RAMP
164A
SERVED BY ADJACENT CLASSROOM WING RTU.
DCUe-3A, 3B, AND 3C STACKED, REFER TO SECTION VIEW FOR ADDITIONAL DETAILS
46"x38" S.A. & 40"x40" R.A. DUCTS PENETRATING WALL TO RTU-4
REFER TO M3.12 FOR CONTINUATION
APPROX LOCATION OF EXTERIOR WALL PENETRATION 48"x16" S.A. & R.A. DUCTS THROUGH WALL TO RTU-5
36"x16" S.A. DUCT DROP & RUN UNDER 56"x20" S.A. DUCT MAIN
12"ø R.A. DUCT DN TO R-3
30"x12" S.A. DUCT UP
30"x12" R.A. DUCT UP
34"x30" S.A. & 47"x13" R.A. DUCTS UP TO RTU-6
16" Ø EXHAUST CONNECTION TO HOOD.
22"X22" GREASE EXH DUCT UP TO KEF-1
12" Ø EXHAUST CONNECTION TO HOOD.
28"x10" DUCT CONNECTION TO COMPENSATED KITCHEN HOOD. (TYP. 2)
28"x6" DUCT CONNECTION TO COMPENSATED KITCHEN HOOD. (TYP. 12)
38"x16" S.A. DUCT UP TO MAU-1
20"x10" S.A. & 20"x10" R.A. DUCTS UP TO RTU-7
VAV 5-3 (STACKED)
VAV 5-2 (STACKED)
S-C 24"x12" 600 (TYP. 4)
R-1 14"x14" 495 (TYP. 2)
R-2 20"x48" 3000
DD-2 220
R-1 30"x30" 2790
DD-7 480 (TYP. 2)
DD-8 900
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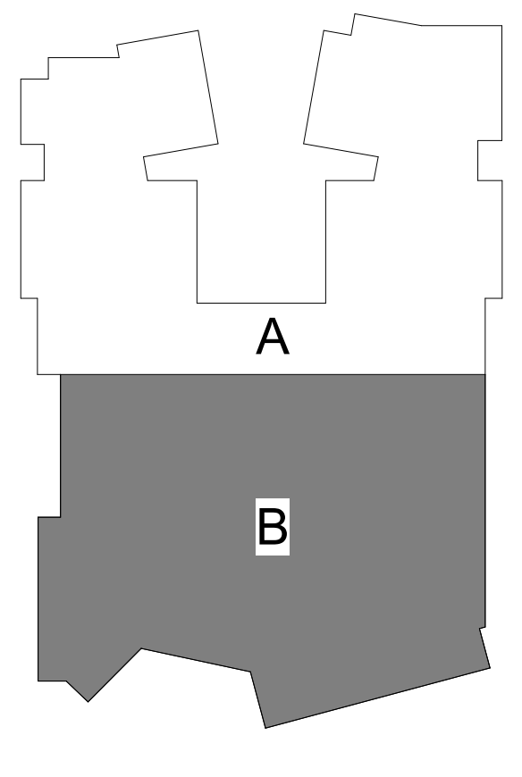

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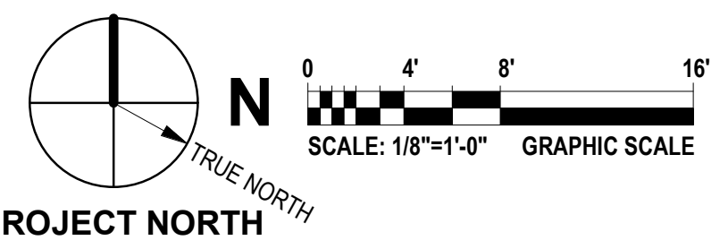


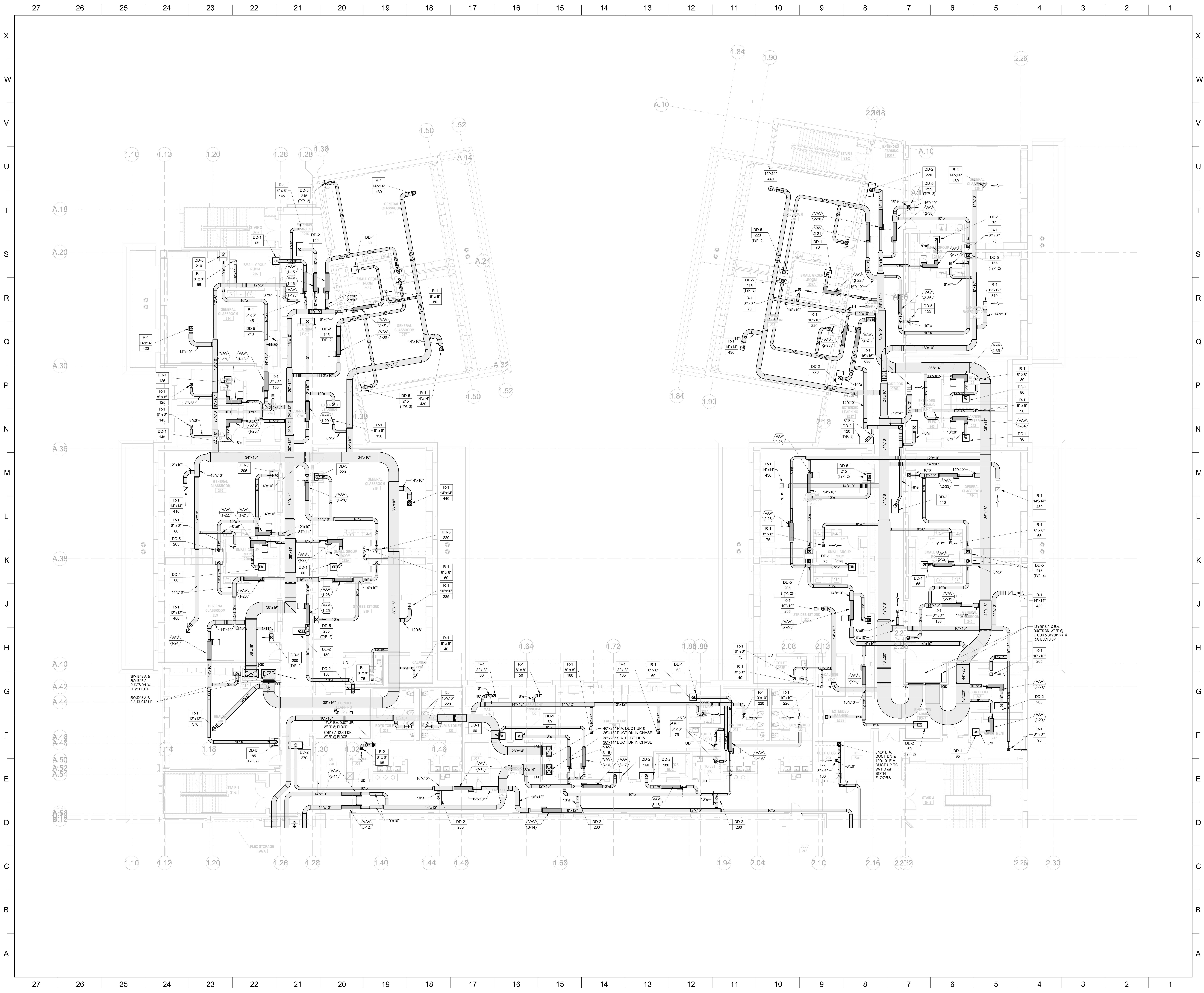
PROJECT NORTH
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

LEVEL 1 AREA B - DUCTWORK

SHEET NUMBER:

M1.12



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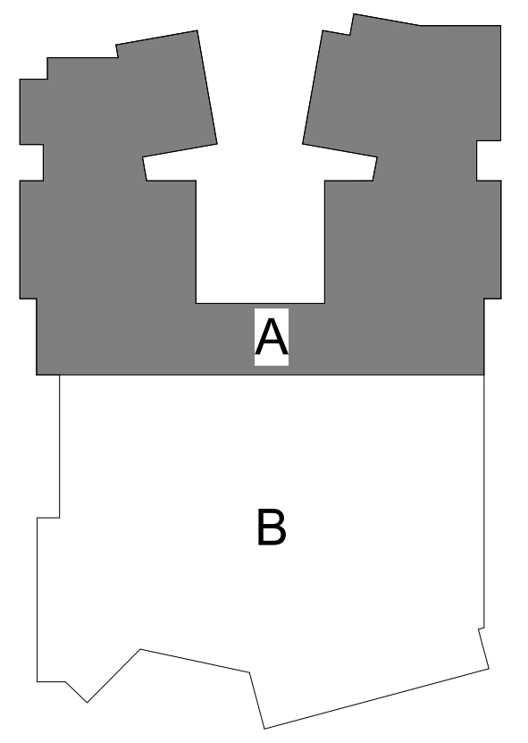

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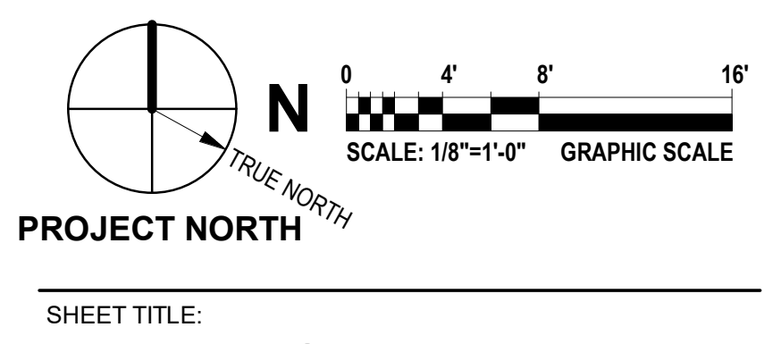

SHEET TITLE:

LEVEL 2 AREA A - DUCTWORK

SHEET NUMBER:

M1.21

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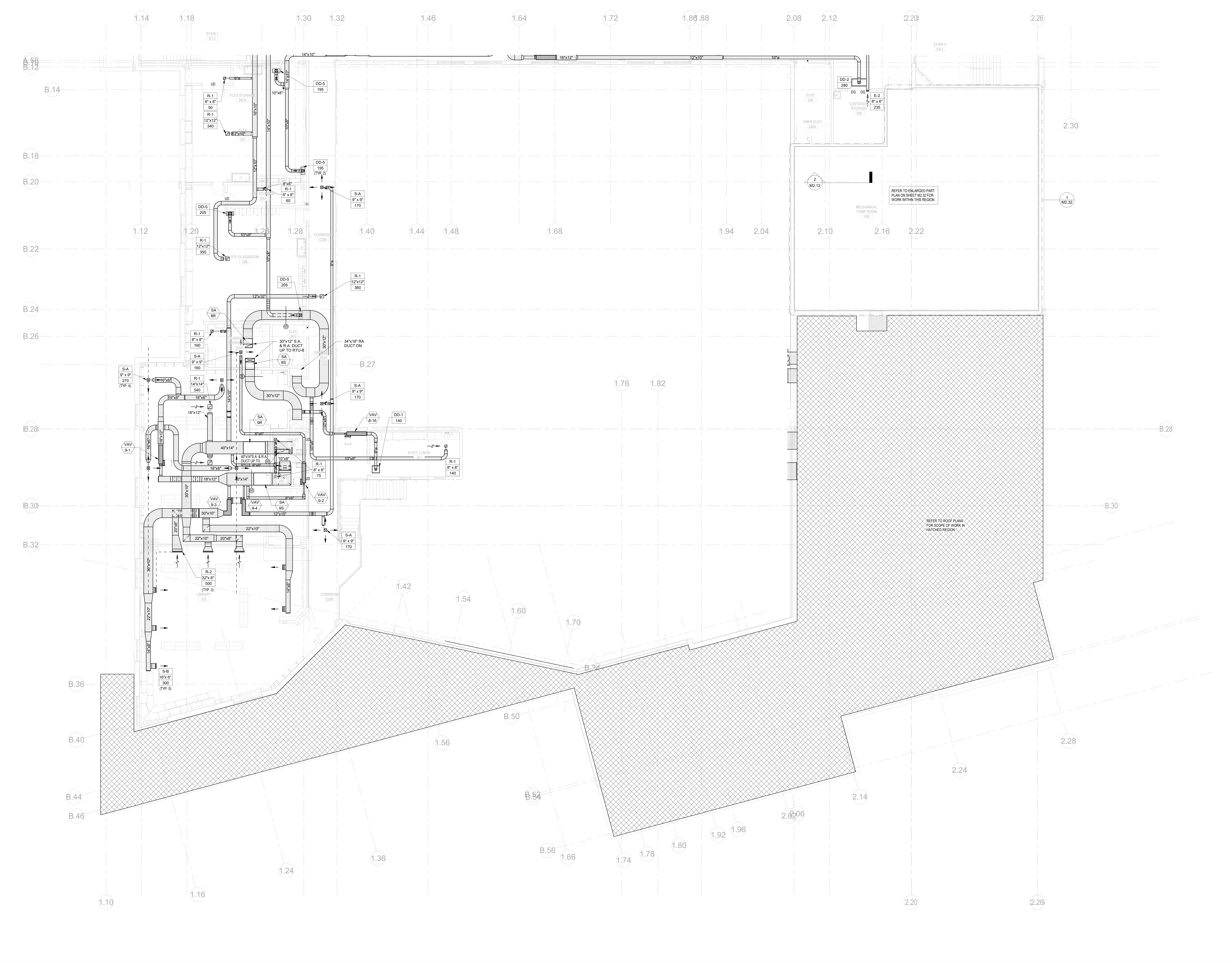

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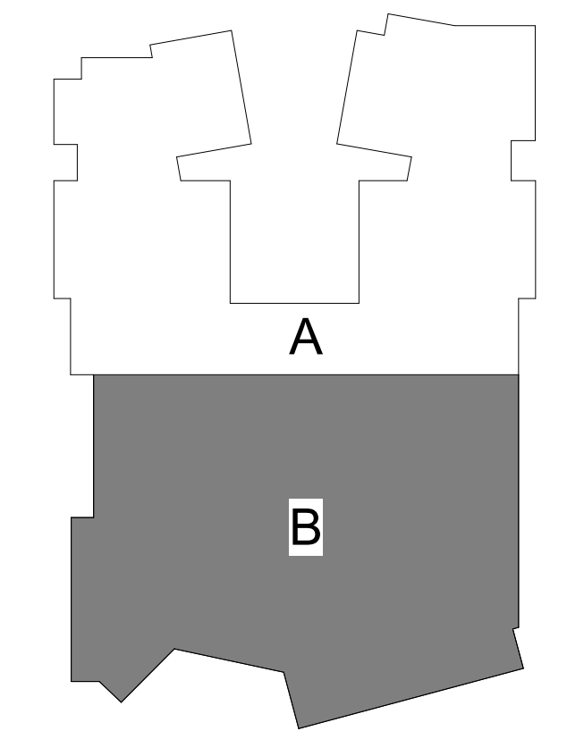

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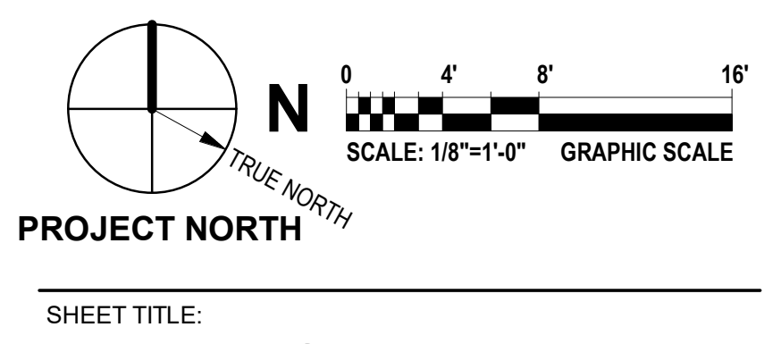
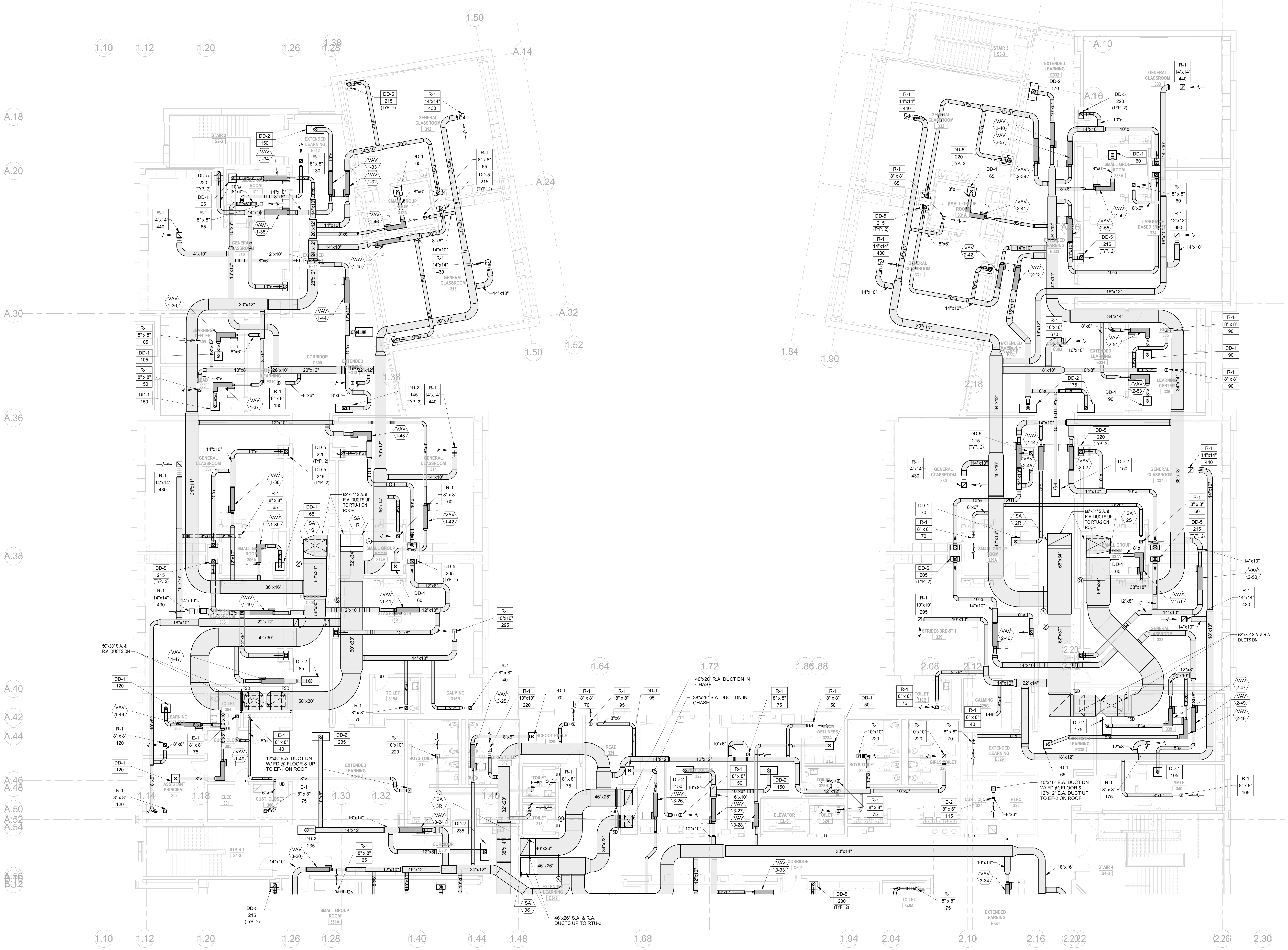


SHEET TITLE:

LEVEL 2 AREA B - DUCTWORK

SHEET NUMBER:

M1.22


62"x34" S.A. & R.A. DUCTS UP TO RTU-1 ON ROOF
66"x34" S.A. & R.A. DUCTS UP TO RTU-2 ON ROOF
50"x30" S.A. & R.A. DUCTS DN
58"x30" S.A. & R.A. DUCTS DN
40"x20" R.A. DUCT DN IN CHASE
38"x26" S.A. DUCT DN IN CHASE
12"x8" E.A. DUCT DN W/ FD @ FLOOR & UP TO EF-1 ON ROOF
10"x10" E.A. DUCT DN W/ FD @ FLOOR & 12"x12" E.A. DUCT UP TO EF-2 ON ROOF
46"x26" S.A. & R.A. DUCTS UP TO RTU-3
SA 1R
SA 1S
SA 2R
SA 2S
SA 3R
SA 3S
GENERAL CLASSROOM
SMALL GROUP ROOM
EXTENDED LEARNING
LEARNING CENTER
CORRIDOR
STAIR 1
STAIR 2
STAIR 3
STAIR 4
ELEVATOR
TOILET
BOYS TOILET
GIRLS TOILET
CALMING
WELLNESS
ASSISTANT PRINCIPAL
CUST. CLOSET
ELEC
MATH
STAGE
STRIDES 3RD-5TH
LANGUAGE BASED
READ
SCHOOL PSYCH

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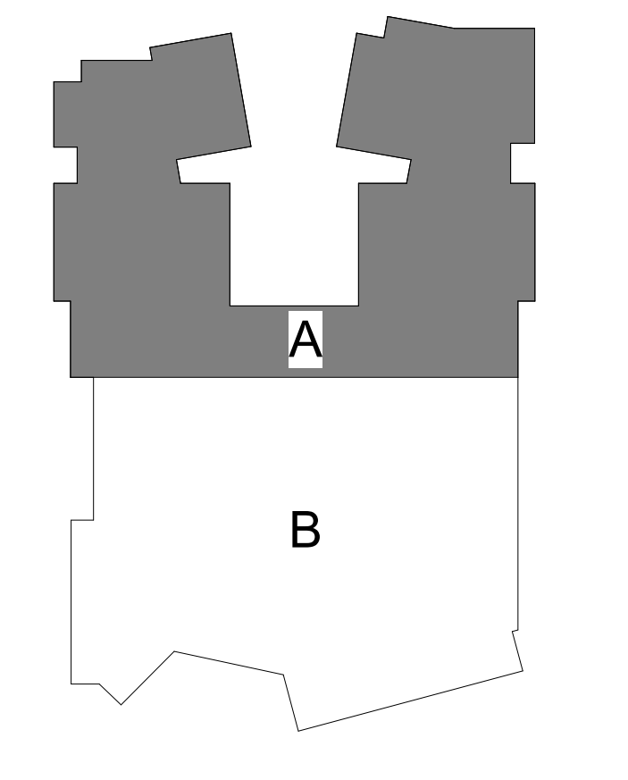

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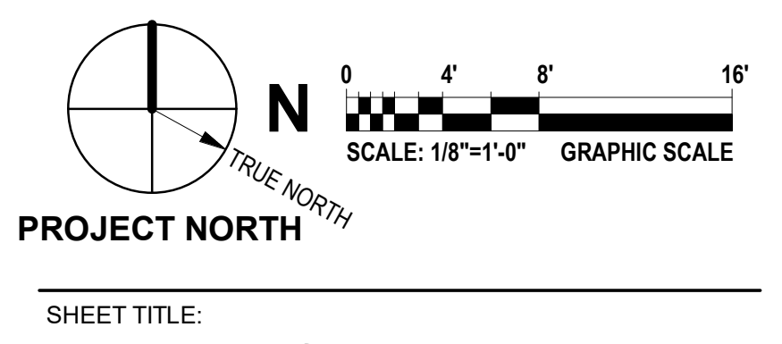
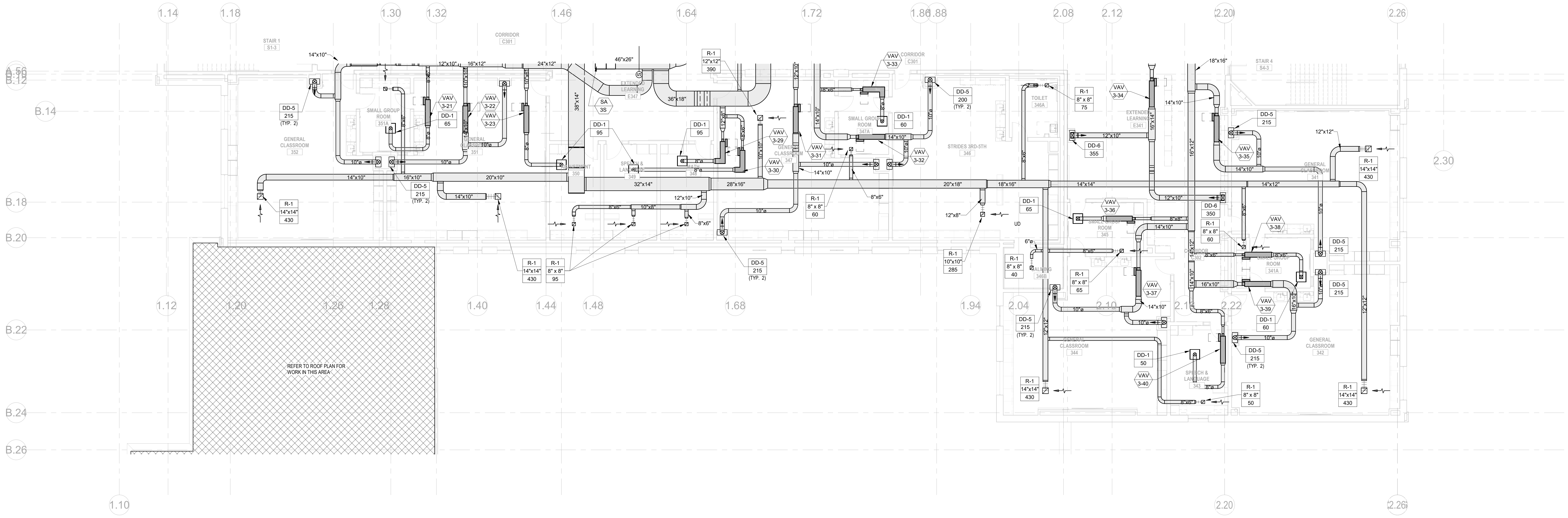


SHEET TITLE:

LEVEL 3 AREA A - DUCTWORK

SHEET NUMBER:

M1.31



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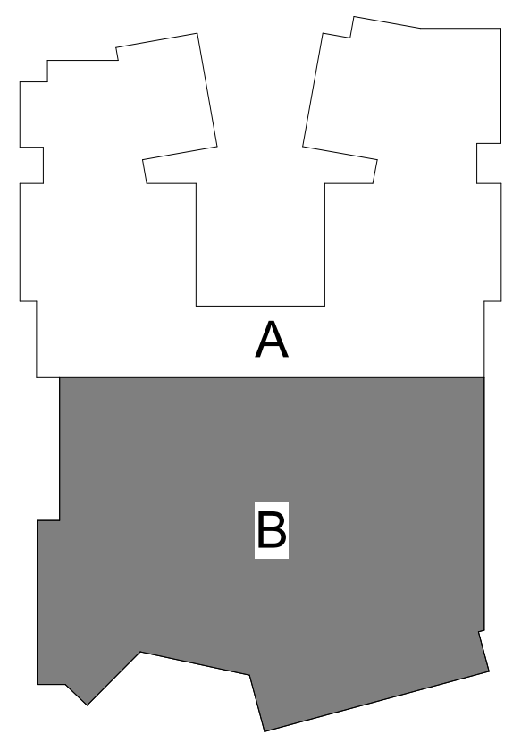
KEY PLAN



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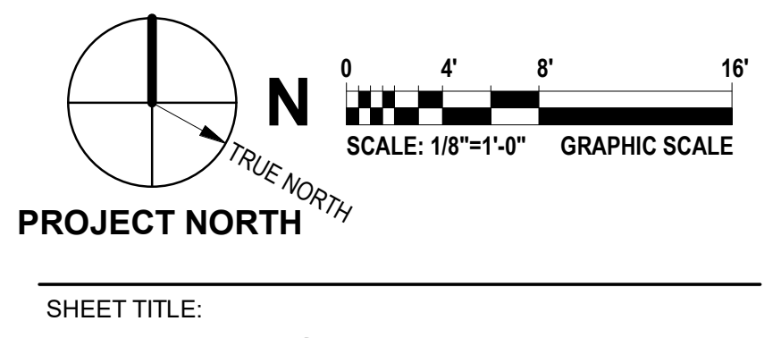

SHEET TITLE:

LEVEL 3 AREA B - DUCTWORK

SHEET NUMBER:

M1.32

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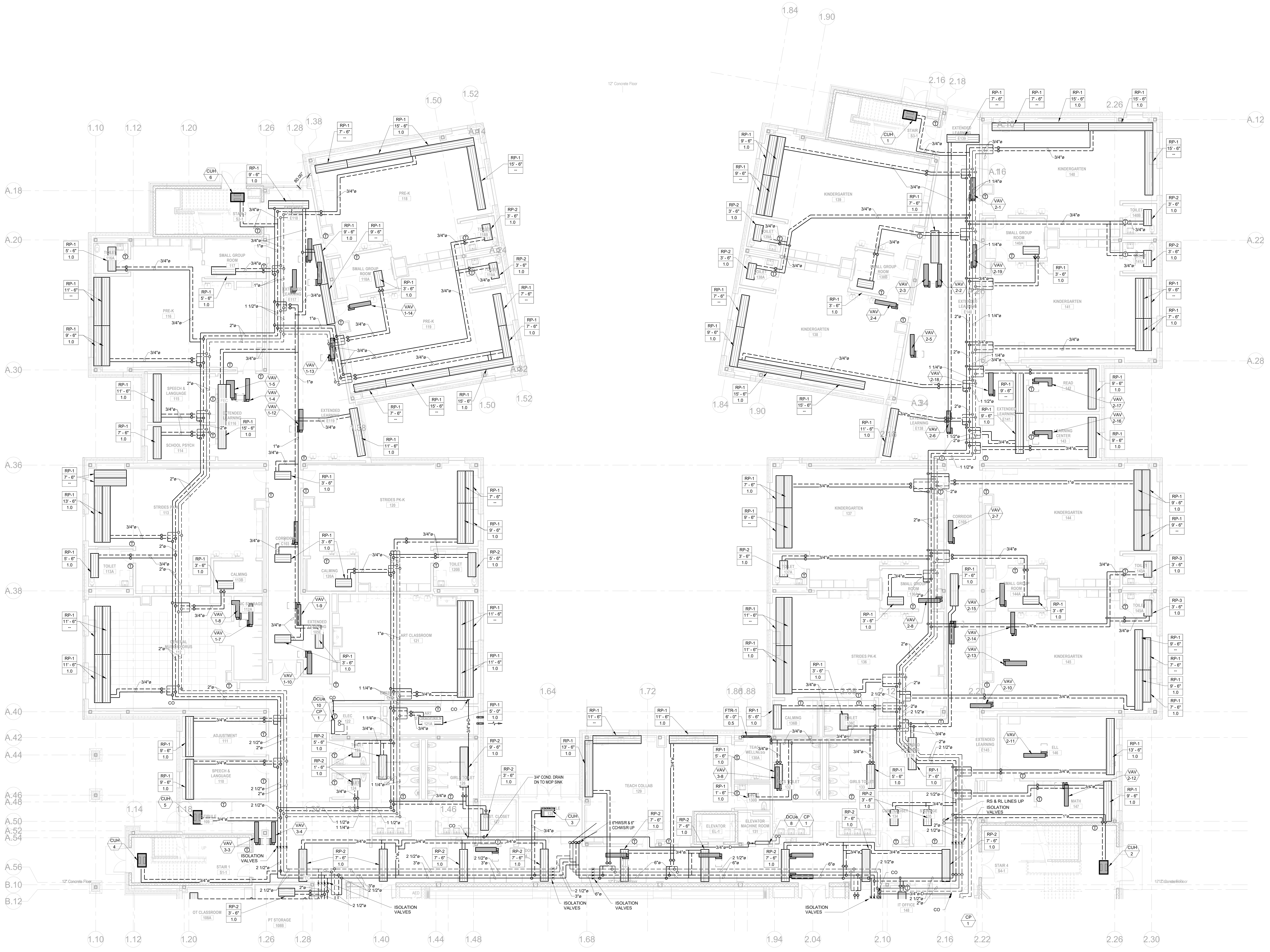

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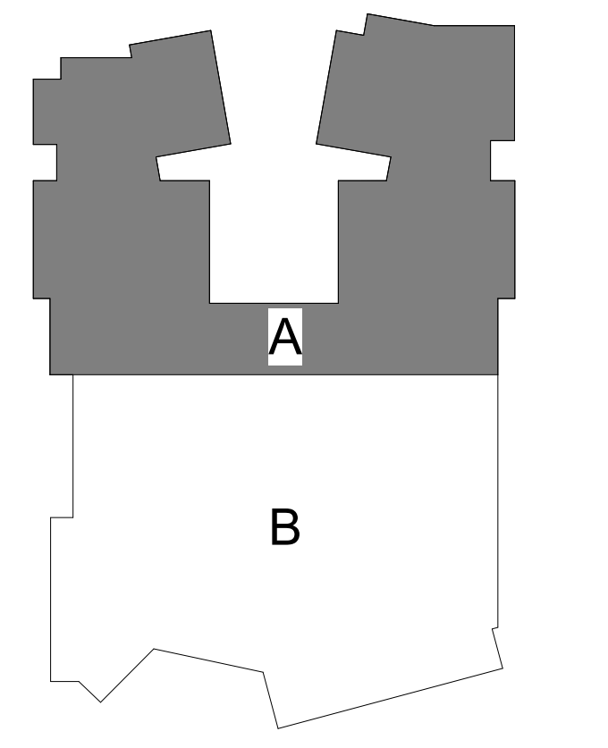
KEY PLAN



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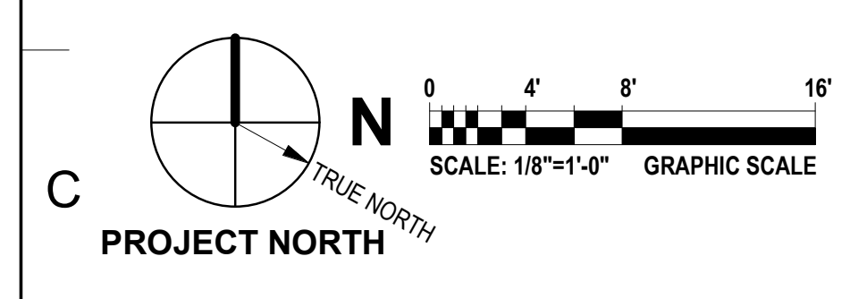

SHEET TITLE:

LEVEL 1 AREA A - PIPING

SHEET NUMBER:

M2.11

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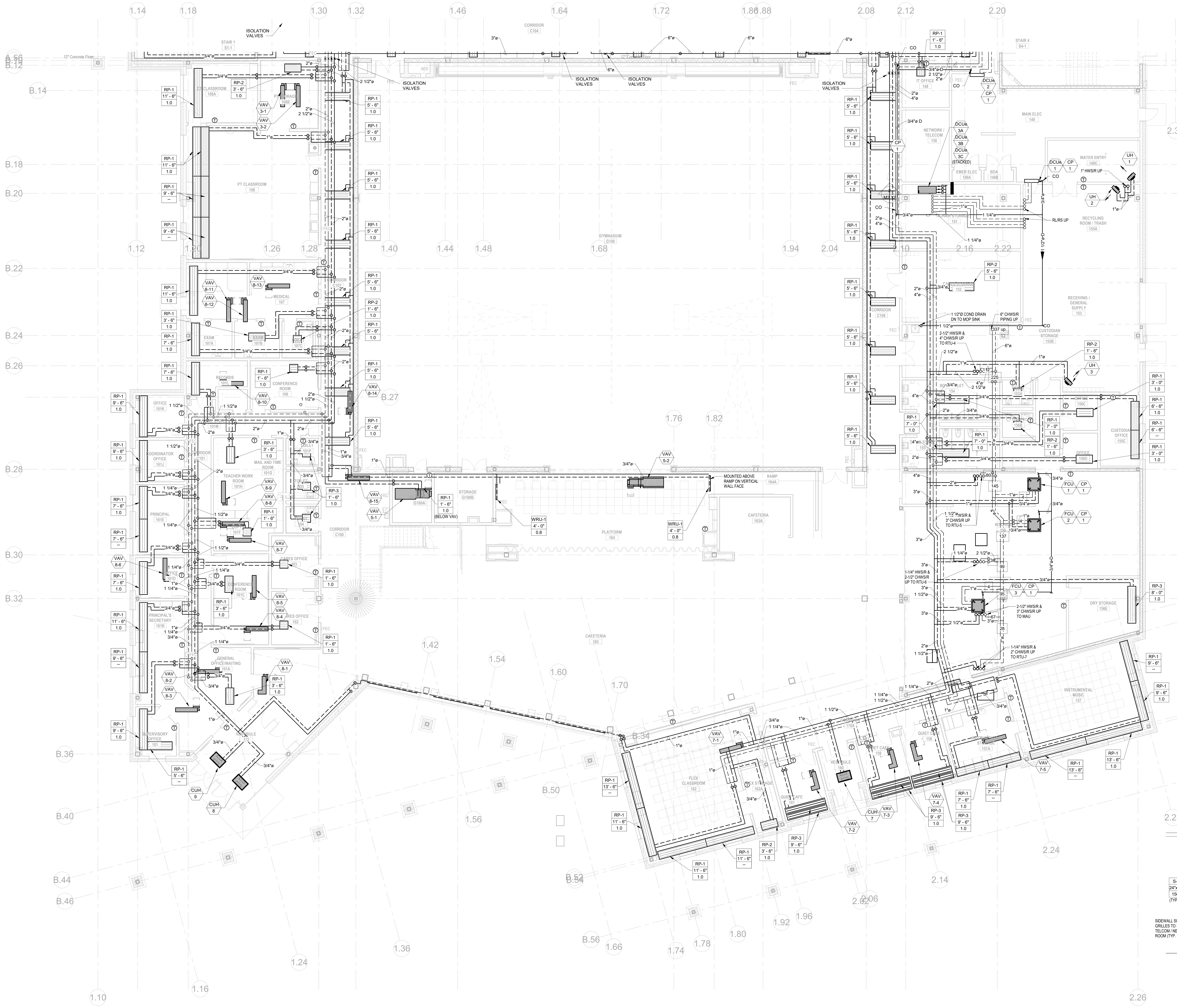

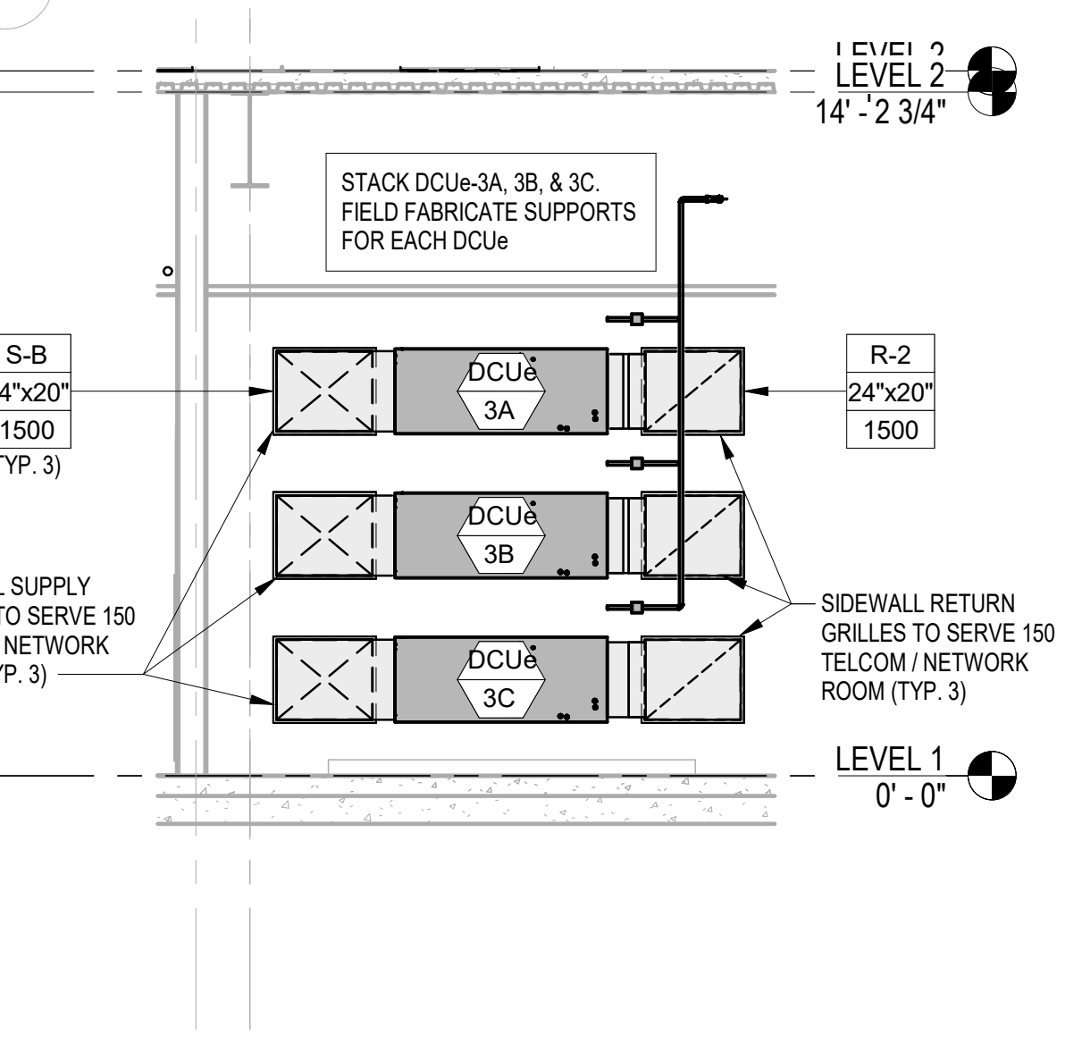
LEVEL 2
14' - 2 3/4"
STACK DCUe-3A, 3B, & 3C. FIELD FABRICATE SUPPORTS FOR EACH DCUe
S-B 24"x20" 1500 (TYP. 3)
R-2 24"x20" 1500
DCUe 3A
DCUe 3B
DCUe 3C
SIDEWALL SUPPLY GRILLES TO SERVE 150 TELCOM / NETWORK ROOM (TYP. 3)
SIDEWALL RETURN GRILLES TO SERVE 150 TELCOM / NETWORK ROOM (TYP. 3)
LEVEL 1
0' - 0"

2 M2.12 DCU 3A, 3B, 3C Section
SCALE: 1/4" = 1'-0"

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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VERMONT
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BURLINGTON, VT 05401
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WILMINGTON ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

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REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

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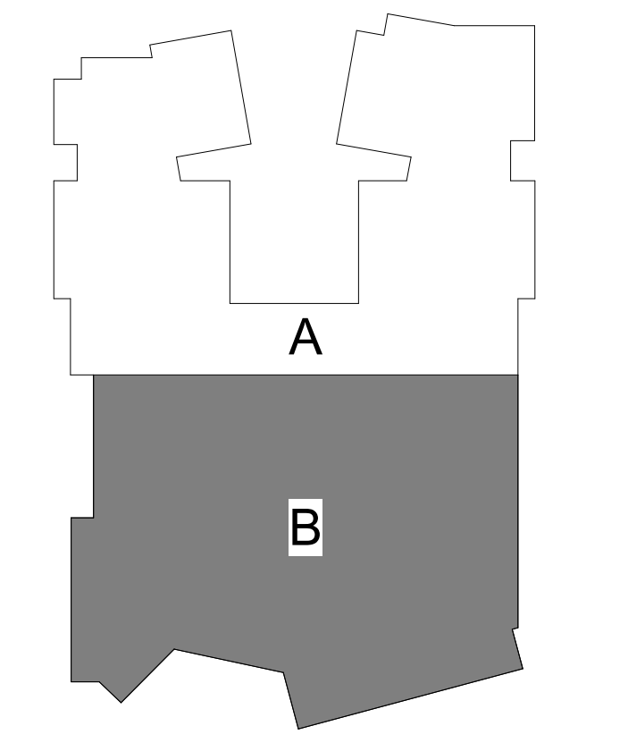
KEY PLAN



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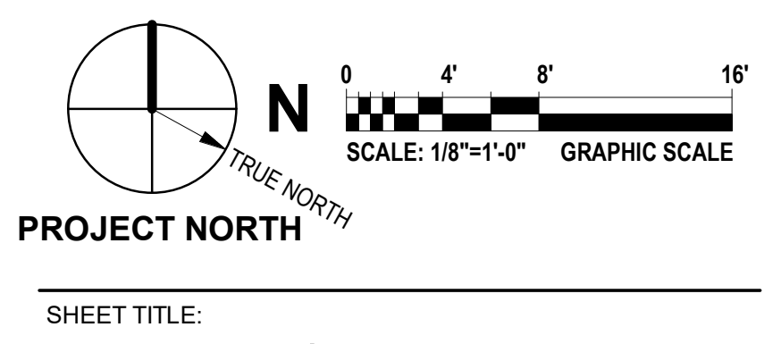

SHEET TITLE:

LEVEL 1 AREA B - PIPING

SHEET NUMBER:

M2.12

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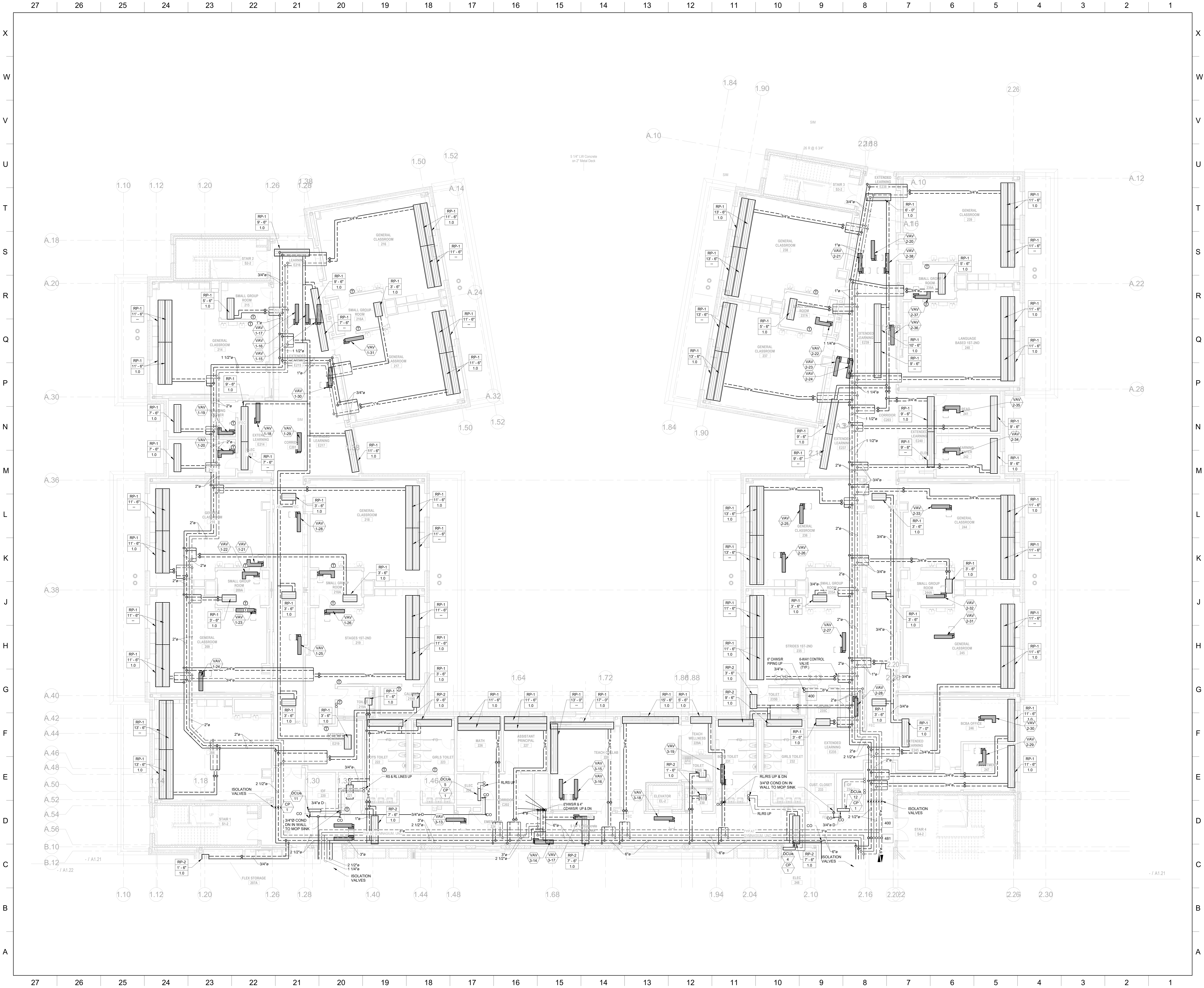

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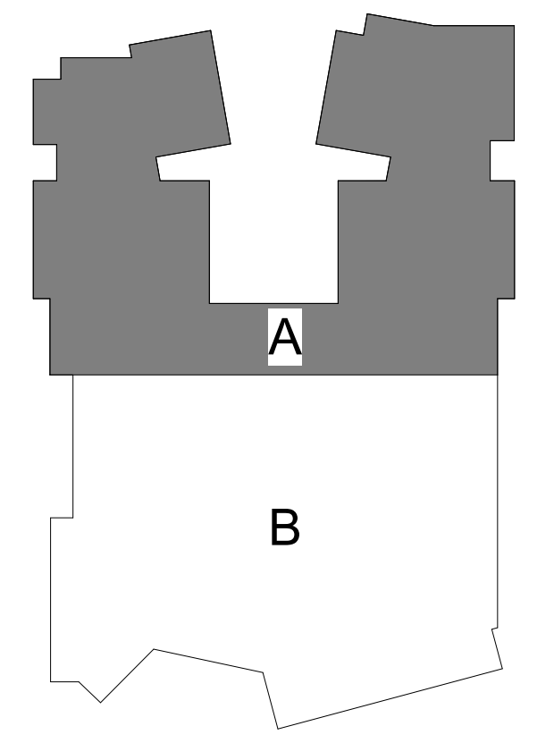

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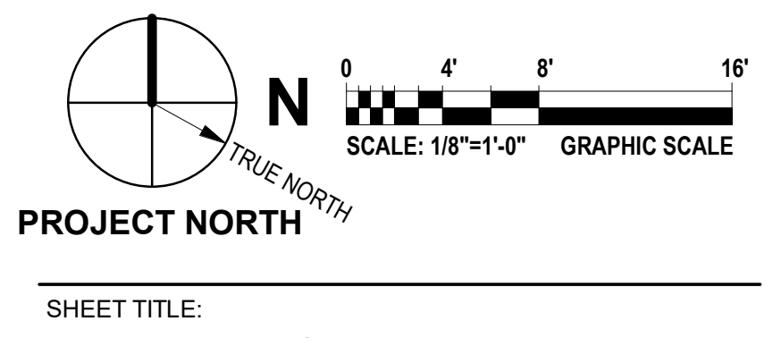

SHEET TITLE:
LEVEL 2 AREA A - PIPING

SHEET NUMBER:
M2.21

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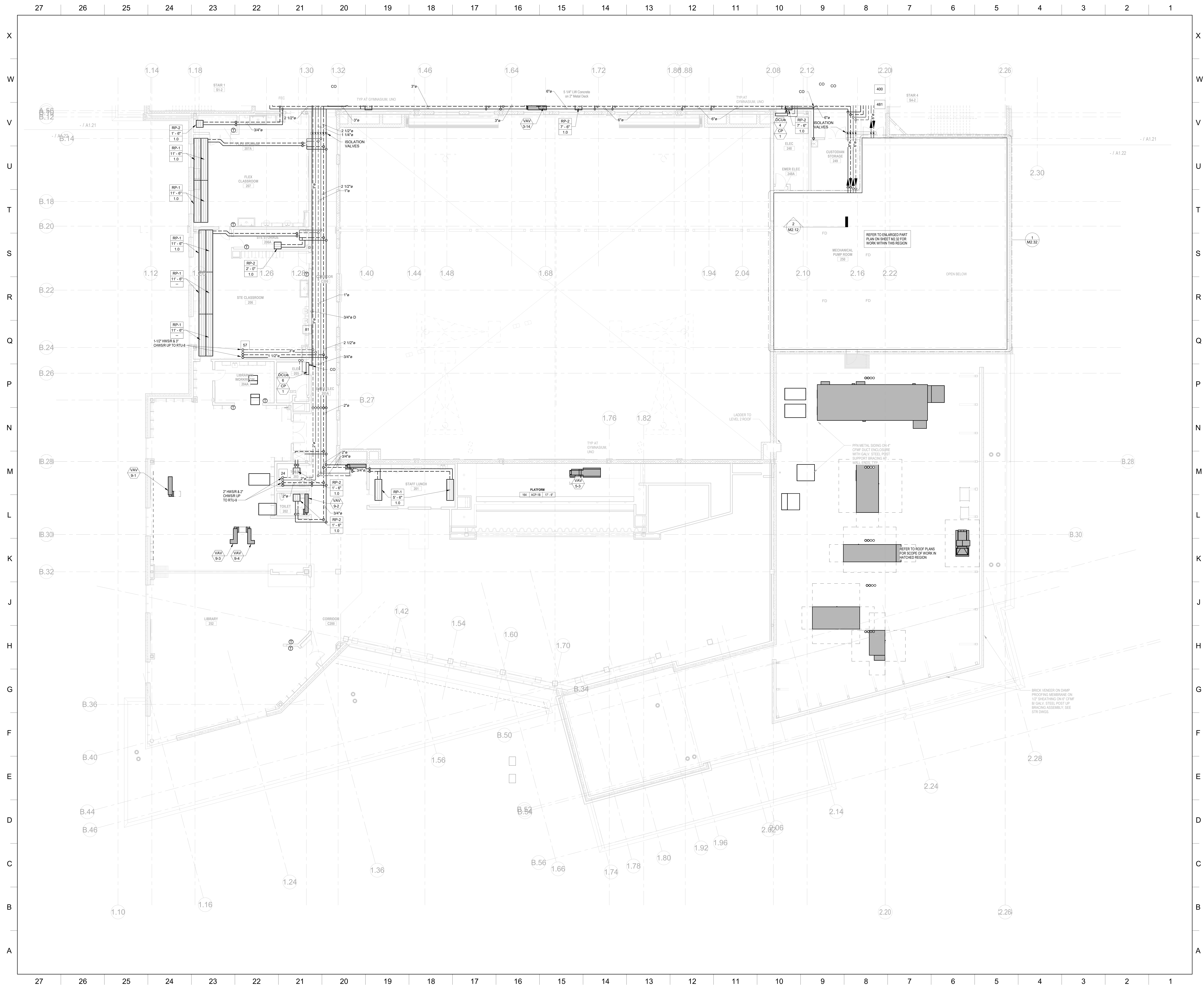

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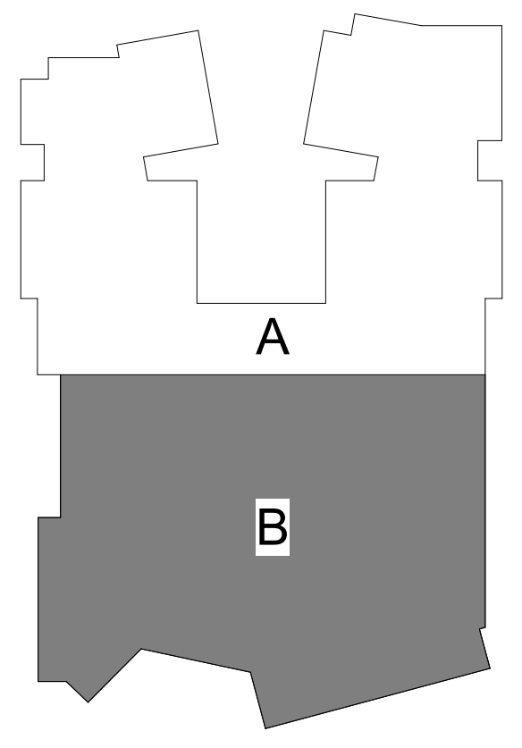


ORIENTATION AND SCALE:

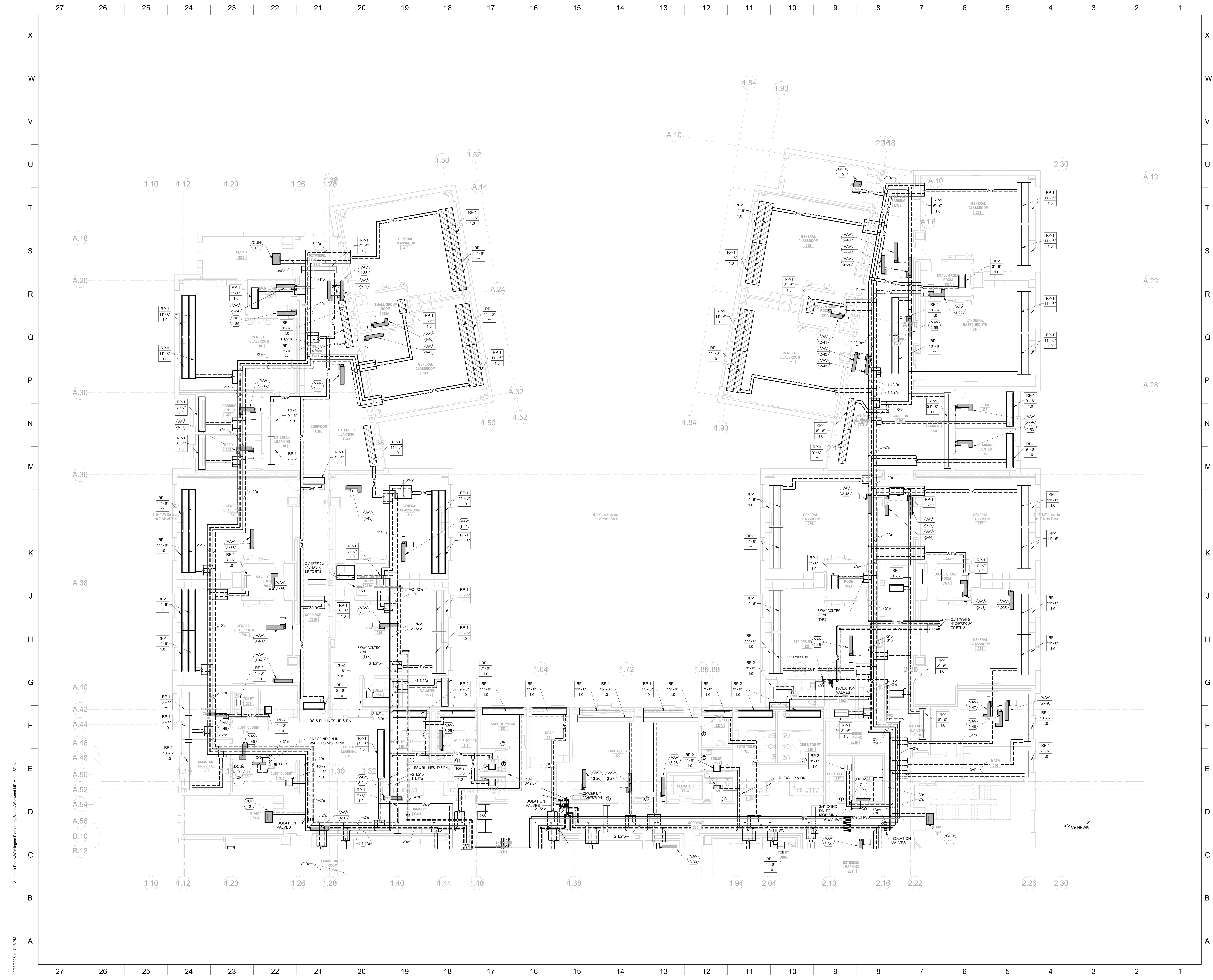
N
TRUE NORTH
PROJECT NORTH
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

LEVEL 2 AREA B - PIPING

SHEET NUMBER:

M2.22



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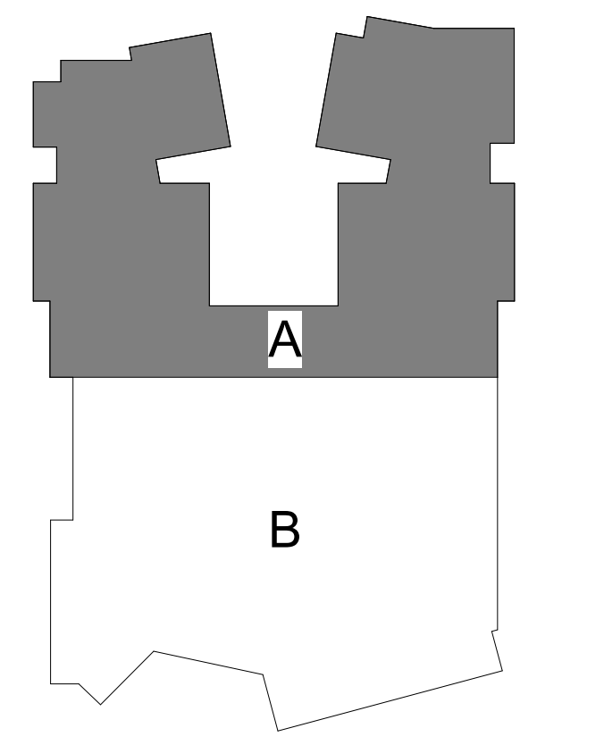

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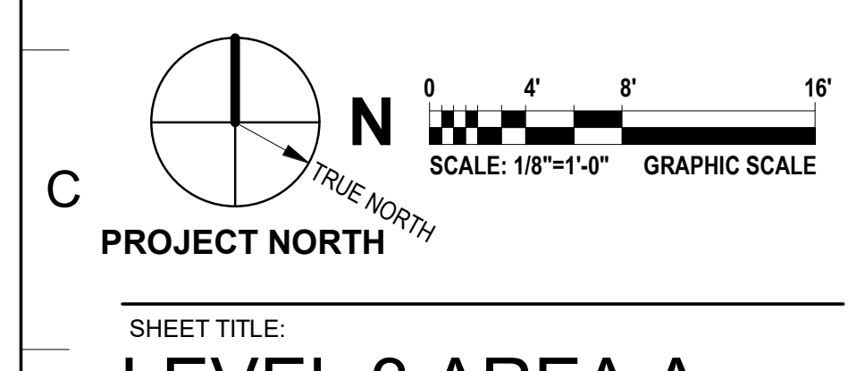

SHEET TITLE:

LEVEL 3 AREA A - PIPING

SHEET NUMBER:

M2.31

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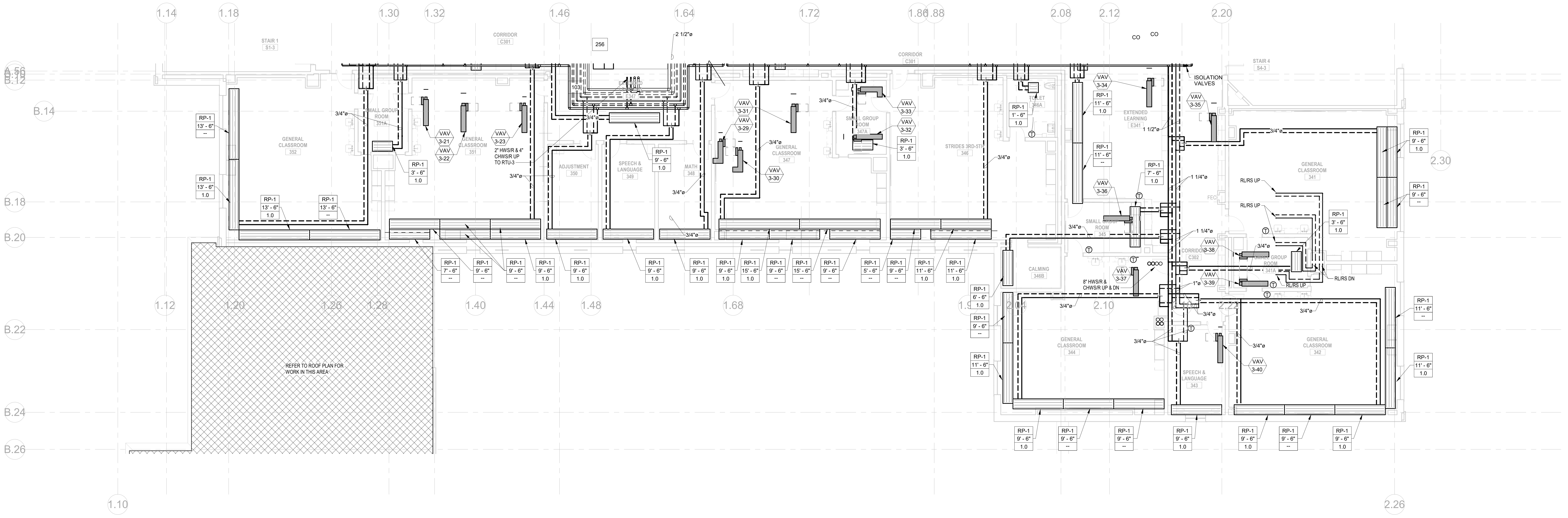
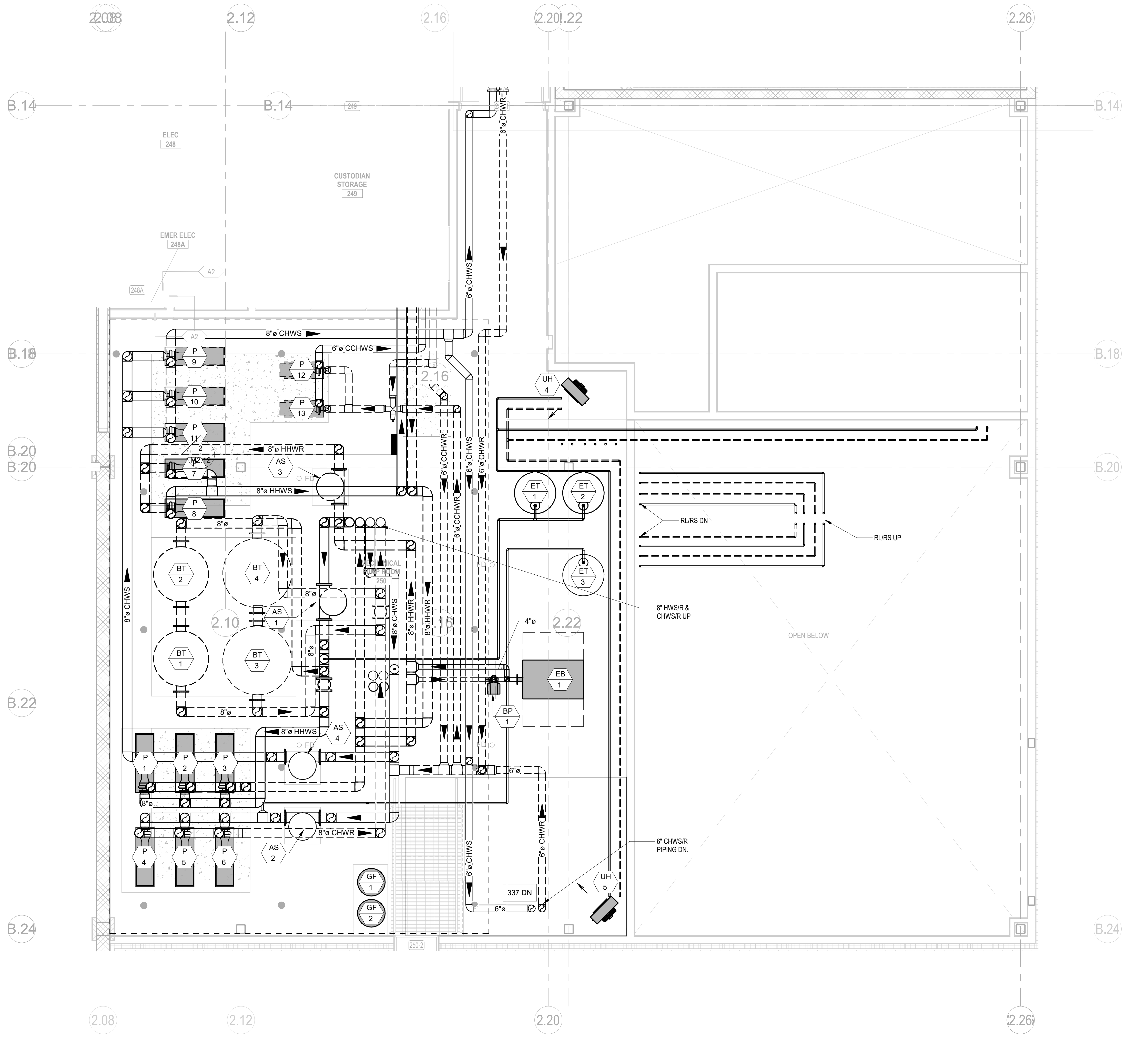
9/23/2026 4:17:18 PM



2 / M2.32 LEVEL 3 - HVAC PIPING - PART B
SCALE: 1/8" = 1'-0"



1 / M2.32 Enlarged Mechanical Room
SCALE: 1/4" = 1'-0"

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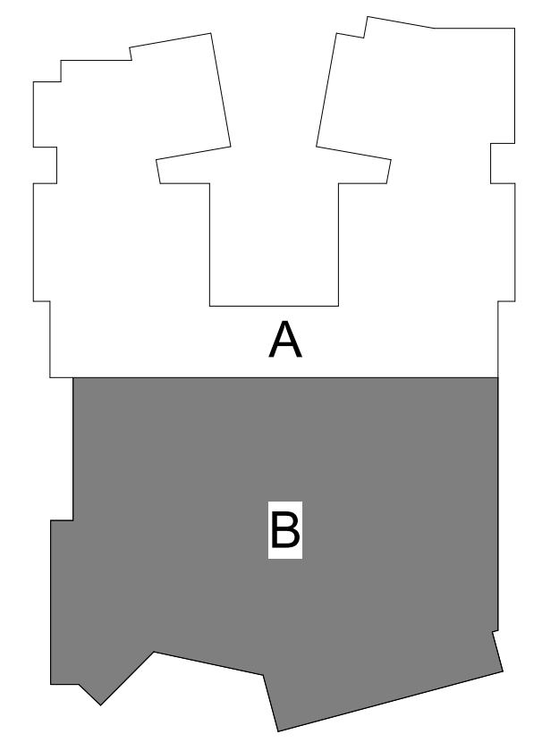


ORIENTATION AND SCALE:

N
TRUE NORTH
PROJECT NORTH

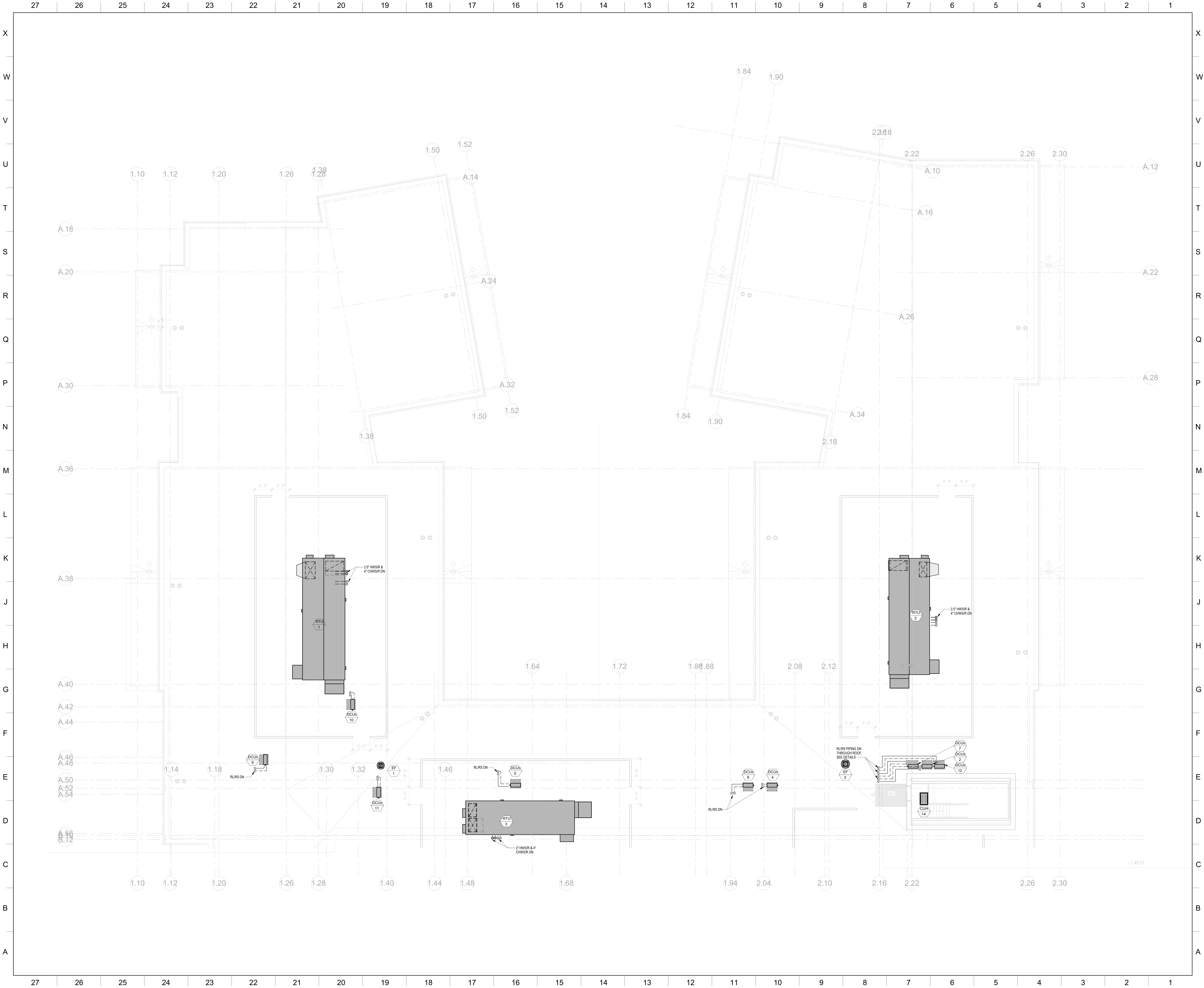
SCALE: AS INDICATED

SHEET TITLE:

LEVEL 3 AREA B - PIPING & ENLARGED MECH RM

SHEET NUMBER:

M2.32



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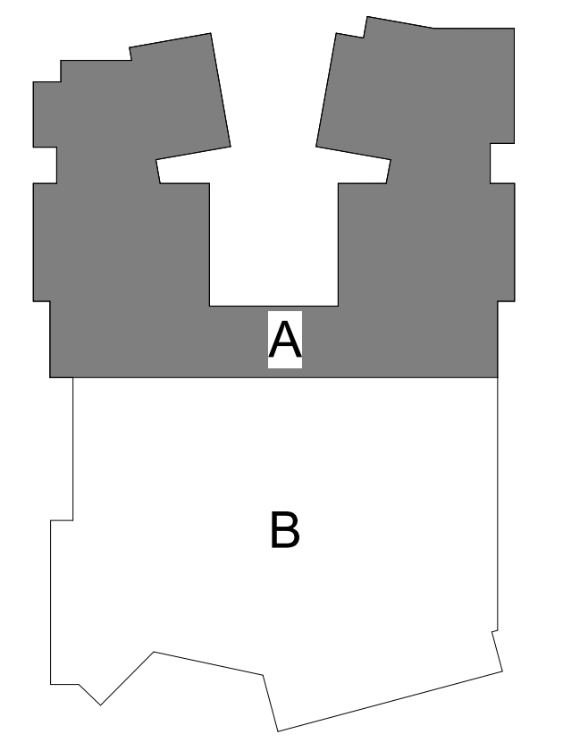

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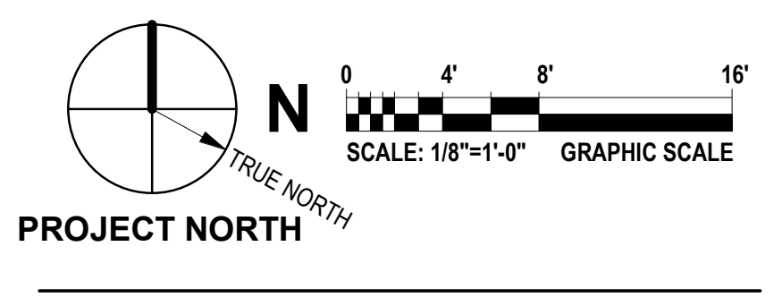

SHEET TITLE:
ROOF AREA A

SHEET NUMBER:
M3.11

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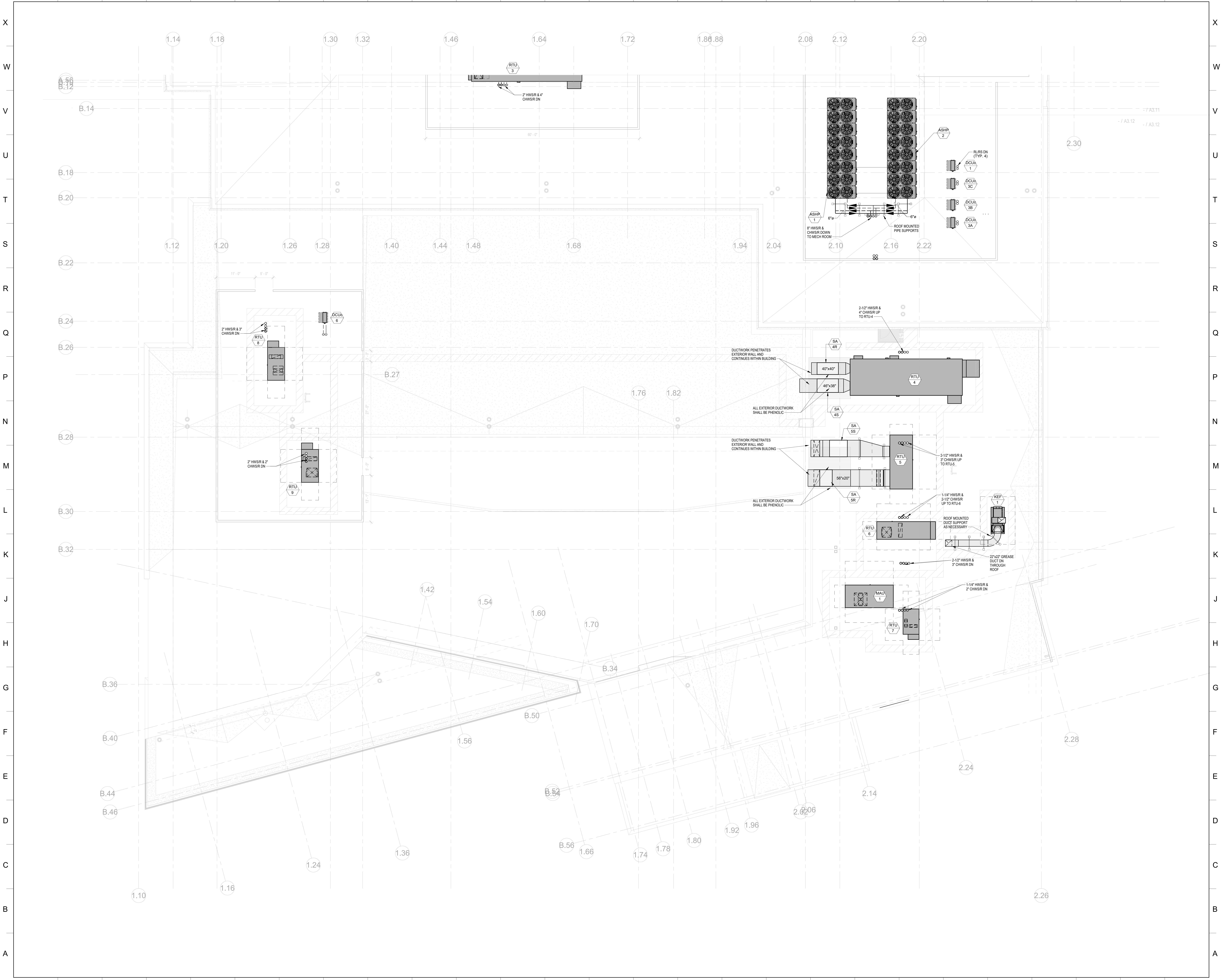
9/23/2026 4:17:24 PM


RTU 3
2" HWS/R & 4" CHWS/R DN
60' - 0"
ASHP 1
ASHP 2
6"ø
6"ø
8" HWS/R & CHWS/R DOWN TO MECH ROOM
ROOF MOUNTED PIPE SUPPORTS
RL/RS DN (TYP. 4)
DCUc 1
DCUc 3C
DCUc 3B
DCUc 3A
11' - 0"
5' - 0"
2" HWS/R & 3" CHWS/R DN
RTU 8
DCUc 6
2" HWS/R & 2" CHWS/R DN
RTU 9
2-1/2" HWS/R & 4" CHWS/R UP TO RTU-4
SA 4R
DUCTWORK PENETRATES EXTERIOR WALL AND CONTINUES WITHIN BUILDING
40"x40"
46"x38"
RTU 4
ALL EXTERIOR DUCTWORK SHALL BE PHENOLIC
SA 4S
SA 5S
DUCTWORK PENETRATES EXTERIOR WALL AND CONTINUES WITHIN BUILDING
RTU 5
2-1/2" HWS/R & 3" CHWS/R UP TO RTU-5
56"x20"
SA 5R
ALL EXTERIOR DUCTWORK SHALL BE PHENOLIC
1-1/4" HWS/R & 2-1/2" CHWS/R UP TO RTU-6
KEF 1
ROOF MOUNTED DUCT SUPPORT AS NECESSARY
RTU 6
22"x22" GREASE DUCT DN THROUGH ROOF
2-1/2" HWS/R & 3" CHWS/R DN
MAU 1
1-1/4" HWS/R & 2" CHWS/R DN
RTU 7

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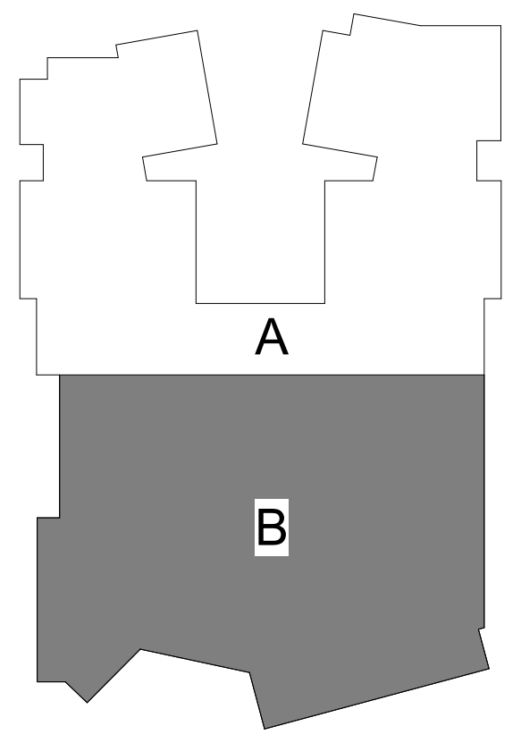

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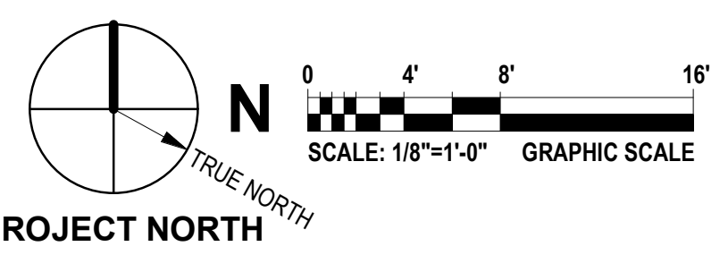
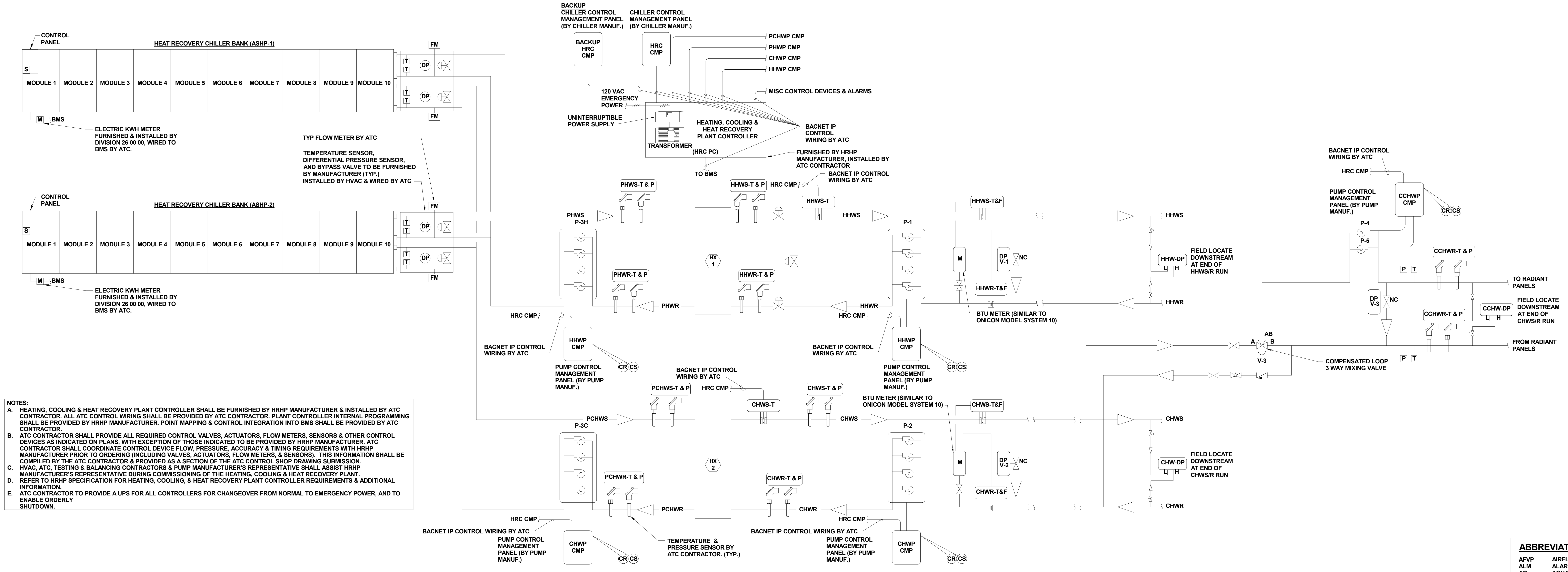


SHEET TITLE:
ROOF AREA B

SHEET NUMBER:
M3.12


CONTROL PANEL
HEAT RECOVERY CHILLER BANK (ASHP-1)
S
MODULE 1
MODULE 2
MODULE 3
MODULE 4
MODULE 5
MODULE 6
MODULE 7
MODULE 8
MODULE 9
MODULE 10
M
BMS
ELECTRIC KWH METER FURNISHED & INSTALLED BY DIVISION 26 00 00, WIRED TO BMS BY ATC.
CONTROL PANEL
HEAT RECOVERY CHILLER BANK (ASHP-2)
FM
T
DP
TYP FLOW METER BY ATC
TEMPERATURE SENSOR, DIFFERENTIAL PRESSURE SENSOR, AND BYPASS VALVE TO BE FURNISHED BY MANUFACTURER (TYP.) INSTALLED BY HVAC & WIRED BY ATC
BACKUP CHILLER CONTROL MANAGEMENT PANEL (BY CHILLER MANUF.)
CHILLER CONTROL MANAGEMENT PANEL (BY CHILLER MANUF.)
BACKUP HRC CMP
HRC CMP
PCHWP CMP
PHWP CMP
CHWP CMP
HHWP CMP
MISC CONTROL DEVICES & ALARMS
120 VAC EMERGENCY POWER
UNINTERRUPTIBLE POWER SUPPLY
TRANSFORMER
HEATING, COOLING & HEAT RECOVERY PLANT CONTROLLER
(HRC PC)
TO BMS
BACNET IP CONTROL WIRING BY ATC
FURNISHED BY HRHP MANUFACTURER, INSTALLED BY ATC CONTRACTOR
BACNET IP CONTROL WIRING BY ATC
PHWS-T & P
HHWS-T & P
HRC CMP
HHWS-T
PHWS
P-3H
HX 1
HHWS
P-1
HHWS-T&F
HHWS
PHWR-T & P
HHWR-T & P
PHWR
HHWR
M
DP V-1
NC
HHW-DP
L H
HHWR-T&F
FIELD LOCATE DOWNSTREAM AT END OF HHWS/R RUN
HHWR
BTU METER (SIMILAR TO ONICON MODEL SYSTEM 10)
HRC CMP
BACNET IP CONTROL WIRING BY ATC
HHWP CMP
CR CS
PUMP CONTROL MANAGEMENT PANEL (BY PUMP MANUF.)
PCHWS-T & P
CHWS-T & P
CHWS-T
PCHWS
P-3C
HX 2
CHWS
P-2
CHWS-T&F
CHWS
BTU METER (SIMILAR TO ONICON MODEL SYSTEM 10)
DP V-2
CHW-DP
FIELD LOCATE DOWNSTREAM AT END OF CHWS/R RUN
CHWR-T&F
PCHWR-T & P
CHWR-T & P
PCHWR
CHWR
CHWR
CHWP CMP
TEMPERATURE & PRESSURE SENSOR BY ATC CONTRACTOR. (TYP.)
BACNET IP CONTROL WIRING BY ATC
BACNET IP CONTROL WIRING BY ATC
HRC CMP
PUMP CONTROL MANAGEMENT PANEL (BY PUMP MANUF.)
CCHWP CMP
CR CS
P-4
P-5
CCHWR-T & P
TO RADIANT PANELS
P T
DP V-3
CCHW-DP
FIELD LOCATE DOWNSTREAM AT END OF CHWS/R RUN
CCHWR-T & P
AB
A
B
V-3
FROM RADIANT PANELS
COMPENSATED LOOP 3 WAY MIXING VALVE

NOTES:
- A. HEATING, COOLING & HEAT RECOVERY PLANT CONTROLLER SHALL BE FURNISHED BY HRHP MANUFACTURER & INSTALLED BY ATC CONTRACTOR. ALL ATC CONTROL WIRING SHALL BE PROVIDED BY ATC CONTRACTOR. PLANT CONTROLLER INTERNAL PROGRAMMING SHALL BE PROVIDED BY HRHP MANUFACTURER. POINT MAPPING & CONTROL INTEGRATION INTO BMS SHALL BE PROVIDED BY ATC CONTRACTOR.
- B. ATC CONTRACTOR SHALL PROVIDE ALL REQUIRED CONTROL VALVES, ACTUATORS, FLOW METERS, SENSORS & OTHER CONTROL DEVICES AS INDICATED ON PLANS, WITH EXCEPTION OF THOSE INDICATED TO BE PROVIDED BY HRHP MANUFACTURER. ATC CONTRACTOR SHALL COORDINATE CONTROL DEVICE FLOW, PRESSURE, ACCURACY & TIMING REQUIREMENTS WITH HRHP MANUFACTURER PRIOR TO ORDERING (INCLUDING VALVES, ACTUATORS, FLOW METERS, & SENSORS). THIS INFORMATION SHALL BE COMPILED BY THE ATC CONTRACTOR & PROVIDED AS A SECTION OF THE ATC CONTROL SHOP DRAWING SUBMISSION.
- C. HVAC, ATC, TESTING & BALANCING CONTRACTORS & PUMP MANUFACTURER'S REPRESENTATIVE SHALL ASSIST HRHP MANUFACTURER'S REPRESENTATIVE DURING COMMISSIONING OF THE HEATING, COOLING & HEAT RECOVERY PLANT.
- D. REFER TO HRHP SPECIFICATION FOR HEATING, COOLING, & HEAT RECOVERY PLANT CONTROLLER REQUIREMENTS & ADDITIONAL INFORMATION.
- E. ATC CONTRACTOR TO PROVIDE A UPS FOR ALL CONTROLLERS FOR CHANGEOVER FROM NORMAL TO EMERGENCY POWER, AND TO ENABLE ORDERLY SHUTDOWN.

SIMULTANEOUS HEATING AND COOLING MODULAR CHILLER WITH HEAT RECOVERY PLANT CONTROL

A DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE HEAT PUMP CHILLER PLANT OPERATION AS FOLLOWS:

HEAT RECOVERY OPERATION:

PROVIDES HOT WATER THROUGH THE CONDENSER LOOP WHILE SIMULTANEOUSLY PRODUCING CHILLED WATER THROUGH THE EVAPORATOR LOOP FOR THE CHILLER SYSTEM AND SHALL INCLUDE ALL NECESSARY SAFETY AND OPERATING CONTROLS FOR HIGH TEMPERATURE OPERATING RANGE.

SIMULTANEOUS HEATING/COOLING OPERATION :

MODULES SHALL OPERATE AS A SIMULTANEOUS HEATING AND COOLING BANK. MASTER CONTROL PANEL SHALL ENABLE BANK TO PRODUCE CHILLED AND HOT WATER. EVERY MODULE IN THE BANK SHALL BE SELECTABLE FOR COOLING, HEATING OR COOLING/HEATING OPERATION. IF THE CHILLED WATER (EVAPORATOR) OR HOT WATER (CONDENSER) IS NOT NEEDED FOR THE BUILDING LOAD THEN IT WILL BE DIVERTED IN THE MODULE TO BE SENT TO THE INTERNAL SOURCE HEADER AND NOT THE LOAD HEADERS.

EACH CHILLER BANK SHALL BE EQUIPPED WITH A DEDICATED STANDALONE DIRECT DIGITAL CONTROL (DDC) SYSTEM INCLUDING A MASTER CONTROLLER AND DISPLAY.

EACH MODULE CONTROL PANEL SHALL COMMUNICATE WITH THE MASTER CONTROLLER. THE MODULE CONTROL PANEL SHALL MONITOR AND CONTROL EACH REFRIGERATION SYSTEM IN RESPONSE TO COMMANDS BY THE MASTER COMPUTER. THE MASTER CONTROLLER SHALL HAVE A TERMINAL STRIP TO ACCEPT FIELD WIRED LOW VOLTAGE SYSTEM INTERLOCK SUCH AS FLOW SWITCHES, AUXILIARY CONTACTS, REMOTE START/STOP, COMMON ALARM OUTPUT, ETC. THE MASTER CONTROLLER SHALL BE PROVIDED BY THE UNIT MANUFACTURER FOR FIELD MOUNTING.

EACH MODULE IS EQUIPPED TO CONTROL ALL ALARM AND FAULT CONDITIONS PROTECTING THE COMPRESSOR AND FEED BACK INPUT CONDITIONS AND OUTPUT CONDITIONS TO THE MASTER CONTROLLER FOR IT TO MONITOR INDIVIDUAL CHILLER MODULE STATUS. THE MASTER CONTROLLER SHALL CONTINUALLY MONITOR ALL OF THE FOLLOWING AREAS FOR EACH INDIVIDUAL MODULE'S REFRIGERATION SYSTEM THROUGH DIGITAL SWITCHING:

(1) DISCHARGE PRESSURE CUTOUT.
(2) SUCTION PRESSURE CUTOUT.
(3) SOLID STATE COMPRESSOR MOTOR PROTECTION.
(4) EVAPORATOR LEAVING CHILLED WATER TEMPERATURE (FOR MODULE FREEZE PROTECTION).

THE MASTER CONTROLLER SHALL ADDITIONALLY MONITOR THE FOLLOWING AREAS: (

(5) EVAPORATOR LEAVING CHILLED WATER TEMPERATURE (FOR CHILLER CAPACITY CONTROL).
(6) EVAPORATOR ENTERING CHILLED WATER TEMPERATURE.
(7) PHASE LOSS (EACH PHASE).
(8) PHASE IMBALANCE AND PHASE REVERSAL.
(9) OVER-/UNDER VOLTAGE.
(10) EVAPORATOR FLOW STATUS.
(11) CONDENSER FLOW STATUS.
(12) CONDENSER ENTERING WATER TEMPERATURE.
(13) CONDENSER LEAVING WATER TEMPERATURE.

A POTENTIALLY UNSAFE (OUT OF TOLERANCE) CONDITION FROM ANY OF THESE CONTROLS OR SENSORS SHALL CAUSE A "FAULT" SHUTDOWN OF THAT COMPRESSOR WITH AN AUTOMATIC TRANSFER OF LOAD REQUIREMENTS TO ANOTHER AVAILABLE COMPRESSOR. A RUNNING HISTORY OF THE COMPLETE FAULT OCCURRENCE CONDITIONS SHALL BE AUTOMATICALLY MAINTAINED (UP TO THE LAST 20 OCCURRENCES) SHOULD IT EVER BE REQUIRED FOR TROUBLESHOOTING.

CONTINUOUS INDIVIDUAL MONITORING OF LEAVING CHILLED WATER TEMPERATURE FROM EACH MODULE'S REFRIGERATION SYSTEM SHALL PROVIDE PROTECTION AGAINST FREEZE-UP IN THE EVENT OF UNUSUAL, UNEXPECTED OPERATING CONDITIONS.

THE MASTER CONTROLLER MUST LEAD/LAG THE DUAL SCROLL COMPRESSORS, BALANCE THE RUN TIME, PREVENT SHORT CYCLING OF COMPRESSORS, AND REGISTER THE LAST 20 FAILURE OCCURRENCES. FAULT CONDITIONS MUST BE ALARMED SO THE COMPRESSOR CAN BE TAKEN OFF LINE. BOTH ALARM AND FAILED CONDITIONS MUST BE DISPLAYED ON DIGITAL DISPLAY ON FRONT OF THE MASTER CONTROL PANEL. AN ALARM RELAY FOR REMOTE INDICATION OF FAULTS AND FAILED CONDITIONS WITH A NORMALLY OPEN AND NORMALLY CLOSED DRY CONTACT MUST BE SUPPLIED. THE OPERATING CONTROL OF CHILLED WATER OUTLET TEMPERATURE MUST BE ABLE TO BE RESET REMOTELY WITH A 4_20MA INPUT SIGNAL. STAGING OF THE ALL SCROLL COMPRESSORS, LEAD/LAG OF THE COMPRESSORS, EQUALIZE RUNTIME OF COMPRESSORS AND PREVENTING COMPRESSOR SHORT CYCLING WILL BE DONE BY THE MASTER CONTROLLER. COMPRESSOR STAGING IS ACCOMPLISHED THROUGH PID CONTROL LOGIC, ADJUSTABLE IN RESPONSE TIMES AND SETTINGS. THE SYSTEM SHALL PROVIDE FOR VARIABLE TIME BETWEEN COMPRESSOR SEQUENCING AND TEMPERATURE SENSING. INPUTS/OUTPUTS TO THE MASTER CONTROLLER INCLUDE:

1. REMOTE START/STOP
2. CHILLER FAILURE OUTPUT (NOTE: CHILLER IS COMPRISED OF ONE OR MORE MODULES- EACH MODULE WILL INDICATE ITS OWN INDIVIDUAL FAILURE AT THE CHILLER. THE "CHILLER FAILURE" INDICATION IS A REMOTE SIGNAL SENT REMOTELY TO INDICATE THAT THE CHILLER HAS HAD SUFFICIENT MODULES FAIL THAT OPERATION OF THE CHILLER WILL NOT BE BENEFICIAL. THIS FAILURE SIGNAL SHALL BE CAPABLE OF ADJUSTING TO PROVIDE A FAILURE SIGNAL ACCORDING TO THE PERCENTAGE OF CAPACITY THAT HAS FAILED.)
3. EVAPORATOR FLOW STATUS (PROVIDED BY DIFFERENTIAL PRESSURE SWITCH)
4. CONDENSER FLOW STATUS (PROVIDED BY DIFFERENTIAL PRESSURE SWITCH)
5. ENTERING AND LEAVING WATER TEMPERATURES OF THE EVAPORATOR ANDGEOTHERMAL WATER MAINS CONNECTED TO THE CHILLER BANK.
6. BAS INTERFACE - BACNET INTERFACE SHALL BE PROVIDED FOR COMMUNICATION TO BUILDING AUTOMATION SYSTEM

A MOTORIZED VALVE SHALL BE PROVIDED TO MAINTAIN PROPER FLOW THRU EACH OPERATING MODULE. SOLENOID OR ON/OFF VALVES ARE NOT ACCEPTABLE FOR VARIABLE FLOW APPLICATIONS.

CHILLER SAFETY CONTROLS SYSTEM SHALL BE PROVIDED WITH THE UNIT (MINIMUM) AS FOLLOWS:

1. LOW EVAPORATOR REFRIGERANT PRESSURE.
2. LOSS OF FLOW THROUGH THE EVAPORATOR
3. LOSS OF FLOW THROUGH THE CONDENSER.
4. HIGH CONDENSER REFRIGERANT PRESSURE
5. HIGH COMPRESSOR MOTOR TEMPERATURE-
6. LOW LEAVING EVAPORATOR WATER TEMPERATURE
7. FAILURE OF CHILLER TO START OR CHILLER SHUTDOWN DUE TO ANY OF THE ABOVE SAFETY CUTOUTS SHALL BE ENUNCIATED BY DISPLAY OF THE APPROPRIATE DIAGNOSTIC DESCRIPTION AT THE UNIT CONTROL PANEL. THIS ANNUNCIATION WILL BE IN PLAIN ENGLISH- ALPHANUMERIC CODES SHALL BE UNACCEPTABLE.

THE CHILLER SHALL BE FURNISHED WITH A MASTER CONTROLLER AS AN INTEGRAL PORTION OF THE CHILLER CONTROL CIRCUITRY TO PROVIDE THE FOLLOWING FUNCTIONS:

1. PROVIDE AUTOMATIC CHILLER SHUTDOWN DURING PERIODS WHEN THE LOAD LEVEL DECREASES BELOW THE NORMAL OPERATING REQUIREMENTS OF THE CHILLER. UPON AN INCREASE IN LOAD, THE CHILLER SHALL AUTOMATICALLY RESTART.
2. PROVISIONS FOR CONNECTION TO AUTOMATICALLY ENABLE THE CHILLER FROM A REMOTE ENERGY MANAGEMENT SYSTEM.
3. THE CHILLER CONTROLLER SHALL UTILIZE THE INTEGRAL MOTORIZED VALVES TO THROTTLE BACK FLOW AND MAINTAIN HEAD PRESSURE IN THE CASE OF THE SOURCE RETURN WATER TEMPS GOING OUTSIDE 'NORMAL' OPERATION.

RESET SCHEDULES:

AN ADJUSTABLE HOT WATER TEMPERATURE RESET SCHEDULE, THROUGH THE CHILLER CONTROL SYSTEM, WILL RESET THE HEATING HOT WATER SUPPLY TEMPERATURE TO MAINTAIN A SUPPLY WATER OF 130 DEGREES AT A 0 DEGREE OUTSIDE AIR TEMPERATURE. AS THE OUTSIDE AIR TEMPERATURE RISES TO 55 DEGREES, THE SUPPLY WATER TEMPERATURE WILL BE RESET BY THE CHILLER MANAGEMENT CONTROL SYSTEM TO RUN AT A SUPPLY WATER TEMPERATURE OF 100 DEGREES. THE RELATIONSHIP BETWEEN OUTDOOR AIR TEMPERATURE & HHWS SETPOINT SHALL BE LINEAR.

AN ADJUSTABLE CHILLED WATER TEMPERATURE WATER RESET SCHEDULE, THROUGH THE CHILLER CONTROL SYSTEM, WILL RESET THE CHILLED WATER SUPPLY TEMPERATURE TO MAINTAIN A SUPPLY WATER OF 45 DEGREES AT A 91 DEGREE OUTSIDE AIR TEMPERATURE. AS THE OUTSIDE AIR TEMPERATURE LOWERS TO 55 DEGREES, THE SUPPLY WATER TEMPERATURE WILL BE RESET BY THE CHILLER MANAGEMENT CONTROL SYSTEM TO RUN AT A SUPPLY WATER TEMPERATURE OF 55 DEGREES. THE RELATIONSHIP BETWEEN OUTDOOR AIR TEMPERATURE & CHWS SETPOINT SHALL BE LINEAR.

HEAT RECOVERY CHILLER PRIMARY PUMP CONTROL (PUMP CONTROL FROM CHILLER HEADER DIFFERENTIAL PRESSURE (DP) SET POINT):

UPON A CALL FOR COOLING OR HEATING, THE AIR SOURCE HEAT PUMP CHILLER PRIMARY CHILLED WATER OR PRIMARY HEATING HOT WATER PUMP SHALL ENERGIZE AND THE PUMP SPEED WILL INCREASE OR DECREASE TO MAINTAIN THE SUBMITTED DP VALUE ACROSS THE HEAT RECOVERY CHILLER DP SENSOR. THERE SHALL BE A 5 MINUTE DELAY BETWEEN PUMP ENABLE AND CHILLER ENABLE. PUMPS SHALL CONTROL TO DIFFERENTIAL PRESSURE ACROSS THE CHILLER ON BOTH THE EVAPORATOR AND CONDENSER SIDE. THE AIR SOURCE HEAT PUMP BYPASS VALVE SHALL MODULATE OPEN TO THE MINIMUM BYPASS POSITION WHEN NO COMPRESSORS ARE RUNNING IN HEATING OR COOLING MODE.

WHEN OUTSIDE AIR TEMPERATURE IS LESS THEN 35 DEGREES (ADJ) AND THE CHILLER HAS BEEN DISABLED FOR 1 HOUR (ADJ.), THE PRIMARY PUMP ARRAYS P-3C & P-3H SHALL BE ACTIVATED FOR 5 MIN (ADJ) EVERY HOUR (ADJ) FOR FREEZE PROTECTION.

BUILDING (LOAD SIDE) SECONDARY PUMP CONTROL (PUMP CONTROL FROM BUILDING DIFFERENTIAL PRESSURE (DP) SET POINT):

THE BUILDING SYSTEM DP SET POINT WILL MAINTAIN THE PUMP SPEED, PROPORTIONALLY DECREASING PUMP SPEED WHEN THE SYSTEM DP SENSOR DP IS HIGH (WHEN SOME LOAD VALVES ARE CLOSED) AND PROPORTIONALLY INCREASING PUMP SPEED WHEN THE SYSTEM DP IS LOW (AS THE LOAD SIDE VALVES ARE OPENING). WHEN THE LOAD SIDE VALVES ARE OPEN (PUMP SPEED IS INCREASED), THIS INTRODUCES ADDITIONAL LOAD TO THE CHILLER CAUSING IT TO STAGE UP TO MEET THIS INCREASED LOAD DEMAND. MEANWHILE, THE BUILDING SYSTEM BYPASS VALVE MONITORS FIELD SUPPLIED AND INSTALLED DP SENSORS THE SYSTEM BYPASS VALVE SHALL OPEN PROPORTIONALLY, TO MAINTAIN MINIMUM MINIMUM HHW AND CHW PUMP SPEED, 30% (ADJ). WHEN THERE IS NO CALL FOR COOLING OR HEATING IN THE BUILDING, THE ASSOCIATED CHILLED OR HEATING HOT WATER PUMPS SHALL DE-ENERGIZE. EACH PUMP SHALL ALSO BE CAPABLE OF DUTY CYCLING WHICH WILL BE AUTOMATICALLY CONTROLLED THROUGH THE DDC SYSTEM AND ROTATE ON A WEEKLY BASIS ON EQUALIZING THE RUN TIME OF THE PUMPS.

COMPENSATED RADIANT PANEL CHILLED WATER LOOPS:

ON A CALL FOR COMPENSATED CHILLED WATER, THE COMPENSATED LOOP PUMPS SHALL ENERGIZE AND CIRCULATE WATER TO THE CHILLED WATER RADIANT PANELS. THE PUMP SHALL MODULATE TO MAINTAIN THE DIFFERENTIAL PRESSURE CONTROL SETPOINT, SETPOINT SHALL BE FIELD DETERMINED BY ATC/TAB CONTRACTOR AND SHALL BE ADJUSTABLE. THE DIFFERENTIAL PRESSURE BYPASS VALVE SHALL MODULATE OPEN WHEN PUMPS ARE AT MINIMUM SPEED AND THE DIFFERENTIAL PRESSURE IS ABOVE SETPOINT. EACH PUMP SHALL ALSO BE CAPABLE OF DUTY CYCLING WHICH WILL BE AUTOMATICALLY CONTROLLED THROUGH THE DDC SYSTEM AND ROTATE ON A WEEKLY BASIS ON EQUALIZING THE RUN TIME OF THE PUMPS. THE THREE WAY MIXING VALVE V-3 ON THE COMPENSATED LOOP SHALL MODULATE TO MAINTAIN A SUPPLY TEMP OF 55 DEG. F. IN THE EVENT THAT THE RTU SENSES A HIGH RETURN AIR HUMIDITY LEVEL OF 70% RH (ADJ.) FOR A PERIOD OF 30 MIN. (ADJ.) , THE DIVERTING VALVE SHALL RESET TO 60 DEG. F (ADJ.).

EMERGENCY POWER SEQUENCE:

UPON A LOSS OF BUILDING NORMAL POWER AND WHILE OPERATING UNDER EMERGENCY POWER THE HEAT RECOVERY AIR SOURCE HEAT PUMP SYSTEM SHALL BE DISABLED. THE FOLLOWING SHALL OCCUR:

1. THE ASHP SHALL BE LOCKED OUT BY THE BMS. (1) ELECTRIC BOILER SHALL BE ENABLED AND RUN TO MAINTAIN THE BUILDING LOOP TEMPERATURE.
2. THE (2) HX ISOLATION VALVES SHALL CLOSE, AND THE HX BYPASS VALVE SHALL OPEN.
3. THE P-1 SECONDARY HOT WATER PUMPS SHALL OPERATE; OTHER PUMPS SHALL BE LOCKED OUT THROUGH THE BMS.
4. THE PRIMARY WATER PUMPS SHALL CYCLE ON FOR (5) MINUTES (ADJ.) EVERY (1) HOUR (ADJ.) FOR FREEZE PREVENTION. OTHER PUMPS SHALL BE LOCKED OUT THROUGH THE BMS.
5. THE CHILLED WATER PUMPS SHALL BE OFF.

HEAT PUMP SYSTEM LOAD SHED SEQUENCE FOR EXTREME WEATHER CONDITIONS

COOLING:

FIRST STAGE - UPON AN INCREASE IN THE CHILLED WATER SUPPLY TEMPERATURE (CHWS) TO THE BUILDING OF 10 DEG F (ADJ) ABOVE SETPOINT, AN ALARM SHALL GENERATE AND THE DESIGNATED PRIORITY LEVEL OF ROOFTOP UNIT ZONES SHALL ENTER THE LOAD SHED SEQUENCE AS FOLLOWS:

STEP 1: PRIORITY LEVELS 1 & 2 RTU ZONES - NO CHANGE IN DESIGN SEQUENCE OR SPACE TEMPERATURE SETPOINTS
STEP 2: PRIORITY LEVEL 3 RTU ZONES - INCREASE SPACE COOLING TEMPERATURE SETPOINT FOR THESE RTU ZONES BY 2° F (ADJ)
STEP 3: PRIORITY LEVEL 2 RTU ZONES - IF THE CHWS TEMPERATURE DOES NOT FALL BACK TO THE INITIAL DESIGN SETPOINT AFTER STEP 2, INCREASE SPACE TEMPERATURE SETPOINT FOR THESE RTU ZONES BY 2° F (ADJ)

SECOND STAGE - UPON A CONTINUED INCREASE IN THE CHILLED WATER SUPPLY TEMPERATURE (CHWS) TO THE BUILDING OF 20° F (ADJ) ABOVE SETPOINT, AN ALARM SHALL GENERATE AND THE DESIGNATED PRIORITY LEVEL OF ROOFTOP UNIT ZONES SHALL ENTER THE LOAD SHED SEQUENCE AS FOLLOWS:

STEP 1: PRIORITY LEVEL 1 RTU ZONES - NO CHANGE IN DESIGN SEQUENCE OR SPACE TEMPERATURE SETPOINTS
STEP 2: PRIORITY LEVEL 2 RTU ZONES - NO CHANGE IN SEQUENCE OR SPACE TEMPERATURE SETPOINTS BEYOND THOSE OUTLINED IN FIRST STAGE
STEP 3: LOAD SHED SETPOINTS STEP 3: PRIORITY LEVEL 3 RTU ZONES - INCREASE SPACE COOLING TEMPERATURE SETPOINT FOR THESE RTU ZONES BY 2 DEG F (ADJ) ABOVE THE FIRST STAGE LOAD SHED SETPOINT
STEP 4: PRIORITY LEVEL 2 RTU ZONES - IF THE GWST DOES NOT FALL BACK TO FIRST STAGE LOAD SHED SETPOINTS AFTER STEP 3, INCREASE SPACE COOLING TEMPERATURE SETPOINT FOR THESE RTU ZONES BY 2° F (ADJ) ABOVE THE FIRST STAGE LOAD SHED SETPOINT

HEATING:

FIRST STAGE - UPON A DECREASE IN THE HOT WATER SUPPLY TEMPERATURE (HWST) TO THE BUILDING OF 10° F (ADJ) BELOW SETPOINT, AN ALARM SHALL GENERATE AND THE DESIGNATED PRIORITY LEVEL OF ROOFTOP UNIT ZONES SHALL ENTER THE LOAD SHED SEQUENCE AS FOLLOWS:

STEP 1: PRIORITY LEVELS 1 & 2 RTU ZONES - NO CHANGE IN DESIGN SEQUENCE OR SPACE TEMPERATURE SETPOINTS
STEP 2: PRIORITY LEVEL 3 RTU ZONES - DECREASE SPACE HEATING TEMPERATURE SETPOINT FOR THESE RTU ZONES BY 2° F (ADJ)
STEP 3: PRIORITY LEVEL 2 RTU ZONES - IF THE HWS TEMPERATURE DOES NOT FALL BACK TO THE INITIAL DESIGN SETPOINT AFTER STEP 2, DECREASE SPACE TEMPERATURE SETPOINT FOR THESE RTU ZONES BY 2° F (ADJ)

SECOND STAGE - UPON A CONTINUED DECREASE IN THE HOT WATER SUPPLY TEMPERATURE (HWST) TO THE BUILDING OF 15° F (ADJ) BELOW SETPOINT, AN ALARM SHALL GENERATE AND THE DESIGNATED PRIORITY LEVEL OF ROOFTOP UNIT ZONES SHALL ENTER THE LOAD SHED SEQUENCE AS FOLLOWS:

STEP 1: PRIORITY LEVEL 1 RTU ZONES - NO CHANGE IN DESIGN SEQUENCE OR SPACE TEMPERATURE SETPOINTS
STEP 2: PRIORITY LEVEL 2 RTU ZONES - NO CHANGE IN SEQUENCE OR SPACE TEMPERATURE SETPOINTS BEYOND THOSE OUTLINED IN FIRST STAGE
STEP 3: PRIORITY LEVEL 3 RTU ZONES - DECREASE SPACE HEATING TEMPERATURE SETPOINT FOR THESE RTU ZONES BY 2 DEG F (ADJ) ABOVE THE FIRST STAGE LOAD SHED SETPOINT
STEP 4: PRIORITY LEVEL 2 RTU ZONES - IF THE HWST DOES NOT FALL BACK TO FIRST STAGE LOAD SHED SETPOINTS AFTER STEP 3, DECREASE SPACE HEATING TEMPERATURE SETPOINT FOR THESE RTU ZONES BY 2 DEG F (ADJ) ABOVE THE FIRST STAGE LOAD SHED SETPOINT

HEAT RECOVERY SYSTEM LOAD SHED PRIORITY LEVEL ZONING	
PRIORITY LEVEL	RTU ZONES
1	CLASSROOMS
2	GYM, CAFETERIA, SHOPS, LOCKER ROOMS
3	ADMIN, MEDIA CENTER

* ABOVE IS THE SUGGESTED ZONING, FINAL PRIORITIZATION SCHEDULE SHALL BE COORDINATED W/ OWNER PRIOR TO PROGRAMMING. PRIORITY LEVEL ASSOCIATIONS SHALL BE ADJUSTABLE.

THIRD STAGE - UPON A CONTINUED DECREASE IN THE HOT WATER SUPPLY TEMPERATURE (HWST) TO THE BUILDING 20 DEG F (ADJ) BELOW SETPOINT, AN ALARM SHALL GENERATE AND THE DESIGNATED PRIORITY LEVEL OF ROOFTOP UNIT ZONES SHALL ENTER THE LOAD SHED SEQUENCE AS FOLLOWS:

STEP 1: PRIORITY LEVEL 1 RTU ZONES - NO CHANGE IN DESIGN SEQUENCE OR SPACE TEMPERATURE SETPOINTS
STEP 2: PRIORITY LEVEL 2 RTU ZONES - NO CHANGE IN SEQUENCE OR SPACE TEMPERATURE SETPOINTS BEYOND THOSE OUTLINED IN SECOND STAGE STEP 4 LOAD SHED SETPOINTS
STEP 3: PRIORITY LEVEL 3 RTU ZONES - MAINTAIN UNOCCUPIED SPACE COOLING TEMPERATURE SETPOINT FOR THESE RTU ZONES

LOW LOAD ISSUE PREVENTION:

INCREASE THE COMPRESSOR STAGING BANDWIDTH TO PREVENT EXCESSIVE COMPRESSOR CYCLING AT LOW LOAD FOR BOTH HOT WATER AND CHILLED WATER.

ONCE A WEEK, SET MINIMUM BYPASS TO 100% FOR 5 MINUTES TO FLOW WATER THROUGH THE ENTIRE MACHINE, DISABLE HEATING AND COOLING WHEN THIS OCCURS AND ONLY PERFORM THE FLUSH OVERNIGHT AT 2AM.

HEAT RECOVERY HEAT PUMP CHILLER PLANT	AI	AO	DI	DO	ALARM	REMARKS
HRHP BANK S/S & STATUS (EACH MODULE)			X	X	X	
PUMP S/S & STATUS (EACH)			X	X	X	ALL CHW, PCHW, PHW, HHW, EBP
PUMP SPEED (EACH)	X	X			X	ALL CHW, PCHW, PHW, HHW, EBP
CHWS TEMPERATURE	X	X			X	
CHWR TEMPERATURE	X					
CHW BTU ENERGY METER	X	X			X	
CHW DIFF PRESSURE BYPASS VALVE	X	X			X	W/ POS. FEEDBACK
CHWS PRESSURE	X					
CHWR PRESSURE	X					
EACH PUMP ARRAY CONTROLLER	X	X	X	X	X	ALL CHW, PCHW, PHW, HHW - BACNET IP
OUTSIDE AIR TEMP.	X					FROM CENTRAL POINT
OUTSIDE AIR % RH	X	X				FROM CENTRAL POINT
HHWS TEMPERATURE	X				X	
HHWR TEMPERATURE	X					
HHW BTU ENERGY METER	X	X			X	
HHW DIFF PRESSURE BYPASS VALVE	X	X			X	W/ POS. FEEDBACK
HHWS PRESSURE	X					
HHWR PRESSURE	X					
PHWS PRESSURE	X					
PHWR PRESSURE	X					
PHWS TEMPERATURE	X	X			X	
PHWR TEMPERATURE	X					
PHW BYPASS VALVE	X	X			X	W/ POS. FEEDBACK
PHW BTU ENERGY METER	X	X			X	
PCHWS PRESSURE	X					
PCHWR PRESSURE	X					
PCHWS TEMPERATURE	X	X			X	
PCHWR TEMPERATURE	X					
PCHW BYPASS VALVE	X	X			X	W/ POS. FEEDBACK
PCHW BTU ENERGY METER	X	X			X	
CCHWS PRESSURE	X					
CCHWR PRESSURE	X					
CCHWS TEMPERATURE	X	X			X	
CCHWR TEMPERATURE	X					
COMPENSATED LOOP 3-WAY VALVE	X	X			X	W/ POS. FEEDBACK
HRHP DP (CHW/HHW)	X					
HRHP TEMPERATURE (CHW/HHW)	X					
HRHP DIFFERENTIAL BYPASS VALVE	X	X			X	W/ POS. FEEDBACK
HRHP FLOW METER (CHW/HHW)	X					BY ATC
REFRIGERANT MONITORING MAKE UP AIR DAMPER	X	X				W/ POS. FEEDBACK
LOOP DIFFERENTIAL PRESSURE (HHW, CHW, CCHW)	X					
CCHW DIFF PRESSURE BYPASS VALVE	X	X			X	W/ POS. FEEDBACK

NOTES:
1. POINT LIST DOES NOT INCLUDE INTEGRAL COMPONENTS INTEGRAL OF THE CHILLERS (I.E. ISOLATION VALVES, ETC.) THAT WILL BE CONTROLLED BY THE CHILLER CONTROL PANEL PROVIDED BY THE MANUFACTURER.
2. POINT MAP ALARMS FROM ALL HRC, BOILERS, & PUMPS INTO BMS FOR GRAPHICAL DISPLAY.
3. ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE.
4. REFER TO HEAT PUMP MANUFACTURER BACNET POINT LIST IN SPECIFICATION FOR POINTS OWNED BY HEAT PUMP MASTER CONTROLLER.
5. REFER TO CONTROL DIAGRAM & SEQUENCES FOR SENSOR QUANTITIES & CONTROL DEVICES.
6. FOR ALL ABSOLUTE PRESSURE SENSORS LOCATED ACROSS HEAT EXCHANGERS, PROVIDE THE PRESSURE READING, ALONG WITH CALCULATED DIFFERENTIAL PRESSURE.

ABBREVIATIONS

AFVP	AIRFLOW VELOCITY PROBE
ALM	ALARM
AQ	AQUASTAT
ATC	AUTOMATIC TEMPERATURE CONTROLS
BLDG	BUILDING
BLR	BOILER
BMS	BUILDING MANAGEMENT SYSTEM (ENERGY & AUTOMATION)
CCHWS	COMPENSATED CHILLED WATER SUPPLY
CCHWR	COMPENSATED CHILLED WATER RETURN
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CM	CONSTRUCTION MANAGER
CMP	CONTROL MANAGEMENT PANEL
COMB	COMBUSTION
CONTR	CONTROLLER
CO2	CARBON DIOXIDE
CR	CONTROL RELAY
CS	CURRENT SENSOR
CUV	CABINET UNIT VENTILATOR
D	DAMPER
DA	DISCHARGE AIR
DAS	DISCHARGE AIR SENSOR
DAT	DISCHARGE AIR TEMPERATURE
DCV	DEMAND CONTROL VENTILATION
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DDC	DIRECT DIGITAL CONTROL
DO	DAMPER OPERATOR
DP	DIFFERENTIAL PRESSURE
DPR	DAMPER
DPV	DIFFERENTIAL PRESSURE VALVE
EA	EXHAUST AIR
EF	EXHAUST FAN
F	FLOW/FARENHEIT (AS APPLICABLE)
FB	FACE & BYPASS
FD	FIRE DAMPER
H	HUMIDITY
HS	ENTHALPY SENSOR
HT	HIGH TEMPERATURE
HTG	HEATING
HR	HEAT RECOVERY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LT	LOW TEMPERATURE
M	MOTOR
MAT	MIXED AIR TEMPERATURE
NAC	NETWORK APPLICATION CONTROLLER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OVR	OVERRIDE
P	PRESSURE
PB	PUSH BUTTON
PCHW	PRIMARY CHILLED WATER
PHW	PRIMARY HOT WATER
PNL	PANEL
RA	RETURN AIR
REL	RELIEF AIR
RF	RETURN FAN
RFC	RETURN FAN CONTROLLER
RM	ROOM
SA	SUPPLY AIR
SD	SMOKE DAMPER OR SMOKE DETECTOR
SF	SUPPLY FAN
SFC	SUPPLY FAN CONTROLLER
SP	STATIC PRESSURE
T	TEMPERATURE
TEC	TERMINAL EQUIPMENT CONTROLLER
VAC	VOLTS - ALTERNATING CURRENT
VDC	VOLTS - DIRECT CURRENT
VFD	SEE VSD
VLV	VALVE
VP	VELOCITY PROBE (AIRFLOW)
VSD	VARIABLE SPEED (FREQUENCY) DRIVE
XFMR	TRANSFORMER

ATC/BMS GENERAL NOTES

1. ALL SETPOINTS INDICATED IN THE SEQUENCE OF OPERATIONS SHALL BE ADJUSTABLE ON GRAPHICAL INTERFACE.
2. THE CONTROL POINTS LISTED IN THE SUMMARY MATRIX ARE THE MINIMUM CONTROL POINTS REQUIRED. ATC CONTRACTOR SHALL PROVIDE ALL CONTROL POINTS AS REQUIRED FOR COMPLETE SYSTEM CONTROL PER THE SEQUENCE OF OPERATIONS.
3. ALL CONTROL WIRING, SENSORS, RELAYS, CONTROLLERS, PANELS, DAMPERS, ACTUATORS, ETC. INDICATED ON THE CONTROL DIAGRAMS SHALL BE PROVIDED BY THE ATC CONTRACTOR UNLESS NOTED OTHERWISE.
4. ALL HHW VALVES SHALL BE FAIL OPEN ON LOSS OF POWER.
5. ALL HHW WATER VALVES SHALL BE MODULATING TYPE FOR GPM > 2.0; 2-POSITION ACCEPTABLE FOR FLOWS < 2.0 GPM
6. ATC CONTRACTOR TO COORDINATE W/ OWNER FOR ALL COMMUNICATION & INTERFACE REQUIREMENTS TO CENTRAL OPERATING STATION. REFER TO SPEC FOR FURTHER INFO.
7. DUCT SMOKE DETECTORS INDICATED ARE TO BE FURNISHED BY DIV. 260000 & INSTALLED BY HVAC CONTRACTOR. POWER WIRING AND FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR TO PROVIDE BMS INTERLOCK TO SHUT ASSOCIATED UNIT DOWN AND INITIATE AN ALARM UPON ACTIVATION
8. ALL SMOKE DAMPERS SHALL BE COMBINATION SMOKE/FIRE DAMPERS, SHALL BE FURNISHED & INSTALLED BY HVAC CONTRACTOR, AND POWER WIRED BY ELECTRICAL CONTRACTOR. DAMPERS SHALL BE MOTOR OPERATED WITH 24 VOLT / 120 VOLT ACTUATOR. FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. DAMPER ENDSWITCH INTEGRATION TO BMS BY ATC CONTRACTOR.
9. ALL ATC CONTROLS SHALL BE POWER WIRED FROM THE MAIN ATC PANEL, OR SUB ATC PANEL. EACH ATC PANEL AND SUB ATC PANEL SHALL BE FED BY EMERGENCY POWER VIA DESIGNATED EMERGENCY POWER JUNCTION BOXES LOCATED ON THE ELECTRICAL DRAWINGS. ALL PANELS SHALL BE PROVIDED BY ATC CONTRACTOR. ALL UNIT CONTROLS SHALL BE FED BY THE MAIN ATC PANEL OR, SUB ATC PANEL, & NOT THROUGH THE UNIT'S MAIN POWER SOURCE. ATC CONTRACTOR SHALL PROVIDE EMERGENCY POWER FEEDER FROM THE ELECTRICAL EMERGENCY POWER PANELS TO ANY AND ALL ATC PANELS/SUB PANELS. THEREFORE ALL CONTROLS SHALL BE ON EMERGENCY POWER. ATC CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR TO DETERMINE WHERE EMERGENCY POWER MAY BE DERIVED FROM.
10. ALL DENSELY OCCUPIED SPACES WITH OCCUPANT DENSITY OF 25 PEOPLE OR MORE PER 1000 SQ/FT SHALL BE PROVIDED W/ ROOM LEVEL TEMPERATURE, CO2, & HUMIDITY SENSORS W/ CO2 CONTROL. THIS SHALL BE PROVIDED IN COMPLIANCE WITH LEED v.4 CREDIT IEQC1. (PROVIDED BY FMS CONTRACTOR & INSTALLED BY ATC CONTRACTOR)

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PROJECT NUMBER:
23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

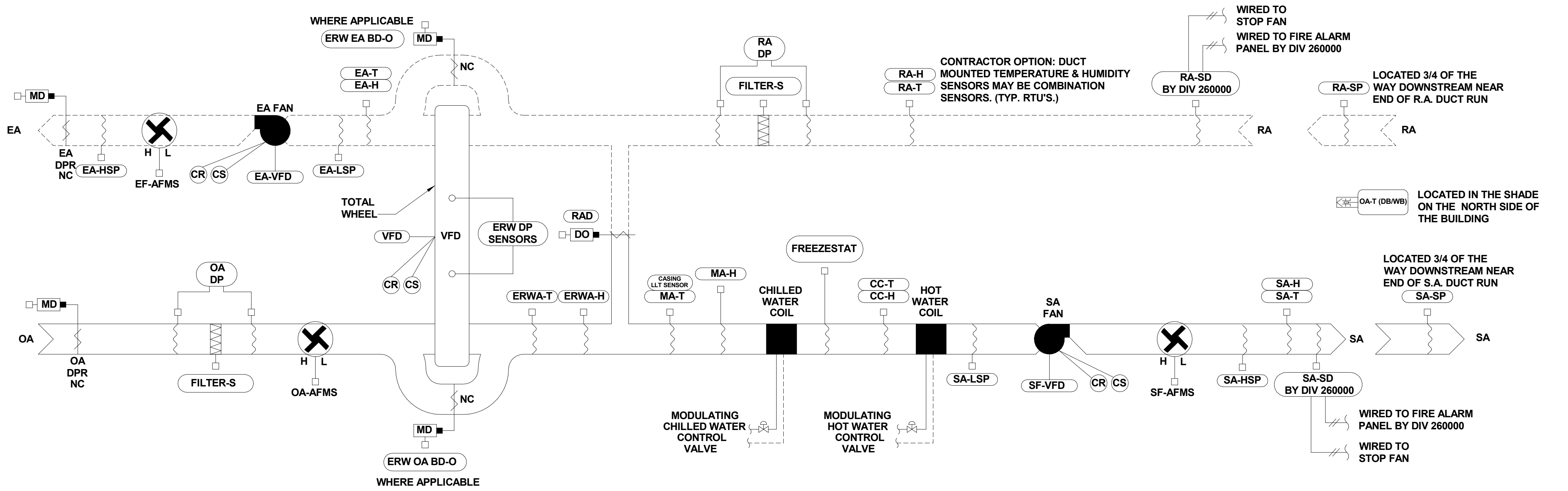
ORIENTATION AND SCALE:

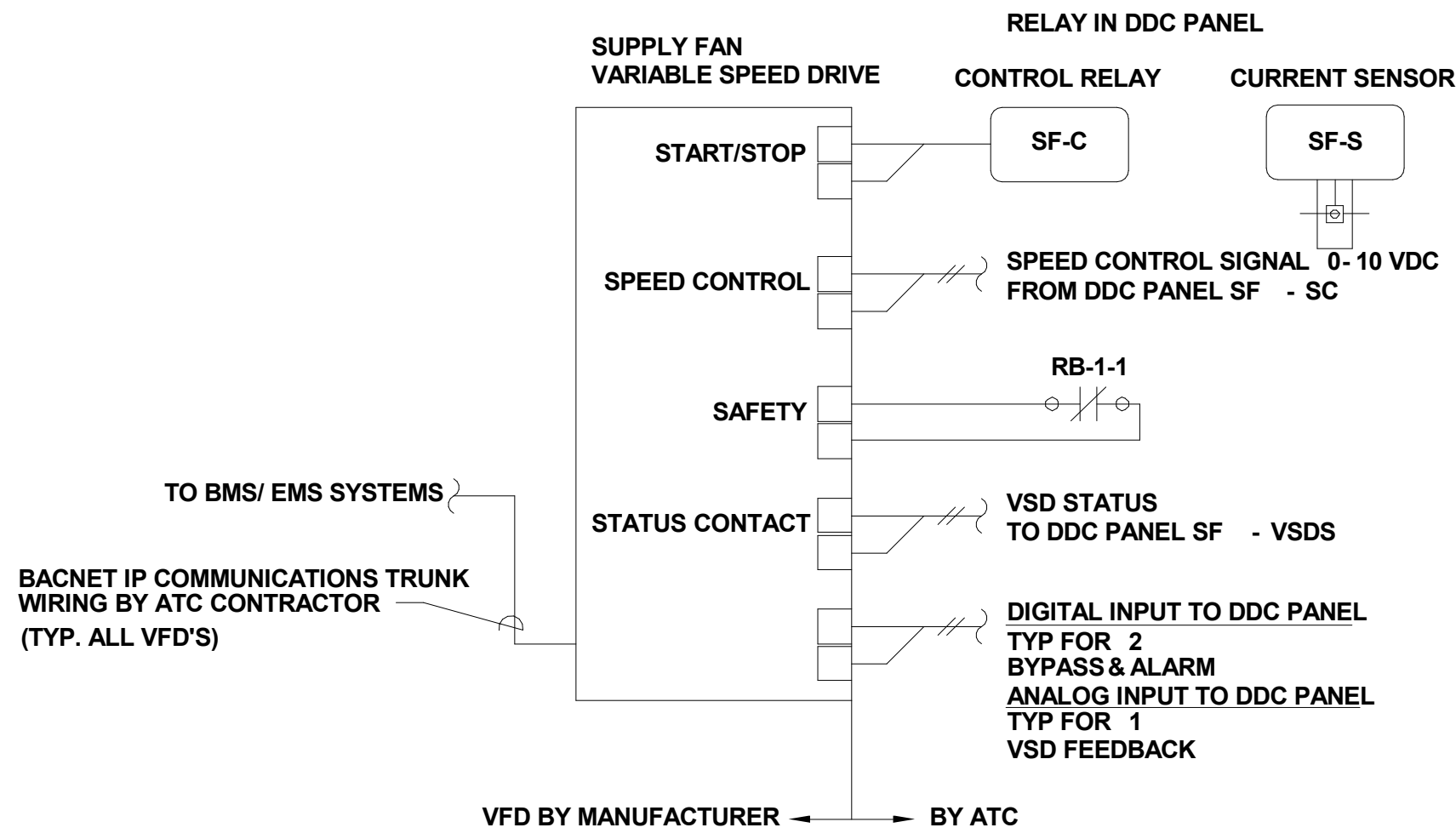
SCALE: AS INDICATED

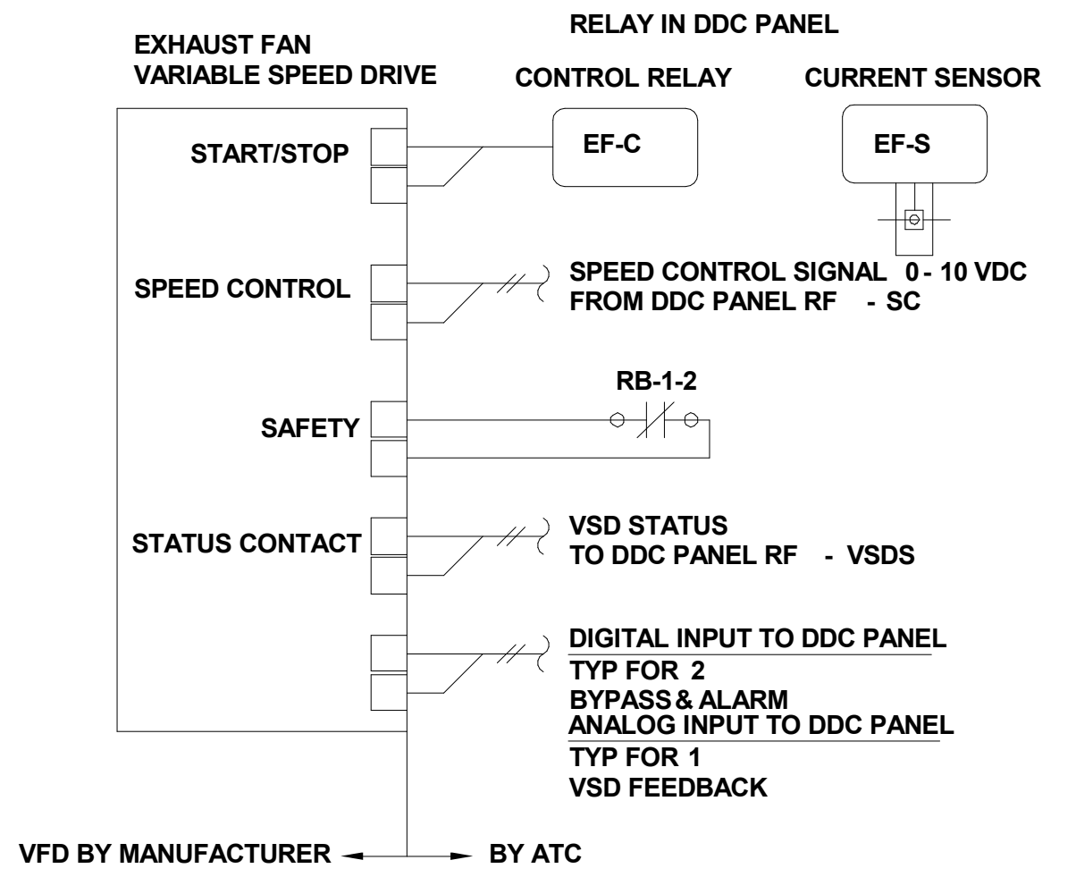
SHEET TITLE:
CONTROLS I

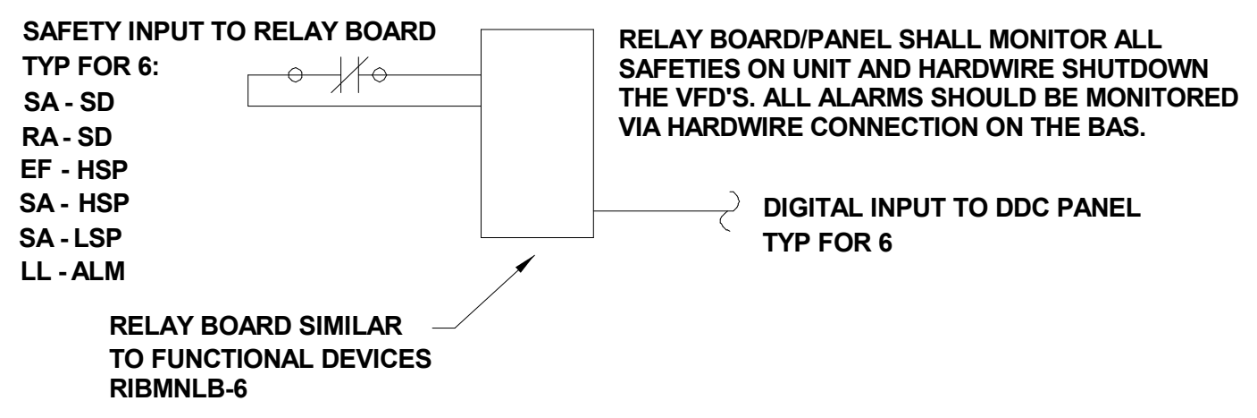
SHEET NUMBER:
M4.11

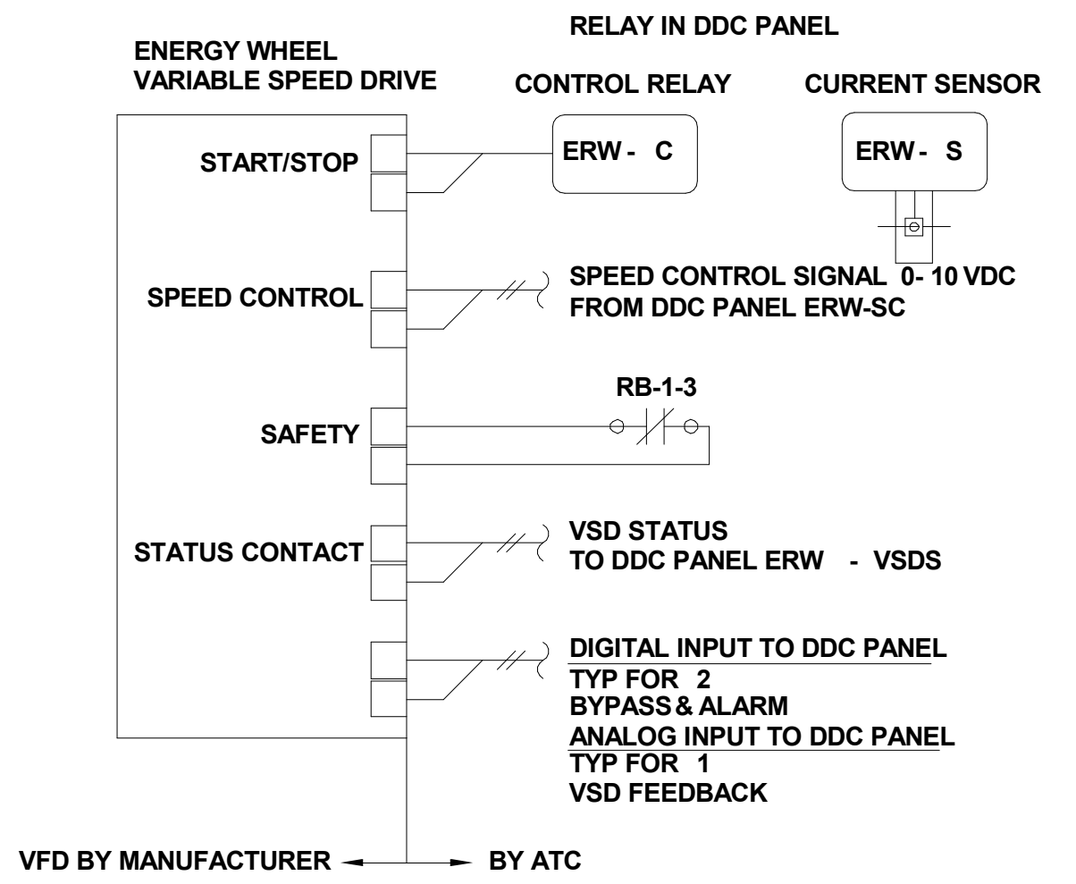
RTU-1, 2, 3, 7 & 8 - 100% O.A. DISPLACEMENT VENTILATION AIR HANDLING SYSTEM w/ DEMAND CONTROL VENTILATION

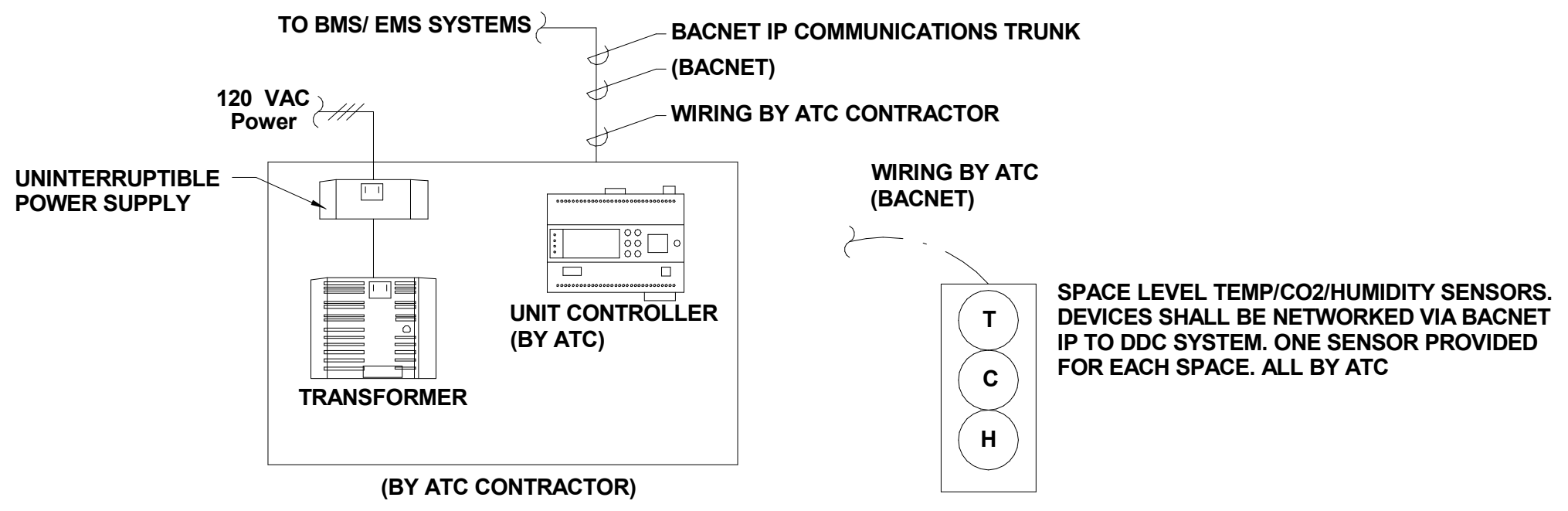



SUPPLY FAN VARIABLE SPEED DRIVE
RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
SF-C
SF-S
SPEED CONTROL
SPEED CONTROL SIGNAL 0- 10 VDC FROM DDC PANEL SF - SC
SAFETY
RB-1-1
TO BMS/ EMS SYSTEMS
STATUS CONTACT
VSD STATUS TO DDC PANEL SF - VSDS
BACNET IP COMMUNICATIONS TRUNK WIRING BY ATC CONTRACTOR (TYP. ALL VFD'S)
DIGITAL INPUT TO DDC PANEL
TYP FOR 2
BYPASS & ALARM
ANALOG INPUT TO DDC PANEL
TYP FOR 1
VSD FEEDBACK
VFD BY MANUFACTURER
BY ATC




SAFETY INPUT TO RELAY BOARD
TYP FOR 6:
SA - SD
RA - SD
EF - HSP
SA - HSP
SA - LSP
LL - ALM
RELAY BOARD/PANEL SHALL MONITOR ALL SAFETIES ON UNIT AND HARDWIRE SHUTDOWN THE VFD'S. ALL ALARMS SHOULD BE MONITORED VIA HARDWIRE CONNECTION ON THE BAS.
DIGITAL INPUT TO DDC PANEL
TYP FOR 6
RELAY BOARD SIMILAR TO FUNCTIONAL DEVICES RIBMNLB-6




TO BMS/ EMS SYSTEMS
BACNET IP COMMUNICATIONS TRUNK
(BACNET)
WIRING BY ATC CONTRACTOR
120 VAC Power
UNINTERRUPTIBLE POWER SUPPLY
TRANSFORMER
UNIT CONTROLLER (BY ATC)
(BY ATC CONTRACTOR)
WIRING BY ATC (BACNET)
T
C
H
SPACE LEVEL TEMP/CO2/HUMIDITY SENSORS. DEVICES SHALL BE NETWORKED VIA BACNET IP TO DDC SYSTEM. ONE SENSOR PROVIDED FOR EACH SPACE. ALL BY ATC

RTU AIR HANDLING UNITS

A DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE ROOFTOP AIR HANDLING UNIT OPERATION AS FOLLOWS:

RUN CONDITIONS - SCHEDULED:
THE RTU SHALL RUN BASED UPON AN OPERATOR-ADJUSTABLE SCHEDULE.

WARM-UP: THE TERMINAL HEATING UNITS (RADIANT PANELS, WALL RADIATION UNITS, FINTUBE, ETC) VALVES SHALL MODULATE OPEN TO RAISE THE SPACES TO THE OCCUPIED SET POINT OF 70°F (ADJ.). ONCE BUILDING HAS REACHED SPACE SETPOINT, THE TERMINAL HEATING UNITS SHALL ENTER THE OCCUPIED MODE, ALLOWING THEIR HOT WATER VALVES TO MODULATE AS REQUIRED TO MAINTAIN THE SPACE SETPOINT. THE RTU SHALL ALSO ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE WARM-UP MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE RISE TO DETERMINE WHEN TO ACTIVATE THE WARM UP MODE TO ENSURE THAT THE BUILDING HAS REACHED ITS SETPOINT FOR OCCUPIED MODE.

COOL-DOWN: THE TERMINAL COOLING UNIT (RADIANT PANELS, FCU'S) VALVES SHALL MODULATE OPEN TO LOWER THE SPACES TO THE OCCUPIED SETPOINT OF 75°F (ADJ.). ONCE THE BUILDING HAS REACHED SPACE SETPOINT OF 75°F (ADJ.), THE RTU SHALL ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE COOL-DOWN MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE DECREASE TO DETERMINE WHEN TO ACTIVATE THE COOL DOWN MODE TO ENSURE THAT THE BUILDING HAS REACHED ITS SETPOINT FOR OCCUPIED MODE. ECONOMIZER MODE OF OPERATION SHALL OVERRIDE NORMAL COOL-DOWN MODE OF OPERATION DURING UNOCCUPIED MODE.

OCCUPIED MODE:

GENERAL:
THE FANS START OR CONTINUE TO RUN AND THE RTU IS CONTROLLED AS FOLLOWS:

THE EXHAUST AIR DAMPER SHALL OPEN, THE OUTSIDE AIR DAMPER SHALL OPEN & THE RECIRCULATION DAMPER SHALL BE CLOSED. THE ENERGY RECOVERY WHEEL SHALL BE ACTIVATED ERW BYPASS DAMPERS CLOSE AND OPERATE PER THE SEQUENCES BELOW. THE SUPPLY AND EXHAUST FANS SHALL BE ACTIVATED OR CONTINUE TO RUN AND THE SUPPLY FAN SHALL ADJUST ITS SPEED BASED ON THE SUPPLY DUCT MOUNTED STATIC PRESSURE SENSOR LOCATED 3/4 DOWN STREAM. THE SYSTEM'S ACTUAL STATIC PRESSURE SETPOINT WILL BE PROVIDED/OBTAINED THROUGH THE TESTING AND BALANCING CONTRACTOR DURING THE BALANCING PROCESS. THE EXHAUST FAN SHALL MODULATE ITS SPEED BASED ON THE SUPPLY AIR FLOW. THE ATC CONTRACTOR SHALL PROVIDE LOGIC TO CONSISTENTLY COLLECT THE TOTAL CFM FROM ALL VAV BOXES AND UTILIZE THAT VALUE IN CONJUNCTION WITH THE EXHAUST AIR FLOW SYSTEM CURVE PROFILE TO MODULATE THE EXHAUST FAN VFD. A SLIGHT OFFSET BETWEEN SUPPLY AND RETURN AIR FLOWS SHALL BE SET TO 5% (ADJ) TO ALLOW THE BUILDING TO MAINTAIN A SLIGHTLY POSITIVE PRESSURE. THE STATIC PRESSURE SET POINT SHALL BE RESET BASED ON PID (PROPORTIONAL-INTEGRAL-DERIVATIVE) LOGIC TO ALLOW THE VAV BOX ZONE REQUIRING THE MOST PRESSURE TO SATISFY ITS AIRFLOW REQUIREMENT AT ITS DESIGN FULL OPEN POSITION. THE STATIC PRESSURE SET POINT SHALL BE LOWERED TO THE POINT WHERE FAN SPEED REDUCTION CAN OCCUR, YET STILL ENSURE THAT THE VAV BOX ZONES REMAIN SATISFIED. THE SYSTEM SHALL USE INPUT SIGNALS FROM VAV BOX CONTROLLERS, THE MAIN DUCTWORK MOUNTED SYSTEM STATIC PRESSURE SENSOR AND THE CONTROLLER'S PROGRAM ALGORITHM TO ACHIEVE THIS CONTROL. IN ADDITION, PROVIDE DETECTION AND ALARM OF ANY VAV ZONE THAT EXCESSIVELY NEGATIVELY DRIVES THE RESET LOGIC. THE BMS SYSTEM SHALL BE CAPABLE OF ALLOWING OPERATOR TO READILY REMOVE OR ADD VAV BOX ZONES FROM THE RESET LOGIC ALGORITHM. THE PROJECT TAB/ATC CONTRACORS SHALL FIELD DETERMINE THE ADJUSTABLE SETPOINT RANGE FOR EACH RTU/AHU SYSTEM AND THE PRIMARY VAV BOX UTILIZED TO CONTROL THE STATIC PRESSURE RESET CONTROL STRATEGY.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND EITHER THE O.A. DAMPER & E.A. DAMPER, OR THE RECIRCULATION DAMPER ARE PROVEN OPEN. THE SUPPLY FAN SHALL MODULATE ITS SPEED BASED ON THE SYSTEM'S STATIC PRESSURE DUE TO VAV DAMPERS OPENING/CLOSING. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER-DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES. BALANCING CONTRACTOR & ATC CONTRACTOR SHALL COORDINATE AND PROVIDE AN EXHAUST FAN(S) PROFILE OF AIR FLOW THROUGHOUT THE FAN SYSTEM CURVE AT DIFFERENT SPEEDS AND AIR FLOW TESTING. THIS SHALL BE USED FOR EXHAUST FAN SPEED CONTROL, TYP. FOR SUPPLY FANS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FAN:
THE EXHAUST FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND THE E.A. DAMPER, IS PROVEN OPEN. THE EXHAUST FAN SHALL MODULATE ITS SPEED BASED ON THE EXHAUST AIR FLOW STATION WHICH SHALL TRACK TOTAL SUPPLY AIR FLOW ACHIEVED AT THE VAV BOXES. EXHAUST FAN SHALL MAINTAIN 5% (ADJ.) LESS AIRFLOW THAN THE SUPPLY FAN TO ALLOW A SLIGHTLY POSITIVE PRESSURE THROUGHOUT THE BUILDING. THE EXHAUST FAN SHALL HAVE A USER DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES. ATC CONTRACTOR SHALL PROVIDE AN EXHAUST FAN(S) PROFILE OF AIR FLOW THROUGHOUT THE FAN SYSTEM CURVE AT DIFFERENT SPEEDS AND AIR FLOW TESTING. THIS SHALL BE USED FOR EXHAUST FAN SPEED CONTROL TO TRACK THE SUPPLY FAN AIRFLOW, TYP. FOR SUPPLY FANS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

CURRENT SWITCHES SHALL BE INSTALLED ON THE SUPPLY AND RETURN FAN MOTORS. THE DDC SYSTEM USES THESE SWITCHES TO CONFIRM THE FANS ARE IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL.

TOTAL ENERGY RECOVERY WHEEL - VARIABLE SPEED:
THE CONTROLLER SHALL MODULATE THE TOTAL ENERGY RECOVERY WHEEL AS FOLLOWS:

COOLING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR COOLING RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE BELOW THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

HEATING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR HEAT RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE ABOVE THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

PERIODIC SELF-CLEANING:
THE TOTAL ENERGY RECOVERY WHEEL SHALL RUN AT 5% SPEED (ADJ.) FOR 10 SEC (ADJ.) EVERY 4HRS (ADJ.) THE UNIT RUNS.

WHEEL DEFROST CYCLE AND FROST PROTECTION:
IF THE WHEEL DIFFERENTIAL PRESSURE RISES 1 INCH. (ADJ.) AND THE OUTSIDE AIR TEMPERATURE IS BELOW 30°F (ADJ.), THE WHEEL SPEED SHALL BE REDUCED VIA WHEEL VARIABLE FREQUENCY DRIVE, OR THE ENERGY RECOVERY WHEEL FACE & BYPASS DAMPERS SHALL MODULATE OPEN TO BYPASS THE WHEEL UNTIL THE PRESSURE RETURNS TO NORMAL. WHEEL DEFROST CONTROL SEQUENCE SHALL BE CHOSEN PER MANUFACTURER'S RECOMMENDATIONS. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- RECOVERY WHEEL ROTATION FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RECOVERY WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- RECOVERY WHEEL RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).
- RECOVERY WHEEL VFD IN FAULT

COOLING AND DEHUMIDIFICATION - CHILLED WATER:
OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-COOLED BY THE INCOMING RETURN AIR, UPON SENSING A MIXED AIR TEMPERATURE AND/OR MIXED AIR HUMIDITY ABOVE THE DESIRED SUPPLY AIR DISCHARGE SETPOINTS OF 63°(ADJ) & 55%RH (ADJ) OR SPACE HUMIDITY ABOVE 55% (ADJ), THE CHILLED WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO COOL AND DEHUMIDIFY THE INCOMING AIR. THE COOLING COIL SHALL MODULATE TO MAINTAIN THE DESIRED COOLING COIL TEMPERATURE SETPOINT STARTING AT 55°F (53GR/LB) (ADJ.) AND SHALL RESET DOWN IN 1°F STEPS OVER TIME, 1°F EVERY FIVE MINUTES (ADJ), TO THE CHILLED WATER LEAVING AIR TEMPERATURE SETPOINT OF 50°F (ADJ.) UNTIL THE SPACE HUMIDITY LEVEL OF 55% RH (ADJ) IS MET. REFER TO RTU SCHEDULE FOR CHILLED WATER LEAVING AIR TEMPERATURE FOR LOW SETPOINT. THE HOT WATER CONTROL VALVE SHALL MODULATE TO REHEAT THE SUB-COOLED SUPPLY AIR FROM THE COOLING COIL BACK UP TO 63°F (ADJ., SUMMER ONLY). THE SUPPLY AIR SETPOINT WILL BE RESET BASED ON OUTDOOR AIR TEMPERATURE / HUMIDITY CONDITION AND/OR A CALL FOR COOLING FROM (2) (ADJ.) OF THE SPACES SERVED BY THE RTU. IF (2) (ADJ.) OF THE ROOMS SERVED BY THE RTU ARE CALLING FOR COOLING AND THE VAV BOXES ARE OPENED 100% THEN THE RESET WILL BE INITIATED. WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 55°F (ADJ.) THE SUPPLY AIR SETPOINT SHALL BE 68°F (ADJ.) & SHALL RESET TO 63°F (ADJ.) AT AN OUTDOOR TEMPERATURE ABOVE 75°F (ADJ.). THE RESET SHALL BE LINEAR BETWEEN THE TWO SETPOINTS. THE COOLING COIL AND HOT WATER COIL (REHEAT) SHALL BE ENABLED WHENEVER:
- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS GREATER THAN 55°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS ABOVE THE DESIRED SETPOINT.
- OR SPACE TEMPERATURES ARE CALLING FOR COOLING

HEATING - HOT WATER:
OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-HEATED BY THE INCOMING RETURN AIR. UPON SENSING A MIXED AIR TEMPERATURE BELOW THE DESIRED SUPPLY AIR DISCHARGE SETPOINT OF 68°F (ADJ.) THE HOT WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO HEAT THE INCOMING AIR TO MAINTAIN THE SUPPLY AIR DISCHARGE SETPOINT OF 68°F (ADJ.). WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 55°F (ADJ.), THE SUPPLY AIR SETPOINT SHALL BE 68°F (ADJ.) & SHALL RESET TO 63°F (ADJ.) AT AN OUTDOOR TEMPERATURE ABOVE 75°F (ADJ.). THE RESET SHALL BE LINEAR BETWEEN THE TWO SETPOINTS. THE HEATING COIL SHALL BE ENABLED WHENEVER:
- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS BELOW THE DESIRED SETPOINT.
- OR COOLING IS ACTIVATED AND REHEAT IS REQUIRED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- LOW ENTERING AIR TEMP: IF THE MIXED AIR OR COOLING COIL LEAVING AIR TEMPERATURE IS LESS THAN 38°F (ADJ.).

ECONOMIZER (DUAL ENTHALPY CONTROL):
THE CONTROLLER SHALL MEASURE THE RETURN AND OUTSIDE AIR ENTHALPIES AND MODULATE THE OUTSIDE AIR DAMPER, RECIRCULATION DAMPER (DURING UNOCCUPIED CONDITIONS) AND WHEEL BYPASS DAMPERS AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL ENERGY RECOVERY WHEEL SHALL BE OFF. THE ECONOMIZER SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN RETURN AIR ENTHALPY.
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
- AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL BE DISABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE DROPS BELOW 40°F (ADJ.).
- OR ON LOSS OF SUPPLY FAN STATUS.
- OR THE FREEZESTAT IS ON.

UNOCCUPIED MODE:

UNDER THIS MODE, ALL RTUS SHALL BE OFF & DAMPERS CLOSED. VAV DAMPERS SHALL BE CLOSED.
HEATING: ALL TERMINAL HEATING UNITS & COMPONENTS THROUGHOUT THE BUILDING SHALL MODULATE AS REQUIRED TO MAINTAIN THE BUILDING'S UNOCCUPIED SETPOINT OF 60°F (ADJ.) IN THE WINTER.

COOLING: WHEN OAT IS ABOVE 80°F (ADJ.) AND/OR RH IS ABOVE 70% (ADJ.) & THE BUILDING'S AVERAGE UNOCCUPIED TEMPERATURE SETPOINTS OF 85°F (ADJ.) & UNOCCUPIED HUMIDITY SETPOINT OF 70% RH (ADJ) ARE NOT MAINTAINED, ALL TERMINAL COOLING UNITS AND COMPONETS THROUGHOUT THE BUILDING SHALL MODULATE AS REQUIRED TO MAINTAIN THE BUILDING'S UNOCCUPED SETPOINT OF 85°F (ADJ.) AND 70%RH (ADJ.).

IN THE EVENT THAT THE TERMINAL HEATING OR COOLING UNITS CANNOT MAINTAIN THE BUILDING AVERAGE UNOCCUPIED SETPOINT, THE RTUS SHALL BE ACTIVATED & FUNCTION AS FOLLOWS:
ALL VAV'S ASSOCIATED WITH THE RTU SHALL GO TO FULL-OPEN POSITION. THE RTU OUTSIDE AND EXHAUST AIR DAMPERS SHALL BE CLOSED, THE RECIRCULATION DAMPER SHALL BE CLOSED. THE TOTAL ENERGY RECOVERY WHEEL SHALL BE DE-ENERGIZED, AND THE ASSOCIATED ERW BYPASS DAMPERS SHALL BE OPEN. THE EXHAUST FAN SHALL BE OFF AND THE SUPPLY FAN SHALL START AND RECIRCULATE BUILDING AIR AT 60% (ADJ.). THE RTU HOT WATER OR CHILLED WATER CONTROL VALVE SHALL MODULATE OPEN AND THE UNIT DISCHARGE AIR SETPOINT SHALL BE 85°F (ADJ.) FOR HEATING AND 55°F (ADJ.) FOR COOLING.

SAFETY SEQUENCES

EMERGENCY SHUTDOWN:
UPON RECEIVING A SIGNAL FROM THE FIRE ALARM SYSTEM, THE UNIT'S FANS SHALL SHUTDOWN, ALL DAMPERS SHALL CLOSE, HOT AND CHILLED WATER VALVES SHALL CLOSE AND AN ALARM SHALL BE GENERATED AT THE BMS. THIS MODE SHALL BE CALLED EMERGENCY SHUTDOWN MODE. ATC CONTRACTOR SHALL HARD WIRE A DIRECT CONNECTION FROM THE FIRE ALARM PANELS DRY CONTACTS TO THE BMS. ALL ASSOCIATED VAV BOXES SHALL FULLY OPEN.

LOW LEAVING TEMPERATURE:
UPON A LOW LEAVING TEMPERATURE CONDITION (38°F ADJ) SENSED BY THE FREEZESTAT SENSOR, CO2 DEMAND CONTROL SHALL BE OVERRIDDEN, THE OUTSIDE AIR AND EXHAUST AIR DAMPER SHALL CLOSE, AND THE SUPPLY AND EXHAUST AIR FAN SHALL SHUT DOWN AND AN ALARM SHALL BE GENERATED.

SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS.

CASING TEMPERATURE SETPOINT:
THE DDC SYSTEM SHALL MONITOR THE UNIT CASING TEMPERATURE SETPOINT (BY THE MAT SENSOR). THE HOT WATER HEATING COIL VALVE SHALL OPEN TO MAINTAIN A 40°F (ADJ.) MINIMUM CASING TEMPERATURE SETPOINT WHEN THE UNIT IS DISABLED.

STAGED OPTIMIZED START/STOP OPERATION:
ALL UNIT CONTROLLERS SHALL BE EQUIPPED WITH OPTIMAL START/STOP OPERATION AND TIME OF DAY SCHEDULING. UNITS SHALL START UP DURING MORNING WARM-UP/COOL-DOWN MODES IN A STAGGERED MANNER SUCH THAT ALL EQUIPMENT IS NOT STARTED AT THE SAME TIME.

ADDITIONAL ALARMS:

OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE PREFILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

RETURN AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FINAL FILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

SPACE HUMIDITY SENSOR:
THE DDC SYSTEM SHALL MONITOR THE SYSTEM ZONE HUMIDITY SENSORS AND REPORT THE INFORMATION TO THE BUILDING DDC SYSTEM ROOM GRAPHICS.

OVERRIDE:
THE SPACE MOUNTED TEMPERATURE SENSOR SHALL HAVE A PUSH BUTTON OVERRIDE CAPABILITY. UPON ACTIVATION OF 10% (ADJ) OR MORE THERMOSTATS ON ONE RTU THE ASSOCIATED ROOFTOP UNIT AND ASSOCIATED VAV'S SHALL CHANGE TO OCCUPIED MODE FOR A PERIOD OF 2 HOURS (ADJ).

CO2 ALARM : UPON A RISE IN SPACE CO2 10% OR MORE THAN THE DESIGN OF 800 PPM (ADJ.) AN ALARM WILL BE GENERATED AT THE BMS WITH A 20 MIN. (ADJ.) DELAY.

CO2 DEMAND CONTROL VENTILATION (DCV):
UPON A RISE IN SPACE CO2 (GREATER THAN 800 PPM) THE ROOM'S RESPECTIVE VAV BOX SHALL MODULATE OPEN (WHERE APPLICABLE). UPON A RISE IN SPACE CO2 10% OR MORE THAN THE DESIGN OF 800 PPM (ADJ) AN ALARM WILL BE GENERATED AT THE BMS WITH A 20 MIN. (ADJ.) DELAY. ONCE LEVELS BEGIN TO DROP BELOW 800 PPM, THE VAV DAMPER SHALL RETURN CONTROL TO THE ROOM THERMOSTAT AND MODULATE ACCORDING TO THE DEMAND.

CO2 DEMAND CONTROL OVERRIDE:
FOR ALL RTU'S EQUPPED WITH CO2 DEMAND CONTROL VENTILATION, THE ATC CONTRACTOR SHALL CREATE A SEQUENCE OF OPERATION AND ASSOCIATED GRAPHIC USER INTERFACE (GUI) BUTTON THAT SHALL BE CAPABLE OF ALLOWING THE BMS OPERATOR TO DISENGAGE AND RE-ENGAGE THE CO2 DEMAND VENTILATION CONTROL CAPABILITIES OF THE VAV'S AND ASSOCIATED AIR DISTRIBUTION SYSTEM. A SOFTWARE NOTIFICATION SHALL BE GENERATED WHEN THIS MODE OF OPERATION IS ACTIVATED. THIS SEQUENCE AND GUI BUTTON SHALL BE PROVIDED FOR EACH INDIVIDUAL RTU AND A MASTER COMMAND GUI BUTTON SHALL ENGAGE/DISENGAGE THE MODE FOR ALL RTU'S. UNDER THIS MODE, THE VENTILATION OVERRIDE SHALL ALLOW THE ROOFTOP UNIT TO OPERATE AT IT'S MAXIMUM AIRFLOW AND MAXIMUM OUTSIDE AIR VENTILATION RATE. VARIABLE AIR VOLUME BOXES SHALL OPEN TO THEIR MAXIMUM POSITIONS. MORNING WARM-UP AND COOL DOWN MODES FOR THIS MODE OF OPERATION SHALL ALSO OPERATE WITH MAXIMUM OUTSIDE AIR ENABLED. OUTSIDE AIR VENTILATION SHALL BE ENABLED AT A MINIMUM OF TWO HOURS (ADJ) PRIOR TO SCHEDULED OCCUPIED TIME, AND SHALL CONTINUE TO RUN TWO HOURS (ADJ) POST SCHEDULED OCCUPANCY.

ECONOMIZER OVERRIDE:
FOR ALL RTU'S EQUPPED WITH ECONOMIZER CONTROL, THE ATC CONTRACTOR SHALL CREATE A SEQUENCE OF OPERATION AND ASSOCIATED GRAPHIC USER INTERFACE (GUI) BUTTON THAT SHALL BE CAPABLE OF ALLOWING THE BMS OPERATOR TO DISENGAGE AND RE-ENGAGE THE ECONOMIZER CONTROL CAPABILITIES OF THE RTU. A SOFTWARE NOTIFICATION SHALL BE GENERATED WHEN THIS MODE OF OPERATION IS ACTIVATED. THIS SEQUENCE AND GUI BUTTON SHALL BE PROVIDED FOR EACH INDIVIDUAL RTU AND IN ADDITION A MASTER COMMAND GUI BUTTON SHALL ENGAGE/DISENGAGE THE MODE FOR ALL RTU'S. UNDER THIS MODE, THE ECONOMIZER OVERRIDE SHALL ALLOW THE ROOFTOP UNIT TO OPERATE ITS HOT WATER AND/OR CHILLED WATER CONTROL VALVES TO MAINTAIN THE DAT SETPOINT. THE OUTSIDE AND RETURN AIR DAMPERS SHALL FUNCTION AS INDICATED IN THE OCCUPIED MODE. THE VARIABLE AIR VOLUME BOXES SHALL MODULATE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AND CO2 SETPOINTS.

RTU HANDLING UNITS	BMS CONTROL POINTS					
POINT NAME	AI	AO	BI	BO	ALARM	REMARKS
OUTSIDE AIR FLOW MEASURING STATION	X				X	NOTE #1
SUPPLY AIR FLOW MEASURING STATION	X					NOTE #6
EXHAUST AIR FLOW MEASURING STATION	X					NOTE #6
OUTSIDE AIR TEMP	X					CENTRAL POINT
OUTSIDE AIR HUMIDITY	X					CENTRAL POINT
EXHAUST AIR TEMP	X					
EXHAUST AIR HUMIDITY	X					
ENERGY RECOVERY HEAT WHEEL DISCHARGE AIR TEMP	X				X	ALARM BELOW 38°
ENERGY RECOVERY WHEEL DISCHARGE AIR HUMIDITY	X					
MIXED AIR TEMP & HUMIDITY	X				X	
COOLING COIL AIR TEMP & HUMIDITY	X				X	
HEATING COIL AIR TEMP	X				X	
SUPPLY AIR TEMP	X				X	
SUPPLY AIR HUMIDITY	X					
SUPPLY AIR STATIC PRESSURE	X	X			X	
OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR HUMIDITY	X					
RETURN AIR TEMP	X					
RETURN AIR STATIC PRESSURE	X	X			X	
CHILLED WATER CONTROL VALVE	X	X			X	
HOT WATER CONTROL VALVE	X	X			X	
RE-CIRC AIR DAMPER	X	X			X	
OUTSIDE AIR DAMPER	X	X			X	
EXHAUST AIR DAMPER	X	X			X	
RETURN AIR SMOKE DETECTOR			X		X	
SUPPLY AIR SMOKE DETECTOR			X		X	
COOLING SUPPLY AIR SET POINT	X	X				
HEATING SUPPLY AIR SET POINT	X	X				
EMERGENCY SHUT DOWN					X	
HIGH COOLING SUPPLY AIR TEMP					X	10° ABOVE
HIGH HEATING SUPPLY AIR TEMP					X	10° ABOVE
LOW HEATING SUPPLY AIR TEMP					X	10° BELOW
OUTSIDE AIR FILTER CHANGE REQUIRED					X	
RETURN AIR FILTER CHANGE REQUIRED					X	
HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION					X	880 PPM ALRM
HIGH RETURN AIR HUMIDITY					X	75% RH ALARM
LOW RETURN AIR TEMP					X	60° OR LESS
HIGH RETURN AIR TEMP					X	85° OR ABOVE
SPACE CO2	X				X	880 PPM ALRM
FREEZESTAT			X		X	NOTE #5
CASING LOW LIMIT TEMPERATURE	X				X	38° ALRM
ERW OA FACE & BYPASS DAMPER			X	X		
ERW EA FACE & BYPASS DAMPER			X	X		
SUPPLY LOW STATIC SAFETY			X			NOTE #7
SUPPLY HI STATIC SAFETY			X			NOTE #7
RETURN LOW STATIC SAFETY			X			NOTE #7
RETURN HI STATIC SAFETY			X			NOTE #7
VFD POINTS						
ENERGY RECOVERY WHEEL VFD SPEED	X	X				HARDWIRE
SUPPLY FAN VFD SPEED	X	X				HARDWIRE
EXHAUST FAN VFD SPEED	X	X				HARDWIRE
SUPPLY FAN STATUS			X		X	HARDWIRE
EXHAUST FAN STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL VFD FAULT			X		X	
SUPPLY FAN VFD FAULT			X		X	
EXHAUST FAN VFD FAULT			X		X	
SUPPLY FAN START/STOP				X		HARDWIRE
EXHAUST FAN START/STOP				X		HARDWIRE
ENERGY RECOVERY WHEEL START/STOP				X		HARDWIRE
SUPPLY FAN FAILURE					X	
SUPPLY FAN IN HAND					X	
EXHAUST FAN FAILURE					X	
EXHAUST FAN IN HAND					X	
ENERGY RECOVERY WHEEL ROTATION FAILURE					X	
ENERGY RECOVERY WHEEL IN HAND					X	
TOTAL WHEEL RUNTIME EXCEEDED					X	

NOTES:

1. OUTSIDE AIRFLOW MEASURING STATION FURNISHED BY UNIT MANUFACTURER & PROGRAMMING SHALL BE PROVIDED BY ATC. ALARM POINT SHALL BE INITIATED AT THE BMS WHEN VALUE IS 10% ABOVE OR BELOW SCHEDULED VALUE.
2. ALL SETPOINTS AND SCHEDULES, PROVIDED FROM ATC CONTRACTOR (UNLESS SPECIFICALLY NOTED OTHERWISE) AND RTU MANUFACTURER CONTROLLER, SHALL BE ADJUSTABLE THROUGH THE BMS SYSTEM
3. ALL ATC (DDC) CONTROL SENSORS AND CONTROL VALVES PROVIDED BY ATC CONTRACTOR. REFER TO SCHEDULE FOR REQUIRED I/O PARAMETERS
4. ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE
5. FREEZESTAT SHALL BE AUTO-RESET TYPE
6. SUPPLY & EXHAUST AIRFLOW MEASURING PROBES SHALL BE PROVIDED BY RTU MANUFACTURER. ATC CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING/REPORTING AIRFLOW MEASUREMENT DATA FROM RTU SUPPLY & EXHAUST FAN TO THE BMS.
7. HI/LOW STATIC ALARM SHALL BE ACTIVATED WHEN DP IS +/-15% (ADJ) FROM NORMAL OPERATING DP.
8. DAMPERS WITHIN THE UNIT SHALL BE PROVIDED BY RTU MANUFACTURER, ACTUATORS W/POSITION FEEDBACK ARE TO BE PROVIDED BY ATC CONTRACTOR.

ABBREVIATIONS

AFVP	AIRFLOW VELOCITY PROBE
ALM	ALARM
AQ	AQUASTAT
ATC	AUTOMATIC TEMPERATURE CONTROLS
BLDG	BUILDING
BLR	BOILER
BMS	BUILDING MANAGEMENT SYSTEM (ENERGY & AUTOMATION)
CM	CONSTRUCTION MANAGER
COMB	COMBUSTION
CONTR	CONTROLLER
CO2	CARBON DIOXIDE
CR	CONTROL RELAY
CS	CURRENT SENSOR
CUV	CABINET UNIT VENTILATOR
D	DAMPER
DA	DISCHARGE AIR
DAS	DISCHARGE AIR SENSOR
DAT	DISCHARGE AIR TEMPERATURE
DCV	DEMAND CONTROL VENTILATION
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DDC	DIRECT DIGITAL CONTROL
DO	DAMPER OPERATOR
DP	DIFFERENTIAL PRESSURE
DPR	DAMPER
DPV	DIFFERENTIAL PRESSURE VALVE
EA	EXHAUST AIR
EF	EXHAUST FAN
F	FLOW/FARENHEIT (AS APPLICABLE)
FB	FACE & BYPASS
FD	FIRE DAMPER
H	HUMIDITY
HS	ENTHALPY SENSOR
HT	HIGH TEMPERATURE
HTG	HEATING
HR	HEAT RECOVERY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LT	LOW TEMPERATURE
M	MOTOR
MAT	MIXED AIR TEMPERATURE
NAC	NETWORK APPLICATION CONTROLLER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OVR	OVERRIDE
P	PRESSURE
PB	PUSH BUTTON
PNL	PANEL
RA	RETURN AIR
REL	RELIEF AIR
RF	RETURN FAN
RFC	RETURN FAN CONTROLLER
RM	ROOM
SA	SUPPLY AIR
SD	SMOKE DAMPER OR SMOKE DETECTOR
SF	SUPPLY FAN
SFC	SUPPLY FAN CONTROLLER
SP	STATIC PRESSURE
T	TEMPERATURE
TEC	TERMINAL EQUIPMENT CONTROLLER
VAC	VOLTS - ALTERNATING CURRENT
VDC	VOLTS - DIRECT CURRENT
VFD	SEE VSD
VLV	VALVE
VP	VELOCITY PROBE (AIRFLOW)
VSD	VARIABLE SPEED (FREQUENCY) DRIVE
XFMR	TRANSFORMER

ATC/BMS GENERAL NOTES

1. ALL SETPOINTS INDICATED IN THE SEQUENCE OF OPERATIONS SHALL BE ADJUSTABLE ON GRAPHICAL INTERFACE.
2. THE CONTROL POINTS LISTED IN THE SUMMARY MATRIX ARE THE MINIMUM CONTROL POINTS REQUIRED. ATC CONTRACTOR SHALL PROVIDE ALL CONTROL POINTS AS REQUIRED FOR COMPLETE SYSTEM CONTROL PER THE SEQUENCE OF OPERATIONS.
3. ALL CONTROL WIRING, SENSORS, RELAYS, CONTROLLERS, PANELS, DAMPERS, ACTUATORS, ETC. INDICATED ON THE CONTROL DIAGRAMS SHALL BE PROVIDED BY THE ATC CONTRACTOR UNLESS NOTED OTHERWISE.
4. ALL HHW VALVES SHALL BE FAIL OPEN ON LOSS OF POWER.
5. ALL HHW WATER VALVES SHALL BE MODULATING TYPE FOR GPM > 2.0; 2-POSITION ACCEPTABLE FOR FLOWS < 2.0 GPM
6. ATC CONTRACTOR TO COORDINATE W/ OWNER FOR ALL COMMUNICATION & INTERFACE REQUIREMENTS TO CENTRAL OPERATING STATION. REFER TO SPEC FOR FURTHER INFO.
7. DUCT SMOKE DETECTORS INDICATED ARE TO BE FURNISHED BY DIV. 260000 & INSTALLED BY HVAC CONTRACTOR. POWER WIRING AND FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR TO PROVIDE BMS INTERLOCK TO SHUT ASSOCIATED UNIT DOWN AND INITIATE AN ALARM UPON ACTIVATION
8. ALL SMOKE DAMPERS SHALL BE COMBINATION SMOKE/FIRE DAMPERS, SHALL BE FURNISHED & INSTALLED BY HVAC CONTRACTOR, AND POWER WIRED BY ELECTRICAL CONTRACTOR. DAMPERS SHALL BE MOTOR OPERATED WITH 24 VOLT / 120 VOLT ACTUATOR. FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. DAMPER ENDSWITCH INTEGRATION TO BMS BY ATC CONTRACTOR.
9. ALL ATC CONTROLS SHALL BE POWER WIRED FROM DESIGNATED EMERGENCY POWER JUNCTION BOXES LOCATED ON THE ELECTRICAL DRAWINGS. JUNCTION BOXES WILL BE FED BY EMERGENCY POWER, THEREFORE ALL CONTROLS SHALL BE ON EMERGENCY POWER. ANY SUB ATC PANELS REQUIRED SHALL BE FED FROM EMERGENCY POWER & ALL SHALL BE PROVIDED BY ATC CONTRACTOR. ALL UNIT CONTROLS SHALL BE FED BY EMERGENCY POWER & NOT THROUGH THE UNIT'S MAIN POWER SOURCE.
10. ALL DENSELY OCCUPIED SPACES WITH OCCUPANT DENSITY OF 25 PEOPLE OR MORE PER 1000 SQ/FT SHALL BE PROVIDED W/ ROOM LEVEL TEMPERATURE, CO2, & HUMIDITY SENSORS W/ CO2 CONTROL. THIS SHALL BE PROVIDED IN COMPLIANCE WITH LEED v.4 CREDIT IEQC1. (PROVIDED BY FMS CONTRACTOR & INSTALLED BY ATC CONTRACTOR)

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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:
90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:
SCALE: AS INDICATED

SHEET TITLE:
CONTROLS II

SHEET NUMBER:
M4.12

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt
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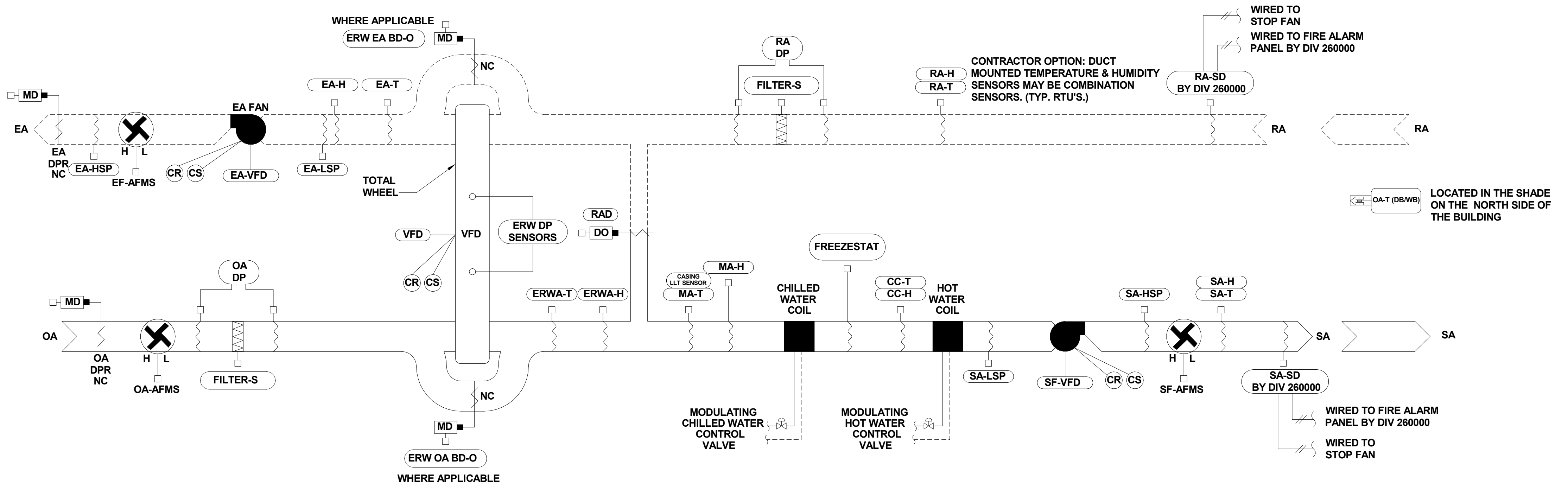
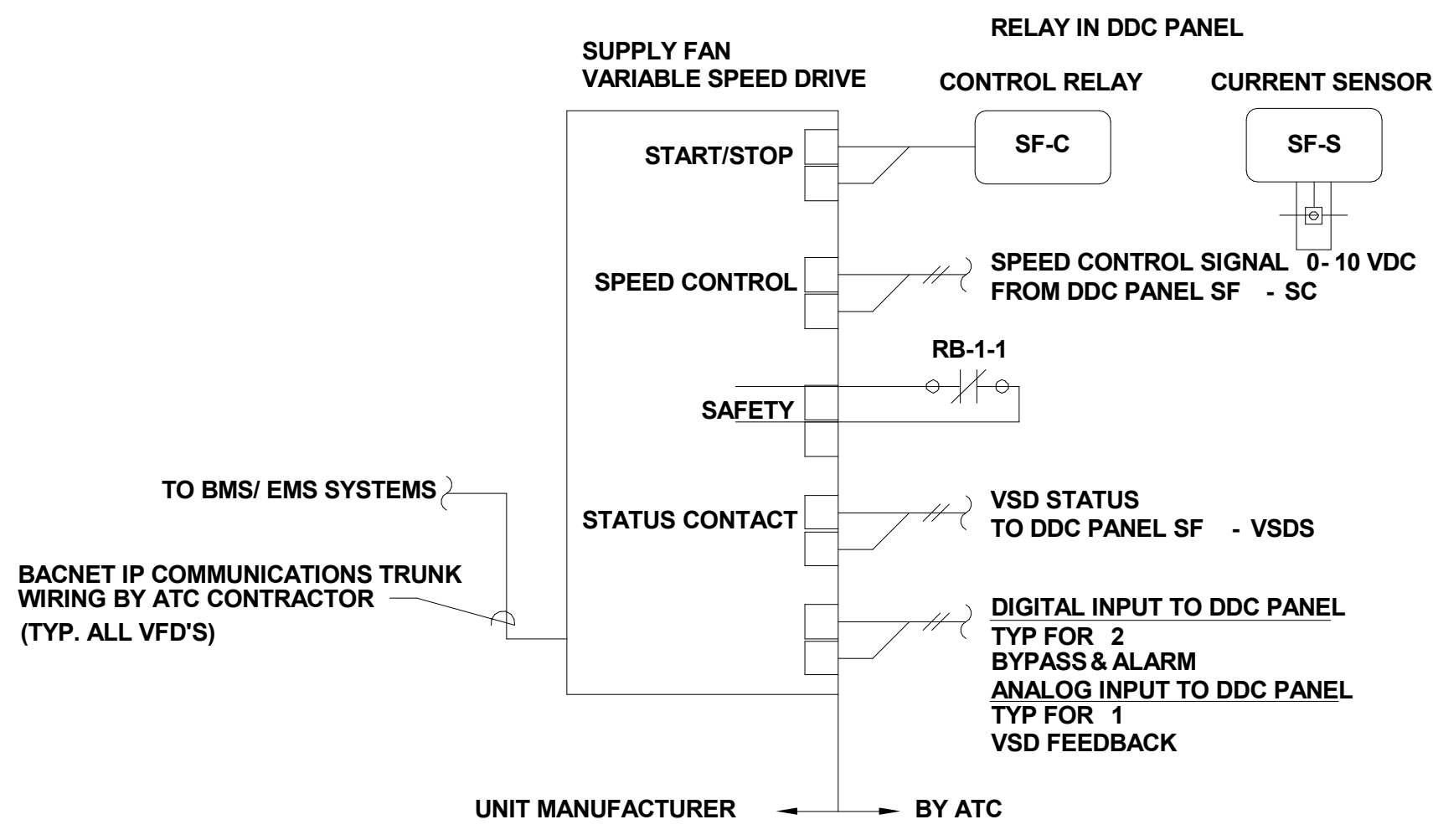
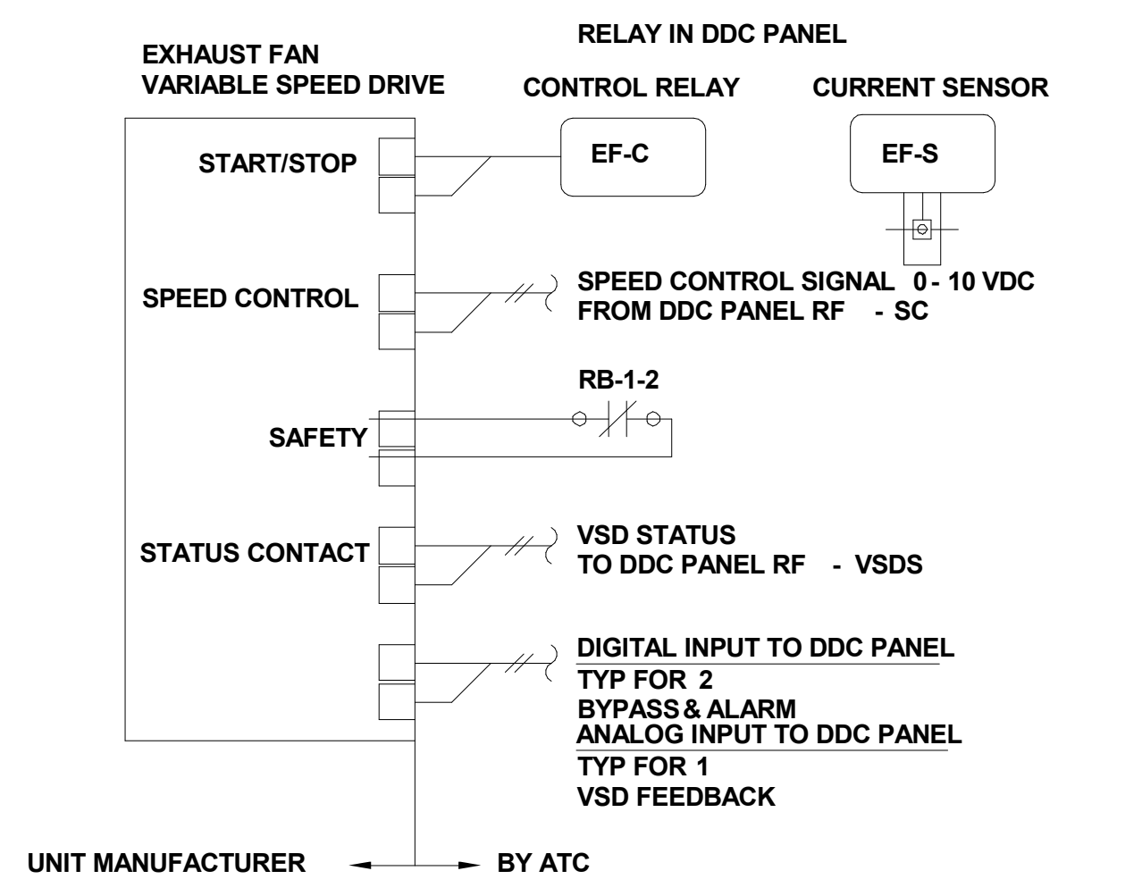
RTU-4 - MIXED AIR OVERHEAD AIR HANDLING SYSTEM w/ DEMAND CONTROL VENTILATION - SINGLE ZONE




SUPPLY FAN VARIABLE SPEED DRIVE
RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
SF-C
SF-S
SPEED CONTROL
SPEED CONTROL SIGNAL 0- 10 VDC FROM DDC PANEL SF - SC
RB-1-1
SAFETY
TO BMS/ EMS SYSTEMS
STATUS CONTACT
VSD STATUS TO DDC PANEL SF - VSDS
BACNET IP COMMUNICATIONS TRUNK WIRING BY ATC CONTRACTOR (TYP. ALL VFD'S)
DIGITAL INPUT TO DDC PANEL
TYP FOR 2
BYPASS & ALARM
ANALOG INPUT TO DDC PANEL
TYP FOR 1
VSD FEEDBACK
UNIT MANUFACTURER
BY ATC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RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
EF-C
EF-S
SPEED CONTROL
SPEED CONTROL SIGNAL 0- 10 VDC FROM DDC PANEL RF - SC
RB-1-2
SAFETY
STATUS CONTACT
VSD STATUS TO DDC PANEL RF - VSDS
DIGITAL INPUT TO DDC PANEL
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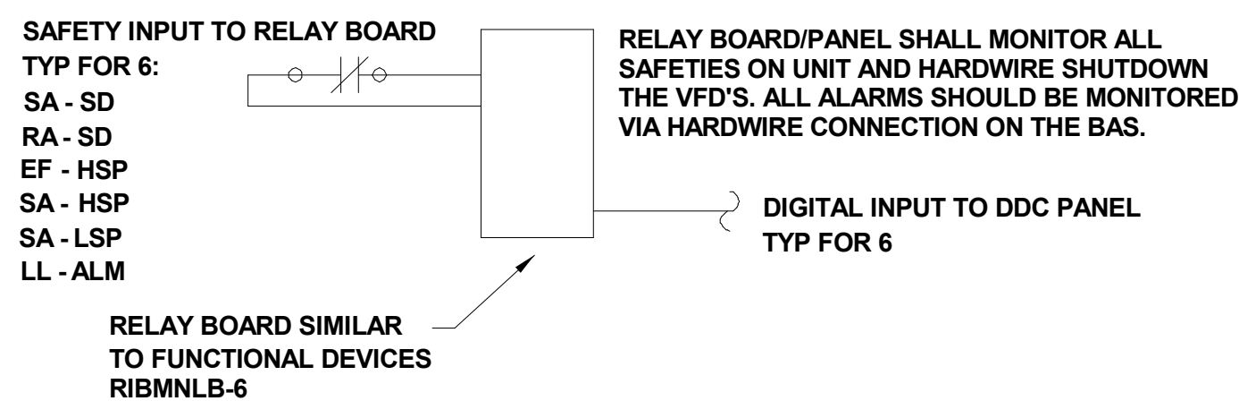
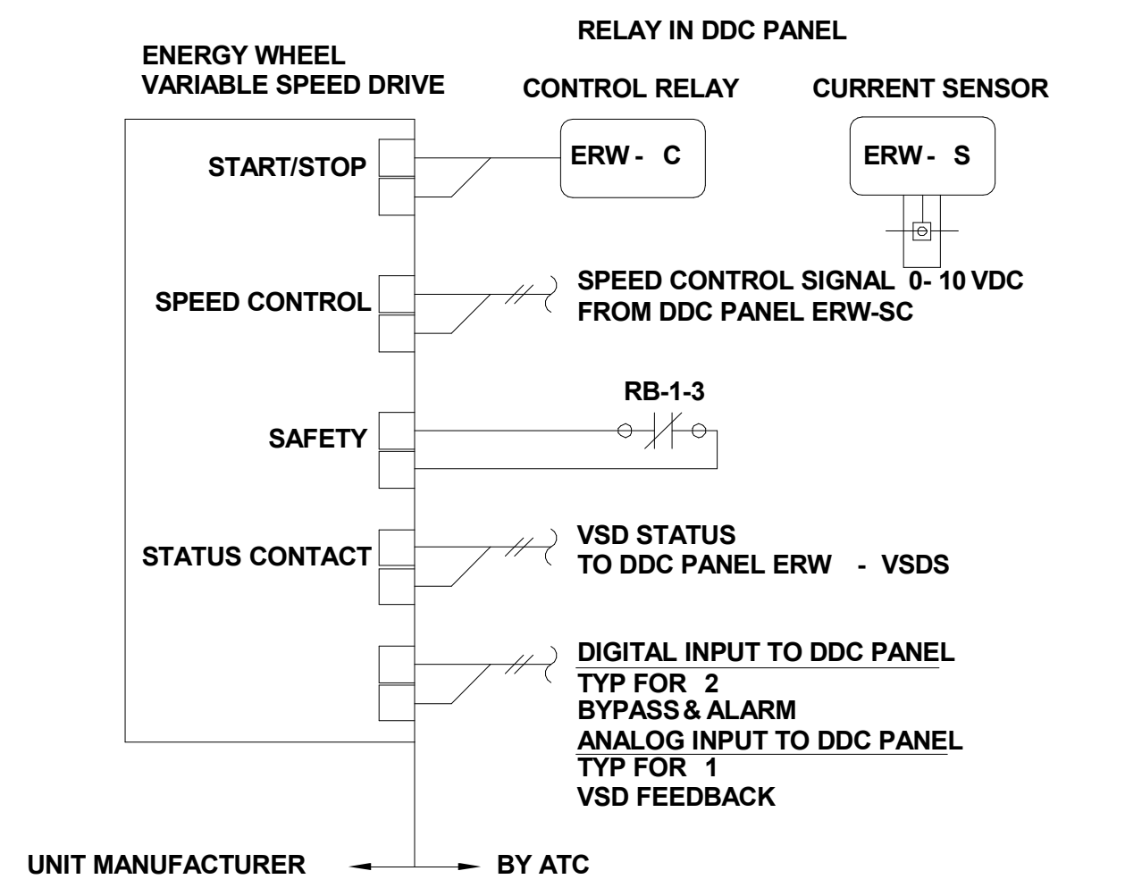
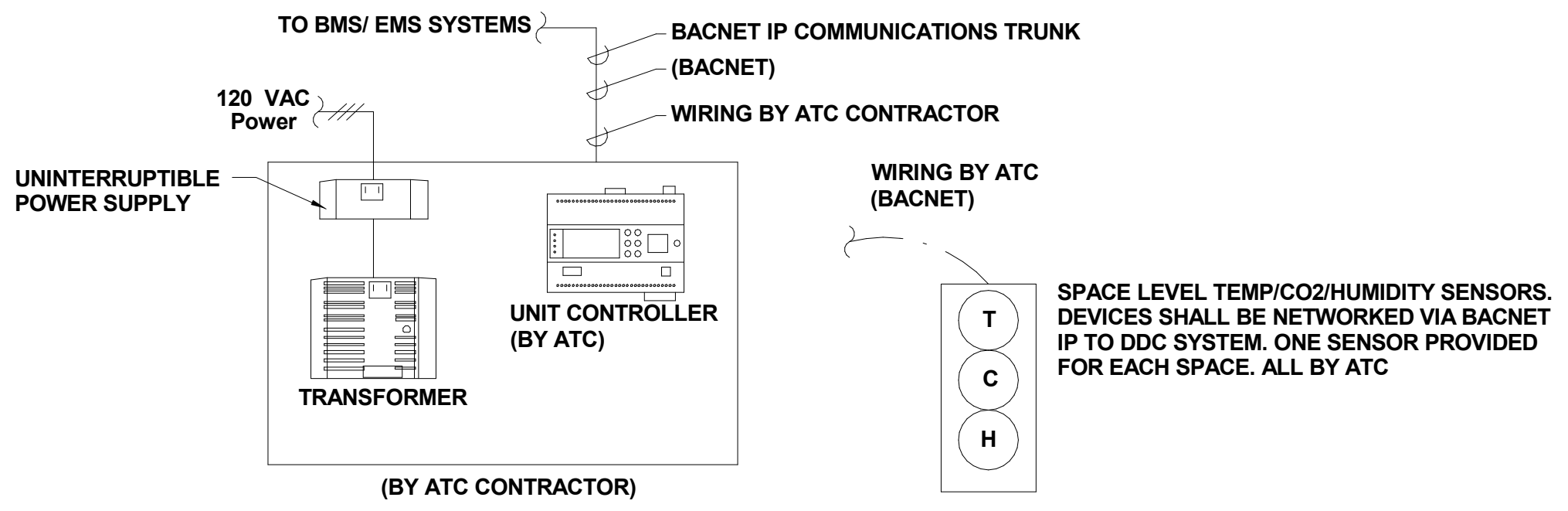
ANALOG INPUT TO DDC PANEL
TYP FOR 1
VSD FEEDBACK
UNIT MANUFACTURER
BY ATC


SAFETY INPUT TO RELAY BOARD
TYP FOR 6:
SA - SD
RA - SD
EF - HSP
SA - HSP
SA - LSP
LL - ALM
RELAY BOARD/PANEL SHALL MONITOR ALL SAFETIES ON UNIT AND HARDWIRE SHUTDOWN THE VFD'S. ALL ALARMS SHOULD BE MONITORED VIA HARDWIRE CONNECTION ON THE BAS.
DIGITAL INPUT TO DDC PANEL
TYP FOR 6
RELAY BOARD SIMILAR TO FUNCTIONAL DEVICES RIBMNLB-6




TO BMS/ EMS SYSTEMS
BACNET IP COMMUNICATIONS TRUNK (BACNET)
WIRING BY ATC CONTRACTOR
120 VAC Power
UNINTERRUPTIBLE POWER SUPPLY
TRANSFORMER
UNIT CONTROLLER (BY ATC)
(BY ATC CONTRACTOR)
WIRING BY ATC (BACNET)
T
C
H
SPACE LEVEL TEMP/CO2/HUMIDITY SENSORS. DEVICES SHALL BE NETWORKED VIA BACNET IP TO DDC SYSTEM. ONE SENSOR PROVIDED FOR EACH SPACE. ALL BY ATC

ROOF TOP UNITS

A DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE ROOFTOP AIR HANDLING UNIT OPERATION AS FOLLOWS:

RUN CONDITIONS - SCHEDULED:
THE RTU SHALL RUN BASED UPON AN OPERATOR-ADJUSTABLE SCHEDULE.

WARM-UP:
THE RTU SHALL BE ACTIVATED TO RAISE THE SPACE TEMPERATURE TO THE OCCUPIED SETPOINT OF 70°F. THE RTU OUTSIDE AND EXHAUST AIR DAMPERS SHALL BE CLOSED, THE RECIRCULATION DAMPER SHALL BE OPEN. THE CHILLED WATER CONTROL VALVE SHALL BE CLOSED, THE TOTAL ENERGY RECOVERY WHEEL SHALL BE DE-ENERGIZED & ASSOCIATED ERW BYPASS DAMPERS SHALL CLOSE. THE SUPPLY FAN SHALL START AND RECIRCULATE BUILDING AIR, THE EXHAUST FAN SHALL BE OFF. THE RTU HOT WATER CONTROL VALVE SHALL MODULATE OPEN AND THE UNIT DISCHARGE AIR SETPOINT DURING WARM-UP SHALL BE 85°F (ADJ.). ONCE THE SPACE HAS REACHED SPACE SETPOINT,THE RTU SHALL ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE WARM-UP MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE RISE TO DETERMINE WHEN TO ACTIVATE THE WARM UP MODE TO ENSURE THAT THE BUILDING HAS REACHED ITS SETPOINT FOR OCCUPIED MODE.

COOL-DOWN:
THE RTU OUTSIDE AND EXHAUST AIR DAMPERS SHALL BE CLOSED, THE RECIRCULATION DAMPER SHALL BE OPEN. THE HOT WATER CONTROL VALVE SHALL BE CLOSED, THE TOTAL ENERGY RECOVERY WHEEL SHALL BE DE-ENERGIZED & ASSOCIATED ERW BYPASS DAMPERS SHALL CLOSE. THE EXHAUST FAN SHALL BE OFF AND THE SUPPLY FAN SHALL START AND RECIRCULATE BUILDING AIR. THE RTU CHILLED WATER VALVE SHALL MODULATE OPEN AND THE UNIT DISCHARGE AIR SETPOINT DURING COOL-DOWN SHALL BE 55°F (ADJ.). ONCE THE SPACE HAS REACHED SPACE SETPOINT OF 78°F (ADJ.), THE RTU SHALL ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE COOL-DOWN MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE DECREASE TO DETERMINE WHEN TO ACTIVATE THE COOL DOWN MODE TO ENSURE THAT THE SPACE HAS REACHED ITS SETPOINT FOR OCCUPIED MODE. ECONOMIZER MODE OF OPERATION SHALL OVERRIDE NORMAL COOL-DOWN MODE OF OPERATION DURING UNOCCUPIED MODE.

OCCUPIED MODE:

GENERAL:
THE FANS START OR CONTINUE TO RUN AND THE RTU IS CONTROLLED AS FOLLOWS:
THE OUTSIDE AIR DAMPER SHALL OPEN TO ITS MINIMUM POSITION AS DETERMINED DURING BALANCING. THE EXHAUST DAMPER SHALL RECEIVE THE SAME SIGNAL AS THE OUTSIDE AIR DAMPER & BOTH SHALL MODULATE IN UNISON. THE RETURN AIR DAMPER SHALL RECEIVE THE OPPOSITE SIGNAL AS THE OUTSIDE AIR DAMPER. ALL THREE DAMPERS WILL MODULATE IN SEQUENCE WITHOUT OVERLAP. THE ENERGY RECOVERY WHEEL SHALL BE ACTIVATED, ERW BYPASS DAMPERS SHALL CLOSE AND THE WHEEL SHALL OPERATE PER THE SEQUENCES BELOW. THE SUPPLY AND EXHAUST FANS SHALL BE ACTIVATED OR CONTINUE TO RUN. THE SUPPLY AIR FAN SHALL MODULATE BETWEEN 60% & 100% SPEED TO MAINTAIN SPACE TEMP DURING HEATING & COOLING MODES. THE EXHAUST FAN SHALL MODULATE ITS SPEED BASED ON THE SUPPLY FAN SPEED MODULATION. FANS SHALL RUN AT 60% SPEED UNLESS THE AVERAGE SPACE SETPOINT CANNOT BE MET AFTER THE HOT WATER OR CHILLED WATER VALVE HAS BEEN OPEN FOR 5 MINUTES (ADJ.) OR UNLESS SPACE CO2 LEVELS RISE ABOVE 800 PPM. REFER TO CO2 DEMAND SEQUENCE FOR FURTHER INFORMATION. THE SYSTEMS OPERATING STATIC PRESSURE RANGES SHALL BE PROVIDED/OBTAINED THROUGH TESTING AND BALANCING CONTRACTOR DURING THE BALANCING PROCESS TO ESTABLISH MIN & MAX SETPOINTS. THE EXHAUST FAN WILL MODULATE ITS SPEED TO MAINTAIN THE SCHEDULED AIRFLOW OFFSET WITH THE SUPPLY FAN. THE RETURN AIR DAMPER AND EXHAUST AIR DAMPER SHALL MODULATE INVERSELY, ALLOWING THE RETURN AIR TO EITHER MIX WITH OA FOR TEMPERATURE CONTROL OR TO EXHAUST FROM THE UNIT.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND THE O.A. DAMPER, RECIRC DAMPER & E.A. DAMPER, ARE PROVEN OPEN. THE SUPPLY FAN SHALL MODULATE ITS SPEED BETWEEN 60% AND 100% TO MAINTAIN SPACE TEMPERATURE. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER-DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FAN:
THE EXHAUST FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND THE O.A. DAMPER & E.A. DAMPER, OR THE RECIRCULATION DAMPER ARE PROVEN OPEN. THE EXHAUST FAN SHALL MODULATE ITS SPEED BASED ON THE SUPPLY AIR FLOW, ACHIEVING THE SCHEDULED AIRFLOW OFFSET FROM THE SUPPLY FAN. THE EXHAUST FAN SHALL HAVE A USER DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

CURRENT SWITCHES SHALL BE INSTALLED ON THE SUPPLY AND RETURN FAN STARTERS. THE DDC SYSTEM USES THESE SWITCHES TO CONFIRM THE FANS ARE IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL.

TOTAL ENERGY RECOVERY WHEEL - VARIABLE SPEED:
THE CONTROLLER SHALL MODULATE THE TOTAL ENERGY RECOVERY WHEEL AS FOLLOWS:

COOLING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED AND/OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR COOLING RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE BELOW THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

HEATING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED AND/OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR HEAT RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE ABOVE THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

PERIODIC SELF-CLEANING:
THE TOTAL ENERGY RECOVERY WHEEL SHALL RUN AT 5% SPEED (ADJ.) FOR 10 SEC (ADJ.) EVERY 4HRS (ADJ.) THE UNIT RUNS.

WHEEL DEFROST CYCLE AND FROST PROTECTION:
IF THE WHEEL DIFFERENTIAL PRESSURE RISES 1 INCH. (ADJ.) AND THE OUTSIDE AIR TEMPERATURE IS BELOW 30°F (ADJ.), THE WHEEL SPEED SHALL BE REDUCED VIA WHEEL VARIABLE FREQUENCY DRIVE, OR THE ENERGY RECOVERY WHEEL FACE & BYPASS DAMPERS SHALL MODULATE OPEN TO BYPASS THE WHEEL UNTIL THE PRESSURE RETURNS TO NORMAL. WHEEL DEFROST CONTROL SEQUENCE SHALL BE CHOSEN PER MANUFACTURER'S RECOMMENDATIONS. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- RECOVERY WHEEL ROTATION FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RECOVERY WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- RECOVERY WHEEL RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).
- RECOVERY WHEEL VFD IN FAULT

COOLING AND DEHUMIDIFICATION - CHILLED WATER:
COOLING: OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-COOLED BY THE INCOMING RETURN AIR. UPON SENSING A MIXED AIR TEMPERATURE AND/OR MIXED AIR HUMIDITY ABOVE THE SCHEDULED SUPPLY AIR DISCHARGE SETPOINTS, THE CHILLED WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO COOL AND DEHUMIDIFY THE INCOMING AIR. THE COOLING COIL SHALL MODULATE TO MAINTAIN THE AVERAGE SPACE TEMPERATURE SETPOINT OF 75°F AT 50% RH.
DEHUM: IF THE AVERAGE ZONE TEMPERATURE DROPS BELOW SETPOINT BY 3°F FOR GREATER THAN 10 MINUTES WHILE COOLING IS ENABLED AND THE SPACE HUMIDITY IS ABOVE SETPOINT, THE FANS SHALL FURTHER MODULATE DOWN IN 10% SPEED INCREMENTS EACH 10 MINUTES THE AVERAGE ZONE TEMPERATURE REMAINS BELOW SETPOINT. THIS LOOP SHALL CONTINUE UNTIL THE ZONE TEMPERATURE IS SATISFIED OR THE FAN SECTION REACHES MINIMUM TURNDOWN. IF THE AVERAGE ZONE TEMPERATURE REMAINS BELOW SETPOINT FOR AN ADDITIONAL 10 MINUTES, THE UNIT REHEAT COIL SHALL BE ENGAGED TO RAISE THE DISCHARGE AIR TEMPERATURE UNTIL SETPOINT IS SATISFIED. THE COOLING COIL AND HOT WATER COIL (REHEAT) SHALL BE ENABLED WHENEVER:
- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS GREATER THAN 55°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS ABOVE THE DESIRED SETPOINT.
- OR SPACE TEMPERATURE IS CALLING FOR COOLING

HEATING - HOT WATER:
OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-HEATED BY THE INCOMING RETURN AIR. UPON SENSING AN AVERAGE ZONE TEMPERATURE BELOW THE DESIRED ZONE TEMPERATURE SETPOINT OF 70°F (ADJ.) THE HOT WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO HEAT THE INCOMING AIR TO MAINTAIN A SUPPLY AIR DISCHARGE SETPOINT OF 70°F (ADJ.). IF THE AVERAGE ZONE TEMPERATURE DROPS BELOW SETPOINT BY 3°F FOR GREATER THAN 10 MINUTES WHILE HEATING IS ENABLED, THE HOT WATER CONTROL VALVE SHALL MODULATE, RAISING THE DISCHARGE AIR TEMPERATURE IN A 5°F INCREMENT. IF THE AVERAGE ZONE TEMPERATURE REMAINS BELOW SETPOINT FOR AN ADDITIONAL 5 MINUTES, THE HEATING COIL SHALL AGAIN RAISE THE DISCHARGE AIR TEMPERATURE IN THIS FASHION. THIS ITERATION SHALL REPEAT UNTIL THE AVERAGE ZONE SETPOINT IS SATISFIED. THE OPPOSITE SHALL OCCUR IF THE AVERAGE ZONE TEMPERATURE EXCEEDS SETPOINT.

- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS BELOW THE DESIRED SETPOINT.
- OR COOLING IS ACTIVATED AND REHEAT IS REQUIRED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- LOW ENTERING AIR TEMP: IF THE MIXED AIR OR COOLING COIL LEAVING AIR TEMPERATURE IS LESS THAN 38°F (ADJ.).

ECONOMIZER (DUAL ENTHALPY CONTROL):
THE CONTROLLER SHALL MEASURE THE RETURN AND OUTSIDE AIR ENTHALPIES AND MODULATE THE OUTSIDE AIR DAMPER, RECIRCULATION DAMPER AND WHEEL BYPASS DAMPERS AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL ENERGY RECOVERY WHEEL SHALL BE OFF DURING UNOCCUPIED MODE. THE ECONOMIZER SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN RETURN AIR ENTHALPY.
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
- AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL BE DISABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE DROPS BELOW 40°F (ADJ.).
- OR ON LOSS OF SUPPLY FAN STATUS.
- OR THE FREEZESTAT IS ON.

UNOCCUPIED MODE:
UNDER THIS MODE, ALL RTUS SHALL BE OFF & DAMPERS CLOSED. THE RTU SHALL MODULATE AS REQUIRED TO MAINTAIN THE SPACE UNOCCUPIED SETPOINT OF 55°F (ADJ.) IN THE WINTER. THE RTUS SHALL BE ACTIVATED & FUNCTION AS INDICATED IN WARM-UP MODE W/ THE EXCEPTION THAT THE FAN SPEED WOULD BE REDUCED TO 60% (ADJ.). DURING THE SUMMER MONTHS, WHEN OAT IS ABOVE 80°F (ADJ.) AND/OR RH IS ABOVE 70% (ADJ.) & THE SPACE UNOCCUPIED TEMPERATURE SETPOINTS OF 85°F (ADJ.) & UNOCCUPIED HUMIDITY SETPOINT OF 70% RH (ADJ) ARE NOT MAINTAINED, THE RTUS WILL BE ACTIVATED & FUNCTION AS INDICATED IN THE COOL-DOWN MODE W/ THE EXCEPTION THAT THE FAN SPEED WOULD BE REDUCED TO 60% (ADJ.).

SAFETY SEQUENCES

EMERGENCY SHUTDOWN:
UPON RECEIVING A SIGNAL FROM THE FIRE ALARM SYSTEM, THE UNIT'S FANS SHALL SHUTDOWN, ALL DAMPERS SHALL CLOSE, HOT AND CHILLED WATER VALVES SHALL CLOSE AND AN ALARM SHALL BE GENERATED AT THE BMS. THIS MODE SHALL BE CALLED EMERGENCY SHUTDOWN MODE. ATC CONTRACTOR SHALL HARD WIRE A DIRECT CONNECTION FROM THE FIRE ALARM PANELS DRY CONTACTS TO THE BMS. ALL ASSOCIATED VAV BOXES SHALL CLOSE.
LOW LEAVING TEMPERATURE:
UPON A LOW LEAVING TEMPERATURE CONDITION (38°F ADJ) SENSED BY THE FREEZESTAT SENSOR, CO2 DEMAND CONTROL SHALL BE OVERRIDDEN, THE OUTSIDE AIR AND EXHAUST AIR DAMPER SHALL CLOSE, AND THE SUPPLY AND EXHAUST AIR FAN SHALL SHUT DOWN AND AN ALARM SHALL BE GENERATED.

SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS.

CASING TEMPERATURE SETPOINT:
THE DDC SYSTEM SHALL MONITOR THE UNIT CASING TEMPERATURE SETPOINT (BY THE MAT SENSOR). THE HOT WATER HEATING COIL VALVE SHALL OPEN TO MAINTAIN A 40°F (ADJ.) MINIMUM CASING TEMPERATURE SETPOINT.

STAGED OPTIMIZED START/STOP OPERATION:
ALL UNIT CONTROLLERS SHALL BE EQUIPPED WITH OPTIMAL START/STOP OPERATION AND TIME OF DAY SCHEDULING. UNITS SHALL START UP DURING MORNING WARM-UP/COOL-DOWN MODES IN A STAGGERED MANNER SUCH THAT ALL EQUIPMENT IS NOT STARTED AT THE SAME TIME.

ADDITIONAL ALARMS:

OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE PREFILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

RETURN AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FINAL FILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

SPACE HUMIDITY SENSOR:
THE DDC SYSTEM SHALL MONITOR THE SPACE HUMIDITY SENSORS AND REPORT THE INFORMATION TO THE BUILDING DDC SYSTEM ROOM GRAPHICS. UPON A HIGH SPACE HUMIDITY LEVEL ABOVE 80% RH (ADJ.) AN ALARM WILL BE GENERATED IN THE BMS & THE UNIT WILL ENTER THE COOL DOWN MODE.

OVERRIDE:
THE SPACE MOUNTED TEMPERATURE SENSOR SHALL HAVE A PUSH BUTTON OVERRIDE CAPABILITY. UPON ACTIVATION OF THE THERMOSTAT OVERRIDE BUTTON THE ASSOCIATED ROOFTOP UNIT SHALL CHANGE TO OCCUPIED MODE FOR A PERIOD OF 2 HOURS (ADJ).

CO2 ALARM : UPON A RISE IN SPACE CO2 10% OR MORE THAN THE DESIGN OF 800 PPM (ADJ.) AN ALARM WILL BE GENERATED AT THE BMS WITH A 20 MIN. (ADJ.) DELAY.

CO2 DEMAND CONTROL VENTILATION (DCV):
UPON A RISE IN SPACE CO2 (GREATER THAN 800 PPM) THE RTU'S RESPECTIVE OUTSIDE AIR DAMPER SHALL MODULATE OPEN FROM ITS MINIMUM POSITION AND THE RETURN DAMPER SHALL BEGIN TO MODULATE CLOSED IN UNISON. UPON A RISE IN SPACE CO2 10% OR MORE THAN THE DESIGN OF 800 PPM (ADJ) AN ALARM WILL BE GENERATED AT THE BMS WITH A 20 MIN. (ADJ.) DELAY. THE FANS SHALL BEGIN TO RAMP UP TO INCREASE VENTILATION. ONCE LEVELS BEGIN TO DROP BELOW 800 PPM, THE RTU SHALL RETURN TO OCCUPIED MODE, AND THE DAMPERS & FANS SHALL MODULATE TO MAINTAIN DISCHARGE AIR & SPACE TEMPERATURE & HUMIDITY.

CO2 DEMAND CONTROL OVERRIDE:
FOR ALL RTU'S EQUPPED WITH CO2 DEMAND CONTROL VENTILATION, THE ATC CONTRACTOR SHALL CREATE A SEQUENCE OF OPERATION AND ASSOCIATED GRAPHIC USER INTERFACE (GUI) BUTTON THAT SHALL BE CAPABLE OF ALLOWING THE BMS OPERATOR TO DISENGAGE AND RE-ENGAGE THE CO2 DEMAND VENTILATION CONTROL CAPABILITIES OF THE ASSOCIATED AIR DISTRIBUTION SYSTEM. A SOFTWARE NOTIFICATION SHALL BE GENERATED WHEN THIS MODE OF OPERATION IS ACTIVATED. THIS SEQUENCE AND GUI BUTTON SHALL BE PROVIDED FOR EACH INDIVIDUAL RTU AND A MASTER COMMAND GUI BUTTON SHALL ENGAGE/DISENGAGE THE MODE FOR ALL RTU'S. UNDER THIS MODE, THE VENTILATION OVERRIDE SHALL ALLOW THE ROOFTOP UNIT TO OPERATE AT IT'S MAXIMUM AIRFLOW AND MAXIMUM OUTSIDE AIR VENTILATION RATE. MORNING WARM-UP AND COOL DOWN MODES FOR THIS MODE OF OPERATION SHALL ALSO OPERATE WITH MAXIMUM OUTSIDE AIR ENABLED WHEN CO2 CONTOL OVERRIDE IS ENABLED. OUTSIDE AIR VENTILATION SHALL BE ENABLED AT A MINIMUM OF TWO HOURS (ADJ) PRIOR TO SCHEDULED OCCUPIED TIME, AND SHALL CONTINUE TO RUN TWO HOURS (ADJ) POST SCHEDULED OCCUPANCY.

EXTREME WEATHER MODE:
THROUGH THE BMS WEATHER STATION, WHEN WIND SPEED NUMBERS ABOVE 50 MPH (ADJ) AND RTU'S ARE IN OCCUPIED MODE, ALL OUTSIDE AIR DAMPERS SHALL CLOSE AND UNIT SHALL GO INTO RECIRCULATION MODE BUT STILL MAINTAIN OCCUPIED SETPOINTS. DURING THIS CONDITION AN ALARM SHALL BE GENERATED AT THE BMS INDICATING HIGH WINDS - OA DAMPER CLOSED.

ECONOMIZER OVERRIDE:
FOR ALL RTU'S EQUPPED WITH ECONOMIZER CONTROL, THE ATC CONTRACTOR SHALL CREATE A SEQUENCE OF OPERATION AND ASSOCIATED GRAPHIC USER INTERFACE (GUI) BUTTON THAT SHALL BE CAPABLE OF ALLOWING THE BMS OPERATOR TO DISENGAGE AND RE-ENGAGE THE ECONOMIZER CONTROL CAPABILITIES OF THE RTU. A SOFTWARE NOTIFICATION SHALL BE GENERATED WHEN THIS MODE OF OPERATION IS ACTIVATED. THIS SEQUENCE AND GUI BUTTON SHALL BE PROVIDED FOR EACH INDIVIDUAL RTU AND IN ADDITION A MASTER COMMAND GUI BUTTON SHALL ENGAGE/DISENGAGE THE MODE FOR ALL RTU'S. UNDER THIS MODE, THE ECONOMIZER OVERRIDE SHALL ALLOW THE ROOFTOP UNIT TO OPERATE ITS HOT WATER AND/OR CHILLED WATER CONTROL VALVES TO MAINTAIN THE DAT SETPOINT. THE OUTSIDE AND RETURN AIR DAMPERS SHALL FUNCTION AS INDICATED IN THE OCCUPIED MODE. THE VARIABLE AIR VOLUME BOXES SHALL MODULATE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AND CO2 SETPOINTS.

RTU HANDLING UNITS	BMS CONTROL POINTS					
POINT NAME	AI	AO	BI	BO	ALARM	REMARKS
OUTSIDE AIR FLOW MEASURING STATION	X				X	NOTE #1
SUPPLY AIR FLOW MEASURING STATION	X					NOTE #6
EXHAUST AIR FLOW MEASURING STATION	X					NOTE #6
OUTSIDE AIR TEMP	X					CENTRAL POINT
OUTSIDE AIR HUMIDITY	X					CENTRAL POINT
EXHAUST AIR TEMP	X					
EXHAUST AIR HUMIDITY	X					
ENERGY RECOVERY HEAT WHEEL DISCHARGE AIR TEMP	X				X	ALARM BELOW 38°
ENERGY RECOVERY WHEEL DISCHARGE AIR HUMIDITY	X					
MIXED AIR TEMP & HUMIDITY	X				X	
COOLING COIL AIR TEMP & HUMIDITY	X				X	
HEATING COIL AIR TEMP	X				X	
SUPPLY AIR TEMP	X				X	
SUPPLY AIR HUMIDITY	X					
SUPPLY AIR STATIC PRESSURE	X	X			X	
OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR HUMIDITY	X					
RETURN AIR TEMP	X					
RETURN AIR STATIC PRESSURE	X	X			X	
CHILLED WATER CONTROL VALVE	X	X			X	
HOT WATER CONTROL VALVE	X	X			X	
RE-CIRC AIR DAMPER	X	X			X	
OUTSIDE AIR DAMPER	X	X			X	
EXHAUST AIR DAMPER	X	X			X	
RETURN AIR SMOKE DETECTOR			X		X	
SUPPLY AIR SMOKE DETECTOR			X		X	
COOLING SUPPLY AIR SET POINT	X	X				
HEATING SUPPLY AIR SET POINT	X	X				
EMERGENCY SHUT DOWN					X	
HIGH COOLING SUPPLY AIR TEMP					X	10° ABOVE
HIGH HEATING SUPPLY AIR TEMP					X	10° ABOVE
LOW HEATING SUPPLY AIR TEMP					X	10° BELOW
OUTSIDE AIR FILTER CHANGE REQUIRED					X	
RETURN AIR FILTER CHANGE REQUIRED					X	
HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION					X	880 PPM ALRM
HIGH RETURN AIR HUMIDITY					X	75% RH ALARM
LOW RETURN AIR TEMP					X	60° OR LESS
HIGH RETURN AIR TEMP					X	85° OR ABOVE
SPACE CO2	X				X	880 PPM ALRM
FREEZESTAT			X		X	NOTE #5
CASING LOW LIMIT TEMPERATURE	X				X	38° ALRM
ERW OA FACE & BYPASS DAMPER			X	X		
ERW EA FACE & BYPASS DAMPER			X	X		
SUPPLY LOW STATIC SAFETY			X			NOTE #7
SUPPLY HI STATIC SAFETY			X			NOTE #7
RETURN LOW STATIC SAFETY			X			NOTE #7
RETURN HI STATIC SAFETY			X			NOTE #7
VFD POINTS						
ENERGY RECOVERY WHEEL VFD SPEED	X	X				HARDWIRE
SUPPLY FAN VFD SPEED	X	X				HARDWIRE
EXHAUST FAN VFD SPEED	X	X				HARDWIRE
SUPPLY FAN STATUS			X		X	HARDWIRE
EXHAUST FAN STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL VFD FAULT			X		X	
SUPPLY FAN VFD FAULT			X		X	
EXHAUST FAN VFD FAULT			X		X	
SUPPLY FAN START/STOP				X		HARDWIRE
EXHAUST FAN START/STOP				X		HARDWIRE
ENERGY RECOVERY WHEEL START/STOP				X		HARDWIRE
SUPPLY FAN FAILURE					X	
SUPPLY FAN IN HAND					X	
EXHAUST FAN FAILURE					X	
EXHAUST FAN IN HAND					X	
ENERGY RECOVERY WHEEL ROTATION FAILURE					X	
ENERGY RECOVERY WHEEL IN HAND					X	
TOTAL WHEEL RUNTIME EXCEEDED					X	

NOTES:

1. OUTSIDE AIRFLOW MEASURING STATION FURNISHED BY UNIT MANUFACTURER & PROGRAMMING SHALL BE PROVIDED BY ATC. ALARM POINT SHALL BE INITIATED AT THE BMS WHEN VALUE IS 10% ABOVE OR BELOW SCHEDULED VALUE.
2. ALL SETPOINTS AND SCHEDULES, PROVIDED FROM ATC CONTRACTOR (UNLESS SPECIFICALLY NOTED OTHERWISE) AND RTU MANUFACTURER CONTROLLER, SHALL BE ADJUSTABLE THROUGH THE BMS SYSTEM
3. ALL ATC (DDC) CONTROL SENSORS AND CONTROL VALVES PROVIDED BY ATC CONTRACTOR. REFER TO SCHEDULE FOR REQUIRED I/O PARAMETERS
4. ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE
5. FREEZESTAT SHALL BE AUTO-RESET TYPE
6. SUPPLY & EXHAUST AIRFLOW MEASURING PROBES SHALL BE PROVIDED BY RTU MANUFACTURER. ATC CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING/REPORTING AIRFLOW MEASUREMENT DATA FROM RTU SUPPLY & EXHAUST FAN TO THE BMS.
7. HI/LOW STATIC ALARM SHALL BE ACTIVATED WHEN DP IS +/-15% (ADJ) FROM NORMAL OPERATING DP.
8. DAMPERS WITHIN THE UNIT SHALL BE PROVIDED BY RTU MANUFACTURER, ACTUATORS W/POSITION FEEDBACK ARE TO BE PROVIDED BY ATC CONTRACTOR.

ABBREVIATIONS

AFVP	AIRFLOW VELOCITY PROBE
ALM	ALARM
AQ	AQUASTAT
ATC	AUTOMATIC TEMPERATURE CONTROLS
BLDG	BUILDING
BLR	BOILER
BMS	BUILDING MANAGEMENT SYSTEM (ENERGY & AUTOMATION)
CM	CONSTRUCTION MANAGER
COMB	COMBUSTION
CONTR	CONTROLLER
CO2	CARBON DIOXIDE
CR	CONTROL RELAY
CS	CURRENT SENSOR
CUV	CABINET UNIT VENTILATOR
D	DAMPER
DA	DISCHARGE AIR
DAS	DISCHARGE AIR SENSOR
DAT	DISCHARGE AIR TEMPERATURE
DCV	DEMAND CONTROL VENTILATION
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DDC	DIRECT DIGITAL CONTROL
DO	DAMPER OPERATOR
DP	DIFFERENTIAL PRESSURE
DPR	DAMPER
DPV	DIFFERENTIAL PRESSURE VALVE
EA	EXHAUST AIR
EF	EXHAUST FAN
F	FLOW/FARENHEIT (AS APPLICABLE)
FB	FACE & BYPASS
FD	FIRE DAMPER
H	HUMIDITY
HS	ENTHALPY SENSOR
HT	HIGH TEMPERATURE
HTG	HEATING
HR	HEAT RECOVERY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LT	LOW TEMPERATURE
M	MOTOR
MAT	MIXED AIR TEMPERATURE
NAC	NETWORK APPLICATION CONTROLLER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OVR	OVERRIDE
P	PRESSURE
PB	PUSH BUTTON
PNL	PANEL
RA	RETURN AIR
REL	RELIEF AIR
RF	RETURN FAN
RFC	RETURN FAN CONTROLLER
RM	ROOM
SA	SUPPLY AIR
SD	SMOKE DAMPER OR SMOKE DETECTOR
SF	SUPPLY FAN
SFC	SUPPLY FAN CONTROLLER
SP	STATIC PRESSURE
T	TEMPERATURE
TEC	TERMINAL EQUIPMENT CONTROLLER
VAC	VOLTS - ALTERNATING CURRENT
VDC	VOLTS - DIRECT CURRENT
VFD	SEE VSD
VLV	VALVE
VP	VELOCITY PROBE (AIRFLOW)
VSD	VARIABLE SPEED (FREQUENCY) DRIVE
XFMR	TRANSFORMER

ATC/BMS GENERAL NOTES

1. ALL SETPOINTS INDICATED IN THE SEQUENCE OF OPERATIONS SHALL BE ADJUSTABLE ON GRAPHICAL INTERFACE.
2. THE CONTROL POINTS LISTED IN THE SUMMARY MATRIX ARE THE MINIMUM CONTROL POINTS REQUIRED. ATC CONTRACTOR SHALL PROVIDE ALL CONTROL POINTS AS REQUIRED FOR COMPLETE SYSTEM CONTROL PER THE SEQUENCE OF OPERATIONS.
3. ALL CONTROL WIRING, SENSORS, RELAYS, CONTROLLERS, PANELS, DAMPERS, ACTUATORS, ETC. INDICATED ON THE CONTROL DIAGRAMS SHALL BE PROVIDED BY THE ATC CONTRACTOR UNLESS NOTED OTHERWISE.
4. ALL HHW VALVES SHALL BE FAIL OPEN ON LOSS OF POWER.
5. ALL HHW WATER VALVES SHALL BE MODULATING TYPE FOR GPM > 2.0; 2-POSITION ACCEPTABLE FOR FLOWS < 2.0 GPM
6. ATC CONTRACTOR TO COORDINATE W/ OWNER FOR ALL COMMUNICATION & INTERFACE REQUIREMENTS TO CENTRAL OPERATING STATION. REFER TO SPEC FOR FURTHER INFO.
7. DUCT SMOKE DETECTORS INDICATED ARE TO BE FURNISHED BY DIV. 260000 & INSTALLED BY HVAC CONTRACTOR. POWER WIRING AND FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR TO PROVIDE BMS INTERLOCK TO SHUT ASSOCIATED UNIT DOWN AND INITIATE AN ALARM UPON ACTIVATION
8. ALL SMOKE DAMPERS SHALL BE COMBINATION SMOKE/FIRE DAMPERS, SHALL BE FURNISHED & INSTALLED BY HVAC CONTRACTOR, AND POWER WIRED BY ELECTRICAL CONTRACTOR. DAMPERS SHALL BE MOTOR OPERATED WITH 24 VOLT / 120 VOLT ACTUATOR. FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. DAMPER ENDSWITCH INTEGRATION TO BMS BY ATC CONTRACTOR.
9. ALL ATC CONTROLS SHALL BE POWER WIRED FROM DESIGNATED EMERGENCY POWER JUNCTION BOXES LOCATED ON THE ELECTRICAL DRAWINGS. JUNCTION BOXES WILL BE FED BY EMERGENCY POWER, THEREFORE ALL CONTROLS SHALL BE ON EMERGENCY POWER. ANY SUB ATC PANELS REQUIRED SHALL BE FED FROM EMERGENCY POWER & ALL SHALL BE PROVIDED BY ATC CONTRACTOR. ALL UNIT CONTROLS SHALL BE FED BY EMERGENCY POWER & NOT THROUGH THE UNIT'S MAIN POWER SOURCE.
10. ALL DENSELY OCCUPIED SPACES WITH OCCUPANT DENSITY OF 25 PEOPLE OR MORE PER 1000 SQ/FT SHALL BE PROVIDED W/ ROOM LEVEL TEMPERATURE, CO2, & HUMIDITY SENSORS W/ CO2 CONTROL. THIS SHALL BE PROVIDED IN COMPLIANCE WITH LEED v.4 CREDIT IEQC1. (PROVIDED BY FMS CONTRACTOR & INSTALLED BY ATC CONTRACTOR)

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320 SALEM ST.
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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:
90% CONSTRUCTION DOCUMENTS
09/25/2026

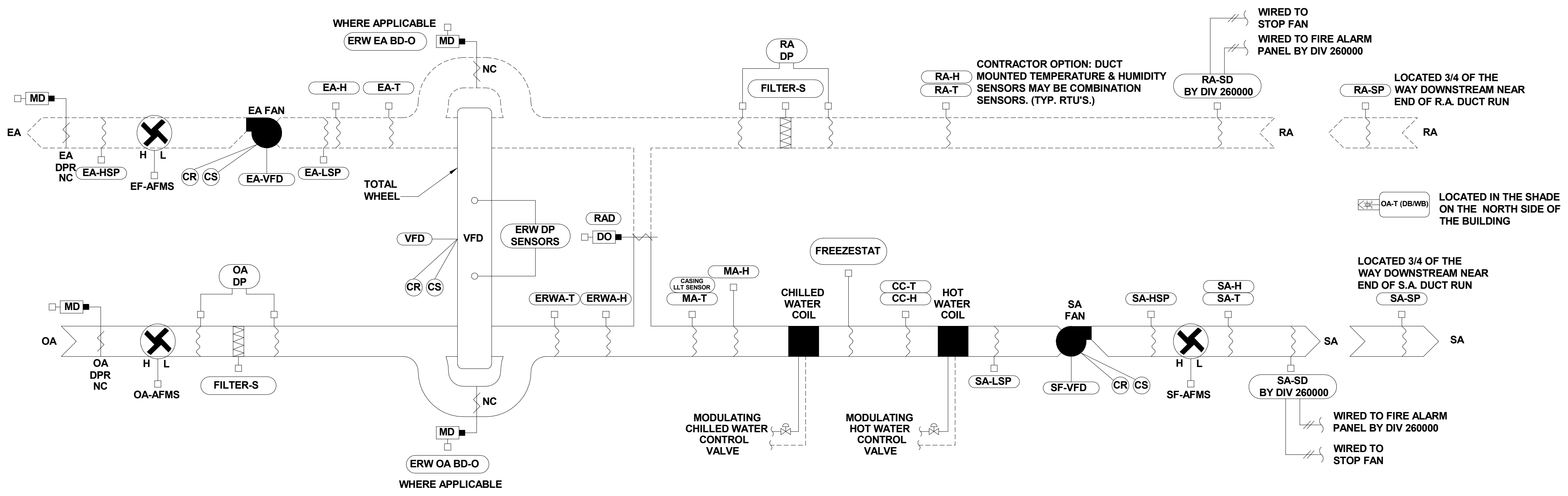
KEY PLAN

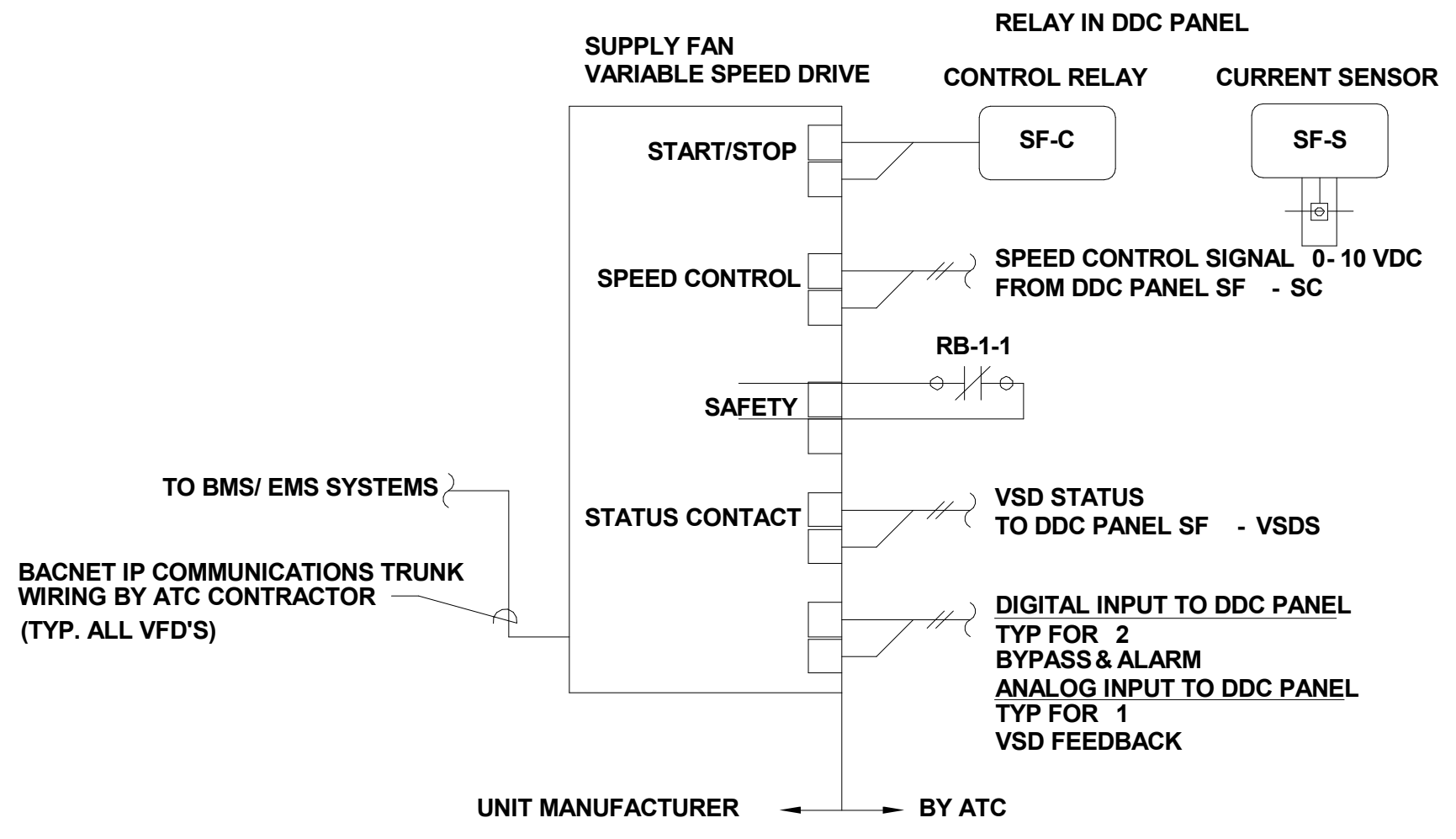
ORIENTATION AND SCALE:
SCALE: AS INDICATED

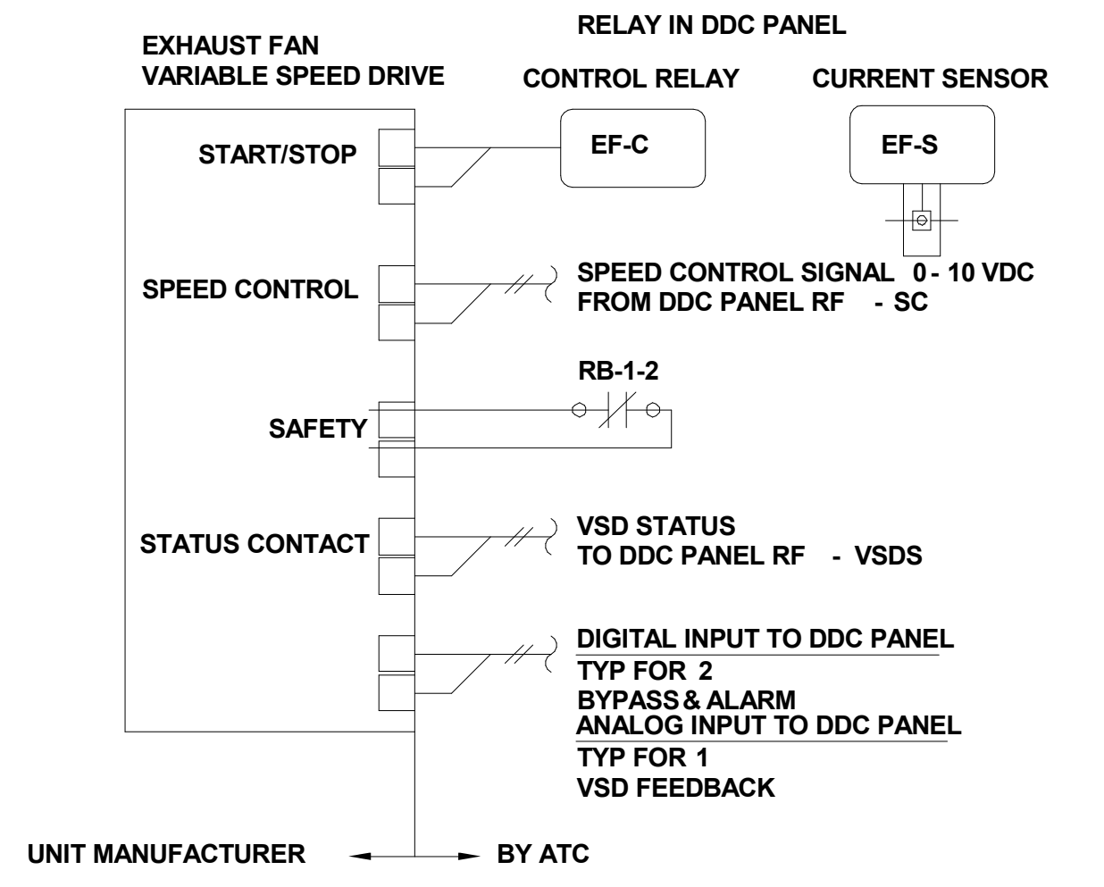
SHEET TITLE:
CONTROLS III

SHEET NUMBER:
M4.13

RTU-5 - MIXED AIR DISPLACEMENT VENTILATION AIR HANDLING SYSTEM w/ DEMAND CONTROL VENTILATION - SINGLE ZONE




SUPPLY FAN VARIABLE SPEED DRIVE
RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
SF-C
SF-S
SPEED CONTROL
SPEED CONTROL SIGNAL 0- 10 VDC FROM DDC PANEL SF - SC
RB-1-1
SAFETY
TO BMS/ EMS SYSTEMS
STATUS CONTACT
VSD STATUS TO DDC PANEL SF - VSDS
BACNET IP COMMUNICATIONS TRUNK WIRING BY ATC CONTRACTOR (TYP. ALL VFD'S)
DIGITAL INPUT TO DDC PANEL
TYP FOR 2
BYPASS & ALARM
ANALOG INPUT TO DDC PANEL
TYP FOR 1
VSD FEEDBACK
UNIT MANUFACTURER
BY ATC


EXHAUST FAN VARIABLE SPEED DRIVE
RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
EF-C
EF-S
SPEED CONTROL
SPEED CONTROL SIGNAL 0- 10 VDC FROM DDC PANEL RF - SC
RB-1-2
SAFETY
STATUS CONTACT
VSD STATUS TO DDC PANEL RF - VSDS
DIGITAL INPUT TO DDC PANEL
TYP FOR 2
BYPASS & ALARM
ANALOG INPUT TO DDC PANEL
TYP FOR 1
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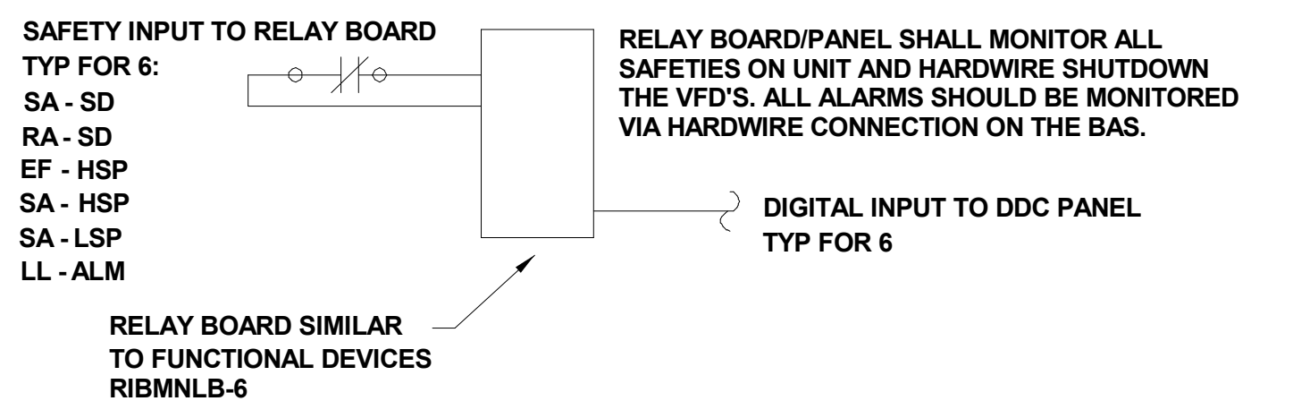
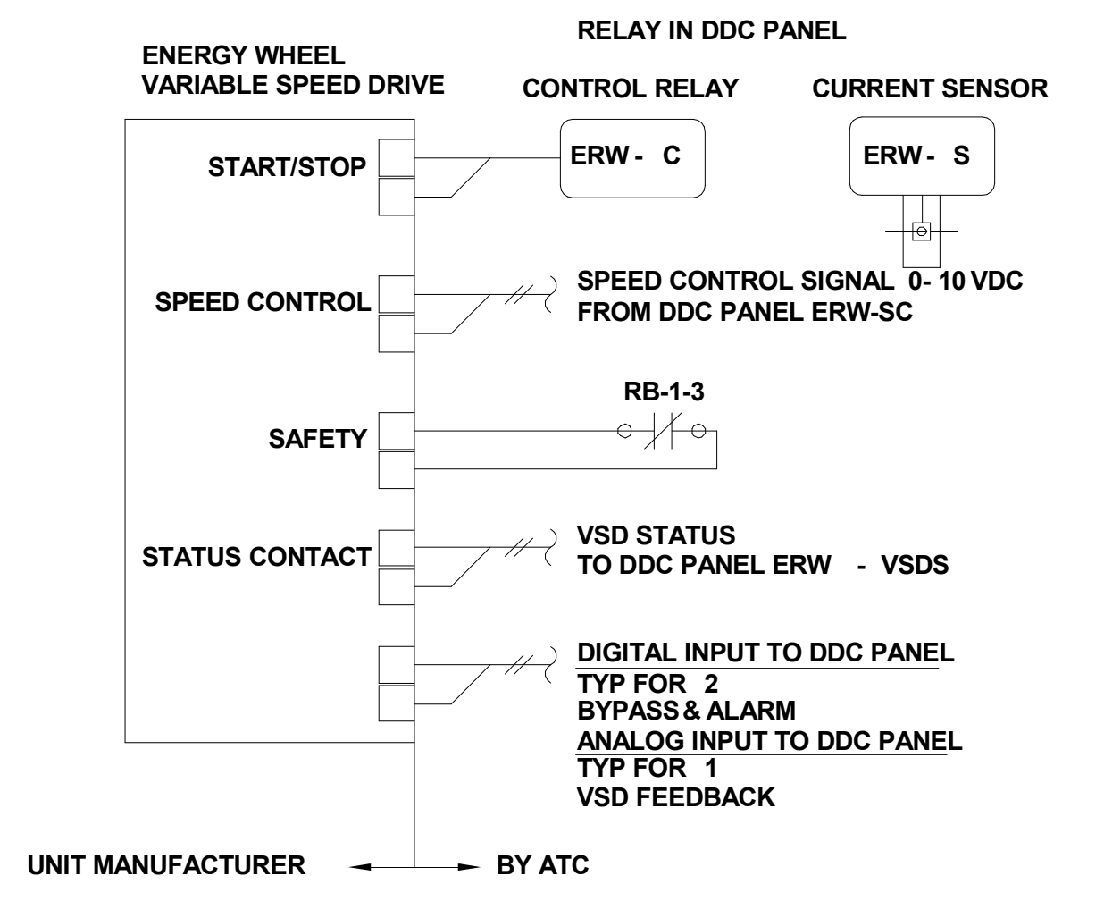
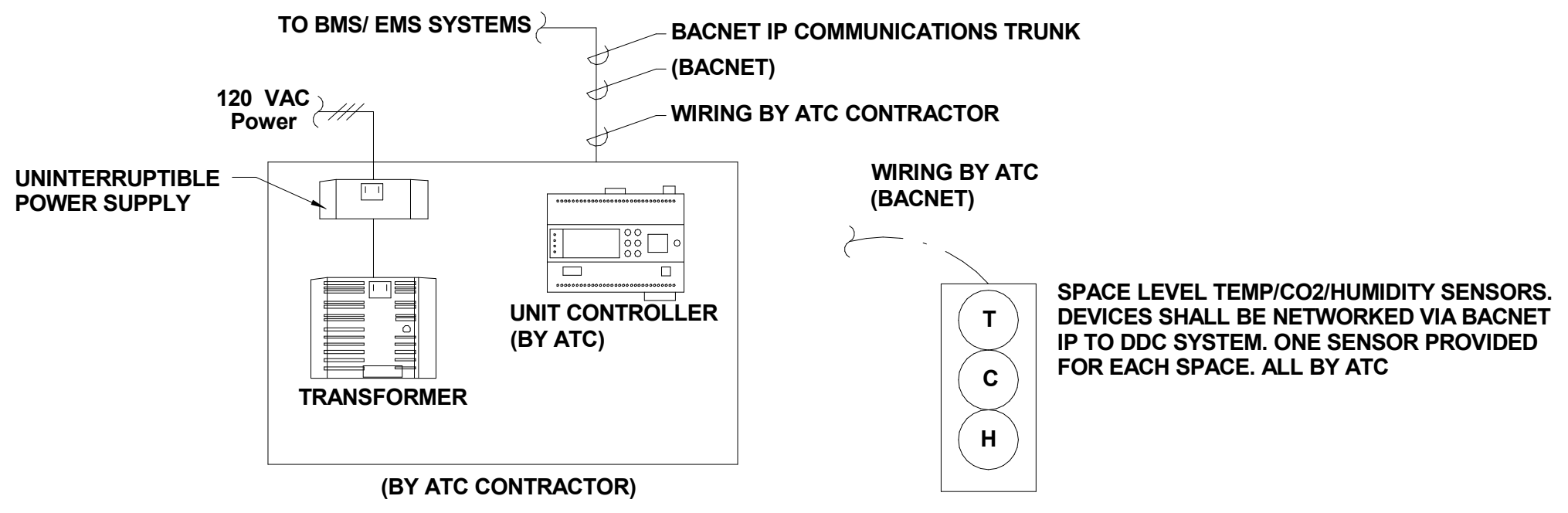
BY ATC


SAFETY INPUT TO RELAY BOARD
TYP FOR 6:
SA - SD
RA - SD
EF - HSP
SA - HSP
SA - LSP
LL - ALM
RELAY BOARD/PANEL SHALL MONITOR ALL SAFETIES ON UNIT AND HARDWIRE SHUTDOWN THE VFD'S. ALL ALARMS SHOULD BE MONITORED VIA HARDWIRE CONNECTION ON THE BAS.
DIGITAL INPUT TO DDC PANEL
TYP FOR 6
RELAY BOARD SIMILAR TO FUNCTIONAL DEVICES RIBMNLB-6




TO BMS/ EMS SYSTEMS
BACNET IP COMMUNICATIONS TRUNK
(BACNET)
WIRING BY ATC CONTRACTOR
120 VAC Power
UNINTERRUPTIBLE POWER SUPPLY
TRANSFORMER
UNIT CONTROLLER (BY ATC)
(BY ATC CONTRACTOR)
WIRING BY ATC (BACNET)
T
C
H
SPACE LEVEL TEMP/CO2/HUMIDITY SENSORS. DEVICES SHALL BE NETWORKED VIA BACNET IP TO DDC SYSTEM. ONE SENSOR PROVIDED FOR EACH SPACE. ALL BY ATC

ROOF TOP UNITS

A DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE ROOFTOP AIR HANDLING UNIT OPERATION AS FOLLOWS:

RUN CONDITIONS - SCHEDULED:
THE RTU SHALL RUN BASED UPON AN OPERATOR-ADJUSTABLE SCHEDULE.

WARM-UP: THE TERMINAL HEATING UNITS (RADIANT PANELS, WALL RADIATION UNITS, FINTUBE, ETC) VALVES SHALL MODULATE OPEN TO RAISE THE SPACES TO THE OCCUPIED SET POINT OF 70°F (ADJ.). ONCE BUILDING HAS REACHED SPACE SETPOINT, THE TERMINAL HEATING UNITS SHALL ENTER THE OCCUPIED MODE, ALLOWING THEIR HOT WATER VALVES TO MODULATE AS REQUIRED TO MAINTAIN THE SPACE SETPOINT. THE RTU SHALL ALSO ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE WARM-UP MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE RISE TO DETERMINE WHEN TO ACTIVATE THE WARM UP MODE TO ENSURE THAT THE BUILDING HAS REACHED ITS SETPOINT FOR OCCUPIED MODE.

COOL-DOWN: THE TERMINAL COOLING UNIT (RADIANT PANELS, FCU'S) VALVES SHALL MODULATE OPEN TO LOWER THE SPACES TO THE OCCUPIED SETPOINT OF 75°F (ADJ.). ONCE THE BUILDING HAS REACHED SPACE SETPOINT OF 75°F (ADJ.), THE RTU SHALL ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE COOL-DOWN MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE DECREASE TO DETERMINE WHEN TO ACTIVATE THE COOL DOWN MODE TO ENSURE THAT THE BUILDING HAS REACHED ITS SETPOINT FOR OCCUPIED MODE. ECONOMIZER MODE OF OPERATION SHALL OVERRIDE NORMAL COOL-DOWN MODE OF OPERATION DURING UNOCCUPIED MODE.

OCCUPIED MODE:

GENERAL:
THE FANS START OR CONTINUE TO RUN AND THE RTU IS CONTROLLED AS FOLLOWS:
THE OUTSIDE AIR DAMPER SHALL OPEN TO ITS MINIMUM POSITION AS DETERMINED DURING BALANCING. THE EXHAUST DAMPER SHALL RECEIVE THE SAME SIGNAL AS THE OUTSIDE AIR DAMPER & BOTH SHALL MODULATE IN UNISON. THE RETURN AIR DAMPER SHALL RECEIVE THE OPPOSITE SIGNAL AS THE OUTSIDE AIR DAMPER. ALL THREE DAMPERS WILL MODULATE IN SEQUENCE WITHOUT OVERLAP. THE ENERGY RECOVERY WHEEL SHALL BE ACTIVATED, ERW BYPASS DAMPERS SHALL CLOSE AND THE WHEEL SHALL OPERATE PER THE SEQUENCES BELOW.

THE SUPPLY AND EXHAUST FANS SHALL BE ACTIVATED OR CONTINUE TO RUN. THE SUPPLY AND EXHAUST FANS SHALL BE ACTIVATED OR CONTINUE TO RUN AND THE SUPPLY FAN SHALL ADJUST ITS SPEED BASED ON THE SUPPLY DUCT MOUNTED STATIC PRESSURE SENSOR LOCATED 3/4 DOWN STREAM. THE SYSTEM'S ACTUAL STATIC PRESSURE SETPOINT WILL BE PROVIDED/OBTAINED THROUGH THE TESTING AND BALANCING CONTRACTOR DURING THE BALANCING PROCESS. THE EXHAUST FAN SHALL MODULATE ITS SPEED BASED ON THE SUPPLY AIR FLOW. THE ATC CONTRACTOR SHALL PROVIDE LOGIC TO CONSISTENTLY COLLECT THE TOTAL CFM FROM ALL VAV BOXES AND UTILIZE THAT VALUE IN CONJUNCTION WITH THE EXHAUST AIR FLOW SYSTEM CURVE PROFILE TO MODULATE THE EXHAUST FAN VFD. A SLIGHT OFFSET BETWEEN SUPPLY AND RETURN AIR FLOWS SHALL BE SET TO 5% (ADJ) TO ALLOW THE BUILDING TO MAINTAIN A SLIGHTLY POSITIVE PRESSURE. THE STATIC PRESSURE SET POINT SHALL BE RESET BASED ON PID (PROPORTIONAL-INTEGRAL- DERIVATIVE) LOGIC TO ALLOW THE VAV BOX ZONE REQUIRING THE MOST PRESSURE TO SATISFY ITS AIRFLOW REQUIREMENT AT ITS DESIGN FULL OPEN POSITION. THE STATIC PRESSURE SET POINT SHALL BE LOWERED TO THE POINT WHERE FAN SPEED REDUCTION CAN OCCUR, YET STILL ENSURE THAT THE VAV BOX ZONES REMAIN SATISFIED. THE SYSTEM SHALL USE INPUT SIGNALS FROM VAV BOX CONTROLLERS, THE MAIN DUCTWORK MOUNTED SYSTEM STATIC PRESSURE SENSOR AND THE CONTROLLER'S PROGRAM ALGORITHM TO ACHIEVE THIS CONTROL. IN ADDITION, PROVIDE DETECTION AND ALARM OF ANY VAV ZONE THAT EXCESSIVELY NEGATIVELY DRIVES THE RESET LOGIC. THE BMS SYSTEM SHALL BE CAPABLE OF ALLOWING OPERATOR TO READILY REMOVE OR ADD VAV BOX ZONES FROM THE RESET LOGIC ALGORITHM. THE PROJECT TAB/ATC CONTRACORS SHALL FIELD DETERMINE THE ADJUSTABLE SETPOINT RANGE FOR EACH RTU/AHU SYSTEM AND THE PRIMARY VAV BOX UTILIZED TO CONTROL THE STATIC PRESSURE RESET CONTROL STRATEGY.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND THE O.A. DAMPER, RECIRC DAMPER & E.A. DAMPER, ARE PROVEN OPEN. THE SUPPLY FAN SHALL MODULATE ITS SPEED TO MAINTAIN SUPPLY STATIC SETPOINT.
TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER-DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FAN:
THE EXHAUST FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND THE O.A. DAMPER & E.A. DAMPER, OR THE RECIRCULATION DAMPER ARE PROVEN OPEN. THE EXHAUST FAN SHALL MODULATE ITS SPEED BASED ON THE SUPPLY AIR FLOW, ACHIEVING 5% (ADJ.) LESS AIRFLOW THAN THE SUPPLY FAN TO ALLOW A SLIGHTLY POSITIVE PRESSURE THROUGHOUT THE BUILDING. THE EXHAUST FAN SHALL HAVE A USER DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

CURRENT SWITCHES SHALL BE INSTALLED ON THE SUPPLY AND RETURN FAN MOTORS. THE DDC SYSTEM USES THESE SWITCHES TO CONFIRM THE FANS ARE IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL.

TOTAL ENERGY RECOVERY WHEEL - VARIABLE SPEED:
THE CONTROLLER SHALL MODULATE THE TOTAL ENERGY RECOVERY WHEEL AS FOLLOWS:

COOLING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED AND/OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR COOLING RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE BELOW THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

HEATING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED AND/OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR HEAT RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE ABOVE THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

PERIODIC SELF-CLEANING:
THE TOTAL ENERGY RECOVERY WHEEL SHALL RUN AT 5% SPEED (ADJ.) FOR 10 SEC (ADJ.) EVERY 4HRS (ADJ.) THE UNIT RUNS.

WHEEL DEFROST CYCLE AND FROST PROTECTION:
IF THE WHEEL DIFFERENTIAL PRESSURE RISES 1 INCH. (ADJ.) AND THE OUTSIDE AIR TEMPERATURE IS BELOW 30°F (ADJ.), THE WHEEL SPEED SHALL BE REDUCED VIA WHEEL VARIABLE FREQUENCY DRIVE, OR THE ENERGY RECOVERY WHEEL FACE & BYPASS DAMPERS SHALL MODULATE OPEN TO BYPASS THE WHEEL UNTIL THE PRESSURE RETURNS TO NORMAL. WHEEL DEFROST CONTROL SEQUENCE SHALL BE CHOSEN PER MANUFACTURER'S RECOMMENDATIONS. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- RECOVERY WHEEL ROTATION FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RECOVERY WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- RECOVERY WHEEL RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).
- RECOVERY WHEEL VFD IN FAULT

COOLING AND DEHUMIDIFICATION - CHILLED WATER:
OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-COOLED BY THE INCOMING RETURN AIR, UPON SENSING A MIXED AIR TEMPERATURE AND/OR MIXED AIR HUMIDITY ABOVE THE DESIRED SUPPLY AIR DISCHARGE SETPOINTS OF 63°(ADJ) & 55%RH (ADJ) OR SPACE HUMIDITY ABOVE 55% (ADJ), THE CHILLED WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO COOL AND DEHUMIDIFY THE INCOMING AIR. THE COOLING COIL SHALL MODULATE TO MAINTAIN THE DESIRED COOLING COIL TEMPERATURE SETPOINT STARTING AT 55°F (53GR/LB) (ADJ.) AND SHALL RESET DOWN IN 1°F STEPS OVER TIME, 1°F EVERY FIVE MINUTES (ADJ), UNTIL THE CHILLED WATER LEAVING AIR TEMPERATURE SETPOINT OF 50°F (ADJ.) IS ACHIEVED & THE SPACE TEMPERATURE OF 75°F & SPACE HUMIDITY LEVEL OF 55% RH (ADJ) IS MET. REFER TO RTU SCHEDULE FOR CHILLED WATER LEAVING AIR TEMPERATURE FOR LOW SETPOINT. THE HOT WATER CONTROL VALVE SHALL MODULATE TO REHEAT THE SUB-COOLED SUPPLY AIR FROM THE COOLING COIL BACK UP TO 63°F (ADJ., SUMMER ONLY) FOR SPACE DEHUMIDIFICATION PURPOSES. THE SUPPLY AIR SETPOINT WILL BE RESET BASED ON OUTDOOR AIR TEMPERATURE / HUMIDITY CONDITION AND/OR A CALL FOR COOLING FROM THE SPACE SERVED BY THE RTU. IF THE SPACE SERVED BY THE RTU IS CALLING FOR COOLING AND THE FAN IS OVER 75% (ADJ.) THEN THE RESET WILL BE INITIATED. WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 55°F (ADJ.) THE SUPPLY AIR SETPOINT SHALL BE 68°F (ADJ.) & SHALL RESET TO 63°F (ADJ.) AT AN OUTDOOR TEMPERATURE ABOVE 75°F (ADJ.). THE RESET SHALL BE LINEAR BETWEEN THE TWO SETPOINTS. THE COOLING COIL AND HOT WATER COIL (REHEAT) SHALL BE ENABLED WHENEVER:

- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS GREATER THAN 55°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS ABOVE THE DESIRED SETPOINT.
- OR SPACE TEMPERATURE IS CALLING FOR COOLING

HEATING - HOT WATER:
OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-HEATED BY THE INCOMING RETURN AIR. UPON SENSING A MIXED AIR TEMPERATURE BELOW THE DESIRED SUPPLY AIR DISCHARGE SETPOINT OF 68°F (ADJ.) THE HOT WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO HEAT THE INCOMING AIR TO MAINTAIN THE SUPPLY AIR DISCHARGE SETPOINT OF 68°F (ADJ.).

- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS BELOW THE DESIRED SETPOINT.
- OR COOLING IS ACTIVATED AND REHEAT IS REQUIRED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- LOW ENTERING AIR TEMP: IF THE MIXED AIR OR COOLING COIL LEAVING AIR TEMPERATURE IS LESS THAN 38°F (ADJ.).

ECONOMIZER (DUAL ENTHALPY CONTROL):
THE CONTROLLER SHALL MEASURE THE RETURN AND OUTSIDE AIR ENTHALPIES AND MODULATE THE OUTSIDE AIR DAMPER, RECIRCULATION DAMPER AND WHEEL BYPASS DAMPERS AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL ENERGY RECOVERY WHEEL SHALL BE OFF DURING UNOCCUPIED MODE. THE ECONOMIZER SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN RETURN AIR ENTHALPY.
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
- AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL BE DISABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE DROPS BELOW 40°F (ADJ.).
- OR ON LOSS OF SUPPLY FAN STATUS.
- OR THE FREEZESTAT IS ON.

UNOCCUPIED MODE:

UNDER THIS MODE, ALL RTUS SHALL BE OFF & DAMPERS CLOSED. ALL TERMINAL HEATING UNITS & COMPONENTS THROUGHOUT THE SPACE SHALL MODULATE AS REQUIRED TO MAINTAIN THE SPACE UNOCCUPIED SETPOINT OF 60°F (ADJ.) IN THE WINTER. IN THE EVENT THAT THE TERMINAL HEATING UNITS CANNOT MAINTAIN THE SPACE UNOCCUPIED SETPOINT, THE RTUS SHALL BE ACTIVATED & FUNCTION AS INDICATED IN WARM-UP MODE W/ THE EXCEPTION THAT THE FAN SPEED WOULD BE REDUCED TO 60% (ADJ.). DURING THE SUMMER MONTHS, WHEN OAT IS ABOVE 80°F (ADJ.) AND/OR RH IS ABOVE 70% (ADJ.) & THE SPACE UNOCCUPIED TEMPERATURE SETPOINTS OF 85°F (ADJ.) & UNOCCUPIED HUMIDITY SETPOINT OF 70% RH (ADJ) ARE NOT MAINTAINED, THE RTUS WILL BE ACTIVATED & FUNCTION AS INDICATED IN THE COOL-DOWN MODE W/ THE EXCEPTION THAT THE FAN SPEED WOULD BE REDUCED TO 60% (ADJ.).

SAFETY SEQUENCES

EMERGENCY SHUTDOWN:
UPON RECEIVING A SIGNAL FROM THE FIRE ALARM SYSTEM, THE UNIT'S FANS SHALL SHUTDOWN, ALL DAMPERS SHALL CLOSE, HOT AND CHILLED WATER VALVES SHALL CLOSE AND AN ALARM SHALL BE GENERATED AT THE BMS. THIS MODE SHALL BE CALLED EMERGENCY SHUTDOWN MODE. ATC CONTRACTOR SHALL HARD WIRE A DIRECT CONNECTION FROM THE FIRE ALARM PANELS DRY CONTACTS TO THE BMS. ALL ASSOCIATED VAV BOXES SHALL CLOSE.

LOW LEAVING TEMPERATURE:
UPON A LOW LEAVING TEMPERATURE CONDITION (38°F ADJ) SENSED BY THE FREEZESTAT SENSOR, CO2 DEMAND CONTROL SHALL BE OVERRIDDEN, THE OUTSIDE AIR AND EXHAUST AIR DAMPER SHALL CLOSE, AND THE SUPPLY AND EXHAUST AIR FAN SHALL SHUT DOWN AND AN ALARM SHALL BE GENERATED.

SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS.

CASING TEMPERATURE SETPOINT:
THE DDC SYSTEM SHALL MONITOR THE UNIT CASING TEMPERATURE SETPOINT (BY THE MAT SENSOR). THE HOT WATER HEATING COIL VALVE SHALL OPEN TO MAINTAIN A 40°F (ADJ.) MINIMUM CASING TEMPERATURE SETPOINT.

STAGED OPTIMIZED START/STOP OPERATION:
ALL UNIT CONTROLLERS SHALL BE EQUIPPED WITH OPTIMAL START/STOP OPERATION AND TIME OF DAY SCHEDULING. UNITS SHALL START UP DURING MORNING WARM-UP/COOL-DOWN MODES IN A STAGGERED MANNER SUCH THAT ALL EQUIPMENT IS NOT STARTED AT THE SAME TIME.

ADDITIONAL ALARMS:

OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE PREFILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

RETURN AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FINAL FILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

SPACE HUMIDITY SENSOR:
THE DDC SYSTEM SHALL MONITOR THE SPACE HUMIDITY SENSORS AND REPORT THE INFORMATION TO THE BUILDING DDC SYSTEM ROOM GRAPHICS. UPON A HIGH SPACE HUMIDITY LEVEL ABOVE 80% RH (ADJ.) AN ALARM WILL BE GENERATED IN THE BMS & THE UNIT WILL ENTER THE COOL DOWN MODE.

OVERRIDE:
THE SPACE MOUNTED TEMPERATURE SENSOR SHALL HAVE A PUSH BUTTON OVERRIDE CAPABILITY. UPON ACTIVATION OF THE THERMOSTAT OVERRIDE BUTTON THE ASSOCIATED ROOFTOP UNIT SHALL CHANGE TO OCCUPIED MODE FOR A PERIOD OF 2 HOURS (ADJ).

CO2 ALARM : UPON A RISE IN SPACE CO2 10% OR MORE THAN THE DESIGN OF 800 PPM (ADJ.) AN ALARM WILL BE GENERATED AT THE BMS WITH A 20 MIN. (ADJ.) DELAY.

CO2 DEMAND CONTROL VENTILATION (DCV):
UPON A RISE IN SPACE CO2 (GREATER THAN 800 PPM) THE RTU'S RESPECTIVE OUTSIDE AIR DAMPER SHALL MODULATE OPEN FROM ITS MINIMUM POSITION AND THE RETURN DAMPER SHALL BEGIN TO MODULATE CLOSED IN UNISON. UPON A RISE IN SPACE CO2 10% OR MORE THAN THE DESIGN OF 800 PPM (ADJ) AN ALARM WILL BE GENERATED AT THE BMS WITH A 20 MIN. (ADJ.) DELAY. THE FANS SHALL BEGIN TO RAMP UP TO INCREASE VENTILATION. ONCE LEVELS BEGIN TO DROP BELOW 800 PPM, THE RTU SHALL RETURN TO OCCUPIED MODE, AND THE DAMPERS & FANS SHALL MODULATE TO MAINTAIN DISCHARGE AIR & SPACE TEMPERATURE & HUMIDITY.

CO2 DEMAND CONTROL OVERRIDE:
FOR ALL RTU'S EQUPPED WITH CO2 DEMAND CONTROL VENTILATION, THE ATC CONTRACTOR SHALL CREATE A SEQUENCE OF OPERATION AND ASSOCIATED GRAPHIC USER INTERFACE (GUI) BUTTON THAT SHALL BE CAPABLE OF ALLOWING THE BMS OPERATOR TO DISENGAGE AND RE-ENGAGE THE CO2 DEMAND VENTILATION CONTROL CAPABILITIES OF THE ASSOCIATED AIR DISTRIBUTION SYSTEM. A SOFTWARE NOTIFICATION SHALL BE GENERATED WHEN THIS MODE OF OPERATION IS ACTIVATED. THIS SEQUENCE AND GUI BUTTON SHALL BE PROVIDED FOR EACH INDIVIDUAL RTU AND A MASTER COMMAND GUI BUTTON SHALL ENGAGE/DISENGAGE THE MODE FOR ALL RTU'S. UNDER THIS MODE, THE VENTILATION OVERRIDE SHALL ALLOW THE ROOFTOP UNIT TO OPERATE AT IT'S MAXIMUM AIRFLOW AND MAXIMUM OUTSIDE AIR VENTILATION RATE. MORNING WARM-UP AND COOL DOWN MODES FOR THIS MODE OF OPERATION SHALL ALSO OPERATE WITH MAXIMUM OUTSIDE AIR ENABLED WHEN CO2 CONTOL OVERRIDE IS ENABLED. OUTSIDE AIR VENTILATION SHALL BE ENABLED AT A MINIMUM OF TWO HOURS (ADJ) PRIOR TO SCHEDULED OCCUPIED TIME, AND SHALL CONTINUE TO RUN TWO HOURS (ADJ) POST SCHEDULED OCCUPANCY.

ECONOMIZER OVERRIDE:
FOR ALL RTU'S EQUPPED WITH ECONOMIZER CONTROL, THE ATC CONTRACTOR SHALL CREATE A SEQUENCE OF OPERATION AND ASSOCIATED GRAPHIC USER INTERFACE (GUI) BUTTON THAT SHALL BE CAPABLE OF ALLOWING THE BMS OPERATOR TO DISENGAGE AND RE-ENGAGE THE ECONOMIZER CONTROL CAPABILITIES OF THE RTU. A SOFTWARE NOTIFICATION SHALL BE GENERATED WHEN THIS MODE OF OPERATION IS ACTIVATED. THIS SEQUENCE AND GUI BUTTON SHALL BE PROVIDED FOR EACH INDIVIDUAL RTU AND IN ADDITION A MASTER COMMAND GUI BUTTON SHALL ENGAGE/DISENGAGE THE MODE FOR ALL RTU'S. UNDER THIS MODE, THE ECONOMIZER OVERRIDE SHALL ALLOW THE ROOFTOP UNIT TO OPERATE ITS HOT WATER AND/OR CHILLED WATER CONTROL VALVES TO MAINTAIN THE DAT SETPOINT. THE OUTSIDE AND RETURN AIR DAMPERS SHALL FUNCTION AS INDICATED IN THE OCCUPIED MODE. THE VARIABLE AIR VOLUME BOXES SHALL MODULATE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AND CO2 SETPOINTS.

RTU HANDLING UNITS	BMS CONTROL POINTS					
POINT NAME	AI	AO	BI	BO	ALARM	REMARKS
OUTSIDE AIR FLOW MEASURING STATION	X				X	NOTE #1
SUPPLY AIR FLOW MEASURING STATION	X					NOTE #6
EXHAUST AIR FLOW MEASURING STATION	X					NOTE #6
OUTSIDE AIR TEMP	X					CENTRAL POINT
OUTSIDE AIR HUMIDITY	X					CENTRAL POINT
EXHAUST AIR TEMP	X					
EXHAUST AIR HUMIDITY	X					
ENERGY RECOVERY HEAT WHEEL DISCHARGE AIR TEMP	X				X	ALARM BELOW 38°
ENERGY RECOVERY WHEEL DISCHARGE AIR HUMIDITY	X					
MIXED AIR TEMP & HUMIDITY	X				X	
COOLING COIL AIR TEMP & HUMIDITY	X				X	
HEATING COIL AIR TEMP	X				X	
SUPPLY AIR TEMP	X				X	
SUPPLY AIR HUMIDITY	X					
SUPPLY AIR STATIC PRESSURE	X	X			X	
OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR HUMIDITY	X					
RETURN AIR TEMP	X					
RETURN AIR STATIC PRESSURE	X	X			X	
CHILLED WATER CONTROL VALVE	X	X			X	
HOT WATER CONTROL VALVE	X	X			X	
RE-CIRC AIR DAMPER	X	X			X	
OUTSIDE AIR DAMPER	X	X			X	
EXHAUST AIR DAMPER	X	X			X	
RETURN AIR SMOKE DETECTOR			X		X	
SUPPLY AIR SMOKE DETECTOR			X		X	
COOLING SUPPLY AIR SET POINT	X	X				
HEATING SUPPLY AIR SET POINT	X	X				
EMERGENCY SHUT DOWN					X	
HIGH COOLING SUPPLY AIR TEMP					X	10° ABOVE
HIGH HEATING SUPPLY AIR TEMP					X	10° ABOVE
LOW HEATING SUPPLY AIR TEMP					X	10° BELOW
OUTSIDE AIR FILTER CHANGE REQUIRED					X	
RETURN AIR FILTER CHANGE REQUIRED					X	
HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION					X	880 PPM ALRM
HIGH RETURN AIR HUMIDITY					X	75% RH ALARM
LOW RETURN AIR TEMP					X	60° OR LESS
HIGH RETURN AIR TEMP					X	85° OR ABOVE
SPACE CO2	X				X	880 PPM ALRM
FREEZESTAT			X		X	NOTE #5
CASING LOW LIMIT TEMPERATURE	X				X	38° ALRM
ERW OA FACE & BYPASS DAMPER			X	X		
ERW EA FACE & BYPASS DAMPER			X	X		
SUPPLY LOW STATIC SAFETY			X			NOTE #7
SUPPLY HI STATIC SAFETY			X			NOTE #7
RETURN LOW STATIC SAFETY			X			NOTE #7
RETURN HI STATIC SAFETY			X			NOTE #7
VFD POINTS						
ENERGY RECOVERY WHEEL VFD SPEED	X	X				HARDWIRE
SUPPLY FAN VFD SPEED	X	X				HARDWIRE
EXHAUST FAN VFD SPEED	X	X				HARDWIRE
SUPPLY FAN STATUS			X		X	HARDWIRE
EXHAUST FAN STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL VFD FAULT			X		X	
SUPPLY FAN VFD FAULT			X		X	
EXHAUST FAN VFD FAULT			X		X	
SUPPLY FAN START/STOP				X		HARDWIRE
EXHAUST FAN START/STOP				X		HARDWIRE
ENERGY RECOVERY WHEEL START/STOP				X		HARDWIRE
SUPPLY FAN FAILURE					X	
SUPPLY FAN IN HAND					X	
EXHAUST FAN FAILURE					X	
EXHAUST FAN IN HAND					X	
ENERGY RECOVERY WHEEL ROTATION FAILURE					X	
ENERGY RECOVERY WHEEL IN HAND					X	
TOTAL WHEEL RUNTIME EXCEEDED					X	

NOTES:

1. OUTSIDE AIRFLOW MEASURING STATION FURNISHED BY UNIT MANUFACTURER & PROGRAMMING SHALL BE PROVIDED BY ATC. ALARM POINT SHALL BE INITIATED AT THE BMS WHEN VALUE IS 10% ABOVE OR BELOW SCHEDULED VALUE.
2. ALL SETPOINTS AND SCHEDULES, PROVIDED FROM ATC CONTRACTOR (UNLESS SPECIFICALLY NOTED OTHERWISE) AND RTU MANUFACTURER CONTROLLER, SHALL BE ADJUSTABLE THROUGH THE BMS SYSTEM
3. ALL ATC (DDC) CONTROL SENSORS AND CONTROL VALVES PROVIDED BY ATC CONTRACTOR. REFER TO SCHEDULE FOR REQUIRED I/O PARAMETERS
4. ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE
5. FREEZESTAT SHALL BE AUTO-RESET TYPE
6. SUPPLY & EXHAUST AIRFLOW MEASURING PROBES SHALL BE PROVIDED BY RTU MANUFACTURER. ATC CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING/REPORTING AIRFLOW MEASUREMENT DATA FROM RTU SUPPLY & EXHAUST FAN TO THE BMS.
7. HI/LOW STATIC ALARM SHALL BE ACTIVATED WHEN DP IS +/-15% (ADJ) FROM NORMAL OPERATING DP.
8. DAMPERS WITHIN THE UNIT SHALL BE PROVIDED BY RTU MANUFACTURER, ACTUATORS W/POSITION FEEDBACK ARE TO BE PROVIDED BY ATC CONTRACTOR.

ABBREVIATIONS

AFVP	AIRFLOW VELOCITY PROBE
ALM	ALARM
AQ	AQUASTAT
ATC	AUTOMATIC TEMPERATURE CONTROLS
BLDG	BUILDING
BLR	BOILER
BMS	BUILDING MANAGEMENT SYSTEM (ENERGY & AUTOMATION)
CM	CONSTRUCTION MANAGER
COMB	COMBUSTION
CONTR	CONTROLLER
CO2	CARBON DIOXIDE
CR	CONTROL RELAY
CS	CURRENT SENSOR
CUV	CABINET UNIT VENTILATOR
D	DAMPER
DA	DISCHARGE AIR
DAS	DISCHARGE AIR SENSOR
DAT	DISCHARGE AIR TEMPERATURE
DCV	DEMAND CONTROL VENTILATION
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DDC	DIRECT DIGITAL CONTROL
DO	DAMPER OPERATOR
DP	DIFFERENTIAL PRESSURE
DPR	DAMPER
DPV	DIFFERENTIAL PRESSURE VALVE
EA	EXHAUST AIR
EF	EXHAUST FAN
F	FLOW/FARENHEIT (AS APPLICABLE)
FB	FACE & BYPASS
FD	FIRE DAMPER
H	HUMIDITY
HS	ENTHALPY SENSOR
HT	HIGH TEMPERATURE
HTG	HEATING
HR	HEAT RECOVERY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LT	LOW TEMPERATURE
M	MOTOR
MAT	MIXED AIR TEMPERATURE
NAC	NETWORK APPLICATION CONTROLLER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OVR	OVERRIDE
P	PRESSURE
PB	PUSH BUTTON
PNL	PANEL
RA	RETURN AIR
REL	RELIEF AIR
RF	RETURN FAN
RFC	RETURN FAN CONTROLLER
RM	ROOM
SA	SUPPLY AIR
SD	SMOKE DAMPER OR SMOKE DETECTOR
SF	SUPPLY FAN
SFC	SUPPLY FAN CONTROLLER
SP	STATIC PRESSURE
T	TEMPERATURE
TEC	TERMINAL EQUIPMENT CONTROLLER
VAC	VOLTS - ALTERNATING CURRENT
VDC	VOLTS - DIRECT CURRENT
VFD	SEE VSD
VLV	VALVE
VP	VELOCITY PROBE (AIRFLOW)
VSD	VARIABLE SPEED (FREQUENCY) DRIVE
XFMR	TRANSFORMER

ATC/BMS GENERAL NOTES

1. ALL SETPOINTS INDICATED IN THE SEQUENCE OF OPERATIONS SHALL BE ADJUSTABLE ON GRAPHICAL INTERFACE.
2. THE CONTROL POINTS LISTED IN THE SUMMARY MATRIX ARE THE MINIMUM CONTROL POINTS REQUIRED. ATC CONTRACTOR SHALL PROVIDE ALL CONTROL POINTS AS REQUIRED FOR COMPLETE SYSTEM CONTROL PER THE SEQUENCE OF OPERATIONS.
3. ALL CONTROL WIRING, SENSORS, RELAYS, CONTROLLERS, PANELS, DAMPERS, ACTUATORS, ETC. INDICATED ON THE CONTROL DIAGRAMS SHALL BE PROVIDED BY THE ATC CONTRACTOR UNLESS NOTED OTHERWISE.
4. ALL HHW VALVES SHALL BE FAIL OPEN ON LOSS OF POWER.
5. ALL HHW WATER VALVES SHALL BE MODULATING TYPE FOR GPM > 2.0; 2-POSITION ACCEPTABLE FOR FLOWS < 2.0 GPM
6. ATC CONTRACTOR TO COORDINATE W/ OWNER FOR ALL COMMUNICATION & INTERFACE REQUIREMENTS TO CENTRAL OPERATING STATION. REFER TO SPEC FOR FURTHER INFO.
7. DUCT SMOKE DETECTORS INDICATED ARE TO BE FURNISHED BY DIV. 260000 & INSTALLED BY HVAC CONTRACTOR. POWER WIRING AND FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR TO PROVIDE BMS INTERLOCK TO SHUT ASSOCIATED UNIT DOWN AND INITIATE AN ALARM UPON ACTIVATION
8. ALL SMOKE DAMPERS SHALL BE COMBINATION SMOKE/FIRE DAMPERS, SHALL BE FURNISHED & INSTALLED BY HVAC CONTRACTOR, AND POWER WIRED BY ELECTRICAL CONTRACTOR. DAMPERS SHALL BE MOTOR OPERATED WITH 24 VOLT / 120 VOLT ACTUATOR. FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. DAMPER ENDSWITCH INTEGRATION TO BMS BY ATC CONTRACTOR.
9. ALL ATC CONTROLS SHALL BE POWER WIRED FROM DESIGNATED EMERGENCY POWER JUNCTION BOXES LOCATED ON THE ELECTRICAL DRAWINGS. JUNCTION BOXES WILL BE FED BY EMERGENCY POWER, THEREFORE ALL CONTROLS SHALL BE ON EMERGENCY POWER. ANY SUB ATC PANELS REQUIRED SHALL BE FED FROM EMERGENCY POWER & ALL SHALL BE PROVIDED BY ATC CONTRACTOR. ALL UNIT CONTROLS SHALL BE FED BY EMERGENCY POWER & NOT THROUGH THE UNIT'S MAIN POWER SOURCE.
10. ALL DENSELY OCCUPIED SPACES WITH OCCUPANT DENSITY OF 25 PEOPLE OR MORE PER 1000 SQ/FT SHALL BE PROVIDED W/ ROOM LEVEL TEMPERATURE, CO2, & HUMIDITY SENSORS W/ CO2 CONTROL. THIS SHALL BE PROVIDED IN COMPLIANCE WITH LEED v.4 CREDIT IEQC1. (PROVIDED BY FMS CONTRACTOR & INSTALLED BY ATC CONTRACTOR)

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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

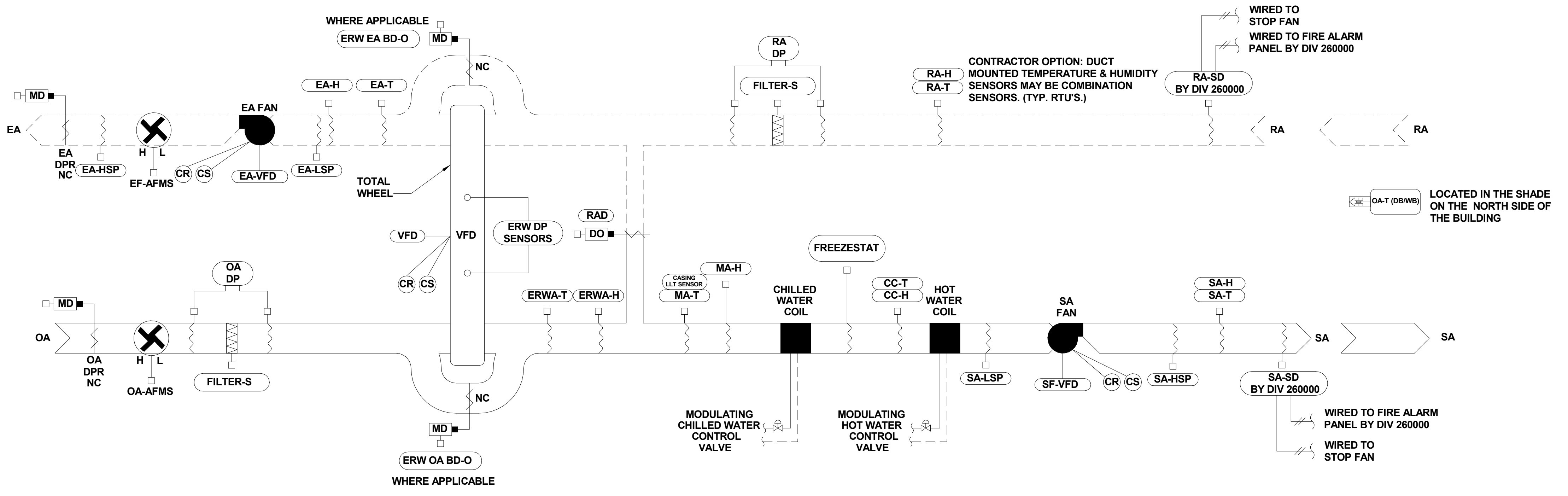
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SCALE: AS INDICATED

SHEET TITLE:
CONTROLS IV

SHEET NUMBER:
M4.14

RTU-6 - 100% OUTSIDE VENTILATION AIR HANDLING SYSTEM w/ DEMAND CONTROL VENTILATION



WHERE APPLICABLE

CONTRACTOR OPTION: DUCT MOUNTED TEMPERATURE & HUMIDITY SENSORS MAY BE COMBINATION SENSORS. (TYP. RTU'S.)

WIRED TO STOP FAN

WIRED TO FIRE ALARM PANEL BY DIV 260000

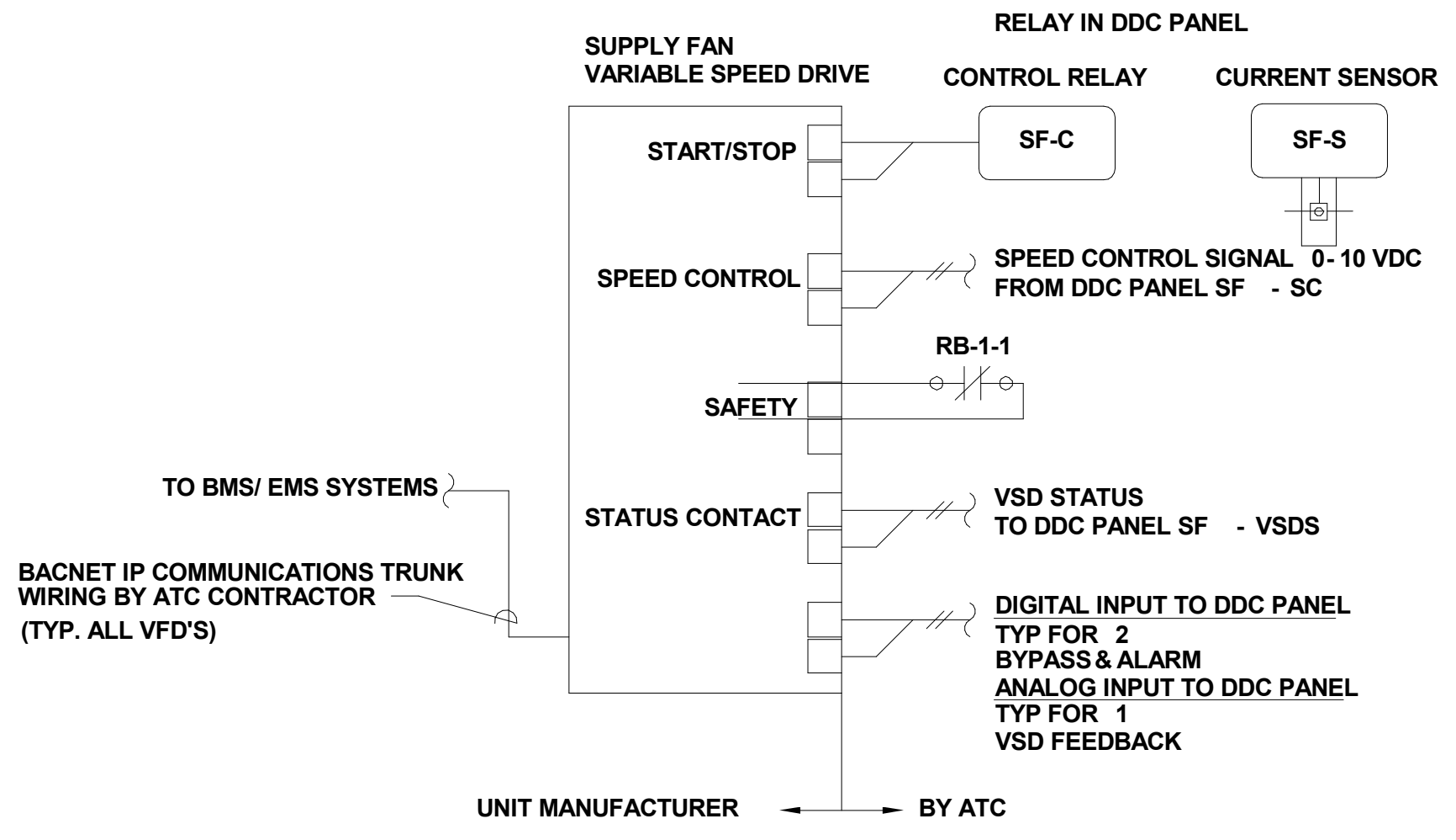
LOCATED IN THE SHADE ON THE NORTH SIDE OF THE BUILDING

MODULATING CHILLED WATER CONTROL VALVE

MODULATING HOT WATER CONTROL VALVE

WIRED TO FIRE ALARM PANEL BY DIV 260000

WIRED TO STOP FAN



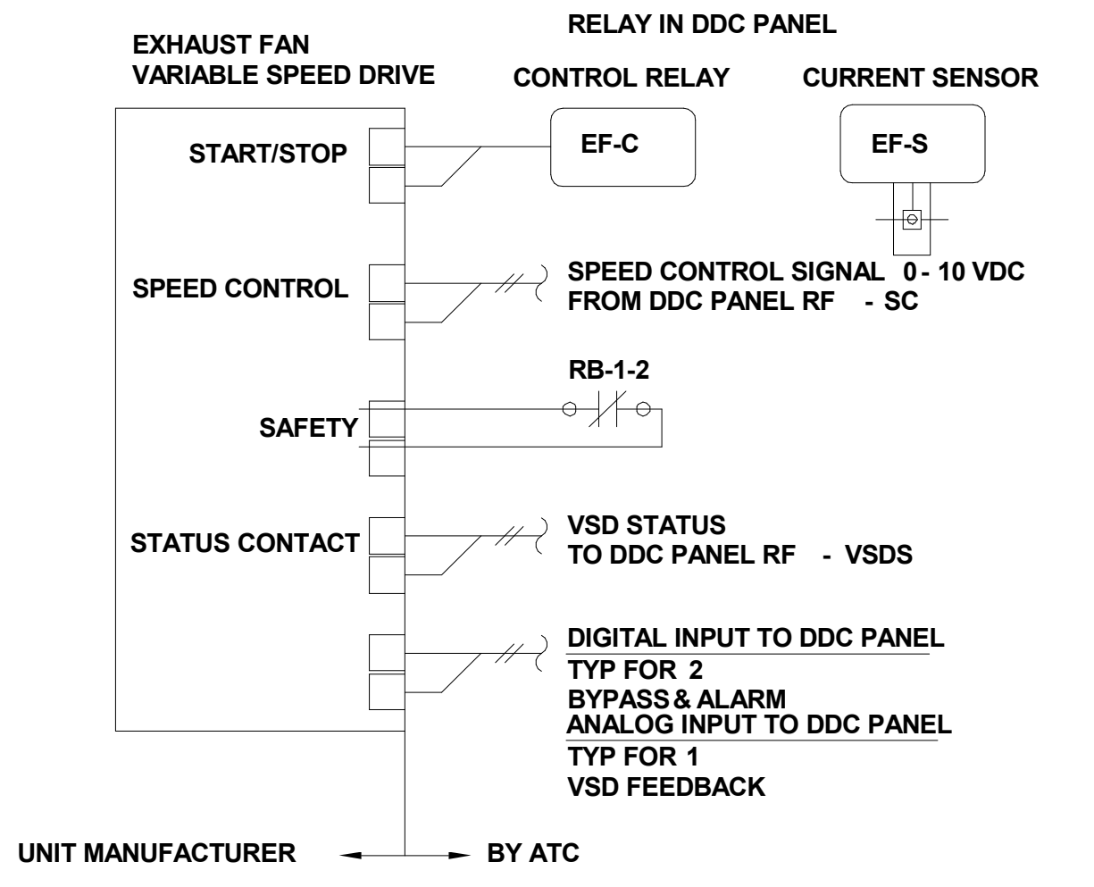
SPEED CONTROL SIGNAL 0- 10 VDC FROM DDC PANEL SF - SC

TO BMS/ EMS SYSTEMS

BACNET IP COMMUNICATIONS TRUNK WIRING BY ATC CONTRACTOR (TYP. ALL VFD'S)

VSD STATUS TO DDC PANEL SF - VSDS

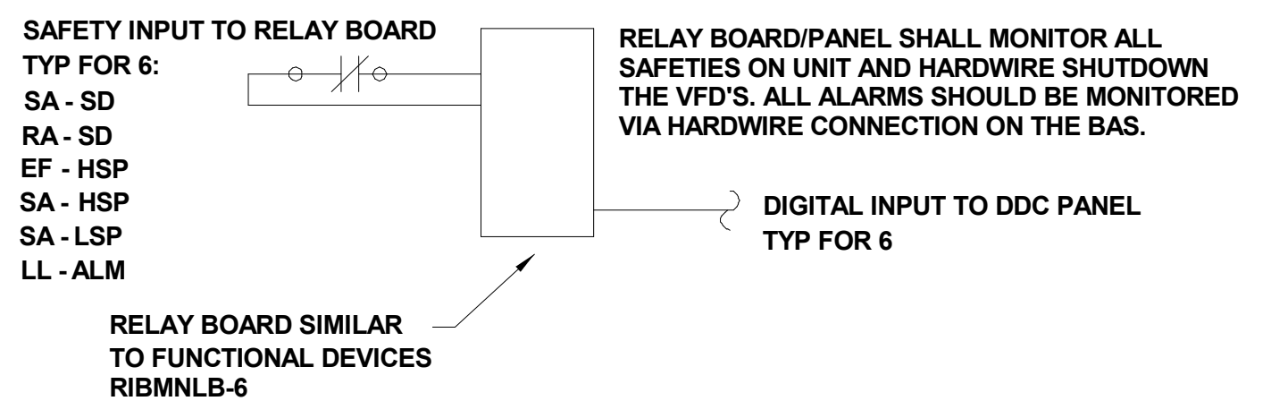
DIGITAL INPUT TO DDC PANEL
TYP FOR 2
BYPASS & ALARM
ANALOG INPUT TO DDC PANEL
TYP FOR 1
VSD FEEDBACK



SPEED CONTROL SIGNAL 0- 10 VDC FROM DDC PANEL RF - SC

VSD STATUS TO DDC PANEL RF - VSDS

DIGITAL INPUT TO DDC PANEL
TYP FOR 2
BYPASS & ALARM
ANALOG INPUT TO DDC PANEL
TYP FOR 1
VSD FEEDBACK

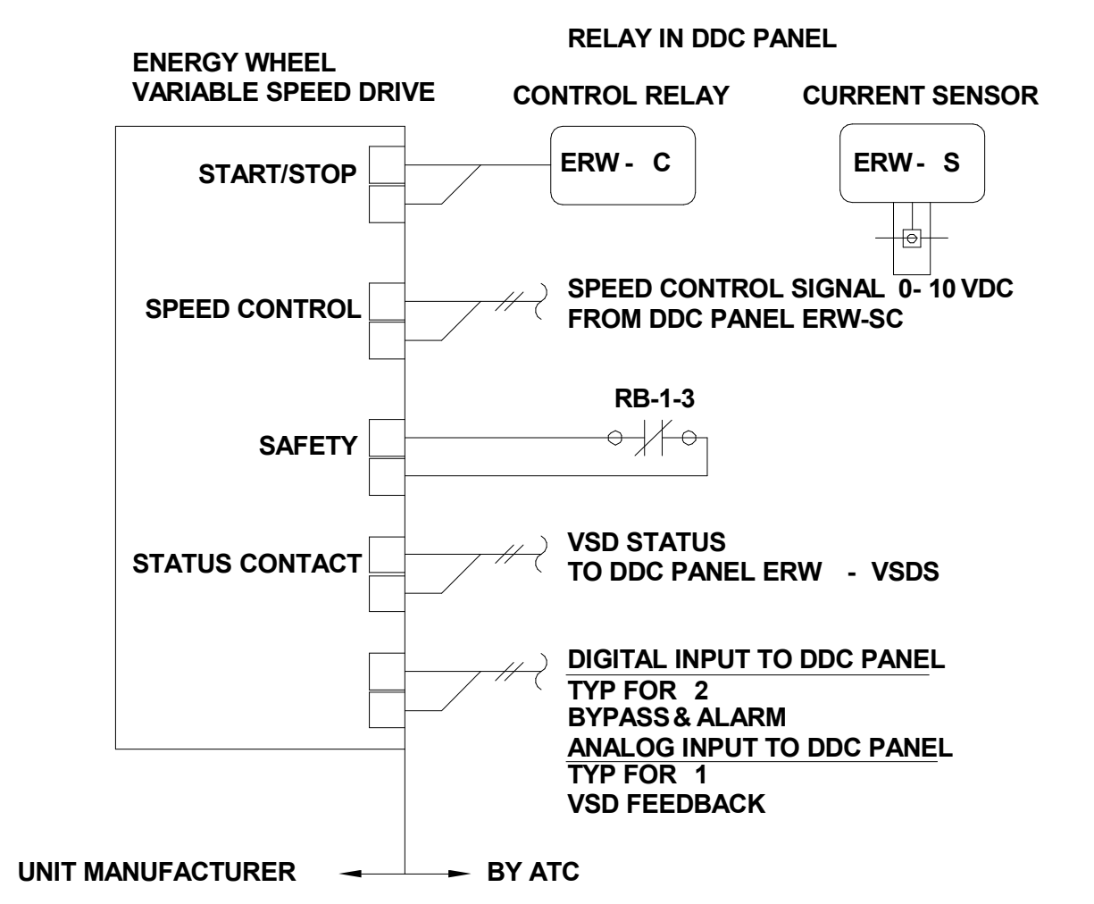


SAFETY INPUT TO RELAY BOARD
TYP FOR 6:
SA - SD
RA - SD
EF - HSP
SA - HSP
SA - LSP
LL - ALM

RELAY BOARD/PANEL SHALL MONITOR ALL SAFETIES ON UNIT AND HARDWIRE SHUTDOWN THE VFD'S. ALL ALARMS SHOULD BE MONITORED VIA HARDWIRE CONNECTION ON THE BAS.

DIGITAL INPUT TO DDC PANEL
TYP FOR 6

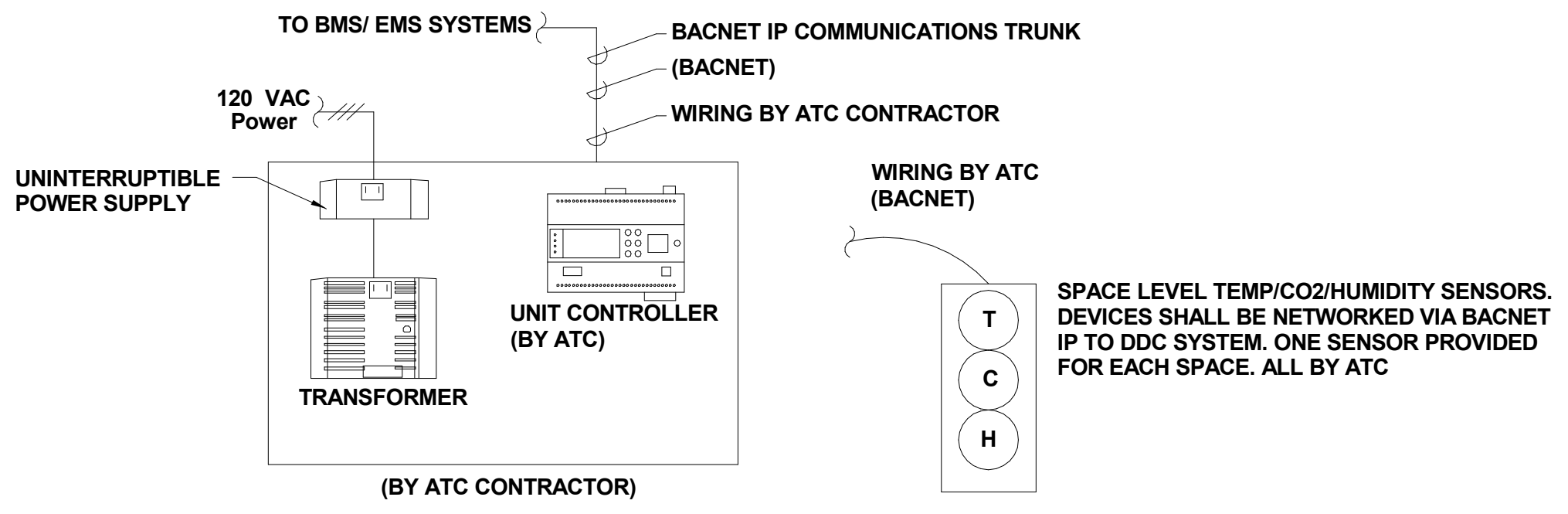
RELAY BOARD SIMILAR TO FUNCTIONAL DEVICES RIBMNLB-6



SPEED CONTROL SIGNAL 0- 10 VDC FROM DDC PANEL ERW-SC

VSD STATUS TO DDC PANEL ERW - VSDS

DIGITAL INPUT TO DDC PANEL
TYP FOR 2
BYPASS & ALARM
ANALOG INPUT TO DDC PANEL
TYP FOR 1
VSD FEEDBACK



(BY ATC CONTRACTOR)

SPACE LEVEL TEMP/CO2/HUMIDITY SENSORS. DEVICES SHALL BE NETWORKED VIA BACNET IP TO DDC SYSTEM. ONE SENSOR PROVIDED FOR EACH SPACE. ALL BY ATC

ROOF TOP UNIT

A DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE ROOFTOP AIR HANDLING UNIT OPERATION AS FOLLOWS:

RUN CONDITIONS - SCHEDULED:
THE RTU SHALL RUN BASED UPON AN OPERATOR-ADJUSTABLE SCHEDULE.

WARM-UP: THE TERMINAL HEATING UNITS (RADIANT PANELS, WALL RADIATION UNITS, FINTUBE, ETC) VALVES SHALL MODULATE OPEN TO RAISE THE SPACES TO THE OCCUPIED SET POINT OF 70°F (ADJ.). ONCE BUILDING HAS REACHED SPACE SETPOINT, THE TERMINAL HEATING UNITS SHALL ENTER THE OCCUPIED MODE, ALLOWING THEIR HOT WATER VALVES TO MODULATE AS REQUIRED TO MAINTAIN THE SPACE SETPOINT. THE RTU SHALL ALSO ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE WARM-UP MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE RISE TO DETERMINE WHEN TO ACTIVATE THE WARM UP MODE TO ENSURE THAT THE BUILDING HAS REACHED ITS SETPOINT FOR OCCUPIED MODE.

COOL-DOWN: THE TERMINAL COOLING UNIT (RADIANT PANELS, FCU'S) VALVES SHALL MODULATE OPEN TO LOWER THE SPACES TO THE OCCUPIED SETPOINT OF 75°F (ADJ.). ONCE THE BUILDING HAS REACHED SPACE SETPOINT OF 75°F (ADJ.), THE RTU SHALL ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE COOL-DOWN MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE DECREASE TO DETERMINE WHEN TO ACTIVATE THE COOL DOWN MODE TO ENSURE THAT THE BUILDING HAS REACHED ITS SETPOINT FOR OCCUPIED MODE. ECONOMIZER MODE OF OPERATION SHALL OVERRIDE NORMAL COOL-DOWN MODE OF OPERATION DURING UNOCCUPIED MODE.

OCCUPIED MODE:

GENERAL:
THE FANS START OR CONTINUE TO RUN AND THE RTU IS CONTROLLED AS FOLLOWS:

THE EXHAUST & OUTSIDE AIR DAMPERS SHALL OPEN TO MAX POSITIONS AS DETERMINED DURING BALANCING & AS SCHEDULED. THE RETURN AIR DAMPER SHALL BE CLOSED. THE ENERGY RECOVERY WHEEL SHALL BE ACTIVATED, ERW BYPASS DAMPERS SHALL BE CLOSED, AND OPERATE PER THE SEQUENCES BELOW. THE SUPPLY AND EXHAUST FANS SHALL BE ACTIVATED OR CONTINUE TO RUN. THE SUPPLY & EXHAUST AIR FAN SHALL OPERATE AT THE SPEED DETERMINED BY THE TAB CONTRACTOR DURING BALANCING TO MEET THE DESIGN SCHEDULED CFM.THE SYSTEMS ACTUAL STATIC PRESSURE SETPOINTS SHALL BE PROVIDED/OBTAINED THROUGH TESTING AND BALANCING CONTRACTOR DURING THE BALANCING PROCESS.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND EITHER THE O.A. DAMPER & E.A. DAMPER, OR THE RECIRCULATION DAMPER ARE PROVEN OPEN. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER-DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FAN:
THE EXHAUST FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND EITHER THE O.A. DAMPER & E.A. DAMPER ARE PROVEN OPEN. THE EXHAUST FAN SHALL MODULATE ITS SPEED BASED ON THE SUPPLY AIR FLOW, ACHIEVED AT THE VAV BOXES. EXHAUST FAN SHALL MAINTAIN 5% (ADJ.) LESS AIRFLOW THAN THE SUPPLY FAN TO ALLOW A SLIGHTLY POSITIVE PRESSURE THROUGHOUT THE BUILDING. THE EXHAUST FAN SHALL HAVE A USER DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES. BALANCING & ATC CONTRACTORS SHALL COORDINATE & DETERMINE AIRFLOW DURING BALANCING. THIS SHALL BE USED FOR EXHAUST FAN SPEED CONTROL TO TRACK THE SUPPLY FAN AIRFLOW. TYPICAL FOR SUPPLY FANS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

CURRENT SWITCHES SHALL BE INSTALLED ON THE SUPPLY AND RETURN FAN MOTORS. THE DDC SYSTEM USES THESE SWITCHES TO CONFIRM THE FANS ARE IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL.

TOTAL ENERGY RECOVERY WHEEL - VARIABLE SPEED:
THE CONTROLLER SHALL MODULATE THE TOTAL ENERGY RECOVERY WHEEL AS FOLLOWS:

COOLING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR COOLING RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE BELOW THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

HEATING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR HEAT RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE ABOVE THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

PERIODIC SELF-CLEANING:
THE TOTAL ENERGY RECOVERY WHEEL SHALL RUN AT 5% SPEED (ADJ.) FOR 10 SEC (ADJ.) EVERY 4HRS (ADJ.) THE UNIT RUNS.

WHEEL DEFROST CYCLE AND FROST PROTECTION:
IF THE WHEEL DIFFERENTIAL PRESSURE RISES 1 INCH. (ADJ.) AND THE OUTSIDE AIR TEMPERATURE IS BELOW 30°F (ADJ.), THE WHEEL SPEED SHALL BE REDUCED VIA WHEEL VARIABLE FREQUENCY DRIVE, OR THE ENERGY RECOVERY WHEEL FACE & BYPASS DAMPERS SHALL MODULATE OPEN TO BYPASS THE WHEEL UNTIL THE PRESSURE RETURNS TO NORMAL. WHEEL DEFROST CONTROL SEQUENCE SHALL BE CHOSEN PER MANUFACTURER'S RECOMMENDATIONS. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- RECOVERY WHEEL ROTATION FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RECOVERY WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- RECOVERY WHEEL RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).
- RECOVERY WHEEL VFD IN FAULT

COOLING AND DEHUMIDIFICATION - CHILLED WATER:
OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-COOLED BY THE INCOMING RETURN AIR, UPON SENSING A MIXED AIR TEMPERATURE AND/OR MIXED AIR HUMIDITY ABOVE THE DESIRED SUPPLY AIR DISCHARGE SETPOINTS OF 70°(ADJ) & 55%RH (ADJ), THE CHILLED WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO COOL AND DEHUMIDIFY THE INCOMING AIR. THE COOLING COIL SHALL MODULATE TO MAINTAIN THE DESIRED COOLING COIL TEMPERATURE SETPOINT STARTING AT 55°F (53GR/LB) (ADJ.) AND SHALL RESET DOWN IN 1°F STEPS OVER TIME, 1°F EVERY FIVE MINUTES (ADJ), UNTIL THE CHILLED WATER LEAVING AIR TEMPERATURE SETPOINT OF 50°F (ADJ.) & THE DISCHARGE AIR & HUMIDITY SETPOINT OR THE SPACE HUMIDITY LEVEL OF 55% RH (ADJ) IS MET. REFER TO RTU SCHEDULE FOR CHILLED WATER LEAVING AIR TEMPERATURE FOR LOW SETPOINT. THE HOT WATER CONTROL VALVE SHALL MODULATE TO REHEAT THE SUB-COOLED SUPPLY AIR FROM THE COOLING COIL BACK UP TO 70°F (ADJ., SUMMER ONLY). THE SUPPLY AIR SETPOINT WILL BE RESET BASED ON OUTDOOR AIR TEMPERATURE / HUMIDITY CONDITIONS, WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 55°F (ADJ.) THE SUPPLY AIR SETPOINT SHALL BE 72°F (ADJ.) & SHALL RESET TO 70°F (ADJ.) AT AN OUTDOOR TEMPERATURE ABOVE 75°F (ADJ.). THE RESET SHALL BE LINEAR BETWEEN THE TWO SETPOINTS. THE COOLING COIL AND HOT WATER COIL (REHEAT) SHALL BE ENABLED WHENEVER:

- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS GREATER THAN 55°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS ABOVE THE DESIRED SETPOINT.
- OR SPACE TEMPERATURES ARE CALLING FOR COOLING

HEATING - HOT WATER:
OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-HEATED BY THE INCOMING RETURN AIR. UPON SENSING A MIXED AIR TEMPERATURE BELOW THE DESIRED SUPPLY AIR DISCHARGE SETPOINT OF 70°F (ADJ.) THE HOT WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO HEAT THE INCOMING AIR TO MAINTAIN THE SUPPLY AIR DISCHARGE SETPOINT OF 70°F (ADJ.). WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 55°F (ADJ.), THE SUPPLY AIR SETPOINT SHALL BE 72°F (ADJ.) & SHALL RESET TO 70°F (ADJ.) AT AN OUTDOOR TEMPERATURE ABOVE 75°F (ADJ.). THE RESET SHALL BE LINEAR BETWEEN THE TWO SETPOINTS. THE HEATING COIL SHALL BE ENABLED WHENEVER:

- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS BELOW THE DESIRED SETPOINT.
- OR COOLING IS ACTIVATED AND REHEAT IS REQUIRED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- LOW ENTERING AIR TEMP: IF THE MIXED AIR OR COOLING COIL LEAVING AIR TEMPERATURE IS LESS THAN 38°F (ADJ.).

ECONOMIZER (DUAL ENTHALPY CONTROL):
THE CONTROLLER SHALL MEASURE THE RETURN AND OUTSIDE AIR ENTHALPIES AND MODULATE THE OUTSIDE AIR DAMPER, RECIRCULATION DAMPER (DURING UNOCCUPIED CONDITIONS) AND WHEEL BYPASS DAMPERS AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL ENERGY RECOVERY WHEEL SHALL BE OFF. THE ECONOMIZER SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN RETURN AIR ENTHALPY.
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
- AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL BE DISABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE DROPS BELOW 40°F (ADJ.).
- OR ON LOSS OF SUPPLY FAN STATUS.
- OR THE FREEZESTAT IS ON.

UNOCCUPIED MODE:

UNDER THIS MODE, ALL RTUS SHALL BE OFF & DAMPERS CLOSED. ALL TERMINAL HEATING UNITS & COMPONENTS THROUGHOUT THE BUILDING SHALL MODULATE AS REQUIRED TO MAINTAIN THE BUILDING'S UNOCCUPIED SETPOINT OF 60°F (ADJ.) IN THE WINTER. IN THE EVENT THAT THE TERMINAL HEATING UNITS CANNOT MAINTAIN THE BUILDING AVERAGE UNOCCUPIED SETPOINT, THE RTUS SHALL BE ACTIVATED & FUNCTION AS INDICATED IN WARM-UP MODE W/ THE EXCEPTION THAT THE FAN SPEED WOULD BE REDUCED TO 60% (ADJ.). DURING THE SUMMER MONTHS, WHEN OAT IS ABOVE 80°F (ADJ.) AND/OR RH IS ABOVE 70% (ADJ.) & THE BUILDING'S AVERAGE UNOCCUPIED TEMPERATURE SETPOINTS OF 85°F (ADJ.) & UNOCCUPIED HUMIDITY SETPOINT OF 70% RH (ADJ) ARE NOT MAINTAINED, THE RTUS WILL BE ACTIVATED & FUNCTION AS INDICATED IN THE COOL-DOWN MODE W/ THE EXCEPTION THAT THE FAN SPEED WOULD BE REDUCED TO 60% (ADJ.).

SAFETY SEQUENCES

EMERGENCY SHUTDOWN:
UPON RECEIVING A SIGNAL FROM THE FIRE ALARM SYSTEM, THE UNIT'S FANS SHALL SHUTDOWN, ALL DAMPERS SHALL CLOSE, HOT AND CHILLED WATER VALVES SHALL CLOSE AND AN ALARM SHALL BE GENERATED AT THE BMS. THIS MODE SHALL BE CALLED EMERGENCY SHUTDOWN MODE. ATC CONTRACTOR SHALL HARD WIRE A DIRECT CONNECTION FROM THE FIRE ALARM PANELS DRY CONTACTS TO THE BMS. ALL ASSOCIATED VAV BOXES SHALL CLOSE.

LOW LEAVING TEMPERATURE:
UPON A LOW LEAVING TEMPERATURE CONDITION (38°F ADJ) SENSED BY THE FREEZESTAT SENSOR, CO2 DEMAND CONTROL SHALL BE OVERRIDDEN, THE OUTSIDE AIR AND EXHAUST AIR DAMPER SHALL CLOSE, AND THE SUPPLY AND EXHAUST AIR FAN SHALL SHUT DOWN AND AN ALARM SHALL BE GENERATED.

SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS.

CASING TEMPERATURE SETPOINT:
THE DDC SYSTEM SHALL MONITOR THE UNIT CASING TEMPERATURE SETPOINT (BY THE MAT SENSOR). THE HOT WATER HEATING COIL VALVE SHALL OPEN TO MAINTAIN A 40°F (ADJ.) MINIMUM CASING TEMPERATURE SETPOINT.

STAGED OPTIMIZED START/STOP OPERATION:
ALL UNIT CONTROLLERS SHALL BE EQUIPPED WITH OPTIMAL START/STOP OPERATION AND TIME OF DAY SCHEDULING. UNITS SHALL START UP DURING MORNING WARM-UP/COOL-DOWN MODES IN A STAGGERED MANNER SUCH THAT ALL EQUIPMENT IS NOT STARTED AT THE SAME TIME.

ADDITIONAL ALARMS:

OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE PREFILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

RETURN AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FINAL FILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

SPACE HUMIDITY SENSOR:
THE DDC SYSTEM SHALL MONITOR THE SYSTEM ZONE HUMIDITY SENSORS AND REPORT THE INFORMATION TO THE BUILDING DDC SYSTEM ROOM GRAPHICS.

OVERRIDE:
THE SPACE MOUNTED TEMPERATURE SENSOR SHALL HAVE A PUSH BUTTON OVERRIDE CAPABILITY. UPON ACTIVATION OF 10% (ADJ) OR MORE THERMOSTATS ON ONE RTU THE ASSOCIATED ROOFTOP UNIT AND ASSOCIATED VAV'S SHALL CHANGE TO OCCUPIED MODE FOR A PERIOD OF 2 HOURS (ADJ).

ECONOMIZER OVERRIDE:
FOR ALL RTU'S EQUPPED WITH ECONOMIZER CONTROL, THE ATC CONTRACTOR SHALL CREATE A SEQUENCE OF OPERATION AND ASSOCIATED GRAPHIC USER INTERFACE (GUI) BUTTON THAT SHALL BE CAPABLE OF ALLOWING THE BMS OPERATOR TO DISENGAGE AND RE-ENGAGE THE ECONOMIZER CONTROL CAPABILITIES OF THE RTU. A SOFTWARE NOTIFICATION SHALL BE GENERATED WHEN THIS MODE OF OPERATION IS ACTIVATED. THIS SEQUENCE AND GUI BUTTON SHALL BE PROVIDED FOR EACH INDIVIDUAL RTU AND IN ADDITION A MASTER COMMAND GUI BUTTON SHALL ENGAGE/DISENGAGE THE MODE FOR ALL RTU'S. UNDER THIS MODE, THE ECONOMIZER OVERRIDE SHALL ALLOW THE ROOFTOP UNIT TO OPERATE ITS HOT WATER AND/OR CHILLED WATER CONTROL VALVES TO MAINTAIN THE DAT SETPOINT. THE OUTSIDE AND RETURN AIR DAMPERS SHALL FUNCTION AS INDICATED IN THE OCCUPIED MODE. THE VARIABLE AIR VOLUME BOXES SHALL MODULATE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AND CO2 SETPOINTS.

RTU HANDLING UNITS	BMS CONTROL POINTS					
POINT NAME	AI	AO	BI	BO	ALARM	REMARKS
OUTSIDE AIR FLOW MEASURING STATION	X				X	NOTE #1
SUPPLY AIR FLOW MEASURING STATION	X					NOTE #6
EXHAUST AIR FLOW MEASURING STATION	X					NOTE #6
OUTSIDE AIR TEMP	X					CENTRAL POINT
OUTSIDE AIR HUMIDITY	X					CENTRAL POINT
EXHAUST AIR TEMP	X					
EXHAUST AIR HUMIDITY	X					
ENERGY RECOVERY HEAT WHEEL DISCHARGE AIR TEMP	X				X	ALARM BELOW 38°
ENERGY RECOVERY WHEEL DISCHARGE AIR HUMIDITY	X					
MIXED AIR TEMP & HUMIDITY	X				X	
COOLING COIL AIR TEMP & HUMIDITY	X				X	
HEATING COIL AIR TEMP	X				X	
SUPPLY AIR TEMP	X				X	
SUPPLY AIR HUMIDITY	X					
OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR HUMIDITY	X					
RETURN AIR TEMP	X					
CHILLED WATER CONTROL VALVE	X	X			X	
HOT WATER CONTROL VALVE	X	X			X	
RE-CIRC AIR DAMPER	X	X			X	
OUTSIDE AIR DAMPER	X	X			X	
EXHAUST AIR DAMPER	X	X			X	
RETURN AIR SMOKE DETECTOR			X		X	
SUPPLY AIR SMOKE DETECTOR			X		X	
COOLING SUPPLY AIR SET POINT	X	X				
HEATING SUPPLY AIR SET POINT	X	X				
EMERGENCY SHUT DOWN					X	
HIGH COOLING SUPPLY AIR TEMP					X	10° ABOVE
HIGH HEATING SUPPLY AIR TEMP					X	10° ABOVE
LOW HEATING SUPPLY AIR TEMP					X	10° BELOW
OUTSIDE AIR FILTER CHANGE REQUIRED					X	
RETURN AIR FILTER CHANGE REQUIRED					X	
HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION					X	880 PPM ALRM
HIGH RETURN AIR HUMIDITY					X	75% RH ALARM
LOW RETURN AIR TEMP					X	60° OR LESS
HIGH RETURN AIR TEMP					X	85° OR ABOVE
SPACE CO2	X				X	880 PPM ALRM
FREEZESTAT			X		X	NOTE #5
CASING LOW LIMIT TEMPERATURE	X				X	38° ALRM
ERW OA FACE & BYPASS DAMPER			X	X		
ERW EA FACE & BYPASS DAMPER			X	X		
SUPPLY LOW STATIC SAFETY			X			NOTE #7
SUPPLY HI STATIC SAFETY			X			NOTE #7
RETURN LOW STATIC SAFETY			X			NOTE #7
RETURN HI STATIC SAFETY			X			NOTE #7
VFD POINTS						
ENERGY RECOVERY WHEEL VFD SPEED	X	X				HARDWIRE
SUPPLY FAN VFD SPEED	X	X				HARDWIRE
EXHAUST FAN VFD SPEED	X	X				HARDWIRE
SUPPLY FAN STATUS			X		X	HARDWIRE
EXHAUST FAN STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL VFD FAULT			X		X	
SUPPLY FAN VFD FAULT			X		X	
EXHAUST FAN VFD FAULT			X		X	
SUPPLY FAN START/STOP				X		HARDWIRE
EXHAUST FAN START/STOP				X		HARDWIRE
ENERGY RECOVERY WHEEL START/STOP				X		HARDWIRE
SUPPLY FAN FAILURE					X	
SUPPLY FAN IN HAND					X	
EXHAUST FAN FAILURE					X	
EXHAUST FAN IN HAND					X	
ENERGY RECOVERY WHEEL ROTATION FAILURE					X	
ENERGY RECOVERY WHEEL IN HAND					X	
TOTAL WHEEL RUNTIME EXCEEDED					X	

NOTES:

1. OUTSIDE AIRFLOW MEASURING STATION FURNISHED BY UNIT MANUFACTURER & PROGRAMMING SHALL BE PROVIDED BY ATC. ALARM POINT SHALL BE INITIATED AT THE BMS WHEN VALUE IS 10% ABOVE OR BELOW SCHEDULED VALUE.
2. ALL SETPOINTS AND SCHEDULES, PROVIDED FROM ATC CONTRACTOR (UNLESS SPECIFICALLY NOTED OTHERWISE) AND RTU MANUFACTURER CONTROLLER, SHALL BE ADJUSTABLE THROUGH THE BMS SYSTEM
3. ALL ATC (DDC) CONTROL SENSORS AND CONTROL VALVES PROVIDED BY ATC CONTRACTOR. REFER TO SCHEDULE FOR REQUIRED I/O PARAMETERS
4. ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE
5. FREEZESTAT SHALL BE AUTO-RESET TYPE
6. SUPPLY & EXHAUST AIRFLOW MEASURING PROBES SHALL BE PROVIDED BY RTU MANUFACTURER. ATC CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING/REPORTING AIRFLOW MEASUREMENT DATA FROM RTU SUPPLY & EXHAUST FAN TO THE BMS.
7. HI/LOW STATIC ALARM SHALL BE ACTIVATED WHEN DP IS +/-15% (ADJ) FROM NORMAL OPERATING DP.
8. DAMPERS WITHIN THE UNIT SHALL BE PROVIDED BY RTU MANUFACTURER, ACTUATORS W/POSITION FEEDBACK ARE TO BE PROVIDED BY ATC CONTRACTOR.

ABBREVIATIONS

AFVP	AIRFLOW VELOCITY PROBE
ALM	ALARM
AQ	AQUASTAT
ATC	AUTOMATIC TEMPERATURE CONTROLS
BLDG	BUILDING
BLR	BOILER
BMS	BUILDING MANAGEMENT SYSTEM (ENERGY & AUTOMATION)
CM	CONSTRUCTION MANAGER
COMB	COMBUSTION
CONTR	CONTROLLER
CO2	CARBON DIOXIDE
CR	CONTROL RELAY
CS	CURRENT SENSOR
CUV	CABINET UNIT VENTILATOR
D	DAMPER
DA	DISCHARGE AIR
DAS	DISCHARGE AIR SENSOR
DAT	DISCHARGE AIR TEMPERATURE
DCV	DEMAND CONTROL VENTILATION
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DDC	DIRECT DIGITAL CONTROL
DO	DAMPER OPERATOR
DP	DIFFERENTIAL PRESSURE
DPR	DAMPER
DPV	DIFFERENTIAL PRESSURE VALVE
EA	EXHAUST AIR
EF	EXHAUST FAN
F	FLOW/FARENHEIT (AS APPLICABLE)
FB	FACE & BYPASS
FD	FIRE DAMPER
H	HUMIDITY
HS	ENTHALPY SENSOR
HT	HIGH TEMPERATURE
HTG	HEATING
HR	HEAT RECOVERY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LT	LOW TEMPERATURE
M	MOTOR
MAT	MIXED AIR TEMPERATURE
NAC	NETWORK APPLICATION CONTROLLER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OVR	OVERRIDE
P	PRESSURE
PB	PUSH BUTTON
PNL	PANEL
RA	RETURN AIR
REL	RELIEF AIR
RF	RETURN FAN
RFC	RETURN FAN CONTROLLER
RM	ROOM
SA	SUPPLY AIR
SD	SMOKE DAMPER OR SMOKE DETECTOR
SF	SUPPLY FAN
SFC	SUPPLY FAN CONTROLLER
SP	STATIC PRESSURE
T	TEMPERATURE
TEC	TERMINAL EQUIPMENT CONTROLLER
VAC	VOLTS - ALTERNATING CURRENT
VDC	VOLTS - DIRECT CURRENT
VFD	SEE VSD
VLV	VALVE
VP	VELOCITY PROBE (AIRFLOW)
VSD	VARIABLE SPEED (FREQUENCY) DRIVE
XFMR	TRANSFORMER

ATC/BMS GENERAL NOTES

1. ALL SETPOINTS INDICATED IN THE SEQUENCE OF OPERATIONS SHALL BE ADJUSTABLE ON GRAPHICAL INTERFACE.
2. THE CONTROL POINTS LISTED IN THE SUMMARY MATRIX ARE THE MINIMUM CONTROL POINTS REQUIRED. ATC CONTRACTOR SHALL PROVIDE ALL CONTROL POINTS AS REQUIRED FOR COMPLETE SYSTEM CONTROL PER THE SEQUENCE OF OPERATIONS.
3. ALL CONTROL WIRING, SENSORS, RELAYS, CONTROLLERS, PANELS, DAMPERS, ACTUATORS, ETC. INDICATED ON THE CONTROL DIAGRAMS SHALL BE PROVIDED BY THE ATC CONTRACTOR UNLESS NOTED OTHERWISE.
4. ALL HHW VALVES SHALL BE FAIL OPEN ON LOSS OF POWER.
5. ALL HHW WATER VALVES SHALL BE MODULATING TYPE FOR GPM > 2.0; 2-POSITION ACCEPTABLE FOR FLOWS < 2.0 GPM
6. ATC CONTRACTOR TO COORDINATE W/ OWNER FOR ALL COMMUNICATION & INTERFACE REQUIREMENTS TO CENTRAL OPERATING STATION. REFER TO SPEC FOR FURTHER INFO.
7. DUCT SMOKE DETECTORS INDICATED ARE TO BE FURNISHED BY DIV. 260000 & INSTALLED BY HVAC CONTRACTOR. POWER WIRING AND FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR TO PROVIDE BMS INTERLOCK TO SHUT ASSOCIATED UNIT DOWN AND INITIATE AN ALARM UPON ACTIVATION
8. ALL SMOKE DAMPERS SHALL BE COMBINATION SMOKE/FIRE DAMPERS, SHALL BE FURNISHED & INSTALLED BY HVAC CONTRACTOR, AND POWER WIRED BY ELECTRICAL CONTRACTOR. DAMPERS SHALL BE MOTOR OPERATED WITH 24 VOLT / 120 VOLT ACTUATOR. FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. DAMPER ENDSWITCH INTEGRATION TO BMS BY ATC CONTRACTOR.
9. ALL ATC CONTROLS SHALL BE POWER WIRED FROM DESIGNATED EMERGENCY POWER JUNCTION BOXES LOCATED ON THE ELECTRICAL DRAWINGS. JUNCTION BOXES WILL BE FED BY EMERGENCY POWER, THEREFORE ALL CONTROLS SHALL BE ON EMERGENCY POWER. ANY SUB ATC PANELS REQUIRED SHALL BE FED FROM EMERGENCY POWER & ALL SHALL BE PROVIDED BY ATC CONTRACTOR. ALL UNIT CONTROLS SHALL BE FED BY EMERGENCY POWER & NOT THROUGH THE UNIT'S MAIN POWER SOURCE.
10. ALL DENSELY OCCUPIED SPACES WITH OCCUPANT DENSITY OF 25 PEOPLE OR MORE PER 1000 SQ/FT SHALL BE PROVIDED W/ ROOM LEVEL TEMPERATURE, CO2, & HUMIDITY SENSORS W/ CO2 CONTROL. THIS SHALL BE PROVIDED IN COMPLIANCE WITH LEED v.4 CREDIT IEQC1. (PROVIDED BY FMS CONTRACTOR & INSTALLED BY ATC CONTRACTOR)

DORE + WHITTIER

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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

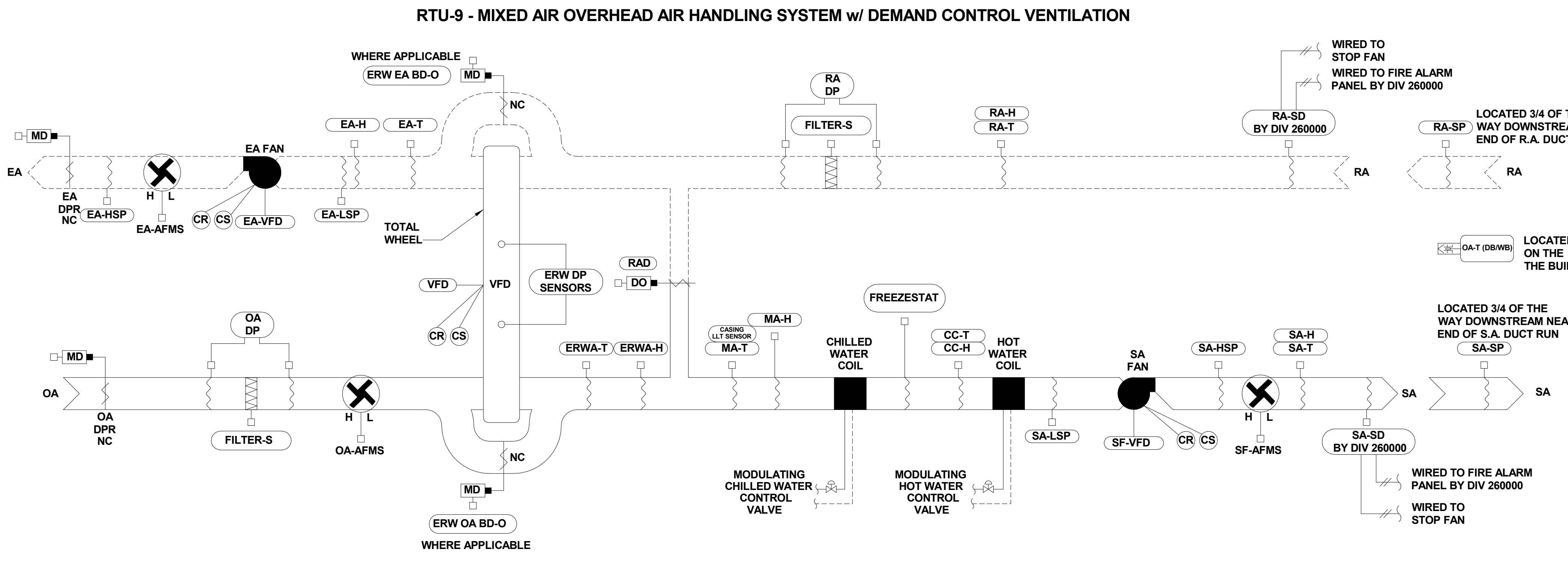
ORIENTATION AND SCALE:

SCALE: AS INDICATED

SHEET TITLE:
CONTROLS V

SHEET NUMBER:
M4.15

RTU-9 - MIXED AIR OVERHEAD AIR HANDLING SYSTEM w/ DEMAND CONTROL VENTILATION



ROOF TOP UNITS

A DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE ROOFTOP AIR HANDLING UNIT OPERATION AS FOLLOWS:

RUN CONDITIONS - SCHEDULED:
THE RTU SHALL RUN BASED UPON AN OPERATOR-ADJUSTABLE SCHEDULE.

WARM-UP:
THE RTU SHALL BE ACTIVATED, ALL VAV BOXES SHALL OPEN, THE RTU OUTSIDE AND EXHAUST AIR DAMPERS SHALL BE CLOSED, THE RECIRCULATION DAMPER SHALL BE OPEN. THE CHILLED WATER CONTROL VALVE SHALL BE CLOSED, THE TOTAL ENERGY RECOVERY WHEEL SHALL BE DE-ENERGIZED & ASSOCIATED ERW BYPASS DAMPERS SHALL CLOSE. THE SUPPLY FAN SHALL START AND RECIRCULATE BUILDING AIR, THE EXHAUST FAN SHALL BE OFF. THE RTU HOT WATER CONTROL VALVE SHALL MODULATE OPEN AND THE UNIT DISCHARGE AIR SETPOINT DURING WARM-UP SHALL BE 85°F (ADJ.). ONCE THE SPACE HAS REACHED SPACE SETPOINT, THE RTU SHALL ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE WARM-UP MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE RISE TO DETERMINE WHEN TO ACTIVATE THE WARM UP MODE TO ENSURE THAT THE BUILDING HAS REACHED ITS SETPOINT FOR OCCUPIED MODE.

COOL-DOWN:
THE RTU OUTSIDE AND EXHAUST AIR DAMPERS SHALL BE CLOSED, THE RECIRCULATION DAMPER SHALL BE OPEN. THE HOT WATER CONTROL VALVE SHALL BE CLOSED, THE TOTAL ENERGY RECOVERY WHEEL SHALL BE DE-ENERGIZED & ASSOCIATED ERW BYPASS DAMPERS SHALL CLOSE. THE EXHAUST FAN SHALL BE OFF AND THE SUPPLY FAN SHALL START AND RECIRCULATE BUILDING AIR. THE RTU CHILLED WATER VALVE SHALL MODULATE OPEN AND THE UNIT DISCHARGE AIR SETPOINT DURING COOL-DOWN SHALL BE 55°F (ADJ.). ONCE THE SPACE HAS REACHED SPACE SETPOINT OF 78°F (ADJ.), THE RTU SHALL ENTER OCCUPIED MODE. THE SYSTEM SHALL BE PREVENTED FROM ENTERING THE COOL-DOWN MODE MORE THAN ONCE PER DAY. THROUGH THE OPTIMIZED START PROGRAM LOGIC WITHIN THE DDC SYSTEM SOFTWARE, THE BMS SHALL MONITOR THE RATE OF TEMPERATURE DECREASE TO DETERMINE WHEN TO ACTIVATE THE COOL DOWN MODE TO ENSURE THAT THE SPACE HAS REACHED ITS SETPOINT FOR OCCUPIED MODE. ECONOMIZER MODE OF OPERATION SHALL OVERRIDE NORMAL COOL-DOWN MODE OF OPERATION DURING UNOCCUPIED MODE.

OCCUPIED MODE:

GENERAL:
THE FANS START OR CONTINUE TO RUN AND THE RTU IS CONTROLLED AS FOLLOWS:

THE OUTSIDE AIR DAMPER SHALL OPEN TO ITS MINIMUM POSITION AS DETERMINED DURING BALANCING. THE EXHAUST DAMPER SHALL RECEIVE THE SAME SIGNAL AS THE OUTSIDE AIR DAMPER & BOTH SHALL MODULATE IN UNISON. THE RETURN AIR DAMPER SHALL RECEIVE THE OPPOSITE SIGNAL AS THE OUTSIDE AIR DAMPER. ALL THREE DAMPERS WILL MODULATE IN SEQUENCE WITHOUT OVERLAP. THE ENERGY RECOVERY WHEEL SHALL BE ACTIVATED, ERW BYPASS DAMPERS SHALL CLOSE AND THE WHEEL SHALL OPERATE PER THE SEQUENCES BELOW. THE SUPPLY AND EXHAUST FANS SHALL BE ACTIVATED OR CONTINUE TO RUN.

THE SUPPLY FAN SHALL ADJUST ITS SPEED BASED ON THE SUPPLY DUCT MOUNTED STATIC PRESSURE SENSOR LOCATED 3/4 DOWN STREAM. THE SYSTEM'S ACTUAL STATIC PRESSURE SETPOINT WILL BE PROVIDED/OBTAINED THROUGH THE TESTING AND BALANCING CONTRACTOR DURING THE BALANCING PROCESS. THE EXHAUST FAN SHALL MODULATE ITS SPEED BASED ON THE SUPPLY AIR FLOW. THE ATC CONTRACTOR SHALL PROVIDE LOGIC TO CONSISTENTLY COLLECT THE TOTAL CFM FROM ALL VAV BOXES AND UTILIZE THAT VALUE IN CONJUNCTION WITH THE EXHAUST AIR FLOW SYSTEM CURVE PROFILE TO MODULATE THE EXHAUST FAN VFD. A SLIGHT OFFSET BETWEEN SUPPLY AND RETURN AIR FLOWS SHALL BE SET TO 5% (ADJ) TO ALLOW THE BUILDING TO MAINTAIN A SLIGHTLY POSITIVE PRESSURE. THE STATIC PRESSURE SET POINT SHALL BE RESET BASED ON PID (PROPORTIONAL-INTEGRAL- DERIVATIVE) LOGIC TO ALLOW THE VAV BOX ZONE REQUIRING THE MOST PRESSURE TO SATISFY ITS AIRFLOW REQUIREMENT AT ITS DESIGN FULL OPEN POSITION. THE STATIC PRESSURE SET POINT SHALL BE LOWERED TO THE POINT WHERE FAN SPEED REDUCTION CAN OCCUR, YET STILL ENSURE THAT THE VAV BOX ZONES REMAIN SATISFIED. THE SYSTEM SHALL USE INPUT SIGNALS FROM VAV BOX CONTROLLERS, THE MAIN DUCTWORK MOUNTED SYSTEM STATIC PRESSURE SENSOR AND THE CONTROLLER'S PROGRAM ALGORITHM TO ACHIEVE THIS CONTROL. IN ADDITION, PROVIDE DETECTION AND ALARM OF ANY VAV ZONE THAT EXCESSIVELY NEGATIVELY DRIVES THE RESET LOGIC. THE BMS SYSTEM SHALL BE CAPABLE OF ALLOWING OPERATOR TO READILY REMOVE OR ADD VAV BOX ZONES FROM THE RESET LOGIC ALGORITHM. THE PROJECT TAB/ATC CONTRACORS SHALL FIELD DETERMINE THE ADJUSTABLE SETPOINT RANGE FOR EACH RTU/AHU SYSTEM AND THE PRIMARY VAV BOX UTILIZED TO CONTROL THE STATIC PRESSURE RESET CONTROL STRATEGY.

THE SYSTEMS OPERATING STATIC PRESSURE RANGES SHALL BE PROVIDED/OBTAINED THROUGH TESTING AND BALANCING CONTRACTOR DURING THE BALANCING PROCESS TO ESTABLISH MIN & MAX SETPOINTS. THE EXHAUST FAN WILL MODULATE ITS SPEED TO MAINTAIN THE SCHEDULED AIRFLOW OFFSET WITH THE SUPPLY FAN. THE RETURN AIR DAMPER AND EXHAUST AIR DAMPER SHALL MODULATE INVERSELY, ALLOWING THE RETURN AIR TO EITHER MIX WITH OA FOR TEMPERATURE CONTROL OR TO EXHAUST FROM THE UNIT.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND EITHER THE O.A. DAMPER & E.A. DAMPER, OR THE RECIRCULATION DAMPER ARE PROVEN OPEN. THE SUPPLY FAN SHALL MODULATE ITS SPEED BASED ON THE SYSTEM'S STATIC PRESSURE DUE TO VAV DAMPERS OPENING/CLOSING. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER-DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES. BALANCING CONTRACTOR & ATC CONTRACTOR SHALL COORDINATE AND PROVIDE AN EXHAUST FAN(S) PROFILE OF AIR FLOW THROUGHOUT THE FAN SYSTEM CURVE AT DIFFERENT SPEEDS AND AIR FLOW TESTING. THIS SHALL BE USED FOR EXHAUST FAN SPEED CONTROL, TYP. FOR SUPPLY FANS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FAN:
THE EXHAUST FAN SHALL RUN ANYTIME THE RTU IS COMMANDED TO RUN AND THE O.A. DAMPER & E.A. DAMPER, OR THE RECIRCULATION DAMPER ARE PROVEN OPEN. THE EXHAUST FAN SHALL MODULATE ITS SPEED BASED ON THE SUPPLY AIR FLOW, ACHIEVING THE SCHEDULED AIRFLOW OFFSET FROM THE SUPPLY FAN. THE EXHAUST FAN SHALL HAVE A USER DEFINABLE 10 MIN (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

CURRENT SWITCHES SHALL BE INSTALLED ON THE SUPPLY AND RETURN FAN STARTERS. THE DDC SYSTEM USES THESE SWITCHES TO CONFIRM THE FANS ARE IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL.

TOTAL ENERGY RECOVERY WHEEL - VARIABLE SPEED:
THE CONTROLLER SHALL MODULATE THE TOTAL ENERGY RECOVERY WHEEL AS FOLLOWS:

COOLING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED AND/OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR COOLING RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE BELOW THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

HEATING RECOVERY MODE:
THE CONTROLLER SHALL MEASURE THE TOTAL WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE TOTAL WHEEL SPEED AND/OR BYPASS DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL WHEEL SHALL RUN FOR HEAT RECOVERY WHENEVER:
- THE RTU RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE ABOVE THE OUTSIDE AIR TEMPERATURE.
- AND THE ECONOMIZER IS OFF.
- AND THE SUPPLY FAN IS ON.

PERIODIC SELF-CLEANING:
THE TOTAL ENERGY RECOVERY WHEEL SHALL RUN AT 5% SPEED (ADJ.) FOR 10 SEC (ADJ.) EVERY 4HRS (ADJ.) THE UNIT RUNS.

WHEEL DEFROST CYCLE AND FROST PROTECTION:
IF THE WHEEL DIFFERENTIAL PRESSURE RISES 1 INCH. (ADJ.) AND THE OUTSIDE AIR TEMPERATURE IS BELOW 30°F (ADJ.), THE WHEEL SPEED SHALL BE REDUCED VIA WHEEL VARIABLE FREQUENCY DRIVE, OR THE ENERGY RECOVERY WHEEL FACE & BYPASS DAMPERS SHALL MODULATE OPEN TO BYPASS THE WHEEL UNTIL THE PRESSURE RETURNS TO NORMAL. WHEEL DEFROST CONTROL SEQUENCE SHALL BE CHOSEN PER MANUFACTURER'S RECOMMENDATIONS. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- RECOVERY WHEEL ROTATION FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RECOVERY WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- RECOVERY WHEEL RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).
- RECOVERY WHEEL VFD IN FAULT

COOLING AND DEHUMIDIFICATION - CHILLED WATER:
OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-COOLED BY THE INCOMING RETURN AIR. UPON SENSING A MIXED AIR TEMPERATURE AND/OR MIXED AIR HUMIDITY ABOVE THE SCHEDULED SUPPLY AIR DISCHARGE SETPOINTS, THE CHILLED WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO COOL AND DEHUMIDIFY THE INCOMING AIR. THE COOLING COIL SHALL MODULATE TO MAINTAIN THE LEAVING AIR TEMPERATURE SETPOINT OF 55°F (ADJ.). IF THE AVERAGE ZONE TEMPERATURE REMAINS BELOW SETPOINT FOR AN ADDITIONAL 10 MINUTES, THE UNIT REHEAT COIL SHALL BE ENGAGED TO RAISE THE DISCHARGE AIR TEMPERATURE UNTIL SETPOINT IS SATISFIED. THE COOLING COIL AND HOT WATER COIL (REHEAT) SHALL BE ENABLED WHENEVER:

- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS GREATER THAN 55°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS ABOVE THE DESIRED SETPOINT.
- OR SPACE TEMPERATURE IS CALLING FOR COOLING

HEATING - HOT WATER:
OUTSIDE AIR SHALL PASS THROUGH THE TOTAL ENERGY RECOVERY WHEEL, PRE-HEATED BY THE INCOMING RETURN AIR. UPON SENSING AN AVERAGE ZONE TEMPERATURE BELOW THE DESIRED ZONE TEMPERATURE SETPOINT OF 70°F (ADJ.) THE HOT WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO HEAT THE INCOMING AIR TO MAINTAIN A SUPPLY AIR DISCHARGE SETPOINT OF 70°F (ADJ.). IF THE AVERAGE ZONE TEMPERATURE DROPS BELOW SETPOINT BY 3°F FOR GREATER THAN 10 MINUTES WHILE HEATING IS ENABLED, THE HOT WATER CONTROL VALVE SHALL MODULATE, RAISING THE DISCHARGE AIR TEMPERATURE IN A 5°F INCREMENT. IF THE AVERAGE ZONE TEMPERATURE REMAINS BELOW SETPOINT FOR AN ADDITIONAL 5 MINUTES, THE HEATING COIL SHALL AGAIN RAISE THE DISCHARGE AIR TEMPERATURE IN THIS FASHION. THIS ITERATION SHALL REPEAT UNTIL THE AVERAGE ZONE SETPOINT IS SATISFIED. THE OPPOSITE SHALL OCCUR IF THE AVERAGE ZONE TEMPERATURE EXCEEDS SETPOINT. REFER TO THE SCHEDULE FOR MAX SUPPLY AIR TEMPERATURE.

- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS BELOW THE DESIRED SETPOINT.
- OR COOLING IS ACTIVATED AND REHEAT IS REQUIRED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- LOW ENTERING AIR TEMP: IF THE MIXED AIR OR COOLING COIL LEAVING AIR TEMPERATURE IS LESS THAN 38°F (ADJ.).

ECONOMIZER (DUAL ENTHALPY CONTROL):
THE CONTROLLER SHALL MEASURE THE RETURN AND OUTSIDE AIR ENTHALPIES AND MODULATE THE OUTSIDE AIR DAMPER, RECIRCULATION DAMPER AND WHEEL BYPASS DAMPERS AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE TOTAL ENERGY RECOVERY WHEEL SHALL BE OFF DURING UNOCCUPIED MODE. THE ECONOMIZER SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN RETURN AIR ENTHALPY.
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
- AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL BE DISABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE DROPS BELOW 40°F (ADJ.).
- OR ON LOSS OF SUPPLY FAN STATUS.
- OR THE FREEZESTAT IS ON.

UNOCCUPIED MODE:
UNDER THIS MODE, ALL RTUS SHALL BE OFF & DAMPERS CLOSED. WHEN THE SPACE DROPS BELOW SETPOINT, THE RTU SHALL MODULATE AS REQUIRED TO MAINTAIN THE SPACE UNOCCUPIED SETPOINT OF 55°F (ADJ.) IN THE WINTER. THE RTUS SHALL BE ACTIVATED & FUNCTION AS INDICATED IN WARM-UP MODE W/ THE EXCEPTION THAT THE FAN SPEED WOULD BE REDUCED TO 60% (ADJ.). DURING THE SUMMER MONTHS, WHEN OAT IS ABOVE 80°F (ADJ.) AND/OR RH IS ABOVE 70% (ADJ.) & THE SPACE UNOCCUPIED TEMPERATURE SETPOINTS OF 85°F (ADJ.) & UNOCCUPIED HUMIDITY SETPOINT OF 70% RH (ADJ) ARE NOT MAINTAINED, THE RTUS WILL BE ACTIVATED & FUNCTION AS INDICATED IN THE COOL-DOWN MODE W/ THE EXCEPTION THAT THE FAN SPEED WOULD BE REDUCED TO 60% (ADJ.).

SAFETY SEQUENCES

EMERGENCY SHUTDOWN:
UPON RECEIVING A SIGNAL FROM THE FIRE ALARM SYSTEM, THE UNIT'S FANS SHALL SHUTDOWN, ALL DAMPERS SHALL CLOSE, HOT AND CHILLED WATER VALVES SHALL CLOSE AND AN ALARM SHALL BE GENERATED AT THE BMS. THIS MODE SHALL BE CALLED EMERGENCY SHUTDOWN MODE. ATC CONTRACTOR SHALL HARD WIRE A DIRECT CONNECTION FROM THE FIRE ALARM PANELS DRY CONTACTS TO THE BMS. ALL ASSOCIATED VAV BOXES SHALL CLOSE.

LOW LEAVING TEMPERATURE:
UPON A LOW LEAVING TEMPERATURE CONDITION (38°F ADJ) SENSED BY THE FREEZESTAT SENSOR, CO2 DEMAND CONTROL SHALL BE OVERRIDDEN, THE OUTSIDE AIR AND EXHAUST AIR DAMPER SHALL CLOSE, AND THE SUPPLY AND EXHAUST AIR FAN SHALL SHUT DOWN AND AN ALARM SHALL BE GENERATED.

SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS.

CASING TEMPERATURE SETPOINT:
THE DDC SYSTEM SHALL MONITOR THE UNIT CASING TEMPERATURE SETPOINT (BY THE MAT SENSOR). THE HOT WATER HEATING COIL VALVE SHALL OPEN TO MAINTAIN A 40°F (ADJ.) MINIMUM CASING TEMPERATURE SETPOINT.

STAGED OPTIMIZED START/STOP OPERATION:
ALL UNIT CONTROLLERS SHALL BE EQUIPPED WITH OPTIMAL START/STOP OPERATION AND TIME OF DAY SCHEDULING. UNITS SHALL START UP DURING MORNING WARM-UP/COOL-DOWN MODES IN A STAGGERED MANNER SUCH THAT ALL EQUIPMENT IS NOT STARTED AT THE SAME TIME.

ADDITIONAL ALARMS:

OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE PREFILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

RETURN AIR FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FINAL FILTER. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

SPACE HUMIDITY SENSOR:
THE DDC SYSTEM SHALL MONITOR THE SPACE HUMIDITY SENSORS AND REPORT THE INFORMATION TO THE BUILDING DDC SYSTEM ROOM GRAPHICS. UPON A HIGH SPACE HUMIDITY LEVEL ABOVE 80% RH (ADJ.) AN ALARM WILL BE GENERATED IN THE BMS & THE UNIT WILL ENTER THE COOL DOWN MODE.

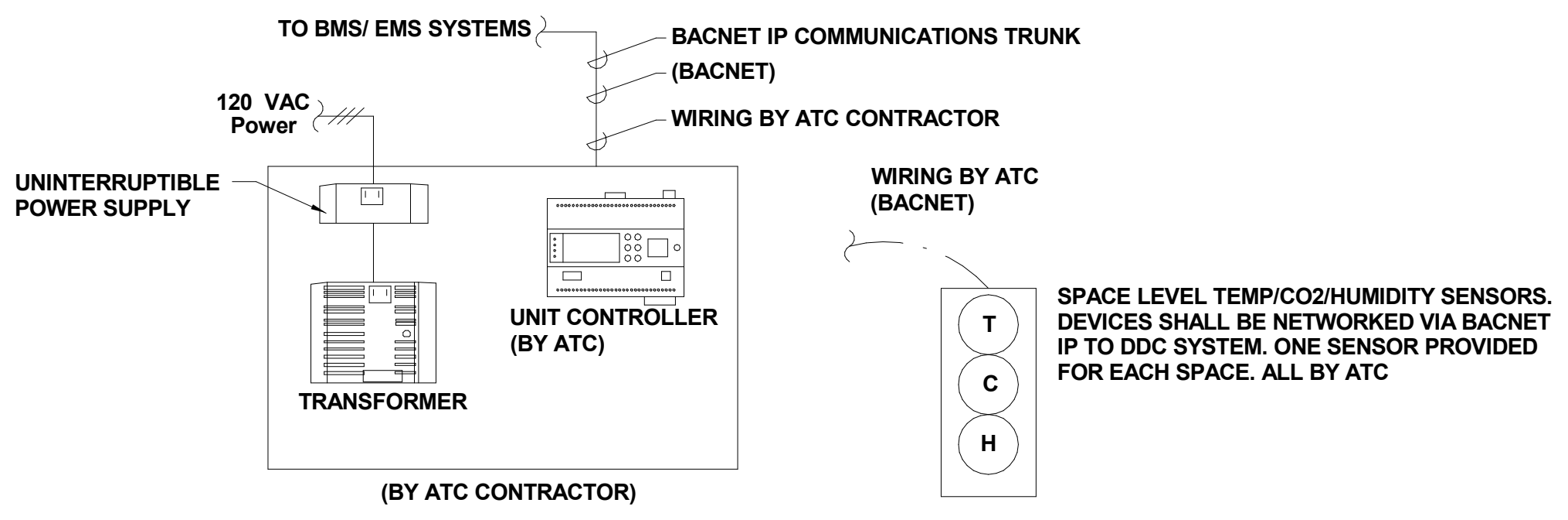
OVERRIDE:
THE SPACE MOUNTED TEMPERATURE SENSOR SHALL HAVE A PUSH BUTTON OVERRIDE CAPABILITY. UPON ACTIVATION OF THE THERMOSTAT OVERRIDE BUTTON THE ASSOCIATED ROOFTOP UNIT SHALL CHANGE TO OCCUPIED MODE FOR A PERIOD OF 2 HOURS (ADJ).

CO2 ALARM : UPON A RISE IN SPACE CO2 10% OR MORE THAN THE DESIGN OF 800 PPM (ADJ.) AN ALARM WILL BE GENERATED AT THE BMS WITH A 20 MIN. (ADJ.) DELAY.

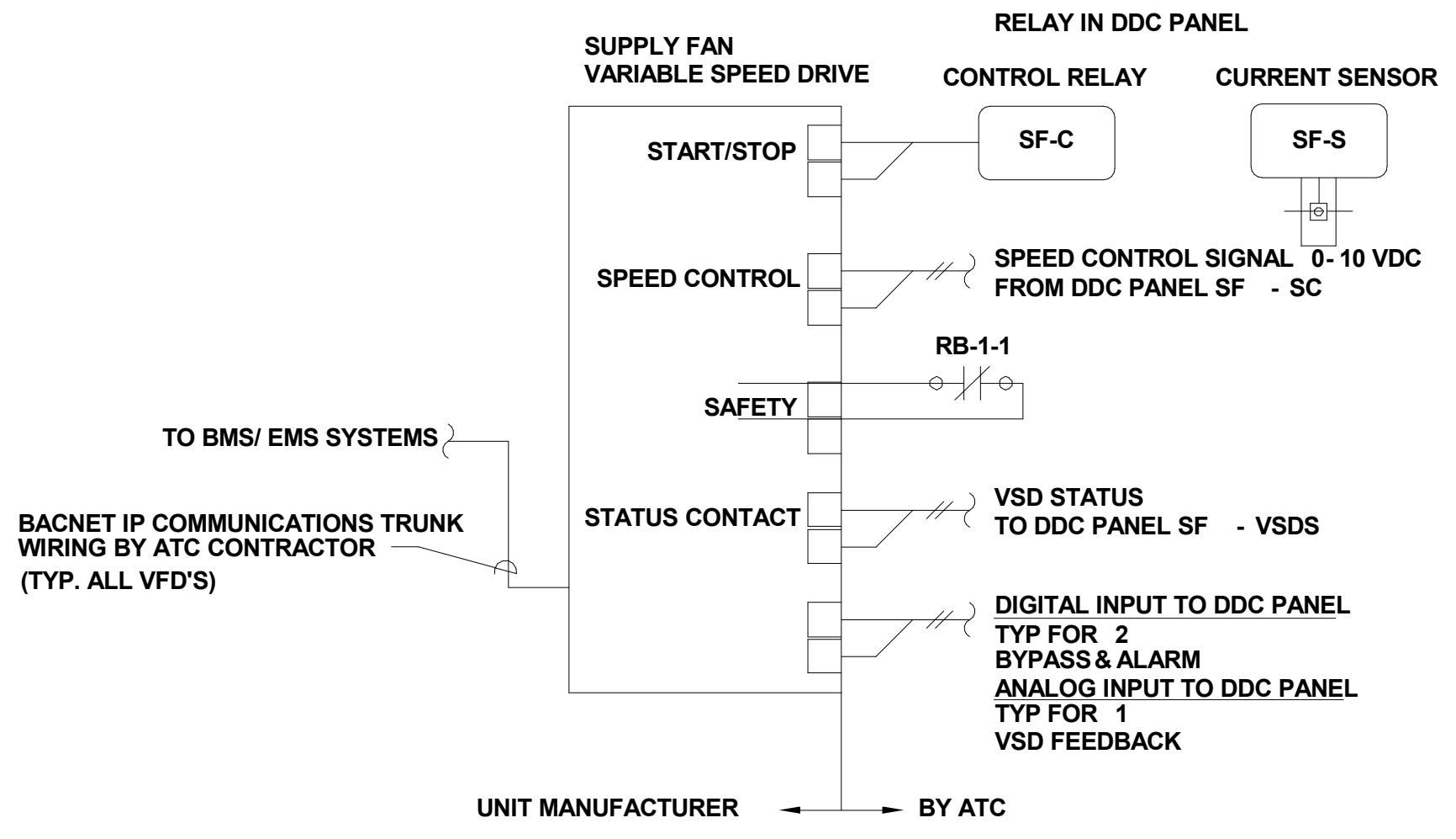
CO2 DEMAND CONTROL VENTILATION (DCV):
UPON A RISE IN SPACE CO2 (GREATER THAN 800 PPM) THE RTU'S RESPECTIVE OUTSIDE AIR DAMPER SHALL MODULATE OPEN FROM ITS MINIMUM POSITION AND THE RETURN DAMPER SHALL BEGIN TO MODULATE CLOSED IN UNISON. UPON A RISE IN SPACE CO2 10% OR MORE THAN THE DESIGN OF 800 PPM (ADJ) AN ALARM WILL BE GENERATED AT THE BMS WITH A 20 MIN. (ADJ.) DELAY. THE FANS SHALL BEGIN TO RAMP UP TO INCREASE VENTILATION. ONCE LEVELS BEGIN TO DROP BELOW 800 PPM, THE RTU SHALL RETURN TO OCCUPIED MODE, AND THE DAMPERS & FANS SHALL MODULATE TO MAINTAIN DISCHARGE AIR & SPACE TEMPERATURE & HUMIDITY.

CO2 DEMAND CONTROL OVERRIDE:
FOR ALL RTU'S EQUPPED WITH CO2 DEMAND CONTROL VENTILATION, THE ATC CONTRACTOR SHALL CREATE A SEQUENCE OF OPERATION AND ASSOCIATED GRAPHIC USER INTERFACE (GUI) BUTTON THAT SHALL BE CAPABLE OF ALLOWING THE BMS OPERATOR TO DISENGAGE AND RE-ENGAGE THE CO2 DEMAND VENTILATION CONTROL CAPABILITIES OF THE ASSOCIATED AIR DISTRIBUTION SYSTEM. A SOFTWARE NOTIFICATION SHALL BE GENERATED WHEN THIS MODE OF OPERATION IS ACTIVATED. THIS SEQUENCE AND GUI BUTTON SHALL BE PROVIDED FOR EACH INDIVIDUAL RTU AND A MASTER COMMAND GUI BUTTON SHALL ENGAGE/DISENGAGE THE MODE FOR ALL RTU'S. UNDER THIS MODE, THE VENTILATION OVERRIDE SHALL ALLOW THE ROOFTOP UNIT TO OPERATE AT IT'S MAXIMUM AIRFLOW AND MAXIMUM OUTSIDE AIR VENTILATION RATE. MORNING WARM-UP AND COOL DOWN MODES FOR THIS MODE OF OPERATION SHALL ALSO OPERATE WITH MAXIMUM OUTSIDE AIR ENABLED WHEN CO2 CONTOL OVERRIDE IS ENABLED. OUTSIDE AIR VENTILATION SHALL BE ENABLED AT A MINIMUM OF TWO HOURS (ADJ) PRIOR TO SCHEDULED OCCUPIED TIME, AND SHALL CONTINUE TO RUN TWO HOURS (ADJ) POST SCHEDULED OCCUPANCY.

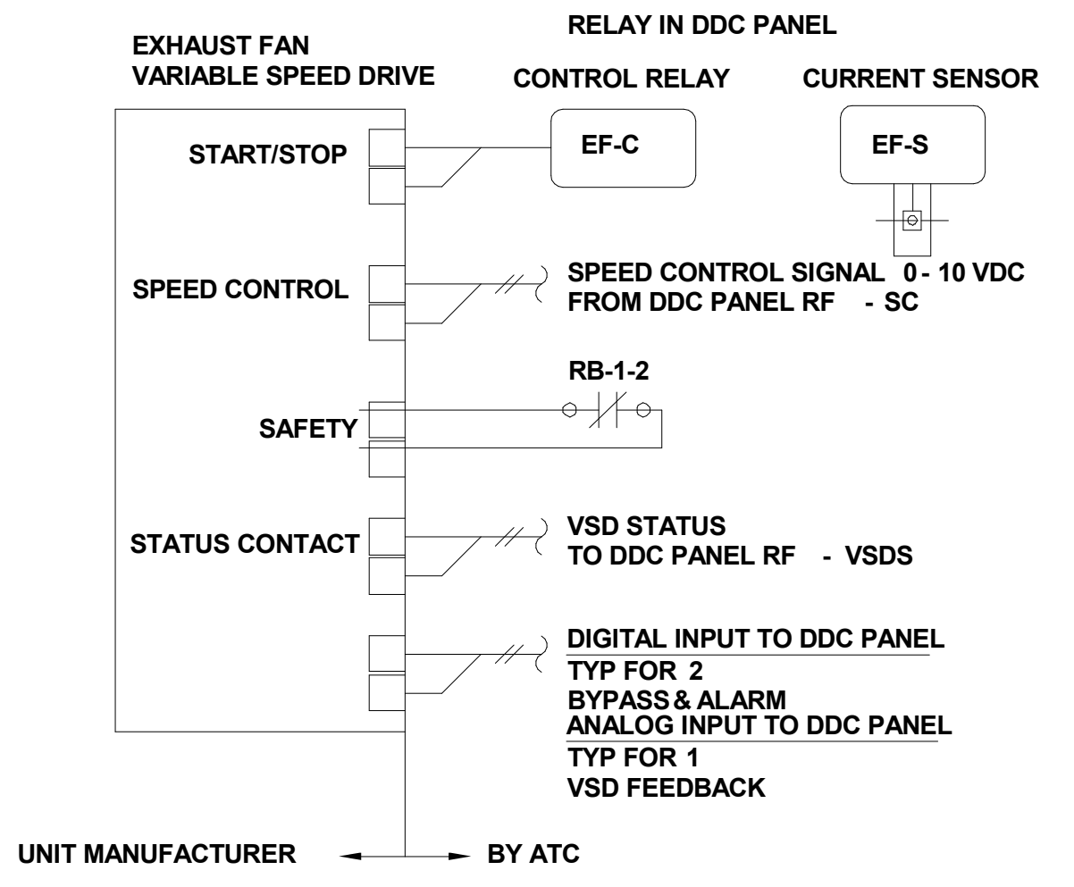
ECONOMIZER OVERRIDE:
FOR ALL RTU'S EQUPPED WITH ECONOMIZER CONTROL, THE ATC CONTRACTOR SHALL CREATE A SEQUENCE OF OPERATION AND ASSOCIATED GRAPHIC USER INTERFACE (GUI) BUTTON THAT SHALL BE CAPABLE OF ALLOWING THE BMS OPERATOR TO DISENGAGE AND RE-ENGAGE THE ECONOMIZER CONTROL CAPABILITIES OF THE RTU. A SOFTWARE NOTIFICATION SHALL BE GENERATED WHEN THIS MODE OF OPERATION IS ACTIVATED. THIS SEQUENCE AND GUI BUTTON SHALL BE PROVIDED FOR EACH INDIVIDUAL RTU AND IN ADDITION A MASTER COMMAND GUI BUTTON SHALL ENGAGE/DISENGAGE THE MODE FOR ALL RTU'S. UNDER THIS MODE, THE ECONOMIZER OVERRIDE SHALL ALLOW THE ROOFTOP UNIT TO OPERATE ITS HOT WATER AND/OR CHILLED WATER CONTROL VALVES TO MAINTAIN THE DAT SETPOINT. THE OUTSIDE AND RETURN AIR DAMPERS SHALL FUNCTION AS INDICATED IN THE OCCUPIED MODE. THE VARIABLE AIR VOLUME BOXES SHALL MODULATE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AND CO2 SETPOINTS.



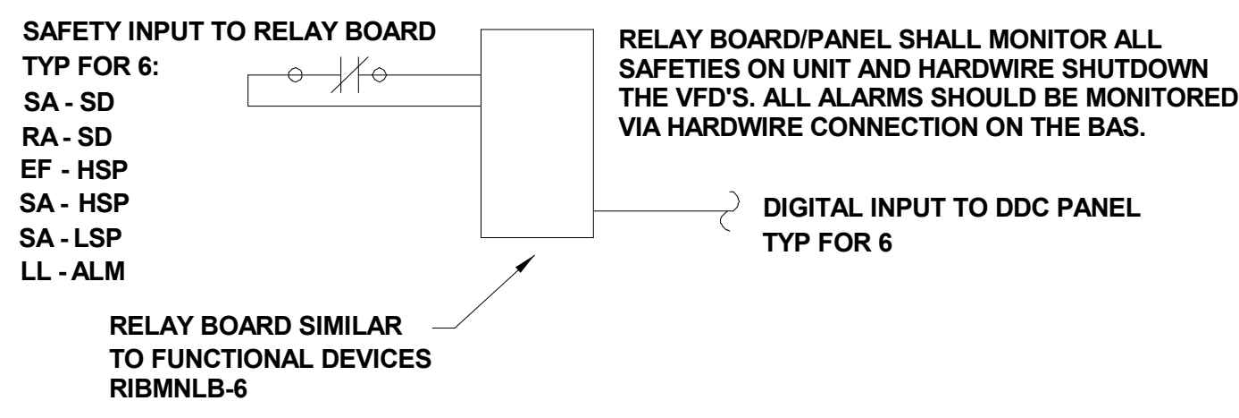
TO BMS/ EMS SYSTEMS
BACNET IP COMMUNICATIONS TRUNK (BACNET)
WIRING BY ATC CONTRACTOR
120 VAC Power
UNINTERRUPTIBLE POWER SUPPLY
WIRING BY ATC (BACNET)
TRANSFORMER
UNIT CONTROLLER (BY ATC)
(BY ATC CONTRACTOR)
T
C
H
SPACE LEVEL TEMP/CO2/HUMIDITY SENSORS. DEVICES SHALL BE NETWORKED VIA BACNET IP TO DDC SYSTEM. ONE SENSOR PROVIDED FOR EACH SPACE. ALL BY ATC



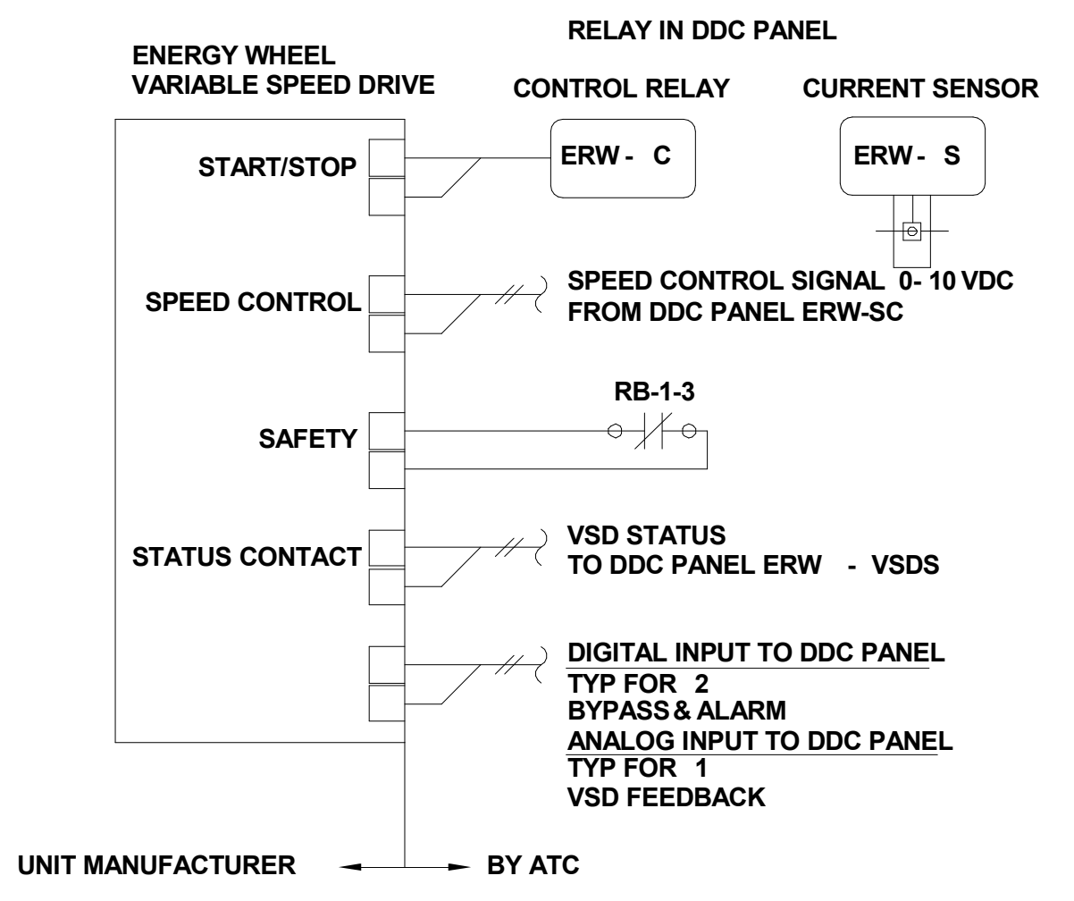
SUPPLY FAN VARIABLE SPEED DRIVE
RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
SF-C
SF-S
SPEED CONTROL
SPEED CONTROL SIGNAL 0-10 VDC FROM DDC PANEL SF - SC
RB-1-1
SAFETY
TO BMS/ EMS SYSTEMS
BACNET IP COMMUNICATIONS TRUNK WIRING BY ATC CONTRACTOR (TYP. ALL VFD'S)
STATUS CONTACT
VSD STATUS TO DDC PANEL SF - VSDS
DIGITAL INPUT TO DDC PANEL TYP FOR 2 BYPASS & ALARM
ANALOG INPUT TO DDC PANEL TYP FOR 1 VSD FEEDBACK
UNIT MANUFACTURER
BY ATC



EXHAUST FAN VARIABLE SPEED DRIVE
RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
EF-C
EF-S
SPEED CONTROL
SPEED CONTROL SIGNAL 0-10 VDC FROM DDC PANEL RF - SC
RB-1-2
SAFETY
STATUS CONTACT
VSD STATUS TO DDC PANEL RF - VSDS
DIGITAL INPUT TO DDC PANEL TYP FOR 2 BYPASS & ALARM
ANALOG INPUT TO DDC PANEL TYP FOR 1 VSD FEEDBACK
UNIT MANUFACTURER
BY ATC



SAFETY INPUT TO RELAY BOARD TYP FOR 6:
SA - SD
RA - SD
EF - HSP
SA - HSP
SA - LSP
LL - ALM
RELAY BOARD/PANEL SHALL MONITOR ALL SAFETIES ON UNIT AND HARDWIRE SHUTDOWN THE VFD'S. ALL ALARMS SHOULD BE MONITORED VIA HARDWIRE CONNECTION ON THE BAS.
DIGITAL INPUT TO DDC PANEL TYP FOR 6
RELAY BOARD SIMILAR TO FUNCTIONAL DEVICES RIBMNLB-6



ENERGY WHEEL VARIABLE SPEED DRIVE
RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
ERW - C
ERW - S
SPEED CONTROL
SPEED CONTROL SIGNAL 0-10 VDC FROM DDC PANEL ERW-SC
RB-1-3
SAFETY
STATUS CONTACT
VSD STATUS TO DDC PANEL ERW - VSDS
DIGITAL INPUT TO DDC PANEL TYP FOR 2 BYPASS & ALARM
ANALOG INPUT TO DDC PANEL TYP FOR 1 VSD FEEDBACK
UNIT MANUFACTURER
BY ATC

RTU HANDLING UNITS	BMS CONTROL POINTS					
POINT NAME	AI	AO	BI	BO	ALARM	REMARKS
OUTSIDE AIR FLOW MEASURING STATION	X				X	NOTE #1
SUPPLY AIR FLOW MEASURING STATION	X					NOTE #6
EXHAUST AIR FLOW MEASURING STATION	X					NOTE #6
OUTSIDE AIR TEMP	X					CENTRAL POINT
OUTSIDE AIR HUMIDITY	X					CENTRAL POINT
EXHAUST AIR TEMP	X					
EXHAUST AIR HUMIDITY	X					
ENERGY RECOVERY HEAT WHEEL DISCHARGE AIR TEMP	X				X	ALARM BELOW 38°
ENERGY RECOVERY WHEEL DISCHARGE AIR HUMIDITY	X					
MIXED AIR TEMP & HUMIDITY	X				X	
COOLING COIL AIR TEMP & HUMIDITY	X				X	
HEATING COIL AIR TEMP	X				X	
SUPPLY AIR TEMP	X				X	
SUPPLY AIR HUMIDITY	X					
SUPPLY AIR STATIC PRESSURE	X	X			X	
OUTSIDE AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR FILTER DIFFERENTIAL PRESSURE	X				X	
RETURN AIR HUMIDITY	X					
RETURN AIR TEMP	X					
RETURN AIR STATIC PRESSURE	X	X			X	
CHILLED WATER CONTROL VALVE	X	X			X	
HOT WATER CONTROL VALVE	X	X			X	
RE-CIRC AIR DAMPER	X	X			X	
OUTSIDE AIR DAMPER	X	X			X	
EXHAUST AIR DAMPER	X	X			X	
RETURN AIR SMOKE DETECTOR			X		X	
SUPPLY AIR SMOKE DETECTOR			X		X	
COOLING SUPPLY AIR SET POINT	X	X				
HEATING SUPPLY AIR SET POINT	X	X				
EMERGENCY SHUT DOWN					X	
HIGH COOLING SUPPLY AIR TEMP					X	10° ABOVE
HIGH HEATING SUPPLY AIR TEMP					X	10° ABOVE
LOW HEATING SUPPLY AIR TEMP					X	10° BELOW
OUTSIDE AIR FILTER CHANGE REQUIRED					X	
RETURN AIR FILTER CHANGE REQUIRED					X	
HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION					X	880 PPM ALRM
HIGH RETURN AIR HUMIDITY					X	75% RH ALARM
LOW RETURN AIR TEMP					X	60° OR LESS
HIGH RETURN AIR TEMP					X	85° OR ABOVE
SPACE CO2	X				X	880 PPM ALRM
FREEZESTAT			X		X	NOTE #5
CASING LOW LIMIT TEMPERATURE	X				X	38° ALRM
ERW OA FACE & BYPASS DAMPER			X	X		
ERW EA FACE & BYPASS DAMPER			X	X		
SUPPLY LOW STATIC SAFETY			X			NOTE #7
SUPPLY HI STATIC SAFETY			X			NOTE #7
RETURN LOW STATIC SAFETY			X			NOTE #7
RETURN HI STATIC SAFETY			X			NOTE #7
VFD POINTS						
ENERGY RECOVERY WHEEL VFD SPEED	X	X				HARDWIRE
SUPPLY FAN VFD SPEED	X	X				HARDWIRE
EXHAUST FAN VFD SPEED	X	X				HARDWIRE
SUPPLY FAN STATUS			X		X	HARDWIRE
EXHAUST FAN STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL STATUS			X		X	HARDWIRE
ENERGY RECOVERY WHEEL VFD FAULT			X		X	
SUPPLY FAN VFD FAULT			X		X	
EXHAUST FAN VFD FAULT			X		X	
SUPPLY FAN START/STOP				X		HARDWIRE
EXHAUST FAN START/STOP				X		HARDWIRE
ENERGY RECOVERY WHEEL START/STOP				X		HARDWIRE
SUPPLY FAN FAILURE					X	
SUPPLY FAN IN HAND					X	
EXHAUST FAN FAILURE					X	
EXHAUST FAN IN HAND					X	
ENERGY RECOVERY WHEEL ROTATION FAILURE					X	
ENERGY RECOVERY WHEEL IN HAND					X	
TOTAL WHEEL RUNTIME EXCEEDED					X	

NOTES:

1. OUTSIDE AIRFLOW MEASURING STATION FURNISHED BY UNIT MANUFACTURER & PROGRAMMING SHALL BE PROVIDED BY ATC. ALARM POINT SHALL BE INITIATED AT THE BMS WHEN VALUE IS 10% ABOVE OR BELOW SCHEDULED VALUE.
2. ALL SETPOINTS AND SCHEDULES, PROVIDED FROM ATC CONTRACTOR (UNLESS SPECIFICALLY NOTED OTHERWISE) AND RTU MANUFACTURER CONTROLLER, SHALL BE ADJUSTABLE THROUGH THE BMS SYSTEM
3. ALL ATC (DDC) CONTROL SENSORS AND CONTROL VALVES PROVIDED BY ATC CONTRACTOR. REFER TO SCHEDULE FOR REQUIRED I/O PARAMETERS
4. ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE
5. FREEZESTAT SHALL BE AUTO-RESET TYPE
6. SUPPLY & EXHAUST AIRFLOW MEASURING PROBES SHALL BE PROVIDED BY RTU MANUFACTURER. ATC CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING/REPORTING AIRFLOW MEASUREMENT DATA FROM RTU SUPPLY & EXHAUST FAN TO THE BMS.
7. HI/LOW STATIC ALARM SHALL BE ACTIVATED WHEN DP IS +/-15% (ADJ) FROM NORMAL OPERATING DP.
8. DAMPERS WITHIN THE UNIT SHALL BE PROVIDED BY RTU MANUFACTURER, ACTUATORS W/POSITION FEEDBACK ARE TO BE PROVIDED BY ATC CONTRACTOR.

ABBREVIATIONS

AFVP	AIRFLOW VELOCITY PROBE
ALM	ALARM
AQ	AQUASTAT
ATC	AUTOMATIC TEMPERATURE CONTROLS
BLDG	BUILDING
BLR	BOILER
BMS	BUILDING MANAGEMENT SYSTEM (ENERGY & AUTOMATION)
CM	CONSTRUCTION MANAGER
COMB	COMBUSTION
CONTR	CONTROLLER
CO2	CARBON DIOXIDE
CR	CONTROL RELAY
CS	CURRENT SENSOR
CUV	CABINET UNIT VENTILATOR
D	DAMPER
DA	DISCHARGE AIR
DAS	DISCHARGE AIR SENSOR
DAT	DISCHARGE AIR TEMPERATURE
DCV	DEMAND CONTROL VENTILATION
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DDC	DIRECT DIGITAL CONTROL
DO	DAMPER OPERATOR
DP	DIFFERENTIAL PRESSURE
DPR	DAMPER
DPV	DIFFERENTIAL PRESSURE VALVE
EA	EXHAUST AIR
EF	EXHAUST FAN
F	FLOW/FARENHEIT (AS APPLICABLE)
FB	FACE & BYPASS
FD	FIRE DAMPER
H	HUMIDITY
HS	ENTHALPY SENSOR
HT	HIGH TEMPERATURE
HTG	HEATING
HR	HEAT RECOVERY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LT	LOW TEMPERATURE
M	MOTOR
MAT	MIXED AIR TEMPERATURE
NAC	NETWORK APPLICATION CONTROLLER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OVR	OVERRIDE
P	PRESSURE
PB	PUSH BUTTON
PNL	PANEL
RA	RETURN AIR
REL	RELIEF AIR
RF	RETURN FAN
RFC	RETURN FAN CONTROLLER
RM	ROOM
SA	SUPPLY AIR
SD	SMOKE DAMPER OR SMOKE DETECTOR
SF	SUPPLY FAN
SFC	SUPPLY FAN CONTROLLER
SP	STATIC PRESSURE
T	TEMPERATURE
TEC	TERMINAL EQUIPMENT CONTROLLER
VAC	VOLTS - ALTERNATING CURRENT
VDC	VOLTS - DIRECT CURRENT
VFD	SEE VSD
VLV	VALVE
VP	VELOCITY PROBE (AIRFLOW)
VSD	VARIABLE SPEED (FREQUENCY) DRIVE
XFMR	TRANSFORMER

ATC/BMS GENERAL NOTES

1. ALL SETPOINTS INDICATED IN THE SEQUENCE OF OPERATIONS SHALL BE ADJUSTABLE ON GRAPHICAL INTERFACE.
2. THE CONTROL POINTS LISTED IN THE SUMMARY MATRIX ARE THE MINIMUM CONTROL POINTS REQUIRED. ATC CONTRACTOR SHALL PROVIDE ALL CONTROL POINTS AS REQUIRED FOR COMPLETE SYSTEM CONTROL PER THE SEQUENCE OF OPERATIONS.
3. ALL CONTROL WIRING, SENSORS, RELAYS, CONTROLLERS, PANELS, DAMPERS, ACTUATORS, ETC. INDICATED ON THE CONTROL DIAGRAMS SHALL BE PROVIDED BY THE ATC CONTRACTOR UNLESS NOTED OTHERWISE.
4. ALL HHW VALVES SHALL BE FAIL OPEN ON LOSS OF POWER.
5. ALL HHW WATER VALVES SHALL BE MODULATING TYPE FOR GPM > 2.0; 2-POSITION ACCEPTABLE FOR FLOWS < 2.0 GPM
6. ATC CONTRACTOR TO COORDINATE W/ OWNER FOR ALL COMMUNICATION & INTERFACE REQUIREMENTS TO CENTRAL OPERATING STATION. REFER TO SPEC FOR FURTHER INFO.
7. DUCT SMOKE DETECTORS INDICATED ARE TO BE FURNISHED BY DIV. 260000 & INSTALLED BY HVAC CONTRACTOR. POWER WIRING AND FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR TO PROVIDE BMS INTERLOCK TO SHUT ASSOCIATED UNIT DOWN AND INITIATE AN ALARM UPON ACTIVATION
8. ALL SMOKE DAMPERS SHALL BE COMBINATION SMOKE/FIRE DAMPERS, SHALL BE FURNISHED & INSTALLED BY HVAC CONTRACTOR, AND POWER WIRED BY ELECTRICAL CONTRACTOR. DAMPERS SHALL BE MOTOR OPERATED WITH 24 VOLT / 120 VOLT ACTUATOR. FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. DAMPER ENDSWITCH INTEGRATION TO BMS BY ATC CONTRACTOR.
9. ALL ATC CONTROLS SHALL BE POWER WIRED FROM THE MAIN ATC PANEL WITHIN THE MECHANICAL ROOM AND DESIGNATED EMERGENCY POWER JUNCTION BOXES LOCATED ON THE ELECTRICAL DRAWINGS. THIS MAIN PANEL AND JUNCTION BOXES WILL BE FED BY EMERGENCY POWER. THEREFORE ALL CONTROLS SHALL BE ON EMERGENCY POWER. ANY SUB ATC PANELS REQUIRED SHALL BE FED FROM THIS MAIN ATC PANEL & SHALL BE ON EMERGENCY POWER & ALL SHALL BE PROVIDED BY ATC CONTRACTOR. ALL UNIT CONTROLS SHALL BE FED BY THIS MAIN ATC PANEL OR SUB ATC PANEL & NOT THROUGH THE UNIT'S MAIN POWER SOURCE.
10. ALL DENSELY OCCUPIED SPACES WITH OCCUPANT DENSITY OF 25 PEOPLE OR MORE PER 1000 SQ/FT SHALL BE PROVIDED W/ ROOM LEVEL TEMPERATURE, CO2, & HUMIDITY SENSORS W/ CO2 CONTROL. THIS SHALL BE PROVIDED IN COMPLIANCE WITH LEED v.4 CREDIT IEQC1. (PROVIDED BY FMS CONTRACTOR & INSTALLED BY ATC CONTRACTOR)

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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

SCALE: AS INDICATED

SHEET TITLE:
CONTROLS VI

SHEET NUMBER:
M4.16

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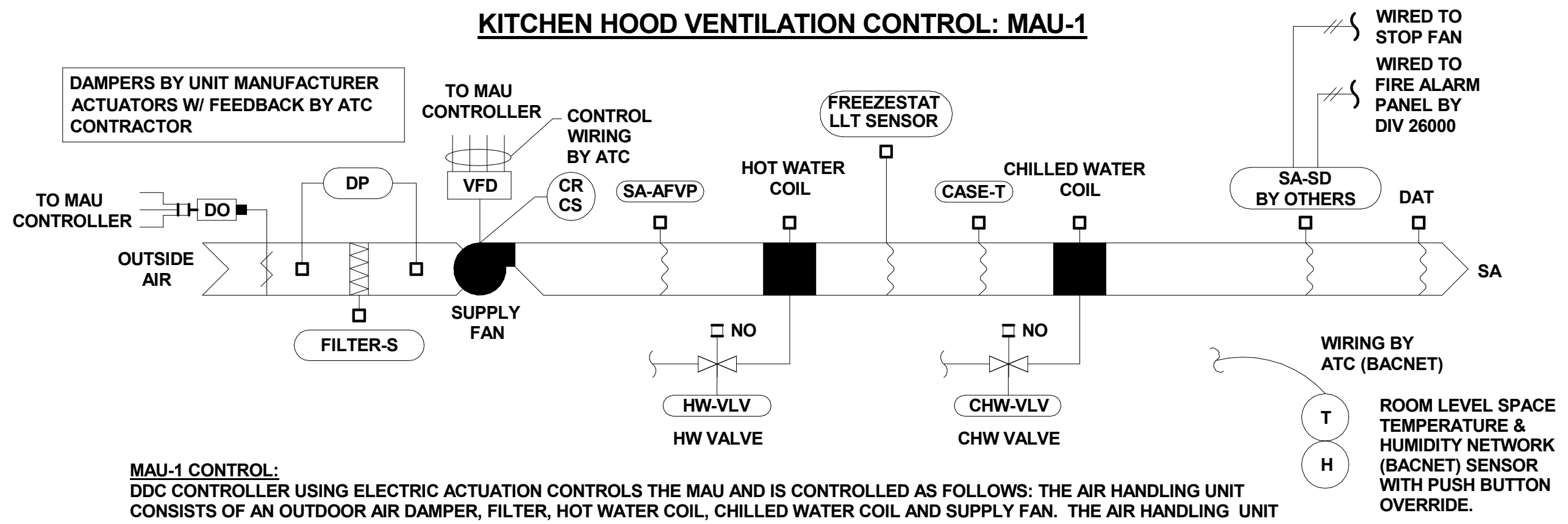
KITCHEN HOOD VENTILATION CONTROL: MAU-1



MAU-1 CONTROL:
DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE MAU AND IS CONTROLLED AS FOLLOWS: THE AIR HANDLING UNIT CONSISTS OF AN OUTDOOR AIR DAMPER, FILTER, HOT WATER COIL, CHILLED WATER COIL AND SUPPLY FAN. THE AIR HANDLING UNIT IS SCHEDULED FOR ON/OFF OPERATION BASED ON A PUSH TO START BUTTON IN THE KITCHEN/HOOD AND PROVIDES TEMPERED MAKE UP AIR FOR THE KITCHEN HOOD. THE MAU OPERATES IN OCCUPIED - HOOD ON, UNOCCUPIED AND SAFETY MODES AS FOLLOWS: (ALL SUGGESTED SETPOINTS AND SETTINGS ARE ADJUSTABLE.)

OCCUPIED - HOOD ON
THE OUTDOOR AIR DAMPER OPENS TO FULL OPEN, AND THE HOT WATER COIL CONTROL VALVE OR COOLING COIL CONTROL VALVE MODULATES TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT OF 68° (ADJ.). THE KITCHEN EXHAUST FAN ASSOCIATED WITH MAU-1 SHALL MODULATE ITS SPEED BASED ON A SIGNAL FROM THE KITCHEN MANAGEMENT SYSTEM CONTROLLER PROVIDED BY THE KITCHEN CONSULTANT. THE SUPPLY FAN MODULATES AND TRACKS THE EXHAUST FAN SPEED (HZ) TO MAINTAIN A SLIGHT NEGATIVE PRESSURE (10% OFFSET). THE OUTSIDE AIR DAMPER REMAINS OPEN WHILE THE MAU IS ON. THE ATC CONTRACTOR SHALL PROVIDE ALL THE NECESSARY PROGRAMMING, INTEGRATION, WIRING AND GRAPHICS FOR A COMPLETE AND FUNCTIONAL SYSTEM ASSOCIATED WITH THE KITCHEN MANAGEMENT SYSTEM CONTROLLER. COORDINATE WITH KITCHEN VENDOR FOR WIRING AND PROGRAMMING INFORMATION.

COOLING AND DEHUMIDIFICATION - CHILLED WATER:
TEMPERATURE AND/OR MIXED AIR HUMIDITY ABOVE THE DESIRED SUPPLY AIR DISCHARGE SETPOINTS OF 68°(ADJ) & 55%RH (ADJ) OR SPACE HUMIDITY ABOVE 55% (ADJ), THE CHILLED WATER CONTROL VALVE SHALL BE ACTIVATED AND MODULATE TO COOL AND DEHUMIDIFY THE INCOMING AIR. THE COOLING COIL SHALL MODULATE TO MAINTAIN THE DESIRED COOLING COIL TEMPERATURE SETPOINT STARTING AT 68°F (53GR/LB) (ADJ.) AND SHALL RESET DOWN IN 1°F STEPS OVER TIME, 1°F EVERY FIVE MINUTES (ADJ), TO THE CHILLED WATER LEAVING AIR TEMPERATURE SETPOINT OF 50°F (ADJ.) UNTIL THE SPACE HUMIDITY LEVEL OF 55% RH (ADJ) IS MET. THE SUPPLY AIR SETPOINT WILL BE RESET BASED ON OUTDOOR AIR TEMPERATURE / HUMIDITY CONDITION AND/OR A CALL FOR COOLING THEN THE RESET WILL BE INITIATED. WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 55°F (ADJ.) THE SUPPLY AIR SETPOINT SHALL BE 68°F (ADJ.) & SHALL RESET TO 65°F (ADJ.) AT AN OUTDOOR TEMPERATURE ABOVE 75°F (ADJ.). THE RESET SHALL BE LINEAR BETWEEN THE TWO SETPOINTS. THE COOLING COIL AND HOT WATER COIL (REHEAT) SHALL BE ENABLED WHENEVER:

- THE SUPPLY FAN STATUS IS ON.
- OUTSIDE AIR TEMPERATURE IS GREATER THAN 55°F (ADJ.).
- OR THE DISCHARGE SUPPLY AIR TEMPERATURE IS ABOVE THE DESIRED SETPOINT.
- OR SPACE TEMPERATURES ARE CALLING FOR COOLING

UNOCCUPIED
THE SUPPLY FAN STOPS AND THE OUTDOOR AIR DAMPER CLOSES. THE UNIT SHALL BE OFF.

SAFETY
THE SMOKE DETECTOR IN THE SUPPLY AIRSTREAM DE-ENERGIZES THE SUPPLY FAN UPON ACTIVATION. OUTSIDE AIR DAMPER MOVES TO THE CLOSED POSITION AFTER THE FAN IS DE-ENERGIZED.

UPON ACTIVATION OF THE ANSUL SYSTEM THE MAU WILL ENTER THE UNOCCUPIED MODE & SHUT DOWN. THE KITCHEN EXHAUST FAN WILL REMAIN OPERATING. ATC CONTRACTOR TO PROVIDE RELAY WIRING & PROGRAMMING WITH THE ANSUL SYSTEM TO ACKNOWLEDGE ACTIVATION & SEQUENCE HVAC EQUIPMENT.

UPON SENSING A HIGH CO LEVEL THROUGH THE FIRE ALARM SYSTEM THE MAU WILL ENTER THE UNOCCUPIED MODE & SHUT DOWN. THE KITCHEN EXHAUST FAN WILL START OR CONTINUE TO RUN TO REMOVE ANY RESIDUAL CO. ONCE CO LEVELS RETURN TO NORMAL THE MAU & KEF WILL REVERT TO THEIR NORMAL MODE OF OPERATION.

A CURRENT SWITCH IS INSTALLED IN THE SUPPLY FAN STARTER. THE DDC SYSTEM USES THE SWITCH TO CONFIRM THE FAN IS IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL.

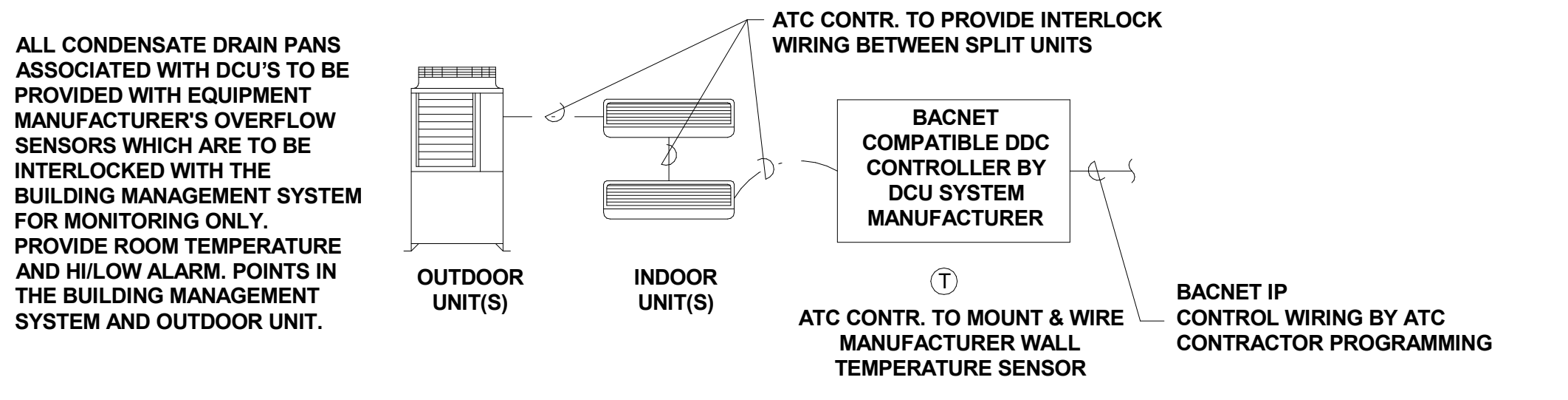
THE HOT WATER CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN A CASING TEMPERATURE OF 40°F (ADJ.)

MAIN KITCHEN HOOD VENTILATION CONTROL
THROUGH THE "PUSH-TO-START" CONTROL PROVIDED ON THE KITCHEN HOOD THE EXHAUST FAN (KEF-1) SHALL START. WHEN THE KITCHEN HOOD IS OFF THE REVERSE SHALL OCCUR. THE SPEED CONTROL OF THE KITCHEN EXHAUST FAN FOR THE KITCHEN HOOD SHALL BE CONTROLLED BY A "KITCHEN HOOD ENERGY MANAGEMENT CONTROL SYSTEM." ATC TO PROVIDE FAN SPEED CONTROL INTERLOCK BETWEEN THE KITCHEN HOOD SYSTEM AND THE MAU SUPPLY FAN.

Makeup Air Unit	AI	AO	DI	DO	ALARM	REMARKS
SUPPLY FAN S/S & STATUS	X	X			X	
OA DAMPER POS.	X	X			X	
FILTER STATUS			X		X	
DISCHARGE AIR TEMP.	X	X			X	
AIRFLOW CFM (SA)	X	X				
HOT WATER COIL (MODULATING CONTROL VALVE)	X	X				
CHILLED WATER COIL (MODULATING CONTROL VALVE)	X	X				
OUTSIDE AIR TEMP. (FROM DDC)	X					
OUTSIDE AIR %RH (FROM DDC)	X					
SMOKE DETECTOR			X		X	
SUPPLY FAN VFD	X	X			X	
KITCHEN EXHAUST FAN VFD	X		X	X	X	
ANSUL SYSTEM			X		X	
CO LEVEL ALARM			X		X	
CASING LOW LIMIT TEMPERATURE	X				X	
HIGH COOLING SUPPLY AIR TEMP					X	10° ABOVE
HIGH HEATING SUPPLY AIR TEMP					X	10° ABOVE
LOW HEATING SUPPLY AIR TEMP					X	10° BELOW
SPACE DIFFERENTIAL PRESSURE	X	X			X	

NOTE: ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE.

DUCTLESS COOLING UNITS (DCU)


ATC CONTR. TO PROVIDE INTERLOCK WIRING BETWEEN SPLIT UNITS
BACNET COMPATIBLE DDC CONTROLLER BY DCU SYSTEM MANUFACTURER
OUTDOOR UNIT(S)
INDOOR UNIT(S)
T
ATC CONTR. TO MOUNT & WIRE MANUFACTURER WALL TEMPERATURE SENSOR
BACNET IP CONTROL WIRING BY ATC CONTRACTOR PROGRAMMING

ALL CONDENSATE DRAIN PANS ASSOCIATED WITH DCU'S TO BE PROVIDED WITH EQUIPMENT MANUFACTURER'S OVERFLOW SENSORS WHICH ARE TO BE INTERLOCKED WITH THE BUILDING MANAGEMENT SYSTEM FOR MONITORING ONLY. PROVIDE ROOM TEMPERATURE AND HI/LOW ALARM. POINTS IN THE BUILDING MANAGEMENT SYSTEM AND OUTDOOR UNIT.

DUCTLESS COOLING UNIT (DCU)	AI	AO	DI	DO	ALARM	SHOW ON GRAPHIC	REMARKS
DCU SYSTEM INDOOR STATUS			X	X	X	X	
SPACE TEMPERATURE	X				X	X	NOTE #1
CONDENSATE OVERFLOW ALARM			X		X	X	

PROVIDE EVAPORATOR UNIT STATUS CONTROL POINTS VIA DCU SYSTEM CONTROLLER'S BAS INTERFACE.
SAFETY: UPON A HIGH FLOAT CONDITION UNIT SHALL BE DE-ENERGIZED.
NOTE #1: ALARM WHEN MEASURED TEMP IS +10°(ADJ.) FROM COOL SETPOINT OR -10°(ADJ.) FROM HEAT SETPOINT FOR MORE THAN 15 MIN (ADJ.)

MISCELLANEOUS BMS POINTS

UNIT #	UNIT FUNCTION	UNIT LOCATION	AI	AO	DI	DO	ALARM	REMARKS
SM-1	DOMESTIC WATER SUB METER	WATER SUPPLY RM	X					NOTE #1
SM-2	DOMESTIC WATER SUB METER	WATER SUPPLY RM	X					NOTE #1
SM-3	KITCHEN WATER SUB METER	KITCHEN MECH RM	X					NOTE #1
SM-4	IRRIGATION WATER SUB METER	WATER SUPPLY RM	X					NOTE #1
TM-1	THERMOSTATIC MIXING VALVE	MECH PUMP ROOM 250			X			COORD. W/ DIV 220000 NOTE #5
TM-2	THERMOSTATIC MIXING VALVE	MECH PUMP ROOM 250			X			COORD. W/ DIV 220000 NOTE #5
RP-1	HOT WATER CIRC PUMP	MECH PUMP ROOM 250	X	X			X	COORD. W/ DIV 220000 NOTE #5
RP-2	HOT WATER CIRC PUMP	MECH PUMP ROOM 250	X	X			X	COORD. W/ DIV 220000 NOTE #5
EWH-1	DOMESTIC WATER HEATER	MECH PUMP ROOM 250			X	X	X	COORD. W/ DIV 220000 NOTE #5
EWH-2	DOMESTIC WATER HEATER	MECH PUMP ROOM 250			X	X	X	COORD. W/ DIV 220000 NOTE #5
EWH-3	DOMESTIC WATER HEATER	MECH PUMP ROOM 250			X	X	X	COORD. W/ DIV 220000 NOTE #5
SPCP-1	ELEV SUMP PUMP PANEL	CUST CLOSET 134			X		X	COORD. W/ DIV 220000 NOTE #5
OMP-1	OIL MONITORING PANEL	COORDINATE W/ DIV 22			X		X	COORD. W/ DIV 220000 NOTE #5
EM-1 & 2	ELECTRICAL MAIN METER	MAIN ELEC 149	X		X			COORD. W/ DIV 260000, QTY. 2
GENSET	GEN STATUS & ON/OFF	EXTERIOR			X	X	X	COORD. W/ DIV 260000 NOTE #2
ATS-OS	TRANSFER SWITCH - OS	MAIN ELEC 149			X		X	COORD. W/ DIV 260000
ATS-LS	TRANSFER SWITCH - LS	MAIN ELEC 149			X		X	COORD. W/ DIV 260000
ALCS	AUTOMATIC LIGHT. CONTROL	MAIN ELEC 149	X		X		X	COORD. W/ DIV 260000 BACNET IP
FREEZEER	WALK IN FREEZER ALARM	KITCHEN			X		X	DRY CONTACTS.
REFRIG.	WALK IN REFRIG. ALARM	KITCHEN			X		X	DRY CONTACTS.
	WEATHER STATION	NORTH SIDE OF BUILDING						NOTE #3
GF-1	GLYCOL FEEDER	BOILER ROOM 1123			X	X	X	NOTE #4

NOTE #1: ACTUAL METER, FLOW SWITCH & HIGH/LOW SENSOR FURNISHED BY OTHERS. COORDINATE INSTALLATION OF METERS W/ DIVISION 220000 CONTRACTOR. ATC CONTRACTOR TO PROVIDE ALL CONTROLLERS, CONDUITS, WIRING, RELAYS, ETC., AS WELL AS GRAPHICAL REPRESENTATION ON THE BMS SYSTEM OF ALL COLLECTED INFORMATION. BTU/H, GPM, TEMPERATURE TO BE TRENDED.

NOTE #2: ATC CONTRACTOR TO PROVIDE NECESSARY CONDUIT, WIRING, SENSORS, CONTROLLERS AND RELAYS FROM ATC MAIN CONTROL PANEL TO EMERGENCY GENERATOR FOR STATUS. THIS SHALL INCLUDE REMOTE ENABLE FOR CYCLING THE GENERATOR FROM THE BMS. ATC CONTRACTOR TO PROVIDE ALL REQUIRED CONTROLLERS, WIRING, RELAYS, ETC. MODBUS TO BACNET IP CONVERTER BY ATC CONTRACTOR.

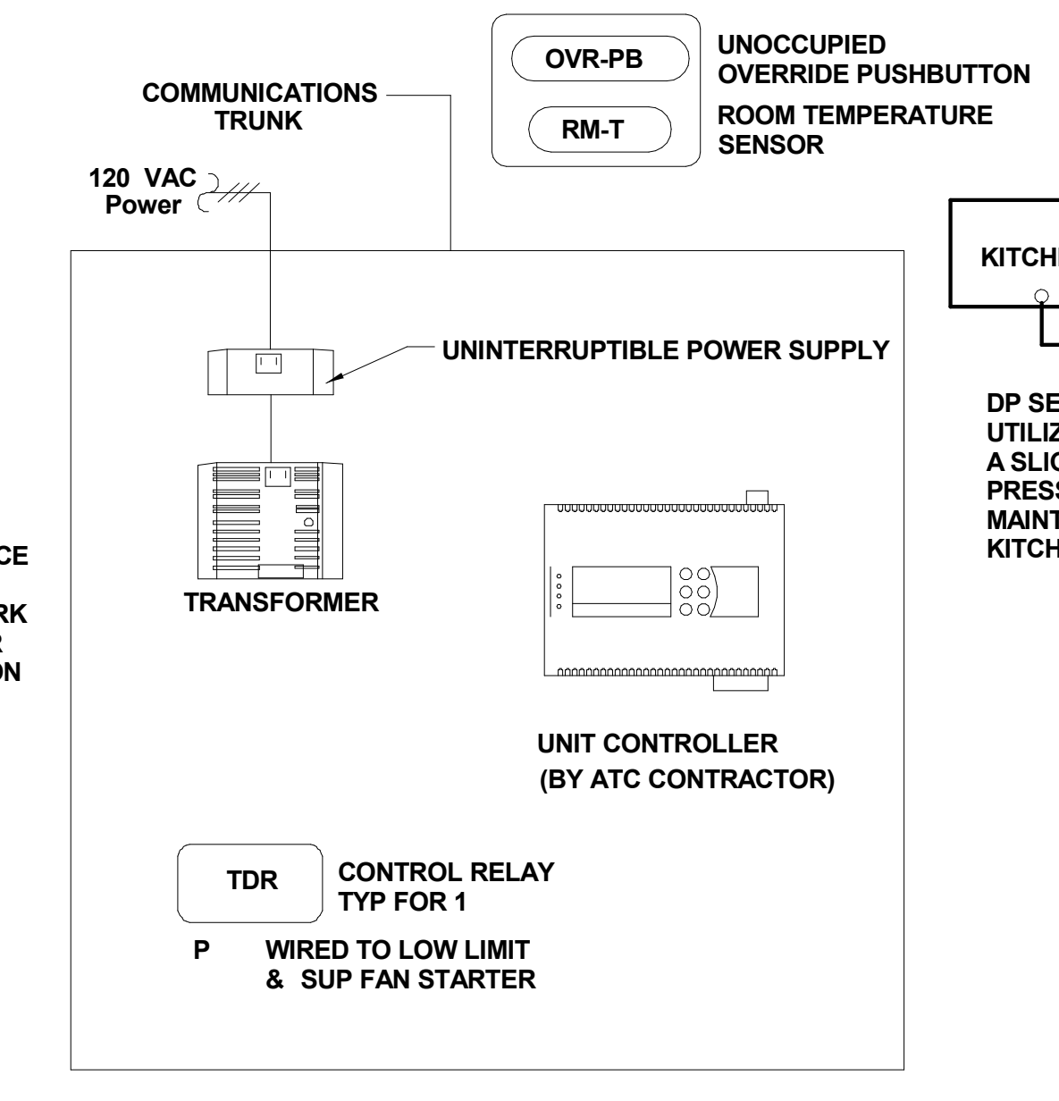
NOTE #3: INCLUDES OA TEMP (DB/WB), OA HUMIDITY (%RH), BAROMETRIC PRESSURE AND WIND SPEED. FURNISHED BY ATC CONTRACTOR.

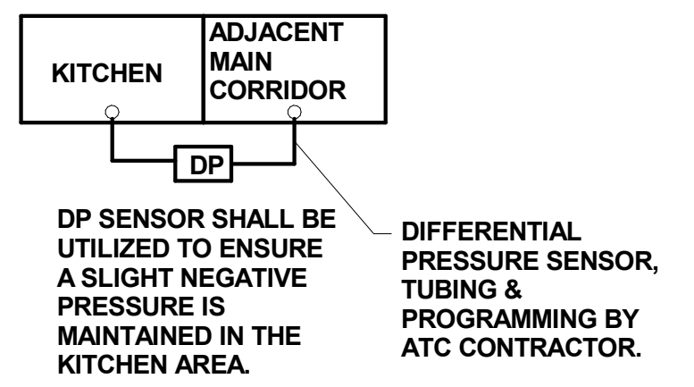
NOTE #4: WATER CUT-OFF ALARM VIA GLYCOL FEEDER CONTROL PANEL OUTPUT.

NOTE #5: ACTUAL DEVICE/PANEL FURNISHED BY OTHERS. COORDINATE INSTALLATION OF ALARM/MONITORING W/ DIVISION 220000 CONTRACTOR. ATC CONTRACTOR TO PROVIDE ALL CONTROLLERS, CONDUITS, WIRING, RELAYS, ETC., AS WELL AS GRAPHICAL REPRESENTATION ON THE BMS SYSTEM OF ALL COLLECTED INFORMATION. BTU/H, GPM, TEMPERATURE TO BE TRENDED.

KEY: WH = WATER HEATER, RP = CIRCULATOR PUMP, NT = NEUTRALIZATION TANK, GB = GAS BOOSTER, GSM = GAS METER, FS = FLOW SWITCH, DWB = DOMESTIC WATER BOOSTER, WSM = WATER SUB METER

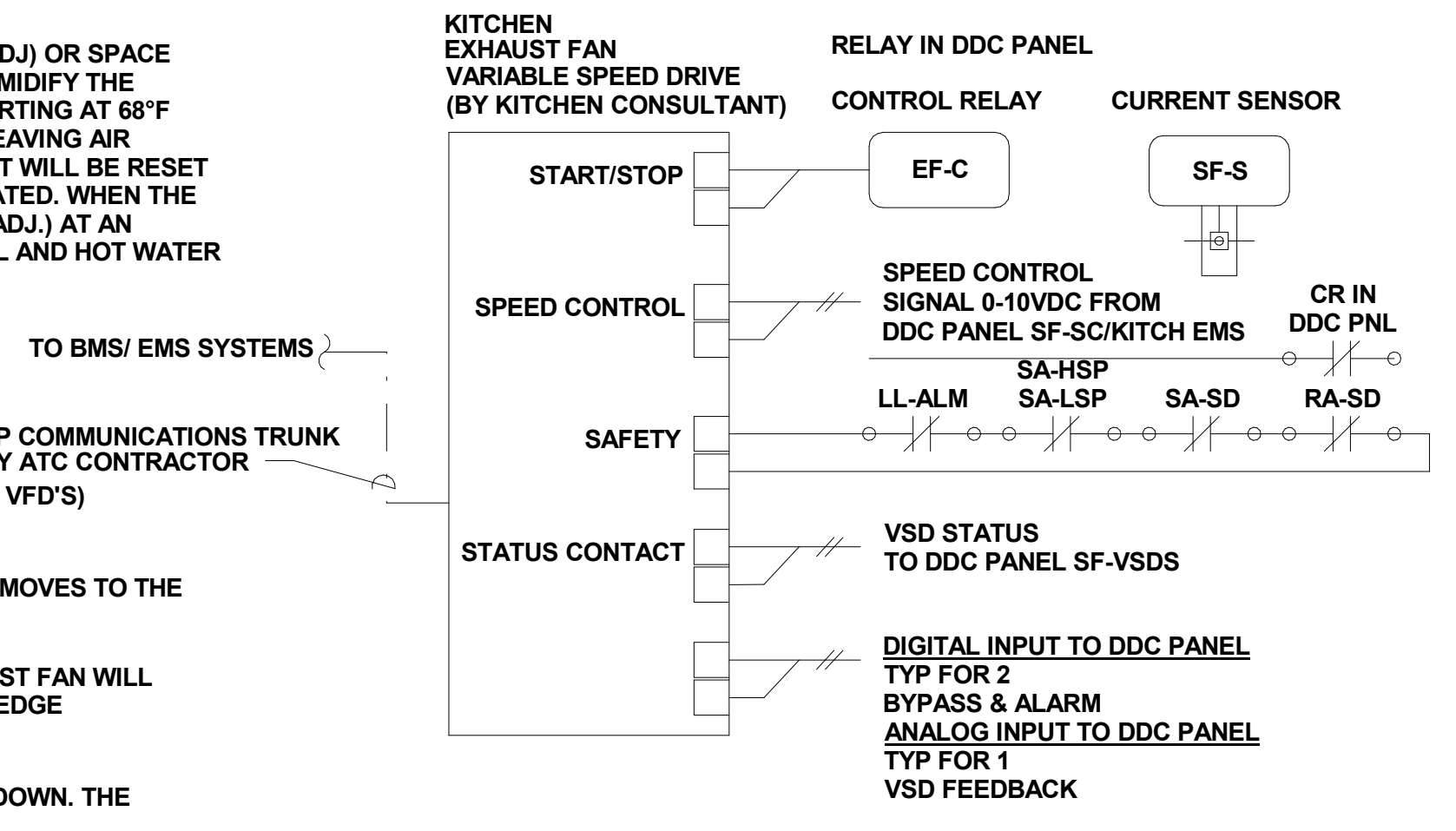
ALL ELECTRIC, AND WATER METER DATA LISTED ABOVE SHALL BE TRENDED AND STORED FOR A MINIMUM OF 2 YEARS. ATC CONTRACTOR RESPONSIBLE FOR PROVIDING THE REQUIRED STORAGE CAPACITY.

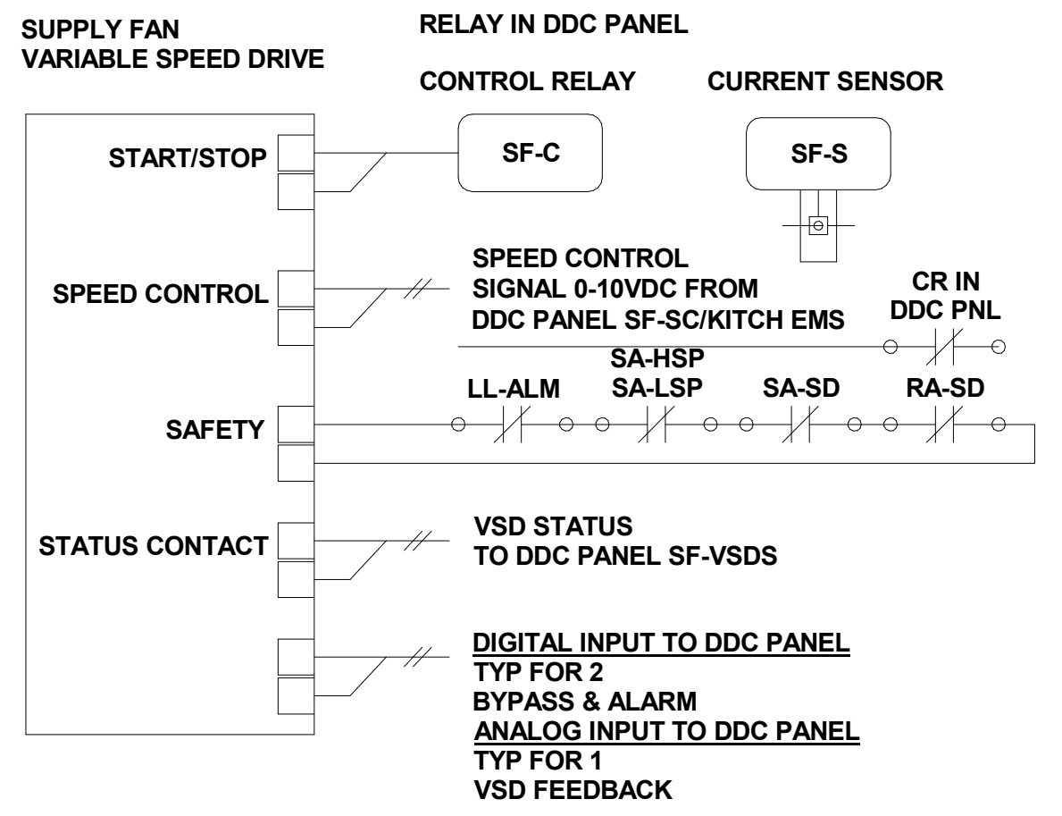

COMMUNICATIONS TRUNK
120 VAC Power
OVR-PB
UNOCCUPIED OVERRIDE PUSHBUTTON
RM-T
ROOM TEMPERATURE SENSOR
UNINTERRUPTIBLE POWER SUPPLY
TRANSFORMER
UNIT CONTROLLER (BY ATC CONTRACTOR)
TDR
CONTROL RELAY TYP FOR 1
P
WIRED TO LOW LIMIT & SUP FAN STARTER

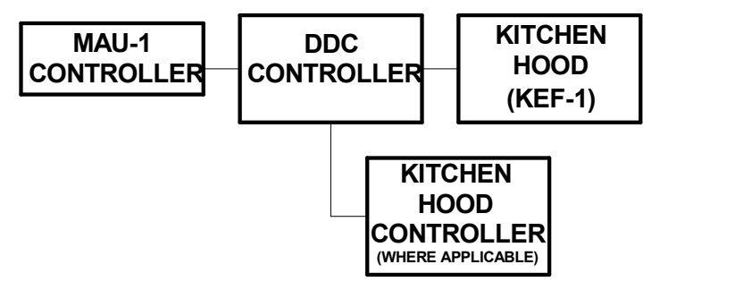


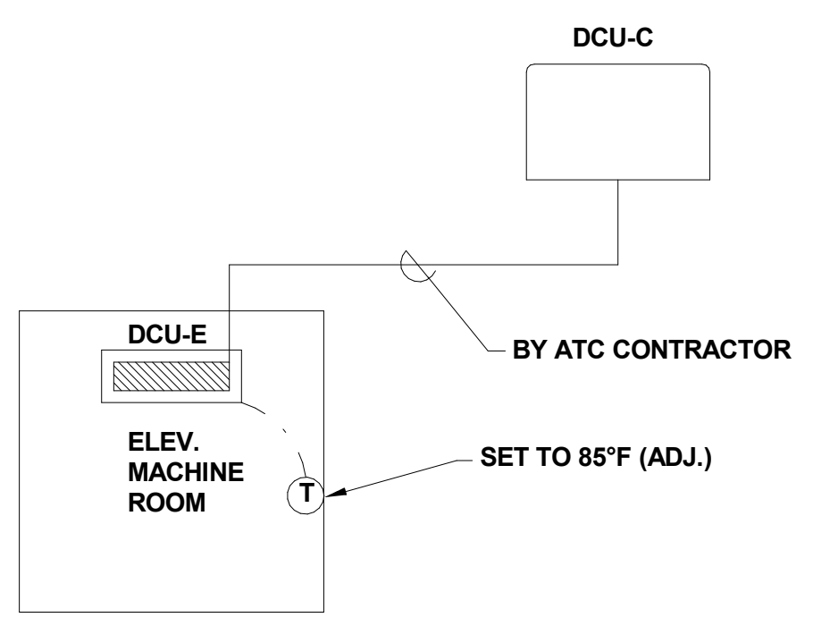
DP SENSOR SHALL BE UTILIZED TO ENSURE A SLIGHT NEGATIVE PRESSURE IS MAINTAINED IN THE KITCHEN AREA.

DIFFERENTIAL PRESSURE SENSOR, TUBING & PROGRAMMING BY ATC CONTRACTOR.


KITCHEN EXHAUST FAN VARIABLE SPEED DRIVE (BY KITCHEN CONSULTANT)
RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
EF-C
SF-S
SPEED CONTROL
SPEED CONTROL SIGNAL 0-10VDC FROM DDC PANEL SF-SC/KITCH EMS
CR IN DDC PNL
SA-HSP
SAFETY
LL-ALM
SA-LSP
SA-SD
RA-SD
TO BMS/ EMS SYSTEMS
BACNET IP COMMUNICATIONS TRUNK WIRING BY ATC CONTRACTOR (TYP. ALL VFD'S)
STATUS CONTACT
VSD STATUS TO DDC PANEL SF-VSDS
DIGITAL INPUT TO DDC PANEL TYP FOR 2 BYPASS & ALARM
ANALOG INPUT TO DDC PANEL TYP FOR 1 VSD FEEDBACK


SUPPLY FAN VARIABLE SPEED DRIVE
RELAY IN DDC PANEL
CONTROL RELAY
CURRENT SENSOR
START/STOP
SF-C
SF-S
SPEED CONTROL
SPEED CONTROL SIGNAL 0-10VDC FROM DDC PANEL SF-SC/KITCH EMS
CR IN DDC PNL
SA-HSP
SAFETY
LL-ALM
SA-LSP
SA-SD
RA-SD
STATUS CONTACT
VSD STATUS TO DDC PANEL SF-VSDS
DIGITAL INPUT TO DDC PANEL TYP FOR 2 BYPASS & ALARM
ANALOG INPUT TO DDC PANEL TYP FOR 1 VSD FEEDBACK



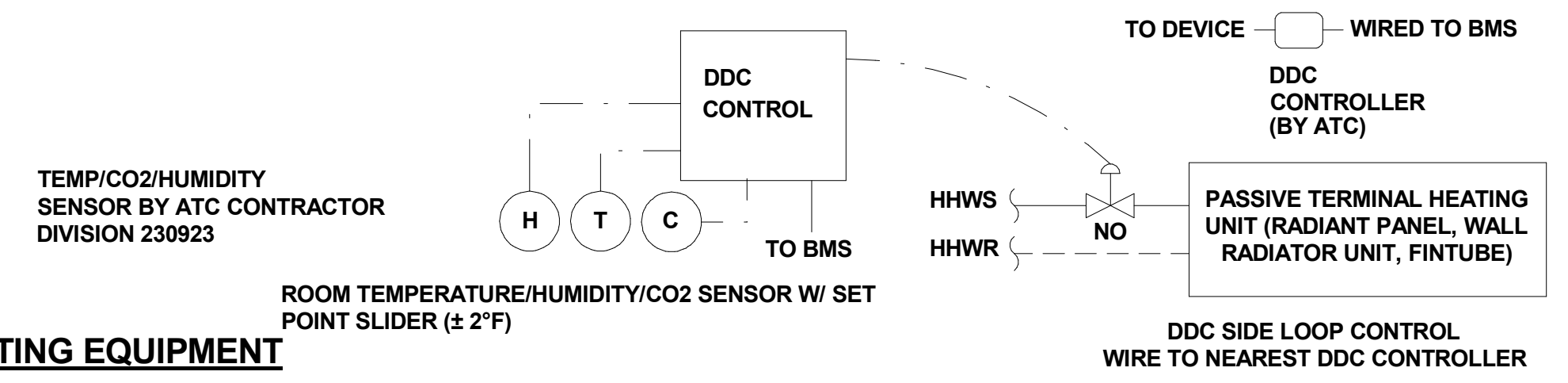


ELEVATOR MACHINE ROOM VENTILATION/AC CONTROL

IF ELEVATOR MACHINE ROOM TEMPERATURE RISES ABOVE 85°F, THE DCU AC SYSTEM SHALL OPERATE TO MAINTAIN SPACE TEMPERATURE SETPOINT AND HOISTWAY MD SHALL CLOSE DURING NORMAL OPERATION.

ELEVATOR MACHINE ROOM CONTROL	AI	AO	DI	DO	ALARM	SHOW ON GRAPHICS	REMARKS
SPACE TEMPERATURE SENSOR	X				X	X	NOTE #2
DCU SYSTEM INDOOR S/S & STATUS			X	X	X	X	NOTE #1
CONDENSATE ALARM			X		X	X	

NOTE #1: VIA BACNET COMPATIBLE CONTROLLER (BY DCU MANUF.)
NOTE #2: ALARM WHEN MEASURED TEMP IS +10°(ADJ.) FROM COOL SETPOINT OR -10°(ADJ.) FROM HEAT SETPOINT FOR MORE THAN 15 MIN (ADJ.)
NOTE #3: ALARM WHEN COMMANDED POSITION AND SENSED POSITION DO NOT AGREE FOR A PERIOD OF MORE THAN 2 MIN (ADJ.)


DDC CONTROL
TO DEVICE
WIRED TO BMS
DDC CONTROLLER (BY ATC)
TEMP/CO2/HUMIDITY SENSOR BY ATC CONTRACTOR DIVISION 230923
H
T
C
TO BMS
HHWS
HHWR
NO
PASSIVE TERMINAL HEATING UNIT (RADIANT PANEL, WALL RADIATOR UNIT, FINTUBE)
ROOM TEMPERATURE/HUMIDITY/CO2 SENSOR W/ SET POINT SLIDER (± 2°F)
DDC SIDE LOOP CONTROL WIRE TO NEAREST DDC CONTROLLER

HOT WATER RADIANT HEATING EQUIPMENT

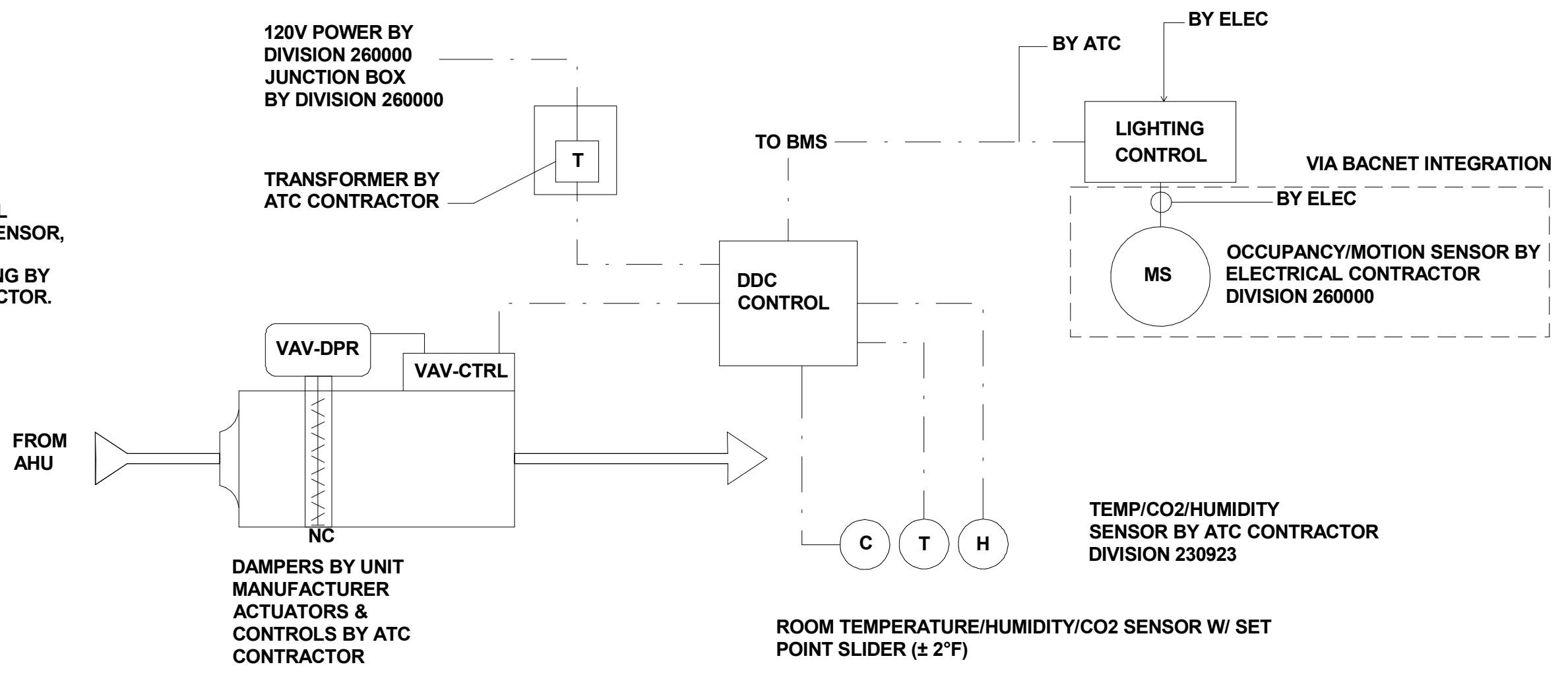
A DDC TEC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE HOT WATER TERMINAL HEATING UNITS.

THE SPACES SERVED BY THE HOT WATER TERMINAL HEATING UNITS ARE CONTROLLED IN OCCUPIED AND UNOCCUPIED MODE AS FOLLOWS:
OCCUPIED
THE HOT WATER TERMINAL HEATING UNIT CONTROLLER MONITORS THE ROOM TEMPERATURE SENSOR.
THE MODULATING CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN
THE SPACE TEMPERATURE SET POINT. THE UNIT REMAINS IN OCCUPIED MODE AS LONG AS THE SPACE MOUNTED OCCUPANCY SENSOR SENSES MOTION AT LEAST ONCE EVERY 10 MINUTES, IF NOT THE UNIT WILL GO INTO STANDBY MODE. THE UNIT SHALL MAINTAIN A HEATING SETPOINT OF 70°F (ADJ.).
STANDBY MODE (DURING THE DAY)
THE HOT WATER TERMINAL HEATING UNIT CONTROL VALVES REMAIN IN UNOCCUPIED MODE UNTIL THE SPACE MOUNTED OCCUPANCY SENSOR INDICATES MOTION IN THE SPACE OR THE SPACE TEMPERATURE IS LESS THAN 67°F (ADJ.) WHICH CAUSES THE VALVES TO OPEN AND THE TERMINAL HEATING UNIT TO GO BACK INTO OCCUPIED MODE.
UNOCCUPIED (AT NIGHT)
THE TERMINAL HEATING UNIT IS CONTROLLED USING THE UNOCCUPIED SPACE TEMPERATURE SET POINT. THE CONTROLLER MAY RESET TO THE OCCUPIED MODE FOR A PREDETERMINED TIME PERIOD UPON A SIGNAL FROM THE CONTROL SYSTEM OR MANUALLY FROM THE SWITCH AT THE ROOM SENSOR. NIGHT SETBACK TEMPERATURE SETPOINTS SHALL BE 60°F (ADJ.).
ROOM/ZONE TEMPERATURE SENSORS SHALL HAVE PUSH BUTTON OCCUPIED OVER-RIDE BUTTON CAPABILITY TO MANUALLY CHANGE TO UNIT OCCUPIED MODE FOR A PERIOD OF 3 HOURS (ADJ.)
SUMMER MODE
HOT WATER CONTROL VALVE SHALL CLOSE WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 75°(ADJ)

HOT WATER TERMINAL HEATING UNITS	AI	AO	DI	DO	ALARM	REMARKS
SPACE TEMP.	X	X			X	NOTE #1
HHW COIL VALVE	X	X			X	2-POSITION IF < 1.5 GPM
COS SENSOR	X				X	
HUMIDITY SENSOR	X				X	
OCCUPANCY SENSOR	X					

GENERAL NOTE: ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE.
NOTE #1: ALARM WHEN MEASURED TEMP IS -10°(ADJ.) FROM HEAT SETPOINT FOR MORE THAN 15 MIN (ADJ.)

VARIABLE AIR VOLUME BOX


120V POWER BY DIVISION 260000 JUNCTION BOX BY DIVISION 260000
BY ATC
BY ELEC
T
TO BMS
TRANSFORMER BY ATC CONTRACTOR
LIGHTING CONTROL
VIA BACNET INTEGRATION
BY ELEC
MS
OCCUPANCY/MOTION SENSOR BY ELECTRICAL CONTRACTOR DIVISION 260000
DDC CONTROL
VAV-DPR
VAV-CTRL
FROM AHU
NC
DAMPERS BY UNIT MANUFACTURER ACTUATORS & CONTROLS BY ATC CONTRACTOR
C
T
H
TEMP/CO2/HUMIDITY SENSOR BY ATC CONTRACTOR DIVISION 230923
ROOM TEMPERATURE/HUMIDITY/CO2 SENSOR W/ SET POINT SLIDER (± 2°F)

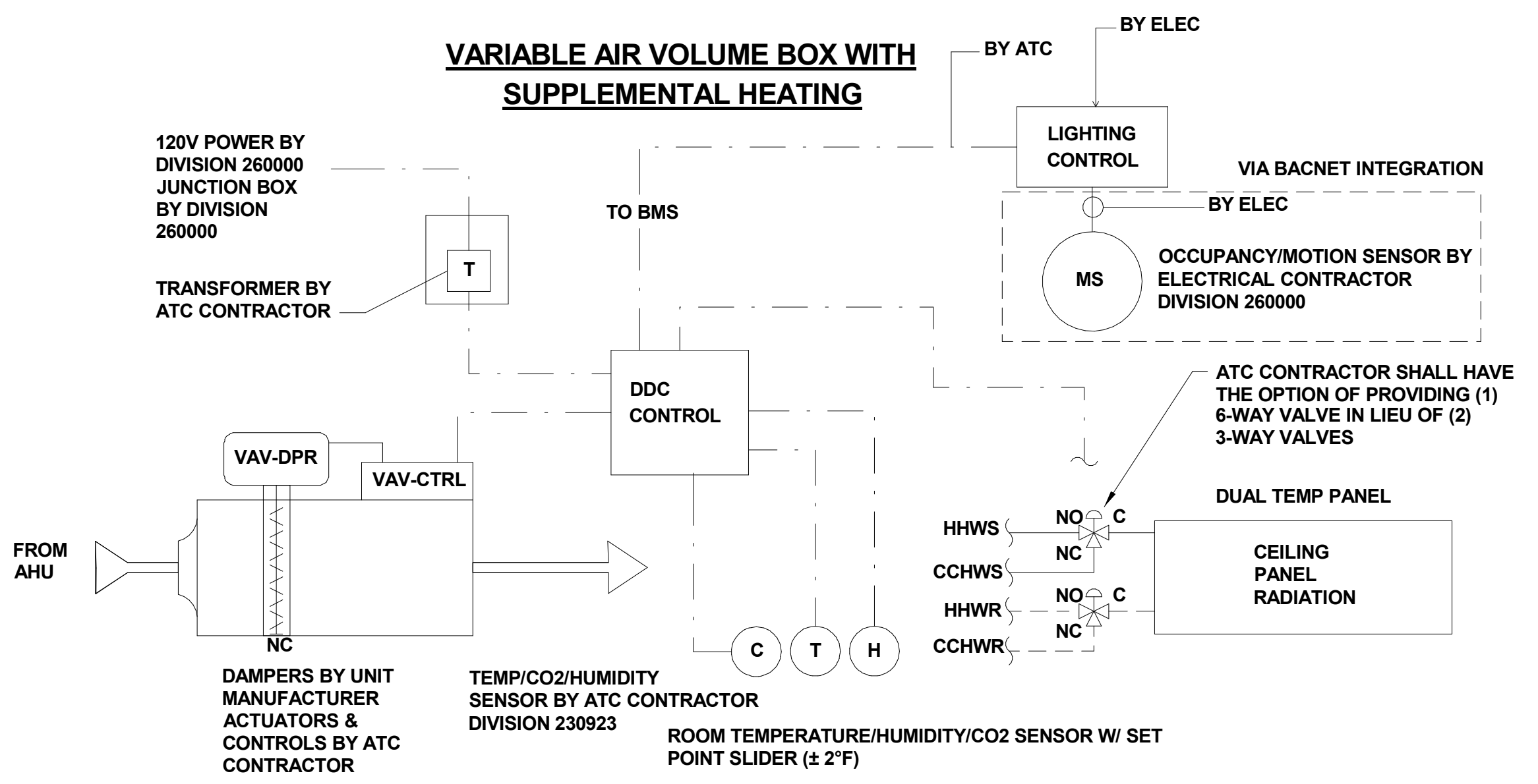
DISPLACEMENT VARIABLE AIR VOLUME BOX

1. OCCUPIED: DURING OCCUPIED MODE, AS DETERMINED BY BUILDING SCHEDULE, THE SPACE THERMOSTAT SHALL MODULATE THE NORMALLY-CLOSED VARIABLE AIR VOLUME BOX DAMPER BETWEEN THE MAXIMUM AND MINIMUM POSITIONS AS INDICATED IN THE DRAWINGS TO MAINTAIN THE OCCUPIED SETPOINTS OF 70°F (ADJ) HEATING & 75°F (ADJ) COOLING. THE VAV BOX REMAINS IN OCCUPIED MODE AS LONG AS THE SPACE MOUNTED OCCUPANCY SENSOR SENSES MOTION AT LEAST ONCE EVERY 10 MINUTES (ADJ), IF NOT THEN THE VAV BOX WILL GO INTO STANDBY MODE.
2. UNOCCUPIED: DURING UNOCCUPIED MODE, THE DAMPER SHALL BE FULL OPEN.
3. OVERRIDE: ROOM/ZONE TEMPERATURE SENSORS SHALL HAVE PUSH BUTTON OCCUPIED OVERRIDE BUTTON CAPABILITY. UPON ACTIVATION OF OVERRIDE BUTTON ON APPROXIMATELY 10% (ADJ) OF THE VAV'S ASSOCIATED WITH ONE RTU, THE RTU STATUS WILL CHANGE TO OCCUPIED MODE FOR A PERIOD OF 2 HOURS (ADJ).
4. CO2 CONTROLS: THE SPACE MOUNTED CO2 SENSOR SHALL GENERATE AN ALARM WHEN CONDITIONS VARY BY 10% OR MORE FROM THE DESIGN CONDITION OF 800 PPM. ONCE THE SPACE CO2 LEVELS REACH 850 PPM, THE VAV DAMPER SHALL MODULATE OPEN UNTIL THE CO2 LEVELS FALL BELOW THE THRESHOLD.
5. STANDBY MODE: DURING STANDBY MODE, THE VAV DAMPER SHALL CLOSE AND THE ROOM SETPOINTS WILL RESET FROM 70°F (ADJ) HEATING TO 68°F (ADJ) AND 76°F (ADJ) COOLING TO 78°F. THE VAV DAMPER SHALL MODULATE TO MAINTAIN THESE RESET SETPOINTS. ONCE THE OCCUPANCY SENSOR SENSES MOTION, THE VAV BOX WILL REVERT BACK TO OCCUPIED MODE.
6. ENTHALPY SENSOR: (EXTERIOR SPACES W/ OPERABLE WINDOWS ONLY): WHEN THE SPACE ENTHALPY IS ABOVE DEWPOINT CONDITIONS, THE SENSOR SHALL NOTIFY THE DDC CONTROLLER AND THE VAV DAMPER SHALL REDUCE TO MINIMUM POSITION. ONCE THE ENTHALPY SENSOR SENSES THE SPACE ENTHALPY IS BELOW DEWPOINT CONDITIONS, THE VAV BOX WILL REVERT BACK TO OCCUPIED MODE.

VARIABLE AIR VOLUME BOX (VAV)	AI	AO	DI	DO	ALARM	REMARKS
DAMPER POS./COMMAND (EACH)	X	X			X	NOTE #3
SUPPLY AIR TEMP.	X					
SUPPLY AIR VOLUME (CFM)	X					NOTE #1
ROOM TEMPERATURE	X				X	NOTE #2
CO2 SENSOR	X				X	880 PPM ALARM
HUMIDITY SENSOR	X				X	75% RH ALARM
OCCUPANCY SENSOR	X					
SPACE DEWPOINT (CALCULATED)	X				X	BMS ALARM

GENERAL NOTES: ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE.
NOTE #1: ATC CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING/REPORTING AIRFLOW MEASUREMENT DATA FROM VAV BOXES TO THE BMS.
NOTE #2: ALARM WHEN MEASURED TEMP IS +10°(ADJ.) FROM COOL SETPOINT OR -10°(ADJ.) FROM HEAT SETPOINT FOR MORE THAN 15 MIN (ADJ.)
NOTE #3: ALARM WHEN COMMANDED POSITION AND SENSED POSITION DO NOT AGREE FOR A PERIOD OF MORE THAN 2 MIN (ADJ.)

VARIABLE AIR VOLUME BOX WITH SUPPLEMENTAL HEATING


120V POWER BY DIVISION 260000 JUNCTION BOX BY DIVISION 260000
BY ATC
BY ELEC
T
TO BMS
TRANSFORMER BY ATC CONTRACTOR
LIGHTING CONTROL
VIA BACNET INTEGRATION
BY ELEC
MS
OCCUPANCY/MOTION SENSOR BY ELECTRICAL CONTRACTOR DIVISION 260000
DDC CONTROL
ATC CONTRACTOR SHALL HAVE THE OPTION OF PROVIDING (1) 6-WAY VALVE IN LIEU OF (2) 3-WAY VALVES
DUAL TEMP PANEL
VAV-DPR
VAV-CTRL
FROM AHU
HHWS
CCHWS
HHWR
CCHWR
NO
NC
C
CEILING PANEL RADIATION
NC
DAMPERS BY UNIT MANUFACTURER ACTUATORS & CONTROLS BY ATC CONTRACTOR
C
T
H
TEMP/CO2/HUMIDITY SENSOR BY ATC CONTRACTOR DIVISION 230923
ROOM TEMPERATURE/HUMIDITY/CO2 SENSOR W/ SET POINT SLIDER (± 2°F)

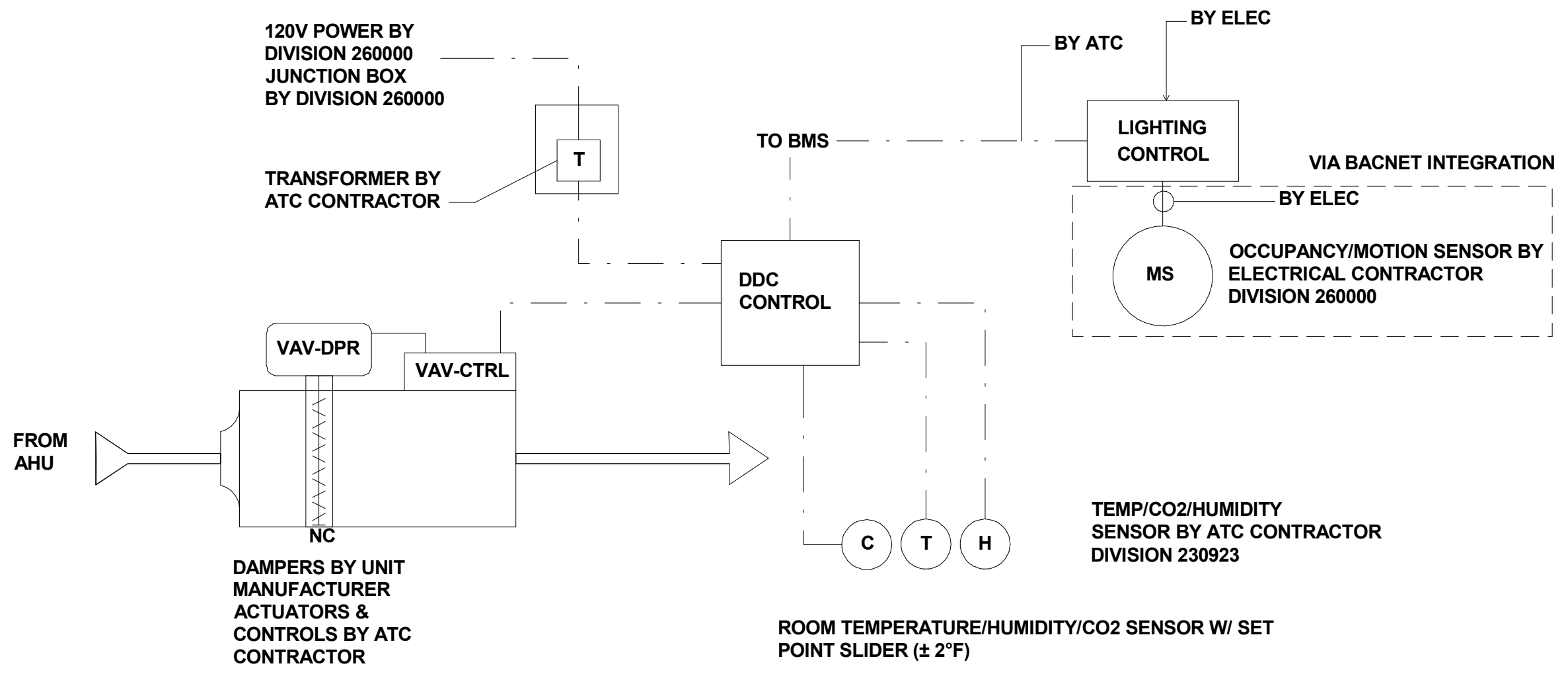
DISPLACEMENT VARIABLE AIR VOLUME BOX WITH SUPPLEMENTAL HEATING & COOLING

1. OCCUPIED: DURING OCCUPIED MODE, AS DETERMINED BY BUILDING SCHEDULE, THE SPACE THERMOSTAT SHALL MODULATE THE NORMALLY-CLOSED VARIABLE AIR VOLUME BOX DAMPER BETWEEN THE MAXIMUM AND MINIMUM POSITIONS AS INDICATED IN THE DRAWINGS TO MAINTAIN THE OCCUPIED SETPOINT OF 75°F (ADJ) COOLING AND THE SPACE CO2 LEVELS AS DESCRIBED BELOW. THE PANEL COOLING CONTROL VALVE SHALL MODULATE AS THE FIRST STAGE OF COOLING. IF THE SPACE SETPOINT IS NOT SATISFIED BY THE PANEL ALONE, THE VAV BOX SHALL MODULATE OPEN TO INCREASE COOLING AIRFLOW. THE VAV BOX SHALL BE AT MINIMUM POSITION DURING HEATING MODE TO MAINTAIN 70°F (ADJ) AND MODULATE AS REQUIRED TO MEET THE CO2 LEVEL AS DESCRIBED BELOW. THE PANEL HEATING CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE HETING SETPOINT OF 70°F (ADJ.). THE VAV BOX REMAINS IN OCCUPIED MODE AS LONG AS THE SPACE MOUNTED OCCUPANCY SENSOR SENSES MOTION AT LEAST ONCE EVERY 10 MINUTES (ADJ), IF NOT THEN THE VAV BOX WILL GO INTO STANDBY MODE.
2. UNOCCUPIED: DURING UNOCCUPIED MODE, THE DAMPER SHALL BE FULL OPEN AND THE RADIATION HEATING HOT WATER CONTROL VALVE SHALL MODULATE TO MAINTAIN UNOCCUPIED SPACE TEMPERATURE SETPOINT OF 60°(ADJ).
3. OVERRIDE: ROOM/ZONE TEMPERATURE SENSORS SHALL HAVE PUSH BUTTON OCCUPIED OVERRIDE BUTTON CAPABILITY. UPON ACTIVATION OF A SINGLE SPACE TEMPERATURE SENSOR DURING THE WINTER MONTHS, THE SPACE RADIANT PANEL CONTROL VALVE WILL BEGIN TO MODULATE OPEN TO MAINTAIN THE OCCUPIED HEATING SETPOINT OF 70°F (ADJ) FOR A PERIOD OF 2 HOURS (ADJ). UPON ACTIVATION OF OVERRIDE BUTTON ON APPROXIMATELY 10% (ADJ) OF THE VAV'S ASSOCIATED WITH ONE RTU, THE RTU STATUS WILL CHANGE TO OCCUPIED MODE FOR A PERIOD OF 2 HOURS (ADJ).
4. CO2 CONTROLS: THE SPACE MOUNTED CO2 SENSOR SHALL GENERATE AN ALARM WHEN CONDITIONS VARY BY 10% OR MORE FROM THE DESIGN CONDITION OF 800 PPM. ONCE THE SPACE CO2 LEVELS REACH 850 PPM THE VAV DAMPER SHALL MODULATE OPEN UNTIL THE CO2 LEVELS FALL BELOW THE THRESHOLD. DURING WINTER MONTHS THE RADIANT PANEL HHW VALVE SHALL MODULATE OPEN TO MAINTAIN SPACE TEMPERATURE DURING THIS CONDITION.
5. STANDBY MODE: DURING STANDBY MODE, THE VAV DAMPER AND HHW RADIANT CONTROL VALVE SHALL CLOSE AND THE ROOM SETPOINTS WILL RESET FROM 70°F (ADJ) HEATING TO 68°F (ADJ) AND 75°F (ADJ) COOLING TO 78°F (ADJ.). DURING THIS MODE BOTH THE VAV DAMPER AND SUPPLEMENTAL HEATING & COOLING CONTROL VALVE SHALL MODULATE TO MAINTAIN THESE RESET SETPOINTS. ONCE THE OCCUPANCY SENSOR SENSES MOTION THE VAV BOX WILL REVERT BACK TO OCCUPIED MODE.

VARIABLE AIR VOLUME BOX (VAV)	AI	AO	DI	DO	ALARM	REMARKS
DAMPER POS./COMMAND (EACH)	X	X			X	NOTE #3
SUPPLY AIR TEMP.	X					
SUPPLY AIR VOLUME (CFM)	X					NOTE #1
ROOM TEMPERATURE	X				X	NOTE #2
SUPPLEMENTAL HEATING CONTROL VALVE	X	X			X	NOTE #3
CO2 SENSOR	X				X	880 PPM ALARM
HUMIDITY SENSOR	X				X	75% RH ALARM
OCCUPANCY SENSOR	X					
SPACE DEWPOINT (CALCULATED)	X				X	BMS ALARM

GENERAL NOTES: ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE.
NOTE #1: ATC CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING/REPORTING AIRFLOW MEASUREMENT DATA FROM VAV BOXES TO THE BMS
NOTE #2: ALARM WHEN MEASURED TEMP IS +10°(ADJ.) FROM COOL SETPOINT OR -10°(ADJ.) FROM HEAT SETPOINT FOR MORE THAN 15 MIN (ADJ.)
NOTE #3: ALARM WHEN COMMANDED POSITION AND SENSED POSITION DO NOT AGREE FOR A PERIOD OF MORE THAN 2 MIN (ADJ.)

VARIABLE AIR VOLUME BOX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DDC CONTROL
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DAMPERS BY UNIT MANUFACTURER ACTUATORS & CONTROLS BY ATC CONTRACTOR
C
T
H
TEMP/CO2/HUMIDITY SENSOR BY ATC CONTRACTOR DIVISION 230923
ROOM TEMPERATURE/HUMIDITY/CO2 SENSOR W/ SET POINT SLIDER (± 2°F)

OVERHEAD HEATING/COOLING VARIABLE AIR VOLUME BOX

1. OCCUPIED: DURING OCCUPIED MODE, AS DETERMINED BY BUILDING SCHEDULE, THE SPACE THERMOSTAT SHALL MODULATE THE NORMALLY-CLOSED VARIABLE AIR VOLUME BOX DAMPER AS DESCRIBED:
   HEATING: VAV BOX SHALL MODULATE BETWEEN THE MINIMUM AND THE REHEAT POSITION TO MAINTAIN THE OCCUPIED HEATING SETPOINT OF 70°F (ADJ.). THE BOX SHALL OVERRIDE OPEN AS REQUIRED PER THE CO2 CONTROL SEQUENCE BELOW, WHEN CO2 LEVELS EXCEED SETPOINT.

   COOLING: VAV BOX SHALL NMODULATE BETWEEN THE MINIMUM AND MAXIMUM POSITIONS TO MAINTAIN THE OCCUPIED COOLING SETPOINT OF 75°F (ADJ.). THE BOX SHALL OVERRIDE OPEN AS REQUIRED PER THE CO2 CONTROL SEQUENCE BELOW, WHEN CO2 LEVELS EXCEED SETPOINT.

   THE VAV BOX REMAINS IN OCCUPIED MODE AS LONG AS THE SPACE MOUNTED OCCUPANCY SENSOR SENSES MOTION AT LEAST ONCE EVERY 10 MINUTES (ADJ), IF NOT THEN THE VAV BOX WILL GO INTO STANDBY MODE.
2. UNOCCUPIED: DURING UNOCCUPIED MODE, THE DAMPER SHALL BE FULL OPEN.
3. OVERRIDE: ROOM/ZONE TEMPERATURE SENSORS SHALL HAVE PUSH BUTTON OCCUPIED OVERRIDE BUTTON CAPABILITY. UPON ACTIVATION OF OVERRIDE BUTTON ON APPROXIMATELY 10% (ADJ) OF THE VAV'S ASSOCIATED WITH ONE RTU, THE RTU STATUS WILL CHANGE TO OCCUPIED MODE FOR A PERIOD OF 2 HOURS (ADJ).
4. CO2 CONTROLS: THE SPACE MOUNTED CO2 SENSOR SHALL GENERATE AN ALARM WHEN CONDITIONS VARY BY 10% OR MORE FROM THE DESIGN CONDITION OF 800 PPM. ONCE THE SPACE CO2 LEVELS REACH 850 PPM, THE VAV DAMPER SHALL MODULATE OPEN UNTIL THE CO2 LEVELS FALL BELOW THE THRESHOLD.
5. STANDBY MODE: DURING STANDBY MODE, THE VAV DAMPER SHALL CLOSE AND THE ROOM SETPOINTS WILL RESET FROM 70°F (ADJ) HEATING TO 68°F (ADJ) AND 76°F (ADJ) COOLING TO 78°F. THE VAV DAMPER SHALL MODULATE TO MAINTAIN THESE RESET SETPOINTS. ONCE THE OCCUPANCY SENSOR SENSES MOTION, THE VAV BOX WILL REVERT BACK TO OCCUPIED MODE.

VARIABLE AIR VOLUME BOX (VAV)	AI	AO	DI	DO	ALARM	REMARKS
DAMPER POS./COMMAND (EACH)	X	X			X	NOTE #3
SUPPLY AIR TEMP.	X					
SUPPLY AIR VOLUME (CFM)	X					NOTE #1
ROOM TEMPERATURE	X				X	NOTE #2
CO2 SENSOR	X				X	880 PPM ALARM
HUMIDITY SENSOR	X				X	75% RH ALARM
OCCUPANCY SENSOR	X					

GENERAL NOTES: ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE.
NOTE #1: ATC CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING/REPORTING AIRFLOW MEASUREMENT DATA FROM VAV BOXES TO THE BMS.
NOTE #2: ALARM WHEN MEASURED TEMP IS +10°(ADJ.) FROM COOL SETPOINT OR -10°(ADJ.) FROM HEAT SETPOINT FOR MORE THAN 15 MIN (ADJ.)
NOTE #3: ALARM WHEN COMMANDED POSITION AND SENSED POSITION DO NOT AGREE FOR A PERIOD OF MORE THAN 2 MIN (ADJ.)

ABBREVIATIONS

AFVP	AIRFLOW VELOCITY PROBE
ALM	ALARM
AQ	AQUASTAT
ATC	AUTOMATIC TEMPERATURE CONTROLS
BLDG	BUILDING
BLR	BOILER
BMS	BUILDING MANAGEMENT SYSTEM (ENERGY & AUTOMATION)
CM	CONSTRUCTION MANAGER
COMB	COMBUSTION
CONTR	CONTROLLER
CO2	CARBON DIOXIDE
CR	CONTROL RELAY
CS	CURRENT SENSOR
CUV	CABINET UNIT VENTILATOR
D	DAMPER
DA	DISCHARGE AIR
DAS	DISCHARGE AIR SENSOR
DAT	DISCHARGE AIR TEMPERATURE
DCV	DEMAND CONTROL VENTILATION
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DDC	DIRECT DIGITAL CONTROL
DO	DAMPER OPERATOR
DP	DIFFERENTIAL PRESSURE
DPR	DAMPER
DPV	DIFFERENTIAL PRESSURE VALVE
EA	EXHAUST AIR
EF	EXHAUST FAN
F	FLOW/FARENHEIT (AS APPLICABLE)
FB	FACE & BYPASS
FD	FIRE DAMPER
H	HUMIDITY
HS	ENTHALPY SENSOR
HT	HIGH TEMPERATURE
HTG	HEATING
HR	HEAT RECOVERY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LT	LOW TEMPERATURE
M	MOTOR
MAT	MIXED AIR TEMPERATURE
NAC	NETWORK APPLICATION CONTROLLER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OVR	OVERRIDE
P	PRESSURE
PB	PUSH BUTTON
PNL	PANEL
RA	RETURN AIR
REL	RELIEF AIR
RF	RETURN FAN
RFC	RETURN FAN CONTROLLER
RM	ROOM
SA	SUPPLY AIR
SD	SMOKE DAMPER OR SMOKE DETECTOR
SF	SUPPLY FAN
SFC	SUPPLY FAN CONTROLLER
SP	STATIC PRESSURE
T	TEMPERATURE
TEC	TERMINAL EQUIPMENT CONTROLLER
VAC	VOLTS - ALTERNATING CURRENT
VDC	VOLTS - DIRECT CURRENT
VFD	SEE VSD
VLV	VALVE
VP	VELOCITY PROBE (AIRFLOW)
VSD	VARIABLE SPEED (FREQUENCY) DRIVE
XFMR	TRANSFORMER

ATC/BMS GENERAL NOTES

1. ALL SETPOINTS INDICATED IN THE SEQUENCE OF OPERATIONS SHALL BE ADJUSTABLE ON GRAPHICAL INTERFACE.
2. THE CONTROL POINTS LISTED IN THE SUMMARY MATRIX ARE THE MINIMUM CONTROL POINTS REQUIRED. ATC CONTRACTOR SHALL PROVIDE ALL CONTROL POINTS AS REQUIRED FOR COMPLETE SYSTEM CONTROL PER THE SEQUENCE OF OPERATIONS.
3. ALL CONTROL WIRING, SENSORS, RELAYS, CONTROLLERS, PANELS, DAMPERS, ACTUATORS, ETC. INDICATED ON THE CONTROL DIAGRAMS SHALL BE PROVIDED BY THE ATC CONTRACTOR UNLESS NOTED OTHERWISE.
4. ALL HHW VALVES SHALL BE FAIL OPEN ON LOSS OF POWER.
5. ALL HHW WATER VALVES SHALL BE MODULATING TYPE FOR GPM > 2.0; 2-POSITION ACCEPTABLE FOR FLOWS < 2.0 GPM
6. ATC CONTRACTOR TO COORDINATE W/ OWNER FOR ALL COMMUNICATION & INTERFACE REQUIREMENTS TO CENTRAL OPERATING STATION. REFER TO SPEC FOR FURTHER INFO.
7. DUCT SMOKE DETECTORS INDICATED ARE TO BE FURNISHED BY DIV. 260000 & INSTALLED BY HVAC CONTRACTOR. POWER WIRING AND FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR TO PROVIDE BMS INTERLOCK TO SHUT ASSOCIATED UNIT DOWN AND INITIATE AN ALARM UPON ACTIVATION
8. ALL SMOKE DAMPERS SHALL BE COMBINATION SMOKE/FIRE DAMPERS, SHALL BE FURNISHED & INSTALLED BY HVAC CONTRACTOR, AND POWER WIRED BY ELECTRICAL CONTRACTOR. DAMPERS SHALL BE MOTOR OPERATED WITH 24 VOLT / 120 VOLT ACTUATOR. FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. DAMPER ENDSWITCH INTEGRATION TO BMS BY ATC CONTRACTOR.
9. ALL ATC CONTROLS SHALL BE POWER WIRED FROM DESIGNATED EMERGENCY POWER JUNCTION BOXES LOCATED ON THE ELECTRICAL DRAWINGS. JUNCTION BOXES WILL BE FED BY EMERGENCY POWER, THEREFORE ALL CONTROLS SHALL BE ON EMERGENCY POWER. ANY SUB ATC PANELS REQUIRED SHALL BE FED FROM EMERGENCY POWER & ALL SHALL BE PROVIDED BY ATC CONTRACTOR. ALL UNIT CONTROLS SHALL BE FED BY EMERGENCY POWER & NOT THROUGH THE UNIT'S MAIN POWER SOURCE.
10. ALL DENSELY OCCUPIED SPACES WITH OCCUPANT DENSITY OF 25 PEOPLE OR MORE PER 1000 SQ/FT SHALL BE PROVIDED W/ ROOM LEVEL TEMPERATURE, CO2, & HUMIDITY SENSORS W/ CO2 CONTROL. THIS SHALL BE PROVIDED IN COMPLIANCE WITH LEED v.4 CREDIT IEQC1. (PROVIDED BY FMS CONTRACTOR & INSTALLED BY ATC CONTRACTOR)

DORE + WHITTIER
MASSACHUSETTS
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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

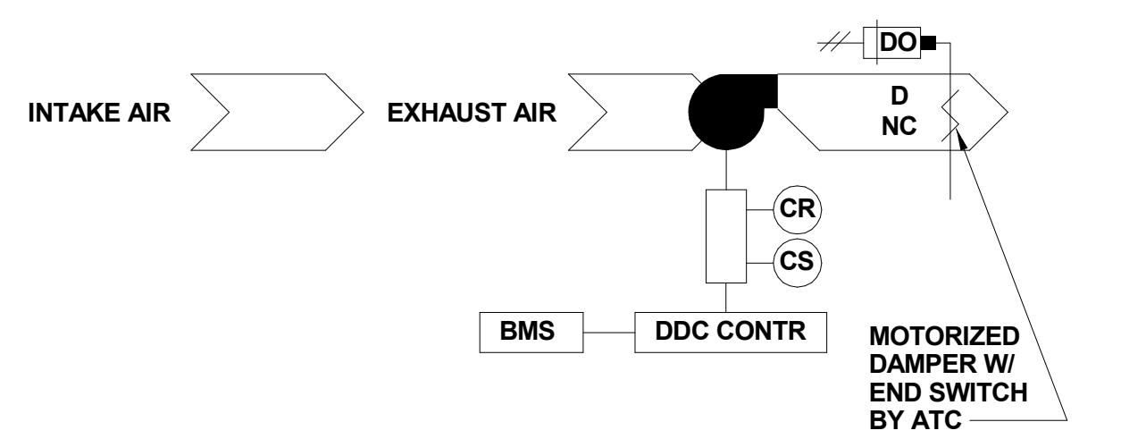
ISSUE TITLE AND DATE:
90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

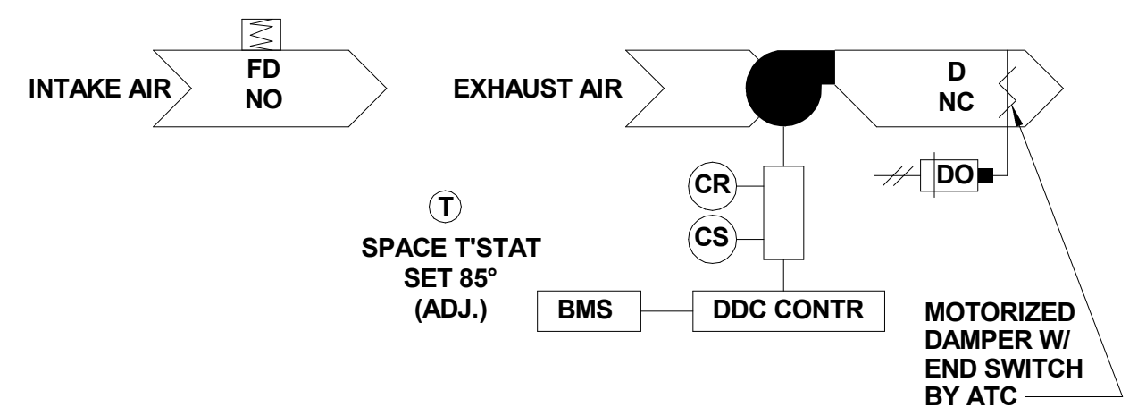
ORIENTATION AND SCALE:
SCALE: AS INDICATED

SHEET TITLE:
CONTROLS VII

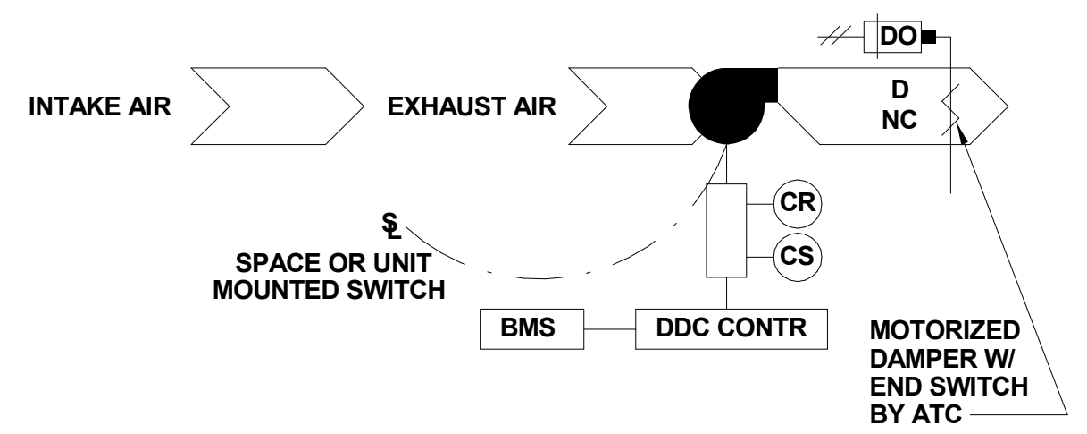
SHEET NUMBER:
M4.17



EXHAUST FAN - TYPE I CONTROLS


INTAKE AIR
FD
NO
EXHAUST AIR
D
NC
T
SPACE T'STAT SET 85° (ADJ.)
CR
CS
BMS
DDC CONTR
MOTORIZED DAMPER W/ END SWITCH BY ATC

EXHAUST FAN - TYPE II CONTROLS


INTAKE AIR
EXHAUST AIR
DO
D
NC
CR
CS
SPACE OR UNIT MOUNTED SWITCH
BMS
DDC CONTR
MOTORIZED DAMPER W/ END SWITCH BY ATC

EXHAUST FAN - TYPE III, VII & VIII CONTROLS

EXHAUST FAN CONTROL : REFER TO DRAWINGS AND SCHEDULES FOR TYPE OF CONTROL REQUIRED FOR EACH FAN. THESE MOTORIZED DAMPERS, SHALL BE PROVIDED AND WIRED BY THIS CONTRACTOR TO OPEN DURING THE OCCUPIED CYCLE AND CLOSE DURING THE UNOCCUPIED CYCLE, UNLESS OTHERWISE NOTED. FANS SHALL BE INTERLOCKED THROUGH THE END SWITCH ON THE DAMPER, TO ONLY OPERATE WHEN THE DAMPER IS PROVEN OPEN. ATC CONTRACTOR SHALL REFER TO EXHAUST FAN SCHEDULE FOR ALL DIRECT DRIVE FANS WITH ECM (GREENHECK VARI-GREEN OR EQUAL) MOTORS. ATC CONTRACTOR SHALL PROVIDE SPEED CONTROL SIGNAL POINT (0-10V - COORDINATED W/ MFGR) AND ASSOCIATED WIRING FROM FAN TO BMS SYSTEM.

1. TYPE I : EXHAUST FAN SHALL BE WIRED INTO BUILDING BMS TO OPERATE DURING OCCUPIED CONDITIONS AND OFF DURING UNOCCUPIED CONDITIONS.

2. TYPE II :

   UPON ACTIVATION OF KILN THE ASSOCIATED EXHAUST FAN DAMPER SHALL OPEN. ONCE THE END SWITCH HAS BEEN PROVEN THE FAN SHALL ENERGIZE, ASSOCIATED KILN ROOM RETURN AIR MOTORIZED DAMPER SHALL CLOSE, THE CLASSROOM RETURN DAMPER SHALL MODULATE TO ITS MINIMUM POSITION DETERMINED BY THE TAB CONTRACTOR AND THE VAV DAMPER ASSOCIATED WITH THAT SPACE SHALL OVERRIDE ITS POSITION & MODULATE TO MAX OPEN POSITION. UPON DEACTIVATION OF KILN, FAN SHALL REMAIN ON UNTIL SPACE TEMPERATURE DECREASES TO SETPOINT, THEN FAN SHALL DEACTIVATE. WHEN THE EXHAUST FAN IS DE-ENERGIZED, ASSOCIATED RETURN AIR DAMPER SHALL OPERATE TO IT'S NORMALLY OPEN POSITION AND VAV DAMPER SHALL MODULATE BASED ON ROOM DEMAND.

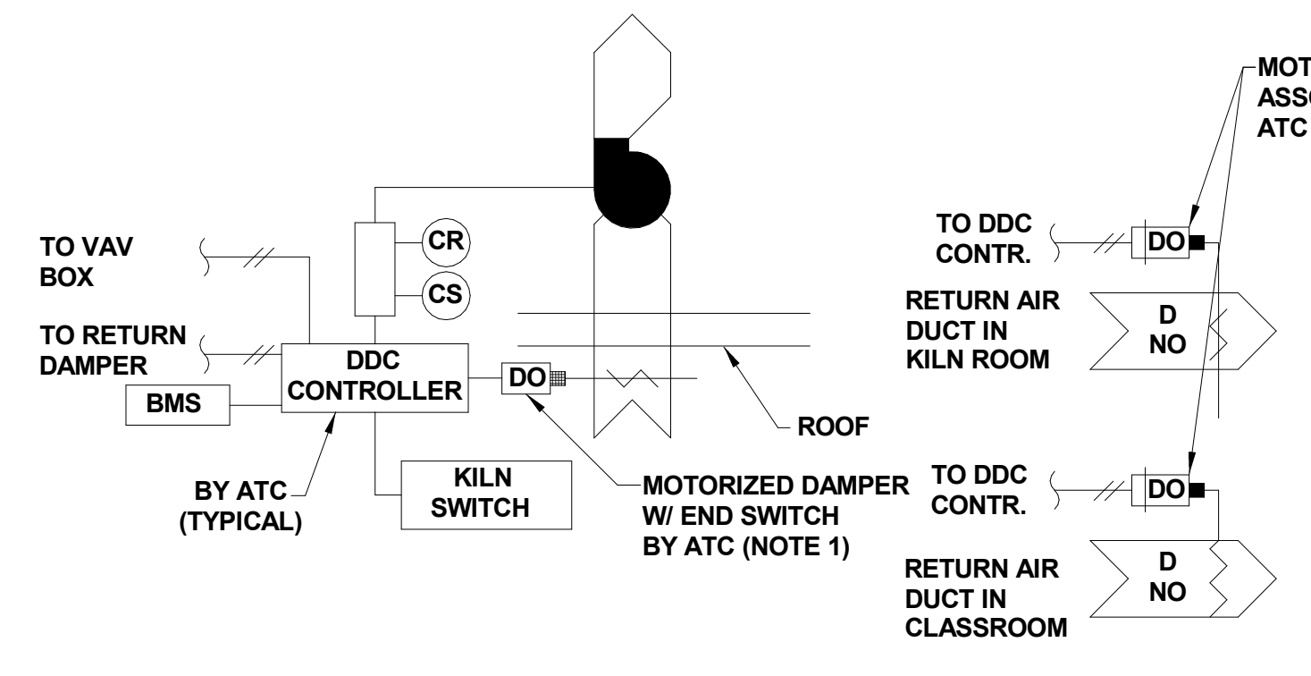
3. TYPE III : DRYER EXHAUST FANS
   THE DRYER EXHAUST FANS SHALL BE ENABLED WHEN THE DUCT PRESSURE SENSOR SENSES THAT THE DRYER IS IN OPERATION. THE FAN SHALL RUN UNTIL THE DRYER IS DE-ENERGIZED.

EXHAUST FANS (EF)	AI	AO	DI	DO	ALARM	REMARKS
FAN S/S & STATUS			X	X	X	ALL TYPES
EA DAMPER/MAKE UP AIR DAMPER	X	X			X	INTERLOCK W/ FAN
SPACE TEMP.	X				X	TYPE II & CONTROL
KILN / FUME HOOD CONTROLLER / SWITCH			X	X	X	TYPE II CONTROL
DIRECT DRIVE SPEED CONTROL	X	X			X	ALL TYPES W/ DIRECT DRIVE
MONITORED EQUIPMENT STATUS			X	X	X	TYPE II, III CONTROL

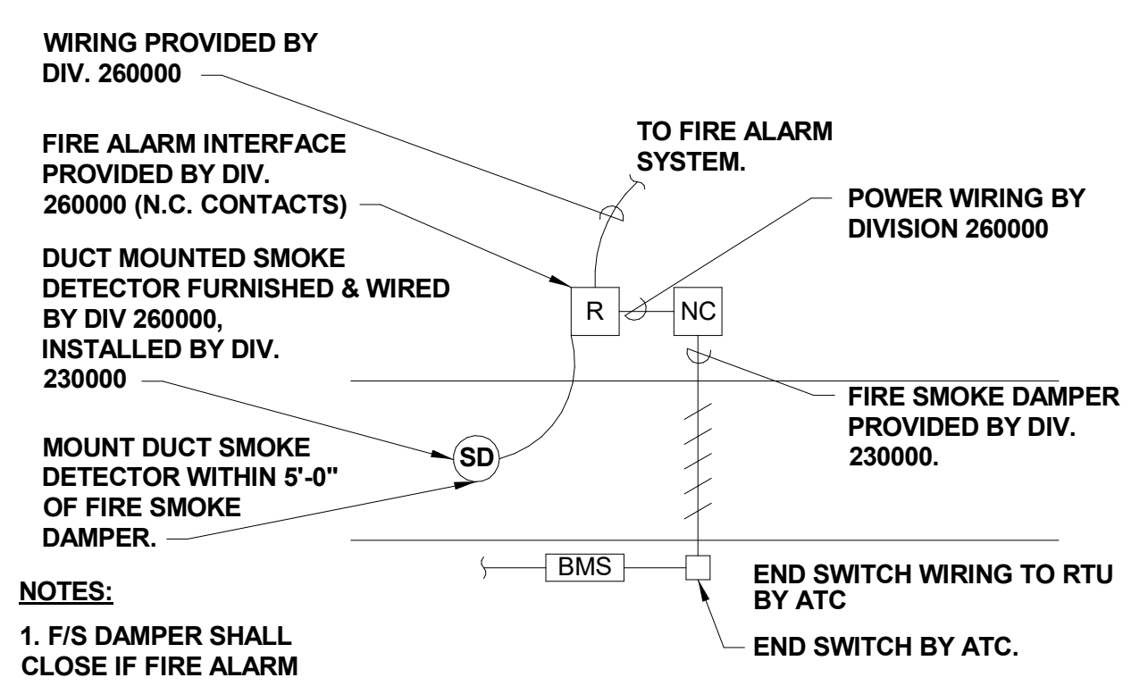
NOTES:

1. ALL FANS GREATER THAN 300 CFM SHALL BE PROVIDED WITH MOTORIZED DAMPERS THAT ARE EQUIPPED W/ END SWITCHES. ONCE THE END SWITCH HAS BEEN PROVEN, THE EXHAUST FAN SHALL START.

2. ALL POINTS TO BE SHOWN ON GRAPHICS UNLESS NOTED OTHERWISE.


TO VAV BOX
TO RETURN DAMPER
BMS
DDC CONTROLLER
CR
CS
DO
BY ATC (TYPICAL)
KILN SWITCH
ROOF
MOTORIZED DAMPER W/ END SWITCH BY ATC (NOTE 1)
TO DDC CONTR.
DO
RETURN AIR DUCT IN KILN ROOM
D
NO
TO DDC CONTR.
DO
RETURN AIR DUCT IN CLASSROOM
D
NO
MOTORIZED DAMPERS & ASSOCIATED WIRING BY ATC CONTRACTOR.

EXHAUST FAN - TYPE IV CONTROLS - KILN


WIRING PROVIDED BY DIV. 260000
FIRE ALARM INTERFACE PROVIDED BY DIV. 260000 (N.C. CONTACTS)
DUCT MOUNTED SMOKE DETECTOR FURNISHED & WIRED BY DIV 260000, INSTALLED BY DIV. 230000
MOUNT DUCT SMOKE DETECTOR WITHIN 5'-0" OF FIRE SMOKE DAMPER.
TO FIRE ALARM SYSTEM.
POWER WIRING BY DIVISION 260000
R
NC
SD
FIRE SMOKE DAMPER PROVIDED BY DIV. 230000.
BMS
END SWITCH WIRING TO RTU BY ATC
END SWITCH BY ATC.

NOTES:

1. F/S DAMPER SHALL CLOSE IF FIRE ALARM IS TRIGGERED AND/OR LOSS OF POWER.

2. ACTIVATED END SWITCH SHALL SHUT DOWN ASSOCIATED RTU.

FIRE/SMOKE DAMPER DETAIL

(NOT TO SCALE)

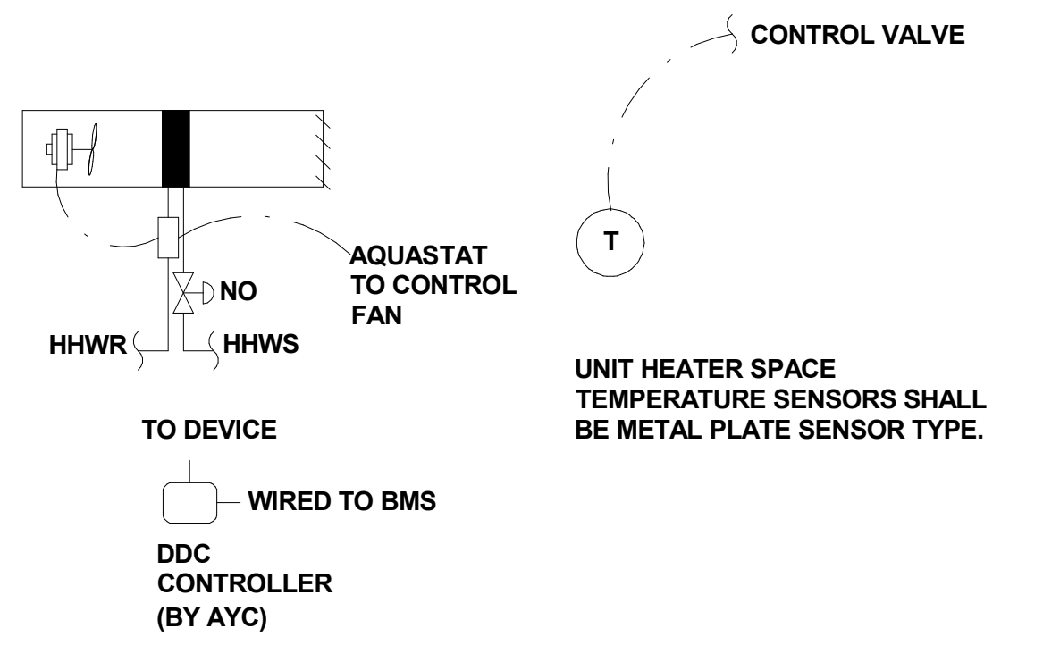
ALL VFD'S TO BE INTEGRATED TO BMS VIA BACNET IP.

VARIABLE FREQUENCY DRIVE INTERFACE

VARIABLE FREQUENCY DRIVE (VFD) INTERFACE MONITOR:
CURRENT VFD STATUS AND OPERATING CONDITIONS SHALL BE MONITORED THROUGH ITS COMMUNICATIONS INTERFACE PORT. THE INTERFACE SHALL MONITOR AND TREND THE POINTS AS SHOWN ON THE POINTS LIST.

VARIABLE FREQUENCY DRIVE INTERFACE	HARDWARE POINTS				SOFTWARE POINTS							REMARKS
POINT NAME	AI	AO	BI	BO	AV	BV	LOOP	SCHED	TREND	ALARM	SHOW ON GRAPHICS	
MOTOR SPEED RPM					X				X		X	
MOTOR FREQUENCY HERTZ					X				X		X	
MOTOR CURRENT AMPS					X				X		X	
MOTOR RUNTIME					X						X	
VFD STATUS						X			X	X	X	
IN FAULT CONDITION						X			X	X	X	
IN BYPASS						X			X	X	X	
POWER, KW					X				X		X	
ENERGY, KWH					X				X		X	

PROPELLER UNIT HEATER (UH)



UNIT HEATER SPACE TEMPERATURE SENSORS SHALL BE METAL PLATE SENSOR TYPE.

UNIT HEATER CONTROL: (PROPELLER TYPE)

A DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE UNIT OPERATION AS FOLLOWS:

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

- OCCUPIED MODE: THE UNIT SHALL MAINTAIN A HEATING SETPOINT OF 70°F (ADJ.).
- UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN A HEATING SETPOINT OF 60°F (ADJ.).

FAN:
THE FAN SHALL RUN ANYTIME THE AQUASTAT SENSES WATER TEMPERATURE IS ABOVE 90°F (ADJ) UNLESS SHUTDOWN ON SAFETIES.

HEATING COIL VALVE:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING COIL VALVE TO MAINTAIN THE SPACE SETPOINT.

THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.

SUMMER OPERATIONS:

- THE FAN IS OFF
- AND THE CONTROL VALVE IS CLOSED

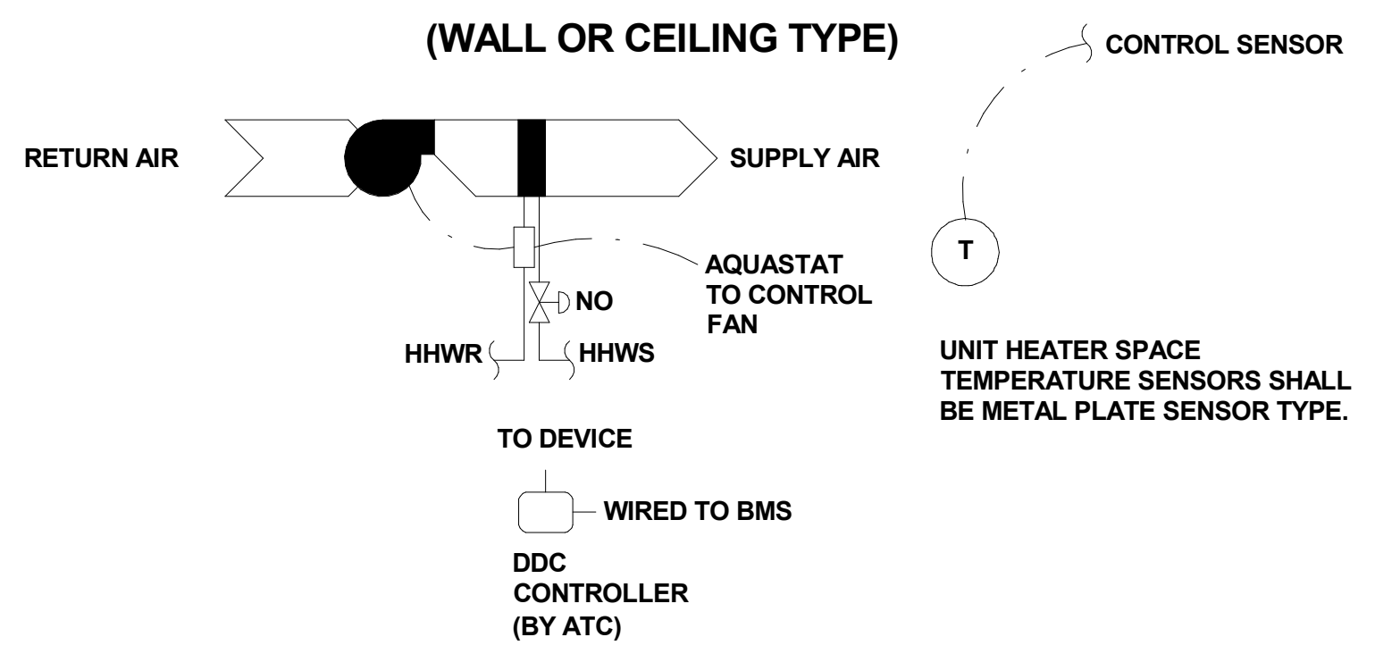
EMERGENCY SHUTDOWN:
UPON RECEIVING A SIGNAL FROM THE FIRE ALARM SYSTEM, THE FANS SHALL SHUTDOWN, ALL DAMPERS SHALL CLOSE AND AN ALARM SHALL BE GENERATED AT THE BMS. THIS MODE SHALL BE CALLED EMERGENCY SHUTDOWN MODE. ATC CONTRACTOR SHALL HARD WIRE A DIRECT CONNECTION FROM THE FIRE ALARM PANELS DRY CONTACTS TO THE BMS.

PROPELLER UNIT HEATER	AI	AO	DI	DO	ALARM	SHOW ON GRAPHIC	REMARKS
ZONE TEMP	X				X	X	NOTE #1
HEATING VALVE	X	X			X	X	NOTE #2
HEATING SETPOINT		X				X	

NOTE #1: ALARM WHEN MEASURED TEMP IS +10°(ADJ.) FROM COOL SETPOINT OR -10°(ADJ.) FROM HEAT SETPOINT FOR MORE THAN 15 MIN (ADJ.)

NOTE #2: ALARM WHEN COMMANDED POSITION AND SENSED POSITION DO NOT AGREE FOR A PERIOD OF MORE THAN 2 MIN (ADJ.)

CABINET UNIT HEATER (CUH)
(WALL OR CEILING TYPE)



UNIT HEATER SPACE TEMPERATURE SENSORS SHALL BE METAL PLATE SENSOR TYPE.

UNIT HEATER CONTROL: (CABINET, CONCEALED, & WALL TYPE)

A DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE UNIT OPERATION AS FOLLOWS:

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

- OCCUPIED MODE: THE UNIT SHALL MAINTAIN A HEATING SETPOINT OF 70°F (ADJ.).
- UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN A HEATING SETPOINT OF 60°F (ADJ.).

FAN:
THE FAN SHALL RUN ANYTIME THE AQUASTAT SENSES WATER TEMPERATURE IS ABOVE 90°F (ADJ) UNLESS SHUTDOWN ON SAFETIES.

HEATING COIL VALVE:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING COIL VALVE TO MAINTAIN THE SPACE SETPOINT.

THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.

SUMMER OPERATIONS:

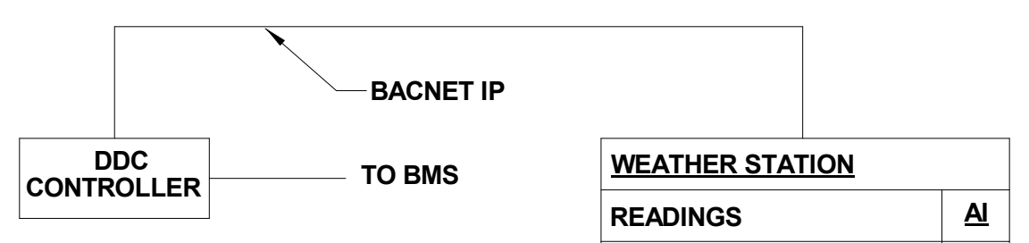
- THE FAN IS OFF
- AND THE CONTROL VALVE IS CLOSED

EMERGENCY SHUTDOWN:
UPON RECEIVING A SIGNAL FROM THE FIRE ALARM SYSTEM, THE FANS SHALL SHUTDOWN, ALL DAMPERS SHALL CLOSE AND AN ALARM SHALL BE GENERATED AT THE BMS. THIS MODE SHALL BE CALLED EMERGENCY SHUTDOWN MODE. ATC CONTRACTOR SHALL HARD WIRE A DIRECT CONNECTION FROM THE FIRE ALARM PANELS DRY CONTACTS TO THE BMS.

CABINET UNIT HEATER	AI	AO	DI	DO	ALARM	SHOW ON GRAPHIC	REMARKS
ZONE TEMP	X				X	X	NOTE #1
HEATING VALVE	X	X			X	X	NOTE #2
HEATING SETPOINT		X				X	

NOTE #1: ALARM WHEN MEASURED TEMP IS +10°(ADJ.) FROM COOL SETPOINT OR -10°(ADJ.) FROM HEAT SETPOINT FOR MORE THAN 15 MIN (ADJ.)

NOTE #2: ALARM WHEN COMMANDED POSITION AND SENSED POSITION DO NOT AGREE FOR A PERIOD OF MORE THAN 2 MIN (ADJ.)

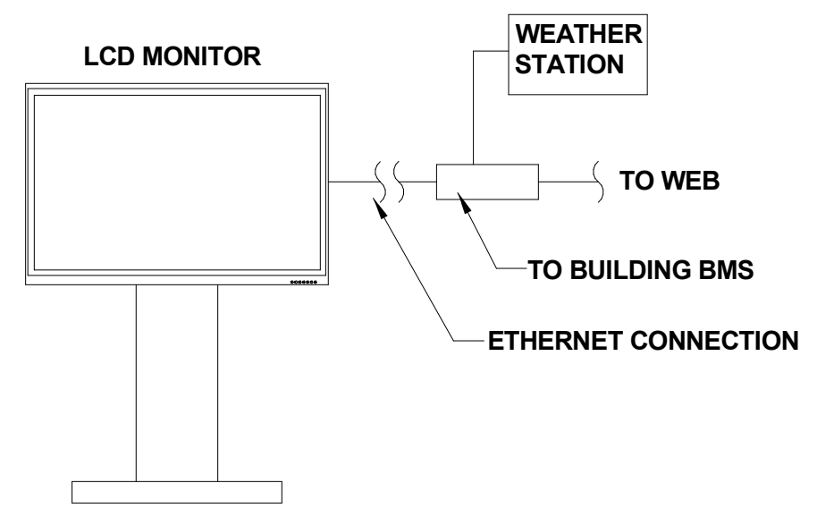


WEATHER STATION	
READINGS	AI
OA TEMP*	X
OA HUMIDITY*	X
BAROMETRIC PRESSURE	X
WIND SPEED	X
WIND DIRECTION	X
BACNET/IP PROTOCOL	X

*OA TEMP & HUMIDITY SENSORS SHALL BE PROVIDED WITH WEATHER SHIELD AND SHALL BE LOCATED ON NORTH SIDE OF BUILDING IN A LOCATION WITH NO DIRECT SOLAR EXPOSURE

DISPLAY THE FOLLOWING BUILDING INFORMATION AND ENERGY METERING DATA ON THE BMS:

- OUTSIDE AIR TEMPERATURE, HUMIDITY, WIND SPEED & DIRECTION, RAIN SENSOR STATUS
- BUILDING ELECTRICAL CONSUMPTION THROUGH MAIN METER
- BUILDING HEATING HOT WATER CONSUMPTION THROUGH BTU METER
- BUILDING CHILLED WATER CONSUMPTION THROUGH BTU METER
- BUILDING COLD WATER CONSUMPTION THROUGH FLOW METER
- BUILDING DOMESTIC HOT WATER CONSUMPTION THROUGH RELAY PROGRAMMING
- BUILDING CHECK METERS FOR PLUG LOADS, LIGHTING LOADS, MECHANICAL LOADS, ETC.
- PV GENERATION



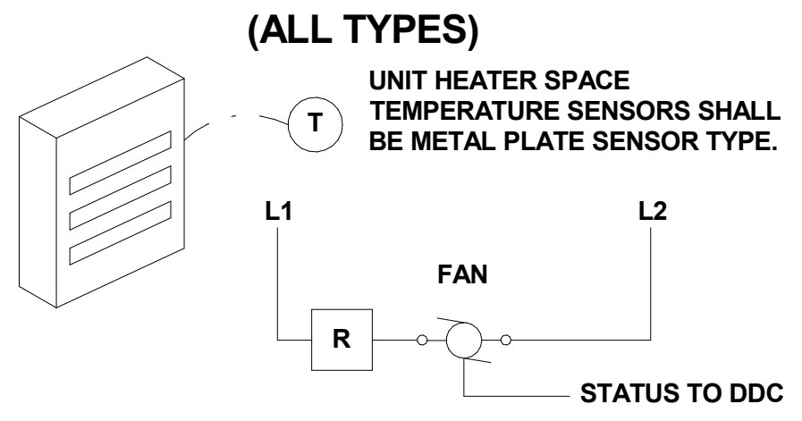
OWNERS INFORMATIONAL KIOSK:

AN OWNER INFORMATIONAL KIOSK FOR USE BY GENERAL PUBLIC SHALL BE PROVIDED BY ATC CONTRACTOR. THE WORKSTATION SHALL BE FULLY PASSWORD PROTECTED SO THAT INFORMATION ON THE SYSTEM MAY ONLY BE VIEWED AND NOT CHANGED IN ANYWAY. VISUAL GRAPHICS AND MANEUVERABILITY ON THIS WORKSTATION SHALL BE MADE AS EASY AS POSSIBLE FOR THE PUBLIC USER AND SHALL FOCUS ON DISPLAYING SYSTEM OPERATIONAL STATUS AND ENERGY CONSUMPTION OF SPECIFIED SYSTEMS. THE SYSTEM SHALL ALSO BE INTERFACED WITH LIGHT CONTROL PANEL FOR LIGHTING SYSTEM OPERATION. THE OWNERS MAIN WORKSTATION SHALL ALSO REFLECT THIS DATA.

DISPLAY THE FOLLOWING BUILDING INFORMATION AND ENERGY METERING DATA:

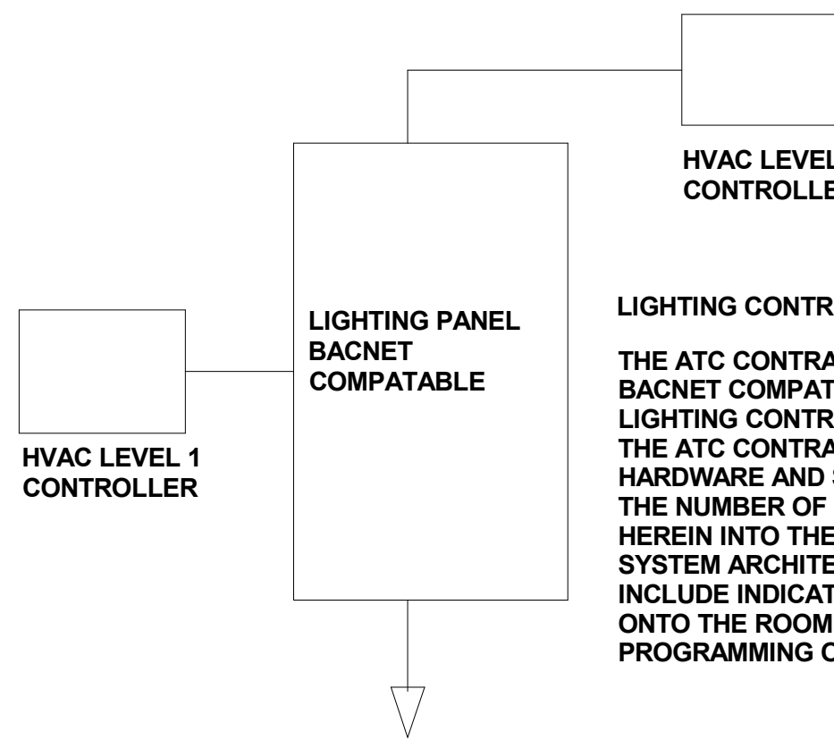
- OUTSIDE AIR TEMPERATURE, HUMIDITY, WIND SPEED & DIRECTION, RAIN SENSOR STATUS
- BUILDING ELECTRICAL CONSUMPTION THROUGH ELECTRIC METERS
- BUILDING HEATING HOT WATER CONSUMPTION THROUGH BTU METERS
- BUILDING CHILLED WATER CONSUMPTION THROUGH BTU METERS
- BUILDING COLD WATER CONSUMPTION THROUGH FLOW METERS
- BUILDING DOMESTIC HOT WATER CONSUMPTION THROUGH RELAY PROGRAMMING
- HRHP PLANT AS WHOLE INCLUDING ADIABATIC DRY COOLERS, GEOTHERMAL WELL SYSTEM (ALTERNATE)

ELECTRIC UNIT HEATERS
(ALL TYPES)


T
UNIT HEATER SPACE TEMPERATURE SENSORS SHALL BE METAL PLATE SENSOR TYPE.
L1
L2
FAN
R
STATUS TO DDC

ELECTRIC UNIT HEATER	AI	AO	DI	DO	ALARM	REMARKS
SPACE TEMP & SETPOINT	X	X			X	NOTE #1
FAN S/S & STATUS		X	X	X	X	

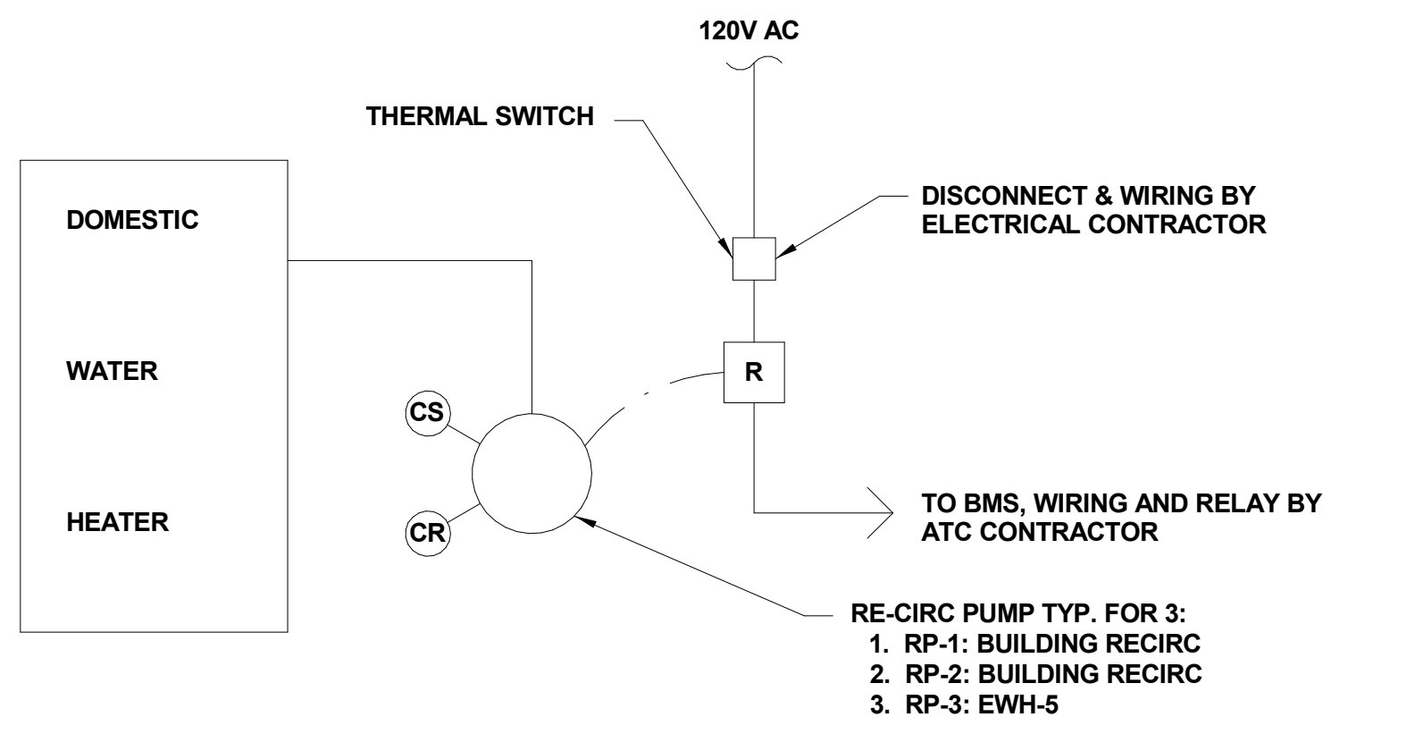
NOTE #1: ALARM WHEN MEASURED TEMP IS -10°(ADJ.) FROM HEAT SETPOINT FOR MORE THAN 15 MIN (ADJ.)


HVAC LEVEL 2 CONTROLLER
HVAC LEVEL 1 CONTROLLER
LIGHTING PANEL BACNET COMPATABLE
LIGHTING PANEL BY DIVISION 26 00 00

LIGHTING CONTROL INTERFACE

THE ATC CONTRACTOR SHALL FURNISH A BACNET COMPATIBLE CONNECTION TO ALL LIGHTING CONTROL SWITCHING PANELS. THE ATC CONTRACTOR SHALL INCLUDE ALL HARDWARE AND SOFTWARE TO INTEGRATE THE NUMBER OF RELAYS INDICATED HEREIN INTO THE BUILDING MANAGEMENT SYSTEM ARCHITECTURE. THIS SHALL INCLUDE INDICATION OF RELAYS STATUS ONTO THE ROOM GRAPHICS SCREEN AND PROGRAMMING OF ON/OFF SCHEDULE.

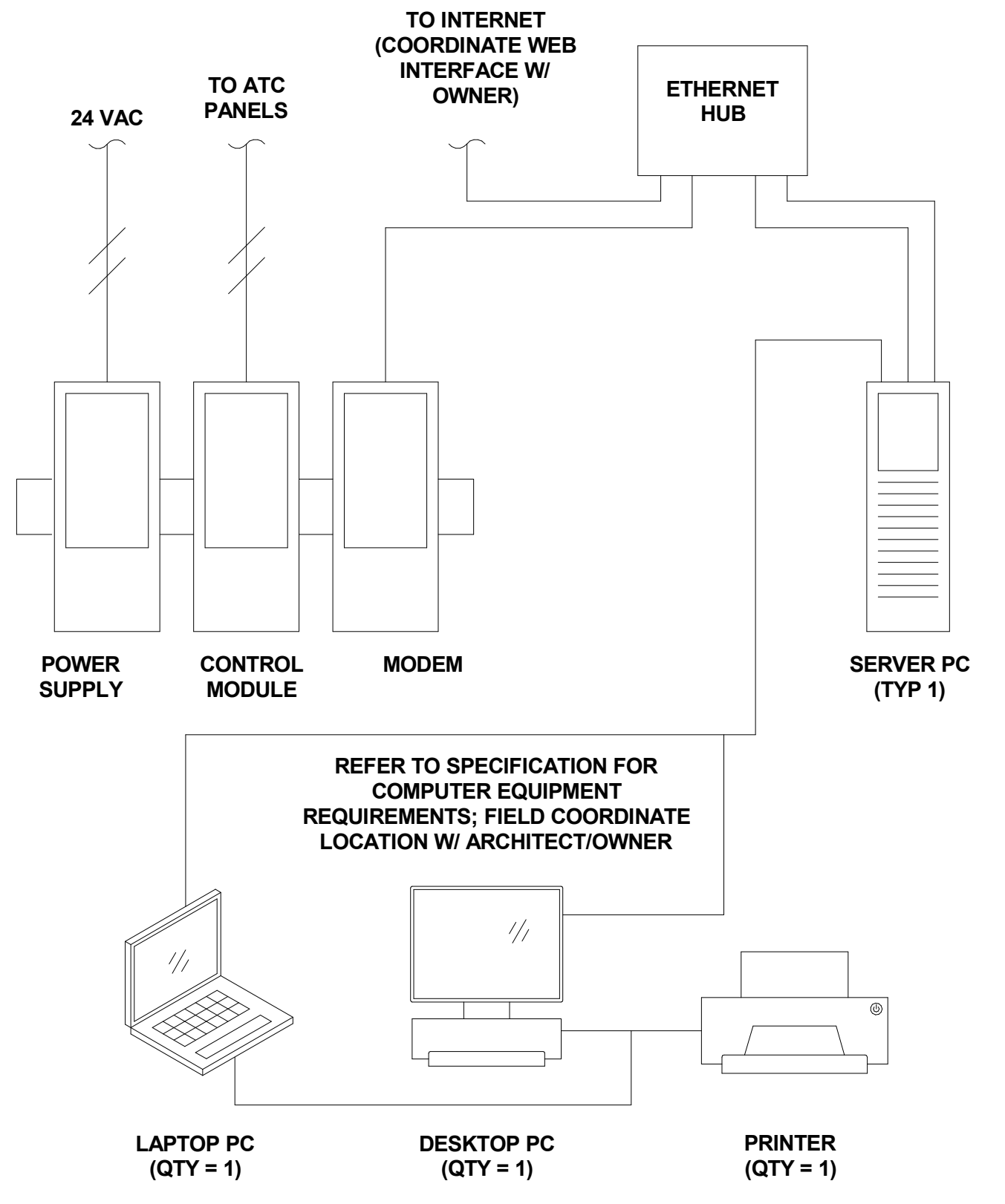
BUILDING MANAGEMENT (AUTOMATIC TEMPERATURE CONTROL)
SYSTEM NETWORK LIGHT CONTROL SYSTEM SHALL BE CAPABLE OF PANEL-TO-PANEL COMMUNICATIONS OVER A HIGH SPEED, HARDWIRED DATA NETWORK. THE NETWORK SHALL CONSIST OF WIRING AS REQUIRED BY THE MANUFACTURER TO THE BMS/ATC SYSTEM FOR OPERATOR CONTROL AT A SINGLE LOCATION. ATC CONTRACTOR SHALL PROVIDE ALL NETWORK WIRING BETWEEN LIGHTING CONTROL PANEL AND BMS SYSTEM CONTROLLER.



DOMESTIC PUMPS	AI	AO	DI	DO	ALARM	SHOW ON GRAPHICS	REMARKS
START				X		X	TYP FOR 3
STOP				X		X	TYP FOR 3
STATUS	X	X			X	X	TYP FOR 3

A DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE DOMESTIC RERIC PUMPS.
THE PUMPS SHALL BE ENABLED BASED ON SCHEDULE.
(2) PUMPS ONE IS LOCATED IN MECH ROOM 3003 (E BUILD MEZZ) & SECOND PUMP IS LOCATED IN (EAST CAMPUS PENTHOUSE

DOMESTIC WATER CIRCULATION CONTROL



REFER TO SPECIFICATION FOR COMPUTER EQUIPMENT REQUIREMENTS; FIELD COORDINATE LOCATION W/ ARCHITECT/OWNER

ATC FRONT END INTERFACE DIAGRAM

ABBREVIATIONS

AFVP	AIRFLOW VELOCITY PROBE
ALM	ALARM
AQ	AQUASTAT
ATC	AUTOMATIC TEMPERATURE CONTROLS
BLDG	BUILDING
BLR	BOILER
BMS	BUILDING MANAGEMENT SYSTEM (ENERGY & AUTOMATION)
CM	CONSTRUCTION MANAGER
COMB	COMBUSTION
CONTR	CONTROLLER
CO2	CARBON DIOXIDE
CR	CONTROL RELAY
CS	CURRENT SENSOR
CUV	CABINET UNIT VENTILATOR
D	DAMPER
DA	DISCHARGE AIR
DAS	DISCHARGE AIR SENSOR
DAT	DISCHARGE AIR TEMPERATURE
DCV	DEMAND CONTROL VENTILATION
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DDC	DIRECT DIGITAL CONTROL
DO	DAMPER OPERATOR
DP	DIFFERENTIAL PRESSURE
DPR	DAMPER
DPV	DIFFERENTIAL PRESSURE VALVE
EA	EXHAUST AIR
EF	EXHAUST FAN
F	FLOW/FARENHEIT (AS APPLICABLE)
FB	FACE & BYPASS
FD	FIRE DAMPER
H	HUMIDITY
HS	ENTHALPY SENSOR
HT	HIGH TEMPERATURE
HTG	HEATING
HR	HEAT RECOVERY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LT	LOW TEMPERATURE
M	MOTOR
MAT	MIXED AIR TEMPERATURE
NAC	NETWORK APPLICATION CONTROLLER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OVR	OVERRIDE
P	PRESSURE
PB	PUSH BUTTON
PNL	PANEL
RA	RETURN AIR
REL	RELIEF AIR
RF	RETURN FAN
RFC	RETURN FAN CONTROLLER
RM	ROOM
SA	SUPPLY AIR
SD	SMOKE DAMPER OR SMOKE DETECTOR
SF	SUPPLY FAN
SFC	SUPPLY FAN CONTROLLER
SP	STATIC PRESSURE
T	TEMPERATURE
TEC	TERMINAL EQUIPMENT CONTROLLER
VAC	VOLTS - ALTERNATING CURRENT
VDC	VOLTS - DIRECT CURRENT
VFD	SEE VSD
VLV	VALVE
VP	VELOCITY PROBE (AIRFLOW)
VSD	VARIABLE SPEED (FREQUENCY) DRIVE
XFMR	TRANSFORMER

ATC/BMS GENERAL NOTES

1. ALL SETPOINTS INDICATED IN THE SEQUENCE OF OPERATIONS SHALL BE ADJUSTABLE ON GRAPHICAL INTERFACE.
2. THE CONTROL POINTS LISTED IN THE SUMMARY MATRIX ARE THE MINIMUM CONTROL POINTS REQUIRED. ATC CONTRACTOR SHALL PROVIDE ALL CONTROL POINTS AS REQUIRED FOR COMPLETE SYSTEM CONTROL PER THE SEQUENCE OF OPERATIONS.
3. ALL CONTROL WIRING, SENSORS, RELAYS, CONTROLLERS, PANELS, DAMPERS, ACTUATORS, ETC. INDICATED ON THE CONTROL DIAGRAMS SHALL BE PROVIDED BY THE ATC CONTRACTOR UNLESS NOTED OTHERWISE.
4. ALL HHW VALVES SHALL BE FAIL OPEN ON LOSS OF POWER.
5. ALL HHW WATER VALVES SHALL BE MODULATING TYPE FOR GPM > 2.0; 2-POSITION ACCEPTABLE FOR FLOWS < 2.0 GPM
6. ATC CONTRACTOR TO COORDINATE W/ OWNER FOR ALL COMMUNICATION & INTERFACE REQUIREMENTS TO CENTRAL OPERATING STATION. REFER TO SPEC FOR FURTHER INFO.
7. DUCT SMOKE DETECTORS INDICATED ARE TO BE FURNISHED BY DIV. 260000 & INSTALLED BY HVAC CONTRACTOR. POWER WIRING AND FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. ATC CONTRACTOR TO PROVIDE BMS INTERLOCK TO SHUT ASSOCIATED UNIT DOWN AND INITIATE AN ALARM UPON ACTIVATION
8. ALL SMOKE DAMPERS SHALL BE COMBINATION SMOKE/FIRE DAMPERS, SHALL BE FURNISHED & INSTALLED BY HVAC CONTRACTOR, AND POWER WIRED BY ELECTRICAL CONTRACTOR. DAMPERS SHALL BE MOTOR OPERATED WITH 24 VOLT / 120 VOLT ACTUATOR. FIRE ALARM INTERLOCK BY ELECTRICAL CONTRACTOR. DAMPER ENDSWITCH INTEGRATION TO BMS BY ATC CONTRACTOR.
9. ALL ATC CONTROLS SHALL BE POWER WIRED FROM DESIGNATED EMERGENCY POWER JUNCTION BOXES LOCATED ON THE ELECTRICAL DRAWINGS. JUNCTION BOXES WILL BE FED BY EMERGENCY POWER, THEREFORE ALL CONTROLS SHALL BE ON EMERGENCY POWER. ANY SUB ATC PANELS REQUIRED SHALL BE FED FROM EMERGENCY POWER & ALL SHALL BE PROVIDED BY ATC CONTRACTOR. ALL UNIT CONTROLS SHALL BE FED BY EMERGENCY POWER & NOT THROUGH THE UNIT'S MAIN POWER SOURCE.
10. ALL DENSELY OCCUPIED SPACES WITH OCCUPANT DENSITY OF 25 PEOPLE OR MORE PER 1000 SQ/FT SHALL BE PROVIDED W/ ROOM LEVEL TEMPERATURE, CO2, & HUMIDITY SENSORS W/ CO2 CONTROL. THIS SHALL BE PROVIDED IN COMPLIANCE WITH LEED v.4 CREDIT IEQC1. (PROVIDED BY FMS CONTRACTOR & INSTALLED BY ATC CONTRACTOR)

DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:
90% CONSTRUCTION DOCUMENTS
09/25/2026

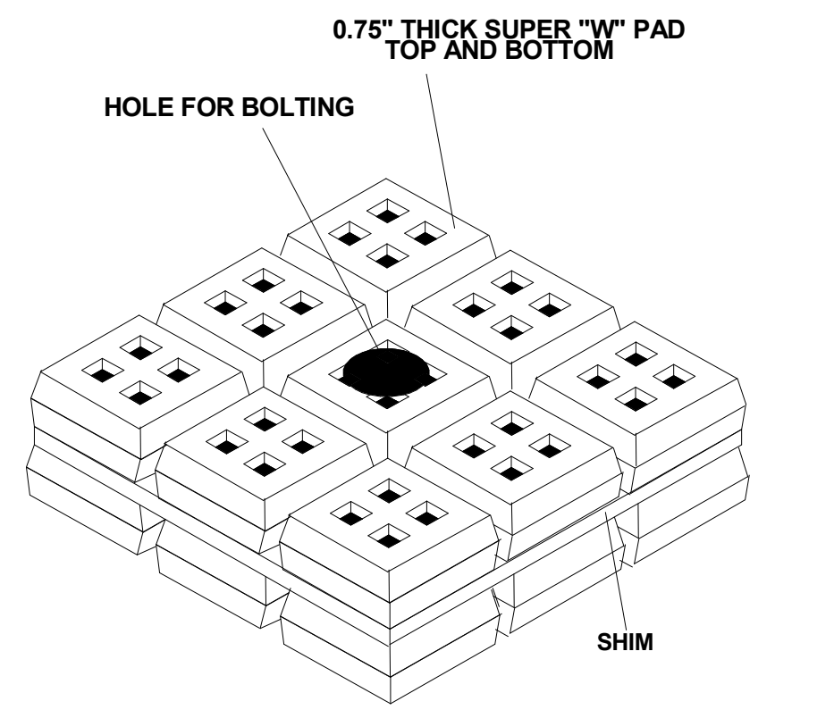
KEY PLAN

ORIENTATION AND SCALE:

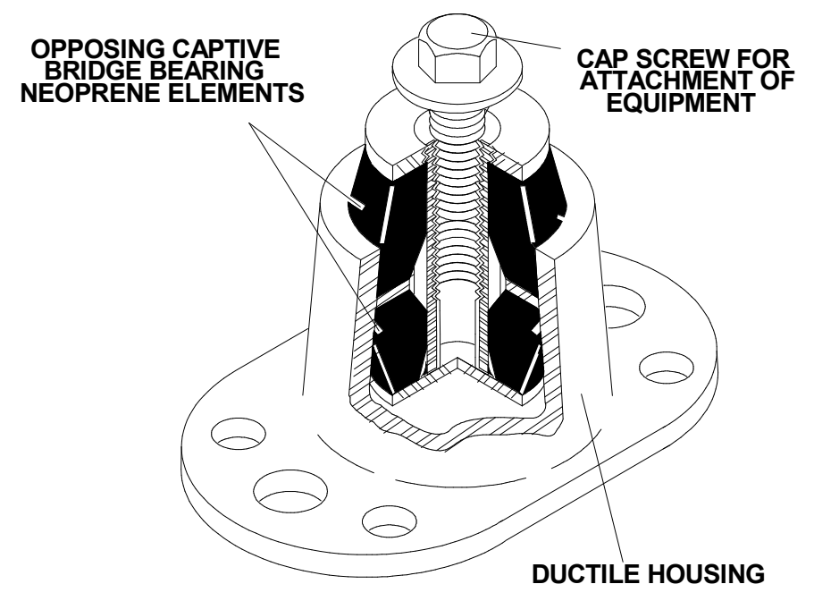
SCALE: AS INDICATED

SHEET TITLE:
CONTROLS VIII

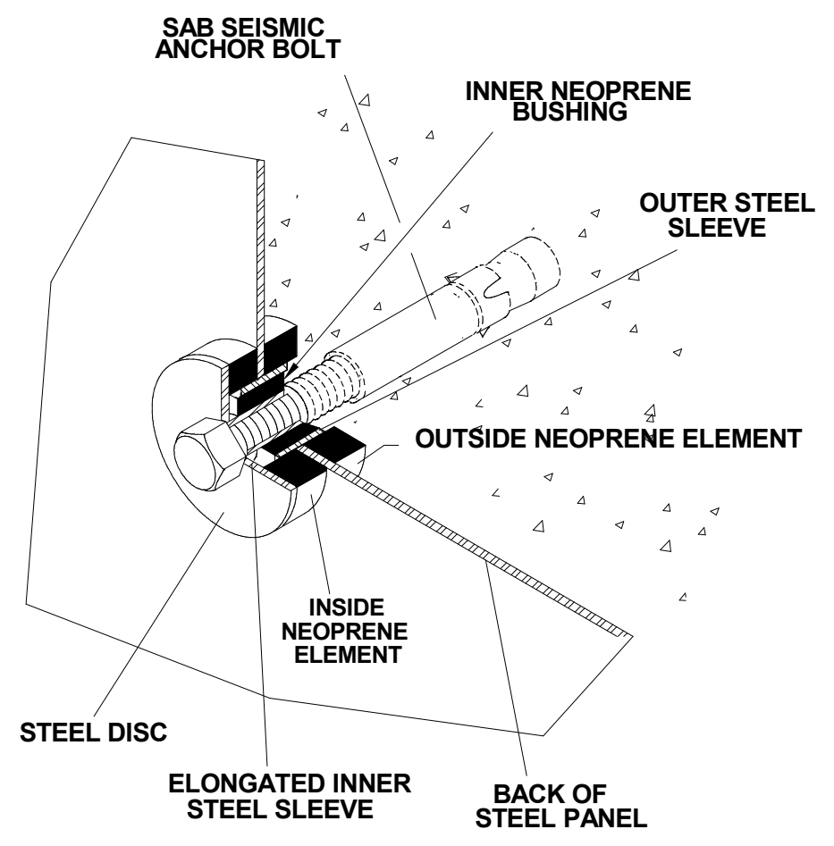
SHEET NUMBER:
M4.18



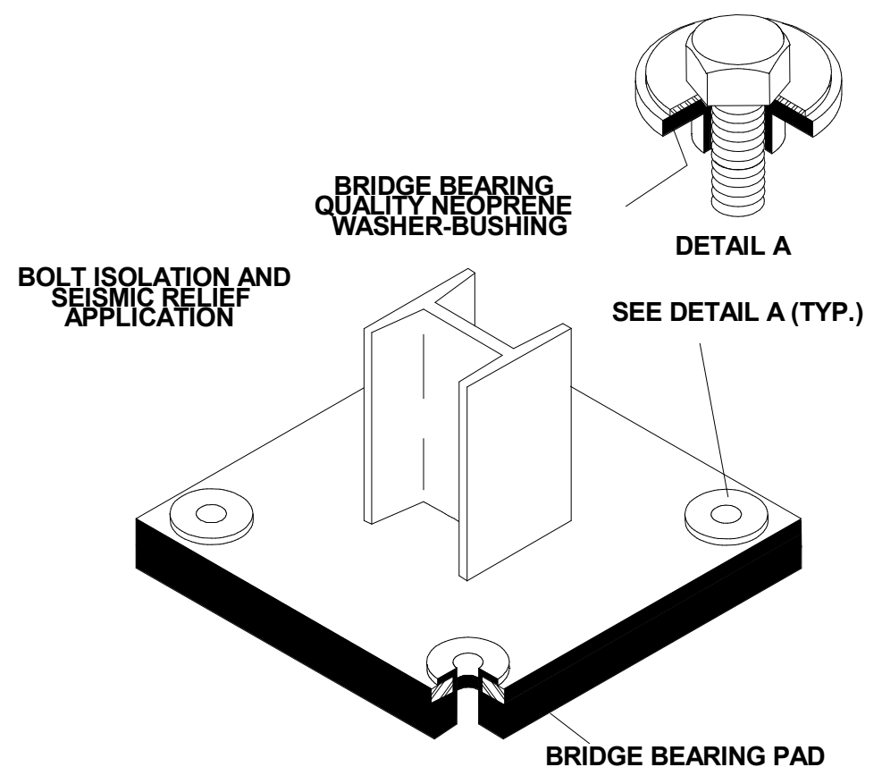
LAYERED SUPER "W" PADS WITH STEEL SHIM
SPECIFICATION 1


OPPOSING CAPTIVE BRIDGE BEARING NEOPRENE ELEMENTS
CAP SCREW FOR ATTACHMENT OF EQUIPMENT
DUCTILE HOUSING

RESTRAINED BR MOUNT
SPECIFICATION 2

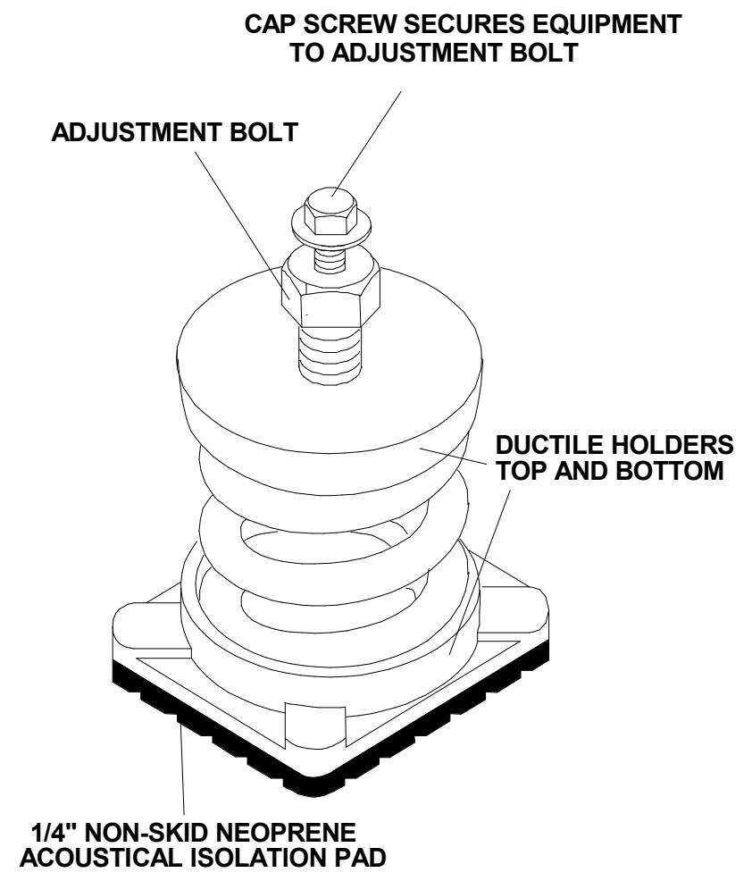


PB BUSHING
SPECIFICATION 3

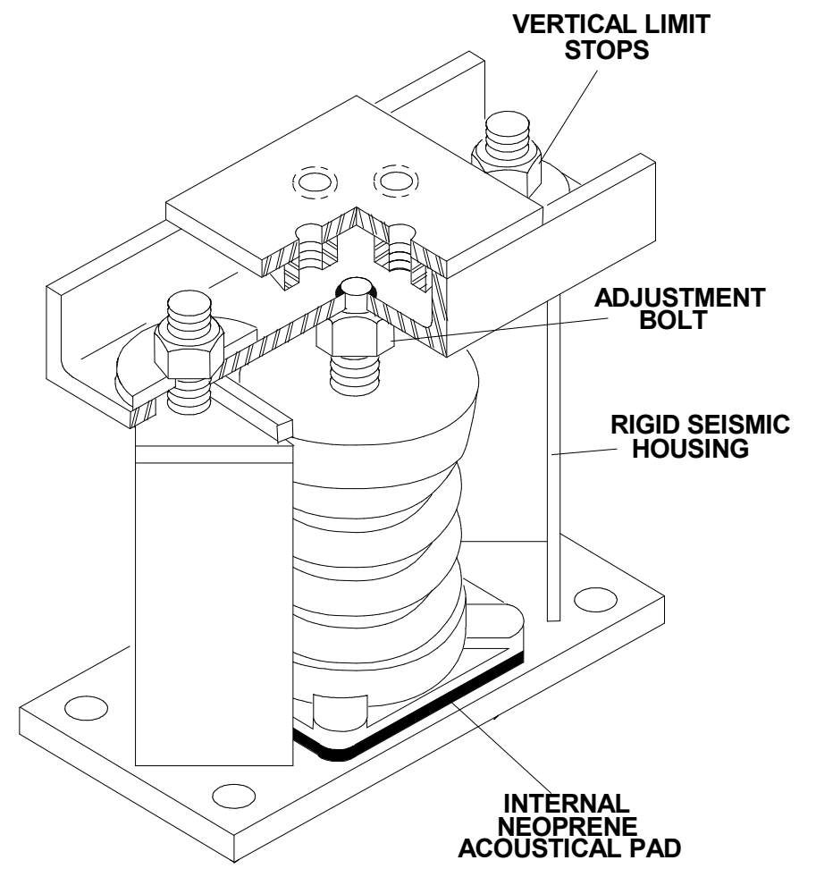

BRIDGE BEARING QUALITY NEOPRENE WASHER-BUSHING
DETAIL A
BOLT ISOLATION AND SEISMIC RELIEF APPLICATION
SEE DETAIL A (TYP.)
BRIDGE BEARING PAD

THIS VIEW SHOWN WITHOUT BOLTS AND STEEL WASHERS FOR CLARITY

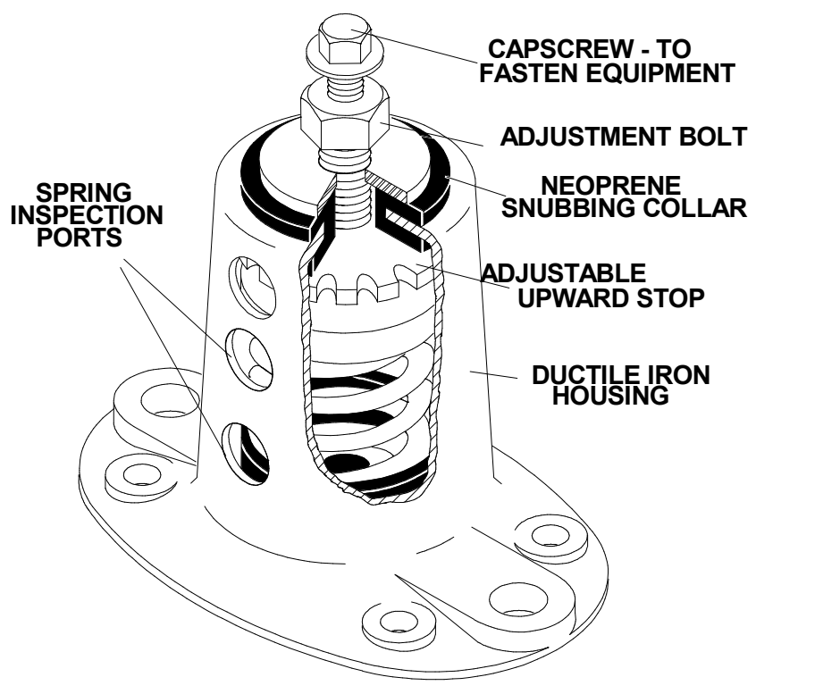
HG NEOPRENE BUSHING
SPECIFICATION 4


CAP SCREW SECURES EQUIPMENT TO ADJUSTMENT BOLT
ADJUSTMENT BOLT
DUCTILE HOLDERS TOP AND BOTTOM
1/4" NON-SKID NEOPRENE ACOUSTICAL ISOLATION PAD

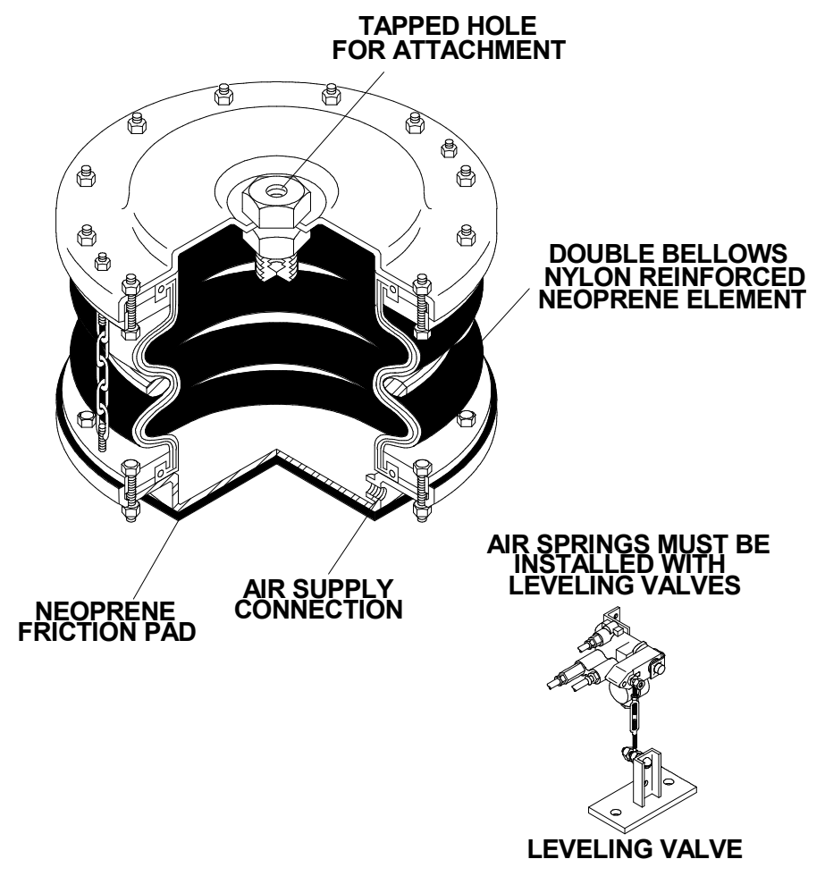
SLF SPRING MOUNT
SPECIFICATION 5



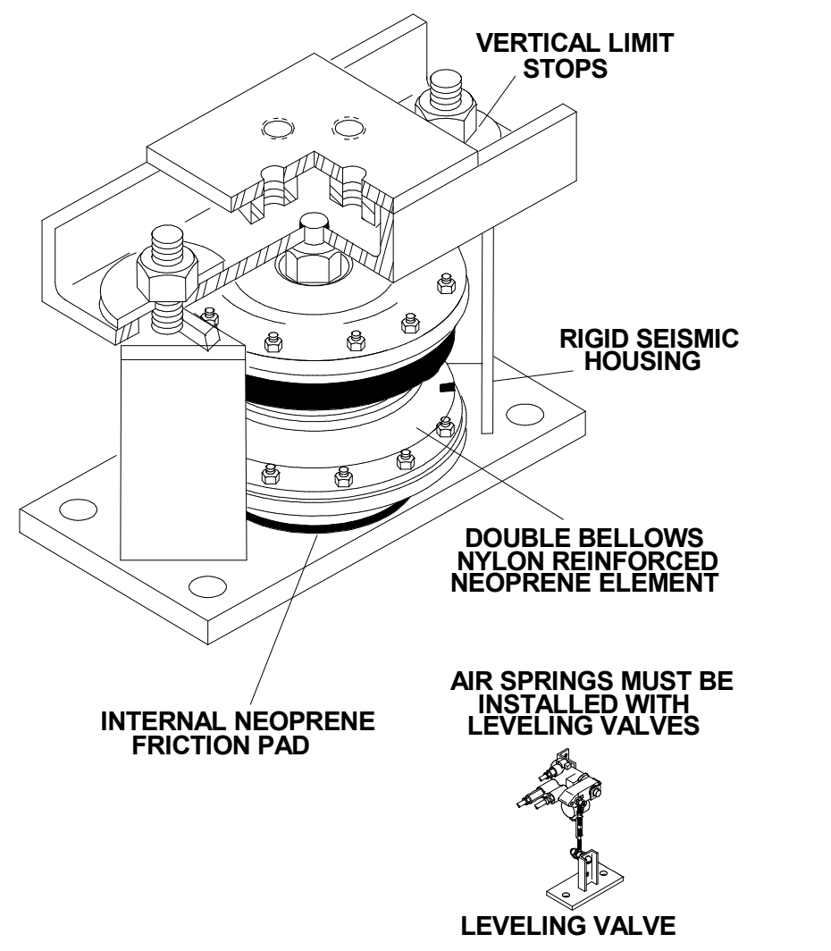
SLR SPRING MOUNT
SPECIFICATION 6



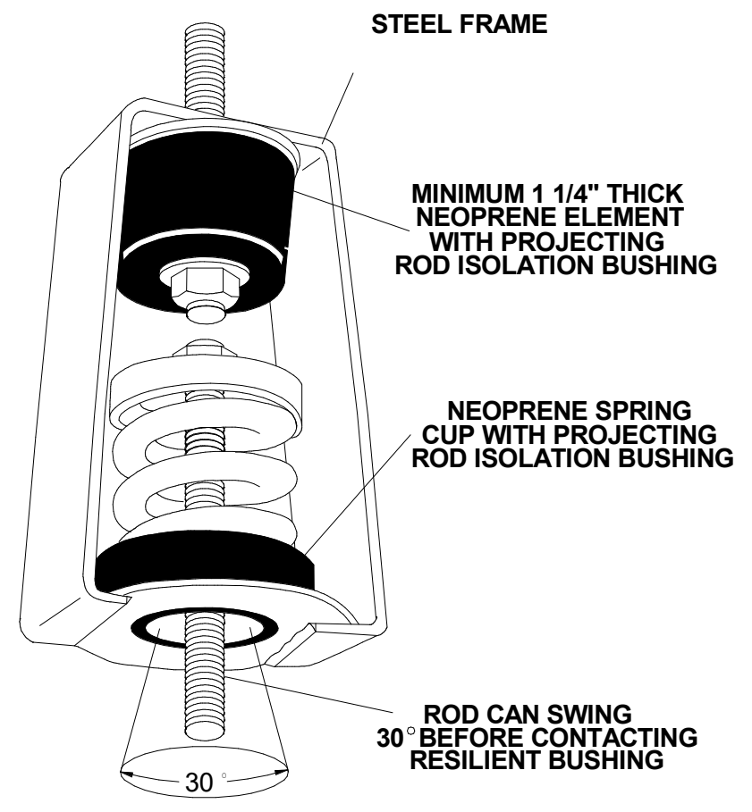
SSLFH HOUSED SPRING MOUNT
SPECIFICATION 7


TAPPED HOLE FOR ATTACHMENT
DOUBLE BELLOWS NYLON REINFORCED NEOPRENE ELEMENT
NEOPRENE FRICTION PAD
AIR SUPPLY CONNECTION
AIR SPRINGS MUST BE INSTALLED WITH LEVELING VALVES
LEVELING VALVE

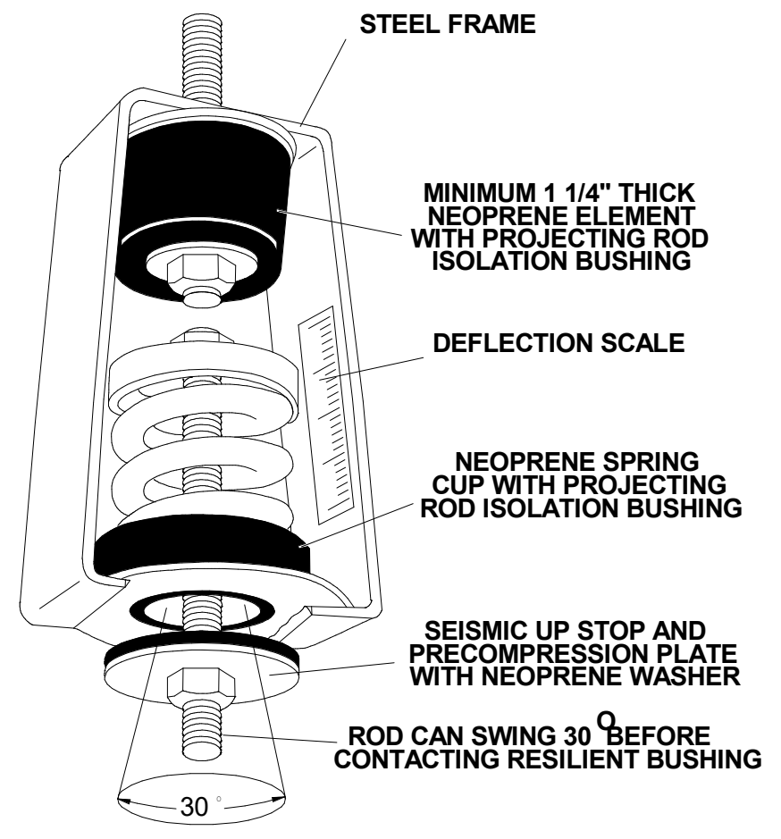
MT AIR SPRING MOUNT
SPECIFICATION 8


VERTICAL LIMIT STOPS
RIGID SEISMIC HOUSING
DOUBLE BELLOWS NYLON REINFORCED NEOPRENE ELEMENT
INTERNAL NEOPRENE FRICTION PAD
AIR SPRINGS MUST BE INSTALLED WITH LEVELING VALVES
LEVELING VALVE

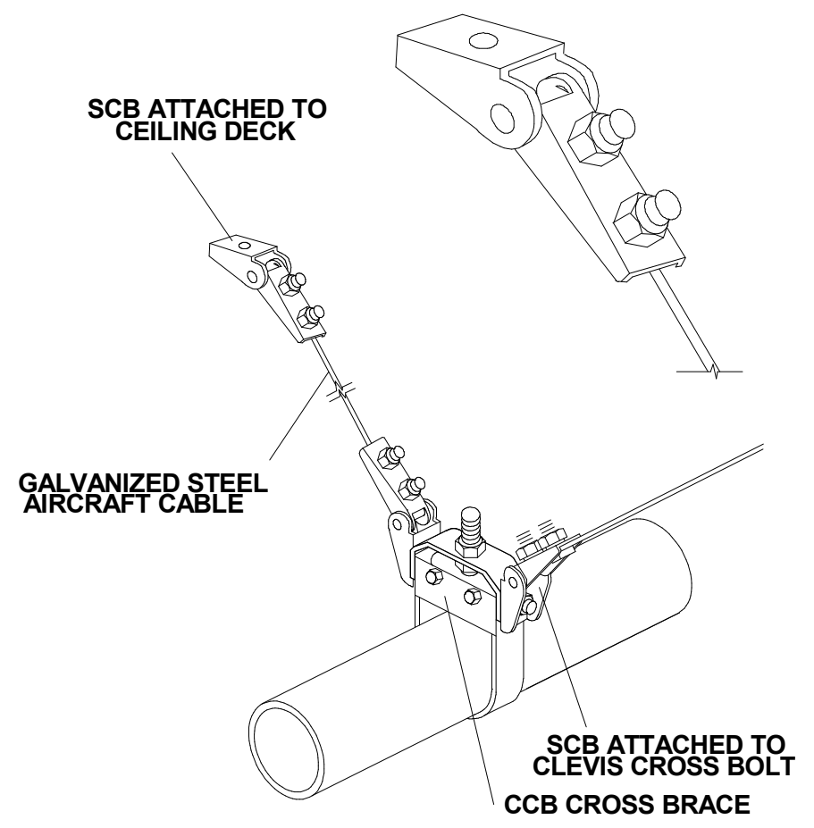
SLR AIR SPRING MOUNT
SPECIFICATION 9


STEEL FRAME
MINIMUM 1 1/4" THICK NEOPRENE ELEMENT WITH PROJECTING ROD ISOLATION BUSHING
NEOPRENE SPRING CUP WITH PROJECTING ROD ISOLATION BUSHING
ROD CAN SWING 30° BEFORE CONTACTING RESILIENT BUSHING
30°

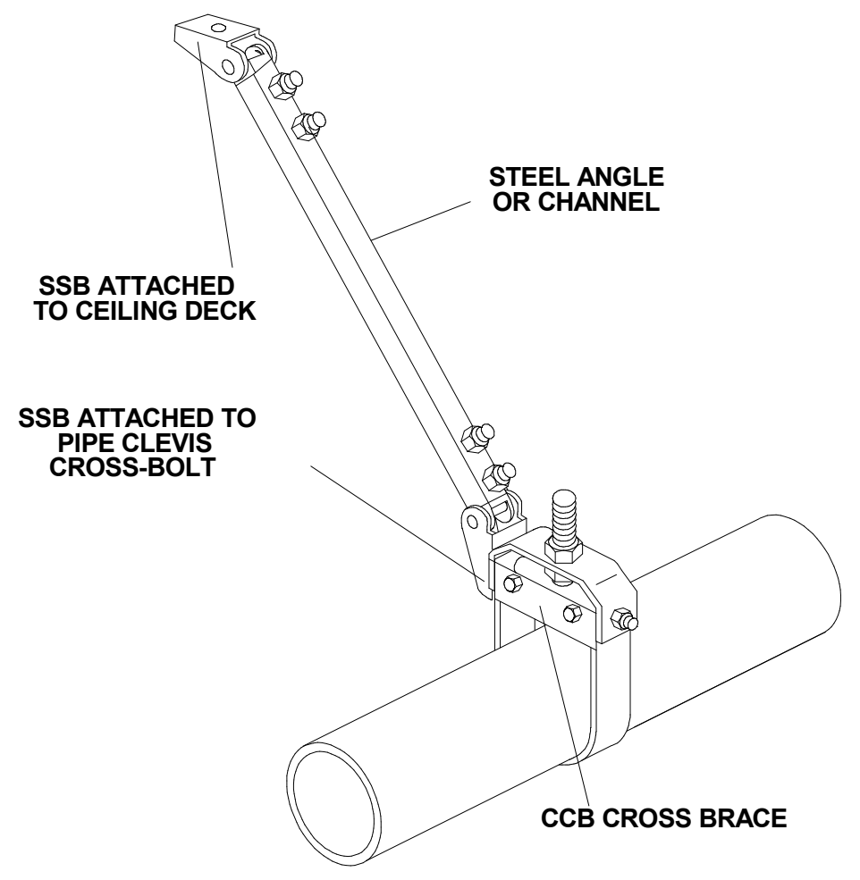
30N SPRING AND NEOPRENE HANGER
SPECIFICATION 10


STEEL FRAME
MINIMUM 1 1/4" THICK NEOPRENE ELEMENT WITH PROJECTING ROD ISOLATION BUSHING
DEFLECTION SCALE
NEOPRENE SPRING CUP WITH PROJECTING ROD ISOLATION BUSHING
SEISMIC UP STOP AND PRECOMPRESSION PLATE WITH NEOPRENE WASHER
ROD CAN SWING 30° BEFORE CONTACTING RESILIENT BUSHING
30°

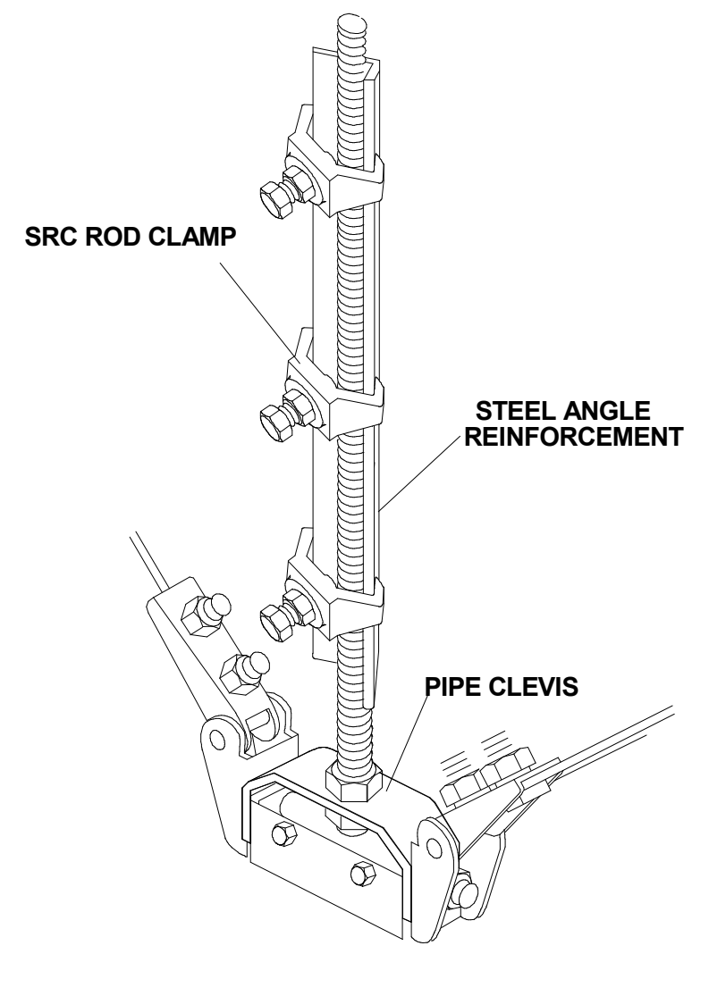
PC30N PRECOMPRESSED SPRING AND NEOPRENE HANGER
SPECIFICATION 11


SCB ATTACHED TO CEILING DECK
GALVANIZED STEEL AIRCRAFT CABLE
SCB ATTACHED TO CLEVIS CROSS BOLT
CCB CROSS BRACE

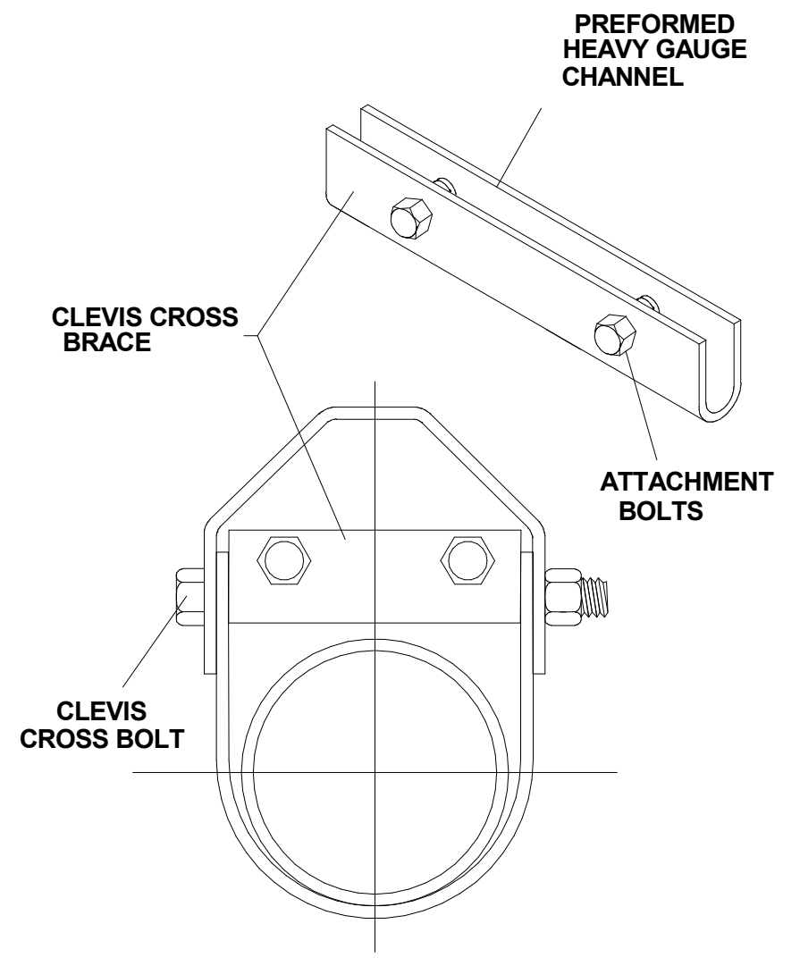
SCB, SCBH, AND SCBV CABLE RESTRAINTS
OSPD PRE-APPROVAL NO. 0202
SPECIFICATION 12


STEEL ANGLE OR CHANNEL
SSB ATTACHED TO CEILING DECK
SSB ATTACHED TO PIPE CLEVIS CROSS-BOLT
CCB CROSS BRACE

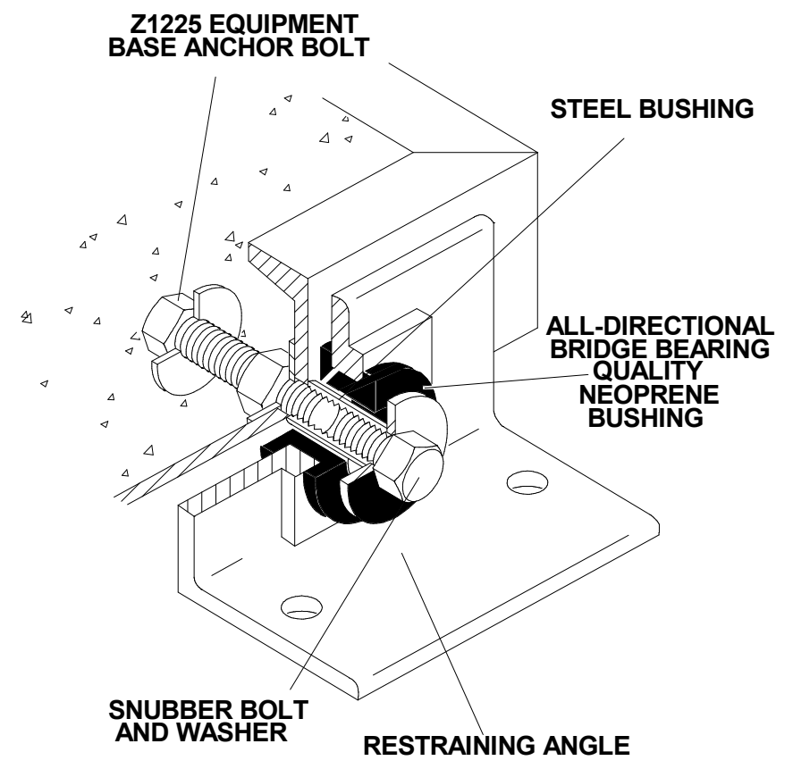
SEISMIC SOLID BRACE
SPECIFICATION 13



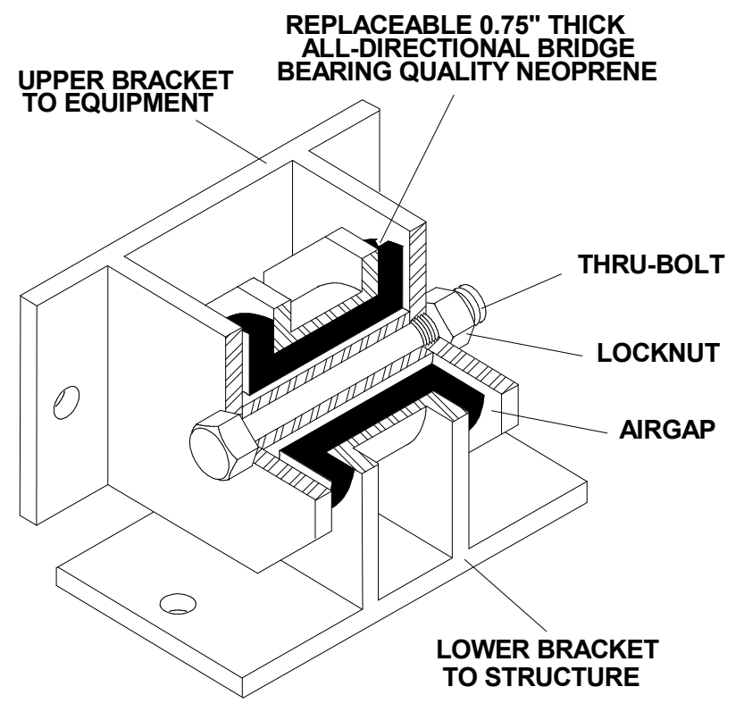
SRC SEISMIC ROD CLAMPS
SPECIFICATION 14



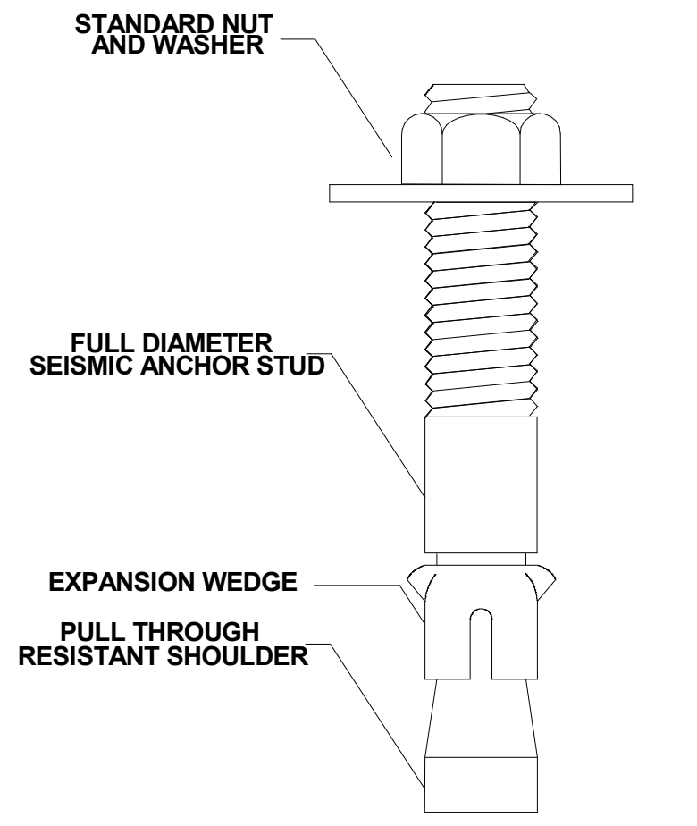
CCB CLEVIS CROSS BRACE
SPECIFICATION 15


Z1225 EQUIPMENT BASE ANCHOR BOLT
STEEL BUSHING
ALL-DIRECTIONAL BRIDGE BEARING QUALITY NEOPRENE BUSHING
SNUBBER BOLT AND WASHER
RESTRAINING ANGLE

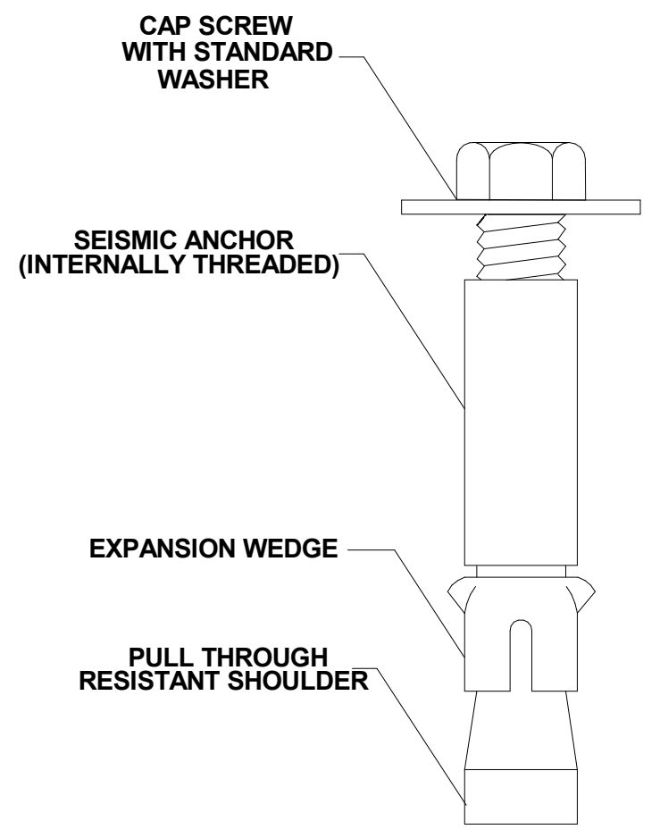
Z1225 ALL DIRECTIONAL SEISMIC SNUBBER
SPECIFICATION 16


UPPER BRACKET TO EQUIPMENT
REPLACEABLE 0.75" THICK ALL-DIRECTIONAL BRIDGE BEARING QUALITY NEOPRENE
THRU-BOLT
LOCKNUT
AIRGAP
LOWER BRACKET TO STRUCTURE

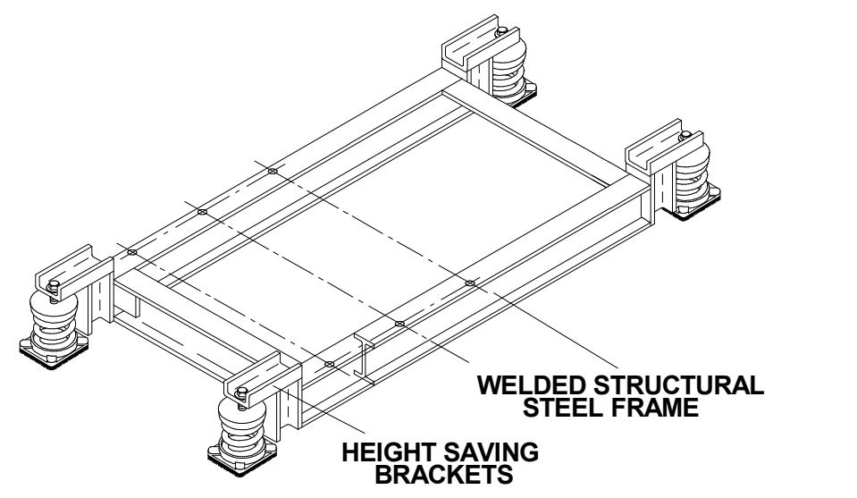
Z1011 ALL DIRECTIONAL SEISMIC SNUBBER
SPECIFICATION 17


STANDARD NUT AND WASHER
FULL DIAMETER SEISMIC ANCHOR STUD
EXPANSION WEDGE
PULL THROUGH RESISTANT SHOULDER

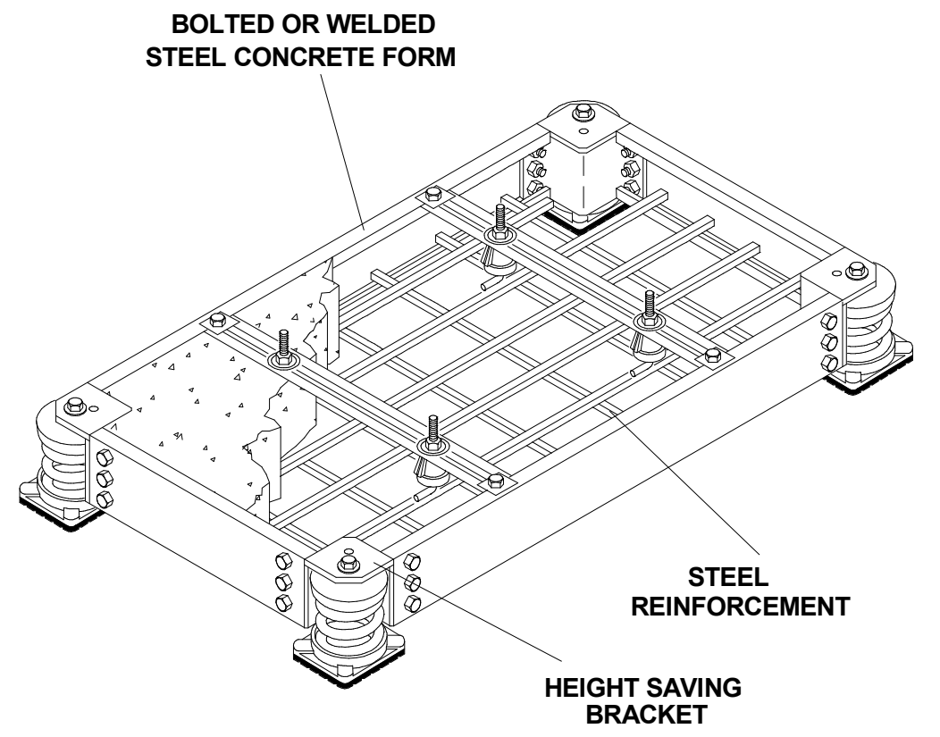
SAS SEISMIC ANCHOR STUD
SPECIFICATION 18


CAP SCREW WITH STANDARD WASHER
SEISMIC ANCHOR (INTERNALLY THREADED)
EXPANSION WEDGE
PULL THROUGH RESISTANT SHOULDER

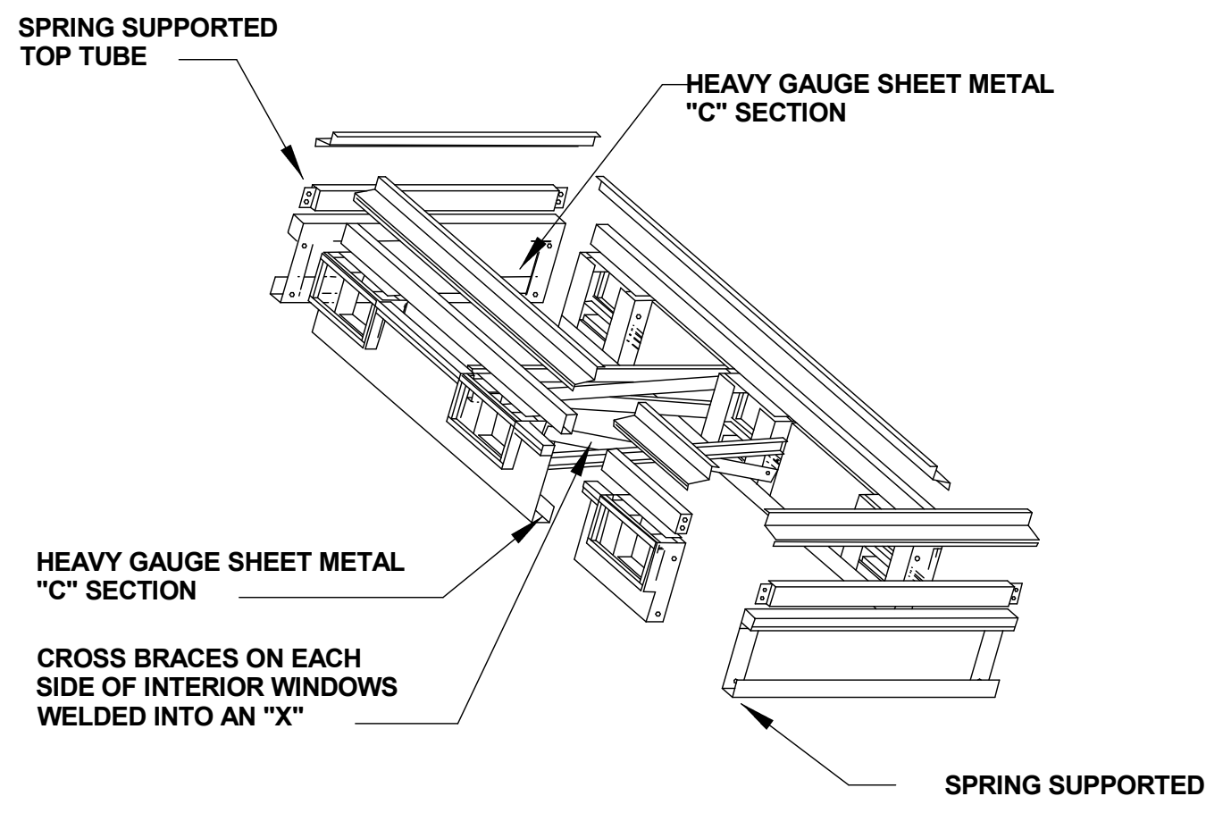
SAB SEISMIC ANCHOR BOLT
SPECIFICATION 19



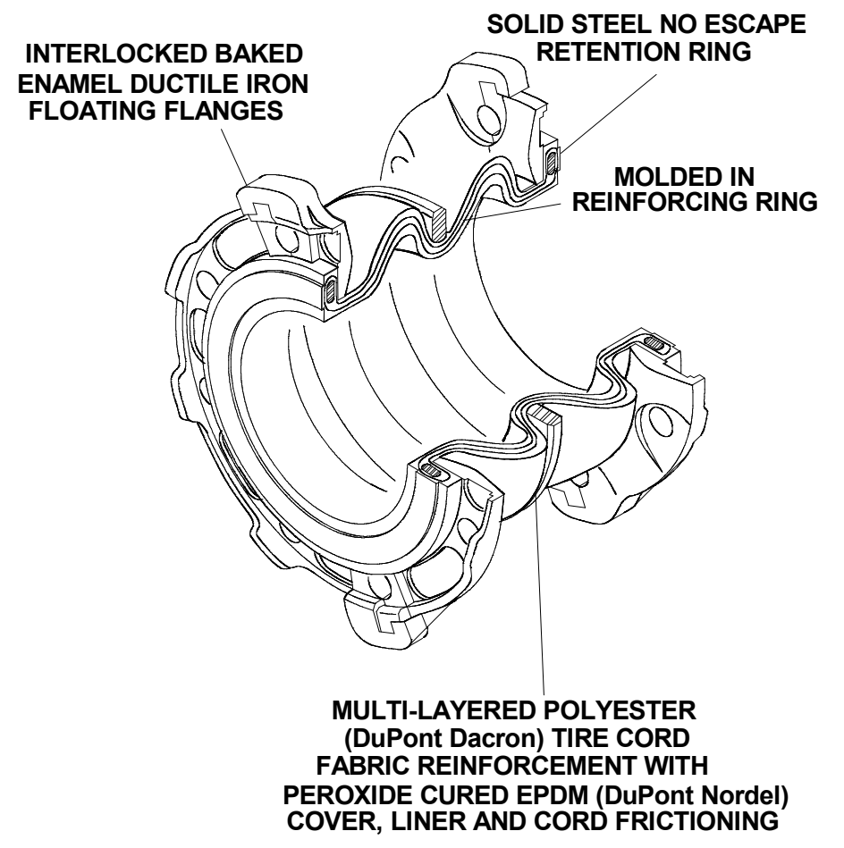
WF WIDE FLANGE STEEL BASE
SPECIFICATION 20



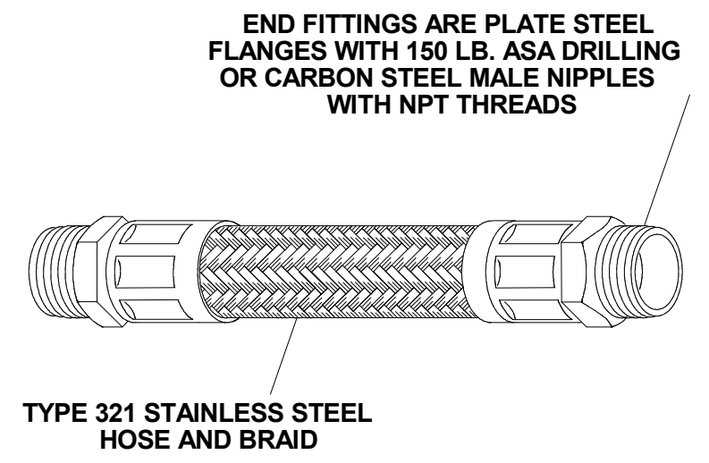
BMK CONCRETE FORM BASE
SPECIFICATION 21


SPRING SUPPORTED TOP TUBE
HEAVY GAUGE SHEET METAL "C" SECTION
HEAVY GAUGE SHEET METAL "C" SECTION
CROSS BRACES ON EACH SIDE OF INTERIOR WINDOWS WELDED INTO AN "X"
SPRING SUPPORTED

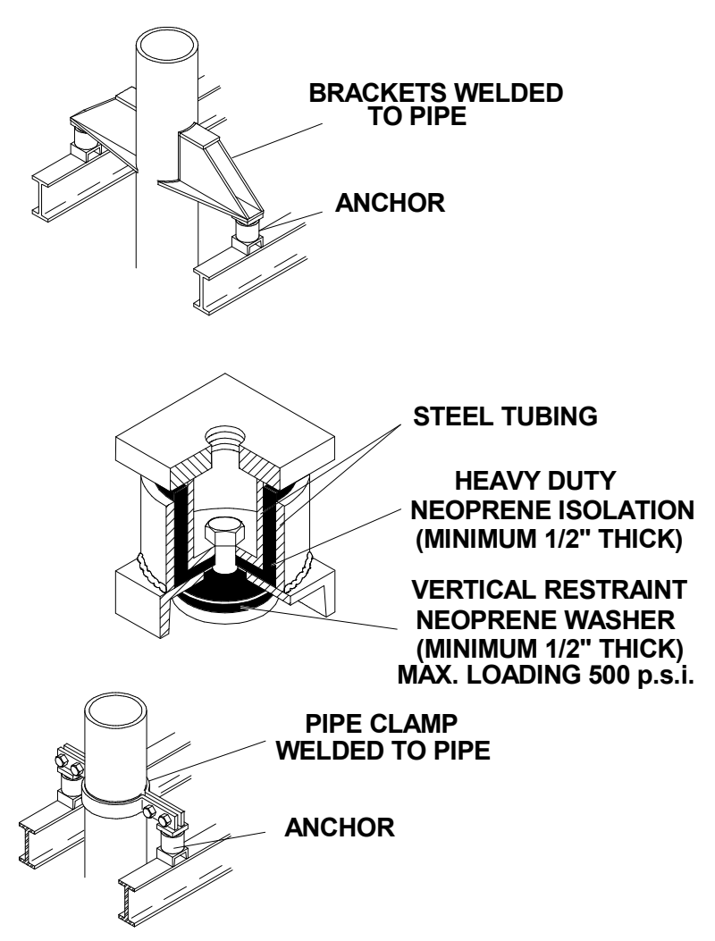
RCS SEISMIC ROOFTOP CURB
SPECIFICATION 22


INTERLOCKED BAKED ENAMEL DUCTILE IRON FLOATING FLANGES
SOLID STEEL NO ESCAPE RETENTION RING
MOLDED IN REINFORCING RING
MULTI-LAYERED POLYESTER (DuPont Dacron) TIRE CORD FABRIC REINFORCEMENT WITH PEROXIDE CURED EPDM (DuPont Nordel) COVER, LINER AND CORD FRICTIONING

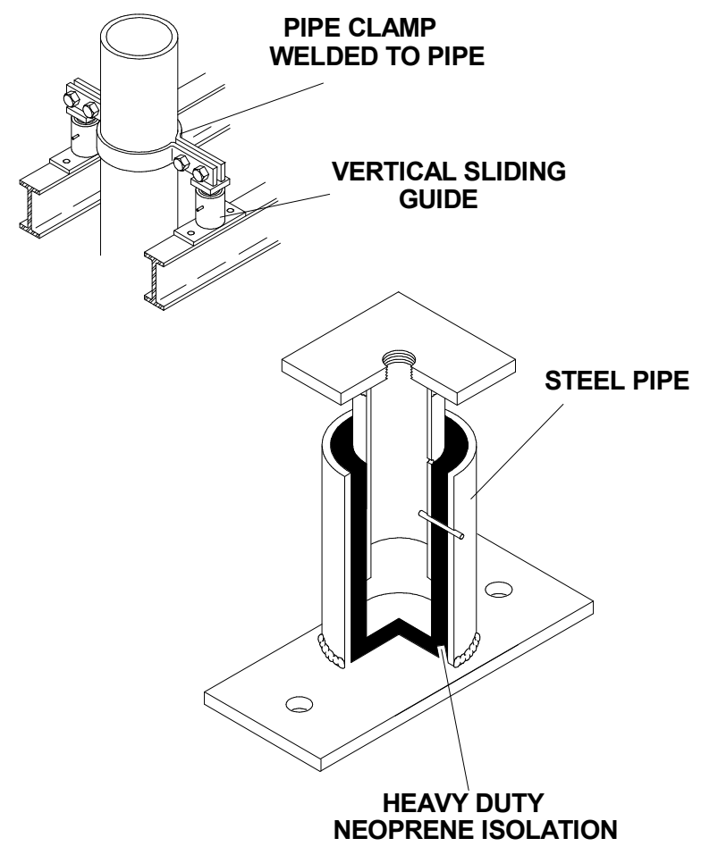
SFDEJ MOLDED EXPANSION JOINT
SPECIFICATION 23


END FITTINGS ARE PLATE STEEL FLANGES WITH 150 LB. ASA DRILLING OR CARBON STEEL MALE NIPPLES WITH NPT THREADS
TYPE 321 STAINLESS STEEL HOSE AND BRAID

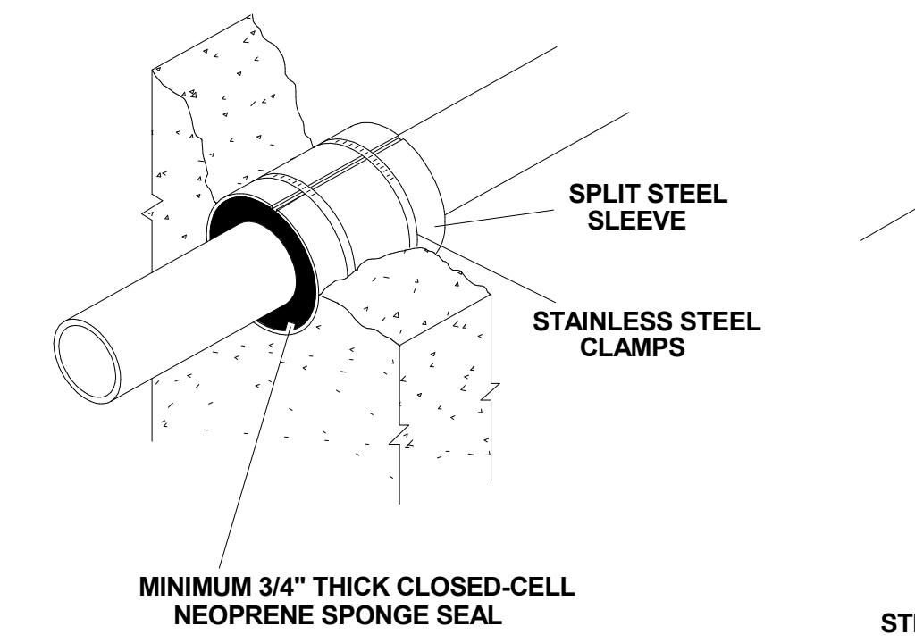
BSS STAINLESS STEEL HOSE
SPECIFICATION 24


BRACKETS WELDED TO PIPE
ANCHOR
STEEL TUBING
HEAVY DUTY NEOPRENE ISOLATION (MINIMUM 1/2" THICK)
VERTICAL RESTRAINT NEOPRENE WASHER (MINIMUM 1/2" THICK) MAX. LOADING 500 p.s.i.
PIPE CLAMP WELDED TO PIPE
ANCHOR

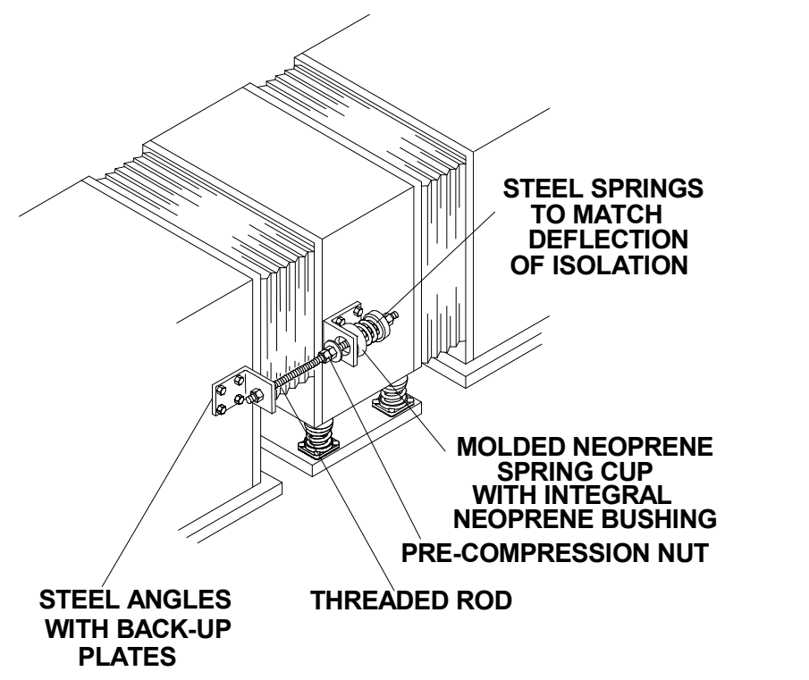
ADA ALL DIRECTIONAL ANCHOR
SPECIFICATION 25



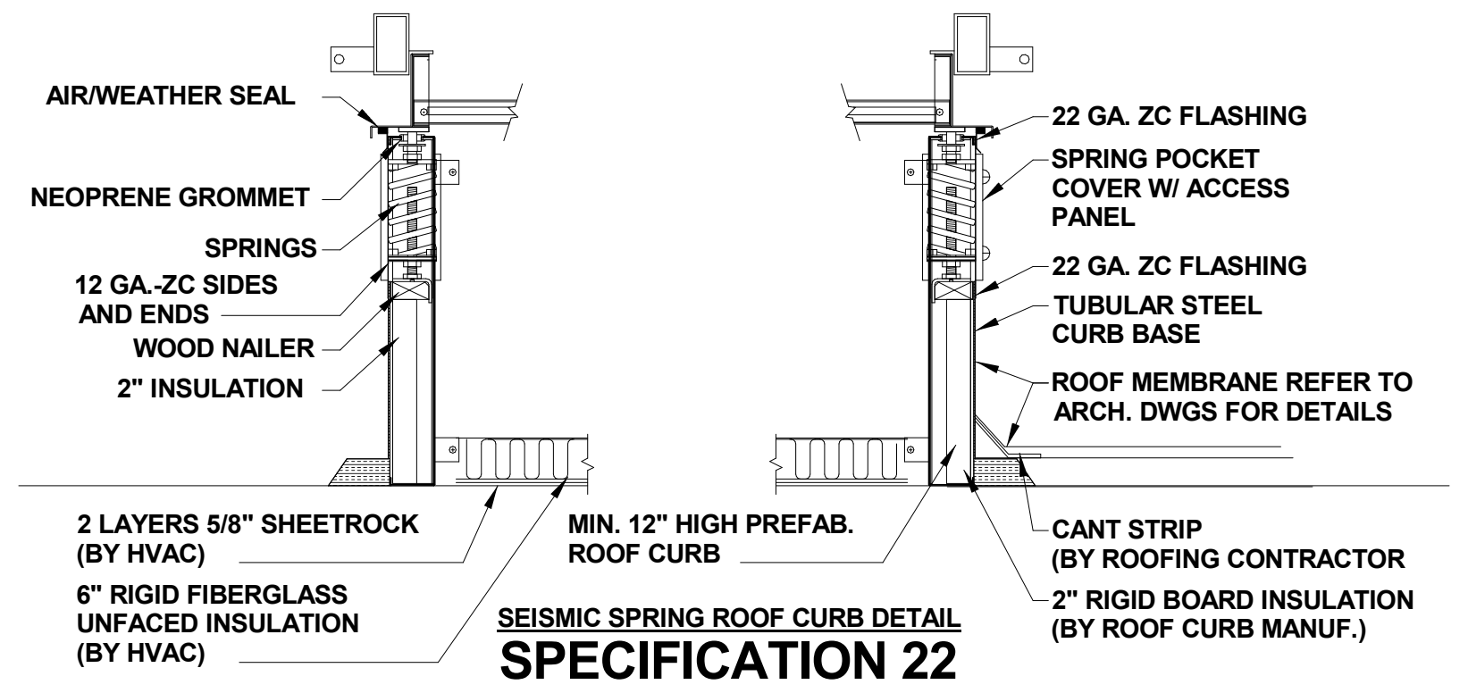
VSG VERTICAL SLIDING GUIDES
SPECIFICATION 26



SWS ACOUSTICAL WALL, CEILING OR FLOOR SEAL
SPECIFICATION 27


STEEL SPRINGS TO MATCH DEFLECTION OF ISOLATION
MOLDED NEOPRENE SPRING CUP WITH INTEGRAL NEOPRENE BUSHING
PRE-COMPRESSION NUT
STEEL ANGLES WITH BACK-UP PLATES
THREADED ROD

WB HORIZONTAL THRUST RESTRAINTS USED IN PAIRS
SPECIFICATION 28


AIR/WEATHER SEAL
NEOPRENE GROMMET
SPRINGS
12 GA.-ZC SIDES AND ENDS
WOOD NAILER
2" INSULATION
2 LAYERS 5/8" SHEETROCK (BY HVAC)
6" RIGID FIBERGLASS UNFACED INSULATION (BY HVAC)
MIN. 12" HIGH PREFAB. ROOF CURB
22 GA. ZC FLASHING
SPRING POCKET COVER W/ ACCESS PANEL
22 GA. ZC FLASHING
TUBULAR STEEL CURB BASE
ROOF MEMBRANE REFER TO ARCH. DWGS FOR DETAILS
CANT STRIP (BY ROOFING CONTRACTOR
2" RIGID BOARD INSULATION (BY ROOF CURB MANUF.)

SEISMIC SPRING ROOF CURB DETAIL
SPECIFICATION 22

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt

9/23/2026 4:26:43 PM

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

SCALE: AS INDICATED

SHEET TITLE:
VIBRATION &
SEISMIC

SHEET NUMBER:
VS1.11

SYMBOL LIST

LEGEND NOTES:

A. THIS SHEET IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS AND SHALL BE USED AS A DICTIONARY TO DEFINE ITEMS INDICATED ON DRAWINGS. NOT ALL SYMBOLS OR ABBREVIATIONS ARE NECESSARILY USED ON THIS PROJECT. ALL EQUIPMENT IS TO BE PROVIDED UNDER THIS SECTION UNLESS SPECIFICALLY INDICATED OTHERWISE.

LIGHTING FIXTURES (see lighting fixture schedule)

A1 ▭ 32b	FIXTURE KEYING SYSTEM A1 = FIXTURE TYPE; REFER TO PLANS FOR TYPES 32= CIRCUIT #; REFER TO PLANS FOR CIRCUIT NUMBERS b= SWITCH CONTROL; REFER TO PLANS FOR SWITCH CONTROL
▭ ○ □	LED LIGHT FIXTURE, CEILING MOUNTED SURFACE, GRID MOUNTED SURFACE, PENDANT, OR RECESSED.
◢ ● ◪	LIGHT FIXTURE CIRCUITED TO NORMAL/EMERGENCY SOURCE AND/OR PROVIDED WITH EMERGENCY BATTERY PACK.
⊗	SINGLE FACE INTERNALLY LIT EXIT SIGN, ARROWS AS INDICATED ON DRAWINGS.
⊗	DOUBLE FACE INTERNALLY LIT EXIT SIGN, ARROWS AS INDICATED ON DRAWINGS.
	WALL MOUNTED FIXTURE.
IU	IN USE SIGN - REFER TO FIXTURE SCHEDULE
	POLE MOUNTED LIGHT FIXTURE
	SITE UTILITY POLE RISER

SWITCHES (typically mtd 48" AFF u.n.o)

S_a	SINGLE POLE SWITCH-"a" DESIGNATES SWITCH CONTROL (LOWER CASE).
S_2	TWO POLE SWITCH
S_3	THREE-WAY SWITCH.
S_P	SINGLE POLE SWITCH WITH PILOT LIGHT-GLOWS IN "OFF" POSITION WHEN IN VIEW OF LIGHTS. GLOWS IN "ON" POSITION WHEN REMOTE FROM LIGHTS.
S_4	FOUR-WAY SWITCH.
S_D	DIMMER SWITCH; 0-10V TYPE.
S_K	KEY OPERATED SWITCH.
S_T	TIMER SWITCH-DIGITAL PROGRAMMABLE TYPE.
S_{WP}	WEATHERPROOF SINGLE POLE SWITCH.
S_{XP}	EXPLOSION PROOF SINGLE POLE SWITCH.
S_{DT}	SINGLE POLE/DOUBLE THROW SWITCH.
S_F	FAN SPEED SWITCH.
S_{MC}	THREE POSITION MOMENTARY CONTACT SWITCH-UP/DOWN/CENTER OFF.
S_{OS}	WALL MOUNTED LOW VOLTAGE, DUAL TECHNOLOGY (PASSIVE INFRARED/ ULTRASONIC) OCCUPANCY SENSOR AND ASSOCIATED POWER PACK(S) AS REQUIRED FOR LOADS CONTROLLED (REFER TO PLANS). PROVIDE WITH RELAY OPTION AND DRY CONTACT CLOSURE TO INTERFACE WITH BUILDING MANAGEMENT SYSTEM (BMS).

LIGHTING CONTROLS

SSU	ALCS SYSTEM SERVER UNIT - REFER TO ALCS ONE-LINE DIAGRAM.
ECU	ALCS ENERGY CONTROL UNIT - REFER TO ALCS ONE-LINE DIAGRAM.
NES	ALCS NETWORK ETHERNET SWITCH - REFER TO ALCS ONE-LINE DIAGRAM.
L	ALCS SINGLE ZONE LOCAL STATION - REFER TO ALCS RISER DIAGRAM
M	ALCS MULTI-SINGLE ZONE STATIONS - REFER TO ALCS RISER DIAGRAM
MTS	ALCS MASTER TOUCH SCREEN - REFER TO ALCS ONE-LINE DIAGRAM.
LTS	ALCS LOCAL TOUCH SCREEN - REFER TO ALCS ONE-LINE DIAGRAM.
I/O DMX	ALCS DMX512 CONTROL INTERFACE - REFER TO ALCS ONE-LINE DIAGRAM.
PC	ALCS EXTERIOR PHOTOCELL - REFER TO ALCS ONE-LINE DIAGRAM.
X OS a	ALCS CEILING OCCUPANCY SENSOR - REFER TO ALCS ONE-LINE DIAGRAM. X = SPECIAL TYPE DESIGNATION E.G.("WG" WIRE GUARD) a = OCCUPANCY SENSOR ZONE CONTROL
X OSH a	ALCS CEILING OCCUPANCY HIGH BAY SENSOR - REFER TO ALCS ONE-LINE DIAGRAM. X = SPECIAL TYPE DESIGNATION E.G.("WG" WIRE GUARD) a = OCCUPANCY SENSOR ZONE CONTROL
PS	ALCS CEILING PHOTO SENSOR - REFER TO ALCS ONE-LINE DIAGRAM.
OS	ALCS WALL OCCUPANCY SENSOR - REFER TO ALCS ONE-LINE DIAGRAM.
LCM	ALCS INPUT/OUTPUT MODULE - REFER TO ALCS ONE-LINE DIAGRAM.
ER	EMERGENCY BY-PASS RELAY - REFER TO EMERGENCY SUPERVISORY BY-PASS RELAY DETAIL

FIRE ALARM SYSTEM

F	MANUAL PULL STATION - MTD 48" AFF TO ℄.
F	SPEAKER / VISUAL "ADA" COMPLIANT SIGNAL - MTD 80" AFF TO ℄.
F	VISUAL "ADA" COMPLIANT SIGNAL - MTD 80" AFF TO ℄.
F A	COMBINATION WALL MOUNTED FIRE ALARM/ MASS NOTIFICATION VISUAL SIGNAL - MTD 80" AFF TO ℄.
F A	COMBINATION WALL MOUNTED FIRE ALARM/ MASS NOTIFICATION SPEAKER/ VISUAL SIGNAL - MTD 80" AFF TO ℄.
A	MASS NOTIFICATION VISUAL SIGNAL - CEILING MTD.
F	SPEAKER / VISUAL "ADA" COMPLIANT SIGNAL - CEILING MTD.
S	CEILING MOUNTED PHOTOELECTRIC SMOKE DETECTOR.
S_E	SMOKE DETECTOR ALSO USED FOR ELEVATOR RECALL.
S_{SC}	SELF-CONTAINED 120 VOLT SMOKE DETECTOR.
S_D	DUCT TYPE SMOKE DETECTOR WITH SAMPLING TUBE. FURNISHED BY EC, INSTALLED BY HVAC, WIRED BY EC.
$S_{D/FSD}$	DUCT TYPE SMOKE DETECTOR WITH SAMPLING TUBE FOR CONTROL OF ASSOCIATED FSD AND UNIT SHUTDOWN FURNISHED BY EC, INSTALLED BY HVAC, WIRED BY EC.
F H 135°	THERMAL DETECTOR - 135°F FIXED TEMPERATURE AND RATE OF RISE. "F" INDICATES FIXED TEMPERATURE ONLY.
H 200°	THERMAL DETECTOR - 200°F FIXED TEMPERATURE.
	REMOTE ALARM INDICATOR-LABEL.
T BD	BEAM SMOKE DETECTOR -"T" DESIGNATES TRANSMITTER, "R" RECEIVER.
RT	KEY OPERATED REMOTE TEST STATION WITH LED-LABEL.
FS	SPRINKLER FLOW SWITCH - F&I BY F.P.C. WIRED BY E.C.
TS	SPRINKLER TAMPER SWITCH - F&I BY F.P.C. WIRED BY E.C.
PS	SPRINKLER PRESSURE SWITCH - F&I BY F.P.C. WIRED BY E.C.
LPS	SPRINKLER LOW PRESSURE SWITCH - F&I BY F.P.C. WIRED BY E.C.
FSD	FIRE SMOKE DAMPER - F&I BY HVAC CONTRACTOR, WIRED BY E.C. CONTROL MODULE AND FIRE ALARM INTERLOCK WIRED BY ELECTRICAL CONTRACTOR.
DH	MAGNETIC DOOR HOLDER - MTD 80" AFF TO ℄.
DC	ELECTRIC DOOR CLOSER-F&I BY HARDWARE, WIRED BY EC.
FACP	FIRE ALARM CONTROL PANEL.
ANN	FIRE ALARM ANNUNCIATOR.
LOC	MASS NOTIFICATION SYSTEM LOCAL OPERATOR CONSOLE.
MNS	MASS NOTIFICATION SYSTEM ELECTRONIC TEXTUAL / ORAL MESSAGE BOARD
R	RED FIRE ALARM BEACON-WEATHERPROOF.
W	WHITE FIRE ALARM BEACON-WEATHERPROOF.
F	RED FIRE ALARM LIGHT OVER MASTER BOX-WEATHERPROOF.
MM	MONITOR MODULE
CM	CONTROL MODULE
IM	ISOLATION MODULE
K	KEY REPOSITORY BOX (KNOX BOX)
FATC	FIRE ALARM TERMINAL CABINET
PIV	POST INDICATOR VALVE-F&I BY FPC, WIRED BY EC.
CO	WALL MOUNTED CARBON MONOXIDE DETECTOR, MOUNTING HEIGHT PER MANUFACTURERS RECOMMENDATION. PROVIDE ONE MONITOR MODULE PER SENSOR.
GD	WALL MOUNTED COMBUSTIBLE GAS DETECTOR (CH4) . PROVIDE A FIRE ALARM CONTROL MODULE PER DETECTOR FOR MONITORING BY THE FACP. MOUNT 1' BELOW CEILING.
CO_D	DUCT MOUNTED CARBON MONOXIDE DETECTOR WITH SAMPLING TUBE FURNISHED BY E.C., INSTALLED BY HVAC, WIRED BY E.C. PROVIDE (1) MONITOR MODULE PER DETECTOR. PROVIDE (1) REMOTE ACCESSORY KIT WITH KEY TEST SWITCH AND INTEGRAL AUDIBLE AND VISUAL ALARM INDICATION TO BE MOUNTED BELOW HVAC UNIT.
E	FIRE ALARM ELECTRIC BELL (120 VOLTS), MOUNTED ABOVE FIRE DEPARTMENT SPRINKLER CONNECTION. FURNISHED BY F.P.C., INSTALLED & WIRED BY E.C.

POWER

■	120/208 VOLT, 3 PHASE, 4 WIRE PANELBOARD.
▨	277/480 VOLT, 3 PHASE, 4 WIRE, PANELBOARD.
■□	120/208 VOLT, 3 PHASE, 4 WIRE NORMAL/EMERGENCY SYSTEM PANELBOARD.
▨□	277/480 VOLT 3 PHASE, 4 WIRE NORMAL/EMERGENCY SYSTEM PANELBOARD.
■	PANELBOARD FLUSH MOUNTED.
E	ELECTRIC MANHOLE
T	TELEPHONE MANHOLE
C	CATV MANHOLE
F	FIBER MANHOLE
M	METER SOCKET
J J	JUNCTION BOX - SIZE AS REQUIRED.
DW J	JUNCTION BOX - WITH FLEXIBLE CONNECTION TO EQUIPMENT-"DW" DENOTES DISHWASHER, "H" HOOD, "WO" WALL OVEN, "D" DISPOSER, "HD" HAND DRYER, "ATC" AUTOMATIC TEMPERATURE CONTROLLER.
3R	FUSED DISCONNECT SWITCH HEAVY DUTY TYPE-"3R" INDICATES NEMA 3R 20 ← INDICATES TIME DELAY FUSE SIZE. 30 ← INDICATES SAFETY SWITCH SIZE
3R	UNFUSED DISCONNECT SWITCH HEAVY DUTY TYPE-"3R" INDICATES NEMA 3R
TS	HORSEPOWER RATED THERMAL SWITCH WITH PILOT LIGHT
VFD	VARIABLE FREQUENCY DRIVE.
C	MULTIPOLE CONTACTOR IN NEMA I ENCLOSURE-RATINGS AND NUMBER OF POLES AS RQUIRED.
CP	EQUIPMENT CONTROL PANEL.
ATS	AUTOMATIC TRANSFER SWITCH.
ATC	AUTOMATIC TRANSFER CONTROLLER.
HOA	HAND-OFF-AUTOMATIC SELECTOR SWITCH.
● ● ●	THREE FUNCTION PUSHBUTTON SWITCH (UP/DOWN/STOP)-FURNISHED BY EQUIPMENT SUPPLIER, INST. & WIRED BY EC.
● ●	ON/OFF PUSHBUTTON SWITCH.
70AT/100AF CB	ENCLOSED CIRCUIT BREAKER-"70AT" INDICATES 70 AMP TRIP; "100AF" INDICATES 100 AMP FRAME.
PB	PULL BOX-SIZE AS REQUIRED.
G	GENERATOR.

WIRE AND RACEWAYS

	WIRING AND RACEWAY - NO. OF DIAGONAL LINES INDICATES NO. #12 AWG CONDUCTORS. ABSENCE OF DIAGONAL LINES INDICATES 2 #12 AWG+#12AWG GROUND UNLESS NOTED OTHERWISE. GROUND WIRE IS NOT SHOWN IN COUNT BUT SHALL BE PROVIDED.
	HOMERUN TO PANEL - NO. OF ARROWS INDICATES NO. OF 20 AMP/1 POLE CIRCUITS TO PANEL - UNLESS NOTED OTHERWISE.
NE	NORMAL/EMERGENCY WIRING - MIN. 2#10 AWG + #10 AWG GROUND. RUN IN SEPARATE RACEWAY.
4F	FIRE ALARM WIRING - "4F" INDICATES 4 #14 THHN SOLID IN 3/4" MIN. SIZE CONDUIT.
E	EMERGENCY ONLY WIRING-MINIMUM 2#10 AWG IN SEPARATE RACEWAY.
P	UNDERGROUND PRIMARY ELECTRIC SERVICE
SE	UNDERGROUND SECONDARY ELECTRIC SERVICE
T	UNDERGROUND TELEPHONE SERVICE
CTV	UNDERGROUND CABLE TV SERVICE
	4" CONDUIT SLEEVE THRU-WAY, ACROSS CORRIDOR OR BETWEEN ROOMS FOR TEL/DATA - LOCATE ABOVE CEILING.
	1" CONDUIT SLEEVE THRU-WAY, ACROSS CORRIDOR OR BETWEEN ROOMS FOR TEL/DATA - LOCATE ABOVE CEILING.
	CONDUIT SLEEVE EXTENDED TO NEAREST ACCESSIBLE CEILING-TERMINATE WITH INSULATED BUSHING.
	FLEXIBLE CONNECTION TO EQUIPMENT
	CABLE TRAY-CONCEALED ABOVE CEILING IN FINISHED AREAS. PROVIDE LATERAL SUPPORT AS REQUIRED.

MISCELLANEOUS-DEVICES

EPO EPO	EMERGENCY POWER SHUNT TRIP - RED MUSHROOM HEAD WITH EXTENDED GUARD WITH EMERGENCY OFF LEGEND. MOUNT AT 48"AFF., U.O.I. PROVIDE NAMEPLATE INDICATING LOAD CONTROLLED.
	HANDICAP DOOR ACTIVATE SWITCH-FURN. & INST. BY SYSTEM SUPPLIER. PROVIDE 4"SQ X 2 1/2"DP JB AND 2#18 IN 1"C TO ELECTRIC DOOR OPERATOR.
SV	SOLENOID VALVE - F&I BY P.C., WIRED BY E.C.
FT	FLUSH VALVE TRANSFORMER / POWER SUPPLY (120V/24V). FURNISHED BY P.C., INSTALLED & WIRED BY E.C.
TPD	TEMPERATURE SENSOR - CONNECT TO SECURITY SYSTEM.
LS	LIMIT SWITCH.
B	DOOR BELL-COORDINATE MH WITH ARCHITECT.
◉	LOW VOLTAGE PUSHBUTTON.
1/E-3	DETAIL IDENTIFIER-INDICATES DETAIL #1 ON DWG. E-3.
	GROUND BAR 24W" X 1/8" THICK X 18" LONG COPPER BUS, U.N.O.
2/E-3 A A	SECTION IDENTIFIER- INDICATES SECTION A-A, DETAIL #2 ON DWG. E-3.
K2	EQUIPMENT TAG NUMBER, REFER TO EQUIPMENT SCHEDULE, "K" INDICATES KITCHEN "C" INDICATES COMPUTER.
1	NOTE SYMBOL, "1" INDICATES TO REFER TO NOTE #1
3	CIRCUIT SIZE NUMBER, REFER TO "CIRCUIT SIZE SCHEDULE".
ADA CS	ADA "CALL STATION", HANDS FREE. MOUNT AT 48"AFF.
ADA MCS	ADA "MASTER CALL STATION", HANDS FREE. MOUNT AT 48"AFF.
P	EMERGENCY CALL STATION - LOCATE WITHIN 3' OF WATER CLOSET WITH PULL CORD EXTENDING TO WITHIN 12" OF THE FLOOR.
AV	AUDIO/VISUAL SIGNAL FOR SINGLE TOILETS. MOUNT OVER DOOR.
E	ELECTRIC DOOR-OPERATOR. FURN. & INST. BY GC, WIRED BY EC.
LS	LIMIT SWITCH WIRED BY E.C.
MS	MICRO SWITCH PHOTO-EYE DOOR CONTROLLER FURNISHED BY DOOR CONTRACTOR, INSTALLED & WIRED BY E.C.
G	TRAFFIC LIGHT FURNISHED BY OVERHEAD DOOR SUPPLIER, INSTALLED & WIRED BY E.C.
SPD	SURGE PROTECTION DEVICE
R	TRAFFIC LIGHT FURNISHED BY OVERHEAD DOOR SUPPLIER, INSTALLED & WIRED BY E.C.
T	REVERSE ACTING THERMOSTAT , INSTALLED & WIRED BY ATC CONTRACTOR
C	CLOCK , FURNISHED BY OTHERS, WIRED BY ELECTRICAL CONTRACTOR
E	EMERGENCY BOILER SHUT-OFF MOUNTED IN STOPPER II COVER, MOUNTED @ 72" A.F.F.

ONE LINE POWER

	LOAD-BREAK SWITCH.
	CIRCUIT BREAKER.
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER.
LA	LIGHTNING ARRESTER AND GROUNDING TO PROTECT ALL PHASES.
	CONTACT, NORMALLY OPEN (NO).
	CONTACT, NORMALLY CLOSED (NC).
ST	SHUNT TRIP COIL.
CM	CUSTOMER METERING, ELECTRONIC SOLID STATE, UNLESS OTHERWISE INDICATED.
	POWER TRANSFORMER.
	FUSE, SIZE AS INDICATED.
GF	GROUND FAULT SENSOR & RELAY.
400A 300A	SWITCH AND FUSE "400A" - INDICATES AMPERE SWITCH SIZE. "300A" - INDICATES AMPERE FUSE SIZE.
	SYSTEM GROUND OR EQUIPMENT GROUND.
N E L	AUTOMATIC TRANSFER SWITCH.

RECEPTACLES (typically mtd. at 18" a.f.f., uno)

ALL 20 AMP RECEPTACLES MOUNTED BELOW 5'6" SHALL BE TAMPER RESISTANT TYPE

"a" = SWITCHED OUTLET, "a" - INDICATES SWITCH CONTROL.
"C" = MOUNTED 8" ABOVE COUNTER OR 42" AFF. COORDINATE EXACT MOUNTING HEIGHT WITH ARCHITECTURAL DRAWINGS.
"CP" = CONNECTED TO COPS PANEL
"F" = FURNITURE MTD, COORDINATE EXACT LOCATION WITH FURNITURE PLANS.
"GFC" = GROUND FAULT INTERRUPTER TYPE MOUNTED 8" ABOVE COUNTER OR 42" AFF. COORDINATE EXACT MOUNTING HEIGHT WITH ARCHITECTURAL DRAWINGS.
"GFI" = GROUND FAULT INTERRUPTER TYPE.
"H" = HORIZONTALLY MOUNTED.
"IG" = ISOLATED GROUND RECEPTACLE WITH SEPARATE GREEN GROUND CONDUCTOR WITH YELLLOW STRIPE TO ISOLATED GROUND BUS IN PANEL.
"M" = MODULAR FURNITURE SERVICE - PROVIDE FLEXIBLE CONNECTION, COORDINATE EXACT LOCATION WITH FURNITURE PLANS.
"SP" = SURGE PROTECTION RECEPTACLE
"T" = TAMPER RESISTANT SAFETY RECEPTACLE.
"TL" = TWIST LOCK TYPE.
"WP"= WEATHERPROOF RECEPTACLE WITH "NRTL" LISTED COVERPLATE FOR WET LOCATION WITH GFI TYPE RECEPTACLE INSTALLED IN NEMA 4 ENCLOSURE W/KEY LOCK. MOUNT AT 48" A.F.F.
"CD" = CABLE DROP RECEPTACLE- REFER TO CABLE DROP DETAIL.
"P" = PEDESTAL MOUNTED ON CASEWORK WITH GFI RECEPTACLE. COORDINATE WITH EQUIPMENT DRAWINGS FOR EXACT LOCATION.
"E" = RECEPTACLE CONNECTED TO NORMAL/EMERGENCY CIRCUIT.
"CP" = RECEPTACLE CONNECTED TO COP PANEL CIRCUIT.

	20AMP, 120 VOLT SINGLE RECEPTACLE
2	20 AMP, 120 VOLT DUPLEX RECEPTACLE; "2" INDICATES CIRCUIT NUMBER.
	20AMP, 120 VOLT DOUBLE DUPLEX RECEPTACLE.
▼	SPECIAL PURPOSE OUTLET - RATING AS INDICATED ON DRAWINGS. EXAMPLE; ELECTRIC DRYER= 30A, 125/250V, 3 POLE, 4 WIRE, NEMA 14-30R ELECTRIC RANGE= 50A, 125/250V, 3 POLE, 4 WIRE, NEMA 14-50R
	20 AMP, 120 VOLT DUPLEX RECEPTACLE FLUSH FLOOR MOUNTED WITH COVER.
	20 AMP, 120 VOLT DOUBLE DUPLEX RECEPTACLE FLUSH FLOOR MOUNTED WITH COVER.
	20AMP, 120VOLT DUPLEX RECEPTACLE CONNECTED TO NORMAL/ EMERGENCY CIRCUIT.
	20AMP, 120VOLT DOUBLE DUPLEX RECEPTACLE CONNECTED TO NORMAL/ EMERGENCY CIRCUIT.
	NEMA TYPE L5 -20R ELECTRICAL RECEPTACLE WITH DEDICATED 20 AMP CIRCUIT. MOUNTED ABOVE EQUIPMENT RACK ON UNDERSIDE OF CABLE TRAY.
EWC J	ELECTRIC WATER COOLER OUTLET OR BOTTLE FILLING STATION - 20 AMP, 120 VOLT. PROVIDE GROUND FAULT INTERRUPTER TYPE CIRCUIT BREAKER & LOCAL TOGGLE SWITCH.
CR	CORD REEL EQUAL TO HUBBELL Cat. No. HBL45123GF220WM1 WITH HBL340PB AND KELLUM GRIPS.
■▨	SURFACE RACEWAY WITH BASE, COVER, AND DIVIDER "B,C&D". IVORY FINISH. PROVIDE FIBER READY 2" RADIUS FITTINGS. SOLID END INDICATES RISE TO ABOVE ACCESSIBLE CEILING SPACE WITH B,C&D.
	20 AMP, 120 VOLT GFI, HORIZONTALLY MOUNTED ON FURNITURE DUPLEX RECEPTACLE INTENDED FOR COMPUTER USE. COLOR OF OUTLET TO BE SELECTED BY OWNER.
	20 AMP, 120 VOLT DUPLEX RECEPTACLE INTENDED FOR COMPUTER USE. COLOR OF OUTLET TO BE SELECTED BY OWNER.
	20AMP, 120VOLT DOUBLE DUPLEX RECEPTACLE INTENDED FOR COMPUTER USE. COLOR OF OUTLET TO BE SELECTED BY OWNER.
	TWO DUPLEX RECEPTACLES, MOUNTED AT 18" AFF AND 84" AFF.
USB	20 AMP, 120 VOLT DUPLEX RECEPTACLE w/ USB OUTLETS INTENDED FOR COMPUTER USE. COLOR OF OUTLET TO BE SELECTED BY ARCHITECT.
	20 AMP, 120 VOLT DUPLEX SWITCHED RECEPTACLE. PROVIDE IO MODULE AND CONNECTION TO OCCUPANCY SENSOR.
	20 AMP, 120 VOLT DOUBLE DUPLEX SWITCHED RECEPTACLE. PROVIDE IO MODULE AND CONNECTION TO OCCUPANCY SENSOR.
4 2 2	RECESSED FLOOR BOX WITH (2) 20A, 120V DUPLEX RECEPTACLES AND PROVISIONS FOR (4) RJ45 JACKS EQUAL TO WIREMOLD SERIES #RFB4-FPCTCBS (CARPET), FPBTCBS (WOOD FLOOR) AND COMMUNICATION BRACKET FOR TEL/DATA DEVICES. PROVIDE 1"C FOR TEL/DATA TO NEAREST ACCESSIBLE CEILING SPACE.
1V/5D	RECESSED FLOOR BOX WITH (2) 20A, 120V DUPLEX RECEPTACLES AND PROVISIONS FOR (4) RJ45 JACKS EQUAL TO WIREMOLD SERIES #RFB4-FPCTCBS (CARPET), FPBTCBS (WOOD FLOOR) AND COMMUNICATION BRACKET FOR TEL/DATA DEVICES. PROVIDE (2)1"C FOR TEL/DATA TO NEAREST ACCESSIBLE CEILING SPACE.
T	RECESSED FLOOR BOX WITH (2) 20A, 120V DUPLEX RECEPTACLES AND PROVISIONS FOR (4) RJ45 JACKS EQUAL TO WIREMOLD SERIES #RFB6-FPCTCBS (CARPET), FPBTCBS (WOOD FLOOR) AND COMMUNICATION BRACKET FOR TEL/DATA DEVICES. PROVIDE (1)1"C FOR TEL/DATA AND (3) 1 1/4" FOR A/V WIRING TO NEAREST ACCESSIBLE CEILING SPACE.
SRP	SMART RESCUE PHONE. CUSTOM BACK BOX FURNISHED AND INSTALL BY E.C. 1" CONDUIT W/PULL STRING TO NEAREST ACCESSIBLE CEILING SPACE BY E.C.. DEVICE AND WIRING BY E.C.
ARA	AREA OF RESCUE ASSISTANCE BUTTON. CUSTOM BACK BOX FURNISHED AND INSTALL BY E.C. 1" CONDUIT W/PULL STRING TO NEAREST ACCESSIBLE CEILING SPACE BY E.C.. DEVICE AND WIRING BY E.C.
1V/3D 2 4	FLUSH MOUNTED 2 HOUR RATED POKE-THRU ASSEMBLY WITH (2) DUPLEX RECEPTACLES & (4) COMMUNICATION DEVICES WITH SOLID BRASS FINISH RING. REQUIRES 6" CORED HOLE.
2V/4D	FLUSH MOUNTED 2 HOUR RATED POKE-THRU ASSEMBLY WITH (2) DUPLEX RECEPTACLES & (6) COMMUNICATION DEVICES WITH SOLID BRASS FINISH RING. REQUIRES 6" CORED HOLE.
T	FLUSH MOUNTED 2 HOUR RATED POKE-THRU ASSEMBLY WITH (2) DUPLEX RECEPTACLES & (2) COMMUNICATION DEVICES WITH SOLID BRASS FINISH RING. REQUIRES 8" CORED HOLE.

MECHANICAL EQUIPMENT

(REFER TO MECHANICAL EQUIPMENT SCHEDULE)

BB	ELECTRIC BASEBOARD-FURNISHED BY HVAC, INSTALLED AND WIRED BY EC.
CUH	CABINET HEATER - F & I BY HVAC, WIRED BY E.C.
UH	UNIT HEATER - F & I BY HVAC, WIRED BY E.C.
EF	EXHAUST FAN - F & I BY HVAC, WIRED BY E.C.
C.O. J	CONNECTION TO CARBON MONOXIDE MONITOR MIN. 3#14 AWG. PER MONITOR.
TB	TERMINAL BOX-F&I BY HVAC WIRED BY E.C.
FS D	MOTORIZED FIRE/SMOKE DAMPER-F&I BY HVAC, WIRED BY E.C. TO POWER & FIRE ALARM SYSTEM.
2	MOTOR - NUMERAL INDICATES HORSEPOWER

TECHNOLOGY SYSTEM (PROVISIONS ONLY)

REFER TO TECHNOLOGY DETAILS SHEET T2.01 FOR SYMBOLS AND LEGENDS

ABBREVIATIONS

A	AMPERE
AL	ALUMINUM
AF	AMP, FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	INTERRUPTING CAPACITY
ALCS	AUTOMATED LIGHTING CONTROL SYSTEM
ARCH	ARCHITECT
AT	AMP TRIP
ATC	AUTO-TEMP CONTROL CONTRACTOR
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
C	CONDUIT (GENERIC TERM FOR RACEWAY. PROVIDE AS SPECIFIED)
CATV	CABLE TELEVISION
CB	CIRCUIT BREAKER
CKT	CIRCUIT
COP	CRITICAL OPERATION SYSTEM
CLG	CEILING
C.M.	CONSTRUCTION MANAGER
CU	COPPER
℄	CENTERLINE
DEP	DEPARTMENT OF ENVIRONMENTAL PROTECTION
DP	DEEP
EPA	ENVIRONMENTAL PROTECTION AGENCY
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
EWC	ELECTRIC WATER COOLER
EMT	ELECTRIC METALLIC TUBING
FA	FIRE ALARM
FPC	FIRE PROTECTION SYSTEM CONTRACTOR
F&I	FURNISHED AND INSTALLED
G,GND	GROUND
GC	GENERAL CONDITIONS
GFI	GROUND FAULT INTERRUPTER
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING CONTRACTOR
HP	HORSEPOWER
IG	ISOLATED GROUND
IMC	INTERMEDIATE METALLIC CONDUIT
IT	INFORMATION TECHNOLOGY CONTRACTOR
JB	JUNCTION BOX
KCMIL	THOUSAND CIRCULAR MILS
KES	KITCHEN EQUIPMENT SUPPLIER
KVA	KILO-VOLT AMPERE
KW	KILO-WATT
LTG	LIGHTING
MAAB	MASS ARCHITECTURAL ACCESS BOARD
MC	METAL CLAD CABLE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MH	MOUNTING HEIGHT
MI	MINERAL-INSULATED METAL SHEATHED CABLE
MLO	MAIN LUGS ONLY
MTD	MOUNTED
MTG	MOUNTING
MTS	MANUAL TRANSFER SWITCH
NIC	NOT IN CONTRACT
NO,#	NUMBER
NTS	NOT TO SCALE
P	POLE(S)
PB	PULL BOX
PC	PLUMBING CONTRACTOR
PH,ø	PHASE
PVC	POLY-VINYL CHLORIDE CONDUIT
PWR	POWER
REF	REFRIGERATOR
RSC	RIGID STEEL CONDUIT
SN	SOLID NEUTRAL
SWBD	SWITCHBOARD
TEL/DATA	TELEPHONE/DATA
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTED POWER SUPPLY
WG	WIRE GUARD
WP	WEATHERPROOF
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
@72"	MOUNT 72 INCHES TO CENTERLINE ABOVE FINISHED FLOOR OR GRADE

ELECTRICAL GENERAL NOTES

1. THE SCOPE OF WORK SHALL INCLUDE PROVIDING ALL WORK INDICATED, AND COORDINATION WITH ALL TRADES. SCOPE OF WORK IS INDICATED ON THE CONTRACT DOCUMENTS INCLUDING THE DRAWINGS AND THE SPECIFICATIONS, WHICH ARE COMPLIMENTARY. WORK INDICATED IN ANY CONTRACT DOCUMENT SHALL BE CONSIDERED PART OF THE SCOPE OF WORK. IN GENERAL, WORK REQUIREMENTS ARE NOT INDICATED IN BOTH DOCUMENTS . WHERE DOCUMENTS CONFLICT WITHIN THEMSELVES OR WITH CODES AND REGULATIONS, PROVIDE THE HIGHER QUANTITY AND QUALITY AND FOLLOW THE STRICTER REQUIREMENTS.
2. COORDINATE WITH THE GENERAL CONTRACTOR, OTHER TRADES AND OF MANUFACTURERS EQUIPMENT AND MAKE ALL FINAL CONNECTIONS AS REQUIRED, I.E., POWER, CONTROL, INTERLOCK, ETC.
3. ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH OSHA, NFPA STANDARDS, THE ELECTRICAL CODE AND THE LOCAL GOVERNING AUTHORITIES. THE DRAWINGS AND SPECIFICATIONS DO NOT ATTEMPT TO INDICATE ALL WORK REQUIRED BY CODES AND AUTHORITIES.
4. TEST ALL EQUIPMENT AND SYSTEMS INSTALLED TO CERTIFY COMPLIANCE WITH DRAWINGS, SPECIFICATIONS, CODES, LOCAL AUTHORITIES AND REGULATIONS. INCLUDE LABOR AND COSTS FOR TESTING, REVIEWS, APPROVALS AND CERTIFICATIONS.
5. DRAWINGS ARE DIAGRAMMATIC ONLY. EXACT LOCATION, MOUNTING HEIGHTS OF EQUIPMENT AND ROUTING OF RACEWAYS SHALL BE COORDINATED WITH THE EQUIPMENT REQUIREMENTS AND FIELD CONDITIONS.
6. FURNISH AND INSTALL ALL INCIDENTAL ACCESSORIES NECESSARY TO MAKE THE ELECTRICAL WORK COMPLETE AND READY FOR OPERATION.
7. SUPPORT ALL WORK FROM THE BUILDING STRUCTURE.
8. ALL MOUNTING HEIGHTS ARE TO CENTERLINE UNLESS OTHERWISE INDICATED.
9. IF EXACT MOUNTING OR RACEWAY ROUTINGS ARE NOT INDICATED (LOCATION OR HEIGHT) REQUEST CLARIFICATION PRIOR TO ROUGHING, OR INSTALLATION.
10. ELECTRICAL WORK SHALL BE RECESSED INTO WALLS OR INSTALLED ABOVE HUNG CEILINGS UNLESS OTHERWISE INDICATED.
11. DO NOT INSTALL OUTLETS BACK TO BACK. PROVIDE 24 INCH SPACING IN FIRE RATED WALLS.
12. PROVIDE ELECTRICAL OUTLET PLATE GASKET SEALS AT RECEPTACLES, SWITCHES AND OTHER ELECTRICAL BOXES ON EXTERIOR WALLS AND INTERIOR WALLS BETWEEN CONDITIONED AND NON-CONDITIONED SPACES.
13. WIRE AND CONDUIT SIZES INDICATED ON HOMERUNS SHALL BE CONTINUOUS THROUGHOUT CIRCUIT.
14. FURNISH AND INSTALL CODE REQUIRED DISCONNECTS WHICH ARE NOT FURNISHED BY THE HVAC OR PLUMBING CONTRACTORS.
15. INSTALL A GREEN GROUNDING CONDUCTOR WITHIN EACH RACEWAY SIZED IN ACCORDANCE WITH THE ELECTRIC CODE.
16. PROVIDE WATERTIGHT AND GAS TIGHT SEALS INSIDE AND OUTSIDE OF CONDUITS THAT PENETRATE THE BUILDING BELOW GRADE, O.Z. GEDNEY OR APPROVED EQUAL. PROVIDE WEATHER TIGHT SEAL AT PENETRATIONS ABOVE GRADE.
17. PROVIDE NRTL LISTED SMOKE AND FIRE SEALS AT ALL PENETRATIONS THROUGH FLOORS OR FULL HEIGHT (SLAB TO SLAB) WALLS.
18. USE CAUTION TO AVOID DAMAGE TO EXISTING UTILITY LINES AND/OR HARM TO PERSONNEL WORKING IN THESE AREAS.
19. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE COPPER MINIMUM #12 AWG. SIZE UNLESS OTHERWISE INDICATED.
20. PROVIDE A PULL LINE IN EVERY EMPTY CONDUIT PROVIDED UNDER THIS SECTION.
21. WIRING IS INDICATED ON DRAWINGS ONLY FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS.
22. WIRING AND CONDUIT SHALL BE REQUIRED BETWEEN ALL OUTLETS INDICATED WITH CIRCUIT NUMBERS AND PANEL DESIGNATIONS.
23. ALTHOUGH ALL BRANCH CIRCUIT WIRE AND CONDUIT IS NOT SHOWN, IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE PROVIDED.
24. ALL SWITCH CONTROLS SHALL BE PROVIDED WITH WIRING AND CONDUIT AS REQUIRED.
25. RACEWAYS SHALL BE LIMITED TO SIX CURRENT CARRYING CONDUCTORS (THREE PHASE AND THREE NEUTRALS) AND GROUNDING CONDUCTOR, UNLESS OTHERWISE INDICATED. PROVIDE A DEDICATED NEUTRAL CONDUCTOR FOR EACH SINGLE PHASE RECEPTACLE CIRCUIT UNLESS AN OVERSIZED NEUTRAL IS SPECIFICALLY INDICATED.
26. ELECTRICAL CONTRACTOR SHALL CONFORM TO ALL PHASING AND SEQUENCING REQUIRED BY THE CONSTRUCTION MANAGER. REFER TO ARCHITECTURAL PLANS FOR PHASING.
27. ELECTRICAL CONTRACTOR SHALL PERFORM ALL CORES AS REQUIRED FOR THEIR WORK.
28. ELECTRICAL SYSTEMS SHALL BE FULLY OPERATIONAL AND TESTED FOR EACH PHASE OF CONSTRUCTION.
29. ELECTRICAL CONTRACTOR SHALL PERFORM ALL TEMPORARY WIRING, CABLING, EQUIPMENT AND EQUIPMENT RELOCATION OF EXISTING SYSTEMS AS REQUIRED TO MAINTAIN OPERATION IN UN-RENOVATED AREAS OF THE BUILDING PRIOR TO RENOVATION OF SUCH AREA.
30. HOUSEKEEPING PADS FOR ELECTRICAL EQUIPMENT SHALL BE PROVIDED BY THE GENERAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL LAYOUT, LOCATE AND SIZE THAN COORDINATE WITH GENERAL CONTRACTOR FOR INSTALLATION.

dw
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WILMINGTON
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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

SHEET TITLE:
ELECTRICAL SYMBOL LIST

SHEET NUMBER:
E0.01

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt

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LIGHTING FIXTURE SCHEDULE ① ⑦ ⑧ ⑨ ⑩ ⑪ ⑭

TYPE	MANUFACTURER	MODEL / SERIES	MTG.	VOLTAGE	LIGHTING SOURCE			DESCRIPTION	ACCEPTABLE MANUFACTURE EQUALS	SCHEDULE NOTES
					LUMENS	WATTS	SOURCE/CCT			
J	RAB LIGHTING	VXBRLED13DG-XX	W	UNIVERSAL	729	13	LED/5000K	UTILITY JELLY JAR STYLE FIXTURE WITH FROSTED HEAT TREATED GLASS GLOBE AND CAST GUARD CAPABLE OF 0-10V DIMMING.	PHOENIX MOBERN	④ ⑥ - - - -
LC1	ACOLYTE LIGHTING	NLAMS-2.435-E	S	UNIVERSAL	120/LF	2.4/LF	LED/3500K	LED SIDE BEND FLEXIBLE TAPE FIXTURE TO BE PROVIDED WITH 0-10V DIMMING CAPABLE DRIVER.	GM LIGHTING QTRAN LIGHTING	④ ⑥ ⑫ - - -
LDC	ACOLYTE LIGHTING	PIC-3.0-35-M-XX + (QTY)DRVW249610P-XX	S/R	UNIVERSAL	164/LF	3/LF	LED/3500K	LED CORNER MOUNTED TAPE IN CHANNEL MOUNTED CONCEALED INTO BUILT IN CASEWORK. FIXTURE TO BE PROVIDED W/ 0-10V DRIVER AND POWER SUPPLY.	LUMINII LIGHTING GM LIGHTING	④ ⑥ ⑫ - - -
LK22	KURTZON LIGHTING	FP-R-3-2X2-2-LEDR-835-UNV-GH85-SW-WHT-316SS-DOOR-XX	R	UNIVERSAL	3165	29	LED/3500K	2'X2' LED RECESSED TROFFER. NSF RATED, SUITABLE FOR USE IN AREAS OF FOOD PREPARATION & CAPABLE OF 0-10V DIMMING. STAINLESS STEEL DOOR & HOUSING.	KENALL LIGHTING XXXX	④ ⑥ - - - -
LP2	AXIS LIGHTING	TB2DILED-300-750-80-35-BW-SO-2-XX-UNV-DP-1-CA-DOS	P	UNIVERSAL	2100	19	LED/3500K	4' LED LINEAR PENDANT MOUNTED FIXTURE PROVIDED WITH DIRECT/INDIRECT BATWING DISTRIBUTION & 0-10V DIMMING CAPABILITY. COORDINATE ALL FINISHES AND MOUNTING WITH ARCHITECT.	LUX LIGHTING FINELITE	④ ⑥ - - - -
LP4	AXIS LIGHTING	TB2DILED-300-750-80-35-BW-SO-4-XX-UNV-DP-1-CA-DOS	P	UNIVERSAL	4200	38	LED/3500K	4' LED LINEAR PENDANT MOUNTED FIXTURE PROVIDED WITH DIRECT/INDIRECT BATWING DISTRIBUTION & 0-10V DIMMING CAPABILITY. COORDINATE ALL FINISHES AND MOUNTING WITH ARCHITECT.	LUX LIGHTING FINELITE	④ ⑥ - - - -
LP6	AXIS LIGHTING	TB2DILED-300-750-80-35-BW-SO-6-XX-UNV-DP-1-CA-DOS	P	UNIVERSAL	6300	57	LED/3500K	6' LED LINEAR PENDANT MOUNTED FIXTURE PROVIDED WITH DIRECT/INDIRECT DISTRIBUTION & 0-10V DIMMING CAPABILITY. FINISH AND MOUNTING SHALL BE SELECTED BY ARCHITECT.	LUX LIGHTING FINELITE	④ ⑥ - - - -
LP8	AXIS LIGHTING	TB2DILED-300-750-80-35-BW-SO-8-XX-UNV-DP-1-CA-DOS	P	UNIVERSAL	8400	76	LED/3500K	8' LED LINEAR PENDANT MOUNTED FIXTURE PROVIDED WITH DIRECT/INDIRECT DISTRIBUTION & 0-10V DIMMING CAPABILITY. FINISH AND MOUNTING SHALL BE SELECTED BY ARCHITECT.	LUX LIGHTING FINELITE	④ ⑥ - - - -
LPA	AXIS LIGHTING	TB2DILED-300-750-80-35-BW-SO-S-XX-UNV-DP-1-CA-DOS	P	UNIVERSAL	1050/LF	9.5/LF	LED/3500K	LED LINEAR PENDANT MOUNTED FIXTURE PROVIDED WITH DIRECT/INDIRECT DISTRIBUTION & 0-10V DIMMING CAPABILITY. FINISH AND MOUNTING SHALL BE SELECTED BY ARCHITECT.	LUX LIGHTING FINELITE	④ ⑥ - - - -
LPB	BARTCO LIGHTING	FAUX31-XX-35-D-1-L-R-2-A-CF-XX-CF	P	UNIVERSAL	1180	12.9	LED/3500K	LED LINEAR PENDANT MOUNTED FIXTURE PROVIDED WITH DIRECT/INDIRECT DISTRIBUTION & 0-10V DIMMING CAPABILITY. CUSTOM WOOD FINISH TO MATCH ARCHITECTURAL BEAMS.	CERNO LIGHTING STICKBULB LIGHTING	④ ⑥ ⑫ - - -
LPBL	BARTCO LIGHTING	FAUX31-XX-35-D-1-L-L-2-A-CF-XX-CF	P	UNIVERSAL	1040	10.7	LED/3500K	LED LINEAR PENDANT MOUNTED FIXTURE PROVIDED WITH DIRECT/INDIRECT DISTRIBUTION & 0-10V DIMMING CAPABILITY. CUSTOM WOOD FINISH TO MATCH ARCHITECTURAL BEAMS.	CERNO LIGHTING STICKBULB LIGHTING	④ ⑥ ⑫ - - -
LPG	SPEC GRADE LTG.	HBF-150-35K-120-V01-XX-PM2-VDIM-UL-FL-80C-XX	P	UNIVERSAL	19,900	150	LED/3500K	LED HIGH BAY FIXTURE PROVIDED WITH FROSTED POLYCARBONATE LENSING OPTION AND UP-LIGHT SOURCE. COLOR BY ARCHITECT.	AGL SOLAS RAY LIGHTING	④ ⑥ - - - -
LR2	AXIS LIGHTING	B2SQRLED-1000-80-35-SO-2-X-UNV-DP-1-TB9-DOS	R	UNIVERSAL	2000	17	LED/3500K	2' X 2" LED LINEAR RECESS MOUNTED FIXTURE PROVIDED WITH 0-10V DIMMING CAPABILITY. COORDINATE ALL FINISHES AND MOUNTING WITH ARCHITECT.	UTOPIA LIGHTING MARK ARCHITECTURAL LIGHTING	④ ⑥ - - - -
LR4	AXIS LIGHTING	B2SQRLED-1000-80-35-SO-4-X-UNV-DP-1-TB9-DOS	R	UNIVERSAL	4000	25.5	LED/3500K	4' X 2" LED LINEAR RECESS MOUNTED FIXTURE PROVIDED WITH 0-10V DIMMING CAPABILITY. COORDINATE ALL FINISHES AND MOUNTING WITH ARCHITECT.	UTOPIA LIGHTING MARK ARCHITECTURAL LIGHTING	④ ⑥ - - - -
LR6	AXIS LIGHTING	B2SQRLED-1000-80-35-SO-6-X-UNV-DP-1-TB9-DOS	R	UNIVERSAL	6000	51	LED/3500K	6' X 2" LED LINEAR RECESS MOUNTED FIXTURE PROVIDED WITH 0-10V DIMMING CAPABILITY. COORDINATE ALL FINISHES AND MOUNTING WITH ARCHITECT.	UTOPIA LIGHTING MARK ARCHITECTURAL LIGHTING	④ ⑥ - - - -
LR6T	AXIS LIGHTING	B2SQRLED-1000-80-TW2750-SO-6-X-UNV-DP-1-TB9-DOS	R	UNIVERSAL	6000	51	LED/TUNABLE	6' X 2" LED LINEAR RECESS MOUNTED FIXTURE PROVIDED WITH 0-10V DIMMING CAPABILITY AND TUNABLE CCT LED SOURCE. COORDINATE ALL FINISHES AND MOUNTING WITH ARCHITECT.	UTOPIA LIGHTING MARK ARCHITECTURAL LIGHTING	④ ⑥ - - - -
LR8	AXIS LIGHTING	B2SQRLED-1000-80-35-SO-8-X-UNV-DP-1-TB9-DOS	R	UNIVERSAL	8000	68	LED/3500K	8' X 2" LED LINEAR RECESS MOUNTED FIXTURE PROVIDED WITH 0-10V DIMMING CAPABILITY. COORDINATE ALL FINISHES AND MOUNTING WITH ARCHITECT.	UTOPIA LIGHTING MARK ARCHITECTURAL LIGHTING	④ ⑥ - - - -
LR8T	AXIS LIGHTING	B2SQRLED-1000-80-TW2750-SO-8-X-UNV-DP-1-TB9-DOS	R	UNIVERSAL	8000	68	LED/TUNABLE	8' X 2" LED LINEAR RECESS MOUNTED FIXTURE PROVIDED WITH 0-10V DIMMING CAPABILITY AND TUNABLE CCT LED SOURCE. COORDINATE ALL FINISHES AND MOUNTING WITH ARCHITECT.	UTOPIA LIGHTING MARK ARCHITECTURAL LIGHTING	④ ⑥ - - - -
LR22	AXIS LIGHTING	AULED-22-4500-90-35-SO-W-UNV-DP-1-XX	R	UNIVERSAL	4500	33	LED/3500K	2' X 2' ARCHITECTURAL TROFFER WITH LOW GLARE DIRECT DISTRIBUTION AND 0-10V DIMMING CAPABILITIES	DAY-BRITE LIGHTING LITHONIA LIGHTING	④ ⑥ - - - -
LRA	AXIS LIGHTING	B2SQRLED-1000-80-35-SO-S-X-UNV-DP-1-TB9-DOS	R	UNIVERSAL	1000/LF	8.5/LF	LED/3500K	LED RECESSED FIXTURE WITH 0-10V DIMMING CAPABILITY. FIXTURE SHALL BE SUITABLE FOR USE IN DAMP LOCATIONS.	FINELITE LIGHTING MARK ARCHITECTURAL LIGHTING	④ ⑥ ⑫ - - -
LRB	LUMENWERX LIGHTING	UBISEALR-D-MWPL-SW-80CRI-500LMF-35K-XFT-UNV-D1-1C-XX-XX	R	UNIVERSAL	500/LF	3.8/LF	LED/3500K	LED RECESSED FIXTURE WITH 0-10V DIMMING CAPABILITY. FIXTURE SHALL BE SUITABLE FOR USE IN DAMP LOCATIONS.	UTOPIA LIGHTING -	④ ⑥ ⑫ - - -
LS2	FINELITE LIGHTING	LN2-FRL-35K-M-UNV10%-SM-OEK-X-2	S	UNIVERSAL	1628	13	LED/3500K	2' X 2" LED UTILITY STRIP FIXTURE WITH FROSTED ACRYLIC LENSING PROVIDED WITH CHAIN MOUNTING HARDWARE WHERE REQUIRED.	PRIMUS LIGHTING COLUMBIA LIGHTING	④ ⑥ - - - -
LS4	FINELITE LIGHTING	LN2-FRL-35K-M-UNV10%-SM-OEK-X-4	S	UNIVERSAL	3256	26	LED/3500K	4' X 2" LED UTILITY STRIP FIXTURE WITH FROSTED ACRYLIC LENSING PROVIDED WITH CHAIN MOUNTING HARDWARE WHERE REQUIRED.	PRIMUS LIGHTING COLUMBIA LIGHTING	④ ⑥ - - - -
LS6	FINELITE LIGHTING	LN2-FRL-35K-M-UNV10%-SM-OEK-X-6	S	UNIVERSAL	4884	39	LED/3500K	6' X 2" LED UTILITY STRIP FIXTURE WITH FROSTED ACRYLIC LENSING PROVIDED WITH CHAIN MOUNTING HARDWARE WHERE REQUIRED.	PRIMUS LIGHTING MARK LIGHTING	④ ⑥ - - - -
LS8	FINELITE LIGHTING	LN2-FRL-35K-M-UNV10%-SM-OEK-X-8	S	UNIVERSAL	6512	52	LED/3500K	8' X 2" LED UTILITY STRIP FIXTURE WITH FROSTED ACRYLIC LENSING PROVIDED WITH CHAIN MOUNTING HARDWARE WHERE REQUIRED.	PRIMUS LIGHTING COLUMBIA LIGHTING	④ ⑥ - - - -
LTC	OCL ARCHITECTURAL LIGHTING	GS1C-PXXXXX-S-RND-X-LVL-CR-XX-35K-UNV-XX-DMO	P	UNIVERSAL	350/DROP	5/DROP	LED/3500K	LED MULTI DROP GLOWSTICK CLUSTER FIXTURE WITH CLEAR ACRYLIC RODS AND 0-10V DIMMING CAPABILITIES.	LUMOS ARCHITECTURAL BROWNLEE LIGHTING	④ ⑥ - - - -
PC1	FOCAL POINT	FSDL-22-FLXP-2000L-35K-1C-UNV-LD1-U-XX	R	UNIVERSAL	2000	27	LED/3500K	2' RECESSED LED RING FIXTURE WITH FROSTED ACRYLIC DIFFUSER AND FLAT FROSTED LENS, 0-10V DIMMING CAPABILITY.	G LIGHTING -	④ ⑥ - - - -
PC2	GOTHAM LIGHTING	EV04CC-35-20-AR-LSS-WD-MVOLT-GZ10-JBX-XX-SXX-XX-NONE-XX-XX	P	UNIVERSAL	1994	19.5	LED/3500K	4" APERTURE LED PENDANT CYLINDER FIXTURE WITH SEMI-SPECULAR REFLECTOR FINISH, EXTRUDED HEAVY GUAGE ALUMINUM CYLINDER BODY, AND 0-10V DIMMING CAPABILITY.	SOLAIS LIGHTING -	④ ⑥ - - - -
RC1	GOTHAM LIGHTING	EV04-35-15-AR-XX-LSS-MWD-MVOLT-GZ10-NONE-NONE-XX	R	UNIVERSAL	1527	13.7	LED/3500K	4" APERTURE LED DOWNLIGHT FIXTURE WITH SEMI-SPECULAR REFLECTOR AND PROVIDED WITH 0-10V DIMMING CAPABILITY. FIXTURE IS CONSTRUCTED TO BE FULLY UPGRADED & SERVICED FROM BELOW.	FOCAL POINT LIGHTING SOLAIS LIGHTING	④ ⑥ - - - -
RC2	GOTHAM LIGHTING	EV02-35-10-AR-XX-LSS-MWD-MVOLT-UGZ-NONE-XX	R	UNIVERSAL	1073	12.7	LED/3500K	2" APERTURE LED DOWNLIGHT FIXTURE WITH SEMI-SPECULAR REFLECTOR AND PROVIDED WITH 0-10V DIMMING CAPABILITY. FIXTURE IS CONSTRUCTED TO BE FULLY UPGRADED & SERVICED FROM BELOW.	FOCAL POINT LIGHTING SOLAIS LIGHTING	④ ⑥ - - - -
RC3	GOTHAM LIGHTING	EV04-35-20-AR-XX-LSS-MD-MVOLT-GZ10-NONE-NONE-XX	R	UNIVERSAL	1994	19.5	LED/3500K	4" APERTURE LED DOWNLIGHT FIXTURE WITH SEMI-SPECULAR REFLECTOR AND PROVIDED WITH 0-10V DIMMING CAPABILITY. FIXTURE IS CONSTRUCTED TO BE FULLY UPGRADED & SERVICED FROM BELOW.	FOCAL POINT LIGHTING SOLAIS LIGHTING	④ ⑥ - - - -
RC4	GOTHAM LIGHTING	ICO4ADJ-35/-30-AR-T40-LSS-30D-277-GZ10-XX	R	UNIVERSAL	2569	34.1	LED/3500K	4" APERTURE LED ADJUSTABLE DOWNLIGHT FIXTURE WITH SEMI-SPECULAR REFLECTOR AND PROVIDED WITH 0-10V DIMMING CAPABILITY. FIXTURE IS CONSTRUCTED TO BE FULLY UPGRADED & SERVICED FROM BELOW.	FOCAL POINT LIGHTING SOLAIS LIGHTING	④ ⑥ - - - -
SL1	LITHONIA LIGHTING	DSX0-P1-30K-80CRI-BLC3-MVOLT-RPA-NLTAIR2 PIRHN	POLE	UNIVERSAL	33	3344	LED/3000K	POLE FIXTURE W/ TYPE III DISTRIBUTION & MOUNTED ON 12.5' ROUND ALUMINUM TAPERED POLE RATED FOR 110MPH WIND CONDITIONS	GARDCO VISIONAIRE LIGHTING	③ ④ ⑥ ⑬ ⑮ -
SL2	LITHONIA LIGHTING	(4)DSX0-P1-30K-80CRI-BLC4-MVOLT-RPA-NLTAIR2 PIRHN	POLE	UNIVERSAL	(4) 33	3454	LED/3000K	4 HEADED POLE FIXTURE W/ TYPE IV DISTRIBUTION W/ HOUSE SIDE SHEILD & MOUNTED ON 12' ROUND ALUMINUM TAPERED POLE RATED FOR 110MPH WIND CONDITIONS	GARDCO VISIONAIRE LIGHTING	③ ④ ⑥ ⑬ ⑮ -
SL3	LITHONIA LIGHTING	DSX0-P1-30K-80CRI-BLC4-MVOLT-RPA-NLTAIR2 PIRHN	POLE	UNIVERSAL	33	3454	LED/3000K	POLE FIXTURE W/ TYPE IV DISTRIBUTION & MOUNTED ON 12.5' ROUND ALUMINUM TAPERED POLE RATED FOR 110MPH WIND CONDITIONS	GARDCO VISIONAIRE LIGHTING	③ ④ ⑥ ⑬ ⑮ -
SL4	LITHONIA LIGHTING	RADPT LED-P1-30K-SYM-MVOLT-PT4-NLTAIR2-XX	POLE	UNIVERSAL	3189	25	LED/3000K	POST TOP FIXTURE MOUNTED ON 12.5' ROUND ALUMINUM TAPERED POLE RATED FOR 110MPH WIND CONDITIONS	GARDCO SOLAIS LIGHTING	④ ⑥ ⑬ - - -
SL5	ECOSENSE LIGHTING	F080-1R-LO-35-8-15-X-X-X	S	UNIVERSAL	309	4	LED/3000K	LED SURFACE MOUNTED SPOT FIXTURE WITH 0-10V DIMMING CAPABILITY IP66 RATED FOR USE IN WET LOCATION	- -	④ ⑥ - - - -
SL6	TARGETTI LIGHTING	JU-R-FL-L2-30-24-XX	R	UNIVERSAL	704	7	LED/3000K	LED IN-GRADE UP LIGHT FIXTURE WITH ADJUSTABLE BEAM SPREAD, ADJUSTABLE TILT ANGLES AMD ANTI SLIP LENSING.	GARDCO MCGRAW-EDISION	④ ⑥ - - - -
SL7	LITHONIA LIGHTING	WDGE1 LED-P1-30K-80CRI-VF-MVOLT-SRM-XX	W	UNIVERSAL	1200	4	LED/3000K	LED WALL MOUNTED LOW PROFILE WEDGE FIXTURE PROVIDED WITH DIRECT TYPE IV DISTRIBUTION AND 0-10V DIMMING CAPABILITY	GARDCO MCGRAW-EDISION	④ ⑥ - - - -
SL8	GOTHAM LIGHTING	EV04-35-15-AR-XX-LSS-MWD-MVOLT-GZ10-NONE-NONE-XX	R	UNIVERSAL	1527	13.7	LED/3000K	4" APERTURE LED DOWNLIGHT FIXTURE WITH SEMI-SPECULAR REFLECTOR AND PROVIDED WITH 0-10V DIMMING CAPABILITY.	GARDCO SOLAIS LIGHTING	④ ⑥ - - - -
SL9	KENALL LIGHTING	MLAS838-XX-AS-XX-33L30K-DCC-DV	W	UNIVERSAL	2043	36	LED/3000K	LED WALL MOUNTED FIXTURE WITH FROSTED ACRYLIC LENS AND 0-10V DIMMING CAPABILITY.	BROWNLEE CGF DESIGN	④ ⑥ - - - -
TR1	JUNO LIGHTING	T TRAC SERIES	P	UNIVERSAL	-	-	-	TRACK HOUSING. LENGTH AS SHOWN ON PLANS. PROVIDE ALL REQUIRED HARDWARE INCLUDING PENDANT ADAPTERS, CURRENT LIMITING END FEEDS AND CONNECTORS.	- -	④ ⑥ ⑫ ⑱ - -
TL1	JUNO LIGHITNG	R608L-35K-80CRI-PDIM-FL-XX-XX	T	UNIVERSAL	1668	15	LED/3500K	TRACK MOUNTED WASH LIGHT WITH WIDE LENS.	- -	④ ⑥ ⑫ - - -
UC	ACOLYTE LIGHTING	CHAC2-M-XX + RB-0-SWS220-3.0-35-XX-FI + (QTY)DRVW249610P-XX + XX	S	UNIVERSAL	279.3/LF	3.0/LF	LED/3500K	LED SURFACE MOUNTED TAPE IN CHANNEL FOR USE IN UNDER CABINET APPLICATIONS. FITURE TO DIM UTILIZING 0-10V SIGNAL.	GM LIGHTING Q-TRAN	④ ⑥ ⑫ - - -
⊗	EVENLITE	SOV-AC-G-1C-XX-XX-XX	U	UNIVERSAL	-	5	LED	SINGLE FACED LED EDGE LIT EXIT SIGN WITH GREEN LETTERING COORDINATE CHEVRONS WITH ARCHITECTURAL CODE PLAN	SIGNTEX EMERGI-LITE	② ⑤ - - - -
⋈	EVENLITE	SOV-AC-G-2M-XX-XX-XX	U	UNIVERSAL	-	5	LED	DOUBLE FACED LED EDGE LIT EXIT SIGN WITH GREEN LETTERING COORDINATE CHEVRONS WITH ARCHITECTURAL CODE PLAN	SIGNTEX EMERGI-LITE	② ⑤ - - - -
⊗	EVENLITE	SOV-AC-G-XX-XX-SW-XX-XX	U	UNIVERSAL	-	5	LED	SINGLE FACED LED EDGE LIT EXIT SIGN WITH GREEN LETTERING COORDINATE CHEVRONS WITH ARCHITECTURAL CODE PLAN	SIGNTEX EMERGI-LITE	② ⑤ - - - -
⊗ MM	EVENLITE	SOV-AC-G-1C-XX-MU-XX-IN	U	UNIVERSAL	-	5	LED	SINGLE FACED LED EXIT SIGN WITH WITH GREEN LETTERING AND SUITABLE FOR USE IN MULLION MOUNTED APPLICATIONS.	DUAL-LITE EMERGI-LITE	② ⑤ - - - -
⊗ HC	EVENLITE	TRE-AC-G-1C-W/SC-MA	U	UNIVERSAL	-	5	LED	SINGLE FACED LED EXIT SIGN WITH MASS. APPROVED WHEEL CHAIR GRAPHIC LOCATED AT ANY EXIT FROM BUILDING TO GRADE.	MULE EMERGI-LITE	② ⑤ ⑰ - - -
⊗ RS	EVENLITE	AUR-1-XX-XX-RS	U	UNIVERSAL	-	5	LED	SINGLE FACED LED EXIT SIGN WITH WITH GREEN LETTERING AND SUITABLE FOR USE IN ROUGH SURFACE APPLICATIONS.	SIGNTEX EMERGI-LITE	② ⑤ ⑯ - - -
EB	MULE LIGHTING	ELW-BB-7L2-XX-DP-DG-XX	U	UNIVERSAL	-	14	LED	LED EMERGENCY BATTERY UNIT FIXTURE TYPICALLY MOUNTED AT 7' 6" A.F.F. AND PROVIDED WITH SELF DIAGNOSTIC CAPABILITIES	SIGNTEX EMERGI-LITE	- - - - - -

MOUNTING DESIGNATIONS

C	COVE	U	UNIVERSAL
P	PENDANT	W	WALL
R	RECESSED	AC	AIRCRAFT CABLE
S	SURFACE	BOL	BOLLARD
T	TRACK / RAIL / CABLE	POLE	POLE

EXIT SIGN CIRCUITING

FIRST FLOOR A NORTH EXITS SIGNS	LP1B-9	SECOND FLOOR B NORTH EXITS SIGNS	LP2B-6
FIRST FLOOR A SOUTH EXITS SIGNS	LP1A-9	SECOND FLOOR B SOUTH EXITS SIGNS	LP2B2-10
FIRST FLOOR B NORTH EXITS SIGNS	LP1B-9	THIRD FLOOR A NORTH EXITS SIGNS	LP3B-2
FIRST FLOOR B SOUTH EXITS SIGNS	LP2B2-10	THIRD FLOOR A SOUTH EXITS SIGNS	LP3A-2
SECOND FLOOR A NORTH EXITS SIGNS	LP2B-6	THIRD FLOOR B NORTH EXITS SIGNS	LP3B-2
SECOND FLOOR A SOUTH EXITS SIGNS	LP2A-2	THIRD FLOOR B SOUTH EXITS SIGNS	LP3A-2

LIGHTING FIXTURE SCHEDULE NOTES (⊖)

1. LIGHTING FIXTURE PACKAGE SUBMITTALS SHALL BE FULLY COORDINATED BETWEEN THE ELECTRICAL CONTRACTOR, LIGHTING FIXTURE REPRESENTATIVE(S), AND LIGHTING MANUFACTURERS TO ENSURE ALL PRODUCT, INSTALLATION, AND CONTROL REQUIREMENTS ARE MET PRIOR TO SUBMISSION FOR REVIEW. IT IS THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO PROVIDE A PACKAGE MEETING ALL REQUIREMENTS OF THE PROJECT FOR A COMPLETE AND FULLY FUNCTIONAL LIGHTING SYSTEM.=
2. PROVIDE EXIT SIGN THAT COMPLIES WITH NFPA 101, UL 924, 521 CMR 26.1.2 AND ALL REFERENCED STANDARDS AND CODES.
3. SITE LIGHTING POLES SHALL BE PROVIDED WITH FULL BASE COVERS TO MATCH PROFILE OF POLE; NUT COVERS ONLY ARE NOT ACCEPTABLE.
4. UNLESS OTHER NOTED, PROVIDE ALL FIXTURES WITH 0-10V DIMMING BALLAST, DRIVER, TRANSFORMER, OR LIGHT ENGINE REQUIRED FOR LAMP OR LED SOURCE SPECIFIED.
5. E.C. SHALL PROVIDE ADDITIONAL EXIT SIGNS (TO INCLUDE 100' OF MC CABLE BRANCH CIRCUITING) FOR FIELD PLACEMENT DURING CONSTRUCTION. REFER TO SPECIFICATIONS FOR QUANTITIES.
6. PROVIDE ALCS ADDRESSABLE INPUT/OUTPUT (I/O) MODULE FOR EACH FIXTURE UNLESS OTHERWISE NOTED. APPLICATIONS NOT REQUIRING INDIVIDUAL CONTROL (WHERE NOTED ON PLANS) SHALL BE PROVIDED WITH I/O MODULES ON A FIXTURE GROUPING BASIS. WHERE FIXTURES ARE LOCATED IN HARD CEILING AREAS THE I/O MODULE SHALL BE REMOTE MOUNTED IN ACCESSIBLE AREA ABOVE AN A.C.T. CEILING. WHERE FIXTURES ARE LOCATED OUTDOORS THE I/O MODULE SHALL BE LOCATED IN THE MAIN ELECTRICAL ROOM ADJACENT TO THE PANEL SERVING THE LIGHTING. REFER TO "AUTOMATED LIGHTING CONTROL SYSTEM - TYPICAL ONE-LINE DIAGRAM" AND SPECIFICATIONS FOR FURTHER INFORMATION.
7. PROVIDE LED SOURCES WITH A MAXIMUM COLOR VARIATION OF 3-STEP MCADAM ELLIPSE. PROVIDE STATEMENT OF COMPLIANCE WITH SUBMITTALS.
8. PROVIDE FIXTURES WITH A MINIMUM WARRANTY COVERAGE OF 5 YEARS ON ALL PARTS. MANUFACTURER SHALL PROVIDE WRITTEN WARRANTY TO PROVIDE REPLACEMENT PARTS, INCLUDING BUT NOT LIMITED TO, LED SOURCE MODULE AND DRIVER FOR A MINIMUM OF TEN YEARS. PARTS SHALL BE FULLY COMPATIBLE WITH FIXTURE TO PROVIDE SAME LIGHT OUTPUT, DISTRIBUTION, COLOR, AND COLOR RENDERING AT OR BELOW THE ORIGINAL WATTAGE. PROVIDE STATEMENT OF COMPLIANCE WITH SUBMITTALS.
9. PROVIDE FIXTURES WITH PROJECT SPECIFIC LABELS CLEARLY INDICATING THE FIXTURE TYPE, SERVICE CONTACT INFORMATION, AND REPLACEMENT PARTS (INCLUDING BUT NOT LIMITED TO SOURCE, DRIVER, AND LENS). MANUFACTURER STANDARD OFFERING OF QR CODE OR BAR CODE CONTAINING REQUIRED INFORMATION WILL BE ACCEPTABLE. PROVIDE STATEMENT OF COMPLIANCE WITH SUBMITTALS.
10. PROVIDE FIXTURES FROM MANUFACTURERS WITH A DOCUMENTED HISTORY OF SUPPLYING PRODUCTS SPECIFIED FOR A MINIMUM OF 5 YEARS. PROVIDE STATEMENT OF COMPLIANCE WITH SUBMITTALS.
11. FIXTURE TO BE PROVIDED WITH A MINIMUM 10 YEAR WARRANTY COVERING BOTH LED'S AND DRIVERS. ALSO FIXTURE TO HAVE A MINIMUM L90 RATING OF 100,000 HOURS BASED ON TM-21 CALCULATION DATA THIS INFORMATION MUST BE SUBMITTED FOR REVIEW.
12. FIXTURE LENGTHS TO BE COORDINATED WITH ELECTRICAL LIGHTING PLANS. PROVIDE ALL NECESSARY MOUNTING HARDWARE, DRIVERS, CONNECTOR CABLES, ETC. FOR RUNS SHOWN
13. PROVIDE 7 PIN PHOTOCELL PROVISIONS FOR EACH POLE FIXTURE TO HOUSE THE WIRELESS SITE LIGHTING CONTROL MODULE (WSLC) - SEE ALCS RISER.
14. FINISH TO BE COORDINATED WITH ARCHITECT PRIOR TO FINAL APPROVAL.
15. PROVIDE LIGHTING CALCULATION USING FINAL APPROVED SIGNAGE DESIGN INDICATING DIMENSIONS FOR FIXTURE SET, FIXTURE OPTICS, AND TILT SETTING.
16. ROUGH SERVICE EXIT SIGNS TO BE PROVIDED IN ALL GYMS, LOCKER ROOMS, AND UTILITY SPACES WHEN REQUIRED REGARDLESS OF EXIT SIGN TYPE INDICATED ON PLANS.
17. HANDICAP EXIT SIGNS TO BE PROVIDED AT ALL EXITS TO GRADE FROM THE BUILDING REGARDLESS OF EXIT SIGN TYPE INDICATED ON PLANS. ALL HANDICAP EXIT SIGNS TO BE PROVIDED WITH MASS APPROVED WHEELCHAIR GRAPHIC
18. PROVIDE ECOSPEC LINEAR DIMMING CONTROL MODULE PLENUM RATED BY ECOSENSE LIGHTING TO ALLOW FOR TRACK FIXTURES TO BE DIMMED.

LIGHTING GENERAL NOTES

1. MANUFACTURERS AND CATALOG NUMBERS IDENTIFIED IN THE "LIGHTING FIXTURE SCHEDULE" SHALL SERVE TO ESTABLISH THE BASIS OF DESIGN FOR EACH LIGHTING FIXTURE TYPE. PRODUCTS OF EQUAL APPEARANCE, CONSTRUCTION, PERFORMANCE, AND WARRANTY COVERAGE FROM MANUFACTURERS OTHER THAN THOSE IDENTIFIED MAY BE PROPOSED FOR USE ON THIS PROJECT, SUBJECT TO REVIEW AND APPROVAL BY THE ARCHITECT AND ENGINEER. THE "FIXTURE MANUFACTURER OPTIONS (OR EQUAL)" LISTING IS PROVIDED FOR GUIDANCE IN IDENTIFYING MANUFACTURERS CAPABLE OF PROVIDING EQUAL PRODUCTS, BUT IN NO WAY LIMITS MANUFACTURERS OR PRODUCTS THAT MAY BE PROPOSED AS EQUALS FOR THE PROJECT.
2. "LIGHTING FIXTURE SCHEDULE" REMARKS, "LIGHTING FIXTURE SCHEDULE NOTES", "LIGHTING GENERAL NOTES", AND NOTATIONS ELSEWHERE MAY INDICATE FEATURES AND ACCESSORIES THAT ARE NOT INDICATED IN THE CATALOG NUMBER BUT ARE REQUIRED FOR THE PROJECT. PRODUCTS OTHER THAN THOSE SPECIFIED SUBMITTED SHALL BE DOCUMENTED FOR CONFORMANCE IN PERFORMANCE, CONSTRUCTION, AND APPEARANCE WITH THE CRITERIA ESTABLISHED BY THE SPECIFIED PRODUCT.
3. FURNISH ALL LIGHTING FIXTURES COMPLETE WITH MOUNTING ACCESSORIES TO MEET THE JOB REQUIREMENTS. VERIFY ROOM SURFACE CONSTRUCTION AND FINISHES PRIOR TO ORDERING FIXTURES TO ENSURE PROPER MOUNTING PROVISIONS AND FIXTURE FITTINGS. REFER TO LATEST ARCHITECTURAL DRAWINGS.
4. VERIFY ALL FIXTURE MOUNTING HEIGHTS AND LOCATIONS WITH LATEST ARCHITECTURAL DRAWINGS. EXACT LOCATION OF FIXTURES SHALL BE CONFIRMED WITH THE ARCHITECT PRIOR TO START OF ROUGHING.
5. LED ARRAYS, MODULES, AND LIGHT ENGINES SHALL HAVE KELVIN COLOR TEMPERATURE AS SCHEDULED HAVING A MINIMUM COLOR RENDERING INDEX (CRI) OF 82 AND A MINIMUM L70 LIFETIME RATING OF 50,OOO HOURS AT 25°C AMBIENT. LED DRIVERS SHALL HAVE 0-10V DIMMING CONTROL WITH FULLY ISOLATED CONTROL INPUTS AND MINIMUM POWER LEVEL OF 10%%%. LED FIXTURES WITH ARRAY / MODULE AND DRIVER PACKAGES OR LIGHT ENGINES SHALL HAVE PUBLISHED IESNA LM-79 AND LM-80 TESTING DATA AS A STANDARD MANUFACTURED OFFERING. INDIVIDUAL COMPONENT TESTING DATA WILL NOT BE ACCEPTED. ALL FIXTURES SHALL BE "DESIGN LIGHTS CONSORTIUM" (DLC) OR "ENERGYSTAR" LISTED, OR FURNISHED WITH DATA INDICATING CONFORMANCE WITH LATEST APPLICABLE LISTING CRITERIA.
6. FIXTURE LETTERS SHOWN ONCE ON A CONTINUOUS ROW OF FIXTURES SHALL BE TYPICAL FOR THAT ROW UNLESS OTHERWISE INDICATED. PROVIDE RUN LENGTH AS INDICATED (NUMERICALLY OR GRAPHICALLY) OR CONTINUOUS WHERE SHOWN BETWEEN TWO ARCHITECTURAL ELEMENTS (WALLS, SOFFITS, COLUMNS, ETC.).
7. LINEAR ROWS OF RECESSED, SURFACE, OR SUSPENDED FIXTURES SHALL BE INSTALLED TO PROVIDE CONTINUOUS RUN LENGTHS AS INDICATED ON THE DRAWINGS. PROVIDE ALL REQUIRED FITTINGS, CONNECTORS, SUPPORTS, TRIMS, ETC. SO THAT RUNS ARE A COMPLETE ASSEMBLY WITH THE APPEARANCE OF A SINGLE UNIT. ROWS SHALL BE CONFIGURED FOR MINIMUM NUMBER OF FEEDS, JOINTS, AND MOUNTINGS. PROVIDE ROW AND PATTERN CONFIGURATION DRAWINGS FOR REVIEW PRIOR AND APPROVAL PRIOR TO RELEASE OF MATERIAL ORDER.
8. PROVIDE FLAT ROUND CANOPIES FOR SUSPENDED FIXTURE LOCATIONS WHERE SUSPENSIONS MOUNTS TO UNFINISHED CEILING STRUCTURE (WHERE LOCATED IN FINISHED SPACES) AND WHERE PASSING THROUGH SUSPENDED CEILINGS (CONFIRM WHETHER IN TILE OR AT GRID). PROVIDE SWIVEL ALIGNERS FOR SUSPENSIONS WHERE REQUIRED FOR SLOPED CEILINGS. ENTIRE SUSPENSION ASSEMBLY SHALL BE SUPPLIED BY MANUFACTURER OF FIXTURES.
9. FIXTURES WITH LOUVERS SHALL BE PROVIDED WITH HIGH TRANSMISSION (95%%% OR BETTER) DIFFUSING LENSES OR FILMS TO OBSCURE DIRECT LAMP VIEWING.
10. FIXTURES SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE, INDEPENDENT OF HUNG CEILINGS. DO NOT TAP METAL ROOF DECK FOR SUPPORT OF ANY ELECTRICAL EQUIPMENT. PROVIDE UNISTRUT AS REQUIRED FOR SUPPORT OF ALL ELECTRICAL EQUIPMENT.
11. REFER TO SPECIFICATIONS FOR SEISMIC SUPPORT, RESTRAINT, AND BRACING REQUIREMENTS OF THIS PROJECT.
12. PROVIDE TYPE AND QUANTITY OF DRIVERS AND TRANSFORMERS AS REQUIRED TO PROVIDE CONTROL METHOD INDICATIONS ON THE PLANS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING: SWITCHING SUBSCRIPTS, NOTES, SCHEDULE REMARKS / DESCRIPTIONS, AND DETAILS. QUANTITY OF DRIVERS AND TRANSFORMERS SHALL BE THE MINIMUM REQUIRED TO PROVIDE CONTROL INDICATED TO MAINTAIN THE LOWEST CONNECTED LOAD OF LIGHTING SYSTEM POSSIBLE. TANDEM WIRING OF FIXTURES SHALL BE PROVIDED WHERE NECESSARY AND WITHIN THE WIRING DISTANCE RESTRICTIONS OF THE MANUFACTURER'S INSTALLATION REQUIREMENTS.
13. ALL LAMPS, LED SOURCES, DRIVERS, AND CONTROLS SHALL MEET THE LATEST UTILITY COMPANY INCENTIVE REQUIREMENTS. REFER TO THE LATEST PROGRAM REQUIREMENTS DOCUMENTATION AND COORDINATE WITH THE UTILITY COMPANY TO ENSURE COMPLIANCE.
14. ALL EXIT SIGN LIGHTING SHALL BE CIRCUITED AHEAD OF ANY SWITCH CONTROL FOR CONSTANT "ON" OPERATION. PROVIDE LOCKING DEVICE ON CIRCUIT BREAKER SERVING EXIT SIGNS.
15. EXIT SIGNS TO BE PROVIDED WITH ARROWS AS INDICATED ON DRAWINGS. TYPICALLY MOUNT ON CEILING WHERE VISIBLE OR ON WALL WHERE CEILING MOUNTING IS NOT PRACTICAL. EDGE-LIT SIGNS SHALL GENERALLY HAVE CLEAR PANELS EXCEPT FOR DOUBLE FACED UNITS AND SINGLE FACED UNITS ABLE TO BE VIEWED FROM BEHIND WHICH SHALL HAVE OPAQUE / MIRRORED PANELS. REFER TO ARCHITECTURAL DRAWINGS FOR INDICATION OF MOUNTING REQUIREMENTS.
16. EXIT SIGNS SHALL BE THE SELF-CONTAINED TYPE WITH INTEGRAL BATTERY BACK-UP AND SELF-DIAGNOSTICS WHERE NO LIFE SAFETY POWER SOURCE IS AVAILABLE, REGARDLESS OF MODEL / SERIES SPECIFIED.
17. EXIT SIGNS INSTALLED IN GYMNASIUMS, LOCKER ROOMS, AND ANY OTHER DESIGNATED AREAS SHALL BE PROVIDED WITH POLYCARBONATE FACE PLATE / SHIELD AS PART OF EXIT SIGN PACKAGE FROM SAME MANUFACTURER.
18. PROVIDE A SELF CONTAINED EMERGENCY LIGHTING UNIT WITH TWIN ADJUSTABLE HEADS (TYPE "EB" WHERE SCHEDULED) AT EACH FIRE ALARM CONTROL PANEL , REMOTE FIRE ALARM ANNUNCIATOR, @ THE LIFE SAFETY TRANSFER SWITCH AND IN THE GENERATOR ROOM. EXACT MOUNTING TO BE COORDINATED IN FIELD WITH ARCHITECT OR ENGINEER.
19. FIXTURES WITH MULTI WATTAGE BALLASTS OR DRIVERS SHALL BE LABELED FROM THE FACTORY FOR THE WATTAGE SPECIFIED TO ENSURE COMPLIANCE WITH ENERGY CODE CALCULATIONS.
20. FINISH FOR ALL FIXTURES SHALL BE SELECTED BY THE ARCHITECT FROM THE MANUFACTURER'S CATALOG OPTIONS. BLACK AND WHITE SHALL BE CONSIDERED A STANDARD FINISH OPTION FOR ALL PRODUCTS SPECIFIED REGARDLESS OF WHAT IS LISTED.
21. WHERE FIXTURES OTHER THAN THE SPECIFIED PRODUCTS ARE PROPOSED, THE CONTRACTOR SHALL PROVIDE LIGHT LEVEL CALCULATIONS IN ACCORDANCE WITH IESNA STANDARDS TO JUSTIFY THAT THE SUBSTITUTED FIXTURES ARE OF EQUAL PERFORMANCE (WITH EQUAL OR LOWER INPUT WATTAGE) TO THE SPECIFIED PRODUCTS (APPLIES TO ALL FIXTURES IN ALL SPACES.)
22. EVERY SPACE ENCLOSED BY FLOOR TO CEILING WALLS SHALL BE PROVIDED WITH A MINIMUM OF ONE MANUAL LIGHTING SWITCH AND ONE CEILING MOUNTED OCCUPANCY SENSOR. ADDITIONAL CONTROLS SHALL BE AS INDICATED ON THE PLAN OR AS SPECIFIED ELSEWHERE.

DORE + WHITTIER

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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

SHEET TITLE:
LIGHTING FIXTURE SCHEDULE

SHEET NUMBER:
E0.02

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt

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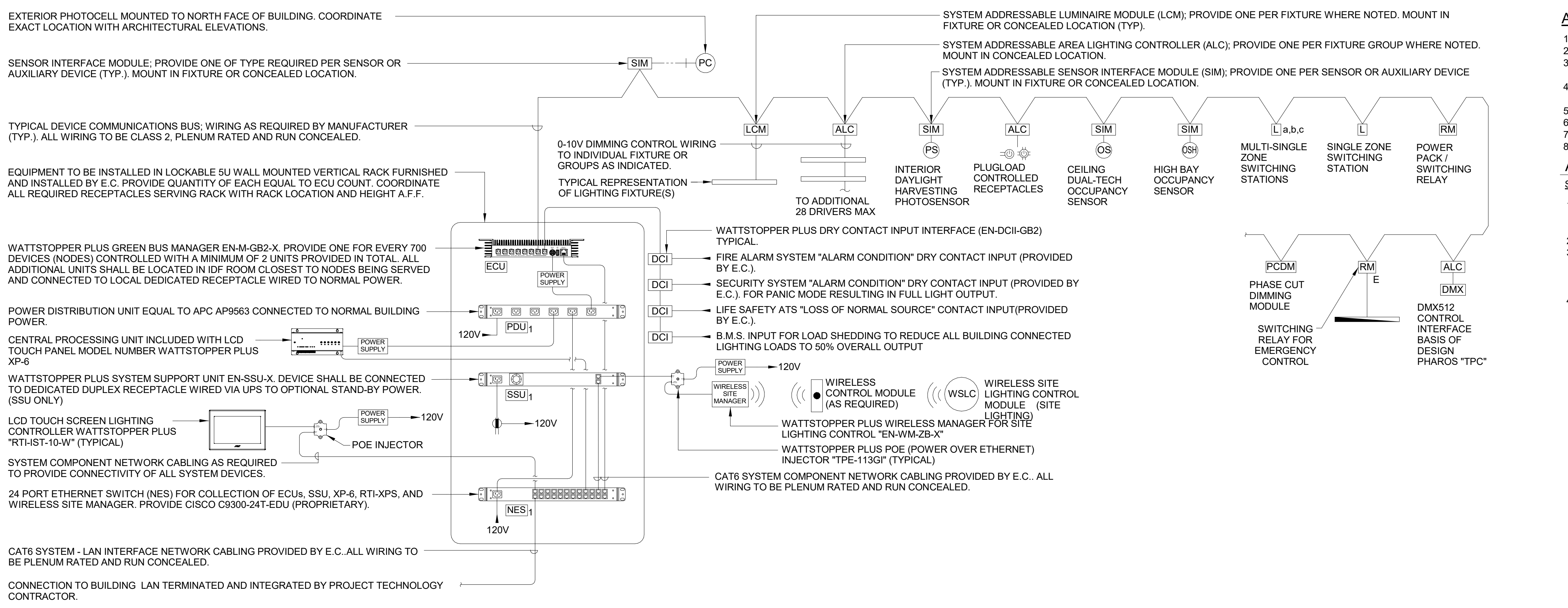

EXTERIOR PHOTOCELL MOUNTED TO NORTH FACE OF BUILDING. COORDINATE EXACT LOCATION WITH ARCHITECTURAL ELEVATIONS.
SENSOR INTERFACE MODULE; PROVIDE ONE OF TYPE REQUIRED PER SENSOR OR AUXILIARY DEVICE (TYP.). MOUNT IN FIXTURE OR CONCEALED LOCATION.
TYPICAL DEVICE COMMUNICATIONS BUS; WIRING AS REQUIRED BY MANUFACTURER (TYP.). ALL WIRING TO BE CLASS 2, PLENUM RATED AND RUN CONCEALED.
EQUIPMENT TO BE INSTALLED IN LOCKABLE 5U WALL MOUNTED VERTICAL RACK FURNISHED AND INSTALLED BY E.C. PROVIDE QUANTITY OF EACH EQUAL TO ECU COUNT. COORDINATE ALL REQUIRED RECEPTACLES SERVING RACK WITH RACK LOCATION AND HEIGHT A.F.F.
WATTSTOPPER PLUS GREEN BUS MANAGER EN-M-GB2-X. PROVIDE ONE FOR EVERY 700 DEVICES (NODES) CONTROLLED WITH A MINIMUM OF 2 UNITS PROVIDED IN TOTAL. ALL ADDITIONAL UNITS SHALL BE LOCATED IN IDF ROOM CLOSEST TO NODES BEING SERVED AND CONNECTED TO LOCAL DEDICATED RECEPTACLE WIRED TO NORMAL POWER.
POWER DISTRIBUTION UNIT EQUAL TO APC AP9563 CONNECTED TO NORMAL BUILDING POWER.
CENTRAL PROCESSING UNIT INCLUDED WITH LCD TOUCH PANEL MODEL NUMBER WATTSTOPPER PLUS XP-6
WATTSTOPPER PLUS SYSTEM SUPPORT UNIT EN-SSU-X. DEVICE SHALL BE CONNECTED TO DEDICATED DUPLEX RECEPTACLE WIRED VIA UPS TO OPTIONAL STAND-BY POWER. (SSU ONLY)
LCD TOUCH SCREEN LIGHTING CONTROLLER WATTSTOPPER PLUS "RTI-IST-10-W" (TYPICAL)
POE INJECTOR
SYSTEM COMPONENT NETWORK CABLING AS REQUIRED TO PROVIDE CONNECTIVITY OF ALL SYSTEM DEVICES.
24 PORT ETHERNET SWITCH (NES) FOR COLLECTION OF ECUs, SSU, XP-6, RTI-XPS, AND WIRELESS SITE MANAGER. PROVIDE CISCO C9300-24T-EDU (PROPRIETARY).
CAT6 SYSTEM - LAN INTERFACE NETWORK CABLING PROVIDED BY E.C..ALL WIRING TO BE PLENUM RATED AND RUN CONCEALED.
CONNECTION TO BUILDING LAN TERMINATED AND INTEGRATED BY PROJECT TECHNOLOGY CONTRACTOR.
SIM
PC
LCM
ALC
SIM
PS
ALC
SIM
OS
SIM
OSH
L a,b,c
L
RM
0-10V DIMMING CONTROL WIRING TO INDIVIDUAL FIXTURE OR GROUPS AS INDICATED.
TYPICAL REPRESENTATION OF LIGHTING FIXTURE(S)
TO ADDITIONAL 28 DRIVERS MAX
INTERIOR DAYLIGHT HARVESTING PHOTOSENSOR
PLUGLOAD CONTROLLED RECEPTACLES
CEILING DUAL-TECH OCCUPANCY SENSOR
HIGH BAY OCCUPANCY SENSOR
MULTI-SINGLE ZONE SWITCHING STATIONS
SINGLE ZONE SWITCHING STATION
POWER PACK / SWITCHING RELAY
SYSTEM ADDRESSABLE LUMINAIRE MODULE (LCM); PROVIDE ONE PER FIXTURE WHERE NOTED. MOUNT IN FIXTURE OR CONCEALED LOCATION (TYP).
SYSTEM ADDRESSABLE AREA LIGHTING CONTROLLER (ALC); PROVIDE ONE PER FIXTURE GROUP WHERE NOTED. MOUNT IN CONCEALED LOCATION.
SYSTEM ADDRESSABLE SENSOR INTERFACE MODULE (SIM); PROVIDE ONE PER SENSOR OR AUXILIARY DEVICE (TYP.). MOUNT IN FIXTURE OR CONCEALED LOCATION.
ECU
POWER SUPPLY
PDU 1
120V
POWER SUPPLY
SSU 1
120V
POWER SUPPLY
120V
NES 1
120V
DCI
DCI
DCI
DCI
WATTSTOPPER PLUS DRY CONTACT INPUT INTERFACE (EN-DCII-GB2) TYPICAL.
FIRE ALARM SYSTEM "ALARM CONDITION" DRY CONTACT INPUT (PROVIDED BY E.C.).
SECURITY SYSTEM "ALARM CONDITION" DRY CONTACT INPUT (PROVIDED BY E.C.). FOR PANIC MODE RESULTING IN FULL LIGHT OUTPUT.
LIFE SAFETY ATS "LOSS OF NORMAL SOURCE" CONTACT INPUT(PROVIDED BY E.C.).
B.M.S. INPUT FOR LOAD SHEDDING TO REDUCE ALL BUILDING CONNECTED LIGHTING LOADS TO 50% OVERALL OUTPUT
POWER SUPPLY
120V
WIRELESS SITE MANAGER
WIRELESS CONTROL MODULE (AS REQUIRED)
WSLC
WIRELESS SITE LIGHTING CONTROL MODULE (SITE LIGHTING)
WATTSTOPPER PLUS WIRELESS MANAGER FOR SITE LIGHTING CONTROL "EN-WM-ZB-X"
WATTSTOPPER PLUS POE (POWER OVER ETHERNET) INJECTOR "TPE-113GI" (TYPICAL)
CAT6 SYSTEM COMPONENT NETWORK CABLING PROVIDED BY E.C.. ALL WIRING TO BE PLENUM RATED AND RUN CONCEALED.
PCDM
PHASE CUT DIMMING MODULE
RM
E
SWITCHING RELAY FOR EMERGENCY CONTROL
ALC
DMX
DMX512 CONTROL INTERFACE BASIS OF DESIGN PHAROS "TPC"

1 / E0.03 AUTOMATED LIGHTING CONTROL SYTEM ONE-LINE DIAGRAM

AUTOMATED LIGHTING CONTROL SYSTEM NOTES:

1. PROVIDE SWITCHING AND 0-10V DIMMING CONTROL FOR ALL LIGHTING (REFER TO PLANS) WITH PRESETS VIA LCM MODULES AND ACCESSORY POWER PACKS.
2. PROVIDE ALL SYSTEM COMPONENTS (AND WARRANTIES) FROM A SINGLE MANUFACTURER EXCEPT WHERE OTHERWISE SPECIFIED.
3. PROVIDE GANGED MASTER AND LOCAL SWITCHES AT LOCATION AS INDICATED FOR USER CONTROL OF LIGHTING (UNDER COMMON MULTI-GANG PLATE).ALL SWITCHES SHALL BE PROVIDED WITH ENGRAVED LABELS ON PLATES DESIGNATING THEIR FUNCTION. FILL FOR ENGRAVED LETTERING SHALL BE AS DIRECTED BY THE ARCHITECT.
4. PROVIDE ENERGY MONITORING AND REPORTING MODULE TO ALLOW FOR ALL LIGHTING ELECTRICAL CONSUMPTION TO BE RECORDED, TRENDED, AND PASSED TO THE BMS SYSTEM VIA THE BACNET IP INTERFACE.
5. THE BASIS-OF-DESIGN FOR THIS SYSTEM IS THE WATTSTOPPER PLUS SYSTEM (W/ POLARIS 3D AND PCS SOFTWARE)
6. REFER TO THE "ALCS METHODS OF OPERATION NOTES" FOR SYSTEM SETUP REQUIREMENTS.
7. ALCS VENDOR SHALL ASSIST THE BMS SUB-SUB CONTRACTOR WITH ALL MAPPING OF BACNET DEVICES / POINTS.
8. LUTRON, N-LIGHT, CRESTRON, OR EQUAL ARE ACCEPTABLE MANUFACTURER OPTIONS.

ALCS METHODS OF OPERATION NOTES

SENSOR OPERATIONS

1. INTERIOR PHOTOSENSORS (ADDRESSABLE): EACH PHOTOSENSOR SHALL BE PROGRAMMED TO MAINTAIN FOOTCANDLE SETPOINTS ESTABLISHED FOR EACH SPACE DURING SYSTEM SETUP AND COMMISSIONING. DIMMING DEADBANDS AND FADE/RISE RATES SHALL BE ESTABLISHED TO PROVIDE SMOOTH, NON-INTRUSIVE, CHANGES IN SPACE LIGHT LEVELS IN RESPONSE TO CHANGING DAYLIGHT CONTRIBUTIONS AT ANY GIVEN TIME.
2. EXTERIOR PHOTOCELLS (ADDRESSABLE): SENSOR SHALL BE PROGRAMMED TO TURN SITE LIGHTING "ON" AT DUSK AND TURN LIGHTS "OFF" AT DAWN. TIMED SCHEDULE PRESETS WILL DETERMINE OUTPUT LEVELS.
3. OCCUPANCY SENSORS (ADDRESSABLE): EACH OCCUPANCY SENSOR SHALL BE PROGRAMMED TO OPERATE AS INDICATED IN AUTOMATED LIGHTING CONTROL SYSTEM SEQUENCE OF OPERATIONS 2/E0.2 UNLESS OTHERWISE NOTED. SENSORS SHALL MAINTAIN 100% DIMMING LEVELS LIGHTING FOR AS LONG AS MOTION IS DETECTED. ABSENCE OF MOTION DETECTION FOR TIME PERIODS AS INDICATED IN SEQUENCE OF OPERATIONS 2/E0.2 SHALL PROMPT A RESPONSE AS INDICATED. FADE/RISE RATES SHALL BE ESTABLISHED TO PROVIDE SMOOTH, NON-INTRUSIVE, CHANGES IN SPACE LIGHT LEVELS. MOTION DETECTED AT ANYTIME PRIOR TO THE FULL TIME-OUT SHALL RETURN THE LIGHTING TO THE NORMAL LEVEL.
4. SENSOR ADJUSTMENTS FOR ALL FUNCTIONS SHALL BE TURNED TO THE MINIMUM ON EACH DEVICE AND ADJUSTED SOLELY THROUGH THE SYSTEM SOFTWARE.

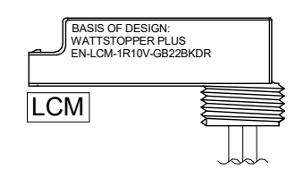
ZONING & PRESET LEVELS

1. INTERIOR SPACES SHALL BE PROGRAMMED AS INDICATED IN SEQUENCE OF OPERATIONS DETAIL 2/E003. LEVELS MAY BE ADJUSTED OUTSIDE OF THESE PRESETS VIA THE LOCAL WALL STATION. HOWEVER, WHERE PHOTOSENSORS ARE PRESENT THE LIGHTING SHALL NOT BE ALLOWED EXCEED THE FOOTCANDLE LEVEL ESTABLISHED BY THE SPACE'S PHOTOSENSOR BASED ON AVAILABLE DAYLIGHT CONTRIBUTION AT ANY GIVEN TIME.
2. LIGHTING WITHIN THE DAYLIGHT ZONE ADJACENT TO OPENINGS TO THE EXTERIOR SUCH AS WINDOWS AND SKYLIGHTS (DEPTH OF EACH DAYLIGHT ZONE RELATIVE TO THE DAYLIGHT OPENING SHALL BE AS DEFINED BY UTILITY COMPANY ADVANCED BUILDING PROGRAM CORE REQUIREMENTS AND COMMONWEALTH OF MASSACHUSETTS ENERGY CODE) SHALL BE PROGRAMMED TO ALLOW FOR CONTROL SEPARATE FROM THE REMAINDER OF THE SPACE.
3. EXTERIOR LIGHTING SHALL BE PROGRAMMED FOR 50% (POST-CURFEW) AND 100% (PRE-CURFEW) DIMMING LEVELS TO BE ACTIVATED VIA PHOTOCELL SET POINTS AND TIMED SCHEDULES. PROVIDE (1) WIRELESS SITE LIGHTING CONTROL MODULE "WSLC" PER EACH POLE MOUNTED LIGHT FIXTURE. COORDINATE WITH POLE FIXTURE MANUFACTURER. PROVIDE WIRELESS MANAGER & WIRELESS CONTROL MODULES REQUIRED FOR COMPLETE CONTROL OF SITE LIGHTING.
4. INTERIOR AND EXTERIOR PATHS OF EGRESS SHALL BE PROGRAMMED TO ACTIVATE AT 100% LEVELS UPON RECEIPT OF AN ALARM SIGNAL FROM THE LIFE SAFETY AUTOMATIC TRANSFER SWITCH, FIRE ALARM SYSTEM, AND SECURITY SYSTEM. LIGHTING LEVELS SHALL BE MAINTAINED AT 100% LEVELS REGARDLESS OF SUBSEQUENT INPUT REQUESTS UNTIL THE ORIGINATING ALARM SIGNAL IS RESTORED TO A NORMAL CONDITION. CONTACT CLOSURE OUTPUTS FROM EACH PIECE OF EQUIPMENT / SYSTEM SHALL BE PROVIDED BY THE RESPECTIVE VENDOR WITH COORDINATION OF ALL PROGRAMMING REQUIRED TO PROVIDE THE FUNCTIONALITY DESCRIBED.
5. REFER TO SPECIFICATIONS FOR FURTHER CONTROL SCENARIOS SUCH AS LOAD SHEDDING, PEAK LIMITING, TASK TUNING, ETC..
6. EXACT ZONING AND LEVEL PROGRAMMING SHALL BE MAPPED OUT (VIA BUILDING FLOOR & SITE GRAPHICS IN SYSTEM SOFTWARE) WITH THE OWNER OR THEIR REPRESENTATIVE PRIOR TO SYSTEM SETUP AND PROGRAMMING OF THE SYSTEM. ALL PROGRAMMING SHALL BE CONFIRMED AND COMPLETED PRIOR TO COMMISSIONING NO OWNER REQUESTED PROGRAMMING SHALL BE ALLOWED WHICH WILL VIOLATE THE LEED PROGRAM REQUIREMENTS OR COMMONWEALTH OF MASSACHUSETTS BUILDING, ELECTRICAL, AND ENERGY CODES OR ANY CODES. REFERENCED THEREIN.

	OCCUPANCY SENSORS					DAYLIGHT SENSORS		WALL SWITCH OPERATION							TIME CLOCK OPERATION			OTHER		
	VACANCY MODE	OCCUPANCY MODE	DUAL TECHNOLOGY SENSOR	SENSOR TIMEOUT PERIODS	GENERAL NOTES	TARGET LIGHTING LEVEL	GENERAL NOTES	SCHEDULE OVERRIDE SWITCH	MANUAL (ON/OFF)	MANUAL DIMMING	SCENE CONTROL	GRAPHICAL TOUCHSCREEN	KEY SWITCH	GENERAL NOTES	TIME CLOCK SCHEDULE ON	TIME CLOCK SCHEDULE OFF	GENERAL NOTES	EXTERIOR LOCATION	PLUG LOAD CONTROLLER	GENERAL NOTES
OFFICES	X	-	X	10 MIN -> 25% 15 MIN -> OFF	REFER TO NOTE #1,2,4	30 FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
LOBBY/VESTIBULE	-	X	X	30 MIN -> 25%	REFER TO NOTE #1,2,3,4	20 FC	REFER TO NOTE #2,4	-	-	-	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
CORRIDOR	-	X	X	30 MIN -> 25%	REFER TO NOTE #1,2,4	20 FC	REFER TO NOTE #2,4	-	-	-	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
TRAINING ROOM	X	-	X	30 MIN -> OFF	REFER TO NOTE #1,2,4	30FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
STORAGE	X	-	X	10 MIN -> OFF	REFER TO NOTE #1,2,4	20 FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
STAIRWELL	-	X	X	10 MIN -> 50%	REFER TO NOTE #1,2,4	20 FC	REFER TO NOTE #2,4	-	-	-	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
BATHROOM	-	X	X	15 MIN -> OFF	REFER TO NOTE #1,2,4	20 FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
GARAGE SPACES	-	X	X	30 MIN -> 10% 45 MIN -> OFF	REFER TO NOTE #1,2,3,4	50FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
SECURED AREAS	-	-	-	-	-	-	-	-	X	X	-	X	-	-	-	-	-	-	-	-
LIBRARY	X	-	X	30 MIN -> OFF	REFER TO NOTE #1,2,4	30FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
EQUIPMENT ROOM	X	-	X	10 MIN -> OFF	REFER TO NOTE #1,2,4	20 FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
FITNESS ROOM	X	-	X	30 MIN -> OFF	REFER TO NOTE #1,2,4	40FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
PARKING LOT	-	-	-	-	-	.5 FC	REFER TO NOTE #2,4	-	-	-	-	-	-	-	DUSK	DAWN	REFER TO NOTE #1	-	-	-
BUILDING FACADE	-	-	-	-	-	2 FC	REFER TO NOTE #2,4	-	-	-	-	-	-	-	DUSK	DAWN	REFER TO NOTE #1	-	-	-
LOCKER ROOM	X	-	X	15 MIN -> OFF	REFER TO NOTE #1,2,4	30FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
ROLL CALL	X	-	X	30 MIN -> OFF	REFER TO NOTE #1,2,4	30FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
CONFERENCE RM.	X	-	X	15 MIN -> OFF	REFER TO NOTE #1,2,4	30FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-
KITCHEN / DINING	X	-	X	30 MIN -> OFF	REFER TO NOTE #1,2,4	30FC	REFER TO NOTE #2,4	-	X	X	-	-	-	-	-	-	REFER TO NOTE #1	-	-	-

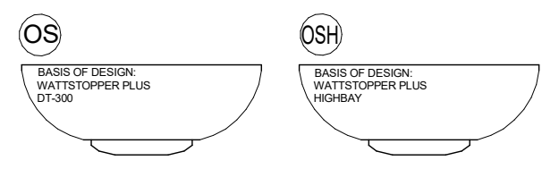
LUMINAIRE CONTROL MODULE

WIRED



1. ELECTRICAL CONTRACTOR (E.C.) SHALL PROVIDE LUMINAIRE CONTROL MODULE (LCM), ALL CABLING AND FIXTURES. E.C. TO MAKE ALL LINE AND LOW VOLTAGE CONNECTIONS TO/BETWEEN LCM AND FIXTURE DRIVERS.
2. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL 0-10V CABLES ALONG WITH ANY REQUIRED RACEWAY, SUPPORTS, HARDWARE, ETC. TO MAKE CONNECTIONS FROM LCM TO DRIVER WHERE DISTANCE BETWEEN THEM EXCEEDS THE LENGTHS OF WHIPS ON LCM AND DRIVERS.
3. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL 0-10V CABLES ALONG WITH AND REQUIRED RACEWAY, SUPPORTS, HARDWARE, ETC. TO MAKE CONNECTIONS BETWEEN DRIVERS.

OCCUPANCY SENSOR



1. ELECTRICAL CONTRACTOR (E.C.) SHALL PROVIDE SENSOR INTERFACE MODULES (SIM), ALL CABLING AND ASSOCIATED SENSOR DEVICES. E.C. TO PROVIDE CABLE AS REQUIRED AND MAKE ALL WIRING CONNECTIONS TO/BETWEEN SIM AND SENSOR.
2. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CABLES (EXCEPT GREENBUS FURNISHED BY ENCELIUM TO E.C.) ALONG WITH ANY REQUIRED RACEWAY, SUPPORTS, HARDWARE, ETC. TO MAKE CONNECTIONS FROM SIM TO SENSOR / DEVICE WHERE DISTANCE BETWEEN THEM EXCEEDS THE LENGTH OF THE WHIPS ON SIM AND SENSOR / DEVICE.

SENSOR INTERFACE MODULE

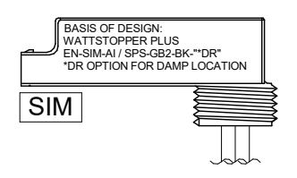


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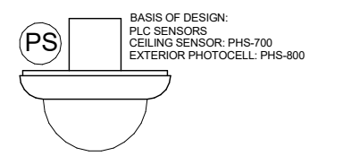
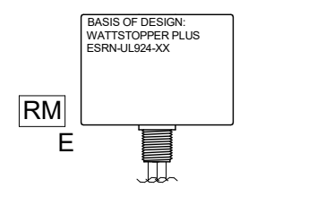
PHOTO SENSOR



1. INTERIOR PHOTOSENSORS (ADDRESSABLE): EACH PHOTOSENSOR SHALL BE PROGRAMMED TO MAINTAIN FOOTCANDLE SETPOINTS ESTABLISHED FOR EACH SPACE DURING SYSTEM SETUP AND COMMISSIONING. DIMMING DEADBANDS AND FADE/RISE RATES SHALL BE ESTABLISHED TO PROVIDE SMOOTH, NON-INTRUSIVE, CHANGES IN SPACE LIGHT LEVELS IN RESPONSE TO CHANGING DAYLIGHT CONTRIBUTIONS AT ANY GIVEN TIME.
2. EXTERIOR PHOTOCELLS (ADDRESSABLE): SENSOR SHALL BE PROGRAMMED TO TURN SITE LIGHTING "ON" AT DUSK AND TURN LIGHTS "OFF" AT DAWN. TIMED SCHEDULE PRESETS WILL DETERMINE OUTPUT LEVELS.

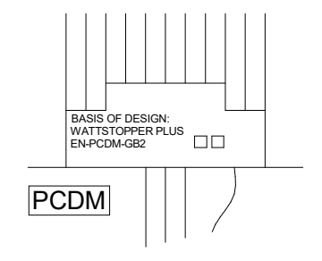
EMERGENCY LIGHTING RELAY



1. ELECTRICAL CONTRACTOR (E.C.) SHALL PROVIDE LUMINAIRE CONTROL MODULE (LCM), ALL CABLING AND FIXTURES. E.C. TO MAKE ALL LINE AND LOW VOLTAGE CONNECTIONS TO/BETWEEN LCM AND FIXTURE DRIVERS.
2. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL 0-10V CABLES ALONG WITH ANY REQUIRED RACEWAY, SUPPORTS, HARDWARE, ETC. TO MAKE CONNECTIONS FROM LCM TO DRIVER WHERE DISTANCE BETWEEN THEM EXCEEDS THE LENGTHS OF WHIPS ON LCM AND DRIVERS.
3. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL 0-10V CABLES ALONG WITH AND REQUIRED RACEWAY, SUPPORTS, HARDWARE, ETC. TO MAKE CONNECTIONS BETWEEN DRIVERS.

PHASE CUT DIMMING MODULE

WIRED



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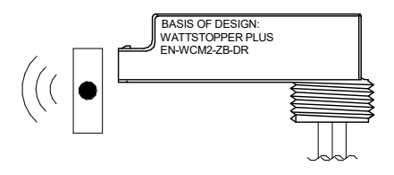
3. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL 0-10V CABLES ALONG WITH AND REQUIRED RACEWAY, SUPPORTS, HARDWARE, ETC. TO MAKE CONNECTIONS BETWEEN DRIVERS.

WIRELESS CONTROL MODULE

WIRELESS



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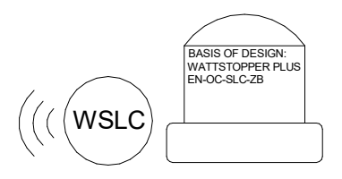
WIRELESS CONTROL MODULE

WIRELESS



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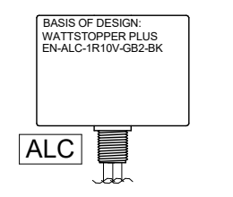
3. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL 0-10V CABLES ALONG WITH AND REQUIRED RACEWAY, SUPPORTS, HARDWARE, ETC. TO MAKE CONNECTIONS BETWEEN DRIVERS.

AREA LIGHTING CONTROLLER

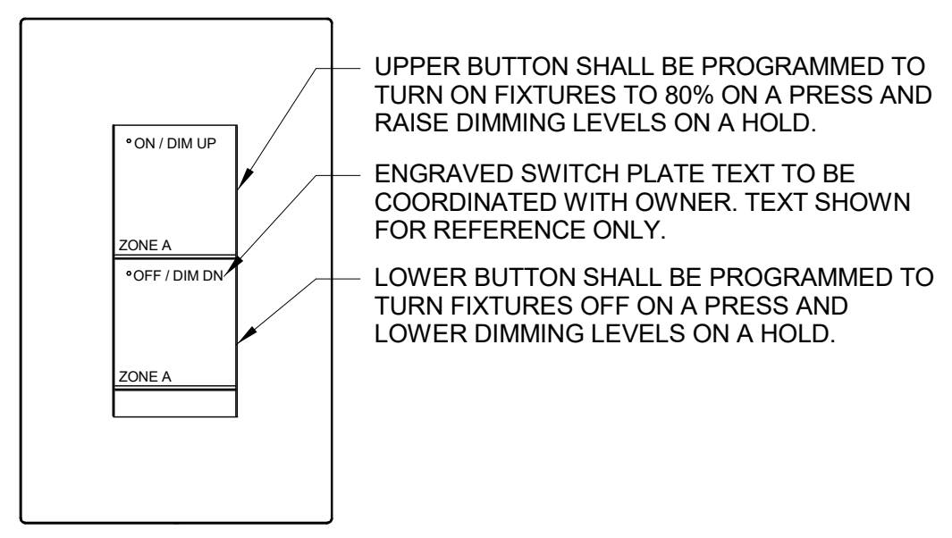
WIRED



1. ELECTRICAL CONTRACTOR (E.C.) TO PROVIDE AREA LIGHTING CONTROLLER (ALC), ALL CABLING, AND FIXTURES. E.C. TO MAKE ALL LINE VOLTAGE AND LOW VOLTAGE WIRING CONNECTIONS TO/BETWEEN ALC AND FIXTURE BALLASTS/DRIVERS IN FIELD.
2. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL 0-10V CABLES ALONG WITH ANY REQUIRED RACEWAY, SUPPORTS, HARDWARE, ETC. TO MAKE ALL NECESSARY CONNECTIONS.
3. MAXIMUM OF 30 0-10V DIMMING BALLASTS/DRIVERS WITH ALC IN 0-10V DIMMING CONFIGURATION.
4. MAXIMUM OF 100FT OF 0-10V CABLING (VIOLET & GREY) FROM FARTHEST BALLAST/DRIVER IN GROUP TO ALC.

CONTROL SEQUENCE NOTES:

1. ALL SEQUENCE OF OPERATIONS LISTED IN THE TABLE ABOVE SHALL BE USED TO SERVE AS A BASIS FOR DESIGN. FINAL CONTROL PROGRAMMING AND TIME CONTROLS TO BE REVIEWED AND APPROVED BY OWNER OR OWNERS PROJECT MANAGER PRIOR TO SYSTEM COMMISSIONING.
2. SENSOR QUANTITIES SHALL BE COORDINATED WITH WHAT IS SHOWN ON FLOOR PLANS. SENSORS TO BE LOCATED AND INSTALLED PER MANUFACTURES RECOMMENDATIONS.
3. ALL SPACES WITHIN THE BUILDING WHERE THE OCCUPANCY SENSOR WILL EXCEED A MOUNTING HEIGHT OF 15' AFF. THE SENSOR PROVIDED SHALL BE OF THE HIGH BAY VARIETY.
4. ALL SENSOR OPERATIONS SHALL BE IN ACCORDANCE WITH IECC 2018, IESNA RECOMMENDATIONS, AND LOCAL APPLICABLE ENERGY CODES IRREGARDLESS OF INFORMATION SHOWN IN SCHEDULE ABOVE.


ON / DIM UP
ZONE A
OFF / DIM DN
ZONE A
UPPER BUTTON SHALL BE PROGRAMMED TO TURN ON FIXTURES TO 80% ON A PRESS AND RAISE DIMMING LEVELS ON A HOLD.
ENGRAVED SWITCH PLATE TEXT TO BE COORDINATED WITH OWNER. TEXT SHOWN FOR REFERENCE ONLY.
LOWER BUTTON SHALL BE PROGRAMMED TO TURN FIXTURES OFF ON A PRESS AND LOWER DIMMING LEVELS ON A HOLD.

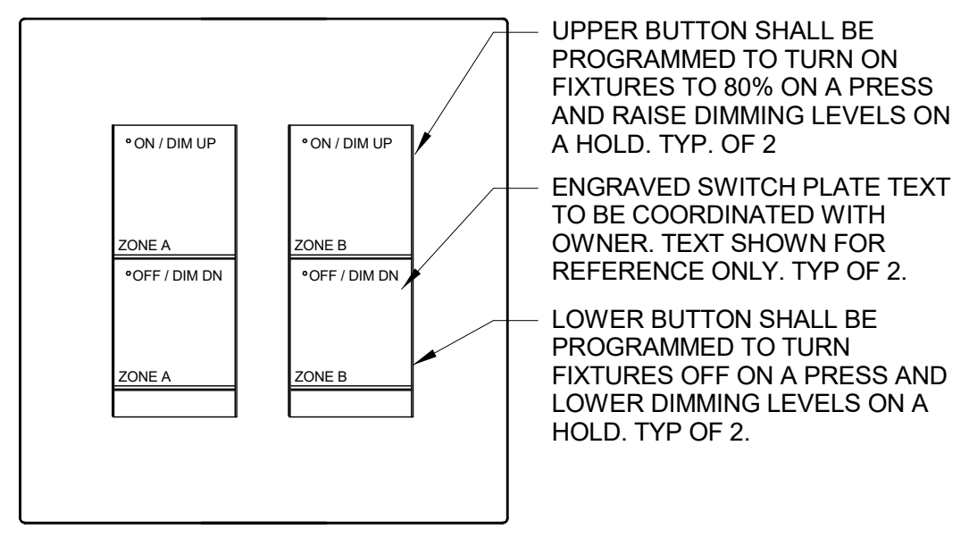
2 / E0.03 STANDARD ZONE CONTROLLER DETAIL

SCALE : N.T.S.

SYMBOL REF: L a

NOTES:

1. BASIS OF DESIGN FOR SWITCH SHOWN IS WATTSTOPPER PLUS MODEL NUMBER "EN-WS-2B-GB2-WH" AND (1)"EN-WS-2B-CBK-WH"
2. ALL ENGRAVED SWITCH PLATES SHALL BE COORDINATED WITH OWNER OR OWNERS PROJECT MANAGER PRIOR TO CONTROL STATION PROCUREMENT.
3. SWITCH STATIONS BEING UTILIZED TO CONTROL FIXTURES WITHIN A DAY LIGHTING ZONE SHALL BE PROGRAMMED AS TO NOT ALLOW A MANUAL OVERRIDE OF THE DIMMING LEVELS SET BY THE PHOTO SENSOR IN THE SPACE.
4. SWITCH SHALL BE PROGRAMMED TO MANUAL OVERRIDE TIME SCHEDULE INDICATED FOR 60 MINUTE INTERVALS.


ON / DIM UP
ZONE A
OFF / DIM DN
ZONE A
ON / DIM UP
ZONE B
OFF / DIM DN
ZONE B
UPPER BUTTON SHALL BE PROGRAMMED TO TURN ON FIXTURES TO 80% ON A PRESS AND RAISE DIMMING LEVELS ON A HOLD. TYP. OF 2
ENGRAVED SWITCH PLATE TEXT TO BE COORDINATED WITH OWNER. TEXT SHOWN FOR REFERENCE ONLY. TYP OF 2.
LOWER BUTTON SHALL BE PROGRAMMED TO TURN FIXTURES OFF ON A PRESS AND LOWER DIMMING LEVELS ON A HOLD. TYP OF 2.

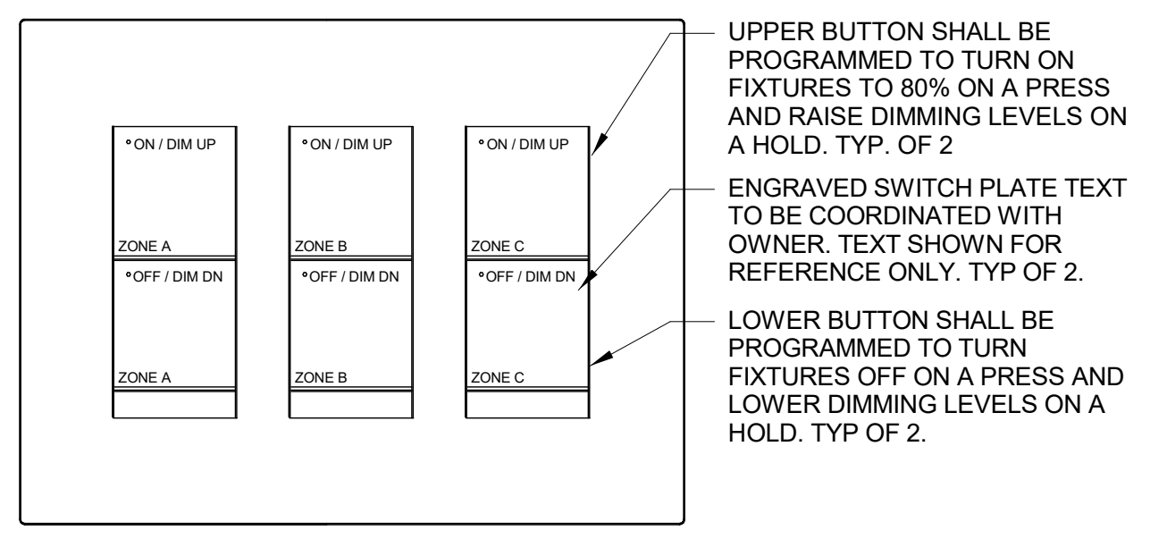
3 / E0.03 STANDARD 2 ZONE CONTROL DETAIL

SCALE : N.T.S.

SYMBOL REF: L a,b

NOTES:

1. BASIS OF DESIGN FOR SWITCH SHOWN IS WATTSTOPPER PLUS MODEL NUMBER (2)"EN-WS-2B-GB2-WH" AND (1)"EN-WS-2B-CBK-WH"
2. ALL ENGRAVED SWITCH PLATES SHALL BE COORDINATED WITH OWNER OR OWNERS PROJECT MANAGER PRIOR TO CONTROL STATION PROCUREMENT.
3. SWITCH STATIONS BEING UTILIZED TO CONTROL FIXTURES WITHIN A DAY LIGHTING ZONE SHALL BE PROGRAMMED AS TO NOT ALLOW A MANUAL OVERRIDE OF THE DIMMING LEVELS SET BY THE PHOTO SENSOR IN THE SPACE.
4. SWITCH SHALL BE PROGRAMMED TO MANUAL OVERRIDE TIME SCHEDULE INDICATED FOR 60 MINUTE INTERVALS.


ON / DIM UP
ZONE A
OFF / DIM DN
ZONE A
ON / DIM UP
ZONE B
OFF / DIM DN
ZONE B
ON / DIM UP
ZONE C
OFF / DIM DN
ZONE C
UPPER BUTTON SHALL BE PROGRAMMED TO TURN ON FIXTURES TO 80% ON A PRESS AND RAISE DIMMING LEVELS ON A HOLD. TYP. OF 2
ENGRAVED SWITCH PLATE TEXT TO BE COORDINATED WITH OWNER. TEXT SHOWN FOR REFERENCE ONLY. TYP OF 2.
LOWER BUTTON SHALL BE PROGRAMMED TO TURN FIXTURES OFF ON A PRESS AND LOWER DIMMING LEVELS ON A HOLD. TYP OF 2.

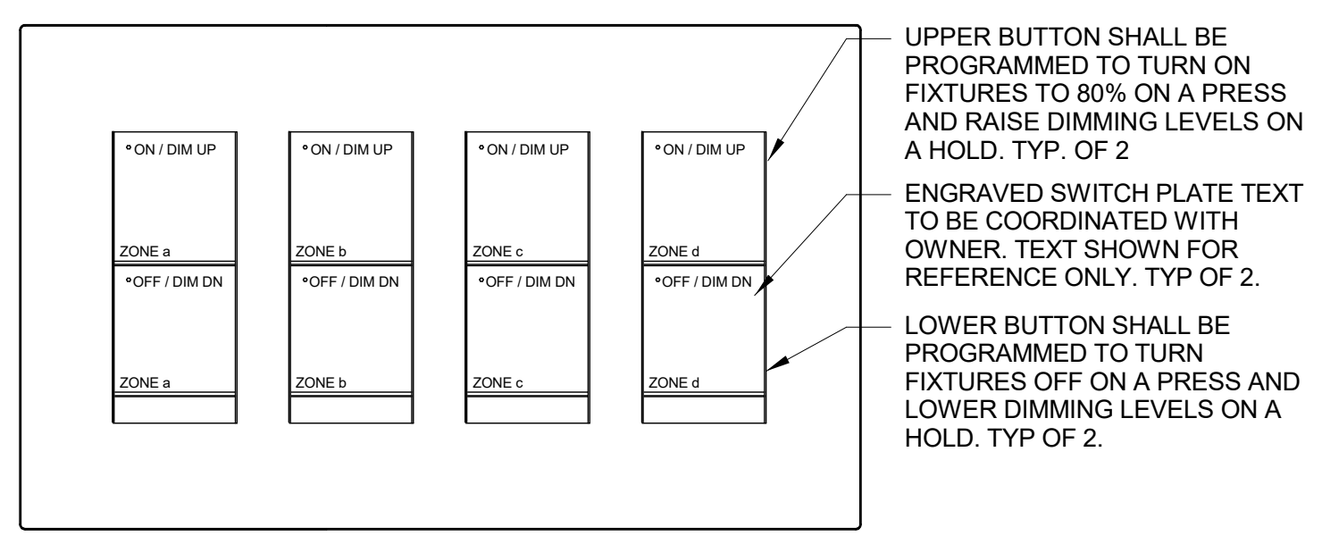
4 / E0.03 STANDARD 3 ZONE CONTROLLER DETAIL

SCALE : N.T.S.

SYMBOL REF: L a,b,c

NOTES:

1. BASIS OF DESIGN FOR SWITCH SHOWN IS WATTSTOPPER PLUS MODEL NUMBER (3)"EN-WS-2B-GB2-WH" AND (1)"EN-WS-2B-CBK-WH"
2. ALL ENGRAVED SWITCH PLATES SHALL BE COORDINATED WITH OWNER OR OWNERS PROJECT MANAGER PRIOR TO CONTROL STATION PROCUREMENT.
3. SWITCH STATIONS BEING UTILIZED TO CONTROL FIXTURES WITHIN A DAY LIGHTING ZONE SHALL BE PROGRAMMED AS TO NOT ALLOW A MANUAL OVERRIDE OF THE DIMMING LEVELS SET BY THE PHOTO SENSOR IN THE SPACE.
4. SWITCH SHALL BE PROGRAMMED TO MANUAL OVERRIDE TIME SCHEDULE INDICATED FOR 60 MINUTE INTERVALS.


ON / DIM UP
ZONE a
OFF / DIM DN
ZONE a
ON / DIM UP
ZONE b
OFF / DIM DN
ZONE b
ON / DIM UP
ZONE c
OFF / DIM DN
ZONE c
ON / DIM UP
ZONE d
OFF / DIM DN
ZONE d
UPPER BUTTON SHALL BE PROGRAMMED TO TURN ON FIXTURES TO 80% ON A PRESS AND RAISE DIMMING LEVELS ON A HOLD. TYP. OF 2
ENGRAVED SWITCH PLATE TEXT TO BE COORDINATED WITH OWNER. TEXT SHOWN FOR REFERENCE ONLY. TYP OF 2.
LOWER BUTTON SHALL BE PROGRAMMED TO TURN FIXTURES OFF ON A PRESS AND LOWER DIMMING LEVELS ON A HOLD. TYP OF 2.

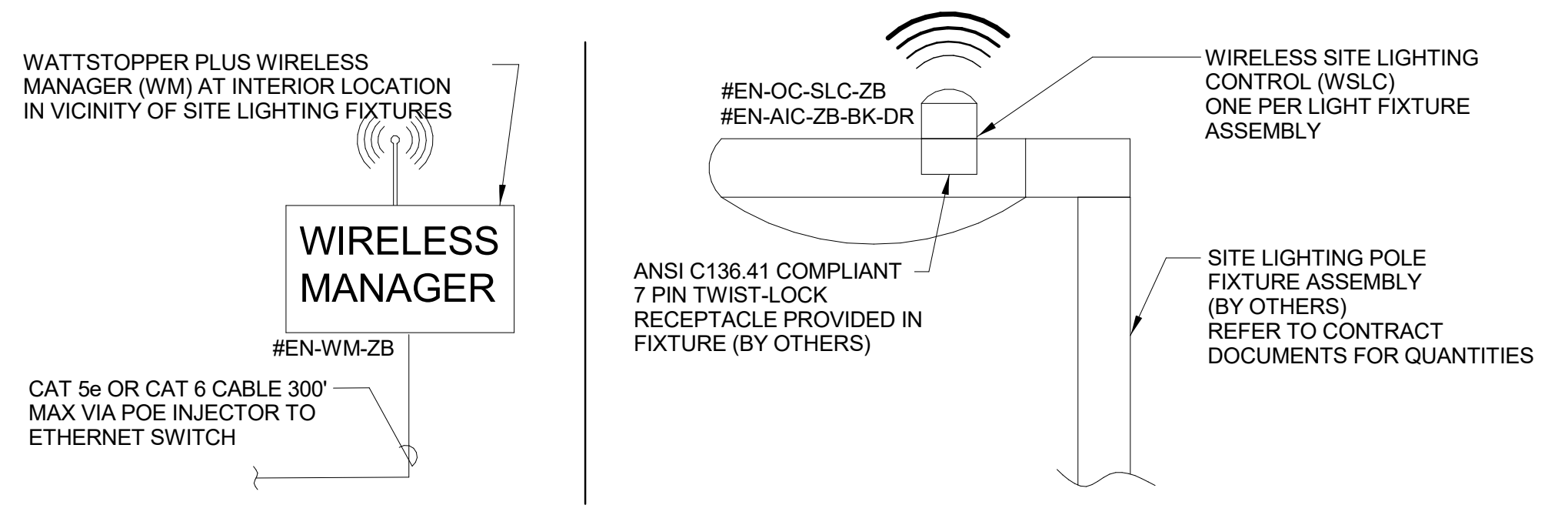
5 / E0.03 STANDARD 4 ZONE CONTROLLER DETAIL

SCALE : N.T.S.

SYMBOL REF: L a,b,c,d

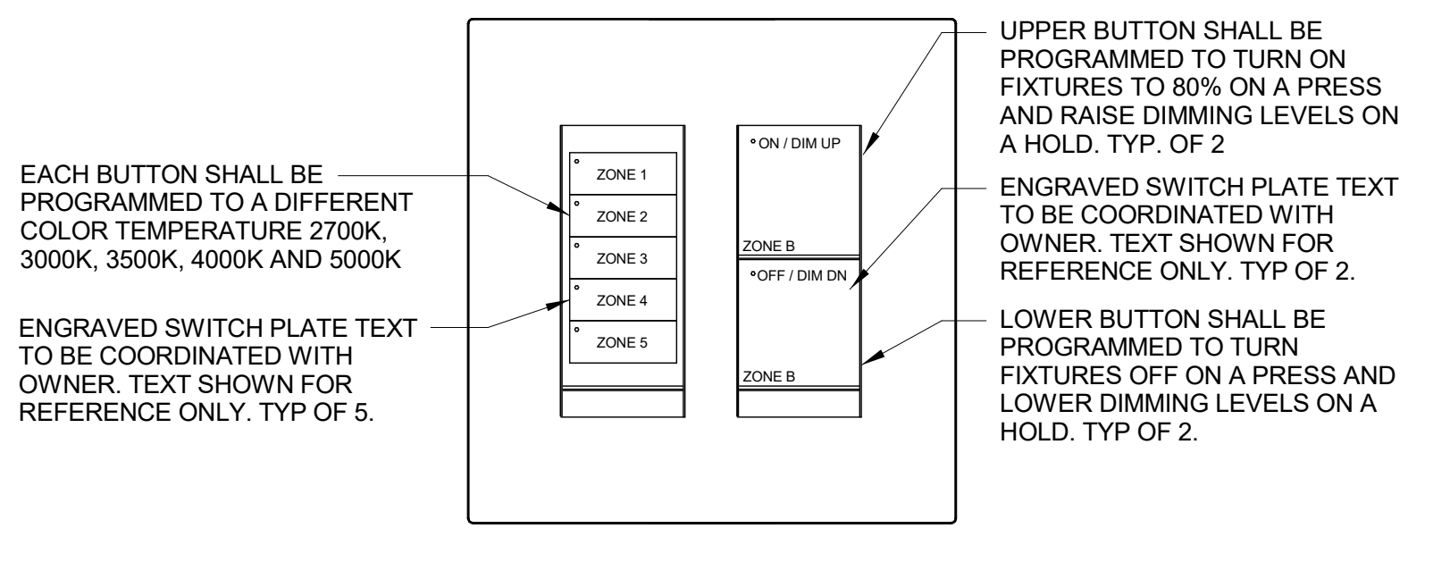
NOTES:

1. BASIS OF DESIGN FOR SWITCH SHOWN IS WATTSTOPPER PLUS MODEL NUMBER (4)"EN-WS-2B-GB2-WH" AND (1)"EN-WS-2B-CBK-WH"
2. ALL ENGRAVED SWITCH PLATES SHALL BE COORDINATED WITH OWNER OR OWNERS PROJECT MANAGER PRIOR TO CONTROL STATION PROCUREMENT.
3. SWITCH STATIONS BEING UTILIZED TO CONTROL FIXTURES WITHIN A DAY LIGHTING ZONE SHALL BE PROGRAMMED AS TO NOT ALLOW A MANUAL OVERRIDE OF THE DIMMING LEVELS SET BY THE PHOTO SENSOR IN THE SPACE.
4. SWITCH SHALL BE PROGRAMMED TO MANUAL OVERRIDE TIME SCHEDULE INDICATED FOR 60 MINUTE INTERVALS.


WATTSTOPPER PLUS WIRELESS MANAGER (WM) AT INTERIOR LOCATION IN VICINITY OF SITE LIGHTING FIXTURES
WIRELESS MANAGER
#EN-WM-ZB
CAT 5e OR CAT 6 CABLE 300' MAX VIA POE INJECTOR TO ETHERNET SWITCH
#EN-OC-SLC-ZB
#EN-AIC-ZB-BK-DR
WIRELESS SITE LIGHTING CONTROL (WSLC) ONE PER LIGHT FIXTURE ASSEMBLY
ANSI C136.41 COMPLIANT 7 PIN TWIST-LOCK RECEPTACLE PROVIDED IN FIXTURE (BY OTHERS)
SITE LIGHTING POLE FIXTURE ASSEMBLY (BY OTHERS) REFER TO CONTRACT DOCUMENTS FOR QUANTITIES

6 / E0.03 WIRELESS SITE LIGHTING DETAIL

SCALE : N.T.S.


ZONE 1
ZONE 2
ZONE 3
ZONE 4
ZONE 5
ON / DIM UP
ZONE B
OFF / DIM DN
ZONE B
EACH BUTTON SHALL BE PROGRAMMED TO A DIFFERENT COLOR TEMPERATURE 2700K, 3000K, 3500K, 4000K AND 5000K
ENGRAVED SWITCH PLATE TEXT TO BE COORDINATED WITH OWNER. TEXT SHOWN FOR REFERENCE ONLY. TYP OF 5.
UPPER BUTTON SHALL BE PROGRAMMED TO TURN ON FIXTURES TO 80% ON A PRESS AND RAISE DIMMING LEVELS ON A HOLD. TYP. OF 2
ENGRAVED SWITCH PLATE TEXT TO BE COORDINATED WITH OWNER. TEXT SHOWN FOR REFERENCE ONLY. TYP OF 2.
LOWER BUTTON SHALL BE PROGRAMMED TO TURN FIXTURES OFF ON A PRESS AND LOWER DIMMING LEVELS ON A HOLD. TYP OF 2.

7 / E0.03 CALMING ROOM 2 ZONE CONTROL DETAIL

SCALE : N.T.S.

SYMBOL REF: M a,b

NOTES:

1. BASIS OF DESIGN FOR SWITCH SHOWN IS WATTSTOPPER PLUS MODEL NUMBER (1)"EN-WS-2B-GB2-WH", (1)"EN-SW-50-ZB-W" AND (1)"EN-WS-2B-CBK-WH".
2. ALL ENGRAVED SWITCH PLATES SHALL BE COORDINATED WITH OWNER OR OWNERS PROJECT MANAGER PRIOR TO CONTROL STATION PROCUREMENT.
3. SWITCH STATIONS BEING UTILIZED TO CONTROL FIXTURES WITHIN A DAY LIGHTING ZONE SHALL BE PROGRAMMED AS TO NOT ALLOW A MANUAL OVERRIDE OF THE DIMMING LEVELS SET BY THE PHOTO SENSOR IN THE SPACE.
4. SWITCH SHALL BE PROGRAMMED TO MANUAL OVERRIDE TIME SCHEDULE INDICATED FOR 60 MINUTE INTERVALS.

DORE + WHITTIER
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260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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GGD CONSULTING ENGINEERS, INC.
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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

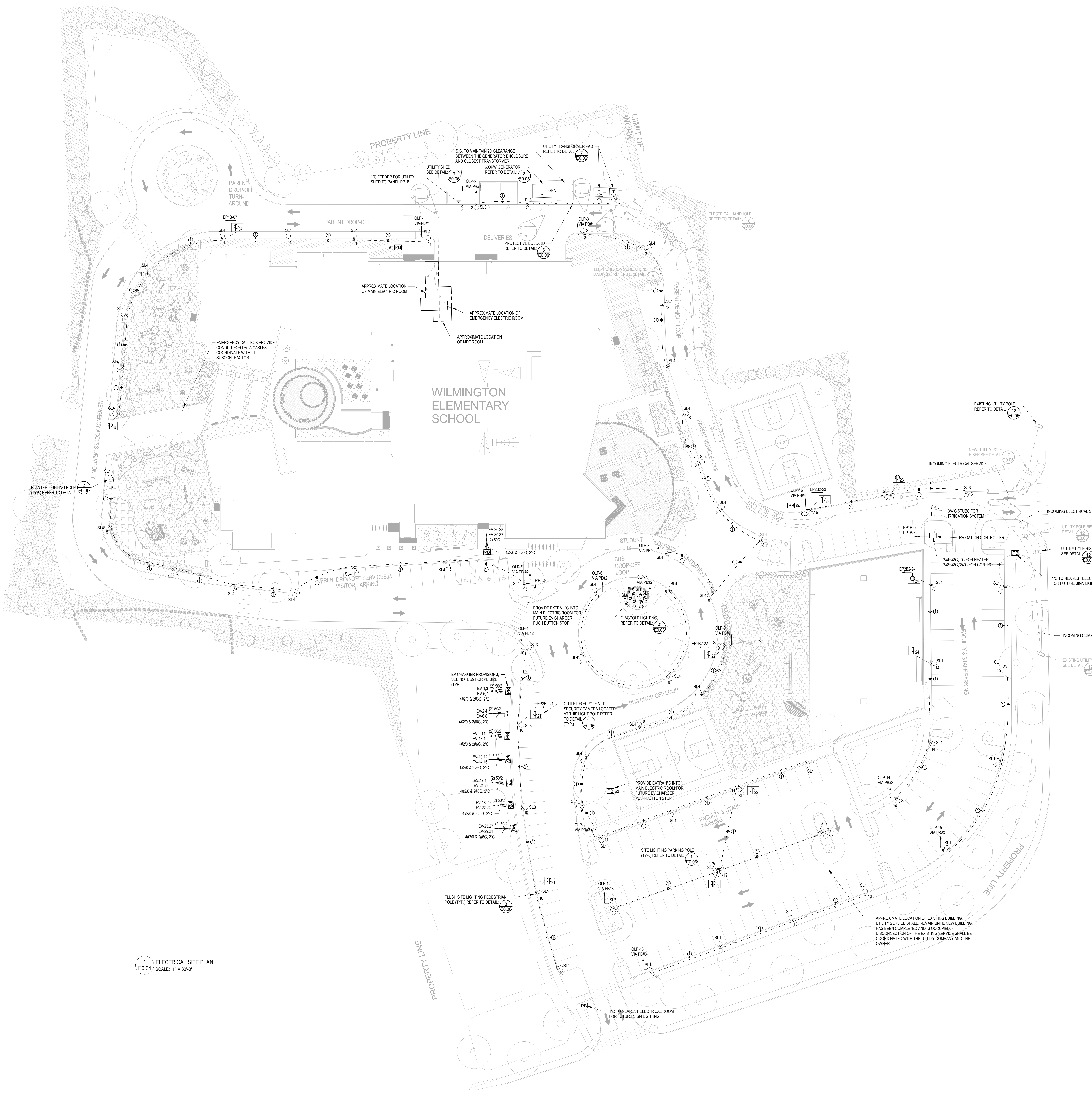
90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

SHEET TITLE:
ALCS RISER & DETAILS

SHEET NUMBER:
E0.03


PROPERTY LINE
LIMIT OF WORK
PARENT DROP-OFF TURN-AROUND
PARENT DROP-OFF
DELIVERIES
G.C. TO MAINTAIN 20' CLEARANCE BETWEEN THE GENERATOR ENCLOSURE AND CLOSEST TRANSFORMER
UTILITY TRANSFORMER PAD REFER TO DETAIL: 7 E0.06
UTILITY SHED SEE DETAIL: 9 E0.06
600KW GENERATOR REFER TO DETAIL: 8 E0.05
GEN
1"C FEEDER FOR UTILITY SHED TO PANEL PP1B
OLP-1 VIA PB#1
OLP-2 VIA PB#1
OLP-3 VIA PB#1
EP1B-67
#1 PB
PROTECTIVE BOLLARD REFER TO DETAIL: 5 E0.06
ELECTRICAL HANDHOLE, REFER TO DETAIL: 10 E0.06
TELEPHONE/COMMUNICATIONS HANDHOLE, REFER TO DETAIL: 9 E0.05
APPROXIMATE LOCATION OF MAIN ELECTRIC ROOM
APPROXIMATE LOCATION OF EMERGENCY ELECTRIC ROOM
APPROXIMATE LOCATION OF MDF ROOM
EMERGENCY CALL BOX PROVIDE CONDUIT FOR DATA CABLES. COORDINATE WITH I.T. SUBCONTRACTOR
WILMINGTON ELEMENTARY SCHOOL
EMERGENCY ACCESS DRIVE ONLY
PLANTER LIGHTING POLE (TYP.) REFER TO DETAIL: 2 E0.06
PARENT VEHICLE LOOP
STUDENT LOADING/UNLOADING ZONE
PREK. DROP-OFF SERVICES, & VISITOR PARKING
EV-26,28 EV-30,32 (2) 50/2
4#2/0 & 2#6G, 2"C
OLP-5 VIA PB #2
PB #2
PROVIDE EXTRA 1"C INTO MAIN ELECTRIC ROOM FOR FUTURE EV CHARGER PUSH BUTTON STOP
STUDENT
BUS DROP-OFF LOOP
OLP-6 VIA PB#2
OLP-7 VIA PB#2
OLP-8 VIA PB#2
OLP-9 VIA PB#2
OLP-10 VIA PB#2
FLAGPOLE LIGHTING, REFER TO DETAIL: 4 E0.06
EP2B2-22
EV CHARGER PROVISIONS, SEE NOTE #9 FOR PB SIZE (TYP.)
EV-1,3 EV-5,7 (2) 50/2 4#2/0 & 2#6G, 2"C
EV-2,4 EV-6,8 (2) 50/2 4#2/0 & 2#6G, 2"C
EV-9,11 EV-13,15 (2) 50/2 4#2/0 & 2#6G, 2"C
EV-10,12 EV-14,16 (2) 50/2 4#2/0 & 2#6G, 2"C
EV-17,19 EV-21,23 (2) 50/2 4#2/0 & 2#6G, 2"C
EV-18,20 EV-22,24 (2) 50/2 4#2/0 & 2#6G, 2"C
EV-25,27 EV-29,31 (2) 50/2 4#2/0 & 2#6G, 2"C
EP2B2-21
OUTLET FOR POLE MTD SECURITY CAMERA LOCATED AT THIS LIGHT POLE REFER TO DETAIL 11 E0.06 (TYP.)
PB #3
PROVIDE EXTRA 1"C INTO MAIN ELECTRIC ROOM FOR FUTURE EV CHARGER PUSH BUTTON STOP
OLP-11 VIA PB#3
OLP-12 VIA PB#3
OLP-13 VIA PB#3
OLP-14 VIA PB#3
OLP-15 VIA PB#3
FACULTY & STAFF PARKING
SITE LIGHTING PARKING POLE (TYP.) REFER TO DETAIL: 1 E0.06
FLUSH SITE LIGHTING PEDESTRIAN POLE (TYP.) REFER TO DETAIL: 3 E0.06
1"C TO NEAREST ELECTRICAL ROOM FOR FUTURE SIGN LIGHTING
APPROXIMATE LOCATION OF EXISTING BUILDING UTILITY SERVICE SHALL REMAIN UNTIL NEW BUILDING HAS BEEN COMPLETED AND IS OCCUPIED. DISCONNECTION OF THE EXISTING SERVICE SHALL BE COORDINATED WITH THE UTILITY COMPANY AND THE OWNER
EXISTING UTILITY POLE, REFER TO DETAIL: 12 E0.05
NEW UTILITY POLE RISER SEE DETAIL 12 E0.05
INCOMING ELECTRICAL SERVICE
OLP-16 VIA PB#4
EP2B2-23
PB #4
3/4"C STUBS FOR IRRIGATION SYSTEM
PP1B-60 PP1B-62
IRRIGATION CONTROLLER
2#4+#8G,1"C FOR HEATER
2#8+#8G,3/4"C FOR CONTROLLER
EP2B2-24
UTILITY POLE RISER SEE DETAIL 12 E0.05
INCOMING COMMUNICATION SERVICE
EXISTING UTILITY POLE SEE DETAIL 12 E0.05
SL1
SL2
SL3
SL4
SL6

1 E0.04 ELECTRICAL SITE PLAN
SCALE: 1" = 30'-0"

ELECTRICAL SITE NOTES:

1. DO NOT RUN ANY UNDERGROUND RACEWAYS WITHIN PLANTING AREAS OR LEACHING FIELDS. REFER TO DRAWINGS FOR LOCATIONS. COORDINATE ROUTING WITH LANDSCAPE ARCHITECT.
2. REFER TO CIVIL DRAWINGS FOR EXACT ROUTING OF UTILITIES. REFER TO LANDSCAPE DRAWINGS FOR EXACT LOCATION OF 'SITE' FIXTURES.
3. ALL SITE WIRING SHALL BE 2#8&#10G,1"C MINIMUM UNLESS SHOWN OTHERWISE.
4. ALL EXTERIOR LIGHTING TO BE PROGRAMMED FOR PHOTOCELL "ON", TIMED "OFF" AND DIMMED LEVELS (VIA 0-10V SIGNAL). PROVIDE INDIVIDUAL CONTROL FOR EACH CIRCUIT. COORDINATE PROGRAMMING WITH OWNER. (REFER TO ALCS ONE-LINE DIAGRAM & SPECIFICATIONS).
5. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF EXTERIOR WALL MOUNTED LIGHTING.
6. REMOVE ALL SITE ELECTRICS WHEN NO LONGER REQUIRED.
7. PROVIDE 17"x30"x12"D GROUND MOUNTED PULL BOX (QUAZITE #PC1730BA12 WITH COVER #PC1730CA17 OR SAME BY CARSON, HIGHLINE, STRONGWELL, OR EQUAL. RUN ALL SITE LIGHTING VIA PULL BOX. ALSO PROVIDE (1) 1"SPARE WITH PULL LINE BETWEEN PULL BOX AND NEAREST ELECTRIC ROOM. LABEL @ EACH END.
8. PROVIDE LIGHTNING PROTECTION SYSTEM FOR COVERAGE OF ENTIRE FACILITY.
9. PROVIDE 12"x12"x12"D GROUND MOUNTED PULL BOX (QUAZITE #PC1212BG12 WITH #PC1212HG00 COVER OR SAME BY CARSON, HIGHLINE, STRONGWELL, OR EQUAL) AT ALL POLES WITH THREE PAIRS OF 1" CONDUITS APPROACHING BASE TO ALLOW FOR SINGLE PAIR TO ENTER BASE.
10. GENERATOR EMISSIONS EXHAUST SHALL MAINTAIN 25 FEET CLEARANCE FROM ANY OPERABLE WINDOWS OR INTAKE LOUVERS. COMPLY WITH ALL FEDERAL EPA AND STATE DEP REQUIREMENTS.

SITE WIRING LEGEND:

① 2#8, 1#10G, 1"C, 24" BELOW GRADE & 2#12 SHIELDED CABLE (0-10V DC) 1"C, 24" BELOW GRADE.

DORE + WHITTIER
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WILMINGTON ELEMENTARY SCHOOL

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PROJECT NUMBER: 23-0847

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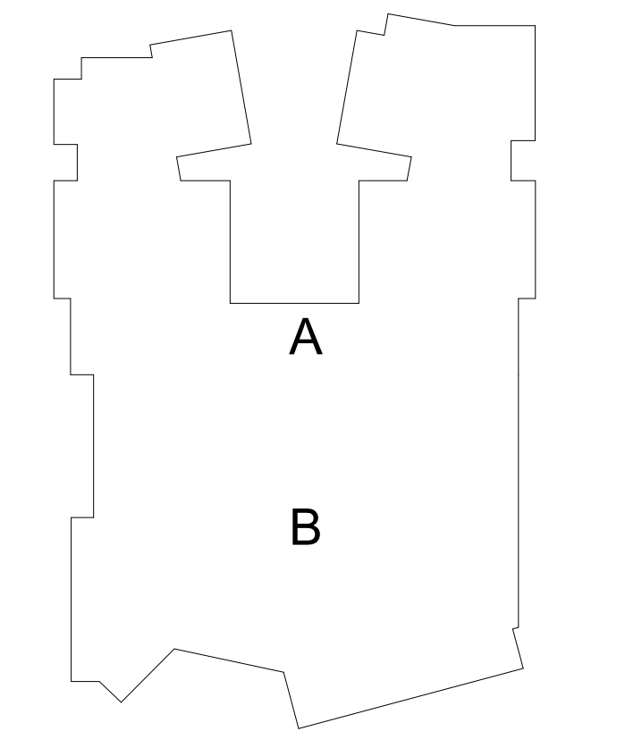
90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:

N
TRUE NORTH
PROJECT NORTH

SHEET TITLE:

ELECTRICAL SITE PLAN

SHEET NUMBER:

E0.04

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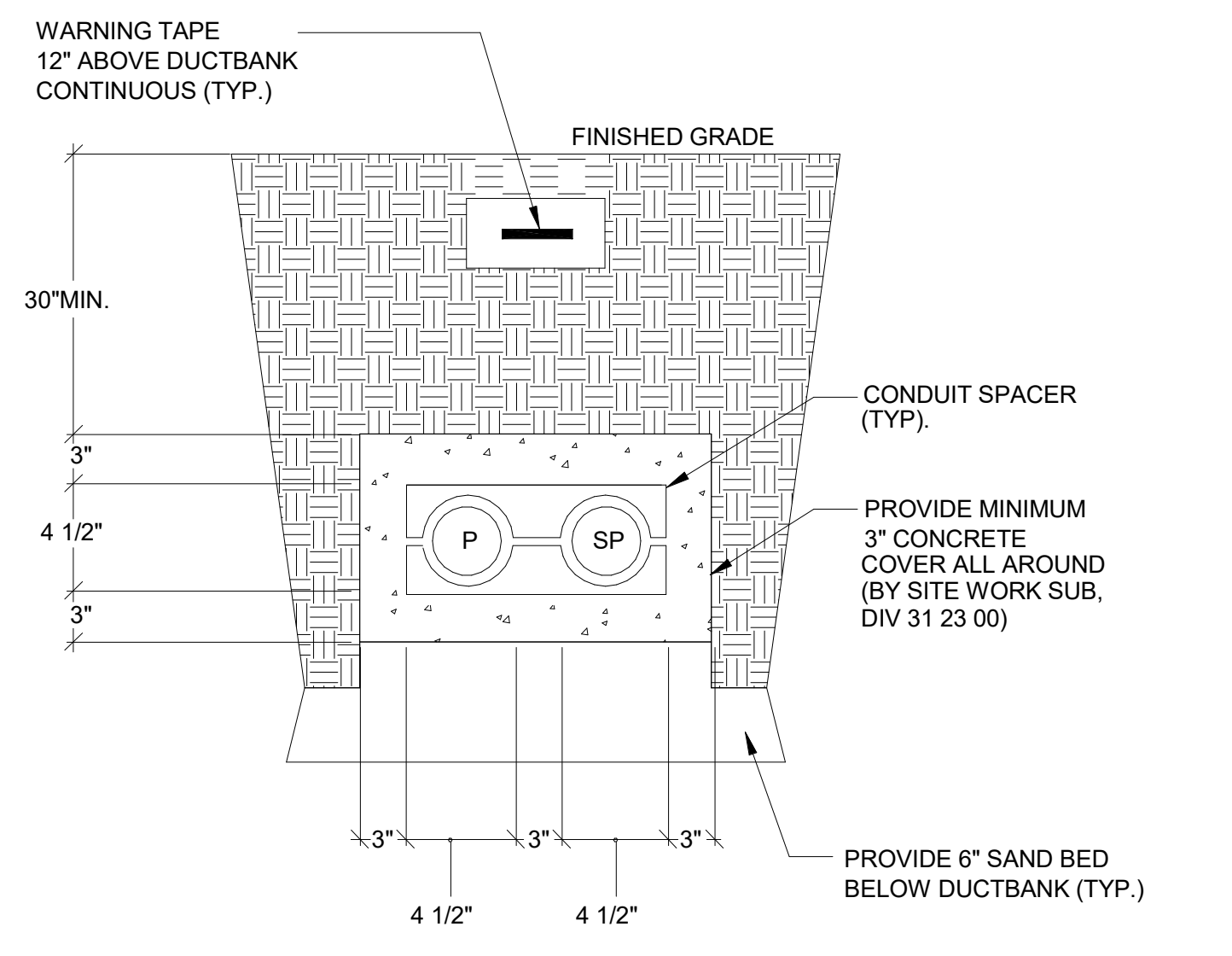
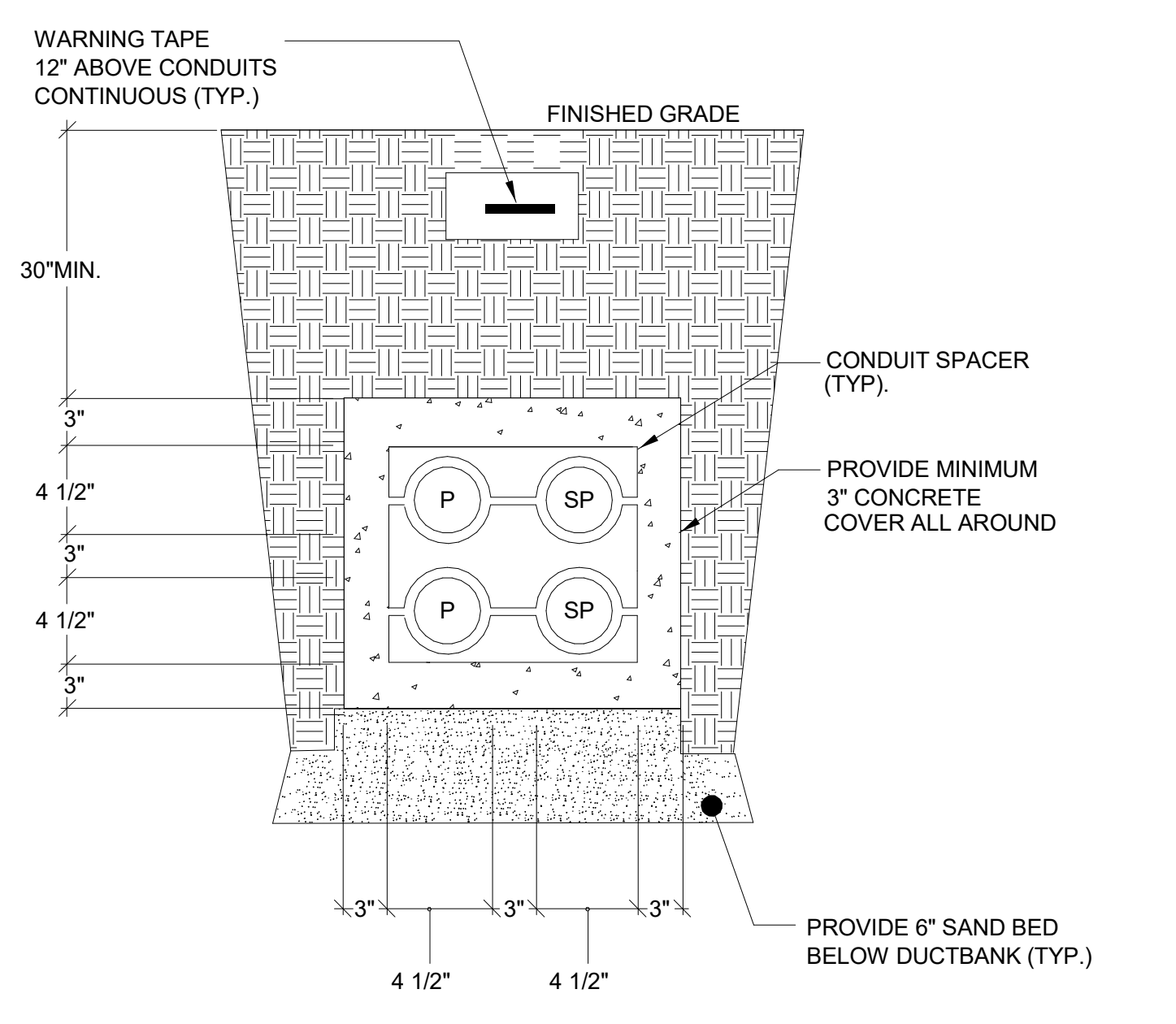


1 PRIMARY DUCT BANK SECTION "A-A"

E0.05 SCALE: N.T.S.

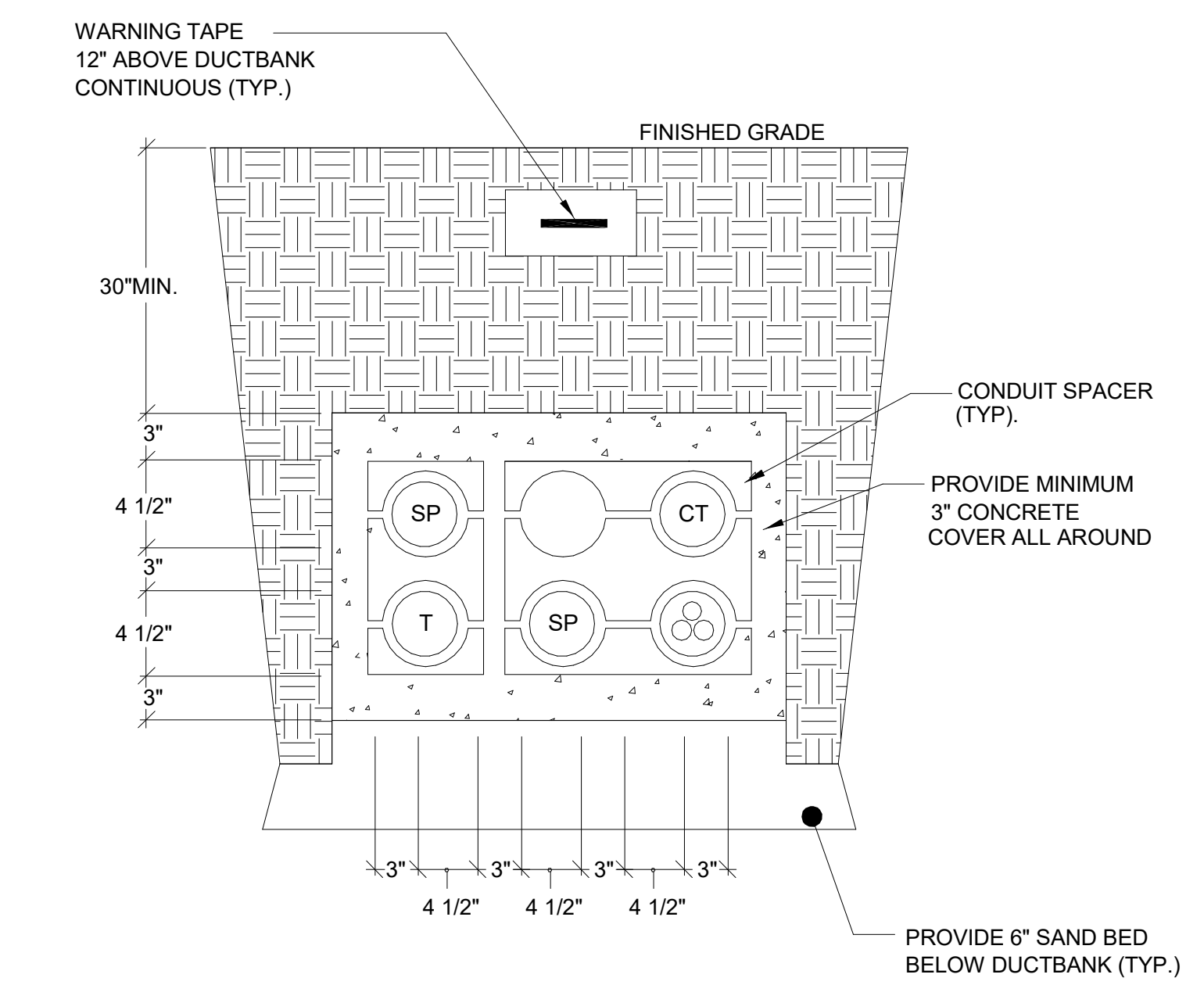
- P 4" PRIMARY- SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.
- SP 4" SPARE - SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.



2 PRIMARY DUCT BANK SECTION "B-B"

E0.05 SCALE: N.T.S

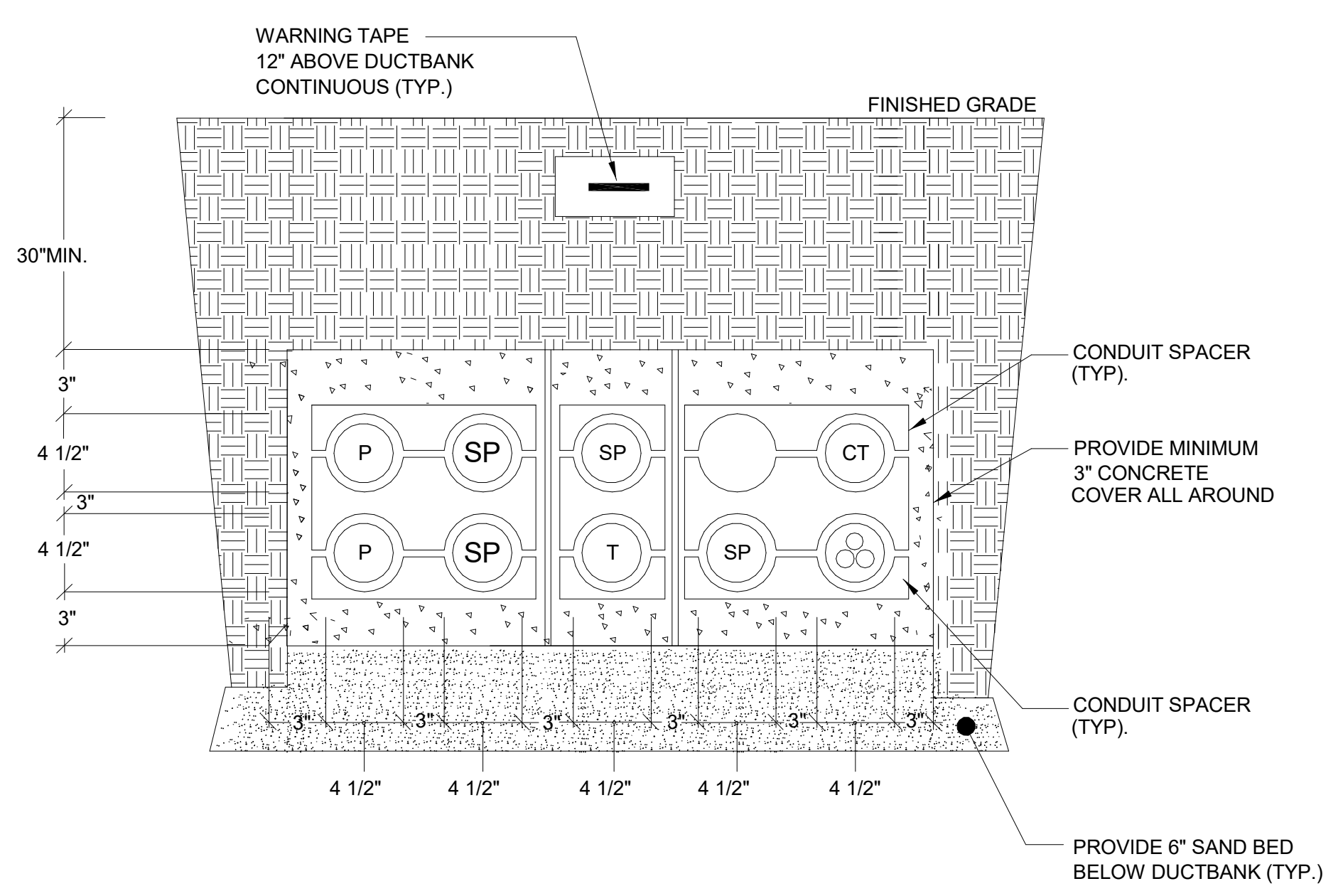
- P 4" PRIMARY- SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.
- SP 4" SPARE - SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.



3 COMMUNICATIONS DUCT BANK SECTION "C-C"

E0.05 SCALE: N.T.S

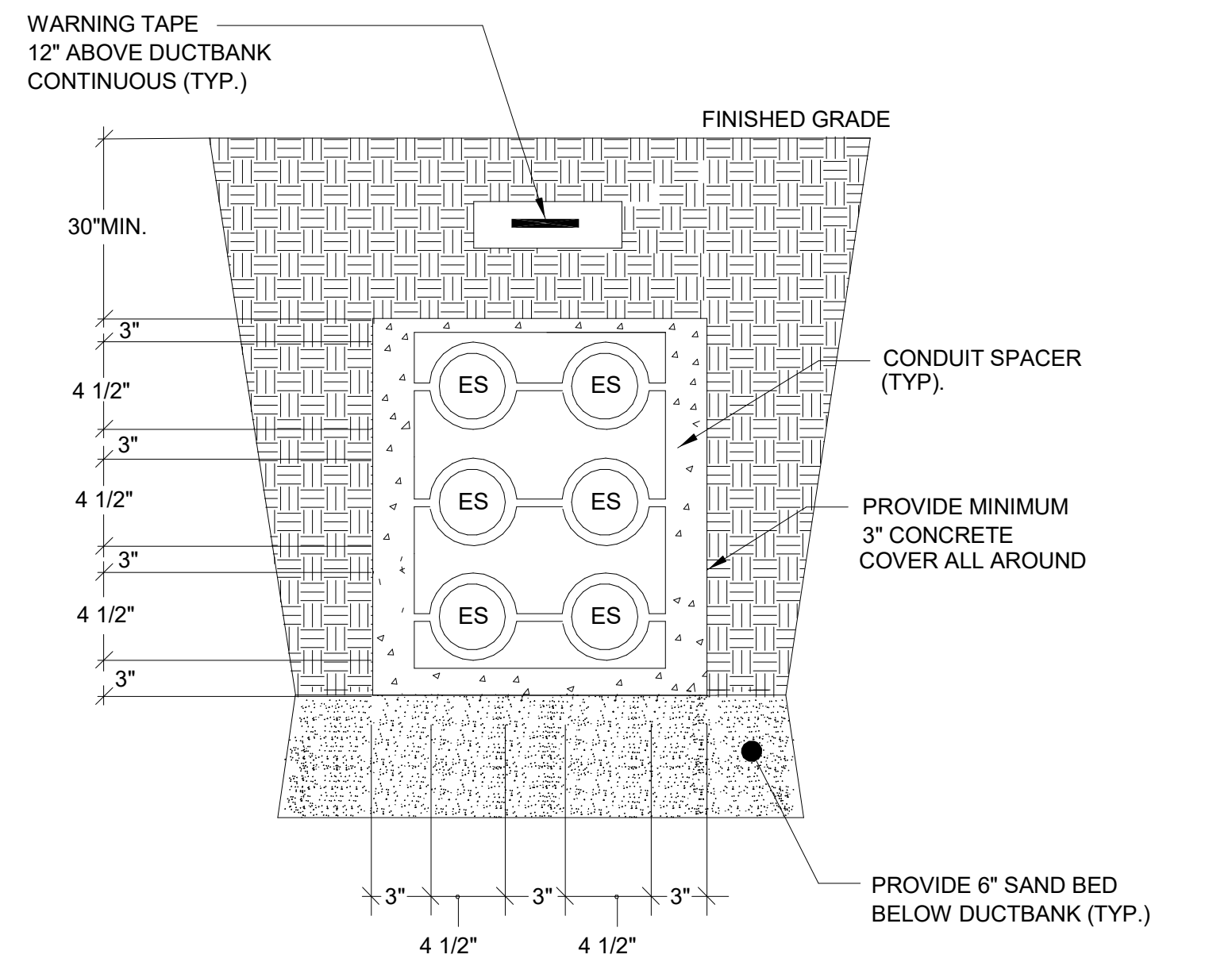
- T 4" TELEPHONE - SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.
- CT 4" CATV - SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.
- 4" FIBER - SCHEDULE 40 P.V.C. PROVIDE (3) 1 1/4" INNERDUCTS w/ PULL WIRES.



4 PRIMARY/COMMUNICATIONS DUCT BANK SECTION "D-D"

E0.05 SCALE: N.T.S

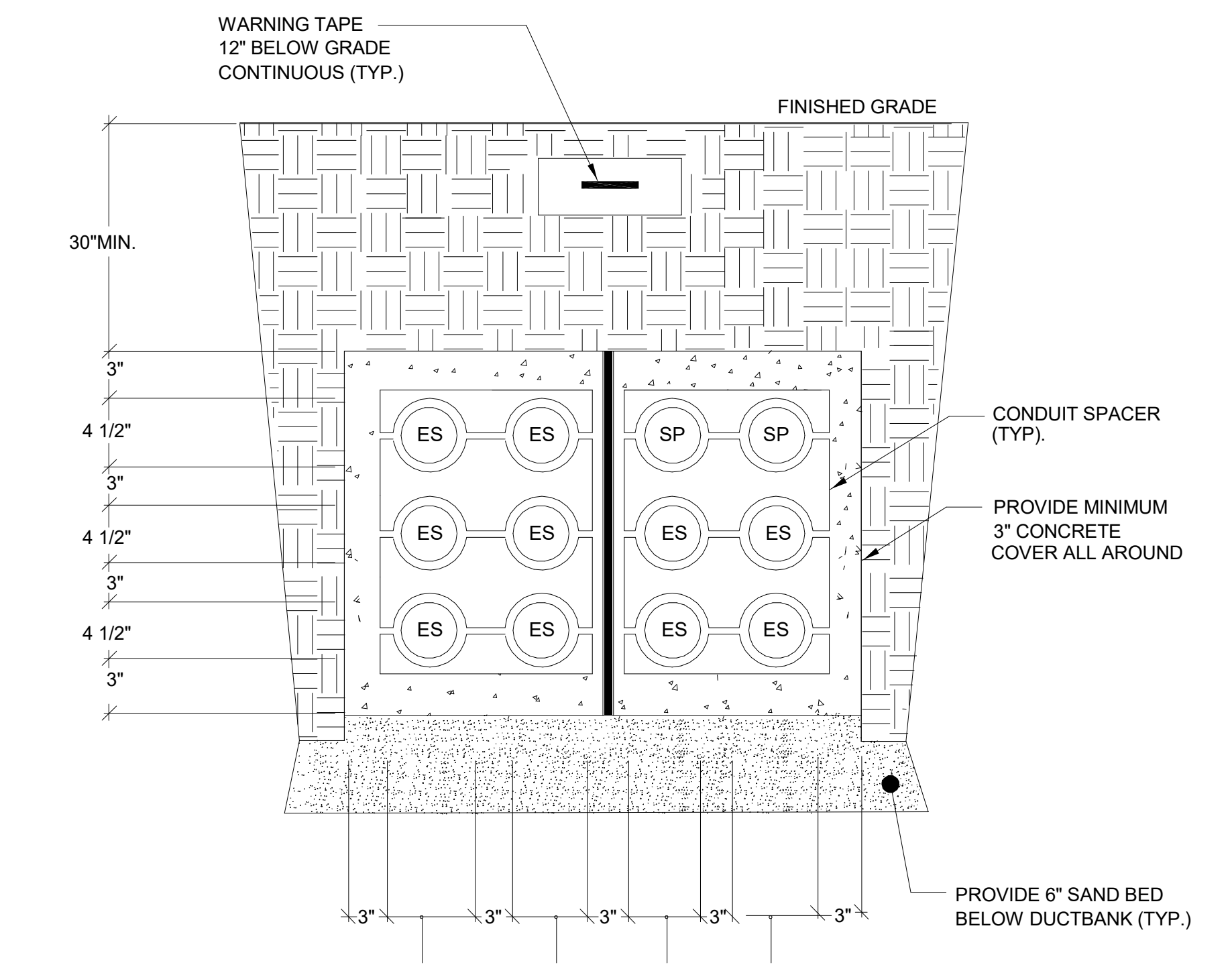
- P 4" PRIMARY- SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.
- SP 4" SPARE - SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.
- T 4" TELEPHONE - SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.
- CT 4" CATV - SCHEDULE 40 P.V.C. PROVIDE PULL LINE IN CONDUIT.
- 4" FIBER - SCHEDULE 40 P.V.C. PROVIDE (3) 1 1/4" INNERDUCTS w/ PULL WIRES.



5 SECONDARY DUCT-BANK SECTION "E-E"

E0.05 SCALE: N.T.S.

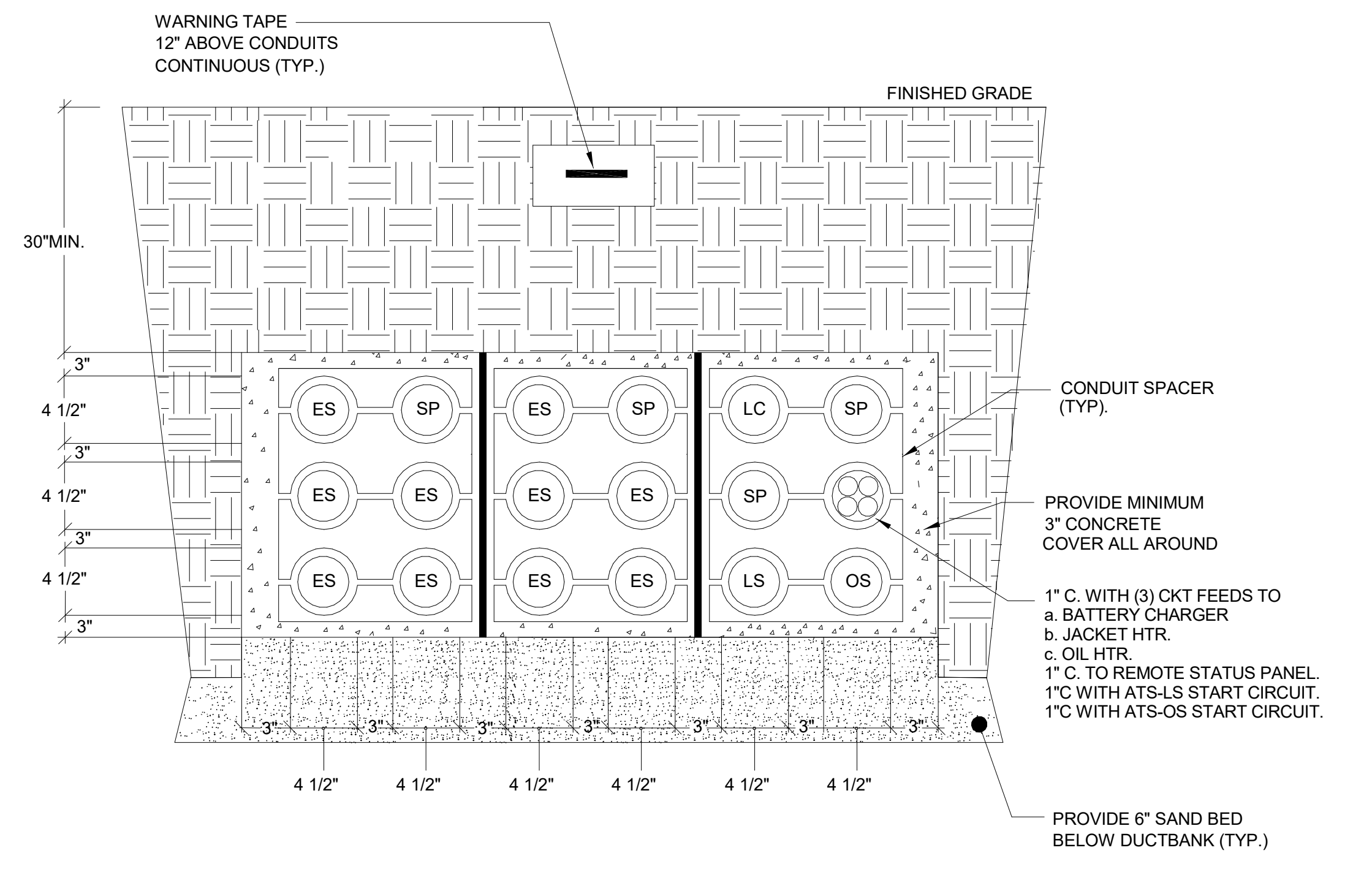
- ES 4" SECONDARY- SCHEDULE 40 P.V.C.
- SP 4" SPARE - SCHEDULE 40 P.V.C. PROVIDE PULL LINE.



6 SECONDARY DUCT-BANK SECTION "F-F"

E0.05 SCALE: N.T.S.

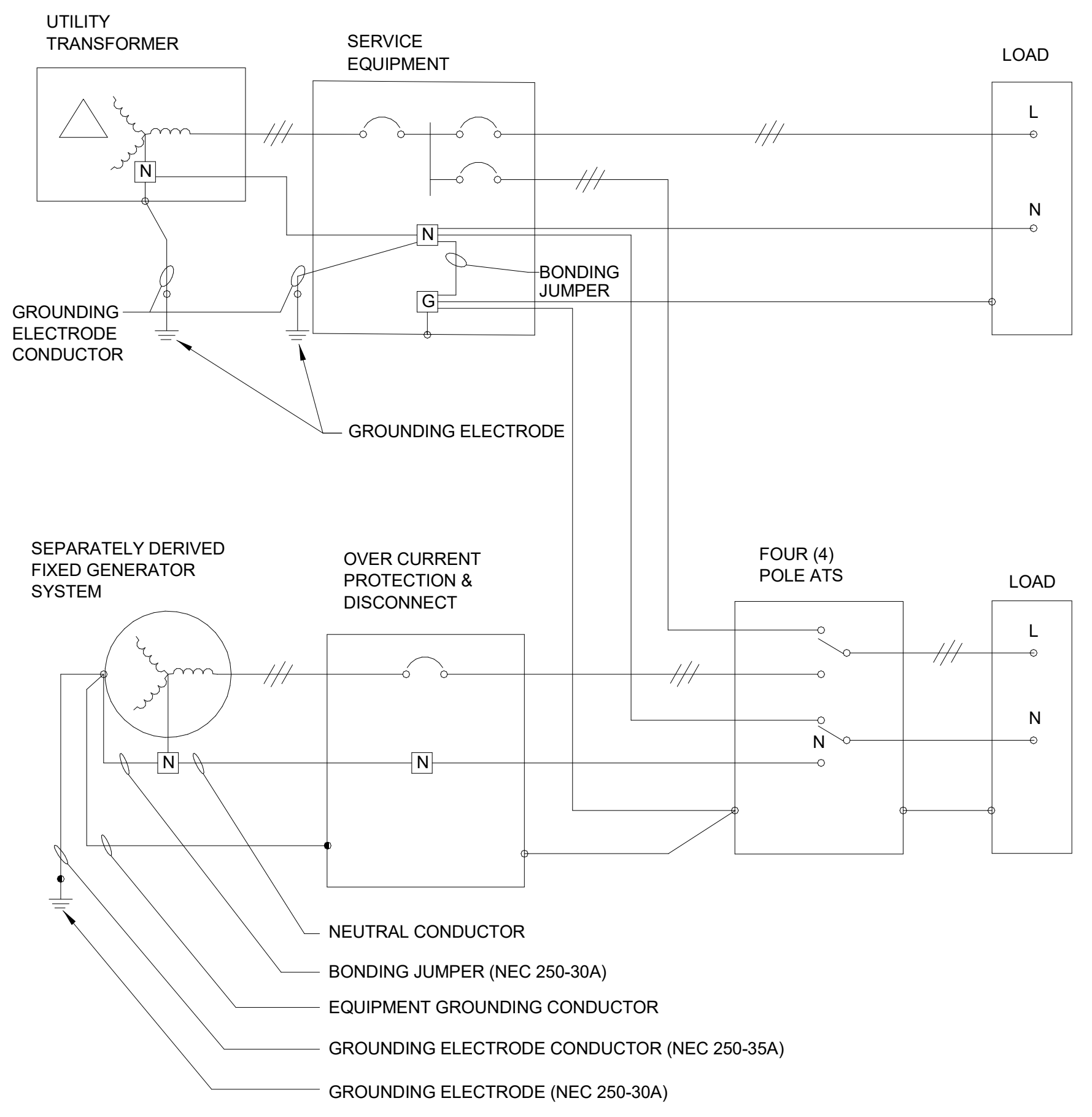
- ES 4" SECONDARY- SCHEDULE 40 P.V.C.
- SP 4" SPARE - SCHEDULE 40 P.V.C. PROVIDE PULL LINE.


WARNING TAPE
12" ABOVE CONDUITS
CONTINUOUS (TYP.)
FINISHED GRADE
30"MIN.
3"
4 1/2"
3"
4 1/2"
3"
4 1/2"
3"
ES
SP
ES
SP
LC
SP
ES
ES
ES
ES
SP
ES
ES
ES
ES
LS
OS
CONDUIT SPACER (TYP).
PROVIDE MINIMUM 3" CONCRETE COVER ALL AROUND
1" C. WITH (3) CKT FEEDS TO
a. BATTERY CHARGER
b. JACKET HTR.
c. OIL HTR.
1" C. TO REMOTE STATUS PANEL.
1"C WITH ATS-LS START CIRCUIT.
1"C WITH ATS-OS START CIRCUIT.
3"
4 1/2"
PROVIDE 6" SAND BED BELOW DUCTBANK (TYP.)

7 SECONDARY/GENERATOR DUCT BANK SECTION "G-G"

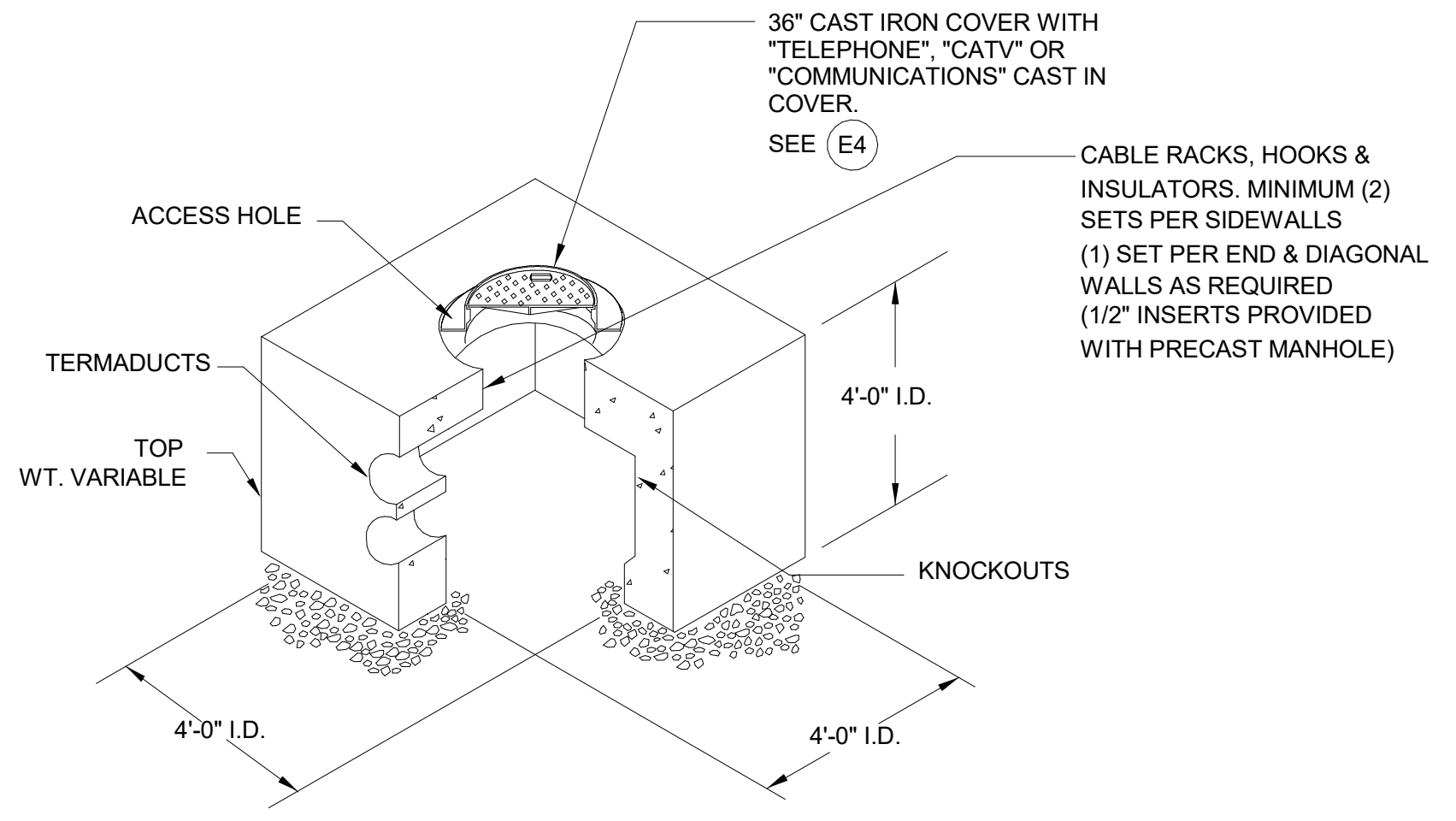
E0.05 SCALE: N.T.S

- ES 4" SECONDARY- SCHEDULE 40 P.V.C.
- OS 4 " ATS-OS SCHEDULE 40 P.V.C.
- LS 4" ATS-LS SCHEDULE 40 P.V.C.
- SP 4" SPARE - SCHEDULE 40 P.V.C. PROVIDE PULL LINE.
- (4) 1" CONDUIT - SCHEDULE 40 P.V.C.
- LC 1 1/2" LOAD CENTER - SCHEDULE 40 P.V.C. PROVIDE PULL LINE.
- SP 1" SHED POWER - SCHEDULE 40 P.V.C. PROVIDE PULL LINE.


UTILITY TRANSFORMER
SERVICE EQUIPMENT
LOAD
L
N
N
N
G
BONDING JUMPER
GROUNDING ELECTRODE CONDUCTOR
GROUNDING ELECTRODE
SEPARATELY DERIVED FIXED GENERATOR SYSTEM
OVER CURRENT PROTECTION & DISCONNECT
FOUR (4) POLE ATS
LOAD
L
N
N
N
N
NEUTRAL CONDUCTOR
BONDING JUMPER (NEC 250-30A)
EQUIPMENT GROUNDING CONDUCTOR
GROUNDING ELECTRODE CONDUCTOR (NEC 250-35A)
GROUNDING ELECTRODE (NEC 250-30A)

8 SEPARATELY DERIVED GENERATOR SYSTEM

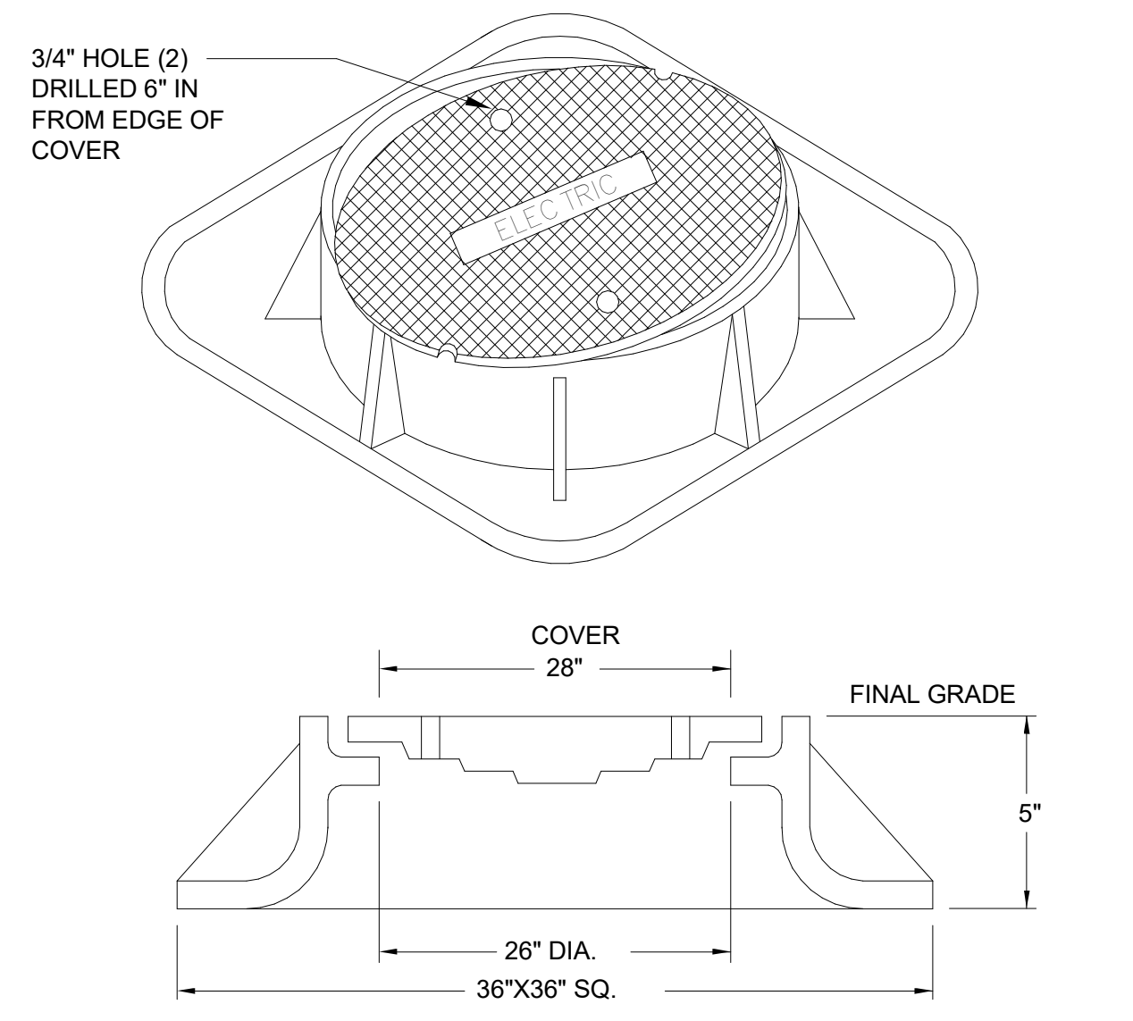
E0.05 SCALE: N.T.S


36" CAST IRON COVER WITH "TELEPHONE", "CATV" OR "COMMUNICATIONS" CAST IN COVER.
SEE E4
ACCESS HOLE
CABLE RACKS, HOOKS & INSULATORS. MINIMUM (2) SETS PER SIDEWALLS
(1) SET PER END & DIAGONAL WALLS AS REQUIRED
(1/2" INSERTS PROVIDED WITH PRECAST MANHOLE)
TERMADUCTS
TOP WT. VARIABLE
4'-0" I.D.
KNOCKOUTS
4'-0" I.D.
4'-0" I.D.

9 TELEPHONE & C.A.T.V. & COMMUNICATIONS HANDHOLE

Ⓣ Ⓒ

E0.05 SCALE: N.T.S

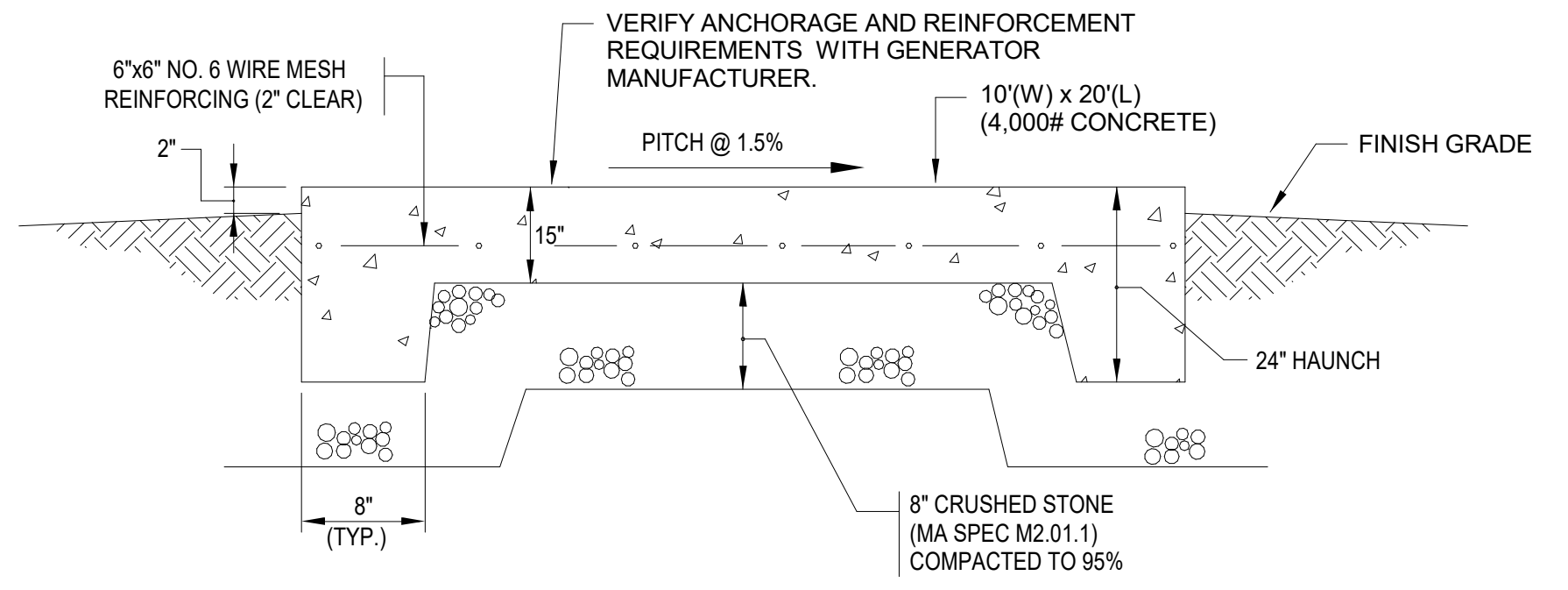


10 FRAME AND COVER DETAIL

E0.05 SCALE: N.T.S

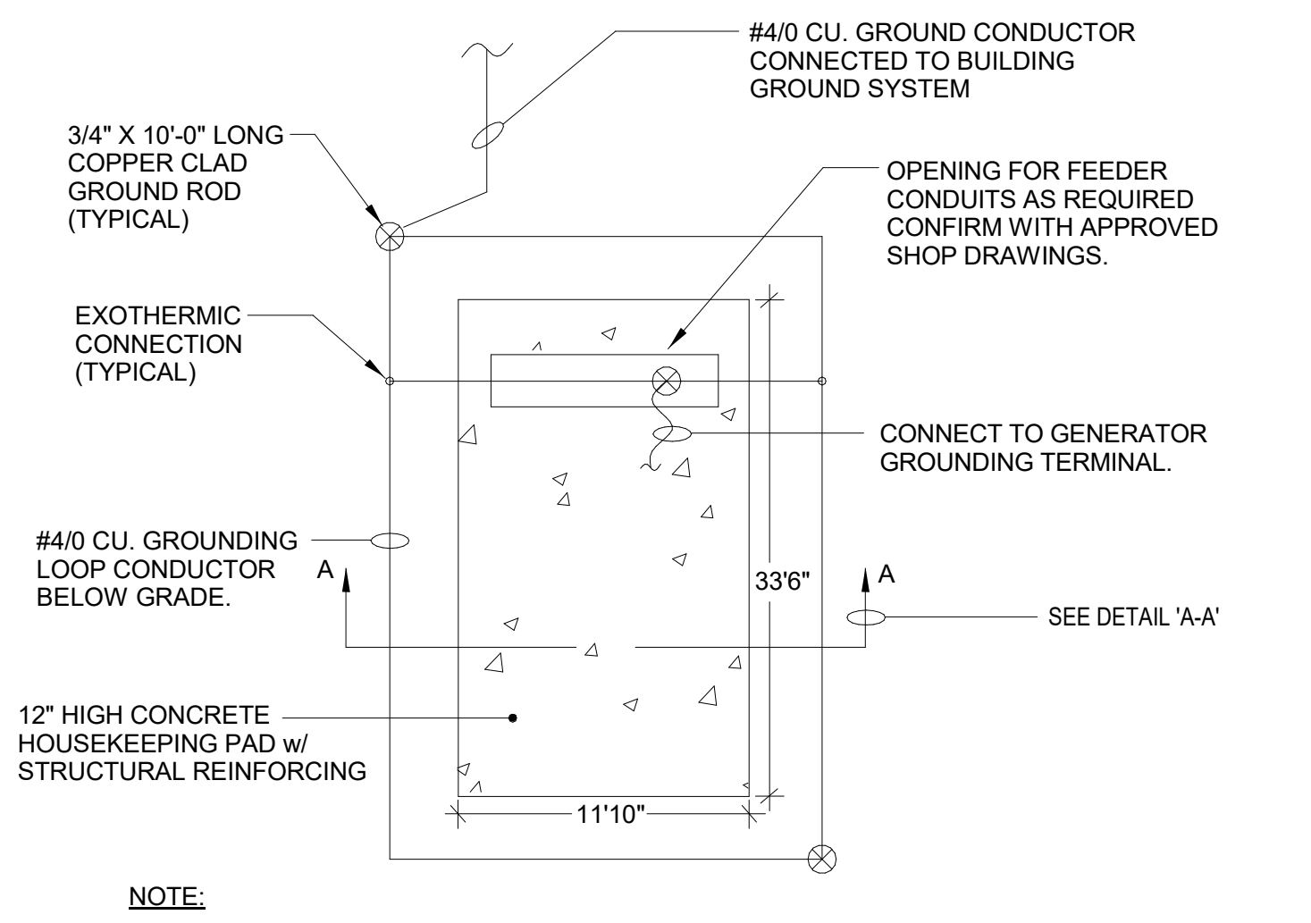
NOTES:
1. COVERS WILL HAVE "ELECTRIC", "TELEPHONE", OR "CATV" CAST IN THEM IN 3 INCH LETTERS.
2. FRAME AND COVER TO SUPPORT H2O WHEEL LOAD.
3. NO VAULT MANHOLE SHALL BE BURIED DEEPER THAN 18" BELOW FINISHED GRADE.
4. COVER SHALL BE FLUSH TO FINAL GRADE (CONCRETE, ASPHALT, GRAVEL, GRASS, ETC..)

	SUPPLIER & CATALOG#	STOCK CODE
FRAME	NACIP AE 124 LEBARON LE-285L OR APPROVED EQUAL	07-29-229
COVER	NACIP LEBARON LE-28C5 ELECTRIC OR APPROVED EQUAL	07-15-530


6"x6" NO. 6 WIRE MESH REINFORCING (2" CLEAR)
VERIFY ANCHORAGE AND REINFORCEMENT REQUIREMENTS WITH GENERATOR MANUFACTURER.
10'(W) x 20'(L) (4,000# CONCRETE)
PITCH @ 1.5%
FINISH GRADE
2"
15"
24" HAUNCH
8" (TYP.)
8" CRUSHED STONE (MA SPEC M2.01.1) COMPACTED TO 95%

GENERATOR PAD DETAIL 'A-A'

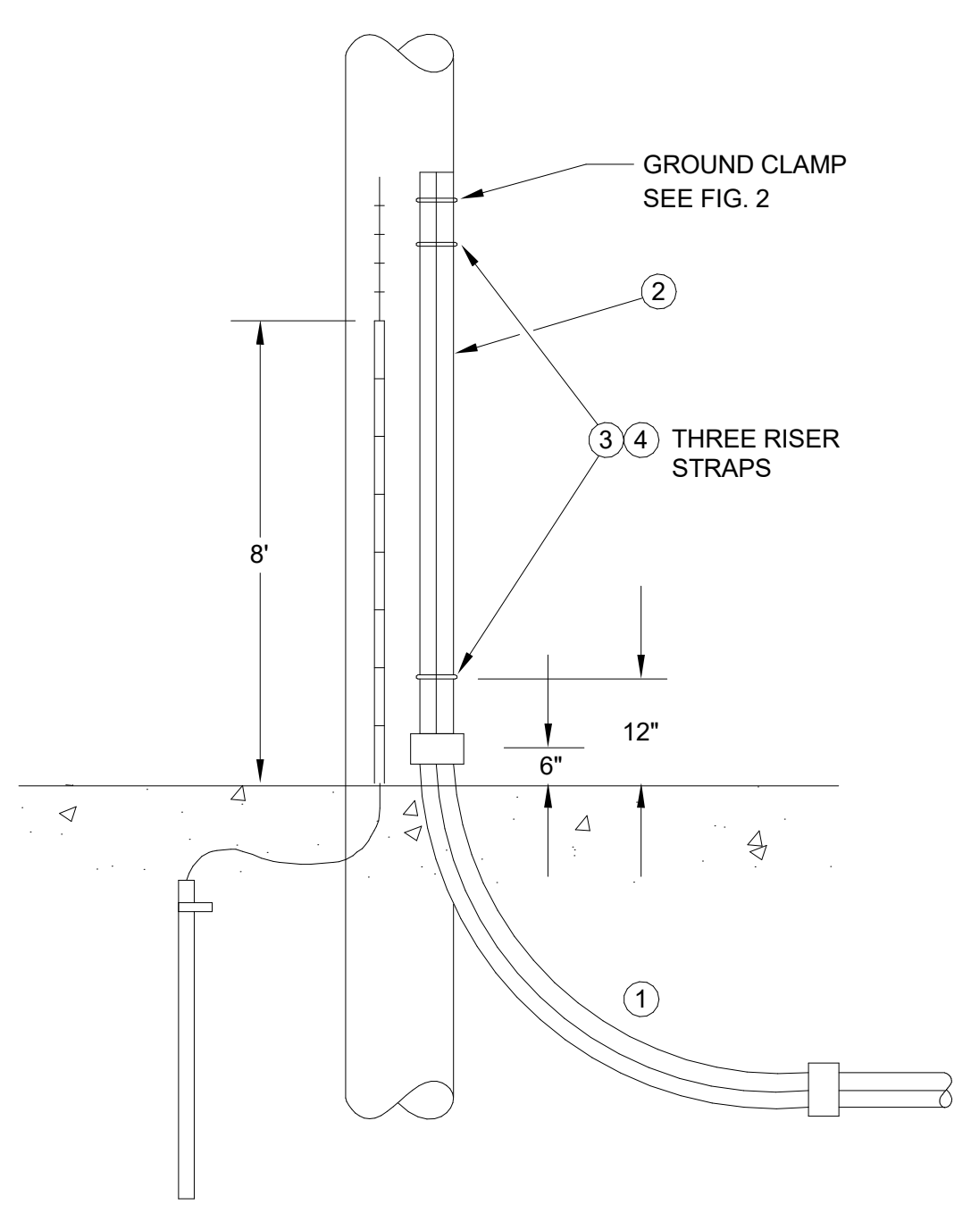
SCALE: N.T.S.


#4/0 CU. GROUND CONDUCTOR CONNECTED TO BUILDING GROUND SYSTEM
3/4" X 10'-0" LONG COPPER CLAD GROUND ROD (TYPICAL)
OPENING FOR FEEDER CONDUITS AS REQUIRED CONFIRM WITH APPROVED SHOP DRAWINGS.
EXOTHERMIC CONNECTION (TYPICAL)
CONNECT TO GENERATOR GROUNDING TERMINAL.
#4/0 CU. GROUNDING LOOP CONDUCTOR BELOW GRADE.
A
A
33'6"
SEE DETAIL 'A-A'
12" HIGH CONCRETE HOUSEKEEPING PAD w/ STRUCTURAL REINFORCING
11'10"

NOTE:
1. PAD SHALL BE PROVIDED IN ACCORDANCE WITH APPROVED SHOP DRAWINGS. PAD SHALL BE PROVIDED BY G.C.
2. PAD DIMENSIONS ARE APPROXIMATE. PROVIDE 12" OF PAD ALL AROUND GENERATOR.

11 GENERATOR PAD DETAIL

E0.05 SCALE: N.T.S



NOTES:
1. RISER CONDUITS SHALL BE LOCATED ON THE STREET QUARTER OF THE POLE, AND, WHEN POSSIBLE ON THE QUARTER AWAY FROM APPROACHING TRAFFIC.
2. SPARE CONDUIT SHALL BE CAPPED 6" ABOVE GRADE.

CODE NUMBERS FOR PIPE SIZES OF:	
ITEM	DESCRIPTION
①	3' RADIUS
②	CONDUIT-10' GALVANIZED STEEL
③	RISER STRAPS
④	LAG SCREWS 3/8" x 3"
⑤	RISER PIPE CONNECTOR
⑥	#6 COPPER SOLID BARE (24" LONG)

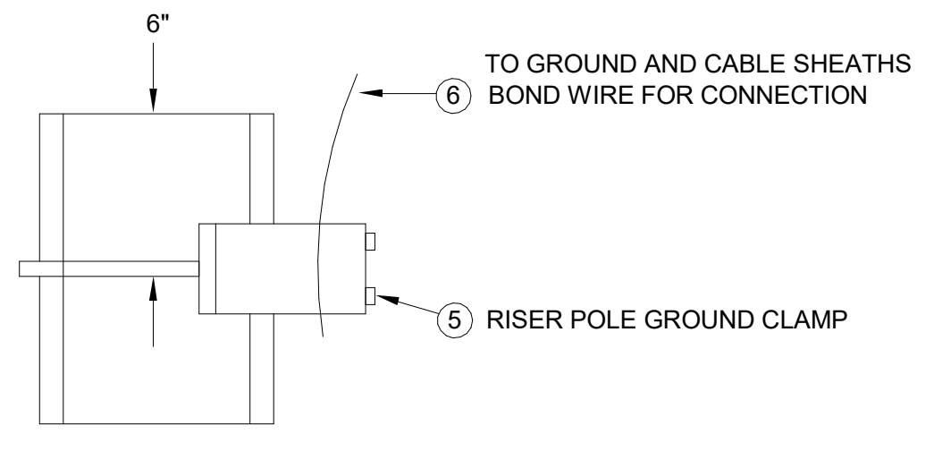
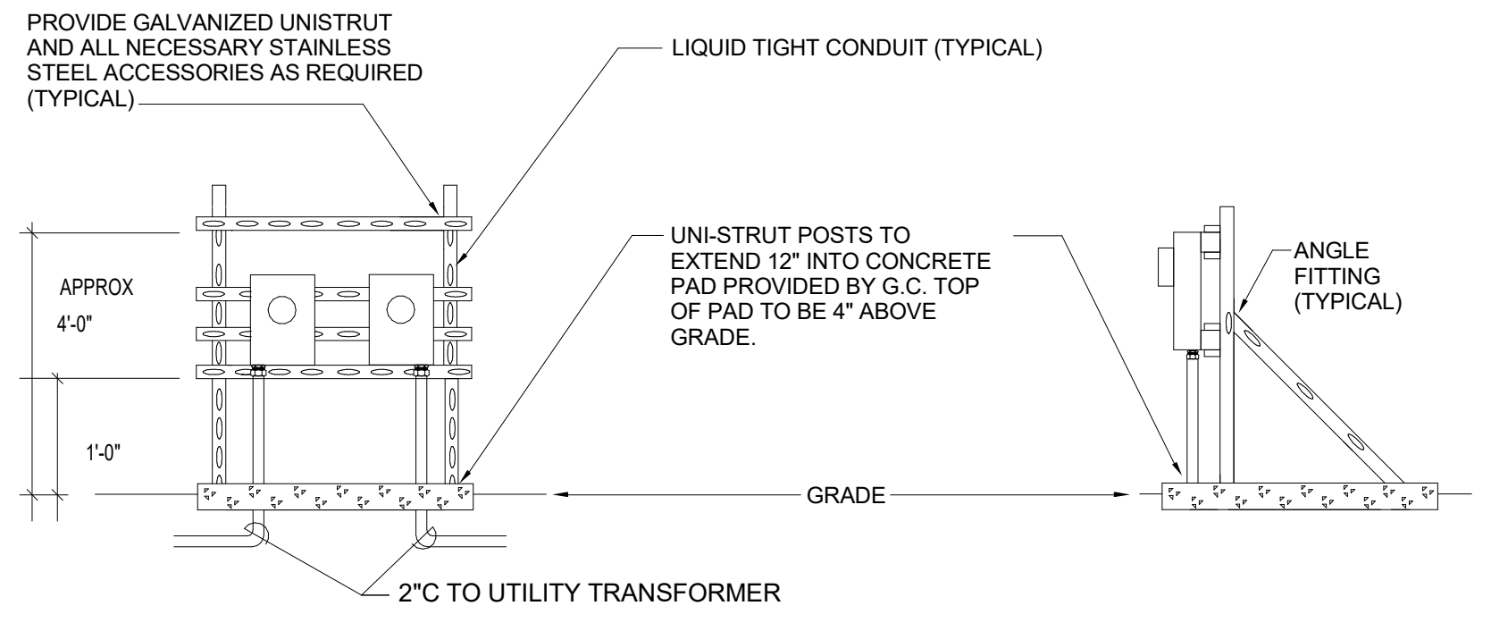

6"
⑥ TO GROUND AND CABLE SHEATHS BOND WIRE FOR CONNECTION
⑤ RISER POLE GROUND CLAMP

FIGURE 2 - RISER GROUND CLAMP

INSTALL GROUND CLAMP AS SHOWN. CONNECT TO POLE EQUIPMENT GROUNDING CONDUCTOR. INSTALL GROUND ROD AND RUN MINIMUM #6 SOLID COPPER UP POLE AND CONNECT TO COMMON NEUTRAL. INSTALL 8 FEET OF MOULDING OVER WIRE AND CONNECT RISER GROUND CLAMP TO GROUND WIRE ABOVE MOULDING AS SHOWN.

12 POLE RISER DETAIL

E0.05 SCALE: N.T.S


PROVIDE GALVANIZED UNISTRUT AND ALL NECESSARY STAINLESS STEEL ACCESSORIES AS REQUIRED (TYPICAL)
LIQUID TIGHT CONDUIT (TYPICAL)
APPROX 4'-0"
1'-0"
UNI-STRUT POSTS TO EXTEND 12" INTO CONCRETE PAD PROVIDED BY G.C. TOP OF PAD TO BE 4" ABOVE GRADE.
ANGLE FITTING (TYPICAL)
GRADE
2"C TO UTILITY TRANSFORMER
FRONT ELEVATION
SIDE ELEVATION

13 CT METER DETAIL

E0.05 SCALE: N.T.S

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model S3.rvt

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DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

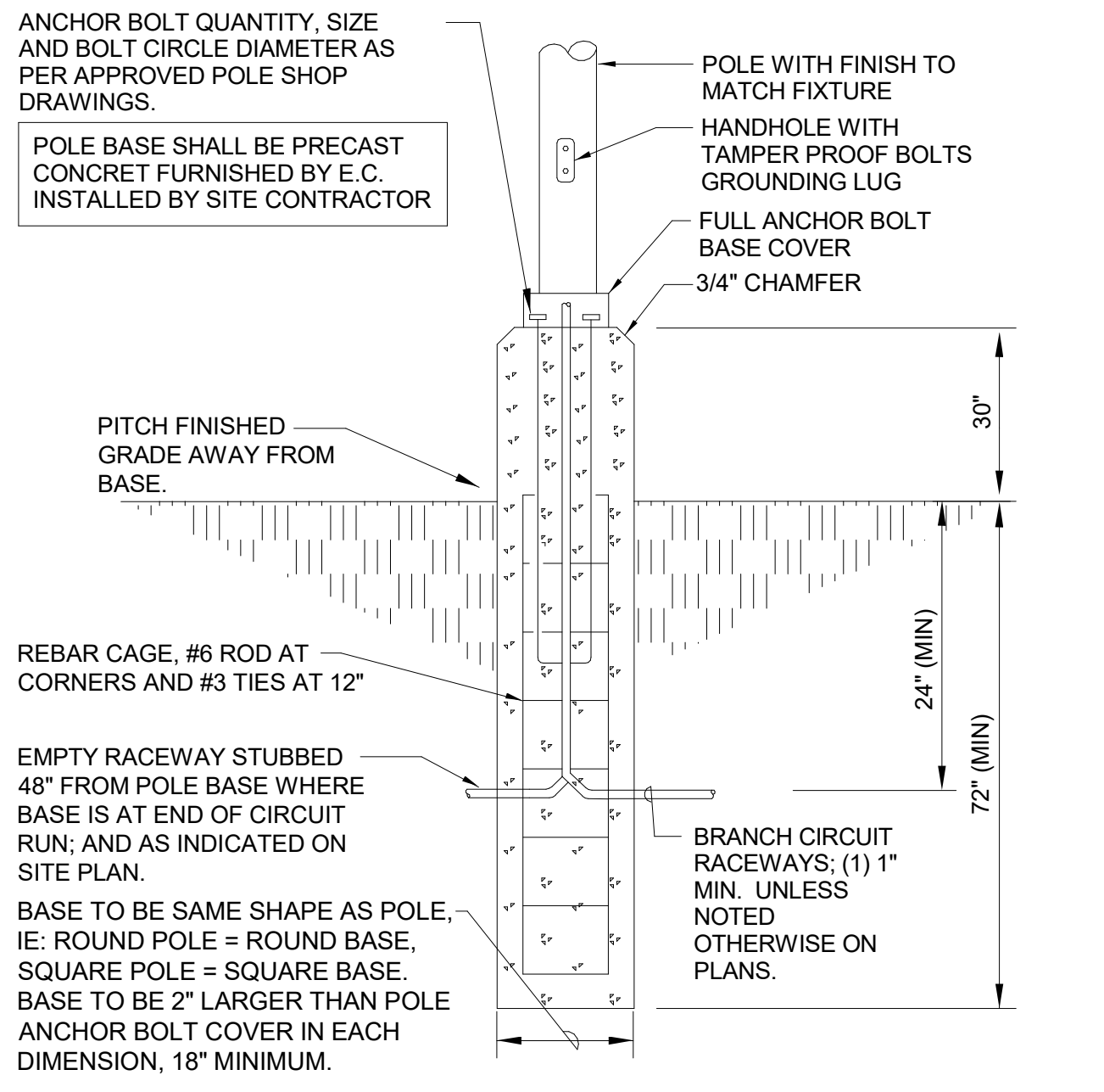
90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

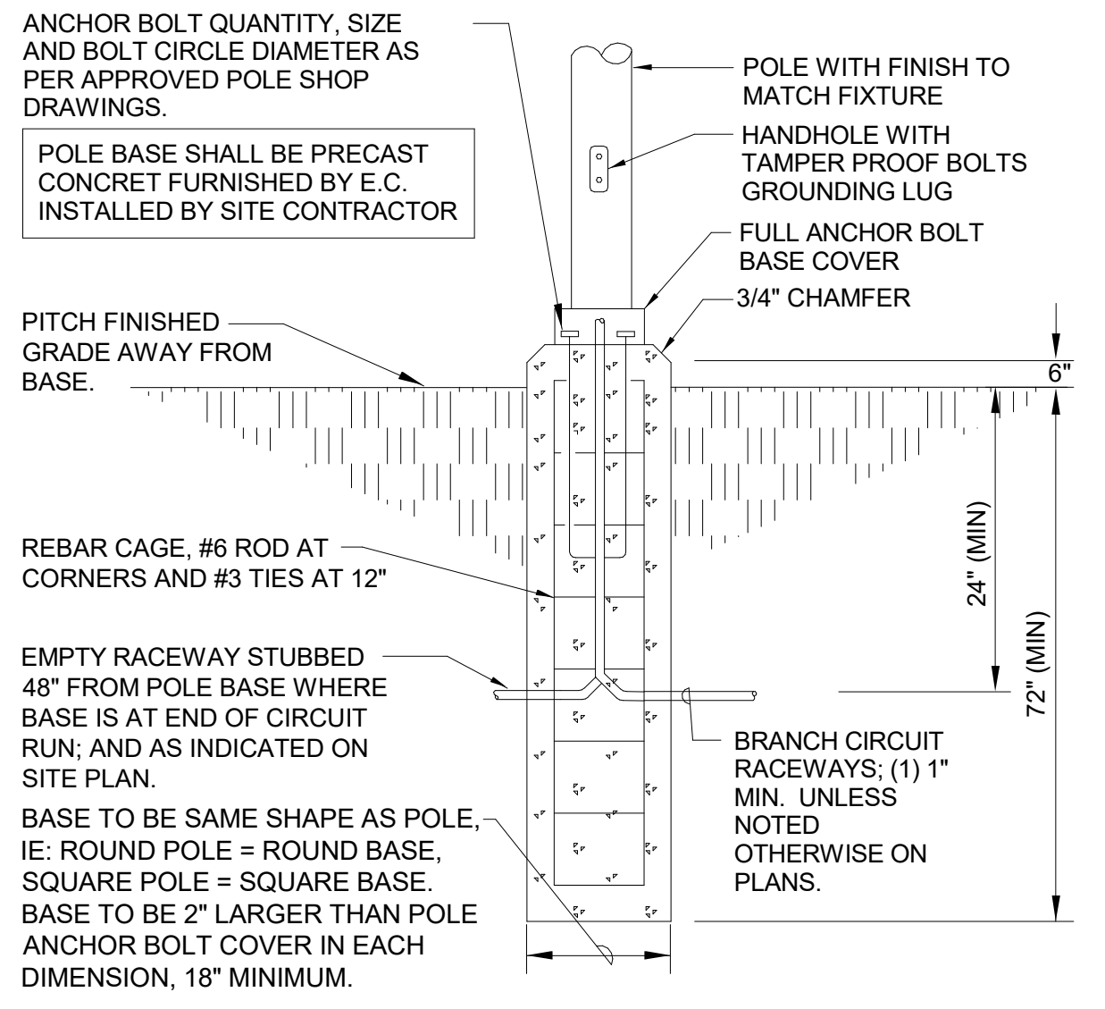
SHEET TITLE:
ELECTRICAL SITE
DETAILS

SHEET NUMBER:
E0.05


ANCHOR BOLT QUANTITY, SIZE AND BOLT CIRCLE DIAMETER AS PER APPROVED POLE SHOP DRAWINGS.
POLE BASE SHALL BE PRECAST CONCRET FURNISHED BY E.C. INSTALLED BY SITE CONTRACTOR
POLE WITH FINISH TO MATCH FIXTURE
HANDHOLE WITH TAMPER PROOF BOLTS GROUNDING LUG
FULL ANCHOR BOLT BASE COVER
3/4" CHAMFER
30"
PITCH FINISHED GRADE AWAY FROM BASE.
REBAR CAGE, #6 ROD AT CORNERS AND #3 TIES AT 12"
24" (MIN)
72" (MIN)
EMPTY RACEWAY STUBBED 48" FROM POLE BASE WHERE BASE IS AT END OF CIRCUIT RUN; AND AS INDICATED ON SITE PLAN.
BRANCH CIRCUIT RACEWAYS; (1) 1" MIN. UNLESS NOTED OTHERWISE ON PLANS.
BASE TO BE SAME SHAPE AS POLE, IE: ROUND POLE = ROUND BASE, SQUARE POLE = SQUARE BASE. BASE TO BE 2" LARGER THAN POLE ANCHOR BOLT COVER IN EACH DIMENSION, 18" MINIMUM.

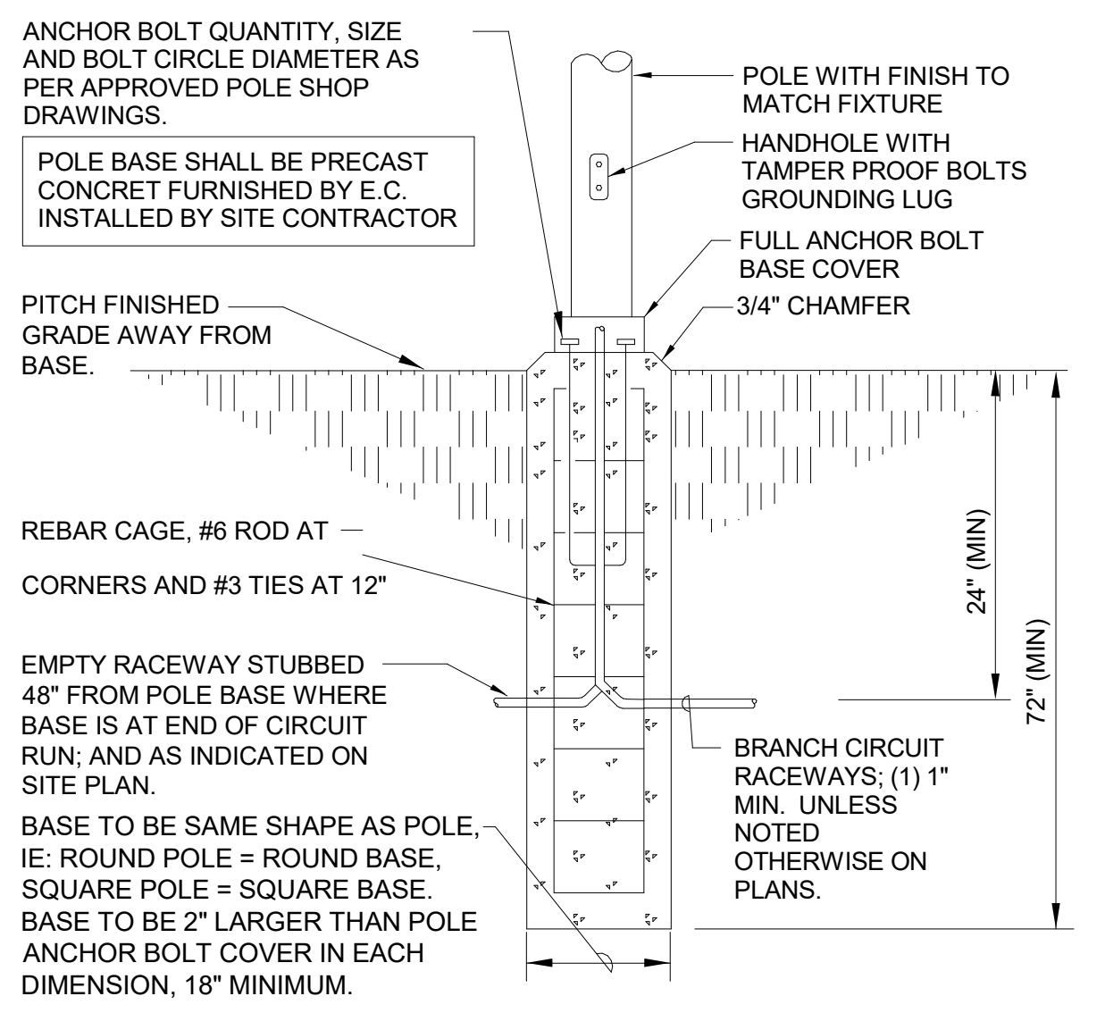
1 E0.06 TYPICAL PARKING/DRIVE POLE BASE DETAIL

SCALE: N.T.S.


ANCHOR BOLT QUANTITY, SIZE AND BOLT CIRCLE DIAMETER AS PER APPROVED POLE SHOP DRAWINGS.
POLE BASE SHALL BE PRECAST CONCRET FURNISHED BY E.C. INSTALLED BY SITE CONTRACTOR
POLE WITH FINISH TO MATCH FIXTURE
HANDHOLE WITH TAMPER PROOF BOLTS GROUNDING LUG
FULL ANCHOR BOLT BASE COVER
3/4" CHAMFER
6"
PITCH FINISHED GRADE AWAY FROM BASE.
REBAR CAGE, #6 ROD AT CORNERS AND #3 TIES AT 12"
24" (MIN)
72" (MIN)
EMPTY RACEWAY STUBBED 48" FROM POLE BASE WHERE BASE IS AT END OF CIRCUIT RUN; AND AS INDICATED ON SITE PLAN.
BRANCH CIRCUIT RACEWAYS; (1) 1" MIN. UNLESS NOTED OTHERWISE ON PLANS.
BASE TO BE SAME SHAPE AS POLE, IE: ROUND POLE = ROUND BASE, SQUARE POLE = SQUARE BASE. BASE TO BE 2" LARGER THAN POLE ANCHOR BOLT COVER IN EACH DIMENSION, 18" MINIMUM.

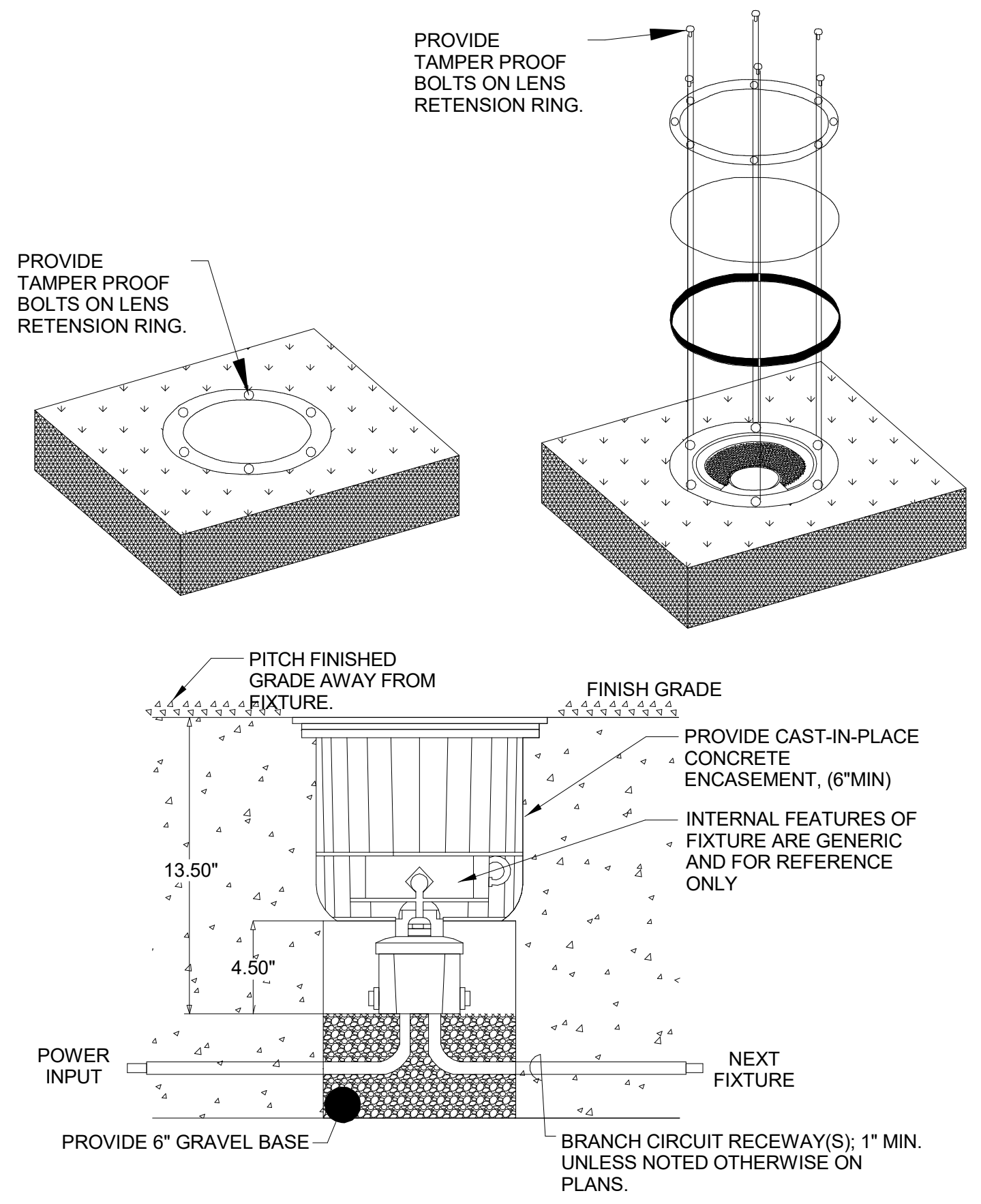
2 E0.06 TYPICAL PEDESTRIAN POLE BASE DETAIL

SCALE: N.T.S.


ANCHOR BOLT QUANTITY, SIZE AND BOLT CIRCLE DIAMETER AS PER APPROVED POLE SHOP DRAWINGS.
POLE BASE SHALL BE PRECAST CONCRET FURNISHED BY E.C. INSTALLED BY SITE CONTRACTOR
POLE WITH FINISH TO MATCH FIXTURE
HANDHOLE WITH TAMPER PROOF BOLTS GROUNDING LUG
FULL ANCHOR BOLT BASE COVER
3/4" CHAMFER
PITCH FINISHED GRADE AWAY FROM BASE.
REBAR CAGE, #6 ROD AT
CORNERS AND #3 TIES AT 12"
24" (MIN)
72" (MIN)
EMPTY RACEWAY STUBBED 48" FROM POLE BASE WHERE BASE IS AT END OF CIRCUIT RUN; AND AS INDICATED ON SITE PLAN.
BRANCH CIRCUIT RACEWAYS; (1) 1" MIN. UNLESS NOTED OTHERWISE ON PLANS.
BASE TO BE SAME SHAPE AS POLE, IE: ROUND POLE = ROUND BASE, SQUARE POLE = SQUARE BASE. BASE TO BE 2" LARGER THAN POLE ANCHOR BOLT COVER IN EACH DIMENSION, 18" MINIMUM.

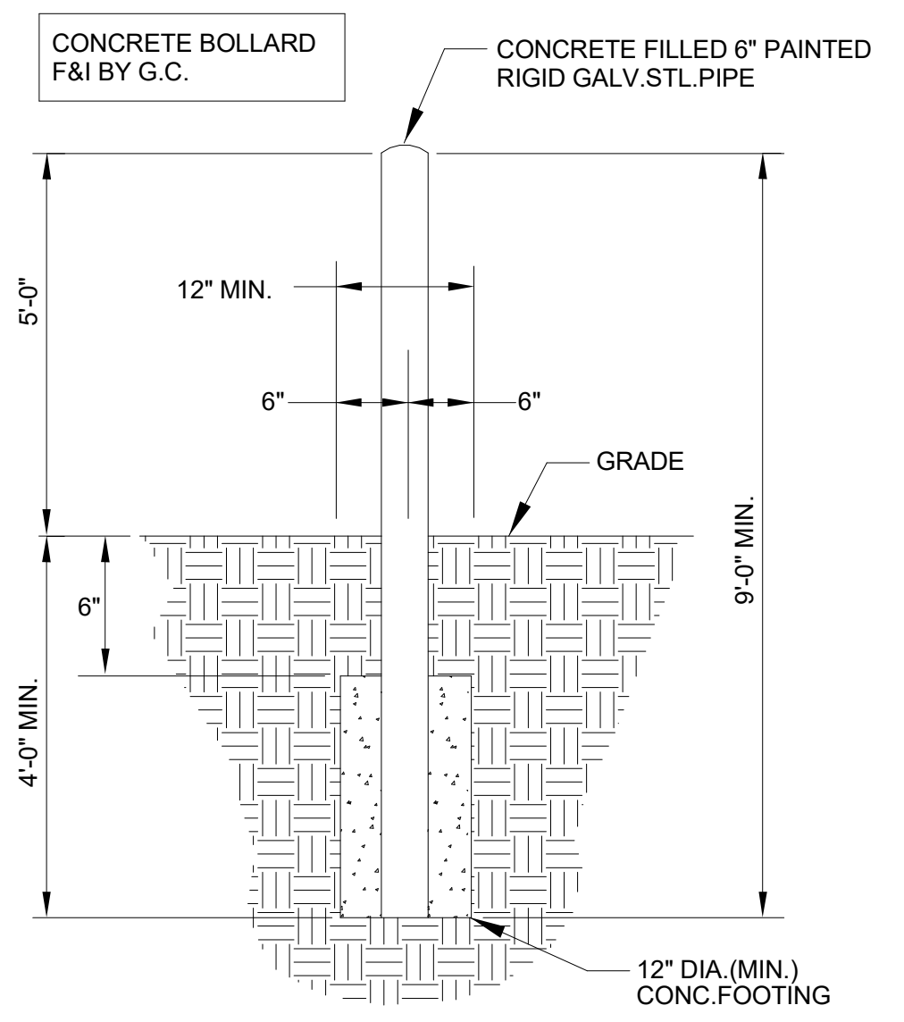
3 E0.06 TYPICAL FLUSH PEDESTRIAN POLE BASE DETAIL

SCALE: N.T.S.


PROVIDE TAMPER PROOF BOLTS ON LENS RETENSION RING.
PROVIDE TAMPER PROOF BOLTS ON LENS RETENSION RING.
PITCH FINISHED GRADE AWAY FROM FIXTURE.
FINISH GRADE
PROVIDE CAST-IN-PLACE CONCRETE ENCASEMENT, (6"MIN)
INTERNAL FEATURES OF FIXTURE ARE GENERIC AND FOR REFERENCE ONLY
13.50"
4.50"
POWER INPUT
NEXT FIXTURE
PROVIDE 6" GRAVEL BASE
BRANCH CIRCUIT RECEWAY(S); 1" MIN. UNLESS NOTED OTHERWISE ON PLANS.

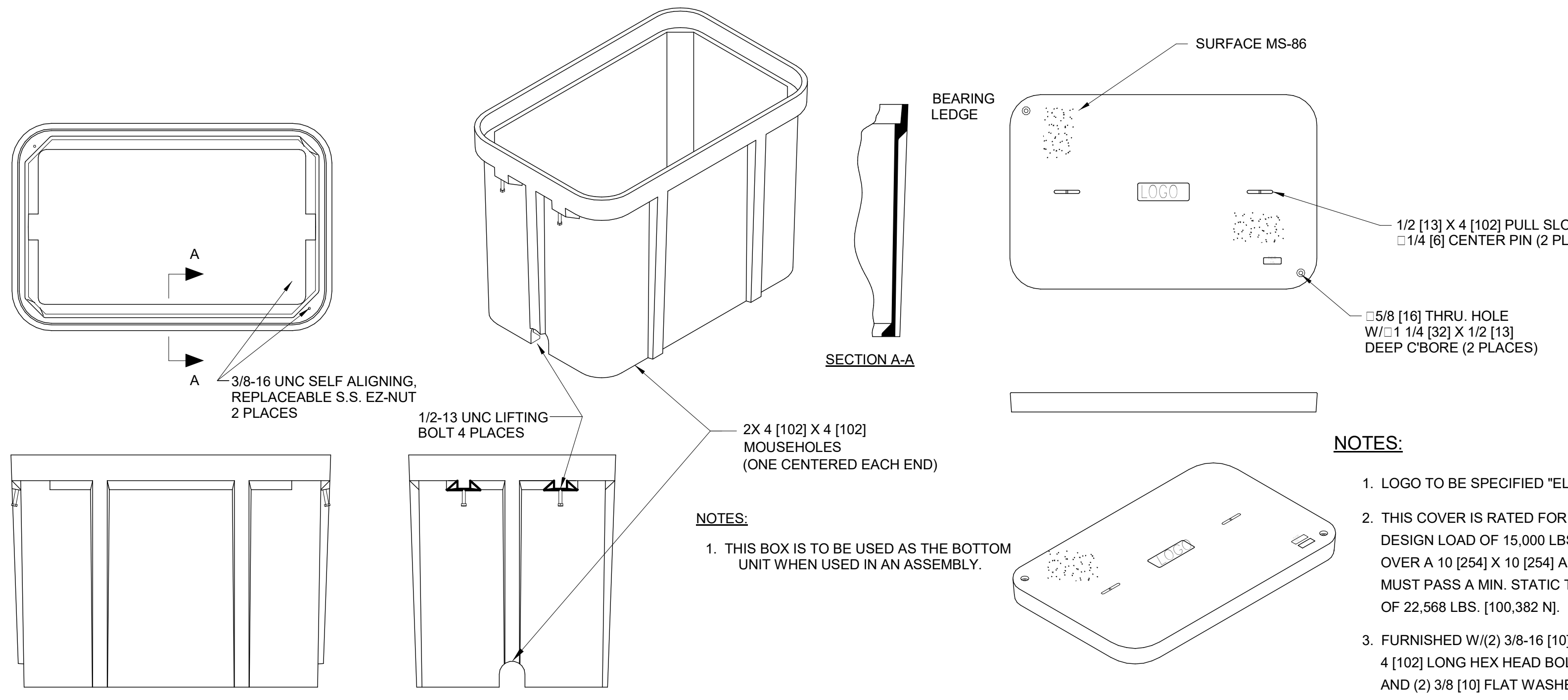
4 E0.06 GROUND MOUNTED LIGHT DETAIL

SCALE: N.T.S.


CONCRETE BOLLARD F&I BY G.C.
CONCRETE FILLED 6" PAINTED RIGID GALV.STL.PIPE
12" MIN.
6"
6"
GRADE
5'-0"
6"
4'-0" MIN.
9'-0" MIN.
12" DIA.(MIN.) CONC.FOOTING

5 E0.06 PROTECTIVE BOLLARD DETAIL

SCALE: N.T.S.


A
A
3/8-16 UNC SELF ALIGNING, REPLACEABLE S.S. EZ-NUT 2 PLACES
1/2-13 UNC LIFTING BOLT 4 PLACES
2X 4 [102] X 4 [102] MOUSEHOLES (ONE CENTERED EACH END)
BEARING LEDGE
SECTION A-A
SURFACE MS-86
LOGO
1/2 [13] X 4 [102] PULL SLOT WITH □1/4 [6] CENTER PIN (2 PLACES)
□5/8 [16] THRU. HOLE W/□1 1/4 [32] X 1/2 [13] DEEP C'BORE (2 PLACES)

NOTES:

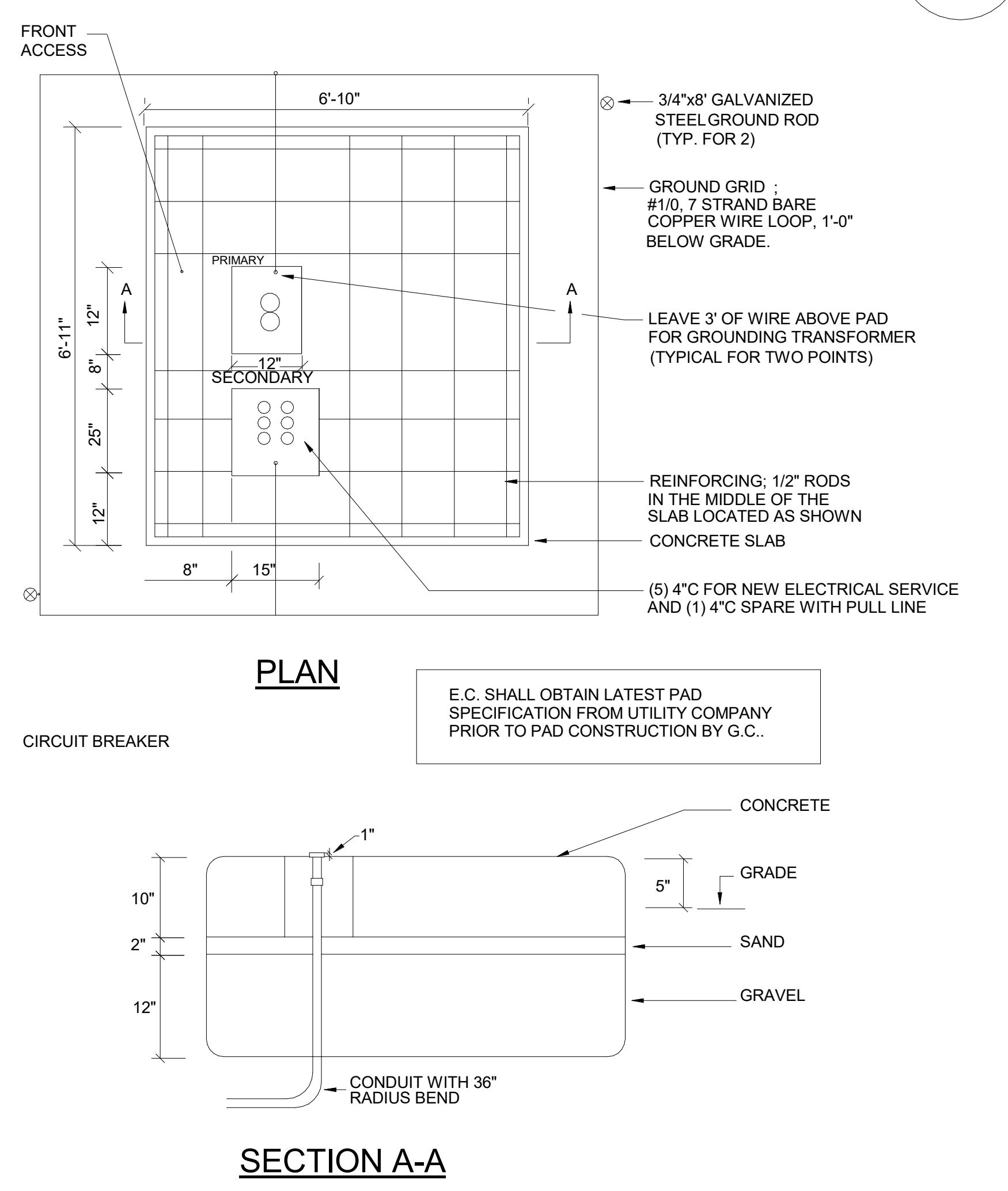
1. THIS BOX IS TO BE USED AS THE BOTTOM UNIT WHEN USED IN AN ASSEMBLY.

NOTES:

1. LOGO TO BE SPECIFIED "ELECTRIC" .
2. THIS COVER IS RATED FOR A STATIC DESIGN LOAD OF 15,000 LBS. [66,720 N] OVER A 10 [254] X 10 [254] AREA AND MUST PASS A MIN. STATIC TEST LOAD OF 22,568 LBS. [100,382 N].
3. FURNISHED W/(2) 3/8-16 [10] UNC X 4 [102] LONG HEX HEAD BOLTS AND (2) 3/8 [10] FLAT WASHERS.
4. DIMENSIONS IN BRACKETS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

6 E0.06 PULL BOX DETAIL

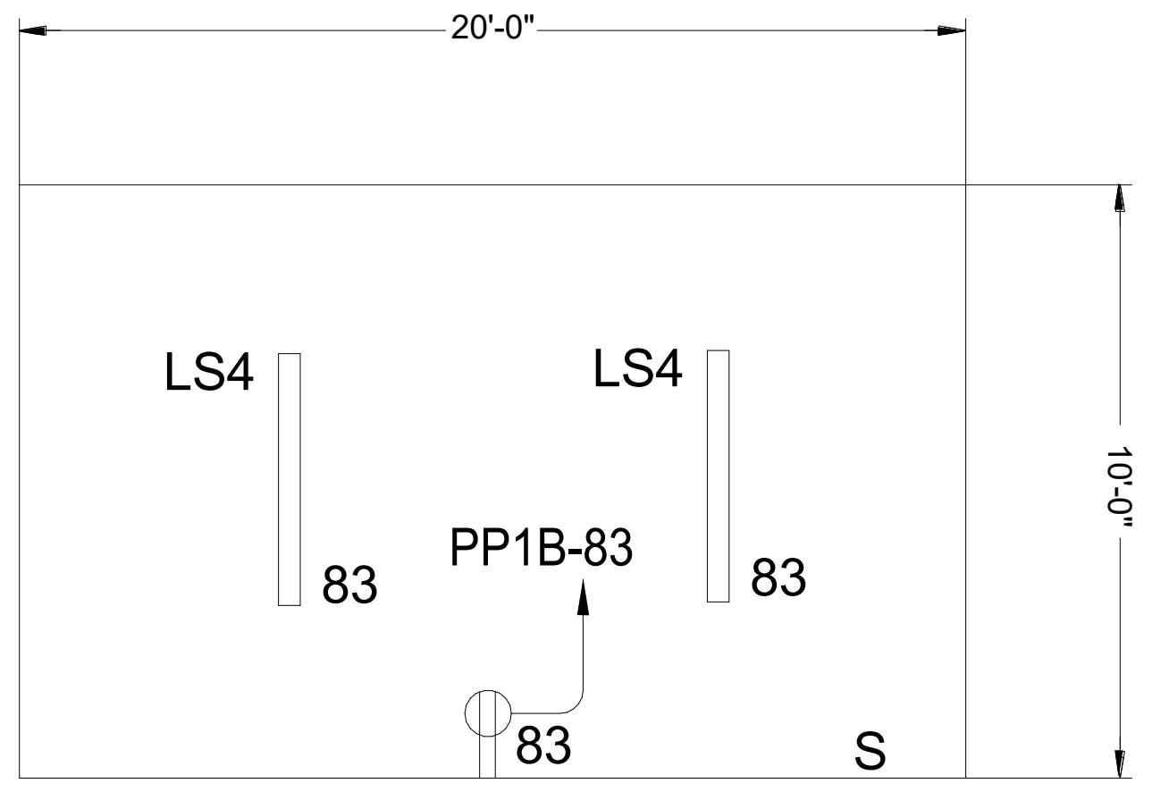
SCALE: N.T.S.

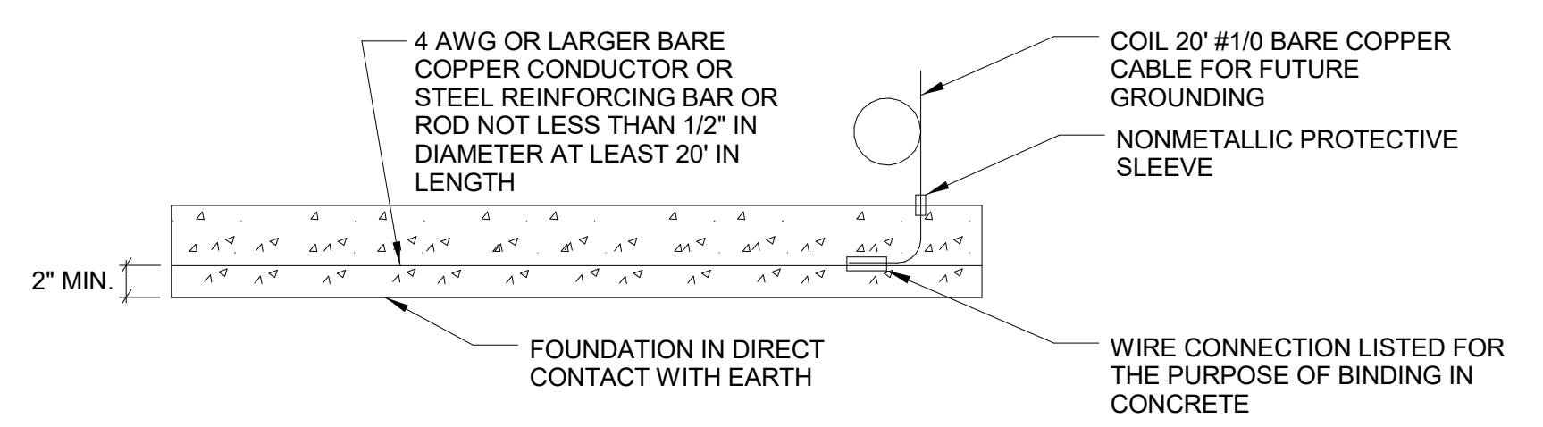

FRONT ACCESS
6'-10"
3/4"x8' GALVANIZED STEELGROUND ROD (TYP. FOR 2)
GROUND GRID ; #1/0, 7 STRAND BARE COPPER WIRE LOOP, 1'-0" BELOW GRADE.
PRIMARY
A
A
LEAVE 3' OF WIRE ABOVE PAD FOR GROUNDING TRANSFORMER (TYPICAL FOR TWO POINTS)
6'-11"
12"
8"
12"
SECONDARY
25"
12"
REINFORCING; 1/2" RODS IN THE MIDDLE OF THE SLAB LOCATED AS SHOWN
CONCRETE SLAB
8"
15"
(5) 4"C FOR NEW ELECTRICAL SERVICE AND (1) 4"C SPARE WITH PULL LINE
PLAN
CIRCUIT BREAKER
1"
CONCRETE
10"
5"
GRADE
2"
SAND
12"
GRAVEL
CONDUIT WITH 36" RADIUS BEND
SECTION A-A

E.C. SHALL OBTAIN LATEST PAD SPECIFICATION FROM UTILITY COMPANY PRIOR TO PAD CONSTRUCTION BY G.C..

7 E0.06 PADMOUNT TRANSFORMER PAD DETAIL

SCALE: N.T.S.




4 AWG OR LARGER BARE COPPER CONDUCTOR OR STEEL REINFORCING BAR OR ROD NOT LESS THAN 1/2" IN DIAMETER AT LEAST 20' IN LENGTH
COIL 20' #1/0 BARE COPPER CABLE FOR FUTURE GROUNDING
NONMETALLIC PROTECTIVE SLEEVE
2" MIN.
FOUNDATION IN DIRECT CONTACT WITH EARTH
WIRE CONNECTION LISTED FOR THE PURPOSE OF BINDING IN CONCRETE

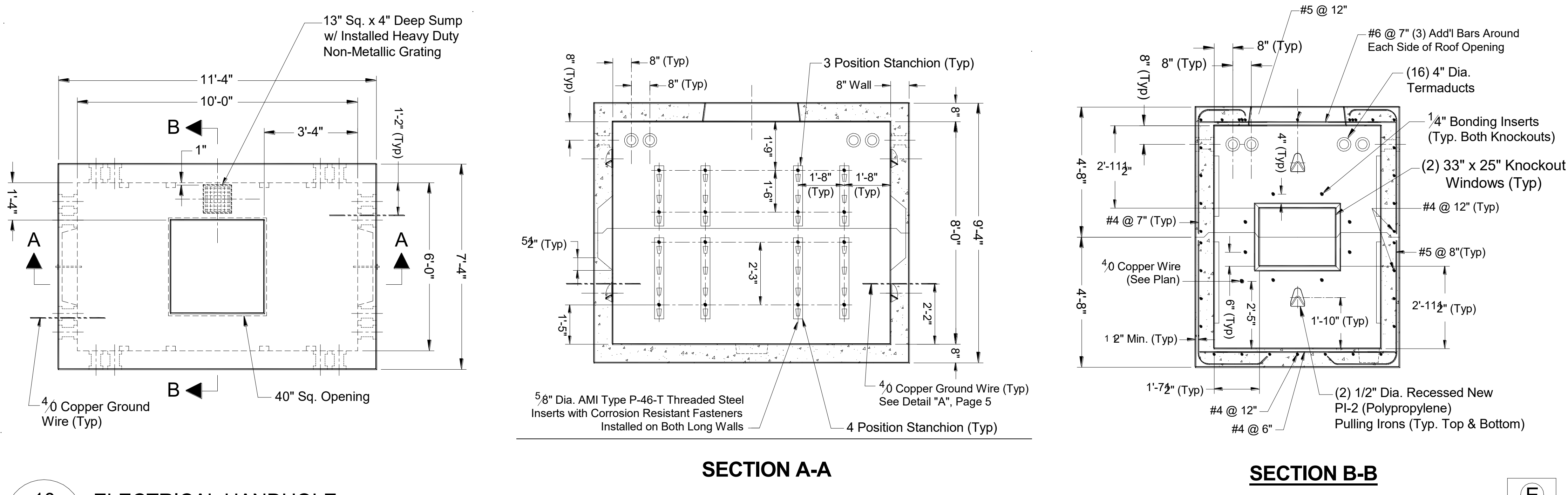
8 E0.06 SLAB GROUNDING DETAIL

SCALE: N.T.S

NOTE:
PROVIDE NEW SLAB GROUNDING IN NEW SLAB.

9 E0.06 SHED DETAIL

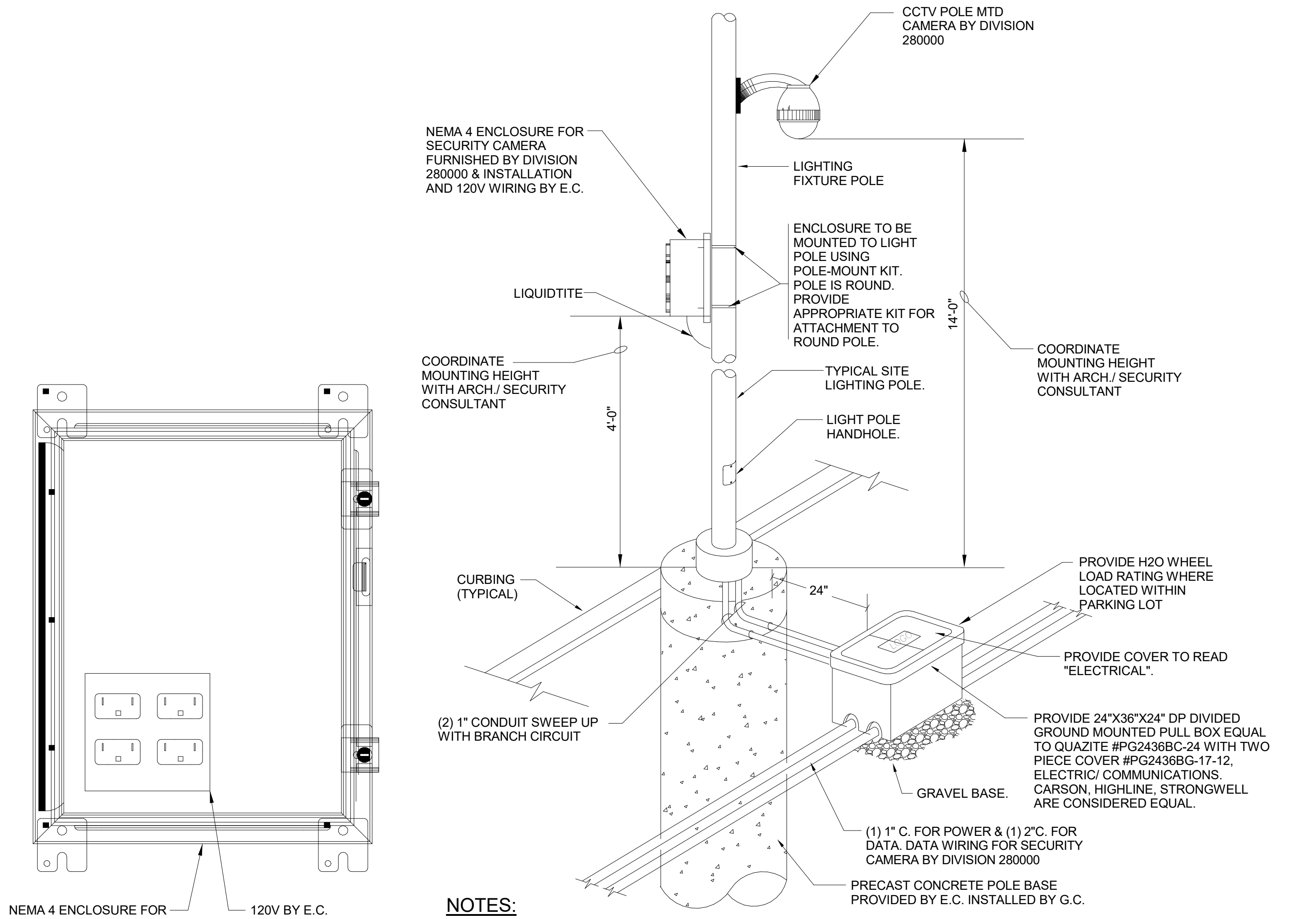
SCALE: N.T.S


13" Sq. x 4" Deep Sump w/ Installed Heavy Duty Non-Metallic Grating
11'-4"
10'-0"
B
3'-4"
1"
1'-2" (Typ)
1'-4"
A
A
6'-0"
7'-4"
B
4/0 Copper Ground Wire (Typ)
40" Sq. Opening
8" (Typ)
8" (Typ)
8" (Typ)
3 Position Stanchion (Typ)
8" Wall
8"
1'-9"
1'-6"
1'-8" (Typ)
1'-8" (Typ)
5½" (Typ)
2'-3"
8'-0"
9'-4"
2'-2"
1'-5"
8"
5/8" Dia. AMI Type P-46-T Threaded Steel Inserts with Corrosion Resistant Fasteners Installed on Both Long Walls
4/0 Copper Ground Wire (Typ) See Detail "A", Page 5
4 Position Stanchion (Typ)
SECTION A-A
#5 @ 12"
8" (Typ)
8" (Typ)
8" (Typ)
#6 @ 7" (3) Add'l Bars Around Each Side of Roof Opening
(16) 4" Dia. Termaducts
1/4" Bonding Inserts (Typ. Both Knockouts)
(2) 33" x 25" Knockout Windows (Typ)
4'-8"
2'-11½"
4" (Typ)
#4 @ 12" (Typ)
#4 @ 7" (Typ)
#5 @ 8"(Typ)
4/0 Copper Wire (See Plan)
4'-8"
6" (Typ)
2'-5"
2'-11½" (Typ)
1'-10" (Typ)
1 ½" Min. (Typ)
1'-7½" (Typ)
#4 @ 12"
#4 @ 6"
(2) 1/2" Dia. Recessed New PI-2 (Polypropylene) Pulling Irons (Typ. Top & Bottom)
SECTION B-B
E

10 E0.06 ELECTRICAL HANDHOLE

SCALE: N.T.S

NOTES:
1. CONCRETE - 5,000 P.S.I. MIN. STRENGTH @ 28 DAYS.
2. STEEL REINFORCEMENT - ASTM A-615, GRADE 60.
3. COVER TO STEEL - 1" MINIMUM
4. VAULTS ARE DESIGNED TO MEET ASTM C857 AND ACI 318 WITH AASHTO HS20-44 LOADING.
5. CONSTRUCTION JOINT - SEALED WITH BUTYL RUBBER RESIN OR EQUIVALENT.
6. PROVIDE WATERPROOFING TO ALL OUTSIDE SURFACES
7. ALL MANHOLES TO HAVE CONNECTORS TO DRAINAGE SYSTEM.
8. EXACT MANHOLE SIZE AND CONSTRUCTION SHALL BE PER UTILITY COMPANY STANDARDS.


CCTV POLE MTD CAMERA BY DIVISION 280000
NEMA 4 ENCLOSURE FOR SECURITY CAMERA FURNISHED BY DIVISION 280000 & INSTALLATION AND 120V WIRING BY E.C.
LIGHTING FIXTURE POLE
ENCLOSURE TO BE MOUNTED TO LIGHT POLE USING POLE-MOUNT KIT. POLE IS ROUND. PROVIDE APPROPRIATE KIT FOR ATTACHMENT TO ROUND POLE.
LIQUIDTITE
14'-0"
COORDINATE MOUNTING HEIGHT WITH ARCH./ SECURITY CONSULTANT
COORDINATE MOUNTING HEIGHT WITH ARCH./ SECURITY CONSULTANT
TYPICAL SITE LIGHTING POLE.
4'-0"
LIGHT POLE HANDHOLE.
CURBING (TYPICAL)
24"
PROVIDE H2O WHEEL LOAD RATING WHERE LOCATED WITHIN PARKING LOT
PROVIDE COVER TO READ "ELECTRICAL".
(2) 1" CONDUIT SWEEP UP WITH BRANCH CIRCUIT
PROVIDE 24"X36"X24" DP DIVIDED GROUND MOUNTED PULL BOX EQUAL TO QUAZITE #PG2436BC-24 WITH TWO PIECE COVER #PG2436BG-17-12, ELECTRIC/ COMMUNICATIONS. CARSON, HIGHLINE, STRONGWELL ARE CONSIDERED EQUAL.
GRAVEL BASE.
(1) 1" C. FOR POWER & (1) 2"C. FOR DATA. DATA WIRING FOR SECURITY CAMERA BY DIVISION 280000
PRECAST CONCRETE POLE BASE PROVIDED BY E.C. INSTALLED BY G.C.
NEMA 4 ENCLOSURE FOR SECURITY CAMERA FURNISHED BY DIVISION 280000 & INSTALLATION AND 120V WIRING BY E.C.
120V BY E.C.

NOTES:

1. INSTALLATION TYPICAL FOR LANDSCAPED AREAS. HANDHOLE SHALL NOT BE LOCATED IN TRAFFIC AREAS. COORDINATE COVER AND FRAME COLOR OF HANDHOLE WITH ARCHITECT.
2. REFER TO TYPICAL LIGHT POLE BASE DETAIL.
3. WHERE CAMERA IS NOT MOUNTED TO A LIGHTING POLE PROVIDE A 15' ROUND ALUMINUM POLE THAT MATCHES ALL OTHER SITE POLE FOR MOUNTING OF CAMERAS.
4. WHERE CAMERA IS MOUNTED TO SPORTS FIELD LIGHTING POLE MOUNTING HEIGHT SHALL BE 25' ABOVE FIELD.

11 E0.06 POLE MOUNTED CCTV CAMERA AND LIGHTING POLE UNDERGROUND DETAIL

SCALE: N.T.S

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WILMINGTON
ELEMENTARY SCHOOL

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PROJECT NUMBER: 23-0847

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ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

ORIENTATION AND SCALE:

SHEET TITLE:
ELECTRICAL SITE DETAILS

SHEET NUMBER:
E0.06

GENERAL LIGHTING NOTES:

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3. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER MINIMUM #12 AWG SIZE, THWN/THHN INSULATION, 600 VOLTS RATED UNLESS OTHERWISE NOTED.
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7. ALL OCCUPANCY AND DAYLIGHT HARVESTING PHOTOSENSORS SHALL BE LOCATED IN COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR EACH INDIVIDUAL SPACE. E.C. SHALL PROVIDE A CEILING PLAN LOCATING ALL SENSORS WHICH HAS BEEN FULLY COORDINATED WITH THE WORK OF OTHER TRADES FOR FINAL REVIEW AND APPROVAL. E.C. SHALL PROVIDE THE SENSOR VENDOR(S) WITH ALL INFORMATION REQUIRED TO FULLY UNDERSTAND THE CONDITIONS OF EACH SPACE.
8. INDIRECT AND DIRECT/INDIRECT FIXTURES SHALL BE SUSPENDED WITH AIRCRAFT CABLE TO PROVIDE A MINIMUM CLEARANCE 18" FROM THE CEILING TO TOP OF EACH FIXTURE. FIELD CONDITIONS REQUIRING A SHORTER SUSPENSION SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER PRIOR TO COMMENCING WITH FIXTURE INSTALLATIONS.
9. FIXTURES ON PLANS SHALL BE PROVIDED WITH 0-10V DIMMING DRIVER(S) OR LIGHT ENGINE(S) AS REQUIRED FOR LED SOURCES SPECIFIED TO BE CONTROLLED VIA A 0-10V SIGNAL FROM THE ALCS, DAYLIGHT HARVESTING PHOTOSENSORS, THEATRICAL DIMMING SYSTEM OR OTHER CONTROLS
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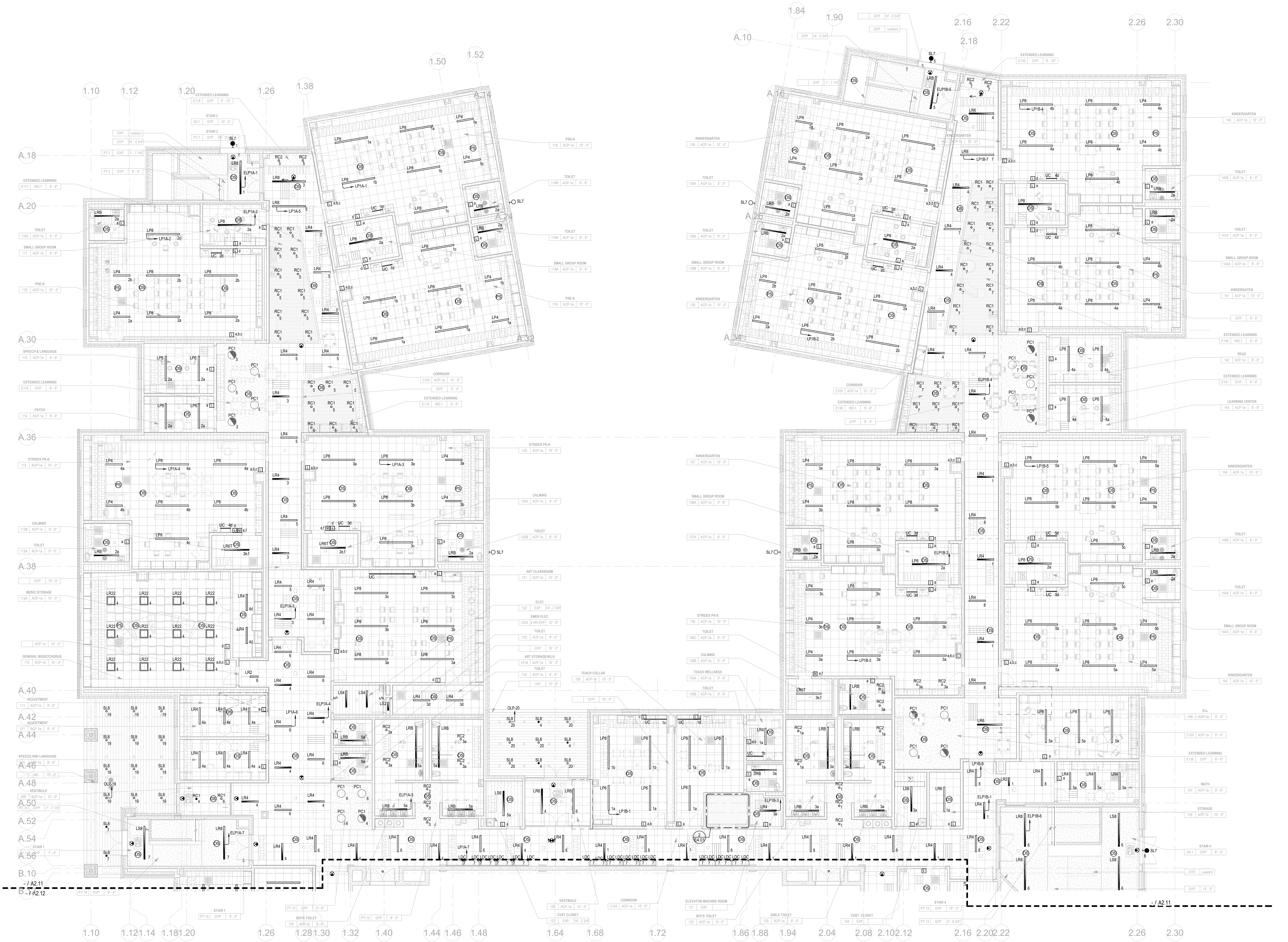

1 / E1.11 LEVEL ONE AREA A - LIGHTING
SCALE: 1/8" = 1'-0"

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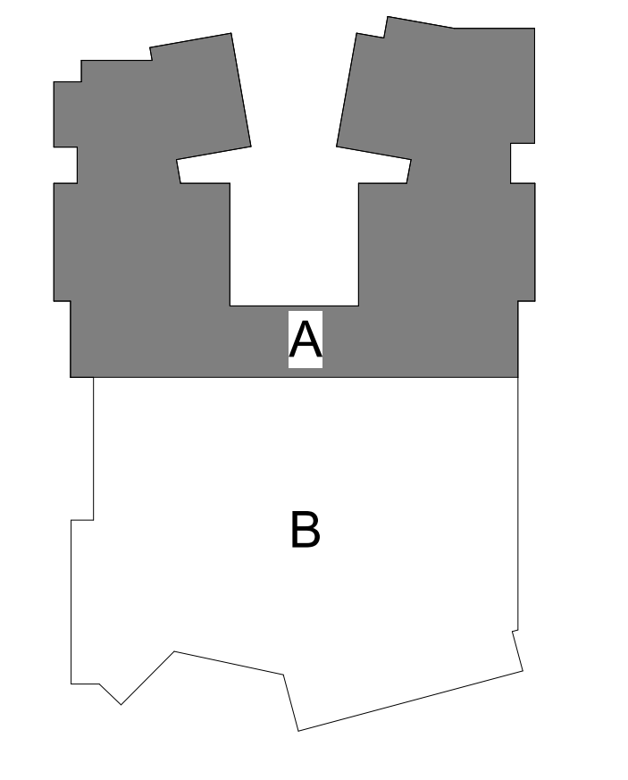
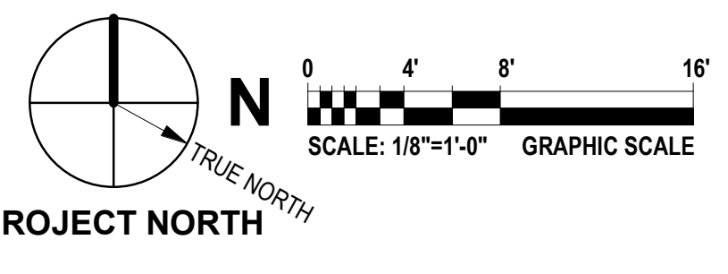


ORIENTATION AND SCALE:



SHEET TITLE:
LEVEL 1 AREA A - LIGHTING

SHEET NUMBER:
E1.11

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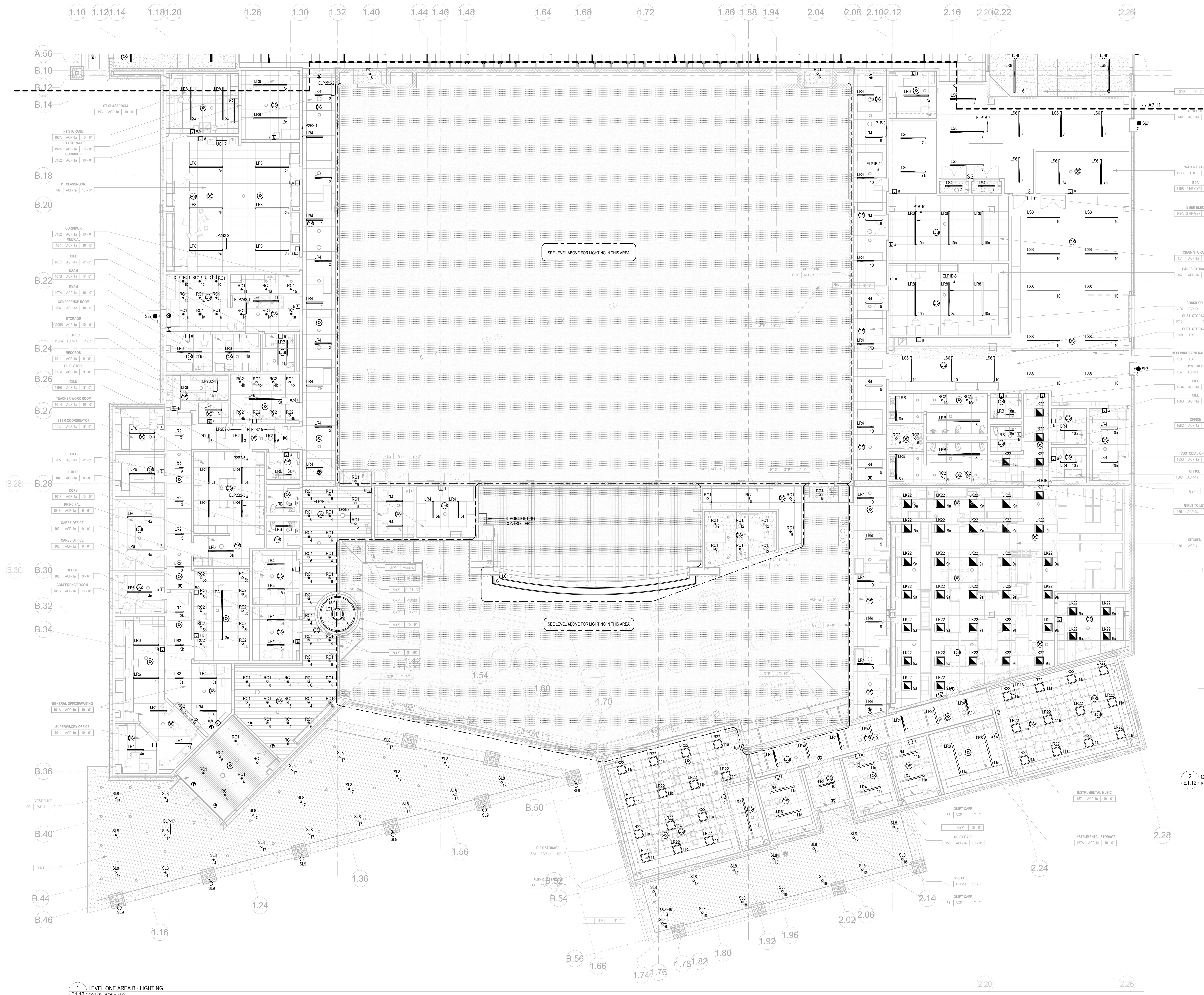
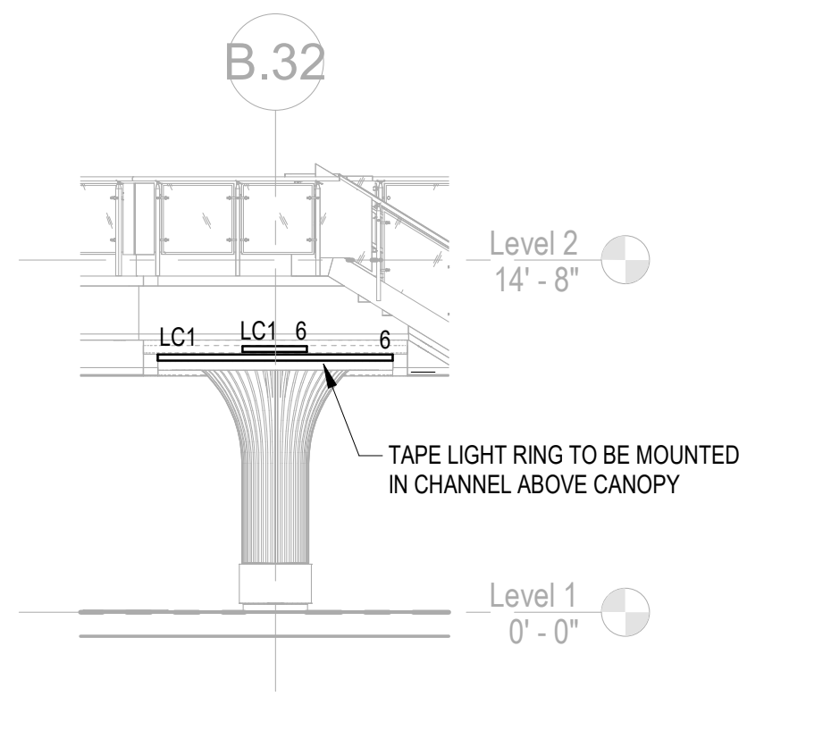

SEE LEVEL ABOVE FOR LIGHTING IN THIS AREA
STAGE LIGHTING CONTROLLER
SEE LEVEL ABOVE FOR LIGHTING IN THIS AREA
CORRIDOR
RAMP
CAFETERIA
FLEX STORAGE
INSTRUMENTAL MUSIC
INSTRUMENTAL STORAGE
QUIET CAFE
VESTIBULE
A2.11

1 LEVEL ONE AREA B - LIGHTING
E1.12 SCALE: 1/8" = 1'-0"



TAPE LIGHT RING TO BE MOUNTED IN CHANNEL ABOVE CANOPY

2 COLUMN CANOPY LIGHTING
E1.12 SCALE: 1/8" = 1'-0"

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ELEMENTARY SCHOOL

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PROJECT NUMBER: 23-0847

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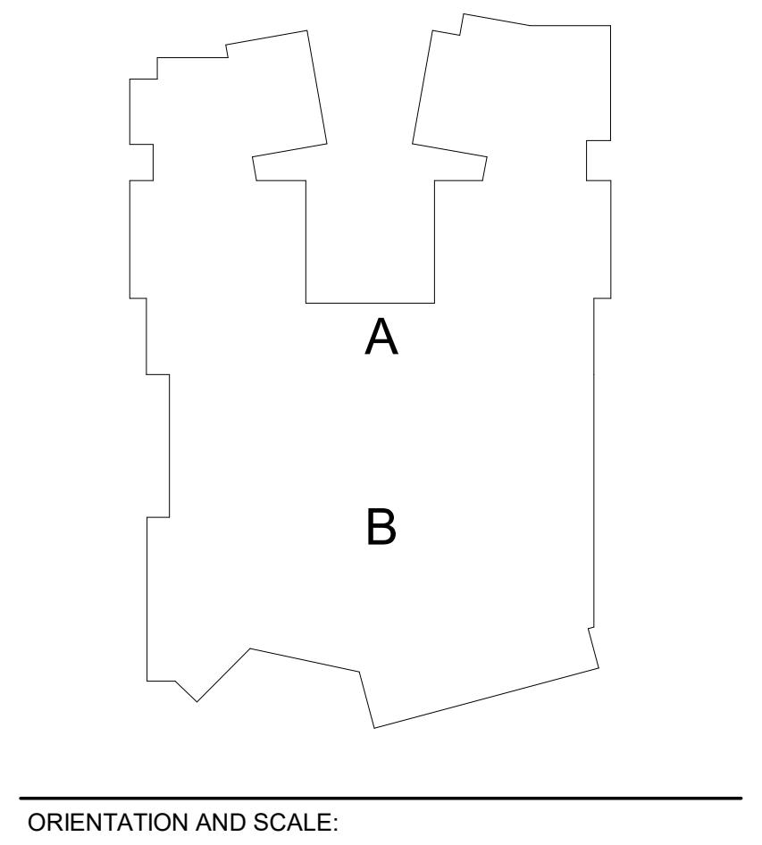
90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:

LEVEL 1 AREA B -
LIGHTING

SHEET NUMBER:

E1.12

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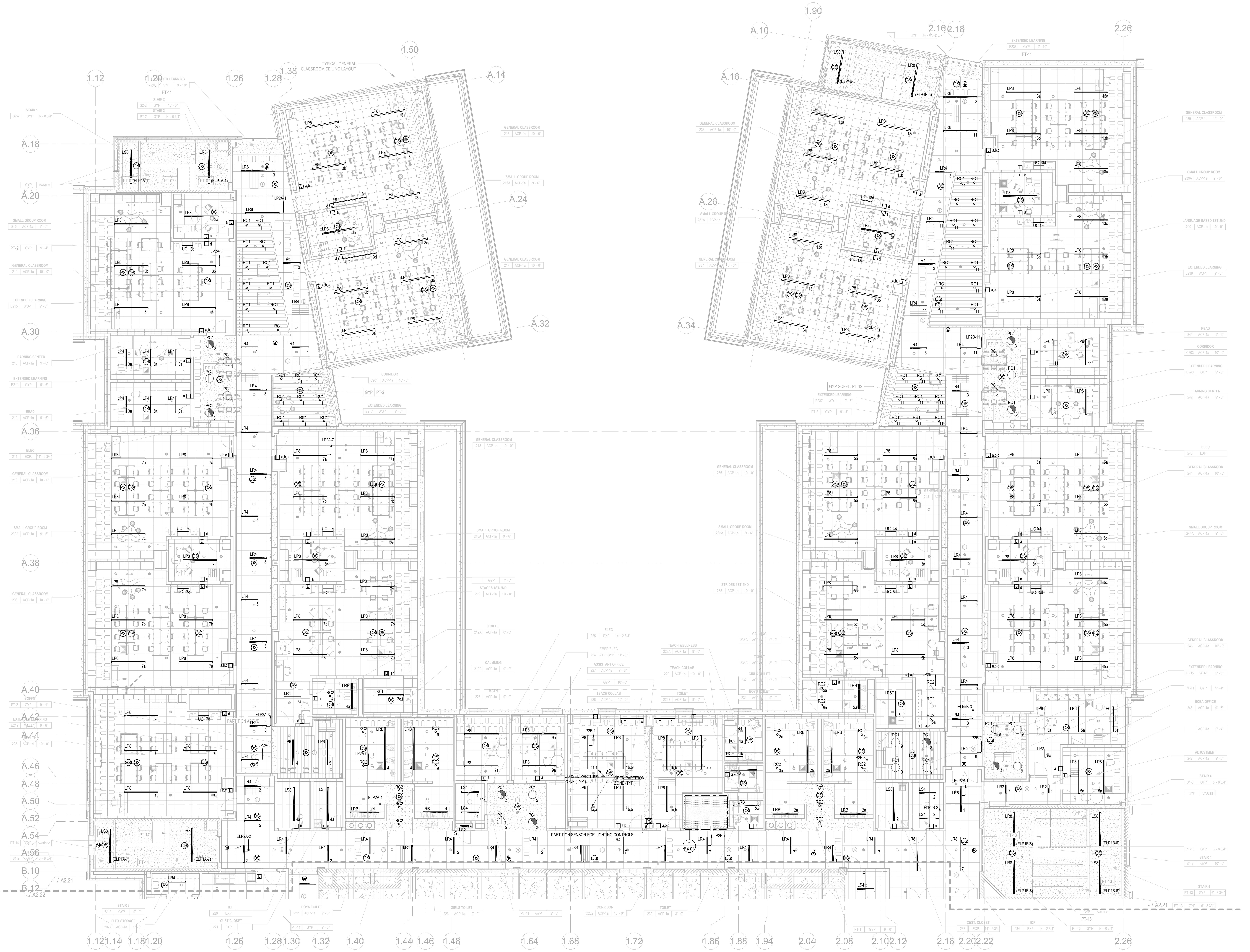

1
E1.21
LEVEL TWO AREA A - LIGHTING
SCALE: 1/8" = 1'-0"

DORE + WHITTIER

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260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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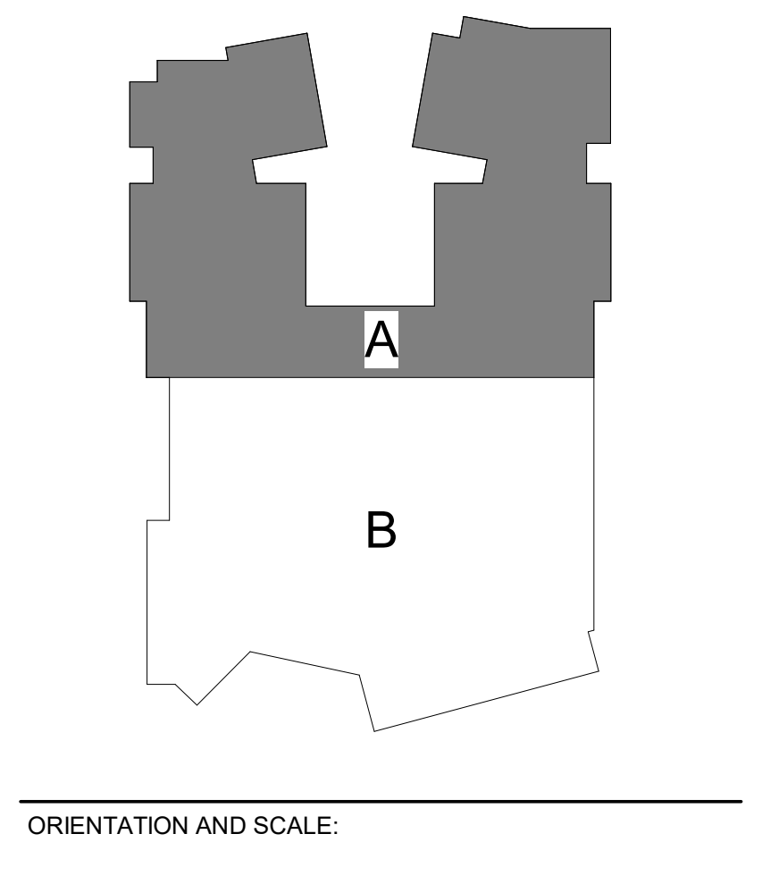

ORIENTATION AND SCALE:

N
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE
TRUE NORTH
PROJECT NORTH

SHEET TITLE:
LEVEL 2 AREA A -
LIGHTING

SHEET NUMBER:
E1.21

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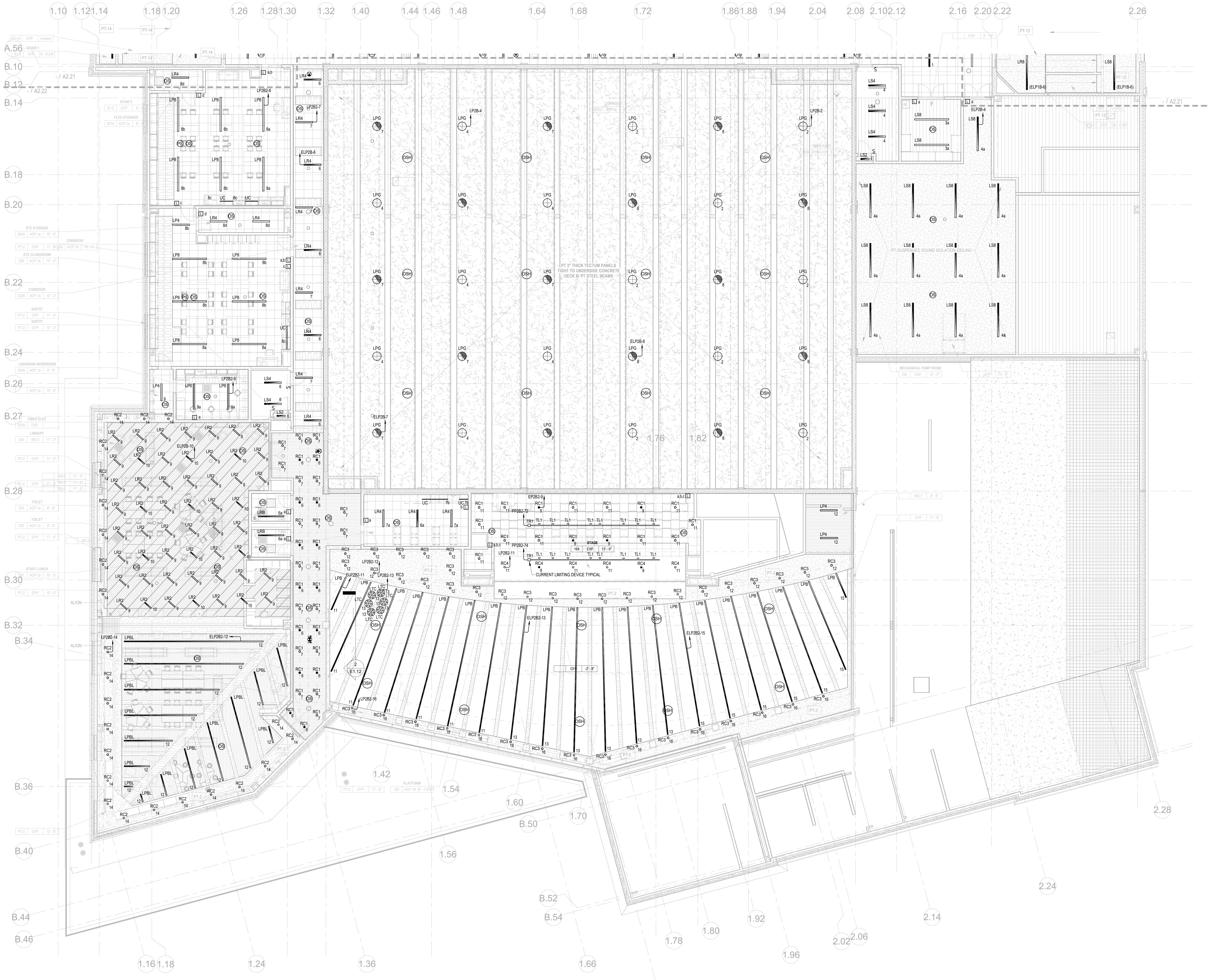
PT 3" THICK TECTUM PANELS TIGHT TO UNDERSIDE CONCRETE DECK B/ PT STEEL BEAMS
PT SUSPENDED SOUND ISOLATION CEILING
CURRENT LIMITING DEVICE TYPICAL
STAGE
MECHANICAL PUMP ROOM
LPG
OSH
LR2
RC1
RC2
RC3
RC4
LPB
LPBL
LP8
LR4
LS4
LS8
TL1
TR1
ELP2B2-12
ELP2B2-15
ELP2B-8
E1.12

1 LEVEL TWO AREA B - LIGHTING
E1.22 SCALE: 1/8" = 1'-0"

DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

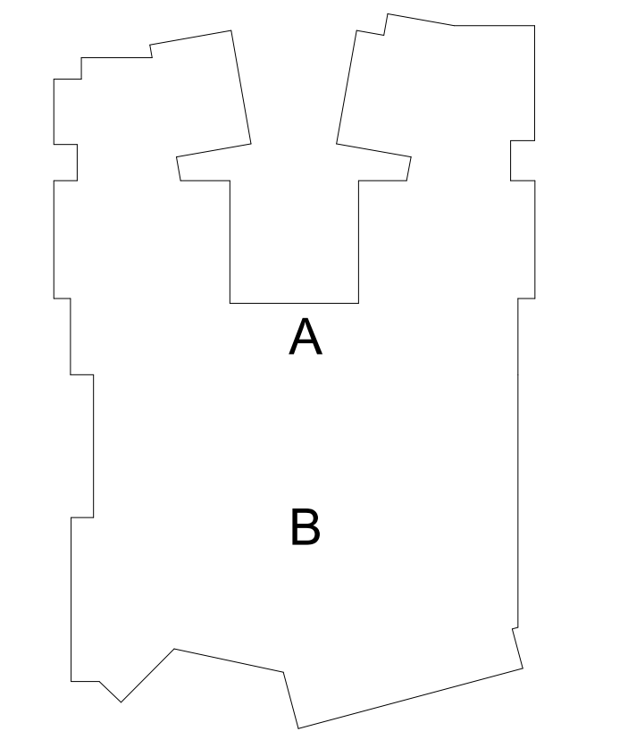
REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:

N
TRUE NORTH
PROJECT NORTH
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

LEVEL 2 AREA B - LIGHTING

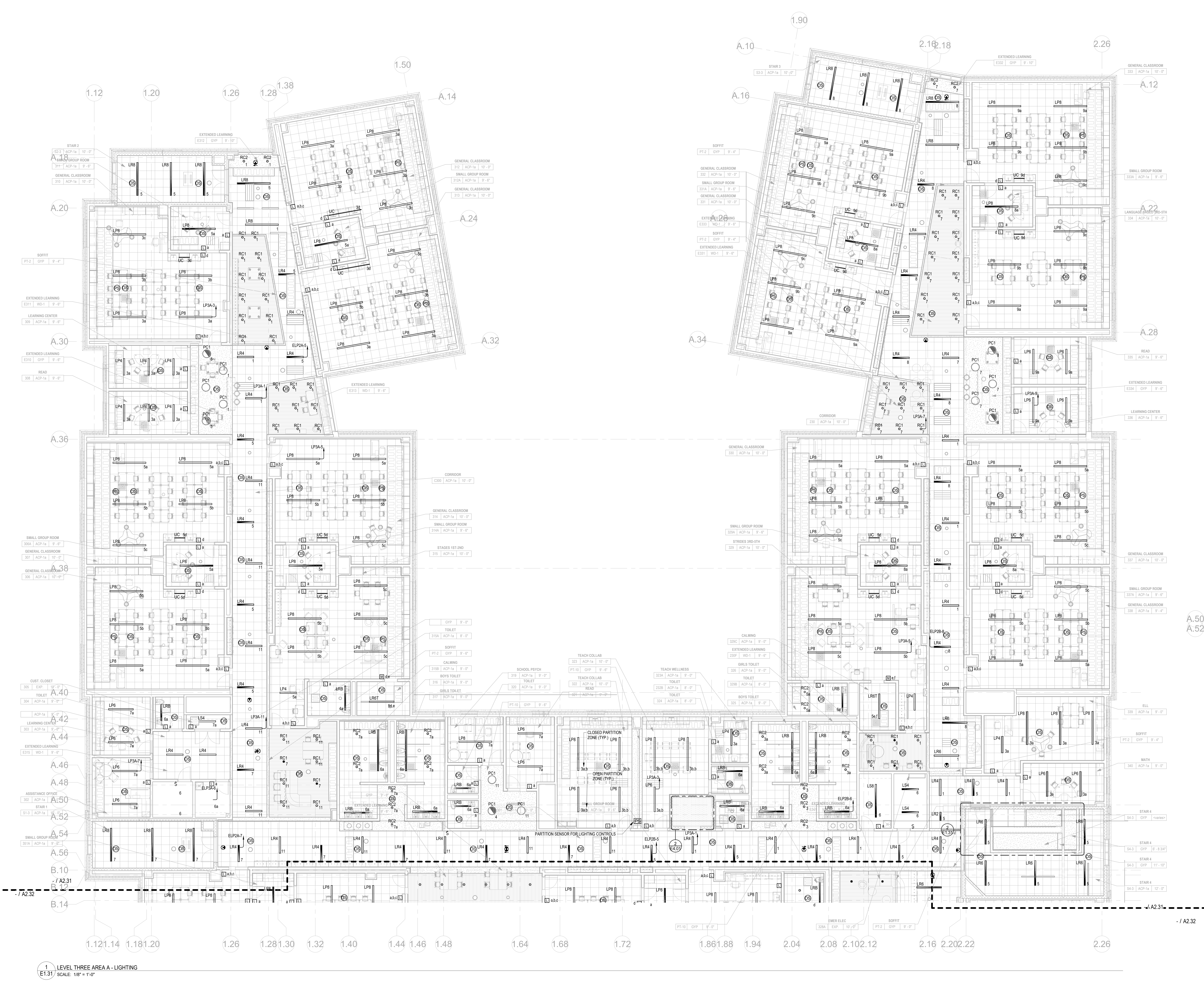
SHEET NUMBER:

E1.22

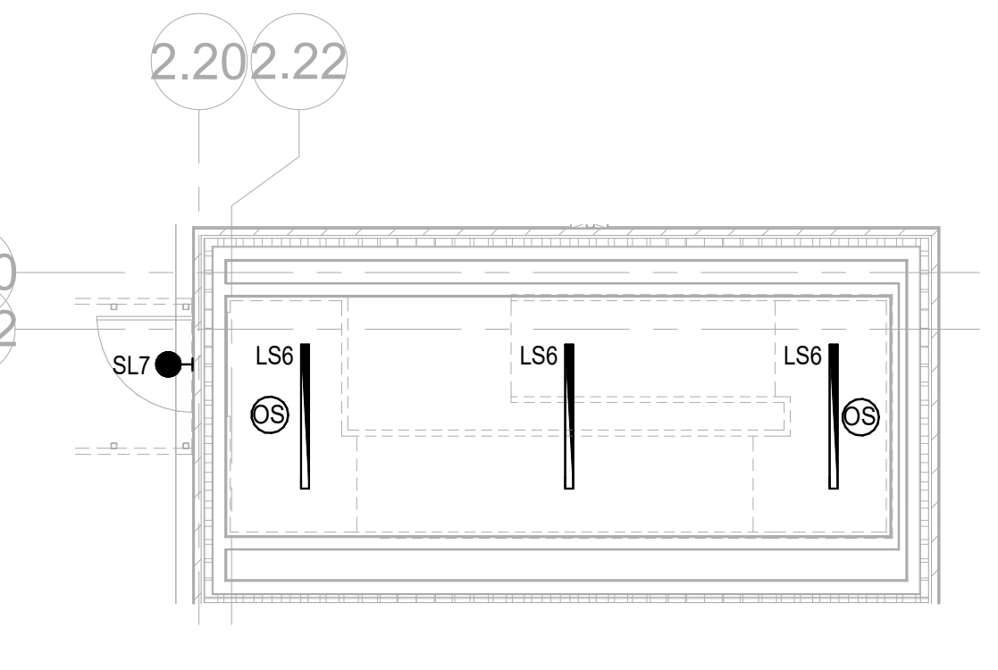
Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt
9/23/2026 4:31:43 PM

GENERAL LIGHTING NOTES:

1. EXACT LOCATIONS OF ALL FIXTURES AND DEVICES SHALL BE FULLY COORDINATED WITH ARCHITECTURAL PLANS, ELEVATIONS, SECTIONS AND THE WORK OF OTHER TRADES PRIOR TO ROUGH-IN. FULLY COORDINATED WITH ARCHITECTURAL PLANS, ELEVATIONS, SECTIONS AND THE WORK OF OTHER TRADES PRIOR TO ROUGH-IN. EXACT LOCATIONS OF ALL FIXTURES AND DEVICES SHALL BE FULLY COORDINATED WITH ARCHITECTURAL PLANS, ELEVATIONS, SECTIONS AND THE WORK OF OTHER TRADES PRIOR TO ROUGH-IN.
2. WIRING AND CONDUIT OR MC CABLE SHALL BE REQUIRED BETWEEN ALL LIGHTING FIXTURES, SWITCHES, DIMMERS, SENSORS, POWER PACKS, RELAYS, AND OTHER AUXILIARY DEVICES. WIRING AND CONDUIT OR MC CABLE IS SHOWN ON DRAWINGS ONLY FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS. IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT AND CONTROL WIRING SYSTEM BE INSTALLED.
3. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER MINIMUM #12 AWG SIZE, THWN/THHN INSULATION, 600 VOLTS RATED UNLESS OTHERWISE NOTED.
4. UTILITIES SHALL NOT PENETRATE STAIR ENCLOSURES, ELEVATOR SHAFTS, AND MACHINE ROOMS EXCEPT WHERE SPECIFICALLY SERVING THAT STAIR OR ELEVATOR.
5. METAL ROOF DECKS SHALL NOT BE TAPPED FOR SUPPORT OF ANY LIGHTING FIXTURES OR ELECTRICAL EQUIPMENT. PROVIDE UNISTRUT OR OTHER SUPPLEMENTAL SUPPORT FITTINGS TO BE ATTACHED TO BUILDING STRUCTURAL FRAMING AS REQUIRED FOR SUPPORT OF ALL LIGHTING FIXTURES AND ELECTRICAL EQUIPMENT.
6. ALL EXPOSED CONDUITS, RACEWAYS, WIREWAYS, BOXES, FITTINGS AND SIMILAR COMPONENTS SHALL BE PAINTED TO MATCH SURROUNDING FINISH WITH EQUAL TYPE PRODUCT(S).
7. ALL OCCUPANCY AND DAYLIGHT HARVESTING PHOTOSENSORS SHALL BE LOCATED IN COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR EACH INDIVIDUAL SPACE. E.C. SHALL PROVIDE A CEILING PLAN LOCATING ALL SENSORS WHICH HAS BEEN FULLY COORDINATED WITH THE WORK OF OTHER TRADES FOR FINAL REVIEW AND APPROVAL. E.C. SHALL PROVIDE THE SENSOR VENDOR(S) WITH ALL INFORMATION REQUIRED TO FULLY UNDERSTAND THE CONDITIONS OF EACH SPACE.
8. INDIRECT AND DIRECT/INDIRECT FIXTURES SHALL BE SUSPENDED WITH AIRCRAFT CABLE TO PROVIDE A MINIMUM CLEARANCE 18" FROM THE CEILING TO TOP OF EACH FIXTURE. FIELD CONDITIONS REQUIRING A SHORTER SUSPENSION SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER PRIOR TO COMMENCING WITH FIXTURE INSTALLATIONS.
9. FIXTURES ON PLANS SHALL BE PROVIDED WITH 0-10V DIMMING DRIVER(S) OR LIGHT ENGINE(S) AS REQUIRED FOR LED SOURCES SPECIFIED TO BE CONTROLLED VIA A 0-10V SIGNAL FROM THE ALCS, DAYLIGHT HARVESTING PHOTOSENSORS, THEATRICAL DIMMING SYSTEM OR OTHER CONTROLS
10. REFER TO "AUTOMATED LIGHTING CONTROL SYSTEM (ALCS) - TYPICAL ONE LINE DIAGRAM" AND SPECIFICATIONS FOR DETAILED LIGHTING CONTROL REQUIREMENTS.
11. ALL EXTERIOR EQUIPMENT, FIXTURES, AND DEVICES SHALL BE RATED IP65 (MINIMUM) AND BE CONSTRUCTED OF STAINLESS STEEL AND/OR MARINE GRADE ALUMINUM SUITABLE FOR COASTAL ENVIRONMENT APPLICATION. PAINTED FINISHES SHALL HAVE PASSED A MINIMUM 5,000 HOUR SALT SPRAY TEST.


PARTITION SENSOR FOR LIGHTING CONTROLS
CLOSED PARTITION ZONE (TYP.)
OPEN PARTITION ZONE (TYP.)
STAIR 4
EXTENDED LEARNING
GENERAL CLASSROOM
SMALL GROUP ROOM
- / A2.31
- / A2.32

1 E1.31 LEVEL THREE AREA A - LIGHTING
SCALE: 1/8" = 1'-0"



2 E1.31 ROOF - LIGHTING
SCALE: 1/8" = 1'-0"

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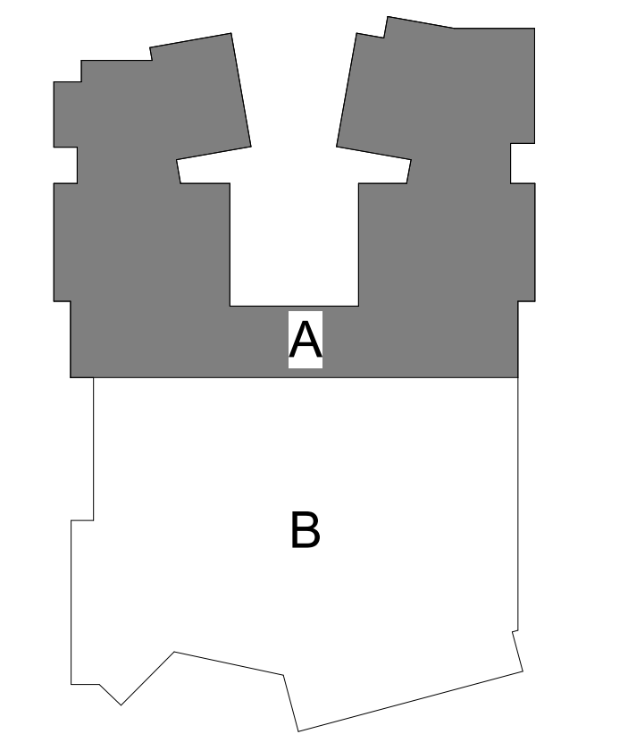

ORIENTATION AND SCALE:

PROJECT NORTH
TRUE NORTH
N
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

LEVEL 3 AREA A - LIGHTING

SHEET NUMBER:

E1.31

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt

9/23/2026 4:32:00 PM

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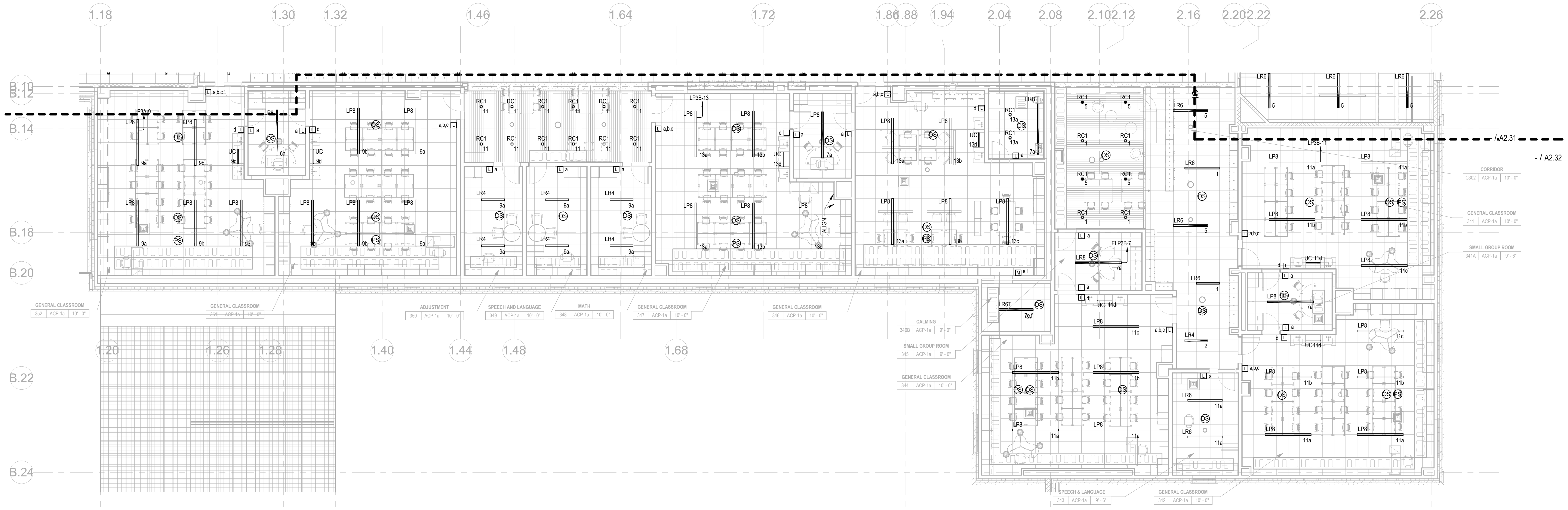
1.18
1.30
1.32
1.46
1.64
1.72
1.86
1.88
1.94
2.04
2.08
2.10
2.12
2.16
2.20
2.22
2.26
B.10
B.12
B.14
B.18
B.20
B.22
B.24
1.20
1.26
1.28
1.40
1.44
1.48
1.68
GENERAL CLASSROOM 352 ACP-1a 10' - 0"
GENERAL CLASSROOM 351 ACP-1a 10' - 0"
ADJUSTMENT 350 ACP-1a 10' - 0"
SPEECH AND LANGUAGE 349 ACP-1a 10' - 0"
MATH 348 ACP-1a 10' - 0"
GENERAL CLASSROOM 347 ACP-1a 10' - 0"
GENERAL CLASSROOM 346 ACP-1a 10' - 0"
CALMING 346B ACP-1a 9' - 0"
SMALL GROUP ROOM 345 ACP-1a 9' - 0"
GENERAL CLASSROOM 344 ACP-1a 10' - 0"
SPEECH & LANGUAGE 343 ACP-1a 9' - 6"
GENERAL CLASSROOM 342 ACP-1a 10' - 0"
CORRIDOR C302 ACP-1a 10' - 0"
GENERAL CLASSROOM 341 ACP-1a 10' - 0"
SMALL GROUP ROOM 341A ACP-1a 9' - 6"
- / A2.31
- / A2.32
LP3B-13
LP3B-11
ELP3B-7
LP8
LR4
LR6
LR6T
LR8
RC1
UC
OS
PS
ALIGN

1 LEVEL THREE AREA B - LIGHTING
E1.32 SCALE: 1/8" = 1'-0"

DORE + WHITTIER

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WILMINGTON ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

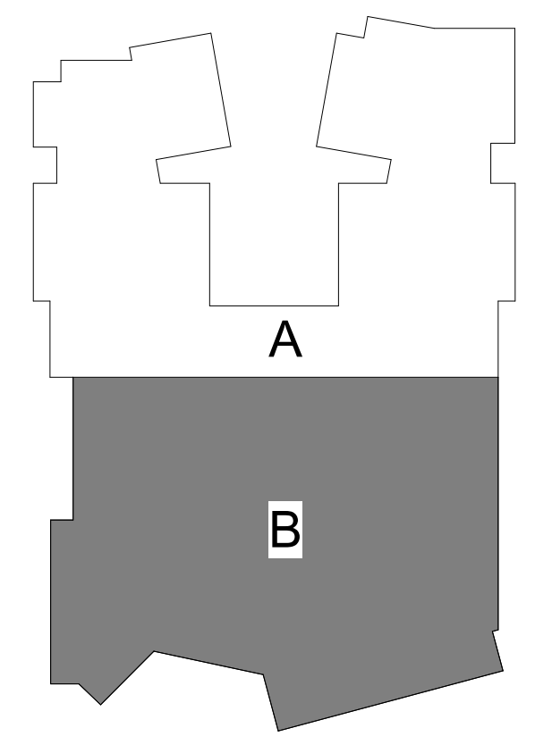
REVISIONS:

NO.	DATE	TITLE

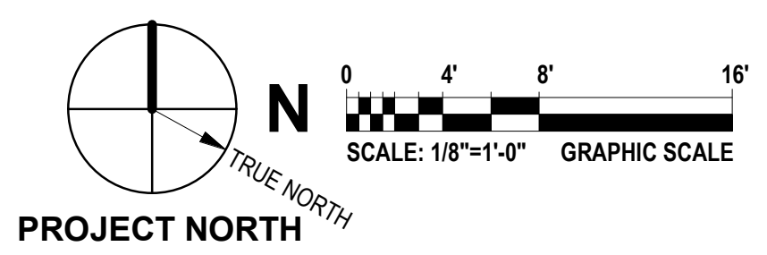
ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:



SHEET TITLE:

LEVEL 3 AREA B LIGHTING

SHEET NUMBER:

E1.32

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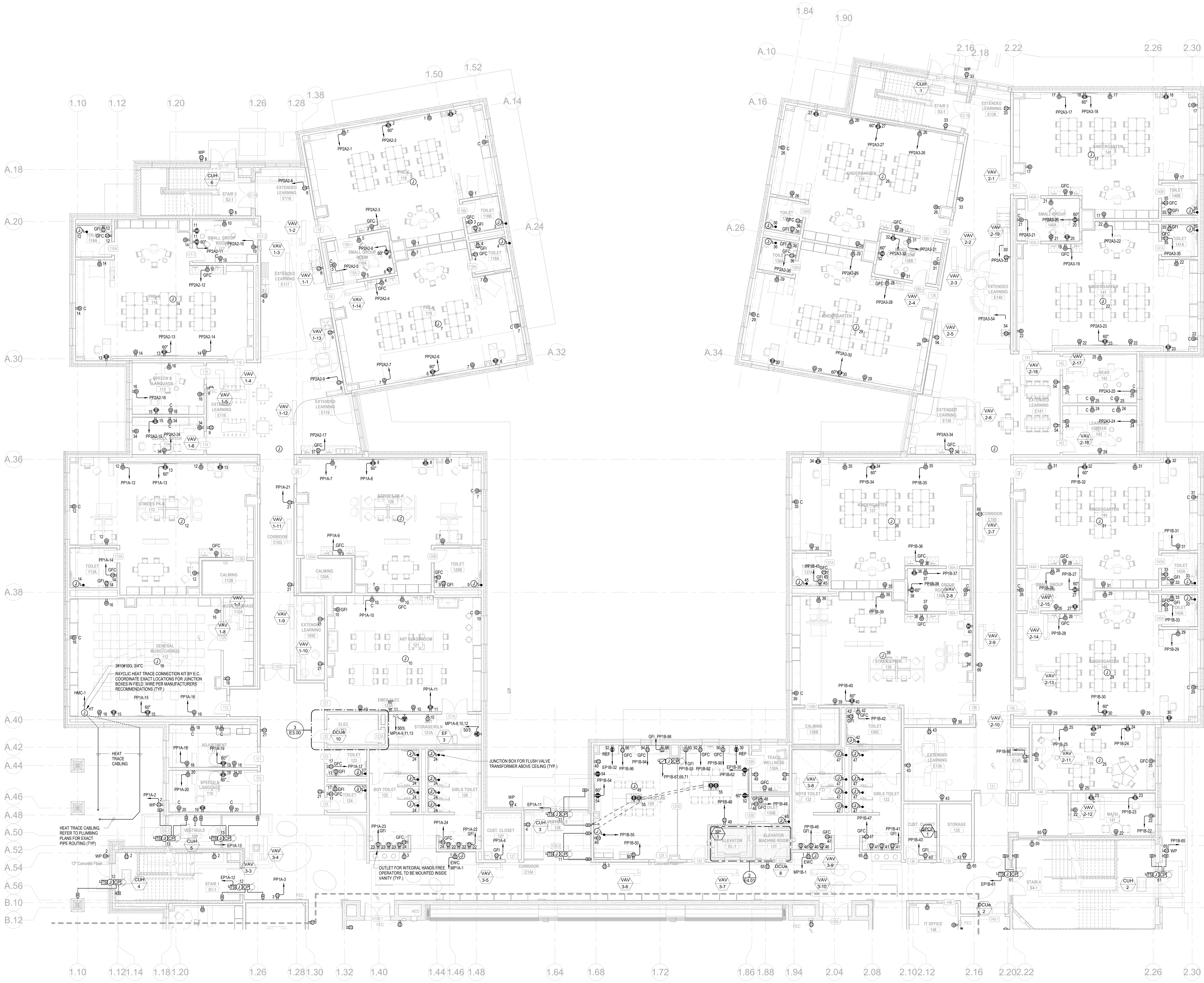

1 E2.11 LEVEL ONE A - POWER
SCALE: 1/8" = 1'-0"

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt
9/23/2026 4:32:11 PM

GENERAL POWER NOTES:

1. COORDINATE EXACT LOCATION OF ALL DEVICES AND EQUIPMENT WITH ARCHITECT PRIOR TO INSTALLATION.
2. REFER TO MECHANICAL PLANS FOR ANY CHANGES AND FOR EXACT LOCATION OF ALL HVAC EQUIPMENT.
3. WIRING IS SHOWN ON DRAWINGS ONLY FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS.
4. WIRING AND CONDUIT SHALL BE REQUIRED BETWEEN ALL OUTLETS INDICATED WITH CIRCUIT NUMBERS AND PANEL DESIGNATIONS.
5. ALTHOUGH ALL BRANCH CIRCUIT WIRE AND CONDUIT IS NOT SHOWN, IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE INSTALLED.
6. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER MINIMUM #12 AWG SIZE, THWN/THHN INSULATION, 600 VOLTS RATED UNLESS OTHERWISE NOTED.
7. REFER TO FIRE PROTECTION PLANS FOR ANY CHANGES AND FOR EXACT LOCATION OF ALL FLOW SWITCH. TAMPER SWITCH, ETC.
8. DO NOT PENETRATE STAIRS WITH ANY UTILITIES EXCEPT FOR UTILITIES SPECIFICALLY SERVING THAT STAIR.
9. WHERE CONDUITS AND/OR BOXES CANNOT BE FLUSH MOUNTED IN BUILDING PROVIDE A SYSTEM OF SURFACE METAL RACEWAYS AND BOXES IN ACCORDANCE WITH ARTICLE 386, EQUAL TO WIREMOLD FOR ALL FINISH SPACES WHERE PUBLIC HAS ACCESS, INCLUDING CORRIDORS, CLASSROOMS, OFFICES, ETC.
10. CONFIRM RATINGS & FINAL LOCATIONS OF EQUIPMENT WITH OWNER PRIOR TO ROUGHING.
11. ALL OUTLETS ON EXTERIOR WALLS WITH CASEWORK SHALL BE MOUNTED 6" ABOVE CASEWORK. CONFIRM HEIGHT OF CASEWORK WITH HVAC AND ARCHITECT PRIOR TO ROUGHING.
12. TYPICALLY PROVIDE GROUND FAULT INTERRUPTER TYPE RECEPTACLES WITHIN 6 FEET OF WATER SOURCES.
13. PROVIDE ALL EMPTY CONDUITS WITH PULL-STRINGS.
14. TYPICALLY PROVIDE (2) 4" SLEEVES OVER EACH CORRIDOR DOOR.
15. ROVIDE (2) 2" THROUGH-WALL SLEEVE ABOVE CEILING OVER THE DOORS INTO EACH ROOM LEADING FROM THE CORRIDOR FOR COMMUNICATIONS/DATA WIRING.
16. LOCATE ALL WALL TELEPHONE OUTLETS 12 INCHES AWAY FROM ALL OTHER OUTLETS/DEVICES.
17. PROVIDE (2) 1" SLEEVES OVER EACH DOOR FOR TEL./DATA SECURITY AND SOUND SYSTEM WIRING. TEL./DATA SHALL BE DEDICATED TO (1) OF THE CONDUITS.
18. E.C. SHALL PROVIDE EMERGENCY BOILER & WATER HEATER SHUT-OFF MOUNTED IN STOPPER II COVER. INTERLOCK w/ BOILER & WATER HEATER CONTROL PANELS. MOUNT @ 72" A.F.F. TYPICAL.
19. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL BOXES AND CONDUITS REQUIRED FOR COMMUNICATIONS SYSTEMS DIVISION 27 DEVICES AS SHOWN ON TECHNOLOGY DRAWINGS. ALL LOCATIONS OF POWER AND COMMUNICATIONS OUTLET BOXES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO ROUGHING.
20. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL BOXES AND CONDUITS REQUIRED FOR AUDIO/VISUAL(AV) SYSTEM SECTION 274100 DEVICES AS SHOWN ON AV DRAWINGS. ALL LOCATIONS OF POWER AND AV OUTLET BOXES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO ROUGHING.
21. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL BOXES AND CONDUITS REQUIRED FOR SECURITY SYSTEM SECTION 280000 DEVICES AS SHOWN ON SECURITY DRAWINGS. ALL LOCATIONS OF POWER AND AV OUTLET BOXES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO ROUGHING
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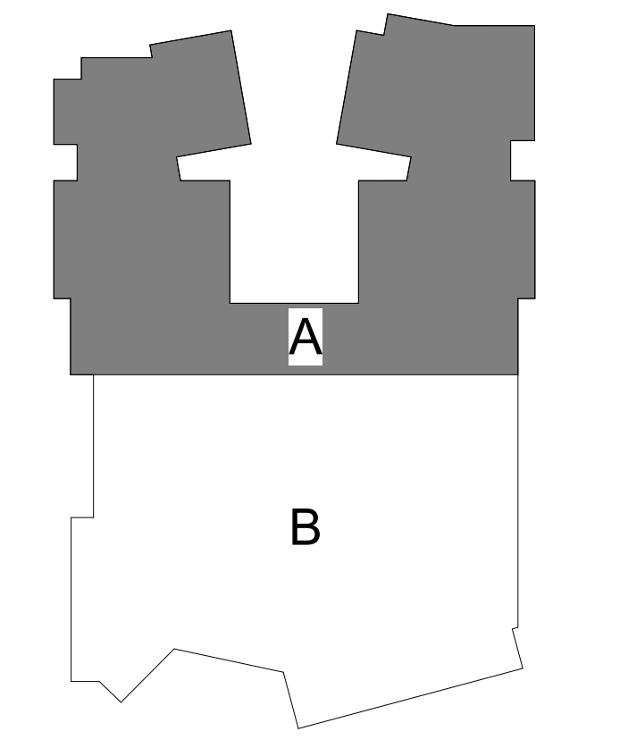
KEY PLAN



ORIENTATION AND SCALE:

PROJECT NORTH
TRUE NORTH
N
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:
LEVEL 1 AREA A - POWER

SHEET NUMBER:
E2.11

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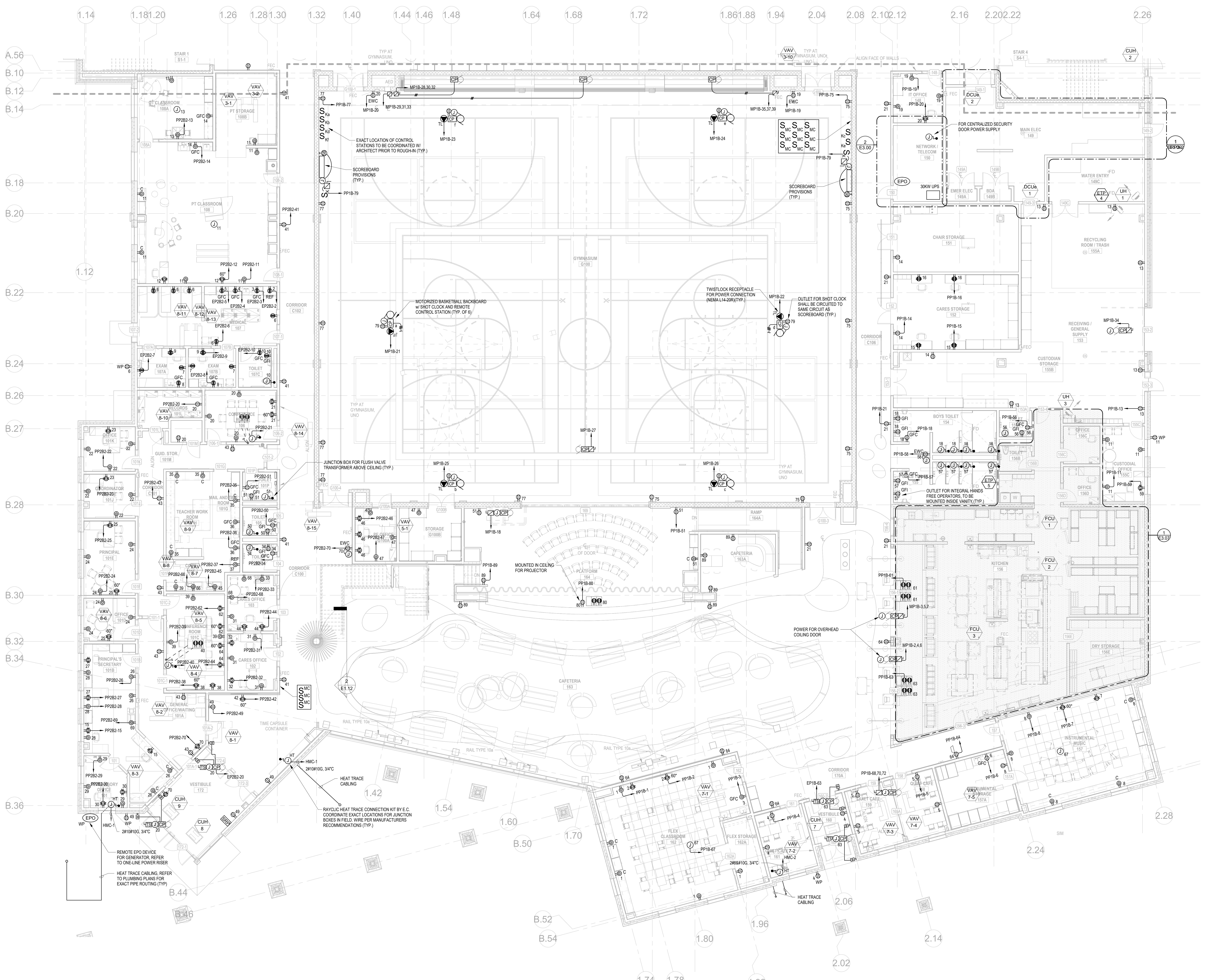
EXACT LOCATION OF CONTROL STATIONS TO BE COORDINATED W/ ARCHITECT PRIOR TO ROUGH-IN (TYP.)
SCOREBOARD PROVISIONS (TYP.)
MOTORIZED BASKETBALL BACKBOARD w/ SHOT CLOCK AND REMOTE CONTROL STATION (TYP. OF 6)
TWISTLOCK RECEPTACLE FOR POWER CONNECTION (NEMA L14-20R)(TYP.)
OUTLET FOR SHOT CLOCK SHALL BE CIRCUITED TO SAME CIRCUIT AS SCOREBOARD (TYP.)
FOR CENTRALIZED SECURITY DOOR POWER SUPPLY
JUNCTION BOX FOR FLUSH VALVE TRANSFORMER ABOVE CEILING (TYP.)
OUTLET FOR INTEGRAL HANDS FREE OPERATORS, TO BE MOUNTED INSIDE VANITY (TYP.)
MOUNTED IN CEILING FOR PROJECTOR
POWER FOR OVERHEAD CEILING DOOR
HEAT TRACE CABLING
RAYCLIC HEAT TRACE CONNECTION KIT BY E.C. COORDINATE EXACT LOCATIONS FOR JUNCTION BOXES IN FIELD. WIRE PER MANUFACTURERS RECOMMENDATIONS (TYP.)
REMOTE EPO DEVICE FOR GENERATOR, REFER TO ONE-LINE POWER RISER
HEAT TRACE CABLING, REFER TO PLUMBING PLANS FOR EXACT PIPE ROUTING (TYP)
GYMNASIUM G100
CORRIDOR C102
CORRIDOR C106
CHAIR STORAGE 151
CARES STORAGE 152
BOYS TOILET 154
KITCHEN 156
CAFETERIA 163
PLATFORM 164
RAMP 164A
VESTIBULE 172
GENERAL OFFICE/WAITING 101A
NETWORK / TELECOM 150
MAIN ELEC 149
RECYCLING ROOM / TRASH 155A
RECEIVING / GENERAL SUPPLY 153
FLEX CLASSROOM 162
INSTRUMENTAL MUSIC 157
PT CLASSROOM 108
2#10#10G, 3/4"C
HMC-1

1 LEVEL ONE B - POWER
E2.12 SCALE: 1/8" = 1'-0"

DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
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375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

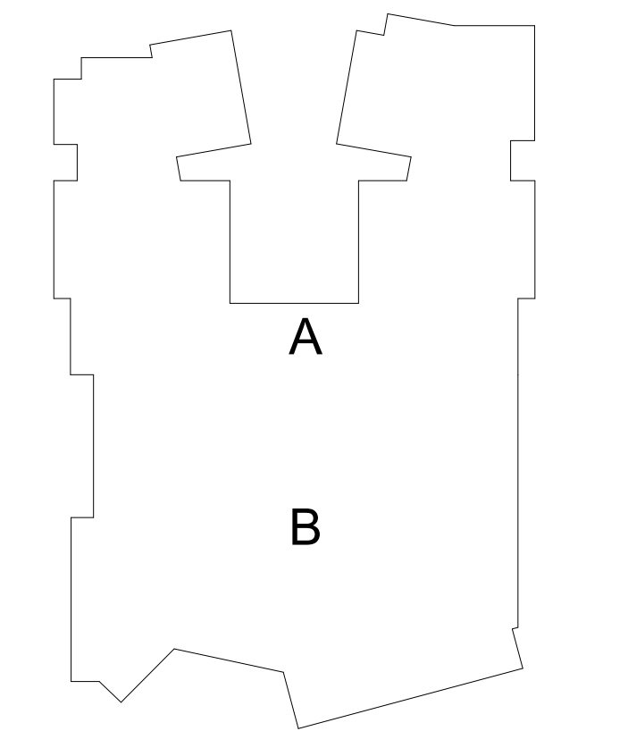
REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:

N
PROJECT NORTH
TRUE NORTH
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

LEVEL 1 AREA B - POWER

SHEET NUMBER:

E2.12

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt
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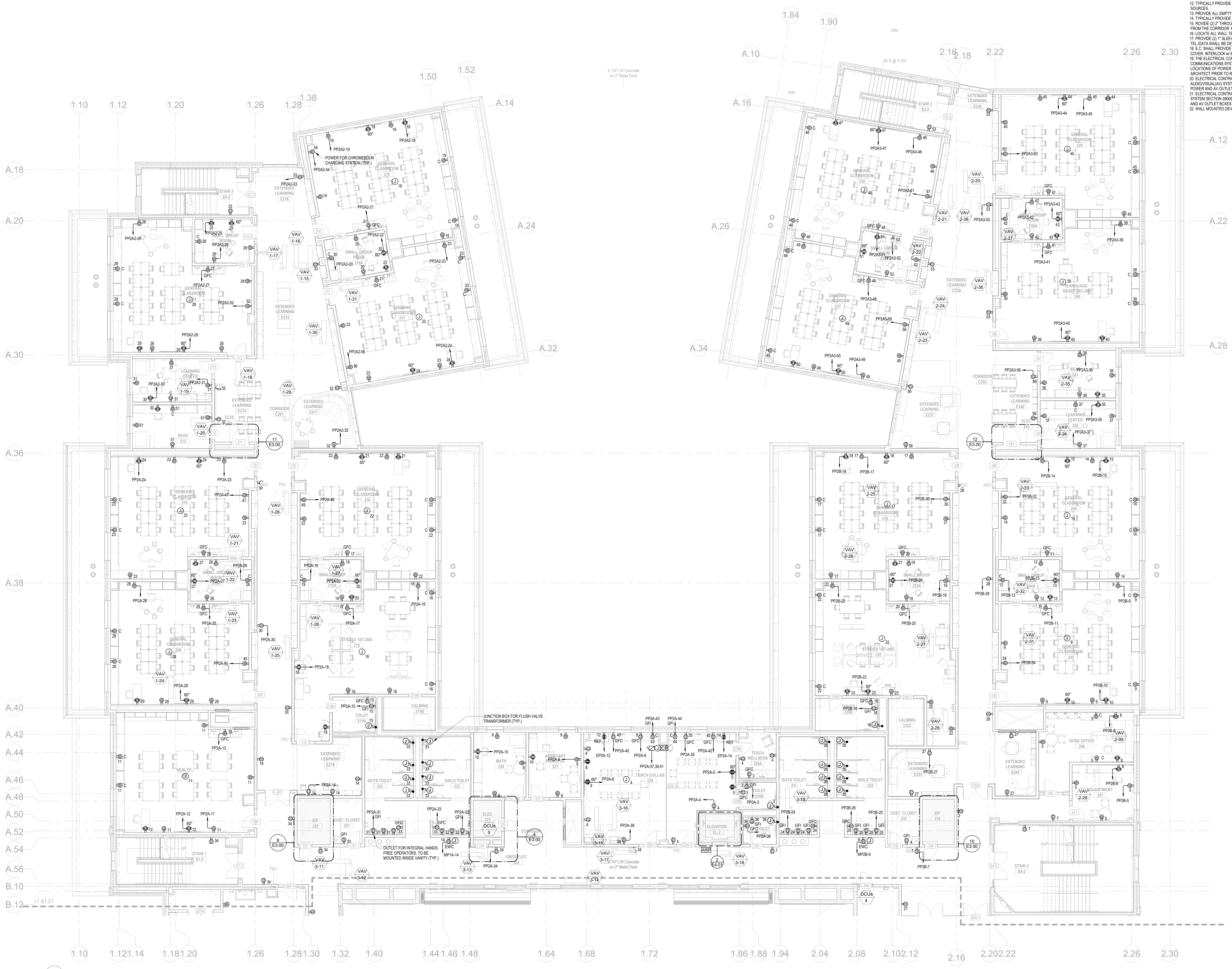

1
E2.21
LEVEL TWO AREA A - POWER
SCALE: 1/8" = 1'-0"

GENERAL POWER NOTES:

1. COORDINATE EXACT LOCATION OF ALL DEVICES AND EQUIPMENT WITH ARCHITECT PRIOR TO INSTALLATION.
2. REFER TO MECHANICAL PLANS FOR ANY CHANGES AND FOR EXACT LOCATION OF ALL HVAC EQUIPMENT.
3. WIRING IS SHOWN ON DRAWINGS ONLY FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS.
4. WIRING AND CONDUIT SHALL BE REQUIRED BETWEEN ALL OUTLETS INDICATED WITH CIRCUIT NUMBERS AND PANEL DESIGNATIONS.
5. ALTHOUGH ALL BRANCH CIRCUIT WIRE AND CONDUIT IS NOT SHOWN, IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE INSTALLED.
6. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER MINIMUM #12 AWG SIZE, THWN/THHN INSULATION, 600 VOLTS RATED UNLESS OTHERWISE NOTED.
7. REFER TO FIRE PROTECTION PLANS FOR ANY CHANGES AND FOR EXACT LOCATION OF ALL FLOW SWITCH. TAMPER SWITCH, ETC.
8. DO NOT PENETRATE STAIRS WITH ANY UTILITIES EXCEPT FOR UTILITIES SPECIFICALLY SERVING THAT STAIR.
9. WHERE CONDUITS AND/OR BOXES CANNOT BE FLUSH MOUNTED IN BUILDING PROVIDE A SYSTEM OF SURFACE METAL RACEWAYS AND BOXES IN ACCORDANCE WITH ARTICLE 386, EQUAL TO WIREMOLD FOR ALL FINISH SPACES WHERE PUBLIC HAS ACCESS, INCLUDING CORRIDORS, CLASSROOMS, OFFICES, ETC.
10. CONFIRM RATINGS & FINAL LOCATIONS OF EQUIPMENT WITH OWNER PRIOR TO ROUGHING.
11. ALL OUTLETS ON EXTERIOR WALLS WITH CASEWORK SHALL BE MOUNTED 6" ABOVE CASEWORK. CONFIRM HEIGHT OF CASEWORK WITH HVAC AND ARCHITECT PRIOR TO ROUGHING.
12. TYPICALLY PROVIDE GROUND FAULT INTERRUPTER TYPE RECEPTACLES WITHIN 6 FEET OF WATER SOURCES.
13. PROVIDE ALL EMPTY CONDUITS WITH PULL-STRINGS.
14. TYPICALLY PROVIDE (2) 4" SLEEVES OVER EACH CORRIDOR DOOR.
15. ROVIDE (2) 2" THROUGH-WALL SLEEVE ABOVE CEILING OVER THE DOORS INTO EACH ROOM LEADING FROM THE CORRIDOR FOR COMMUNICATIONS/DATA WIRING.
16. LOCATE ALL WALL TELEPHONE OUTLETS 12 INCHES AWAY FROM ALL OTHER OUTLETS/DEVICES.
17. PROVIDE (2) 1" SLEEVES OVER EACH DOOR FOR TEL./DATA SECURITY AND SOUND SYSTEM WIRING. TEL./DATA SHALL BE DEDICATED TO (1) OF THE CONDUITS.
18. E.C. SHALL PROVIDE EMERGENCY BOILER & WATER HEATER SHUT-OFF MOUNTED IN STOPPER II COVER. INTERLOCK w/ BOILER & WATER HEATER CONTROL PANELS. MOUNT @ 72" A.F.F. TYPICAL.
19. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL BOXES AND CONDUITS REQUIRED FOR COMMUNICATIONS SYSTEMS DIVISION 27 DEVICES AS SHOWN ON TECHNOLOGY DRAWINGS. ALL LOCATIONS OF POWER AND COMMUNICATIONS OUTLET BOXES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO ROUGHING.
20. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL BOXES AND CONDUITS REQUIRED FOR AUDIO/VISUAL(AV) SYSTEM SECTION 274100 DEVICES AS SHOWN ON AV DRAWINGS. ALL LOCATIONS OF POWER AND AV OUTLET BOXES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO ROUGHING.
21. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL BOXES AND CONDUITS REQUIRED FOR SECURITY SYSTEM SECTION 280000 DEVICES AS SHOWN ON SECURITY DRAWINGS. ALL LOCATIONS OF POWER AND AV OUTLET BOXES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO ROUGHING
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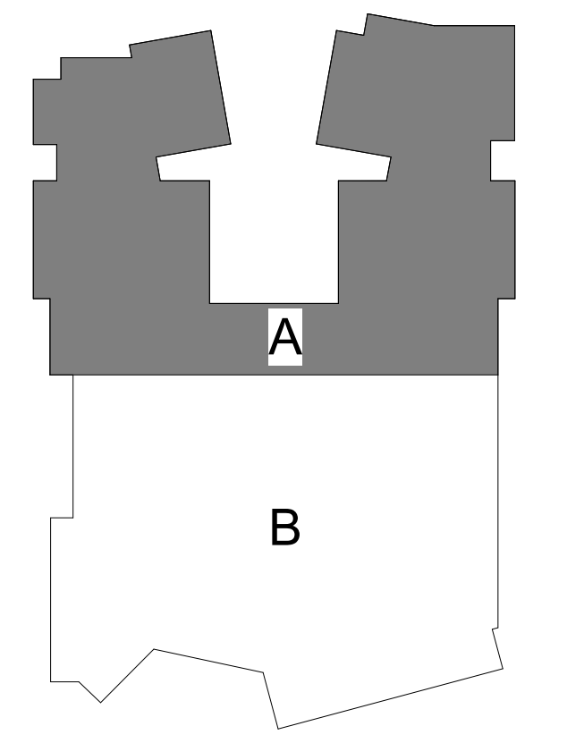

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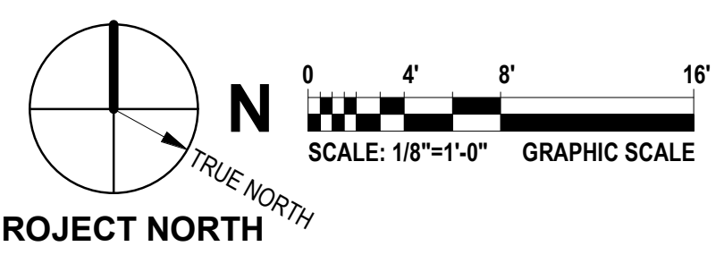

SHEET TITLE:

LEVEL 2 AREA A - POWER

SHEET NUMBER:

E2.21

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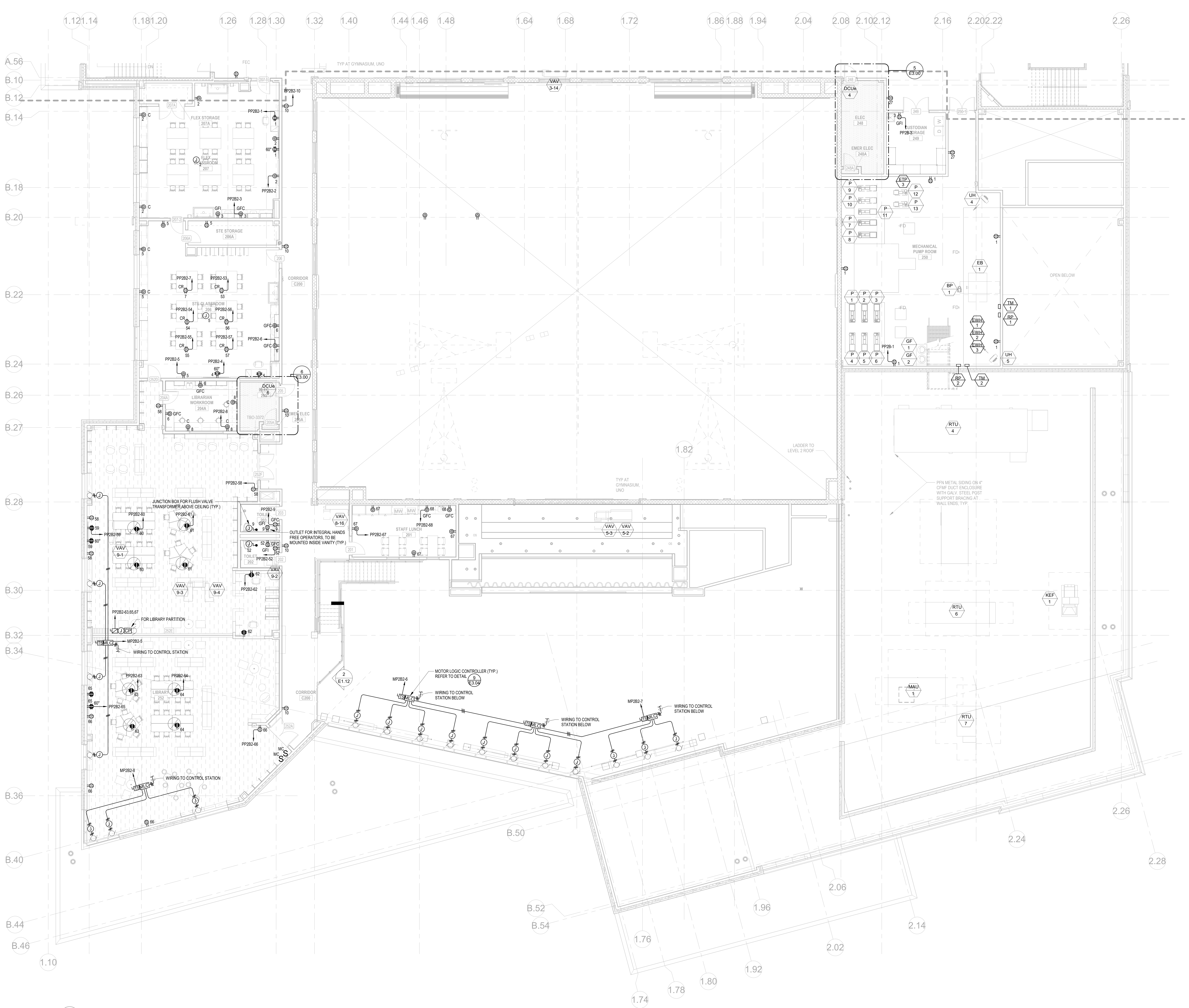

1 / E2.22 LEVEL TWO AREA B - POWER
SCALE: 1/8" = 1'-0"

GENERAL POWER NOTES:

1. COORDINATE EXACT LOCATION OF ALL DEVICES AND EQUIPMENT WITH ARCHITECT PRIOR TO INSTALLATION.
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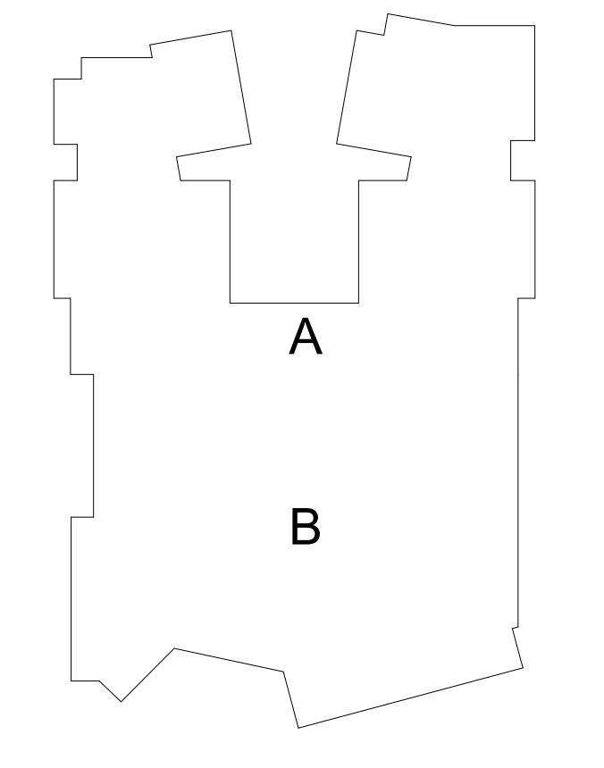

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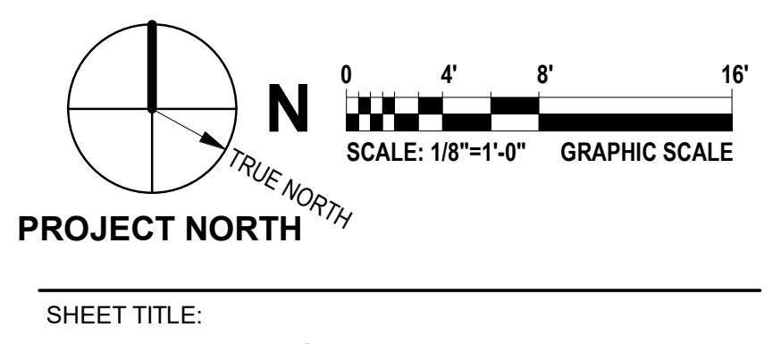

SHEET TITLE:

LEVEL 2 AREA B - POWER

SHEET NUMBER:

E2.22

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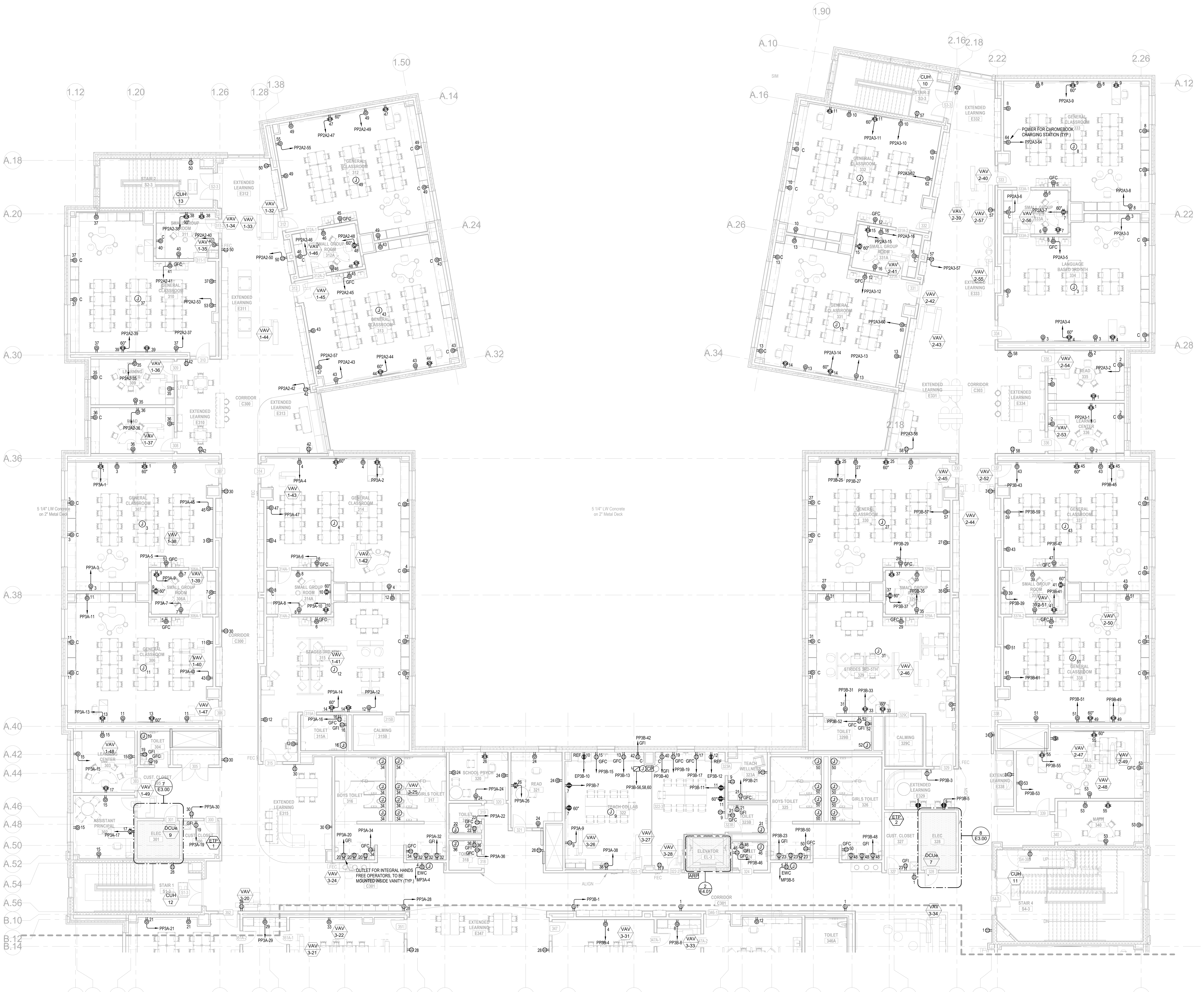

1
E2.31
LEVEL THREE AREA A - POWER
SCALE: 1/8" = 1'-0"

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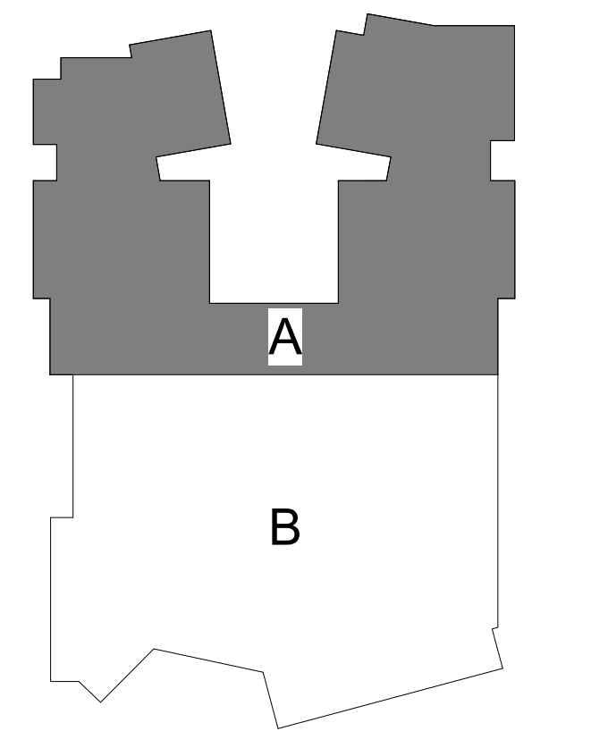

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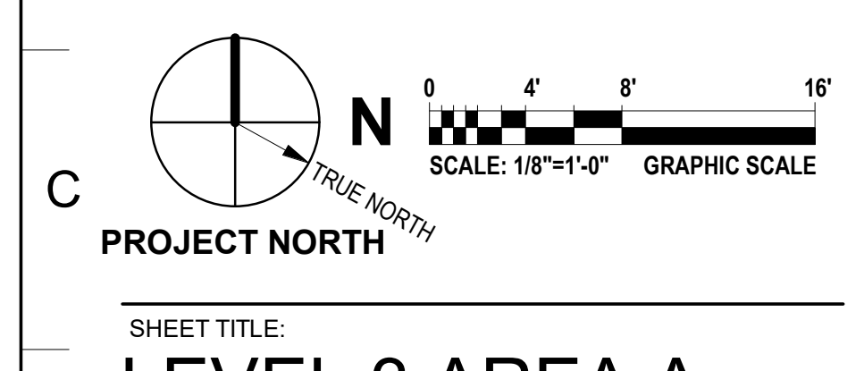

SHEET TITLE:

LEVEL 3 AREA A -
POWER

SHEET NUMBER:

E2.31

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GENERAL POWER NOTES:

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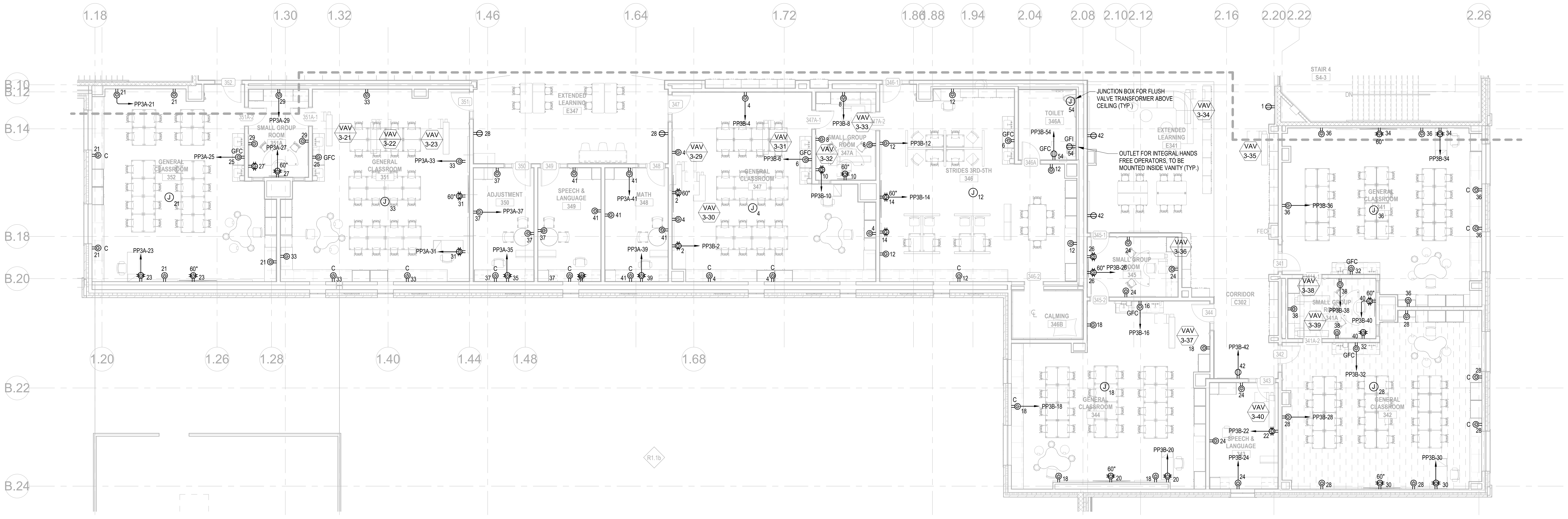

1
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LEVEL THREE AREA B - POWER
SCALE: 1/8" = 1'-0"

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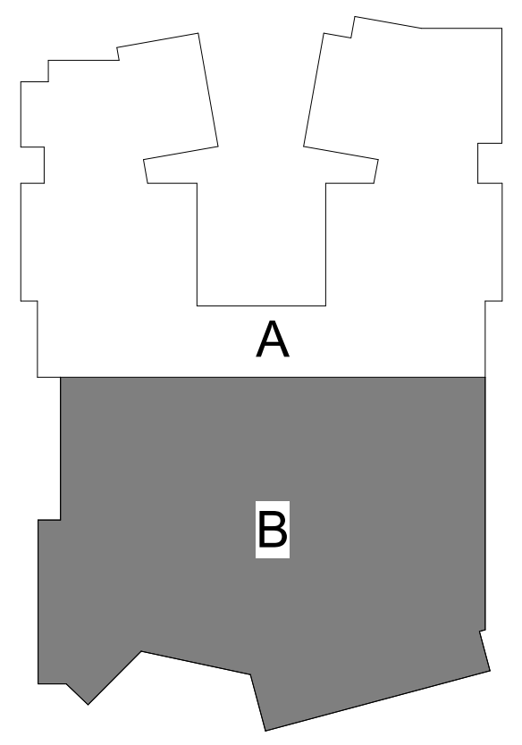

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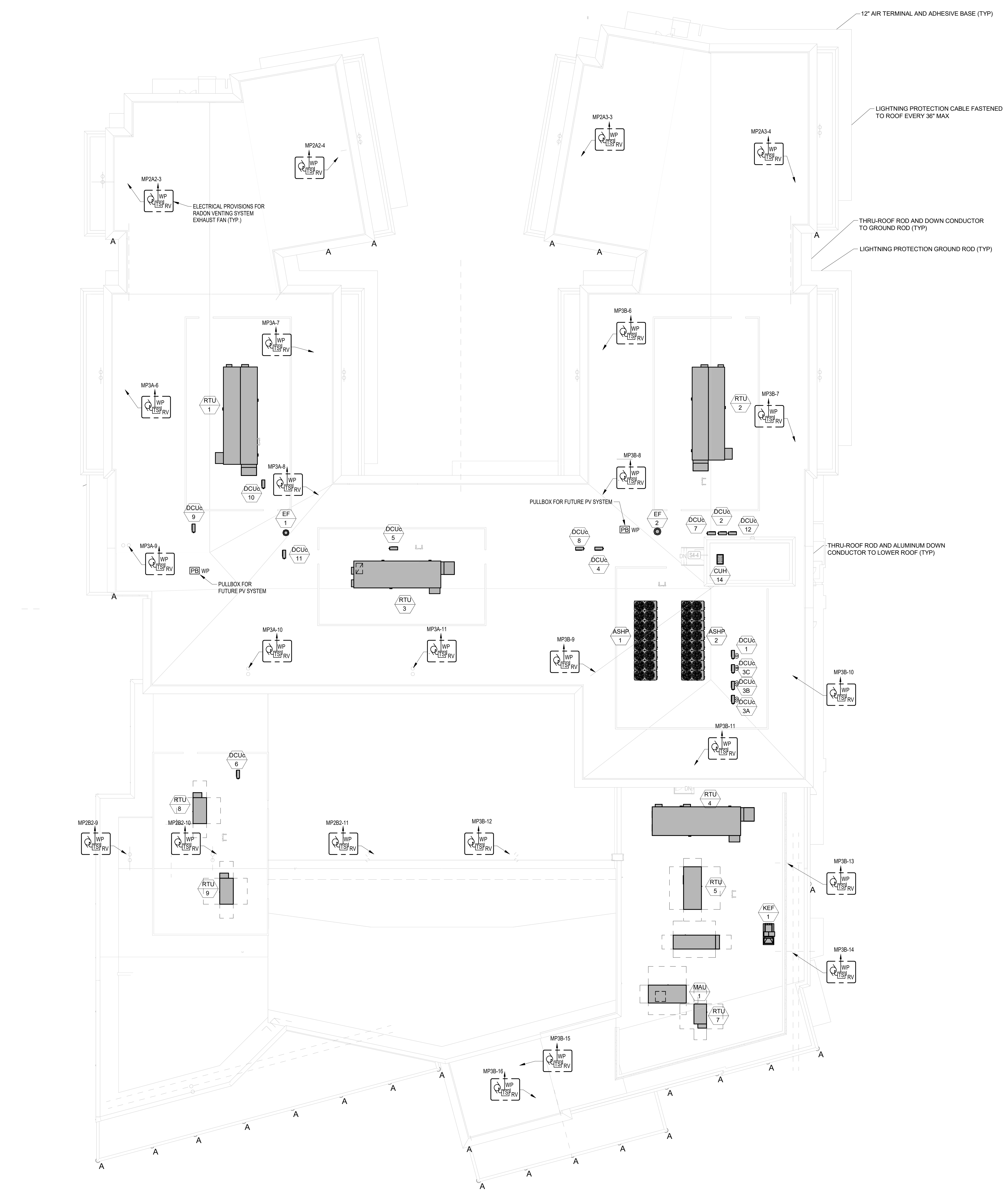
12" AIR TERMINAL AND ADHESIVE BASE (TYP)
LIGHTNING PROTECTION CABLE FASTENED TO ROOF EVERY 36" MAX
THRU-ROOF ROD AND DOWN CONDUCTOR TO GROUND ROD (TYP)
LIGHTNING PROTECTION GROUND ROD (TYP)
ELECTRICAL PROVISIONS FOR RADON VENTING SYSTEM EXHAUST FAN (TYP.)
THRU-ROOF ROD AND ALUMINUM DOWN CONDUCTOR TO LOWER ROOF (TYP)
PULLBOX FOR FUTURE PV SYSTEM
PULLBOX FOR FUTURE PV SYSTEM
PB WP
PB WP
MP2A2-3
MP2A2-4
MP2A3-3
MP2A3-4
MP3A-7
MP3A-6
MP3A-8
MP3A-9
MP3A-10
MP3A-11
MP3B-6
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MP3B-13
MP3B-14
MP3B-15
MP3B-16
MP2B2-9
MP2B2-10
MP2B2-11
WP
TS
RV
RTU 1
RTU 2
RTU 3
RTU 4
RTU 5
RTU 7
RTU 8
RTU 9
DCUc 1
DCUc 2
DCUc 3A
DCUc 3B
DCUc 3C
DCUc 4
DCUc 5
DCUc 6
DCUc 7
DCUc 8
DCUc 9
DCUc 10
DCUc 11
DCUc 12
EF 1
EF 2
CUH 14
ASHP 1
ASHP 2
KEF 1
MAU 1
S4-4
DN
A

1 E2.40 ROOF POWER
SCALE: 1/16" = 1'-0"

GENERAL POWER NOTES:

1. COORDINATE EXACT LOCATION OF ALL DEVICES AND EQUIPMENT WITH ARCHITECT PRIOR TO INSTALLATION.
2. REFER TO MECHANICAL PLANS FOR ANY CHANGES AND FOR EXACT LOCATION OF ALL HVAC EQUIPMENT.
3. WIRING IS SHOWN ON DRAWINGS ONLY FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS.
4. WIRING AND CONDUIT SHALL BE REQUIRED BETWEEN ALL OUTLETS INDICATED WITH CIRCUIT NUMBERS AND PANEL DESIGNATIONS.
5. ALTHOUGH ALL BRANCH CIRCUIT WIRE AND CONDUIT IS NOT SHOWN, IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE INSTALLED.
6. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER MINIMUM #12 AWG SIZE, THWN/THHN INSULATION, 600 VOLTS RATED UNLESS OTHERWISE NOTED.
7. REFER TO FIRE PROTECTION PLANS FOR ANY CHANGES AND FOR EXACT LOCATION OF ALL FLOW SWITCH. TAMPER SWITCH, ETC.
8. DO NOT PENETRATE STAIRS WITH ANY UTILITIES EXCEPT FOR UTILITIES SPECIFICALLY SERVING THAT STAIR.
9. WHERE CONDUITS AND/OR BOXES CANNOT BE FLUSH MOUNTED IN BUILDING PROVIDE A SYSTEM OF SURFACE METAL RACEWAYS AND BOXES IN ACCORDANCE WITH ARTICLE 386, EQUAL TO WIREMOLD FOR ALL FINISH SPACES WHERE PUBLIC HAS ACCESS, INCLUDING CORRIDORS, CLASSROOMS, OFFICES, ETC.
10. CONFIRM RATINGS & FINAL LOCATIONS OF EQUIPMENT WITH OWNER PRIOR TO ROUGHING.
11. ALL OUTLETS ON EXTERIOR WALLS WITH CASEWORK SHALL BE MOUNTED 6" ABOVE CASEWORK. CONFIRM HEIGHT OF CASEWORK WITH HVAC AND ARCHITECT PRIOR TO ROUGHING.
12. TYPICALLY PROVIDE GROUND FAULT INTERRUPTER TYPE RECEPTACLES WITHIN 6 FEET OF WATER SOURCES.
13. PROVIDE ALL EMPTY CONDUITS WITH PULL-STRINGS.
14. TYPICALLY PROVIDE (2) 4" SLEEVES OVER EACH CORRIDOR DOOR.
15. ROVIDE (2) 2" THROUGH-WALL SLEEVE ABOVE CEILING OVER THE DOORS INTO EACH ROOM LEADING FROM THE CORRIDOR FOR COMMUNICATIONS/DATA WIRING.
16. LOCATE ALL WALL TELEPHONE OUTLETS 12 INCHES AWAY FROM ALL OTHER OUTLETS/DEVICES.
17. PROVIDE (2) 1" SLEEVES OVER EACH DOOR FOR TEL./DATA SECURITY AND SOUND SYSTEM WIRING. TEL./DATA SHALL BE DEDICATED TO (1) OF THE CONDUITS.
18. E.C. SHALL PROVIDE EMERGENCY BOILER & WATER HEATER SHUT-OFF MOUNTED IN STOPPER II COVER. INTERLOCK w/ BOILER & WATER HEATER CONTROL PANELS. MOUNT @ 72" A.F.F. TYPICAL.
19. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL BOXES AND CONDUITS REQUIRED FOR COMMUNICATIONS SYSTEMS DIVISION 27 DEVICES AS SHOWN ON TECHNOLOGY DRAWINGS. ALL LOCATIONS OF POWER AND COMMUNICATIONS OUTLET BOXES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO ROUGHING.
20. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL BOXES AND CONDUITS REQUIRED FOR AUDIO/VISUAL(AV) SYSTEM SECTION 274100 DEVICES AS SHOWN ON AV DRAWINGS. ALL LOCATIONS OF POWER AND AV OUTLET BOXES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO ROUGHING.
21. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL BOXES AND CONDUITS REQUIRED FOR SECURITY SYSTEM SECTION 280000 DEVICES AS SHOWN ON SECURITY DRAWINGS. ALL LOCATIONS OF POWER AND AV OUTLET BOXES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO ROUGHING
22. WALL MOUNTED DEVICES IN THE GYM TO BE PROVIDED WITH WIRE GUARDS AS NECESSARY.

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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

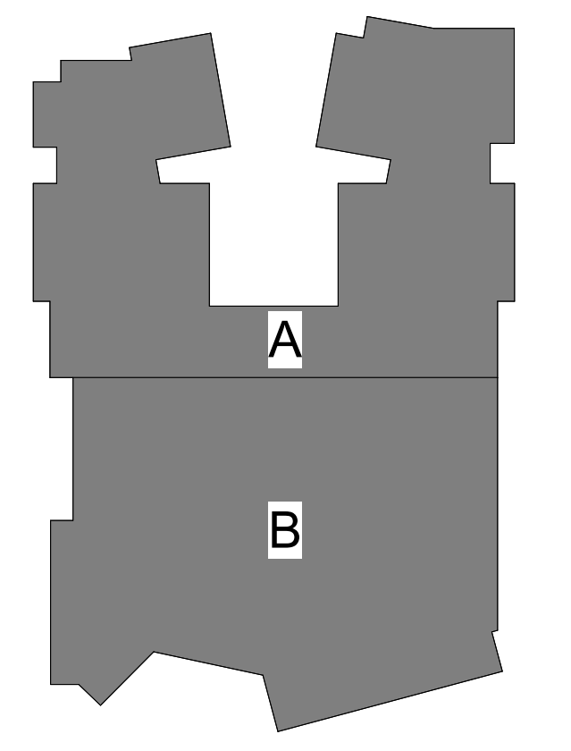
REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



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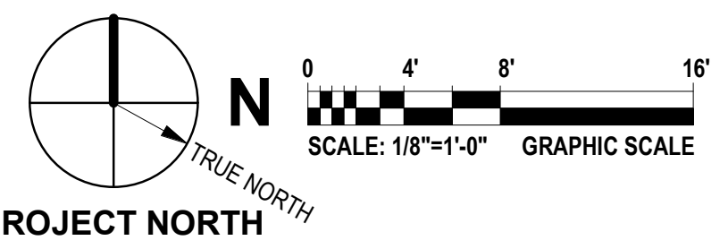
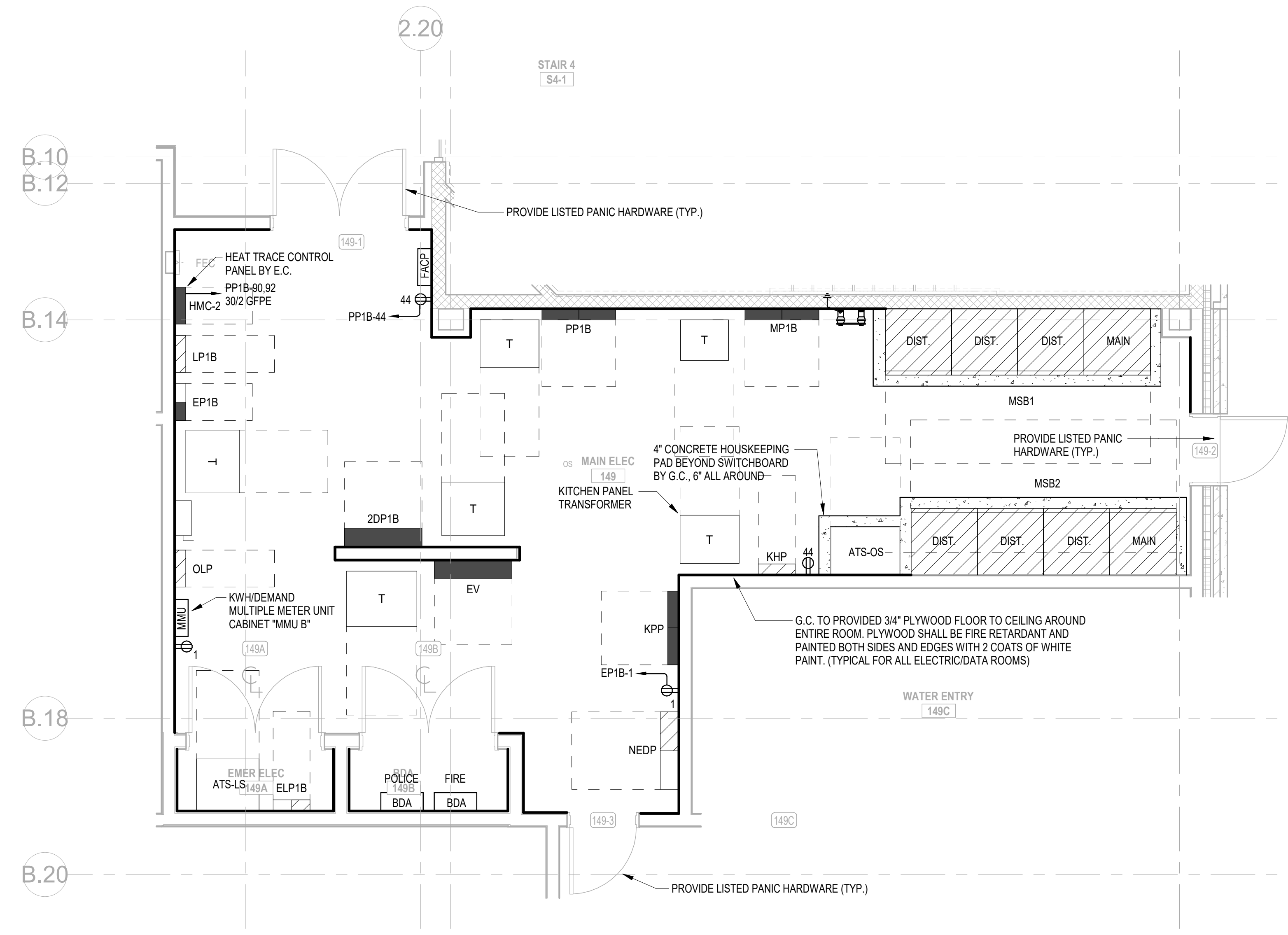


SHEET TITLE:

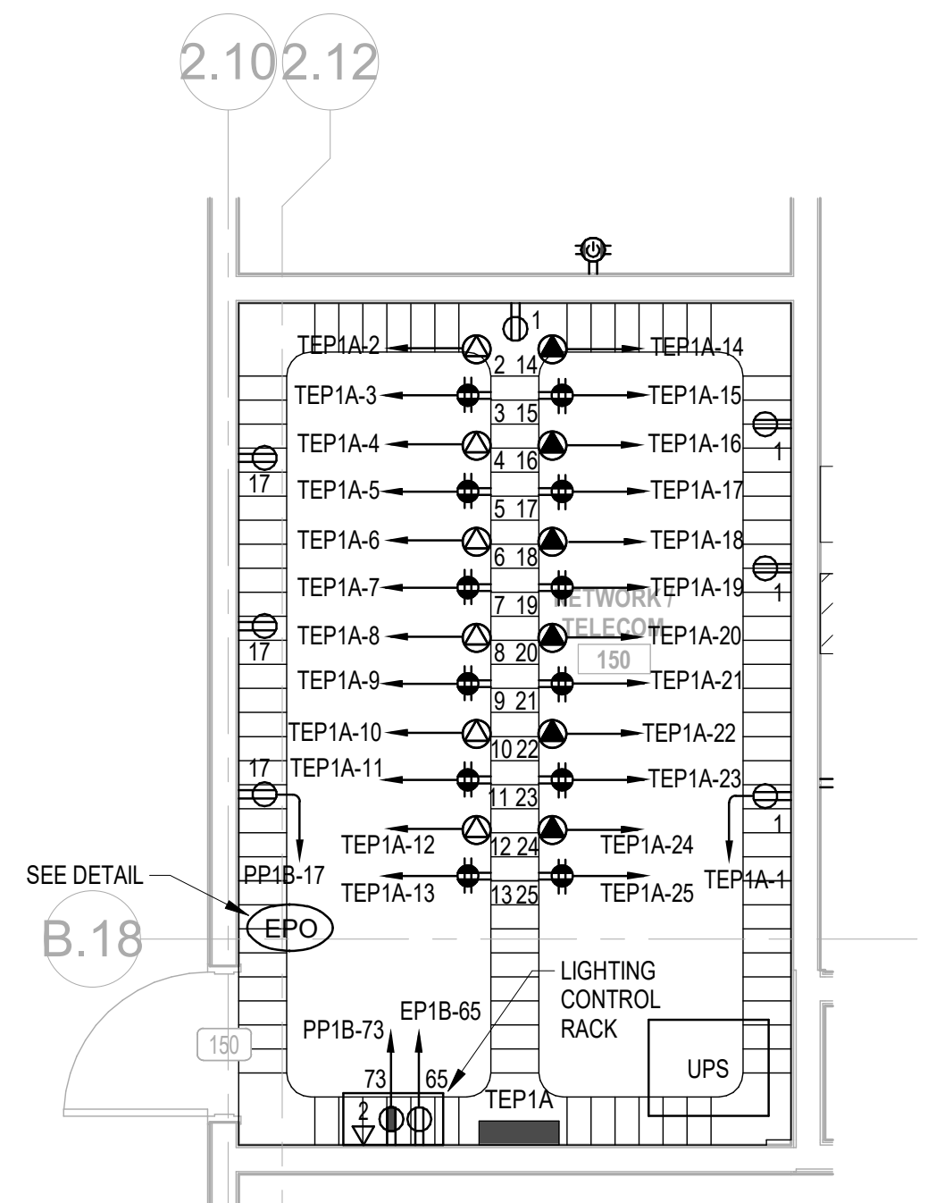
ROOF PLAN

SHEET NUMBER:

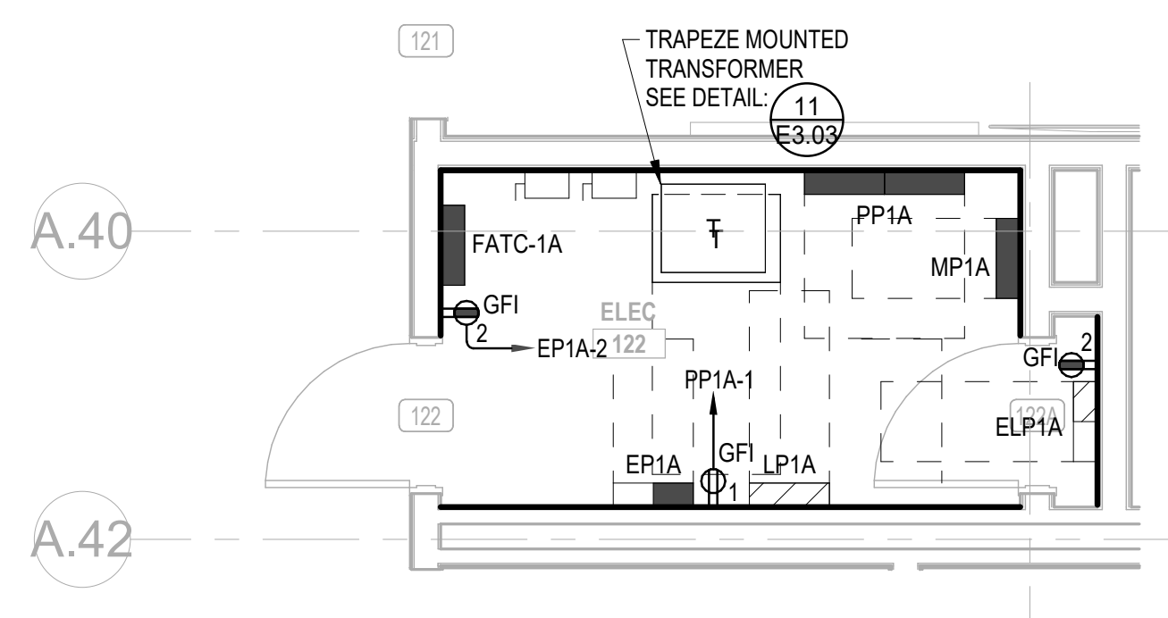
E2.40


2.20
STAIR 4
S4-1
B.10
B.12
B.14
B.18
B.20
PROVIDE LISTED PANIC HARDWARE (TYP.)
149-1
HEAT TRACE CONTROL PANEL BY E.C.
FEC
PP1B-90,92
30/2 GFPE
HMC-2
FACP
44
PP1B-44
T
PP1B
MP1B
DIST.
MAIN
MSB1
LP1B
EP1B
PROVIDE LISTED PANIC HARDWARE (TYP.)
149-2
MAIN ELEC
149
4" CONCRETE HOUSKEEPING PAD BEYOND SWITCHBOARD BY G.C., 6" ALL AROUND
KITCHEN PANEL TRANSFORMER
MSB2
2DP1B
EV
KHP
ATS-OS
OLP
KWH/DEMAND MULTIPLE METER UNIT CABINET "MMU B"
MMU
149A
149B
KPP
G.C. TO PROVIDED 3/4" PLYWOOD FLOOR TO CEILING AROUND ENTIRE ROOM. PLYWOOD SHALL BE FIRE RETARDANT AND PAINTED BOTH SIDES AND EDGES WITH 2 COATS OF WHITE PAINT. (TYPICAL FOR ALL ELECTRIC/DATA ROOMS)
EP1B-1
WATER ENTRY
149C
EMER ELEC
ATS-LS
ELP1B
BDA
POLICE
FIRE
NEDP
149-3
PROVIDE LISTED PANIC HARDWARE (TYP.)
2.16
2.22
2.26

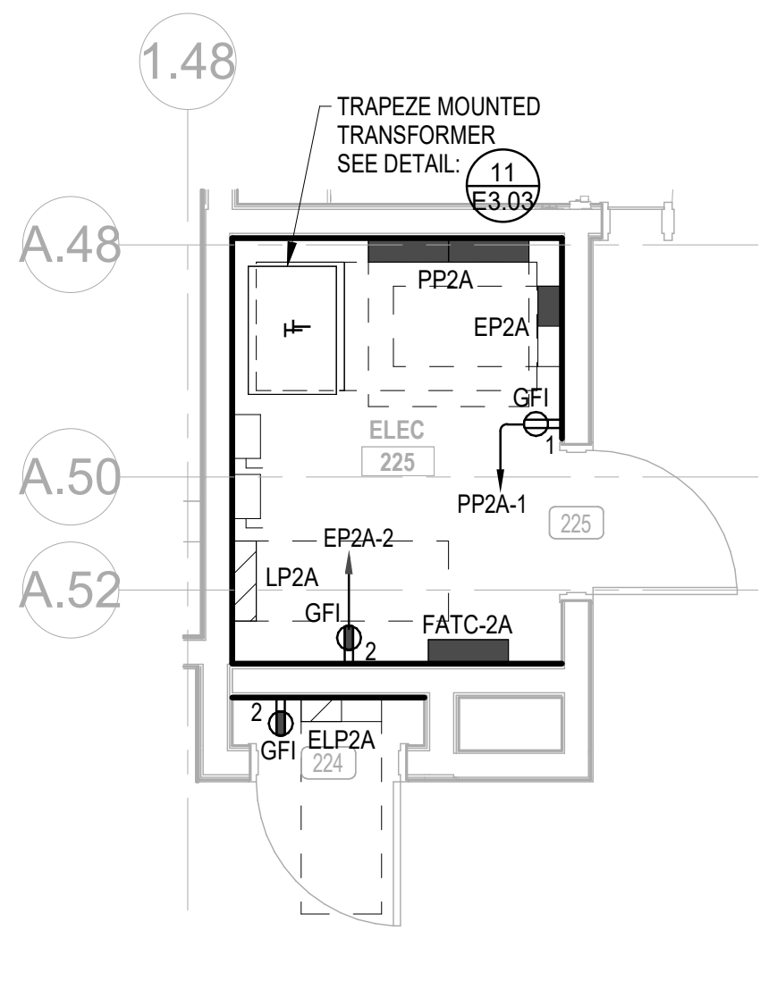
1 E3.00 MAIN ELECTRIC ROOM
SCALE: 1/4" = 1'-0"



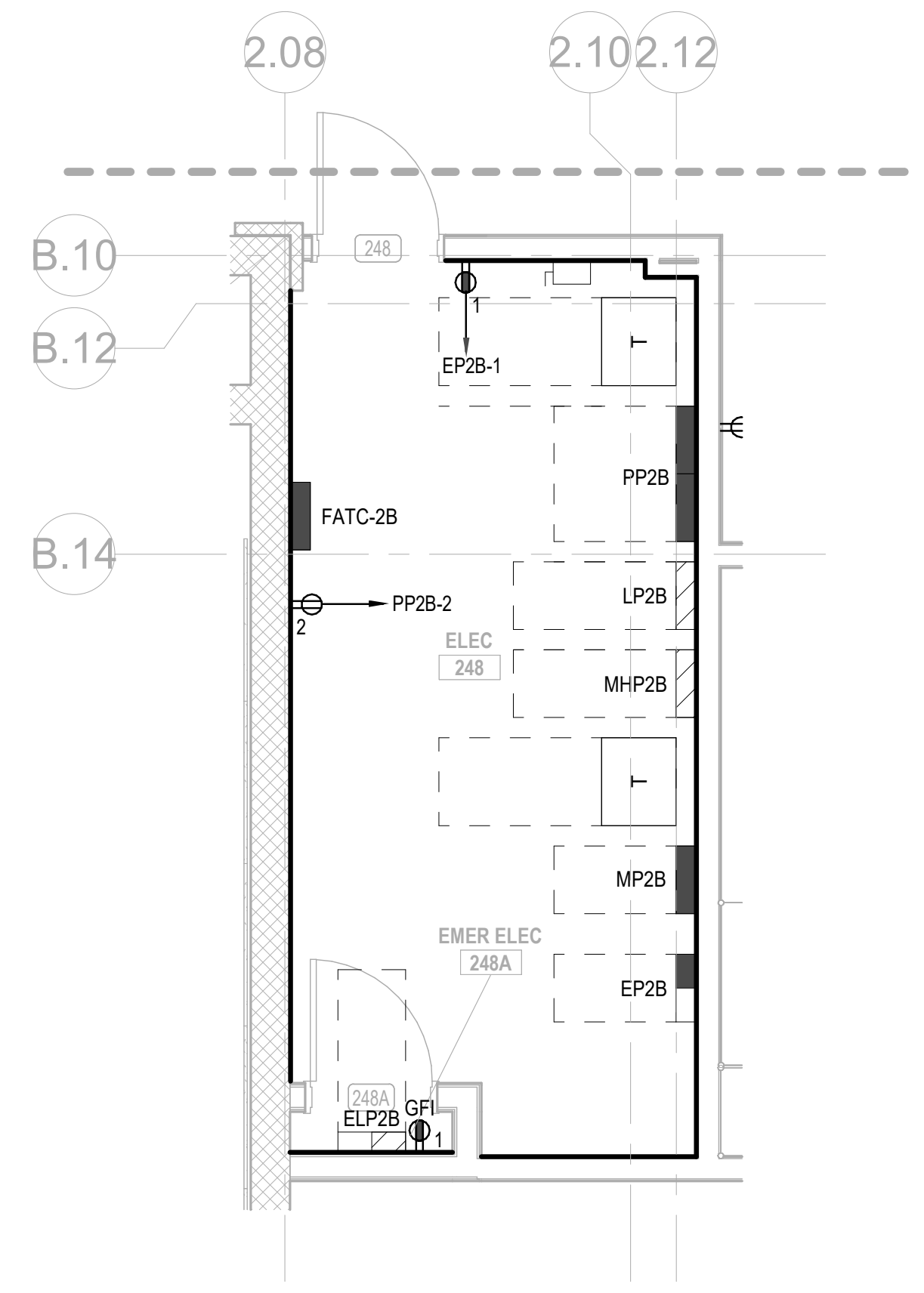
2 E3.00 MDF 149
SCALE: 1/4" = 1'-0"



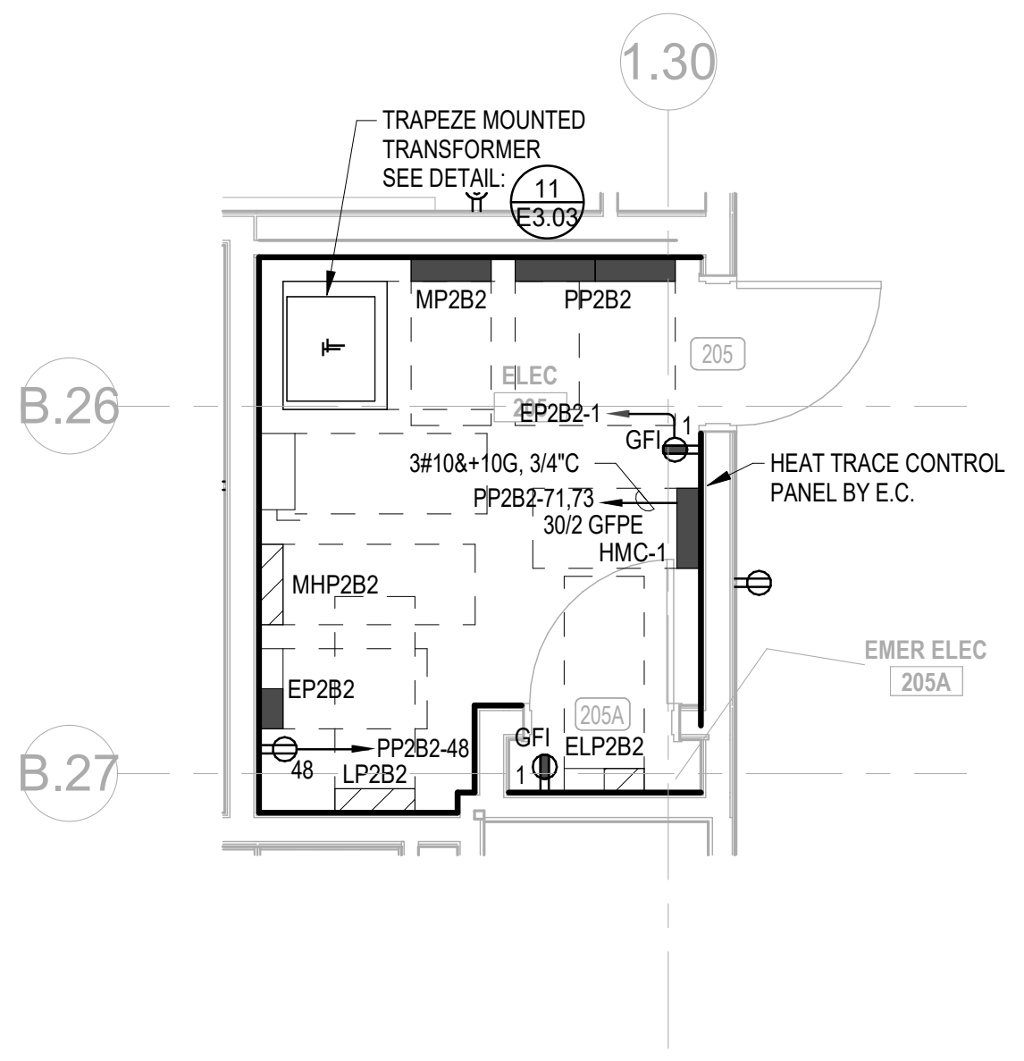
3 E3.00 FIRST FLOOR A ELEC ROOM 117
SCALE: 1/4" = 1'-0"



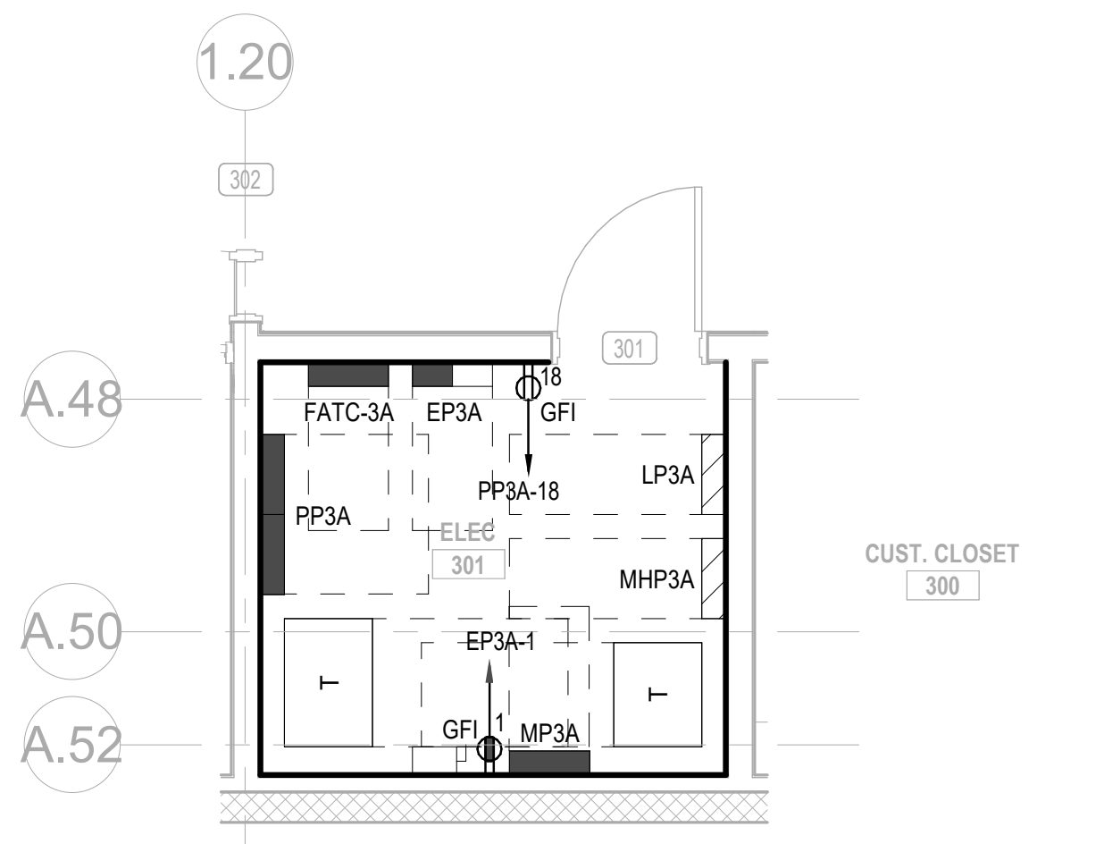
4 E3.00 SECOND FLOOR A ELEC ROOM 221
SCALE: 1/4" = 1'-0"



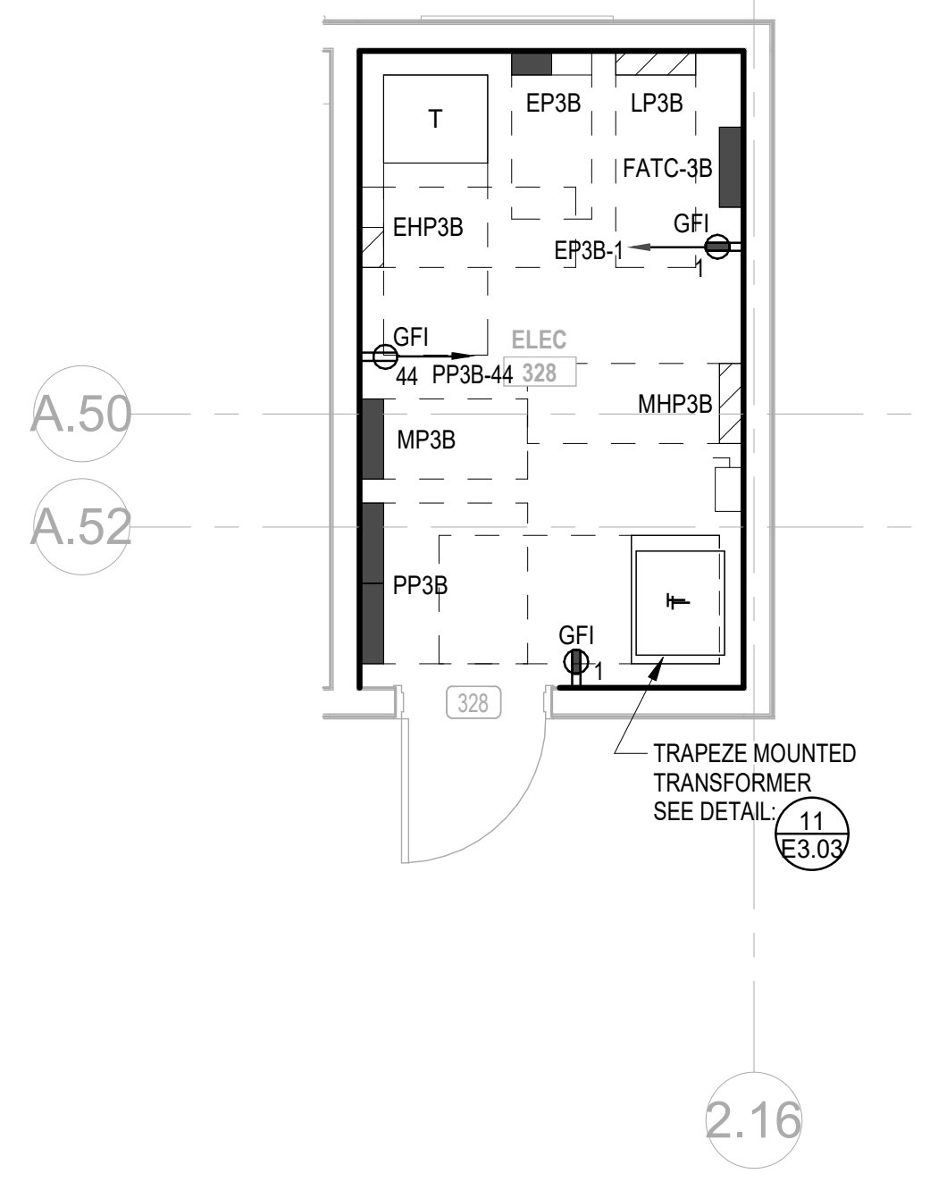
5 E3.00 SECOND FLOOR B ELEC ROOM 249
SCALE: 1/4" = 1'-0"



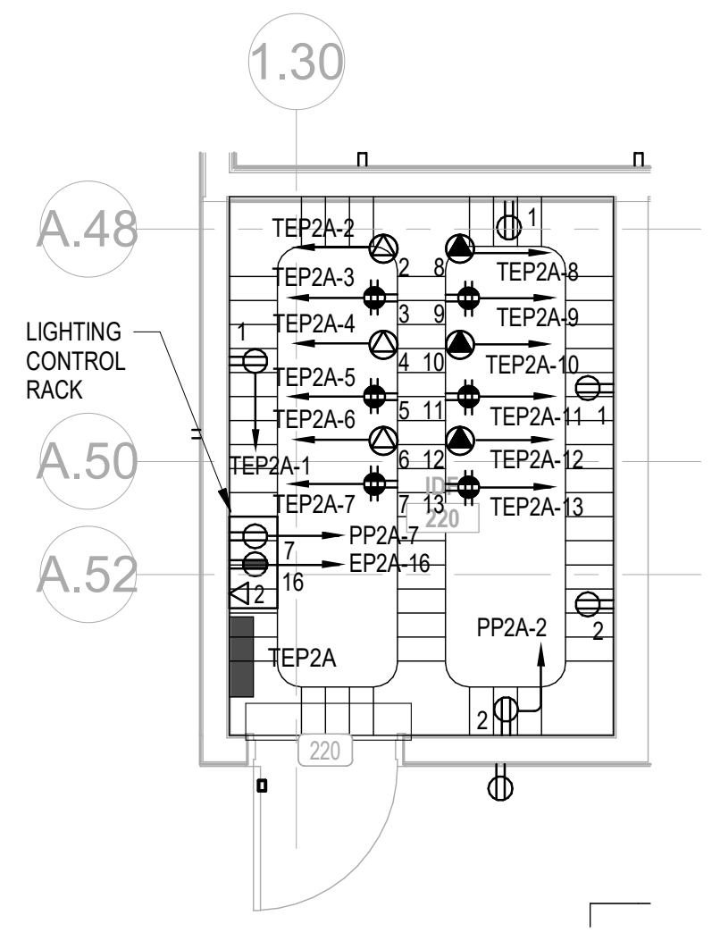
6 E3.00 SECOND FLOOR AREA B ELEC ROOM 255
SCALE: 1/4" = 1'-0"



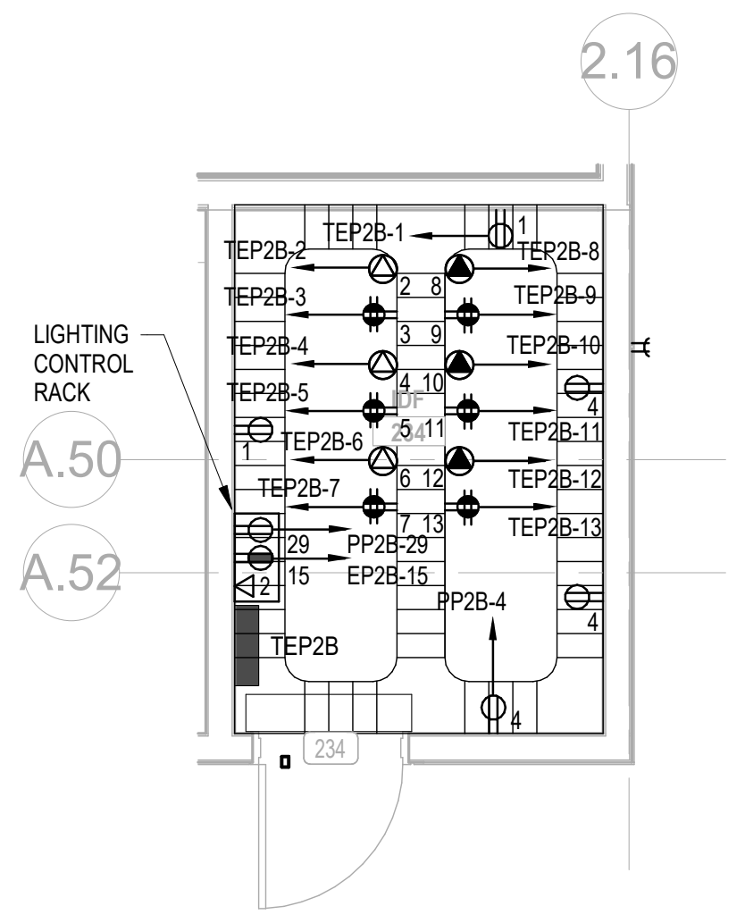
7 E3.00 THIRD FLOOR A ELEC ROOM 304
SCALE: 1/4" = 1'-0"



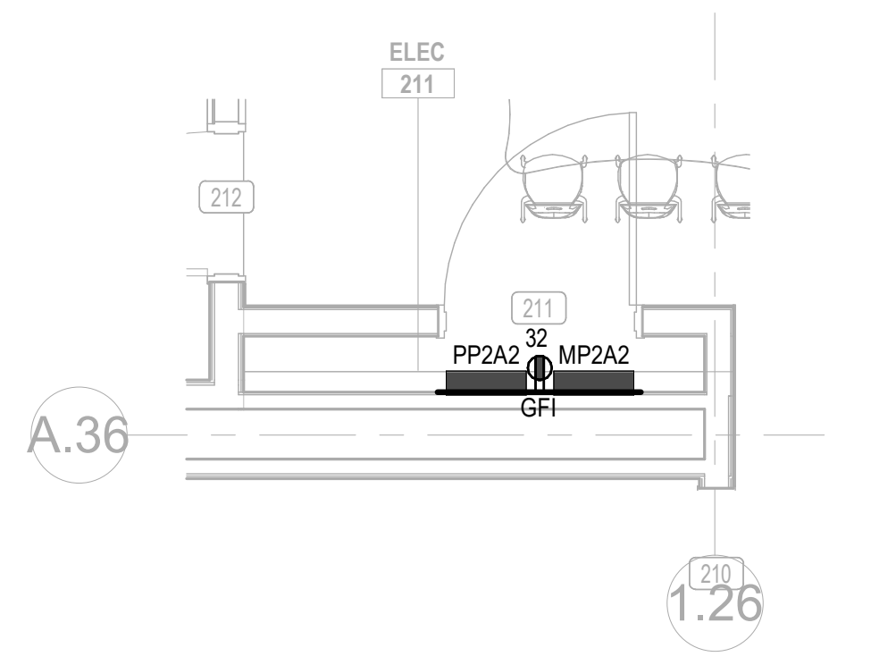
8 E3.00 THIRD FLOOR A ELEC ROOM 332
SCALE: 1/4" = 1'-0"



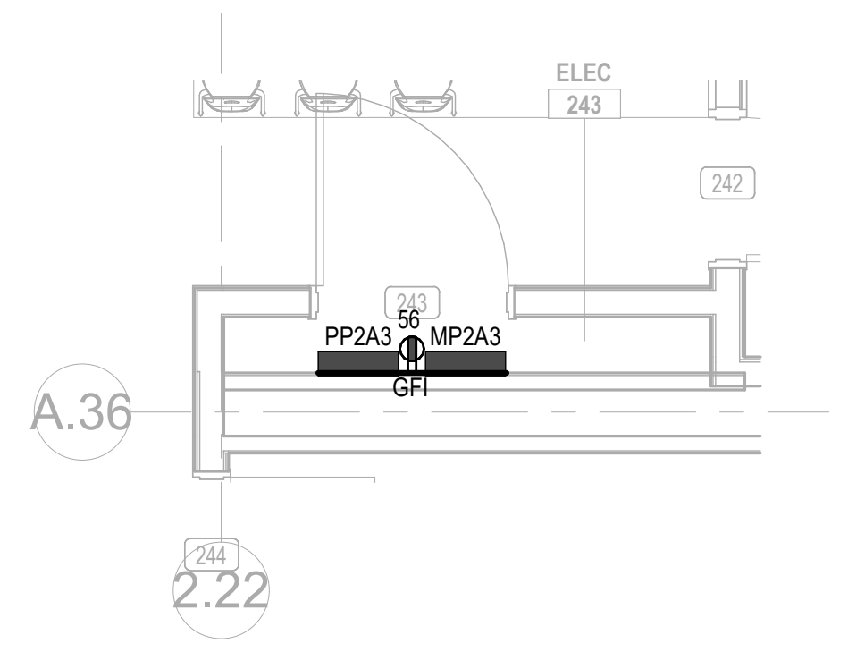
9 E3.00 SECOND FLOOR A IDF ROOM 203
SCALE: 1/4" = 1'-0"



10 E3.00 SECOND FLOOR A IDF ROOM 229
SCALE: 1/4" = 1'-0"



11 E3.00 SECOND FLOOR AREA A ELEC ROOM 205F
SCALE: 1/4" = 1'-0"



12 E3.00 SECOND FLOOR AREA A ELEC ROOM 230G
SCALE: 1/4" = 1'-0"

TECHNOLOGY ROOM NOTES:

1. CONTRACTOR IS TO USE THE L5-20R RECEPTACLE MOUNTED ON CABLE TRAY FOR POWERING OF ALL EQUIPMENT RACKS.
2. ALL CABLE TRAY IS TO PROVIDED BY E.C. CABLE TRAY SHALL BE 12" W x 4" HIGH AND 6" RUNG ALUMINUM CONSTRUCTION. INSTALL CABLE TRAY 18" ABOVE EQUIPMENT RACK.
3. ELECTRICAL CONTRACTOR SHALL LABEL EACH RECEPTACLE WITH THE CIRCUIT NUMBER AND THE PHASE "A", "B" OR "C" ON THE OUTSIDE FACE OF THE FACEPLATE WITH MACHINE GENERATED LABELS. BLACK LETTERING ON WHITE TAPE. HANDWRITTEN LABELS ARE NOT ACCEPTABLE.
4. PROVIDE CONDUIT SLEEVES FROM MDF/IDF ROOM TO THE NEAREST ACCESSIBLE CEILING SPACE AS REQUIRED TO ACCOMMODATE THE QUANTITY OF CABLES TERMINATED WITHIN THE ROOM. REFER TO DETAIL 20/E3.04, TELECOMMUNICATIONS CONDUIT AND GROUNDING RISER FOR ADDITIONAL CONDUIT SLEEVE INFORMATION.

TECHNOLOGY ROOM LEGEND:

⊕	QUADRAPLEX ELECTRICAL OUTLET WITH 20 AMP DEDICATED CIRCUIT. MOUNTED ABOVE EQUIPMENT RACK ON UNDERSIDE OF CABLE TRAY. COORDINATE EXACT LOCATION OF OUTLET WITH EQUIPMENT RACK INSTALLER.
△	NEMA TYPE L5 -20R ELECTRICAL TWIST LOCK RECEPTACLE WITH DEDICATED 20 AMP CIRCUIT. MOUNTED ABOVE EQUIPMENT RACK ON UNDERSIDE OF CABLE TRAY TO RECEIVE NEMA TYPE L5-20P PLUG FROM EQUIPMENT RACK POWER STRIPS AND UNINTERRUPTIBLE POWER SUPPLIES. COORDINATE EXACT LOCATION OF OUTLET WITH EQUIPMENT RACK INSTALLER.
▲	NEMA TYPE L5 -30R ELECTRICAL TWIST LOCK RECEPTACLE WITH DEDICATED 30 AMP CIRCUIT. MOUNTED ABOVE EQUIPMENT RACK ON UNDERSIDE OF CABLE TRAY TO RECEIVE NEMA TYPE L5-30P PLUG FROM EQUIPMENT RACK POWER STRIPS AND UNINTERRUPTIBLE POWER SUPPLIES. COORDINATE EXACT LOCATION OF OUTLET WITH EQUIPMENT RACK INSTALLER.

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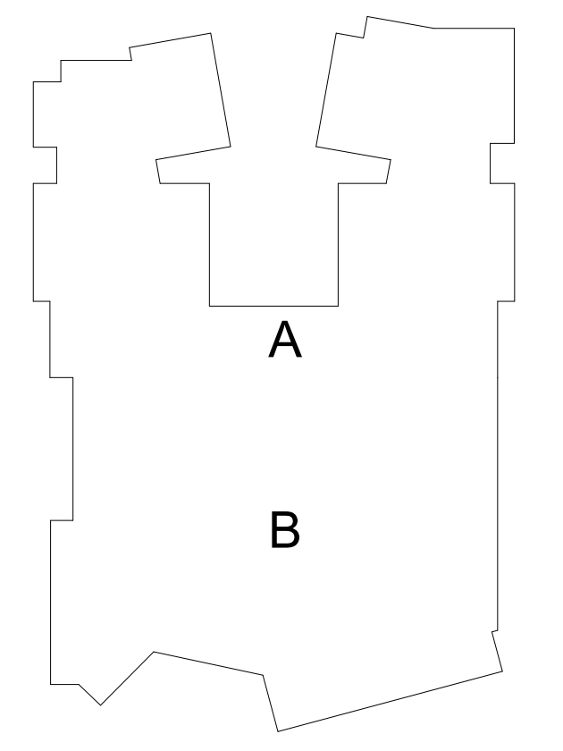
KEY PLAN



ORIENTATION AND SCALE:

N
PROJECT NORTH
TRUE NORTH

SHEET TITLE:
ELECTRICAL ROOM PART PLANS

SHEET NUMBER:
E3.00

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt
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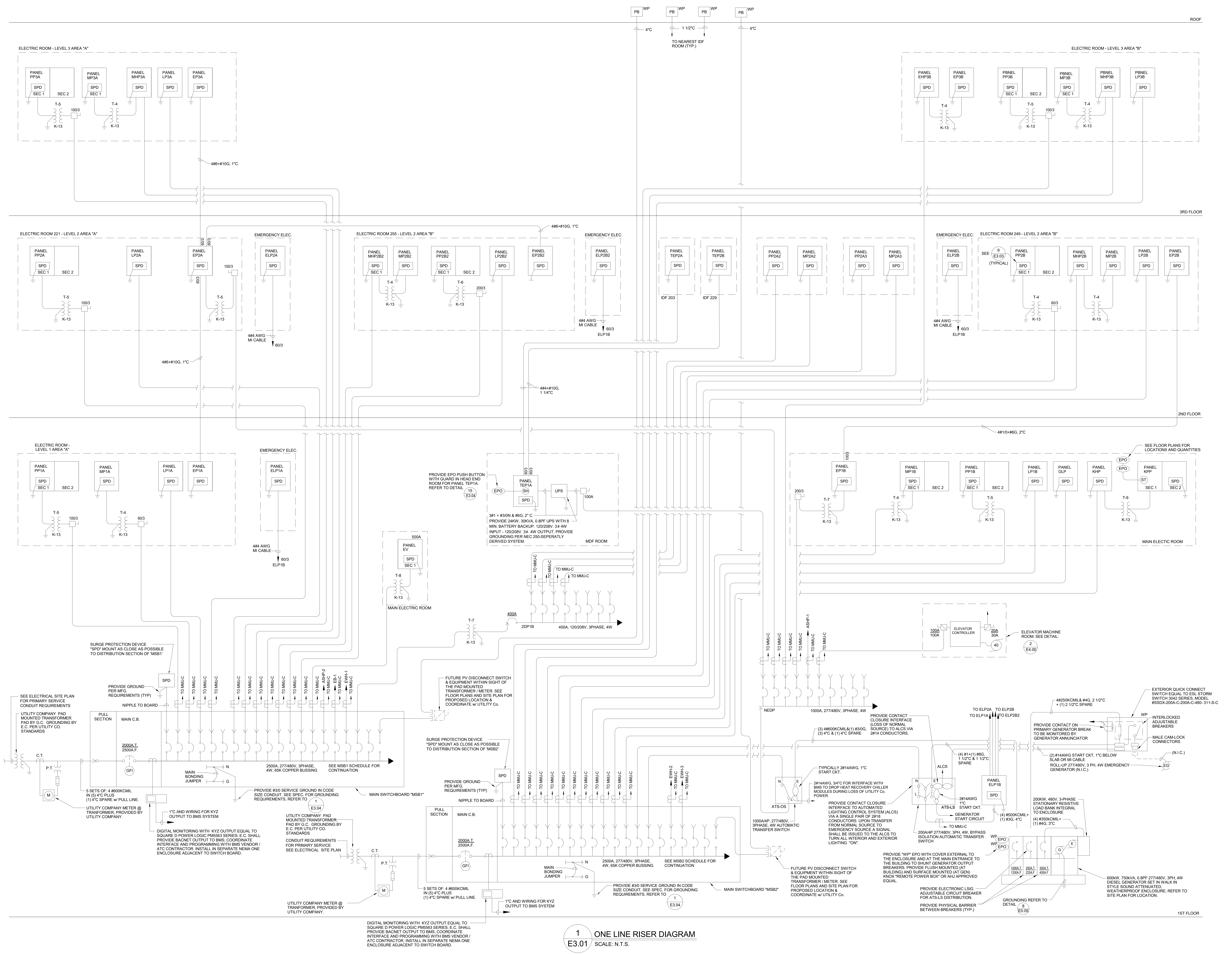

PROVIDE EPO PUSH BUTTON WITH GUARD IN HEAD END ROOM FOR PANEL TEP1A. REFER TO DETAIL 15/E3.04

3#1 + #3/0N & #6G, 2" C.

PROVIDE 24KW, 30KVA, 0.8PF UPS WITH 8 MIN. BATTERY BACKUP. 120/208V. 3ϕ 4W INPUT - 120/208V. 3ϕ. 4W OUTPUT. PROVIDE GROUNDING PER NEC 250-SEPERATLY DERIVED SYSTEM.

SEE FLOOR PLANS FOR LOCATIONS AND QUANTITIES

ELEVATOR MACHINE ROOM. SEE DETAIL: 2/E4.00

SURGE PROTECTION DEVICE "SPD" MOUNT AS CLOSE AS POSSIBLE TO DISTRIBUTION SECTION OF 'MSB1'

PROVIDE GROUND PER MFG. REQUIREMENTS (TYP)

NIPPLE TO BOARD

SEE ELECTRICAL SITE PLAN FOR PRIMARY SERVICE CONDUIT REQUIREMENTS

UTILITY COMPANY PAD MOUNTED TRANSFORMER. PAD BY G.C. GROUNDING BY E.C. PER UTILITY CO. STANDARDS

MAIN BONDING JUMPER

2500A, 277/480V, 3PHASE, 4W, 65K COPPER BUSSING

SEE MSB1 SCHEDULE FOR CONTINUATION

5 SETS OF: 4 #600KCMIL IN (5) 4"C PLUS (1) 4"C SPARE w/ PULL LINE.

UTILITY COMPANY METER @ TRANFORMER, PROVIDED BY UTILITY COMPANY.

1"C AND WIRING FOR KYZ OUTPUT TO BMS SYSTEM

DIGITAL MONITORING WITH KYZ OUTPUT EQUAL TO SQUARE D POWER LOGIC PM5563 SERIES; E.C. SHALL PROVIDE BACNET OUTPUT TO BMS; COORDINATE INTERFACE AND PROGRAMMING WITH BMS VENDOR / ATC CONTRACTOR. INSTALL IN SEPARATE NEMA ONE ENCLOSURE ADJACENT TO SWITCH BOARD.

PROVIDE #3/0 SERVICE GROUND IN CODE SIZE CONDUIT. SEE SPEC. FOR GROUNDING REQUIREMENTS, REFER TO 1/E3.04

MAIN SWITCHBOARD "MSB1"

FUTURE PV DISCONNECT SWITCH & EQUIPMENT WITHIN SIGHT OF THE PAD MOUNTED TRANSFORMER / METER. SEE FLOOR PLANS AND SITE PLAN FOR PROPOSED LOCATION & COORDINATE w/ UTILITY Co.

SURGE PROTECTION DEVICE "SPD" MOUNT AS CLOSE AS POSSIBLE TO DISTRIBUTION SECTION OF 'MSB2'

PROVIDE GROUND PER MFG. REQUIREMENTS (TYP)

NIPPLE TO BOARD

UTILITY COMPANY PAD MOUNTED TRANSFORMER. PAD BY G.C. GROUNDING BY E.C. PER UTILITY CO. STANDARDS

CONDUIT REQUIREMENTS FOR PRIMARY SERVICE SEE ELECTRICAL SITE PLAN

UTILITY COMPANY METER @ TRANFORMER, PROVIDED BY UTILITY COMPANY.

5 SETS OF: 4 #600KCMIL IN (5) 4"C PLUS (1) 4"C SPARE w/ PULL LINE.

1"C AND WIRING FOR KYZ OUTPUT TO BMS SYSTEM

DIGITAL MONITORING WITH KYZ OUTPUT EQUAL TO SQUARE D POWER LOGIC PM5563 SERIES; E.C. SHALL PROVIDE BACNET OUTPUT TO BMS; COORDINATE INTERFACE AND PROGRAMMING WITH BMS VENDOR / ATC CONTRACTOR. INSTALL IN SEPARATE NEMA ONE ENCLOSURE ADJACENT TO SWITCH BOARD.

MAIN BONDING JUMPER

2500A, 277/480V, 3PHASE, 4W, 65K COPPER BUSSING

SEE MSB2 SCHEDULE FOR CONTINUATION

PROVIDE #3/0 SERVICE GROUND IN CODE SIZE CONDUIT. SEE SPEC. FOR GROUNDING REQUIREMENTS, REFER TO 1/E3.04

MAIN SWITCHBOARD "MSB2"

FUTURE PV DISCONNECT SWITCH & EQUIPMENT WITHIN SIGHT OF THE PAD MOUNTED TRANSFORMER / METER. SEE FLOOR PLANS AND SITE PLAN FOR PROPOSED LOCATION & COORDINATE w/ UTILITY Co.

(3) 4#600KCMIL&(1) #3/0G, (3) 4"C & (1) 4"C SPARE

PROVIDE CONTACT CLOSURE INTERFACE (LOSS OF NORMAL SOURCE) TO ALCS VIA 2#14 CONDUCTORS.

TYPICALLY 2#14AWG, 1"C START CKT.

2#14AWG, 3/4"C FOR INTERFACE WITH BMS TO DROP HEAT RECOVERY CHILLER MODULES DURING LOSS OF UTILITY Co. POWER.

1000A/4P, 277/480V, 3PHASE, 4W AUTOMATIC TRANSFER SWITCH

PROVIDE CONTACT CLOSURE INTERFACE TO AUTOMATED LIGHTING CONTROL SYSTEM (ALCS) VIA A SINGLE PAIR OF 2#18 CONDUCTORS. UPON TRANSFER FROM NORMAL SOURCE TO EMERGENCY SOURCE A SIGNAL SHALL BE ISSUED TO THE ALCS TO TURN ALL INTERIOR AND EXTERIOR LIGHTING "ON".

(4) #1+(1) #8G, 1 1/2"C & 1 1/2"C SPARE

2#14AWG 1"C START CKT.

GENERATOR START CIRCUIT

TO MMU-C

200A/4P 277/480V, 3PH, 4W, BYPASS ISOLATION AUTOMATIC TRANSFER SWITCH

(4) #500KCMIL+ (1) #3G, 4"C

4#250KCMIL& #4G, 2 1/2"C + (1) 2 1/2"C SPARE

EXTERIOR QUICK CONNECT SWITCH EQUAL TO ESL STORM SWITCH 3042 SERIES, MODEL #SSDX-200A-C-200A-C-480- 311-S-C

PROVIDE CONTACT ON PRIMARY GENERATOR BREAK TO BE MONITORED BY GENERATOR ANNUNCIATOR

INTERLOCKED ADJUSTABLE BREAKERS

MALE CAM-LOCK CONNECTORS

(N.I.C.)

(2) #14AWG START CKT, 1"C BELOW SLAB OR MI CABLE

ROLL-UP 277/480V, 3 PH, 4W EMERGENCY GENERATOR (N.I.C.)

200KW, 480V, 3-PHASE STATIONARY RESISTIVE LOAD BANK INTEGRAL TO ENCLOSURE

(4) #350kCMIL+ (1) #4G, 3"C

PROVIDE "WP" EPO WITH COVER EXTERNAL TO THE ENCLOSURE AND AT THE MAIN ENTRANCE TO THE BUILDING TO SHUNT GENERATOR OUTPUT BREAKERS. PROVIDE FLUSH MOUNTED (AT BUILDING) AND SURFACE MOUNTED (AT GEN) KNOX "REMOTE POWER BOX" OR AHJ APPROVED EQUAL.

PROVIDE ELECTRONIC LSIG ADJUSTABLE CIRCUIT BREAKER FOR ATS-LS DISTRIBUTION.

PROVIDE PHYSICAL BARRIER BETWEEN BREAKERS (TYP.)

GROUNDING REFER TO DETAIL 8/E0.05

600kW, 750kVA, 0.8PF 277/480V, 3PH, 4W DIESEL GENERATOR SET IN WALK IN STYLE SOUND ATTENUATED, WEATHERPROOF ENCLOSURE; REFER TO SITE PLAN FOR LOCATION.

1/E3.01 ONE LINE RISER DIAGRAM

SCALE: N.T.S.

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90% CONSTRUCTION DOCUMENTS
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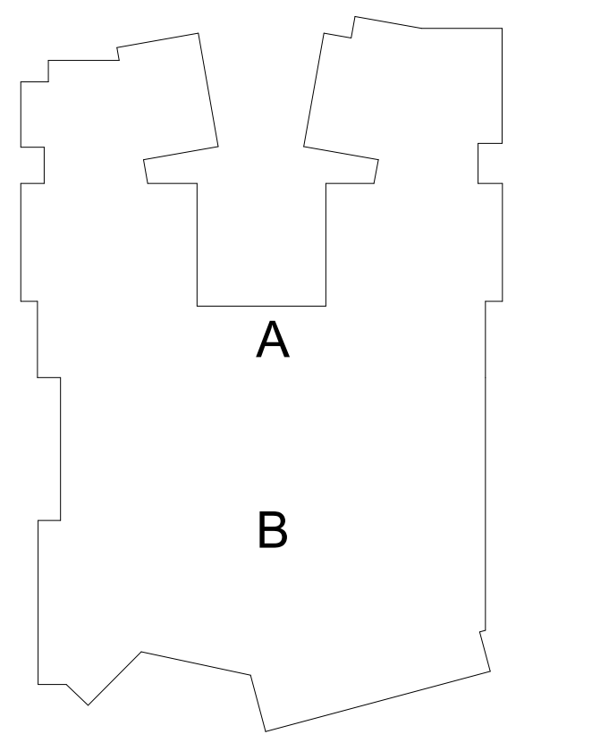
KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:
ELECTRICAL ONE
LINE RISER

SHEET NUMBER:
E3.01

THREE PHASE TRANSFORMER SCHEDULE (K13 RATED) COPPER CONDUCTORS

ID NO	KVA	PRIMARY 480 VOLT					SECONDARY 208 VOLT					GROUNDING ELECTRODE CONDUCTOR (250-66)*
		AMPS	WIRE (THHN)	COND.	C.B.	FUSE	AMPS	WIRE (THHN)	COND.	C.B.	FUSE	
T-1	3	3.6	3#12+#12EG	3/4"	15/3	10	8.3	4#12+#12(EG)	3/4"	15/3	15	#8
T-2	9	10.8	3#12+#12EG	3/4"	20/3	20	25	4#10+#10(EG)	3/4"	30/3	30	#8
T-3	15	18	3#10+#10EG	3/4"	30/3	30	41.6	3#6(ϕ)+1#2(N)+1#8(IG)+1#8(EG)	1 1/4"	50/3	50	#8
T-4	30	36	3#6+#10EG	3/4"	60/3	45	83.3	3#2(ϕ)+#3/0(N)+1#8(IG)+1#8(EG)	2"	100/3	100	#8
T-5	45	54.3	3#2+#8EG	1 1/4"	90/3	80	125	3#1/0(ϕ)+2#1/0(N) +1#6(IG)+1#6(EG)	2 1/2"	150/3	150	#6
T-6	75	90.2	3#1/0+#6EG	1 1/2"	150/3	150	208	3#250 KCMIL(ϕ)+2#250 KCMIL(N) +1#4(IG)+1#4(EG)	3"	250/3	250	#2
T-7	112.5	135.3	3#3/0+#6EG	2"	200/3	200	311	3#500 KCMIL(ϕ)+2#500 KCMIL(N) +1#3(IG)+1#3(EG)	4"	400/3	400	#1/0
T-8	150	180.6	3#350+#4EG	3"	300/3	300	416.8	2 SETS 3#250 KCMIL(ϕ)+2#250 KCMIL(N) +1#2(IG)+1#2(EG)	2 - 3"	500/3	500	#2/0
T-9	225	270.7	3#500+#3EG	3"	400/3	400	625	2 SETS 3#500 KCMIL(ϕ)+2#500 KCMIL(N) +1#1/0(IG)+1#1/0(EG)	2 - 4"	800/3	800	#2/0
T-10	300	360.8	2 SETS 3#350& #1EG	2-3"	600/3	600	833	3 SETS 3#400KCMIL(ϕ)+2#400 KCMIL (N) +1#2/0(IG)+1#2/0(EG)	3 - 4"	1000/3	1000	#3/0

* RUN IN CODE SIZE CONDUIT TO CODE APPROVED GROUNDING ELECTRODE, i.e., BUILDING STEEL, ETC. "EG" INDICATES EQUIPMENT GROUNDING CONDUCTOR, "IG" INDICATES ISOLATED GROUNDING CONDUCTOR, "N" INDICATES NEUTRAL CONDUCTOR AND " ϕ" INDICATES PHASE CONDUCTOR.

** PROVIDE "IG" GROUNDING CONDUCTORS FOR PANELBOARDS DESIGNATED WITH "IG" BUS WHERE SHOWN ON PANEL SCHEDULE.

277/480V, 3 PHASE, 4W, 65 KAIC
2500A BUS

FRONT ACCESSIBLE

SWITCHBOARD "MSB1" SCHEDULE ⑥

OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
No.	TRIP	FRAME				
-	2000	2500	MAIN BREAKER	SEE RISER	-	100% RATED WITH GFI PROTECTION
1	60	100	SURGE PROTECTION DEVICE (SPD)	(4) #6 & (1) #6G	1 1/4"	PER MFGR. REQUIREMENTS
2	90	100	PANEL PP1A VIA T-5 XMFR	REFER TO SCHEDULE NOTE ③	③	
3	60	100	PANEL MP1A VIA T-4	REFER TO SCHEDULE NOTE ③	③	
4	100	100	PANEL LP1A	4#1+#8G	1 1/2"	
5	90	100	PANEL PP2A VIA T-5 XFMR	REFER TO SCHEDULE NOTE ③	③	
6	200	225	SPARE			
7	100	100	PANEL LP2A	4#1+#8G	1 1/2"	
8	90	100	PANEL PP3A VIA T-5 XFMR	REFER TO SCHEDULE NOTE ③	③	
9	150	225	PANEL MHP3A	4#1/0+#6G	2"	
10	100	100	PANEL LP3A	4#1+#8G	1 1/2"	
11	100	100	PANEL MHP2B2	4#1+#8G	1 1/2"	
12	150	225	PANEL PP2B2 VIA T-6 XFMR	REFER TO SCHEDULE NOTE ③	③	
13	100	100	PANEL LP2B2	4#1+#8G	1 1/2"	
14	150	225	SPARE			
15	200	225	PANEL 2DP1B VIA T-7 XFMR	REFER TO SCHEDULE NOTE ③	③	
16	300	400	PANEL EV VIA T-8 XFMR	REFER TO SCHEDULE NOTE ③	③	
17	1000	1000	EB-1 ELECTRIC BOILER	3 SETS 4#400KCMIL+#2/0G	(3) 3"	
18	150	225	EWH-1	4#1/0+#6G	2"	
19	600	600	ASHP-2	2 SETS 4#350KCMIL+#1G	(2) 3"	
20	100	100	SPARE			
21	-	225	SPACE - PROVISIONS ONLY	-	-	
22	-	100	SPACE - PROVISIONS ONLY	-	-	
23	-	800	SPACE - PROVISIONS ONLY	-	-	FUTURE PV @ END OF BUSSING

① PROVIDE CURENT LIMITING BREAKER UL LISTED SERIES RATED FOR 65,000 AMPS RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE CURRENT LIMITING BREAKER.
③ SEE TRANSFORMER SCHEDULE FOR WIRE AND CONDUIT SIZE.
④ CONDUCTOR SIZES SHOWN ARE FOR COPPER. ALUMINUM CONDUCTORS ARE ACCEPTABLE. RESIZE CONDUCTORS & CONDUITS ACCORDINGLY.
⑤ PROVIDE SHUNT TRIP CIRCUIT BREAKER.
⑥ PROVIDE ENERGY-REDUCING MAINTENANCE SWITCHING WITH LOCAL STATUS INDICATOR FOR ARC ENERGY REDUCTION.

277/480V, 3 PHASE, 4W, 65 KAIC
2500A BUS

FRONT ACCESSIBLE

SWITCHBOARD "MSB2" SCHEDULE ⑥

OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
No.	TRIP	FRAME				
-	2000	2500	MAIN BREAKER	SEE RISER	-	100% RATED WITH GFI PROTECTION
1	60	100	SPD	(4) #6 & (1) #6G	1 1/4"	PER MFGR. REQUIREMENTS
2	90	100	PANEL PP3B VIA T-5 XFMR	REFER TO SCHEDULE NOTE ③	③	
3	200	225	PANEL MHP3B	4#3/0+#6G	2 1/2"	
4	100	100	PANEL LP3B	4#1+#8G	1 1/2"	
5	60	100	PANEL PP2B VIA T-4 XFMR	REFER TO SCHEDULE NOTE ③	③	
6	300	400	PANEL MHP2B	4#350KCMIL+#4G	3"	
7	100	100	PANEL LP2B	4#1+#8G	1 1/2"	
8	60	100	PANEL MP1B VIA T-4 XFMR	REFER TO SCHEDULE NOTE ③	③	
9	90	100	PANEL PP1B VIA T-5 XFMR	REFER TO SCHEDULE NOTE ③	③	
10	100	100	PANEL LP1B	4#1+#8G	1 1/2"	
11	100	100	PANEL OLP	4#1+#8G	1 1/2"	
12	400	400	PANEL KHP	4#500KCMIL+#3G	4"	
13	1000	1000	ATS-OS	3 SETS 4#400KCMIL+#2/0G	(3) 3"	
② 14	200	225	ATS-LS	4#3/0+#6G	2 1/2"	
15	200	225	SPARE	-	-	
16	150	225	EWH-2	4#1/0+#6G	2"	
17	90	100	EWH-3	4#2+#8G	1 1/4"	
18	150	225	SPARE	-	-	
19	100	100	SPARE	-	-	
20	-	225	SPACE - PROVISIONS ONLY	-	-	
21	-	100	SPACE - PROVISIONS ONLY	-	-	
22	-	800	SPACE - PROVISIONS ONLY	-	-	FUTURE PV @ END OF BUSSING

① PROVIDE CURENT LIMITING BREAKER UL LISTED SERIES RATED FOR 65,000 AMPS RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE ELECTRONIC LSIG ADJUSTABLE CIRCUIT BREAKER.
③ SEE TRANSFORMER SCHEDULE FOR WIRE AND CONDUIT SIZE.
④ CONDUCTOR SIZES SHOWN ARE FOR COPPER. ALUMINUM CONDUCTORS ARE ACCEPTABLE. RESIZE CONDUCTORS & CONDUITS ACCORDINGLY.
⑤ PROVIDE SHUNT TRIP CIRCUIT BREAKER.
⑥ PROVIDE ENERGY-REDUCING MAINTENANCE SWITCHING WITH LOCAL STATUS INDICATOR FOR ARC ENERGY REDUCTION.

277/480V, 3 PHASE, 4W, 65 KAIC

PANEL SCHEDULE

PANEL NO.	LOCATION	MTG	MAIN BUS AMPS	MAIN CB	BRANCH CKT BREAKER (AMPS)										TOTAL POLES	OTHERS
					1 POLE			2 POLE			3 POLE					
					15	20	30	15	20	30	15	20	30	60		
ELP1A	1ST FLOOR AREA "A" EM. CLOSET	S	100	-											42	
ELP1B	1ST FLOOR AREA "B" EM. CLOSET	S	225	200										4	42	
ELP2A	2ND FLOOR AREA "A" EM. CLOSET	S	100	-											42	
ELP2B	2ND FLOOR AREA "B" EM. CLOSET	S	100	-											42	
ELP2B2	2ND FLOOR AREA "B" EM. CLOSET	S	100	-											42	
LP1A	1ST FLOOR AREA "A" ELEC ROOM	S	100	-											42	
LP1B	1ST FLOOR AREA "B" ELEC ROOM	S	100	-											42	
LP2A	2ND FLOOR AREA "A" ELEC ROOM	S	100	-											42	
LP2B	2ND FLOOR AREA "B" ELEC ROOM	S	100	-											42	
LP2B2	2ND FLOOR AREA "B" ELEC ROOM	S	100	-											42	
LP3A	3RD FLOOR AREA "A" ELEC ROOM	S	100	-											42	
LP3B	3RD FLOOR AREA "A" ELEC ROOM	S	100	-											42	
OLP	1ST FLOOR AREA "B" ELEC ROOM	S	100	-											42	
KHP	1ST FLOOR AREA "B" ELEC ROOM	S	400	400											42	
MHP2B	2ND FLOOR AREA "B" ELEC ROOM	S	400	-											42	
MHP2B2	2ND FLOOR AREA "B" ELEC ROOM	S	100	-											42	
MHP3A	3RD FLOOR AREA "A" ELEC ROOM	S	225	-											42	
MHP3B	3RD FLOOR AREA "A" ELEC ROOM	S	225	-											42	

① FED FROM CURRENT LIMITING BREAKERS. UL LISTED SERIES RATED FOR 65,000A RMS @ RATED VOLTAGE WITH UPSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE SHUNT TRIP CIRCUIT BREAKER WITH 120V COIL.
③ SINGLE TUB PANEL BUT TALLER IN HEIGHT.

277/480V, 3 PHASE, 4W, 65 KAIC
1000A MLO

DISTRIBUTION PANEL "NEDP" SCHEDULE

OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
No.	TRIP	FRAME				
① 1	150	225	PANEL EP1A VIA T-6	REFER TO SCHEDULE NOTE ③	③	
② 2	200	225	PANEL EP1B VIA T-7	REFER TO SCHEDULE NOTE ③	③	
3	600	600	ASHP-1	2 SETS 4#350KCMIL+#1G	(2) 3"	
4	100	100	ELEVATOR	4#1+#8G	1 1/2"	
5	300	400	PANEL EHP3B	4#350KCMIL+#4G	3"	
① 6	100	100	PANEL TEP1A VIA UPS	4#1+#8G	1 1/2"	
7	100	100	SPARE			
① 8	60	100	SPARE			
① 9	30	100	SPARE			
② 10	20	100	SPARE			
11	-	100	SPACE PROVISIONS			
12	-	225	SPACE PROVISIONS			
13	-	225	SPACE PROVISIONS			
14						
15						

① UL LISTED SERIES RATED FOR 65,000A RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE CURRENT LIMITING BREAKER
③ SEE TRANSFORMER SCHEDULE FOR WIRE AND CONDUIT SIZE.

120/208V, 3 PHASE, 4W, 65 KAIC
400A MLO

DISTRIBUTION PANEL "2DP1B" SCHEDULE

OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
No.	TRIP	FRAME				
1	200	225	PANEL PP2A2	4#3/0+#6G	2 1/2"	
2	60	100	PANEL MP2A2	4#4+#10G	1 1/2"	
3	200	225	PANEL PP2A3	4#3/0+#6G	2 1/2"	
4	60	100	PANEL MP2A3	4#4+#10G	1 1/2"	
5	60	100	SPARE			
6	30	100	SPARE			
7	-	100	SPACE PROVISIONS	-	-	
8	-	225	SPACE PROVISIONS	-	-	
9	-	225	SPACE PROVISIONS	-	-	
10						

① UL LISTED SERIES RATED FOR 65,000A RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE CURRENT LIMITING BREAKER
③ SEE TRANSFORMER SCHEDULE FOR WIRE AND CONDUIT SIZE.
④ CONDUCTOR SIZES SHOWN ARE FOR COPPER. ALUMINUM CONDUCTORS ARE ACCEPTABLE. RESIZE CONDUCTORS & CONDUITS ACCORDINGLY.

120/208V, 3 PHASE, 4W, 22 KAIC

PANEL SCHEDULE

PANEL NO.	LOCATION	MTG	MAIN BUS AMPS	MAIN CB	BRANCH CKT BREAKER (AMPS)										TOTAL POLES	OTHERS
					1 POLE			2 POLE			3 POLE					
					15	20	30	15	20	30	15	20	30	60		
④③ EP1A	1ST FLOOR AREA "A" ELEC RM	S	100	-											84	
⑤③ EP1B	1ST FLOOR AREA "B" ELEC RM	S	400	400											84	
③ EP2A	2ND FLOOR AREA "A" ELEC RM	S	225	150										3	42	
③ EP2B	2ND FLOOR AREA "B" ELEC RM	S	100	-										1	42	
③ EP2B2	2ND FLOOR AREA "B" ELEC RM	S	100	-											42	
③ EP3A	3RD FLOOR AREA "A" ELEC RM	S	100	-											42	
③ EP3B	3RD FLOOR AREA "A" ELEC RM	S	100	60											42	
④③ TEP1A	NETWORK TELCOM 149	S	100	100										2	84	
④③ TEP2A	2ND FLOOR AREA "A" IDF ROOM 203	S	60	-											42	
④③ TEP2B	2ND FLOOR AREA "A" IDF ROOM 229	S	60	-											42	
⑤② KPP	1ST FLOOR AREA "B" ELEC ROOM	S	400	250											84	
⑤② PP1A	1ST FLOOR AREA "A" ELEC RM	S	225	150											84	
④② PP1B	1ST FLOOR AREA "B" ELEC RM	S	225	150											84	
⑤② PP2A	2ND FLOOR AREA "A" ELEC RM	S	225	150											84	
⑤② PP2A2	2ND FLOOR AREA "A" ELEC RM	S	225	-											84	
⑤② PP2A3	2ND FLOOR AREA "A" ELEC RM	S	225	-											84	
④② PP2B	2ND FLOOR AREA "B" ELEC RM	S	100	100											84	
④② PP2B2	2ND FLOOR AREA "B" ELEC RM	S	400	250											84	
⑤② PP3A	3RD FLOOR AREA "A" ELEC RM	S	225	150											84	
④② PP3B	3RD FLOOR AREA "A" ELEC RM	S	225	150											84	
① EV	1ST FLOOR AREA "B" ELEC RM	S	600	500											84	(9) 125/2 ⑦
④⑥ MP1A	1ST FLOOR AREA "A" ELEC RM	S	100	100											84	
⑤⑥ MP1B	1ST FLOOR AREA "B" ELEC RM	S	100	100											84	
④⑥ MP2A2	2ND FLOOR AREA "A" ELEC RM	S	100	-											84	
④⑥ MP2A3	2ND FLOOR AREA "A" ELEC RM	S	100	-											84	
④⑥ MP2B	2ND FLOOR AREA "B" ELEC RM	S	100	100											84	
④⑥ MP2B2	2ND FLOOR AREA "B" ELEC RM	S	100	100											84	
④⑥ MP3A	3RD FLOOR AREA "A" ELEC RM	S	100	100											84	
④⑥ MP3B	3RD FLOOR AREA "A" ELEC RM	S	100	100											84	

① PROVIDE SHUNT TRIP MAIN CIRCUIT BREAKER WITH 120V COIL.
② 200% NEUTRAL BUS.
③ DOUBLE NEUTRAL BUS AND IG BUS.
④ SINGLE TUB PANEL BUT TALLER IN HEIGHT.
⑤ DOUBLE TUB PANEL BUT TALLER IN HEIGHT.
⑥ PROVIDE GFPE TYPE CIRCUIT BREAKER FOR EWC'S.
⑦ PROVIDE LOCK-OFF DEVICES FOR ALL BRANCH BREAKERS SERVING EV CHARGERS.

SUB-METERING (BFM) SCHEDULE

##	LOAD METERED	LOAD TYPE	VOLTAGE, PH, WIRE	AMPERE RATING	NOTES
1	MAIN SERVICE	TOTAL ELEC ENERGY	277/480V, 3PH, 4W	2000	-
2	MAIN SERVICE	TOTAL ELEC ENERGY	277/480V, 3PH, 4W	2000	
3	PP1A via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
4	MP1A via T-4 xfmr	HVAC	277/480V, 3PH, 4W	100	
5	LP1A	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
6	PP2A via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
7	LP2A	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
8	PP3A via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
9	MHP3A	HVAC	277/480V, 3PH, 4W	200	
10	LP3A	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
11	MHP2B2	HVAC	277/480V, 3PH, 4W	100	
12	PP2B2 via T-6 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	200	
13	LP2B2	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
14	EV via T-8 xfmr	EV CHARGING	277/480V, 3PH, 4W	400	
15	ASHP-2	HVAC	277/480V, 3PH, 4W	600	
16	EB-1	HVAC	277/480V, 3PH, 4W	1000	
17	EWH-1	HVAC	277/480V, 3PH, 4W	200	
18	SPARE	-	-	-	
19	PP2A2	PLUGLOAD / REC	120/208V, 3PH, 4W	200	
20	MP2A2	HVAC	120/208V, 3PH, 4W	100	
21	PP2A3	PLUGLOAD / REC	120/208V, 3PH, 4W	200	
22	MP2A2	HVAC	120/208V, 3PH, 4W	100	
23	SPARE	-	-	-	
24	PP3B via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
25	MHP3B	HVAC	277/480V, 3PH, 4W	200	
26	LP3B	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
27	PP2B via T-4 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
28	MHP2B	HVAC	277/480V, 3PH, 4W	400	
29	LP2B	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
30	MP1B via T-4 xfmr	HVAC	277/480V, 3PH, 4W	100	
31	PP1B via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
32	LP1B	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
33	OLP	EXTERIOR LIGHTING	277/480V, 3PH, 4W	100	
34	KHP	KITCHEN EQUIPMENT	277/480V, 3PH, 4W	400	
35	SPARE	-	-	-	
36	ELP1B	EMERG'Y LIGHTING	277/480V, 3PH, 4W	200	
37	TEP1A via UPS	TELECOM SYSTEMS	277/480V, 3PH, 4W	100	
38	EP1A via T-6 xfmr	EMERGENCY POWER	277/480V, 3PH, 4W	200	
39	EHP3B	EMERGENCY POWER	277/480V, 3PH, 4W	400	
40	EP1B via T-7 xfmr	EMERGENCY POWER	277/480V, 3PH, 4W	200	
41	ASHP-1	HVAC	277/480V, 3PH, 4W	600	
42	ELEVATOR	ELEVATOR	277/480V, 3PH, 4W	100	

SUB-METERING NOTES:

1. PROVIDE SATEC BFM-II SUB-METERING SYSTEM OR APPROVED EQUAL. SEE ELECTRICAL SPECIFICATIONS FOR COMPLETE SET OF SYSTEM REQUIREMENTS.
2. SINGLE BFM-II EXTENDED UNIT WITH VIM DUAL VOLTAGE INPUT MODULE CAN MONITOR UP TO 36 SINGLE PHASE / 12 THREE PHASE CURRENT CHANNELS. PROVIDE MULTIPLE BFM-II UNITS AS REQUIRED TO ACCOMMODATE LOADS AS SCHEDULED.
3. PROVIDE 15A/3P CIRCUIT BREAKER PER VOLTAGE SOURCE FOR EACH BFM-II UNIT FOR INPUT VOLTAGE REFERENCE.
4. PROVIDE NEMA-1 ENCLOSURE WITH HINGED COVER AND DIN RAIL MOUNTING PROVISIONS TO HOUSE BFM-II UNIT(S) AND ACCESSORY MODULES. COORDINATE EXACT DIMENSIONS WITH ACTUAL EQUIPMENT TO BE INSTALLED.
5. CURRENT TRANSFORMERS (C/T) SHALL BE SIZED FOR LOAD SCHEDULED WITH LEADS SELECTED BY METERING MANUFACTURER TO ALLOW FOR DISTANCE REQUIRED BETWEEN C/T'S AND METERING UNIT. PROVIDE EXTERNAL WIRING TROUGH AND/OR BOXES FOR INSTALLATION OF CURRENT TRANSFORMERS AROUND CONDUCTORS IF REQUIRED TO MAINTAIN CODE COMPLIANT PANELBOARD GUTTER FILL.
6. PROVIDE THREE (3) SPLIT / SOLID CORE CURRENT TRANSFORMERS FOR EACH THREE PHASE LOAD IN SCHEDULE. PROVIDE ONE (1) SPLIT/ SOLID CORE CURRENT TRANSFORMER FOR EACH SINGLE PHASE LOAD IN SCHEDULE.
7. PROVIDE ONE (1) CAT-6A CONNECTION FROM EACH BFM-II UNIT TO NEAREST MDF/IDF ROOM.

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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

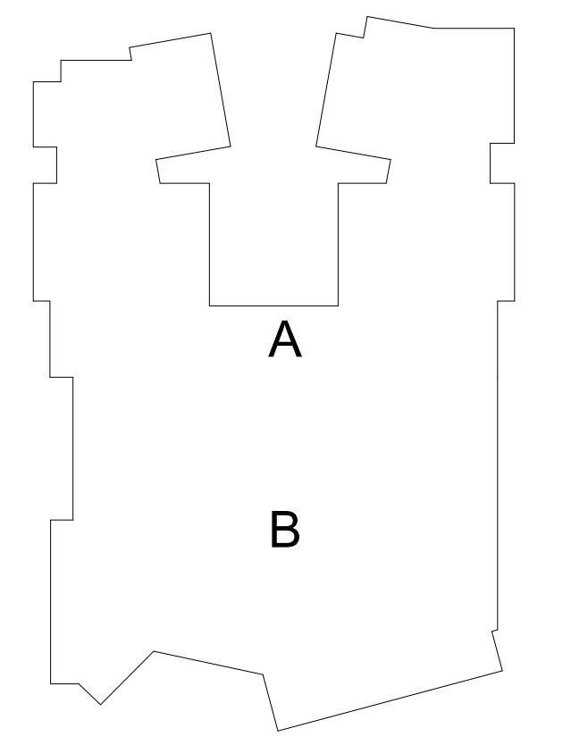
REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



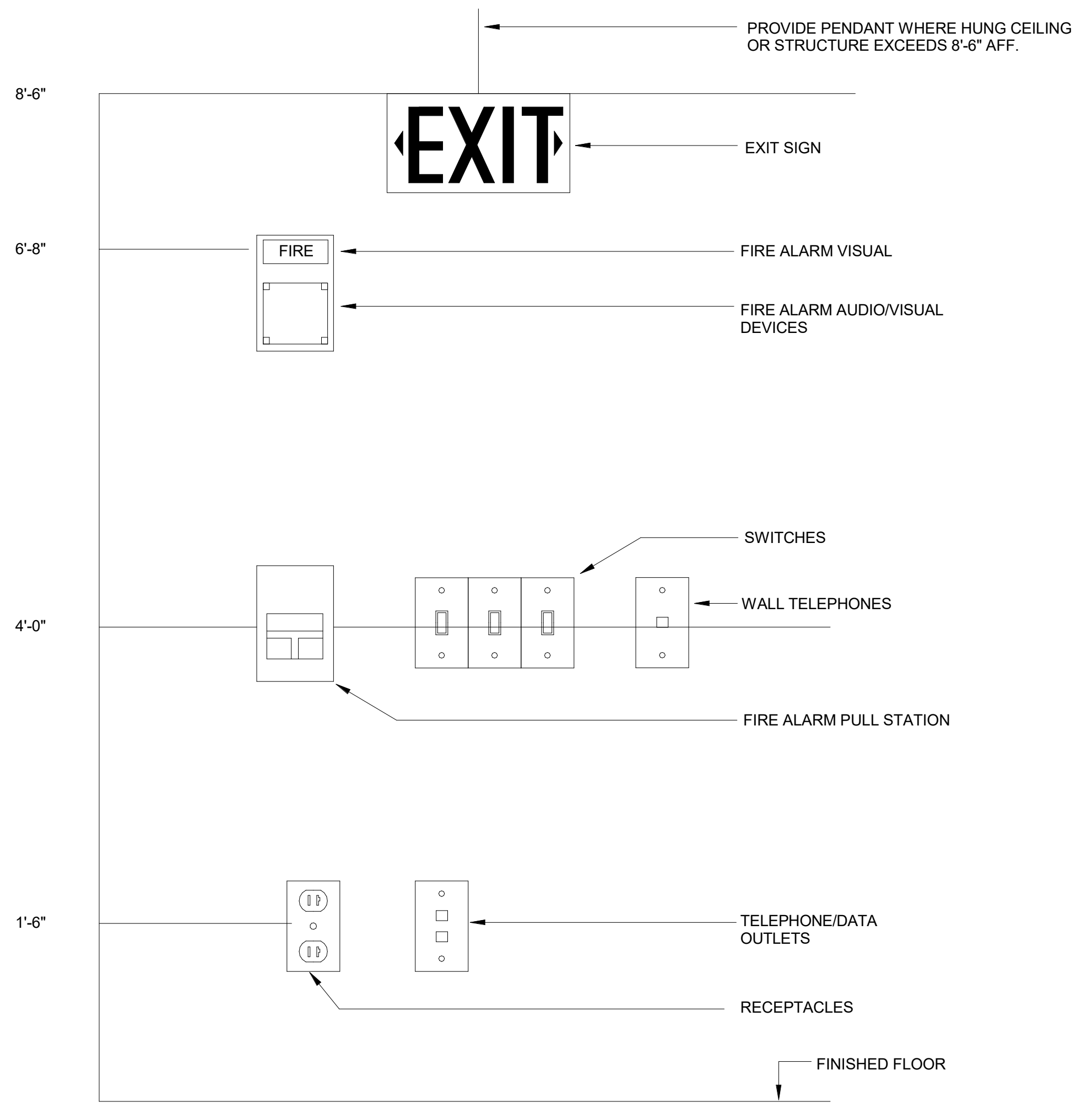
ORIENTATION AND SCALE:

SHEET TITLE:

ELECTRICAL PANEL SCHEDULES

SHEET NUMBER:

E3.02



NOTES:

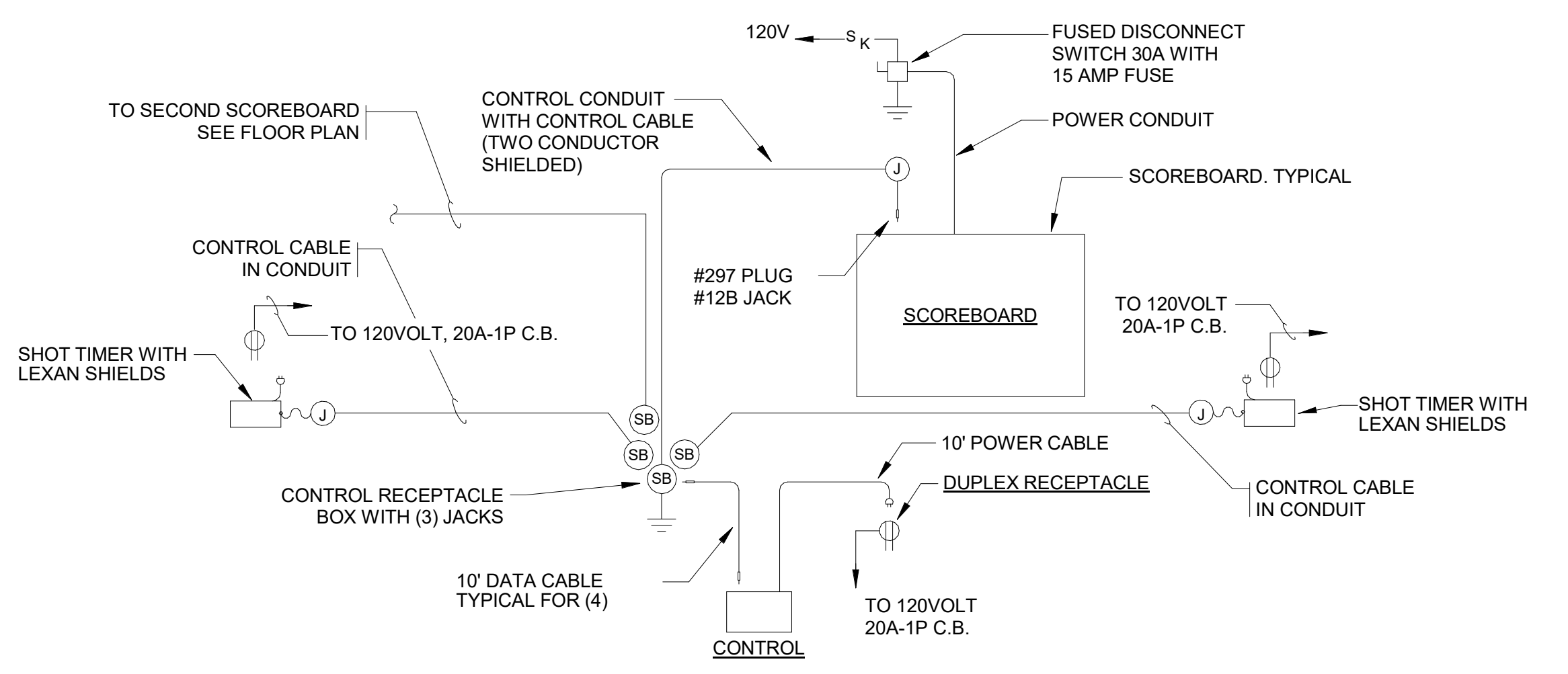
1. ALL MOUNTING HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF DEVICE EXCEPT EXIT SIGNS. MEASURE 6'-8" TO VISUAL OF AUDIO/VISUAL DEVICE.

2. DEVICES SHALL BE INSTALLED ON A COMMON VERTICAL CENTERLINE WHEREVER POSSIBLE.

3. ALL DEVICES SHALL BE INSTALLED AT MOUNTING HEIGHTS AS INDICATED ON THIS DETAIL UNLESS OTHERWISE NOTED.

1 / E3.03 TYPICAL DEVICE MOUNTING HEIGHT DETAIL

SCALE: N.T.S



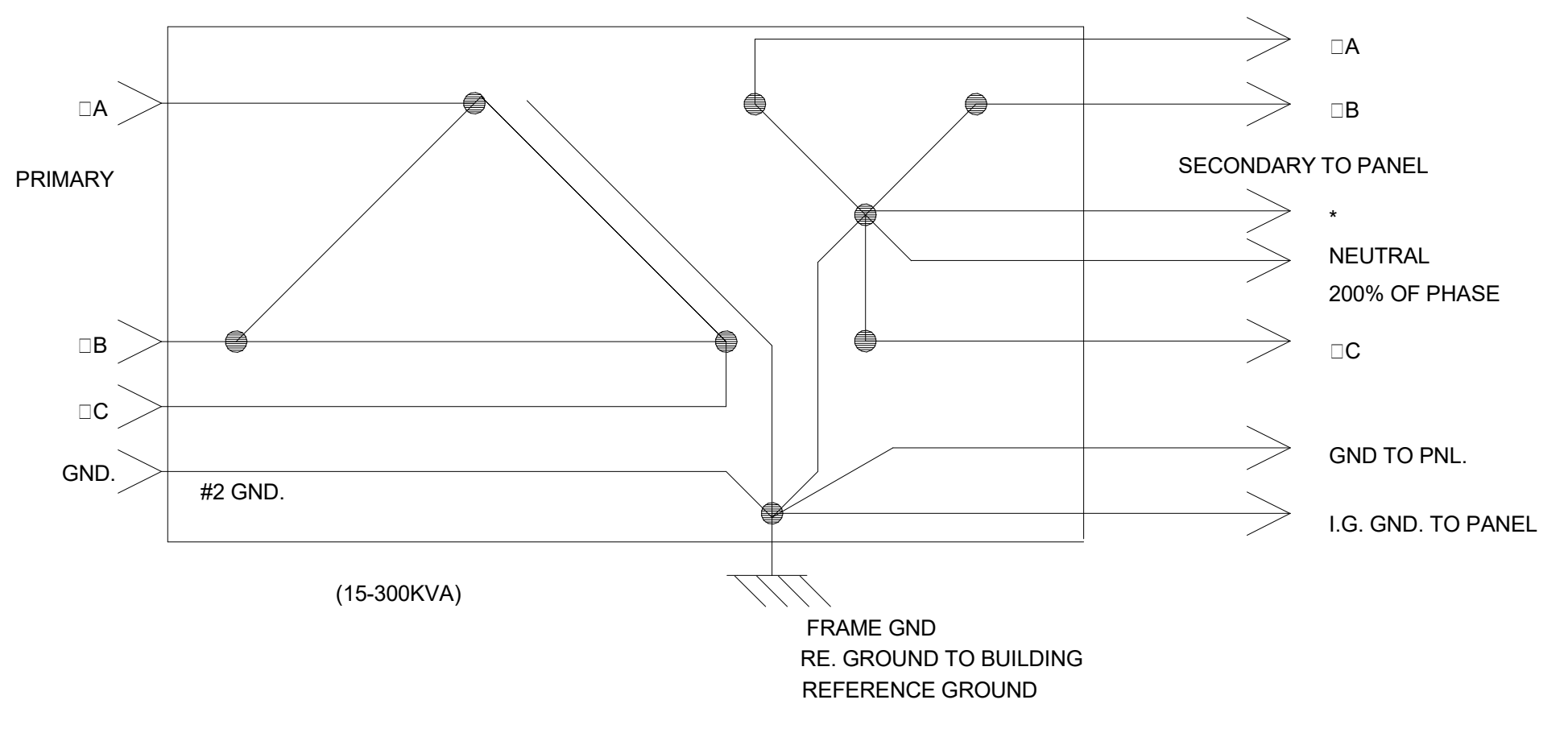
120V
S K
FUSED DISCONNECT SWITCH 30A WITH 15 AMP FUSE
TO SECOND SCOREBOARD SEE FLOOR PLAN
CONTROL CONDUIT WITH CONTROL CABLE (TWO CONDUCTOR SHIELDED)
POWER CONDUIT
SCOREBOARD. TYPICAL
J
CONTROL CABLE IN CONDUIT
#297 PLUG #12B JACK
SCOREBOARD
TO 120VOLT 20A-1P C.B.
TO 120VOLT, 20A-1P C.B.
SHOT TIMER WITH LEXAN SHIELDS
SHOT TIMER WITH LEXAN SHIELDS
SB
10' POWER CABLE
DUPLEX RECEPTACLE
CONTROL CABLE IN CONDUIT
CONTROL RECEPTACLE BOX WITH (3) JACKS
10' DATA CABLE TYPICAL FOR (4)
TO 120VOLT 20A-1P C.B.
CONTROL

NOTES:

1. POWER WIRING SHOULD BE ROUTED IN SEPARATE CONDUIT FROM CONTROL CABLING. PROVIDE 1/2" CONDUIT FOR POWER AND 3/4" CONDUIT FOR CONTROL.

2 / E3.03 BASKETBALL SCOREBOARD WIRING DIAGRAM

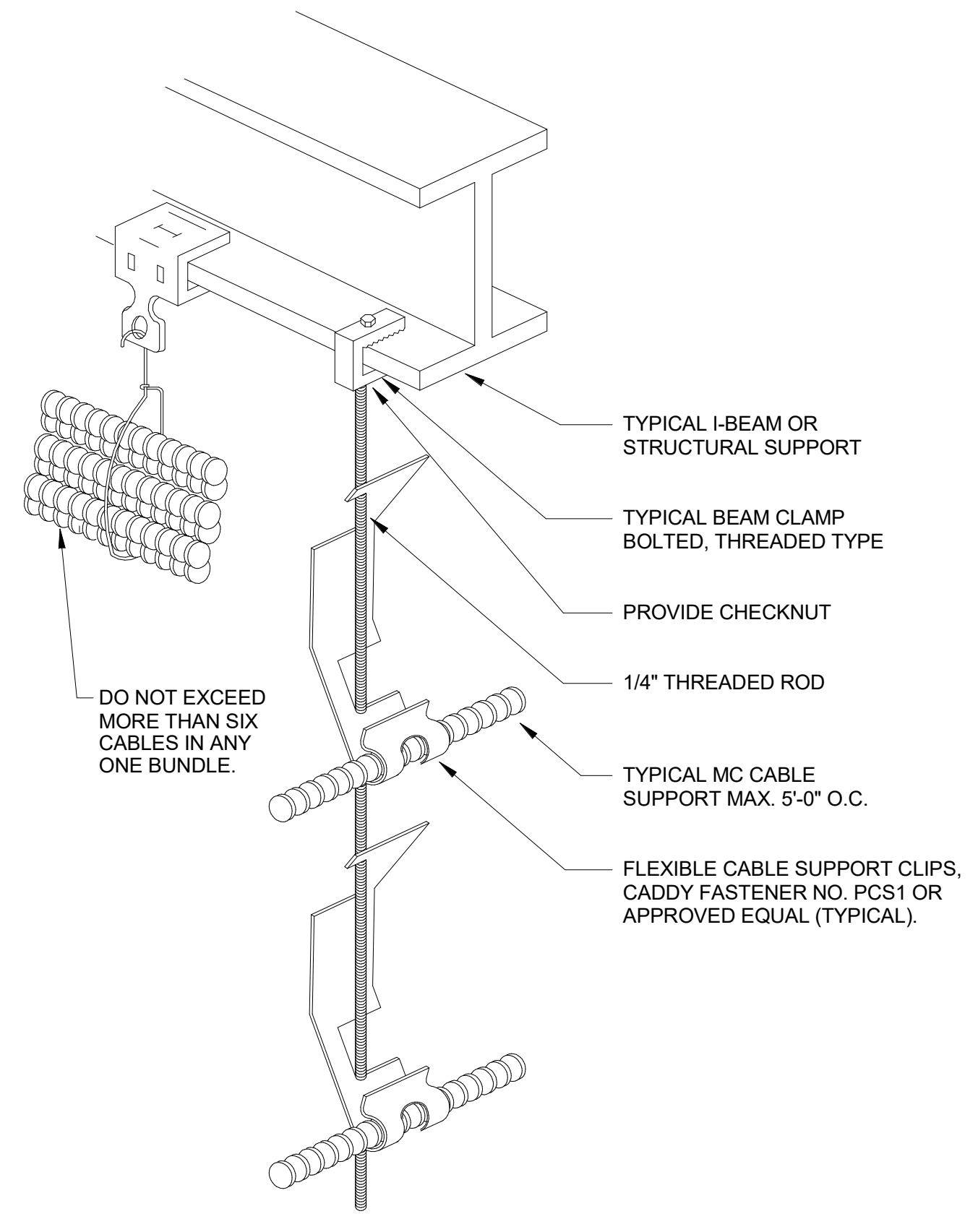
SCALE: N.T.S.



3 / E3.03 K-RATED TRANSFORMER CONNECTIONS WIRING DETAIL

SCALE: N.T.S.

* NEUTRAL CONDUCTORS #1/0 OR LARGER MAY BE PARALLELED. DO NOT PARALLEL CONDUCTORS SMALLER THAN #1/0.



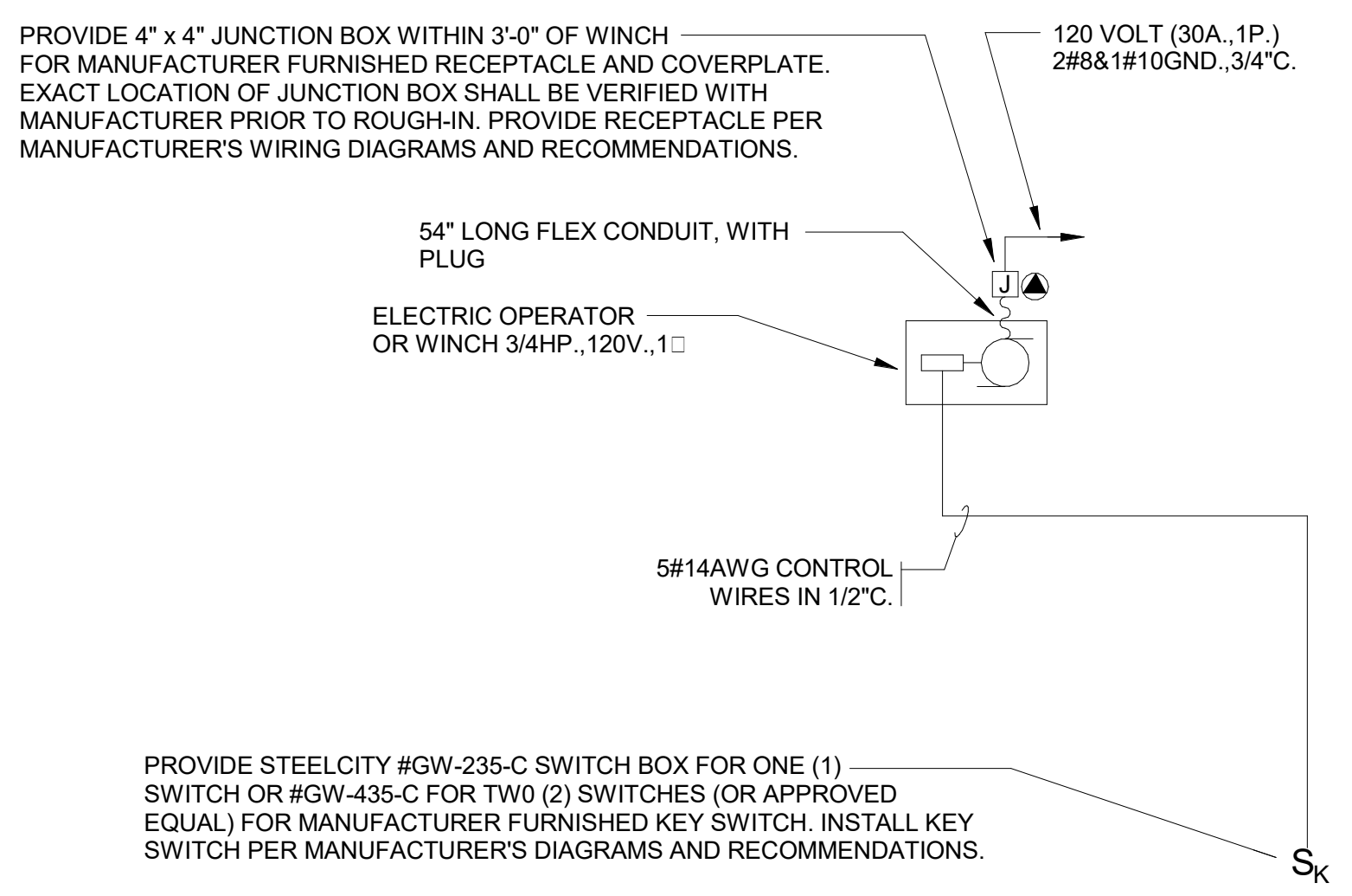
TYPICAL I-BEAM OR STRUCTURAL SUPPORT
TYPICAL BEAM CLAMP BOLTED, THREADED TYPE
PROVIDE CHECKNUT
1/4" THREADED ROD
DO NOT EXCEED MORE THAN SIX CABLES IN ANY ONE BUNDLE.
TYPICAL MC CABLE SUPPORT MAX. 5'-0" O.C.
FLEXIBLE CABLE SUPPORT CLIPS, CADDY FASTENER NO. PCS1 OR APPROVED EQUAL (TYPICAL).

NOTES:

1. SUPPORTING CABLE IS ACCEPTABLE BELOW SUPPORT STEEL OR ABOVE STEEL. COORDINATE MOUNTING LOCATIONS WITH OTHER TRADES AND FIELD CONDITIONS. PROVIDE SUPPORT CLIPS AND THREADED RODES AS REQUIRED FOR A COMPLETE SUPPORT SYSTEM AS INDICATED.
2. SUPPORT CABLES FROM EITHER PARALLEL OR PERPENDICULAR SUPPORT STEEL.
3. BUNDLE A UP TO A MAXIMUM OF (6) SIX CABLES.

4 / E3.03 TYPICAL MC CABLE SUPPORTING DETAIL

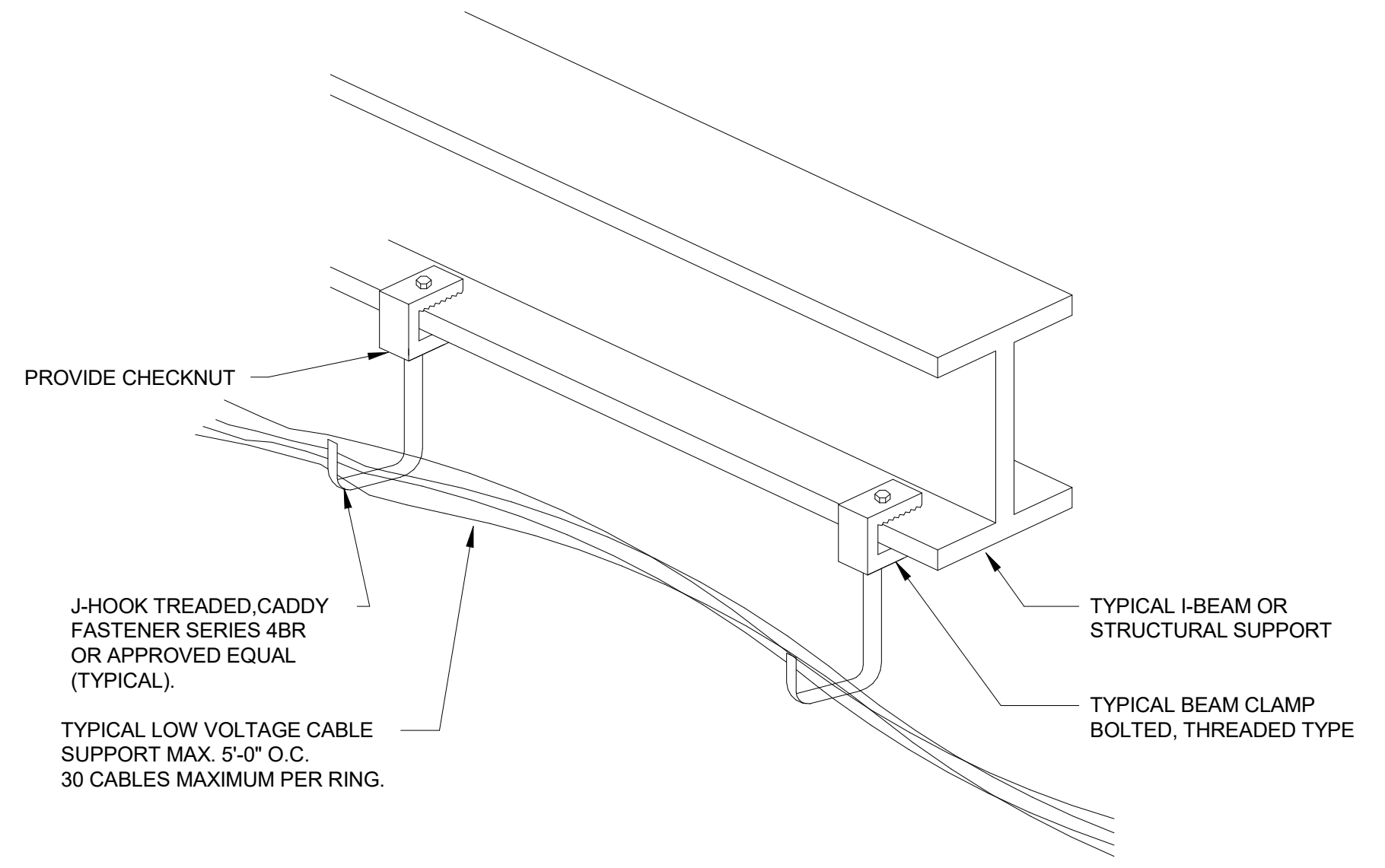
SCALE: N.T.S.



PROVIDE 4" x 4" JUNCTION BOX WITHIN 3'-0" OF WINCH FOR MANUFACTURER FURNISHED RECEPTACLE AND COVERPLATE. EXACT LOCATION OF JUNCTION BOX SHALL BE VERIFIED WITH MANUFACTURER PRIOR TO ROUGH-IN. PROVIDE RECEPTACLE PER MANUFACTURER'S WIRING DIAGRAMS AND RECOMMENDATIONS.
120 VOLT (30A.,1P.) 2#8&1#10GND.,3/4"C.
54" LONG FLEX CONDUIT, WITH PLUG
J
ELECTRIC OPERATOR OR WINCH 3/4HP.,120V.,1□
5#14AWG CONTROL WIRES IN 1/2"C.
PROVIDE STEELCITY #GW-235-C SWITCH BOX FOR ONE (1) SWITCH OR #GW-435-C FOR TW0 (2) SWITCHES (OR APPROVED EQUAL) FOR MANUFACTURER FURNISHED KEY SWITCH. INSTALL KEY SWITCH PER MANUFACTURER'S DIAGRAMS AND RECOMMENDATIONS.
S K

5 / E3.03 TYPICAL ELECTRICAL WINCH WIRING FOR BACKBOARD, CURTAIN OR BLEACHER

SCALE N.T.S.



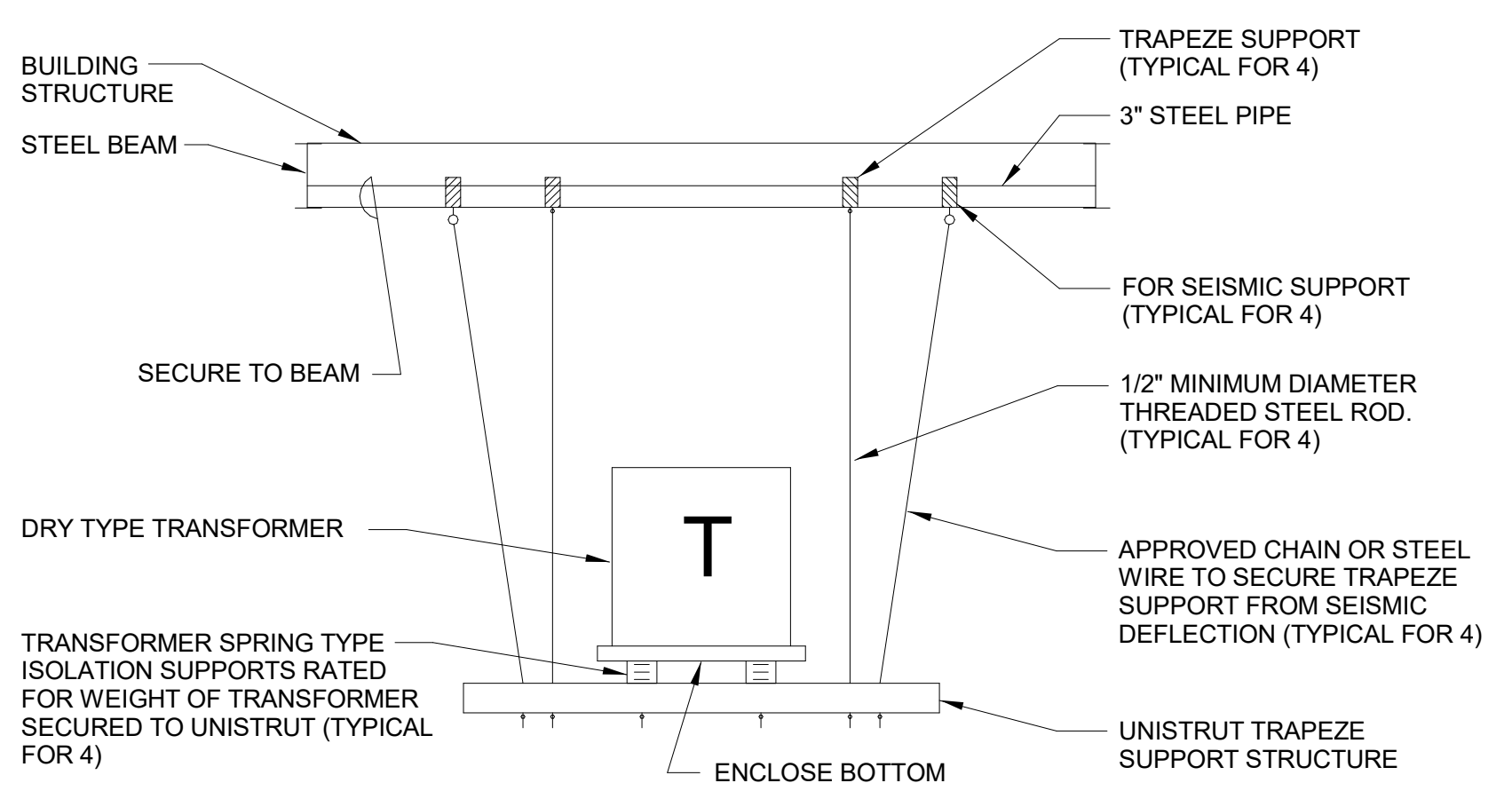
PROVIDE CHECKNUT
J-HOOK TREADED,CADDY FASTENER SERIES 4BR OR APPROVED EQUAL (TYPICAL).
TYPICAL LOW VOLTAGE CABLE SUPPORT MAX. 5'-0" O.C. 30 CABLES MAXIMUM PER RING.
TYPICAL I-BEAM OR STRUCTURAL SUPPORT
TYPICAL BEAM CLAMP BOLTED, THREADED TYPE

NOTES:

1. SUPPORTING CABLE IS ACCEPTABLE BELOW SUPPORT STEEL OR ABOVE STEEL. COORDINATE MOUNTING LOCATIONS WITH OTHER TRADES AND FIELD CONDITIONS. PROVIDE SUPPORT CLIPS AND THREADED RODS AS REQUIRED FOR A COMPLETE SUPPORT SYSTEM AS INDICATED.
2. SUPPORT CABLE EITHER PARALLEL OR PERPENDICULAR TO SUPPORT STEEL.

6 / E3.03 TYPICAL LOW VOLTAGE CABLE SUPPORT DETAIL

SCALE N.T.S.

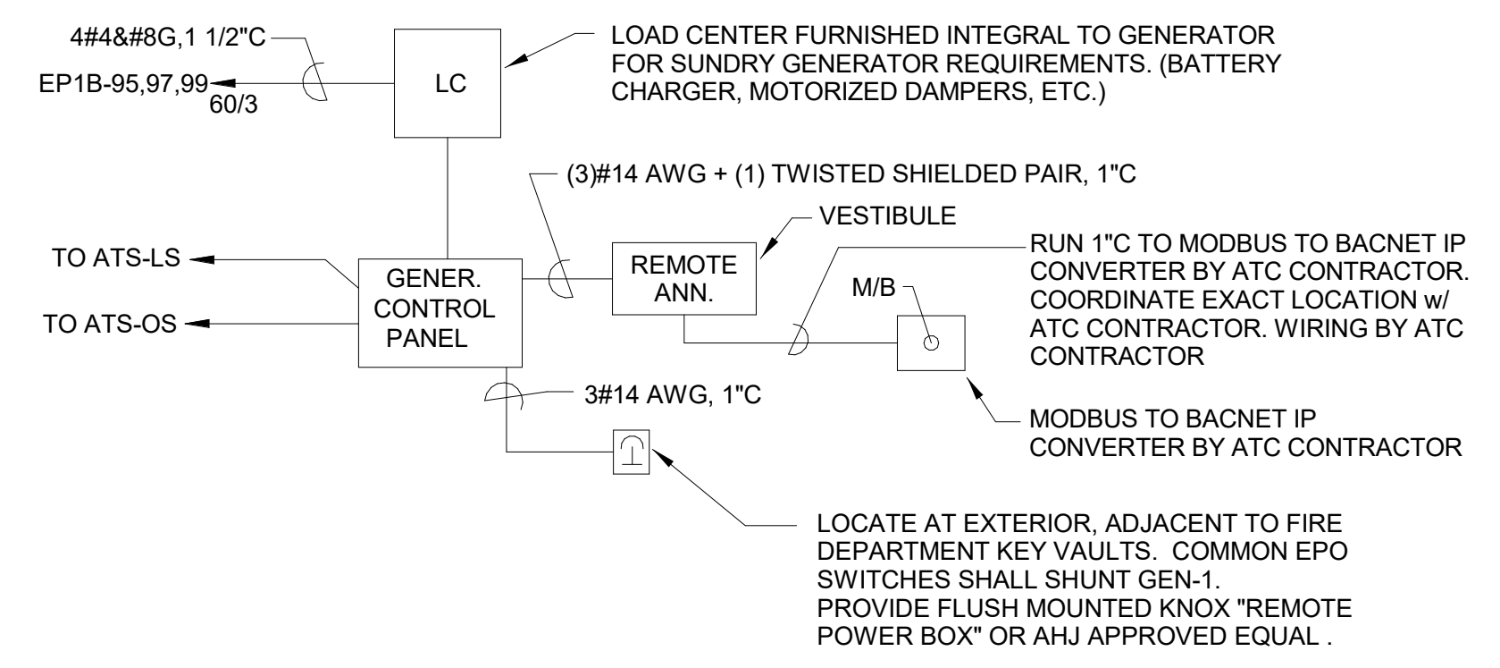


BUILDING STRUCTURE
STEEL BEAM
TRAPEZE SUPPORT (TYPICAL FOR 4)
3" STEEL PIPE
FOR SEISMIC SUPPORT (TYPICAL FOR 4)
SECURE TO BEAM
1/2" MINIMUM DIAMETER THREADED STEEL ROD. (TYPICAL FOR 4)
DRY TYPE TRANSFORMER
T
APPROVED CHAIN OR STEEL WIRE TO SECURE TRAPEZE SUPPORT FROM SEISMIC DEFLECTION (TYPICAL FOR 4)
TRANSFORMER SPRING TYPE ISOLATION SUPPORTS RATED FOR WEIGHT OF TRANSFORMER SECURED TO UNISTRUT (TYPICAL FOR 4)
UNISTRUT TRAPEZE SUPPORT STRUCTURE
ENCLOSE BOTTOM OF TRANSFORMER.

7 / E3.03 TRAPEZE MOUNTED TRANSFORMER DETAIL

SCALE: N.T.S.

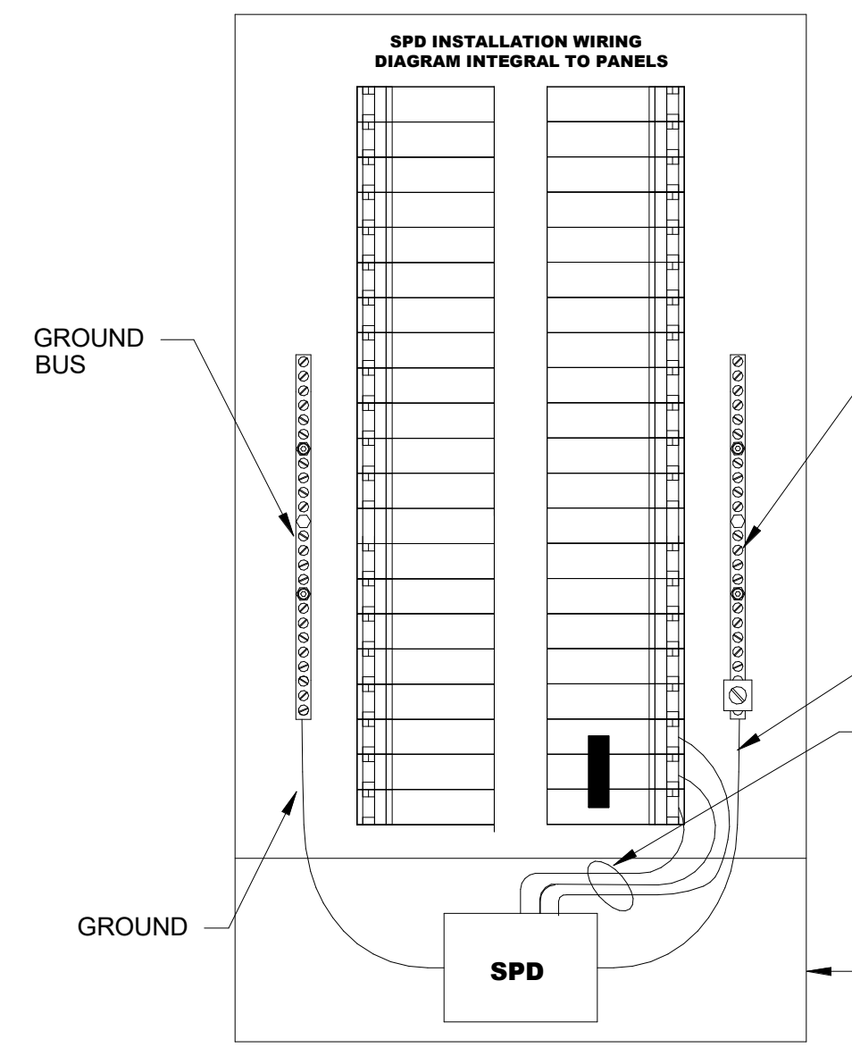
NOTE: CONFIRM WITH STRUCTURAL ENGINEER.



4#4&#8G,1 1/2"C
EP1B-95,97,99
60/3
LC
LOAD CENTER FURNISHED INTEGRAL TO GENERATOR FOR SUNDRY GENERATOR REQUIREMENTS. (BATTERY CHARGER, MOTORIZED DAMPERS, ETC.)
(3)#14 AWG + (1) TWISTED SHIELDED PAIR, 1"C
VESTIBULE
TO ATS-LS
TO ATS-OS
GENER. CONTROL PANEL
REMOTE ANN.
M/B
RUN 1"C TO MODBUS TO BACNET IP CONVERTER BY ATC CONTRACTOR. COORDINATE EXACT LOCATION w/ ATC CONTRACTOR. WIRING BY ATC CONTRACTOR
3#14 AWG, 1"C
MODBUS TO BACNET IP CONVERTER BY ATC CONTRACTOR
LOCATE AT EXTERIOR, ADJACENT TO FIRE DEPARTMENT KEY VAULTS. COMMON EPO SWITCHES SHALL SHUNT GEN-1. PROVIDE FLUSH MOUNTED KNOX "REMOTE POWER BOX" OR AHJ APPROVED EQUAL .

8 / E3.03 TYPICAL EMERGENCY GENERATOR CONTROL WIRING

SCALE: N.T.S. (NOTE: MAY VARY BY MANUFACTURER)

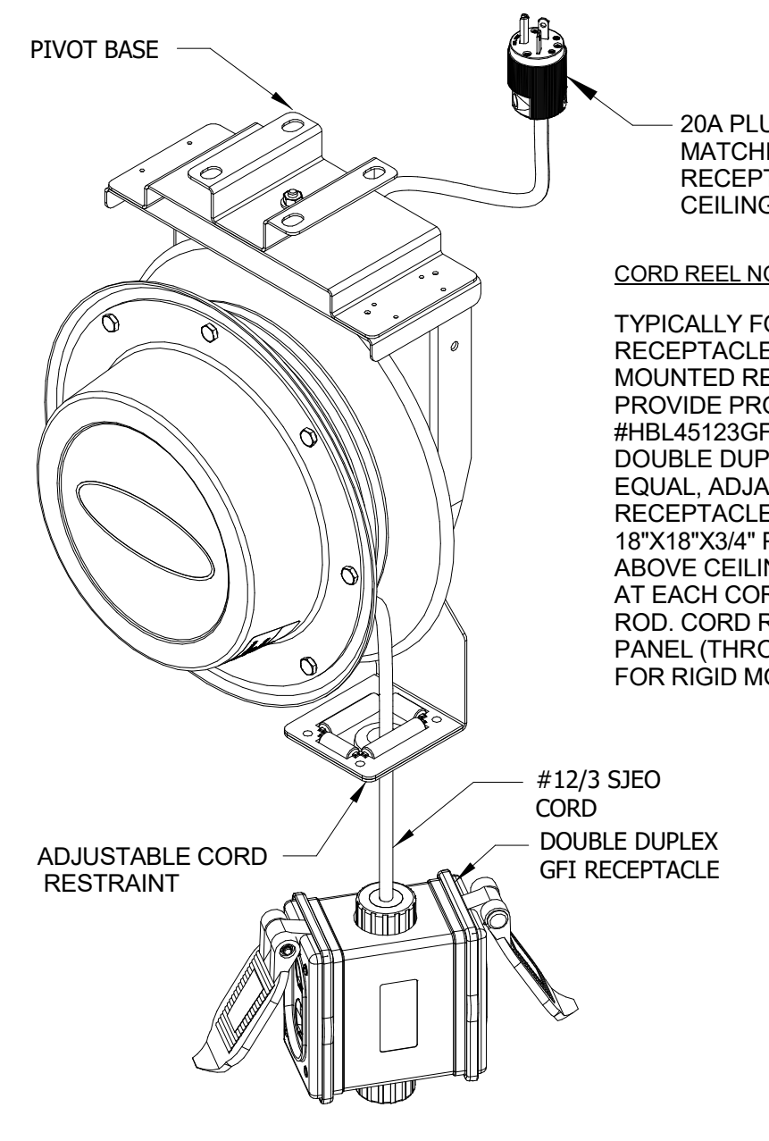


NOTES:

1. CONNECT SPD TO NEAREST 60A BREAKER IN PANEL.
2. LIMIT WIRE LENGTH TO 18" OR LESS, KEEP WIRE FREE OF ANY SHARP BENDS.
3. DIRECT CONNECTION TO PHASE BUS IS NOT PERMITTED.
4. EXTERNAL SPD IS ACCEPTABLE; PROVIDE WITH 60A/3P BREAKER. ALSO CONFIRM/COORDINATE MOUNTING SPACE FOR EXTERNAL SPD.
5. SPD FOR SWITCHBOARD(S) AND DISTRIBUTION PANEL(S) SHALL BE EXTERNAL ONLY.

9 / E3.03 SPD WIRING DIAGRAM

SCALE: N.T.S.



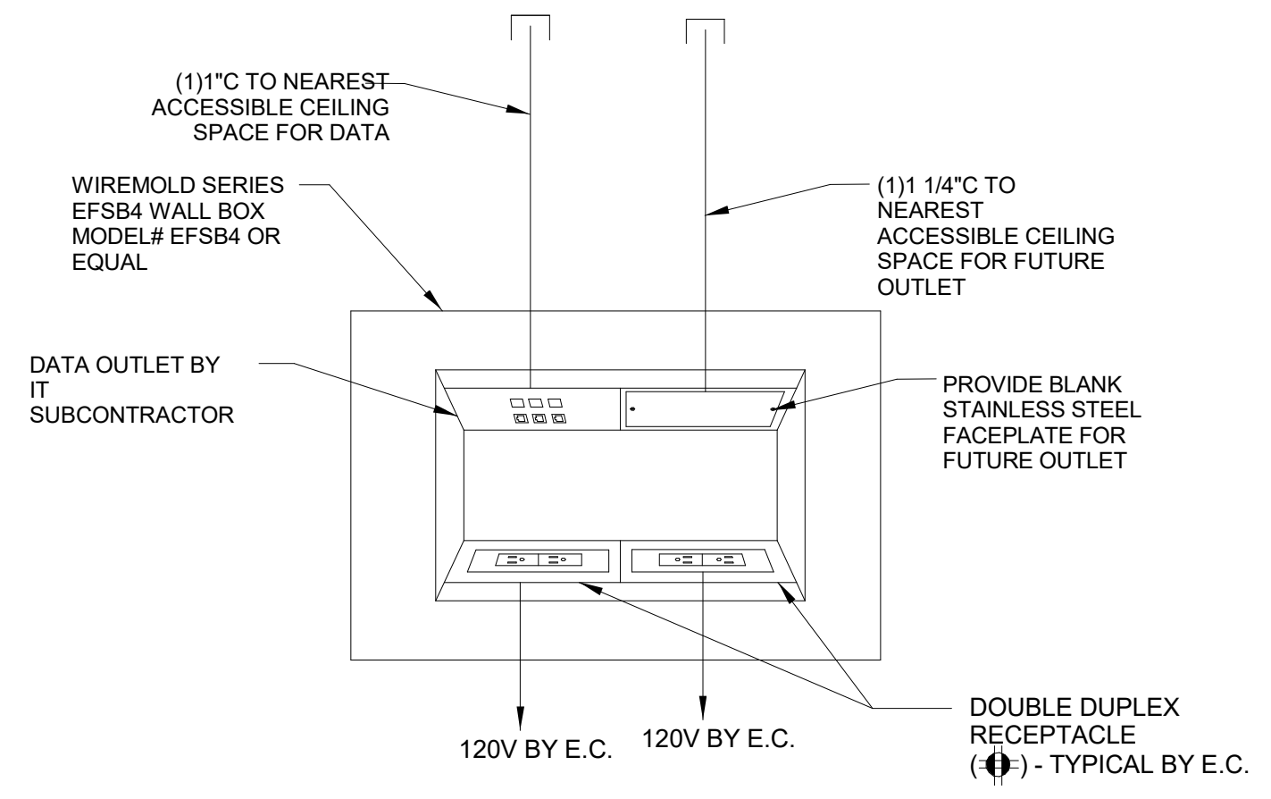
PIVOT BASE
20A PLUG. PROVIDE MATCHING RECEPTACLE AT CEILING LEVEL
#12/3 SJEO CORD
DOUBLE DUPLEX GFI RECEPTACLE
ADJUSTABLE CORD RESTRAINT

CORD REEL NOTE:

TYPICALLY FOR "CR" RECEPTACLES: INSTALL CEILING MOUNTED RECEPTACLE AND PROVIDE PROVIDE HUBBEL #HBL45123GF220WM1 SERIES DOUBLE DUPLEX CORD REEL, OR EQUAL, ADJACENT TO RECEPTACLE. PROVIDE 18"X18"X3/4" PLYWOOD PANEL ABOVE CEILING TILE SUPPORTED AT EACH CORNER WITH THREADED ROD. CORD REEL SHALL MOUNT TO PANEL (THROUGH CEILING TILE) FOR RIGID MOUNTING.

10 / E3.03 CORD REEL DETAIL

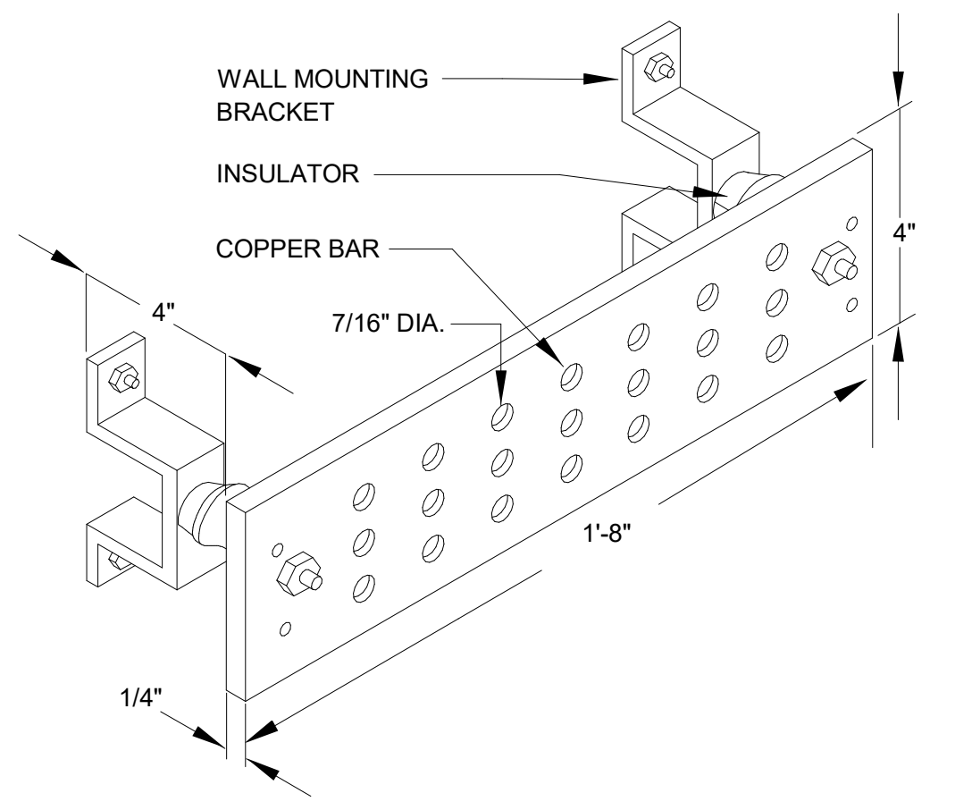
SCALE: N.T.S.



(1)1"C TO NEAREST ACCESSIBLE CEILING SPACE FOR DATA
WIREMOLD SERIES EFSB4 WALL BOX MODEL# EFSB4 OR EQUAL
(1)1 1/4"C TO NEAREST ACCESSIBLE CEILING SPACE FOR FUTURE OUTLET
DATA OUTLET BY IT SUBCONTRACTOR
PROVIDE BLANK STAINLESS STEEL FACEPLATE FOR FUTURE OUTLET
120V BY E.C.
120V BY E.C.
DOUBLE DUPLEX RECEPTACLE (⊕) - TYPICAL BY E.C.

11 / E3.03 TVE / TVC BOX AND CONDUIT PROVISION DETAIL

SCALE: N.T.S.



12 / E3.03 TYPICAL GROUND BAR DETAIL

SCALE: N.T.S.

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

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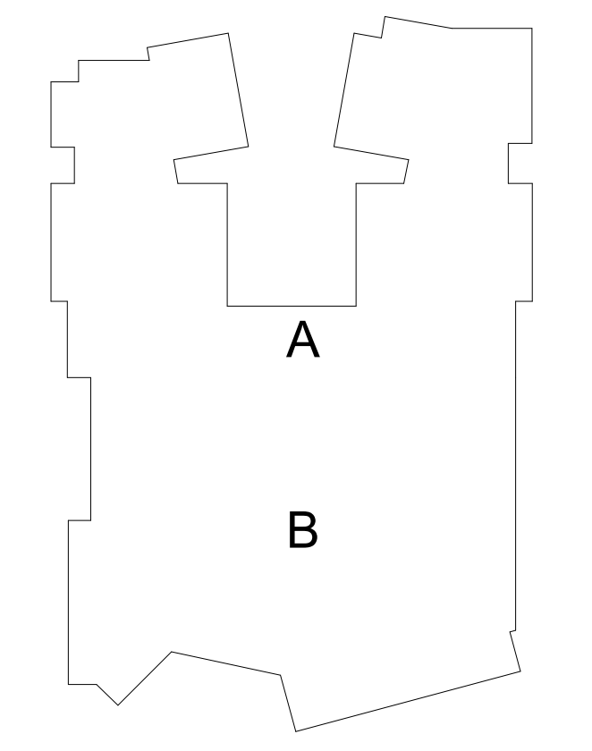
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:
ELECTRICAL DETAILS

SHEET NUMBER:
E3.03

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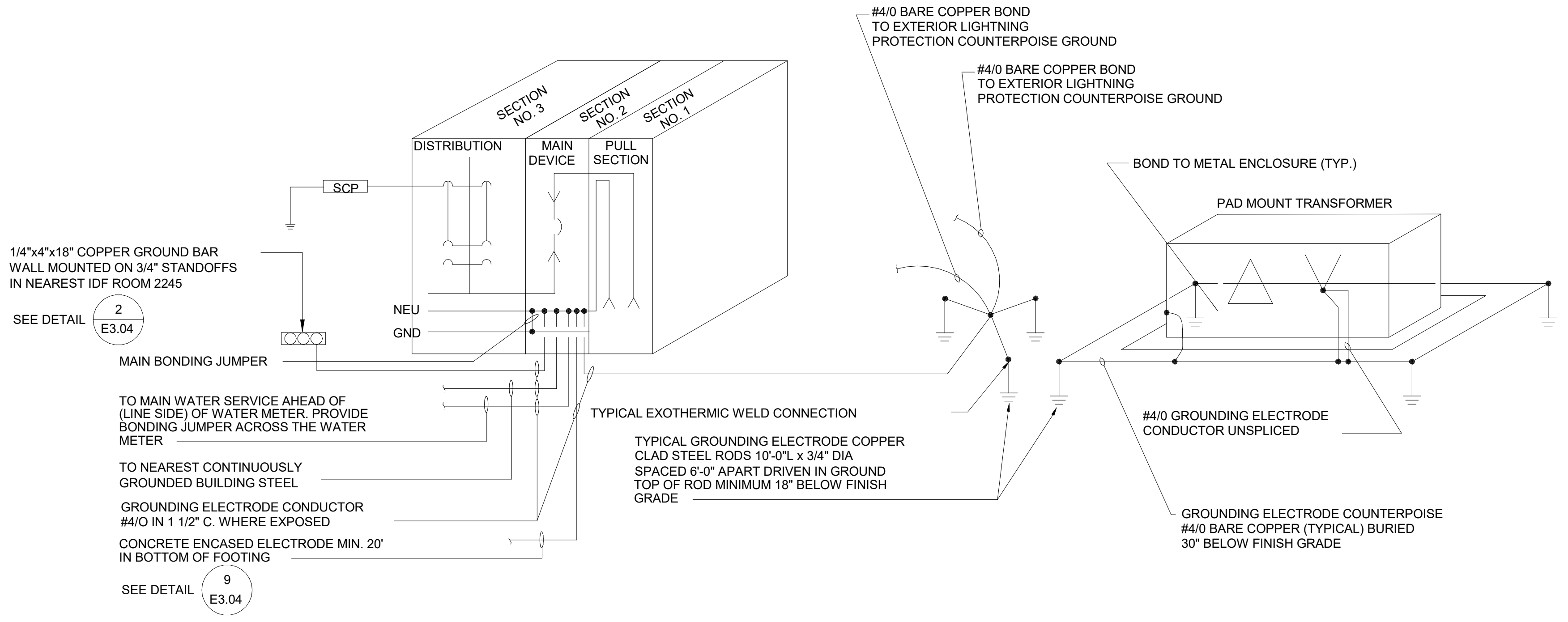
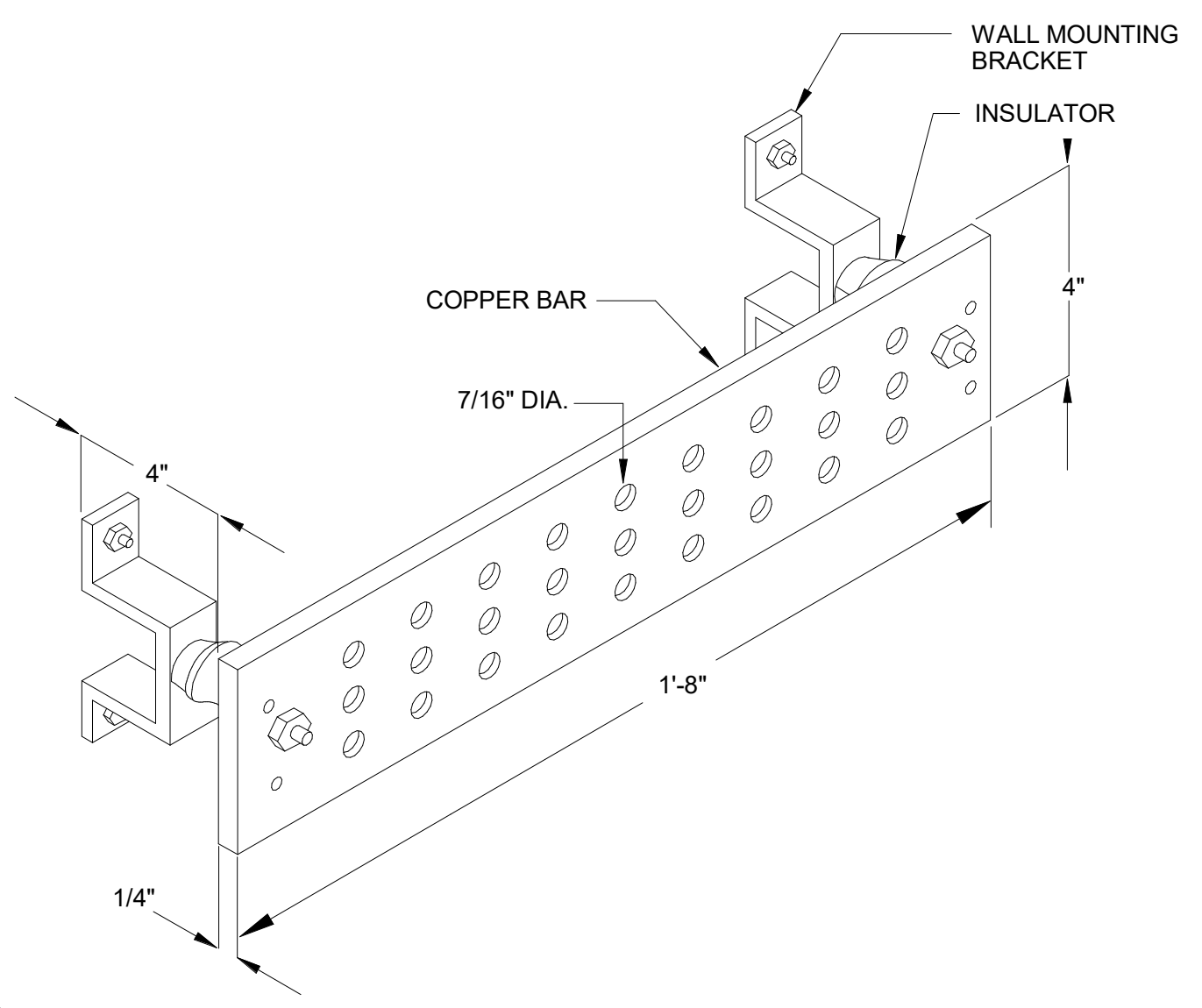

#4/0 BARE COPPER BOND TO EXTERIOR LIGHTNING PROTECTION COUNTERPOISE GROUND
#4/0 BARE COPPER BOND TO EXTERIOR LIGHTNING PROTECTION COUNTERPOISE GROUND
SECTION NO. 3
SECTION NO. 2
SECTION NO. 1
DISTRIBUTION
MAIN DEVICE
PULL SECTION
SCP
1/4"x4"x18" COPPER GROUND BAR WALL MOUNTED ON 3/4" STANDOFFS IN NEAREST IDF ROOM 2245
SEE DETAIL 2 E3.04
NEU
GND
MAIN BONDING JUMPER
TO MAIN WATER SERVICE AHEAD OF (LINE SIDE) OF WATER METER. PROVIDE BONDING JUMPER ACROSS THE WATER METER
TO NEAREST CONTINUOUSLY GROUNDED BUILDING STEEL
GROUNDING ELECTRODE CONDUCTOR #4/O IN 1 1/2" C. WHERE EXPOSED
CONCRETE ENCASED ELECTRODE MIN. 20' IN BOTTOM OF FOOTING
SEE DETAIL 9 E3.04
TYPICAL EXOTHERMIC WELD CONNECTION
TYPICAL GROUNDING ELECTRODE COPPER CLAD STEEL RODS 10'-0"L x 3/4" DIA SPACED 6'-0" APART DRIVEN IN GROUND TOP OF ROD MINIMUM 18" BELOW FINISH GRADE
BOND TO METAL ENCLOSURE (TYP.)
PAD MOUNT TRANSFORMER
#4/0 GROUNDING ELECTRODE CONDUCTOR UNSPLICED
GROUNDING ELECTRODE COUNTERPOISE #4/0 BARE COPPER (TYPICAL) BURIED 30" BELOW FINISH GRADE

1 / E3.04

MAIN SWITCHBOARD GROUNDING DETAIL (TYPICAL)

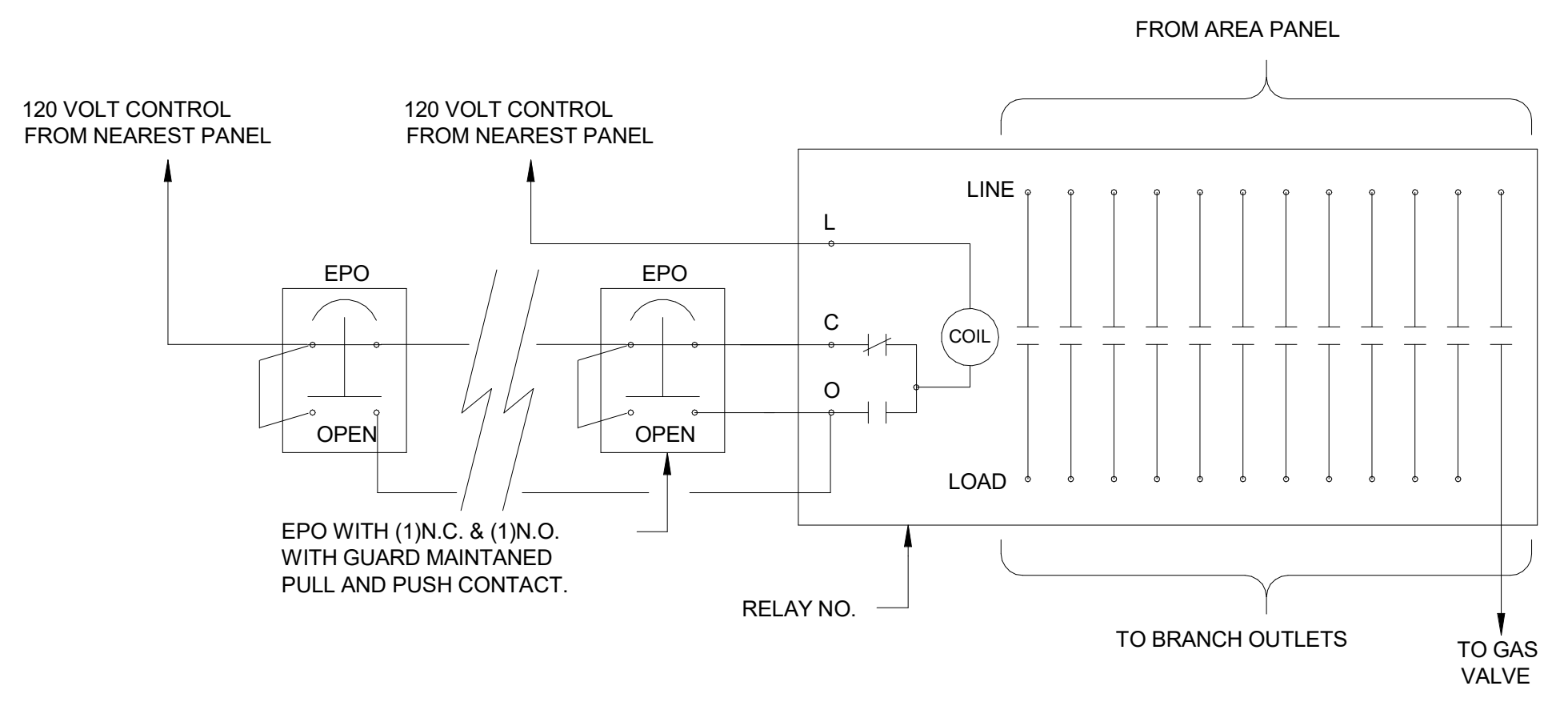
SCALE: N.T.S.



2 / E3.04

TELECOMMUNICATIONS GROUNDING BAR DETAIL

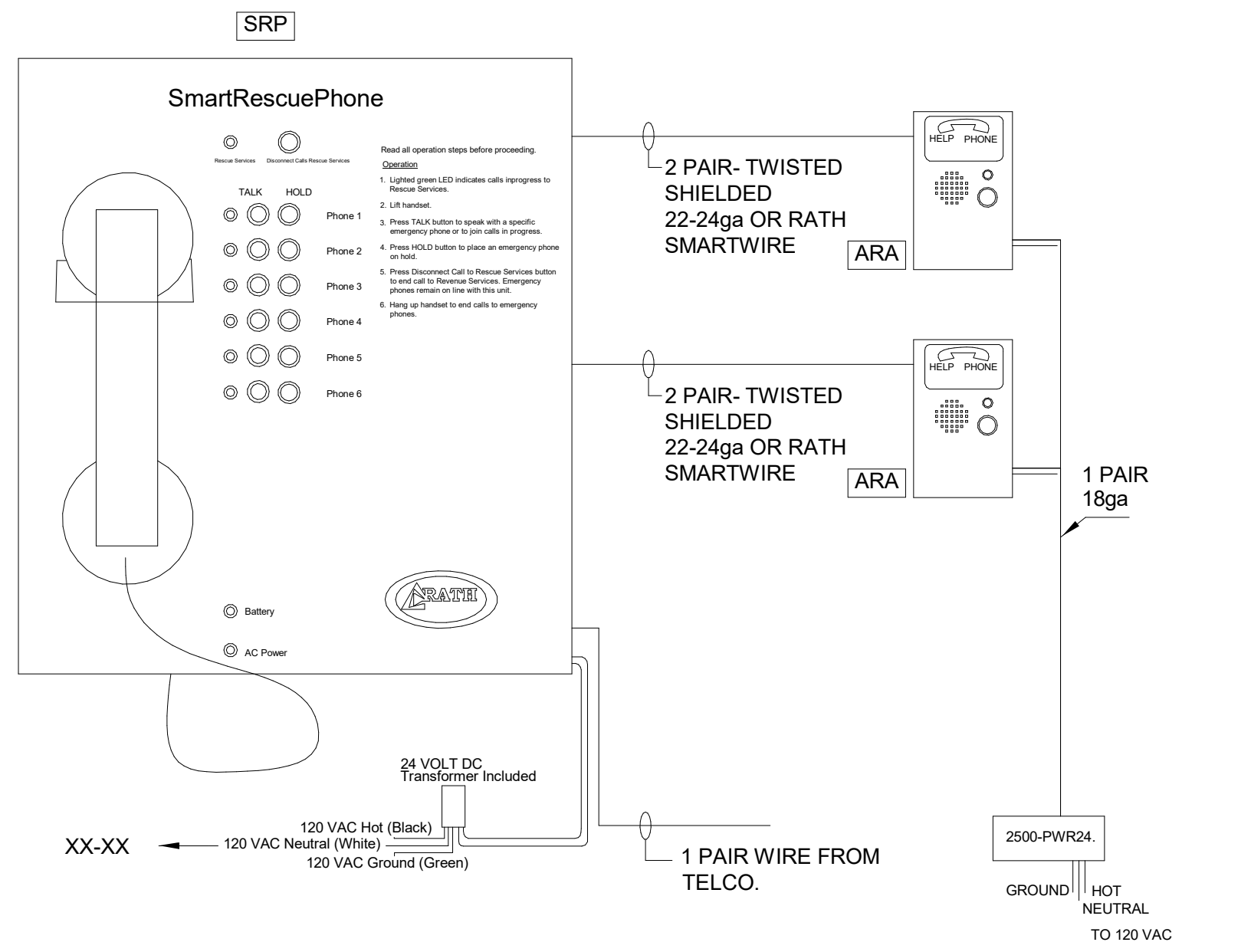
SCALE: N.T.S.


FROM AREA PANEL
120 VOLT CONTROL FROM NEAREST PANEL
120 VOLT CONTROL FROM NEAREST PANEL
EPO
EPO
OPEN
OPEN
LINE
L
C
O
COIL
LOAD
EPO WITH (1)N.C. & (1)N.O. WITH GUARD MAINTANED PULL AND PUSH CONTACT.
RELAY NO.
TO BRANCH OUTLETS
TO GAS VALVE

3 / E3.04

EPO SHUTDOWN DETAIL

SCALE: N.T.S.



Read all operation steps before proceeding.

Operation

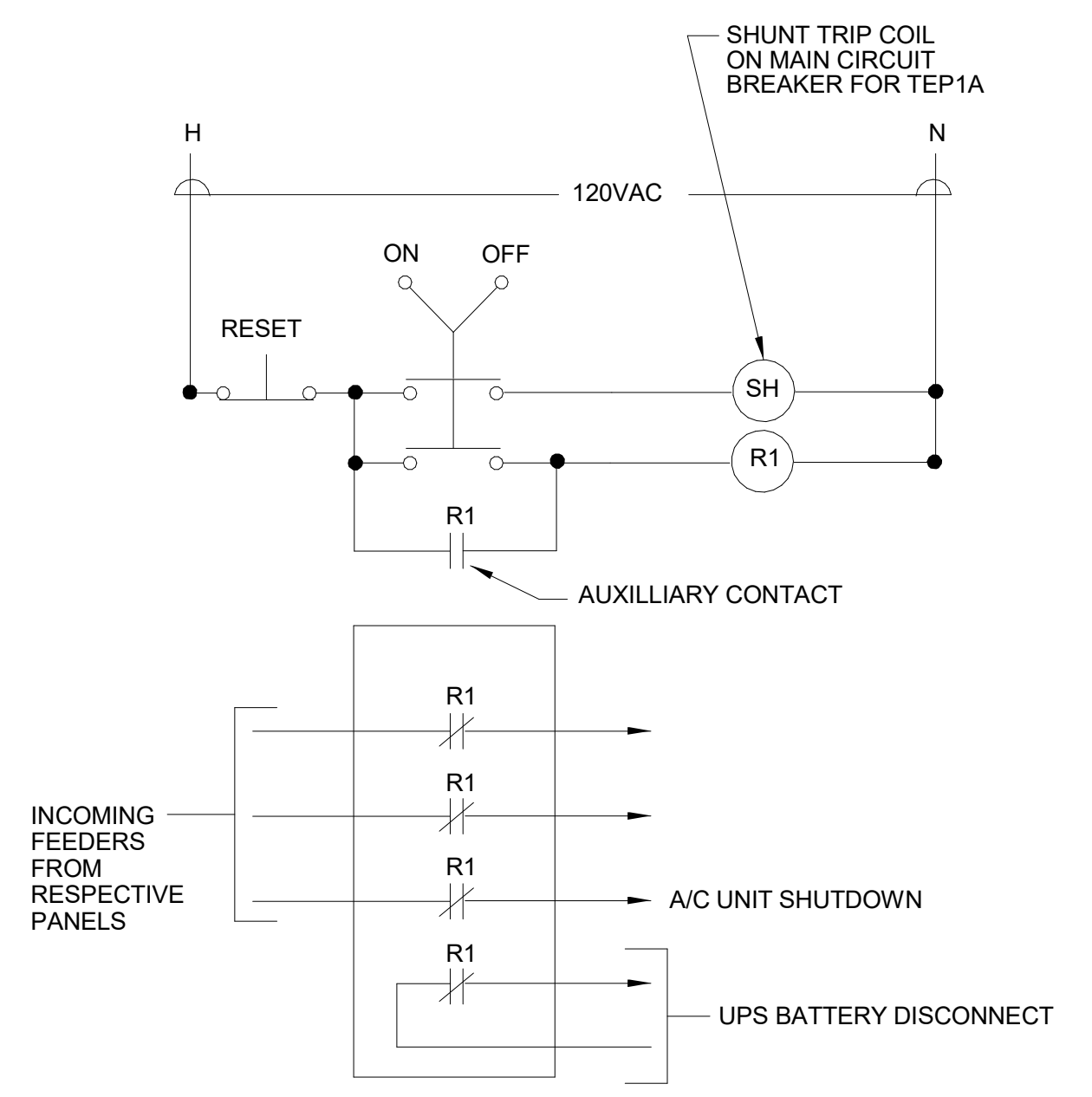
1. Lighted green LED indicates calls inprogress to Rescue Services.
2. Lift handset.
3. Press TALK button to speak with a specific emergency phone or to join calls in progress.
4. Press HOLD button to place an emergency phone on hold.
5. Press Disconnect Call to Rescue Services button to end call to Revenue Services. Emergency phones remain on line with this unit.
6. Hang up handset to end calls to emergency phones.

4 / E3.04

ELEVATOR TWO-WAY COMMUNICATIONS

SCALE: N.T.S.

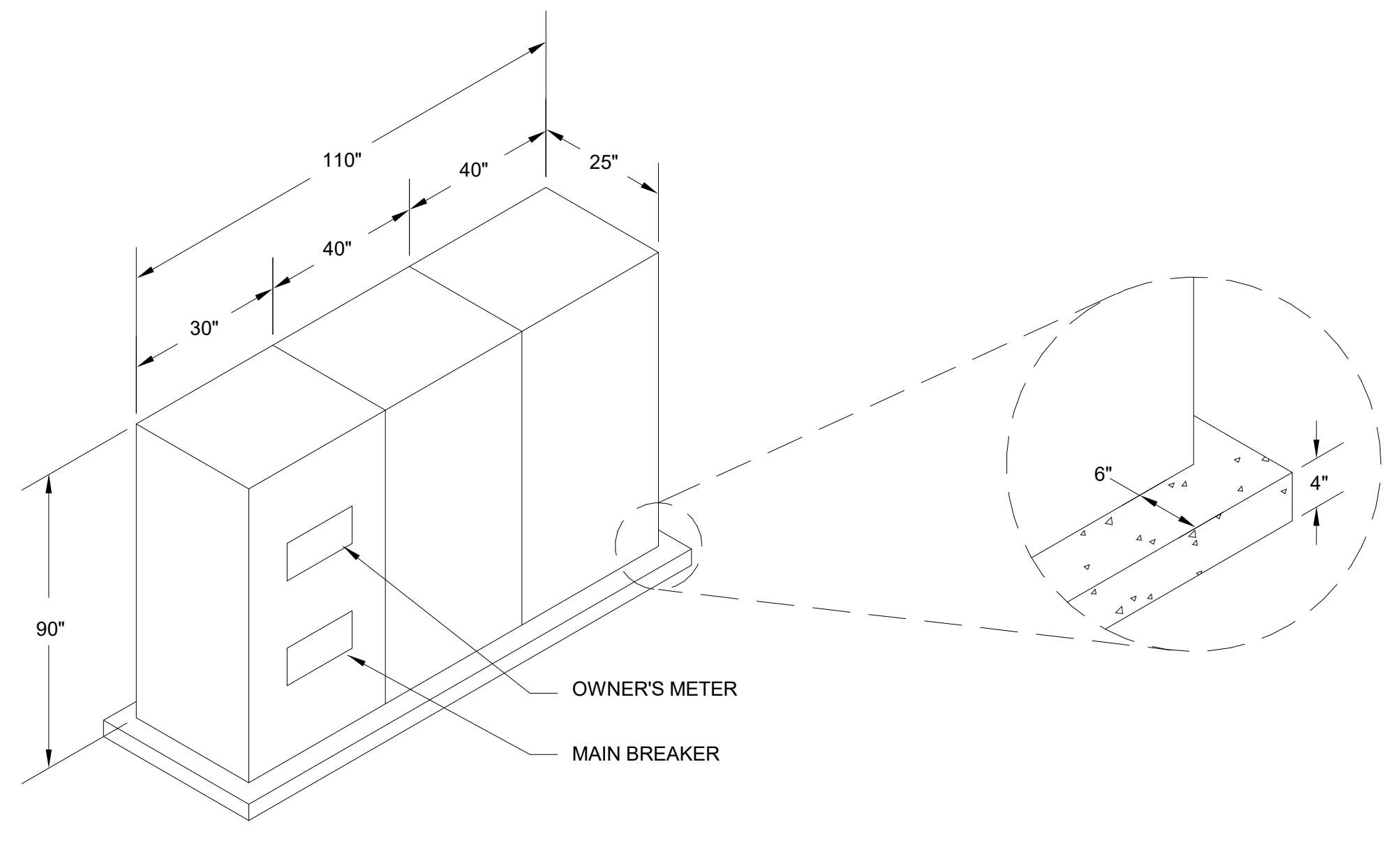
SRP	SMART RESCUE PHONE
ARA	AREA RESCUE ASSISTANCE BUTTON



5 / E3.04

NET/TEL ROOM 112.0 SHUT DOWN DETAIL

SCALE: N.T.S.

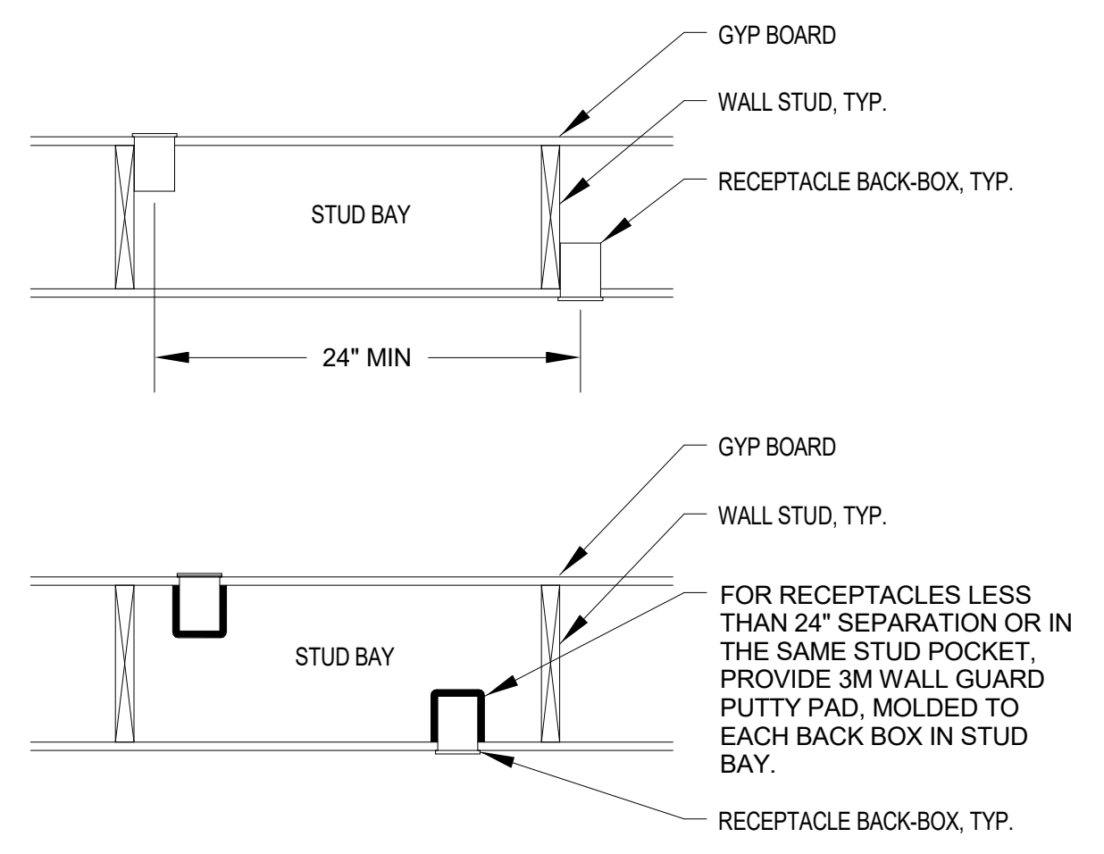


NOTE:
SWITCHBOARD DIMENSIONS ARE FOR DIAGRAMMATICAL PURPOSES. CONSULT APPROVED MANUFACTURER'S EQUIPMENT FOR ACTUAL DIMENSIONS.

6 / E3.04

MAIN SWITCHBOARD "MSB" ELEVATION DETAIL

SCALE: N.T.S.


GYP BOARD
WALL STUD, TYP.
RECEPTACLE BACK-BOX, TYP.
STUD BAY
24" MIN
GYP BOARD
WALL STUD, TYP.
STUD BAY
FOR RECEPTACLES LESS THAN 24" SEPARATION OR IN THE SAME STUD POCKET, PROVIDE 3M WALL GUARD PUTTY PAD, MOLDED TO EACH BACK BOX IN STUD BAY.
RECEPTACLE BACK-BOX, TYP.

NOTES:

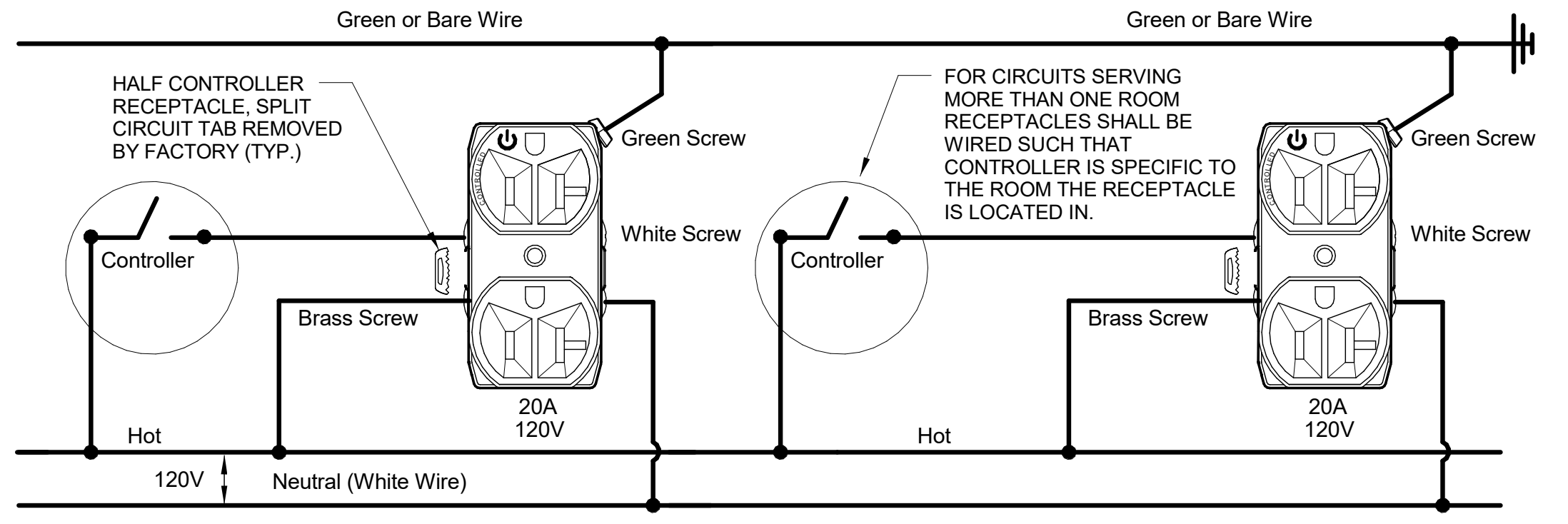
1. ALL BOXES ARE TO BE OFFSET HORIZONTALLY WHERE SPACES SHARE A STUD WALL IN WHICH OUTLETS ARE TO BE INSTALLED.

2. WHERE BACK BOXES EXCEED 100 SQUARE INCHES PER 100 SQUARE FEE OF WALL SURFACE FOR FIRE RATED WALLS, PROVIDE 3M WALL GUARD PUTTY, MOLDED TO BACK-BOX.

7 / E3.04

ELECTRICAL BACK-BOX INSTALLATION DETAIL

N.T.S.


Green or Bare Wire
Green or Bare Wire
HALF CONTROLLER RECEPTACLE, SPLIT CIRCUIT TAB REMOVED BY FACTORY (TYP.)
FOR CIRCUITS SERVING MORE THAN ONE ROOM RECEPTACLES SHALL BE WIRED SUCH THAT CONTROLLER IS SPECIFIC TO THE ROOM THE RECEPTACLE IS LOCATED IN.
Green Screw
Green Screw
White Screw
White Screw
Controller
Controller
Brass Screw
Brass Screw
20A 120V
20A 120V
Hot
Hot
120V
Neutral (White Wire)

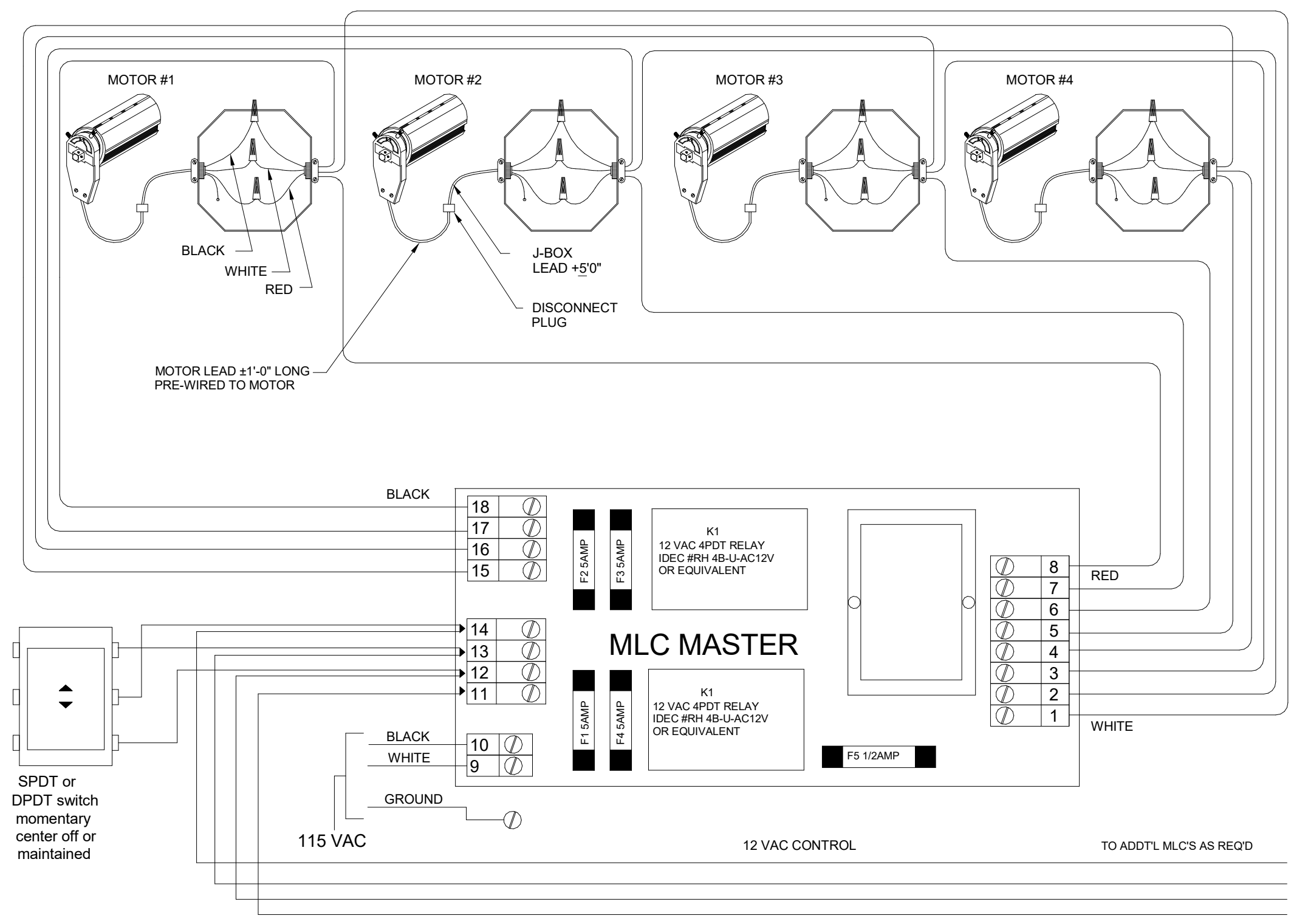
8 / E3.04

PLUG LOAD CONTROLLED RECEPTACLE DETAIL

SCALE: N.T.S.

NOTES:

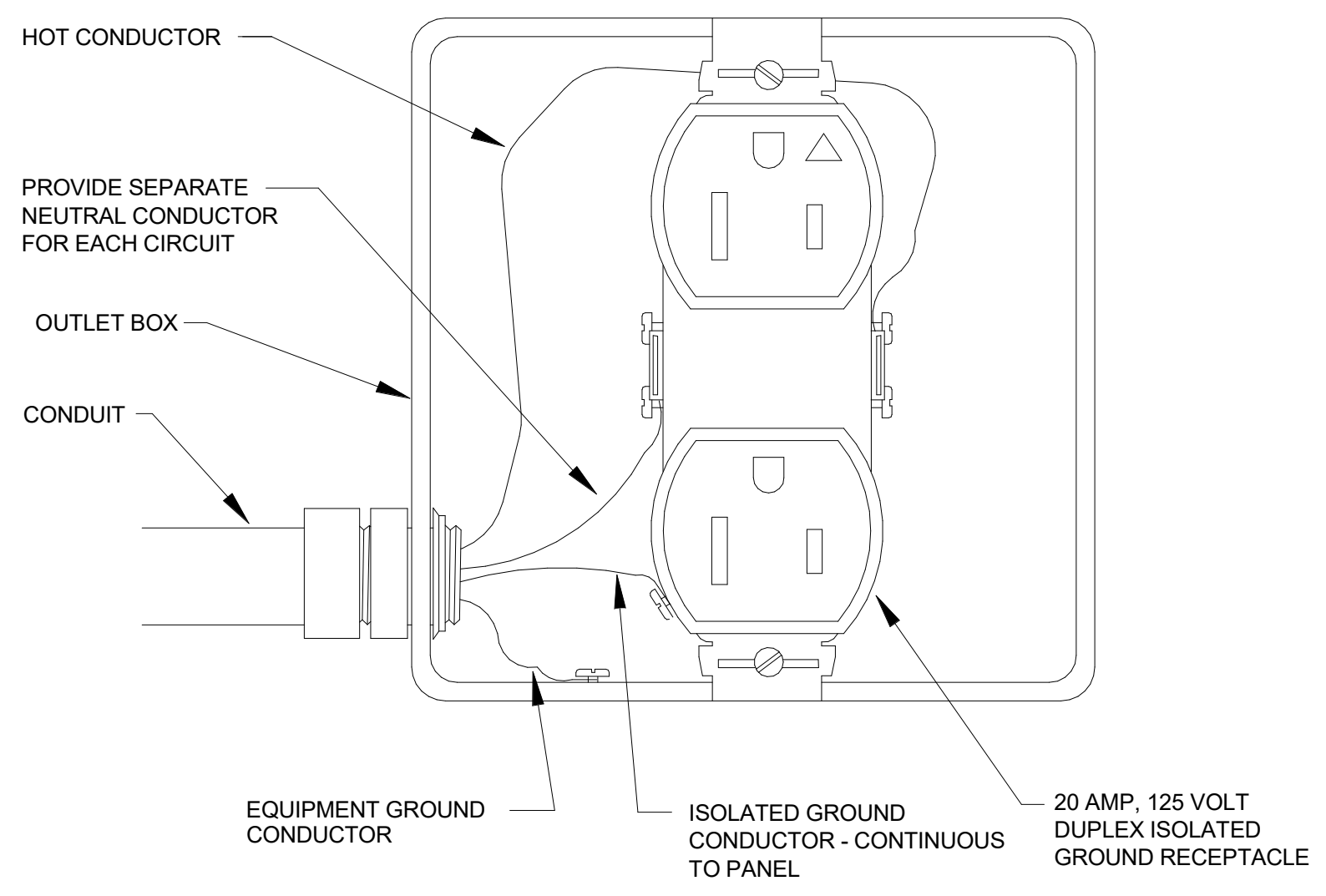
1. ALL GFI/GFC RECEPTACLES ARE NOT TO BE SPLIT TAB TYPE AND SHOULD BE FULLY CONTROLLED BY OCCUPANCY SENSOR.



9 / E3.04

MOTOR LOGIC CONTROLLER (MLC) WIRING DIAGRAM

SCALE: N.T.S.

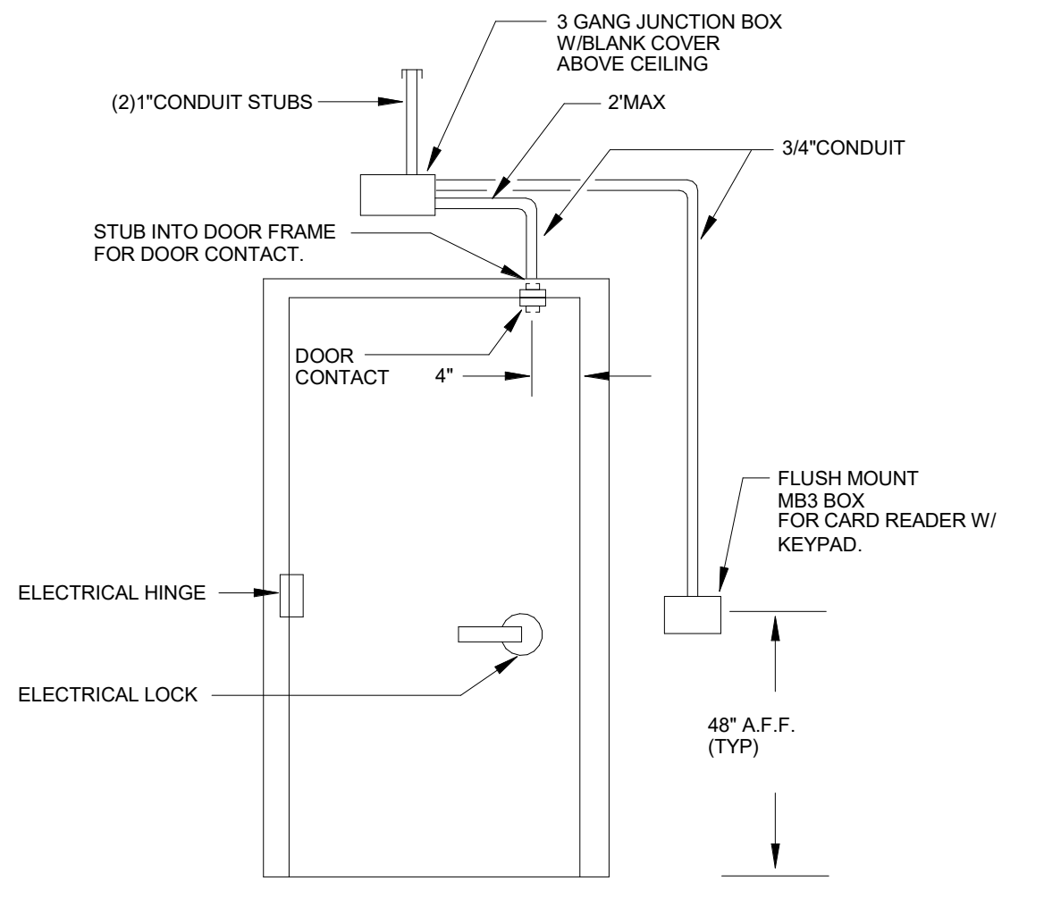

HOT CONDUCTOR
PROVIDE SEPARATE NEUTRAL CONDUCTOR FOR EACH CIRCUIT
OUTLET BOX
CONDUIT
EQUIPMENT GROUND CONDUCTOR
ISOLATED GROUND CONDUCTOR - CONTINUOUS TO PANEL
20 AMP, 125 VOLT DUPLEX ISOLATED GROUND RECEPTACLE

NOTE:
MAXIMUM OF (2) I.G. RECEPTACLES OR (1) QUADRUPLEX I.G. RECEPTACLES PER CIRCUIT

10 / E3.04

I.G. RECEPTACLE DETAIL

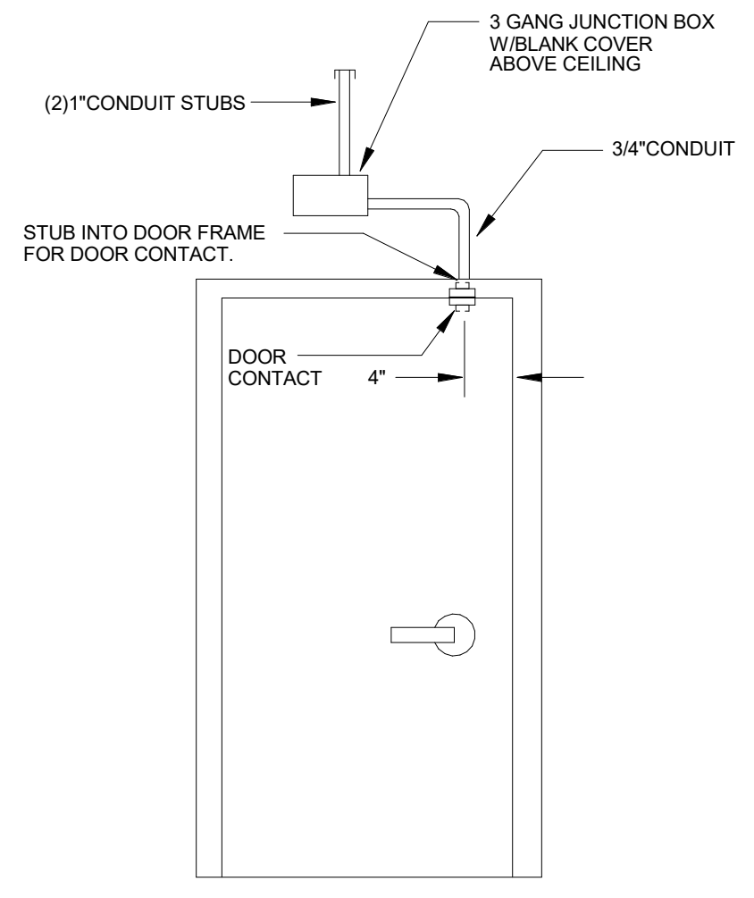
SCALE: N.T.S


3 GANG JUNCTION BOX W/BLANK COVER ABOVE CEILING
(2)1"CONDUIT STUBS
2'MAX
3/4"CONDUIT
STUB INTO DOOR FRAME FOR DOOR CONTACT.
DOOR CONTACT
4"
FLUSH MOUNT MB3 BOX FOR CARD READER W/ KEYPAD.
ELECTRICAL HINGE
ELECTRICAL LOCK
48" A.F.F. (TYP)

11 / E3.04

TYPICAL EXTERIOR DOOR W/ ACCESS CONTROL

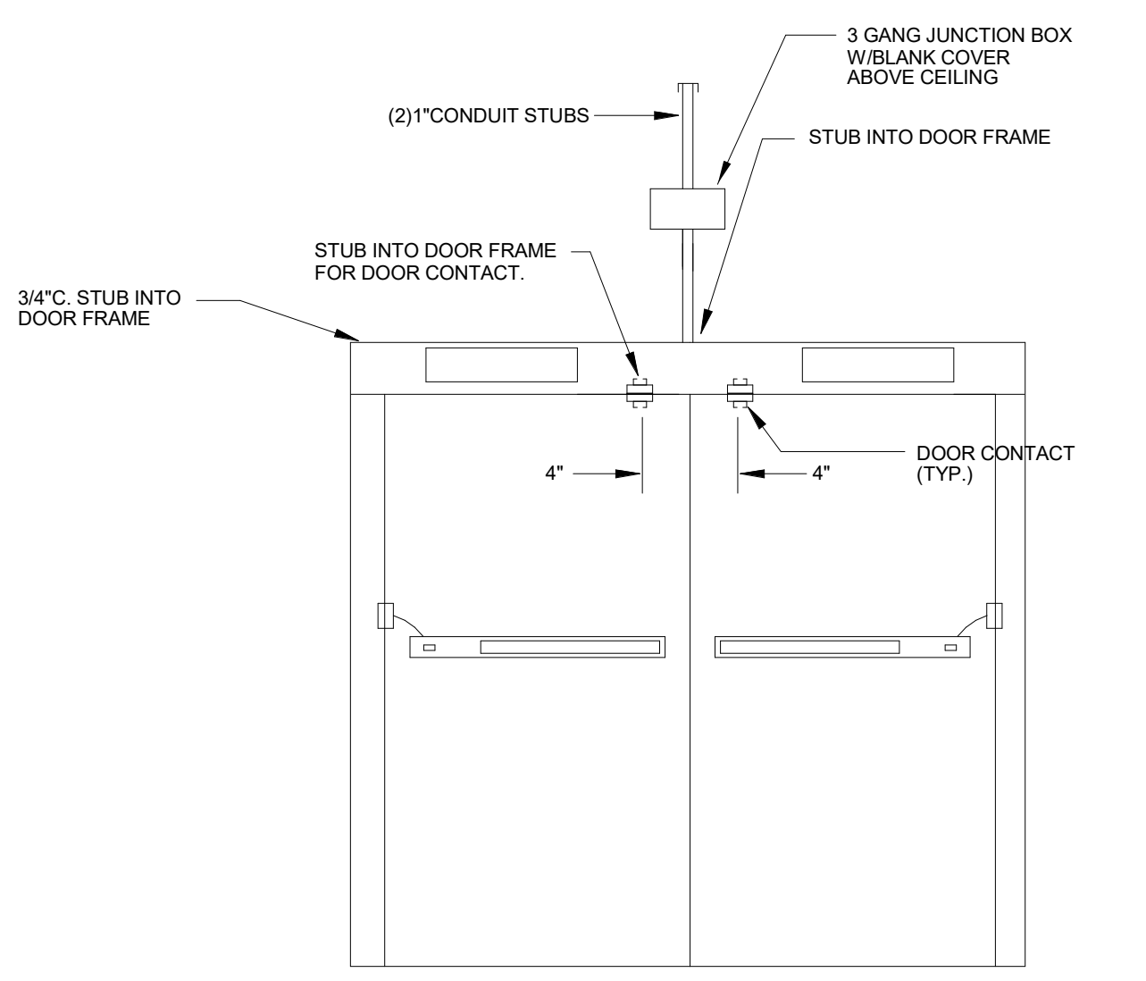
SCALE: N.T.S.


3 GANG JUNCTION BOX W/BLANK COVER ABOVE CEILING
(2)1"CONDUIT STUBS
3/4"CONDUIT
STUB INTO DOOR FRAME FOR DOOR CONTACT.
DOOR CONTACT
4"

12 / E3.04

TYPICAL DOOR WITHOUT ACCESS CONTROL

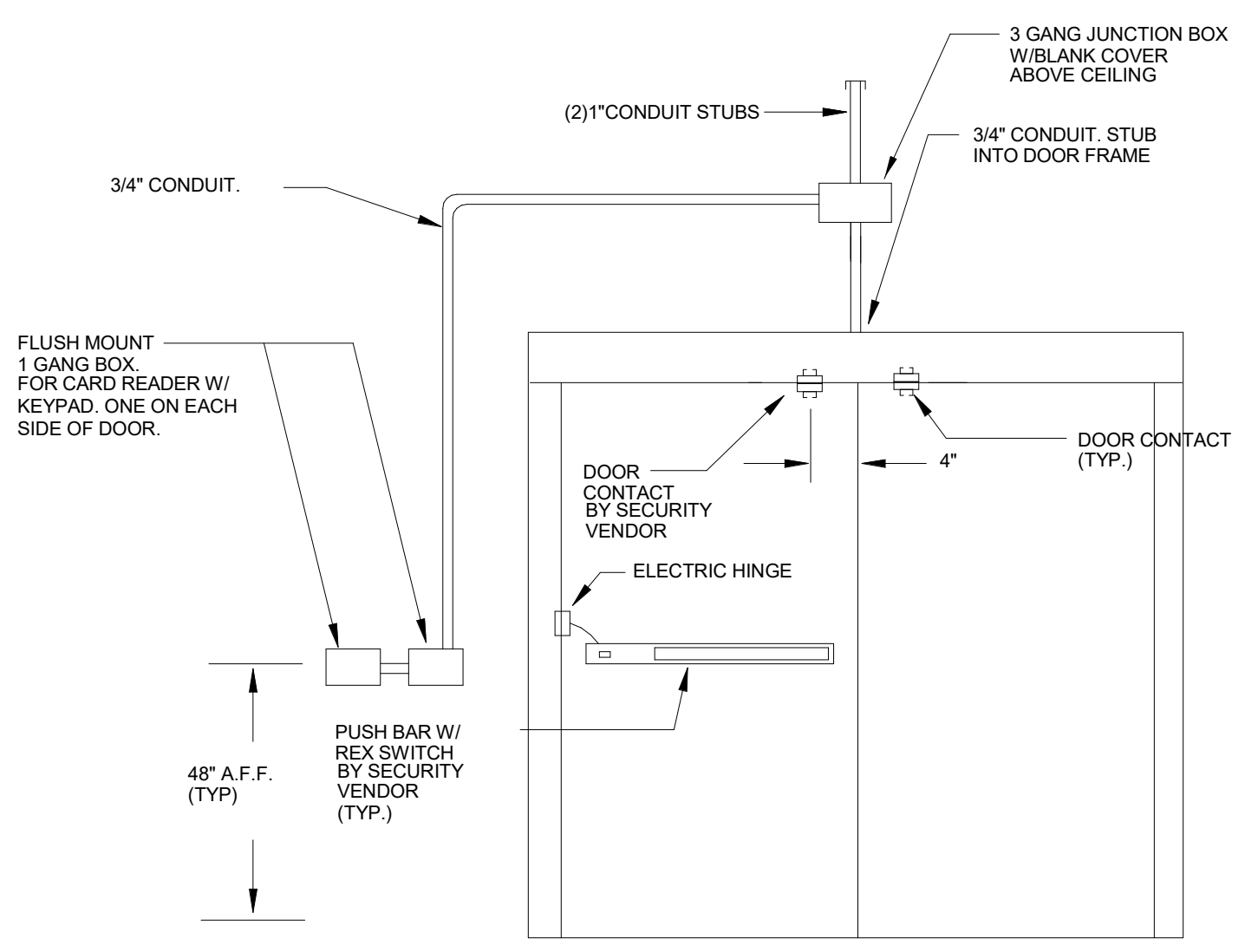
SCALE: N.T.S.


3 GANG JUNCTION BOX W/BLANK COVER ABOVE CEILING
(2)1"CONDUIT STUBS
STUB INTO DOOR FRAME
STUB INTO DOOR FRAME FOR DOOR CONTACT.
3/4"C. STUB INTO DOOR FRAME
4"
4"
DOOR CONTACT (TYP.)

13 / E3.04

TYPICAL EXTERIOR DOOR WITHOUT ACCESS CONTROL

SCALE: N.T.S.


3 GANG JUNCTION BOX W/BLANK COVER ABOVE CEILING
(2)1"CONDUIT STUBS
3/4" CONDUIT. STUB INTO DOOR FRAME
3/4" CONDUIT.
FLUSH MOUNT 1 GANG BOX. FOR CARD READER W/ KEYPAD. ONE ON EACH SIDE OF DOOR.
DOOR CONTACT BY SECURITY VENDOR
4"
DOOR CONTACT (TYP.)
ELECTRIC HINGE
PUSH BAR W/ REX SWITCH BY SECURITY VENDOR (TYP.)
48" A.F.F. (TYP)

14 / E3.04

TYPICAL EXTERIOR DOOR W/ ACCESS CONTROL

SCALE: N.T.S.

GENERAL NOTES

1. ALL BOX, CONDUIT AND 120V WIRING PROVISIONS FOR SECURITY SYSTEM SHALL BE PROVIDED BY SECTION 260000. REFER TO FLOOR PLANS FOR QUANTITIES AND LOCATIONS OF EQUIPMENT.

IESS SYMBOL LEGEND

NOTE

TYPICALLY ALL CONDUITS TO RUN TO AN ACCESSIBLE CEILING.

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DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

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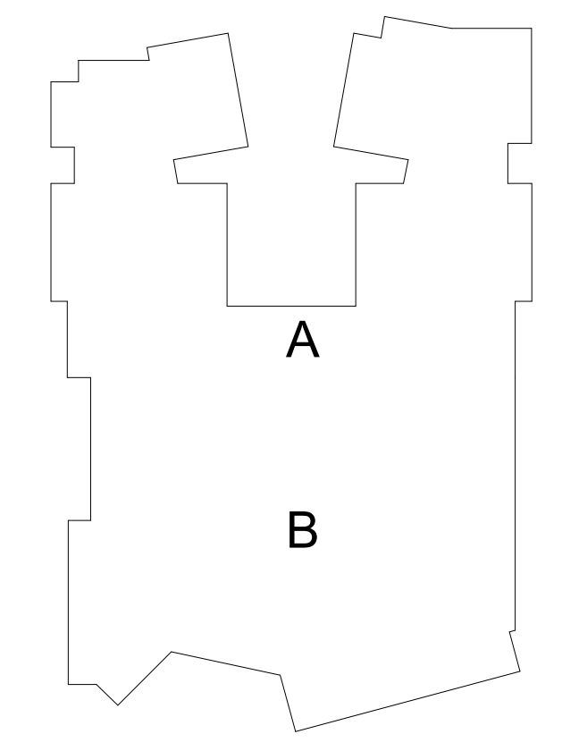
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:
ELECTRICAL DETAILS

SHEET NUMBER:
E3.04

ELECTRICAL SCHEDULE OF MECHANICAL EQUIPMENT ⑩⑪

UNIT NO.	DESCRIPTION	LOCATION	LOAD CHARACTERISTICS	VOLT	PH	PANEL CIRCUIT	CIRCUIT BREAKER	FEEDER	EQUIPMENT AND CONNCECTIONS										REMARKS	
									TS	⧄	☐	~	S D	CO D	WP	J	J S WP	VFD		
ASHP-1	AIR SOURCE HEAT PUMP	ROOF	588 MCA/600 MOCP	480	3	NEDP-3	600A/3P	SEE "NEDP" SCHEDULE	-	X	-	X	-	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO EP3B-	
		CONTROL PANEL	15 MOCP	120	1	EP3B-11	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
		-	15 MOCP	120	1	EP3B-12	20A/1P	2#12+#12G, 3/4"C	(8)X	-	-	(8)X	-	-	-	(8)X	-	-	MISC. INTERCONNECTION REQUIREMENTS	
ASHP-2	AIR SOURCE HEAT PUMP	ROOF	588 MCA/600 MOCP	480	3	MSB1-19	600A/3P	SEE "MSB2" SCHEDULE	-	X	-	X	-	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO MP3B-	
		CONTROL PANEL	15 MOCP	120	1	MP3B-19	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
		-	15 MOCP	120	1	MP3B-20	20A/1P	2#12+#12G, 3/4"C	(8)X	-	-	(8)X	-	-	-	(8)X	-	-	MISC. INTERCONNECTION REQUIREMENTS	
EB-1	ELECTRIC BOILER	ROOF	723 FLA/904 MCA	480	3	MSB1-17	1000A/3P	SEE "MSB1" SCHEDULE	-	X	-	X	-	-	-	X	-	-	-	⑨
CP-1	CONDENSATE PUMP	-	14 W	120	1	-	20A/1P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	TYPICAL FOR ALL DCUs. REFER TO DETAIL 1/E3.05	③
DCUc-1	CONDENSER	ROOF	18.8 MCA/20 MOCP	208	1	EP1B-7,9	20A/2P	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP1B-	
DCUe-1	EVAPORATER	151 MAIN ELEC	1 MCA	208	1	EP1B-8,10	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-1. CONNECT CP-1 TO EP1B-	①②③
DCUc-2	CONDENSER	ROOF	18.8 MCA/20 MOCP	208	1	EP1B-11,13	20A/2P	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP1B-	
DCUe-2	EVAPORATER	151 MAIN ELEC	1 MCA	208	1	EP1B-12,14	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-2. CONNECT CP-1 TO EP1B-	①②③
DCUc-3A	CONDENSER	ROOF	34.6 MCA/35 MOCP	208	1	EP1B-15,17	40A/2P	3#8+#10G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP1B-	
DCUe-3A	EVAPORATER	149 MDF	1 MCA	208	1	EP1B-16,18	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-3A. CONNECT CP-1 TO EP1B-	①②③
DCUc-3B	CONDENSER	ROOF	34.6 MCA/35 MOCP	208	1	EP1B-19,21	40A/2P	3#8+#10G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TOEP1B-	
DCUe-3B	EVAPORATER	149 MDF	1 MCA	208	1	EP1B-20,22	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-3B. CONNECT CP-1 TO EP1B-	①②③
DCUc-4	CONDENSER	ROOF	12.3 MCA/15 MOCP	208	1	EP2B-3,5	20A/2P	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP2B-	
DCUe-4	EVAPORATER	249 ELEC	1 MCA	208	1	EP2B-4,6	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-4. CONNECT CP-1 TO EP2B-	①②③
DCUc-5	CONDENSER	ROOF	12.3 MCA/15 MOCP	208	1	EP2A-3,5	20A/2P	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP2A-	
DCUe-5	EVAPORATER	221 ELEC	1 MCA	208	1	EP2A-4,6	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-5. CONNECT CP-1 TO EP2A-	①②③
DCUc-6	CONDENSER	ROOF	12.3 MCA/15 MOCP	208	1	EP2B2-11,13	20A/2P	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP2B2-	
DCUe-6	EVAPORATER	255 ELEC	1 MCA	208	1	EP2B2-12,14	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-6. CONNECT CP-1 TO EP2B2-	①②③
DCUc-7	CONDENSER	ROOF	12.3 MCA/15 MOCP	208	1	EP3B-3,5	20A/2P	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP3B-	
DCUe-7	EVAPORATER	332 ELEC	1 MCA	208	1	EP3B-4,6	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-7. CONNECT CP-1 TO EP3B-	①②③
DCUc-8	CONDENSER	ROOF	18.8 MCA/20 MOCP	208	1	EP1B-23,25	20A/2P	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP1B-	
DCUe-8	EVAPORATER	126 ELEV. MACHINE RM	1 MCA	208	1	EP1B-24,26	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-8. CONNECT CP-1 TO EP1B-	①②③
DCUc-9	CONDENSER	ROOF	12.3 MCA/15 MOCP	208	1	EP3A-3,5	20A/2P	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP3A-	
DCUe-9	EVAPORATER	304 ELEC	1 MCA	208	1	EP3A-4,6	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-9. CONNECT CP-1 TO EP3A-	①②③
DCUc-10	CONDENSER	ROOF	12.3 MCA/15 MOCP	208	1	EP1A-3,5	20A/2P	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP1A-	
DCUe-10	EVAPORATER	117 ELEC	1 MCA	208	1	EP1A-4,6	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-10. CONNECT CP-1 TO EP1A-	①②③
DCUc-11	CONDENSER	ROOF	34.6 MCA/35 MOCP	208	1	EP2A-7,9	40A/2P	3#8+#10G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP2A-	
DCUe-11	EVAPORATER	203 IDF	1 MCA	208	1	EP2A-8,10	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-11. CONNECT CP-1 TO EP2A-	①②③
DCUc-12	CONDENSER	ROOF	34.6 MCA/35 MOCP	208	1	EP2B-7,9	40A/2P	3#8+#10G,3/4"C	-	X	-	X	-	-	-	X	-	-	CONNECT WP RECEPTACLE TO EP2B-	
DCUe-12	EVAPORATER	229 IDF	1 MCA	208	1	EP2B-8,10	20A/2P	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	PROVIDE 2#12+1#12G-3/4"C TO DCUc-12. CONNECT CP-1 TO EP2B-	①②③
EF-1	EXHAUST FAN	ROOF	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
EF-2	EXHAUST FAN	ROOF	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
EF-3	EXHAUST FAN	ROOF	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
EF-4	EXHAUST FAN	116A STORAGE	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
BF-5	EXHAUST FAN	CUST. LAUNDRY	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
BF-6	EXHAUST FAN	KITCHEN LAUNDRY	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
KEF-1	KITCHEN EXHAUST FAN	ROOF	-	-	-	-	-	3#12+#12G,3/4"C	-	X	-	X	-	-	-	X	-	-	-	⑧
FCU-1-1	FAN COIL UNIT	ROOF	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
FCU-1-2	FAN COIL UNIT	ROOF	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
FCU-1-3	FAN COIL UNIT	ROOF	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
FCU-1-4	FAN COIL UNIT	ROOF	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
FCU-1-5	FAN COIL UNIT	ROOF	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
FCU-1-6	FAN COIL UNIT	ROOF	-	-	-	-	-	2#12+#12G,3/4"C	X	-	-	X	-	-	-	X	-	-	-	
GF-1	GLYCOL MAKE UP	247 MECH PUMP RM	.7 A	120	1	MP2B-1	20A/1P	2#12+#12G,3/4"C	-	-	-	-	-	-	X	-	-	-	-	
GF-2	GLYCOL MAKE UP	247 MECH PUMP RM	.7 A	120	1	MP2B-1	-	2#12+#12G,3/4"C	-	-	-	-	-	-	X	-	-	-	-	
GF-3	GLYCOL MAKE UP	-	.7 A	120	1	MP2B-	-	2#12+#12G,3/4"C	-	-	-	-	-	-	X	-	-	-	-	
GF-4	GLYCOL MAKE UP	-	.7 A	120	1	MP2B-	-	2#12+#12G,3/4"C	-	-	-	-	-	-	X	-	-	-	-	
MAU-1	MAKE UP AIR UNIT	KITCHEN	9.2 MCA/15 MOCP	480	3	MHP2B-1,2,3	20A/3P	4#12+#12G, 3/4"C	-	X	-	X	X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO MP2B-	
		-	15 MOCP	120	1	MP2B-2	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
P-1	WATER PUMP	247 MECH PUMP RM	7.5 HP	480	3	EHP3B-1,3,5	20A/3P	3#12+#12G, 3/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-2	WATER PUMP	247 MECH PUMP RM	7.5 HP	480	3	EHP3B-2,4,6	20A/3P	3#12+#12G, 3/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-3	WATER PUMP	247 MECH PUMP RM	7.5 HP	480	3	EHP3B-7,9,11	20A/3P	3#12+#12G, 3/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-4	WATER PUMP	247 MECH PUMP RM	10 HP	480	3	MHP2B-2,4,6	30A/3P	3#10+#10G, 3/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-5	WATER PUMP	247 MECH PUMP RM	10 HP	480	3	MHP2B-7,9,11	30A/3P	3#10+#10G, 3/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-6	WATER PUMP	247 MECH PUMP RM	10 HP	480	3	MHP2B-8,10,12	30A/3P	3#10+#10G, 3/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-7	WATER PUMP	247 MECH PUMP RM	20 HP	480	3	EHP3B-8,10,12	60A/3P	3#4+#10G, 1 1/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-8	WATER PUMP	247 MECH PUMP RM	20 HP	480	3	EHP3B-13,15,17	60A/3P	3#4+#10G, 1 1/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-9	WATER PUMP	247 MECH PUMP RM	20 HP	480	3	MHP2B-13,15,17	60A/3P	3#4+#10G, 1 1/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-10	WATER PUMP	247 MECH PUMP RM	20 HP	480	3	MHP2B-14,16,18	60A/3P	3#4+#10G, 1 1/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-11	WATER PUMP	247 MECH PUMP RM	20 HP	480	3	MHP2B-19,21,23	60A/3P	3#4+#10G, 1 1/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-12	WATER PUMP	247 MECH PUMP RM	10 HP	480	3	MHP2B-20,22,24	30A/3P	3#10+#10G, 3/4"C	-	X	-	X	-	-	-	X	-	X	-	
P-13	WATER PUMP	247 MECH PUMP RM	10 HP	480	3	MHP2B-25,27,29	30A/3P	3#10+#10G, 3/4"C	-	X	-	X	-	-	-	X	-	X	-	
BP-1	WATER PUMP	247 MECH PUMP RM	3 HP	480	3	MHP2B-26,28,30	20A/3P	3#12+#12G, 3/4"C	-	X	-	X	-	-	-	X	-	X	-	
RTU-1	ROOF TOP UNIT	ROOF	69.4 MCA/80 MOCP	480	3	MHP3A-1,3,5	100A/3P	3#1+#8G, 1 1/2"C	-	X	-	X	(3)X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO MP3A-	④⑤⑥
		-	15 MOCP	120	1	MP3A-1	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
RTU-2	ROOF TOP UNIT	ROOF	69.4 MCA/80 MOCP	480	3	MHP3B-1,3,5	100A/3P	3#1+#8G, 1 1/2"C	-	X	-	X	(3)X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO MP3B-	④⑤⑥
		-	15 MOCP	120	1	MP3B-1	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
RTU-3	ROOF TOP UNIT	ROOF	45.2 MCA/50 MOCP	480	3	MHP3B-2,4,6	60A/3P	3#4+#10G, 1"C	-	X	-	X	(2)X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO MP3B-	④⑤⑥
		-	15 MOCP	120	1	MP3B-2	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
RTU-4	ROOF TOP UNIT	ROOF	50.8 MCA/60 MOCP	480	3	EHP3B-14,16,18	60A/3P	3#4+#10G, 1"C	-	X	-	X	(2)X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO EP2B-	④⑤⑥
		-	15 MOCP	120	1	EP2B-11	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
RTU-5	ROOF TOP UNIT	ROOF	31.5 MCA/45 MOCP	480	3	EHP3B-20,22,24	60A/3P	3#4+#10G, 1"C	-	X	-	X	(2)X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO EP2B-	④⑤⑥
		-	15 MOCP	120	1	EP2B-12	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
RTU-6	ROOF TOP UNIT	ROOF	9.1 MCA/15 MOCP	480	3	MHP2B-31,33,35	20A/3P	3#12+#12G, 3/4"C	-	X	-	X	(2)X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO MP2B-	④⑤⑥
		-	15 MOCP	120	1	MP2B-3	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
RTU-7	ROOF TOP UNIT	ROOF	10.0 MCA/15 MOCP	480	3	MHP2B-32,34,36	20A/3P	3#12+#12G, 3/4"C	-	X	-	X	(2)X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO MP2B-	④⑤⑥
		-	15 MOCP	120	1	MP2B-4	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
RTU-8	ROOF TOP UNIT	ROOF	13.1 MCA/15 MOCP	480	3	MHP2B2-1,3,5	20A/3P	3#12+#12G, 3/4"C	-	X	-	X	(2)X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO MP2B2-	④⑤⑥
		-	15 MOCP	120	1	MP2B2-1	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
RTU-9	ROOF TOP UNIT	ROOF	- MCA/- MOCP	480	3	EHP3B-19,21,23	20A/3P	3#12+#12G, 3/4"C	-	X	-	X	(2)X	-	-	X	X	-	CONNECT FIXTURE TYPE "J" LGT & REC. TO EP2B2-	④⑤⑥
		-	15 MOCP	120	1	EP2B2-15	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	INTERIOR LIGHTS & RECEPTACLES	
UH-01	UNIT HEATER	152 WATER ENTRY	1/4 HP	120	1	MP1B-8	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
UH-02	UNIT HEATER	155A RECYCLING RM	1/4 HP	120	1	MP1B-9	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
UH-03	UNIT HEATER	155 RECEIVING	1/4 HP	120	1	MP1B-10	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
UH-04	UNIT HEATER	247 MECH PUMP RM	1/4 HP	120	1	MP2B-5	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
UH-05	UNIT HEATER	247 MECH PUMP RM	1/4 HP	120	1	MP2B-6	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-01	UNIT HEATER	S3-1 STAIR 3	1/4 HP	120	1	MP2A3-1	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-02	UNIT HEATER	S4-1 STAIR 4	1/4 HP	120	1	MP1B-11	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-03	UNIT HEATER	124 VESTIBULE	1/4 HP	120	1	MP1A-5	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-04	UNIT HEATER	ST2-1 STAIR 2	1/4 HP	120	1	MP1A-6	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-05	UNIT HEATER	101 VESTIBULE	1/4 HP	120	1	MP1A-7	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-06	UNIT HEATER	S1-1 STAIR 1	1/4 HP	120	1	MP2A2-1	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-07	UNIT HEATER	167 VESTIBULE	1/4 HP	120	1	MP1B-12	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-08	UNIT HEATER	172 VESTIBULE	1/4 HP	120	1	MP2B2-2	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-09	UNIT HEATER	172 VESTIBULE	1/4 HP	120	1	MP2B2-4	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-10	UNIT HEATER	S3-3 STAIR 3	1/4 HP	120	1	MP2A3-2	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-11	UNIT HEATER	S4-3 STAIR 4	1/4 HP	120	1	MP3B-3	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-12	UNIT HEATER	S2-3 STAIR 2	1/4 HP	120	1	MP3A-2	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-13	UNIT HEATER	S1-3 STAIR 1	1/4 HP	120	1	MP2A2-2	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	
CUH-14	UNIT HEATER	S4-4 STAIR 4	1/4 HP	120	1	MP3B-4	20A/1P	2#12+#12G, 3/4"C	X	-	-	X	-	-	-	X	-	-	-	

ELECTRICAL SCHEDULE OF MECHANICAL EQUIPMENT ⑩⑪

UNIT NO.	DESCRIPTION	LOCATION	LOAD CHARACTERISTICS	VOLT	PH	PANEL CIRCUIT	CIRCUIT BREAKER	FEEDER	EQUIPMENT AND CONNCECTIONS										REMARKS	
									TS	⧄	☐	~	S D	CO D	WP	J	J S WP	VFD		
VAV-1-1 THRU VAV-1-10	VARIABLE AIR VOLUME BOX	-	-	120	1	EP1A-7	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-1	⑦
VAV-1-11 THRU VAV-1-20	VARIABLE AIR VOLUME BOX	-	-	120	1	EP1A-8	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-1	⑦
VAV-1-21 THRU VAV-1-30	VARIABLE AIR VOLUME BOX	-	-	120	1	EP1A-9	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-1	⑦
VAV-1-31 THRU VAV-1-40	VARIABLE AIR VOLUME BOX	-	-	120	1	EP3A-7	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-1	⑦
VAV-1-41 THRU VAV-1-49	VARIABLE AIR VOLUME BOX	-	-	120	1	EP3A-8	20A/1P	2#12+#12G, 3/4"C	(9)X	-	-	(9)X	-	-	-	(9)X	-	-	SERVING RTU-1	⑦
VAV-2-1 THRU VAV-2-10	VARIABLE AIR VOLUME BOX	-	-	120	1	EP1B-27	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-2	⑦
VAV-2-11 THRU VAV-2-20	VARIABLE AIR VOLUME BOX	-	-	120	1	EP1B-28	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-2	⑦
VAV-2-21 THRU VAV-2-30	VARIABLE AIR VOLUME BOX	-	-	120	1	EP2B-13	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-2	⑦
VAV-2-31 THRU VAV-2-40	VARIABLE AIR VOLUME BOX	-	-	120	1	EP2B-14	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-2	⑦
VAV-2-41 THRU VAV-2-50	VARIABLE AIR VOLUME BOX	-	-	120	1	EP3B-7	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-2	⑦
VAV-2-51 THRU VAV-2-57	VARIABLE AIR VOLUME BOX	-	-	120	1	EP3B-8	20A/1P	2#12+#12G, 3/4"C	(7)X	-	-	(7)X	-	-	-	(7)X	-	-	SERVING RTU-2	⑦
VAV-3-1 THRU VAV-3-10	VARIABLE AIR VOLUME BOX	-	-	120	1	EP1A-10	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-3	⑦
VAV-3-11 THRU VAV-3-20	VARIABLE AIR VOLUME BOX	-	-	120	1	EP2A-11	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-3	⑦
VAV-3-21 THRU VAV-3-30	VARIABLE AIR VOLUME BOX	-	-	120	1	EP3A-9	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-3	⑦
VAV-3-31 THRU VAV-3-40	VARIABLE AIR VOLUME BOX	-	-	120	1	EP3B-9	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-3	⑦
VAV-5-1 THRU VAV-5-3	VARIABLE AIR VOLUME BOX	-	-	120	1	EP2B2-16	20A/1P	2#12+#12G, 3/4"C	(3)X	-	-	(3)X	-	-	-	(3)X	-	-	SERVING RTU-5	⑦
VAV-7-1 THRU VAV-7-5	VARIABLE AIR VOLUME BOX	-	-	120	1	EP1B-29	20A/1P	2#12+#12G, 3/4"C	(5)X	-	-	(5)X	-	-	-	(5)X	-	-	SERVING RTU-7	⑦
VAV-8-1 THRU VAV-8-10	VARIABLE AIR VOLUME BOX	-	-	120	1	EP2B2-17	20A/1P	2#12+#12G, 3/4"C	(10)X	-	-	(10)X	-	-	-	(10)X	-	-	SERVING RTU-8	⑦
VAV-8-11 THRU VAV-8-16	VARIABLE AIR VOLUME BOX	-	-	120	1	EP2B2-18	20A/1P	2#12+#12G, 3/4"C	(6)X	-	-	(6)X	-	-	-	(6)X	-	-	SERVING RTU-8	⑦
VAV-9-1 THRU VAV-9-4	VARIABLE AIR VOLUME BOX	-	-	120	1	EP2B2-19	20A/1P	2#12+#12G, 3/4"C	(4)X	-	-	(4)X	-	-	-	(4)X	-	-	SERVING RTU-9	⑦

MECHANICAL SCHEDULE GENERAL NOTES:

1. DUCT SMOKE DETECTORS SHALL BE PROVIDED ON RETURN DUCT FOR ALL MECHANICAL UNITS OVER 2000CFM. PROVIDE DUCT SMOKE ON RETURN AND SUPPLY DUCTWORK FOR ALL MECHANICAL UNITS OVER 15000 CFM. PROVIDE REMOTE TEST STATION WITH EACH DETECTOR. LOCATION OF TEST STATION SHALL BE ADJACENT TO THE FACP. DUCT SMOKES TO INITIATE ALARM.
2. PROVIDE FLEXIBLE CONNECTION TO EQUIPMENT REFER TO SPECIFICATIONS.
3. CONTROLLERS AND DISCONNECT DEVICES SHALL BE NRTL RATED FOR USE WITH A DESIGN E MOTOR WITH A HORSE POWER RATING NOT LESS THAN 1.4 TIMES THE MOTOR HORSE POWER. (REFER TO ELECTRICAL CODE ARTICLE 430).
4. TWO SPEED MOTORS SHALL HAVE TWO MOTOR BRANCH CIRCUITS AND SIX POLE DISCONNECTS.
5. WHERE INDICATED PROVIDE WEATHERPROOF DUPLEX RECEPTACLES AT MECHANICAL EQUIPMENT. PROVIDE 3/4"C. WITH 2#12+#12G AWG TO NEAREST PANEL AND CONNECT TO 20A/1P CIRCUIT BREAKER UNLESS OTHERWISE INDICATED.
6. TYPICALLY LOCATE STARTERS OR VFD'S IN ELECTRIC ROOM (NEAR PANEL).
7. ALL EXTERIOR MOUNTED DISCONNECT SWITCHES, JUNCTION/PULL BOXES, RACEWAYS, FLEXIBLE CONNECTION TO EQUIPMENT, ETC. SHALL BE NEMA "3R."
8. THE E.C. SHALL PROVIDE NEMA 7 DISCONNECT SWITCHES AND SEAL FITTINGS AT EXPLOSION PROOF FANS.
9. WHERE INDICATED PROVIDE 120 VOLT CIRCUIT FOR RECEPTACLE AND LIGHT FIXTURE TYPE "J" AT ROOF TOP UNIT AS NOTED. TYPICALLY CONNECT TO NEAREST 120 VOLT RECEPTACLE CIRCUIT UNLESS OTHERWISE INDICATED.
10. ALL VFD'S SHALL BE PROVIDED WITH CONNECTIONS TO BACNET DATA COMMUNICATION PROTOCOL FOR BUILDING AUTOMATION AND CONTROL NETWORK. COORDINATE WITH ATC CONTRACTOR.

MECHANICAL SCHEDULE KEY NOTES: ⊝

① PROVIDE 3/4"CONDUIT w/ PULL WIRE BETWEEN INDOOR UNIT & OUTDOOR UNIT FOR EACH SPLIT SYSTEM.

② PROVIDE HARD CONNECTION FOR CONDENSATE PUMP (CP-1). CONNECT TO NEAREST 120V, 1□ BRANCH CIRCUIT UNLESS OTHERWISE INDICATED. PROVIDE THERMAL SWITCH AT UNIT. FIELD COORDINATE EXACT LOCATION WITH HVAC.

SEE DETAIL 1/E3.05

③ REFER TO MECHANICAL DRAWINGS FOR EXACT LOCATION OF CONDENSATE PUMPS CP-1.

④ E.C. SHALL F&I UNI-STRUT, FOR MOUNTING OF DISCONNECT SWITCH, ATTACHED TO ROOF STRUCTURE INDEPENDENT OF HVAC ROOF-TOP EQUIPMENT TO PREVENT EXCESSIVE WEAR DUE TO VIBRATIONS. LOCATE ADJACENT TO ROOFTOP UNIT BEING SERVED.

SEE DETAIL 2/E3.05

⑤ VFD FURNISHED INTEGRAL WITH UNIT BY HVAC EQUIPMENT SUPPLIER. SINGLE POINT CONNECTION BY E.C.

⑥ REFER TO MECHANICAL DRAWINGS FOR EXACT LOCATION OF DUCT TYPE SMOKE DETECTORS.

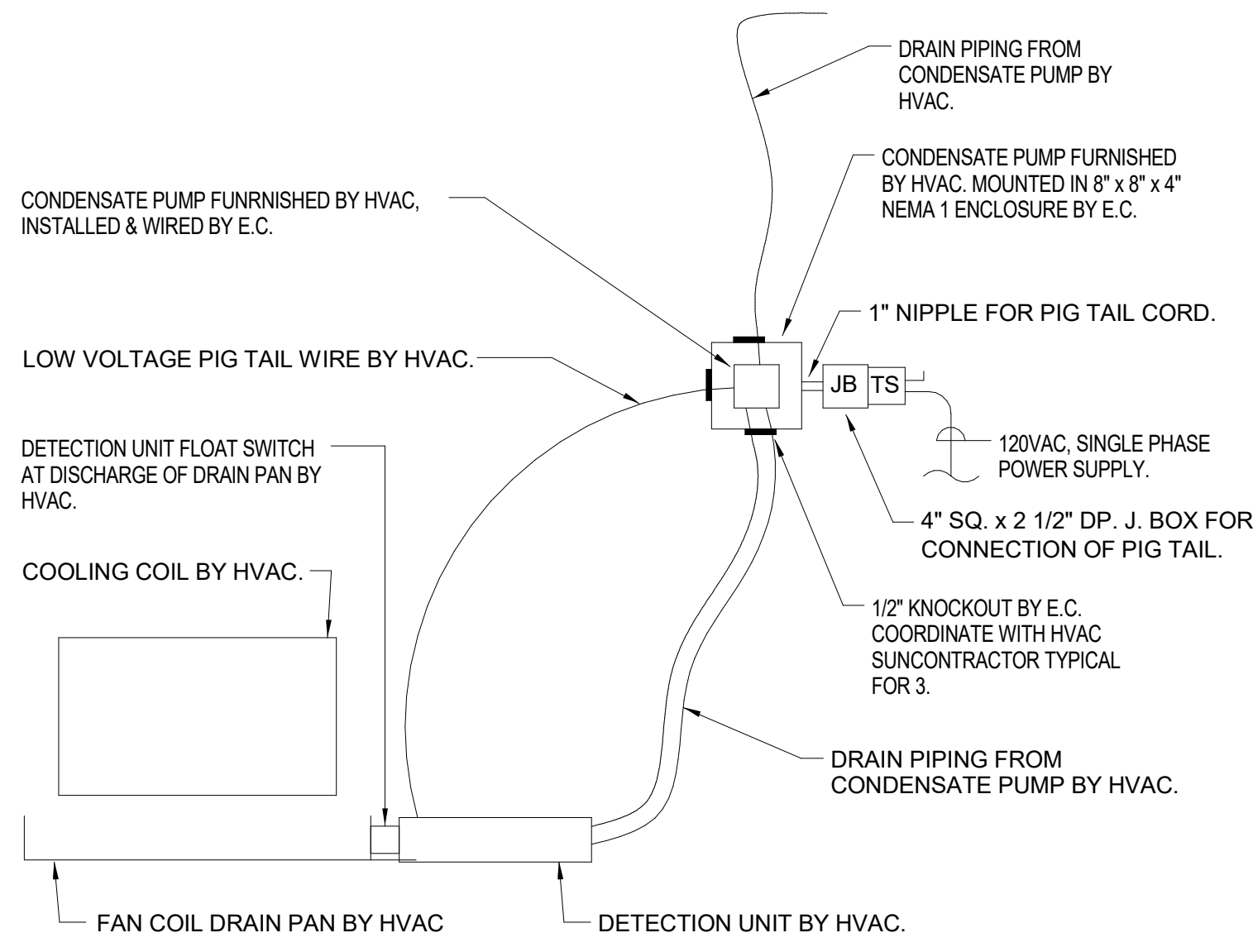
⑦ FINAL VAV BOX CONNECTION BY ATC CONTRACTOR. ALSO REFER TO MECHANICAL DRAWINGS FOR UNIT EXACT LOCATIONS AND QUANTITIES. COORDINATE WITH HVAC CONTRACTOR FOR EXACT LOCATION OF JUNCTION BOXES.

⑧ VFD FURNISHED WITH VENTILATOR CONTROL SYSTEM BY KITCHEN EQUIPMENT SUPPLIER.

⑨ EMERGENGY BOILER SHUT OFF SWITCH LOCATED INSIDE OF MECHANICAL PUMP ROOM 126 AT EXTERIOR DOOR AND OUTSIDE AT INTERIOR CORRIDOR 125 AND MOUNTED IN STOPPER II COVER, INTERLOCK WITH BOILER CONTROL PANEL. MOUNT 72" AFF AND COORDINATE EXACT LOCATION IN FIELD WITH ARCHITECT. REFER TO DRAWING E3.12 FOR LOCATION.

⑩ REFER TO APPROVED HVAC SHOP DRAWINGS FOR ELECTRICAL WIRING DIAGRAMS AND ROUGHING REQUIREMENTS.

⑪ REFER TO HVAC DRAWINGS FOR EXACT EQUIPMENT LOCATIONS AND TOTAL QUANTITIES.

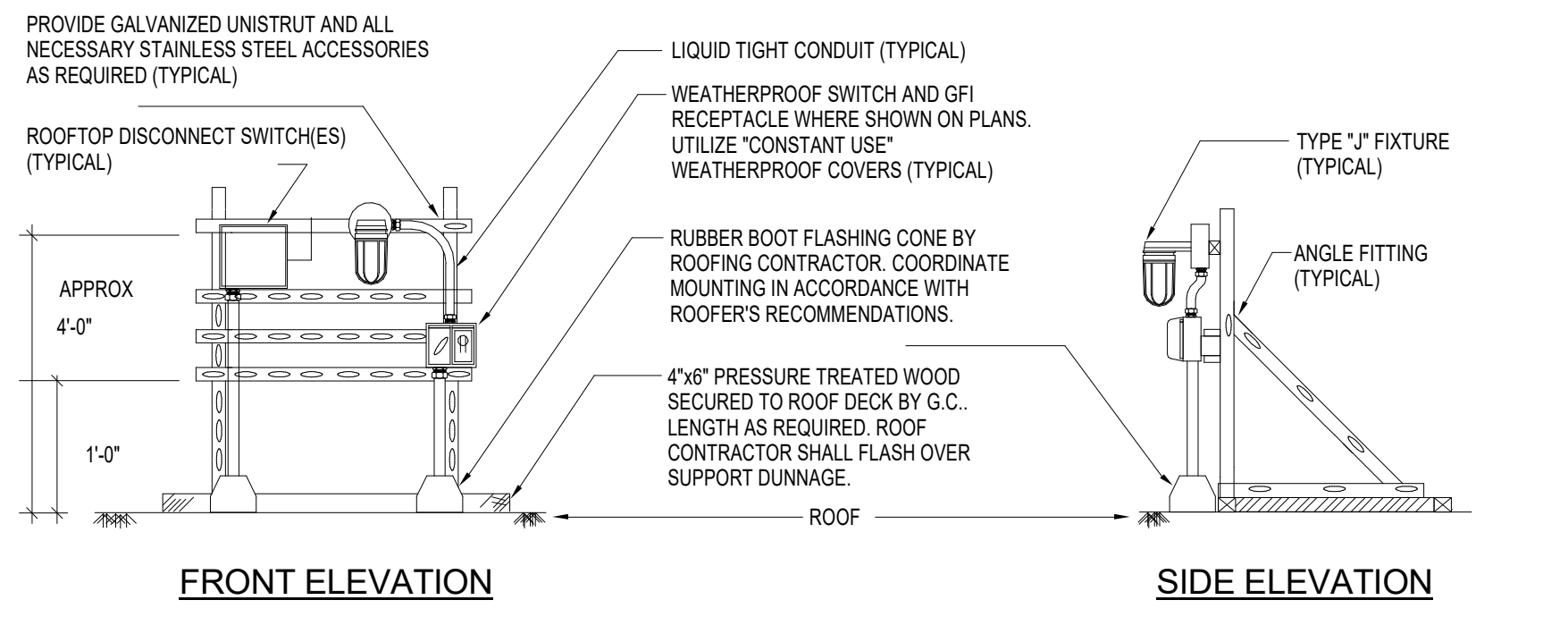

DRAIN PIPING FROM CONDENSATE PUMP BY HVAC.
CONDENSATE PUMP FURNISHED BY HVAC. MOUNTED IN 8" x 8" x 4" NEMA 1 ENCLOSURE BY E.C.
CONDENSATE PUMP FUNRNISHED BY HVAC, INSTALLED & WIRED BY E.C.
1" NIPPLE FOR PIG TAIL CORD.
LOW VOLTAGE PIG TAIL WIRE BY HVAC.
JB
TS
120VAC, SINGLE PHASE POWER SUPPLY.
DETECTION UNIT FLOAT SWITCH AT DISCHARGE OF DRAIN PAN BY HVAC.
4" SQ. x 2 1/2" DP. J. BOX FOR CONNECTION OF PIG TAIL.
COOLING COIL BY HVAC.
1/2" KNOCKOUT BY E.C. COORDINATE WITH HVAC SUNCONTRACTOR TYPICAL FOR 3.
DRAIN PIPING FROM CONDENSATE PUMP BY HVAC.
FAN COIL DRAIN PAN BY HVAC
DETECTION UNIT BY HVAC.

1/E3.05 CONDENSATE PUMP (CP-1) WIRING DETAIL

SCALE : N.T.S.

NOTE:

1. WIRING MAY VARY BY MANUFACTURER. FIELD CONFIRM WITH APPROVED SHOP DRAWINGS PRIOR TO ROUGHING.


PROVIDE GALVANIZED UNISTRUT AND ALL NECESSARY STAINLESS STEEL ACCESSORIES AS REQUIRED (TYPICAL)
ROOFTOP DISCONNECT SWITCH(ES) (TYPICAL)
APPROX 4'-0"
1'-0"
LIQUID TIGHT CONDUIT (TYPICAL)
WEATHERPROOF SWITCH AND GFI RECEPTACLE WHERE SHOWN ON PLANS. UTILIZE "CONSTANT USE" WEATHERPROOF COVERS (TYPICAL)
RUBBER BOOT FLASHING CONE BY ROOFING CONTRACTOR. COORDINATE MOUNTING IN ACCORDANCE WITH ROOFER'S RECOMMENDATIONS.
4"x6" PRESSURE TREATED WOOD SECURED TO ROOF DECK BY G.C.. LENGTH AS REQUIRED. ROOF CONTRACTOR SHALL FLASH OVER SUPPORT DUNNAGE.
ROOF
TYPE "J" FIXTURE (TYPICAL)
ANGLE FITTING (TYPICAL)

FRONT ELEVATION

SIDE ELEVATION

2/E3.05 TYPICAL ROOFTOP DISCONNECT SWITCH(ES) DETAIL

SCALE: N.T.S.

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
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212 BATTERY STREET
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GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

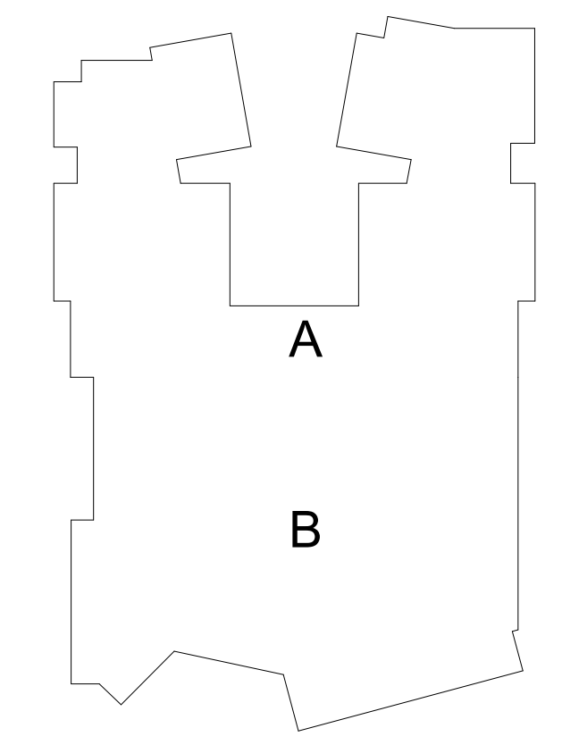
REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:
MECHANICAL
EQUIPMENT
SCHEDULE

SHEET NUMBER:
E3.05

ELECTRICAL SCHEDULE OF PLUMBING EQUIPMENT ⑥⑦

	UNIT NUMBER	UNIT DESCRIPTION	UNIT LOCATION	LOAD CHARACTERISTICS	VOLTAGE	PHASE	PANEL CIRCUIT	CIRCUIT BREAKER	FEEDER & CONDUIT SIZE	EQUIPMENT AND CONNECTIONS							REMARKS
										TS	⊠	⧄	☐	●	⏀	Ⓙ	
⑤③	EWH-1	ELECTRIC WATER HEATER	MECH ROOM	90kW	480	3	MSB1-18	150A-3P	SEE "MSB1" SCHEDULE	-	-	-	X	X	-	X	-
⑤③	EWH-2	ELECTRIC WATER HEATER	MECH ROOM	90kW	480	3	MSB2-16	150A-3P	SEE "MSB2" SCHEDULE	-	-	-	X	X	-	X	-
⑤③	EWH-3	ELECTRIC WATER HEATER	MECH ROOM	54kW	480	3	MSB2-17	90A-3P	SEE "MSB2" SCHEDULE	-	-	-	X	X	-	X	-
	MV-1	MIXING VALVE	MECH ROOM	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
	MV-2	MIXING VALVE	MECH ROOM	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
③②①	RP-1	CIRCULATION PUMP	-	1/4 HP, 0.76 A	120	1	MP2B-7	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	SERVICE: HOT WATER RECIRCULATON
③②①	RP-2	CIRCULATION PUMP	-	1/6 HP, 0.4 A	120	1	MP2B-8	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	SERVICE: HOT WATER RECIRCULATON (140HWR)
	SP-1	ELEVATOR SUMP PUMP (SIMPLEX)	ELEVATOR PIT	3/4 HP, 3.0 A	208	1	EP1B-68,70	15A-2P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	REFER TO DETAIL 1/E3.06
③	SPCP-1	ELEVATOR SUMP PUMP CONTROL PANEL	CUST CLOSET 134	-	120	1	EP1B-74	20A-2P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	REFER TO DETAIL 1/E3.06
③	OMP-1	OIL MONITORING PANEL	-	-	120	1	EP1B-76	20A-2P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
③	SM-1	WATER SUB-METER (DCW)	WATER SUPPLY ROOM	-	120	1	MP1B-15	20A-1P	2 #12 + 1 #12G - 3/4"C	-	-	-	-	-	X	-	REFER TO DETAIL 2/E3.06
③	SM-2	WATER SUB-METER (DHW)	WATER SUPPLY ROOM	-	120	1	MP1B-16	20A-1P	2 #12 + 1 #12G - 3/4"C	-	-	-	-	-	X	-	REFER TO DETAIL 2/E3.06
③	SM-3	WATER SUB-METER (KHW)	KITCHEN MECHANICAL ROOM	-	120	1	MP1B-17	20A-1P	2 #12 + 1 #12G - 3/4"C	-	-	-	-	-	X	-	REFER TO DETAIL 2/E3.06
③	SM-4	WATER SUB-METER (IRRIGATION)	WATER SUPPLY ROOM	-	120	1	MP2B2-3	20A-1P	2 #12 + 1 #12G - 3/4"C	-	-	-	-	-	X	-	REFER TO DETAIL 2/E3.06
④	EWC	ELECTRIC WATER COOLER (P-6)	REFER TO FLOOR PLANS	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	-	-	-	-	X	X	X	REFER TO FLOOR PLANS FOR POWER CONNECTIONS & CIRCUITRY
	TP-1	TRAP PRIMER ELECTRIC	CUST CLOSET 303	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
	TP-2	TRAP PRIMER ELECTRIC	GIRLS TOILET 331	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
	TP-3	TRAP PRIMER ELECTRIC	MECH PUMP ROOM 250	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
	TP-4	TRAP PRIMER ELECTRIC	RECYCLING/TRASH ROOM 155A	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
	TP-5	TRAP PRIMER ELECTRIC	TOILETS 154,155	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
	TP-6	TRAP PRIMER ELECTRIC	KITCHEN 156	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
	TP-7	TRAP PRIMER ELECTRIC	KITCHEN 156	-	120	1	-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-
	WTC-1	MAIN WATER TEMP DIGITAL CONTROL	-	-	120	1	MP1B-	20A-1P	2 #12 + 1 #12G - 3/4"C	X	-	-	-	X	-	X	-

PLUMBING SCHEDULE KEY NOTES:

① AQUASTATS FURNISHED AND INSTALLED BY PC, 120V CONNECTION BY EC.

② PROVIDE GFCI TYPE CIRCUIT BREAKER.

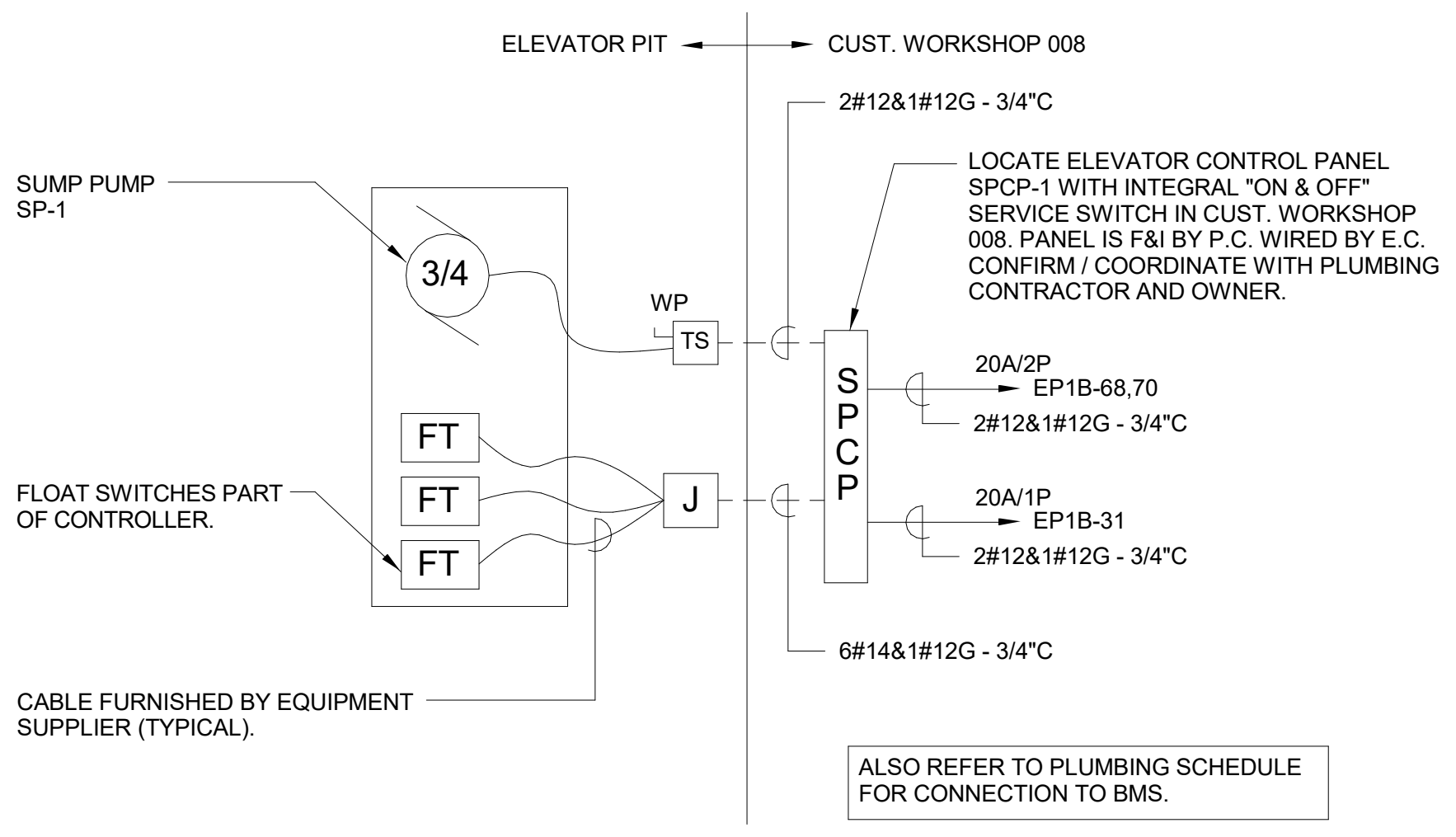
③ CONNECT TO BMS SYSTEM WITH 3#14 - 3/4"C. FINAL CONNECTION TO BMS SYSTEM BY ATC CONTRACTOR.

④ PROVIDE GFCI TYPE CIRCUIT BREAKERS TO FEED "EWC" CIRCUITS.

⑤ EMERGENGY WATER HEATER SHUT OFF SWITCH LOCATED OUTSIDE MEP ROOM 004 IN BASEMENT CORRIDOR C0-0. MOUNT IN STOPPER II COVER & INTERLOCK WITH BOILER CONTROL PANEL. MOUNT 72" A.F.F. AND COORDINATE FINAL LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN.

⑥ REFER TO APPROVED PLUMBING SHOP DRAWINGS FOR ELECTRICAL WIRING DIAGRAMS AND ROUGHING REQUIREMENTS.

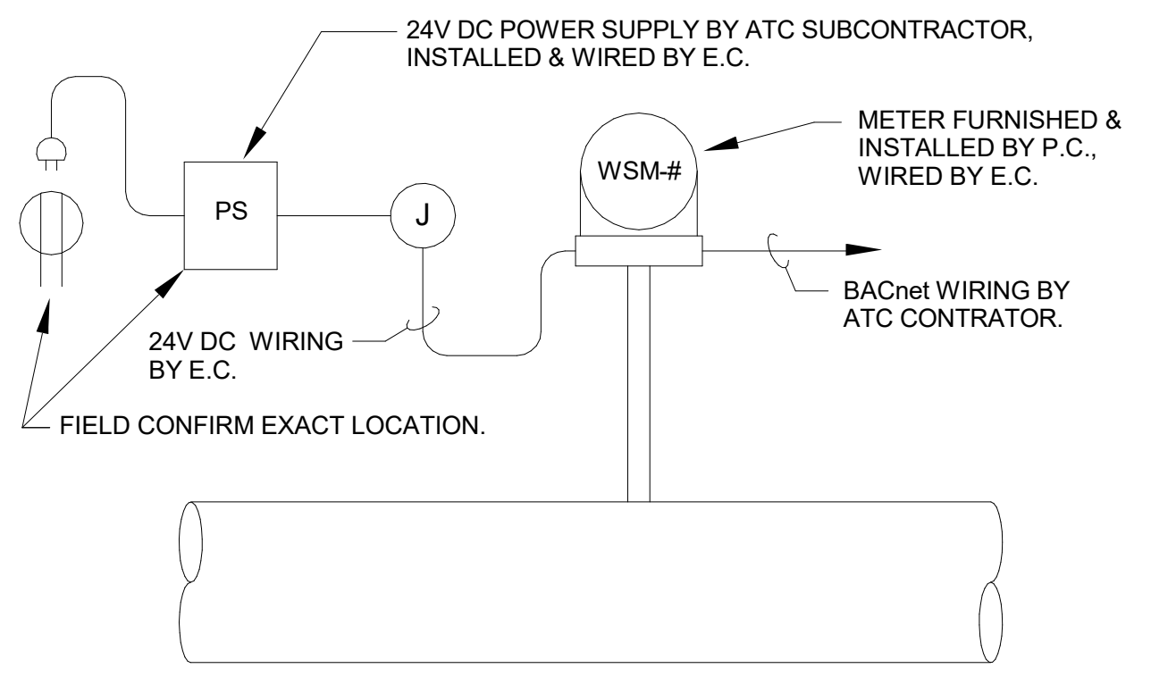
⑦ REFER TO PLUMBING DRAWINGS FOR EXACT EQUIPMENT LOCATIONS AND TOTAL QUANTITIES.



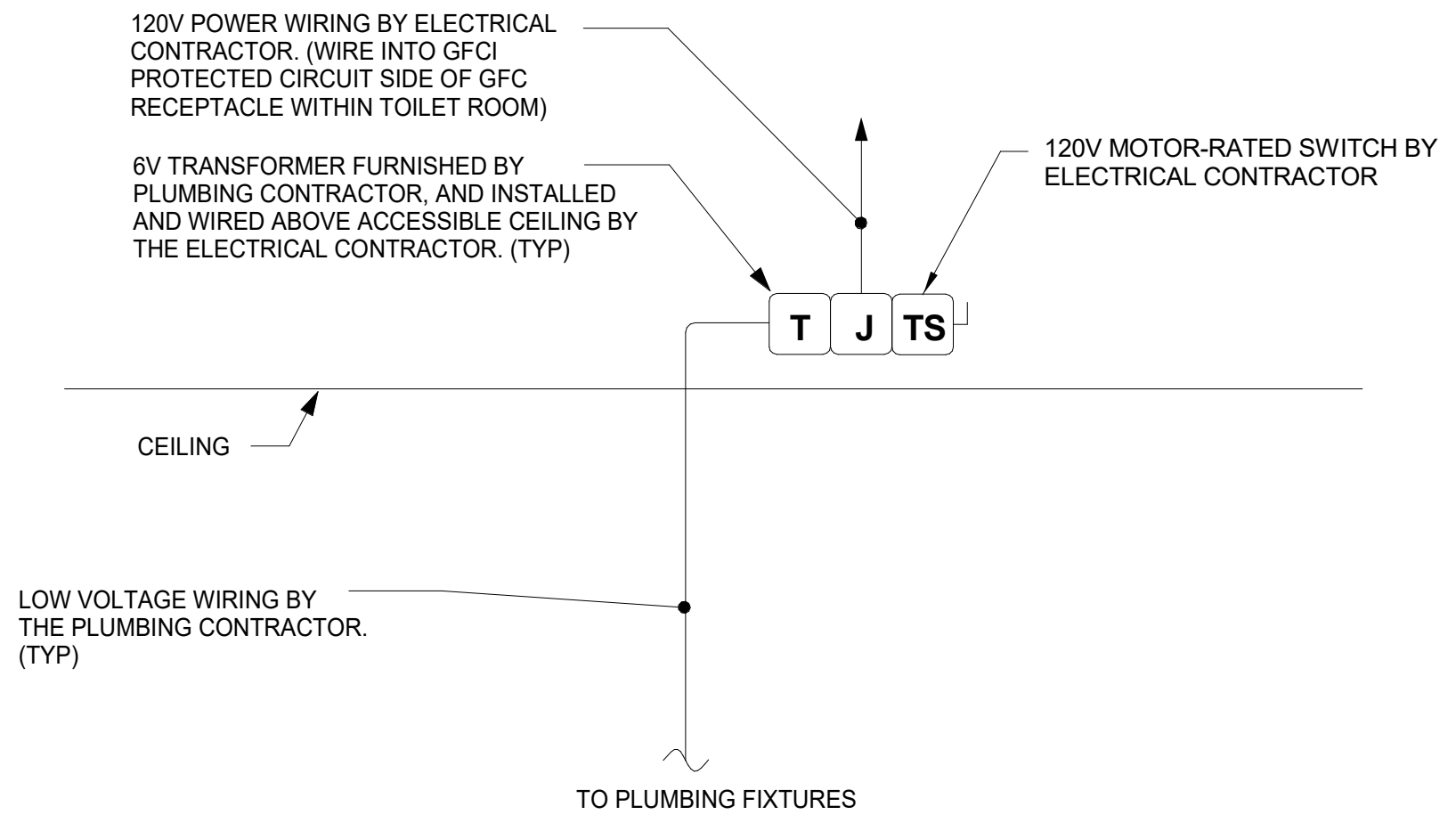
LOCATE ELEVATOR CONTROL PANEL SPCP-1 WITH INTEGRAL "ON & OFF" SERVICE SWITCH IN CUST. WORKSHOP 008. PANEL IS F&I BY P.C. WIRED BY E.C. CONFIRM / COORDINATE WITH PLUMBING CONTRACTOR AND OWNER.

ALSO REFER TO PLUMBING SCHEDULE FOR CONNECTION TO BMS.

1
E3.06
ELEVATOR SUMP PUMPS DETAIL
SCALE : N.T.S.


PS
J
WSM-#
24V DC POWER SUPPLY BY ATC SUBCONTRACTOR, INSTALLED & WIRED BY E.C.
METER FURNISHED & INSTALLED BY P.C., WIRED BY E.C.
24V DC WIRING BY E.C.
BACnet WIRING BY ATC CONTRATOR.
FIELD CONFIRM EXACT LOCATION.

2
E3.06
WATER SUB-METER DETAIL
SCALE : N.T.S.


120V POWER WIRING BY ELECTRICAL CONTRACTOR. (WIRE INTO GFCI PROTECTED CIRCUIT SIDE OF GFC RECEPTACLE WITHIN TOILET ROOM)
6V TRANSFORMER FURNISHED BY PLUMBING CONTRACTOR, AND INSTALLED AND WIRED ABOVE ACCESSIBLE CEILING BY THE ELECTRICAL CONTRACTOR. (TYP)
120V MOTOR-RATED SWITCH BY ELECTRICAL CONTRACTOR
T
J
TS
CEILING
LOW VOLTAGE WIRING BY THE PLUMBING CONTRACTOR. (TYP)
TO PLUMBING FIXTURES

3
E3.06
TYPICAL ELECTRONIC CONTROL FOR FLUSH VALVES AND /OR FAUCETS DETAIL
SCALE : N.T.S.

NOTES:
1. E.C. SHALL PROVIDE LABELS ON CEILING GRID AT LOCATIONS OF TRANSFORMERS. COORDINATE WITH ARCHITECT ON LOCATIONS OF LABELING/IDENTIFICATION.

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt

9/23/2026 4:39:16 PM

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
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GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

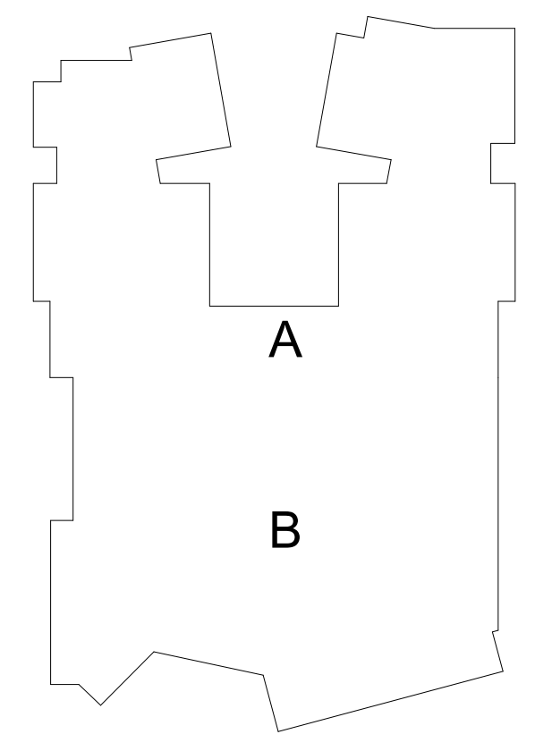
REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

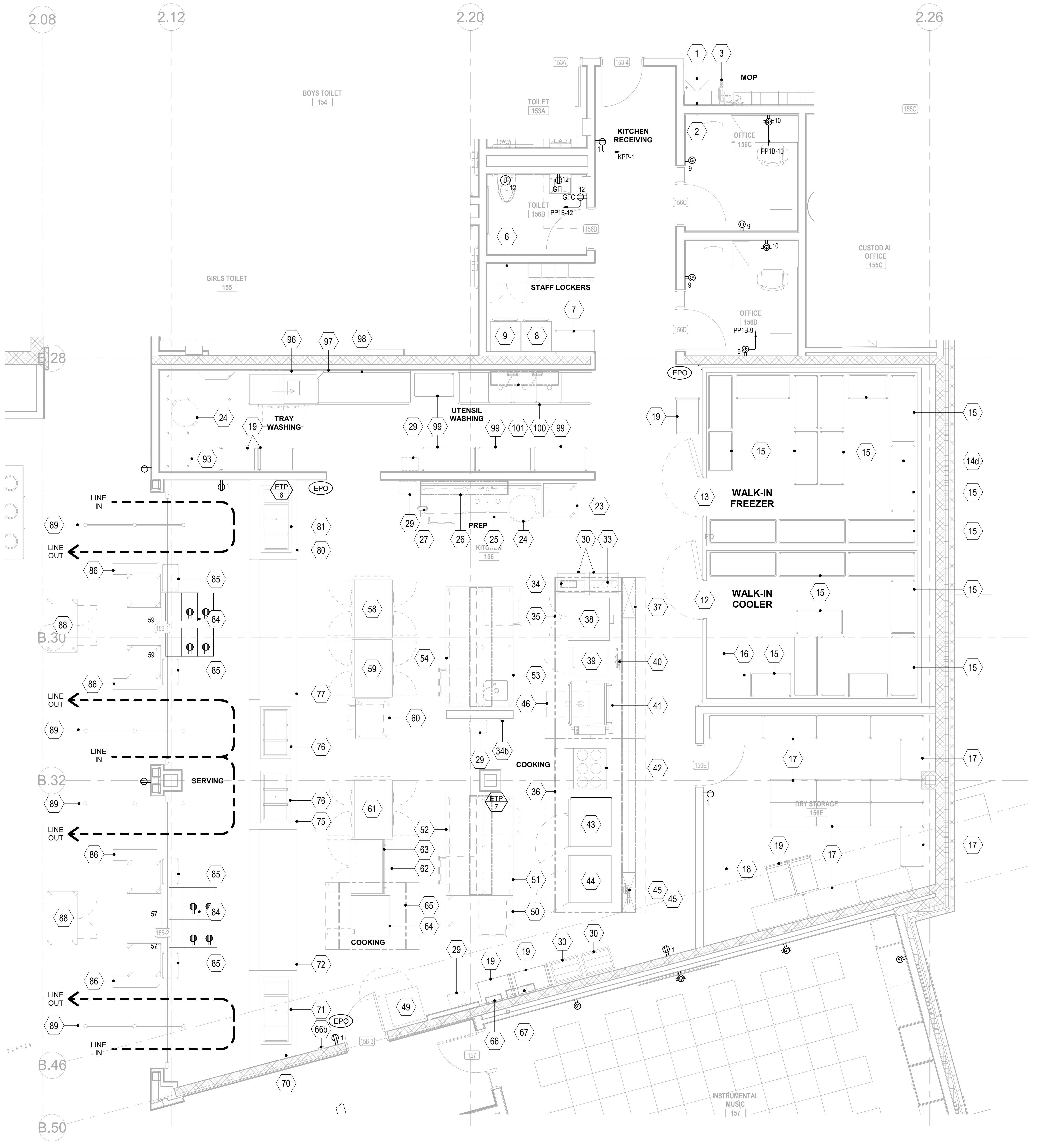
KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:
PLUMBING
EQUIPMENT
SCHEDULE

SHEET NUMBER:
E3.06



1 E3.07 KITCHEN - POWER
SCALE: 1/4" = 1'-0"

① ELECTRICAL MAIN KITCHEN EQUIPMENT SCHEDULE

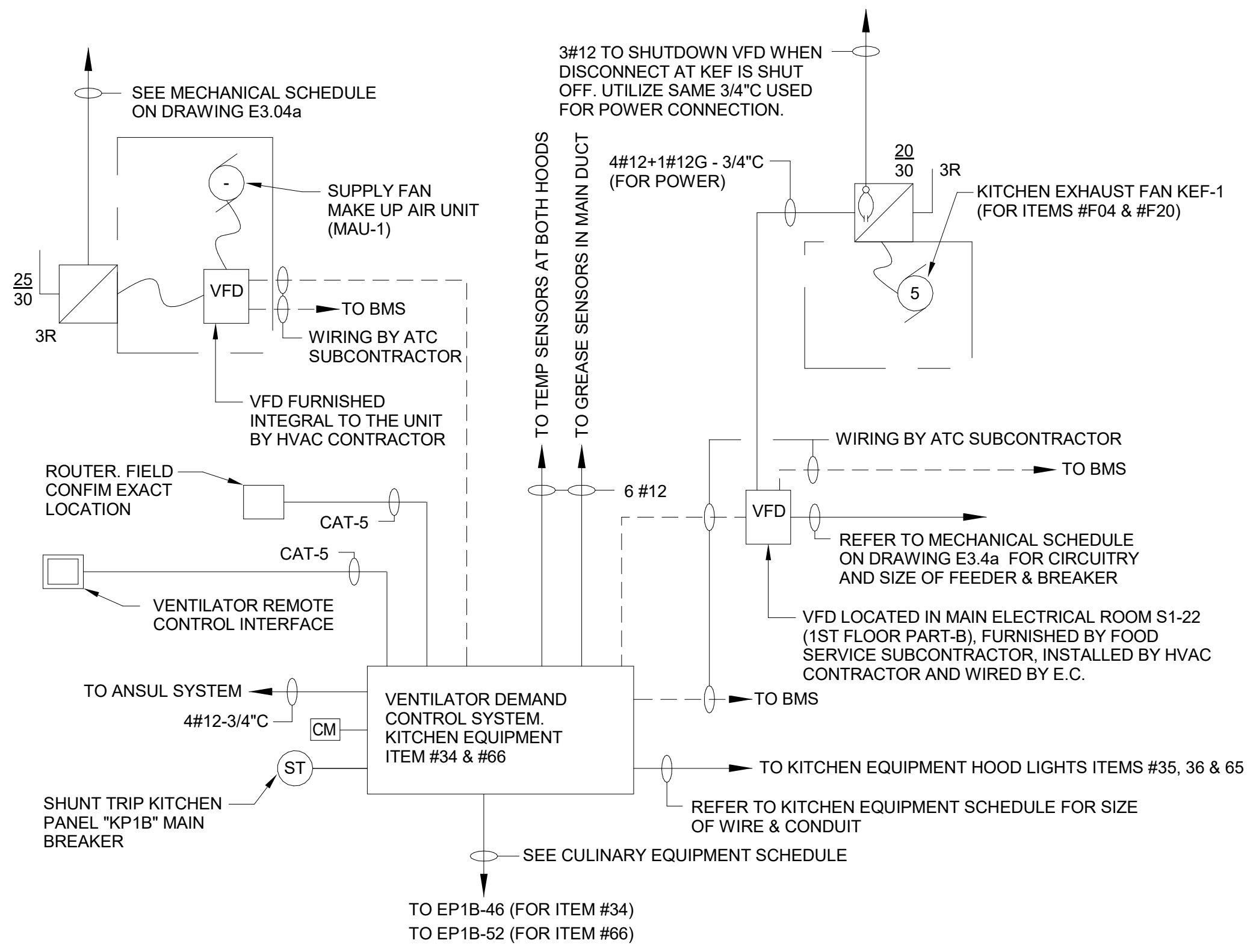
EQUIP NO.	EQUIPMENT	QTY	NEW	EXIST	HP	K.W.	AMPS.	VOLT PHASE	PANEL	CKT. NO.	BRKR.	WIRE & COND.	EQUIPMENT AND CONNECTIONS									REMARKS
													TS	⊠	⧄	□	⌒•	⏀	CR/HD ⏀	▼	Ⓙ	
8	FRONT LOAD CLOTHES WASHER	1	X	-	-	-	-	120/1	KPP	2	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	C&P CONNECTION
9	FRONT LOAD CLOTHES DRYER	1	X	-	-	-	-	120/208/1	KPP	4,6	30A-2P	3#10+1#10G-3/4"C	-	-	-	-	-	-	-	X	-	NEMA 14-30R C&P CONNECTION
12	WALK-IN COOLER - LIGHTS	4	X	-	-	1.1	-	120/1	EP1B	33	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	(4) X	-	-	-	(4) X	SEE KITCHEN EQUIPMENT NOTE #18
	WALK-IN COOLER - HEAT TRACE	1	X	-	-	-	-	120/1	EP1B	35	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	PROVIDE EQUIPMENT GROUND FAULT PROTECTION PER NEC
	WALK-IN COOLER - ALARMS	1	X																			SEE KITCHEN EQUIPMENT NOTE #17
13	WALK-IN FREEZER - LIGHTS	4	X	-	-	1.3	-	120/1	EP1B	37	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	(4) X	-	-	-	(4) X	SEE KITCHEN EQUIPMENT NOTE #18
	WALK-IN FREEZER - HEAT TRACE	1	X	-	-	-	-	120/1	EP1B	39	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	PROVIDE EQUIPMENT GROUND FAULT PROTECTION PER NEC
	WALK-IN FREEZER - ALARMS	1	X																			SEE KITCHEN EQUIPMENT NOTE #17
14a	WALK-IN COOLER - CONDENSING UNIT	1	X	-	1.5	-	9.7	208/3	EP1B	38,40,42	15A-3P	4#12+1#12G-3/4"C	-	-	X	-	X	-	-	-	X	
14b	WALK-IN COOLER - EVAPORATOR COIL	1	X	-	-	-	1.8	120/1	EP1B	36	20A-1P	2#12+1#12G-3/4"C	X	-	-	-	X	-	-	-	X	PROVIDE 6#14 FOR INTERLOCK TO CONDENSING UNIT
	EVAPORATOR COIL - ALARMS	1	X																			SEE KITCHEN EQUIPMENT NOTE #17
	EVAPORATOR COIL - LEAK DETECTION	1	X																			LOW VOLTAGE CONNECTION FROM COIL LEAK SENSOR TO REFRIGERANT SHUT-OFF VALVE
14c	WALK-IN FREEZER CONDENSING UNIT	1	X	-	4.5	-	15.0	208/3	EP1B	43,45,47	30A-3P	4#10+1#10G-3/4"C	-	-	X	-	X	-	-	-	X	-
14d	WALK-IN FREEZER EVAPORATOR COIL	1	X	-	-	-	13.7	208/1	EP1B	49,51	20A-2P	3#12+1#12G-3/4"C	X	-	-	-	X	-	-	-	X	PROVIDE 6#14 FOR INTERLOCK TO CONDENSING UNIT
	EVAPORATOR COIL - ALARMS	1	X																			SEE KITCHEN EQUIPMENT NOTE #17
	EVAPORATOR COIL - LEAK DETECTION	1	X																			LOW VOLTAGE CONNECTION FROM COIL LEAK SENSOR TO REFRIGERANT SHUT-OFF VALVE
22	AUTOMATIC SLICER	1	X	-	-	-	5.6	120/1	KPP	8	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	C&P CONNECTION
25	PREP TABLE WITH SINKS	1	X	-	-	-	-	(2)120/1	KPP	10 & 12	(2) 20A-1P	(2) 2#12+1#12G-3/4"C	-	-	-	-	-	(2) X	-	-	-	-
33	FIRE SUPPRESSION SYSTEM	1	X	-	-	-	-	120/1	EP1B	44	20A-1P	2#12+1#12G-3/4"C	X	-	-	-	X	-	-	-	X	-
34	VENTILATOR DEMAND CONTROL PANEL	1	X	-	-	-	15.0	120/1	EP1B	46	20A-1P	2#12+1#12G-3/4"C	X	-	-	-	X	-	-	-	X	-
34a	VENTILATOR CNTRL INTERFACE SCREEN	1	X	-	-	-	-	-	ITEM 34	-	-	2#12+1#12G-3/4"C	-	-	-	-	X	-	-	-	-	LOW VOLTAGE CONNECTION TO ITEM #34 - REFER TO DETAIL 2/ E3.07
34b	ROOM TEMPERATURE SENSOR	1	X	-	-	-	-	-	ITEM 34	-	-	2#12+1#12G-3/4"C	-	-	-	-	-	-	-	-	-	LOW VOLTAGE CONNECTION TO ITEM #34 - REFER TO DETAIL 2/ E3.07
35	EXHAUST VENTILATOR	1	X	-	-	-	-	-	ITEM 34	-	-	2#12+1#12G-3/4"C	-	-	-	-	X	-	-	-	X	POWER & LIGHTS FED FROM ITEM #34 - REFER TO DETAIL 2/ E3.07
36	EXHAUST VENTILATOR	1	X	-	-	-	-	-	ITEM 34	-	-	2#12+1#12G-3/4"C	-	-	-	-	X	-	-	-	X	POWER & LIGHTS FED FROM ITEM #34 - REFER TO DETAIL 2/ E3.07
37	UTILITY DISTRIBUTION SYSTEM (UDS)	1	X	-	-	-	-	480/3	KHP	1,3,5	250-3P	4#250KCMIL&#4G-3"C	-	-	X	-	X	-	-	-	X	-
38	DOUBLE CONVECTION OVEN	1	X	-	-	(2) 11	(2) 14	(2)480/3	ITEM 37	-	-	(2) 3#12+1#12G-3/4"C	-	-	-	-	-	-	-	-	-	-
39	TEN-PAN CONVECTION STEAMER	1	X	-	-	30.0	94.0	208/3	ITEM 37	-	-	4#1&#6G-2"C	-	-	-	-	-	-	-	-	-	-
41	40 GALLON TILTING BRAISING PAN	1	X	-	-	15.3	19.0	480/3	ITEM 37	-	-	3#10+1#10G-3/4"C	-	-	-	-	-	-	-	-	-	-
42	6 BURNER RANGE WITH OVEN	1	X	-	-	17.0	23.5	480/3	ITEM 37	-	-	3#10+1#10G-3/4"C	-	-	-	-	-	-	-	-	-	-
43	DOUBLE CONVECTION OVEN	1	X	-	-	(2) 24.4	(2) 26.9	(2)480/3	ITEM 37	-	-	(2) 3#8+1#10G-3/4"C	-	-	-	-	-	-	-	-	-	-
44	DOUBLE CONVECTION OVEN	1	X	-	-	(2) 24.4	(2) 26.9	(2)480/3	ITEM 37	-	-	(2) 3#8+1#10G-3/4"C	-	-	-	-	-	-	-	-	-	-
				-	-	-	-								-		-		-	-		
49	MOBILE HOT FOOD HOLDING CABINET	1	X	-	-	-	13.8	120/1	KPP	5	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	-
51	WORK TABLE w/ OVERSHELF	1	X	-	-	-	-	(3)120/1	KPP	13, 15 & 17	(3) 20A-1P	(3) 2#12+1#12G-3/4"C	-	-	-	-	(3)X	-	-	-	(3)X	PRE-WIRED CONVENIENCE RECEPTACLES BY KEC
52	WORK TABLE	1	X	-	-	-	-	(3)120/1	KPP	21, 23 & 25	(3) 20A-1P	(3) 2#12+1#12G-3/4"C	-	-	-	-	(3)X	-	-	-	(3)X	PRE-WIRED CONVENIENCE RECEPTACLES BY KEC
53	COOK'S TABLE w/ SINK & OVERSHELF	1	X	-	-	-	-	(2)120/1	KPP	14 & 16	(2) 20A-1P	(2) 2#12+1#12G-3/4"C	-	-	-	-	(2)X	-	-	-	(2)X	PRE-WIRED CONVENIENCE RECEPTACLES BY KEC
54	WORK TABLE	1	X	-	-	-	-	(3)120/1	KPP	18, 20 & 22	(3) 20A-1P	(3) 2#12+1#12G-3/4"C	-	-	-	-	(3)X	-	-	-	(3)X	PRE-WIRED CONVENIENCE RECEPTACLES BY KEC
55	FOOD PROCESSOR	1	X				12.0	120/1	KPP	24	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	-
				-	-	-																
58	REFRIGERATOR, PASS-THRU	1	X	-	-	-	6.4	120/1	EP1B	48	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	-
59	HOT FOOD HOLDING CAB., PASS-THRU	1	X	-	-	-	10.6	208/1	KPP	25,27	20A-2P	2#12+1#12G-3/4"C	-	-	-	-	-	-	-	X	-	NEMA 6-20R
61	REFRIGERATOR, PASS-THRU	1	X	-	-	-	6.4	120/1	EP1B	50	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	-
62	STAINLESS STEEL ELECTRICAL CHASE	1	X	-	-	-	-	208/3	EP1B	56,58,60	50A-3P	3#6+1#10G-1"C	-	-	-	-	-	-	-	X	-	NEMA 15-50R
				-	-	-	-	120/1	EP1B	53	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	-
63	REFRIGERATOR, WORKTOP	1	X	-	-	-	3.0	120/1	ITEM 62	-	-	-	-	-	-	-	-	-	-	-	-	-
64	GRIDDLE w/ MOBILE STAND	1	X	-	-	-	40.0	208/3	ITEM 62	-	-	-	-	-	-	-	-	-	-	-	-	-
65	EXHAUST VENTILATOR	1	X	-	-	-	-	-	ITEM 66	-	-	2#12+1#12G-3/4"C	-	-	-	-	X	-	-	-	X	POWER & LIGHTS FED FROM ITEM #66 - REFER TO DETAIL 2/ E3.07
66	VENTILATOR DEMAND CONTROL PANEL	1	X	-	-	-	15.0	120/1	EP1B	52	20A-1P	2#12+1#12G-3/4"C	X	-	-	-	X	-	-	-	X	-
66a	VENTILATOR CNTRL INTERFACE SCREEN	1	X	-	-	-	-	-	ITEM 66	-	-	-	-	-	-	-	-	-	-	-	-	LOW VOLTAGE CONNECTION TO ITEM #66 - REFER TO DETAIL 2/ E3.07
66b	ROOM TEMPERATURE SENSOR	1	X	-	-	-	-	-	ITEM 66	-	-	-	-	-	-	-	-	-	-	-	-	LOW VOLTAGE CONNECTION TO ITEM #66 - REFER TO DETAIL 2/ E3.07
67	FIRE SUPPRESSION SYSTEM	1	X	-	-	-	-	120/1	EP1B	54	20A-1P	2#12+1#12G-3/4"C	X	-	-	-	X	-	-	-	X	-
70	SERVING COUNTER	1	X	-	-	-	-	120/1	KPP	29	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	X	-	-	-	X	-
71	REFRIGERATED COLD PAN, DROP-IN	1	X	-	-	-	5.0	120/1	ITEM 70	-	-	2#12+1#12G-3/4"C	-	-	-	-	X	-	-	-	X	-
72	SERVING COUNTER	1	X	-	-	-	-	(2)120/1	KPP	26 & 28	(2)20A-1P	(2)2#12+1#12G-3/4"C	-	-	-	-	(2)X	-	-	-	(2)X	-
															-		-		-	-		
74a	HOT FOOD WELL, DROP-IN (GRP OF 2)	1	X	-	-	1.8	-	208/1	KPP	31,33	20A-2P	3#12+1#12G-3/4"C	(2)X	-	-	-	(2)x	-	-	-	(2)X	-
74b	HOT FOOD WELL, DROP-IN (GRP OF 3)	1	X	-	-	2.7	-	208/1	KPP	35,37	20A-2P	3#12+1#12G-3/4"C	(3)X	-	-	-	(3)X	-	-	-	(3)X	-
75	SERVING COUNTER	1	X	-	-	-	-	(2)120/1	KPP	30 & 32	(2)20A-1P	(2)2#12+1#12G-3/4"C	-	-	-	-	-	(2)X	-	-	-	-
76	REFRIGERATED COLD PAN, DROP-IN	2	X	-	-	-	5.0 EACH	(2)120/1	ITEM 75	-	-	-	-	-	-	-	-	-	-	-	-	C&P CONNECTIONS FROM ITEM 75
77	SERVING COUNTER	1	X	-	-	-	-	(2)120/1	KPP	39 & 41	(2)20A-1P	(2)2#12+1#12G-3/4"C	-	-	-	-	-	(2)X	-	-	-	-
79a	HOT FOOD WELL, DROP-IN (GRP OF 2)	1	X	-	-	1.8	-	208/1	KPP	34,36	20A-2P	3#12+1#12G-3/4"C	(2)X	-	-	-	(2)X	-	-	-	(2)X	-
79b	HOT FOOD WELL, DROP-IN (GRP OF 3)	1	X	-	-	2.7	-	208/1	KPP	38,40	20A-2P	3#12+1#12G-3/4"C	(3)X	-	-	-	(3)X	-	-	-	(3)X	-
80	SERVING COUNTER	1	X	-	-	-	-	120/1	KPP	42	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	X	-	-	-	PRE-WIRED CONVENIENCE RECEPTACLE BY KEC
81	REFRIGERATED COLD PAN, DROP-IN	1	X	-	-	-	5.0	120/1	ITEM 80	-	-	-	-	-	-	-	-	-	-	-	-	C&P CONNECTION FROM ITEM 80
84	MILK COOLER	2	X	-	-	-	(2)3.3	120/1	EP1B	55	20A-1P	2#12+1#12G-3/4"C	-	-	-	-	-	(2)X	-	-	-	-
87	CASHIER TERMINAL (BY OWNER)	4	X	-	-	-	-	120/1	EP1B	57-59-73-75	(4)20A-1P	(4)2#12+1#12G-3/4"C	-	-	-	-	-	(4)X	-	-	-	SEE NOTE #24
96	WAREWASHER, CONVEYOR TYPE	1	X	-	-	-	35.0	480/3	KHP	2,4,6	60A-3P	4#4+1#10G-1 1/2"C	-	-	X	-	X	-	-	-	X	TANK HEAT
				-	-	-	26.0	480/3	KHP	8,10,12	40A-3P	4#8+1#10G-3/4"C	-	-	X	-	X	-	-	-	X	BOOSTER HEATER
													-	-	-	-	X	-	-	-	X	J-BOX FOR WIRING TO TABLE LIMIT SWITCH @ ITEM #98
98	CLEAN WARE TABLE	1	X	-	-	-							-	-	-	-	X	-	-	-	X	J-BOX FOR WIRING TO TABLE LIMIT SWITCH @ ITEM #96

KEYED SCHEDULE NOTES (-)

① REFER TO FOOD SERVICE DRAWINGS FOR EXACT EQUIPMENT LOCATION AND ROUGHING REQUIREMENTS.

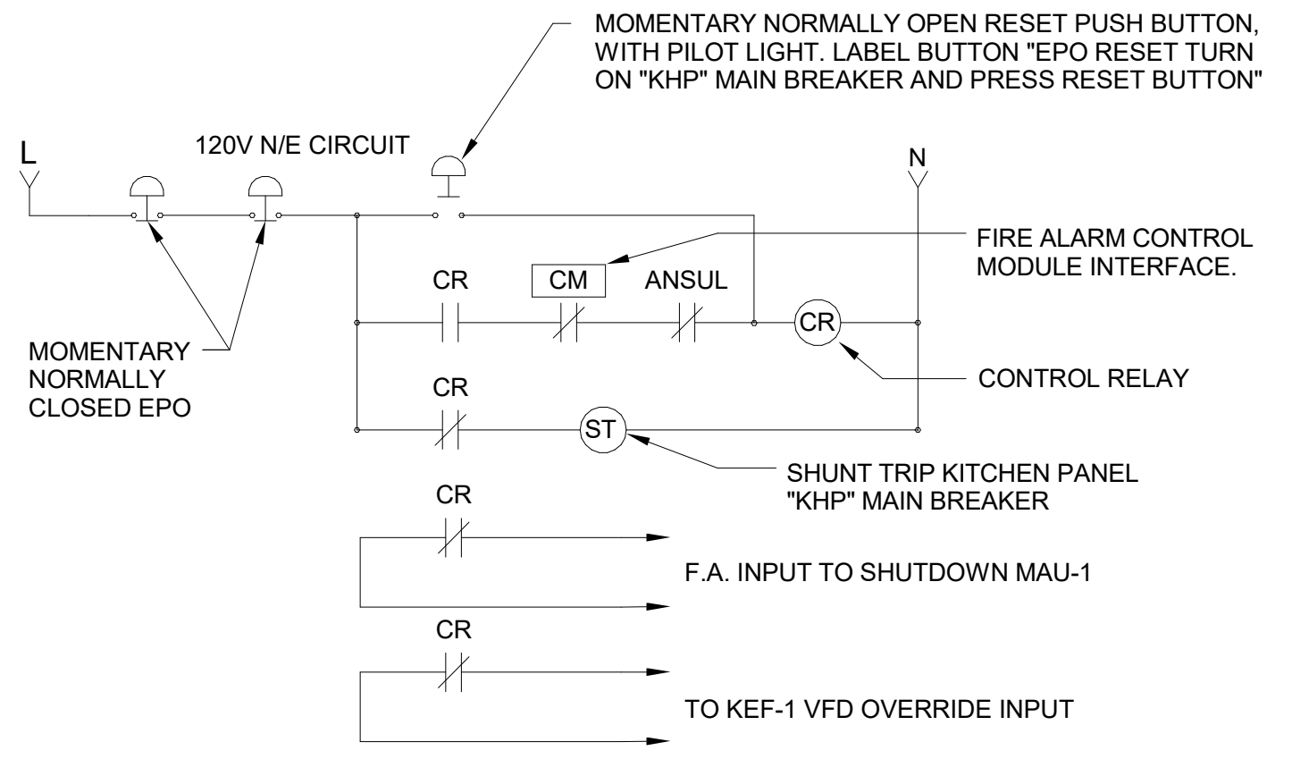
KEYED EQUIPMENT NOTES

1. REFER TO KITCHEN EQUIPMENT DRAWINGS AND ARCHITECTURAL DRAWINGS FOR KITCHEN EQUIPMENT LAYOUT, ELECTRICAL CHARACTERISTICS, AND EXACT LOCATION, ROUGH-IN AND CONNECTION REQUIREMENTS.
2. COORDINATE WITH THE KITCHEN EQUIPMENT INSTALLER'S FINAL ELECTRICAL REQUIREMENTS PRIOR TO ROUGHING IN OF ANY ELECTRICAL WORK.
3. PROVIDE ALL DISCONNECTING DEVICES FOR ALL KITCHEN EQUIPMENT REQUIRED BY ELECTRICAL CODE ART. 422, PART D UNLESS PROVIDED AS PART OF KITCHEN EQUIPMENT.
4. GROUND CONDUCTORS SIZED PER ELECTRIC CODE GROUNDING CONDUCTOR TABLE 250-95 SHALL BE INCLUDED IN ALL KITCHEN BRANCH CIRCUITS.
5. PROVIDE CONTROL CONNECTION FROM AUTOMATIC FIRE SUPPRESSION SYSTEM TO SHUNT TRIP AND SOLENOID CONTROLS.
6. ALL DIRECT CONNECTIONS TO KITCHEN EQUIPMENT SHALL BE MADE PER KITCHEN EQUIPMENT MANUFACTURER'S REQUIREMENTS, VERIFY LIQUITITE FLEXIBLE CONDUIT/CORD LENGTHS REQUIRED.
7. ALL SWITCHES INSTALLED AS AN EQUIPMENT DISCONNECTING MEANS SHALL BE LABELED WITH THE DESCRIPTION OF THE EQUIPMENT BEING SERVED. EXAMPLE: WALK-IN COOLER.
8. EXPOSED WIRING SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS FOR A WET AREA. MOUNT WORK OFF SURFACES TO ALLOW CLEANING. ALL WORK SHALL USE GALVANIZED OR CORROSIVE RESISTANT MATERIALS. CONDUITS PENETRATING FLOOR SHALL BE RIGID GALVANIZED STEEL.
9. CIRCUIT SIZE SHALL MATCH THE CIRCUIT BREAKER AMPACITY, REFER TO SCHEDULES.
10. TO HOOD SUPPLIED JB @ CEILING TO FEED HOOD LIGHTING FROM REMOTE SWITCH PROVIDED BY E.C. & CONTROL SWITCH FOR REMOTE FAN PROVIDED BY E.C.
11. JB MTD CEILING TO LIGHTS FROM REMOTE SWITCHES PROVIDED BY E.C. (EACH SIDE CONTROLLED SEPARATELY) CONTROL SW FOR REMOTE FANS PROVIDED BY E.C. (EACH SIDE CONTROLLED SEPARATELY).
12. INSTALL AND CONNECT LIGHT FIXTURES IN COOLER & FREEZER, FURNISHED BY KITCHEN EQUIPMENT SUPPLIER.
13. TRENCH FLOOR AS REQUIRED TO FEED KITCHEN ISLANDS.
14. UNLESS OTHERWISE NOTED ALL CIRCUITS SHALL BE FED FROM PANEL "KP1B" FOR NORMAL 120/208V POWER, "KHP1B" FOR NORMAL 277/480V POWER AND "EP1B" FOR NORMAL/EMERGENCY 120/208V POWER .
15. ALL FLOOR BOXES IN KITCHEN SHALL BE INSTALLED 6" AFF. FLOOR BOXES SHALL BE WATERTIGHT.
16. PROVIDE SHUTDOWN WIRING FOR GAS SOLENOID IN KITCHEN. FROM ANSUL SYSTEM.
17. CONNECT KITCHEN WALK-IN COOLER & FREEZER ALARMS TO LOCAL BMS SYSTEM IN MECHANICAL ROOM WITH 2 #14 - 3/4"C FOR EACH ALARM. ALSO REFER TO KITCHEN DRAWINGS FOR FURTHER CLARIFICATION. FINAL CONNECTION AT BMS BY ATC CONTRACTOR.
18. ALL DISCONNECT SWITCHES LOCATED IN THE KITCHEN AREA SHALL BE NEMA 4X STAINLESS STEEL.
19. ALL SINGLE PHASE RECEPTACLES 50 AMPS OR LESS AND THREE PHASE RECEPTACLES 100 AMPS OR LESS IN THE KITCHEN SHALL BE PROVIDED WITH GROUND FAULT PROTECTION (GFI) PER NEC ARTICLE 210.8.B(2).
20. PROVIDE JUNCTION BOX FOR UNIT LIGHTS, FOR DOOR HEATER, AND AUDIO/VISUAL ALARM.
21. E.C. TO WIRE THERMOSTATS FOR WALK-IN REFRIGERATORS AND FREEZERS REFER TO FOOD SERVICE DRAWINGS FOR ADDITIONAL INFORMATION.
22. PROVIDE 3#12 WIRES FROM MICRO SWITCH FOR FIRE EXTINGUISHER IN CEILING TO U.D.S.
23. PROVIDE THE FOLLOWING WIRING FROM THE FIRE SUPPRESSION SYSTEM:
    - 23.1. 2#12 TO VENTILATOR CONTROL PANEL (N.O.)
    - 23.2. 2#12 WIRES TO GAS VALVE AND CONTRACTOR.
    - 23.3. 3#12 WIRES TO FIRE/FUEL SHUTOFF VALVE IN U.D.S.
    - 23.4. 2#12 WIRES TO AUTO/MAN RELEASE
24. EXTEND 1"C FOR DATA OUTLETS FOR CASH REGISTERS TO KITCHEN OFFICE (TYPICAL).


SEE MECHANICAL SCHEDULE ON DRAWING E3.04a
SUPPLY FAN MAKE UP AIR UNIT (MAU-1)
25/30
3R
VFD
TO BMS
WIRING BY ATC SUBCONTRACTOR
VFD FURNISHED INTEGRAL TO THE UNIT BY HVAC CONTRACTOR
ROUTER. FIELD CONFIM EXACT LOCATION
CAT-5
CAT-5
VENTILATOR REMOTE CONTROL INTERFACE
TO ANSUL SYSTEM
4#12-3/4"C
CM
ST
SHUNT TRIP KITCHEN PANEL "KP1B" MAIN BREAKER
VENTILATOR DEMAND CONTROL SYSTEM. KITCHEN EQUIPMENT ITEM #34 & #66
SEE CULINARY EQUIPMENT SCHEDULE
TO EP1B-46 (FOR ITEM #34)
TO EP1B-52 (FOR ITEM #66)
TO TEMP SENSORS AT BOTH HOODS
TO GREASE SENSORS IN MAIN DUCT
6 #12
3#12 TO SHUTDOWN VFD WHEN DISCONNECT AT KEF IS SHUT OFF. UTILIZE SAME 3/4"C USED FOR POWER CONNECTION.
4#12+1#12G - 3/4"C (FOR POWER)
20/30
3R
KITCHEN EXHAUST FAN KEF-1 (FOR ITEMS #F04 & #F20)
5
WIRING BY ATC SUBCONTRACTOR
TO BMS
VFD
REFER TO MECHANICAL SCHEDULE ON DRAWING E3.4a FOR CIRCUITRY AND SIZE OF FEEDER & BREAKER
VFD LOCATED IN MAIN ELECTRICAL ROOM S1-22 (1ST FLOOR PART-B), FURNISHED BY FOOD SERVICE SUBCONTRACTOR, INSTALLED BY HVAC CONTRACTOR AND WIRED BY E.C.
TO BMS
TO KITCHEN EQUIPMENT HOOD LIGHTS ITEMS #35, 36 & 65
REFER TO KITCHEN EQUIPMENT SCHEDULE FOR SIZE OF WIRE & CONDUIT

NOTE:
REFER TO APPROVED FOOD SERVICE SUBMITTALS WIRING DIAGRAM FOR FINAL COORDINATION OF ITEM #26.

2 E3.07 KITCHEN HOOD VENTILATOR DEMAND CONTROL SYSTEM WIRING DIAGRAM (ITEMS 34 & 66)
SCALE : N.T.S.


MOMENTARY NORMALLY OPEN RESET PUSH BUTTON, WITH PILOT LIGHT. LABEL BUTTON "EPO RESET TURN ON "KHP" MAIN BREAKER AND PRESS RESET BUTTON"
L
120V N/E CIRCUIT
N
FIRE ALARM CONTROL MODULE INTERFACE.
CR
CM
ANSUL
CR
CONTROL RELAY
MOMENTARY NORMALLY CLOSED EPO
CR
ST
SHUNT TRIP KITCHEN PANEL "KHP" MAIN BREAKER
CR
F.A. INPUT TO SHUTDOWN MAU-1
CR
TO KEF-1 VFD OVERRIDE INPUT

SEQUENCE OF OPERATIONS:

1. PROVIDE ALL RELAYS, PUSH BUTTONS, TRANSFORMERS, CONTACTORS SHUNT TRIP CIRCUIT BREAKERS, WIRING AND CONDUITS FOR A COMPLETE POWER OFF SYSTEM AND ALARM NOTIFICATION DESCRIBED IN PARAGRAPHS 2 & 3 BELOW.
2. THE ACT OF PUSHING ANY EMERGENCY POWER OFF PUSH-BUTTON, SHALL CAUSE THE FOLLOWING TO OCCUR:
    - 2.1. TURN OFF POWER TO ALL ITEMS UNDER KITCHEN HOOD REQUIRING ELECTRICAL CONNECTION OR CONTROL BY TURNING OFF POWER TO THE KITCHEN PANEL VIA SHUNT TRIP MAIN BREAKER.
3. THE ACTIVATION OF HOOD FIRE SUPPRESSION SYSTEM, SHALL CAUSE THE FOLLOWING TO OCCUR:
    - 3.1. TURN OFF POWER TO ALL ITEMS UNDER KITCHEN HOOD REQUIRING ELECTRICAL CONNECTION OR CONTROL BY TURNING OFF POWER TO KITCHEN PANEL VIA SHUNT TRIP MAIN BREAKER.
    - 3.2. SEND A SIGNAL TO THE FIRE ALARM CONTROL PANEL TO INITIATE (FACP) SYSTEM OPERATION.
4. COORDINATE WITH INSTALLERS OF FIRE SUPPRESSION SYSTEM, AND KITCHEN EQUIPMENT SUPPLIER.
5. ONE SYSTEM REQUIRED PER HOOD.
6. KITCHEN HOOD SUMMARY: THE HOOD FIRE SUPPRESSION SYSTEM CONTROL PANEL, UPON ACTIVATION, SHALL PUT THE FACP INTO "AUTO" ALARM MODE AND SHALL ALSO SHUTDOWN THE HOOD'S SUPLLY FAN, TURN OFF POWER TO THE GAS SOLENOID AND TURN OFF POWER TO ALL ITEMS UNDER THE KITCHEN HOOD. THE HOOD EXHAUST FAN SHALL CONTINUE TO OPERATE. FIRE ACTUATED DAMPERS IF INSTALLED IN THE EXHAUST OUTLET SHALL SHUT DOWN THE EXHAUST FAN UPON ACTUATION. IT SHALL NOT BE REQUIRED TO RESTART THE HOOD EXHAUST FAN WHEN THE EXTINGUISHING SYSTEM IS ACTIVATED IF THE EXHAUST FAN AND ALL COOKING EQUIPMENT SERVED BY THE FAN HAD PREVIOUSLY BEEN SHUTDOWN. SHUTOFF DEVICES SHALL REQUIRE MANUAL RESET.

3 E3.07 KITCHEN EQUIPMENT EMERGENCY POWER OFF WIRING DIAGRAM
SCALE: NTS

DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
P: (802) 863-1428

GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
p: 508-998-5700 • f: 508-998-0883 • E-MAIL: info@g-g-d.com

WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

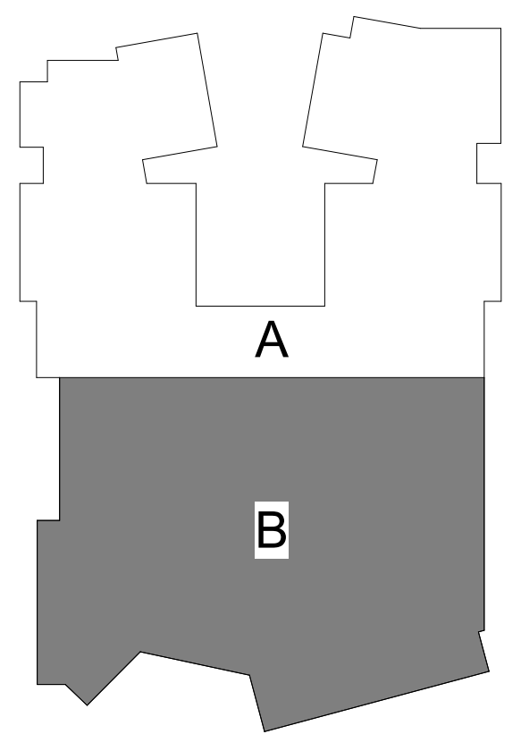
SEAL AND SIGNATURE:

REVISIONS:

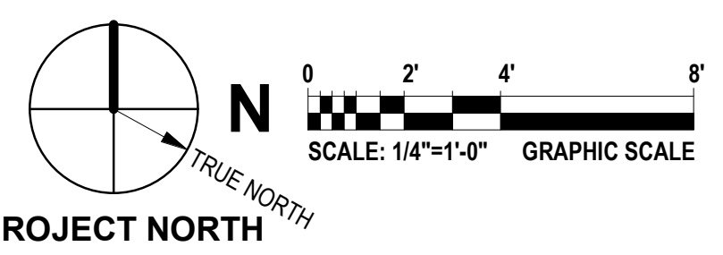
NO.	DATE	TITLE

ISSUE TITLE AND DATE:
90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN

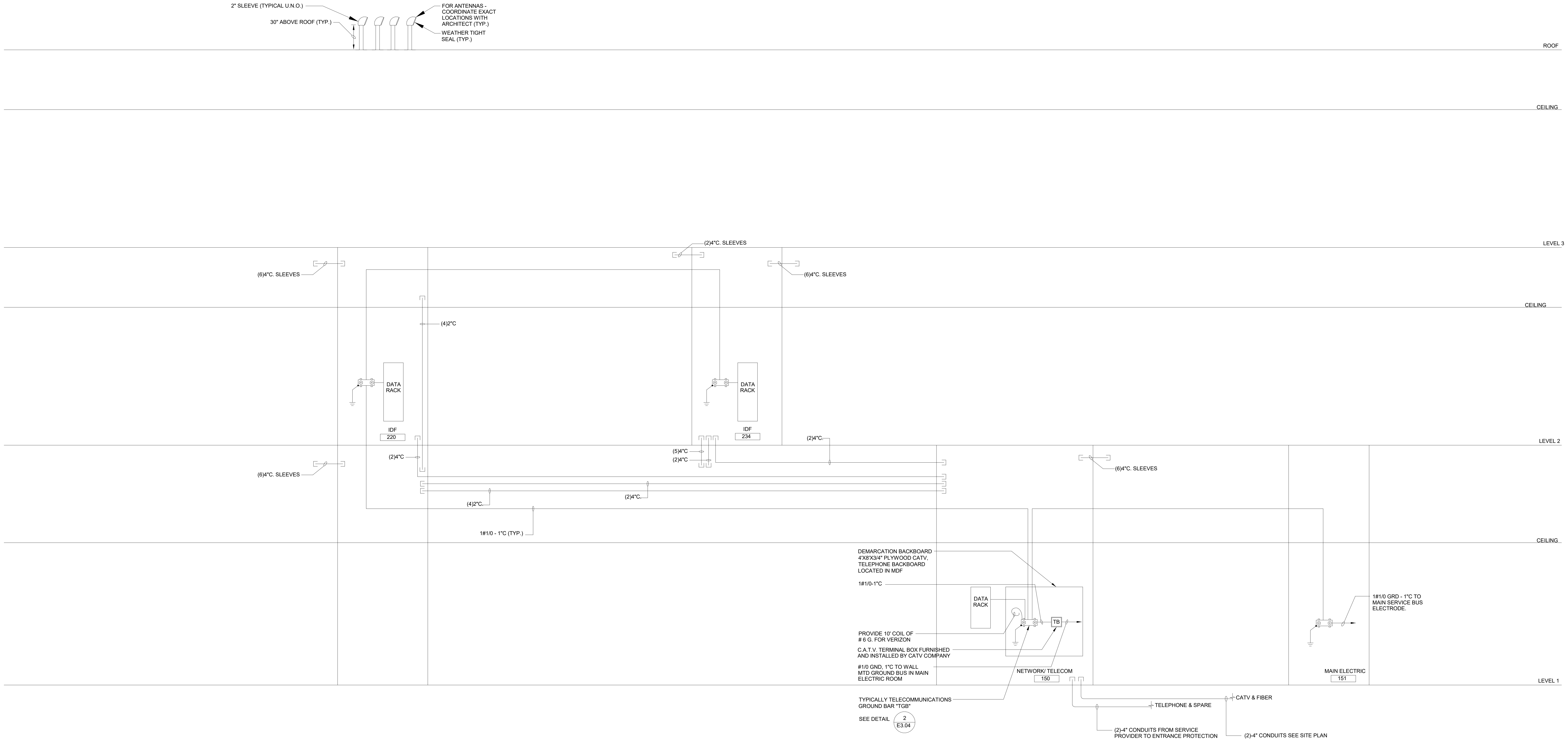


ORIENTATION AND SCALE:



SHEET TITLE:
KITCHEN SCHEDULE

SHEET NUMBER:
E3.07


2" SLEEVE (TYPICAL U.N.O.)
30" ABOVE ROOF (TYP.)
FOR ANTENNAS - COORDINATE EXACT LOCATIONS WITH ARCHITECT (TYP.)
WEATHER TIGHT SEAL (TYP.)
ROOF
CEILING
(2)4"C. SLEEVES
LEVEL 3
(6)4"C. SLEEVES
(6)4"C. SLEEVES
CEILING
(4)2"C
DATA RACK
DATA RACK
IDF
220
IDF
234
(2)4"C
LEVEL 2
(5)4"C
(2)4"C
(2)4"C
(6)4"C. SLEEVES
(6)4"C. SLEEVES
(4)2"C.
(2)4"C.
1#1/0 - 1"C (TYP.)
CEILING
DEMARCATION BACKBOARD 4'X8'X3/4" PLYWOOD CATV, TELEPHONE BACKBOARD LOCATED IN MDF
1#1/0-1"C
DATA RACK
TB
PROVIDE 10' COIL OF # 6 G. FOR VERIZON
C.A.T.V. TERMINAL BOX FURNISHED AND INSTALLED BY CATV COMPANY
#1/0 GND, 1"C TO WALL MTD GROUND BUS IN MAIN ELECTRIC ROOM
NETWORK/ TELECOM
150
1#1/0 GRD - 1"C TO MAIN SERVICE BUS ELECTRODE.
MAIN ELECTRIC
151
LEVEL 1
TYPICALLY TELECOMMUNICATIONS GROUND BAR "TGB"
SEE DETAIL 2 E3.04
TELEPHONE & SPARE
CATV & FIBER
(2)-4" CONDUITS FROM SERVICE PROVIDER TO ENTRANCE PROTECTION TERMINATION SEE SITE PLAN FOR CONTINUATION
(2)-4" CONDUITS SEE SITE PLAN FOR CONTINUATION

1
E3.07

TELECOMMUNICATIONS CONDUIT & GROUNDING RISER DIAGRAM

SCALE: N.T.S.

NOTES:

1. COORDINATE ALL SLEEVE LOCATIONS WITH TELECOMMUNICATIONS CONTRACTOR PRIOR TO INSTALLATION.

2. COORDINATE ALL CONDUIT ROUTING WITH TELECOMMUNICATIONS CONTRACTOR. PROVIDE PULL BOXES WHERE CONDUIT BEND EXCEEDS A TOTAL OF 180 DEGREES OR DISTANCE EXCEEDS 150'. ALWAYS ALIGN CONDUITS ON OPPOSITE ENDS OF PULL BOX.

3. PULL BOX SIZES FOR 4" CONDUITS SHALL BE MINIMUM 15" WIDE X 60" LONG X 8" DEEP. INCREASE WIDTH OF PULL BOX 8" FOR EVERY ADDITIONAL 4" CONDUIT.

4. ALL CONDUIT BENDS SHALL BE MINIMUM 36" RADIUS.

5. DO NOT RUN CONDUITS PARALLEL WITH POWER CONDUITS. MAINTAIN MINIMUM OF 4' CLEARANCE.

6. E.C. SHALL BOND ALL CABLE TRAY TO "TGB" IN RESPECTIVE DATA ROOM WITH #6 GROUND. THE CABLE TRAY SHALL BE ELECTRICALLY CONTINUOUS THROUGH. ENTIRE RUN INCLUDING ALL FITTINGS.

DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
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GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
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ELEMENTARY SCHOOL

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WILMINGTON, MA 01887

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ISSUE TITLE AND DATE:

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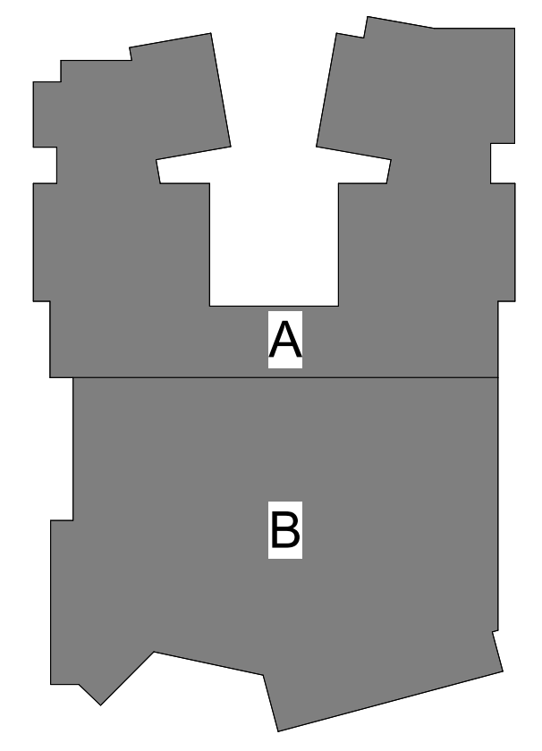
09/25/2026

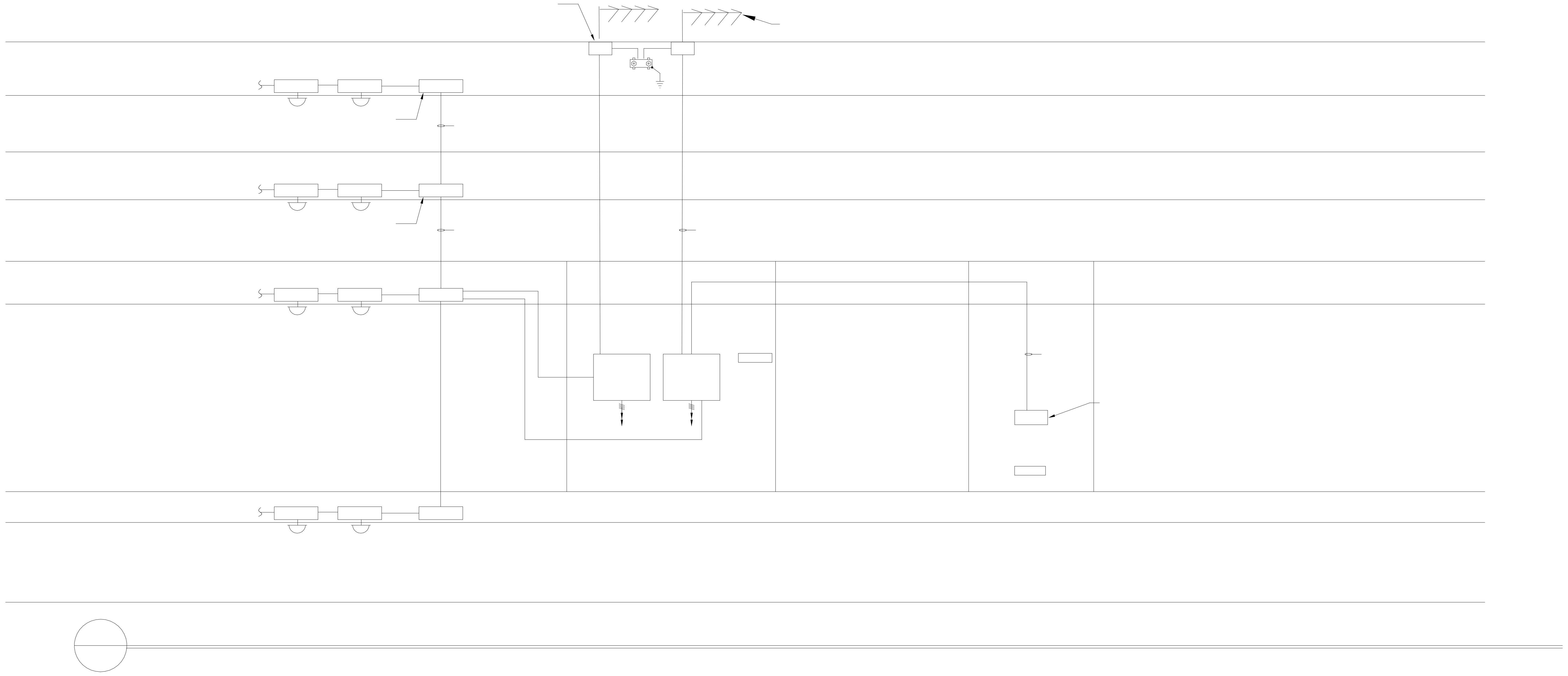
KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:
TELECOM RISER DIAGRAM

SHEET NUMBER:
E3.08



DORE + WHITTIER
MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT   05401
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WILMINGTON ELEMENTARY SCHOOL

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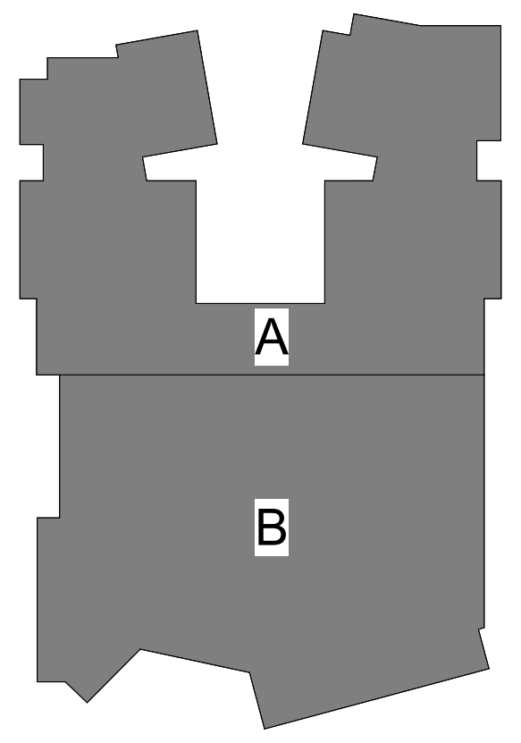
KEY PLAN



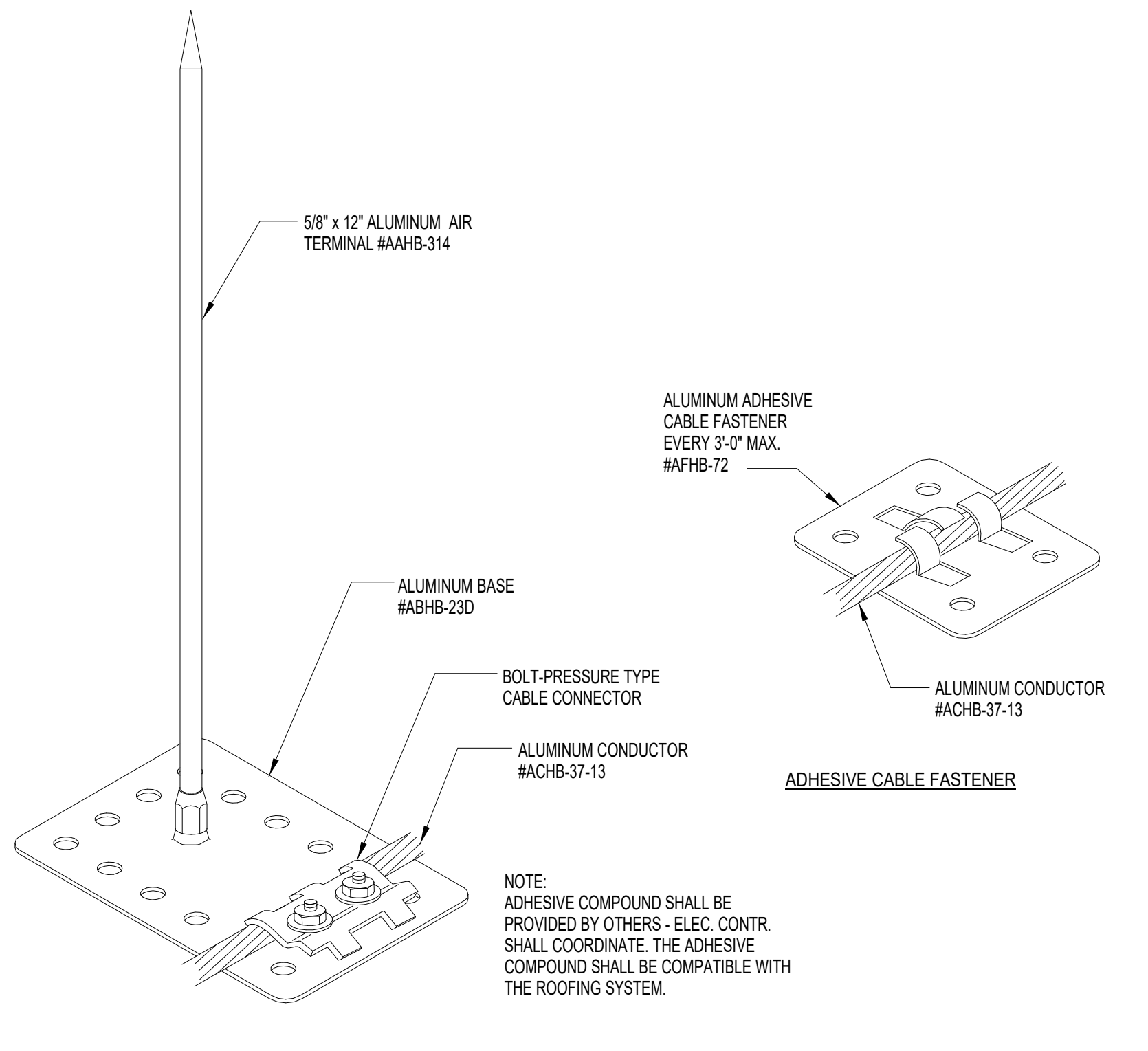
ORIENTATION AND SCALE:

N
TRUE NORTH
PROJECT NORTH

SHEET TITLE:
BDA SYSTEM DIAGRAM

SHEET NUMBER:
E3.09

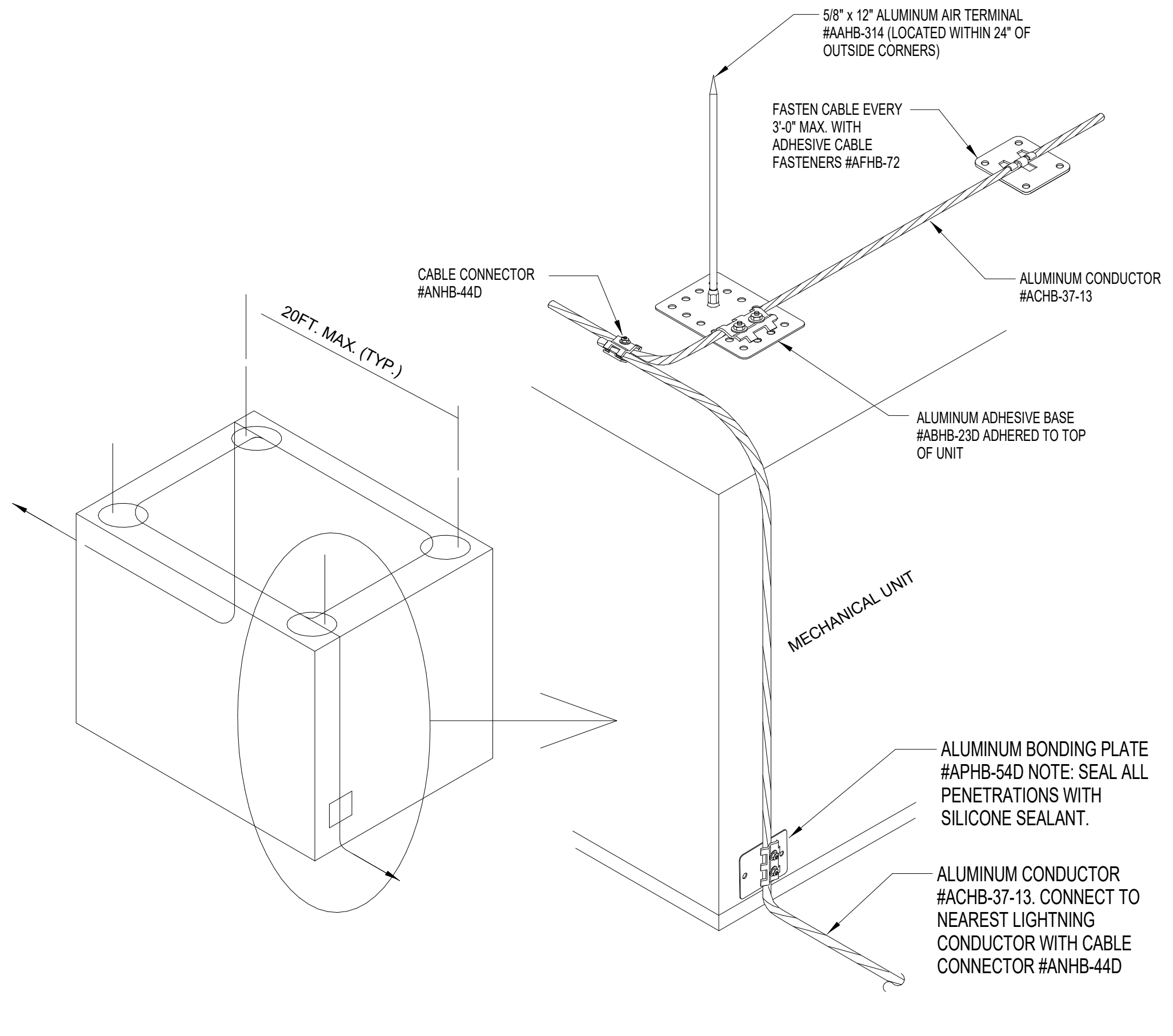
9/23/2026 4:39:18 PM
Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt


5/8" x 12" ALUMINUM AIR TERMINAL #AAHB-314
ALUMINUM ADHESIVE CABLE FASTENER EVERY 3'-0" MAX. #AFHB-72
ALUMINUM BASE #ABHB-23D
BOLT-PRESSURE TYPE CABLE CONNECTOR
ALUMINUM CONDUCTOR #ACHB-37-13
ALUMINUM CONDUCTOR #ACHB-37-13
ADHESIVE CABLE FASTENER

NOTE:
ADHESIVE COMPOUND SHALL BE PROVIDED BY OTHERS - ELEC. CONTR. SHALL COORDINATE. THE ADHESIVE COMPOUND SHALL BE COMPATIBLE WITH THE ROOFING SYSTEM.

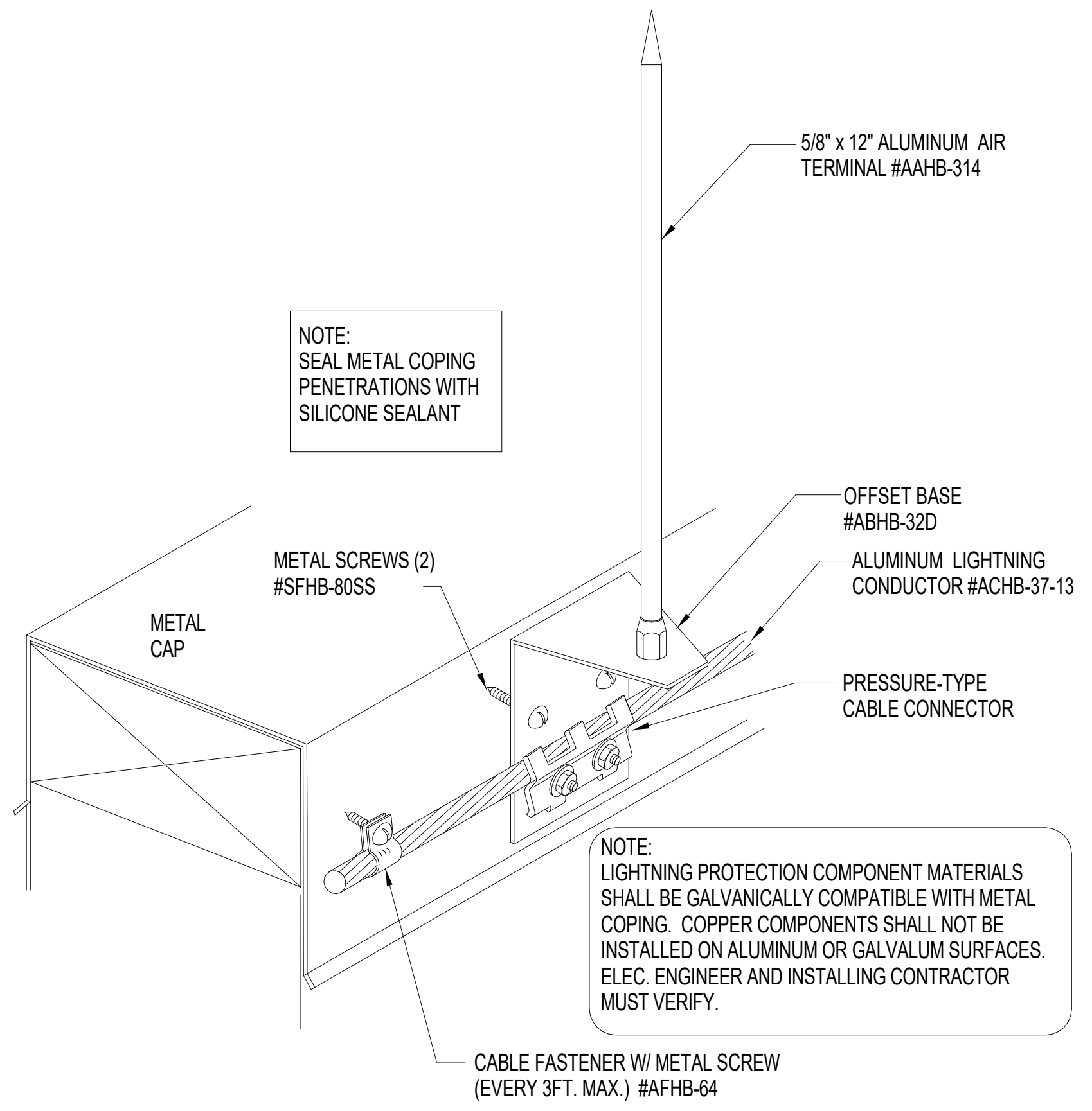
1 AIR TERMINAL BASE

NTS SYMBOL °A


5/8" x 12" ALUMINUM AIR TERMINAL #AAHB-314 (LOCATED WITHIN 24" OF OUTSIDE CORNERS)
FASTEN CABLE EVERY 3'-0" MAX. WITH ADHESIVE CABLE FASTENERS #AFHB-72
CABLE CONNECTOR #ANHB-44D
ALUMINUM CONDUCTOR #ACHB-37-13
20FT. MAX. (TYP.)
ALUMINUM ADHESIVE BASE #ABHB-23D ADHERED TO TOP OF UNIT
MECHANICAL UNIT
ALUMINUM BONDING PLATE #APHB-54D NOTE: SEAL ALL PENETRATIONS WITH SILICONE SEALANT.
ALUMINUM CONDUCTOR #ACHB-37-13. CONNECT TO NEAREST LIGHTNING CONDUCTOR WITH CABLE CONNECTOR #ANHB-44D

4 LIGHTNING PROTECTION AT ROOF TOP UNIT

NTS

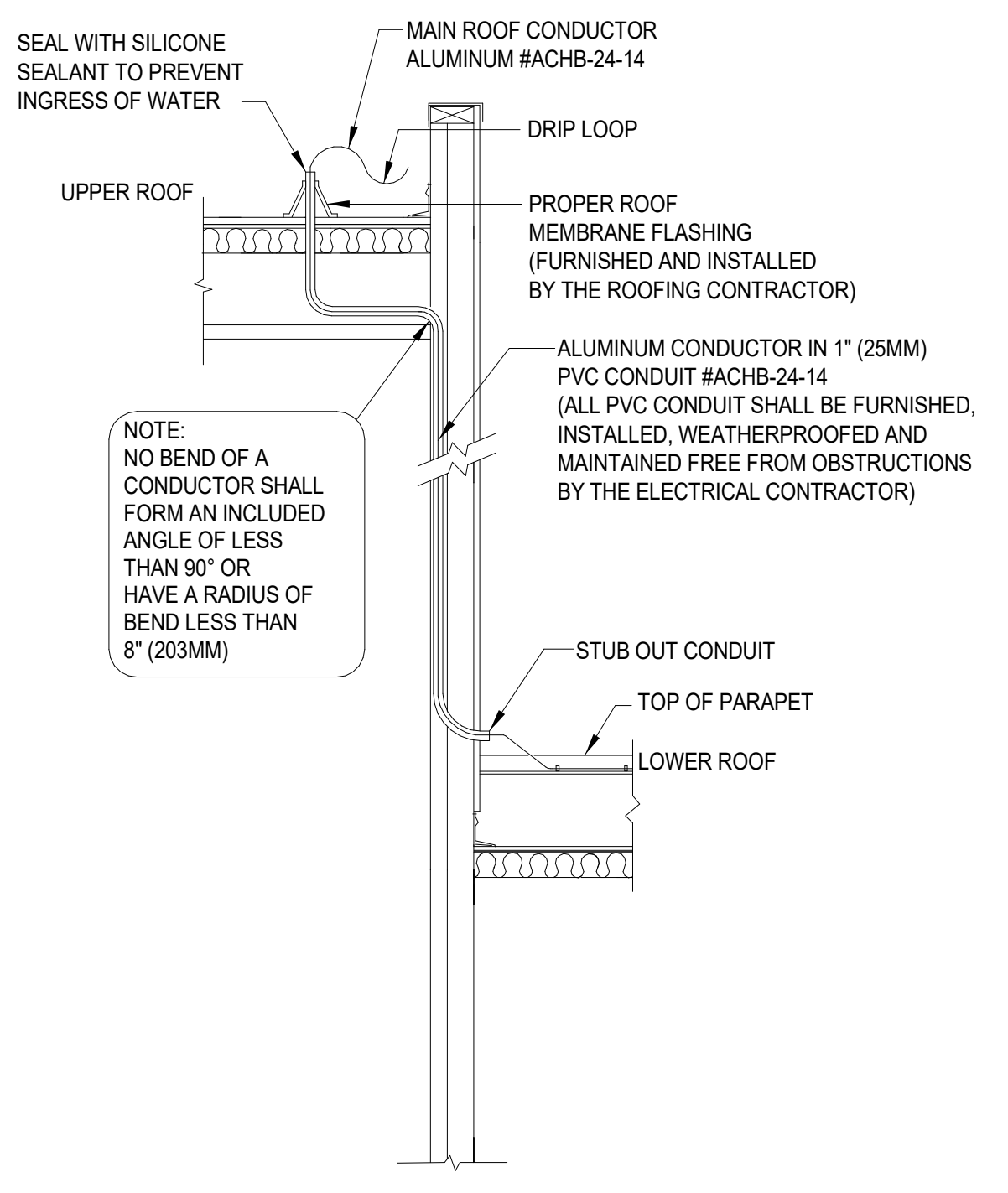

5/8" x 12" ALUMINUM AIR TERMINAL #AAHB-314
OFFSET BASE #ABHB-32D
METAL SCREWS (2) #SFHB-80SS
ALUMINUM LIGHTNING CONDUCTOR #ACHB-37-13
METAL CAP
PRESSURE-TYPE CABLE CONNECTOR
CABLE FASTENER W/ METAL SCREW (EVERY 3FT. MAX.) #AFHB-64

NOTE:
SEAL METAL COPING PENETRATIONS WITH SILICONE SEALANT

NOTE:
LIGHTNING PROTECTION COMPONENT MATERIALS SHALL BE GALVANICALLY COMPATIBLE WITH METAL COPING. COPPER COMPONENTS SHALL NOT BE INSTALLED ON ALUMINUM OR GALVALUM SURFACES. ELEC. ENGINEER AND INSTALLING CONTRACTOR MUST VERIFY.

2 OFFSET AIR TERMINAL BASE

NTS SYMBOL °B

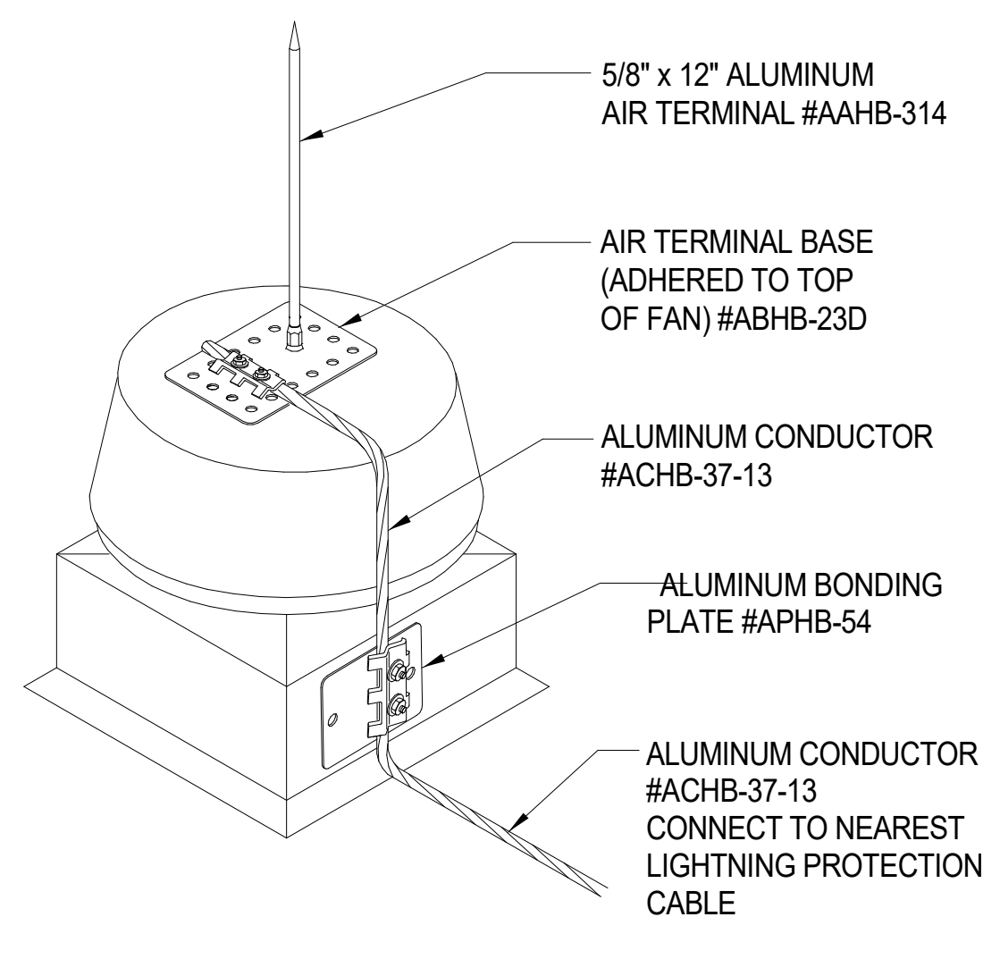

SEAL WITH SILICONE SEALANT TO PREVENT INGRESS OF WATER
MAIN ROOF CONDUCTOR ALUMINUM #ACHB-24-14
DRIP LOOP
UPPER ROOF
PROPER ROOF MEMBRANE FLASHING (FURNISHED AND INSTALLED BY THE ROOFING CONTRACTOR)
ALUMINUM CONDUCTOR IN 1" (25MM) PVC CONDUIT #ACHB-24-14 (ALL PVC CONDUIT SHALL BE FURNISHED, INSTALLED, WEATHERPROOFED AND MAINTAINED FREE FROM OBSTRUCTIONS BY THE ELECTRICAL CONTRACTOR)
STUB OUT CONDUIT
TOP OF PARAPET
LOWER ROOF

NOTE:
NO BEND OF A CONDUCTOR SHALL FORM AN INCLUDED ANGLE OF LESS THAN 90° OR HAVE A RADIUS OF BEND LESS THAN 8" (203MM)

5 DOWNLOAD TO LOWER ROOF

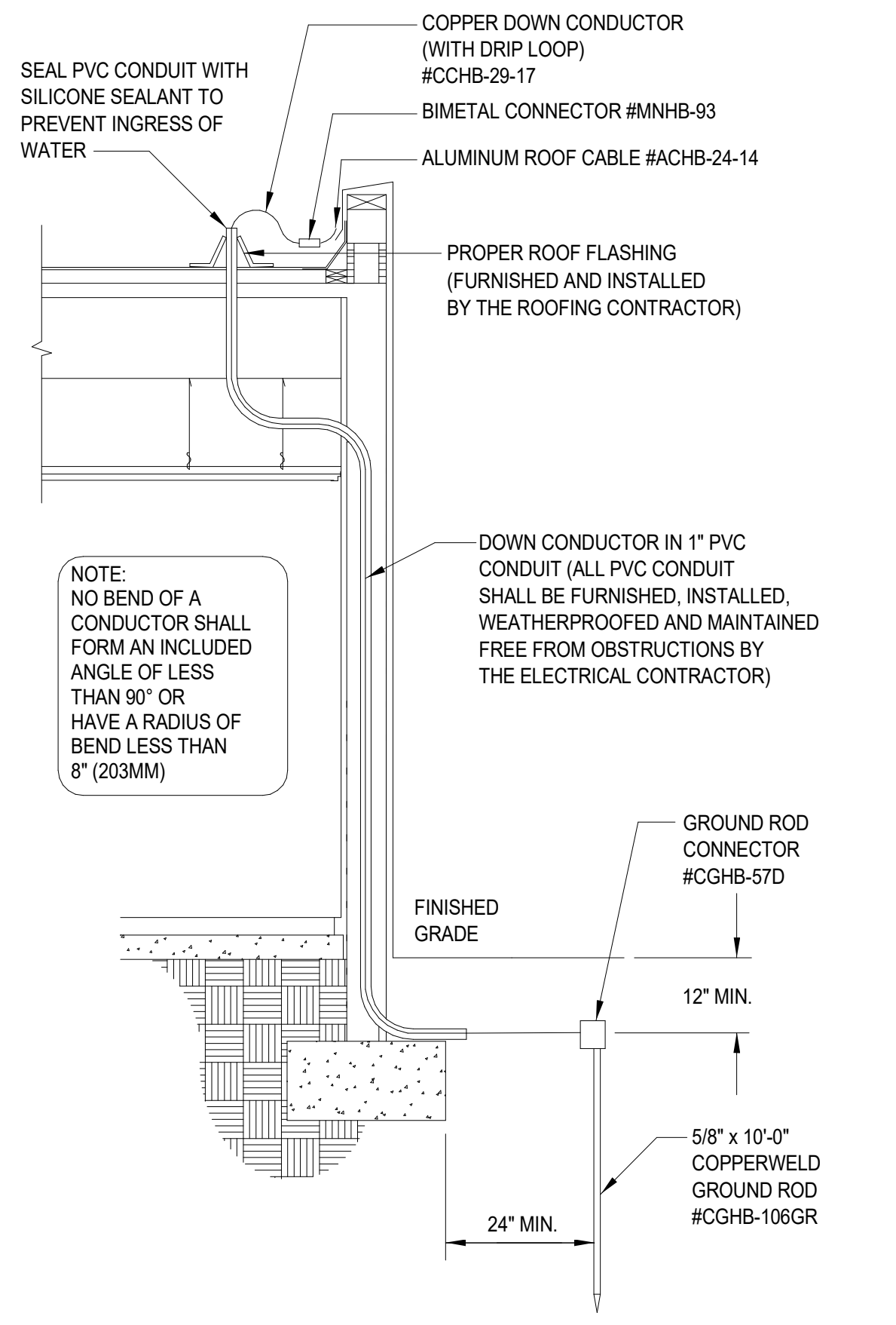
NTS SYMBOL ▲

NOTE: AIR TERMINALS ARE REQUIRED ON ROOF VENTILATORS/EXH. FANS THAT ARE NOT WITHIN A ZONE OF PROTECTION OR WHEN HIGHER THAN ADJACENT AIR TERMINALS.


5/8" x 12" ALUMINUM AIR TERMINAL #AAHB-314
AIR TERMINAL BASE (ADHERED TO TOP OF FAN) #ABHB-23D
ALUMINUM CONDUCTOR #ACHB-37-13
ALUMINUM BONDING PLATE #APHB-54
ALUMINUM CONDUCTOR #ACHB-37-13 CONNECT TO NEAREST LIGHTNING PROTECTION CABLE

3 AIR TERMINAL AT EXH. FAN

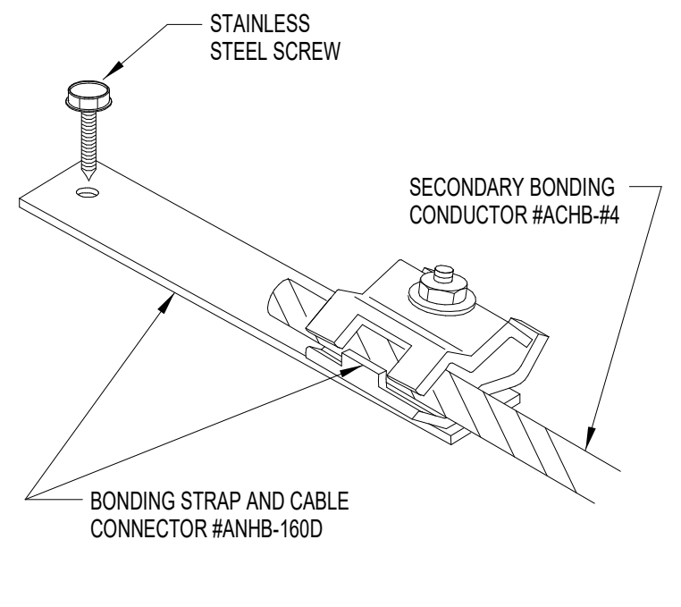
NTS SYMBOL °F


COPPER DOWN CONDUCTOR (WITH DRIP LOOP) #CCHB-29-17
SEAL PVC CONDUIT WITH SILICONE SEALANT TO PREVENT INGRESS OF WATER
BIMETAL CONNECTOR #MNHB-93
ALUMINUM ROOF CABLE #ACHB-24-14
PROPER ROOF FLASHING (FURNISHED AND INSTALLED BY THE ROOFING CONTRACTOR)
DOWN CONDUCTOR IN 1" PVC CONDUIT (ALL PVC CONDUIT SHALL BE FURNISHED, INSTALLED, WEATHERPROOFED AND MAINTAINED FREE FROM OBSTRUCTIONS BY THE ELECTRICAL CONTRACTOR)
GROUND ROD CONNECTOR #CGHB-57D
FINISHED GRADE
12" MIN.
5/8" x 10'-0" COPPERWELD GROUND ROD #CGHB-106GR
24" MIN.

NOTE:
NO BEND OF A CONDUCTOR SHALL FORM AN INCLUDED ANGLE OF LESS THAN 90° OR HAVE A RADIUS OF BEND LESS THAN 8" (203MM)

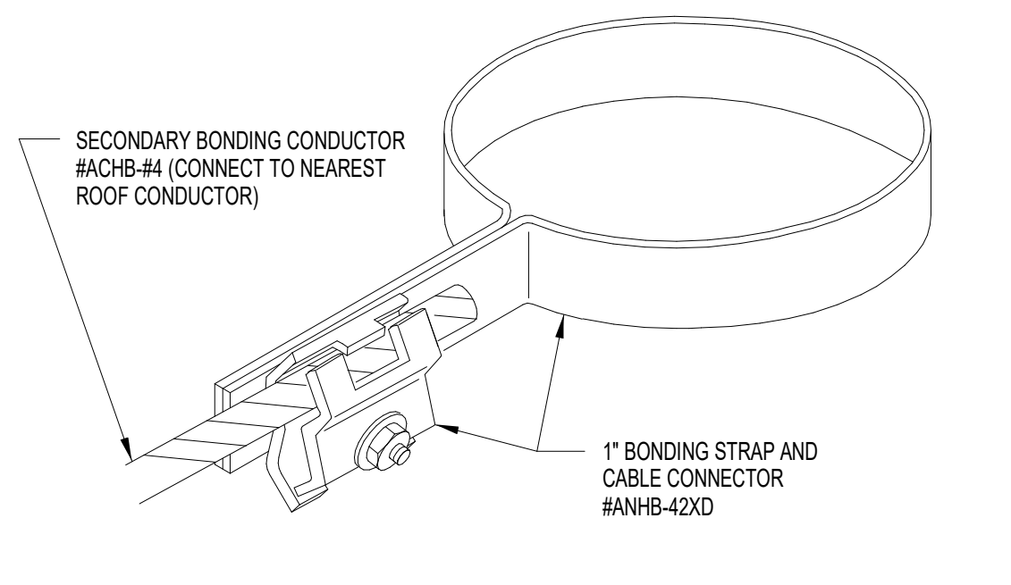
6 LIGHTNING PROTECTION GROUNDING

NTS SYMBOL △


STAINLESS STEEL SCREW
SECONDARY BONDING CONDUCTOR #ACHB-#4
BONDING STRAP AND CABLE CONNECTOR #ANHB-160D

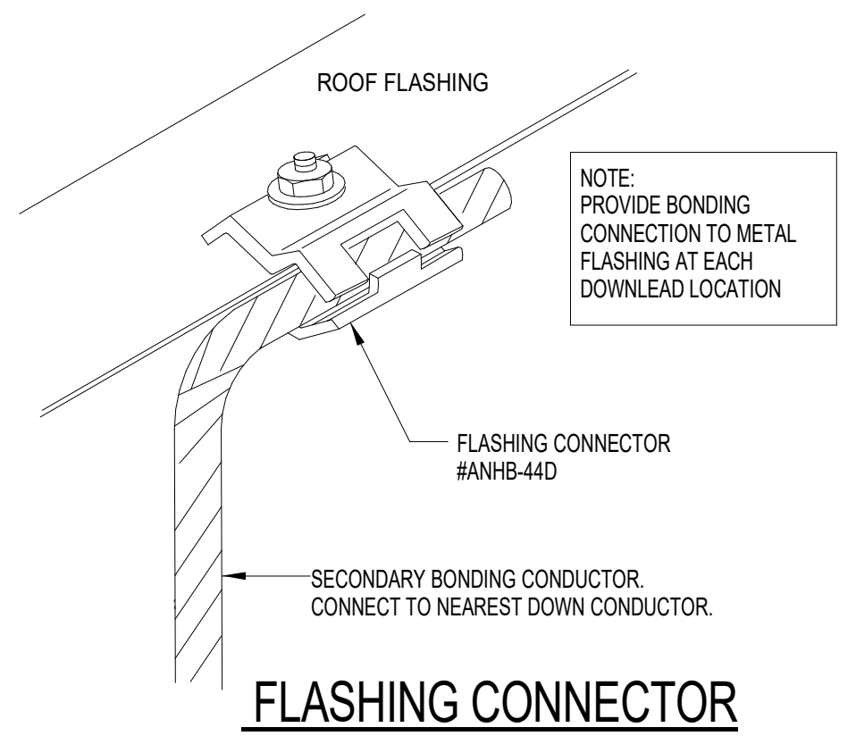
BONDING LUG (GUTTERS)

NTS


SECONDARY BONDING CONDUCTOR #ACHB-#4 (CONNECT TO NEAREST ROOF CONDUCTOR)
1" BONDING STRAP AND CABLE CONNECTOR #ANHB-42XD

BONDING STRAP AT (VENT PIPES)

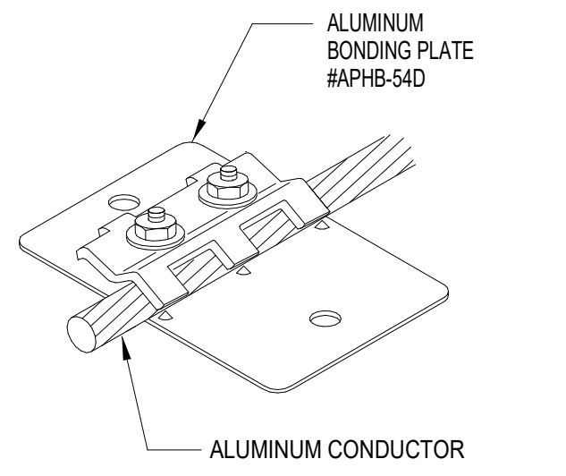
NTS


ROOF FLASHING
FLASHING CONNECTOR #ANHB-44D
SECONDARY BONDING CONDUCTOR. CONNECT TO NEAREST DOWN CONDUCTOR.

NOTE:
PROVIDE BONDING CONNECTION TO METAL FLASHING AT EACH DOWNLEAD LOCATION

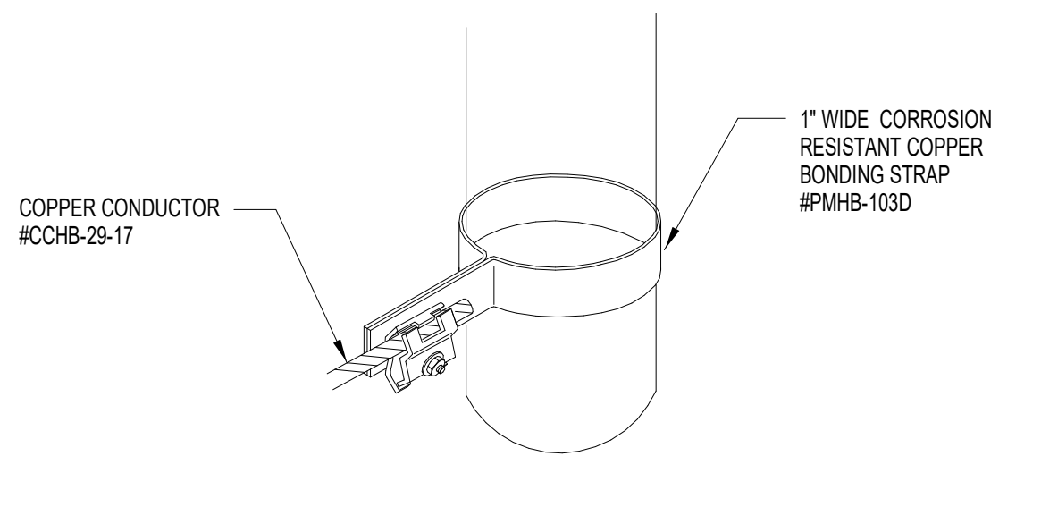
FLASHING CONNECTOR

NTS



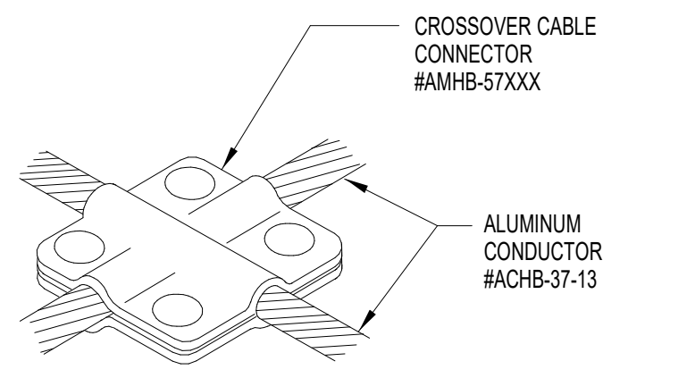
BONDING PLATE

NTS


COPPER CONDUCTOR #CCHB-29-17
1" WIDE CORROSION RESISTANT COPPER BONDING STRAP #PMHB-103D

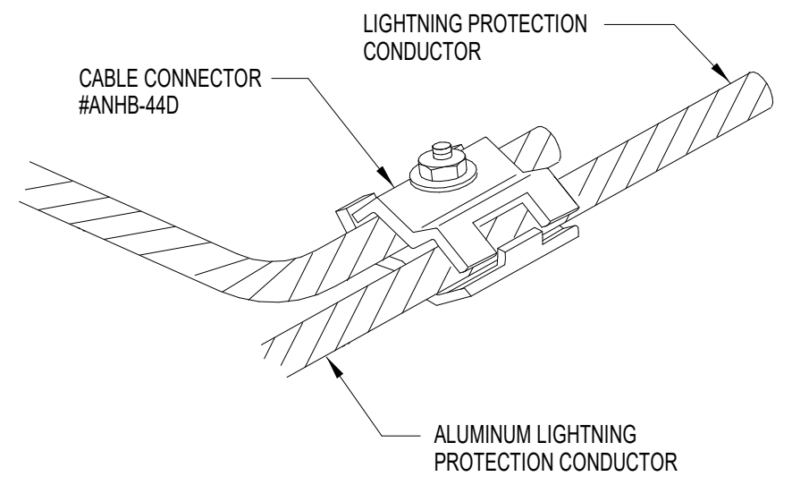
PIPE CLAMP (RAILINGS, ANTENNAS, ETC.)

NTS


CROSSOVER CABLE CONNECTOR #AMHB-57XXX
ALUMINUM CONDUCTOR #ACHB-37-13

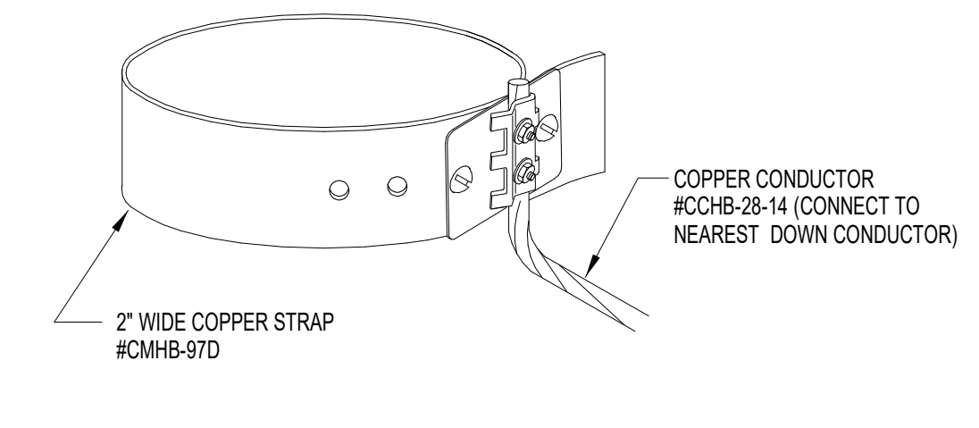
CROSSOVER CABLE CONNECTOR

NTS


LIGHTNING PROTECTION CONDUCTOR
CABLE CONNECTOR #ANHB-44D
ALUMINUM LIGHTNING PROTECTION CONDUCTOR

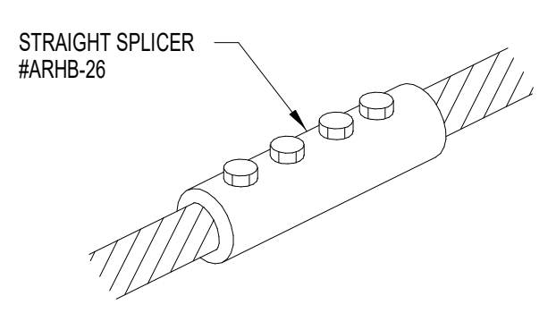
CABLE CONNECTOR

NTS


COPPER CONDUCTOR #CCHB-28-14 (CONNECT TO NEAREST DOWN CONDUCTOR)
2" WIDE COPPER STRAP #CMHB-97D

WATERLINE BONDING STRAP

NTS



STRAIGHT SPLICER

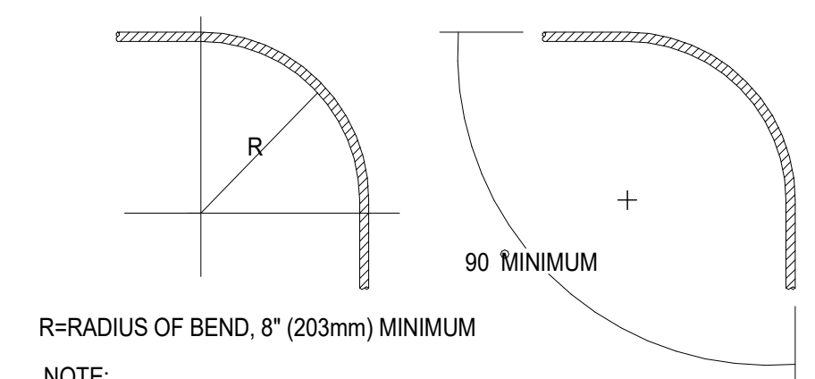
NTS

LIGHTNING PROTECTION MATERIALS LIST

⌒	ALUMINUM LIGHTNING PROTECTION MAIN ROOF CONDUCTOR	ACHB-37-13
	ALUMINUM LIGHTNING PROTECTION SECONDARY BONDING CABLE*	ACHB-#4
	COPPER LIGHTNING PROTECTION DOWN CONDUCTOR	CCHB-28-14
	BIMETAL CONNECTOR	MNHB-93
	CABLE FASTENERS (FASTEN CABLE EVERY 3FT. MAX.)	AFHB-72, 66, 64, CFHB-72, 64
°A	5/8" x 12" ALUMINUM AIR TERMINAL AND ADHESIVE BASE	AAHB-314, ABHB-23D
°B	5/8" x 12" ALUMINUM AIR TERMINAL AND OFFSET BASE (SCREEN WALL)	AAHB-314, ABHB-32D
°F	5/8" x 12" ALUMINUM AIR TERMINAL AND ADHESIVE BASE (AT FANS)	AAHB-314, ABHB-23D
°S	5/8" x 12" ALUMINUM AIR TERMINAL AND SADDLE BASE	AAHB-314, ABHB-172D
	SECONDARY BONDING:	
	*FLASHING CONNECTOR	ANHB-44D
	*METAL ROOF DRAIN / GUTTER CONNECTOR	ANHB-160D
	*METAL VENT PIPE CONNECTOR	ANHB-42X
	ALUMINUM BONDING PLATE (AT LIGHT POLES, RTU & FANS)	APHB-54D
	CORROSION RESISTANT COPPER BONDING PLATE (TO BASE OF STEEL AT EACH DOWNLEAD)	PPHB-54D
	PIPE CLAMP (ANTENNAS, RAILINGS, ETC.)	PMHB-103D
	CABLE CONNECTOR	ANHB-44D, CNHB-44D
	STRAIGHT SPLICER	ARHB-26
	CROSSOVER CABLE CONNECTOR	AMHB-57XXX
	WATERLINE CONNECTOR (FIRE WATER & DOMESTIC WATER)	CMHB-97D
⏚	3/4" x 10'-0" COPPERWELD GROUND ROD AND CONNECTOR	CGHB-107GR, 57D

LIGHTNING PROTECTION NOTES

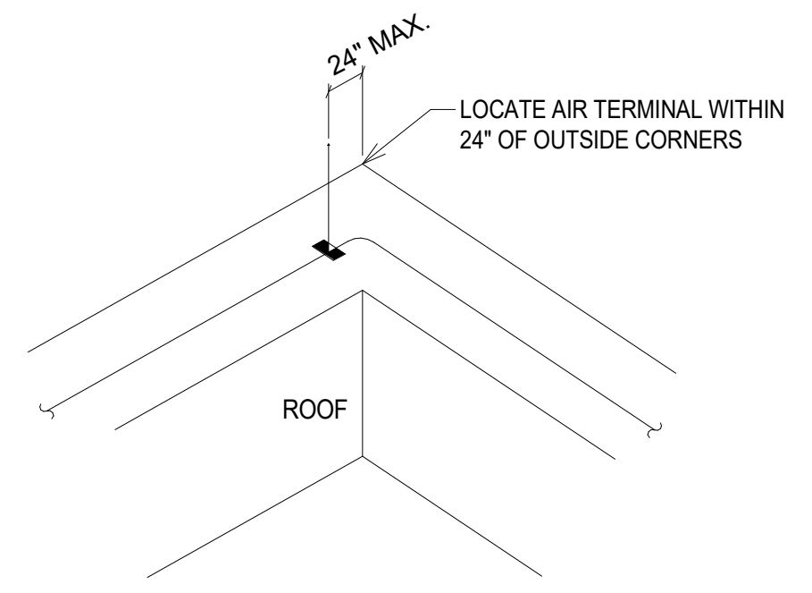
1. ALL CATALOG NUMBERS INDICATED ARE FOR HEARY BROS. LIGHTNING PROTECTION CO., INC., (BASIS OF DESIGN)
2. THE LIGHTNING PROTECTION SYSTEM AS SHOWN ON DRAWING HAS BEEN DESIGNED IN ACCORDANCE WITH UL96A & NFPA-780 LIGHTNING PROTECTION SYSTEM STANDARDS.
3. CONDUCTORS SHALL MAINTAIN A HORIZONTAL OR DOWNWARD COURSE, FREE FROM "U" OR "V" (DOWN AND UP) POCKETS.
4. NO BEND OF CONDUCTOR SHALL FORM AN ANGLE OF LESS THAN 90° NOR SHALL HAVE A RADIUS OF BEND LESS THAN 8".
5. AIR TERMINALS SHALL BE SPACED EVERY 20'-0" MAXIMUM AROUND THE ROOF PERIMETER AND/OR ALONG ROOF RIDGES. AIR TERMINALS SHALL BE LOCATED WITHIN 2'-0" OF OUTSIDE CORNERS.
6. AIR TERMINALS SHALL BE SPACED EVERY 50'-0" MAXIMUM IN CENTER ROOF AREAS.
7. ACTUAL JOBSITE CONDITIONS MAY REQUIRE SLIGHT ALTERATIONS IN AIR TERMINAL, DOWN CONDUCTOR AND GROUND ROD LOCATIONS.
8. BARE COPPER MATERIALS SHALL NOT BE INSTALLED ON ALUMINUM OR GALVALUM SURFACES, AND ALUMINUM MATERIALS SHALL NOT BE INSTALLED ON COPPER SURFACES.
9. ALL LIGHTNING PROTECTION CONDUCTORS SHALL BE FASTENED EVERY 3'-0" MAX.
10. ALL BOLTS ON BOLT-PRESSURE CONNECTORS SHALL BE TORQUED AT 150 POUND-INCHES (17N-m).
11. ALL CONNECTIONS MUST BE USED WITH UL LISTED CLASS I OR CLASS II CABLE OF SAME METAL TYPE.
12. METALLIC BODIES OF INDUCTANCE SITUATED WITHIN 6'-0" OF A LIGHTNING CONDUCTOR OR ANOTHER BONDED METAL BODY SHALL BE INTERCONNECTED TO THE LIGHTNING CONDUCTOR SYSTEM, UNLESS INHERENTLY GROUNDED.
13. BOND TO ALL METAL BODIES OF CONDUCTANCE WITHIN 6'-0" OF THE MAIN LIGHTNING CONDUCTOR SUCH AS EXHAUST FANS, ROOF VENTS, METAL COOLING TOWERS, H.V.A.C. UNITS, LADDERS, RAILINGS, ANTENNAS, SKYLIGHTS, METAL STACKS AND ANY OTHERS LARGE METAL BODY WHOSE HEIGHT EXCEEDS THAT OF THE AIR TERMINAL IN USE, UNLESS PROTECTED BY HIGHER ROOF ELEVATIONS.
14. CONNECTIONS TO GROUND RODS SHALL BE MADE AT A POINT NOT LESS THAN 1'-0" BELOW FINISHED GRADE AND 2'-0" AWAY FROM FOUNDATION WALL.
15. BOND TO WATERLINES (DOMESTIC & FIRE).
16. A LIGHTNING ARRESTOR, PROTECTOR OR ANTENNA DISCHARGE UNIT SHALL BE INSTALLED ON EACH ELECTRIC AND TELEPHONE SERVICE AND RADIO AND TELEVISION ANTENNA LEAD-IN BY THE ELECTRICAL CONTRACTOR, IN ACCORDANCE WITH NFPA-70.
17. TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) OF SERVICES SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. (I.E. COMPUTERS, COPIERS, TELEPHONE, ETC.).



R=RADIUS OF BEND, 8" (203mm) MINIMUM

NOTE:
-LP CONDUCTOR SHALL REMAIN IN A HORIZONTAL OR DOWNWARD PATH AVOIDING "U" & "V" POCKETS (DOWN & UP).
-NO BEND OF A CONDUCTOR SHALL FORM AN INCLUDED ANGLE OF LESS THAN 90° OR HAVE A RADIUS OF BEND LESS THAN 8".

8" MIN. RADIUS BEND IN CABLE



AIR TERMINALS SHALL BE LOCATED WITHIN 24" OF OUTSIDE CORNERS

NTS

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PROJECT NUMBER: 23-0847

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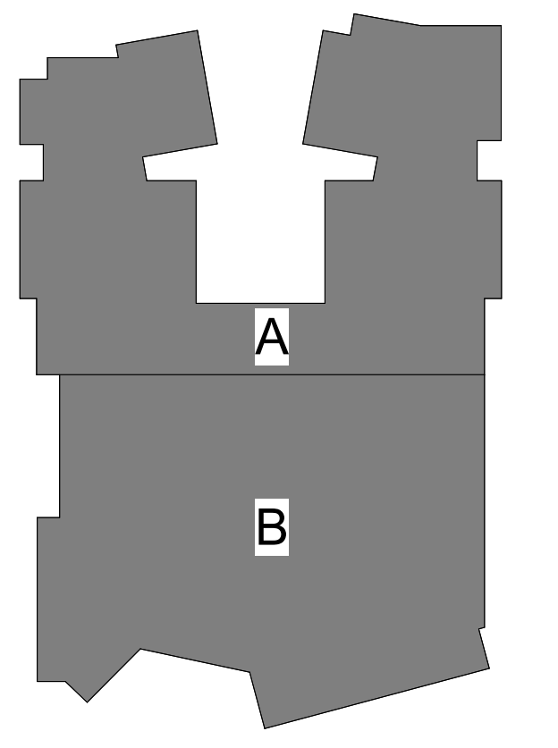
KEY PLAN



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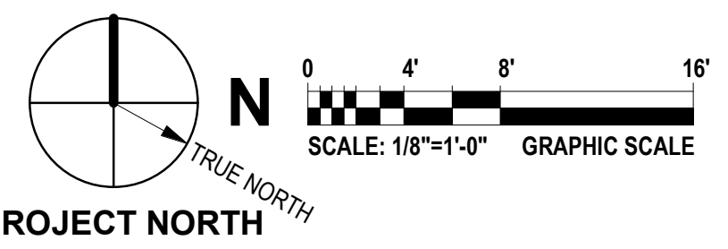

SHEET TITLE:
LIGHTNING
PROTECTION
DETAILS

SHEET NUMBER:
E3.10

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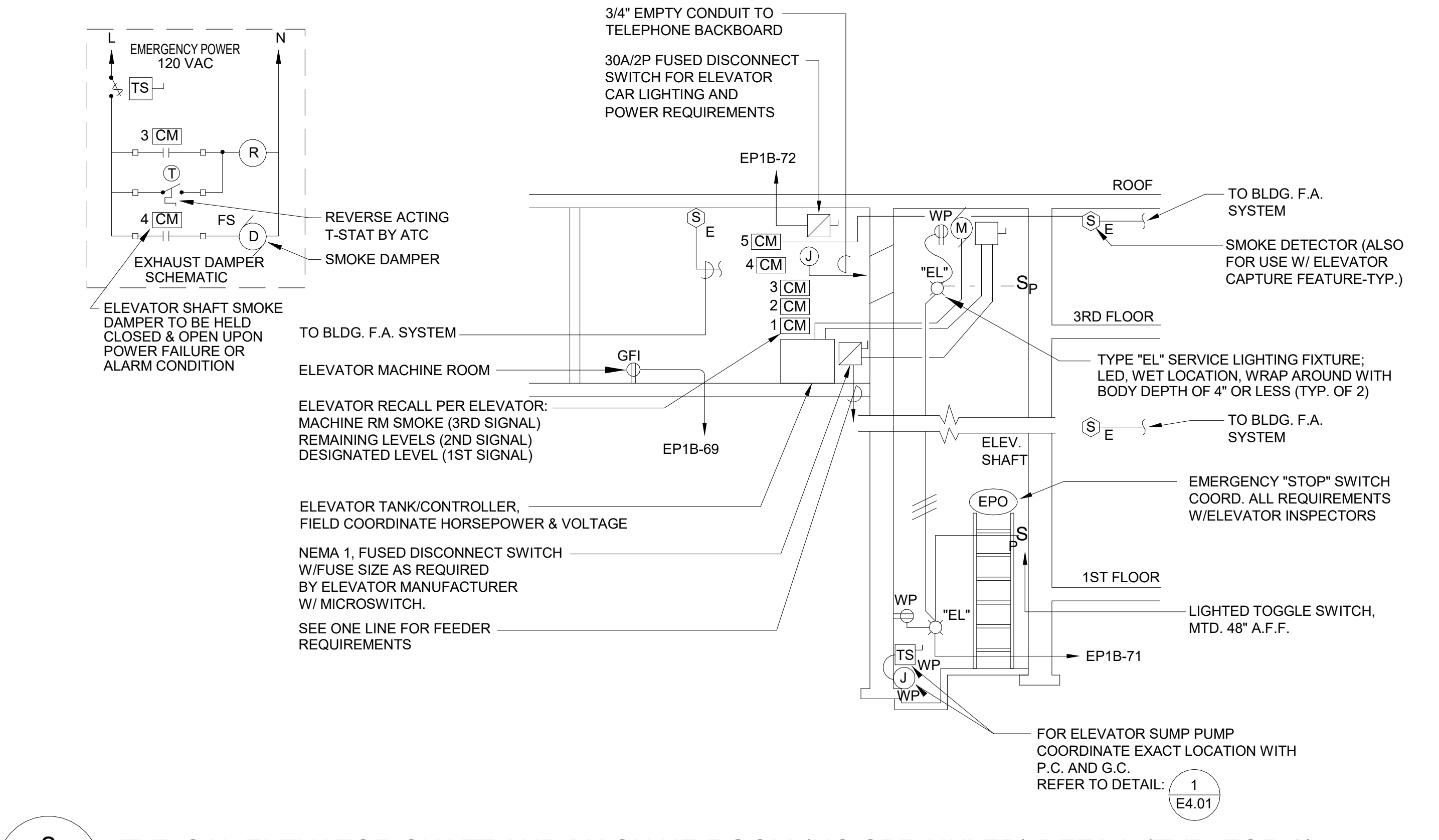

EMERGENCY POWER 120 VAC
L
N
TS
3 CM
R
T
4 CM
FS
D
EXHAUST DAMPER SCHEMATIC
REVERSE ACTING T-STAT BY ATC
SMOKE DAMPER
ELEVATOR SHAFT SMOKE DAMPER TO BE HELD CLOSED & OPEN UPON POWER FAILURE OR ALARM CONDITION
3/4" EMPTY CONDUIT TO TELEPHONE BACKBOARD
30A/2P FUSED DISCONNECT SWITCH FOR ELEVATOR CAR LIGHTING AND POWER REQUIREMENTS
EP1B-72
ROOF
TO BLDG. F.A. SYSTEM
SMOKE DETECTOR (ALSO FOR USE W/ ELEVATOR CAPTURE FEATURE-TYP.)
5 CM
4 CM
3 CM
2 CM
1 CM
J
WP
M
"EL"
SP
3RD FLOOR
TO BLDG. F.A. SYSTEM
ELEVATOR MACHINE ROOM
GFI
ELEVATOR RECALL PER ELEVATOR: MACHINE RM SMOKE (3RD SIGNAL) REMAINING LEVELS (2ND SIGNAL) DESIGNATED LEVEL (1ST SIGNAL)
EP1B-69
TYPE "EL" SERVICE LIGHTING FIXTURE; LED, WET LOCATION, WRAP AROUND WITH BODY DEPTH OF 4" OR LESS (TYP. OF 2)
TO BLDG. F.A. SYSTEM
ELEV. SHAFT
ELEVATOR TANK/CONTROLLER, FIELD COORDINATE HORSEPOWER & VOLTAGE
EPO
EMERGENCY "STOP" SWITCH COORD. ALL REQUIREMENTS W/ELEVATOR INSPECTORS
NEMA 1, FUSED DISCONNECT SWITCH W/FUSE SIZE AS REQUIRED BY ELEVATOR MANUFACTURER W/ MICROSWITCH.
1ST FLOOR
SEE ONE LINE FOR FEEDER REQUIREMENTS
LIGHTED TOGGLE SWITCH, MTD. 48" A.F.F.
EP1B-71
TS
WP
J
FOR ELEVATOR SUMP PUMP COORDINATE EXACT LOCATION WITH P.C. AND G.C. REFER TO DETAIL: 1 E4.01

2 E4.01 TYPICAL ELEVATOR SHAFT AND MACHINE ROOM (NO SPRINKLER) DETAIL (TYP. FOR 2)

N.T.S.

SEQUENCE OF OPERATION

1. SMOKE DETECTORS LOCATED IN EACH ELEVATOR LOBBY & MACHINE ROOM SHALL INITIATE ELEVATOR RECALL IN ADDITION TO SENDING SYSTEM INTO "AUTO" ALARM MODE FOR FIRE FIGHTERS SERVICE.
2. FIVE (5) CONTROL MODULES WILL BE LOCATED IN THE ELEVATOR MACHINE ROOM.
3. THE SMOKE DETECTOR LOCATED ON THE DESIGNATED LEVEL WILL ACTUATE THE FIRST CONTROL MODULE OF EACH ELEVATOR AND INITIATE THE ALTERNATE LEVEL RECALL.
4. THE SMOKE DETECTORS ON THE REMAINING ELEVATOR LEVELS WILL ACTUATE THE SECOND CONTROL MODULE FOR DESIGNATED LEVEL RECALL FOR EACH ELEVATOR.
5. THE THIRD CONTROL MODULE WILL BE ACTUATED BY A FIRE ALARM INITIATING DEVICE IN THE MACHINE ROOM, CONTROL SPACE, CONTROL ROOM AND/OR HOISTWAY AND WILL ILLUMINATE THE ASSOCIATED FIREFIGHTERS HAT.
6. WHERE THE ELEVATOR MACHINE ROOM IS LOCATED AT THE DESIGNATED LEVEL, THAT MACHINE ROOM SMOKE DETECTOR WILL ALSO ACTUATE THE FIRST CONTROL MODULE TO RECALL ELEVATOR TO THE ALTERNATE LEVEL.
7. THE FOURTH CONTROL MODULE WILL BE ACTUATED BY A FIRE ALARM INITIATING DEVICE IN THE MACHINE ROOM, CONTROL SPACE, CONTROL ROOM AND/OR HOISTWAY AND WILL ENERGIZE THE MACHINE ROOM EXHAUST FAN.
8. THE FIFTH CONTROL MODULE WILL BE ACTUATED BY A FIRE ALARM INITIATING DEVICE IN THE MACHINE ROOM, CONTROL SPACE, CONTROL ROOM AND/OR HOISTWAY AND WILL DE-ENERGIZE THE FIRE/SMOKE DAMPER CAUSING IT TO OPEN.

	F.A. RADIO BOX ZONE SCHEDULE
ZONE	
1	SPRINKLER MAIN
2	SPRINKLER ZONE 1 - FIRST FLOOR
3	SPRINKLER ZONE 2 - SECOND FLOOR
4	SPRINKLER ZONE 3 - THIRD FLOOR
5	PULL STATIONS - FIRST FLOOR
6	PULL STATIONS - SECOND FLOOR
7	PULL STATIONS - THIRD FLOOR
8	SMOKES AND HEATS (AUTOMATIC DEVICES) - FIRST FLOOR
9	SMOKES AND HEATS (AUTOMATIC DEVICES) - SECOND FLOOR
10	SMOKES AND HEATS (AUTOMATIC DEVICES) - THIRD FLOOR
11	DUCT SMOKE DETECTORS (SUPERVISORY)
12	SYSTEM TROUBLE
13	CO DETECTOR (SUPERVISORY)
14	SPRINKLER TAMPERS (SUPERVISORY)
15	KNOX BOX (SUPERVISORY)

NOTE: CONFIRM ALL ZONES WITH FIRE DEPARTMENT PRIOR TO SHOP DRAWING SUBMITTAL.

FIRE ALARM SYSTEM INPUT/OUTPUT MATRIX

NOTES:

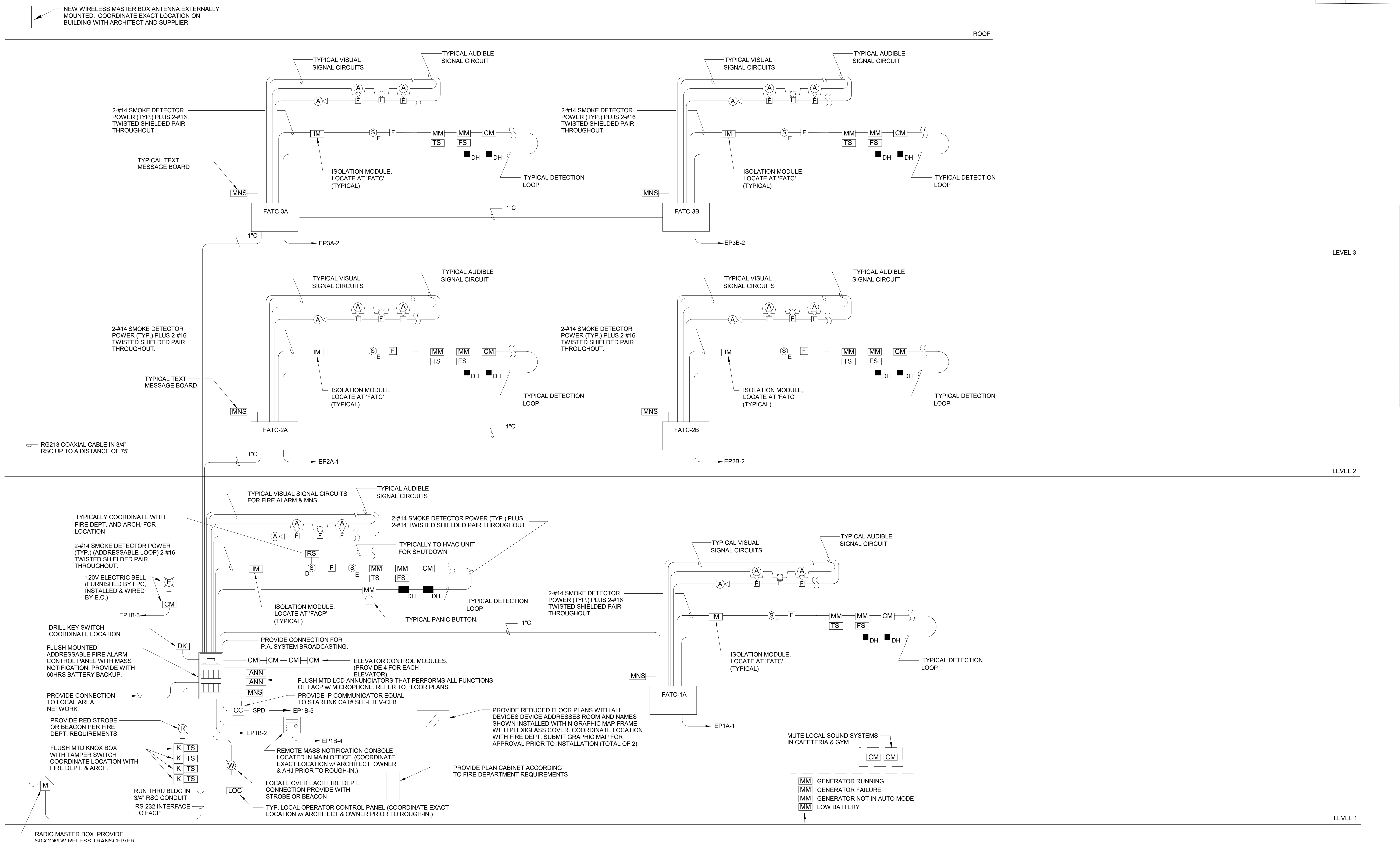
1. COORDINATE SEQUENCE OF OPERATIONS WITH FIRE DEPT PRIOR TO PROGRAMING .

		ACTUATE COMMON ALARM SIGNAL INDICATOR	ACTUATE AUDIBLE ALARM SIGNAL	ACTUATE COMMON SUPERVISORY SIGNAL INDICATOR	ACTUATE AUDIBLE SUPERVISORY SIGNAL	ACTUATE COMMON TROUBLE SIGNAL INDICATOR	ACTUATE AUDIBLE TROUBLE SIGNAL	ACTUATE ZONE OR DEVICE ADDRESS ALARM INDICATOR	ACTUATE GENERAL EVACUATION SIGNAL	DISPLAY CHANGE OF STATUS	TRANSMIT FIRE ALARM SIGNAL TO FIRE DEPT	TRANSMIT SUPERVISORY SIGNAL TO FIRE DEPT	TRANSMIT TROUBLE SIGNAL TO FIRE DEPT	RELEASE MAGNETICALLY HELD DOORS	RECALL ELEVATORS TO RECALL FLOOR	RECALL ELEVATORS TO ALTERNATE RECALL FLOOR	ACTUATE WARNING TO ELEVATOR CABS	CLOSE ALL SMOKE DAMPERS	UNLOCK EXITS AND CONTROL DOORS	TURN OFF POWER TO GAS SOLENOID	MUTE LOCAL SOUND SYSTEMS	SHUT DOWN RESPECTIVE AIR HANDLING UNIT	ACTIVATE HOOD EXHAUST FAN, DISABLE HOOD MAKE-UP	ACTUATE FLOOR PRESSURIZATION	ACTUATE STAIRWELL PRESSURIZATION	ACTUATE SMOKE EXHAUST		
		FACP ANNUNCATION					NOTIFICATION					REQUIRED FIRE SAFETY CONTROL																
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
1	FIRE ALARM SYSTEM AC POWER FAILURE			X	X							X																1
2	FIRE ALARM SYSTEM LOW BATTERY					X	X						X															2
3	OPEN CIRCUIT					X	X						X															3
4	GROUND FAULT					X	X						X															4
5	NOTIFICATION APPLIANCE DEVICE SHORT					X	X						X															5
6	BUILDING MANUAL PULL STATIONS	X	X					X	X	X	X			X					X									6
7	CORRIDOR SMOKE DETECTOR	X	X					X	X	X	X			X	X			X	X		X							7
8	AREA SMOKE DETECTOR	X	X					X	X	X	X			X	X			X	X		X							8
9	HVAC AIR DUCT SMOKE DETECTOR OR DUCT CO DETECTOR	X	X					X	X	X	X											X						9
10	AREA HEAT DETECTORS	X	X					X	X	X	X			X	X			X	X		X							10
11	HOOD OR ROOM FIRE SUPPRESSION SYSTEM ALARM	X	X					X	X	X	X			X	X			X	X	X			X					11
12	SPRINKLER TAMPER SWITCH			X	X			X				X																12
13	SPRINKLER WATER FLOW SWITCH	X	X					X	X	X	X			X	X			X	X		X							13
14	ELEVATOR EQUIPMENT AREA SMOKE DETECTOR	X	X					X	X	X	X			X	X		X	X	X									14
15																												15
16	ELEVATOR LOBBY SMOKE DETECTOR, ALTERNATE FL	X	X					X	X	X	X			X	X													16
17	ELEVATOR LOBBY SMOKE DETECTOR, RECALL FL	X	X					X	X	X	X			X		X	X	X	X									17
18	STANDBY GENERATOR SYSTEM LOW BATTERY			X	X			X				X																18
19	STANDBY GENERATOR SYSTEM NOT IN AUTO MODE			X	X			X				X																19
20	AREA OF REFUGE TWO WAY COMMUNICATIONS STATUS			X	X			X				X																20
21	SYSTEM CARBON MONOXIDE DETECTOR			X	X			X				X																21
22	KITCHEN CARBON MONOXIDE DETECTOR			X	X			X				X								X								22
23	BI DIRECTIONAL ANTENNA SYSTEM			X	X			X				X																23
24																												24
25																												25
26																												26

LOOP NUMBER	ADDRESSABLE LOOP SCHEDULE
1	FIRST FLOOR SECTION A + B
2	FIRST FLOOR SECTION C + D
3	SECOND FLOOR SECTION A + B
4	SECOND FLOOR SECTION C + D
5	THIRD FLOOR SECTION A + B
6	FOURTH FLOOR SECTION A + B
7	SPARE
8	SPARE
9	SPARE
10	SPARE

ROOM SPACING FOR CEILING-MOUNTED VISIBLE APPLIANCES		
MAXIMUM ROOM SIZE	MAXIMUM LENS HEIGHT	MINIMUM REQUIRED LIGHT OUTPUT (EFFECTIVE INTENSITY) ; ONE LIGHT (cd)
20' x 20'	10	15
30' x 30'	10	30
40' x 40'	10	60
44' x 44'	10	75
50' x 50'	10	95
53' x 53'	10	110
55' x 55'	10	115
59' x 59'	10	135
63' x 63'	10	150
68' x 68'	10	177
70' x 70'	10	185
20' x 20'	20	30
30' x 30'	20	45
44' x 44'	20	75
46' x 46'	20	80
50' x 50'	20	95
53' x 53'	20	110
55' x 55'	20	115
59' x 59'	20	135
63' x 63'	20	150
68' x 68'	20	177
70' x 70'	20	185
20' x 20'	30	55
30' x 30'	30	75
50' x 50'	30	95
53' x 53'	30	110
55' x 55'	30	115
59' x 59'	30	135
63' x 63'	30	150
68' x 68'	30	177
70' x 70'	30	185

ROOM SPACING FOR WALL-MOUNTED VISIBLE APPLIANCES			
	MINIMUM REQUIRED LIGHT OUTPUT EFFECTIVE INTENSITY (cd)		
MAXIMUM ROOM SIZE	ONE LIGHT PER ROOM (CEILING HEIGHT)	TWO LIGHTS PER ROOM (LOCATED ON OPPOSITE WALLS)	FOUR LIGHTS PER ROOM ONE LIGHT PER WALLS
20' x 20'	15	NA	NA
28' x 28'	30	UNKNOWN	NA
30' x 30'	34	15	NA
40' x 40'	60	30	15
45' x 45'	75	UNKNOWN	19
50' x 50'	94	60	30
54' x 54'	110	UNKNOWN	30
55' x 55'	115	UNKNOWN	28
60' x 60'	135	95	30
63' x 63'	150	UNKNOWN	37
68' x 68'	177	UNKNOWN	43
70' x 70'	184	95	60
80' x 80'	240	135	60
90' x 90'	304	185	95
100' x 100'	375	240	95
110' x 110'	455	240	135
120' x 120'	540	305	135
130' x 130'	635	375	185


NEW WIRELESS MASTER BOX ANTENNA EXTERNALLY MOUNTED. COORDINATE EXACT LOCATION ON BUILDING WITH ARCHITECT AND SUPPLIER.
ROOF
TYPICAL VISUAL SIGNAL CIRCUITS
TYPICAL AUDIBLE SIGNAL CIRCUIT
2-#14 SMOKE DETECTOR POWER (TYP.) PLUS 2-#16 TWISTED SHIELDED PAIR THROUGHOUT.
IM
MM
TS
FS
CM
DH
TYPICAL TEXT MESSAGE BOARD
ISOLATION MODULE, LOCATE AT 'FATC' (TYPICAL)
TYPICAL DETECTION LOOP
MNS
FATC-3A
FATC-3B
1"C
EP3A-2
EP3B-2
LEVEL 3
FATC-2A
FATC-2B
EP2A-1
EP2B-2
LEVEL 2
RG213 COAXIAL CABLE IN 3/4" RSC UP TO A DISTANCE OF 75'.
TYPICAL VISUAL SIGNAL CIRCUITS FOR FIRE ALARM & MNS
TYPICAL AUDIBLE SIGNAL CIRCUITS
TYPICALLY COORDINATE WITH FIRE DEPT. AND ARCH. FOR LOCATION
2-#14 SMOKE DETECTOR POWER (TYP.) PLUS 2-#14 TWISTED SHIELDED PAIR THROUGHOUT.
2-#14 SMOKE DETECTOR POWER (TYP.) (ADDRESSABLE LOOP) 2-#16 TWISTED SHIELDED PAIR THROUGHOUT.
RS
TYPICALLY TO HVAC UNIT FOR SHUTDOWN
120V ELECTRIC BELL (FURNISHED BY FPC, INSTALLED & WIRED BY E.C.)
EP1B-3
ISOLATION MODULE, LOCATE AT 'FACP' (TYPICAL)
TYPICAL PANIC BUTTON.
DRILL KEY SWITCH COORDINATE LOCATION
DK
FLUSH MOUNTED ADDRESSABLE FIRE ALARM CONTROL PANEL WITH MASS NOTIFICATION. PROVIDE WITH 60HRS BATTERY BACKUP.
PROVIDE CONNECTION FOR P.A. SYSTEM BROADCASTING.
ELEVATOR CONTROL MODULES. (PROVIDE 4 FOR EACH ELEVATOR).
ANN
FLUSH MTD LCD ANNUNCIATORS THAT PERFORMS ALL FUNCTIONS OF FACP w/ MICROPHONE. REFER TO FLOOR PLANS.
PROVIDE CONNECTION TO LOCAL AREA NETWORK
PROVIDE IP COMMUNICATOR EQUAL TO STARLINK CAT# SLE-LTEV-CFB
CC
SPD
EP1B-5
PROVIDE RED STROBE OR BEACON PER FIRE DEPT. REQUIREMENTS
EP1B-2
EP1B-4
REMOTE MASS NOTIFICATION CONSOLE LOCATED IN MAIN OFFICE. (COORDINATE EXACT LOCATION w/ ARCHITECT, OWNER & AHJ PRIOR TO ROUGH-IN.)
FLUSH MTD KNOX BOX WITH TAMPER SWITCH COORDINATE LOCATION WITH FIRE DEPT. & ARCH.
K
LOCATE OVER EACH FIRE DEPT. CONNECTION PROVIDE WITH STROBE OR BEACON
RUN THRU BLDG IN 3/4" RSC CONDUIT
RS-232 INTERFACE TO FACP
LOC
TYP. LOCAL OPERATOR CONTROL PANEL (COORDINATE EXACT LOCATION w/ ARCHITECT & OWNER PRIOR TO ROUGH-IN.)
PROVIDE REDUCED FLOOR PLANS WITH ALL DEVICES DEVICE ADDRESSES ROOM AND NAMES SHOWN INSTALLED WITHIN GRAPHIC MAP FRAME WITH PLEXIGLASS COVER. COORDINATE LOCATION WITH FIRE DEPT. SUBMIT GRAPHIC MAP FOR APPROVAL PRIOR TO INSTALLATION (TOTAL OF 2).
PROVIDE PLAN CABINET ACCORDING TO FIRE DEPARTMENT REQUIREMENTS
FATC-1A
EP1A-1
MUTE LOCAL SOUND SYSTEMS IN CAFETERIA & GYM
MM GENERATOR RUNNING
MM GENERATOR FAILURE
MM GENERATOR NOT IN AUTO MODE
MM LOW BATTERY
MONITOR STATUS OF GENERATOR
LEVEL 1
M
RADIO MASTER BOX. PROVIDE SIGCOM WIRELESS TRANSCEIVER WITH INTELLITAP CARD SPECIFIC FOR FACP MANUFACTURER. COORDINATE WITH FIRE DEPARTMENT.

1 E4.01 FIRE ALARM RISER DIAGRAM

N.T.S.

FIRE ALARM NOTES

1. E.C. SHALL REFER TO SPECIFICATIONS AND DRAWINGS FOR QUANTITY OF DEVICES, SPARE CAPACITY, PARTS, ETC.

2. E.C. SHALL FIELD CONFIRM LOCATIONS OF DUCT MOUNTED SMOKE DETECTORS. DUCT DETECTORS FURNISHED AND WIRED BY E.C.; INSTALLED BY HVAC.

3. TYPICALLY FIRE ALARM SYSTEM SIGNAL CONDUCTORS SHALL BE #14 AWG MINIMUM, TYPE THHN SOLID. FIRE ALARM MC CABLE WITH RED ARMOR IS ALLOWED WHERE RUN CONCEALED AND ALLOWED BY CODE.

4. TYPICALLY ALL SPEAKER/STROBE UNITS SHALL BE WIRED SO THAT THE SPEAKERS AND THE STROBES CAN BE SILENCED SIMULTANEOUSLY.

5. ALL SPEAKER/STROBES SHALL BE MULTI-TAPPED TYPE. E.C. SHALL OWN dB ADJUSTING DURING FIRE DEPARTMENT TESTING.

6. ALL SPEAKER/STROBES SHALL BE MOUNTED IN ACCORDANCE WITH ADA/NFPA ROOM SPACING

7. ALL DEVICES SHALL BE LABELED WITH CLEAR TAPE WITH BLACK INK. LABEL SHALL IDENTIFY LOOP# AND DEVICE NUMBER.

8. ALL REMOTE TEST STATIONS SHALL BE KEYED AND MOUNTED ADJACENT TO FACP OR AS DIRECTED BY LOCAL FIRE DEPT. LABEL EACH UNIT.

9. PULL STATIONS SHALL BE DOUBLE ACTION.

10. ALL TAMPER AND SUPERVISORY SWITCHES SHALL BE PROGRAMMED AS LOCAL SUPERVISORY CONDITION UPON ACTIVATION. TROUBLE OR SUPERVISORY SHALL BE SELF RESTORING.

11. PRIOR TO SUBMITTING SHOP DRAWINGS, COORDINATE WITH LOCAL FIRE DEPT. FOR EXACT REQUIREMENTS. OBTAIN FIRE PREVENTION RULES AND REGULATIONS WHEN AVAILABLE AND COMPLY IN FULL.

12. COORDINATE WITH SELECTED SYSTEM MANUFACTURER FOR WIRING REQUIREMENTS.

13. ALL DETECTION & SIGNAL WIRING SHALL BE CLASS "A".

14. SUBMIT AS PART OF SHOP DRAWINGS COMPLETE FLOOR PLANS & RISERS WITH ALL DEVICES SHOWN AND WITH DEVICE ADDRESSES.

15. PROVIDE ISOLATION MODULE FOR EVERY 20 DEVICES, TYPICAL.

16. ALL VISUAL SIGNALS SHALL BE SYNCHRONIZED.

17. PROVIDE CONTACT CLOSURE INTERFACE TO AUTOMATED LIGHTING CONTROL SYSTEM (ALCS) VIA A SINGLE PAIR OF 2#18 CONDUCTORS. WHEN ALARM SYSTEM GOES INTO ALARM A SIGNAL SHALL BE ISSUED TO ALLOW THE ALCS TO TURN ALL INTERIOR AND EXTERIOR LIGHTING "ON" UNLESS NOTED OTHERWISE. MUTE LOCAL SOUND SYSTEMS FOR PUBLIC ASSEMBLY SPACES.

18. FIRE ALARM PROGRAMMING SHALL BE COORDINATED WITH APPROVED SIGNAGE SHOP DRAWINGS.

19. MASS NOTIFICATION SIGNAL LOOP SHALL TAKE PRIORITY OVER FIRE ALARM SIGNAL LOOP. COORDINATE MESSAGE

20. FOR "SHELTER - IN - PLACE" AND "LOCK DOWN" COORDINATE WITH OWNER FOR INSTRUCTIONS.

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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

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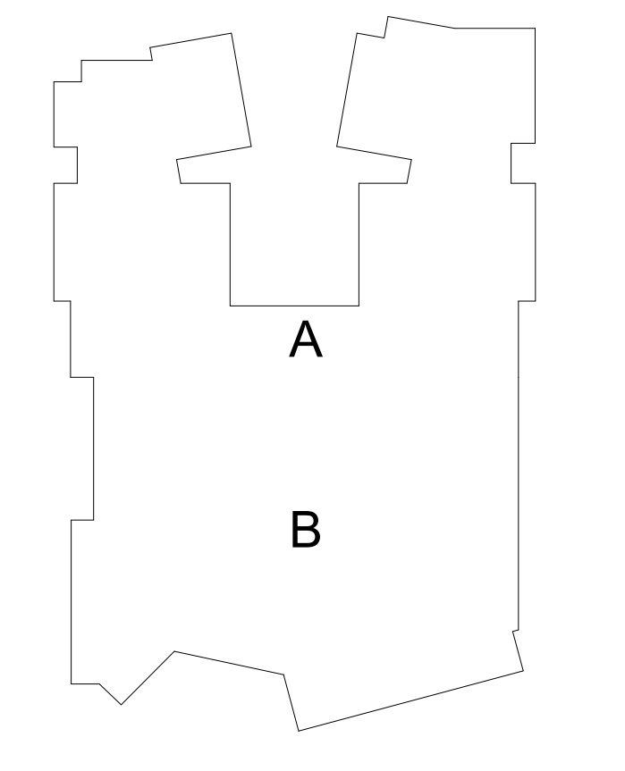

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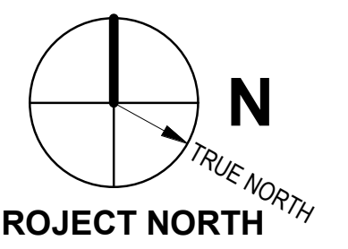

SHEET TITLE:
FIRE ALARM RISER

SHEET NUMBER:
E4.01

GENERAL FIRE ALARM NOTES:

1. E.C. SHALL REFER TO SPECIFICATIONS AND DRAWINGS FOR QUANTITY OF DEVICES, SPARE CAPACITY, PARTS, ETC.
2. E.C. SHALL REFER TO HVAC DRAWINGS FOR EXACT LOCATION OF HVAC UNITS AND FOR LOCATIONS OF DUCT MOUNTED SMOKE DETECTORS. DUCT DETECTORS FURNISHED AND WIRED BY E.C.; INSTALLED BY HVAC.
3. PROVIDE EACH FIRE ALARM TERMINAL CABINET AND FIRE ALARM CONTROL PANEL WITH AN ADA POWER SUPPLY TO SERVE ALL SPEAKER/STROBE UNITS ON RESPECTIVE FLOORS.
4. TYPICALLY FIRE ALARM SYSTEM POWER CONDUCTORS SHALL BE #14 AWG, TYPE THHN SOLID. ALL WIRING SHALL BE INSTALLED IN CONDUIT OR SURFACE METAL RACEWAY. MC CABLE IS ALLOWED WHERE CONCEALED.
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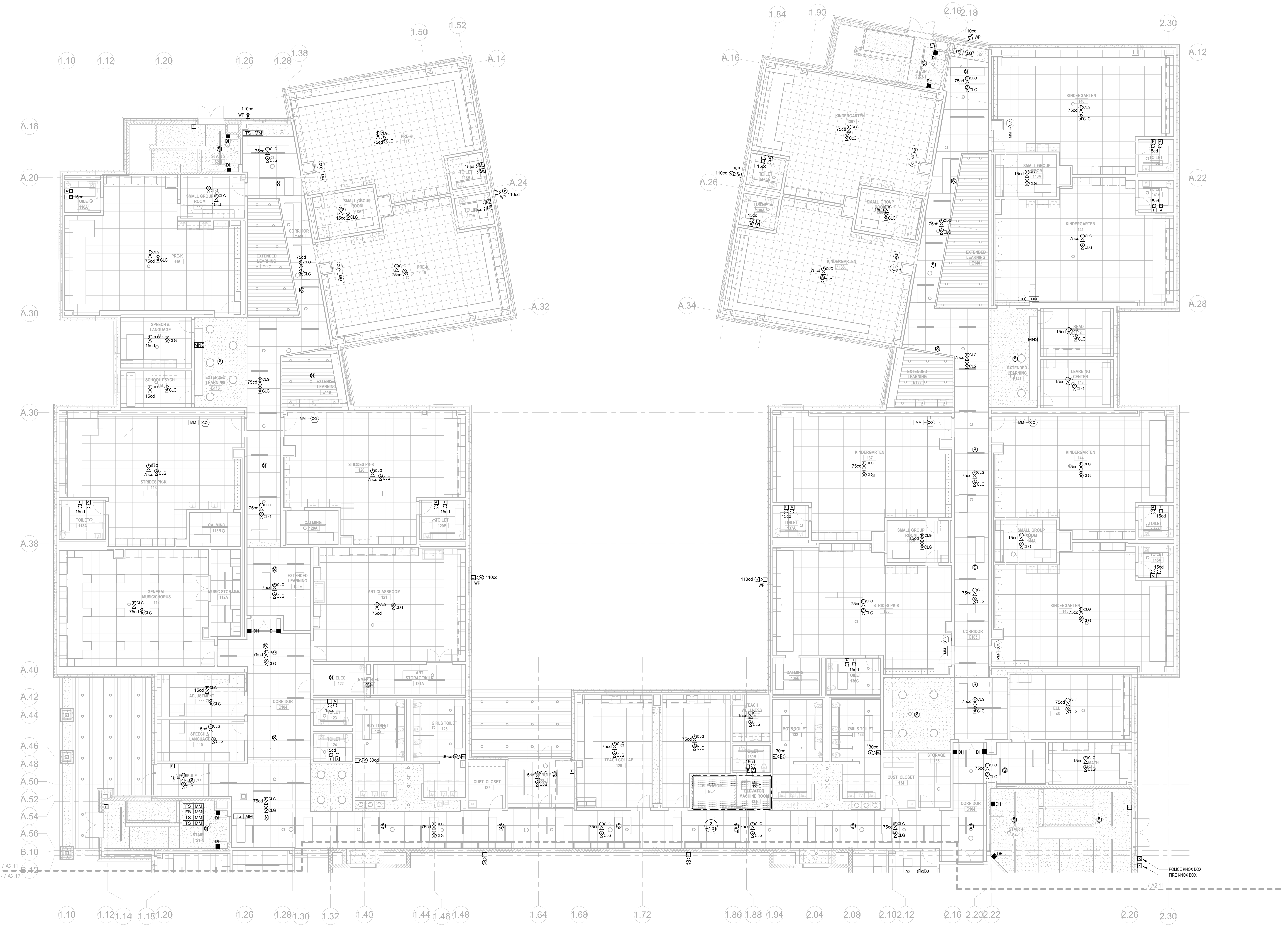

1 / E4.11 LEVEL ONE AREA A - FIRE ALARM
SCALE: 1/8" = 1'-0"

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

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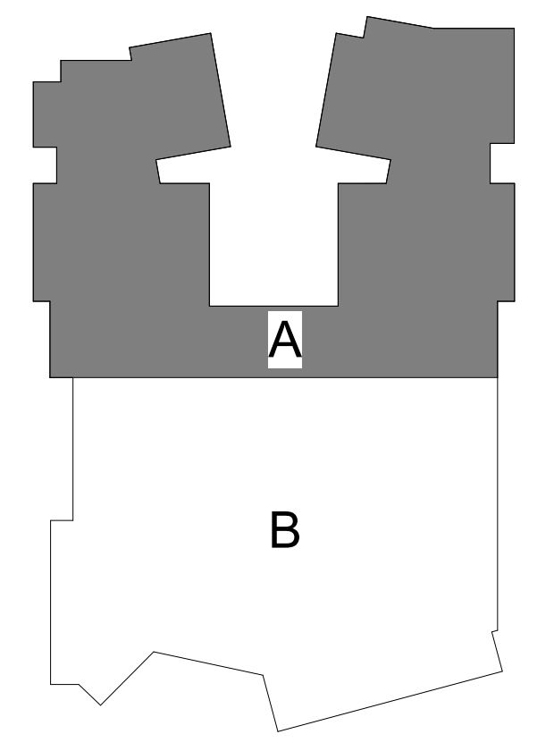
KEY PLAN



ORIENTATION AND SCALE:

PROJECT NORTH
TRUE NORTH
N
0 4' 8' 16'
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:
LEVEL 1 AREA A -
FIRE ALARM

SHEET NUMBER:
E4.11

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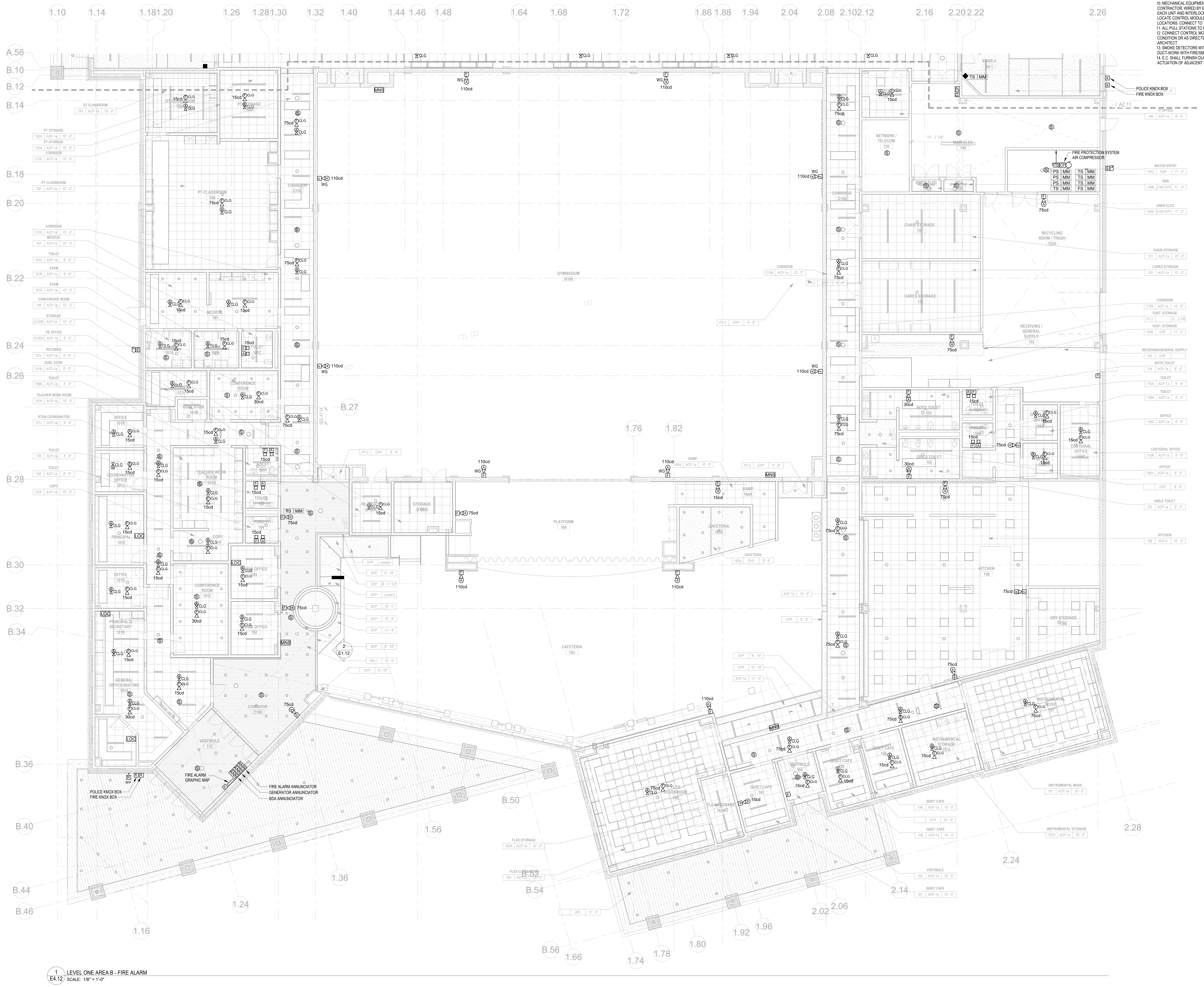

1
E4.12
LEVEL ONE AREA B - FIRE ALARM
SCALE: 1/8" = 1'-0"

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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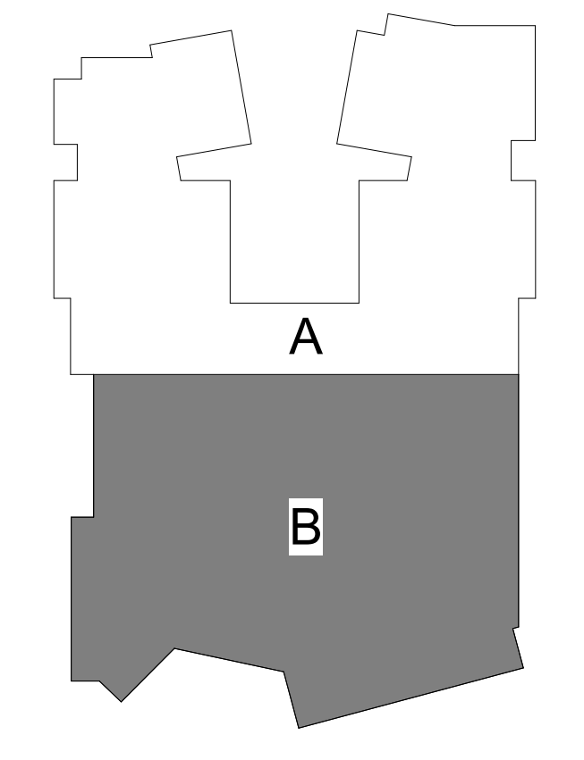
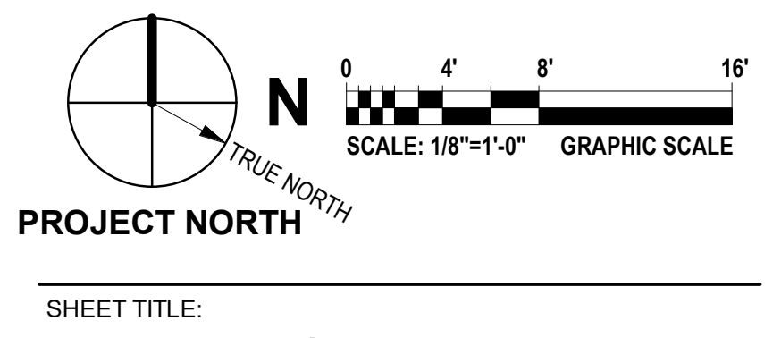


ORIENTATION AND SCALE:



SHEET TITLE:
LEVEL 1 AREA B - FIRE ALARM

SHEET NUMBER:
E4.12

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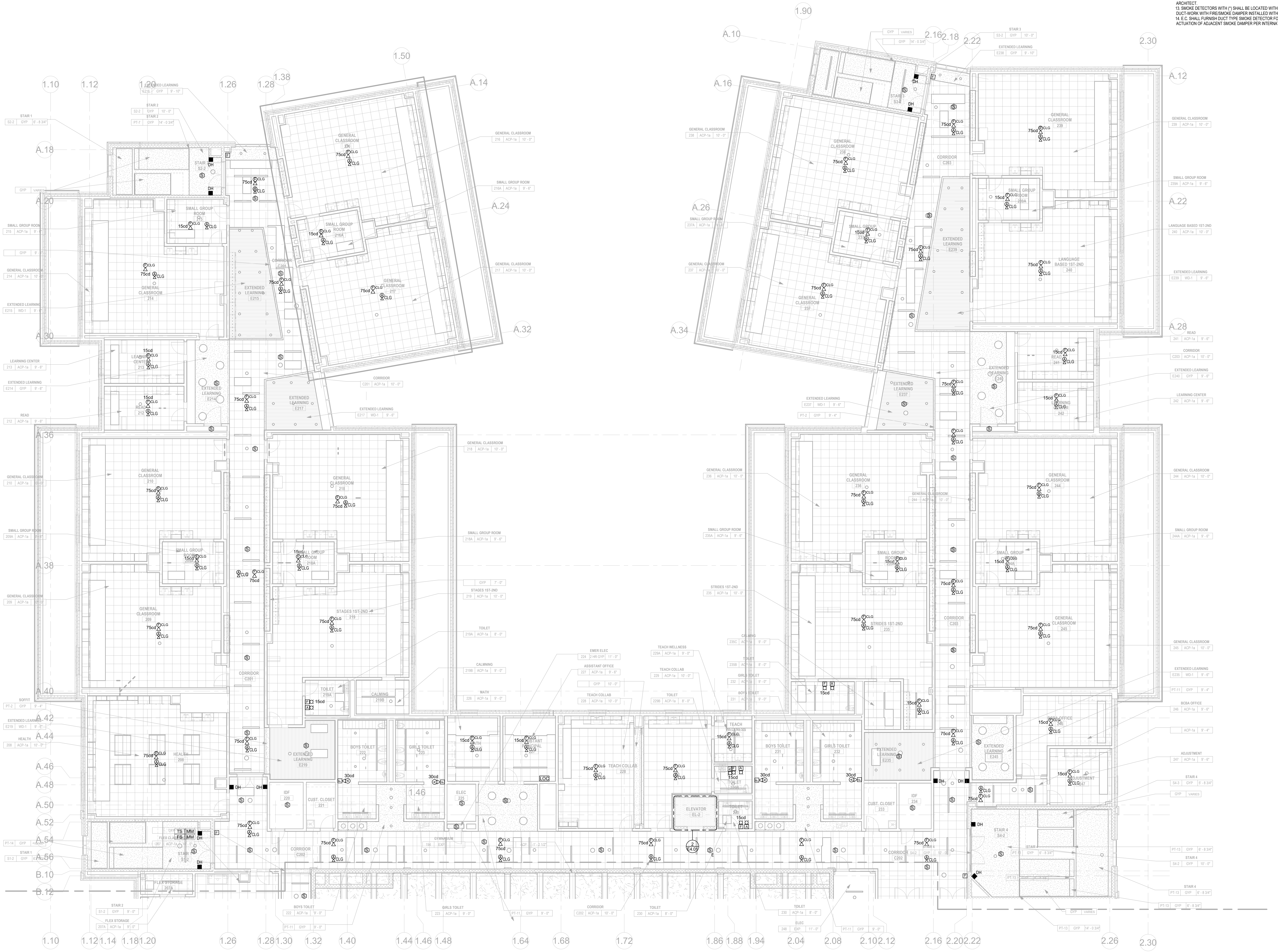

1 / E4.21 LEVEL TWO AREA A - FIRE ALARM
SCALE: 1/8" = 1'-0"

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DORE + WHITTIER

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PROJECT NUMBER: 23-0847

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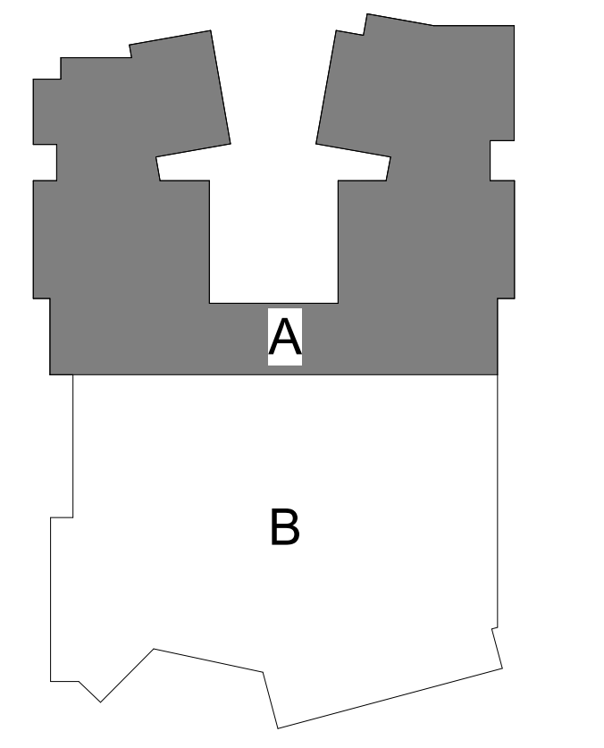

ORIENTATION AND SCALE:

SHEET TITLE:

LEVEL 2 AREA A - FIRE ALARM

SHEET NUMBER:

E4.21

GENERAL FIRE ALARM NOTES:

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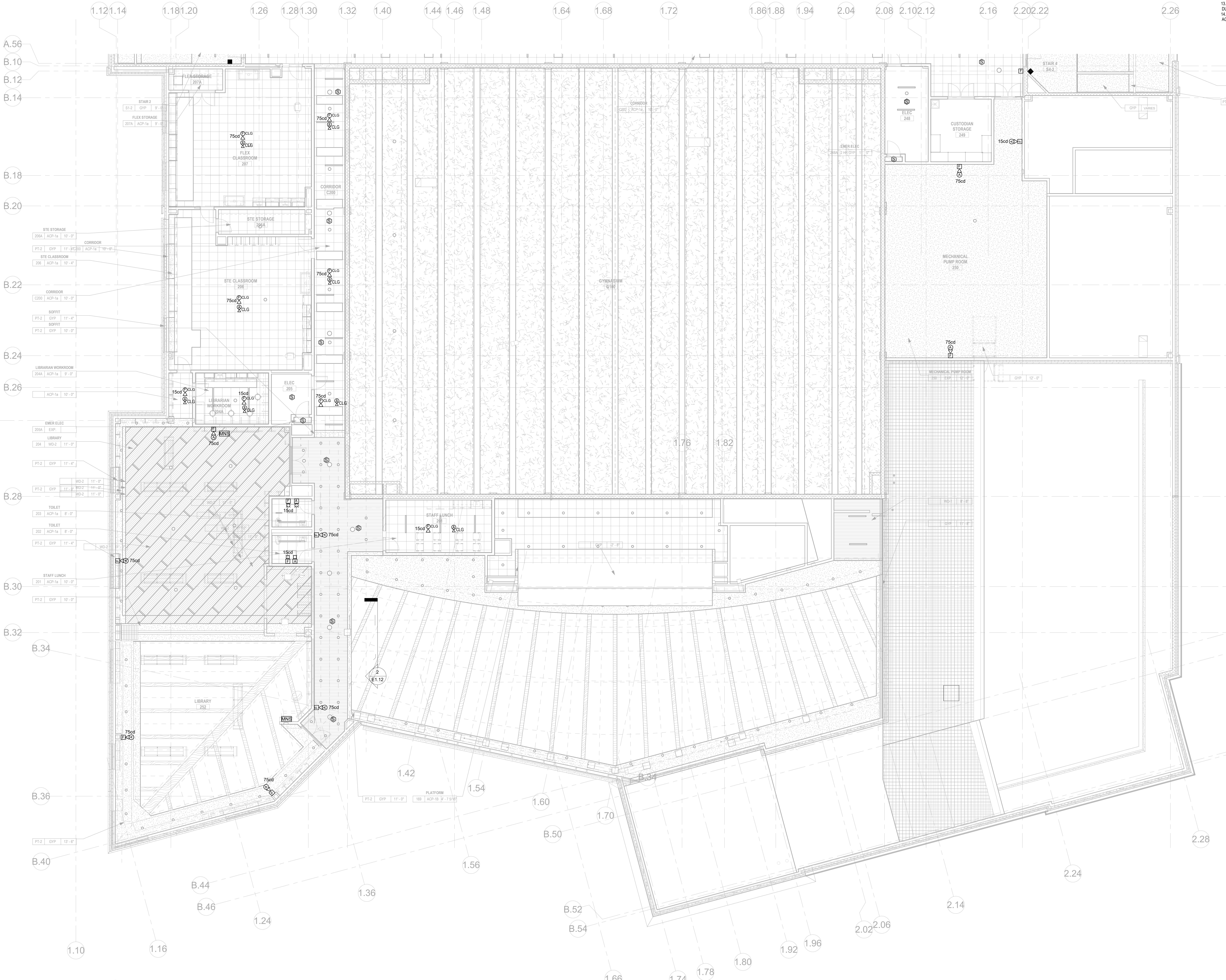

1 E4.22 LEVEL TWO AREA B - FIRE ALARM
SCALE: 1/8" = 1'-0"

DORE + WHITTIER
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260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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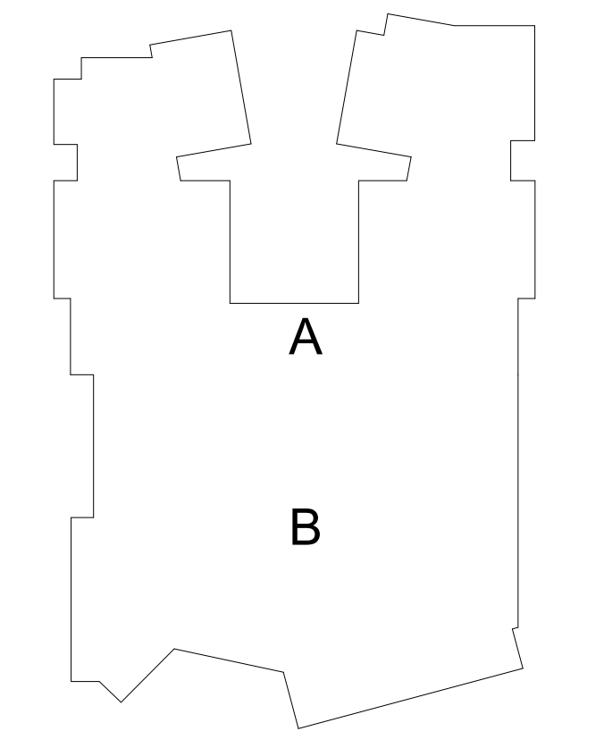
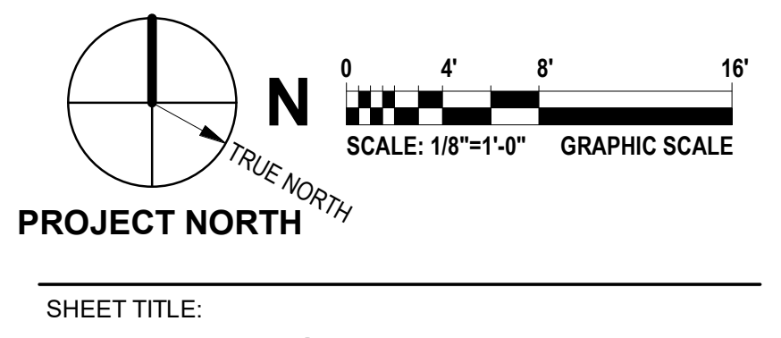


ORIENTATION AND SCALE:



SHEET TITLE:
LEVEL 2 AREA B -
FIRE ALARM

SHEET NUMBER:
E4.22

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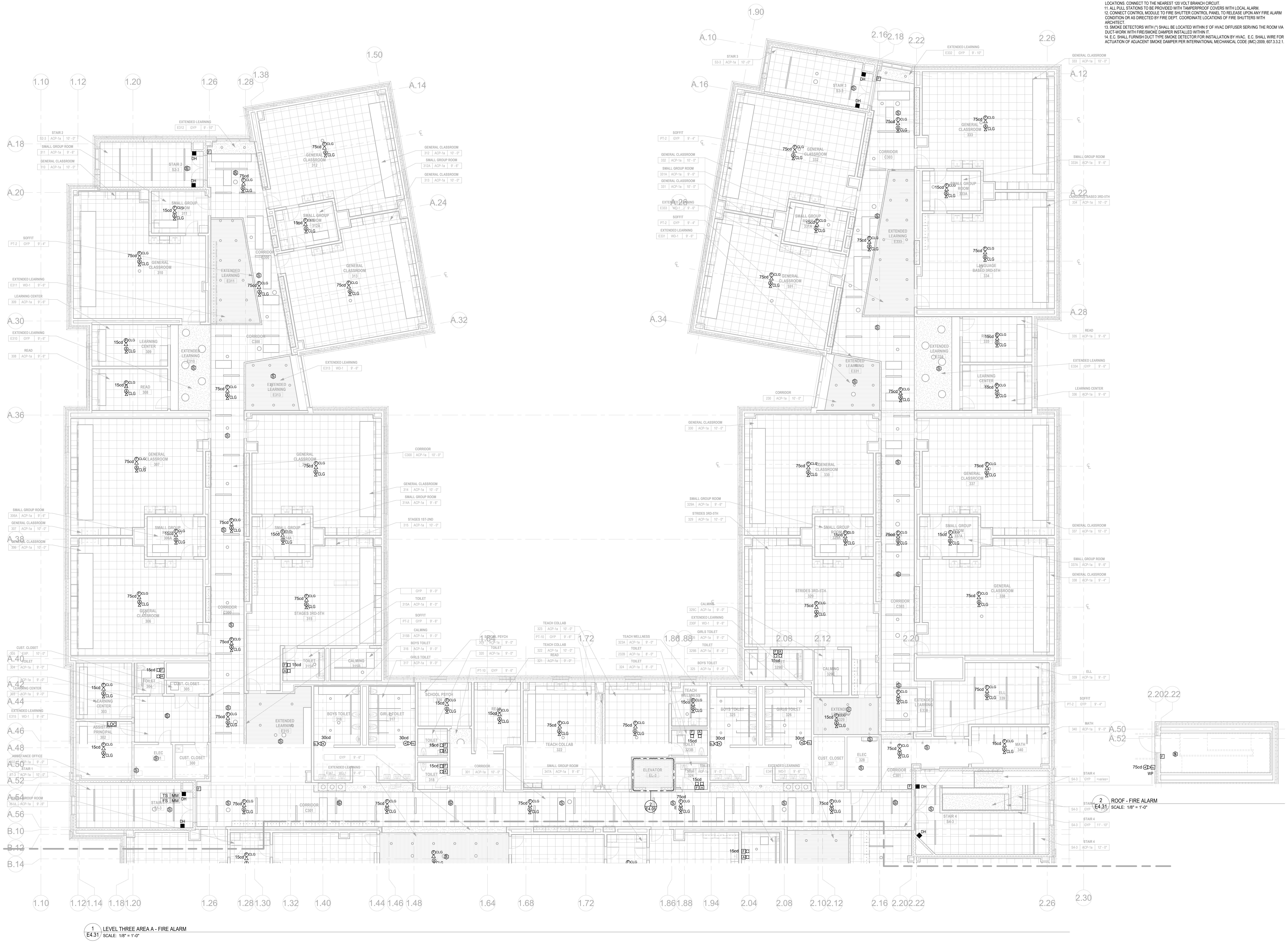

1
E4.31
LEVEL THREE AREA A - FIRE ALARM
SCALE: 1/8" = 1'-0"

2
E4.31
ROOF - FIRE ALARM
SCALE: 1/8" = 1'-0"

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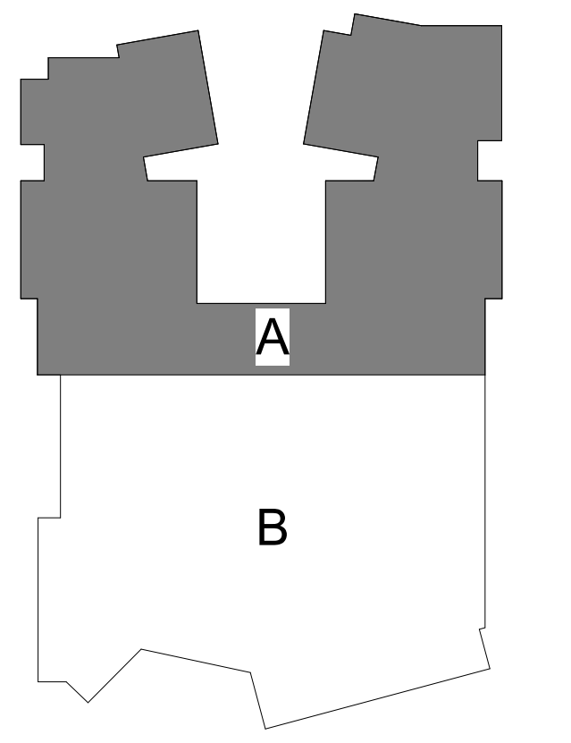

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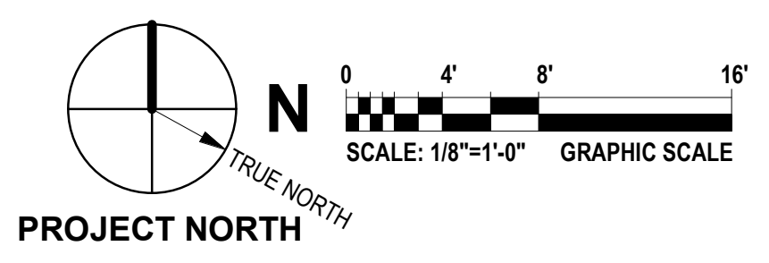

SHEET TITLE:

LEVEL 3 AREA A - FIRE ALARM

SHEET NUMBER:

E4.31

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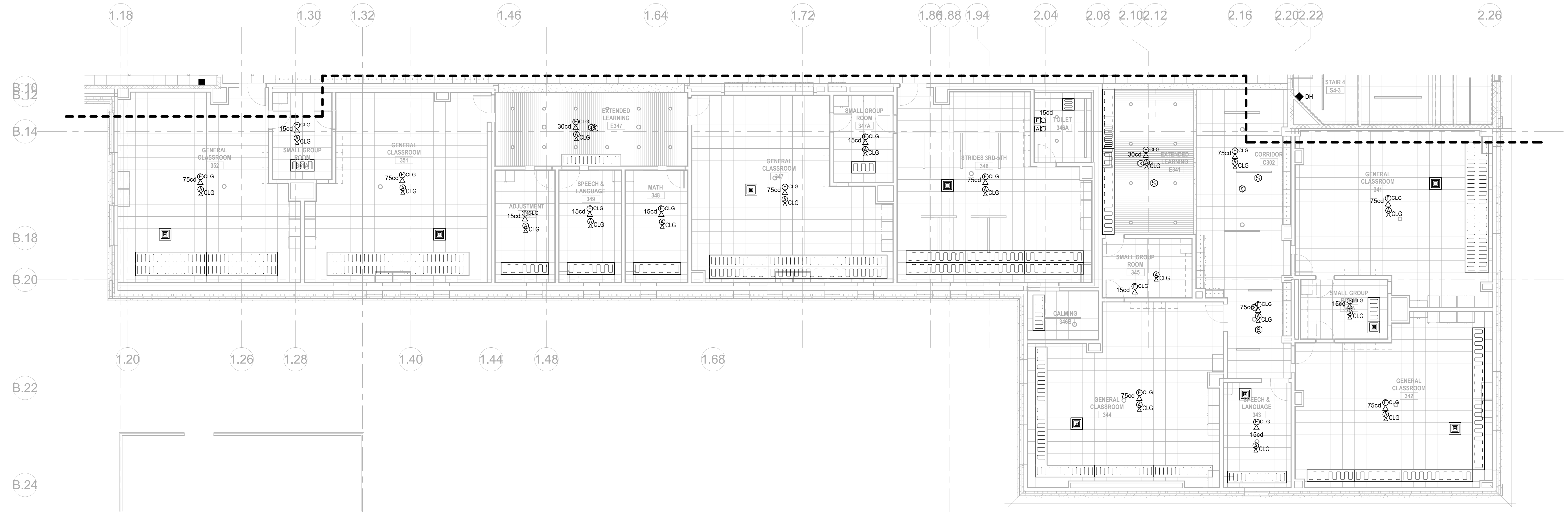
11. ALL PULL STATIONS TO BE PROVIDED WITH TAMPERPROOF COVERS WITH LOCAL ALARM.
12. CONNECT CONTROL MODULE TO FIRE SHUTTER CONTROL PANEL TO RELEASE UPON ANY FIRE ALARM CONDITION OR AS DIRECTED BY FIRE DEPT. COORDINATE LOCATIONS OF FIRE SHUTTERS WITH ARCHITECT.
13. SMOKE DETECTORS WITH (*) SHALL BE LOCATED WITHIN 5' OF HVAC DIFFUSER SERVING THE ROOM VIA DUCT-WORK WITH FIRE/SMOKE DAMPER INSTALLED WITHIN IT.
14. E.C. SHALL FURNISH DUCT TYPE SMOKE DETECTOR FOR INSTALLATION BY HVAC. E.C. SHALL WIRE FOR ACTUATION OF ADJACENT SMOKE DAMPER PER INTERNATIONAL MECHANICAL CODE (IMC) 2009, 607.3.3.2.1.



1
E4.32
LEVEL THREE AREA B - FIRE ALARM
SCALE: 1/8" = 1'-0"

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
BURLINGTON, VT 05401
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GGD CONSULTING ENGINEERS, INC.
375 Faunce Corner Road, Suite D, Dartmouth, MA 02747-1258
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WILMINGTON
ELEMENTARY SCHOOL

320 SALEM ST.
WILMINGTON, MA 01887

PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

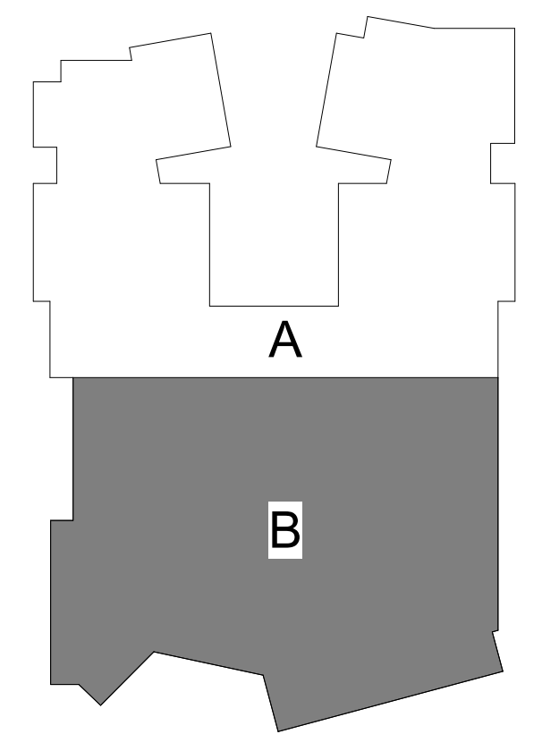
REVISIONS:

NO.	DATE	TITLE

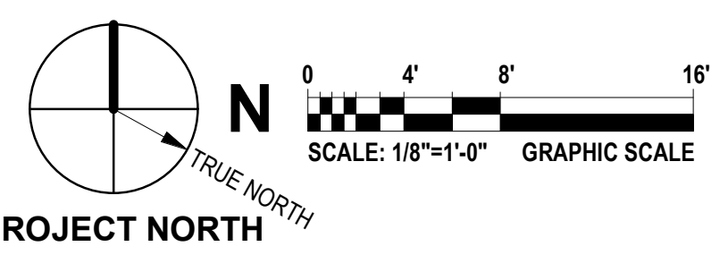
ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

KEY PLAN



ORIENTATION AND SCALE:



SHEET TITLE:

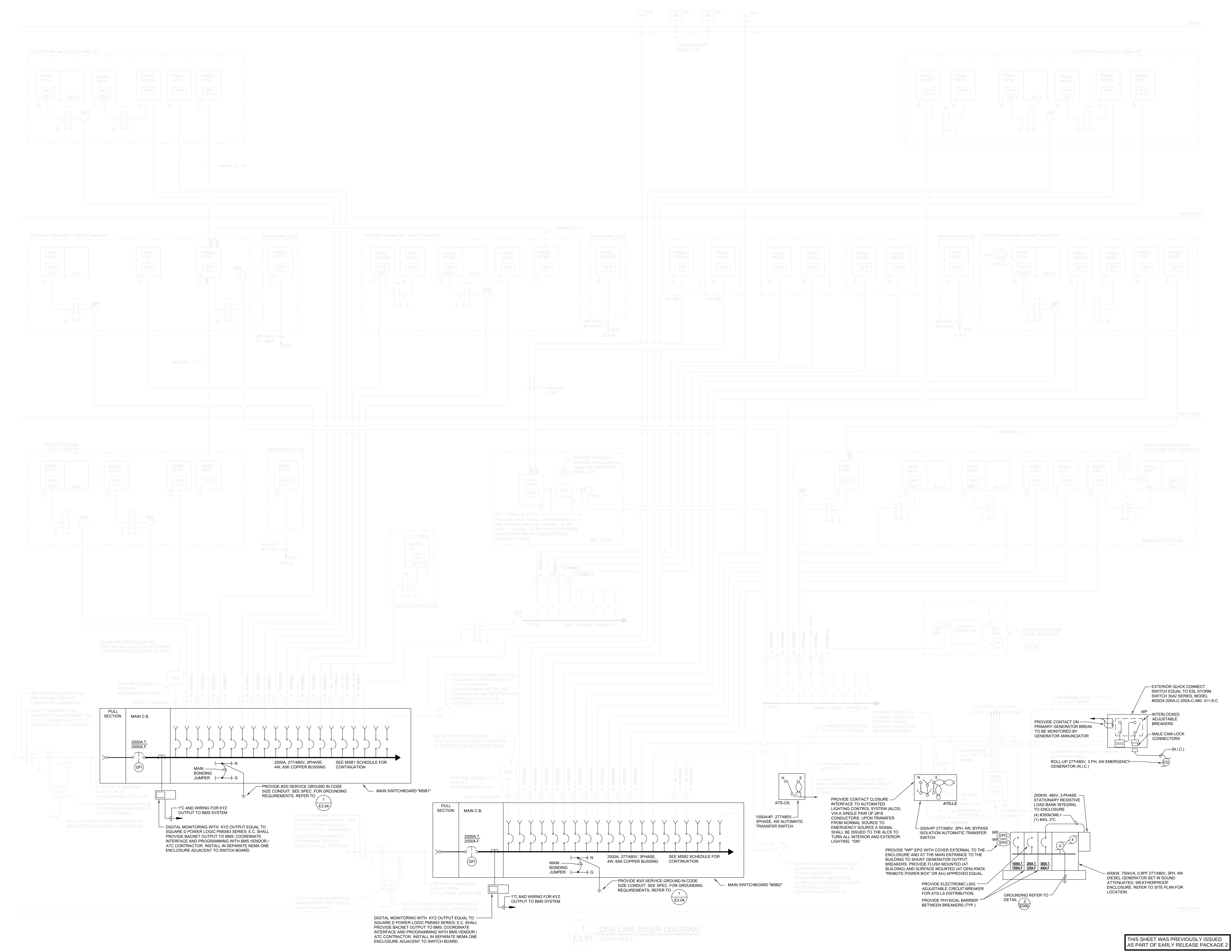
LEVEL 3 AREA B -
FIRE ALARM

SHEET NUMBER:

E4.32

Autodesk Docs://Wilmington Elementary School/Wildwood ME Model SD.rvt

9/23/2026 4:39:33 PM


PULL SECTION
MAIN C.B.
2000A.T.
2500A.F.
GFI
TO MMU-C
ASHP-2
EB-1
EWH-1
MAIN BONDING JUMPER
N
G
2500A, 277/480V, 3PHASE, 4W, 65K COPPER BUSSING
SEE MSB1 SCHEDULE FOR CONTINUATION
1"C AND WIRING FOR KYZ OUTPUT TO BMS SYSTEM
DIGITAL MONITORING WITH KYZ OUTPUT EQUAL TO SQUARE D POWER LOGIC PM5563 SERIES; E.C. SHALL PROVIDE BACNET OUTPUT TO BMS; COORDINATE INTERFACE AND PROGRAMMING WITH BMS VENDOR / ATC CONTRACTOR. INSTALL IN SEPARATE NEMA ONE ENCLOSURE ADJACENT TO SWITCH BOARD.
PROVIDE #3/0 SERVICE GROUND IN CODE SIZE CONDUIT. SEE SPEC. FOR GROUNDING REQUIREMENTS, REFER TO
1
E3.04
MAIN SWITCHBOARD "MSB1"
PULL SECTION
MAIN C.B.
2000A.T.
2500A.F.
GFI
MAIN BONDING JUMPER
N
G
2500A, 277/480V, 3PHASE, 4W, 65K COPPER BUSSING
SEE MSB2 SCHEDULE FOR CONTINUATION
1"C AND WIRING FOR KYZ OUTPUT TO BMS SYSTEM
DIGITAL MONITORING WITH KYZ OUTPUT EQUAL TO SQUARE D POWER LOGIC PM5563 SERIES; E.C. SHALL PROVIDE BACNET OUTPUT TO BMS; COORDINATE INTERFACE AND PROGRAMMING WITH BMS VENDOR / ATC CONTRACTOR. INSTALL IN SEPARATE NEMA ONE ENCLOSURE ADJACENT TO SWITCH BOARD.
PROVIDE #3/0 SERVICE GROUND IN CODE SIZE CONDUIT. SEE SPEC. FOR GROUNDING REQUIREMENTS, REFER TO
1
E3.04
MAIN SWITCHBOARD "MSB2"
EWH-2
EWH-3
N
E
L
ATS-OS
1000A/4P, 277/480V, 3PHASE, 4W AUTOMATIC TRANSFER SWITCH
PROVIDE CONTACT CLOSURE INTERFACE TO AUTOMATED LIGHTING CONTROL SYSTEM (ALCS) VIA A SINGLE PAIR OF 2#18 CONDUCTORS. UPON TRANSFER FROM NORMAL SOURCE TO EMERGENCY SOURCE A SIGNAL SHALL BE ISSUED TO THE ALCS TO TURN ALL INTERIOR AND EXTERIOR LIGHTING "ON".
ATS-LS
200A/4P 277/480V, 3PH, 4W, BYPASS ISOLATION AUTOMATIC TRANSFER SWITCH
WP
EPO
WP
EPO
PROVIDE "WP" EPO WITH COVER EXTERNAL TO THE ENCLOSURE AND AT THE MAIN ENTRANCE TO THE BUILDING TO SHUNT GENERATOR OUTPUT BREAKERS. PROVIDE FLUSH MOUNTED (AT BUILDING) AND SURFACE MOUNTED (AT GEN) KNOX "REMOTE POWER BOX" OR AHJ APPROVED EQUAL.
PROVIDE ELECTRONIC LSIG ADJUSTABLE CIRCUIT BREAKER FOR ATS-LS DISTRIBUTION.
PROVIDE PHYSICAL BARRIER BETWEEN BREAKERS (TYP.)
1000A.T.
1200A.F
200A.T.
225A.F
300A.T.
400A.F
G
E
GROUNDING REFER TO DETAIL
3
E006
200KW, 480V, 3-PHASE STATIONARY RESISTIVE LOAD BANK INTEGRAL TO ENCLOSURE
(4) #350kCMIL+ (1) #4G, 3"C
600kW, 750kVA, 0.8PF 277/480V, 3PH, 4W DIESEL GENERATOR SET IN SOUND ATTENUATED, WEATHERPROOF ENCLOSURE; REFER TO SITE PLAN FOR LOCATION.
EXTERIOR QUICK CONNECT SWITCH EQUAL TO ESL STORM SWITCH 3042 SERIES, MODEL #SSDX-200A-C-200A-C-480- 311-S-C
WP
INTERLOCKED ADJUSTABLE BREAKERS
MALE CAM-LOCK CONNECTORS
PROVIDE CONTACT ON PRIMARY GENERATOR BREAK TO BE MONITORED BY GENERATOR ANNUNCIATOR
(N.I.C.)
EG
ROLL-UP 277/480V, 3 PH, 4W EMERGENCY GENERATOR (N.I.C.)
PROVIDE GROUND PER MFG. REQUIREMENTS (TYP)
NIPPLE TO BOARD
SPD
5 SETS OF: 4 #600KCMIL IN (5) 4"C PLUS (1) 4"C SPARE w/ PULL LINE.
UTILITY COMPANY METER @ TRANFORMER, PROVIDED BY UTILITY COMPANY.
2#14, 1"C. FOR KYZ OUTPUT WIRING TO BMS SYSTEM IN BOILER / WATER ROOM
UTILITY COMPANY PAD MOUNTED TRANSFORMER. PAD BY G.C. GROUNDING BY E.C. PER UTILITY CO. STANDARDS
CONDUIT REQUIREMENTS FOR PRIMARY SERVICE SEE ELECTRICAL SITE PLAN
C.T.
P.T.
M
FUTURE PV DISCONNECT SWITCH & EQUIPMENT WITHIN SIGHT OF THE PAD MOUNTED TRANSFORMER / METER. SEE FLOOR PLANS AND SITE PLAN FOR PROPOSED LOCATION & COORDINATE w/ UTILITY Co.
(3) 4#600KCMIL&(1) #3/0G, (3) 4"C & (1) 4"C SPARE
TYPICALLY 2#14AWG, 1"C START CKT.
2#14AWG, 3/4"C FOR INTERFACE WITH BMS TO DROP HEAT RECOVERY CHILLER MODULES DURING LOSS OF UTILITY Co. POWER.
ALCS
(4) #1+(1) #8G, 1 1/2"C & 1 1/2"C SPARE
PANEL ELP1B
2#14AWG 1"C START CKT.
GENERATOR START CIRCUIT
TO MMU-C
(4) #500KCMIL+ (1) #3G, 4"C
4#250KCMIL& #4G, 2 1/2"C + (1) 2 1/2"C SPARE
TO ELP2A
TO ELP2B
TO ELP1A
TO ELP2B2
(2) #14AWG START CKT, 1"C BELOW SLAB OR MI CABLE
ELEVATOR MACHINE ROOM. SEE DETAIL:
3
E4.00
1ST FLOOR
ROOF

1
E3.01
ONE LINE RISER DIAGRAM
SCALE: N.T.S.

THIS SHEET WAS PREVIOUSLY ISSUED
AS PART OF EARLY RELEASE PACKAGE 2

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
NEWBURYPORT, MA 01950
P: (978) 499-2999

VERMONT
212 BATTERY STREET
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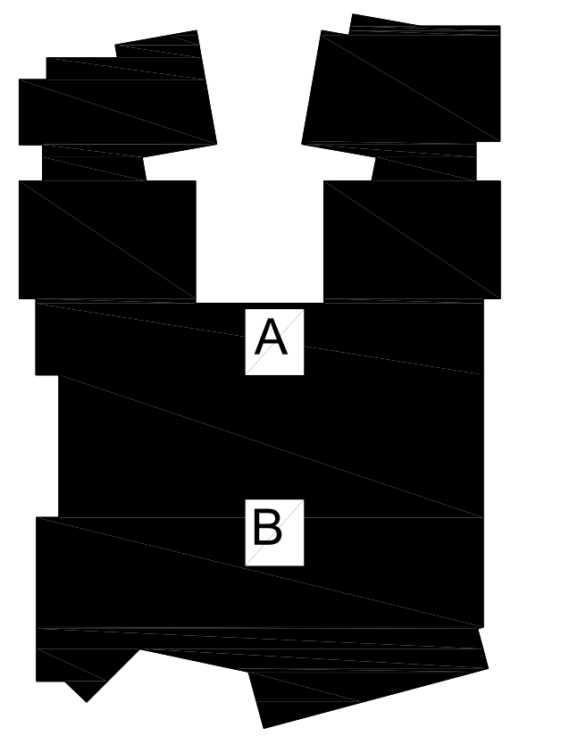
KEY PLAN



ORIENTATION AND SCALE:

SHEET TITLE:

EARLY RELEASE
RISER DIAGRAM

SHEET NUMBER:

E5.01

THREE PHASE TRANSFORMER SCHEDULE (K13 RATED) COPPER CONDUCTORS

ID NO	KVA	PRIMARY 480 VOLT					SECONDARY 208 VOLT					GROUNDING ELECTRODE CONDUCTOR (250-66)*
		AMPS	WIRE (THHN)	COND.	C.B.	FUSE	AMPS	WIRE (THHN)	COND.	C.B.	FUSE	
T-1	3	3.6	3#12+#12EG	3/4"	15/3	10	8.3	4#12+#12(EG)	3/4"	15/3	15	#8
T-2	9	10.8	3#12+#12EG	3/4"	20/3	20	25	4#10+#10(EG)	3/4"	30/3	30	#8
T-3	15	18	3#10+#10EG	3/4"	30/3	30	41.6	3#6(ϕ)+1#2(N)+1#8(IG)+1#8(EG)	1 1/4"	50/3	50	#8
T-4	30	36	3#6+#10EG	3/4"	60/3	45	83.3	3#2(ϕ)+#3/0(N)+1#8(IG)+1#8(EG)	2"	100/3	100	#8
T-5	45	54.3	3#2+#8EG	1 1/4"	90/3	80	125	3#1/0(ϕ)+2#1/0(N) +1#6(IG)+1#6(EG)	2 1/2"	150/3	150	#6
T-6	75	90.2	3#1/0+#6EG	1 1/2"	150/3	150	208	3#250 KCMIL(ϕ)+2#250 KCMIL(N) +1#4(IG)+1#4(EG)	3"	250/3	250	#2
T-7	112.5	135.3	3#3/0+#6EG	2"	200/3	200	311	3#500 KCMIL(ϕ)+2#500 KCMIL(N) +1#3(IG)+1#3(EG)	4"	400/3	400	#1/0
T-8	150	180.6	3#350+#4EG	3"	300/3	300	416.8	2 SETS 3#250 KCMIL(ϕ)+2#250 KCMIL(N) +1#2(IG)+1#2(EG)	2 - 3"	500/3	500	#2/0
T-9	225	270.7	3#500+#3EG	3"	400/3	400	625	2 SETS 3#500 KCMIL(ϕ)+2#500 KCMIL(N) +1#1/0(IG)+1#1/0(EG)	2 - 4"	800/3	800	#2/0
T-10	300	360.8	2 SETS 3#350& #1EG	2-3"	600/3	600	833	3 SETS 3#400KCMIL(ϕ)+2#400 KCMIL (N) +1#2/0(IG)+1#2/0(EG)	3 - 4"	1000/3	1000	#3/0

* RUN IN CODE SIZE CONDUIT TO CODE APPROVED GROUNDING ELECTRODE, i.e., BUILDING STEEL, ETC. "EG" INDICATES EQUIPMENT GROUNDING CONDUCTOR, "IG" INDICATES ISOLATED GROUNDING CONDUCTOR, "N" INDICATES NEUTRAL CONDUCTOR AND "ϕ" INDICATES PHASE CONDUCTOR.

** PROVIDE "IG" GROUNDING CONDUCTORS FOR PANELBOARDS DESIGNATED WITH "IG" BUS WHERE SHOWN ON PANEL SCHEDULE.

277/480V, 3 PHASE, 4W, 65 KAIC
2500A BUS

FRONT ACCESSIBLE

SWITCHBOARD "MSB1" SCHEDULE ⑥

OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
No.	TRIP	FRAME				
-	2000	2500	**MAIN BREAKER**	SEE RISER	-	100% RATED WITH GFI PROTECTION
1	60	100	**SURGE PROTECTION DEVICE (SPD)**	(4) #6 & (1) #6G	1 1/4"	PER MFGR. REQUIREMENTS
2	90	100	PANEL PP1A VIA T-5 XMFR	REFER TO SCHEDULE NOTE ③	③	
3	60	100	PANEL MP1A VIA T-4	REFER TO SCHEDULE NOTE ③	③	
4	100	100	PANEL LP1A	4#1+#8G	1 1/2"	
5	90	100	PANEL PP2A VIA T-5 XFMR	REFER TO SCHEDULE NOTE ③	③	
6	200	225	SPARE			
7	100	100	PANEL LP2A	4#1+#8G	1 1/2"	
8	90	100	PANEL PP3A VIA T-5 XFMR	REFER TO SCHEDULE NOTE ③	③	
9	150	225	PANEL MHP3A	4#1/0+#6G	2"	
10	100	100	PANEL LP3A	4#1+#8G	1 1/2"	
11	100	100	PANEL MHP2B2	4#1+#8G	1 1/2"	
12	150	225	PANEL PP2B2 VIA T-6 XFMR	REFER TO SCHEDULE NOTE ③	③	
13	100	100	PANEL LP2B2	4#1+#8G	1 1/2"	
14	150	225	SPARE			
15	200	225	PANEL 2DP1B VIA T-7 XFMR	REFER TO SCHEDULE NOTE ③	③	
16	300	400	PANEL EV VIA T-8 XFMR	REFER TO SCHEDULE NOTE ③	③	
17	1000	1000	EB-1 ELECTRIC BOILER	3 SETS 4#400KCMIL+#2/0G	(3) 3"	
18	150	225	EWH-1	4#1/0+#6G	2"	
19	600	600	ASHP-2	2 SETS 4#350KCMIL+#1G	(2) 3"	
20	100	100	SPARE			
21	-	225	SPACE - PROVISIONS ONLY	-	-	
22	-	100	SPACE - PROVISIONS ONLY	-	-	
23	-	800	SPACE - PROVISIONS ONLY	-	-	FUTURE PV @ END OF BUSSING

① PROVIDE CURENT LIMITING BREAKER UL LISTED SERIES RATED FOR 65,000 AMPS RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE CURRENT LIMITING BREAKER.
③ SEE TRANSFORMER SCHEDULE FOR WIRE AND CONDUIT SIZE.
④ CONDUCTOR SIZES SHOWN ARE FOR COPPER. ALUMINUM CONDUCTORS ARE ACCEPTABLE. RESIZE CONDUCTORS & CONDUITS ACCORDINGLY.
⑤ PROVIDE SHUNT TRIP CIRCUIT BREAKER.
⑥ PROVIDE ENERGY-REDUCING MAINTENANCE SWITCHING WITH LOCAL STATUS INDICATOR FOR ARC ENERGY REDUCTION.

277/480V, 3 PHASE, 4W, 65 KAIC
2500A BUS

FRONT ACCESSIBLE

SWITCHBOARD "MSB2" SCHEDULE ⑥

OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
No.	TRIP	FRAME				
-	2000	2500	**MAIN BREAKER**	SEE RISER	-	100% RATED WITH GFI PROTECTION
1	60	100	SPD	(4) #6 & (1) #6G	1 1/4"	PER MFGR. REQUIREMENTS
2	90	100	PANEL PP3B VIA T-5 XFMR	REFER TO SCHEDULE NOTE ③	③	
3	200	225	PANEL MHP3B	4#3/0+#6G	2 1/2"	
4	100	100	PANEL LP3B	4#1+#8G	1 1/2"	
5	60	100	PANEL PP2B VIA T-4 XFMR	REFER TO SCHEDULE NOTE ③	③	
6	300	400	PANEL MHP2B	4#350KCMIL+#4G	3"	
7	100	100	PANEL LP2B	4#1+#8G	1 1/2"	
8	60	100	PANEL MP1B VIA T-4 XFMR	REFER TO SCHEDULE NOTE ③	③	
9	90	100	PANEL PP1B VIA T-5 XFMR	REFER TO SCHEDULE NOTE ③	③	
10	100	100	PANEL LP1B	4#1+#8G	1 1/2"	
11	100	100	PANEL OLP	4#1+#8G	1 1/2"	
12	400	400	PANEL KHP	4#500KCMIL+#3G	4"	
13	1000	1000	ATS-OS	3 SETS 4#400KCMIL+#2/0G	(3) 3"	
② 14	200	225	ATS-LS	4#3/0+#6G	2 1/2"	
15	200	225	SPARE	-	-	
16	150	225	EWH-2	4#1/0+#6G	2"	
17	90	100	EWH-3	4#2+#8G	1 1/4"	
18	150	225	SPARE	-	-	
19	100	100	SPARE	-	-	
20	-	225	SPACE - PROVISIONS ONLY	-	-	
21	-	100	SPACE - PROVISIONS ONLY	-	-	
22	-	800	SPACE - PROVISIONS ONLY	-	-	FUTURE PV @ END OF BUSSING

① PROVIDE CURENT LIMITING BREAKER UL LISTED SERIES RATED FOR 65,000 AMPS RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE ELECTRONIC LSIG ADJUSTABLE CIRCUIT BREAKER.
③ SEE TRANSFORMER SCHEDULE FOR WIRE AND CONDUIT SIZE.
④ CONDUCTOR SIZES SHOWN ARE FOR COPPER. ALUMINUM CONDUCTORS ARE ACCEPTABLE. RESIZE CONDUCTORS & CONDUITS ACCORDINGLY.
⑤ PROVIDE SHUNT TRIP CIRCUIT BREAKER.
⑥ PROVIDE ENERGY-REDUCING MAINTENANCE SWITCHING WITH LOCAL STATUS INDICATOR FOR ARC ENERGY REDUCTION.

277/480V, 3 PHASE, 4W, 65 KAIC

PANEL SCHEDULE

PANEL NO.	LOCATION	MTG	MAIN BUS AMPS	MAIN CB	BRANCH CKT BREAKER (AMPS)										TOTAL POLES	OTHERS
					1 POLE			2 POLE			3 POLE					
					15	20	30	15	20	30	15	20	30	60		
ELP1A	1ST FLOOR AREA "A" EM. CLOSET	S	100	-											42	
ELP1B	1ST FLOOR AREA "B" EM. CLOSET	S	225	200										4	42	
ELP2A	2ND FLOOR AREA "A" EM. CLOSET	S	100	-											42	
ELP2B	2ND FLOOR AREA "B" EM. CLOSET	S	100	-											42	
ELP2B2	2ND FLOOR AREA "B" EM. CLOSET	S	100	-											42	
LP1A	1ST FLOOR AREA "A" ELEC ROOM	S	100	-											42	
LP1B	1ST FLOOR AREA "B" ELEC ROOM	S	100	-											42	
LP2A	2ND FLOOR AREA "A" ELEC ROOM	S	100	-											42	
LP2B	2ND FLOOR AREA "B" ELEC ROOM	S	100	-											42	
LP2B2	2ND FLOOR AREA "B" ELEC ROOM	S	100	-											42	
LP3A	3RD FLOOR AREA "A" ELEC ROOM	S	100	-											42	
LP3B	3RD FLOOR AREA "A" ELEC ROOM	S	100	-											42	
OLP	1ST FLOOR AREA "B" ELEC ROOM	S	100	-											42	
KHP	1ST FLOOR AREA "B" ELEC ROOM	S	400	400											42	
MHP2B	2ND FLOOR AREA "B" ELEC ROOM	S	400	-											42	
MHP2B2	2ND FLOOR AREA "B" ELEC ROOM	S	100	-											42	
MHP3A	3RD FLOOR AREA "A" ELEC ROOM	S	225	-											42	
MHP3B	3RD FLOOR AREA "A" ELEC ROOM	S	225	-											42	

① FED FROM CURRENT LIMITING BREAKERS. UL LISTED SERIES RATED FOR 65,000A RMS @ RATED VOLTAGE WITH UPSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE SHUNT TRIP CIRCUIT BREAKER WITH 120V COIL.
③ SINGLE TUB PANEL BUT TALLER IN HEIGHT.

277/480V, 3 PHASE, 4W, 65 KAIC
1000A MLO

DISTRIBUTION PANEL "NEDP" SCHEDULE

	OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
	No.	TRIP	FRAME				
①	1	150	225	PANEL EP1A VIA T-6	REFER TO SCHEDULE NOTE ③	③	
②	2	200	225	PANEL EP1B VIA T-7	REFER TO SCHEDULE NOTE ③	③	
	3	600	600	ASHP-1	2 SETS 4#350KCMIL+#1G	(2) 3"	
	4	100	100	ELEVATOR	4#1+#8G	1 1/2"	
	5	300	400	PANEL EHP3B	4#350KCMIL+#4G	3"	
①	6	100	100	PANEL TEP1A VIA UPS	4#1+#8G	1 1/2"	
	7	100	100	SPARE			
①	8	60	100	SPARE			
①	9	30	100	SPARE			
②	10	20	100	SPARE			
	11	-	100	SPACE PROVISIONS			
	12	-	225	SPACE PROVISIONS			
	13	-	225	SPACE PROVISIONS			
	14						
	15						

① UL LISTED SERIES RATED FOR 65,000A RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE CURRENT LIMITING BREAKER
③ SEE TRANSFORMER SCHEDULE FOR WIRE AND CONDUIT SIZE.

120/208V, 3 PHASE, 4W, 65 KAIC
400A MLO

DISTRIBUTION PANEL "2DP1B" SCHEDULE

OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
No.	TRIP	FRAME				
1	200	225	PANEL PP2A2	4#3/0+#6G	2 1/2"	
2	60	100	PANEL MP2A2	4#4+#10G	1 1/2"	
3	200	225	PANEL PP2A3	4#3/0+#6G	2 1/2"	
4	60	100	PANEL MP2A3	4#4+#10G	1 1/2"	
5	60	100	SPARE			
6	30	100	SPARE			
7	-	100	SPACE PROVISIONS	-	-	
8	-	225	SPACE PROVISIONS	-	-	
9	-	225	SPACE PROVISIONS	-	-	
10						

① UL LISTED SERIES RATED FOR 65,000A RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS IS ACCEPTABLE.
② PROVIDE CURRENT LIMITING BREAKER
③ SEE TRANSFORMER SCHEDULE FOR WIRE AND CONDUIT SIZE.
④ CONDUCTOR SIZES SHOWN ARE FOR COPPER. ALUMINUM CONDUCTORS ARE ACCEPTABLE. RESIZE CONDUCTORS & CONDUITS ACCORDINGLY.

120/208V, 3 PHASE, 4W, 22 KAIC

PANEL SCHEDULE

	PANEL NO.	LOCATION	MTG	MAIN BUS AMPS	MAIN CB	BRANCH CKT BREAKER (AMPS)										TOTAL POLES	OTHERS
						1 POLE			2 POLE			3 POLE					
						15	20	30	15	20	30	15	20	30	60		
④③	EP1A	1ST FLOOR AREA "A" ELEC RM	S	100	-											84	
⑤③	EP1B	1ST FLOOR AREA "B" ELEC RM	S	400	400											84	
③	EP2A	2ND FLOOR AREA "A" ELEC RM	S	225	150										3	42	
③	EP2B	2ND FLOOR AREA "B" ELEC RM	S	100	-										1	42	
③	EP2B2	2ND FLOOR AREA "B" ELEC RM	S	100	-											42	
③	EP3A	3RD FLOOR AREA "A" ELEC RM	S	100	-											42	
③	EP3B	3RD FLOOR AREA "A" ELEC RM	S	100	60											42	
④③	TEP1A	NETWORK TELCOM 149	S	100	100										2	84	
④③	TEP2A	2ND FLOOR AREA "A" IDF ROOM 203	S	60	-											42	
④③	TEP2B	2ND FLOOR AREA "A" IDF ROOM 229	S	60	-											42	
⑤②	KPP	1ST FLOOR AREA "B" ELEC ROOM	S	400	250											84	
⑤②	PP1A	1ST FLOOR AREA "A" ELEC RM	S	225	150											84	
④②	PP1B	1ST FLOOR AREA "B" ELEC RM	S	225	150											84	
⑤②	PP2A	2ND FLOOR AREA "A" ELEC RM	S	225	150											84	
⑤②	PP2A2	2ND FLOOR AREA "A" ELEC RM	S	225	-											84	
⑤②	PP2A3	2ND FLOOR AREA "A" ELEC RM	S	225	-											84	
④②	PP2B	2ND FLOOR AREA "B" ELEC RM	S	100	100											84	
④②	PP2B2	2ND FLOOR AREA "B" ELEC RM	S	400	250											84	
⑤②	PP3A	3RD FLOOR AREA "A" ELEC RM	S	225	150											84	
④②	PP3B	3RD FLOOR AREA "A" ELEC RM	S	225	150											84	
①	EV	1ST FLOOR AREA "B" ELEC RM	S	600	500											84	(9) 125/2 ⑦
④⑥	MP1A	1ST FLOOR AREA "A" ELEC RM	S	100	100											84	
⑤⑥	MP1B	1ST FLOOR AREA "B" ELEC RM	S	100	100											84	
④⑥	MP2A2	2ND FLOOR AREA "A" ELEC RM	S	100	-											84	
④⑥	MP2A3	2ND FLOOR AREA "A" ELEC RM	S	100	-											84	
④⑥	MP2B	2ND FLOOR AREA "B" ELEC RM	S	100	100											84	
④⑥	MP2B2	2ND FLOOR AREA "B" ELEC RM	S	100	100											84	
④⑥	MP3A	3RD FLOOR AREA "A" ELEC RM	S	100	100											84	
④⑥	MP3B	3RD FLOOR AREA "A" ELEC RM	S	100	100											84	

① PROVIDE SHUNT TRIP MAIN CIRCUIT BREAKER WITH 120V COIL.
② 200% NEUTRAL BUS.
③ DOUBLE NEUTRAL BUS AND IG BUS.
④ SINGLE TUB PANEL BUT TALLER IN HEIGHT.
⑤ DOUBLE TUB PANEL BUT TALLER IN HEIGHT.
⑥ PROVIDE GFPE TYPE CIRCUIT BREAKER FOR EWC'S.
⑦ PROVIDE LOCK-OFF DEVICES FOR ALL BRANCH BREAKERS SERVING EV CHARGERS.

SUB-METERING (BFM) SCHEDULE

##	LOAD METERED	LOAD TYPE	VOLTAGE, PH, WIRE	AMPERE RATING	NOTES
1	MAIN SERVICE	TOTAL ELEC ENERGY	277/480V, 3PH, 4W	2000	-
2	MAIN SERVICE	TOTAL ELEC ENERGY	277/480V, 3PH, 4W	2000	
3	PP1A via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
4	MP1A via T-4 xfmr	HVAC	277/480V, 3PH, 4W	100	
5	LP1A	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
6	PP2A via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
7	LP2A	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
8	PP3A via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
9	MHP3A	HVAC	277/480V, 3PH, 4W	200	
10	LP3A	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
11	MHP2B2	HVAC	277/480V, 3PH, 4W	100	
12	PP2B2 via T-6 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	200	
13	LP2B2	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
14	EV via T-8 xfmr	EV CHARGING	277/480V, 3PH, 4W	400	
15	ASHP-2	HVAC	277/480V, 3PH, 4W	600	
16	EB-1	HVAC	277/480V, 3PH, 4W	1000	
17	EWH-1	HVAC	277/480V, 3PH, 4W	200	
18	SPARE	-	-	-	
19	PP2A2	PLUGLOAD / REC	120/208V, 3PH, 4W	200	
20	MP2A2	HVAC	120/208V, 3PH, 4W	100	
21	PP2A3	PLUGLOAD / REC	120/208V, 3PH, 4W	200	
22	MP2A2	HVAC	120/208V, 3PH, 4W	100	
23	SPARE	-	-	-	
24	PP3B via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
25	MHP3B	HVAC	277/480V, 3PH, 4W	200	
26	LP3B	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
27	PP2B via T-4 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
28	MHP2B	HVAC	277/480V, 3PH, 4W	400	
29	LP2B	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
30	MP1B via T-4 xfmr	HVAC	277/480V, 3PH, 4W	100	
31	PP1B via T-5 xfmr	PLUGLOAD / REC	277/480V, 3PH, 4W	100	
32	LP1B	INTERIOR LIGHTING	277/480V, 3PH, 4W	100	
33	OLP	EXTERIOR LIGHTING	277/480V, 3PH, 4W	100	
34	KHP	KITCHEN EQUIPMENT	277/480V, 3PH, 4W	400	
35	SPARE	-	-	-	
36	ELP1B	EMERG'Y LIGHTING	277/480V, 3PH, 4W	200	
37	TEP1A via UPS	TELECOM SYSTEMS	277/480V, 3PH, 4W	100	
38	EP1A via T-6 xfmr	EMERGENCY POWER	277/480V, 3PH, 4W	200	
39	EHP3B	EMERGENCY POWER	277/480V, 3PH, 4W	400	
40	EP1B via T-7 xfmr	EMERGENCY POWER	277/480V, 3PH, 4W	200	
41	ASHP-1	HVAC	277/480V, 3PH, 4W	600	
42	ELEVATOR	ELEVATOR	277/480V, 3PH, 4W	100	

SUB-METERING NOTES:

1. PROVIDE SATEC BFM-II SUB-METERING SYSTEM OR APPROVED EQUAL. SEE ELECTRICAL SPECIFICATIONS FOR COMPLETE SET OF SYSTEM REQUIREMENTS.
2. SINGLE BFM-II EXTENDED UNIT WITH VIM DUAL VOLTAGE INPUT MODULE CAN MONITOR UP TO 36 SINGLE PHASE / 12 THREE PHASE CURRENT CHANNELS. PROVIDE MULTIPLE BFM-II UNITS AS REQUIRED TO ACCOMMODATE LOADS AS SCHEDULED.
3. PROVIDE 15A/3P CIRCUIT BREAKER PER VOLTAGE SOURCE FOR EACH BFM-II UNIT FOR INPUT VOLTAGE REFERENCE.
4. PROVIDE NEMA-1 ENCLOSURE WITH HINGED COVER AND DIN RAIL MOUNTING PROVISIONS TO HOUSE BFM-II UNIT(S) AND ACCESSORY MODULES. COORDINATE EXACT DIMENSIONS WITH ACTUAL EQUIPMENT TO BE INSTALLED.
5. CURRENT TRANSFORMERS (C/T) SHALL BE SIZED FOR LOAD SCHEDULED WITH LEADS SELECTED BY METERING MANUFACTURER TO ALLOW FOR DISTANCE REQUIRED BETWEEN C/T'S AND METERING UNIT. PROVIDE EXTERNAL WIRING TROUGH AND/OR BOXES FOR INSTALLATION OF CURRENT TRANSFORMERS AROUND CONDUCTORS IF REQUIRED TO MAINTAIN CODE COMPLIANT PANELBOARD GUTTER FILL.
6. PROVIDE THREE (3) SPLIT / SOLID CORE CURRENT TRANSFORMERS FOR EACH THREE PHASE LOAD IN SCHEDULE. PROVIDE ONE (1) SPLIT/ SOLID CORE CURRENT TRANSFORMER FOR EACH SINGLE PHASE LOAD IN SCHEDULE.
7. PROVIDE ONE (1) CAT-6A CONNECTION FROM EACH BFM-II UNIT TO NEAREST MDF/IDF ROOM.

THIS SHEET WAS PREVIOUSLY ISSUED
AS PART OF EARLY RELEASE PACKAGE 2

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8/7/2026 7:46:33 AM

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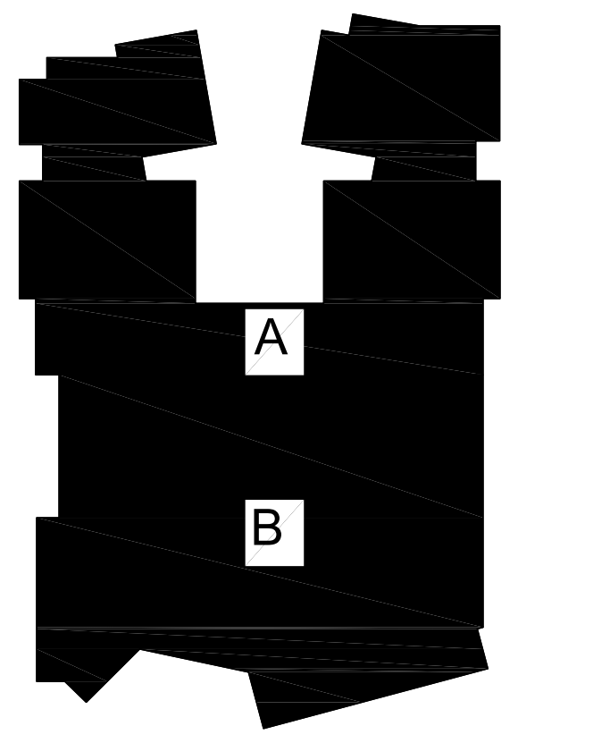
KEY PLAN



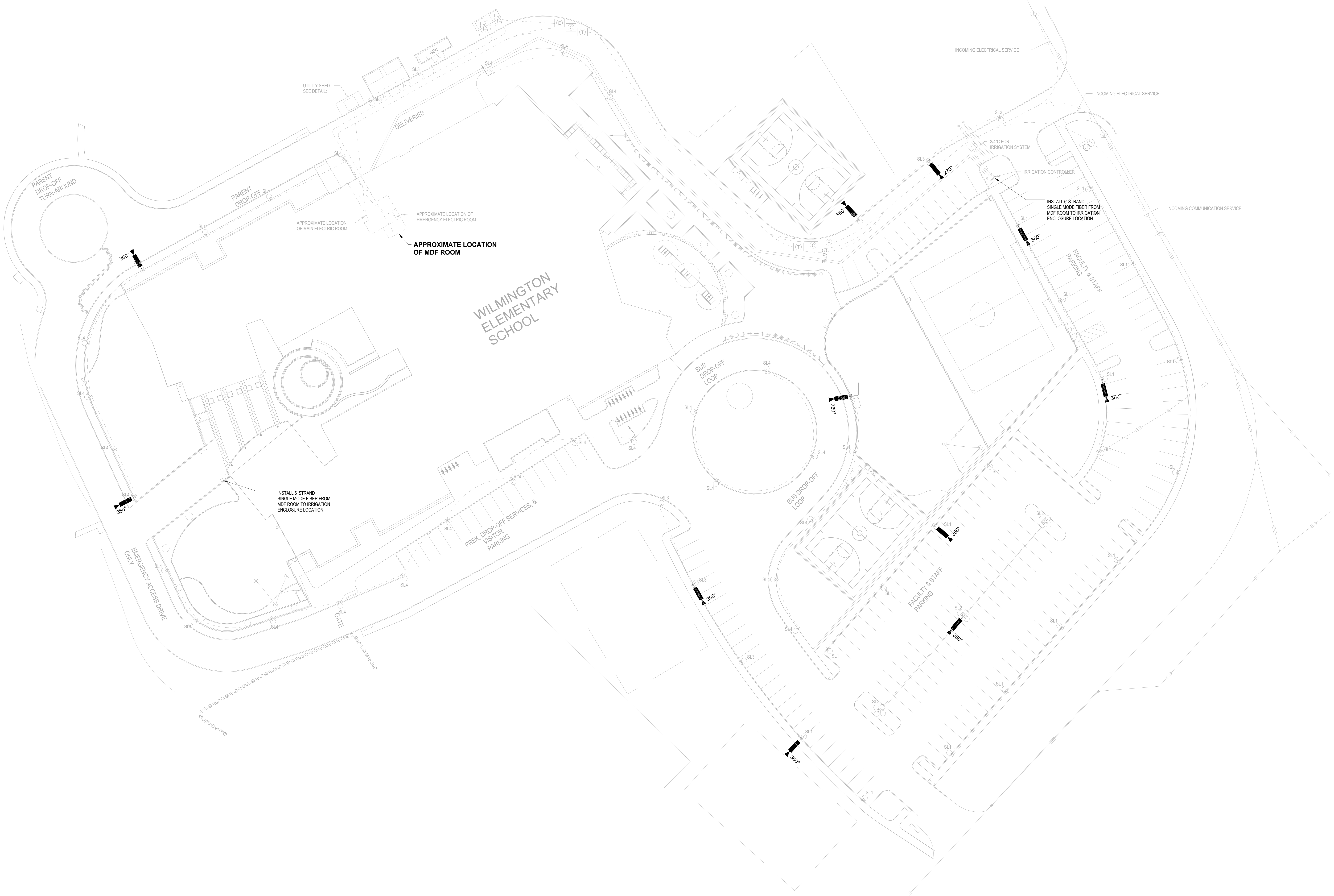
ORIENTATION AND SCALE:

SHEET TITLE:

EARLY RELEASE
SWITCHBOARD
SCHEDULES

SHEET NUMBER:

E5.02



**APPROXIMATE LOCATION
OF MDF ROOM**

INSTALL 6' STRAND
SINGLE MODE FIBER FROM
MDF ROOM TO IRRIGATION
ENCLOSURE LOCATION.

INSTALL 6' STRAND
SINGLE MODE FIBER FROM
MDF ROOM TO IRRIGATION
ENCLOSURE LOCATION.

① TECHNOLOGY SITE PLAN EXTERIOR CAMERAS
1" = 30'-0"

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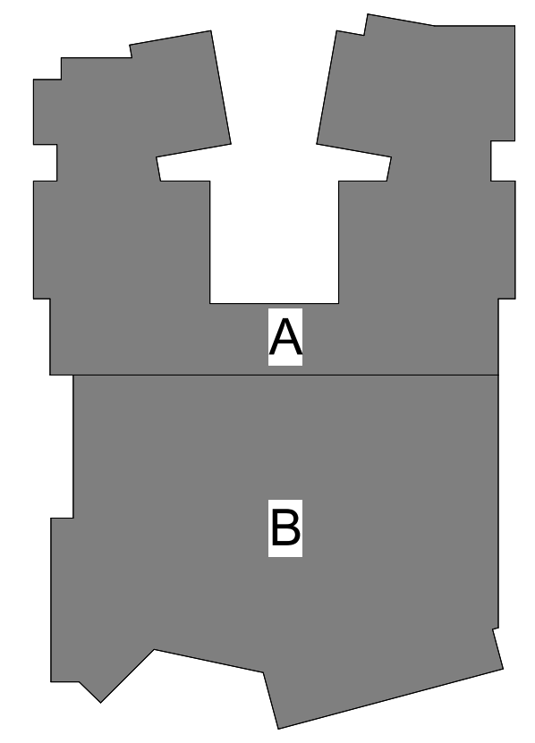

ORIENTATION AND SCALE:

N
TRUE NORTH
PROJECT NORTH
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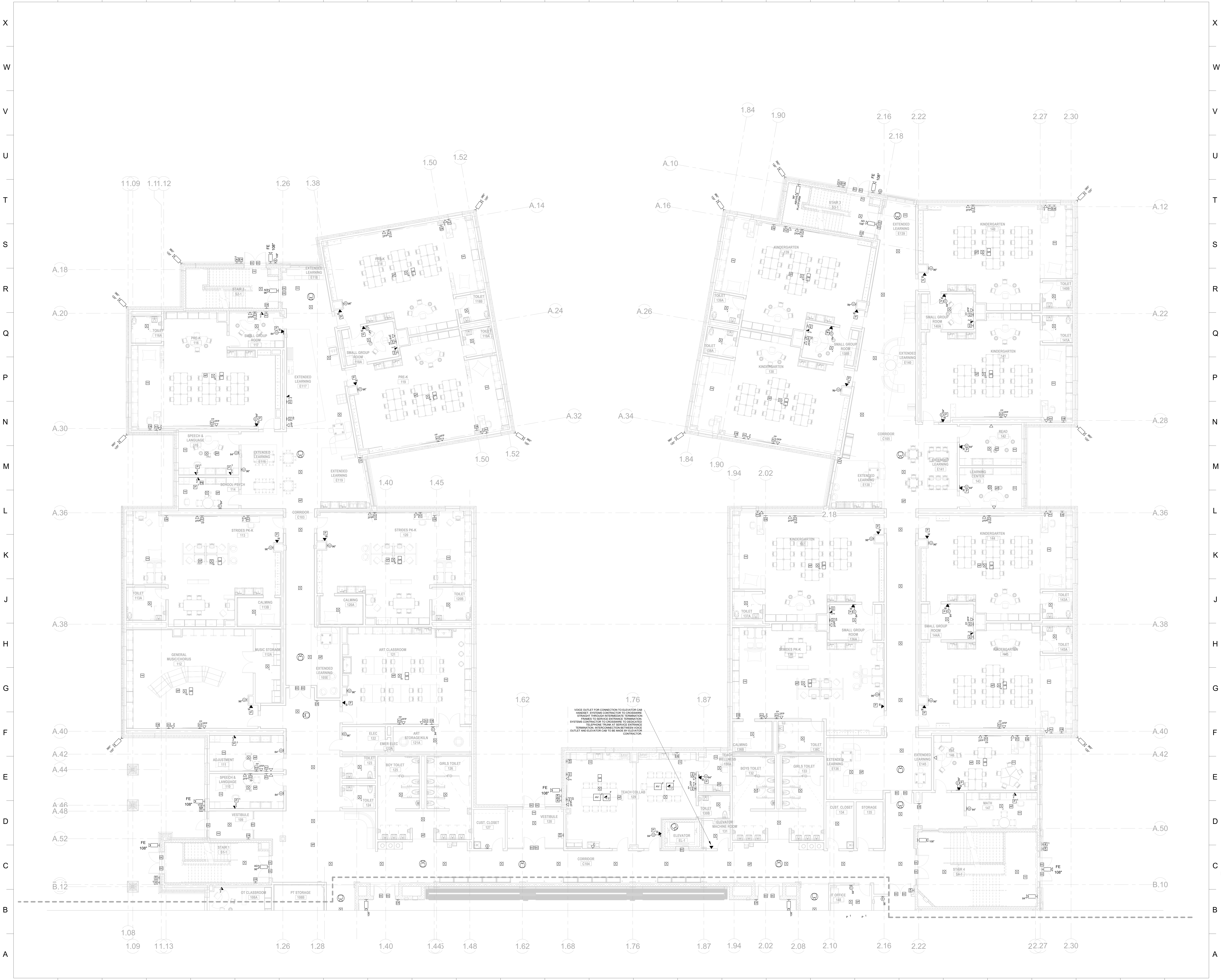
SCALE: 1/8"=1'-0" GRAPHIC SCALE

SHEET TITLE:

SITE PLAN EXTERIOR
CAMERAS
TECHNOLOGY

SHEET NUMBER:

T0.01



VOICE OUTLET FOR CONNECTION TO ELEVATOR CAB HANDSET. SYSTEMS CONTRACTOR TO CROSSWIRE STRAIGHT THROUGH INTERMEDIATE TERMINATION FRAMES TO SERVICE ENTRANCE TERMINATION. SYSTEMS CONTRACTOR TO CROSSWIRE TO DEDICATED TELEPHONE TRUNK AT SERVICE ENTRANCE TERMINATION. INTERCONNECTION BETWEEN VOICE OUTLET AND ELEVATOR CAB TO BE MADE BY ELEVATOR CONTRACTOR.

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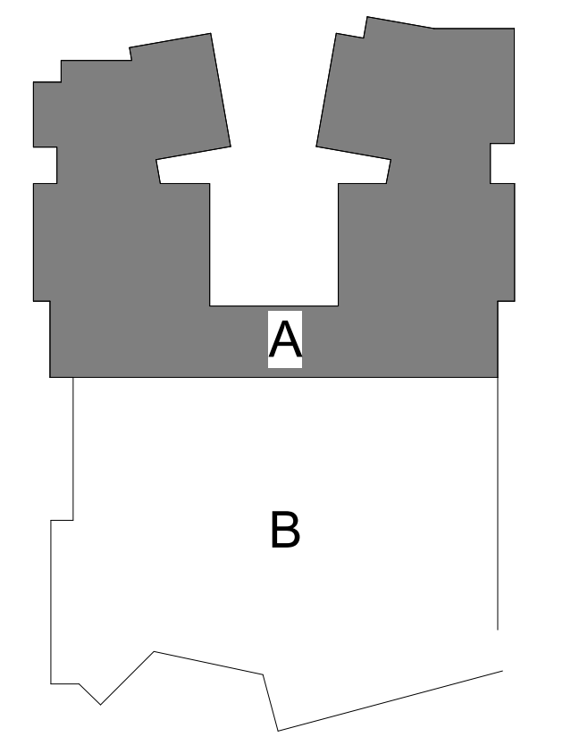

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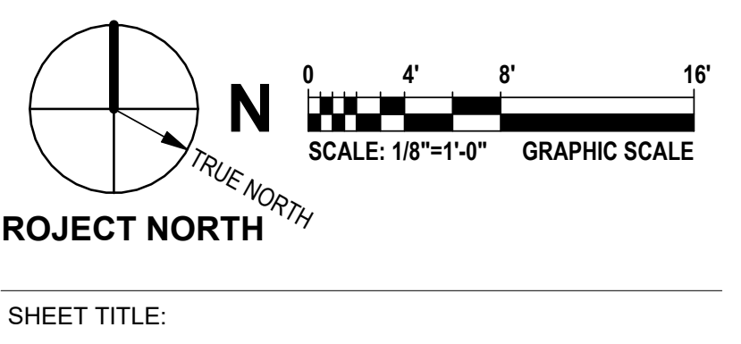
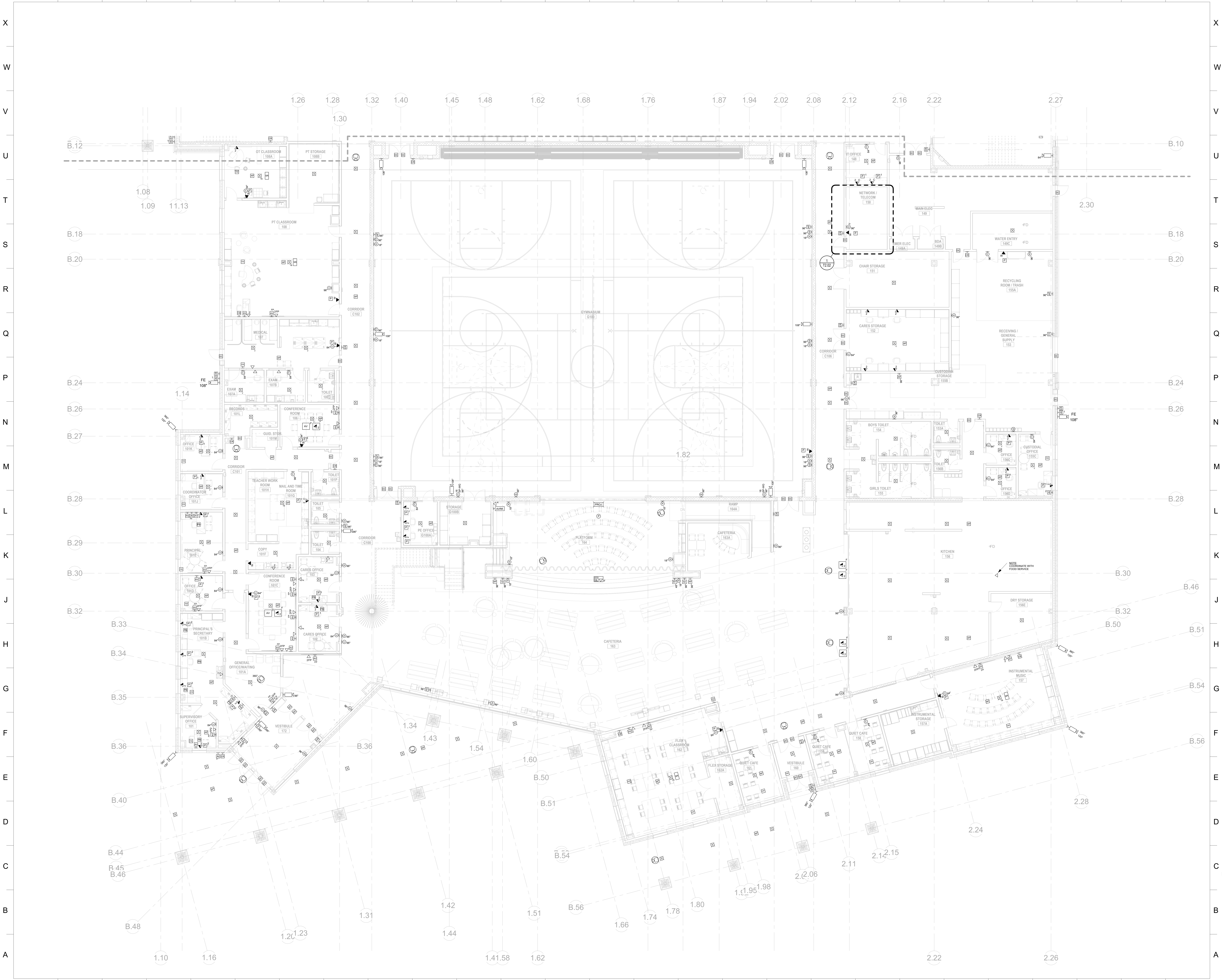


SHEET TITLE:

LEVEL 1 - AREA A TECHNOLOGY

SHEET NUMBER:

T1.11



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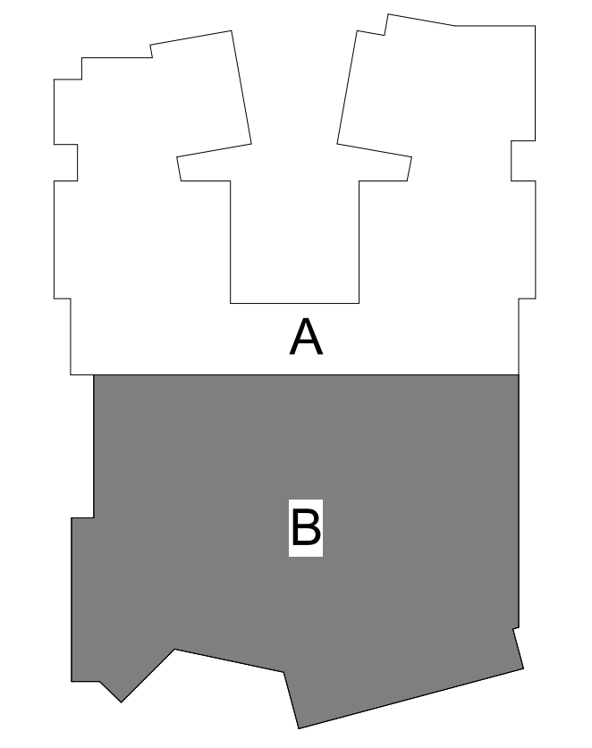

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PROJECT NORTH
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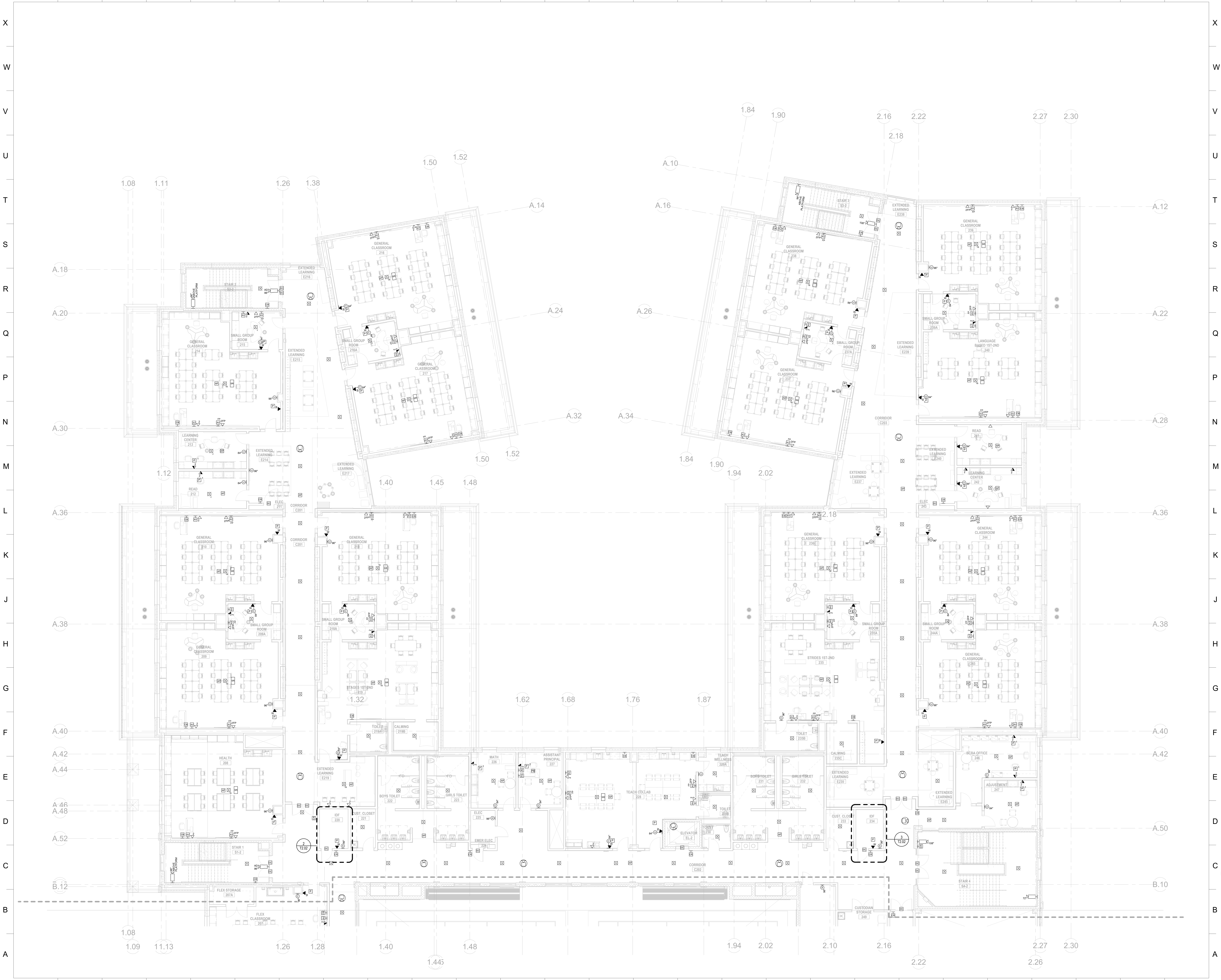
LEVEL 1 - AREA B TECHNOLOGY

SHEET NUMBER:

T1.12



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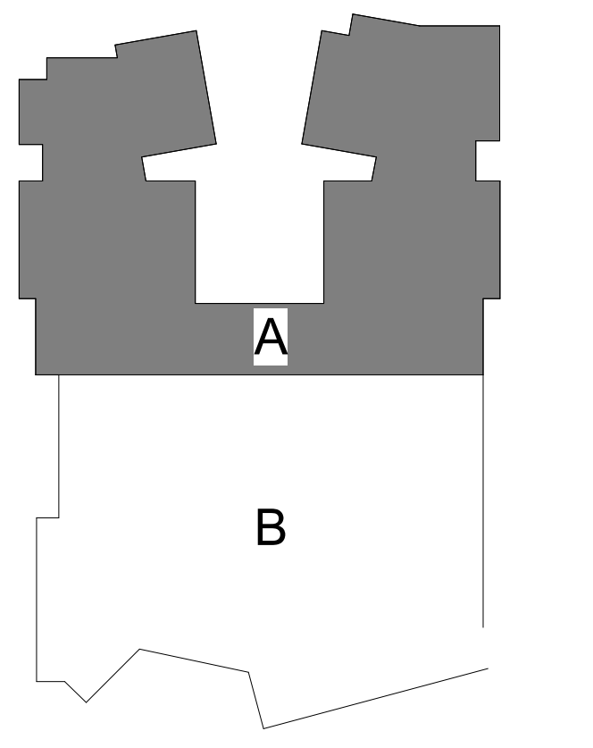

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TRUE NORTH
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SCALE: 1/8"=1'-0"
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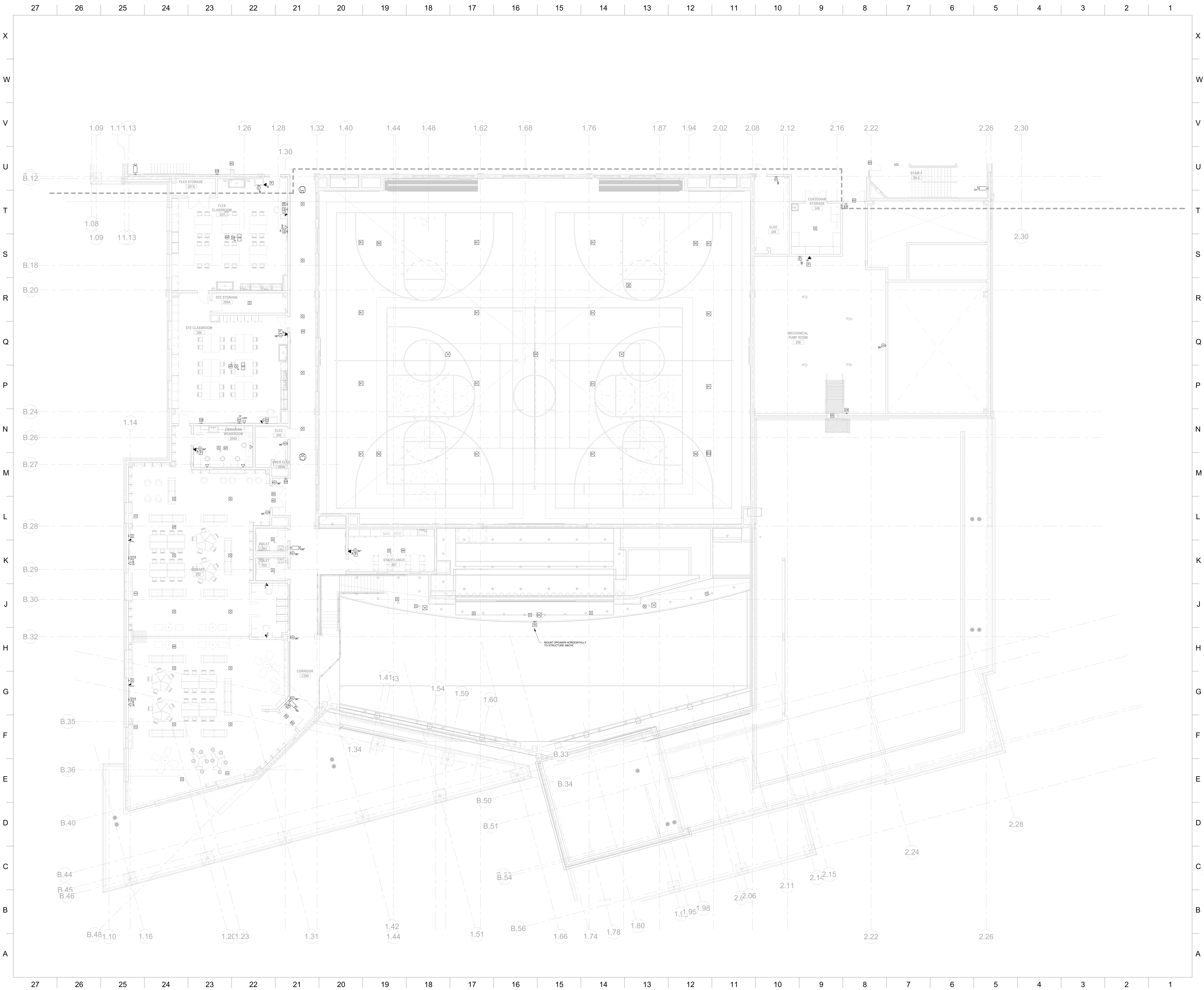
SHEET TITLE:

LEVEL 2 - AREA A TECHNOLOGY

SHEET NUMBER:

T1.21



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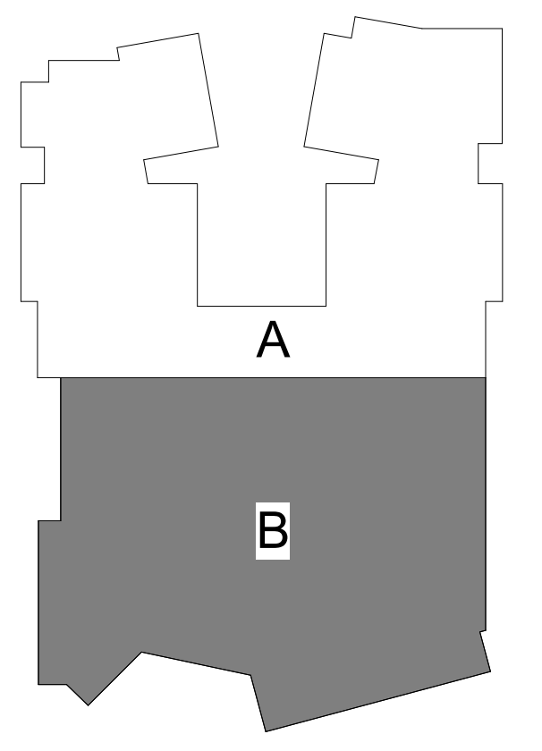

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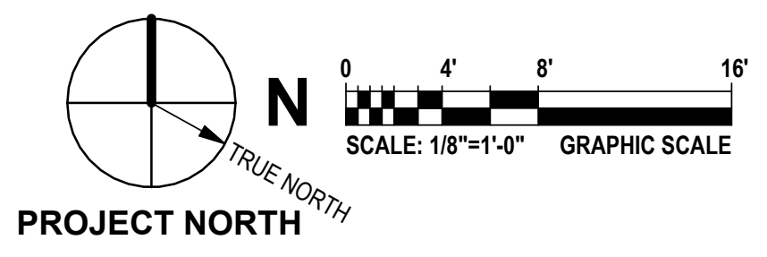

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SHEET NUMBER:

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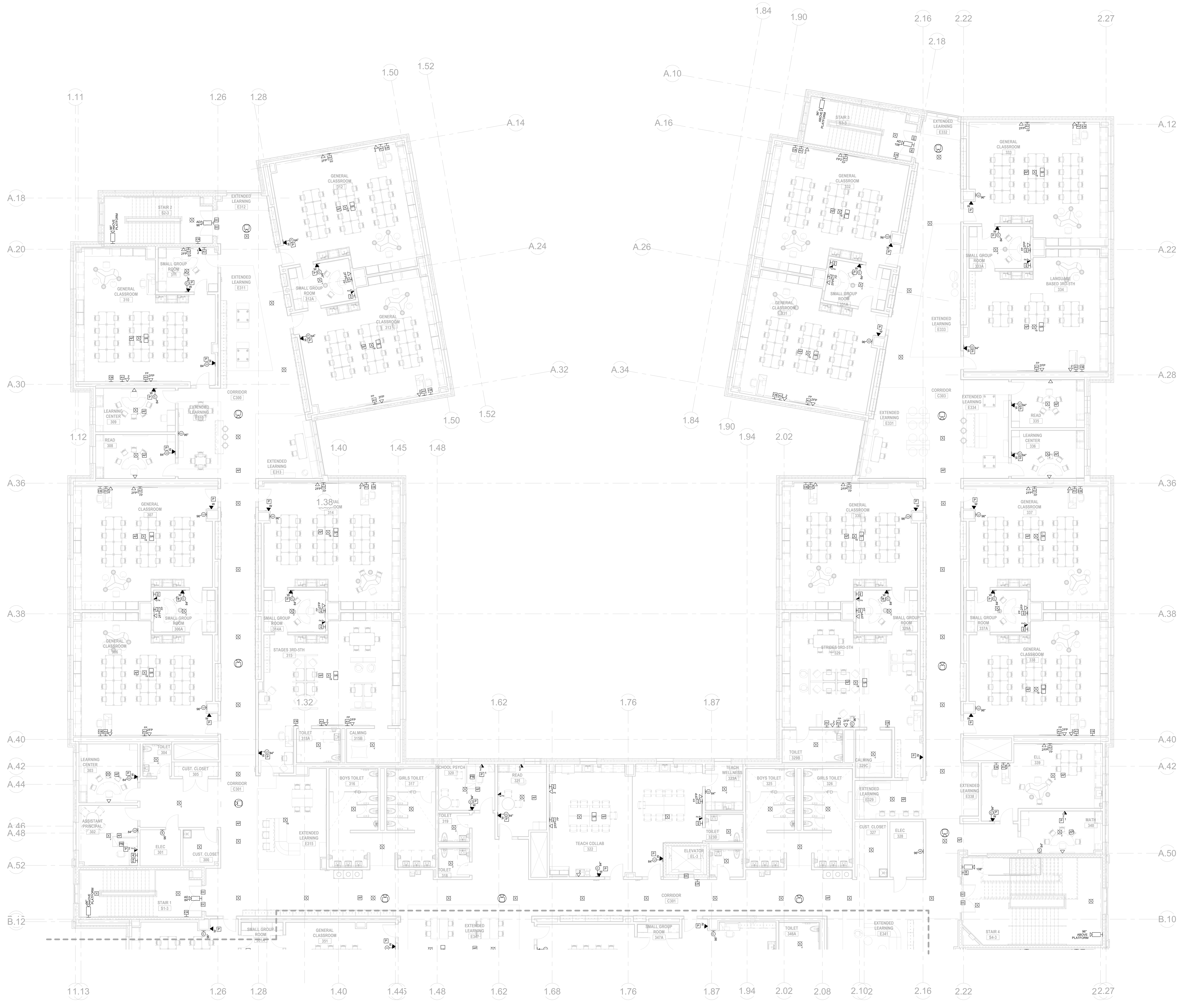

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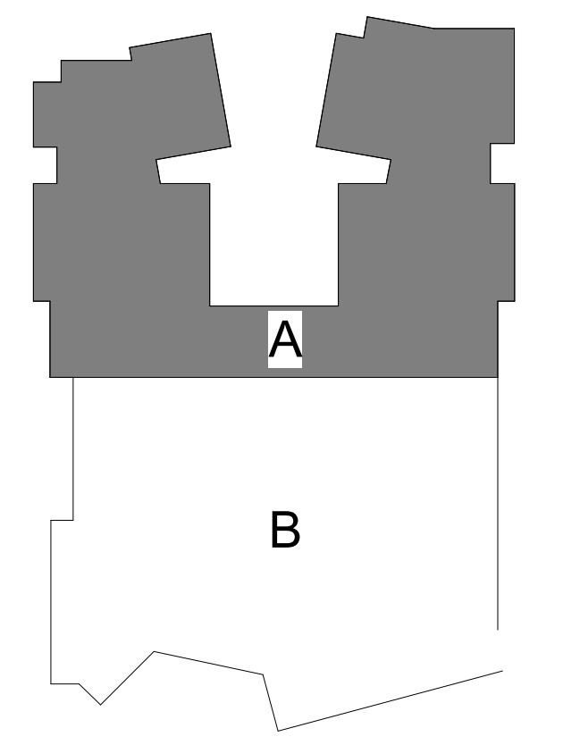

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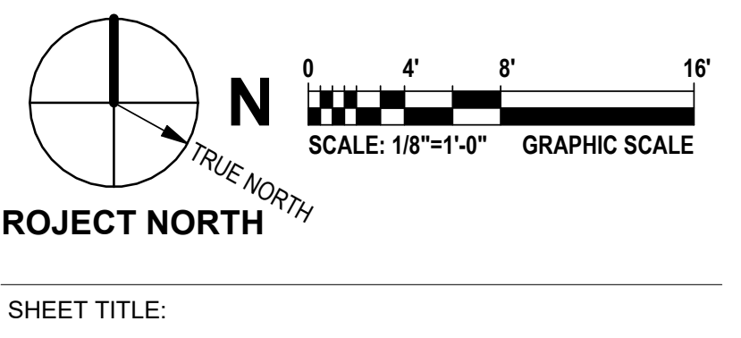

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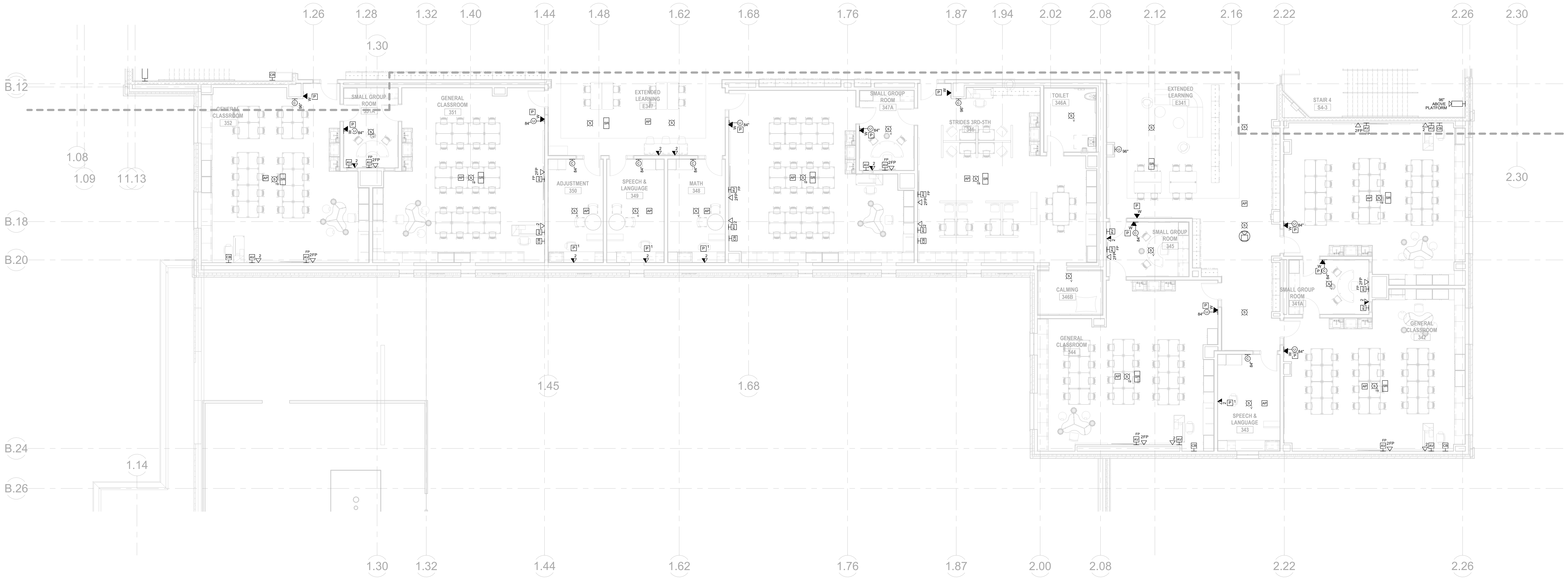
LEVEL 3 - AREA A TECHNOLOGY

SHEET NUMBER:

T1.31



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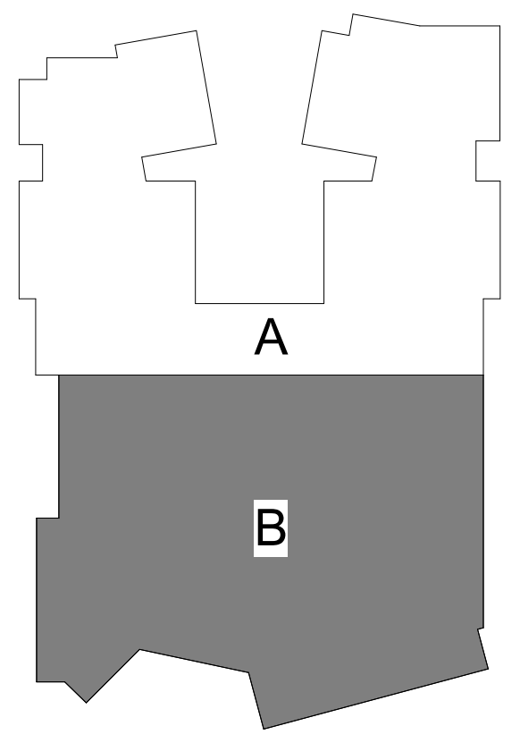

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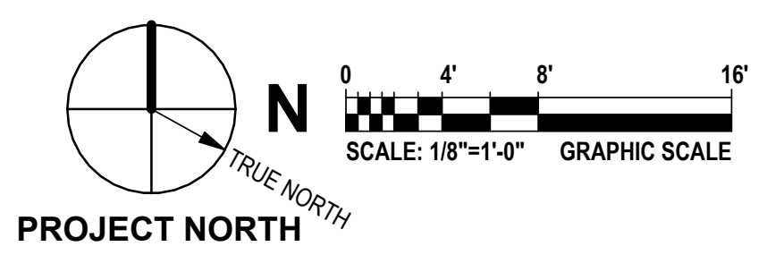

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LEVEL 3 - AREA B TECHNOLOGY

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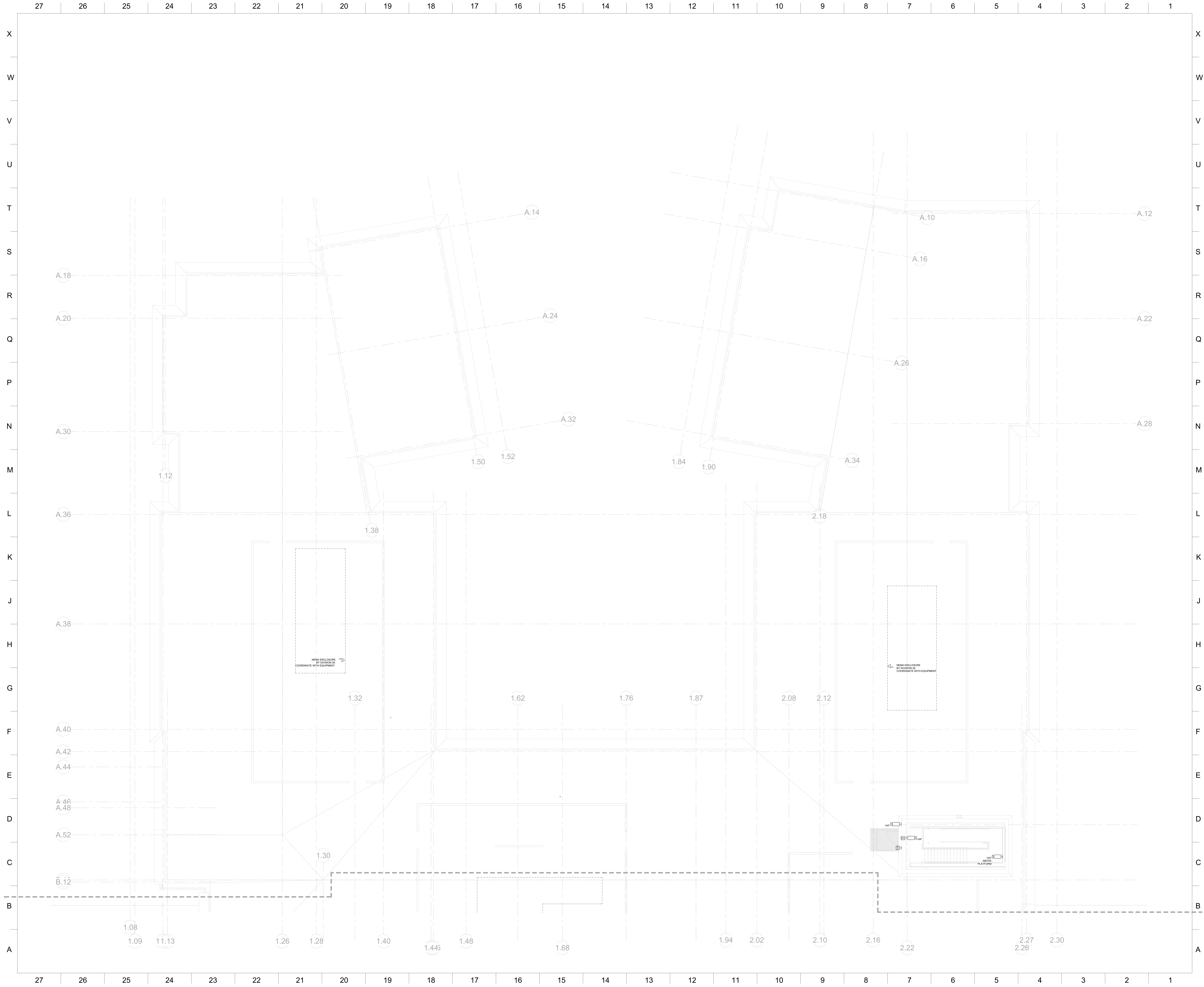

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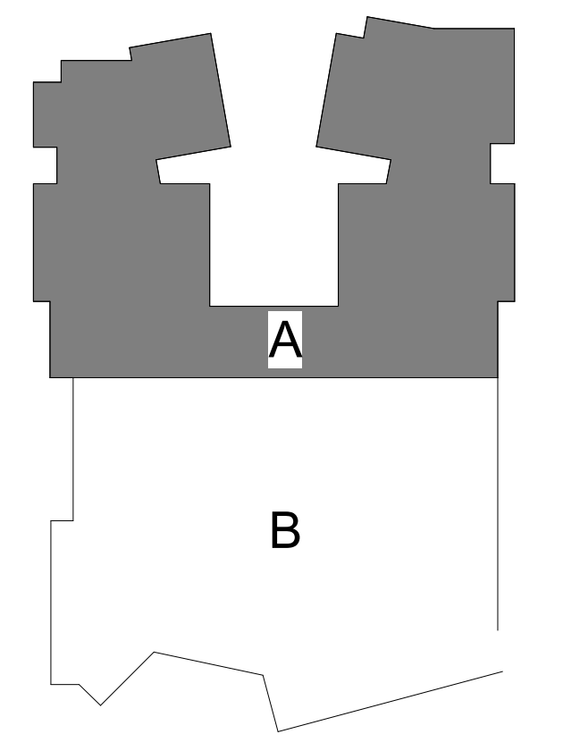

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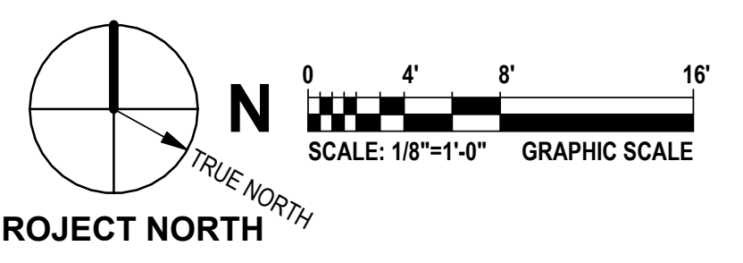
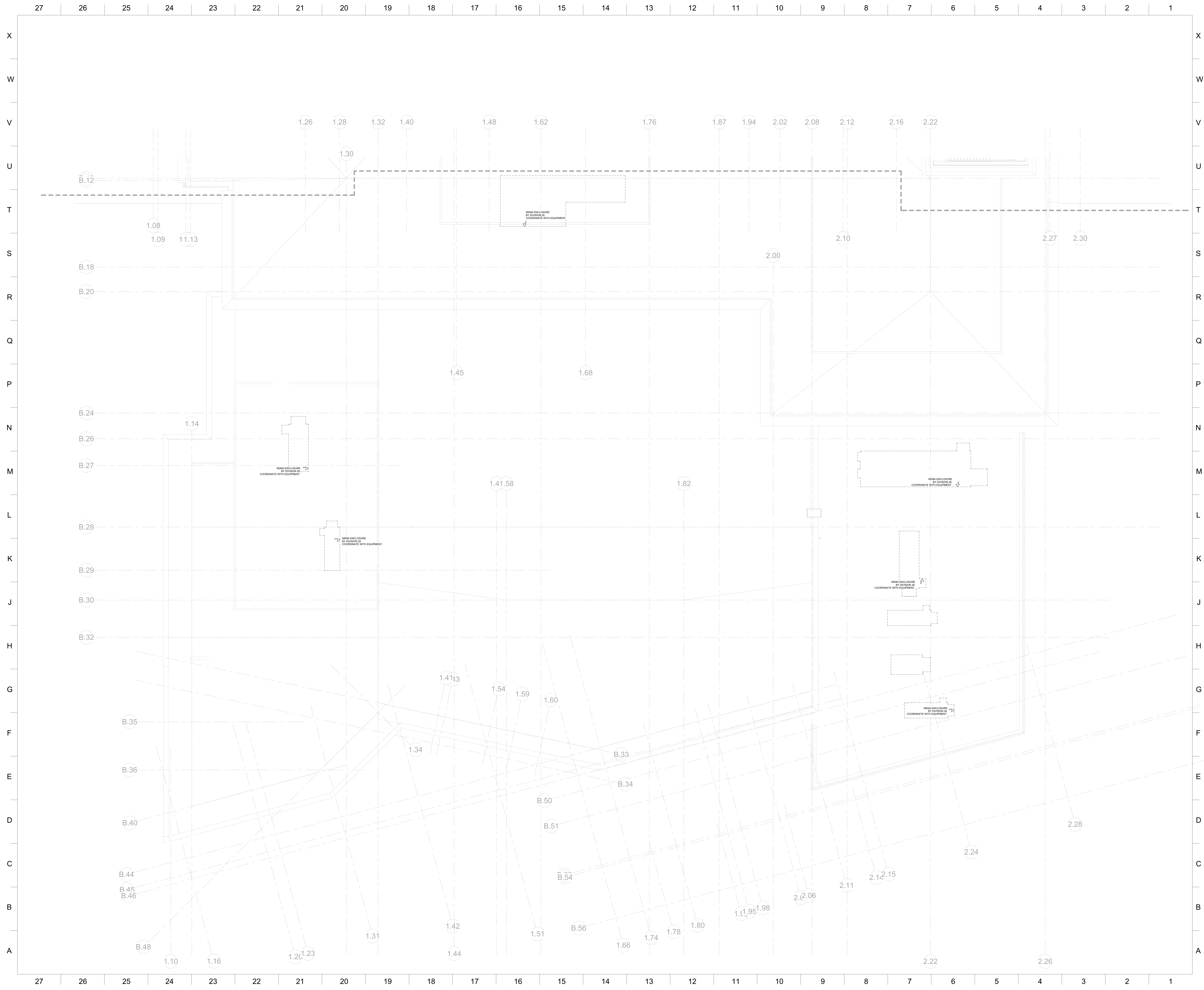


SHEET TITLE:

ROOF - AREA A
TECHNOLOGY

SHEET NUMBER:

T1.41



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PROJECT NUMBER: 23-0847

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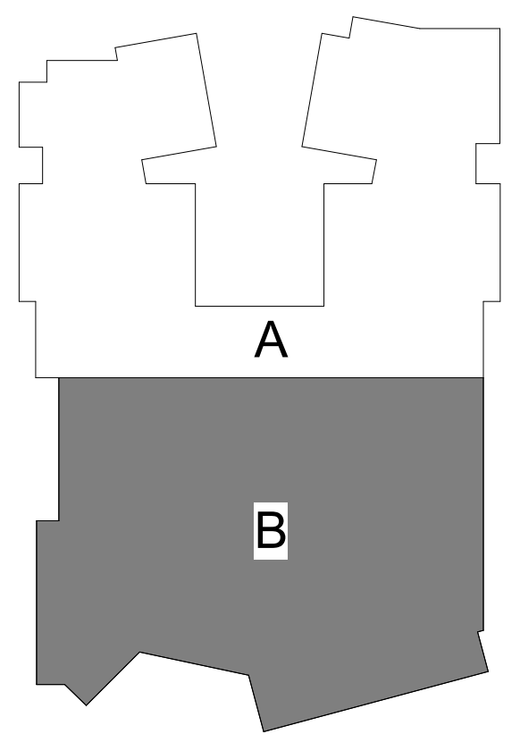
KEY PLAN



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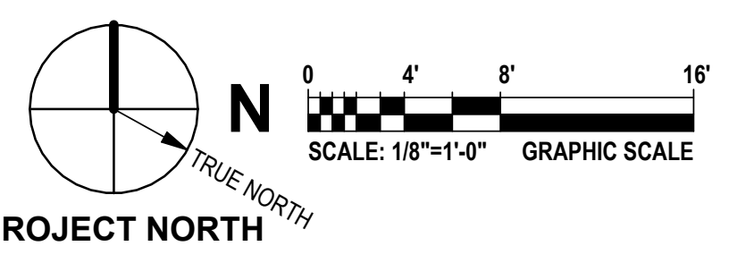

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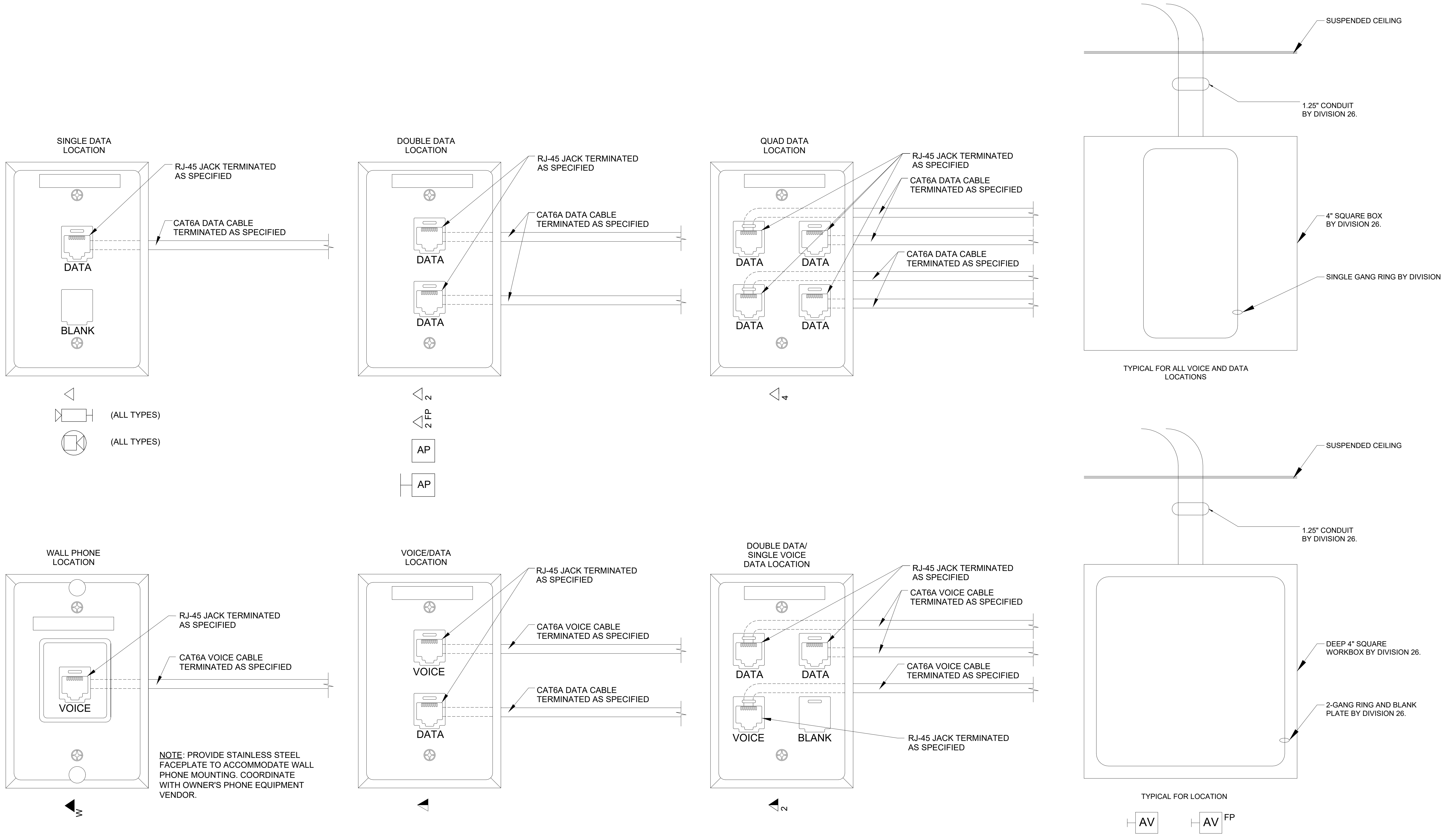
ROOF - AREA B TECHNOLOGY

SHEET NUMBER:

T1.42


SINGLE DATA LOCATION
RJ-45 JACK TERMINATED AS SPECIFIED
CAT6A DATA CABLE TERMINATED AS SPECIFIED
DATA
BLANK
(ALL TYPES)
(ALL TYPES)
DOUBLE DATA LOCATION
RJ-45 JACK TERMINATED AS SPECIFIED
CAT6A DATA CABLE TERMINATED AS SPECIFIED
DATA
DATA
2
2 FP
AP
AP
QUAD DATA LOCATION
RJ-45 JACK TERMINATED AS SPECIFIED
CAT6A DATA CABLE TERMINATED AS SPECIFIED
CAT6A DATA CABLE TERMINATED AS SPECIFIED
DATA
DATA
DATA
DATA
4
SUSPENDED CEILING
1.25" CONDUIT BY DIVISION 26.
4" SQUARE BOX BY DIVISION 26.
SINGLE GANG RING BY DIVISION 26.
TYPICAL FOR ALL VOICE AND DATA LOCATIONS
WALL PHONE LOCATION
RJ-45 JACK TERMINATED AS SPECIFIED
CAT6A VOICE CABLE TERMINATED AS SPECIFIED
VOICE
W
VOICE/DATA LOCATION
RJ-45 JACK TERMINATED AS SPECIFIED
CAT6A VOICE CABLE TERMINATED AS SPECIFIED
CAT6A DATA CABLE TERMINATED AS SPECIFIED
VOICE
DATA
DOUBLE DATA/ SINGLE VOICE DATA LOCATION
RJ-45 JACK TERMINATED AS SPECIFIED
CAT6A VOICE CABLE TERMINATED AS SPECIFIED
CAT6A VOICE CABLE TERMINATED AS SPECIFIED
RJ-45 JACK TERMINATED AS SPECIFIED
DATA
DATA
VOICE
BLANK
2
SUSPENDED CEILING
1.25" CONDUIT BY DIVISION 26.
DEEP 4" SQUARE WORKBOX BY DIVISION 26.
2-GANG RING AND BLANK PLATE BY DIVISION 26.
TYPICAL FOR LOCATION
AV
AV FP

NOTE: PROVIDE STAINLESS STEEL FACEPLATE TO ACCOMMODATE WALL PHONE MOUNTING. COORDINATE WITH OWNER'S PHONE EQUIPMENT VENDOR.

① TECHNOLOGY FACEPLATE CONFIGURATIONS
NTS

GENERAL NOTES:

1) ALL FACEPLATES SHALL MATCH ELECTRICAL FOR COLOR, FINISH AND MATERIAL.

2) OUTLET SYMBOLS ARE SHOWN AS A REPRESENTATION OF THE JACKS AND FACEPLATES TO BE INSTALLED. OUTLET AND DEVICE LOCATIONS AND HEIGHTS SHALL BE CLOSELY COORDINATED WITH THE ARCHITECT, FIELD CONDITIONS, AND OTHER TRADES.

3) COORDINATE ALL OUTLETS AND DEVICES WITH ALL ADJACENT CLASSES OF WORK.

4) COORDINATE THE EXACT MOUNTING LOCATION AND CONSTRUCTION METHOD FOR ALL OUTLETS AND DEVICES WITH THE ARCHITECT, CASEWORK CONTRACTOR, TECHNOLOGY EQUIPMENT VENDOR AND FURNITURE CONTRACTOR TO PROVIDE A COMPLETE AND SATISFACTORY INSTALLATION.

5) ALL CONDUITS, WORKBOXES, FLOOR BOXES AND PLASTER RINGS SHALL BE PROVIDED BY DIVISION 26. WHERE APPLICABLE, SPECIAL DEVICE WORKBOXES SHALL BE FURNISHED FOR INSTALLATION BY DIVISION 26. FACEPLATES, CONNECTORS AND CABLING SHALL BE FURNISHED AND INSTALLED BY COMMUNICATION SYSTEM INSTALLER.

6) ALL REFERENCES TO DIVISION 26 CONVEY WORK THAT SHALL BE PERFORMED BY THE ELECTRICAL CONTRACTOR.

7) ALL REFERENCES TO OUTLETS AND DEVICE HEIGHTS REFER TO HEIGHT OF THE CENTER OF THE OUTLET OR DEVICE ABOVE FINISHED FLOOR. COORDINATE ALL MOUNTING HEIGHTS WITH THE ARCHITECT, DIVISION 26 AND ELEVATIONS.

8) PROVIDE LABELING ON ALL PLATES TO IDENTIFY DEVICE FUNCTION FOR ALL AUDIO-VISUAL DATA JACKS WITH AV DESIGNATION. DATA JACKS FOR DEDICATED AUDIO-VISUAL NETWORK SHALL BE LABELED ACCORDINGLY.

TYPICAL SYMBOL KEY

TYPICAL VOICE/DATA OUTLETS

◁ "SPECIAL DESIGNATION" "MOUNTING DESIGNATION"

TYPICAL VOICE/DATA OUTLETS

⊢□ "SPECIAL DESIGNATION" "MOUNTING DESIGNATION"

⊢○ "SPECIAL DESIGNATION" "MOUNTING DESIGNATION"

TYPICAL CEILING MOUNTED DEVICES

TYPICAL DEVICE INSTALLED IN RECESS FLOORBOX OR POKE THRU WHERE APPLICABLE

□ F

EXAMPLES

◁ 2 C	DOUBLE DATA INSTALLED ABOVE COUNTER COUNTER HEIGHT ABOVE FINISHED FLOOR (A.F.F.)
⊢AP	FLUSH MOUNTED WIRELESS ACCESS POINT 96" ABOVE FINISHED FLOOR (A.F.F.)
◀ 2 F	SINGLE VOICE DOUBLE DATA INSTALLED IN FLOORBOX

MOUNTING DESIGNATIONS:

"AE" = REFER TO ARCHITECTURAL ELEVATIONS AND ARCHITECT FOR MOUNTING HEIGHT AND LOCATION.

"AD" = DEVICE MOUNTED AND CENTERED DIRECTLY ABOVE DOOR FRAME

"C" = DEVICE MOUNTED AT COUNTER HEIGHT

"CLG" = DEVICE FINISH CEILING MOUNTED.

"##" = DEVICE MOUNTED "##" INCHES ABOVE FINISH FLOOR

"F" = DEVICE MOUNTED IN FLOOR BOX OR POKE-THRU

"D" = DIRECT CONNECT TELEPHONE LINE. CONNECT DIRECTLY TO TELCO LINE.

"WG" = DEVICE PROTECTED BY WIREGUARD. COORDINATE WIREGUARD TYPE WITH DIVISION 260144.

"FP" = MOUNT AT FLAT PANEL DISPLAY LOCATION IN AV BOX.

"TB" = TALKBACK SPEAKER

"TV" = MOUNT BEHIND FLATSCREEN TV IN AV BOX. COORDINATE WITH ARCHITECTURAL ELEVATIONS.

"PRO" = MOUNT ADJACENT TO PROJECTOR. COORDINATE WITH ARCHITECTURAL ELEVATIONS.

LEGEND

◁	DATA OUTLET- SINGLE GANG FACEPLATE WITH DATA JACK (QUANTITY AS INDICATED BY SPECIAL DESIGNATION). WORKBOX AND CONDUIT STUB BY DIVISION 26. MOUNTING HEIGHTS AT 18" A.F.F. UNLESS OTHERWISE NOTED. SPECIAL DESIGNATIONS: "2"=TWO DATA JACKS PER FACEPLATE, "3"=THREE DATA JACKS PER FACEPLATE, "4"=FOUR DATA JACKS PER FACEPLATE, ETC. NO SPECIAL DESIGNATION INDICATES A SINGLE DATA JACK.
◀ W	WALL PHONE OUTLET- SINGLE GANG FACEPLATE WITH CONNECTORS AND CABLING AS INDICATED IN TECHNOLOGY DETAILS. WORKBOX AND CONDUIT STUB BY DIVISION 26. MOUNTING HEIGHT AT 46" A.F.F. UNLESS OTHERWISE NOTED. USE A STAINLESS STEEL FACEPLATE WITH RJ45 JACK TO ACCOMMODATE PERMANENT WALLPHONE MOUNTING. ALL STAINLESS STEEL FACEPLATES SHALL HAVE A LABEL WINDOW. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
◀	SINGLE VOICE OUTLET- SINGLE GANG FACEPLATE WITH CONNECTORS AND CABLING AS INDICATED IN TECHNOLOGY DETAILS. WORKBOX AND CONDUIT STUB BY DIVISION 26. MOUNTING HEIGHT AT 18" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
◭	VOICE/DATA OUTLET- SINGLE GANG FACEPLATE WITH CONNECTORS AND CABLING AS INDICATED IN TECHNOLOGY DETAILS. WORKBOX AND CONDUIT STUB BY DIVISION 26. MOUNTING HEIGHT AT 18" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
◭ 2	DOUBLE DATA/SINGLE VOICE OUTLET- SINGLE GANG FACEPLATE WITH CONNECTORS AND CABLING AS INDICATED IN TECHNOLOGY DETAILS. WORKBOX AND CONDUIT STUB BY DIVISION 26. MOUNTING HEIGHT AT 18" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
AP	CEILING WIRELESS ACCESS POINT PER SECTION 272000. DOUBLE DATA OUTLET FOR WIRELESS ACCESS POINTS WITH WIRELESS ACCESS POINT CABLING INSTALLED AS SPECIFIED ABOVE REFLECTED CEILING WITH 20' OF COILED CABLE SLACK. FOR HARD/GYP CEILING AREAS, PROVIDE SINGLE GANG FACEPLATE WITH CONNECTORS AND CABLING AS INDICATED IN TECHNOLOGY DETAILS. WORKBOX AND CONDUIT STUB BY DIVISION 26. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT. CABLING BY SECTION 270100 AND WIRELESS ACCESS POINT BY SECTION 272000.
⊢AP	WALL MOUNTED WIRELESS ACCESS POINT PER SECTION 272000. WALL MOUNTED DOUBLE DATA OUTLET FOR WIRELESS ACCESS POINT. SINGLE GANG FACEPLATE WITH CONNECTORS AND CABLING AS INDICATED IN TECHNOLOGY DETAILS. WORKBOX AND CONDUIT STUB BY DIVISION 26. MOUNTING HEIGHT AT 96" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT. CABLING BY SECTION 270100 AND WIRELESS ACCESS POINT BY SECTION 272000.
⊢AV	AUDIO/VISUAL BOX AT TEACHER'S LOCATIONS. (1) 4" SQUARE WORKBOXES, WITH (1) 1.25" CONDUIT AND (1) 1" CONDUIT TO CORRESPONDING SPACE'S ACCESSIBLE CEILING BY DIVISION 26. MOUNTING HEIGHT AT 18" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
⊢AV FP	AUDIO/VISUAL BOX FOR FLAT PANEL DISPLAY. (1) 4" SQUARE WORKBOX AND (1) 1.25" CONDUIT AND (1) 1" CONDUIT TO CORRESPONDING SPACE'S ACCESSIBLE CEILING BY DIVISION 26. COORDINATE MOUNTING HEIGHTS WITH ARCHITECT.
⊢C	WALL CLOCK AS SPECIFIED. SINGLE WIRED DATA JACK AND IP SECONDARY CLOCK AS SPECIFIED. BACKBOX AND CONDUITS SHALL BE PROVIDED BY DIVISION 26. CLOCK WILL HAVE A 12" FACE UNLESS OTHERWISE NOTED. MOUNTING HEIGHT AT 84" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
⊢CB	CALL BUTTON WITH DEVICE PLATE AND CABLING AS SPECIFIED. WORKBOX AND 1" CONDUIT TO ACCESSIBLE CEILING BY DIVISION 26. MOUNTING HEIGHT AT 48" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHT WITH THE ARCHITECT.
S	CEILING SPEAKER AS SPECIFIED. CUSTOM BACKBOX FURNISHED AND INSTALLED BY COMMUNICATION CONTRACTOR. PROVIDE WEATHER PROOF PRODUCT WHERE SHOWN OUTDOORS. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
S TB	TALK BACK CEILING SPEAKER AS SPECIFIED. CUSTOM BACKBOX FURNISHED AND INSTALLED BY COMMUNICATION CONTRACTOR. PROVIDE WEATHER PROOF PRODUCT WHERE SHOWN OUTDOORS. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
S V	VOLUME CONTROLLED CEILING SPEAKER AS SPECIFIED. CUSTOM BACKBOX FURNISHED AND INSTALLED BY COMMUNICATION CONTRACTOR. BACKBOX AND 1" CONDUIT TO ACCESSIBLE CEILING BY DIVISION 26. COORDINATE MOUNTING HEIGHT WITH THE ARCHITECT.
⊢S	WALL SPEAKER AS SPECIFIED. PROVIDE CUSTOM BACKBOX AS REQUIRED BY MANUFACTURER TO DIVISION 26 FOR INSTALLATION. PROVIDE SURFACE MOUNTED BACK BOX AT BLOCK WALL LOCATIONS. 1" CONDUIT TO ACCESSIBLE CEILING BY DIVISION 26. MOUNTING HEIGHT AT 96" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
⊢S TB	TALK BACK WALL SPEAKER AS SPECIFIED. PROVIDE CUSTOM BACKBOX AS REQUIRED BY MANUFACTURER TO DIVISION 26 FOR INSTALLATION. PROVIDE SURFACE MOUNTED BACK BOX AT BLOCK WALL LOCATIONS. 1" CONDUIT TO ACCESSIBLE CEILING BY DIVISION 26. MOUNTING HEIGHT AT 96" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
⊢HS	HORN SPEAKER AS SPECIFIED. PROVIDE CUSTOM BACKBOX AS REQUIRED BY MANUFACTURER TO DIVISION 26 FOR INSTALLATION. 1" CONDUIT TO ACCESSIBLE CEILING BY DIVISION 26. MOUNTING HEIGHT AT 96" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
⊢PA	PA CONSOLE AS SPECIFIED. WORKBOX AND CONDUIT STUB BY DIVISION 26.
SR	CLASSROOM SPEECH REINFORCEMENT SYSTEM AS SPECIFIED. HARDWIRED POWER BY DIVISION 26. "W" DESIGNATES WALL MOUNT. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
P	PHONES AS SPECIFIED BY SECTION 273000 VOICE COMMUNICATION SYSTEM WHERE PHONE WITH NO DESIGNATION = WALL PHONE, "1" = GENERAL OFFICE DESK PHONE, "2" = ADMINISTRATIVE DESK PHONE, "3" = CONFERENCE PHONE.
PB	ALARM PANIC BUTTON MOUNTED TO FURNITURE. WORKBOX AND 1" CONDUIT TO ACCESSIBLE CEILING BY DIVISION 26.
⊢CR	PROXIMITY CARD READER AS SPECIFIED. WORKBOX AND CONDUIT STUB BY DIVISION 26. "M" = MULLION MOUNTED. MOUNTING HEIGHT AT 48" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
⊢KP	ALARM KEYPAD CONTROL STATION. WORKBOX AND 1" CONDUIT TO ACCESSIBLE CEILING AS REQUIRED BY DIVISION 26. MOUNT AT 48" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
DC	DOUBLE POLE/DOUBLE THROW DOOR CONTACT AS SPECIFIED. WORKBOX AND CONDUIT STUB BY DIVISION 26.
DR	DOOR RELEASE BUTTON AS SPECIFIED. WORKBOX AND CONDUIT STUB BY DIVISION 26.
⊢AI 1	VIDEO INTERCOM DOOR STATION AS SPECIFIED. WORKBOX AND CONDUIT STUB BY DIVISION 26. MOUNTING HEIGHTS AT 48 A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
⊢AI 2	VIDEO INTERCOM MASTER STATION AS SPECIFIED. WORKBOX AND CONDUIT STUB BY DIVISION 26. MOUNTING HEIGHT AT 48 A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
PIR	CEILING MOUNTED ALARM MOTION SENSOR BY SECTION 281000. WORKBOX AND 1" CONDUIT TO ACCESSIBLE CEILING BY DIVISION 26.
⊢PIR	WALL MOUNTED ALARM MOTION SENSOR BY SECTION 281000. SINGLE GANG BOX AND 1" CONDUIT TO ACCESSIBLE CEILING BY DIVISION 26. MOUNTING HEIGHT AT 96" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
⊢CI	CAMERA INPUT PLATE. WORKBOX AND CONDUIT STUB BY DIVISION 26. MOUNTING HEIGHTS AT 18" A.F.F. UNLESS OTHERWISE NOTED. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.
	CEILING MOUNTED INTERIOR SURVEILLANCE CAMERA AS SPECIFIED. "360°" DESIGNATION INDICATES 360 DEGREE CAMERA. "180°" DESIGNATION INDICATES 180 DEGREE CAMERA. WORKBOX AND CONDUIT AS REQUIRED BY DIVISION 26.
	SURFACE MOUNTED SURVEILLANCE CAMERA AS SPECIFIED. "P" DESIGNATION INDICATES PENDANT MOUNT. "S" DESIGNATION INDICATES STAIRWELL CAMERA. WORKBOX AND CONDUIT AS REQUIRED BY DIVISION 26. COORDINATE MOUNTING HEIGHTS WITH THE ARCHITECT.

MISC. AUDIO-VISUAL SYSTEMS

S1	GYMNASIUM CEILING MOUNT LOCAL SOUND SYSTEM SPEAKERS BY SECTION 274000.
S1	GYMNASIUM S1 SPEAKER CABLE BACKBOX FOR LOCAL SOUND SYSTEM S1 SPEAKERS BY SECTION 274000. SINGLE GANG BOX WITH 1" CONDUIT BY DIVISION 26.
⊢S2	CAFETERIA SURFACE MOUNT PROGRAM LOUDSPEAKERS BY SECTION 274000.
⊢S2	CAFETERIA S2 SPEAKER CABLE BACKBOX FOR S2 SPEAKERS BY SECTION 274000. SINGLE GANG BOX WITH 1" CONDUIT BY DIVISION 26.
S3	CAFETERIA CEILING MOUNT PROGRAM LOUDSPEAKERS BY SECTION 274000.
⊢S3	CAFETERIA S3 SPEAKER CABLE BACKBOX FOR S3 SPEAKERS BY SECTION 274000. SINGLE GANG BOX WITH 1" CONDUIT BY DIVISION 26.
W	ASSISTED LISTENING AND WIRELESS MICROPHONE ANTENNA BY SECTION 274000. SINGLE GANG BOX AND CONDUIT BY DIVISION 26.
WA	ASSISTED LISTENING AND MICROPHONE ANTENNA BY SECTION 274000. SINGLE BOX AND CONDUIT BY DIVISION 26.
⊢M	MICROPHONE PLATE AS SPECIFIED BY SECTION 274000. SINGLE GANG BOX AND CONDUIT BY DIVISION 26.
⊢BT	BLUETOOTH RECEIVER AS SPECIFIED.
⊢AVRK	AV EQUIPMENT RACK. NEMA BOX BY DIVISION 26 TO ACCOMMODATE ALL CONDUITS AND CABLING. DEDICATED 20A CIRCUIT QUAD RECEPTACLE BY DIVISION 26.
PC	COMPUTER CONNECTION TO AV SYSTEM BY 274000. FLOOR WORKBOX AND CONDUIT BY DIVISION 26.
PROJ	PROJECTOR CABLING INTERFACE OUTLET AS SPECIFIED BY SECTION 274000. DOUBLE GANG BOX AND CONDUIT BY DIVISION 26.
P	PROJECTOR AS SPECIFIED BY SECTION 274000.

② TECHNOLOGY OUTLET LEGEND
NTS

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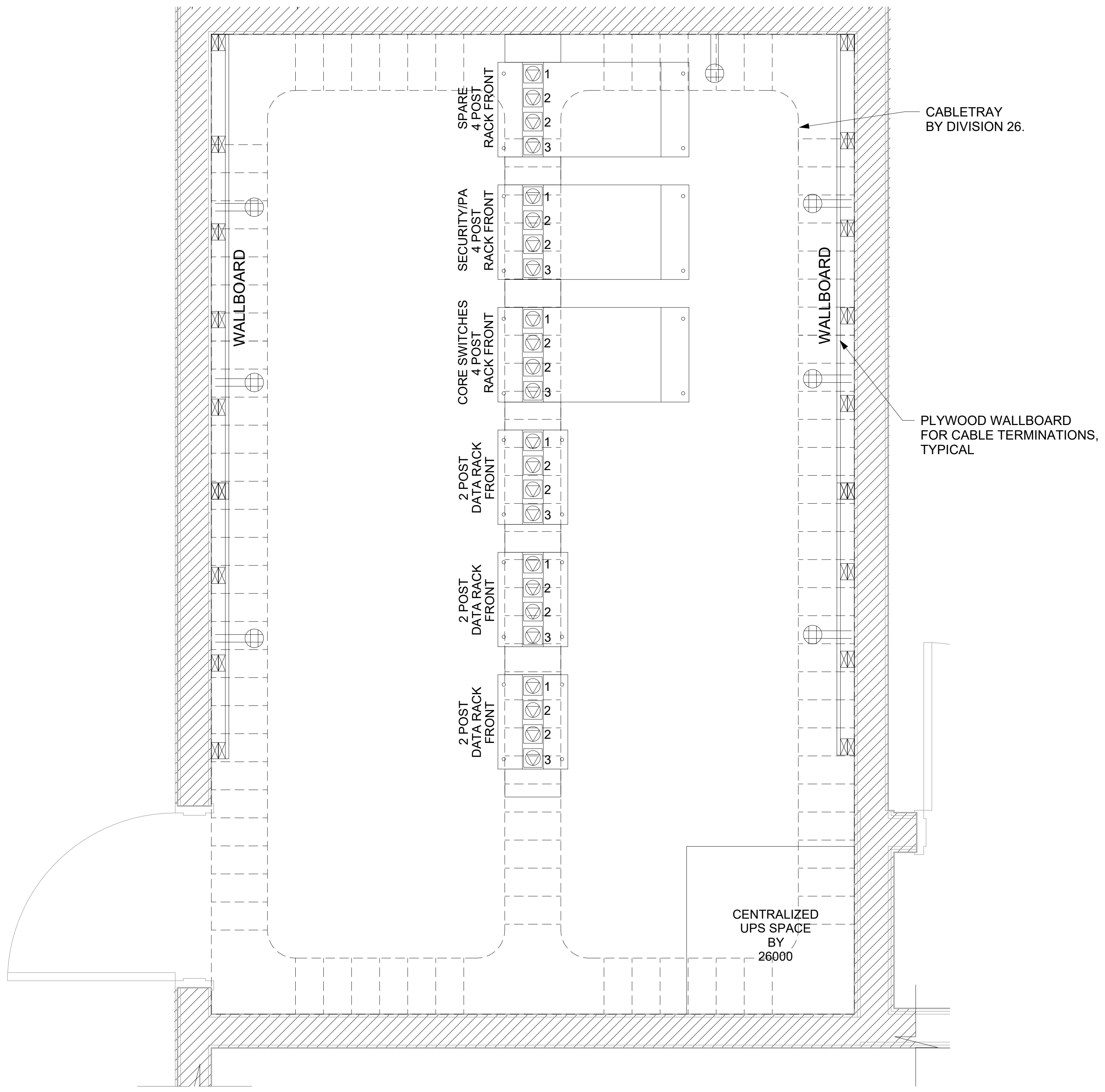
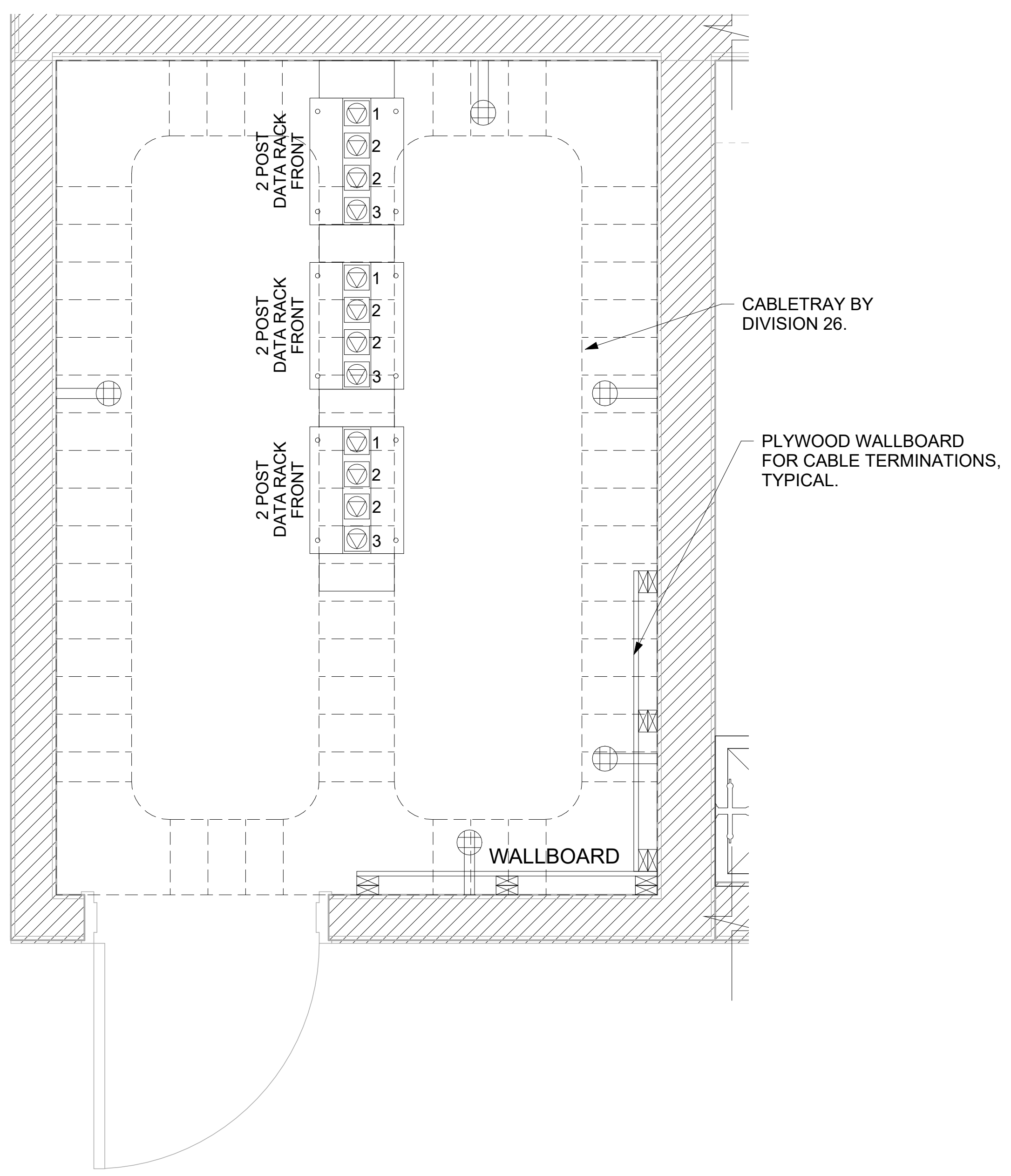
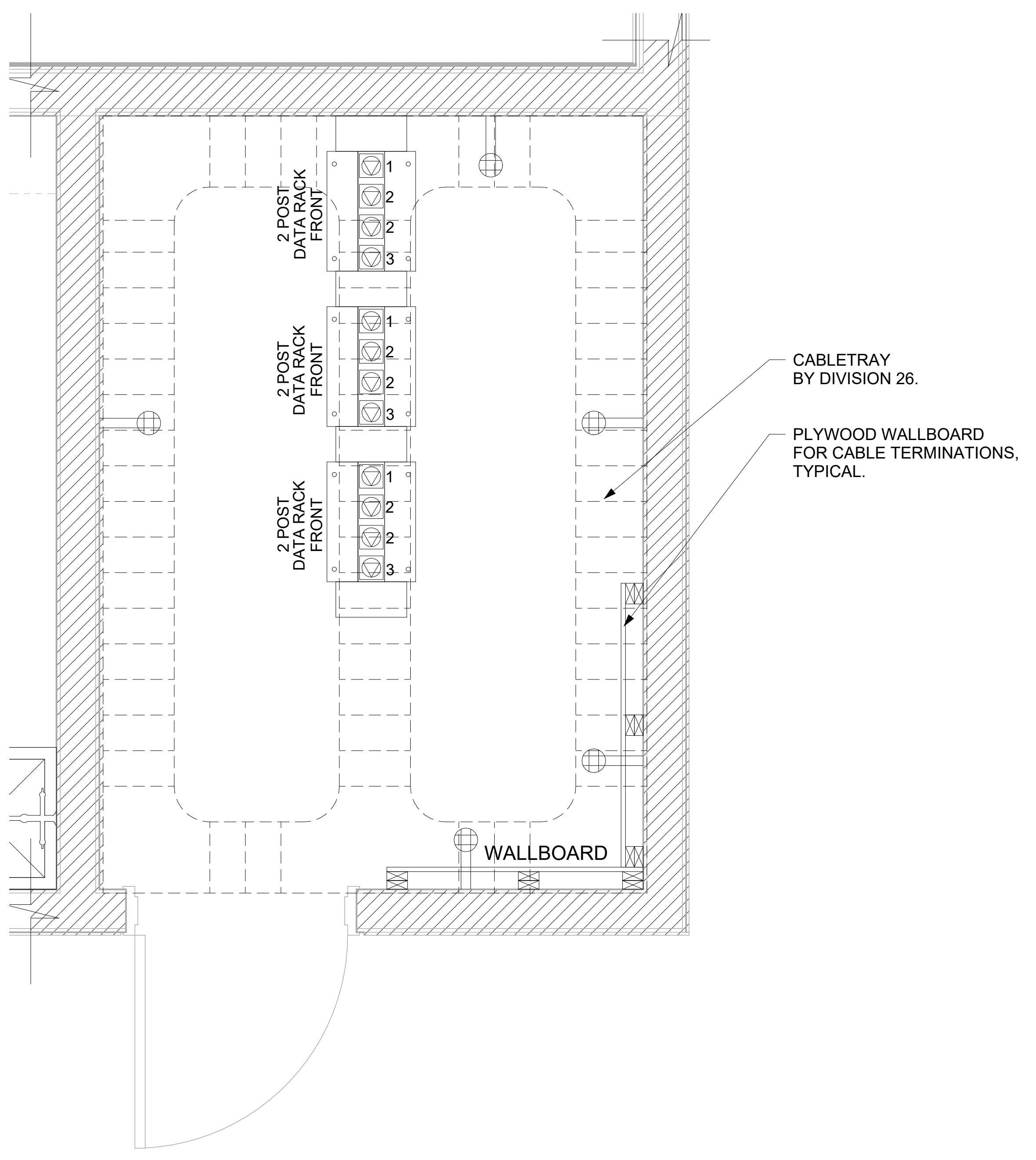


① TECHNOLOGY NETWORK/TELECOM ROOM 150 EQUIPMENT LAYOUT
3/4" = 1'-0"



② TECHNOLOGY IDF ROOM 220 EQUIPMENT LAYOUT
3/4" = 1'-0"



③ TECHNOLOGY IDF ROOM 234 EQUIPMENT LAYOUT
3/4" = 1'-0"

LEGEND:

DUPLEX ELECTRICAL CONVENIENCE OUTLET WITH 20 AMP DEDICATED AND ISOLATED CIRCUIT ON UPS. COORDINATE EXACT ELECTRICAL OUTLET REQUIREMENTS WITH DIVISION 26 DRAWINGS.

QUADRAPLEX ELECTRICAL CONVENIENCE OUTLET WITH 20 AMP DEDICATED AND ISOLATED CIRCUIT ON UPS. COORDINATE EXACT ELECTRICAL OUTLET REQUIREMENTS WITH DIVISION 26 DRAWINGS.

"X" LOCKING NEMA RECEPTACLE MOUNTED TO THE UNDERSIDE OF CABLE TRAY FACING DOWNWARD, WHERE:
"1" SIGNIFIES 20 120 = 20A L5-20R DEDICATED AND ISOLATED CIRCUIT ON UPS.
"2" SIGNIFIES 30 120 = 30A L5-30R DEDICATED AND ISOLATED CIRCUIT ON UPS.
"3" SIGNIFIES 30 208 = 30A L6-30R DEDICATED AND ISOLATED CIRCUIT ON UPS.

COORDINATE EXACT ELECTRICAL OUTLET REQUIREMENTS WITH DIVISION 26 DRAWINGS.

GENERAL NOTES:

1) COMMUNICATION CONTRACTOR SHALL USE THE POWER RECEPTACLES PROVIDED BY THE DIVISION 26 FOR POWERING OF ALL EQUIPMENT IN THE EQUIPMENT RACKS. PROVIDE EXTENSION CORDS AS REQUIRED.

2) ALL CABLES ARE TO BE ROUTED THROUGH CABLE TRAY. NO CABLES MAY BE RUN ALONG THE FLOOR.

3) ALL CABLE TRAY SHOWN SHALL BE PROVIDED AND INSTALLED BY DIVISION 26.

4) COORDINATE ALL REQUIREMENTS WITH GENERAL CONTRACTOR, ELECTRICAL CONTRACTOR AND ALL OTHER APPLICABLE TRADES.

5) ALL CONDUITS AND CONDUIT SLEEVES TO ACCOMMODATE HORIZONTAL AND BACKBONE CABLING SHALL BE PROVIDED BY DIVISION 26.

VOICE/DATA EQUIPMENT RACK GENERAL NOTES:

1) THE QUANTITY OF 48 PORT PATCH PANELS REQUIRED FOR EACH RACK SHALL BE EQUAL TO THE THE QUANTITY NEEDED TO TERMINATE ALL VOICE AND DATA CABLES AT THAT RACK PLUS THE QUANTITY REQUIRED TO PROVIDE FOR 20% SPARE.

2) A SINGLE 24 PORT FIBER OPTIC PATCH PANEL IS REQUIRED TO TERMINATE FIBERS IN EACH IDF ROOM AND THE MDF ROOM. THE MDF ROOM REQUIRES A QUANTITY OF 24 PORT FIBER OPTIC PATCH PANELS EQUAL TO THE NUMBER OF TECHNOLOGY ROOMS PLUS THE SERVICE ENTRANCE ROOM.

3) MEET WITH OWNER PRIOR TO INSTALLATION OF RACKS, PATCH PANELS, CABLE MANAGEMENT AND EQUIPMENT TO COORDINATE EXACT LOCATIONS FOR ALL COMPONENTS.

④ TECHNOLOGY ROOM EQUIPMENT LAYOUTS NOTES AND LEGEND
NTS

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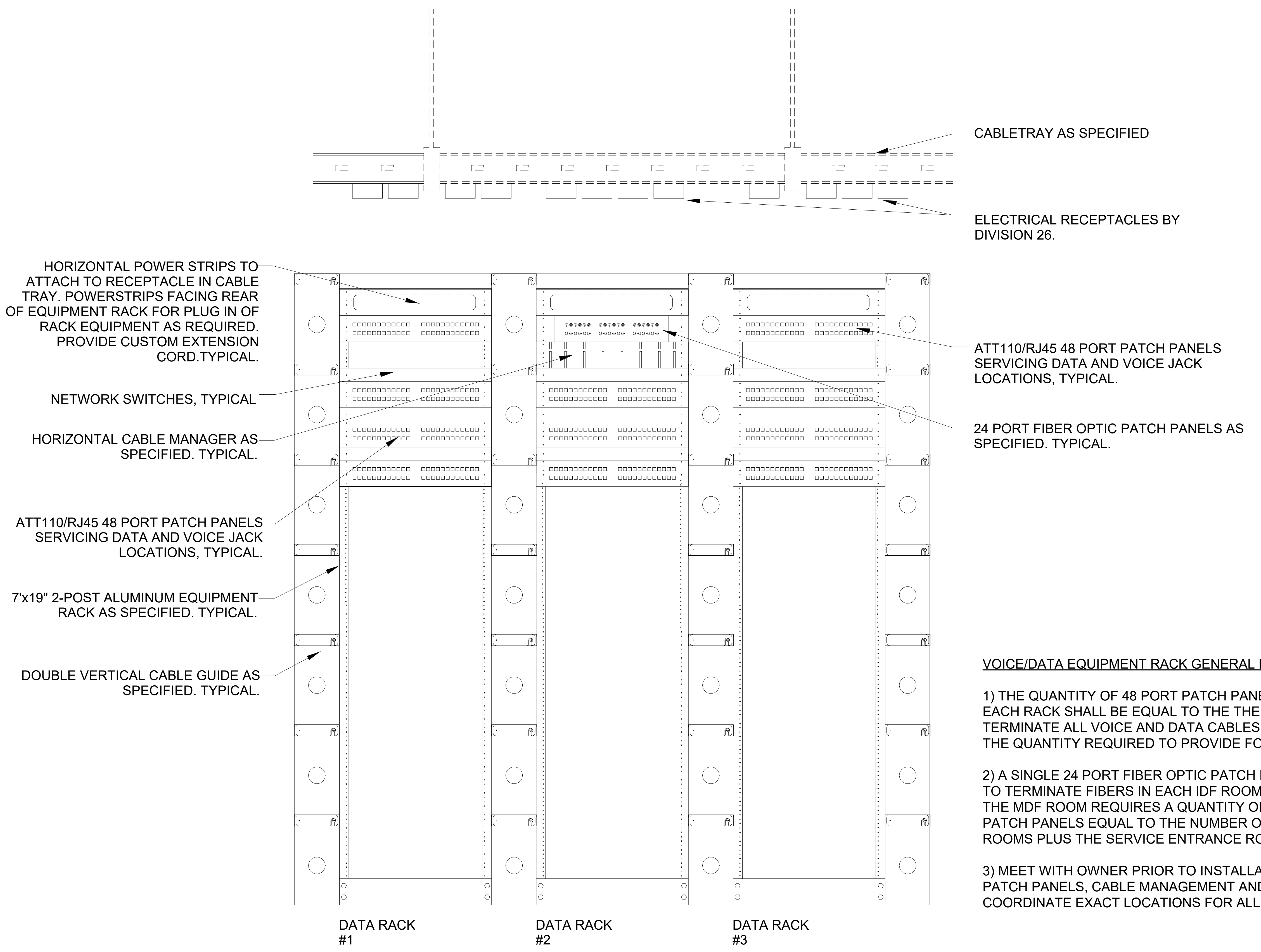

CABLETRAY AS SPECIFIED
ELECTRICAL RECEPTACLES BY DIVISION 26.
HORIZONTAL POWER STRIPS TO ATTACH TO RECEPTACLE IN CABLE TRAY. POWERSTRIPS FACING REAR OF EQUIPMENT RACK FOR PLUG IN OF RACK EQUIPMENT AS REQUIRED. PROVIDE CUSTOM EXTENSION CORD.TYPICAL.
NETWORK SWITCHES, TYPICAL
HORIZONTAL CABLE MANAGER AS SPECIFIED. TYPICAL.
ATT110/RJ45 48 PORT PATCH PANELS SERVICING DATA AND VOICE JACK LOCATIONS, TYPICAL.
7'x19" 2-POST ALUMINUM EQUIPMENT RACK AS SPECIFIED. TYPICAL.
DOUBLE VERTICAL CABLE GUIDE AS SPECIFIED. TYPICAL.
ATT110/RJ45 48 PORT PATCH PANELS SERVICING DATA AND VOICE JACK LOCATIONS, TYPICAL.
24 PORT FIBER OPTIC PATCH PANELS AS SPECIFIED. TYPICAL.
DATA RACK #1
DATA RACK #2
DATA RACK #3

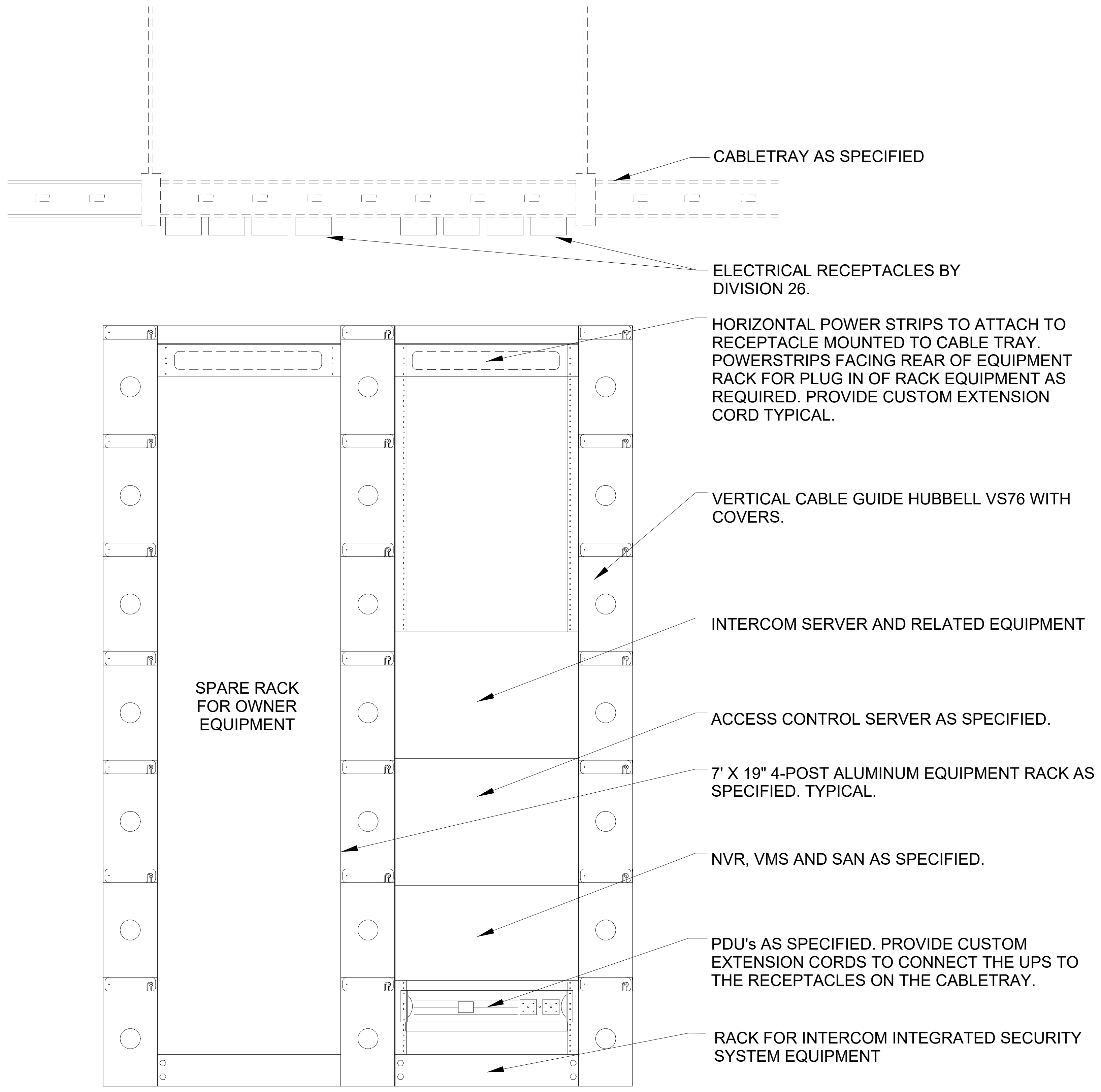
VOICE/DATA EQUIPMENT RACK GENERAL NOTES:

1) THE QUANTITY OF 48 PORT PATCH PANELS REQUIRED FOR EACH RACK SHALL BE EQUAL TO THE THE QUANTITY NEEDED TO TERMINATE ALL VOICE AND DATA CABLES AT THAT RACK PLUS THE QUANTITY REQUIRED TO PROVIDE FOR 20% SPARE.

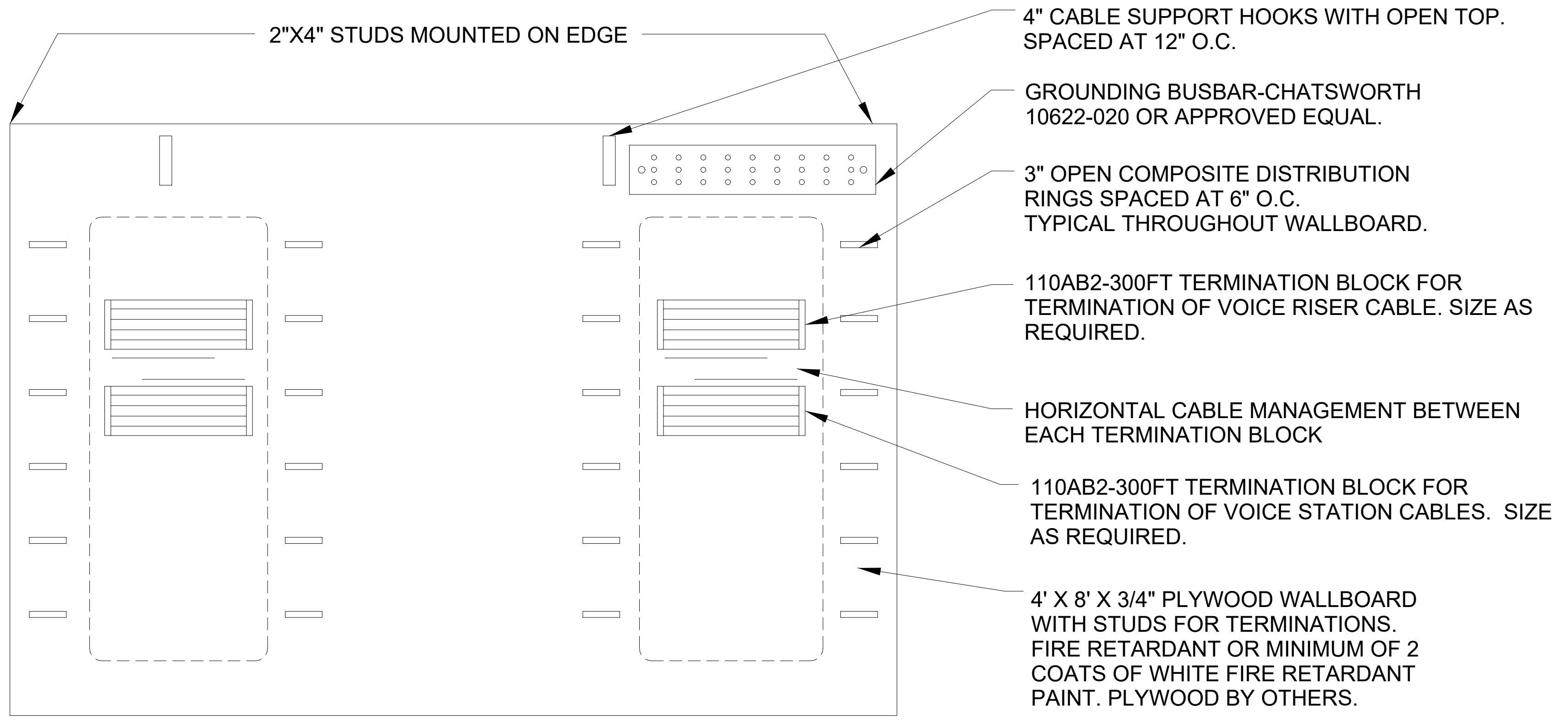
2) A SINGLE 24 PORT FIBER OPTIC PATCH PANEL IS REQUIRED TO TERMINATE FIBERS IN EACH IDF ROOM AND THE MDF ROOM. THE MDF ROOM REQUIRES A QUANTITY OF 24 PORT FIBER OPTIC PATCH PANELS EQUAL TO THE NUMBER OF TECHNOLOGY ROOMS PLUS THE SERVICE ENTRANCE ROOM.

3) MEET WITH OWNER PRIOR TO INSTALLATION OF RACKS, PATCH PANELS, CABLE MANAGEMENT AND EQUIPMENT TO COORDINATE EXACT LOCATIONS FOR ALL COMPONENTS.

① TYPICAL MDF-IDF 2 POST TRIPLE DATA EQUIPMENT RACK CONFIGURATION
NTS


CABLETRAY AS SPECIFIED
ELECTRICAL RECEPTACLES BY DIVISION 26.
HORIZONTAL POWER STRIPS TO ATTACH TO RECEPTACLE MOUNTED TO CABLE TRAY. POWERSTRIPS FACING REAR OF EQUIPMENT RACK FOR PLUG IN OF RACK EQUIPMENT AS REQUIRED. PROVIDE CUSTOM EXTENSION CORD TYPICAL.
VERTICAL CABLE GUIDE HUBBELL VS76 WITH COVERS.
INTERCOM SERVER AND RELATED EQUIPMENT
ACCESS CONTROL SERVER AS SPECIFIED.
7' X 19" 4-POST ALUMINUM EQUIPMENT RACK AS SPECIFIED. TYPICAL.
NVR, VMS AND SAN AS SPECIFIED.
PDU's AS SPECIFIED. PROVIDE CUSTOM EXTENSION CORDS TO CONNECT THE UPS TO THE RECEPTACLES ON THE CABLETRAY.
RACK FOR INTERCOM INTEGRATED SECURITY SYSTEM EQUIPMENT
SPARE RACK FOR OWNER EQUIPMENT

② TYPICAL MDF SPARE AND SECURITY/PA 4 POST EQUIPMENT RACK CONFIGURATION
NTS


2"X4" STUDS MOUNTED ON EDGE
4" CABLE SUPPORT HOOKS WITH OPEN TOP. SPACED AT 12" O.C.
GROUNDING BUSBAR-CHATSWORTH 10622-020 OR APPROVED EQUAL.
3" OPEN COMPOSITE DISTRIBUTION RINGS SPACED AT 6" O.C. TYPICAL THROUGHOUT WALLBOARD.
110AB2-300FT TERMINATION BLOCK FOR TERMINATION OF VOICE RISER CABLE. SIZE AS REQUIRED.
HORIZONTAL CABLE MANAGEMENT BETWEEN EACH TERMINATION BLOCK
110AB2-300FT TERMINATION BLOCK FOR TERMINATION OF VOICE STATION CABLES. SIZE AS REQUIRED.
4' X 8' X 3/4" PLYWOOD WALLBOARD WITH STUDS FOR TERMINATIONS. FIRE RETARDANT OR MINIMUM OF 2 COATS OF WHITE FIRE RETARDANT PAINT. PLYWOOD BY OTHERS.

EXTEND CABLES FROM CABLETRAY TO WALLBOARDS IN A NEAT AND PROFESSIONAL MANNER.

PROVIDE ALL REQUIRED CROSS CONNECTIONS BETWEEN BACKBONE CABLING, HORIZONTAL CABLING, PATCH PANELS, ETC.

INTRUSION DETECTION AND ACCESS CONTROL EQUIPMENT MAY BE MOUNTED ON BACKBOARD.

③ TYPICAL VOICE WALLBOARD CONFIGURATION
NTS

DORE + WHITTIER

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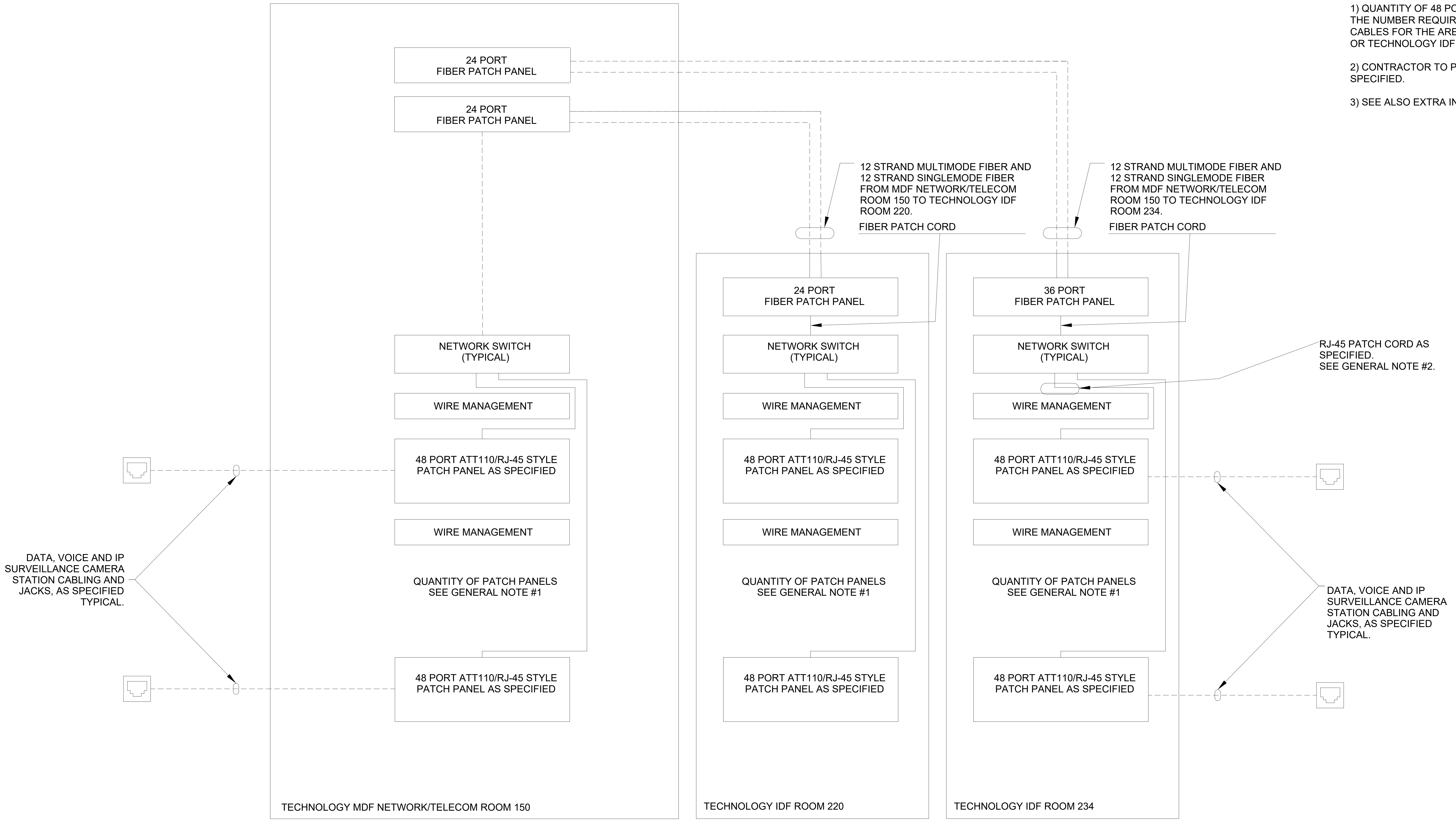
24 PORT
FIBER PATCH PANEL
24 PORT
FIBER PATCH PANEL
12 STRAND MULTIMODE FIBER AND 12 STRAND SINGLEMODE FIBER FROM MDF NETWORK/TELECOM ROOM 150 TO TECHNOLOGY IDF ROOM 220.
FIBER PATCH CORD
12 STRAND MULTIMODE FIBER AND 12 STRAND SINGLEMODE FIBER FROM MDF NETWORK/TELECOM ROOM 150 TO TECHNOLOGY IDF ROOM 234.
FIBER PATCH CORD
24 PORT
FIBER PATCH PANEL
36 PORT
FIBER PATCH PANEL
NETWORK SWITCH (TYPICAL)
NETWORK SWITCH (TYPICAL)
NETWORK SWITCH (TYPICAL)
RJ-45 PATCH CORD AS SPECIFIED.
SEE GENERAL NOTE #2.
WIRE MANAGEMENT
WIRE MANAGEMENT
WIRE MANAGEMENT
48 PORT ATT110/RJ-45 STYLE PATCH PANEL AS SPECIFIED
48 PORT ATT110/RJ-45 STYLE PATCH PANEL AS SPECIFIED
48 PORT ATT110/RJ-45 STYLE PATCH PANEL AS SPECIFIED
WIRE MANAGEMENT
WIRE MANAGEMENT
WIRE MANAGEMENT
DATA, VOICE AND IP SURVEILLANCE CAMERA STATION CABLING AND JACKS, AS SPECIFIED TYPICAL.
QUANTITY OF PATCH PANELS SEE GENERAL NOTE #1
QUANTITY OF PATCH PANELS SEE GENERAL NOTE #1
QUANTITY OF PATCH PANELS SEE GENERAL NOTE #1
DATA, VOICE AND IP SURVEILLANCE CAMERA STATION CABLING AND JACKS, AS SPECIFIED TYPICAL.
48 PORT ATT110/RJ-45 STYLE PATCH PANEL AS SPECIFIED
48 PORT ATT110/RJ-45 STYLE PATCH PANEL AS SPECIFIED
48 PORT ATT110/RJ-45 STYLE PATCH PANEL AS SPECIFIED
TECHNOLOGY MDF NETWORK/TELECOM ROOM 150
TECHNOLOGY IDF ROOM 220
TECHNOLOGY IDF ROOM 234

NOTES:

1) QUANTITY OF 48 PORT PATCH PANELS PER RACK SHALL EQUAL THE NUMBER REQUIRED TO TERMINATE ALL DATA AND VOICE CABLES FOR THE AREA THAT THE MDF NETWORK/TELECOM ROOM OR TECHNOLOGY IDF ROOMS SERVICES PLUS 20% SPARE PORTS.

2) CONTRACTOR TO PROVIDE DATA AND FIBER PATCH CORDS, AS SPECIFIED.

3) SEE ALSO EXTRA INSTALLATION PROVISIONS AS SPECIFIED.

① TECHNOLOGY DATA SYSTEM ONE LINE DIAGRAM
NTS

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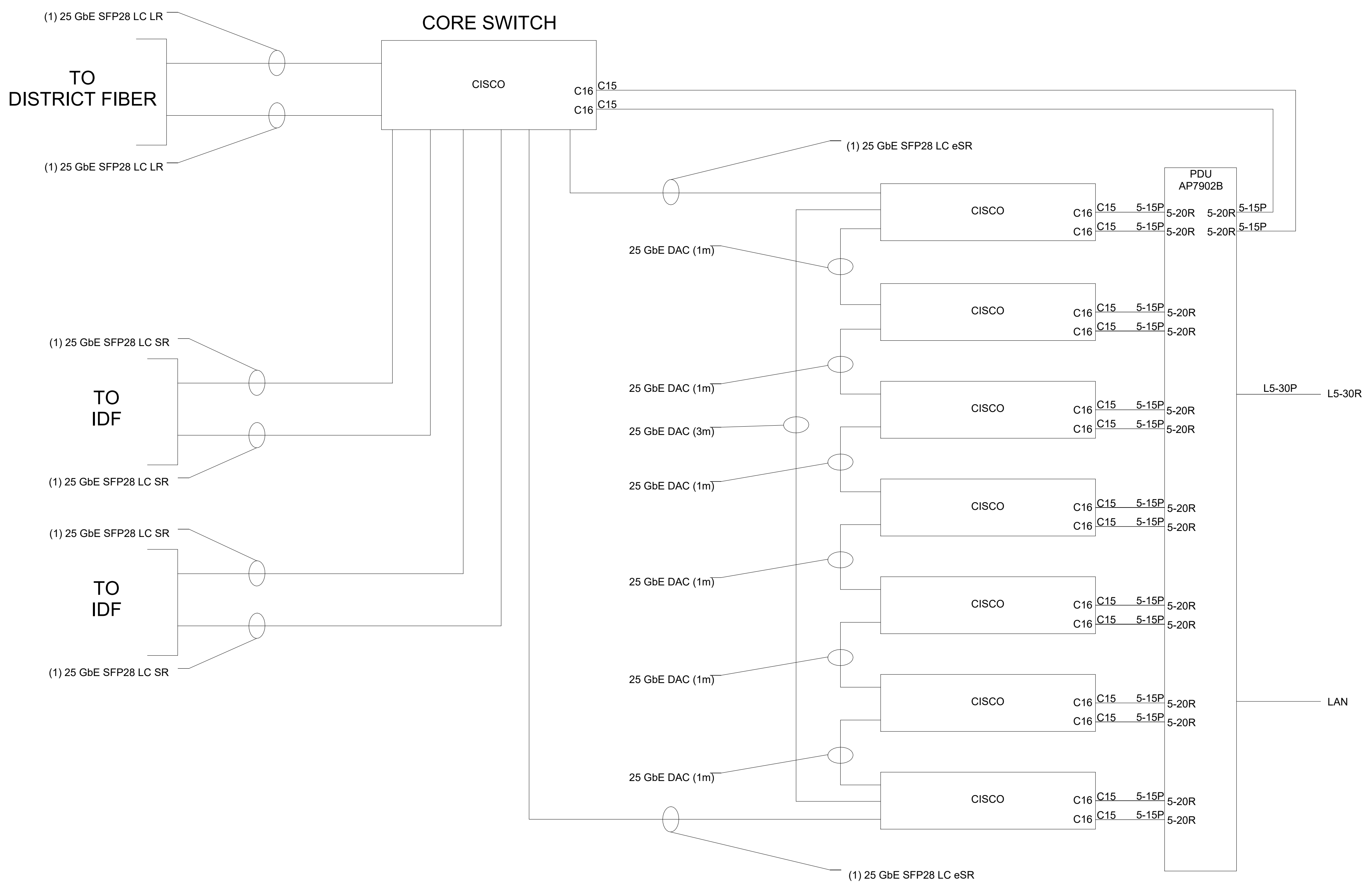
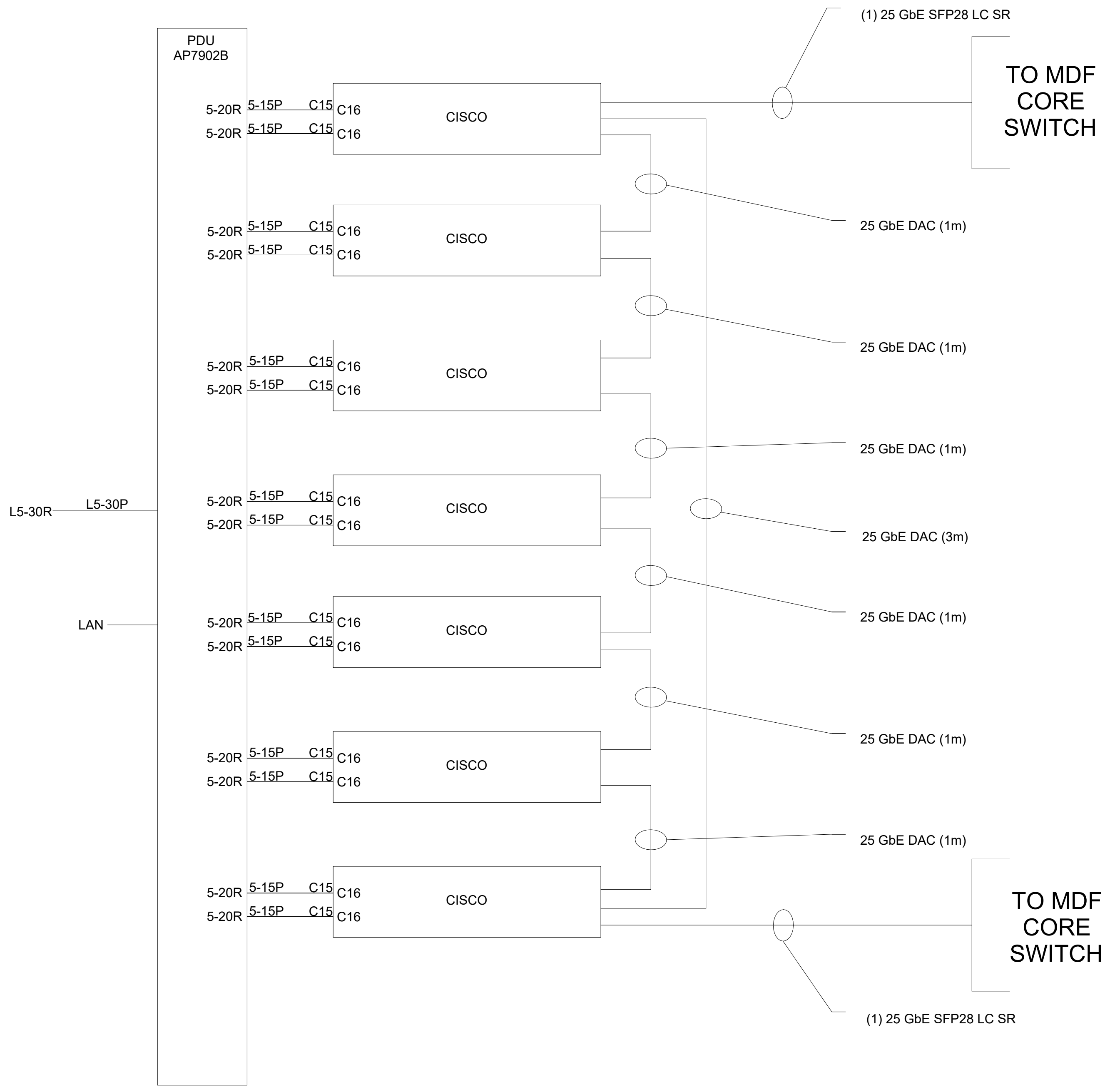
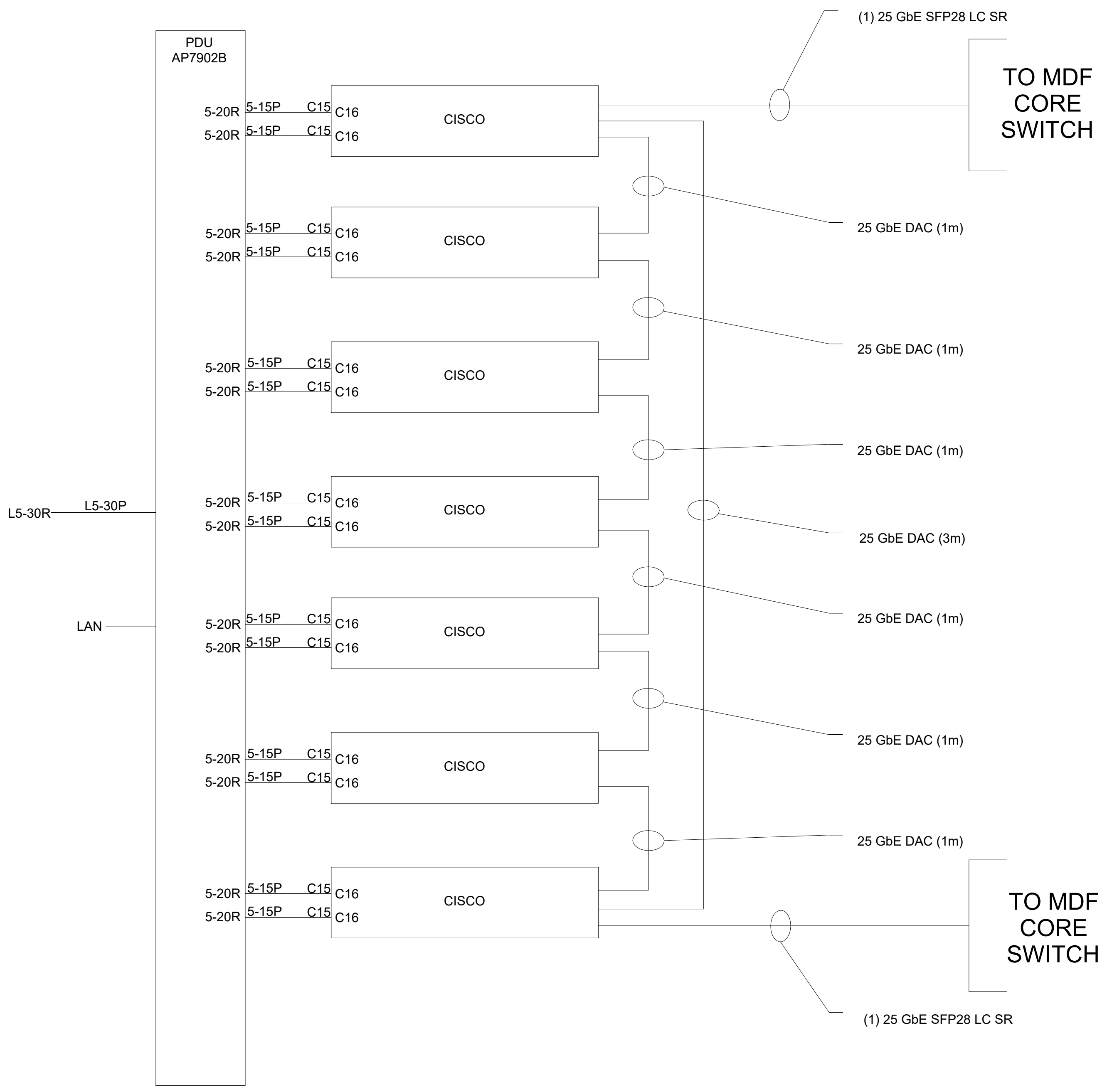


① TECHNOLOGY MDF NETWORK/TELECOM ROOM 150 SWITCHES ONE LINE DIAGRAM
NTS



② TECHNOLOGY IDF ROOM 220 SWITCHES ONE LINE DIAGRAM
NTS



③ TECHNOLOGY IDF ROOM 234 SWITCHES ONE LINE DIAGRAM
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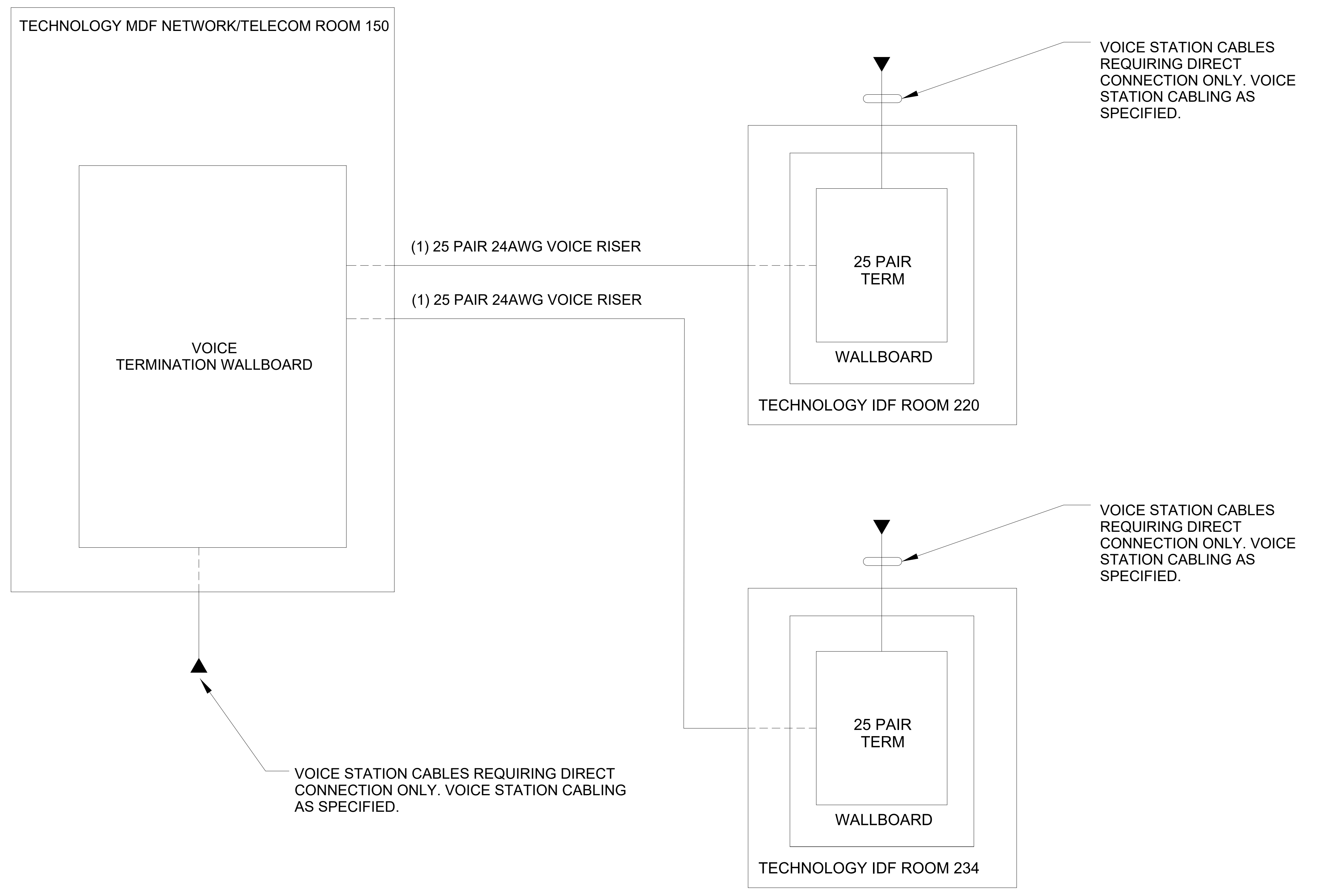
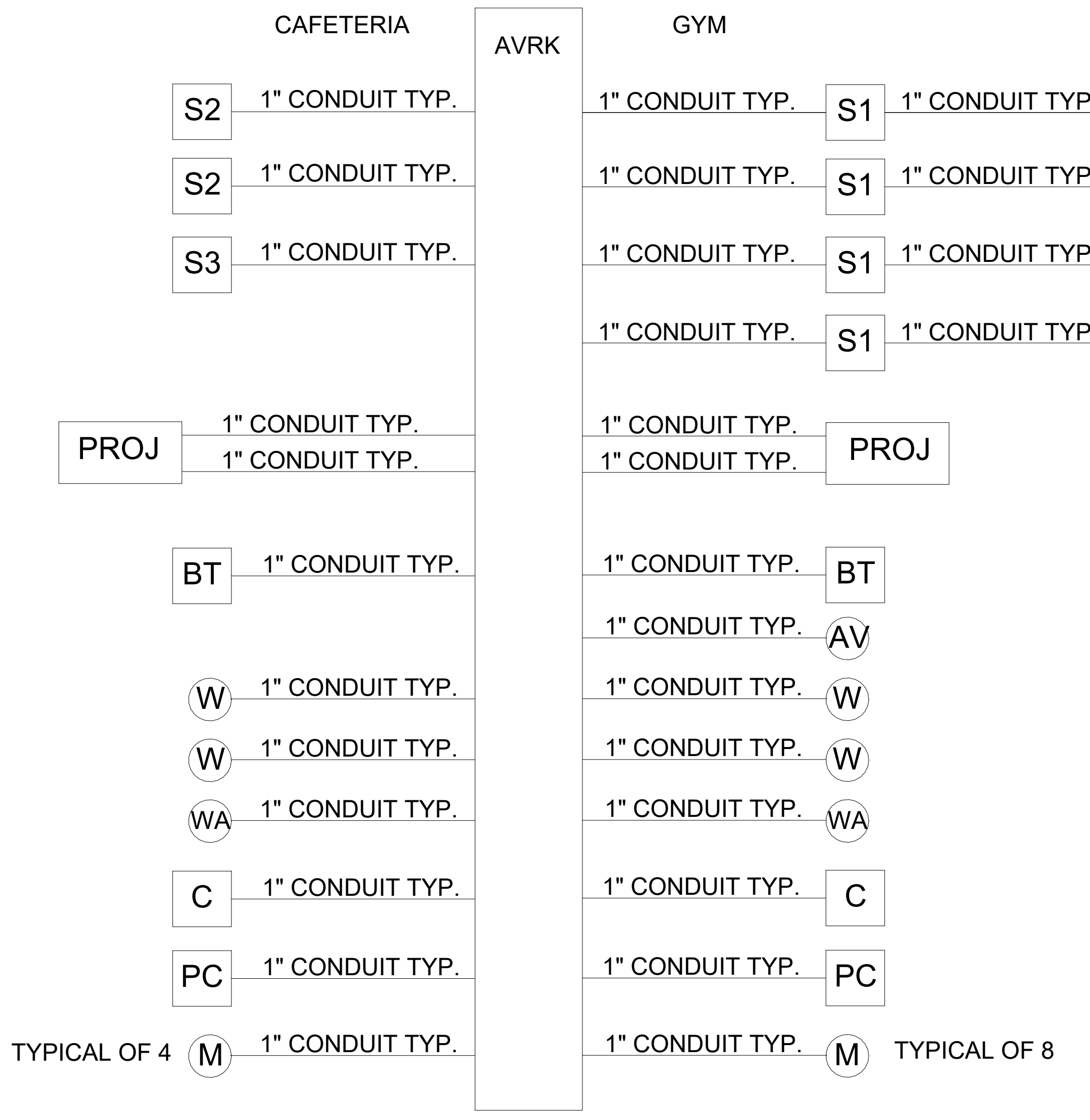

TECHNOLOGY MDF NETWORK/TELECOM ROOM 150
VOICE
TERMINATION WALLBOARD
(1) 25 PAIR 24AWG VOICE RISER
(1) 25 PAIR 24AWG VOICE RISER
25 PAIR
TERM
WALLBOARD
TECHNOLOGY IDF ROOM 220
25 PAIR
TERM
WALLBOARD
TECHNOLOGY IDF ROOM 234
VOICE STATION CABLES REQUIRING DIRECT CONNECTION ONLY. VOICE STATION CABLING AS SPECIFIED.
VOICE STATION CABLES REQUIRING DIRECT CONNECTION ONLY. VOICE STATION CABLING AS SPECIFIED.
VOICE STATION CABLES REQUIRING DIRECT CONNECTION ONLY. VOICE STATION CABLING AS SPECIFIED.

① TECHNOLOGY VOICE SYSTEM ONE LINE DIAGRAM
NTS

CAFETERIA/GYM
AUDIO/VISUAL BOX AND CONDUIT SCHEDULE
(CONDUIT/BOXES BY DIVISION 26)



AVRK = AV JUNCTION BOX TO ACCOMMODATE ALL CONDUITS

S1 = SINGLE GANG BOX FOR GYM CEILING SPEAKERS

S2 = SINGLE GANG BOX/EXTENSION RING FOR PANARAY SPEAKERS

S3 = SINGLE GANG BOX/EXTENSION RING FOR SUBWOOFER SPEAKERS

PROJ = DOUBLE GANG DEEP WORKBOX FOR PROJECTOR CABLING

W = SINGLE GANG BOX/EXTENSION RING FOR WIRELESS MICS ANTENNA. LOCATE FOR BEST RECEPTION.

WA = SINGLE GANG BOX/EXTENSION RING FOR ASSISTIVE LISTENING ANTENNA. LOCATE FOR BEST RECEPTION.

BT = SINGLE GANG BOX/EXTENSION RING FOR BLUETOOTH RECEIVER

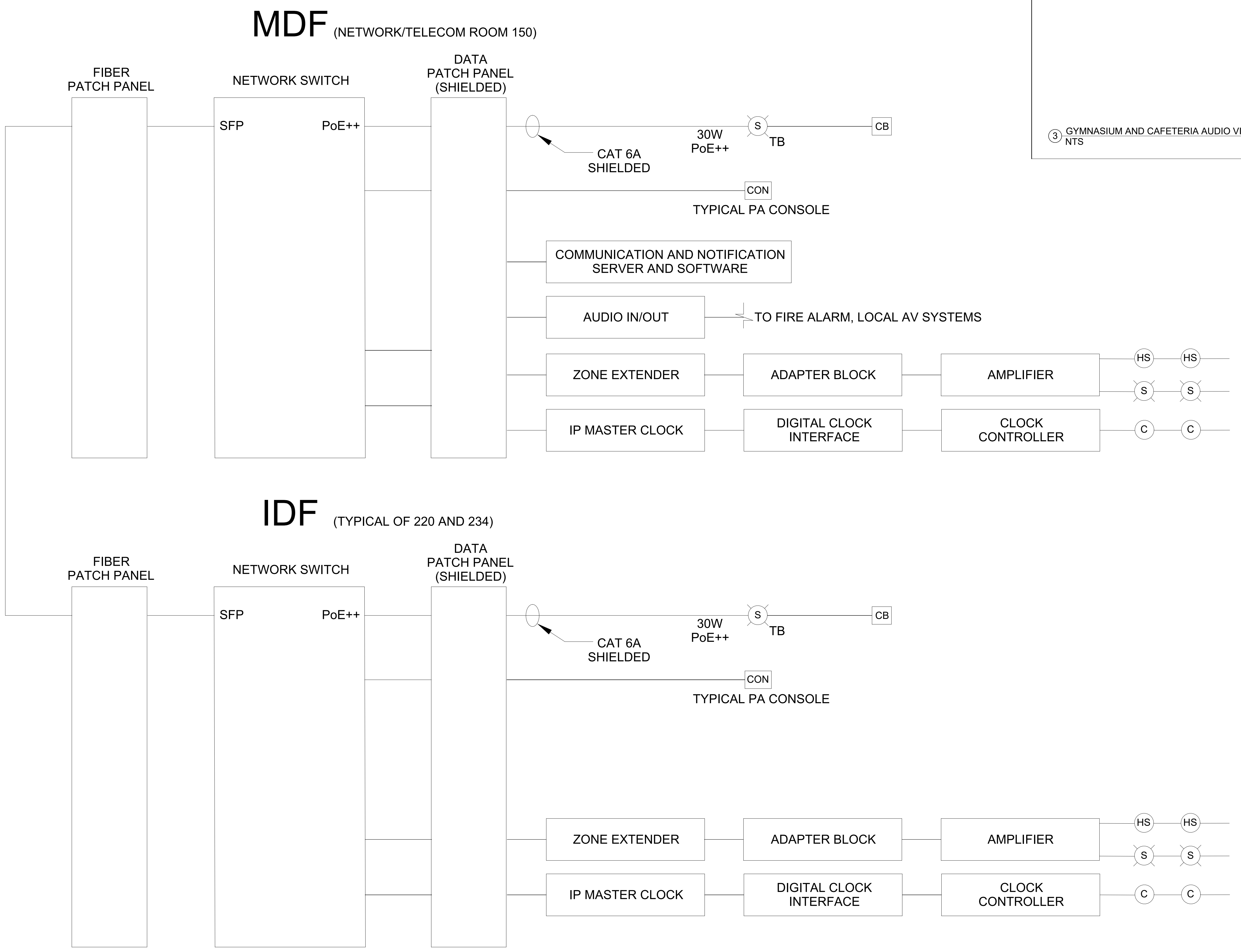
M = SINGLE GANG BOX/EXTENSION RING FOR WIRE MICROPHONES

PC = DOUBLE GANG BOX FOR COMPUTER CONNECTION

AV = AV INPUT/OUTPUT PLATE FOR MOBILE PROJECTOR

C = DOUBLE GANG BOX FOR CAMERA INPUT PLATE

③ GYMNASIUM AND CAFETERIA AUDIO VISUAL BOX AND CONDUIT SCHEDULE
NTS



② TECHNOLOGY PA SYSTEM ONE LINE DIAGRAM
NTS

GENERAL NOTES:

1) PROVIDE ALL CROSS-CONNECT CABLING REQUIRED FOR FULLY FUNCTIONAL SYSTEM(S).

2) PROVIDE ALL NECESSARY PROGRAMMING AND CONNECTION BETWEEN PUBLIC ADDRESS SYSTEM AND TELEPHONE SYSTEM.

3) PROVIDE ALL CABLING REQUIRED FOR FULLY FUNCTIONAL PUBLIC ADDRESS AND CLOCK SYSTEMS.

4) PROVIDE ALL REQUIRED CONNECTIONS TO TELCO LINES FOR ALL SYSTEMS REQUIRING DIAL-TONE.

5) RACK MOUNT EQUIPMENT IN TECHNOLOGY IDF ROOMS AS SPECIFIED.

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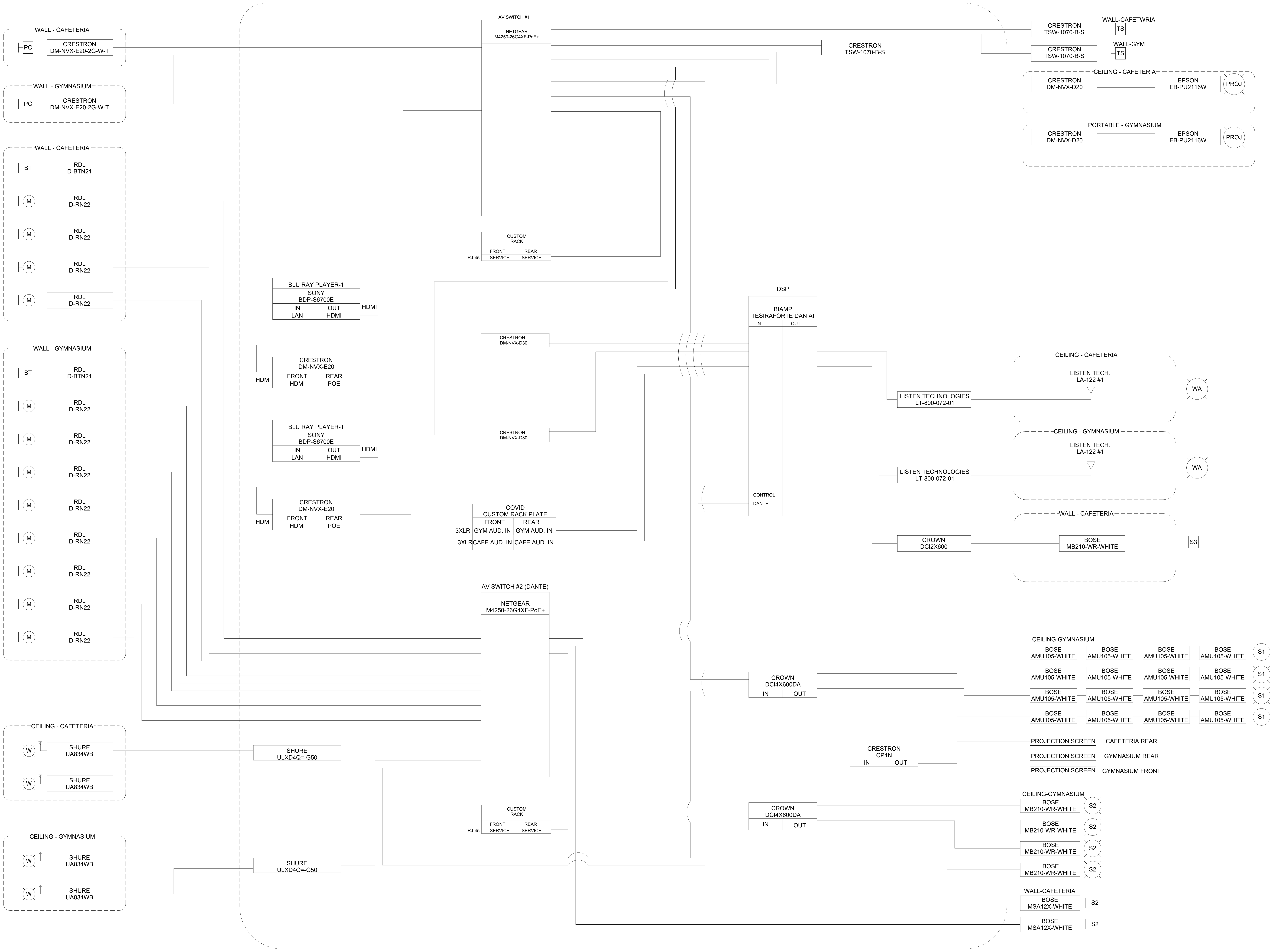

① GYMNASIUM AND CAFETERIA AUDIO VISUAL SYSTEM ONE-LINE DIAGRAM
NTS

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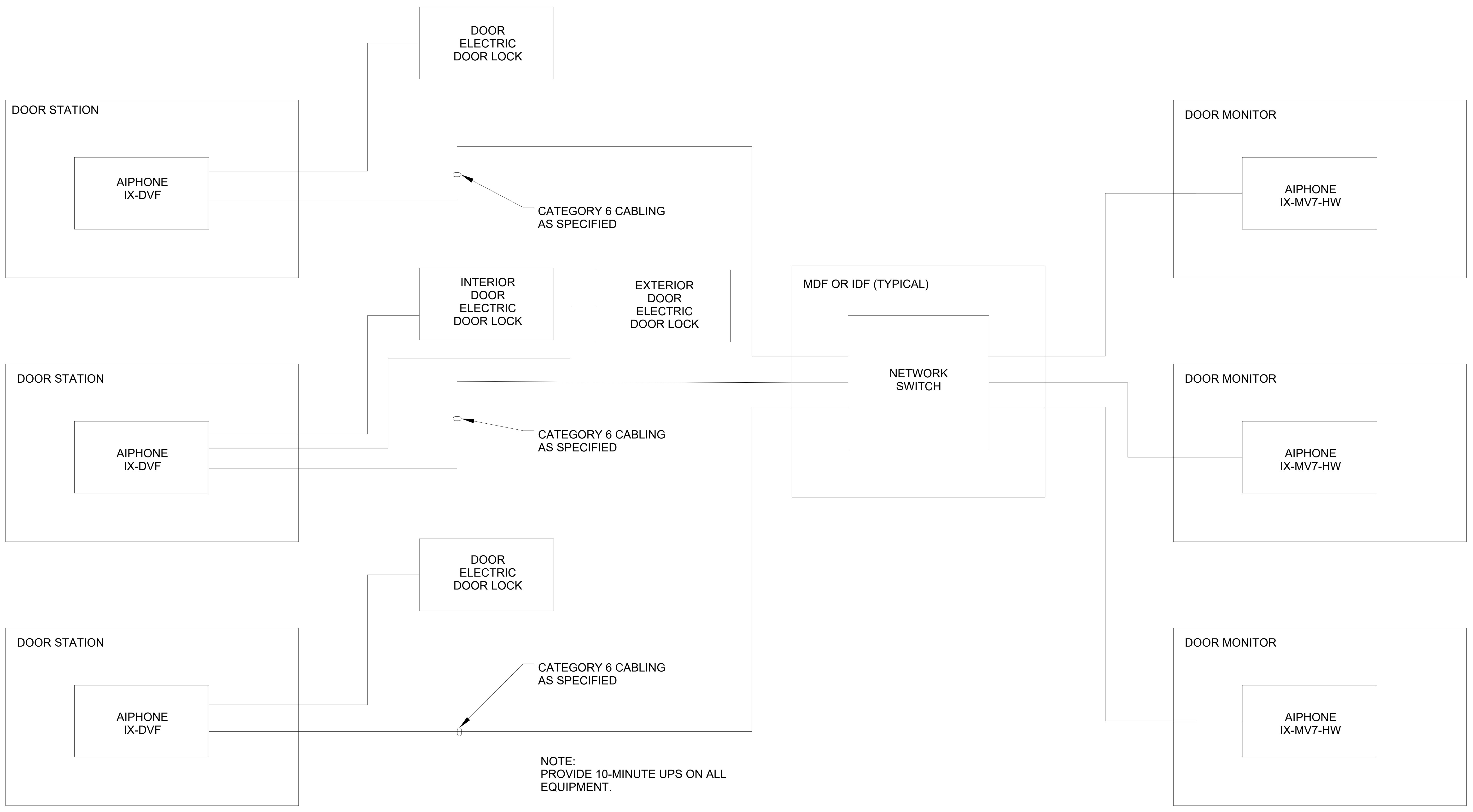
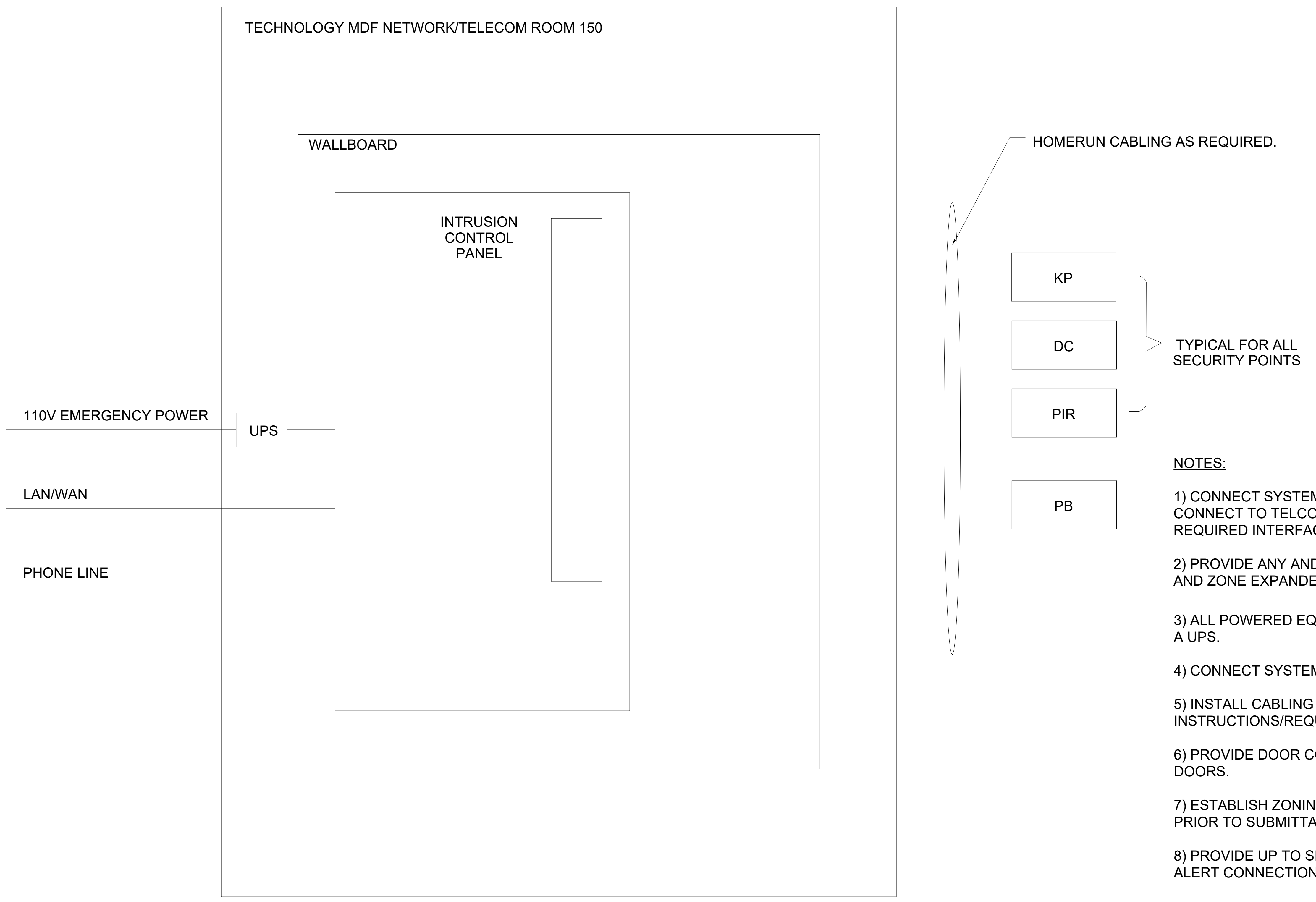


NOTE:
PROVIDE 10-MINUTE UPS ON ALL EQUIPMENT.

① TECHNOLOGY DOOR AND INTERCOM SYSTEM ONE LINE DIAGRAM
NTS


TECHNOLOGY MDF NETWORK/TELECOM ROOM 150
WALLBOARD
INTRUSION CONTROL PANEL
110V EMERGENCY POWER
UPS
LAN/WAN
PHONE LINE
HOMERUN CABLING AS REQUIRED.
KP
DC
PIR
PB
TYPICAL FOR ALL SECURITY POINTS

NOTES:

1) CONNECT SYSTEMS TO THE DATA NETWORK. CONNECT TO TELCO PHONE LINE. PROVIDE ALL REQUIRED INTERFACE EQUIPMENT.

2) PROVIDE ANY AND ALL REQUIRED POWER SUPPLIES AND ZONE EXPANDERS IN LOCATIONS AS REQUIRED.

3) ALL POWERED EQUIPMENT SHALL BE CONNECTED TO A UPS.

4) CONNECT SYSTEMS TO FIRE ALARM AS REQUIRED.

5) INSTALL CABLING ACCORDING TO MANUFACTURER INSTRUCTIONS/REQUIREMENTS.

6) PROVIDE DOOR CONTACTS ON ALL ROOF ACCESS DOORS.

7) ESTABLISH ZONING REQUIREMENTS WITH THE OWNER PRIOR TO SUBMITTALS AND INSTALLATION.

8) PROVIDE UP TO SIX (6) HIGH/LOW TEMPERATURE ALERT CONNECTIONS TO OWNER'S EQUIPMENT.

② TECHNOLOGY INTRUSION DETECTION SYSTEM ONE LINE DIAGRAM
NTS

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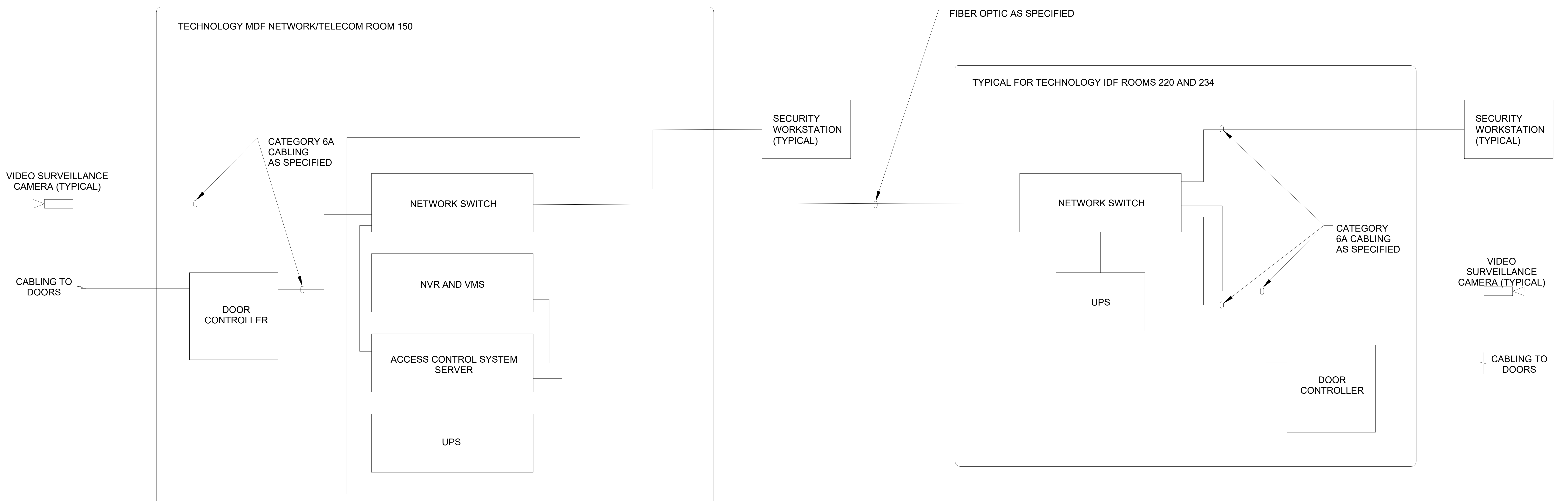
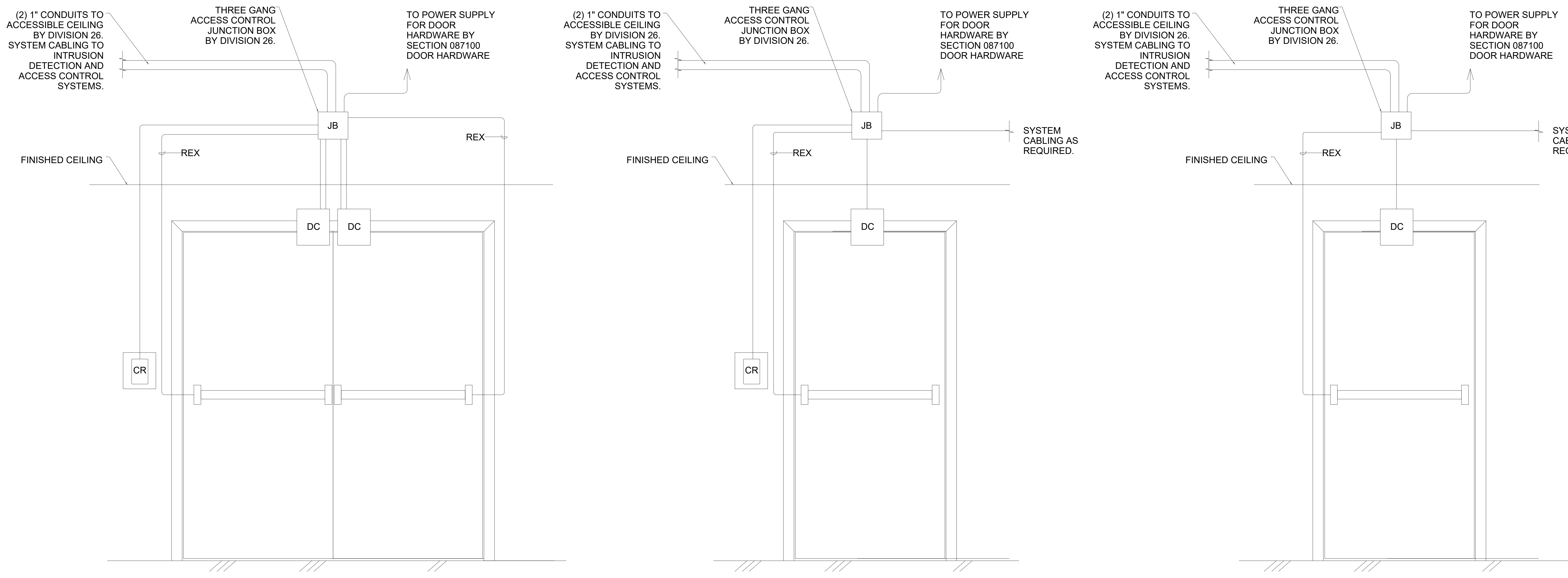

TECHNOLOGY MDF NETWORK/TELECOM ROOM 150
VIDEO SURVEILLANCE CAMERA (TYPICAL)
CATEGORY 6A CABLING AS SPECIFIED
NETWORK SWITCH
CABLING TO DOORS
DOOR CONTROLLER
NVR AND VMS
ACCESS CONTROL SYSTEM SERVER
UPS
SECURITY WORKSTATION (TYPICAL)
FIBER OPTIC AS SPECIFIED
TYPICAL FOR TECHNOLOGY IDF ROOMS 220 AND 234
SECURITY WORKSTATION (TYPICAL)
NETWORK SWITCH
CATEGORY 6A CABLING AS SPECIFIED
UPS
VIDEO SURVEILLANCE CAMERA (TYPICAL)
DOOR CONTROLLER
CABLING TO DOORS

NOTES:

1) PROVIDE FIBER CABLING POWER SUPPLIES AND CAT 6 MEDIA CONVERTERS FOR CAMERA FURTHER THAN 290' FROM THE NEAREST MDF/IDF.

① TECHNOLOGY ACCESS CONTROL AND VIDEO SURVEILLANCE ONE LINE DIAGRAM
NTS


(2) 1" CONDUITS TO ACCESSIBLE CEILING BY DIVISION 26. SYSTEM CABLING TO INTRUSION DETECTION AND ACCESS CONTROL SYSTEMS.
THREE GANG ACCESS CONTROL JUNCTION BOX BY DIVISION 26.
TO POWER SUPPLY FOR DOOR HARDWARE BY SECTION 087100 DOOR HARDWARE
JB
REX
REX
FINISHED CEILING
DC
DC
CR
(2) 1" CONDUITS TO ACCESSIBLE CEILING BY DIVISION 26. SYSTEM CABLING TO INTRUSION DETECTION AND ACCESS CONTROL SYSTEMS.
THREE GANG ACCESS CONTROL JUNCTION BOX BY DIVISION 26.
TO POWER SUPPLY FOR DOOR HARDWARE BY SECTION 087100 DOOR HARDWARE
JB
SYSTEM CABLING AS REQUIRED.
REX
FINISHED CEILING
DC
CR
(2) 1" CONDUITS TO ACCESSIBLE CEILING BY DIVISION 26. SYSTEM CABLING TO INTRUSION DETECTION AND ACCESS CONTROL SYSTEMS.
THREE GANG ACCESS CONTROL JUNCTION BOX BY DIVISION 26.
TO POWER SUPPLY FOR DOOR HARDWARE BY SECTION 087100 DOOR HARDWARE
JB
SYSTEM CABLING AS REQUIRED.
REX
FINISHED CEILING
DC

TYPICAL ACCESS CONTROL DOUBLE DOOR
SHOWING CARD READER(S) AND DOOR CONTACT(S)

TYPICAL ACCESS CONTROL SINGLE DOOR
SHOWING CARD READER(S) AND DOOR CONTACT(S)

TYPICAL EXTERIOR DOOR WITHOUT CARD READER
SHOWING DOOR CONTACT(S) ONLY

NOTES:

1) PROVIDE QUANTITY OF CABLES AND AWG REQUIRED TO CONNECT ALL COMPONENTS TO ACCESS CONTROL AND INTRUSION DETECTION SYSTEMS.

2) CONDUITS AND BOXES AS REQUIRED SHALL BE PROVIDED BY DIVISION 26.

3) COORDINATE WITH DOOR HARDWARE AND DIVISION 26 ELECTRICAL.

4) CONNECT ALL DOORS WITH ELECTRIFIED HARDWARE TO THE ACCESS CONTROL SYSTEM.

5) ALL DOOR CONTACTS SHALL BE USED AS DOOR POSITION SWITCHES ON BOTH THE ACCESS CONTROL AND INTRUSION DETECTION SYSTEMS.

6) CONNECT ALL REQUEST TO EXIT (REX) DEVICES TO THE SYSTEM. REX DEVICES ARE BUILT-INTO CRASHBARS.

② TECHNOLOGY ACCESS CONTROL AND INTRUSION DETECTION ONE LINE DIAGRAM
NTS

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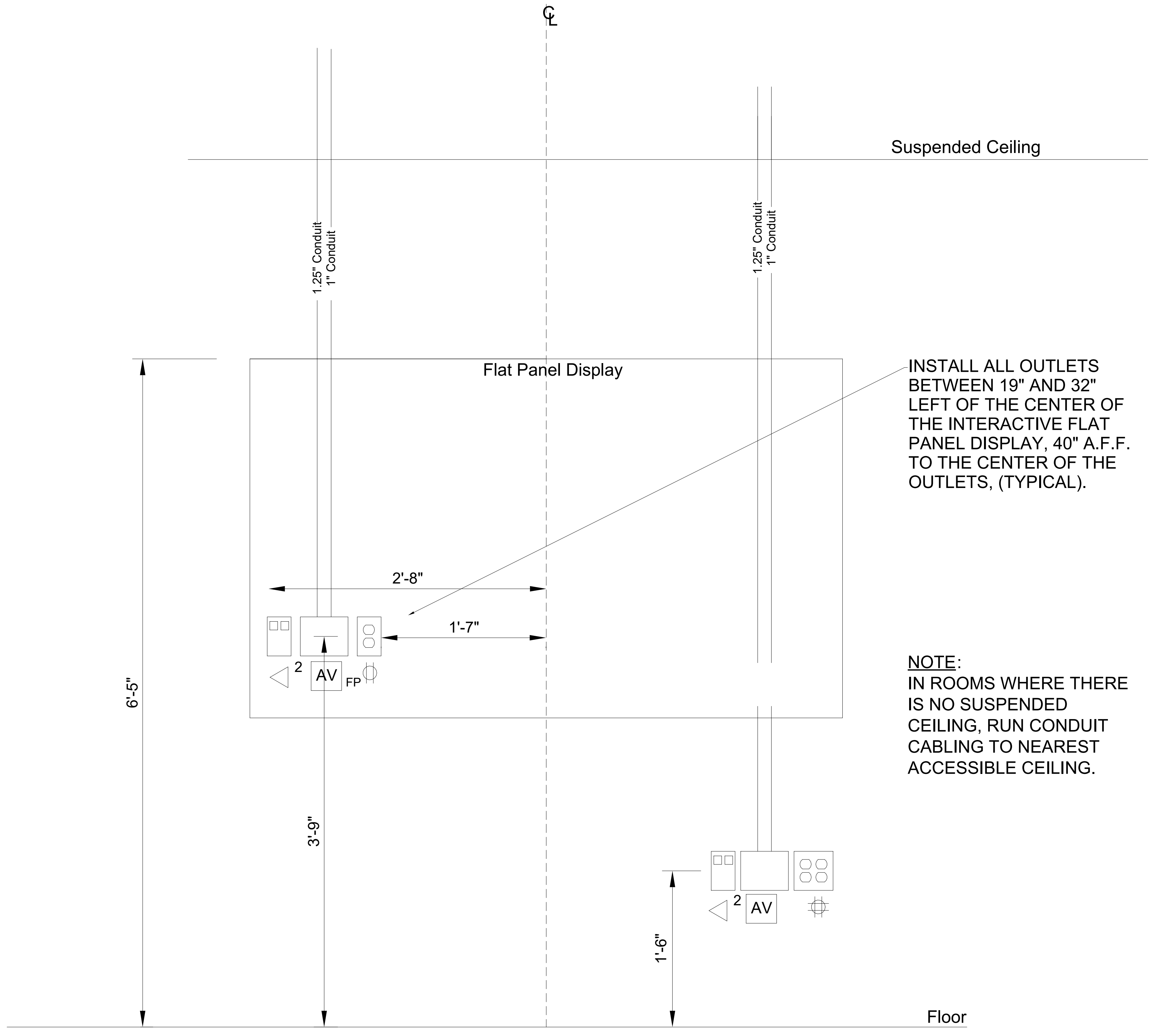
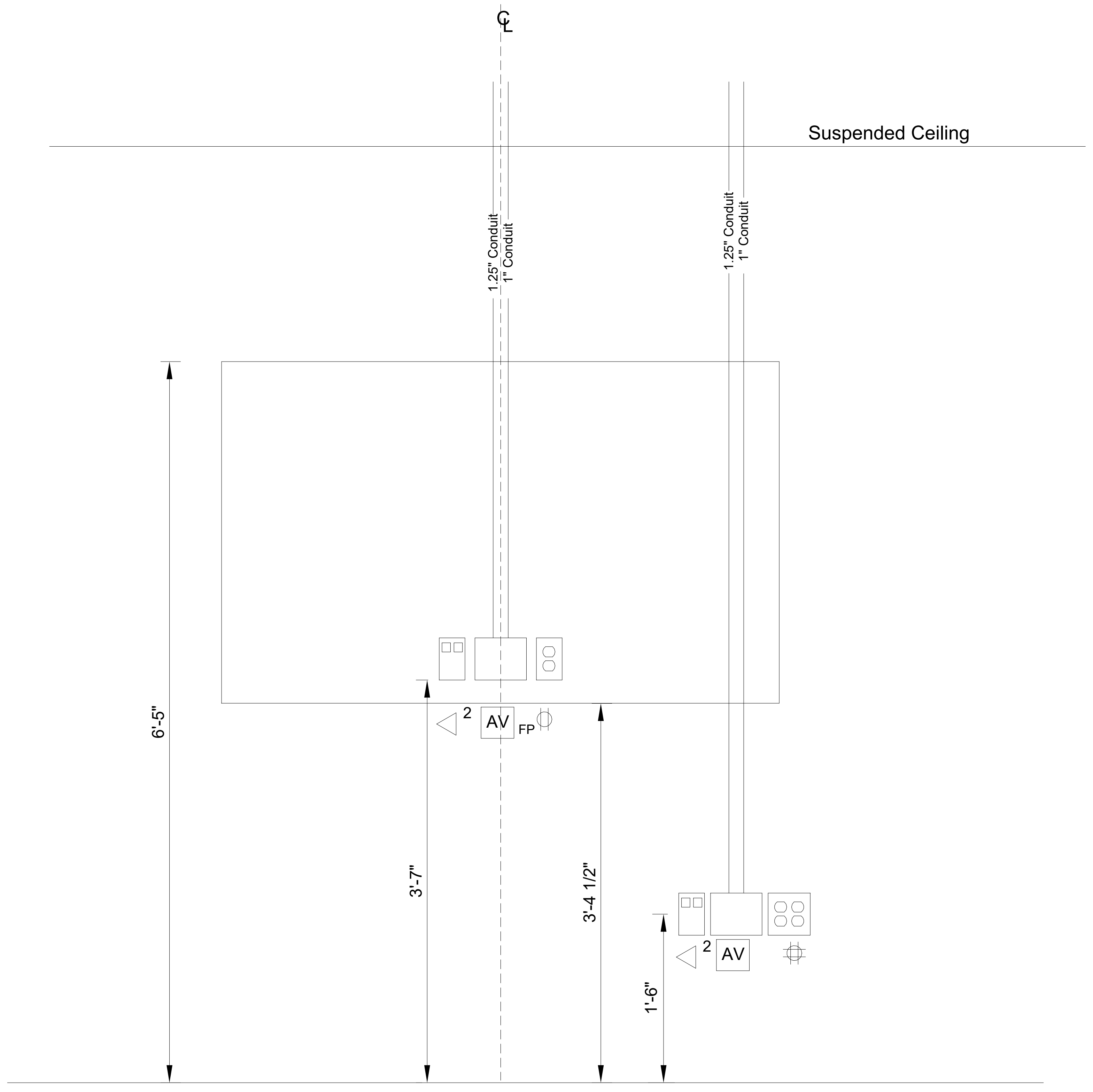


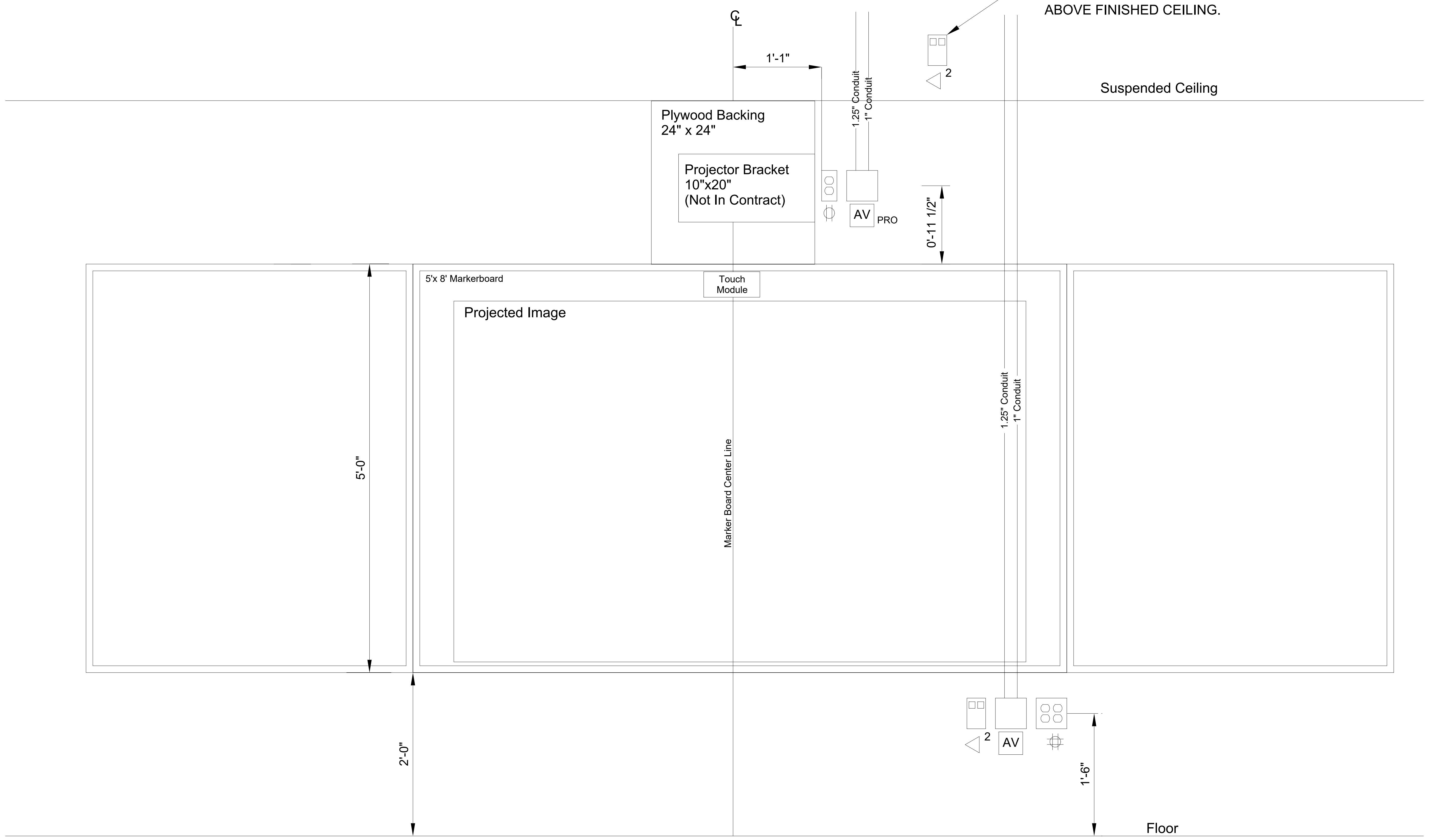
INSTALL ALL OUTLETS BETWEEN 19" AND 32" LEFT OF THE CENTER OF THE INTERACTIVE FLAT PANEL DISPLAY, 40" A.F.F. TO THE CENTER OF THE OUTLETS, (TYPICAL).

NOTE:
IN ROOMS WHERE THERE IS NO SUSPENDED CEILING, RUN CONDUIT CABLING TO NEAREST ACCESSIBLE CEILING.

① CLASSROOM FLAT PANEL ONE LINE DIAGRAM
NTS



② SMALL AREA FLAT PANEL ONE LINE DIAGRAM
NTS



NOTE:
INSTALL DATA OUTLET ABOVE FINISHED CEILING.

③ TEACHING WALL DIAGRAM WITH PROJECTION
NTS

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PROJECT NUMBER: 23-0847

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE

ISSUE TITLE AND DATE:

90% CONSTRUCTION DOCUMENTS
09/25/2026

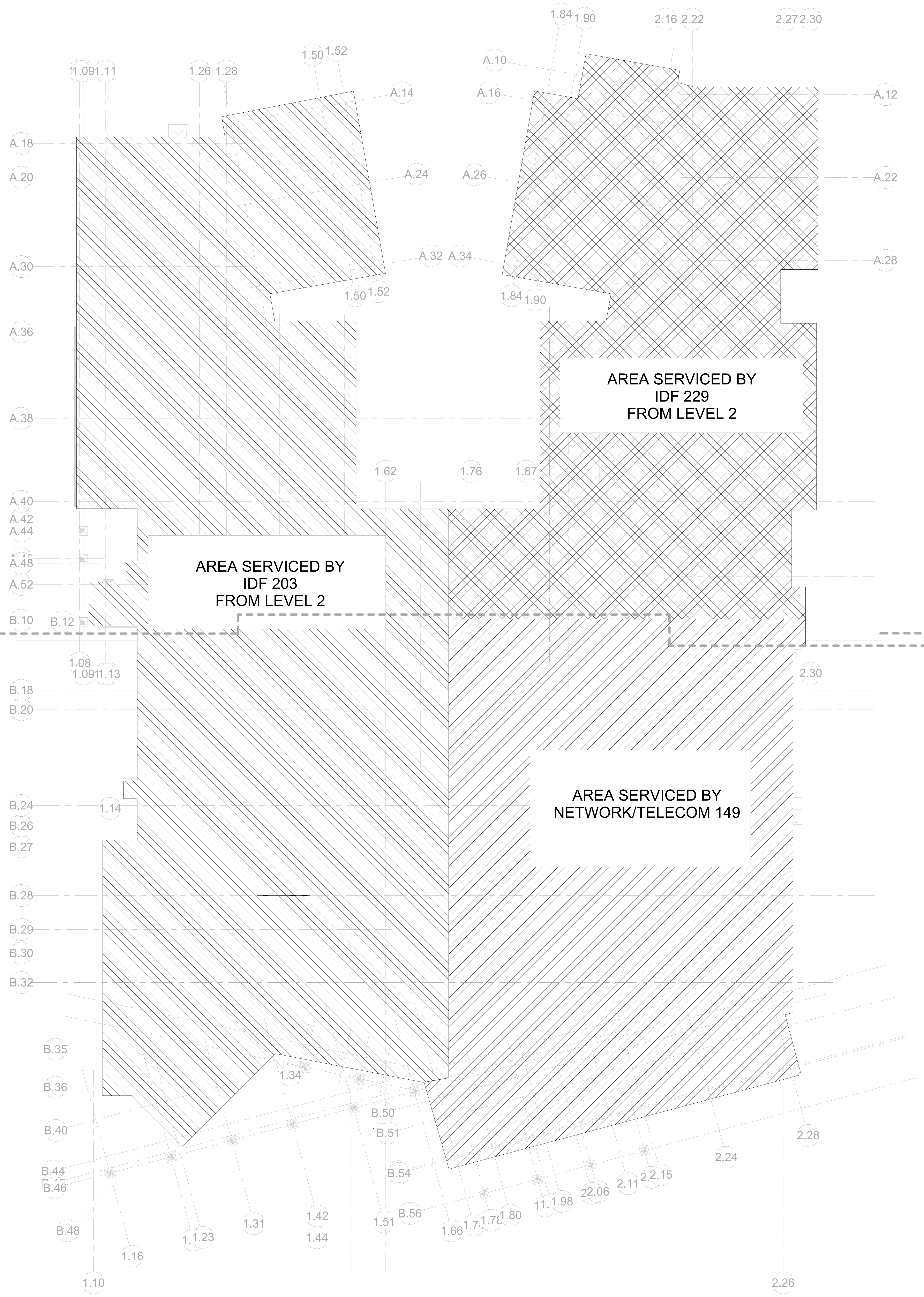
KEY PLAN

ORIENTATION AND SCALE:

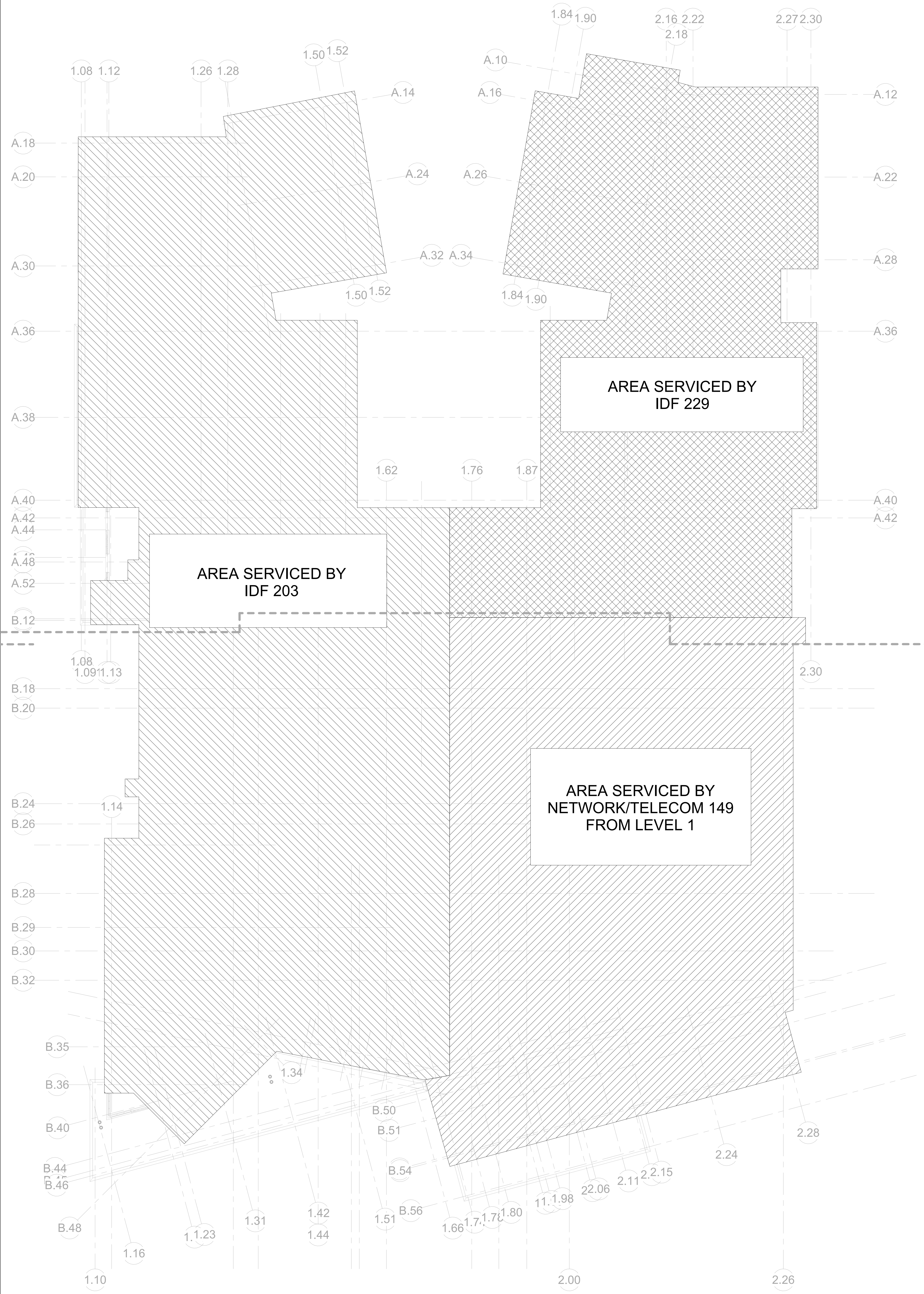
SCALE: AS INDICATED

SHEET TITLE:
DETAIL SHEET
TECHNOLOGY

SHEET NUMBER:
T2.10



① TECHNOLOGY LEVEL 1 COVERAGE PLAN
1/16" = 1'-0"



② TECHNOLOGY LEVEL 2 COVERAGE PLAN
1/16" = 1'-0"

DORE + WHITTIER
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WILMINGTON
ELEMENTARY SCHOOL

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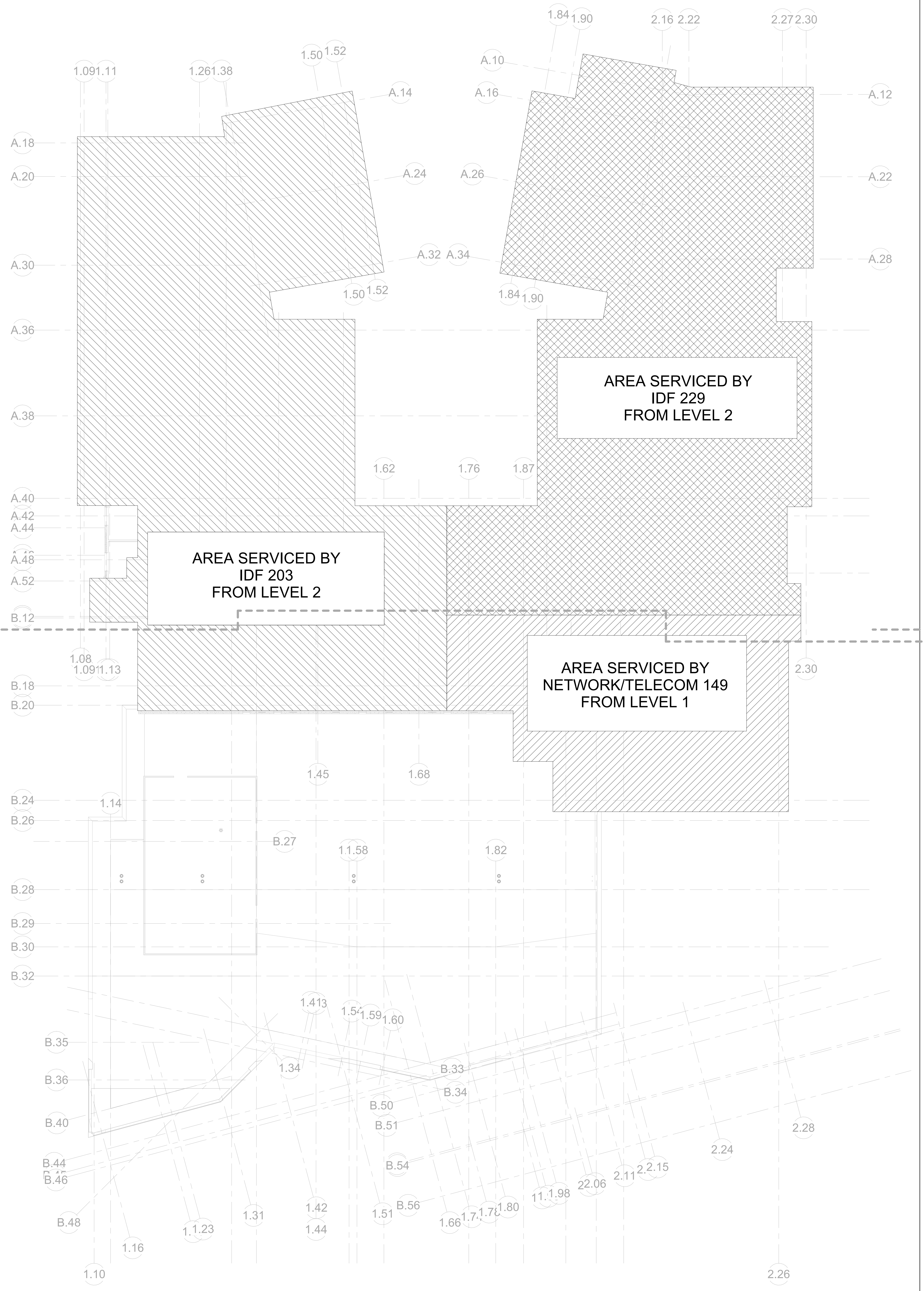
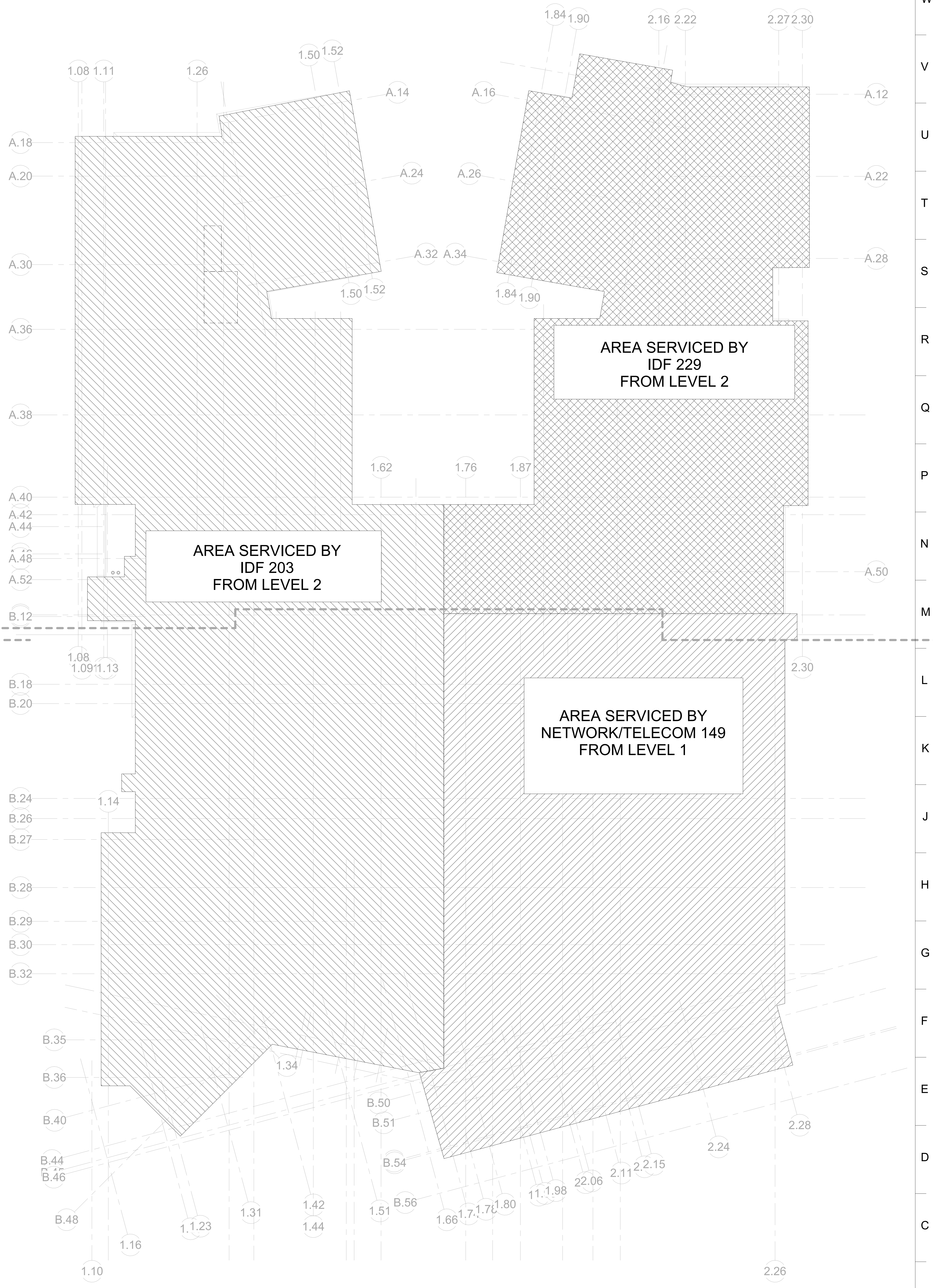
T2.11



① TECHNOLOGY LEVEL 3 COVERAGE PLAN
1/16" = 1'-0"



② ROOF TECHNOLOGY COVAERAGE PLAN
1/16" = 1'-0"

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KEY PLAN

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SCALE: AS INDICATED

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DETAIL SHEET
TECHNOLOGY

SHEET NUMBER:
T2.12