

Replace HVAC & Boilers/ Pumps/ Controls MSHP Troop B Macon, Missouri



OWNER: STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR

DESIGNER: MIDWEST ENGINEERING AND DESIGN
3100 BROWN STATION RD, SUITE C
COLUMBIA, MISSOURI 65202

PROJECT NUMBER: R2511-01

PROJECT MANAGEMENT: OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

SITE NUMBER: 4753
ASSET NUMBER: 55113, 55114, 55142, 55143, 55161, 55162

SHEET NUMBER:

G-001

1 OF 41 SHEETS
06-15-2026

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GENERAL CONSTRUCTION NOTES

- 1 THESE DRAWINGS SHALL NOT BE SCALED. REFER TO DIMENSIONS INDICATED OR WHERE NO DIMENSIONS ARE GIVEN, CONTRACTOR SHALL VERIFY THE ACTUAL SIZE AND LOCATION THROUGH FIELD VERIFICATION. THE EXISTING CONDITIONS SHOWN ON THESE DRAWINGS WERE DERIVED FROM OBSERVATIONS AND MEASUREMENTS TAKEN DURING SITE VISITS AND FROM ARCHIVE INFORMATION PROVIDED BY THE OWNER AND MAY NOT BE TOTALLY ACCURATE. THE CONTRACTOR SHALL BE RESPONSIBLE TO FIELD VERIFY ANY CRITICAL DIMENSIONS PRIOR TO BIDDING AND/OR FABRICATION AND INSTALLATION OF THE WORK.
- 2 IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND EACH SUBCONTRACTOR TO REVIEW THE DRAWINGS TO ASSURE COORDINATION OF ALL WORK AFFECTING EACH TRADE. FAILURE TO REVIEW ALL CONTRACT DOCUMENTS FOR APPLICABLE ITEMS OF WORK SHALL NOT RELIEVE THE RESPONSIBLE PARTY FROM PERFORMING ALL WORK REQUIRED BY THE CONTRACT DOCUMENTS.
- 3 COORDINATION - THE GENERAL CONTRACTOR SHALL COORDINATE REQUIREMENTS OF ALL TRADES TO ALLOW FOR TIMELY INCLUSION IN THE WORK SO AS NOT TO DELAY THE WORK OR THE WORK OF ANY SUBCONTRACTOR. GENERAL CONTRACTOR SHALL UTILIZE CONSTRUCTION SEQUENCING TO MINIMIZE DISRUPTION TO OCCUPANTS AS BUILDING WILL REMAIN OCCUPIED DURING CONSTRUCTION ACTIVITIES. UTILIZE PRACTICES TO KEEP OCCUPANTS SAFE AND CLEAN FROM DEBRIS CAUSED DURING CONSTRUCTION. GENERAL CONTRACTOR TO PROVIDE TEMPORARY HEAT AND/OR COOLING AS NEEDED TO COMPLETE WORK SEQUENCES. COORDINATE ALL ACTIVITIES WITH THE OWNER. -SEE M-001 GENERAL PROJECT NOTES.
- 4 PRECAUTIONS - CONTRACTOR SHALL IMMEDIATELY REPORT ANY UNFORESEEN STRUCTURAL CONDITIONS WHICH COULD RESULT IN DAMAGE TO THE STRUCTURE OR INJURY TO ITS OCCUPANTS REPORT ANY SUCH CONDITION IMMEDIATELY TO THE OWNER AND ENGINEER. TAKE PRECAUTIONS NECESSARY TO PROPERLY SUPPORT THE STRUCTURE AND PROTECT THE OCCUPANTS.
- 5 SITE USAGE - USE OF THE SITE FOR ANY CONSTRUCTION STAGING OR OTHER OPERATIONS SHALL BE COORDINATED WITH THE OWNER AND CONSTRUCTION ADMINISTRATOR. THE CONTRACTOR'S OPERATIONS SHALL NOT OBSTRUCT OR ADVERSELY AFFECT ANY PUBLIC OR ADJACENT OWNER AREAS.
- 6 EXIT ACCESS - MAINTAIN FREE, SAFE, AND APPROVED MEANS OF EGRESS IN AND OUT OF PROJECT LOCATION AND EXISTING OCCUPIED BUILDINGS IN ACCORDANCE WITH REQUIREMENTS OF APPLICABLE REGULATORY AGENCIES.
- 7 GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING RED LINE "AS-BUILT" DRAWINGS AT THE END OF THE PROJECT ALONG WITH ALL OPERATING MANUALS OF NEW SYSTEMS INSTALLED.
- 8 OWNER APPROVED CONSTRUCTION TRAILER LOCATION. VERIFY EXACT LOCATION WITH OWNER.
- 9 JOHNSON CONTROLS CONTACT: JACK CONROY, CELL: (314)-624-7181, EMAIL: jack.conroy@jci.com

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MISSOURI DEPARTMENT
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HIGHWAY PATROL

REPLACE HVAC &
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MSHP TROOP B
HEADQUARTERS 308 PINE
CREST DR. MACON, MO
63552

PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____

ISSUE DATE: 06/15/2026

CAD DWG FILE:TBHCL-E.dwg
DRAWN BY: GGF/SAK/MDS
CHECKED BY: JLD
DESIGNED BY: GGF/SAK/MDS

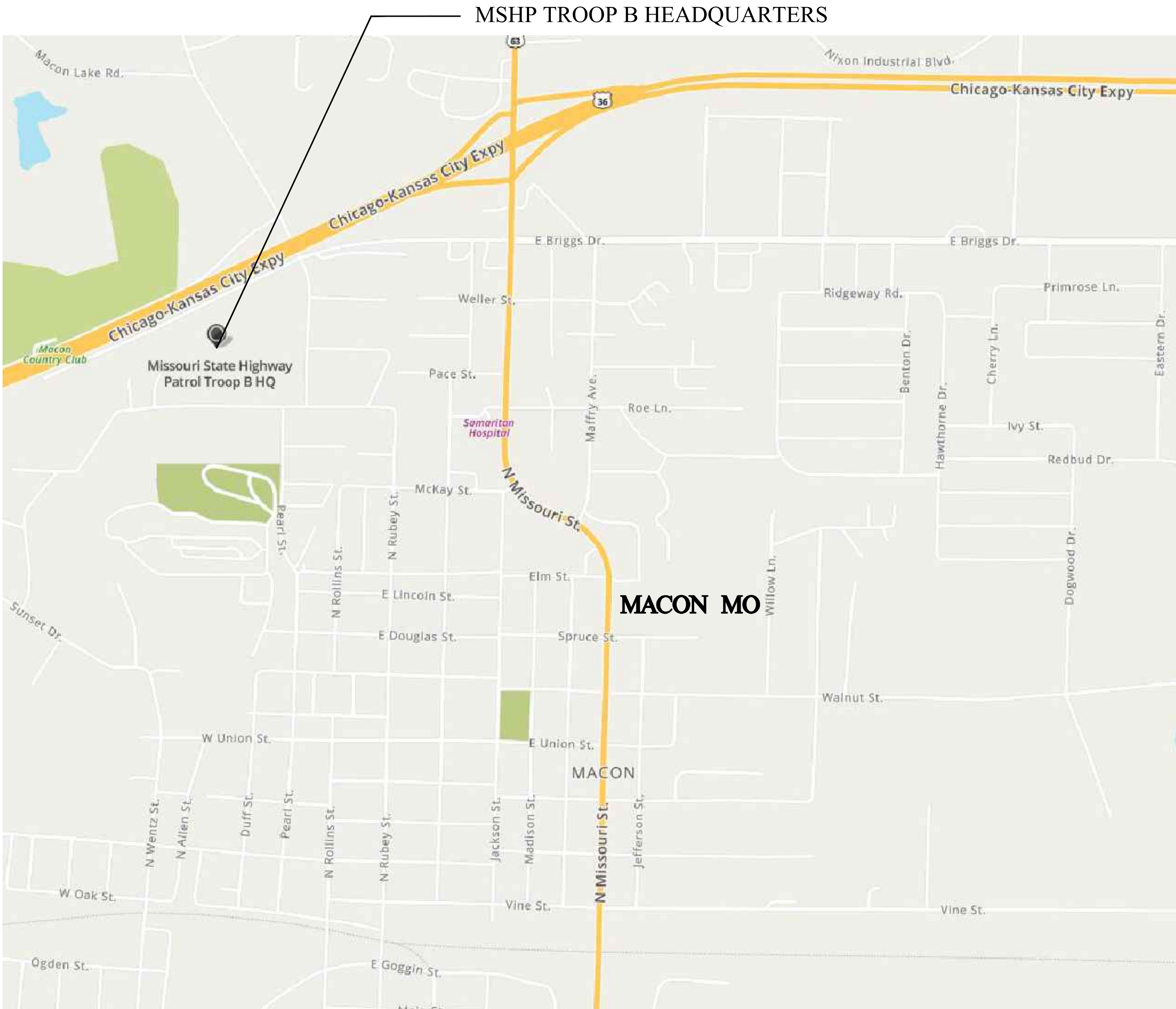
SHEET TITLE:

LOCATION MAP
DRAWING INDEX
AND SITE PLAN

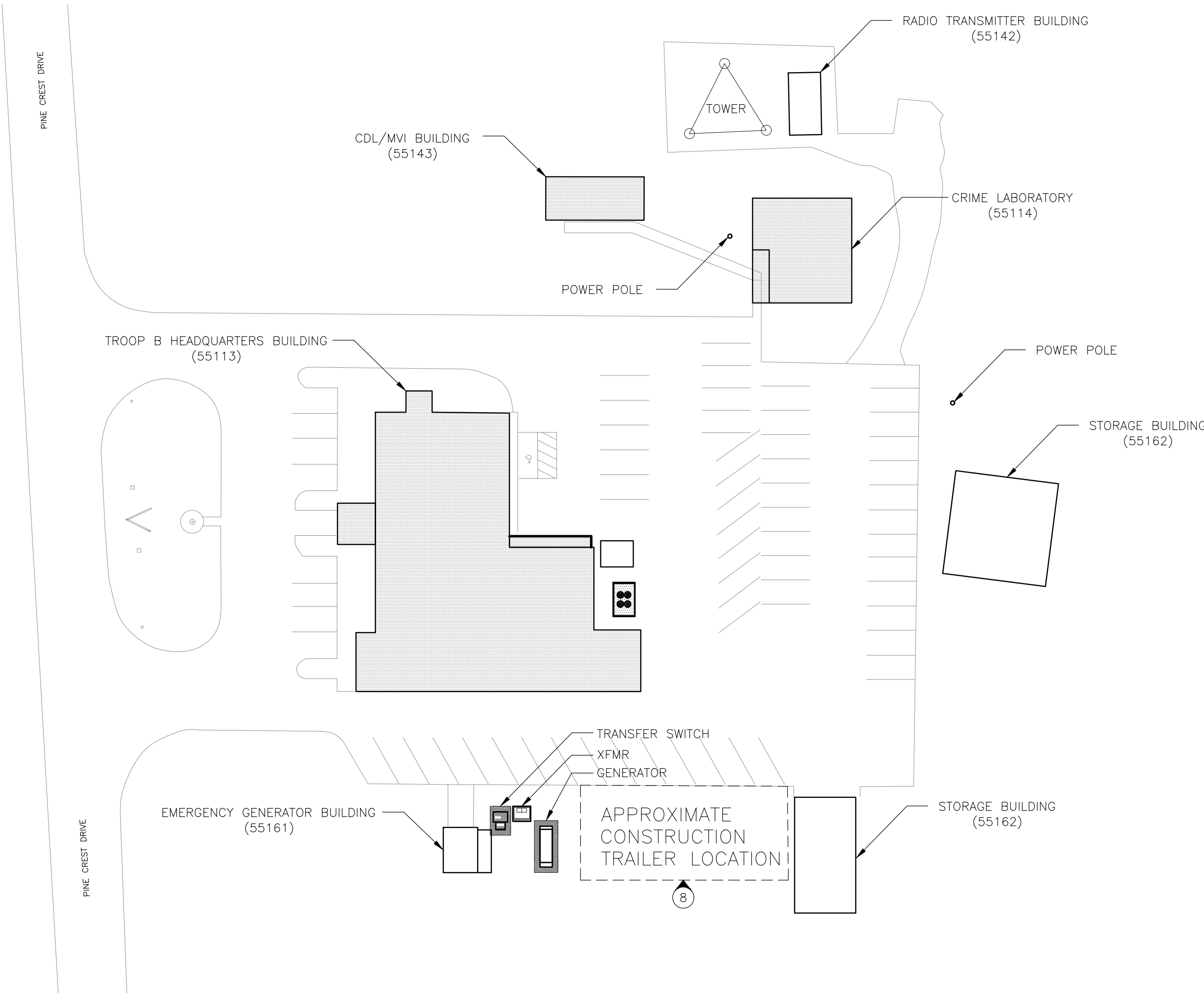
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G-002

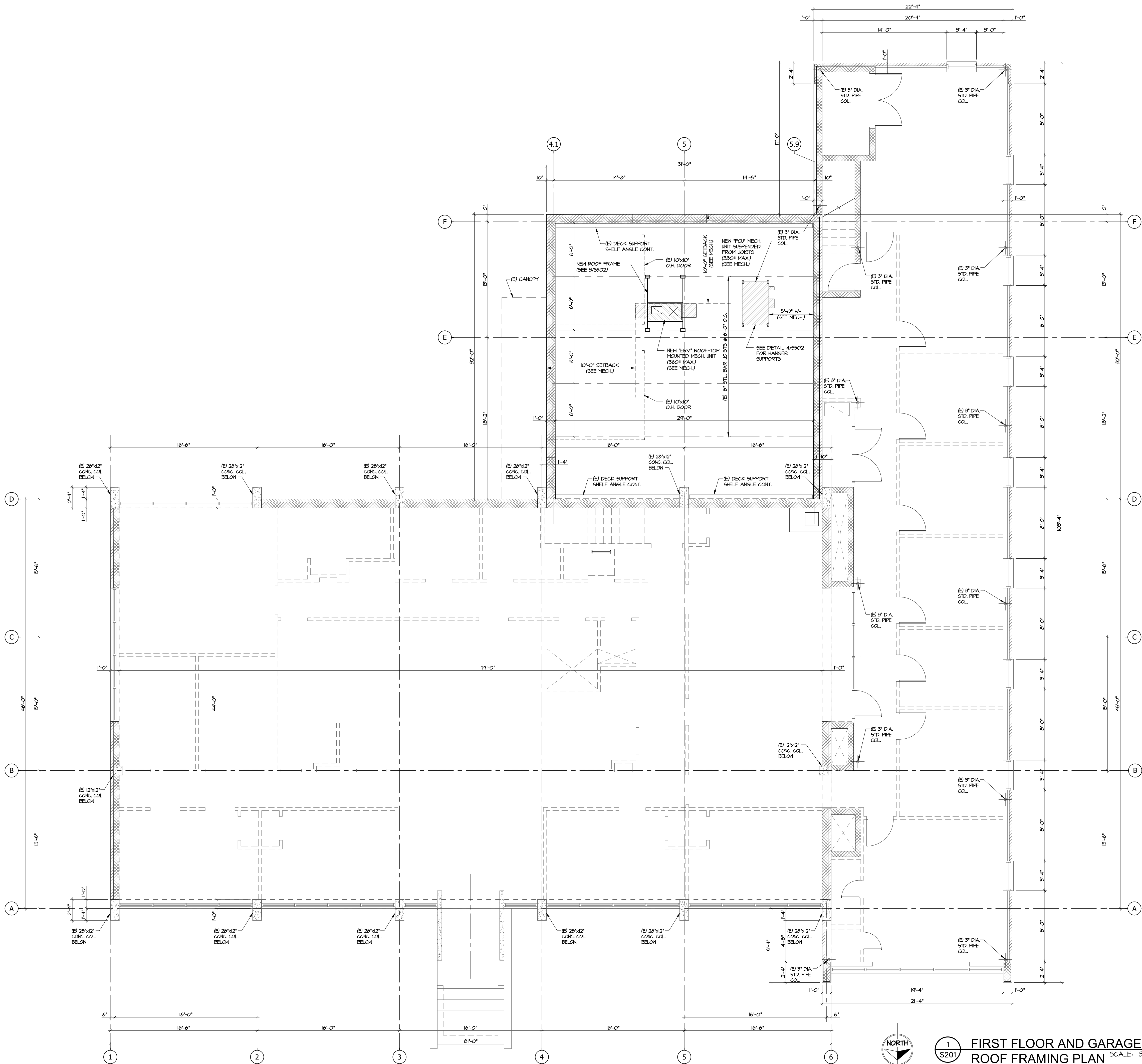
2 OF 41 SHEETS
2026-06-15



1 MSHP TROOP B LOCATION MAP
SCALE: NONE



2 MSHP TROOP B SITE MAP
SCALE: 1/32" = 1'-0"



GENERAL NOTES:

- LOCATE NEW ROOF FRAMES AS SHOWN ON THIS PLAN AND WHERE INDICATED BY THE MECHANICAL DRAWINGS TO ALLOW PROPER INSTALLATION OF NEW PRE-FABRICATED ROOF CURBS AND NEW ROOF-TOP-UNITS (RTU).
- FIELD WELD NEW ROOF FRAMES TO THE EXISTING STEEL BAR JOISTS AS SHOWN ON S501 AND S502. DO NOT OVERHEAT EXISTING JOISTS DURING FIELD WELDING.
- WHERE CONCENTRATED LOADS OCCUR ON EXISTING STEEL BAR JOISTS, INSTALL DIAGONAL BRACES AS REQUIRED PER 1/5501.
- REFERENCE THE MECHANICAL DRAWINGS FOR ROOF CURB DETAILS.
- MECHANICAL CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH CONSTRUCTION.
- DESIGN REFERENCES USED:
 - BUILDING CODE: IBC2015 & ASCE/SEI 7-10
 - STEEL: AISC 14TH EDITION AISC 360-10
- THE EXISTING BUILDING STRUCTURE HAS BEEN EVALUATED BASED ON THE RTU WEIGHTS SHOWN ON THIS DRAWING. IF AN ALTERNATE RTU IS SUBSTITUTED THAT IS HEAVIER THAN THE WEIGHT SHOWN, NOTIFY THE STRUCTURAL ENGINEER IMMEDIATELY AS FURTHER ANALYSIS MAY BE REQUIRED. THE MAXIMUM RTU WEIGHTS SHOWN INCLUDE THE BASE UNIT, ALL ACCESSORIES, AND CURB WEIGHT AS PROVIDED BY THE MECHANICAL ENGINEER.
- REFERENCE THE ORIGINAL STRUCTURAL DRAWINGS DATED "11/21/63" AND "10/16/66" FOR BALANCE OF INFORMATION. THE FRAMING PLAN PROVIDED HERE IS ONLY FOR LAYOUT AND STRUCTURAL EVALUATION PURPOSES TO DETERMINE THE STRUCTURAL CONFIGURATIONS AND LOAD-CARRYING CAPACITY OF EXISTING FRAMING AT THE NEW MECHANICAL UNITS. NOTE THAT THE ORIGINAL "FIRST FLOOR FRAMING PLAN" ON SHEET S2, DATED 11/21/63 DOES NOT MATCH THE AS-BUILT CONDITIONS FOR THE GARAGE ROOF AREA. THE ORIGINAL DRAWING INDICATES THAT THIS ROOF WAS TO BE CONSTRUCTED WITH REINFORCED CONCRETE BEAMS AND AN ELEVATED REINFORCED CONCRETE ROOF SLAB. THE ACTUAL ROOF CONSTRUCTION CONSISTS OF STEEL BAR JOISTS, STEEL ROOF DECK, RIGID INSULATION AND TPO (OR SIMILAR) MEMBRANE ROOFING, PER OUR FIELD VERIFICATION AND AS SHOWN ON THIS SHEET.
- REFERENCE THE STRUCTURAL STEEL NOTES ON SHEET S-503. THESE NOTES APPLY TO ALL ROOF FRAMES, SUSPENDED UNIT HANGER SUPPORTS, JOIST SEAT REINFORCING, ETC.
- ALL STEEL WORK TO BE COMPLETED BY A QUALIFIED STEEL FABRICATOR & STEEL ERECTOR WITH A MINIMUM OF 10 YEARS SIMILAR EXPERIENCE WITH COMMERCIAL BLDGS. CONSTRUCTION.
- ALL SHOP AND FIELD WELDING SHALL BE PERFORMED BY AN AWS CERTIFIED WELDER WITH CURRENT CERTIFICATION.
- REFERENCE THE FIRE SAFETY CONSTRUCTION NOTES ON SHEET S-503 FOR APPLICABLE FIRE SAFETY INSTRUCTIONS REQUIRED DURING COMPLETION OF ALL WORK INDICATED IN THESE STRUCTURAL DRAWINGS.

DRAWING INDEX:

S201	FIRST FLOOR & GARAGE ROOF FRAMING PLAN
S202	ROOF FRAMING PLAN
S501	RTU ROOF FRAME DETAILS
S502	RTU ROOF FRAME DETAILS
S503	EXTG. JOIST SEAT REINFORCING DETAILS



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HIGHWAY PATROL

REPLACE HVAC &
BOILERS / PUMPS /
CONTROLS

MSHP TROOP B
HEADQUARTERS
308 PINE CREST DR.
MACON, MO 63552

PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 06/15/26

CAD DWG FILE: S-201
DRAWN BY: TDT
CHECKED BY: TDT
DESIGNED BY: TDT

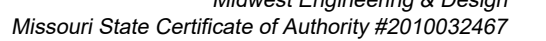
SHEET TITLE:
FIRST FLOOR AND
GARAGE ROOF
FRAMING PLAN

SHEET NUMBER:

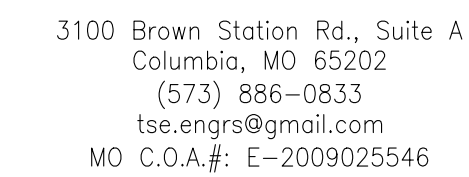
S-201

3 OF 41 SHEETS
2026-06-15

1 S201 FIRST FLOOR AND GARAGE
ROOF FRAMING PLAN SCALE: 3/16" = 1'-0"



S-202
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2026-06-15



- LOCATE NEW ROOF FRAMES AS SHOWN ON THIS PLAN AND WHERE INDICATED BY THE MECHANICAL DRAWINGS TO ALLOW PROPER INSTALLATION OF NEW PRE-FABRICATED CURB ROOF AND NEW ROOF-TOP-UNITS (RTU).
2. FIELD WELD NEW ROOF FRAMES TO THE EXISTING STEEL BAR JOISTS AS SHOWN ON 5501 AND 5502. DO NOT OVERHEAT EXISTING JOISTS DURING FIELD WELDING.
3. WHERE CONCENTRATED LOADS OCCUR ON EXISTING STEEL BAR JOISTS, INSTALL DIAGONAL BRACES AS REQUIRED PER 1/5501.
4. REFERENCE THE MECHANICAL DRAWINGS FOR ROOF CURB DETAILS.
5. MECHANICAL CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH CONSTRUCTION.
6. DESIGN REFERENCES USED:
 - 6.1. BUILDING CODE: IBC2015 & ASCE/SEI 1-10
 - 6.2. STEEL: AISC 14TH EDITION AISC 360-10
7. THE EXISTING BUILDING STRUCTURE HAS BEEN EVALUATED BASED ON THE RTU WEIGHTS SHOWN ON THIS DRAWING. IF AN ALTERNATE RTU IS SUBSTITUTED THAT IS HEAVIER THAN THE WEIGHT SHOWN, NOTIFY THE STRUCTURAL ENGINEER IMMEDIATELY. A FURTHER ANALYSIS MAY BE REQUIRED. THE MAXIMUM RTU WEIGHTS SHOWN INCLUDE THE BASE UNIT, ALL ACCESSORIES, AND CURB WEIGHT AS PROVIDED BY THE MECHANICAL ENGINEER.
8. REFERENCE THE ORIGINAL STRUCTURAL DRAWINGS DATED "11/21/63" AND "10/16/66" FOR BALANCE OF INFORMATION. THE FRAMING PLAN PROVIDED HERE IS ONLY FOR LAYOUT AND STRUCTURAL EVALUATION PURPOSES TO DETERMINE THE STRUCTURAL CONFIGURATIONS AND LOAD-CARRYING CAPACITY OF EXISTING FRAMING AT THE NEW MECHANICAL UNITS.
9. REFERENCE THE STRUCTURAL STEEL NOTES ON SHEET 5-503. THESE NOTES APPLY TO ALL ROOF FRAMES, SUSPENDED UNIT HANGER SUPPORTS, JOIST SEAT REINFORCING, ETC.
10. ALL STEEL WORK TO BE COMPLETED BY A QUALIFIED STEEL FABRICATOR & STEEL ERECTOR WITH A MINIMUM OF 10 YEARS SIMILAR EXPERIENCE WITH COMMERCIAL BLDG. CONSTRUCTION.
11. ALL SHOP AND FIELD WELDING SHALL BE PERFORMED BY AN AWS CERTIFIED WELDER WITH CURRENT CERTIFICATION.
12. REFERENCE THE FIRE SAFETY CONSTRUCTION NOTES ON SHEET 5-503 FOR APPLICABLE FIRE SAFETY INSTRUCTIONS REQUIRED DURING COMPLETION OF ALL WORK INDICATED IN THESE STRUCTURAL DRAWINGS.
13. SEE DETAIL 5/5501 FOR ANY DUCT INTERFERENCES WITH BRIDGING FOR 12" STEEL BAR JOISTS.
14. SEE DETAIL 6/5501 FOR ANY DUCT INTERFERENCES WITH BRIDGING FOR 24" STEEL BAR JOISTS.



1 ROOF FRAMING PLAN
S202 SCALE: 3/16" = 1'-0"



06/15/26



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PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 06/15/26

CAD DWG FILE: S-501
DRAWN BY: TDT
CHECKED BY: TDT
DESIGNED BY: TDT

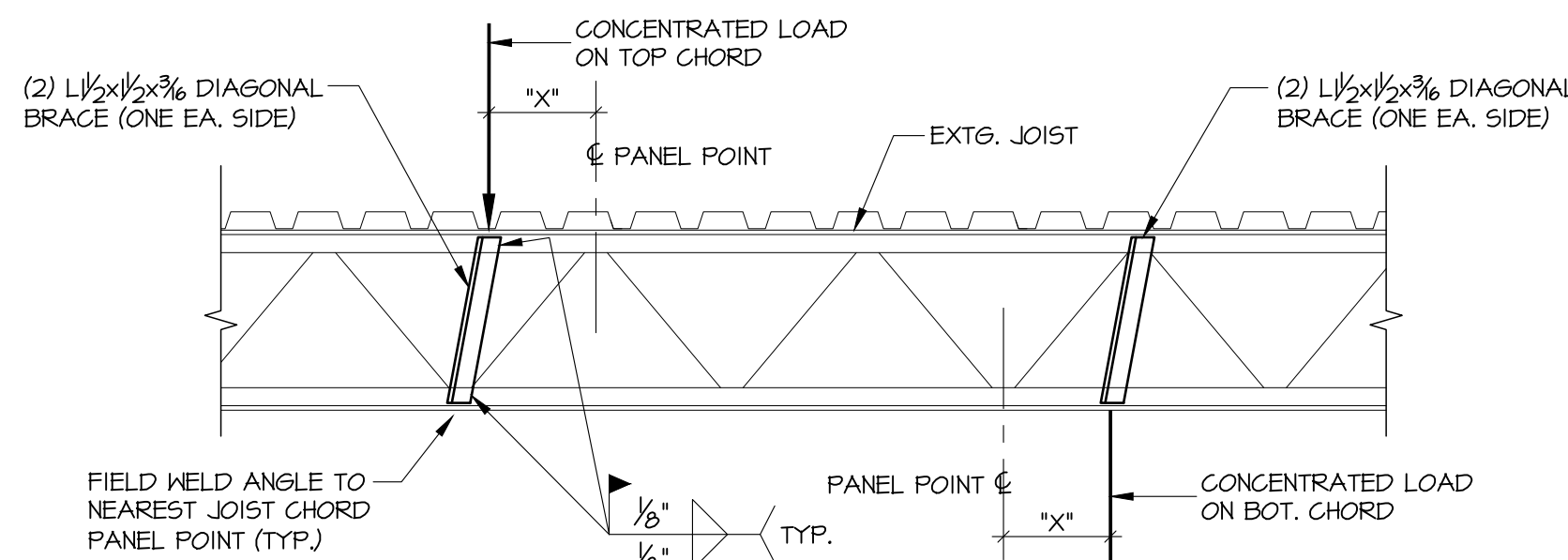
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RTU ROOF FRAME
DETAILS

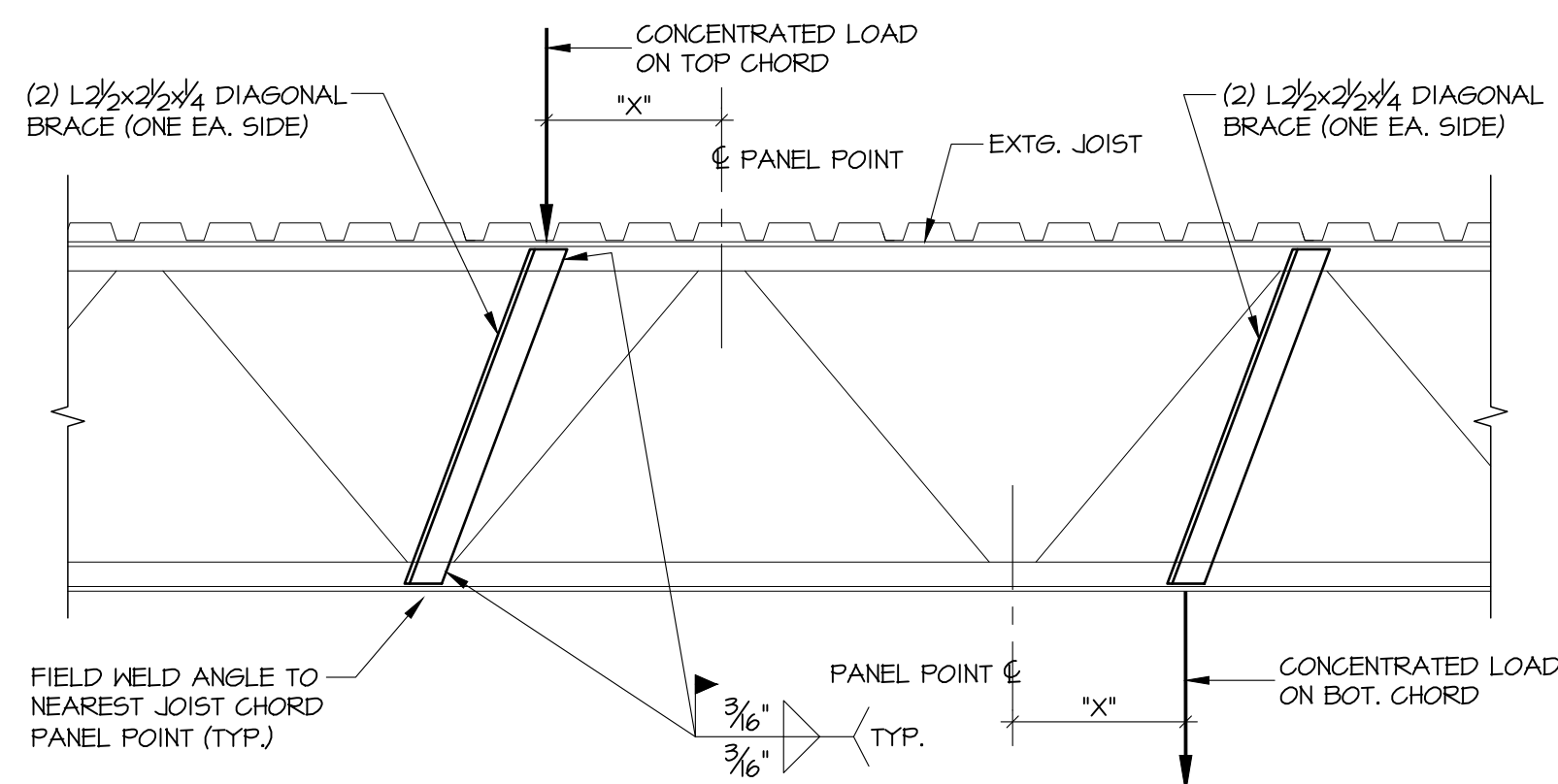
SHEET NUMBER:

S-501

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2026-06-15



LOAD ON H-SERIES JOIST

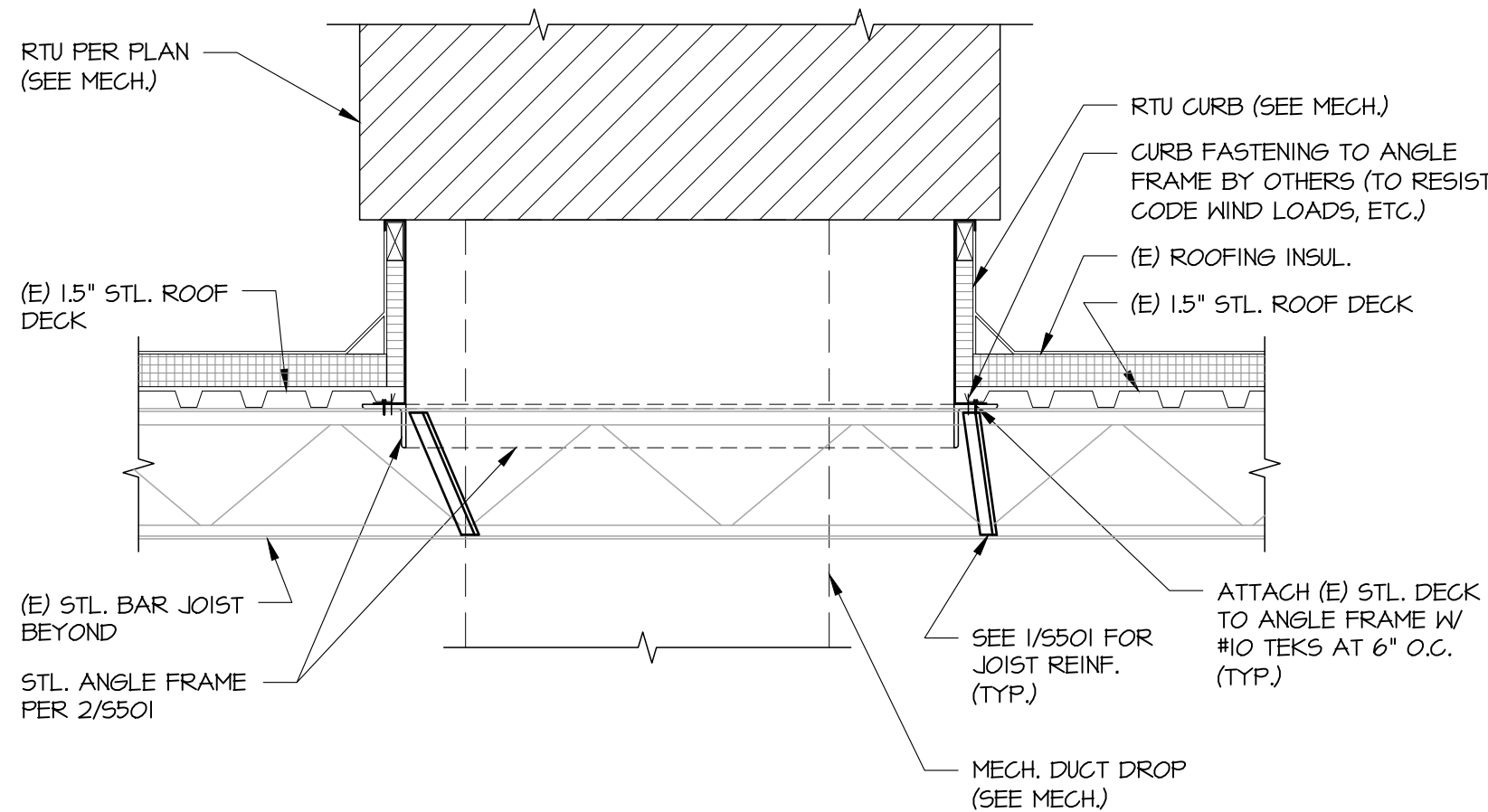


LOAD ON LH-SERIES JOIST

- NOTES:
1. FOR CONCENTRATED LOADS GREATER THAN 100 LBS., INSTALL DIAGONAL BRACE ANGLES AS SHOWN.
 2. DIAGONAL BRACE NOT REQUIRED FOR "X" LESS THAN 3" FOR H-SERIES JOISTS.
 3. DIAGONAL BRACE NOT REQUIRED FOR "X" LESS THAN 6" FOR LH-SERIES JOISTS.
 4. PROVIDE DIAGONAL BRACES AT LOCATION OF CONCENTRATED LOADS SUCH AS MECHANICAL ROOF-TOP-UNITS, SUSPENDED MECHANICAL UNITS, HEAVY PIPES, AND ANY OTHER CONCENTRATED LOADS WHERE LOCATED PER THE MECHANICAL ENGINEER.
 5. ANY LOADS GREATER THAN 200 LBS. AT BOT. CHORD SHALL BE HUNG WITH A HANGER ROD BETWEEN JOIST CHORD ANGLES. DO NOT HANG HEAVY LOADS FROM CLAMP ATTACHED TO THE OUTSIDE EDGE OF CHORD ANGLES.
 6. USE CAUTION TO AVOID OVERHEATING OR DAMAGING JOISTS DURING WELDING.

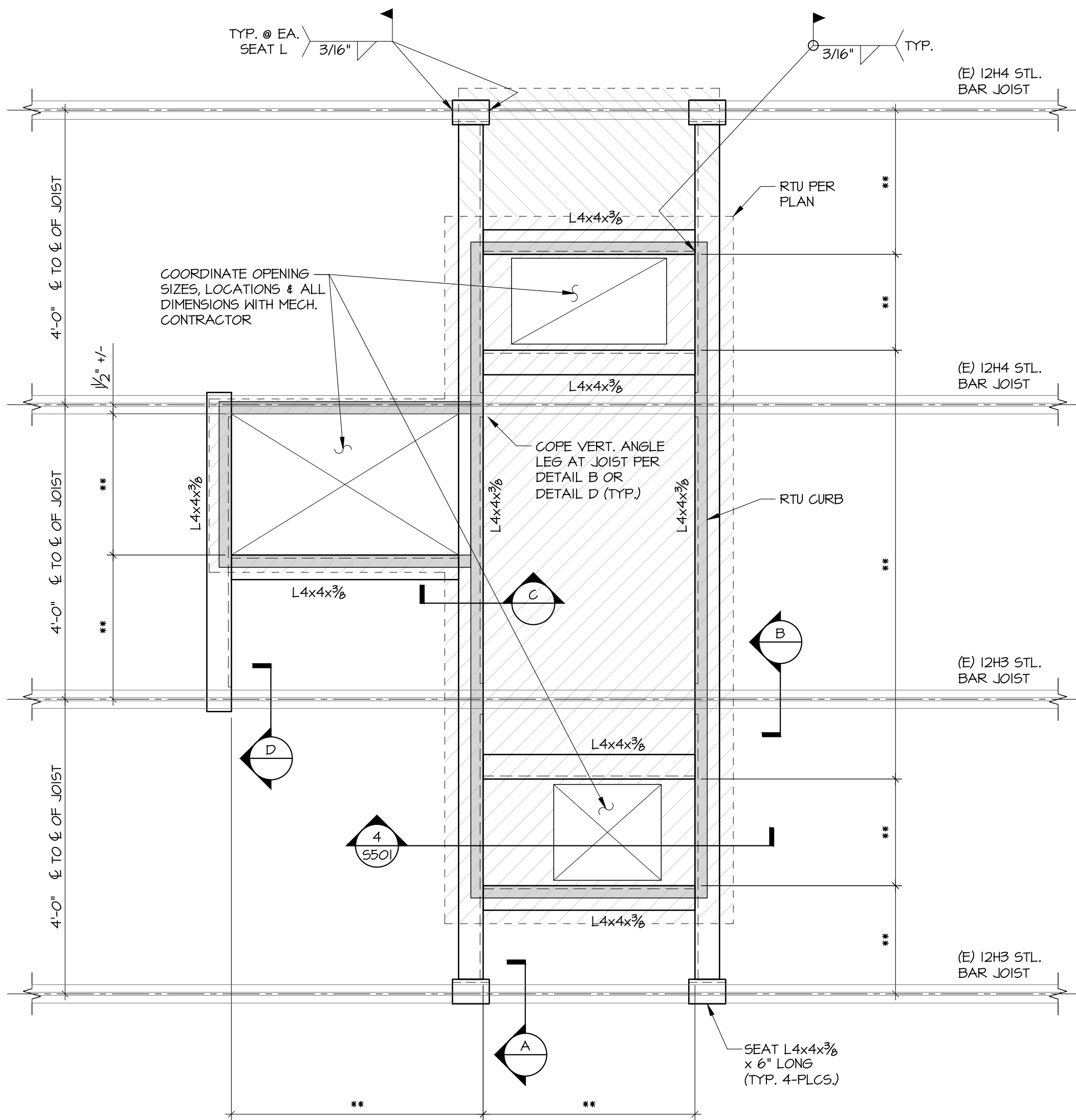
1 TYP. JOIST REINFORCING DETAIL

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



4 ROOF FRAME SECTION

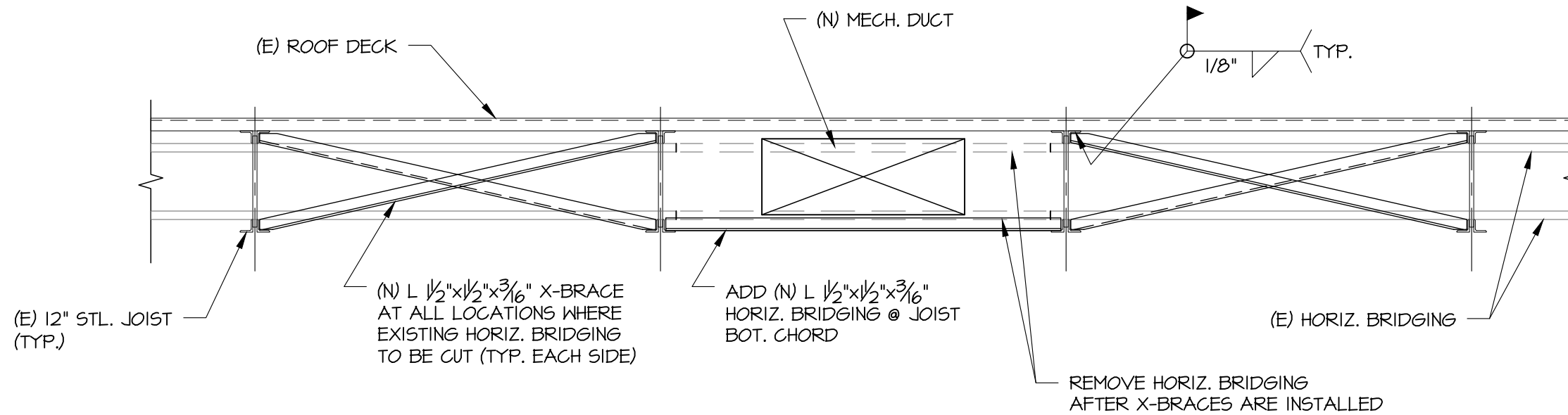
SCALE: N.T.S.



- NOTES:
1. FIELD VERIFY ALL EXISTING JOIST FRAMING DIMENSIONS.
 2. COORDINATE ALL ROOF FRAME DIMENSIONS WITH THE MECH. CONTRACTOR **.

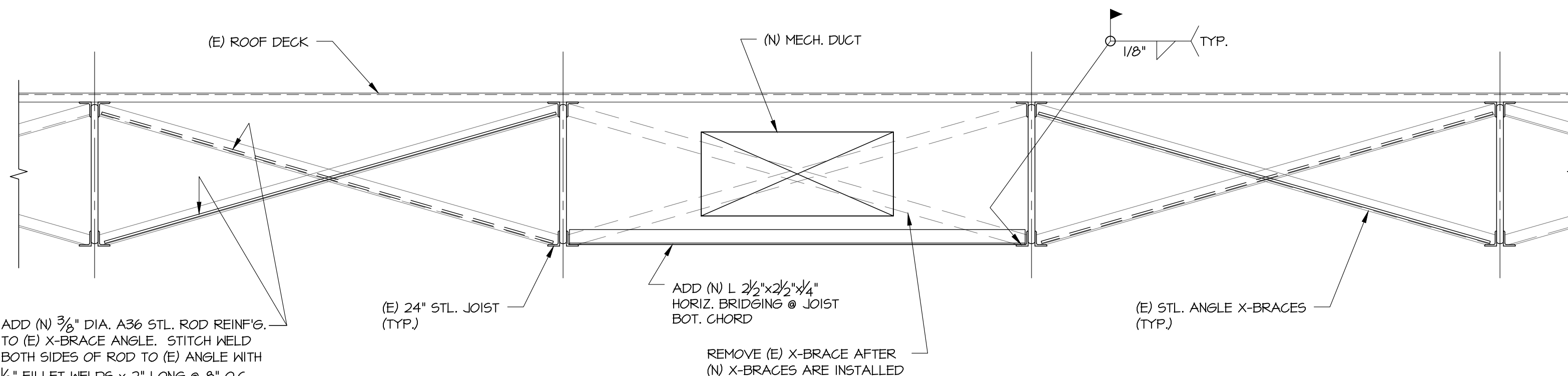
2 ROOF FRAME DETAIL @ RTU-2
(FOR NEW RTU @ 1986 ADDN.)

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



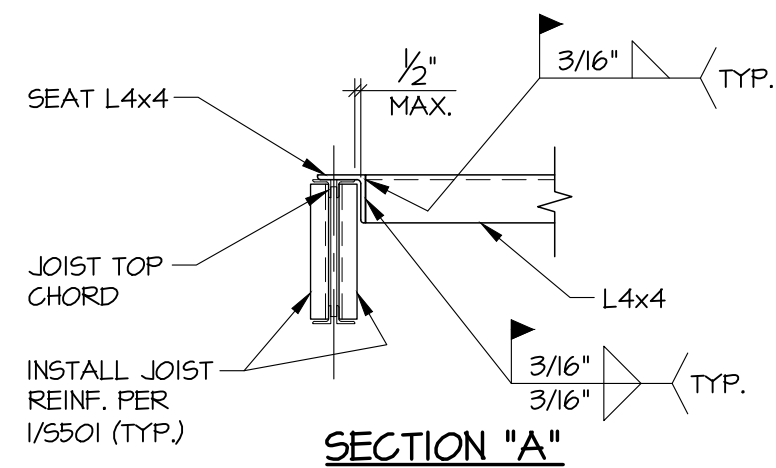
5 TYP. X-BRACES REQ'D. AT (E) HORIZ. BRIDGING
INTERFERENCE (AT 12" STL. BAR JOISTS)

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

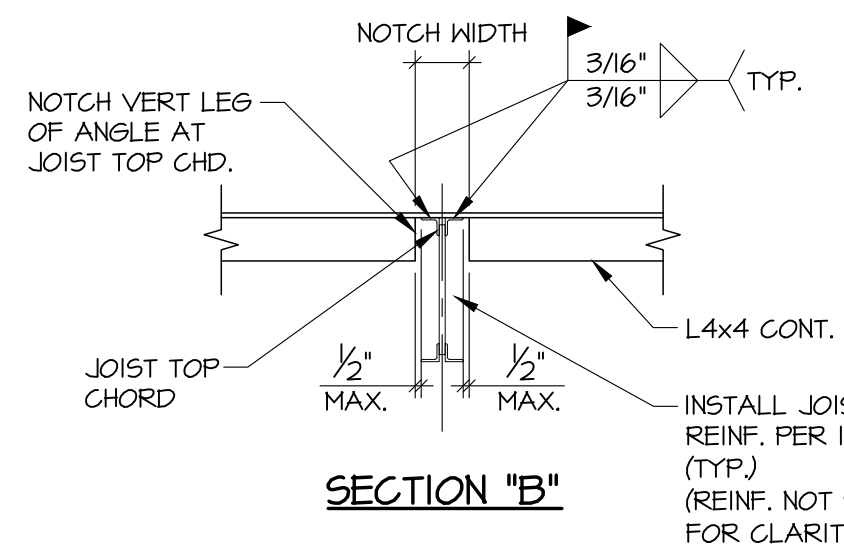


6 TYP. X-BRACES REQ'D. AT (E) X-BRACE
INTERFERENCE (AT 24" STL. BAR JOISTS)

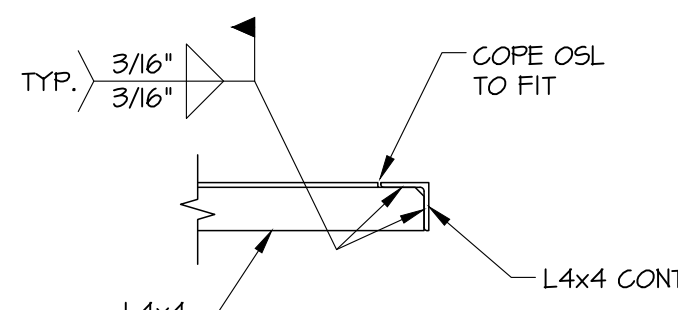
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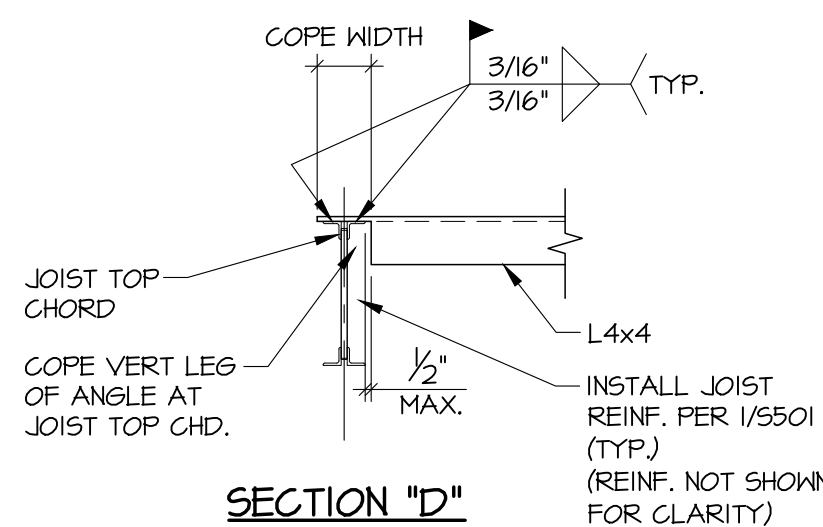
SECTION "A"



SECTION "B"

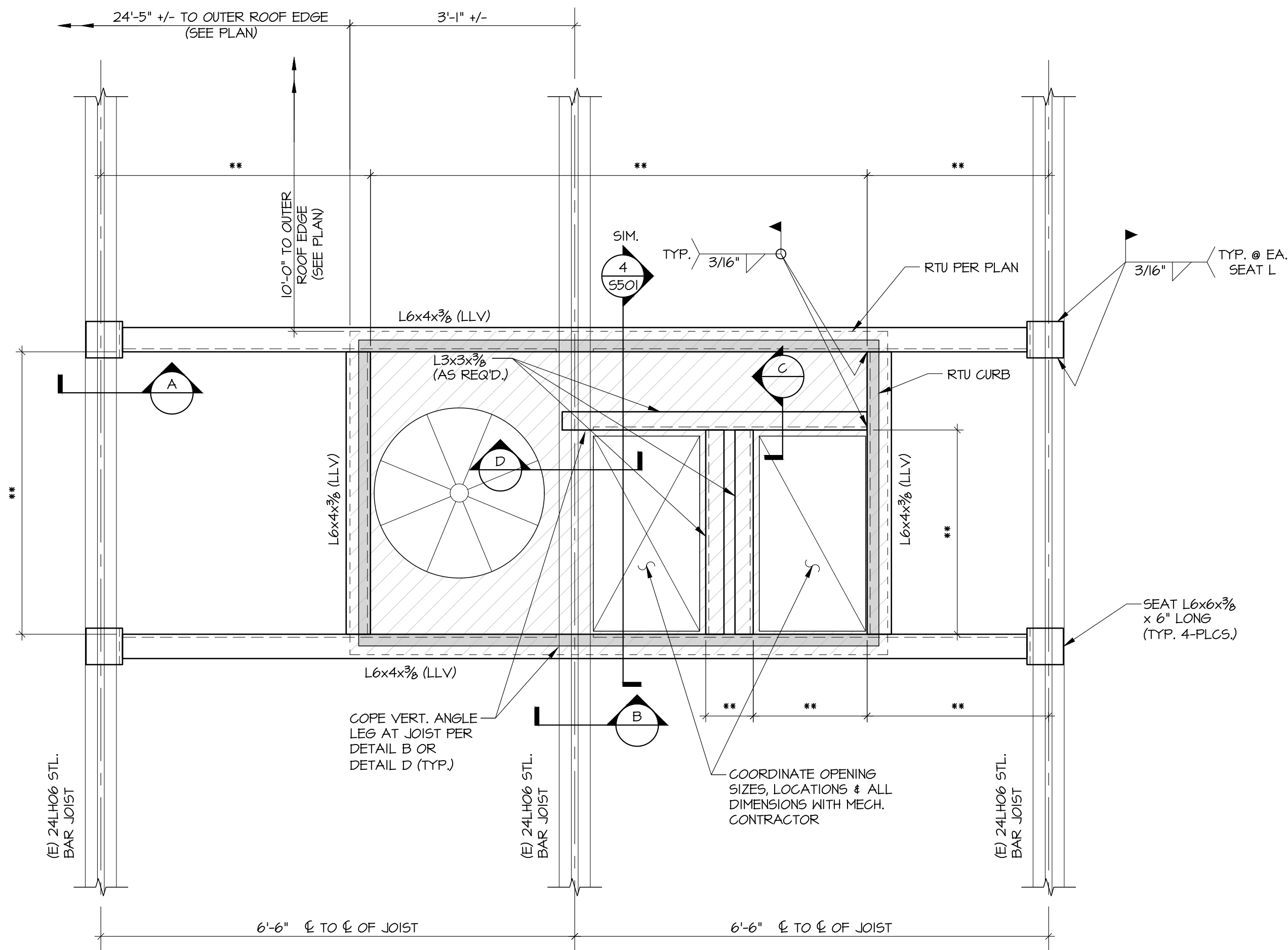


SECTION "C"



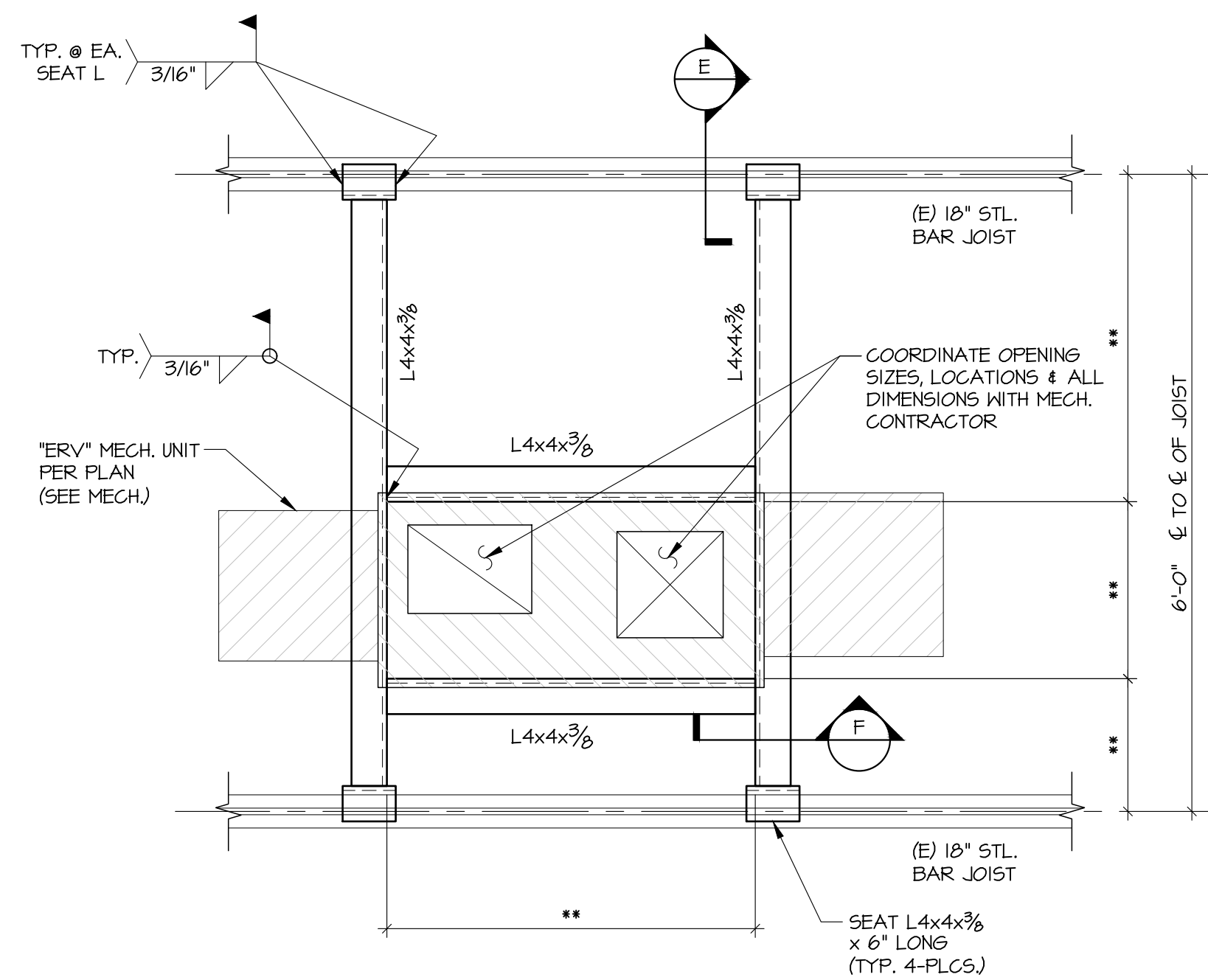
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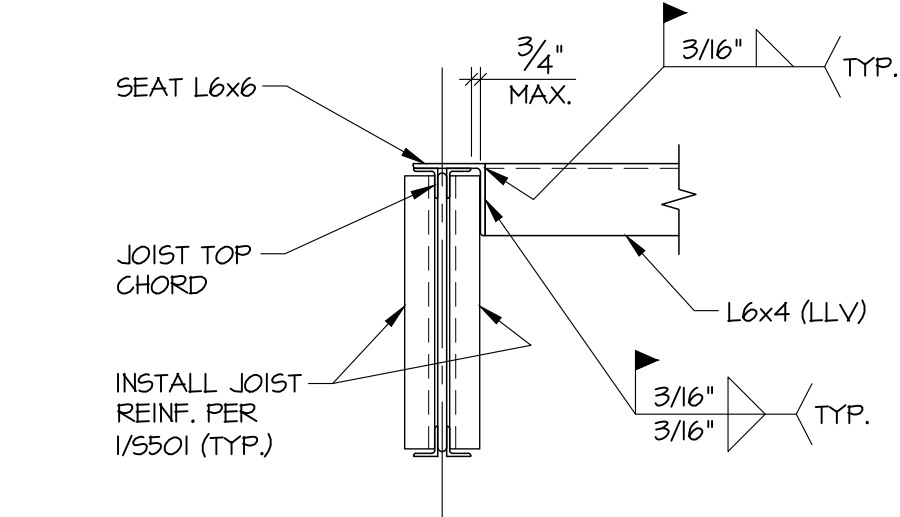
- NOTES:
1. FIELD VERIFY ALL EXISTING JOIST FRAMING DIMENSIONS.
 2. COORDINATE ALL ROOF FRAME DIMENSIONS WITH THE MECH. CONTRACTOR **.

1 ROOF FRAME DETAIL @ RTU-1
S502 (FOR NEW RTU @ ORIG. 1963 BLDG.) SCALE: 3/4" = 1'-0"

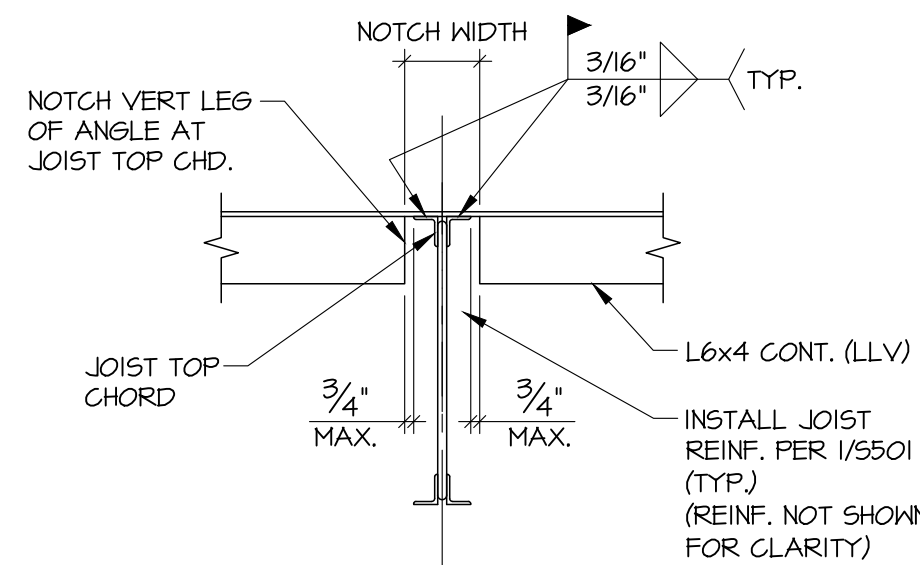


- NOTES:
1. FIELD VERIFY ALL EXISTING JOIST FRAMING DIMENSIONS.
 2. COORDINATE ALL ROOF FRAME DIMENSIONS WITH THE MECH. CONTRACTOR **.

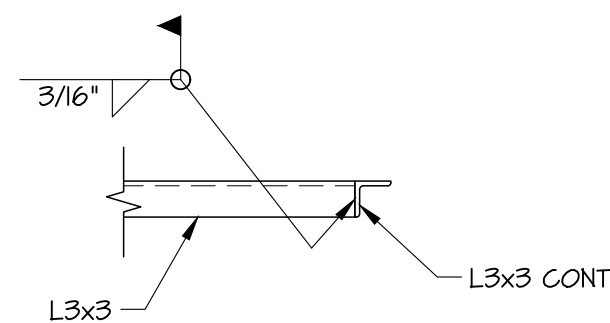
3 ROOF FRAME DETAIL
S502 (FOR NEW ERV @ GARAGE) SCALE: 3/4" = 1'-0"



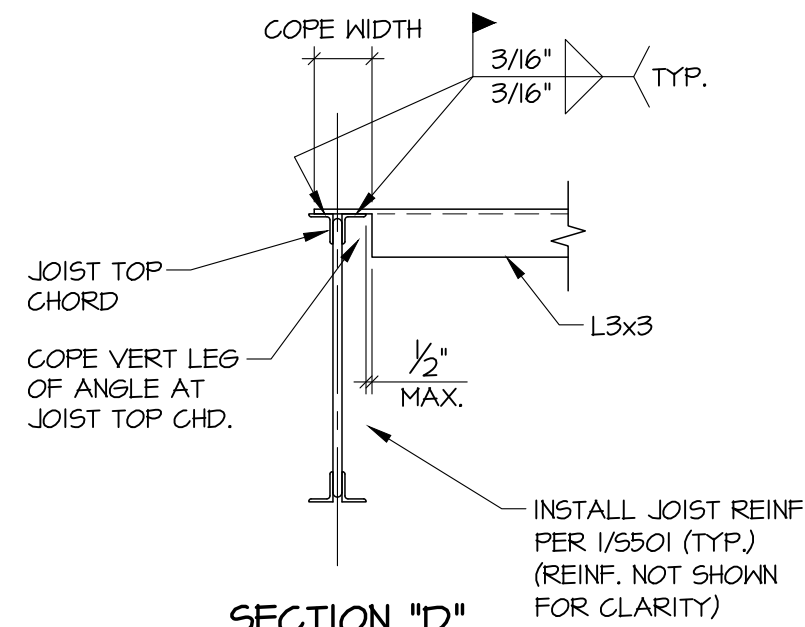
SECTION "A"



SECTION "B"

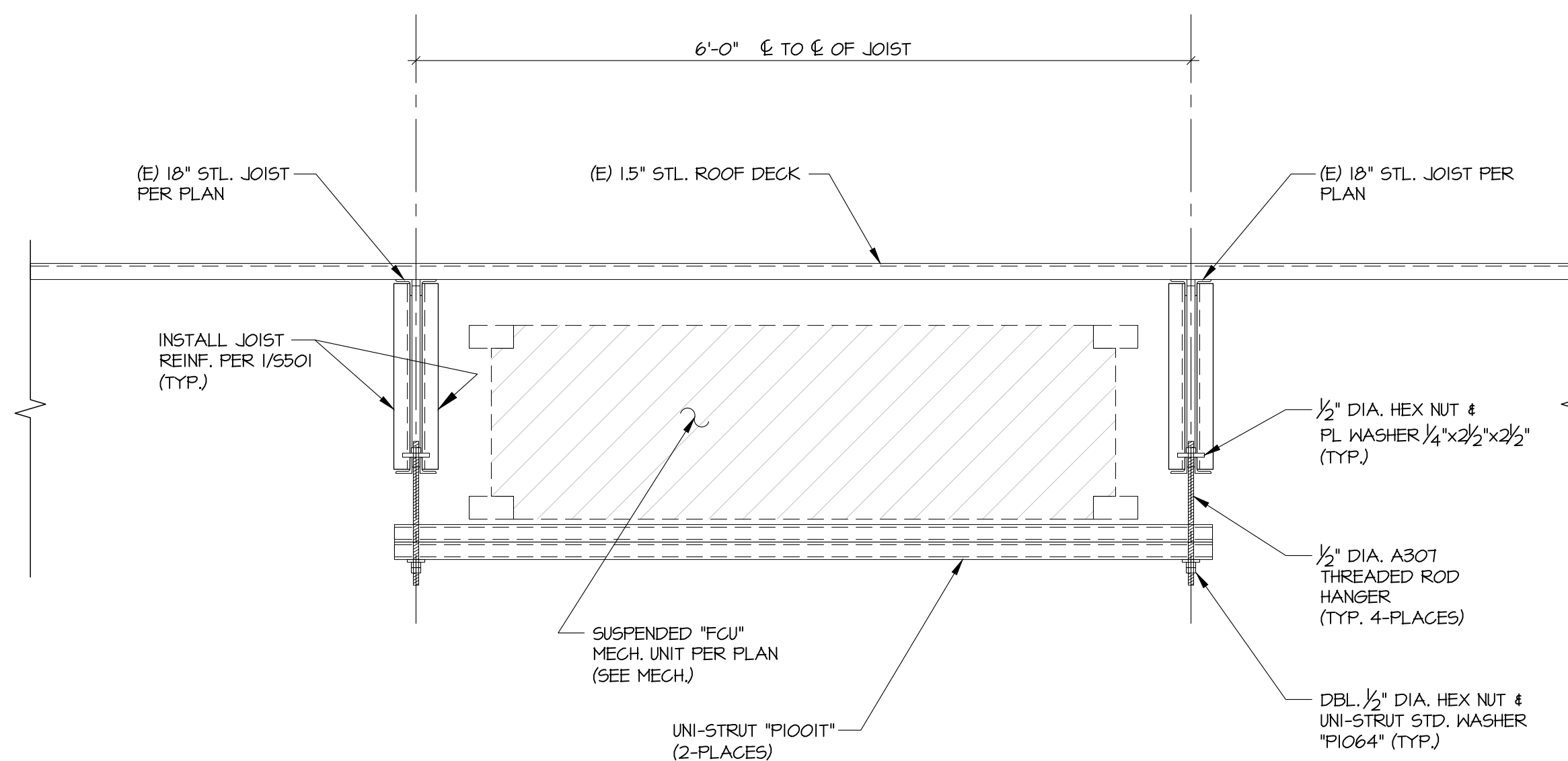


SECTION "C"



SECTION "D"

2 ROOF FRAME CONNECTION DETAILS
S502 SCALE: 3/4" = 1'-0"



4 SUSPENDED MECH. UNIT HANGER DETAIL
S502 (FOR NEW FCU @ GARAGE) SCALE: 1" = 1'-0"



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FACILITY # 55113

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 06/15/26

CAD DWG FILE: S-502
DRAWN BY: TDT
CHECKED BY: TDT
DESIGNED BY: TDT

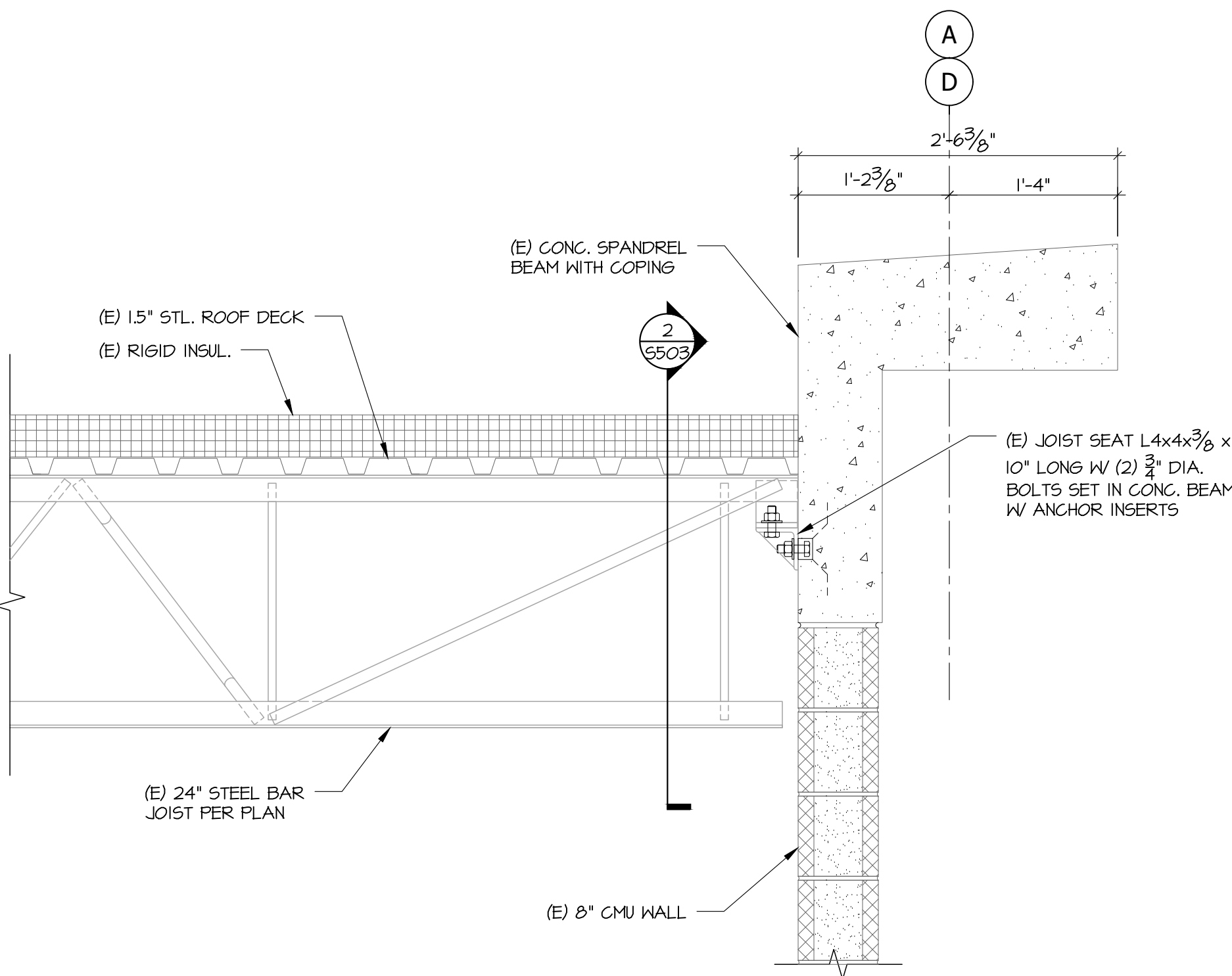
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DETAILS

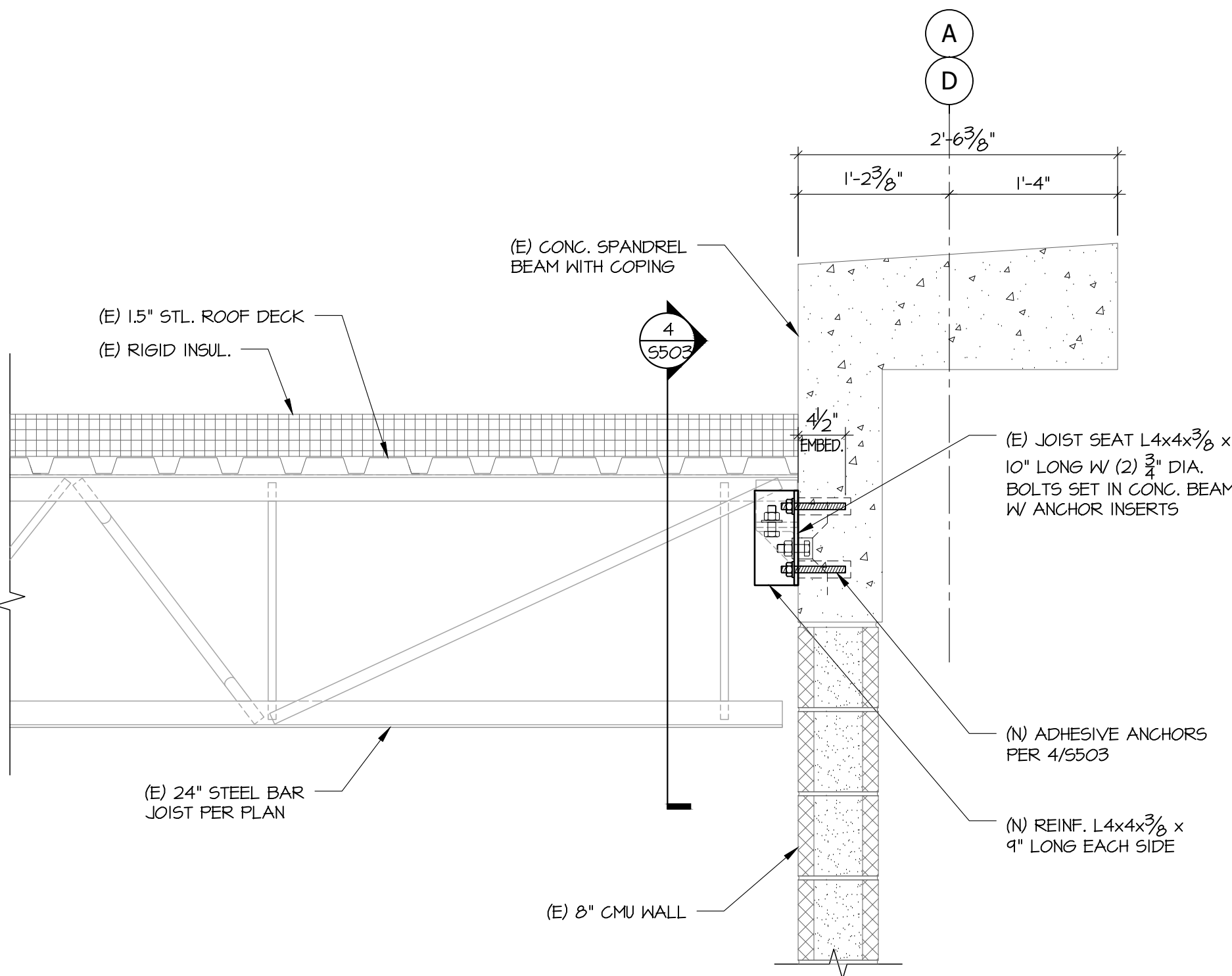
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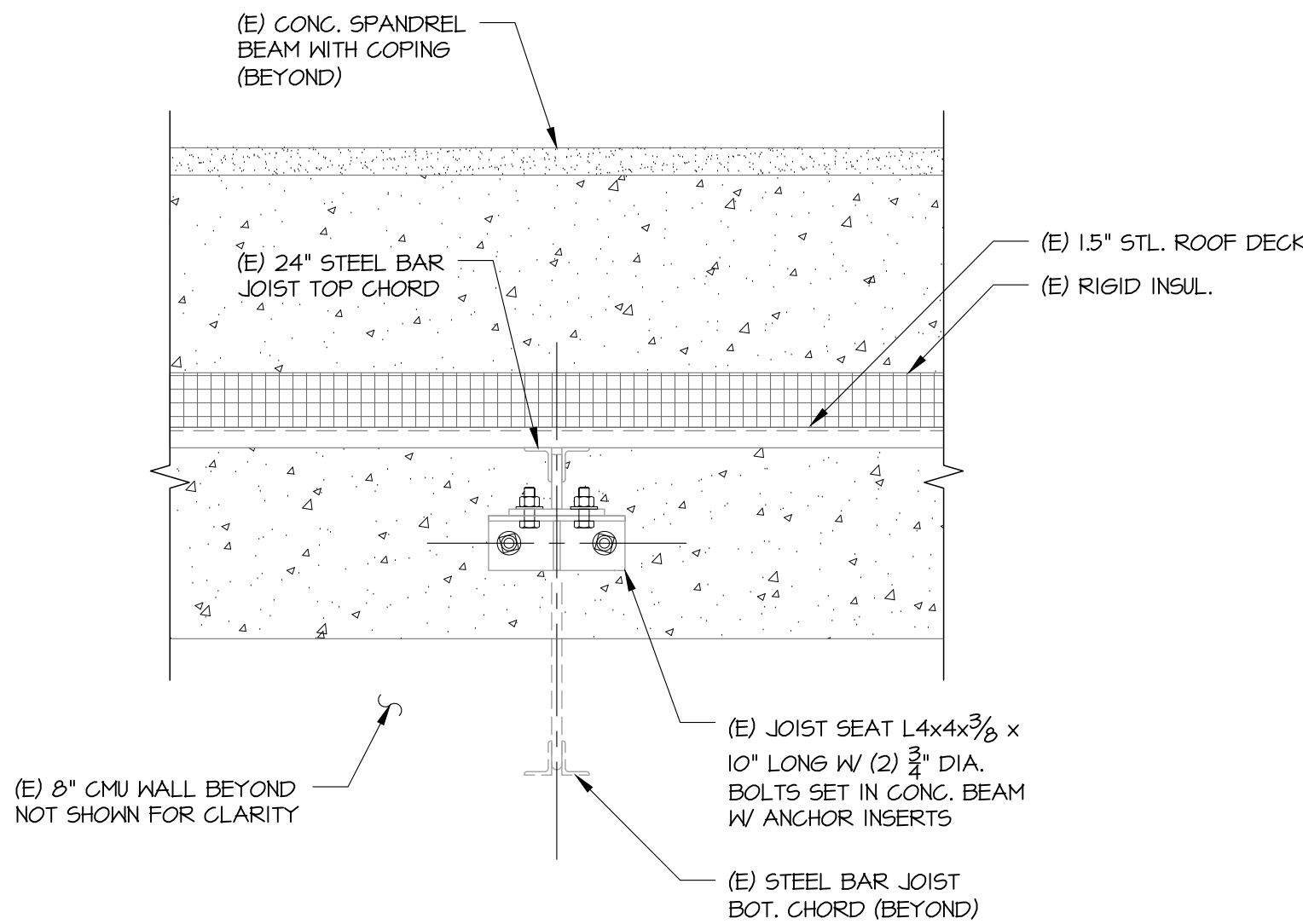
6 OF 41 SHEETS
2026-06-15



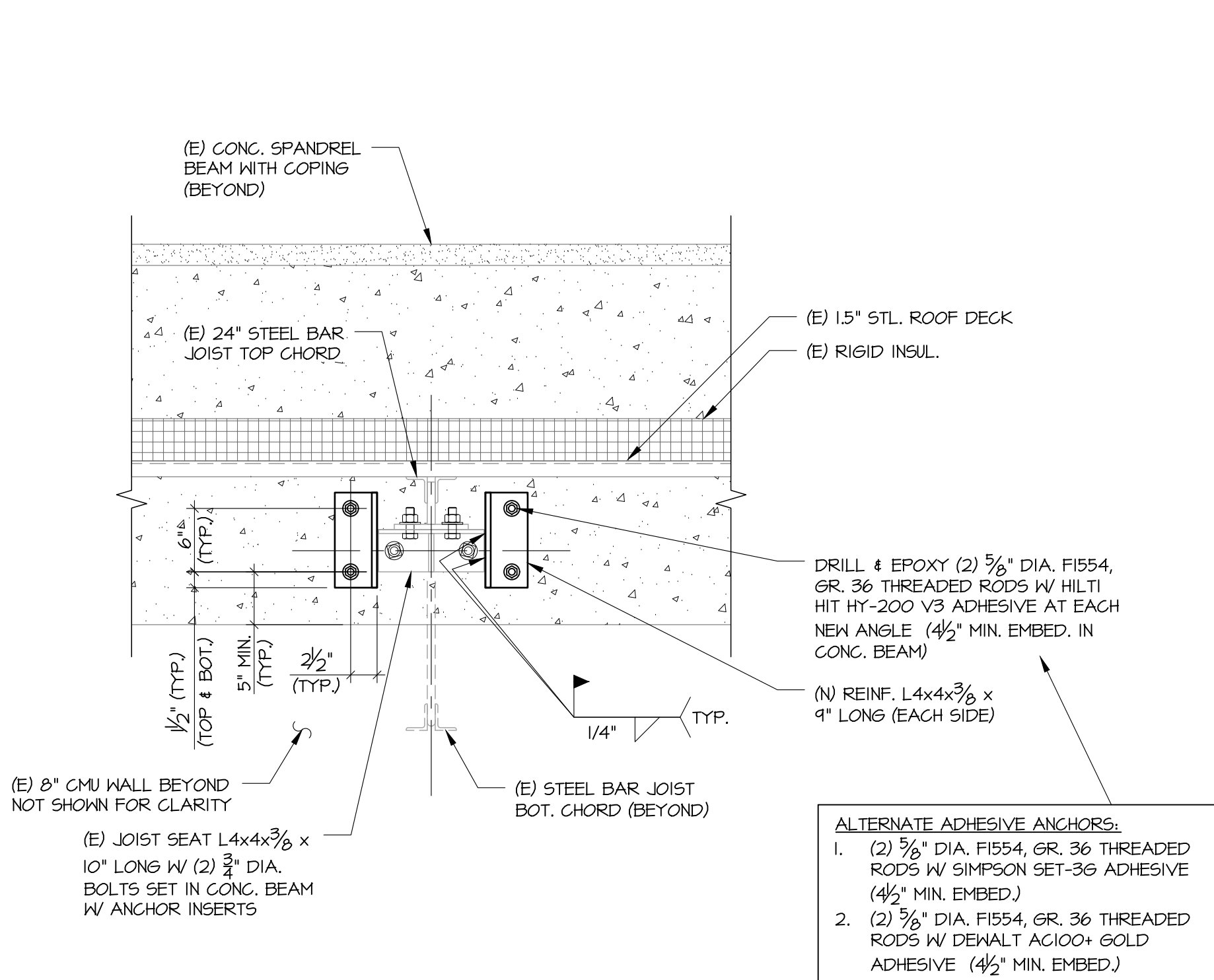
1
S503 EXTG. JOIST SEAT CONN. TO CONC. BEAM
SCALE: 1" = 1'-0"



3
S503 EXTG. JOIST SEAT REINFORCING DETAIL
SCALE: 1" = 1'-0"



2
S503 EXTG. JOIST SEAT DETAIL
SCALE: 1" = 1'-0"



4
S503 EXTG. JOIST SEAT REINFORCING DETAIL
SCALE: 1" = 1'-0"

STRUCTURAL STEEL NOTES:

- DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STEEL CONSTRUCTION", 14TH EDITION, BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION, "SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS", 2010 EDITION, BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION, AND THE STRUCTURAL WELDING CODE (AWS D11), LATEST EDITION, BY THE AMERICAN WELDING SOCIETY.
- STRUCTURAL STEEL MATERIALS SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE:

ANGLES, PLATES	ASTM A36	(Fy=36 ksi)
THREADED ROD (FOR HANGERS)	ASTM F1554, GR. 36	(Fy=36 ksi)
THREADED ROD (FOR EPOXY ANCS.)	ASTM F1554, GR. 36	(Fy=36 ksi)
HEX NUTS	ASTM 563, TYPE C	
FLAT WASHERS	ASTM F436, TYPE I	
- STEEL MEMBER FINISH:

SURFACE PREP.	S5PC-SP2 OR S5PC-SP3
PAINT	FABRICATOR'S STD. PRIMER
- ALL STRUCTURAL SHOP AND FIELD WELDING SHALL BE MADE WITH ELECTRODES DESIGNATED BY EIOXXX LOW HYDROGEN, IN ACCORDANCE WITH AWS D11, PERFORMED BY AWS CERTIFIED WELDERS.
- 3.1. THE MINIMUM FILLET WELD SIZE SHALL BE 1/4" UNLESS OTHERWISE APPROVED BY THE STRUCTURAL ENGINEER, OR AS NOTED IN THESE DRAWINGS.
- NO MEMBER SPLICES ARE PERMITTED.
- FIELD MODIFICATION OF STRUCTURAL STEEL IS NOT PERMITTED WITHOUT PRIOR APPROVAL OF THE STRUCTURAL ENGINEER.
- STRUCTURAL STEEL FABRICATION SHALL NOT PROCEED UNTIL SHOP DRAWINGS HAVE BEEN SUBMITTED AND APPROVED BY THE STRUCTURAL ENGINEER.

FIRE SAFETY CONSTRUCTION NOTES:

- GENERAL FIRE SAFETY DURING CONSTRUCTION SHALL COMPLY WITH OSHA 1910.252, OSHA 1926.352, AND NFPA 51B.
- FIRE WATCH: MAINTAIN FIRE WATCH WHEN REQUIRED BY THE BUILDING OFFICIAL AND PER OSHA 1910.252(a)(2)(ii) AND WHEN FIRE PROTECTION SYSTEMS ARE SHUTDOWN FOR ALTERATIONS. FIRE WATCH SHALL REMAIN IN EFFECT UNTIL ALL WELDING OR CUTTING IS COMPLETED. FIRE WATCH SHALL ALSO REMAIN IN EFFECT UNTIL EXISTING FIRE PROTECTION SYSTEMS ARE RETURNED TO SERVICE AND AS ALLOWED BY THE BUILDING OFFICIAL.
- GUARDS: GUARDS SHALL BE USED PER OSHA 1910.252(a)(1)(i) DURING ALL WELDING AND CUTTING.
- FIRE WATCHERS SHALL HAVE FIRE EXTINGUISHING EQUIPMENT READILY AVAILABLE AND BE TRAINED IN ITS USE AND SHALL FULLY COMPLY WITH OSHA 1910.252(a)(2)(ii)(B).

OSHA NOTES:

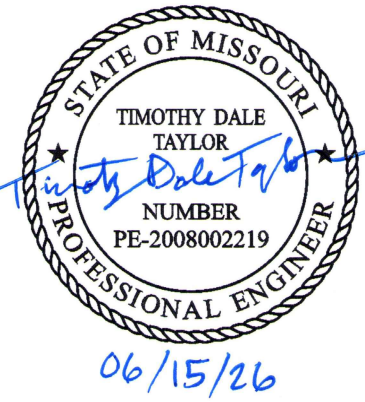
- ALL SAFETY AND OSHA REGULATIONS SHALL BE FOLLOWED STRICTLY. METHODS OF CONSTRUCTION AND ERECTION OF STRUCTURAL MATERIAL ARE THE CONTRACTOR'S RESPONSIBILITY.
- DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH OSHA REGULATIONS AS STATED IN "29 CFR PART 1926, SUBPART R".

POST-INSTALLED ANCHOR NOTES:

- ALL POST-INSTALLED ANCHORS ARE DESIGNED IN ACCORDANCE WITH ACI 308.
- POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE SPECIFIED IN THESE STRUCTURAL DRAWINGS.
- CARE SHALL BE TAKEN IN PLACING POST-INSTALLED ANCHORS TO AVOID CONFLICTS WITH EXISTING REBAR. EXISTING REINFORCING BARS SHALL NOT BE CUT UNLESS APPROVED BY THE STRUCTURAL ENGINEER-OF-RECORD (E.O.R.). USE SCANNING EQUIPMENT OR OTHER MEANS AS NECESSARY TO LOCATE REBAR AND TO AVOID DAMAGING OR CUTTING REBAR.
- ALL ANCHORS MUST BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INFORMATION (MPI) IN CONJUNCTION WITH EDGE DISTANCE, SPACING, AND EMBEDMENT DEPTH AS INDICATED ON THE DRAWINGS. HOLES SHALL BE DRILLED AND CLEANED IN ACCORDANCE WITH THE MPI.
- SUBSTITUTION REQUESTS, FOR PRODUCTS OTHER THAN THOSE SPECIFIED, SHALL BE SUBMITTED BY THE CONTRACTOR TO THE STRUCTURAL E.O.R. ALONG WITH STRUCTURAL CALCULATIONS THAT ARE PREPARED & SEALED BY A PROFESSIONAL ENGINEER HOLDING CURRENT LICENSE IN THE STATE OF MISSOURI. THE CALCULATIONS SHALL DEMONSTRATE THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING EQUIVALENT PERFORMANCE VALUES OF THE SPECIFIED PRODUCT USING THE APPROPRIATE DESIGN PROCEDURE AND/OR STANDARD(S) AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION AND PER APPLICABLE CODES.
- THE CONTRACTOR SHALL ARRANGE FOR A MANUFACTURER'S FIELD REPRESENTATIVE TO PROVIDE INSTALLATION TRAINING FOR ALL PRODUCTS TO BE USED, PRIOR TO THE ANCHOR INSTALLATION. A RECORD OF TRAINING SHALL BE KEPT ON SITE AND MADE AVAILABLE TO THE STRUCTURAL E.O.R. AS REQUESTED.
- ADHESIVE ANCHORS INSTALLED IN HORIZONTAL OR VERTICALLY OVERHEAD ORIENTATION THAT SUPPORT SUSTAINED TENSION LOADS SHALL BE DONE BY A CERTIFIED ANCHOR INSTALLER (AAI) AS CERTIFIED THROUGH ACI/CRSI (ACI 308-II, APPENDIX D, D.4.2.4 OR ACI 308-14, 11.8.2.2). PROOF OF CURRENT CERTIFICATION SHALL BE SUBMITTED TO THE STRUCTURAL E.O.R. FOR APPROVAL PRIOR TO COMMENCEMENT OF INSTALLATION.
- ALL POST INSTALLED ANCHORS SHALL BE INSTALLED IN DRY HOLES THAT HAVE BEEN DRILLED, CLEANED, AND PREPARED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INFORMATION AND THE RESPECTIVE ICC-ES EVALUATION REPORTS.
- PROVIDE SPECIAL INSPECTION BY A QUALIFIED THIRD PARTY INSPECTOR AS APPROVED BY THE OWNER FOR ALL MECHANICAL AND ADHESIVE ANCHORS PER THE APPLICABLE BUILDING CODE (REF. IBC 2015 TABLE 1705.3) AND PER THE CURRENT ICC-ES REPORT.

ALTERNATE ADHESIVE ANCHORS:
 1. (2) 3/8" DIA. F1554, GR. 36 THREADED RODS W/ SIMPSON SET-36 ADHESIVE (4 1/2" MIN. EMBED.)
 2. (2) 3/8" DIA. F1554, GR. 36 THREADED RODS W/ DEWALT AC100+ GOLD ADHESIVE (4 1/2" MIN. EMBED.)

STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR



Midwest Engineering & Design

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Midwest Engineering & Design
Missouri State Certificate of Authority #2010032467

OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES
MANAGEMENT,
DESIGN AND CONSTRUCTION

MISSOURI DEPARTMENT
OF PUBLIC SAFETY
DIVISION OF MO STATE
HIGHWAY PATROL

REPLACE HVAC &
BOILERS / PUMPS /
CONTROLS

MSHP TROOP B
HEADQUARTERS
308 PINE CREST DR.
MACON, MO 63552

PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 06/15/26

CAD DWG FILE: S-503
DRAWN BY: TDT
CHECKED BY: TDT
DESIGNED BY: TDT

SHEET TITLE:

EXTG. JOIST SEAT
REINFORCING
DETAILS

SHEET NUMBER:

S-503

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2026-06-15



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Columbia, MO 65202
(573) 886-0833
tse-engr@gmail.com
MO C.O.A.#: E-2009025546

PROJECT SCOPE SUMMARY

THIS PROJECT CONSISTS OF MODIFICATION AND/OR REPLACEMENT OF THE COMPLETE HVAC SYSTEMS IN THE MAIN BUILDING, THE COMMERCIAL DRIVERS LICENSE/MOTOR VEHICLE INSPECTION (CDL/MVI) BUILDING, AND THE CRIME LABORATORY BUILDING. THE SCOPE WILL INCLUDE NEW HVAC EQUIPMENT, CONTROLS, RELATED ELECTRICAL, STRUCTURAL, AND DEMOLITION. THERE IS MINOR PLUMBING MODIFICATION FOR MAKE UP WATER TO THE HYDRONIC HEATING AND CHILLED WATER LOOPS. THIS PROJECT ALSO INCLUDES INCIDENTAL WALL PATCHING, FINISHING, AND LAY-IN CEILING WORK.

GENERAL PROJECT NOTES

- 1
- CONTRACTOR SHALL REPAIR ANY DAMAGED LAWN AND/OR LANDSCAPING AS REQUIRED IF DAMAGED IN THE COURSE OF THE PROJECT.
- 2
- SEE SITE PLAN FOR CONSTRUCTION TRAILER AND STAGING AREAS ON SHEET G002.
- 3
- THE MAIN BUILDING IS TO REMAIN OCCUPIED DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR PHASING & PROVIDING TEMPORARY HEATING AND COOLING TO MAINTAIN BUILDING CONDITIONS THROUGHOUT THE CONSTRUCTION PERIOD. THE METHOD AND MEANS FOR TEMPORARY HEATING AND COOLING IS TO BE DECIDED BY THE CONTRACTOR, BUT MUST MAINTAIN REASONABLE TEMPERATURE & HUMIDITY THROUGHOUT THE PROJECT. SEE G-002 – GENERAL CONSTRUCTION NOTES.
- 4
- CONTRACTOR TO PROVIDE VIDEO RECORDINGS OF ALL TRAINING SESSIONS. SEE SPECS 17900.

SUGGESTED CONSTRUCTION PHASING

- 1
- THIS IS A SUGGESTED PROCEDURE. IT IS PROVIDED AS A GUIDELINE. IT IS NOT INTENDED TO CONSTRAIN THE CONTRACTOR FROM COORDINATING A DIFFERENT PROCEDURE WITH THE OWNER.
- 2
- THIS SEQUENCE MAY ALSO BE MODIFIED BY THE TIMING OF OTHER CONSTRUCTION PROJECTS.
- 3
- MOST OF THESE PHASES CAN BE ACCOMPLISHED AT THE SAME TIME.

PHASE 1 – RADIO & IT ROOM

- INSTALL REMOTE RADIO ROOM UNIT IN PARKING LOT.
- MOVE PEOPLE & OPERATIONS TO REMOTE UNIT (3 PEOPLE).
- DEMOLITION
- RENOVATION
- START UP NEW HVAC SYSTEM
- REOCCUPY

PHASE 1 – MAIN BUILDING – MECHANICAL & STORAGE ROOM – THIS WILL CONTINUE DURING MOST OF THE CONSTRUCTION PERIOD.

- PROVIDE TEMPORARY HVAC FOR ALL OCCUPIED AREAS OF MAIN BUILDING.
- DEMO MECH ROOM, STORAGE ROOM, AND OUTDOOR EQUIPMENT,
- RENOVATION
- FEED ALL NEW EQUIPMENT.
- START UP.

PHASE 2 – FIRING RANGE – 1ST FLOOR OFFICES

- MOVE ~8 PEOPLE TO TEMPORARY OFFICES IN TWO CONFERENCE ROOMS & BREAK ROOM.
- DEMOLITION
- RENOVATION
- REOCCUPY WITH TEMPORARY HVAC.

PHASE 3 – MAIN BUILDING 1ST FLOOR – THIS PHASE IS TO START WHEN PHASE 2 IS CLOSE TO FINISHED.

- MOVE ~7 PEOPLE TO TEMPORARY OFFICES IN TWO CONFERENCE ROOMS & BREAK ROOM.
- DEMOLITION
- RENOVATION
- REOCCUPY WITH TEMPORARY HVAC.

PHASE 4 – MAIN BUILDING GROUND FLOOR – THE GROUND FLOOR SHOULD BE UNOCCUPIED BY THE START OF THIS PHASE.

- DEMOLITION
- RENOVATION

PHASE 5 – HVAC SYSTEM SWITCH OVER

- FEED NEW SYSTEMS WITH HEATING WATER, CHILLED WATER, ELECTRICITY, ETC.
- START UP
- REMOVE TEMPORARY HVAC EQUIPMENT.

PHASE – GARAGE – THIS CAN BE DONE AT ANY TIME DURING THE CONSTRUCTION PERIOD.

- RELOCATE 2 PEOPLE.
- DEMOLITION
- RENOVATION
- PROVIDE TEMPORARY HVAC.
- REOCCUPY

PHASE – CRIME LAB & CDL/MVI BUILDINGS – THESE CAN BE DONE AT ANY TIME DURING THE CONSTRUCTION PERIOD. THEY HAVE NO IMPACT ON THE MAIN BUILDING SYSTEMS OR OPERATIONS.

- RELOCATE ~3 PEOPLE
- DEMOLITION
- RENOVATION
- START UP
- REOCCUPY WITH NEW HVAC SYSTEMS.

GENERAL HVAC CONSTRUCTION NOTES – SEE SPECS.

- 1
- FABRICATION, INSTALLATION AND TESTING OF ALL HVAC SYSTEMS SHALL BE IN ACCORDANCE WITH THE INTERNATIONAL MECHANICAL CODE (IMC) 2024, IBC 2021, ALL STATE AND LOCAL CODES, AND ALL MANUFACTURER INSTALLATION GUIDELINES & RECOMMENDATIONS.
- 2
- ALL METALLIC AND FLEXIBLE DUCTS SHALL BE CONSTRUCTED, INSTALLED & SUPPORTED AS SPECIFIED IN THE IMC AND SMACNA HVAC DUCT CONSTRUCTION STANDARDS 2021.
- 3
- DUCT SIZES MAY BE MARKED ALONG THE LENGTH OF RUNS ON THE PLAN. IF THE DUCT SIZE CHANGES THE CONTRACTOR SHALL SELECT THE SUITABLE TRANSITION TO SATISFY THE CONNECTION. DUCT LAYOUT IS DRAWN FOR DESIGN INTENT AND CLARITY. MINIMIZE THE NUMBER OF TURNS AND FITTINGS IN DUCT WHEREVER POSSIBLE WHILE MAINTAINING THE INTENDED DESIGN. DUCT LAYOUT, SIZING, AND CONFIGURATIONS BASED ON AVAILABLE DOCUMENTS & LIMITED FIELD OBSERVATIONS. CONTRACTOR TO NOTIFY OWNER AND/OR ENGINEER, PRIOR TO BIDDING, IF SIGNIFICANT CHANGES, THAT WILL AFFECT THEIR BID, ARE REQUIRED.
- 4
- ALL DUCTWORK INDICATED WITH TWO DIMENSION <WxD> INDICATES RECTANGULAR DUCT. ALL <Dø> INDICATES ROUND DUCT. DIMENSIONS ARE INCHES MEASURED INSIDE. THE FIRST NUMBER IS THE SIDE SHOWN OR TOUCHED WITH THE ARROW HEAD. THIS PROJECT ALSO INCLUDES SOME OVAL DUCT.
- 5
- ALL SUPPLY AIR & OUTSIDE AIR DUCTS WITHIN THE SPACE SHALL BE INSULATED TO R6 MINIMUM EXTERNAL WRAP OR INSULATION BOARD W/ VAPOR BARRIER. INSULATION SHALL BE RATED FOR RETURN AIR PLENUM PER IMC & ASTM E-84 FLAME/SMOKE SPREAD INDEX.
- 6
- PROVIDE STANDARD TURNING VANES OR CURVED ELBOWS WITH SQUARE THROAT ON RECTANGULAR DUCTS IN BULLHEAD TEES AND ELBOWS GREATER THAN 45° UNLESS OTHERWISE INDICATED. ALL CHANGES IN DUCT DIRECTION INDICATED WITH RADIUS FITTING SHALL MAINTAIN A CENTERLINE TURNING RADIUS OF 1.5 (MINIMUM) X DUCT DIAMETER.
- 7
- FLEXIBLE DUCT SHALL BE RATED FOR RETURN AIR PLENUM PER IMC & ASTM E-84 FLAME/SMOKE SPREAD INDEX, LIMITED TO 2 FEET MAXIMUM LENGTH, UNLESS OTHERWISE INDICATED, BE REASONABLY WELL EXTENDED & SUPPORTED TO MINIMIZE PRESSURE DROP. FLEXIBLE DUCT SHALL NOT BE USED IN CHANGE OF DIRECTION OF MORE THAN 45 DEGREES, UNLESS OTHERWISE INDICATED OR APPROVED. AND SHALL NOT PENETRATE WALL, FLOOR, ROOF, OR CEILING.
- 8
- AN INDEPENDENT CERTIFIED BALANCING CONTRACTOR SHALL BALANCE THE AIR AND HYDRONIC SYSTEMS TO THE VALUES SPECIFIED AND SUBMIT A BALANCE REPORT.
- 9
- PROVIDE SUITABLE SUPPORTS & VIBRATION ISOLATORS COMPLYING WITH SMACNA CONSTRUCTION STANDARDS & IMC, FOR STABILITY OF ALL HVAC EQUIPMENT AND DUCT.
- 10
- PROVIDE VIBRATION ISOLATION DEVICES WHERE SHOWN & AT ALL EQUIPMENT WITH MOTORS AND/OR EQUIPMENT THAT MAY BE SUBJECT TO VIBRATION
- 11
- COORDINATE LOCATION AND PLACEMENT OF ALL EQUIPMENT, DUCTS AND DEVICES WITH OTHER TRADES AND BUILDING STRUCTURE.
- 12
- ALL DUCT TO BE GALVANIZED STEEL CONSTRUCTION UNLESS OTHERWISE NOTED.
- 13
- ALL AIR HANDLING UNITS PRODUCING 2000 CFM OR GREATER TO HAVE DUCT SMOKE DETECTOR IN RETURN SYSTEM TIED INTO EXISTING FIRE ALARM SYSTEM.
- 14
- ALL DIMENSIONS & CONFIGURATION OF EXISTING FIELD WORK, INCLUDING AIR DEVICES, IS BASED ON EXISTING CONSTRUCTION DOCUMENTS AND LIMITED FIELD OBSERVATIONS. CONTRACTOR TO VERIFY & INFORM THE OWNER AND/OR ENGINEER IF SIGNIFICANT DISCREPANCIES ARE FOUND THAT WILL AFFECT THEIR BID.

- 15
- CONTRACTOR TO PROVIDE NEW HOUSEKEEPING PADS AS REQ'D FOR ALL HVAC EQUIPMENT AS SHOWN & AS REQ'D TO KEEP EQUIPMENT ABOVE FLOOR OR GRADE.
- 16
- DAMAGED OR MISSING INSULATION ON ALL EXISTING DUCT WHICH REMAINS IN SERVICE SHALL BE REPAIRED OR REPLACED AS REQUIRED WHETHER IT IS CAUSED BY THIS PROJECT OR IS A PRE-EXISTING CONDITION.
- 17
- CONTRACTOR TO CLEAN THE INTERIOR OF ALL EXISTING DUCT THAT REMAINS IN SERVICE.

HYDRONIC CONSTRUCTION NOTES – SEE SPECS.

- 1
- CONTRACTOR SHALL INSTALL ALL FITTINGS, PIPE AND OTHER HYDRONIC EQUIPMENT AS SPECIFIED & AS REQ'D FOR A COMPLETE OPERATING SYSTEM. ALL WORK TO COMPLY WITH IMC. SEE NOTE 1 IN GENERAL HVAC CONSTRUCTION NOTES. HYDRONIC SYSTEMS ARE PART OF HVAC SYSTEM.
- 2
- CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE REQUIRED BOILER/PRESSURE VESSEL INSTALLATION PERMITTING AND CERTIFIED INSPECTIONS BY THE MISSOURI DEPARTMENT OF PUBLIC SAFETIES' DIVISION OF FIRE SAFETY.
- 3
- PROVIDE CONDENSATE DRAIN PIPES PER MANUFACTURER REQUIREMENTS FOR EACH AHU (AIR HANDLING UNIT), CONDENSING BOILER & ANY OTHER EQUIPMENT REQUIRING CONDENSATE DRAIN.
- 4
- ANY COPPER PIPE CONNECTION TO STEEL OR OTHER DISSIMILAR METAL SHALL REQUIRE A DIELECTRIC UNION. PROTECT COPPER PIPE AGAINST CONTACT WITH DISSIMILAR METALS. ALL HANGERS, SUPPORTS, ANCHORS, AND CLIPS SHALL BE COPPER OR COPPER PLATED. WHERE COPPER PIPE IS CARRIED ON IRON TRAPEZE HANGERS WITH OTHER PIPES, PROVIDE A PERMANENT ELECTROLYTIC ISOLATION MATERIAL, SUCH AS EPDM RUBBER, TO PREVENT CONTACT WITH DISSIMILAR METALS.
- 5
- CONTRACTOR SHALL PROVIDE NEW DEIONIZED-WATER WITH 30 PERCENT (BY VOLUME) INHIBITED PROPYLENE-GLYCOL HEAT TRANSFER FLUID EQUAL TO DOWFROST FLUID FOR THE CHILLED WATER SYSTEMS.
- 6
- CONTRACTOR SHALL PRESSURE AND LEAK TEST THE COMPLETE HYDRONIC LOOPS ACCORDING TO THE INTERNATIONAL MECHANICAL CODE. CONTRACTOR SHALL PROVIDE PRESSURE TEST REPORT.
- 7
- HYDRONIC HEATING AND CHILLED WATER PIPE TO BE ONE OF THE FOLLOWING:
COPPER PIPE (ASTM B42; ASTM B43; ASTM B302)
COPPER TUBE TYPE K (ASTM B75; ASTM B88; ASTM B135; ASTM B251)
IRON PIPE (AWWA C115/A21.15; AWWA C151/A21.51)
STEEL PIPE (ASTM A53; ASTM A106)
CROSS LINK POLYETHYLENE PRESSURE PIPE-PEX-AL-PEX (ASTM F1281; CSA CAN/CSA-B-137.10)
- 8
- PIPE INSULATION:
HYDRONIC HEATING & CHILLED WATER PIPE FITTINGS AND DEVICES TO BE INSULATED WITH FIBERGLASS 1-1/2" MIN THK. WITH VAPOR BARRIER. PROVIDE INSULATION JACKET ON ALL PIPE WITHIN MECHANICAL ROOM, GARAGE, & STORE ROOMS WHERE EXPOSED TO POSSIBLE PHYSICAL CONTACT. JACKET TO BE PVC, ALUMINUM OR STAINLESS STEEL. PROVIDE APPROPRIATE MATCHING, FORMED INSULATION & JACKETS AT ALL FITTINGS AND PIPE SPECIALTIES.
- 9
- CONTRACTOR TO PROVIDE PIPE EXPANSION DEVICES WHERE SHOWN AND REQUIRED FOR INSTALLED PIPE RUNS.
- 10
- CONTRACTOR TO PROVIDE FLEX PIPE CONNECTORS WHERE SHOWN AND AS REQUIRED AT ALL EQUIPMENT WHICH MAY PRODUCE VIBRATION AND/OR WHERE REQUIRED FOR ALIGNMENT.
- 11
- DAMAGED OR MISSING INSULATION, INCLUDING JACKET WHERE REQUIRED, ON ALL HYDRONIC PIPE WHICH REMAINS IN SERVICE SHALL BE REPAIRED OR REPLACED AS REQUIRED WHETHER IT IS CAUSED BY THIS PROJECT OR IS A PRE-EXISTING CONDITION.

HYDRONIC WATER TREATMENT

WATER TREATMENT SYSTEM: THE WINNING CONTRACTOR SHALL BE RESPONSIBLE FOR HIRING WALTER LOUIS FLUID TECHNOLOGIES AS THE WATER TREATMENT CONTRACTOR AND INCLUDE ALL COSTS ASSOCIATED WITH INSTALLATION, EQUIPMENT, LABOR AND CHEMICALS ASSOCIATED WITH PROVIDING A COMPLETE AND OPERATIONAL SYSTEM AS DESCRIBED IN THESE CONSTRUCTION DOCUMENTS. SEE SPECIFICATIONS – 232500

CONTACT INFORMATION: WALTER LOUIS FLUID TECHNOLOGIES, SALES@WALTERLOUIS.COM PH (217)~223~2017
ROGER SMITH ROGER@WALTERLOUIS.COM (217)~653~7538

HVAC SYSTEM CONTROLS NOTES

THE EXISTING AND NEW CONTROLS SYSTEM IS PROVIDED BY JOHNSON CONTROLS. MODIFY TO PROVIDE THE SPECIFIED CONTROL SEQUENCE FOR THE NEW HVAC SYSTEM. MECHANICAL CONTRACTOR TO COORDINATE WITH CONTROLS CONTRACTOR AND INCLUDE JOHNSON CONTROL'S PRICE IN THE BID. JOHNSON CONTROLS CONTACT: JACK CONROY, CELL: (314)~624~7181, EMAIL: jack.conroy@jci.com

SEE SHEET M-800 & SPECIFICATIONS.

CONTROLS LEGEND (SHEETS M-800 THRU M-808 ONLY)

CONTROL OUTPUTS & CURRENTS

- RLF-0 – RELIEF FAN OUTPUT COMMAND SIGNAL SENT TO THE RELIEF FAN (TYPICALLY 0-100% OR START/STOP).
- RLF-C – RELIEF FAN CURRENT ELECTRICAL CURRENT DRAW OF THE RELIEF FAN, USED FOR STATUS

VERIFICATION AND DIAGNOSTICS.

- OAD-0 – OUTSIDE AIR DAMPER OUTPUT CONTROL SIGNAL POSITIONING THE OUTSIDE AIR DAMPER.
- RAD-0 – RETURN AIR DAMPER OUTPUT CONTROL SIGNAL POSITIONING THE RETURN AIR DAMPER.
- PH-0 – PREHEAT OUTPUT COMMAND TO THE PREHEAT COIL VALVE OR PREHEAT STAGE.
- CLG-0 – COOLING OUTPUT COMMAND TO THE COOLING COIL VALVE OR DX COOLING STAGE.
- SF-0 – SUPPLY FAN OUTPUT COMMAND TO START/STOP OR MODULATE THE SUPPLY FAN.
- MAD-0 – MIXED AIR DAMPER OUTPUT CONTROL SIGNAL FOR THE MIXED AIR DAMPER (IF SEPARATE FROM OAD/RAD).
- BYPV-0 – BYPASS VALVE OUTPUT COMMAND TO MODULATE A HYDRONIC BYPASS VALVE.
- DPR-0 – DAMPER OUTPUT GENERIC DAMPER COMMAND (CONTEXT-DEPENDENT).
- HTG-0 – HEATING OUTPUT COMMAND TO THE HEATING COIL VALVE OR HEATING STAGE. EQUIPMENT STATUS & CURRENTS
- RLF-S – RELIEF FAN STATUS BINARY INDICATION OF WHETHER THE RELIEF FAN IS PROVEN ON.
- SDR – SMOKE DETECTOR RELAY STATUS OF SMOKE DETECTION; TYPICALLY TRIGGERS SHUTDOWN OR MODE CHANGE.
- RHP – REHEAT PUMP STATUS ON/OFF STATUS OF THE REHEAT PUMP.
- RHP-C – REHEAT PUMP CURRENT ELECTRICAL CURRENT DRAW OF THE REHEAT PUMP.
- SF-C – SUPPLY FAN CURRENT ELECTRICAL CURRENT DRAW OF THE SUPPLY FAN.
- SF-S – SUPPLY FAN STATUS PROOF-OF-FLOW OR RUN STATUS FOR THE SUPPLY FAN.
- PFILT-S – PREFILTER STATUS INDICATES FILTER CONDITION (CLEAN/DIRTY).
- SCHWP – SECONDARY CHILLED WATER PUMP STATUS RUN STATUS OF THE SECONDARY CHILLED WATER PUMP.
- SCHWP-C – SECONDARY CHILLED WATER PUMP CURRENT CURRENT DRAW OF THE SECONDARY CHILLED WATER PUMP.
- PCHWP – PRIMARY CHILLED WATER PUMP STATUS RUN STATUS OF THE PRIMARY CHILLED WATER PUMP.
- BLR-S – BOILER STATUS INDICATES WHETHER THE BOILER IS FIRING OR ENABLED.
- BLR-A – BOILER ALARM ALARM CONDITION FROM THE BOILER.
- PHWP – PRIMARY HOT WATER PUMP STATUS RUN STATUS OF THE PRIMARY HOT WATER PUMP.
- ZNPA-C – ZONE PUMP CURRENT CURRENT DRAW OF A ZONE-LEVEL PUMP.
- OCC-S – OCCUPANCY STATUS INDICATES WHETHER THE ZONE IS OCCUPIED (SCHEDULE OR SENSOR).

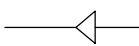
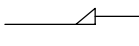
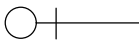
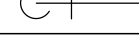
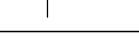
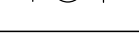
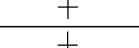
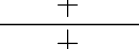
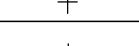
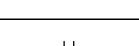
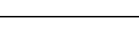
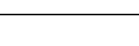
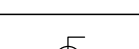
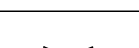
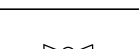
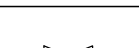
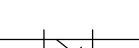
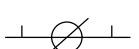
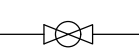
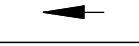
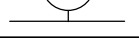
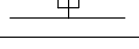
TEMPERATURE SENSORS

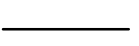
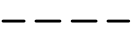
- MA-T – MIXED AIR TEMPERATURE TEMPERATURE AFTER OUTSIDE/RETURN AIR MIXING.
- PH-T – PREHEAT TEMPERATURE TEMPERATURE DOWNSTREAM OF THE PREHEAT COIL.
- CC-T – COOLING COIL TEMPERATURE TEMPERATURE DOWNSTREAM OF THE COOLING COIL.
- DA-T – DISCHARGE AIR TEMPERATURE SUPPLY AIR TEMPERATURE LEAVING THE AHU.
- PCHWR-T – PRIMARY CHILLED WATER RETURN TEMPERATURE RETURN TEMPERATURE FROM THE PRIMARY CHILLED WATER LOOP.
- PCHWS-T – PRIMARY CHILLED WATER SUPPLY TEMPERATURE SUPPLY TEMPERATURE FROM THE PRIMARY CHILLED WATER LOOP.
- RA-T – RETURN AIR TEMPERATURE TEMPERATURE OF AIR RETURNING FROM THE ZONE.
- ZN-T – ZONE TEMPERATURE TEMPERATURE MEASURED IN THE OCCUPIED SPACE. PRESSURE & AIRFLOW SENSORS
- BLDG-P – BUILDING PRESSURE DIFFERENTIAL PRESSURE BETWEEN BUILDING INTERIOR AND OUTDOORS.
- DA1-P – DISCHARGE AIR PRESSURE STATIC PRESSURE IN THE SUPPLY DUCT.
- CHW-DP – CHILLED WATER DIFFERENTIAL PRESSURE PRESSURE DIFFERENCE ACROSS THE CHILLED WATER LOOP.
- HW-DP – HOT WATER DIFFERENTIAL PRESSURE PRESSURE DIFFERENCE ACROSS THE HOT WATER LOOP.
- ZN-DP – ZONE DIFFERENTIAL PRESSURE PRESSURE DIFFERENCE ACROSS A ZONE OR TERMINAL UNIT.
- DA-VP – DISCHARGE AIR VELOCITY PRESSURE VELOCITY PRESSURE USED FOR AIRFLOW MEASUREMENT.

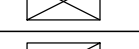
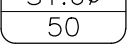
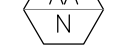
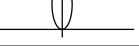
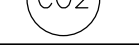
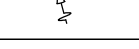
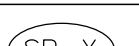
CONTROLS LEGEND CONT. (SHEETS M-800 THRU M-808 ONLY)

ALARMS & SAFETY

- LT-A – LOW TEMPERATURE ALARM INDICATES A FREEZE-RISK CONDITION IN THE AHU.
- SDR – SMOKE DETECTOR RELAY SAFETY INTERLOCK FOR SMOKE DETECTION (SHUTDOWN OR SMOKE CONTROL MODE).
- ZONE & QUALITY INDICATORS
- ZN-Q – ZONE QUALITY INDOOR AIR QUALITY INDICATOR (CO₂, VOCs, OR COMPOSITE INDEX DEPENDING ON SYSTEM).

HYDRONIC PIPE LEGEND	
	PIPE REDUCER
	PIPE CONCENTRIC REDUCER
	PIPE ELBOW UP
	PIPE ELBOW DOWN
	PIPE ELBOW
	PIPE TEE UP
	PIPE TEE DOWN
	PIPE TEE
	PIPE TEE & ELBOW DOWN
	PIPE TEE & ELBOW UP
	PIPE UNION (OR FLG AS REQ'D)
	PIPE FLANGE CONNECTION
	FLEXIBLE PIPE CONNECTOR
	EXPANSION JOINT OR LOOP
	BALL VALVE
	GATE VALVE
	GLOBE VALVE
	2-WAY VALVE
	3 WAY VALVE
	MOTORIZED 3 WAY VALVE
	MOTORIZED 2 WAY VALVE
	MOTORIZED BALL VALVE
	CHECK VALVE
	STRAINER
	BALANCE VALVE
	TRIPLE DUTY VALVE
	AIR VENT
	AUTOMATIC AIR VENT
	DIRECTION OF FLOW
	PRESSURE GAUGE
	TEMPERATURE GAUGE
	THERMOMETER

PIPE ABBR. & SYMBOLS	
RFG	REFRIGERANT PIPE
CDP	CONDENSATE DRAIN PIPE
MUW	MAKE UP WATER
HWS	HYDRONIC HEATING WATER SUPPLY
HWR	HYDRONIC HEATING WATER RETURN
CWS	CHILLED WATER SUPPLY
CWR	CHILLED WATER RETURN
CMP	COMMON PIPE
	SUPPLY PIPE
	RETURN PIPE

HVAC LEGEND	
	THERMOSTAT WITH EQUIPMENT LABEL
	REMOTE TEMPERATURE SENSOR
	SUPPLY AIR DIFFUSER
	RETURN AIR GRILL
	EXHAUST AIR GRILLE
	SUPPLY AIR DUCT (AXIAL VIEW)
	RA, OA, OR VA DUCT (AXIAL VIEW)
	EA, RLA DUCT (AXIAL VIEW)
	AIR DEVICE: TYPE, NECK(N) OR FACE(F) SIZE (INCHES)/CFM
	EQUIPMENT TAG
	DETAIL REFERENCE, NUMBER/SHEET
	BALANCE DAMPER RECTANGULAR DUCT
	BALANCE DAMPER ROUND OR OVAL DUCT
	CO2 SENSOR
	SMOKE DETECTOR DUCT MOUNTED
	EXISTING
	OVAL DUCT INLET
	DIRECTION OF RETURN OR EXHAUST AIR FLOW
	DIRECTION OF AIR FLOW
	CONNECTION POINT TO EXISTING SYSTEM
	STATIC PRESSURE SENSOR

DUCT ABBREVIATIONS	
SA	SUPPLY AIR
RA	RETURN AIR
EA	EXHAUST AIR
OA	OUTSIDE AIR
RLA	RELIEF AIR
VA	VENTILATION AIR (CONDITIONED OA)

EQUIPMENT ABBREVIATIONS	
AHU	AIR HANDLER UNIT
CUH	CONDENSER/HEAT PUMP UNIT
CU	CONDENSER UNIT
EXF	EXHAUST FAN
RLF	RELIEF AIR FAN
SF	SUPPLY FAN
B	BOILER
EXT	EXPANSION TANK
CPF	CHEMICAL POT FEEDER
C/C	COILING COIL
H/C	HEATING COIL
C	CHILLER
CV	CONTROL VALVE

AIR DEVICE ABBREVIATIONS	
S	SUPPLY DIFFUSER OR GRILL
R	RETURN GRILL
E	EXHAUST GRILL
TG	TRANSFER GRILL
RH	RELIEF AIR HOOD
L	LOUVER

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63552

PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

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ISSUE DATE: 06/15/2026

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CHECKED BY: JLD
DESIGNED BY: GGF/SAK

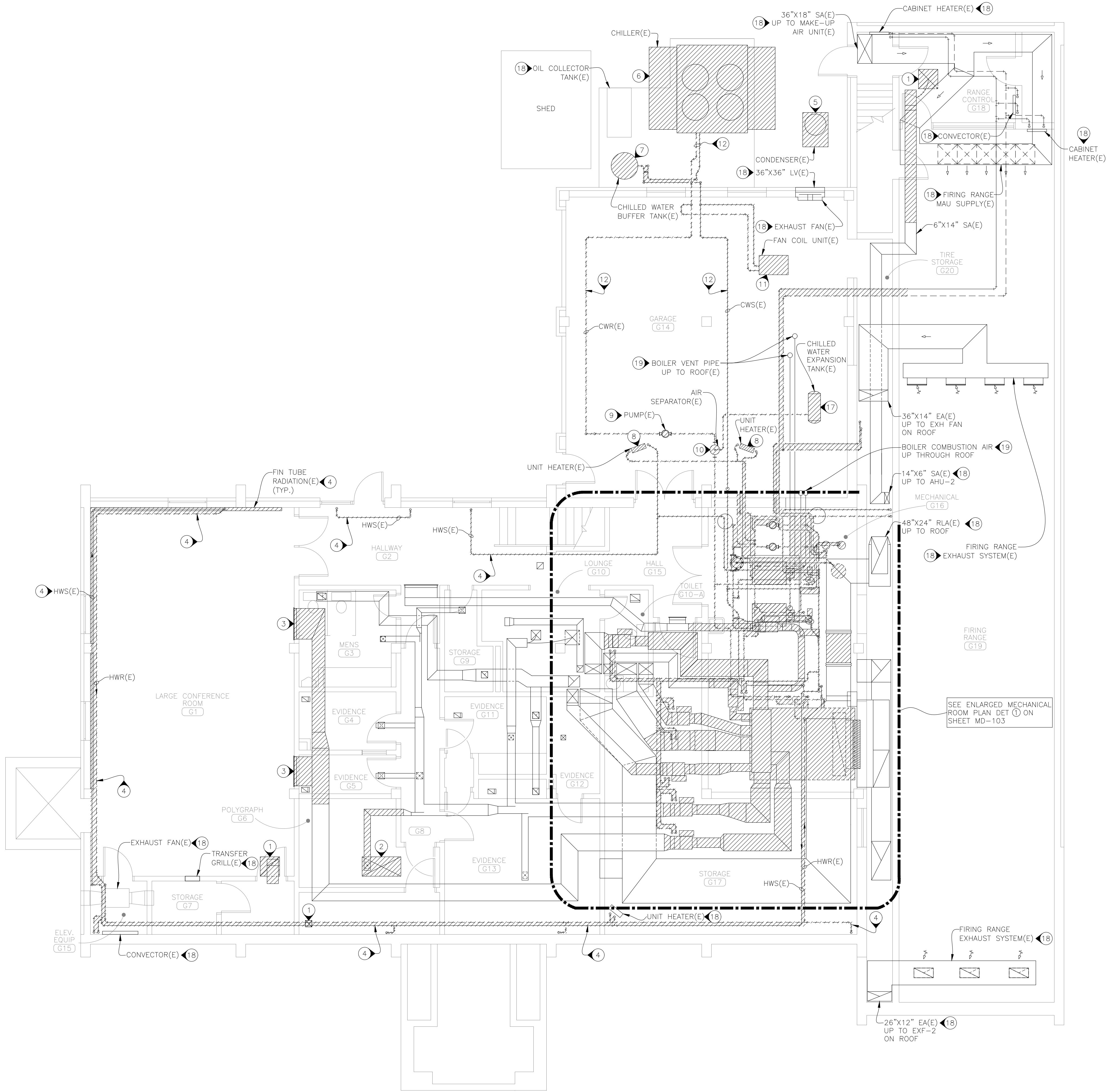
SHEET TITLE:

MECHANICAL
NOTES AND LEGEND

SHEET NUMBER:

M-001

8 OF 41 SHEETS
2026-06-15



1 HEADQUARTERS GROUND FLOOR HVAC DEMOLITION PLAN
SCALE: 3/16"=1'-0"

GENERAL DEMO NOTES(SHEETS MD-101 TO MD-104)

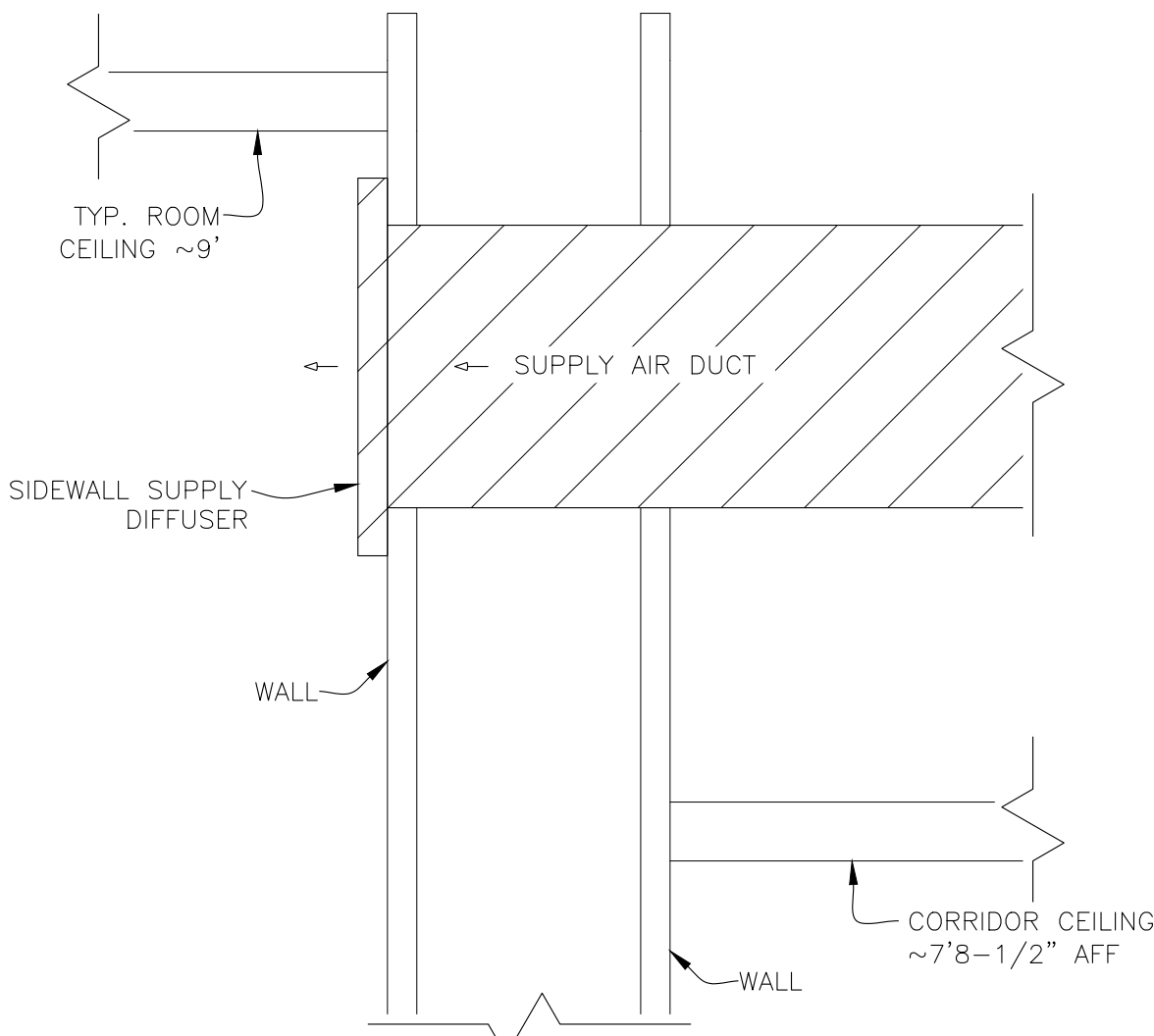
- 1 INFORMATION SHOWN ON DEMOLITION DRAWINGS & PLANS ARE FROM FIELD TAKE-OFF AND ORIGINAL DRAWINGS. CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY PRIOR TO BIDDING AND/OR CONSTRUCTION.
- 2 COVER ALL OPENINGS INTO THE BUILDING FROM THE WORK AREA. INSURE DEBRIS IS REMOVED FROM THE CONSTRUCTION AND DEMOLITION AREA AND AIR BORN DEBRIS IS NOT ALLOWED TO TRAVEL TO THE REMAINDER OF THE BUILDING. CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND DISPOSAL OF ALL DEMOLISHED MATERIAL AND EQUIPMENT.
- 3 SECTIONS OF DUCTWORK TO BE REMOVED IS INDICATED BY DEMOLITION HATCHING. REMOVE ALL UNUSED DUCTWORK AND AIR DEVICES EXCEPT AS NOTED.
- 4 REMOVE ALL EXISTING ROOM THERMOSTATS, ASSOCIATED CONTROL WIRING. HANDY BOXES TO BE EITHER REMOVED OR REUSED IF IN CORRECT LOCATION.
- 5 THE EXISTING FIRING RANGE EXHAUST AND MAKE-UP AIR UNIT & ITS DUCT WORK IS NOT MODIFIED IN THE PROJECT AND SHALL REMAIN.
- 6 RECOVER REFRIGERANT FROM EXISTING HVAC EQUIPMENT PRIOR TO REMOVAL, DEMOLITION, OR DISPOSAL. VENTING OF REFRIGERANT IS PROHIBITED.
- 7 REFRIGERANT RECOVERY PERFORMED BY A EPA SECTION 608 CERTIFIED TECHNICIAN. RECOVERY TO MET FEDERAL EVACUATION REQUIREMENTS APPLICABLE TO EQUIPMENT & REFRIGERANT TYPE.

KEYED DEMO NOTES(MD-101 & MD-102)

- 1 REMOVE CEILING SUPPLY DIFFUSER, RETURN GRILL, OR EXHAUST GRILL AND ASSOCIATED DUCT AS INDICATED BY DEMOLITION HATCHING.
- 2 REMOVE CEILING SUPPLY DIFFUSER, ASSOCIATED 24"x48" PERFORATED CEILING PANEL, AND ASSOCIATED DUCT AS INDICATED BY DEMOLITION HATCHING.
- 3 SIDEWALL SUPPLY DIFFUSER AND SUPPLY DUCT IN WALL TO BE REMOVED. SEE DETAIL 2 ON MD101 FOR REFERENCE ONLY. ACTUAL CONDITIONS MAY VARY DEPENDING ON THE DIFFUSER.
- 4 REMOVE FIN TUBE RADIATION, HOUSING, AND ASSOCIATED PIPING AS INDICATED BY DEMOLITION HATCHING. UNIT HEATER IN RM. G17 AND CONVECTOR IN RM. G15 ARE TO REMAIN.
- 5 REMOVE EXISTING CONDENSER UNIT AND REFRIGERANT PIPING. RECOVER REFRIGERANT. SEE GENERAL NOTE 6.
- 6 REMOVE CHILLER, CHILLED WATER PIPING, AND VALVES AS SHOWN. RECOVER REFRIGERANT. SEE GENERAL NOTE 6.
- 7 REMOVE CHILLED WATER BUFFER TANK, CHILLED WATER PIPING, AND VALVES AS SHOWN.
- 8 REMOVE UNIT HEATER, HANGARS, HEATING WATER PIPING, AND VALVES AS SHOWN.
- 9 REMOVE CHILLED WATER PUMP, HANGARS, CHILLED WATER PIPING, AND VALVES AS SHOWN.
- 10 REMOVE AIR SEPARATOR, CHILLED WATER PIPING, AND VALVES AS SHOWN.
- 11 REMOVE FAN COIL UNIT, MOUNTING EQUIPMENT, AND CHILLED WATER PIPING AS SHOWN.
- 12 REMOVE CHILLED WATER PIPING, VALVES, AND HANGERS AS INDICATED BY DEMOLITION HATCHING.
- 13 REMOVE TRANSFER GRILL LOCATED ABOVE DOOR TO IT ROOM.
- 14 REMOVE CEILING CASSETTE UNIT, REFRIGERANT PIPING, AND CONDENSATE PIPING AS SHOWN.
- 15 REMOVE EXISTING AIR HANDLER, PIPING, AND VALVES.
- 16 REMOVE OUTSIDE AIR DUCT AS SHOWN.
- 17 REMOVE CHILLED WATER EXPANSION TANK, CHILLED WATER PIPING, VALVES, AND HANGARS AS SHOWN.
- 18 EXISTING EQUIPMENT OR DUCT TO REMAIN.
- 19 RE-USE PORTION OF EXISTING BOILER VENT & COMBUSTION AIR PVC PIPE IF VIABLE, OR REPLACE AS REQUIRED.

DEMOLITION LEGEND	
	EQUIPMENT OR DUCT TO BE REMOVED
	PIPE TO BE REMOVED
	FLEX DUCT TO BE REMOVED

SEE ENLARGED MECHANICAL ROOM PLAN DET 1 ON SHEET MD-103



2 SIDEWALL DIFFUSER DEMOLITION DETAIL
SCALE: NTS

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PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

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DATE: _____
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DATE: _____
ISSUE DATE: 06/15/2026

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DRAWN BY: GGF/SAK
CHECKED BY: JLD
DESIGNED BY: GGF/SAK

SHEET TITLE:

HEADQUARTERS
GROUND FLOOR
DEMOLITION PLAN

SHEET NUMBER:

MD-101

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2026-06-15

DEMOLITION NOTES

1. SEE SHEET MD-101 FOR DEMOLITION AND KEYED DEMOLITION NOTES.

DEMOLITION LEGEND

	EQUIPMENT OR DUCT TO BE REMOVED
	PIPE TO BE REMOVED
	FLEX DUCT TO BE REMOVED

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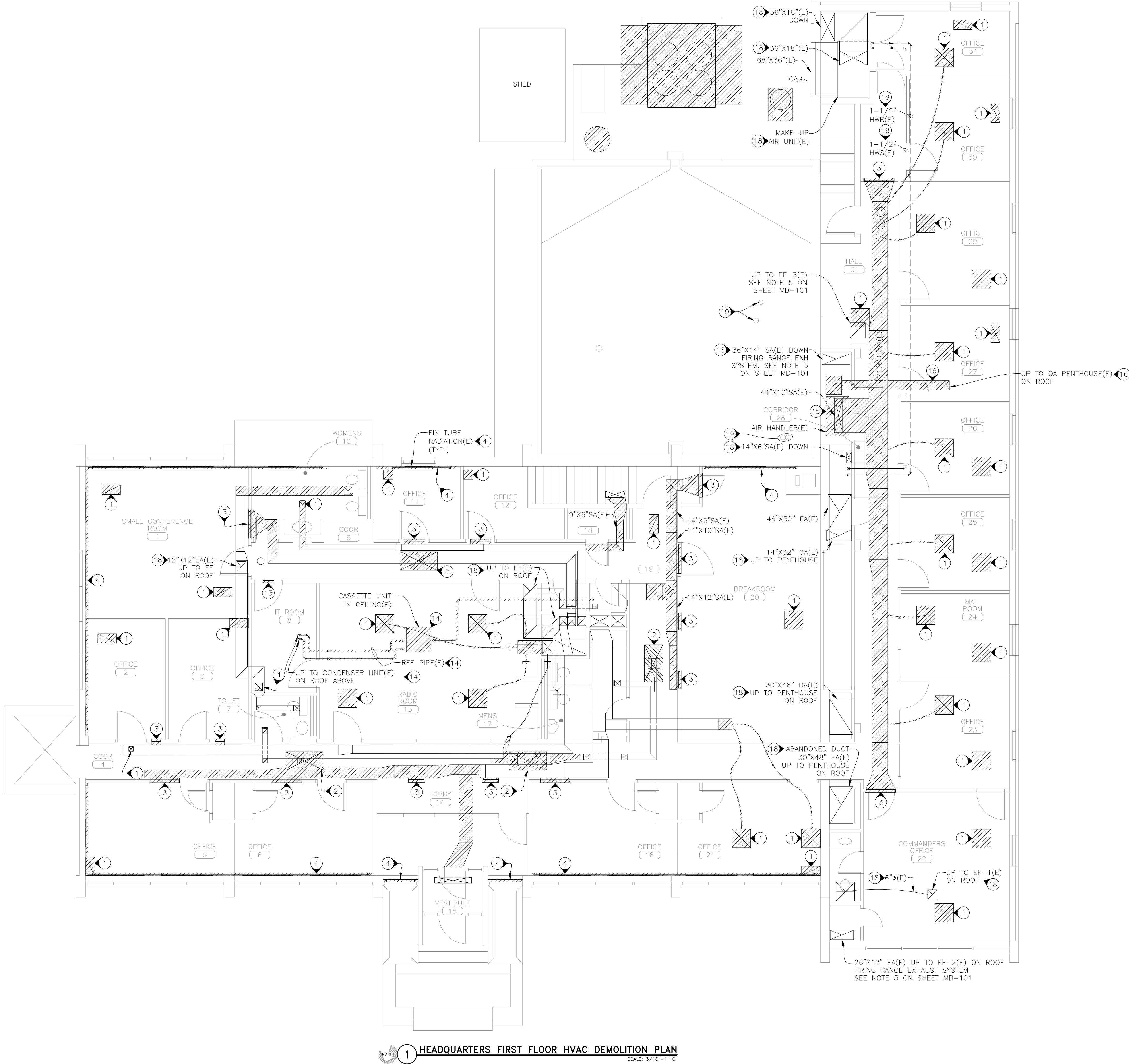
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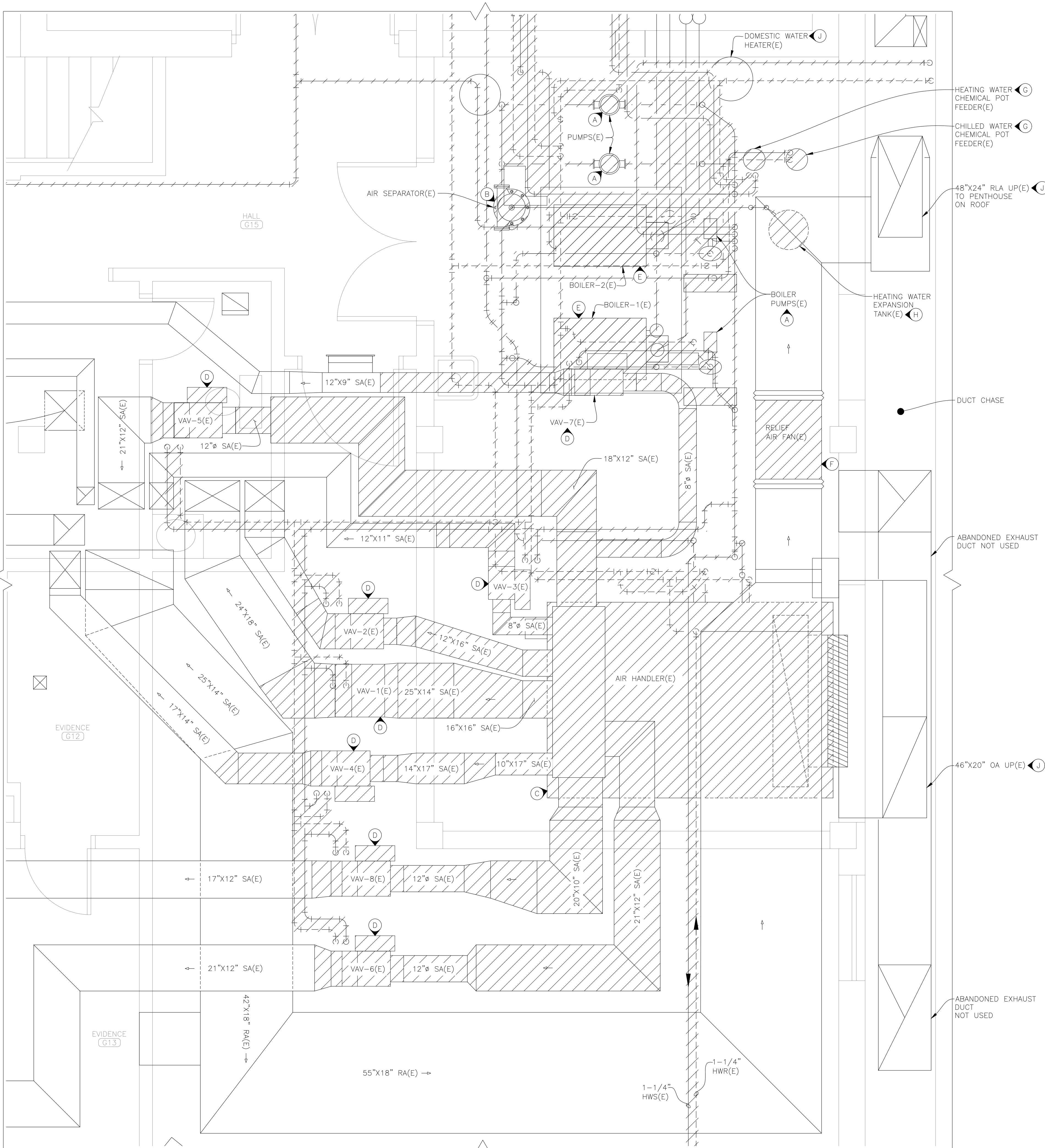
HEADQUARTERS
FIRST FLOOR
DEMOLITION PLAN

SHEET NUMBER:

MD-102

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2026-06-15





DEMOLITION NOTES

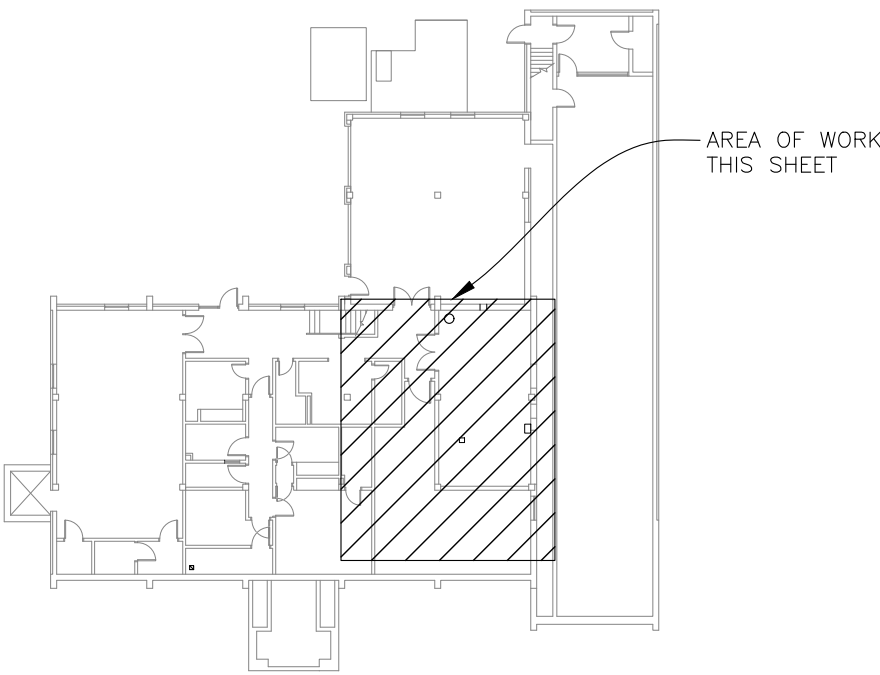
1 SEE SHEET MD-101 FOR GENERAL DEMOLITION NOTES.

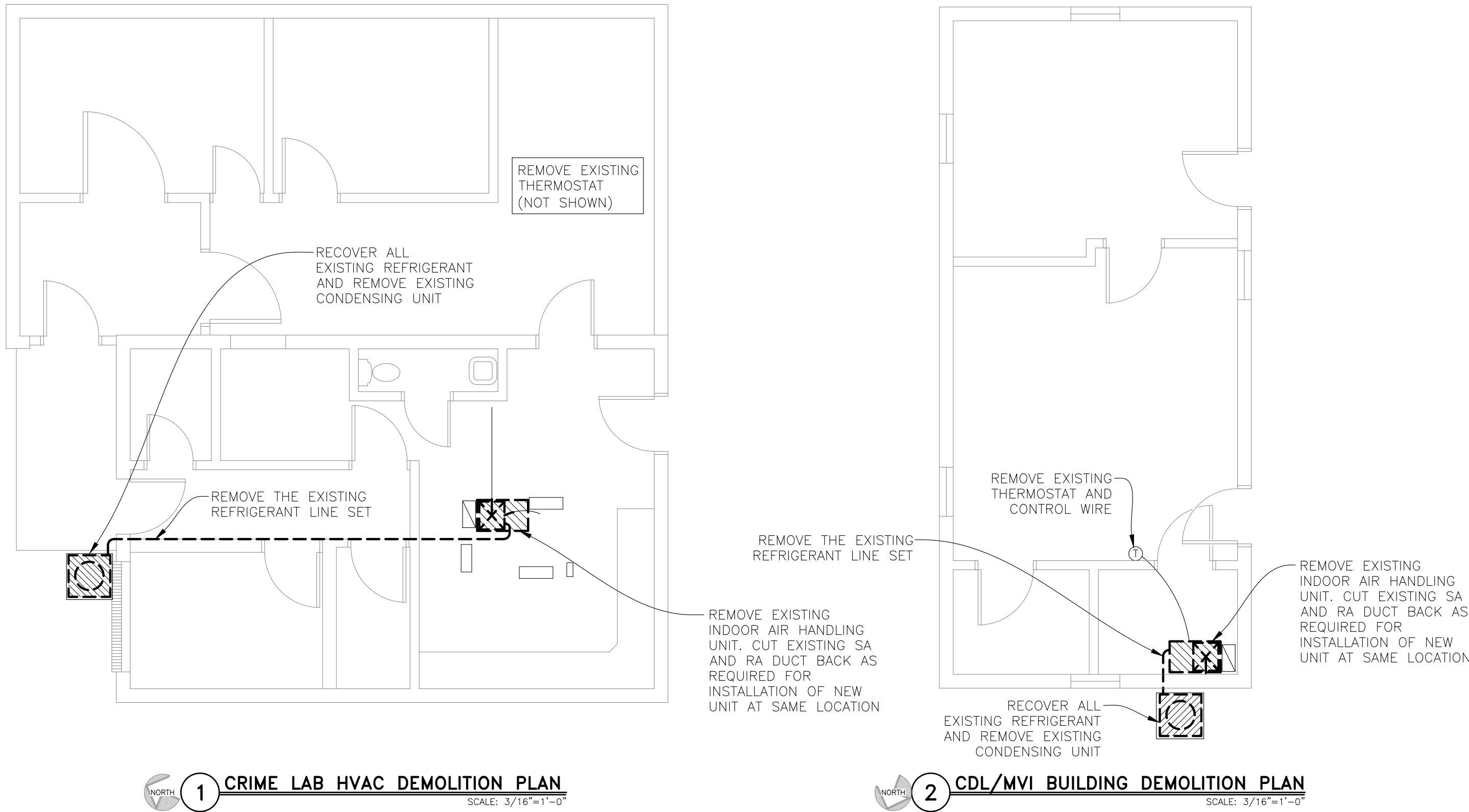
KEYED DEMOLITION NOTES

- (A) REMOVE PUMP, HEATING WATER PIPING, VALVES, AND MOUNTING EQUIPMENT AS SHOWN.
- (B) REMOVE AIR SEPARATOR, HEATING WATER PIPING, VALVES, AND HANGARS AS SHOWN.
- (C) REMOVE AIR HANDLER, HEATING & CHILLED WATER PIPING, VALVES, DRAIN PIPE, AND ASSOCIATED DUCT AS SHOWN.
- (D) REMOVE VAV BOX, HEATING WATER PIPING, AND VALVES AS SHOWN.
- (E) REMOVE BOILER, HEATING WATER PIPING, AND VALVES AS SHOWN. REMOVE BOILER VENT PIPING UP TO WALL SEPARATING THE MECHANICAL ROOM AND GARAGE. SEE KEYED NOTE 20 ON SHEET MD-101.
- (F) REMOVE RELIEF AIR FAN. RETAIN EXISTING RELIEF AIR DUCT ON BOTH ENDS OF THE FAN.
- (G) REMOVE POT FEEDER, ASSOCIATED PIPING, AND VALVES AS SHOWN.
- (H) REMOVE HEATING WATER EXPANSION TANK, HEATING WATER PIPING, AND VALVES AS SHOWN.
- (J) EXISTING EQUIPMENT OR DUCT TO REMAIN.

DEMOLITION LEGEND

	EQUIPMENT OR DUCT TO BE REMOVED
	PIPE TO BE REMOVED
	FLEX DUCT TO BE REMOVED





DEMOLITION NOTES

1 SEE SHEET MD-101 FOR GENERAL DEMOLITION NOTES.

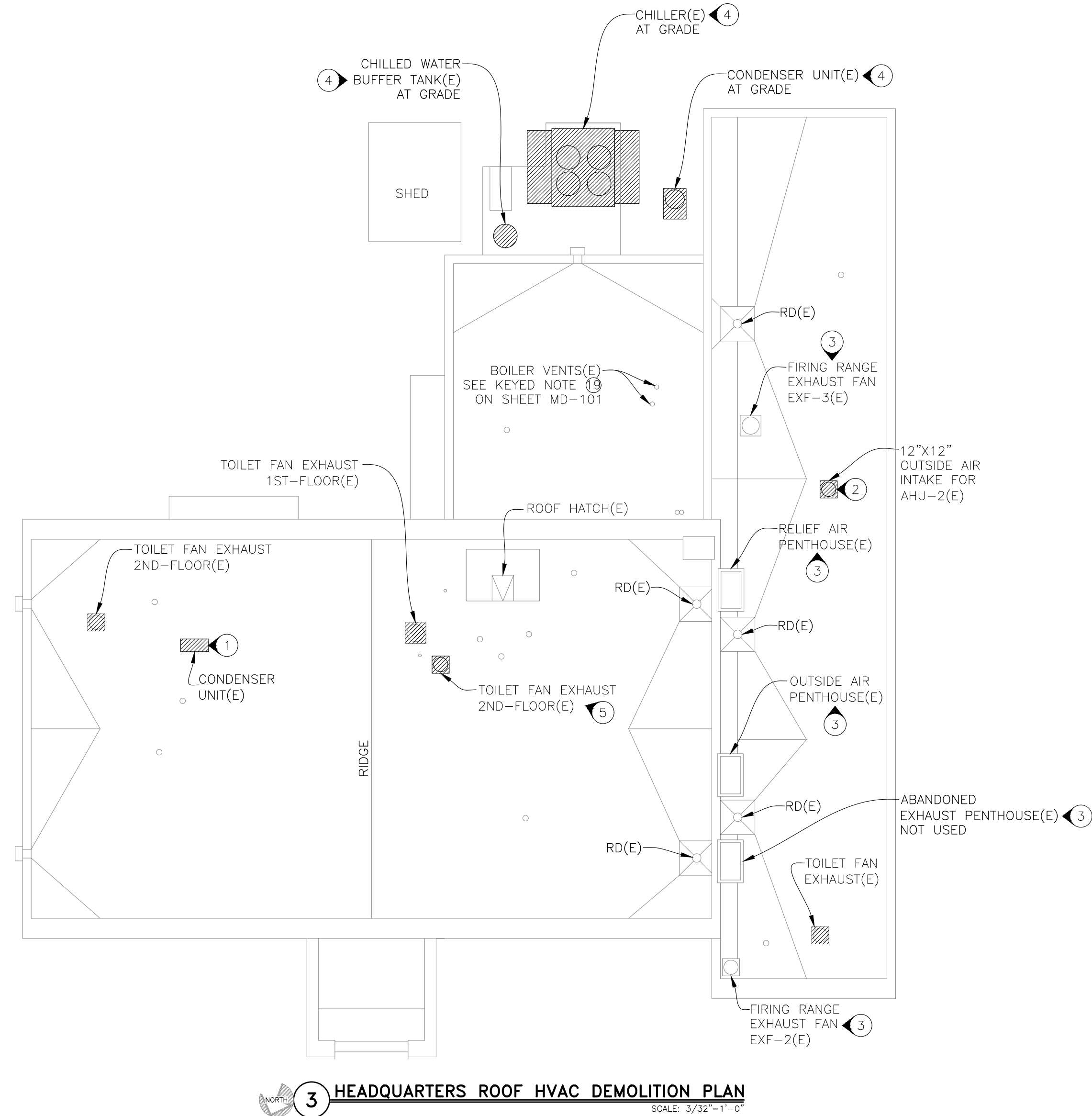
KEYED DEMOLITION NOTES – THIS SHEET

(N) INDICATES KEYED NOTES

- 1 REMOVE ROOF MOUNTED CONDENSER UNIT, REFRIGERANT PIPING, AND ROOF CURB.
- 2 REMOVE OUTSIDE AIR INTAKE AND DUCT PROTRUDING THROUGH ROOF.
- 3 EXISTING EQUIPMENT OR DUCT TO REMAIN.
- 4 SEE SHEET MD-101
- 5 SEE KEYED NOTE (3) ON M-101.

DEMOLITION LEGEND

	EQUIPMENT OR DUCT TO BE REMOVED
	PIPE TO BE REMOVED
	FLEX DUCT TO BE REMOVED



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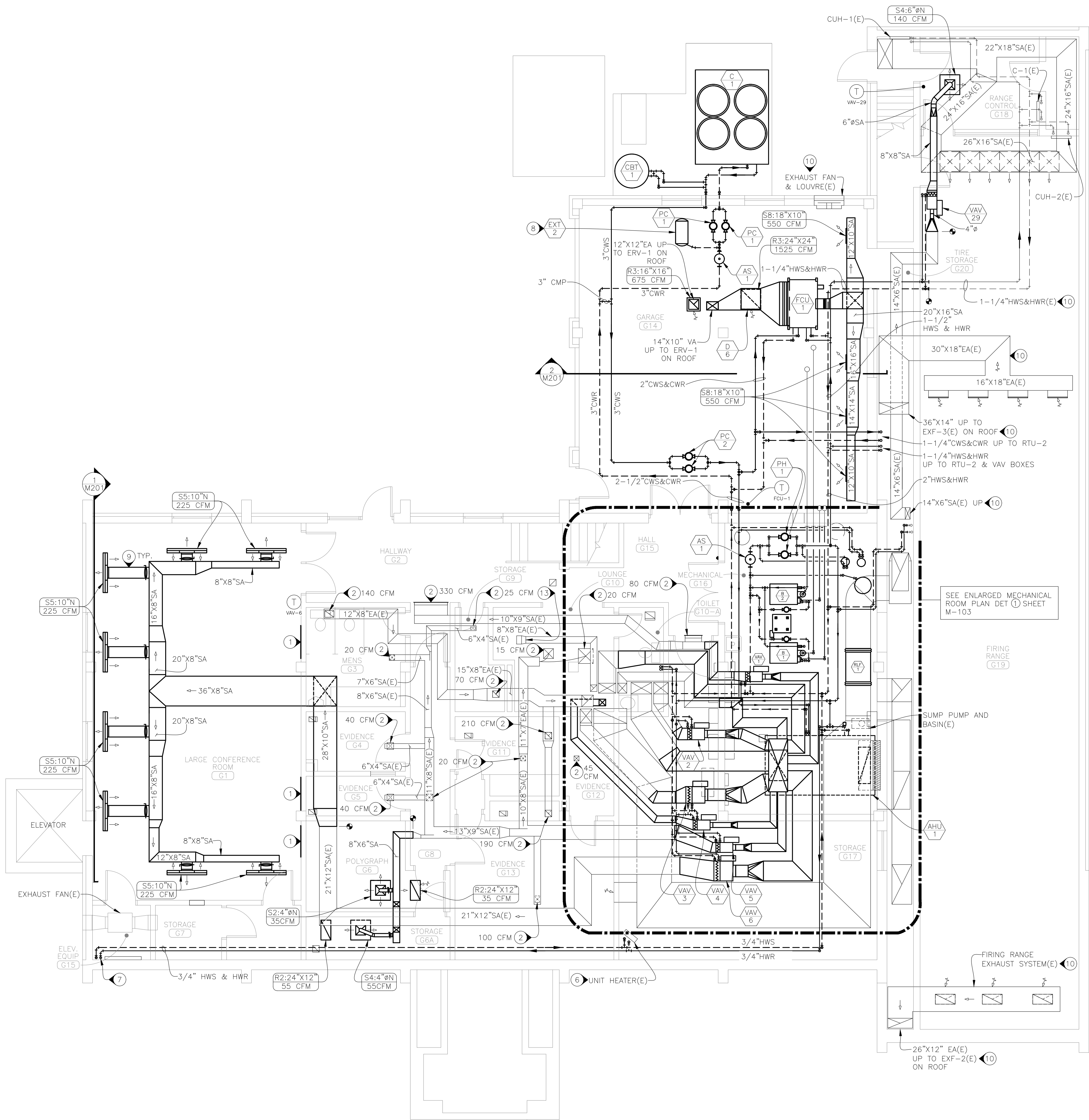
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CHECKED BY: JLD
DESIGNED BY: GGF/SAK

SHEET TITLE:
ROOF, CRIME LAB,
AND CDL/MVI
BUILDING
DEMOLITION PLAN

SHEET NUMBER:

MD-104

12 OF 41 SHEETS
2026-06-15



1 GROUND FLOOR HVAC RENOVATION PLAN
SCALE: 3/16"=1'-0"

GENERAL RENO NOTES(SHEETS M-101 TO M-104)

- 1 ALL EXISTING DUCT SIZES SHOWN ARE BASED ON EXISTING CONSTRUCTION DOCUMENTS & LIMITED FIELD OBSERVATIONS. CONTRACTOR TO VERIFY.
- 2 CONTRACTOR TO VERIFY ALL EXISTING SIZES AND EQUIPMENT.
- 3 SEE SHEET M-501 FOR HYDRONIC PIPE SIZING
- 4 SEE SHEET E-105 FOR NEW CEILING GRID CHANGES.
- 5 THE EXISTING FIRING RANGE EXHAUST AND MAKE-UP AIR UNIT & ITS DUCT WORK IS NOT MODIFIED IN THE PROJECT AND SHALL REMAIN. IN SERVICE AS IS.

KEYED RENO NOTES(M-101 & M-102)

- 1 FILL IN OPENING IN WALL WHERE SUPPLY DIFFUSER, RETURN GRILL, OR TRANSFER GRILL WAS REMOVED WITH 5/8" GYP BOARD TO MATCH EXISTING WALL CONSTRUCTION. PROVIDE BLOCKING TAPE & PLASTER AS REQUIRED. FINISH WITH PRIMER & TWO COATS OF FINISH PAINT OR WALL COVERING TO MATCH EXISTING. COORDINATE WITH OWNER.
- 2 RE-BALANCE EXISTING AIR DEVICE TO CFM VALUE PLACED NEXT TO KEYED NOTE.
- 3 BLANK OFF HOLE IN DUCT WHERE GRILL WAS REMOVED WITH GALVANIZED SHEET METAL TO MATCH EXISTING. SEAL AND INSULATE AS REQUIRED TO MATCH EXISTING.
- 4 CONNECT NEW SUPPLY AIR DUCT TO EXISTING SUPPLY DIFFUSER.
- 5 CONNECT NEW EXHAUST DUCT TO EXISTING EXHAUST GRILL.
- 6 FEED EXISTING UNIT HEATER WITH NEW PIPE, PIPE SPECIALTIES, AND CONTROL VALVE. PROVIDE NEW THERMOSTAT IN CURRENT LOCATION.
- 7 FEED EXISTING CABINET CONVECTOR WITH NEW PIPE, PIPE SPECIALTIES, AND CONTROL VALVE.
- 8 NEW EXPANSION TANK TO BE ADEQUATELY SUPPORTED FROM STRUCTURE ABOVE.
- 9 OVAL DUCT SIZE TO MATCH AIR DEVICE INLET OR APPROPRIATE ROUND FLEX DUCT.
- 10 EXISTING EQUIPMENT, PIPE, OR DUCT TO REMAIN.
- 11 NOT USED.
- 12 PROVIDE BALANCE DAMPER IN VERTICAL DROP TO SUPPLY DIFFUSER.
- 13 EXISTING EXHAUST SYSTEM IS NOT OPERATIONAL AND IS ABANDONED IN PLACE, INCLUDING A ROOF MOUNTED FAN. CONTRACTOR TO VERIFY AND INFORM THE OWNER OR ENGINEER IF THIS IS NOT THE CASE. EXHAUST FAN TO BE REMOVED AND EXISTING CURB TO BE CAPPED WITH INSULATED CAP PERMANENTLY ATTACHED. SEE DETAIL 14 ON SHEET M503.

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HIGHWAY PATROL

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BOILERS / PUMPS /
CONTROLS

MSHP TROOP B
HEADQUARTERS 308 PINE
CREST DR. MACON, MO
63552

PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

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DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____

ISSUE DATE: 06/15/2026

CAD DWG FILE: TBHCL-M.dwg
DRAWN BY: GGF/SAK
CHECKED BY: JLD
DESIGNED BY: GGF/SAK

SHEET TITLE:

HEADQUARTERS
GROUND FLOOR
RENOVATION PLAN

SHEET NUMBER:

M-101

13 OF 41 SHEETS
2026-06-15

RENOVATION NOTES

1 SEE SHEET M-101 FOR GENERAL AND KEYED RENOVATION NOTES.

INDICATES KEYED NOTES

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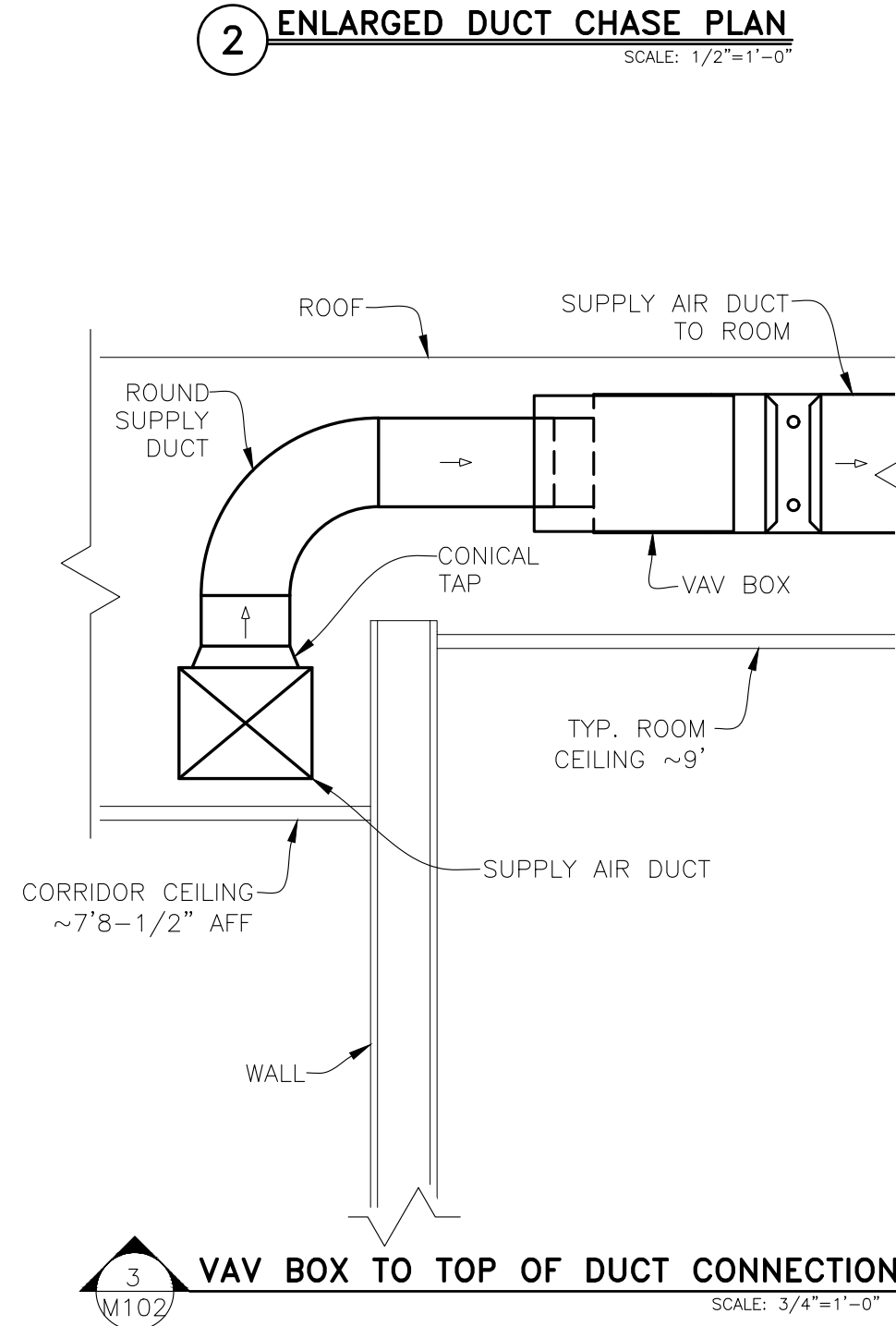
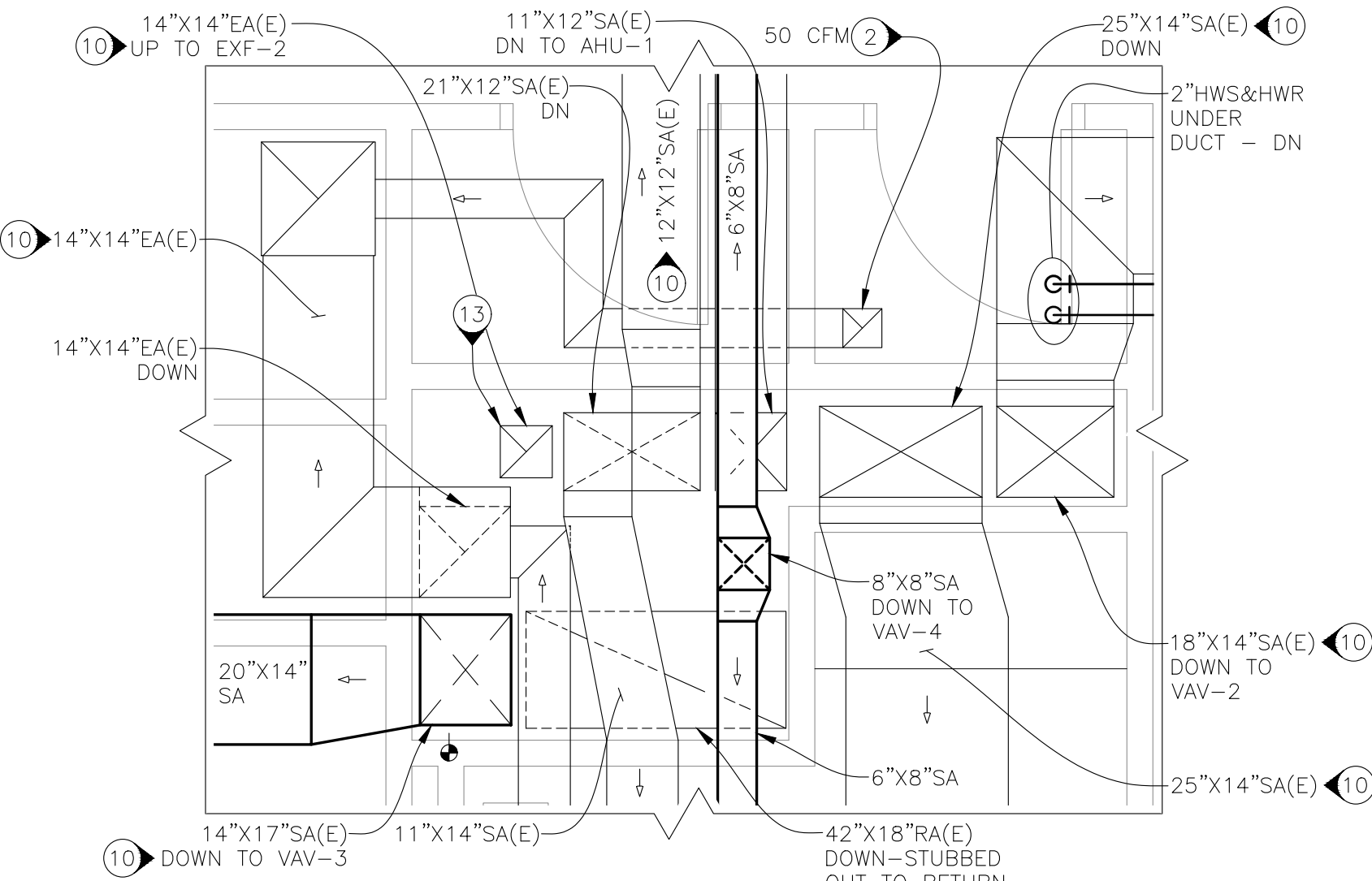
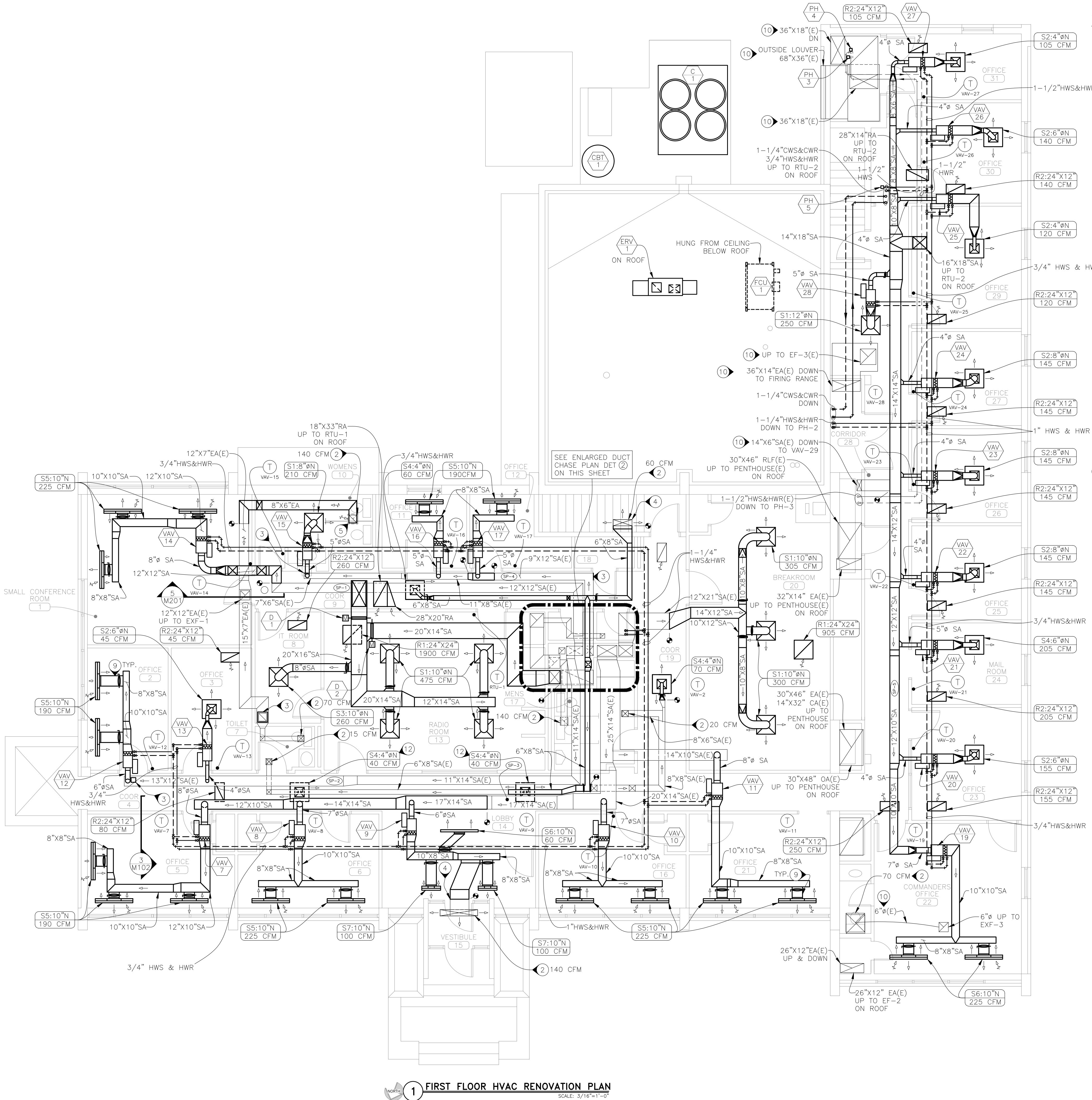
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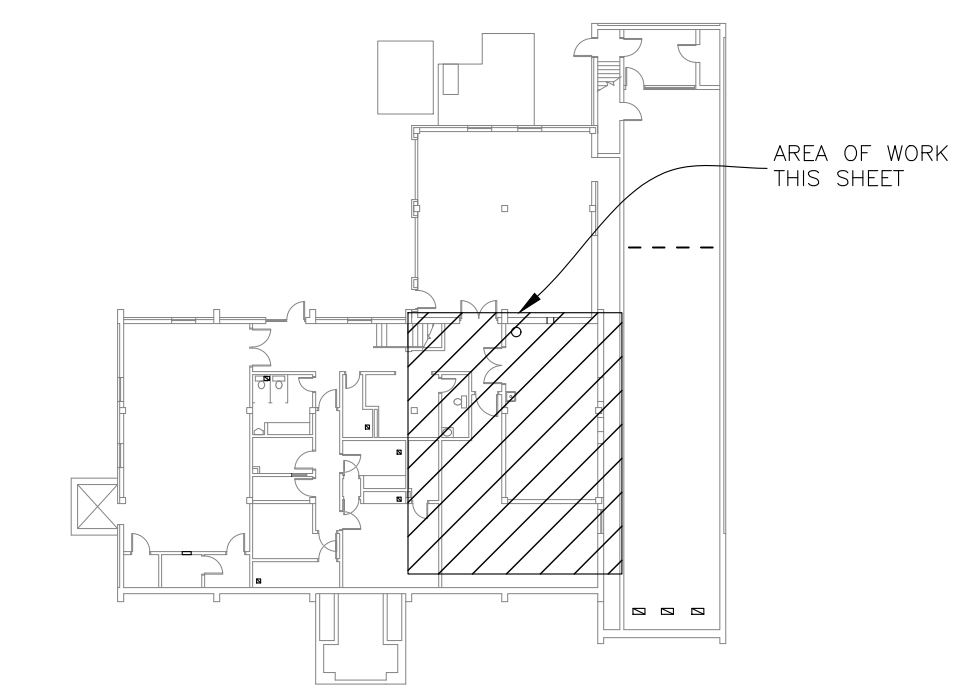
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FIRST FLOOR
RENOVATION PLAN

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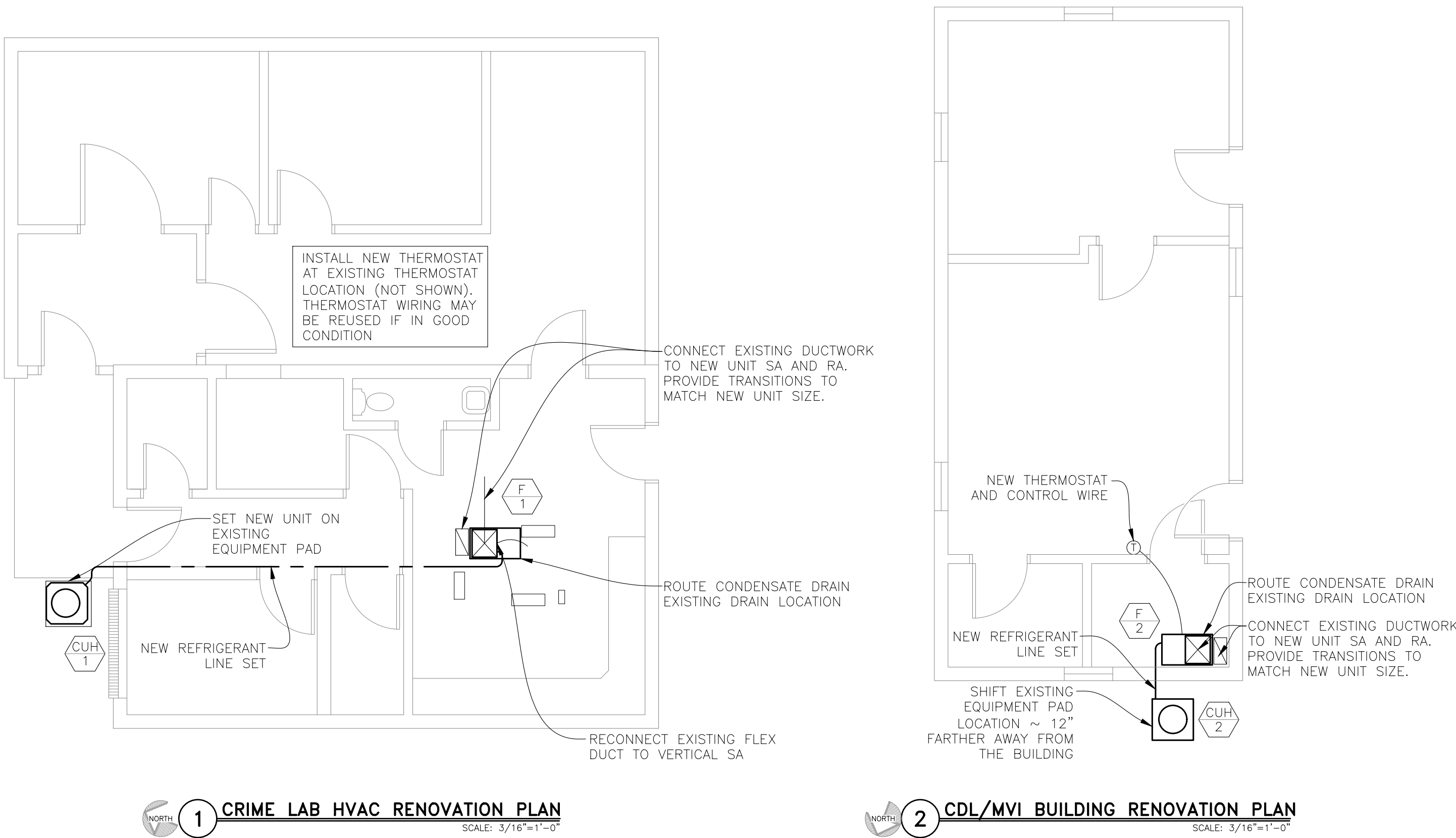
M-102

14 OF 41 SHEETS
2026-06-15





15 OF 41 SHEETS
2026-06-15



RENOVATION NOTES

INDICATES KEYED NOTES

CONTRACTOR TO ENLARGE EXISTING OUTSIDE AIR DUCT PENETRATION THROUGH ROOF FOR A NEW RELIEF AIR HOOD. SEE DETAIL 13 ON M-503.

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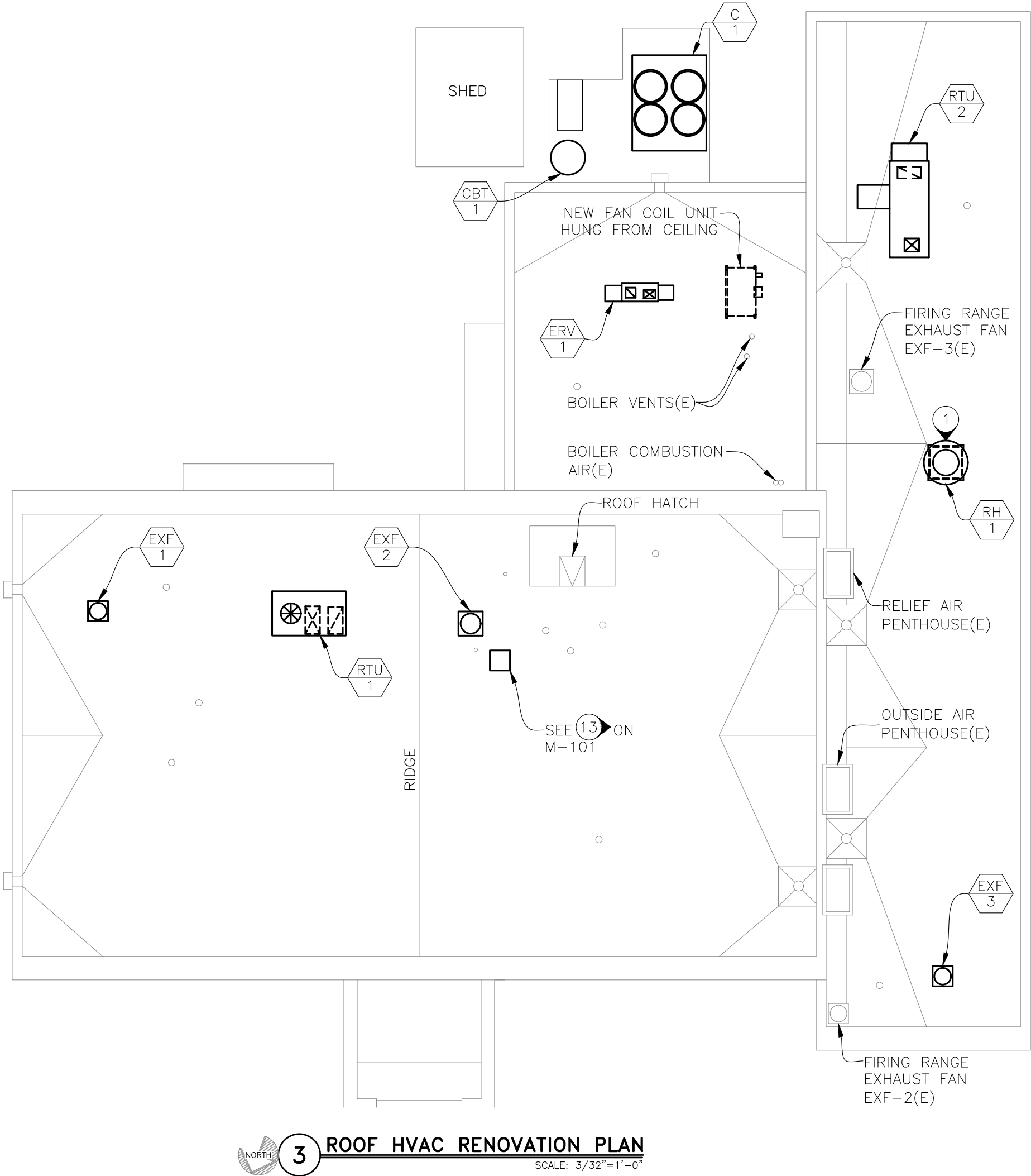
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DESIGNED BY: GGF

SHEET TITLE:
ROOF, CRIME LAB,
AND CDL/MVI
BUILDING
RENOVATION PLAN

SHEET NUMBER:

M-104

16 OF 41 SHEETS
2026-06-15



ALL ROOF SYSTEM MODIFICATIONS
REQUIRED FOR NEW EQUIPMENT TO
COMPLY WITH EXISTING ROOFING SYSTEM
& SHALL NOT VOID OR DIMINISH THE
EXISTING ROOF WARRANTEE.



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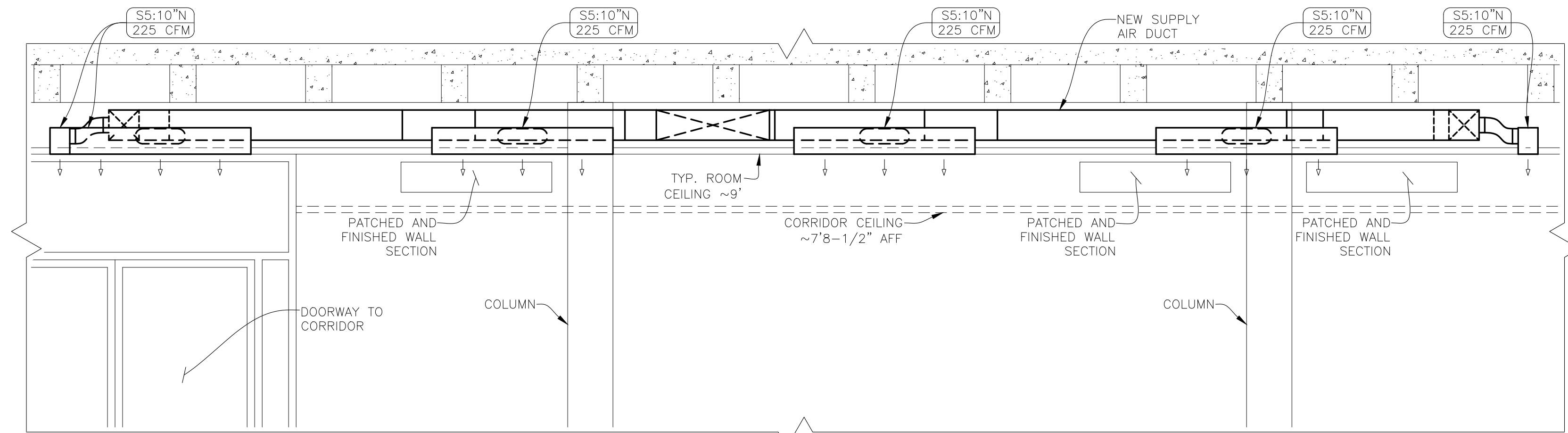
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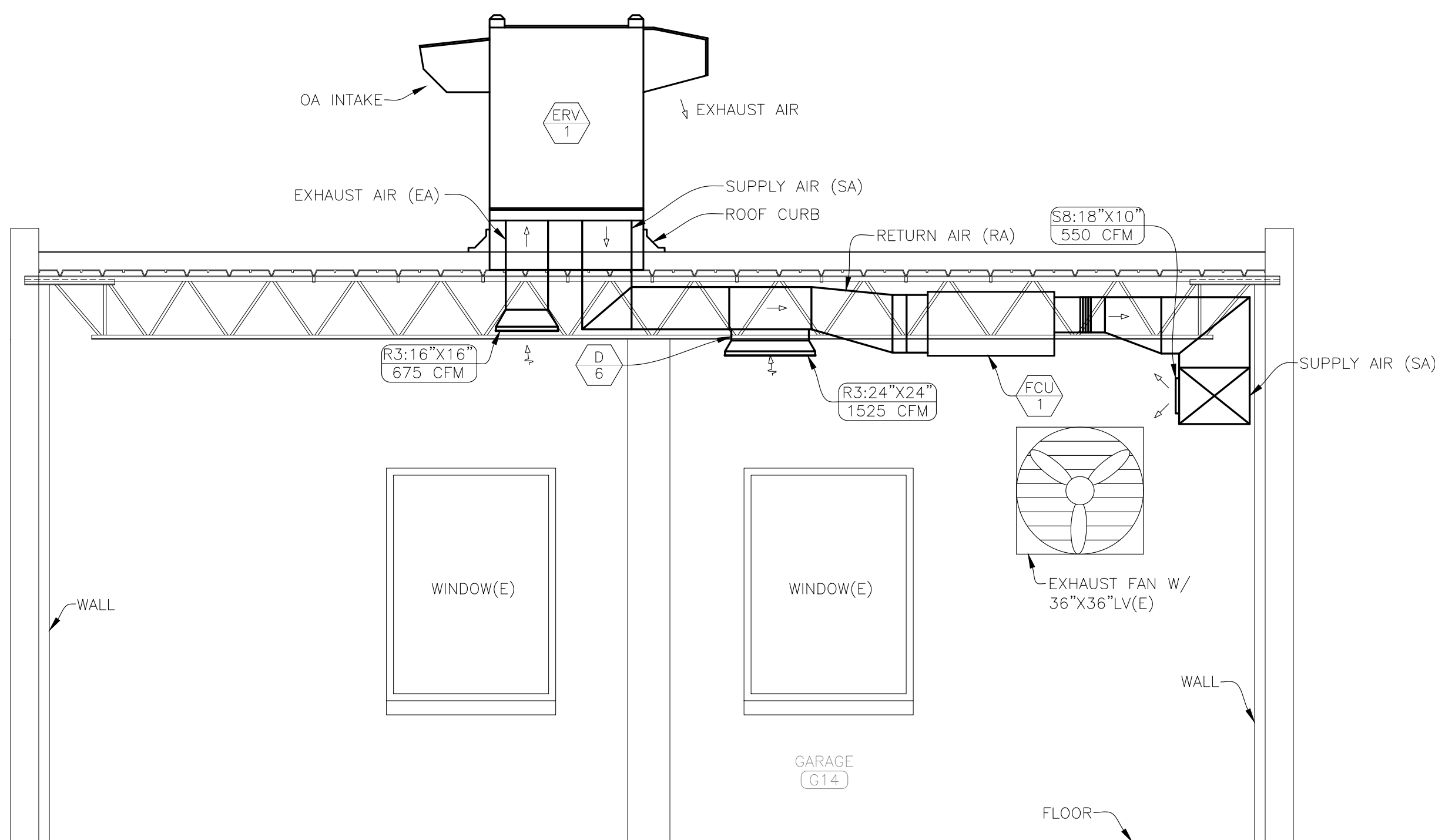
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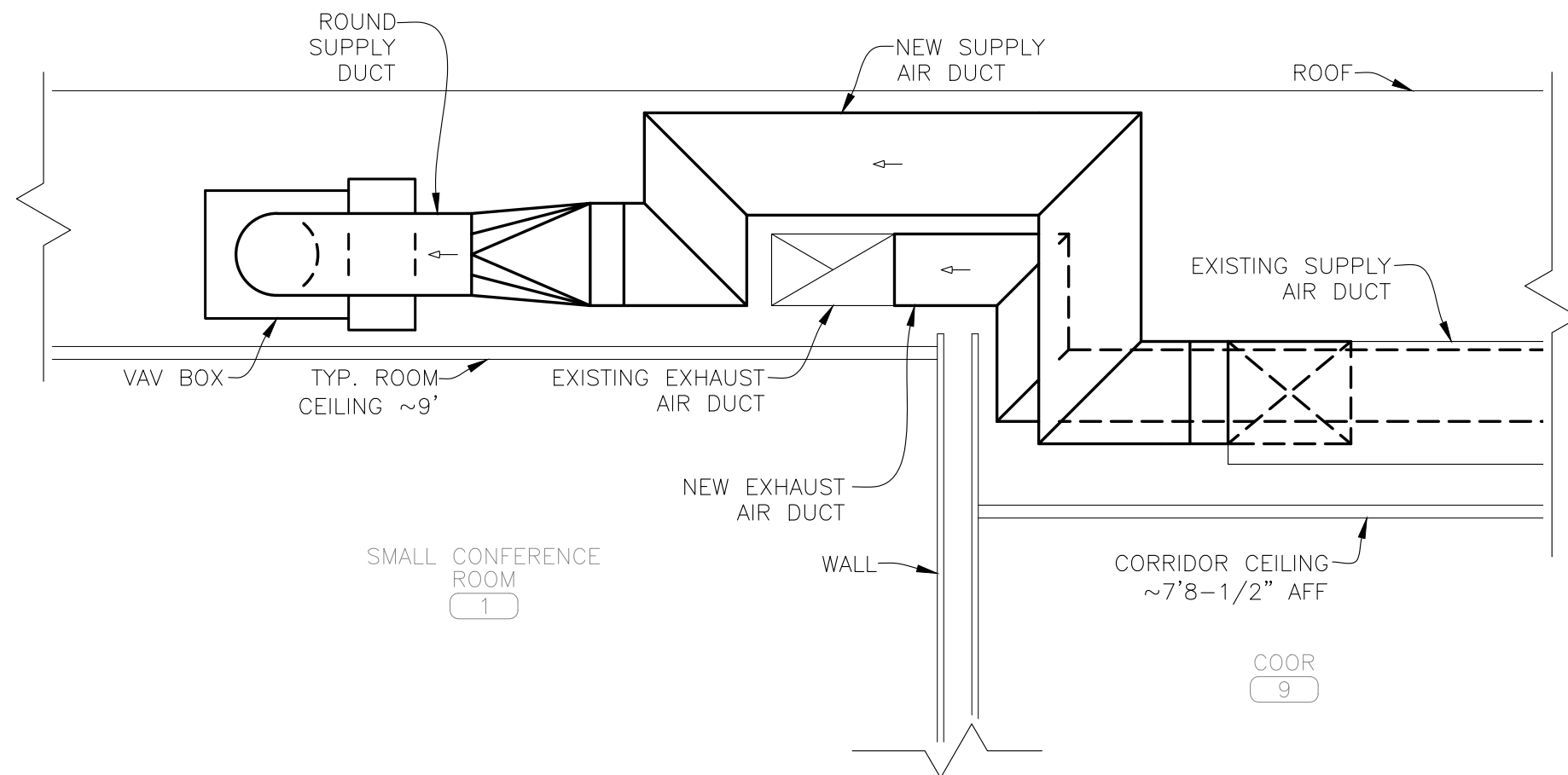
17 OF 41 SHEETS
2026-06-15



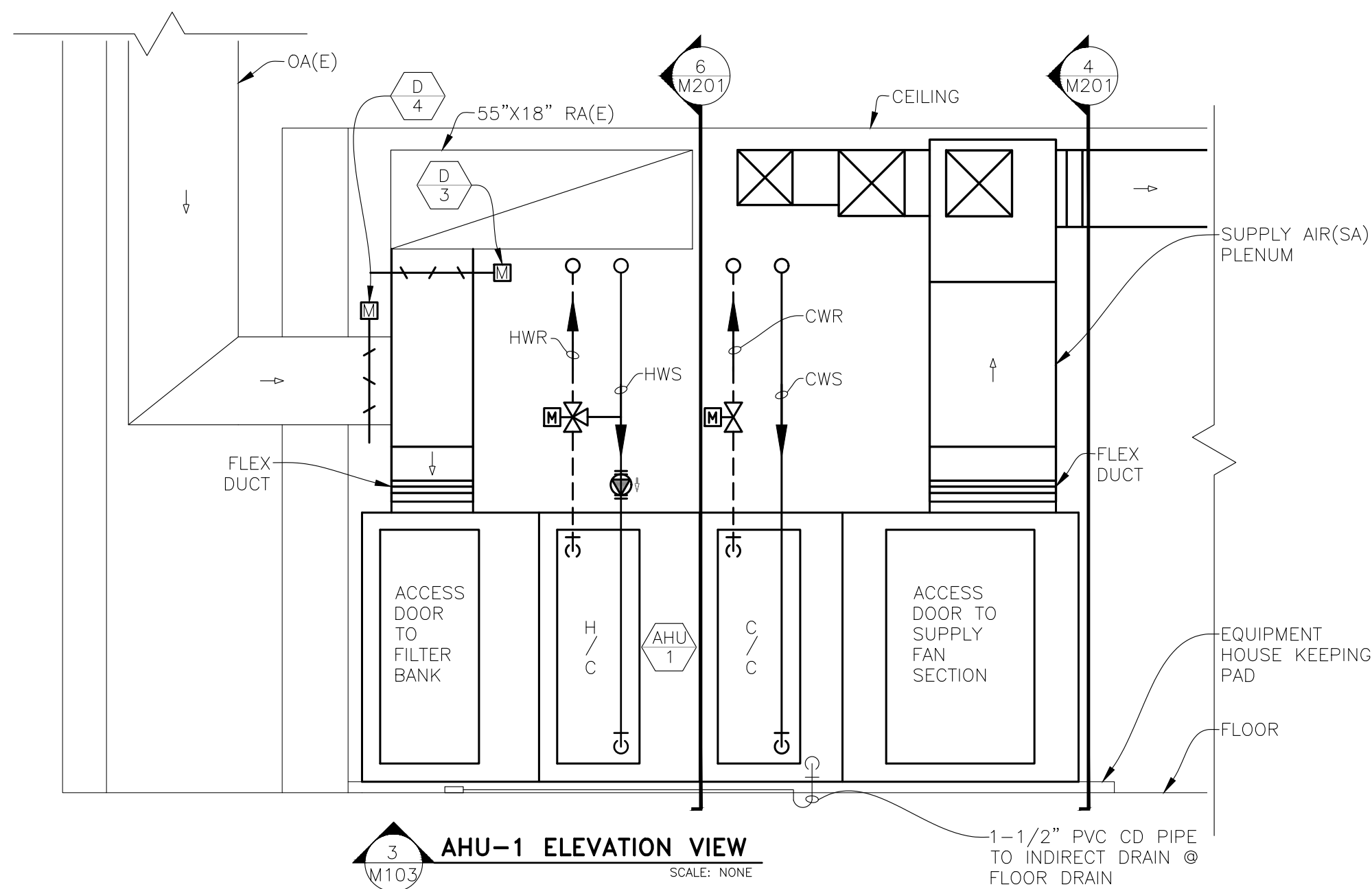
1 LARGE CONFERENCE ROOM ELEVATION VIEW
SCALE: 1/2"=1'-0"



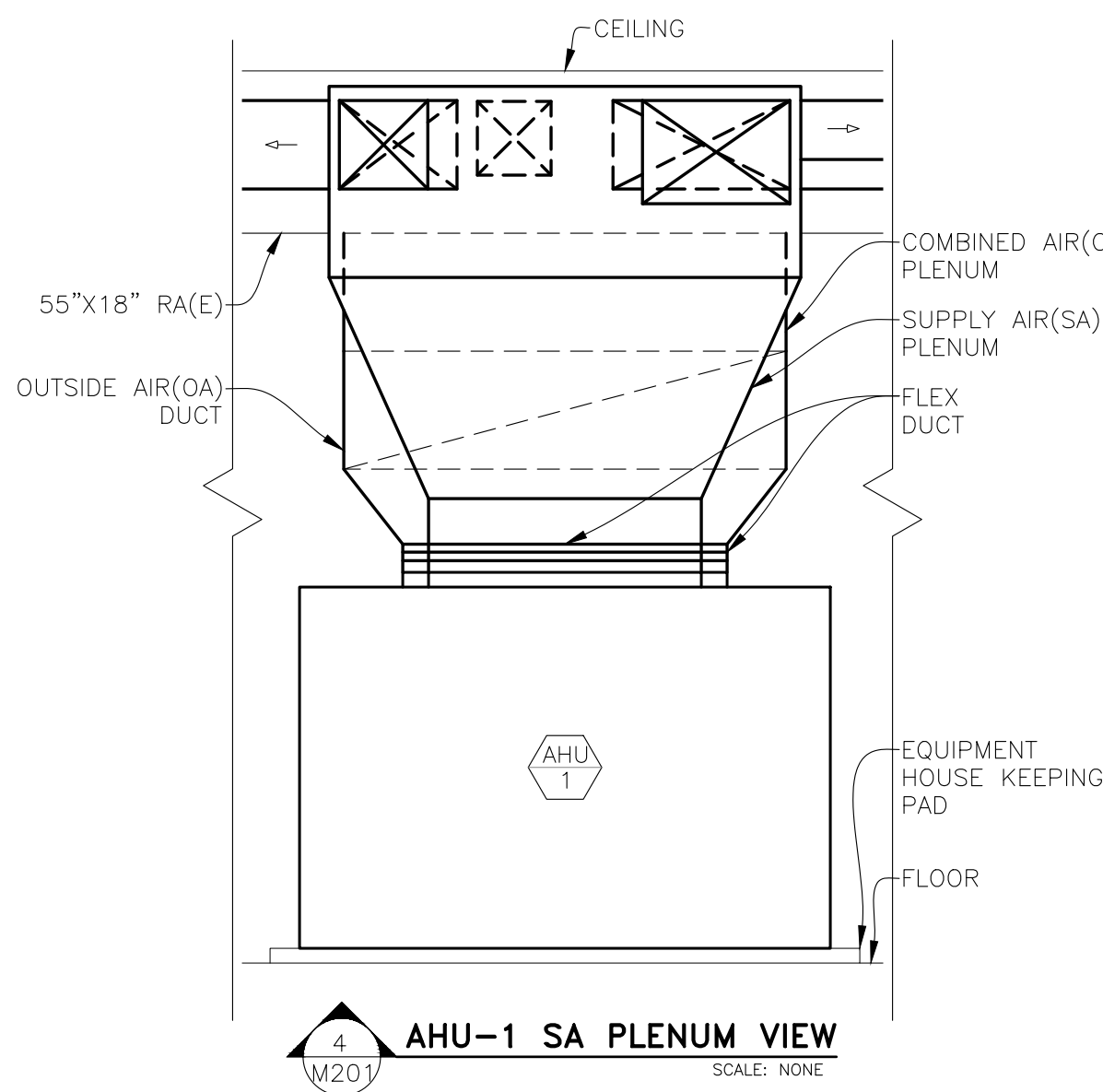
2 ERV-1 AND FCU-1 ELEVATION VIEW
SCALE: 3/8"=1'-0"



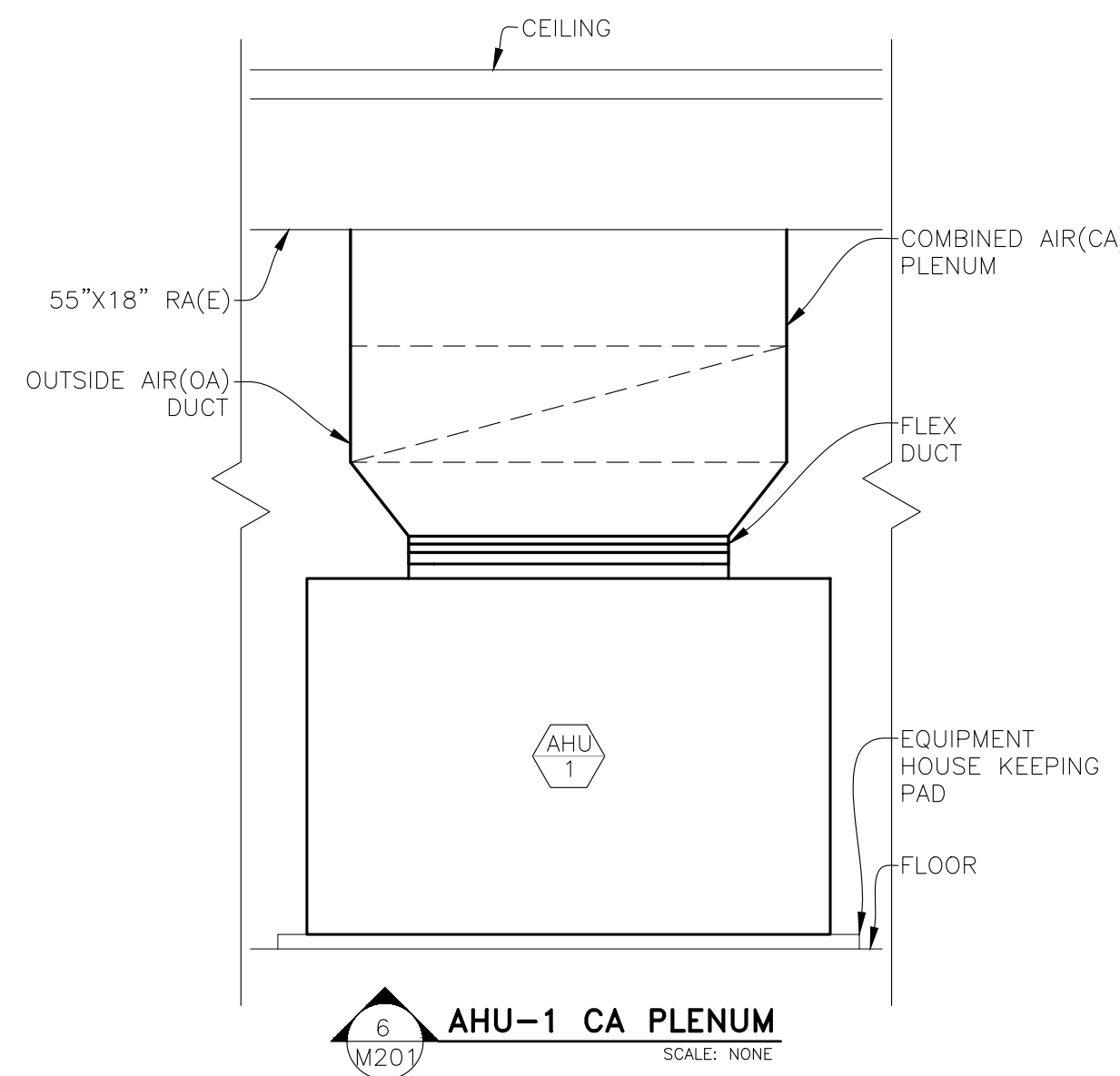
5 AHU-1 ELEVATION VIEW
SCALE: 3/4"=1'-0"



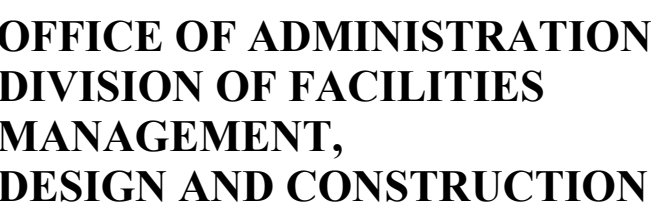
3 AHU-1 ELEVATION VIEW
SCALE: NONE



4 AHU-1 SA PLENUM VIEW
SCALE: NONE



6 AHU-1 CA PLENUM
SCALE: NONE

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SITE # 4753
FACILITY # 55113

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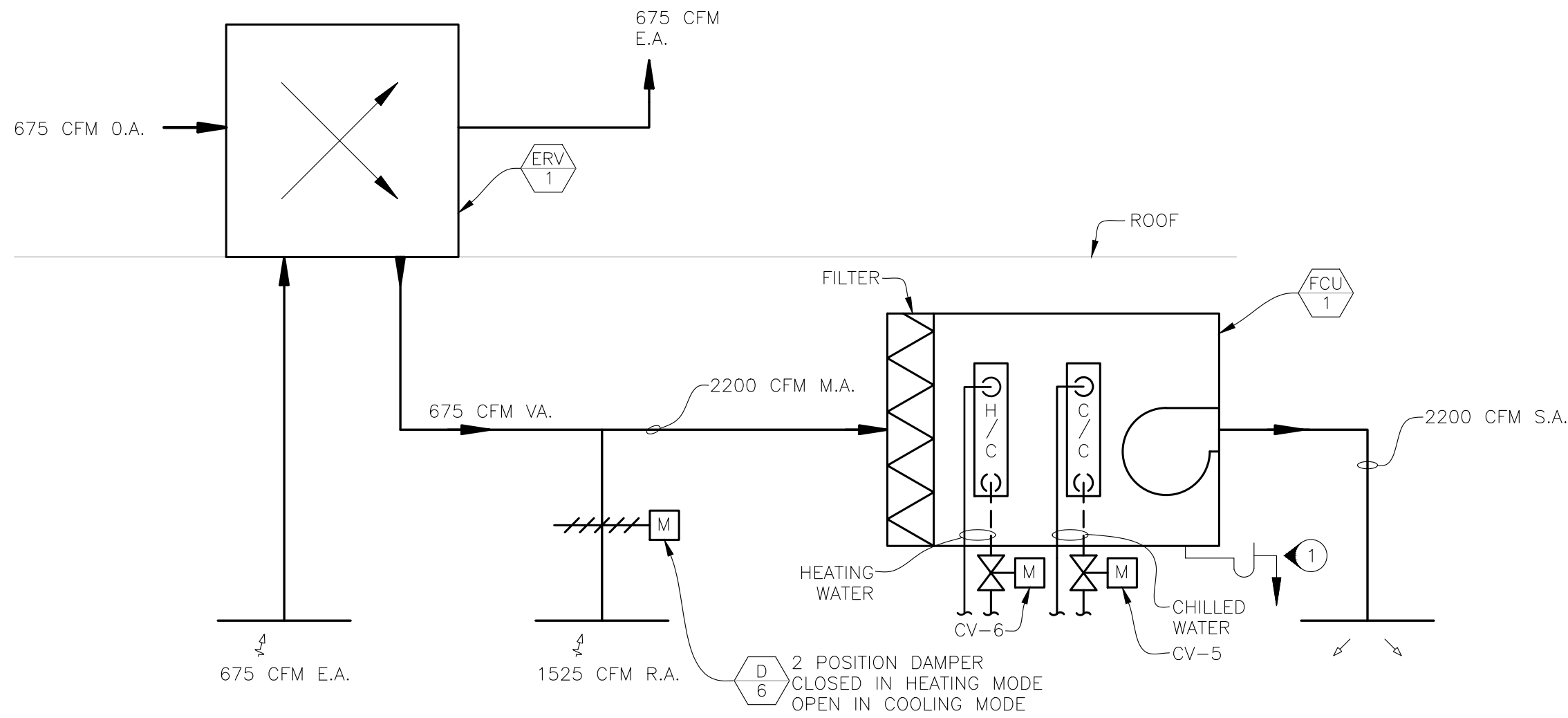
DETAILS

M-501

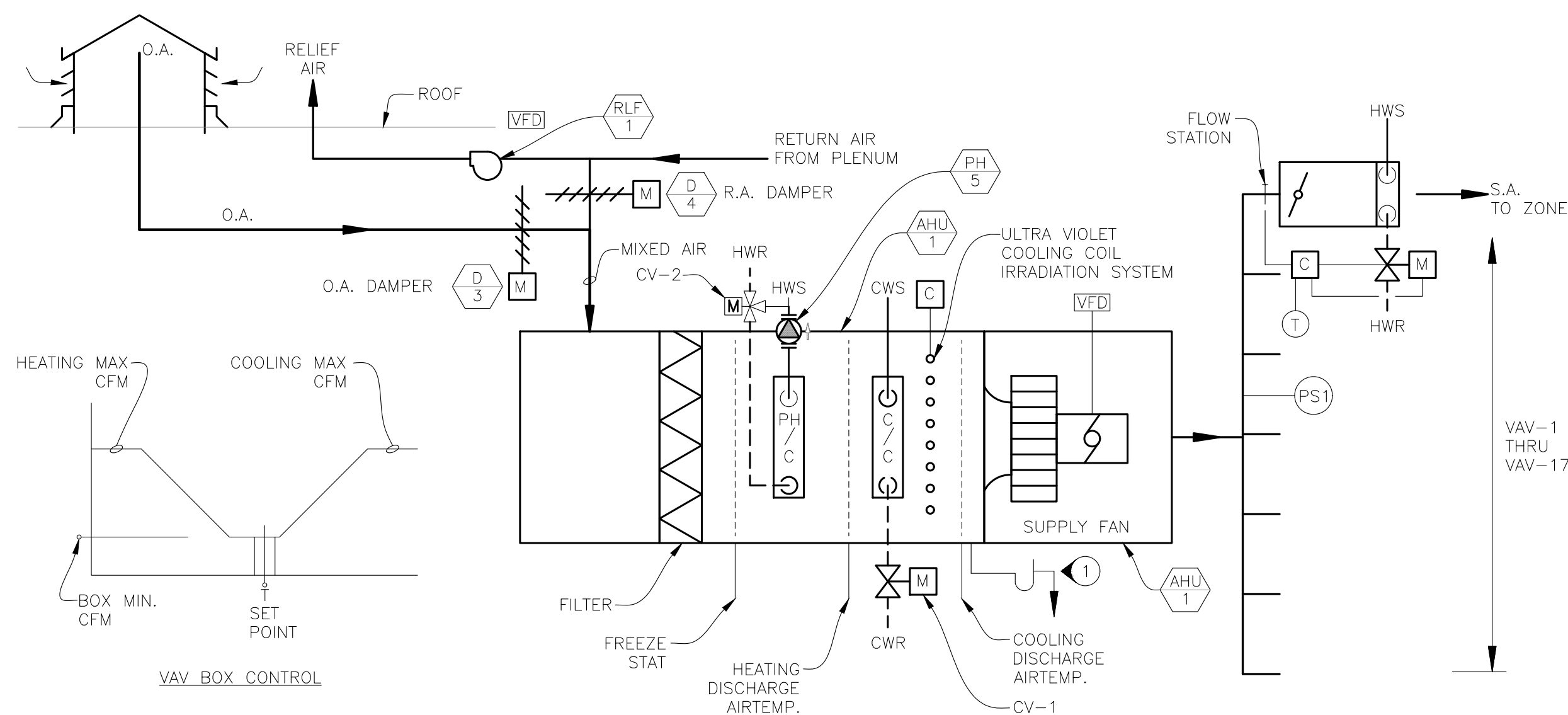
(N) INDICATES KEYED NOTES

- ## 1 HEATING WATER SCHEMATIC DIAGRAM

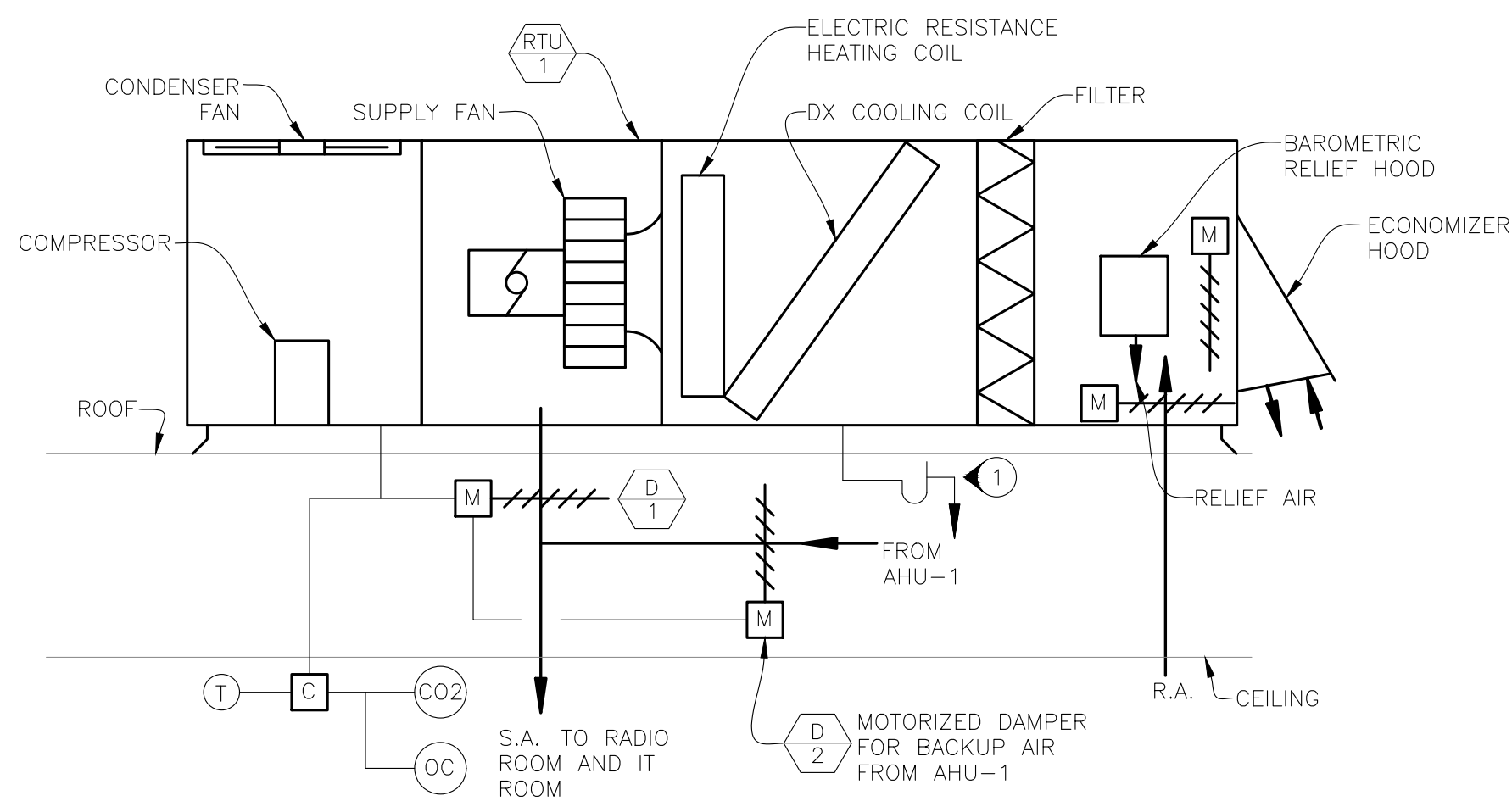




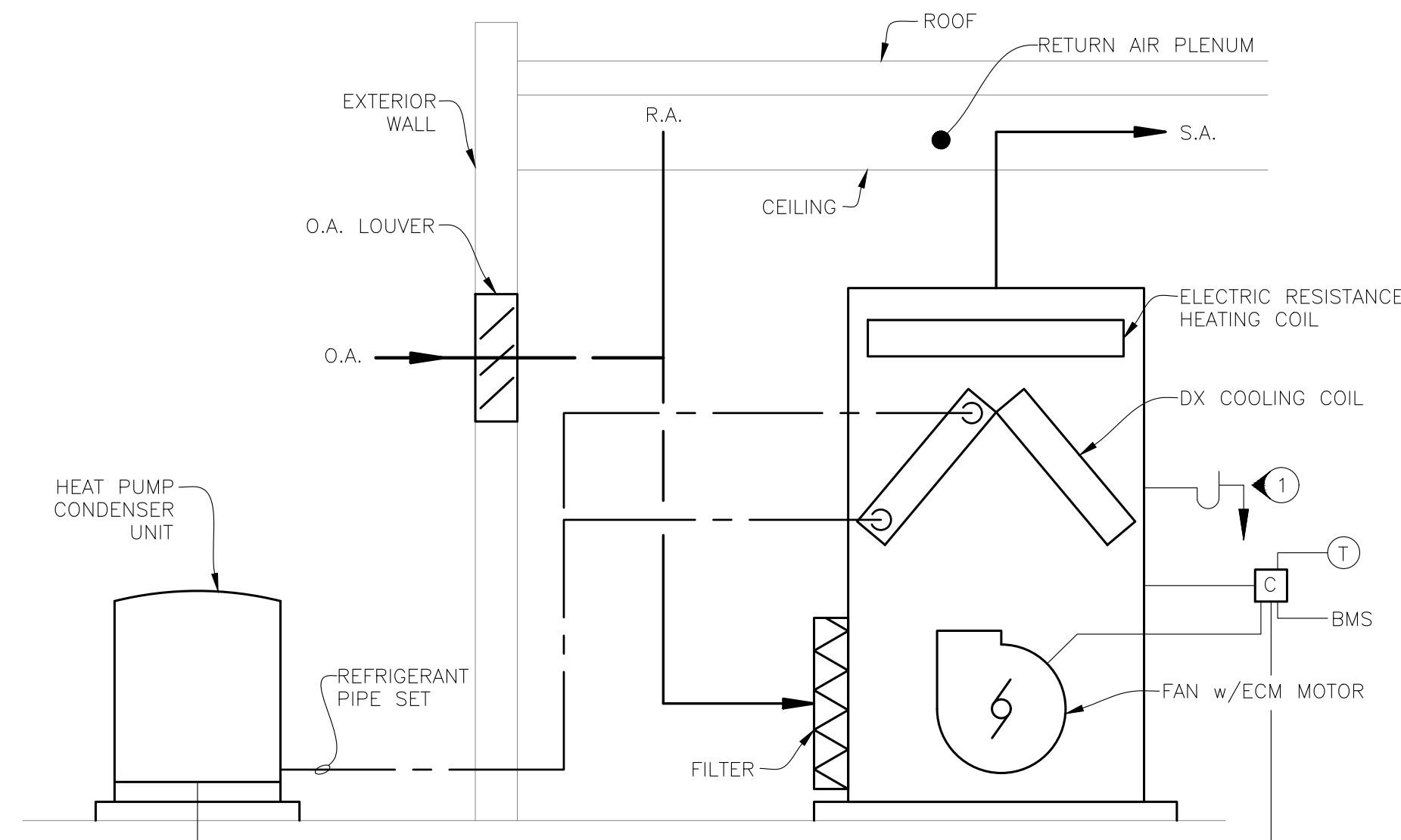
1 FCU-1 AND ERV-1 SYSTEM SCHEMATIC-GARAGE



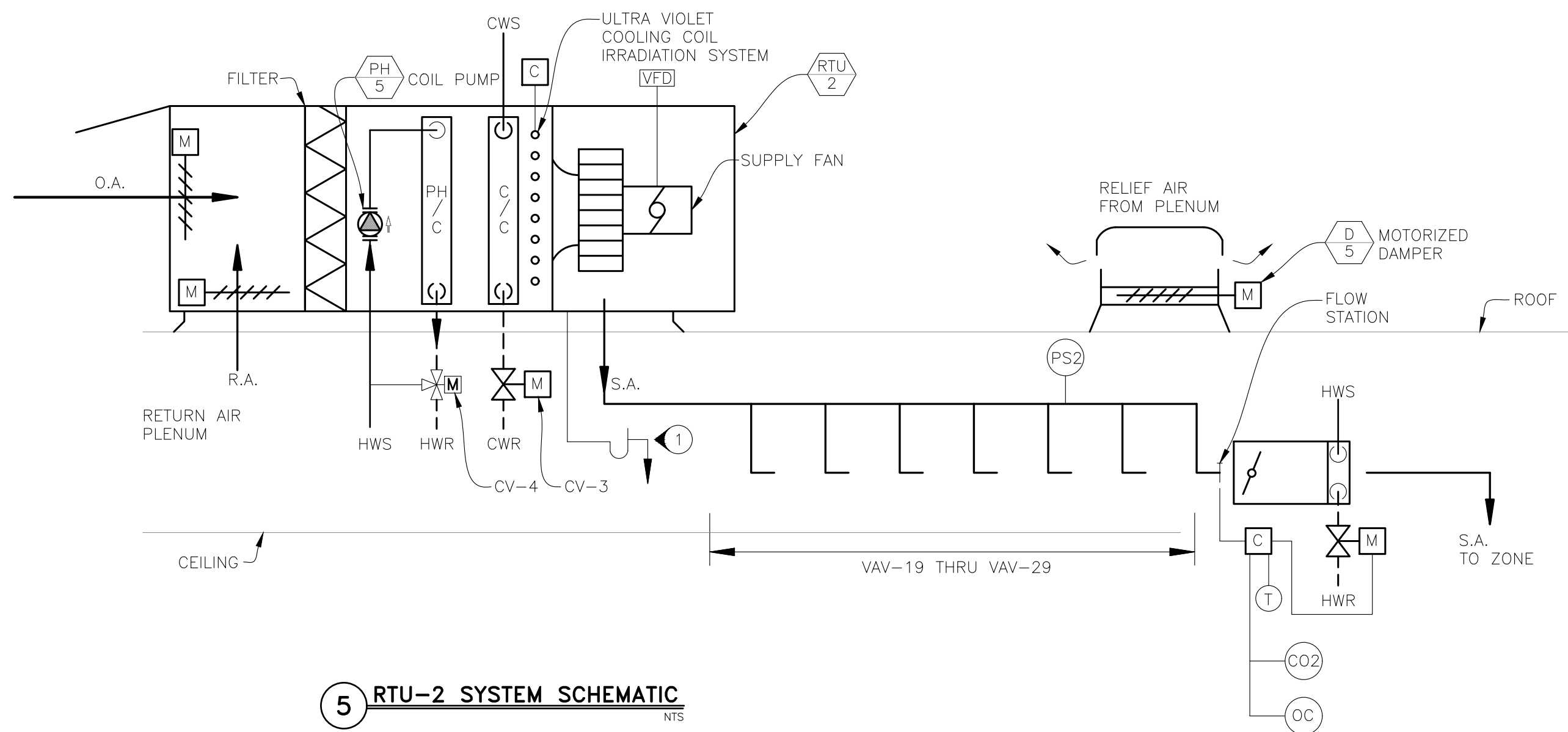
2 AHU-1 SYSTEM SCHEMATIC



3 RTU-1 SYSTEM SCHEMATIC-RADIO AND IT ROOMS



4 HEAT PUMP SYSTEM SCHEMATIC-CRIME LAB AND CDL/MVI BUILDING



5 RTU-2 SYSTEM SCHEMATIC

NOTES

- 1 CONDENSATE DRAIN TO INDIRECT DRAIN AT FLOOR DRAIN OR ROOF DRAIN.

INDICATES KEYED NOTES

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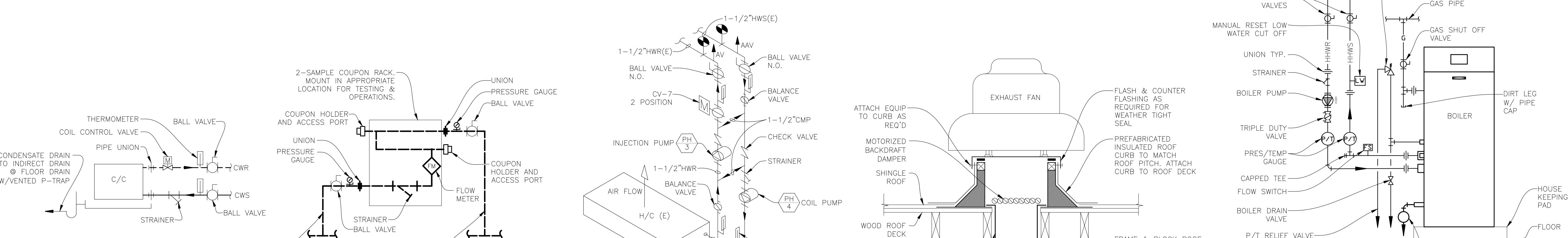
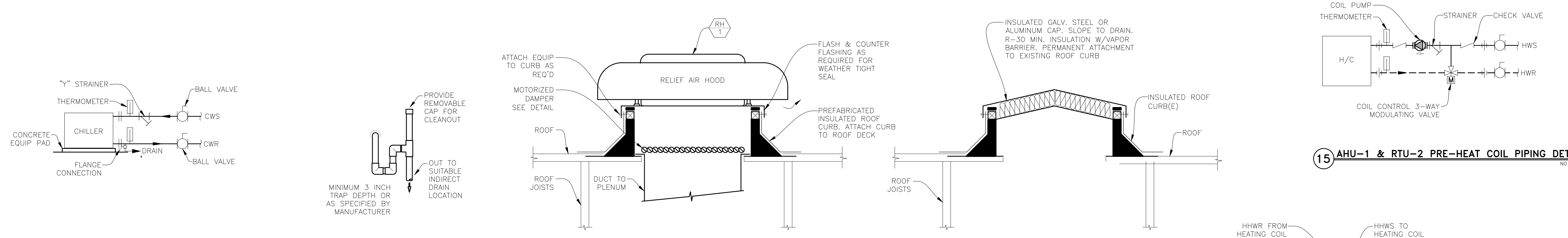
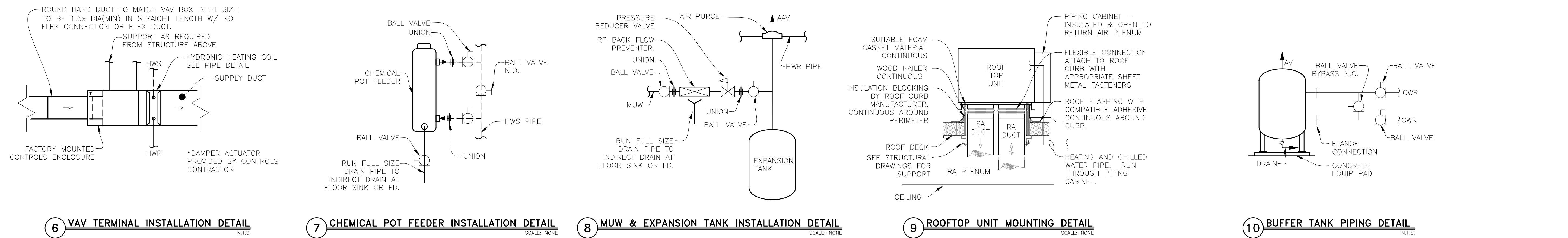
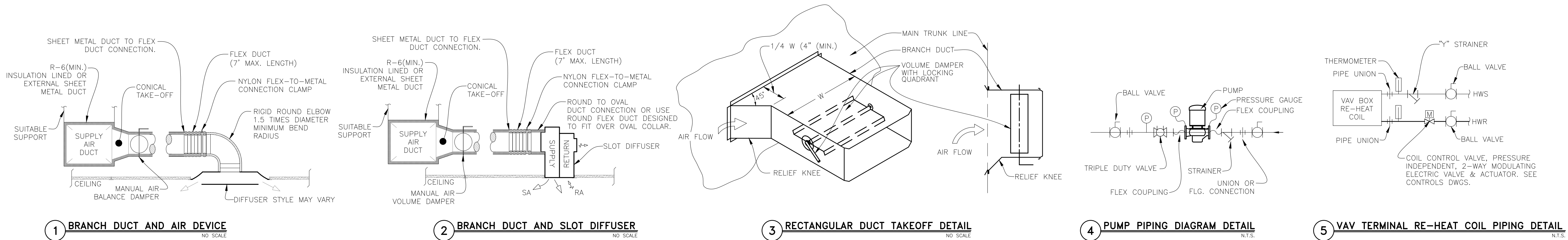
SHEET TITLE:

DETAILS

SHEET NUMBER:

M-502

19 OF 41 SHEETS
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PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

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CAD DWG FILE: TBHCL-M.dwg
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DESIGNED BY: GGF/SAK

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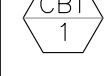
DETAILS

SHEET NUMBER:

M-503

20 OF 41 SHEETS
2026-06-15

VAV BOX SCHEDULE																																	
MARK	SUPPLY FROM	SERVES		MFG	MODEL	SIZE	OUTLET SIZE	TYPE (NOTE 1)	CFM BOX RANGE	PEAK COOLING LOAD CFM	CFM MIN	PEAK HEATING LOAD CFM	MIN OUTLET SP ("wc)	CONTROLS (NOTE 3)	NC LEVELS		HYDRONIC REHEAT COIL (SEE NOTE 5)														CONTROL VALVE		NOTES
		ROOMS	HAP ZONE (REF)												RAD	DIS	ROWS	FINS/ INCH	EAT (°F)	LAT MIN (°F)	MBH	EWI (°F)	DES WΔt (°F)	LWT (°F)	GPM	AIR P.D. ("WC)	WATER P.D. (FT H2O) (NOTE 4)	STYLE	ACTUATOR				
	AHU-1	G2	1	TITUS	DESV	6E	12"x10"	SINGLE DUCT	45-500	415	125	415	0.10	DESV	24	25	3	10	55	98	18.8	130	25	110.7	2	0.1	0.28	2 WAY	ELEC MODULATING	1,3,4			
	AHU-1	20	13	TITUS	DESV	09	14"x12.5"	SINGLE DUCT	120-1050	905	270	275	0.22	DESV	20	25	2	12	55	95.5	11.7	130	25	116	1.7	0.27	0.3	2 WAY	ELEC MODULATING	1,3,4			
	AHU-1	8&13 BACK UP	12	TITUS	DESV	14	20"x17.5"	SINGLE DUCT	300-3000	2160	635	635	0.60	DESV	23	23	1	10	55	76	14	130	25	117.6	2.3	0.16	0.3	2 WAY	ELEC MODULATING	1,3,4			
	AHU-1	4,7,17, 19,9	9	TITUS	DESV	06	12"x8"	SINGLE DUCT	45-500	300	90	280	0.22	DESV	17	20	3	12	55	95	11.8	130	25	111.5	1.3	0.18	0.39	2 WAY	ELEC MODULATING	1,3,4			
	AHU-1	GRD FLOOR	3	TITUS	DESV	07	12"X10"	SINGLE DUCT	70-650	420	130	420	0.07	DESV	19	23	4	10	55	95	18.1	130	25	110	1.8	0.25	0.23	2 WAY	ELEC MODULATING	1,3,4			
	AHU-1	G1	2	TITUS	DESV	14E	24"X18"	SINGLE DUCT	300-3000	1360	410	1800	0.53	DESV	15	17	3	10	55	93	72.1	130	25	115.3	9.9	0.27	1.18	2 WAY	ELEC MODULATING	1,2,3,4			
	AHU-1	5	4	TITUS	DESV	8E	14"X12.5"	SINGLE DUCT	90-900	335	175	570	0.20	DESV	20	28	3	10	55	89.3	20.6	130	25	107.2	1.8	0.17	0.26	2 WAY	ELEC MODULATING	1,2,3,4			
	AHU-1	6	5	TITUS	DESV	7E	14"X12.5"	SINGLE DUCT	90-900	300	135	450	0.14	DESV	20	25	2	10	55	86	14.7	130	25	115.5	2.1	0.08	0.37	2 WAY	ELEC MODULATING	1,2,3,4			
	AHU-1	14,14a, 15	6	TITUS	DESV	06	12"X8"	SINGLE DUCT	45-500	400	115	330	0.12	DESV	21	23	3	10	55	95	13.9	130	25	115.3	1.9	0.29	0.62	2 WAY	ELEC MODULATING	1,3,4			
	AHU-1	16	7	TITUS	DESV	7E	14"X12.5"	SINGLE DUCT	90-900	280	135	450	0.17	DESV	20	25	2	10	55	87	15.2	130	25	117.1	2.4	0.08	0.39	2 WAY	ELEC MODULATING	1,2,3,4			
	AHU-1	21	8	TITUS	DESV	8E	14"X12.5"	SINGLE DUCT	90-900	300	135	450	0.30	DESV	19	27	2	10	55	86	14.7	130	25	115.5	2.1	0.08	0.37	2 WAY	ELEC MODULATING	1,2,3,4			
	AHU-1	2	10	TITUS	DESV	6E	12"X10"	SINGLE DUCT	40-350	280	115	380	0.23	DESV	23	25	2	10	55	84.6	11.9	130	25	112.5	1.4	0.06	0.22	2 WAY	ELEC MODULATING	1,2,3,4			
	AHU-1	3	11	TITUS	DESV	04	12"X8"	SINGLE DUCT	30-225	50	30	30	0.11	DESV	-	19	1	10	55	87.5	1	130	25	109.2	0.1	0	0.01	2 WAY	ELEC MODULATING	1,3,4			
	AHU-1	1	14	TITUS	DESV	8E	14"X12.5"	SINGLE DUCT	120-1050	600	205	675	0.27	DESV	22	28	3	10	55	90	24.9	130	25	110.1	2.5	0.23	0.39	2 WAY	ELEC MODULATING	1,2,3,4			
	AHU-1	10	15	TITUS	DESV	05	12"X8"	SINGLE DUCT	40-350	210	70	210	0.18	DESV	18	29	3	10	55	97	9.3	130	25	109.4	0.9	0.1	0.25	2 WAY	ELEC MODULATING	1,3,4			
	AHU-1	11	16	TITUS	DESV	05	12"X8"	SINGLE DUCT	40-350	155	70	225	0.18	DESV	20	29	2	10	55	91	8.5	130	25	124.7	3.3	0.07	1.17	2 WAY	ELEC MODULATING	1,2,3,4			
	AHU-1	12	17	TITUS	DESV	05	12"X8"	SINGLE DUCT	30-225	120	55	225	0.05	DESV	20	29	2	10	55	87.3	7.7	130	25	118.9	1.4	0.07	0.28	2 WAY	ELEC MODULATING	1,2,3,4			
	RTU-2	22	2	TITUS	DESV	7E	14"X12.5"	SINGLE DUCT	70-650	365	135	450	0.26	DESV	20	25	2	12	55	88	15.7	130	25	113.4	1.9	0.09	0.34	2 WAY	ELEC MODULATING	1,2,3,4			
	RTU-2	23	3	TITUS	DESV	04	12"X8"	SINGLE DUCT	30-225	155	50	100	0.11	DESV	22	32	2	10	55	96.2	4.4	130	25	120.4	0.9	0.04	0.16	2 WAY	ELEC MODULATING	1,3,4			
	RTU-2	24	4	TITUS	DESV	05	12"X8"	SINGLE DUCT	40-350	205	65	80	0.12	DESV	18	29	2	10	55	99.7	3.8	130	25	121.7	0.9	0.06	0.16	2 WAY	ELEC MODULATING	1,3,4			
	RTU-2	25	5	TITUS	DESV	04	12"X8"	SINGLE DUCT	30-225	145	45	100	0.12	DESV	21	31	2	10	55	96.2	4.4	130	25	120.4	0.9	0.04	0.16	2 WAY	ELEC MODULATING	1,3,4			
	RTU-2	26	6	TITUS	DESV	04	12"X8"	SINGLE DUCT	30-225	145	45	100	0.12	DESV	21	31	2	10	55	96.2	4.4	130	25	120.4	0.9	0.04	0.16	2 WAY	ELEC MODULATING	1,3,4			
	RTU-2	27	7	TITUS	DESV	04	12"X8"	SINGLE DUCT	30-225	145	45	100	0.12	DESV	21	31	2	10	55	96.2	4.4	130	25	120.4	0.9	0.04	0.16	2 WAY	ELEC MODULATING	1,3,4			
	RTU-2	29	8	TITUS	DESV	04	12"X8"	SINGLE DUCT	30-225	160	55	105	0.11	DESV	22	32	2	10	55	95.5	4.5	130	25	120.1	0.9	0.04	0.16	2 WAY	ELEC MODULATING	1,3,4			
	RTU-2	30	9	TITUS	DESV	04	12"X8"	SINGLE DUCT	30-225	145	45	100	0.11	DESV	21	31	2	10	55	96.2	4.4	130	25	120.4	0.9	0.04	0.16	2 WAY	ELEC MODULATING	1,3,4			
	RTU-2	31	10	TITUS	DESV	04	12"X8"	SINGLE DUCT	30-225	105	35	90	0.11	DESV	15	27	2	10	55	95.1	3.8	130	25	119	0.7	0.02	0.11	2 WAY	ELEC MODULATING	1,3,4			
	RTU-2	HALL 28	11	TITUS	DESV	05	12"X8"	SINGLE DUCT	40-350	250	75	220	0.12	DESV	21	31	3	10	55	95.8	9.5	130	25	109	0.9	0.13	0.25	2 WAY	ELEC MODULATING	1,3,4			
	RTU-2	G18	1	TITUS	DESV	04	12"X8"	SINGLE DUCT	30-225	145	50	125	0.14	DESV	21	31	2	12	55	96.1	5.4	130	25	118	0.9	0.04	0.16	2 WAY	ELEC MODULATING	1,3,4			
NOTES:																																	
1	ALL BOXES ARE SINGLE DUCT, PRESSURE INDEPENDENT WITH REHEAT.																																
2	CONTROL SEQUENCE FOR PERMITER SPACES WITH OVERHEAD DOWN DRAFT PROTECTION. SEE CONTROLS DWGS & SPECIFICATIONS. MAX HEATING CFM IS DETERMINED BY DOWN DRAFT PROTECTION.																																
3	CONTROLS AND COIL CONTROL VALVES BY JOHNSON CONTROLS																																
4	MAX PRESSURE DROP FOR ALL BOXES INCLUDING REHEAT COIL AT MAX CFM IS .075" wc.																																
5	HEATING PERFORMANCE AT PEAK HEATING LOAD CFM																																

EXPANSION & BUFFER TANK SCHEDULE										
MARK	MFG	SERIES	MODEL	TYPE	SERVES	CAPACITY (GAL)	WORKING PRESS (PSI)	ACCEPT FACTOR	CHARGE (PSI)	NOTES
	AMTROL	EXTROL LBC SERIES	130LBC	BLADDER	HEATING LOOP	34	125	0.79	12	1
	AMTROL	EXTROL HORIZONTAL AX	AX-40-DD		CHILLED WATER	23	125	0.49	12	1
	AMTROL	BUFFER TANKS	CWB7200-3	VERTICAL BAFFLE	CHILLED WATER	200	125	NA	NA	1,2,3
NOTES:										
1	ASME									
2	3" CONNECTIONS									
3	450°F MAX WORKING TEMP									

AIR DEVICE SCHEDULE								
MARK	DEVICE	MFG	MODEL	STYLE	FRAME TYPE	MATL	COLOR	NOTES
S1	SUPPLY DIFFUSER	TITUS	TMS	CEILING DIFFUSER 24"x24" LAY-IN 24"x24" MODULE	3	STEEL	WHITE	1,2,3
S2	SUPPLY DIFFUSER	TITUS	TMS	CEILING DIFFUSER 12"x12" LAY-IN 12"x12" MODULE	3	STEEL	WHITE	1,2,3
S3	SUPPLY DIFFUSER	TITUS	TMSA	CEILING DIFFUSER 24"x24" LAY-IN 24"x24" MODULE	3	STEEL	WHITE	1,2,3,4
S4	SUPPLY DIFFUSER	TITUS	TMSA	CEILING DIFFUSER 24"x24" LAY-IN 12"x12" MODULE	3	STEEL	WHITE	1,2,3,4
S5	SUPPLY DIFFUSER	TITUS	N-1-DR	4' LONG LAY-IN. 13" DOWN BLOW SLOT	N/A	STEEL	BLACK	1,2,3,5
S6	SUPPLY DIFFUSER	TITUS	N-1	4' LONG LAY-IN	N/A	STEEL	BLACK	1,2,3
S7	SUPPLY DIFFUSER	TITUS	N-1-DR	2' LONG LAY-IN. 8" DOWN BLOW SLOT	N/A	STEEL	BLACK	1,2,3,5
S8	SUPPLY DIFFUSER	TITUS	300RS	SURFACE MOUNT DIFFUSER, 18"x10" FACE	1	STEEL	WHITE	1,2
R1	RETURN GRILL	TITUS	8R	CEILING PERFORATED 24"x24" LAY-IN	3	STEEL	WHITE	1,2
R2	RETURN GRILL	TITUS	8R	CEILING PERFORATED 24"x12" LAY-IN	3	STEEL	WHITE	1,2
R3	RETURN GRILL	TITUS	350ZRL	SURFACE MOUNT GRILL. 16"x16" FACE	1	STEEL	WHITE	1,2
R4	RETURN GRILL	TITUS	350ZRL	SURFACE MOUNT GRILL. 24"x24" FACE	1	STEEL	WHITE	1,2
RH1	RELIEF AIR HOOD	LORIN COOK	PR	SPUN ALUMINUM		ALUM		6, 7
NOTES:								
1	SEE DEVICE CALL OUTS FOR NECK AND/OR FACE SIZE							
2	SEE AIR FLOW ARROWS ON PLANS FOR REQUIRED PATTERNS							
3	MOLDED INSULATION BLANKET							
4	ADJUSTABLE VANES TO VARY DISCHARGE PATTERN WHERE INDICATED							
5	INCLUDES RETURN SECTION TO PLENUM							
6	MOTORIZED MODULATING DAMPER. ACTUATOR BY CONTROLS CONTRACTOR.							
7	INSULATED ROOF CURB							

BOILER SCHEDULE																	
MARK	MFG	MODEL	TYPE	INPUT (MBH)	MIN INPUT (MBH)	DOE HEATING CAP (MBH)	AHRI NET RATING (MBH)	EFF (%)	MAX WORKING PRESSURE (PSI)	MAX WORKING TEMP (°F)	PRESSURE RELIEF VALVE SETTING (PSI)	MIN WORKING PRESSURE (PSI)	SUPPLY WATER TEMP (°F)	WATER DELTA TEMP (°F)	GPM AT 20°F DELTA	BOILER PRESSURE DROP (FT)	NOTES
	PATTERSON KELLY	SL-850	CONDENSING, DIRECT VENT, STAINLESS STEEL, NAT GAS FIRED, HOT WATER	850	72.5	829		97	160	210	50		135	25	82.9	5.5	1,2,3,4
NOTES																	
1	INSTALLATION TO COMPLY WITH ALL APPLICABLE CODES AND MANUFACTURER'S INSTRUCTIONS & RECOMMENDATIONS.																
2	PROVIDE CONDENSATE NEUTRALIZER																
3	PROVIDE MANUAL RESET LOW WATER CUT OFF																
4	10/1 MAX TURN DOWN																

CHILLER SCHEDULE																							
MARK	MFG	MODEL #	TYPE	REF	CAP (TONS)		EFFICIENCY (EER)			OUT DOOR AIR T (°F)	CHILLED WATER					COMPRESSORS		REF CIRCUITS	COND FANS	ELECTRICAL *		NOTES	
					NOM	REF	COOL	IPLV	NPLV		% PROP GLY	DESIGN GPM	MIN GPM	EW T (°F)	LWT (°F)	PRESS DROP (PSI)	QT			TYPE	VOL T/ PH S / H Z		MOP
	TRANE	CGAM52	AIR COOLED	R-454B	52	49.66	11.55	17.35	17.05	95	30	125.8	77.68	54	44	19.6	4	SCROLL	2	4	208/3/60	300	1,2,3,4,5
NOTES	* SEE EQUIPMENT DATA SCHEDULE ON ELECTRICAL DRAWINGS.																						
1	UNIT MOUNTED DISCONNECT																						
2	AHRI CERTIFIED																						
3	ETL LISTED TO US/CANADIAN SAFETY STANDARDS																						
4	UNIT MOUNTED VFDs																						
5	FACTORY MOUNTED DISCONNECT																						

HEAT PUMP SPLIT SYSTEM																																													
SYSTEM										INDOOR UNIT - HEAT PUMP FURNACE W/ ELECTRIC BACKUP HEAT																OUTDOOR UNIT - HP CONDENSER UNIT								NOTES											
MARK	TYPE	SERVES	MFG	MODEL	NOMINAL SYSTEM COOLING CAPACITY (TON)	REFRIG	DESIGN OUTDOOR TEMP (db/wb °F)	COOLING EFFICIENCY (AHRI DATA)				TYPE	MODEL	FAN			COIL PERFORMANCE										BACKUP HEAT	ELECTRIC *				FILTERS		MARK	MFG	MODEL	TYPE	NOMINAL CAPACITY (MBH)	COMP	ELECTRIC *					
								CFM	CAP (MBH)	EER2	SEER2			DRIVE	CFM	MOTOR	COOLING					HEATING						KW	VOLTS/PH/HR	RLA	MOCP	MERV	TYPE							VOLTS/PH/HR	MCA	MOCP			
																	EDB (°F)	EWB (°F)	LDB (°F)	LWB (°F)	TOTAL CAP (MBH)	SEN CAP (MBH)	EDB (°F)	LDB (°F)	CAP @ 47 °F O.A. (MBH)	COP @ 47°F (KW/KW)																		COP @ 17°F (KW/KW)	HSPF2 (BTU _h /W)
F 1	UNITARY SPLIT SYSTEM	CRIM LAB	TRANE	STWR4042AI	3	R454B	95/77	1210	37.8	11.7	14.3	ELECT FURNACE	STEM4D04AC31	DIRECT	1350	3.9 FLA	80.0	67.0	60.6	57.7	38.454	27.82	70	87.04	39.0	24.6	3.90	2.60		9.6*	208/1/60	16.9	60	8	1" THROW AWAY	CUH 1	TRANE	STWR4042A 1000	DX HEAT PUMP	42	(1) SCROLL	208/1/60	24	40	1
F 2	UNITARY SPLIT SYSTEM	CDL-MVI BLDG	TRANE	STWR4	1.5	R454B	95/77	655	19.1	11.7	14.3	ELECT FURNACE	STAM5B01AC21	DIRECT	600	2.6 FLA	80	67	58.1	56.7	18.8	14.00	70	87.59	17.7	11.5	3.6	2.5	7.5	7.68*	208/1/60		45	8	1" THROW AWAY	CUH 2	TRANE	STWR4018A1	DX HEAT PUMP	18	(1) SCROLL	208/1/60	12	20	1
NOTES	* SEE EQUIPMENT DATA SCHEDULE ON ELECTRICAL DRAWINGS																																												
1	PERFORMANCE AND EFFICIENCIES ARE FOR THE FULL SYSTEM																																												
2																																													
3																																													

MARK	TYPE	SERVES	MFG	SERIES	MODEL	PUMP								MOTOR *				NOTES
						GPM	VARIABLE FLOW	P.D. (FT H2O)	PUMP EFFICIENCY (%)	NPSHr (ft H2O)	FLUID	FLANGE SIZE	IMPELLER SIZE (in)	VOLTS/PHS 60HZ	H.P	FLA	RPM	
	CLOSE COUPLED IN-LINE CENTRIFUGAL PUMP	BOILERS	BELL & GOSSETT	e-90	2AAC	81	NO	20	74.9	6.94	WATER	2"	5"	208/3	3/4	3.5*	1800	1,2,3,4,5
	CLOSE COUPLED IN-LINE CENTRIFUGAL PUMP	BOILERS	BELL & GOSSETT	e-90	2AAC	81	NO	20	74.9	6.94	WATER	2"	5"	208/3	3/4	3.5*	1800	1,2,3,4,5
	CLOSE COUPLED IN-LINE CENTRIFUGAL PUMP	PRIMARY HEATING WATER LOOP	BELL & GOSSETT	e-80	1200	100	YES	40	58.6	2.75	WATER	3"	10"	208/3	3	4.6*	1200	1,2,3,4,5
	BOOSTER - INLINE HORIZONTAL	AHU-1 COIL LOOP	BELL & GOSSETT	PL	PL-30	5	NO	5			WATER	1"		120/1	1/12	1.4	2650	1,2,3,4
	BOOSTER - INLINE HORIZONTAL	MAU-1 COIL LOOP	BELL & GOSSETT	PL	PL-50	21	NO	7			WATER	1-1/2"		120/1	1/6	1.8	3300	1,2,3,4
	BOOSTER - INLINE HORIZONTAL	MAU-1 INJECTOR PUMP	BELL & GOSSETT	ecocirc XL	ecocirc XL 36-45	21	YES	15			WATER	1-1/2"		120/1	1/6	2.1		1,2,3,4,6
	BOOSTER - INLINE HORIZONTAL	RTU-2 COIL LOOP	BELL & GOSSETT	PL	PL-30	3	NO	5			WATER	3/4"		120/1	1/12	1.4	2650	1,2,3,4
	CLOSE COUPLED IN-LINE CENTRIFUGAL PUMP	CHILLER	BELL & GOSSETT	e-80	3X3X7C	125	NO	40	71	4.46	30% PROPYLENE GLYCOL	3"	5.5"	208/3	1.5	6.6*	1750	1,2,3,4,5
	CLOSE COUPLED IN-LINE CENTRIFUGAL PUMP	CHILLED WATER LOOP	BELL & GOSSETT	e-80	2.5X2.5X7B	100	YES	42	60.5	4.43	30% PROPYLENE GLYCOL	2.5"	5.375"	208/3	1	4.6*	1750	1,2,3,4,5
NOTE	* SEE EQUIPMENT DATA SCHEDULE ON ELECTRICAL DRAWINGS.																	
1	BOLTED FLANGE																	
2	BRONZE FITTED																	
3	STANDARD SEAL																	
4	PERMANENTLY																	
5	ELECTRICAL																	
6	ECM MOTOR																	

GLYCOL FEED SYSTEM										
MARK	MFG	MODEL	SERVES	MAX PRESS (PSI)	MAX TEMP (°F)	CAPACITY (GAL)	PUMP H.P.	ELECTRICAL		NOTES
								V/PS/HRz	FLA	
	J.L. WINGERT CO.	GL30-E(X)-(X)	HEATING & CHILLED WATER LOOPS	150	150	30	1/3	115/1/60	6.5	1,2
NOTES										
1	PROVIDED WITH THE WATER TREATMENT CONTRACT									
2	8 FT POWER CHORD									

CHEMICAL POT FEEDER SCHEDULE								
MARK	MFG	MODEL	MAT'L	SERVES	MAX PRESS	MAX TEMP (°F)	CAPACITY (GAL)	NOTES
	J.L. WINGERT CO.	FILTER FEEDER	STEEL	HEATING & CHILLED WATER LOOPS	150	150	2	1,2
NOTES								
1	PROVIDED BY WATER TREATMENT CONTRACTOR							
2	25 MICRON FILTER INCLUDED							

ROOF TOP UNIT SCHEDULE																																	
MARK	TYPE	SERVES	MFG	MODEL	NOMINAL CAPACITY (TONS)	OUTSIDE AIR MIN (CFM)	RFRG	SUPPLY FAN				FAN MOTOR			COOLING								HEATING		ELECTRIC *				FILTERS		NOTES		
								TYPE	QTY	DRIVE	CFM	EXT STATIC PRESSURE ("wg)	H.P.	RPM	V/PHS/HRz	TYPE	QTY	CAPACITY TOTAL (MBH)	CAPACITY SEN (MBH)	EAT (db/wb) (°F)	LAT (db/wb) (°F)	EER @ AHRI			SEER @ AHRI	EER2 @ AHRI	SEER2 @ AHRI	TYPE	CAP (MBH)	V/Ø/Hz		MCA (AMP)	MOP (AMP)
RTU 1	CLIMATE CHANGER VAV	RADIO/IT ROOM	TRANE	THK060A3S0B	5	200	R-454B	BC PLENUM	1	DIRECT	2000	1.00	3	989	208/3/60	SCROLL	1	58.19	43.27	75.60/65.53	54.01/52.93	12.90	17.10	12.20	16.40	ELECT RESIST	6 KW	208/3/60	31.0	45.0	13	2" PLEATED	1,2,3,4
NOTES	* SEE EQUIPMENT DATA SCHEDULE ON ELECTRICAL DRAWINGS																																
1	FACTORY INSULATED ROOF CURB																																
2	AIR SIDE ECONOMIZER CYCLE - DRY BULB CONTROL																																
3	FACTORY MOUNTED DISCONNECT																																
4	FACTORY MOUNTED 15 AMP CONVENIENCE OUTLET																																



**OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES
MANAGEMENT,
DESIGN AND CONSTRUCTION**

**MISSOURI DEPARTMENT
OF PUBLIC SAFETY
DIVISION OF MO STATE
HIGHWAY PATROL**

REPLACE HVAC & BOILERS / PUMPS / CONTROLS

MSHP TROOP B
HEADQUARTERS 308 PINE
CREST DR. MACON, MO
63552

PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____

ISSUE DATE: 06/15/2026

CAD DWG FILE: TBHCL-M.dwg
DRAWN BY: GGF/SAK
CHECKED BY: JLD
DESIGNED BY: GGF/SAK

SHEET TITLE:

SCHEDULES

SHEET NUMBER:

M-602

22 OF 41 SHEETS
2026-06-15

MISSOURI DEPARTMENT
OF PUBLIC SAFETY
DIVISION OF MO STATE
HIGHWAY PATROL

MSHP TROOP B
HEADQUARTERS 308 PINE
CREST DR. MACON, MO
63552

EVISION: _____
 DATE: _____
 EVISION: _____
 DATE: _____
 EVISION: _____
 DATE: _____

AD DWG FILE: TBHCL-M.dwg
 DRAWN BY: GGF/SAK
 CHECKED BY: JLD
 DESIGNED BY: GGF/SAK

SHEET NUMBER

23 OF 41 SHEETS
026-06-15

ENERGY RECOVERY VENTILATOR SCHEDULE																																						
MARK	MFG	Model	SERVES	SUPPLY AIR				EXHAUST AIR				SUMMER - COOLING PERFORMANCE						WINTER - HEATING PERFORMANCE						PERFORMANCE EFFECTIVENESS			ELECTRICAL *			FILTERS						NOTES		
				O.A (CFM)	ESP ("wc)	MOTOR HP	VFD	FLA	EXHAUST AIR (CFM)	ESP ("wc)	MOTOR HP	VFD	FLA	OUTDOOR AIR		CONDITIONED O.A.		EXHAUST AIR		OUTDOOR AIR		CONDITIONED O.A.		EXHAUST AIR		SENSIBLE (%)	SUMMER TOTAL (%)	WINTER TOTAL (%)	V/PH/HRZ	MCA	MOPD	OUTDOOR AIR			RETURN AIR			
														TEMP (db/wb °F)	H2O (GR/LB)	TEMP (db/wb °F)	H2O (GR/LB)	TEMP (db/wb °F)	H2O (GR/LB)	TEMP (db/wb °F)	H2O (GR/LB)	TEMP (db/wb °F)	H2O (GR/LB)	TEMP (db/wb °F)	H2O (GR/LB)							TEMP (db/wb °F)	H2O (GR/LB)	TEMP (db/wb °F)	H2O (GR/LB)		TEMP (db/wb °F)	H2O (GR/LB)
ERV 1	RENEWAIR	HE10	GARAGE	675	0.5	0.5	NO	1.73	675	0.5	0.5	NO	1.73	96/77	114.1	81/70.1	97.0	75/64	74.5	0/-1	4.0	50.1/43.3	31.9	70/55.6	44.9	71.6	56.2	70.5	208/1/60	3.9	15	PLEATED	2"	8	PLEATED	2"	8	1,2
NOTES:		SEE EQUIP DATA SCHEDULE ON ELECTRICAL DRAWINGS																																				
1		INSULATED ROOF CURB																																				
2		SEALED WEATHER PROOF OUTDOOR CONSTRUCTION																																				

FAN SCHEDULE													
MARK	TYPE	SERVES	MFG	SERIES	MODEL	FAN				ELECT MOTOR *			NOTES
						DRIVE	CFM	S.P. ("H2O)	RPM	V/HS/HRz	HP	RPM	
	CENTRIFUGAL SQUARE INLINE	AHU-1	LOREN COOK	SQI-B	225SQIB	BELT	8000	1	1203	208/3/60	5	1725	1,2,5,6
	CENTRIFUGAL ROOF MOUNT DOWN BLAST	TOILET ROOMS	LOREN COOK	ACE	90C15DL	DIRECT	210	0.18	1067	120/1/60	0.125	1550	3,4,7,8,9
	CENTRIFUGAL ROOF MOUNT DOWN BLAST	TOILET ROOMS	LOREN COOK	ACE	120C15D	DIRECT	800	0.3	992	120/1/60	0.250	1550	3,4,7,8,9
	CENTRIFUGAL ROOF MOUNT DOWN BLAST	TOILET ROOMS	LOREN COOK	ACE	70C15DL	DIRECT	70	0.15	1172	120/1/60	0.050	1550	3,4,7,8,9
NOTES	* SEE EQUIPMENT DATA SCHEDULE ON ELECTRICAL DRAWINGS												
1	FACTORY PROVIDED VFD FOR VARIABLE VOLUME PERFORMANCE												
2	FACTORY INSTALLED NEMA 1 DISCONNECT PRE-WIRED												
3	INSULATED ROOF CURB												
4	BIRD SCREEN												
5	SPRING TYPE VIBRATION ISOLATORS												
6	BELT GUARD												
7	MOTORIZED BACK DRAFT DAMPER												
8	FACTORY INSTALLED NEMA 3 LIQUID TIGHT DISCONNECT PRE-WIRED												
9	FAN SPEED CONTROLLER (FSC) FOR BALANCING												

[illegible]

EVISION: _____
 DATE: _____
 EVISION: _____
 DATE: _____
 EVISION: _____
 DATE: _____

CONTROLS SEQUENCE

SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 – GENERAL

1.1 SUMMARY

A. THIS SECTION DEFINES THE SEQUENCES OF OPERATION FOR ALL HVAC SYSTEMS AND EQUIPMENT, INCLUDING:

- 1.HEATING WATER PLANT – BOILERS AND PUMPS
- 2.CHILLED WATER PLANT – CHILLERS AND PUMPS
- 3.AIR HANDLING UNITS (AHU–1)
- 4.ROOFTOP UNITS (RTU–1 AND RTU–2)
- 5.VAV TERMINAL UNITS (VAV–1 THROUGH 29)
- 6.FAN COIL UNITS (FCU–1) AND ENERGY RECOVERY VENTILATOR (ERV–1)
- 7.HEAT PUMP SPLIT SYSTEMS (F–1, CUH–1, F–2, CUH–2)
- 8.MAKEUP AIR UNIT – EXISTING (MAU–1)
- 9.ASSOCIATED PUMPS, DAMPERS, AND CONTROL VALVES

B. PROVIDE ALL CONTROL LOGIC, PROGRAMMING, AND INTEGRATION REQUIRED TO ACHIEVE THE SEQUENCES DESCRIBED HEREIN.

PART 2 – PRODUCTS

- A. APPROVED MANUFACTURER: JCI METASYS BAS
- a.CONTACT IS: JACK CONROY – 314–624–7181
 - b.THE BUILDING CONTROLS SYSTEM SHALL BE TIED TO THE CENTRAL MO HIGHWAY PATROL BMS USING BACNET PROTOCOL.
 - c.THE SYSTEM SHALL PROVIDE TOTAL GRAPHICS FEATURES BOTH ON SITE AND AT THE BMS
 - d.GRAPHICS DISPLAY WILL INCLUDE ALL POINTS & SCHEDULES TO ENHANCE COMMISSIONING. UNNECESSARY DISPLAYS FOR NORMAL SYSTEMS OPERATING SHOULD BE DEACTIVATED BY THE CONTROLS CONTRACTOR AFTER THE SYSTEM'S PROPER OPERATION HAS BEEN VERIFIED.
 - e.ALL SET POINTS AND SCHEDULES ARE ADJUSTABLE FROM THE BMS UNLESS OTHERWISE NOTED.

PART 3 – EXECUTION

3.1 HEATING WATER PLANT – BOILERS

A. BOILER PUMPS

- 1.ENABLE ONE BOILER PUMP WHEN: A. OUTSIDE AIR TEMPERATURE (OAT) ≤ 60°F; OR B. ANY HEATING COIL ISSUES A HEATING DEMAND.
- 2.UPON PROOF OF FLOW, ENABLE THE LEAD BOILER.

B. BOILER OPERATION

- 1.BOILERS SHALL OPERATE UNDER FACTORY CONTROLLERS.
- 2.MAINTAIN HEATING WATER SUPPLY TEMPERATURE AT 130°F.
- 3.SEE MAU–1 SEQUENCE FOR SUPPLY WATER TEMPERATURE OVER RIDE.

C. REDUNDANCY AND ROTATION

- 1.TWO BOILERS SHALL PROVIDE 100% REDUNDANCY.
- 2.AUTOMATIC LEAD/LAG ROTATION BASED ON RUNTIME.

3.2 PRIMARY HEATING WATER PUMPS (PH–2)

A. OPERATION

- 1.ENABLE LEAD PRIMARY PUMP UPON HEATING DEMAND.
- 2.MODULATE PUMP SPEED VIA VFD TO MAINTAIN HEATING WATER DIFFERENTIAL PRESSURE.

B. REDUNDANCY.

- 1.TWO PUMPS SHALL PROVIDE 100% BACKUP CAPACITY.
- 2.AUTOMATIC LEAD/LAG ROTATION BASED ON RUNTIME OR FAILURE.

3.3 CHILLED WATER PLANT

A. PUMP ENABLE

- 1.ENABLE LEAD PRIMARY CHILLED WATER PUMP (PC–1) WHEN OAT ≥ 55°F.
- 2.ENABLE LEAD SECONDARY CHILLED WATER PUMP (PC–2) SIMULTANEOUSLY.

B. CHILLER ENABLE

- 1.UPON PROOF OF FLOW, ENABLE CHILLER.
- 2.CHILLER SHALL MAINTAIN 45°F CHILLED WATER SUPPLY TEMPERATURE UNDER FACTORY CONTROLLER.

C. REDUNDANCY

- 1.PRIMARY AND SECONDARY PUMPS SHALL EACH PROVIDE 100% REDUNDANCY.
- 2.AUTOMATIC LEAD/LAG ROTATION.

D. FREEZE PROTECTION

- 1.WHEN OAT ≤ 0°F, RUN CHILLED WATER PUMP (CP–1).

3.4 AHU–1 – MAIN BUILDING

A. OCCUPANCY

- 1.OCCUPIED: 8:00 AM – 6:00 PM, MONDAY–FRIDAY (EXCLUDING HOLIDAYS).
- 2.UNOCCUPIED: ALL OTHER TIMES.
- 3.BMS OVERRIDE PERMITTED.
- 4.PROVIDE AUTOMATIC WARM–UP AND COOL–DOWN CYCLES.

B. SUPPLY FAN

- 1.STATIC PRESSURE CONTROL: THE SUPPLY FAN VFD SHALL MODULATE TO MAINTAIN THE CURRENT DUCT STATIC PRESSURE SETPOINT AT PS–1, PS–2, PS–3, OR PS–4 WHICHEVER IS LOWEST. SENSORS LOCATED AS SHOWN ON THE DWGS.
- 2.RESET LOGIC BASED ON VAV DAMPER POSITION: THE BMS SHALL CONTINUOUSLY MONITOR THE DAMPER POSITION OF ALL PRESSURE–INDEPENDENT VAV TERMINAL UNITES SERVED BY AHU–1.
 - 2.1. HIGH DEMAND CONDITION: IF MORE THAN 20% OF THE VAV BOXES HAVE THEIR PRIMARY AIR DAMPERS OPEN ABOVE 90% FOR LONGER THAN 5 MINUTES, THE DUCT STATIC PRESSURE SETPOINT SHALL BE INCREASED IN INCREMENTS OF 0.05 IN. W.C. EVERY 5 MINUTES , UP TO MAXIMUM OF 1.5 IN. W.C.
 - 2.2. LOW DEMAND CONDITION: IF MORE THAN 80% OF THE VAV BOXES HAVE THEIR PRIMARY AIR DAMPERS BELOW 50% OPEN FOR LONGER THAN 5 MINUTES, THE DUCT STATIC PRESSURE SETPOINT SHALL BE DECREASED IN INCREMENTS OF 0.05 IN. W.C. EVERY 5 MINUTES, DOWN TO A MINIMUM OF 0.90 IN. W.C. (TO BE DEFINED BY DESIGN).
- 3.DEFAULT/STATIC LIMITS: ON SYSTEM ENABLE, THE INITIAL DUCT STATIC PRESSURE SETPOINT SHALL BE 1.24 IN. W.C. (DESIGN VALUE). THE RESET SCHEDULE SHALL ALWAYS MAINTAIN THE SETPOINT BETWEEN THE MINIMUM AND MAXIMUM LIMITS DEFINED ABOVE.
- 4.UNOCCUPIED AND WARM–UP/COOL–DOWN MODES: DURING OCCUPIED OPERATION, WARM–UP, AND COOL–DOWN CYCLES, THE SUPPLY FAN STATIC PRESSURE SETPOINT MAY BE HELD AT THE DEFAULT VALUE OR CONTROLLED PER BMS OPTIMIZATION STRATEGIES, BUT SHALL NOT EXCEED THE MAXIMUM STATIC PRESSURE LIMIT.

C. COOLING COIL

- 1.MODULATE CHILLED WATER VALVE TO MAINTAIN 55°F DISCHARGE AIR TEMPERATURE (DAT).
- 2.RESET DAT LINEARLY TO 60°F WHEN OAT DECREASES TO 45°F.

D. PREHEAT COIL

- 1.RUN COIL PUMP (PH–2) WHEN MIXED AIR TEMPERATURE IS ≤ 55°F.
- 2.MODULATE COIL 3 WAY VALVE TO MAINTAIN 52°F DAT.

E. ECONOMIZER

- 1.ENABLE WHEN OA ENTHALPY < RA ENTHALPY AND COOLING IS REQUIRED.
- 2.MODULATE OA AND RA DAMPERS TO MAINTAIN 55°F MIXED AIR TEMPERATURE.

F. RELIEF FAN

- 1.MODULATE TO MAINTAIN BUILDING PRESSURE PER DIFFERENTIAL PRESSURE SENSOR DPS_1.

3.5 VAV TERMINAL UNITS FOR AHU–1

A. GENERAL

- 1.PRESSURE INDEPENDENT VAV BOXES WITH HYDRONIC REHEAT COILS.
- 2.PRESSURE INDEPENDENT 2–WAY COIL CONTROL VALVES.

B. COOLING MODE

- 1.AIRFLOW MODULATES FROM MAXIMUM COOLING TO MINIMUM AS ZONE TEMPERATURE DECREASES.

C. HEATING MODE

- 1.AT MINIMUM AIRFLOW, REHEAT VALVE MODULATES TO MAINTAIN ZONE TEMPERATURE.
- 2.A 2°F DEADBAND SEPARATES HEATING AND COOLING.
- 3.IF FULL HEATING VALVE AND STILL BELOW SETPOINT, AIRFLOW INCREASES TO MAXIMUM HEATING AIRFLOW.
- 4.DOWNDRAFT ZONES: INCREASE TO MAXIMUM HEATING AIRFLOW WHEN OAT ≤ 35°F.

3.6 DEMAND CONTROL VENTILATION (DCV)

A. OPERATION

- 1.INCREASE VENTILATION BASED ON CO₂ CONCENTRATION OR OCCUPANCY SENSOR INPUT.
- 2.MODULATE OA DAMPER TO MAINTAIN ZONE CO₂ ≤ 1100 PPM.
- 3.DISABLE DCV DURING ECONOMIZER OPERATION.

3.7 AHU–1 – UNOCCUPIED MODE

A. SETPOINTS

- 1.HEATING: 60°F
- 2.COOLING: 80°F

B. DAMPERS

- 1.OA DAMPER CLOSED.
- 2.RA DAMPER OPEN.

C. FANS

- 1.SUPPLY FAN OPERATES AS IN OCCUPIED MODE.
- 2.RELIEF FAN OFF.

D. DCV

- 1.DISABLED.

3.8 FREEZE PROTECTION – AHU–1, RTU–2, AND FCU–1

A. UPON MIXED AIR TEMPERATURE ≤ 35°F

- 1.PREHEAT VALVE → 100% OPEN TO COIL.
- 2.PREHEAT COIL PUMP → FULL FLOW
- 3.OA DAMPER → CLOSED
- 4.RA DAMPER → OPEN
- 5.ALARM → BMS AND LOCAL
- 6.MANUAL RESET REQUIRED

3.9 SMOKE DETECTION – AHU–1, RTU–1, RTU–2, AND FCU–1

A. OPERATION

- 1.UPON SMOKE DETECTION IN MIXED AIR PLENUM: A. SHUT DOWN ASSOCIATED AIR HANDLING UNIT. B. SIGNAL FIRE ALARM SYSTEM.

3.10 RTU–2 – FIRING RANGE ADDITION OFFICES

A. OCCUPANCY

SAME AS AHU–1.

B. SUPPLY FAN

- 1.DURING OCCUPIED HOURS, THE SUPPLY FAN VFD SHALL MODULATE TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT AS MEASURED BY PRESSURE SENSOR PS–5 LOCATED AS SHOWN ON THE DRAWINGS. THE SUPPLY FAN SHALL RUN CONTINUOUSLY WHEN THE UNIT IS ENABLED.
- 2.RESET LOGIC BASED ON VAV DAMPER POSITION: THE BMS SHALL CONTINUOUSLY MONITOR THE PRIMARY AIR DAMPER POSITION OF ALL PRESSURE–INDEPENDENT VAV TERMINAL UNITES SERVED BY RTU–2.
 - 2.1. HIGH DEMAND CONDITION: IF MORE THAN 20% OF THE VAV BOXES HAVE THEIR PRIMARY AIR DAMPERS OPEN ABOVE 90% FOR LONGER THAN 5 MINUTES, THE DUCT STATIC PRESSURE SETPOINT SHALL BE INCREASED IN INCREMENTS OF 0.05 IN. W.C. EVERY 5 MINUTES, UP TO A MAXIMUM OF 1.20 IN. W.C.
 - 2.2. LOW DEMAND CONDITION: IF MORE THAN 80% OF THE VAV BOXES HAVE THEIR PRIMARY AIR DAMPERS BELOW 50% OPEN FOR LONGER THAN 5 MINUTES, THE DUCT STATIC PRESSURE SETPOINT SHALL BE DECREASED IN INCREMENTS OF 0.05 IN. W.C. EVERY 5 MINUTES, DOWN TO A MINIMUM OF 0.30 IN. W.C.
- 3.DEFAULT/STATIC LIMITS: ON SYSTEM ENABLE, THE INITIAL DUCT STATIC PRESSURE SETPOINT SHALL BE 0.90 IN. W.C. (DESIGN VALUE). THE RESET SCHEDULE SHALL ALWAYS MAINTAIN THE SETPOINT BETWEEN THE MINIMUM AND MAXIMUM LIMITS DEFINED ABOVE.
- 4.UNOCCUPIED, WARM–UP, AND COOL–DOWN MODES: DURING UNOCCUPIED OPERATION AND DURING ANY WARM–UP OR COOL–DOWN CYCLES, THE DUCT STATIC PRESSURE SETPOINT MAY BE HELD AT THE DEFAULT VALUE OR CONTROLLED PER BMS OPTIMIZATION STRATEGIES, BUT SHALL NOT EXCEED THE MAXIMUM STATIC PRESSURE LIMIT.

C. COOLING COIL

- 1.MAINTAIN 55°F DAT, RESET TO 60°F AT OAT ≤ 45°F.

D. PREHEAT COIL

- 1.RUN COIL PUMP (PH–5) WHEN MIXED AIR TEMPERATURE IS LESS THAN DISCHARGE AIR TEMPERATURE SET POINT.
- 2.MODULATE 3 WAY COIL CONTROL VALVE TO MAINTAIN 52°F DAT.

E. ECONOMIZER

- 1.ENABLE WHEN OA TEMPERATURE < RA TEMPERATURE AND COOLING IS REQUIRED.
- 2.MAINTAIN 55°F MIXED AIR TEMPERATURE.

F. RELIEF AIR DAMPER

- 1.MODULATE DAMPER TO MAINTAIN BLDG PRESSURE AT 0.05 IN. W.C.

G. VAV BOXES FOR RTU–2

SAME LOGIC AS AHU–1.

3.11 MAKE UP AIR UNIT – EXISTING (MAU–1)

A. STARTUP AND SHUT DOWN IS ACCOMPLISHED WITH EXISTING MANUAL SWITCH, CONTROLLER, VFD, AND CONTROLS. TIE TO BMS SO START UP AND SHUT DOWN CAN BE ACCOMPLISHED THROUGH BMS. REPLACE IF REQUIRED.

B. SEQUENCE WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 65°F

- 1.START UP – MANUAL
- 2.OPEN OUTSIDE AIR DAMPER
- 3.TURN ON SUPPLY AIR FAN. RUN AT CONSTANT SPEED
- 4.SHUT DOWN
- 5.TURN OFF SUPPLY AIR FAN
- 5.CLOSE OUTSIDE AIR DAMPER

C. SEQUENCE WHEN OUTSIDE AIR TEMPERATURE IS 65°F AND 35°F

- 1.START UP – MANUAL
- 2.OPEN 2–POSITION BALL VALVE (CV–7).
- 3.START COIL PUMP (PH–6) AND RUN AT CONSTANT SPEED.
- 4.START INJECTOR PUMP (PH–3) AND RUN AT FULL SPEED.
- 5.UPON PROOF OF WATER FLOOR OPEN OUTDOOR AIR DAMPER.
- 6.START SUPPLY FAN AND RUN AT CONSTANT SPEED.
- 7.MODULATE THE SPEED OF INJECTOR PUMP (PH–3) TO MAINTAIN THE HEATING COIL DISCHARGE AIR TEMPERATURE AT 70°F.
- 8.SHUT DOWN.
- 9.TURN OFF THE SUPPLY FAN.
- 10.CLOSE OUTDOOR AIR DAMPER.
- 11. AFTER A TIME DELAY OF 3 MINUTES, TURN OFF COIL PUMP (PH–6) AND INJECTOR PUMP (PH–3).
- 12.CLOSE 2–POSITION BALL VALVE (CV–7)

D. SEQUENCE WHEN OUTSIDE AIR TEMPERATURE IS 35°F OR BELOW.

- 1.START UP
- 2.THE SUPPLY HEATING WATER TEMPERATURE BOILER SET POINT WILL BE RAISED IN STEPS TO 160°F AT A RATE OF 5°F PER 3 MINUTES.
- 2.WHEN SUPPLY WATER TEMPERATURE REACHES 160°F OPEN 2–POSITION BALL VALVE (CV–7).
- 3.TURN ON THE COIL PUMP (PH–6) AND RUN AT CONSTANT FLOW.
- 4.TURN ON INJECTOR PUMP (PH–3) AND RUN AT MAXIMUM FLOW.
- 5.UPON PROOF OF WATER FLOW AND TEMPERATURE, OPEN THE OUTDOOR AIR DAMPER.
- 6.TURN ON THE SUPPLY AIR FAN AND RUN AT CONSTANT SPEED.
- 7.MODULATE THE SPEED OF THE INJECTOR PUMP TO MAINTAIN THE COIL DISCHARGE AIR TEMPERATURE AT 70°F.
- 8.SHUT DOWN.
- 9.TURN OFF SUPPLY AIR FAN.
- 10.CLOSE OUTDOOR AIR DAMPER.
- 11. AFTER 5 MINUTE TIME DELAY, TURN OFF INJECTOR PUMP AND COIL PUMP.
- 12.CLOSE 2–POSITION BALL VALVE (CV–7).

3.12 RTU–1 – RADIO & IT ROOMS

A. GENERAL

- 1.ROOMS ARE ALWAYS OCCUPIED.
- 2.UNIT IS CONSTANT VOLUME WITH DX COOLING AND ELECTRIC HEAT.

B. OPERATION

- 1.COOLING MODULATES TO MAINTAIN ROOM SETPOINT.
- 2.ELECTRIC HEAT CYCLES TO MAINTAIN HEATING SETPOINT.

ECONOMIZER MAINTAINS 52°F MIXED AIR TEMPERATURE WHEN OA < RA AND COOLING IS REQUIRED.

3.13 VAV–3 – BACKUP FOR RADIO & IT ROOMS

A. BACKUP MODE

- 1.INITIATED BY MANUAL SWITCH OR BMS COMMAND.
- 2.RTU–1 SHUTS DOWN.
- 3.RTU–1 SUPPLY DAMPER (D–1) CLOSES.
- 4.VAV–3 SUPPLY DAMPER (D–2) OPENS.
- 5.VAV–3 OPERATES UNDER AHU–1 SEQUENCES.

INDICATOR LIGHT SHOWS BACKUP MODE.

B. NON BACK UP MODE

- 1.D–1 IS OPEN
- 2.D–2 IS CLOSED
- 3.VAV–3 DAMPER IS CLOSED
- 4.REHEAT COIL VALVE IS CLOSED

3.14 FCU–1 AND ERV–1 – GARAGE

A. OCCUPIED MODE

- 1.FCU–1 FAN RUNS CONTINUOUSLY.
- 2.ERV–1 RUNS CONTINUOUSLY.
- 3.HEATING MODE: A. LOW FAN SPEED B. RA DAMPER (D–5) CLOSED C. HEATING VALVE (CV–6) MODULATES
- 4.COOLING MODE: A. HIGH FAN SPEED B. RA DAMPER (D–5) OPEN C. COOLING VALVE (CV–5) MODULATES

B. UNOCCUPIED MODE

- 1.HEATING SETPOINT: 60°F
- 2.COOLING SETPOINT: 80°F
- 3.ERV–1 OFF; ERV–TO–FCU DAMPER CLOSED
- 4.FCU–1 CYCLES TO MAINTAIN SETPOINTS

3.15 HEAT PUMP SPLIT SYSTEMS – CRIME LAB & CDL/MVI

A. OCCUPANCY

SAME AS AHU–1.

B. HEATING MODE

- 1.HEAT PUMP PROVIDES HEATING DOWN TO 45°F OAT.
- 2.ELECTRIC HEAT PROVIDES HEATING BELOW 45°F.
- 3.HEAT PUMP AND ELECTRIC HEAT SHALL NOT OPERATE SIMULTANEOUSLY.
- 4.SUPPLY FAN RUNS CONTINUOUSLY IN OCCUPIED MODE.

C. COOLING MODE

- 1.COMPRESSOR CYCLES TO MAINTAIN SETPOINT.
- 2.OA DAMPER OPEN IN OCCUPIED MODE; CLOSED IN UNOCCUPIED MODE.

D. UNOCCUPIED MODE

- 1.HEATING SETBACK: 60°F
- 2.COOLING SETBACK: 80°F
- 3.FAN CYCLES AS REQUIRED

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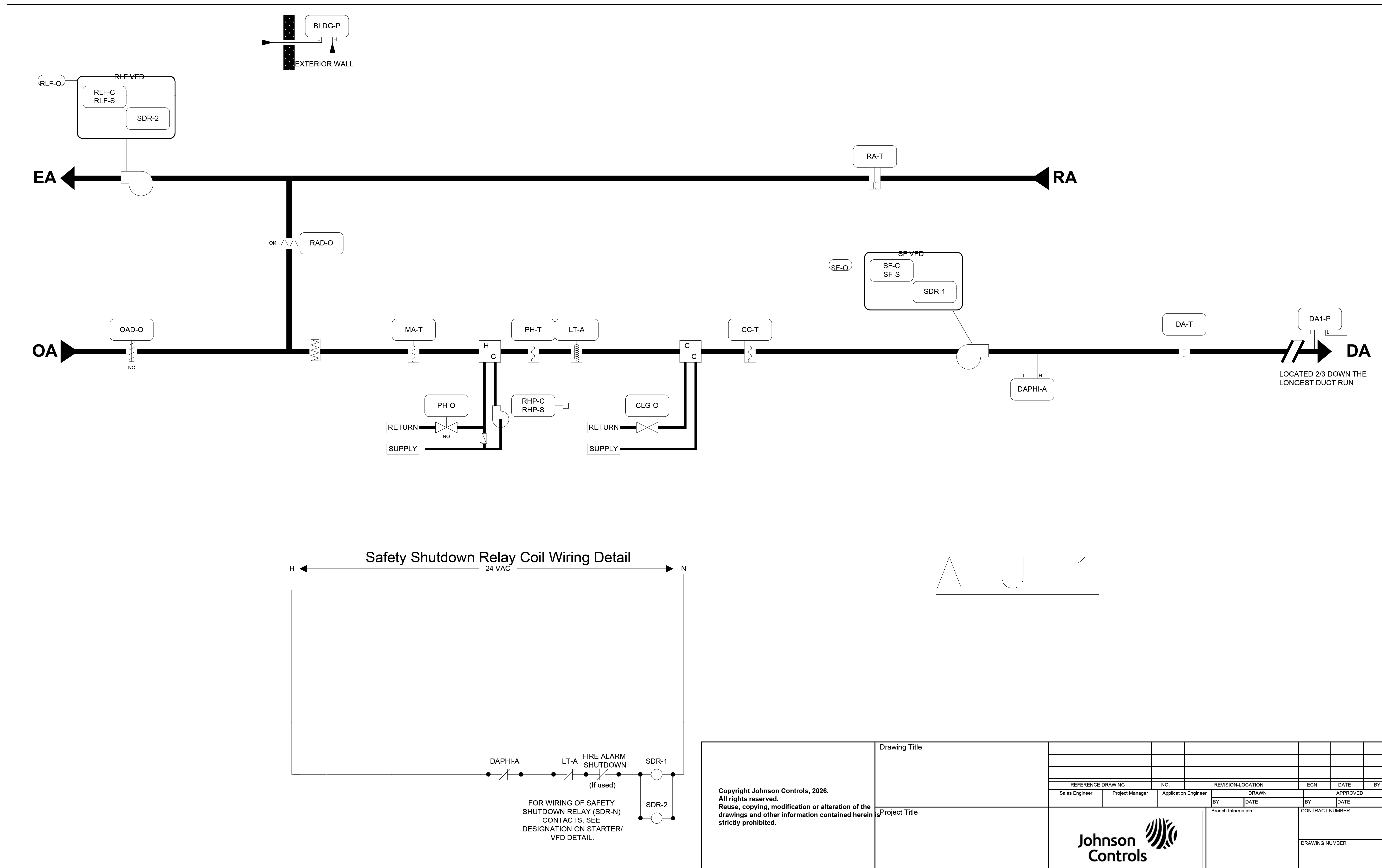
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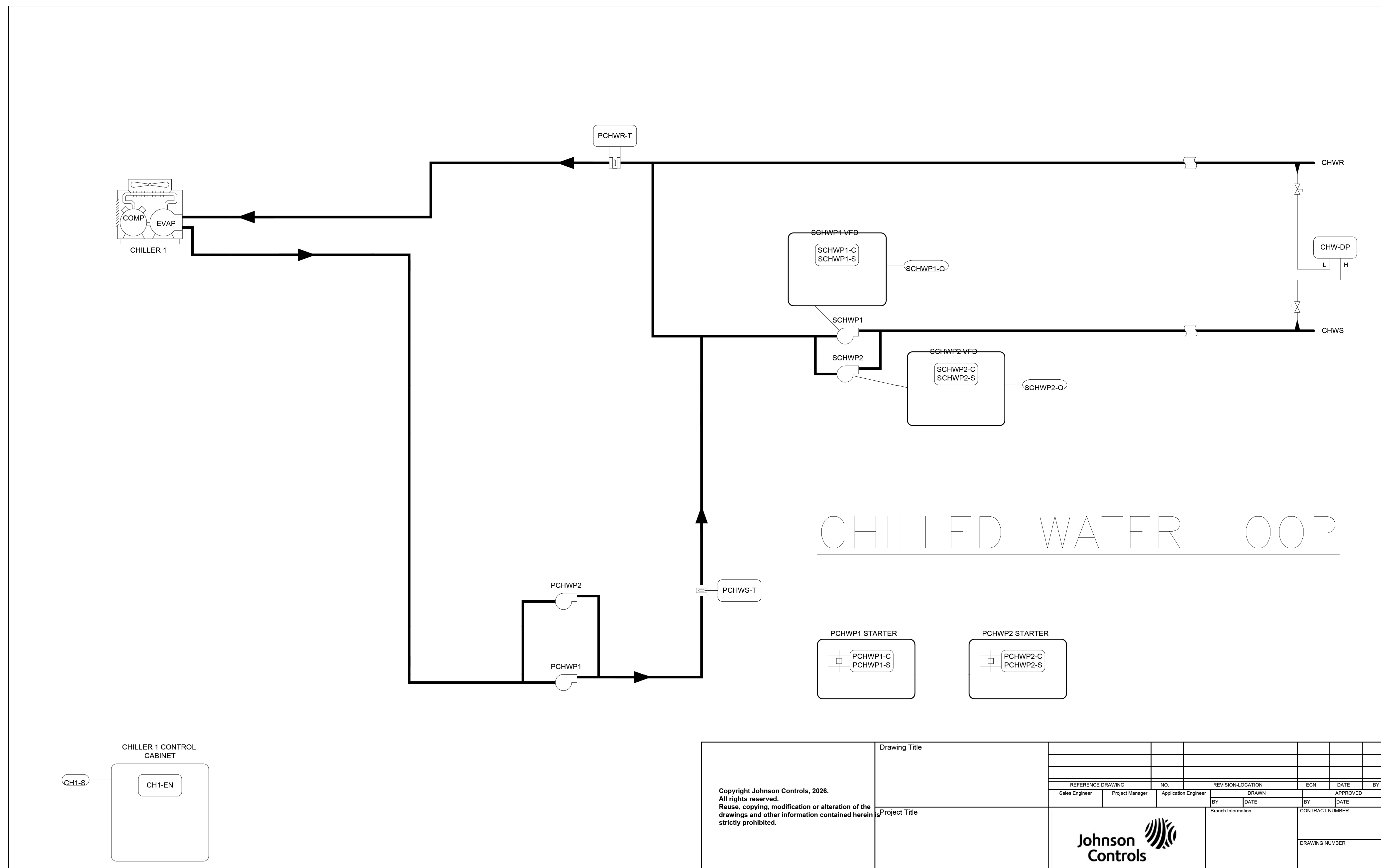
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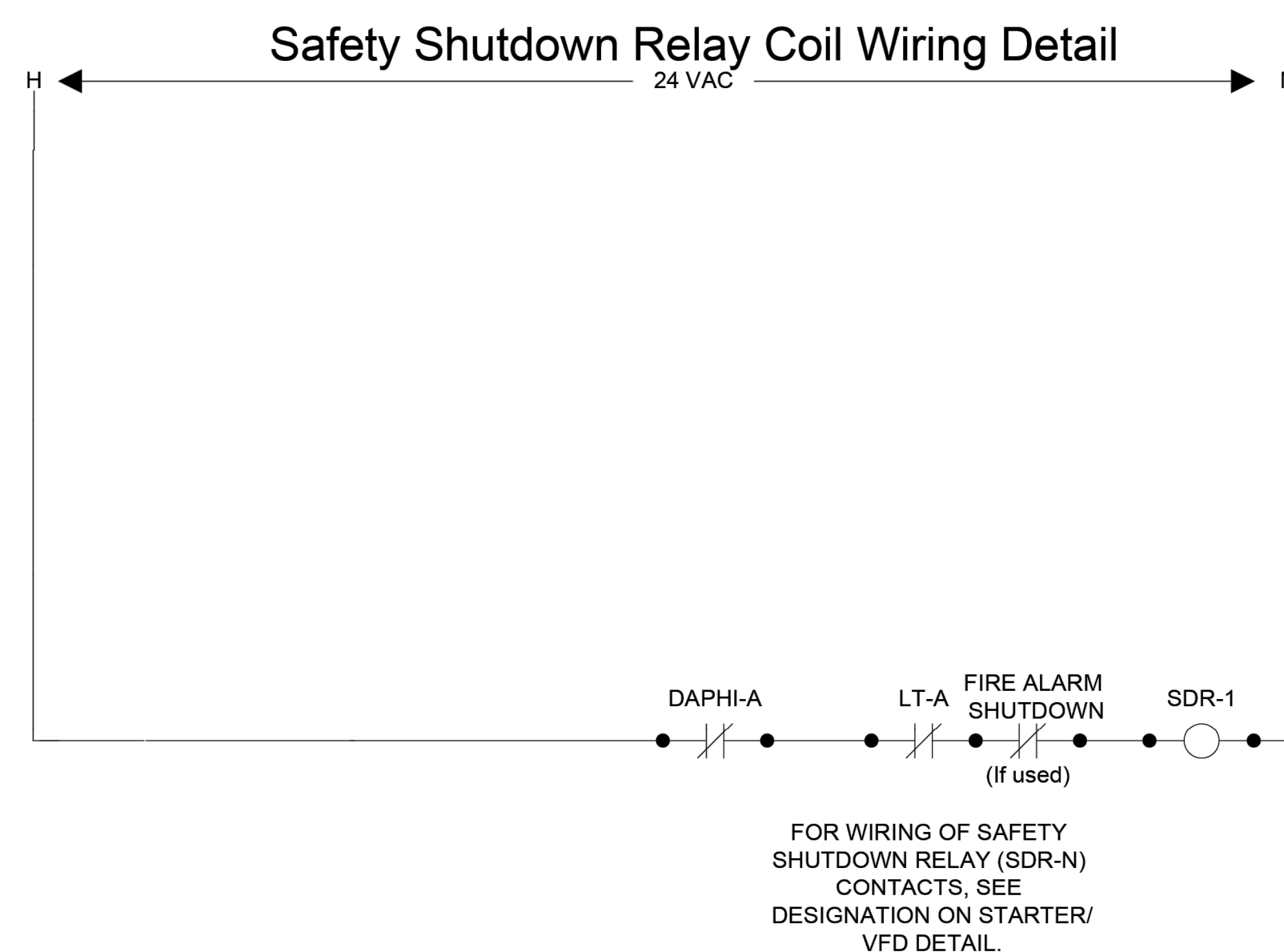
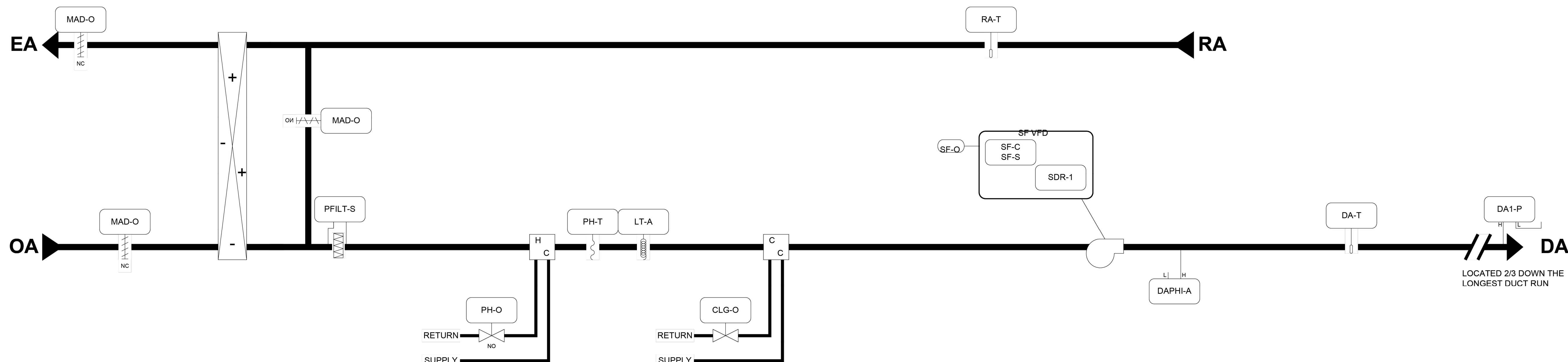
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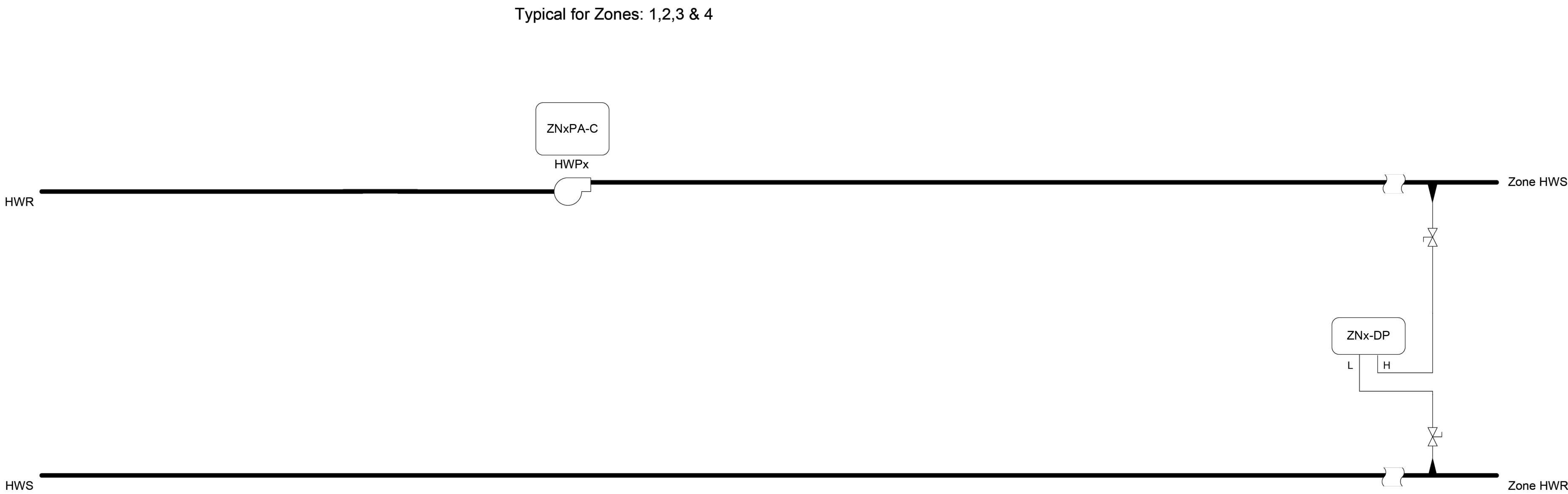


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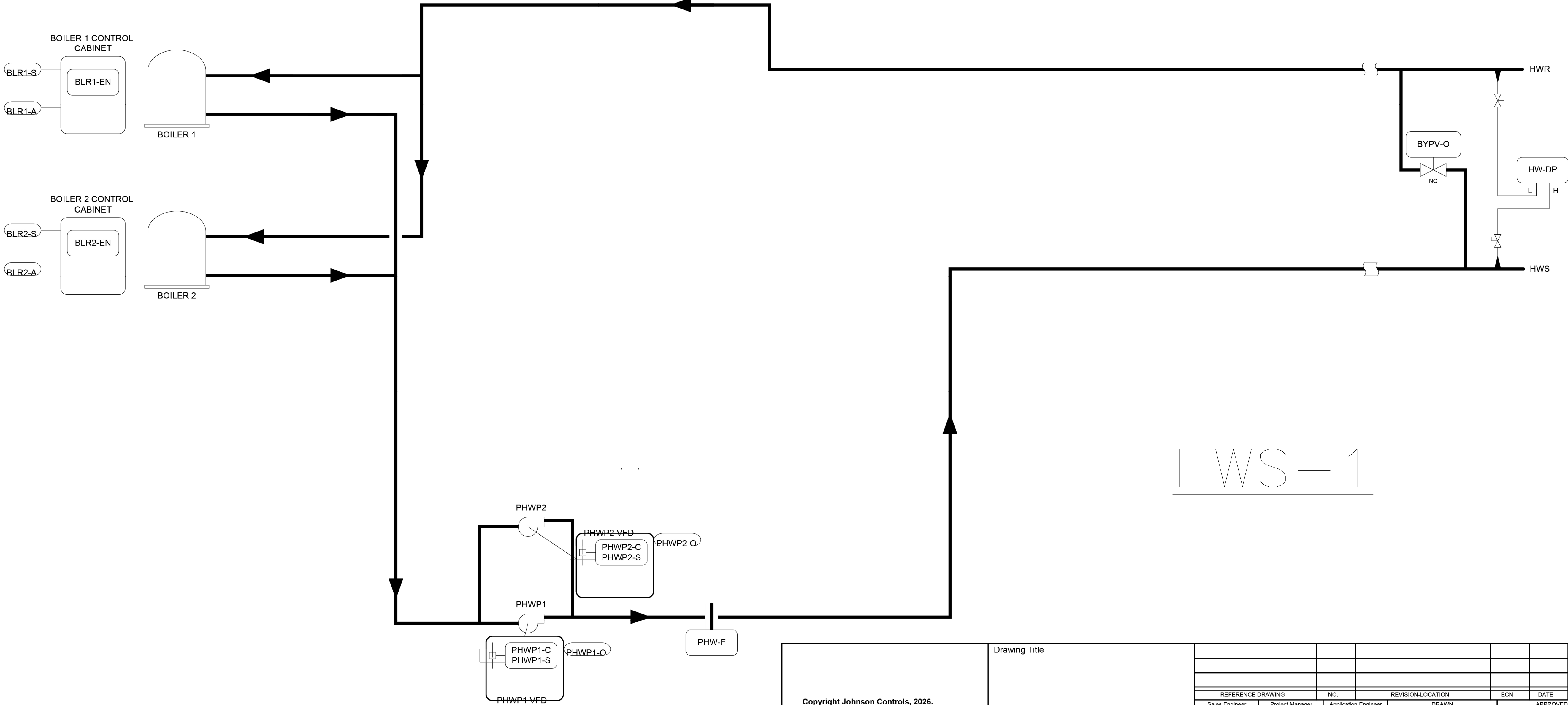
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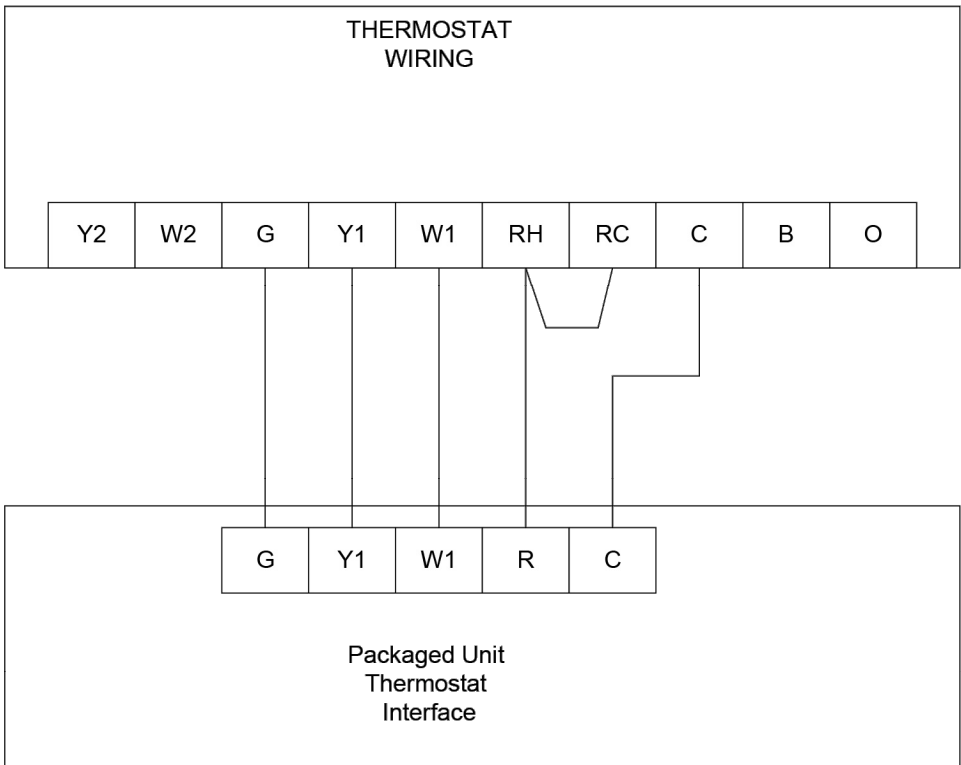
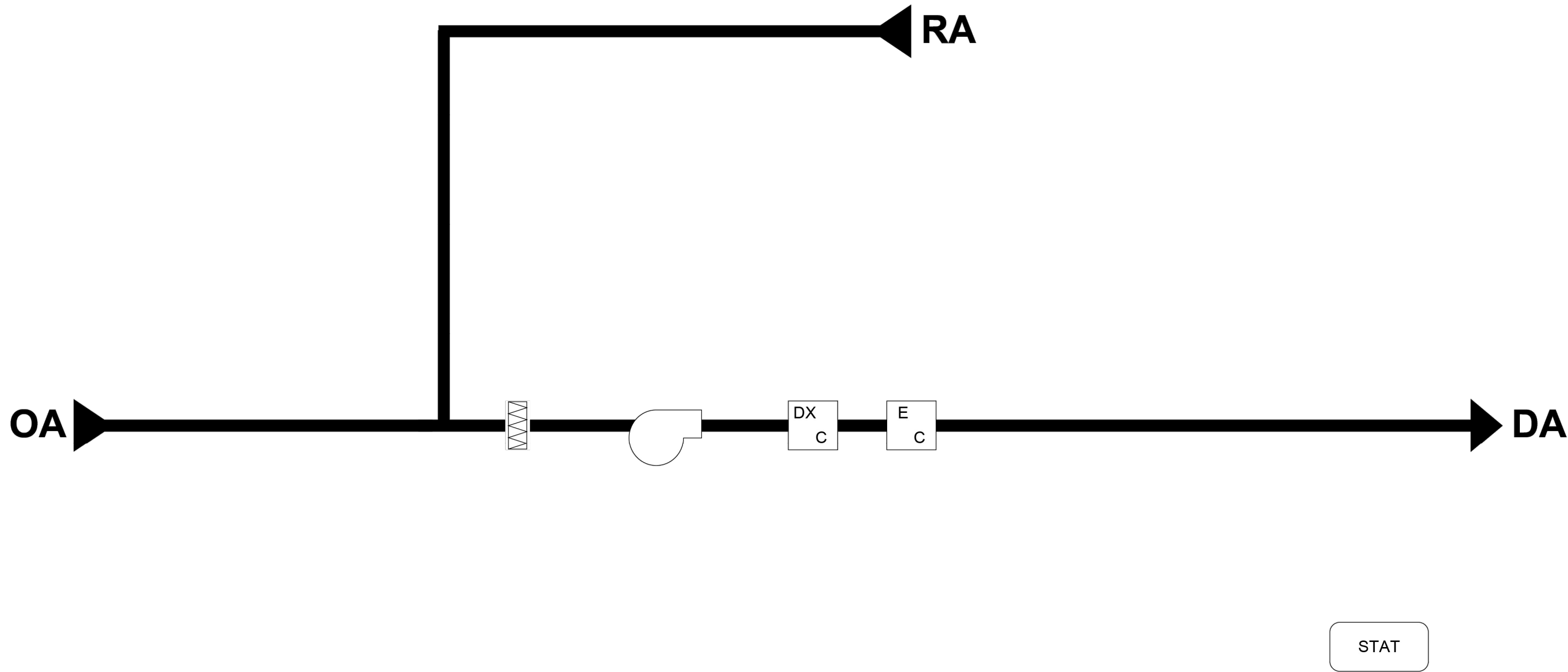
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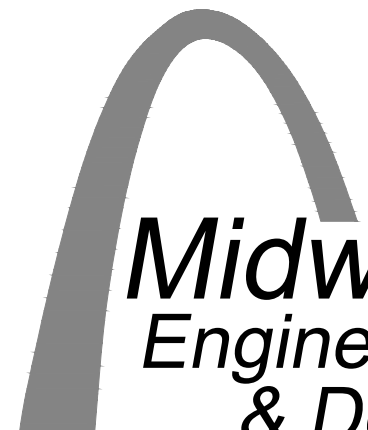
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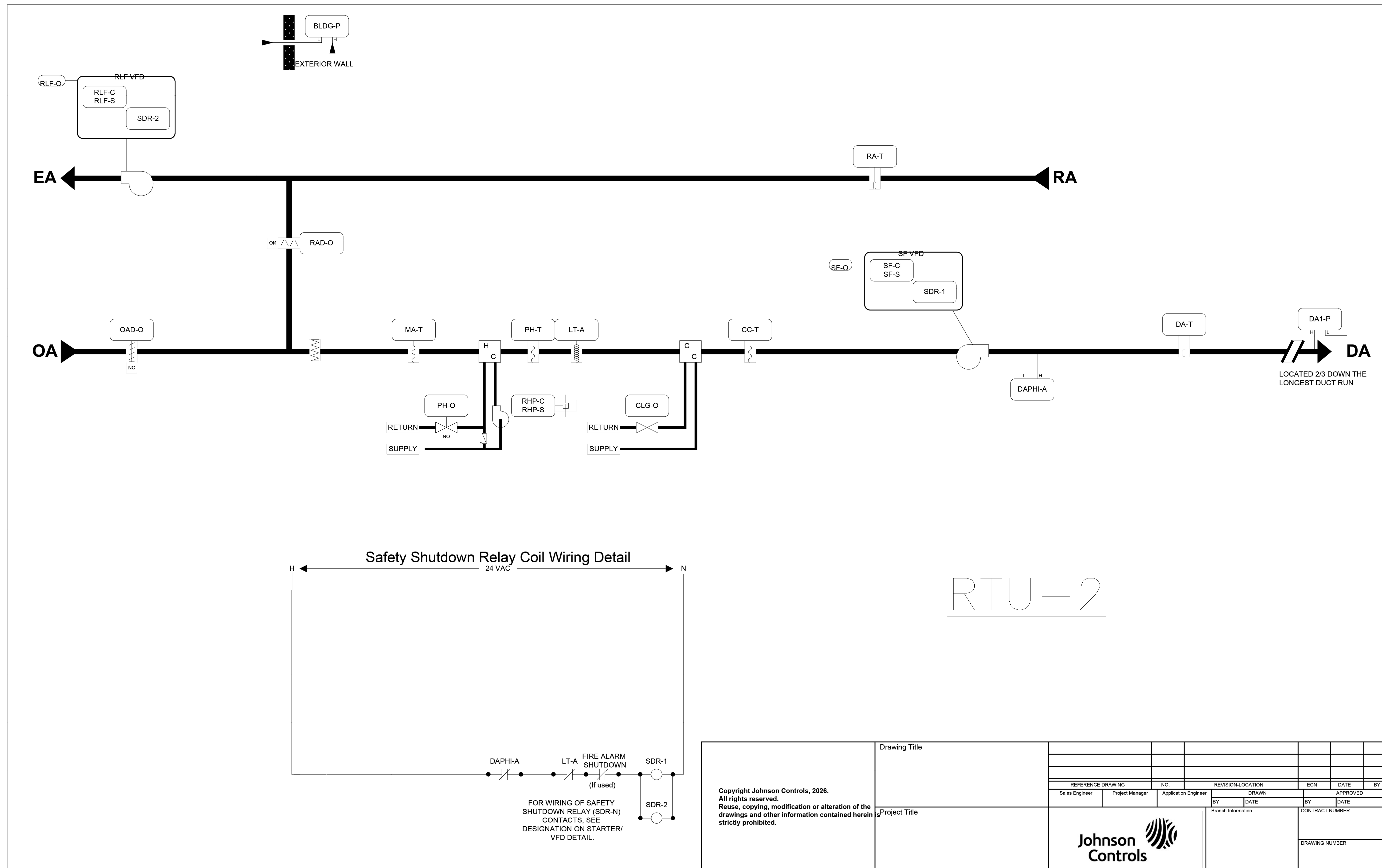
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SHEET TITLE:

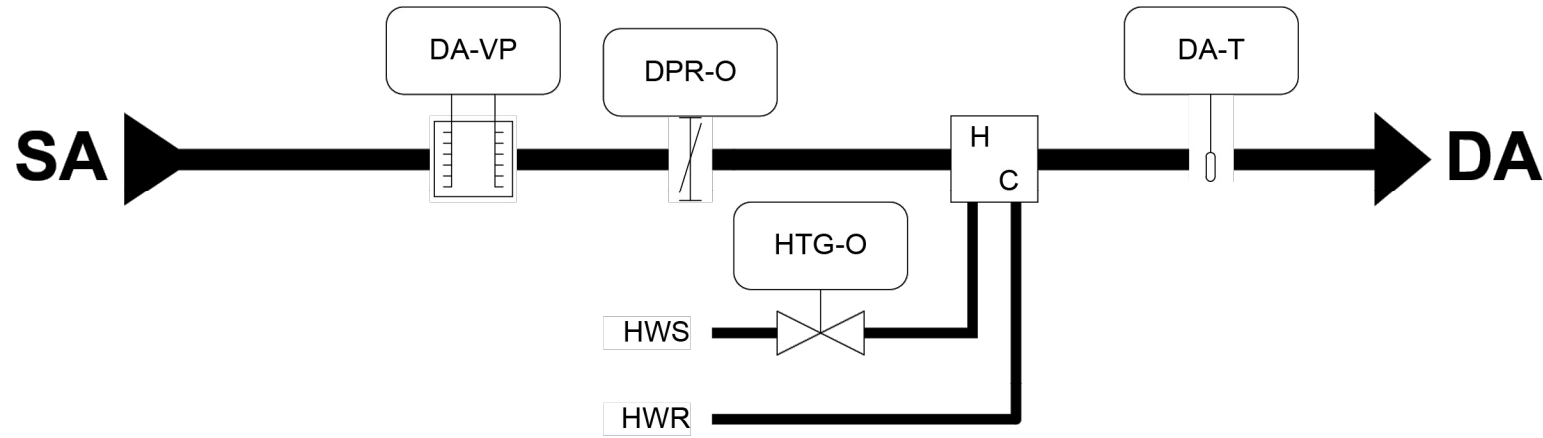
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CONTROLS

SHEET NUMBER:

M-807

31 OF 41 SHEETS
2026-06-15

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INFORMATION
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VAV ZONES

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MSHP TROOP B
HEADQUARTERS 308 PINE
CREST DR. MACON, MO
63552

PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

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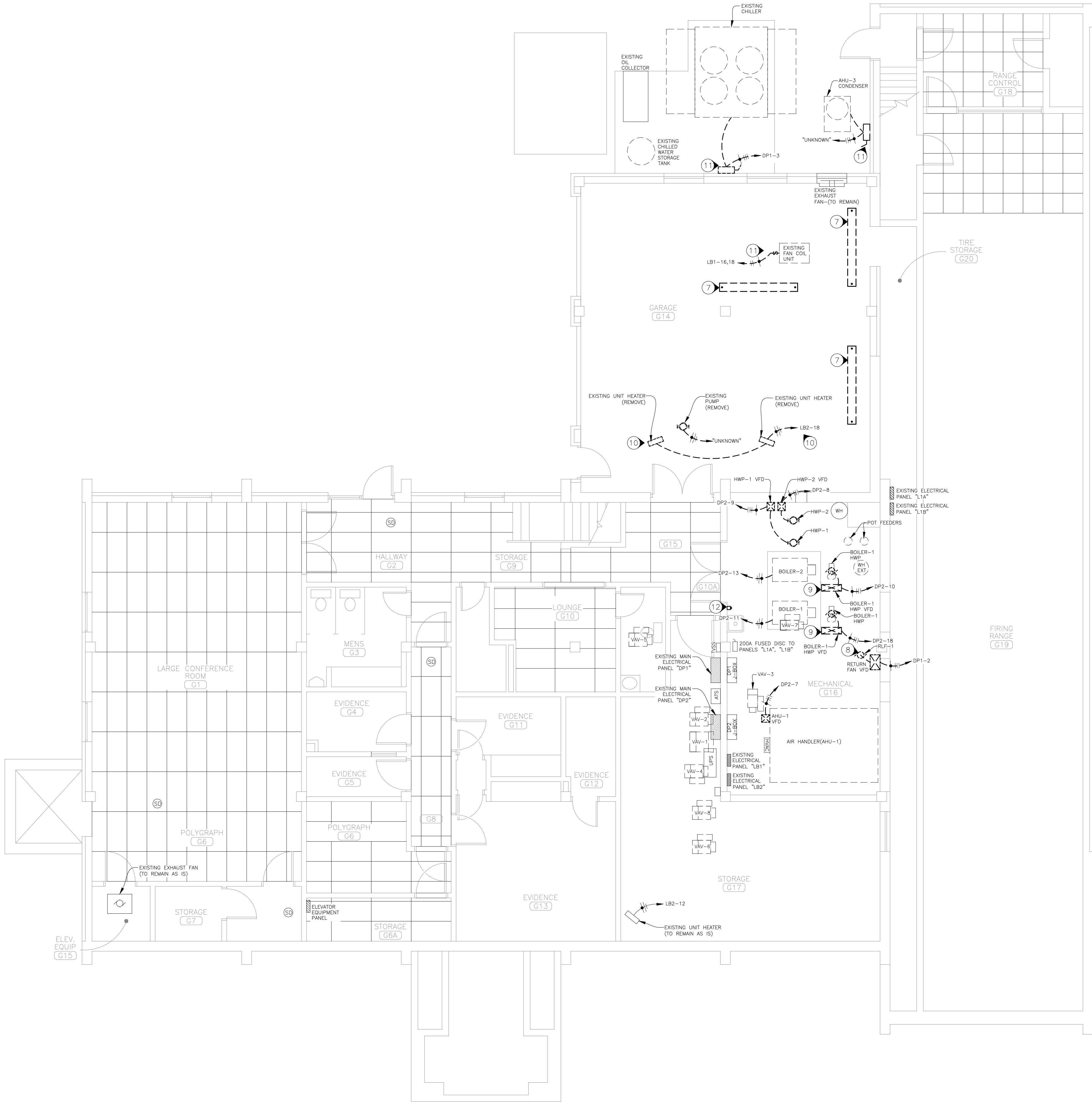
SHEET TITLE:

VAV
CONTROLS

SHEET NUMBER:

M-808

32 OF 41 SHEETS
2026-06-15



1 HEADQUARTERS GROUND FLOOR ELECTRICAL DEMOLITION PLAN
SCALE: 3/16"=1'-0"

DEMOLITION NOTES

N INDICATES KEYED NOTES

- 1 CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ELECTRICAL PERMITTING FEES AND COORDINATION WITH LOCAL AUTHORITY ON INSTALLATION INSPECTIONS. ALL WORK SHALL BE DONE IN STRICT CONFORMANCE WITH THE LOCAL BUILDING CODES AND REGULATIONS.
- 2 ALL EXISTING MECHANICAL EQUIPMENT, (AIR HANDLERS, CONDENSING UNITS, EXHAUST FANS, PUMPS AND BOILERS) ARE TO BE REMOVED. EXISTING DISCONNECTS ARE TO BE REMOVED AND OR REPLACED. EXISTING WIRE, CONDUIT, BREAKERS AND CONTROL WIRING CAN BE REUSED IF APPROPRIATELY SIZED PER RENOVATION PLANS. ANY UNUSED WIRE AND CONDUIT IS TO BE DISCONNECTED AND REMOVED IN ITS ENTIRETY. THE ELECTRICAL CONTRACTOR (ELC) SHALL COORDINATE WITH MECHANICAL CONTRACTOR FOR DEMOLITION OF EQUIPMENT AND THE SCHEDULING THEIR REMOVAL.
- 3 CIRCUITING SHOWN ON THE PLAN IS FROM EXISTING DRAWINGS AND MINOR FIELD OBSERVATIONS AND MAY NOT BE ACCURATE OR COMPLETE. ELC TO FIELD VERIFY ALL CIRCUITING PRIOR TO START OF WORK. ANY DISCREPANCIES ARE TO BE CORRECTED IN THE PANEL SCHEDULES AND ON THE RED-LINE DRAWINGS. ELC TO VERIFY CIRCUITING TO ALL "UNKNOWN" LOCATIONS. ALL UPDATED SCHEDULES SHALL BE TYPED AND PLACED IN A PROTECTIVE SLEEVE INSIDE PANEL DOOR.
- 4 ELC TO COORDINATE WITH JOHNSON CONTROLS REPRESENTATIVE FOR DEMOLITION AND RENOVATION OF POWER FOR HVAC CONTROLS. ELC TO PROVIDE ALL NEW CONDUIT AS NEEDED FOR LINE VOLTAGE AND LOW VOLTAGE WIRING.
- 5 FOR ALL EXISTING VAV BOXES, ELC TO REMOVE ANY DISCONNECTS AND ELECTRICAL WIRING AND CONDUIT.
- 6 ELC TO FURNISH AS-BUILT DRAWINGS FOR THE ELECTRICAL SYSTEMS WITHIN 90 DAYS OF SUBSTANTIAL COMPLETION.
- 7 LIGHTS SHOWN IN THE GARAGE AS DARKER AND DASHED MAY NEED TO BE RELOCATED TO AVOID NEW HVAC WORK. ELC TO OFFSET CLOSE TO EXISTING LOCATION AS TO ALLOW HVAC INSTALLATION. ELC MAY HAVE TO RELOCATE OTHER FIXTURES NOT IDENTIFIED DEPENDING ON FINAL EQUIPMENT INSTALLATIONS. ELC SHALL BE RESPONSIBLE FOR MOVING ALL LIGHTS, CONDUIT AND WIRE AS NEEDED TO INSTALL THE NEW HVAC EQUIPMENT.
- 8 ELC TO REMOVE WIRING, VFD WIRING, AND CONDUIT TO RETURN FAN MOTOR. VFD TO BE NEW FOR NEW MOTOR. REFERENCE MECHANICAL SHEETS AND EQUIPMENT SCHEDULE ON E-106.
- 9 ELC TO LEAVE THE EXISTING VFD MOUNTING RACKS FOR THE NEW VFD's. SEE SHEET E-104.
- 10 REMOVE EXISTING UNIT HEATERS. ELC TO VERIFY IF OTHER LOADS STILL EXIST AFTER REMOVAL OF THE UNIT HEATERS. IF NO OTHER LOADS ARE PRESENT, MARK BREAKER AS SPARE AND UPDATE THE PANEL SCHEDULE WITH A NEW TYPED PANEL SCHEDULE.
- 11 ELC TO REMOVE DISCONNECT, WIRE AND CONDUIT TO UNIT BEING REMOVED. UNITS SHOWN DASHED ARE BEING REMOVED.
- 12 BOILER EMERGENCY SHUT-OFF BUTTON TO BE REMOVED AND REPLACED WITH NEW BUTTON. SEE SHEET E-104.

ELECTRICAL LEGEND	
	MOTOR (TO BE REMOVED)
	MOTOR STARTER/VFD (TO BE REMOVED)
	DISCONNECT SWITCH (TO BE REMOVED)
	DISCONNECT SWITCH (TO BE REMOVED)
	8" SUSPENDED LIGHT FIXTURE (RELOCATE)
	BOILER EMERG. SHUT OFF (TO BE REMOVED)
	MECHANICAL EQUIPMENT (TO REMAIN)
	MECHANICAL EQUIPMENT (TO BE REMOVED)
	FIRE ALARM CONTROL PANEL (TO REMAIN)
	HVAC CONTROL PANEL (TO BE REWIRED)
	SURFACE MOUNTED PANELBOARD (TO REMAIN)
	ELECTRICAL WIRE/CONDUIT (TO REMAIN)
	ELECTRICAL WIRE/CONDUIT (TO BE REMOVED)
	HOME RUN--SHORT STROKES INDICATE PHASE OR SWITCHED WIRES, LONG STROKE INDICATE NEUTRAL, LONG WITH DOT INDICATE GROUND
	VARIOUS LIGHTS--2X4 TROFFER, 1X4 LINEAR ROUND SURFACE LIGHT AND RECESSED CAN ALL TO REMAIN AS IS.
	SMOKE DETECTOR (TO REMAIN)

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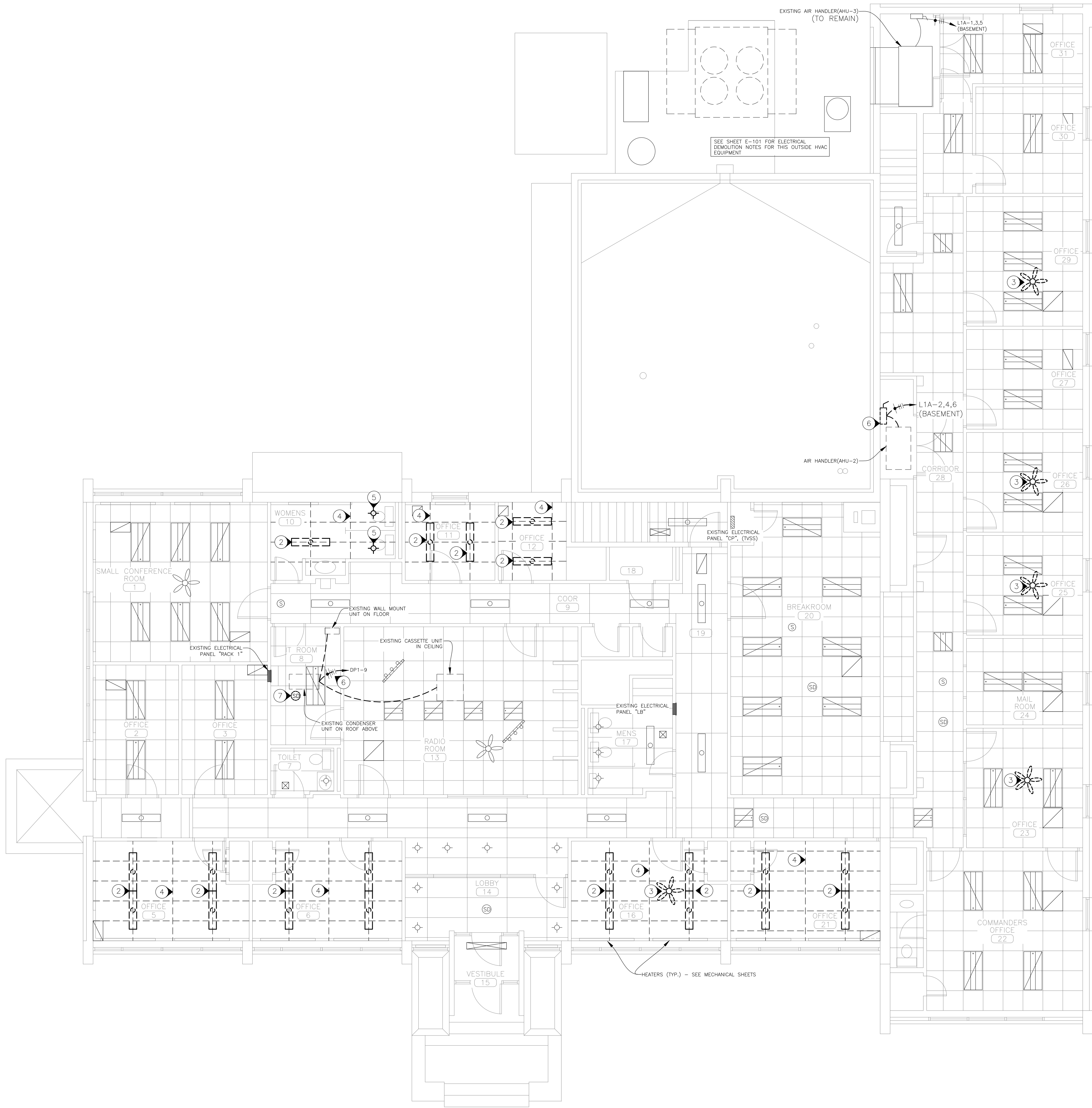
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SHEET TITLE:
HEADQUARTERS
GROUND FLOOR
ELECTRICAL
DEMO PLAN

SHEET NUMBER:

E-101

33 OF 41 SHEETS
2026-06-15



1 HEADQUARTERS FIRST FLOOR ELECTRICAL DEMOLITION PLAN
SCALE: 3/16"=1'-0"

DEMOLITION NOTES

N INDICATES KEYED NOTES

- 1 EXISTING CONDUIT AND WIRE MAY BE REUSED IF IT BENEFITS THE CONTRACTOR AND IS SUPPORTED PER THE N.E.C.
- 2 DISCONNECT POWER TO AND REMOVE THESE LIGHT FIXTURES. FIXTURES ARE TO BE REPLACED WITH SIMILAR RECESSED TROFFER AS EXISTING IN OTHER OFFICES. WILLIAMS EPG-SS24 OR EQUAL BASKET TYPE LED TROFFER. CONDUIT, WIRING, AND SWITCHING TO REMAIN AS CLOSE TO ORIGINAL DESIGN AS POSSIBLE.
- 3 DISCONNECT POWER TO THIS CEILING FAN AND TO ANY SWITCHING. REMOVE CEILING FAN ENTIRELY. REMOVE ANY UNUSED WIRE AND CONDUIT. COORDINATE WITH GENERAL CONTRACTOR TO REPAIR CEILING TILES AS NEEDED.
- 4 ELC TO COORDINATE WITH THE GENERAL CONTRACTOR TO REMOVE THE EXISTING CEILING TILE IN THIS ROOM. ALL EXISTING ELECTRICAL DEVICES ARE ALSO TO BE REMOVED. ALL ITEMS MAY NOT BE SHOWN BUT IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE ALL EXISTING DEVICES ARE REMOVED AND OR REINSTALLED IN NEW CEILING. EXTEND ALL WIRE AND CONDUIT TO ANY MOVED DEVICES.
- 5 REMOVE THIS LIGHT FIXTURE TEMPORARILY. CLEAN AND PROTECT FIXTURE. REINSTALL IN NEW GRID.
- 6 REMOVE DISCONNECT, WIRE, AND CONDUIT TO THIS MECHANICAL UNIT BEING REMOVED. REFERENCE MECHANICAL SHEETS.
- 7 RELOCATE EXISTING FIRE SMOKE DETECTOR TO NEXT TILE TO ALLOW NEW HVAC GRILLE. EXTEND WIRING AND CONDUIT AS NEEDED. SEE SHEET E-105.

ELECTRICAL LEGEND

	MOTOR (TO BE REMOVED)
	MOTOR STARTER/DISC (TO BE REMOVED)
	DISCONNECT SWITCH (TO BE REMOVED)
	MECHANICAL EQUIPMENT (TO REMAIN)
	MECHANICAL EQUIPMENT (TO BE REMOVED)
	FIRE ALARM CONTROL PANEL (TO REMAIN)
	HVAC CONTROL PANEL (TO BE RIWIRED)
	SURFACE MOUNTED PANELBOARD (TO REMAIN)
	ELECTRICAL WIRE (TO REMAIN)
	ELECTRICAL WIRE (TO BE REMOVED)
	HOME RUN--SHORT STROKES INDICATE PHASE OR SWITCHED WIRES, LONG STROKE INDICATE NEUTRAL, LONG WITH DOT INDICATE GROUND
	CEILING MOUNTED SPEAKER (REMAINS)
	CEILING MOUNTED SMOKE DETECTOR(REMAINS)
	CEILING MOUNTED S.D. (RELOCATE--EXTEND)
	CEILING FAN (REMAINS)
	CEILING FAN (TO BE REMOVED)
	RECESSED LIGHT FIXTURES (TO REMAIN)
	SURFACE LIGHT FIXTURES (TO REMAIN)
	SURFACE LIGHT FIXTURE (TO BE REMOVED)

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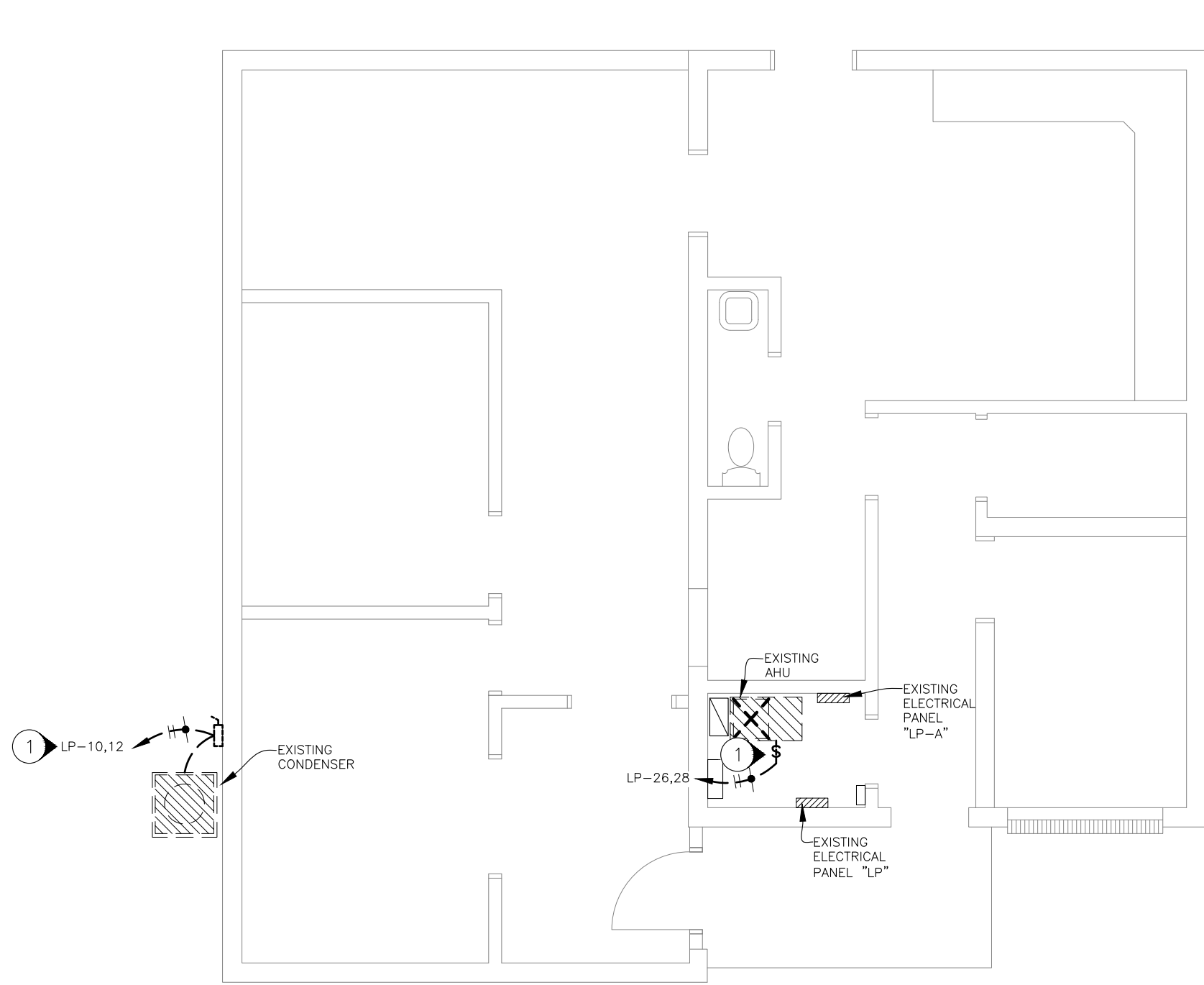
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SHEET TITLE:
HEADQUARTERS
FIRST FLOOR
ELECTRICAL
DEMOLITION PLAN

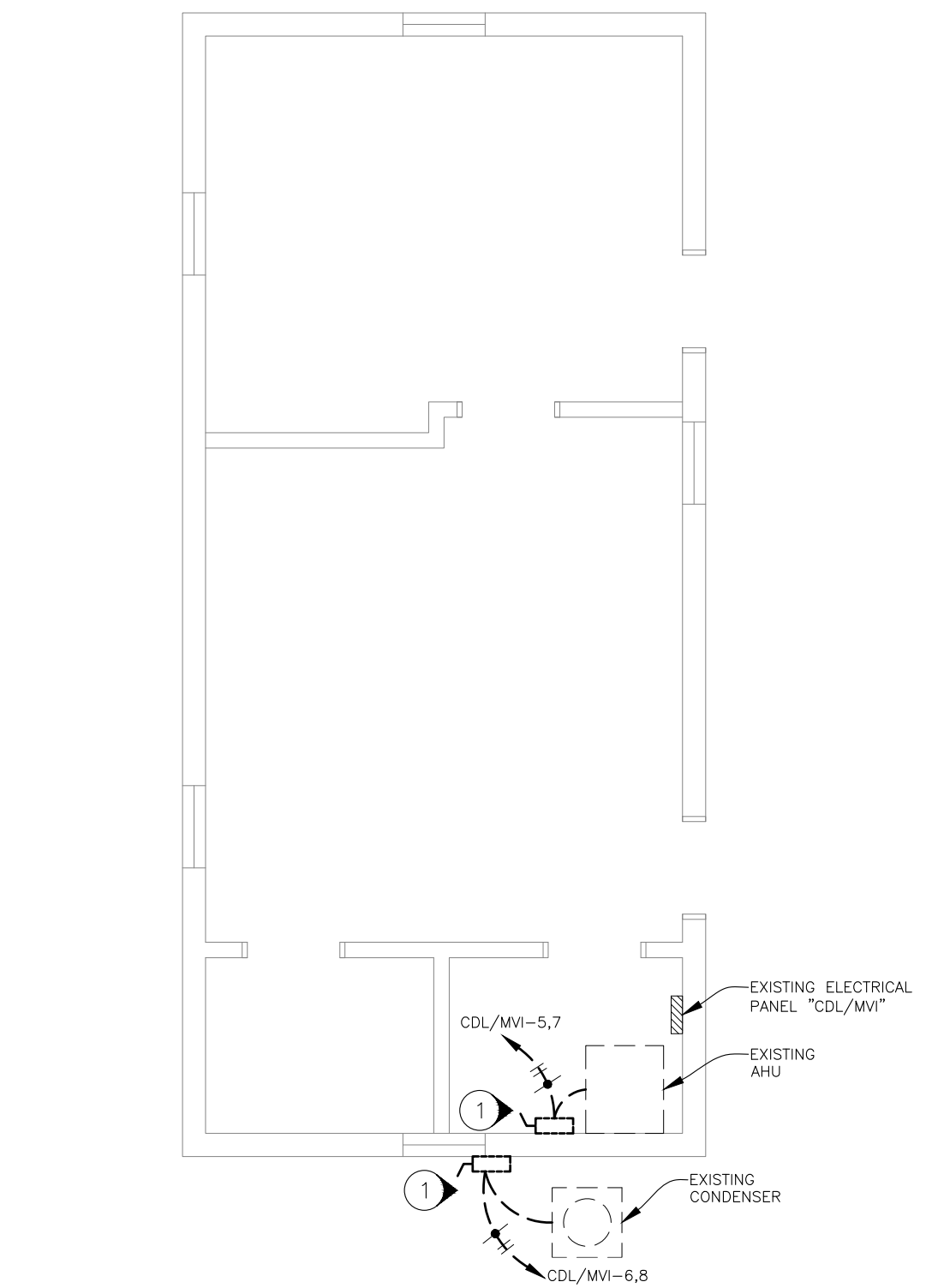
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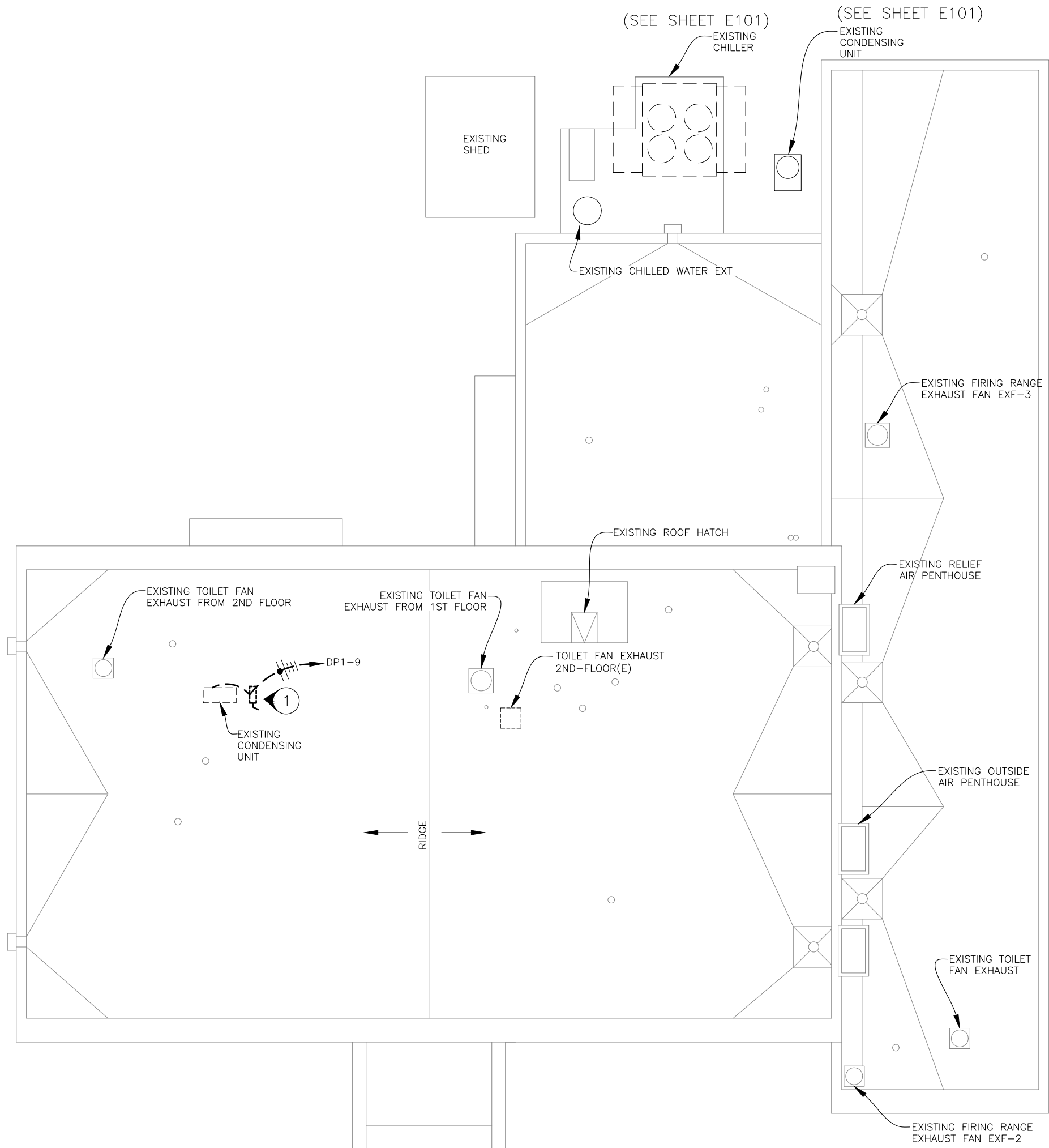
34 OF 41 SHEETS
2026-06-15



1 CRIME LAB ELECTRICAL DEMOLITION PLAN
SCALE: 3/16"=1'-0"



2 CDL/MVI BUILDING ELECTRICAL DEMOLITION PLAN
SCALE: 3/16"=1'-0"



3 HEADQUARTERS ROOF ELECTRICAL DEMOLITION PLAN
SCALE: 3/32"=1'-0"

DEMOLITION NOTES

- ① ELC TO REMOVE DISCONNECT, WIRE, AND CONDUIT TO UNIT BEING REMOVED. UNITS SHOWN DASHED ARE BEING REMOVED. SEE PREVIOUS SHEETS FOR OTHER ELECTRICAL DEMOLITION NOTES.

ELECTRICAL LEGEND

	MOTOR (TO BE REMOVED)
	MOTOR STARTER/DISC (TO BE REMOVED)
	DISCONNECT SWITCH (TO BE REMOVED)
	DISCONNECT SWITCH (TO BE REMOVED)
	MECHANICAL EQUIPMENT (TO REMAIN)
	MECHANICAL EQUIPMENT (TO BE REMOVED)
	FIRE ALARM CONTROL PANEL (TO REMAIN)
	HVAC CONTROL PANEL (TO BE REWIRED)
	SURFACE MOUNTED PANELBOARD (TO REMAIN)
	ELECTRICAL WIRE (TO REMAIN)
	ELECTRICAL WIRE (TO BE REMOVED)
	HOME RUN—SHORT STROKES INDICATE PHASE OR SWITCHED WIRES, LONG STROKE INDICATE NEUTRAL, LONG WITH DOT INDICATE GROUND

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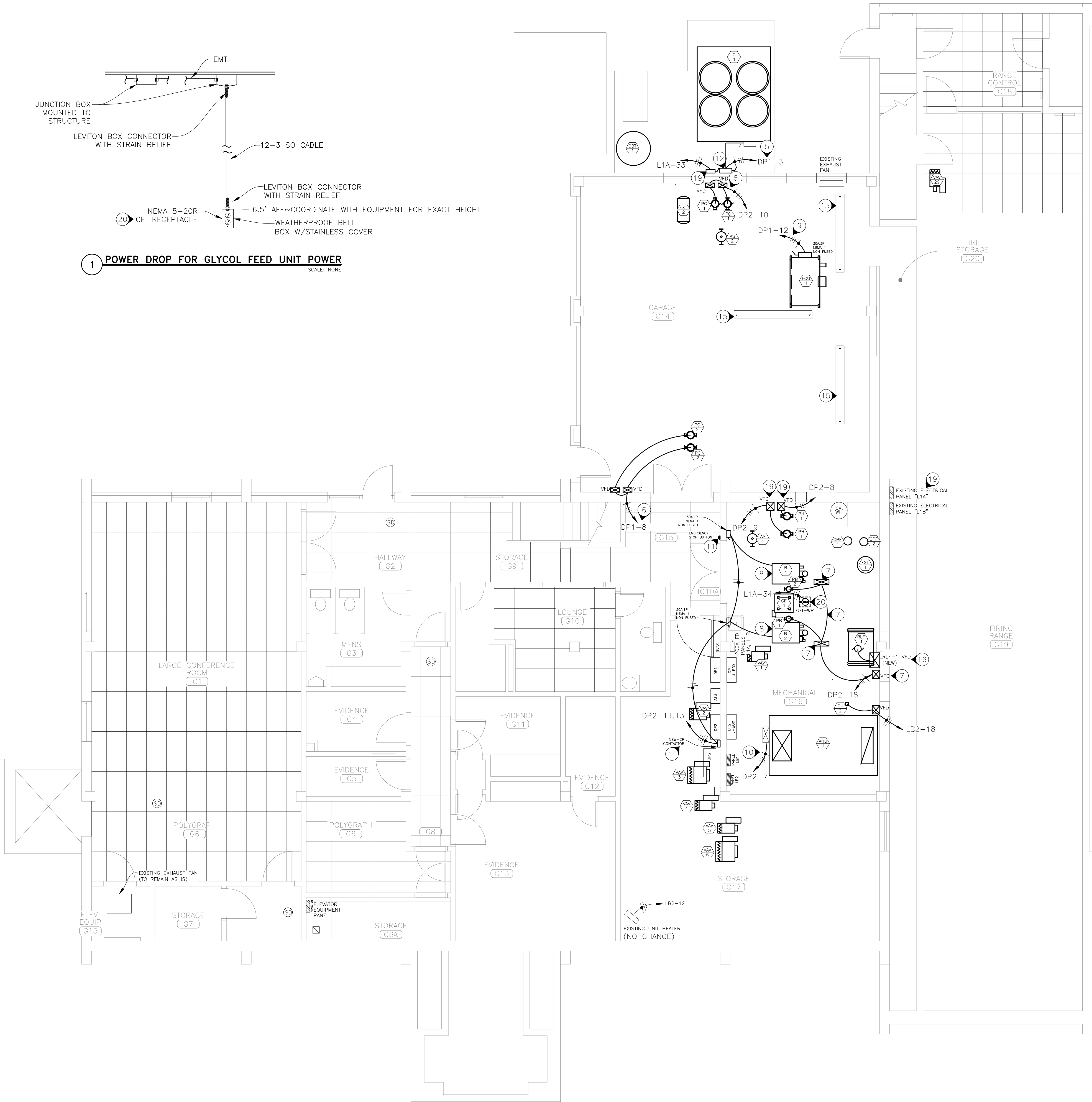
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DESIGNED BY: MDS/SAK

SHEET TITLE:
ROOF, CRIME LAB,
AND CDL/MVI
ELECTRICAL
DEMO PLAN

SHEET NUMBER:

E-103

35 OF 41 SHEETS
2026-06-15



2 HEADQUARTERS GROUND FLOOR ELECTRICAL RENOVATION PLAN
SCALE: 3/16"=1'-0"

NOTES

INDICATES KEYED NOTES

- ALL EXPOSED LINE VOLTAGE WIRING SHALL BE PULLED IN PROPERLY SIZED CONDUIT (EMT) WITH APPROVED FITTINGS. ALL WIRE IS TO BE COPPER. ALL CONDUIT IS TO BE RUN NEATLY AND PARALLEL TO BUILDING LINES. INSTALL PULL BOXES ON ANY RUNS THAT REQUIRE MORE THAN 360° WORTH OF BENDS. USE OF MC CABLE IN CONCEALED AREAS, (WALLS AND HARD CEILINGS ONLY), AND EMT IS ALLOWED IF HELPFUL FOR NEW DESIGN BUT MUST BE SUPPORTED PER N.E.C. REQUIREMENTS. EMT AND JUNCTION BOXES WITH A MC CABLE WHIP OF 6 FEET OR LESS FOR ALL EXPOSED CEILINGS AND ALL LAY-IN CEILINGS. ALL WIRE ABOVE CEILING IS TO BE PLENUM RATED.
- DISCONNECTS AND VFD'S SHOWN LIGHTER ARE FACTORY PROVIDED. DISCONNECTS SHOWN HEAVIER WITH SIZING CALL OUTS ARE TO BE PROVIDED BY THE ELECTRICAL CONTRACTOR. SIZE PER SUPPLIED EQUIPMENT.
- IF ANY MECHANICAL, PLUMBING OR ELECTRICAL EQUIPMENT SPECIFIED IN THE DRAWINGS IS SUBSTITUTED BY A CONTRACTOR, THAT CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE EQUIPMENT'S ELECTRICAL PROTECTION AND WIRE SIZES PER THE MANUFACTURER'S NAMEPLATE, AND THE CURRENT NEC, ALONG WITH ALL EXPENSES INCURRED DUE TO SAID SUBSTITUTION. THE CONTRACTOR WHO IS PROVIDING THE SUBSTITUTION SHALL COORDINATE WITH ALL DISCIPLINES AFFECTED BY THIS CHANGE.
- ELECTRICAL CONTRACTOR (ELC) IS TO SUPPLY AND INSTALL ALL CONDUIT AND ALL LINE VOLTAGE WIRING. COORDINATE WITH MECHANICAL CONTRACTOR TO RUN ALL CONDUIT AND WALL BOXES FOR MECHANICAL SYSTEM LOW VOLTAGE WIRING. COORDINATE WITH OTHER DISCIPLINES TO RUN CONDUIT AND WALL BOXES FOR OTHER LOW VOLTAGE WIRING. ELC SHALL PROVIDE A SINGLE GANG HANDY BOX MOUNTED VERTICALLY AND A 1/2" EMT CONDUIT UP TO ACCESSIBLE CEILING SPACE FOR ALL THERMOSTATS AND ROOM SENSORS. INSTALL AT 60 INCHES ABOVE FINISH FLOOR AT LOCATIONS SHOWN WITH A "T" IN A CIRCLE OR AN "RS" IN A CIRCLE ON MECHANICAL DRAWINGS. COORDINATE WITH THE MECHANICAL CONTRACTOR AND CONTROLS CONTRACTOR.
- ELC TO REMOVE EXISTING 200A/3P BREAKER IN PANEL "DP1", CIRCUIT 3 AND REPLACE WITH NEW 65kA, 300A, 3P BREAKER. REFERENCE PANEL SCHEDULES. RUN (3) 250KCMIL CU THWN AND (1) #4 CU GND IN (1) 2 1/2" CONDUIT FOR NEW CHILLER TO FACTORY PROVIDED DISCONNECT.
- ELC TO REMOVE EXISTING 20A/2P BREAKER IN PANEL "DP1" AND REPLACE WITH 20A, 3P BREAKER TO INCLUDE THE SPARE SPACE BELOW. REFERENCE PANEL SCHEDULES. RUN (3) #12 CU THHN AND (1) #12 CU GND IN (1) 3/4" CONDUIT TO ELC APPROPRIATELY SIZED AND INSTALLED VARIABLE FREQUENCY DRIVE. COORDINATE WITH OWNER ON EXACT LOCATIONS.
- ELC TO RUN (3) #12 CU THHN AND (1) #12 CU GND IN (1) 3/4" CONDUIT. UTILIZE EXISTING 20A/3P BREAKER AND EXISTING RACKING SYSTEM FOR MOUNTING VFD. REFERENCE PANEL SCHEDULES.
- IF ANY LINE VOLTAGE WIRING AND CONDUIT IS REQUIRED FOR NEW BOILER CONTROLS ELC TO RUN CIRCUIT FROM EXISTING ELECTRICAL PANEL "DP2-12".
- ELC TO REMOVE EXISTING 20A/3P BREAKER IN PANEL "DP1" AND REPLACE WITH 25A, 3P BREAKER. REFERENCE PANEL SCHEDULES. RUN (3) #12 CU THHN AND (1) #12 CU GND IN (1) 3/4" CONDUIT.
- ELC TO REMOVE EXISTING 60A/3P BREAKER IN PANEL "DP2", CIRCUIT 7 AND REPLACE WITH NEW 65kA, 125A, 3P BREAKER. REFERENCE PANEL SCHEDULES. RUN (3) #3 CU THWN AND (1) #3 CU GND IN (1) 1 1/2" CONDUIT FOR NEW AHU-1 FACTORY PROVIDED VFD.
- ELC TO PROVIDE AND INSTALL BOILER EMERGENCY SHUT-OFF OPERATOR STATION WITH 40MM MUSHROOM BUTTON, NEMA 1, UL LISTED, (PILLA MODEL NUMBER "WPSMOSL") OR EQUAL JUST OUTSIDE THE ENTRANCE DOOR (PER DIV. OF FIRE SAFETY 11 CSR 40-2) IN A SURFACE MOUNTED SINGLE GANG BACK BOX AND 1/2". ELC TO ADD A COVER EQUAL TO FREEDOM ELECTRONICS STOP BUTTON COVER (INDOOR FE-STI-1230NR) AND CLEARLY MARKED AS EMERGENCY BOILER SHUT-DOWN. THE SWITCH IS TO BE WIRED LOW VOLTAGE FROM A ELC PROPERLY SIZED 2 POLE CONTACTOR WITH ELC 24V TRANSFORMER AT PANEL DP2. RUN LOW VOLTAGE WIRE FROM CONTACTOR TO EMERGENCY STOP BUTTON. POWER IS TO INTERRUPT THE MAIN POWER FEED TO BOTH BOILER CONTROL CIRCUITS. WIRE PER EQUIPMENT SPECIFICATIONS. RUN #12 CU THHN AND #12 CU GND THROUGH CONTACTOR IN 1/2" CONDUIT TO ELC PROVIDED BOILER DISCONNECTS FROM BOILER. ELC TO PROVIDE ALL ITEMS TO COMPLETE THIS SYSTEM.
- ELC TO SUPPLY AND INSTALL NEW WALL MOUNTED 400A, 3 POLE, NEMA 3R NON-FUSED DISCONNECT IN SAME LOCATION AS THE EXISTING DISCONNECT THAT WAS REMOVED DURING DEMOLITION. DISCONNECT TO BE SCHNEIDER ELECTRIC OR APPROVED EQUAL. RUN WIRE AND CONDUIT FROM WALL MOUNTED DISCONNECT DOWN TO THE EXISTING CONCRETE PAD AND OVER TO FACTORY DISCONNECT ON UNIT. FASTEN TO CONCRETE PAD PER N.E.C.
- ALL NEW VAV BOXES FOR HVAC HAVE ELECTRIC MODULATING ACTUATORS THAT WILL BE LOW VOLTAGE (24V) AND BE CONTROLLED BY THE HVAC CONTROL SYSTEM BY JOHNSON CONTROLS. COORDINATE WITH MECHANICAL CONTRACTOR TO PROVIDE ALL CONDUIT FOR LOW VOLTAGE WIRING.
- THERE ARE NO CHANGES TO THE EXISTING LIGHTING.
- POSSIBLE LOCATION FOR RELOCATED SUSPENDED LIGHT FIXTURES TO ALLOW HVAC INSTALLATION. COORDINATE THIS WORK WITH MECHANICAL CONTRACTOR AND OWNER.
- ELC TO CONNECT FACTORY INSTALLED VARIABLE FREQUENCY DRIVE TO RLF-1 FAN MOTOR FACTORY PROVIDED DISCONNECT. CIRCUITING TO BE REWORKED AS SHOWN. ENSURE CIRCUIT BREAKER IS CLEARLY MARKED FOR RLF-1 VFD PER THE SPECIFICATIONS. REFERENCE MECHANICAL SHEET M103.
- ELC TO FOLLOW MANUFACTURER GUIDELINES FOR WIRING MULTIPLE VFDS FROM ONE FEEDER CIRCUIT. EACH VFD OUTPUT TO MOTOR SHALL BE IN A SEPARATE CONDUIT TO AVOID INTERFERENCE AND ENSURE PROPER MOTOR PROTECTION.
- ELC SHALL ENSURE ALL HVAC EQUIPMENT IS CONNECTED TO THE FIRE ALARM SYSTEM AS REQUIRED.
- ELC TO USE EXISTING 30A/3P BREAKER IN PANEL "DP2" FOR NEW PUMP PH-1. REFERENCE PANEL SCHEDULES. RUN (3) #12 CU THHN AND (1) #12 CU GND IN (1) 3/4" CONDUIT TO ELC APPROPRIATELY SIZED AND INSTALLED VARIABLE FREQUENCY DRIVE. COORDINATE WITH OWNER ON EXACT LOCATIONS.
- ELC TO RUN (3) #12 CU THHN IN (1) 1/2" EMT FROM PANEL "L1A"-34 FOR POWER DROP TO FEED POWER TO NEW GLYCOL FEED UNIT. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR. PROVIDE NEW 20A/1P CIRCUIT BREAKER IN "L1A" AND UPDATE PANEL SCHEDULE PER SPECIFICATIONS.
- ELC IS TO COORDINATE WITH MECHANICAL SUGGESTED CONSTRUCTION PHASING AS SHOWN ON M-001 ALONG WITH NOTE 3 ON M-001 UNDER GENERAL PROJECT NOTES.
- IF NEW MOTORS THAT ARE FRACTIONAL HORSE POWER RATED ARE NOT SUPPLIED AS ECM MOTORS A VFD WILL BE REQUIRED. ELC SHALL SIZE THE VFD IN THAT CASE AND SUPPLY ALL WIRING AND CONDUIT. SEE GENERAL NOTE 3 ABOVE ON SUBSTITUTIONS.

ELECTRICAL LEGEND

	NEW DISCONNECT SWITCH—FACTORY PROVIDED
	NEW NON FUSED DISC. SWITCH—ELC PROVIDES
	NEW DISCONNECT SWITCH—FACTORY PROVIDED
	NEW NON FUSED DISC. SWITCH—ELC PROVIDE
	NEW EMERGENCY STOP BUTTON—ELC PROVIDE
	NEW ELECTRIC MOTOR
	HOME RUN—SHORT STROKES INDICATE PHASE OR SWITCHED WIRES, LONG STROKE INDICATE NEUTRAL, LONG WITH DOT INDICATE GROUND
	SURFACE MOUNTED PANELBOARD (TO REMAIN)
	VARIOUS LIGHTS—2X4 TROFFER, 1X4 LINEAR ROUND SURFACE LIGHT AND RECESSED CAN ALL TO REMAIN AS IS.
	SMOKE DETECTOR (TO REMAIN)
	APPROPRIATELY SIZED VFD — BY ELC
	DUPLEX RECP.— 120V GFI: WEATHER PROOF
	WEATHER PROOF POWER DROP OUTLET

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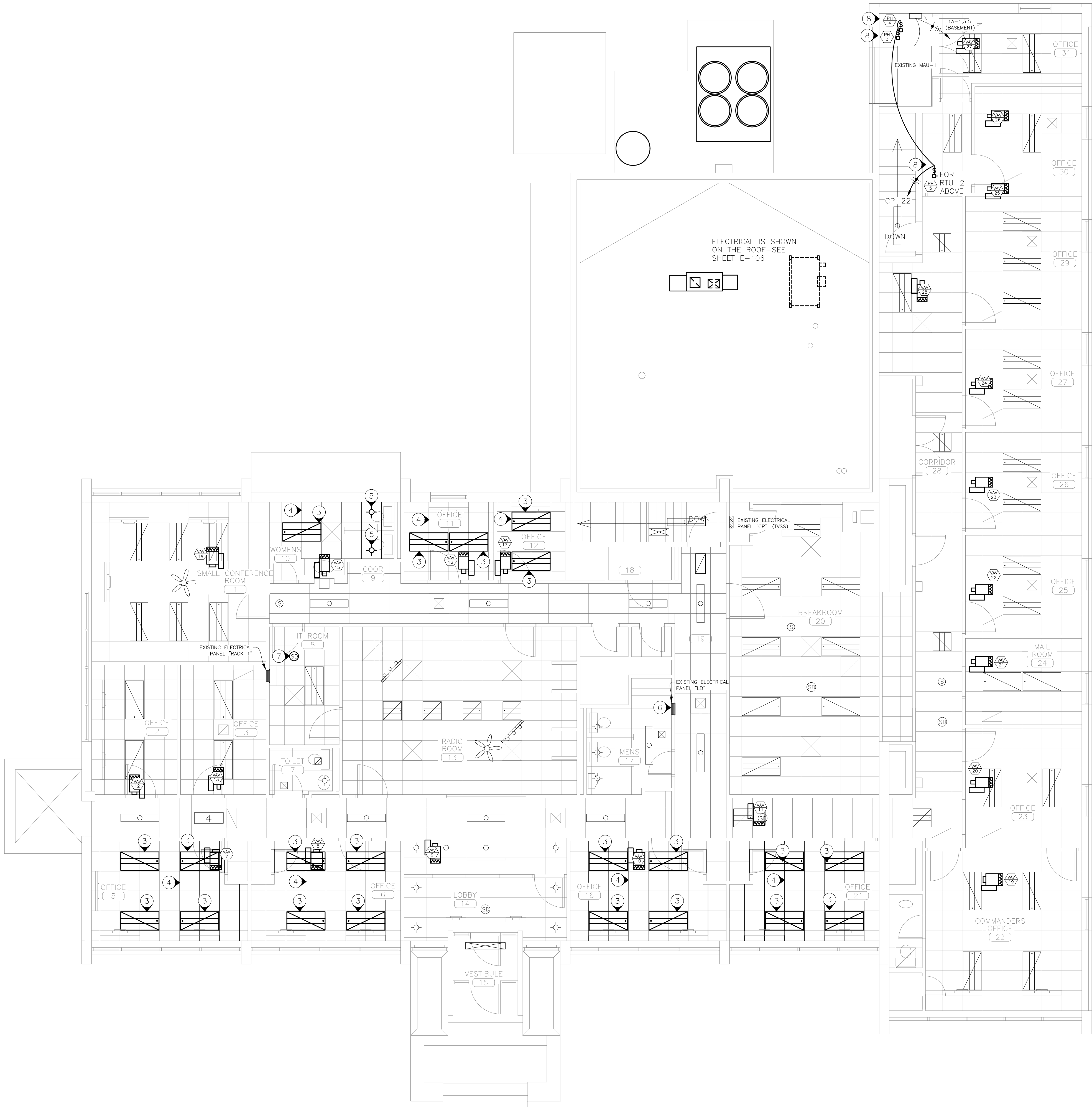
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SHEET TITLE:
**HEADQUARTERS
GROUND FLOOR
ELECTRICAL RENO
PLAN**

SHEET NUMBER:

E-104

36 OF 41 SHEETS
2026-06-15



1 HEADQUARTERS FIRST FLOOR ELECTRICAL RENOVATION PLAN
SCALE: 3/16"=1'-0"

NOTES

N INDICATES KEYED NOTES

- 1 ALL NEW VAV BOXES WILL HAVE AN ELECTRICAL MODULATING ACTUATORS THAT ARE 24V AND GET POWER FROM THE HVAC CONTROLS BY JOHNSON CONTROLS. ELC TO PROVIDE ANY AND ALL CONDUIT FOR LOW VOLTAGE WIRING. COORDINATE WITH MECHANICAL AND CONTROLS CONTRACTOR. NEW VAV's WILL COME WITH FACTORY DISCONNECT SWITCHES. SEE MECHANICAL SCHEDULES. LOW VOLTAGE WIRING IS NOT SHOWN ON THESE PLANS.
- 2 IF ANY HVAC EQUIPMENT SUBSTITUTIONS REFER TO SHEET E-104 GENERAL NOTE 3.
- 3 ELC TO INSTALL METALUX CRUZE ST 24CZ2-40-UNV-L835-CD1 OR APPROVED EQUAL. EXISTING CIRCUITING TO REMAIN. EXTEND ALL WIRING AND CONDUIT ALONG WITH ANY SWITCHING WIRING. REMOVE ANY UNUSED WIRE AND CONDUIT. THE GOAL IS TO MATCH EXISTING FIXTURES AS CLOSE AS POSSIBLE.
- 4 IN THIS ROOM, ELC TO COORDINATE WITH THE GENERAL CONTRACTOR TO PROVIDE A NEW 2'x2' CEILING GRID TO MATCH THE EXISTING 2'x2' CEILING GRIDS IN OTHER PORTIONS OF THE BUILDING.
- 5 ELC TO REINSTALL CAN LIGHT TAKEN DOWN DURING DEMOLITION. CENTER IN TILE. EXISTING CIRCUITING AND SWITCHING TO REMAIN. EXTEND ALL WIRING AND CONDUIT TO NEW LOCATION.
- 6 FOR BAS CONTROL PANEL ON THE FIRST FLOOR FOR VAV CONTROL, ELC TO BRING POWER FROM EXISTING ELECTRICAL PANEL "LB". PROVIDE 20A/1P BREAKER FOR POWER TO BAS CONTROL PANEL. RUN (2) #12 CU THHN AND (1) CU GRND IN (1) 1/2" EMT AS REQUIRED BY CONTROL PANEL REQUIREMENTS. COORDINATE LOCATION OF NEW CONTROL PANEL WITH MECHANICAL. PROVIDE NEW TYPED PANEL SCHEDULE.
- 7 RELOCATED SMOKE DETECTOR. ELC TO EXTEND CIRCUIT AS REQUIRED. SD WAS TO BE RELOCATED PER NOTES ON SHEET E-102.
- 8 ELC TO ADD A 20A/1P CIRCUIT BREAKER IN EXISTING PANEL "CP" ON THE FIRST FLOOR AND RUN POWER TO THE THREE PH MOTOR DISCONNECT SWITCHES AS SHOWN. ALL WIRE IS #12 IN 1/2" EMT. SEE PANEL SCHEDULES ON SHEET E602.

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MISSOURI DEPARTMENT
OF PUBLIC SAFETY
DIVISION OF MO STATE
HIGHWAY PATROL

REPLACE HVAC &
BOILERS / PUMPS /
CONTROLS

MSHP TROOP B
HEADQUARTERS 308 PINE
CREST DR. MACON, MO
63552

PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____

ISSUE DATE: 06/15/2026

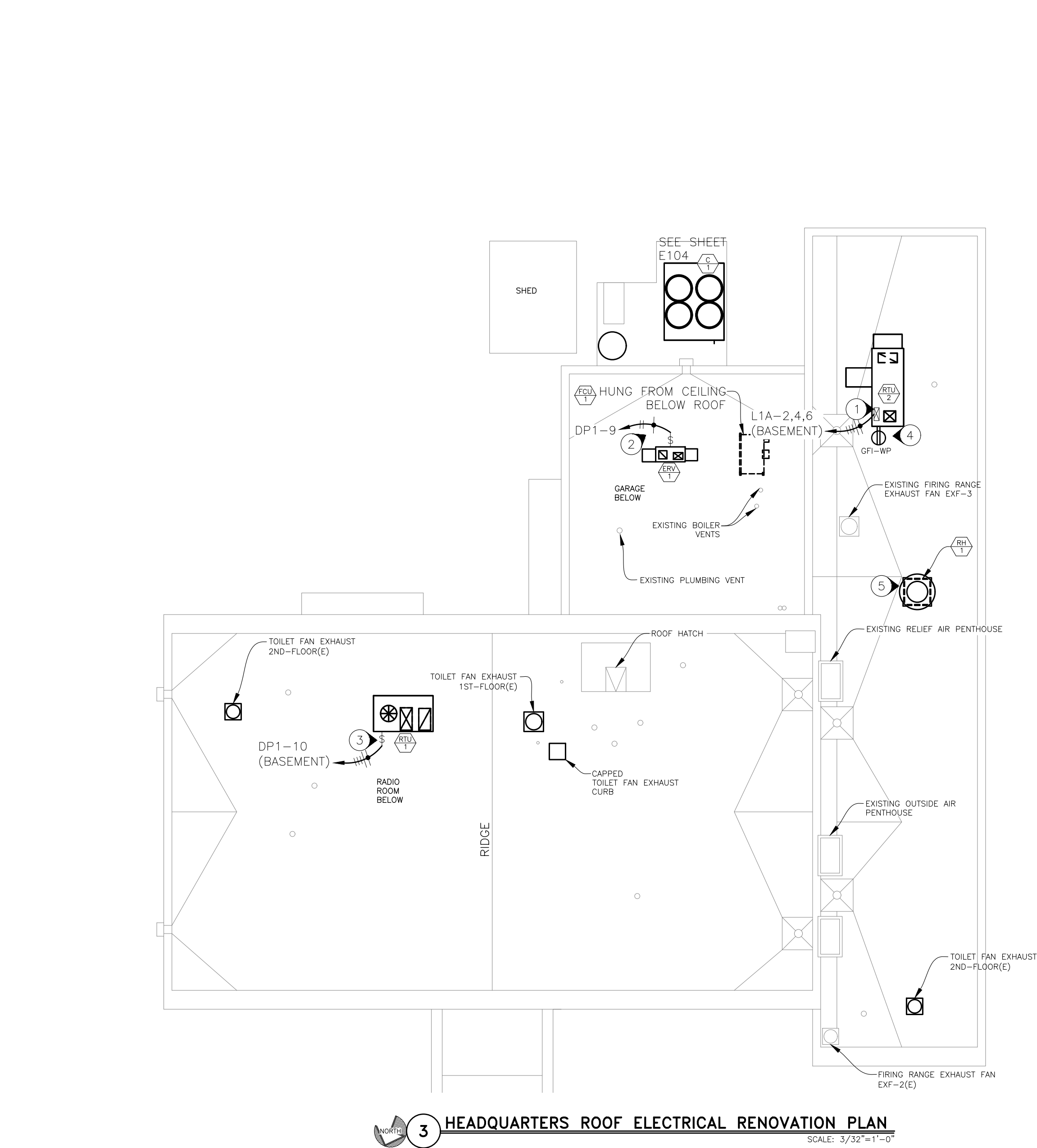
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DRAWN BY: MDS/SAK
CHECKED BY: JLD
DESIGNED BY: MDS/SAK

SHEET TITLE:
**HEADQUARTERS
FIRST FLOOR
ELECTRICAL RENO
PLAN**

SHEET NUMBER:

E-105

37 OF 41 SHEETS
2026-06-15



 INDICATES KEYED NOTES

- ① ROUTE POWER TO NEW RTU-2 INTERNAL VFD PER MANUFACTURERS INSTRUCTIONS. RUN (4) #12 CU THWN AND (1) #12 CU THWN GROUND IN (1) 3/4" CONDUIT. NEUTRAL REQUIRED FOR CONVENIENCE OUTLET. SEE NOTE 4 BELOW.
- ② ELC TO REMOVE EXISTING 35A/2P BREAKER IN PANEL "DP1" AND REPLACE WITH 20A, 2P BREAKER. REFERENCE PANEL SCHEDULES. RUN (2) #10 CU THHN AND (1) #12 CU GND IN (1) 1/2" CONDUIT FROM FACTORY PROVIDED AND INSTALLED NON-FUSED DISCONNECT.
- ③ ROUTE POWER TO NEW RTU-1 FACTORY INSTALLED NON-FUSED DISCONNECT. RUN (3) # 8 CU THWN, (1) #10 CU THWN AND (1) #10 CU GROUND IN (1) 1" CONDUIT. UNIT COMES WITH FACTORY CONVENIENCE OUTLET.
- ④ ELC TO SUPPLY AND INSTALL A 20A GFCI CONVENIENCE OUTLET IN WEATHERPROOF BELL BOX ON THE SIDE OF RTU-2 ON ROOF. SEAL ANY ROOF PENETRATIONS TO A WATER TIGHT CONDITION.
- ⑤ RELIEF HOOD FOR HVAC TO HAVE ELECTRIC MODULATING DAMPER THAT WILL BE LOW VOLTAGE (24V) AND BE CONTROLLED BY THE HVAC CONTROL SYSTEM BY JOHNSON CONTROLS. ELC TO COORDINATE WITH MECHANICAL CONTRACTOR TO PROVIDE ALL CONDUIT FOR LOW VOLTAGE WIRING.
- ⑥ IF ANY HVAC EQUIPMENT IS SUBSTITUTED IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO PROVIDE PROPER SIZED WIRE, CONDUIT AND CIRCUIT BREAKER ALONG WITH ANY ROOF PENETRATION WATERPROOF SEAL.
- ⑦ CONTRACTOR TO PROVIDE AND INSTALL BUSSMANN SSU FUSED DISCONNECT. SIZE PER MANUFACTURER'S NAME PLATE DATA. MOUNT TO SIDE OF UNIT IN HANDY BOX.
- ⑧ SEE EQUIPMENT DATA SCHEDULE BELOW FOR ELECTRICAL CONTRACTOR PROVIDED AND INSTALLED VARIABLE FREQUENCY DRIVES.

8

DESCRIPTION		LOAD DATA										STARTER			DISCONNECT AT EQUIP.						REMARKS
MARK	EQUIPMENT	FURNISHED BY (2)	INSTALLED BY (2)	LOCATION	LOAD (1)	VOLTAGE	PHASE	FREQ.(HZ)	STARTER TYPE (3)	STARTER H.P. SIZE	ACCS. (4)	DISC. TYPE (5)	DISC. SIZE (6)	FURNISHED BY (2)	INSTALLED BY (2)	CONTROL WIRING (2)	DISC. TYPE (5)	DISC. SIZE (6)	FURNISHED BY (2)	INSTALLED BY (2)	
PB-1	BOILER PUMP--CLOSE COUPLED IN--LINE CENTRIFUGAL PUMP	MC	MC	MECH. ROOM	.75 HP 3.5A	208	3	60	VFD	1				EC	EC	CC					VFD--EATON POWER XL DH1 4.6A OR EQUAL--1725 RPM VARIABLE, 81 GPM
PB-2	BOILER PUMP--CLOSE COUPLED IN--LINE CENTRIFUGAL PUMP	MC	MC	MECH. ROOM	.75 HP 3.5A	208	3	60	VFD	1				EC	EC	CC					VFD--EATON POWER XL DH1 4.6A OR EQUAL--1725 RPM (VARIABLE), 81 GPM
PH-1	HOT WATER--CLOSE COUPLED IN--LINE CENTRIFUGAL PUMP	MC	MC	MECH. ROOM	3 HP 10.6A	208	3	60	VFD	1				EC	EC	CC					VFD--EATON 5HP DH1-32017FN-C21C OR EQUAL
PH-2	HOT WATER--BOOSTER IN--LINE HORIZONTAL	MC	MC	MECH. ROOM	1/12 HP 1.4A	120	1	60	SW	1				EC	EC	CC					HEAVY DUTY SNAP SWITCH -- FRACTIONAL HP
PH-3	HOT WATER--BOOSTER IN--LINE HORIZONTAL	MC	MC	FIRST FLOOR	1/6 HP 4.4A	120	1	60	SW	1				EC	EC	CC					HEAVY DUTY SNAP SWITCH -- FRACTIONAL HP
PH-4	HOT WATER--BOOSTER IN--LINE HORIZONTAL	MC	MC	FIRST FLOOR	1/6 HP 4.4A	120	1	60	SW	1				EC	EC	CC					HEAVY DUTY SNAP SWITCH -- FRACTIONAL HP
PH-5	HOT WATER--BOOSTER IN--LINE HORIZONTAL	MC	MC	FIRST FLOOR	1/12 HP 1.4A	120	1	60	SW	1				EC	EC	CC					HEAVY DUTY SNAP SWITCH -- FRACTIONAL HP
PC-1	COLD WATER--CLOSE COUPLED IN--LINE CENTRIFUGAL PUMP	MC	MC	GARAGE	1.5 HP 6.6A	208	3	60	VFD	1.5				EC	EC	CC					VFD--ABB 1.5HP ACS58-01-06A6-2 OR EQUAL--750 RPM (VARIABLE), 125 GPM
PC-2	COLD WATER--CLOSE COUPLED IN--LINE CENTRIFUGAL PUMP	MC	MC	GARAGE	1 HP 4.6A	208	3	60	VFD	1				EC	EC	CC					VFD--EATON POWER XL DH1 4.6A OR EQUAL--1750 RPM (VARIABLE), 70 GPM
F-1	FURNACE -- WITH ELECTRIC HEAT	MC	MC	CRIME LAB	3.9A 40A	208	1	60				NF	60A 2P	EC	EC	CC					
CUH-1	EXTERIOR HEAT PUMP	MC	MC	CRIME LAB EXTERIOR	19.7A	208	1	60				NF	60A 2P	EC	EC	CC					
F-2	FURNACE -- WITH ELECTRIC HEAT	MC	MC	CDL/MVI	2.6A 32A	208	1	60				NF	60A 2P	EC	EC	CC					
CUH-2	EXTERIOR HEAT PUMP	MC	MC	CDL/MVI EXTERIOR	0.64A 7.8A	208	1	60				NF	30A 2P	EC	EC	CC					
B-1	BOILER -- NATURAL GAS	MC	MC	MECH. ROOM	10A	120	1	60	VFD	1				EC	EC	CC					VFD--SCHNEIDER ELECTRIC 100-120V AC, 1 HP MAX NEMA 1, BLACK OR EQUAL
B-2	BOILER -- NATURAL GAS	MC	MC	MECH. ROOM	10A	120	1	60	VFD	1				EC	EC	CC					VFD--SCHNEIDER ELECTRIC 100-120V AC, 1 HP MAX NEMA 1, BLACK OR EQUAL
AHU-1	AIR HANDLER UNIT 1-15HP/1800RPM MOTOR WITH FACTORY VFD	MC	MC	MECH. ROOM	59.4A	208	3	60	VFD (FACT.)							CC					VFD--INSTALLED IN THE FACTORY--ELC TO CONNECT
FCU-1	FAN COIL UNIT	MC	MC	GARAGE	11.2A	208	3	60				NF	30A 3P	EC	EC	CC		30A 3P			ELC TO SUPPLY AND INSTALL A 30A/3P NON FUSED NEMA 1 DISCONNECT TO SIDE OF UNIT. SCHNEIDER OR ~ ELC TO CONNECT FACTORY NON--FUSED DISCONNECT
ERV-1	ENERGY RECOVERY VENTILATOR	MC	MC	GARAGE ROOF	10A	208	1	60				NF (FACT.)	30A 2P			CC					ELC TO CONNECT FACTORY NON--FUSED DISCONNECT AND FACTORY CONVENIENCE OUTLET
RTU-1	PRECEDENT PACKAGED ROOFTOP UNIT	MC	MC	RADIO AND IT ROOF	40.5A	208	3	60				NF (FACT.)				CC					ELC TO CONNECT FACTORY NON--FUSED DISCONNECT
RTU-2	AIR HANDLER UCCA ROOFTOP UNIT	MC	MC	ROOF	7.5A	208	3	60								CC					ELC TO CONNECT FACTORY NON--

HP / LOAD	BY	STARTER TYPE	ACCESSORIES	DISCONNECT TYPE	SIZE	
HORSEPOWER UNLESS KW, MECHANICAL OR AMPS INDICATED.	EC MC PC CC	ELECTRICAL CONTRACTOR MECHANICAL CONTRACTOR PLUMBING CONTRACTOR CONTROLS CONTRACTOR	FVN FULL VOLTAGE, NON-REVERSING FVR FULL VOLTAGE, REVERSING FMR MANUAL MOTOR STARTER w/ OVERLOAD(S) PWPC PRE-WIRED CONTROL PANEL RWAT REDUCED VOLTAGE - AUTO TRANSFORMER SDS REDUCED VOLTAGE - STAR DELTA VFD VARIABLE FREQUENCY DRIVE	AUX AUXILIARY CONTACTS CPT CONTROL POWER TRANSFER HOA HAND-OFF-AUTO SEL. SWITCH PB START - STOP PUSHBUTTON PL PILOT LIGHT	CB CIRCUIT BREAKER FSD FUSED SWITCH NF NON-FUSED SWITCH SW TOGGLE SWITCH (FACT.) FACTORY PROVIDED	FUSE/SWITCH SIZE TRIP/FRAME SIZE

- A. INSTALL DISCONNECT SWITCH ON THE SIDE OF THE EQUIPMENT HOUSING.
- B. PANELBOARD FEEDER SERVING UNIT SHALL BE LOCKABLE USING A PADLOCK, IN ACCORDANCE WITH OSHA LOCK-OUT TAG-OUT RULES.
- C. STARTER SHALL BE INTERLOCKED WITH THE FIRE ALARM SYSTEM.
- D. IF ECM MOTORS ARE NOT SUPPLIED FOR PUMPS SHOWN ABOVE, ELC SHALL SIZE AND INSTALL APPROPRIATE VARIABLE FREQUENCY DRIVES

NOTES

INDICATES KEYED NOTES

- 1 THERE ARE NO CHANGES PROPOSED FOR THE EXISTING ELECTRICAL RISER. IF THE ELECTRICAL CONTRACTOR FINDS ANY OF THIS INFORMATION TO BE DIFFERENT FROM THE ACTUAL FIELD CONDITIONS THE RISER IS TO BE UPDATED VIA RED LINE AS-BUILT DRAWINGS THAT ARE TO BE SENT TO THE ENGINEER FOLLOWING JOB COMPLETION.

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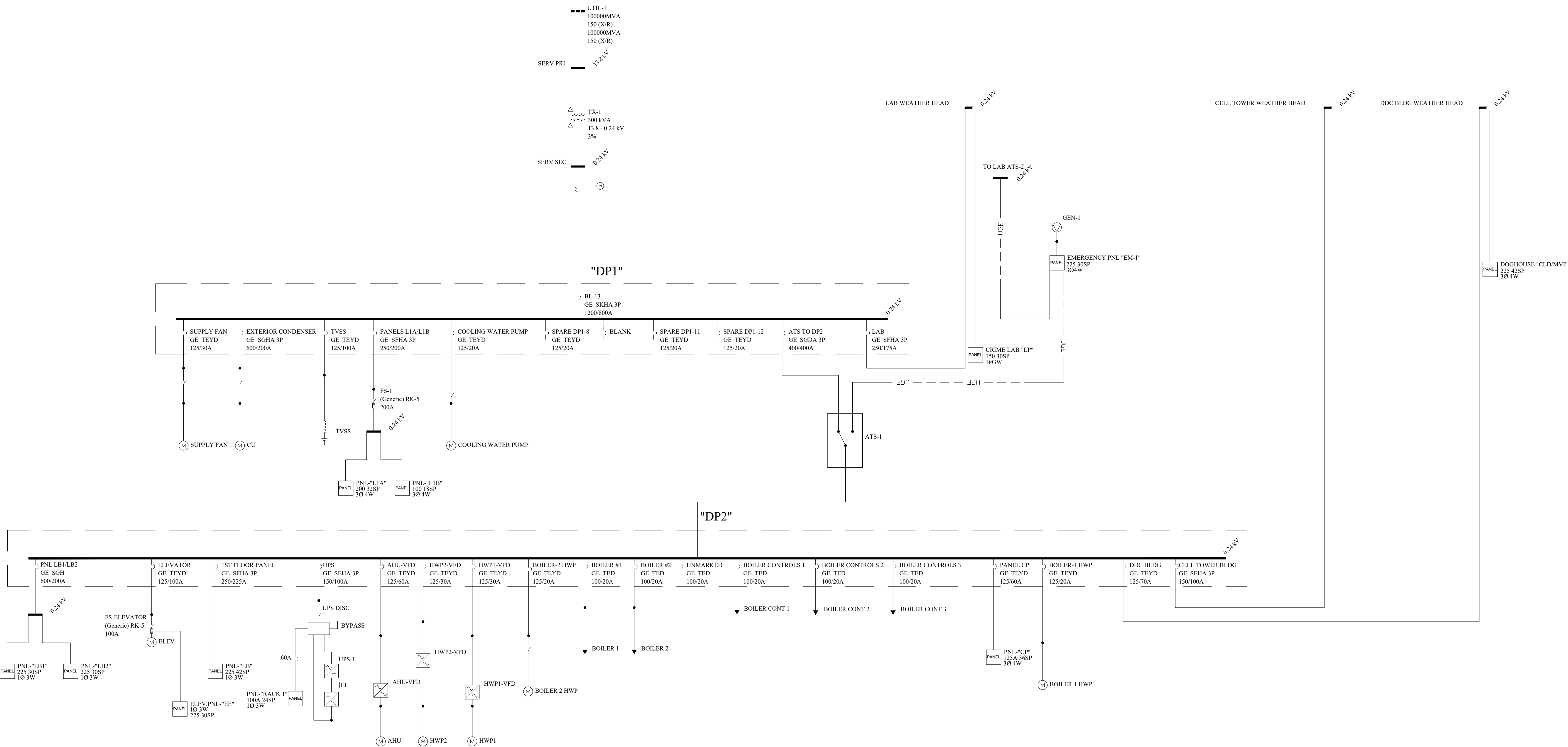
PROJECT # R2511-01
SITE # 4753
FACILITY # 55113

REVISION: _____
DATE: _____
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REVISION: _____
DATE: _____
ISSUE DATE: 06/15/2026

CAD DWG FILE: TBHHBP-E.dwg
DRAWN BY: MDS/JJS/SAK
CHECKED BY: JLD
DESIGNED BY: MDS/JJS/SAK

SHEET TITLE:
**EXISTING
ELECTRICAL
RISER**

SHEET NUMBER:
E-501
39 OF 41 SHEETS
2026-06-15



1 HEADQUARTERS EXISTING ELECTRICAL RISER DIAGRAM
NO SCALE



40 OF 41 SHEETS
2026-06-15

EXISTING "CP" ELECTRICAL PANEL SCHEDULE (NO CHANGE)														
PANEL DESIGNATION: CP (PED FROM DP2)														
VOLTAGE: 208 3PHASE 4WIRE MAINS: 60A MB X MLO			PANEL LOCATION: UPPER FLOOR BREAK ROOM CLOSET				TOTAL VOLT/AMPS THIS PANEL			0				
MOUNTING: FLUSH X SURFACE			PANEL SPACES: 36				TOTAL CONNECTED LOAD (AMPS)			0				
CIRCUIT DESIGNATION		WIRE	TRIP	CONNECTED LOAD			GKT. NO.	CONNECTED LOAD			TRIP	WIRE	CIRCUIT DESIGNATION	
				A	B	C		A	B	C				
TVSS		100A/3P					1 2					20A/1P	WEST CORRIDOR -N. COPPER	
						3 4						BLANK (WILD LEG)		
						5 6						RHONDA & TINA		
SOUTHEAST OFFICE W. WALL		20A/1P					7 8					20A/1P	COMMANDER & PAULA	
SOUTHEAST OFFICE E. WALL		20A/1P					9 10					20A/1P	WEST CORRIDOR - S. COPPER	
EVIDENCE & WEST OFFICE		20A/1P					11 12					20A/1P	WEST CORRIDOR - S. COPPER	
SOUTHEAST OFFICE COPPER		20A/1P					13 14					20A/1P	MELISSA & SONIA	
EAST LEUTENANTS OFFICES		20A/1P					15 16					20A/1P	SOUTHWEST OFFICE	
WEST LEUTENANTS OFFICES		20A/1P					17 18					20A/1P	JULIE	
RADIO OPERATOR & AIRCRAFT		20A/1P					19 20					20A/1P	GARAGE	
BASEMENT CONFERENCE RM.		20A/1P					21 22						BLANK	
POLYGRAPH		20A/1P					23 24						BLANK	
WEST DETECTIVE		20A/1P					25 26						BLANK	
RON & EAST DETECTIVE		20A/1P					27 28						BLANK	
BLANK							29 30						BLANK	
BLANK							31 32						BLANK	
BLANK							33 34						BLANK	
BLANK							35 36						BLANK	
				0				0					PHASE A 0	
					0				0				PHASE B 0	
						0				0			PHASE C 0	

PANEL DESIGNATION LB (BED FROM DP2)												
VOLTAGE: 208 1PHASE 3WIRE		PANEL LOCATION: UPPER FLOOR CORRIDOR				TOTAL VOLTAMPS THIS PANEL		0				
MANS: 225A _MB _X MLO		MOUNTING: SURFACE		PANEL SPACES: 42		TOTAL CONNECTED LOAD (AMPS)		0				
		CONNECTED LOAD				CONNECTED LOAD						
CIRCUIT DESIGNATION	WIRE	TRIP	A	B	CKT. NO.	A	B	TRIP	WIRE	CIRCUIT DESIGNATION		
LIGHTS ZONE OFFICE	20A/1P				1			20A/1P		BREAKROOM PLUGS EAST		
LIGHTS LEUTENANTS OFFICE 8	20A/1P				3			20A/1P		ZONE OFFICE/BREAKRM PLUGS		
PLUGS LEUTENANTS OFFICE 8	20A/1P				5			20A/1P		PLUGS CAPTAINS OFFICE		
LIGHTS LEUTENANTS OFFICE 9	20A/1P				7			20A/1P		PLUGS RM 9 Foyer, TRANS. RM		
PLUGS ROOM 9	20A/1P				9			20A/1P		MENS RM JAN, CLOSET LIGHTS		
PLUGS DF, BACK HALL/WOMENS RR	20A/1P				11			20A/1P		FLOOR PLUGS WORK OFFICE		
FLOOR & WALL PLUGS WORK RM	20A/1P				13			20A/1P		WORK OFFICE LIGHTS		
WORK OFFICE LIGHTS	20A/1P				15			20A/1P		LTS & CEILING FAN, E. END RADIO RM/RR		
F & W PLUGS DR. EXAM.SAFETY OFF.	20A/1P				16			20A/1P		PLUGS RM, FRONT HALL, WORK RM		
FOYER & VESTIBULE LIGHTS	20A/1P				19			20A/1P		LIGHTS SAFETY OFFICE		
LIGHTS DR. EXAM OFFICE	20A/1P				21			20A/1P		PLUGS W. WALL, RADIO ROOM		
LIGHTS RADIO SHOP/CHIEF/WOM.	20A/1P				23			20A/1P		PLUGS RADIO SHOP, STOR. CL, SHREDR		
PLUGS N RADIO SHOP	20A/1P				25			20A/1P		LIGHTS JAN. CL., MENS RM		
EXHAUST FANS	20A/1P				27			20A/1P		PLUGS N. WALL OF RADIO ROOM		
TVX PLUGS	20A/1P				29			20A/1P		UNKNOWN		
LIGHTS N RADIO ROOM	20A/1P				31			20A/1P		PLUG BACK HALL & RADIO ROOM		
HALL LIGHTS	20A/1P				33			20A/1P		PLUGS MENS RR/FRONT HALL/D.F.		
20A LINE TO RADIO RM. FOR COMP.	20A/1P				35			20A/1P		UNKNOWN		
UNKNOWN	20A/1P				37			20A/1P		HALL LIGHTS NEW ADD./STAIR RING.		
UNKNOWN	20A/1P				39			20A/1P		THERMOSTAT AT DESK		
BLANK					41					BLANK		
			0			0				PHASE A 0		
				0			0			PHASE B 0		

PANEL DESIGNATION: LB (FED FROM DP2)									
VOLTAGE: 208 1PHASE 3WIRE		PANEL LOCATION: UPPER FLOOR CORRIDOR				TOTAL VOLTAMPS THIS PANEL		120	
MAINS: 225A _MB X MLO		MOUNTING: SURFACE		PANEL SPACES: 42		TOTAL CONNECTED LOAD (AMPS)		1	
		CONNECTED LOAD		O.K.T.		CONNECTED LOAD			
		A		B		A		B	
CIRCUIT DESIGNATION	WIRE	TRIP					TRIP	WIRE	CIRCUIT DESIGNATION
LIGHTS ZONE OFFICE	20A/1P				1	2		20A/1P	BREAKROOM/PLUGS EAST
LIGHTS LIEUTENANTS OFFICE 8	20A/1P				3	4		20A/1P	ZONE OFFICE/BREAKRM PLUGS
LIGHTS LIEUTENANTS OFFICE 8	20A/1P				5	6		20A/1P	PLUGS CAPTAINS OFFICE
LIGHTS LIEUTENANTS OFFICE 9	20A/1P				7	8		20A/1P	PLUGS RM 9, FOYER, TRANS. RM
PLUGS ROOM 9	20A/1P				9	10		20A/1P	MENS RR JAN. CLOSET LIGHTS
PLUGS DF, BACK HALL, WOMENS RR	20A/1P				11	12		20A/1P	FLOOR PLUGS WORK OFFICE
FLOOR & WALL PLUGS WORK RM	20A/1P				13	14		20A/1P	WORK OFFICE LIGHTS
WORK OFFICE LIGHTS	20A/1P				15	16		20A/1P	LTS & CEILING FAN, E. END RADIO RM/RR
F & W, PLUGS, DR. EXAM, SAFETY OFF.	20A/1P				17	18		20A/1P	PLUGS RR, FRONT HALL, WORK RM.
FOYER & VESTIBULE LIGHTS	20A/1P				19	20		20A/1P	LIGHTS SAFETY OFFICE
LIGHTS DR. EXAM OFFICE	20A/1P				21	22		20A/1P	PLUGS, W. WALL RADIO ROOM
LIGHTS RADIO SHOP/CHEF/WOM.	20A/1P				23	24		20A/1P	LIGHTS N RADIO SHOP, STOR. CL. SHREDR
PLUGS N RADIO SHOP	20A/1P				25	26		20A/1P	PLUGS JAN. CL., MENS RR
EXHAUST FANS	20A/1P				27	28		20A/1P	PLUGS N. WALL, OF RADIO ROOM
TXV PLUGS	20A/1P				29	30		20A/1P	UNKNOWN
LIGHTS N RADIO ROOM	20A/1P				31	32		20A/1P	PLUG BACK HALL & FRONT RM
HALL LIGHTS	20A/1P				33	34		20A/1P	PLUGS MENS RR/FRONT HALLD F.
20A LINE TO RADIO RM. FOR COMP.	20A/1P				35	36		20A/1P	UNKNOWN
UNKNOWN	20A/1P				37	38		20A/1P	HALL LIGHTS/NEW ADD./STAR. RNG.
UNKNOWN	20A/1P				39	40		20A/1P	THERMOSTAT AT DESK
BAS CONTROL PANEL FOR VAVs	#12 20A/1P			120		41	42		BLANK
				120					
				0					PHASE A 120
				0					PHASE B 0

EXISTING "L1A" ELECTRICAL PANEL SCHEDULE
(DASHED AREAS DENOTE REMOVE OR CHANGE)

PANEL DESIGNATION: L1A (FED FROM DP1)											
VOLTAGE: 208 3PHASE 4WIRE						PANEL LOCATION: BASEMENT TIRE STORAGE SPACE					
MANS: 200 A _MB _X MLO						TOTAL VOLTAMPS THIS PANEL					
MOUNTING: _FLUSH _X SURFACE						TOTAL CONNECTED LOAD (AMPS)					
PANEL SPACES: 36						0					
CONNECTED LOAD											
CIRCUIT DESIGNATION	WIRE	TRIP	A	B	C	CKT. NO.	A	B	C	TRIP	WIRE
AHU-3 (FRING RANGE)	70A/3P					1 2					
						3 4				20A/3P	UNKNOWN (MAYBE AHU-2, ALSO KNOWN AS AC-1)
						5 6					
TRAP	20A/3P					7 8					
						9 10				15A/3P	EXHAUST FAN -FRING LINE
						11 12					
EXHAUST FAN - RANGE N. END	30A/1P					13 14				20A/1P	UNKNOWN
BLANK						15 16					BLANK
UNKNOWN	20A/1P					17 18				20A/1P	UNKNOWN
UNKNOWN	20A/1P					19 20				20A/1P	UNKNOWN
BLANK						21 22					BLANK
OUTLETS - BREAK RM	20A/1P					23 24				20A/1P	UNKNOWN
UNKNOWN	20A/1P					25 26				20A/1P	UNKNOWN
BLANK						27 28					BLANK
UNKNOWN	20A/1P					29 30				60A/2P	MAIN (FOR L1B POSSBLY SUB PANEL)
UNKNOWN	20A/1P					31 32					
BLANK						33 34					
UNKNOWN	20A/1P					35 36				20A/1P	UNKNOWN
			0				0				PHASE A 0
				0				0			PHASE B 0
					0				0		PHASE C 0

EXISTING "L1A" ELECTRICAL PANEL SCHEDULE
(BOLD TEXT DENOTES NEW LOADS)

PANEL DESIGNATION: L1A (FED FROM DP1)											
VOLTAGE: 208 3PHASE 4WIRE						PANEL LOCATION: BASEMENT TIRE STORAGE SPACE					
MANS: 200 A _MB _X MLO						TOTAL VOLTAMPS THIS PANEL					
MOUNTING: _FLUSH _X SURFACE						TOTAL CONNECTED LOAD (AMPS)					
PANEL SPACES: 36						4341					
CONNECTED LOAD											
CIRCUIT DESIGNATION	WIRE	TRIP	A	B	C	CKT. NO.	A	B	C	TRIP	WIRE
EXISTNG						1 2					
AHU-3 (FRNG RANGE)		70A/3P				3 4	1055		1055	20A/3P	#12
						5 6					#12
						7 8			1055		
TRAP		20A/3P				9 10				15A/3P	
						11 12					
EXHAUST FAN - RANGE N. END		30A/1P				13 14				20A/1P	
BLANK						15 16					BLANK
UNKNOWN		20A/1P				17 18				20A/1P	UNKNOWN
UNKNOWN		20A/1P				19 20				20A/1P	UNKNOWN
BLANK						21 22					BLANK
OUTLETS - BREAK RM		20A/1P				23 24				20A/1P	UNKNOWN
UNKNOWN		20A/1P				25 26				20A/1P	UNKNOWN
BLANK						27 28					BLANK
UNKNOWN		20A/1P				29 30				60A/2P	MAIN (FOR L1B POSSBLY)
UNKNOWN		20A/1P				31 32					
BLANK						33 34			1176	20A/1P	#12
UNKNOWN		20A/1P				35 36				20A/1P	
			0				1055				PHASE A 1055
				0				2231			PHASE B 2231
					0				1055		PHASE C 1055

EXISTING "L1B" ELECTRICAL PANEL SCHEDULE
(NO CHANGE)

PANEL DESIGNATION: L1B (FED FROM DP1)													
VOLTAGE: 208 3PHASE 4WIRE			PANEL LOCATION: BASEMENT TIRE STORAGE SPACE					TOTAL VOLTAMPS THIS PANEL				0	
MANS: 100 A _MB X MLO			MOUNTING: _FLUSH X SURFACE		PANEL SPACES: 18			TOTAL CONNECTED LOAD (AMPS)				0	
CONNECTED LOAD													
CIRCUIT DESIGNATION		WIRE	TRIP	A	B	C	CKT. NO.	A	B	C	TRIP	WIRE	CIRCUIT DESIGNATION
PLUG IN NORTH WALL RANGE			20A/1P				1 2				20A/1P		UNKNOWN
BLANK							3 4						
UNKNOWN			60A/2P				5 6				60A/3P		AR CONDITIONER NEW ADDN.
							7 8						
BLANK							9 10						BLANK
UNKNOWN			20A/1P				11 12				20A/1P		TRACK OPERATOR
UNKNOWN			20A/1P				13 14				20A/1P		TRACK OPERATOR
BLANK							15 16						BLANK
UNKNOWN			20A/1P				17 18				20A/1P		UNKNOWN
				0				0					PHASE A 0
					0				0				PHASE B 0
						0				0			PHASE C 0

EXISTING "LP" ELECTRICAL PANEL SCHEDULE
(DASHED AREAS DENOTE REMOVE OR CHANGE)

PANEL DESIGNATION: LP - (FED FROM OVERHEAD DROP SERVICE)											
VOLTAGE: 208 1PHASE 3WIRE						PANEL LOCATION: CRIME LAB ELECTRICAL ROOM					
MANS: 150 A X MB _MLO						TOTAL VOLTAMPS THIS PANEL					
MOUNTING: _SURFACE						TOTAL CONNECTED LOAD (AMPS)					
PANEL SPACES: 30						0					
CONNECTED LOAD						0					
CIRCUIT DESIGNATION						CIRCUIT DESIGNATION					
WIRE	TRIP	A	B	CKT. NO.	A	B	TRIP	WIRE			
PLUG IN STORERMP/PLUG IN FUR. RM	20A/20A/1P			1 2					PLUG ON N WALL/ATS IN BRKR RM		
LTS IN LAB/PLUGS N & E & S WALLS	20A/20A/1P			3 4					LTS IN OFF./FUR. RM & STORERM		
POWER TO UPS BYPASS SWITCH	50A/2P			5 6					UPS MACHINE		
				7 8							
220 PLUG ON NORTH WALL	30A/2P			9 10					A.C. COMPRESSOR		
				11 12							
PLUGS IN OFFICE	20A/1P			13 14					BLANK		
EVIDENCE EXHAUST FAN	20A/1P			15 16				20A/1P	EAST HOOD FRIDGES WALL		
220 A.C. WATER HEATER	20A/1P			17 18				20A/1P	OVEN		
PLUGS ON E WALL IN LAB/TEC OFF.	20A/1P			19 20				20A/1P	MICROSCOPE		
N ORNG PLUG W LAB WALL	30A/1P			21 22				20A/1P	LIGHTS IN SEC. & LABS OFFICE		
S ORANGE PLUG ON W LAB WALL	30A/1P			23 24				20A/1P	LTS IN WALL & SE CORNER OF LAB		
110V PYWR FOR COMP TERM AMP C	20A/1P			25 26				125A/2P	HEATER & AIR HANDLER		
UNKNOWN	20A/1P			27 28							
UNKNOWN	20A/1P			29 30				15A/1P	PLUG ON W WALL IN LAB/TEC OFF.		
		0				0			PHASE A 0		
			0				0		PHASE B 0		
									PHASE C 0		

EXISTING "LP" ELECTRICAL PANEL SCHEDULE
(BOLD TEXT DENOTES NEW LOADS)

PANEL DESIGNATION: LP - (FED FROM OVERHEAD DROP SERVICE)											
VOLTAGE: 208 1PHASE 3WIRE						PANEL LOCATION: CRIME LAB ELECTRICAL ROOM					
MANS: 150 A X MB _MLO						TOTAL VOLTAMPS THIS PANEL					
MOUNTING: SURFACE						TOTAL CONNECTED LOAD (AMPS)					
PANEL SPACES: 30						55					
CONNECTED LOAD											
CIRCUIT DESIGNATION	WIRE	TRIP	A	B	CKT. NO.	A	B	TRIP	WIRE	CIRCUIT DESIGNATION	
PLUG IN STORERMP/PLUG IN FUR. RM		20A/20A/1P			1 2			20A/20A/1P		PLUG ON N WALL/ATS IN BRKR RM	
LTS IN LAB/PLUGS N & E & S WALLS		20A/20A/1P			3 4			20A/20A/1P		LTS IN OFF./FUR. RM & STORERM	
POWER TO UPS BYPASS SWITCH		50A/2P			5 6			50A/2P		UPS MACHINE	
					7 8						
220 PLUG ON NORTH WALL		30A/2P			9 10	2049		40A/2P	#10	HEAT PUMP (CUH-1)	
					11 12		2049		#10	CRIME LAB OUTSIDE AT N.H WALL	
PLUGS IN OFFICE		20A/1P			13 14					BLANK	
EVIDENCE EXHAUST FAN		20A/1P			15 16			20A/1P		EAST HOOD FRIDGES WALL	
220 A.C. WATER HEATER		20A/1P			17 18			20A/1P		OVEN	
PLUGS ON E WALL IN LAB/TEC OFF.		20A/1P			19 20			20A/1P		MICROSCOPE	
N ORNG PLUG W LAB WALL		30A/1P			21 22			20A/1P		LIGHTS IN SEC. & LABS OFFICE	
S ORANGE PLUGS ON W LAB WALL		30A/1P			23 24			20A/1P		LTS IN HALL & SE CORNER OF LAB	
110V PYWR FOR COMP TERM AMP C		20A/1P			25 26	4566		60A/2P	#6	FURNACE (F-1)	
UNKNOWN		20A/1P			27 28		4566		#6	CRIME LAB MECH/ELEC CLOSET	
UNKNOWN		20A/1P			29 30			15A/1P		PLUG ON W WALL IN LAB/TEC OFF.	
			0			6615			PHASE A	6615	
				0			6615		PHASE B	6615	
									PHASE C	6615	

EXISTING "RACK 1" ELECTRICAL PANEL SCHEDULE
(NO CHANGE)

PANEL DESIGNATION: RACK 1 PANEL(FED FROM "DP2" BYPASS)											
VOLTAGE: 208 1PHASE 3WIRE				PANEL LOCATION: UPPER FLOOR STORAGE ROOM				TOTAL VOLTAMPS THIS PANEL			
MANS: 100 A _MB _X MLO				MOUNTING: _SURFACE				PANEL SPACES: 24			
								TOTAL CONNECTED LOAD (AMPS)			
								0			
CIRCUIT DESIGNATION		WIRE		CONNECTED LOAD		CKT.		CONNECTED LOAD		WIRE	
		TRIP		A		B		A		B	
RADIO 1		20A/1P				24 23		20A/1P		RADIO 2	
RADIO 3		20A/1P				22 21		20A/1P		DESK 1	
DESK 2		20A/1P				20 19		20A/1P		DATA 1	
DATA 2		20A/1P				18 17		20A/1P		DATA 3	
RR C/L WEST		20A/1P				16 15		20A/1P		PHONES	
RR C/L		20A/1P				14 13		20A/1P		TV	
AUX 1		20A/1P				12 11		20A/1P		AUX 2	
CEB		20A/1P				10 9		20A/1P		SPARE	
CKT 1		20A/1P				8 7		20A/1P		CKT 2	
CKT 3		20A/1P				6 5		20A/1P		CKT 4	
CKT 5		20A/1P				4 3		20A/1P		CKT 6	
CKT 7		20A/1P				2 1		20A/1P		CKT 8	
				0				0		PHASE A 0	
				0				0		PHASE B 0	