CRAWFORD AUSABLE SCHOOL DISTRICT

GRAYLING ELEMENTARY SCHOOL HVAC UPGRADES

BID SET - 01.17.2025

GENERAL NOTES

OWNERSHIP AND USE OF DOCUMENTS:

- THIS IS AN INSTRUMENT OF PROFESSIONAL SERVICE AND SHALL REMAIN THE PROPERTY OF CORNERSTONE ARCHITECTS, INC. WHETHER THE PROJECT FOR WHICH IT IS MADE IS EXECUTED OR NOT. NO CHANGES, ALTERATIONS, ADDITIONS OR DELETIONS MAY BE MADE HERETO EXCEPT BY THE ARCHITECT AND SHALL NOT BE USED OR REPRODUCED BY ANYONE ON OTHER PROJECTS OR FOR COMPLETION OF THIS PROJECT BY OTHERS WITHOUT THE EXPRESS WRITTEN CONSENT OF CORNERSTONE ARCHITECTS, INC.. SUBMISSION OR DISTRIBUTION TO MEET REGULATORY REQUIREMENTS OR FOR PURPOSES IN CONNECTION WITH THIS PROJECT IS NOT TO BE CONSTRUED AS PUBLICATION IN DEROGATION OF THE RIGHTS OF CORNERSTONE ARCHITECTS, INC. C COPYRIGHT 2015 CORNERSTONE ARCHITECTS, INC.
- ALL WORK AND MATERIALS SHALL BE IN FULL CONFORMANCE WITH THE LATEST FEDERAL, STATE AND LOCAL LAWS, CODES AND ORDINANCES, INCLUDING THEIR MOST RECENT REVISIONS, ADDITIONS, AMENDMENTS, AND INTERPRETATIONS. ALL SUCH CODES AND COMPLIANCE ARE TO BE DEEMED AS PART OF THIS CONTRACT AND PART OF THE CONSTRUCTION DOCUMENTS AS THEY HAVE BEEN WRITTEN IN FULL. IN THE EVENT OF CONFLICT, THE MOST STRINGENT REQUIREMENTS SHALL APPLY.
- ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE.
- HOLD INDICATED DIMENSIONS. DO NOT SCALE DRAWINGS. RESOLVE ANY DISCREPANCIES WITH THE ARCHITECT BEFORE BEGINNING WORK.
- IN THE CASE OF AN INCONSISTENCY BETWEEN THE DRAWINGS AND SPECIFICATIONS, OR WITHIN EITHER DOCUMENT NOT CLARIFIED BY ADDENDUM, THE BETTER QUALITY, MORE EXPENSIVE, OR GREATER QUANTITY OF WORK SHALL BE PROVIDED IN ACCORDANCE WITH THE ARCHITECTS INTERPRETATION.
- ALL CONSTRUCTION THAT IS ALREADY IN PLACE THAT IS TO REMAIN AS PART OF THE PROJECT SHALL BE PROTECTED FROM DAMAGE SHALL BE PROTECTED THROUGHOUT THE PERIOD OF CONSTRUCTION WORK. ANY DAMAGED CONSTRUCTION OR FEATURES SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR TO THE SATISFACTION OF THE OWNER WITH MATERIALS EQUIVALENT OR SUPERIOR TO THE ORIGINAL ITEM(S).
- IT SHALL BE THE RESPONSIBILITY OF EACH CONTRACTOR TO VERIFY ALL DIMENSIONS AND INSPECT CONDITIONS OF PRIOR WORK OF THE OTHER TRADES BEFORE STARTING WORK. PROCEEDING WITH THE WORK SHALL CONSTITUTE ACCEPTANCE OF PRIOR WORK.
- ALL ELECTRICAL OUTLETS, DATA & TELEPHONE OUTLETS/JACKS, SWITCHES, PULL STATIONS, THERMOSTATS, EXIT LIGHTS, AND ALL OTHER WALL MOUNTED ACCESSORIES SHALL BE ALIGNED VERTICALLY AND HORIZONTALLY WHEN IN PROXIMITY.
- UNLESS OTHERWISE SHOWN, PLACING OF ACCESS DOORS IN GYPSUM CEILINGS SHALL NOT BE ACCEPTED. LOCATE AND INSTALL ALL WORK AS REQUIRED TO PRECLUDE THE NEED FOR ACCESS THROUGH THE CEILINGS. COORDINATION OF THIS REQUIREMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- PROVIDE BLOCKING IN PARTITIONS AS REQUIRED FOR ALL MILLWORK, CASEWORK, ACCESSORIES OR OTHER SIMILAR ITEMS ATTACHED TO WALLS. ALL WOOD BLOCKING TO BE FIRE-RETARDENT TREATED AS REQUIRED BY CODE, CONTINUOUS FROM STUD TO STUD.
- ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED PER MANUFACTURE'S WRITTEN INSTRUCTIONS.
- SEALANT, CAULKING, AND FLASHING LOCATIONS SHOWN ON DRAWINGS ARE NOT INTENDED TO BE INCLUSIVE. FOLLOW MANUFACTURE'S INSTALLATION RECOMMENDATIONS AND STANDARD INDUSTRY AND BUILDING PRACTICE.
- IN ALL CASES WHERE WORK DEPICTED IN THESE DRAWINGS REPRESENTS A COMPLETE SYSTEM COMPOSED OF SEPARATE PARTS, IT IS THE RESPONSIBILITY OF THE OMGENERAL CONTRACTOR TO PROVIDE ALL OF THE PARTS, COMPONENTS, ACCESSORIES, HARDWARE, FASTENERS, ETC. REQUIRED FOR A COMPLETE AND FULLY FUNCTIONING ASSEMBLY WITHIN THE DEFINITIONS OF NORMAL INDUSTRY STANDARDS, WHETHER OR NOT THESE MISCELLANEOUS ITEMS ARE DIRECTLY SPECIFIED IN THE CONSTRUCTION DOCUMENTS.

ABBREVIATIONS

A.F.F.	ABOVE FINISHED FLOOR
ABV.	ABOVE
AC	AIR CONDITIONING
ADJ.	ADJUSTABLE
ALUM.	ALUMINUM
ALT.	ALTERNATE
ASPH.	ASPHALT
B.O.	BOTTOM OF
BD.	BOARD
BLDG.	BUILDING
BLKG.	BLOCKING
BLW.	BELOW
BM.	BEAM
BTW.	BETWEEN
CMU	CONCRETE MASONRY UNIT
COL.	COLUMN
CONC.	CONCRETE
CAB.	CABINET
CLO.	CLOSET
CLR.	CLEAR
CONT.	CONTINUOUS
COORD.	COORDINATE
CTR	CENTER
DEMO	DEMOLITION
DIA.	DIAMETER
DR.	DOOR
DN.	DOWN
DIM.	DIMENSION
DTL.	DETAIL
ELEV.	ELEVATINO
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
EXT.	EXTERIOR
F.G.	FINISHED GRADE
F.O.C.	FACE OF CONCRETE
F.O.F.	FACE OF FINISH
F.O.M.	FACE OF MASONRY
F.O.S.	FACE OF STUD
FDN.	FOUNDATION
FR.	FRAME
FIN.	FINISH
FLR.	FLOOR
FRPR.	FIREPROOFING
FTG.	FOOTING
GALV.	GALVANIZED
GWB	GYPSUM WALLBOARD
GL.	GLASS
GC	GENERAL CONTRACTOR
H.W.	HOT WATER
H.C.	HOLLOW CORE
HM	HOLLOW METAL
HB	HOSEBIB
HDR.	HEADER
HDW	HARDWARE
I.D.	INSIDE DIAMETER
INSUL.	INSULATION
INT.	INTERIOR
J.H.	JOIST HANGER
JB	JUNCTION BOX
JST.	JOIST
K.D.	KILN-DRIED
LAV.	LAVATORY
LT.	LIGHT
MAT	MATERIAL
MAX	MAXIMUM
MFR.	MANUFACTURER
MIN.	MINIMUM
MO	MASONRY OPENING
MIR.	MIRROR
MTL.	METAL
(N)	NEW
N.T.S.	NOT TO SCALE
NIC	NOT IN CONTRACT
o/	OVER
OC	ON CENTER
OPNG.	OPENING
OPP.	OPPOSITE
P.T.	PRESSURE TREATED
PL.	PLATE
PLAM.	PLASTIC LAMINATE
PLYWD	PLYWOOD
PNL.	PANEL
PTD.	PAINTED
RO	ROUGH OPENING
R.W.L.	RAINWATER LEADER
RESIL.	RESILIENT
REQ'D	REQUIRED
RM.	ROOM
RTG	RATING
RAD./R.	RADIUS
S.A.D.	SEE ARCHITECTURAL DWGS
S.A.S.F.	SELF-ADHERED SHEET FLASHING
S.C.	SOLID CORE
S.C.D.	SEE CIVIL DRAWINGS
S.L.D.	SEE LANDSCAPE DWGS
S.S.	STAINLESS STEEL
S.S.D.	SEE STRUCTURAL DWGS
SIM.	SIMILAR
SPEC	SPECIFICATIONS
STL.	STEEL
STN.	STAIN
SQ.	SQUARE
SFTY	SAFETY
T&G	TONGUE AND GROOVE
T.O.	TOP OF
T.O.C.	TOP OF CONCRETE
T.O.S.	TOP OF STEEL
T.O.P	TOP OF PLATE
TYP.	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
V.I.F.	VERIFY IN FIELD
W.O.	WHERE OCCURS
w/	WITH
WC	WATER CLOSET
WDW.	WINDOW
WD.	WOOD
WH	WATER HEATER

LOCATION MAP

PROJECT INFORMATION

PROJECT DESCRIPTION:
UPGRADES AND REPLACEMENT OF HVAC EQUIPMENT TO BE EQUIPPED WITH AIR CONDITIONING AT THE EXISTING NORTH WING. RELATED WORK INCLUDES REPLACEMENT OF CEILINGS & LIGHTING, ELECTRICAL UPGRADES, AND MINOR EXTERIOR WORK

USE & OCCUPANCY CLASSIFICATION - *CHAPTER 3*
EDUCATION (E) - K-12 EDUCATION

FIRE SUPRESSION SYSTEM: FULLY SPRINKLERED, NFPA 13 SYSTEM

CONSTRUCTION TYPE (PER NFPA 101 LIFE SAFETY CODE, 2012 EDITION)
TYPE II(000)

CONSTRUCTION TYPE (PER MBC)
TYPE 2B

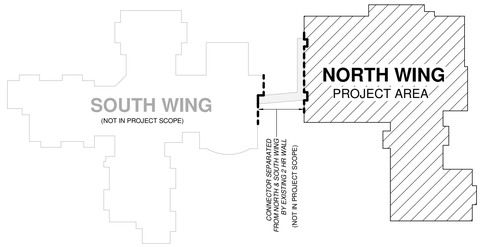
CORRIDORS
ALL NEW WORK SHALL MAINTAIN 1-HR RATING OF CORRIDOR WALLS AS REQUIRED PER MBC 1020.1

TOTAL AREA OF NORTH WING: 46,407 SF *(NO CHANGE)*

OCCUPANT LOAD: 1,498 *(NO CHANGE)*

THIS RENOVATION TO SN EXISTING SCHOOL BUILDING IS DESIGNED IN ACCORDANCE WITH THE FOLLOWING CODES THAT GOVERN STATE OF MICHIGAN PROJECTS:

MICHIGAN BUILDING CODE.....2015
MICHIGAN MECHANICAL CODE....2021
MICHIGAN PLUMBING CODE.....2021
MICHIGAN ELECTRICAL CODE....2023
NFPA 101.....2012



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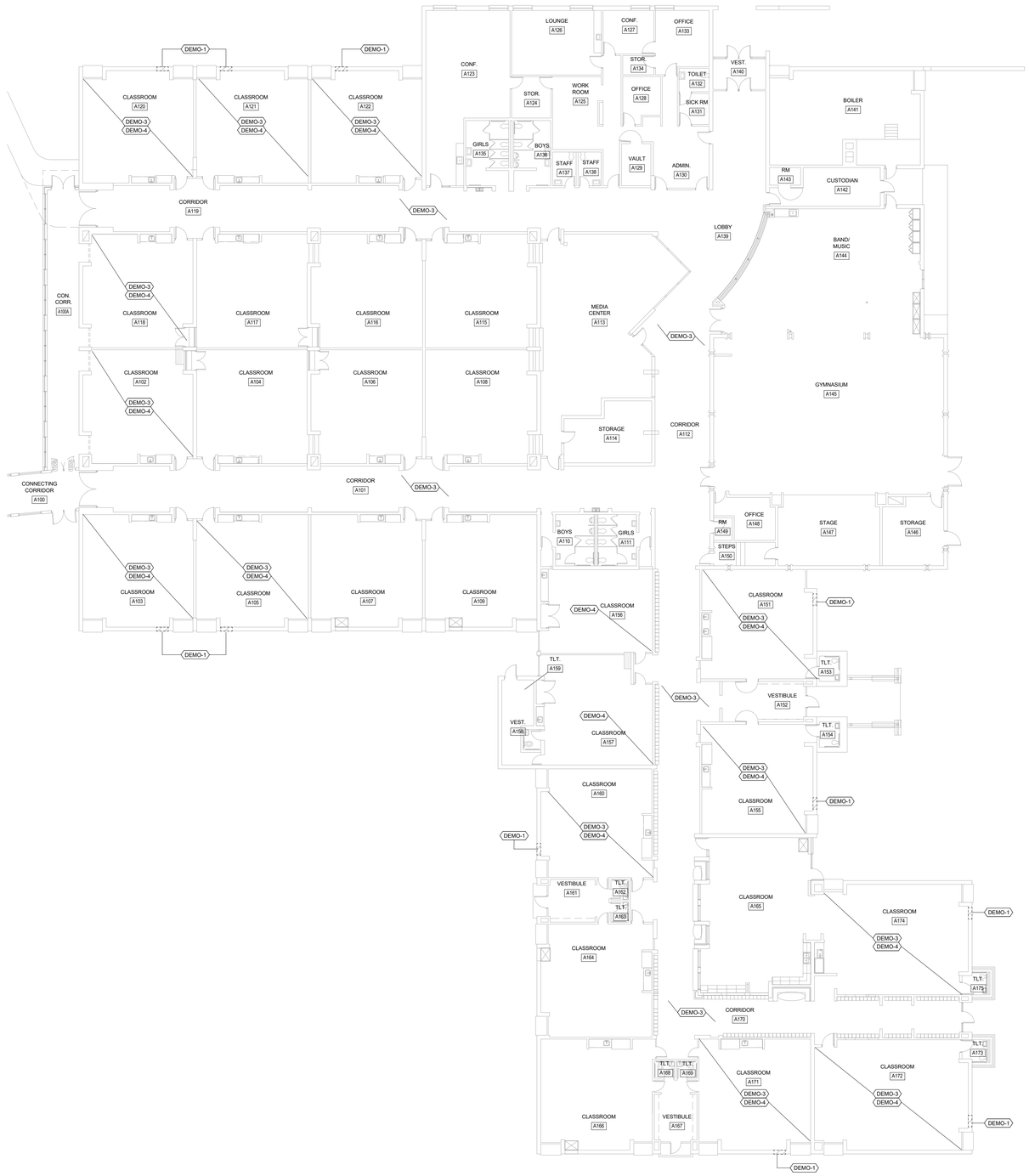

NORTH WING DEMO PLAN
SCALE: 1/16" = 1'-0"

GENERAL DEMO NOTES

- THE GENERAL CONTRACTOR SHALL FURNISH ALL LABOR AND MATERIALS REQUIRED TO COMPLETE DEMOLITION, REMOVAL AND RE-USE OF ALL ITEMS SHOWN ON DRAWINGS.
- OBTAIN PROPER PERMITS PRIOR TO THE COMMENCEMENT OF DEMOLITION. ALL SUBMITTAL AND FEES ARE THE RESPONSIBILITY OF THE G.C.
- ALL WORK DEMOLISHED SHALL BE REMOVED FROM THE PREMISES DAILY, EXCEPT ITEMS TO BE REUSED OR RETURNED TO THE OWNER, OR AS DIRECTED OTHERWISE. REMOVE AND DISPOSE OF ALL MATERIALS IN A LEGAL MANNER, USING LABOR, MATERIALS AND EQUIPMENT AS NECESSARY.
- REFER TO ATTACHED FLOOR PLANS FOR EXISTING CONSTRUCTION TO REMAIN, EXTENT OF DEMOLITION, AND SCHEDULED ITEMS FOR RELOCATION. THE OWNER RETAINS ALL SALVAGE RIGHTS. REVIEW WITH THE OWNER ALL ITEMS OF POTENTIAL SALVAGE AND STORE APPROPRIATELY. THE USE OF NON-SALVAGED ITEMS IN NEW CONSTRUCTION NOT PERMITTED WITHOUT WRITTEN PERMISSION FROM THE OWNER AND THE ARCHITECT. ITEMS NOT APPROVED FOR SALVAGE BY THE OWNER, ARE TO BE PROPERLY DISPOSED OF BY THE G.C. ALL EXISTING DOORS, FRAMES, HARDWARE, ELECTRICAL FIXTURES, CABINETRY, AND OTHER BUILDING STANDARD COMPONENTS REMOVED DURING DEMOLITION AND NOT REUSED FOR THIS PROJECT SHALL BE TAGGED AND STORED AS DIRECTED BY BUILDING MANAGEMENT/OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING ADEQUATE PRECAUTIONS TO PROTECT BUILDING OCCUPANTS, MATERIALS AND EXISTING FINISHES THROUGHOUT ALL PHASES OF CONSTRUCTION AREAS AND OCCUPIED OR PUBLIC AREAS TO BE MAINTAINED BY CONTRACTOR. PROTECT OR TEMPORARILY REMOVE ALL ITEMS THAT ARE EXISTING TO REMAIN. RESET TEMPORARY REMOVALS ACCURATELY AND SECURELY. DAMAGE TO EXISTING TO REMAIN CONSTRUCTION, MATERIALS OR EQUIPMENT TO BE RESTORED TO ORIGINAL CONDITION OR AS OUTLINED IN THE CONSTRUCTION DOCUMENTS.
- THE GENERAL CONTRACTOR SHALL ERECT ALL NECESSARY PLASTIC DROP CLOTH PARTITIONS, BARRICADES, AND OTHER METHODS OF DUST CONTROL TO ASSURE A SAFE AND NEAT DEMOLITION PROCESS AND TO PROTECT ADJACENT BUILDING PROPERTIES. THE USE OF EXPLOSIVES AND BURNING ARE NOT PERMITTED.
- TEMPORARILY SHORE AND SUPPORT ANY AREA OF DEMOLITION IN WALLS, FLOORS, CEILING ASSEMBLIES, THAT ARE STRUCTURAL. PROTECT ALL WORK IN PLACE.
- DEMOLITION AND TRENCHING, CUTTING, BORING, AND REPAIR ASSOCIATED WITH TRADES IS THE RESPONSIBILITY OF THAT TRADE. COORDINATE WITH THE G.C. PRIOR TO DEMOLITION WORK.
- ALL TRADES ARE TO REVIEW EXISTING CONDITIONS AND INCLUDE DEMOLITION OF EXISTING SYSTEMS AS REQUIRED BY SCOPE OF NEW WORK.
- THE GENERAL CONTRACTOR SHALL REMOVE ALL WALL CONDUITS, SWITCH PLATES, TELEPHONE OR ELECTRICAL WIRING OR EQUIPMENT, ETC.. TO THE SOURCE AFTER WALL DEMOLITION.
- REMOVE EXISTING MECHANICAL COMPONENTS AS REQUIRED TO ACCOMMODATE NEW HVAC DESIGN AND DUE TO CEILING RELATED WORK, SALVAGE DEVICES AS PRACTICAL FOR REUSE. CLEAN/REPLACE SUPPLY AIR DIFFUSERS AND RETURN AIR GRILLES, CALIBRATE AND RELOCATE THERMOSTATS, AND INSTALL NEW DUCTWORK AS REQUIRED.
- REMOVE EXISTING AND/OR RELOCATE EXISTING LIGHT FIXTURES AND OTHER CEILING DEVICES AS REQUIRED TO ACCOMMODATE REFLECTED CEILING PLAN, ALL EXISTING FIXTURES DEVICES SHALL BE CLEANED, (INCLUDING LENS), DAMAGED PARTS REPAIRED OR REPLACED, AND RELAMPED AS NECESSARY.
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- COORDINATE WALL DEMO WITH LOCATION OF NEW COLUMN GRID.

DEMOLITION LEGEND

THE FOLLOWING SCOPE OF WORK APPLIES TO ALL AREAS OF DEMOLITION WORK. CONSTRUCTION MANAGER TO FIELD VERIFY THE EXTENT OF THE WORK AND THE EXISITING CONDITIONS PRIOR TO THE START OF WORK

DEMO-1 REMOVE PORTION OF WALL FOR NEW LOUVER OPENING. COORDINATE w/ STRUCTURAL AND REFER TO STRUCTURAL DRAWINGS FOR HEADER/LINTEL. PROVIDE TEMPORARY SHORING FOR BEARING WALLS.

DEMO-2 *NOT USED*

DEMO-3 REMOVE EXISTING CEILING & RADIANT CEILING PANELS FOR INSTALLATION OF NEW DUCTOWRK & NEW CEILING. SEE NEW CONSTRUCTION CEILING PLANS

DEMO-4 REFER TO MECHANICAL & ELECTRICAL DEMO DRAWINGS FOR REMOVAL OF EXISTING SYSTEMS

DEMO-5 REMOVE EXISTING CEILING AS REQ'D FOR NEW CONSTRUCTION. SEE NEW CONSTRUCTION CEILING PLANS

DEMOLITION SYMBOL LEGEND

EXISTING TO BE DEMOLISHED

EXISTING WALL TO REMAIN

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Date	Issued For
01/17/25	BID SET

PIC:
PM:
DRAFTS:
PROJECT NO:
22.516ES
SHEET TITLE:
NORTH WING DEMO PLAN

AD100

DEMO CEILING PLAN
SCALE: 1/16" = 1'-0"

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EXISTING TO BE DEMOLISHED	
EXISTING WALL TO REMAIN	

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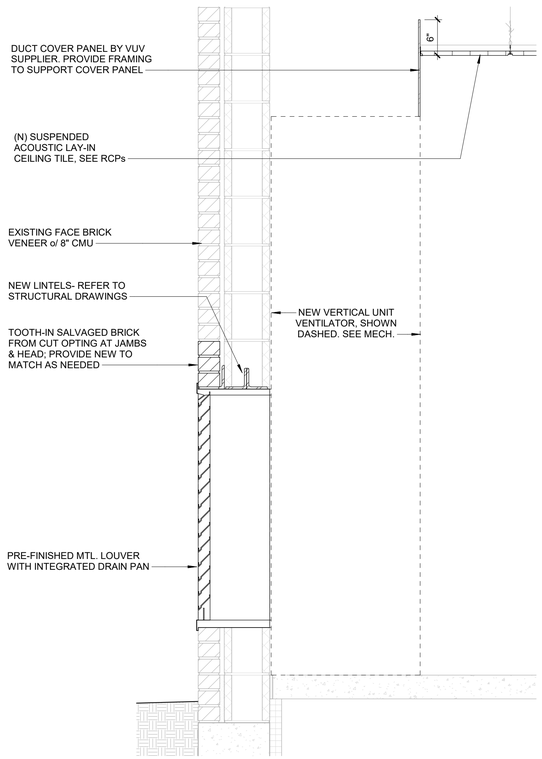
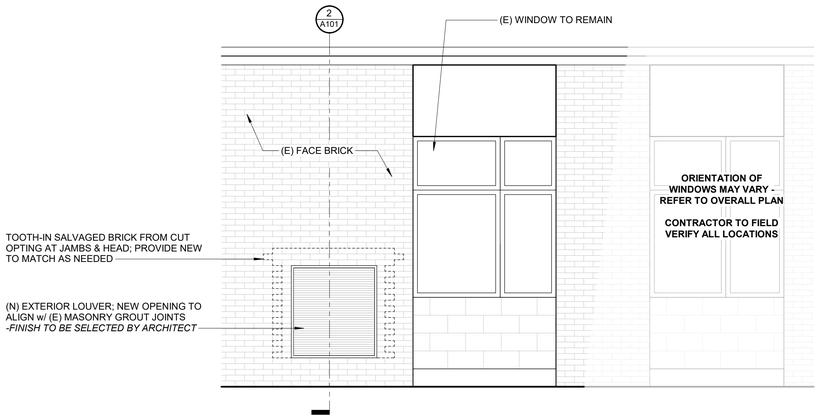
AD200



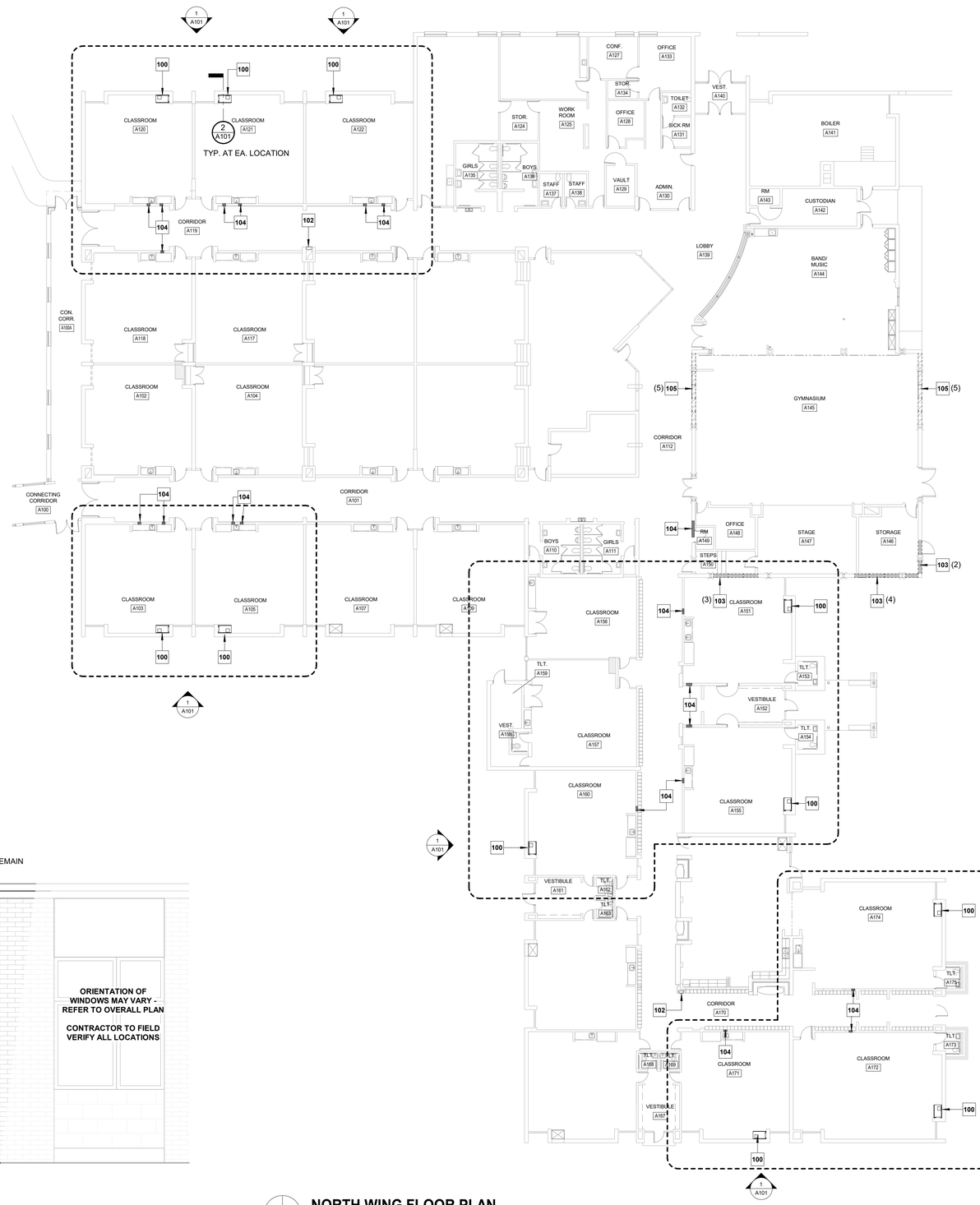
2 A101 TYP. SECTION AT VUV/LOUVER

SCALE: 1" = 1'-0"



1 A101 TYP. ELEVATION AT (N) LOUVER

SCALE: 3/8" = 1'-0"



NORTH WING FLOOR PLAN

SCALE: 1/16" = 1'-0"

GENERAL FLOOR PLAN NOTES

- **ALL OPENINGS CREATED BY REMOVED DUCTWORK OR PIPING SHALL BE INFILLED WITH WALL CONSTRUCTION EQUAL TO OR GREATER THAN 1-HOUR FIRE RESISTANCE RATING AT CORRIDOR WALL PENETRATIONS FOR TO BE**
- **ALL WALL PENETRATIONS AT CORRIDOR WALLS SHALL BE PROTECTED IN ACCORDANCE TO MBC SECTION 714.3 OR WITH APPROVED FIRESTOP SYSTEM**
- ALL INTERIOR DIMENSIONS ARE TO FACE OF FRAMING, U.O.N.
- REFER TO WALL SECTION AND WALL TYPE LEGEND FOR WALL CONSTRUCTION
- REFER TO MECHANICAL & ELECTRICAL DRAWINGS FOR EQUIPMENT MOUNTING REQUIREMENTS

GENERAL INTERIOR FINISH NOTES

- PROVIDE INTERIOR WALL TOUCH-UP, PATCHING, & PAINTING AS REQ'D AT ALL NEW WORK LOCATIONS
- ALL FLOORING TO BE PROTECTED WHERE NEW WORK IS TO OCCUR. ANY INCIDENTAL DAMAGE TO EXISTING FLOORING DUE TO NEW CONTRUCTION WORK WITHOUT PROPER PRECAUTIONS/PROTECTION SHALL BE RESPONSIBILITY OF CONTRACTOR TO REPAIR AT NO ADDITIONAL COST.

FLOOR PLAN KEYNOTE LEGEND

100 (N) VERTICAL UNIT VENTILATOR: PROVIDE (N) STEEL LINTEL AT (E) MASONRY WALL FOR MECH. LOUVER. COORDINATED w/ MECH.

102 MODIFY (E) MASONRY OPENINGS AS REQ'D FOR REPLACEMENT OF (E) ELEC. PANEL. COORD. w/ ELEC.

103 ABANDON (E) EXTERIOR LOUVER; CAP AT INTERIOR w/ INSULATED METAL INFILL PANEL, SEE MECH. DETAIL

104 INFILL CORRIDOR WALL PENETRATION WHERE (E) DUCT IS REMOVED w/ 1-HR RATED CONSTRUCTION: 3-5/8" METAL STUD FRAMING w/ 5/8" TYPE X GYP. BOARD AT BOTH SIDE, FILL VOID w/ FIBERGLASS BATT INSULATION (UL DESIGN U465). COORDINATE w/ MECH. DRAWINGS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS & INFILL AS REQ'D

105 INFILL EXISTING FRAME WITH INSULATED METAL WINDOW PANEL WHERE (E) LOUVER IS REMOVED. CONTRACTOR TO FIELD VERIFY THICKNESS REQ'D - REFER TO SPEC SECTION 07.42.00

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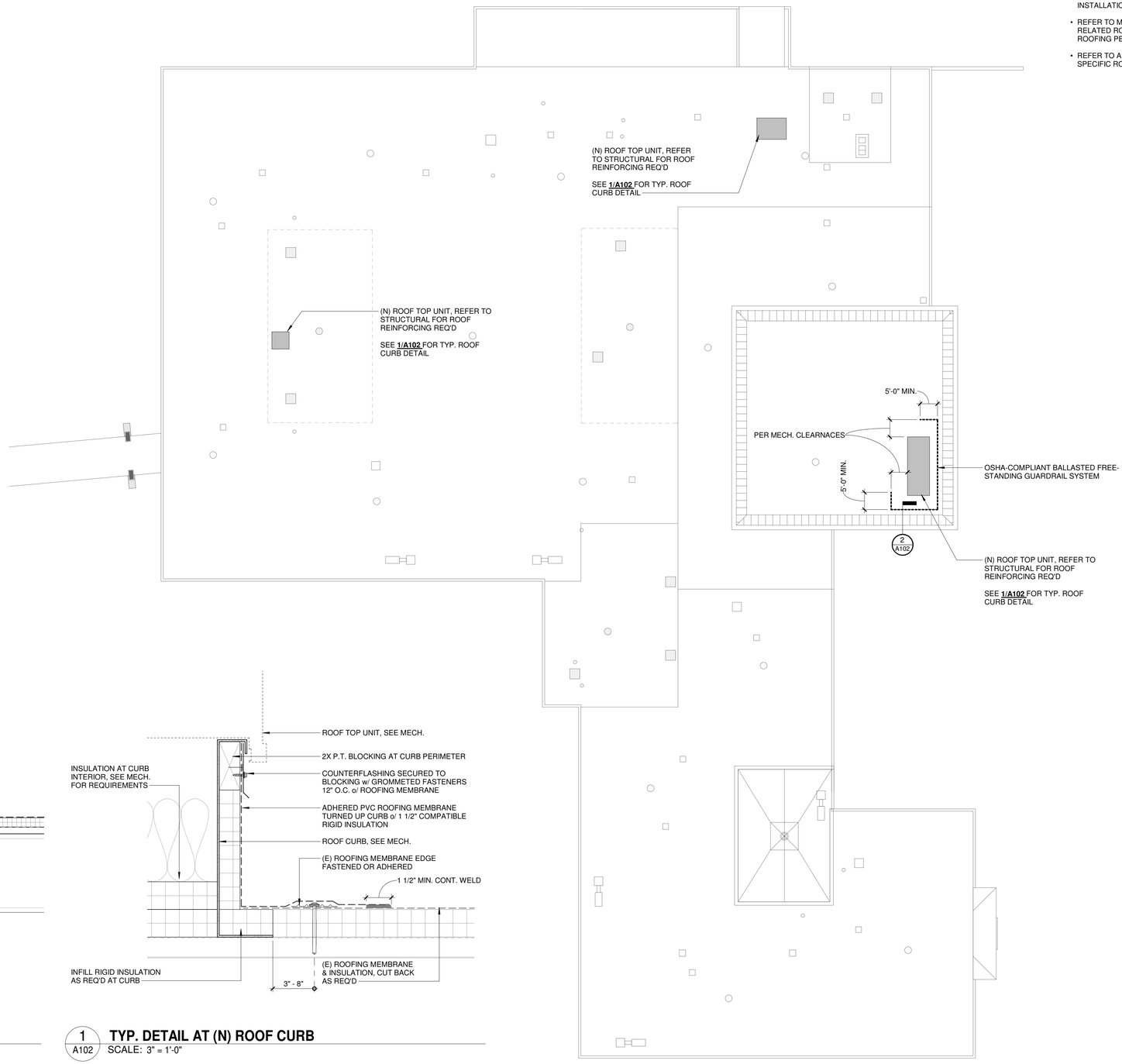
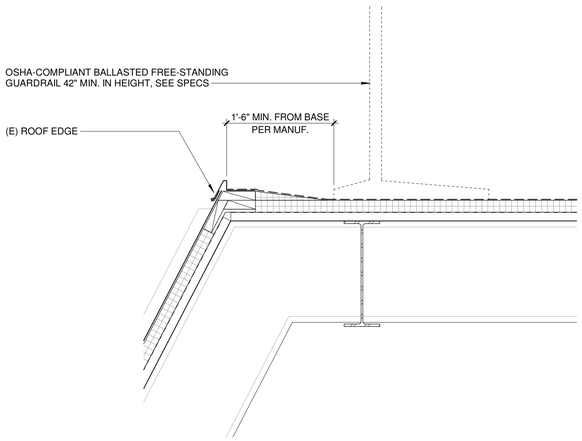
GENERAL ROOF NOTES

- AT FLAT ROOFS PROVIDE MIN. **1/8" SLOPE PER FOOT** TO ROOF DRAINS AT TAPERED INSULATION
- REFER TO ROOF MEMBRANE MANUFACTURER'S WRITTEN GUIDLINES FOR ATTACHEMENT & INSTALLATION METHODS
- REFER TO MECHANICAL/PLUMBING DRAWINGS FOR RELATED ROOF PENETRATIONS. COORDINATE ROOFING PENETRATIONS WITH ALL OTHER TRADES
- REFER TO ARCHITECTURAL SECTIONS & DETAILS FOR SPECIFIC ROOF EDGE AND PARAPET CONDITIONS





2 A102 **SECTION AT ROOF EDGE & GUARD**
SCALE: 1" = 1'-0"

1 A102 **TYP. DETAIL AT (N) ROOF CURB**
SCALE: 3" = 1'-0"

NORTH WING ROOF PLAN
SCALE: 1/16" = 1'-0"

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ELEMENTARY SCHOOL

HVAC UPGRADES

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Date	Issued For
01/17/25	BID SET

PIC:
PM:
DRAFTS:
PROJECT NO:
22.516ES
SHEET TITLE:
NORTH WING ROOF PLAN

A102

FIRST FLOOR RCP
SCALE: 1/16" = 1'-0"

CEILING FINISH LEGEND

CEILING TYPE

HEIGHT ABOVE FINISH FLOOR

A — REPLACE EXISTING w/ SUSPENDED 2'-0" x 2'-0" SQUARE EDGE LAY-IN ACOUSTICAL CEILING TILE; MATCH EXISTING CEILING HEIGHT

REMOVE, PROTECT, & REINSTALL (E) LIGHT FIXTURES AT ALL LOCATIONS WHERE CEILING TO BE REPLACED. CONTRACTOR TOVERIFY QUANITIES & TYPES IN THE FIELD

- **CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS PRIOR TO INSTALLATION OF (N) CEILING**
- *LIGHTING & HVAC SYMBOLS SHOWN FOR PLACEMENT AND REFERENCE. COORDINATE w/ ELEC. & MECH. DRAWINGS*
- *USE MOLD RESISTANT DRYWALL AT WET LOCATIONS*

REFLECTED CEILING PLAN KEYNOTE LEGEND

200 REMOVE (E) CEILING FOR INSTALLTION OF (N) REINF. STEEL AND/OR (N)MECH. COMPONENTS/EQUIPMENT; REINSTALL CEILING & PROVIDE NEW AS REQ'D

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SHEET TITLE:
NORTH WING RCP

A201

STRUCTURAL SPECIAL INSPECTION SCHEDULE (2015 IBC - Chapter 17)

row #	ITEM	CONT[2]	PERIODIC[2]	REFERENCE STANDARD	NOTES
1	PRE-FABRICATED CONSTRUCTION (1704.2.5)				3&4
2					
3	STRUCTURAL STEEL CONSTRUCTION (1705.2)				13
7	Verify Structural Steel Materials		X	ASTM A 6/ASTM A 568	
8	Verify Weld Filler Materials		X	AISC 360 - A3.5	
10	Single-pass Fillet Welds ≤ 5/16", Anchor / Stud Welds, Stair / Railing Welds		X	AWS D1.1	6

STRUCTURAL SPECIAL INSPECTION SCHEDULE NOTES:

1. Items marked with an 'X' shall be inspected in accordance with chapter 17 of the building code by a certified special inspector from an established testing agency. For material sampling and testing requirements, refer to the project specifications and the specific general notes, sections. The testing agency shall send copies of all structural testing and inspection reports directly to the architect, engineer, contractor, and building official. Any items which fail to comply with the approved construction documents shall immediately be brought to the attention of the contractor for correction. If discrepancies are not corrected, they shall be brought to the attention of the building official, architect, and engineer prior to completion of that phase of the work. Special inspection testing requirements apply equally to all bidder designed components.
2. Continuous special inspection means the full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed. Periodic special inspection means the part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work. (sect 1702)
3. Special inspection is not required for work performed by an approved fabricator per section 1704.2.5.1.
4. Inspection for pre-fabricated construction shall be the same as if the material used in the construction took place on site. Continuous inspection will not be required during pre-fabrication if the approved agency certifies the construction and furnishes evidence of compliance.
5. Not used.
6. All welds shall be visibly inspected.
7. Not used.
8. Not used.
9. Not used.
10. Not used.
11. Not used.
12. Not used.
13. Special inspection for structural steel shall be per AISC 303, Section 8 or the project contract documents, whichever is more stringent.
14. Any construction or material that has failed inspection shall be subject to removal and replacement.
15. This table and notes represent code requirements for structural portions of the project and is not a complete representation of what may be required by chapter 17 of the building code. See chapter 17 and project specifications for additional requirements.

STRUCTURAL ABBREVIATION INDEX

ABBREV.	ITEM
A/E	Architect/Engineer
AB	Anchor Bolt/Column Anchor Rod
ACIP	Augered Cast In Place
AESS	Architecturally Exposed Structural Steel
AFF	Above Finished Floor
ALT	Alternate
AP	Anchor Plate
ARCH	Architectural
BB	Bond Beam
BC	Bottom Chord
BCX	Bottom Chord Extension
BFF	Below Finished Floor
BL	Brick Ledge
BM	Beam
BO	Bottom of
BOS	Bottom of Steel
BP	Bearing Plate
BRG	Bearing
BT	Bent
C/C	Center-to-Center
CANT	Cantilever
CBP	Column Base Plate
CFMF	Cold Formed Metal Framing
CFMT	Cold Formed Metal Truss
CJ	Construction Joint
CJ	Contraction Joint
CJ	Control Joint
CJP	Complete Joint Penetration Weld
CL	Centerline
CLR	Clear
CMU	Concrete Masonry Unit
COL	Column
CONC	Concrete
CONN	Connection, Connect
CONT	Continuous
COORD	Coordinate
DA	Deck Angle
DB	Deck Bar
DBE	Deck Bearing Elevation
DIA, Ø	Diameter
DP	Deck Plate
DWG	Drawing(s)
EA	Each
EF	Each Face
EL	Elevation
EQ	Equal
ES	Each Side
EW	Each Way
EX	Existing
EXP	Expansion
EXT	Exterior
FD	Floor Drain
FDN	Foundation
FF	Finished Floor
FFE	Finished Floor Elevation
FP	Foundation Pier
FS	Far Side
FTG, F	Footing
FV	Field Verify
GA	Gauge
GALV	Galvanized
GB	Grade Beam
GS	Grout Solid
GT	Girder Truss
HD	Hold Down Anchor
HORZ	Horizontal
HP	High Point
HS	Headed Stud
HT	Height
ID	Inside Diameter
IF	Inside Face

STRUCTURAL ABBREVIATION INDEX

ABBREV.	ITEM
INT	Interior
JB	Joist Bearing Elevation
L	Lintel
L	Angle
LAT	Lateral
LD	Load
LF	Linear Foot
LG	Long
LLH	Long Leg Horizontal
LLV	Long Leg Vertical
LOC'N	Location
LP	Low Point
LT	Light
LW	Long Way
LWB	Laminated Wood Beam
MAX	Maximum
MCJ	Masonry Control Joint
MECH	Mechanical
MIN	Minimum
NS	Near Side
NTS	Not To Scale
O/O	Out-to-Out
OC	On-Center
OD	Outside Diameter
OF	Outside Face
OFD	Overflow Drain
OH	Opposite Hand
P	Pier
PAF	Power Actuated Fastener
PC	Precast
PEMB	Pre-Engineered Metal Building
PERP	Perpendicular
PL	Plate
PT	Pressure Treated
R, RAD	Radius
RD	Roof Drain
RE:	Reference, Refer to
REINF	Reinforce
REM	Remainder
REQ'D	Required
RMW	Reinforced Masonry Wall
RTU	Roof Top Unit
RXN	Reaction
SC	Slip Critical
SF	Step Footing
SIM	Similar
SIP	Structural Insulated Panel
SOG	Slab On Grade
SPCS	Spaces
SS	Stainless Steel
SST	Simpson Strong Tie
STL	Steel
SW	Short Way
T&B	Top and Bottom
TC	Top Chord
TCX	Top Chord Extension
TO	Top of
TOB	Top of Beam
TOF	Top of Footing
TOL	Top of Ledge
TOM	Top of Masonry
TOS	Top of Steel
TOW	Top of Wall
TYP	Typical
UNO	Unless Noted Otherwise
VERT	Vertical
w/	With
w/o	Without
WF	Wall Footing
WP	Working Point
WWF	Welded Wire Fabric

GENERAL STRUCTURAL NOTES

1. All work shall be performed in accordance with the contract documents. In case of a conflict within the contract documents, the more stringent condition shall govern, unless directed otherwise by the engineer of record. Prior to implementation, any discrepancies shall be reported to the architect for clarification.
2. In the event that certain details of construction are not indicated or noted in the drawings, details for similar conditions that are indicated or noted shall be utilized, subject to the structural engineer's approval.
3. Openings and penetrations through structural elements, and items embedded in structural elements that are not indicated in the structural drawings shall be reviewed by the structural engineer prior to fabrication, erection and/or construction.
4. Materials or equipment shall not be placed on unfinished floors or roofs in excess of 20 psf nor on finished floors in excess of the design live loads which are indicated in the structural drawings. Impact loading shall be avoided.
5. The structure has been designed for the in-service loads only. The methods, procedures and sequences of construction are the responsibility of the contractor. Contractor shall take all necessary precautions to maintain and ensure the integrity of the structure at all stages of construction. Contractor shall immediately notify the structural engineer of any condition which, in his opinion, might endanger the stability of the structure or cause distress in the structure.
6. All existing conditions and all related dimensions indicated in the contract documents shall be field verified prior to fabrication, erection and/or construction. Any condition that differs from that indicated in the contract documents shall be submitted to the architect for review prior to fabrication, erection and/or construction.
7. The structure has been designed to meet or exceed serviceability requirements of section 1604.3 of the Michigan Building Code. All non-structural components & their connections that are anchored to the structure shall be designed to allow for the movement of the structure caused by wind, snow, live, thermal, shrinkage/creep and earthquake loads. Non-structural components include items such as non-load bearing walls, MEP components, bulkheads, etc.
8. Provide special inspection in accordance with chapter 17 of the Michigan Building Code and with project specifications.
9. Unless noted otherwise, all loads specified in these documents are nominal loads and are to be entered into the appropriate strength or allowable stress design load combinations with appropriate factors, as defined by ASCE 7, by the building component engineer in the design of their product. Gravity load shear beam reactions on plan for steel framing represent the combined service load effect from allowable stress design load combinations.
10. Copies or reproductions of architectural or structural drawings and details will not be accepted as shop drawings. Submittals recieved as such will not be reviewed and will be rejected.

CONCRETE MASONRY NOTES

1. Concrete masonry units shall conform to ASTM C90, below grade units shall be medium or normal weight.
2. Mortar shall conform to ASTM C270, and shall be made with Type I portland cement/lime or mortar cement. Mortar shall be Type S.
3. Grout shall conform to ASTM C476, with a minimum compressive strength of 2000 psi.
4. Reinforcing bars shall conform to ASTM A615, Grade 60, unless noted.
5. Provide layout shop drawings indicating lap splices, rebar spacing, bond beams, grout lifts, etc.
6. Horizontal joint reinforcing (continuous wire reinforcing) shall be hot-dipped galvanized ladder type fabricated units with a single pair of 9 gage side rods and 9 gage cross rods at 16" oc fabricated from cold drawn steel wire complying with ASTM A82.
7. Horizontal joint reinforcing shall be spaced at 16" oc in all masonry walls and shall be lapped 8", unless noted otherwise on the drawings.
8. No chases, risers, conduits or toothing of masonry shall occur in masonry walls within 18" of centerline of beam bearing.
9. Reinforcing shall be secured in place before grouting starts.
10. Vertical bars shall be held in position at top and bottom of grout lifts, and at intervals not exceeding 200 diameters of the reinforcing bar.
11. Vertical cells that will be grouted shall have a vertical alignment to maintain a continuous unobstructed cell area not less than 3" x 4".
12. All bolts, anchors, etc. inserted into the walls shall be grouted solidly into position.
13. Joist and beam bearing plates shall be centered on the member that they support, within a tolerance of 1" on either side of the member centerline.
14. Provide "Dur-O-Stop" grout screens (or equal) to terminate grout pours over open cells below, such as at bond beams.
15. Coordinate bond beam locations with Architectural & Structural drawings.
16. The masonry has been engineered, and shall be inspected in accordance with chapter 1 of TMS 402/ACI 530/ASCE 5 (Building Code Requirements for Masonry Structures). A minimum Level B Quality Assurance program is required. Periodic inspection shall be performed daily with a minimum of one inspection for every 1,500 square feet or portion thereof.
17. Masonry has been designed and shall be built in conformance to TMS 402/ACI 530/ASCE 5 (Building Code Requirements for Masonry Structures) and TMS 602/ACI 530.1/ASCE 6 (Specifications for Masonry Structures).
18. Contractor shall design and provide all temporary bracing required for strength and stability of the masonry throughout construction. At a minimum, comply with OSHA and local requirements for temporary bracing of walls.

CONCRETE MASONRY SPEC NOTES

1. Provide vertical control joints in all CMU walls at a maximum spacing of 24' or two times the wall height, whichever is less. Coordinate joint locations with the bearing plate layout such that no joint is located within 16" from the centerline of a bearing plate. Joint reinforcing shall be stopped either side of vertical joints.
2. Provide solid masonry or fill cores of block under all beam and lintel bearing points down to concrete wall or footing below.
3. All reinforced cells shall be grouted solid.
4. Spliced reinforcing shall be lapped 48 times the bar diameter, in inches.
5. Vertical reinforcing bars shall have a minimum clearance of 3/4 of an inch from the masonry and not less than one bar diameter between bars.
6. Grouting shall be stopped 1.5 inches below the top of a course so as to form a key at the pour.
7. Bond beams are intended to be open-cell with "Dur-O-Stop" or equivalent grout stop below. Vertical reinforcing shall extend through or into bond beam. All bond beams shall be filled with grout. Refer to Architectural & Structural drawings for locations.

STEEL NOTES

1. Structural steel shall be finished as follows:
   A. Non-fireproofed interior steel shall be shop painted with min. 1.5 mil dry film thickness of a rust inhibiting primer.
   B. Unless noted otherwise, exterior exposed steel, including veneer relief angles, shall be:
      - Galvanized and prepared for paint
2. Erector is to provide temporary bracing sufficient to hold frame in position until all construction necessary for building stability is complete.
3. Beam and lintel bearing on concrete and masonry wall shall be 8" unless otherwise shown. Provide beam bearing plates and wall anchors as required.
4. Camber beams upward the designated amount indicated on the structural drawings. Beams without a specified camber shall be oriented such that any incidental camber is upward.
5. All bolted moment, brace frame, and truss connections shall be done with slip critical bolts including the gravity shear connection. Slip critical joints shall be prepared with a Class A faying surface, and oversized holes in slip critical joints may be used at the fabricator's option.
6. Bolted connections not specified to be slip critical shall be tightened snug tight (all metal surfaces in contact).
7. Refer to specs. and Arch. drawings for all fireproofing requirements and UL assembly Nos. Beams and columns do not necessarily conform to minimum size requirements of the UL assembly. Adjust thickness of fireproofing as required based on (W/D) ratio as outlined in the latest edition of the "Fire Resistance Directory" by Underwriters" Laboratories, Inc. All beams and assemblies shall be considered unrestrained.
8. Where aluminum or steel will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer and applying sealant or tape, or by installing nonconductive spacers as recommended for this purpose.
9. All gusset plates to be minimum 3/8" thick. Unless noted otherwise, all column and beam web stiffeners and gusset plates shall be 3/8" thick.

STEEL SPEC NOTES

1. All steel shall be fabricated, detailed, and erected in accordance with AISC" Code of Standard Practice", ASTM A6 "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use", and Research Council on Structural Connections (RCSC) "Specifications for Structural Joints Using ASTM A325 or A490 Bolts."
2. Inspect all steel in accordance with Michigan Building Code and AISC requirements. At a minimum visually inspect all fillet welds, non-destructively test all full penetration welds, inspect all bolted connections, etc.
3. All welding shall be done in accordance with AWS D1.1 "Structural Welding - Steel."
4. All metal deck shall be in accordance with SDI Standards and Specifications. Floor deck shall be galvanized per ASTM A653/A653M, grade G60. Roof deck shall be cleaned, pretreated, and primed with manufacturer's baked-on, lead and chromate-free rust inhibitive primer. Deck supplier shall provide closures and edge stiffeners as required.
5. Deck strengths shall be as follows:
   A. Roof Deck shall be minimum 33 ksi

STEEL NOTES

1. Unless otherwise shown on plans, provide lintels for masonry walls and veneer as follows:

   For 6" Walls
   (2)L3-1/2x2-1/2x5/16, spans to 6'-0"
   For each 4" of wall thickness:
   (1)L3-1/2x31/2x1/4, SPANS TO 4'-0"
   (1)L4x3-1/2x5/16, SPANS TO 6'-0"
   (1)L5x3-1/2x5/16, SPANS TO 8'-0"

ENGINEERING DATA

Design stresses

Steel	
W shapes	Fy = 50000 psi
Rectangular HSS shapes (A500 Gr. C)	Fy = 46000 psi
Round HSS & Pipe shapes (A500)	Fy = 42000 psi
All other shapes	Fy = 36000 psi
Welding electrode	E70XX
Masonry	
CMU	f'm = 2000 psi
Grout	f'c = 2250 psi
Reinforcing steel	Fy = 60000 psi

Structural design requirements

Roof live load	20 psf
Risk Category	III
Roof snow load	
Ground snow load (Pg)	50 psf
Flat roof snow load (Pf)	39 psf + Drift
Snow exposure (Ce)	1.0
Snow load importance factor (I)	1.1
Thermal factor (Ct)	1.0
Wind Load	
Ultimate design wind speed (3 sec)	115 mph
Wind exposure category	B
Internal pressure coeff (GCpi)	0.18
Components & cladding (varies)	
Wall stud design pressure	varies - per ASCE7
Earthquake	
Seismic importance factor, Ie	1.25
Spectral response	Ss = 0.051
	S1 = 0.032
	SDs = 0.054
	SD1 = 0.052
Site class	D
Seismic design category	A
Basic seismic force resisting system:	
Ordinary reinforced masonry shear walls	
Design base shear	0.034W
Seismic response coefficient Cs	0.034
Response Modification Factor R	2
Analysis Procedure	"Equivalent lateral force"

Specific Design Loads

Roof dead loads	
Roofing (Adhered)	2
Insulation	4
Metal deck	3
Structure	5
Ceiling	3
M/E/P	3
Fire protection	3
Misc	2
	25 psf Total

Design codes

General building code	Michigan Building Code 2015
Steel	AISC 360 - ASD
Masonry	TMS 402/ACI 530/ASCE 5
Environmental Loads	ASCE 7

EXISTING BUILDING NOTE:

THIS PROJECT IS AN ADDITION AND EXTENSION OF AN EXISTING BUILDING. THE DRAWINGS REFLECT WHAT IS KNOWN ABOUT THE EXISTING BUILDING, BUT EXISTING CONDITIONS MUST BE VERIFIED BEFORE FABRICATION AND CONSTRUCTION. ABUTTING CONSTRUCTION MUST MATCH UP. VERIFY ALL SUCH CONDITIONS, AND NOTIFY A/E IF ACTUAL CONDITIONS DIFFER FROM THE CONTRACT DOCUMENTS. AN ATTEMPT HAS BEEN MADE TO ANTICIPATE CONDITIONS IN THE EXISTING STRUCTURE.

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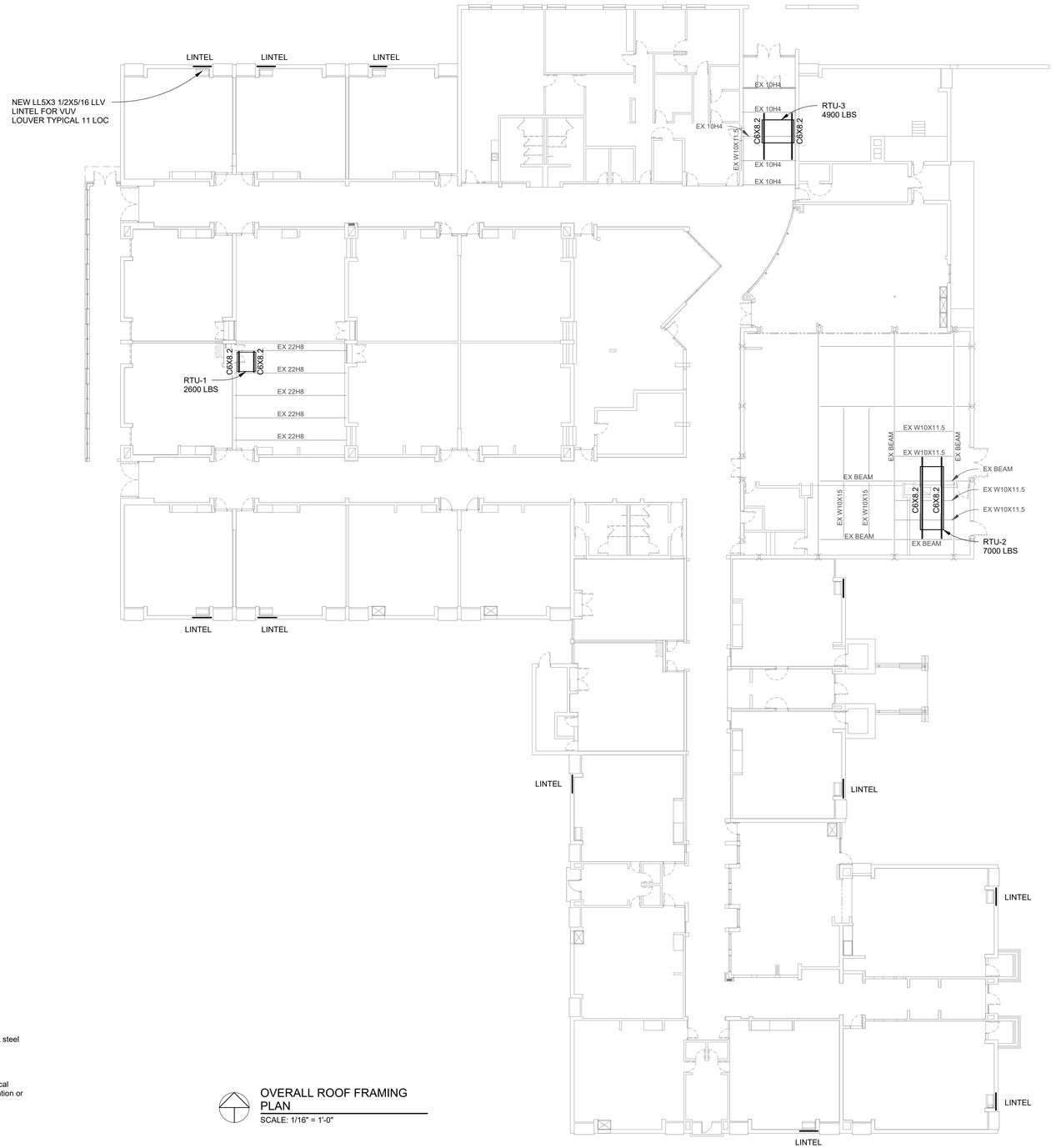
306 PLUM ST. GRAYLING, MI 49738

Date	Issued For
01/17/2025	BID SET

PIC: T. Nemitz
PM: J. Cardinal
DRAFTS: M. Fox
PROJECT NO:
22.516ES
SHEET TITLE:
STRUCTURAL NOTES & SCHEDULES
S0.1



OVERALL ROOF FRAMING PLAN

SCALE: 1/16" = 1'-0"

ROOF FRAMING PLAN NOTES

1. Steel bar joists:
   A. Horizontal bridging shall be welded (1/8" fillet weld) to top and bottom chord at steel bar joist.
2. Roof top mechanical equipment:
   A. Refer to Mechanical drawings for exact size, qty and location of mechanical equipment.
   B. Mechanical equipment weight shall be as indicated on plan and/or in mechanical equipment schedules. Any deviation or discrepancy in equipment weight, location or quantity shall be reported to the architect and structural engineer.
   C. Provide support framing under all mechanical unit curbs and around all roof penetrations.

EXISTING BUILDING NOTE:

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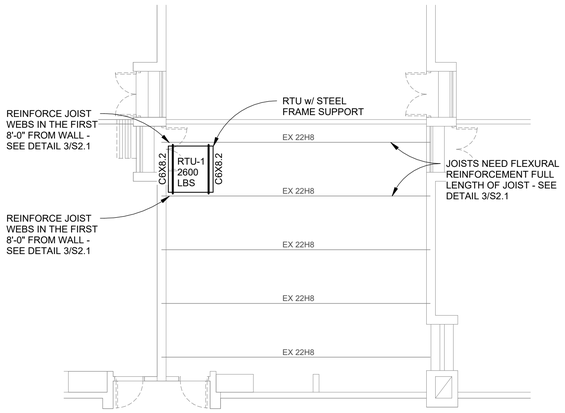
Date	Issued For
01/17/2025	BID SET

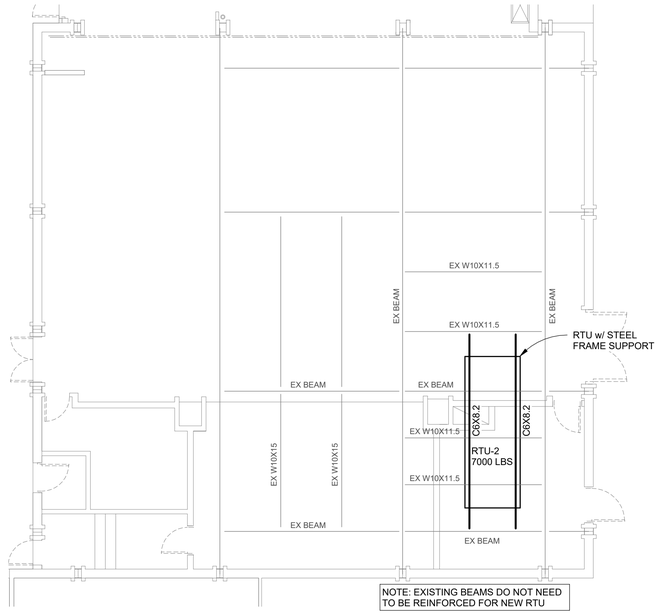
PIC: T. Nemitz
PM: J. Cardinal
DRAFTS: M. Fox
PROJECT NO: 22.516ES
SHEET TITLE: OVERALL ROOF FRAMING PLAN

S1.1



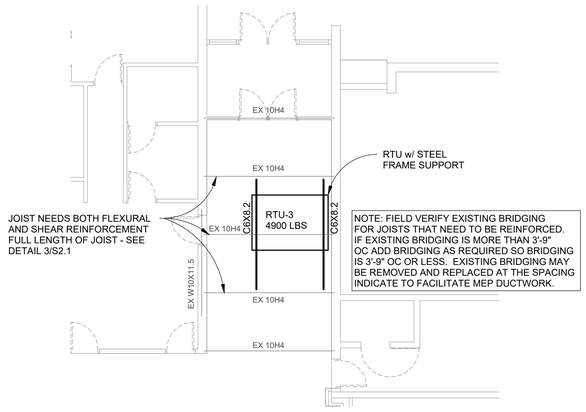
1 S1.2 RTU-1 FRAMING PLAN

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



2 S1.2 RTU-2 FRAMING PLAN

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



3 S1.2 RTU-3 FRAMING PLAN

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

EXISTING BUILDING NOTE:

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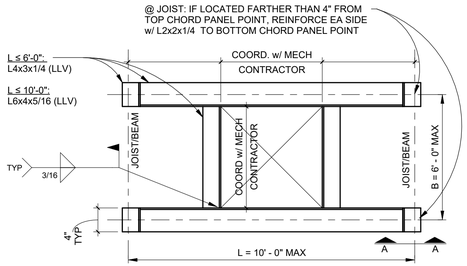
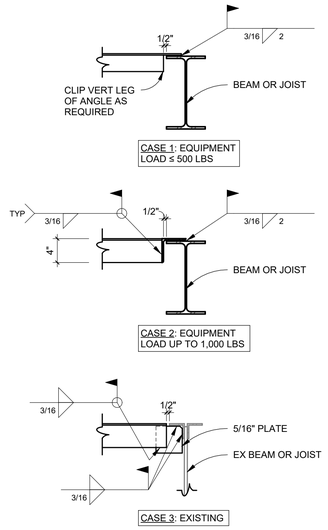
PIC: T. Nemitz
PM: J. Cardinal
DRAFTS: M. Fox
PROJECT NO:
22.516ES
SHEET TITLE:
PARTIAL ROOF FRAMING PLANS

S1.2

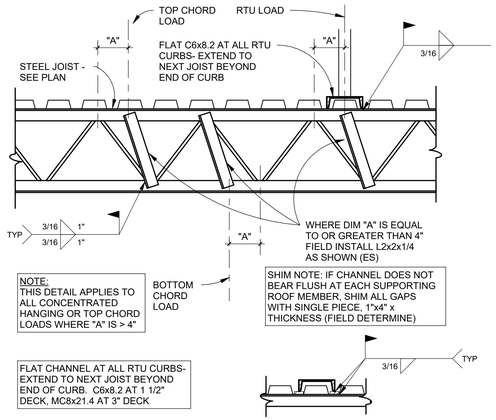


NOTES:
1. This detail applies to all roof openings larger than 18". All openings are not necessarily shown on structural drawings. Coordinate openings with final Arch and Mechanical drawings.
2. At existing building, field weld frame together as required to allow for installation and tolerance.

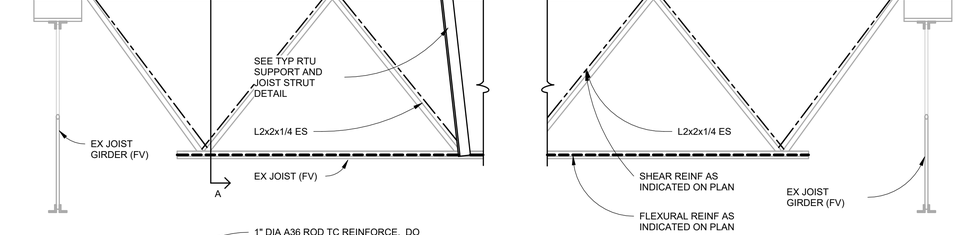
1 S2.1 TYPICAL ROOF OPENING FRAME
SCALE: 1" = 1'-0"

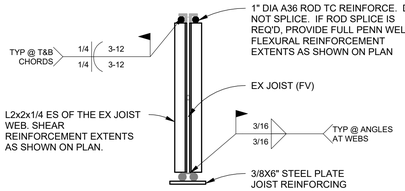


DETAIL "A-A"



2 S2.1 TYPICAL RTU SUPPORT & JOIST STRUT DETAIL
SCALE: 1" = 1'-0"





SECTION A-A

3 S2.1 EXISTING JOIST REINFORCING
SCALE: 1" = 1'-0"

EXISTING BUILDING NOTE:

THIS PROJECT IS AN ADDITION AND EXTENSION OF AN EXISTING BUILDING. THE DRAWINGS REFLECT WHAT IS KNOWN ABOUT THE EXISTING BUILDING, BUT EXISTING CONDITIONS MUST BE VERIFIED BEFORE FABRICATION AND CONSTRUCTION. ABUTTING CONSTRUCTION MUST MATCH UP. VERIFY ALL SUCH CONDITIONS, AND NOTIFY A/E IF ACTUAL CONDITIONS DIFFER FROM THE CONTRACT DOCUMENTS. AN ATTEMPT HAS BEEN MADE TO ANTICIPATE CONDITIONS IN THE EXISTING STRUCTURE.

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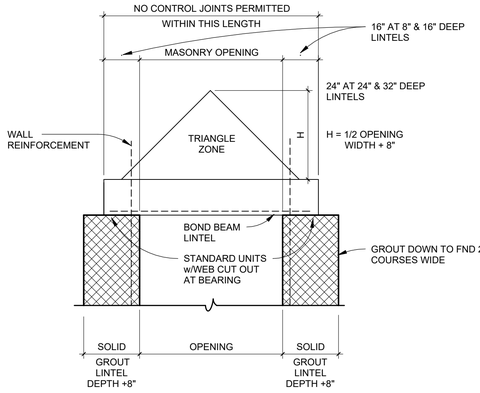
Date	Issued For
01/17/2025	BID SET

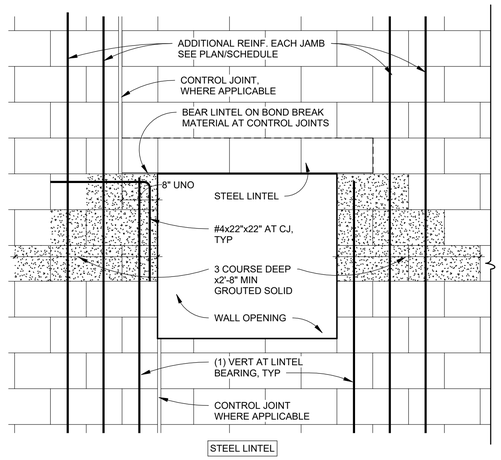
PIC: T. Nemitz
PM: J. Cardinal
DRAFTS: M. Fox
PROJECT NO: 22.516ES
SHEET TITLE: FRAMING DETAILS

S2.1



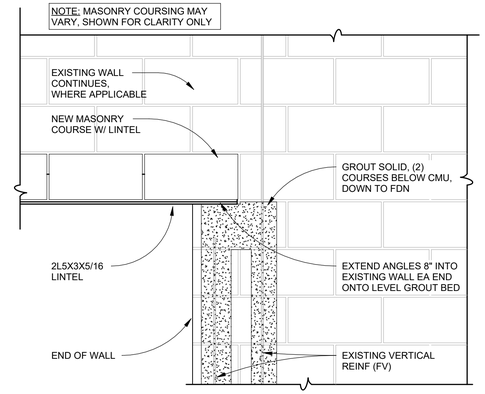
4 S3.1 TYPICAL MASONRY LINTEL DETAIL

SCALE: 1" = 1'-0"



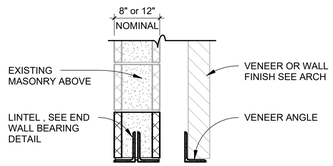
1 S3.1 TYPICAL MASONRY WALL OPENING DETAIL

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



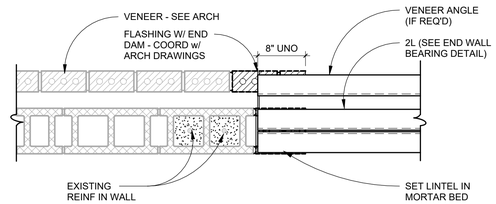
2 S3.1 END WALL BEARING DETAIL

SCALE: 1" = 1'-0"



5 S3.1 TYPICAL LINTEL DETAIL

SCALE: 1" = 1'-0"



3 S3.1 TYPICAL LINTEL BEARING

SCALE: 1" = 1'-0"

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PIC: T. Nemitz
PM: J. Cardinal
DRAFTS: M. Fox
PROJECT NO:
22.516ES
SHEET TITLE:
LINTEL DETAILS

S3.1

MECHANICAL ABBREVIATION LIST

ABBREVIATION	DESCRIPTION
A	COMPRESSED AIR
A(___#)	COMPRESSED AIR (SPECIFIC PSIG)
AAV	AUTOMATIC AIR VENT
ACC	AIR COOLED CONDENSER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
AD	AREA DRAIN
AE	AIR EXTRACTOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
AMP	AMPERE
APD	AIR PRESSURE DROP
AR	ARGON
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING ENGINEERS
ASR	AUTOMATIC SPRINKLER RISER
ATD	AIR TRANSFER DUCT
AUX	AUXILIARY
AV	ACID VENT
AVTR	ACID VENT THROUGH ROOF
AW	ACID WASTE
BAS	BUILDING AUTOMATION SYSTEM
BCU	BLOWER COIL UNIT
BDD	BACKDRAFT DAMPER
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
BVC	BEVERAGE CONDUIT
BWV	BACKWATER VALVE
C	COMMON
CAP	CAPACITY
CAV	CONSTANT AIR VOLUME
CB	CATCH BASIN
CC	COOLING COIL
CD	COLD DECK
CD	CONDENSATE DRAIN
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHW	CHILLED WATER
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CLG	COOLING
CNDS	CONDENSATE
CNDS (___#)	CONDENSATE (SPECIFIC PSIG)
CO	CLEAN OUT
CO2	CARBON DIOXIDE
CONT	CONTINUATION OR CONTINUED
CONTR	CONTRACTOR
CONV	CONVECTOR
COP	COEFFICIENT OF PERFORMANCE
CP	CIRCULATING PUMP
CRU	CONDENSATE RETURN UNIT
CSS	CLINICAL SERVICE SINK
CT	COOLING TOWER
CUH	CABINET UNIT HEATER
CW	DOMESTIC COLD WATER
CWF	DOMESTIC COLD WATER - FILTERED
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D&T	DRIP AND TRAP
DA	DISCHARGE AIR
DAT	DISCHARGE AIR TEMPERATURE
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DFU	DRAINAGE FIXTURE UNITS
DIA	DIAMETER
DMPR	DAMPER
D/N	DAY/NIGHT
DN	DOWN
DNZ	DOWNSPOUT NOZZLE
DS	DUCT SILENCER
DT	DRAIN TILE
DTC	DRAIN TILE CONNECTION
DWH	DOMESTIC WATER HEATER
DWG	DRAWING
(E)	EXISTING
E	EXHAUST GRILLE OR REGISTER
EA	EACH
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	EXPANSION COMPENSATOR
ECM	ELECTRONICALLY COMMUTATED MOTOR
ECUH	ELECTRIC CABINET UNIT HEATER
EDB	ENTERING DRY BULB
EER	ENERGY EFFICIENCY RATIO
EES	EMERGENCY EYE WASH / SHOWER
EEW	EMERGENCY EYE WASH
EF	EXHAUST FAN
EFF	EFFICIENCY
EHC	ELECTRIC HEATING COIL
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
EMS	ENERGY MANAGEMENT SYSTEM
ERL	ENERGY RECOVERY LOOP
ERLR	ENERGY RECOVERY LOOP RETURN
ERLS	ENERGY RECOVERY LOOP SUPPLY
ERU	ENERGY RECOVERY UNIT
ESH	EMERGENCY SHOWER
ESP	EXTERNAL STATIC PRESSURE
EUH	ELECTRIC UNIT HEATER
EWB	ENTERING WET BULB
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
F	FIRE PROTECTION
°F	DEGREES FAHRENHEIT
F&B	FACE AND BYPASS
F&T	FLOAT AND THERMOSTATIC
FA	FACE AREA
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FFD	FUNNEL FLOOR DRAIN
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FHR	FIRE HOSE RACK
FHV	FIRE HOSE VALVE
FLA	FULL LOAD AMPS
FLR	FLOOR
FM	FLOW METER
FMS	FLOW MEASURING STATION
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FP	FIRE PUMP
FPTU	FAN POWERED (AIR) TERMINAL UNIT
FS	FLOOR SINK
FSEC	FOOD SERVICE EQUIPMENT CONTRACTOR
FT	FEET
FTR	FINNED TUBE RADIATION
FV	FACE VELOCITY
G	NATURAL GAS
GA	GAUGE
GAL	GALLON
GRH	GRAVITY RELIEF HOOD
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GSAN	GREASE SANITARY WASTE
H	HYDROGEN
HB	HOSE BIBB
HC	HEATING COIL
HD	HOT DECK
HEPA	HIGH EFFICIENCY PARTICULATE ARRESTANCE
HL	HIGH LIMIT
HOA	HAND/OFF/AUTO
HP	HEAT PUMP
HP	HORSEPOWER
HPCW	HIGH PRESSURE DOMESTIC COLD WATER
HPHW	HIGH PRESSURE DOMESTIC HOT WATER
HPHWR	HIGH PRESSURE DOMESTIC HOT WATER RETURN
HPL	HEAT PUMP LOOP
HPLR	HEAT PUMP LOOP RETURN
HPLS	HEAT PUMP LOOP SUPPLY
HR	HOUR
HTG	HEATING
HV	HEATING VENTILATING
HVAC	HEATING, VENTILATING, AIR CONDITIONING
HWH	HOT WATER HEATING
HWHR	HOT WATER HEATING RETURN
HWHS	HOT WATER HEATING SUPPLY
HW	DOMESTIC HOT WATER
HW(___)	DOMESTIC HOT WATER (SPECIFIC TEMP °F)
HWR	DOMESTIC HOT WATER RETURN
HX	HEAT EXCHANGER
HZ	HERTZ
IAQ	INDOOR AIR QUALITY
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IH	INTAKE HOOD
IN	INCHES
IR	INFRARED HEATER
IW	INDIRECT WASTE
JC	JANITOR'S CLOSET
JP	JOCKEY PUMP
KA	THOUSAND AMP
KW	KILOWATT
KWH	KILOWATT-HOUR
LAT	LEAVING AIR TEMPERATURE
LAB	LABORATORY
LAV	LAVATORY
LBS	POUNDS
LDB	LEAVING DRY BULB
LL	LOW LIMIT
LPC	LOW PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM
LRA	LOCKED ROTOR AMPS
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MAT	MIXED AIR TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MEDICAL COMPRESSED AIR
MCA	MINIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MH	MANHOLE
MIL	1/1000th INCH
MIN	MINIMUM
MISC	MISCELLANEOUS
MMBH	MILLION BRITISH THERMAL UNITS PER HOUR
MOP	MAXIMUM OVERCURRENT PROTECTION
M/S	MOTOR STARTER
MTD	MOUNTED
MTR	MOTOR
MV	MANUAL AIR VENT
MVAC	MEDICAL VACUUM
N	NITROGEN
N2O	NITROUS OXIDE
NC	NOISE CRITERIA
NC	NORMALLY CLOSED
NCTC	NORMALLY CLOSED TIMED CLOSED
NCTO	NORMALLY CLOSED TIMED OPEN
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NOTC	NORMALLY OPEN TIMED CLOSED
NOTO	NORMALLY OPEN TIMED OPEN
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NPCW	NON POTABLE COLD WATER
O	OXYGEN
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OB	OUTLET BOX
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER/CENTER TO CENTER
OD	OUTSIDE DIAMETER
OED	OPEN ENDED DUCT
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OL	OVERLOAD
ORC	OVERFLOW RAIN CONDUCTOR
ORD	OVERFLOW ROOF DRAIN
OS&Y	OUTSIDE SCREW AND YOKE
OV	OUTLET VELOCITY
OWS	OPERATOR WORKSTATION
PACU	PACKAGED AIR CONDITIONING UNIT
PBD	PARALLEL BLADE DAMPER
PC	PUMPED CONDENSATE
PCW	PROCESS COOLING WATER
PCWR	PROCESS COOLING WATER RETURN
PCWS	PROCESS COOLING WATER SUPPLY
PD	PRESSURE DROP (FEET OF WATER)
PH	PERIMETER HEAT
PHR	PERIMETER HEAT RETURN
PHS	PERIMETER HEAT SUPPLY
PNL	PANEL
PPM	PARTS PER MILLION
PRESS	PRESSURE
PRV	PRESSURE REDUCING VALVE
PSAN	PUMPED SANITARY
PST	PUMPED STORM
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH - ABSOLUTE
PSIG	POUNDS PER SQUARE INCH - GAUGE
PW	PURIFIED WATER
PWR	PURIFIED WATER RETURN
PWS	PURIFIED WATER SUPPLY
(R)	RELOCATED
R	RETURN GRILLE OR REGISTER
RA	RETURN AIR
RAT	RETURN AIR TEMPERATURE
RC	RAIN CONDUCTOR
RCP	RADIANT CEILING PANEL
RD	ROOF DRAIN
REQD	REQUIRED
REF	ROOF EXHAUST FAN
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID
RLFA	RELIEF AIR
RPM	REVOLUTIONS PER MINUTE
RPDA	REDUCED PRESSURE BACKFLOW PREVENTION DETECTION ASSY
RPZA	REDUCED PRESSURE BACKFLOW PREVENTION ZONE ASSY
RS	REFRIGERANT SUCTION
RTU	ROOFTOP UNIT
S	SUPPLY AIR DIFFUSER OR GRILLE
SA	SOUND ATTENUATOR
SA	SUPPLY AIR
SAN	SANITARY WASTE
SAT	SUPPLY AIR TEMPERATURE
SECT	SECTION
SCCR	SHORT CIRCUIT CURRENT RATING
SF	SUPPLY FAN
SH	SHOWER
SK	SINK
SMR	SNOW MELT RETURN
SMS	SNOW MELT SUPPLY
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SPKLR	SPRINKLER
SQFT	SQUARE FOOT/SQUARE FEET
S/S	START/STOP
SS	SERVICE SINK
ST	STORM
STD	STANDARD
STK	STACK
STM	STEAM
STM(___#)	STEAM (SPECIFIC PSIG)
S/W	SUMMER/WINTER
SW	SWITCH
T	TRANSFER GRILLE
TC	TEMPERATURE CONTROL
TC	TEMPERING COIL
TCP	TEMPERATURE CONTROL PANEL
TD	TRENCH DRAIN
TEMP	TEMPERATURE
TEMP	TEMPORARY
TH	TERMINAL HEATING
THA	TOTAL HEAT ABSORBED
THR	TERMINAL HEATING RETURN
THR	TOTAL HEAT REJECTED
THS	TERMINAL HEATING SUPPLY
TK	TANK
TMR	TIMER SWITCH
TPD	TEPID WATER
TSP	TOTAL STATIC PRESSURE
TU	(AIR) TERMINAL UNIT
TV	TURNING VANES
TW	TEMPERED WATER
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORY
UON	UNLESS OTHERWISE NOTED
UR	URINAL
UV	UNIT VENTILATOR
V	VALVE
V	VENT
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VB	VACUUM BREAKER
VD	VOLUME DAMPER (MANUALLY ADJUSTABLE)
VOL	VOLUME
VFC	VARIABLE FREQUENCY CONTROLLER
VTR	VENT THROUGH ROOF
VTU	VENTURI TERMINAL UNIT
VUV	VERTICAL UNIT VENTILATOR
W	WASTE
W&V	WASTE AND VENT
WAGD	WASTE ANESTHETIC GAS DISPOSAL
WB	WET BULB
WC	WATER CLOSET
WC	WATER COLUMN
WG	WATER GAUGE
WH	WALL HYDRANT
WMSD	WASHING MACHINE SUPPLY AND DRAIN BOX
WPD	WATER PRESSURE DROP
WT	WEIGHT
XFMR	TRANSFORMER
ZVB	ZONE VALVE BOX

TEMPERATURE CONTROL - PARTIAL SYMBOLS LIST

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CO2	CARBON DIOXIDE SENSOR	OS	OCCUPANCY SENSOR
CO	CARBON MONOXIDE SENSOR	PT	PRESSURE TRANSMITTER
DPT	DIFFERENTIAL PRESSURE TRANSMITTER	SP	STATIC PRESSURE SENSOR OR PROBE
FM	FLOW METER	2-WAY	VALVE - 2 WAY CONTROL VALVE
	GUARD FOR STAT OR SENSOR	3-WAY	VALVE - 3 WAY CONTROL VALVE
H	HUMIDISTAT OR HUMIDITY SENSOR (AS DEFINED ON TC DRAWINGS)	T	THERMOSTAT OR TEMPERATURE SENSOR (AS DEFINED ON TC DRAWINGS)

NOTE: LIST OF ADDITIONAL SYMBOLS & ABBREVIATIONS ASSOCIATED WITH TEMPERATURE CONTROLS ARE IDENTIFIED ON TC DRAWINGS.

MECHANICAL SYMBOL LIST

PIPING SYMBOLS

SYMBOL	DESCRIPTION
AV	AIR VENT - AUTOMATIC
MV	AIR VENT - MANUAL
BFP	BACKFLOW PREVENTER
	CATCH BASIN
	CIRCULATING PUMP
CO	CLEAN OUT - IN FLOOR
CO	CLEAN OUT - FLANGE
	DIRECTION OF FLOW
	DIRECTION OF PITCH - DOWN
	FINNED TUBE RADIATION
	FIRE PROTECTION - SIAMESE CONNECTION - FREE STANDING
	FIRE PROTECTION - SIAMESE CONNECTION - WALL MOUNTED
	FIRE PROTECTION - SPRINKLER HEAD, CONCEALED
	FIRE PROTECTION - SPRINKLER HEAD, PENDANT
	FIRE PROTECTION - SPRINKLER HEAD, UPRIGHT
	FIRE PROTECTION - SPRINKLER HEAD, SIDEWALL
	FLOOR DRAIN
	FLOOR DRAIN - ELEVATION
	FLOOR DRAIN - FUNNEL
	FLOOR DRAIN - FUNNEL, ELEVATION
	FLOW MEASURING DEVICE (FOR TEST AND BALANCING)
FS	FLOW SWITCH
FM	FLOW METER
HB	HOSE BIBB
MH	MANHOLE
	OPEN SITE DRAIN
	PIPE - ANCHOR
	PIPE - CAP OR PLUG
	PIPE - ELBOW DOWN
	PIPE - ELBOW UP
	PIPE - EXPANSION JOINT OR COMPENSATOR
	PIPE - FLANGE
	PIPE - HOSE AND BRAID FLEXIBLE CONNECTION
	PIPE - RUBBER FLEXIBLE CONNECTION
	PIPE - GUIDE
	PIPE - TEE DOWN
	PIPE - TEE UP
	PIPE - UNION
P/T	PRESSURE AND TEMPERATURE TEST PLUG
	PRESSURE GAUGE AND COCK
	REDUCER - CONCENTRIC
	REDUCER - ECCENTRIC
	ROOF/OVERFLOW DRAIN
	STEAM TRAP - FLOAT AND THERMOSTATIC
	STEAM TRAP - BUCKET
	STRAINER
	STRAINER WITH VALVE AND BLOW-OFF
	THERMOMETER
	TRAP
	VALVE - ANGLE
	VALVE - BALL
	VALVE - BUTTERFLY
0.5	VALVE - BALANCE (i.e. BALANCE VALVE TO 0.5 GPM)
0.5	VALVE - COMBINATION BALANCE & FLOW MEASURING (i.e. BALANCE VALVE TO 0.5 GPM)
	VALVE - CHECK
	VALVE - SPRING CHECK
	VALVE - GAS (MANUAL)
	VALVE - GLOBE
	VALVE - ISOLATION
	VALVE - NEEDLE
	VALVE - OS&Y
	VALVE - PLUG
	VALVE - PRESSURE REGULATING
	VALVE - PRESSURE REDUCING
	VALVE - PRESSURE RELIEF
	VALVE - PRESSURE & TEMPERATURE RELIEF
VTR	VENT THROUGH ROOF
WH	WALL HYDRANT
WM	WATER METER
GM	GAS METER

DOUBLE LINE PIPING SYMBOLS

SYMBOL	DESCRIPTION
	FLANGE
	FLEX CONNECTION
	STRAINER - BASKET
	STRAINER - Y TYPE
	VALVE - 2 WAY CONTROL
	VALVE - 3 WAY CONTROL
	VALVE - BUTTERFLY
	VALVE - CHECK
	VALVE - DETECTOR CHECK
	VALVE - OS&Y HORIZONTAL STEM
	VALVE - OS&Y VERTICAL STEM

DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
TU-101	AIR TERMINAL UNIT
TU-101	AIR TERMINAL UNIT WITH HEATING COIL
VTU-101	VENTURI AIR TERMINAL UNIT
VTU-101	VENTURI AIR TERMINAL UNIT WITH HEATING COIL
	DAMPER - HORIZONTAL FIRE (EXISTING, NEW)
	DAMPER - HORIZONTAL FIRE / SMOKE (EXISTING, NEW)
	DAMPER - SMOKE (EXISTING, NEW)
	DAMPER - VERTICAL FIRE (EXISTING, NEW)
	DAMPER - VERTICAL FIRE / SMOKE (EXISTING, NEW)
BDD	DAMPER - BACK DRAFT
M	DAMPER - MOTORIZED
	DAMPER - VOLUME (MANUALLY ADJUSTABLE)
	DIFFUSER - BLANK OFF
	DIFFUSER - LINEAR SLOT
	DIFFUSER - SQUARE OR RECTANGULAR
	DUCT CROSS SECTION - SUPPLY
	DUCT CROSS SECTION - RETURN
	DUCT CROSS SECTION - EXHAUST
	DUCT - FLEXIBLE CONNECTION
	DUCT - FLEXIBLE DUCT
	DUCT TAKE-OFF - ROUND CONICAL
	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
	ELBOW - RECTANGULAR WITH TURNING VANES
	ELBOW - RECTANGULAR/ ROUND SMOOTH RADIUS
	ELBOW DOWN - RECTANGULAR
	ELBOW DOWN - ROUND
	ELBOW UP - RECTANGULAR
	ELBOW UP - ROUND
	FAN - AXIAL
	FAN - CENTRIFUGAL (ELEVATION)
VFC XX-#	VARIABLE FREQUENCY CONTROLLER SERVING EQUIPMENT XX-#
	HEATING COIL
D	INCLINED DROP IN DIRECTION OF AIRFLOW
R	INCLINED RISE IN DIRECTION OF AIRFLOW
	INTAKE OR RELIEF HOOD
	REGISTER - RETURN OR EXHAUST
	REGISTER - RETURN WITH BOOT
	REGISTER - TRANSFER GRILLE
	ROOF EXHAUST FAN
	TRANSITION - CONCENTRIC
	TRANSITION - ECCENTRIC
	UNIT HEATER - HORIZONTAL THROW
	UNIT HEATER - VERTICAL THROW

DOUBLE LINE DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
	DUCT TAKE-OFF - ROUND CONICAL
	ELBOW - RECTANGULAR WITH TURNING VANES
	ELBOW - RECTANGULAR SHORT RADIUS WITH SPLITTER VANES
	ELBOW - ROUND
	ELBOW - RECTANGULAR SMOOTH RADIUS
	ELBOW DOWN - RECTANGULAR
	ELBOW DOWN - ROUND
	ELBOW UP - RECTANGULAR
	ELBOW UP - ROUND
	HEATING COIL
D	INCLINED DROP IN DIRECTION OF AIRFLOW
R	INCLINED RISE IN DIRECTION OF AIRFLOW
	TRANSITION - CONCENTRIC
	TRANSITION - ECCENTRIC

MECHANICAL DRAWING INDEX

STANDARD METHODS OF NOTATION

S-1
10ø
350-4
SUPPLY DIFFUSER WITH SCHEDULE TAG "1",
10" DIAMETER NECK SIZE
350 CFM TYPICAL FOR 4

R-1
22x22
640-2
RETURN REGISTER WITH SCHEDULE TAG "1",
22"x 22" NECK SIZE
640 CFM TYPICAL FOR 2
EXHAUST REGISTER E DESIGNATION SIMILAR.

TU-101 — AIR TERMINAL UNIT WITH HEATING COIL NO. 101 WITH SERVICE CLEARANCE SHOWN

VTU-101 — VENTURI AIR TERMINAL WITH HEATING COIL NO. 101 WITH SERVICE CLEARANCE SHOWN

(2)WC-1 / FD-1 — PLUMBING FIXTURE UNIT IDENTIFICATION TAG
WATER CLOSET TYPE "1"
TYPICAL FOR 2

8 — PIPE DIAMETER NOTATION
ALL SIZES IN INCHES

8ø / 22x10 / 18x14ø — DUCT SIZE NOTATION
ALL SIZES IN INCHES

OVAL DUCT
RECTANGULAR DUCT

1 — CONSTRUCTION KEY NOTE (NUMBER) OR DEMOLITION KEY NOTE (LETTER)

EF-1 — EQUIPMENT DESIGNATION,
(i.e. EXHAUST FAN NUMBER 1)

HW-1 — PIPING RISER DESIGNATION
(i.e. HOT WATER RISER NUMBER 1)

NEW SYSTEM COMPONENT
EXISTING SYSTEM COMPONENT TO REMAIN
POINT OF NEW CONNECTION SYMBOL

1 / M5.1 — SECTION OR PLAN NUMBER
SHEET WHERE SECTION IS DRAWN

AREA OF ENLARGEMENT
PLAN NUMBER
1 / M5.1 — SHEET WHERE ENLARGED PLAN IS DRAWN

1 / M5.1 — SECTION OR PLAN NUMBER
SHEET WHERE SECTION IS CUT OR ENLARGED PLAN IS REFERENCED

SECTION OR ENLARGED PLAN
SCALE: 1/8" = 1' - 0"

SHEET M1.0 / SHEET M1.1 — MATCH LINE

HEAVY LINE WEIGHT INDICATES NEW WORK

LIGHT LINE WEIGHT INDICATES EXISTING EQUIPMENT OR REFERENCED INFORMATION

GRAY LINE INDICATES BACKGROUND INFORMATION

DASHED LINES INDICATE PIPING ROUTED BELOW SLAB OR GRADE

HATCH MARKS INDICATE EQUIPMENT OR MATERIALS TO BE DISCONNECTED AND REMOVED.

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

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11/20/24	DD
12/06/24	50% CD
01/17/25	BID SET

PIC: WEK
PM: WEK
DRAFTS: EMW

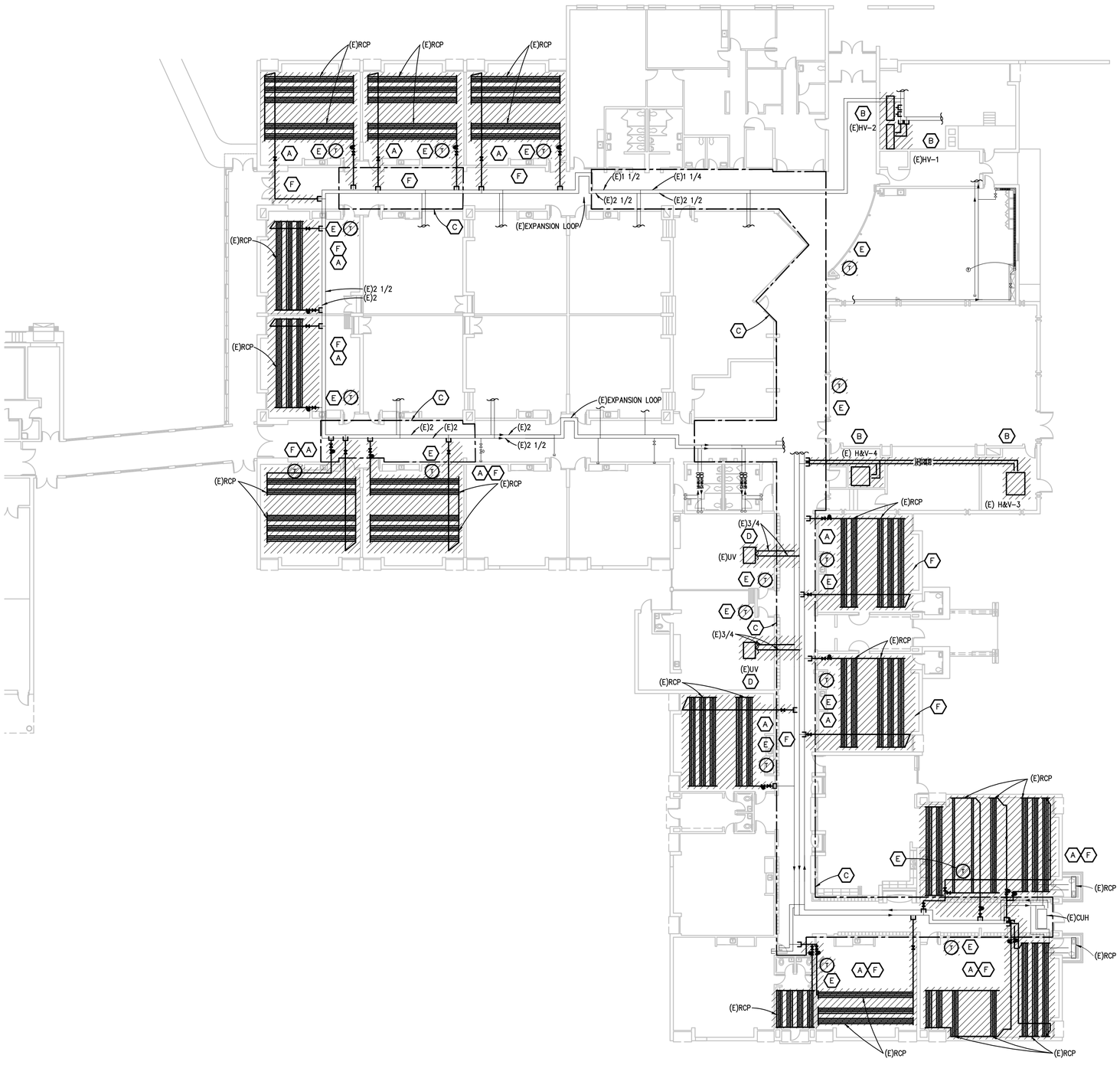
PROJECT NO: 22.516ES

SHEET TITLE: MECHANICAL STANDARDS AND DRAWING INDEX

SHEET NO: M001

STATE OF MICHIGAN
DENNIS P. SCZOMAK
ENGINEER
No. 6201036881
LICENSED PROFESSIONAL ENGINEER

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



NORTH 3-4 HVAC PIPING DEMOLITION PLAN
SCALE: 1/16" = 1' - 0"

MECHANICAL DEMOLITION GENERAL NOTES:

1. ANY INTERRUPTION OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE.
2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE WORK. ACTUAL ROUTING AND SIZES OF EXISTING PIPING AND DUCTWORK MIGHT DIFFER TO A LIMITED EXTENT FROM WHAT IS SHOWN. MAJOR DISCREPANCIES BETWEEN THE DRAWINGS AND ACTUAL EXISTING CONDITIONS SHALL BE REPORTED TO THE ENGINEER.
3. THE EXACT EXTENT OF DEMOLITION SHALL BE AS REQUIRED BY THE NEW WORK.
4. ALL MECHANICAL ITEMS TO BE REMOVED SHALL BE REMOVED COMPLETE, INCLUDING ALL RELATED ITEMS SUCH AS HANGERS, SUPPORTS, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTWORK.

(#) DEMOLITION KEY NOTES:

A. DISCONNECT AND REMOVE EXISTING RADIANT CEILING PANEL, HWHS, HWHR, AND CONTROLS COMPLETE. CUT AND CAP PIPING AT MAIN.

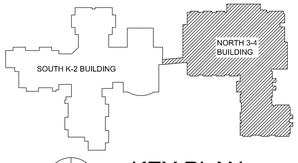
B. DISCONNECT AND REMOVE EXISTING H&V UNIT, HWHS, HWHR, AND CONTROLS. CUT AND CAP PIPING AT MAIN.

C. DISCONNECT AND REMOVE ALL EXISTING RADIANT CEILING PANEL, HWHS, HWHR,VALVES, AND CONTROLS IN THE CORRIDOR COMPLETE. CUT AND CAP PIPING AT MAIN.

D. DISCONNECT AND REMOVE EXISTING UNIT VENTILATOR. DISCONNECT HWHS AND HWHR REMOVE AS INDICATED ON DRAWINGS AND CAP. PREPARE FOR RECONNECT OF NEW UNIT VENTILATOR.

E. REMOVE TEMPERATURE CONTROLS COMPLETE.

F. REFER TO ARCHITECTURAL TRADES FOR LOCATIONS OF REMOVAL AND INSTALLATION OF CEILING TILE.



KEY PLAN
SCALE: N.T.S.

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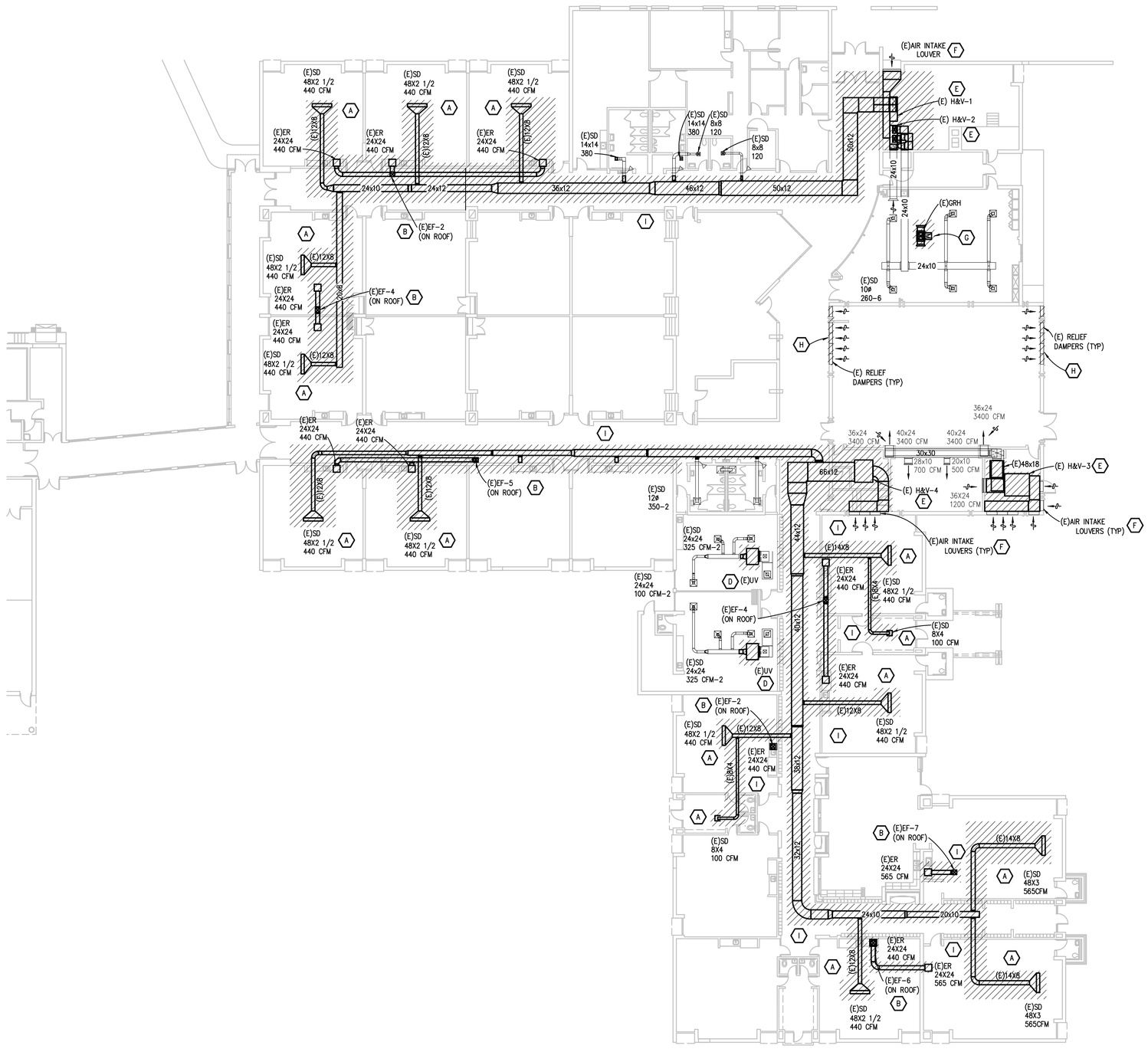
PIC: -
PM: -
DRAFTS: -

PROJECT NO: 22.516ES

SHEET TITLE: NORTH 3-4 HVAC PIPING DEMOLITION PLAN

SHEET NO: MD302

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



NORTH 3-4 SHEET METAL DEMOLITION PLAN
SCALE: 1/16" = 1' - 0"

MECHANICAL DEMOLITION GENERAL NOTES:

1. ANY INTERRUPTION OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE.
2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE WORK. ACTUAL ROUTING AND SIZES OF EXISTING PIPING AND DUCTWORK MIGHT DIFFER TO A LIMITED EXTENT FROM WHAT IS SHOWN. MAJOR DISCREPANCIES BETWEEN THE DRAWINGS AND ACTUAL EXISTING CONDITIONS SHALL BE REPORTED TO THE ENGINEER.
3. THE EXACT EXTENT OF DEMOLITION SHALL BE AS REQUIRED BY THE NEW WORK.
4. ALL MECHANICAL ITEMS TO BE REMOVED SHALL BE REMOVED COMPLETE, INCLUDING ALL RELATED ITEMS SUCH AS HANGERS, SUPPORTS, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTWORK.

(#) DEMOLITION KEY NOTES:

A. DISCONNECT AND REMOVE EXISTING DUCTWORK, SUPPLY DIFFUSERS, AND THERMOSTAT COMPLETE.

B. DISCONNECT AND REMOVE EXISTING EXHAUST FAN, EXHAUST DUCT WORK GRILLES AND CONTROLS COMPLETE, CAP EXISTING ROOF CURB SEE DETAIL.

C. DEMOLISH DUCTWORK UP TO WALL PENETRATION AND CAP TO PREPARE FOR NEW WORK.

D. DEMOLISH SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK AND CAP TO PREPARE FOR NEW HORIZONTAL UNIT VENTILATOR.

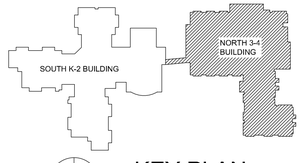
E. DISCONNECT AND REMOVE EXISTING H&V WITH ASSOCIATED DUCTWORK AS INDICATED ON PLANS.

F. DISCONNECT AND REMOVE DUCT TO EXISTING OUTSIDE AIR LOUVER COMPLETE. INSULATE LOUVER AS SEEN IN DETAIL ON SHEET M6.1.

G. DISCONNECT AND REMOVE EXISTING GRAVITY RELIEF HOOD AND DUCTWORK, AND MOTORIZED DAMPER COMPLETE. CAP EXISTING ROOF CURB, SEE DETAIL.

H. DISCONNECT AND REMOVE DAMPER. REMOVAL OF LOUVER DONE BY ARCHITECTURAL TRADES.

I. REFER TO ARCHITECTURAL TRADES FOR LOCATIONS OF REMOVAL AND INSTALLATION OF CEILING TILE.



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DRAFTS: EMW
PROJECT NO: 22.516ES
SHEET TITLE: NORTH 3-4 SHEET METAL DEMOLITION PLAN
SHEET NO: MD402

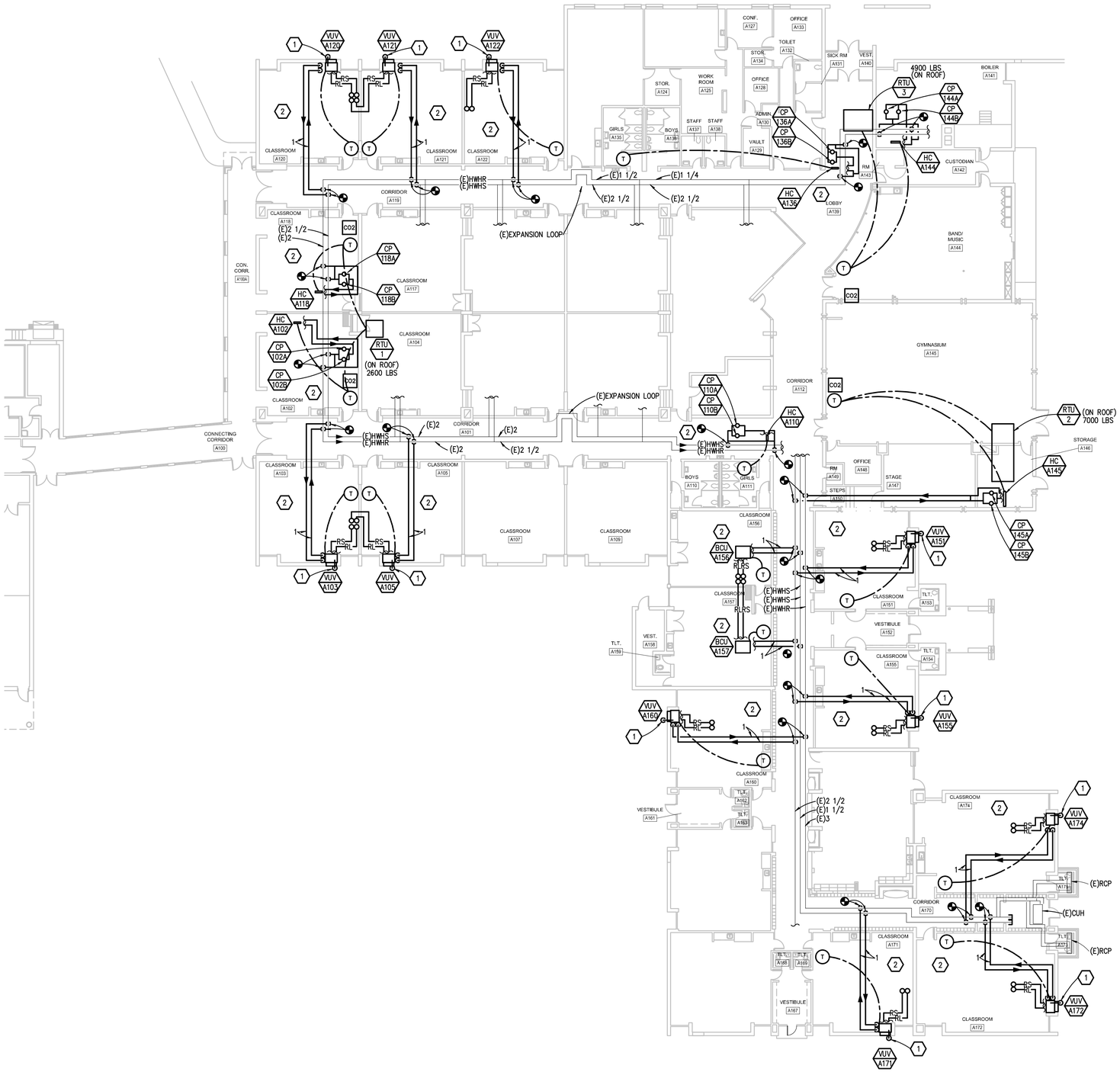
THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"

HVAC PIPING GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PIPING AND DUCTWORK SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. SUBMIT PROPOSED METHODS OF ANCHORING AND GUIDING PIPING SYSTEMS TO STRUCTURAL ENGINEER FOR APPROVAL.
7. COORDINATE LOCATION OF DUCT-MOUNTED HYDRONIC DEVICES WITH SHEET METAL TRADES.
8. BRANCH PIPING SERVING TERMINAL UNIT HEATING COILS OR RADIANT CEILING PANELS SHALL BE 3/4" UNLESS OTHERWISE NOTED. BRANCH PIPING SERVING MORE THAN ONE TERMINAL UNIT HEATING COIL SHALL BE 1" UNLESS OTHERWISE NOTED. BRANCH PIPING SERVING HOT WATER UNIT HEATERS AND CABINET UNIT HEATERS SHALL BE 1" UNLESS OTHERWISE NOTED.
9. REFER TO TEMPERATURE CONTROLS STANDARD MOUNTING HEIGHTS DETAIL FOR ELEVATIONS OF WALL MOUNTED TEMPERATURE CONTROL DEVICES.

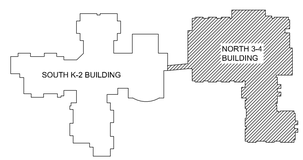
(#) CONSTRUCTION KEY NOTES:

1. PROVIDE CONDENSATE DRAIN LINE FROM VUV TO SPILL OUT ON GRADE, REFER TO DETAILS.
2. REFER TO ARCHITECTURAL TRADES FOR REMOVAL AND INSTALLATION OF CEILING TILE.



NORTH 3-4 HVAC PIPING NEW WORK PLAN

SCALE: 1/16" = 1' - 0"



KEY PLAN

SCALE: N.T.S.

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PIC: WEK
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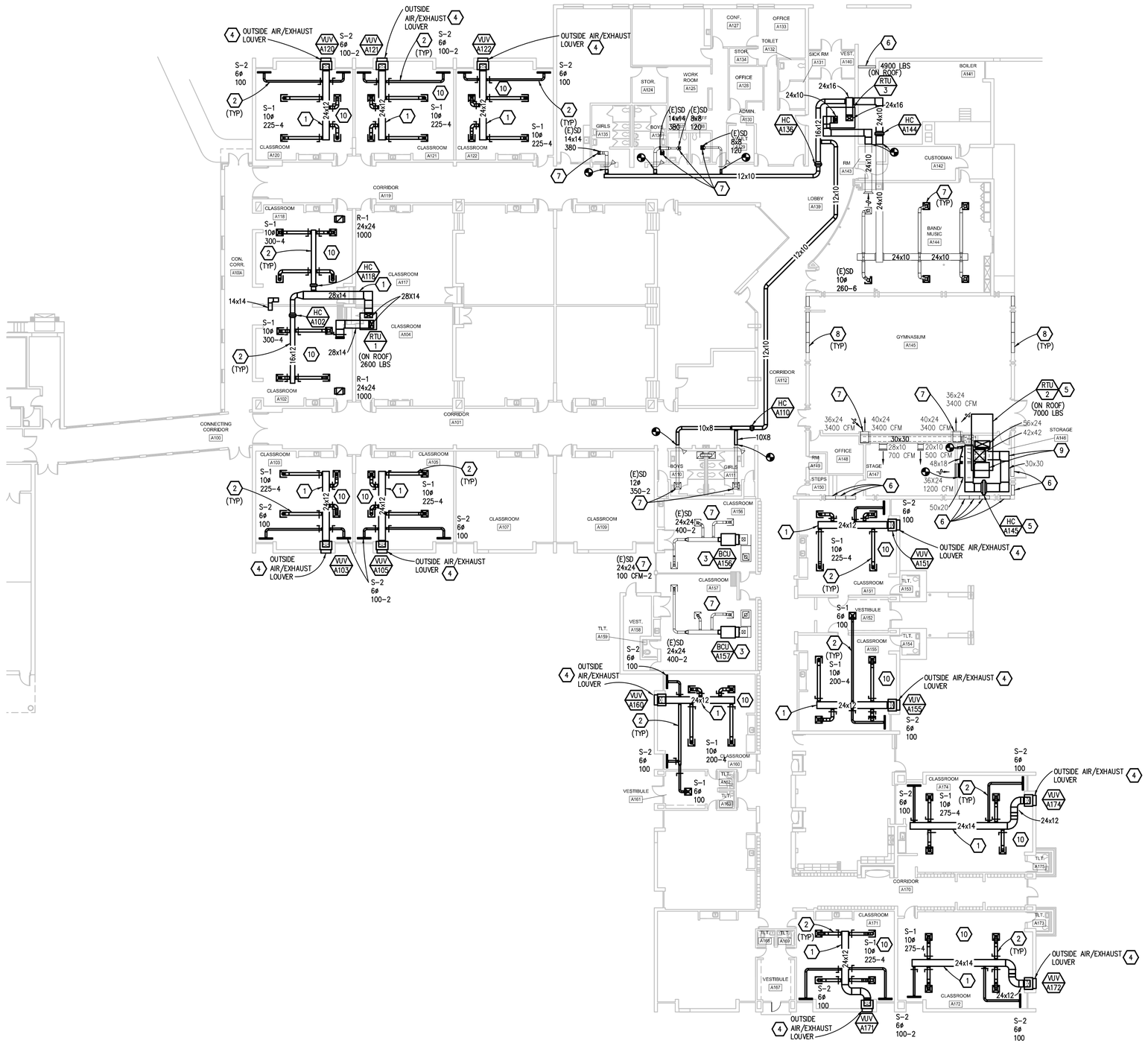
DRAFTS: EMW

PROJECT NO: 22.516ES

SHEET TITLE: NORTH 3-4 HVAC PIPING NEW WORK PLAN

SHEET NO: M302

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



NORTH 3-5 SHEET METAL NEW WORK PLAN

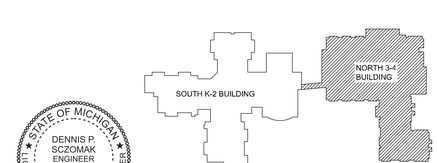
SCALE: 1/16" = 1' - 0"

SHEET METAL GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PIPING AND DUCTWORK SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR DIMENSIONED LOCATION OF GRILLES, REGISTERS, AND DIFFUSERS.
7. REFER TO TEMPERATURE CONTROLS STANDARD MOUNTING HEIGHTS DETAIL FOR ELEVATIONS OF WALL MOUNTED TEMPERATURE CONTROL DEVICES.

(#) CONSTRUCTION KEY NOTES:

1. ROUTE NEW SUPPLY AIR DUCT BETWEEN EXISTING STEEL JOIST, REWORK EXISTING CROSS BRIDGES TO ACCOMMODATE NEW DUCTWORK.
2. ROUTE NEW SUPPLY AIR DUCTWORK THROUGH EXISTING JOIST WEB.
3. ROUTE 14X10 SUPPLY, 36X4 RETURN, AND 36X4 OUTSIDE AIR INTAKE DUCT TO NEW HORIZONTAL UNIT VENTILATOR.
4. SAW CUT NEW OA LOUVER, COORDINATE WORK WITH STRUCTURAL, SEAL WEATHER TIGHT.
5. REHEAT COIL AND ASSOCIATED DUCTWORK IS LOCATED IN THE PENTHOUSE ABOVE STORAGE A146. RTU-2 IS LOCATED ON ROOF ABOVE PENTHOUSE.
6. INSULATE OUTSIDE AIR LOUVER AS SEEN ON SHEET M6.1. LOCATED AT PENTHOUSE LEVEL.
7. RE-BALANCE ALL AIR DIFFUSER TO CFM INDICATED ON DRAWINGS.
8. REMOVAL AND INSULATION OF LOUVER DONE MY ARCHITECT TRADES.
9. ROUTE SUPPLY DUCT WORK DOWN TO REHEAT COIL, AND RECONNECT TO EXISITNG WYE, LEADING TO STAGE AND GYM. ROUTE RETURN DUCTWORK DOWN UNDER SUPPLY DUCTWORK AND RECONNECT TO STAGE RETURN DUCTWORK, AND BRANCH A RETURN DUCT TO EXISTING RETURN DUCTWORK FOR THE GYM.
10. REFER TO ARCHITECTURAL TRADES FOR THE REMOVAL AND INSTALLATION OF CEILING TILE.



KEY PLAN
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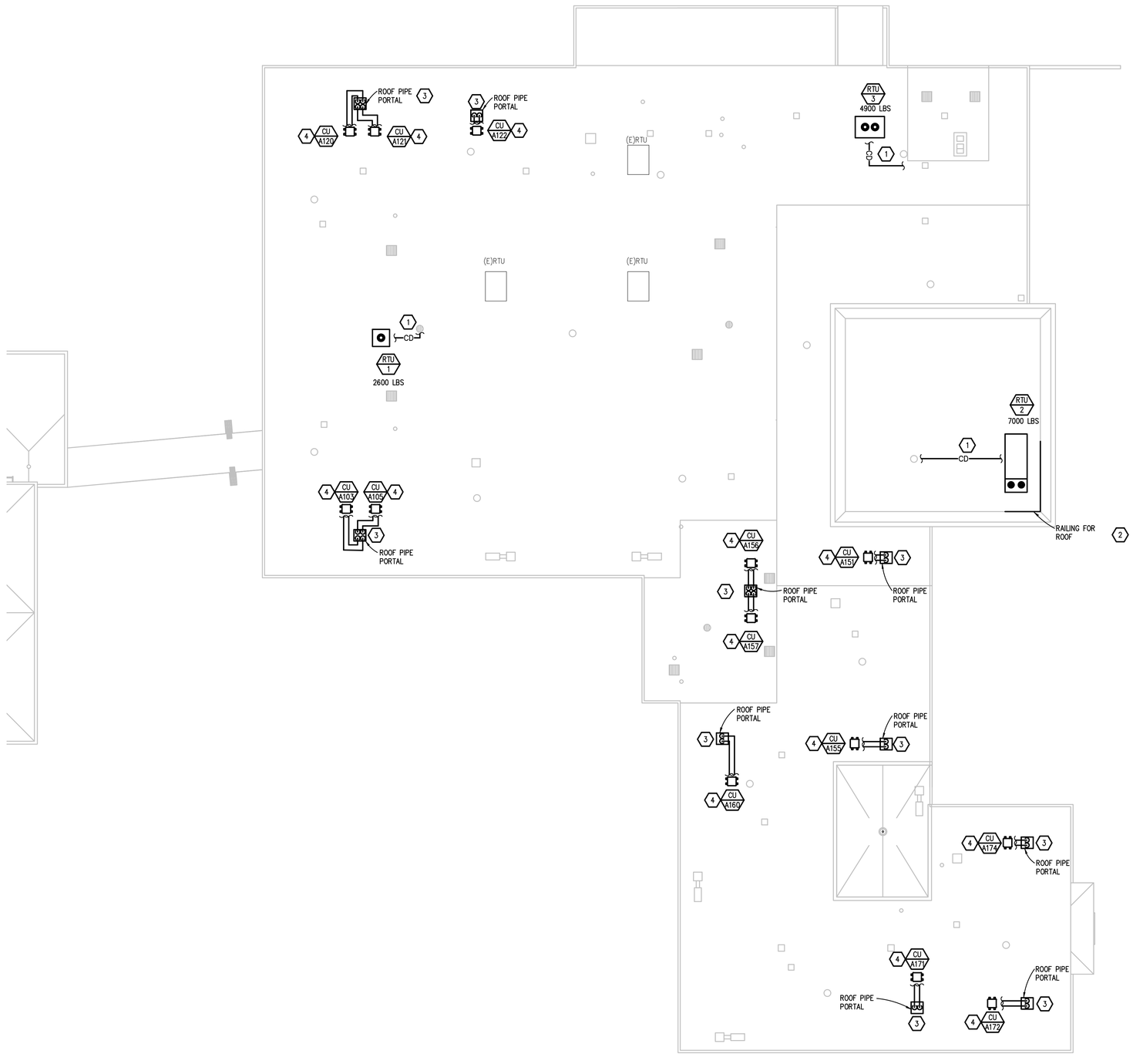
DRAFTS: EMW

PROJECT NO: 22.516ES

SHEET TITLE: NORTH 3-5 SHEET METAL NEW WORK PLAN

SHEET NO: M402

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



NORTH 3-5 ROOF MECHANICAL NEW WORK PLAN

SCALE: 1/16" = 1' - 0"

HVAC PIPING GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PIPING AND DUCTWORK SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. SUBMIT PROPOSED METHODS OF ANCHORING AND GUIDING PIPING SYSTEMS TO STRUCTURAL ENGINEER FOR APPROVAL.
7. COORDINATE LOCATION OF DUCT-MOUNTED HYDRONIC DEVICES WITH SHEET METAL TRADES.
8. BRANCH PIPING SERVING TERMINAL UNIT HEATING COILS OR RADIANT CEILING PANELS SHALL BE 3/4" UNLESS OTHERWISE NOTED. BRANCH PIPING SERVING MORE THAN ONE TERMINAL UNIT HEATING COIL SHALL BE 1" UNLESS OTHERWISE NOTED. BRANCH PIPING SERVING HOT WATER UNIT HEATERS AND CABINET UNIT HEATERS SHALL BE 1" UNLESS OTHERWISE NOTED.
9. REFER TO TEMPERATURE CONTROLS STANDARD MOUNTING HEIGHTS DETAIL FOR ELEVATIONS OF WALL MOUNTED TEMPERATURE CONTROL DEVICES.

SHEET METAL GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
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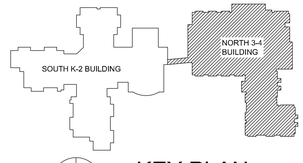
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR DIMENSIONED LOCATION OF GRILLES, REGISTERS, AND DIFFUSERS.
7. REFER TO TEMPERATURE CONTROLS STANDARD MOUNTING HEIGHTS DETAIL FOR ELEVATIONS OF WALL MOUNTED TEMPERATURE CONTROL DEVICES.

(#) CONSTRUCTION KEY NOTES:

1. PROVIDE CONDENSATE DRAIN PIPING TO THE NEAREST ROOF DRAIN AND PROVIDE HEAT TRACE.
2. PROVIDE PORTABLE GUARD RAIL PER OSHA REQUIREMENTS. PROVIDED BY ARCHITECTURAL TRADES.
3. PROVIDE PIPE PORTAL WITH MINIMUM 5 OUTLET OPENINGS, ONE FOR EACH REFRIGERANT LINE AND ONE FOR ELECTRICAL CONDUIT.
4. MOUNT CONDENSING UNIT ON EQUIPMENT SUPPORT RAILS AND SECURE CONDENSING UNIT TO EQUIPMENT RAILS.



KEY PLAN
SCALE: N.T.S.

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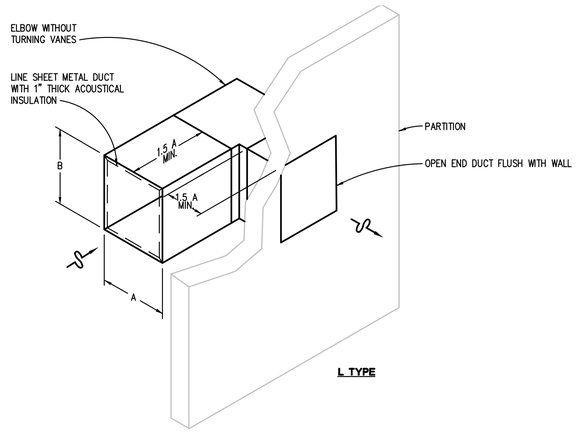
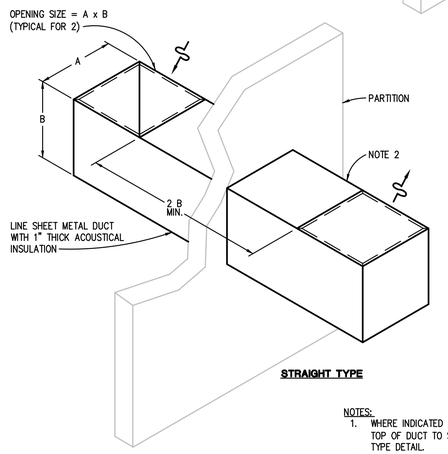
SHEET TITLE: NORTH 3-5 ROOF MECHANICAL NEW WORK PLAN

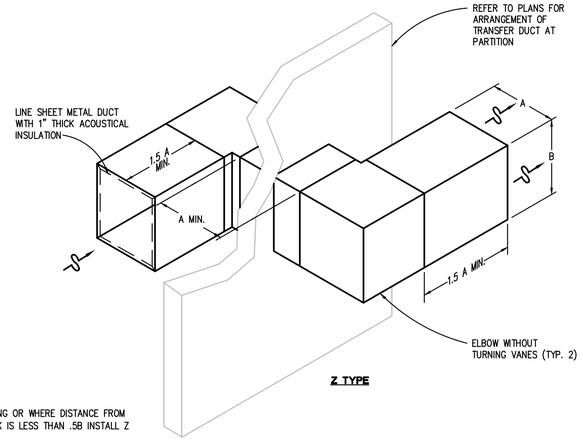
SHEET NO: M502



L TYPE



STRAIGHT TYPE

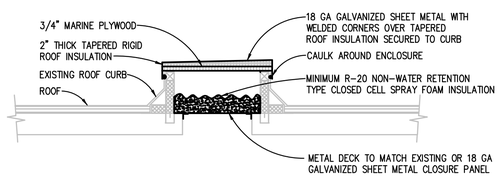


Z TYPE

NOTES:
1. WHERE INDICATED ON DRAWING OR WHERE DISTANCE FROM TOP OF DUCT TO SLAB/DECK IS LESS THAN .5B INSTALL Z TYPE DETAIL.
2. SIZE DUCTS FOR 400 FPM MAX BASED ON CLEAR INSIDE DIMENSIONS AND 100% OF THE SUPPLY AIR TO THE SPACE UNLESS OTHERWISE NOTED.
3. ROTATE DETAILS 90° WHERE VERTICAL INSTALLATION IS INDICATED.
4. DIMENSIONS ARE INSIDE CLEAR.

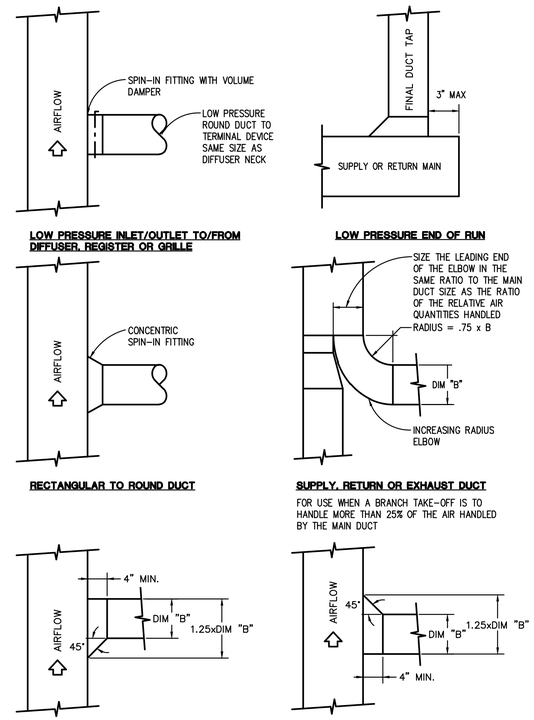
OPTIONS:
1. RIGID FIBER BOARD MAY BE USED IN LIEU OF LINED SHEET METAL DUCT.

AIR TRANSFER DUCT DETAILS
NO SCALE



NOTE:
1. FASTEN TOP CLOSURE, WITH SCREWS THROUGH SIDE.
2. NOT TO BE USED FOR CURBS GREATER THAN 24" IN ANY DIMENSION

SMALL ROOF CURB CAP DETAIL
NO SCALE



LOW PRESSURE INLET/OUTLET TO/FROM DIFFUSER, REGISTER OR GRILLE

LOW PRESSURE END OF RUN

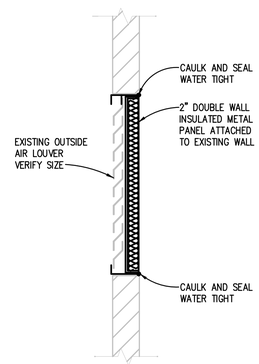
RECTANGULAR TO ROUND DUCT

SUPPLY, RETURN OR EXHAUST DUCT
FOR USE WHEN A BRANCH TAKE-OFF IS TO HANDLE MORE THAN 25% OF THE AIR HANDLED BY THE MAIN DUCT

SUPPLY DUCT

RETURN OR EXHAUST DUCT

RECTANGULAR DUCT BRANCH TAKE-OFF DETAILS
NO SCALE



EXISTING EXTERIOR LOUVER AND/OR GRILLE CLOSURE DETAIL
NO SCALE

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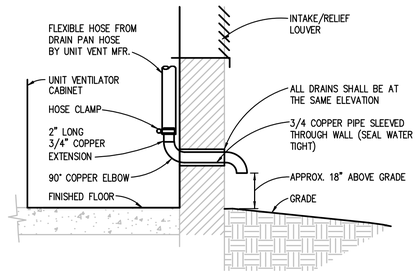
PIC:	WEK
PM:	WEK
DRAFTS:	EMW

PROJECT NO: 22.516ES

SHEET TITLE: MECHANICAL DETAILS

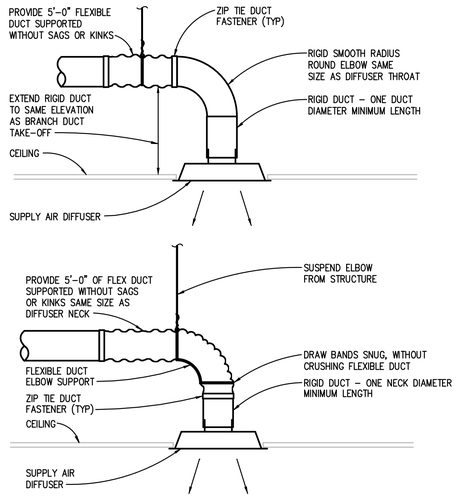
SHEET NO: M601

STATE OF MICHIGAN
DENNIS P. SCZOMAK
ENGINEER
No. 6201036881
LICENSED PROFESSIONAL ENGINEER



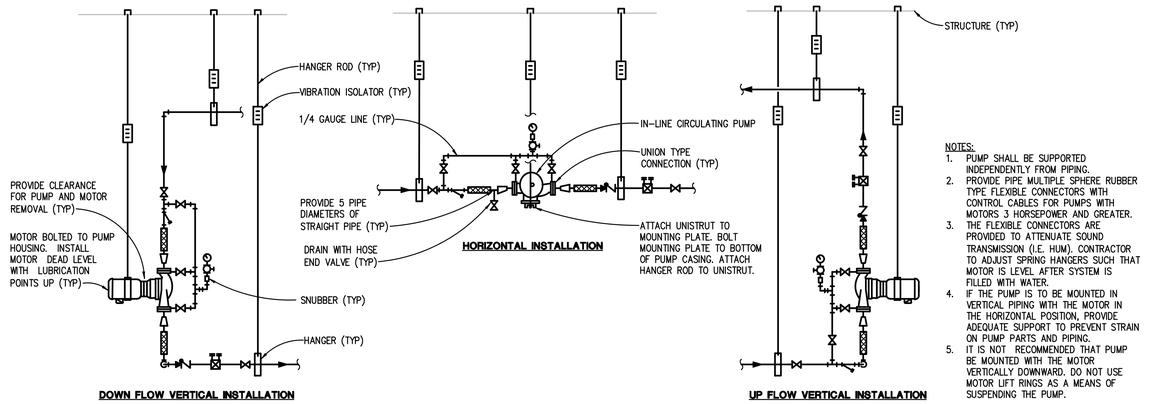
VERTICAL UNIT VENTILATOR CONDENSATE DRAIN DETAIL

NO SCALE



ROUND NECK SUPPLY AIR DIFFUSER DETAIL

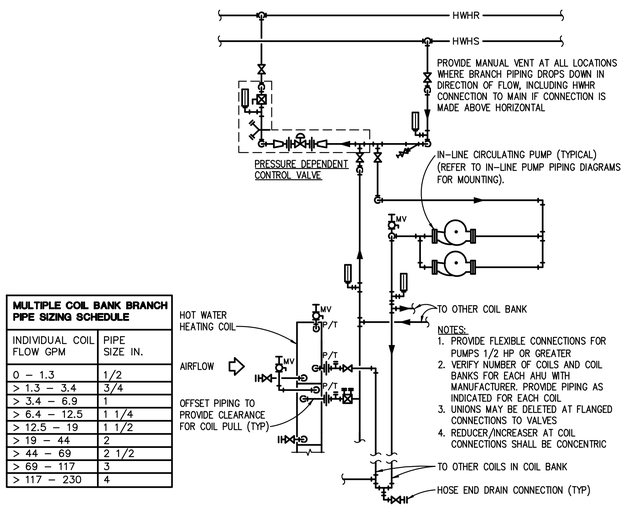
NO SCALE



NOTES:
1. PUMP SHALL BE SUPPORTED INDEPENDENTLY FROM PIPING.
2. PROVIDE PIPE MULTIPLE SPHERE RUBBER TYPE FLEXIBLE CONNECTORS WITH CONTROL CABLES FOR PUMPS WITH MOTORS 3 HORSEPOWER AND GREATER.
3. THE FLEXIBLE CONNECTORS ARE PROVIDED TO ATTENUATE SOUND TRANSMISSION (I.E. HUM). CONTRACTOR TO ADJUST SPRING HANGERS SUCH THAT MOTOR IS LEVEL AFTER SYSTEM IS FILLED WITH WATER.
4. IF THE PUMP IS TO BE MOUNTED IN VERTICAL PIPING WITH THE MOTOR IN THE HORIZONTAL POSITION, PROVIDE ADEQUATE SUPPORT TO PREVENT STRAIN ON PUMP PARTS AND PIPING.
5. IT IS NOT RECOMMENDED THAT PUMP BE MOUNTED WITH THE MOTOR VERTICALLY DOWNWARD. DO NOT USE MOTOR LIFT RINGS AS A MEANS OF SUSPENDING THE PUMP.

IN-LINE CLOSE COUPLED (BELL AND GOSSETT SERIES PL-36 AND 90) TYPE CIRCULATING PUMP PIPING DIAGRAM

NO SCALE

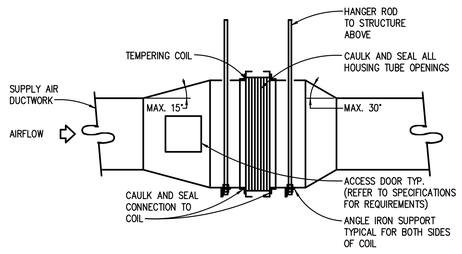


MULTIPLE COIL BANK BRANCH PIPE SIZING SCHEDULE	
INDIVIDUAL COIL FLOW GPM	PIPE SIZE IN.
0 – 1.3	1/2
> 1.3 – 3.4	3/4
> 3.4 – 6.9	1
> 6.4 – 12.5	1 1/4
> 12.5 – 19	1 1/2
> 19 – 44	2
> 44 – 69	2 1/2
> 69 – 117	3
> 117 – 230	4

NOTES:
1. PROVIDE FLEXIBLE CONNECTIONS FOR PUMPS 1/2 HP OR GREATER
2. VERIFY NUMBER OF COILS AND COIL BANKS FOR EACH AHU WITH MANUFACTURER. PROVIDE PIPING AS INDICATED FOR EACH COIL
3. UNIONS MAY BE DELETED AT FLANGED CONNECTIONS TO VALVES
4. REDUCER/INCREASER AT COIL CONNECTIONS SHALL BE CONCENTRIC

AHU HOT WATER HEATING COIL PIPING DIAGRAM

NO SCALE



DUCT MOUNTED TEMPERING COIL INSTALLATION DETAIL

NO SCALE

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DRAFTS: EMW

PROJECT NO: 22.516ES

SHEET TITLE: MECHANICAL DETAILS

SHEET NO: M602

STATE OF MICHIGAN
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No. 6201036881
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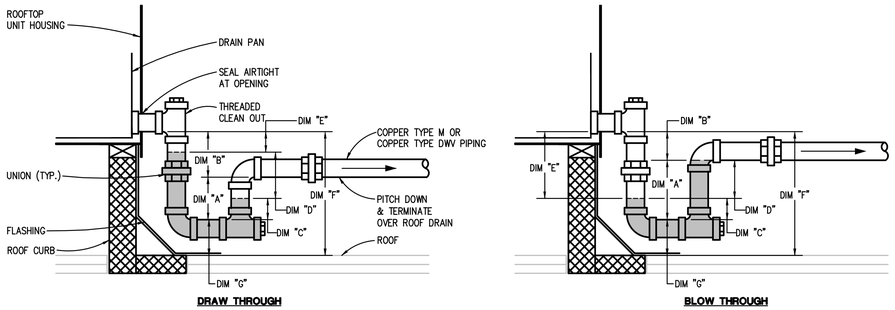
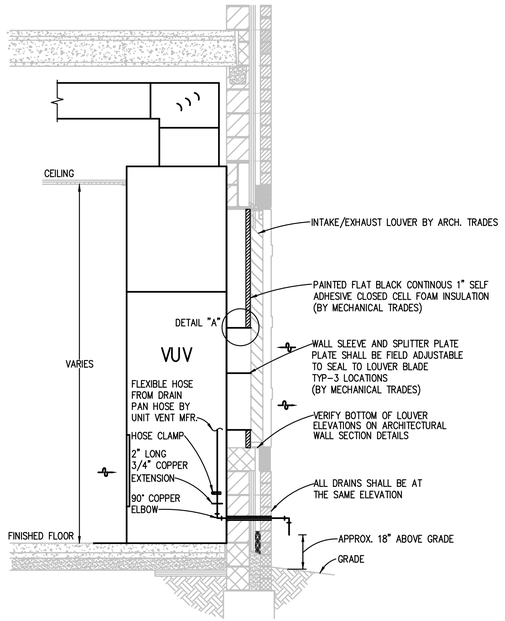
TRAP DIMENSION TABLE

TYPE OF SYSTEM	S.P. AT DRAIN PAN (IN.) (NOTE A)	DIMENSION "A" (INCHES) MIN.	DIMENSION "B" (INCHES)	DIMENSION "C" (INCHES) (TRAP SEAL)	DIMENSION "D" (INCHES)	DIMENSION "E" (INCHES)	DIMENSION "F" (INCHES)			
							DRAIN PIPE SIZE (INCHES)			
							1 1/2	2	2 1/2, 3	4
DRAW THROUGH	−5.1 TO −6	5.0	5.0	2	6	2	13.0	14.0	15.0	16.0
	−4.1 TO −5	4.5	4.5	2	5	2	12.0	13.0	14.0	15.0
	−3.1 TO −4	4.0	4.0	2	4	2	11.0	12.0	13.0	14.0
	−2.1 TO −3	3.5	3.5	2	3	2	10.0	11.0	12.0	13.0
	UP TO −2	3.0	3.0	2	2	2	9.0	10.0	11.0	12.0
BLOW THROUGH	UP TO +2	4.0	2.0	2	2	4	9.0	10.0	11.0	12.0
	+2.1 TO +3	5.0	2.0	2	3	5	10.0	11.0	12.0	13.0
	+3.1 TO +4	6.0	2.0	2	4	6	11.0	12.0	13.0	14.0
	+4.1 TO +5	7.0	2.0	2	5	7	12.0	13.0	14.0	15.0
	+5.1 TO +6	8.0	2.0	2	6	8	13.0	14.0	15.0	16.0

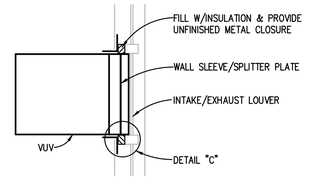
NOTES: A. REFER TO ROOFTOP AIR HANDLING UNIT (COMMERCIAL, UNITARY, MODULAR) SCHEDULE FOR (−) OR (+) STATIC PRESSURE AT DRAIN PAN.
B. CONDENSATE DRAIN PAN TRAP PIPING SERVING ENERGY RECOVERY UNIT HEAT EXCHANGER AND HUMIDIFIER SECTIONS, WHERE LOCATED OUTDOORS, SHALL BE INSULATED AND HEAT TRACED.
C. DIMENSION "C" IS MIN: 3" FOR UP TO 1 1/2" DRAIN PIPE
4" FOR 2" DRAIN PIPE
5" FOR 2 1/2" OR 3" DRAIN PIPE
6" FOR 4" DRAIN PIPE
D. PROVIDE ROOF CURB WITH ADEQUATE HEIGHT TO MEET DIMENSION "F"



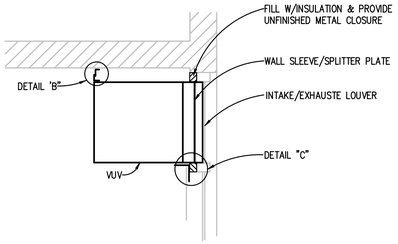
ROOFTOP AIR HANDLING/AIR CONDITIONING UNIT CONDENSATE DRAIN PAN TRAP DETAIL
NO SCALE



VERTICAL UNIT VENTILATOR SECTION VUV/LOUVER DETAIL
NO SCALE

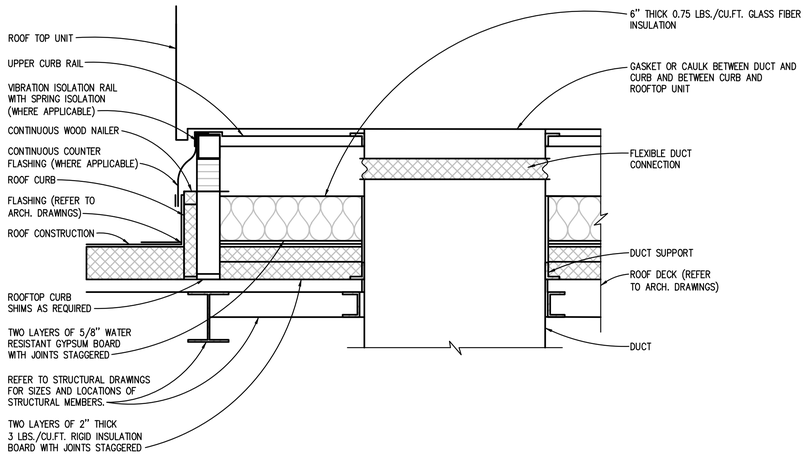


VUV ROOM CENTER ORIENTATION



VUV ROOM CORNER ORIENTATION

VERTICAL UNIT VENTILATOR PLAN VIEW DETAILS
NO SCALE



NOTE:
1. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR SPECIFIC FLASHING AND SUPPORT DETAILS.

ROOF TOP UNIT CURB SOUND ATTENUATION DETAIL
NO SCALE

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PROJECT NO: 22.516ES

SHEET TITLE: MECHANICAL DETAILS

SHEET NO: M603

STATE OF MICHIGAN
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No. 6201036881
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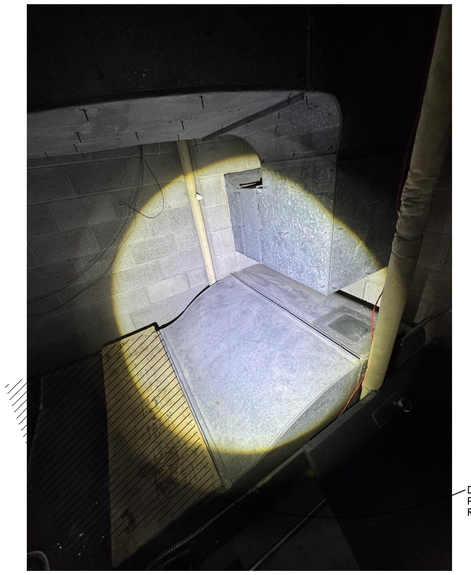
DEMOLISH UP TO THIS LINE AND PREPARE TO CONNECT TO NEW SUPPLY DUCT WORK

H&V 3 SUPPLY DUCT WORK DEMO DETAIL

DEMOLISH UP TO THIS LINE AND PREPARE TO CONNECT TO NEW RETURN DUCT WORK

H&V 3 RETURN DUCT WORK DEMO DETAIL



DEMOLISH UP TO THIS LINE AND PREPARE TO CONNECT TO NEW RETURN DUCT WORK

H&V 3 RETURN DUCT WORK DEMO DETAIL

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SHEET NO: M604

STATE OF MICHIGAN
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ABOVEGROUND HVAC PIPING & VALVE APPLICATION SCHEDULE

PIPE SIZE (INCHES)	SOFT COPPER TYPE K	HARD COPPER TYPE L	HARD COPPER TYPE M	CARBON STEEL (SCHED. 40)	CARBON STEEL (SCHED. 80)	CARBON STEEL (STD.)	COPPER TYPE DWV	SOLDERED	BRAZED	WELDED	THREADED	FLANGED	GROOVED	PRESSURE SEAL	MECHANICALLY FORMED TEE	BALL	GENERAL SERVICE BUTTERFLY	HI-PERF BUTTERFLY	GATE	KEYED NOTES
HEATING HOT WATER SUPPLY & RETURN - MIN. WORKING PRESS. & TEMP.: 125 PSIG AT 200 DEG F																				
UP TO 2				X							X					X				
UP TO 2		X						X	X							X				
2-1/2 TO 4				X						X		X					X			A
2-1/2 TO 4		X							X								X			A
6 TO 8				X						X		X					X			A
6 TO 8		X							X								X			A
10				X						X		X					X			A
12						X				X		X					X			A
14 AND LARGER						X				X		X					X			A

GENERAL NOTES

1. 'X' INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A PIPING SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. DISSIMILAR-METAL PIPING JOINTS: CONSTRUCT JOINTS USING DIELECTRIC FITTINGS COMPATIBLE WITH BOTH PIPING MATERIALS. IF A BRONZE VALVE CONNECTS THE DISSIMILAR METALS NO FURTHER DIELECTRIC ISOLATION IS REQUIRED.

   a. NPS 2 AND SMALLER: USE BRASS COUPLING, NIPPLE, OR UNION.
   b. NPS 2-1/2 AND LARGER: USE DIELECTRIC FLANGE KITS.

3. USE UNIONS OR FLANGES AT VALVE AND EQUIPMENT CONNECTIONS.
4. HVAC EQUIPMENT DRAINS, VENTS, SAFETY VALVE PIPING, BLOWDOWN PIPING AND THE LIKE SHALL BE SAME PIPING MATERIAL AS ASSOCIATED PIPING SYSTEM.
5. GROOVED END VALVES MAY BE USED WITH GROOVED PIPING.

KEYED NOTES

A. GROOVED AND FLANGED FITTINGS, JOINTS, AND COUPLINGS, IF INDICATED AS AN ACCEPTABLE SELECTION, MAY BE USED IN ACCESSIBLE LOCATIONS FOR THIS PIPING SYSTEM ONLY. ACCESSIBLE LOCATIONS ARE DEFINED AS EXPOSED CONSTRUCTION OR ABOVE LAY-IN CEILINGS.
B. BALL VALVE WITH 250 PSIG STEAM TRIM.
C. BALL VALVE WITH 150 PSIG STEAM TRIM.

DUCT SYSTEM APPLICATION SCHEDULE

AIR SYSTEMS	G90 GALV. SHEET METAL	DOUBLE-WALL LINED G90 GALV. SHEET METAL (SOLID INNER WALL)	DOUBLE-WALL LINED G90 GALV. SHEET METAL (PERF. INNER WALL)	G90 GALV. SHEET METAL WITH 1-INCH LINING	GALVANNEALED SHEET METAL	ALUMINUM	TYPE 304 STAINLESS STEEL	TYPE 316 STAINLESS STEEL	PVC COATED GALV. SHEET METAL (4X1)	PVC COATED GALV. SHEET METAL (1X4)	PVC COATED GALV. SHEET METAL (4X4)	16 GA. CARBON STEEL	ZERO-CLEARANCE PREFABRICATED RANGE HOOD EXHAUST DUCT	FABRIC	DESIGN PRESSURE CLASS (INCHES WG)	SEAL CLASS	MAX. ALLOWABLE LEAKAGE RATE (PERCENT)	KEYED NOTES
SUPPLY AIR WITHOUT TERMINAL UNITS	X														+2	A	5	
RETURN AIR WITHOUT TERMINAL UNITS	X														-2	A	5	
AIR TRANSFER DUCT				X											+2	A	5	
RELIEF AIR DOWNSTREAM OF FANS	X														+6	A	5	

GENERAL NOTES

1. 'X' INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A DUCT SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. 4 X 1 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON EXTERIOR SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON INTERIOR SURFACES.
3. 1 X 4 (4 X 1 REVERSE COATED) PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON INTERIOR SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON EXTERIOR SURFACES.
4. 4 X 4 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND 4 MILS (0.10 MM) THICK ON OPPOSITE SURFACES.

KEYED NOTES

A. SCREWS, DAMPERS, OR PROJECTIONS OF ANY TYPE ON INTERIOR OF DUCT SURFACE ARE PROHIBITED.
B. DUCT SHALL BE LINED WITHIN 25 FEET UPSTREAM OF FANS.
C. ALL WELDED CONSTRUCTION.

ABOVEGROUND HVAC PIPE & ACCESSORY INSULATION APPLICATION SCHEDULE

	FLEXIBLE ELASTOMERIC	FIBERGLASS	MINERAL WOOL	POLYISOCYANURATE	PHENOLIC	CELLULAR GLASS	CALCIUM SILICATE	ALUMINUM	STAINLESS STEEL	PVC	SELF-ADHESIVE (FOR OUTDOOR APPLICATIONS)	PVDC (INDOOR)	PVDC (OUTDOOR)	KEYED NOTES
	INSULATION MATERIAL & THICKNESS (INCHES)							FIELD-APPLIED JACKET MATERIAL						
INDOOR PIPE SYSTEM AND SIZE (INCHES)														
HEATING HOT WATER SUPPLY & RETURN 200 DEG F AND LOWER														
NPS 1-1/4 AND SMALLER		1.5						X		X				A
NPS 1-1/2 AND LARGER		2						X		X				A
REFRIGERANT SUCTION & HOT GAS (RIGID COPPER)														
NPS 6 AND SMALLER	1	1		1	1	1		X		X				
NPS 8 AND LARGER	1.5	1.5		1.5	1.5	1.5		X		X				
REFRIGERANT SUCTION & HOT GAS (SOFT COPPER)	1							X		X				
OUTDOOR (ABOVEGROUND) AND TUNNEL PIPE SYSTEM AND SIZE (INCHES)														
REFRIGERANT SUCTION & HOT GAS (RIGID COPPER)	2.5	2.5						X			X			B
REFRIGERANT SUCTION & HOT GAS (SOFT COPPER)	2							X			X			B

UNLESS OTHERWISE INDICATED OR SCHEDULED, THE FOLLOWING DO NOT REQUIRE INSULATION:
DIRECT BURIED COOLING SYSTEM PIPING
PIPING THAT CONVEYS FLUIDS HAVING DESIGN OPERATING TEMPERATURE RANGE BETWEEN 60 DEG F. AND 105 DEG F., INCLUSIVE.

GENERAL NOTES

1. 'X' OR THICKNESS IN INCHES INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. INSULATE PIPING WITHIN AIR HANDLING EQUIPMENT THE SAME AS INDOOR PIPING. PROVIDE ALUMINUM OR STAINLESS STEEL JACKET.
3. FOR PIPING NPS 1-1/4 AND SMALLER WITHIN PARTITIONS IN CONDITIONED SPACES INSULATION MAY BE REDUCED BY ONE-INCH THICKNESS, BUT NOT TO LESS THAN ONE-INCH THICKNESS.
4. FOR PIPING NPS 1 AND SMALLER, INSULATION IS NOT REQUIRED FOR STRAINERS, CONTROL VALVES, AND BALANCING VALVES.

KEYED NOTES

A. PROVIDE FIELD APPLIED JACKET FOR PIPING EXPOSED IN EQUIPMENT ROOMS, STORAGE ROOMS, JANITORS CLOSETS, RECEIVING ROOMS, TEST AREAS, CIRCULATION AREAS AND SUCH AREAS SUBJECT TO DAMAGE WITHIN 10 FEET (3 METERS) OF FINISHED FLOOR.
B. PROVIDE MANUFACTURER'S RECOMMENDED PROTECTIVE COATING FOR FLEXIBLE ELASTOMERIC THERMAL INSULATION.
C. STEAM AND CONDENSATE PIPING JACKET SHALL BE STUCCO EMBOSSED.
D. PIPING WITHIN ENERGY RECOVERY UNITS SHALL BE TYPE 304 STAINLESS STEEL, SMOOTH; 0.010 INCH THICK. SEAMS AND JOINTS CAULKED WITH CHEMICALLY RESISTANT SEALER.

DUCT SYSTEM INSULATION APPLICATION SCHEDULE

	FIBERGLASS BLANKET 0.75 LB/CU FT	FIBERGLASS BLANKET 1.0 LB/CU FT	FIBERGLASS BOARD 2.25 LB/CU FT	FIBERGLASS BOARD 6.0 LB/CU FT	FLEXIBLE ELASTOMERIC	ASTM E2336 2-HOUR FIRE RATED BLANKET	2-HOUR FIRE RATED BLANKET	ALUMINUM	SELF-ADHESIVE (FOR OUTDOOR APPLICATIONS)	KEYED NOTES
	INSULATION MATERIAL & THICKNESS (INCHES)							FIELD APPLIED JACKET MATERIAL		
DUCT SYSTEMS LOCATED INDOORS										
SUPPLY AIR, EXCEPT AS NOTED BELOW		1.5								A, E

PLENUMS, DUCTS, AND DUCT ACCESSORIES NOT REQUIRING INSULATION:
FIBROUS-GLASS DUCTS
DOUBLE-WALL METAL DUCTS WITH INSULATION OF SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1 - 2013
METAL DUCTS WITH DUCT LINER OF SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1 - 2013
FABRIC SUPPLY DUCTS
FACTORY-INSULATED FLEXIBLE DUCTS
FACTORY-INSULATED PLENUMS AND CASINGS
FLEXIBLE CONNECTORS
VIBRATION-CONTROL DEVICES
FACTORY-INSULATED ACCESS PANELS AND DOORS

GENERAL NOTES

1. 'X' OR THICKNESS IN INCHES INDICATE ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A DUCT SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. REFER TO METAL DUCT SECTION OF SPECIFICATIONS FOR DUCT LINING AND DOUBLE-WALL INSULATED DUCT.
3. REFER TO HVAC CASINGS SECTION OF SPECIFICATIONS FOR DOUBLE-WALL INSULATED PLENUMS.

KEYED NOTES

A. INCLUDE INSULATION AROUND DUCT MOUNTED COILS AND AIR TERMINAL UNIT COILS.
B. NUMBER OF LAYERS AND TOTAL INSULATION THICKNESS AS RECOMMENDED BY SELECTED MANUFACTURER.
C. DOES NOT APPLY TO PREFABRICATED, ZERO-CLEARANCE GREASE DUCT.
D. PROVIDE MANUFACTURER'S RECOMMENDED PROTECTIVE COATING FOR FLEXIBLE ELASTOMERIC THERMAL DUCT INSULATION.
E. EXPOSED SUPPLY DUCTWORK LOCATED IN A CONDITIONED SPACE SERVED BY THE SAME AIR HANDLING SYSTEM IS NOT REQUIRED TO BE INSULATED.

SCHEDULES GENERAL NOTES:

TYPICAL FOR ALL SCHEDULE SHEETS:

1. REFER TO ELECTRICAL STANDARD SCHEDULES, ONE LINE DIAGRAM AND PANEL SCHEDULES FOR ADDITIONAL ELECTRICAL INFORMATION
2. PROVIDE THE FOLLOWING FACTORY-WIRED ELECTRICAL OPTIONS/ACCESSORIES WHERE INDICATED IN SCHEDULE:
   A - NON-FUSED DISCONNECT SWITCH
   B - UNIT SHALL BE SINGLE POINT ELECTRICAL CONNECTION WITH FACTORY INSTALLED DISCONNECTING MEANS AND ALL REQUIRED STARTERS AND CONTROLS
   C - SERVICE RECEPTACLE
   D - FUSED DISCONNECT SWITCH
   E - COMBINATION STARTER
   F - UNIT SHALL HAVE (2) SINGLE POINT CONNECTIONS WITH FACTORY INSTALLED DISCONNECTING MEANS AND ALL REQUIRED STARTERS AND CONTROLS. (1) CONNECTION SHALL BE FOR CONDENSING SECTION AND (1) CONNECTION SHALL BE FOR THE REMAINDER OF THE UNIT.
3. FOR MODULATION/CONTROL TYPE COLUMN, "VFC" INDICATES VARIABLE FREQUENCY CONTROLLERS, "AUTO" INDICATES AUTOMATIC OPERATION (CONTROLLED BY TEMPERATURE CONTROLS OR SELF CONTAINED CONTROLS), "MANUAL" INDICATES HAND OPERATION.
4. IF VARIABLE FREQUENCY CONTROLLERS ARE INDICATED TO BE PROVIDED AND ARE NOT INSTALLED INTEGRAL TO THE UNIT, VARIABLE FREQUENCY CONTROLLERS SHALL BE SUPPLIED BY THE MECHANICAL CONTRACTOR (UNLESS OTHERWISE NOTED) AND INSTALLED BY THE ELECTRICAL CONTRACTOR INCLUDING THE LINE SIDE AND LOAD SIDE WIRING TO THE MOTOR AND INCLUDING MISCELLANEOUS STEEL REQUIRED FOR THE SUPPORT AND MOUNTING OF THE VFC. REFER TO FLOOR PLANS FOR LOCATION.
5. WHERE EQUIPMENT IS INDICATED TO HAVE A SINGLE POINT ELECTRICAL CONNECTION, THAT EQUIPMENT SHALL COME COMPLETE WITH FACTORY INSTALLED STARTERS, MOTOR OVERLOAD PROTECTION, CONTACTORS, FUSING AND ALL NECESSARY INTERNAL WIRING AND CONTROLS. PROVIDE A FACTORY MOUNTED UNIT DISCONNECTING MEANS WHERE THE ELECTRICAL CONTRACTOR SHALL MAKE SINGLE POINT CONNECTION. INSTALL PACKAGED EQUIPMENT SUCH THAT THE ELECTRICAL CONNECTION AND CONTROLS ARE ACCESSIBLE AND HAVE CLEARANCES MEETING THE NATIONAL ELECTRICAL CODE.
6. WHERE PACKAGED EQUIPMENT IS PROVIDED, NAMEPLATE MUST INDICATE MAXIMUM OVERCURRENT PROTECTION BY HACR RATED CIRCUIT BREAKERS OR FUSES. IF FUSE PROTECTION ONLY IS INDICATED, PROVIDE A FUSIBLE DISCONNECT AND FUSES WITH THE UNIT.
7. WHERE EQUIPMENT IS DESIGNATED BY MANUFACTURER AND MODEL NUMBER, THIS IS THE BASIS OF DESIGN. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT BY OTHER SPECIFIED MANUFACTURERS OR PROPOSED ALTERNATE EQUIPMENT BY THE BASIS OF DESIGN MANUFACTURER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REVISIONS TO ELECTRICAL REQUIREMENTS, STRUCTURAL LOADING, OR ARCHITECTURAL APPURTENANCES AND SHALL INCLUDE THE COST OF SUCH REVISIONS IN HIS BID.
8. WHERE EQUIPMENT IS SCHEDULED TO INCLUDE A SERVICE RECEPTACLE, PROVIDE A FACTORY MOUNTED SERVICE RECEPTACLE WITH APPROPRIATE FUSES AND TRANSFORMERS CONNECTED ON THE LINE SIDE OF THE UNIT DISCONNECT. PROVIDE A NAMEPLATE ON THE DISCONNECT SWITCH INDICATING THE PRESENCE OF LIVE POWER TO THE SERVICE RECEPTACLE WHEN THE UNIT DISCONNECT IS IN THE OFF POSITION.
9. SIZE ALL EQUIPMENT FEEDERS BASED ON THE LISTED MOP (MAXIMUM OVERCURRENT PROTECTION). REFER TO THE FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE ON THE ELECTRICAL STANDARD SCHEDULES SHEET.

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DATE	ISSUED FOR
11/20/24	DD
12/06/24	50% CD
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PIC: WEK
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DRAFTS: EMW

PROJECT NO: 22.516ES

SHEET TITLE: MECHANICAL SCHEDULES

SHEET NO: M701

STATE OF MICHIGAN
DENNIS P. SCZOMAK
ENGINEER
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UNIT VENTILATOR SCHEDULE

UNIT TYPE	SUPPLY FAN						RELIEF FAN	COOLING COIL							HEATING COIL						ARRANGEMENT	MAXIMUM UNIT DISCHARGE SOUND POWER LEVELS – dB								MODULATION/ CONTROL TYPE	ELECTRICAL					MODEL NUMBER	KEYED NOTES
								MINIMUM TOTAL CAPACITY MBH	AIR			DIRECT EXPANSION			MINIMUM TOTAL CAPACITY MBH	AIR		WATER					63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		VOLTS	PHASE	FLA	MOP	OPTIONS/ ACCESSORIES		
	CFM	MINIMUM OUTSIDE AIRFLOW CFM (NOTE 3)		E.S.P. IN. WG.	NUMBER FANS	H.P. EACH	HP		E.D.B. °F	L.D.B. °F	L.W.B. °F	MAX FACE VEL. F.P.M.	REFRIG. TYPE	NO. OF STAGES		E.D.B. °F	L.D.B. °F	FLOW GPM	E.W.T. °F	L.W.T. °F	MAXIMUM W.P.D. FT. HEAD	CONTROL VALVE W.P.D. FT. HEAD															
		MAX-MIN	MIN-MIN																																		
VUV-A120	1100	312	--	0.25	1	1/2	1/3	28.36	79	55	54	273	R-454B	1	46.65	50	89	3	130	98	0.19	5	VERTICAL	71	65	63	67	66	63	61	55	AUTO	120	1	10	15	B	S11212B	
VUV-A121	1100	312	--	0.25	1	1/2	1/3	28.36	79	55	54	273	R-454B	1	46.65	50	89	3	130	98	0.19	5	VERTICAL	71	65	63	67	66	63	61	55	AUTO	120	1	10	15	B	S11212B	
VUV-A122	1100	312	--	0.25	1	1/2	1/3	28.36	79	55	54	273	R-454B	1	46.65	50	89	3	130	98	0.19	5	VERTICAL	71	65	63	67	66	63	61	55	AUTO	120	1	10	15	B	S11212B	
VUV-A103	1100	312	--	0.25	1	1/2	1/3	28.36	79	55	54	273	R-454B	1	46.65	50	89	3	130	98	0.19	5	VERTICAL	71	65	63	67	66	63	61	55	AUTO	120	1	10	15	B	S11212B	
VUV-A105	1100	312	--	0.25	1	1/2	1/3	28.36	79	55	54	273	R-454B	1	46.65	50	89	3	130	98	0.19	5	VERTICAL	71	65	63	67	66	63	61	55	AUTO	120	1	10	15	B	S11212B	
VUV-A160	1100	312	--	0.25	1	1/2	1/3	28.36	79	55	54	273	R-454B	1	46.65	50	89	3	130	98	0.19	5	VERTICAL	71	65	63	67	66	63	61	55	AUTO	120	1	10	15	B	S11212B	
VUV-A151	1100	312	--	0.25	1	1/2	1/3	28.36	79	55	54	273	R-454B	1	46.65	50	89	3	130	98	0.19	5	VERTICAL	71	65	63	67	66	63	61	55	AUTO	120	1	10	15	B	S11212B	
VUV-A155	1100	312	--	0.25	1	1/2	1/3	28.36	79	55	54	273	R-454B	1	46.65	50	89	3	130	98	0.19	5	VERTICAL	71	65	63	67	66	63	61	55	AUTO	120	1	10	15	B	S11212B	
VUV-A171	1100	312	--	0.25	1	1/2	1/3	28.36	79	55	54	273	R-454B	1	46.65	50	89	3	130	98	0.19	5	VERTICAL	71	65	63	67	66	63	61	55	AUTO	120	1	10	15	B	S11212B	
VUV-A172	1300	377	--	0.25	1	1/2	1/3	33.71	80	56	55	273	R-454B	1	62.28	46	90	5	130	105	0.5	5	VERTICAL	73	68	67	70	70	67	65	59	AUTO	120	1	10	15	B	S11212B	
VUV-A174	1300	377	--	0.25	1	1/2	1/3	33.71	80	56	55	273	R-454B	1	62.28	46	90	5	130	105	0.5	5	VERTICAL	73	68	67	70	70	67	65	59	AUTO	120	1	10	15	B	S11212B	

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MANUFACTURER BASED ON DAIKIN (HORIZONTAL UNITS), CHANGEAIRE (VERTICAL UNITS) UNLESS OTHERWISE INDICATED.
3. MINIMUM OUTSIDE AIRFLOW MAX-MIN CFM IS THE REQUIRED MINIMUM OUTSIDE AIRFLOW RATE WITH MAXIMUM OCCUPANT LOAD. MINIMUM OUTSIDE AIRFLOW MIN-MIN CFM IS THE REQUIRED MINIMUM OUTSIDE AIRFLOW RATE WITH ZERO OCCUPANT LOAD.

SEE PART "B"

SEE PART "B"

PACKAGED ROOFTOP AIR CONDITIONING UNIT SCHEDULE - PART A

UNIT I.D.	AREA SERVED	SUPPLY FAN											RELIEF OR EXHAUST FAN						COOLING SECTION-DX													INTEGRAL AIR-COOLED CONDENSING SECTION	
		AIRFLOW CFM	MINIMUM OUTSIDE AIRFLOW CFM (NOTE 4)		E.S.P. IN. W.G.	T.S.P. IN. W.G.	FAN SPEED RPM	FAN POSITION	WHEEL TYPE	CONTROL TYPE (NOTE 7)	MOTOR		AIRFLOW CFM	E.S.P. IN. W.G.	FAN SPEED RPM	WHEEL TYPE	MOTOR		MIXED AIR		COIL LEAVING AIR		UNIT LEAVING AIR		NET UNIT CAPACITY		MINIMUM NUMBER OF CIRCUITS	REFRIG. TYPE	HOT GAS REHEAT		MIN. FACE AREA SQ. FT.	MAX. FACE VEL. F.P.M	MAX. A.P.D. IN. W.G.	DESIGN AMBIENT TEMP. °F	MIN. AMBIENT TEMP. °F
											BHP	HP					BHP	HP	E.D.B. °F	E.W.B. °F	L.D.B. °F	L.W.B. °F	L.D.B. °F	L.W.B. °F	TOTAL MBH	SENSIBLE MBH			E.D.B. °F	L.D.B. °F					
			MAX-MIN	MIN-MIN																														
RTU-1	CLASSROOMS A102 & A118	2500	899	137	0.5	1.6	2188	DRAWTHRU	AF	ECM	1	2	2500	0.5	1820	AF	0.44	2	80	66	56	56	57	56	75	63	1	R-32	-	70	6	414	0.35	95	45
RTU-2	GYM	8000	1395	1006	0.5	2	1341	DRAWTHRU	AF	ECM	4.03	5	8000	0.5	1312	AF	1.59	5	78	64	55	55	56	55	223	195	1	R-32	-	70	19.7	374	0.36	95	45
RTU-3	MUSIC/BAND	3500	820	33	0.5	1.51	1527	DRAWTHRU	AF	ECM	1.29	3	1950	0.5	1113	AF	0.26	1 1/2	80	66	56	56	57	56	101	89	1	R-32	-	70	15.4	226	0.15	95	45

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE DAIKIN UNLESS OTHERWISE NOTED.
3. FLUID TYPE: W = WATER, PGXX = PROPYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL, EGXX = ETHYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL.
4. MINIMUM OUTSIDE AIRFLOW MAX-MIN CFM IS THE REQUIRED MINIMUM OUTSIDE AIRFLOW RATE WITH MAXIMUM OCCUPANT LOAD. MINIMUM OUTSIDE AIRFLOW MIN-MIN CFM IS THE REQUIRED MINIMUM OUTSIDE AIRFLOW RATE WITH ZERO OCCUPANT LOAD.
5. MERV DESIGNATES THE "MINIMUM EFFICIENCY REPORTING VALUE" AS EVALUATED UNDER ASHRAE STANDARD 52.2 1999.
6. TOTAL STATIC PRESSURE FOR VARIABLE AIR VOLUME SYSTEMS IS BASED ON THE FILTER DIRTY AIR PRESSURE DROP AND AVERAGE/MIDLIFE FILTER AIR PRESSURE DROP FOR CONSTANT VOLUME SYSTEMS UNLESS NOTED OTHERWSE.
7. SZVAV = SINGLE ZONE VARIABLE AIR VOLUME; DAT-DSP VAV = DISCHARGE AIR TEMPERATURE CONTROL AND DUCT STATIC PRESSURE CONTROL WITH VARIABLE AIR VOLUME.

SEE PART "A"

COMMERCIAL ROOFTOP UNIT AIR CONDITIONING SCHEDULE - PART B

SEE PART "C"

UNIT I.D.	PRE-FILTER SECTION				AFTER-FILTER SECTION				CURB			MAXIMUM UNIT DIMENSIONS			MAXIMUM UNIT OPERATING WEIGHT LBS. (WITH CURB)	TOTAL UNIT ELECTRICAL						MODEL NO.	KEYED NOTES
	TYPE	MERV	AIR PRESS. DROP		TYPE	MERV	AIR PRESS. DROP		TYPE		HEIGHT	LENGTH	HEIGHT (WITH CURB)	WIDTH		VOLTS	PHASE	FLA	MOP	SCCR KA	OPTIONS/ ACCESSORIES		
			INITIAL IN. W.G.	FINAL IN. W.G.			INITIAL IN. W.G.	FINAL IN. W.G.	STANDARD	VIBRATION ISOLATION SPRING CURB													
RTU-1	4 @ 16x16x2	8	--	--	4 @ 16x16x4	14	0.18	0.68	N	Y	18	85	88	84	2600	230	3	34.1	50	10		DPSC06B	
RTU-2	9 @ 18x24x2	8	--	--	9 @ 18x24x4	14	0.27	0.77	N	Y	18	203	90	77	7000	230	3	82.6	125	65		DPSC18B	
RTU-3	6 @ 18x24x2	8	--	--	6 @ 18x24x4	14	0.26	0.76	N	Y	18	102	104	74	4900	230	3	47.2	70	10		DPSC07B	

NOTE: SEE NOTES UNDER PART "A"

SEE PART "B"

COMMERICAL ROOFTOP AIR CONDITIONING UNIT SCHEDULE - PART C

UNIT I.D.	MAXIMUM SOUND POWER LEVELS																							
	UNIT DISCHARGE Lw BY OCTAVE BAND								UNIT INLET Lw BY OCTAVE BAND								CASING RADIATED Lw BY OCTAVE BAND							
	63 HZ (DB)	125 HZ (DB)	250 HZ (DB)	500 HZ (DB)	1000 HZ (DB)	2000 HZ (DB)	4000 HZ (DB)	8000 HZ (DB)	63 HZ (DB)	125 HZ (DB)	250 HZ (DB)	500 HZ (DB)	1000 HZ (DB)	2000 HZ (DB)	4000 HZ (DB)	8000 HZ (DB)	63 HZ (DB)	125 HZ (DB)	250 HZ (DB)	500 HZ (DB)	1000 HZ (DB)	2000 HZ (DB)	4000 HZ (DB)	8000 HZ (DB)
RTU-1	71	73	81	78	81	80	77	72	71	70	78	73	75	74	69	64	82	82	78	75	74	69	77	72
RTU-2	79	78	83	78	76	73	68	63	73	72	80	72	67	66	61	58	80	74	76	76	76	72	68	63
RTU-3	75	76	84	81	84	78	75	69	75	73	81	76	78	72	67	61	85	85	81	78	76	71	68	60

NOTE: SEE NOTES UNDER PART "A"

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PROJECT NO: 22.516ES

SHEET TITLE: MECHANICAL SCHEDULES

SHEET NO: M702

STATE OF MICHIGAN
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GRILLE, REGISTER, AND DIFFUSER SCHEDULE

UNIT IDENTIFICATION	TYPE	FACE SIZE	NECK SIZE	FRAME TYPE	ACCESSORY	CONSTRUCTION	FINISH	MODEL NUMBER	KEYED NOTES
S-1	DIFFUSER	24X24	SEE PLANS	NOTE 2	NONE	ALUMINUM	WHITE	SPD	
S-2	DIFFUSER	SEE PLANS	SEE PLANS	NOTE 2	NONE	ALUMINUM	WHITE	AST210	
R-1	GRILLE	24X24	SEE PLANS	NOTE 2	RAC	ALUMINUM	WHITE	510	

GENERAL NOTES:
1. MODEL NUMBERS ARE PRICE UNLESS OTHERWISE NOTED.
2. REFER TO ARCHITECTURAL PLANS FOR CEILING TYPE.

HOT WATER HEATING COIL SCHEDULE

UNIT IDENTIFICATION	MAXIMUM NUMBER ROWS	MAXIMUM FIN DENSITY FINS/INCH	CAPACITY MBH	AIR				MINIMUM FACE AREA SQ. FT.	WATER					CONTROL VALVE W.P.D. FT. HD.	MODEL NUMBER	KEYED NOTES
				AIRFLOW CFM	E.D.B. °F	L.D.B. °F	MAXIMUM A.P.D. IN. W.G.		FLOW GPM	FLUID TYPE	E.W.T. °F	L.W.T. °F	MAXIMUM W.P.D. FT. HEAD			
HC-A118	2	11	63	1250	42	90	0.23	3	6.3	W	130	110	7.2	5	5BD1102C	
HC-A102	2	11	63	1250	42	90	0.23	3	6.3	W	130	110	7.2	5	5BD1102C	
HC-A136	2	11	49	1000	46	90	0.23	2.5	4.8	W	130	110	3.7	5	5BD1102C	
HC-A144	3	9	90	1800	46	90	0.22	4	4.2	W	130	110	8.7	5	5WQ0903B	
HC-A145	2	14	319	8000	54	90	0.22	17.3	31.5	W	130	110	1.4	5	5MH1402B	
HC-A110	2	12	35	700	46	90	0.31	1.5	3.4	W	130	110	9.4	5	5BS1202C	

GENERAL NOTES:
1. MODEL NUMBERS ARE DAIKIN UNLESS OTHERWISE NOTED.
2. COIL SELECTION BASED ON .00025 FOULING FACTOR.
3. FLUID TYPE: W = WATER, PGXX = PROPYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL, EGXX = ETHYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL.

AIR COOLED CONDENSING UNIT SCHEDULE

UNIT IDENTIFICATION	SYSTEM SERVED	TOTAL CAPACITY MBH	MINIMUM EER	REFRIGERATION TYPE	NUMBER OF CONTROL STAGES	CONDENSER		CONDENSER FAN		COMPRESSOR		MODULATION/ CONTROL TYPE	ELECTRICAL						MODEL NUMBER	KEYED NOTES
						DESIGN AMBIENT TEMPERATURE °F	MINIMUM AMBIENT TEMPERATURE °F	QUANTITY	HP EACH	NUMBER OF COMPRESSORS	TYPE OF COMPRESSOR		VOLTS	PHASE	FLA	MOP	SCCR KA	OPTIONS/ ACCESSORIES		
CU-A120	VUV-A120	34	11.7	R-454B	1	95 °F	95 °F	1	1/6	1	SCROLL	AUTO	230	1		30		--	RA15AY36	
CU-A121	VUV-A121	34	11.7	R-454B	1	95 °F	95 °F	1	1/6	1	SCROLL	AUTO	230	1		30		--	RA15AY36	
CU-A122	VUV-A122	34	11.7	R-454B	1	95 °F	95 °F	1	1/6	1	SCROLL	AUTO	230	1		30		--	RA15AY36	
CU-A103	VUV-A103	34	11.7	R-454B	1	95 °F	95 °F	1	1/6	1	SCROLL	AUTO	230	1		30		--	RA15AY36	
CU-A105	VUV-A105	34	11.7	R-454B	1	95 °F	95 °F	1	1/6	1	SCROLL	AUTO	230	1		30		--	RA15AY36	
CU-A157	BCU-A157	34	11.2	R-32	1	95 °F	95 °F	1	1/4	1	SCROLL	AUTO	230	1		30		--	DX3SQN31610	
CU-A156	BCU-A156	34	11.2	R-32	1	95 °F	95 °F	1	1/4	1	SCROLL	AUTO	230	1		30		--	DX3SQN31610	
CU-A160	VUV-A160	34	11.7	R-454B	1	95 °F	95 °F	1	1/6	1	SCROLL	AUTO	230	1		30		--	RA15AY36	
CU-A151	VUV-A151	34	11.7	R-454B	1	95 °F	95 °F	1	1/6	1	SCROLL	AUTO	230	1		30		--	RA15AY36	
CU-A155	VUV-A155	34	11.7	R-454B	1	95 °F	95 °F	1	1/6	1	SCROLL	AUTO	230	1		30		--	RA15AY36	
CU-A171	VUV-A171	34	11.7	R-454B	1	95 °F	95 °F	1	1/6	1	SCROLL	AUTO	230	1		30		--	RA15AY36	
CU-A172	VUV-A172	40	11.7	R-454B	1	95 °F	95 °F	1	1/5	1	SCROLL	AUTO	230	1		50		--	RA15AY42	
CU-A174	VUV-A174	40	11.7	R-454B	1	95 °F	95 °F	1	1/5	1	SCROLL	AUTO	230	1		50		--	RA15AY42	

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE DAIKIN UNLESS OTHERWISE NOTED.
3. REFER TO AIR HANDLING UNIT DIRECT EXPANSION COOLING COIL SCHEDULE FOR ASSOCIATED COOLING COIL.
4. EFFICIENCY RATING SHALL BE IN ACCORDANCE WITH ARI-STANDARD 340/360-2004.

PUMP SCHEDULE

UNIT IDENTIFICATION	SYSTEM SERVED	LOCATION	TYPE	COUPLING TYPE	WATERFLOW GPM	FLUID TYPE	COLDEST SYSTEM OPERATING TEMP. °F FOR PUMP SELECTION	PUMP HEAD FT.	OVERLOAD GPM	MINIMUM EFFICIENCY %	MOTOR			MODULATION/ CONTROL TYPE	ELECTRICAL				MODEL NUMBER	KEYED NOTES
											BHP	HP	RPM		VOLTS	PHASE	SCCR KA (NOTE 4)	OPTIONS/ ACCESSORIES		
CP-102A	HC A102	A102	INLINE	CLOSE	6.3	WATER	40	15	NON-OVERLOADING	38	0.06	1/4	1800	AUTO	120	1			E90-1AAB	PRIMARY
CP-102B	HC A102	A102	INLINE	CLOSE	6.3	WATER	40	15	NON-OVERLOADING	38	0.06	1/4	1800	AUTO	120	1			E90-1AAB	BACKUP
CP-118A	HC-A118	A118	INLINE	CLOSE	6.3	WATER	40	15	NON-OVERLOADING	38	0.06	1/4	1800	AUTO	120	1			E90-1AAB	PRIMARY
CP-118B	HC-A118	A118	INLINE	CLOSE	6.3	WATER	40	15	NON-OVERLOADING	38	0.06	1/4	1800	AUTO	120	1			E90-1AAB	BACKUP
CP-136A	HC-A136	A139	INLINE	CLOSE	4.8	WATER	40	11	NON-OVERLOADING	38	0.04	1/4	1800	AUTO	120	1			E90-1AAB	PRIMARY
CP-136B	HC-A136	A139	INLINE	CLOSE	4.8	WATER	40	11	NON-OVERLOADING	38	0.04	1/4	1800	AUTO	120	1			E90-1AAB	BACKUP
CP-144A	HC-A144	A141	INLINE	CLOSE	4.2	WATER	40	16	NON-OVERLOADING	34	0.05	1/4	1800	AUTO	120	1			E90-1AAB	PRIMARY
CP-144B	HC-A144	A141	INLINE	CLOSE	4.2	WATER	40	16	NON-OVERLOADING	34	0.05	1/4	1800	AUTO	120	1			E90-1AAB	BACKUP
CP-145A	HC-A145	PENTHOUSE	INLINE	CLOSE	31.5	WATER	40	15	NON-OVERLOADING	65	0.2	1/3	1800	AUTO	120	1			E90-1.25AAB	PRIMARY
CP-145B	HC-A145	PENTHOUSE	INLINE	CLOSE	31.5	WATER	40	15	NON-OVERLOADING	65	0.2	1/3	1800	AUTO	120	1			E90-1.25AAB	BACKUP
CP-110A	HC-A110	A101	INLINE	CLOSE	3.4	WATER	40	17	NON-OVERLOADING	--	--	1/6	3300	AUTO	120	1			PL-36	PRIMARY
CP-110B	HC-A110	A101	INLINE	CLOSE	3.4	WATER	40	17	NON-OVERLOADING	--	--	1/6	3300	AUTO	120	1			PL-36	BACKUP

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBER ARE BELL & GOSSETT UNLESS OTHERWISE NOTED.
3. FLUID TYPE: W = WATER, PGXX = PROPYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL, EGXX = ETHYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL.
4. CONTROLLER (E.G. VARIABLE FREQUENCY CONTROLLER, MOTOR STARTER) FOR SPECIFIED EQUIPMENT SHALL BE MANUFACTURED AND MARKED PER NEC WITH A MINIMUM SHORT CIRCUIT CURRENT RATING AS INDICATED.

BLOWER COIL UNIT SCHEDULE

UNIT IDENTIFICATION	FAN						COOLING COIL					HEATING COIL								ARRANGEMENT	MAXIMUM UNIT DIMENSIONS			FILTER	MODULATION/ CONTROL TYPE	ELECTRICAL				MODEL NUMBER	KEYED NOTES
	AIRFLOW CFM	ESP IN. W.G.	TSP IN. W.G.	BHP	HP	FAN RPM	SENSIBLE CAPACITY MBH	TOTAL CAPACITY MBH	AIR			MINIMUM TOTAL CAPACITY MBH	AIR		WATER						LENGTH INCHES	WIDTH INCHES	HEIGHT INCHES	TYPE		VOLTS	PHASE	SCCR KA	OPTIONS/ ACCESSORIES		
									E.D.B. °F	E.W.B. °F	L.D.B. °F		E.D.B. °F	L.D.B. °F	FLOW GPM	E.W.T. °F	L.W.T. °F	FT. HEAD	CONTROL VALVE TYPE	CONTROL VALVE W.P.D. FT. HEAD											
BCU-A156	1000	0.75					24.8	33.1	80 °F	67 °F	57.1 °F	51.8	40 °F	87.7 °F	gpm	130	107	4.34	2-WAY	5	HORIZONTAL				2" MERV 13	AUTO	120	1		B		1, 2
BCU-A157	1000	0.75					24.8	33.1	80 °F	67 °F	57.1 °F	51.8	40 °F	87.7 °F	gpm	130	107	4.34	2-WAY	5	HORIZONTAL				2" MERV 13	AUTO	120	1		B		1, 2

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE DAIKIN UNLESS OTHERWISE NOTED

KEYED NOTES:
1. PROVIDE THREE SETS OF FILTERS FOR EACH UNIT
2. SEE CONDENSING UNIT SCHEDULED FOR CONDENSING UNIT

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11/20/24	DD
12/06/24	50% CD
01/17/25	BID SET

PIC: WEK
PM: WEK
DRAFTS: EMW

PROJECT NO: 22.516ES

SHEET TITLE: MECHANICAL SCHEDULES

SHEET NO: M703

STATE OF MICHIGAN
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TEMPERATURE CONTROL - SYMBOLS LIST

SCHEMATIC SYMBOLS

SYMBOL	DESCRIPTION
AFC	AIR FLOW CONTROLLER
AQ	AQUASTAT, STRAP ON BULB
CO2	CARBON DIOXIDE SENSOR – WALL MOUNTED
CO2	CARBON DIOXIDE SENSOR – DUCT MOUNTED
CO	CARBON MONOXIDE SENSOR – WALL MOUNTED
CO	CARBON MONOXIDE SENSOR – DUCT MOUNTED
CS	CURRENT SWITCH
CT	CURRENT TRANSMITTER
	DAMPER – INLET VANES
	DAMPER – OPPOSED BLADE
	DAMPER – PARALLEL BLADE
M	DAMPER MOTOR
M	DAMPER MOTOR W/ POSITIVE POSITIONER
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DPS	DIFFERENTIAL PRESSURE SWITCH
EP	ELECTRIC–PNEUMATIC RELAY
EPT	ELECTRIC TO PNEUMATIC TRANSDUCER
CM	FIRE ALARM SYSTEM, ADDRESSABLE CONTROL MODULE
IM	FIRE ALARM SYSTEM, ADDRESSABLE INTERFACE MODULE
FMS	FLOW MEASURING STATION
FM	FLOW METER
FS	FLOW SWITCH
FZ	FREEZESTAT
F	GAUGE – FLOW
P	GAUGE – PRESSURE
T	GAUGE – TEMPERATURE
	GUARD FOR STAT OR SENSOR
	HUMIDIFIER
H	HUMIDISTAT OR HUMIDITY SENSOR (AS DEFINED ON TC DRAWINGS)
H	HUMIDITY SENSOR, DUCT MOUNTED
LVL	LEVEL SWITCH OR TRANSMITTER
LS	LIMIT SWITCH
	LINE – ELECTRIC
	LINE – PNEUMATIC
M	MAIN CONTROL AIR SUPPLY
M/S	MOTOR STARTER
OS	OCCUPANCY SENSOR
R	PILOT LIGHT OR BEACON R – RED LENS A – AMBER LENS B – BLUE LENS G – GREEN LENS
PE	PNEUMATIC–ELECTRIC SWITCH
PS	PRESSURE SWITCH
PT	PRESSURE TRANSMITTER
R	RELAY, ELECTRIC
N	SELECTOR SWITCH, (N=NUMBER OF POSITIONS)
AI	SIGNAL – DDC/BAS, ANALOG INPUT
AO	SIGNAL – DDC/BAS, ANALOG OUTPUT
DI	SIGNAL – DDC/BAS, DIGITAL INPUT
DO	SIGNAL – DDC/BAS, DIGITAL OUTPUT
AI	SIGNAL – PACKAGED EQUIPMENT, ANALOG INPUT
AO	SIGNAL – PACKAGED EQUIPMENT, ANALOG OUTPUT
DI	SIGNAL – PACKAGED EQUIPMENT, DIGITAL INPUT
DO	SIGNAL – PACKAGED EQUIPMENT, DIGITAL OUTPUT

SCHEMATIC SYMBOLS (CONT.)

SYMBOL	DESCRIPTION
DD	SMOKE DETECTOR – DUCT MOUNTED
SD	SMOKE DETECTOR – SPACE MOUNTED
S/S	START/STOP RELAY
SPT	STATIC PRESSURE TRANSMITTER
SP	STATIC PRESSURE SENSOR OR PROBE
SW	SWITCH
T	TEMPERATURE SENSOR – RIGID ELEMENT IN WELL
T	TEMPERATURE SENSOR – STRAP ON BULB
T	TEMPERATURE SENSOR – DUCT MOUNTED AVG ELEMENT
T	TEMPERATURE SENSOR – DUCT MOUNTED RIGID ELEMENT
T	THERMOSTAT OR TEMPERATURE SENSOR (AS DEFINED ON TC DRAWINGS)
T N	THERMOSTAT FOR NIGHT SETBACK
XF	TRANSFORMER
	VALVE – 2 WAY CONTROL VALVE
	VALVE – 3 WAY CONTROL VALVE
M	VALVE – 2 WAY CONTROL W/ POSITIONER
M	VALVE – 3 WAY CONTROL W/ POSITIONER
VFC	VARIABLE FREQUENCY CONTROLLER
VS	VELOCITY SENSOR
VIB	VIBRATION SWITCH
V	VOLTAGE SENSOR

WIRING SYMBOLS

SYMBOL	DESCRIPTION
	AUDIBLE DEVICE (AS DEFINED ON TC DRAWINGS)
M/S	COIL – MOTOR STARTER CONTACTOR
R	COIL – RELAY
TDR	COIL – TIME DELAY RELAY
VFC	COIL – VARIABLE FREQUENCY CONTROLLER CONTACTOR
	COIL – EP OR SOLENOID VALVE
	CONTACT – INSTANT OPERATING, NO
	CONTACT – INSTANT OPERATING, NC
	CONTACT – TIMED AFTER COIL IS ENERGIZED, NOTC
	CONTACT – TIMED AFTER COIL IS ENERGIZED, NCTO
	CONTACT – TIMED AFTER COIL IS DE–ENERGIZED, NOTO
	CONTACT – TIMED AFTER COIL IS DE–ENERGIZED, NCTC
	GROUND
	MOTOR, SINGLE PHASE
R	PILOT LIGHT OR BEACON R – RED LENS A – AMBER LENS B – BLUE LENS G – GREEN LENS
R	PILOT LIGHT, WITH PUSH–TO–TEST
	PUSH BUTTON – MOMENTARY CONTACT, NO
	PUSH BUTTON – MOMENTARY CONTACT, NC
	PUSH BUTTON – MOMENTARY CONTACT, NO & NC
	PUSH BUTTON – MOMENTARY, NO (MUSHROOM HEAD)
	PUSH BUTTON – MOMENTARY, NC (MUSHROOM HEAD)

WIRING SYMBOLS (CONT.)

SYMBOL	DESCRIPTION
1 2	SWITCH – 2 POSITION SELECTOR
H O A	SWITCH – 3 POSITION SELECTOR HAND/OFF/AUTO
	SWITCH – FLOW (AIR, WATER, ETC.), NO
	SWITCH – FLOW (AIR, WATER, ETC.), NC
	SWITCH – LIMIT, NO, HELD CLOSED
	SWITCH – LIMIT, NC
	SWITCH – LIMIT, NC, HELD OPEN
	SWITCH – LIQUID LEVEL, NO
	SWITCH – LIQUID LEVEL, NC
	SWITCH – MANUAL SPST, NO
	SWITCH – MANUAL DPDT, NO
	SWITCH – MANUAL SPST, NC
	SWITCH – MANUAL DPDT, NC
	SWITCH – MANUAL SPDT
	SWITCH – MANUAL DPDT
	SWITCH – PRESSURE & VACUUM, NO
	SWITCH – PRESSURE & VACUUM, NC
	SWITCH – TEMPERATURE ACTUATED, NO
	SWITCH – TEMPERATURE ACTUATED, NC
	THERMAL OVERLOAD, SINGLE PHASE
OL'S	THERMAL OVERLOAD CONTACTS – 3 PHASE
	TRANSFORMER
	WIRE TERMINATION AT DEVICE
	WIRE TO WIRE TERMINATION
	WIRING NOT CONNECTED

WIRING TERMS

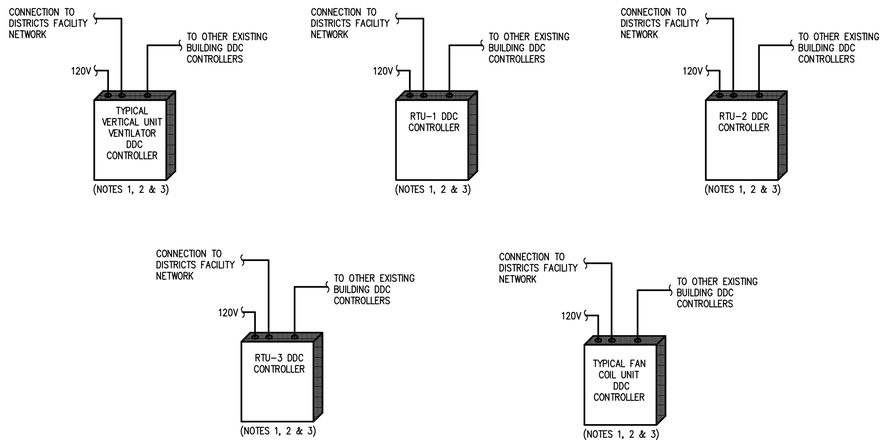
ABBREVIATION	DESCRIPTION
SPST	SINGLE POLE SINGLE THROW
SPDT	SINGLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DPDT	DOUBLE POLE DOUBLE THROW
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
NOTO	NORMALLY OPEN TIMED OPEN
NOTC	NORMALLY OPEN TIMED CLOSED
NCTO	NORMALLY CLOSED TIMED OPEN
NCTC	NORMALLY CLOSED TIMED CLOSED

PNEUMATIC CONTROL SYMBOLS (ADDITIONAL)

SYMBOL	DESCRIPTION
LA	LOAD ANALYZER
LR	LOW PRESSURE SELECTOR RELAY
	MANUAL GRADUAL POSITION SWITCH
PS	PNEUMATIC SWITCH
RR	RATIO RELAY
RC	RECEIVER CONTROLLER
	SWITCHED CONTROL AIR SUPPLY

NOTE: SOME SYMBOLS & ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

NOTE: REFER TO MECHANICAL STANDARDS ON DRAWING M0.1 FOR ADDITIONAL SYMBOLS & ABBREVIATIONS THAT MAY BE USED ON TEMPERATURE CONTROL DRAWINGS.



DDC SYSTEM ARCHITECTURE

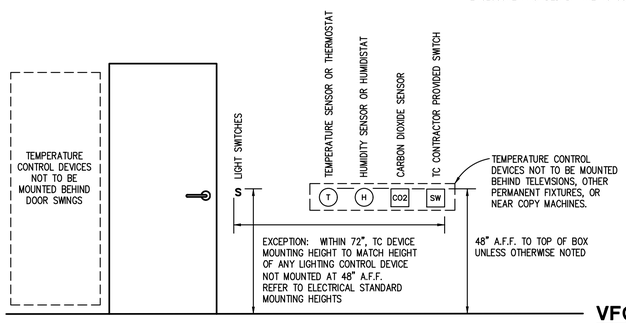
NO SCALE

NOTES:

1. REFER TO TEMPERATURE CONTROL SCHEMATICS FOR THE REQUIRED POINTS ASSOCIATED FOR EACH SYSTEM.
2. TC CONTRACTOR SHALL PROVIDE SYSTEM NETWORK CONTROL GRAPHICS FOR ALL NEW WORK. REFER TO SPECIFICATIONS FOR REQUIREMENTS.
3. TC CONTRACTOR SHALL PROVIDE REQUIRED POWER SUPPLIES FROM DEDICATED AND/OR SPARE CIRCUITS IDENTIFIED ON ELECTRICAL PANEL SCHEDULES. COORDINATE WITH ELEC CONTRACTOR. REFER TO ELECTRICAL DWGS FOR PANEL SCHEDULES AND PANEL LOCATIONS.

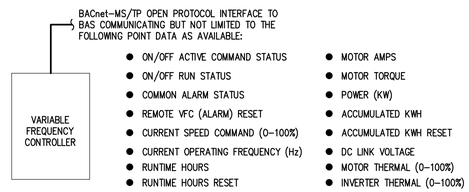
TEMPERATURE CONTROL GENERAL NOTES

1. THESE GENERAL SHALL BE APPLICABLE FOR ALL TC DRAWINGS.
2. "PROVIDE" IS DEFINED AS "FURNISH AND INSTALL".
3. TC CONTRACTOR SHALL BE RESPONSIBLE TO COMPLY WITH ALL APPLICABLE CODES AND STANDARDS.
4. THE PORTIONS OF CONTROL DIAGRAMS AND WIRING DIAGRAMS DRAWN IN HEAVY LINE WEIGHT INDICATE NETWORK. THE PORTIONS DRAWNS IN LIGHT LINE WEIGHT INDICATE EXISTING.
5. ALL CONTROL SCHEMATICS AND WIRING DIAGRAMS ARE FOR THE CLARIFICATION OF EQUIPMENT INTERLOCKING FUNCTIONS AND THE INTERFACE OF VARIOUS CONTRACTORS'S WORK AND SHALL NOT BE MISTAKEN AS SHOP DRAWINGS FOR ACTUAL INSTALLATION.
6. TC CONTRACTOR SHALL PROVIDE DDC CONTROLLERS AS REQUIRED TO MEET INTENT OF DESIGN DOCUMENTS. REFER TO THE PLANS FOR THE DDC FUNCTIONS THAT APPLY TO EACH MECHANICAL SYSTEM.
7. ALL TC PROVIDED COMPONENTS, AND ALL TC CONTRACTOR INSTALLED WIRING AND SHALL BE LABELED PER SPECIFICATIONS.
8. ALL WIRING AND SYSTEM CONTROL VOLTAGES SHALL BE IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATION AND THE ELECTRICAL SPECIFICATIONS.
9. DESIGNATES DEVICE TO BE MOUNTED IN T.C. PANEL.
10. DUCT SMOKE DETECTORS SHALL BE FURNISHED, INSTALLED AND WIRED TO THE FIRE ALARM SYSTEM BY THE ELECTRICAL TC CONTRACTOR SHALL PROVIDE DUCT SMOKE DETECTOR WIRING INTERLOCK TO MOTOR STARTERS OR VSD'S.
11. ALL DDC AND CONTROL INTERLOCK WIRING SHALL BE BY TC CONTRACTOR UNLESS OTHERWISE NOTED. TC CONTRACTOR SHALL COORDINATE WITH VSD AND MOTOR STARTER SUPPLIERS TO DETERMINE EXACT WIRING REQUIREMENTS AND TERMINATION POINTS.
12. ALL DDC AND CONTROL INTERLOCK WIRING BETWEEN COMPONENTS SHALL BE INSTALLED WITHOUT INTERMEDIATE STOPS. WIRE SPLICING AT INTERMEDIATE TERMINAL STRIPS IS NOT ACCEPTABLE.
13. ALL ELECTRICAL WIRING AND RACEWAY SYSTEMS SHALL COMPLY WITH ELECTRICAL SPECIFICATION REQUIREMENTS. TWO SEPERATE ELECTRICAL RACEWAY SYSTEMS SHALL BE PROVIDED: ONE FOR A.C. WIRING AND THE OTHER FOR D.C. WIRING.
14. TC CONTRACTOR SHALL BE RESPONSIBLE FOR ALL POWER SUPPLIES REQUIRED FOR TC SYSTEM UNLESS OTHERWISE NOTED. REFER TO ELECTRICAL PANEL SCHEDULES FOR SPARE CIRCUITS OR CIRCUITS DEDICATED TO TEMPERATURE CONTROLS. COORDINATE CIRCUIT USE WITH ELECTRICAL CONTRACTOR.
15. TC CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL FIELD MOUNTED COMPONENTS.
16. THERMOSTATS AND SPACE TEMPERATURE SENSORS SHALL BE MOUNTED 4'–0" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE.
17. TC CONTRACTOR SHALL PROVIDE AUXILIARY PANELS FOR REQUIRED PANEL MOUNTED EQUIPMENT SUCH AS RELAYS, TRANSDUCERS, CONTROL TRANSFORMERS, ETC. AUXILIARY PANELS SHALL BE LOCATED NEXT TO ASSOCIATED DDC PANEL.
18. REMOTELY MOUNTED FIELD DEVICES SUCH AS RELAYS, CONTROL TRANSFORMERS, ETC., SHALL BE HOUSE IN AN ENCLOSURE PROVIDED BY THE TC CONTRACTOR.
19. CONTROL TRANSFORMERS WHEN REQUIRED SHALL BE SIZED FOR 150% OF ACTUAL LOAD.
20. FREEZE–STATS SHALL BE MOUNTED ON UPSTREAM FACE OF COOLING COILS.
21. CURRENT SWITCHES USED FOR OPERATIONAL STATUS SHALL HAVE CURRENT THRESHOLD SETPOINT ADJUSTED TO INDICATE BELT OR DRIVE FAILURE.
22. ALL CONTROL VALVES, CONTROL DAMPERS AND ASSOCIATED CONTROL ACTUATORS IDENTIFIED ON TC DRAWINGS SHALL BE FURNISHED BY TC CONTRACTOR UNLESS OTHERWISE NOTED. DAMPER SIZE AND LOCATIONS ARE INDICATED ON MECHANICAL FLOOR PLAN DRAWINGS.
23. ALL CONTROL VALVES AND DAMPERS FURNISHED BY THE TC CONTRACTOR SHALL BE INSTALLED BY THE MECHANICAL CONTRACTOR. ALL PIPE PENETRATIONS AND BASIC FITTINGS REQUIRED FOR SENSOR INSTALLATIONS SHALL BE PROVIDED BY MECHANICAL CONTRACTOR.
24. DAMPER ACTUATORS SHALL BE INSTALLED BY TC CONTRACTOR.
25. ALL INSTRUMENTATION TUBING REQUIRED FOR DPS, DPT AND SPT COMPONENT INSTALLATIONS SHALL BE PROVIDED BY TC CONTRACTOR.
26. TC CONTRACTOR SHALL FIELD MOUNT ALL REQUIRED PACKAGED CONTROL COMPONENTS FURNISHED BY EQUIPMENT SUPPLIERS WHERE INDICATED. ALL REQUIRED 24V PACKAGED CONTROL FIELD WIRING AND 120V FAN INTERLOCK WIRING SHALL BE PROVIDED BY TC CONTRACTOR UNLESS NOTED OTHERWISE. TC CONTRACTOR SHALL COORDINATE SPECIFIC SYSTEM WIRING REQUIREMENTS WITH PACKAGED EQUIPMENT SUPPLIERS.



TC DEVICE STANDARD MOUNTING HEIGHTS DETAIL

NO SCALE



VFC BACnet INTERFACE & MONITORING REQUIREMENTS

TYPICAL FOR NEW FAN & PUMP VFCs

NOTE:

TC CONTRACTOR SHALL COORDINATE BACnet–MS/TP OPEN PROTOCOL WIRE TERMINATION REQUIREMENTS AND POINT INTEGRATION CAPABILITIES WITH VFC SUPPLIER/MANUFACTURER AND PROVIDE APPROPRIATE BAS COMPONENTS FOR COMMUNICATION INTERFACE TO BAS.

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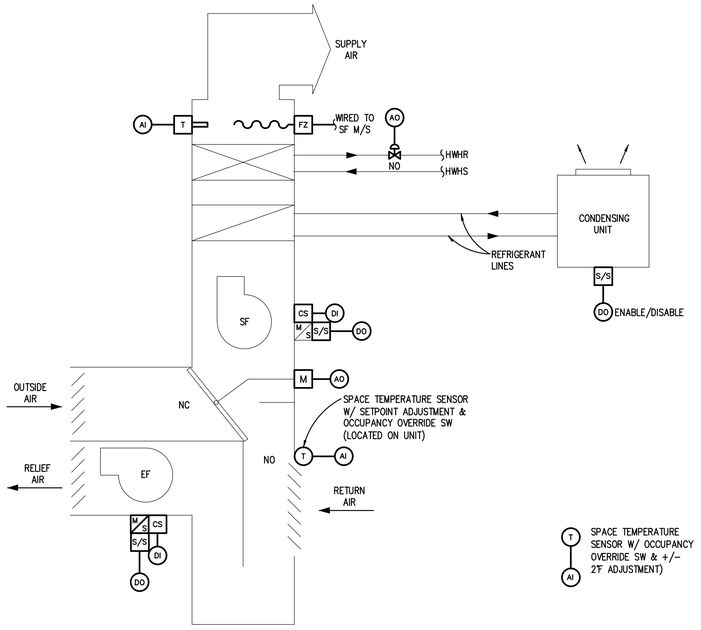
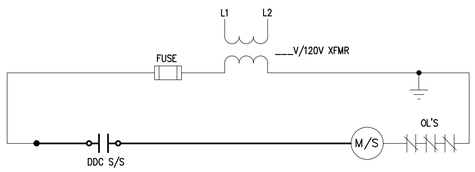
PROJECT NO: 22.516ES

SHEET TITLE: TEMPERATURE CONTROLS

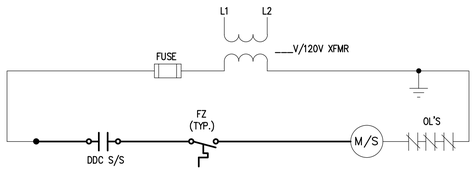
SHEET NO: M801



TYPICAL VERTICAL UNIT VENTILATOR CONTROL



TYPICAL VUV EF M/S WIRING



TYPICAL VUV SF M/S WIRING

SEQUENCE OF OPERATION

VERTICAL UNIT VENTILATOR – TYPE C (CHW COOLING):

NOTE: ALL SETPOINTS DESCRIBED IN SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS (CREATE REQUIRED VIRTUAL POINTS). APPROPRIATE DEADBANDS SHALL BE USED TO PREVENT SHORT CYCLING SITUATIONS.

1. SUPPLY FAN SHALL HAVE START/STOP CAPABILITY FROM THE DDC SYSTEM. FAN SHALL OPERATE BASED ON TIME SCHEDULED OCCUPIED MODE (COMPENSATED BY OPTIMUM START PROGRAM), TEMPORARY OCCUPIED MODE (SET FOR 2 HRS ENABLED FROM OVERRIDE SWITCH ON TEMPERATURE SENSOR) AND UNOCCUPIED CYCLE MODE.
2. (WHERE APPLICABLE) WHEN ZONE IS UNOCCUPIED DURING SCHEDULED OCCUPIED MODE AS DETERMINED BY MONITORING THE LIGHTING OCCUPANCY SENSOR AUX CONTACTS, DDC SHALL OPERATE VUV IN A TEMPORARY UNOCCUPIED MODE.
3. FOR HEATING OCCUPIED MODE, VUV SHALL BE CONTROLLED TO MAINTAIN SPACE TEMP SETPOINT OF 70°F.
4. FOR COOLING OCCUPIED MODE, VUV SHALL BE CONTROLLED TO MAINTAIN SPACE TEMP SETPOINT OF 74°F.
5. FOR HEATING UNOCCUPIED MODE, VUV SHALL CYCLE ON & OFF TO MAINTAIN A SETBACK SPACE TEMP SETPOINT OF 62°F.
6. FOR COOLING UNOCCUPIED MODE, VUV SHALL REMAIN OFF.
7. (WHERE APPLICABLE) FOR TEMPORARY UNOCCUPIED MODE, THE HEATING OCCUPIED MODE SPACE TEMP SETPOINT SHALL BE SETBACK BY 2°F AND THE COOLING OCCUPIED MODE SPACE TEMP SETPOINT SHALL BE SETUP BY 2°F.
8. EXHAUST FAN SHALL HAVE START/STOP CAPABILITY FROM THE DDC SYSTEM AND SHALL BE SOFTWARE INTERLOCKED WITH SF TO BE ACTIVATED DURING THE OCCUPIED MODE.
9. SUPPLY FAN AND EXHAUST FAN STATUS SHALL BE MONITORED BY DDC THRU RESPECTIVE CURRENT SWITCH. SF CURRENT SWITCH SHALL PROVIDE FEEDBACK TO ENABLE TEMPERATURE CONTROLS. ABNORMAL STATUS CONDITION FOR SF SHALL ACTIVATE ALARM.
10. WHEN VUV IS ACTIVATED DURING OCCUPIED MODE, MIXED AIR DAMPER SHALL BE ALLOWED TO MODULATE AS DESCRIBED. WHEN VUV IS DEACTIVATED OR OPERATING IN UNOCCUPIED CYCLE MODE, TEMPORARY UNOCCUPIED MODE (WHERE APPLICABLE) OR MORNING WARM-UP MODE, MIXED AIR DAMPER SHALL REMAIN IN NORMAL POSITIONS.
11. WHEN SPACE TEMP IS BELOW HEATING SETPOINT, DDC SHALL KEEP MIXED AIR DAMPER, AT MINIMUM OA POSITION IN SEQUENCE WITH HEATING VALVE CONTROL TO MAINTAIN SPACE TEMP SETPOINT. REFER TO MECHANICAL EQUIPMENT SCHEDULE FOR MINIMUM OA CFM REQUIREMENT AND ESTABLISH MINIMUM OA DAMPER POSITION WITH THE AIR BALANCE CONTRACTOR.
12. WHEN SPACE TEMP IS ABOVE COOLING SETPOINT AND OA TEMP IS LESS THAN SPACE TEMP, DDC SHALL MODULATE COOLING COIL VALVE IN SEQUENCE WITH DAMPER OA ECONOMIZER TO MAINTAIN SPACE TEMP SETPOINT.
13. WHEN SPACE TEMP IS ABOVE COOLING SETPOINT AND OA TEMP IS GREATER THAN SPACE TEMP, MIXED AIR DAMPER SHALL REMAIN AT MINIMUM OA POSITION AND DDC SHALL MODULATE COOLING COIL VALVE TO MAINTAIN SPACE TEMP SETPOINT.
14. FREEZESTAT SHALL DEACTIVATE SF AND SOFTWARE INTERLOCKED EF WHEN TEMP IS 35°F OR BELOW.
15. WHEN VUV IS DEACTIVATED, COOLING COIL VALVE SHALL REMAIN CLOSED.
16. WHEN OA TEMP IS BELOW 40°F AND VUV IS DEACTIVATED, HEATING COIL VALVE SHALL BE MODULATED BY DDC BASED ON DISCHARGE AIR TEMP TO MAINTAIN LOW LIMIT PLENUM TEMP SETPOINT OF 50°F.

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REFER TO SHEET M801 FOR T.C. (TEMPERATURE CONTROL) GENERAL NOTES.

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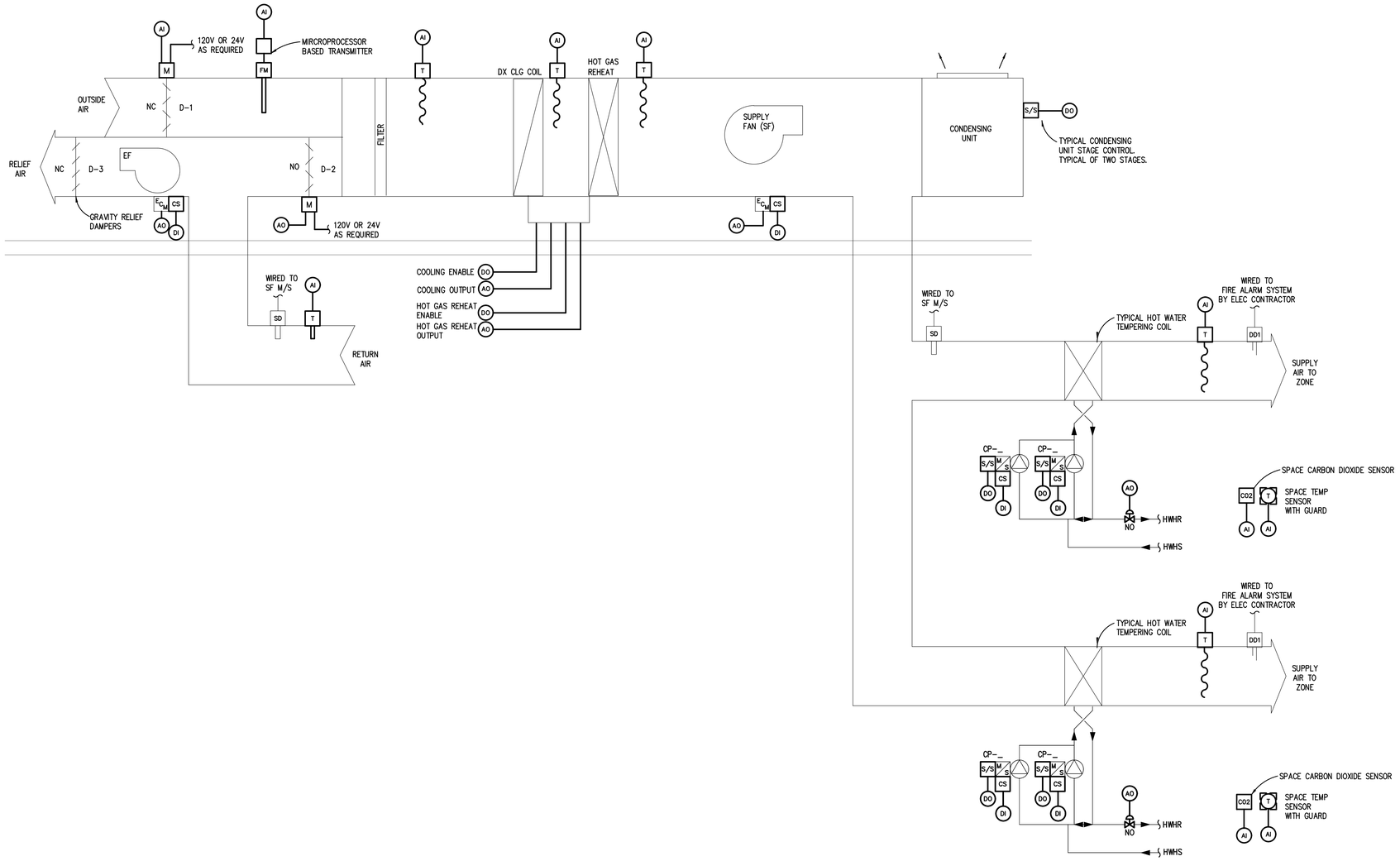
12/06/24	50% CD
01/17/25	BID SET

PIC: WEK
PM: WEK
DRAFTS: EMW

PROJECT NO: 22.516ES

SHEET TITLE: TEMPERATURE CONTROLS

SHEET NO: M802



TYPICAL ROOF TOP UNIT (RTU) CONTROL DIAGRAM

NO SCALE (TYPICAL FOR RTU-1 SERVING CLASSROOMS AND RTU-3 SERVING BAND/MUSIC ROOM).

SEQUENCE OF OPERATION

TYPICAL RTU-1 & RTU-3 CONTROL

1. WITH THE SUPPLY FAN MOTOR ECM MOTOR CONTROL HAND/OFF/AUTO SWITCH IN THE "AUTO" POSITION,THE SUPPLY FAN SHALL BE AUTOMATICALLY STARTED AND STOPPED BASED ON THE OPTIMUM START PROGRAM AND THE OCCUPANCY SCHEDULE AS PROGRAMMED THROUGH THE ENERGY MANAGEMENT SYSTEM EMS/DIRECT DIGITAL CONTROL SYSTEM (DDC).

2. SUPPLY AND EXHAUST FAN'S SHALL BE EQUIPPED WITH ECM MOTORS AND CONTROLLED BY TC CONTRACTOR TO MAINTAIN PROPER CONSTANT VOLUME AIR FLOW AND BALANCING. TC CONTRACTOR SHALL COORDINATE WITH TAB CONTRACTOR FOR PROPER ECM MOTOR SPEED CONTROL.

3. DURING THE UNOCCUPIED MODE, THE RTU SHALL BE CYCLED ON AND OFF BY THE NIGHT CYCLE PROGRAM TO MAINTAIN SPACE TEMPERATURE ABOVE 60 DEGREES F (ADJUSTABLE) BASED ON THE LOWEST READING FROM THE ZONE TEMPERATURE SENSORS. WHEN THE SUPPLY FAN IS STARTED PRIOR TO THE OCCUPANCY HOUR BY THE OPTIMUM START PROGRAM OR DURING THE NIGHT CYCLE, THE OUTSIDE/RELIEF AIR DAMPERS (D-1/D-3) SHALL REMAIN CLOSED, THE RETURN AIR DAMPER (D-2) SHALL FULLY OPEN.

4. DURING THE OCCUPIED PERIOD, THE OUTSIDE AIR FLOW MEASURING DEVICE THROUGH DDC SHALL MODULATE THE OUTSIDE AIR DAMPER (D-1) AND RECIRCULATION DAMPER (D-2) TO MAINTAIN A MINIMUM OUTSIDE AIR FLOW VOLUME FROM IT MIN/MIN POSITION TO MIN/MAX OA POSITION (REFER TO ERU EQUIPMENT SCHEDULE FOR MIN/MIN AND MIN/MAX AIR FLOW SETPOINTS.

5. PROOF OF FLOW STATUS FOR THE SUPPLY FAN SHALL BE PROVEN TO THE DDC SYSTEM BY MEANS OF ITS RESPECTIVE FAN MOTOR CURRENT SWITCH.

6. THE DISCHARGE AIR TEMPERATURE SENSOR THROUGH DDC SHALL MODULATE IN SEQUENCE THE STAGES OF DX COOLING, THE OUTSIDE AND RETURN AIR DAMPERS (D-1, AND D-3) TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. THE DISCHARGE AIR TEMPERATURE SET POINT SHALL BE 55 DEGREES F WHENEVER OUTSIDE AIR TEMPERATURE IS 25 DEGREES F (ADJUSTABLE) OR ABOVE, AND THE DISCHARGE AIR TEMPERATURE SET POINT SHALL BE 60 DEGREES F (ADJUSTABLE). WHENEVER OUTSIDE AIR TEMPERATURE IS 25 DEGREES F OR BELOW (ADJUSTABLE).

7. DURING THE COOLING MODE WHEN BUILDING BOILERS ARE DE-ENERGIZED, THE STAGES OF DX COOLING SHALL BE CONTROLLED TO MAINTAIN AN AVERAGE OF THE ROOM TEMPERATURE SENSORS. THE SPACE TEMPERATURE SENSOR COOLING SET POINT SHALL BE 75 DEGREES F (ADJUSTABLE).

8. THE ZONE TEMPERING COIL'S RESPECTIVE SPACE AIR TEMPERATURE SENSOR THROUGH DDC SHALL MODULATE THE ZONE TEMPERING COIL CONTROL VALVE TO MAINTAIN SPACE TEMPERATURE SET POINT.

9. HWH CIRC PUMPS ASSOCIATED WITH HEATING COIL SHALL HAVE START/STOP CAPABILITY FROM THE BAS. THE COIL PUMP SHALL BE ACTIVATED BY DDC TO OPERATE CONTINUOUSLY WHEN OA TEMP IS LESS THAN 55'F WHEN RTU IS ACTIVATED OR WHEN OA TEMP IS LESS THAN 35'F REGARDLESS OF RTU ACTIVATION. THE OTHER COIL CIRCULATING PUMP WILL SERVE AS STANDBY. BAS SHALL ALTERNATE PUMP OPERATION ON A WEEKLY BASIS. BAS SHALL MONITOR OPERATING STATUS O F EACH PUMP. UPON PUMP FAILURE, BAS SHALL ACTIVATE FAILURE ALARM AND AUTOMATICALLY START THE STANDBY PUMP.

10. DURING THE OCCUPIED MODE, THE SPACE AIR CARBON DIOXIDE (CO2) SENSOR THROUGH THE DDC SHALL OVERRIDE THE MIXED AIR DAMPER CONTROL TO MODULATE THE OUTSIDE AIR DAMPER TOWARDS OPEN AND RETURN AIR DAMPER TOWARDS CLOSE TO PREVENT THE CO2 LEVEL IN THE SPACE FROM RISING ABOVE 1,000 PARTS PER MILLION (PPM). WHEN OUTSIDE AIR TEMPERATURE IS 40 DEGREES F. OR BELOW AND THE CARBON DIOXIDE (CO2) DEMAND CONTROL IS ACTIVE, THE OUTSIDE AIR DAMPER DAMPER SHALL BE LIMITED TO A MIN/MAX AIRFLOW (REFER TO THE RTU EQUIPMENT SCHEDULE FOR MIN/MIN AND MIN/MAX OUTSIDE AIR FLOW SETPOINTS) AS MEASURED BY THE OUTSIDE AIR FLOW MEASURING DEVICE THROUGH DDC..

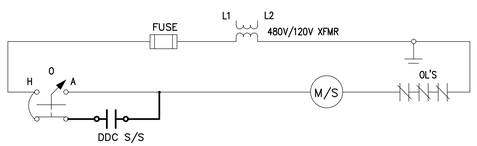
11. WHENEVER THE RETURN AIR HUMIDITY RISES ABOVE 60 PERCENT RELATIVE HUMIDITY (ADJUSTABLE), THE DX COOLING COILS DISCHARGE TEMPERATURE SETPOINT SHALL BE 50 DEGREES FAHRENHEIT AND THE HOT GAS REHEAT SHALL BE ENABLED AND MODULATED TO MAINTAIN DISCHARGE AND SPACE TEMPERATURE SETPOINTS.

12. THE FILTER DIFFERENTIAL PRESSURE SWITCH SHALL ISSUE A DIRTY FILTER ALARM IF ITS SET POINT IS REACHED.

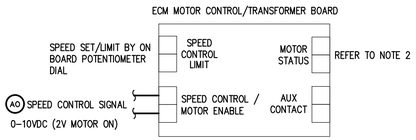
13. IF SMOKE IS DETECTED IN THE AIR STREAM BY A SMOKE DETECTOR, THE SUPPLY AND RETURN FAN SHALL BE DE-ENERGIZED.

14. IF THE SET POINT OF A FREEZESTAT IS REACHED, THE SUPPLY AND RETURN FAN SHALL BE DE-ENERGIZED.

15. WHEN THE SUPPLY FAN IS DE-ENERGIZED, THE OUTSIDE AIR DAMPER (D-1) SHALL CLOSE, THE RETURN AIR DAMPER (D-2) SHALL OPEN FULLY AND THE DX COOLING STAGES SHALL BE DE-ENERGIZED.



TYPICAL COIL CIRC PUMP CP- M/S WIRING

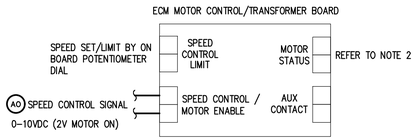


TYPICAL RTU RETURN FAN ECM WIRING

NOTES:

1. WIRING DETAIL IDENTIFIES INTENT AND DOES NOT INDICATE ACTUAL WIRING REQUIREMENTS. CONSULT WITH ECM SUPPLIER FOR THE ACTUAL WIRING REQUIREMENTS.

2. IF AVAILABLE, MOTOR STATUS CONTACT ASSOCIATED WITH ECM MAY BE USED IN-LIEU-OF CURRENT SWITCH MONITORING



TYPICAL RTU SUPPLY FAN ECM WIRING

NOTES:

1. WIRING DETAIL IDENTIFIES INTENT AND DOES NOT INDICATE ACTUAL WIRING REQUIREMENTS. CONSULT WITH ECM SUPPLIER FOR THE ACTUAL WIRING REQUIREMENTS.

2. IF AVAILABLE, MOTOR STATUS CONTACT ASSOCIATED WITH ECM MAY BE USED IN-LIEU-OF CURRENT SWITCH MONITORING

REFER TO SHEET M801 FOR T.C. (TEMPERATURE CONTROL) GENERAL NOTES.

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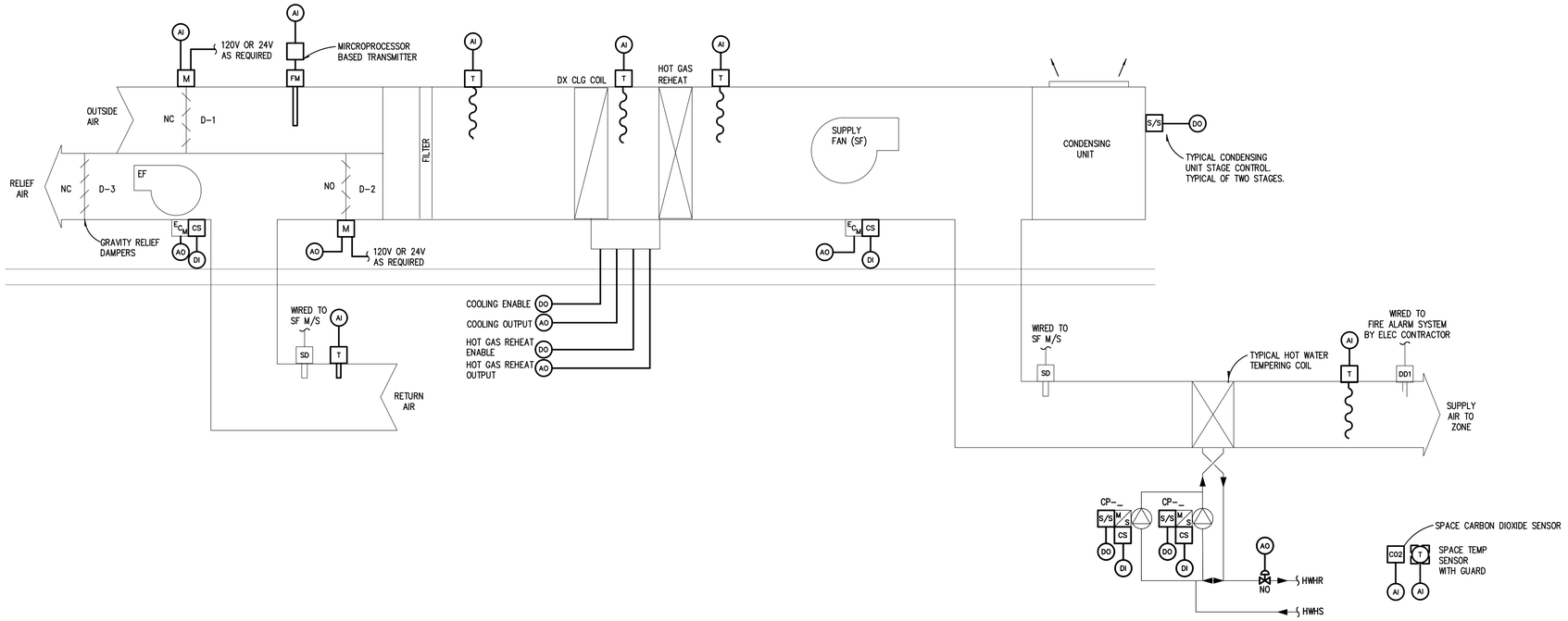
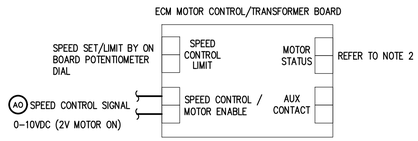


TYPICAL ROOF TOP UNIT (RTU) CONTROL DIAGRAM

NO SCALE (TYPICAL FOR RTU-2 SERVING GYMNASIUM).



TYPICAL RTU RETURN FAN ECM WIRING

NOTES:

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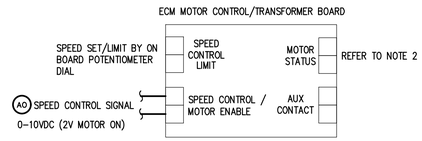

TYPICAL RTU SUPPLY FAN ECM WIRING

NOTES:

1. WIRING DETAIL IDENTIFIES INTENT AND DOES NOT INDICATE ACTUAL WIRING REQUIREMENTS. CONSULT WITH ECM SUPPLIER FOR THE ACTUAL WIRING REQUIREMENTS.
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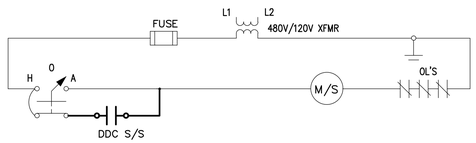

TYPICAL COIL CIRC PUMP CP- M/S WIRING

SEQUENCE OF OPERATION

TYPICAL RTU-2 CONTROL

1. WITH THE SUPPLY FAN MOTOR ECM MOTOR CONTROL HAND/OFF/AUTO SWITCH IN THE "AUTO" POSITION,THE SUPPLY FAN SHALL BE AUTOMATICALLY STARTED AND STOPPED BASED ON THE OPTIMUM START PROGRAM AND THE OCCUPANCY SCHEDULE AS PROGRAMMED THROUGH THE ENERGY MANAGEMENT SYSTEM EMS/DIRECT DIGITAL CONTROL SYSTEM (DDC).
2. SUPPLY AND EXHAUST FAN'S SHALL BE EQUIPPED WITH ECM MOTORS AND CONTROLLED BY TC CONTRACTOR TO MAINTAIN PROPER CONSTANT VOLUME AIR FLOW AND BALANCING. TC CONTRACTOR SHALL COORDINATE WITH TAB CONTRACTOR FOR PROPER ECM MOTOR SPEED CONTROL.
3. DURING THE UNOCCUPIED MODE, THE RTU SHALL BE CYCLED ON AND OFF BY THE NIGHT CYCLE PROGRAM TO MAINTAIN SPACE TEMPERATURE ABOVE 60 DEGREES F (ADJUSTABLE) BASED ON THE LOWEST READING FROM THE ZONE TEMPERATURE SENSORS. WHEN THE SUPPLY FAN IS STARTED PRIOR TO THE OCCUPANCY HOUR BY THE OPTIMUM START PROGRAM OR DURING THE NIGHT CYCLE, THE OUTSIDE/RELIEF AIR DAMPERS (D-1/D-3) SHALL REMAIN CLOSED, THE RETURN AIR DAMPER (D-2) SHALL FULLY OPEN.
4. DURING THE OCCUPIED PERIOD, THE OUTSIDE AIR FLOW MEASURING DEVICE THROUGH DDC SHALL MODULATE THE OUTSIDE AIR DAMPER (D-1) AND RECIRCULATION DAMPER (D-2) TO MAINTAIN A MINIMUM OUTSIDE AIR FLOW VOLUME FROM IT MIN/MIN POSITION TO MIN/MAX OA POSITION (REFER TO ERU EQUIPMENT SCHEDULE FOR MIN/MIN AND MIN/MAX AIR FLOW SETPOINTS.
5. PROOF OF FLOW STATUS FOR THE SUPPLY FAN SHALL BE PROVEN TO THE DDC SYSTEM BY MEANS OF ITS RESPECTIVE FAN MOTOR CURRENT SWITCH.
6. THE DISCHARGE AIR TEMPERATURE SENSOR THROUGH DDC SHALL MODULATE IN SEQUENCE THE STAGES OF DX COOLING, THE OUTSIDE AND RETURN AIR DAMPERS (D-1, AND D-3) TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. THE DISCHARGE AIR TEMPERATURE SET POINT SHALL BE 55 DEGREES F WHENEVER OUTSIDE AIR TEMPERATURE IS 25 DEGREES F (ADJUSTABLE) OR ABOVE, AND THE DISCHARGE AIR TEMPERATURE SET POINT SHALL BE 60 DEGREES F (ADJUSTABLE). WHENEVER OUTSIDE AIR TEMPERATURE IS 25 DEGREES F OR BELOW (ADJUSTABLE).
7. DURING THE COOLING MODE WHEN BUILDING BOILERS ARE DE-ENERGIZED, THE STAGES OF DX COOLING SHALL BE CONTROLLED TO MAINTAIN AN AVERAGE OF THE ROOM TEMPERATURE SENSORS. THE SPACE TEMPERATURE SENSOR COOLING SET POINT SHALL BE 75 DEGREES F (ADJUSTABLE).
8. THE ZONE TEMPERING COIL'S RESPECTIVE SPACE AIR TEMPERATURE SENSOR THROUGH DDC SHALL MODULATE THE ZONE TEMPERING COIL CONTROL VALVE TO MAINTAIN SPACE TEMPERATURE SET POINT.
9. HWH CIRC PUMPS ASSOCIATED WITH HEATING COIL SHALL HAVE START/STOP CAPABILITY FROM THE BAS. THE COIL PUMP SHALL BE ACTIVATED BY DDC TO OPERATE CONTINUOUSLY WHEN OA TEMP IS LESS THAN 55'F WHEN RTU IS ACTIVATED OR WHEN OA TEMP IS LESS THAN 35'F REGARDLESS OF RTU ACTIVATION. THE OTHER COIL CIRCULATING PUMP WILL SERVE AS STANDBY. BAS SHALL ALTERNATE PUMP OPERATION ON A WEEKLY BASIS. BAS SHALL MONITOR OPERATING STATUS O F EACH PUMP. UPON PUMP FAILURE, BAS SHALL ACTIVATE FAILURE ALARM AND AUTOMATICALLY START THE STANDBY PUMP.
10. DURING THE OCCUPIED MODE, THE SPACE AIR CARBON DIOXIDE (CO2) SENSOR THROUGH THE DDC SHALL OVERRIDE THE MIXED AIR DAMPER CONTROL TO MODULATE THE OUTSIDE AIR DAMPER TOWARDS OPEN AND RETURN AIR DAMPER TOWARDS CLOSE TO PREVENT THE CO2 LEVEL IN THE SPACE FROM RISING ABOVE 1,000 PARTS PER MILLION (PPM). WHEN OUTSIDE AIR TEMPERATURE IS 40 DEGREES F. OR BELOW AND THE CARBON DIOXIDE (CO2) DEMAND CONTROL IS ACTIVE, THE OUTSIDE AIR DAMPER DAMPER SHALL BE LIMITED TO A MIN/MAX AIRFLOW (REFER TO THE RTU EQUIPMENT SCHEDULE FOR MIN/MIN AND MIN/MAX OUTSIDE AIR FLOW SETPOINTS) AS MEASURED BY THE OUTSIDE AIR FLOW MEASURING DEVICE THROUGH DDC..
11. WHENEVER THE RETURN AIR HUMIDITY RISES ABOVE 60 PERCENT RELATIVE HUMIDITY (ADJUSTABLE), THE DX COOLING COILS DISCHARGE TEMPERATURE SETPOINT SHALL BE 50 DEGREES FAHRENHEIT AND THE HOT GAS REHEAT SHALL BE ENABLED AND MODULATED TO MAINTAIN DISCHARGE AND SPACE TEMPERATURE SETPOINTS.
12. THE FILTER DIFFERENTIAL PRESSURE SWITCH SHALL ISSUE A DIRTY FILTER ALARM IF ITS SET POINT IS REACHED.
13. IF SMOKE IS DETECTED IN THE AIR STREAM BY A SMOKE DETECTOR, THE SUPPLY AND RETURN FAN SHALL BE DE-ENERGIZED.
14. IF THE SET POINT OF A FREEZESTAT IS REACHED, THE SUPPLY AND RETURN FAN SHALL BE DE-ENERGIZED.
15. WHEN THE SUPPLY FAN IS DE-ENERGIZED, THE OUTSIDE AIR DAMPER (D-1) SHALL CLOSE, THE RETURN AIR DAMPER (D-2) SHALL OPEN FULLY AND THE DX COOLING STAGES SHALL BE DE-ENERGIZED.

REFER TO SHEET M801 FOR T.C. (TEMPERATURE CONTROL) GENERAL NOTES.

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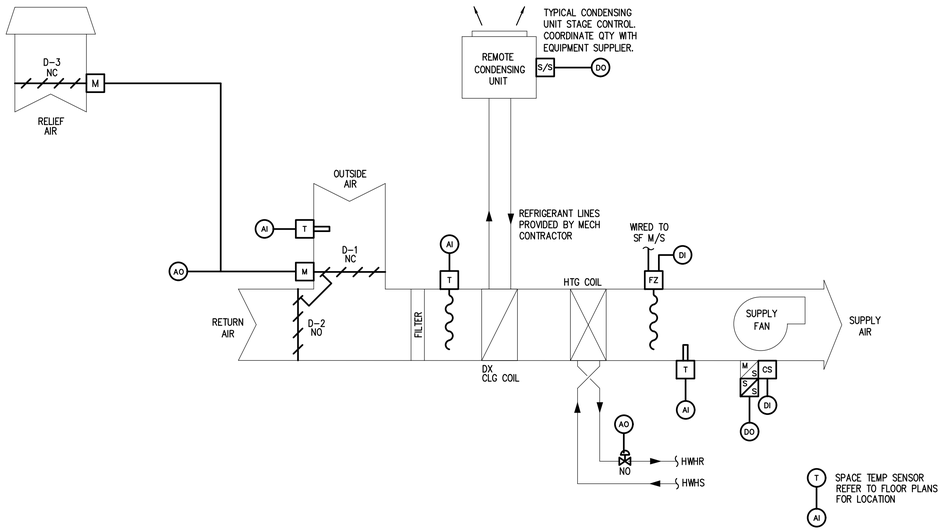
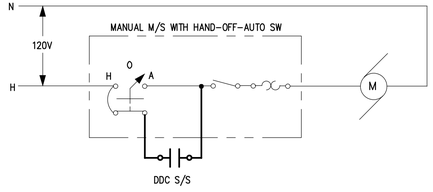


TYPICAL BLOWER COIL UNIT (BCU) CONTROL

NOTE:

1. REFER TO FLOOR PLANS FOR UNIT LOCATIONS.
2. UNIT TO BE PROVIDED WITH MANUFACTURER INSTALLED UNIT SENSORS AND PACKAGED DDC CONTROLLER WITH BACNET MS/TP COMMUNICATIONS.
3. TEMPERATURE CONTROL CONTRACTOR TO PROVIDE DDC FOR UNIT CONTROL.
4. HEATING AND COOLING COIL POSITIONS WITHIN UNIT MAY VARY BASED UNIT MANUFACTURER.
5. COORDINATE UNIT DAMPER REQUIREMENTS WITH FCU SUPPLIER. TC CONTRACTOR SHALL PROVIDE DAMPERS THAT ARE NOT PROVIDED WITH FCU.



TYPICAL BCU-SF M/S WIRING

SEQUENCE OF OPERATION

TYPICAL BLOWER COIL UNIT (BCU) CONTROL:

NOTE: ALL SETPOINTS, OCCUPIED/UNOCCUPIED MODE SCHEDULING, MONITORED TEMPERATURES AND VARIOUS ALARMS AS DESCRIBED IN SEQUENCE SHALL BE ACCESSIBLE BY SYSTEM OPERATORS THRU BAS.

1. SUPPLY FAN SHALL HAVE START/STOP CAPABILITY FROM THE TC CONTRACTOR PROVIDED DDC SYSTEM. UNIT SHALL OPERATE BASED ON TIME SCHEDULED OCCUPIED MODE (WITH MORNING WARM-UP), TEMPORARY OCCUPIED MODE (SET FOR 2 HRS ENABLED FROM OVERRIDE SWITCH ON TEMPERATURE SENSOR) AND UNOCCUPIED CYCLE MODE.
2. FOR HEATING OCCUPIED MODE, UV SHALL BE CONTROLLED TO MAINTAIN SPACE TEMP SETPOINT OF 72°F.
3. FOR COOLING OCCUPIED MODE, UV SHALL BE CONTROLLED TO MAINTAIN SPACE TEMP SETPOINT OF 75°F.
4. FOR HEATING UNOCCUPIED MODE, UV SHALL CYCLE ON & OFF TO MAINTAIN A SETBACK SPACE TEMP SETPOINT OF 62°F.
5. FOR COOLING UNOCCUPIED MODE, UV SHALL REMAIN OFF.
6. SUPPLY FAN STATUS SHALL BE MONITORED BY DDC THRU CURRENT SWITCH. ABNORMAL STATUS CONDITION FOR SF SHALL ACTIVATE ALARM.
7. WHEN UV IS ACTIVATED DURING OCCUPIED MODE, MIXED AIR DAMPER SHALL BE POSITIONED TO MINIMUM OA POSITION AND ALLOWED TO OPERATE IN ECONOMIZER AS DESCRIBED. WHEN UV IS DEACTIVATED OR OPERATING IN UNOCCUPIED CYCLE MODE, OR MORNING WARM-UP MODE, MIXED AIR DAMPER SHALL REMAIN CLOSED (OUTSIDE AIR DAMPER FULLY CLOSED AND RETURN AIR DAMPER FULLY OPEN).
8. MIXED AIR LOW TEMP LIMIT OF 45°F SHALL PROVIDE OVERRIDE CONTROL OF MIXED AIR DAMPERS AND ALLOW MODULATION BELOW THE MINIMUM OA DAMPER POSITION SETPOINT.
9. WHEN SPACE TEMP IS BELOW HEATING SETPOINT, DDC SHALL MODULATE HWH COIL CONTROL VALVE MODULATION TO MAINTAIN A DISCHARGE AIR TEMPERATURE SETPOINT THAT SHALL BE RESET BASED ON DEVIATION FROM SPACE TEMP SETPOINT. HEATING MODE DISCHARGE AIR TEMP SETPOINT RANGE SHALL BE 65°F TO 90°F.
10. WHEN SPACE TEMP IS ABOVE COOLING SETPOINT, OA TEMP IS LESS THAN SPACE TEMP AND OUTSIDE AIR TEMP IS BELOW ECONOMIZER LOCKOUT SETPOINTS OF 65°F, DDC SHALL ACTIVATE DX COOLING IN SEQUENCE WITH DAMPER OA ECONOMIZER TO MAINTAIN SPACE TEMP SETPOINT.
11. WHEN SPACE TEMP IS ABOVE COOLING SETPOINT AND OA TEMP IS GREATER THAN SPACE TEMP OR OUTSIDE AIR TEMP IS ABOVE ECONOMIZER LOCKOUT SETPOINT OF 65°F, DAMPERS SHALL REMAIN AT MINIMUM OA POSITION AND DDC SHALL ACTIVATE DX COOLING TO MAINTAIN SPACE TEMP SETPOINT.
12. FREEZESTAT CUTOUT SHALL BE WIRED TO DEACTIVATE SF, FULLY CLOSE OA DAMPER AND FULLY OPEN HWH COIL VALVE WHEN TEMP IS 35°F OR BELOW. LOW-LIMIT FREEZESTAT ALARM SHALL BE ACTIVATED.
13. WHEN UV IS DEACTIVATED, OA DAMPER SHALL REMAIN CLOSED AND COOLING SHALL REMAIN OFF.
14. WHEN OA TEMP IS BELOW 40°F AND UV IS DEACTIVATED, HWH COIL CONTROL VALVE SHALL BE MODULATED BY DDC BASED ON MIXED AIR TEMP TO MAINTAIN LOW LIMIT PLENUM TEMP SETPOINT OF 50°F.

REFER TO SHEET M801 FOR T.C. (TEMPERATURE CONTROL) GENERAL NOTES.

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STATE OF MICHIGAN
DENNIS P. SCZOMAK
ENGINEER
No. 6201036881
LICENSED PROFESSIONAL ENGINEER

ELECTRICAL SYMBOL LIST

(NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT)

SYMBOL	DESCRIPTION
X (NL)	X DENOTES FIXTURE TYPE (NL INDICATES NIGHT LIGHT)
	FILL DENOTES EMERGENCY FIXTURE
	TROFFER LIGHT
	STRIP LIGHT
	LINEAR LIGHT
	MULTIHEAD ADJUSTABLE LIGHT
	DOWN LIGHT
	DIRECTIONAL DOWN LIGHT
	DECORATIVE LIGHT
	DECORATIVE LIGHT
	WALL MOUNTED LIGHT
	WALL SCONCE
	ARM MOUNTED LIGHT
	LIGHTING TRACK
	TRACK LIGHT
	ADJUSTABLE FLOOD LIGHT
	STEP LIGHT
	LED TAPE
	REMOTE DRIVER
	HIGH BAY LIGHT
	POLE MOUNTED LIGHT
	POST TOP LIGHT
	BOLLARD LIGHT
	IN GROUND LIGHT
	EMERGENCY LIGHT
	EXIT LIGHT WITH DIRECTIONAL ARROWS (FILLED AREA INDICATES FACE)
	EXIT LIGHT WITH DIRECTIONAL ARROWS (FILLED AREA INDICATES FACE)
	EXIT LIGHT – WALL MOUNTED (FILLED AREA INDICATES FACE)
	EXIT/EMERGENCY LIGHT COMBO – WALL MOUNTED (FILLED AREA INDICATES FACE)
BCELTS	BRANCH CIRCUIT EMERGENCY LIGHTING TRANSFER SWITCH
ALCR	AUTOMATIC LOAD CONTROL RELAY
LC	LIGHTING CONTROL DEVICE – REFER TO LIGHTING CONTROL SCHEDULE
XX	ROOM CONTROL DESIGNATION – REFER TO LIGHTING CONTROL SCHEDULE
S	SINGLE POLE TOGGLE SWITCH
S2	TWO POLE TOGGLE SWITCH
S3	3 WAY TOGGLE SWITCH
S4	4 WAY TOGGLE SWITCH
K	KEY OPERATED SWITCH
K3	3 WAY KEY OPERATED SWITCH
K4	4 WAY KEY OPERATED SWITCH
D	DIMMER SWITCH
D3	3 WAY DIMMER SWITCH
DO	DIMMER OCCUPANCY SENSOR SWITCH
DL	LOW VOLTAGE DIMMER SWITCH
SP	PILOT SWITCH

SYMBOL	DESCRIPTION
TWC	TWO-WAY COMMUNICATION SYSTEM CALL STATION
TWCD	TWO-WAY COMMUNICATION SYSTEM AUTO DIALER
TWCA	TWO-WAY COMMUNICATION SYSTEM ANNUNCIATOR & COMMUNICATION PANEL
TWCP	TWO-WAY COMMUNICATION SYSTEM POWER SUPPLY WITH BATTERY BACK-UP
TWCDP	TWO-WAY COMMUNICATION SYSTEM AUTO DIALER POWER SUPPLY WITH BATTERY BACK-UP
RGP	REMOTE GENERATOR ANNUCIATOR PANEL
ATS	AUTOMATIC TRANSFER SWITCH
UPS	UNINTERRUPTIBLE POWER SUPPLY
CSX	LOW VOLTAGE CONTROL STATION "X" INDICATES TYPE
	SINGLE/DUPLEX RECEPTACLE OUTLET "X" INDICATES TYPE
	SINGLE/DUPLEX RECEPTACLE OUTLET CONTROLLED BY AUTOMATIC CONTROL DEVICE/SYSTEM
	QUAD RECEPTACLE OUTLET
	ABOVE COUNTER DUPLEX RECEPTACLE OUTLET (SIMILAR FOR TAMPER RESISTANT, CONTROLLED, QUADS, EMERGENCY, UPS, USB, AND GFCI RECEPTACLE OUTLETS)
	DUPLEX GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE OUTLET
	DEAD FRONT GROUND FAULT CIRCUIT INTERRUPTER
	DUPLEX EMERGENCY RECEPTACLE OUTLET
	DUPLEX TAMPER RESISTANT RECEPTACLE OUTLET
	QUAD TAMPER RESISTANT RECEPTACLE OUTLET
	DUPLEX UPS RECEPTACLE OUTLET
	DUPLEX RECEPTACLE OUTLET WITH 2 USB PORTS
	4 PORT USB CHARGING STATION
	CEILING MOUNTED DUPLEX/QUAD RECEPTACLE OUTLET
	POWER POLE
TGB	TELECOMMUNICATION GROUNDING BUS BAR
TMGB	TELECOMMUNICATION MAIN GROUNDING BUS BAR
	MULTI-OUTLET SURFACE RACEWAY
	MULTI-SERVICE DROP SEE ELECTRICAL DETAILS AND DIAGRAMS SHEET "X" INDICATES TYPE
	POKE-THROUGH ASSEMBLY "X" INDICATES TYPE
	FLOOR SERVICE FITTING "X" INDICATES TYPE
	ACCESS FLOOR SERVICE FITTING "X" INDICATES TYPE
	CORD REEL "X" INDICATES TYPE
	DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
S3S3	3-WAY DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
S4S4	4-WAY DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
ST	DIGITAL TIME SWITCH
SI	ILLUMINATED TOGGLE SWITCH FOR CONTROL OF LIGHTING ON CRITICAL POWER-ILLUMINATED WHEN SWITCH IS IN "OFF" POSITION
SL	LOW VOLTAGE SWITCH
SO	OCCUPANCY SENSOR
SO2	OCCUPANCY SENSOR
OS X	OCCUPANCY SENSOR "X" INDICATES TYPE

REFER TO ELECTRICAL STANDARD SCHEDULES

SYMBOL	DESCRIPTION
CP	CONTROL PANEL
MD	MOTOR
VFC	VARIABLE FREQUENCY CONTROLLER.
K	MANUAL CONTROLLER
DC	MAGNETIC CONTROLLER
KP	COMBINATION MAGNETIC CONTROLLER
CR	NON-FUSIBLE DISCONNECT SWITCH
DB	FUSIBLE DISCONNECT SWITCH
DE	ENCLOSED CIRCUIT BREAKER
REX	PUSH BUTTON STATION
PP	JUNCTION BOX
DO	HARD WIRE POWER CONNECTION
DA	GROUND ROD
AC	GROUND CONNECTION
HH	HANDHOLE
ACCP	CONDUIT SLEEVE WITH BUSHINGS LENGTH AS REQUIRED "X" INDICATES CONDUIT SIZE
ACPS	CONDUIT UP
	CONDUIT DOWN
	EMPTY BOX FOR FUTURE TELECOMMUNICATION OUTLET
	ABOVE COUNTER EMPTY BOX FOR FUTURE TELECOMMUNICATION OUTLET
	EMPTY BOX FOR FUTURE CEILING MOUNTED TELECOMMUNICATION OUTLET
	TELECOMMUNICATION OUTLET "X" INDICATES TYPE
	ABOVE COUNTER TELECOMMUNICATION OUTLET "X" INDICATES TYPE
	TELECOMMUNICATION CEILING MOUNTED OUTLET "X" INDICATES TYPE
	TELECOMMUNICATION BACKBOARD
	LIGHTNING ARRESTOR
X	PANELBOARD "X" INDICATES PANELBOARD NAME
	GROUND
	STRESS CONE TERMINATION
K	SECURITY KEY INTERLOCK
G	ENGINE GENERATOR
M	UTILITY METER
EMU	ELECTRONIC METERING UNIT
A	AMMETER
V	VOLTMETER
AS	AMMETER SWITCH
VS	VOLTMETER SWITCH
SPD	SURGE PROTECTIVE DEVICE
CR	CONTROL RELAY
TDR	TIME DELAY RELAY
PRM	PHASE ROTATION MONITOR
	CAMLOK – MALE
	CAMLOK – FEMALE
EVSE	ELECTRICAL VEHICLE SUPPLY EQUIPMENT
DCFC	DC FAST CHARGER – STANDALONE
DCPM	DC FAST CHARGER – POWER MODULE
DCDP	DC FAST CHARGER – DISPENSER

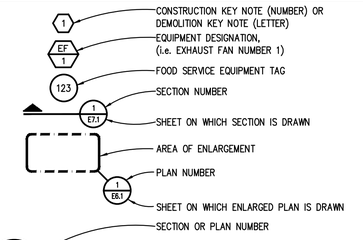
SYMBOL	DESCRIPTION
	SECURITY CAMERA
SD	MOTION DETECTOR
K	SECURITY KEY SWITCH
DD	DOOR CONTACT
CO	CARBON MONOXIDE DETECTOR
RT	REMOTE TEST STATION (FOR DUCT DETECTOR)
HD	HEAT DETECTOR
BD	PROJECTED BEAM DETECTOR
F	FIRE ALARM BELL
F	FIRE ALARM AUDIBLE NOTIFICATION APPLIANCE
XX	FIRE ALARM VISUAL NOTIFICATION APPLIANCE "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
XX	FIRE ALARM COMBINATION VISUAL/ AUDIBLE "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
XX	FIRE ALARM COMBINATION VISUAL/ AUDIBLE NOTIFICATION APPLIANCE– CEILING MOUNTED "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
XX	FIRE ALARM VISUAL NOTIFICATION APPLIANCE CEILING MOUNTED "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
F	FIRE ALARM AUDIBLE NOTIFICATION APPLIANCE – CEILING MOUNTED
F	FIREFIGHTERS PHONE JACK
FACP	FIRE ALARM CONTROL PANEL
FAA	FIRE ALARM ANNUNCIATOR PANEL
NAC	NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANEL
MM	ADDRESSABLE MONITORING MODULE
CM	ADDRESSABLE CONTROL MODULE
TS	ADDRESSABLE MONITORING MODULE FOR TAMPER SWITCH
FS	ADDRESSABLE MONITORING MODULE FOR FLOW SWITCH
DR	MAGNETIC DOOR RELEASE
	THERMAL OVERLOAD RELAY
	NORMALLY OPEN CONTACTS
	NORMALLY CLOSED CONTACTS
	N.O. PUSH BUTTON SINGLE CIRCUIT
	N.C. PUSH BUTTON SINGLE CIRCUIT
X–X	CABLE VAULT "X–X" INDICATES TYPE
	BRANCH CIRCUIT PANELBOARD
	LOAD CENTER
	MOTOR CONTROL CENTER
T	TRANSFORMER
	DISTRIBUTION EQUIPMENT
GB	ELECTRICAL GROUNDING BUS BAR
PB	PLUG IN BUSWAY
FB	FEEDER BUSWAY
12x4	CABLE TRAY – ALL SIZES IN INCHES

ELECTRICAL DRAWING INDEX

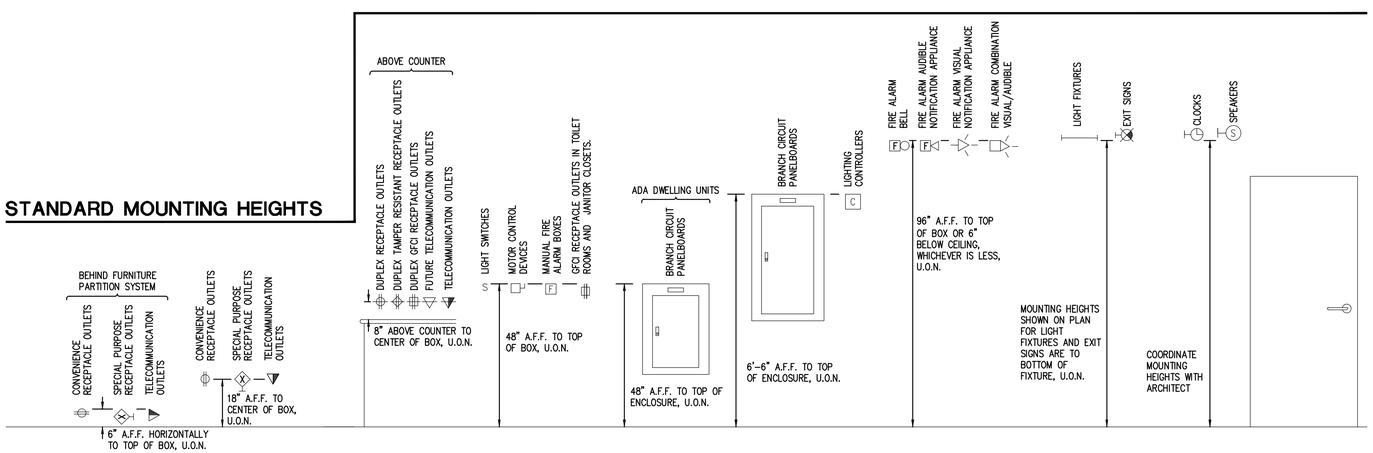
ELECTRICAL ABBREVIATION LIST

ABBREVIATION	DESCRIPTION
A	AMPERES
AER	ARC ENERGY REDUCTION
AF	AMPERES FRAME (BREAKER RATING)
AFCI	ARC FAULT CIRCUIT INTERRUPTER
A.F.F.	ABOVE FINISH FLOOR
AIC	AMPS INTERRUPTING CAPACITY
AL	AUDIENCE LEFT
ALCR	AUTOMATIC LOAD CONTROL RELAY
AR	AUDIENCE RIGHT
AT	AMPERES TRIP (BREAKER SETTING)
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
BCELTS	BRANCH CIRCUIT EMERGENCY LIGHTING TRANSFER SWITCH
BKR	BREAKER
BPS	BOLTED PRESSURE SWITCH
C	CONDUIT
CB	CIRCUIT BREAKER
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CKT	CIRCUIT
CT	CURRENT TRANSFORMER
DEMO	DEMOLITION
DIM	DIMENSION
DISC	DISCONNECT
DP	DISTRIBUTION PANEL
DS	DOWNSTAGE
DWG	DRAWING
EBU	EMERGENCY BATTERY UNIT
EC	ELECTRICAL CONTRACTOR
ECM	ELECTRONICALLY COMMUTATED MOTOR
ELEC	ELECTRICAL
EM/ EMERG	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EO	ELECTRICALLY OPERATED
EPO	EMERGENCY POWER OFF
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
FA	FIRE ALARM
FLA	FULL LOAD AMPS
FLR	FLOOR
FOH	FRONT OF HOUSE
FSEC	FOOD SERVICE EQUIPMENT CONTRACTOR
FU	FUSE
G/GRD/EG	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
HOA	HAND–OFF–AUTO
HP	HORSEPOWER
HV	HIGH VOLTAGE
HZ	HERTZ
IG	ISOLATED GROUND
JB	JUNCTION BOX
KA	THOUSAND AMP
KV	KILOVOLT
KVA	KILOVOLT – AMPERES
KW	KILOWATT
KWH	KILOWATT – HOURS
LA	LIGHTNING ARRESTOR
LP	LIGHTING PANEL
LDP	LIGHTING DISTRIBUTION PANEL
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MIN	MINIMUM
MISC.	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MOP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
MTG	MOUNTING
MTR	MOTOR
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NF	NON–FUSIBLE
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
P	POLE
PB	PUSHBUTTON STATION
PH	PHASE
PT	POTENTIAL TRANSFORMER
PDP	POWER DISTRIBUTION PANEL
RECEPT.	RECEPTACLE
RDP	RECEPTACLE DISTRIBUTION PANEL
RP	RECEPTACLE PANEL
RSC	RIGID STEEL CONDUIT
SCCR	SHORT CIRCUIT CURRENT RATING
SCHED	SCHEDULE
SPD	SURGE PROTECTION DEVICE
ST	SHUNT TRIP
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TB	TERMINAL BOX
TELECOM	TELECOMMUNICATIONS
TR	TAMPER RESISTANT
TTB	TELEPHONE TERMINAL BACKBOARD
TYP	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
US	UPSTAGE
V	VOLTS
W	WIRE OR WATTS
WAP	WIRELESS ACCESS POINT
WG	WIRE GUARD
WP	WEATHERPROOF
WR	WEATHER RESISTANT
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
(E)	EXISTING
(R)	RELOCATED

STANDARD METHODS OF NOTATION



STANDARD MOUNTING HEIGHTS



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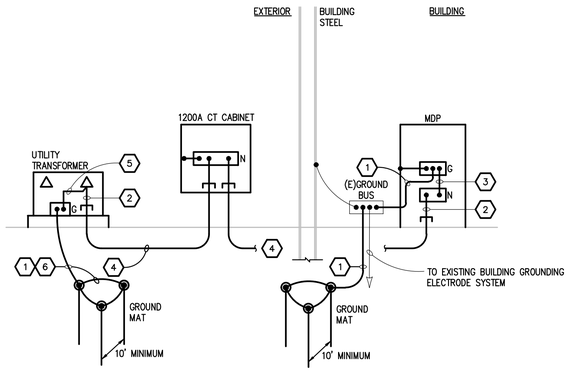
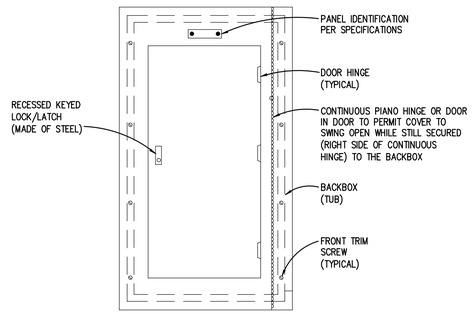


GROUNDING SYSTEM DIAGRAM
SECONDARY SERVICE
INTERIOR SERVICE ENTRANCE EQUIPMENT

NO SCALE

(#) **KEYED NOTES:**

1. GROUNDING ELECTRODE CONDUCTOR, #4/0 COPPER.
2. GROUNDED CONDUCTOR (NEUTRAL), SEE ONE LINE DIAGRAM.
3. MAIN BONDING JUMPER, PROVIDED BY MANUFACTURER AS PART OF LISTED EQUIPMENT SIZED PER NEC 250.28 AND 250.102.
4. SERVICE ENTRANCE PHASE CONDUCTORS AND GROUNDED CONDUCTOR IN CONDUIT. SEE ONE LINE DIAGRAM.
5. CONNECTION FROM GROUNDED SERVICE CONDUCTOR TO GROUNDING ELECTRODE AT THE TRANSFORMER PER NEC 250.24. COORDINATE WITH UTILITY.
6. COORDINATE REQUIREMENTS WITH UTILITY COMPANY PRIOR TO INSTALLATION. PROVIDE ALL NECESSARY GROUND RODS AND CONDUCTORS TO MEET UTILITY COMPANY REQUIREMENTS.



PANELBOARD FRONT COVER DETAIL

NO SCALE

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

RACEWAY / CONDUCTOR / CABLE APPLICATION SCHEDULE

	WIRE		RACEWAY											CABLE / CORD
	COPPER, TYPE THHN/THWN-2	COPPER, TYPE XHHW-2	ELECTRICAL METALLIC TUBING (EMT)	INTERMEDIATE METAL CONDUIT (IMC)	RIGID STEEL CONDUIT (RSC)	RIGID NON-METALLIC CONDUIT (RNC) TYPE EPC-40	HIGH DENSITY POLYETHYLENE (HDPE) SCHEDULE 40	REINFORCED THERMOSET RESIN CONDUIT (RTRC) TYPE BG	FLEXIBLE METAL CONDUIT (FMC)	LIQUID TIGHT FLEXIBLE METAL CONDUIT (LFMC)	SURFACE RACEWAY	CABLE TRAY		METAL CLAD TYPE CABLE WITH INSULATED GROUND WIRE (TYPE MC)
FEEDERS - EXTERIOR														
EXPOSED, SURFACE MOUNTED TO STRUCTURE		X		X	X									
BELOW PARKING LOTS AND ROADWAYS		X						X						
BELOW GREEN SPACE		X				X	X	X						
WITHIN 5' OF FOUNDATION WALL		X			X									
FEEDERS - INTERIOR														
EXPOSED, BELOW 10' AFF AND SUBJECT TO DAMAGE	X			X	X									
EXPOSED, BELOW 10' AFF AND NOT SUBJECT TO DAMAGE	X		X	X										
EXPOSED, ABOVE 10' AFF UNFINISHED SPACES	X		X	X										
BRANCH CIRCUITS - EXTERIOR														
ROOFTOPS (WHEN APPROVED BY ENGINEER)		X		X	X									
BRANCH CIRCUITS - INTERIOR														
CONCEALED, ACCESSIBLE CEILINGS	X		X	X										X
CONCEALED, INACCESSIBLE CEILINGS	X		X	X										
CONCEALED IN GYPSUM BOARD PARTITION WALLS	X		X	X					X					X
CONCEALED IN CMU WALLS	X		X	X										
EXPOSED, BELOW 10' AFF AND SUBJECT TO DAMAGE	X			X	X									
EXPOSED, BELOW 10' AFF AND NOT SUBJECT TO DAMAGE	X		X	X							X			
EXPOSED, ABOVE 10' AFF UNFINISHED SPACES	X		X	X										
SPECIAL APPLICATIONS														
SERVICE ENTRANCE - UNDERGROUND		X				X	X							
SERVICE ENTRANCE - ABOVE GROUND		X	X	X	X									
CLASS 1 CONTROL CIRCUITS	X		X	X	X									
CLASS 2 CONTROL CIRCUITS	X		X	X	X							X		
CLASS 3 CONTROL CIRCUITS	X		X	X	X							X		
CONNECTIONS TO TRANSFORMERS, MOTORS AND VIBRATING EQUIPMENT		X								X				

GENERAL NOTES:

1. TRANSITION FROM PVC/HDPE AND PROVIDE RIGID STEEL OR RTRC SWEEPS WHERE CONDUITS PENETRATE WALLS, CONCRETE SLABS, CONCRETE BASES, AND ASPHALT.
2. REFER TO SPECIFICATIONS FOR RESTRICTIONS ON MC/AC CABLE INSTALLATION.
3. EMT SHALL NOT BE USED ON THE EXTERIOR OF A BUILDING OR IN AREAS SUBJECT TO DAMAGE BELOW 10' AFF.
4. INSTALL SURFACE RACEWAYS ONLY WHERE INDICATED ON DRAWINGS.

FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE - GENERAL PURPOSE

OVERCURRENT DEVICE RATING (AMPERES)	COPPER CONDUCTORS						KEYED NOTES
	WIRE SIZE (AWG OR KCMIL)		CONDUIT SIZE				
	PHASE & NEUTRAL	GROUND	SINGLE PHASE 2 WIRE+G (1PH, 1N, 1G, 2PH, 1G)	SINGLE PHASE 3 WIRE+G (2PH, 1N, 1G)	THREE PHASE 3 WIRE+G (3PH, 1G)	THREE PHASE & NEUTRAL 4 WIRE+G (3PH, 1N, 1G)	
15-20	12	12	3/4"	3/4"	3/4"	3/4"	
25-30	10	10	3/4"	3/4"	3/4"	3/4"	
35-40	8	10	3/4"	3/4"	3/4"	3/4"	
45-50	8 (6)	10	3/4"	3/4"	3/4"	3/4"	1
60	6 (4)	10	3/4" (1")	3/4" (1")	3/4" (1")	1" (1 1/4")	1
70	4	8	1"	1 1/4"	1 1/4"	1 1/4"	
80	4 (3)	8	1"	1 1/4"	1 1/4"	1 1/4"	1
90-100	3 (2)	8	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1
110	2 (1)	6	–	1 1/4"	1 1/4"	1 1/4" (1 1/2")	1
125	1 (1/0)	6	–	1 1/4" (1 1/2")	1 1/4" (1 1/2")	1 1/2"	1
150	1/0	6	–	1 1/2"	1 1/2"	1 1/2"	
175	2/0	6	–	2"	2"	2"	
200	3/0	6	–	2"	2"	2 1/2"	
225	4/0	4	–	2"	2"	2 1/2"	
250	250	4	–	2 1/2"	2 1/2"	2 1/2"	
300	350	4	–	2 1/2"	2 1/2"	3"	
350	500	3	–	3"	3"	3"	
400	500	3	–	3"	3"	3"	

GENERAL NOTES:

1. CONTRACTOR TO SIZE FEEDERS AND BRANCH CIRCUITS BASED ON THIS SCHEDULE AND OVER CURRENT DEVICE SIZE, UNLESS NOTED OTHERWISE.
2. CONTRACTOR MAY COMBINE 20A CIRCUITS AS NOTED IN SPECIFICATION.
3. CONDUCTORS ARE BASED ON THHN/THWN-2 UP TO AND INCLUDING #4/0. LARGER THAN #4/0 ARE BASED ON TYPE XHHW.
4. CONDUIT SIZES ARE VALID FOR EMT OR RSC. CONDUIT SIZES SHALL BE ADJUSTED AS REQUIRED FOR OTHER TYPES OF CONDUIT.
5. SIZE OF DISCONNECT SWITCH LOCATED AT EQUIPMENT SHALL BE SIZED BASED UPON OVERCURRENT PROTECTION OF THAT DEVICE.
6. OBTAIN APPROVAL FROM ENGINEER PRIOR TO INSTALLING DIFFERENT SIZE/QUANTITY OF CONDUCTORS TO OBTAIN AN EQUIVALENT AMPACITY.

KEYED NOTES:

1. CONDUCTORS ARE BASED ON 90°C, 600V INSULATED WIRE APPLIED AT 75°C FOR TERMINATION RATED 60/75°C OR 75°C. FOR TERMINATION RATED AT 60°C, USE CONDUCTORS AND CONDUIT SIZES INDICATED IN PARENTHESES.

BRANCH CIRCUIT VOLTAGE DROP WIRING SCHEDULE FOR SINGLE PHASE CIRCUITS

BRANCH CKT RATING (A)	WIRE SIZE (AWG)	MAXIMUM BRANCH CIRCUIT LENGTH (IN FEET)				
		120V	208V	240V	277V	480V
20A	12	83	143	165	191	331
	10	128	222	256	295	511
	8	201	348	402	464	804
	6	313	542	625	721	1250
30A	10	85	148	170	197	341
	8	134	232	268	309	536
	6	208	361	417	481	833
	4	313	542	625	721	1250

GENERAL NOTES:

1. THE ABOVE TABLE VALUES ARE BASED ON COPPER CONDUCTORS, IN STEEL CONDUIT, WITH A LOAD POWER FACTOR OF 0.85 PER NEC CHAPTER 9, TABLE 9.
2. PROVIDE BRANCH CIRCUIT CONDUCTORS AS INDICATED IN THE TABLE ABOVE FOR ALL LIGHTING AND RECEPTACLE BRANCH CIRCUITS. WHERE BRANCH CIRCUITS SERVE DEDICATED EQUIPMENT, THE CONTRACTOR MAY PERFORM VOLTAGE DROP CALCULATIONS BASED ON ACTUAL EQUIPMENT CONNECTED LOAD AND PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO A MAXIMUM OF 3%.
3. CONDUCTOR SIZES ARE BASED ON MAXIMUM OF 9 CURRENT CARRYING CONDUCTORS IN A SINGLE CONDUIT.
4. LIMITS FOR CONDUCTOR LENGTHS SHOWN ARE BASED ON A MAXIMUM BRANCH CIRCUIT LOADING OF 64% OF THE BRANCH BREAKER RATING AND A MAXIMUM OF 3 PERCENT VOLTAGE DROP TO COMPLY WITH ASHRAE 90.1 AND THE NEC. FOR CIRCUITS LOADED GREATER THAN 64% OF BRANCH BREAKER RATING, THE CONTRACTOR SHALL PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO 3%.

MOTOR CIRCUIT SIZING SCHEDULE (120V, SINGLE PHASE)

MOTOR HP	CIRCUIT BREAKER	MANUAL MOTOR STARTER SIZE	COMBINATION STARTER SIZE	MOTOR DISCONNECT (NOTE 3)
1/6	15A	1 HP	0	20A
1/4	15A	1 HP	0	20A
1/3	15A	1 HP	0	20A
1/2	20A	1 HP	0	20A

GENERAL NOTES:

1. BASED ON MOTOR FULL LOAD AMPERES AS PROVIDED BY THE NEC
2. BASED ON MOTOR RUNNING OVERLOAD PROTECTIONS PROVIDED BY THERMAL OVERLOAD RELAYS.
3. WHERE THE STARTER IS LOCATED REMOTE FROM THE MOTOR, PROVIDE DISCONNECT LOCATED AT THE MOTOR, SIZE AS INDICATED.

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DRAFTS: NCJ

PROJECT NO: 22.516ES

SHEET TITLE: ELECTRICAL STANDARD SCHEDULES

SHEET NO: E002

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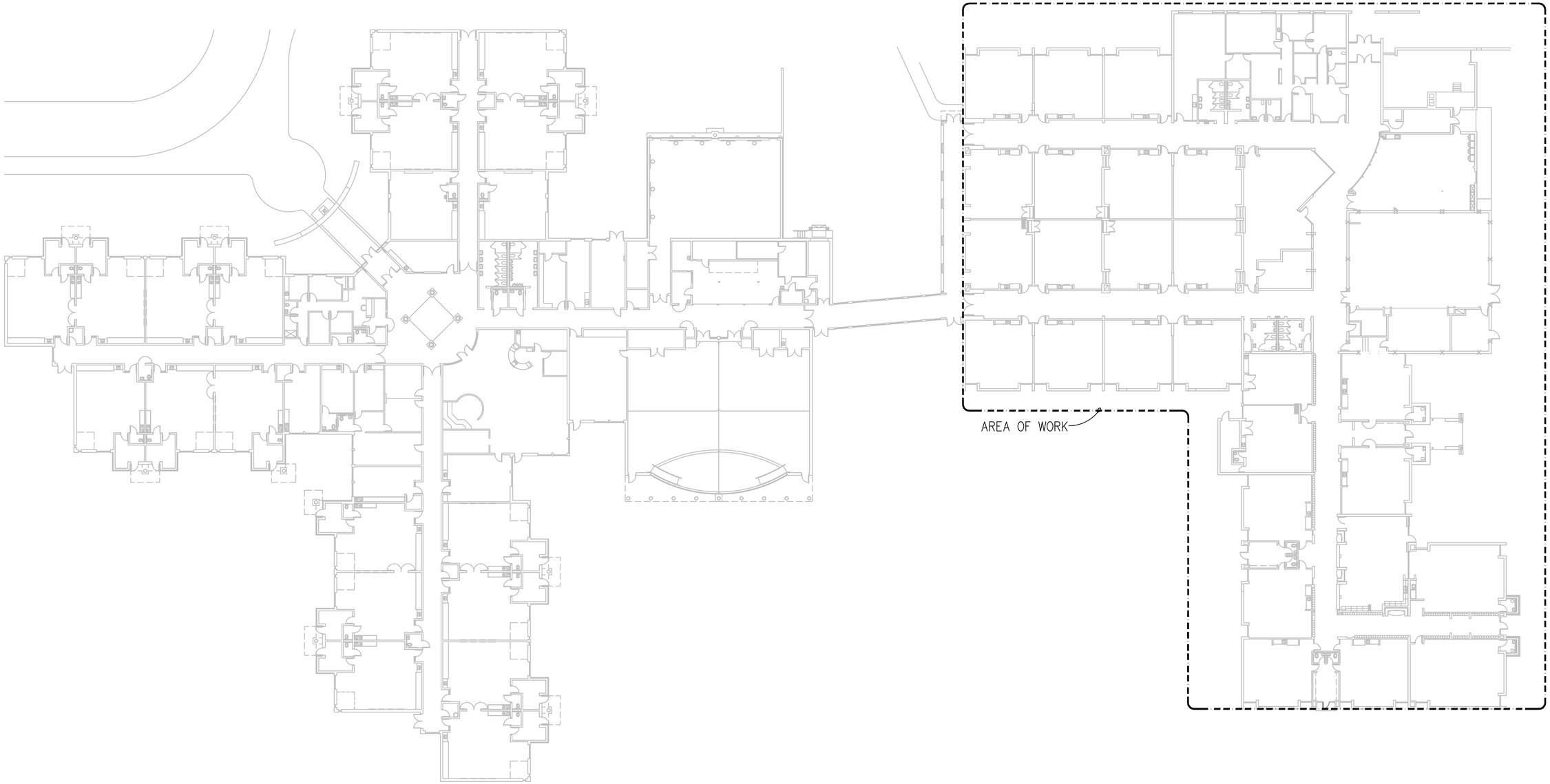
THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



ELECTRICAL COMPOSITE PLAN

SCALE: 3/64" = 1' - 0"

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SHEET NO: E003

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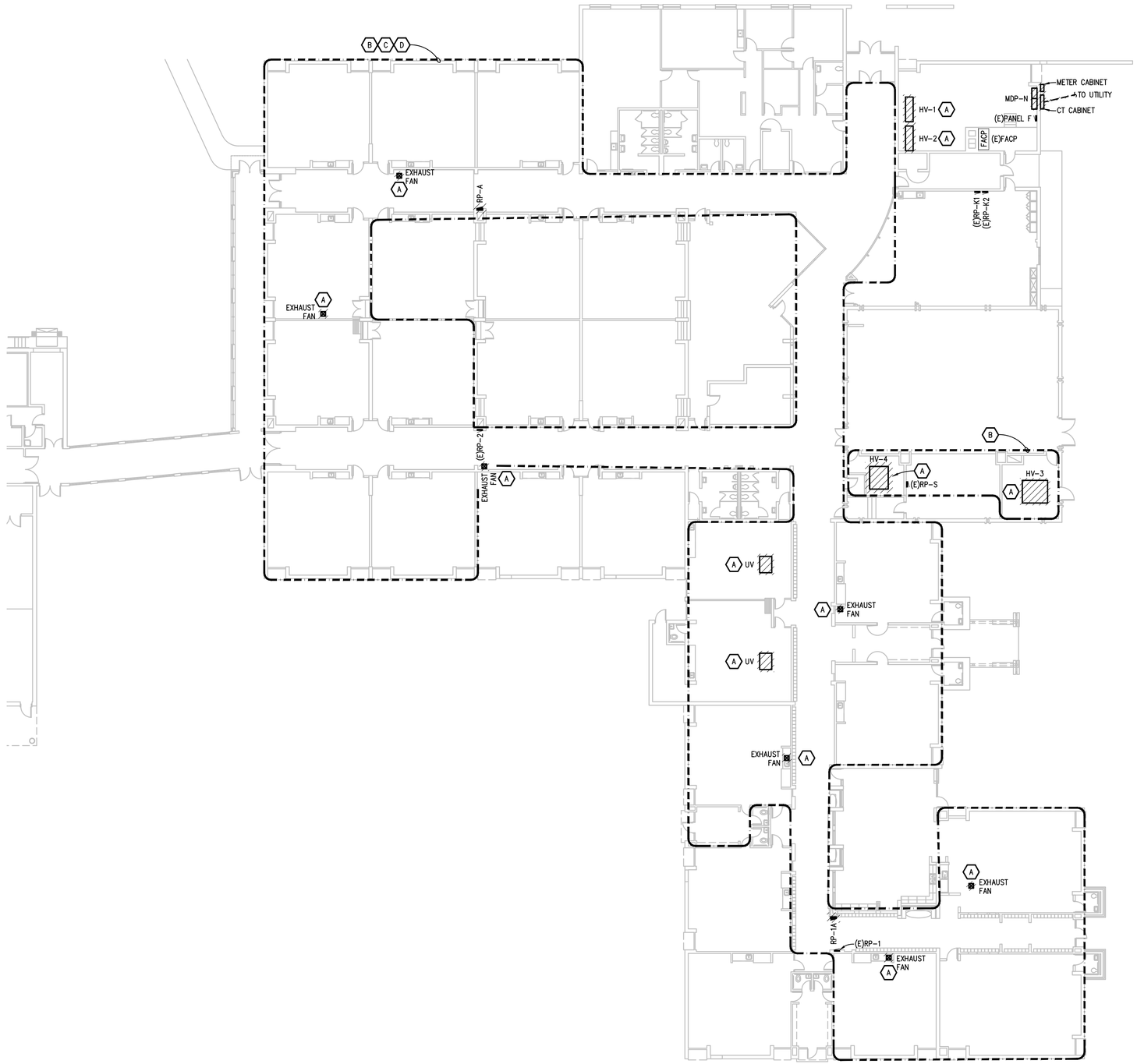


NORTH 3-4 ELECTRICAL DEMOLITION PLAN
SCALE: 1/16" = 1' - 0"

ELECTRICAL DEMOLITION GENERAL NOTES:

1. VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND THE EXTENT OF DEMOLITION WORK.
2. EXAMINE THE DRAWINGS OF OTHER TRADES AND BE FAMILIAR WITH THE DEMOLITION REQUIRED BY OTHER TRADES. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES, WHETHER OR NOT SPECIFICALLY INDICATED.
3. REMOVE EQUIPMENT OR MATERIALS AS INDICATED ON PLAN WITH CROSS HATCHING. DEMOLITION SHALL INCLUDE, BUT NOT BE LIMITED TO, THOSE COMPONENTS SHOWN.
4. COORDINATE WITH NEW WORK PLANS, ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR EXTENT OF DEMOLITION WORK.
5. PROVIDE PROPER SUPPORT FOR EXISTING TO REMAIN CONDUITS AND BOXES WHERE EXISTING SUPPORT IS TO BE REMOVED. RE-ROUTE BRANCH CIRCUIT CONDUITS AND RELOCATE JUNCTION BOXES AS REQUIRED TO FACILITATE INSTALLATION OF NEW EQUIPMENT AND SYSTEMS IN CEILING SPACES.
6. REMOVE ALL CONDUIT AND WIRE BACK TO THE SOURCE OR NEAREST UPSTREAM DEVICE REMAINING IN SERVICE.
7. MAINTAIN ELECTRICAL SERVICE TO ALL LIGHTING FIXTURES, DEVICES AND EQUIPMENT THAT ARE TO REMAIN. EXTEND CONDUIT AND WIRE AS REQUIRED WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM LOADS THAT ARE TO REMAIN.
8. DISPOSE OF ALL MATERIALS OFF SITE AND INCLUDE ALL COSTS FOR DISPOSAL IN BID. ALL MATERIALS SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, INCLUDING TCLP TESTING, PROPER DISPOSAL AND/OR RECYCLING OF FLUORESCENT LAMPS.
9. RING OUT AND TAG ALL CIRCUITS AFFECTED BY THIS ALTERATION AT BOTH ENDS. MARK ALL UNUSED CIRCUIT BREAKERS "SPARE".
10. PROVIDE UPDATED TYPED-IN DIRECTORIES FOR ALL PANELS AFFECTED BY THIS ALTERATION.
11. COORDINATE ANY SHUT DOWN OF EXISTING SERVICES AND EQUIPMENT THAT ARE REMAINING IN USE WITH THE OWNER'S REPRESENTATIVE. WHERE EXISTING BUILDING SERVICE IS REQUIRED TO BE SHUT DOWN, INCLUDE ALL ASSOCIATED OVERTIME COSTS TO PERFORM THIS WORK DURING WEEKENDS AND EVENINGS INCLUDE ALL COSTS FOR PROVIDING TEMPORARY POWER WHERE SHUT DOWNS MUST OCCUR FOR PERIODS LONGER THAN THESE HOURS. COORDINATE ELECTRICAL SHUT DOWNS WITH THE OWNER 72 HOURS PRIOR TO SHUT DOWN.

(#) DEMOLITION KEY NOTES:

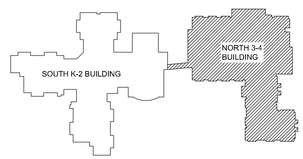
A. DISCONNECT MECHANICAL EQUIPMENT AND MAKE ELECTRICALLY SAFE. MECHANICAL EQUIPMENT TO BE REMOVED BY OTHERS. REMOVE DISCONNECTS AND CONTROLS COMPLETE. REMOVE CONDUCTORS AND CONDUIT BACK TO SOURCE.

B. REMOVE BRANCH CIRCUITS BACK TO NEAREST ACCESSIBLE SOURCE AND MAKE ELECTRICALLY SAFE TO FACILITATE MECHANICAL INSTALLATION. RELOCATE ELECTRICAL AND TELECOMMUNICATIONS DEVICES AS REQUIRED. EXTEND BRANCH CIRCUITS IN NEW WORK. COORDINATE RELOCATION WITH OWNER.

C. REMOVE, STORE, AND PROTECT LIGHT FIXTURES FOR REINSTALLATION IN NEW WORK.

D. TEMPORARILY SUPPORT ELECTRICAL/FIRE ALARM/TELECOMMUNICATION DEVICES TO FACILITATE CEILING DEMOLITION.

STATE OF MICHIGAN
MYRON SCOTT GIBBS
ENGINEER
No. 6201061469
LICENSED PROFESSIONAL ENGINEER



KEY PLAN
SCALE: N.T.S.

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DATE	ISSUED FOR
11/20/24	DD
12/06/24	50% CD
01/17/25	BID SET

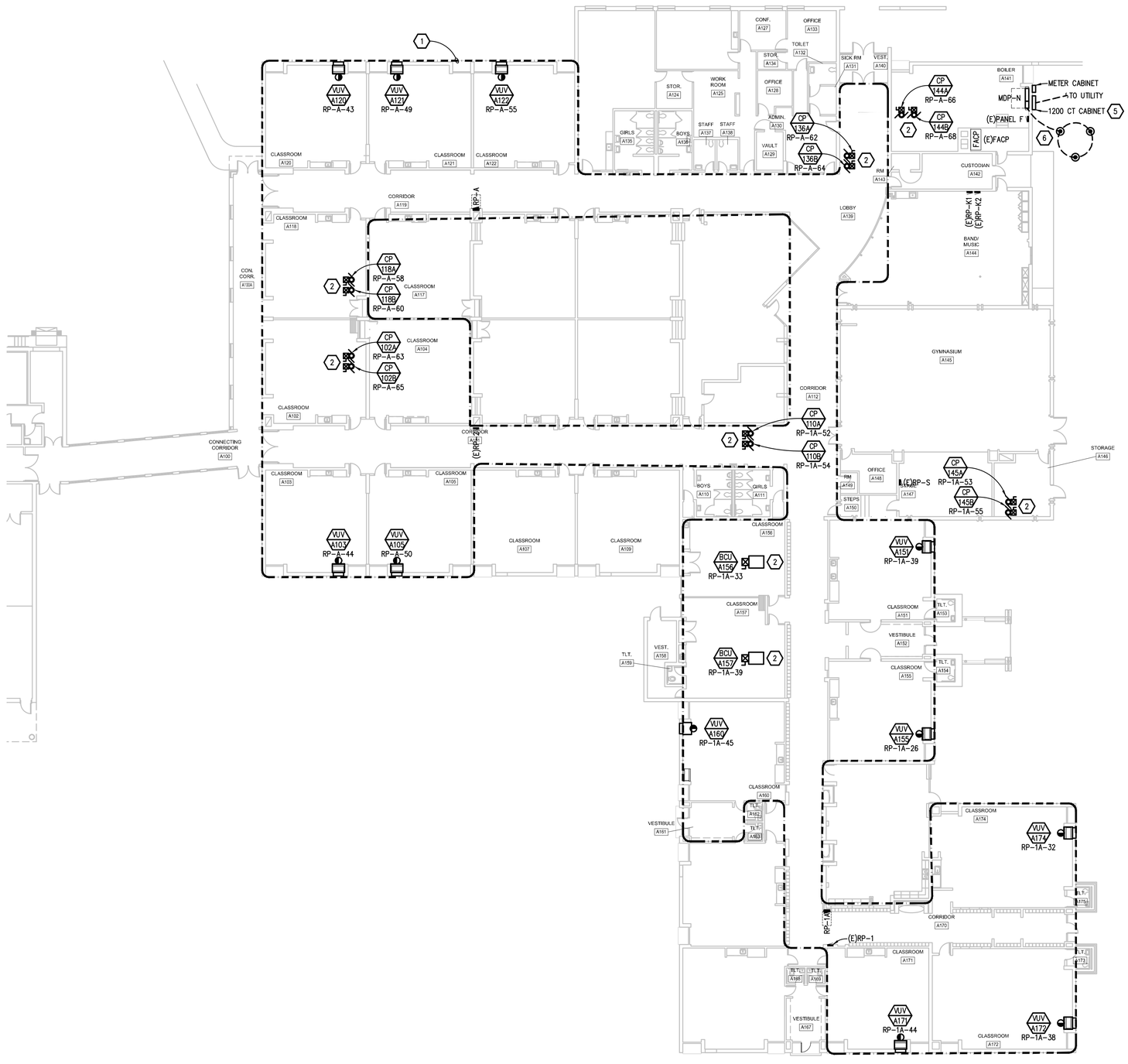
PIC: WEK
PM: WEK
DRAFTS: NCJ

PROJECT NO: 22.516ES

SHEET TITLE: NORTH 3-4 ELECTRICAL DEMOLITION PLAN

SHEET NO: ED102

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



NORTH 3-4 ELECTRICAL NEW WORK PLAN

SCALE: 1/16" = 1' - 0"

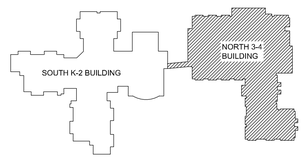
ELECTRICAL GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS. COORDINATE EXACT EQUIPMENT LOCATIONS, ELEVATIONS, AND FINAL CONNECTION REQUIREMENTS. PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS AND OFFSETS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
4. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
5. REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY.
6. REFER TO TEMPERATURE CONTROLS SHEETS FOR REQUIRED FIRE ALARM CONTROL MODULES, DUCT SMOKE DETECTORS, AND MOTOR CONTROLLERS. PROVIDE ALL ACCESSORIES INDICATED.
7. ALL FIRE ALARM DEVICES SHALL BE COMPATIBLE WITH EXISTING EDWARDS FIRE ALARM SYSTEM. PROVIDE NECESSARY COMPONENTS, MODULES, ETC. AS REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. RE-TEST AND CERTIFY EXISTING FIRE ALARM SYSTEM AT COMPLETION OF PROJECT.

(#) CONSTRUCTION KEY NOTES:

1. REINSTALL LIGHT FIXTURES IN SAME LOCATION. CLEAN AND RE-LAMP FIXTURES.
2. PROVIDE COMBINATION STARTER WITHIN 6'-0" OF MECHANICAL EQUIPMENT.
3. PROVIDE DISCONNECT WITHIN 6'-0" OF MECHANICAL EQUIPMENT.
4. PROVIDE CIRCUIT FOR HEAT TRACE SYSTEM. HEAT TRACE AND ASSOCIATED COMPONENTS TO BE PROVIDED BY MECHANICAL CONTRACTOR. COORDINATE EXACT REQUIREMENTS WITH HEAT TRACE MANUFACTURER AND INSTALLER. COORDINATE EXACT LOCATIONS WITH MECHANICAL DRAWINGS AND TRADES.
5. ELECTRICAL CONTRACTOR TO PROVIDE NEW CT CABINET AND METERING CABINET AS REQUIRED TO MEET UTILITY REQUIREMENTS.
6. GROUND MAT WITH #4/0 BARE COPPER TO ELECTRICAL ROOM GROUND BUS.

STATE OF MICHIGAN
MYRON SCOTT GIBBS
ENGINEER
No. 6201061469
LICENSED PROFESSIONAL ENGINEER



KEY PLAN
SCALE: N.T.S.

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PIC:	WEK
PM:	WEK
DRAFTS:	NCJ

PROJECT NO: 22.516ES

SHEET TITLE: NORTH 3-4 ELECTRICAL NEW WORK PLAN

SHEET NO: E202

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"

NORTH 3-4 ELECTRICAL NEW WORK ROOF PLAN

SCALE: 1/16" = 1' - 0"

ELECTRICAL GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS. COORDINATE EXACT EQUIPMENT LOCATIONS, ELEVATIONS, AND FINAL CONNECTION REQUIREMENTS. PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS AND OFFSETS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
4. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
5. REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY.
6. REFER TO TEMPERATURE CONTROLS SHEETS FOR REQUIRED FIRE ALARM CONTROL MODULES, DUCT SMOKE DETECTORS, AND MOTOR CONTROLLERS. PROVIDE ALL ACCESSORIES INDICATED.
7. ALL FIRE ALARM DEVICES SHALL BE COMPATIBLE WITH EXISTING EDWARDS FIRE ALARM SYSTEM. PROVIDE NECESSARY COMPONENTS, MODULES, ETC. AS REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. RE-TEST AND CERTIFY EXISTING FIRE ALARM SYSTEM AT COMPLETION OF PROJECT.

(#) CONSTRUCTION KEY NOTES:

1. REINSTALL LIGHT FIXTURES IN SAME LOCATION. CLEAN AND RE-LAMP FIXTURES.
2. PROVIDE COMBINATION STARTER WITHIN 6'-0" OF MECHANICAL EQUIPMENT.
3. PROVIDE DISCONNECT WITHIN 6'-0" OF MECHANICAL EQUIPMENT.
4. PROVIDE CIRCUIT FOR HEAT TRACE SYSTEM. HEAT TRACE AND ASSOCIATED COMPONENTS TO BE PROVIDED BY MECHANICAL CONTRACTOR. COORDINATE EXACT REQUIREMENTS WITH HEAT TRACE MANUFACTURER AND INSTALLER. COORDINATE EXACT LOCATIONS WITH MECHANICAL DRAWINGS AND TRADES.
5. ELECTRICAL CONTRACTOR TO PROVIDE NEW CT CABINET AND METERING CABINET AS REQUIRED TO MEET UTILITY REQUIREMENTS.
6. GROUND MAT WITH #4/0 BARE COPPER TO ELECTRICAL ROOM GROUND BUS.

STATE OF MICHIGAN
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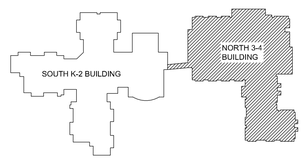
LICENSED PROFESSIONAL ENGINEER



KEY PLAN
SCALE: N.T.S.

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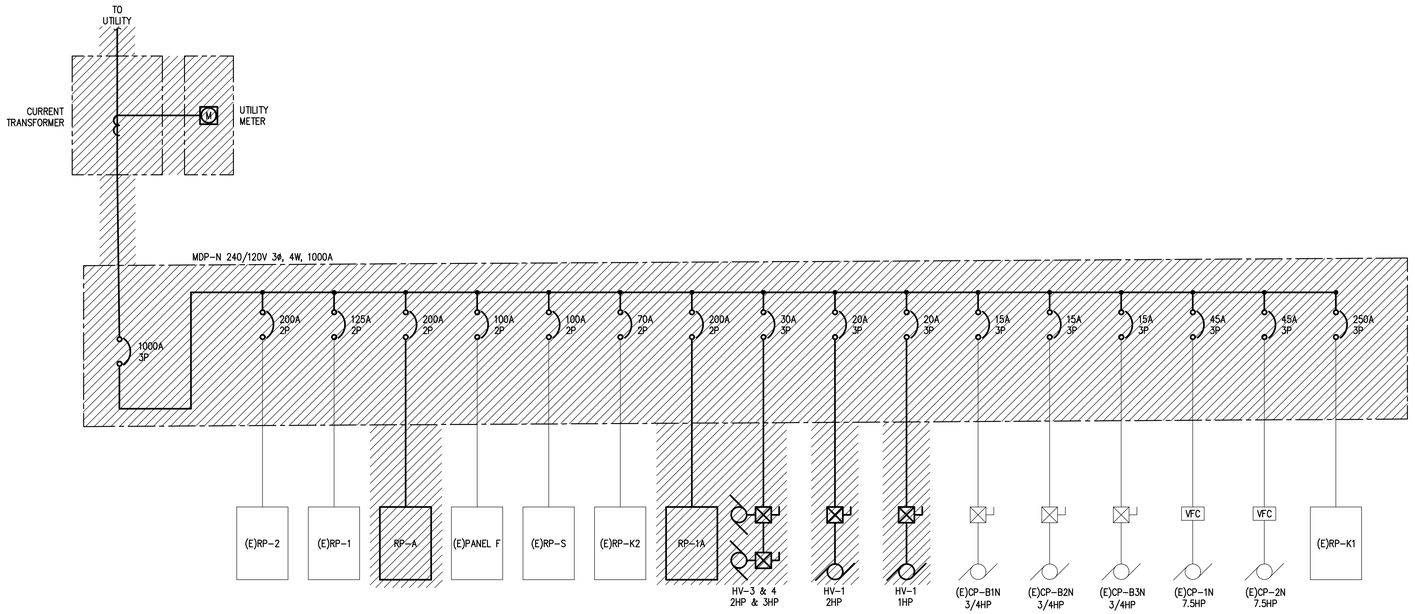
PIC: WEK
PM: WEK
DRAFTS: NCJ
PROJECT NO: 22.516ES
SHEET TITLE: NORTH 3-4 ELECTRICAL NEW WORK ROOF PLAN
SHEET NO: E204



ONE-LINE DIAGRAM - NORTH ELECTRIC SERVICE - DEMOLITION

NO SCALE

DIAGRAM GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS. COORDINATE EXACT EQUIPMENT LOCATIONS, ELEVATIONS, AND FINAL CONNECTION REQUIREMENTS. PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS AND OFFSETS.
2. FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE "FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE–GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
3. TRANSFORMER SECONDARY CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE "TRANSFORMER CIRCUIT SIZING SCHEDULE–GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
4. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH THE MOTOR CIRCUIT SIZING SCHEDULES ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
5. BASIS OF DESIGN IS EATON DISTRIBUTION EQUIPMENT. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT FROM OTHER APPROVED MANUFACTURERS, THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE THE LAYOUT AND CLEARANCE REQUIREMENTS IN ALL SPACES CONTAINING ELECTRICAL EQUIPMENT AND PROVIDE EQUIPMENT MEETING THE SPECIFICATIONS AND ACHIEVING CODE REQUIRED CLEARANCES WITHIN THE SPACE PROVIDED.

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12/06/24	50% CD
01/17/25	BID SET

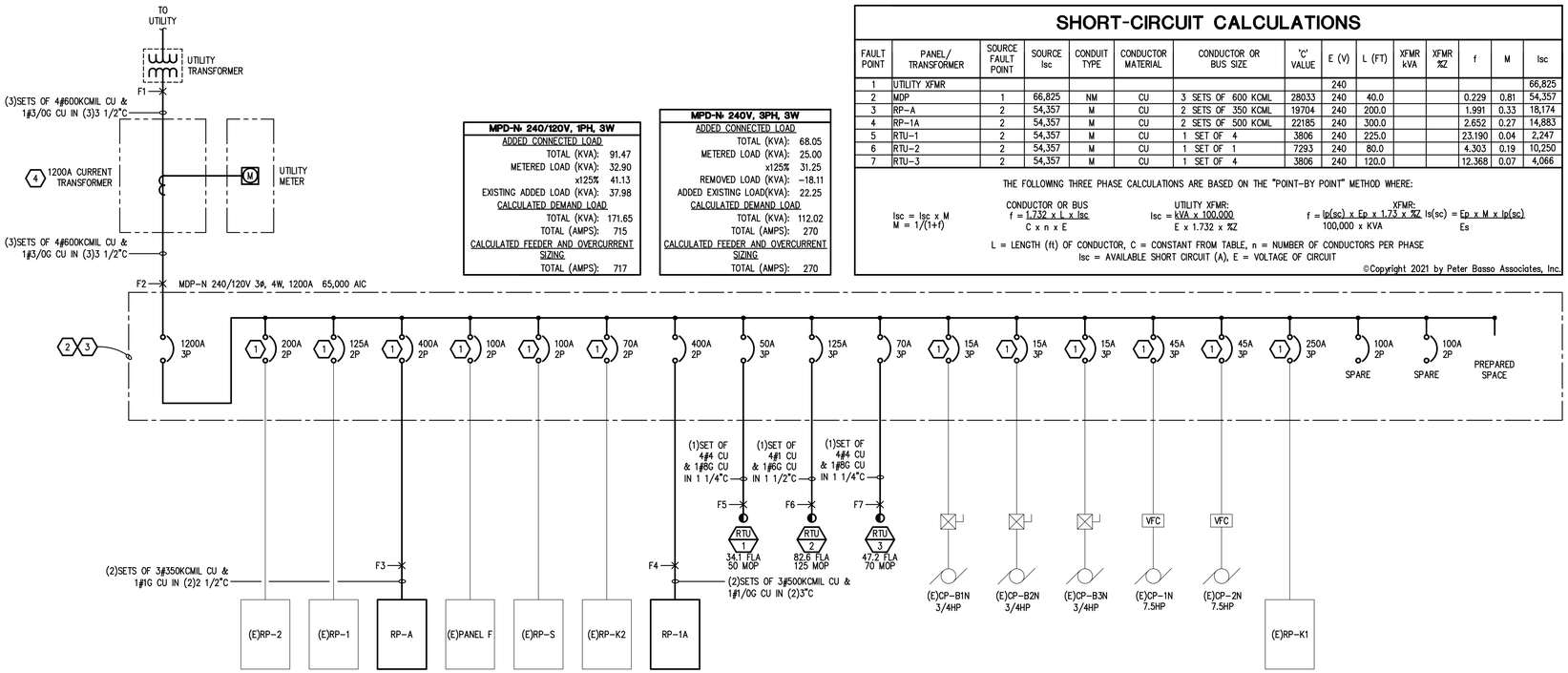
PIC: WEK
PM: WEK
DRAFTS: NCJ

PROJECT NO: 22.516ES

SHEET TITLE: ONE LINE DIAGRAM - DEMOLITION

SHEET NO: E501

STATE OF MICHIGAN
MYRON SCOTT GIBBS
ENGINEER
No. 6201061469
LICENSED PROFESSIONAL ENGINEER



MPD-N: 240/120V, 1PH, 3W

ADDED CONNECTED LOAD	
TOTAL (KVA):	91.47
METERED LOAD (KVA):	32.90
x125%	41.13
EXISTING ADDED LOAD (KVA):	37.98
CALCULATED DEMAND LOAD	
TOTAL (KVA):	171.65
TOTAL (AMPS):	715
CALCULATED FEEDER AND OVERCURRENT SIZING	
TOTAL (AMPS):	717

MPD-N: 240V, 3PH, 3W

ADDED CONNECTED LOAD	
TOTAL (KVA):	68.05
METERED LOAD (KVA):	25.00
x125%	31.25
REMOVED LOAD (KVA):	−18.11
ADDED EXISTING LOAD(KVA):	22.25
CALCULATED DEMAND LOAD	
TOTAL (KVA):	112.02
TOTAL (AMPS):	270
CALCULATED FEEDER AND OVERCURRENT SIZING	
TOTAL (AMPS):	270

SHORT-CIRCUIT CALCULATIONS

FAULT POINT	PANEL/ TRANSFORMER	SOURCE FAULT POINT	SOURCE Isc	CONDUIT TYPE	CONDUCTOR MATERIAL	CONDUCTOR OR BUS SIZE	'C' VALUE	E (V)	L (FT)	XFMR kVA	XFMR %Z	f	M	Isc
1	UTILITY XFMR							240						66,825
2	MDP	1	66,825	NM	CU	3 SETS OF 600 KCML	28033	240	40.0			0.229	0.81	54,357
3	RP-A	2	54,357	M	CU	2 SETS OF 350 KCML	19704	240	200.0			1.991	0.33	18,174
4	RP-1A	2	54,357	M	CU	2 SETS OF 500 KCML	22185	240	300.0			2.652	0.27	14,883
5	RTU-1	2	54,357	M	CU	1 SET OF 4	3806	240	225.0			23.190	0.04	2,247
6	RTU-2	2	54,357	M	CU	1 SET OF 1	7293	240	80.0			4.303	0.19	10,250
7	RTU-3	2	54,357	M	CU	1 SET OF 4	3806	240	120.0			12.368	0.07	4,066

THE FOLLOWING THREE PHASE CALCULATIONS ARE BASED ON THE "POINT-BY POINT" METHOD WHERE:

$Isc = Isc \times M$, $M = 1/(1+f)$

CONDUCTOR OR BUS: $f = \frac{1.732 \times L \times Isc}{C \times n \times E}$

UTILITY XFMR: $Isc = \frac{kVA \times 100{,}000}{E \times 1.732 \times \%Z}$

XFMR: $f = \frac{Ip(sc) \times Ep \times 1.73 \times \%Z}{100{,}000 \times kVA}$, $Is(sc) = \frac{Ep \times M \times Ip(sc)}{Es}$

L = LENGTH (ft) OF CONDUCTOR, C = CONSTANT FROM TABLE, n = NUMBER OF CONDUCTORS PER PHASE
Isc = AVAILABLE SHORT CIRCUIT (A), E = VOLTAGE OF CIRCUIT

ONE-LINE DIAGRAM - NORTH ELECTRIC SERVICE - NEW WORK

NO SCALE

DIAGRAM GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS. COORDINATE EXACT EQUIPMENT LOCATIONS, ELEVATIONS, AND FINAL CONNECTION REQUIREMENTS. PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS AND OFFSETS.
2. FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE "FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE–GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
3. TRANSFORMER SECONDARY CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE "TRANSFORMER CIRCUIT SIZING SCHEDULE–GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
4. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH THE MOTOR CIRCUIT SIZING SCHEDULES ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
5. BASIS OF DESIGN IS EATON DISTRIBUTION EQUIPMENT. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT FROM OTHER APPROVED MANUFACTURERS, THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE THE LAYOUT AND CLEARANCE REQUIREMENTS IN ALL SPACES CONTAINING ELECTRICAL EQUIPMENT AND PROVIDE EQUIPMENT MEETING THE SPECIFICATIONS AND ACHIEVING CODE REQUIRED CLEARANCES WITHIN THE SPACE PROVIDED.

(#) CONSTRUCTION KEY NOTES:

1. CONNECT EXISTING FEEDER TO NEW CIRCUIT BREAKER.
2. PROVIDE SIGN INDICATING "240V HIGH LEG".
3. ELECTRICAL CONTRACTOR TO COORDINATE WITH UTILITY PROVIDER FOR SERVICE UPGRADE, SERVICE SHUTDOWN, AND UTILITY FAULT CURRENT INFORMATION. COORDINATE EXACT SERVICE SHUTDOWN WITH OWNER PRIOR TO SHUTDOWN AGREEMENT WITH UTILITY. UTILITY TO MAKE FINAL DECISION ON UTILITY OWNED EQUIPMENTS NEED FOR UPGRADE.
4. ELECTRICAL CONTRACTOR TO PROVIDE NEW CT CABINET AND METERING CABINET AS REQUIRED TO MEET UTILITY REQUIREMENTS.

PANELBOARD RP-1A

#	LOAD TYPE	DESCRIPTION	CB TYPE	CB	VA	ØA	ØC	VA	CB	CB TYPE	DESCRIPTION	LOAD TYPE	#
1	M	(E)CU-A107		30	2295	4590		2295	30		(E)CU-A109	M	2
3	M				2295		4590	2295				M	4
5	M	(E)VUV-A107		20	1300	2600		1300	20		(E)VUV-A109	M	6
7	M	(E)CU-A164		30	2295		4590	2295	30		(E)CU-A165	M	8
9	M				2295	4590		2295				M	10
11	M	(E)VUV-A164		20			1300	1300	20		(E)VUV-A165	M	12
13	M	(E)CU-A166		30	2295	3015		720	15		(E)RECEPT. ROOFTOP	R	14
15	M				2295		2345	50	15		(E)EF-A173, EF-A175	M	16
17	M	(E)VUV-A166		20	360	410		50	20		(E)CUH-A170	M	18
19	R	(E)RECEPT. RM A173, A175		20	900		2100	1200	20		(E)MICROWAVE OVEN RM A165	NC	20
21	R	(E)RECEPT. RM A165		20	360	720		360	20		(E)RECEPT. RM A165	R	22
23	R	(E)RECEPT. RM A165		20	360		720	360	20		(E)RECEPT. RM A165	R	24
25	R	(E)RECEPT. RM A165		20	360	1710		1350	20		VUV-A155	M	26
27	M	BCU-A156		15	756		2916	2160	30		CU-A155	M	28
29	M	CU-A156		30	3633	5793		2160				M	30
31	M				3633		4983	1350	15		VUV-A174	M	32
33	M	BCU-A157		15	756	2916		2160	30		CU-A174	M	34
35	MH	CU-A157		30	3633		5793	2160				M	36
37	MH				3633	4983		1350	15		VUV-A172	M	38
39	M	VUV-A151		15	1350		3510	2160	30		CU-A172	M	40
41	M	CU-A151		30	2160	4320		2160				M	42
43	M				2160		3510	1350	15		VUV-A171	M	44
45	M	VUV-A160		15	1350	3510		2160	30		CU-A171	M	46
47	M	CU-A160		30	2160			2160				M	48
49	M				2160	2640		480	20		RECEPT. ROOFTOP	R	50
51	R	RECEPT. ROOFTOP		20	480		1008	528	15		CP-110A	M	52
53	M	CP-145A		20	864	1392		528	15		CP-110B	M	54
55	M	CP-145B		15	864		864		20		SPARE		56
57	C	HEAT TRACE RTU 2	GFEP	20	500	500			20		SPARE		58
59		SPARE		20					20		SPARE		60
61		SPARE		20					20		SPARE		62
63		SPARE		20					20		SPARE		64
65		SPARE		20					20		SPARE		66
67		SPARE		20					20		SPARE		68
69		SPARE		20					20		SPARE		70
71		SPARE		20					20		SPARE		72
						43689 ØA	38229 ØC						

PANELBOARD INFORMATION
VOLTAGE: 120/240–1Ø
BUS AMPACITY: 400A
MAIN TYPE: MLO
MINIMUM A.I.C.: 22,000
MOUNTING: FLUSH

____ FEED–THROUGH LUGS
____ DOUBLE LUGS
____ INTEGRAL SPD

PANELBOARD LOCATION
CORRIDOR A170

BRANCH CIRCUIT CONNECTED LOAD:		DEMAND FACTOR	CALCULATED LOAD	FEEDER AND OCPD SIZING	
CONTINUOUS LOAD (C):	500	100%	500	125%	625
ELECTRIC HEAT (E)		100%		100%	
NON–CONTINUOUS LOAD (NC):	1200	100%	1200	100%	1200
KITCHEN LOAD (K):		100%		100%	
RECEPTACLE BASE LOAD (R):	4380	100%	4380	100%	4380
RECEPTACLE DEMAND LOAD (R):		50%		100%	
LIGHTING LOAD (L):		100%		125%	
ADDITIONAL TRACK LIGHTING LOAD				100%	
MOTORS, HIGHEST LOAD (MH):	7266	125%	9083	100%	9083
MOTORS, REMAINING LOAD (M):	72892	100%	72892	100%	72892
		TOTAL(KVA):	88.05		
		TOTAL (AMPS):	367	TOTAL (AMPS):	367

NOTE: DEMAND AND SIZING INFORMATION IS CALCULATED FROM CONNECTED LOAD

NOTES:

PANELBOARD RP-A

#	LOAD TYPE	DESCRIPTION	CB TYPE	CB	VA	ØA	ØC	VA	CB	CB TYPE	DESCRIPTION	LOAD TYPE	#
1	L	(E)CLASSROOM LTG.		20	1500	3000		1500	20		(E)CLASSROOM LTG.	L	2
3	L	(E)CLASSROOM LTG.		20	1500		3000	1500	20		(E)CLASSROOM LTG.	L	4
5	L	(E)CLASSROOM LTG.		20	1500	3000		1500	20		(E)CLASSROOM LTG.	L	6
7	L	(E)CLASSROOM LTG.		20	1500		3000	1500	20		(E)CLASSROOM LTG.	L	8
9	L	(E)CLASSROOM LTG.		20	1500	3000		1500	20		(E)BATHROOM LTG.	L	10
11	L	(E)LTG.		20	1500		3000	1500	20		(E)LTG.	L	12
13	L	(E)COORIDOR LTG.		20	1500	2580		1080	20		(E)CLASSROOM RECEPT.	R	14
15	R	(E)CLASSROOM RECEPT.		20	1080		2160	1080	20		(E)CLASSROOM RECEPT.	R	16
17	R	(E)CLASSROOM RECEPT.		20	1080	2160		1080	20		(E)CLASSROOM RECEPT.	R	18
19	R	(E)CLASSROOM RECEPT.		20	1080		2160	1080	20		(E)CLASSROOM RECEPT.	R	20
21	R	(E)CLASSROOM RECEPT.		20	1080	2160		1080	20		(E)TEACHER'S ROOM RECEPT.	R	22
23	R	(E)TEACHER'S ROOM RECEPT.		20	1080		2160	1080	20		(E)WORK ROOM RECEPT.	R	24
25	R	(E)WORK ROOM RECEPT.		20	1080	2160		1080	20		(E)PRINT ROOM RECEPT.	R	26
27	R	(E)OFFICE ROOM RECEPT.		20	1080		2160	1080	20		(E)RECEPT.	R	28
29	E	(E)CEILING HEATERS		20	1920	3420		1500	20		(E)LTG.	L	30
31	NC	(E)LOAD		20	1080		3000	1920	20		(E)LOAD	NC	32
33	M	(E)EXHAUST FANS		20	100	600		500	20		(E)INTERCOM SYSTEM	C	34
35	R	(E)240V RECEPT.		50	4800		6300	1500	20		(E)LTG.	L	36
37	R				4800	5880		1080	20		(E)RECEPT.	R	38
39	R	(E)FRONT DESK RECEPT.		20	1080		1269	189	20		(E)LTG. CORRIDOR	NC	40
41	NC	(E)RECEPT, DOOR HARDWARE		20	600	2976		2376	30		(E)BC–1, BC–2	NC	42
43	M	VUV–A120		15	1350		2700	1350	15		VUV–A103	M	44
45	MH	CU–A120		30	2160	4320		2160	30		CU–A103	M	46
47	MH				2160			2160				M	48
49	M	VUV–A121		15	1350	2700		1350	15		VUV–A105	M	50
51	M	CU–A121		30	2160		4320	2160	30		CU–A105	M	52
53	M				2160	4320		2160				M	54
55	M	VUV–A122		15	1350		1830	480	20		RECEPT. ROOFTOP	R	56
57	M	CU–A122		30	2160	2856		696	15		CP–118A	M	58
59	M				2160		2856	696	15		CP–118B	M	60
61	R	RECEPT. ROOFTOP		20	540	1236		696	15		CP–136A	M	62
63	M	CP–102A		15	696		1392	696	15		CP–136B	M	64
65	M	CP–102B		15	696	1392		696	15		CP–144A	M	66
67	C	HEAT TRACE RTU 1	GFEP	20	500		1196	696	15		CP–144B	M	68
69	C	HEAT TRACE RTU 3	GFEP	20	500	500			20		SPARE		70
71		SPARE		20					20		SPARE		72
						48260 ØA	42503 ØC						

PANELBOARD INFORMATION
VOLTAGE: 120/240–1Ø
BUS AMPACITY: 400A
MAIN TYPE: MLO
MINIMUM A.I.C.: 22,000
MOUNTING: FLUSH

____ FEED–THROUGH LUGS
____ DOUBLE LUGS
____ INTEGRAL SPD

PANELBOARD LOCATION
CORRIDOR A119

BRANCH CIRCUIT CONNECTED LOAD:		DEMAND FACTOR	CALCULATED LOAD	FEEDER AND OCPD SIZING	
CONTINUOUS LOAD (C):	1500	100%	1500	125%	1875
ELECTRIC HEAT (E)	1920	100%	1920	100%	1920
NON–CONTINUOUS LOAD (NC):	6165	100%	6165	100%	6165
KITCHEN LOAD (K):		100%		100%	
RECEPTACLE BASE LOAD (R):	10000	100%	10000	100%	10000
RECEPTACLE DEMAND LOAD (R):	18980	50%	9490	100%	9490
LIGHTING LOAD (L):	22500	100%	22500	125%	28125
ADDITIONAL TRACK LIGHTING LOAD				100%	
MOTORS, HIGHEST LOAD (MH):	4320	125%	5400	100%	5400
MOTORS, REMAINING LOAD (M):	29698	100%	29698	100%	29698
		TOTAL(KVA):	86.67		
		TOTAL (AMPS):	361	TOTAL (AMPS):	386

NOTE: DEMAND AND SIZING INFORMATION IS CALCULATED FROM CONNECTED LOAD

NOTES:

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DATE	ISSUED FOR
11/20/24	DD
12/06/24	50% CD
01/17/25	BID SET

PIC: WEK
PM: WEK
DRAFTS: NCJ

PROJECT NO: 22.516ES

SHEET TITLE: ONE LINE DIAGRAM - NEW WORK

SHEET NO: E502

STATE OF MICHIGAN
MYRON SCOTT GIBBS
ENGINEER
No. 6201061469
REGISTERED PROFESSIONAL ENGINEER