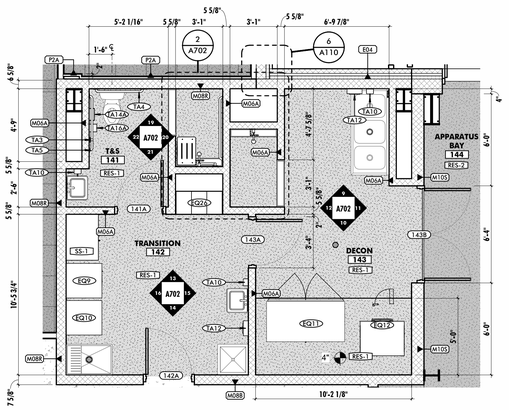
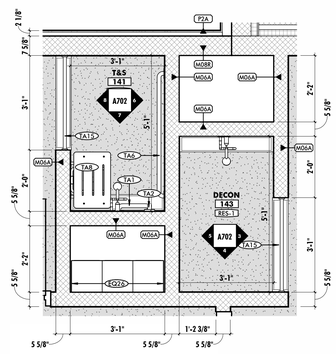
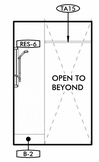


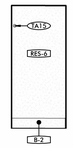
1 **T&S 141, TRANSITION 142, DECON 143 - ENLARGED PLAN**
1/4" = 1'-0"



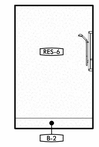
2 **T&S 141 & DECON 143 SHOWERS - ENLARGED PLAN**
1/2" = 1'-0"



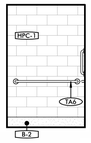
3 **DECON 143 SHOWER - EAST**
1/4" = 1'-0"



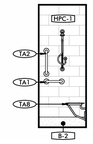
4 **DECON 143 SHOWER - SOUTH**
1/4" = 1'-0"



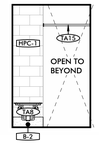
5 **DECON 143 SHOWER - WEST**
1/4" = 1'-0"



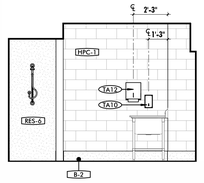
6 **T&S 141 SHOWER - EAST**
1/4" = 1'-0"



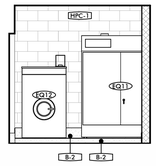
7 **T&S 141 SHOWER - SOUTH**
1/4" = 1'-0"



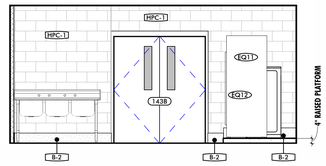
8 **T&S 141 SHOWER - WEST**
1/4" = 1'-0"



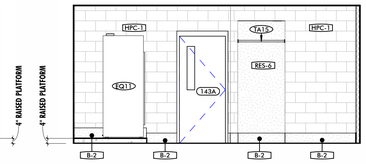
9 **DECON 143- NORTH**
1/4" = 1'-0"



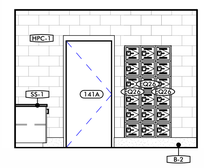
10 **DECON 143- SOUTH**
1/4" = 1'-0"



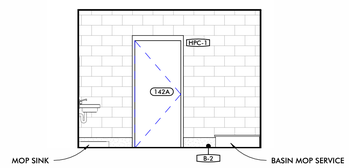
11 **DECON 143- EAST**
1/4" = 1'-0"



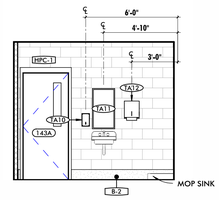
12 **DECON 143- WEST**
1/4" = 1'-0"



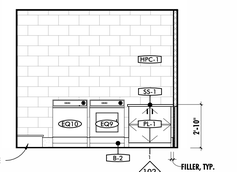
13 **TRANSITION 142- NORTH**
1/4" = 1'-0"



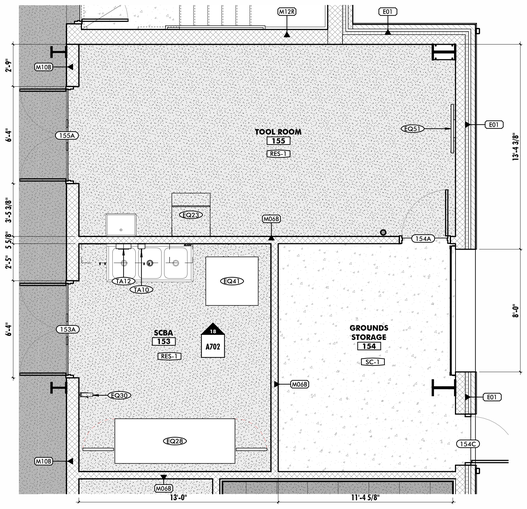
14 **TRANSITION 142- SOUTH**
1/4" = 1'-0"



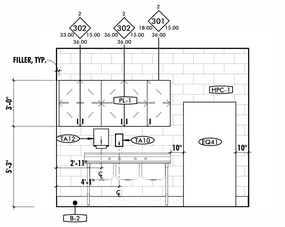
15 **TRANSITION 142- EAST**
1/4" = 1'-0"



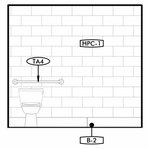
16 **TRANSITION 142- WEST**
1/4" = 1'-0"



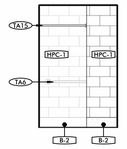
17 **SCBA 153 & TOOL ROOM 155 - ENLARGED PLAN**
1/4" = 1'-0"



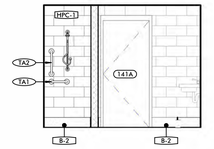
18 **SCBA 163 - NORTH**
1/4" = 1'-0"



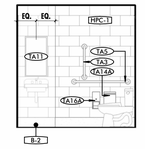
19 **T&S 141- NORTH**
1/4" = 1'-0"



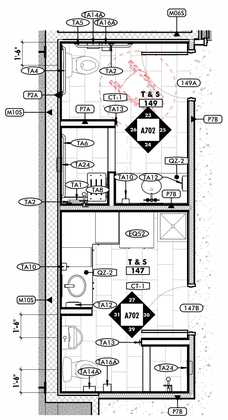
20 **T&S 141- EAST**
1/4" = 1'-0"



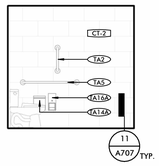
21 **T&S 141- SOUTH**
1/4" = 1'-0"



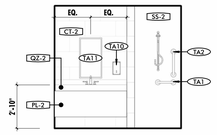
22 **T&S 141- WEST**
1/4" = 1'-0"



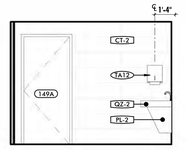
28 **T&S 147 & 149 - ENLARGED PLAN**
1/4" = 1'-0"



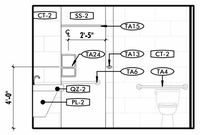
23 **T&S 149 - NORTH**
1/4" = 1'-0"



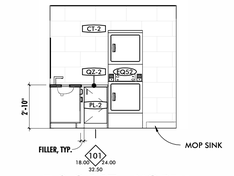
24 **T&S 149 SOUTH**
1/4" = 1'-0"



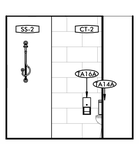
25 **T&S 149 - EAST**
1/4" = 1'-0"



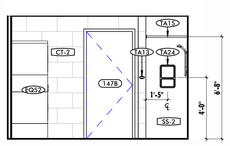
26 **T&S 149 - WEST**
1/4" = 1'-0"



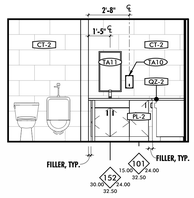
27 **T & S 147 - NORTH**
1/4" = 1'-0"



29 **T&S 147 - SOUTH**
1/4" = 1'-0"



30 **T&S 147 - EAST**
1/4" = 1'-0"



31 **T&S 147 - WEST**
1/4" = 1'-0"

SCHEDULE - TOILET ROOM ACCESSORIES

MARK	DESCRIPTION	BOD MANUFACTURER	BOD MODEL	OF/CI	COMMENTS
TA1	12" GRAB BAR	BOBRICK	B-6806X12	No	
TA2	18" GRAB BAR	BOBRICK	B-6806X18	No	
TA3	24" GRAB BAR	BOBRICK	B-6806X24	No	
TA4	36" GRAB BAR	BOBRICK	B-6806X36	No	
TA5	42" GRAB BAR	BOBRICK	B-6806X42	No	
TA6	48" GRAB BAR	BOBRICK	B-6806X48	No	
TA7	STAINLESS STEEL RECESSED CHANGING STATION	BOBRICK	KB310-SSRE	No	
TA8	FOLDING SHOWER SEAT	BOBRICK	B-5181	No	GC TO PROVIDE BLOCKING IN WALL TO RECEIVE SHOWER SEAT AT METAL STUD WALL LOCATIONS. GC SHALL NOT INSTALL SHOWER SEATS. SHOWER SEATS SHALL BE PROVIDED TO OWNER FOR FUTURE INSTALL.
TA10	LIQUID SOAP DISPENSER	BOBRICK	B-2111	Yes	
TA11	16" x 30" CHANNEL FRAME MIRROR	AMERICAN SPECIALTIES	0620-1630	No	
TA12	SURFACE MOUNTED PAPER TOWEL DISPENSER	BOBRICK	B-9262	Yes	
TA13	ROBE HOOK	AMERICAN SPECIALTIES	7345-S	No	
TA14A	SANITARY NAPKIN BIN	BOBRICK	B-270	No	
TA14B	PARTITION-MOUNTED SANITARY NAPKIN BIN	BOBRICK	B-354	No	
TA15	HEAVY DUTY SHOWER CURTAIN ROD	BOBRICK	B-207	No	
TA16A	MULTI-ROLL TOILET TISSUE DISPENSER	BOBRICK	B-4288	Yes	
TA16B	DOUBLE-ROLL TOILET TISSUE DISPENSER	BOBRICK	B-265	Yes	
TA17	TOILET PARTITION	BRADLEY	SERIES 400 -SENTINEL	No	
TA21	MOP/ BROOM HOLDER	BOBRICK	B-239	No	
TA24	RECESSED SHOWER SHELF	INPRO	12 x 8 TOILETRY SHELF	No	

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LICENSE NUMBER: #RA405311
EXPIRATION DATE: 6-30-2027

EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING, PA 19606

PROJECT NUMBER: 25-049

SUBMISSION:
BID SET

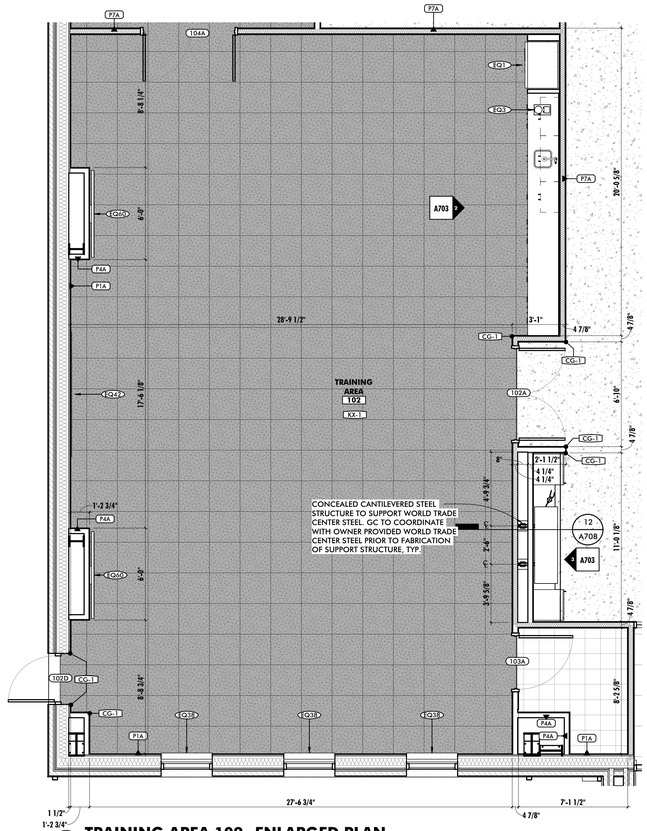
ORIGINAL ISSUE DATE:
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

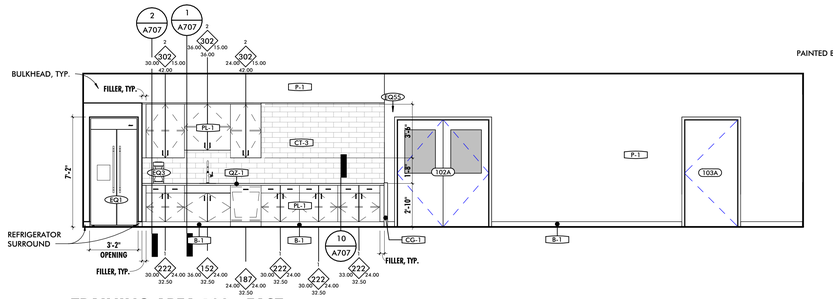
ENLARGED PLANS & INT. ELEVATIONS

SHEET NUMBER:
A702

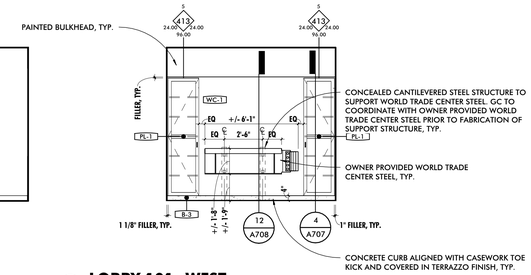
10/1/2026 9:57:51 PM



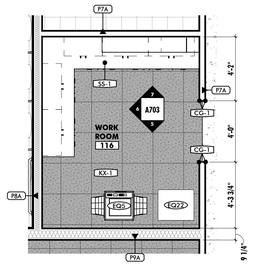
1 TRAINING AREA 102- ENLARGED PLAN
1/4" = 1'-0"



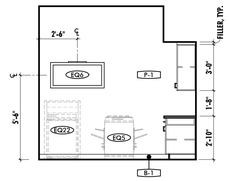
2 TRAINING AREA 102 - EAST
1/4" = 1'-0"



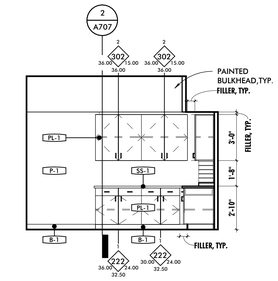
3 LOBBY 101- WEST
1/4" = 1'-0"



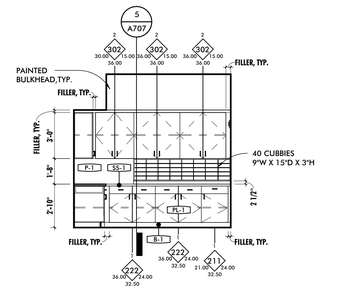
4 WORK ROOM 116- ENLARGED PLAN
1/4" = 1'-0"



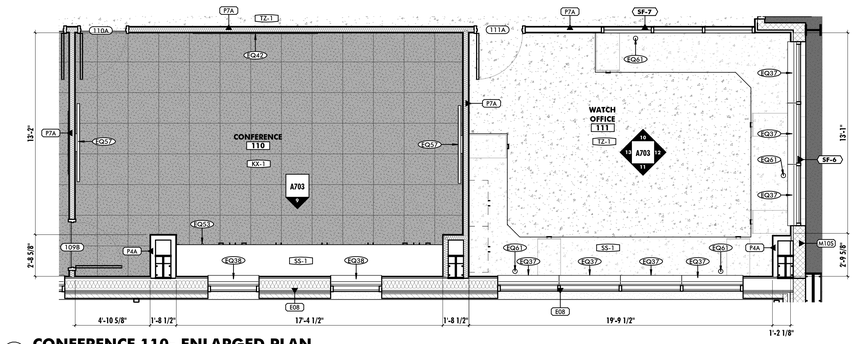
5 WORKROOM 116- NORTH
1/4" = 1'-0"



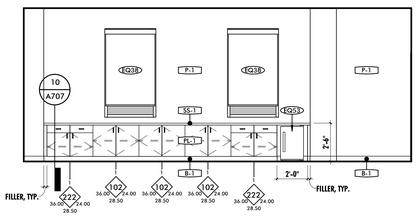
6 WORKROOM 116- WEST
1/4" = 1'-0"



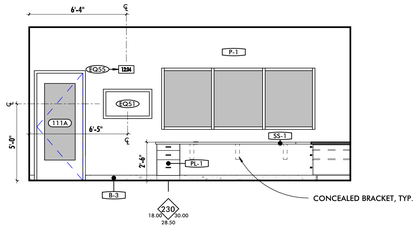
7 WORKROOM 116- SOUTH
1/4" = 1'-0"



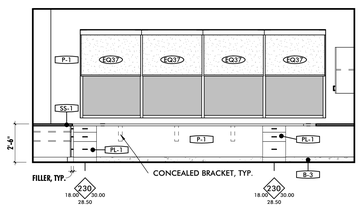
8 CONFERENCE 110- ENLARGED PLAN
1/4" = 1'-0"



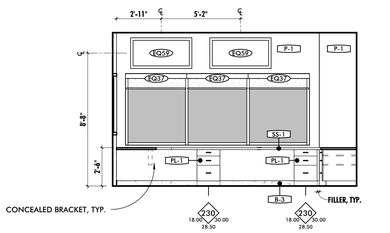
9 CONFERENCE 110- SOUTH
1/4" = 1'-0"



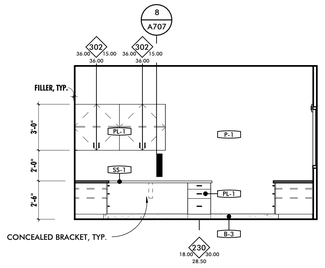
10 WATCH OFFICE 111 -NORTH
1/4" = 1'-0"



11 WATCH OFFICE 111 - SOUTH
1/4" = 1'-0"



12 WATCH OFFICE 111 - EAST
1/4" = 1'-0"



13 WATCH OFFICE 111 - WEST
1/4" = 1'-0"

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A703

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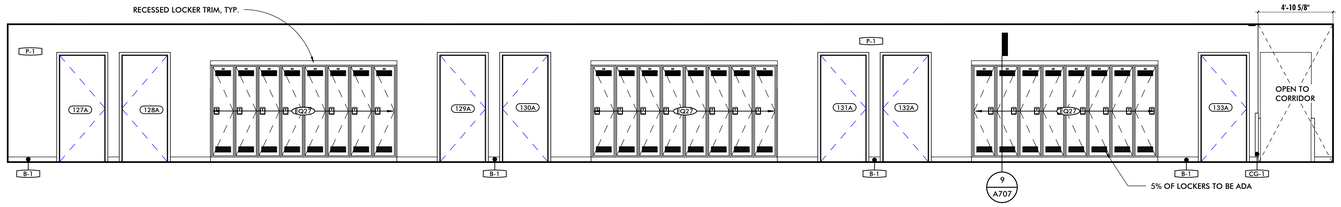
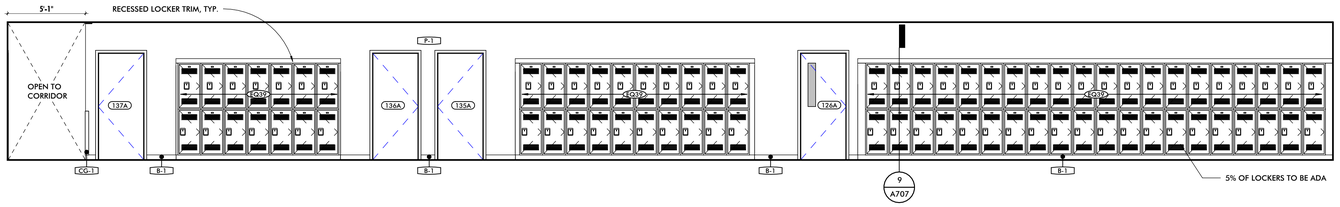
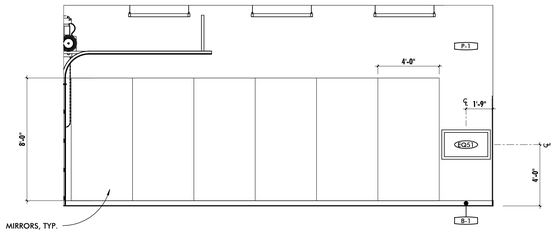


1 COORIDOR 126- NORTH
1/4" = 1'-0"



2 COORIDOR 126- SOUTH
1/4" = 1'-0"



3 FITNESS ROOM 123 - NORTH
1/4" = 1'-0"

MW STUDIOS
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8098 SANDPIPER CIR, SUITE H
NOTTINGHAM, MD 21236
410-344-1460
INFO@MWSARCH.COM
WWW.MWSARCH.COM

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LICENSE NUMBER: #RA405311
EXPIRATION DATE: 6-30-2027

EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING, PA 19606

PROJECT NUMBER: 25-049

SUBMISSION:
BID SET

ORIGINAL ISSUE DATE:
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

ENLARGED PLANS & INT. ELEVATIONS

SHEET NUMBER:

A704

10/1/2026 9:57:56 PM

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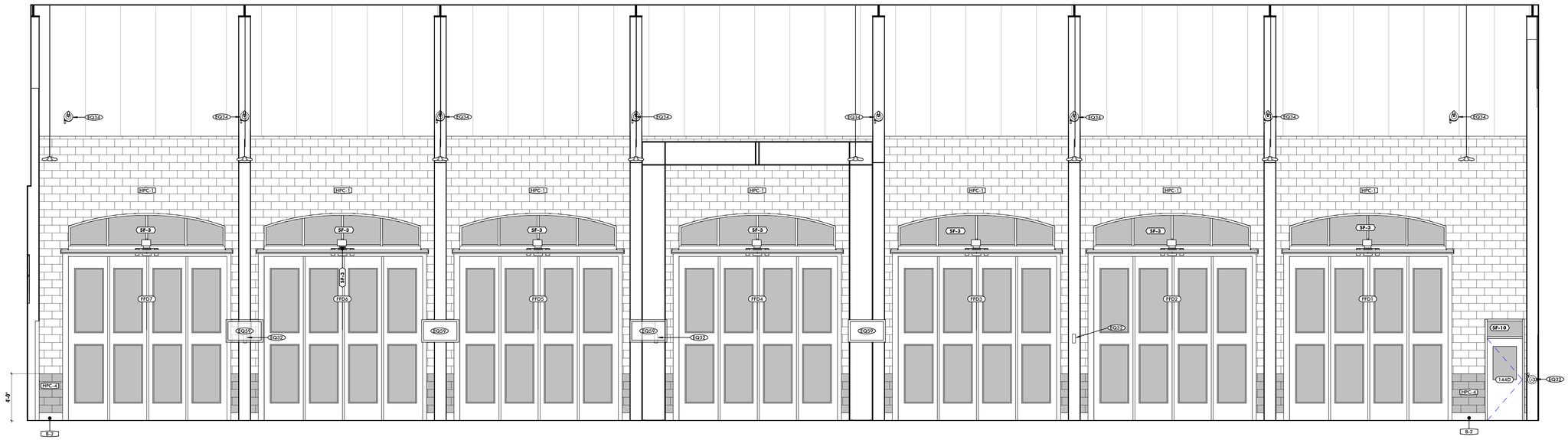
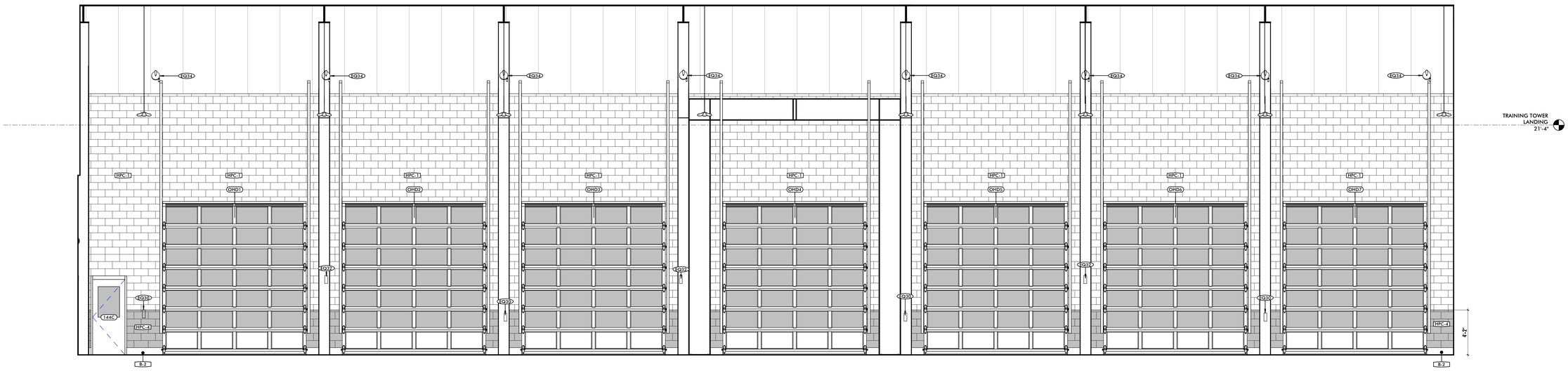


1 APPARATUS BAY 144 -SOUTH

1/4" = 1'-0"



2 APPARATUS BAY 144 - NORTH

1/4" = 1'-0"

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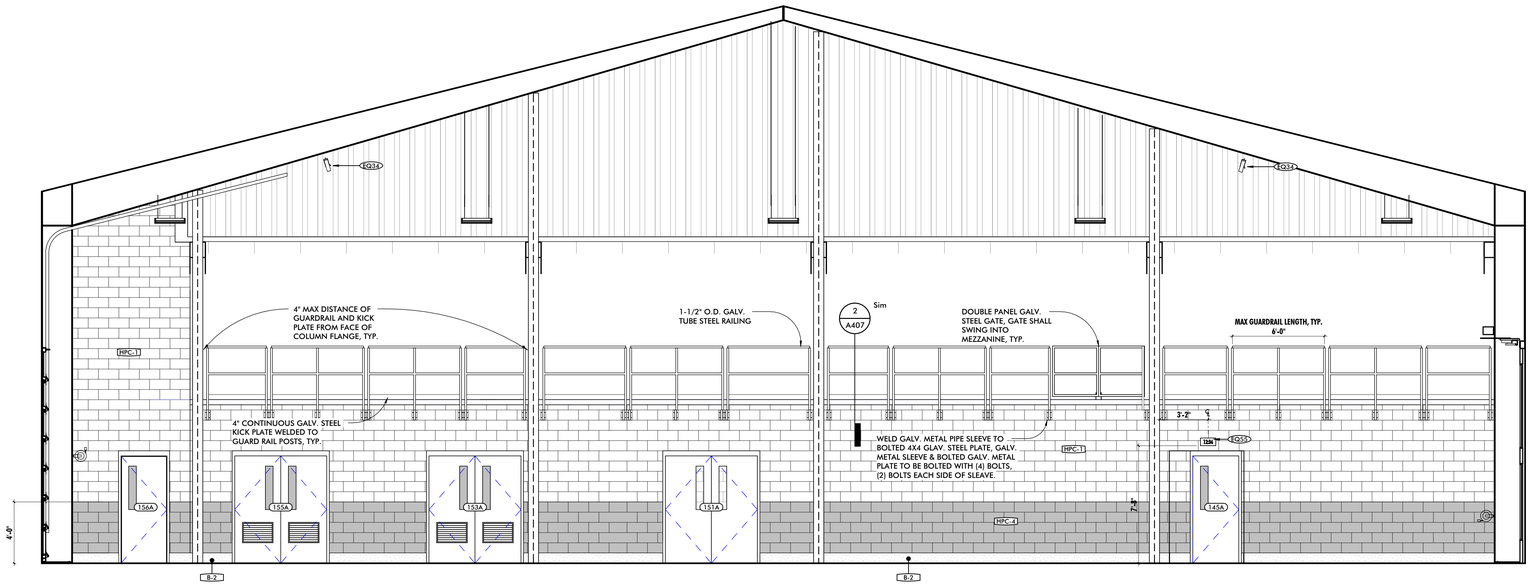
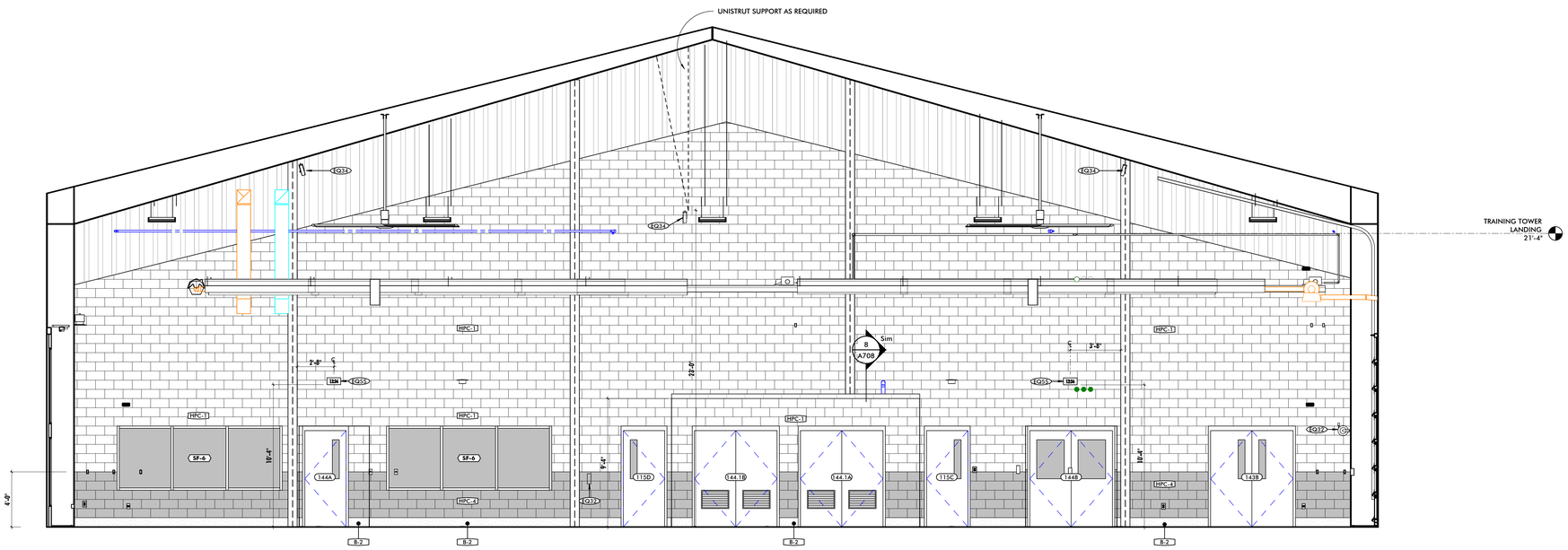


1 APPARATUS BAY 144 EAST ELEVATION

1/4" = 1'-0"



2 APPARATUS BAY 144 - WEST

1/4" = 1'-0"

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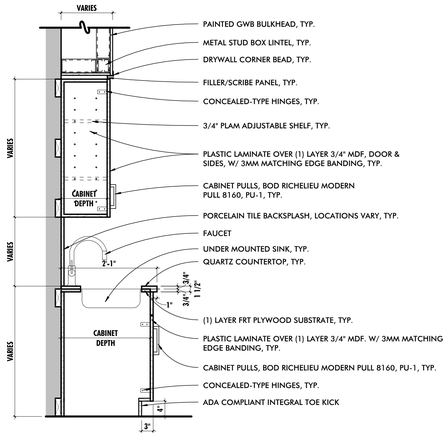
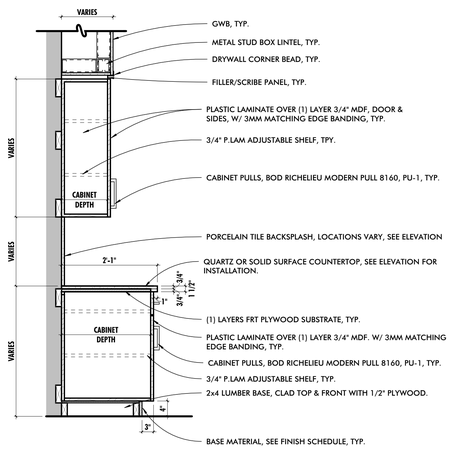
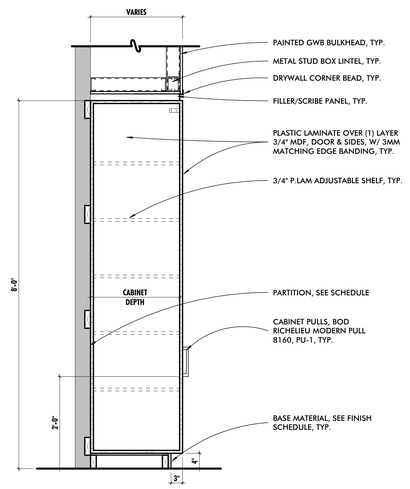
10/1/2026 9:57:59 PM



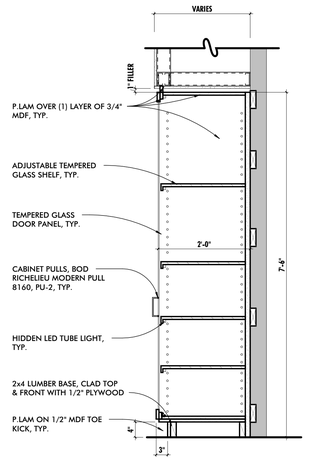
1 TYPICAL CASEWORK @ SINK
3/4" = 1'-0"



2 TYPICAL CASEWORK SECTION
3/4" = 1'-0"



3 TYPICAL PANTRY SECTION
3/4" = 1'-0"

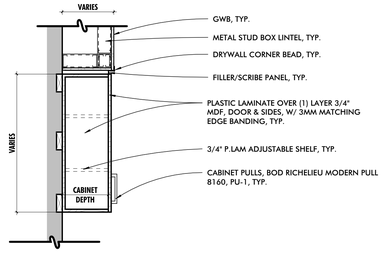


4 DISPLAY CASE SECTION DETAIL
3/4" = 1'-0"

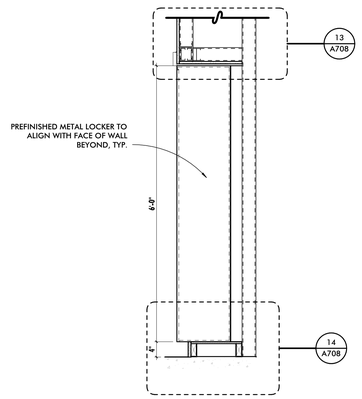
5 CUBBIES CASEWORK SECTION
3/4" = 1'-0"

6 TYPICAL CABINET W/ OPEN SHELVING
3/4" = 1'-0"

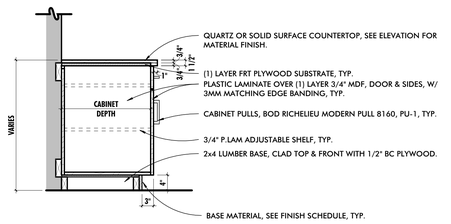
7 TYPICAL BASE BOOKCASE
3/4" = 1'-0"



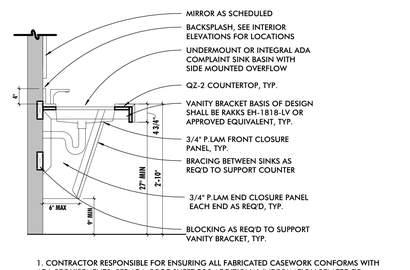
8 TYPICAL UPPER CABINET
3/4" = 1'-0"



9 TYPICAL LOCKER DETAIL - CONCRETE BASE
3/4" = 1'-0"



10 TYPICAL BASE CABINET
3/4" = 1'-0"

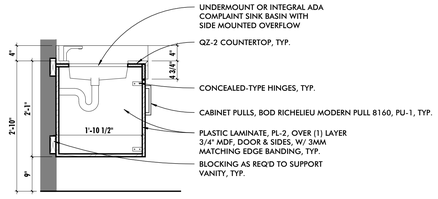


1. CONTRACTOR RESPONSIBLE FOR ENSURING ALL FABRICATED CASEWORK CONFORMS WITH ADA REQUIREMENTS. SEE ADA CODE SHEET FOR ADDITIONAL INFORMATION RELATED TO CLEARANCE REQUIREMENTS.

2. SEE INTERIOR ELEVATIONS FOR WALL FINISHES AND BACKSPLASH REQUIREMENTS.

3. ALL COUNTERS SHALL BE SEAMLESS UNLESS NOTED OTHERWISE.

11 TYPICAL LAVATORY DETAIL
3/4" = 1'-0"



12 LAVATORY CASEWORK
3/4" = 1'-0"

GENERAL CASEWORK NOTES

1	CONTRACTOR SHALL BE REQUIRED TO COORDINATE FINAL CASEWORK SHOP DRAWINGS AND INSTALLATION WITH ALL EQUIPMENT, INCLUDING EQUIPMENT PROVIDED BY OWNER. COORDINATION EFFORTS SHALL INCLUDE BUT ARE NOT LIMITED TO ENSURING PROPER CLEARANCES ARE PROVIDED FOR BOTH INSTALLATION AND OPERATION. EQUIPMENT SHALL BE AS TIGHT TO CASEWORK AS POSSIBLE AS PERMITTED BY EQUIPMENT REQUIREMENTS. PRIOR TO INSTALLATION OF CASEWORK EQUIPMENT CUT SHEETS & INSTALLATION INSTRUCTIONS SHALL BE POSTED WITH IN THE ROOM WHERE WORK IS BEING PERFORMED. CONTRACTOR SHALL VERIFY FINAL REVIEWED SHOP DRAWINGS CONFORM TO EQUIPMENT AND CLEARANCE REQUIREMENTS OF ACTUAL PURCHASED EQUIPMENT AS EQUIPMENT TYPES AND MODELS ARE SUBJECT TO FACTORY BASED CHANGES FROM THE TIME OF DESIGN TO THE TIME OF PURCHASE INSTALL.
2	CONTRACTOR SHALL REFER TO ARCHITECTURAL WOODWORK STANDARDS 2014, CABINET DESIGN SERIES (CDS) FOR FURTHER INFORMATION ABOUT CASEWORK
3	ALL BASE PROVIDED CASEWORK SHALL RECEIVE 7 1/2" CABINET PULL INSTALLED BOTH VERTICALLY AND HORIZONTALLY. CONTRACTOR PROVIDED UPPER CASEWORK LESS THAN 36" IN HEIGHT SHALL RECEIVE 7 1/2" CABINET PULL INSTALLED VERTICALLY. CONTRACTOR PROVIDED UPPER CASEWORK 36" IN HEIGHT OR GREATER SHALL RECEIVE 14 7 /16" CABINET PULL INSTALLED VERTICALLY.

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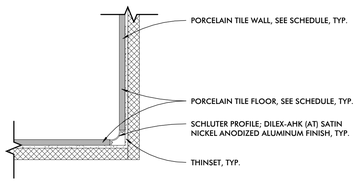
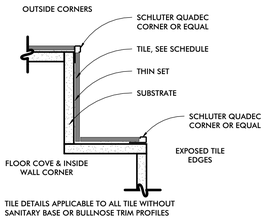
TYPICAL INTERIOR DETAILS

SHEET NUMBER:
A707

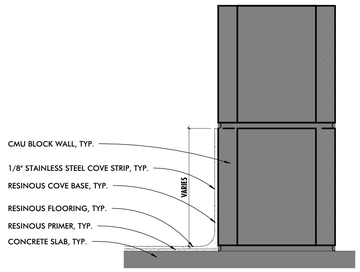
10/1/2026 9:58:00 PM



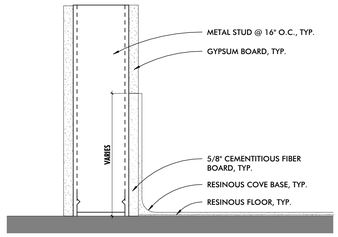
1 PORCELAIN TILE FLOOR @ PORCELAIN TILE WALL
3" = 1'-0"



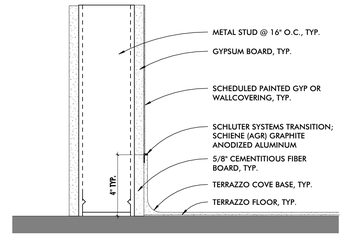
2 TYPICAL TILE EDGE DETAILS
3" = 1'-0"



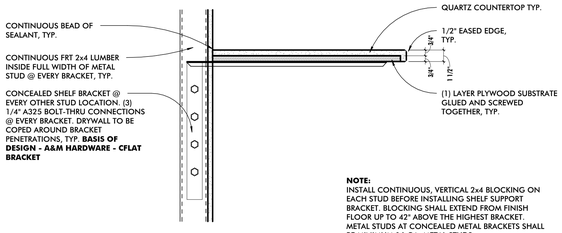
3 RESINOUS/ TERRAZZO COVE BASE @ MASONRY
3" = 1'-0"



4 RESINOUS/ TERRAZZO COVE BASE @ GYPSUM
3" = 1'-0"

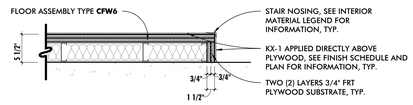


5 TERRAZZO COVE BASE @ WALLCOVERING
3" = 1'-0"

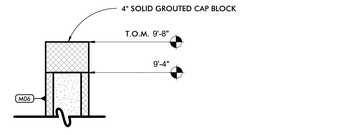


NOTE:
INSTALL CONTINUOUS, VERTICAL 2x4 BLOCKING ON EACH STUD BEFORE INSTALLING SHELF SUPPORT BRACKET. BLOCKING SHALL EXTEND FROM FINISH FLOOR UP TO 42" ABOVE THE HIGHEST BRACKET. METAL STUDS AT CONCEALED METAL BRACKETS SHALL BE MINIMUM 16 GA. METAL STUDS.

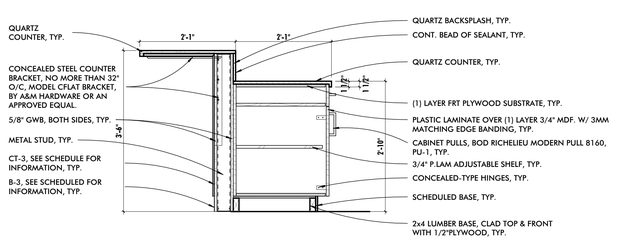
6 TYPICAL COUNTERTOP & BRACKET
1 1/2" = 1'-0"



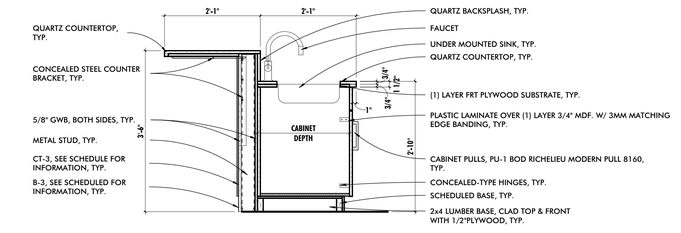
7 DAYROOM PLATFORM DETAIL
1" = 1'-0"



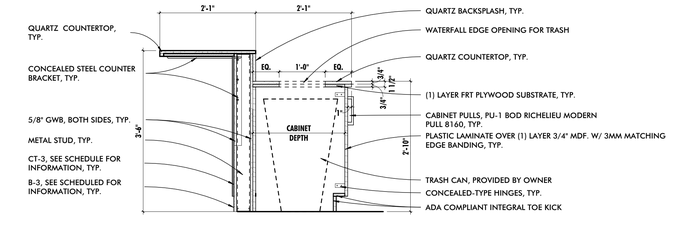
8 CLOSET ROOF SECTION
1 1/2" = 1'-0"



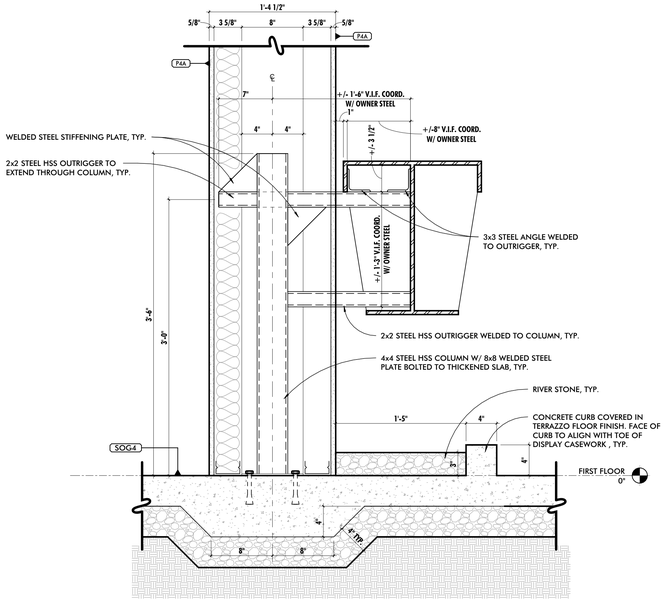
9 KITCHEN ISLAND DETAIL
3/4" = 1'-0"



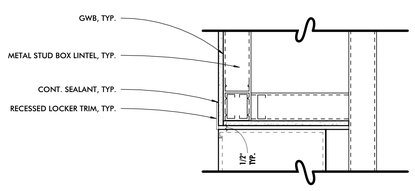
10 SINK AT KITCHEN ISLAND
3/4" = 1'-0"



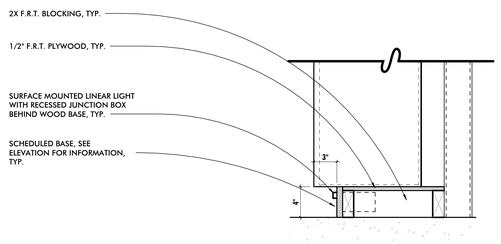
11 TYPICAL TRASH CAN CASEWORK DETAIL
3/4" = 1'-0"



12 MEMORIAL DETAIL
1 1/2" = 1'-0"



13 LOCKER HEAD DETAIL
1 1/2" = 1'-0"



14 LOCKER BASE DETAIL
1 1/2" = 1'-0"

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TYPICAL INTERIOR DETAILS

SHEET NUMBER:
A708

10/1/2026 9:58:01 PM

SCHEDULE - CEILING TYPES

MARK	DESCRIPTION	BOD MANUFACTURER	BOD MODEL	COMMENTS
CLG-1	2x2 ACOUSTICAL CEILING TILE	USG	MARS HIGH-NRC PANELS 88137, FLAT WHITE 050	
CLG-1A	2x2 ACOUSTICAL CEILING TILE	USG	MARS HIGH-NRC PANELS 88137, FLAT WHITE 050	<varies>
CLG-2	5/8" GWB ON 3 5/8" METAL STUDS @ 16" O.C.	N/A	N/A	
CLG-2A	5/8" GWB ON 3 5/8" METAL STUDS @ 16" O.C.	N/A	N/A	<varies>
CLG-3	2x2 CLEANABLE CEILING TILE	ARMSTRONG	KITCHEN ZONE 673, WHITE (WH)	
CLG-8	12" WIDE VENTED METAL PANEL SOFFIT	PAC-CLAD	FLUSH SOLID	AT ALL EXTERIOR OVERHANGS. COLOR "SIERRA TAN. COLOR CHANGING LED POD LIGHTS AT ALL EXTERIOR SOFFIT LOCATIONS. SEE ELECTRICAL.
EXP.	EXPOSED CEILING	N/A	N/A	EXPOSED STEEL FRAMES TO BE PAINTED HPC-2 AND EXPOSED METAL DECK TO BE PAINTED HPC-3

GENERAL CEILING NOTES

1	UNDERSIDE OF EXPOSED STRUCTURE, PIPING, AND DUCTWORK IN ALL ROOMS, STAIRWAYS, AND OTHER SPACES SHALL BE PAINTED UNLESS NOTED OTHERWISE. CONTRACTOR SHALL COORDINATE COLOR SELECTION WITH THE ARCHITECT PRIOR TO PAINTING OR PRIMING, TYP.
2	CONTRACTOR SHALL COORDINATE FINAL FIELD LOCATION OF ALL EXIT SIGNS AND EMERGENCY LIGHTING WITH ARCHITECT PRIOR TO ROUGH-IN, TYP.
3	THE CONTRACTOR SHALL PROVIDE SPRINKLER SYSTEM SHOP DRAWINGS TO THE ARCHITECT FOR APPROVAL WHERE SPRINKLERS ARE REQUIRED BY CODE (SEE CODE SHEET). DRAWINGS SHALL INDICATE HEAD LOCATIONS, HEAD TYPES, AND PIPING DISTRIBUTION. IN EXPOSED OCCUPIED AREAS MAINS SHALL BE ROUTED THROUGH AREAS WITH ACCESSIBLE FINISHED CEILINGS TO THE MAXIMUM EXTENT FEASIBLE. WHERE CEILINGS ARE FINISHED ALL HEADS SHALL BE EQUIPPED WITH CONCEALMENT COVERS. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
4	***APPARATUS BAYS ONLY*** CONTRACTOR SHALL PROVIDE COORDINATION DRAWINGS WITHIN THE APPARATUS BAY AREA INDICATING, WHERE APPLICABLE, THE VEHICLE EXHAUST SYSTEMS, SPRINKLER SYSTEM, OVERHEAD DOOR TRACKS, HEATERS (INCLUDING COMBUSTIBLE CLEARANCE REQUIREMENTS), LIGHTING, RETRACTABLE DROP DOWN CORDS, INTERIOR STORMDRAIN PIPING, FANS. COORDINATION DRAWINGS AT A MINIMUM SHALL INCLUDE PLANS AND BOTH LONGITUDINAL AND TRANSVERSE SECTIONS THROUGH THE BAYS INDICATING THE LOCATION AND ELEVATION OF BAY SYSTEM COMPONENTS.
5	SPRINKLER LOCATIONS DEPICTED HEREIN ARE DIAGRAMMATIC AND ARE SHOWN FOR DESIGN INTENT ONLY.
6	ON ACT CEILINGS IN FIRE-RATED AREAS INSTALL HOLD DOWN CLIPS ON ACOUSTIC PANELS WEIGHING LESS THAN 1 LB. PER SQ. FT. PER SPEC.
7	ALL MECHANICAL, ELECTRICAL, PLUMBING, AND SPRINKLER WORK TO OCCUR IN AREAS WHERE THE STRUCTURE IS EXPOSED SHALL BE EXECUTED IN A COORDINATED, NEAT AND WORKMANLIKE MANNER. AT A MINIMUM ALL WIRING SHALL BE RUN THOUGH CONDUITS, PIPE AND DUCT INSULATION SHALL BE NEATLY INSTALLED AND PAINTABLE. ALL PIPES AND DUCTS SHALL BE RUN EITHER PERPENDICULAR OR PARALLEL TO WALL CONSTRUCTION AND SHALL BE INSTALLED AT THE SAME NOMINAL ELEVATION OR SLOPE. ALL MATERIALS AND INSTALLATION METHODS SHALL COMPLY WITH APPLICABLE CODES AND STANDARDS. WHERE MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS INDICATE OTHER REQUIREMENTS THE GREATER QUALITY SHALL PREVAIL.
8	WHERE CEILINGS ARE EXPOSED ALL TIES, CABLES, AND SUPPORTS FOR CLOUDS, ELECTRICAL, MECHNICAL EQUIPMENT AND OTHER APPURTENANCES SHALL BE INSTALLED IN A NEAT, ORGANIZED AND WORKMANLIKE MANNER. VISIBLE TIES SHALL BE PLUMB/TRUE/SQUARE TO ELEMENTS, TIGHTLY WRAPPED, WITH EXCESS WIRE NEATLY CUT.
9	CONTRACTOR SHALL COORDINATE THE COLOR AND FINISH OF ALL CEILING MOUNTED EQUIPMENT SUCH AS DIFFUSERS, RETURNS, SPEAKERS, ETC. WITH THE ARCHITECT TO ENSURE THERE ARE NO STARK CONTRASTING COLORS.
10	WHERE ACT GRID LAYOUT AT EDGE CONDITIONS FOR 2X2 TILES REQUIRE TILES TO BE CUT TO LESS THAN 3", UTILIZE A 2X4 TILE IN LIEU OF THE 2X2 TILE. OMIT CEILING GRID CROSS MEMBERS AS REQUIRED. NO TILE SHALL EXCEED 27" OR BE LESS THAN 3" AT PERIMETER CONDITIONS. IT IS THE CONTRACTORS RESPONSIBILITY TO COORDINATE GRID MAINS AS REQUIRED TO ACHIEVE THIS DESIGN INTENT.



1 FIRST FLOOR REFLECTED CEILING PLAN
1/8" = 1'-0"

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LICENSE NUMBER: #RA405311
EXPIRATION DATE: 6-30-2027

EXETER TOWNSHIP EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING, PA 19606

PROJECT NUMBER: 25-049

SUBMISSION:
BID SET

ORIGINAL ISSUE DATE:
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

REFLECTED CEILING PLAN

SHEET NUMBER:
A800

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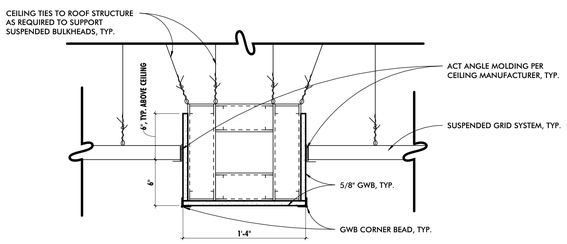
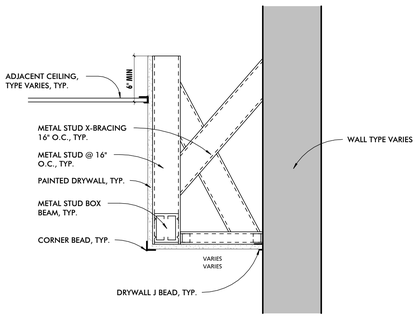


1 TYPICAL SUSPENDED BULKHEAD DETAIL
1 1/2" = 1'-0"



2 TYPICAL BULKHEAD DETAIL
1 1/2" = 1'-0"

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EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING, PA 19606

PROJECT NUMBER: 25-049

SUBMISSION:
BID SET

ORIGINAL ISSUE DATE:
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

CEILING TYPES & NOTES

SHEET NUMBER:

A801

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GENERAL STRUCTURAL NOTES

A. BUILDING CODES AND STANDARDS

1. THE FOLLOWING CODES AND STANDARDS, INCLUDING ALL SPECIFICATIONS REFERENCED WITHIN, SHALL APPLY TO THE DESIGN, CONSTRUCTION AND QUALITY CONTROL OF ALL WORK PERFORMED ON THE PROJECT.
   a. "INTERNATIONAL BUILDING CODE - 2021" INTERNATIONAL CODE COUNCIL, INC.
   b. "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES", (ANSI/ASCE 7) AMERICAN SOCIETY OF CIVIL ENGINEERS.
2. ADDITIONAL DESIGN STANDARDS FOR MATERIALS SHALL BE FOUND IN THE APPROPRIATE SECTIONS THAT FOLLOW. SEE THOSE SECTIONS FOR THE APPLICABLE CODES.

B. DESIGN LOADS

1. GRAVITY - SUPERIMPOSED DEAD LOADS

a. ROOF (STEEL FRAMED)	
ROOFING (NO BALLAST)	2 PSF
INSULATION	2 PSF
METAL DECK	2 PSF
JOISTS	3 PSF
MECHANICAL/ELECTRICAL	4 PSF
SPRINKLERS	2 PSF
CEILING	5 PSF
TOTAL	20 PSF
b. ROOF (PRE-ENGINEERED METAL BUILDING(PEMB)) COLLATERAL	8 PSF
c. FLOORS (STEEL FRAMED)	
FLOORING	2 PSF
4" CONCRETE SLAB ON DECK	40 PSF
FRAMING	3 PSF
MECHANICAL/ELECTRICAL	4 PSF
SPRINKLERS	2 PSF
CEILING	2 PSF
TOTAL	53 PSF

2. GRAVITY - FLOOR LIVE LOADS

a. SLAB-ON-GROUND	100 PSF
b. LOBBIES/STAIRS/EXIT CORRIDORS	100 PSF
c. MEZZANINE	60 PSF

3. GRAVITY - ROOF LIVE LOADS

a. LIVE LOAD	20 PSF (NOT REDUCIBLE)
b. SNOW LOAD (PLUS DRIFTING WHERE APPLICABLE)	
1) GROUND SNOW LOAD (Pg)	30 PSF
2) SNOW EXPOSURE FACTOR (Ce)	1.0
3) SNOW LOAD IMPORTANCE FACTOR (Is)	1.2
4) THERMAL FACTOR (Ct)	1.0
5) SLOPE FACTOR(s), (Cs)	1.0
6) FLAT ROOF SNOW LOAD (Pf)	30 PSF (NOT REDUCIBLE)
7) DRIFT SURCHARGE LOADS	SEE PLAN ON S202

4. LATERAL LOADS - WIND

a. ANALYSIS PROCEDURE	ASCE 7 / IBC
b. ULTIMATE DESIGN WIND SPEED (3 SECOND GUST)	126 MPH
c. NOMINAL WIND SPEED	97.6 MPH
d. RISK CATEGORY	I'V
e. EXPOSURE CATEGORY	C
f. INTERNAL PRESSURE COEFFICIENT	±0.18

g. COMPONENTS AND CLADDING (ULTIMATE) 1.0W, 10 SQ. FT.

ELEMENT	EXPOSURE	PRESSURE
ROOF	1	74.4 PSF
ROOF	2	108.5 PSF
ROOF	3	128.9 PSF
WALLS	4	43.7 PSF
WALLS	5	53.9 PSF

h. NET WIND UPLIFT (ULTIMATE) 250 SQ. FT.

1) FIELD OF MAIN ROOF	10 PSF
2) EDGES OF MAIN ROOF, EDGE DISTANCE = 10'	54 PSF
3) CANOPIES	15 PSF

5. LATERAL LOADS - SEISMIC

a. SEISMIC IMPORTANCE FACTOR (Ie)	1.5
b. RISK CATEGORY	I'V
c. SPECTRAL RESPONSE ACCELERATION FOR SHORT PERIOD (Ss)	0.176
d. SPECTRAL RESPONSE ACCELERATION FOR 1-SECOND PERIOD (S1)	0.047
e. SPECTRAL RESPONSE COEFFICIENT (SDS)	0.153
f. SPECTRAL RESPONSE COEFFICIENT (SD1)	0.047
g. SITE CLASS	C
h. SEISMIC DESIGN CATEGORY	A
i. BASIC SEISMIC FORCE RESISTING SYSTEM(S)	STRUCTURAL STEEL SYSTEMS NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE
j. RESPONSE MODIFICATION FACTOR(S) (R)	3
k. SEISMIC RESPONSE COEFFICIENT(S) (Cs)	0.076
l. ANALYSIS PROCEDURE	EQUIVALENT LATERAL FORCE PROCEDURE
m. BASE SHEAR (ULTIMATE)	PER PEMB MANUFACTURER

6. LATERAL LOADS - EARTH PRESSURE (SERVICE LEVEL)

a. LATERAL EQUIVALENT FLUID PRESSURE	
1) AT REST CONDITION (BRACED WALLS)	60 PSF/FT OF DEPTH
2) ACTIVE CONDITION (CANTILEVERED WALLS)	45 PSF/FT OF DEPTH

7. THE STRUCTURE HAS BEEN DESIGNED FOR THE DEAD, LIVE AND LATERAL LOADS INDICATED ABOVE. ANY INCREASE OF LOADS DUE TO CHANGE IN USAGE OR CONSTRUCTION MATERIALS, ETC. SHALL HAVE THE WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER. THE CONTRACTOR IS CAUTIONED AS TO NOT STORE ANY CONSTRUCTION MATERIALS OR UNDERTAKE ANY CONSTRUCTION OPERATIONS WHICH WILL EXCEED THE DESIGN LIVE LOAD CAPACITIES NOTED.
8. WEIGHT OF EQUIPMENT SHOWN ON THE STRUCTURAL DRAWINGS HAS BEEN CONSIDERED IN THE FRAMING DESIGN. ANY ADDITIONAL EQUIPMENT NOT SHOWN ON THE STRUCTURAL DRAWINGS AND EXCEEDING 300 POUNDS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION FOR APPROVAL PRIOR TO INSTALLATION. COORDINATE ALL WORK WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS.

C. CONSTRUCTION

1. GENERAL
   a. THESE DRAWINGS REPRESENT THE COMPLETED PROJECT WHICH HAS BEEN DESIGNED FOR THE STRUCTURE DEAD LOADS AND FOR THE SUPERIMPOSED LIVE LOADS INDICATED IN THE DESIGN LOADS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ALLOWABLE CONSTRUCTION LOADS AND TO PROVIDE PROPER DESIGN AND CONSTRUCTION OF FALSEWORK, FORMWORK, TEMPORARY BRACING, SHEETING AND SHORING, ETC.
   b. THE STABILITY OF THE STRUCTURE IS DEPENDENT UPON THE DIAPHRAGM ACTION OF THE ROOF AND FLOORS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE METHODS OF CONSTRUCTION AND SHALL PROVIDE ALL GUYS, BRACING AND SHORING REQUIRED TO ACCOMMODATE ALL INTERIM LOADING CONDITIONS FOR GRAVITY AND LATERAL RESISTING SYSTEMS, INCLUDING BUT NOT LIMITED TO, SIDE LOADED CONDITIONS AND/OR CONDITIONS RESULTING IN TEMPORARY UNRESTRAINED MEMBERS SUBJECT TO TORSIONAL LOADS DURING CONSTRUCTION.
   c. IMPLEMENTING JOB SITE SAFETY AND CONSTRUCTION PROCEDURES AND ALL OSHA REGULATIONS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
   d. IN CASE OF CONFLICT BETWEEN THE GENERAL NOTES, SPECIFICATIONS, AND DRAWINGS, THE MOST RIGID REQUIREMENT SHALL GOVERN.
   e. STRUCTURAL DOCUMENTS ARE NOT STAND-ALONE DOCUMENTS, THE ARCHITECTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS FOR DIMENSIONS, ELEVATIONS, SECTIONS, AND DETAILS. REPORT DISCREPANCIES IMMEDIATELY TO THE ARCHITECT AND THE STRUCTURAL ENGINEER. DO NOT SCALE DRAWINGS FOR THE PURPOSE OF ESTABLISHING DIMENSIONS NOR FOR DETAILING.
   f. BY SUBMITTING A BID FOR THE PROJECT, THE CONTRACTOR AGREES THEY HAVE COMPLETELY REVIEWED AND FULLY UNDERSTAND THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND ARE QUALIFIED TO SUCCESSFULLY COMPLETE ALL PROJECT REQUIREMENTS TO THE SATISFACTION OF THE OWNER. CONTRACTOR'S FAILURE TO EVALUATE POTENTIAL SITE OR OTHER LIMITATIONS OR OTHERWISE COORDINATE THEIR WORK WITH ALL TRADES DOES NOT RELIEVE THE CONTRACTOR'S OBLIGATION TO SUCCESSFULLY COMPLETE THE WORK. THE CONTRACTOR SHALL INCUR ALL COSTS ASSOCIATED WITH WORK THAT HAS NOT BEEN COORDINATED.
   g. DRAWINGS IN DIGITAL FORMAT, INCLUDING, BUT NOT LIMITED TO AUTOCAD OR REVIT, ARE FOR CONVENIENCE ONLY AND DO NOT CONSTITUTE CONTRACT DOCUMENTS. PROVIDENCE OFFERS NO WARRANTIES, EXPRESSED NOR IMPLIED, REGARDING THE ACCURACY OF SUCH DIGITAL FILES. CONTRACT BINDING DOCUMENTS ARE THE DESIGN DRAWINGS IN "PORTABLE DOCUMENT FORMAT" (PDF) ONLY.
   h. DRAWINGS LABELED AS "ISSUED FOR PERMIT" OR OTHER PROGRESS DESIGNATION, AND NOT SPECIFICALLY LABELED AS "ISSUED FOR CONSTRUCTION", SHALL NOT BE CONSIDERED AS CONSTRUCTION DOCUMENTS NOR ISSUED FOR CONSTRUCTION PURPOSES.
   i. THE CONTRACTOR SHALL CHECK AND VERIFY DIMENSIONS AND ELEVATIONS FOR ALL WORK BEFORE PROCEEDING WITH THE CONSTRUCTION. ALL DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO THE START OF ANY WORK.
   j. CONSULT ARCHITECTURAL, CIVIL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR VERIFICATION OF LOCATION AND SIZE OF ALL OPENINGS, SLEEVES, REVEALS, DEPRESSIONS, INSERTS, CONCRETE HOUSEKEEPING PADS, HANDRAILS, GUARDRAILS, PARTITION SUPPORTS, LINTELS, ETC. REQUIRED FOR THE PROJECT. VERIFY REQUIREMENTS OF TRADES AFFECTING THE WORK AND NOTIFY THE ARCHITECT AND STRUCTURAL ENGINEER OF ANY CONFLICTS.
   k. THE FRAMING MEMBERS INDICATED ON THE DOCUMENTS SHALL BE CONSIDERED A MINIMUM PROJECT REQUIREMENT. AT NO ADDITIONAL COST, CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SUPPLEMENTAL, MISCELLANEOUS AND/OR ADDITIONAL FRAMING INCLUDING JOISTS, HEADERS, RAFTERS, BEAMS, MISCELLANEOUS STEEL, PLATES, ANGLES, CONNECTIONS TO PRIMARY STRUCTURE, ETC. REQUIRED FOR COMPLETED CONSTRUCTION AND RESULTING FROM CONTRACTOR'S COORDINATION OF ALL PROJECT TRADES. ENGINEER IS NOT RESPONSIBLE FOR DESIGN OR MATERIALS FOR SECONDARY OR SUPPLEMENTAL ARCHITECTURAL OR OTHER DISCIPLINE COMPONENTS OR ASSEMBLIES.
   l. WORK NOT INCLUDED ON THE DRAWINGS BUT IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES ELSEWHERE ON THE DRAWINGS SHALL BE REPEATED.
   m. ALL COSTS OF INVESTIGATION AND/OR REDESIGN, DUE TO THE CONTRACTOR'S MIS-LOCATION OF STRUCTURAL ELEMENTS OR OTHER LACK OF CONFORMANCE WITH THE PROJECT DOCUMENTS, SHALL BE AT THE CONTRACTOR'S EXPENSE.
   n. SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR DETAILED INFORMATION REGARDING FINISHES, DAMPPROOFING, WATERPROOFING, UL ASSEMBLY DESIGNATIONS AND FIREPROOFING REQUIREMENTS, ETC.
   o. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF MASONRY AND DRYWALL NON-LOAD-BEARING PARTITIONS, PROVIDE SLIP CONNECTIONS THAT ALLOW VERTICAL MOVEMENT AT THE HEADS OF ALL SUCH PARTITION. UNLESS SHOWN ON THE DRAWINGS, THE CONNECTIONS SHALL BE DESIGNED TO SUPPORT THE TOP OF THE WALLS LATERALLY FOR THE CODE REQUIRED LATERAL LOAD. PROVIDE COMPRESSIBLE FIRESAFING AT THE TOP OF THE WALL AS REQUIRED BY THE ARCHITECTURAL DRAWINGS.
   p. ALL MECHANICAL BOLTS AND ADHESIVE ANCHORS SHALL BE SET IN FULLY CURED CONCRETE OR 100% GROUT FILLED MASONRY.
   q. CUTTING, PATCHING, DEMOLITION AND REMOVAL WORK SHALL BE PERFORMED WITH METHODS LEAST LIKELY TO DAMAGE ADJACENT ADJOINING CONDITIONS. DAMAGE SHALL BE REPAIRED TO THE SATISFACTION OF THE ARCHITECT AND AT THE EXPENSE OF THE CONTRACTOR.
   r. STRUCTURAL COMPONENTS ARE NOT DESIGNED FOR VIBRATORY EQUIPMENT. PLACE VIBRATORY EQUIPMENT ON VIBRATION ISOLATORS APPROPRIATE FOR EQUIPMENT AND USE OF SPACE. VIBRATION ISOLATION HAS NOT BEEN PROVIDED BY THE STRUCTURAL ENGINEER.
   s. CONSTRUCTION IS TO BE IN SUCH A MANNER THAT NO CRANE LOADS OR ANY OTHER UNAPPROVED CONSTRUCTION LOADS ARE PLACED ON SLAB-ON-GROUND OR ELEVATED STRUCTURE DURING CONSTRUCTION.
2. SHOP DRAWINGS
   a. SHOP DRAWINGS FOR ALL STRUCTURAL ELEMENTS SHOWN ON THE CONTRACT DOCUMENTS, INCLUDING ALL CONCRETE AND GROUT MIX DESIGNS AND ADMIXTURES, MUST BE SUBMITTED BY THE GENERAL CONTRACTOR AND REVIEWED BY THE STRUCTURAL ENGINEER. SHOP DRAWINGS SHALL BEAR THE CONTRACTOR'S APPROVAL STAMP CERTIFYING HE HAS VERIFIED ALL CONSTRUCTION CRITERIA INCLUDING FIELD MEASUREMENTS, MATERIAL AND SIMILAR DATA AND HAS CHECKED THE SUBMITTAL FOR COMPLETENESS, COORDINATION AND COMPLIANCE WITH THE CONTRACT DOCUMENTS.
   b. REVIEW IS ONLY FOR GENERAL COMPATIBILITY WITH THE DESIGN CONCEPT OF THE COMPLETED PROJECT AS A FUNCTIONING WHOLE AS INDICATED BY THE CONTRACT DOCUMENTS, AND FOR GENERAL CONFORMANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS. ANY REVIEW OR COMMENTS DO NOT MODIFY THE CONTRACTOR'S INDEPENDENT DUTY TO STRICTLY COMPLY WITH THE CONTRACT DOCUMENTS. PROVIDENCE ASSUMES NO RESPONSIBILITY FOR DIMENSIONS OR QUANTITIES. PROVIDENCE'S REVIEW SHALL NOT CONSTITUTE APPROVAL OF THE MEANS, METHODS, TECHNIQUES, SEQUENCES, OPERATIONS OF CONSTRUCTION OR SAFETY PRECAUTIONS OR PROGRAMS INCIDENTAL THERETO, WHICH ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR REMAINS RESPONSIBLE FOR DETAIL AND ACCURACY, FOR PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER, AND COORDINATING THE WORK OF ALL TRADES.
   c. UNAUTHORIZED REPRODUCTION OF ANY PORTION OF THE STRUCTURAL DRAWINGS FOR RESUBMITTAL AS SHOP DRAWINGS IS PROHIBITED. SHOP DRAWINGS PRODUCED IN SUCH A MANNER MAY BE REJECTED AND RETURNED.
   d. IF THE CONTRACTOR OR OWNER FAILS TO OBTAIN THE STRUCTURAL ENGINEER'S REVIEW OF THE SHOP DRAWINGS, THE STRUCTURAL ENGINEER WILL NOT BE RESPONSIBLE FOR THE STRUCTURAL CERTIFICATION AND DESIGN OF THE PROJECT. SHOP DRAWINGS ARE REVIEWED BY THE STRUCTURAL ENGINEER AS A CONVENIENCE TO THE GENERAL CONTRACTOR AND ARE NOT A CONTRACT DOCUMENT.
   e. CONTRACTOR SHALL FURNISH DIMENSIONED SHOP DRAWINGS AT ALL LEVELS LOCATING FLOOR AND ROOF EDGES AND LOCATING ALL SLEEVES AND OPENINGS REQUIRED BY ALL TRADES FOR REVIEW BY THE ARCHITECT AND STRUCTURAL ENGINEER.
   f. AT THE TIME OF SHOP DRAWING SUBMISSION, THE GENERAL CONTRACTOR SHALL INFORM THE STRUCTURAL ENGINEER, IN WRITING, OF ANY DEVIATIONS OR OMISSIONS FROM THE CONTRACT DOCUMENTS.
   g. AFTER REVIEW OF SUBMITTAL, PROVIDENCE WILL INDICATE THE APPROPRIATE ACTION ON SUBMITTAL WITH AN ACTION STAMP TO INDICATE ONE OF THE FOLLOWING:
      1) REVIEWED, NO EXCEPTIONS - WORK MAY PROCEED
      2) REVIEWED, EXCEPTIONS NOTED - WORK MAY PROCEED BASED ON CORRECTIONS INDICATED
      3) REVIEWED, EXCEPTIONS NOTED, RESUBMIT FILE COPY - WORK MAY PROCEED BASED ON CORRECTIONS INDICATED
      4) REJECTED, REVISE AND RESUBMIT - WORK MAY NOT PROCEED
      5) INFORMATION ONLY - INFORMATION ONLY SUBMITTALS INCLUDE, BUT ARE NOT LIMITED TO QUALITY CONTROL PROCEDURES, MATERIAL CERTIFICATES, MANUFACTURER DATA, INSPECTION REPORTS, AND CLOSEOUT DOCUMENTS.
   h. PROVIDENCE IS NOT RESPONSIBLE FOR RESUBMITTALS NOR TRACKING PROGRESS OF RESUBMITTALS.

D. DELEGATED DESIGN SUBMITTALS

1. STRUCTURAL SYSTEMS DESIGNATED TO BE DELEGATED DESIGNS SHALL BE PERFORMED BY THE CONTRACTOR'S SPECIALTY STRUCTURAL ENGINEER (SSE) WHO IS LICENSED IN THE PROJECT LOCATION. THE SPECIALTY STRUCTURAL ENGINEER IS RESPONSIBLE FOR THE DELEGATED PORTIONS OF THE WORK.
2. AS THE STRUCTURAL ENGINEER OF RECORD (SEOR) FOR THE REMAINDER OF THE WORK OF THIS PROJECT (PORTIONS NOT DELEGATED), PROVIDENCE WILL PROVIDE DESIGN CRITERIA AND DESIGN INTENT FOR THE SPECIALTY STRUCTURAL ENGINEER'S USE IN PREPARING THE DELEGATED DESIGN. IF THE SPECIALTY STRUCTURAL ENGINEER DETERMINES THERE IS INSUFFICIENT DESIGN INFORMATION OR PROJECT LIMITATIONS, A TIMELY REQUEST FOR INFORMATION SHALL BE SUBMITTED TO THE ARCHITECT AND STRUCTURAL ENGINEER FOR RESOLUTION.
3. LOADS IMPOSED BY THE DELEGATED DESIGN ASSEMBLIES ON THE REMAINDER OF THE WORK SHALL BE CLEARLY PROVIDED BY THE SSE FOR REVIEW BY THE STRUCTURAL ENGINEER OF RECORD (PROVIDENCE).
4. THE CONTRACTOR SHALL SUBMIT DELEGATED DESIGN DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY THE SPECIALTY STRUCTURAL ENGINEER LICENSED IN THE PROJECT'S JURISDICTION.
   a. DELEGATED DESIGN SUBMITTALS SHALL INDICATE THAT PRODUCTS AND SYSTEMS COMPLY WITH PERFORMANCE AND DESIGN CRITERIA IN THE CONTRACT DOCUMENTS AND RELEVANT CODES. INCLUDE LIST OF LOADS, CODES AND OTHER RELEVANT FACTORS USED IN PERFORMING THE DELEGATED DESIGN.
   b. CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING MOST CURRENT CONTRACT DOCUMENTATION INCLUDING REVISIONS, ADDENDA, RFI RESPONSES, ETC. TO THE SPECIALTY STRUCTURAL ENGINEER(S). SPECIALTY STRUCTURAL ENGINEER(S) SHALL PROVIDE A LIST OF RELEVANT DOCUMENTS AND CORRESPONDING DATES OF ISSUANCE AS PART OF THEIR SUBMITTAL.
   c. THE SUBMITTED DRAWINGS AND CALCULATIONS SHALL CLEARLY SHOW THE LOAD REACTIONS AS APPLIED TO THE BUILDING STRUCTURE.
   d. REVIEW BY THE STRUCTURAL ENGINEER OF RECORD (PROVIDENCE) SHALL BE FOR GENERAL CONFORMANCE WITH THE PROJECT PARAMETERS INDICATED ON THE CONTRACT DOCUMENTS. THE STRUCTURAL ENGINEER OF RECORD (PROVIDENCE) WILL CONFIRM THE DELEGATED DESIGN PARAMETERS (INPUT) CONFORM WITH THE SPECIFIED DESIGN CRITERIA AND DESIGN INTENT; HOWEVER, THE SPECIALTY STRUCTURAL ENGINEER IS SOLELY RESPONSIBLE FOR THEIR WORK.
5. LIST OF DELEGATED DESIGN ASSEMBLIES INCLUDED IN CONTRACT:
   a. STUD WALL AND CURTAIN WALL SYSTEMS AND RELATED CONNECTIONS.
      1) DESIGNS SHALL ACCOUNT FOR ALL VERTICAL AND LATERAL LOADS REQUIRED BY APPLICABLE BUILDING CODES.
      2) COLD-FORMED MEMBER TYPE, SIZE, GAGE, AND SPACING INDICATED ON THE CONTRACT DOCUMENTS ARE THE MINIMUM ACCEPTABLE SIZES FOR THE WORK. TIMELY SUBSTITUTION REQUESTS MUST BE SUBMITTED FOR CONSIDERATION PRIOR TO DELEGATED DESIGNER'S COMMENCEMENT OF WORK.
      3) DEFLECTION CRITERIA FOR BACKUP STUD SYSTEMS AND CURTAIN WALLS WITH APPLICABLE DESIGN VERTICAL AND LATERAL LOADS:
         a) NON-MASONRY/NON-BRICK BACKUP - MAXIMUM OF 1/360 OF SPAN IN INCHES.
         b) BRICK AND NON-REINFORCED MASONRY BACKUP - MAXIMUM OF 1/600 OF SPAN IN INCHES, OR 3/8", WHICHEVER IS LESS.
      4) SUBMISSION SHALL CLEARLY SHOW LOAD REACTIONS AND LOCATIONS APPLIED TO THE BUILDING STRUCTURE.
   b. METAL STAIRS, METAL GUARDS, AND METAL RAILINGS
      1) DESIGNS SHALL ACCOUNT FOR ALL VERTICAL AND LATERAL LOADS REQUIRED BY THE SPECIFICATIONS AND/OR APPLICABLE BUILDING CODES.
      2) DEFLECTION CRITERIA FOR STAIR TREADS, PLATFORMS AND FRAMING - MAXIMUM OF 1/360 OF SPAN IN INCHES.
      3) DESIGN SHALL ACCOUNT FOR THERMAL MOVEMENT FROM AMBIENT AND SURFACE TEMPERATURE DIFFERENTIALS.
      4) DESIGNS SHALL BE COMPLETED TO PROVIDE SATISFACTORY (IMPERCEPTIBLE) SWAY AND/OR VIBRATION CHARACTERISTICS.
      5) WHERE HEADERS OR OTHER TYPES OF STRUCTURAL MEMBERS HAVE BEEN DESIGNATED BY THE STRUCTURAL ENGINEER OF RECORD TO SUPPORT THE STAIRS, CONNECTIONS FROM STAIRS SHALL BE DESIGNED TO AVOID IMPOSING ECCENTRIC AND TORSIONAL FORCES ON SUCH MEMBERS.
      6) THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING, FURNISHING AND INSTALLING EMBEDS AND HARDWARE REQUIRED BY THE STAIR DESIGN.
   c. STRUCTURAL STEEL CONNECTIONS
      1) DESIGN THE FOLLOWING CONNECTIONS FOR THE REACTIONS SHOWN ON THE CONTRACT DRAWINGS IN ACCORDANCE WITH THE DESIGN BASIS INDICATED IN THE STRUCTURAL STEEL NOTES AND THE MINIMUM CONNECTION REQUIREMENTS TABLE:

MINIMUM CONNECTION REQUIREMENTS

NOMINAL DEPTH OF BEAM OR GIRDER	'L' NOTE 3	MINIMUM NUMBER OF ROWS OF BOLTS	MINIMUM VERTICAL REACTION (R), KIPS (ASD LOADS)	MINIMUM AXIAL REACTION (A) KIPS (ASD), NOTE 1	
				ALL BEAM END CONNECTIONS	
8, 10	6"	2	5	A = R	
18, 21	12"	4	20	A = R	

NOTES:
1. WHERE MINIMUM TABULATED AXIAL FORCE (A) IS USED, IT NEED NOT BE CONSIDERED TO ACT SIMULTANEOUSLY WITH THE VERTICAL REACTION (R). WHERE AXIAL FORCES ARE TAKEN FROM THE DRAWINGS, THESE SHALL BE CONSIDERED TO ACT SIMULTANEOUSLY WITH VERTICAL REACTIONS (EITHER MINIMUM TABULATED OR THOSE SPECIFICALLY SHOWN IN THE DRAWINGS).
2. REFER TO STRUCTURAL STEEL AND DELEGATED DESIGN SUBMITTAL GENERAL STRUCTURAL NOTE SECTIONS FOR ADDITIONAL INFORMATION.
3. 'L' INDICATES THE NOMINAL CONNECTION PLATE ANGLE LENGTH. SEE STRUCTURAL DETAILS FOR ADDITIONAL INFORMATION AND DETAIL IN ACCORDANCE WITH AISC SPECIFICATIONS.

   d. STEEL JOISTS
      1) DESIGNS SHALL ACCOUNT FOR ALL VERTICAL AND LATERAL LOADS REQUIRED BY APPLICABLE BUILDING CODES INCLUDING: SPECIAL LOAD DIAGRAMS DEPICTED ON THE CONTRACT DOCUMENTS; NET WIND UPLIFT SHOWN IN THE DESIGN LOADS SECTION; THE WEIGHT OF SUPPORTED EQUIPMENT, PIPING AND CONDUIT; DEFLECTION CRITERIA INDICATED ON THE CONTRACT DOCUMENTS; AND ALL CODE-REQUIRED LOAD COMBINATIONS.
      2) PRIOR TO FABRICATION, SUBMIT SHOP DRAWINGS WITH A COVER LETTER SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE PROJECT LOCATION STATING THE JOISTS AND ASSOCIATED DETAILS HAVE BEEN DEVELOPED USING THE PERFORMANCE CRITERIA INDICATED ON THE STRUCTURAL CONTRACT DOCUMENTS.
      3) SUBMIT SHOP DRAWINGS AND CALCULATIONS AT THE SAME TIME FOR REVIEW BY STRUCTURAL ENGINEER OF RECORD.
         a) SHOP DRAWINGS SHALL INCLUDE JOIST LAYOUT PLANS, PIECE MARKS, SECTIONS, DETAILS AND JOIST DETAIL SHEETS.
         b) SUBMIT DESIGN CALCULATIONS PREPARED AND SEALED BY A SPECIALTY ENGINEER WHO IS LICENSED IN THE PROJECT LOCATION FOR THE FOLLOWING CONDITIONS: SPECIAL LOADINGS, ROLLOVER LOADINGS AT SEATS. CALCULATIONS SHALL BE REFERENCED TO THE JOIST LAYOUT PLANS AND JOIST DETAIL SHEETS.
   e. STOREFRONT GLAZING ASSEMBLIES
   f. PRE-ENGINEERED METAL BUILDING FRAMING
      1) DESIGNS SHALL ACCOUNT FOR ALL VERTICAL AND LATERAL LOADS REQUIRED BY APPLICABLE BUILDING CODES INCLUDING: SPECIAL LOAD DIAGRAMS DEPICTED ON THE CONTRACT DOCUMENTS; THE WEIGHT OF SUPPORTED EQUIPMENT, PIPING AND CONDUIT; DEFLECTION CRITERIA INDICATED ON THE CONTRACT DOCUMENTS; AND ALL CODE-REQUIRED LOAD COMBINATIONS.
      2) SUBMITTED SHOP DRAWINGS AND ENGINEERING CALCULATIONS SHALL CLEARLY INDICATE COMPLETE RATIONAL LOAD PATH, MEMBER LOCATIONS, DIMENSIONS, STRUCTURAL ELEVATIONS, CROSS SECTIONS, CONNECTION DETAILS, ETC.
      3) SUBMISSION SHALL INCLUDE AN ANCHOR ROD SETTING PLAN AND FRAME REACTION DIAGRAMS.
   g. SHEETING/SHORING/TEMPORARY BRACING.

E. FOUNDATION

1. DESIGN DATA
   a. FOUNDATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT PREPARED BY DAVID BLACKMORE & ASSOCIATES. INC., DATED 01/27/2026. REPORT PROJECT NO. 5779G1R1.
   b. ALL FOUNDATIONS HAVE BEEN DESIGNED FOR AN ALLOWABLE NET BEARING PRESSURE OF 3,000 PSF. IT SHALL BE THE OWNER'S RESPONSIBILITY TO SECURE AND PAY FOR THE SERVICES OF A GEOTECHNICAL ENGINEER FOR FIELD VERIFICATION OF THE SOIL BEARING PRESSURES. BEARING CAPACITY OF THE SOIL SHALL BE INSPECTED AND APPROVED BY THE GEOTECHNICAL ENGINEER IMMEDIATELY PRIOR TO CONCRETE PLACEMENT. SHOULD THE SOIL BEARING PRESSURE BE FOUND TO BE LESS THAN 3,000 PSF, THE OWNER SHALL IMMEDIATELY NOTIFY THE ARCHITECT AND STRUCTURAL ENGINEER.
   c. ALL EXTERIOR FOUNDATIONS SHALL BEAR A MINIMUM OF 3'-0" BELOW FINISHED GRADE. IN CASE OF CONFLICT, NOTIFY THE STRUCTURAL ENGINEER IN ADVANCE OF ANY CONSTRUCTION TO ALLOW FOR ADJUSTMENT. FOOTINGS SHALL BEAR ON APPROVED UNDISTURBED MATERIAL OR STRUCTURAL FILL.
2. GENERAL
   a. SEE THE PROJECT SPECIFICATIONS AND GEOTECHNICAL ENGINEERING REPORT FOR EXCAVATION AND SUBGRADE PREPARATION REQUIREMENTS, INCLUDING COMPACTION PROCEDURES. REQUIREMENTS CONTAINED IN THE GEOTECHNICAL ENGINEERING REPORT ARE PART OF THIS WORK.
   b. ALL EXCAVATION, BACKFILLING AND STRUCTURAL FILL PLACEMENT OPERATIONS BENEATH THE BUILDING SLAB AND FOUNDATIONS, AND ALL COMPACTION TESTS AND INSPECTIONS SHALL BE DONE UNDER THE DIRECTION AND SUPERVISION OF A LICENSED PROFESSIONAL GEOTECHNICAL ENGINEER. ALL FILL MATERIAL, COMPACTION EQUIPMENT AND PROCEDURES SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PERFORMING ANY EARTHWORK OPERATIONS.
   c. CONCRETE FOR FOUNDATIONS SHALL BE PLACED ON THE SAME DAY SUBGRADE APPROVAL IS GIVEN BY THE GEOTECHNICAL ENGINEER. SHOULD THE SOIL BEARING PRESSURE BE FOUND TO BE LESS THAN THE ALLOWABLE BEARING PRESSURES LISTED ABOVE, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE STRUCTURAL ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
   d. THE CONTRACTOR SHALL VERIFY ALL EXISTING FIELD CONDITIONS THAT MAY AFFECT THE INSTALLATION OF THE FOUNDATION SYSTEM AS SHOWN PRIOR TO STARTING WORK.
   e. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES. EXISTING STRUCTURES, ETC., WHETHER INDICATED OR NOT, WHICH MAY BE AFFECTED BY THE CONSTRUCTION PROCESS, SHOULD ANY DAMAGE TO SUCH UTILITIES OCCUR, THE CONTRACTOR SHALL BE REQUIRED TO REPAIR SUCH DAMAGE AT HIS OWN EXPENSE AND TO THE SATISFACTION OF THE OWNER.
   f. UTILITY LINES SHALL NOT BE PLACED THROUGH OR BELOW FOUNDATIONS WITHOUT THE STRUCTURAL ENGINEER'S APPROVAL. STEP FOUNDATIONS UNDER UTILITIES AS REQUIRED WHERE UTILITIES OCCUR.
   g. THE SLOPE BETWEEN THE LOWER EDGES OF ADJACENT FOUNDATIONS SHALL NOT EXCEED 45 DEGREES WITH THE HORIZONTAL UNLESS INDICATED OTHERWISE ON THE PLANS. MAINTAIN A 1:1 SLOPE FROM BOTTOM EDGE OF ANY EXCAVATION.
   h. FOLLOWING REQUIRED STRIPPING OPERATIONS, ANY PROOF ROLLING SHALL BE AS DIRECTED BY A QUALIFIED GEOTECHNICAL ENGINEER. THE PURPOSE FOR PROOF ROLLING WILL BE TO LOCATE ANY ISOLATED AREAS OF SOFT OR LOOSE SOILS REQUIRING IMPROVEMENT OR REPLACEMENT. SOFT AREAS SHALL BE UNDERCUT AND REPLACED BY PROPERLY COMPACTED MATERIALS AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
   i. ALL SHORING, SHEETING AND DEWATERING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL ENGAGE AN ENGINEER LICENSED IN THE PROJECT'S JURISDICTION TO DESIGN ALL SHEETING AND SHORING.
   j. SEE PLUMBING AND CIVIL DRAWINGS FOR UNDER SLAB AND PERIMETER DRAINAGE SYSTEMS (IF ANY).
3. BACKFILL
   a. ALL BACKFILL OPERATIONS SHALL BE PERFORMED IN HORIZONTAL LIFTS USING STRUCTURAL FILL MATERIAL APPROVED BY THE GEOTECHNICAL ENGINEER,

GENERAL STRUCTURAL NOTES

G. MASONRY

1. DESIGN CODES AND STANDARDS
   a. "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES, TMS 402" AND "SPECIFICATIONS FOR MASONRY STRUCTURES, TMS 602".

2. MATERIALS
   a. LOAD-BEARING CONCRETE
      HOLLOW AND SOLID CMU — ASTM C90, MINIMUM COMPRESSIVE STRENGTH ON NET AREA = 2,800 PSI
      CONCRETE BRICK — ASTM C55
   b. MORTAR — ASTM C270 - TYPE S (ABOVE GRADE) / ASTM C270 - TYPE M (BELOW GRADE AND RETAINING WALLS)
   c. GROUT — ASTM C476, MINIMUM COMPRESSIVE STRENGTH f'c AT 28 DAYS = 2,500 PSI; SLUMP, BETWEEN 8-11 INCHES IN ACCORDANCE WITH ASTM C1611
   d. DEFORMED REINFORCING BARS — ASTM A615, GRADE 60
   e. HORIZONTAL JOINT REINFORCING — ASTM A1064, ASTM A951
   f. ANCHORS AND TIES — ASTM A36, ASTM A82, ASTM A1064, ASTM A1008
   g. HOT-DIP GALVANIZED COATINGS
      JOINT REINFORCING, WIRE TIES AND ANCHORS — ASTM A153 (1.5 OZ/FT^2)
      SHEET METAL TIES AND ANCHORS, STEEL PLATES AND BARS — ASTM A153, CLASS B
   h. PRISM STRENGTH
      (UNIT STRENGTH METHOD) — F'm = 2,000 PSI (HOLLOW AND SOLID CMU)

3. GENERAL
   a. PROVIDE STANDARD WEIGHT LADDER TYPE GALVANIZED HORIZONTAL JOINT REINFORCEMENT IN WALLS AND PARTITIONS AT 16" O.C. UNLESS OTHERWISE SHOWN OR NOTED. PROVIDE ONE PIECE PREFABRICATED UNITS AT 8' O.C. AT ALL WALL CORNERS AND INTERSECTIONS. PROVIDE ADDITIONAL JOINT REINFORCING ABOVE AND BELOW ALL OPENINGS, EXTEND A MINIMUM OF 24" BEYOND EDGE OF OPENING.
   b. PROVIDE MASONRY ANCHORS AND TIES ON COURSING BETWEEN MASONRY CONSTRUCTION AND THE BUILDING STRUCTURE AS DETAILED ON THE DRAWINGS.
   c. PROVIDE BOND BEAMS WITH (2) #4 HORIZONTAL REINFORCEMENT CONTINUOUS IN ALL MASONRY WALLS AT EACH FRAMING LEVEL.
   d. ALL PIERS AND PARTITIONS SHALL BE BONDED OR ANCHORED TO ADJACENT MASONRY WALLS.
   e. IN GROUTED AND/OR REINFORCED MASONRY WALLS, USE MASONRY UNITS WITH CORES THAT ALIGN VERTICALLY TO PROVIDE CONTINUOUS UNOBSTRUCTED CELLS FOR GROUTING AND REINFORCING STEEL PLACEMENT.
   f. MAXIMUM GROUT LIFT SHALL BE 5'-0", UNLESS HIGH LIFT GROUTING PROCEDURES IN ACCORDANCE WITH TMS 402 ARE FOLLOWED.
   g. LAP SPLICES FOR DEFORMED REINFORCING BARS USED IN MASONRY CONSTRUCTION SHALL BE 48 BAR DIAMETERS.
   h. ALL WALL SECTIONS AND/OR PIERS LESS THAN 2 SQUARE FEET IN CROSS-SECTIONAL AREA SHALL BE FULLY GROUTED OR CONSTRUCTED WITH 100% SOLID MASONRY UNITS.
   i. SUBMIT GROUT MIX DESIGN AND MASONRY UNIT CERTIFICATIONS TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO PROCEEDING WITH THE WORK.
   j. ALL BLOCK CELLS BELOW SLAB ON GROUND, AT BEAM, LINTEL AND JOIST BEARING, AT BOND BEAMS, AT CHANGES IN WALL THICKNESS AND AT VERTICAL REINFORCING SHALL BE FILLED SOLID WITH GROUT.
   k. CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AND SUPPORT FOR ALL MASONRY WORK UNTIL PERMANENT CONSTRUCTION IS IN PLACE.
   l. SEE ARCHITECTURAL DRAWINGS FOR LOCATION OF MASONRY WALL MOVEMENT JOINTS.
   m. PROVIDE LINTELS OVER ALL MASONRY OPENINGS. LOOSE STEEL LINTELS SHALL BE AS FOLLOWS FOR EACH 4" OF WALL THICKNESS (UNLESS SHOWN OTHERWISE ON THE STRUCTURAL DRAWINGS):

OPENING WIDTH	ANGLE SIZE	BEARING LENGTH
UP TO 3'-0"	L5-1/2x3-1/2x5/16	6"
3'-1" TO 5'-0"	L5x3-1/2x5/16 (LLV)	6"
5'-1" TO 8'-0"	L6x3-1/2x5/16 (LLV)	8"

   ALL STEEL LINTELS USED IN EXTERIOR WALLS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123, U.N.O.

4. INSPECTION AND TESTING
   a. THE OWNER WILL ENGAGE A TESTING AND INSPECTION AGENCY IN ACCORDANCE WITH THE SPECIAL INSPECTION SECTION.
   b. ALL MASONRY MUST BE INSPECTED AND TESTED IN ACCORDANCE WITH THE QUALITY ASSURANCE LEVEL DEFINED BY THE BUILDING CODE, BY TMS 402/602 AND BY THE APPROVED AGENCY REFERENCED ABOVE.
   c. THE AGENCY SHALL MONITOR THE PROPORTIONING, MIXING AND CONSISTENCY OF THE MORTAR AND GROUT; THE PLACEMENT OF MORTAR, GROUT AND MASONRY UNITS; AND THE PLACEMENT OF REINFORCING STEEL FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS.

H. STRUCTURAL STEEL

1. DESIGN STANDARDS
   a. "STEEL CONSTRUCTION MANUAL", LATEST EDITION, AISC (INCLUDING "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS", AISC 360, "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", RCSC, "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", AISC.)
   b. "DETAILING FOR STEEL CONSTRUCTION", AISC.
   c. "STRUCTURAL WELDING CODE - STEEL", AWS D1.1.

2. MATERIALS
   a. W-SHAPES AND WTs — ASTM A992, Fy = 50 KSI
   b. CHANNELS, ANGLES AND PLATES — ASTM A36, Fy = 36 KSI
   c. STRUCTURAL TUBING (HSS) — ASTM A500, GRADE C, Fy = 50 KSI - RECTANGULAR
   d. HIGH STRENGTH BOLTS — ASTM F3125, GRADE A325, TYPE 1 (UNLESS NOTED OTHERWISE ON DRAWINGS)
   e. WASHERS AND NUTS — ASTM F436 AND ASTM A563
   f. ANCHOR RODS — ASTM F1554, GRADE 36 (UNLESS NOTED ON DRAWINGS)
   g. WELDING ELECTRODES — AWS A5.1 OR A5.5, E70XX
   h. EXPANSION BOLTS — HILTI KWIK BOLT 3, DEWALT/POWERS POWER-STUD+SD1 OR APPROVED EQUAL SUBMIT ICC-ES REPORT(S) FOR ANY PROPOSED EQUAL
   i. ADHESIVE ANCHORS — HILTI HIT HY200, DEWALT/POWERS AC 200+ OR HIT-HY270 ADHESIVE SYSTEM, DEWALT/POWERS AC100+GOLD ADHESIVE SYSTEM OR APPROVED EQUAL SUBMIT ICC-ES REPORT(S) FOR ANY PROPOSED EQUAL
   j. NON-SHRINK GROUT UNDER PLATES — MINIMUM COMPRESSIVE STRENGTH = 8,000 PSI

3. GENERAL
   a. THE CONTRACTOR SHALL DESIGN AND INSTALL ALL NECESSARY TEMPORARY SUPPORTS, GUYING AND OTHER BRACING TO PROVIDE LATERAL STABILITY OF THE STRUCTURE UNTIL ALL PERMANENT STRUCTURAL ELEMENTS, INCLUDING SHEAR WALLS AND BRACING ARE ATTACHED AND CAPABLE OF SUPPORTING LOADS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ERECTION PROCEDURES.
   b. ALL SHOP AND FIELD CONNECTIONS SHALL BE MADE WITH HIGH STRENGTH BOLTS OR WELDS. ALL HIGH STRENGTH BOLTS AND NUTS SHALL BE CLEARLY MARKED AS REQUIRED BY AISC SPECIFICATIONS. CONNECTIONS MADE WITH UNMARKED BOLTS AND NUTS WILL BE REJECTED.
   c. ALL ANCHOR ROD EMBEDDED ENDS SHALL BE HEADED OR DOUBLE-NUTTED. HOOK BOLTS ARE NOT ALLOWED. ANCHOR RODS SHALL BE FURNISHED WITH A36 PLATE WASHERS ON TOP OF THE BASE PLATE. MINIMUM WASHER SIZE AND THICKNESS SHALL BE AS SHOWN IN TABLE 14-2 OF THE AISC MANUAL.
   d. ALL STEEL AT AND BELOW FINISHED GRADE OR SLAB ON GROUND ELEVATION SHALL RECEIVE (2) COATS OF BITUMINOUS PAINT COMPLYING WITH ASTM D1187 OR BE ENCASED IN CONCRETE WHICH PROVIDES A MINIMUM 3" OF COVER.
   e. EXCEPT FOR STEEL ENCASED IN CONCRETE OR SPRAY-ON FIREPROOFING, ALL STEEL SHALL BE CLEANED (SSPC-SP3 FOR INTERIOR EXPOSURE AND SSPC-SP6 FOR EXTERIOR EXPOSURE) AND PAINTED WITH AN APPROVED CORROSION RESISTANT PRIMER. MASK OUT AREAS TO BE FIELD WELDED, AREAS AROUND BOLT HOLES AT SLIP CRITICAL CONNECTIONS, ETC. TOUCH-UP ALL FIELD WELDS AND ABRADED AREAS WITH SHOP PRIMER. PRIMER SHALL BE COMPATIBLE WITH FINAL FINISHES. COORDINATE WITH ARCHITECT.
   f. ALL STRUCTURAL STEEL THAT IS LOCATED IN EXTERIOR UNHEATED SPACES, INCLUDING STEEL DIRECTLY EXPOSED TO WEATHER, SHALL BE SSPC-SP6 CLEANED AND PAINTED WITH (3) COATS OF OIL BASE PAINT IN ACCORDANCE WITH SSPC-PS 1.09.
   g. ALL STRUCTURAL STEEL THAT IS SUBJECT TO WETTING WITH SALT-LADEN WATER OR OTHER MILD CHEMICAL ATTACK SHALL BE SSPC-SP6 CLEANED AND PAINTED WITH (3) COATS OF EPOXY PAINT IN ACCORDANCE WITH SSPC-PS 13.01. A URETHANE TOPCOAT SHALL BE PROVIDED FOR ALL STEEL EXPOSED TO VIEW.
   h. FABRICATE ARCHITECTURALLY EXPOSED STEEL IN ACCORDANCE WITH THE AISC CODE OF STANDARD PRACTICE, SECTION 10. USE MATERIALS SELECTED FOR BEST APPEARANCE. CUT, FIT, AND ASSEMBLE WORK WITH SMOOTH, SQUARE, AND COMPLETE CONTACT JOINTS. WELD ALL WORK CONTINUOUSLY; GRIND WELDS SMOOTH AND FLUSH TO MAKE SEAMS NOT VISIBLE AFTER PAINTING. PREPARE SURFACES TO COMPLY WITH SSPC-SP6 AND APPLY PRIMER WITHIN 24 HOURS OF CLEANING.
   i. THE GENERAL CONTRACTOR SHALL NOTIFY THE STRUCTURAL ENGINEER OF ANY FABRICATION OR ERECTION ERRORS OR DEVIATIONS AND RECEIVE WRITTEN APPROVAL BEFORE ANY FIELD CORRECTIONS ARE MADE.
   j. GAS CUTTING TORCHES SHALL NOT BE USED TO CORRECT FABRICATION ERRORS WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER.
   k. NO OPENINGS IN BEAMS SHALL BE PERMITTED WITHOUT THE WRITTEN PERMISSION OF THE STRUCTURAL ENGINEER.
   l. WELDING ELECTRODES, WELDING PROCESS, MINIMUM PREHEAT AND INTERPASS TEMPERATURES SHALL BE IN ACCORDANCE WITH THE AISC AND AWS SPECIFICATIONS. ANY STRUCTURAL STEEL DAMAGED IN WELDING IS TO BE REPLACED OR ACCEPTABLY REINFORCED AS ACCEPTABLE TO THE STRUCTURAL ENGINEER.
   m. WELDERS SHALL HAVE CURRENT EVIDENCE OF PASSING THE APPROPRIATE AWS QUALIFICATION TESTS. THE ENGINEER MAY REQUEST SUCH EVIDENCE AT ANY TIME DURING THE PROJECT.
   n. UNLESS OTHERWISE NOTED, ALL BOLTS SHALL BE TIGHTENED TO THE "SNUG TIGHT" CONDITION DEFINED AS THE TIGHTNESS ATTAINED BY EITHER A FEW IMPACTS OF AN IMPACT WRENCH, RESISTANCE TO A SUITABLE NON-IMPACTING WRENCH, OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH. THE SNUG TIGHT CONDITION MUST ENSURE THAT ALL PILES OF THE CONNECTED MATERIAL HAVE BEEN BROUGHT INTO FIRM CONTACT. PROVIDE WASHERS IN ACCORDANCE WITH THE RCSC SPECIFICATION.
   o. ALL BOLTS SUBJECT TO DIRECT TENSION OR DESIGNATED AS SC (SLIP CRITICAL) SHALL BE PRE-TENSIONED IN ACCORDANCE WITH THE SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS. PROVIDE WASHERS IN ACCORDANCE WITH THE RCSC SPECIFICATION.
   p. PROVIDE FRAMING FOR ALL ROOFTOP EQUIPMENT CURBS AND OPENINGS IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND TYPICAL DETAILS.
   q. SPLICING STRUCTURAL MEMBERS WHERE NOT DETAILED ON THE DRAWINGS IS PROHIBITED WITHOUT PRIOR APPROVAL OF THE STRUCTURAL ENGINEER.

4. INSPECTION AND TESTING
   a. THE OWNER WILL ENGAGE A TESTING AND INSPECTION AGENCY IN ACCORDANCE WITH THE SPECIAL INSPECTION SECTION.
   b. MINIMUM REQUIREMENTS:
      1) VISUALLY INSPECT ALL FILLET WELDS, BOLTED CONNECTIONS.
      2) THE AGENCY SHALL MONITOR THE INSTALLATION OF BOLTS REQUIRING PRE-TENSIONING FOR CONFORMANCE WITH SPECIFIC PRE-CALIBRATED TIGHTENING PROCEDURES.
      3) 10% OF ALL FIELD FILLET WELDS IN PRIMARY CONNECTIONS AND MULTI-PASS WELDS SHALL BE TESTED BY THE MAGNETIC PARTICLE METHOD.
      4) TEST ANY WELD WHICH VISUAL EXAMINATION INDICATES AN UNUSUAL CONDITION AND/OR POOR QUALITY.
      5) WELDING INSPECTION AND TESTING PROCEDURES SHALL BE IN ACCORDANCE WITH THE AWS CODE.

I. STEEL JOISTS

1. DESIGN STANDARDS
   a. "STANDARD SPECIFICATIONS FOR OPEN WEB STEEL, K-SERIES JOISTS," STEEL JOIST INSTITUTE (SJI).

2. GENERAL
   a. DESIGN AND FABRICATE OPEN WEB JOISTS IN ACCORDANCE WITH THE LATEST EDITION OF THE SJI SPECIFICATIONS. DESIGN OF JOISTS SHALL BE BY THE JOIST SUPPLIER FOR THE UNIFORM LOADS INDICATED IN THE SJI STANDARD LOAD TABLES, UNLESS NOTED OTHERWISE. SEE "DELEGATED DESIGN SUBMITTALS" SECTION FOR DESIGN AND SUBMITTAL REQUIREMENTS.
   b. SPECIAL JOISTS, WHERE NOTED ON PLANS, SHALL BE DESIGNED FOR THE LOADS INDICATED ON THE LOAD DIAGRAMS SHOWN ON THE PLANS.
   c. DESIGN AND INSTALL BRIDGING PER SJI'S REQUIREMENTS. BRIDGING SHALL BE WELDED OR BOLTED AND ANCHORED AT END WALLS OR BEAMS, ALL BRIDGING, BRIDGING ANCHORS AND JOIST SEATS SHALL BE COMPLETELY INSTALLED PRIOR TO THE APPLICATION OF ANY CONSTRUCTION LOADS.
   d. DESIGN ROOF JOISTS FOR NET WIND UPLIFT SHOWN IN DESIGN LOADS. PROVIDE BRIDGING AT THE FIRST BOTTOM CHORD PANEL POINT FROM SUPPORT. PROVIDE ADDITIONAL BRIDGING AS REQUIRED BY THE JOIST MANUFACTURER.
   e. ALL JOIST SEATS SHALL BE DESIGNED TO TRANSFER A ROLLOVER REACTION OF 1.0 KIP FROM THE ROOF DIAPHRAGM TO THE SUPPORTING STRUCTURE.
   f. STEEL JOISTS SHALL BE SHOP PAINTED WITH AN APPROVED CORROSION RESISTANT PRIMER. ALL STEEL SHALL BE PAINTED IN STRICT ACCORDANCE WITH THE SPECIFICATIONS AND PAINT MANUFACTURER'S RECOMMENDATIONS. PRIOR TO PAINTING, ALL STEEL SURFACES SHALL BE PREPARED IN ACCORDANCE WITH SSPC-SP3. ALL PRIMER SHALL BE APPROVED BY THE ARCHITECT PRIOR TO THEIR USE.
   g. STEEL JOISTS SHALL HAVE DOUBLE ANGLE TOP AND BOTTOM CHORDS.
   h. CAMBER JOISTS PER SJI STANDARDS. UNLESS OTHERWISE NOTED. PROVIDE ZERO CAMBER WHERE JOISTS ARE LOCATED ADJACENT TO PARALLEL WALLS AND/OR ADJACENT NON-CAMBERED STRUCTURAL MEMBERS.
   i. ATTACH CONCENTRATED LOADS TO JOISTS AT PANEL POINTS ONLY OR AS DETAILED ON THE STRUCTURAL DRAWINGS.
   j. FOR ALL JOISTS ON COLUMN LINES, EXTEND BOTTOM CHORD TO STABILIZER PLATE WELDED TO COLUMN. DO NOT WELD BOTTOM CHORD EXTENSIONS TO PLATE.
   k. DELIVER, STORE, HANDLE, AND ERECT JOISTS AS RECOMMENDED IN SJI'S SPECIFICATIONS.
   l. PROTECT JOISTS FROM CORROSION, DEFORMATION AND OTHER DAMAGE DURING DELIVERY, STORAGE AND HANDLING.
   m. EQUIP BEARING ENDS OF JOIST WITH MANUFACTURER'S STANDARD BEVELED ENDS OR SLOPED SHOES IF JOIST SLOPE EXCEEDS 1/4" PER 12".
   n. SUPPLY MISCELLANEOUS ACCESSORIES, INCLUDING SPLICE PLATES AND BOLTS REQUIRED BY JOIST MANUFACTURER TO COMPLETE JOIST INSTALLATION.
   o. SHOP DRAWINGS: SHOW LAYOUT, MARK, NUMBER TYPE, LOCATION AND SPACINGS OF JOISTS. INCLUDE JOINING AND ANCHORAGE DETAILS, BRACING, BRIDGING, ACCESSORIES, SPLICE AND CONNECTION LOCATIONS AND DETAILS, AND ATTACHMENTS TO OTHER CONSTRUCTION.

J. STEEL DECK

1. DESIGN STANDARDS
   a. LATEST EDITION OF THE STEEL DECK INSTITUTE (SDI) ROOF DECK DESIGN MANUAL AND FLOOR DECK DESIGN MANUAL.
   b. "STRUCTURAL WELDING CODE - SHEET STEEL", AWS D1.3

2. MATERIALS
   a. STEEL DECK UNITS AND ACCESSORIES SHALL BE FABRICATED FROM STEEL CONFORMING TO ASTM A653 OR ASTM A1008. THE STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI

3. GENERAL
   a. DECKING SHALL MEET SDI'S MINIMUM SECTION PROPERTY REQUIREMENTS.
   b. ALL FLOOR DECK AND ACCESSORIES SHALL BE GALVANIZED.
   c. ALL ROOF DECK AND ACCESSORIES SHALL BE GALVANIZED.
   d. INSTALL IN ACCORDANCE WITH SDI SUGGESTED SPECIFICATIONS UNLESS NOTED OTHERWISE ON THE DRAWINGS. INDIVIDUAL SHEETS SHALL EXTEND OVER AT LEAST THREE SUPPORTS (TWO-SPAN CONDITION), WITH LAPS TO BE PLACED OVER SUPPORTS. MINIMUM LAP AND END BEARING TO BE 2".
   e. EXCEPT WHERE NOTED ON THE PLANS, DECK SUPPLIER SHALL PROVIDE ALL ADDITIONAL FRAMING TO SUPPORT DECK AT OPENINGS THROUGH DECK AND ALL CLOSURE ANGLES, PLATES, POURSTOPS, END CLOSURES, ETC. WHERE REQUIRED TO RESULT IN A COMPLETE INSTALLATION.
   f. PROVIDE STEEL LEDGER ANGLE 2-1/2x2-1/2x1/4 AROUND COLUMNS AS REQUIRED TO SUPPORT METAL DECKING.
   g. UNLESS NOTED OTHERWISE ON THE DRAWINGS, ROOF AND NON-COMPOSITE FLOOR DECKS SHALL BE WELDED TO STEEL SUPPORTS, INCLUDING THE EDGE SUPPORT PARALLEL TO THE DECK SPAN WITH 5/8" DIA. (EFFECTIVE FUSION DIAMETER) PUDDLE WELDS AT 12" O.C. FASTEN SIDELAPS WITH #10 SELF-TAPPING SCREWS AT MIDSPAN OR 36," WHICHEVER DISTANCE IS SMALLER.
   h. COMPOSITE FLOOR DECKS SHALL BE WELDED TO ALL SUPPORTS INCLUDING THE EDGE SUPPORT PARALLEL TO THE DECK SPAN WITH 5/8" DIA. (EFFECTIVE FUSION DIAMETER) PUDDLE WELDS OR HEADED SHEAR STUD WELDS AT 12" O.C. FASTEN SIDELAPS WITH #10 SELF-TAPPING SCREWS AT MIDSPAN OR 36", WHICHEVER DISTANCE IS SMALLER. HEADED STUDS SHALL BE FIELD INSTALLED BY WELDING THROUGH THE METAL DECK. REMOVE FERRULES FROM THE DECK BEFORE CONCRETE IS PLACED.
   i. USE WELDING WASHERS FOR DECK MATERIAL LESS THAN 22 GAGE AND WHERE RECOMMENDED BY THE DECK MANUFACTURER.
   j. ALL WELDS AND BURN AREAS SHALL BE CLEANED AND PAINTED WITH AN APPROVED ZINC RICH REPAIR PAINT IN ACCORDANCE WITH ASTM A780.
   k. CONTRACTOR SHALL REVIEW CONCRETE PLACEMENT METHOD AND CONSTRUCTION LIVE LOADS WITH METAL DECK SUPPLIER TO CONFIRM MAXIMUM UNSHORED DECK SPANS.
   l. SHOP DRAWINGS: SHOW LOCATION OF DECK UNITS AND PANEL LAYOUT, ANCHORAGE DETAILS AND PATTERN, POURSTOPS AND CLOSURES, SUMP PANS, CUT OPENINGS AND ACCESSORIES, AND OTHER INFORMATION REQUIRED TO DESCRIBE A THOROUGH INSTALLATION.

K. PRE-ENGINEERED METAL BUILDING FRAMING

1. DESIGN STANDARDS
   a. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS", AISC 360.
   b. "NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD FORMED STEEL STRUCTURAL MEMBERS", AISI-NAS.
   c. "METAL BUILDING SYSTEMS MANUAL", MBMA.

2. MATERIALS
   a. HEADED ANCHOR RODS — ASTM F1554 GRADE 36

3. GENERAL
   a. THE PRE-ENGINEERED METAL BUILDING SYSTEM SHALL BE DESIGNED, FABRICATED AND ERECTED BY THE CONTRACTOR AND THEIR METAL BUILDING SYSTEMS SUPPLIER.
   b. PROVIDENCE IS THE STRUCTURAL ENGINEER OF RECORD (SEOR) FOR THE OVERALL BUILDING INCLUDING THE MEZZANINE. SEE "DELEGATED DESIGN SUBMITTALS" SECTION FOR DESIGN AND SUBMITTAL REQUIREMENTS. BUILDING FRAMES SHALL MEET THE PROFILE AND DIMENSIONS INDICATED ON THE DRAWINGS.
   c. ALL COLUMNS SHALL BE DESIGNED AS HAVING "PINNED" BASES.
   d. METAL BUILDING SYSTEMS FRAME AND MEMBER DEFLECTION REQUIREMENTS SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF THE AISC STEEL DESIGN GUIDE SERIES 3 - "SERVICEABILITY DESIGN CONSIDERATIONS FOR LOW-RISE BUILDINGS", UNLESS OTHERWISE NOTED ON DRAWINGS OR IN SPECIFICATIONS.
   e. ANCHOR RODS SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR CONFORMING TO THE ANCHOR ROD SETTING PLAN PREPARED BY THE METAL BUILDING SYSTEMS MANUFACTURER. ANCHOR RODS SHALL HAVE THE MINIMUM EMBEDMENT INDICATED IN THE CONTRACT DOCUMENTS.
   f. THE CONTRACTOR SHALL SUBMIT METAL BUILDING FRAME REACTIONS FOR REVIEW BY THE STRUCTURAL ENGINEER. THE STRUCTURAL ENGINEER WILL THEN VERIFY ALL PIER AND FOOTING SIZE REQUIREMENTS WITH THE INFORMATION SHOWN ON THE DRAWINGS FOR BIDDING AND MAKE ALL NECESSARY ADJUSTMENTS TO THE FOUNDATION DESIGN. FOUNDATION SHOP DRAWINGS WILL NOT BE REVIEWED AND NO FOUNDATIONS ARE TO BE PLACED PRIOR TO THE ENGINEER'S REVIEW OF THE FINAL COLUMN REACTIONS FROM THE METAL BUILDING SUPPLIER.
   g. FOUNDATION CONTRACTOR SHALL VERIFY COLUMN BASE LOCATIONS AND SIZES WITH FINAL METAL BUILDING SHOP DRAWINGS PRIOR TO PLACING FOUNDATIONS.

L. SPECIAL INSPECTION

1. SPECIAL INSPECTION SHALL BE PROVIDED IN ACCORDANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE.
2. THE OWNER SHALL EMPLOY SPECIAL INSPECTORS TO PERFORM INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THIS SECTION AND AS REQUIRED BY THE CODE. THE SPECIAL INSPECTORS SHALL BE QUALIFIED PERSONS COMPETENT FOR INSPECTION OF CONSTRUCTION AND CONSTRUCTION OPERATIONS REQUIRING SPECIAL INSPECTIONS, AND WHOSE QUALIFICATIONS SATISFY THE REQUIREMENTS OF THE LOCAL BUILDING OFFICIAL OF THE JURISDICTION.
3. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE SPECIAL INSPECTOR(S) FOR ITEMS REQUIRING SPECIAL INSPECTIONS. THE CONTRACTOR SHALL PROVIDE ACCESS TO THE SITE, ADEQUATE NOTICE FOR SCHEDULING AND ACCESS TO APPROVED PLANS IN ORDER TO GIVE THE SPECIAL INSPECTOR(S) TIME TO PREPARE FOR INSPECTIONS.
4. SPECIAL INSPECTIONS REPORTS SHALL BE FURNISHED TO THE ARCHITECT, STRUCTURAL ENGINEER, CONTRACTOR, AND BUILDING CODE OFFICIAL.
   a. WORK IN VARIANCE WITH THE CONTRACT DOCUMENTS SHALL BE REPORTED IMMEDIATELY TO THE CONTRACTOR FOR TIMELY CORRECTIVE ACTION.
   b. WORK REMAINING IN VARIANCE WITH THE CONTRACT DOCUMENTS, OR WORK COVERED WITH OTHER MATERIALS PRIOR TO THE SPECIAL INSPECTOR'S CONFIRMATION, SHALL BE REPORTED TO THE ARCHITECT, STRUCTURAL ENGINEER, CONTRACTOR, AND BUILDING CODE OFFICIAL.
   c. IF THE CONTRACTOR COVERS UNINSPECTED WORK, REMOVAL OF SUCH MATERIALS AT THE CONTRACTOR'S COST WILL BE REQUIRED IN ORDER FOR INSPECTIONS TO BE PROPERLY COMPLETED.
   d. WHEN INSPECTIONS ARE COMPLETE, THE SPECIAL INSPECTOR SHALL SUBMIT A FINAL REPORT STATING THAT STRUCTURAL WORK WAS, TO THE BEST OF THE SPECIAL INSPECTOR'S KNOWLEDGE, COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
5. REQUIRED SPECIAL INSPECTIONS AND REQUIRED FREQUENCY ARE DESIGNATED IN THE SCHEDULE BELOW.

SPECIAL INSPECTION SCHEDULE

DESCRIPTION	EXTENT	REFERENCED STANDARD
SOIL BEARING CAPACITY	CONTINUOUS	GEOTECHNICAL ENGINEER REQUIREMENTS
EXCAVATION DEPTH AND BEARING MATERIAL	CONTINUOUS	GEOTECHNICAL ENGINEER REQUIREMENTS
CLASSIFICATION / TESTING COMPACTED FILL	CONTINUOUS	GEOTECHNICAL ENGINEER REQUIREMENTS
MATERIALS, DENSITY, LIFT THICKNESS OF COMPACTED FILL	CONTINUOUS	GEOTECHNICAL ENGINEER REQUIREMENTS
SUBGRADE PREPARATION	CONTINUOUS	GEOTECHNICAL ENGINEER REQUIREMENTS
CONCRETE MIX DESIGN	PERIODIC	ACI
CONCRETE FORMWORK	PERIODIC	ACI
HOT AND COLD WEATHER CONCRETE PLACEMENT REQUIREMENTS	CONTINUOUS	ACI
EMBEDDED ANCHOR BOLT INSTALLATION IN CONCRETE	PERIODIC	ACI
POST-INSTALLED ANCHOR BOLT INSTALLATION IN CONCRETE	CONTINUOUS	ACI
CONCRETE REINFORCING STEEL PLACEMENT (EXCEPT SLAB-ON-GROUND)	PERIODIC	ACI
CAST-IN-PLACE CONCRETE. PLACEMENT	PERIODIC	ACI
REINFORCING STEEL PLACEMENT IN GROUTED MASONRY	PERIODIC	TMS
MASONRY GROUT PLACEMENT	PERIODIC	TMS
HOT AND COLD WEATHER MASONRY PLACEMENT REQUIREMENTS	CONTINUOUS	TMS
EMBEDDED ANCHOR BOLT INSTALLATION IN GROUTED MASONRY	PERIODIC	TMS
POST-INSTALLED ANCHOR BOLT INSTALLATION IN GROUTED MASONRY	CONTINUOUS	TMS
STEEL JOIST END CONNECTIONS	PERIODIC	SJI
STEEL JOIST BRIDGING	PERIODIC	SJI
STRUCTURAL STEEL FABRICATION	PERIODIC	AISC
STRUCTURAL STEEL INSTALLATION	PERIODIC	AISC
HIGH-STRENGTH BOLT INSTALLATION, FIELD AND SHOP	PERIODIC	AISC
WELDING, FIELD AND SHOP	PERIODIC	AISC, AWS
STEEL ROOF DIAPHRAGM FASTENING	PERIODIC	SDI
STEEL FLOOR DIAPHRAGM FASTENING	PERIODIC	SDI

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10/01/2026

EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING, PA 19606

PROJECT NUMBER: 25-049

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GENERAL STRUCTURAL NOTES

SHEET
S002

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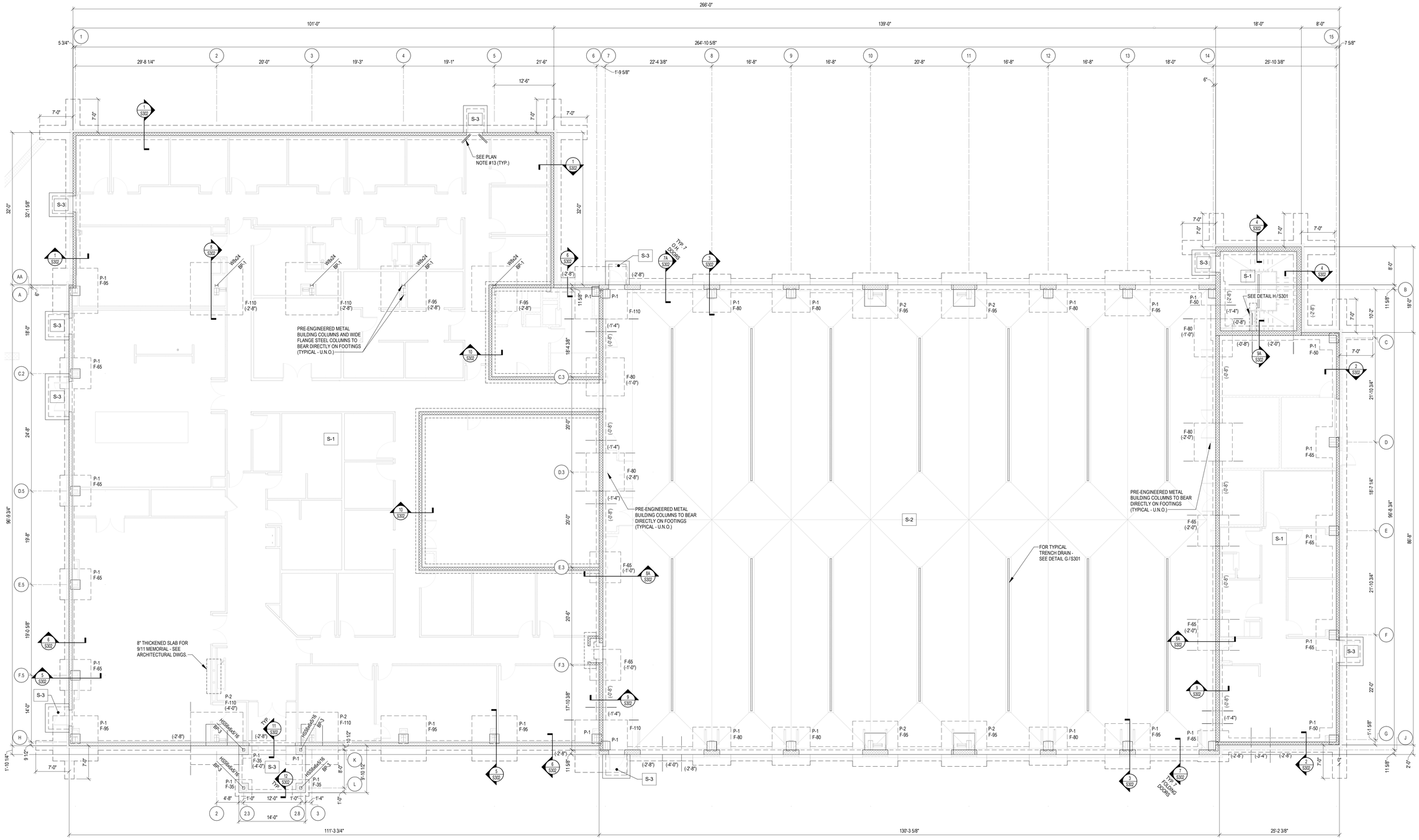


FOUNDATION PLAN

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

PLAN NORTH

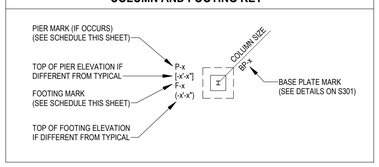
PLAN NOTES

1. TOP OF SLAB ELEVATION = (254.00') = REFERENCE ELEVATION (0'-0") UNLESS NOTED. CONTRACTOR TO FIELD VERIFY.
2. ALL ELEVATIONS INDICATED ON THE DRAWINGS ARE TAKEN FROM REFERENCE ELEVATION.
3. (-x'-x") INDICATES TOP OF FOOTING ELEVATION. STEP FOOTING AS REQUIRED PER DETAIL D / S301
4. TOP OF INTERIOR FOOTING ELEVATION = (-1'-0") UNLESS NOTED.
5. TOP OF EXTERIOR FOOTING ELEVATION = (-2'-8") UNLESS NOTED.
6. TOP OF PIER ELEVATION = [-1'-0"] UNLESS NOTED.
7. ALL PIERS, COLUMNS AND FOOTINGS SHALL BE CENTERED ON COLUMN LINES UNLESS DIMENSIONED OR DETAILED OTHERWISE.
8. SEE S001 AND S002 FOR GENERAL STRUCTURAL NOTES.
9. REFER TO ARCHITECTURAL DRAWINGS FOR HOUSEKEEPING PADS, FLOOR SLOPES, FLOOR RECESSES, SLAB INSERTS AND DETAILS, ETC. SEE MECHANICAL DRAWINGS FOR FLOOR DRAIN AND CLEANOUT LOCATIONS.
10. REFER TO ARCHITECTURAL DRAWINGS FOR EXTERIOR STOOP LAYOUT, DIMENSIONS AND LOCATIONS.
11. REFER TO SITE AND MEP DRAWINGS FOR UNDERGROUND UTILITY LOCATIONS. COORDINATE FOUNDATION INSTALLATION WITH UTILITIES. STEP FOOTING AS REQUIRED. SEE DETAIL E / S301
12. S-x - INDICATES SLAB TYPE. SEE FLOOR SLAB LEGEND ON THIS SHEET.
13. PROVIDE ADDITIONAL SLAB REINFORCING AT RE-ENTRANT CORNERS (TYPICAL). SEE DETAIL C / S301

FLOOR SLAB SCHEDULE

MARK	DESCRIPTION
S-1	4" THICK CONCRETE SLAB REINFORCED WITH 6x6-W1.4xW1.4 WWR ON 10 MIL BLACK POLYFILM VAPOR RETARDER ON 6" COMPACTED BASE COURSE
S-2	8" THICK CONCRETE SLAB REINFORCED WITH #3 BARS AT 18" O.C. E.W. ON 10 MIL BLACK POLYFILM VAPOR RETARDER ON 6" MIN. COMPACTED BASE COURSE
S-3	4" THICK AIR-ENTRAINED CONCRETE SLAB REINFORCED WITH 6x6-W1.4xW1.4 WWR ON 6" COMPACTED BASE COURSE

COLUMN AND FOOTING KEY



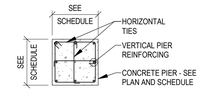
CONCRETE PIER SCHEDULE

PIER MARK	PIER SIZE WIDTH	PIER SIZE LENGTH	VERTICAL REINFORCEMENT	HORIZONTAL TIES	REMARKS
P-1	2'-0"	2'-0"	(8) #6 BARS	#3 BARS AT 8" O.C.	
P-2	4'-6"	4'-6"	(20) #6 BARS	#3 BARS AT 8" O.C.	

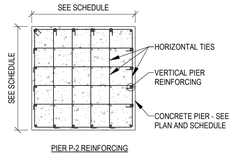
NOTE:
DOWEL ALL VERTICAL PIER REINFORCING INTO FOOTINGS.

CONCRETE FOOTING SCHEDULE

MARK	DIMENSIONS WIDTH	DIMENSIONS LENGTH	DIMENSIONS DEPTH	REINFORCEMENT
F-35	3' - 6"	3' - 6"	12"	(5) #4 BARS E.W. BOTTOM
F-50	5' - 0"	5' - 0"	16"	(4) #6 BARS E.W. TOP AND BOTTOM
F-65	6' - 6"	6' - 6"	16"	(6) #6 BARS E.W. TOP AND BOTTOM
F-80	8' - 0"	8' - 0"	20"	(6) #7 BARS E.W. TOP AND BOTTOM
F-95	9' - 6"	9' - 6"	20"	(7) #7 BARS E.W. TOP AND BOTTOM
F-110	11' - 0"	11' - 0"	22"	(7) #8 BARS E.W. TOP AND BOTTOM



PIER P-1 REINFORCING



PIER P-2 REINFORCING

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10/01/2026

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FOUNDATION PLAN

SHEET
S101

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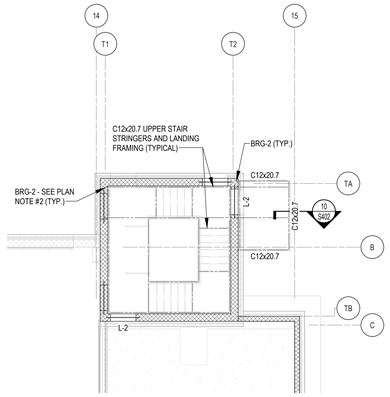


STAIR TOWER UPPER STAIR FRAMING PLAN

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

PLAN NORTH

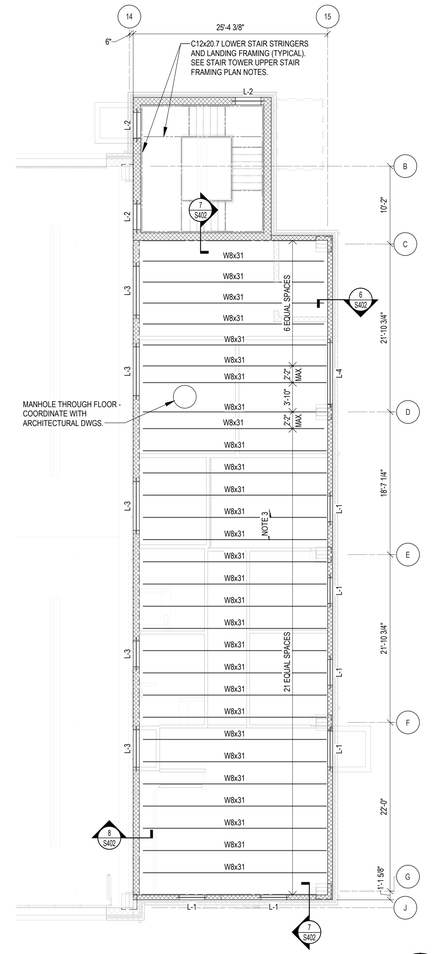
PLAN NOTES

1. BALCONY FRAMING TO BE INTERGRAL WITH STAIR STRINGER. MEMBER SIZES LISTED ARE FOR ESTIMATING PURPOSES ONLY. FINAL SIZES TO BE BY DELEGATED DESIGN ENGINEER.
2. BEARING PLATE OPTION FOR ESTIMATING PURPOSES ONLY. CONNECTION OF STAIR MEMBERS TO CMU TO BE BY DELEGATED DESIGN ENGINEER.
3. BALCONY FRAMING TO BE HOT DIP GALVANIZED AFTER FABRICATION.

LINTEL SCHEDULE

MARK	DESCRIPTION	BEARING (EACH END)	REMARKS
L-1	(2) L3 1/2x3 1/2x5/16	6" MIN.	
L-2	(3) L3 1/2x3 1/2x5/16	6" MIN.	
L-3	W8x18 WITH 3/8" THK. BOTTOM PLATE	8" MIN.	PLATE EXTENDS ACROSS MASONRY OPENING ONLY
L-4	GALV. W8x24 WITH 1/2" THK. BOTTOM PLATE	8" MIN.	PLATE EXTENDS ACROSS MASONRY OPENING ONLY
L-5	GALV. HSS12x10x5/16 (LSH) WITH C10x15.3	8" MIN.	SEE NOTE #1
L-5A	ARCHED W16x40 WITH 3/8" x 20"± W. BOTTOM PLATE AND PRECAST ARCHED STONE LINTEL PER MANUFACTURER DESIGN	8" MIN.	SEE NOTE #1 AND SEE ARCHITECTURAL DWGS. FOR ARCH CURVATURE AND PRECAST STONE CONFIGURATION

NOTE:
1. FOR LINTEL CONFIGURATION, SEE DETAIL J / S401
2. BUILD ALL MASONRY TIGHT AROUND LINTEL BEAMS AND ANCHOR WITH MASONRY TIES.



MEZZANINE FRAMING PLAN

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

PLAN NORTH

PLAN NOTES

1. TOP OF SLAB ELEVATION = (+10'-8") ABOVE REFERENCE ELEVATION (0'-0") UNLESS NOTED. CONTRACTOR TO FIELD VERIFY. COORDINATE WITH ARCHITECTURAL DWGS.
2. TOP OF STEEL (BOTTOM OF METAL DECK) ELEVATION IS (-0'-4") BELOW TOP OF FLOOR SLAB UNLESS NOTED (x'-x"). THIS IS THE REFERENCE ELEVATION FOR THIS PLAN.
3. STRUCTURAL SLAB TO BE 2 1/2" NORMAL WEIGHT CONCRETE OVER 1 1/2" DEEP x 22 GAGE GALVANIZED FORMDECK (NON-COMPOSITE DECK), TOTAL THICKNESS = 4", REINFORCED WITH 6x6-W1.4 x W1.4 WWF. SEE GENERAL STRUCTURAL NOTES AND DETAIL D / S401 FOR DECK ATTACHMENT REQUIREMENTS.
4. SEE S001 AND S002 FOR GENERAL STRUCTURAL NOTES.
5. COORDINATE SIZE AND LOCATION OF ALL OPENINGS AND SLEEVES WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS. SEE DETAIL A / S401
6. L-x - INDICATES LINTEL BELOW REFERENCE ELEVATION OF PLAN. SEE LINTEL SCHEDULE ON THIS SHEET AND MASONRY SECTION OF GENERAL STRUCTURAL NOTES.
7. BRG-x - INDICATES BEARING PLATE. SEE DETAIL E / S401. ALL BEARING PLATES TO BE BRG-1 (U.N.O.).

STRUCTURAL STEEL FRAMING KEY



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10/01/2026

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70 GIBRALTAR ROAD
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MEZZANINE FRAMING PLAN

SHEET
S201

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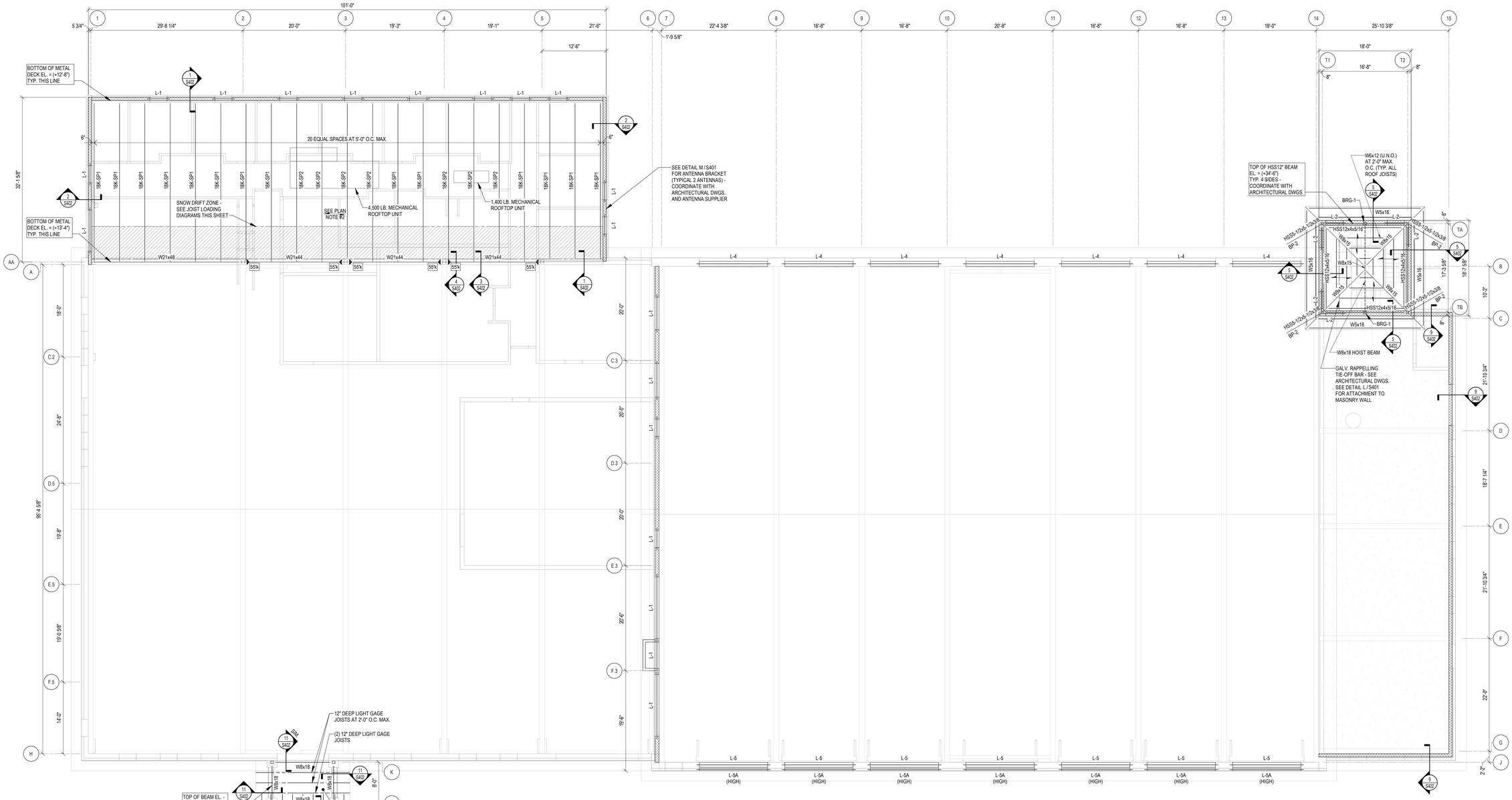


ROOF FRAMING PLAN

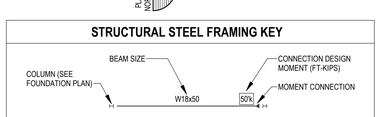
SCALE: 1/8" = 1'-0"

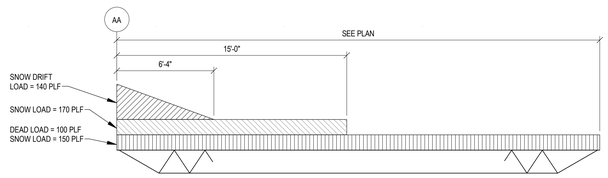
PLAN NORTH

PLAN NOTES

1. WHERE NOTED, BMD EL. = (+x'-x") INDICATES BOTTOM OF METAL DECK ELEVATION ABOVE REFERENCE ELEVATION (0'-0") UNLESS NOTED.
2. WHERE NOTED, ROOF DECK TO BE 1 1/2" DEEP, WIDE RIB, TYPE B, 22 GAGE GALVANIZED METAL DECK. SEE GENERAL STRUCTURAL NOTES AND DETAIL D / S401 FOR DECK ATTACHMENT REQUIREMENTS.
3. WHERE NOTED, ROOF SYSTEM TO BE LIGHT GAUGE FRAMED CONSTRUCTION WITH 22 GA., 9/16" DP. METAL FORMDECK BY DELEGATED ENGINEER. SEE ARCHITECTURAL DWGS.
4. ALL JOISTS (BEAMS) ARE SPACED EVENLY BETWEEN COLUMN LINES UNLESS NOTED.
5. SEE S001 AND S002 FOR GENERAL STRUCTURAL NOTES.
6. SEE DETAIL K / S401 FOR MOMENT FRAMES. SEE KEY THIS SHEET.
7. COORDINATE SIZE AND LOCATION OF ALL OPENINGS AND SLEEVES WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS. PROVIDE ROOF FRAMES FOR ALL OPENINGS > 10" DIAMETER. SEE DETAIL A / S401 . COORDINATE WITH OTHER TRADES.
8. REINFORCE JOISTS AT CONCENTRATED LOADS APPLIED BETWEEN PANEL POINTS. SEE DETAIL B / S401. COORDINATE WITH OTHER TRADES.
9. L-x - INDICATES LINTEL BELOW REFERENCE ELEVATION OF PLAN. SEE LINTEL SCHEDULE ON SHEET S201 AND MASONRY SECTION OF GENERAL STRUCTURAL NOTES.
10. BRG-x - INDICATES BEARING PLATE. SEE DETAIL E / S401 . ALL BEARING PLATES TO BE BRG-2 (U.N.O.).

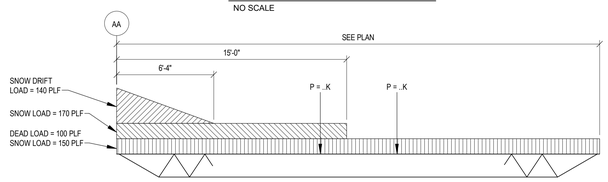
STRUCTURAL STEEL FRAMING KEY





18K-SP1 JOIST LOADING DIAGRAM

NO SCALE



18K-SP2 JOIST LOADING DIAGRAM

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ROOF FRAMING PLAN

SHEET

S202

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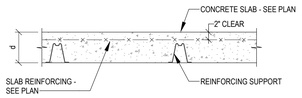
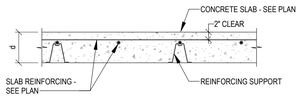
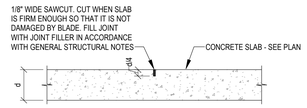


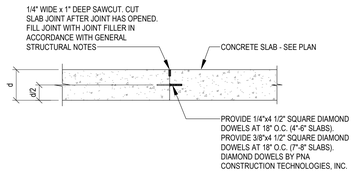
TYPICAL WWR REINFORCED SLAB SECTION



TYPICAL REINFORCING BAR REINFORCED SLAB SECTION



TYPICAL SAWCUT CONTRACTION JOINT



TYPICAL CONSTRUCTION JOINT

REINFORCEMENT NOTES:
1. REINFORCEMENT SHALL NOT CONTINUE THROUGH CONSTRUCTION JOINTS UNLESS OTHERWISE NOTED.

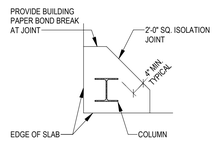
2. PLACE AND SUPPORT REINFORCEMENT PRIOR TO CONCRETE PLACEMENT TO MAINTAIN LOCATION. DURING CONCRETE PLACEMENT, SHOWN ON THESE DETAILS AND WITHIN TOLERANCES INDICTATED IN ACI 117. REINFORCEMENT SUPPORT SHALL CONFORM TO CRSI RB4.1.

3. CONCRETE BRICKS ARE NOT ACCEPTABLE FOR REINFORCING SUPPORT IN SLABS.

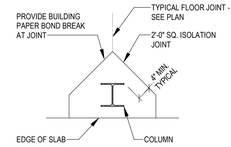
4. WWR W4.0/D4.0 AND SMALLER SHALL HAVE CONTINUOUS SUPPORT. THE CONTINUOUS SUPPORT SHALL NOT EXCEED 12 INCHES PERPENDICULAR TO THE DIRECTION OF SPAN.

5. IF VAPOR RETARDER/BARRIER IS PRESENT, REINFORCEMENT SUPPORTS SHALL NOT DAMAGE VAPOR RETARDER/BARRIER. PROVIDE CONTINUOUS PLATES ON BOTTOM OF BOLSTERS AND PROVIDE PLATES ON INDIVIDUAL CHAIRS.

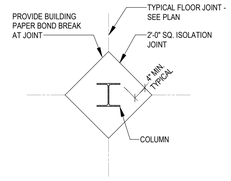
A	TYPICAL SLAB ON GROUND JOINTS
S301	NO SCALE



TYPICAL COLUMN AT CORNER OF BUILDING

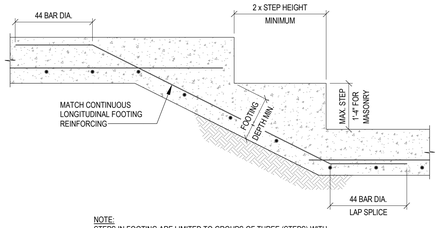


TYPICAL COLUMN AT EDGE OF BUILDING



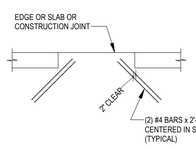
TYPICAL COLUMN AT CENTER OF SLAB

B	TYPICAL COLUMN ISOLATION JOINTS
S301	NO SCALE

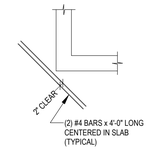


NOTE:
STEPS IN FOOTING ARE LIMITED TO GROUPS OF THREE (STEPS) WITH 8'-0" (MINIMUM) OF HORIZONTAL DISTANCE BETWEEN EACH GROUP.

D	TYPICAL STEPPED FOOTING
S301	NO SCALE



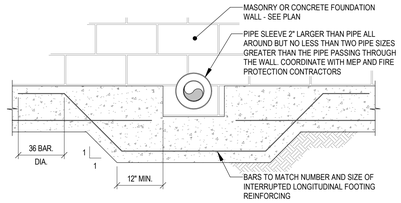
TYPICAL SLAB DETAIL AT WALL OPENING



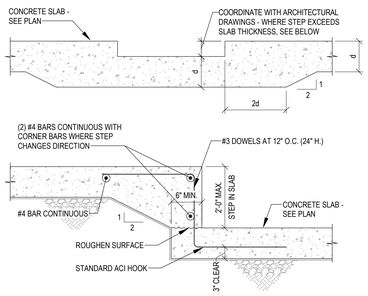
TYPICAL SLAB DETAIL AT RE-ENTRANT WALL CORNER

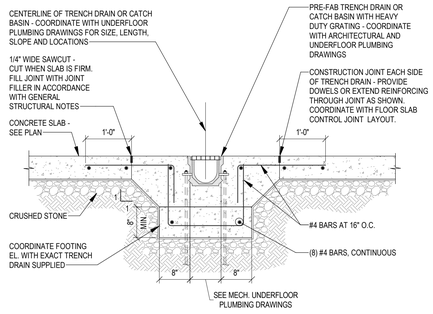
TYPICAL ADDITIONAL SLAB REINFORCING AT RE-ENTRANT CORNERS

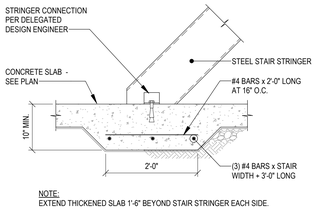
C	
S301	NO SCALE



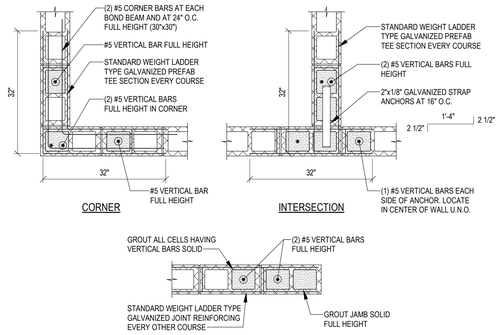
E	TYPICAL PIPE SLEEVE
S301	NO SCALE



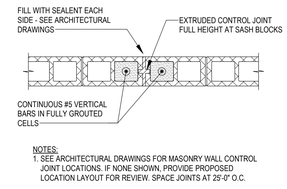




NOTE:
EXTEND THICKENED SLAB 1'-6" BEYOND STAIR STRINGER EACH SIDE.



NOTE:
SEE PLANS AND SECTIONS FOR MASONRY BOND BEAM AND VERTICAL WALL REINFORCING REQUIREMENTS. PROVIDE BOND BEAMS WITH CORNER BARS AND DOWELS AT INTERSECTING WALLS. ALL BOND BEAM REINFORCING SHALL BE CONTINUOUS THROUGH JOINTS.



NOTES:
1. SEE ARCHITECTURAL DRAWINGS FOR MASONRY WALL CONTROL JOINT LOCATIONS. IF NONE SHOWN, PROVIDE PROPOSED LOCATION LAYOUT FOR REVIEW. SPACE JOINTS AT 25'-0" O.C.

2. HORIZONTAL WIRE JOINT REINFORCEMENT DOES NOT EXTEND THROUGH JOINT.

3. ALL HORIZONTAL BOND BEAM REINFORCEMENT SHALL BE CONTINUOUS THROUGH JOINT.

F	TYPICAL RECESSED OR STEPPED SLAB-ON-GROUND
S301	NO SCALE

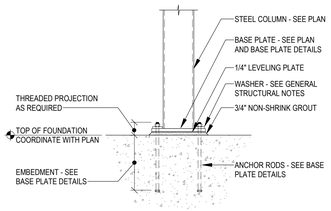
G	TYPICAL PRE-FAB TRENCH DRAIN
S301	NO SCALE

H	TYPICAL SLAB BASE AT STAIR
S301	NO SCALE

J	TYPICAL MASONRY WALL REINFORCING
S301	NO SCALE

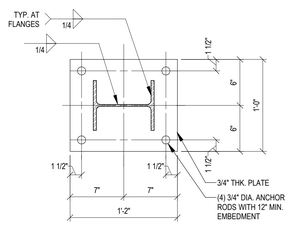
K	TYPICAL MASONRY WALL CONTROL JOINT
S301	NO SCALE

COLUMN BASE PLATES

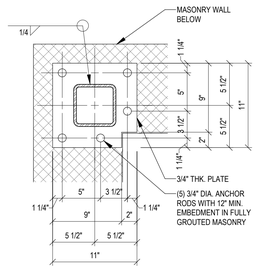


NOTE:
LEVELING NUTS WITH WASHERS MAY BE USED AT THE CONTRACTOR'S OPTION. PROVIDE 2"± NON-SHRINK GROUT BETWEEN BASE PLATE AND FOUNDATION.

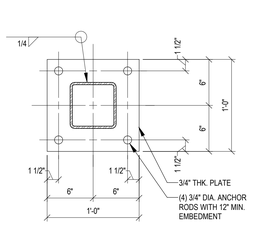
L	TYPICAL BASE PLATE
S301	NO SCALE



BASE PLATE BP-1



BASE PLATE BP-2



BASE PLATE BP-3

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Certificate Number: 3869

SEAL:
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
MICHELLE ELIZABETH BENOIT
NO. 087356
10/01/2026

EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING, PA 19606

PROJECT NUMBER: 25-049

SUBMISSION
BID SET

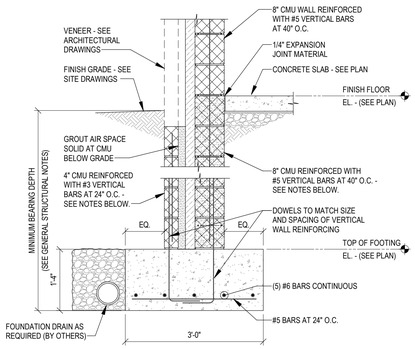
ORIGINAL ISSUE
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

FOUNDATION DETAILS

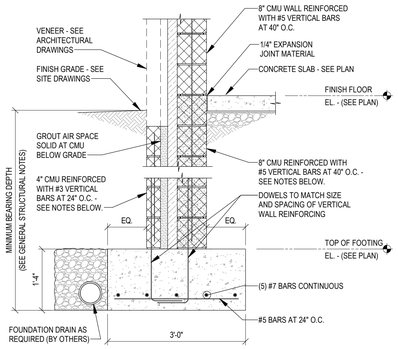
SHEET
S301

10/1/2026 4:45:35 PM



NOTES:
1. AT VERTICAL WALL REINFORCEMENT, GROUT ALL CELLS WITH REINFORCING SOLID AND PROVIDE 48 BAR DIAMETER LAP.
2. GROUT ALL CELLS SOLID BELOW GRADE.
3. WALL FOOTING REINFORCING TO BE CONTINUOUS THROUGH COLUMN FOOTINGS.

1 S302 SECTION
SCALE: 3/4" = 1'-0"



NOTES:
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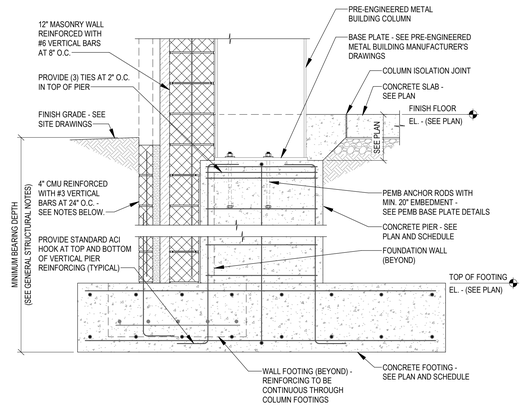
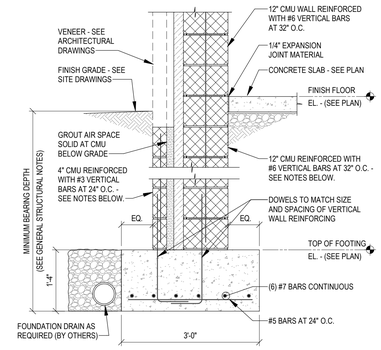
3. WALL FOOTING REINFORCING TO BE CONTINUOUS THROUGH COLUMN FOOTINGS.

2 S302 SECTION
SCALE: 3/4" = 1'-0"

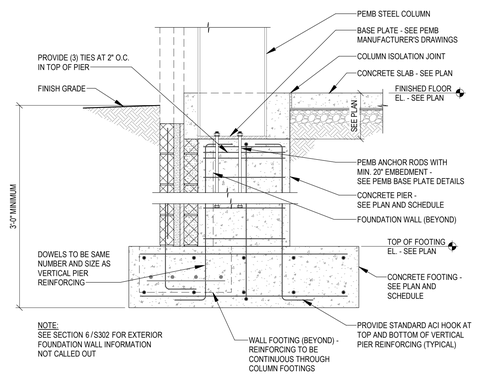


3 S302 SECTION
SCALE: 3/4" = 1'-0"



NOTES:
1. AT VERTICAL WALL REINFORCEMENT, GROUT ALL CELLS WITH REINFORCING SOLID AND PROVIDE 48 BAR DIAMETER LAP.
2. GROUT ALL CELLS SOLID BELOW GRADE.
3. WALL FOOTING REINFORCING TO BE CONTINUOUS THROUGH COLUMN FOOTINGS.

4 S302 SECTION
SCALE: 3/4" = 1'-0"



NOTE:
SEE SECTION 6 / S302 FOR EXTERIOR FOUNDATION WALL INFORMATION NOT CALLED OUT

5 S302 SECTION
SCALE: 3/4" = 1'-0"

NOTES:
1. AT VERTICAL WALL REINFORCEMENT, GROUT ALL CELLS WITH REINFORCING SOLID AND PROVIDE 48 BAR DIAMETER LAP.
2. GROUT ALL CELLS SOLID BELOW GRADE.
3. WALL FOOTING REINFORCING TO BE CONTINUOUS THROUGH COLUMN FOOTINGS.

6 S302 SECTION
SCALE: 3/4" = 1'-0"

NOTES:
1. AT VERTICAL WALL REINFORCEMENT, GROUT ALL CELLS WITH REINFORCING SOLID AND PROVIDE 48 BAR DIAMETER LAP.
2. GROUT ALL CELLS SOLID BELOW GRADE.
3. WALL FOOTING REINFORCING TO BE CONTINUOUS THROUGH COLUMN FOOTINGS.

7 S302 SECTION
SCALE: 3/4" = 1'-0"

NOTES:
1. AT VERTICAL WALL REINFORCEMENT, GROUT ALL CELLS WITH REINFORCING SOLID AND PROVIDE 48 BAR DIAMETER LAP.
2. GROUT ALL CELLS SOLID BELOW GRADE.
3. WALL FOOTING REINFORCING TO BE CONTINUOUS THROUGH COLUMN FOOTINGS.

7A S302 SECTION
SCALE: 3/4" = 1'-0"

8 S302 SECTION
SCALE: 3/4" = 1'-0"

8A S302 SECTION
SCALE: 3/4" = 1'-0"

9A S302

NOTES:
1. AT VERTICAL WALL REINFORCEMENT, GROUT ALL CELLS WITH REINFORCING SOLID AND PROVIDE 48 BAR DIAMETER LAP.
2. GROUT ALL CELLS SOLID BELOW GRADE.
3. WALL FOOTING REINFORCING TO BE CONTINUOUS THROUGH COLUMN FOOTINGS.

9 S302 SECTION
SCALE: 3/4" = 1'-0"

10 S302 SECTION
SCALE: 3/4" = 1'-0"

11 S302 SECTION
SCALE: 3/4" = 1'-0"

NOTES:
1. EXTERIOR CONCRETE TO BE AIR-ENTRAINED, SEE GENERAL STRUCTURAL NOTES.
2. SLOPE TO BE COORDINATED WITH SITE AND ARCHITECTURAL DRAWINGS.

12 S302 SECTION
SCALE: 3/4" = 1'-0"

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SEAL:

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — ENGINEER — MICHELLE ELIZABETH BENOIT — NO. 087356

10/01/2026

EXETER TOWNSHIP EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING, PA 19606

PROJECT NUMBER: 25-049

SUBMISSION
BID SET

ORIGINAL ISSUE
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

FOUNDATION SECTIONS

SHEET
S302

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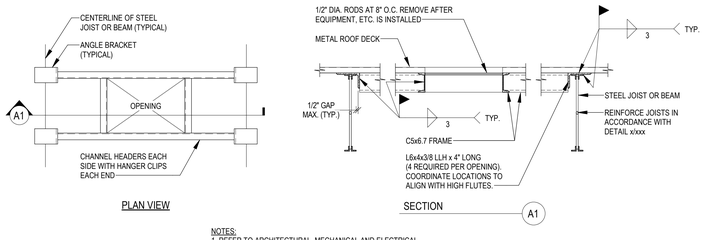
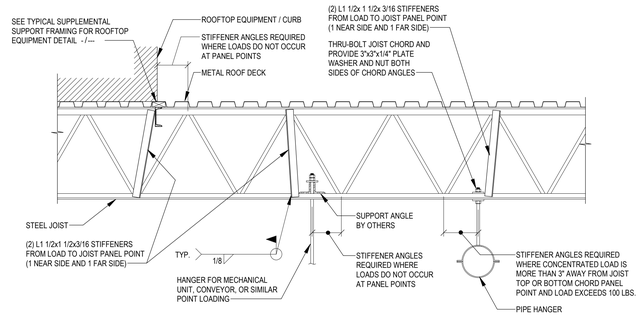
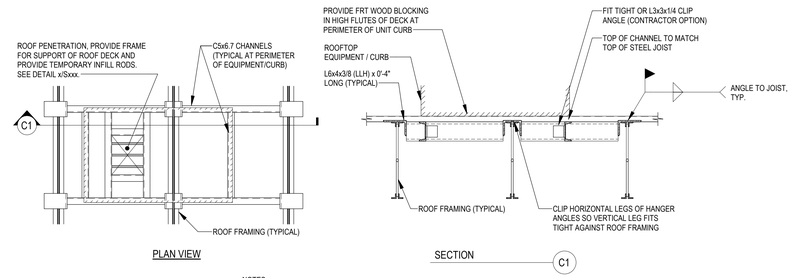


NOTES:
1. REFER TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR EXACT NUMBER, SIZE AND LOCATION. PROVIDE FRAMES FOR ALL OPENINGS GREATER THAN 10" DIAMETER.

A TYPICAL ROOF OPENING
S401 NO SCALE

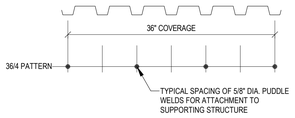


B TYPICAL JOIST REINFORCING
S401 NO SCALE



NOTES:
1. EQUIPMENT CONNECTIONS TO SUPPORTING STRUCTURE SHALL BE PROVIDED BY THE CONTRACTOR AND IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.

C TYPICAL SUPPLEMENTAL SUPPORT FRAMING FOR ROOFTOP EQUIPMENT
S401 NO SCALE



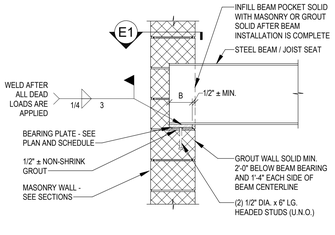
SIDELAP NOTES:

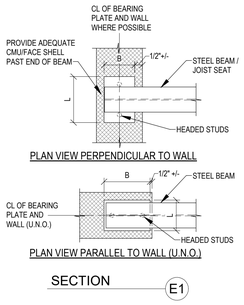
36/4 PATTERN	FASTEN SIDELAPS TOGETHER WITH (1) FASTENER BETWEEN EACH SUPPORT USING #10 SHEET METAL SCREWS

D TYPICAL DECK FASTENING
S401 NO SCALE

BEAM BEARING PLATE SCHEDULE

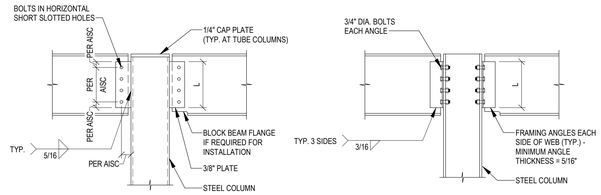
MARK	SIZE (BxL)	THICKNESS	REMARKS
BRG-1	6"x10"	1/2"	TYPICAL AT BEAMS
BRG-2	6"x8"	3/8"	TYPICAL AT JOISTS



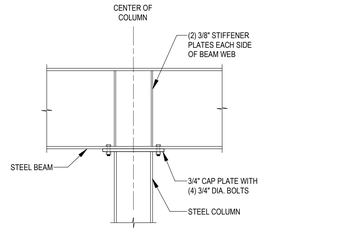


E TYPICAL BEARING PLATE DETAIL
S401 NO SCALE

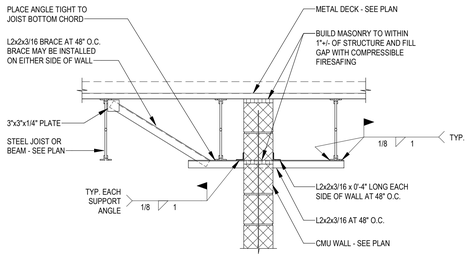
BEAM SIZE	'L'	NUMBER OF BOLTS
W6	5"	2
W8	6"	2
W21	15"	5

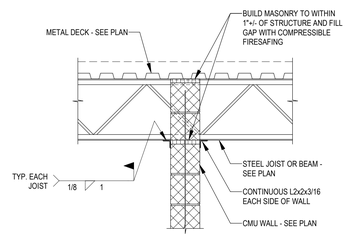


F TYPICAL BEAM CONNECTIONS
S401 NO SCALE

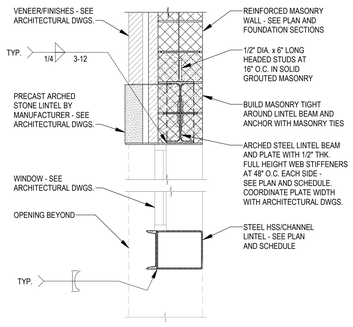


G TYPICAL BEAM OVER COLUMN CONNECTION
S401 NO SCALE

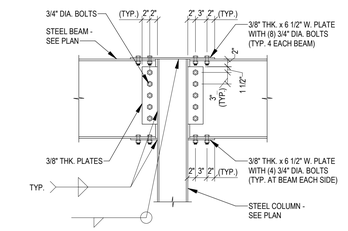




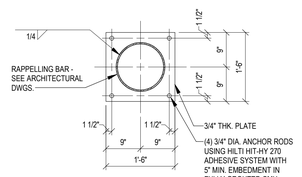
H TYPICAL MASONRY WALL BRACING
S401 NO SCALE



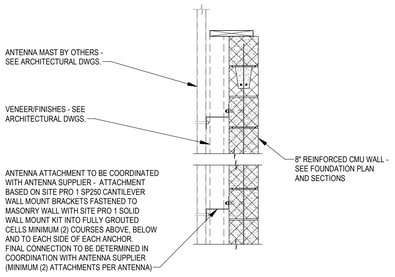
J TYPICAL APPARATUS BAY FOLDING DOOR LINTEL
S401 NO SCALE



K TYPICAL BEAM TO COLUMN MOMENT CONNECTION
S401 NO SCALE



L TOWER RAPPELLING BAR ATTACHMENT
S401 NO SCALE



M ANTENNA BRACKET ATTACHMENT
S401 NO SCALE

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COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
MICHELLE ELIZABETH BENOIT
NO. 081266
10/01/2026

EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING, PA 19606

PROJECT NUMBER: 25-049

SUBMISSION
BID SET

ORIGINAL ISSUE
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

STRUCTURAL DETAILS

SHEET
S401

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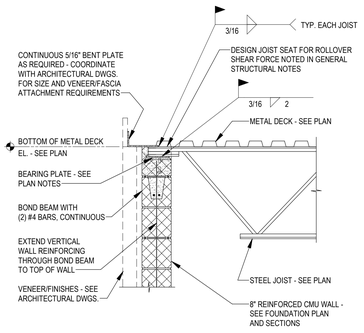

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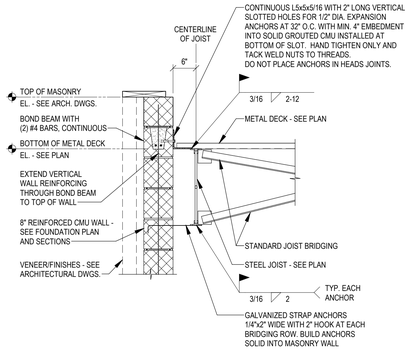

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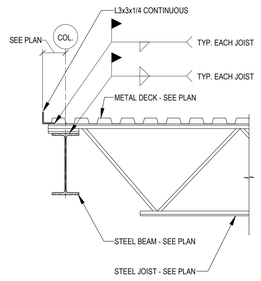

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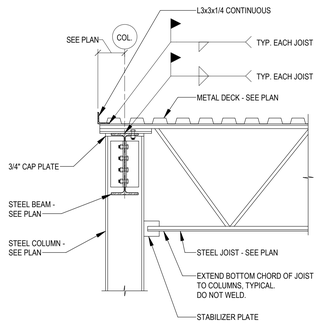

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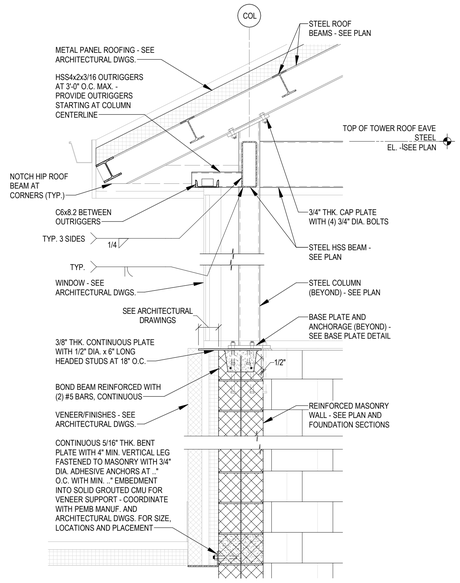

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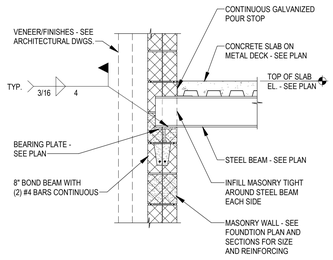

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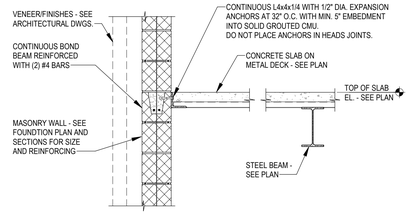

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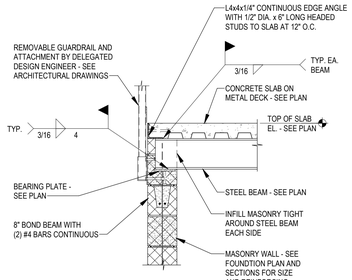

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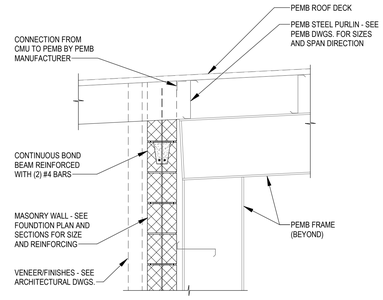

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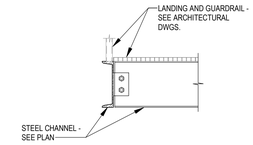

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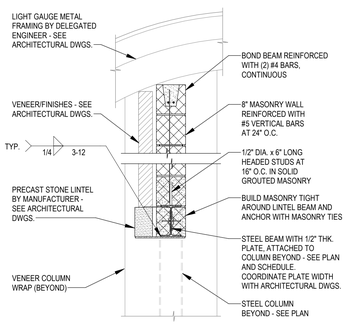

11 S402 SECTION
SCALE: 3/4" = 1'-0"

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STRUCTURAL SECTIONS

SHEET
S402

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General Plan Symbols

- Plan Revision Number
- Detail Number on Sheet / Sheet Number Where Detail is Placed
- Keynote Symbol
- Continuation Symbol
- Point Where New Connects To Existing
- Room Name / Number (Room 1)
- Area Being Demolished
- Area Not In Contract

Abbreviations

Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	M/A	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BOR/FV	BOTTOM OF REFLECTOR/FAN/VACUUM	MUA	MAKE-UP/AIR
BTU	BRITISH THERMAL UNITS	NC	NOISE CRITERIA
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NORMALLY CLOSED
CAP	CAPACITY	NIC	NOT IN CONTRACT
CB	CATCH BASIN	NO	NUMBER
CFM	CUBIC FEET PER MINUTE	NO	NORMALLY OPEN
CLG	CEILING	NTS	NOT TO SCALE
CO	CLEAN OUT	O	OXYGEN
CW	COLD WATER	O/A	OUTSIDE AIR
D	DEGREE	ORD	OVERFLOW ROOF DRAIN
DB	DRY BULB	PD	PRESSURE DROP
DIA	DIAMETER	PIV	POST INDICATOR VALVE
DN	DOWN	PLBG	PLUMBING
DW	DISTILLED WATER	PRESS	PRESSURE
EA	EACH	PRV	PRESSURE REDUCING VALVE
EAT	ENTERING AIR TEMPERATURE	PSI	POUNDS PER SQUARE INCH
ELEC	ELECTRICAL	PSIG	POUNDS PER SQUARE INCH GAUGE
EQUIP	EQUIPMENT	PWR	POWER
EWC	ELECTRIC WATER COOLER	R	DUCT RISER
EWT	ENTERING WATER TEMPERATURE	R/A	RETURN AIR
E/A	EXHAUST AIR	RCP	RADIANT CEILING PANEL
EXIST	EXISTING	RD	ROOF DRAIN
F	DEGREES FAHRENHEIT	REC	RECESSED
FCO	FLOOR CLEAN OUT	RED	REDUCER
FD	FLOOR DRAIN	RH	RELATIVE HUMIDITY
FDC	FIRE DEPARTMENT CONNECTION	RL/A	RELIEF AIR
FL	FLOOR	RM	ROOM
FO	FUEL OIL	RPM	REVOLUTIONS PER MINUTE
FOV	FUEL OIL VENT	RW	RAIN WATER
FOR	FUEL OIL RETURN	SF	SQUARE FOOT
FOS	FUEL OIL SUPPLY	S/A	SUPPLY AIR
FPM	FEET PER MINUTE	SAN	SANITARY
FS	FLOOR SINK	SF	SQUARE FOOT
FT	FOOT/FEET	SD	SMOKE DAMPER
FTR	FIN TUBE RADIATION	SM	SURFACE MOUNT
GAL	GALLON	SP	STANDPIPE
GF	GAS-FIRED	SP	STATIC PRESSURE
GC	GENERAL CONTRACTOR	STM	STEAM
GPM	GALLONS PER MINUTE	T	THERMOSTAT
GW	GREASE WASTE	TD	TEMPERATURE DROP
HB	HOSE BIB	TDR	TRENCH DRAIN
HP	HORSE POWER	TEMP	TEMPERATURE
HTG	HEATING	TYP	TYPICAL
HTR	HEATER	UG	UNDERGROUND
HW	HOT WATER	VAC	VACUUM
HYD	HYDRANT	V	VENT
ID	INDIRECT	VAV	VARIABLE AIR VOLUME
IN	INCH	VENT	VENTILATION
INV	INVERT	VTR	VENT THROUGH ROOF
LB	POUND	W	WASTE
LB/HR	POUNDS PER HOUR	WB	WET BULB
LAT	LEAVING AIR TEMPERATURE	WCO	WALL CLEAN OUT
LP	LOW PRESSURE	WH	WALL HYDRANT
LPG	LIQUEFIED PETROLEUM GAS		

Equipment Abbreviations

AC	AIR CONDITIONING UNIT	ET	EXPANSION TANK
ACCU	AIR COOLING CONDENSING UNIT	EWH	ELECTRIC WATER HEATER
AHU	AIR HANDLING UNIT	FCU	FAN COIL UNIT
AS	AIR SEPARATOR	FP	FIRE PUMP
B	BOILER	GI	GREASE INTERCEPTOR
CH	CHILLER	GRV	GRAVITY ROOF VENTILATOR
CT	COOLING TOWER	HWP	HEATING WATER PUMP
CUH	CABINET UNIT HEATER	HRU	HEAT RECOVERY UNIT
CHWP	CHILLED WATER PUMP	PRV	POWER ROOF VENTILATOR
DBP	DOMESTIC WATER BOOSTER PUMP	RE	RETURN/EXHAUST FAN
DC	DUCT MOUNTED COIL	RTU	ROOFTOP UNIT
DCP	DOMESTIC WATER CIRCULATING PUMP	SP	SUMP PUMP
EF	EXHAUST FAN	UH	UNIT HEATER
EDC	ELECTRIC DUCT COIL	VFD	VARIABLE FREQUENCY DRIVE
		WH	WATER HEATER

* NOTE *

ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET. THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

HVAC Symbols

- 24"x12" — Sq. Duct Size (Width x Height)
- 24"/12" — Oval Duct Size (Width / Height)
- 18"Ø — Round Duct Size (Diameter)
- (E) — Existing Duct To Remain
- Duct To Be Demolished
- S/A — Supply Air
- V/A — Ventilation Air
- O/A — Outdoor Air
- R/A — Return Air
- T/A — Transfer Air
- L/A — Building Relief Air
- E/A — General Exhaust Air
- KED — Kitchen Exhaust Duct
- LH — Laboratory Hood
- ETS — Env. Tobacco Smoke
- FLUE — Flue Gas Vent
- C/A — Combustion Air
- Rect. Supply Duct Rise / Drop
- Round Supply Duct Rise / Drop
- Rect. Return Duct Rise / Drop
- Round Return Duct Rise / Drop
- Rect. Exhaust Duct Rise / Drop
- Round Exhaust Duct Rise / Drop

Grille, Register, Diffusers

Square Ceiling Diffuser — Type (See Schedule)
- CD3 | 500 — Airflow
- 10"Ø/24x24 — Neck Size / Module Size
- 29 |HS/9/17 — Catalog Throw Performance
- Throw Pattern
- Max NC Rating

Round Ceiling Diffuser
- CD11 | 100 — Airflow
- 6"Ø — Neck Size
- TYP. X 4 — Type Count for Space

Sidewall Supply Grille
- SG1 | 500 — Airflow
- 18"x10" — Nominal Duct Size
- AFF-9'-0" — Mounting Elevation (Centerline)

Linear Diffuser
- LD8 | 200 — Airflow
- 8'Ø/2s/4'-0"L — Neck Size/ Slot(s)/ Active Length

Sidewall Return Grille
- RG1 | 800 — Airflow
- 16"x16" — Nominal Duct Size
- AFF-9'-0" — Mounting Elevation (Centerline)

Ceiling Return
- RG2 | 500 — Airflow
- 12"x12"/24x24 — Neck Size / Module Size
- 25 — Max NC Rating

Mechanical Equipment

- RTU-1 — Unit Identity
- 10.0 ton — Nominal Cooling Capacity
- RTU-1
- 180000 Btu/h — Heating Capacity
- 180 CFH — Gas Supply Input Rate
- ET-1
- 379 lb — Operating Weight
- EF-XX
- 500 CFM — Design Airflow Rate
- VAV 1-2
- 3.7 GPM — Design Water Flow
- AC-1
- AFF:7'-0" — Bottom of Equipment Height
- (E)AHU-2 — Existing to Remain Equipment
- (R)AHU-3 — Existing Relocated Equipment
- Equipment By Others (Refer To Other Disciplines)

Damper Types

- (B) — Manual Damper
- (M) — Motorized Damper
- (D) — Backdraft Damper
- (S) — Smoke Damper
- Fire Damper
- (S) — Comb. Fire/ Smoke Damper

Mechanical Piping Symbols

- 2" — Nominal Pipe Size
- Above Ground Piping
- Below Ground Piping
- 1/8" / 12" SLOPE — Pipe Slope (When Applicable)
- (E) — Existing Pipe To Remain
- Pipe To Be Demolished
- CHWR — Chilled-Water Return
- CHWS — Chilled-Water Supply
- CD — Condensate Drain
- CWR — Condenser-Water Return
- CWS — Condenser-Water Supply
- GWR — Geothermal-Water Return
- GWS — Geothermal-Water Supply
- HWR — Hot-Water Return
- HWS — Hot-Water Supply
- NG — Natural Gas
- LP — Liquid Propane
- RL — Refrigerant Liquid
- RS — Refrigerant Gas
- RD — Refrigerant Discharge
- STM — Steam Supply
- CDR — Steam Condensate Return
- Pipe Rise / Drop

Valve Types

- 2" SHUTOFF — Ball Valve
- 2" BAL — Balancing Valve
- 2" BFV — Butterfly Valve
- 2" CHECK — Check Valve
- 2" CHECK — Alternate Check Valve
- 3" CIRC — Circuit Setter
- 2" GATE — Gate Valve
- 2" GLOBE — Globe Valve
- 2" LOCK — Locked Shield Valve
- 2" PRV — Pressure Reducing Valve
- 2" QUICK — Quick Opening Valve
- 2" STRAIN — Fluid Strainer
- (M) 2" M-CNTRL — Elec. Control Valve
- 4" 3-WAY CNTRL — 3-Way Elec. Valve
- (S) 1" GAS-CNTRL — Emergency Gas Shutoff
- 1" PLUG — Plug Valve
- 1" GAS COCK — Gas Shutoff Cock
- 1" REG — Gas Regulator

Mechanical Devices

- AHU-1 — Unit Identity
- (TS) Temperature Sensor
- (TH) Temp/ Humidity Sensor
- (TC) Temp/ CO2 Sensor
- (T) Thermostat
- (H) Humidistat
- (HS) Humidity Sensor
- CO2 Carbon Dioxide Detector
- CO Carbon Monoxide Detector
- H2 Hydrogen Gas Detector
- HZG Hazardous Gas Detector
- NO2 Nitrogen Dioxide Detector
- O2 Oxygen Gas Detector

Project Requirements

A. COORDINATE INSTALLATION OF PIPING, DUCTWORK, CONDUIT, LIGHTS, CABLE TRAY, STRUCTURE, AND EQUIPMENT TO PREVENT CONFLICTS.

B. FINAL PRODUCT SHALL BE A COMPLETE AND FUNCTIONING SYSTEM, AND SHALL CONFORM TO ALL REQUIREMENTS OF APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING BUT NOT LIMITED TO THE INTERNATIONAL BUILDING CODE AND INTERNATIONAL MECHANICAL CODE.

C. LOCATE EQUIPMENT REQUIRING ACCESS 2'-0" MAXIMUM ABOVE CEILING.

D. ALL ROOF MOUNTED EQUIPMENT SHALL BE A MINIMUM 10'-0" FROM EDGE OF ROOF.

E. LOCATE DUCTWORK, PIPING AND MECHANICAL EQUIPMENT AWAY FROM THE SPACE ABOVE ELECTRICAL PANELS, TRANSFORMERS AND OTHER ELECTRICAL EQUIPMENT.

F. PENETRATIONS OF RATED ASSEMBLIES SHALL BE FIRE STOPPED. FIRE STOPPING SHALL BE AN APPROVED MATERIAL AS PRESCRIBED IN CSFM STANDARD 43-1 AND SHALL BE U.L. LISTED.

G. PROVIDE SLEEVES AND/OR OPENINGS TO RUN PIPES AND DUCTS THROUGH FOUNDATIONS, FLOORS, WALLS, AND ROOF.

H. MAINTAIN CLEAR ACCESS TO SERVICE EQUIPMENT AND OTHER ACCESSORIES REQUIRING SERVICE, VISUAL INSPECTION OR HAND OPERATION. WHERE INDICATED OR REQUIRED, PROVIDE ACCESS PANELS OF THE TYPE SELECTED TO SUIT MATERIALS IN WHICH INSTALLED.

I. ADJUST PIPING AND DUCTWORK SIZES TO PROPERLY CONNECT TO MECHANICAL EQUIPMENT.

J. REFER TO HVAC SERIES DRAWINGS FOR GAS AND A.C. CONDENSATE DRAIN PIPING.

K. PIPE SIZES SHOWN SHALL BE CONTINUED IN THE DIRECTION OF FLOW UNTIL ANOTHER SIZE IS SHOWN.

L. ON DETAILS, EQUIPMENT CONNECTIONS, AND PIPE SIZES NOT SHOWN ON THE SEGMENTS, REFER TO DETAILS, SCHEDULES, AND SPECIFICATIONS.

M. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE RESPECTIVE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AT A LEVEL OF QUALITY AND WORKMANSHIP CONSISTENT WITH THE SPECIFICATIONS.

N. LOCATIONS OF PIPING, DUCTWORK AND EQUIPMENT AS INDICATED ON THE DRAWING, ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. WORK SHALL BE COORDINATED WITH ALL OTHER TRADES TO AVOID INTERFERENCE IN THE FIELD.

O. INSTALL EXPOSED PIPING AND DUCTWORK AS HIGH AS PRACTICAL IN ROOMS WITHOUT CEILINGS.

P. THE CONTRACTOR'S WORK SCHEDULE SHALL BE SUBMITTED TO AND APPROVED BY THE OWNER.

Q. PRIOR TO STARTING WORK, SUBMIT SHOP DRAWINGS FOR ALL MECHANICAL EQUIPMENT, PLUMBING FIXTURES, AND DIFFUSERS.

R. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND SHALL ARRANGE FOR ALL INSPECTIONS AS REQUIRED.

S. PROVIDE ONE YEAR WARRANTY FOR ALL WORKMANSHIP AND MATERIALS AFTER THE DATE OF FINAL ACCEPTANCE.

HVAC General Notes

A. SUPPLY AND RETURN PIPING TO COILS ARE THE SAME SIZE.

B. CONTRACTOR SHALL LOCATE THERMOSTATS AND TEMPERATURE SENSORS AT 5'-0" AFF, A MINIMUM OF 8' FROM LIGHT SWITCH.

C. REFER TO HVAC DRAWINGS FOR THERMOSTAT AND TEMPERATURE SENSOR LOCATIONS.

D. CONDENSATE DRAINS SHALL BE SUPPLIED FOR ALL COOLING EQUIPMENT. CONTRACTOR SHALL ENSURE PROPER INSTALLATION AND DRAINAGE AS REQUIRED BY FEDERAL, STATE, AND LOCAL CODES. CONDENSATE PIPING SHALL BE TYPE "L" COPPER.

E. ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK SHALL BE RATED FOR PRESSURE CLASS OF 2" W.G. UNLESS NOTED OTHERWISE.

F. COORDINATE THE EXACT LOCATION OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES WITH NEW AND EXISTING LIGHTING.

G. PROVIDE A 4" HOUSEKEEPING PAD FOR EACH PIECE OF MECHANICAL EQUIPMENT. COORDINATE SIZES WITH MECHANICAL EQUIPMENT SELECTED.

H. THIS CONTRACTOR SHALL BE REQUIRED TO REPLACE FILTERS ON HVAC EQUIPMENT AFTER ALL DUST PRODUCING CONSTRUCTION HAS BEEN COMPLETED AND PRIOR TO THE FINAL PUNCH.

I. PROVIDE DIFFUSERS AND REGISTERS WITH 4-WAY BLOW PATTERN UNLESS OTHERWISE NOTED.

J. IN HIGH-HUMIDITY AREAS, INCLUDING SHOWER ROOMS, ALL DUCTWORK SHALL BE CONSTRUCTED OF ALUMINUM.

K. INSTALL, SUPPORT, AND BRACE ALL HVAC DUCTWORK AND ACCESSORIES PER "HVAC DUCT CONSTRUCTION STANDARDS" BY SMACNA, ANSI/SMACNA 006-2006 AND "SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS" BY SMACNA, ANSI/SMACNA 001-2008.

L. A COPY OF "HVAC DUCT CONSTRUCTION STANDARDS" BY SMACNA, ANSI/SMACNA 006-2006 SHALL BE PROVIDED BY THE CONTRACTOR AND KEPT ON THE JOB SITE AT ALL TIMES.

M. A COPY OF "SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS" BY SMACNA, ANSI/SMACNA 001-2008 SHALL BE PROVIDED BY THE CONTRACTOR AND KEPT ON THE JOB SITE AT ALL TIMES.

HVAC SHEET INDEX

M000	HVAC TITLE SHEET
M001	FIRST FLOOR - HVAC ZONE PLAN
M101	FIRST FLOOR - HVAC PLAN
M102	MEZZANINE - HVAC PLAN
M103	ROOF - HVAC PLAN
M111	FIRST FLOOR - MECHANICAL PIPING PLAN
M112	MEZZANINE - MECHANICAL PIPING PLAN
M201	FIRST FLOOR - MECHANICAL RCP
M601	MECHANICAL SCHEDULES
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M603	MECHANICAL SCHEDULES
M604	MECHANICAL DETAILS
M701	SEQUENCE & CONTROLS DIAGRAMS
M702	SEQUENCE & CONTROLS DIAGRAMS
M703	SEQUENCE & CONTROLS DIAGRAMS

SEISMIC & WIND REQUIREMENTS FOR MECHANICAL / PLUMBING SYSTEMS IBC / ASCE-7

THIS FIRE STATION IS ASSIGNED TO SEISMIC DESIGN CATEGORY C AND IS OCCUPANCY / RISK CATEGORY IV AS DEFINED BY CHAPTER 1 OF ASCE-7. ALL HVAC, PLUMBING & FIRE PROTECTION SYSTEMS AND EQUIPMENT ARE REQUIRED FOR THE CONTINUED OPERATION OF THE FIRE STATION AFTER AN EARTHQUAKE AND SHALL BE ASSIGNED A COMPONENT IMPORTANCE FACTOR OF 1.5 IN ACCORDANCE WITH CHAPTER 13 OF ASCE 7.

A. PER SECTION 301.15 OF THE INTERNATIONAL MECHANICAL CODE, MECHANICAL EQUIPMENT, APPLIANCES AND SUPPORTS (INCLUDING ROOF CURBS & ROOF RAILS) EXPOSED TO WIND SHALL BE DESIGNED AND INSTALLED TO RESIST THE WIND PRESSURES DETERMINED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE. WHERE SEISMIC RESTRAINT IS REQUIRED, THE MORE DEMANDING FORCE OF WIND AND SEISMIC MUST BE USED. SEE SEISMIC INFORMATION CONTAINED IN THE STRUCTURAL DRAWINGS FOR SITE SPECIFIC INFORMATION ON SEISMIC DESIGN CATEGORY.

B. USE APPLICABLE TABLE BELOW TO DETERMINE SEISMIC RESTRAINT REQUIREMENTS FOR EACH MECHANICAL COMPONENT.

C. FOR ALL COMPONENTS REQUIRING SEISMIC AND/OR WIND RESTRAINT, THE MECHANICAL / PLUMBING CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CALCULATIONS PREPARED IN ACCORDANCE WITH THE IBC AND ASCE 7 BEARING THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF PENNSYLVANIA WHO IS QUALIFIED TO DESIGN SEISMIC RESTRAINT SYSTEMS. SHOP DRAWINGS SHALL INCLUDE SEPARATE DETAILS AND CALCULATIONS FOR EACH SEPARATE SYSTEM, DEVICE, OR ELEMENT. THE APPROVAL OF SEISMIC BRACING SHOP DRAWINGS SHALL BE REQUIRED PRIOR TO THE INSTALLATION OF ANY BUILDING SYSTEMS OR COMPONENTS.

D. WHERE SEISMIC RESTRAINT IS REQUIRED, HOUSEKEEPING PADS NEEDED FOR THE INSTALLATION OF EQUIPMENT UNDER THIS CONTRACT MUST BE DESIGNED BY THE SEISMIC ENGINEER. DO NOT POUR ANY HOUSEKEEPING PADS PRIOR TO THE RECEIPT OF THE SEISMIC SUBMITTAL.

E. SEISMIC RESTRAINTS FOR PIPING AND DUCTWORK MUST BE SHOWN ON LAYOUT DRAWINGS SHOWING SPECIFIC RESTRAINT LOCATIONS ALONG WITH ACCOMPANYING DETAILS AND CALCULATIONS.

COMPONENT IDENTIFICATION		SEISMIC RESTRAINT REQUIREMENT	NOTES
ROOF MOUNTED		RESTRAIN ALL - SEISMIC & WIND	-
FLOOR MOUNTED		RESTRAIN ALL	-
WALL MOUNTED		RESTRAIN ALL	-
COMPONENT SUPPORTS		RESTRAIN ALL	-
SUSPENDED EQUIPMENT	INLINE W/ DUCT	RESTRAIN IF >75 LBS PROVIDE FLEX. CONN.	3
	NOT INLINE W/ DUCT/PIPE	RESTRAIN ALL	-
SUSPENDED DUCTILE PIPING (STEEL, ALUMINUM, COPPER, ETC.)		>2"	4
SUSPENDED NON DUCTILE PIPING (CAST IRON, PLASTIC, CERAMIC)		RESTRAIN ALL	4
SUSPENDED PIPE ON TRAPEZE		RESTRAIN IF ANY PIPE ON TRAPEZE > 2" RESTRAIN IF TOTAL WEIGHT OF PIPES ON TRAPEZE > 10 LBS/FT	4
DUCTWORK		6 SQ.FT. AND LARGER	5
MULTIPLE DUCTS ON TRAPEZE		RESTRAIN IF TOTAL WEIGHT OF DUCTS ON TRAPEZE > 10 LBS/FT	4
COMPONENT CERTIFICATION (SEE NOTE 6)		REQUIRED	6

NOTES:

1. EQUIPMENT 20 LBS. OR LESS IS EXEMPT IF FLEXIBLE CONNECTIONS ARE PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
2. RESTRAINTS ARE NOT REQUIRED IF THE COMPONENT WEIGHS 400 LBS. OR LESS, IS MOUNTED AT 4 FT. OR LESS ABOVE A FLOOR, AND HAS FLEXIBLE CONNECTIONS BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
3. FLEXIBLE CONNECTIONS REQUIRED FOR PIPE CONNECTIONS ONLY.
4. RESTRAINT IS NOT REQUIRED IF THE PIPING / DUCTWORK IS SUPPORTED BY HANGERS AND EACH HANGER IN THE PIPING RUN IS 12 IN. OR LESS IN LENGTH FROM THE TOP OF THE PIPE TO THE SUPPORTING STRUCTURE. WHERE PIPES ARE SUPPORTED ON A TRAPEZE, THE TRAPEZE SHALL BE SUPPORTED BY HANGERS HAVING A LENGTH OF 12 IN. OR LESS. WHERE ROD HANGERS ARE USED, T HEY SHALL BE EQUIPPED WITH SWIVELS, EYE NUTS OR OTHER DEVICES TO PREVENT BENDING IN THE ROD.
5. ALL DUCTWORK , REGARDLESS OF SIZE, DESIGNED TO CARRY TOXIC, HIGHLY TOXIC, OR EXPLOSIVE GASES OR USED FOR SMOKE CONTROL MUST BE RESTRAINED.
6. COMPONENT CERTIFICATION MUST BE SUPPLIED BY THE EQUIPMENT MANUFACTURER AT TIME OF SUBMITTAL FOR REVIEW BY ENGINEER OF RECORD.

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COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — SCOTT W. FRENCH — ENGINEER — PE044129 — PENNSYLVANIA

EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING PA 19606

PROJECT NUMBER: 25-049

SUBMISSION:
BID SET

ORIGINAL ISSUE DATE:
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

HVAC TITLE SHEET

SHEET NUMBER:
M000

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GENERAL NOTES:
- M001 - FIRST FLOOR - HVAC ZONE PLAN TO BE PRINTED IN COLOR.



1 M001 FIRST FLOOR - HVAC ZONE PLAN
1/8" = 1'-0"

SYSTEM ZONES

IR-01	VRFI-13
IT-01	VRFI-14
UH-1	VRFI-15A
Uh-2	VRFI-15B
VRFI-01	VRFI-15C
VRFI-02	VRFI-16A
VRFI-03	VRFI-16B
VRFI-04	VRFI-16C
VRFI-05	VRFI-16D
VRFI-06	VRFI-16E
VRFI-07	VRFI-16F
VRFI-08	VRFI-17
VRFI-09	VRFI-19
VRFI-10	VRFi-20
VRFI-11	VRFi-21
VRFI-12	VRFI-AV

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EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
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FIRST FLOOR - HVAC ZONE PLAN

SHEET NUMBER:

M001

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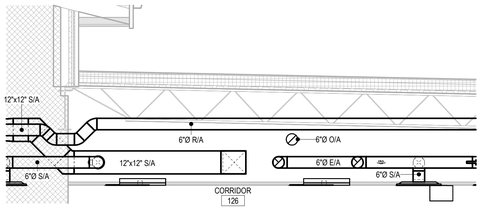
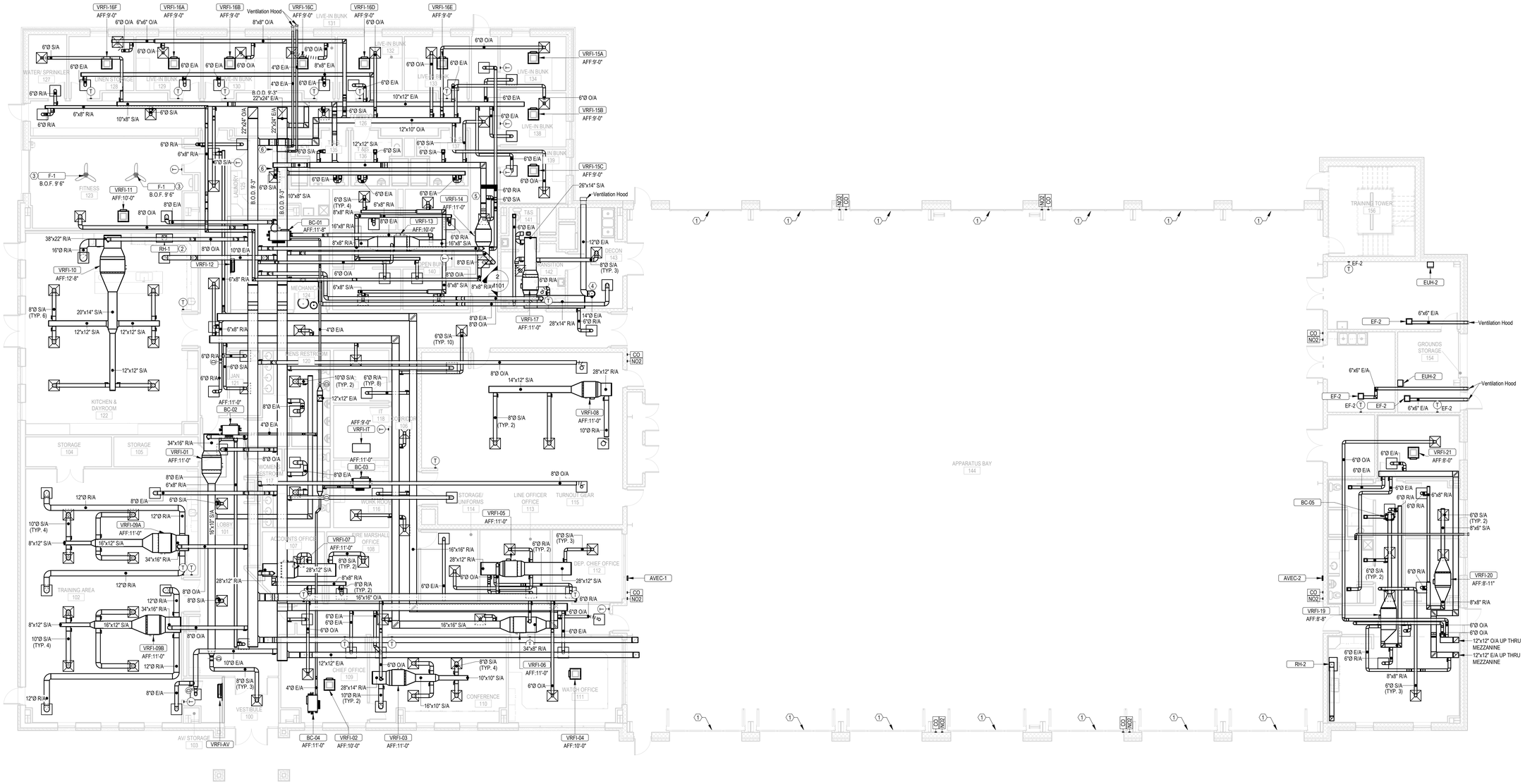


2 / M101 DUCT SECTION VIEW
3/8" = 1'-0"

NOTE:
- CONTRACTOR TO INSTALL DUCT AND PIPING IN A WAY TO MAINTAIN CLEARANCE WITH DEEP JOIST.

KEYNOTES

1. APP BAY DOOR TO BE INSTALLED WITH TAKEX MODEL PB-30TK AND SHALL BE CONNECTED TO THE AIRVAC SYSTEM. CONTRACTOR TO COORDINATE W/AIRVAC VENDOR FOR WIRING AND CONNECTIONS.
2. RH-1 TO BE EXHAUSTED UP TO ROOF WITH 6'Ø DUCT CONNECTED TO INLINE BLOWER.
3. MECHANICAL CONTRACTOR TO COORDINATE EXACT FAN LOCATION WITH ELECTRICAL CONTRACTOR.
4. MC TO PROVIDE A 12" FAMCO WVEBP HOODED WALL VENT WITH SPRING LOADED DAMPER, GASKET, AND SCREEN AT THE EXTERIOR WALL. CONNECT 12'Ø EXHAUST DUCT TO PPE DRYING CABINET. TRANSITION TO 14'Ø AT CABINET CONNECTION.
5. REFER TO SECTION 2/M101.
6. DRYER LOCATION SHOWN FOR REFERENCE.



1 / M101 FIRST FLOOR - HVAC PLAN
1/8" = 1'-0"

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EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING PA 19606

PROJECT NUMBER: 25-049

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FIRST FLOOR - HVAC PLAN

SHEET NUMBER:
M101

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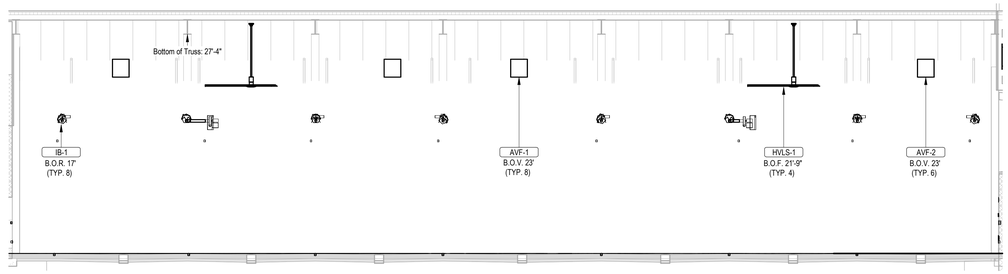
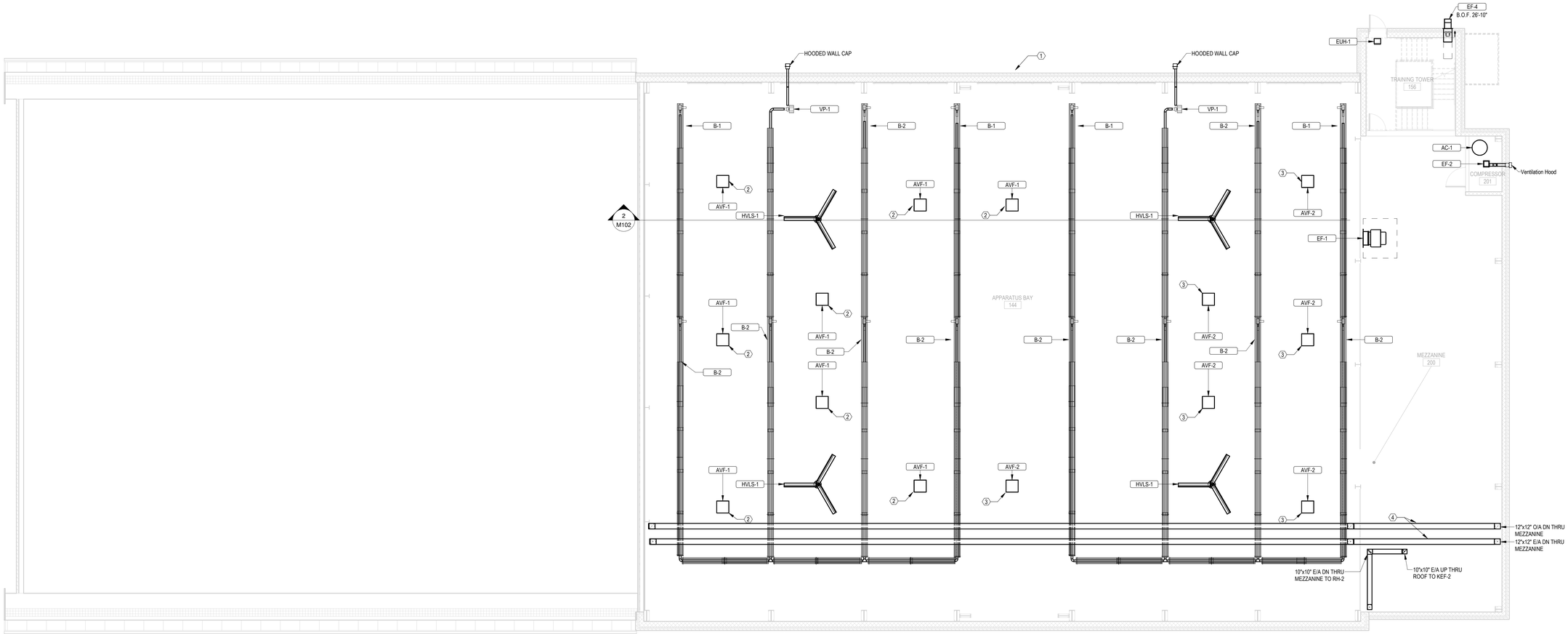
KEYNOTES

1. DESIGNATED OVERHEAD DOOR SHALL BE INTERLOCKED WITH THE CO/NO2 DETECTION SYSTEM. UPON A VENTILATION SIGNAL FROM THE CO/NO2 SYSTEM, THE DOOR SHALL AUTOMATICALLY OPEN TO PROVIDE OUTDOOR MAKEUP AIR FOR THE EXHAUST SYSTEM. COORDINATE CONTROL RELAY AND DOOR OPERATOR INTERFACE WITH ELECTRICAL AND DOOR CONTROLS.
2. CONNECT AVF-1 AIRVAC UNITS AND ASSOCIATED ACTIVATION DEVICES TO AVEC-1 CONTROL PANEL. PROVIDE REQUIRED LOW-VOLTAGE CONTROL WIRING.
3. CONNECT AVF-2 AIRVAC UNITS AND ASSOCIATED ACTIVATION DEVICES TO AVEC-2 CONTROL PANEL. PROVIDE REQUIRED LOW-VOLTAGE CONTROL WIRING.
4. MECHANICAL CONTRACTOR TO RUN DUCTS TIGHT TO ROOF DECK AND MATCH THE ROOF SLOPE.



2 / M102 APPARATUS BAY CROSS SECTION
1/8" = 1'-0"



1 / M102 MEZZANINE - HVAC PLAN
1/8" = 1'-0"

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EXETER TOWNSHIP
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MEZZANINE - HVAC PLAN

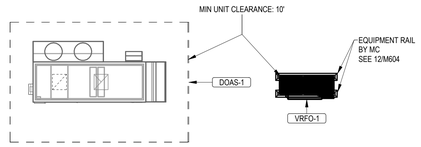
SHEET NUMBER:
M102

10/1/2026 2:58:22 PM

KEYNOTES

1 EXHAUST FAN TO SERVE REFRIGERANT BRANCH CONTROLLER ENCLOSURE: BC-1 THRU BC-4 LOCATED ON FIRST FLOOR IN THE EVENT OF A REFRIGERANT LEAK TO PREVENT ODOR FROM ESCAPING INTO OCCUPIED SPACES.

2 VRFO TO BE HUNG FROM TOWER WALL WITH QWIK-SLING WALL BRACKETS



1 M103 ROOF - HVAC PLAN
1/8" = 1'-0"

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ROOF - HVAC PLAN

SHEET NUMBER:
M103

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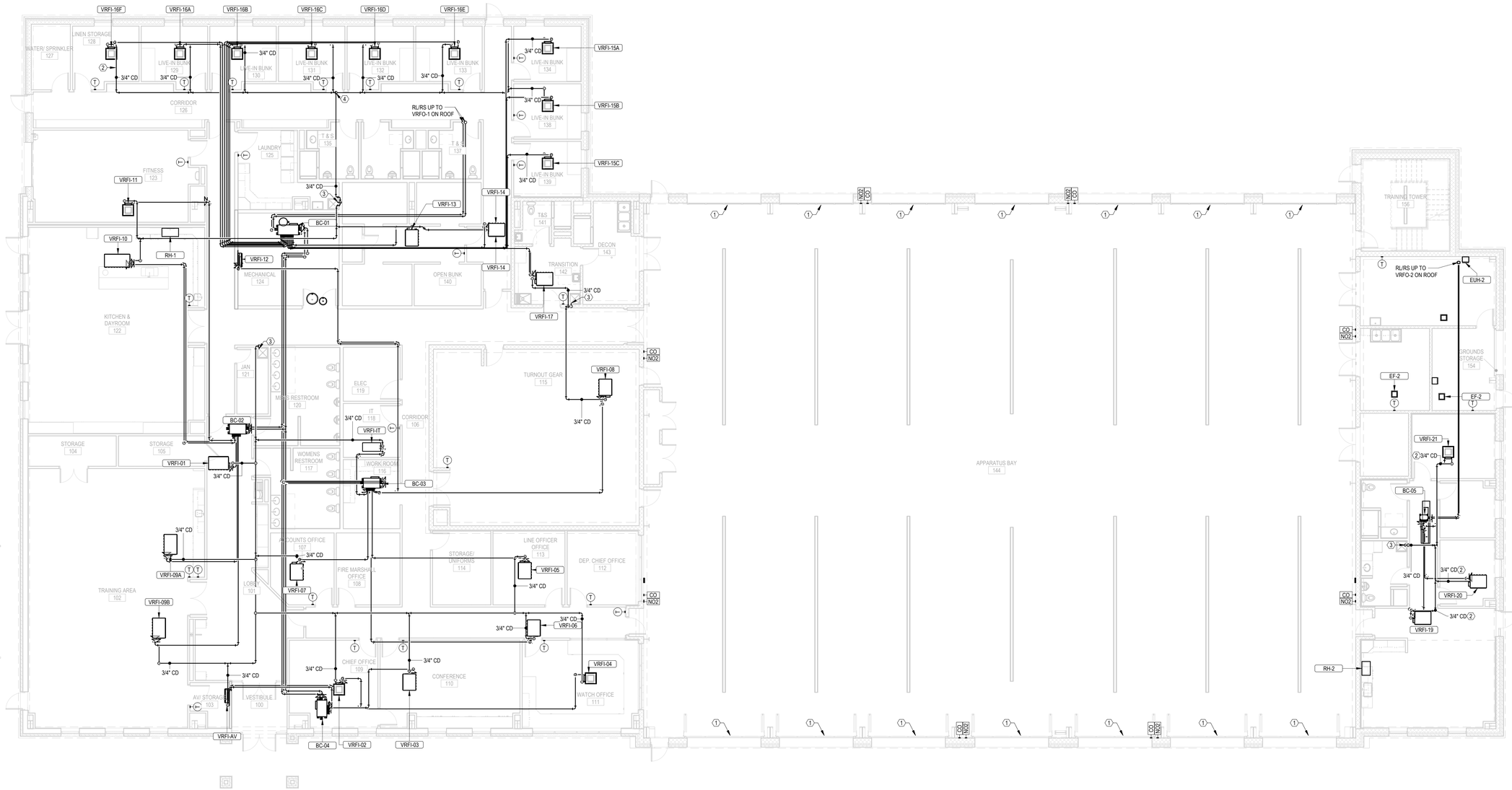

KEYNOTES

1. APP BAY DOOR TO BE INSTALLED WITH TAKEX MODEL PB-30TK AND SHALL BE CONNECTED TO THE AIRVAC SYSTEM. CONTRACTOR TO COORDINATE W/AIRVAC VENDOR FOR WIRING AND CONNECTIONS.
2. ROUTE 3/4" CONDENSATE PIPING TIGHT TO STRUCTURE.
3. ROUTE 3/4" CONDENSATE PIPING TO MOP SINK.
4. ROUTE CONDENSATE PIPING TO AVOID OTHER TRADE DISCIPLINES WITHIN CORRIDOR.

GENERAL PAGE NOTES:

- ALL RS/RL PIPING TO BE SIZED ACCORDING TO MANUFACTURER.

1 / M111 FIRST FLOOR - MECHANICAL PIPING PLAN
1/8" = 1'-0"

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70 GIBRALTAR ROAD
READING PA 19606

PROJECT NUMBER: 25-049

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FIRST FLOOR - MECHANICAL PIPING PLAN

SHEET NUMBER:
M111

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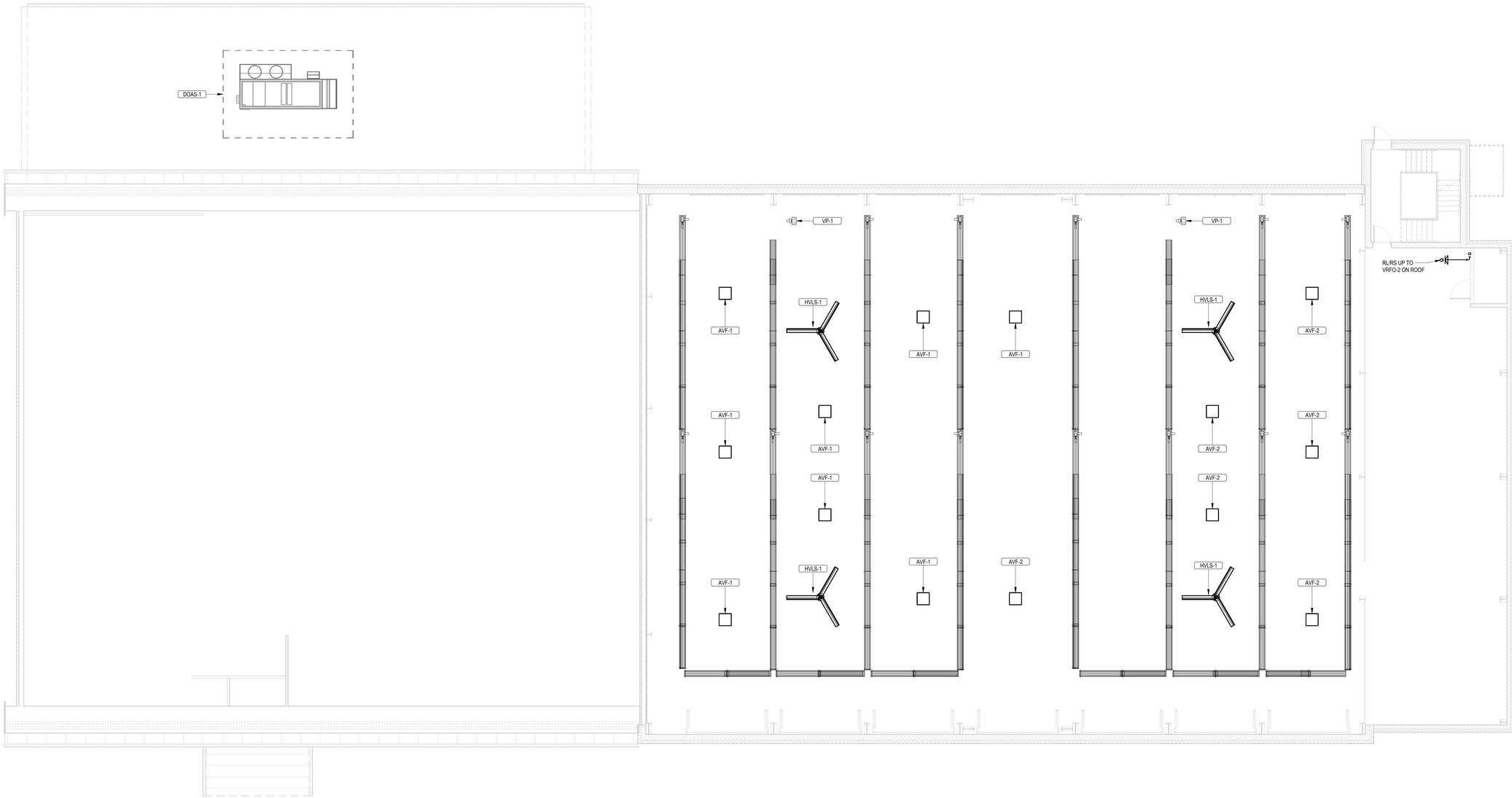
GENERAL PAGE NOTES:

- ALL RS/RL PIPING TO BE SIZED ACCORDING TO MANUFACTURER.



1 M112 MEZZANIN - MECHANICAL PIPING PLAN
1/8" = 1'-0"

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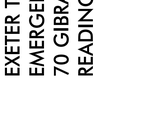

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ORIGINAL ISSUE DATE:
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MEZZANINE - MECHANICAL PIPING PLAN

SHEET NUMBER:
M112

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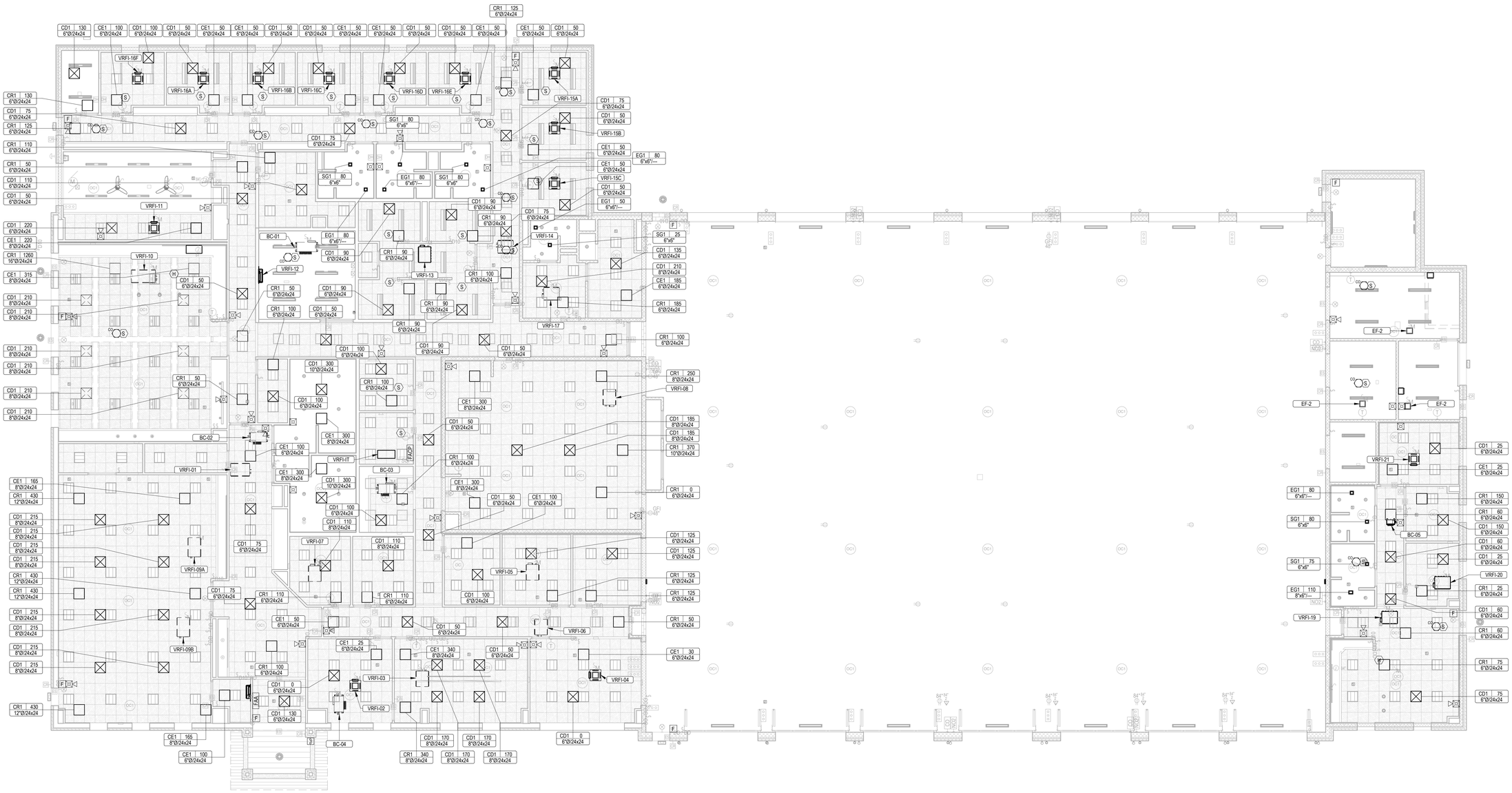

1 / M201 FIRST FLOOR -MECHANICAL RCP
1/8" = 1'-0"

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EXETER TOWNSHIP
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FIRST FLOOR - MECHANICAL RCP

SHEET NUMBER:
M201

10/1/2026 2:59:08 PM

Product Data - Horizon™ - Outdoor Air Unit (Revision 6)

Size	Qty	Description	Model Number
D015	1	Horizon™ - Outdoor Air Unit (Revision 6)	OADG015E3-DAB5GAE00-J1AGG3AE0-21A20C01B-A00C20A00-A01A00000-00AL00000

Tag(s): DOAS-1

Unit Voltage: 460-3-60
Curb Selection: Standard Knockdown Curb - Energy Recovery Wheel Cabinet
Warranty: 1-Year Parts Only (manufacturer warranty)
Warranty: 5-Year Digital/Variable Speed/Standard Scroll Compressor / 25-Year Heat Exchanger
Controller Hardware Template: UC600 - Horizon v12.1 / Thrive v2.3
Airflow Configuration: Horizontal Discharge/Vertical Return
Indoor Coil Type: DX 6-Row
Reheat: Fin & Tube Modulating HGRH
Compressor: Digital Scroll-1st Circuit Only
Outdoor Coil Type: ASHP Fin & Tube
Capacity Control: R-454B - Low GWP Refrigerant & No RCC Valve
Heat Type - Primary: Indirect Fired NG (IF) - Standard Efficiency (80%)
Heat Capacity - Primary: 150 MBH, (10:1 Turndown)
Supply Fan Motor Type: Direct Drive w/VFD
Exhaust Fan Motor Type: Direct Drive w/Shaft Grounding Ring w/VFD
Unit Controls: Discharge Air Control
Building Interface: BACnet
Filter Options: MERV-8,30%
Energy Recovery: ERV-Composite Construction with Frost Protection w/ VFD
Energy Recovery Wheel Size: ERC-4136C
Damper Options: 100% OA 2-Position Damper
Exhaust Dampers: Isolation Dampers
Electrical Options: Non-Fused Disconnect *Circuit Breaker*
Condenser Fan Options: Active (VFD) Head Pressure Low Ambient Control
Hailguards: Hailguards
Installation: Outdoor
Controls Display: TD7 Factory Installed
Cooling Controls: Relaitel
Supply Discharge Air Sensor (FLD)
2 inch Double Wall Construction
Stainless Steel Drip Pan
Blower HP - 5
Blower RPM - 1878
Supply Fan - ANPA 18
Exhaust RPM - 2203
Exhaust HP - 3
Exhaust Fan - ANPA 16
Unit Amps - FLA: 41.2 Amps
Min Circuit Ampacity - MCA: 44.4 Amps
Maximum Overcurrent Protection - MOCP: 50 Amps

TRANE

Project Name: **Exeter Township Fire Department** Tag: **DOAS-1**

Comments:

Unit Information

Model:	**Horizon™ (OAD/N Rev6 - OADG/OANG)**	Unit Length:	**183** in
Size:	**D015**	Unit Width:	**95** in
Quantity:	**1**	Unit Height:	**68** in
Supply Airflow:	**4,000** CFM	Elevation:	**0** ft
Outside Airflow:	**4,000** CFM	Ambient Air DB:	**95** F
Minimum Airflow:	**1722** CFM		

Weight Operating: **4067** lb*
Note:** **Weight does not include CURB weight. See CURB submittal for actual

Refrigerant Charge - R-454B
Circuit 1: **39.6** lbs

Cooling Performance

Gross Total Capacity:	**186.7** MBh	Evaporator Face Area:	**13.89** sq ft
Gross Sensible Capacity:	**120.1** MBh	Evaporator Rows / FPI:	**6 / 14**
Net Total Capacity:	**179.1** MBh	Condenser Face Area:	**28.67** sq ft
Net Sensible Capacity:	**112.5** MBh	Condenser Rows / FPI:	**3 / 12**
Entering Air DB / WB (Coil):	**82.9 / 69.8** F	Air Velocity:	**287** fpm
Leaving Air DB / WB (Coil):	**54.8 / 54.8** F	Coil Air PD:	**0.20** in H2O
Leaving Air DB / WB (Reheat):	**81.6 / 64.7** F	EER:	**16.9**
Leaving Air DB / WB (Unit):	**83.7 / 65.4** F	Watts:	**18421**
Leaving DP:	**54.6** F	MRE:	**7.37** lb/kWh
MRC:	**135.84** lb/h	**AHRI Certified ISMRE2**	**6.4**
		AHRI Certified ISMRE2-70	**6.4**
		ISCOP2 @AHRI	**4.7**
		Rated in accordance with AHRI standard 920	

Heating Performance

Heat Type:	**Heat Pump**	COP:	**2.9**
Capacity:	**104.8** MBh	Entering Air DB:	**44.5** F
Ambient Air DB:	**0** F	Leaving Air DB:	**66.7** F

Heating Performance

Heat Type:	**Gas Furnace**	Entering Air DB:	**44.5** F
Input Capacity:	**150** MBh	Leaving Air DB:	**72.1** F
Output Capacity:	**120** MBh	Coil Air PD:	**0.69** in H2O

Energy Recovery Wheel ERC-4136C

*** TAB Outside airflow through OA intake to this value*

Summer Conditions

Ventilation Supply		Outside	
Airflow:	**4,000** CFM	Airflow:	**4,279** CFM**
DB:	**82.9** F	DB:	**95.0** F
WB:	**69.9** F	WB:	**78.0** F
PD:	**1.06** in H20		
Return		**Exhaust**	
Airflow:	**4,000** CFM	Airflow:	**4,279** CFM
DB:	**75.0** F	DB:	**67.0** F
WB:	**63.0** F	WB:	**72.4** F
ESP:	**1.00** in H20	ERV PD:	**1.04** in H20

ENTER / ERV

Total Capacity:	**133.13**	MBH	Eff: **58.0%**
Sensible Capacity:	**51.61**	MBH	Eff: **60.0%**
Latent Capacity:	**81.52**	MBH	Eff: **56.0%**
Enthalpy Recovery Ratio:	**58.2%**		
Sensible Recovery Ratio:	**59.8%**		

Winter Conditions

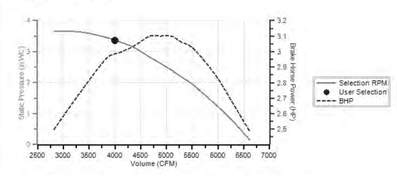
Ventilation Supply		Outside	
Airflow:	**4,000** CFM	Airflow:	**4,279** CFM**
DB:	**44.5** F	DB:	**10.0** F
WB:	**40.4** F	WB:	**8.0** F
PD:	**1.06** in H20		
Return		**Exhaust**	
Airflow:	**4,000** CFM	Airflow:	**4,279** CFM
DB:	**70.0** F	DB:	**33.3** F
WB:	**58.0** F	WB:	**32.4** F
ESP:	**1.00** in H20	ERV PD:	**1.04** in H20

ENTER / ERV

Frost likely to occur. Results are considered to be estimates.

Total Capacity:	**234.64**	MBH	Eff: **59.0%**
Sensible Capacity:	**159.17**	MBH	Eff: **61.0%**
Latent Capacity:	**75.46**	MBH	Eff: **56.0%**
Enthalpy Recovery Ratio:	**56.0%**		
Sensible Recovery Ratio:	**96.8%**		

Supply Fan ANPA 18



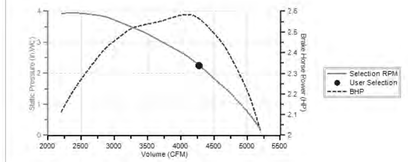
Supply Pressure Drop Summary

External Static Pressure:	**1.00** in H2O
Cabinet:	**0.01** in H2O
Cooling Coil:	**0.2** in H2O
Base Filter:	**0.01** in H2O
Filter:	**0.11** in H2O
Primary Heat:	**0.69** in H2O
HGRH:	**0.03** in H2O
ERV OA:	**1.06** in H2O
Outdoor:	**0.06** in H2O
Airflow Configuration:	**0.19** in H2O
Total Static Pressure:	**3.36** in H2O

Supply Fan Conditions

Fan Motor BHP:	**2.98** BHP
Operating RPM:	**1878** RPM
Minimum RPM:	**808** RPM

Exhaust Fan ANPA 16



Exhaust Pressure Drop Summary

Return External Static Pressure:	**1** in H2O
ERV Return Filter PD:	**0.2** in H2O
ERV Wheel PD:	**1.04** in H2O
Total Exhaust Static Pressure	**2.24** in H2O

Exhaust Fan Conditions

Fan Motor BHP:	**2.56** BHP
Operating RPM:	**2203** RPM

Standard Radiated Sound Power Level (dBA)

63	125	250	500	1000	2000	4000	8000	Total dBA
50	**60.1**	**67.7**	**72.7**	**72.9**	**72.4**	**73.9**	**69.2**	**79.8**

Sound power levels are listed for informational purposes only and are not guaranteed.

Unit Electrical Data

Unit Voltage-Ph-Hz:	**460-3-60**	Min Circuit Ampacity - MCA:	**44.4** Amps
Unit Amps - FLA:	**41.2** Amps	Maximum Overcurrent Protection - MOCP:	**50.0** Amps

Electrical Summary

Component	Fan Service	Qty	HP (ea.)	FLA (ea.)	RLA (ea.)	LRA (ea.)
ERV/HRV		**1**	**0.17**	**0.44**		
	Exhaust	**1**	**3**	**4.2**		
Scroll		**1**			**11.5**	**103**
Digital Scroll		**1**			**12.8**	**100**
	Supply	**1**	**5**	**6.6**		
	Condenser	**2**	**1**	**2.1**		
Controls		**1**		**1.48**		
Gas Heater		**1**		**3.13**		

Notes

- Unit Electrical amps include the greater of compressor or electrical heat amps.
- Unit's electrical as shown above are for single point power.

Exhaust Fan Schedule

Identity	Manufacturer	Model	QTY.	Installation Type	Design Airflow Rate	Fan Design ESP	Fan Design bhp	Fan Design RPM	Electrical Voltage	Electrical Phase	Motor Power	Weight	Notes
EF-1	GREENHECK	CUE-240-VG	1	Sidewall	9,298 CFM	0.20 in-wg	2.89 hp	605	460 V	3	5 HP	380 lb	TO BE MOUNTED ON CURB MODEL: GPF-34-G12. CONTRACTOR SHALL COORDINATE ALL WORK IN FIELD WITH OTHER DISCIPLINES AS REQUIRED.
EF-2	GREENHECK	SP-B70	4	Above Ceiling	620 CFM	0.10 in-wg	0.04 hp	1725	115 V	1	.10	11 lb	FAN TO BE PROVIDED WITH TEMP AND RELATIVE HUMIDISTAT CONTROLS.
EF-3	GREENHECK	G-097-VG	1	Roof	150 CFM	0.73 in-wg	0.07 hp	1429	115 V	1	-	54 lb	TO BE MOUNTED ON CURB MODEL: GPFP-19-G12. CONTRACTOR TO CONFIRM ROOF PITCH PRIOR TO ORDERING AND SHALL COORDINATE ALL WORK IN FIELD WITH OTHER DISCIPLINES AS REQUIRED.
EF-4	GREENHECK	SE1-12-426-D	1	Sidewall	500 CFM	0.10 in-wg	-	1300	115 V	1	-	85 lb	TO BE MOUNTED DIRECTLY TO WALL SURFACE IN HOSE TOWER. FAN TO BE PROVIDED WITH TEMP AND RELATIVE HUMIDISTAT CONTROLS.
KEF-1	GREENHECK	CUE-090-E	1	Roof	250 CFM	0.40 in-wg	0.10 hp	1256	115 V	1	.10	45 lb	TO BE MOUNTED ON CURB MODEL: GPFP-19-G12. CONTRACTOR TO CONFIRM ROOF PITCH PRIOR TO ORDERING AND SHALL COORDINATE ALL WORK IN FIELD WITH OTHER DISCIPLINES AS REQUIRED.
KEF-2	GREENHECK	CUE-090-E	1	Roof	250 CFM	0.40 in-wg	0.10 hp	1256	115 V	1	.10	45 lb	TO BE MOUNTED ON CURB MODEL: GPFP-19-G12. CONTRACTOR TO CONFIRM ROOF PITCH PRIOR TO ORDERING AND SHALL COORDINATE ALL WORK IN FIELD WITH OTHER DISCIPLINES AS REQUIRED.

*NOTE:
EF-1 TO BE CONNECTED TO APPARATUS BAY GARAGE DOOR AND THE CO/NO2 SYSTEM.
EF-3 TO SERVE REFRIGERANT BRANCH CONTROLLER ENCLOSURE: BC-1 THRU BC-4 LOCATED ON FIRST FLOOR IN THE EVENT OF A REFRIGERANT LEAK TO PREVENT ODOR FROM ESCAPING INTO OCCUPIED SPACES.

GREENHECK HVLS SCHEDULE

Identity Mark	Manufacturer	Model	Description	Count	# of Blades	Fan Diameter	Fan RPM	Electrical Volt.	Hz	Phase	FLA	Notes
HVLS-1	Greenheck	DS-3-10-90LV	High Volume, Low Speed Ceiling Fan	4	3	120"	105	208 V	60 Hz	1	7 A	

NOTE:
MC TO CONFIRM COLOR OF FOILS WITH CUSTOMER BEFORE ORDERING.

AIRVAC FILTER SCHEDULE

Identity Type Mark	Manufacturer	Model	Count	Power Supply (Ph, V, Hz)	Type Coomments
AVF-1	AIRVAC 911	AIR VACUUM CORPORATION	8	120/60/1	VERTICULAR AIR FLOW DESIGN, CEILING HUNG, RE-CIRCULATING AIR FILTRATION SYSTEM W/ PREFILTERS & AIRVAC 911 4 STAGE FILTER PACK, NEMA 5-20P PLUG
AVF-2	AIRVAC 911	AIR VACUUM CORPORATION	6	120/60/1	VERTICULAR AIR FLOW DESIGN, CEILING HUNG, RE-CIRCULATING AIR FILTRATION SYSTEM W/ PREFILTERS & AIRVAC 911 4 STAGE FILTER PACK, NEMA 5-20P PLUG

Electric Unit Heater Schedule

Identity	Manufacturer	Model	Product Type	Electric Heat Rating	Electrical Voltage	Electrical Phase	Product Weight	Notes
EUH-1	Marley Engineered Products	QMD07832	Washdown Electric Unit Heater	25590.0 Btu/h	208 V	3	25 lb	7500W Washdown electric unit heater w/ wall mounting bracket and inegral T-stat.
EUH-2	Marley Engineered Products	MUH	Unit Heater	17000.0 Btu/h	208 V	3	27 lb	Electric unit heater w/ wall mounting bracket and inegral T-stat.

Vacuum Pump Schedule

Type ID	Qty	Manufacturer	Model	HP	RPM	INTAKE DUCT DIA. (INCH)	EXHAUST DUCT DIA.	ELECTRICAL Voltage	ELECTRICAL Phase	ELECTRICAL A	Product Weight	Notes
VP-1	2	CO-RAY-VAC	CRV-EP-201	.75	3450	4"	4"	115 V	1	6.6	112 lb	1,2

1. PROVIDE 120V, 20 AMP SYSTEM CONTROL PANEL, MANUFACTURER MODEL # 0277002 AND MANUFACTURER RECOMMEND 24-VOLT THERMOSTATS.
2. VACUUM PUMP SHALL BE CONNECTED TO CONTROL PANEL WITH PROGRAMMABLE THERMOSTATS.

CEILING FAN SCHEDULE

Identity Type Mark	Manufacturer	Model	Material Description	Count	Fan Diameter	Operating Weight	Max Fan RPM	Design Airflow Rate	Watts	System Voltage	Phase	Frequency (Hz)	Schedule Notes
F-1	Big Ass Fans	Haiku L	Aluminum	2	52"	17 lb	199	5,172 CFM	15 W	120 V	1	60 Hz	TO BE PROVIDED WITH BLUETOOTH REMOTE CONTROLLER.

Grilles, Registers & Diffusers Schedule

ID Type	Description	Manufacturer	Model	Qty	Type	Material	Finish	Border Application	Face or Module Size	Notes
CD1	Ceiling Diffuser	Titus	PAS-AA	71	Perforated Face	Steel	White Enamel	Lay-In Full Face	24x24	
CE1	Ceiling Exhaust	Titus	PAR-AA	26	Perforated Exhaust	Aluminum	White Enamel	Lay-In Full Face	24x24	
CR1	Ceiling Return	Titus	PAR-AA	37	Perforated Return	Aluminum	White Enamel	Lay-In Full Face	24x24	
EG1	Exhaust Grille	Titus	350FL	6	Louvered Exhaust	Aluminum	Mill	Surface Mount	---	
RG1	Return Grille	Titus	T700L	4	Door Louver	Steel	Mill	Surface Mount	---	
SG1	Supply Grille	Titus	300F	6	Louvered Grille	Aluminum	Mill	Surface Mount		

Gas-Fired Heater Burner Schedule

Identity	Qty	Manufacturer	Model	FUEL	INPUT MBH	Electrical Voltage	Electrical Phase	Electrical A	Notes
B-1	4	CO-RAY-VAC	CRV-B4	N.G.	40.0	120 V	1	.30	1,2,3,4,5
B-2	10	CO-RAY-VAC	CRV-B6	N.G.	60.0	120 V	1	.30	1,2,3,4,5

1. INCLUDE COMPLETE SYSTEM. BURNER/PUMP/CONTROL PANEL, MOUNTING HARDWARE, 5 PSI REGULATOR.
2. TUBING SHALL BE HEAT TREATED ALUMINIZED.
3. ALL BURNERS SHALL HAVE COMBUSTION INTAKE FILTERS.
4. BRANCH RUNS ALONG PERIMETER WALLS SHALL HAVE PERIMETER REFLECTORS. ALL OTHER DEFLECTORS SHALL BE ANGLED AT 45°.
5. PROVIDE 120V, 20 AMP SYSTEM CONTROL PANEL, MANUFACTURER MODEL # 0277002 AND MANUFACTURER RECOMMEND 24-VOLT THERMOSTATS.

Range Hood Schedule

Identity	Qty	Manufacturer	Model	CFM	Fan Type	Venting	Electrical Voltage	Electrical Phase	Electrical A	Notes
RH-1	1	DENLAR	D1036	250	IN-LINE DUCT FAN	VERTICAL DUCT	115 V	1	5	
RH-2	1	DENLAR	D1036	250	IN-LINE DUCT FAN	VERTICAL DUCT	115 V	1	5	

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EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING PA 19606

PROJECT NUMBER: 25-049

SUBMISSION:
BID SET

ORIGINAL ISSUE DATE:
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

MECHANICAL SCHEDULES

SHEET NUMBER:
M601

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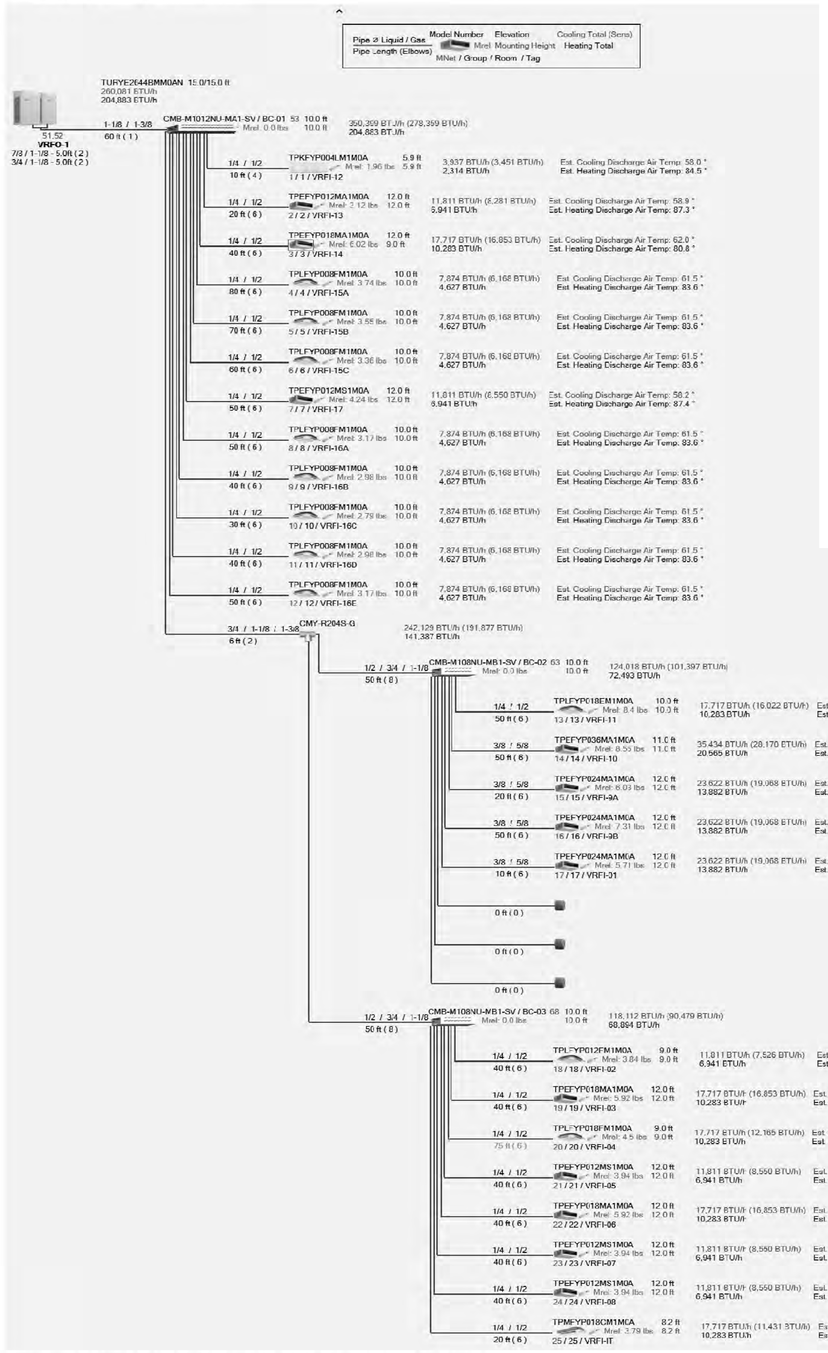
Centralized System - 1 : VRFO-1

Piping Diagram Image (Design View)

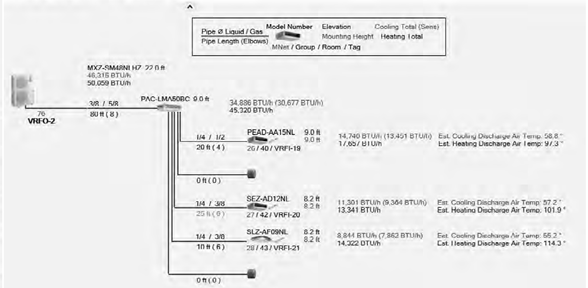


Quantities

Qty	Model	Description	Tag
28	TAC-YT53CRAU-J	Simple MA controller	CTR1-VRFI-12,CTR2-VRFI-13,CTR3-VRFI-14,CTR4-VRFI-15A,CTR5-VRFI-15B,CTR6-VRFI-15C,CTR7-VRFI-17,CTR8-VRFI-16A,CTR9-VRFI-16B,CTR10-VRFI-16C,CTR11-VRFI-16D,CTR12-VRFI-16E,CTR13-VRFI-11,CTR14-VRFI-10,CTR15-VRFI-9A,CTR16-VRFI-9B,CTR17-VRFI-01,CTR18-VRFI-02,CTR19-VRFI-03,CTR20-VRFI-04,CTR21-VRFI-05,CTR22-VRFI-06,CTR23-VRFI-07,CTR24-VRFI-08,CTR25-VRFI-IT,CTR1-VRFI-19,CTR2-VRFI-20,CTR3-VRFI-21
1	TURYE2644BMM0AN	R32 R2 Series Outdoor Unit	VRFO-1
1	MXZ-SM48NLHZ	R454B MXZSM Series Outdoor Unit	VRFO-02
1	CMB-M1012NU-MA1-SV	BC Controller Main	BC-01
2	CMB-M108NU-MB1-SV	BC Controller Sub	BC-02,BC-03
1	TPKFYP004LM1M0A	Wall -Mounted Indoor Unit	VRFI-12
1	TPEFYP012MA1M0A	Ceiling-Concealed (Ducted) Indoor Unit	VRFI-13
3	TPEFYP018MA1M0A	Ceiling-Concealed (Ducted) Indoor Unit	VRFI-14,VRFI-03,VRFI-06
8	TPLFYP008FM1M0A	Ceiling-Cassette (Four-Way) Indoor Unit	VRFI-15A,VRFI-15B,VRFI-15C,VRFI-16A,VRFI-16B,VRFI-16C,VRFI-16D,VRFI-16E
4	TPEFYP012MS1M0A	Ceiling-Concealed (Ducted) Indoor Unit	VRFI-17,VRFI-05,VRFI-07,VRFI-08
1	TPLFYP018EM1M0A	Ceiling-Cassette (Four-Way) Indoor Unit	VRFI-11
1	TPEFYP036MA1M0A	Ceiling-Concealed (Ducted) Indoor Unit	VRFI-10
3	TPEFYP024MA1M0A	Ceiling-Concealed (Ducted) Indoor Unit	VRFI-9A,VRFI-9B,VRFI-01
1	TPLFYP012FM1M0A	Ceiling-Cassette (Four-Way) Indoor Unit	VRFI-02
1	TPLFYP018FM1M0A	Ceiling-Cassette (Four-Way) Indoor Unit	VRFI-04
1	TPMFYP018CM1M0A	Ceiling Cassette (One-Way) Indoor Unit	VRFI-IT
1	PEAD-AA15NL	Ceiling-Concealed (Ducted) Indoor Unit	VRFI-19
1	SEZ-AD12NL	Ceiling-Concealed (Ducted) Indoor Unit	VRFI-20
1	SLZ-AF09NL	Ceiling-Cassette (Four-Way) Indoor Unit	VRFI-21
1	CMY-R204S-G	Branch Joint	Joint 1
1	TE-C400A	System Remote Controller	CTR1
1	LIC-BACNET-MASTER	Software License	
1	QSSB48M-18	Super Stand w/ 48in rails, 18in Tall	
1	QSSX48M-18	Super Stand Ext w/ 48in Rails, 18in Tall	
31	COMBI	Condensate Pump	BC-01,BC-02,BC-03,VRFI-12,VRFI-13,VRFI-14,VRFI-15A,VRFI-15B,VRFI-15C,VRFI-17,VRFI-16A,VRFI-16B,VRFI-16C,VRFI-16D,VRFI-16E,VRFI-11,VRFI-10,VRFI-9A,VRFI-9B,VRFI-01,VRFI-02,VRFI-03,VRFI-04,VRFI-05,VRFI-06,VRFI-07,VRFI-08,VRFI-IT,VRFI-19,VRFI-20,VRFI-21
1	CMY-R904S-G1	Reducer	BC-01
1	CMY-R303S-G1	Reducer	BC-01
2	CMY-R306S-G	Reducer	BC-02,BC-03
10	TLP-18FAU	Decoration Panel	VRFI-15A,VRFI-15B,VRFI-15C,VRFI-16A,VRFI-16B,VRFI-16C,VRFI-16D,VRFI-16E,VRFI-02,VRFI-04
1	TLP-41EAEU	Grille with 3D i-see Sensor™	VRFI-11
1	TLP-449W-U1	Grille	VRFI-IT
1	ADP3812	Port Adapter size: 3/8" x 1/2"	BranchBox 2
1	QSMS1802M	Stand - 18" High	VRFO-02
1	SLP-18FAU	Decoration Panel	VRFI-21
1	PAC-LMA50BC	Branch Box	BranchBox 2

COMMENT CHANGES : VRFO-2

Piping Diagram Image (Design View)



VRF HEAT RECOVERY BRANCH CIRCUIT CONTROLLER

System Tag	Tag Reference	M-NET Address	Model Number	Type (double / Main / Sub)	Number of Ports	Connected Capacity to BC	Voltage / Phase	Power Cooling 208V/230V (kW)	Power Heating 208V/230V (kW)	MCA 208/230	Notes / Options
VRFO-1	BC-01	53	CMB-M1012NU-MA1-SV	Main	12	368,000.0	208/230V/1-phase	0.182/0.235	0.091/0.118	1.1/1.29	1
VRFO-1	BC-02	63	CMB-M108NU-MB1-SV	Sub	8	126,000.0	208/230V/1-phase	0.122/0.157	0.061/0.078	0.74/0.87	1
VRFO-1	BC-03	68	CMB-M108NU-MB1-SV	Sub	8	76,000.0	208/230V/1-phase	0.122/0.157	0.061/0.078	0.74/0.87	1
VRFO-1	BC-04	75	CMB-M104NU-MB1-SV	Sub	4	52,000.0	208/230V/1-phase	0.061/0.078	0.030/0.039	0.38/0.44	1

Notes & Options:
1 Include Diamondback Ball Valves BV-Series, 700PSIG working pressure, full port, 410A rated.
2 For sub BC controller CMB-P-NU-GB1 or -GB, the total connectable indoor unit capacity can be 126,000 BTUs or less. If two sub BC controllers are used, the total indoor unit capacity connected to BOTH sub BC controllers also cannot exceed 126,000 BTUs. For sub BC controller CMB-P1016NU-HB1 the total connectable indoor unit capacity can be 126,000 BTUs or less. However, if two sub controllers are used, and one of them is CMB-1016NU-HB1, the total indoor unit capacity connected to BOTH sub controllers must NOT exceed 168,000 BTUs.
3 Provide Condensate Pump for Indoor Units up to 120,000 BTUs 100-240VAC

MXZ Branch Box

System Tag	Model Number	Connectable number of Indoor unit (Maximum)	Voltage / Phase	Frequency - Hz	Power Input - kW	Running Current - A	External Finish	Unit Dimension			Weight - lb(kg)	Piping Connection				Notes / Options
								Width - in(mm)	Depth - in(mm)	Height - in(mm)		to Outdoor Unit		to Indoor Unit		
												Liquid - in(mm)	Gas - in(mm)	Liquid - in(mm)	Gas - in(mm)	
BC-05	PAC-LMA50BC	5	208/230 / 1-phase	60	0.003	0.15	Galvanized Sheets	17-23/32 (450)	11-1/32 (280)	6-11/16 (170)	16 (7.4)	3/8 (9.52)	5/8 (15.88)	1/4 (6.35) x 5 (A, B, C, D, E)	3/8 (9.52) x 4 (A, B, C, E), 1/2 (12.7) x 1 (E)	1

Notes & Options:
1 The piping connection size differs according to the type and capacity of indoor units. Match the piping connection size for indoor and branch box. If the piping connection size of branch box does not match the piping connection size of indoor units, use optional different-diameter (deformed) joints to the branch box side. (Connected deformed joint directly to the branch box side.)

MITSUBISHI ELECTRIC TRANE HVAC US: CITY MULTI VRF OUTDOOR UNIT SCHEDULE

System Tag	Quantity	Tag Reference	M-NET Address	Model Number	Modules	Nominal Cooling Capacity (BTU/h)	Nominal Heating Capacity (BTU/h)	Cooling Efficiency (i)EER [SEER]	EER2 [SEER2]	Heating COP @ 47°F [HSPF]	HSPF2 IV [V]	Nom System Connected Capacity (% of NOM)	Design Cooling Outdoor Temp DB (°F)	Design Heating Outdoor Temp WB (°F)	Max Pipe Length from BC or 1st Joint (feet)	Refrig Pipe Dim High/Low Pressure (inch) (See Note 4)	Altitude (feet)	Corrected Cooling Total Capacity (BTU/h)	Corrected Heating Capacity (BTU/h)	Sound Pressure (dBA)	Inverter Driven Compressor Type / Quantity	Preliminary Added Field Charge (See Note 5)	Electrical-Per Module				Notes / Options
																							208/230 or [460V]				
																							Voltage / Phase	MCA 208/230 or [460V]	RFS	MOCP	
VRFO-1	1	VRFO-1	51, 52	TURYE2644BMM 0AN	EM144, EM120	264,000	295,000	22.45 / 12.1	N/A	3.610	N/A [N/A]	134.8 %	92.0	7.9	167.8	1-1/8 / 1-3/8	266.0	260,080.8	204,882.7	83.5/86.5	SCROLL/2	72.5	460V / 3-phase 3-wire	31, 27	35, 30	50, 45	1, 2, 3, 5, 6, 7, 8, 9, 10, 11
VRFO-2	1	VRFO-02	76	MXZ-SM48NLHZ	P48	48,000	54,000	N/A	11.55	3.600	N/A [N/A]	75.0 %	92.0	7.9	30.9	3/8 / 5/8	266.0	46,314.9	50,059.4	51/54	SCROLL/1	14.7	208/230V / 1-phase	51	45	86	1, 2, 3, 5, 6, 7, 8, 9, 10

Notes & Options:
1 Nominal cooling capacities are based on indoor coil EAT of 80/67°F (DB/WB), outdoor of 95°F (DB)
2 Nominal heating capacities are based on indoor coil EAT of 70°F (DB), outdoor of 43°F (WB)
3 Efficiency values for EER, IEER, COP are based on AHRI 1230 test method for mixture of ducted & non-ducted indoor units.
4 Efficiency values for EER2, SEER2, COP are based on AHRI 210/240 test method for mixture of ducted & non-ducted indoor units.
5 For systems with multiple modules, refrigerant pipe dimensions indicate total system combined piping downstream of module twinning.
6 Added field charge listed is in addition to factory charge, this must be updated based upon final as-built piping layout.
7 Factory representatives shall review the project prior to and throughout the installation of CITY MULTI equipment
8 Factory representatives shall startup and commission CITY MULTI equipment upon completion of equipment installations
9 Factory representatives shall provide on-site assistance for the BMS integration of the CITY MULTI equipment
10 Factory representatives shall provide end-user training on the CITY MULTI equipment upon completion of the installation of equipment
11 Provide 18" Super Stand Kit

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SCOTT W. FRENCH
ENGINEER
PE084124

EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING PA 19606

PROJECT NUMBER: 25-049

SUBMISSION:
BID SET

ORIGINAL ISSUE DATE:
10/01/2026

SHEET REVISION SCHEDULE:
No. DATE

MECHANICAL SCHEDULES

SHEET NUMBER:
M602

10/1/2026 2:59:18 PM

MITSUBISHI ELECTRIC TRANE HVAC US: CITY MULTI VRF INDOOR UNIT SCHEDULE

System Tag	Quantity	Room Name	Tag Reference	M-NET Address	Model	Type	Nominal Cooling Capacity (BTU/h)	Nominal Heating Capacity (BTU/h)	Cooling Design Entering Temp DB/WB (°F) / [Water in temp]	Heating Design Entering Temp DB/WB (°F) / [Water in temp]	Altitude (feet)	Connected Capacity					Estimated Cooling Coil LAT (°F) / [LWT]	Estimated Heating Coil LAT (°F) / [LWT]	Refrig Pipe Dim Liquid/Suction (inch)	Fan Speed Setting	Peak Fan Airflow (cfm) / [Design gpm GI/USI/min]	Max Fan ESP Setting 208V/230V (IN WG)	Sound Pressure Per Fan Speed 208V/230V (dBA)	Voltage / Phase	Power Cooling 208V/230V (kW)	Power Heating 208V/230V (kW)	Electrical MCA/MFS	Mref (lbs)	Condensate Removal Rate (gal/hr)	Actual Port Assignments	Notes / Options
												Cooling Diversity Full/Partial (See Note 5, 6)	Cooling Total Capacity (BTU/h)	Cooling Sensible Capacity (BTU/h)	Heating Diversity Full/Partial (See Note 5, 6)	Heating Capacity (BTU/h)														
VRFO-1	1		VRFI-12	1	TPKFYP004LM1M0A	Wall -Mounted	4,000	4,500	80.0/67.0	70	266.0	PARTIAL DEMAND	3,937.1	3,450.8	FULL DEMAND	2,313.6	58.0	84.5	1/4 / 1/2	HIGH	148		22-24-26-28	208/230V/1-phase	0.02	0.01	0.24/15	1.96	0.5		1, 2, 3, 4, 5
VRFO-1	1		VRFI-13	2	TPEFYP012MM1M0A	Ceiling-Concealed (Ducted)	12,000	13,500	80.0/67.0	70	266.0	PARTIAL DEMAND	11,811.2	8,281.4	FULL DEMAND	6,940.8	58.9	87.3	1/4 / 1/2	HIGH	371	0.6	26-30-34	208/230V/1-phase	0.052	0.05	1.9/15	3.12	0.5		1, 2, 3, 4, 5
VRFO-1	1		VRFI-14	3	TPEFYP018MM1M0A	Ceiling-Concealed (Ducted)	18,000	20,000	80.0/67.0	70	266.0	PARTIAL DEMAND	17,716.8	16,852.8	FULL DEMAND	10,282.7	62.0	80.8	1/4 / 1/2	HIGH	883	0.6	31-35-39	208/230V/1-phase	0.142	0.14	2.5/15	6.02	0.5		1, 2, 3, 4, 5
VRFO-1	1		VRFI-15A	4	TPLFYP008FM1M0A	Ceiling-Cassette (Four-Way)	8,000	9,000	80.0/67.0	70	266.0	PARTIAL DEMAND	7,874.1	6,168.4	FULL DEMAND	4,627.2	61.5	83.6	1/4 / 1/2	HIGH	315		26-30-33	208/230V/1-phase	0.02	0.02	0.36/15	3.74	0.25		1, 2, 3, 4, 5
VRFO-1	1		VRFI-15B	5	TPLFYP008FM1M0A	Ceiling-Cassette (Four-Way)	8,000	9,000	80.0/67.0	70	266.0	PARTIAL DEMAND	7,874.1	6,168.4	FULL DEMAND	4,627.2	61.5	83.6	1/4 / 1/2	HIGH	315		26-30-33	208/230V/1-phase	0.02	0.02	0.36/15	3.55	0.25		1, 2, 3, 4, 5
VRFO-1	1		VRFI-15C	6	TPLFYP008FM1M0A	Ceiling-Cassette (Four-Way)	8,000	9,000	80.0/67.0	70	266.0	PARTIAL DEMAND	7,874.1	6,168.4	FULL DEMAND	4,627.2	61.5	83.6	1/4 / 1/2	HIGH	315		26-30-33	208/230V/1-phase	0.02	0.02	0.36/15	3.36	0.25		1, 2, 3, 4, 5
VRFO-1	1		VRFI-17	7	TPEFYP012MS1M0A	Ceiling-Concealed (Ducted)	12,000	13,500	80.0/67.0	70	266.0	PARTIAL DEMAND	11,811.2	8,550.2	FULL DEMAND	6,940.8	58.2	87.4	1/4 / 1/2	HIGH	370	0.2	23-28-35	208/230V/1-phase	0.064	0.062	1.17/15	4.24	0.37		1, 2, 3, 4, 5
VRFO-1	1		VRFI-16A	8	TPLFYP008FM1M0A	Ceiling-Cassette (Four-Way)	8,000	9,000	80.0/67.0	70	266.0	PARTIAL DEMAND	7,874.1	6,168.4	FULL DEMAND	4,627.2	61.5	83.6	1/4 / 1/2	HIGH	315		26-30-33	208/230V/1-phase	0.02	0.02	0.36/15	3.17	0.25		1, 2, 3, 4, 5
VRFO-1	1		VRFI-16B	9	TPLFYP008FM1M0A	Ceiling-Cassette (Four-Way)	8,000	9,000	80.0/67.0	70	266.0	PARTIAL DEMAND	7,874.1	6,168.4	FULL DEMAND	4,627.2	61.5	83.6	1/4 / 1/2	HIGH	315		26-30-33	208/230V/1-phase	0.02	0.02	0.36/15	2.98	0.25		1, 2, 3, 4, 5
VRFO-1	1		VRFI-16C	10	TPLFYP008FM1M0A	Ceiling-Cassette (Four-Way)	8,000	9,000	80.0/67.0	70	266.0	PARTIAL DEMAND	7,874.1	6,168.4	FULL DEMAND	4,627.2	61.5	83.6	1/4 / 1/2	HIGH	315		26-30-33	208/230V/1-phase	0.02	0.02	0.36/15	2.79	0.25		1, 2, 3, 4, 5
VRFO-1	1		VRFI-16D	11	TPLFYP008FM1M0A	Ceiling-Cassette (Four-Way)	8,000	9,000	80.0/67.0	70	266.0	PARTIAL DEMAND	7,874.1	6,168.4	FULL DEMAND	4,627.2	61.5	83.6	1/4 / 1/2	HIGH	315		26-30-33	208/230V/1-phase	0.02	0.02	0.36/15	2.98	0.25		1, 2, 3, 4, 5
VRFO-1	1		VRFI-16E	12	TPLFYP008FM1M0A	Ceiling-Cassette (Four-Way)	8,000	9,000	80.0/67.0	70	266.0	PARTIAL DEMAND	7,874.1	6,168.4	FULL DEMAND	4,627.2	61.5	83.6	1/4 / 1/2	HIGH	315		26-30-33	208/230V/1-phase	0.02	0.02	0.36/15	3.17	0.25		1, 2, 3, 4, 5
VRFO-1	1		VRFI-11	13	TPLFYP018EM1M0A	Ceiling-Cassette (Four-Way)	18,000	20,000	80.0/67.0	70	266.0	PARTIAL DEMAND	17,716.8	16,022.4	FULL DEMAND	10,282.7	61.4	81.7	1/4 / 1/2	HIGH	812		26-30-32-34	208/230V/1-phase	0.04	0.04	0.54/15	8.4	0.23		1, 2, 3, 4, 5
VRFO-1	1		VRFI-10	14	TPEFYP036MM1M0A	Ceiling-Concealed (Ducted)	36,000	40,000	80.0/67.0	70	266.0	PARTIAL DEMAND	35,433.6	28,169.9	FULL DEMAND	20,565.4	59.1	85.0	3/8 / 5/8	HIGH	1271	0.6	35-39-43	208/230V/1-phase	0.222	0.22	3.1/15	8.55	0.5		1, 2, 3, 4, 5
VRFO-1	1		VRFI-9A	15	TPEFYP024MM1M0A	Ceiling-Concealed (Ducted)	24,000	27,000	80.0/67.0	70	266.0	PARTIAL DEMAND	23,622.4	19,068.3	FULL DEMAND	13,881.6	59.6	84.6	3/8 / 5/8	HIGH	883	0.6	31-35-39	208/230V/1-phase	0.142	0.14	2.5/15	6.03	0.5		1, 2, 3, 4, 5
VRFO-1	1		VRFI-9B	16	TPEFYP024MM1M0A	Ceiling-Concealed (Ducted)	24,000	27,000	80.0/67.0	70	266.0	PARTIAL DEMAND	23,622.4	19,068.3	FULL DEMAND	13,881.6	59.6	84.6	3/8 / 5/8	HIGH	883	0.6	31-35-39	208/230V/1-phase	0.142	0.14	2.5/15	7.31	0.5		1, 2, 3, 4, 5
VRFO-1	1		VRFI-01	17	TPEFYP024MM1M0A	Ceiling-Concealed (Ducted)	24,000	27,000	80.0/67.0	70	266.0	PARTIAL DEMAND	23,622.4	19,068.3	FULL DEMAND	13,881.6	59.6	84.6	3/8 / 5/8	HIGH	883	0.6	31-35-39	208/230V/1-phase	0.142	0.14	2.5/15	5.71	0.5		1, 2, 3, 4, 5
VRFO-1	1		VRFI-02	18	TPLFYP012FM1M0A	Ceiling-Cassette (Four-Way)	12,000	13,500	80.0/67.0	70	266.0	PARTIAL DEMAND	11,811.2	7,526.5	FULL DEMAND	6,940.8	58.8	89.2	1/4 / 1/2	HIGH	335		26-30-34	208/230V/1-phase	0.02	0.02	0.36/15	3.84	0.54		1, 2, 3, 4, 5
VRFO-1	1		VRFI-03	19	TPEFYP018MA1M0A	Ceiling-Concealed (Ducted)	18,000	20,000	80.0/67.0	70	266.0	PARTIAL DEMAND	17,716.8	16,852.8	FULL DEMAND	10,282.7	62.0	80.8	1/4 / 1/2	HIGH	883	0.6	31-35-39	208/230V/1-phase	0.142	0.14	2.5/15	5.92	0.5		1, 2, 3, 4, 5
VRFO-1	1		VRFI-04	20	TPLFYP018FM1M0A	Ceiling-Cassette (Four-Way)	18,000	20,000	80.0/67.0	70	266.0	PARTIAL DEMAND	17,716.8	12,165.4	FULL DEMAND	10,282.7	55.0	90.7	1/4 / 1/2	HIGH	460		33-39-43	208/230V/1-phase	0.04	0.04	0.36/15	4.5	0.71		1, 2, 3, 4, 5
VRFO-1	1		VRFI-05	21	TPEFYP012MS1M0A	Ceiling-Concealed (Ducted)	12,000	13,500	80.0/67.0	70	266.0	PARTIAL DEMAND	11,811.2	8,550.2	FULL DEMAND	6,940.8	58.2	87.4	1/4 / 1/2	HIGH	370	0.2	23-28-35	208/230V/1-phase	0.064	0.062	1.17/15	3.94	0.37		1, 2, 3, 4, 5
VRFO-1	1		VRFI-06	22	TPEFYP018MA1M0A	Ceiling-Concealed (Ducted)	18,000	20,000	80.0/67.0	70	266.0	PARTIAL DEMAND	17,716.8	16,852.8	FULL DEMAND	10,282.7	62.0	80.8	1/4 / 1/2	HIGH	883	0.6	31-35-39	208/230V/1-phase	0.142	0.14	2.5/15	5.92	0.5		1, 2, 3, 4, 5
VRFO-1	1		VRFI-07	23	TPEFYP012MS1M0A	Ceiling-Concealed (Ducted)	12,000	13,500	80.0/67.0	70	266.0	PARTIAL DEMAND	11,811.2	8,550.2	FULL DEMAND	6,940.8	58.2	87.4	1/4 / 1/2	HIGH	370	0.2	23-28-35	208/230V/1-phase	0.064	0.062	1.17/15	3.94	0.37		1, 2, 3, 4, 5
VRFO-1	1		VRFI-08	24	TPEFYP012MS1M0A	Ceiling-Concealed (Ducted)	12,000	13,500	80.0/67.0	70	266.0	PARTIAL DEMAND	11,811.2	8,550.2	FULL DEMAND	6,940.8	58.2	87.4	1/4 / 1/2	HIGH	370	0.2	23-28-35	208/230V/1-phase	0.064	0.062	1.17/15	3.94	0.37		1, 2, 3, 4, 5
VRFO-1	1		VRFI-IT	25	TPMFYP018CM1M0A	Ceiling Cassette (One-Way)	18,000	20,000	80.0/67.0	70	266.0	PARTIAL DEMAND	17,716.8	11,431.2	FULL DEMAND	10,282.7	54.3	92.7	1/4 / 1/2	HIGH	420		30-36-41-45	208-230V/1-phase	0.05	0.05	/15	3.79	0.5		1, 2, 3, 4, 5
VRFO-2	1		VRFI-19	26	PEAD-AA15NL	Ceiling-Concealed (Ducted)	15,000	18,000	80.0/67.0	70	266.0	PARTIAL DEMAND	14,740.5	13,451.3	FULL DEMAND	17,657.3	58.8	97.3	1/4 / 1/2	HIGH	600	0.14/0.20/0.28/0.40/0.60	27-28-33-36	208/230V/1-phase			2.25/15		0.76		1, 2, 3, 4, 5
VRFO-2	1		VRFI-20	27	SEZ-AD12NL	Ceiling-Concealed (Ducted)	11,500	13,600	80.0/67.0	70	266.0	PARTIAL DEMAND	11,301.0	9,363.5	FULL DEMAND	13,341.1	57.2	101.9	1/4 / 3/8	HIGH	388	0.02/0.06/0.14/0.20	23-28-33	/			/		0.26		1, 2, 3, 4, 5
VRFO-2	1		VRFI-21	28	SLZ-AF09NL	Ceiling-Cassette (Four-Way)	9,000	14,600	80.0/67.0	70	266.0	PARTIAL DEMAND	8,844.3	7,862.4	FULL DEMAND	14,322.0	55.2	114.3	1/4 / 3/8	HIGH	300		25-28-31	208/230V/1-phase	0.02	0.02	1/15		0.13		1, 2, 3, 4, 5

Notes & Options:
1 Nominal cooling capacities are based on indoor coil EAT of 80/67°F (DB/WB), outdoor of 95°F (DB)
2 Nominal heating capacities are based on indoor coil EAT of 70°F (DB), outdoor of 43°F (WB)
3 See outdoor unit schedule for outdoor ambient conditions, connected capacity, and other factors associated with corrected capacities
4 See schematic piping/control diagram for indication of required indoor unit remote controllers, system controllers, and integration devices.
5 Full demand corrected capacity includes de-rate associated with indoor vs. outdoor connected capacity indicated on outdoor unit schedule for associated system.
Partial corrected capacity assumes sufficient diversity exists such that the connected capacity de-rate does not apply.
It is the designer's responsibility to ensure "Diamond System Builder" is set in the appropriate output capacity setting (full demand/partial demand) prior to generating this schedule.
6 It is recommended to always base heating corrected capacity on full demand.
7 Provide Condensate Pump for Indoor Units up to 120,000 BTUs 100-240VAC

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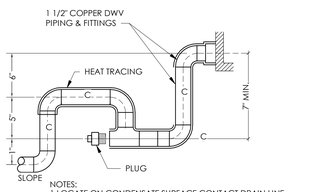
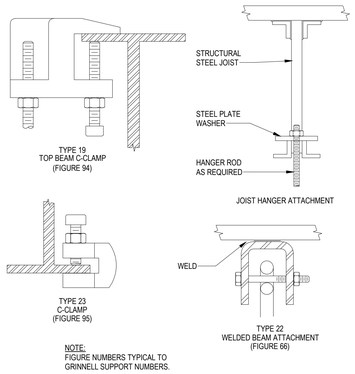


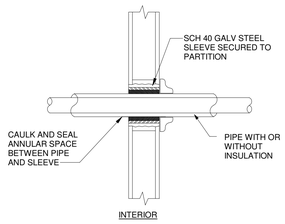
NOTES:
1.LOCATE ON CONDENSATE SURFACE CONTACT DRAIN LINE.
2.VERTICAL DROP MAY NOT BE IN THE SAME PLANE AS CLEANOUT

1 M604 DETAIL - CONDENSATE TRAP
NOT TO SCALE



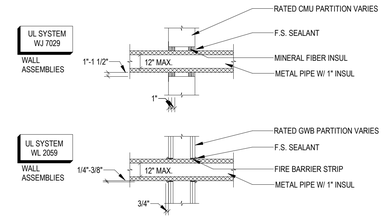
NOTE:
FIGURE NUMBERS TYPICAL TO GRINNELL SUPPORT NUMBERS.

2 M604 C-CLAMPS, JOIST HANGER ROD, AND WELDED BEAM ATTACHMENTS
NOT TO SCALE

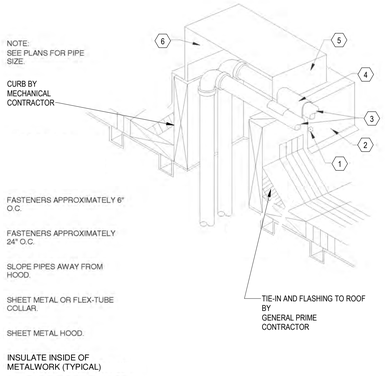


NOTES:
1. TYPICAL FOR NON-INSULATED PIPE AND CONDUIT.
2. ALL CAULKING AND SEALANT SHALL BE FIRE RATED (SEE SPECIFICATIONS).
3. WHERE PIPING IS EXPOSED AT FINISHED WALL, FLUSH MOUNT SLEEVE AND PROVIDE AN ESCUTCHEON PLATE.

3 M604 PIPE PENETRATION THRU INTERIOR WALLS
NOT TO SCALE

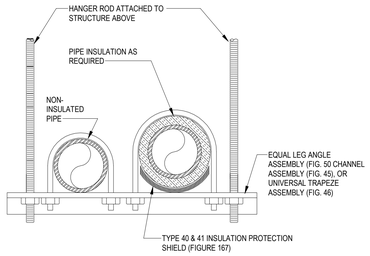


4 M604 FIRESTOP DETAIL AT INSULATED METAL PIPE
NOT TO SCALE



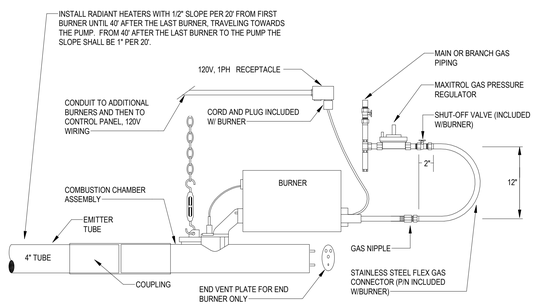
1 FASTENERS APPROXIMATELY 6" O.C.
2 FASTENERS APPROXIMATELY 24" O.C.
3 SLOPE PIPES AWAY FROM HOOD.
4 SHEET METAL OR FLEX-TUBE COLLAR.
5 SHEET METAL HOOD.
6 INSULATE INSIDE OF METALWORK (TYPICAL)

5 M604 DETAIL - ROOF PIPING PENETRATION
NOT TO SCALE



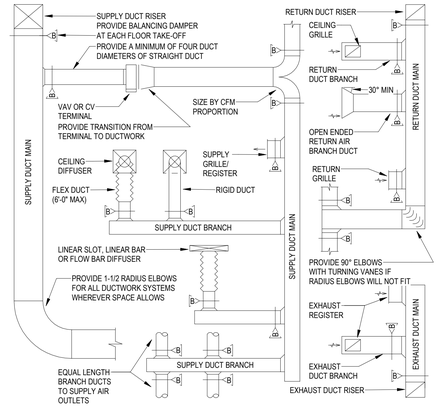
NOTES:
1. SIZE RODS, SPRING CUSHION, AND HORIZONTAL MEMBER APPROVED TO SATISFY LOAD REQUIREMENT WITH SAFETY FACTOR OF 5.
2. FIGURE NUMBERS ARE TYPICAL TO GRINNELL SUPPORT NUMBERS.

6 M604 TRAPEZE TYPE PIPE SUPPORT
NOT TO SCALE

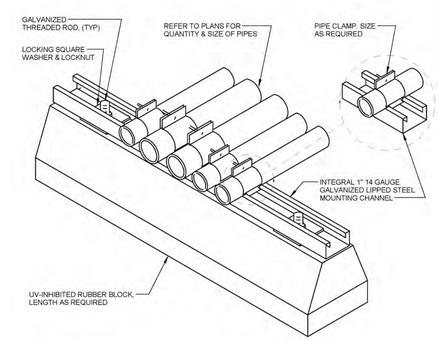


7 M604 INFRARED DETAIL 4
NOT TO SCALE

NOTES:
1. REFER TO HVAC FLOOR PLANS FOR DUCT SIZES
2. REFER TO SCHEDULES FOR GRILLES, REGISTERS, DIFFUSERS AND TERMINAL SIZES AND TYPES
3. PROVIDE A MANUAL TYPE BALANCING DAMPER FOR EACH SUPPLY OUTLET AND RETURN INLET
4. ALL DUCT RUNOUTS TO DIFFUSERS SHALL BE THE SAME SIZE AS DIFFUSER NECK SIZE, UNLESS OTHERWISE NOTED
5. FLEX DUCT WILL NOT BE ALLOWED ON RETURN OR EXHAUST DUCTWORK SYSTEMS
6. PROVIDE 12" AIR CUSHION AT THE END OF EACH SUPPLY MAIN AND BRANCH DUCT
7. INDIVIDUAL BRANCH BALANCING DAMPERS NOT REQUIRED FOR SUPPLY OR EXHAUST REGISTERS

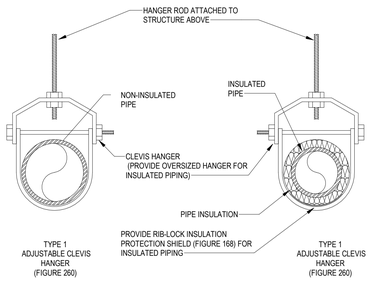


11 M604 DUCTWORK INSTALLATION DIAGRAM
NOT TO SCALE



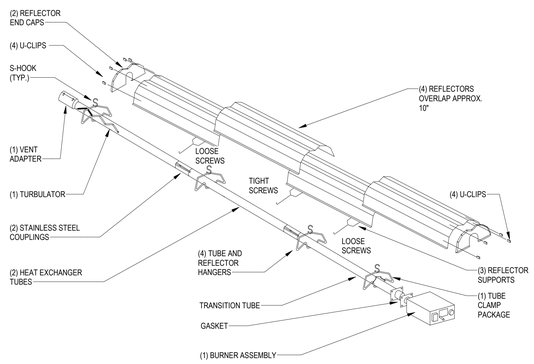
NOTE:
1. NO ROOFING PENETRATIONS SHALL BE REQUIRED.

8 M604 DETAIL - ROOF PIPING SUPPORT
NOT TO SCALE

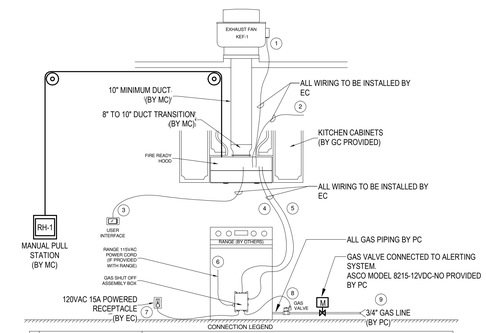


NOTE:
FIGURE NUMBERS ARE TYPICAL TO GRINNELL SUPPORT NUMBERS.

9 M604 SINGLE PIPE CLEVIS HANGER
NOT TO SCALE

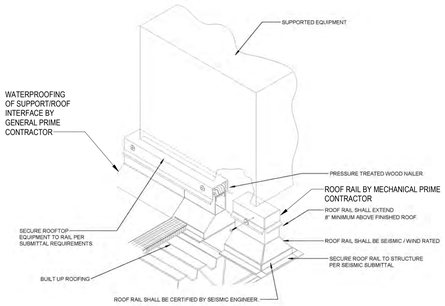


10 M604 INFRARED DETAIL 1
NOT TO SCALE

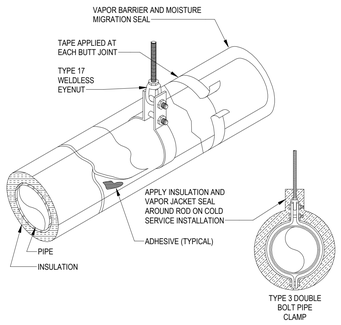


ID	ITEM	ITEM DETAILS
1	FAN	FIELD TO CONNECT FAN KEF-1 TO QCE, PROVIDED WITH 0-10VDC SPEED REFERENCE AND 115VAC RUN COMMAND.
2	HOOD POWER	FIELD TO PROVIDE 115VAC POWER FROM 15A BREAKER TO TERMINAL BLOCKS H1 AND N1 INSIDE HOOD (GROUND TO GROUNDING TERMINAL).
3	SHIP LOOSE USER INTERFACE	8.5 FT PLUG AN PLAY CABLE WITH LIGHT BLUE LABEL COILED UP AND ATTACHED TO HOOD. FIELD TO CONNECT PLUG TO BACK OF USER INTERFACE INSIDE INTERFACE J-BOX.
4	GAS/ELECTRIC DISCONNECT CABLE 1	10 FT PLUG AND PLAY CABLE COILED UP AND ATTACHED TO 9PIN CONNECTION AT HOOD. FIELD TO PLUG THIS INTO GAS/ELECTRIC SHUT OFF ASSEMBLY BOX.
5	GAS/ELECTRIC DISCONNECT CABLE 2	10 FT PLUG AND PLAY CABLE COILED UP AND ATTACHED TO 4PIN CONNECTION AT HOOD. FIELD TO PLUG THIS INTO GAS/ELECTRIC SHUT OFF ASSEMBLY BOX.
6	RANGE POWER CORD	PLUG RANGE POWER CORD (IF PROVIDED WITH RANGE) INTO GAS SHUT OFF ASSEMBLY BOX.
7	SHUT-OFF ASSEMBLY BOX POWER	PLUG GAS SHUT OFF ASSEMBLY BOX POWER CORD INTO NEARBY 115VAC RECEPTACLE.
8	SHUT OFF ASSEMBLY VALVE POWER	GAS VALVE TO CONNECT TO QUICK CONNECTOR, CONNECTS 5FT GAS VALVE POWER CORD TO 1.5FT CABLE ON GAS VALVE.
9	GAS LINE	PIPE GAS LINE INTO GAS VALVE INLET, THEN OUT OF GAS VALVE OUTLET TO RANGE.

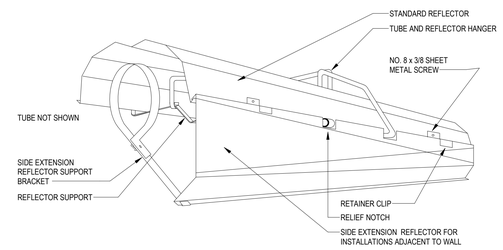
15 M604 KITCHEN HOOD/KEF-1 INSTALLATION DETAIL1
NOT TO SCALE



12 M604 DETAIL - VRFO EQUIPMENT SUPPORT
NOT TO SCALE



13 M604 PIPE HANGER, INSULATION AND VAPOR JACKET
NOT TO SCALE



14 M604 INFRARED SIDE REFLECTOR DETAIL
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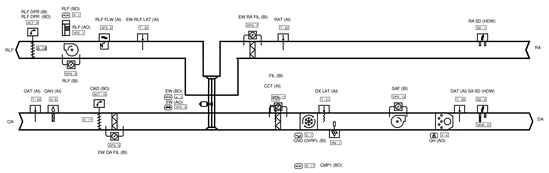
Flow Diagram: DOAS-1



1 M701 DOAS SEQUENCES AND CONTROLS
NOT TO SCALE

Sequence of Operation: DOAS-1

DOAS RUNS 24/7/365 TO PROVIDE CODE REQUIRED VENTILATION AIR TO THE BUILDING

DOAS Building Automation System Interface:

The Building Automation System (BAS) shall send the controller Morning Warm-up/Pre-Cool, and Heat/Cool modes. The BAS shall also send the discharge air temperature setpoint and the duct static pressure setpoint. If a BAS is not present, or communication is lost with the BAS the controller shall operate using default modes and setpoints.

DOAS Occupied:

The DX cooling and the gas heat shall control to maintain the active discharge air temperature setpoint.

DOAS Heat/Cool Mode:

COOLING: The unit controller shall use the discharge air temperature sensor and discharge air temperature cooling setpoint to determine when to initiate requests for cooling. Discharge air setpoint shall be maintained by controlling the cooling as required.

HEATING: The unit controller shall use the discharge air temperature sensor and discharge air temperature heating setpoint to determine when to initiate requests for heating. Discharge air setpoint shall be maintained by controlling the heating as required.

DOAS Cooling:

Cooling Mode shall be enabled whenever the Outdoor Air Temperature rises above the Outdoor Air Cooling Enable Setpoint. The Outdoor Air Temperature shall be above the Outdoor Air Heating Enable Setpoint. During Cooling Mode, Cooling Capacity shall be adjusted to maintain Discharge Air Temperature Setpoint. On units without head pressure control, the compressors shall be locked out if the Outdoor Air Temperature falls below the Compressor Low Ambient Lockout Setpoint and there is a demand for cooling. When this occurs, the unit shall display Compressor Low Ambient Lockout Active as an informational diagnostic.

DOAS Primary Heating:

Heating Mode shall be enabled whenever the Outdoor Air Temperature is below the Outdoor Air Heating Enable Setpoint. During Heating Mode, Heat Capacity shall be adjusted to maintain the Discharge Air Temperature to Discharge Air Temperature Setpoint. The unit controller shall monitor the status of the heater using Heat On Off Status Local. In the event of ignition failure, the unit shall make three ignition attempts before displaying Diagnostic: Heat Failure. The unit shall shut down when a heat failure occurs and shall a reset four hours later to re-attempt ignition.

DOAS Dehumidification:

Dehumidification mode shall be enabled whenever outside air dew point is above 55F (adj). During the dehumidification mode, the cooling capacity shall be adjusted to maintain the dehumidification temperature setpoint. The Hot Gas Heating Valve shall be adjusted to maintain the discharge air temperature setpoint.

DOAS Energy Recovery Wheel Operation:

The Energy Recovery Wheel (ERV) Start Stop Command shall be enabled whenever there is a call for relief fan. During Ventilation Mode or Economizer Mode the ERV shall be enabled. The unit prevents frost accumulation on the ERV by measuring the Relief Leaving Temperature. Initially the ERV speed shall be reduced to maintain 15 deg. F for the relief temperature. If the ERV speed is at minimum, but the relief temperature remains below 15 deg. F, the unit shall maintain the temperature by modulating the Outdoor Air Damper closed and the Return Air Damper open. During normal operation, the VFD is at 100% (full speed) and the Outdoor Air Damper is at 100% (open) and the Return Air Damper 0% (closed).

DOAS Ventilation:

Ventilation Mode shall be enabled when the Outdoor Air Temperature is between the Outdoor Air Cooling Enable Setpoint and the Outdoor Air Heating Enable Setpoint. During Ventilation Mode, heating and cooling shall be locked out and the unit shall supply un-conditioned air. Ventilation Mode shall be locked out whenever the unit is in Dehumidification Mode.

DOAS Supply Fan Operation:

When the unit becomes occupied, the outdoor air damper shall open. When the outdoor air damper is completely open the damper end switch shall close indicating the damper is fully open and the supply fan sequence can begin. When the fan start sequence has begun, the unit controller shall command the variable speed drive for the supply fan to 50%. A supply fan status switch shall prove fan status. If after 2 minutes (adj.) the fan does not have a proven signal, the Supply Fan Failure alarm shall be displayed and the unit shall shutdown requiring a manual reset. If the fan status is proven the fan shall increase to full flow.

DOAS Relief Air and Building Pressure Control:

A differential pressure switch shall monitor the differential pressure across the relief air fan. If the switch is detected to be open for 40 consecutive seconds after a request for relief fan operation a fan failure alarm shall annunciate at the BAS and the relief fan shall stop. A manual reset shall be required.

DOAS Relief Fan Operation:

After completing the Supply Fan Starting Sequence, the Exhaust Damper Open Close Command shall be enabled. Once the Exhaust Damper End Switch has proven, the Exhaust Fan Start Stop Command shall be enabled. The unit controller shall enable the variable speed drive for the relief fan. The speed of the relief fan shall vary to maintain a constant volume of relief air (volume shall be set by the factory and be field adjustable).

DOAS Filter Status:

A differential pressure switch shall monitor the differential pressure across the filter(s) when the fan is running. If the switch closes during normal operation a dirty filter alarm shall annunciate at the BAS.

DOAS Smoke Detector Shutdown:

The unit shall shut down in response to a signal from the smoke detector indicating the presence of smoke. The smoke detector shall be interlocked to the unit through the dry contacts of the smoke detector. A manual reset of the smoke detector shall be required to restart the unit.

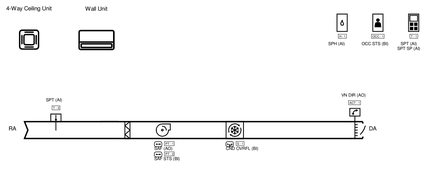
Refrigerant Mitigation Mode:

The unit controller shall monitor the leak detection system, when a leak is detected, an alarm shall promptly alert the BAS via BACnet Change-of-Value (COV) and mitigation shall be activated.

In occupied mode, the supply fan shall remain operational, and the compressor(s), electric heating, fuel-fired heating, electrostatic devices, and any other ignition device starters shall be disabled, and activate mechanical ventilation (if it's required by Section 7.6.4 of the ASRAE standard). for the duration of the mitigation process plus an additional 5 minutes.

In unoccupied mode, the supply fan shall remain operational, and the compressor(s), electric heating, fuel-fired heating, electrostatic devices, and any other ignition device starters shall be disabled, and activate mechanical ventilation (if it's required by Section 7.6.4 of the ASRAE standard). for the duration of the mitigation process plus an additional 5 minutes.

Flow Diagram: VRF INDOOR UNIT - 4WAY CASSETTE [QTY: 12] VRF INDOOR UNIT - HIGH WALL [QTY: 01]



2 M701 VRF INDOOR UNITS - 4 WAY CASSETTE AND WALL MOUNTED SEQUENCES AND CONTROLS
NOT TO SCALE

Sequence of Operation: VRF INDOOR UNIT - 4WAY CASSETTE [QTY: 12]

Building Automation System Interface:

The Building Automation System (BAS) shall allow the user to monitor the status of Variable Refrigerant Flow (VRF) terminal units, outdoor units, and secondary VRF equipment, and modify control parameters of terminal units and secondary VRF equipment as necessary to maintain the desired space conditions.

If communication between the VRF equipment and the BAS is lost, the VRF system shall continue to operate using the current control parameters stored within the equipment to maintain the desired space conditions.

External Control Device:

In this specification the term 'external control device' is used to denote one or more user interface control devices that may be present in the system. The control devices that may be present are a Local Control device, VRF System Control device, or a Building Automation System. When more than one external control device is present in the control system, the last command or configuration value received by the indoor unit governs indoor unit operation.

There may be other means to provide commands and configuration parameters to the VRF system, such as hardwired control inputs. However, these are not considered the typical system control use case and the specification does not address them as written.

Zone Temperature Setpoint Control:

Single Setpoint. One zone air temperature setpoint is present. When the terminal unit is in a heating or cooling mode, it shall control the zone air temperature value to the Zone Temperature Setpoint value.

On/Off Mode:

The terminal unit has two modes that drive the overall operation of the unit, On and Off mode.

On. The internal algorithm shall control the unit to maintain the desired zone air temperature.

Off. The internal algorithm shall NOT control the unit to maintain the desire zone air temperature. The algorithm shall control components internal to the unit to minimize energy consumption and isolate it from VRF system refrigerant circuit. The zone air temperature sensor in use shall be monitored to allow the Zone Air Temperature Value to be displayed at an External Control Device(s).

Operation Mode:

Operation mode is the primary control parameter of the indoor unit when it is in the On state. The operation mode command provided to the indoor unit from an eternal control device shall determine the base HVAC control function the indoor unit is providing. Available modes of operation are Cool, Dry, Fan, Heat, Setback, and Auto.

Cool. When the terminal unit Operation Mode is the Cool state, liquid refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The position of LEV is determined by an algorithm internal to the terminal unit. The algorithm calculates the temperature difference value between the measured zone air temperature value and the Cooling Temperature Setpoint value. When a large difference value exists, the LEV is driven open to allow more refrigerant into the evaporator coil. As the zone air temperature decreases the difference value becomes less. The algorithm shall respond and drive the LEV to more closed position reducing the amount of refrigerant entering into the evaporator coil. As the difference value approaches zero, the system stabilizes and the amount of LEV modulation is minimal.

Dry. When the terminal unit Operation Mode is the Dry state, liquid refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The goal in Dry mode is to remove water vapor from the air, not control the zone air temperature value to a zone temperature setpoint. When the terminal unit is commanded to the Dry state, an algorithm internal to the terminal unit drives the LEV to an open position. It is assumed that the position of the valve allows a sufficient amount of refrigerant to enter the coil, to cause the surface temperature of the coil fins to fall below the dew point temperature. The result is condensation that removes water vapor from the air passing through the coil.

When the zone air temperature value is greater than or equal to the Cooling Temperature Setpoint, Dry state is beneficial from both a humidity and zone temperature perspective because water vapor is being removed from the air in the zone and the difference value between the zone air temperature value and the Cooling Temperature Setpoint value is reduced.

Continued dehumidification shall cause the zone air temperature value to become less than the Cooling Temperature Setpoint, which is undesirable. To combat the effect, the algorithm calculates the temperature difference value between the zone air temperature value and Cooling Temperature Setpoint. Based on the difference value, the algorithm uses a sliding time scale method to modulate the LEV between the open position and the fully closed position for a variable length of time. It is assumed that when the LEV is in the fully closed position latent heat within the zone shall cause the zone air temperature value to increase. The method allows some dehumidification to take place without significantly lowering the air temperature in the zone below the Cooling Temperature Setpoint.

Fan. When the terminal unit Operation Mode is the Fan state, the LEV is closed and the terminal unit does not attempt regulate the air temperature in the zone. The temperature of the air in the zone may change due to latent heat within the zone. With the use of an external user interface, the speed of the fan may be modulated between the discrete states supported by the terminal unit.

Heat. When the terminal unit Operation Mode is the Heat state, hot gas refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The position of LEV is determined by an algorithm internal to the terminal unit. The algorithm calculates the temperature difference value between the measured zone air temperature value and the Heating Temperature Setpoint value. When a large difference value exists, the LEV is driven open to allow more refrigerant into the evaporator coil. As the zone air temperature increases the difference value becomes less. The algorithm shall respond and drive the LEV to more closed position reducing the amount of refrigerant entering into the evaporator coil. As the difference value approaches zero, the system stabilizes and the amount of LEV modulation is minimal.

Setback. Some terminal units may not support the Setback state. When the terminal unit Operation Mode transitions to Setback state, the LEV is driven closed and the zone air temperature is allowed to drift. The amount of drift is bounded by the Setback Cooling Temperature Setpoint and the Setback Heating Temperature Setpoint.

When the zone air temperature value is greater than the Setback Cooling Temperature Setpoint the terminal unit shall execute the setback cool algorithm. The algorithm modulates the LEV to maintain the zone temperature to the Setback Cooling Temperature Setpoint.

When the zone air temperature value is less than the Setback Heating Temperature Setpoint the terminal unit shall execute the setback heat algorithm. The algorithm modulates the LEV to maintain the zone temperature to the Setback Heating Temperature Setpoint.

Auto. Some manufacturers' terminal units may not support the Auto state of Operation Mode.
Auto mode is beneficial in a heat recovery system because it allows the terminal unit to automatically switch between cooling and heating states based on the current zone air temperature and the zone temperature setpoint in use. When the terminal unit Operation Mode is the Auto state, two sub-states are available, Auto (Cool) and Auto (Heat).

Depending on the setpoint control configuration of the terminal unit, one of three setpoints is used for control. When the unit is configured for single setpoint control, the Auto Zone Temperature Setpoint is used. When the unit is configured for dual setpoint control, the Cooling Temperature Setpoint is used when the unit is in the Auto (Cool) state and Heating Temperature Setpoint is used when the unit is in the Auto (Heat) state.

When the terminal unit Operation Mode is the Auto (Cool) state, liquid refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The position of LEV is determined by an algorithm internal to the terminal unit.

The algorithm subtracts the Zone Air Temperature value from the zone temperature setpoint value, the result is the temperature difference value. When the result is a large positive value, the LEV is driven open to allow more refrigerant into the evaporator coil. As the zone air temperature decreases the difference value becomes smaller. The algorithm shall respond and drive the LEV to a more closed position to reduce the amount of refrigerant entering into the evaporator coil. As the difference value approaches zero, the system stabilizes and the amount of LEV modulation is minimal. When the difference value is negative, the LEV is driven closed to prevent refrigerant from entering the evaporator.

When the terminal unit Operation Mode is the Auto (Heat) state, hot gas refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The position of LEV is determined by an algorithm internal to the terminal unit.

The algorithm subtracts the zone temperature setpoint value from the Zone Air Temperature value, the result is the temperature difference value. When the result is a large positive value, the LEV is driven open to allow more refrigerant into the evaporator coil. As the zone air temperature increases the difference value becomes smaller. The algorithm shall respond and drive the LEV to a more closed position reducing the amount of refrigerant entering into the evaporator coil. As the difference value approaches zero, the system stabilizes and the amount of LEV modulation is minimal. When the difference value is negative, the LEV is driven closed to prevent refrigerant from entering the evaporator.

Auto Mode System Changeover. The state of the terminal unit is Auto (Cool). When the absolute value of the difference value is greater than the factory defined changeover delta value, the terminal unit shall transition to the Auto (Heat) state.

The state of the terminal unit is Auto (Heat). When the difference value is greater than the factory defined changeover delta setpoint, the terminal unit shall transition to the Auto (Cool) state.

Fan Control. When the indoor unit is in the Off state, the fan is controlled to the minimum speed required to measure zone air temperature at the return air temperature sensor. This allows zone air temperature to be accurately measured while the indoor unit is in the Off state.

Upon transition from the Off state to the On state, the RPM of the fan is governed to match a manufacture specified, RPM value assigned to the each discrete fan speed state available in the unit. The number of distinct fan speed states and the fan RPM value for each state varies by manufacture and model of indoor unit. The fan speed state is controlled by one of two methods, automatic fan speed control or manual fan speed control. The choice of control method is made by a user of the system.

Upon indoor unit transition from the On state to the Off state, the fan transitions to the state described when the indoor unit is in the Off state.

Manual Fan Speed Control. A user of the system selects a desired fan speed state. The fan speed RPM shall change to match the manufacture specified RPM value and maintain the RMP value until a different fan speed state is selected or a change is made to another control parameter of the indoor unit that causes the fan to change to a different state.

Automatic Fan Speed Control. When a user of the system selects the fan speed state Auto, an algorithm internal to the indoor unit controls the selection of the fan speed state. The algorithm calculates the temperature difference value between the measured zone air temperature value and the zone temperature setpoint value in use. When a large difference value exists, the fan state selected shall have a highest fan speed RPM value. As the difference value is reduced, the algorithm shall change the fan speed in use to a state with a smaller RPM value.

Vane Direction:

The terminal unit has movable air vanes to change the direction of air flow from the unit. Three air vane control modes are

available: Auto, Swing, and Manual. The external user interface is used to select the air vane position in use.

Auto. When the Operation Mode is Cool state, the air vanes modulate to direct airflow parallel to the ceiling. When the Operation Mode is Heat state, the air vanes modulate to direct airflow perpendicular to the ceiling.

Swing. Regardless of Operation Mode state, the air vanes continuously modulate between parallel and perpendicular flow to the ceiling in a periodic manner.

Manual. Regardless of Operation Mode state, the air vanes are fixed at a position. The number of individual positions available varies by manufacturer and model type. Typically, two to five fixed positions are supported.

Condensate Overflow Monitoring:

The unit shall be equipped with a condensate drain pan level sensor to protect against drain pan overflow. If the sensor detects a high condensate level in the drain pan, the control shall shut down the indoor unit before an overflow can occur and a condensate alarm diagnostic shall annunciate at the BAS.

Points List: VRF INDOOR UNIT - 4WAY CASSETTE [QTY: 12]

Point Name	POINTS								ALARMS					
	GRAPHIC	ANALOG HARDWARE INPUT (AI)	BINARY HARDWARE INPUT (BI)	ANALOG HARDWARE OUTPUT (AO)	BINARY HARDWARE OUTPUT (BO)	SOFTWARE POINT (SFT)	HARDWARE INTERLOCK (HDW)	WIRELESS (WLS)	NETWORK (NET)	LOW AMBIENT LOCKOUT LIMIT	LOW ANALOG LIMIT	BINARY	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL
CONDENSATE OVERFLOW DETECTION LOCAL CND OVRFL			X										X		
FAN SPEED STATUS SAF STS			X												
SPACE HUMIDITY SENSOR LOCAL SPH		X	X												
SPACE OCCUPANCY STATUS OCC STS			X												
SPACE TEMPERATURE LOCAL SPT		X	X												
SPACE TEMPERATURE SETPOINT LOCAL SPT SP		X	X												
SPACE TEMPERATURE (TH1) SPT			X												
SUPPLY FAN SPEED SAF				X											
VANE DIRECTION VN DIR		X			X										
ALARM CODE ALM						X									
ALARM MESSAGE ALM MSG						X									
BAS COMMUNICATION STATE BAS COM						X									X
EXPANSION VALVE STATE XV RATE						X									
FILTER TIMER HOURS FIL HRS						X									
GAS PIPE TEMPERATURE (TH3) VAPT						X									
GAS PIPE TEMPERATURE (TH4) VAPT						X									
INDOOR LEV RATE LEV RATE						X									
LIQUID PIPE TEMPERATURE (TH2) LIQT						X									
OCCUPIED COOLING SETPOINT OCC CLG SP						X									
OCCUPIED HEATING SETPOINT OCC HTG SP						X									
SUBCOOL (SC) SC						X									
SUPERHEAT (SH) SH						X									
UNOCCUPIED COOLING SETPOINT UNOCC CLG SP						X									
UNOCCUPIED HEATING SETPOINT UNOCC HTG SP						X									

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PROJECT NUMBER: 25-049

SUBMISSION:
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No. DATE

SEQUENCE & CONTROLS DIAGRAMS

SHEET NUMBER:
M701

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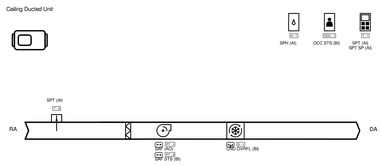
Flow Diagram: VRF INDOOR UNIT - DUCTED [QTY: 13]



NOTE: DUCTED VRF TO RUN 24/7 EXCEPT UNITS VRFI-03, VRFI-05, VRFI-9A, VRFI-9B, VRFI-10

Sequence of Operation: VRF INDOOR UNIT - DUCTED [QTY: 13]

Building Automation System Interface:

The Building Automation System (BAS) shall allow the user to monitor the status of Variable Refrigerant Flow (VRF) terminal units, outdoor units, and secondary VRF equipment, and modify control parameters of terminal units and secondary VRF equipment as necessary to maintain the desired space conditions.

If communication between the VRF equipment and the BAS is lost, the VRF system shall continue to operate using the current control parameters stored within the equipment to maintain the desired space conditions.

External Control Device:

In this specification the term 'external control device' is used to denote one or more user interface control devices that may be present in the system. The control devices that may be present are a Local Control device, VRF System Control device, or a Building Automation System. When more than one external control device is present in the control system, the last command or configuration value received by the indoor unit governs indoor unit operation.

There may be other means to provide commands and configuration parameters to the VRF system, such as hardwired control inputs. However, these are not considered the typical system control use case and the specification does not address them as written.

Zone Temperature Setpoint Control:

Single Setpoint. One zone air temperature setpoint is present. When the terminal unit is in a heating or cooling mode, it shall control the zone air temperature value to the Zone Temperature Setpoint value.

On/Off Mode:

The terminal unit has two modes that drive the overall operation of the unit, On and Off mode.

On. The internal algorithm shall control the unit to maintain the desired zone air temperature.

Off. The internal algorithm shall NOT control the unit to maintain the desire zone air temperature. The algorithm shall control components internal to the unit to minimize energy consumption and isolate it from VRF system refrigerant circuit. The zone air temperature sensor in use shall be monitored to allow the Zone Air Temperature Value to be displayed at an External Control Device(s).

Operation Mode:

Operation mode is the primary control parameter of the indoor unit when it is in the On state. The operation mode command provided to the indoor unit from an eternal control device shall determine the base HVAC control function the indoor unit is providing. Available modes of operation are Cool, Dry, Fan, Heat, Setback, and Auto.

Cool. When the terminal unit Operation Mode is the Cool state, liquid refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The position of LEV is determined by an algorithm internal to the terminal unit. The algorithm calculates the temperature difference value between the measured zone air temperature value and the Cooling Temperature Setpoint value. When a large difference value exists, the LEV is driven open to allow more refrigerant into the evaporator coil. As the zone air temperature decreases the difference value becomes less. The algorithm shall respond and drive the LEV to more closed position reducing the amount of refrigerant entering into the evaporator coil. As the difference value approaches zero, the system stabilizes and the amount of LEV modulation is minimal.

Dry. When the terminal unit Operation Mode is the Dry state, liquid refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The goal in Dry mode is to remove water vapor from the air, not control the zone air temperature value to a zone temperature setpoint. When the terminal unit is commanded to the Dry state, an algorithm internal to the terminal unit drives the LEV to an open position. It is assumed that the position of the valve allows a sufficient amount of refrigerant to enter the coil, to cause the surface temperature of the coil fins to fall below the dew point temperature. The result is condensation that removes water vapor from the air passing through the coil.

When the zone air temperature value is greater than or equal to the Cooling Temperature Setpoint, Dry state is beneficial from both a humidity and zone temperature perspective because water vapor is being removed from the air in the zone and the difference value between the zone air temperature value and the Cooling Temperature Setpoint value is reduced.

Continued dehumidification shall cause the zone air temperature value to become less than the Cooling Temperature Setpoint, which is undesirable. To combat the effect, the algorithm calculates the temperature difference value between the zone air temperature value and Cooling Temperature Setpoint. Based on the difference value, the algorithm uses a sliding time scale method to modulate the LEV between the open position and the fully closed position for a variable length of time. It is assumed that when the LEV is in the fully closed position latent heat within the zone shall cause the zone air temperature value to increase. The method allows some dehumidification to take place without significantly lowering the air temperature in the zone below the Cooling Temperature Setpoint.

Fan. When the terminal unit Operation Mode is the Fan state, the LEV is closed and the terminal unit does not attempt regulate the air temperature in the zone. The temperature of the air in the zone may change due to latent heat within the zone. With the use of an external user interface, the speed of the fan may be modulated between the discrete states supported by the terminal unit.

Heat. When the terminal unit Operation Mode is the Heat state, hot gas refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The position of LEV is determined by an algorithm internal to the terminal unit. The algorithm calculates the temperature difference value between the measured zone air temperature value and the Heating Temperature Setpoint value. When a large difference value exists, the LEV is driven open to allow more refrigerant into the evaporator coil. As the zone air temperature increases the difference value becomes less. The algorithm shall respond and drive the LEV to more closed position reducing the amount of refrigerant entering into the evaporator coil. As the difference value approaches zero, the system stabilizes and the amount of LEV modulation is minimal.

Setback. Some terminal units may not support the Setback state. When the terminal unit Operation Mode transitions to Setback state, the LEV is driven closed and the zone air temperature is allowed to drift. The amount of drift is bounded by the Setback Cooling Temperature Setpoint and the Setback Heating Temperature Setpoint.

When the zone air temperature value is greater than the Setback Cooling Temperature Setpoint the terminal unit shall execute the setback cool algorithm. The algorithm modulates the LEV to maintain the zone temperature to the Setback Cooling Temperature Setpoint.

When the zone air temperature value is less than the Setback Heating Temperature Setpoint the terminal unit shall execute the setback heat algorithm. The algorithm modulates the LEV to maintain the zone temperature to the Setback Heating Temperature Setpoint.

Auto. Some manufacturers' terminal units may not support the Auto state of Operation Mode.

Auto mode is beneficial in a heat recovery system because it allows the terminal unit to automatically switch between cooling and heating states based on the current zone air temperature and the zone temperature setpoint in use. When the terminal unit Operation Mode is the Auto state, two sub-states are available, Auto (Cool) and Auto (Heat).

Depending on the setpoint control configuration of the terminal unit, one of three setpoints is used for control. When the unit is configured for single setpoint control, the Auto Zone Temperature Setpoint is used. When the unit is configured for dual setpoint control, the Cooling Temperature Setpoint is used when the unit is in the Auto (Cool) state and Heating Temperature Setpoint is used when the unit is in the Auto (Heat) state.

When the terminal unit Operation Mode is the Auto (Cool) state, liquid refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The position of LEV is determined by an algorithm internal to the terminal unit.

The algorithm subtracts the Zone Air Temperature value from the zone temperature setpoint value, the result is the temperature difference value. When the result is a large positive value, the LEV is driven open to allow more refrigerant into the evaporator coil. As the zone air temperature decreases the difference value becomes smaller. The algorithm shall respond and drive the LEV to a more closed position to reduce the amount of refrigerant entering into the evaporator coil. As the difference value approaches zero, the system stabilizes and the amount of LEV modulation is minimal. When the difference value is negative, the LEV is driven closed to prevent refrigerant from entering the evaporator.

When the terminal unit Operation Mode is the Auto (Heat) state, hot gas refrigerant is provided to the terminal unit. The amount of refrigerant entering the evaporator coil is regulated by the Linear Expansion Valve. The position of LEV is determined by an algorithm internal to the terminal unit.

The algorithm subtracts the zone temperature setpoint value from the Zone Air Temperature value, the result is the temperature difference value. When the result is a large positive value, the LEV is driven open to allow more refrigerant into the evaporator coil. As the zone air temperature increases the difference value becomes smaller. The algorithm shall respond and drive the LEV to a more closed position reducing the amount of refrigerant entering into the evaporator coil. As the difference value approaches zero, the system stabilizes and the amount of LEV modulation is minimal. When the difference value is negative, the LEV is driven closed to prevent refrigerant from entering the evaporator.

Auto Mode System Changeover. The state of the terminal unit is Auto (Cool). When the absolute value of the difference value is greater than the factory defined changeover delta value, the terminal unit shall transition to the Auto (Heat) state.

The state of the terminal unit is Auto (Heat). When the difference value is greater than the factory defined changeover delta setpoint, the terminal unit shall transition to the Auto (Cool) state.

Fan Control. When the indoor unit is in the Off state, the fan is controlled to the minimum speed required to measure zone air temperature at the return air temperature sensor. This allows zone air temperature to be accurately measured while the indoor unit is in the Off state.

Upon transition from the Off state to the On state, the RPM of the fan is governed to match a manufacture specified, RPM value assigned to the each discrete fan speed state available in the unit. The number of distinct fan speed states and the fan RPM value for each state varies by manufacture and model of indoor unit. The fan speed state is controlled by one of two methods, automatic fan speed control or manual fan speed control. The choice of control method is made by a user of the system.

Upon indoor unit transition from the On state to the Off state, the fan transitions to the state described when the indoor unit is in the Off state.

Manual Fan Speed Control. A user of the system selects a desired fan speed state. The fan speed RPM shall change to match the manufacture specified RPM value and maintain the RMP value until a different fan speed state is selected or a change is made to another control parameter of the indoor unit that causes the fan to change to a different state.

Automatic Fan Speed Control. When a user of the system selects the fan speed state Auto, an algorithm internal to the indoor unit controls the selection of the fan speed state. The algorithm calculates the temperature difference value between the measured zone air temperature value and the zone temperature setpoint value in use. When a large difference value exists, the fan state selected shall have a highest fan speed RPM value. As the difference value is reduced, the algorithm shall change the fan speed in use to a state with a smaller RPM value.

Condensate Overflow Monitoring:

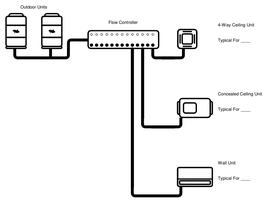
The unit shall be equipped with a condensate drain pan level sensor to protect against drain pan overflow. If the sensor detects a high condensate level in the drain pan, the control shall shut down the indoor unit before an overflow can occur and a condensate alarm diagnostic shall annunciate at the BAS.

Points List: VRF INDOOR UNIT - DUCTED [QTY: 13]

Point Name	POINTS								ALARMS					
	GRAPHIC	ANALOG HARDWARE INPUT (AI)	BINARY HARDWARE INPUT (BI)	ANALOG HARDWARE OUTPUT (AO)	BINARY HARDWARE OUTPUT (BO)	SOFTWARE POINT (SFT)	HARDWARE INTERLOCK (HDW)	WIRELESS (WLS)	NETWORK (NET)	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL
CONDENSATE OVERFLOW DETECTION LOCAL CND OVRFL			X												
FAN SPEED STATUS SAF STS			X												
SPACE HUMIDITY SENSOR LOCAL SPH	X	X													
SPACE OCCUPANCY STATUS OCC STS		X													
SPACE TEMPERATURE LOCAL SPT	X	X													
SPACE TEMPERATURE SETPOINT LOCAL SPT SP	X	X													
SPACE TEMPERATURE (TH1) SPT		X													
SUPPLY FAN SPEED SAF				X											
ALARM CODE ALM						X									
ALARM MESSAGE ALM MSG						X									
BAS COMMUNICATION STATE BAS COM						X									X
EXPANSION VALVE STATE XV RATE						X									
FILTER TIMER HOURS FIL HRS						X									
GAS PIPE TEMPERATURE (TH3) VAPT						X									
GAS PIPE TEMPERATURE (TH4) VAPT						X									
INDOOR LEV RATE LEV RATE						X									
LIQUID PIPE TEMPERATURE (TH2) LIQT						X									
OCCUPIED COOLING SETPOINT OCC CLG SP						X									
OCCUPIED HEATING SETPOINT OCC HTG SP						X									
SUBCOOL (SC) SC						X									
SUPERHEAT (SH) SH						X									
UNOCCUPIED COOLING SETPOINT UNOCC CLG SP						X									
UNOCCUPIED HEATING SETPOINT UNOCC HTG SP						X									

1 M702 VRF INDOOR UNIT - DUCTED SEQUENCES AND CONTROLS
NOT TO SCALE

Flow Diagram: VRF SYSTEM



Sequence of Operation: VRF SYSTEM

Variable Refrigerant Flow (VRF) System Sequence of Operation:

This sequence of operations describes the "system-level" control functions of a variable refrigerant flow (VRF) system, which includes coordinating the operation of the outdoor unit with terminal units during the various operating modes. The "equipment-level" control functions of the outdoor unit and the terminal units are contained in their respective sequence of operations documents.

Variable Refrigerant Flow (VRF) Heat Recovery System:

A Heat Recovery System shall provide synchronous/simultaneous heating and cooling to individual zones served by the VRF system. The state of the VRF system is Off when the outdoor unit is off and all terminal units are off. When any terminal unit transitions to the On state, the outdoor unit shall transition to the On state and the VRF system shall transition to the On state.

While the VRF system is in the On state, the outdoor unit supplies subcooled liquid and super-heated gas refrigerant to the refrigerant manifold device(s). The refrigerant manifold device shall simultaneously distribute liquid refrigerant to terminal units requesting cooling, and gas refrigerant to terminal units requesting heat. Each terminal unit shall communicate to the outdoor unit the need for heating or cooling.

While the outdoor unit is in the On state, if all of the terminal units transition to the Off state, the outdoor unit shall transition to the Shutdown state. Entering this state shall cause the outdoor unit to perform the necessary functions required to prepare the refrigerant system to stop operation. Once the refrigerant system has stopped operation, the outdoor unit shall transition to the Off state and the VRF System state shall transition to the Off state.

Building Automation System Control:

The Building Automation System (BAS) is a computer based, application that provides a method for a building operator to monitor and control the operation of a building. The BAS coordinates the actions of one or more building sub-systems (HVAC, lighting, etc.). The purpose of the system is to provide a safe and comfortable occupant environment using advanced control strategies to minimize the environmental footprint of the building.

The BAS shall have the ability to monitor and display data emanating from any piece of equipment connected to the system in human readable form. The BAS shall have the ability to perform building level control functions such as, but not limited to, time schedule based system operation, recording of operating parameter data values as a time or sample series, collection and annunciation for alarms generated by equipment, and control of equipment within the building.

The BAS shall monitor the status of the zone(s) in the building served by the Variable Refrigerant Flow (VRF) system and send commands to the VRF terminal unit(s) to maintain the environment in the zone.

Unoccupied Zone Temperature Control:

Unoccupied zone temperature (UZT) control is an energy minimization strategy. The BAS shall monitor the time schedule(s) controlling a group(s) of terminal units. When the time schedule transitions from the Occupied state to the Unoccupied state, the terminal units shall transition from the Occupied state to the Unoccupied state, and the UZT algorithm shall be enabled.

While enabled, the UZT algorithm shall monitor the air temperature of each zone in the group, calculate the average zone air temperature, and compare the average value to the unoccupied cooling and unoccupied heating zone temperature setpoints.

When the average zone air temperature is above the unoccupied cooling zone temperature setpoint, the terminal units in the group shall transition from the Unoccupied state to the Occupied state. This shall cause the VRF system to transition from the Off state to the On state, allowing the group of zones to be cooled.

When the average zone air temperature is below than the unoccupied cooling zone temperature setpoint minus a dead band value, the terminal units in the group shall transition from the Occupied state to the Unoccupied state. Once all terminal units in the VRF system are in the Unoccupied state, the VRF system shall transition from the On state to the Off state.

Conversely, when the average zone air temperature is below the unoccupied heating zone temperature setpoint, the terminal units in the group shall transition from the Unoccupied state to the Occupied state. This shall cause the VRF system to transition from the Off state to the On state, allowing the group of zones to be heated.

When the average zone air temperature is above the unoccupied heating zone temperature setpoint plus a dead band value, the terminal units in the group shall transition from the Occupied state to the Unoccupied state. Once all terminal units in the VRF system are in the Unoccupied state, the VRF system shall transition from the On state to the Off state.

When the time schedule controlling the group of terminal units transitions from the Unoccupied state to the Occupied state, all terminal units shall transition from the Unoccupied state to the Occupied state and the UZT algorithm shall be disabled. While disabled, the UZT algorithm is dormant.

2 M702 VRF SYSTEM SEQUENCES AND CONTROLS
NOT TO SCALE

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EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
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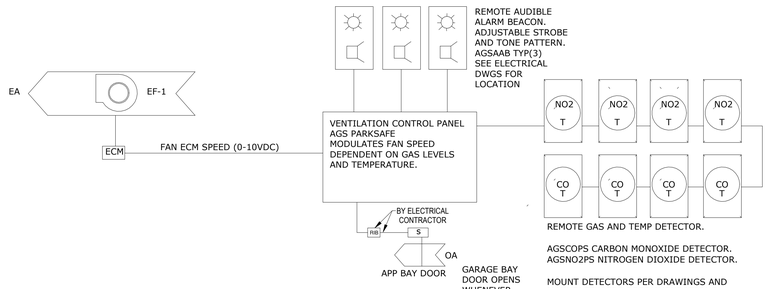
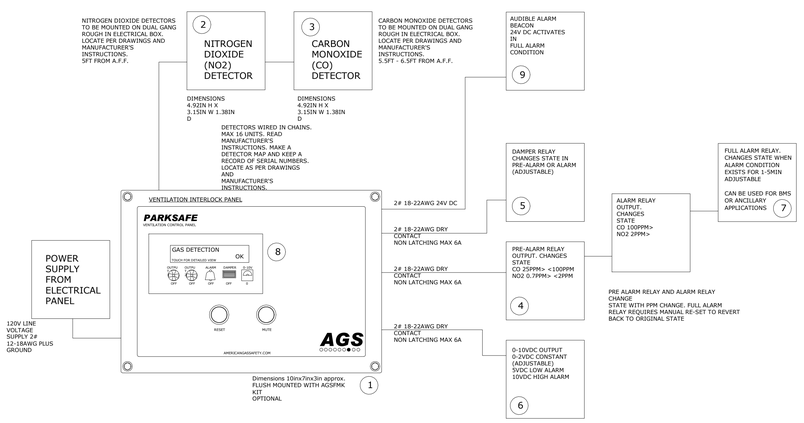




EXHAUST FAN EF-1 NORMAL OPERATION MODE

NOTE:

CONTRACTOR RESPONSIBLE FOR PROVIDING THIS SYSTEM OR APPROVED EQUIVALENT TO CONTROL EF-1 ECM MOTOR

RUN CONDITIONS:

EF-1: CONTINUOUS (24/7/365). ON GAS ALARM OR RISE IN TEMPERATURE, SPEED RAMPS UP

COOLING OPERATION:

UPON AN INCREASE IN TEMPERATURE ABOVE SETPOINT (80F) THE FAN SPEED SHALL BE INCREASED IN INCREMENTS BASED ON THE TEMPERATURE RANGE. (MAX 86F)

EF-1 FAN OVERRIDE:

CONTROLLER PROVIDES FASCIA MOUNTED MANUAL FAN ACTIVATION.

EXHAUST FAN RUN SEQUENCE - NO2 / CO

RUN CONDITIONS:

THE EXHAUST FAN ECM SHALL BE SENT 5VDC WHEN CO (CARBON MONOXIDE) OR NO2 (NITROGEN DIOXIDE) IS ABOVE:
CO 25PPM, NO2 0.7PPM

THE EXHAUST FAN ECM SHALL BE SENT 10VDC AND SET TO MAXIMUM WHEN GAS LEVELS REACH HIGH ALARM LEVELS:
CO >100PPM, NO2 >2PPM

VENTILATION CONTROLLER SHALL PROVIDE A CLEAR COLOR DIGITAL DISPLAY OF ALL CONDITIONS.

IF HIGH ALARM LEVEL EXISTS BEYOND TIMED DELAY (ADJ) CONTROLLER SHALL EMIT AUDIBLE WARNING TONES AND SIGNAL REMOTE AUDIBLE ALARM BEACONS.

GARAGE BAY DOOR OPERATION MODE

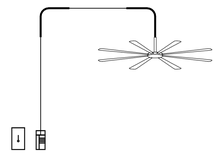
RUN CONDITIONS - INTERLOCKED WITH EF-1

CONTROLLER PROVIDES INTERNAL RELAY TO GOVERN POWER TO THE GARAGE BAY DOOR CONTROL WHENEVER EF-1 IS RUNNING .

1. AGS PARKSAFE VENTILATION CONTROL PANEL MODULATES FANS ON/OFF OR SPEED DEPENDING ON CONCENTRATIONS OF CO (CARBON MONOXIDE) AND NO2 (NITROGEN DIOXIDE) WITHIN THE PARKING STRUCTURE.
2. AGS CO DETECTORS AGSCOP INSTALL VIA CONDUIT OR ELECTRICAL ROUGH IN BOX. MOUNT PER MANUFACTURER'S INSTRUCTIONS. LOCATE PER DRAWINGS. DETECTORS COMMUNICATE WITH PARKSAFE UNIT VIA MODBUS. PARKSAFE UNIT POWERS DETECTORS. WIRE MULTIPLE DETECTORS IN SERIES PER MANUFACTURER'S INSTRUCTIONS
3. AGS NO2 DETECTOR AGSNO2P INSTALL VIA CONDUIT OR ELECTRICAL ROUGH IN BOX. MOUNT PER MANUFACTURER'S INSTRUCTIONS. LOCATE PER DRAWINGS. DETECTORS COMMUNICATE WITH PARKSAFE UNIT VIA MODBUS. PARKSAFE UNIT POWERS DETECTORS. WIRE MULTIPLE DETECTORS IN SERIES PER MANUFACTURER'S INSTRUCTIONS
4. PARKSAFE UNIT PROVIDES RELAY OUTPUTS FOR PRE-ALAM, ALARM AND FULL ALARM CONDITIONS. VOLT FREE NON LATCHING MAX 6A. OUTPUT 1 CHANGES STATE WHEN DETECTORS REACH PRE-ALARM CO >25PPM <100PPM NO2 >0.7PPM <2PPM OUTPUT 2 CHANGES STATE WHEN DETECTORS REACH ALARM CO 100>PPM NO2 >2PPM. FULL ALARM CHANGES STATE AFTER HIGH ALARM CONTINUES 1-5MINS ADJUSTABLE.
5. DAMPER RELAY CHANGES STATE WITH PRE-ALARM OR ALARM OUTPUTS ADJUSTABLE. VOLT FREE NON LATCHING MAX 6A.
6. 0-10VDC OUTPUT. 0-2V CONSTANT ADJUSTABLE. 5V LOW ALARM 10V HIGH ALARM
7. RELAYS AND 24V CAN BE UTILIZED FOR BMS CONNECTIVITY. FULL ALARM RELAY CHANGES STATE AFTER DESIRED TIME DELAY OF ALARM CONDITION. REQUIRES MANUAL RESET TO REVERT BACK TO ORIGINAL STATE
8. PANEL PROVIDES COLOR DISPLAY FOR ALARM CONDITIONS. GREEN=GOOD YELLOW-PRE-ALARM ORANGE-ALARM RED-FULL ALARM. TOUCH SCREEN MENU PROVIDES ACCESS TO SETTINGS, SENSOR TYPE AND CONDITION. FAN AND RELAY STATE SHOWN VIA IMAGES.
9. AUDIBLE ALARM BEACON AGSAAB. ACTIVATES IN FULL ALARM CONDITION. LOCATE OUTSIDE PARKING AREA TO WARN OF DANGEROUS ENVIRONMENT.

1 / M703 CONTROLS - APPARATUS BAY EXHAUST FANS EF-1
NOT TO SCALE

Flow Diagram: HVLS FAN [QTY: 4]



2 / M703 CONTROLS - HVLS
NOT TO SCALE

Sequence of Operation: HVLS FAN [QTY: 4]

Operation:

The exhaust fan shall be controlled by a space thermostat.

Smoke Detector Shutdown:

The system shall shut down in response to a signal from the smoke detector indicating the presence of smoke, and an alarm shall annunciate at the BAS. The smoke detector shall be interlocked to the fan motor controller through the dry contacts of the smoke detector. A manual reset of the smoke detector shall be required to restart the system.

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General Plan Symbols

- Plan Revision Number
- Detail Number on Sheet / Sheet Number Where Detail is Placed
- Keynote Symbol
- Continuation Symbol
- Point Where New Connects To Existing
- Room 1 — Room Name / Number
- Area Being Demolished
- Area Not In Contract

Abbreviations

Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	MIA	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BTU	BRITISH THERMAL UNITS	MUA	MAKE-UP/AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA
CAP	CAPACITY	NC	NORMALLY CLOSED
CB	CATCH BASIN	NIC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
CLG	CEILING	NO	NORMALLY OPEN
CO	CLEAN OUT	NTS	NOT TO SCALE
CW	COLD WATER	O	OXYGEN
D	DEGREE	O/A	OUTSIDE AIR
DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN
DIA	DIAMETER	PD	PRESSURE DROP
DN	DOWN	PIV	POST INDICATOR VALVE
DW	DISTILLED WATER	PLBG	PLUMBING
EA	EACH	PRESS	PRESSURE
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE
ELEC	ELECTRICAL	PSI	POUNDS PER SQUARE INCH
EQUIP	EQUIPMENT	PSIG	POUNDS PER SQUARE INCH GAUGE
EWC	ELECTRIC WATER COOLER	PWR	POWER
EWT	ENTERING WATER TEMPERATURE	R	DUCT RISER
E/A	EXHAUST AIR	R/A	RETURN AIR
EXIST	EXISTING	RCP	RADIANT CEILING PANEL
F	DEGREES FAHRENHEIT	RD	ROOF DRAIN
FCO	FLOOR CLEAN OUT	REC	RECESSED
FD	FLOOR DRAIN	RED	REDUCER
FDC	FIRE DEPARTMENT CONNECTION	RH	RELATIVE HUMIDITY
FL	FLOOR	RL/A	RELIEF AIR
FO	FUEL OIL	RM	ROOM
FOV	FUEL OIL VENT	RPM	REVOLUTIONS PER MINUTE
FOR	FUEL OIL RETURN	RW	RAIN WATER
FOS	FUEL OIL SUPPLY	SF	SQUARE FOOT
FPM	FEET PER MINUTE	S/A	SUPPLY AIR
FS	FLOOR SINK	SAN	SANITARY
FT	FOOT/FEET	SF	SQUARE FOOT
FTR	FIN TUBE RADIATION	SD	SMOKE DAMPER
GAL	GALLON	SM	SURFACE MOUNT
GF	GAS-FIRED	SP	STANDPIPE
GC	GENERAL CONTRACTOR	SP	STATIC PRESSURE
GPM	GALLONS PER MINUTE	STM	STEAM
GW	GREASE WASTE	T	THERMOSTAT
HB	HOSE BIB	TD	TEMPERATURE DROP
HP	HORSE POWER	TDR	TRENCH DRAIN
HTG	HEATING	TEMP	TEMPERATURE
HTR	HEATER	TYP	TYPICAL
HW	HOT WATER	UG	UNDERGROUND
HYD	HYDRANT	VAC	VACUUM
ID	INDIRECT	V	VENT
IN	INCH	VAV	VARIABLE AIR VOLUME
INV	INVERT	VENT	VENTILATION
LB	POUND	VTR	VENT THROUGH ROOF
LB/HR	POUNDS PER HOUR	W	WASTE
LAT	LEAVING AIR TEMPERATURE	WB	WET BULB
LP	LOW PRESSURE	WCO	WALL CLEAN OUT
LPG	LIQUEFIED PETROLEUM GAS	WH	WALL HYDRANT

Equipment Abbreviations

AC	AIR CONDITIONING UNIT	EXP	EXPANSION TANK
ACCU	AIR COOLING CONDENSING UNIT	EWH	ELECTRIC WATER HEATER
AHU	AIR HANDLING UNIT	FCU	FAN COIL UNIT
AS	AIR SEPARATOR	FP	FIRE PUMP
B	BOILER	GHW	GAS-FIRED WATER HEATER
CH	CHILLER	GI	GREASE INTERCEPTOR
CT	COOLING TOWER	GRV	GRAVITY ROOF VENTILATOR
CUH	CABINET UNIT HEATER	HWP	HEATING WATER PUMP
CHWP	CHILLED WATER PUMP	HRU	HEAT RECOVERY UNIT
DBP	DOMESTIC WATER BOOSTER PUMP	PRV	POWER ROOF VENTILATOR
DC	DUCT MOUNTED COIL	RE	RETURN/EXHAUST FAN
DCP	DOMESTIC WATER CIRCULATING PUMP	RTU	ROOFTOP UNIT
EF	EXHAUST FAN	SP	SUMP PUMP
EDC	ELECTRIC DUCT COIL	UH	UNIT HEATER
		WH	WATER HEATER

* NOTE *
ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET.THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

Plumbing Symbols

- 2" — Nominal Pipe Size
- Above Ground Piping
- Below Ground Piping
- 1/8" / 12" SLOPE — Pipe Slope (When Applicable)
- (E) — Existing Pipe To Remain
- Pipe To Be Demolished
- CW — Domestic Cold-Water
- NPW — Non-Potable Water
- S-CW — Soft Cold-Water
- F-CW — Filtered Cold-Water
- RO — Reverse Osmosis Water
- HW — Domestic Hot-Water
- HW 140° — Domestic Hot-Water 140°
- HW-R — Hot-Water Recirculation
- HW-R 140° — Hot-Water Recirculation 140°
- SS — Sanitary Drain
- V — Sanitary Vent
- WV — Sanitary Wet Vent
- CWV — Combination DWV
- CD — Condensate Drain
- ID — Indirect Drain
- GW — Grease Waste
- GV — Grease Vent
- OW — Oil Waste
- OV — Oil Vent
- PD — Pump Discharge
- RGC — Radon Gas Collection
- SD — Storm Drain
- OSD — Storm Overflow
- CA — Compressed Air
- NG — Natural Gas
- LP — Liquid Propane
- Pipe Rise / Drop

Pipe Accessory Notes

- 4" FCO — Cleanout
- 2" BACKWATER — Swing Check
- 2" CHECK — Check Valve
- 2" CHECK — Alternate Check Valve
- 2" BALANCE — Balancing Valve
- 2" CIRC — Circuit Setter
- 2" GATE — Gate Valve
- 2" QUICK — Quick Opening Valve
- 2" S/O — Ball Valve
- 2" STRAIN — Fluid Strainer
- S — 1" GAS-CNTRL — Emergency Gas Shutoff
- 1" PLUG — Plug Valve
- 1" GAS COCK — Gas Shutoff Cock
- 1" REG — Gas Regulator
- T/V — 1" T/V — Thermostatic Valve
- TP — PRIMER — Trap Primer
- M — 2" M-CNTRL — Elec. Control Valve
- T/P — TMV-XT/P — Mixing Valve
- EM — TMVEM — Emergency Mixer
- 2" PRV — Pressure Reducing Valve
- W — 2" METER — Water Meter
- IR — 1 1/2" METER — Irrigation Meter
- Double Check Valve
- Reduced Pressure Zone

Plumbing Fixture Notes

- Floor Drain — Design Size
- 0" FD-1 / 2 DFU — Identity Type / Drainage Fixture Units
- 2" FD-3 — Floor Drain w/ Deep Seal Trap
- 2" FD-3P — Floor Drain w/ Trap Primer ("P" Indicates Primer Connection)
- 2" FD-7 — Floor Drain w/ Integral Cleanout
- 3" AD-1 — Area Drain (No Trap)
- 6" DD-1 — Deck Drain
- 3" HD-1 — Hub Drain (Funnel Type)
- 3" FS-4 — Floor Sink
- 8" SD-12 — Roof Drain
- 6" SD-1 / 2000 SF — Combination Drain / Rainfall Surface Area

Project Requirements

A. COORDINATE INSTALLATION OF PIPING, DUCTWORK, CONDUIT, LIGHTS, CABLE TRAY, STRUCTURE, AND EQUIPMENT TO PREVENT CONFLICTS.

B. FINAL PRODUCT SHALL BE A COMPLETE AND FUNCTIONING SYSTEM, AND SHALL CONFORM TO ALL REQUIREMENTS OF APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING BUT NOT LIMITED TO THE INTERNATIONAL BUILDING CODE AND INTERNATIONAL MECHANICAL CODE.

C. LOCATE EQUIPMENT REQUIRING ACCESS 2'-0" MAXIMUM ABOVE CEILING.

D. ALL ROOF MOUNTED EQUIPMENT SHALL BE A MINIMUM 10'-0" FROM EDGE OF ROOF.

E. LOCATE DUCTWORK, PIPING AND MECHANICAL EQUIPMENT AWAY FROM THE SPACE ABOVE ELECTRICAL PANELS. TRANSFORMERS AND OTHER ELECTRICAL EQUIPMENT.

F. PENETRATIONS OF RATED ASSEMBLIES SHALL BE FIRE STOPPED. FIRE STOPPING SHALL BE AN APPROVED MATERIAL AS PRESCRIBED IN CSFM STANDARD 43-1 AND SHALL BE U.L. LISTED.

G. PROVIDE SLEEVES AND/OR OPENINGS TO RUN PIPES AND DUCTS THROUGH FOUNDATIONS, FLOORS, WALLS, AND ROOF.

H. MAINTAIN CLEAR ACCESS TO SERVICE EQUIPMENT AND OTHER ACCESSORIES REQUIRING SERVICE, VISUAL INSPECTION OR HAND OPERATION. WHERE INDICATED OR REQUIRED, PROVIDE ACCESS PANELS OF THE TYPE SELECTED TO SUIT MATERIALS IN WHICH INSTALLED.

I. ADJUST PIPING AND DUCTWORK SIZES TO PROPERLY CONNECT TO MECHANICAL EQUIPMENT.

J. REFER TO HVAC SERIES DRAWINGS FOR GAS AND A.C. CONDENSATE DRAIN PIPING.

K. PIPE SIZES SHOWN SHALL BE CONTINUED IN THE DIRECTION OF FLOW UNTIL ANOTHER SIZE IS SHOWN.

L. FOR DETAILS, EQUIPMENT CONNECTIONS, AND PIPE SIZES NOT SHOWN ON THE SEGMENTS, REFER TO DETAILS, SCHEDULES, AND SPECIFICATIONS.

M. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE RESPECTIVE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AT A LEVEL OF QUALITY AND WORKMANSHIP CONSISTENT WITH THE SPECIFICATIONS.

N. LOCATIONS OF PIPING, DUCTWORK AND EQUIPMENT AS INDICATED ON THE DRAWING, ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. WORK SHALL BE COORDINATED WITH ALL OTHER TRADES TO AVOID INTERFERENCE IN THE FIELD.

O. INSTALL EXPOSED PIPING AND DUCTWORK AS HIGH AS PRACTICAL IN ROOMS WITHOUT CEILINGS.

P. THE CONTRACTOR'S WORK SCHEDULE SHALL BE SUBMITTED TO AND APPROVED BY THE OWNER.

Q. PRIOR TO STARTING WORK, SUBMIT SHOP DRAWINGS FOR ALL MECHANICAL EQUIPMENT, PLUMBING FIXTURES, AND DIFFUSERS.

R. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND SHALL ARRANGE FOR ALL INSPECTIONS AS REQUIRED.

S. PROVIDE ONE YEAR WARRANTY FOR ALL WORKMANSHIP AND MATERIALS AFTER THE DATE OF FINAL ACCEPTANCE.

Plumbing General Notes

A. FIELD VERIFY ALL NEW WATER, WASTE, AND VENT PIPING CONNECTIONS AND PROVIDE NEW CONNECTIONS AS REQUIRED FOR PROPERLY OPERATING SYSTEMS.

B. PITCH UNDERFLOOR SANITARY WASTE PIPING AT 1/4" PER FOOT, UNLESS NOTED OTHERWISE.

C. PITCH UNDERFLOOR STORM PIPING 3" AND GREATER AT 1/8" PER FOOT, UNLESS NOTED OTHERWISE. PITCH ALL OTHER STORM PIPING AT 1/4" PER FOOT UNLESS OTHERWISE NOTED.

D. FIELD VERIFY LOCATION AND INVERTS OF SITE UTILITIES PRIOR TO INSTALLATION.

E. ROUTE DOMESTIC WATER, FIRE PROTECTION, SANITARY SEWER, AND STORM SEWER SERVICES TO SITE UTILITIES 5'-0" FROM BUILDING UNLESS NOTED OTHERWISE. REFER TO CIVIL PLANS.

F. WASTE AND VENT PIPING BELOW FLOOR AND THROUGH FLOOR SHALL BE 2" MINIMUM.

G. PROVIDE CLEANOUT IN ACCESSIBLE LOCATION AT THE BASE OF ALL PLUMBING RISERS.

Plumbing Sheet Index

P000	PLUMBING TITLE SHEET
P101	FIRST FLOOR - SANITARY PIPING PLAN
P201	FIRST FLOOR - SERVICE PIPING PLAN
P202	MEZZANINE - SERVICE PIPING PLAN
P401	FIRST FLOOR - ENLARGED SANITARY PIPING PLANS
P402	FIRST FLOOR - ENLARGED SERVICE PIPING PLANS
P403	FIRST FLOOR - ENLARGED SERVICE PIPING PLANS
P501	GAS RISER DIAGRAM
P502	DOMESTIC WATER RISER DIAGRAM
P503	SANITARY / VENT RISER DIAGRAM
P601	PLUMBING SCHEDULES & DETAILS
P602	PLUMBING SCHEDULES & DETAILS
P603	PLUMBING SCHEDULES & DETAILS

Code Fixture Unit Table

Qty	UPC	IPC	NPC	Code Fixture Unit Table	Design Total WSFU	Design Total DFU
101	Yes	No	No	UPC Fixture Unit Summary	227.5	357

Drainage Fixture Units

Qty	Description	Product Type	Emergency Drain	DFU Each	DFU Total
1	Bottle Filler	Bottle Filling Station		0.5	0.5
1	Commercial Sink	1-Compartment		4	4
1	Commercial Sink	1-Compartment		4	4
2	Commercial Sink	3-Compartment		4	8
2	Commercial Sink	1-Compartment		4	8
24	Floor Drain	Round Strainer	No	8	192
2	Floor Sink	12" Square X 6" Deep	No	4	8
1	Lavatory	Wall Hung		1	1
1	Lavatory	Wall Hung ADA		1	1
9	Lavatory	Counter Mount		1	9
3	Lavatory	Counter Mount ADA		1	3
4	Outlet Box	Ice Maker		0	0
6	Outlet Box	Washing Machine		3	18
2	Outlet Box	Dishwasher		3	6
1	Outlet Box	Coffee Maker		0	0
7	Shower Stall - ADA	Shower Fixtures		2	14
4	Sink	Janitor		3	12
3	Sink	Laundry Tub		2	6
7	Urinal	Wall Hung		2	14
6	Water Closet	Pressure Assist Water Closet		4	24
6	Water Closet	Pressure Assist Water Closet		4	24
1	Water Cooler	Electric Water Cooler - Dual Height		0.5	0.5
Grand total: 94					357

Water Supply Properties

Standard Water Density = 62.4 lb/ft³ or 1000 kg/m³
Standard Water Specific Heat = 1.000 BTU/(lb·°F) or 4.187 J/(g·°C)
Water Supply Temp. = Estimated Ground Water Temp.

Qty	Water Properties: Density	Water Properties: Specific Heat	Water Meter Pressure	Water Supply Temp.
8	62.4 lb/ft³	1.000 BTU/(lb·°F)	0 psi	40 °F

SEISMIC & WIND REQUIREMENTS FOR MECHANICAL / PLUMBING SYSTEMS IBC / ASCE-7

THIS FIRE STATION IS ASSIGNED TO SEISMIC DESIGN CATEGORY C AND IS OCCUPANCY / RISK CATEGORY IV AS DEFINED BY CHAPTER 1 OF ASCE-7. ALL HVAC, PLUMBING & FIRE PROTECTION SYSTEMS AND EQUIPMENT ARE REQUIRED FOR THE CONTINUED OPERATION OF THE FIRE STATION AFTER AN EARTHQUAKE AND SHALL BE ASSIGNED A COMPONENT IMPORTANCE FACTOR OF 1.5 IN ACCORDANCE WITH CHAPTER 13 OF ASCE 7.

A. PER SECTION 301.15 OF THE INTERNATIONAL MECHANICAL CODE, MECHANICAL EQUIPMENT, APPLIANCES AND SUPPORTS (INCLUDING ROOF CURBS & ROOF RAILS) EXPOSED TO WIND SHALL BE DESIGNED AND INSTALLED TO RESIST THE WIND PRESSURES DETERMINED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE. WHERE SEISMIC RESTRAINT IS REQUIRED, THE MORE DEMANDING FORCE OF WIND AND SEISMIC MUST BE USED. SEE SEISMIC INFORMATION CONTAINED IN THE STRUCTURAL DRAWINGS FOR SITE SPECIFIC INFORMATION ON SEISMIC DESIGN CATEGORY.

B. USE APPLICABLE TABLE BELOW TO DETERMINE SEISMIC RESTRAINT REQUIREMENTS FOR EACH MECHANICAL COMPONENT.

C. FOR ALL COMPONENTS REQUIRING SEISMIC AND/OR WIND RESTRAINT, THE MECHANICAL / PLUMBING CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CALCULATIONS PREPARED IN ACCORDANCE WITH THE IBC AND ASCE 7 BEARING THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF PENNSYLVANIA WHO IS QUALIFIED TO DESIGN SEISMIC RESTRAINT SYSTEMS. SHOP DRAWINGS SHALL INCLUDE SEPARATE DETAILS AND CALCULATIONS FOR EACH SEPARATE SYSTEM. DEVICE, OR ELEMENT. THE APPROVAL OF SEISMIC BRACING SHOP DRAWINGS SHALL BE REQUIRED PRIOR TO THE INSTALLATION OF ANY BUILDING SYSTEMS OR COMPONENTS.

D. WHERE SEISMIC RESTRAINT IS REQUIRED, HOUSEKEEPING PADS NEEDED FOR THE INSTALLATION OF EQUIPMENT UNDER THIS CONTRACT MUST BE DESIGNED BY THE SEISMIC ENGINEER. DO NOT POUR ANY HOUSEKEEPING PADS PRIOR TO THE RECEIPT OF THE SEISMIC SUBMITTAL.

E. SEISMIC RESTRAINTS FOR PIPING AND DUCTWORK MUST BE SHOWN ON LAYOUT DRAWINGS SHOWING SPECIFIC RESTRAINT LOCATIONS ALONG WITH ACCOMPANYING DETAILS AND CALCULATIONS.

COMPONENT IDENTIFICATION		SEISMIC RESTRAINT REQUIREMENT	NOTES
ROOF MOUNTED		RESTRAIN ALL - SEISMIC & WIND	-
FLOOR MOUNTED		RESTRAIN ALL	-
WALL MOUNTED		RESTRAIN ALL	-
COMPONENT SUPPORTS		RESTRAIN ALL	-
SUSPENDED EQUIPMENT	INLINE W/ DUCT	RESTRAIN IF >75 LBS PROVIDE FLEX. CONN.	3
	NOT INLINE W/ DUCT/PIPE	RESTRAIN ALL	-
SUSPENDED DUCTILE PIPING (STEEL, ALUMINUM, COPPER, ETC.)		>2"	4
SUSPENDED NON DUCTILE PIPING (CAST IRON, PLASTIC, CERAMIC)		RESTRAIN ALL	4
SUSPENDED PIPE ON TRAPEZE		RESTRAIN IF ANY PIPE ON TRAPEZE > 2" RESTRAIN IF TOTAL WEIGHT OF PIPES ON TRAPEZE > 10 LBS/FT	4
DUCTWORK		6 SQ.FT. AND LARGER	5
MULTIPLE DUCTS ON TRAPEZE		RESTRAIN IF TOTAL WEIGHT OF DUCTS ON TRAPEZE > 10 LBS/FT	4
COMPONENT CERTIFICATION (SEE NOTE 6)		REQUIRED	6

NOTES:
1. EQUIPMENT 20 LBS. OR LESS IS EXEMPT IF FLEXIBLE CONNECTIONS ARE PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
2. RESTRAINTS ARE NOT REQUIRED IF THE COMPONENT WEIGHS 400 LBS. OR LESS, IS MOUNTED AT 4 FT. OR LESS ABOVE A FLOOR, AND HAS FLEXIBLE CONNECTIONS BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
3. FLEXIBLE CONNECTIONS REQUIRED FOR PIPE CONNECTIONS ONLY.
4. RESTRAINT IS NOT REQUIRED IF THE PIPING / DUCTWORK IS SUPPORTED BY HANGERS AND EACH HANGER IN THE PIPING RUN IS 12 IN. OR LESS IN LENGTH FROM THE TOP OF THE PIPE TO THE SUPPORTING STRUCTURE. WHERE PIPES ARE SUPPORTED ON A TRAPEZE, THE TRAPEZE SHALL BE SUPPORTED BY HANGERS HAVING A LENGTH OF 12 IN. OR LESS. WHERE ROD HANGERS ARE USED, T HEY SHALL BE EQUIPPED WITH SWIVELS, EYE NUTS OR OTHER DEVICES TO PREVENT BENDING IN THE ROD.
5. ALL DUCTWORK , REGARDLESS OF SIZE, DESIGNED TO CARRY TOXIC, HIGHLY TOXIC, OR EXPLOSIVE GASES OR USED FOR SMOKE CONTROL MUST BE RESTRAINED.
6. COMPONENT CERTIFICATION MUST BE SUPPLIED BY THE EQUIPMENT MANUFACTURER AT TIME OF SUBMITTAL FOR REVIEW BY ENGINEER OF RECORD.

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EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING PA 19606

PROJECT NUMBER: 25-049

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PLUMBING TITLE SHEET

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KEYNOTES

1. 4" SAN TIE-POINT. SEE CIVIL SITE PLAN FOR CONTINUATION.
2. 3" SAN TIE-POINT. SEE CIVIL SITE PLAN FOR CONTINUATION.
3. 6" SAN TIE-POINT. SEE CIVIL SITE PLAN FOR CONTINUATION.
4. OSI PURCHASED AND INSTALLED BY SITE CIVIL CONTRACTOR. PLUMBING CONTRACTOR TO PROVIDE/INSTALL SS PIPING TO OSI AND ALL OSI VENT PIPING. PIPING DOWNSTREAM OF OSI BY SITE CIVIL. SEE 6/P601 FOR OSI INFORMATION.
5. PC TO PROVIDE TWO-WAY CLEANOUT TEE PIPED TO GRADE ON OSI INLET
6. SC TO PROVIDE TWO-WAY CLEANOUT TEE PIPED TO GRADE ON OSI OUTLET
8. RADON FAN (EF-RGC), IN-LINE ON VERTICAL PIPING AT 4'-0" AFF, WITH FLEXIBLE COUPLINGS AND VIBRATION ISOLATING SUPPORTS. DISCHARGE PIPING SOLVENT-WELDED DIRECT TO ROOF TERMINATION. NO CLEANOUTS OR MECHANICAL JOINTS ON DISCHARGE SIDE. BASIS OF DESIGN: FANTECH RxHEC, 120V/1PH, 175 WATTS MAX. FINAL MAKE, MODEL, VOLTAGE, AND AMPERAGE SHALL BE DETERMINED BY THE RADON DELEGATED DESIGNER AND SUBMITTED FOR REVIEW. FURNISH FINAL ELECTRICAL DATA TO THE ELECTRICAL CONTRACTOR BEFORE ROUGH-IN. SEE SPECIFICATION SECTION 22 38 00.
9. CONTRACTOR TO INSTALL ALL UNDERGROUND RADON LINES ~ 8" BELOW SLAB BOTTOM.



1 P101 SANITARY PIPING PLAN - FIRST FLOOR
1/8" = 1'-0"

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EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING PA 19606

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FIRST FLOOR - SANITARY PIPING PLAN

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P101

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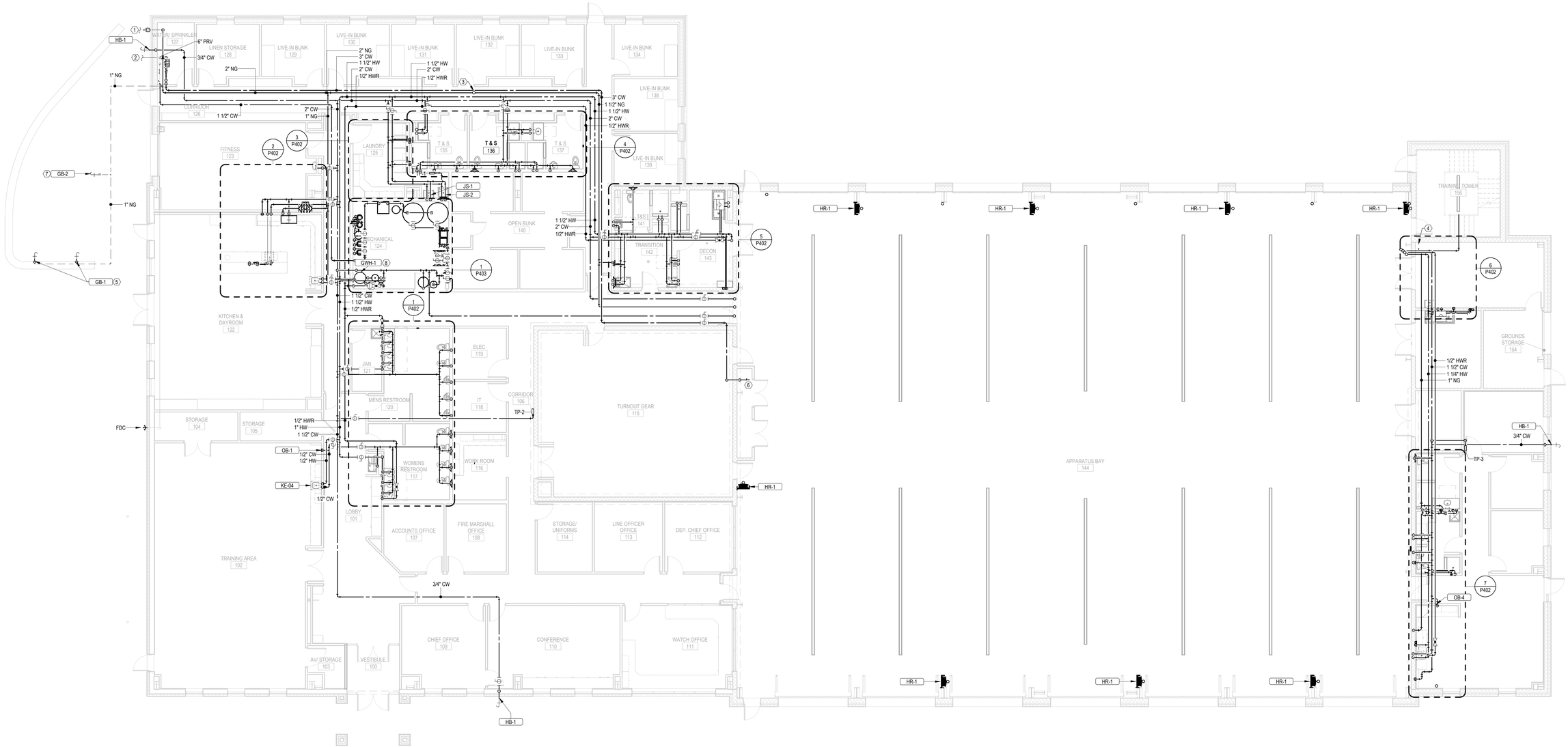
KEYNOTES

1. 2" NATURAL GAS INCOMING FROM UTILITY EXTENSION. SIZED PER IFC 402.4(2) WITH 598MBH AND APPROX. 300FT LENGTH. SEE CIVIL SITE PLAN FOR CONTINUATION.
2. 6" COMBINED FW/CW MAIN. SEE CIVIL SITE PLAN FOR CONTINUATION.
3. 2" NATURAL GAS UP THRU ROOF TO DOAS-1. COORDINATE WITH MECHANICAL PLANS FOR EXACT LOCATIONS.
4. 1" NATURAL GAS THRU WALL TO VRF0-2 ON ROOF. COORDINATE WITH MECHANICAL PLANS FOR EXACT LOCATION.
5. GAS BOX STUB TO BE RECESSED AND SHALL BE COORDINATED WITH OWNER PRIOR TO INSTALL. NG TO GB-1 IS INTO THE BOTTOM OF THE SURFACE MOUNTED GB-1.
6. CONTRACTOR TO INSTALL 3" BALL VALVE WITH DROP. TRANSITION TO 2 1/2" THREADED.
7. VERIFY FINAL LOCATION WITH ARCHITECT. INSTALL A 1 1/4" DRAIN PIPE TO THE ADJACENT PAVED AREA.
8. PC TO INSTALL VENT/COMBUSTION AIR PIPES ABV CEILING & THRU WALL ABOVE BUNK-130. TERMINATE WITH CONCENTRIC VENT KIT.

NOTE: KITCHEN STOVE TOP AND PATIO GAS LINE NEEDS TO HAVE A REMOTE ACTUATED VALVE TO BE COORDINATED WITH FIRE STATION ALERTING SYSTEM



1 P201 SERVICE PIPING PLAN - FIRST FLOOR
1/8" = 1'-0"

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EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING PA 19606

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FIRST FLOOR - SERVICE PIPING PLAN

SHEET NUMBER:
P201

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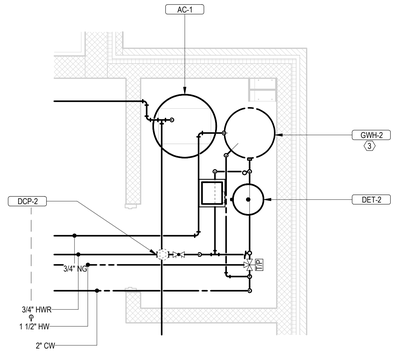
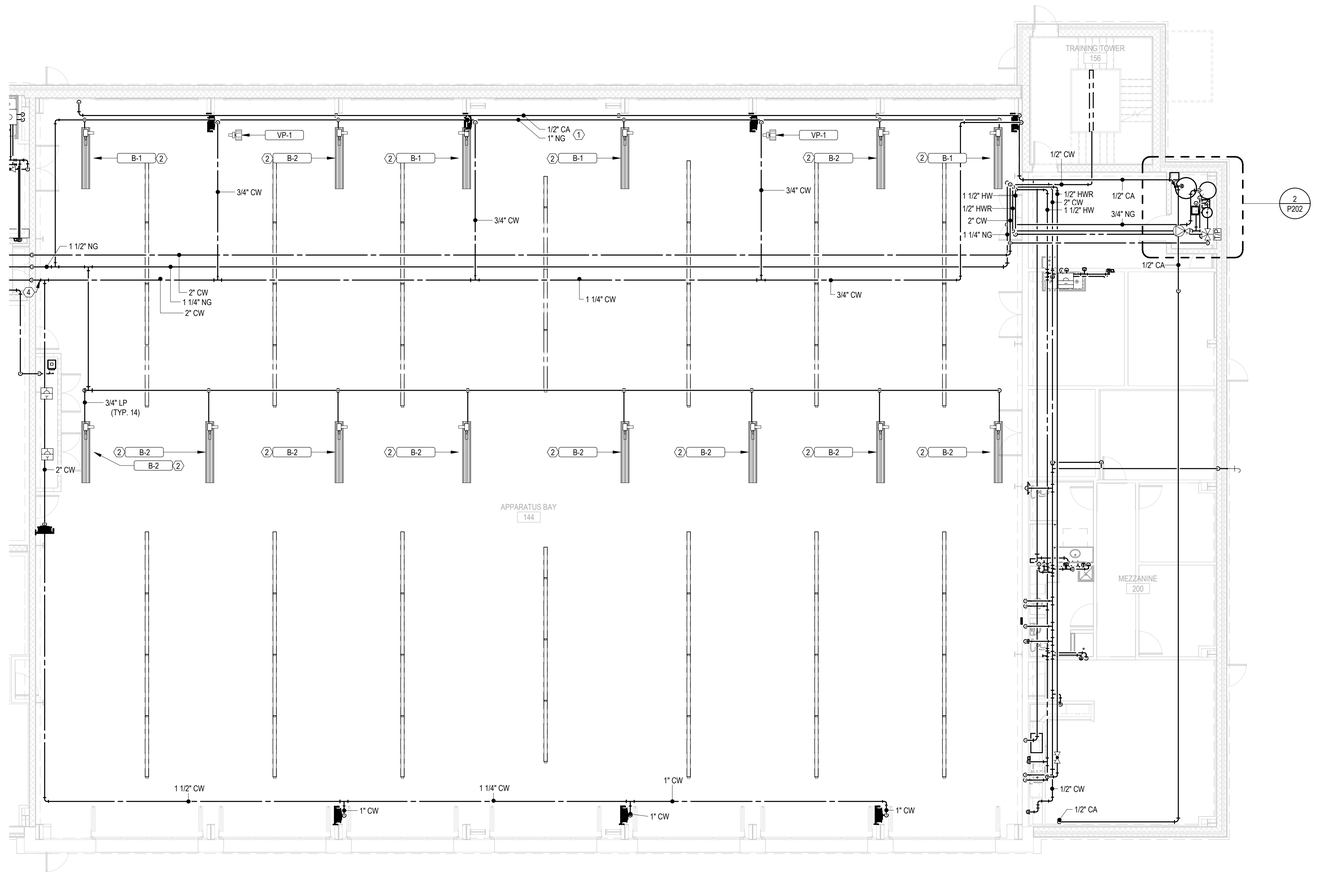
KEYNOTES

1. PLUMBING CONTRACTOR TO COORDINATE SUPPLY PIPING WITH STRUCTURAL DRAWINGS AND OVERHEAD TRACKS.
2. CONTRACTOR TO REFERENCE PLUMBING DETAIL 7/P602 FOR INFRARED HEATING BURNER / GAS CONNECTION
3. PC TO INSTALL VENT/COMBUSTION AIR PIPES THRU WALL. TERMINATE WITH CONCENTRIC VENT KIT.
4. TRUCK WASH COLD WATER LINE.



2 P202 MEZZANINE PLUMBING PLAN
3/8" = 1'-0"



1 P202 SERVICE PIPING PLAN - MEZZANINE
1/8" = 1'-0"

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MEZZANINE - SERVICE PIPING PLAN

SHEET NUMBER:

P202

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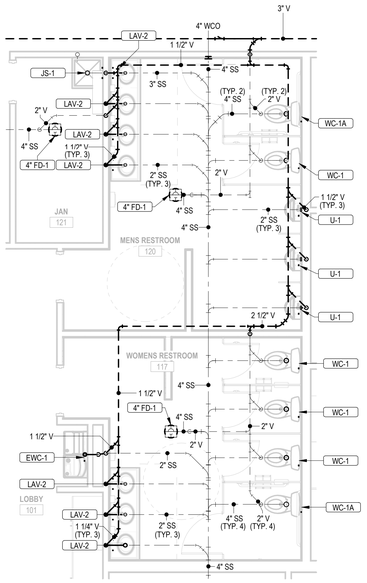
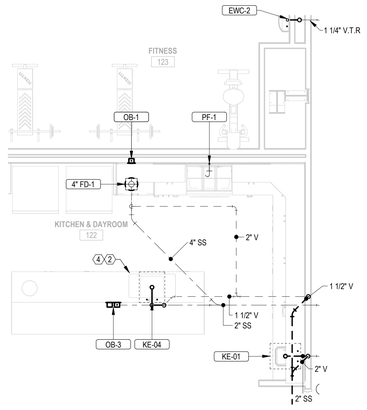
KEYNOTES

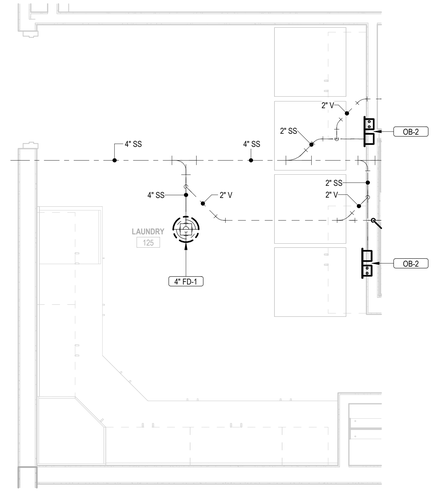
1. 14"x10"x3'-0" LONG WASHING MACHINE DRAIN TROUGH WITH LINT TRAP H-M COMPANY OR EQUAL. FLOOR MOUNTED WITH BOTTOM DRAIN CONNECTIONS.
2. CONTRACTOR IS TO CONNECT FIXTURES TO BOTH SANITARY AND DOMESTIC LINES. PLUMBING CONTRACTOR TO INSTALL GARBAGE DISPOSAL IN KITCHEN SINK. GARBAGE DISPOSAL TO BE MOEN DISPOSAL CHEF SERIES MODEL EXL100C. CONTRACTOR IS TO CONNECT FIXTURES TO BOTH SANITARY AND DOMESTIC LINES.
4. PLUMBING CONTRACTOR IS TO REFERENCE 8/P602 WHEN INSTALLING ISLAND SANITARY. TYPICAL FOR ALL ISLAND SINKS.



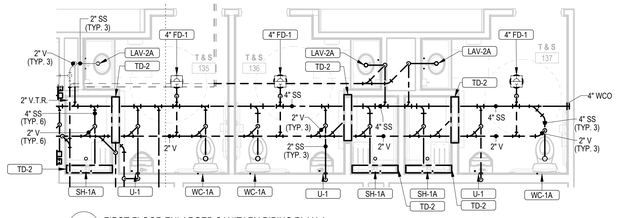
1 P401 FIRST FLOOR ENLARGED SANITARY PIPING PLAN 1
1/4" = 1'-0"



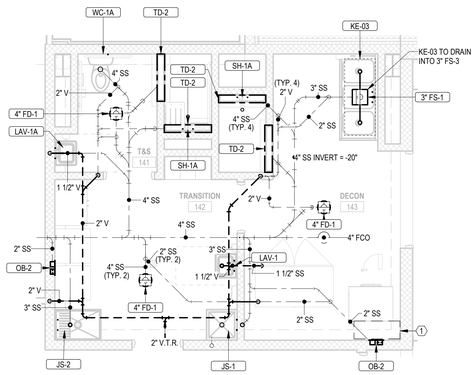
2 P401 FIRST FLOOR ENLARGED SANITARY PIPING PLAN 2
1/4" = 1'-0"



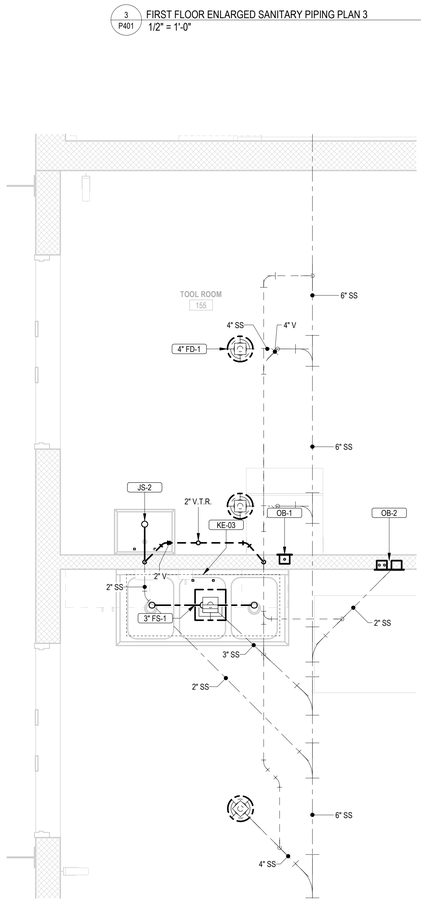
3 P401 FIRST FLOOR ENLARGED SANITARY PIPING PLAN 3
1/2" = 1'-0"



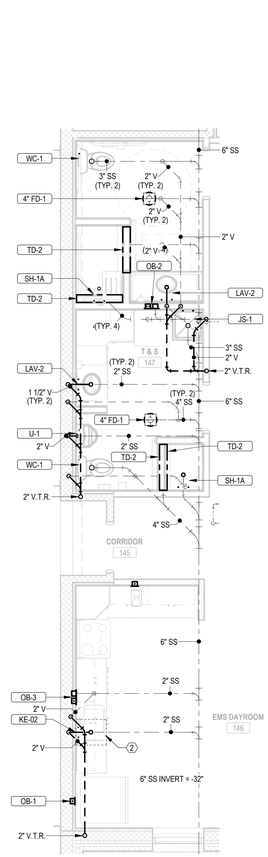
4 P401 FIRST FLOOR ENLARGED SANITARY PIPING PLAN 4
1/4" = 1'-0"



5 P401 FIRST FLOOR ENLARGED SANITARY PIPING PLAN 5
1/4" = 1'-0"



6 P401 FIRST FLOOR ENLARGED SANITARY PIPING PLAN 6
1/2" = 1'-0"



7 P401 FIRST FLOOR ENLARGED SANITARY PIPING PLAN 7
1/4" = 1'-0"

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EXETER TOWNSHIP
EMERGENCY SERVICES FACILITY
70 GIBRALTAR ROAD
READING PA 19606

PROJECT NUMBER: 25-049

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FIRST FLOOR - ENLARGED SANITARY PIPING PLANS

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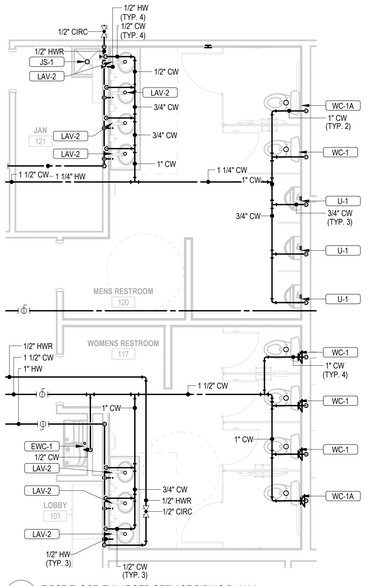
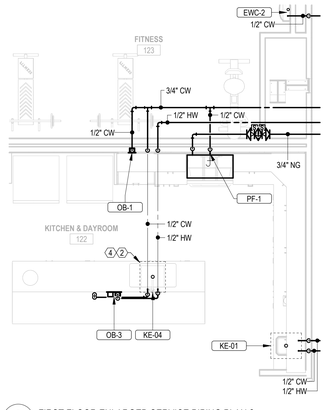
KEYNOTES

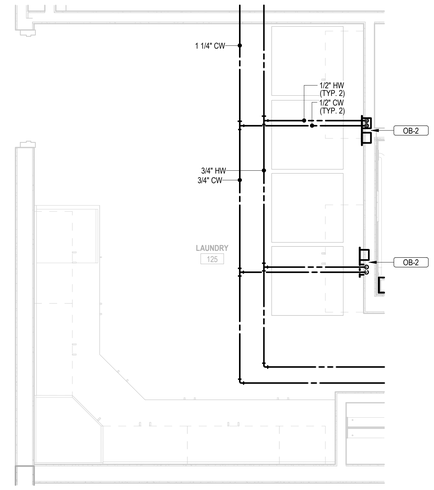
1. 14"x10"x3'-0" LONG WASHING MACHINE DRAIN TROUGH WITH LINT TRAP H-M COMPANY OR EQUAL. FLOOR MOUNTED WITH BOTTOM DRAIN CONNECTIONS.
2. CONTRACTOR IS TO CONNECT FIXTURES TO BOTH SANITARY AND DOMESTIC LINES. PLUMBING CONTRACTOR TO INSTALL GARBAGE DISPOSAL IN KITCHEN SINK. GARBAGE DISPOSAL TO BE MOEN DISPOSAL CHEF SERIES MODEL EJXL100C. CONTRACTOR IS TO CONNECT FIXTURES TO BOTH SANITARY AND DOMESTIC LINES.
4. PLUMBING CONTRACTOR IS TO REFERENCE 8/P802 WHEN INSTALLING ISLAND SANITARY. TYPICAL FOR ALL ISLAND SINKS.



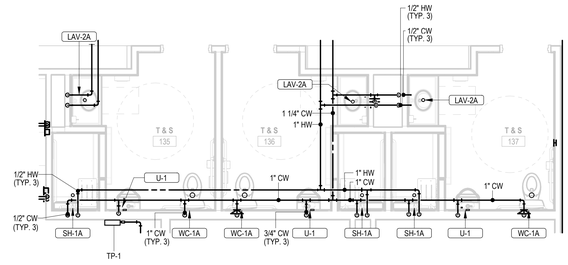
1 P402 FIRST FLOOR ENLARGED SERVICE PIPING PLAN 1
1/4" = 1'-0"



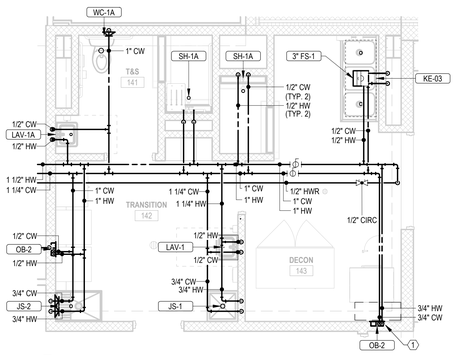
2 P402 FIRST FLOOR ENLARGED SERVICE PIPING PLAN 2
1/4" = 1'-0"



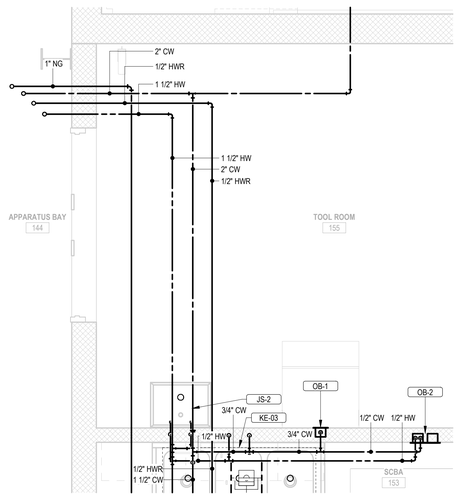
3 P402 FIRST FLOOR ENLARGED SERVICE PIPING PLAN 3
1/2" = 1'-0"



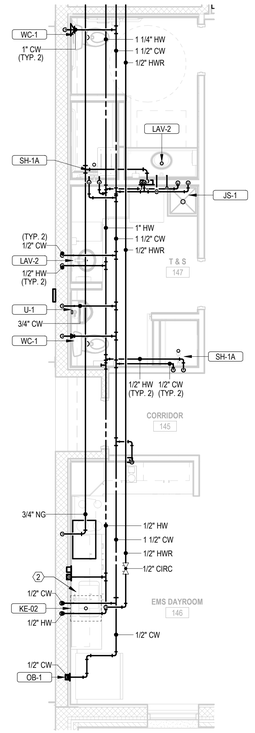
4 P402 FIRST FLOOR ENLARGED SERVICE PIPING PLAN 4
1/4" = 1'-0"



5 P402 FIRST FLOOR ENLARGED SERVICE PIPING PLAN 5
1/4" = 1'-0"



6 P402 FIRST FLOOR ENLARGED SERVICE PIPING PLAN 6
1/2" = 1'-0"



7 P402 FIRST FLOOR ENLARGED SERVICE PIPING PLAN 7
1/4" = 1'-0"

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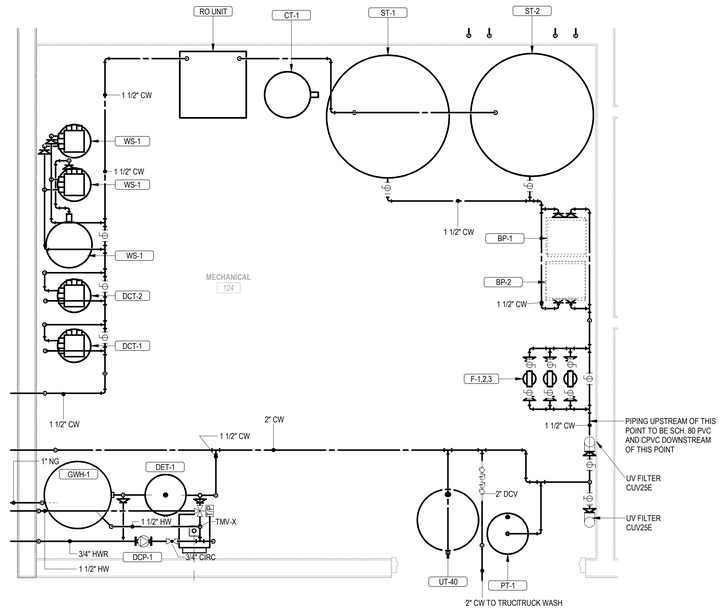
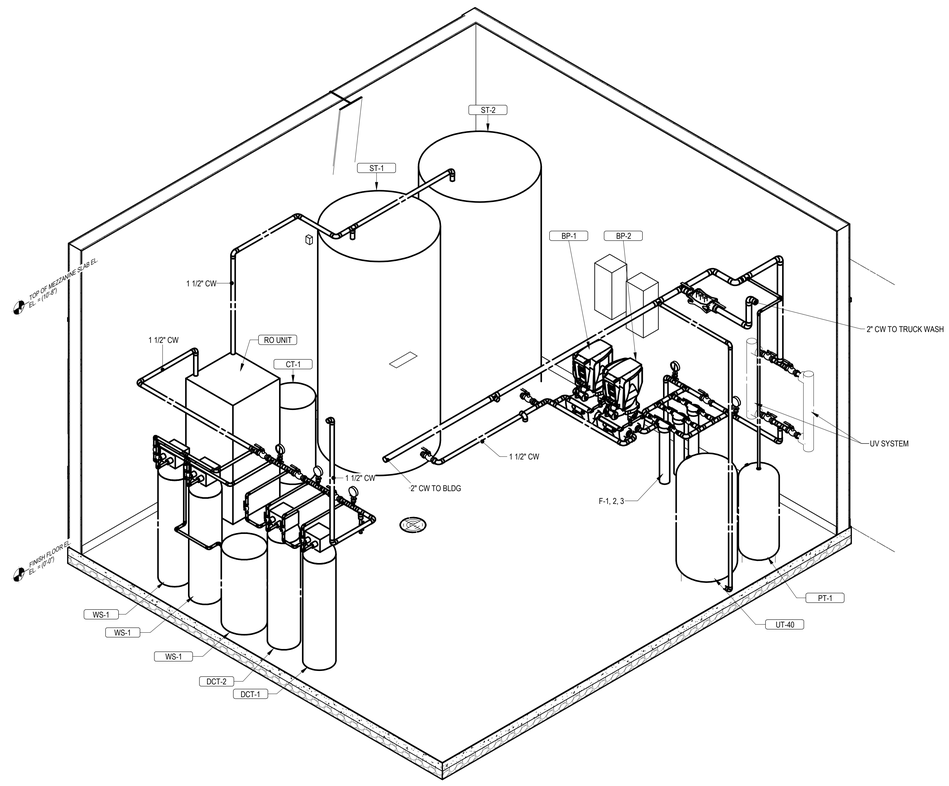


1 P403 FIRST FLOOR ENLARGED SERVICE PIPING PLAN 8
1/2" = 1'-0"

NOTES: CONTRACTOR TO REFER TO P603 FOR ENHANCED DETAIL OF MECHANICAL ROOM WATER PURIFICATION SYSTEM



2 P403 WATER FILTRATION ROOM SW ISOMETRIC

NOTE: WATER HEATER / ASSOCIATED PIPING NOT SHOW IN THIS VIEW

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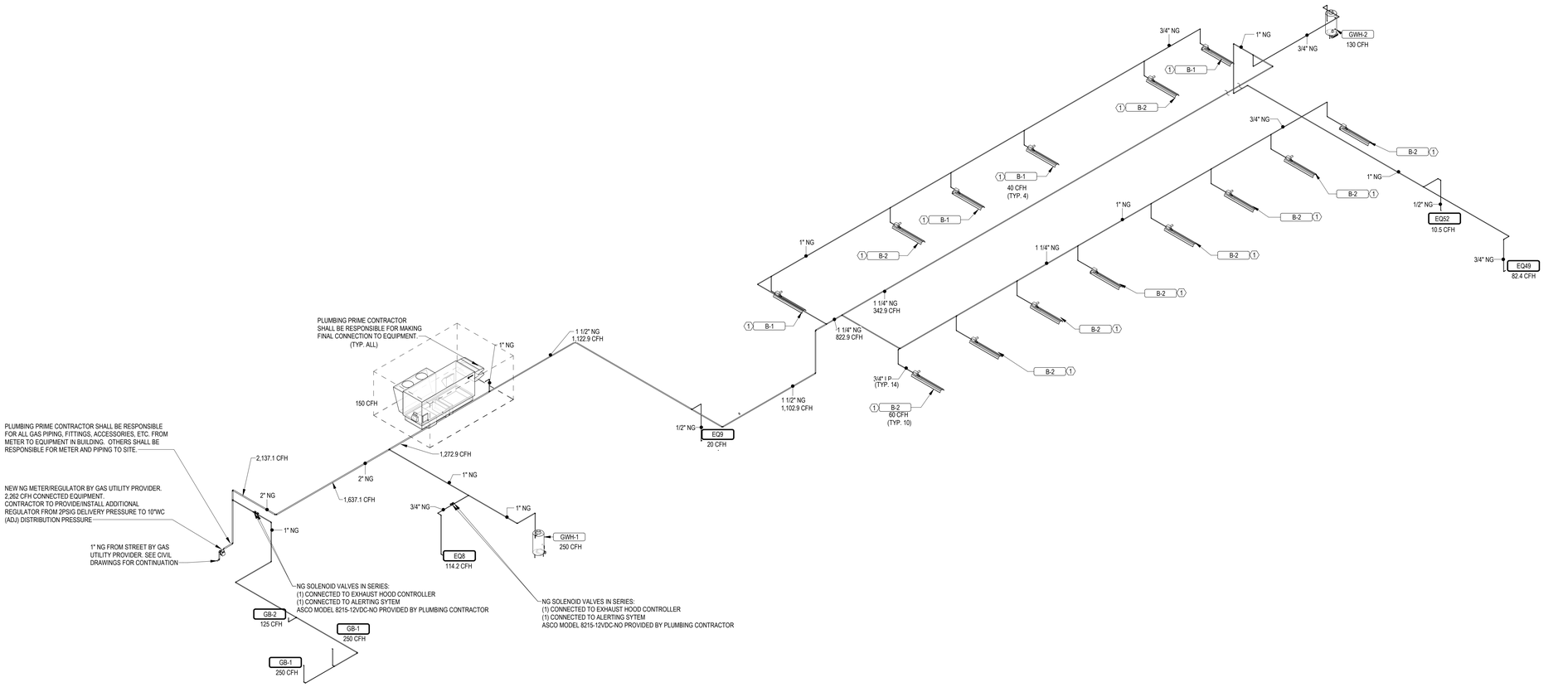
NATURAL GAS GENERAL NOTES

1. PROVIDE ISOLATION VALVE FOR ALL NATURAL GAS PIPING AT ALL BRANCHES. PROVIDE ACCESS PANELS WHERE REQUIRED.
2. PROVIDE DRIP & SEDIMENT TRAP AT ALL LOW POINTS IN NATURAL GAS PIPING SYSTEM AS WELL AS IMMEDIATELY PRIOR TO EQUIPMENT.
3. INSTALL NATURAL GAS PIPING WITH 2% GRADE TO DRIP & SEDIMENT TRAPS.
4. PROVIDE STRAINER AND PRESSURE REGULATOR IMMEDIATELY PRIOR TO EQUIPMENT RECEIVING NATURAL GAS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL CONNECTION TO EQUIPMENT.
6. PIPING SHOWN DIAGRAMMATIC. CONTRACTOR SHALL COORDINATE PIPING WITH ALL OTHER DISCIPLINES AND PRIME CONTRACTORS INCLUDING BUT NOT LIMITED TO; STRUCTURAL, MECHANICAL, ELECTRICAL, ETC.

KEYNOTES

1 CONTRACTOR TO REFERENCE PLUMBING DETAIL 7/P602 FOR INFRARED HEATING BURNER / GAS CONNECTION



1 / P501 GAS SUPPLY RISER DIAGRAM
NOT TO SCALE

NATURAL GAS FIXTURE SCHEDULE

ID	DESCRIPTION	MANUFACTURER	MODEL	QTY	NATURAL GAS FUEL LOAD	NATURAL GAS ROUGH-IN PIPE SIZE	FURNISHING CONTRACTOR
B-1	IR HEAT BURNER	CO-RAY-VAC	CRV-B4	4	40 CFH	3/4"	BY MECHANICAL CONTRACTOR
B-2	IR HEAT BURNER	CO-RAY-VAC	CRV-B6	10	60 CFH	3/4"	BY MECHANICAL CONTRACTOR
DOAS-1	DEDICATED OUTDOOR AIR SYSTEM	TRANE	OADG015E3-DAB5GAE00-J1AGG3AE0-21A20C01B-A00C00A00-A01A00000-00AL00000	1	150 CFH	3/4"	BY MECHANICAL CONTRACTOR
EQ8	6 BURNER GAS RANGE	WOLF	GR366	1	114.2 CFH	3/4"	BY GENERAL CONTRACTOR. PLUMBING CONTRACTOR TO CONFIRM GAS PRESSURE REQUIREMENTS AND PROVIDE APPLIANCE PRESSURE REGULATOR IF REQUIRED
GB-1	GAS GRILL	BY GENERAL CONTRACTOR	BY GENERAL CONTRACTOR	2	250 CFH	1/2"	GRILL BY GENERAL CONTRACTOR
GB-2	GAS CONNECTION	BY GENERAL CONTRACTOR	BY GENERAL CONTRACTOR	1	125 CFH	1/2"	BY GENERAL CONTRACTOR
EQ9	CLOTHES DRYER	GE	GFD65GSSVWW	1	20 CFH	2"	BY MECHANICAL CONTRACTOR
EQ49	4 BURNER GAS RANGE	WOLF	GR304	1	82.4 CFH	3/4"	BY GENERAL CONTRACTOR. PLUMBING CONTRACTOR TO CONFIRM GAS PRESSURE REQUIREMENTS AND PROVIDE APPLIANCE PRESSURE REGULATOR IF REQUIRED
EQ52	COMPACT LAUNDRY CENTER	GE	GUD24ESSM	1	10.5 CFH	1/2"	BY MECHANICAL CONTRACTOR
GWH-1	GAS WATER HEATER	RHEEM	GHE100SU-250(A)	2	250 CFH	1/2"	BY MECHANICAL CONTRACTOR
TOTAL	-	-	-	-	2,262.1 CFH	-	-

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