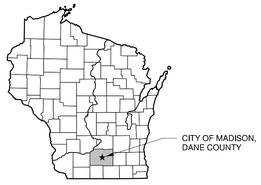
CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703
EXHIBIT "A"

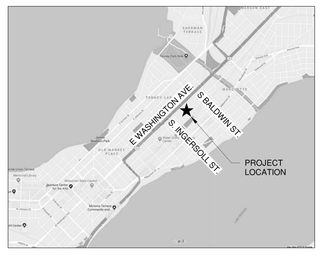
CONTRACT No.: 8462
PROJECT No.: 11229
MUNIS No.: 11229-85-140-114403
M&H PROJECT No.: 4503500-170148.07

STATE MAP:



STATE OF WISCONSIN

VICINITY MAP:



PUBLIC WORKS IMPROVEMENT PROJECT **APPROVED BY THE COMMON COUNCIL OF MADISON, WISCONSIN** **RES: 19-00708** **FILE ID: 57551** **DATE: October 19, 2019**	**PUBLIC IMPROVEMENT DESIGN** **APPROVED BY:** **CITY ENGINEER** October 28, 2019 **DATE**

WISCONSIN — RICHARD K. LUNDEEN — A-5672 — SHEBOYGAN — ARCHITECT — 11/7/19

WISCONSIN — DAVID K. COCKRUM — E-37725 — MILWAUKEE — PROFESSIONAL ENGINEER — 11/7/19

WISCONSIN — DANIEL J. GREEN — E-33526 — MADISON — PROFESSIONAL ENGINEER — DW 23 11/7/2019

WISCONSIN — MARK A. MLADENOFF — D-1960-E — MACHESNEY PARK ILLINOIS — PROFESSIONAL ENGINEER — 11/07/19

SHEET INDEX

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metro transit

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT
1101 EAST WASHINGTON AVE.
MADISON, WI 53703

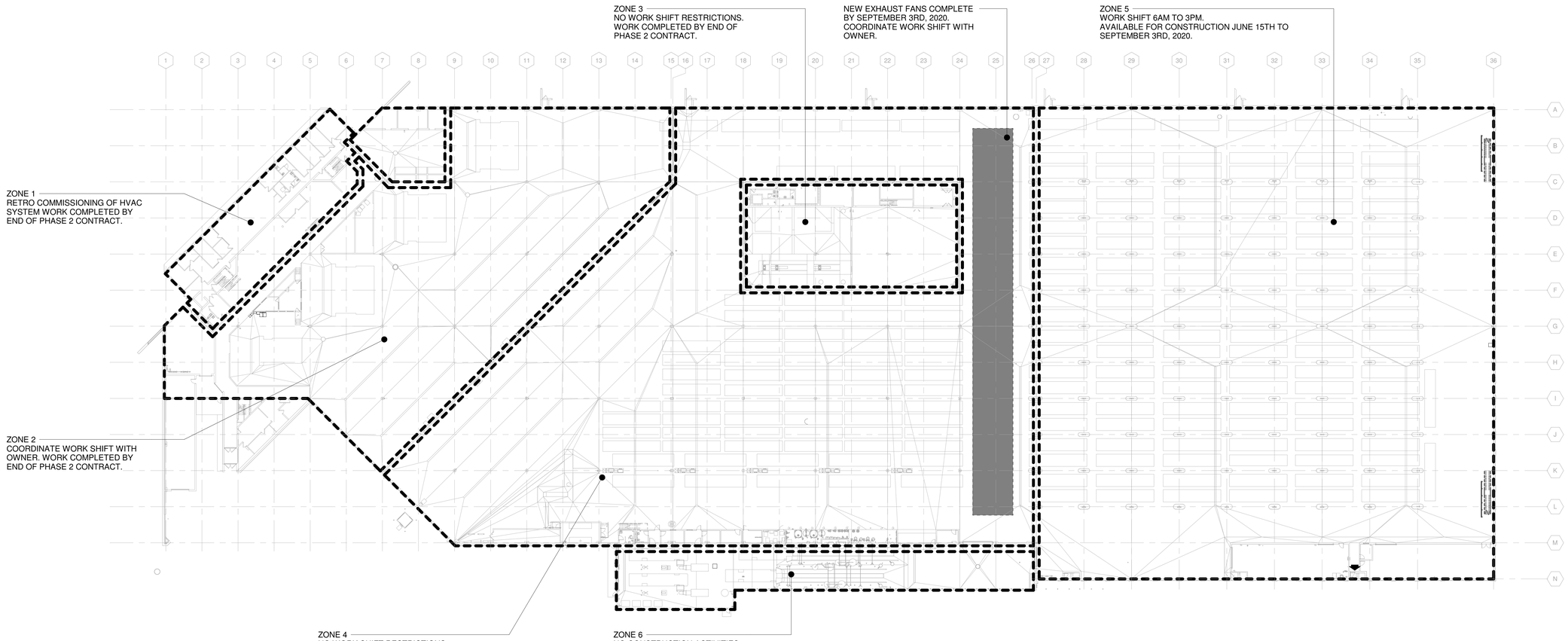
ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
COVER SHEET

SHEET NO.:
G-001

10/30/2019 7:17:47 AM C:\Revit Local\4503500-170148.07-G-Anno-Central-2018_mark.brailhwaite.rvt



TRUE NORTH PLAN NORTH

1 FIRST FLOOR CONSTRUCTION SEQUENCING PLAN

1/32" = 1'-0"

CONSTRUCTION SEQUENCING PLAN GENERAL NOTES:

1. THE ZONE LABELS OF #1 THRU #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

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SHEET CONTENTS
FIRST FLOOR CONSTRUCTION SEQUENCING PLAN

SHEET NO.:
G-101

STRUCTURAL DESIGN CRITERIA

1. GOVERNING CODE: WISCONSIN COMMERCIAL BUILDING CODE SPS 361-366 2015 INTERNATIONAL BUILDING CODE
2. RISK CATEGORY: II
3. FLOOR LIVE LOAD (1603.1.1)

   MECHANICAL MEZZANINE CATWALK AND STAIRS: 40 PSF UNIFORM
4. ROOF LIVE LOAD (1603.1.2) N/A
5. ROOF SNOW LOAD (1603.1.3)

   GROUND SNOW LOAD: P_G = 30 PSF
   FLAT-ROOF SNOW LOAD: P_F = 23 PSF
   SNOW EXPOSURE FACTOR: C_E = 1.1
   SNOW LOAD IMPORTANCE FACTOR: I_S = 1
   THERMAL FACTOR: C_T = 1
6. WIND DESIGN DATA (1603.1.4)

   ULTIMATE WIND SPEED (3-SECOND GUST): V_{ULT} = 115 MPH
   NOMINAL WIND SPEED (3-SECOND GUST) V_{ASD} = 90 MPH
   WIND EXPOSURE: C
   INTERNAL PRESSURE COEFFICIENT: GCPI = +/- 0.15
7. EARTHQUAKE DESIGN DATA (1603.1.5)

   IMPORTANCE FACTOR: I_E = 1

   MAPPED, MCE, 5% DAMPED, SPECTRAL ACCELERATIONS:
   AT SHORT PERIODS: S_S = 0.08 G
   AT A PERIOD OF 1 SECOND: S_1 = 0.05 G

   SITE CLASS: D

   DESIGN EARTHQUAKE SPECTRAL ACCELERATIONS
   AT SHORT PERIODS: S_{DS} = 0.09 G
   AT A PERIOD OF 1 SECOND: S_{D1} = .073 G

   SEISMIC DESIGN CATEGORY: SDC = B
8. GEOTECHNICAL DESIGN DATA (1603.1.6) N/A
9. FLOOD DESIGN DATA (1603.1.7)

   BUILDING IS NOT LOCATED IN FLOOD HAZARD AREA; THEREFORE FLOOD DESIGN DATA IS NOT REQUIRED
10. SPECIAL LOADS (1603.1.8)

    LOADING FOR FUTURE PHOTOVOLTAIC PANELS 4PSF

GENERAL NOTES

G-1. FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO START OF CONSTRUCTION - RESOLVE ANY DISCREPANCY WITH ARCHITECT/ENGINEER.

G-2. NOT USED

G-3. VERIFY ALL SIZES, WEIGHTS AND LOCATIONS OF MECHANICAL AND ELECTRICAL EQUIPMENT, ROOF PENETRATIONS, DUCTS, ETC. WITH MECHANICAL AND ELECTRICAL CONTRACTORS AND FIELD CONDITIONS.

G-4. DETAILS MARKED "TYPICAL" MAY OR MAY NOT BE CUT ON PLANS, BUT SHALL APPLY UNLESS NOTED OTHERWISE.

G-5. STRUCTURAL SYSTEM IS DESIGNED TO WORK AS A COMPLETED SYSTEM, ANY SHORING OR BRACING NECESSARY DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.

G-6. NOT USED

G-7. **DO NOT SCALE DRAWINGS!!!!** ALL TRADES SHALL PASS THROUGH STRUCTURAL MEMBERS WITHOUT APPROVAL OF THE STRUCTURAL ENGINEER.

G-8. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL SITE SAFETY AND ALL ACCIDENTS WHICH RESULT IN DEATH, PERSONAL INJURY, OR DAMAGE TO PROPERTY ARISING OUT OF OR IN CONNECTION WITH THE PERFORMANCE OF THE WORK.

G-9. NOT USED

G-10. SECTIONS, DETAILS, AND NOTES SHOWN ON THE DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR CONDITIONS ELSEWHERE, UNLESS OTHERWISE SHOWN.

STEEL BAR JOISTS

MATERIAL PROPERTIES (U.N.O)
COMPLY WITH SJI'S "SPECIFICATIONS" FOR WEB AND STEEL-ANGLE CHORD MEMBERS.

J-1. BAR JOISTS SHALL BE DESIGNED TO RESIST FORCES INDICATED ON DRAWINGS AND SPECIFICATIONS.

J-2. TYPICAL BAR JOISTS ARE NOT DESIGNED FOR CONCENTRATED LOADS. PLACE LOADS AT PANEL POINTS OR WELD ADDITIONAL DOUBLE ANGLE MEMBERS ONE EACH SIDE FROM POINT OF CONCENTRATED LOAD TO THE NEAREST PANEL POINT ON THE OPPOSITE CHORD.

J-3. ALL FIELD MODIFICATIONS OR REPAIRS TO THE JOIST, OR JOIST GIRDERS, SHALL BE APPROVED BY THE JOIST MANUFACTURER IN WRITING. THIS LETTER SHALL BE FORWARDED TO THE ENGINEER FOR REVIEW.

J-4. CUTTING & DRILLING OF CHORD OR WEB MEMBERS IN BAR JOISTS, OR JOIST GIRDERS, IS NOT PERMITTED.

J-5. ALL BRIDGING SHALL BE EQUALLY SPACED, UNLESS NOTED OTHERWISE, BY JOIST MANUFACTURER.

J-6. CONTRACTOR(S) SHALL PROVIDE MEANS FOR ADEQUATE DISTRIBUTION OF CONSTRUCTION LOADS SO THAT CARRYING CAPACITY OF ANY BAR JOIST, JOIST GIRDER, OR OTHER STRUCTURAL MEMBER IS NOT EXCEEDED.

J-7. JOIST SHALL BE CONSIDERED AS UNSTABLE DURING ERECTION. UNDER NO CIRCUMSTANCES ARE CONSTRUCTION LOADS OF ANY DESCRIPTION TO BE PLACED ON UNBRIDGED JOISTS. THE APPLICATION OF CONSTRUCTION LOADS ON UNBRIDGED JOISTS IS IN DIRECT VIOLATION OF O.S.H.A. REGULATIONS.

J-8. WHERE X-BRIDGING INTERFERES WITH MECHANICAL PIPING OR DUCTWORK, UTILIZE HORIZONTAL BRIDGING AS DIRECTED BY JOIST MANUFACTURER.

J-9. ALL BRIDGING SHALL BE PER SJI AND AS REQUIRED FOR DESIGN LOADS.

J-10. PROVIDE JOIST WITH UPLIFT CAPACITY AS REQUIRED BY THE BUILDING CODE AND THE STRUCTURAL DESIGN CRITERIA.

J-11. NEW OR ADDED JOIST WITH SJI DESIGNATIONS HAVE BEEN SIZED FOR ALL LOADS, INCLUDING SNOW DRIFT AND MECHANICAL EQUIPMENT.

J-12. NEW JOIST SHALL HAVE MINIMUM SHEAR CAPACITY THROUGHOUT ENTIRE LENGTH EQUAL TO HALF OF ENTIRE LOAD ON JOIST.

J-13. RETROFIT JOIST SHALL HAVE JOIST SEAT DEPTH MAX 2" AND 1/2" SHIM PACK SO AS TO BE ABLE TO BE INSERTED IN EXISTING 2 1/2" JOIST SEAT SPACE AND SHIMMED SNUG.

STRUCTURAL STEEL NOTES

MATERIAL PROPERTIES (U.N.O.)
W-SHAPES - Fy = 50 KSI (A992 OR A572 Gr 50)
C-SHAPES & ANGLES - Fy = 36 KSI (A36)
PLATES & BARS - Fy = 36 KSI (A36)
RECTANGULAR HSS - Fy = 46 KSI (A500 Gr B)
ROUND HSS - Fy = 42 KSI (A500 Gr B)
PIPE - Fy = 35 KSI (A53 Gr B)
ROUNDS - Fy = 36 KSI (A36)

S-1. STEEL BEAMS WITH RESIDUAL CAMBER RESULTING FROM MILL FABRICATION OR ROLLING SHALL BE SHOP FABRICATED AND ERECTED SUCH THAT THIS RESIDUAL CAMBER COUNTERACTS GRAVITY LOAD DEFLECTION.

S-2. U.N.O., ALL BOLTED CONNECTIONS SHALL UTILIZE 3/4 INCH DIAMETER A325 BOLTS TIGHTENED TO THE SNUG-TIGHT CONDITION. THE SNUG-TIGHT CONDITION IS DEFINED BY THE RCSC'S "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS:".

S-3. NOT USED

S-4. NOT USED

S-5. NOT USED

S-6. NOT USED

S-7. ALL WELDING OF NEW STEEL IS TO BE WITH E70XX ELECTRODES, U.N.O. WELDING SHALL BE IN ACCORDANCE WITH THE LATEST AWS SPECIFICATIONS BY CERTIFIED WELDERS.

S-8. WHEN FIELD WELDING TO EXISTING STEEL, ADJUST WELDING PROCEDURES AS REQUIRED TO BE COMPATIBLE WITH THE NEW AND EXISTING STEEL.

S-9. STEEL CONNECTIONS NOT DETAILED ON THE PLANS ARE TO BE THE FABRICATOR'S STANDARD AND ARE TO BE SELECTED AND DESIGNED IN ACCORDANCE WITH AISC ASD SPECIFICATIONS,

S-10. UNLESS NOTED OTHERWISE, THE MINIMUM CONNECTION PLATE/ANGLE THICKNESS SHALL BE 5/16", THE MINIMUM WELD 1/4", AND THE MINIMUM DESIGN LOAD ON ANY CONNECTION 10 KIPS STRENGTH LEVEL.

S-11. NOT USED

S-12. THE CONTRACTOR SHALL FURNISH AND INSTALL MISCELLANEOUS STEEL (CURBS, HANGERS, BRACING, ETC.) AS INDICATED AND AS NECESSARY PER ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS.

S-13. ALL EXTERIOR STEEL IS HOT DIPPED GALVANIZED ACCORDING TO ASTM A123.

S-14. ALL WELDS MAY BE REQUIRED TO BE FIELD WELDS TO ALLOW FIT UP TO EXISTING STRUCTURE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE CONSTRUCTABILITY, PROVIDE AS MUCH SHOP WELDING AS POSSIBLE AND PROVIDE FIELD WELDING OF ANY AND ALL WELDING THAT IS NEEDED IN THE FIELD TO COMPLETE PROJECT.

OBSERVATION AND INSPECTION

TI-1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PERFORM ALL STRUCTURAL WORK IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY STRUCTURAL INSPECTION PROVIDED BY OTHERS DOES NOT RELIEVE THE CONTRACTOR OF THIS RESPONSIBILITY. ANY STRUCTURAL DEVIATIONS FROM THE CONTRACT DOCUMENTS THAT ARE FOUND AT A LATER DATE AND ARE DECLARED TO BE SIGNIFICANT BY THE STRUCTURAL ENGINEER SHALL BE CORRECTED BY THE CONTRACTOR WITHOUT COST OR ANY DELAY TO THE PROJECT SCHEDULE.

TI-2. THE CONTRACTOR SHALL PROVIDE AN ALLOWANCE PER THE FRONT END DOCUMENTS FOR THE OWNER TO RETAIN AN INDEPENDENT INSPECTION AGENCY TO PROVIDE CONSTRUCTION OBSERVATIONS AND INSPECTIONS.

TI-3. THE CONTRACTOR SHALL PROVIDE THE INSPECTION AGENCY ACCESS TO ALL PLACES WHERE THE WORK IS BEING PERFORMED. A MINIMUM OF 24 HOURS NOTIFICATION SHALL BE GIVEN TO THE INSPECTION AGENCY PRIOR TO THE COMMENCEMENT OF WORK REQUIRING OBSERVATION OR INSPECTION.

TI-4. THE INSPECTION AGENCY IS NOT AUTHORIZED TO DIRECT OR APPROVE ANY CHANGES FROM THE CONTRACT DOCUMENTS. IF THE CONTRACTOR WISHES TO QUESTION THE TESTING AGENCY'S INTERPRETATION OF THE CONTRACT DOCUMENTS, HE MAY DO SO DIRECTLY WITH THE ARCHITECT OR STRUCTURAL ENGINEER.

TI-5. THE TESTING AGENCY IS NOT AUTHORIZED TO STOP OR DELAY THE WORK. IF THE CONTRACTOR ELECTS TO CONTINUE WITH A CERTAIN PORTION OF WORK AFTER BEING NOTIFIED BY THE TESTING AGENCY THAT SUCH WORK IS NOT IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS, THE CONTRACTOR DOES SO AT THEIR OWN RISK AND MAY BE REQUIRED TO CORRECT THE WORK AT A LATER DATE.

TI-6. THE INSPECTING AGENCY IS NOT INSPECTING FOR O.S.H.A. COMPLIANCE OR REQUIRED TO INSPECT TEMPORARY CONSTRUCTION, SUCH AS TEMPORARY BRACING. TEMPORARY CONSTRUCTION IS THE CONTRACTOR'S SOLE RESPONSIBILITY.

TI-7. THE CONTRACTOR SHALL NOTIFY THE INSPECTION AGENCY OF ANY WELDS THAT WERE DONE IN THE FIELD THAT WERE NOT DETAILED AS FIELD WELDS ON THE DESIGN DRAWINGS.

TI-8. INSPECTION AGENCY SHALL:
A. OBSERVE SHORING AND REMOVAL OF BALLAST BEFORE REINFORCING
B. OBSERVE ABSENCE OF SNOW DURING REINFORCING
C. VISUALLY OBSERVE ALL FIELD WELDS
D. CLOSELY INSPECT ANY NONCONFORMING WELDS
E. IMMEDIATELY NOTIFY THE CONTRACTOR OF NONCONFORMING WORK.
F. ISSUE BI-WEEKLY PROGRESS REPORTS
G. OBSERVE INSTALLATION, REINSTALLATION OF JOIST BRIDGING AND BRACING.
H. OBSERVE NEW JOIST TOP CHORD CONNECTION TO ROOF DECK
I. OBSERVE NO WELD HSS4X4 TO HSS4X4 ON DETAILS 11, 21 / S-543 UNTIL AFTER MAU-6 PLACED.

TI-9. WELD INSPECTION SHALL BE PERFORMED BY AN AWS CERTIFIED WELD INSPECTOR.

TI-10. STRUCTURAL OBSERVATIONS SHALL BE PERFORMED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF WISCONSIN.

TI-12. PROGRESS REPORTS SHALL INCLUDE DOCUMENTATION OF ALL OBSERVATION AND INSPECTIONS AND NONCONFORMANCES. PROGRESS REPORTS SHALL BE SEALED AND SIGNED BY A PROFESIONAL ENGINEER.

TI-13. CONTRACTOR SHALL CORRECT ALL NONCONFORMANCES AT CONTRACTOR'S EXPENSE. CONTRACTOR SHALL NOT APPLY COST OF CORRECTIONS TO ALLOWANCE.

TI-14. CONTRACTOR SHALL PROVIDE REINSPECTION OF ALL NONCONFORMANCES AT CONTRACTOR'S EXPENSE. CONTRACTOR SHALL NOT APPLY COST OF REINSPECTION TO ALLOWANCE.

TI-15. NOT USED

TI-16. OBSERVATION OF FIELD WELDS SHALL INCLUDE PLACEMENT, TYPE, SIZE, FUSION, POROSITY, CRACKING, UNDERCUT, SPATTER AND SMOOTHNESS FOLLOWING AWS D1.1.

CONCRETE & REINFORCING STEEL NOTES

CR-1. NOT USED

CR-2. ALL BAR LAPS SHALL CONFORM TO ACI 318 CLASS "B" SPLICE CRITERIA. USE TOP BAR LAP LENGTHS FOR TOP BARS IN SLABS AND BEAMS OVER 14" DEEP. MINIMUM BAR LAPS AS FOLLOWS U.N.O.:

#3 = 1'-4" #4 = 1'-4" #5 = 1'-10" #6 = 2'-7" #7 = 4'-2"
#8 = 5'-2" #9 = 6'-4" #10 = 7'-8" #11 = 9'-0"

FOR EPOXY COATED BARS, PROVIDE 1.5 TIMES THE INDICATED LAP LENGTH. FOR TOP BARS PROVIDE 1.3 TIMES THE INDICATED LAP LENGTH.

CR-3. LAP LENGTH SHALL BE SPECIFICALLY NOTED ON SHOP DRAWINGS WHERE MORE THAN ONE BAR MAKES UP A CONTINUOUS STRING.

CR-4. HORIZONTAL BARS SHALL BE DETAILED TO SHOW THE DISTANCE FROM AT LEAST ONE END OF THE BAR TO THE NEAREST BUILDING GRID LINE OR WALL.

CR-5. REINFORCING SHALL BE DETAILED IN ACCORDANCE WITH ACI 315.

CR-6. ALL REINFORCEMENT BARS SHALL BE FABRICATED IN ACCORDANCE WITH THE LATEST CRSI MANUAL OF STANDARD PRACTICE AND SHALL BE CLEAN AND FREE OF GREASE AND SCALING RUST.

CR-7. CONTINUOUS TOP AND BOTTOM BARS, WHEN SHOWN IN TRANSVERSE SECTION ONLY, SHALL BE LAPPED AS FOLLOWS:

TOP BARS NEAR MID-SPANS; BOTTOM BARS DIRECTLY OVER SUPPORTS, U.N.O.

CR-8. WATER STOPS SHALL BE PROVIDED IN HORIZONTAL AND VERTICAL CONSTRUCTION JOINTS WHERE FINISHED FLOOR IS BELOW EXTERIOR GRADE UNLESS OMISSION IS APPROVED BY THE ENGINEER.

CR-9. HOOK HORIZONTAL WALL AND BEAM REINFORCING BARS AT DISCONTINUOUS ENDS, TYPICAL U.N.O. EXTEND REINFORCEMENT TO FAR FACE OF PIERS/PEDESTALS AND/OR COLUMNS U.N.O.

CR-10. PROVIDE HOT/COLD WEATHER PROCEDURES AND PROTECTION IN ACCORDANCE WITH ACI RECOMMENDATIONS AND PROJECT SPECIFICATIONS.

CR-11. CONCRETE REINFORCEMENT PROTECTION/CLEAR COVER, U.N.O.:

FOOTINGS:
BOTTOM & SIDES 3"
TOP 2"

WALLS:
EXTERIOR EXPOSURE 2"
INTERIOR EXPOSURE 1"

BEAMS/COLUMNS:
OVER TIES OR STIRRUPS 1 1/2"

ELEVATED SLABS: 1"

CR-12. PROVIDE ADDITIONAL #4 BARS AT 4'-0" LONG 1" BELOW TOP OF SLAB AT 45° TO ALL REENTRANT CORNERS,OPENINGS IN CONCRETE SLABS AND AS INDICATED ON DRAWINGS.

CR-13. ALL CONCRETE FOUNDATION WALLS SHALL HAVE A MINIMUM OF (2) #5 BARS CONTINUOUS TOP AND BOTTOM, UNLESS NOTED OR DETAILED OTHERWISE.

CR-14. NOT USED

CR-15. ALL CONCRETE DESIGN AND CONSTRUCTION SHALL CONFORM WITH THE LOCAL BUILDING CODE REQUIREMENTS AND THOSE OF THE FOLLOWING STANDARDS (LATEST EDITION):

"ACI 318, BUILDING CODE REQUIREMENTS FOR REINFORCED CONC."
"ACI 315, DETAILS AND DETAILING OF CONCRETE REINFORCEMENT"
"ACI 301, SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BLDGS."
"ACI 307, RECOMMENDED PRACTICE FOR CONCRETE FORM WORK"

CR-16. SEE SECTION 033000 OF SPECIFICATIONS FOR INFORMATION REGARDING CONCRETE MIX DESIGN, TESTING, MATERIALS, AND ADMIXTURES.

CR-17. ALUMINUM CONDUIT IS NOT PERMITTED TO BE EMBEDDED IN CONCRETE.

CR-18. REFER TO FLATWORK DRAWINGS AND/OR SPECIFICATIONS FOR SLAB-ON-GRADE FINISH TYPES AND DEPRESSIONS REQUIRED FOR MATS, TILE, AND OTHER FINISH MATERIALS.

CR-19. NOT USED.

CR-20. NOT USED

CR-21. NOT USED

CR-22. NOT USED.

CR-23. PITCH CONCRETE TO FLOOR DRAINS. COORDINATE WITH PLUMBING AND ARCHITECTURAL DRAWINGS.

CR-24. U.N.O., PROVIDE CONTROL OR CONSTRUCTION JOINTS IN SLABS-ON-GRADE AT 15 FOOT MAXIMUM CENTERS EACH DIRECTION. CONTRACTOR SHALL SUBMIT PLANS OF JOINT LOCATIONS TO THE ARCHITECT/ENGINEER FOR APPROVAL PRIOR TO CASTING SLABS-ON GRADE. COORDINATE WITH ARCHITECTURAL DRAWINGS AND FLOOR FINISHES SUCH AS TILE AND TERRAZZO.

CR-25. ALL DOWELS INTO EXISTING CONCRETE OR SOLID MASONRY TO BE EPOXY ANCHORED WITH SIMPSON SET-3G. DRILL ALL HOLES WITH BOSCH DUST EXTRACTION VACUUM SYSTEM AND USE BLOW, BRUSH, BLOW HOLE CLEANING.

SHOP DRAWINGS

SD-1. SHOP DRAWINGS SHALL BE SUBMITTED FOR STRUCTURAL ITEMS AS REQUIRED BY THE SPECIFICATIONS. CONSTRUCTION DOCUMENTS SHALL NOT BE REPRODUCED FOR USE AS SHOP DRAWINGS.

SD-2. THE GENERAL CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS AND PRODUCT DATA FOR CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS PRIOR TO SUBMITTAL. REVIEWED SUBMITTALS SHALL BE STAMPED BY THE CONTRACTOR. ANY SHOP DRAWING OR PRODUCT DATA NOT REVIEWED AND STAMPED BY THE GENERAL CONTRACTOR WILL BE REJECTED. GENERAL CONTRACTOR SHALL CLOUD OR FLAG ALL ITEMS NOT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND SHALL VERIFY ALL DIMENSIONS.

SD-3. ANY CHANGES, SUBSTITUTIONS OR DEVIATIONS FROM THE ORIGINAL CONTRACT DRAWINGS SHALL BE CLOUDED BY THE MANUFACTURER OR FABRICATOR. ANY CHANGES, SUBSTITUTIONS, OR DEVIATIONS WHICH ARE CLOUDED OR FLAGGED BY SUBMITTING PARTIES SHALL NOT BE CONSIDERED APPROVED AFTER THE ENGINEER'S REVIEW, UNLESS SPECIFICALLY NOTED ACCORDINGLY BY THE ENGINEER.

SD-4. THE APPROVED SHOP DRAWINGS DO NOT REPLACE THE ORIGINAL CONTRACT DRAWINGS. ITEMS OMITTED OR SHOWN INCORRECTLY ARE NOT TO BE CONSIDERED CHANGES TO THE ORIGINAL CONTRACT DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ITEMS OMITTED OR SHOWN INCORRECTLY ARE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DRAWINGS.

SD-5. SHOP DRAWING REVIEW IS INTENDED ONLY FOR GENERAL CONFORMANCE TO THE DESIGN CONCEPT AND CONSTRUCTION DOCUMENTS.

SD-6. SHOP DRAWINGS WILL BE RETURNED FOR RESUBMITTAL IF MAJOR ERRORS ARE FOUND DURING REVIEW.

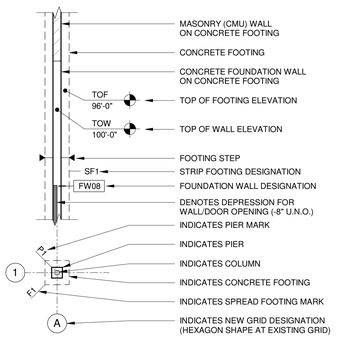
SD-7. ALLOW A MINIMUM OF (10) WORKING DAYS FOR REVIEW OF SHOP DRAWINGS BY THE STRUCTURAL ENGINEER.

ABBREVIATIONS

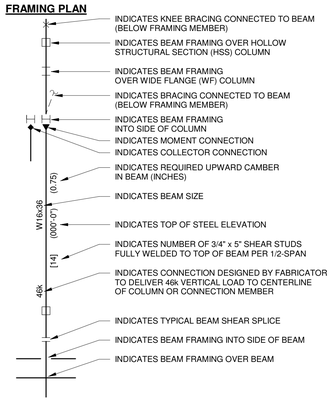
B.O.	= BOTTOM OF _____
BP#	= BASE PLATE TYPE
BRG	= BEARING
C TO C	= CENTER TO CENTER
CCJ	= CONSTRUCTION CONTROL JOINT
CJ	= CONTROL JOINT
CLSM	= CONTROLLED LOW STRENGTH MATERIAL ("FLOWABLE FILL")
CONT	= CONTINUOUS
DBLT	= DOUBLE-TEE
DIA	= DIAMETER
DTB	= DOUBLE-TEE BEARING
EF	= EACH FACE
EL	= ELEVATION
EW	= EACH WAY
F#	= SPREAD FOOTING TYPE
FDTN	= FOUNDATION
FV	= FIELD VERIFY
GALV	= GALVANIZED
HPC	= HIGH PERFORMANCE COATING
JB	= JOIST BEARING
LLH	= LONG LEG HORIZONTAL
LLV	= LONG LEG VERTICAL
NIC	= NOT IN CONTRACT
NS FS	= NEAR SIDE, FAR SIDE
NTS	= NOT TO SCALE
OC	= ON CENTER
P#	= PIER TYPE
PCB	= PRECAST BEARING (ELEVATION)
PRCST	= PRECAST
RTU	= ROOF TOP UNIT
Rxn	= REACTION
SF#	= STRIP FOOTING TYPE
SIM	= SIMILAR
SST	= STAINLESS STEEL
STL	= STEEL
T.O.	= TOP OF _____
TBD	= TO BE DETERMINED
TOC	= TOP OF COLUMN
TOF	= TOP OF FOOTING
TOL	= TOP OF LEDGE
TOP	= TOP OF PIER
TOS	= TOP OF STEEL
TOW	= TOP OF WALL
TPC	= TOP OF PRECAST
TSL	= TOP OF SLAB
TYP	= TYPICAL
UNO	= UNLESS NOTED OTHERWISE
WWF	= WELDED WIRE FABRIC/REINFORCEMENT

STRUCTURAL SYMBOLOGY

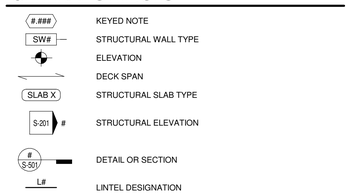
FOUNDATION PLAN



FRAMING PLAN



GENERAL SYMBOLS



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CITY OF MADISON WISCONSIN

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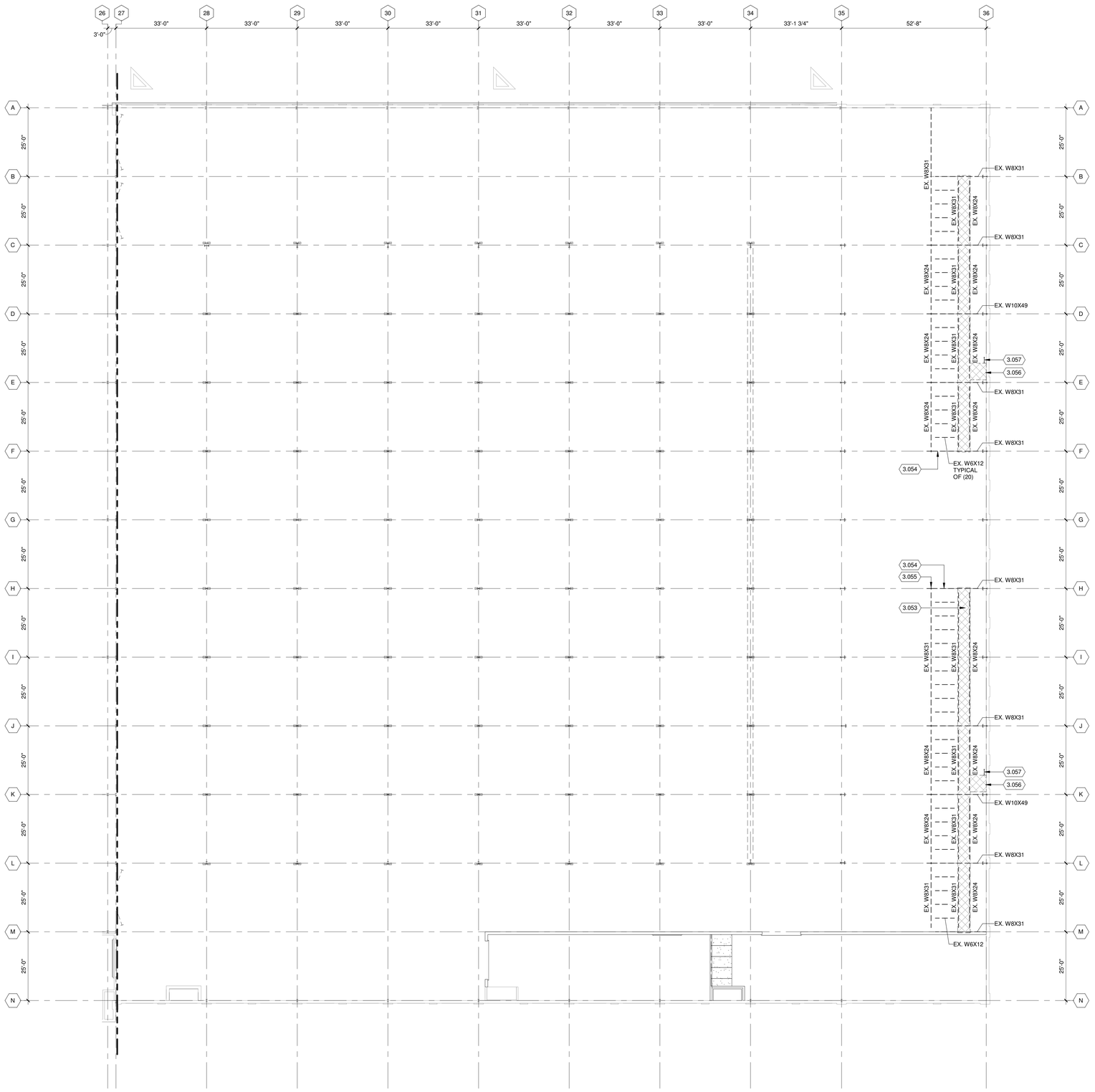
DESIGNED BY: DXC
DRAWN BY: MJE
CHECKED BY: -
DO NOT SCALE DRAWINGS

SHEET CONTENTS
STRUCTURAL NOTES

SHEET NO.:
S-001



TRUE NORTH PLAN NORTH

FRAMING DEMOLITION PLAN - ZONE 5

1/16" = 1'-0"

DEMOLITION PLAN GENERAL NOTES:

1. ELEVATION 100'-0" = FINISHED FLOOR +/- ON THE WEST END OF THE FACILITY. THE FLOOR SLOPES UP MOVING TO THE EAST. THE FINISHED FLOOR IS 102'-4" +/- AT THE EAST END OF THE FACILITY.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. COORDINATE ALL DEMOLITION WITH OVERALL PHASING OF PROJECT AND ON SITE CONDITIONS. BUILDING MUST REMAIN OPERATIONAL THROUGHOUT ENTIRE LENGTH OF DEMOLITION AND CONSTRUCTION.
5. DIMENSIONS WITH ± ARE APPROXIMATE DIMENSIONS TO BE FIELD VERIFIED PRIOR TO ANY DEMOLITION OF EXISTING BUILDING ELEMENTS.
6. DEMOLITION SHOWN IS FOR CONCEPT ONLY, CONTRACTOR SHALL BE RESPONSIBLE FOR ACTUAL DEMOLITION EXTENTS AS REQUIRED FOR REMOVAL OF EXISTING (INCLUDING BUT NOT LIMITED TO; SAWCUTING, CORE DRILLING, SLAB REMOVAL, STEEL DISASSEMBLY, ETC.) AND INSTALLATION OF NEW ELEMENTS.
7. SEE OTHER DISCIPLINES (ARCHITECTURAL, PLUMBING, ELECTRICAL, AND CIVIL) FOR OTHER ITEMS NOT SHOWN ON THIS PLAN THAT REQUIRE DEMOLITION.
8. FIELD MEASURE EXISTING OPENINGS. SIZE FRAMED ROOF OPENINGS TO SUPPORT ROOF DECK AT EDGE OF EXISTING OPENING. WHERE RTU HAS TWO HOLES CLOSE TOGETHER SIZE FRAMED ROOF OPENING TO SUPPORT DECK AROUND BOTH OPENINGS.
9. ALL BUILDING STEEL TO REMAIN, GRIND SMOOTH IN PREPARATION FOR PAINT COATING.
10. THE ZONE LABELS OF #1 THROUGH #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

KEYED NOTES

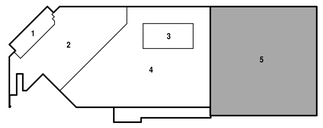
3.053 EXISTING BAR GRATING IS ATTACHED WITH SCREWS AND GRATING CLIPS. REMOVE BAR GRATING. STORE ON SITE FOR REUSE ON NEW MEZZANINE.

3.054 EXISTING FRAMING IS LARGELY FIELD WELDED IN PLACE. DEMOLISH AND REMOVE EXISTING MEZZANINE FRAMING IN ENTIRETY.

3.055 DEMOLISH AND REMOVE EXISTING L4X4X3/8 HANGAR - 12'-0" +/- LONG, TYP OF 8.

3.056 DEMOLISH AND REMOVE PLATFORM FRAMING.

3.057 DEMOLISH AND REMOVE STEEL LADDER.



KEY PLAN

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
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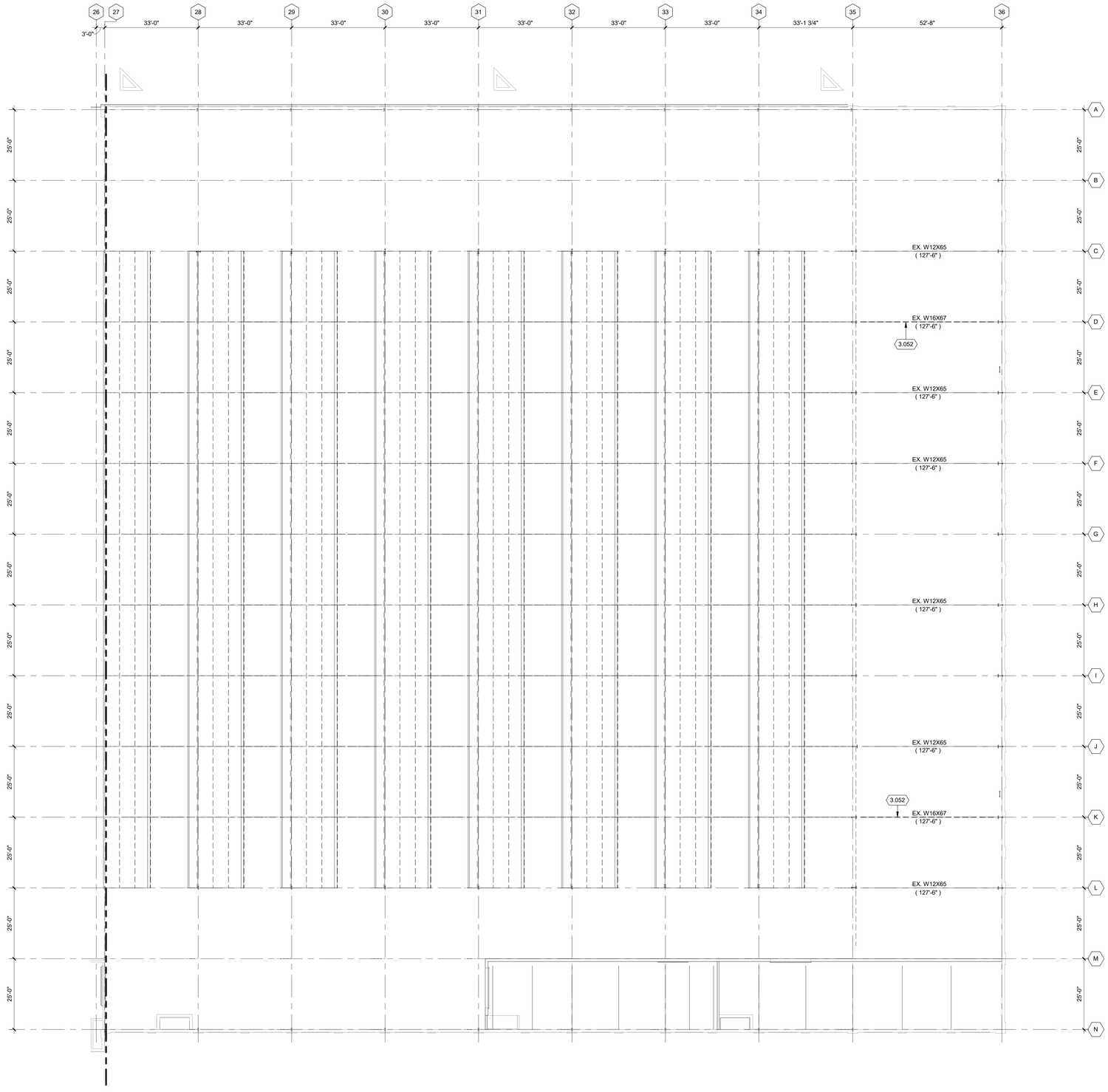
SHEET CONTENTS
HVAC MEZZANINE FRAMING DEMOLITION PLAN - ZONE 5

SHEET NO.:

SD142C



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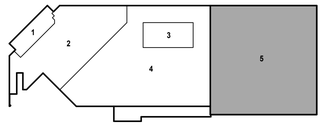
9. ALL BUILDING STEEL TO REMAIN, GRIND SMOOTH IN PREPARATION FOR PAINT COATING.
10. THE ZONE LABELS OF #1 THROUGH #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

KEYED NOTES

3.052 DEMOLISH AND REMOVE EXISTING STEEL BEAM.

TRUE NORTH PLAN NORTH

1 **FRAMING DEMOLITION PLAN - ZONE 5**
1/16" = 1'-0"



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CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

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SHEET CONTENTS
HVAC MEZZANINE FRAMING DEMOLITION PLAN - ZONE 5

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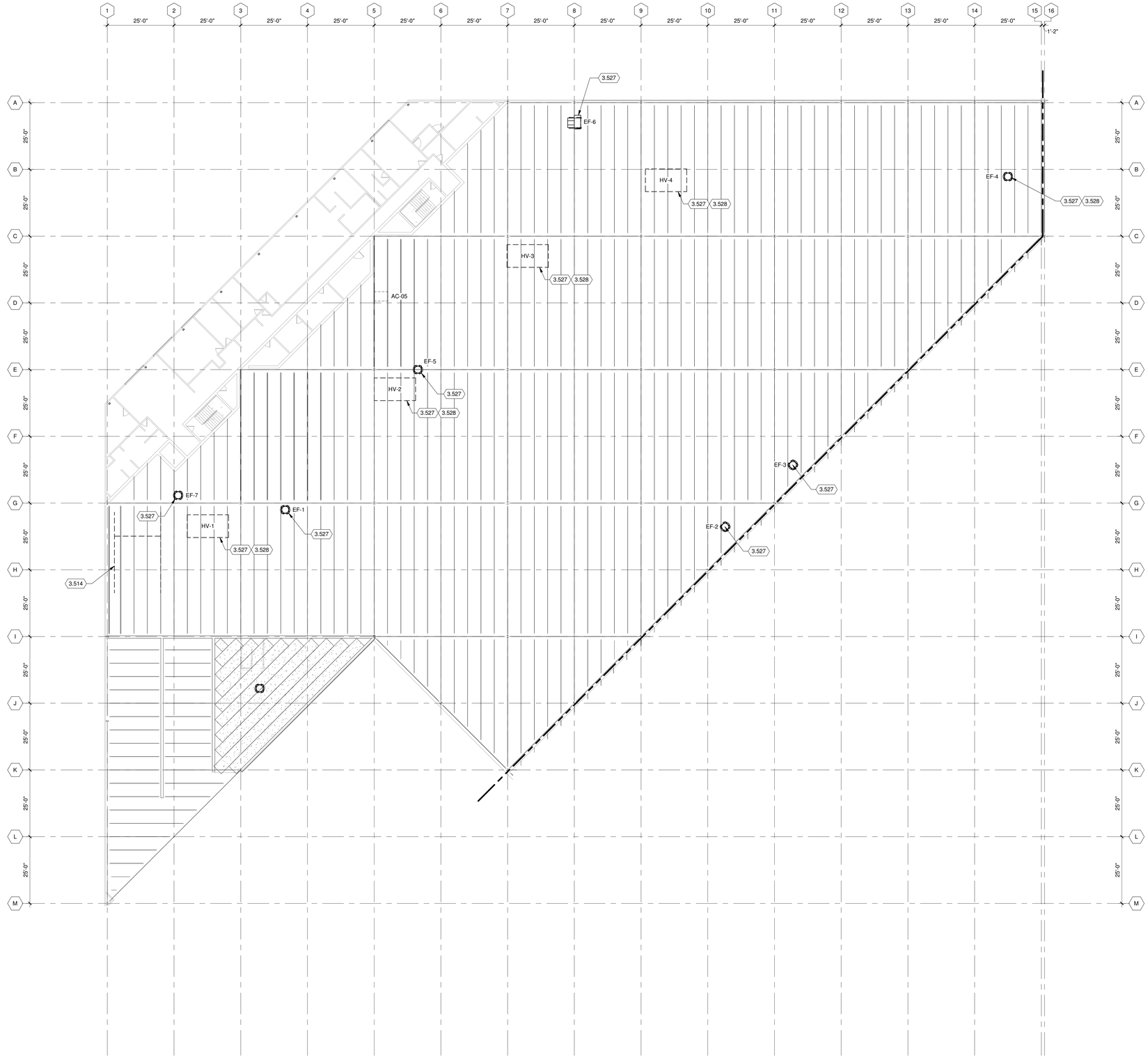

TRUE NORTH PLAN NORTH

1 ROOF FRAMING DEMOLITION PLAN - ZONES 1 & 2

1/16" = 1'-0"

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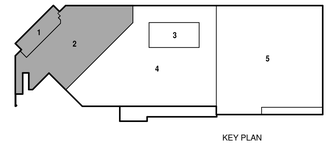
KEYED NOTES

3.514 TAKE DOWN BRIDGE CRANE AND GIVE IT TO OWNER. THIS INCLUDES HOIST, TROLLEY, BRIDGE RUNWAY BEAMS AND SUPPORTS.

3.527 PROVIDE AND INSTALL FRAMED ROOF OPENING PER 8/S-541.

3.528 PROVIDE AND INSTALL 20 GAUGE ROOF DECK OVER OPENING. MATCH EXISTING DECK PROFILE. FASTEN WITH #12 @ 12" ALL AROUND.



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METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

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SHEET CONTENTS
ROOF FRAMING DEMOLITION PLAN - ZONES 1 & 2

SHEET NO.:
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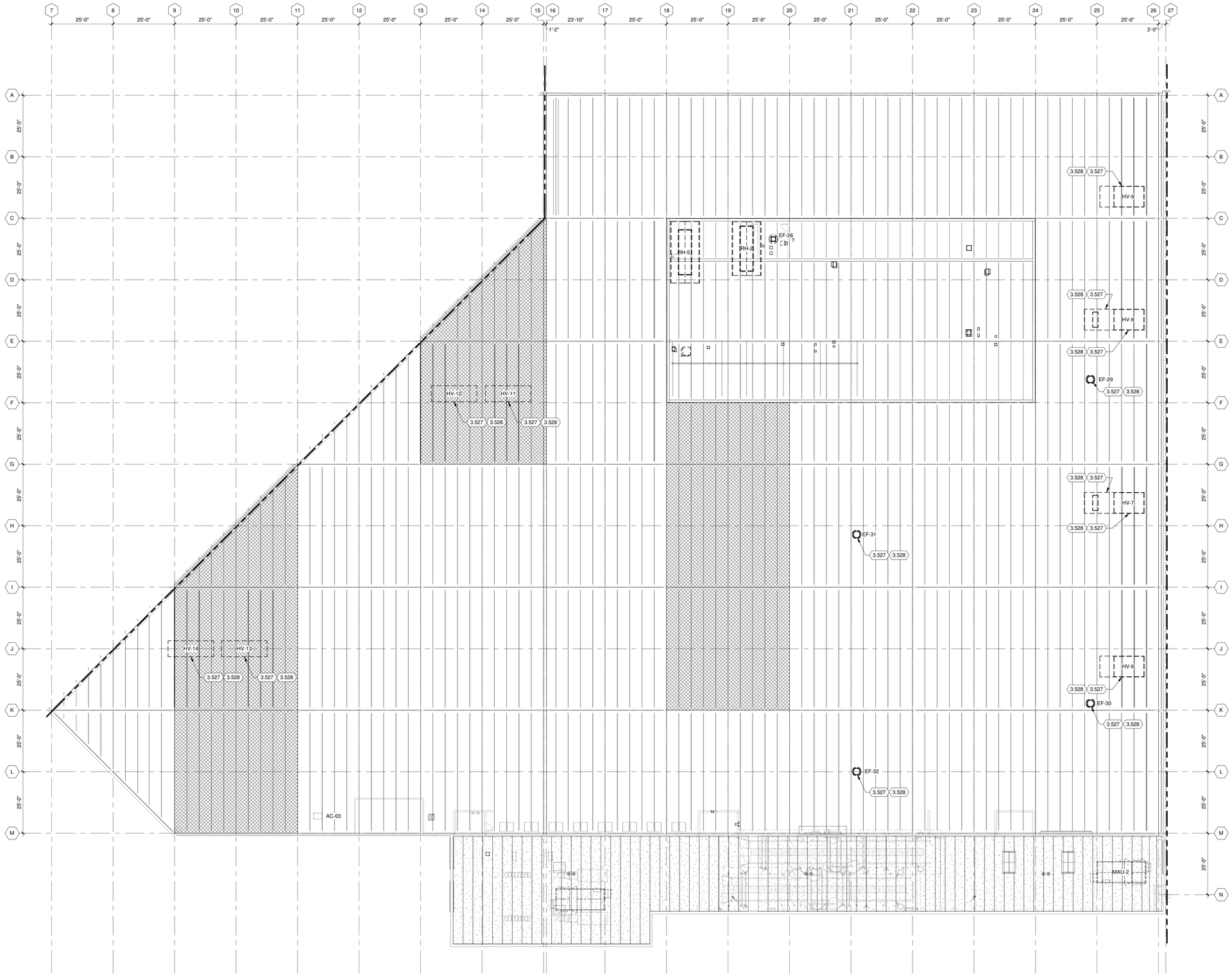

TRUE NORTH PLAN NORTH

1 **ROOF FRAMING PLAN - ZONES 3 & 4**

1/16" = 1'-0"

DEMOLITION PLAN GENERAL NOTES:

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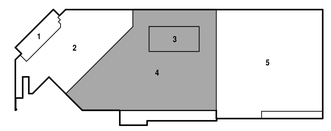
9. ALL BUILDING STEEL TO REMAIN, GRIND SMOOTH IN PREPARATION FOR PAINT COATING.
10. THE ZONE LABELS OF #1 THROUGH #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

KEYED NOTES

3.527 PROVIDE AND INSTALL FRAMED ROOF OPENING PER 8/S-541.

3.528 PROVIDE AND INSTALL 20 GAUGE ROOF DECK OVER OPENING. MATCH EXISTING DECK PROFILE. FASTEN WITH #12 @ 12" ALL AROUND.



KEY PLAN

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CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

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MADISON, WI 53703

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SHEET CONTENTS
ROOF FRAMING DEMOLITION PLAN - ZONES 3 & 4

SHEET NO.:

SD151B

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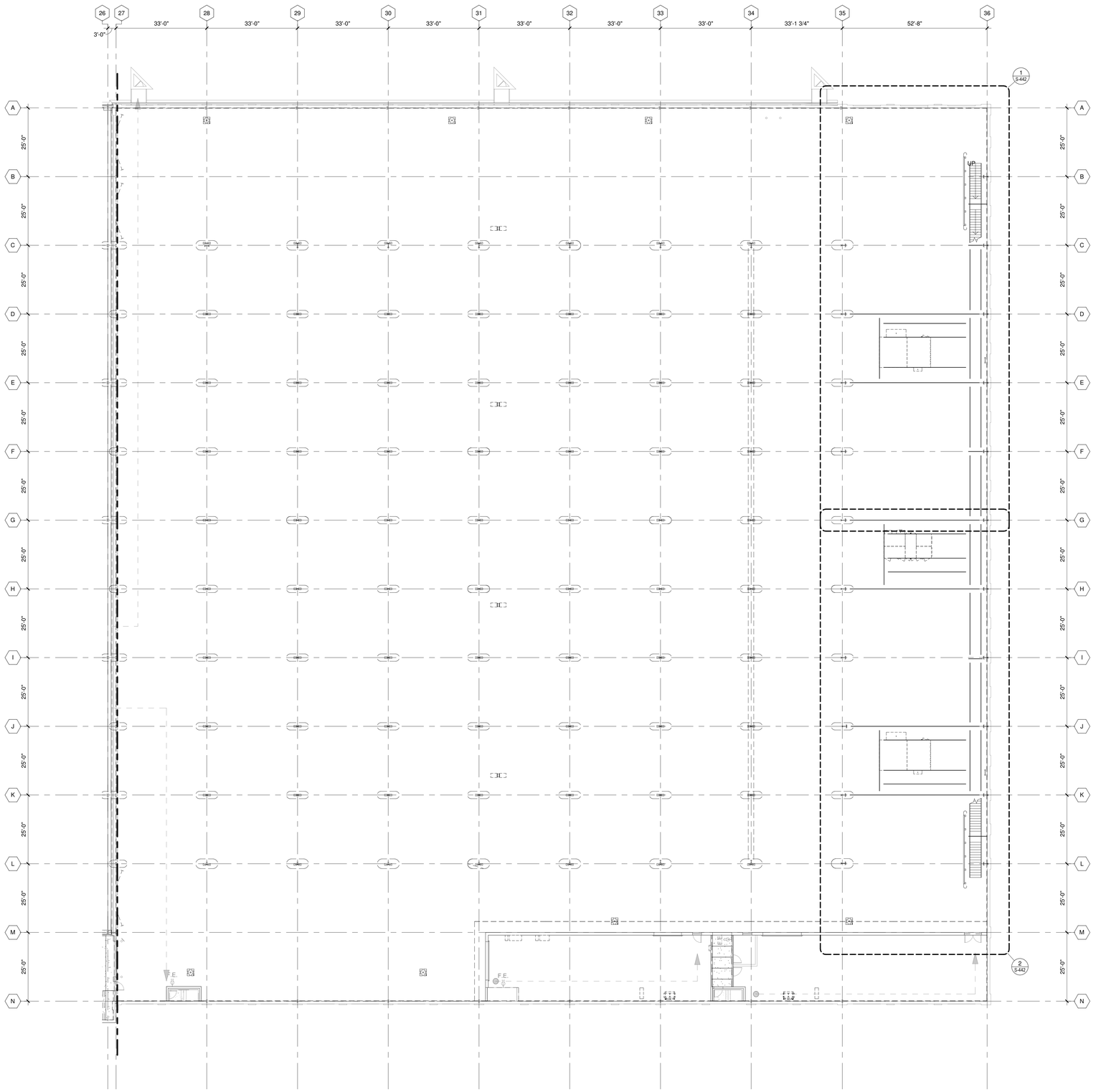

FRAMING PLAN GENERAL NOTES:

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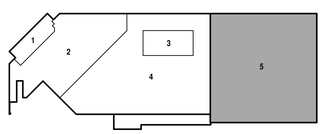
4. REFER TO SHEET S-541 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE;
   A. AT MASONRY WALLS
      - "K" SERIES - MIN. 4"
      - "KCS" SERIES - MIN. 4"
      - "LH" SERIES - MIN. 6"
      - "DLH" SERIES - MIN. 6"
   B. AT CONCRETE WALLS
      - "K" SERIES - MIN. 4"
      - "KCS" SERIES - MIN. 4"
      - "LH" SERIES - MIN. 6"
      - "DLH" SERIES - MIN. 6"
   C. AT STEEL BEAMS
      - "K" SERIES - MIN. 2 1/2"
      - "KCS" SERIES - MIN. 2 1/2"
      - "LH" SERIES - MIN. 4"
      - "DLH" SERIES - MIN. 4"
6. REUSE SALVAGED BAR GRATING ON SPANS OF 4'-0" OR LESS. FOR REMAINING AREAS TO BE FILLED WITH BAR GRATING MEET THE FOLLOWING: 3/16 X 1 BEARING BAR, SPACED AT 15/16" OC.
7. VERIFY STEEL LAYOUT AND FIT UP WITH MAU8 MAU9 AND ERV5.
8. THE ZONE LABELS OF #1 THROUGH #5 DEPICT AREAS OF WORK ACTWITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.
9. STAIRS PER SPECIFICATION 055113.
10. HANDRAIL PER SPECIFICATION 055213.

KEYED NOTES

TRUE NORTH PLAN NORTH

1 HVAC MEZZANINE FRAMING PLAN - ZONE 5

1/16" = 1'-0"



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CITY OF MADISON WISCONSIN

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SHEET CONTENTS
HVAC MEZZANINE FRAMING PLAN - ZONE 5

SHEET NO.:

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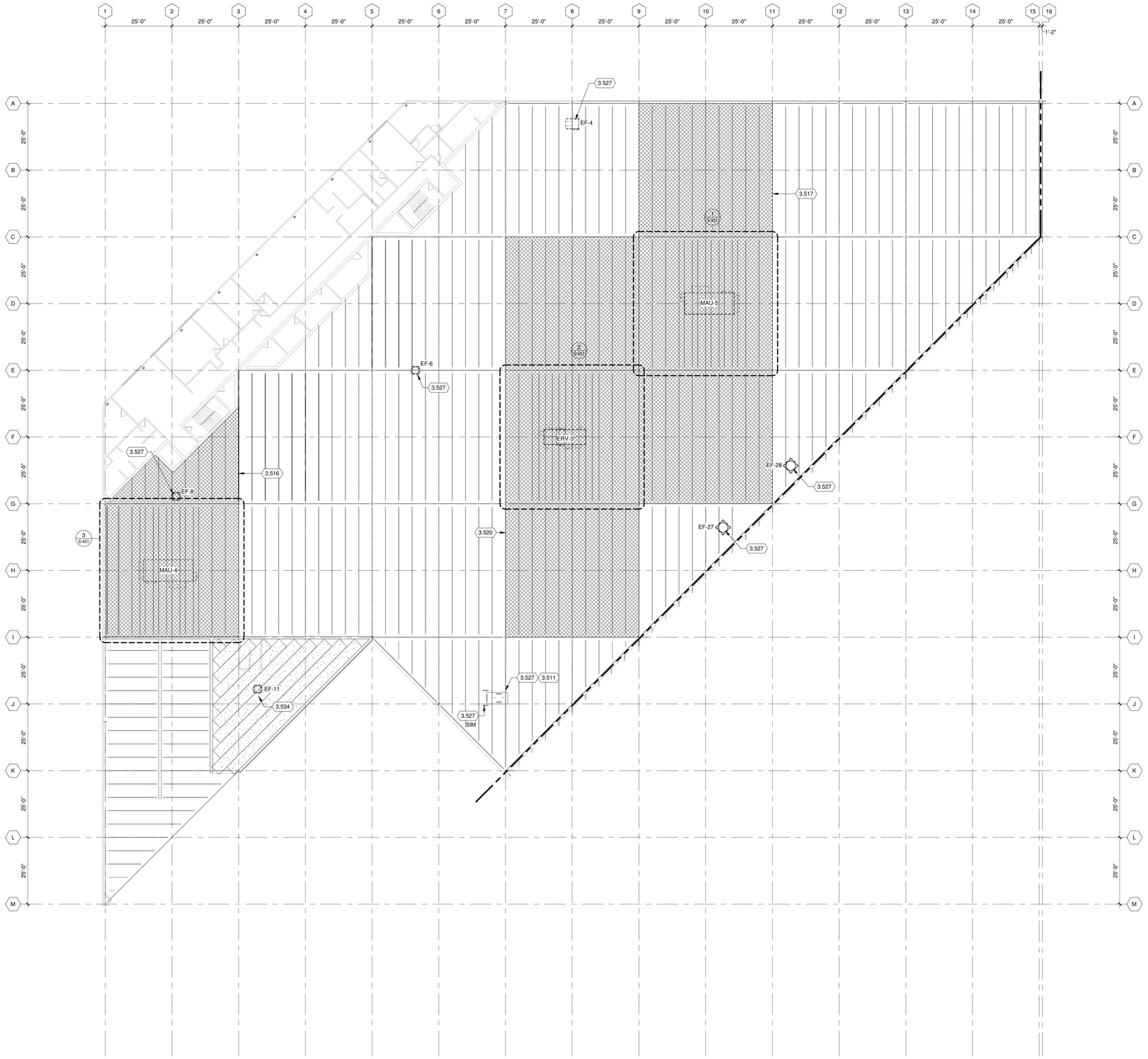

TRUE NORTH PLAN NORTH

1 ROOF FRAMING PLAN - ZONES 1 & 2

1/16" = 1'-0"

ROOF FRAMING PLAN GENERAL NOTES:

1. ELEVATION 100'-0" = FINISHED FLOOR +/- ON THE WEST END OF THE FACILITY. THE FLOOR SLOPES UP MOVING TO THE EAST. THE FINISHED FLOOR IS 102'-4" +/- AT THE EAST END OF THE FACILITY.
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      - "LH" SERIES - MIN. 6"
      - "DLH" SERIES - MIN. 6"
   C. AT STEEL BEAMS
      - "K" SERIES - MIN. 2 1/2"
      - "KCS" SERIES - MIN. 2 1/2"
      - "LH" SERIES - MIN. 4"
      - "DLH" SERIES - MIN. 4"
6. ALL NEW JOISTS SHALL BE DESIGNED AND SUPPLIED WITH AT LEAST ONE MOMENT SPLICE. CONTRACTOR SHALL PROVIDE ADDITIONAL MOMENT SPLICES TO INSTALL SISTER-JOIST AMONG EXISTING UTILITIES OR OTHER OBSTRUCTIONS. MOMENT SPLICES SHALL BE DESIGNED AND STAMPED BY PROFESSIONAL ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND REINSTALL ANYTHING IN THE WAY OF THE INSTALLATION OF NEW NEW JOISTS. MOMENT CONNECTIONS MUST BE SHOP FABRICATED.
7. ALL JOIST GIRDER REINFORCING WELDS ARE FIELD WELDS.
8. ALL CIRCULAR REINFORCING SHALL BE SMOOTH SOLID RODS. REBAR IS NOT ALLOWED TO BE USED TO REINFORCE STRUCTURAL STEEL.
9. BRACE NEW JOISTS AT FIFTH POINTS PER DETAIL 8/S-543. NEW JOISTS SHALL BE DESIGNED FOR TOP CHORD BRACING AT THESE POINTS ONLY.
10. REMOVE JOIST BRIDGING AND BRACING WHERE NEW JOISTS ARE PLANNED. AFTER INSTALLATION OF NEW JOISTS RESTORE BRIDGING AND BRACING TO ORIGINAL CONDITIONS. PROVIDE BRIDGING TO LOWER CHORD OF NEW JOISTS AT LINES MATCHING EXISTING.
11. REINFORCING JOIST GIRDERS AND INSTALLING SISTER JOIST MUST BE DONE WITH NO LOAD ON ROOF. REMOVE BALLAST, SNOW, ICE AND WATER BEFORE REINFORCING JOIST GIRDERS AND INSTALLING SISTER JOIST.
14. BEFORE REINFORCING JOIST GIRDERS, SHORE JOIST GIRDERS AT NODES CLOSEST TO FIFTH POINTS.
15. CUT BRIDGING AND BRACING TO INSTALL NEW JOIST. REINSTALL BRIDGING AND BRACING TO ORIGINAL CONDITIONS OR SJI MINIMUM REQUIREMENTS WHICHEVER IS GREATER.
16. ROOF TOP UNITS MUST BE LOCATED WITHIN 1/4" OF LOCATION SHOWN.
17. IF NEW DUCT INTERFERES WITH EXISTING JOIST BRIDGING OR BRACING INSTALL NEW X-BRACING ON BOTH SIDES OF DUCT PER 12/S-541.
18. PILE BALAST ON GROUND, AT LOCATION ON SITE, TO BE DETERMINED OWNER.
19. NEW JOISTS DO NOT NEED TO BE DESIGNED FOR UPLIFT FORCE.
20. BALLAST REMOVED MAY NOT BE PLACED ON OTHER AREAS OF ROOF.
21. FABRICATE JOIST WITH ZERO CAMBER. PROVIDE SHIMS IN SPLICE CONNECTION(S) TO ADJUST NEW JOIST TO EXISTING DECK SURFACE.
22. PLACEMENT OF BALLAST SHALL NOT EXCEED 12PSF.
23. VERIFY STEEL LAYOUT AND FIT UP WITH MAU AND ERV UNITS.
24. FOR ROOF TOP UNITS OVER 1200LB INSTALL CURBS ON EXISTING DECK DETAIL PER DETAIL 9/S-543.
25. FIELD MEASURE EXISTING OPENINGS. SIZE FRAMED ROOF OPENINGS TO SUPPORT ROOF DECK AT EDGE OF EXISTING OPENING. WHERE RTU HAS TWO HOLES CLOSE TOGETHER SIZE FRAMED ROOF OPENING TO SUPPORT DECK AROUND BOTH OPENINGS.
26. THE ZONE LABELS OF #1 THROUGH #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO AND NUMBERING OF EXISTNG FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

KEYED NOTES

3.511 INSTALL STRUT IN EXISTING JOIST AT SUPPORT POINT FOR ROOF TOP UNIT PER DETAIL 11/S-541. TYPICAL AT EVERY EXISTING JOIST UNDER ROOF TOP UNIT.

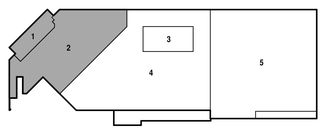
3.516 REMOVE BALLAST FROM THIS AREA BEFORE ADDING JOIST OR REINFORCING JOIST GIRDER FOR MAU-4.

3.517 REMOVE BALLAST FROM THIS AREA BEFORE ADDING JOIST OR REINFORCING JOIST GIRDER FOR MAU-5.

3.520 REMOVE BALLAST FROM THIS AREA BEFORE ADDING JOIST OR REINFORCING JOIST GIRDER FOR ERV-3.

3.527 PROVIDE AND INSTALL FRAMED ROOF OPENING PER 8/S-541.

3.534 PRECAST PLANK HEADER SUPPORT REFER TO DETAIL 17/S-541.



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Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DXC
DRAWN BY: MJE
CHECKED BY: -
DO NOT SCALE DRAWINGS

SHEET CONTENTS
ROOF FRAMING PLAN - ZONES 1 & 2

SHEET NO.:
S-151A

10/30/2019 1:52:31 PM C:\Revit Local\4503500-170148.07-S-Anno-Central-2018_22144md.rvt

TRUE NORTH PLAN NORTH

1 ROOF FRAMING PLAN - ZONES 3 & 4

1/16" = 1'-0"

ROOF FRAMING PLAN GENERAL NOTES:

1. ELEVATION 100'-0" = FINISHED FLOOR +/- ON THE WEST END OF THE FACILITY. THE FLOOR SLOPES UP MOVING TO THE EAST. THE FINISHED FLOOR IS 102'-4" +/- AT THE EAST END OF THE FACILITY.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-541 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE;
   A. AT MASONRY WALLS
      - "K" SERIES - MIN. 4"
      - "KCS" SERIES - MIN. 4"
      - "LH" SERIES - MIN. 6"
      - "DLH" SERIES - MIN. 6"
   B. AT CONCRETE WALLS
      - "K" SERIES - MIN. 4"
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      - "DLH" SERIES - MIN. 6"
   C. AT STEEL BEAMS
      - "K" SERIES - MIN. 2 1/2"
      - "KCS" SERIES - MIN. 2 1/2"
      - "LH" SERIES - MIN. 4"
      - "DLH" SERIES - MIN. 4"
6. ALL NEW JOISTS SHALL BE DESIGNED AND SUPPLIED WITH AT LEAST ONE MOMENT SPLICE. CONTRACTOR SHALL PROVIDE ADDITIONAL MOMENT SPLICES TO INSTALL SISTER-JOIST AMONG EXISTING UTILITIES OR OTHER OBSTRUCTIONS. MOMENT SPLICES SHALL BE DESIGNED AND STAMPED BY PROFESSIONAL ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND REINSTALL ANYTHING IN THE WAY OF THE INSTALLATION OF NEW NEW JOISTS. MOMENT CONNECTIONS MUST BE SHOP FABRICATED.
7. ALL JOIST GIRDER REINFORCING WELDS ARE FIELD WELDS.
8. ALL CIRCULAR REINFORCING SHALL BE SMOOTH SOLID RODS. REBAR IS NOT ALLOWED TO BE USED TO REINFORCE STRUCTURAL STEEL.
9. BRACE NEW JOISTS AT FIFTH POINTS PER DETAIL 8/S-543. NEW JOISTS SHALL BE DESIGNED FOR TOP CHORD BRACING AT THESE POINTS ONLY.
10. REMOVE JOIST BRIDGING AND BRACING WHERE NEW JOISTS ARE PLANNED. AFTER INSTALLATION OF NEW JOISTS RESTORE BRIDGING AND BRACING TO ORIGINAL CONDITIONS. PROVIDE BRIDGING TO LOWER CHORD OF NEW JOISTS AT LINES MATCHING EXISTING.
11. REINFORCING JOIST GIRDERS AND INSTALLING SISTER JOIST MUST BE DONE WITH NO LOAD ON ROOF. REMOVE BALLAST, SNOW, ICE AND WATER BEFORE REINFORCING JOIST GIRDERS AND INSTALLING SISTER JOIST.
14. BEFORE REINFORCING JOIST GIRDERS, SHORE JOIST GIRDERS AT NODES CLOSEST TO FIFTH POINTS.
15. CUT BRIDGING AND BRACING TO INSTALL NEW JOIST. REINSTALL BRIDGING AND BRACING TO ORIGINAL CONDITIONS OR SJI MINIMUM REQUIREMENTS WHICHEVER IS GREATER.
16. ROOF TOP UNITS MUST BE LOCATED WITHIN 1/4" OF LOCATION SHOWN.
17. IF NEW DUCT INTERFERES WITH EXISTING JOIST BRIDGING OR BRACING INSTALL NEW X-BRACING ON BOTH SIDES OF DUCT PER 12/S-541.
18. PILE BALAST ON GROUND, AT LOCATION ON SITE, TO BE DETERMINED OWNER.
19. NEW JOISTS DO NOT NEED TO BE DESIGNED FOR UPLIFT FORCE.
20. BALLAST REMOVED MAY NOT BE PLACED ON OTHER AREAS OF ROOF.
21. FABRICATE JOIST WITH ZERO CAMBER. PROVIDE SHIMS IN SPLICE CONNECTION(S) TO ADJUST NEW JOIST TO EXISTING DECK SURFACE.
22. PLACEMENT OF BALLAST SHALL NOT EXCEED 12PSF.
23. VERIFY STEEL LAYOUT AND FIT UP WITH MAU AND ERV UNITS.
24. FOR ROOF TOP UNITS OVER 1200LB INSTALL CURBS ON EXISTING DECK DETAIL PER DETAIL 9/S-543.
25. FIELD MEASURE EXISTING OPENINGS. SIZE FRAMED ROOF OPENINGS TO SUPPORT ROOF DECK AT EDGE OF EXISTING OPENING. WHERE RTU HAS TWO HOLES CLOSE TOGETHER SIZE FRAMED ROOF OPENING TO SUPPORT DECK AROUND BOTH OPENINGS.
26. THE ZONE LABELS OF #1 THROUGH #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO AND NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

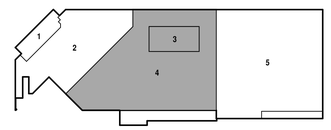
KEYED NOTES

3.518 REMOVE BALLAST FROM THIS AREA BEFORE ADDING JOIST OR REINFORCING JOIST GIRDER FOR MAU-6.

3.519 REMOVE BALLAST FROM THIS AREA BEFORE ADDING JOIST OR REINFORCING JOIST GIRDER FOR MAU-7.

3.521 REMOVE BALLAST FROM THIS AREA BEFORE ADDING JOIST OR REINFORCING JOIST GIRDER FOR ERV-4.

3.527 PROVIDE AND INSTALL FRAMED ROOF OPENING PER 8/S-541.



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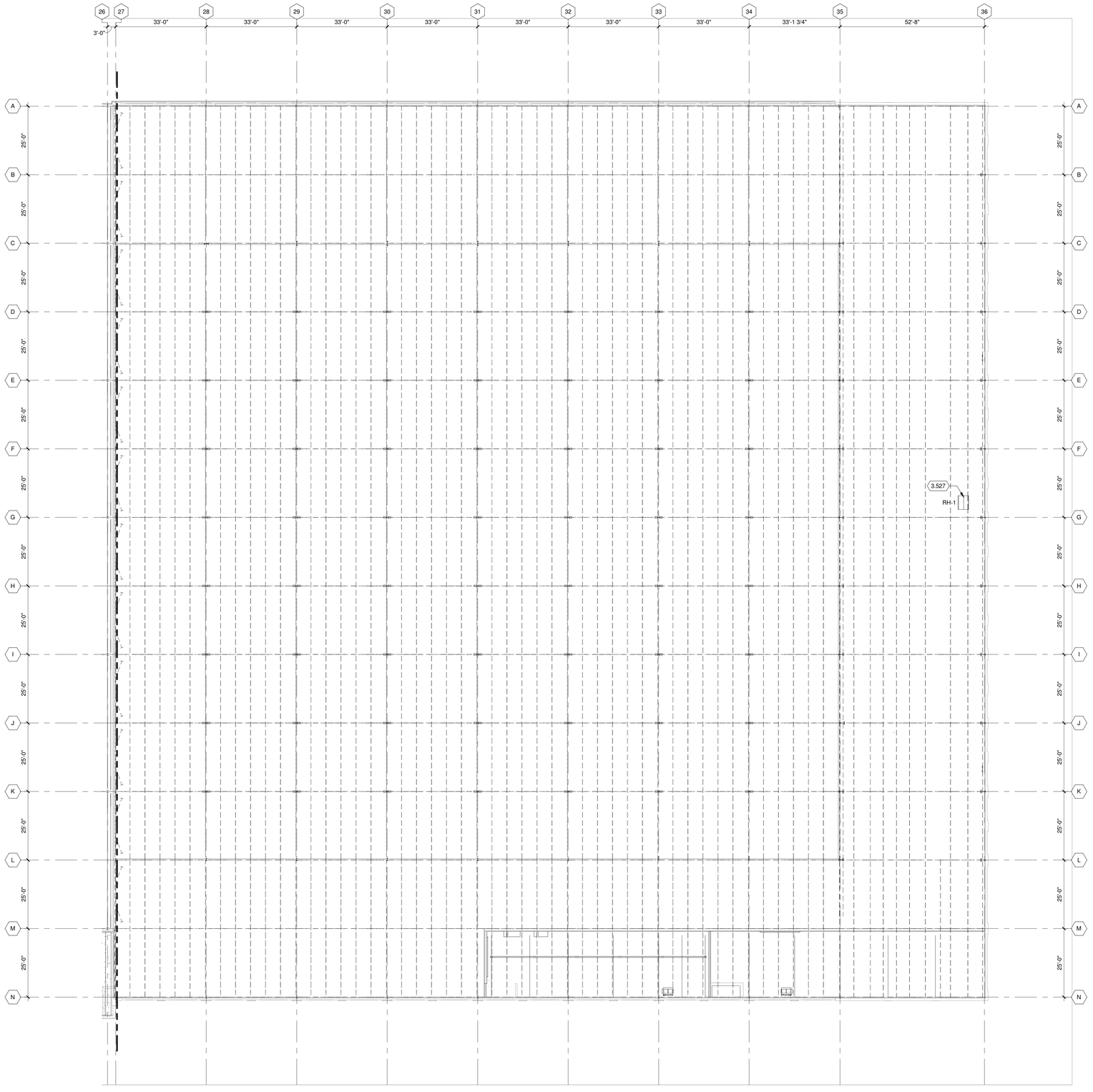
ROOF FRAMING PLAN - ZONES 3 & 4

SHEET NO.:

S-151B



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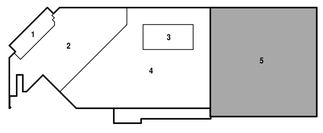
KEYED NOTES

3.527 PROVIDE AND INSTALL FRAMED ROOF OPENING PER 8/S-541.

TRUE NORTH PLAN NORTH

1 ROOF FRAMING PLAN - ZONE 5

1/16" = 1'-0"



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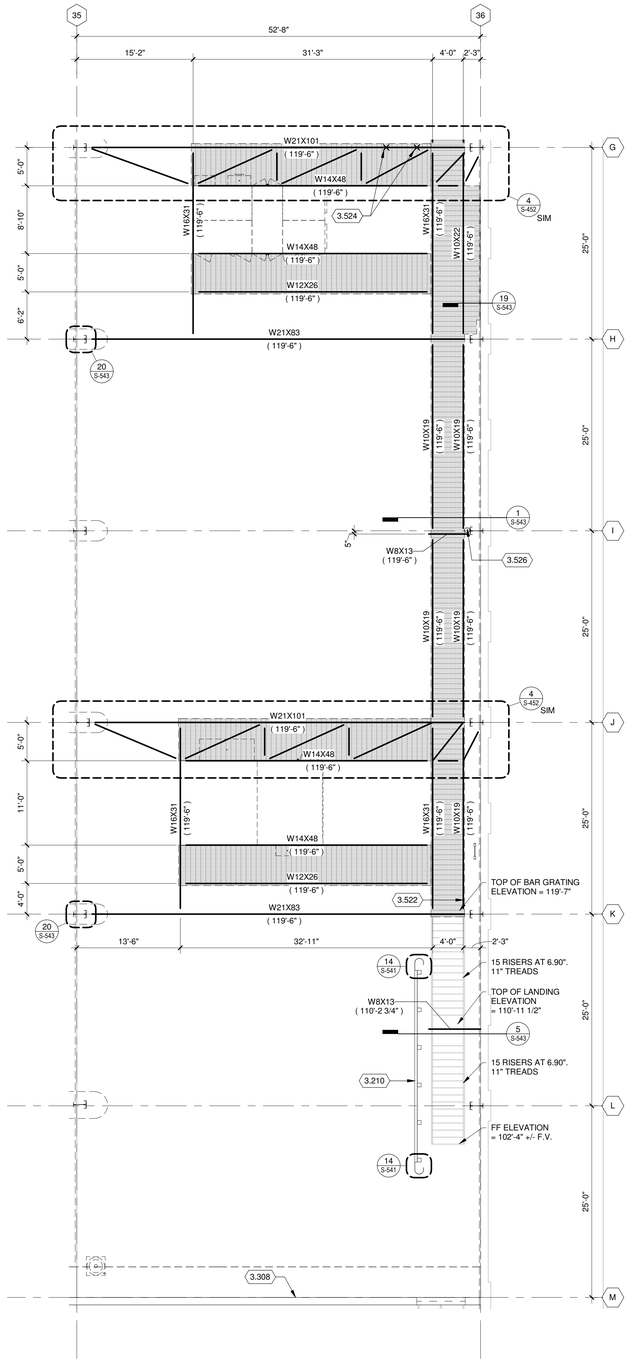
SHEET CONTENTS
ROOF FRAMING PLAN - ZONE 5

SHEET NO.:

S-151C

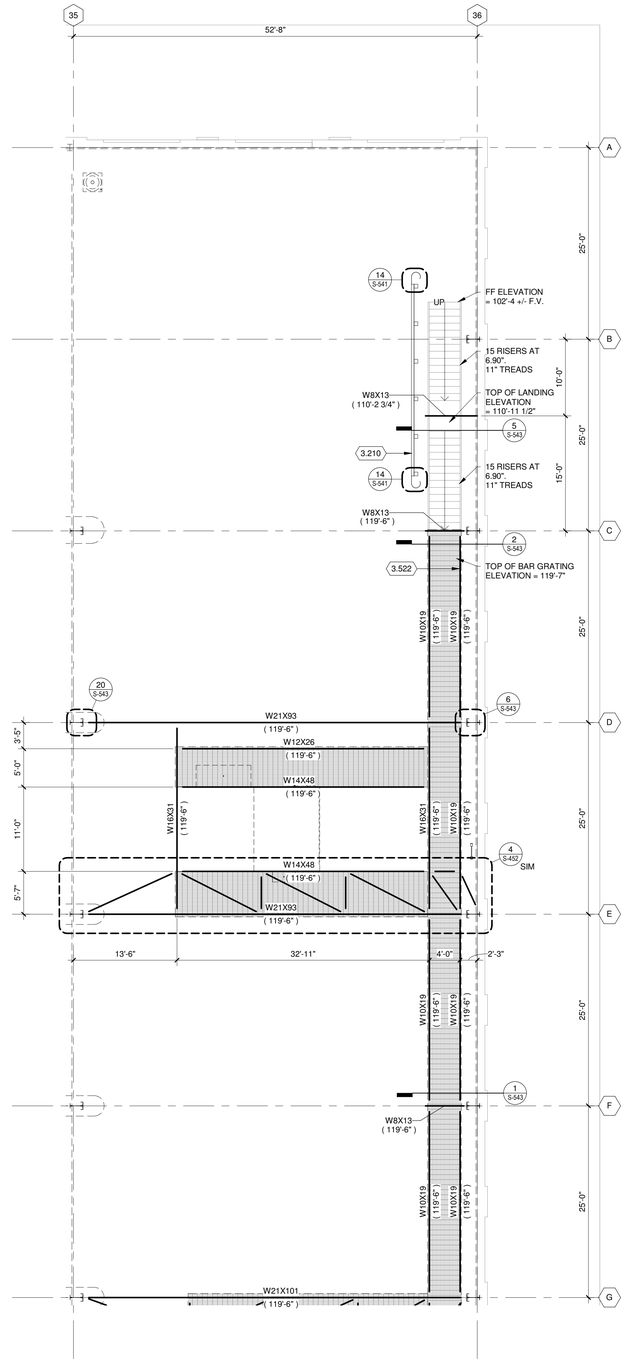
10/30/2019 1:52:41 PM C:\Revit Local\4503500-170148.07-S-Arno-Central-2018_22146rvt.rvt



TRUE NORTH PLAN NORTH

2 ENLARGED HVAC MEZZANINE FRAMING PLAN

1/8" = 1'-0"



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1 ENLARGED HVAC MEZZANINE FRAMING PLAN

1/8" = 1'-0"

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   B. AT CONCRETE WALLS
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      - "LH" SERIES - MIN. 6"
      - "DLH" SERIES - MIN. 6"
   C. AT STEEL BEAMS
      - "K" SERIES - MIN. 2 1/2"
      - "KCS" SERIES - MIN. 2 1/2"
      - "LH" SERIES - MIN. 4"
      - "DLH" SERIES - MIN. 4"
6. REUSE SALVAGED BAR GRATING ON SPANS OF 4'-0" OR LESS. FOR REMAINING AREAS TO BE FILLED WITH BAR GRATING MEET THE FOLLOWING: 3/16 X 1 BEARING BAR, SPACED AT 15/16" OC.
7. VERIFY STEEL LAYOUT AND FIT UP WITH MAU8 MAU9 AND ERV5.
8. THE ZONE LABELS OF #1 THROUGH #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.
9. STAIRS PER SPECIFICATION 055113.
10. HANDRAIL PER SPECIFICATION 055213.

KEYED NOTES

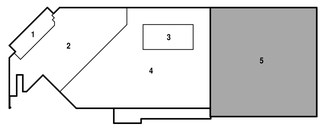
3.210 CORRUGATED STEEL BEAM GUARDRAIL, SEE DETAIL 13/S-541.

3.308 CMU PATCH 12" X 12" HOLE IN EXISTING WALL & PAINT TO MATCH ADJACENT.

3.522 POST SIGN ON GUARDRAIL THAT STATES: "MEZZANINE LIVE LOAD = 40 PSF".

3.524 1.5K DESIGN LOAD FOR FUTURE STAIR TO HIGH ROOF.

3.526 FIRE RISER, CUT BEAM FLANGES TO CLEAR RISER, REFER TO DETAIL 22/S-543.



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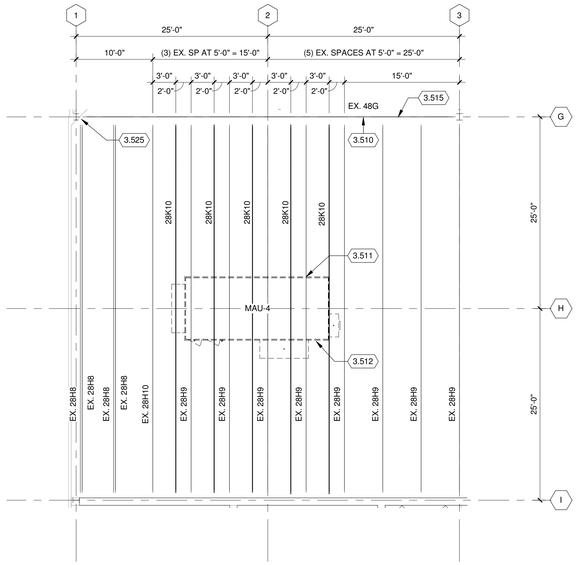
SHEET CONTENTS
ENLARGED FRAMING PLANS

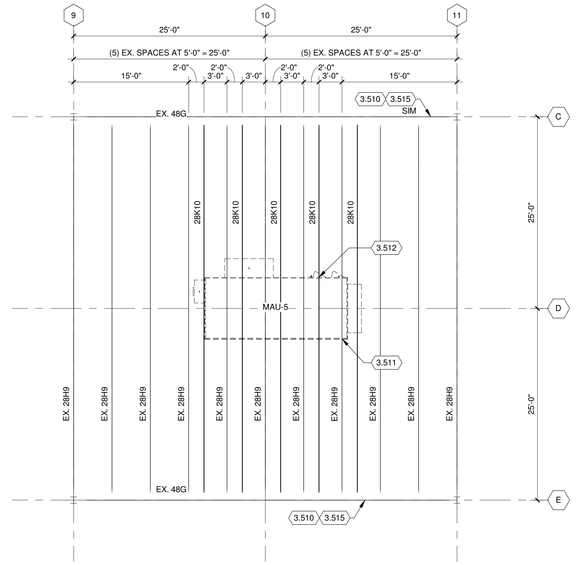
SHEET NO.:
S-442



TRUE NORTH PLAN NORTH

ENLARGED ROOF FRAMING PLAN 3

1/8" = 1'-0"



TRUE NORTH PLAN NORTH

ENLARGED ROOF FRAMING PLAN 1

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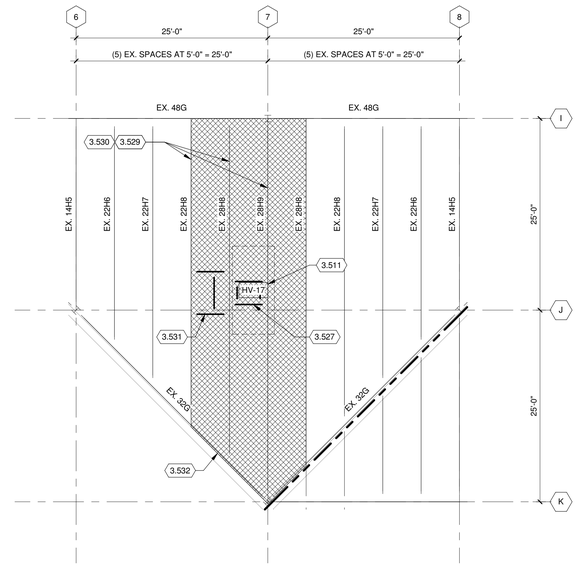

TRUE NORTH PLAN NORTH

ENLARGED ROOF FRAMING PLAN 4

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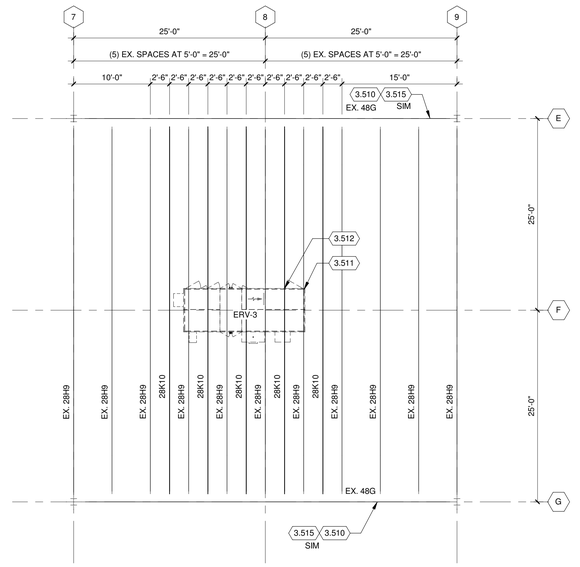

TRUE NORTH PLAN NORTH

ENLARGED ROOF FRAMING PLAN 2

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KEYED NOTES

3.510 REINFORCE EXISTING GIRDER PER DETAIL 4/S-542.

3.511 INSTALL STRUT IN EXISTING JOIST AT SUPPORT POINT FOR ROOF TOP UNIT PER DETAIL 11/S-541. TYPICAL AT EVERY EXISTING JOIST UNDER ROOF TOP UNIT.

3.512 JOIST MANUFACTURER TO PROVIDE JOIST NODE IN NEW JOIST AT SUPPORT POINT FOR RTU. SUPPORT POINT OF RTU OCCURS AT EACH SIDE OF RTU. TYPICAL AT EVERY JOIST UNDER ROOF TOP UNIT. LOAD FROM ROOF TOP UNIT = 813LB.

3.515 ADD STRUTS TO EXISTING JOIST GIRDER PER DETAIL 6/S-542 INSTALL STITCH PLATES IN NEW STRUTS PER DETAIL12/S-543.

3.525 CHIP CMU AWAY FROM JOIST GIRDER TO EXTENT NEEDED FOR ACCESS TO REINFORCE JOIST GIRDER. AFTER REINFORCEMENT PATCH CMU, SOLID GROUTED.

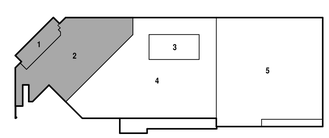
3.527 PROVIDE AND INSTALL FRAMED ROOF OPENING PER 8/S-541.

3.529 NO ADDED LOAD ALLOWED THIS JOIST. PROVIDE AND HANG METAL SIGN FROM THIS JOIST PAINTED TO READ; "NO ADDED SUSPENDED LOADS ALLOWED ON THIS JOIST". MAKE LETTER HEIGHT = 2 INCHES

3.530 NO PHOTOVOLTAIC LOADING ALLOWED ON THIS JOIST.

3.531 ROOF FRAME SIMILAR TO 8/S-541.

3.532 REMOVE ALL BALLAST FROM THIS AREA. SPREAD 6,200 LB BALLAST UNIFORMLY OVER THIS AREA. SUBMIT DOCUMENTATION OF BALLAST WEIGHT CONTROL.



KEY PLAN

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

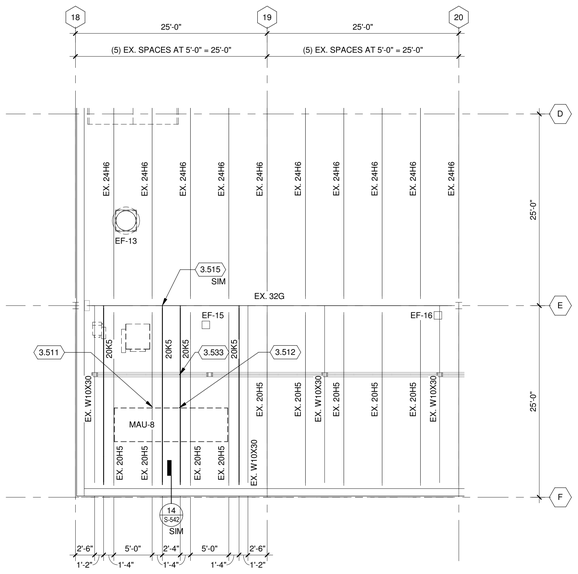
ISSUED:
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DXC
DRAWN BY: MJE
CHECKED BY: -
DO NOT SCALE DRAWINGS

SHEET CONTENTS
ENLARGED ROOF FRAMING PLANS

SHEET NO.:
S-451

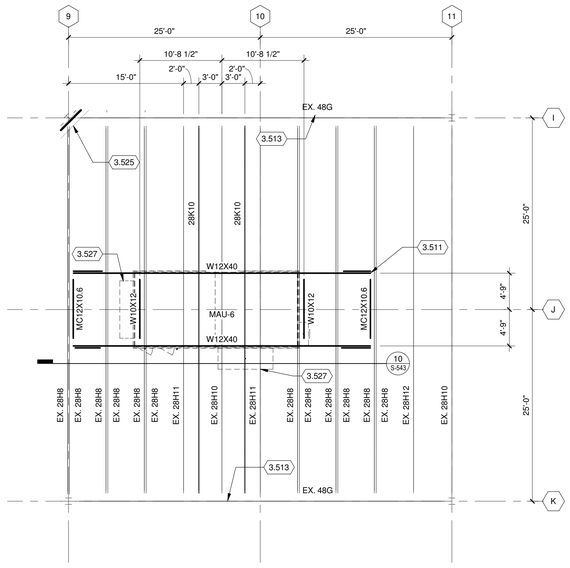
10/30/2019 1:52:45 PM C:\Revit Local\4503500-170148.07-S-Anne-Central-2018_2214dnat.rvt



TRUE NORTH PLAN NORTH 5

ENLARGED ROOF FRAMING PLAN

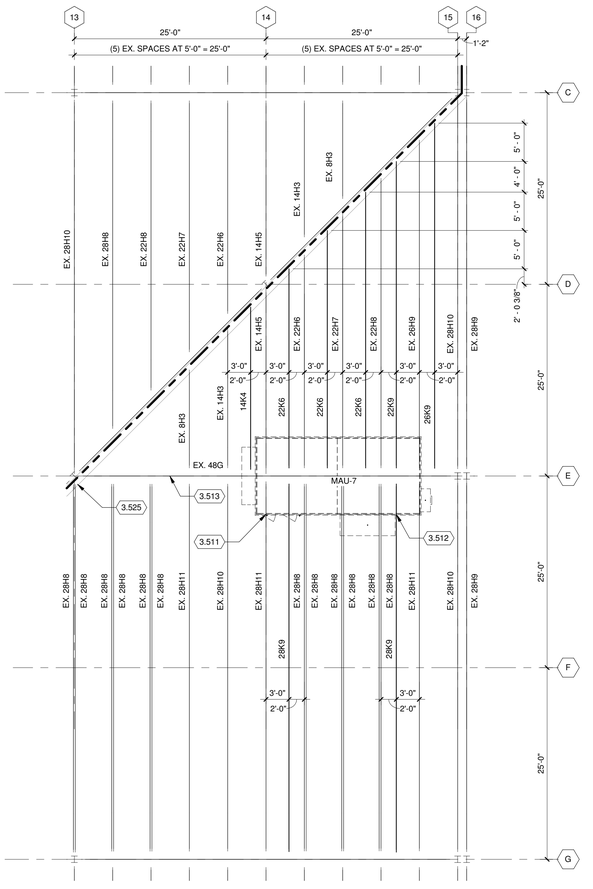
1/8" = 1'-0"



TRUE NORTH PLAN NORTH 3

ENLARGED ROOF FRAMING PLAN

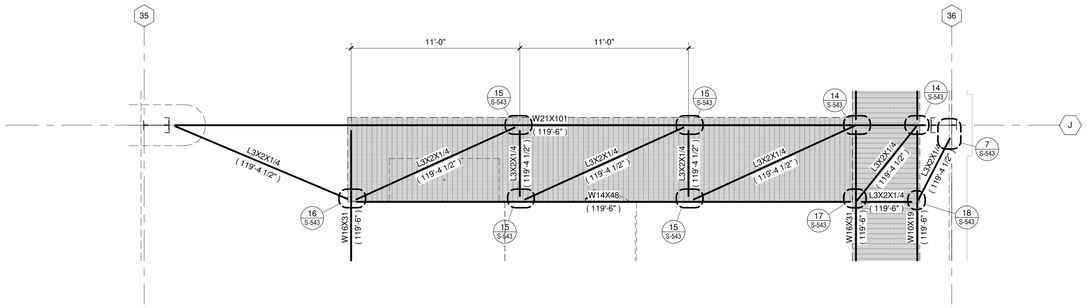
1/8" = 1'-0"



TRUE NORTH PLAN NORTH 1

ENLARGED ROOF FRAMING PLAN

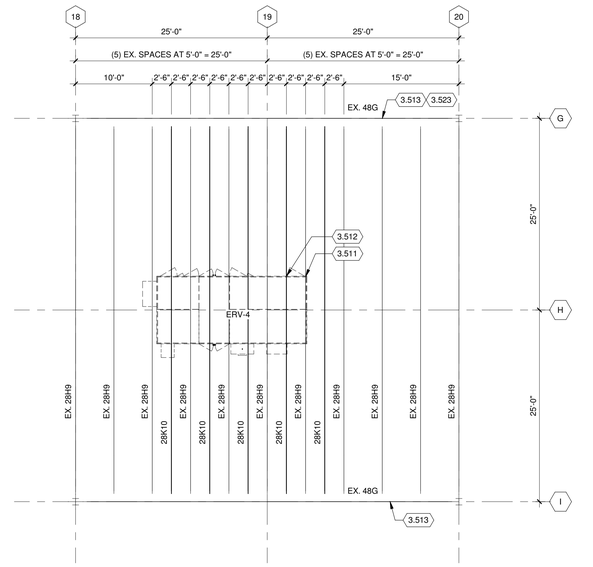
1/8" = 1'-0"



TRUE NORTH PLAN NORTH 4

ENLARGED HVAC MEZZANINE FRAMING PLAN

1/4" = 1'-0"



TRUE NORTH PLAN NORTH 2

ENLARGED ROOF FRAMING PLAN

1/8" = 1'-0"

ROOF FRAMING PLAN GENERAL NOTES:

1. ELEVATION 100'-0" = FINISHED FLOOR +/- ON THE WEST END OF THE FACILITY. THE FLOOR SLOPES UP MOVING TO THE EAST. THE FINISHED FLOOR IS 102'-4" +/- AT THE EAST END OF THE FACILITY.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-541 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE;
   A. AT MASONRY WALLS
      - "K" SERIES - MIN. 4"
      - "KCS" SERIES - MIN. 4"
      - "LH" SERIES - MIN. 6"
      - "DLH" SERIES - MIN. 6"
   B. AT CONCRETE WALLS
      - "K" SERIES - MIN. 4"
      - "KCS" SERIES - MIN. 4"
      - "LH" SERIES - MIN. 6"
      - "DLH" SERIES - MIN. 6"
   C. AT STEEL BEAMS
      - "K" SERIES - MIN. 2 1/2"
      - "KCS" SERIES - MIN. 2 1/2"
      - "LH" SERIES - MIN. 4"
      - "DLH" SERIES - MIN. 4"
6. ALL NEW JOISTS SHALL BE DESIGNED AND SUPPLIED WITH AT LEAST ONE MOMENT SPLICE. CONTRACTOR SHALL PROVIDE ADDITIONAL MOMENT SPLICES TO INSTALL SISTER-JOIST AMONG EXISTING UTILITIES OR OTHER OBSTRUCTIONS. MOMENT SPLICES SHALL BE DESIGNED AND STAMPED BY PROFESSIONAL ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND REINSTALL ANYTHING IN THE WAY OF THE INSTALLATION OF NEW NEW JOISTS. MOMENT CONNECTIONS MUST BE SHOP FABRICATED.
7. ALL JOIST GIRDER REINFORCING WELDS ARE FIELD WELDS.
8. ALL CIRCULAR REINFORCING SHALL BE SMOOTH SOLID RODS. REBAR IS NOT ALLOWED TO BE USED TO REINFORCE STRUCTURAL STEEL.
9. BRACE NEW JOISTS AT FIFTH POINTS PER DETAIL 8/S-543. NEW JOISTS SHALL BE DESIGNED FOR TOP CHORD BRACING AT THESE POINTS ONLY.
10. REMOVE JOIST BRIDGING AND BRACING WHERE NEW JOISTS ARE PLANNED. AFTER INSTALLATION OF NEW JOISTS RESTORE BRIDGING AND BRACING TO ORIGINAL CONDITIONS. PROVIDE BRIDGING TO LOWER CHORD OF NEW JOISTS AT LINES MATCHING EXISTING.
11. REINFORCING JOIST GIRDERS AND INSTALLING SISTER JOIST MUST BE DONE WITH NO LOAD ON ROOF. REMOVE BALLAST, SNOW, ICE AND WATER BEFORE REINFORCING JOIST GIRDERS AND INSTALLING SISTER JOIST.
14. BEFORE REINFORCING JOIST GIRDERS, SHORE JOIST GIRDERS AT NODES CLOSEST TO FIFTH POINTS.
15. CUT BRIDGING AND BRACING TO INSTALL NEW JOIST. REINSTALL BRIDGING AND BRACING TO ORIGINAL CONDITIONS OR SJI MINIMUM REQUIREMENTS WHICHEVER IS GREATER.
16. ROOF TOP UNITS MUST BE LOCATED WITHIN 1/4" OF LOCATION SHOWN.
17. IF NEW DUCT INTERFERES WITH EXISTING JOIST BRIDGING OR BRACING INSTALL NEW X-BRACING ON BOTH SIDES OF DUCT PER 12/S-541.
18. PILE BALAST ON GROUND, AT LOCATION ON SITE, TO BE DETERMINED OWNER.
19. NEW JOISTS DO NOT NEED TO BE DESIGNED FOR UPLIFT FORCE.
20. BALLAST REMOVED MAY NOT BE PLACED ON OTHER AREAS OF ROOF.
21. FABRICATE JOIST WITH ZERO CAMBER. PROVIDE SHIMS IN SPLICE CONNECTION(S) TO ADJUST NEW JOIST TO EXISTING DECK SURFACE.
22. PLACEMENT OF BALLAST SHALL NOT EXCEED 12PSF.
23. VERIFY STEEL LAYOUT AND FIT UP WITH MAU AND ERV UNITS.
24. FOR ROOF TOP UNITS OVER 1200LB INSTALL CURBS ON EXISTING DECK DETAIL PER DETAIL 9/S-543.
25. FIELD MEASURE EXISTING OPENINGS. SIZE FRAMED ROOF OPENINGS TO SUPPORT ROOF DECK AT EDGE OF EXISTING OPENING. WHERE RTU HAS TWO HOLES CLOSE TOGETHER SIZE FRAMED ROOF OPENING TO SUPPORT DECK AROUND BOTH OPENINGS.
26. THE ZONE LABELS OF #1 THROUGH #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO AND NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

KEYED NOTES

3.511 INSTALL STRUT IN EXISTING JOIST AT SUPPORT POINT FOR ROOF TOP UNIT PER DETAIL 11/S-541. TYPICAL AT EVERY EXISTING JOIST UNDER ROOF TOP UNIT.

3.512 JOIST MANUFACTURER TO PROVIDE JOIST NODE IN NEW JOIST AT SUPPORT POINT FOR RTU. SUPPORT POINT OF RTU OCCURS AT EACH SIDE OF RTU. TYPICAL AT EVERY JOIST UNDER ROOF TOP UNIT. LOAD FROM ROOF TOP UNIT = 813LB.

3.513 REINFORCE EXISTING JOIST GIRDER PER DETAIL 5/S-542.

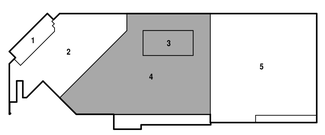
3.515 ADD STRUTS TO EXISTING JOIST GIRDER PER DETAIL 6/S-542 INSTALL STITCH PLATES IN NEW STRUTS PER DETAIL12/S-543.

3.523 REINFORCE EXISTING JOIST GIRDER PER DETAIL 7/S-542.

3.525 CHIP CMU AWAY FROM JOIST GIRDER TO EXTENT NEEDED FOR ACCESS TO REINFORCE JOIST GIRDER. AFTER REINFORCEMENT PATCH CMU, SOLID GROUTED.

3.527 PROVIDE AND INSTALL FRAMED ROOF OPENING PER 8/S-541.

3.533 REMOVE AND REINSTALL EXISTING FALL PROTECTION RUNWAY OR WORK NEW JOIST IN AND AROUND FALL PROTECTION RUNWAY.



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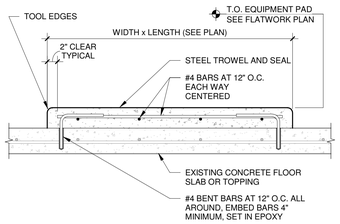
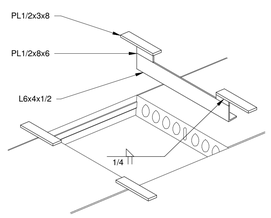
ENLARGED ROOF FRAMING PLANS

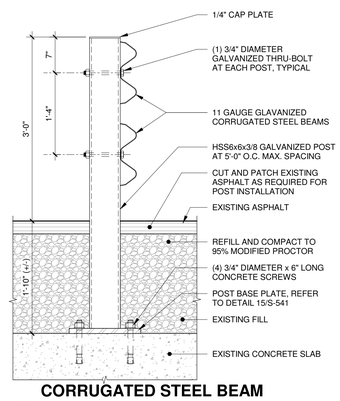
SHEET NO.:
S-452



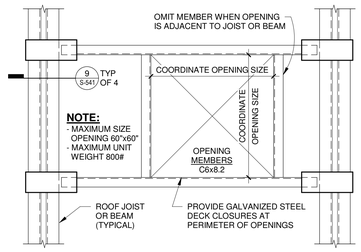
16 EQUIPMENT PADS
1" = 1'-0"



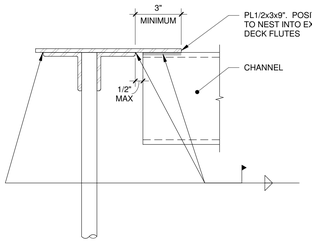
17 PRECAST PLANK HEADER SUPPORT
1/2" = 1'-0"



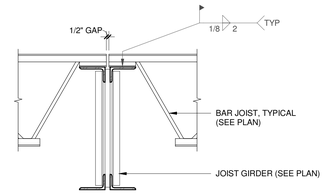
13 CORRUGATED STEEL BEAM GUARDRAIL AT STAIRS
1" = 1'-0"



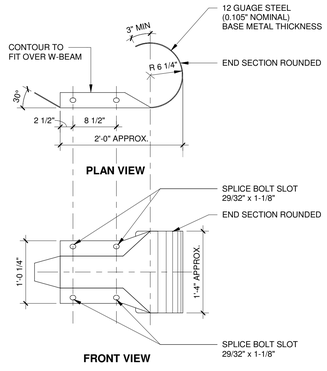
8 TYPICAL FRAMED ROOF OPENING
1" = 1'-0"



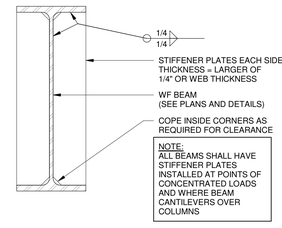
9 CHANNEL TO JOIST CONNECTION
3" = 1'-0"



5 JOIST BEARING AT JOIST GIRDER
1" = 1'-0"

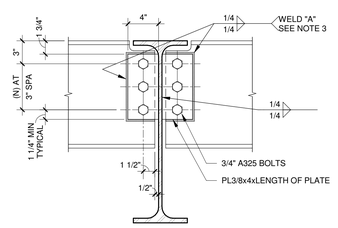


14 END RAIL DETAIL
1" = 1'-0"



10 TYPICAL WF STIFFENER PLATE
1 1/2" = 1'-0"

6 NOT USED
1 1/2" = 1'-0"



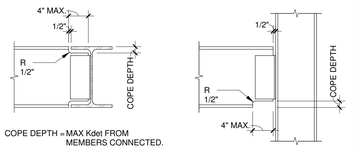
SINGLE PLATE SHEAR CONNECTION

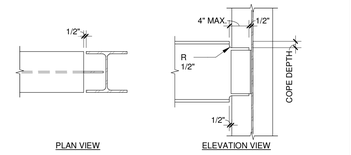
NOMINAL BEAM DEPTH, INCHES	ROWS OF BOLTS (N)	LENGTH OF PLATE
W36	10	29 1/2"
W33	9	26 1/2"
W30	8	23 1/2"
W24 - W27	7	20 1/2"
W21	6	17 1/2"
W18	5	14 1/2"
W16	4	11 1/2"
W12 - W14	3	8 1/2"
W8 - W10	2	5 1/2"

SINGLE PLATE SHEAR CONNECTION NOTES

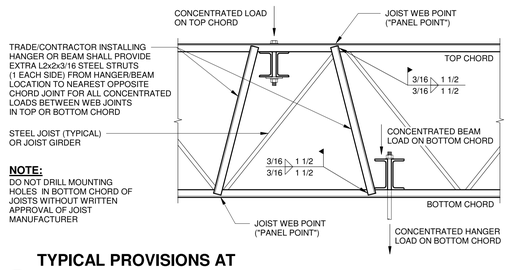
1. ALL FRAMING CONNECTIONS SHALL CONFORM TO SCHEDULE UNLESS DETAILED OR NOTED OTHERWISE.
2. STANDARD HOLES OR HORIZONTAL SHORT SLOT HOLES MAY BE UTILIZED AT CONTRACTORS OPTION IN EITHER THE CONNECTION ANGLE OR THE FRAMING MEMBERS.
3. WELD "A" MAY BE USED IN LIEU OF "A" SIDE BOLTS AT CONTRACTORS OPTION. WELD SHALL BE ON ALL 3 SIDES.
4. FOR MISS-ALIGNED BOLT HOLES, PROVIDE FIELD WELDS. NOTIFY THE ARCHITECT/ENGINEER OF LOCATIONS USING FIELD WELDED CONNECTION.
5. REFER TO TYPICAL COPING DETAIL 2/S-541 FOR CONNECTIONS WHERE COPING IS REQUIRED.
6. THIS DETAIL IS NOT INTENDED FOR EVERY WF SECTION. CHECK RIDING THE FILLET AND COPE DEPTH PRIOR TO FABRICATION.

1 TYPICAL SINGLE PLATE SHEAR FRAMING CONNECTION
1 1/2" = 1'-0"



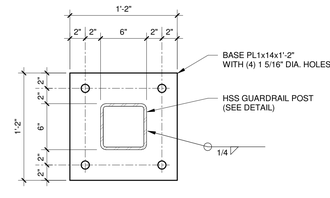


2 TYPICAL COPING DETAIL
1" = 1'-0"

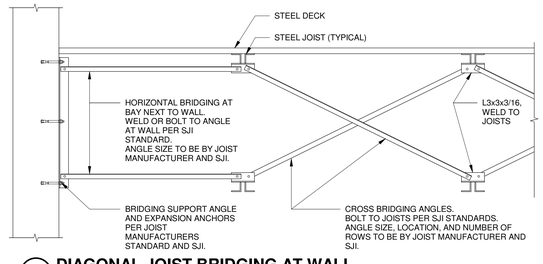


11 TYPICAL PROVISIONS AT CONCENTRATED LOADS ON OPEN WEB STEEL JOISTS
3/4" = 1'-0"

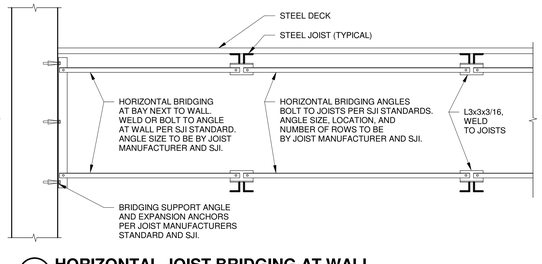
7 NOT USED
1 1/2" = 1'-0"



15 CORRUGATED STEEL BEAM RAILING BASE PLATE
1 1/2" = 1'-0"



12 DIAGONAL JOIST BRIDGING AT WALL
3/4" = 1'-0"



3 HORIZONTAL JOIST BRIDGING AT WALL
3/4" = 1'-0"

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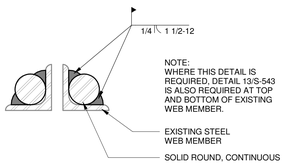
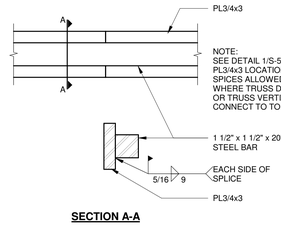
SHEET CONTENTS
FRAMING DETAILS

SHEET NO.:
S-541

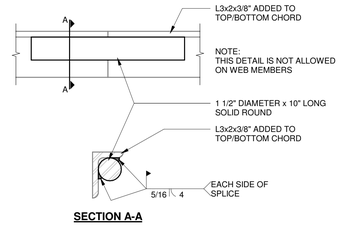


12 REINFORCEMENT RODS SECTION
6" = 1'-0"



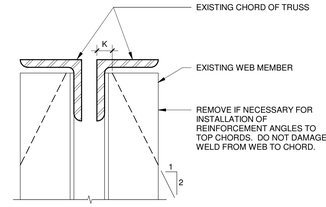
SECTION A-A

9 REINFORCEMENT SPLICE
3" = 1'-0"

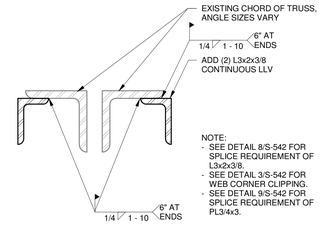


SECTION A-A

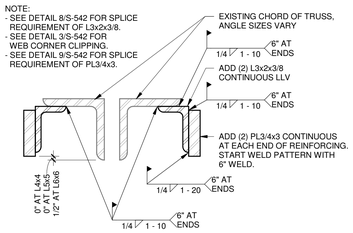
8 CHORD REINFORCEMENT SPLICE
3" = 1'-0"



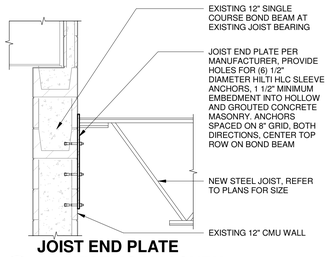
3 WEB CORNER CLIPPING
3" = 1'-0"



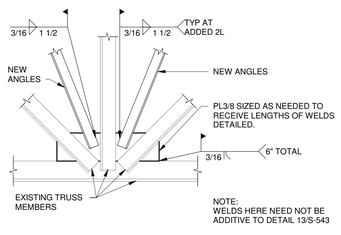
2 CHORD REINFORCEMENT
3" = 1'-0"



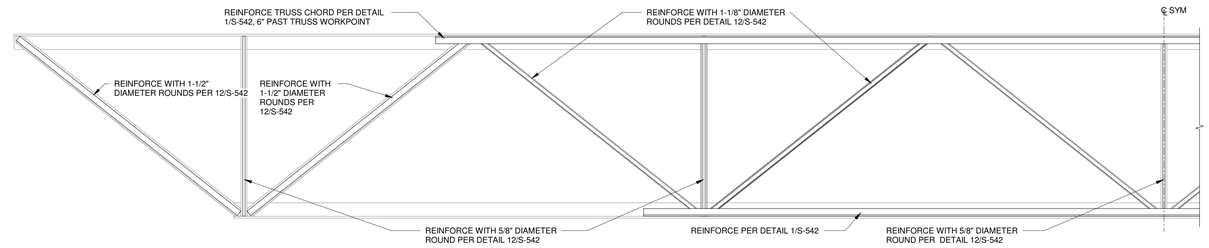
1 CHORD REINFORCEMENT
3" = 1'-0"



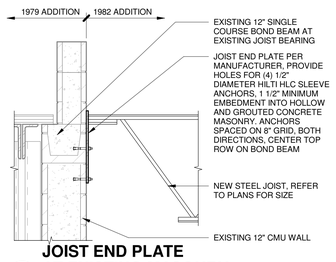
13 JOIST END PLATE AT EXISTING MASONRY
3/4" = 1'-0"



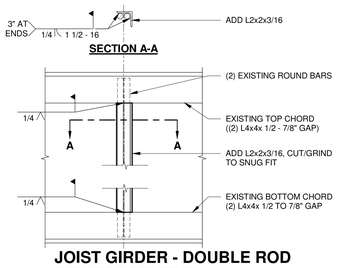
10 ADDED STRUTS AT NEW JOIST
1" = 1'-0"



4 REINFORCED JOIST GIRDER ELEVATION (TYPICAL BOTH ENDS)
3/4" = 1'-0"

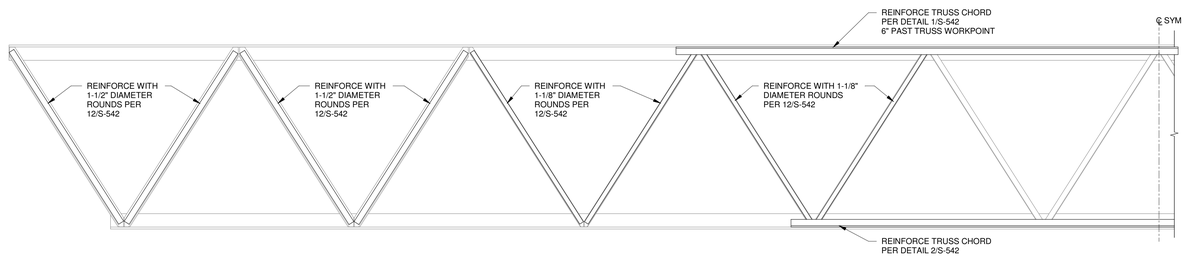


14 JOIST END PLATE AT EXISTING MASONRY
3/4" = 1'-0"

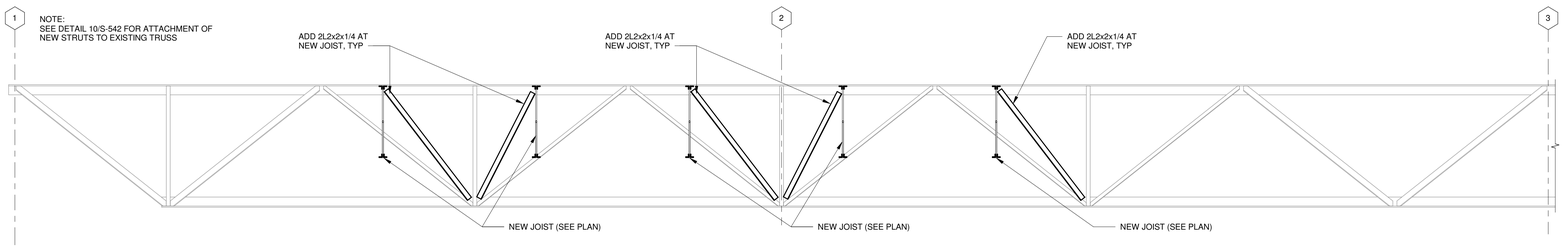


SECTION A-A

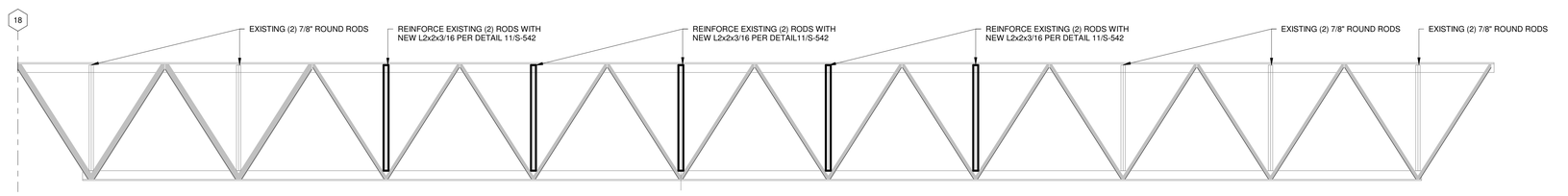
11 JOIST GIRDER - DOUBLE ROD REINFORCEMENT
1 1/2" = 1'-0"



5 REINFORCED JOIST GIRDER ELEVATION (TYPICAL BOTH ENDS)
3/4" = 1'-0"



6 JOIST GIRDER AT LINE G - ELEVATION FROM LINE 1 TO LINE 3 LOOKING NORTH
1/2" = 1'-0"



7 REINFORCED JOIST GIRDER ELEVATION GRID LINE G BEYOND 18 LOOKING NORTH
1/2" = 1'-0"

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
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CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

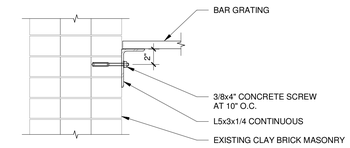
1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

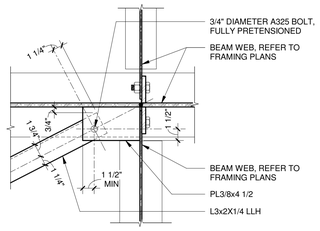
CONTRACT NO.: 8462
M&H NO.: 4502500-170148.07
DATE: November 7, 2019
DESIGNED BY: DXC
DRAWN BY: MJE
CHECKED BY: -
DO NOT SCALE DRAWINGS

SHEET CONTENTS
FRAMING DETAILS

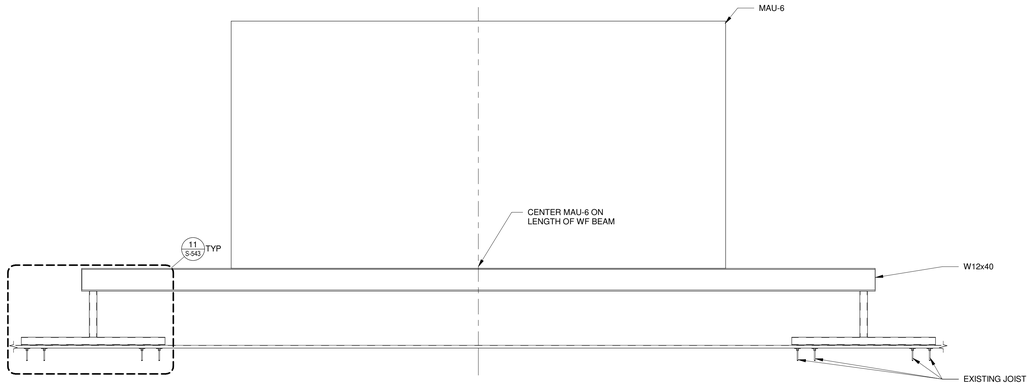
SHEET NO.:
S-542



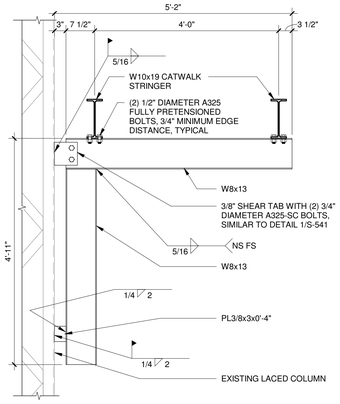
19 CLAY BRICK TO BAR GRATING CONNECTION
1 1/2" = 1'-0"



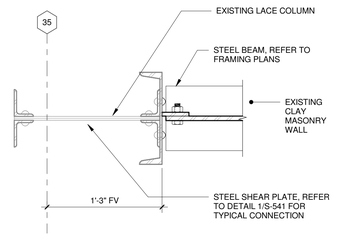
14 FRAMING CONNECTION
1 1/2" = 1'-0"



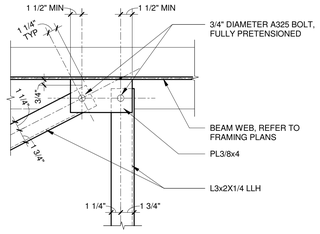
10 PLATFORM FRAMING FOR MAU-6
3/8" = 1'-0"



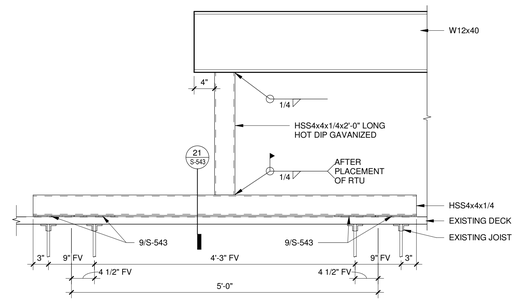
1 CATWALK SUPPORT FRAMING
3/4" = 1'-0"



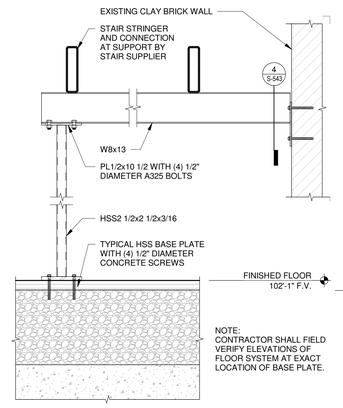
20 FRAMING CONNECTION
1 1/2" = 1'-0"



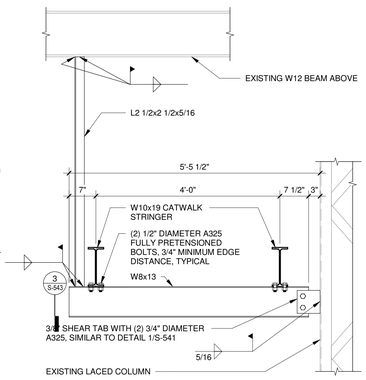
15 FRAMING CONNECTION
1 1/2" = 1'-0"



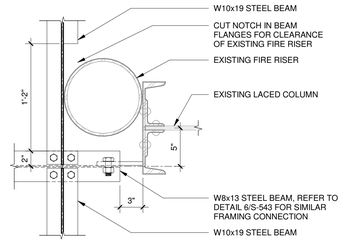
11 PLATFORM FRAMING CONNECTIONS
1" = 1'-0"



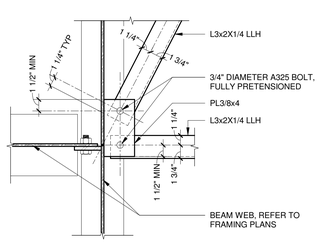
5 STRINGER SUPPORT FRAMING
3/4" = 1'-0"



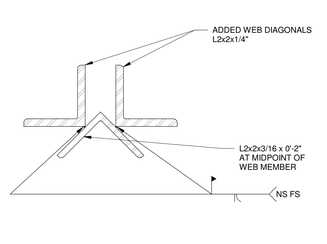
2 CATWALK SUPPORT FRAMING
3/4" = 1'-0"



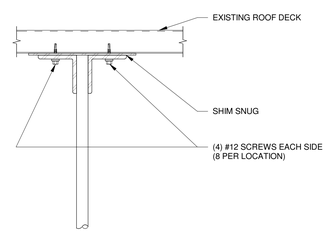
22 FRAMING CONNECTION
1 1/2" = 1'-0"



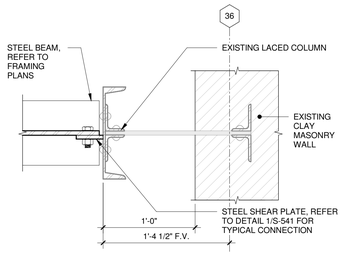
17 FRAMING CONNECTION
1 1/2" = 1'-0"



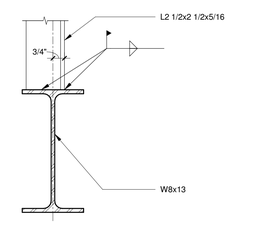
12 JOIST GIRDER WEB DIAGONALS
6" = 1'-0"



8 JOIST TO DECK CONNECTION
3" = 1'-0"

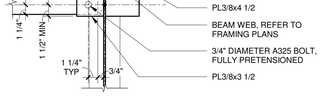


6 FRAMING CONNECTION
1 1/2" = 1'-0"

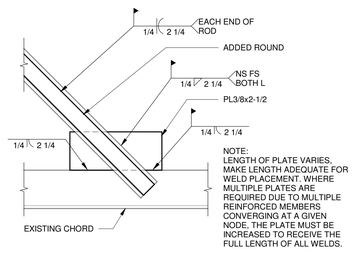


3 FRAMING CONNECTION
3" = 1'-0"

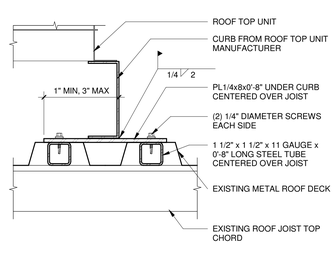
21 PLATFORM FRAMING CONNECTIONS
1 1/2" = 1'-0"



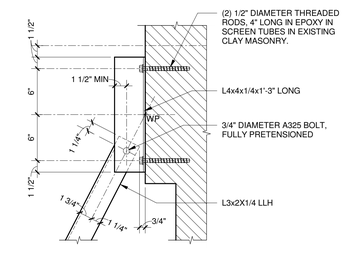
16 FRAMING CONNECTION
1 1/2" = 1'-0"



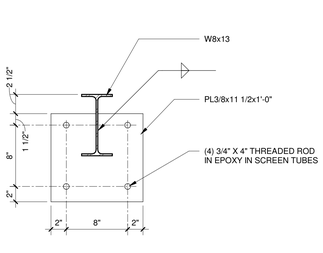
13 FRAMING CONNECTION
3" = 1'-0"



9 TYPICAL CURB ON EXISTING DECK
3" = 1'-0"



7 FRAMING CONNECTION
1 1/2" = 1'-0"



4 SUPPORT BEAM END PLATE
1 1/2" = 1'-0"

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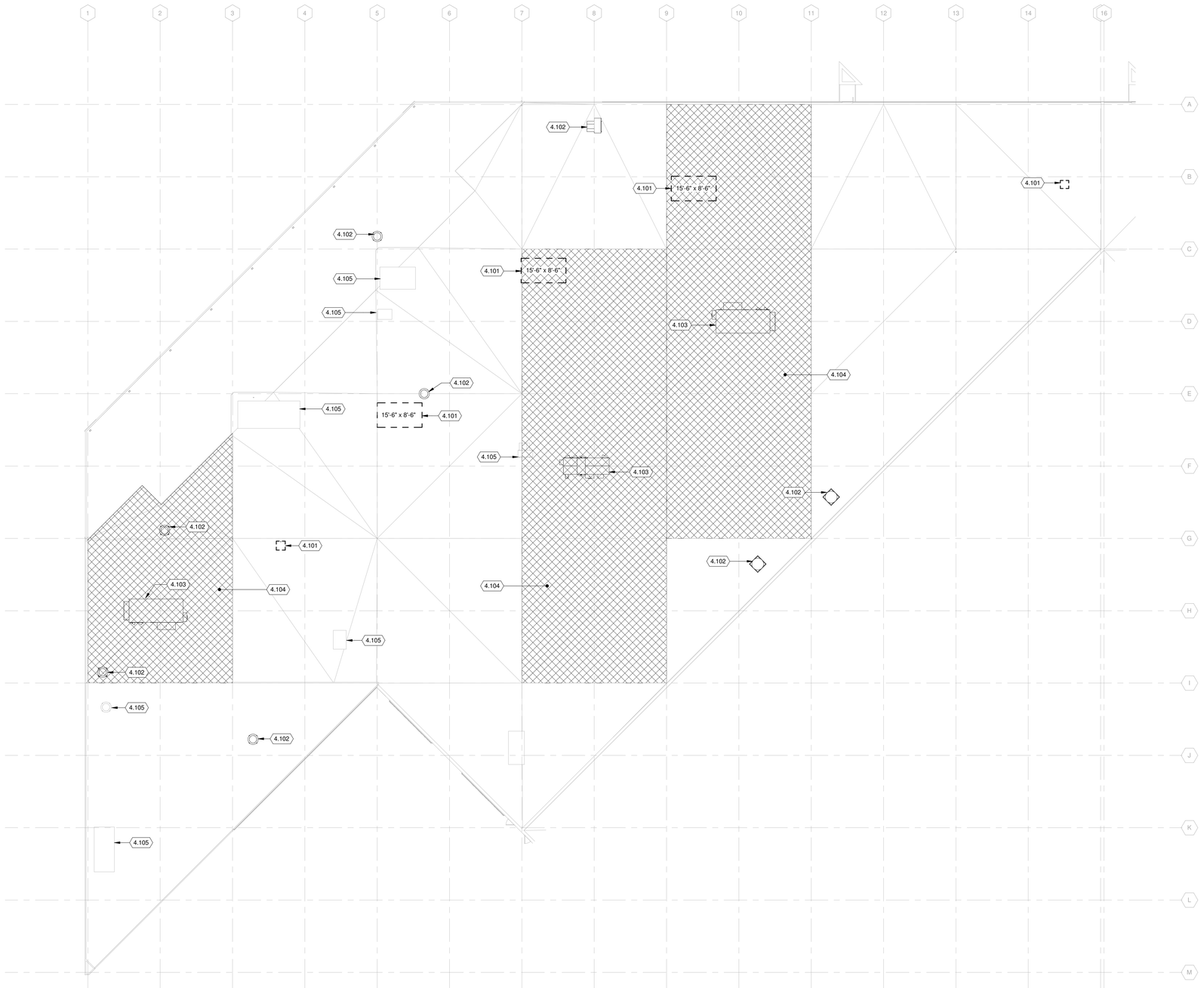
SHEET CONTENTS
FRAMING DETAILS

SHEET NO.:
S-543



TRUE NORTH PLAN NORTH

1 ROOF PLAN - ZONES 1 & 2

1/16" = 1'-0"

ROOF PLAN GENERAL NOTES:

1. ALL WORK TO BE DONE ON 2 YEAR OLD EXISTING BALLAST EPDM ROOF SHALL BE DONE BY A CERTIFIED FIRESTONE INSTALLER. ALL WORK COMPLETED TO BE INSPECTED BY FIRESTONE AND REPORTED THAT EXISTING WARRANTEE IS STILL INTACT.
2. ELEVATION 100'-0" = FINISHED FLOOR +/- ON THE WEST END OF THE FACILITY. THE FLOOR SLOPES UP MOVING TO THE EAST. THE FINISHED FLOOR IS 102'-4" +/- AT THE EAST END OF THE FACILITY.
3. THE ZONE LABELS OF #1 THRU #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.
4. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.

KEYED NOTES

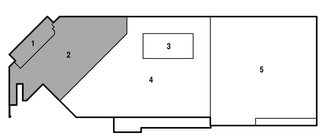
4.101 INFILL EXISTING OPENING WITH NEW ROOF DECK AND ROOF SYSTEM, MATCH EXISTING SLOPES.

4.102 PATCH EXISTING ROOF AFTER NEW CURB AND EQUIPMENT IS INSTALLED.

4.103 ROOFING CONTRACTOR TO CUT OPEN EXISTING ROOF SYSTEM TO LET IN NEW ROOF CURB AND EQUIPMENT. PATCH IN ROOF SYSTEM AFTER OTHER WORK IN COMPLETE.

4.104 AREA OF BALLAST ROOF REMOVAL AND REINSTALLATION.

4.105 EXISTING MECHANICAL EQUIPMENT.



KEY PLAN

Mead & Hunt

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
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meadhunt.com

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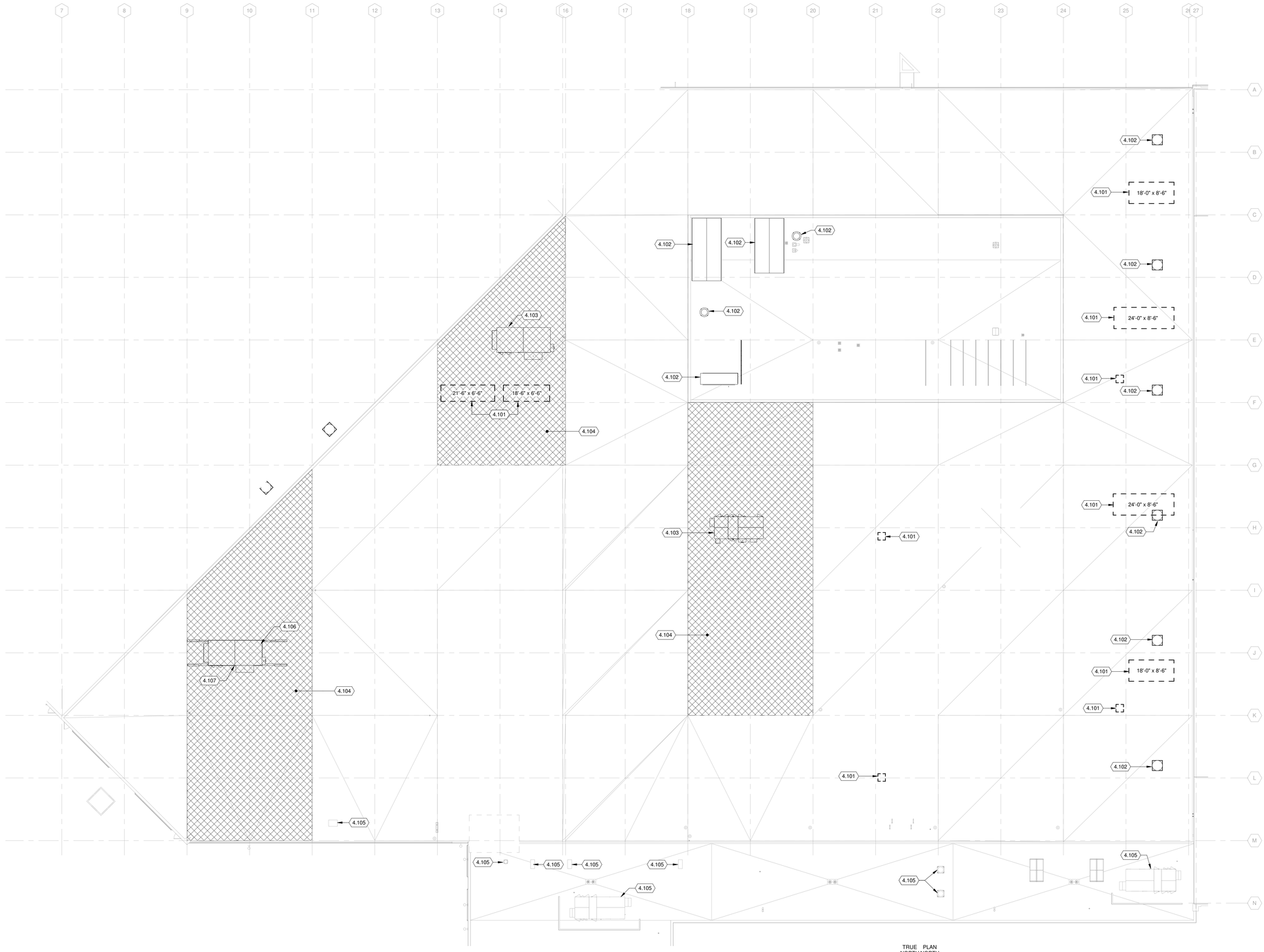
SHEET CONTENTS
ROOF PLAN - ZONES 1 & 2

SHEET NO.:
A-201



TRUE NORTH PLAN NORTH

1 ROOF PLAN - ZONES 3 & 4

1/16" = 1'-0"

ROOF PLAN GENERAL NOTES:

1. ALL WORK TO BE DONE ON 2 YEAR OLD EXISTING BALLAST EPDM ROOF SHALL BE DONE BY A CERTIFIED FIRESTONE INSTALLER. ALL WORK COMPLETED TO BE INSPECTED BY FIRESTONE AND REPORTED THAT EXISTING WARRANTEE IS STILL INTACT.
2. ELEVATION 100'-0" = FINISHED FLOOR +/- ON THE WEST END OF THE FACILITY. THE FLOOR SLOPES UP MOVING TO THE EAST. THE FINISHED FLOOR IS 102'-4" +/- AT THE EAST END OF THE FACILITY.
3. THE ZONE LABELS OF #1 THRU #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.
4. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.

KEYED NOTES

4.101 INFILL EXISTING OPENING WITH NEW ROOF DECK AND ROOF SYSTEM, MATCH EXISTING SLOPES.

4.102 PATCH EXISTING ROOF AFTER NEW CURB AND EQUIPMENT IS INSTALLED.

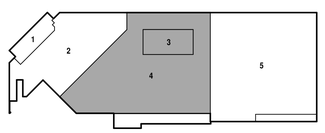
4.103 ROOFING CONTRACTOR TO CUT OPEN EXISTING ROOF SYSTEM TO LET IN NEW ROOF CURB AND EQUIPMENT. PATCH IN ROOF SYSTEM AFTER OTHER WORK IN COMPLETE.

4.104 AREA OF BALLAST ROOF REMOVAL AND REINSTALLATION.

4.105 EXISTING MECHANICAL EQUIPMENT.

4.106 SEE DETAIL 1/A-501 AT STEEL SUPPORT COLUMNS (4) SEE STRUCTURAL DRAWINGS FOR LOCATIONS.

4.107 SEE DETAIL 2/A-501 AT DUCT OPENINGS (2) SEE MECHANICAL DRAWINGS FOR LOCATIONS.



KEY PLAN

Mead & Hunt

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
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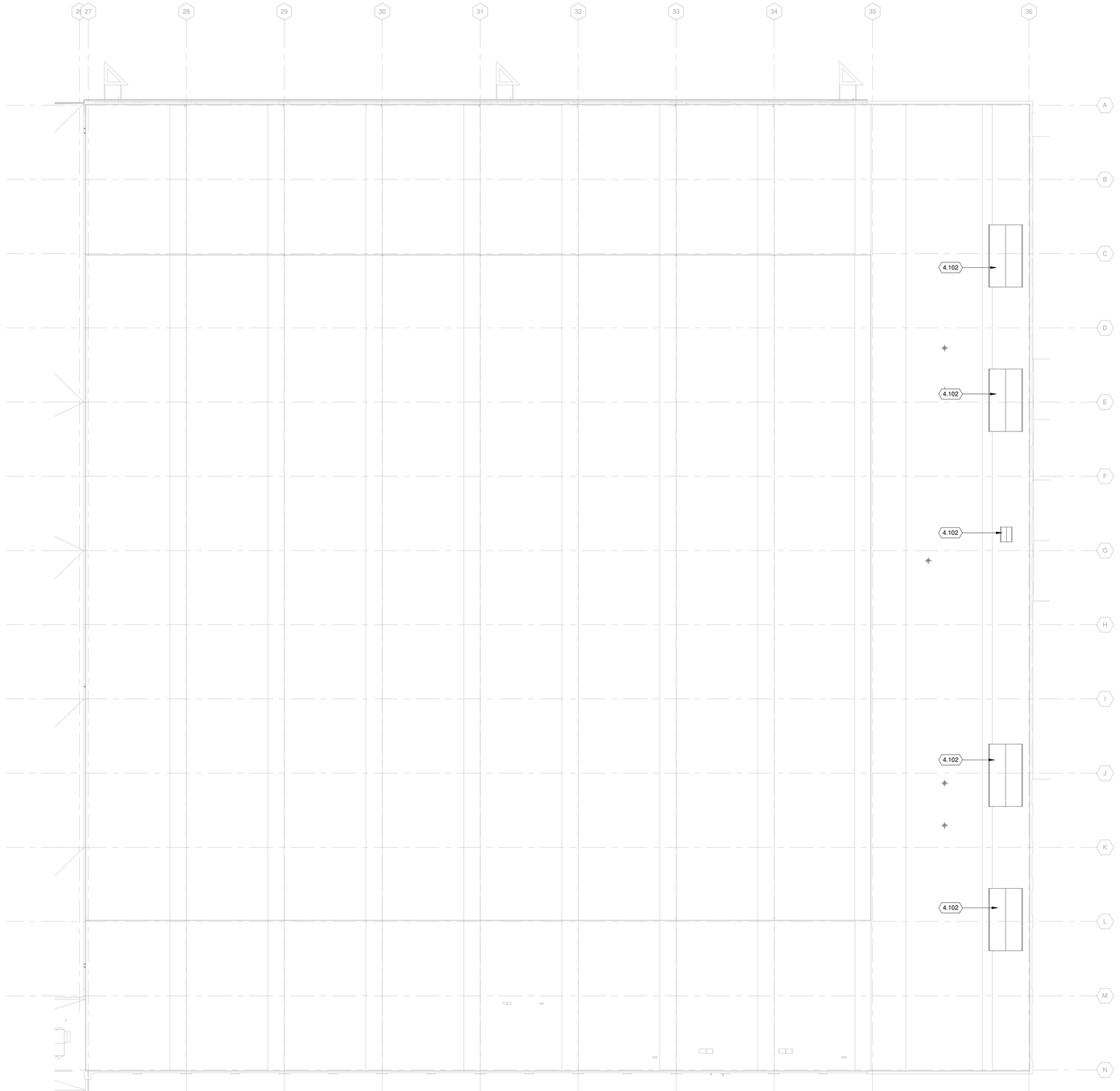
SHEET CONTENTS
ROOF PLAN - ZONES 3 & 4

SHEET NO.:
A-202



TRUE NORTH PLAN NORTH

1 ROOF PLAN - ZONE 5

1/16" = 1'-0"

ROOF PLAN GENERAL NOTES:

1. ALL WORK TO BE DONE ON 2 YEAR OLD EXISTING BALLAST EPDM ROOF SHALL BE DONE BY A CERTIFIED FIRESTONE INSTALLER. ALL WORK COMPLETED TO BE INSPECTED BY FIRESTONE AND REPORTED THAT EXISTING WARRANTEE IS STILL INTACT.
2. ELEVATION 100'-0" = FINISHED FLOOR +/- ON THE WEST END OF THE FACILITY. THE FLOOR SLOPES UP MOVING TO THE EAST. THE FINISHED FLOOR IS 102'-4" +/- AT THE EAST END OF THE FACILITY.
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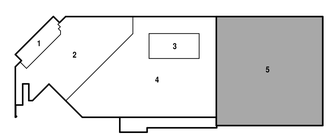
4. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.

KEYED NOTES

4.102 PATCH EXISTING ROOF AFTER NEW CURB AND EQUIPMENT IS INSTALLED.



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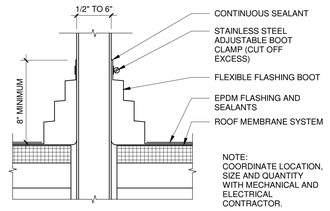
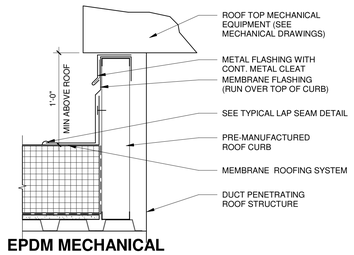
SHEET CONTENTS
ROOF PLAN - ZONE 5

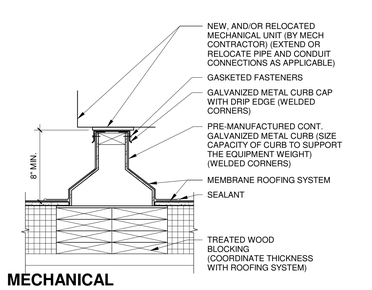
SHEET NO.:
A-203



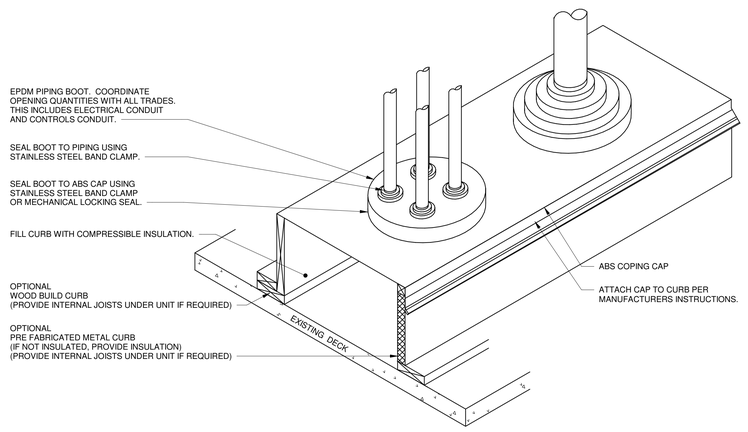
1 PIPE PENTRATION - EPDM
1 : 1



2 EPDM MECHANICAL DUCT PENTRATION CURB
1 1/2" = 1'-0"



3 MECHANICAL EQUIPMENT SUPPORT CURB
1 1/2" = 1'-0"



4 MULTIPLE PIPE PENETRATIONS THRU ROOF DETAIL
12" = 1'-0"

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SHEET CONTENTS
DETAILS

SHEET NO.:
A-501

FIRE PROTECTION GENERAL NOTES

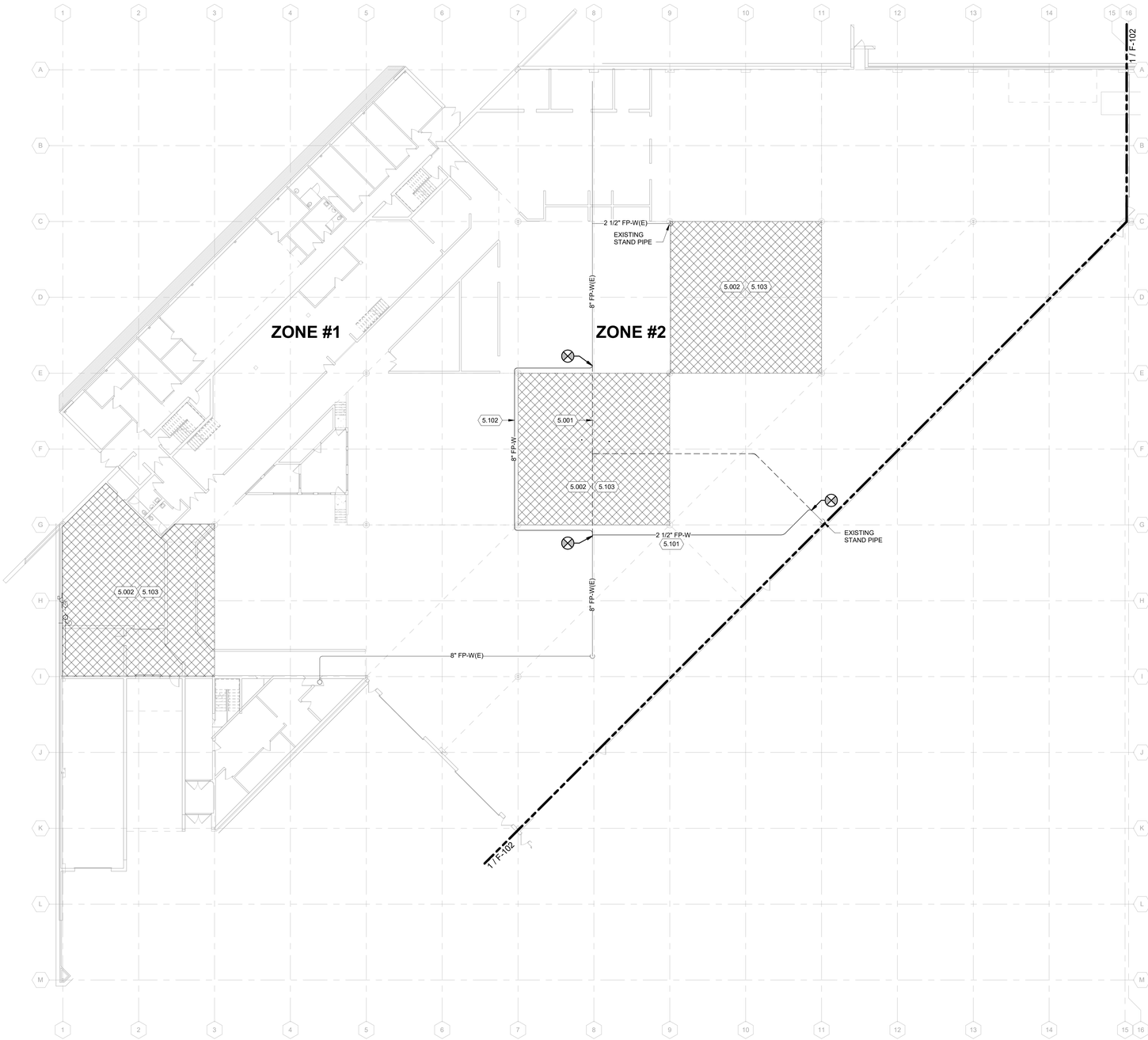
1. ABBREVIATIONS INDICATED HERE AND NOT USED IN THE CONTRACT. DOCUMENTS DO NOT APPLY TO THIS PROJECT. ADDITIONAL ABBREVIATIONS MAY BE INDICATED IN THE CONTRACT DOCUMENTS.
2. THESE DRAWINGS ARE DESIGN DRAWINGS AND ARE DIAGRAMMATIC, THEY MAY NOT SHOW ALL PHYSICAL ARRANGEMENTS, OFFSETS, BENDS, OR ELBOWS WHICH MAY BE REQUIRED FOR PROPER INSTALLATION OF VARIOUS MATERIALS, EQUIPMENT, AND PIPING SYSTEMS IN ALLOTTED SPACES. EXAMINE THESE AND OTHER AVAILABLE DRAWINGS TO DETERMINE SPACE LIMITATIONS AND INTERFERENCES. MAKE ANY MINOR CHANGES IN LOCATIONS OF EQUIPMENT, AND PIPING FROM THAT SHOWN ON DRAWINGS AND FOR ALL PHYSICAL DETAILS REQUIRED FOR INSTALLATION. COST FOR ADAPTING WORK TO JOB SITE CONDITIONS SHALL NOT BE CONSIDERED AS BASIS OF AN EXTRA COST TO CONTRACT.
3. ELEVATION OF PIPING INDICATED ON THESE DRAWINGS ARE TO BE USED AS GUIDELINES TO ASSIST WITH INSTALLATIONS. MINOR CHANGES TO THESE ELEVATIONS MAY BE NECESSARY TO ELIMINATE UNFORESEEN INTERFERENCES. ANY CHANGE IN ELEVATION SHALL BE APPROVED PRIOR TO CHANGE.
4. ANY AND ALL INFORMATION SHOWN ON THESE DRAWINGS WITH RESPECT TO EXISTING STRUCTURES, UTILITIES, AND MECHANICAL SYSTEMS, IS AS EXACT AS COULD BE SECURED. THE INFORMATION IS NOT WARRANTED NOR GUARANTEED ACCURATE, FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO PROCEEDING WITH WORK.
5. DO NOT SCALE DRAWINGS. USE GIVEN DIMENSIONS. CONTRCTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AT THE PROJECT SITE PRIOR TO THE START OF CONSTRUCTION. WHERE SPECIFIC DEMENSIONS, DETAILS OR DESIGN INTENT CANNOT BE DETERMIND, CONSULT FIRE PROTECTION DESIGNER BEFORE PROCEEDING WITH THE WORK.
6. SEQUENCE OF WORK AND/OR PLACE OF COMMENCEMENT OF WORK SHALL BE APPROVED PRIOR TO WORK BEING STARTED. SCHEDULED SHUTDOWNS SHALL BE CLOSELY COORDINATED WITH OWNER & EXISTING OPERATIONS.
7. ACCURATE AND LEGIBLE RECORD (AS-BUILT) DRAWINGS SHALL BE MAINTAINED AT THE JOB SITE, AND BE SUBMITTED PRIOR TO FINAL PAYMENT.
8. VERIFY ALL EQUIPMENT LOCATIONS AND PIPE ROUTING WITH OWNER PRIOR TO INSTALLATION.
9. ALL SPRINKLER IN ACOUSTICAL CELINGS SHALL BE LOCATED IN THE CENTER OF CEILING TILE.
10. PROVIDE CONCEALED SPRINKLER HEADS IN ALL FINISHED AREAS.
11. COORDINATE WITH ARCHITECTURAL PLANS FOR CEILINGS TYPES AND HEIGHTS.
12. VISIT THE BUILDING SITE & BECOME THOROUGHLY FAMILIAR WITH ALL EXISTING CONDITIONS AFFECTING WORK.
13. NOMINAL FINISHED FLOOR ELEVATION = 100.0 FT. UNLESS OTHERWISE NOTED.
14. THE ZONE LABELS OF #1 THRU #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

FIRE PROTECTION SYMBOLS:

- FIRE DEPARTMENT CONNECTION
- ORIFICE
- FLOW SWITCH
- ALARM BELL
- ISOLATION VALVE
- GATE VALVE
- PRESSURE GAUGE
- CHECK VALVE
- VALVE SUPERVISION/TAMPER SWITCH
- STRAINER
- PIPE DROP
- PIPE RISE
- STRAINER

FIRE PROTECTION ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
BPD	BACKFLOW PREVENTION DEVICE
CW	COLD WATER
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DI	DUCTILE IRON
FDC	FIRE DEPARTMENT CONNECTION
FH	FIRE HYDRANT
FPE	PROFESSIONAL FIRE PROTECTION ENGINEER
PIV	POST INDICATOR VALVE
SP	SPRINKLER MAIN ENGINEER
TFB	TO FLOOR BELOW



KEYED NOTES

5.001 DEMOLISH WET SPRINKLER PIPE MAIN AS NEEDED TO ACCOMMODATE INSTALLATION OF NEW STRUCTURE AND MECHANICAL EQUIPMENT.

5.002 DEMOLISH ALL SPRINKLER PIPE BRANCHES WHERE STRUCTURE AND MECHANICAL WORK IS BEING PERFORMED.

5.101 RE-ROUTE NEW FIRE PIPE TO EXISTING STAND PIPE.

5.102 RE-ROUTE FIRE MAIN PIPE AROUND AREA OF WORK.

5.103 ROUTE NEW SPRINKLER PIPE AND INSTALL NEW SPRINKLER HEADS AFTER STRUCTURAL AND MECHANICAL WORK IS COMPLETE.

FIRE PROTECTION GROUP PATTERN LEGEND:

- LIGHT HAZARD
- ORDINARY HAZARD GROUP 1
- ORDINARY HAZARD GROUP 2

NFPA-13 HYDRAULIC CALCULATION STANDARD

HAZARD CLASSIFICATION	DENSITY GPM/SQ.FT	AREA OF SPRINKLER OPERATION SQ.FT	TOTAL HOSE STREAM GPM	DURATION MINIMUM
LIGHT HAZARD	0.10	1500	100	60
ORDINARY HAZARD GROUP 1	0.15	1500	250	60-90
ORDINARY HAZARD GROUP 2	0.20	1500	250	60-90

* THE MOST HYDRAULICALLY REMOTE LOCATIONS MUST MEET THE ABOVE REQUIREMENTS.

WATER SUPPLY FLOW BASES FOR BID:

NOTE: INFORMATION SHOWN FOR BID ONLY, NOT FOR DESIGN.

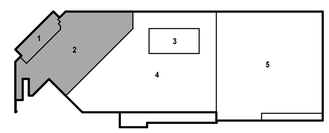
FIRE PROTECTION DESIGN / INSTALLATION CONTRACTOR SHALL CONDUCT SEPARATE WATER FLOW TEST AND USE RESULTS IN HYDRAULIC CALCULATIONS.

DATE OF TEST:	7/24/2018
LOCATION:	HYDRAULIC MODEL
TEST HYDRANTS	H-1, 100 S. INGERSOL ST.
HYD. OUTLET ELEV.:	20" OFF FINISHED GRADE
STATC PRESSURE:	86 PSI
RESIDUAL PRESSURE:	76 PSI
FLOW GPM:	2000 GPM

TRUE NORTH PLAN NORTH

1 FIRST FLOOR SPRINKLER PLAN - ZONES 1 & 2

1/16" = 1'-0"



KEY PLAN

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: JET
DRAWN BY: JET
CHECKED BY: DJG
DO NOT SCALE DRAWINGS

SHEET CONTENTS
FIRST FLOOR FIRE SPRINKLER PLAN

SHEET NO.:
F-101

TRUE NORTH PLAN NORTH

1 FIRST FLOOR SPRINKLER PLAN - ZONES 3 & 4

1/16" = 1'-0"

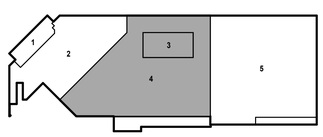
FIRE PROTECTION GROUP PATTERN LEGEND:

- LIGHT HAZARD
- ORDINARY HAZARD GROUP 1
- ORDINARY HAZARD GROUP 2

KEYED NOTES

5.002 DEMOLISH ALL SPRINKLER PIPE BRANCHES WHERE STRUCTURE AND MECHANICAL WORK IS BEING PERFORMED.

5.103 ROUTE NEW SPRINKLER PIPE AND INSTALL NEW SPRINKLER HEADS AFTER STRUCTURAL AND MECHANICAL WORK IS COMPLETE.



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SHEET CONTENTS
FIRST FLOOR FIRE SPRINKLER PLAN

SHEET NO.:

F-102

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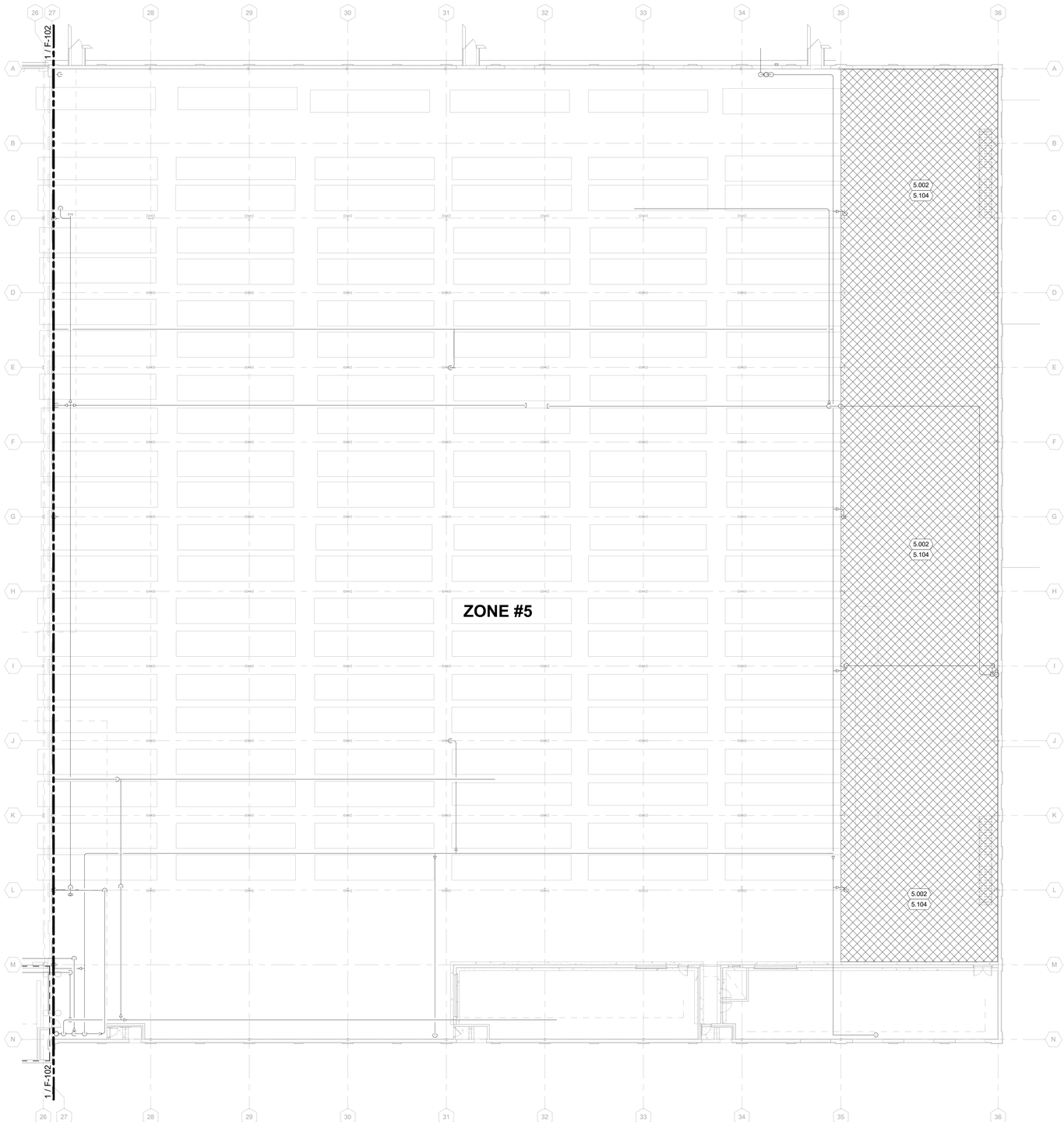


TRUE NORTH PLAN NORTH

1 **FIRST FLOOR SPRINKLER PLAN - ZONE 5**

1/16" = 1'-0"

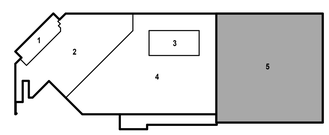
FIRE PROTECTION GROUP PATTERN LEGEND:

- LIGHT HAZARD
- ORDINARY HAZARD GROUP 1
- ORDINARY HAZARD GROUP 2

KEYED NOTES

5.002 DEMOLISH ALL SPRINKLER PIPE BRANCHES WHERE STRUCTURE AND MECHANICAL WORK IS BEING PERFORMED.

5.104 RE-ROUTE SPRINKLER HEADS AS NEEDED TO ACCOMMODATE SPRINKLER COVERAGE ABOVE NEW MECHANICAL EQUIPMENT. PROVIDE WET SPRINKLER COVERAGE BELOW ANY PLATFORMS, EQUIPMENT, OR DUCTWORK GREATER THAN 48 INCHES WIDE.



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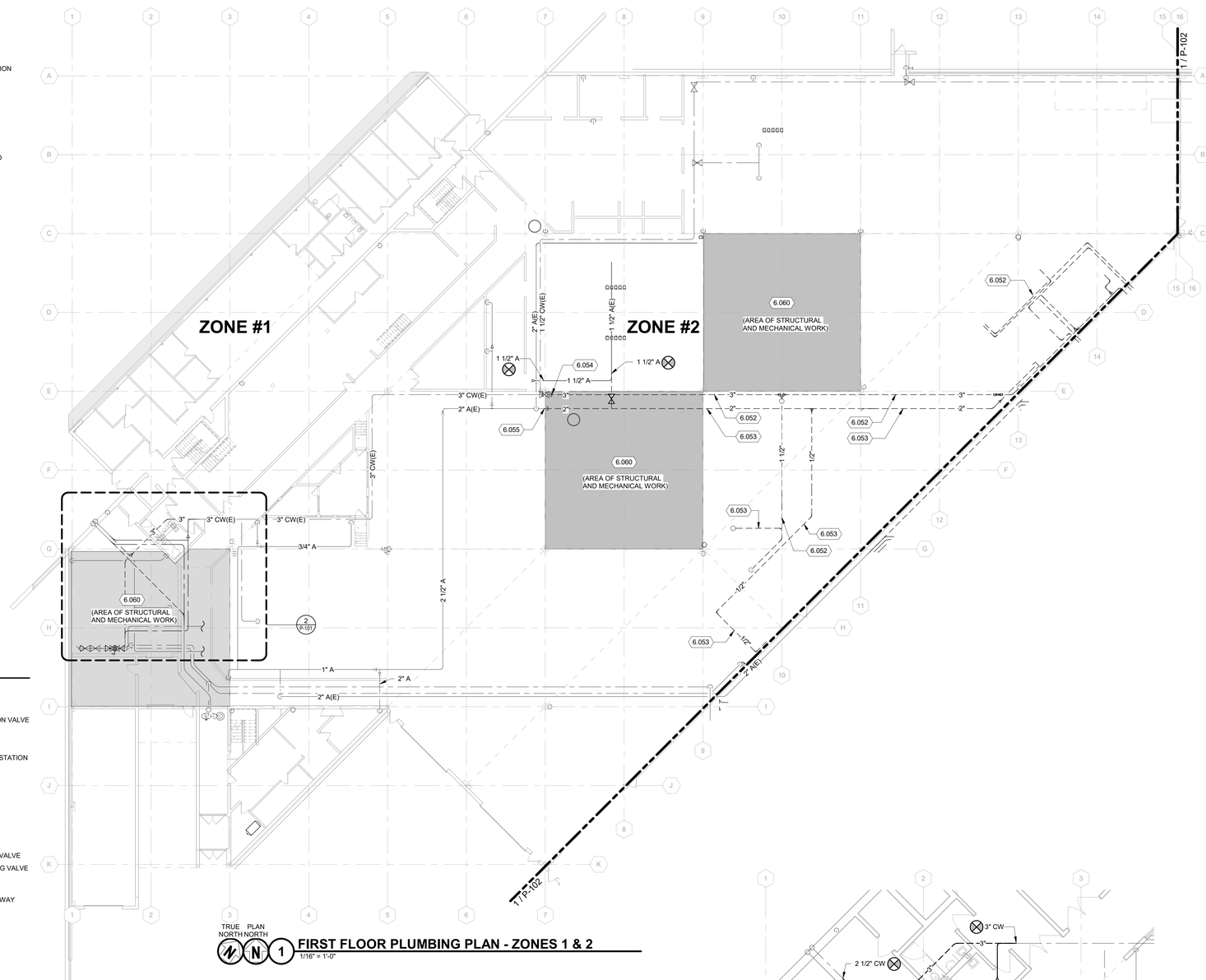
SHEET CONTENTS
FIRST FLOOR FIRE SPRINKLER PLAN

SHEET NO.:
F-103

A	AMPS
ABI	ALTERNATE BID ITEM
AFF	ABOVE FINISHED FLOOR
AGD	ABOVE GROUND
AHJ	AUTHORITY HAVING JURISDICTION
ALUM	ALUMINUM
APPROX	APROXIMATELY
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASL	ABOVE SEA LEVEL
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASSE	AMERICAN SOCIETY OF SANITARY ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESSTING AND MATERIALS
BLDG	BUILDING
BPD	BACKFLOW PREVENTION DEVICE
BR	BRAZE
BRS	BRASS
BRZ	BRONZE
BS	BLACK (MILD) STEEL
BTU	BRITISH THERMAL UNIT
BW	BUTT WELD
BZ	BRONZE
CI	CAST IRON
CISPI	CAST IRON SOIL PIPE INSTITUTE
CL	CENTERLINE
COMP	COMPRESSOR
CRA	CONCRETE REACTION ANCHOR
CS	CARBON STEEL
CU	COPPER OR CUBIC
DBA	DECIBELS, BAND A
DCVA	DOUBLE CHECK VALVE ASSEMBLY BPD
DEG	DEGREE
DEMO	DEMOLISH OR DEMOLITION
DI	DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DISCH	DISCHARGE
DN	DOWN
DWG	DRAWING
DWV	DRAIN, WASTE AND VENT
E	EXISTING
EEW	EMERGENCY EYE/FACE WASH
EFF	EFFICIENCY
EL	ELEVATION
ELEC	ELECTRIC
EQPT	EQUIPMENT
ESEW	EMERGENCY SHOWER/EYE WASH
ET	EXPANSION TANK
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
F	FAHRENHEIT
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FLA	FULL LOAD AMPS
FLOW	FLOW OR FLOWRATE
FPM	FEET PER MINUTE
FS	FLOOR SINK
FT	FEET
GAL	GALLON OR GAUGE
GBS	GASKETED BELL AND SPIGOT
GPM	GALLONS PER MINUTE
GR	GROOVED
GS	GALVANIZED STEEL
H	HEIGHT
HC	HOSE CONNECTION
HP	HORSE POWER
HZ	HERTZ
IAW	IN ACCORDANCE WITH
IBNLT	INCLUDED BUT NOT LIMITED TO
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCH
IPC	INTERNATIONAL PLUMBING CODE
L	LENGTH OR LAVATORY
LB	POUNDS
LCO	LINE CLEAN OUT
LIN	LINEAR
LPG	LIQUIFIED PETROLEUM GAS
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MIN	MINIMUM
MMBH	MILLION BTU PER HOUR
MOCP	MINIMUM OVER CURRENT PROTECTION
MTL	MATERIAL
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NG	NATURAL GAS
NH	NO-HUB
NHC	NO-HUB COUPLING
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
P	PRESSURE
PD	PRESSURE DROP/DIFFERENTIAL
PE	POLYETHYLENE
PH	PHASE
PL	PLACES
PP	POLYPROPYLENE
PSI	POUNDS PER SQUARE INCH
PSIA	PSI ABSOLUTE
PSID	PSI DIFFERENTIAL
PSIG	PSI GAGE
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RCP	REINFORCED CONCRETE PIPE
REF	REFERENCE
RPM	REVOLUTIONS PER MINUTE
SCH	SCHEDULE
SCO	STACK CLEANOUT
SD	SOLDER
SDR	STANDARD DIMENSION RATIO
SH	SHOWER
SHT	SHEET
SMLS	SEAMLESS
SP	STATIC PRESSURE
SPEC	SPECIFICATIONS
SQ	SQUARE
SRV	SAFETY RELIEF VALVE
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
SV	SOLVENT WELD
SW	SOCKET WELD
TDH	TOTAL DEVELOPED HEAD
TDS	TOTAL DISSOLVED SOLIDS
TEMP	TEMPERATURE
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TYP	TYPICAL
UGD	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
V	VOLTS OR VENT
VLV	VALVE
VTR	VENT THROUGH ROOF
W	WATTS OR WIDTH
WC	WATER CLOSET
WCO	WALL CLEANOUT
YCO	YARD CLEANOUT

PIPING SYMBOLS

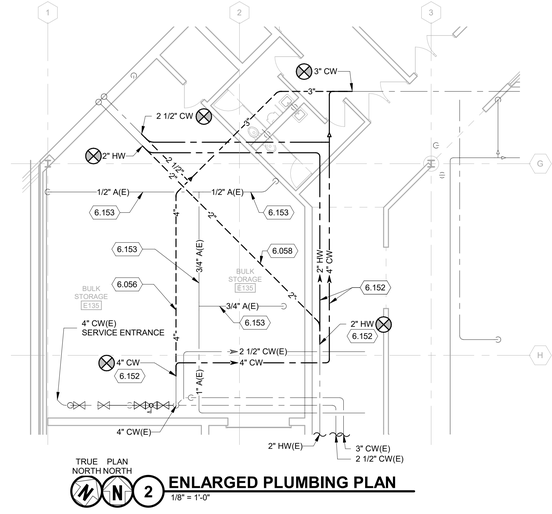
- PIPE TURNED TOWARD
- PIPE TURNED AWAY
- PIPE TURNED AWAY
- PIPE TURNED TOWARD
- FLEXIBLE CONNECTOR
- UNION
- FLANGES
- REDUCER (CONCENTRIC)
- REDUCER (ECCENTRIC)
- PIPE CAP
- PIPE PLUG
- FLUID FLOW DIRECTION
- PG — PIPE GUIDE
- PA — PIPE ANCHOR
- PITCH — PIPE PITCH DIRECTION
- NEW CONNECTION TO EXISTING
- EXISTING TO REMAIN
- EXISTING TO BE REMOVED
- NEW TO BE INSTALLED
- PRESSURE GAUGE
- TEMPERATURE GAUGE
- WATER HAMMER ARRESTOR
- AV — AIR VENT (AUTO)
- MV — AIR VENT (MANUAL)
- AUTOMATIC CONTROL VALVE (2-WAY)
- AUTOMATIC CONTROL VALVE (3-WAY)
- BALL VALVE
- BALANCING VALVE
- BUTTERFLY VALVE
- BACKFLOW PREVENTION VALVE
- CHECK VALVE
- FILTER
- FLOW MEASUREMENT STATION
- GATE VALVE
- GAUGE CONNECTION
- GLOBE ANGLE VALVE
- GLOBE VALVE
- ISOLATION/SHUT-OFF/ MANUAL VALVE
- PLUG VALVE
- PRESSURE REDUCING VALVE
- PRESSURE REGULATING VALVE
- RELIEF VALVE
- SOLENOID VALVE ONE-WAY (ELECTRIC)
- STRAINER
- THROTTLING VALVE
- VACUUM BREAKER
- FS — FLOW SENSOR
- LS — LEVEL SENSOR
- PS — PRESSURE SENSOR
- TS — TEMPERATURE SENSOR



TRUE NORTH PLAN NORTH 1

FIRST FLOOR PLUMBING PLAN - ZONES 1 & 2

1/16" = 1'-0"



TRUE NORTH PLAN NORTH 2

ENLARGED PLUMBING PLAN

1/8" = 1'-0"

PLUMBING GENERAL NOTES

1. ABBREVIATIONS INDICATED HERE AND NOT USED IN THE CONTRACT DOCUMENTS DO NOT APPLY TO THIS PROJECT. ADDITIONAL ABBREVIATIONS MAY BE INDICATED IN THE CONTRACT DOCUMENTS.
2. THESE DRAWINGS ARE DESIGN DRAWINGS AND ARE DIAGRAMMATIC, THEY MAY NOT SHOW ALL PHYSICAL ARRANGEMENTS, OFFSETS, BENDS, OR ELBOWS WHICH MAY BE REQUIRED FOR PROPER INSTALLATION OF VARIOUS MATERIALS, EQUIPMENT, AND PIPING SYSTEMS IN ALLOTTED SPACES. EXAMINE THESE AND OTHER AVAILABLE DRAWINGS TO DETERMINE SPACE LIMITATIONS AND INTERFERENCES. MAKE ANY MINOR CHANGES IN LOCATIONS OF EQUIPMENT, AND PIPING FROM THAT SHOWN ON DRAWINGS AND FOR ALL PHYSICAL DETAILS REQUIRED FOR INSTALLATION. COST FOR ADAPTING WORK TO JOB SITE CONDITIONS SHALL NOT BE CONSIDERED AS BASIS OF AN EXTRA COST TO CONTRACT.
3. ELEVATION OF PIPING INDICATED ON THESE DRAWINGS ARE TO BE USED AS GUIDELINES TO ASSIST WITH INSTALLATIONS. MINOR CHANGES TO THESE ELEVATIONS MAY BE NECESSARY TO ELIMINATE UNFORESEEN INTERFERENCES. ANY CHANGE IN ELEVATION SHALL BE APPROVED PRIOR TO CHANGE.
4. ANY AND ALL INFORMATION SHOWN ON THESE DRAWINGS WITH RESPECT TO EXISTING STRUCTURES, UTILITIES, AND MECHANICAL SYSTEMS, IS AS EXACT AS COULD BE SECURED. THE INFORMATION IS NOT WARRANTED NOR GUARANTEED ACCURATE, FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO PROCEEDING WITH WORK.
5. DO NOT SCALE DRAWINGS. USE GIVEN DIMENSIONS. CONTRCTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AT THE PROJECT SITE PRIOR TO THE START OF CONSTRUCTION. WHERE SPECIFIC DEMENSIONS, DETAILS OR DESIGN INTENT CANNOT BE DETERMIND, CONSULT COR BEFORE PROCEEDING WITH THE WORK.
6. SEQUENCE OF WORK AND/OR PLACE OF COMMENCEMENT OF WORK SHALL BE APPROVED PRIOR TO WORK BEING STARTED. SCHEDULED SHUTDOWNS SHALL BE CLOSELY COORDINATED WITH OWNER & EXISTING OPERATIONS.
7. ACCURATE AND LEGIBLE RECORD (AS-BUILT) DRAWINGS SHALL BE MAINTAINED AT THE JOB SITE, AND BE SUBMITTED PRIOR TO FINAL PAYMENT.
8. VERIFY ALL EQUIPMENT LOCATIONS AND PIPE ROUTING WITH OWNER PRIOR TO INSTALLATION.
9. ALL SPRINKLER IN ACOUSTICAL CELINGS SHALL BE LOCATED IN THE CENTER OF CEILING TILE.
10. PROVIDE CONCEALED SPRINKLER HEADS IN ALL FINISHED AREAS.
11. COORDINATE WITH ARCHITECTURAL PLANS FOR CEILINGS TYPES AND HEIGHTS.
12. VISIT THE BUILDING SITE & BECOME THOROUGHLY FAMILIAR WITH ALL EXISTING CONDITIONS AFFECTING WORK.
13. NOMINAL FINISHED FLOOR ELEVATION = 100.0 FT. UNLESS OTHERWISE NOTED.
14. GENERAL NOTES APPLY UNLESS NOTED OTHERWISE
15. CONTRACTOR SHALL FOLLOW SYSTEM IMPAIRMENT REQUIREMENTS PER NFPA.
16. QUALIFIED CONTRACTORS SHALL INSTALL BOTH FIRE SUPPRESSION AND FIRE DETECTION AS AN ALL INCLUSIVE SYSTEM.
17. THE ZONE LABELS OF #1 THRU #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

PLUMBING DEMOLITION NOTES

1. PIPING AND EQUIPMENT TO BE DEMOLISHED IS SHOWN DRAWN ON PLANS WITH BOLD AND DASHED LINES.
2. WHERE PIPES ARE REMOVED, ALSO REMOVE ALL VALVES, INSULATION, HANGERS, SUPPORTS, AND OTHER ASSOCIATED COMPONENTS.
3. WHERE FIXTURES AND EQUIPMENT ARE REMOVED, ALSO REMOVE ALL ASSOCIATED ROUGH-IN PIPING.
4. WHERE PIPES ARE REMOVED AND NOT RE-CONNECTED, REMOVE PIPE BACK TO NEXT BRANCH THAT IS TO REMAIN. INSTALL CAPS OR PLUGS ON OPENINGS. INSULATE AND PAINT DISTURBED PIPE SAME AS SPECIFIED FOR NEW WORK.
5. ABANDON IN PLACE UNDERGROUND PIPES SHOWN ON PLANS AS PHANTOM.
6. WHERE PIPES ARE ROUTED INSIDE CMU WALLS, PIPE MAY BE ABANDONED PIPE IN PLACE. REMOVE PIPE TO 1" INSIDE WALL ON BOTH ENDS OF PIPE. DETERMINE WHERE PIPE EMERGES FROM CMU WALL AND PIPE BACK TO NEXT BRANCH THAT IS TO REMAIN.
7. WHERE PIPES PASS THROUGH FLOOR SLABS, SAW-CUT SLAB AND REMOVE CONCRETE TO MINIMUM EXTENT NECESSARY TO GAIN ACCESS TO BELOW SLAB. REMOVE PIPE DOWN TO HORIZONTAL PIPING BELOW FLOOR.
8. PATCH EXISTING ROOFS, WALLS, AND FLOORS DISTURBED BY DEMOLITION. RESTORE TO MATCH CONDITION OF ORIGINAL SURROUNDING SURFACES PER SATISFACTION OF OWNER.

KEYED NOTES

6.052 DEMOLISH ALL COLD WATER PIPE FOR PREVIOUS BUS WASH.

6.053 DEMOLISH COMPRESSED AIR LINE FOR PREVIOUS BUS WASH.

6.054 CAP COLD WATER AT THIS LOCATION.

6.055 CAP COMPRESSED AIR AT THIS LOCATION.

6.056 DEMOLISH EXISTING COLD WATER PIPE AS NEEDED TO CONSTRUCT NEW STRUCTURAL SUPPORTS FOR NEW MECHANICAL SYSTEM.

6.058 DEMOLISH HOT WATER PIPING IN AREA OF CONSTRUCTION.

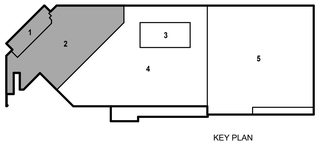
6.060 PC TO REMOVE ALL PIPING REQUIRED TO LET IN NEW STRUCTURE & EQUIPMENT. REINSTALL ONCE NEW WORK IN COMPLETE.

6.152 ROUTE WATER PIPE AROUND AREA OF CONSTRUCTION TO MAINTAIN ALL WATER SERVICES IN THE BUILDING DURING CONSTRUCTION.

6.153 DEMOLISH ALL COMPRESSED AIR PIPING WITHIN STORAGE E135. INSTALL NEW COMPRESSED AIR PIPING IN SAME LOCATION AS EXISTING UPON COMPLETION OF THE STRUCTURAL AND MECHANICAL WORK.

PLUMBING PIPING:

- A - COMPRESSOR AIR
- CW - DOMESTIC COLD WATER
- HW - DOMESTIC HOT WATER
- DEMOLISHED PIPE



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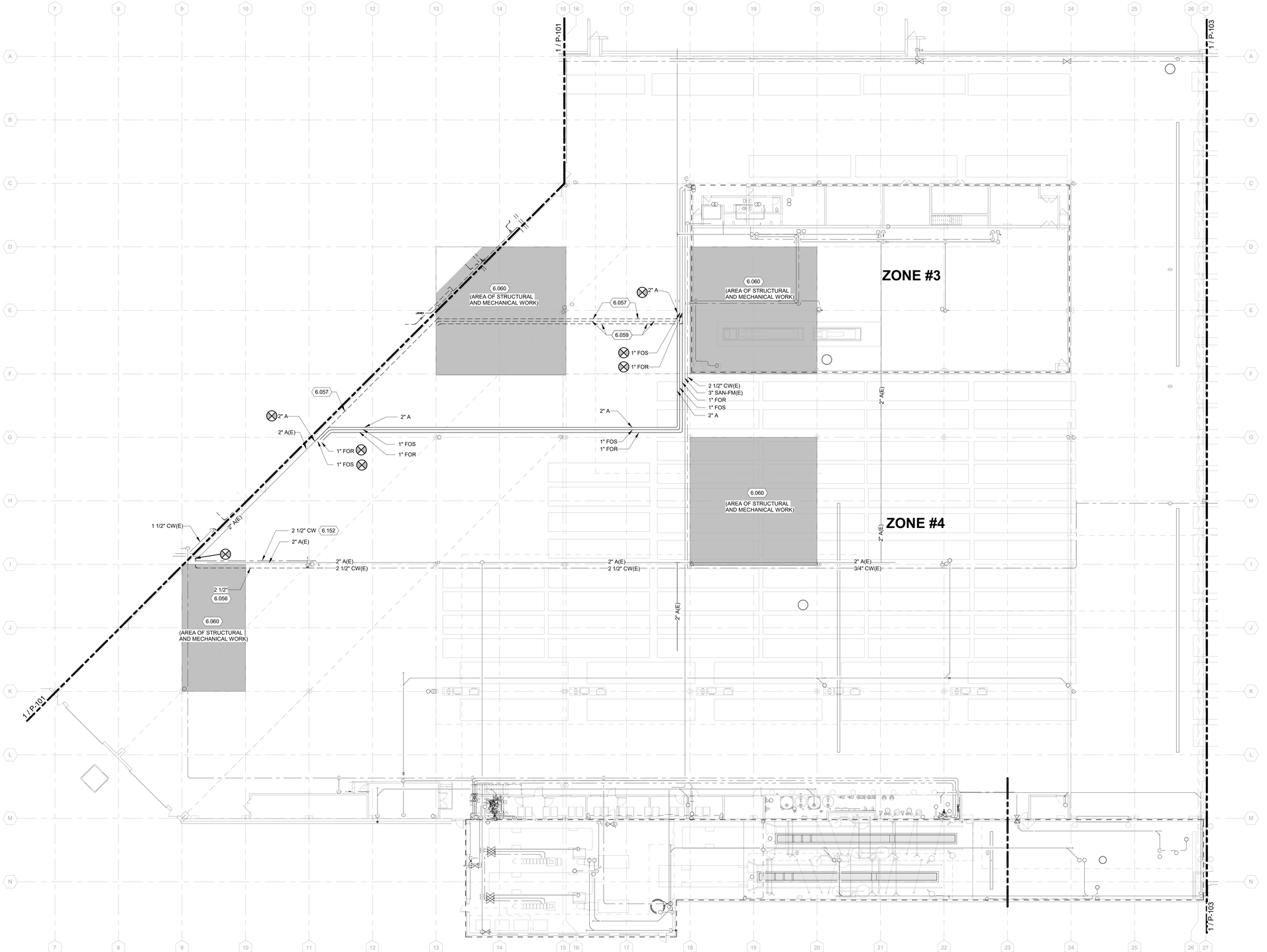
SHEET CONTENTS
FIRST FLOOR PLUMBING PLAN

SHEET NO.:
P-101



KEYED NOTES

6.056 DEMOLISH EXISTING COLD WATER PIPE AS NEEDED TO CONSTRUCT NEW STRUCTURAL SUPPORTS FOR NEW MECHANICAL SYSTEM.

6.057 DEMOLISH COMPRESSED AIR PIPING IN AREA OF CONSTRUCTION.

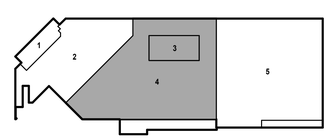
6.059 DEMOLISH FUEL OIL SUPPLY AND RETURN PIPING IN AREA OF CONSTRUCTION.

6.060 PC TO REMOVE ALL PIPING REQUIRED TO LET IN NEW STRUCTURE & EQUIPMENT. REINSTALL ONCE NEW WORK IN COMPLETE.

6.152 ROUTE WATER PIPE AROUND AREA OF CONSTRUCTION TO MAINTAIN ALL WATER SERVICES IN THE BUILDING DURING CONSTRUCTION.

TRUE NORTH PLAN NORTH

1 **FIRST FLOOR PLUMBING PLAN - ZONES 3 & 4**
1/16" = 1'-0"



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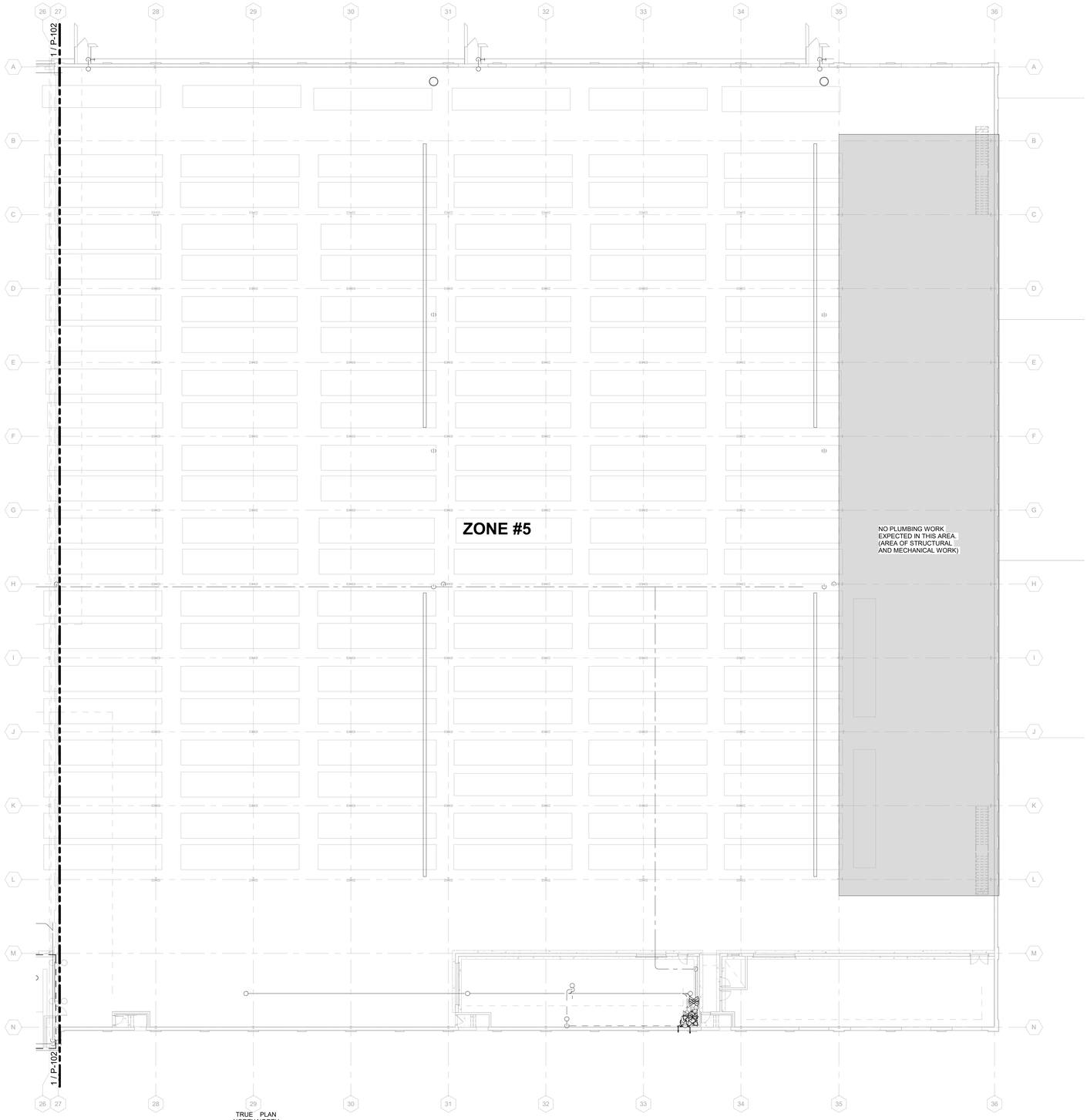
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: JET
DRAWN BY: JET
CHECKED BY: DJG
DO NOT SCALE DRAWINGS

SHEET CONTENTS
FIRST FLOOR PLUMBING PLAN

SHEET NO.:
P-102

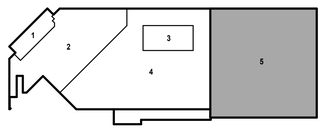
10/30/2019 2:31:38 PM C:\Revit Local\4503500-170148.07-P-Anno-Central-2018_roger.wisinger@meadhunt.com.rvt



TRUE NORTH PLAN NORTH

1 FIRST FLOOR PLUMBING PLAN - ZONE 5

1/16" = 1'-0"



KEY PLAN

Mead & Hunt

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
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metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

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SHEET CONTENTS
FIRST FLOOR PLUMBING PLAN

SHEET NO.:

P-103

HVAC SYMBOLS

- AIRFLOW (SUPPLY/OUTSIDE AIR)
- AIRFLOW (RETURN/EXHAUST)
- DOOR GRILLE (DG)
- 3/4" DOOR UNDERCUT (DCO)
- SUPPLY OR OUTDOOR AIR
- RETURN OR TRANSFER
- EXHAUST
- SUPPLY DUCT TURNED AWAY
- SUPPLY DUCT TURNED TOWARD
- RECTANGLE DUCT SIZE (FIRST FIGURE IS SIDE SHOWN) (12x12)
- ROUND DUCT (RIGID) (12ø)
- OVAL DUCT (12/12ø)
- SMOKE DETECTOR (S)
- FLEXIBLE CONNECTION
- DUCT (FLEXIBLE ROUND)
- TURNING VANES
- TRANSITION (SQUARE-TO-ROUND)
- BACKDRAFT DAMPER (BD)
- VOLUME DAMPER
- FIRE DAMPER & ACCESS DOOR (AD / FD)
- SMOKE DAMPER & ACCESS DOOR (AD / SD)
- COMBINATION FIRE/SMOKE DAMPER & ACCESS DOOR (AD / FSD)
- MOTOR OPERATED DAMPER (MOD)
- CEILING MOUNTED ACCESS PANEL (AP)
- AIR OUTLET/INLET TYPE (CFM) (A / 100)

MECHANICAL PIPING

- COMPRESSED AIR (A)
- BOILER FEED WATER (BFW)
- BOILER SURFACE BLOW DOWN (BSD)
- BOILER BOTTOM BLOW DOWN (BBD)
- CHEMICAL FEED (CF)
- CHILLED WATER SUPPLY (CHWS)
- CHILLED WATER RETURN (CHWR)
- CONDENSER WATER SUPPLY (CWS)
- CONDENSER WATER RETURN (CWR)
- CONDENSATE DRAIN (CD)
- GLYCOL WATER SUPPLY (GWS)
- GLYCOL WATER RETURN (GWR)
- HIGH PRESSURE CONDENSATE RETURN (HPCR)
- HIGH PRESSURE STEAM (HPS)
- HOT WATER SUPPLY (HWS)
- HOT WATER RETURN (HWR)
- ICE WATER SUPPLY (IWS)
- ICE WATER RETURN (IWR)
- LIQUID PETROLEUM (LP)
- LOW PRESSURE STEAM (LPS)
- LOW PRESSURE CONDENSATE RETURN (LPCR)
- MEDIUM PRESSURE STEAM (MPS)
- MEDIUM PRESSURE CONDENSATE RETURN (MPCR)
- NATURAL GAS (G)
- PUMPED CONDENSATE RETURN (PCR)
- REFRIGERANT LIQUID (RL)
- REFRIGERANT SUCTION (RS)
- REFRIGERANT HOT GAS (RHG)
- STEAM VENT (SV)
- TOWER WATER SUPPLY (TWS)
- TOWER WATER RETURN (TWR)
- VACUUM (VAC)

PIPING SYMBOLS

- PIPE TURNED TOWARD
- PIPE TURNED AWAY
- PIPE TURNED AWAY
- PIPE TURNED TOWARD
- FLEXIBLE CONNECTOR
- UNION
- FLANGES
- REDUCER (CONCENTRIC)
- REDUCER (ECCENTRIC)
- PIPE CAP/CLEAN OUT
- PIPE PLUG
- FLUID FLOW DIRECTION (PG)
- PIPE GUIDE (PA)
- PIPE ANCHOR
- PIPE PITCH DIRECTION (PITCH)
- PRESSURE GAUGE
- TEMPERATURE GAUGE
- WATER HAMMER ARRESTOR
- AIR VENT (AUTO) (AV)
- AIR VENT (MANUAL) (MV)
- AUTOMATIC CONTROL VALVE (2-WAY)
- AUTOMATIC CONTROL VALVE (3-WAY)
- BALL VALVE
- BALANCING VALVE
- BUTTERFLY VALVE
- BACKFLOW PREVENTION VALVE
- CHECK VALVE
- EQUIPMENT DRAIN VALVE
- FILTER
- FLOW MEASUREMENT STATION
- GATE VALVE
- GAUGE CONNECTION
- GLOBE ANGLE VALVE
- GLOBE VALVE
- ISOLATION/SHUT-OFF/MANUAL VALVE
- PLUG VALVE
- PRESSURE REDUCING VALVE
- PRESSURE REGULATING VALVE
- RELIEF VALVE
- SOLENOID VALVE ONE-WAY (ELECTRIC) (S)
- STRAINER
- STRAINER WITH BLOW OFF VALVE AND NIPPLE
- THROTTLING VALVE
- VACUUM BREAKER
- PUMP
- FLOW SENSOR (FS)
- LEVEL SENSOR (LS)
- PRESSURE SENSOR (PS)
- TEMPERATURE SENSOR (TS)

GENERAL SYMBOLS

- CARBON MONOXIDE (CO) SENSOR (CO)
- CARBON DIOXIDE (CO2) SENSOR (CO2)
- DIFFERENTIAL PRESSURE SENSOR
- NITROGEN DIOXIDE (NO2) SENSOR (NO2)
- ROOM SENSOR (RS)
- STATIC PRESSURE SENSOR (SP)
- HUMIDISTAT (H)
- TEMPERATURE SENSOR (TS)
- THERMOSTAT (T)
- INSULATED BASE THERMOSTAT (T)
- SWITCH ($)
- NEW CONNECTION TO EXISTING
- EXISTING TO REMAIN
- EXISTING TO BE REMOVED
- NEW TO BE INSTALLED

GENERAL NOTES

1. THE MECHANICAL CONTRACTOR SHALL EXAMINE ALL CONTRACT DOCUMENTS AND IS REQUIRED TO DO ALL WORK WHICH IS SHOWN ON THE DRAWINGS, STATED IN THE SPECIFICATIONS, OR REASONABLY IMPLIED AS NECESSARY TO COMPLETE THEIR DIVISION OF WORK FOR THIS PROJECT REGARDLESS OF WHERE IN THE CONTRACT DOCUMENTS THE WORK IS REPRESENTED. MECHANICAL CONTRACTOR TO COORDINATE WORK WITH ALL OTHER TRADES. ALL OTHER TRADE DOCUMENTS ARE TO BE CONSIDERED PART OF THIS CONTRACTORS DOCUMENTS WITH RESPECT TO COORDINATION OF WORK BETWEEN TRADES OF WORK.
2. ABBREVIATIONS AND SYMBOLS INDICATED HERE AND NOT USED IN THE CONTRACT DOCUMENTS DO NOT APPLY TO THIS PROJECT. ADDITIONAL ABBREVIATIONS MAY BE INDICATED IN THE CONTRACT DOCUMENTS.
3. THESE DRAWINGS ARE DESIGN DRAWINGS AND ARE DIAGRAMMATIC, THEY MAY NOT SHOW ALL PHYSICAL ARRANGEMENTS, OFFSETS, BENDS, OR ELBOWS WHICH MAY BE REQUIRED FOR PROPER INSTALLATION OF VARIOUS MATERIALS, EQUIPMENT, PIPING AND DUCTWORK SYSTEMS IN ALLOTTED SPACES. EXAMINE THESE AND OTHER AVAILABLE DRAWINGS TO DETERMINE SPACE LIMITATIONS AND INTERFERENCES. MAKE ANY MINOR CHANGES IN LOCATIONS OF EQUIPMENT, PIPING, AND DUCTWORK FROM THAT SHOWN ON DRAWINGS AND FOR ALL PHYSICAL DETAILS REQUIRED FOR INSTALLATION. COST FOR ADAPTING WORK TO JOB SITE CONDITIONS SHALL NOT BE CONSIDERED AS BASIS OF AN EXTRA COST TO CONTRACT.
4. ELEVATION OF PIPING AND DUCTWORK INDICATED ON THESE DRAWINGS ARE TO BE USED AS GUIDELINES TO ASSIST WITH INSTALLATIONS. MINOR CHANGES TO THESE ELEVATIONS MAY BE NECESSARY TO ELIMINATE UNFORESEEN INTERFERENCES. ANY CHANGE IN ELEVATION SHALL BE APPROVED PRIOR TO CHANGE.
5. ANY AND ALL INFORMATION SHOWN ON THESE DRAWINGS WITH RESPECT TO EXISTING STRUCTURES, UTILITIES, AND MECHANICAL SYSTEMS, IS AS EXACT AS COULD BE SECURED. THE INFORMATION IS NOT WARRANTED NOR GUARANTEED ACCURATE, FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO PROCEEDING WITH WORK.
6. ACCURATE AND LEGIBLE AS-BUILT DRAWING MARKUPS SHALL BE MAINTAINED AT THE JOB SITE, AND BE SUBMITTED PRIOR TO FINAL PAYMENT FOR THE CREATION OF FINAL RECORD DRAWINGS.
7. ALL NEW AND EXISTING ROOFING SYSTEMS SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION ACTIVITIES.
8. TEMPORARILY PATCH ALL ROOF OPENINGS WATERTIGHT UNTIL FINAL CLOSURE CAN BE MADE.
9. VERIFY ALL EQUIPMENT LOCATIONS AND PIPE AND DUCT ROUTING WITH OWNER PRIOR TO INSTALLATION.
10. SEQUENCE OF WORK AND/OR PLACE OF COMMENCEMENT OF WORK SHALL BE APPROVED PRIOR TO WORK BEING STARTED. SCHEDULED SHUTDOWNS SHALL BE CLOSELY COORDINATED WITH EXISTING OPERATIONS.
11. MAINTAIN 3'-0" CLEAR HORIZONTALLY IN FRONT OF ALL ELECTRICAL EQUIPMENT.
12. COORDINATE POWER REQUIREMENTS FOR ALL POWER TO MECHANICAL EQUIPMENT INCLUDING CONTROL SYSTEM WITH ELECTRICAL CONTRACTOR AND INSURE ALL COSTS ASSOCIATED WITH SUCH ARE INCLUDED IN THE PROJECT BID COST. PROVIDE ELECTRICAL POWER, TRANFORMERS, RELAYS, ETC. AS NECESSARY TO ALL HVAC AND MECHANICAL CONTROLS.
13. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
14. THE ZONE LABELS OF #1 THRU #5 DEPICT AREAS OF WORK ACTIVITIES THAT RELATE TO THIS SPECIFIC PROJECT. THEY DO NOT RELATE TO ANY NUMBERING OF EXISTING FIRE ZONES, HVAC ZONING OR ZONING OF ELECTRICAL OR TECHNOLOGY SYSTEMS.

ABBREVIATIONS

A	AMPS
ABI	ALTERNATE BID ITEM
AC	DUCTLESS SPLIT SYSTEM
ACC	AIR COOLED CONDENSER
ACCU	AIR COOLED CONDENSING UNIT
ACH	AIR COOLED CHILLER
ACOMP	AIR COMPRESSOR
ACU	AIR CONDITIONING UNIT
ACV	AUTOMATIC CONTROL VALVE
AD	AIR DROP
AF	AIR FILTER OR AIR FOIL
AFC	AFTER COOLER
AFF	ABOVE FINISHED FLOOR
AFMS	AIRFLOW MEASUREMENT STATION
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AL	ALUMINUM
AMD	AIR MIXING DEVICE
ANG	AIR NATIONAL GUARD
APPROX	APPROXIMATELY
AS	AIR SEPARATOR
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AT	AIR TERMINAL
AWC	ABSORPTION CHILLER
BC	BOOSTER COIL
BH	BOOSTER HUMIDIFIER
BHP	BRAKE HORSEPOWER
BHR	CONTINUOUS BLOWDOWN HEAT RECOVERY SYSTEM
BI	BACKWARD INCLINED
BLD	BOILER BLOWDOWN SEPARATOR
BPD	BACKFLOW PREVENTION DEVICE
BRS	BRASS
BRZ	BRONZE
BS	BLACK (MILD) STEEL
BSB	BRANCH SELECTOR BOX
BTU	BUFFER TANK
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
BW	BUTTWELD
BZ	BRONZE
C	CONVECTOR
CA	COMBUSTION AIR
CAD	COMPRESSED AIR DRYER
CAF	COMPRESSED AIR FILTER
CC	COOLING COIL OR CONTROLS CONTRACTOR
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CI	CAST IRON
COMP	COMPRESSOR
COND	CONDENSATE
COR	CONTRACTING OFFICER'S REPRESENTATIVE
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT
CRP	CONDENSATE RETURN PUMP
CS	CENTRIFUGAL SEPARATOR
CT	COOLING TOWER
CTCLG	CLOSE TO CEILING
CTCLM	CLOSE TO COLUMN
CTW	CLOSE TO WALL
CU	COPPER
CUH	CABINET UNIT HEATER
DAC	DOOR AIR CURTAIN
DBA	DECIBELS, BAND A
DC	DUST COLLECTOR
DCVA	DOUBLE CHECK VALVE ASSEMBLY BPD
DDC	DIRECT DIGITAL CONTROL
DDH	DESICCANT DEHUMIDIFIER
DEMO	DEMOLISH
DF	DESTRATIFICATION FAN
DFD	DIVISION OF FACILITIES DEVELOPMENT
DIA	DIAMETER
DIM	DIMENSION
DISCH	DISCHARGE
DMPR	DAMPER
DN	DOWN
DOD	DEPARTMENT OF DEFENSE
DRC	DRY COOLER
DWG	DRAWING
DX	DIRECT EXPANSION
E	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EBH	ELECTRIC BASEBOARD HEATER
EC	EVAPORATIVE COOLER OR ELECTRICAL CONTRACTOR
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EFF	EFFICIENCY
EFT	ENTERING FLUID TEMPERATURE
EG	EXHAUST GRILLE
EGLY	ETHYLENE GLYCOL
EHC	ELECTRIC HEATING COIL
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRIC
EOM	END OF MAIN
EPDM	ETHYLENE PROPYLENE DIENE MONOMER
ERV	AIR-TO-AIR HEAT EXCHANGER
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
ETR	EXISTING TO REMAIN
EWH	ELECTRIC WALL HEATER
EWT	ENTERING WATER TEMPERATURE
°F	FAHRENHEIT
FAF	FORCED AIR FURNACE
FC	FLUID COOLER
FCU	FAN COIL UNIT
FE	FUME EXTRACTOR
FLA	FULL LOAD AMPS
FLR	FLOOR
FM	FLOW METER
FOP	FUEL OIL PUMP
FPM	FEET PER MINUTE
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FLASH TANK OR FEET
FTC	FINNED TUBE CONVECTOR
FTWC	FEET WATER COLUMN PRESSURE
GA	GAUGE
GAL	GALLON
GC	GENERAL CONTRACTOR
GFT	GLYCOL FILL TANK
GPM	GALLONS PER MINUTE
GS	GALVANIZED STEEL
H	HEIGHT
HB	HUMIDIFICATION BOILER
HC	HEATING COIL
HD	HEAD (FT)
HDB	HYDROSTATIC DESIGN BASIS
HP	HEAT PUMP OR HORSEPOWER
HPC	ERV HEAT PUMP COIL
HR	HOSE REEL
HRW	ROTARY AIR-TO-AIR EXCHANGER
HUM	HUMIDIFIER
HWB	HOT WATER BOILER
HX	FLUID HEAT EXCHANGER
HZ	HERTZ
IAW	IN ACCORDANCE WITH
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IH	INTAKE HOOD
IN	INCH
INHG	INCHES MERCURY PRESSURE
INWC	INCHES WATER COLUMN PRESSURE
IR	INFRARED HEATER
JF	JET FAN
KH	KITCHEN HOOD
KW	KILOWATT
L	LOUVER OR LENGTH
LAT	LEAVING AIR TEMPERATURE
LB	POUNDS
LD	LINEAR DIFFUSER
LFT	LEAVING FLUID TEMPERATURE
LPG	LIQUIFIED PETROLEUM GAS
LS	LEVEL SWITCH
LWT	LEAVING WATER TEMPERATURE
MADP	MAXIMUM ALLOWABLE DIFFERENTIAL PRESSURE
MAU	MAKE-UP AIR UNIT
MAWP	MAXIMUM ALLOWABLE WORKING PRESSURE
MAX	MAXIMUM
MBH	THOUSANDS BTU'S PER HOUR
MC	MECHANICAL CONTRACTOR OR MECHANICAL COUPLING
MCA	MINIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MIN	MINIMUM
MMBH	MILLION BTU PER HOUR
MOCP	MINIMUM OVER CURRENT PROTECTION
MOD	MOTOR OPERATED CONTROL DAMPER
MSS	MANUFACTURERS STANDARDIZATION SOCIETY
MTL	MATERIAL
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NG	NATURAL GAS
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NH	NO-HUB
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NPSH	NET POSITIVE SUCTION HEAD
NPSHA	NPSH AVAILABLE
NPSHR	NPSH REQUIRED
OA	OUTSIDE AIR
OC	ON CENTER
OD	OUTSIDE DIAMETER
OED	OPEN ENDED DUCT
P	HYDRONIC PUMP OR PRESSURE
PC	PLUMBING CONTRACTOR
PCP	PRESSURE POWERED CONDENSATE PUMP
PD	PRESSURE DROP/DIFFERENTIAL
PG	PROPYLENE GLYCOL
PH	PHASE
PPH	POUND PER HOUR
PROP	PROPELLER
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	PSI ABSOLUTE
PSID	PSI DIFFERENTIAL
PSIG	PSI GAGE
PTAC	PACKAGED TERMINAL AIR CONDITIONER
PTHP	PACKAGED TERMINAL HEAT PUMP
PVC	POLYVINYL CHLORIDE
RA	RETURN AIR
RCP	RADIANT CEILING PANEL
RDH	REFRIGERATED DEHUMIDIFIER
RG	RETURN GRILLE
RH	RELIEF HOOD
RPM	REVOLUTIONS PER MINUTE
RTD	RESISTIVE THERMAL DEVICE
RTU	ROOF TOP UNIT
RZ	RADIANT FLOOR HEATING ZONE
SA	SUPPLY AIR
SAD	SOUND ATTENUATING DEVICE
SB	SECURITY BARRIER
SCFM	STANDARD CFM
SCH	SCHEDULE
SD	SLOT DIFFUSER/SOLDER
SF	STEAM FILTER OR SUPPLY FAN
SG	SUPPLY GRILLE
SHT	SHEET
SMLS	SEAMLESS
SMS	SNOW MELTING SYSTEM
	DISTRIBUTION MANIFOLD
SP	STATIC PRESSURE
SPEC	SPECIFICATIONS
SQ	SQUARE
SRV	SAFETY RELIEF VALVE
SS	STAINLESS STEEL
ST	STEAM TRAP
STD	STANDARD
STL	STEEL
SV	SOLVENT WELD
SW	SOCKET WELD
T	TEMPERATURE
TA	TRANSFER AIR
TCC	TEMPERATURE CONTROL CONTRACTOR
TCP	TEMPERATURE CONTROL PANEL
TDH	TOTAL DEVELOPED HEAD
TDS	TOTAL DISSOLVED SOLIDS
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TH	THREADED
TMC	TECHNOLOGY MANAGEMENT CENTER
TMV	THERMOSTATIC MIXING VALVE
TONR	TONS COOLING
TYP	TYPICAL
UC	UNIT COOLER
UFC	UNIFIED FACILITIES CRITERIA
UGD	UNDERGROUND
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UTR	UP THRU ROOF
UV	UNIT VENTILATOR OR ULTRAVIOLET
V	VOLTS
VA	VENT AIR
VER	VEHICLE EXHAUST REEL
VFD	VARIABLE FREQUENCY DRIVE
VI	VIBRATION ISOLATORS
VLV	VALVE
VRF	VARIABLE REFRIGERANT FLOW
W	WATTS OR WIDTH
WC	WATER COLUMN
WCC	WATER COOLED CONDENSER
WCH	WATER COOLED CHILLER
WF	WATER FILTER
WIV	WATER INLET VALVE
WHA	WATER HAMMER ARRESTOR

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metro transit

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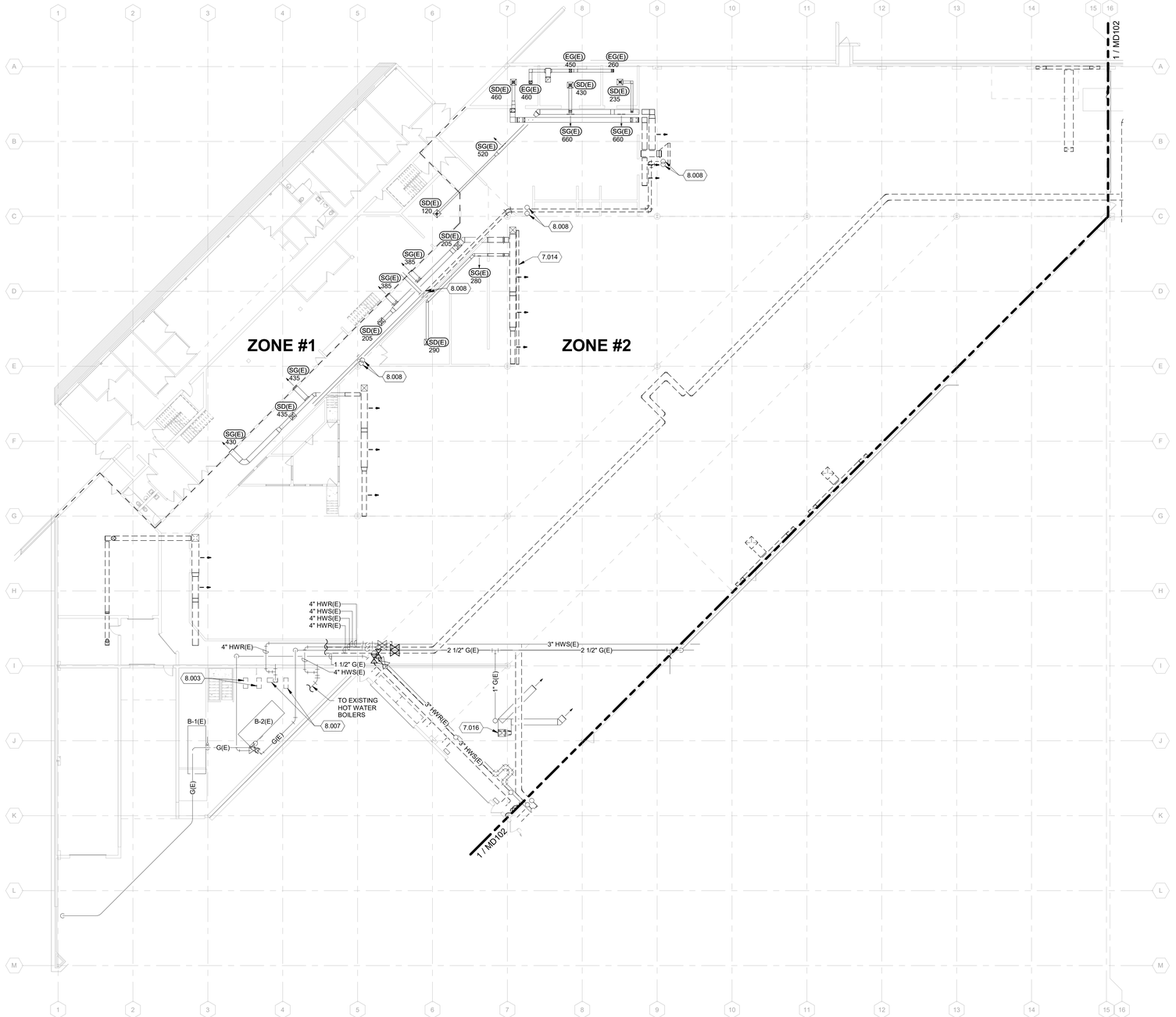
SHEET CONTENTS
NOTES, SYMBOLS AND ABBREVIATIONS

SHEET NO.:
M-001



TRUE NORTH PLAN NORTH

1 FIRST FLOOR MECHANICAL DEMOLITION PLAN - ZONES 1 & 2

1/16" = 1'-0"

GENERAL HVAC DEMOLITION NOTES:

1. COMPLETELY DEMOLISH ALL EXISTING DUCTWORK AS SHOWN WITH BOLD DASHED LINES, INCLUDING ALL ABANDONED AND UNUSED ACCESSORIES, INSULATION, HANGER SUPPORTS, ETC. FOR REMAINING DUCT SYSTEM. PLUG OR CAP ALL OPENINGS CREATED BY DUCT DEMOLITION. TEST DUCTWORK AS SPECIFIED, AND INSULATE OR PAINT SAME AS NEW WORK. PATCH EXISTING WALLS, ROOFS, CEILINGS, AND FLOORS DISTURBED BY DEMOLITION TO ORIGINAL CONDITION.
2. COMPLETELY DEMOLISH ALL EXISTING EQUIPMENT AS SHOWN WITH BOLD DASHED LINES, INCLUDING ALL ABANDONED AND UNUSED ACCESSORIES, INSULATION, HANGERS, SUPPORTS, BASES, CONTROLS, ETC. PATCH EXISTING WALLS, ROOFS, CEILINGS, AND FLOORS DISTURBED BY DEMOLITION TO ORIGINAL CONDITION.
3. DELIVER INDICATED EQUIPMENT TO OWNER'S DESIGNATED STORAGE SPACE ON SITE. PLUG OR CAP ALL EQUIPMENT OPENINGS TO PREVENT DIRT AND MOISTURE FROM ENTERING EQUIPMENT.
4. REINSTALL INDICATED EQUIPMENT, SAME AS NEW WORK, IN NEW LOCATION WHERE INDICATED. COMPLETELY CLEAN AND RESTORE EQUIPMENT TO GOOD OPERATING CONDITION.
5. INSTALL TEMPORARY COVERS OVER EXISTING EXTERIOR ENVELOPE OPENINGS CREATED BY REMOVED EQUIPMENT/DUCT. COVER SHALL BE WATERTIGHT, AND MEET OSHA AND OWNER REQUIREMENTS. COMPLETELY REMOVE TEMPORARY COVER WHEN OPENINGS ARE PATCHED TO FINAL CONDITION. REPAIR ANY DAMAGE TO EXISTING BUILDING COMPONENTS CAUSED BY TEMPORARY COVER.
6. WHERE BRANCH DUCTWORK IS SHOWN TO BE DEMOLISHED BACK TO THE MAIN DUCT AND THE EXISTING MAIN DUCT OPENING IS NOT TO BE RE-USED, CAP AND SEAL THE MAIN DUCT BRANCH OPENING AIRTIGHT.

GENERAL PIPING DEMOLITION NOTES:

1. COMPLETELY DEMOLISH ALL INDICATED EXISTING PIPING SHOWN WITH BOLD DASHED LINES, INCLUDING ALL ABANDONED AND UNUSED PIPING, VALVES, INSULATION, HANGERS, SUPPORTS, ETC. FOR REMAINING PIPING SYSTEMS. PLUG OR CAP ALL OPENINGS CREATED BY PIPING DEMOLITION. TEST PIPING SYSTEMS AS SPECIFIED, AND INSULATE OR PAINT SAME AS NEW WORK. PATCH EXISTING WALLS, ROOFS, CEILINGS, AND FLOORS DISTURBED BY DEMOLITION TO ORIGINAL CONDITION.
2. COMPLETELY DEMOLISH ALL EXISTING EQUIPMENT SHOWN WITH BOLD DASHED LINES, INCLUDING ALL ABANDONED AND UNUSED PIPING, VALVES, INSULATION, HANGERS, SUPPORTS, BASES, CONTROLS, ETC. PATCH EXISTING WALLS, ROOFS, CEILINGS, AND FLOORS DISTURBED BY DEMOLITION TO ORIGINAL CONDITION.
3. DELIVER INDICATED EQUIPMENT TO OWNER'S DESIGNATED STORAGE SPACE ON SITE. PLUG OR CAP ALL EQUIPMENT OPENINGS TO PREVENT DIRT AND MOISTURE FROM ENTERING EQUIPMENT.
4. WHERE PIPES ARE REMOVED AND NOT RE-CONNECTED, REMOVE PIPE BACK TO NEXT BRANCH THAT IS TO REMAIN. INSTALL CAPS OR PLUGS ON OPENINGS. PRIME, PAINT, AND INSULATE DISTURBED PIPE SAME AS SPECIFIED FOR NEW WORK.
5. REINSTALL INDICATED EQUIPMENT, SAME AS NEW WORK, IN NEW LOCATION WHERE INDICATED. COMPLETELY CLEAN AND RESTORE EQUIPMENT TO GOOD OPERATING CONDITION.
6. ABANDON IN PLACE UNDERGROUND PIPES SHOWN ON DRAWINGS AS PHANTOM.
7. WHERE PIPES ARE ROUTED INSIDE CMU WALLS, PIPE MAY BE ABANDONED PIPE IN PLACE. REMOVE PIPE TO 1" INSIDE WALL AT BOTH ENDS.
8. WHERE PIPES PASS THROUGH FLOOR SLABS, SAW-CUT SLAB AND REMOVE CONCRETE TO MINIMUM EXTENT NECESSARY TO GAIN ACCESS BELOW SLAB. REMOVE PIPE DOWN TO HORIZONTAL PIPING BELOW FLOOR. SEAL AND CAP ABANDONED PIPE ENDS.
9. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL TRADES. PATCH EXISTING ROOFS, WALLS, AND FLOORS DISTURBED BY DEMOLITION. RESTORE TO MATCH CONDITION OF ORIGINAL SURROUNDING SURFACES.

KEYED NOTES

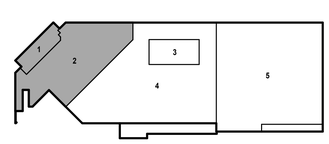
7.014 CONTRACTOR SHALL RELOCATE EXISTING EXHAUST FUME EXTRACTION DUCTWORK RUNNING NORTH/SOUTH AS INDICATED ON SHEET M-101.

7.016 THIS DUCWORK AND ASSOCIATED UNIT HV-17 ON ROOF IS EXISTING TO REMAIN. NO WORK IS REQUIRED DURING THIS PHASE.

8.003 CONTRACTOR TO DEMO EXISTING HOT WATER PUMP AND ASSOCIATED VALVES AND ACCESSORIES AND REMOVE ELEVATED PORTION OF HOUSEKEEPING PAD WITHOUT DAMAGING PRECAST PLANK BELOW. PATCH REMAINING PAD LOCATION WITH CONCRETE TOPPING OR CONCRETE PATCHING MIX.

8.007 CONTRACTOR TO DEMO EXISTING HOT WATER PUMP ONLY AND PREPARE PAD FOR NEW PUMP INSTALLATION IN SAME PLACE.

8.008 CONTRACTOR TO DEMO EXISTING HYDRONIC PIPING AS INDICATED AND CAP AT MAIN OR AS SHOWN.



KEY PLAN

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

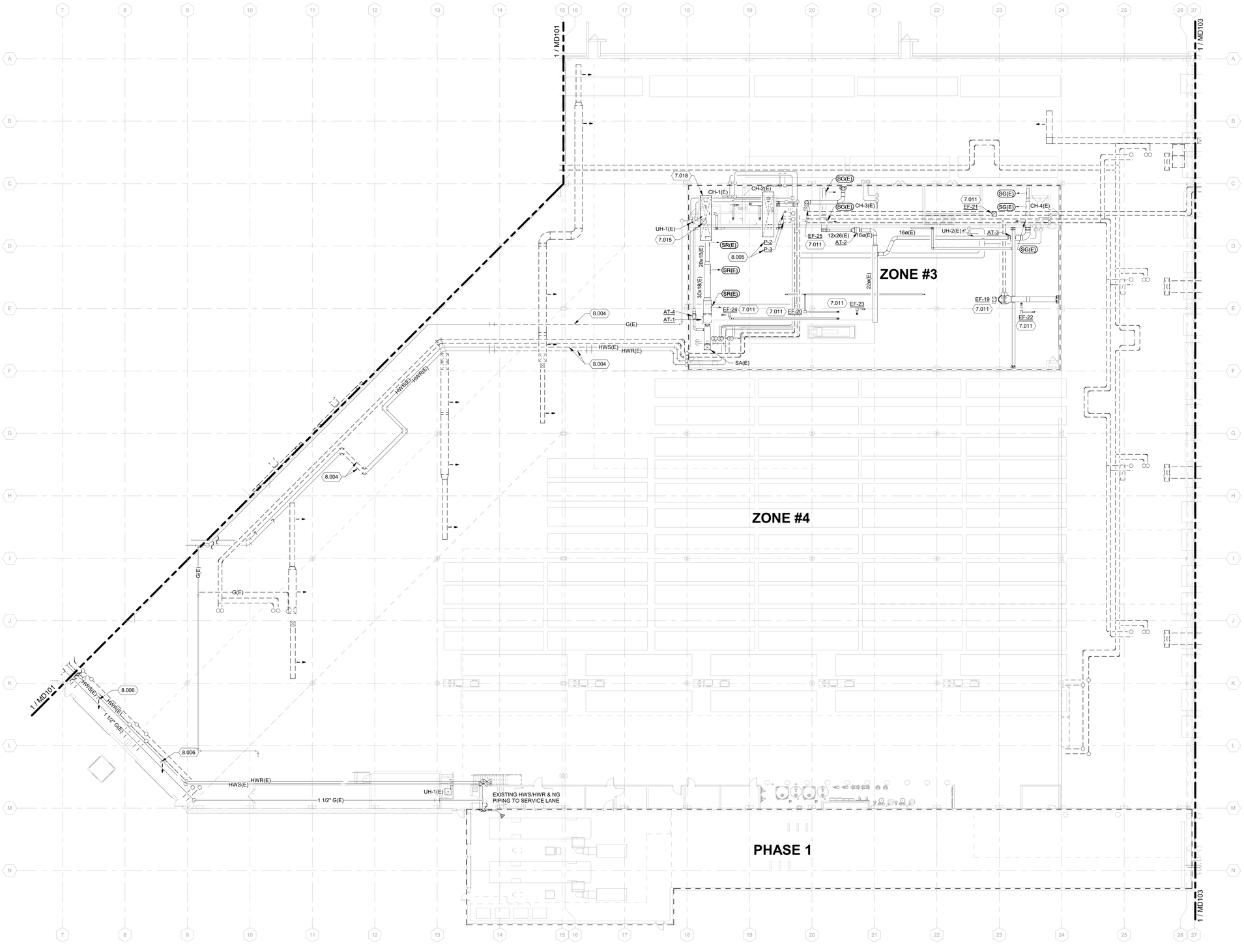
ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
FIRST FLOOR MECHANICAL DEMOLITION PLAN - ZONES 1 & 2

SHEET NO.:

MD101



TRUE NORTH PLAN NORTH

1 FIRST FLOOR MECHANICAL DEMOLITION PLAN - ZONES 3 & 4

1/16" = 1'-0"

GENERAL HVAC DEMOLITION NOTES:

1. COMPLETELY DEMOLISH ALL EXISTING DUCTWORK AS SHOWN WITH BOLD DASHED LINES, INCLUDING ALL ABANDONED AND UNUSED ACCESSORIES, INSULATION, HANGER SUPPORTS, ETC. FOR REMAINING DUCT SYSTEM. PLUG OR CAP ALL OPENINGS CREATED BY DUCT DEMOLITION. TEST DUCTWORK AS SPECIFIED, AND INSULATE OR PAINT SAME AS NEW WORK. PATCH EXISTING WALLS, ROOFS, CEILINGS, AND FLOORS DISTURBED BY DEMOLITION TO ORIGINAL CONDITION.
2. COMPLETELY DEMOLISH ALL EXISTING EQUIPMENT AS SHOWN WITH BOLD DASHED LINES, INCLUDING ALL ABANDONED AND UNUSED ACCESSORIES, INSULATION, HANGERS, SUPPORTS, BASES, CONTROLS, ETC. PATCH EXISTING WALLS, ROOFS, CEILINGS, AND FLOORS DISTURBED BY DEMOLITION TO ORIGINAL CONDITION.
3. DELIVER INDICATED EQUIPMENT TO OWNER'S DESIGNATED STORAGE SPACE ON SITE. PLUG OR CAP ALL EQUIPMENT OPENINGS TO PREVENT DIRT AND MOISTURE FROM ENTERING EQUIPMENT.
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5. INSTALL TEMPORARY COVERS OVER EXISTING EXTERIOR ENVELOPE OPENINGS CREATED BY REMOVED EQUIPMENT/DUCT. COVER SHALL BE WATERTIGHT, AND MEET OSHA AND OWNER REQUIREMENTS. COMPLETELY REMOVE TEMPORARY COVER WHEN OPENINGS ARE PATCHED TO FINAL CONDITION. REPAIR ANY DAMAGE TO EXISTING BUILDING COMPONENTS CAUSED BY TEMPORARY COVER.
6. WHERE BRANCH DUCTWORK IS SHOWN TO BE DEMOLISHED BACK TO THE MAIN DUCT AND THE EXISTING MAIN DUCT OPENING IS NOT TO BE RE-USED, CAP AND SEAL THE MAIN DUCT BRANCH OPENING AIRTIGHT.

GENERAL PIPING DEMOLITION NOTES:

1. COMPLETELY DEMOLISH ALL INDICATED EXISTING PIPING SHOWN WITH BOLD DASHED LINES, INCLUDING ALL ABANDONED AND UNUSED PIPING, VALVES, INSULATION, HANGERS, SUPPORTS, ETC. FOR REMAINING PIPING SYSTEMS. PLUG OR CAP ALL OPENINGS CREATED BY PIPING DEMOLITION. TEST PIPING SYSTEMS AS SPECIFIED, AND INSULATE OR PAINT SAME AS NEW WORK. PATCH EXISTING WALLS, ROOFS, CEILINGS, AND FLOORS DISTURBED BY DEMOLITION TO ORIGINAL CONDITION.
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6. ABANDON IN PLACE UNDERGROUND PIPES SHOWN ON DRAWINGS AS PHANTOM.
7. WHERE PIPES ARE ROUTED INSIDE CMU WALLS, PIPE MAY BE ABANDONED PIPE IN PLACE. REMOVE PIPE TO 1" INSIDE WALL AT BOTH ENDS.
8. WHERE PIPES PASS THROUGH FLOOR SLABS, SAW-CUT SLAB AND REMOVE CONCRETE TO MINIMUM EXTENT NECESSARY TO GAIN ACCESS BELOW SLAB. REMOVE PIPE DOWN TO HORIZONTAL PIPING BELOW FLOOR. SEAL AND CAP ABANDONED PIPE ENDS.
9. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL TRADES. PATCH EXISTING ROOFS, WALLS, AND FLOORS DISTURBED BY DEMOLITION. RESTORE TO MATCH CONDITION OF ORIGINAL SURROUNDING SURFACES.

KEYED NOTES

7.011 REMOVE EXISTING EXHAUST FAN AND REPLACE WITH NEW AS SCHEDULED.

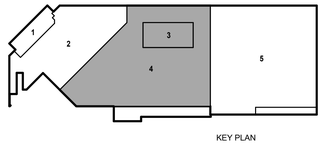
7.015 CONTRACTOR SHALL DEMO EXISTING DUCTWORK UP THROUGH ROOF BACK TO POINT OF NEW CONNECTION INDICATED ON SHEET M-102.

7.018 CONTRACTOR SHALL REMOVE EXISTING BLANK-OFF PANEL FROM IH-5 DUCTWORK.

8.004 CONTRACTOR TO TEMPORARY REMOVE THIS PORTION OF EXISTING PIPING AS INDICATED TO ALLOW FOR INSTALLATION OF NEW STRUCTURAL STEEL OR DUCTWORK.

8.005 CONTRACTOR TO DEMO EXISTING HOT WATER PUMP AND ASSOCIATED VALVES AND ACCESSORIES LOCATED ON MEZZANINE LEVEL.

8.006 CONTRACTOR TO DEMO EXISTING HOT WATER PIPING, VALVES AND ACCESSORIES ASSOCIATED WITH UNIT HEATER. CONTRACTOR SHALL SALVAGE EXISTING UNIT HEATER AND DELIVER TO OWNER. CONTRACTOR SHALL DEMO ALL ASSOCIATED WIRING BACK TO SOURCE.



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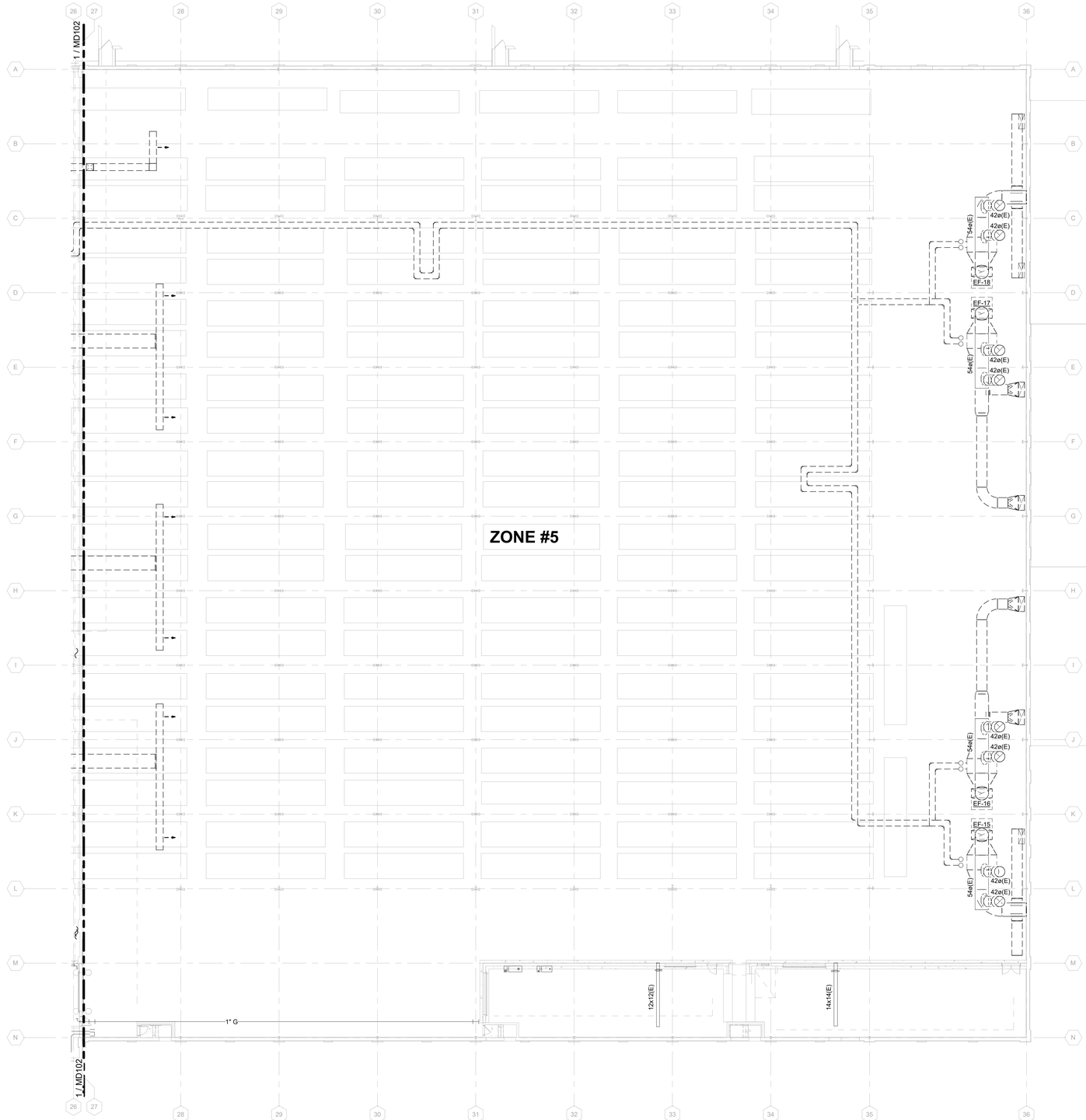
FIRST FLOOR MECHANICAL DEMOLITION PLAN - ZONES 3 & 4

SHEET NO.:

MD102



TRUE NORTH PLAN NORTH

FIRST FLOOR MECHANICAL DEMOLITION PLAN - ZONE 5

1/16" = 1'-0"

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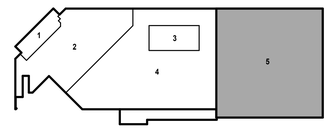
KEYED NOTES



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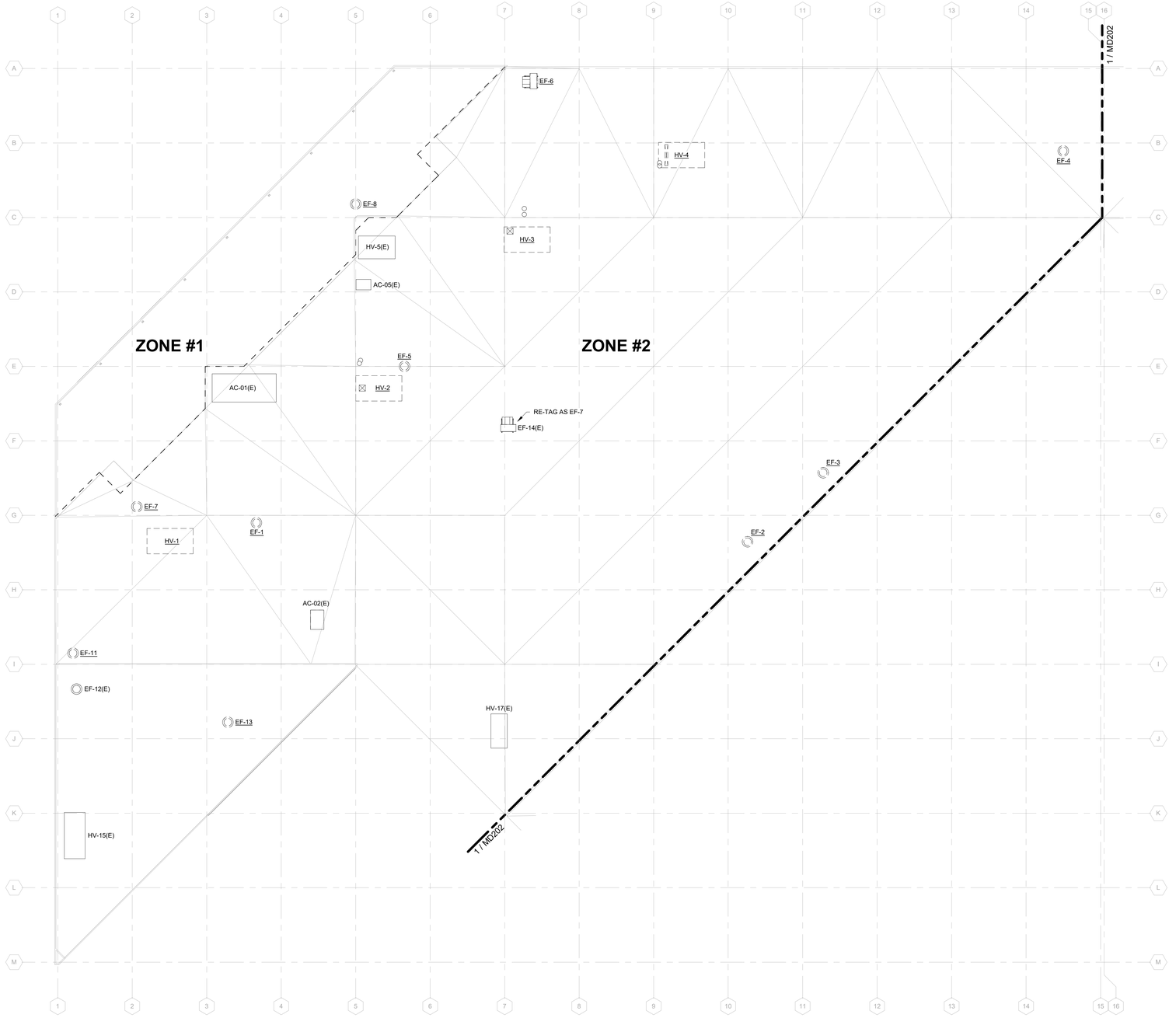
FIRST FLOOR MECHANICAL DEMOLITION PLAN - ZONE 5

SHEET NO.:
MD103



TRUE NORTH PLAN NORTH

ROOF MECHANICAL DEMOLITION PLAN - ZONES 1 & 2

1/16" = 1'-0"

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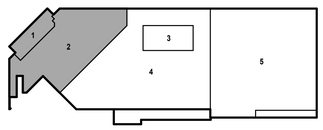

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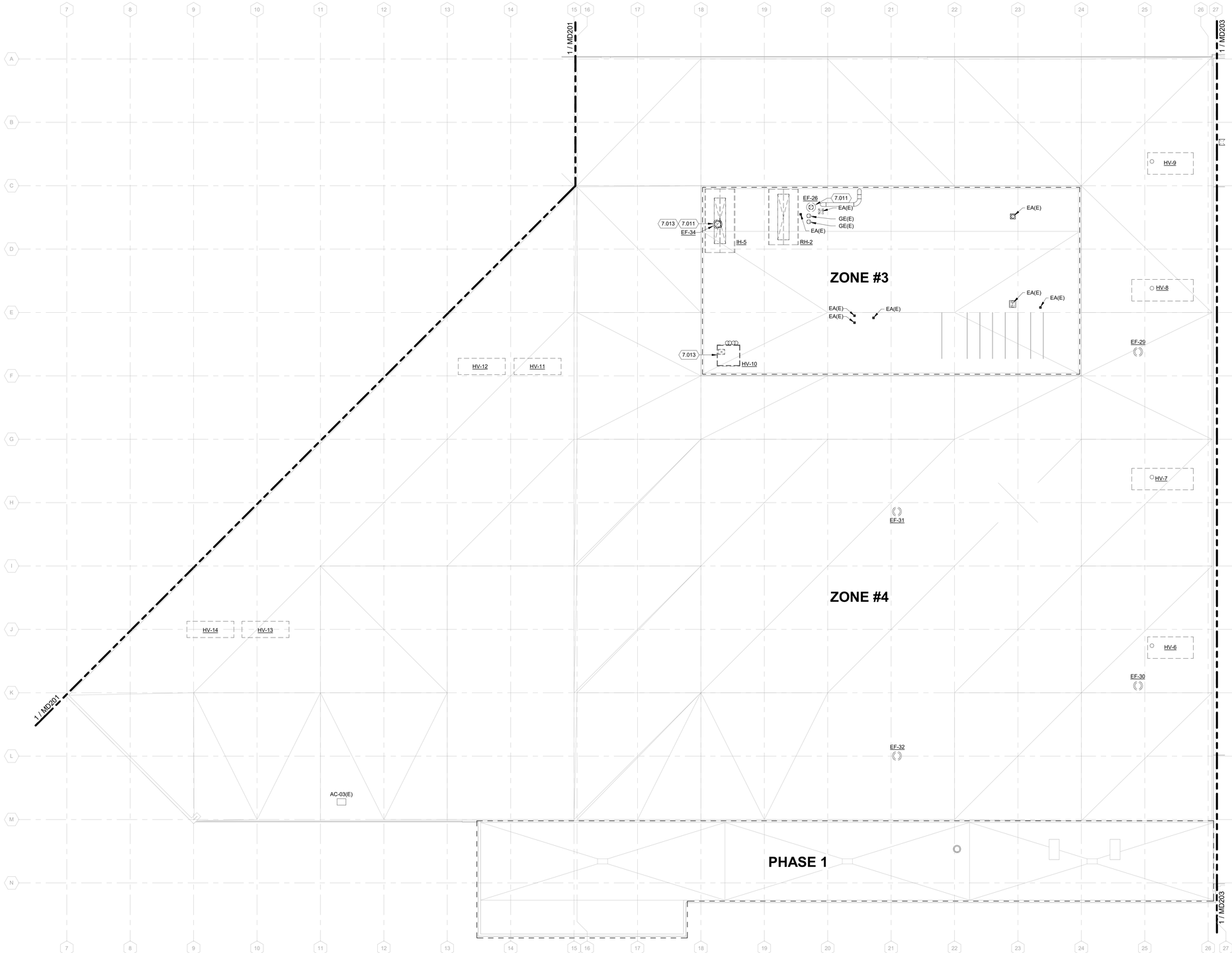
ROOF MECHANICAL DEMOLITION PLAN - ZONES 1 & 2

SHEET NO.:

MD201



TRUE NORTH PLAN NORTH

1 ROOF MECHANICAL DEMOLITION PLAN - ZONES 3 & 4

1/16" = 1'-0"

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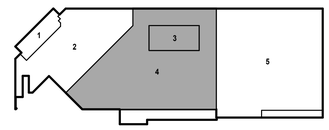
KEYED NOTES

7.011 REMOVE EXISTING EXHAUST FAN AND REPLACE WITH NEW AS SCHEDULED.

7.013 CONTRACTOR SHALL SALVAGE EXISTING BIRD DETERRENT DEVICES FROM TOP OF DEMOED EQUIPMENT AND INSTALL ON NEW.



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SHEET NO.:
MD202

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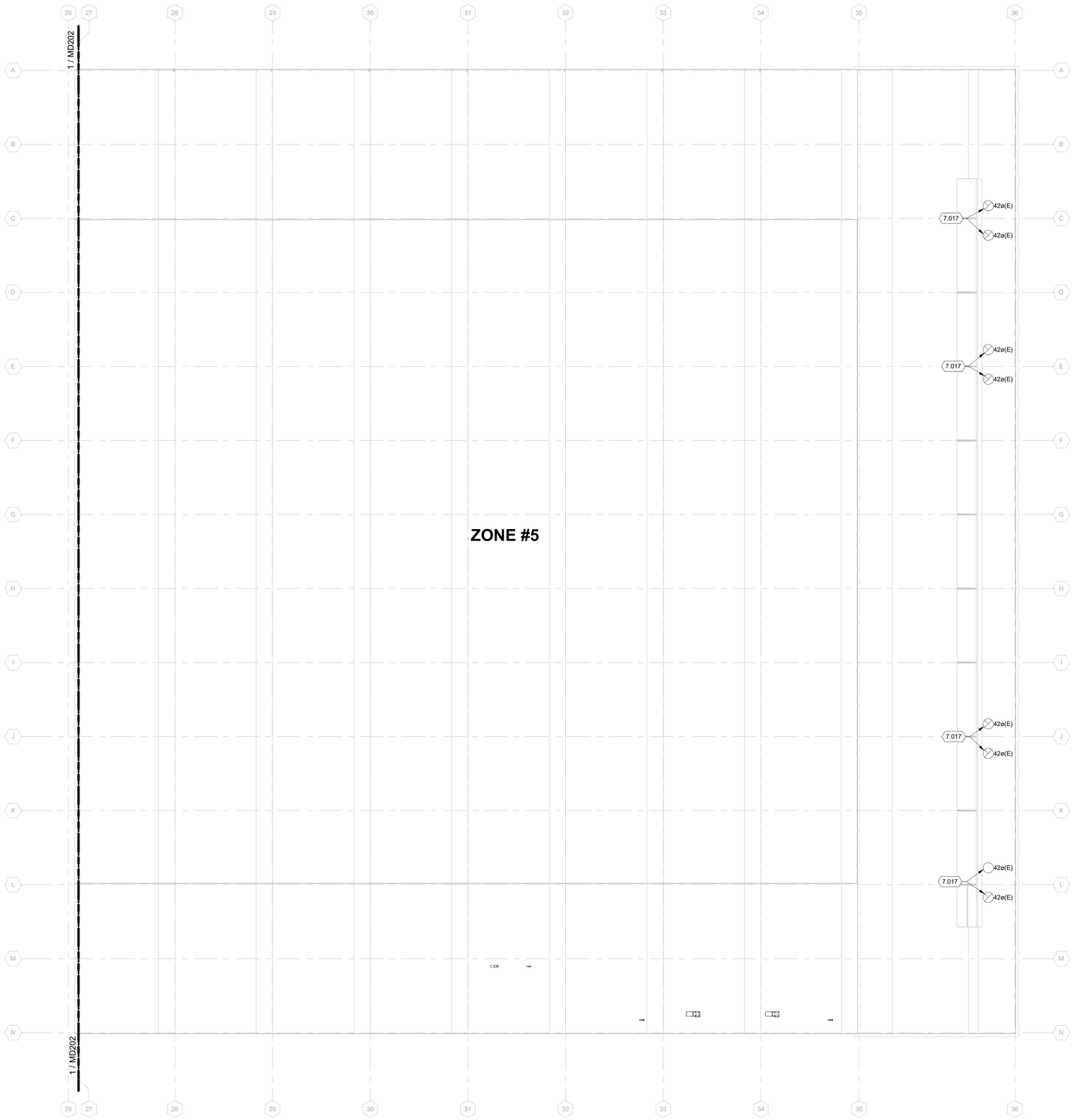

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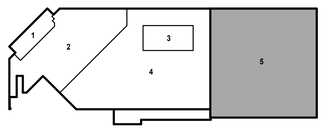
4. REINSTALL INDICATED EQUIPMENT, SAME AS NEW WORK, IN NEW LOCATION WHERE INDICATED. COMPLETELY CLEAN AND RESTORE EQUIPMENT TO GOOD OPERATING CONDITION.
5. INSTALL TEMPORARY COVERS OVER EXISTING EXTERIOR ENVELOPE OPENINGS CREATED BY REMOVED EQUIPMENT/DUCT. COVER SHALL BE WATERTIGHT, AND MEET OSHA AND OWNER REQUIREMENTS. COMPLETELY REMOVE TEMPORARY COVER WHEN OPENINGS ARE PATCHED TO FINAL CONDITION. REPAIR ANY DAMAGE TO EXISTING BUILDING COMPONENTS CAUSED BY TEMPORARY COVER.
6. WHERE BRANCH DUCTWORK IS SHOWN TO BE DEMOLISHED BACK TO THE MAIN DUCT AND THE EXISTING MAIN DUCT OPENING IS NOT TO BE RE-USED, CAP AND SEAL THE MAIN DUCT BRANCH OPENING AIRTIGHT.

GENERAL PIPING DEMOLITION NOTES:

1. COMPLETELY DEMOLISH ALL INDICATED EXISTING PIPING SHOWN WITH BOLD DASHED LINES, INCLUDING ALL ABANDONED AND UNUSED PIPING, VALVES, INSULATION, HANGERS, SUPPORTS, ETC. FOR REMAINING PIPING SYSTEMS. PLUG OR CAP ALL OPENINGS CREATED BY PIPING DEMOLITION. TEST PIPING SYSTEMS AS SPECIFIED, AND INSULATE OR PAINT SAME AS NEW WORK. PATCH EXISTING WALLS, ROOFS, CEILINGS, AND FLOORS DISTURBED BY DEMOLITION TO ORIGINAL CONDITION.
2. COMPLETELY DEMOLISH ALL EXISTING EQUIPMENT SHOWN WITH BOLD DASHED LINES, INCLUDING ALL ABANDONED AND UNUSED PIPING, VALVES, INSULATION, HANGERS, SUPPORTS, BASES, CONTROLS, ETC. PATCH EXISTING WALLS, ROOFS, CEILINGS, AND FLOORS DISTURBED BY DEMOLITION TO ORIGINAL CONDITION.
3. DELIVER INDICATED EQUIPMENT TO OWNER'S DESIGNATED STORAGE SPACE ON SITE. PLUG OR CAP ALL EQUIPMENT OPENINGS TO PREVENT DIRT AND MOISTURE FROM ENTERING EQUIPMENT.
4. WHERE PIPES ARE REMOVED AND NOT RE-CONNECTED, REMOVE PIPE BACK TO NEXT BRANCH THAT IS TO REMAIN. INSTALL CAPS OR PLUGS ON OPENINGS. PRIME, PAINT, AND INSULATE DISTURBED PIPE SAME AS SPECIFIED FOR NEW WORK.
5. REINSTALL INDICATED EQUIPMENT, SAME AS NEW WORK, IN NEW LOCATION WHERE INDICATED. COMPLETELY CLEAN AND RESTORE EQUIPMENT TO GOOD OPERATING CONDITION.
6. ABANDON IN PLACE UNDERGROUND PIPES SHOWN ON DRAWINGS AS PHANTOM.
7. WHERE PIPES ARE ROUTED INSIDE CMU WALLS, PIPE MAY BE ABANDONED PIPE IN PLACE. REMOVE PIPE TO 1" INSIDE WALL AT BOTH ENDS.
8. WHERE PIPES PASS THROUGH FLOOR SLABS, SAW-CUT SLAB AND REMOVE CONCRETE TO MINIMUM EXTENT NECESSARY TO GAIN ACCESS BELOW SLAB. REMOVE PIPE DOWN TO HORIZONTAL PIPING BELOW FLOOR. SEAL AND CAP ABANDONED PIPE ENDS.
9. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL TRADES. PATCH EXISTING ROOFS, WALLS, AND FLOORS DISTURBED BY DEMOLITION. RESTORE TO MATCH CONDITION OF ORIGINAL SURROUNDING SURFACES.

KEYED NOTES

7.017 CONTRACTOR SHALL CUT AND REMOVE EXISTING STACK AT APPROX. 12" ABOVE ROOF AND PREPARE REMAINING END TO ACCEPT NEW INTAKE HOOD AND CURB.



KEY PLAN

Mead & Hunt
Mead & Hunt, Inc.
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meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

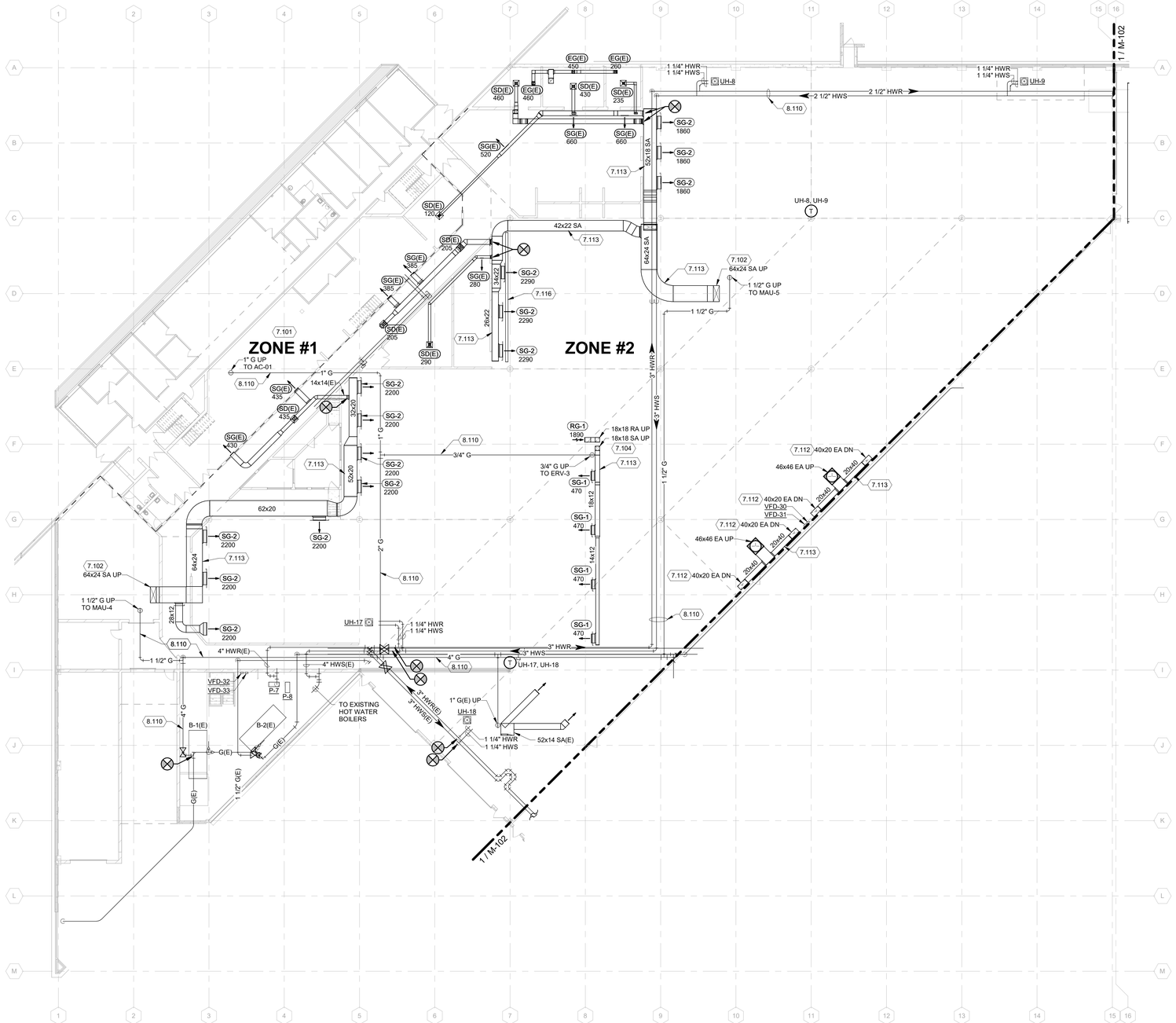
1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
ROOF MECHANICAL DEMOLITION PLAN - ZONE 5

SHEET NO.:
MD203



TRUE NORTH PLAN NORTH

1 FIRST FLOOR MECHANICAL PLAN - ZONES 1 & 2

1/16" = 1'-0"

GENERAL HVAC NOTES:

1. PROVIDE MANUAL BALANCE DAMPER AT EACH DIFFUSER, GRILLE, AND BRANCH TAKE-OFF IN ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK EXCEPT KITCHEN GREASE EXHAUST DUCT. LOCATE BALANCE DAMPER AS CLOSE TO BRANCH TAKE-OFF AS POSSIBLE.
2. DUCT SIZE TO DIFFUSERS, REGISTERS, AND GRILLES SHALL BE SAME AS NECK SIZE UNLESS NOTED OR DETAILED OTHERWISE.
3. COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH EXISTING CEILING PLAN.

GENERAL PIPING NOTES:

1. PIPING RUNOUTS TO ALL EQUIPMENT TO BE 3/4" UNLESS NOTED OTHERWISE.
2. WELD-O-LETS AND THREAD-O-LETS MAY BE USED FOR BRANCH TAKE-OFFS UP TO ONE-HALF THE DIAMETER OF THE MAIN.
3. INSTALL DIELECTRIC FITTINGS WHERE PIPING OF DIFFERENT MATERIALS IS JOINED.
4. INSTALL PIPING FREE OF SAGS AND BENDS.
5. LOCATE ALL VALVES FOR EASY ACCESS. INSTALL VALVES WITH STEM UP OR HORIZONTAL.
6. INSTALL DRAIN VALVES AT ALL LOW POINTS IN PIPING SYSTEM AND ELSEWHERE AS REQUIRED FOR SYSTEM DRAINAGE. INSTALL MANUAL AIR VENTS AT ALL HIGH POINTS IN PIPING, AT HEAT-TRANSFER COILS, AND ELSEWHERE AS REQUIRED FOR SYSTEM AIR VENTING.

KEYED NOTES

7.101 REFER TO 230800 FOR RETRO COMMISSIONING FOR ZONE 1 EXISTING HVAC EQUIPMENT.

7.102 CONTRACTOR TO COORDINATE MAU SUPPLY DUCTWORK WITH EXISTING STRUCTURAL JOISTS. SEE STRUCTURAL DRAWINGS.

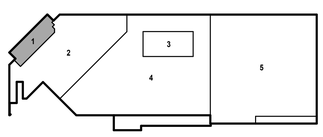
7.104 CONTRACTOR TO COORDINATE ERV SUPPLY AND RETURN DUCTWORK WITH EXISTING STRUCTURAL JOISTS. SEE STRUCTURAL DRAWINGS.

7.112 CONTRACTOR TO INSTALL NEW DUCTWORK SAME AS PREVIOUS DOWN TO 18" ABOVE FLOOR. DUCTWORK TO BE OPENENDED.

7.113 CONTRACTOR TO INSTALL DUCTWORK AS CLOSE TO BOTTOM OF STRUCTURE AS POSSIBLE BUT NO LOWER THEN 13'-0" AFF TO BOTTOM OF DUCTWORK.

7.116 CONTRACTOR TO SUPPLY, INSTALL AND RECONNECT NEW EXHAUST FUME EXTRACTION DUCTWORK RUN AT THIS LOCATION AND AT THE SAME ELEVATION, SIZE AND CONFIGURATION AS PREVIOUSLY DEMOED.

8.110 CONTRACTOR TO INSTALL PIPING AS HIGH AS POSSIBLE BUT NO LOWER THEN 13'-0" AFF.



KEY PLAN

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SHEET CONTENTS
FIRST FLOOR MECHANICAL PLAN - ZONES 1 & 2

SHEET NO.:

M-101

GENERAL HVAC NOTES:

1. PROVIDE MANUAL BALANCE DAMPER AT EACH DIFFUSER, GRILLE, AND BRANCH TAKE-OFF IN ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK EXCEPT KITCHEN GREASE EXHAUST DUCT. LOCATE BALANCE DAMPER AS CLOSE TO BRANCH TAKE-OFF AS POSSIBLE.
2. DUCT SIZE TO DIFFUSERS, REGISTERS, AND GRILLES SHALL BE SAME AS NECK SIZE UNLESS NOTED OR DETAILED OTHERWISE.
3. COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH EXISTING CEILING PLAN.

GENERAL PIPING NOTES:

1. PIPING RUNOUTS TO ALL EQUIPMENT TO BE 3/4" UNLESS NOTED OTHERWISE.
2. WELD-O-LETS AND THREAD-O-LETS MAY BE USED FOR BRANCH TAKE-OFFS UP TO ONE-HALF THE DIAMETER OF THE MAIN.
3. INSTALL DIELECTRIC FITTINGS WHERE PIPING OF DIFFERENT MATERIALS IS JOINED.
4. INSTALL PIPING FREE OF SAGS AND BENDS.
5. LOCATE ALL VALVES FOR EASY ACCESS. INSTALL VALVES WITH STEM UP OR HORIZONTAL.
6. INSTALL DRAIN VALVES AT ALL LOW POINTS IN PIPING SYSTEM AND ELSEWHERE AS REQUIRED FOR SYSTEM DRAINAGE. INSTALL MANUAL AIR VENTS AT ALL HIGH POINTS IN PIPING, AT HEAT-TRANSFER COILS, AND ELSEWHERE AS REQUIRED FOR SYSTEM AIR VENTING.

KEYED NOTES

7.102 CONTRACTOR TO COORDINATE MAU SUPPLY DUCTWORK WITH EXISTING STRUCTURAL JOISTS. SEE STRUCTURAL DRAWINGS.

7.104 CONTRACTOR TO COORDINATE ERV SUPPLY AND RETURN DUCTWORK WITH EXISTING STRUCTURAL JOISTS. SEE STRUCTURAL DRAWINGS.

7.106 CONTRACTOR TO COORDINATE EF EXHAUST DUCTWORK WITH EXISTING STRUCTURAL JOISTS. SEE STRUCTURAL DRAWINGS.

7.113 CONTRACTOR TO INSTALL DUCTWORK AS CLOSE TO BOTTOM OF STRUCTURE AS POSSIBLE BUT NO LOWER THEN 13'-0" AFF TO BOTTOM OF DUCTWORK.

7.118 CONTRACTOR TO INSTALL NEW DAMPERS, SEE IH AND RH SCHEDULE.

8.109 CONTRACTOR TO INSTALL NEW PIPING AS INDICATED AT HIGHER ELEVATION TO AVOID NEW DUCTWORK OR EQUIPMENT INSTALLATION. PRESSURE TEST FOR LEAKS APON COMPLETION.

8.110 CONTRACTOR TO INSTALL PIPING AS HIGH AS POSSIBLE BUT NO LOWER THEN 13'-0" AFF.

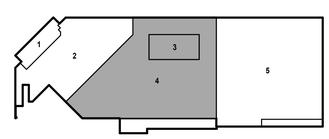
ZONE #3

ZONE #4

PHASE 1

TRUE NORTH PLAN NORTH

1 FIRST FLOOR MECHANICAL PLAN - ZONES 3 & 4
1/16" = 1'-0"



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SHEET CONTENTS
FIRST FLOOR MECHANICAL PLAN - ZONES 3 & 4

SHEET NO.:
M-102

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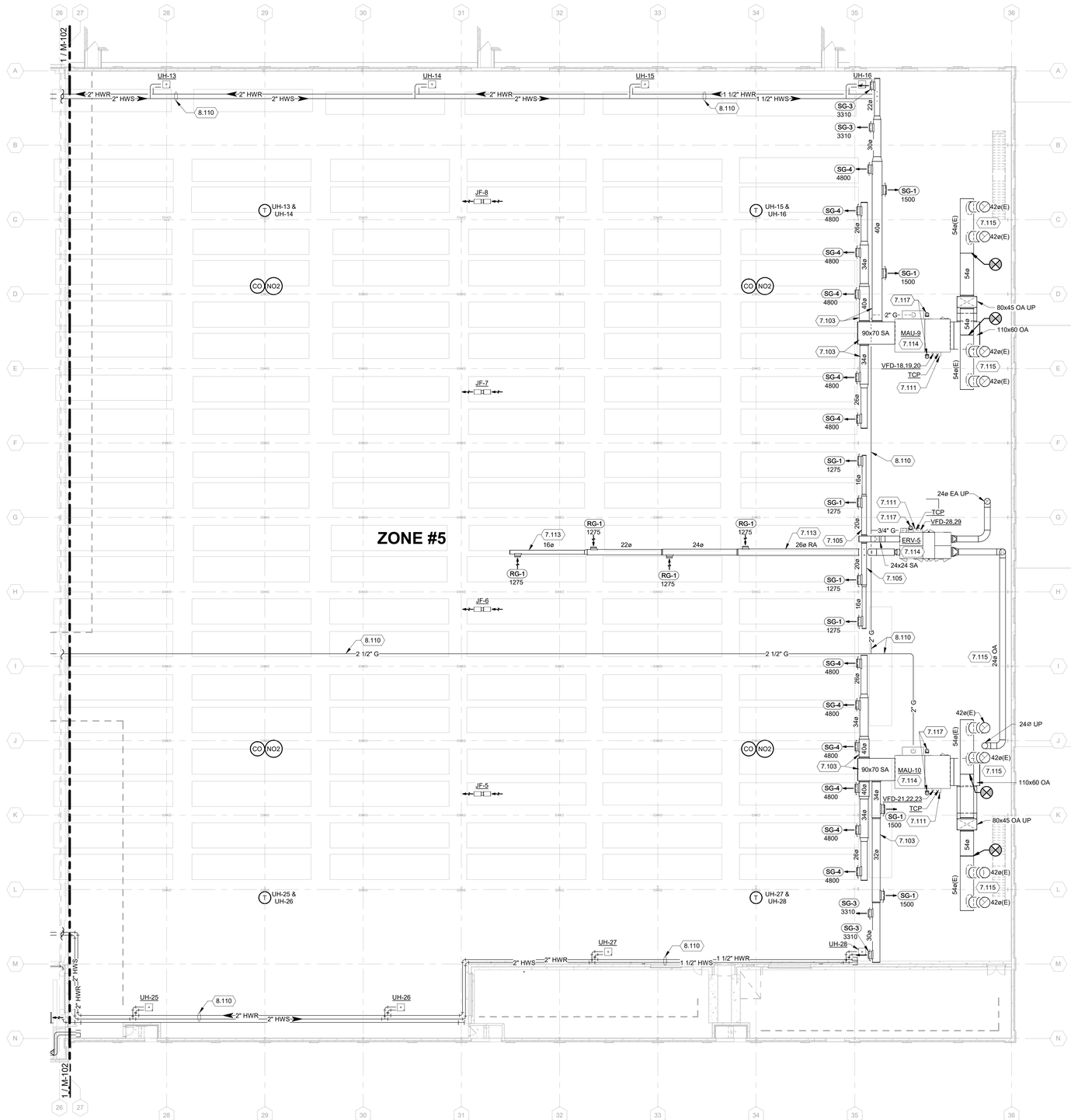
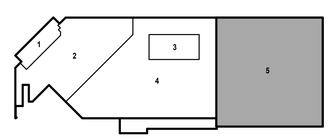


TRUE NORTH PLAN NORTH

1 FIRST FLOOR MECHANICAL PLAN - ZONE 5

1/16" = 1'-0"



KEY PLAN

GENERAL HVAC NOTES:

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2. DUCT SIZE TO DIFFUSERS, REGISTERS, AND GRILLES SHALL BE SAME AS NECK SIZE UNLESS NOTED OR DETAILED OTHERWISE.
3. COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH EXISTING CEILING PLAN.

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KEYED NOTES

7.103 CONTRACTOR TO COORDINATE MAU-9 & MAU-10 SUPPLY DUCTWORK WITH STRUCTURAL SUPPORT MEZZANINE. SEE STRUCTURAL DRAWINGS.

7.105 CONTRACTOR TO COORDINATE ERV-5 DUCTWORK WITH STRUCTURAL SUPPORT MEZZANINE. SEE STRUCTURAL DRAWINGS.

7.111 CONTRACTOR TO INSTALL VARIABLE FREQUENCY DRIVES AND TEMPERATURE CONTROL PANELS INSIDE OF MANUFACTURER'S ELECTRICAL ENCLOSURE CABINET PROVIDED BY MAU AND ERV EQUIPMENT IN SPECIFICATION 23 74 23.16.

7.113 CONTRACTOR TO INSTALL DUCTWORK AS CLOSE TO BOTTOM OF STRUCTURE AS POSSIBLE BUT NO LOWER THEN 13'-0" AFF TO BOTTOM OF DUCTWORK.

7.114 CONTRACTOR TO INSTALL MECHANICAL EQUIPMENT ON STRUCTURAL STEEL. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION.

7.115 CONTRACTOR TO INSULATE ALL NEW AND EXISTING DUCTWORK, PER SCHEDULE, FROM HOODS TO EQUIPMENT.

7.117 CONTRACTOR TO SUPPLY AND INSTALL 14"Ø DOUBLE WALL VENT STACK UP THROUGH ROOF PER EQUIPMENT MANUFACTURER'S REQUIREMENTS.

8.110 CONTRACTOR TO INSTALL PIPING AS HIGH AS POSSIBLE BUT NO LOWER THEN 13'-0" AFF.

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CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

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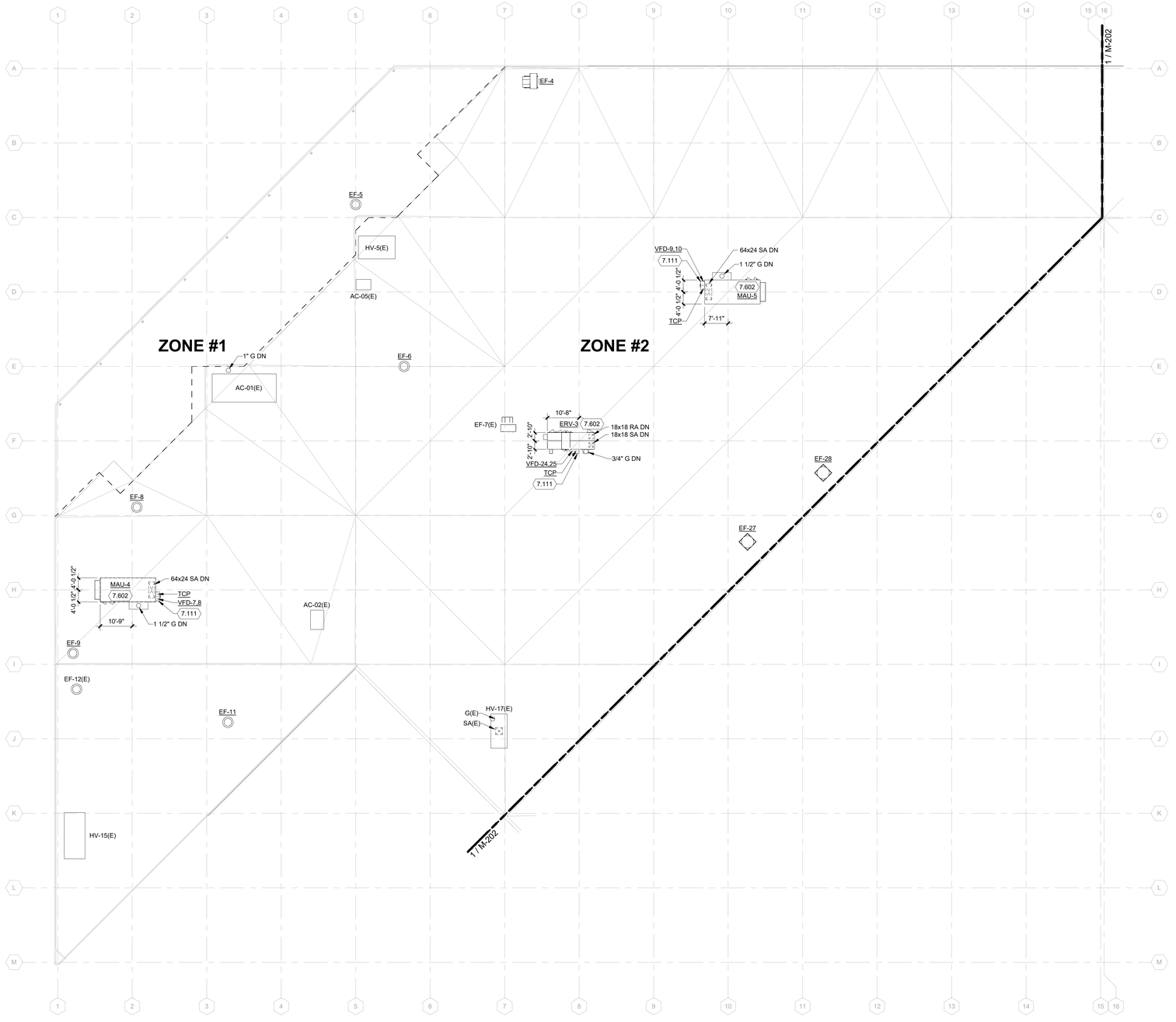
SHEET CONTENTS
FIRST FLOOR MECHANICAL PLAN - ZONE 5

SHEET NO.:
M-103



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KEYED NOTES

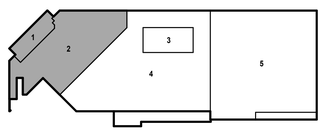
7.111 CONTRACTOR TO INSTALL VARIABLE FREQUENCY DRIVES AND TEMPERATURE CONTROL PANELS INSIDE OF MANUFACTURER'S ELECTRICAL ENCLOSURE CABINET PROVIDED BY MAU AND ERV EQUIPMENT IN SPECIFICATION 23 74 23.16.

7.602 CONTRACTOR TO LOCATE MECHANICAL EQUIPMENT, SHOWN ON ROOF, ACCORDING TO DIMENSIONS SHOWN.

TRUE NORTH PLAN NORTH

1 ROOF MECHANICAL PLAN - ZONES 1 & 2

1/16" = 1'-0"



KEY PLAN

Mead & Hunt

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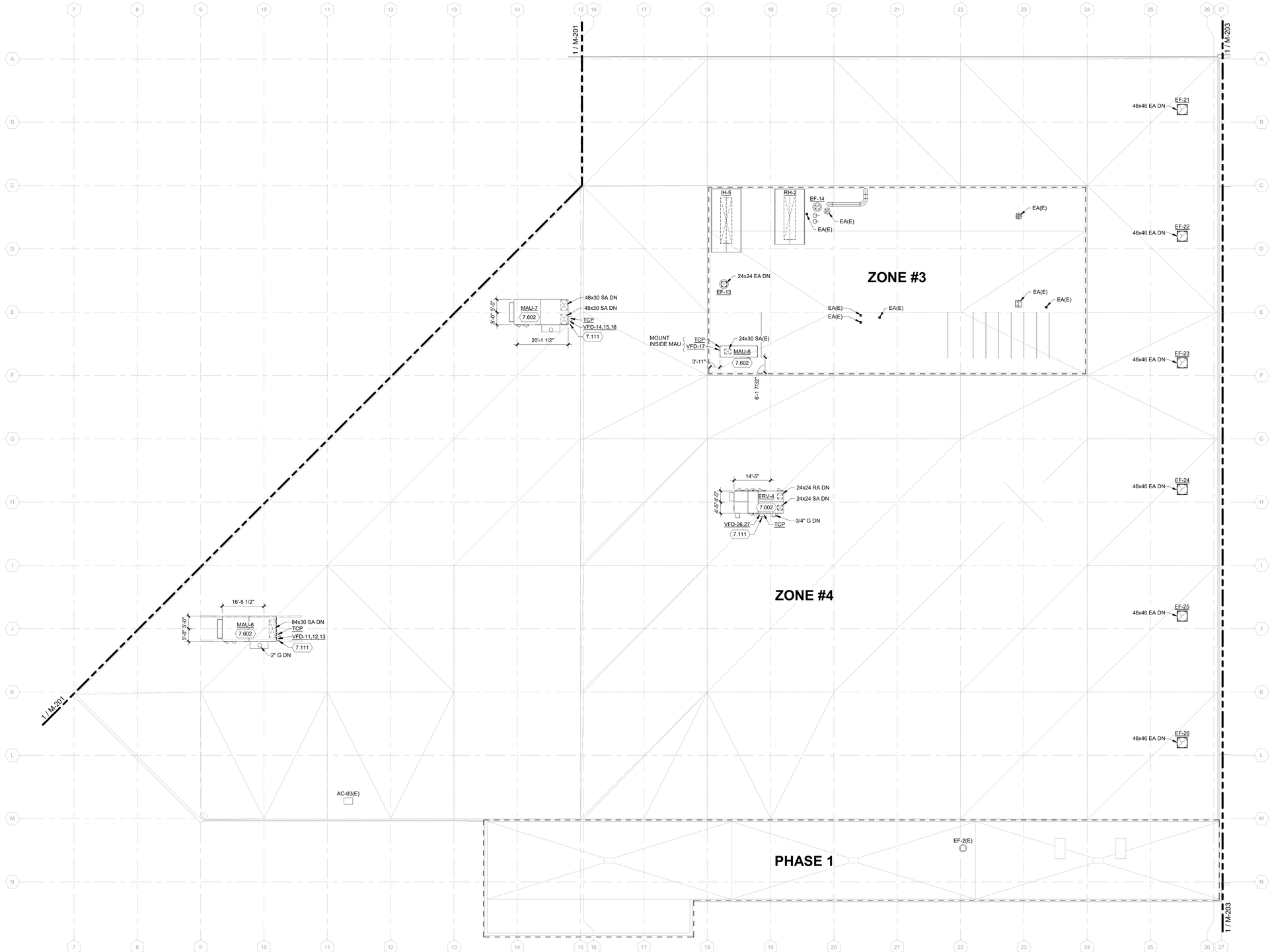
SHEET CONTENTS
ROOF MECHANICAL PLAN - ZONES 1 & 2

SHEET NO.:
M-201



TRUE NORTH PLAN NORTH

ROOF MECHANICAL PLAN - ZONES 3 & 4

1/16" = 1'-0"

GENERAL HVAC NOTES:

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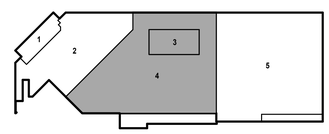

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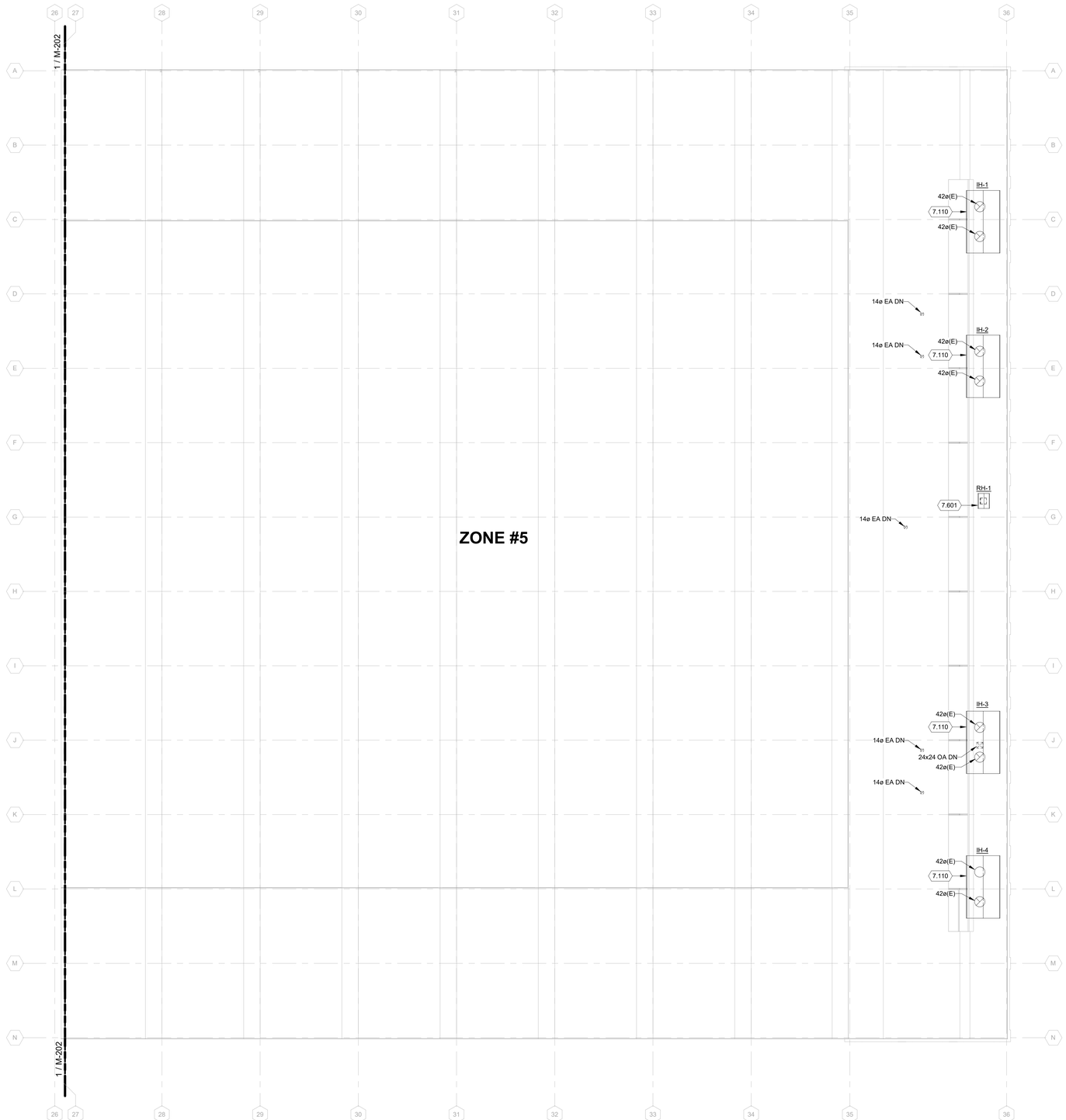
SHEET CONTENTS
ROOF MECHANICAL PLAN - ZONES 3 & 4

SHEET NO.:

M-202



TRUE NORTH PLAN NORTH

ROOF MECHANICAL PLAN - ZONE 5

1/16" = 1'-0"

GENERAL HVAC NOTES:

1. PROVIDE MANUAL BALANCE DAMPER AT EACH DIFFUSER, GRILLE, AND BRANCH TAKE-OFF IN ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK EXCEPT KITCHEN GREASE EXHAUST DUCT. LOCATE BALANCE DAMPER AS CLOSE TO BRANCH TAKE-OFF AS POSSIBLE.
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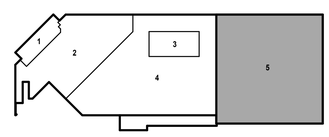
KEYED NOTES

7.110 CONTRACTOR TO CONNECT NEW INTAKE HOOD TO EXISTING 42"Ø DUCTWORK.

7.601 ALL HVAC ROOF PENETRATIONS SHALL BE A MINIMUM 4 FEET FROM PARAPET FOR 3 HOUR FIRE WALL COMPLIANCE.



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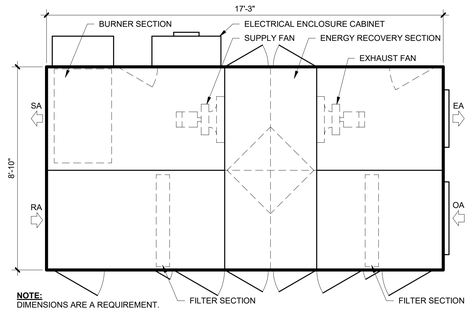
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
ROOF MECHANICAL PLAN - ZONE 5

SHEET NO.:
M-203



9 ERV-5 CONFIGURATION PLAN (ZONE 5)
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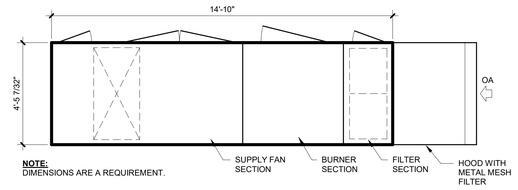

5 MAU-8 CONFIGURATION PLAN (ZONE 3)
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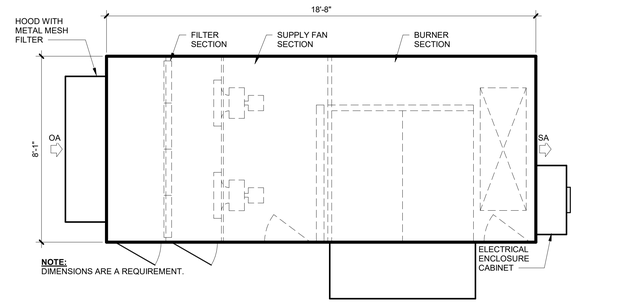

1 MAU-4 CONFIGURATION PLAN (ZONE 2)
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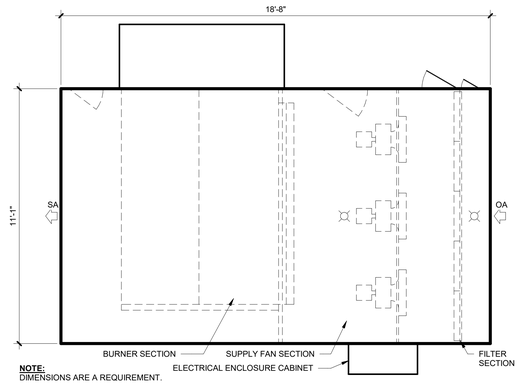

6 MAU-9 & 10 CONFIGURATION PLAN (ZONE 5)
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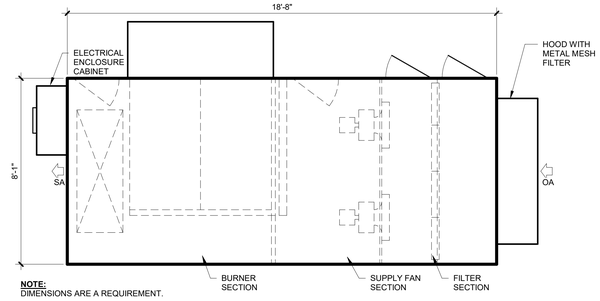

2 MAU-5 CONFIGURATION PLAN (ZONE 2)
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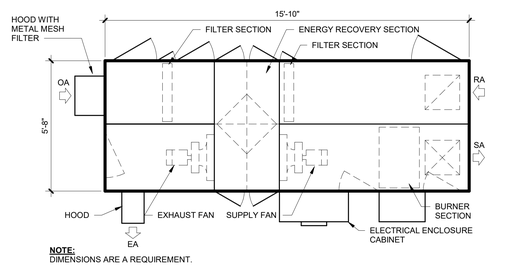

7 ERV-3 CONFIGURATION PLAN (ZONE 2)
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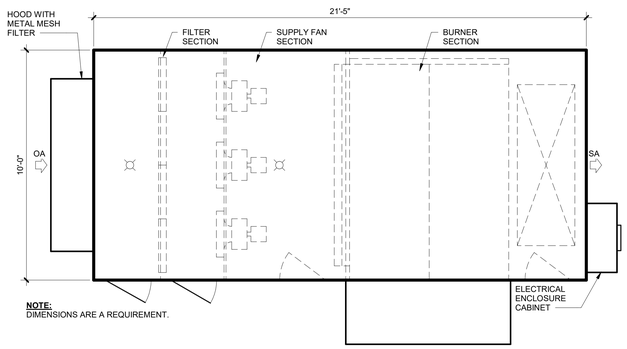

3 MAU-6 CONFIGURATION PLAN (ZONE 4)
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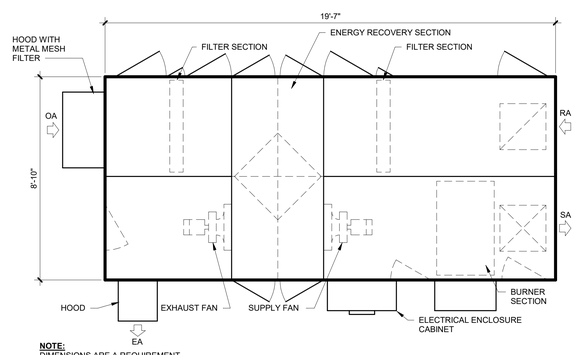

8 ERV-4 CONFIGURATION PLAN (ZONE 4)
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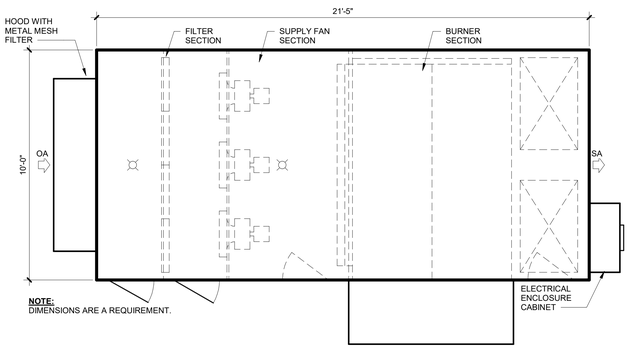


4 MAU-7 CONFIGURATION PLAN (ZONE 4)
NO SCALE

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

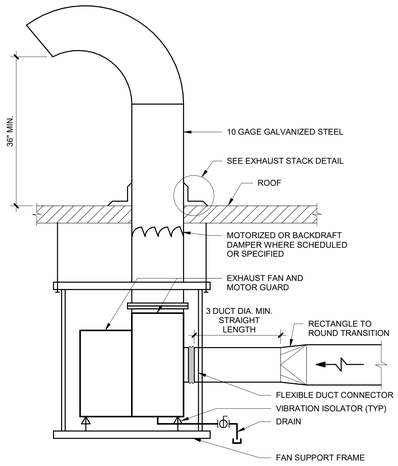
1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

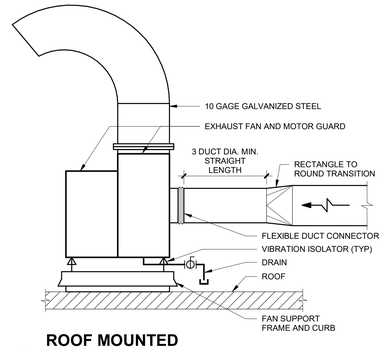
CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
HVAC DETAILS

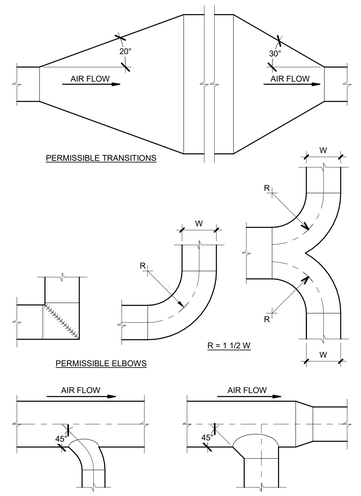
SHEET NO.:
M-501



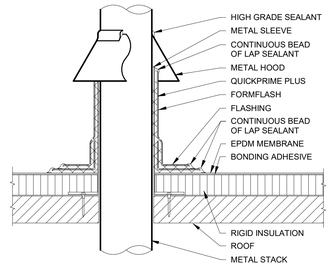
9 CEILING SUSPENDED VERTICAL DISCHARGE EXHAUST FAN
NO SCALE



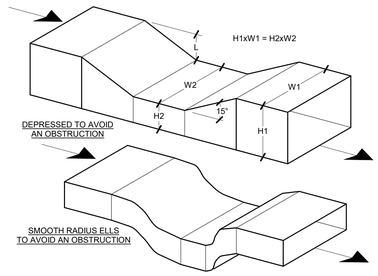
5 ROOF MOUNTED VERTICAL DISCHARGE EXHAUST FAN
NO SCALE



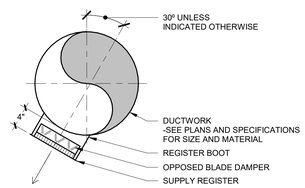
1 TYPICAL DUCT TRANSITIONS
NO SCALE



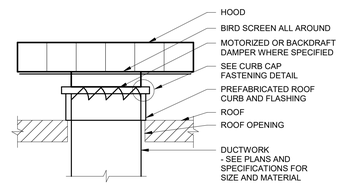
6 EXHAUST STACK ROOF PENETRATION - ZONE 3
NO SCALE



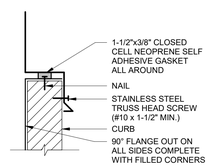
2 TYPICAL DUCT OFFSET
NO SCALE



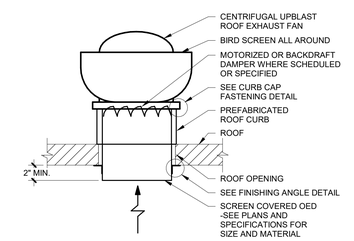
7 ANGLED SUPPLY REGISTER
NO SCALE



3 INTAKE/RELIEF HOOD
NO SCALE



8 CURB CAP FASTENING
NO SCALE



4 UPBLAST ROOF EXHAUST FAN
NO SCALE

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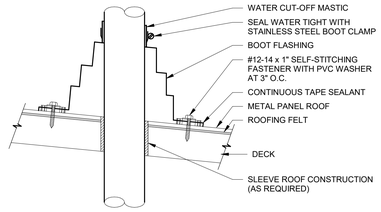
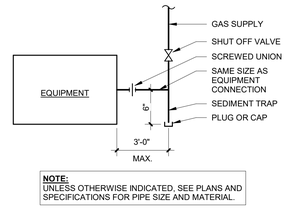
SHEET CONTENTS
HVAC DETAILS

SHEET NO.:
M-502

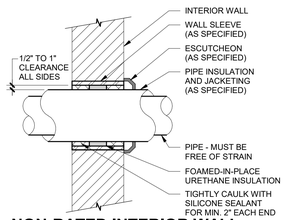


5 ROOF PIPE PENETRATION - METAL PANEL
NO SCALE

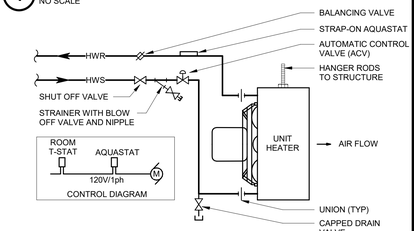


NOTE:
UNLESS OTHERWISE INDICATED, SEE PLANS AND SPECIFICATIONS FOR PIPE SIZE AND MATERIAL.

1 EQUIPMENT GAS CONNECTION (TYP)
NO SCALE

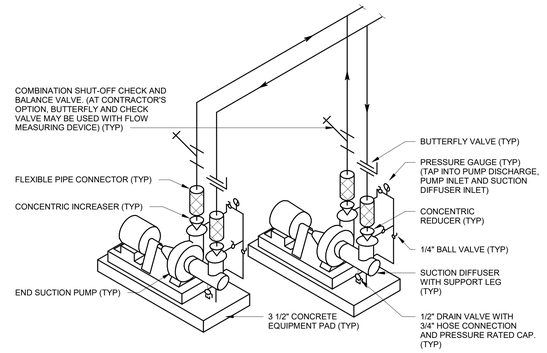


6 NON-RATED INTERIOR WALL INSULATED PIPE PENETRATION
NO SCALE

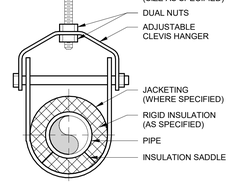


NOTE:
UNLESS OTHERWISE INDICATED, SEE PLANS AND SPECIFICATIONS FOR PIPE SIZE AND MATERIAL.

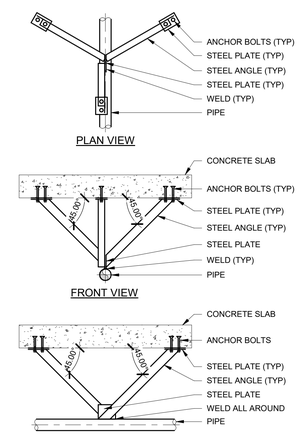
2 HOT WATER UNIT HEATER PIPING WITH TEMPERATURE CONTROL AND ACV
NO SCALE



7 PARALLEL END SUCTION BASE MOUNTED PUMP DETAIL
NO SCALE



ADJUSTABLE CLEVIS HANGER - INSULATED PIPE
3
NO SCALE



NOTES:
1. THIS DETAIL APPLIES TO PIPE ANCHOR AT CONCRETE SLAB AND CONCRETE WALL.
2. FOR BEAM APPLICATION, WELD RATHER THAN BOLT PLATES.
3. INSULATION SHALL COMPLETELY COVER PLATE WELDED TO PIPE.
4. CONTRACTORS SHALL BE RESPONSIBLE FOR SIZING STEEL MEMBERS, WELDS AND BOLTS FOR PIPE EXPANSION FORCES AND STRUCTURAL INTEGRITY FOR EACH SPECIFIC ANCHOR LOCATION.

4 PIPE ANCHOR
NO SCALE

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phone: 608-273-6380
meadhunt.com

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SHEET CONTENTS
PIPING DETAILS

SHEET NO.:
M-511

AIR-TO-AIR HEAT EXCHANGER (ERV) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	FIRE TYPE	AIR FLOW (CFM)		SUPPLY/EXHAUST FANS					MIN. INLET TEMP. (°F)	GAS FIRED HEATER (5)							AIR-TO-AIR EXCHANGER COIL TAG (4)	(1) FILTER TYPE	FAN MOTORS		(2) INTERLOCK WITH	(3) ACCESSORIES	MTG. HEIGHT (FT)	WEIGHT (LB)	LOCATION	REMARKS
				HIGH SPEED SUPPLY	LOW SPEED SUPPLY	ESP (IN WC)	TSP (IN WC)	MOTOR ENCL. TYPE	QTY. OF FANS	MOTOR POWER (HP)		INPUT (MBH)	OUTPUT (MBH)	HX MAT.	STAGES	VOLTS/PH	MCA	VENT TYPE			VOLTS	PHASE						
ERV-3	VENMAR, CES - ENERGY PACK	O	IF	1,890	1,890	1.5	3	TEFC	2	1.5 EA	-15	150	120	SS	MOD	115 / 1	15	FD	HX-3	4T	460	3	BAS	1,2,4,5	1.5	5,860	ROOF	(4)
ERV-4	VENMAR, CES - ENERGY PACK	O	IF	5,100	5,100	1.5	3	TEFC	2	4 EA	-15	400	320	SS	MOD	115 / 1	15	FD	HX-4	4T	460	3	BAS	1,2,4	1.5	9,245	ROOF	(4)
ERV-5	VENMAR, CES - ENERGY PACK	I	IF	5,100	5,100	1.5	3	TEFC	2	4 EA	-15	400	320	SS	MOD	115 / 1	15	FD	HX-5	4T	460	3	BAS	1,2,4	-	7,665	ROOF	(4)

TYPE		FIRE TYPE		MOTOR ENCLOSURE TYPE		HEAT EXCHANGER MATERIAL		HEATER STAGES		VENT TYPE		FILTER TYPE		ACCESSORIES			
I	INDOOR	DF - DIRECT	ODP	OPEN DRIP PROOF	AS	ALUMINIZED STEEL	1	1-STAGE	G	GRAVITY	1W	1" WASHABLE	1	INTAKE HOOD	8	THERMOSTAT
O	OUTDOOR	IF - INDIRECT	TEFC	TOTALLY ENCLOSED, FAN COOLED	SS	STAINLESS STEEL	2	2-STAGE	FD	FORCED DRAFT	2W	2" WASHABLE	2	ROOF CURB	9	UNIT-MOUNTED CONTROL PANEL
V	VERTICAL		XPL	EXPLOSION PROOF			3	3-STAGE	SC	SEALED COMBUSTION	1T	1" THROWAWAY	3	DISCONNECT SWITCH	10	REMOTE CONTROL PANEL
H	HORIZONTAL						4	4-STAGE			2T	2" THROWAWAY	4	INLET /DISCHARGE DAMPER	11	7-DAY TIME CLOCK
							MOD, 10:1	MODULATING TO XX%			4T	4" THROWAWAY MERV 8	5	FACE AND BYPASS DAMPER	12	24-HOUR TIME CLOCK
													6	FREEZESTAT	13	DDC INTERFACE
													7	CLOGGED FILTER SWITCH	14	DISCHARGE GRILLE

REMARKS:

(1) PROVIDE 4-INCH, MERV 8 FILTERS FOR SUPPLY/EXHAUST AIRSTREAMS.
(2) SEQUENCE OF OPERATION WITH BUILDING AUTOMATION CONTROLS (BAS).
(3) HEAT RECOVERY DEVICE - PLATE TO PLATE HEAT EXCHANGER WITH FACE AND BYPASS DAMPERS.
(4) INVERTED DUTY RATED VFD MOTORS WITH SHAFT GROUNDING RINGS.
(5) PROVIDE INDIRECT GAS FIRED BENT TUBE IN-SHOT STYLE FURNACE.

MAKE-UP AIR UNIT (MAU) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	FIRE TYPE	AIR FLOW (CFM)			SUPPLY FAN					MIN. INLET TEMP. (°F)	HEATER					FILTER TYPE	FILTER TYPE	ELECTRICAL		(2) INTERLOCK WITH	ACCESSORIES	(3) MTG. HEIGHT (FT)	(5) WEIGHT (LB)	LOCATION	REMARKS
				HIGH SPEED SUPPLY	LOW SPEED SUPPLY	(1) MIN. OUTDOOR	ESP (IN WC)	TSP (IN WC)	MOTOR ENCL. TYPE	QTY. OF FANS	MOTOR POWER (HP)		INPUT (MBH)	OUTPUT (MBH)	HX MAT.	STAGES	VENT TYPE			VOLTS	PHASE						
MAU-4	VENMAR, CES	O	IF	18,900	9,450	-	1.5	3.5	TEFC	4	14	-15	2,425	1,939	SS	MOD	FD	2W	4T	460	3	BAS	1,2,4	1.5	10,885	ROOF	
MAU-5	VENMAR, CES	O	IF	18,900	9,450	-	1.5	3.5	TEFC	4	14	-15	2,425	1,939	SS	MOD	FD	2W	4T	460	3	BAS	1,2,4	1.5	10,885	ROOF	
MAU-6	VENMAR, CES	O	IF	35,060	17,530	-	1.5	3.5	TEFC	9	22	-15	3,050	2,441	SS	MOD	FD	2W	4T	460	3	BAS	1,2,4	1.5	12,650	ROOF	(4)
MAU-7	VENMAR, CES	O	IF	35,060	17,530	-	1.5	3.5	TEFC	9	22	-15	3,050	2,441	SS	MOD	FD	2W	4T	460	3	BAS	1,2,4	1.5	12,650	ROOF	(4)
MAU-8	VENMAR, CES	O	IF	12,185	3,625	-	1.5	3.5	TEFC	1	15	-15	1,200	1,104	SS	MOD	FD	2W	4T	460	3	BAS	1,2,4	1.5	6,000	ROOF	
MAU-9	VENMAR, CES	I	IF	38,420	19,120	-	1.5	3.5	TEFC	9	30	-15	4,900	3,942	SS	MOD	FD	2W	4T	460	3	BAS	1,2,4	-	13,260	INDOOR	
MAU-10	VENMAR, CES	I	IF	38,420	19,120	-	1.5	3.5	TEFC	9	30	-15	4,900	3,942	SS	MOD	FD	2W	4T	460	3	BAS	1,2,4	-	13,260	INDOOR	

TYPE		FIRE TYPE		MOTOR ENCLOSURE TYPE		HEAT EXCHANGER MATERIAL		HEATER STAGES		VENT TYPE		FILTER TYPE		ACCESSORIES			
I	INDOOR	DF	DIRECT	ODP	OPEN DRIP PROOF	AS	ALUMINIZED STEEL	1	1-STAGE	G	GRAVITY	1W	1" WASHABLE	1	INTAKE HOOD	8	THERMOSTAT
O	OUTDOOR	IF	INDIRECT	TEFC	TOTALLY ENCLOSED, FAN COOLED	SS	STAINLESS STEEL	2	2-STAGE	FD	FORCED DRAFT	2W	2" WASHABLE	2	ROOF CURB	9	UNIT-MOUNTED CONTROL PANEL
V	VERTICAL			XPL	EXPLOSION PROOF			3	3-STAGE	SC	SEALED COMBUSTION	1T	1" THROWAWAY	3	DISCONNECT SWITCH	10	REMOTE CONTROL PANEL
H	HORIZONTAL							4	4-STAGE			2T	2" THROWAWAY	4	INLET DAMPER	11	7-DAY TIME CLOCK
								MOD, 10:1	MODULATING TO XX%			4T	4" THROWAWAY	5	RETURN AIR DAMPER	12	24-HOUR TIME CLOCK
														6	FREEZESTAT	13	DDC INTERFACE
														7	CLOGGED FILTER SWITCH	14	DISCHARGE GRILLE

REMARKS:

(1) AT HIGH SPEED.
(2) SEQUENCE OF OPERATION WITH BUILDING AUTOMATION CONTROLS.
(3) INSTALL ROOF MOUNTED EQUIPMENT ON INSULATED ROOF CURB. PROVIDE 14 GAGE ROOF CURB FOR ALL UNITS.
(4) UNIT CONSTRUCTION SHALL BE ALL ALUMINUM-STEEL CASING PANEL SYSTEM AND ALUMINUM CHANNEL SUPPORT FRAME. REFER TO SECTION 237423.19
(5) UNIT CONSTRUCTION SHALL ADHERE TO THE WEIGHT AND OVERALL LISTED DIMENSIONS OF THE UNITS FOR EXISTING ROOF BEARING CAPACITIES. REFER TO SHEET M-501 FOR DIMENSIONS.

VARIABLE FREQUENCY DRIVE (VFD) SCHEDULE

MARK	MODEL, MANUFACTURER NUMBER	SERVES	MOTOR (HP)	VOLTS / PHASE	ENCLOSURE	ACCESSORIES		LOCATION	SERVES	REMARKS
						INTEGRAL DISCONNECT	MANUAL BYPASS			
VFD-7	DANFOSS, VLT	MAU-4 SA	7.5	480 / 3	NEMA 1	YES	NONE	ROOF	2 FANS	(1)(4)(6)
VFD-8	DANFOSS, VLT	MAU-4 SA	7.5	480 / 3	NEMA 1	YES	NONE	ROOF	2 FANS	(1)(4)(6)
VFD-9	DANFOSS, VLT	MAU-5 SA	7.5	480 / 3	NEMA 1	YES	NONE	ROOF	2 FANS	(1)(4)(6)
VFD-10	DANFOSS, VLT	MAU-5 SA	7.5	480 / 3	NEMA 1	YES	NONE	ROOF	2 FANS	(1)(4)(6)
VFD-11	DANFOSS, VLT	MAU-6 SA	10	480 / 3	NEMA 1	YES	NONE	ROOF	3 FANS	(1)(5)(6)
VFD-12	DANFOSS, VLT	MAU-6 SA	10	480 / 3	NEMA 1	YES	NONE	ROOF	3 FANS	(1)(5)(6)
VFD-13	DANFOSS, VLT	MAU-6 SA	10	480 / 3	NEMA 1	YES	NONE	ROOF	3 FANS	(1)(5)(6)
VFD-14	DANFOSS, VLT	MAU-7 SA	10	480 / 3	NEMA 1	YES	NONE	ROOF	3 FANS	(1)(5)(6)
VFD-15	DANFOSS, VLT	MAU-7 SA	10	480 / 3	NEMA 1	YES	NONE	ROOF	3 FANS	(1)(5)(6)
VFD-16	DANFOSS, VLT	MAU-7 SA	10	480 / 3	NEMA 1	YES	NONE	ROOF	3 FANS	(1)(5)(6)
VFD-17	DANFOSS, VLT	MAU-8 SA	15	480 / 3	NEMA 1	YES	NONE	ROOF	1 FAN	(1)(4)(6)
VFD-18	DANFOSS, VLT	MAU-9 SA	10	480 / 3	NEMA 12	YES	NONE	MEZZ	3 FANS	(1)(3)(6)
VFD-19	DANFOSS, VLT	MAU-9 SA	10	480 / 3	NEMA 12	YES	NONE	MEZZ	3 FANS	(1)(3)(6)
VFD-20	DANFOSS, VLT	MAU-9 SA	10	480 / 3	NEMA 12	YES	NONE	MEZZ	3 FANS	(1)(3)(6)
VFD-21	DANFOSS, VLT	MAU-10 SA	10	480 / 3	NEMA 12	YES	NONE	MEZZ	3 FANS	(1)(3)(6)
VFD-22	DANFOSS, VLT	MAU-10 SA	10	480 / 3	NEMA 12	YES	NONE	MEZZ	3 FANS	(1)(3)(6)
VFD-23	DANFOSS, VLT	MAU-10 SA	10	480 / 3	NEMA 12	YES	NONE	MEZZ	3 FANS	(1)(3)(6)
VFD-24	DANFOSS, VLT	ERV-3 SA	1.5	480 / 3	NEMA 1	YES	NONE	ROOF	1 FAN	(1)(2)(6)
VFD-25	DANFOSS, VLT	ERV-3 EA	1.5	480 / 3	NEMA 1	YES	NONE	ROOF	1 FAN	(1)(2)(6)
VFD-26	DANFOSS, VLT	ERV-4 SA	3	480 / 3	NEMA 1	YES	NONE	ROOF	1 FAN	(1)(2)(6)
VFD-27	DANFOSS, VLT	ERV-4 EA	3	480 / 3	NEMA 1	YES	NONE	ROOF	1 FAN	(1)(2)(6)
VFD-28	DANFOSS, VLT	ERV-5 SA	3	480 / 3	NEMA 1	YES	NONE	ROOF	1 FAN	(1)(2)(6)
VFD-29	DANFOSS, VLT	ERV-5 EA	3	480 / 3	NEMA 1	YES	NONE	ROOF	1 FAN	(1)(2)(6)
VFD-30	DANFOSS, VLT	EF-27	5	480 / 3	NEMA 1	YES	NONE	ZONE 2	MAU-4/5	(1)(6)
VFD-31	DANFOSS, VLT	EF-28	5	480 / 3	NEMA 1	YES	NONE	ZONE 2	MAU-4/5	(1)(6)
VFD-32	DANFOSS, VLT	HWP-7	5	480 / 3	NEMA 1	YES	NONE	BOILER RM	HYDRONICS	(1)(6)
VFD-33	DANFOSS, VLT	HWP-8	5	480 / 3	NEMA 1	YES	NONE	BOILER RM	HYDRONICS	(1)(6)
VFD-34	DANFOSS, VLT	EF-21	10	480 / 3	NEMA 1	YES	NONE	MEZZ	MAU-6/7	(1)(6)
VFD-35	DANFOSS, VLT	EF-22	10	480 / 3	NEMA 1	YES	NONE	MEZZ	MAU-9/10	(1)(6)
VFD-36	DANFOSS, VLT	EF-23	10	480 / 3	NEMA 1	YES	NONE	MEZZ	MAU-6/7	(1)(6)
VFD-37	DANFOSS, VLT	EF-24	10	480 / 3	NEMA 1	YES	NONE	MEZZ	MAU-9/10	(1)(6)
VFD-38	DANFOSS, VLT	EF-25	10	480 / 3	NEMA 1	YES	NONE	MEZZ	MAU-6/7	(1)(6)
VFD-39	DANFOSS, VLT	EF-26	10	480 / 3	NEMA 1	YES	NONE	MEZZ	MAU-9/10	(1)(6)

REMARKS:

(1) TEMPERATURE CONTROL CONTRACTOR TO FURNISH DANFOSS VFD DRIVES PER 230914.
(2) ELECTRICAL CONTRACTOR TO INSTALL DANFOSS VFD DRIVES INSIDE THE MAKEUP UNIT'S ENCLOSED CABINET. SEE SECTION 237200
(3) ELECTRICAL CONTRACTOR TO INSTALL DANFOSS VFD DRIVES INSIDE THE MAKEUP UNIT'S ENCLOSED CABINET. SEE SECTION 237300
(4) ELECTRICAL CONTRACTOR TO INSTALL DANFOSS VFD DRIVES INSIDE THE MAKEUP UNIT'S ENCLOSED CABINET. SEE SECTION 237423.16
(5) ELECTRICAL CONTRACTOR TO INSTALL DANFOSS VFD DRIVES INSIDE THE MAKEUP UNIT'S ENCLOSED CABINET. SEE SECTION AND 237423.19
(6) PROVIDE BACNET INTERFACE OF VFD DRIVES WITH BUILDING AUTOMATION SYSTEM (BAS).

EXHAUST FAN (EF) SCHEDULE

OLD MARK	NEW MARK	MANUFACTURER, MODEL NUMBER	FAN TYPE	AIR FLOW RATE (CFM)	ESP (IN WC)	MOTOR			FAN SPEED (RPM)	DRIVE TYPE	ELECTRICAL (VOLTS/PH)	(2) MTG. HEIGHT (FT)	MAXIMUM SOUND			(1) INTERLOCK WITH	OPENING (IN)		ACCESSORIES	WEIGHT (LB)	ZONE SERVED	LOCATION	SERVICE	REMARKS
						(HP)	TYPE	SPEED (RPM)					(3) (DB)	(4) SONES	INSTALL. TYPE		LENGTH	WIDTH					
EF-6	EF-4	TWIN CITY, DCV 135	5	1,210	0.75	1/2	ECM	1800	1254	DIRECT	115/1	-	-	14.6	-	BAS	-	-	20	130	ZONE 2	ROOF	BATTERY	(8)
EF-8	EF-5	TWIN CITY, TUD 24B105	5	4,050	0.75	1.5	TEFC	1750	1734	DIRECT	460/3	-	-	54	-	HV-5 (E)	34	34	20	255	ZONE 1	ROOF	LOCKER RMS	
EF-5	EF-6	TWIN CITY, DCRU 083B	5	260	0.75	1/12	ECM	1750	1709	DIRECT	115/1	-	-	7.7	-	BAS	10.5	10.5	20	65	ZONE 2	ROOF	WORK RM	
EF-14	EF-7	EXISTING TO REMAIN FAN	-	6,000	5.00	10	TEFC	1800	1739	DIRECT	460/3	-	-	31	-	MAU-4/5	-	-		615	ZONE 2	-	VEHICLE REEL	(7)
EF-7	EF-8	TWIN CITY, DCRU 110BE	5	695	0.5	1/6	ECM	1750	1152	DIRECT	115/1	-	-	6.7	-	AC-01 (E)	18.5	18.5	20	110	ZONE 2	ROOF	RESTROOMS	
EF-11	EF-9	TWIN CITY, DCRU 083BE	5	360	0.75	1/4	ECM	1750	1730	DIRECT	115/1	-	-	7.9	-	BAS	10.5	10.5	20	65	ZONE 2	ROOF	PAINT MIXING	
EF-13	EF-11	TWIN CITY, TUD 30B105	3	9,100	0.5	2	TEFC	1160	1219	DIRECT	460/3	-	-	35	-	BOILER RM	41	41	20	415	ZONE 2	ROOF	BOILER RM	
EF-34	EF-13	TWIN CITY, DCRU 120B	5	1,000	0.5	1/2	ECM	1750	1100	DIRECT	115/1	-	-	8.2	-	T-STAT	18.5	18.5	20	115	ZONE 3	ROOF	AIR COMP.	
EF-26	EF-14	TWIN CITY, DCRU 120B	5	735	0.5	1/2	TEFC	1750		DIRECT	115/1	-	-	-	-	MAU-8	18.5	18.5	20	115	ZONE 3	ROOF	LOCKER RMS	
EF-24	EF-15	TWIN CITY, DCV 105	3	1,130	3.50	1.5	TEFC	3600	3294	DIRECT	460/3	-	-	25	-	SWITCH W/MAU-8	-	-	2	165	ZONE 3	INDOORS	VEHICLE REEL	
EF-20	EF-16	TWIN CITY, DCV	3	400	3.50	0.5	ECM	1750	1730	DIRECT	115/1	-	-	-	-	SWITCH W/MAU-8	-	-	2	65	ZONE 3	INDOORS	VEHICLE REEL	
EF-23	EF-17	TWIN CITY, DCV 105	3	1150	3.25	1.5	TEFC	3600	3237	DIRECT	460/3	-	-	25	-	SWITCH W/MAU-8	-	-	2	165	ZONE 3	INDOORS	VEHICLE REEL	
EF-21	EF-18	TWIN CITY, DCV 200	3	3,500	3.00	3	TEFC	1481	1750	DIRECT	460/3	-	-	19.2	-	SWITCH W/MAU-8	-	-	2	340	ZONE 3	INDOORS	BENCH EXH	
EF-19	EF-19	TWIN CITY, DCV 200	3	3,800	0.75	2	TEFC	1351	1000	DIRECT	460/3	-	-	12.1	-	MAU-8	-	-	2	234	ZONE 3	INDOORS	GAS DETECTION	
EF-22	EF-20	TWIN CITY, DCV 105	3	1,150	3.25	1.5	TEFC	3600	3237	DIRECT	460/3	-	-	25	-	SWITCH W/MAU-8	-	-	2	165	ZONE 3	INDOORS	VEHICLE REEL	
EF-29/30	EF-21	TWIN CITY, TUB	5	23,370	0.50	10	TEFC	860	863	DIRECT	460/3	-	-	34	-	MAU-6/7	47	47	20	715	ZONE 4	ROOF	GAS DETECTION	
EF-17/18	EF-22	TWIN CITY, TUB	5	25,490	0.75	10	TEFC	1160	1149	DIRECT	460/3	-	-	46	-	MAU-9/10	47	47	20	675	ZONE 5	ROOF	GAS DETECTION	
EF-31	EF-23	TWIN CITY, TUB	5	23,375	0.50	10	TEFC	860	863	DIRECT	460/3	-	-	34	-	MAU-6/7	47	47	20	715	ZONE 4	ROOF	GAS DETECTION	
EF-16	EF-24	TWIN CITY, TUB	5	25,495	0.75	10	TEFC	1160	1149	DIRECT	460/3	-	-	46	-	MAU-9/10	47	47	20	675	ZONE 5	ROOF	GAS DETECTION	
EF-32	EF-25	TWIN CITY, TUB	5	23,375	0.50	10	TEFC	860	863	DIRECT	460/3	-	-	34	-	MAU-6/7	47	47	20	715	ZONE 4	ROOF	GAS DETECTION	
EF-15	EF-26	TWIN CITY, TUB	5	25,495	0.75	10	TEFC	1160	1149	DIRECT	460/3	-	-	46	-	MAU-9/10	47	47	20	675	ZONE 5	ROOF	GAS DETECTION	
EF-1/2	EF-27	TWIN CITY, TUB	5	18,250...	0.75	10	TEFC	860	863	DIRECT	460/3	-	-	34	-	MAU-4/5	47	47	20	675	ZONE 2	ROOF	GAS DETECTION	
EF-3/4	EF-28	TWIN CITY, TUB	5	18,250...	0.75	10	TEFC	860	863	DIRECT	460/3	-	-	34	-	MAU-4/5	47	47	20	675	ZONE 2	ROOF	GAS DETECTION	
EF-25	EF-29	TWIN CITY, DCV	3	2,600	2.50	2	TEFC	1750	1477	DIRECT	460/3	-	-	16	-	MAU-8	-	-	-	211	ZONE 3	MEZZ.	STEAM EXH	

FAN TYPE			
CENTRIFUGAL		AXIAL	
1	SIDEWALL	8	ROOFTOP DOWNBLAST
2	INLINE	9	SIDEWALL PROPELLER
3	UTILITY	10	TUBE AXIAL
4	CABINET	11	VANE AXIAL
5	ROOFTOP UPBLAST	12	MIXED FLOW
6	ROOFTOP HOODED	13	ROOFTOP FRP UPBLAST
7	ROOFTOP FILTERED SUPPLY		

MOTOR TYPE	
ODP	OPEN DRIP PROOF
TEFC	TOTALLY ENCLOSED FAN COOLED
XPL	EXPLOSION PROOF
INV	INVERTER DUTY
TEAO	TOTALLY ENCLOSED AIR OVER
ECM	ELECTRONICALLY COMMUTATED MOTOR

INSTALLATION TYPE	
A	FREE INLET, FREE OUTLET
B	FREE INLET, DUCTED OUTLET
C	DUCTED INLET, FREE OUTLET
D	DUCTED INLET, DUCTED OUTLET

ACCESSORIES					
1	GRAVITY BACKDRAFT DAMPER	11	OUTLET WIRE GUARD	21	HOODED WALL CAP
2	MOTORIZED BACKDRAFT DAMPER	12	INLET FILTER GUARD	22	HOODED ROOF CAP
3	WEATHERHOOD	13	MOTOR COVER	23	HINGED ROOF CURB
4	WALL COLLAR	14	HOUSING INSULATION	24	INLET GRILLE
5	MOTOR WIRE GUARD	15	BELT (OSHA) WIRE GUARD	25	BASE MOUNTED VIBRATION ISOLATORS
6	MOTOR (OSHA) WIRE GUARD	16	INLET BELL	26	DUCT ADAPTOR
7	SHUTTER GUARD	17	INLET/OUTLET FLANGES	27	HANGING SPRING ISOLATORS
8	FAN SPEED CONTROLLER	18	INLET VANE DAMPER	28	HANGING NEOPRENE ISOLATORS
9	NON-FUSED DISCONNECT SWITCH	19	EXTENDED LUBE LINES	29	FACTORY INSULATED ANGLED FILTER BOX
10	INLET WIRE GUARD	20	MFR. ROOF CURB		

REMARKS:

(1) SEE SPECIFICATION SECTION 230993 - HVAC SEQUENCE OF OPERATION.
(2) MOUNTING HEIGHT IS FROM FINISHED FLOOR LEVEL OF INDICATED ROOM, TO TOP OF FAN OR WALL OPENING.
(3) SOUND POWER LEVEL RATING PER AMCA 301.
(4) LOUDNESS VALUES AT 5 FT' IN A HEMISPHERICAL FREE FIELD PER AMCA 301.
(5) VFD RATED FAN MOTOR.
(6) SINGLE SPEED FAN.
(7) EXISTING FAN AND ACCESSORIES AS INDICATED ON PLANS AND RE-BALANCE TO SCHEDULED CAPACITIES.
(8) EXPLOSION PROOF, AMCA CONSTRUCTION.

INTAKE (IH) AND RELIEF (RH) HOOD SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	INTAKE / RELIEF	HOOD TYPE	MAX. INLET VEL. (FT/MIN.)	CAPACITY		NECK SIZE (IN)		HOOD SIZE (IN)		HEIGHT (IN)		DAMPER	SYSTEM SERVED	HOOD WEIGHT (LB)	LOCATION	REMARKS
					AIR FLOW (CFM)	PD (IN WC)	LENGTH	WIDTH	LENGTH	WIDTH	CURB (4)	HOOD					
IH-1	TWIN CITY, MGI	INTAKE	3	500	20,000	0.15	162	62	126	195	24	49.5	-	MAU-9	875	ZONE 5	
IH-2	TWIN CITY, MGI	INTAKE	3	500	20,000	0.15	162	62	126	195	24	49.5	-	MAU-9	875	ZONE 5	
IH-3	TWIN CITY, MGI	INTAKE	3	500	20,000	0.15	162	62	126	195	24	49.5	-	MAU-10	875	ZONE 5	
IH-4	TWIN CITY, MGI	INTAKE	3	500	20,000	0.15	162	62	126	195	24	49.5	-	MAU-10	875	ZONE 5	
IH-5	TWIN CITY, MGI	INTAKE	3	500	-	0.15	216	60	-	-	24	-	M	GENSET	875	ZONE 3	(1)(2)
RH-1	TWIN CITY, MGR	RELIEF	3	500	5,100	0.15	36	24	40	51	24	35.38	-	ERV-5	90	ZONE 5	(1)(3)
RH-2	TWIN CITY, MGR	RELIEF	3	500	-	0.15	216	60	-	-	24	-	M	GENSET	500	ZONE 3	

HOOD TYPE		DAMPER			
1	DOMED	G	GRAVITY	PB	PARALLEL BLADE
2	LOUVERED	M	MOTORIZED	OB	OPPOSED BLADE
3	HOODED				

REMARKS:

(1) PROVIDE A TAMCO DAMPER SERIES 1500 FOR THE GENERATOR INTAKE AND DISCHARGE HOOD NECK SIZE. DAMPERS SHALL BE WIRED TO EXISTING GENSET.
(2) PROVIDE DAMPER WITH BELIMO MOTORIZED ACTUATOR. DAMPER SIZE: 11'-6" X 5'-0" FOR IH-5. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS.
(3) PROVIDE TWO DAMPERS WITH BELIMO MOTORIZED ACTUATOR. DAMPER SIZES: 3'-0" X 4'-6" AND 10'-0" X 4'-6" FOR RH-2. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS.
(4) PROVIDE INSULATED ROOF CURBS.

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
HVAC SCHEDULES

SHEET NO.:
M-601

HVAC DUCT INSULATION SCHEDULE

INDOOR OR OUTDOOR	CONCEALED OR EXPOSED	DUCT SHAPE	DUCT SERVICE	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION JACKETING TYPE	REMARKS
INDOOR	CONCEALED	SQUARE	OUTSIDE AIR	D1, D2	3	J1	-
			EXHAUST AIR	D1, D2	1	J1	(1)
		ROUND	OUTSIDE AIR	D1	3	J1	-
			EXHAUST AIR	D1	1	J1	(1)
	EXPOSED	SQUARE	OUTSIDE AIR	D1, D2	3	J1	-
			EXHAUST AIR	D1, D2	1	J1	(1)
		ROUND	OUTSIDE AIR	D1	3	J1	-
			EXHAUST AIR	D1	1	J1	(1)

INSULATION TYPE		JACKETING TYPE	
D1	MINERAL FIBER BLANKET (ASTM C 553 TYPE II) (ASTM C 1290 TYPE III) AVAIL. MFR'S: CERTAINTEED CORP: DUCT WRAP JOHNS MANVILLE; MICROLITE. KNAUF INSULATION; DUCT WRAP OWENS CORNING; ALL-SERVICE DUCT WRAP	J1	FACTORY APPLIED FSK
D2	MINERAL FIBER BOARD (ASTM C 612 TYPE 1A OR 1B) AVAIL. MFR'S: CERTAINTEED CORP.; COMMERCIAL BOARD. JOHNS MANVILLE; 800 SERIES SPIN-GLAS KNAUF INSULATION; INSULATION BOARD. OWENS CORNING; FIBERGLAS 700 SERIES.		

REMARKS:

(1) EXHAUST DUCT ONLY NEEDS TO BE INSULATED FROM THE DAMPER TO THE OUTSIDE WALL OR ROOF.

HVAC DUCT SCHEDULE

SYSTEM		DUCT MATERIAL TYPE	DUCT MATERIAL REFERENCE STANDARD	DUCT MATERIAL FINISH	PRESS. CLASS (IN WC)	SEAL CLASS	LEAKAGE CLASS RECT.	LEAKAGE CLASS ROUND	COMMENTS
SUPPLY AIR	DUCT CONNECTED TO MAKE-UP AIR UNITS (MAU)	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO OTHER FAN POWERED EQUIPMENT	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO AIR-TO-AIR ENERGY RECOVERY UNITS (ERV)	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
RETURN AIR	DUCT CONNECTED TO MAKE-UP AIR UNITS (MAU)	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO OTHER FAN POWERED EQUIPMENT	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO AIR-TO-AIR ENERGY RECOVERY UNITS (ERV)	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
EXHAUST AIR	DUCT CONNECTED TO EXHAUST FANS	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
	VEHICLE EXHAUST AND REELS	304 SS	18 GAUGE	NO. 4	3	FULLY WELDED SEAMS AND JOINTS			
	DUCT CONNECTED TO AIR-TO-AIR ENERGY RECOVERY UNITS (ERV)	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO MAKE-UP AIR UNITS (MAU)	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
OUTSIDE AIR	DUCT CONNECTED TO MAKE-UP AIR UNITS (MAU)	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO OTHER FAN POWERED EQUIPMENT	G90 GALV.	ASTM A 653	MILL PHOSPHATIZED	3	A	12	6	
	FIRST 3 FEET FROM LOUVER/HOOD	PVC-COATED GALV.	ASTM A 653	4 MILL PVC	3	A	12	6	SEAL LIQUID-TIGHT. SLOPE TOWARD LOUVER.

FITTINGS

RECTANGULAR DUCT ELBOWS (COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 2-2, "RECTANGULAR ELBOWS.")
RADIUS TYPE RE 1 WITH MINIMUM 1.5 RADIUS-TO-DIAMETER RATIO.
RADIUS TYPE RE 3 WITH MINIMUM 1.0 RADIUS-TO-DIAMETER RATIO AND TWO VANES.
MITERED TYPE RE 2 WITH VANES COMPLYING WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 2-3, "VANES AND VANE RUNNERS," AND FIGURE 2-4, "VANE SUPPORT IN ELBOWS."

ROUND DUCT ELBOWS (COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 3-3, "ROUND DUCT ELBOWS.")
RADIUS TO DIAMETER RATIO: 1.5
ROUND ELBOWS, 12 INCHES AND SMALLER IN DIAMETER: STAMPED OR PLEATED
ROUND ELBOWS, 14 INCHES AND LARGER IN DIAMETER: WELDED

RECTANGULAR BRANCH DUCT CONFIGURATION (COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 2-6, "BRANCH CONNECTIONS.")
RECTANGULAR MAIN TO RECTANGULAR BRANCH: 45° ENTRY
RECTANGULAR MAIN TO ROUND BRANCH: SPIN IN

ROUND BRANCH DUCT CONFIGURATION (COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 3-4, "90 DEGREE TEES AND LATERALS," AND FIGURE 3-5, "CONICAL TEES." SADDLE TAPS ARE PERMITTED IN EXISTING DUCT)
VELOCITY 1500 FT/MIN AND LOWER: CONICAL TAP
VELOCITY GREATER THAN 1500 FT/MIN: 45° LATERAL

REMARKS:

(1) PROVIDE PAINT GRIP TYPE DUCT WHERE DUCT IS EXPOSED AND INDICATED TO BE PAINTED.
(2) INSTALL DUCT ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" UNLESS OTHERWISE INDICATED.
(3) INTERMEDIATE REINFORCEMENT MATERIAL SHALL MATCH DUCT MATERIAL.
(4) SUPPLY AIR DUCTS PASSING THROUGH UNCONDITIONED OR OUTDOOR SPACES SHALL BE SEAL CLASS A (ASHRAE 90.1 - 2007).
(5) RETURN AIR DUCTS PASSING THROUGH OUTDOOR SPACES SHALL BE SEAL CLASS A (ASHRAE 90.1 - 2007).
(6) SHEET METAL MATERIALS SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, AND OTHER IMPERFECTIONS.

AIR FLOW MEASURING STATION (AFMS) SCHEDULE

MARK	MANUFACTURER, MODEL	DIMENSION (IN)	AIRFLOW RANGE (CFM)	VELOCITY RANGE (FPM)	SENSORS (NO)	MAX PRESS. DROP (IN WG)	HONEYCOMB AIR STRAIGHTENER	SENSOR ACCURACY	TEMPERATURE RANGE (F)	SERVES	REMARKS
AFMS-7	PIEZOMETER	-	0 - 1,800	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	ERV-3 SA	(1)(2)
AFMS-8	PIEZOMETER	-	0 - 1,800	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	ERV-3 EA	(1)(2)
AFMS-9	PIEZOMETER	-	0 - 5,100	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	ERV-4 SA	(1)(2)
AFMS-10	PIEZOMETER	-	0 - 5,100	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	ERV-4 EA	(1)(2)
AFMS-11	PIEZOMETER	-	0 - 5,100	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	ERV-5 SA	(1)(2)
AFMS-12	PIEZOMETER	-	0 - 5,100	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	ERV-5 EA	(1)(2)
AFMS-13	PIEZOMETER	-	0 - 4,725	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-4 SA	(1)(2)
AFMS-14	PIEZOMETER	-	0 - 4,725	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-4 SA	(1)(2)
AFMS-15	PIEZOMETER	-	0 - 4,725	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-4 SA	(1)(2)
AFMS-16	PIEZOMETER	-	0 - 4,725	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-4 SA	(1)(2)
AFMS-17	PIEZOMETER	-	0 - 4,725	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-5 SA	(1)(2)
AFMS-18	PIEZOMETER	-	0 - 4,725	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-5 SA	(1)(2)
AFMS-19	PIEZOMETER	-	0 - 4,725	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-5 SA	(1)(2)
AFMS-20	PIEZOMETER	-	0 - 4,725	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-5 SA	(1)(2)
AFMS-21	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-6 SA	(1)(2)
AFMS-22	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-6 SA	(1)(2)
AFMS-23	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-6 SA	(1)(2)
AFMS-24	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-6 SA	(1)(2)
AFMS-25	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-6 SA	(1)(2)
AFMS-26	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-6 SA	(1)(2)
AFMS-27	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-6 SA	(1)(2)
AFMS-28	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-6 SA	(1)(2)
AFMS-29	PIEZOMETER	-	0 - 3,900	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-6 SA	(1)(2)
AFMS-30	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-7 SA	(1)(2)
AFMS-31	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-7 SA	(1)(2)
AFMS-32	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-7 SA	(1)(2)
AFMS-33	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-7 SA	(1)(2)
AFMS-34	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-7 SA	(1)(2)
AFMS-35	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-7 SA	(1)(2)
AFMS-36	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-7 SA	(1)(2)
AFMS-37	PIEZOMETER	-	0 - 3,895	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-7 SA	(1)(2)
AFMS-38	PIEZOMETER	-	0 - 3,900	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-7 SA	(1)(2)
AFMS-39	PIEZOMETER	-	0 - 12,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-8 SA	(1)(2)
AFMS-40	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-9 SA	(1)(2)
AFMS-41	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-9 SA	(1)(2)
AFMS-42	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-9 SA	(1)(2)
AFMS-43	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-9 SA	(1)(2)
AFMS-44	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-9 SA	(1)(2)
AFMS-45	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-9 SA	(1)(2)
AFMS-46	PIEZOMETER	-	0 - 4,255	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-9 SA	(1)(2)
AFMS-47	PIEZOMETER	-	0 - 4,255	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-9 SA	(1)(2)
AFMS-48	PIEZOMETER	-	0 - 4,260	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-9 SA	(1)(2)
AFMS-49	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-10 SA	(1)(2)
AFMS-50	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-10 SA	(1)(2)
AFMS-51	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-10 SA	(1)(2)
AFMS-52	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-10 SA	(1)(2)
AFMS-53	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-10 SA	(1)(2)
AFMS-54	PIEZOMETER	-	0 - 4,245	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-10 SA	(1)(2)
AFMS-55	PIEZOMETER	-	0 - 4,255	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-10 SA	(1)(2)
AFMS-56	PIEZOMETER	-	0 - 4,255	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-10 SA	(1)(2)
AFMS-57	PIEZOMETER	-	0 - 4,260	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	MAU-10 SA	(1)(2)

REMARKS:

(1) ALL INLET FAN PIEZOMETER RINGS SHALL BE PROVIDED BY SPECIFICATION SECTION 237200, 237300, 237423.16 AND 237423.19 UNIT MANUFACTURERS.
(2) DIFFERENTIAL PRESSURE TRANSDUCERS ARE PROVIDED UNDER SECTION 230900.

UNIT HEATER (UH) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	NOMINAL CAPACITY (MBH)	AIR FLOW (CFM)	AIR FLOW HOR. or VER.	AIR THROW (FT)	MOTOR (HP)	ELECTRICAL (VOLTS/PH)	EAT (°F)	LAT (°F)	WATER FLOW (GPM)	WATER PD (FT)	WATER EWT (°F)	WATER LWT (°F)	FUEL FIRED FUEL TYPE	FUEL FIRED INPUT (MBH)	FUEL FIRED OUTPUT (MBH)	FUEL FIRED VENT TYPE	ACCESSORIES	(1) MTG. HEIGHT (FT)	WEIGHT (LB)	LOCATION	REMARKS
UH-8	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-9	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-10	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-11	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-12	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-13	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-14	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-15	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-16	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-17	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-18	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-19	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-20	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-21	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-22	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-23	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-24	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-25	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-26	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-27	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	
UH-28	STERLING, VSB70061	HYD	150	2,400	VER.	-	3	460 / 3	65	80	8.4	5	120	80	-	-	-	-	1, 7	13	365	SEE PLANS	

TYPE				VENT TYPE		ACCESSORIES			
HYD	HYDRONIC	XPL	EXPLOSION PROOF	GV	GRAVITY VENT	1	CONCENTRIC VENT ASSEMBLY	5	MANUFACTURER SUPPLIED MOUNTING HARDWARE
STM	STEAM	WD	WASH DOWN	PV	POWER VENT	2	DOWN TURN AIR NOZZLE	6	INTEGRAL THERMOSTAT
GF	GAS-FIRED			SC	SEPARATED COMBUSTION	3	STAINLESS STEEL HEAT EXCHANGER	7	REMOTE DDC SENSOR
EL	ELECTRIC					4	STAINLESS STEEL BURNER	8	DISCONNECT SWITCH

REMARKS:

(1) MOUNTING HEIGHT SHALL BE FROM FINISHED FLOOR TO BOTTOM OF UNIT.

(1) EXISTING PACKAGED ROOFTOP UNIT (AC) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	NOM. CAP. (TON)	SUPPLY FAN AIR FLOW (CFM)	SUPPLY FAN ESP (IN WC)	SUPPLY FAN TSP (IN WC)	MIN. OUTDOOR AIR FLOW (CFM)	COOLING COIL EAT (°F) DB	COOLING COIL EAT (°F) WB	COOLING COIL LAT (°F) DB	COOLING COIL LAT (°F) WB	COOLING COIL NO. OF STAGES	COOLING COIL TOTAL CAP. (MBH)	COOLING COIL SENS. CAP. (MBH)	GAS HEATER EAT (°F)	GAS HEATER LAT (°F)	GAS HEATER NO. OF STAGES	GAS HEATER CAPACITY (MBH) INPUT	GAS HEATER CAPACITY (MBH) OUTPUT	GAS HEATER GAS PRESS. (IN WC)	GAS HEATER MIN. AFUE (%)	ELECTRIC HEATER CAP. (KW)	ELECTRIC HEATER NO. OF STAGES
AC-01 (E)	EXISTING TRANE	30	9,850	-	-	2,505	-	-	-	-	-	360	360	-	-	2	600	486	-	-	-	-
AC-02 (E)	EXISTING CARRIER	3	760	-	-	115	-	-	-	-	-	36	36	-	-	-	-	-	-	-	-	-

MARK	FILTER TAG	REFRIG. TYPE	CONDENSER AMB. TEMP. (°F) MIN.	CONDENSER AMB. TEMP. (°F) MAX.	CONDENSER MIN. EER	RETURN/EXHAUST FAN AIR FLOW (CFM)	RETURN/EXHAUST FAN ESP (IN WC)	RETURN/EXHAUST FAN TSP (IN WC)	ELECTRICAL VOLTS	ELECTRICAL PHASE	ELECTRICAL MCA	ELECTRICAL MOCP	ACCESSORIES	WEIGHT WITH CURB (LB)	LOCATION	REMARKS
AC-01 (E)	-	R410-A	-	-	-	-	-	-	460	3	85.0	110	-	-	ROOF	(2)
AC-02 (E)	-	R410-A	-	-	-	-	-	-	208	3	19.4	25	-	-	ROOF	(3)

ACCESSORIES	
1	DRY BULB ECONOMIZER CONTROL
2	ENTHALPY ECONOMIZER CONTROL
3	POWER EXHAUST
4	DISCONNECT SWITCH

REMARKS:

(1) EXISTING UNIT(S) SHALL BE RE-BALANCED TO SCHEDULED CAPACITIES.

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
HVAC SCHEDULES

SHEET NO.:
M-602

MECHANICAL PIPING & VALVE SCHEDULE

SYSTEM MARK	SERVICE	ROOM TYPE	PIPING SIZE (IN)	PIPING: MATERIAL TYPE	WALL THICKNESS	ASME PIPING: STD	ASME PIPING: GRADE	ASME PIPING: TYPE	PRESS. CLASS	FITTING TYPE	ENDS	JOINT TYPE	VALVE: TYPE	CHECK VALVES	PRESS. CLASS	CONNECTION TYPE	BODY MATERIAL	TRIM MATERIAL	VALVE EQUAL TO: [MANUFACTURER, MODEL]	REMARKS
G	NATURAL GAS	OUTDOORS	1/2 TO 2	BS	SCH 40	A 53	B	E or S	150#	MI	PLAIN	TH	2BV	-	125#	THREADED	BRONZE	BRONZE	APOLLO, 77-100	PAINT PIPE
-	- LOW PRESSURE (2 PSIG OR <)	-	2 1/2 OR MORE	BS	SCH 40	A 53	B	E or S	150#	WS	BEVELED	BW, FL	PV	-	125#	FLANGED	IRON	IRON	XOMOX TUFFLINE	PAINT PIPE
-	-	INDOORS	1/2 TO 2	BS	SCH 40	A 53	B	E or S	150#	MI	PLAIN	TH	2BV	-	125#	THREADED	BRONZE	BRONZE	APOLLO, 77-100	PAINT PIPE
-	-	-	2 1/2 OR MORE	BS	SCH 40	A 53	B	E or S	150#	WS	BEVELED	BW, FL	PV	-	125#	FLANGED	IRON	IRON	XOMOX TUFFLINE	PAINT PIPE
-	NATURAL GAS	OUTDOORS	1/2 TO 2	BS	SCH 40	A 53	B	E or S	150#	WS	PLAIN	SW	2BV	-	125#	THREADED	BRONZE	BRONZE	APOLLO, 77-100	PAINT PIPE
-	- HIGH PRESSURE (> 2 PSIG)	-	2 1/2 OR MORE	BS	SCH 40	A 53	B	E or S	150#	WS	BEVELED	BW, FL	PV	-	125#	FLANGED	IRON	IRON	XOMOX TUFFLINE	PAINT PIPE
-	-	INDOORS	1/2 TO 2	BS	SCH 40	A 53	B	E or S	150#	WS	PLAIN	SW	2BV	-	125#	THREADED	BRONZE	BRONZE	APOLLO, 77-100	PAINT PIPE
-	-	-	2 1/2 OR MORE	BS	SCH 40	A 53	B	E or S	150#	WS	BEVELED	BW, FL	PV	-	125#	FLANGED	IRON	IRON	XOMOX TUFFLINE	PAINT PIPE
HWS/R	HEATING WATER SUPPLY/RETURN	ALL AREAS	3/4 TO 2	Cu	L	B 88	-	-	-	WCu	PLAIN	SD	2BV	SWING	125#	THREADED	BRONZE	BRONZE	APOLLO, 77-100	-
-	- (HVAC)	-	2 1/2 OR MORE	BS	SCH 40	A 53	A or B	E or S	150#	WS,WC,FS	BEVELED	BW, FL	SBV	SWING	125#	FLANGED	IRON	IRON	AMERICAN 4000	PFA FUSED BALL
CD	HVAC CONDENSATE DRAIN	ALL AREAS	3/4 TO 2	Cu	ACR	B 280	-	-	-	WCu	PLAIN	SD	-	-	-	-	-	-	-	-

MATERIAL TYPE		JOINT TYPE	
BS	BLACK STEEL	BW	BUTT WELD
SS	STAINLESS STEEL	SW	SOCKET WELD
GS	GALVANIZED STEEL	TH	THREADED
PE	POLYETHYLENE	FL	FLANGED
CU	COPPER	SF	SOCKET FUSION
PVC	PVC	BF	BUTT FUSION
		SD	SOLDERED
		BZ	BRAZED
		SV	SOLVENT WELD

FITTING TYPE			
CI	CAST IRON (THREADED) (ASME B16.4 FOR IRON, ASME A 351 FOR SS) (FLANGED) (ASME B16.1)	WC	WROUGHT CAST (FLANGES, ASME B16.5)
MI	MALLEABLE IRON (THREADED) (ASME B16.3)	FS	FORGED STEEL (FLANGES, ASME B16.5)
WS	WROUGHT STEEL (ASTM A 234 FOR STEEL, ASTM A 403 FOR SS)	PS	PVC SOCKET
PE	POLYETHYLENE (ASTM D 2683 (SOCKET) OR ASTM D 3261 (BUTT))	WCu	WROUGHT COPPER (ASME B 16.22)
WW	WELDED WROUGHT STEEL (ASTM A 774 FOR SS)		

ASME PIPING TYPE	
S	SEAMLESS
E	ELECTRIC RESISTANCE WELDED
F	FURNACE BUTT WELDED

VALVE TYPE	
1BV	ONE PIECE FULL PORT BALL VALVE
2BV	TWO PIECE FULL PORT BALL VALVE
3BV	THREE PIECE FULL PORT BALL VALVE
SBV	STEEL BODY BALL VALVE
NGV	NON-RISING STEM GATE VALVE
RGV	RISING STEM GATE VALVE
OGV	OSY GATE VALVE
BFV	BUTTERFLY VALVE
PV	PLUG VALVE

PIPING SYSTEM JOINING MATERIALS

1. PIPE-FLANGE GASKET MATERIALS: SUITABLE FOR CHEMICAL AND THERMAL CONDITIONS OF PIPING SYSTEM CONTENTS.
2. PIPE FLANGE GASKETS: ASME B16.21, NONMETALLIC, FLAT, ASBESTOS-FREE, 1/8IN MAXIMUM THICKNESS UNLESS SPECIFIED OTHERWISE.
   A. FULL-FACE TYPE: FOR FLAT-FACE, CLASS 125, CAST-IRON AND CAST-BRONZE FLANGES.
   B. NARROW-FACE TYPE: FOR RAISED-FACE, CLASS 250, CAST-IRON AND STEEL FLANGES.
3. FLANGE BOLTS AND NUTS: ASME B18.2.1, CARBON STEEL, UNLESS OTHERWISE INDICATED.
4. PLASTIC, PIPE-FLANGE GASKET, BOLTS, AND NUTS: TYPE AND MATERIAL RECOMMENDED BY PIPING SYSTEM MANUFACTURER, UNLESS OTHERWISE INDICATED.
5. SOLDER FILLER METALS: ASTM B 32, LEAD-FREE ALLOYS. INCLUDE WATER-FLUSHABLE FLUX ACCORDING TO ASTM B 813.
6. GENERAL DUTY BRAZING FILLER METALS: AWS A5.8, BCUP SERIES, COPPER-PHOSPHORUS ALLOYS UNLESS OTHERWISE INDICATED.
8. WELDING FILLER METALS: AWS D10.12 FOR WELDING MATERIALS APPROPRIATE FOR WALL THICKNESS AND CHEMICAL ANALYSIS OF STEEL PIPE.
9. SOLVENT CEMENTS FOR JOINING PLASTIC PIPING: CPVC PIPING: ASTM F 493, PVC PIPING: ASTM D 2564. INCLUDE PRIMER ACCORDING TO ASTM F 656.

REMARKS:

(1) FITTING MATERIAL SHALL MATCH PIPING MATERIAL (EXCEPTION: MI FITTINGS SHALL BE USED FOR BS PIPING WHERE INDICATED).
(2) PRESS. CLASS LISTED IS MIN. REQUIRED. PROVIDE GREATER PRESS. CLASS VALVE AND PIPE SYSTEM IF PRESS. CLASS INDICATED IS NOT AVAILABLE FOR GIVEN VALVE AND PIPE TYPE.
(3) FLANGES SHALL BE RAISED FACE WITH SPOT FACED BOLT HOLES.
(4) AIR VENT, VACUUM BREAKER, AND SAFETY VALVE PIPING SHALL BE THE SAME AS THE CONNECTED SERVICE PIPING.

MECHANICAL PIPE & EQUIPMENT INSULATION SCHEDULE

MARK	SERVICE	PIPE SIZES (IN)	INDOORS: INSULATION TYPE	INDOORS: THICKNESS (IN)	INDOORS: JACKETING TYPE	OUTDOORS: INSULATION TYPE	OUTDOORS: THICKNESS (IN)	OUTDOORS: JACKETING TYPE	PIPE/EQUIP LABEL (Y/N)	HEAT TRACE	REMARKS
HWS/R	HEATING HOT WATER SUPPLY & RETURN	3/4 TO 1 1/2	I2	1 1/2	J2	I2	2	J2	Y	NONE	-
	(120ºF - 180ºF)	2 OR MORE	I2	2	J2	I2	3	J2	Y	NONE	-
CD	ERV AND HX CONDENSATE DRAIN	ALL SIZES	I2	1	J2	-	-	-	-	NONE	-

INSULATION TYPE	
I1	RIGID MOLDED HYDROUS CALCIUM SILICATE (ASTM C 533, TYPE I) FABRICATE SHAPES ACCORDING TO ASTM C 450 AND ASTM C 585 AVAIL. MFR'S: JOHNS MANVILLE: THERMO-12 GOLD
I2	MINERAL FIBER, PRE-FORMED PIPE (ASTM C 547, Type I, Grade A) INCLUDING SSL-ASJ WITH PREFORMED FITTING JACKETS AVAIL. MFR'S: JOHNS MANVILLE: MICRO-LOK KNAUF INSULATION: 1000 PIPE INSULATION OWENS CORNING: FIBERGLAS PIPE INSULATION

JACKETING TYPE (FIELD APPLIED)	
J1	PVC, 30 MIL THICK, WHITE, UVC RESISTANT, ASTM D 1784 CLASS 16354-C, AVAIL. MFR'S: JOHNS MANVILLE; ZESTON
J2	STAINLESS STEEL, 304, 0.016" THICK, SMOOTH, 2B OR 4 FINISH, ASTM A 167 OR ASTM A 240 FACTORY FABRICATED FITTING COVERS AVAIL. MFR'S: CHILDERS PRODUCTS, DIV OF ITW RPR PRODUCTS, INC.; INSUL-MATE

REMARKS:

(1)

AIR OUTLET AND INLET SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	APPLICATION	(4) MAX AIRFLOW (CFM)	OUTLET / INLET	TYPE	MOUNTING SYSTEM	(5) DAMPER	(3) FACE SIZE (IN)	NECK SIZE (IN)	(2) MAX NOISE LEVEL (NC)	PATTERN	MAX SP (IN WG)	FINISH	MATERIAL	(1) MOUNTING HEIGHT (IN)	ACCESSORIES	LOCATION	REMARKS
SG-1	TITUS, 300RL	SUPPLY	1500	3	2	4	NONE	30x12	28x10	35	-	0.1	M	STEEL				(6)
SG-2	TITUS, 300RL	SUPPLY	2500	3	2	4	NONE	36x14	34x12	35	-	1.1	M	STEEL				(6)
SG-3	TITUS, 300RL	SUPPLY	3500	3	2	4	NONE	42x18	40x16	35	-	0.1	M	STEEL				(6)
SG-4	TITUS, 300RL	SUPPLY	5000	3	2	4	NONE	46x22	44x20	35	-	0.1	M	STEEL				(6)
RG-1	TITUS, 350RL	RETURN	1500	3	3	4	NONE	24x12	22x10	35	-	0.1	M	STEEL				(7)
EG-1	TITUS, 350RL	EXHAUST	3200	3	3	4	NONE	36x18	34x16	35	-	0.1	M	STEEL				(7)

OUTLET/INLET		TYPE				MOUNTING SYSTEM		DAMPER		FINISH	
1	DIFFUSER	1	SINGLE DEFLECTION	9	LOUVERED	1	T-BAR CEILING	N	NONE	M	MILL
2	REGISTER	2	DOUBLE DEFLECTION	10	HOODED	2	PLASTER/CONCRETE CEILING	BF	BUTTERFLY	W	MFR. STANDARD WHITE
3	GRILLE	3	FIXED BLADE	11	DOOR TRANSFER	3	PLASTER/MASONRY WALL	G	GRAVITY	S	MFR. SPECIAL COLOR
4	LOUVER	4	PERFORATED	12	BRICK	4	EXPOSED DUCTWORK	MP	MOTORIZED PNEUMATIC	A	ANODIZED ALUMINUM
5	PENTHOUSE	5	LINEAR	13	PUNKAH	5	METAL PANEL WALL	ME	MOTORIZED ELECTRIC	P	PRIME COAT (FINAL COAT BY GC)
6	VENT	6	PLENUM SLOT	14	LAMINAR	6	FLOOR	OB	OPPOSED BLADE	O	OTHER (SEE SPECIFICATIONS)
		7	PLAQUE	15	DRUM	7	ROOF	PB	PARALLEL BLADE		
		8	EGGCRATE			8	EXTERIOR STUD WALL	LL	LOW LEAKAGE, INSUL.		

REMARKS:

(1) MOUNTING HEIGHT SHALL BE FROM FINISHED FLOOR TO BOTTOM OF OPENING.
(2) ALL GRILLES AND DIFFUSERS SHALL NOT EXCEED NOISE CRITERIA LISTED (BASED ON 10 DB ROOM ATTENUATION) AND AT THE SCHEDULED MAXIMUM STATIC PRESSURE DROP.
(3) BORDER TYPES SHALL BE COMPATIBLE WITH SPACE TYPES WHERE AIR DEVICE IS LOCATED.
(4) SEE PLANS FOR ACTUAL INDIVIDUAL AIR QUANTITIES OF EACH DEVICE.
(5) IF DAMPER IS SCHEDULED 'NONE', EACH SUPPLY, RETURN, AND EXHAUST DEVICE TO HAVE A BALANCE DAMPER IN THE DUCT BRANCH TAKE-OFF.
(6) INDIVIDUALLY ADJUSTABLE AIRFOIL BLADE WITH 3/4" SPACING. FRONT BLADES PARALLEL TO THE SHORT DIMENSION. INITIALLY SET BLADES FOR APPROXIMATELY 30° THROW.
(7) BLADES PARALLEL TO THE LONG DIMENSION WITH FIXED 45 DEGREE DEFLECTION AND 3/4" SPACING.

AIR TERMINAL (AT) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	AIR FLOW (CFM): MAX.	AIR FLOW (CFM): MIN.	(1) MAX. PD (IN. WC)	INLET SIZE (IN)	OUTLET: WIDTH (IN)	OUTLET: DEPTH (IN)	OUTLET: QTY.	INTERLOCK	WEIGHT (LB)	ACCESSORIES	LOCATION	REMARKS
AT-1	TITUS, DESV	1, 3	6,500	1,000	0.35	24X16	38	18	-	(4)	150	3	ZONE 3	(3)
AT-2	TITUS, DESV	1, 3	2,600	0	0.35	16	24	18	-	EF-29	130	3	ZONE 3	(3)
AT-3	TITUS, DESV	1, 3	2,350	0	0.35	16	24	18	-	EF-18	130	3	ZONE 3	(3)
AT-4	TITUS, DESV	1, 3	735	0	0.35	8	16	10	-	EF-14	100	3	ZONE 3	(2)

TYPE							
1	PRESSURE INDEPENDENT	5	SERIES FAN POWERED	1	ELECTRIC HEAT	5	FACTORY MOUNTED TRANSFORMER
2	PRESSURE DEPENDENT	6	PARALLEL FAN POWERED	2	FUSE	6	FACTORY MOUNTED DISCONNECT SWITCH
3	SINGLE DUCT	7	BYPASS	3	DDC CONTROLS		
4	DUAL DUCT			4	PNEUMATIC CONTROLS		

REMARKS:

(1) MAXIMUM STATIC PRESSURE DROP BASED ON MAXIMUM RATED AIR FLOW.
(2) CONSTANT VOLUME AIR TERMINAL.
(3) VARIABLE VOLUME AIR TERMINAL.
(4) INTERLOCK AT-1 WITH EXHAUST FANS EF-15, 16, 17, AND 20 WITH LOCAL SWITCHES. EXHAUST FAN EF-19 SHALL BE INTERLOCK GAS DETECTION AND MAU-8.

JET THRUST FAN (JF) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	FAN TYPE	AIR FLOW RATE (CFM)	ESP (IN WC)	MOTOR (HP)	MOTOR TYPE	FAN SPEED (RPM)	DRIVE TYPE	ELECTRICAL (VOLTS/PH)	(2) MTG. HEIGHT (FT)	MAXIMUM SOUND (3) (DBA)	MAXIMUM SOUND (4) SONES	MAXIMUM SOUND INSTALL. TYPE	(1) INTERLOCK WITH	ACCESSORIES	WEIGHT (LB)	LOCATION	REMARKS
JF-1	SYSTEMAIR, AJR-355	2	3,772	-	1.5	TEFC	3,420	DIRECT	460/3	13	74.0	-	A	MAU-6/7	28,30	168	ZONE 4	
JF-2	SYSTEMAIR, AJR-355	2	3,772	-	1.5	TEFC	3,420	DIRECT	460/3	13	74.0	-	A	MAU-6/7	28,30	168	ZONE 4	
JF-3	SYSTEMAIR, AJR-355	2	3,772	-	1.5	TEFC	3,420	DIRECT	460/3	13	74.0	-	A	MAU-6/7	28,30	168	ZONE 4	
JF-4	SYSTEMAIR, AJR-355	2	3,772	-	1.5	TEFC	3,420	DIRECT	460/3	13	74.0	-	A	MAU-6/7	28,30	168	ZONE 4	
JF-5	SYSTEMAIR, AJR-355	2	3,772	-	1.5	TEFC	3,420	DIRECT	460/3	13	74.0	-	A	MAU-9/10	28,30	168	ZONE 5	
JF-6	SYSTEMAIR, AJR-355	2	3,772	-	1.5	TEFC	3,420	DIRECT	460/3	13	74.0	-	A	MAU-9/10	28,30	168	ZONE 5	
JF-7	SYSTEMAIR, AJR-355	2	3,772	-	1.5	TEFC	3,420	DIRECT	460/3	13	74.0	-	A	MAU-9/10	28,30	168	ZONE 5	
JF-8	SYSTEMAIR, AJR-355	2	3,772	-	1.5	TEFC	3,420	DIRECT	460/3	13	74.0	-	A	MAU-9/10	28,30	168	ZONE 5	

FAN TYPE			
CENTRIFUGAL		AXIAL	
1	SIDEWALL	8	ROOFTOP DOWNBLAST
2	INLINE	9	SIDEWALL PROPELLER
3	UTILITY	10	TUBE AXIAL
4	CABINET	11	VANE AXIAL
5	ROOFTOP UPBLAST	12	MIXED FLOW
6	ROOFTOP HOODED	13	ROOFTOP FRP UPBLAST
7	ROOFTOP FILTERED SUPPLY		

MOTOR TYPE	
ODP	OPEN DRIP PROOF
TEFC	TOTALLY ENCLOSED FAN COOLED
XPL	EXPLOSION PROOF
INV	INVERTER DUTY
TEAO	TOTALLY ENCLOSED AIR OVER

INSTALLATION TYPE	
A	FREE INLET, FREE OUTLET
B	FREE INLET, DUCTED OUTLET
C	DUCTED INLET, FREE OUTLET
D	DUCTED INLET, DUCTED OUTLET

ACCESSORIES			
1	GRAVITY BACKDRAFT DAMPER	11	OUTLET WIRE GUARD
2	MOTORIZED BACKDRAFT DAMPER	12	INLET FILTER GUARD
3	WEATHERHOOD	13	MOTOR COVER
4	WALL COLLAR	14	HOUSING INSULATION
5	MOTOR WIRE GUARD	15	BELT (OSHA) WIRE GUARD
6	MOTOR (OSHA) WIRE GUARD	16	INLET BELL
7	SHUTTER GUARD	17	INLET/OUTLET FLANGES
8	FAN SPEED CONTROLLER	18	INLET VANE DAMPER
9	NON-FUSED DISCONNECT SWITCH	19	EXTENDED LUBE LINES
10	INLET WIRE GUARD	20	MFR. ROOF CURB
		21	HOODED WALL CAP
		22	HOODED ROOF CAP
		23	HINGED ROOF CURB
		24	INLET GRILLE
		25	BASE MOUNTED VIBRATION ISOLATORS
		26	DUCT ADAPTOR
		27	HANGING SPRING ISOLATORS
		28	HANGING NEOPRENE ISOLATORS
		29	FACTORY INSULATED ANGLED FILTER BOX
		30	SILENCER AT INLET & OUTLET

REMARKS:

(1) SEE SPECIFICATION SECTION 230993 - HVAC SEQUENCE OF OPERATION.
(2) MOUNTING HEIGHT IS FROM FINISHED FLOOR LEVEL OF INDICATED ROOM, TO BOTTOM OF FAN.
(3) SOUND INLET AT 5 FT. LEVEL RATING PER AMCA 301.
(4) LOUDNESS VALUES AT 5 FT IN A HEMISPHERICAL FREE FIELD PER AMCA 301.

HYDRONIC PUMP (P) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	SYSTEM SERVED	MEDIA	FLOW RATE (GPM)	TDH (FT)	MOTOR: POWER (HP)	MOTOR: SPEED (RPM)	MOTOR: (VOLTS/ PH)	IMPELLER DIA. (IN)	PUMP EFF. (%)	FLUID TEMP. (°F): MAX.	FLUID TEMP. (°F): MIN.	SIZE (IN): SUCT.	SIZE (IN): DISCH.	NPSHA (FT)	SUCTION DIFFUSER (IN)	MTG. HEIGHT (IN)	WEIGHT (LB)	LOCATION	REMARKS
HWP-7	GRUNDFOS, LCS	FMES	HYDRONIC	WTR	224.0	60	7.5	1,775	460 / 3	9.06	79%	250	40	3	2.5	6.5	3	-	287	BOILER RM	(1)(2)
HWP-8	GRUNDFOS, LCS	FMES	HYDRONIC	WTR	224.0	60	7.5	1,775	460 / 3	9.06	79%	250	40	3	2.5	6.5	3	-	287	BOILER RM	(1)(2)

TYPE			
IC	IN-LINE CIRCULATOR	SP	SUBMERSIBLE PUMP
VCC	VERTICAL CLOSED COUPLED	VS	VERTICAL SUBMERSIBLE
CCES	CLOSE COUPLED END SUCTION	ES	EFFLUENT SUMP
FMES	FRAME MOUNTED END SUCTION	PMV	PUMPED MIXING VALVE
DS	DOUBLE SUCTION	WRC	WET ROTOR CIRCULATOR

REMARKS:

(1) PROVIDE WITH VFD RATED MOTORS.
(2) PROVIDE MOUNTING HARDWARE TO SUPPORT PUMP.

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DATE: November 7, 2019
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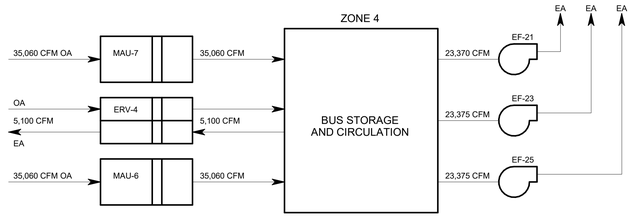
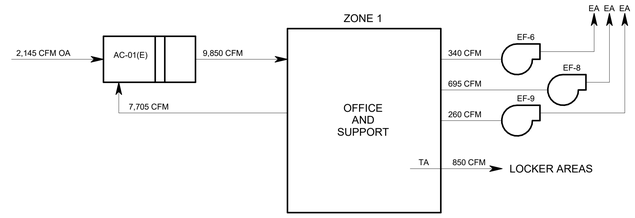
SHEET CONTENTS
HVAC SCHEDULES

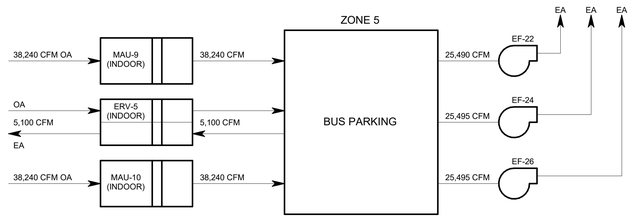
SHEET NO.:
M-603



5 BUS STORAGE AND CIRCULATION AIRFLOW DIAGRAM
NO SCALE



1 OFFICE AND SUPPORT AIRFLOW DIAGRAM
NO SCALE



6 BUS PARKING AIRFLOW DIAGRAM
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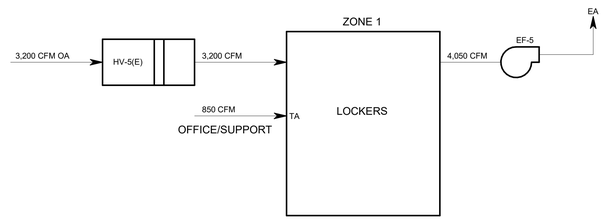
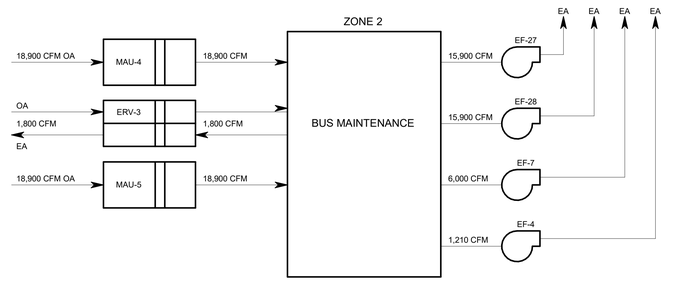
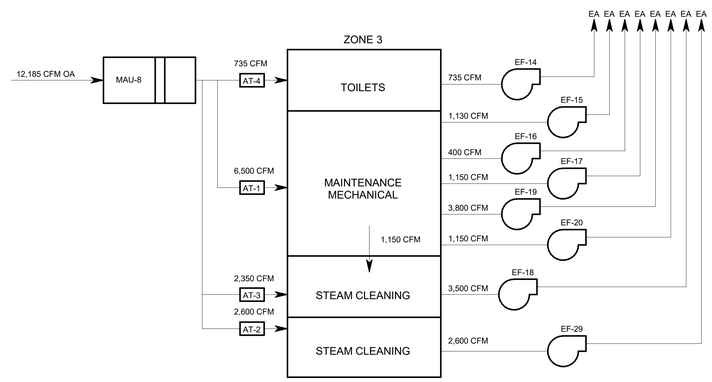


2 LOCKERS AIRFLOW DIAGRAM
NO SCALE

7 BOILER ROOM VENTILATION AIRFLOW DIAGRAM
NO SCALE



3 BUS MAINTENANCE AIRFLOW DIAGRAM
NO SCALE



4 MAINTENANCE MECHANICAL AIRFLOW DIAGRAM
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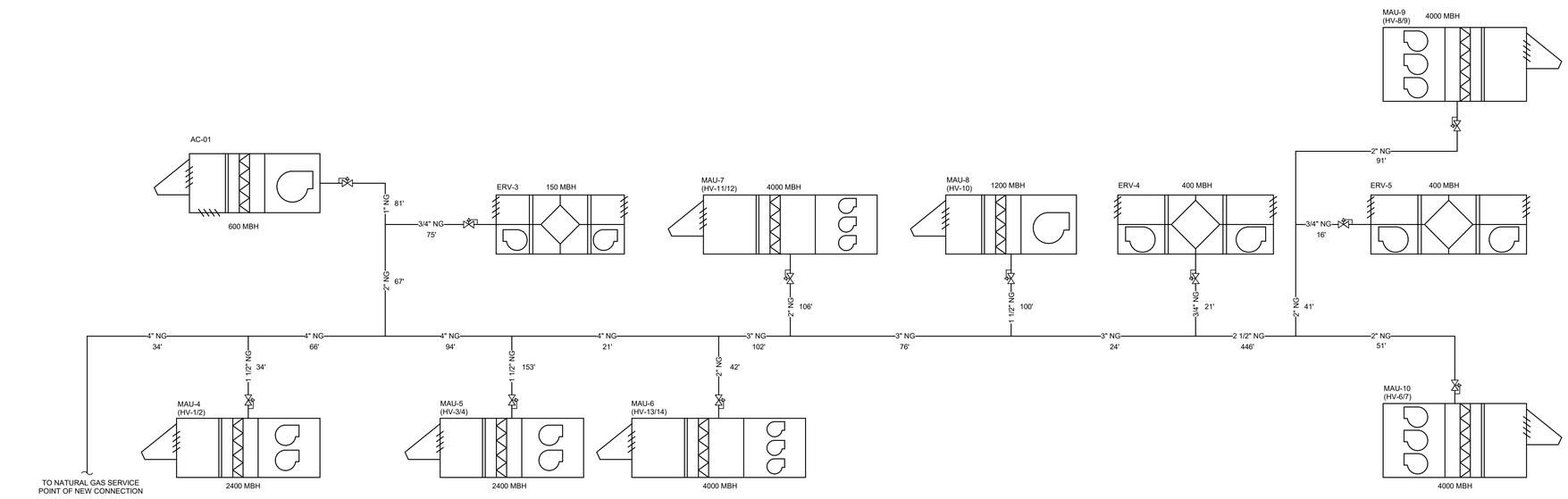
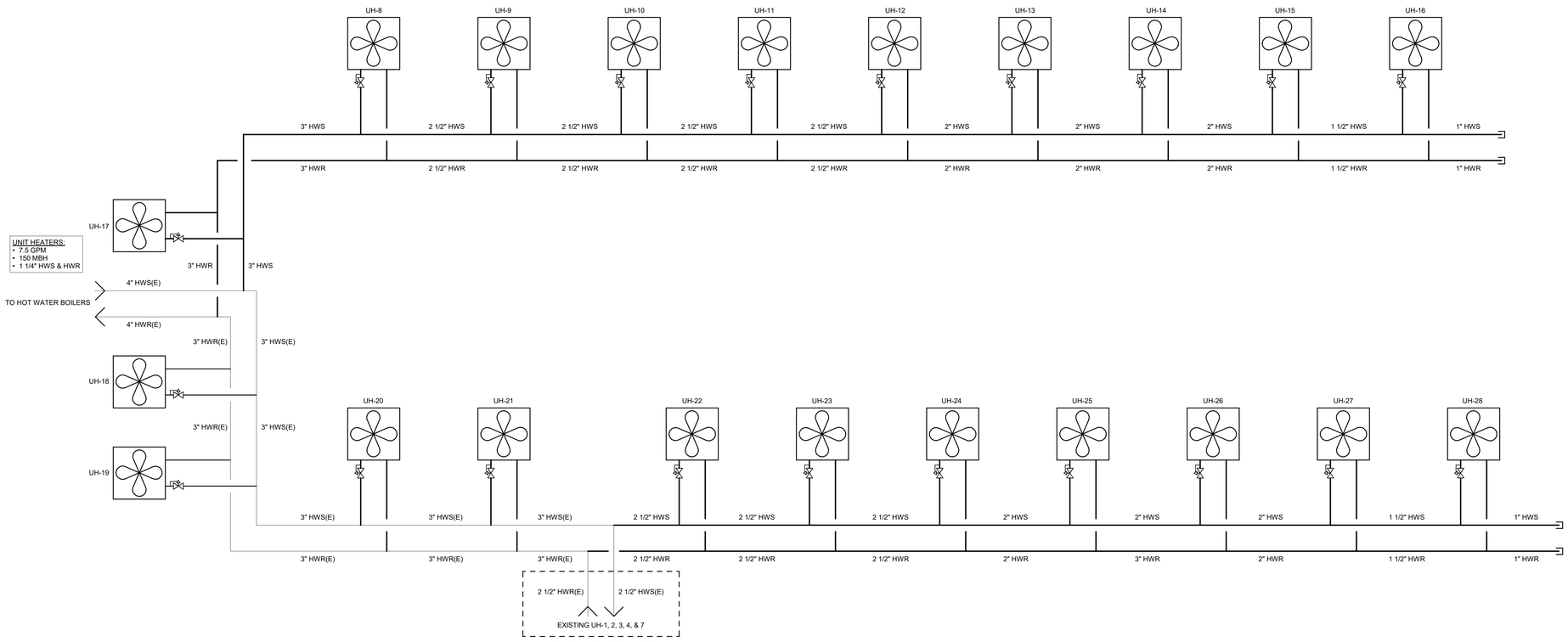
SHEET CONTENTS
HVAC AIRFLOW DIAGRAMS

SHEET NO.:
M-701



1 NATURAL GAS FLOW METER SCHEMATIC - HVAC UPGRADE
NO SCALE



2 HYDRONIC FLOW SCHEMATIC - HVAC UPGRADE
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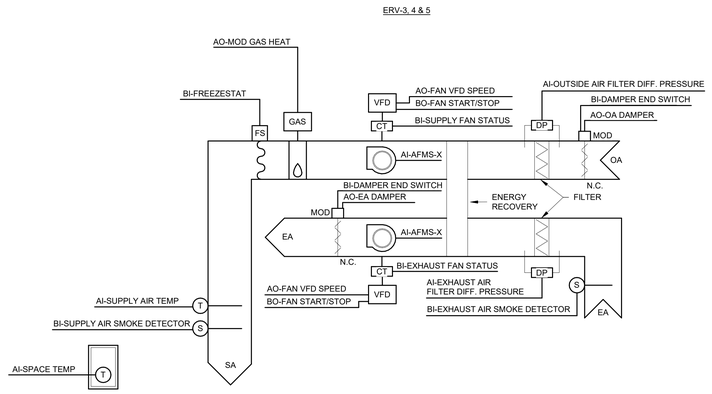
SHEET CONTENTS
HVAC PIPING DIAGRAMS

SHEET NO.:
M-702



SEQUENCE OF OPERATIONS:
VARIABLE VOLUME MAKEUP AIR UNIT CONTROL (ERV-3, 4 & 5):

FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE SUPPLY AND EXHAUST FANS VIA THEIR RESPECTIVE VFDS.

CURRENT STATUS SWITCH: PROVIDE VFD MOTOR RUN STATUS, IN THIS SECTION FOR THE SUPPLY AND EXHAUST FANS.

VENTILATION AIR CONTROL:
ERV-3, 4 AND 5 ARE A 100% OUTSIDE AIR AND 100% EXHAUST FAN UNITS.

NORMAL MODE CONTROL:
THE SUPPLY AND EXHAUST FANS SHALL OPERATE AT A CONSTANT SPEED. VENTILATION SYSTEM SHALL OPERATE CONTINUOUSLY AS SCHEDULED.

ERV-3 IS A 100% OUTSIDE AIR UNIT AND 100% EXHAUST.
ERV-4 IS A 100% OUTSIDE AIR UNIT AND 100% EXHAUST.
ERV-5 IS A 100% OUTSIDE AIR UNIT AND 100% EXHAUST.

OCCUPIED/UNOCCUPIED SCHEDULE SHALL BE SET AT THE DDC OPERATOR INTERFACE. WHEN INDEXED TO UNOCCUPIED THE UNIT SHALL SHUTDOWN. PROVIDED INDEX DDC CONTROLLED HEATING AND VENTILATION ASSOCIATED WITH THIS ENERGY RECOVERY VENTILATOR UNIT TO MAINTAIN FIXED DISCHARGE AIR TEMPERATURE SETPOINT (ADJ.) UNLESS OVERRIDDEN BY BUILDING AUTOMATION SYSTEM. UNOCCUPIED SCHEDULE SHALL BE ONLY ESTABLISHED FOR ERV-3 SERVING THE MAINTENANCE SERVICE AREAS HOURS AS DEFINED BY CITY OF MADISON'S PROJECT REPRESENTATIVE. ERV-4 AND 5 SERVING THE BUS STORAGE AND STAGING/CIRCULATION WILL OPERATE 24 HOURS/DAY AND 7 DAYS/WEEK.

SUPPLY FAN SPEED CONTROL: THE PURPOSE OF THE SUPPLY FAN SPEED CONTROL IS TO MAINTAIN VENTILATION WITHIN THE SPACE. THE SUPPLY AND EXHAUST FAN SHALL OPERATE IN NORMAL MODE. THE AIRFLOW MEASURING STATION PROVIDED WITH THE SUPPLY FAN SHALL BE TO DETERMINE THE VFD SPEED SETTINGS THAT CORRESPOND WITH THE AIR FLOWRATES FOR EACH OPERATING MODE AS SCHEDULED ON THE DRAWINGS.

EXHAUST FAN SPEED CONTROL: THE PURPOSE OF THE EXHAUST FAN SPEED CONTROL IS TO MAINTAIN VENTILATION WITHIN THE SPACE. THE EXHAUST FAN SHALL OPERATE IN NORMAL MODE. THE AIRFLOW MEASURING STATION PROVIDED WITH THE EXHAUST FAN SHALL BE USED TO DETERMINE THE VFD SPEED SETTINGS THAT CORRESPOND WITH THE AIR FLOWRATES FOR NORMAL MODE AS SCHEDULED ON THE DRAWINGS. REFER TO NORMAL MODE CONTROL BELOW.

FILTERS: INSTALL A DIFFERENTIAL STATIC PRESSURE SENSOR ACROSS EACH FILTER BANK. ENSURE THAT THE STATIC PROBES DO NOT IMPEDE FILTER REMOVAL.
FOR FILTER BANK, PROVIDE AN ALARM TO THE OPERATOR INTERFACE WHEN THE DIFFERENTIAL STATIC PRESSURE EXCEEDS 1.0" W.C. (ADJ.).

GAS HEATING COIL CONTROL: MODULATE THE GAS HEATING COIL TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT.

DISCHARGE AIR TEMPERATURE SETPOINT (HEATING ONLY UNIT): THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE A FIXED 65º F (ADJ.).

SAFETIES: GENERAL: ALL SAFETIES SHALL BE HARD WIRED TO THE SUPPLY AND RETURN FAN STARTERS OR VFD SAFETY CIRCUITS. STARTERS SHALL NOT FUNCTION IN THE "HAND" OR "AUTO" AND VFD'S SHALL BE DISABLED IF THEY ARE INDEXED TO THE "AUTO" OR "HAND" POSITION IN EITHER THE VFD.

FREEZESTAT: INSTALL AN ELECTRIC FREEZESTAT TO SHUT DOWN THE UNIT (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION) IF THE TEMPERATURE UPSTREAM OF THE HEATING SECTION DROPS BELOW 35º F (ADJ.). THE ELECTRIC FREEZESTAT SHALL ACT INDEPENDENTLY OF THE DDC SYSTEM VIA HARDWIRE INTERLOCK AND SHALL OVERRIDE THE DDC SYSTEM CONTROL SIGNAL TO DEENERGIZE THE SUPPLY(S) AND EXHAUST FAN(S). THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE.
A FREEZESTAT TRIP SHALL NOTIFY THE DDC SYSTEM THAT SHALL SEND AN ALARM TO THE OPERATOR INTERFACE.

FIRE ALARM SHUTDOWN: UPON A LOCAL FIRE ALARM SYSTEM ALARM, THE FIRE ALARM CONTROL MODULE PROVIDED BY THE ELECTRICAL CONTRACTOR AT THE TEMPERATURE CONTROL PANEL SHALL CHANGE STATE OF ITS CONTACTS. THIS SHALL CAUSE THE UNIT TO BE SHUT DOWN (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION). AN AUXILIARY CONTACT SHALL BE PROVIDED TO NOTIFY THE DDC SYSTEM OF A LOCAL FIRE ALARM SHUTDOWN.

UNIT SHUTDOWN: WHENEVER THE ENERGY RECOVERY VENTILATOR UNIT IS INDEXED OFF, THE SUPPLY AND EXHAUST FAN SHALL STOP. ON A FAILURE OF THE SUPPLY OR EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE SUPPLY FAN(S) IS OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR:

THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE.

THE GAS HEATING VALVE(S) SHALL CLOSE.

UNOCCUPIED CONTROL: OCCUPIED/UNOCCUPIED SCHEDULE SHALL BE SET AT THE DDC OPERATOR INTERFACE. WHEN INDEXED TO UNOCCUPIED THE UNIT SHALL SHUTDOWN.

POWER OUTAGE OPERATION: IN EVENT OF FAILURE OF PRIMARY ELECTRICAL SERVICE, ENERGY RECOVERY VENTILATOR UNIT SHALL OPERATION VIA. STANDBY POWER FROM THE EXISTING STANDBY GENERATOR. ALL TEMPERATURE CONTROL PANELS AND DDC CONTROLLER TO BE CONNECTED TO STANDBY POWER.

EXHAUST FAN CONTROL:
FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE EXHAUST FAN VIA THEIR ASSOCIATED VFD MOTORS.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCHES FOR EXHAUST FAN.

INTERLOCK: THE EXHAUST FAN SHALL BE INTERLOCKED VIA THE DDC SYSTEM WITH THE ERV UNIT AND SHALL RUN WHEN NORMAL MODE OPERATION.

NORMAL MODE: INTERLOCK EXHAUST FAN TO OPERATE WHEN ASSOCIATED ERV UNIT IS IN THE NORMAL MODE. EXHAUST FAN REQUIRED MOTORIZED AUTOMATIC DAMPER. WHEN EXHAUST FAN IS ENERGIZED, THE MOTORIZED AUTOMATIC DAMPER ASSOCIATED WITH THE FAN SHALL OPEN AND THE FAN MOTOR SHALL START. WHEN DE-ENERGIZED, THE FAN MOTOR SHALL STOP AND THE MOTORIZED AUTOMATIC DAMPER SHALL CLOSE. THE AUTOMATIC DAMPER SHALL BE HARD WIRE TO THE FAN POWER.

UNIT SHUTDOWN: WHENEVER THE SYSTEM IS INDEXED OFF, THE EXHAUST FAN SHALL STOP. THE ASSOCIATED ENERGY RECOVERY VENTILATOR UNITS WILL RETURN EITHER TO THE NORMAL MODE OR TO NEXT DDC SCHEDULED FOR OCCUPIED/UNOCCUPIED SETTING. ON A FAILURE OF THE EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE EXHAUST FAN IS OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR: THE EXHAUST FAN SHALL STOP AND THE EXHAUST AIR DAMPER SHALL CLOSE.

POWER OUTAGE OPERATION: IN EVENT OF FAILURE OF PRIMARY ELECTRICAL SERVICE, ENERGY RECOVERY VENTILATOR UNITS AND ASSOCIATED EXHAUST FAN SHALL OPERATION VIA. STANDBY POWER FROM THE EXISTING STANDBY GENERATOR.

1 ENERGY RECOVERY VENTILATOR UNITS / EXHAUST FANS - ERV-3. 4 & 5
NO SCALE

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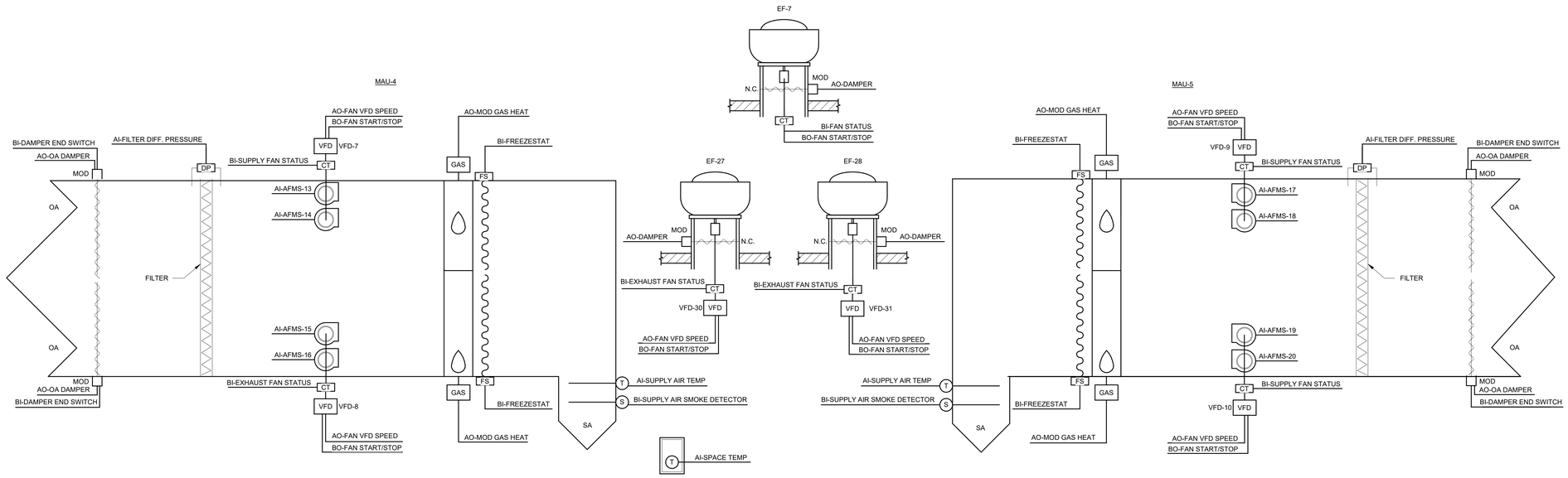
SHEET CONTENTS:
CONTROL SCHEMATICS

SHEET NO.:
M-801



SEQUENCE OF OPERATIONS:
VARIABLE VOLUME MAKEUP AIR UNIT CONTROL (MAU-4 AND 5):

FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE SUPPLY AND EXHAUST FANS VIA THEIR RESPECTIVE VFDS..

CURRENT STATUS SWITCH: PROVIDE VFD MOTOR RUN STATUS, IN THIS SECTION FOR THE SUPPLY AND EXHAUST FANS.

VENTILATION AIR CONTROL:
MAU-4 AND MAU-5 ARE 100% OUTSIDE AIR UNITS WITH ASSOCIATED 100% EXHAUST AIR FANS.

MAU-4 SHALL BE 100% OUTSIDE AIR
MAU-5 SHALL BE 100% OUTSIDE AIR
EF-7 SHALL BE 100% EXHAUST AIR
EF-27 AND EF-28 AT 100% EXHAUST AIR

NORMAL MODE CONTROL:
THE SUPPLY AND EXHAUST FANS SHALL OPERATE AT CONSTANT VOLUME DURING NORMAL MODE OPERATION AT 50% AIRFLOW VOLUME TO MAINTAIN SPACE TEMPERATURE. WHEN SPACE TEMPERATURE IS BELOW SETPOINT, MAU-4 AND 5 SHALL OPERATE AT 50% AIRFLOW RATE. THE REVERSE SHALL OCCUR WHEN IS ABOVE SETPOINT WHICH MAU-4 AND MAU-5 AT 100% AIRFLOW RATE IN VENTILATION MODE.

MAU-4 SHALL BE A MINIMUM 50% OUTSIDE AIR
MAU-5 SHALL BE A MINIMUM 50% OUTSIDE AIR
EF-7 SHALL BE 100% EXHAUST AIR
EF-27 IS 100% EXHAUST AIR AND EF-28 IS OFF

OCCUPIED/UNOCCUPIED SCHEDULE SHALL BE SET AT THE DDC OPERATOR INTERFACE. WHEN UNIT IS INDEXED TO UNOCCUPIED, THE UNIT SHALL SHUTDOWN AND ONLY CYCLE TO MAINTAIN SETBACK AND SETUP TEMPERATURE SETPOINTS UNLESS OVERRIDDEN BY BUILDING AUTOMATION SYSTEM. UNIT CYCLING TO MAINTAIN SETBACK/SETUP TEMPERATURES: CYCLE THE MAKE-UP AIR UNIT ON TO MAINTAIN THE SETBACK AND SETUP TEMPERATURE ZONE SETPOINTS TO MAINTAIN 50 °F AND 85 °F RESPECTIVELY.

SUPPLY FAN SPEED CONTROL: THE PURPOSE OF THE SUPPLY FAN SPEED CONTROL IS TO MAINTAIN VENTILATION WITHIN THE SPACE IN DIFFERENT OPERATING MODES. THE SUPPLY AND EXHAUST FANS SHALL OPERATE IN (2) MODES: NORMAL MODE AND VENTILATION MODE. THE AIRFLOW MEASURING STATION PROVIDED WITH THE SUPPLY FAN SHALL BE TO DETERMINE THE VFD SPEED SETTINGS THAT CORRESPOND WITH THE AIRFLOW RATES FOR EACH OPERATING MODE AS SCHEDULED ON THE DRAWINGS. REFER TO NORMAL MODE AND VENTILATION MODE CONTROL ABOVE.

EXHAUST FAN SPEED CONTROL: THE PURPOSE OF THE EXHAUST FAN SPEED CONTROL IS TO MAINTAIN VENTILATION WITHIN THE SPACE IN DIFFERENT OPERATING MODES. THE EXHAUST FANS SHALL OPERATE IN (2) MODES: NORMAL MODE AND VENTILATION MODE. THE AIRFLOW MEASURING STATION PROVIDED WITH THE EXHAUST FAN SHALL BE USED TO DETERMINE THE VFD SPEED SETTINGS THAT CORRESPOND WITH THE AIRFLOW RATES FOR NORMAL OR VENTILATION MODE AS SCHEDULED ON THE DRAWINGS. REFER TO NORMAL MODE AND VENTILATION MODE CONTROL ABOVE.

FILTERS: INSTALL A DIFFERENTIAL STATIC PRESSURE SENSOR ACROSS EACH FILTER BANK. ENSURE THAT THE STATIC PROBES DO NOT IMPEDE FILTER REMOVAL.
FOR FILTER BANK, PROVIDE AN ALARM TO THE OPERATOR INTERFACE WHEN THE DIFFERENTIAL STATIC PRESSURE EXCEEDS 1.0" W.C. (ADJ.).

DISCHARGE AIR TEMPERATURE CONTROL: THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE A FIXED 68º F (ADJ.). DISCHARGE AIR TEMPERATURE SETPOINT RESET FROM ZONE TEMPERATURE SETPOINT SHALL BE BASED ON THE ZONE TEMPERATURE BETWEEN 55º F (ADJ.) AND 75 º F TO MAINTAIN A ZONE HEATING SETPOINT OF 72º F.

WHEN HEATING IS COMPLETELY OFF AND THE ECONOMIZER SEQUENCE IS ENABLED, THE OUTSIDE AIR DAMPERS AND EXHAUST FAN'S DAMPERS SHALL BE OPEN IN SEQUENCE TO MAINTAIN SPACE TEMPERATURE SETPOINT.

ECONOMIZER CONTROL:
WHEN THE ECONOMIZER SEQUENCE IS ENABLED BY THE SWITCHOVER SEQUENCE BELOW, MAU-4 AND MAU-5 SHALL OPERATE AT 100% AIR FLOW RATE WITH ALL ASSOCIATED EXAHUST FANS AT 100% AIR FLOW RATE. THE OUTSIDE AIR DAMPERS AND EXHAUST AIR DAMPER SHALL OPEN IN SEQUENCE TO PROVIDE OUTSIDE AIR TO BE USED FOR FREE COOLING. THE DAMPERS SHALL OPEN IN SEQUENCE WITH THE GAS HEATING AS DESCRIBED IN THE DISCHARGE AIR TEMPERATURE CONTROL SEQUENCE ABOVE. THE DRY BULB ECONOMIZER SWITCHOVER SHALL BE ENABLED WHENEVER THE OUTSIDE AIR TEMPERATURE IS BELOW 68º F (ADJ.).

GAS HEATING COIL CONTROL: MODULATE THE GAS HEATING COIL TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT.

SAFETIES: GENERAL: ALL SAFETIES SHALL BE HARD WIRED TO THE SUPPLY AND RETURN FAN STARTERS OR VFD SAFETY CIRCUITS. STARTERS SHALL NOT FUNCTION IN THE "HAND" OR "AUTO" AND VFD'S SHALL BE DISABLED IF THEY ARE INDEXED TO THE "AUTO" OR "HAND" POSITION IN EITHER THE VFD.

FREEZESTAT: INSTALL AN ELECTRIC FREEZESTAT TO SHUT DOWN THE UNIT (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION) IF THE TEMPERATURE UPSTREAM OF THE HEATING SECTION DROPS BELOW 35º F (ADJ.). THE ELECTRIC FREEZESTAT SHALL ACT INDEPENDENTLY OF THE DDC SYSTEM VIA HARDWIRE INTERLOCK AND SHALL OVERRIDE THE DDC SYSTEM CONTROL SIGNAL TO DEENERGIZE THE SUPPLY(S) AND EXHAUST FAN(S). THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE.
A FREEZESTAT TRIP SHALL NOTIFY THE DDC SYSTEM THAT SHALL SEND AN ALARM TO THE OPERATOR INTERFACE.

FIRE ALARM SHUTDOWN: UPON A LOCAL FIRE ALARM SYSTEM ALARM, THE FIRE ALARM CONTROL MODULE PROVIDED BY THE ELECTRICAL CONTRACTOR AT THE TEMPERATURE CONTROL PANEL SHALL CHANGE STATE OF ITS CONTACTS. THIS SHALL CAUSE THE UNIT TO BE SHUT DOWN (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION). AN AUXILIARY CONTACT SHALL BE PROVIDED TO NOTIFY THE DDC SYSTEM OF A LOCAL FIRE ALARM SHUTDOWN.

UNIT SHUTDOWN: WHENEVER THE MAKEUP AIR UNIT IS INDEXED OFF, THE SUPPLY AND ASSOCIATED EXHAUST FAN(S) SHALL STOP. ON A FAILURE OF THE SUPPLY OR EXHAUST FAN(S), AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE SUPPLY FAN(S) IS OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR:

THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE.

THE GAS HEATING VALVE(S) SHALL CLOSE.

UNOCCUPIED CONTROL: GENERAL: OCCUPIED/UNOCCUPIED SCHEDULE SHALL BE SET AT THE DDC OPERATOR INTERFACE. WHEN INDEXED TO UNOCCUPIED THE UNIT SHALL SHUTDOWN.

EXHAUST FAN CONTROL (EF-7, 26 & 27):
FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE EXHAUST FANS VIA THEIR ASSOCIATED VFD OR STARTER MOTORS.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCHES FOR EXHAUST FANS.

INTERLOCK: THE EXHAUST FANS SHALL BE INTERLOCKED VIA THE DDC SYSTEM WITH MAU-4 AND MAU-5.

EXHAUST FANS EF-7, 26 & 27 REQUIRED MOTORIZED AUTOMATIC DAMPERS. WHEN EXHAUST FANS EF-7, 26 & 27 ARE ENERGIZED, THE MOTORIZED AUTOMATIC DAMPER ASSOCIATED WITH THE FAN SHALL OPEN AND THE FAN MOTOR SHALL START. WHEN DE-ENERGIZED, THE FAN MOTOR SHALL STOP AND THE MOTORIZED AUTOMATIC DAMPER SHALL CLOSE. THE AUTOMATIC DAMPER SHALL BE HARD WIRE TO THE FAN POWER.

UNIT SHUTDOWN: WHENEVER THE SYSTEM IS INDEXED OFF, THE EXHAUST FANS SHALL STOP. THE ASSOCIATED MAKE-UP AIR UNIT WILL RETURN EITHER THE NORMAL MODE OR TO NEXT DDC SCHEDULED FOR OCCUPIED/UNOCCUPIED SETTING. ON A FAILURE OF THE EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE EXHAUST FAN OR EXHAUST FANS ARE OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR: THE EXHAUST FANS SHALL STOP AND THE EXHAUST AIR DAMPERS SHALL CLOSE.

1 MAKE-UP AIR UNITS / EXHAUST FANS - MAU-4 & MAU-5 / EF-7, 27 & 28
NO SCALE

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

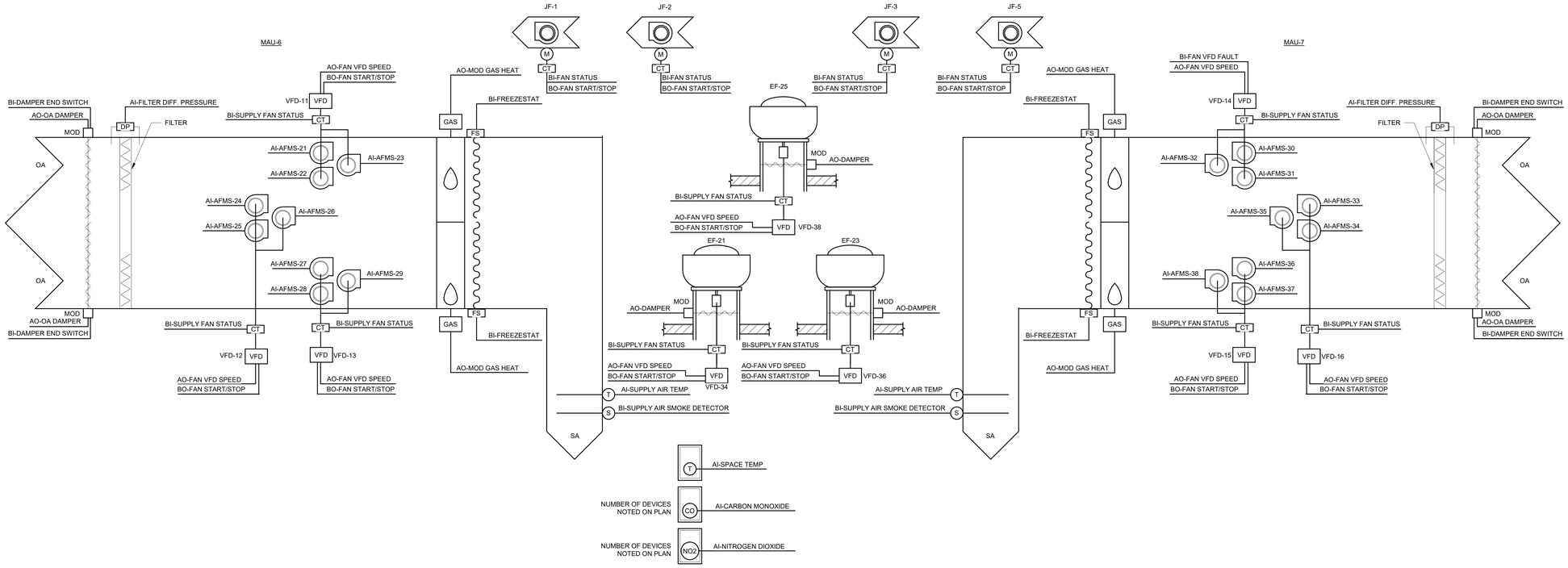
1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
CONTROL SCHEMATICS

SHEET NO.:
M-802



SEQUENCE OF OPERATIONS:

MAKEUP AIR UNIT CONTROL (MAU-6 AND 7):

FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE SUPPLY AND EXHAUST FANS VIA THEIR RESPECTIVE VFDS.

CURRENT STATUS SWITCH: PROVIDE VFD MOTOR RUN STATUS, IN THIS SECTION FOR THE SUPPLY AND EXHAUST FANS.

MAU-6 AND MAU-7 IS A 100% OUTSIDE AIR UNIT WITH ASSOCIATED EXHAUST FANS EF-21, 23 & 25.

GAS DETECTION SYSTEM SHALL BE SET AT THE DDC OPERATOR INTERFACE.

WHEN THE GAS DETECTION IS ACTIVATED, THE SUPPLY AND EXHAUST FANS SHALL START FIRST AT MINIMUM SPEED AND INCREASE IT'S SPEED TO MAXIMUM FAN SPEED SETPOINT. SYSTEM SHALL CONTINUE TO RUN AT MAXIMUM FAN SPEED SETPOINT UNTIL MANUALLY RESETTED AT THE GAS DETECTION SYSTEM CONTROLLER PRIOR TO RESUMING TO SPACE TEMPERATURE CONTROL SETPOINT SEQUENCE.

GAS DETECTION: THE CONCENTRATION OF A DETECTED GAS IS ABOVE THE SETPOINT. SIGNAL ALARM THROUGH DDC WITH MANUAL RESET ON GAS DETECTION CONTROLLER. GAS DETECTION FAILURE. SIGNAL ALARM THROUGH DDC.

CARBON MONOXIDE (CO) SET POINT: 35 PPM. (ADJUSTABLE)

NITROGEN DIOXIDE (NO2) SET POINT: 1 PPM. (ADJUSTABLE)

THE SUPPLY AND EXHAUST FANS SHALL OPERATE AT A CONSTANT VOLUME DURING GAS SYSTEM DETECTION.

SUPPLY FAN SPEED CONTROL: THE PURPOSE OF THE SUPPLY FAN SPEED CONTROL IS TO MAINTAIN VENTILATION WITHIN THE SPACE IN DIFFERENT OPERATING MODES. THE SUPPLY AND EXHAUST FAN SHALL OPERATE UPON SPACE GAS DETECTION. THE AIRFLOW MEASURING STATION PROVIDED WITH THE SUPPLY FAN SHALL BE TO DETERMINE THE VFD SPEED SETTINGS THAT CORRESPOND WITH THE CFM FLOWRATES FOR EACH OPERATING MODE AS SCHEDULED ON THE DRAWINGS. REFER TO NORMAL MODE AND PURGE MODE CONTROL BELOW.

EXHAUST FAN SPEED CONTROL: THE PURPOSE OF THE EXHAUST FAN SPEED CONTROL IS TO MAINTAIN VENTILATION WITHIN THE SPACE IN DIFFERENT OPERATING MODES.

FILTERS: INSTALL A DIFFERENTIAL STATIC PRESSURE SENSOR ACROSS EACH FILTER BANK. ENSURE THAT THE STATIC PROBES DO NOT IMPEDE FILTER REMOVAL.
FOR FILTER BANK, PROVIDE AN ALARM TO THE OPERATOR INTERFACE WHEN THE DIFFERENTIAL STATIC PRESSURE EXCEEDS 1.0" W.C. (ADJ.).

DISCHARGE AIR TEMPERATURE CONTROL: THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE A FIXED 65º F (ADJ.).

GAS HEATING COIL CONTROL: MODULATE THE GAS HEATING COIL TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT.

SAFETIES: GENERAL: ALL SAFETIES SHALL BE HARD WIRED TO THE SUPPLY AND RETURN FAN STARTERS OR VFD SAFETY CIRCUITS. STARTERS SHALL NOT FUNCTION IN THE "HAND" OR "AUTO" AND VFD'S SHALL BE DISABLED IF THEY ARE INDEXED TO THE "AUTO" OR "HAND" POSITION IN EITHER THE VFD.

FREEZESTAT: INSTALL AN ELECTRIC FREEZESTAT TO SHUT DOWN THE UNIT (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION) IF THE TEMPERATURE UPSTREAM OF THE HEATING SECTION DROPS BELOW 35º F (ADJ.). THE ELECTRIC FREEZESTAT SHALL ACT INDEPENDENTLY OF THE DDC SYSTEM VIA HARDWIRE INTERLOCK AND SHALL OVERRIDE THE DDC SYSTEM CONTROL SIGNAL TO DEENERGIZE THE SUPPLY(S) AND EXHAUST FAN(S). THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE. A FREEZESTAT TRIP SHALL NOTIFY THE DDC SYSTEM THAT SHALL SEND AN ALARM TO THE OPERATOR INTERFACE.

FIRE ALARM SHUTDOWN: UPON A LOCAL FIRE ALARM SYSTEM ALARM, THE FIRE ALARM CONTROL MODULE PROVIDED BY THE ELECTRICAL CONTRACTOR AT THE TEMPERATURE CONTROL PANEL SHALL CHANGE STATE OF ITS CONTACTS. THIS SHALL CAUSE THE UNIT TO BE SHUT DOWN (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION). AN AUXILIARY CONTACT SHALL BE PROVIDED TO NOTIFY THE DDC SYSTEM OF A LOCAL FIRE ALARM SHUTDOWN.

UNIT SHUTDOWN: WHENEVER THE MAKEUP AIR UNIT IS INDEXED OFF, THE SUPPLY AND EXHAUST FAN(S) SHALL STOP. ON A FAILURE OF THE SUPPLY OR EXHAUST FAN(S), AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE SUPPLY FAN(S) IS OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR:

THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE.

THE GAS HEATING VALVE(S) SHALL CLOSE.

EXHAUST FAN CONTROL (EF-21, 23 & 25):
FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE EXHAUST FANS VIA THEIR ASSOCIATED ECM MOTORS.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCHES FOR EXHAUST FANS.

INTERLOCK: THE EXHAUST FANS SHALL BE INTERLOCKED VIA THE DDC SYSTEM WITH MAKE-UP AIR UNITS (MAU-6 AND MAU-7).

EXHAUST FANS EF-21, 23 & 25 HAVE MOTORIZED AUTOMATIC DAMPERS. WHEN EXHAUST FANS EF-21, 23 & 25 ARE ENERGIZED, THE MOTORIZED AUTOMATIC DAMPER ASSOCIATED WITH THE FAN SHALL OPEN AND THE FAN MOTOR SHALL START. WHEN DE-ENERGIZED, THE FAN MOTOR SHALL STOP AND THE MOTORIZED AUTOMATIC DAMPER SHALL CLOSE. THE AUTOMATIC DAMPER SHALL BE HARD WIRE TO THE FAN POWER.

UNIT SHUTDOWN: WHENEVER THE SYSTEM IS INDEXED OFF, THE EXHAUST FANS SHALL STOP. ON A FAILURE OF THE EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE EXHAUST FAN OR EXHAUST FANS ARE OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR: THE EXHAUST FANS SHALL STOP AND THE EXHAUST AIR DAMPERS SHALL CLOSE.

JET THRUST FAN CONTROL (JF-1, 2, 3 & 4):
FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE JET THRUST FANS VIA THEIR ASSOCIATED TWO-SPEED MOTORS.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCHES FOR JET THRUST FANS.

INTERLOCK JET THRUST FANS TO OPERATE WHEN ASSOCIATED MAKE-UP AIR UNITS (MAU-6 AND 7) ARE ACTIVIATED BY GAS DETECTION SYSTEM. WHEN DE-ENERGIZED, THE FAN MOTOR SHALL STOP.

UNIT SHUTDOWN: WHENEVER THE SYSTEM IS INDEXED OFF, THE JET THRUST FANS SHALL STOP. ON A FAILURE OF THE JET THRUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE JET THRUST FAN OR JET THRUST FANS ARE OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR: THE JET THRUST FANS SHALL STOP.

1 MAKE-UP AIR UNITS / EXHAUST FANS - MAU-6 & MAU-7 / EF-21, 23 & 25
NO SCALE

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

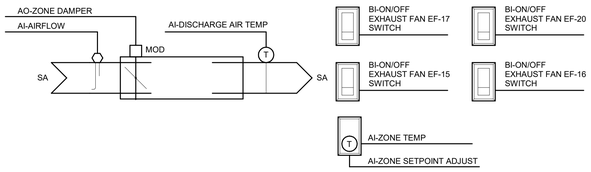
1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
CONTROL SCHEMATICS

SHEET NO.:
M-803



SEQUENCE OF OPERATIONS:
VAV TERMINAL UNIT CONTROL (AT-1):
REFER TO THE AIR TERMINAL SCHEDULES ON THE PLANS FOR EXHAUST FAN(S) INTERLOCK REQUIREMENTS, MINIMUM AND MAXIMUM FLOW RATES.

PROVIDE A DDC SPACE TEMPERATURE SENSOR TO CONTROL, IN SEQUENCE WITH THE EXHAUST FAN EF-19 INTERLOCK. WHEN SPACE TEMPERATURE IS BELOW SETPOINT, THE AIR TERMINAL DAMPER SHALL CLOSE TO THE COOLING MINIMUM FLOW POSITION TO MAINTAIN SPACE TEMPERATURE. THE REVERSE SHALL OCCUR WHEN SPACE TEMPERATURE IS BELOW SETPOINT AND EXHAUST FAN EF-19 SHALL BE ENERGIED.

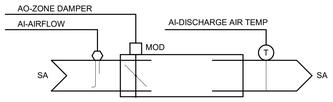
WHEN INDIVIDUAL EXHAUST FANS EF-15, 16, 17 AND 22 ARE ENERGIZED BY LOCAL TOGGLE SWITCHES, THE AIR TERMINAL SHALL MODULATE FROM MINIMUM TO MAXIMUM FLOW RATES DEPENDING ON LOCAL ACTIVITION OF THE EXHAUST FANS. AIR TERMINAL SUPPLY AIRFLOW SHALL TRACK WITH THE EXHAUST FANS ENERGIZED.

AIRFLOW MODE CONTROL: THE ZONE AIR TERMINALS SHALL OPEN BETWEEN THE MINIMUM AND MAXIMUM OCCUPIED FLOW RATES AS SPECIFIED IN THE AIR TERMINAL SCHEDULES. ALL AIRFLOW SETPOINTS SHALL BE ADJUSTABLE.

DISCHARGE AIR TEMPERATURE SHALL BE MONITORED FOR AIR TERMINAL.

THE BALANCER SHALL MEASURE THE EXHAUST FLOW AND PROVIDE THE MINIMUM AND MAXIMUM SPEEDS FOR MATCHING AIR TERMINAL TO THE CONTROL CONTRACTOR.

2 COOLING ONLY VARIABLE AIR VOLUME AIR TERMINAL (AT-1)
NO SCALE



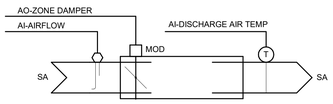
SEQUENCE OF OPERATIONS:
CAV TERMINAL UNIT CONTROL (AT-2):
REFER TO THE AIR TERMINAL SCHEDULES ON THE PLANS FOR EXHAUST FAN (EF-29) INTERLOCK REQUIREMENTS, MINIMUM AND MAXIMUM FLOW RATES. ALL AIRFLOW SETPOINTS SHALL BE ADJUSTABLE.

WHEN EXHAUST FAN (EF-29) IS ENERGIZED BY LOCAL TOGGLE SWITCH, THE AIR TERMINAL SHALL MODULATE FROM MINIMUM TO MAXIMUM FLOW RATES. AIR TERMINAL SUPPLY AIRFLOW SHALL TRACK WITH THE EXHAUST FAN ENERGIZED. THE REVERSE SHALL OCCUR WHEN SWITCHED OFF TO DE-ENERGIZE FAN.

DISCHARGE AIR TEMPERATURE SHALL BE MONITORED FOR SUPPLY AIR TERMINAL.

THE BALANCER SHALL MEASURE THE EXHAUST FLOW AND PROVIDE THE MINIMUM AND MAXIMUM SPEEDS FOR MATCHING AIR TERMINAL TO THE CONTROL CONTRACTOR.

3 COOLING ONLY CONSTANT AIR VOLUME AIR TERMINAL (AT-2)
NO SCALE



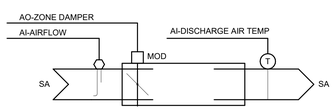
SEQUENCE OF OPERATIONS:
CAV TERMINAL UNIT CONTROL (AT-3):
REFER TO THE AIR TERMINAL SCHEDULES ON THE PLANS FOR EXHAUST FAN (EF-18) INTERLOCK REQUIREMENTS, MINIMUM AND MAXIMUM FLOW RATES. ALL AIRFLOW SETPOINTS SHALL BE ADJUSTABLE

WHEN EXHAUST FAN (EF-18) IS ENERGIZED BY LOCAL TOGGLE SWITCH, THE AIR TERMINAL SHALL MODULATE FROM MINIMUM TO MAXIMUM FLOW RATES. AIR TERMINAL SUPPLY AIRFLOW SHALL TRACK WITH THE EXHAUST FAN ENERGIZED. THE REVERSE SHALL OCCUR WHEN SWITCHED OFF TO DE-ENERGIZE FAN.

DISCHARGE AIR TEMPERATURE SHALL BE MONITORED FOR SUPPLY AIR TERMINAL.

THE BALANCER SHALL MEASURE THE EXHAUST FLOW AND PROVIDE THE MINIMUM AND MAXIMUM SPEEDS FOR MATCHING AIR TERMINAL TO THE CONTROL CONTRACTOR.

4 COOLING ONLY CONSTANT AIR VOLUME AIR TERMINAL (AT-3)
NO SCALE



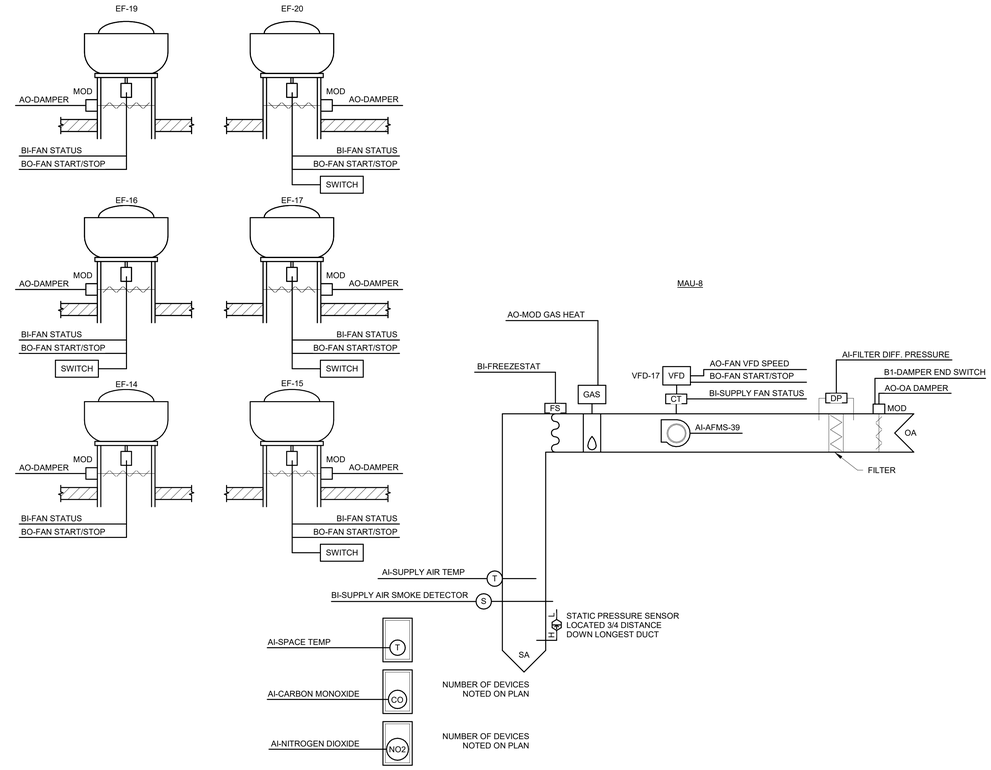
SEQUENCE OF OPERATIONS:
CAV TERMINAL UNIT CONTROL (AT-4):
REFER TO THE AIR TERMINAL SCHEDULES ON THE PLANS FOR EXHAUST FAN (EF-14) INTERLOCK REQUIREMENTS, MINIMUM AND MAXIMUM FLOW RATES. ALL AIRFLOW SETPOINTS SHALL BE ADJUSTABLE.

WHEN EXHAUST FAN (EF-14) IS ENERGIZED BY OCCUPANCY SCHEDULE, THE AIR TERMINAL SHALL MODULATE FROM MINIMUM TO MAXIMUM FLOW RATES. AIR TERMINAL SUPPLY AIRFLOW SHALL TRACK WITH THE EXHAUST FAN WHEN ENERGIZED.

DISCHARGE AIR TEMPERATURE SHALL BE MONITORED FOR SUPPLY AIR TERMINAL.

THE BALANCER SHALL MEASURE THE EXHAUST FLOW AND PROVIDE THE MINIMUM AND MAXIMUM SPEEDS FOR MATCHING AIR TERMINAL TO THE CONTROL CONTRACTOR.

5 COOLING ONLY CONSTANT AIR VOLUME AIR TERMINAL (AT-4)
NO SCALE



SEQUENCE OF OPERATIONS:

VARIABLE VOLUME MAKEUP AIR UNIT CONTROL (MAU-8):

FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE SUPPLY AND EXHAUST FANS VIA THEIR RESPECTIVE VFDS.

CURRENT STATUS SWITCH: PROVIDE VFD MOTOR RUN STATUS, IN THIS SECTION FOR THE SUPPLY AND EXHAUST FANS.

VENTILATION AIR CONTROL:
MAU-8 IS A 100% OUTSIDE AIR UNIT AND 100% EXHAUST.

NORMAL MODE CONTROL:
THE SUPPLY AND EXHAUST FANS SHALL OPERATE AT A VARIABLE VOLUME DURING NORMAL MODE OPERATION. BASED ON NUMBER OF EXHAUST FANS THAT ARE ENERGIED.

MAU-8 IS A 100% OUTSIDE AIR UNIT AND 100% EXHAUST.
EF-14 BASED ON OCCUPANCY SCHEDULE.
EF-19 BASED ON SPACE TEMPERATURE AND/OR GAS DETECTION SYSTEM.
EF-15, 16, 17, AND 20 ARE ENERIZED BY LOCAL TOGGLE SWITCHES.

OCCUPIED/UNOCCUPIED SCHEDULE FOR UNIT AND ASSOCIATED EXHAUST FAN SHALL BE SET AT THE DDC OPERATOR INTERFACE. WHEN INDEXED TO UNOCCUPIED THE UNIT AND EXAUST FANS SHALL SHUTDOWN. PROVIDED INDEX DDC CONTROLLED HEATING AND VENTILATION ASSOCIATED WITH THIS MAKE-UP AIR UNIT TO MAINTAIN SETBACK AND SETUP TEMPERATURE SETPOINTS UNLESS OVERRIDDEN BY THE BUILDING AUTOMATION SYSTEM.

PURGE MODE CONTROL:

PURGE MODE SCHEDULE SHALL BE SET AT THE DDC OPERATOR INTERFACE.

WHEN THE GAS DETECTION IS ACTIVATED, THE SUPPLY AND EXHAUST FAN (EF-19) SHALL START FIRST AT MINIMUM SPEED AND INCREASE IT'S SPEED TO MAXIMUM EXHAUST FAN (EF-19) SPEED SETPOINT. SYSTEM SHALL CONTINUE TO RUN AT MAXIMUM FAN SPEED SETPOINT.

GAS DETECTION: THE CONCENTRATION OF A DETECTED GAS IS ABOVE THE SETPOINT, SIGNAL ALARM THROUGH DDC WITH MANUAL RESET ON GAS DETECTION CONTROLLER. GAS DETECTION FAILURE. SIGNAL ALARM THROUGH DDC.

CARBON MONOXIDE (CO) SET POINT: 35 PPM. (ADJUSTABLE)

NITROGEN DIOXIDE (NO2) SET POINT: 1 PPM. (ADJUSTABLE)

THE SUPPLY AND EXHAUST FANS SHALL OPERATE AT A CONSTANT VOLUME DURING THE PURGE MODE OPERATION.

UNIT CYCLING TO MAINTAIN SETBACK/SETUP TEMPERATURES: CYCLE THE MAKE-UP AIR UNIT ON TO MAINTAIN THE SETBACK AND SETUP TEMPERATURE ZONE SETPOINTS TO MAINTAIN 50 °F AND 85 °F RESPECTIVELY. IN THE HEATING MODE, THE OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL OPEN, AND HEATING DISCHARGE TEMPERATURE CONTROL SHALL FUNCTION AS SPECIFIED. MINIMUM ON RUNTIME TIMER SHALL BE SET FOR 15 MINUTES (ADJ.) AND THE OFF TIMER FOR 30 MINUTES (ADJ.).

SUPPLY FAN SPEED CONTROL: THE PURPOSE OF THE SUPPLY FAN CONTROL IS TO MAINTAIN A MINIMUM STATIC PRESSURE IN THE SUPPLY DUCTWORK TO INSURE PROPER TERMINAL AIR BOX OPERATION. INSTALL A STATIC PRESSURE SENSING PROBE IN THE MAIN SUPPLY DUCT LOCATED AT APPROXIMATELY ¾ OF THE WAY DOWN THE MAIN SUPPLY DUCT AS SHOWN ON THE PLANS AND PIPE TO THE DIFFERENTIAL PRESSURE TRANSMITTER THAT SHALL BE LOCATED IN THE UNIT TEMPERATURE CONTROL PANEL.

THE INPUTS TO THE DIFFERENTIAL PRESSURE TRANSMITTER SHALL BE THE STATIC PRESSURE INSIDE OF THE DUCT AND THE REFERENCE INPUT SHALL SENSE THE ACTUAL SPACE SERVED BY THE AIR SYSTEM LOCATED IN THE CEILING BELOW THE DUCT PROBE. THE DDC SYSTEM SHALL MODULATE THE SUPPLY FAN VFD TO MAINTAIN THE STATIC PRESSURE SETPOINT AS SENSED BY THE STATIC PRESSURE SENSOR. IF THE STATIC SENSORS DEVIATE BY MORE THAN 0.5 IN. W.C. (ADJ.), AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. STATIC PRESSURE SETPOINT SHALL BE AS DESCRIBED IN THE STATIC PRESSURE RESET CONTROL BELOW.

EXHAUST FAN SPEED CONTROL: THE PURPOSE OF THE EXHAUST FAN SPEED CONTROL IS TO MAINTAIN EXHAUST VENTILATION WITHIN THE SPACE IN DIFFERENT OPERATING MODES. THE EXHAUST FAN EF-19 VFD SHALL MODULATE TO MAINTAIN A CONSTANT CFM OFFSET OF 500 (ADJ.) FROM THE SUPPLY FAN TO ACCOUNT FOR TOTAL EXHAUST FROM THE AREA IN WHICH IT SERVES WHILE MAINTAINING A SLIGHTLY NEGATIVE PRESSURE. TCC SHALL COORDINATE WITH THE BALANCING CONTRACTOR TO OPTIMIZE THIS SETTING.

FILTERS: INSTALL A DIFFERENTIAL STATIC PRESSURE SENSOR ACROSS EACH FILTER BANK. ENSURE THAT THE STATIC PROBES DO NOT IMPEDE FILTER REMOVAL.
FOR FILTER BANK, PROVIDE AN ALARM TO THE OPERATOR INTERFACE WHEN THE DIFFERENTIAL STATIC PRESSURE EXCEEDS 1.0" W.C. (ADJ.).

DISCHARGE AIR TEMPERATURE CONTROL: THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE A FIXED 65º F (ADJ.).

GAS HEATING COIL CONTROL: MODULATE THE GAS HEATING COIL TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT.

SAFETIES: GENERAL: ALL SAFETIES SHALL BE HARD WIRED TO THE SUPPLY AND EXHAUST FAN STARTERS OR VFD SAFETY CIRCUITS. STARTERS SHALL NOT FUNCTION IN THE "HAND" OR "AUTO" AND VFD'S SHALL BE DISABLED IF THEY ARE INDEXED TO THE "AUTO" OR "HAND" POSITION IN EITHER THE VFD.

FREEZESTAT: INSTALL AN ELECTRIC FREEZESTAT TO SHUT DOWN THE UNIT (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION) IF THE TEMPERATURE UPSTREAM OF THE HEATING SECTION DROPS BELOW 35º F (ADJ.). THE ELECTRIC FREEZESTAT SHALL ACT INDEPENDENTLY OF THE DDC SYSTEM VIA HARDWIRE INTERLOCK AND SHALL OVERRIDE THE DDC SYSTEM CONTROL SIGNAL TO DEENERGIZE THE SUPPLY(S) AND EXHAUST FAN(S). THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE.
A FREEZESTAT TRIP SHALL NOTIFY THE DDC SYSTEM THAT SHALL SEND AN ALARM TO THE OPERATOR INTERFACE.

FIRE ALARM SHUTDOWN: UPON A LOCAL FIRE ALARM SYSTEM ALARM, THE FIRE ALARM CONTROL MODULE PROVIDED BY THE ELECTRICAL CONTRACTOR AT THE TEMPERATURE CONTROL PANEL SHALL CHANGE STATE OF ITS CONTACTS. THIS SHALL CAUSE THE UNIT TO BE SHUT DOWN (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION). AN AUXILIARY CONTACT SHALL BE PROVIDED TO NOTIFY THE DDC SYSTEM OF A LOCAL FIRE ALARM SHUTDOWN.

UNIT SHUTDOWN: WHENEVER THE MAKEUP AIR UNIT IS INDEXED OFF, THE SUPPLY AND EXHAUST FAN(S) SHALL STOP. ON A FAILURE OF THE SUPPLY OR EXHAUST FAN(S), AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE SUPPLY FAN(S) IS OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR:

THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE.

THE GAS HEATING VALVE SHALL CLOSE.

UNOCCUPIED CONTROL: GENERAL: OCCUPIED/UNOCCUPIED SCHEDULE SHALL BE SET AT THE DDC OPERATOR INTERFACE. WHEN INDEXED TO UNOCCUPIED THE UNIT SHALL SHUTDOWN.

EXHAUST FAN CONTROL (EF-14, 15, 16, 17, 19 & 20):
FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE EXHAUST FANS VIA THEIR ASSOCIATED MOTORS.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCHES FOR EXHAUST FANS.

INTERLOCK: THE EXHAUST FANS SHALL BE INTERLOCKED VIA THE DDC SYSTEM WITH MAU-8 AND SHALL RUN WHEN NORMAL MODE OPERATION.

PURGE MODE: INTERLOCK EXHAUST FAN (EF-19) TO OPERATE WHEN ASSOCIATED MAU-8 ARE IN THE NORMAL MODE.

EXHAUST FANS EF-15, 16, 17, 19 & 20 REQUIRED MOTORIZED AUTOMATIC DAMPERS. WHEN EXHAUST FANS EF-15, 16, 17, 19 & 20 ARE ENERGIZED, THE MOTORIZED AUTOMATIC DAMPER ASSOCIATED WITH THE FAN SHALL OPEN AND THE FAN MOTOR SHALL START. WHEN DE-ENERGIZED, THE FAN MOTOR SHALL STOP AND THE MOTORIZED AUTOMATIC DAMPER SHALL CLOSE. THE AUTOMATIC DAMPER SHALL BE HARD WIRE TO THE FAN POWER.

UNIT SHUTDOWN: WHENEVER THE SYSTEM IS INDEXED OFF, THE EXHAUST FANS SHALL STOP. THE ASSOCIATED MAKE-UP AIR HANDLING UNIT WILL RETURN EITHER THE NORMAL MODE OR TO NEXT DDC SCHEDULED FOR OCCUPIED/UNOCCUPIED SETTING. ON A FAILURE OF THE EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE EXHAUST FAN OR EXHAUST FANS ARE OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR: THE EXHAUST FANS SHALL STOP AND THE EXHAUST AIR DAMPERS SHALL CLOSE.

1 MAKE-UP AIR UNIT / EXHAUST FANS - MAU-8 / EF-14, 15, 16, 17, 19 & 20
NO SCALE

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

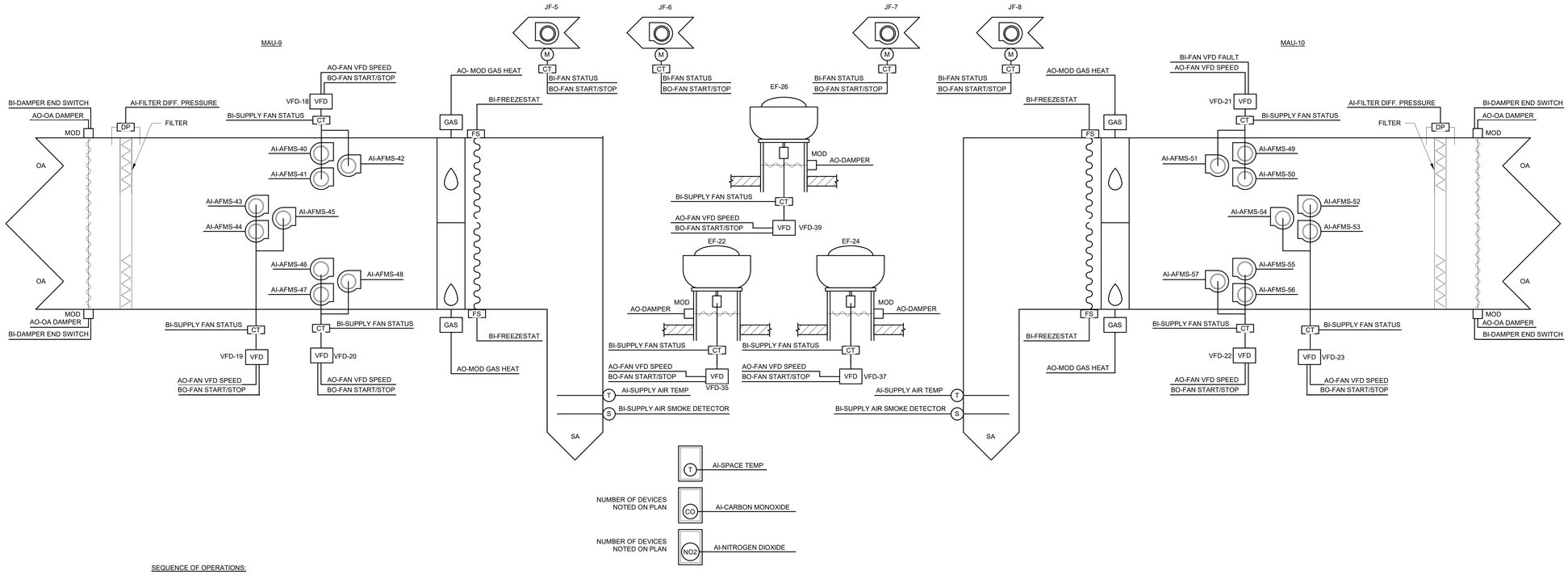
1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
CONTROL SCHEMATICS

SHEET NO.:
M-804



SEQUENCE OF OPERATIONS:

MAKEUP AIR UNIT CONTROL (MAU-9 AND 10):

FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE SUPPLY AND EXHAUST FANS VIA THEIR RESPECTIVE VFDS.

CURRENT STATUS SWITCH: PROVIDE VFD MOTOR RUN STATUS, IN THIS SECTION FOR THE SUPPLY AND EXHAUST FANS.

GAS DETECTION CONTROL:
MAU-9 AND 10 IS A 100% OUTSIDE AIR UNIT AND 100% EXHAUST EF-22, 24 & 26.

GAS DETECTION SYSTEM SHALL BE SET AT THE DDC OPERATOR INTERFACE.

WHEN THE GAS DETECTION IS ACTIVATED, THE SUPPLY AND EXHAUST FANS SHALL START FIRST AT MINIMUM SPEED AND INCREASE IT'S SPEED TO MAXIMUM FAN SPEED SETPOINT. SYSTEM SHALL CONTINUE TO RUN AT MAXIMUM FAN SPEED SETPOINT.

GAS DETECTION: THE CONCENTRATION OF A DETECTED GAS IS ABOVE THE SETPOINT. SIGNAL ALARM THROUGH DDC. GAS DETECTION FAILURE. SIGNAL ALARM THROUGH DDC.

CARBON MONOXIDE (CO) SET POINT: 35 PPM. (ADJUSTABLE)

NITROGEN DIOXIDE (NO2) SET POINT: 1 PPM. (ADJUSTABLE)

SUPPLY FAN SPEED CONTROL: THE PURPOSE OF THE SUPPLY FAN SPEED CONTROL IS TO MAINTAIN VENTILATION WITHIN THE SPACE FOR GAS DETECTION MODE. THE AIRFLOW MEASURING STATION PROVIDED WITH THE SUPPLY FAN SHALL BE TO DETERMINE THE VFD SPEED SETTINGS THAT CORRESPOND WITH THE CFM FLOWRATES IN GAS DETECTOIN MODE AS SCHEDULED ON THE DRAWINGS.

EXHAUST FAN SPEED CONTROL: THE PURPOSE OF THE EXHAUST FAN SPEED CONTROL IS TO MAINTAIN VENTILATION EXHAUST AIRFLOW WITHIN THE SPACE FOR GAS DETECTOPM MODE.

FILTERS: INSTALL A DIFFERENTIAL STATIC PRESSURE SENSOR ACROSS EACH FILTER BANK. ENSURE THAT THE STATIC PROBES DO NOT IMPEDE FILTER REMOVAL.
FOR FILTER BANK, PROVIDE AN ALARM TO THE OPERATOR INTERFACE WHEN THE DIFFERENTIAL STATIC PRESSURE EXCEEDS 1.0" W.C. (ADJ.).

DISCHARGE AIR TEMPERATURE CONTROL: THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE A FIXED 65º F (ADJ.).

GAS HEATING COIL CONTROL: MODULATE THE GAS HEATING COIL TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT.

SAFETIES: GENERAL: ALL SAFETIES SHALL BE HARD WIRED TO THE SUPPLY AND RETURN FAN STARTERS OR VFD SAFETY CIRCUITS. STARTERS SHALL NOT FUNCTION IN THE "HAND" OR "AUTO" AND VFD'S SHALL BE DISABLED IF THEY ARE INDEXED TO THE "AUTO" OR "HAND" POSITION IN EITHER THE VFD.

FREEZESTAT: INSTALL AN ELECTRIC FREEZESTAT TO SHUT DOWN THE UNIT (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION) IF THE TEMPERATURE UPSTREAM OF THE HEATING SECTION DROPS BELOW 35º F (ADJ.). THE ELECTRIC FREEZESTAT SHALL ACT INDEPENDENTLY OF THE DDC SYSTEM VIA HARDWIRE INTERLOCK AND SHALL OVERRIDE THE DDC SYSTEM CONTROL SIGNAL TO DEENERGIZE THE SUPPLY(S) AND EXHAUST FAN(S). THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE. A FREEZESTAT TRIP SHALL NOTIFY THE DDC SYSTEM THAT SHALL SEND AN ALARM TO THE OPERATOR INTERFACE.

FIRE ALARM SHUTDOWN: UPON A LOCAL FIRE ALARM SYSTEM ALARM, THE FIRE ALARM CONTROL MODULE PROVIDED BY THE ELECTRICAL CONTRACTOR AT THE TEMPERATURE CONTROL PANEL SHALL CHANGE STATE OF IT'S CONTACTS. THIS SHALL CAUSE THE UNIT TO BE SHUT DOWN (SEE UNIT SHUTDOWN FOR ADDITIONAL INFORMATION). AN AUXILIARY CONTACT SHALL BE PROVIDED TO NOTIFY THE DDC SYSTEM OF A LOCAL FIRE ALARM SHUTDOWN.

UNIT SHUTDOWN: WHENEVER THE MAKEUP AIR UNIT IS INDEXED OFF, THE SUPPLY AND EXHAUST FAN(S) SHALL STOP. ON A FAILURE OF THE SUPPLY OR EXHAUST FAN(S), AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE SUPPLY FAN(S) IS OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR:

THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL CLOSE.

THE GAS HEATING VALVE(S) SHALL CLOSE.

EXHAUST FAN CONTROL (EF-22, 24 & 26):
FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE EXHAUST FANS VIA THEIR ASSOCIATED VFD MOTORS.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCHES FOR EXHAUST FANS.

INTERLOCK: THE EXHAUST FANS SHALL BE INTERLOCKED VIA THE DDC SYSTEM WITH MAU-6 AND MAU-7 AND SHALL RUN WHEN IN EITHER NORMAL OR PURGE MODE OPERATION.

INTERLOCK EXHAUST FANS TO OPERATE WHEN ASSOCIATED MAU-9 AND 10 ARE IN THE GAS DETECTION MODE. EXHAUST FANS EF-22, 24 & 26 REQUIRED MOTORIZED AUTOMATIC DAMPERS. WHEN EXHAUST FANS EF-22, 24 & 26 ARE ENERGIZED, THE MOTORIZED AUTOMATIC DAMPER ASSOCIATED WITH THE FAN SHALL OPEN AND THE FAN MOTOR SHALL START. WHEN DE-ENERGIZED, THE FAN MOTOR SHALL STOP AND THE MOTORIZED AUTOMATIC DAMPER SHALL CLOSE. THE AUTOMATIC DAMPER SHALL BE HARD WIRE TO THE FAN POWER.

UNIT SHUTDOWN: WHENEVER THE SYSTEM IS INDEXED OFF, THE EXHAUST FANS SHALL STOP. THE ASSOCIATED MAKE-UP AIR UNITS WILL RETURN EITHER THE NORMAL MODE OR TO NEXT DDC SCHEDULED FOR OCCUPIED/UNOCCUPIED SETTING. ON A FAILURE OF THE EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE EXHAUST FAN OR EXHAUST FANS ARE OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR: THE EXHAUST FANS SHALL STOP AND THE EXHAUST AIR DAMPERS SHALL CLOSE.

JET THRUST FAN CONTROL (JF-5, 6, 7 & 8):
FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE JET THRUST FANS VIA THEIR ASSOCIATED TWO-SPEED MOTORS STARTER.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCHES FOR JET THRUST FANS.

INTERLOCK: THE JET THRUST FANS SHALL BE INTERLOCKED VIA THE DDC SYSTEM WITH MAU-9 AND MAU-10 AND SHALL RUN WHEN ACTIVIATED BY THE GAS DETECTION OPERATION.

UNIT SHUTDOWN: WHENEVER THE SYSTEM IS INDEXED OFF, THE JET THRUST FANS SHALL STOP. ON A FAILURE OF THE JET THRUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE JET THRUST FAN OR JET THRUST FANS ARE OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR: THE JET THRUST FANS SHALL STOP.

1 MAKE-UP AIR UNITS / EXHAUST FANS - MAU-9 & MAU-10 / EF-22, 24 & 26

NO SCALE

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metro transit

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

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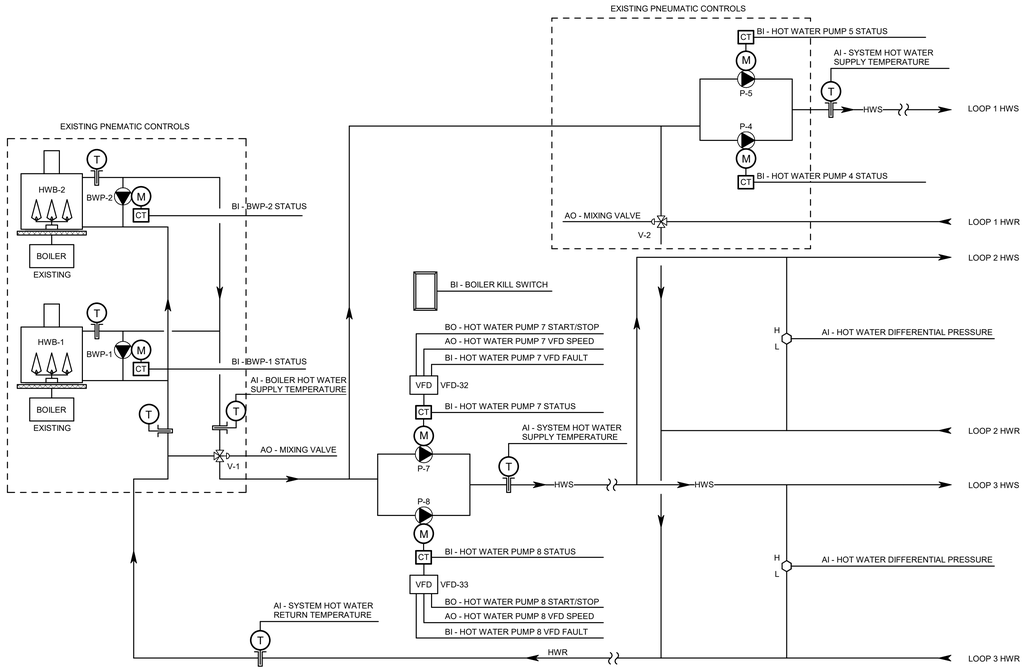
SHEET CONTENTS
CONTROL SCHEMATICS

SHEET NO.:
M-805



SEQUENCE OF OPERATIONS:
HEATING WATER PUMP CONTROL
PUMP (HWP-7) AND PUMP (HWP-8) CONTROL:
THE SECONDARY HOT WATER PUMPS ARE PIPED IN PARALLEL AND OPERATE IN A LEAD-LAG MODE. EACH PUMP IS PROVIDED WITH A VARIABLE FREQUENCY DRIVE (VFD) TO MODULATE THE PUMP SPEED.

START/STOP: THE DDC SYSTEM SHALL START THE HOT WATER LEAD PUMP WHENEVER 15% OR MORE OF ALL HYDRONIC TERMINALS ARE CALLING FOR HEAT. THE HOT WATER LAG PUMP SHALL NORMALLY REMAIN OFF. THE LAG SECONDARY HOT WATER PUMP SHALL BE STARTED WHEN REQUIRED BY THE LEAD/LAG CONTROL DESCRIBED BELOW. THE SECONDARY HOT WATER PUMP START/STOP RELAYS SHALL UTILIZE NORMALLY CLOSED CONTACTS SO UPON FAILURE OF THE RELAY OR DDC CONTROLLER THE PUMP WILL FAIL ON. SECONDARY HOT WATER PUMPS SHALL BE COMMANDED OFF IF ALL ASSOCIATED HYDRONIC TERMINALS ARE OFF AND THE OUTSIDE AIR TEMPERATURE IS ABOVE 60º F (ADJ.).

LEAD / LAG CONTROL: CURRENT STATUS SWITCHES, EITHER INTEGRAL TO THE VFD AND/OR DISCREET DEVICES, SHALL PROVE LEAD AND LAG PUMP OPERATION. IF THE LEAD PUMP IS CALLED TO RUN AND THE CURRENT STATUS SWITCH INDICATES THAT THE LEAD PUMP IS NOT OPERATING FOR 30 SECONDS (ADJ.), AN ALARM SHALL BE SENT TO THE OPERATOR INTERFACE AND THE DDC SYSTEM SHALL START THE LAG PUMP. UPON SENSING THE LEAD PUMP IS OPERATING, THE LAG PUMP SHALL BE STOPPED. THE DDC SYSTEM SHALL INDEX THE LAG PUMP TO BECOME THE LEAD PUMP THROUGH WEEKLY SCHEDULING FEATURE OF THE BUILDING AUTOMATION SYSTEM.

UPON SENSING THE LEAD SECONDARY HOT WATER PUMP IS OPERATING, THE LAG SECONDARY HOT WATER PUMP SHALL BE STOPPED. THE DDC SYSTEM SHALL INDEX THE LAG SECONDARY HOT WATER PUMP TO BECOME THE LEAD SECONDARY HOT WATER PUMP THROUGH WEEKLY SCHEDULING FEATURE OF THE BUILDING AUTOMATION SYSTEM.

SPEED CONTROL: INSTALL A DIFFERENTIAL PRESSURE SENSOR(**S**) ACROSS THE SUPPLY AND RETURN PIPING AT THE POINT(S) IN THE SYSTEM WITH THE HIGHEST PRESSURE DROP AS INDICATED ON PLANS. THE DDC SYSTEM SHALL CONTROL THE OPERATING SECONDARY HOT WATER PUMP VFD TO MAINTAIN A SETPOINT AS DESCRIBED BELOW. FINAL SETPOINT SHALL BE OPTIMIZED BY THE BALANCING CONTRACTOR.

PROVIDE TWO (2) DIFFERENTIAL PRESSURE SENSORS AS INDICATED ON THE PLANS. THE DIFFERENTIAL PRESSURE SETPOINT SHALL BE SELECTED BASED ON HIGH-LOW CONFIGURATION FOR THE TWO SENSORS WHICH THE SETPOINT IS SELECTED ON THE LOWEST READING.

RESET DIFFERENTIAL PRESSURE SETPOINT CONTROL: THE DIFFERENTIAL PRESSURE SETPOINT SHALL BE RESET USING TRIM & RESPOND LOGIC WITHIN THE RANGE 2 PSIG TO 12 PSIG. WHEN THE PUMP IS OFF, THE SETPOINT SHALL BE 8 PSIG. WHILE THE PUMP IS PROVEN ON, EVERY FIVE MINUTES, TRIM THE SETPOINT BY 0.4 PSIG. IF THERE ARE ONE OR FEWER ZONE PRESSURE REQUESTS, IF THERE IS MORE THAN ONE ZONE PRESSURE REQUESTS, RESPOND BY INCREASING THE SETPOINT BY 0.6 PSIG.

A ZONE PRESSURE REQUEST IS GENERATED WHEN A HYDRONIC TERMINAL VALVE IS GREATER THAN 95% OPEN UNTIL IT DROPS TO 80% OPEN. PROVIDE A BINARY DATA ENABLE POINT FOR EACH ZONE TO ENABLE/DISABLE THE HYDRONIC TERMINAL IN THE TRIM AND RESPOND ALGORITHM. ALL SETPOINTS, TIMERS, AND ZONE PRESSURE REQUEST THRESHOLD FOR THE DIFFERENTIAL PRESSURE RESET SHALL BE ADJUSTABLE. TUNE THE RESET TO PREVENT CYCLIC INSTABILITY AFTER THE SPACE IS OCCUPIED. PROVIDE A TREND GRAPH TO SHOW THE RELATIVE STABILITY OF THE DIFFERENTIAL PRESSURE SETPOINT. FINAL MAXIMUM SETPOINT SHALL BE DETERMINED BY THE BALANCING CONTRACTOR TO SATISFY THE WORST CASE ZONE AT MAXIMUM DESIGN CONDITION.

WHENEVER PUMP (HWP-7) OR PUMP (HWP-8) IS RUNNING, AS DETERMINED BY THE DDC SYSTEM, THE TEMPERATURE OF THE HEATING WATER SUPPLY SHALL BE CONTROLLED TO MAINTAIN A SETPOINT. THE SETPOINT SHALL BE 180° F (ADJ.) WITH A RESET SCHEDULE AS NOTED BELOW.

SUPPLY WATER TEMPERATURE:
- 180 DEG F (ADJUSTABLE) WHEN THE OUTSIDE AIR TEMPERATURE IS -15 DEG F (ADJUSTABLE) OR BELOW.
- 140 DEG F (ADJUSTABLE) WHEN THE OUTSIDE AIR TEMPERATURE IS 60 DEG F (ADJUSTABLE) OR ABOVE.
- LINEAR RELATIONSHIP BETWEEN THE TWO POINTS ABOVE.

PROVIDE A DEDICATED EMERGENCY BOILER SHUTDOWN SWITCHES TO SHUTDOWN ALL BOILERS UPON EMERGENCY SHUTDOWN. LABEL SWITCH "EMERGENCY SHUTDOWN". REFER TO DRAWINGS FOR LOCATION OF SWITCHES AT BOTH ENTRY/EGRESS LOCATION. EMERGENCY BOILER SHUTDOWN SWITCH SHALL BE HARDWIRED TO EACH BOILER THROUGH ITS SAFETY CIRCUIT AT TERMINALS. AUXILIARY CONTACT SHALL BE WIRED TO BAS FOR MONITORING AND IN THE EVENT SWITCHED WILL GENERATED WHEN ACTIVATED.

PROVIDE A SOFTWARE OVERRIDE TO PREVENT NUISANCE TRIPS DURING NORMING FILLING OPERATION.
PROVIDE OPERATION AND ALARM STATUS AT BAS.
ON FAILURE OF THE LEAD HEATING HOT WATER PUMP, AS MEASURED VIA CURRENT SWITCH, LAG HEATING HOT WATER PUMP SHALL BE STARTED AND A CRITICAL ALARM SHALL BE GENERATED. TIME LIMIT FOR DETERMINING HEATING HOT WATER PUMP FAILURE SHALL BE 30 SECONDS (ADJ).

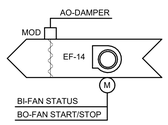
POWER OUTAGE OPERATION:
IN THE EVENT OF A FAILURE OF THE PRIMARY ELECTRICAL SERVICE, THE LEAD AND/OR LAG HEATING HOT WATER PUMP SHALL BE AUTOMATICALLY STARTED AND OPERATE VIA STANDBY POWER FROM THE BUILDING STANDBY POWER SYSTEM.

DDC SHALL ALLOW BOTH HEATING HOT WATER PUMPS TO OPERATE VIA STANDBY POWER FROM THE BUILDING STANDBY POWER SYSTEM.

ON FAILURE OF THE LEAD HEATING HOT WATER PUMP, AS MEASURED VIA CURRENT SWITCH, LAG HEATING HOT WATER PUMP SHALL BE STARTED AND A CRITICAL ALARM SHALL BE GENERATED. TIME LIMIT FOR DETERMINING HEATING HOT WATER PUMP FAILURE SHALL BE 30 SECONDS (ADJ).

DESIGNATION OF LEAD / LAG / STANDBY HEATING HOT WATER PUMPS, FOR POWER OUTAGE OPERATION, SHALL BE MANUALLY DEFINABLE THROUGH THE DDC.

8 MULTIPLE BOILER SYSTEM - CONSTANT PRIMARY/VARIABLE SECONDARY
NO SCALE



SEQUENCE OF OPERATIONS:
FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE EXHAUST FAN VIA THEIR ASSOCIATED MOTOR.

SCHEDULE: THE EXHAUST FAN SHALL BE CONNECTED TO A BAS TIMECLOCK AND PROGRAMMED TO SCHEDULE AS FOLLOWING:

OCCUPIED/UNOCCUPIED SCHEDULE SHALL BE SET AT THE DDC OPERATOR INTERFACE. WHEN INDEXED TO UNOCCUPIED THE UNIT SHALL SHUTDOWN.

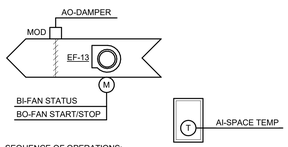
DAMPER: OPEN THE MOTORIZED DAMPER ASSOCIATED WITH THE EXHAUST FAN WHEN THE EXHAUST FAN IS COMMANDED TO RUN. THE AUTOMATIC DAMPER SHALL BE HARD WIRE TO THE FAN POWER.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCH FOR EXHAUST FAN.
PROVIDE STATUS INDICATION THRU DDC FOR EXHAUST FAN.

UNIT SHUTDOWN: WHENEVER THE SYSTEM IS INDEXED OFF, THE EXHAUST FAN SHALL STOP. ON A FAILURE OF THE EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE EXHAUST FAN IS OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR: THE EXHAUST FAN SHALL STOP AND THE EXHAUST AIR DAMPER SHALL CLOSE.

REFER TO SEQUENCE: AIR TERMINAL UNIT DDC CONTROL AND EF TRACKING PORTION OF THIS SPECIFICATION FOR DETAILS ON THE FAN AND TERMINAL AIR BOX SEQUENCE

10 EXHAUST FAN - EF-14
NO SCALE



SEQUENCE OF OPERATIONS:
FAN CONTROL: START/STOP: THE EXHAUST FAN WITH THE ASSOCIATED AIR DAMPER SHALL BE STARTED AND STOPPED VIA HAND-OFF-AUTO SWITCH AND LOCAL SPACE TEMPERATURE SENSOR.

WHEN EXHAUST FAN IS ENERGIZED, THE MOTORIZED AUTOMATIC DAMPER FAN SHALL OPEN AND THE FAN MOTOR SHALL START. THE REVERSE SHALL OCCUR WHEN SPACE TEMPERATURE IS BELOW SETPOINT AND EXHAUST FAN SHALL BE ENERGIED AND CLOSE DAMPER.

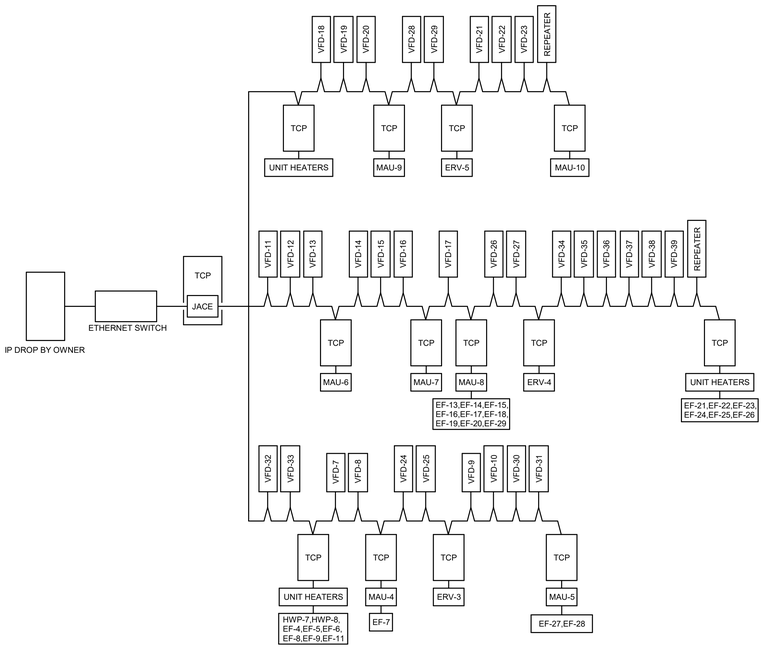
TEMPERATURE CONTROL: INSTALL A SPACE TEMPERATURE SENSOR IN THE GENERATOR ROOM. CYCLE THE EXHAUST FAN TO MAINTAIN SPACE TEMPERATURE 85°F (ADJ.)

UNIT SHUTDOWN: WHENEVER THE VENTILATION SYSTEM IS INDEXED OFF, THE EXHAUST FAN SHALL STOP. ON A FAILURE OF THE EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE EXHAUST FAN IS OFF FOR ANY REASON THE AIR DAMPER SHALL STOP SHALL CLOSE.

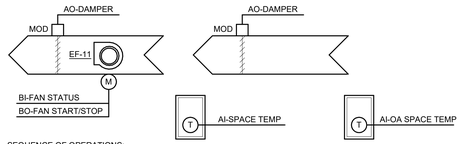
CURRENT STATUS SWITCH: PROVIDE FOR EXHAUST FAN.

PROVIDE STATUS INDICATION THRU DDC FOR EXHAUST FAN.

9 EXHAUST FAN - EF-13
NO SCALE



1 BAS-SYSTEM ARCHITECTURE NETWORK
NO SCALE



SEQUENCE OF OPERATIONS:
FAN CONTROL: START/STOP: THE EXHAUST FAN WITH THE ASSOCIATED AIR DAMPER AND OUTSIDE AIR DAMPER SHALL BE STARTED AND STOPPED VIA HAND-OFF-AUTO SWITCH AND LOCAL SPACE TEMPERATURE SENSOR.

WHEN EXHAUST FAN IS ENERGIZED, THE MOTORIZED AUTOMATIC DAMPERS FAN SHALL OPEN AND THE FAN MOTOR SHALL START. THE REVERSE SHALL OCCUR WHEN SPACE TEMPERATURE IS BELOW SETPOINT AND EXHAUST FAN SHALL BE ENERGIED AND CLOSE DAMPERS.

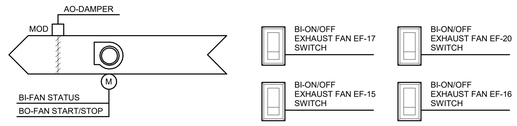
TEMPERATURE CONTROL: INSTALL A SPACE TEMPERATURE SENSOR IN THE BOILER ROOM. CYCLE THE EXHAUST FAN TO MAINTAIN SPACE TEMPERATURE 85°F (ADJ.). AND SUBJECT TO THE FLOATING DRYBULB LOCKOUT.

FLOATING DRY BULB LOCKOUT: THE VENTILATION SYSTEM SHALL BE ENABLED WHENEVER THE OUTDOOR AIR TEMPERATURE IS MORE THAN 4° F (ADJ.) COOLER THAN THE BOILER ROOM SPACE TEMPERATURE.

UNIT SHUTDOWN: WHENEVER THE VENTILATION SYSTEM IS INDEXED OFF, THE EXHAUST FAN SHALL STOP. ON A FAILURE OF THE EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE EXHAUST FAN IS OFF FOR ANY REASON THE OUTSIDE AIR DAMPER SHALL STOP SHALL CLOSE.

CURRENT STATUS SWITCH: PROVIDE FOR EXHAUST FAN. PROVIDE STATUS INDICATION THRU DDC FOR EXHAUST FAN.

5 EXHAUST FAN - EF-11
NO SCALE



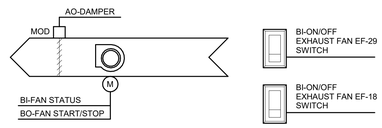
SEQUENCE OF OPERATIONS:
FAN CONTROL: START/STOP: THE FAN SHALL BE STARTED AND STOPPED VIA INTERLOCK WITH THE LOCAL TOGGLE SWITCH. COORDINATE WITH EC.

WHEN EXHAUST FAN IS ENERGIZED, THE MOTORIZED AUTOMATIC DAMPER ASSOCIATED WITH THE FAN SHALL OPEN AND THE FAN MOTOR SHALL START. THE EXHAUST FAN SHALL STOP AND THE EXHAUST MOTOR OPERATOR DAMPER SHALL CLOSE.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCH FOR EXHAUST FAN.
PROVIDE STATUS INDICATION THRU DDC FOR EXHAUST FAN.

REFER TO SEQUENCE: AIR TERMINAL UNIT DDC CONTROL AND EF TRACKING PORTION OF THIS SPECIFICATION FOR DETAILS ON THE FAN AND TERMINAL AIR BOX SEQUENCE

6 FUME EXTRACTORS - EF-15, 16, 17 AND 20
NO SCALE



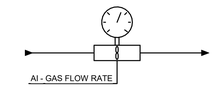
SEQUENCE OF OPERATIONS:
FAN CONTROL: START/STOP: THE FAN SHALL BE STARTED AND STOPPED VIA INTERLOCK WITH THE LOCAL TOGGLE SWITCH: COORDINATE WITH EC.

WHEN EXHAUST FAN IS ENERGIZED, THE MOTORIZED AUTOMATIC DAMPER ASSOCIATED WITH THE FAN SHALL OPEN AND THE FAN MOTOR SHALL START. THE EXHAUST FAN SHALL STOP AND THE EXHAUST MOTOR OPERATOR DAMPER SHALL CLOSE.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCH FOR EXHAUST FAN.
PROVIDE STATUS INDICATION THRU DDC FOR EXHAUST FAN.

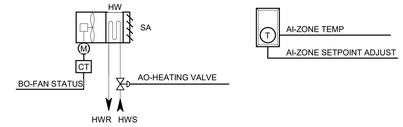
REFER TO SEQUENCE: AIR TERMINAL UNIT DDC CONTROL AND EF TRACKING PORTION OF THIS SPECIFICATION FOR DETAILS ON THE FAN AND TERMINAL AIR BOX SEQUENCE

7 EXHAUST FANS - EF-18 AND 29
NO SCALE



NATURAL GAS METERING: THE TEMPERATURE CONTROL CONTRACTOR SHALL ARRANGE WITH THE PROJECT'S NATURAL GAS UTILITY FOR PROVIDING A PULSE TRANSMITTER AT THE EXISTING SERVICE GAS METER TO ALLOW INDEPENDENT PULSE SIGNALS TO BE MONITORED BY THE DDC CONTROL SYSTEM FOR GAS UTILITY GAS CONSUMPTION OF THE BUILDING. NO POWER IS REQUIRED BY THE PULSE TRANSMITTER. TCC SHALL OBTAIN THE PULSE SIGNAL MULTIPLIERS FROM THE UTILITY.

2 NATURAL GAS METER
NO SCALE

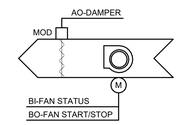


SEQUENCE OF OPERATIONS:
PROVIDE AN ELECTRIC SPACE THERMOSTAT TO CONTROL THE CONTROL VALVE TO MAINTAIN SPACE TEMPERATURE. PROVIDE A STRAP ON AQUASTAT MOUNTED ON THE HOT WATER RETURN LINE SET AT 100º F TO CONTROL THE UNIT FAN WHEN HOT WATER TEMPERATURE IS ABOVE SETPOINT.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCH FOR UNIT HEATER FAN.

PROVIDE ALARM THRU DDC SYSTEM IF SPACE TEMPERATURE RISES ABOVE 75°F (ADJ.) OR DROPS BELOW 65°F (ADJ.)

3 HOT WATER UNIT HEATERS - UH-8 TO UH-28
NO SCALE



SEQUENCE OF OPERATIONS:
FAN CONTROL: START/STOP: THE DDC SYSTEM SHALL START THE EXHAUST FAN VIA THEIR ASSOCIATED MOTOR.

SCHEDULE: THE EXHAUST FAN SHALL BE CONNECTED TO A BAS TIMECLOCK AND PROGRAMMED TO SCHEDULE AS FOLLOWING:

OCCUPIED/UNOCCUPIED SCHEDULE SHALL BE SET AT THE DDC OPERATOR INTERFACE. WHEN INDEXED TO UNOCCUPIED THE UNIT SHALL SHUTDOWN.

DAMPER: OPEN THE MOTORIZED DAMPER ASSOCIATED WITH THE EXHAUST FAN WHEN THE EXHAUST FAN IS COMMANDED TO RUN. THE AUTOMATIC DAMPER SHALL BE HARD WIRE TO THE FAN POWER.

CURRENT STATUS SWITCH: PROVIDE CURRENT STATUS SWITCH FOR EXHAUST FAN.
PROVIDE STATUS INDICATION THRU DDC FOR EXHAUST FANS.

UNIT SHUTDOWN: WHENEVER THE SYSTEM IS INDEXED OFF, THE EXHAUST FANS SHALL STOP. ON A FAILURE OF THE EXHAUST FAN, AN ALARM SHALL BE SENT THROUGH THE DDC SYSTEM. WHENEVER THE EXHAUST FAN IS OFF FOR ANY REASON THE FOLLOWING SHALL OCCUR: THE EXHAUST FAN SHALL STOP AND THE EXHAUST AIR DAMPER SHALL CLOSE.

4 EXHAUST FANS - EF-4, 6, 7, 8, AND 9
NO SCALE

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CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

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MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
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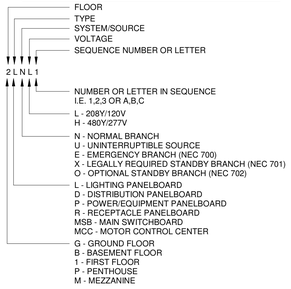
DATE: November 7, 2019
DESIGNED BY: DJG
DRAWN BY: RRW
CHECKED BY: KML
DO NOT SCALE DRAWINGS

SHEET CONTENTS
CONTROL SCHEMATICS

SHEET NO.:
M-806

PANEL DESIGNATION KEY



GENERAL SYMBOLS

#/E-###	DETAIL NUMBER / SHEET NUMBER
9.###	KEYED NOTE, USED TO DESCRIBE ADDITIONAL INFORMATION OF WORK REQUIRED, SPECIFIC TO THE SHEET AND/OR DETAIL IT IS SHOWN WITH.

LINE TYPE KEY

	NEW WORK BY THIS CONTRACTOR (DARK SOLID LINE)
	EXISTING TO BE REMOVED BY THIS CONTRACTOR (DARK DASHED LINE)
	EXISTING TO REMAIN WORK (THIN SOLID LINE)
	NEW WORK UNDER FLOOR BY THIS CONTRACTOR
	ONE-LINE EQUIPMENT ENCLOSURE
	PANEL DIVISION LINES

ONE-LINE SYMBOLS

	LOW VOLTAGE CIRCUIT BREAKER
#	CURRENT TRANSFORMER (# DENOTES QUANTITY)
DPM	DIGITAL POWER METER
	LOW VOLTAGE FUSE
N	NEUTRAL BOND
	NORMALLY CLOSED CONTACT
	NORMALLY OPEN CONTACT
	PANELBOARD (ELEVATION VIEW)
	TRANSFORMER
O.L'S	MOTOR STARTER - (#) INDICATES NEMA STARTER SIZE

RECEPTACLE SYMBOLS

60"	DUPLEX RECEPTACLE TEXT INDICATES MOUNTING HEIGHT
	DOUBLE DUPLEX RECEPTACLE
	ABOVE COUNTER DUPLEX RECEPTACLE
	SIMPLEX RECEPTACLE
	SPLIT WIRED DUPLEX RECEPTACLE
	SPECIFIC USE RECEPTACLE. NEMA CONFIGURATIONAS NOTED ON DRAWINGS AND/OR SCHEDULE.
	EMERGENCY SHADING MODIFIER

RECEPTACLE NOTATIONS:

a	DENOTES SWITCH LEG FOR SWITCHED OUTLETS
D	DENOTES DEDICATED OUTLETS
GFCI	DENOTES GROUND FAULT INTERRUPTER OUTLETS
IG	DENOTES ISOLATED GROUND OUTLETS
H	DENOTES HORIZONTALLY MOUNTED OUTLETS
TR	DENOTES TAMPER RESISTANT SAFETY OUTLETS
WP	DENOTES WEATHER PROOF OUTLETS

MOTOR & EQUIPMENT CONNECTION SYMBOLS

	ELECTRICAL CONNECTION TO EQUIPMENT AND MOTORS, SIZED PER NEC. COORDINATE REQUIREMENTS WITH CONTRACTOR FURNISHING MOTOR OR EQUIPMENT. REFER TO SPECIFICATIONS AND EQUIPMENT WIRING SCHEDULE FOR ADDITIONALWORK ASSOCIATED WITH MOTOR OR EQUIPMENT.
	COMBINATION MAGNETIC CONTROLLER
VFD	VARIABLE FREQUENCY MOTOR CONTROLLER
	MAGNETIC CONTROLLER - FULL VOLTAGE, ACROSS THE LINE, ELECTRICALLY HELD
	NON-FUSIBLE DISCONNECT SWITCH
	FUSIBLE DISCONNECT SWITCH
S_{FS}	FUSED SINGLE POLE SWITCH
S_{MS}	MOTOR STARTING SWITCH WITH OVERLOADS
S_{MX}	MOTOR STARTING SWITCH WITHOUT OVERLOADS
ATS	AUTOMATIC TRANSFER SWITCH
	ENCLOSED CIRCUIT BREAKER
	EMERGENCY SHADING MODIFIER

RACEWAY SYMBOLS

	SURFACE MOUNTED CONDUIT
	CONCEALED CONDUIT IN CEILING OR WALL
J	JUNCTION BOX - CEILING MOUNTED
J	JUNCTION BOX - WALL MOUNTED

FIRE ALARM SYMBOLS

SD	INTELLIGENT PHOTOELECTRIC SMOKE DETECTOR FOR SMOKE DAMPER CONTROL
DS	INTELLIGENT PHOTOELECTRIC DUCT SMOKE DETECTOR
MM	MONITOR MODULE
CM	CONTROL MODULE
RTS/I	REMOTE TEST SWITCH WITH INDICATOR
NAC	FIRE ALARM NOTIFICATION APPLIANCE EXTENDER PANEL
FR	FIRE ALARM RELAY
FACP	FIRE ALARM CONTROL PANEL
FAAP	FIRE ALARM ANNUNCIATOR PANEL
DACT	DIGITAL COMMUNICATION PANEL

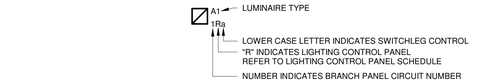
SERVICE & DISTRIBUTION SYMBOLS

	PANELBOARD
C	CONTACTOR
P	PUSH BUTTON
	EMERGENCY SHADING MODIFIER

LUMINAIRE SYMBOLS

	SURFACE INDUSTRIAL
	PENDANT INDUSTRIAL
	WALL SURFACE LINEAR
	CEILING MOUNTED EXIT SIGN
	WALL MOUNTED EXIT SIGN
	WALL MOUNTED COMBINATION EXIT SIGN/EBU
	EMERGENCY SHADING MODIFIER

LUMINAIRE CIRCUITRY & CONTROL KEY:



LUMINAIRE CONTROL SYMBOLS

OS	OCCUPANCY SENSOR CEILING MOUNT (X REPRESENTS OCCUPANCY/PHOTO SENSOR SCHEDULE DESIGNATION)
S	SINGLE POLE SWITCH

SWITCH NOTATIONS:

3	DENOTES 3-WAY SWITCH
4	DENOTES 4-WAY SWITCH
C	MAINTAINED CONTACT, THREE POSITION, CENTER OFF
D	DENOTES WALL BOX DIMMER SWITCH
F	FAN SPEED CONTROL SWITCH
K	DENOTES KEY SWITCH
M	MOMENTARY CONTACT SWITCH
OSX	DENOTES OCCUPANCY SENSOR (X REPRESENTS SCHEDULE DESIGNATION)
P	DENOTES PILOT SWITCH
PB	PUSH BUTTON
T	DENOTES TIMER SWITCH
VSX	DENOTES VACANCY SENSOR (X REPRESENTS SCHEDULE DESIGNATION)
WL	DENOTES WET LOCATION SWITCH
X1	DENOTES EXPLOSION PROOF CLASS 1 DIVISION 1 SWITCH
X2	DENOTES EXPLOSION PROOF CLASS 1 DIVISION 2 SWITCH

ELECTRICAL ABBREVIATIONS

3R	NEMA 3R RATING
4X	NEMA 4X RATING
A	AMPERES
A/E	ARCHITECT / ENGINEER
AAC	ABOVE ACCESSIBLE CEILING
ACCU	AIR COOLED CONDENSING UNIT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
BLDG	BUILDING
BRKR	BREAKER
C	CONDUIT
CB	CIRCUIT BREAKER
CEB	CONCRETE EQUIPMENT BASE
CKT	CIRCUIT
CP	CIRCULATION PUMP
CRAC	COMPUTER ROOM AIR CONDITIONER
DISC	DISCONNECT
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
ECB	ENCLOSED CIRCUIT BREAKER
EF	EXHAUST FAN
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ERL	EXISTING TO BE RELOCATED
ERLD	EXISTING - RELOCATED LOCATION
ES	EQUIPMENT SUPPLIER
ETR	EXISTING TO REMAIN
F	FUSED
FA	FIRE ALARM
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
HP	HORSEPOWER
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HWB	HOT WATER BOILER
HWP	HOT WATER PUMP
IMC	INTERMEDIATE METALLIC CONDUIT
J-BOX	JUNCTION BOX
LFS	LIGHTING FIXTURE SCHEDULE
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MC	MECHANICAL CONTRACTOR
MCC	MOTOR CONTROL CENTER
MIN.	MINIMUM
MTD	MOUNTED
MTG	MOUNTING
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NL/EL	NIGHT LIGHT AND EMERGENCY LIGHT
NTS	NOT TO SCALE
O.L'S	OVERLOADS
PH	PHASE
PNL	PANEL
PVC	POLYVINYL CHLORIDE
RECPT	RECEPTACLE
REQ'D	REQUIRED
RF	RETURN FAN
RMC	RIGID METAL CONDUIT
RTU	ROOF TOP UNIT
S/N	SOLID NEUTRAL
SF	SUPPLY FAN
SS	STAINLESS STEEL
TBR	TO BE REMOVED
TCP	TEMPERATURE CONTROL PANEL
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TYP	TYPICAL
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
V	VOLTS
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS
WL	WET LOCATION LISTED
WP	WEATHERPROOF
XFMR	TRANSFORMER

DEMOLITION GENERAL NOTES:

1. THE INFORMATION SHOWN IS BASED ON EXISTING DRAWINGS AND SITE OBSERVATIONS TO ASSIST CONTRACTOR IN BIDDING. THE ELECTRICAL DRAWINGS INDICATE EXISTING ELECTRICAL ITEMS TO BE REMOVED. THE DRAWINGS ARE INTENDED TO INDICATE THE SCOPE OF WORK REQUIRED AND DO NOT INDICATE EVERY BOX, CONDUIT, OR WIRE THAT MUST BE REMOVED. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID AND VERIFY EXISTING CONDITIONS. REFER TO SPECIFICATION SECTION 26 05 02 FOR ADDITIONAL REQUIREMENTS.
2. WHERE LIGHTS, SWITCHES, RECEPTACLES, ETC., ARE BEING REMOVED ALL ASSOCIATED CONDUIT AND WIRE BACK TO THE PANELBOARD OR FEEDER JUNCTION BOX SERVING THE DEVICE SHALL ALSO BE REMOVED, UNLESS THE CONDUIT CAN BE REUSED FOR NEW CONDUCTORS. THE CONTRACTOR SHALL DISPOSE OF MATERIAL THE OWNER DOES NOT WANT TO REUSE OR RETAIN FOR MAINTENANCE PURPOSES.
3. ALL BOXES THAT REMAIN IN PLACE IN EXISTING MASONRY WALLS THAT ARE TO REMAIN SHALL BE PROVIDED WITH A BLANK COVERPLATE. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS ASSOCIATED WITH TYPE AND ATTACHMENT.
4. WHERE CONDUIT IS IN THE CONCRETE SLAB, CUT OFF FLUSH, PULL OUT WIRE, AND PLUG. WHERE CONDUIT IS RUN EXPOSED, ALL ASSOCIATED CLAMPS, SUPPORTS, HANGERS, ETC., SHALL ALSO BE REMOVED. CONDUIT CONCEALED IN WALL CONSTRUCTION MAY BE ABANDONED IN PLACE IF NOT AFFECTED BY OTHER CONSTRUCTION.
5. THIS CONTRACTOR SHALL COORDINATE ALL HIS WORK, INCLUDING PHASING WITH OTHER CONTRACTORS AT THE JOB SITE BEFORE REMOVING EXISTING ELECTRICAL AND INSTALLING NEW ITEMS.
6. EXISTING CONDUIT IN GOOD CONDITION, MAY BE REUSED IN PLACE. RELOCATED EXISTING CONDUIT SHALL NOT BE ALLOWED. BONDING CONDUCTORS SHALL BE INSTALLED IN ALL REUSED CONDUIT TO ASSURE PROPER GROUND PATH.
7. MAINTAIN CIRCUIT CONTINUITY OF DEVICES LOCATED OUTSIDE OF CONSTRUCTION AREA. DEVICE AND EQUIPMENT REMOVAL IN CERTAIN LOCATIONS MAY REQUIRE THE INSTALLATION OF A JUNCTION BOX TO RECONNECT CIRCUITS THAT REMAIN IN OPERATION. EXTEND CONDUIT AND WIRING AS REQUIRED TO MAINTAIN POWER TO REMAINING EQUIPMENT.
8. HID AND FLUORESCENT LAMPS CONTAIN MERCURY AND SHALL BE DISPOSED OF IN ACCORDANCE WITH SPECIFICATIONS.
9. CONTRACTOR SHALL REMOVE AND INSTALL ALL CEILING TILES AS REQUIRED FOR THE EXECUTION OF ELECTRICAL WORK THAT IS OUTSIDE THE CONTRACT LIMITS OF CONSTRUCTION. CONTRACTOR SHALL REPLACE CEILING TILES WITH IDENTICAL MATERIAL WHERE DAMAGED BY THIS CONTRACTOR.
10. PROVIDE REVISED TYPED CIRCUIT DIRECTORY IN PANELBOARDS THAT HAVE CIRCUITS REMOVED OR ADDED CIRCUITS.
11. DISCONNECT AND REMOVE ABANDONED LUMINAIRES, INCLUDING BRACKETS, STEMS, HANGERS, AND OTHER ACCESSORIES.
12. DISCONNECT AND REMOVE ELECTRICAL DEVICES AND EQUIPMENT SERVING UTILIZATION EQUIPMENT THAT IS ASSOCIATED WITH MECHANICAL EQUIPMENT THAT HAS BEEN REMOVED.

GENERAL NOTES:

1. REFER TO THE G SERIES DRAWINGS FOR CODE ANALYSIS PLANS, INFORMATION AND NOTES.
2. THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE DETAILS OF WORK, VERIFY DIMENSIONS IN THE FIELD, AND ADVISE THE [ARCHITECT/ENGINEER] [CONTRACTING OFFICER] OF ANY DISCREPANCY BEFORE PERFORMING ANY WORK.
3. THE COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH THE ADAAG (AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES).
4. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE RATED WALLS AND FLOORS. MAKE RATED PENETRATIONS AS REQUIRED. SEAL ALL RATED PENETRATIONS AS IDENTIFIED IN DIVISION 1 REQUIREMENTS.
5. CIRCUIT NUMBERS ARE SHOWN FOR CIRCUIT IDENTIFICATION. CIRCUITING SHALL AGREE WITH NUMBERING ON THE PANEL SCHEDULES PROVIDED. BALANCE THE LOAD ON PANELS AS EVENLY AS POSSIBLE BETWEEN EACH PHASE. COMMON NEUTRALS MAY NOT BE USED FOR BRANCH CIRCUITS. BALANCE THE LOAD ON PANEL AS EVENLY AS POSSIBLE BETWEEN EACH PHASE.
6. A #12 GREEN INSULATED GROUND CONDUCTOR SHALL BE INSTALLED WITH CIRCUIT CONDUCTORS TO ALL RECEPTACLES.
7. CONCEAL ALL CONDUIT IN WALLS, PARTITIONS, ABOVE CEILING, ETC. UNLESS OTHERWISE INDICATED ON THE PLANS OR IN THE SPECIFICATIONS. CONDUIT IN MECHANICAL ROOMS, AND STORAGE ROOMS WITHOUT CEILINGS MAY BE EXPOSED ON BUILDING STRUCTURE. WHERE RACEWAY IS REQUIRED ON EXISTING CONCRETE AND MASONRY WALLS, SURFACE RACEWAY MAY BE USED IN LIEU OF CHANNELING WALLS TO ALLOW CONCEALED ROUTING. THE RACEWAY SHALL BE SINGLE CHANNEL STYLE TYPE WITH IVORY FINISH. THIS APPLIES FOR BRANCH CIRCUIT CONDUITS UP TO 3/4" SIZE. CONDUITS LARGER THAN 3/4" MAY BE ROUTED EXPOSED, BUT INSTALLED PARALLEL AND/OR PERPENDICULAR TO BUILDING LINES AND RUN AS UNOBTRUSIVELY AS POSSIBLE.
8. CONTRACTOR TO PROVIDE SUITABLE MECHANICAL PROTECTION AROUND ALL CONDUITS STUBBED OUT FROM FLOORS, WALLS OR CEILINGS DURING CONSTRUCTION TO PREVENT BENDING OR DAMAGING OF STUB OUTS DUE TO CARELESSNESS WITH CONSTRUCTION EQUIPMENT.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPENINGS REQUIRED IN WALLS. ALL OPENINGS SHALL BE REPAIRED TO MATCH EXISTING BY A QUALIFIED CONTRACTOR AT THE EXPENSE OF THIS CONTRACTOR. ALL CONDUITS THROUGH WALLS SHALL BE GROUTED OR SEALED INTO OPENINGS.
10. DRAWINGS INDICATE THE EXTENT OF HAZARDOUS OR WET LOCATIONS. INSTALLATION MEANS AND METHODS SHALL BE SUITABLY RATED FOR THE ENVIRONMENT INDICATED ON THE DRAWINGS.
11. CONTRACTOR SHALL REMOVE AND REINSTALL ALL CEILING TILES AS REQUIRED FOR THE EXECUTION OF ELECTRICAL WORK THAT IS OUTSIDE THE CONTRACT LIMITS OF CONSTRUCTION. CONTRACTOR SHALL REPLACE CEILING TILES WITH IDENTICAL MATERIAL WHERE DAMAGED BY THIS CONTRACTOR.
12. SCCR RATINGS LISTED FOR EQUIPMENT ARE MINIMUM REQUIREMENTS FOR BUS BRACING AND DEVICE RATING. ALL EQUIPMENT SHALL BE FULLY RATED UNLESS SPECIFICALLY NOTED AS SERIES RATED.
13. "SE" INDICATES LUMINAIRE IS SWITCHED/CONTROLLED DURING NORMAL OPERATION AND OPERATES FROM EMERGENCY BALLAST/DRIVER UPON LOSS OF NORMAL POWER.

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metro transit

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: MAM
DRAWN BY: KAS
CHECKED BY: SDL
DO NOT SCALE DRAWINGS

SHEET CONTENTS
NOTES, SYMBOLS & ABBREVIATIONS

SHEET NO.:
E-001

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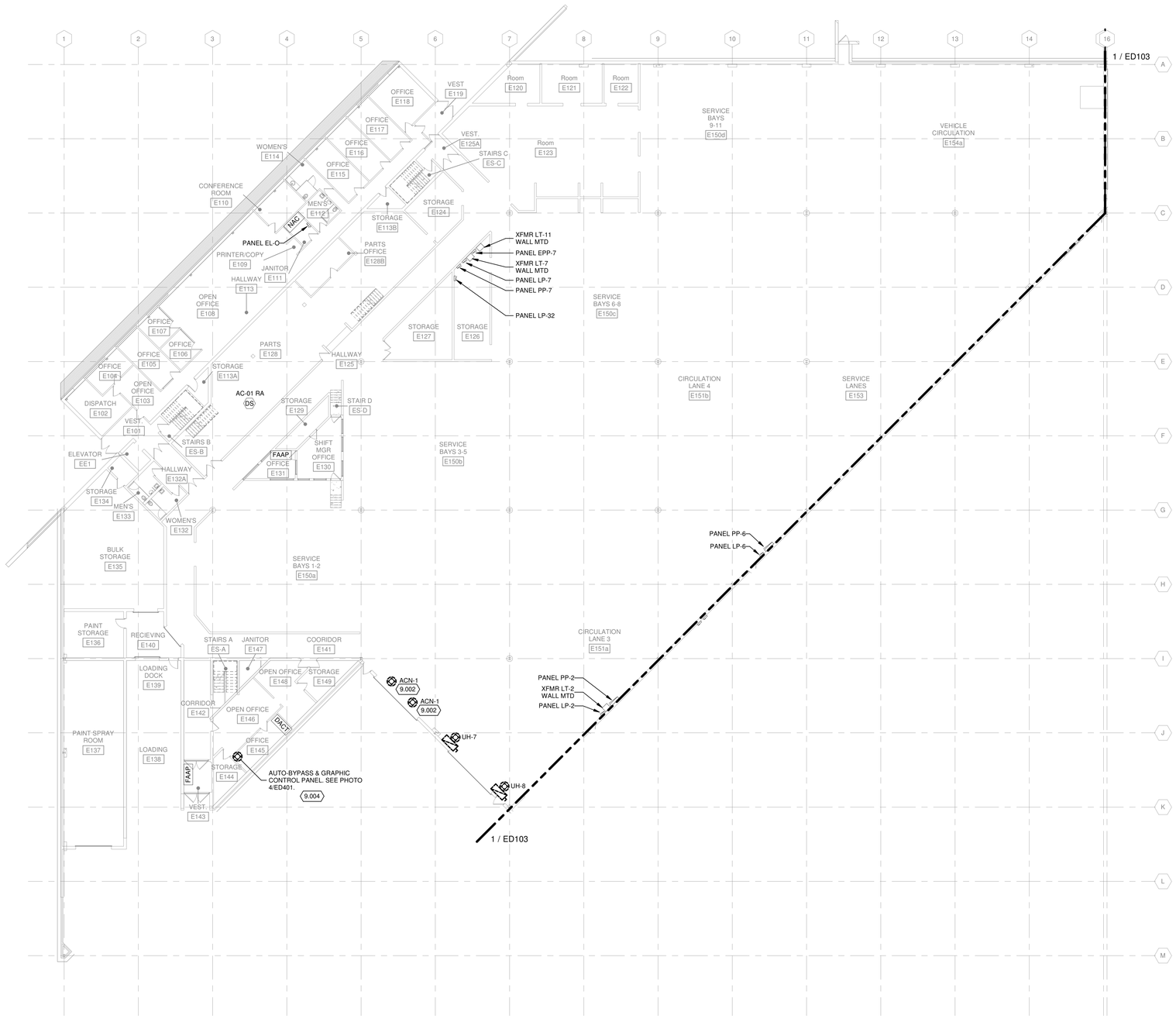


TRUE NORTH PLAN NORTH

1 FIRST FLOOR POWER & FIRE ALARM DEMOLITION PLAN - ZONES 1 & 2

1/16" = 1'-0"

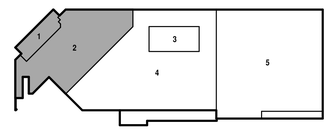
KEYED NOTES

9.002 REMOVE ASSOCIATED LIMIT SWITCHES, INTERLOCK, ETC BACK TO ASSOCIATED CONTROL PANEL, INCLUDING CONTROL PANEL.

9.004 CONTROL PANEL FOR EF'S 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, AND 19.

DEMOLITION GENERAL SHEET NOTES:

1. ALL ASSOCIATED CONTROLLERS, DISCONNECT(S) ASSOCIATED WITH HVAC EQUIPMENT TO BE REMOVED WILL BE DEMOLISHED, INCLUDING ALL WIRING & CONDUIT BACK TO SOURCE.
2. ALL EXISTING FIRE ALARM DEVICES AND INTERFACE ASSOCIATED WITH EXISTING HVAC EQUIPMENT WILL BE REMOVED & REPLACED WITH NEW & COMPATIBLE WITH NEW FIRE ALARM SYSTEM. REFER TO SPECIFICATION SECTION 284621.11.



KEY PLAN

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SHEET CONTENTS
FIRST FLOOR POWER DEMOLITION PLAN - ZONES 1 & 2

SHEET NO.:
ED101

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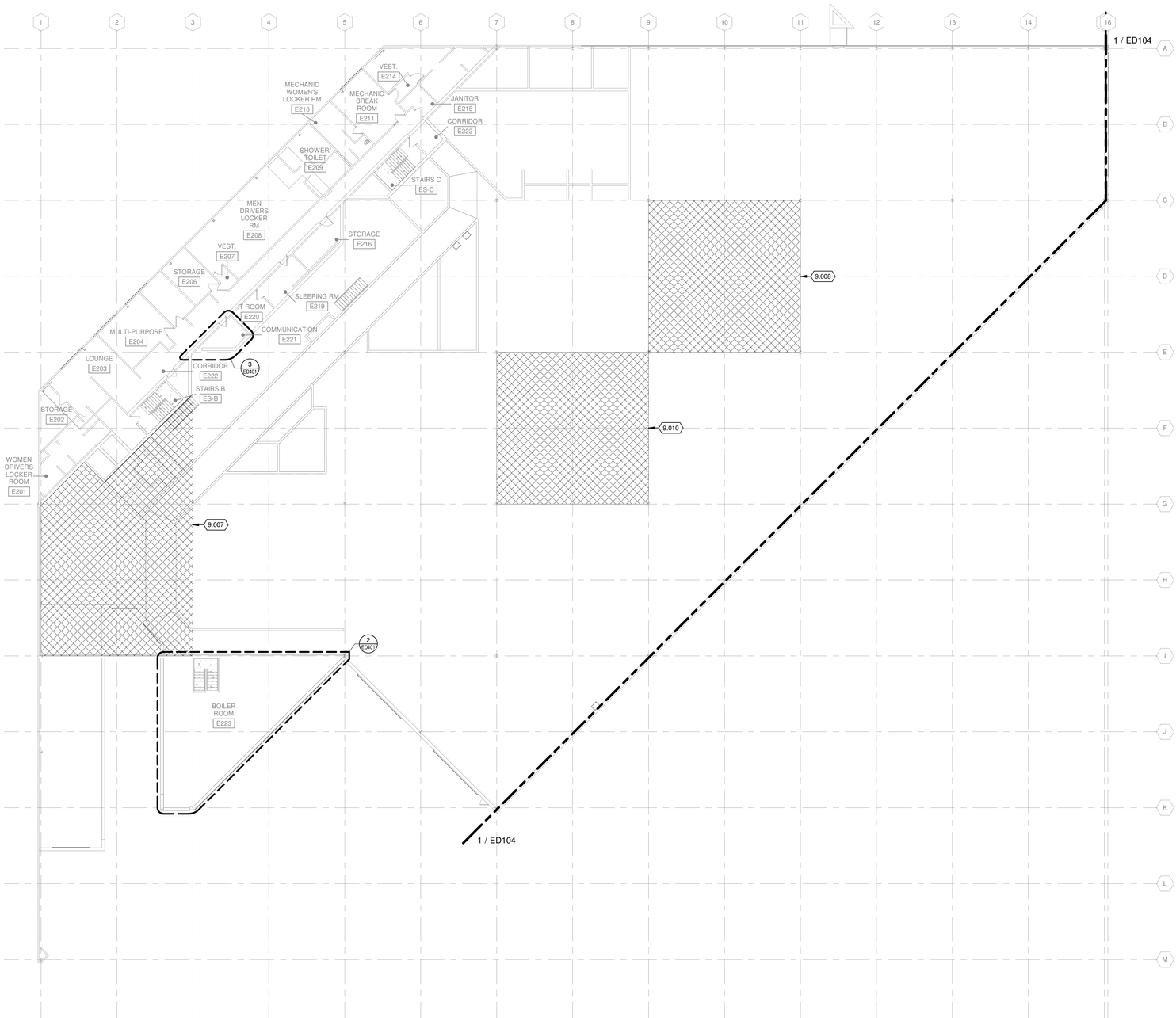


TRUE NORTH PLAN NORTH

1 SECOND FLOOR POWER & FIRE ALARM DEMOLITION PLAN - ZONES 1 & 2

1/16" = 1'-0"

KEYED NOTES

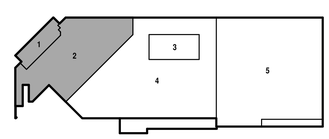
9.007 DISCONNECT, REMOVE, AND REPLACE CONDUIT, LIGHTING, ETC. SPANNING ACROSS THE STRUCTURE IN THIS AREA TO ALLOW STRUCTURAL STEEL INSTALLATION FOR MAU-4. REFER TO 6/ED401. COORDINATE WORK WITH STRUCTURAL. REFER TO STRUCTURAL SHEETS S-451 AND S-452.

9.008 DISCONNECT, REMOVE, AND REPLACE CONDUIT, LIGHTING, ETC. SPANNING ACROSS THE STRUCTURE IN THIS AREA TO ALLOW STRUCTURAL STEEL INSTALLATION FOR MAU-5. REFER TO 7/ED401. COORDINATE WORK WITH STRUCTURAL. REFER TO STRUCTURAL SHEETS S-451 AND S-452.

9.010 DISCONNECT, REMOVE, AND REPLACE CONDUIT, LIGHTING, ETC. SPANNING ACROSS THE STRUCTURE IN THIS AREA TO ALLOW STRUCTURAL STEEL INSTALLATION FOR ERV-3. REFER TO 9/ED401. COORDINATE WORK WITH STRUCTURAL. REFER TO STRUCTURAL SHEETS S-451 AND S-452.

DEMOLITION GENERAL SHEET NOTES:

1. ALL ASSOCIATED CONTROLLERS, DISCONNECT(S) ASSOCIATED WITH HVAC EQUIPMENT TO BE REMOVED WILL BE DEMOLISHED, INCLUDING ALL WIRING & CONDUIT BACK TO SOURCE.
2. ALL EXISTING FIRE ALARM DEVICES AND INTERFACE ASSOCIATED WITH EXISTING HVAC EQUIPMENT WILL BE REMOVED & REPLACED WITH NEW & COMPATIBLE WITH NEW FIRE ALARM SYSTEM. REFER TO SPECIFICATION SECTION 284621.11.



KEY PLAN

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CITY OF MADISON WISCONSIN

CITY OF MADISON
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CHECKED BY: SDL
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SHEET CONTENTS
SECOND FLOOR POWER DEMOLITION PLAN - ZONES 1 & 2

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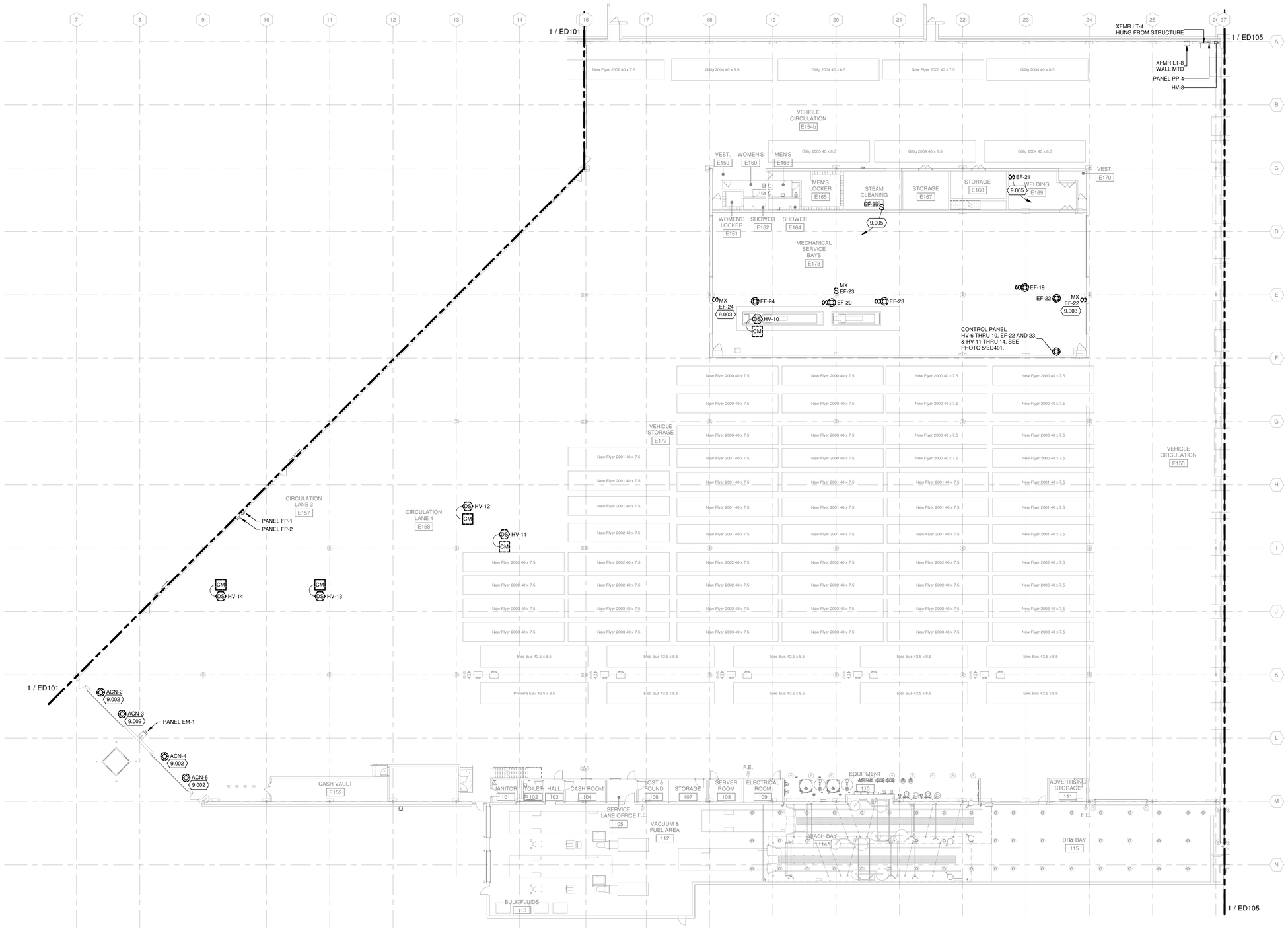
ED102



TRUE NORTH PLAN NORTH

1 FIRST FLOOR POWER & FIRE ALARM DEMOLITION PLAN - ZONES 3 & 4

1/16" = 1'-0"

KEYED NOTES

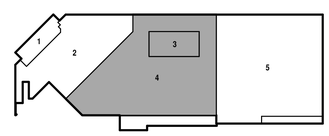
9.002 REMOVE ASSOCIATED LIMIT SWITCHES, INTERLOCK, ETC BACK TO ASSOCIATED CONTROL PANEL, INCLUDING CONTROL PANEL.

9.003 DISCONNECT AND REMOVE REMOVE DEVICE AND WIRING TO EXHAUST FAN (EF). MAINTAIN BACKBOX AND CONDUIT INPLACE FOR NEW DEVICE AND WIRING AS SHOWN ON DRAWING 1/E-103.

9.005 TO EF-25 STARTER DISCONNECT. MOUNTED ON FLOOR ABOVE. REFER TO DRAWING 1/ED401.

DEMOLITION GENERAL SHEET NOTES:

1. ALL ASSOCIATED CONTROLLERS, DISCONNECT(S) ASSOCIATED WITH HVAC EQUIPMENT TO BE REMOVED WILL BE DEMOLISHED, INCLUDING ALL WIRING & CONDUIT BACK TO SOURCE.
2. ALL EXISTING FIRE ALARM DEVICES AND INTERFACE ASSOCIATED WITH EXISTING HVAC EQUIPMENT WILL BE REMOVED & REPLACED WITH NEW & COMPATIBLE WITH NEW FIRE ALARM SYSTEM. REFER TO SPECIFICATION SECTION 284621.11.



KEY PLAN

Mead & Hunt
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2440 Deming Way
Middleton, WI 53562
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meadhunt.com

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CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

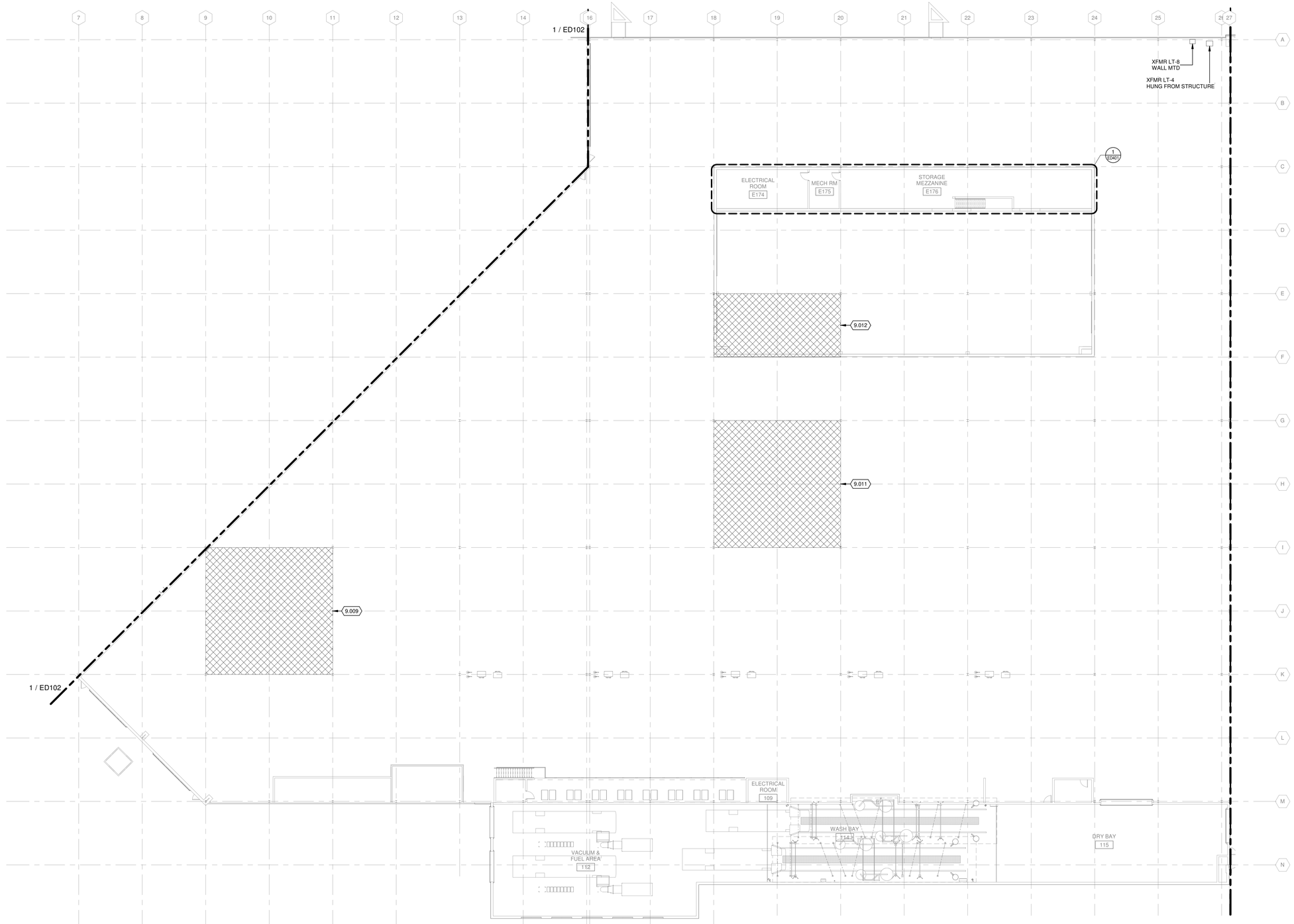
ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: MAM
DRAWN BY: KAS
CHECKED BY: SDL
DO NOT SCALE DRAWINGS

SHEET CONTENTS
FIRST FLOOR
POWER DEMOLITION
PLAN - ZONES 3 & 4

SHEET NO.:
ED103

10/30/2019 2:16:25 PM C:\Revit Local\4503500-170148.07-E-Anno-Central-2018_Kyle.Schommer.rvt



TRUE NORTH PLAN NORTH

1 SECOND FLOOR POWER & FIRE ALARM DEMOLITION PLAN - ZONES 3 & 4

1/16" = 1'-0"

KEYED NOTES

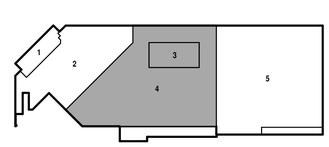
9.009 DISCONNECT, REMOVE, AND REPLACE CONDUIT, LIGHTING, ETC. SPANNING ACROSS THE STRUCTURE IN THIS AREA TO ALLOW STRUCTURAL STEEL INSTALLATION FOR MAU-6. REFER TO 8/ED401. COORDINATE WORK WITH STRUCTURAL. REFER TO STRUCTURAL SHEETS S-451 AND S-452.

9.011 DISCONNECT, REMOVE, AND REPLACE CONDUIT, LIGHTING, ETC. SPANNING ACROSS THE STRUCTURE IN THIS AREA TO ALLOW STRUCTURAL STEEL INSTALLATION FOR ERV-4. REFER TO 10/ED401. COORDINATE WORK WITH STRUCTURAL. REFER TO STRUCTURAL SHEETS S-451 AND S-452.

9.012 DISCONNECT, REMOVE, AND REPLACE CONDUIT, LIGHTING, ETC. SPANNING ACROSS THE STRUCTURE IN THIS AREA TO ALLOW STRUCTURAL STEEL INSTALLATION FOR MAU-8. REFER TO 11/ED401. COORDINATE WORK WITH STRUCTURAL. REFER TO STRUCTURAL SHEETS S-451 AND S-452.

DEMOLITION GENERAL SHEET NOTES:

1. ALL ASSOCIATED CONTROLLERS, DISCONNECT(S) ASSOCIATED WITH HVAC EQUIPMENT TO BE REMOVED WILL BE DEMOLISHED, INCLUDING ALL WIRING & CONDUIT BACK TO SOURCE.
2. ALL EXISTING FIRE ALARM DEVICES AND INTERFACE ASSOCIATED WITH EXISTING HVAC EQUIPMENT WILL BE REMOVED & REPLACED WITH NEW & COMPATIBLE WITH NEW FIRE ALARM SYSTEM. REFER TO SPECIFICATION SECTION 284621.11.



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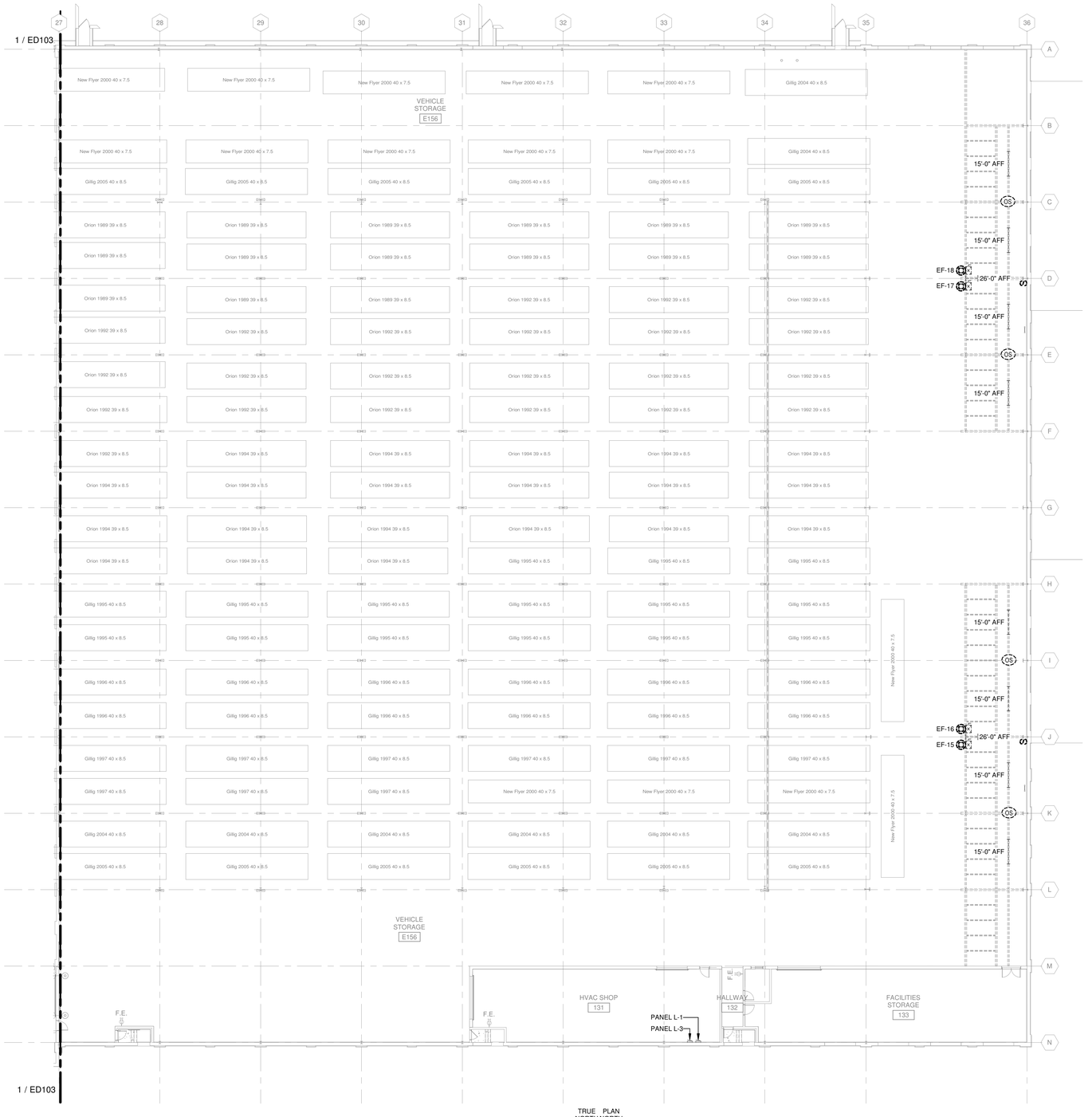
SHEET CONTENTS
SECOND FLOOR POWER DEMOLITION PLAN - ZONES 3 & 4

SHEET NO.:
ED104



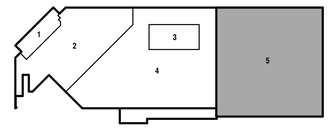
TRUE NORTH PLAN NORTH

1 FIRST FLOOR POWER DEMOLITION PLAN - ZONE 5

1/16" = 1'-0"

DEMOLITION GENERAL SHEET NOTES:

1. ALL ASSOCIATED CONTROLLERS, DISCONNECT(S) ASSOCIATED WITH HVAC EQUIPMENT TO BE REMOVED WILL BE DEMOLISHED, INCLUDING ALL WIRING & CONDUIT BACK TO SOURCE.
2. ALL EXISTING FIRE ALARM DEVICES AND INTERFACE ASSOCIATED WITH EXISTING HVAC EQUIPMENT WILL BE REMOVED & REPLACED WITH NEW & COMPATIBLE WITH NEW FIRE ALARM SYSTEM. REFER TO SPECIFICATION SECTION 284621.11.



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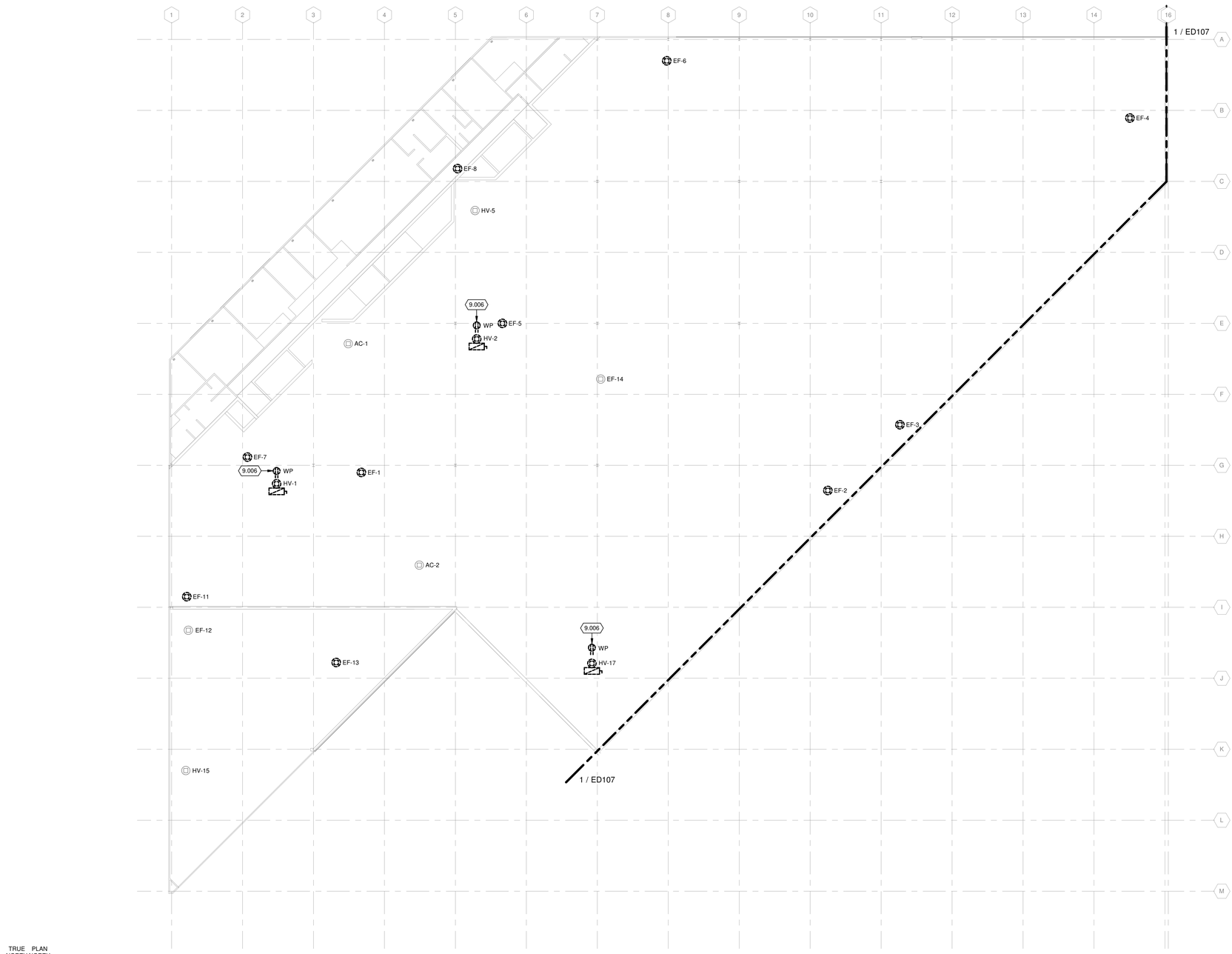
SHEET CONTENTS
FIRST FLOOR POWER DEMOLITION PLAN - ZONE 5

SHEET NO.:
ED105



TRUE NORTH PLAN NORTH

1 ROOF POWER DEMOLITION PLAN - ZONES 1 & 2

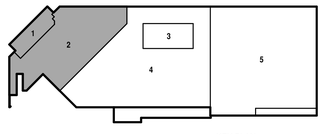
1/16" = 1'-0"

KEYED NOTES

9.006 RECEPTACLE IS MOUNTED ON UNIT HOUSING.

DEMOLITION GENERAL SHEET NOTES:

1. ALL ASSOCIATED CONTROLLERS, DISCONNECT(S) ASSOCIATED WITH HVAC EQUIPMENT TO BE REMOVED WILL BE DEMOLISHED, INCLUDING ALL WIRING & CONDUIT BACK TO SOURCE.
2. ALL EXISTING FIRE ALARM DEVICES AND INTERFACE ASSOCIATED WITH EXISTING HVAC EQUIPMENT WILL BE REMOVED & REPLACED WITH NEW & COMPATIBLE WITH NEW FIRE ALARM SYSTEM. REFER TO SPECIFICATION SECTION 284621.11.



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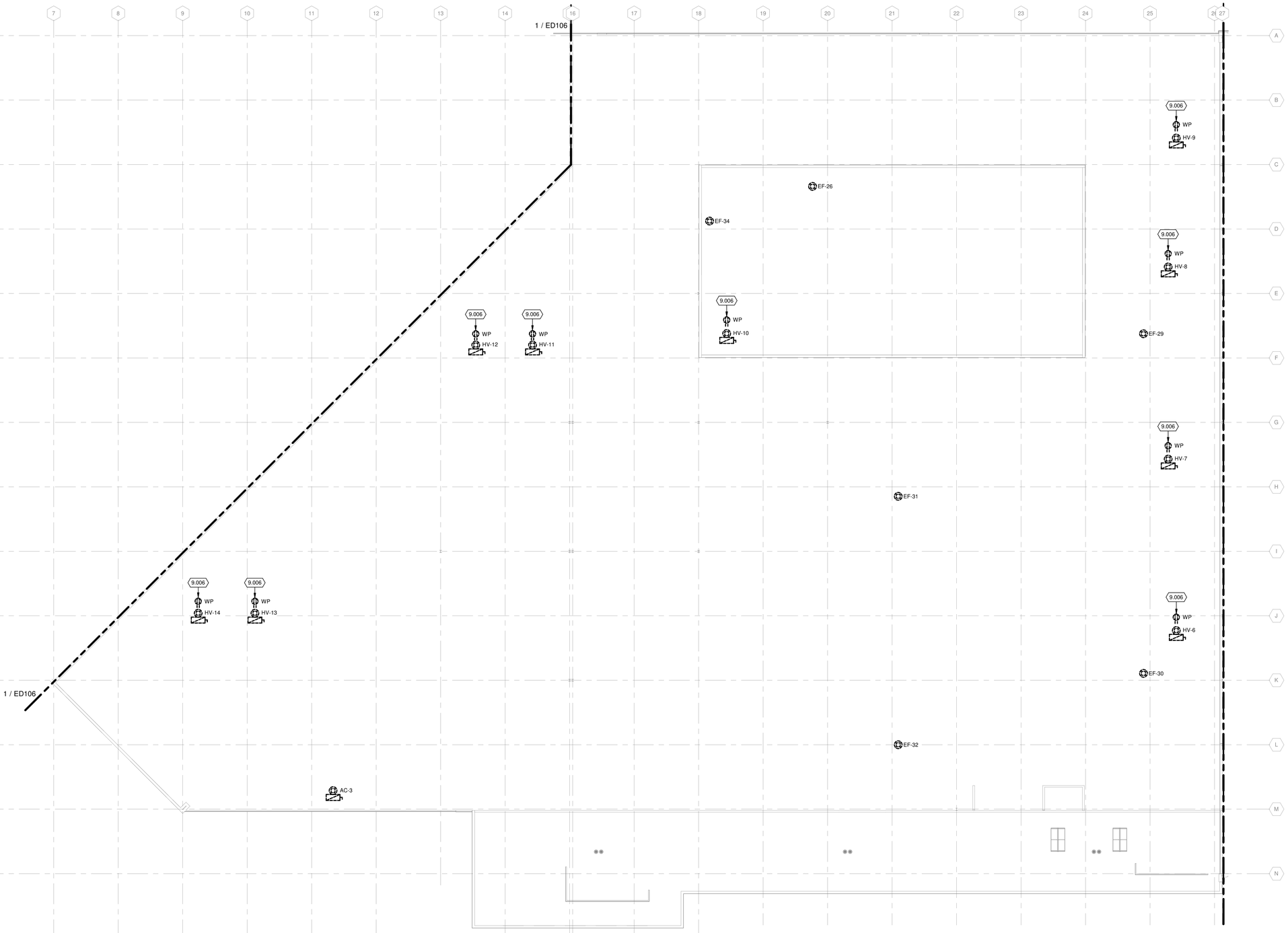
SHEET CONTENTS
ROOF POWER DEMOLITION PLAN - ZONES 1 & 2

SHEET NO.:
ED106



TRUE NORTH PLAN NORTH

1 ROOF POWER DEMOLITION PLAN - ZONES 3 & 4

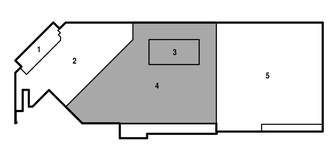
1/16" = 1'-0"

KEYED NOTES

9.006 RECEPTACLE IS MOUNTED ON UNIT HOUSING.

DEMOLITION GENERAL SHEET NOTES:

1. ALL ASSOCIATED CONTROLLERS, DISCONNECT(S) ASSOCIATED WITH HVAC EQUIPMENT TO BE REMOVED WILL BE DEMOLISHED, INCLUDING ALL WIRING & CONDUIT BACK TO SOURCE.
2. ALL EXISTING FIRE ALARM DEVICES AND INTERFACE ASSOCIATED WITH EXISTING HVAC EQUIPMENT WILL BE REMOVED & REPLACED WITH NEW & COMPATIBLE WITH NEW FIRE ALARM SYSTEM. REFER TO SPECIFICATION SECTION 284621.11.



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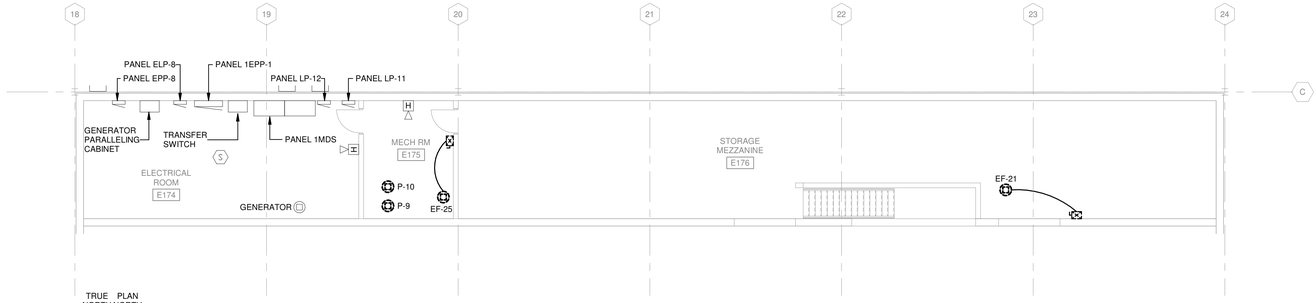
SHEET CONTENTS
ROOF POWER DEMOLITION PLAN - ZONES 3 & 4

SHEET NO.:
ED107

KEYED NOTES

9.001 DISCONNECT CIRCUIT IN PLACE FOR RECONNECTION OF NEW PUMP AS SHOWN ON 2/E-401.



TRUE NORTH PLAN NORTH

1 **ENLARGED STORAGE MEZZANINE POWER DEMOLITION PLAN**
1/8" = 1'-0"

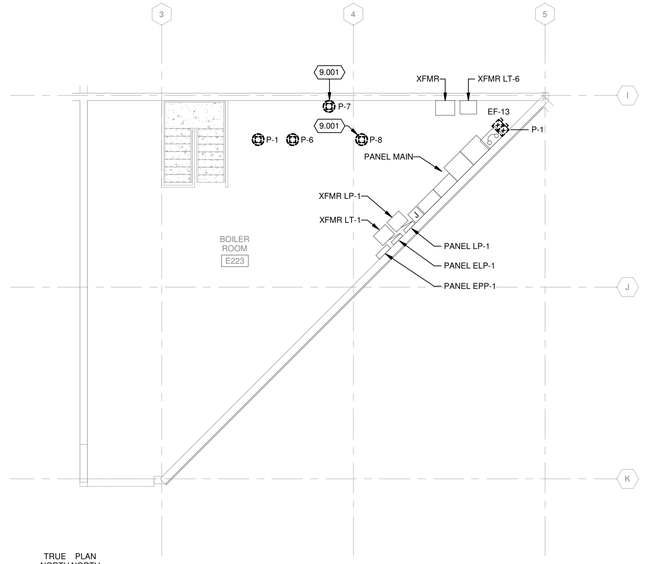
9 **ERV-3 STRUCTURAL STEEL INSTALLATION LOCATION**
NO SCALE

6 **MAU-4 STRUCTURAL STEEL INSTALLATION LOCATION**
NO SCALE

10 **ERV-4 STRUCTURAL STEEL INSTALLATION LOCATION**
NO SCALE

7 **MAU-5 STRUCTURAL STEEL INSTALLATION LOCATION**
NO SCALE

4 **GRAPHIC CONTROL PANEL**
NO SCALE



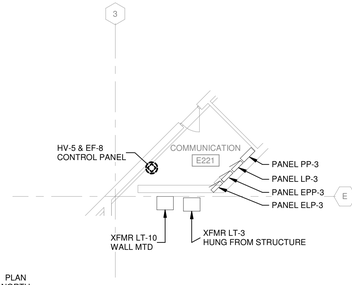
TRUE NORTH PLAN NORTH

2 **ENLARGED BOILER ROOM POWER DEMOLITION PLAN**
1/8" = 1'-0"

11 **MAU-8 STRUCTURAL STEEL INSTALLATION LOCATION**
NO SCALE

8 **MAU-6 STRUCTURAL STEEL INSTALLATION LOCATION**
NO SCALE

5 **HVAC CONTROL PANEL**
NO SCALE



TRUE NORTH PLAN NORTH

3 **ENLARGED ELECTRICAL ROOM POWER DEMOLITION PLAN**
1/8" = 1'-0"

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SHEET CONTENTS
ENLARGED DEMOLITION PLANS, ELEVATIONS & SECTIONS

SHEET NO.:

ED401

ONE-LINE GENERAL DEMOLITION NOTES:

1. REFER TO DRAWING E-001 FOR ONE-LINE SYMBOLS.
2. PANELS "MAIN", 1MDS, AND 1EPP-1 ARE IT GOULD, TYPE FC-1, SERIES 6 DISTRIBUTION EQUIPMENT. PANEL "MAIN" DATED AUGUST 1980, AND PANELS 1MDS AND 1EPP-1 ARE DATED JUNE 1983 AND JULY 1983, RESPECTIVELY.

1 ONE-LINE POWER DIAGRAM - DEMOLITION
NO SCALE

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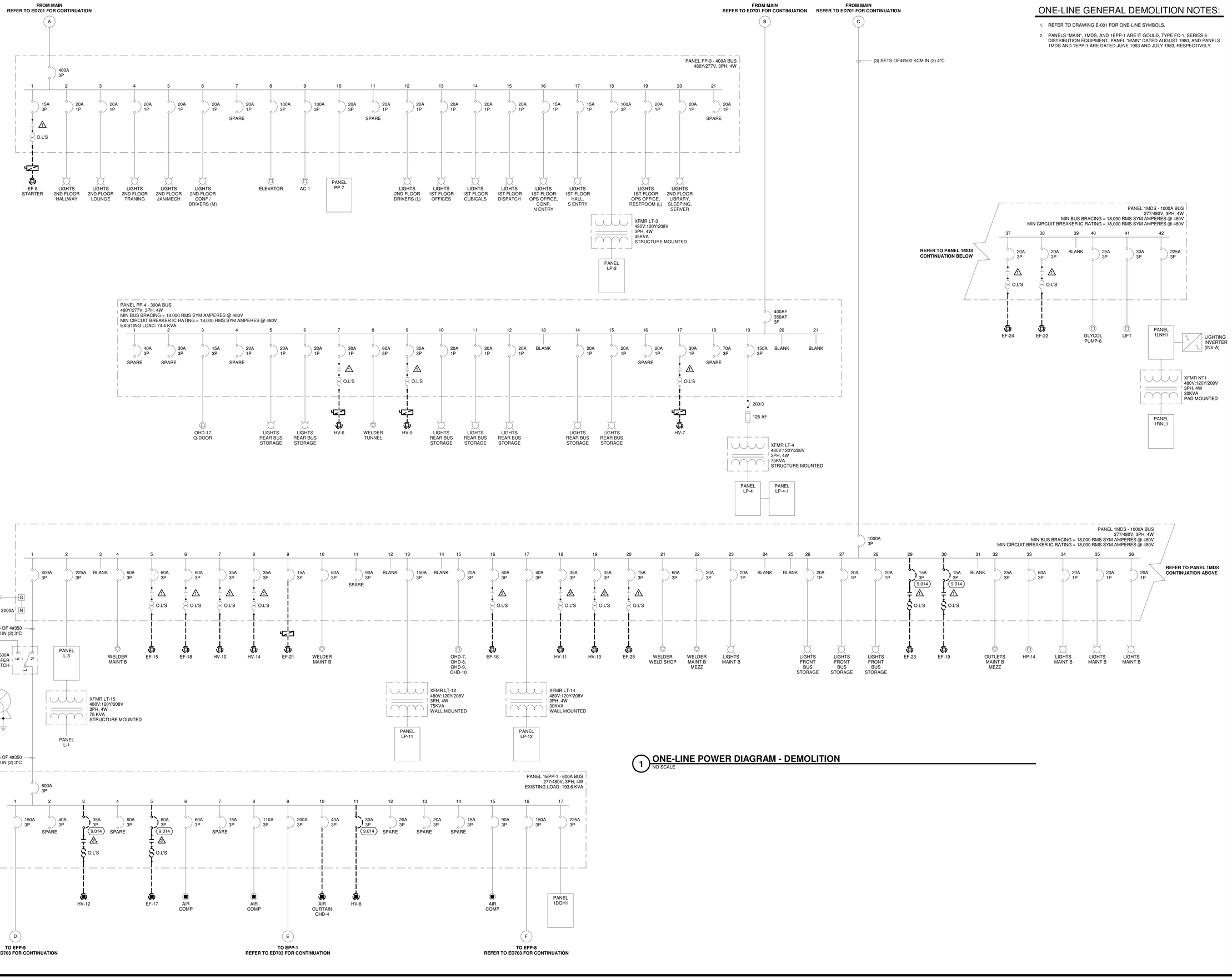
SHEET CONTENTS
ONE-LINE DEMOLITION DIAGRAM

SHEET NO.:
ED701



ONE-LINE GENERAL DEMOLITION NOTES:

1. REFER TO DRAWING E-001 FOR ONE-LINE SYMBOLS.
2. PANELS "MAIN", 1MDS, AND 1EPP-1 ARE IT GOULD, TYPE FC-1, SERIES 6 DISTRIBUTION EQUIPMENT. PANEL "MAIN" DATED AUGUST 1980, AND PANELS 1MDS AND 1EPP-1 ARE DATED JUNE 1983 AND JULY 1983, RESPECTIVELY.

1 ONE-LINE POWER DIAGRAM - DEMOLITION
NO SCALE

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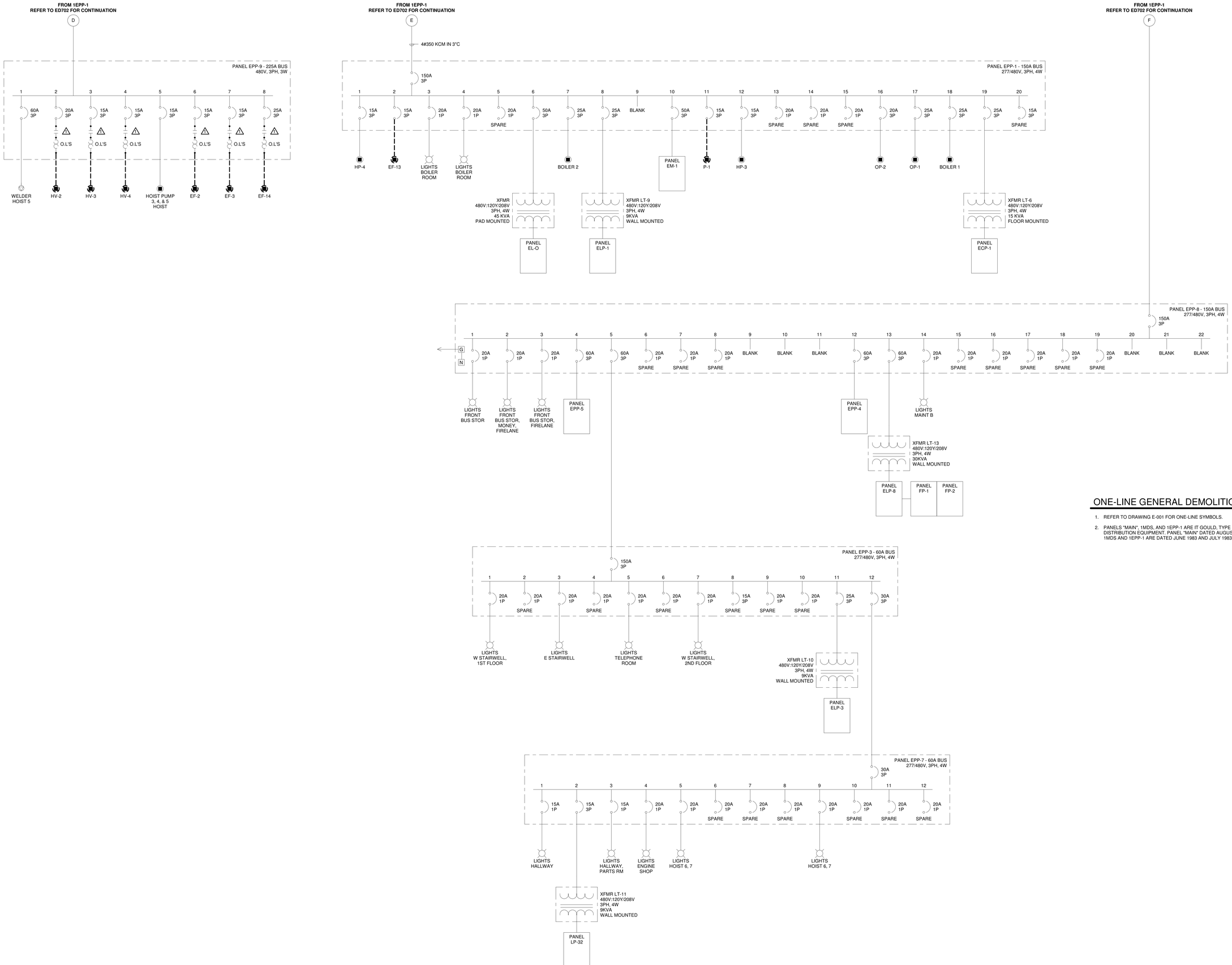
SHEET CONTENTS
ONE-LINE DEMOLITION DIAGRAM

SHEET NO.:
ED702



1 **ONE-LINE POWER DIAGRAM - DEMOLITION**
NO SCALE

ONE-LINE GENERAL DEMOLITION NOTES:

1. REFER TO DRAWING E-001 FOR ONE-LINE SYMBOLS.
2. PANELS "MAIN", 1MDS, AND 1EPP-1 ARE IT GOULD, TYPE FC-1, SERIES 6 DISTRIBUTION EQUIPMENT. PANEL "MAIN" DATED AUGUST 1980, AND PANELS 1MDS AND 1EPP-1 ARE DATED JUNE 1983 AND JULY 1983, RESPECTIVELY.

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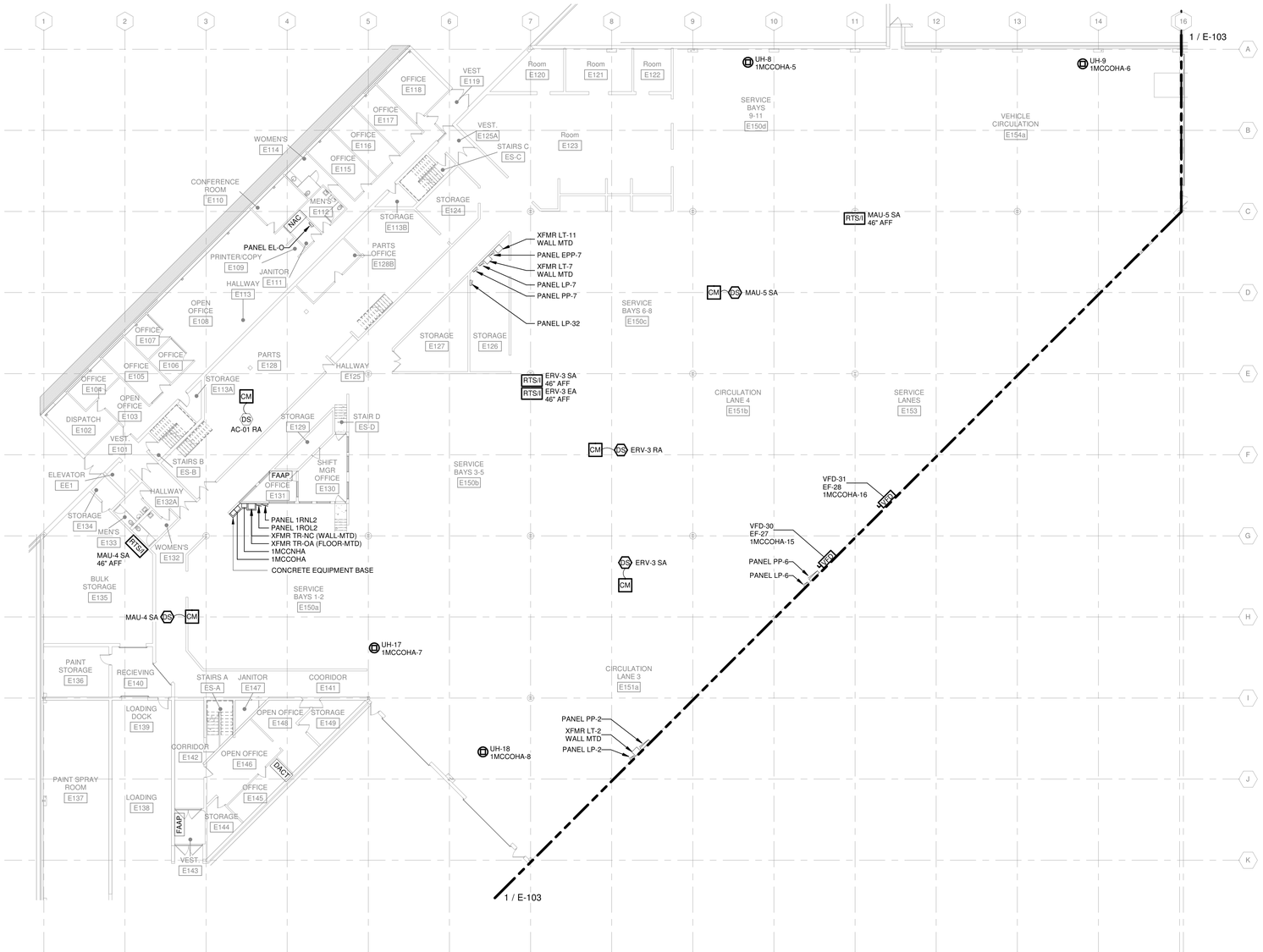
SHEET CONTENTS
ONE-LINE DEMOLITION DIAGRAM

SHEET NO.:
ED703



TRUE NORTH PLAN NORTH

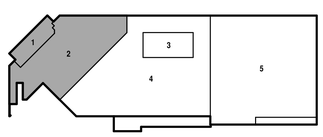
1 FIRST FLOOR POWER & FIRE ALARM PLAN - ZONES 1 & 2

1/16" = 1'-0"

POWER GENERAL NOTES:

1. REFER TO MECHANICAL DRAWINGS AND COORDINATE WITH MC EXACT LOCATION OF DUCT SMOKE DETECTOR LOCATIONS.
2. ALL MAU'S AND ERV'S SHALL SHUT DOWN ONLY UPON ACTUATION OF THE DUCT SMOKE DETECTOR ASSOCIATED WITH THAT PARTICULAR UNIT, EXCEPT MAU-4 AND MAU-5 SHALL SHUT DOWN ON ANY ALARM AND REMAIN SHUT DOWN UNTIL A VALID SYSTEM RESET OCCURS.

KEYED NOTES



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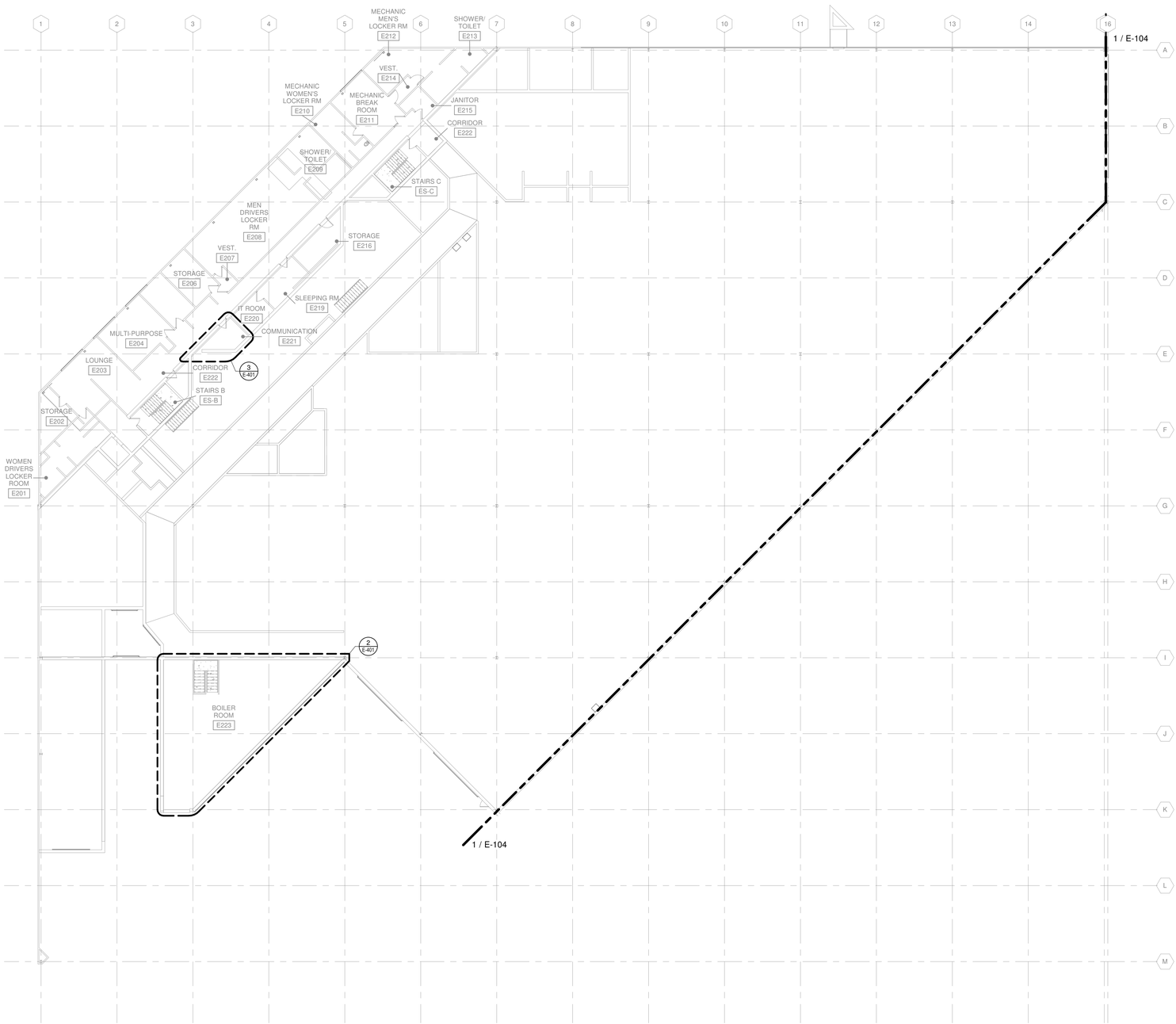
SHEET CONTENTS
FIRST FLOOR POWER & FIRE ALARM PLAN - ZONES 1 & 2

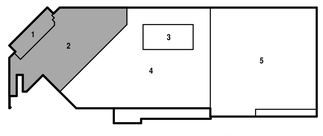
SHEET NO.:
E-101



TRUE NORTH PLAN NORTH

1 SECOND FLOOR POWER & FIRE ALARM PLAN - ZONES 1 & 2

1/16" = 1'-0"



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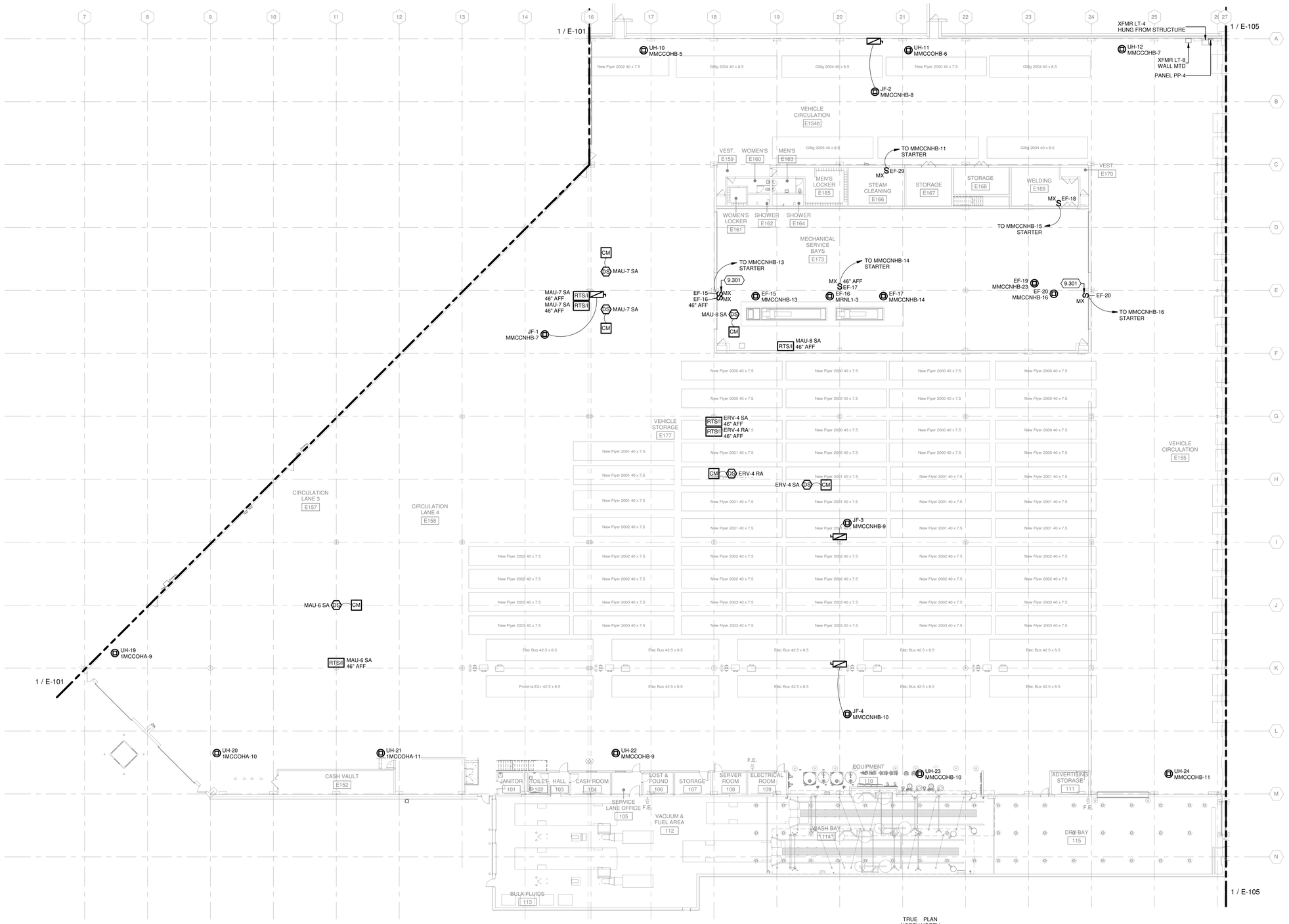
SHEET CONTENTS
SECOND FLOOR POWER PLAN - ZONES 1 & 2

SHEET NO.:

E-102



TRUE NORTH PLAN NORTH

FIRST FLOOR POWER & FIRE ALARM PLAN - zones 3 & 4

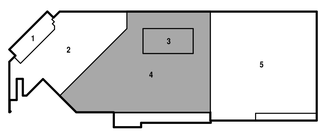
1/16" = 1'-0"

POWER GENERAL NOTES:

1. REFER TO MECHANICAL DRAWINGS AND COORDINATE WITH MC EXACT LOCATION OF DUCT SMOKE DETECTOR LOCATIONS.
2. ALL MAU'S AND ERV'S SHALL SHUT DOWN ONLY UPON ACTUATION OF THE DUCT SMOKE DETECTOR ASSOCIATED WITH THAT PARTICULAR UNIT, EXCEPT MAU-4 AND MAU-5 SHALL SHUT DOWN ON ANY ALARM AND REMAIN SHUT DOWN UNTIL A VALID SYSTEM RESET OCCURS.

KEYED NOTES

9.301 MOUNT NEW DEVICE IN EXISTING BACKBOX AND UTILIZE EXISTING CONDUIT FOR NEW WIRING.



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SHEET CONTENTS
FIRST FLOOR POWER & FIRE ALARM PLAN - ZONES 3 & 4

SHEET NO.:
E-103

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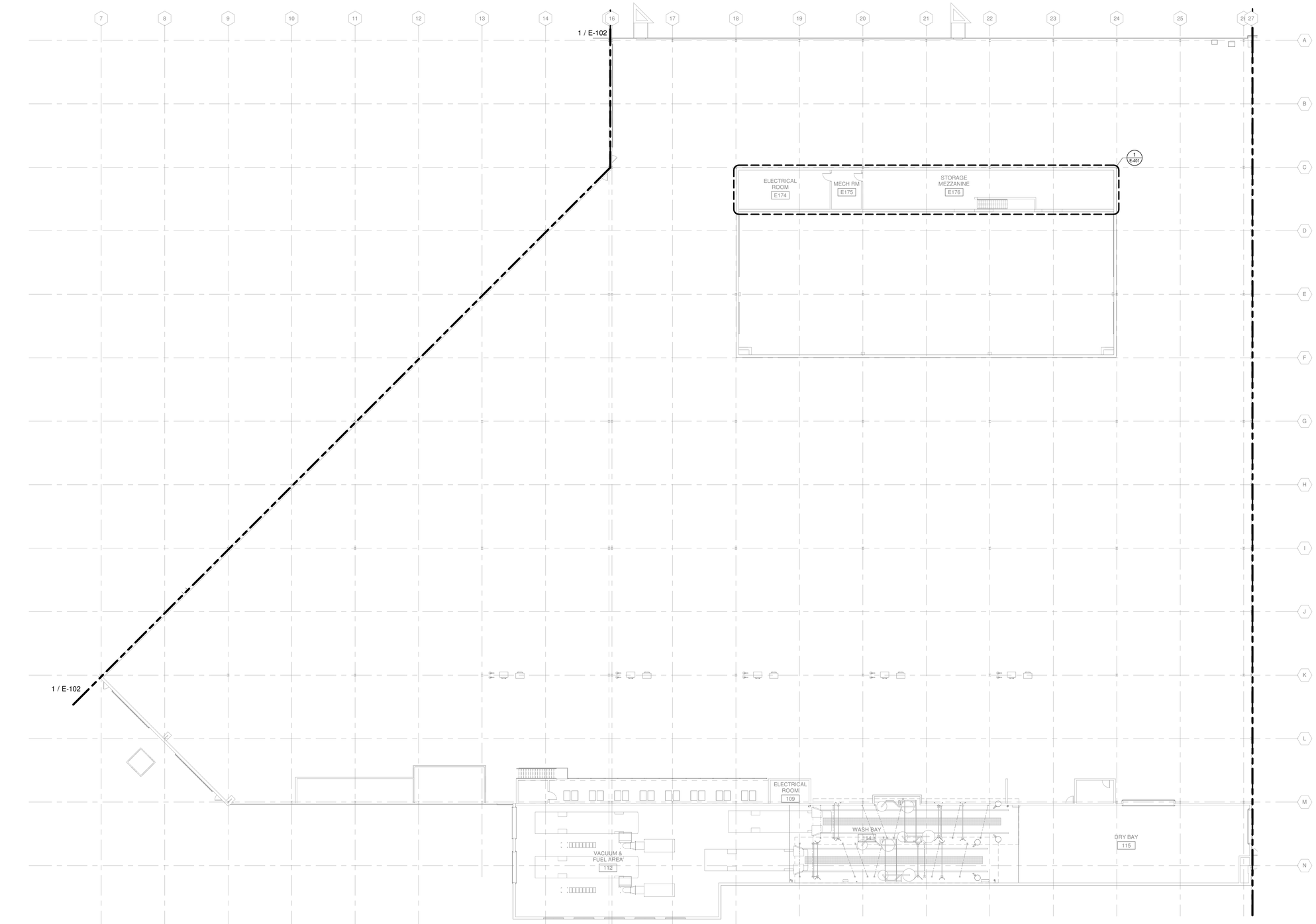


TRUE NORTH PLAN NORTH

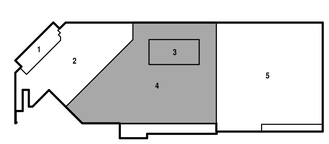
1 SECOND FLOOR POWER & FIRE ALARM PLAN - ZONES 3 & 4

1/16" = 1'-0"

POWER GENERAL NOTES:

1. REFER TO MECHANICAL DRAWINGS AND COORDINATE WITH MC EXACT LOCATION OF DUCT SMOKE DETECTOR LOCATIONS.
2. ALL MAU'S AND ERV'S SHALL SHUT DOWN ONLY UPON ACTUATION OF THE DUCT SMOKE DETECTOR ASSOCIATED WITH THAT PARTICULAR UNIT, EXCEPT MAU-4 AND MAU-5 SHALL SHUT DOWN ON ANY ALARM AND REMAIN SHUT DOWN UNTIL A VALID SYSTEM RESET OCCURS.

KEYED NOTES



KEY PLAN

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

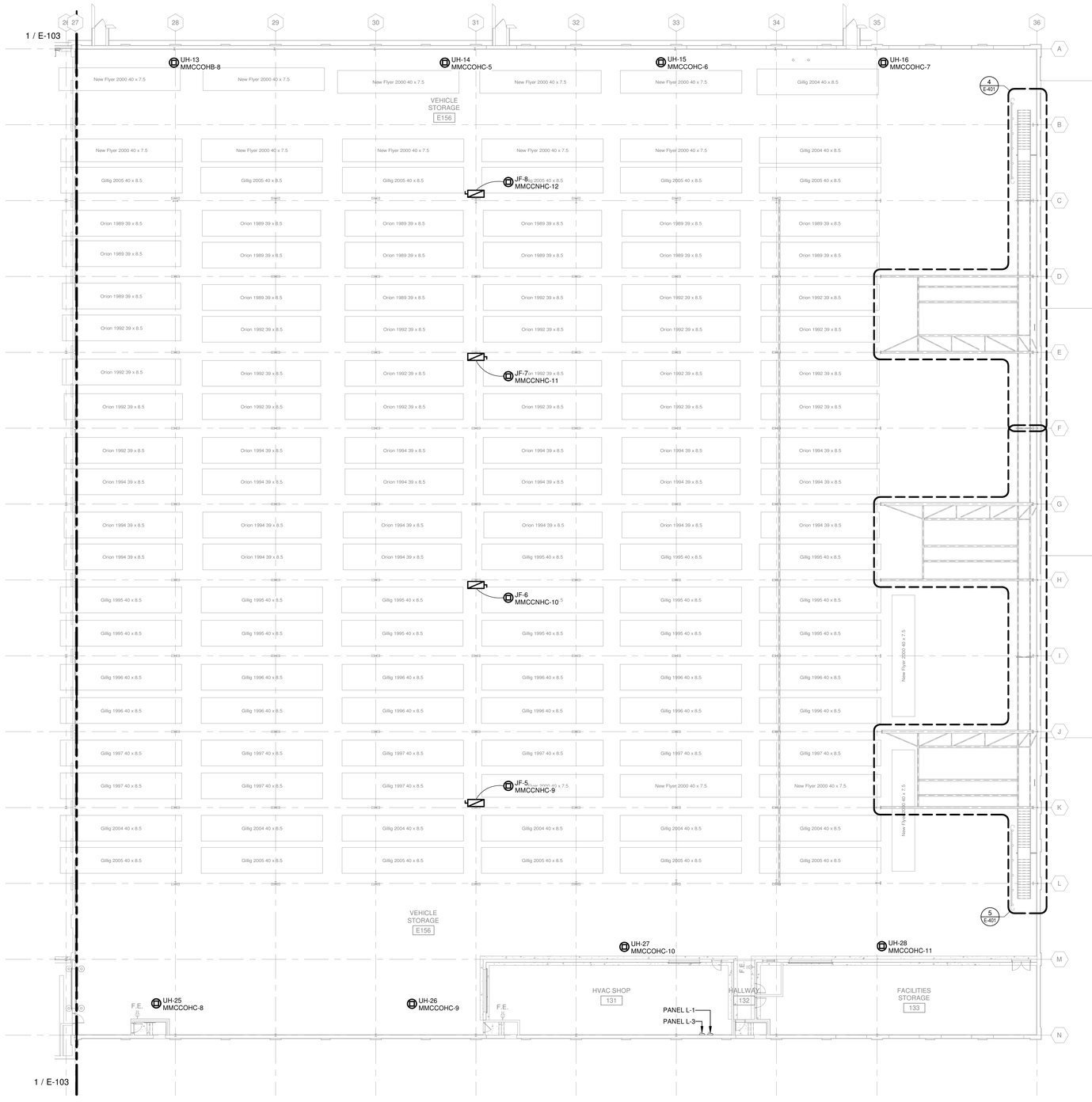
ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: MAM
DRAWN BY: KAS
CHECKED BY: SDL
DO NOT SCALE DRAWINGS

SHEET CONTENTS
SECOND FLOOR POWER PLAN - ZONES 3 & 4

SHEET NO.:
E-104

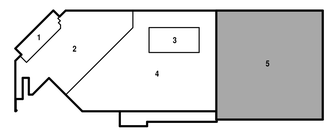
10/30/2019 2:15:53 PM C:\Revit Local\4503500-170148.07-E-Anno-Central-2018_Kyle.Schommer.rvt



TRUE NORTH PLAN NORTH

1 FIRST FLOOR POWER & FIRE ALARM PLAN - ZONE 5

1/16" = 1'-0"



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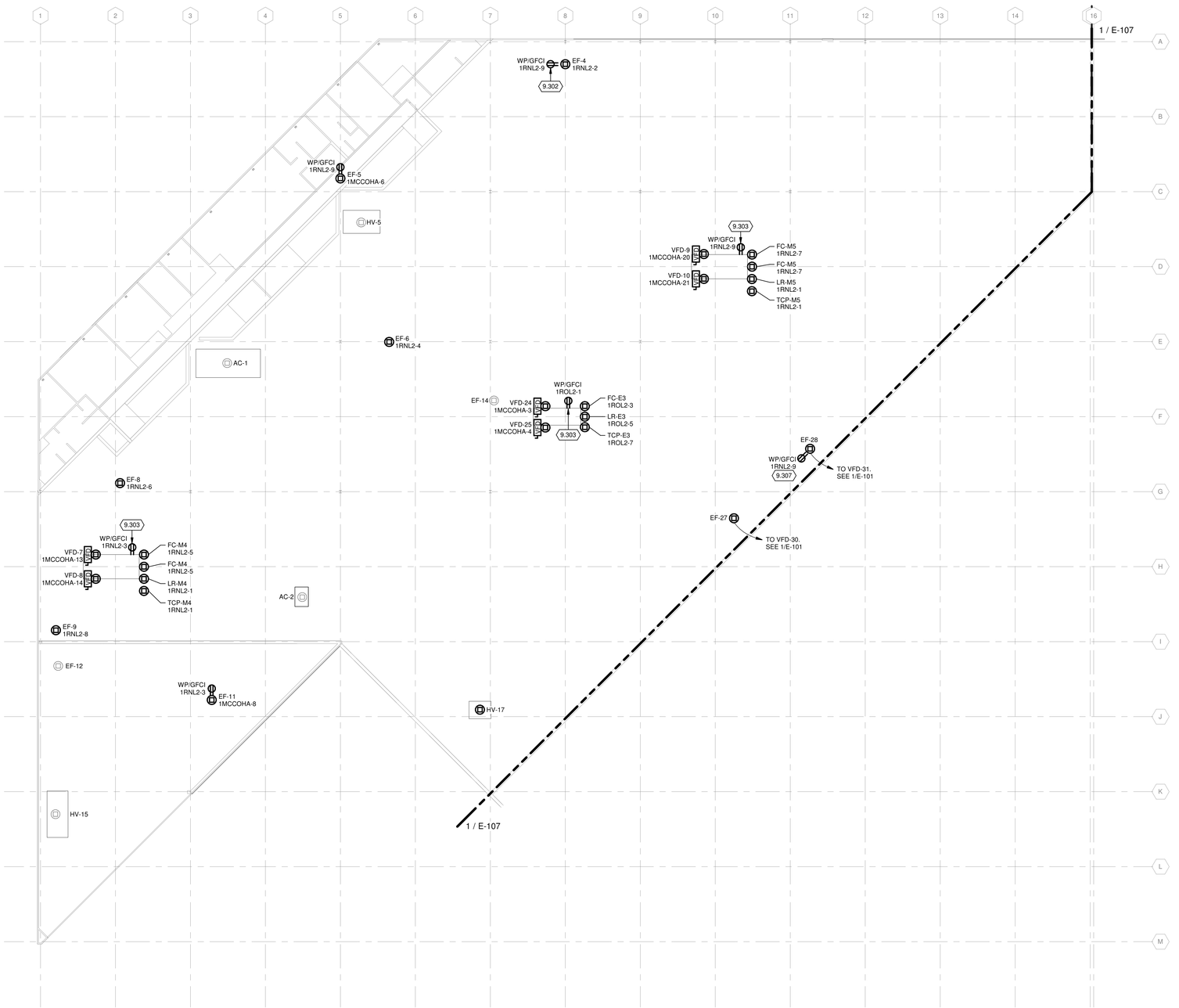
SHEET CONTENTS
FIRST FLOOR POWER & FIRE ALARM PLAN - ZONE 5

SHEET NO.:
E-105



TRUE NORTH PLAN NORTH

1 ROOF POWER PLAN - ZONES 1 & 2

1/16" = 1'-0"

POWER GENERAL NOTES:

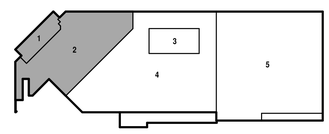
1. REFER TO MECHANICAL DRAWINGS AND COORDINATE WITH MC EXACT LOCATION OF DUCT SMOKE DETECTOR LOCATIONS.
2. ALL MAU'S AND ERV'S SHALL SHUT DOWN ONLY UPON ACTUATION OF THE DUCT SMOKE DETECTOR ASSOCIATED WITH THAT PARTICULAR UNIT, EXCEPT MAU-4 AND MAU-5 SHALL SHUT DOWN ON ANY ALARM AND REMAIN SHUT DOWN UNTIL A VALID SYSTEM RESET OCCURS.

KEYED NOTES

9.302 MOUNT RECEPTACLE HORIZONTALLY ON EXHAUST FAN ROOF CURB JUST BELOW FAN CAP TO CURB TERMINATION.

9.303 MOUNT RECEPTACLE ON UNIT HOUSING.

9.307 PROVIDE RECEPTACLE MOUNTED 30" ABOVE ROOF.



KEY PLAN

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METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
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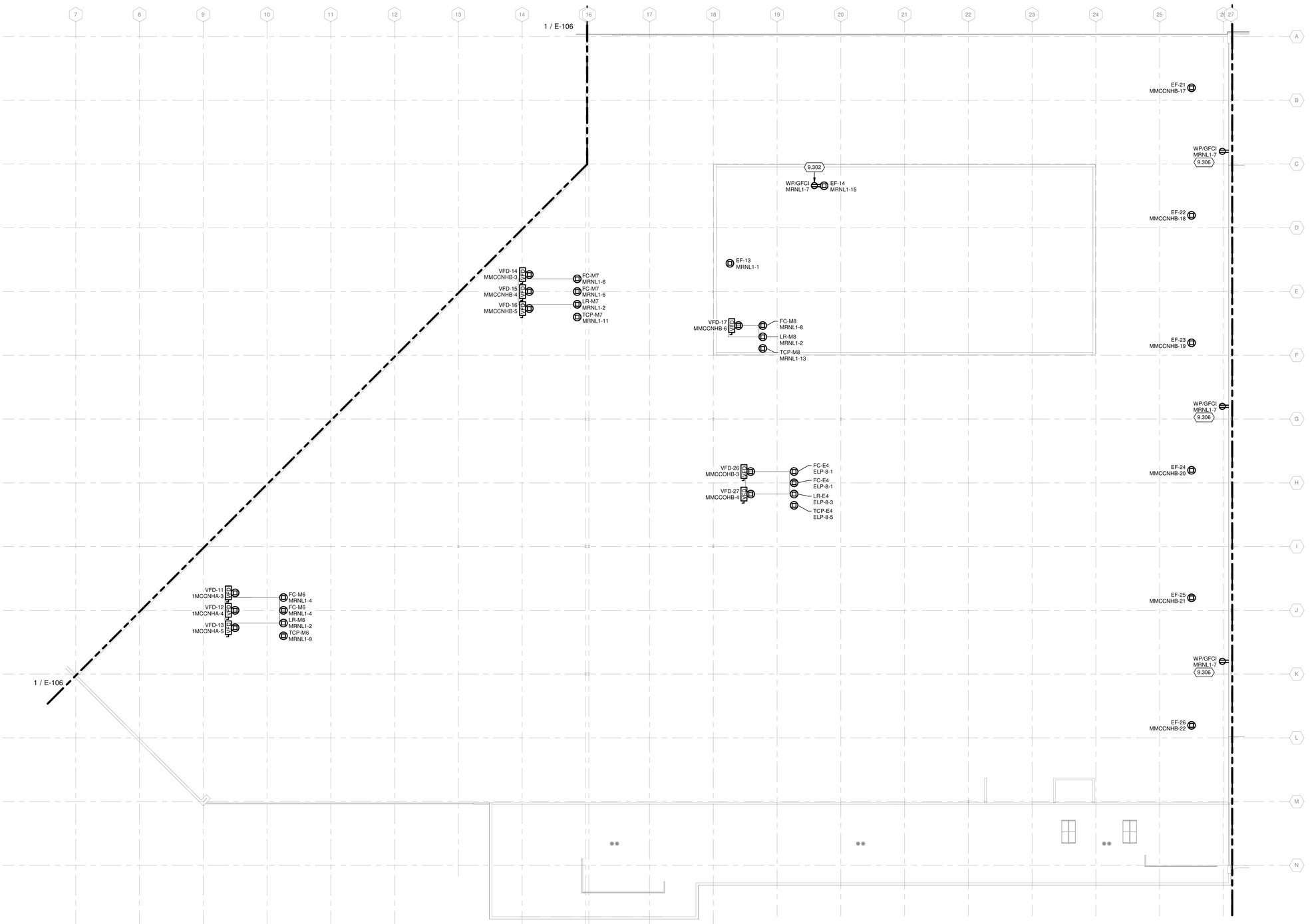
SHEET CONTENTS
ROOF POWER PLAN - ZONES 1 & 2

SHEET NO.:
E-106



TRUE NORTH PLAN NORTH

1 ROOF POWER PLAN - ZONES 3 & 4

1/16" = 1'-0"

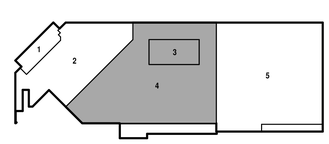
POWER GENERAL NOTES:

1. REFER TO MECHANICAL DRAWINGS AND COORDINATE WITH MC EXACT LOCATION OF DUCT SMOKE DETECTOR LOCATIONS.
2. ALL MAU'S AND ERV'S SHALL SHUT DOWN ONLY UPON ACTUATION OF THE DUCT SMOKE DETECTOR ASSOCIATED WITH THAT PARTICULAR UNIT, EXCEPT MAU-4 AND MAU-5 SHALL SHUT DOWN ON ANY ALARM AND REMAIN SHUT DOWN UNTIL A VALID SYSTEM RESET OCCURS.
3. REFER TO 1/E-401 FOR LOCATION OF PANEL ELP-8.

KEYED NOTES

9.302 MOUNT RECEPTACLE HORIZONTALLY ON EXHAUST FAN ROOF CURB JUST BELOW FAN CAP TO CURB TERMINATION.

9.306 MOUNT RECEPTACLES HORIZONTALLY ON ROOF PARAPET WALL AT 30" ABOVE ROOF.



KEY PLAN

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CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

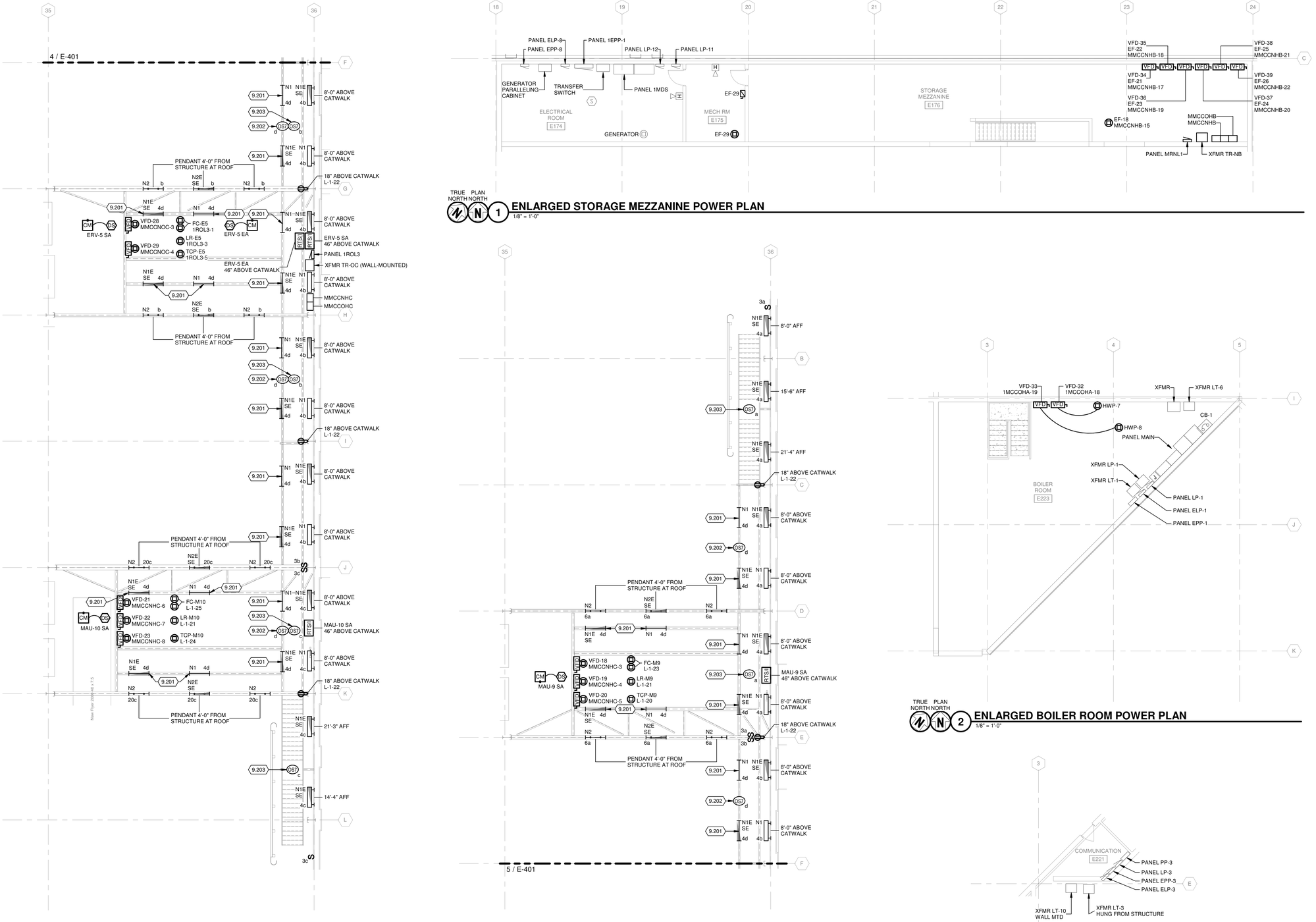
ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: MAM
DRAWN BY: KAS
CHECKED BY: SDL
DO NOT SCALE DRAWINGS

SHEET CONTENTS
ROOF POWER PLAN - ZONES 3 & 4

SHEET NO.:
E-107

10/30/2019 2:15:59 PM C:\Revit Local\4503500-170148.07-E-Anno-Central-2018_Kyle.Schommer.rvt



TRUE NORTH PLAN NORTH 1 **ENLARGED STORAGE MEZZANINE POWER PLAN**
1/8" = 1'-0"

TRUE NORTH PLAN NORTH 2 **ENLARGED BOILER ROOM POWER PLAN**
1/8" = 1'-0"

TRUE NORTH PLAN NORTH 3 **ENLARGED POWER PLAN (ADMIN)**
1/8" = 1'-0"

TRUE NORTH PLAN NORTH 4 **ENLARGED ZONE 5 MEZZANINE ELECTRICAL PLAN - NORTH**
1/8" = 1'-0"

TRUE NORTH PLAN NORTH 5 **ENLARGED ZONE 5 MEZZANINE ELECTRICAL PLAN - SOUTH**
1/8" = 1'-0"

ELECTRICAL GENERAL NOTES:

1. ALL LIGHTS SHOWN ON THIS SHEET SHALL BE CIRCUITED TO PANEL L-3
2. REFER TO MECHANICAL DRAWINGS AND COORDINATE WITH MC EXACT LOCATION OF DUCT SMOKE DETECTOR LOCATIONS.
3. ALL MAU'S AND ERV'S SHALL SHUT DOWN ONLY UPON ACTUATION OF THE DUCT SMOKE DETECTOR ASSOCIATED WITH THAT PARTICULAR UNIT, EXCEPT MAU-4 AND MAU-5 SHALL SHUT DOWN ON ANY ALARM AND REMAIN SHUT DOWN UNTIL A VALID SYSTEM RESET OCCURS.

KEYED NOTES

9.201 MOUNT LIGHT FIXTURES TO UNDERSIDE OF STRUCTURAL STEEL OF CATWALK.

9.202 MOUNT OCCUPANCY SENSOR TO UNDERSIDE OF STRUCTURAL STEEL OF CATWALK.

9.203 PENDANT-MOUNT OCCUPANCY SENSOR 18'-0" ABOVE CATWALK.

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meadhunt.com

metro transit

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4502500-170148.07
DATE: November 7, 2019
DESIGNED BY: MAM
DRAWN BY: KAS
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SHEET CONTENTS
ENLARGED PLANS, ELEVATIONS & SECTIONS

SHEET NO.:
E-401

EQUIPMENT SCHEDULE GENERAL NOTES:

1. ALL WORK BY THIS CONTRACTOR TO COMPLY WITH ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES.
2. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO AVOID CONFLICTS AND TO VERIFY ALL EQUIPMENT CONNECTIONS AND FOR COMPLETE INSTALLATION.
3. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM PER CONTRACT DRAWINGS AND ENSURING THAT THE SYSTEM IS OPERATIONAL UPON JOB COMPLETION.
4. PROVIDE ALL POWER WIRING INCLUDING ALL CIRCUITRY CARRYING ELECTRICAL ENERGY FROM PANELBOARD OR OTHER SOURCE THROUGH STARTERS AND DISCONNECTS TO MOTORS, PACKAGED EQUIPMENT OR PACKAGED CONTROL PANELS. PROVIDE ALL WIRING BETWEEN CONTROL PANELS AND MOTORS. INCLUDE STARTERS, DISCONNECTS AND OVERLOAD PROTECTION IF NOT IN INCLUDED HVAC SPECIFICATIONS. COORDINATE WITH HVAC SPECIFICATIONS.
5. MOTORS CONNECTED TO EMERGENCY SYSTEMS CIRCUITRY SHALL HAVE CIRCUITRY INSTALLED IN SEPARATE RACEWAY PER NEC ARTICLE 700.
6. THIS CONTRACTOR SHALL VERIFY WITH MECHANICAL CONTRACTOR, ELECTRICAL REQUIREMENTS INCLUDING VOLTAGES, HORSE POWER, DISCONNECTING MEANS, STARTERS FOR MOTORS AND EQUIPMENT PRIOR TO ORDERING CIRCUIT BREAKERS, FUSIBLE SWITCHES AND STARTERS.
7. ALL INTERLOCKING REQUIRED BY THE DRIVE MANUFACTURER BETWEEN THE VARIABLE FREQUENCY DRIVE AND THE DISCONNECT SWITCHES SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

EQUIPMENT SCHEDULE KEYED NOTES:

1. VFD'S FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED BY EC INSIDE UNIT'S CONTROL CABINET. WIRE VFD TO EACH RESPECTIVE FAN MOTOR DISCONNECT(S) PROVIDED BY MANUFACTURER INSIDE UNIT'S CONTROL CABINET. REFER TO SCHEDULE FOR MOTOR QUANTITIES SERVED BY VFD.
2. REFER TO ONE-LINE DIAGRAMS FOR EACH RESPECTIVE MOTOR CONTROL CENTER FOR STARTER NEMA SIZE.
3. DISCONNECT MOUNTED ON UNIT HOUSING.
4. SINGLE POINT CONNECTION TO MANUFACTURER PROVIDED JUNCTION BOX LOCATED IN EQUIPMENT CONTROL CABINET.

ELECTRICAL EQUIPMENT WIRING SCHEDULE

STARTER/DISCONNECT TYPE:

MX - MANUAL MOTOR SWITCH	2SP - 2 SPEED, 2 WINDING
MS - MANUAL MOTOR STARTER (W/OVERLOAD RELAYS)	SW - 2 SPEED, 1 WINDING
YD - WYE- DELTA	CS - COMBINATION MAGNETIC CONTROLLER
FV - FULL VOLTAGE	FS - FUSED SWITCH
SS - REDUCED VOLTAGE, SOLID STATE	VFD - VARIABLE FREQUENCY DRIVE
RE - REVERSING	RVS - REDUCED VOLTAGE (MAGNETIC)

ABBREVIATIONS:

MFR - MANUFACTURER	MCC - MOTOR CONTROL CENTER
F- FUSED	ECB - ENCLOSED CIRCUIT BREAKER
NF - NON-FUSED	
EC - ELECTRICAL CONTRACTOR	
MC - MECHANICAL CONTRACTOR	
PC - PLUMBING CONTRACTOR	

EQUIPMENT	EQUIPMENT DESCRIPTION	LOCATION	LOAD					EQUIPMENT		BRANCH WIRING				STARTER			DISCONNECT TYPE AND RATING				KEYED NOTE
			KW	HP	FLA (AMPS)	MCA (AMPS)	MOCP (AMPS)	VOLTS	PHASE	NO.	SIZE	GND.	C	TYPE	NEMA SIZE	FURNISHED/ INSTALLED BY	TYPE	SIZE / FUSE	NEMA ENCLOSURE	FURNISHED/ INSTALLED BY	
EF-4	EXHAUST FAN	ROOF		1/2	9.8	12.3	20	120	1	2	6	6	3/4"	-	-	-	-	-	-	MFR	
EF-5	EXHAUST FAN	ROOF		1 1/2	3	3.8	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
EF-6	EXHAUST FAN	ROOF		1/12	2.4	3.0	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	MFR	
EF-8	EXHAUST FAN	ROOF		1/6	4.4	5.5	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	MFR	
EF-9	EXHAUST FAN	ROOF		3/4	13.8	17.3	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	MFR	
EF-10	EXHAUST FAN	ROOF		10	4.4	5.5	25	480	3	3	12	10	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
EF-11	EXHAUST FAN	ROOF		2	3.4	4.3	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
EF-13	EXHAUST FAN	ROOF		1/2	9.8	12.3	20	120	1	2	8	8	1/2"	-	-	-	-	-	-	MFR	
EF-14	EXHAUST FAN	ROOF		1/2	9.8	12.3	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	MFR	
EF-15	EXHAUST FAN	E173		1 1/2	3	3.8	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	-	2
EF-16	EXHAUST FAN	E173		1/2	9.8	12.3	20	120	1	2	8	8	1/2"	-	-	-	MX	-	1	EC	
EF-17	EXHAUST FAN	E173		1 1/2	3.4	4.3	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	-	2
EF-18	EXHAUST FAN	E176		3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	-	2
EF-19	EXHAUST FAN	E173		3	4.8	6.0	20	480	3	2	12	12	1/2"	FV	-	MC/EC	-	-	-	-	2
EF-20	EXHAUST FAN	E173		1 1/2	3	3.8	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	-	2
EF-21	EXHAUST FAN	ROOF		10	14	17.5	25	480	3	3	12	10	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
EF-22	EXHAUST FAN	ROOF		10	14	17.5	25	480	3	3	12	10	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
EF-23	EXHAUST FAN	ROOF		10	14	17.5	25	480	3	3	12	10	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
EF-24	EXHAUST FAN	ROOF		10	14	17.5	25	480	3	3	12	10	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
EF-25	EXHAUST FAN	ROOF		10	14	17.5	25	480	3	3	12	10	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
EF-26	EXHAUST FAN	ROOF		10	14	17.5	25	480	3	3	12	10	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
EF-27	EXHAUST FAN	ROOF		10	14	17.5	25	480	3	3	12	10	1/2"	FV	-	MCC MFR	-	-	-	MFR	
EF-28	EXHAUST FAN	ROOF		10	14	17.5	25	480	3	3	12	10	1/2"	FV	-	MCC MFR	-	-	-	MFR	
EF-29	EXHAUST FAN	E175		2	3.4	4.3	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	F	4.5	1	EC	2
FC-E3	ERV-3 FURNACE	ROOF		-	12	15.0	20	120	1	2	8	8	1/2"	-	-	-	MX	20A	1	EC	4
FC-E4	ERV-4 FURNACE	ROOF		-	12	15.0	20	120	1	2	8	8	1/2"	-	-	-	MX	20A	1	EC	4
FC-E5	ERV-5 FURNACE	ZONE 5		-	12	15.0	20	120	1	2	12	12	1/2"	-	-	-	MX	20A	1	EC	4
FC-M4	MAU-4 FURNACE	ROOF		-	(2) 5	12.5	20	120	1	2	10	10	1/2"	-	-	-	MX	20A	1	EC	4
FC-M5	MAU-5 FURNACE	ROOF		-	(2) 5	12.5	20	120	1	2	6	6	3/4"	-	-	-	MX	20A	1	EC	4
FC-M6	MAU-6 FURNACE	ROOF		-	(2) 5	12.5	20	120	1	2	8	8	1/2"	-	-	-	MX	20A	1	EC	4
FC-M7	MAU-7 FURNACE	ROOF		-	(2) 5	12.5	20	120	1	2	6	6	3/4"	-	-	-	MX	20A	1	EC	4
FC-M8	MAU-8 FURNACE	ROOF		-	5	6.3	20	120	1	2	10	10	1/2"	-	-	-	MX	20A	1	EC	4
FC-M9	MAU-9 FURNACE	ZONE 5		-	(2) 5	12.5	20	120	1	2	6	6	3/4"	-	-	-	MX	20A	1	EC	4
FC-M10	MAU-10 FURNACE	ZONE 5		-	(2) 5	12.5	20	120	1	2	8	8	1/2"	-	-	-	MX	20A	1	EC	4
HWP-7	HOT WATER PUMP	E223		7.5	11	13.8	20	480	3	3	12	12	1/2"	VFD	-	MC/EC	-	-	-	-	2
HWP-8	HOT WATER PUMP	E223		7.5	11	13.8	20	480	3	3	12	12	1/2"	VFD	-	MC/EC	-	-	-	-	2
JF-1	JET FAN	ZONE 4		1.5	3	3.8	20	480	3	3	12	12	1/2"	FV	-	-	F	30/4A	NEMA 1	EC	2,3
JF-2	JET FAN	ZONE 4		1.5	3	3.8	20	480	3	3	12	12	1/2"	FV	-	-	F	30/4A	NEMA 1	EC	2,3
JF-3	JET FAN	ZONE 4		1.5	3	3.8	20	480	3	3	12	12	1/2"	FV	-	-	F	30/4A	NEMA 1	EC	2,3
JF-4	JET FAN	ZONE 4		1.5	3	3.8	20	480	3	3	12	12	1/2"	FV	-	-	F	30/4A	NEMA 1	EC	2,3
JF-5	JET FAN	ZONE 5		1.5	3	3.8	20	480	3	3	12	12	1/2"	FV	-	-	F	30/4A	NEMA 1	EC	2,3
JF-6	JET FAN	ZONE 5		1.5	3	3.8	20	480	3	3	12	12	1/2"	FV	-	-	F	30/4A	NEMA 1	EC	2,3
JF-7	JET FAN	ZONE 5		1.5	3	3.8	20	480	3	3	12	12	1/2"	FV	-	-	F	30/4A	NEMA 1	EC	2,3
JF-8	JET FAN	ZONE 5		1.5	3	3.8	20	480	3	3	12	12	1/2"	FV	-	-	F	30/4A	NEMA 1	EC	2,3
LR-E3	ERV-3 LIGHTS/RECEPTS	ROOF		-	3	3.8	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	4
LR-E4	ERV-4 LIGHTS/RECEPTS	ROOF		-	3	3.8	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	4
LR-E5	ERV-5 LIGHTS/RECEPTS	ZONE 5		-	3	3.8	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	4
LR-M4	MAU-4 LIGHTS/RECEPTS	ROOF		-	3	3.8	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	4
LR-M5	MAU-5 LIGHTS/RECEPTS	ROOF		-	3	3.8	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	4
LR-M6	MAU-6 LIGHTS/RECEPTS	ROOF		-	3	3.8	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	4
LR-M7	MAU-7 LIGHTS/RECEPTS	ROOF		-	3	3.8	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	4
LR-M8	MAU-8 LIGHTS/RECEPTS	ROOF		-	3	3.8	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	4
LR-M9	MAU-9 LIGHTS/RECEPTS	ZONE 5		-	3	3.8	20	120	1	2	10	10	1/2"	-	-	-	-	-	-	-	4
LR-M10	MAU-10 LIGHTS/RECEPTS	ZONE 5		-	3	3.8	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	4
TCP-E3	ERV-3 TCP	ROOF		-	4	5.0	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	
TCP-E4	ERV-4 TCP	ROOF		-	4	5.0	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	
TCP-E5	ERV-5 TCP	ZONE 5		-	4	5.0	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	
TCP-M4	MAU-4 TCP	ROOF		-	4	5.0	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	
TCP-M5	MAU-5 TCP	ROOF		-	4	5.0	20	120	1	2	10	10	1/2"	-	-	-	-	-	-	-	
TCP-M6	MAU-6 TCP	ROOF		-	4	5.0	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	
TCP-M7	MAU-7 TCP	ROOF		-	4	5.0	20	120	1	2	10	10	1/2"	-	-	-	-	-	-	-	
TCP-M8	MAU-8 TCP	ROOF		-	4	5.0	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	
TCP-M9	MAU-9 TCP	ZONE 5		-	4	5.0	20	120	1	2	10	10	1/2"	-	-	-	-	-	-	-	
TCP-M10	MAU-10 TCP	ZONE 5		-	4	5.0	20	120	1	2	12	12	1/2"	-	-	-	-	-	-	-	
UH-8	UNIT HEATER	ZONE 3	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-9	UNIT HEATER	ZONE 3	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-10	UNIT HEATER	ZONE 4	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-11	UNIT HEATER	ZONE 4	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-12	UNIT HEATER	ZONE 4	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-13	UNIT HEATER	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-14	UNIT HEATER	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-15	UNIT HEATER	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-16	UNIT HEATER	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-17	UNIT HEATER	ZONE 3	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-18	UNIT HEATER	ZONE 3	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-19	UNIT HEATER	ZONE 4	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-20	UNIT HEATER	ZONE 4	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-21	UNIT HEATER	ZONE 4	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-22	UNIT HEATER	ZONE 4	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-23	UNIT HEATER	ZONE 4	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-24	UNIT HEATER	ZONE 4	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-25	UNIT HEATER	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-26	UNIT HEATER	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-27	UNIT HEATER	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
UH-28	UNIT HEATER	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	FV	-	MCC MFR	-	-	-	MFR	2
VFD-7	MAU-4 SUPPLY AIR	ROOF	-	(2) 7.5	22	27.5	30	480	3	3	12	10	1/2"	VFD	-	MC/EC	-	-	-	-	1
VFD-8	MAU-4 SUPPLY AIR	ROOF	-	(2) 7.5	22	27.5	30	480	3	3	12	10	1/2"	VFD	-	MC/EC	-	-	-	-	1
VFD-9	MAU-5 SUPPLY AIR	ROOF	-	(2) 7.5	22	27.5	30	480	3	3	10	8	1/2"	VFD	-	MC/EC	-	-	-	-	1
VFD-10	MAU-5 SUPPLY AIR	ROOF	-	(2) 7.5	22	27.5	30	480	3	3	10	8	1/2"	VFD	-	MC/EC	-	-	-	-	1
VFD-11	MAU-6 SUPPLY AIR	ROOF	-	(3) 10	42	52.5	60	480	3	3	8	10	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-12	MAU-6 SUPPLY AIR	ROOF	-	(3) 10	42	52.5	60	480	3	3	8	10	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-13	MAU-6 SUPPLY AIR	ROOF	-	(3) 10	42	52.5	60	480	3	3	8	10	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-14	MAU-7 SUPPLY AIR	ROOF	-	(3) 10	42	52.5	60	480	3	3	6	8	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-15	MAU-7 SUPPLY AIR	ROOF	-	(3) 10	42	52.5	60	480	3	3	6	8	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-16	MAU-7 SUPPLY AIR	ROOF	-	(3) 10	42	52.5	60	480	3	3	6	8	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-17	MAU-8 SUPPLY AIR	ROOF	-	(1) 15	21	26.3	40	480	3	3	10	8	1/2"	VFD	-	MC/EC	-	-	-	-	1
VFD-18	MAU-9 SUPPLY AIR	ZONE 5	-	(3) 10	42	52.5	60	480	3	3	10	10	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-19	MAU-9 SUPPLY AIR	ZONE 5	-	(3) 10	42	52.5	60	480	3	3	10	10	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-20	MAU-9 SUPPLY AIR	ZONE 5	-	(3) 10	42	52.5	60	480	3	3	10	10	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-21	MAU-10 SUPPLY AIR	ZONE 5	-	(3) 10	42	52.5	60	480	3	3	10	10	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-22	MAU-10 SUPPLY AIR	ZONE 5	-	(3) 10	42	52.5	60	480	3	3	10	10	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-23	MAU-10 SUPPLY AIR	ZONE 5	-	(3) 10	42	52.5	60	480	3	3	10	10	3/4"	VFD	-	MC/EC	-	-	-	-	1
VFD-24	ERV-3 SUPPLY AIR	ROOF	-	1.5	3	3.8	20	480	3	3	12	12	1/2"	VFD	-	MC/EC	-	-	-	-	1,2
VFD-25	ERV-3 EXHAUST AIR	ROOF	-	1.5	3	3.8	20	480	3	3	12	12	1/2"	VFD	-	MC/EC	-	-	-	-	1,2
VFD-26	ERV-4 SUPPLY AIR	ROOF	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	VFD	-	MC/EC	-	-	-	-	1,2
VFD-27	ERV-4 EXHAUST AIR	ROOF	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	VFD	-	MC/EC	-	-	-	-	1,2
VFD-28	ERV-5 SUPPLY AIR	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	VFD	-	MC/EC	-	-	-	-	1,2
VFD-29	ERV-5 EXHAUST AIR	ZONE 5	-	3	4.8	6.0	20	480	3	3	12	12	1/2"	VFD	-	MC/EC	-	-	-	-	1,2

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metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: MAM
DRAWN BY: KAS
CHECKED BY: SDL
DO NOT SCALE DRAWINGS

SHEET CONTENTS
SCHEDULES

SHEET NO.:
E-601

LUMINAIRE SCHEDULE

NOTE: SEE SPECIFICATION FOR ADDITIONAL INFORMATION REGARDING LUMINAIRE AND INSTALLATION REQUIREMENTS. PROVIDE OPTIONS AND ACCESSORIES REFERENCED BY THE COLUMN TITLED " OPTIONS/ACCESSORIES". MANUFACTURERS LISTED ACCEPTABLE SHALL MEET ALL REQUIREMENTS AND FEATURES INDICATED. ACCEPTABLE MANUFACTURERS MUST MEET THE PHOTOMETRIC PERFORMANCE OF THE LISTED UNIT.

ABBREVIATIONS: GWB = GYPSUM WALL BOARD; P = PENDANT; R = RECESSED; V = VARIES
ES = EXPOSED STRUCTURE; PLAS = PLASTER; S = SURFACE; W = WALL MOUNTED
LG = LAY-IN GRID; PL = POLE MOUNTED; UNV = UNIVERSAL VOLTAGE

DES.	MANUFACTURER	CATALOG SERIES	DESCRIPTION	LAMP DATA	VOLTAGE	BALLAST/ DRIVER	MOUNT	CEILING TYPE	FIXTURE DEPTH	LED SYSTEM INPUT WATTAGE	LED DELIVERED LUMENS	OPTIONS / ACCESSORIES	ACCEPTABLE MANUFACTURERS	KEYED NOTE
N1	LITHONIA	VAP SERIES	4' ENCLOSED AND GASKETED INDUSTRIAL LED. FROSTED POLYCARBONATE HOUSING, CAPTIVE TAMPER-RESISTANT LATCHES, IP66 RATED ENCLOSURE. IMPACT RESISTANT FROSTED POLYCARBONATE LENS WITH MEDIUM DISTRIBUTION.	4000K LED	277V	D	V	V	4 1/8"	33W	4517		EATON VT4 LED SERIES	
													HE WILLIAMS EGL2 SERIES	
N1E	LITHONIA	VAP SERIES	SAME AS N1 WITH 15W EMERGENCY BATTERY PACK	4000K LED	277V	D	V	V	4 1/8"	33W	4517		EATON VT4 LED SERIES	
													HE WILLIAMS EGL2 SERIES	
N2	LITHONIA	IBHST SERIES	2' INDUSTRIAL LED HIGH BAY. GLOSS WHITE FINISH, AIRCRAFT CABLE SUSPENSION, SEMI-DIFFUSE ACRYLIC LENS WITH MEDIUM DISTRIBUTION.	4000K LED	277V	D	P	ES	4 1/8"	137W	15000		EATON VT4 LED SERIES	
													HE WILLIAMS EGL2 SERIES	
N2E	LITHONIA	IBHST SERIES	SAME AS N2 WITH 20W EMERGENCY BATTERY PACK	4000K LED	277V	D	P	ES	4 1/8"	137W	15000		EATON VT4 LED SERIES	
													HE WILLIAMS EGL2 SERIES	

BALLAST/DRIVER CODE LISTING: (SEE SPECIFICATIONS)

D — LED DIMMABLE POWER SUPPLY (0-10V, 0-10%).

GENERAL NOTES:

1. ONLY BALLAST SERIES IS INDICATED ON THIS SCHEDULE. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION. EACH FIXTURE SUBMITTAL SHALL BE PROVIDED WITH FULL BALLAST AND LAMP INFORMATION.
2. ALL FLUORESCENT LAMPS/BALLASTS WIRED TO THE DIMMING SYSTEM SHALL BE BURNED FOR A MINIMUM OF 100 HOURS PRIOR TO DIMMING SYSTEM SET UP/PROGRAMMING.
3. ALL LED REPLACEMENT LAMPS SHALL BE TESTED FOR DIMMING COMPATABILITY WITH DIMMING SYSTEM BEING SUPPLIED. CONTRACTOR SHALL PROVIDE MINIMUM OF (4) FOUR LAMPS OF EACH TYPE LISTED IN THIS SCHEDULE OR ANY SUBSTITUTE TO BE SUPPLIES TO DIMMING SYSTEMS/DEVICE MANUFACTURER FOR TESTING TO VERIFY LAMP PERFORMANCE.
4. EC SHALL VERIFY AND COORDINATE ALL LUMINAIRE TRIMS/FLANGES WITH RESPECTIVE CEILING TYPES SCHEDULED AND/OR SUBMITTED BY THE GC PRIOR TO ORDERING OF THE LUMINAIRES. SCHEDULE INDICATES TRIM TYPES BASED ON THE GENERIC CEILING INFORMATION AVAILABLE AT THE TIME BIDDING DOCUMENTS WERE ISSUED AND DOES NOT REFLECT ACTUAL THICKNESS OF GYPSUM WALL BOARD OR PLASTER CEILING OR EXACT GRID TYPE SPECIFIED BY THE ARCHITECT.

Panelboard: Panel MRNL1

Bus Ampacity	225	Volts	208Y/120	Panel Source:	MMCCNHB
Branch Brkr Space	30 Poles	Phase	3	Feed-Thru Lugs	None
Main Type	MCB	Wires	4		
MCB Amps	110	Delta/Wye	Wye	Sub-Feed Lugs	None
		Mounting	Surface		
		Enclosure	NEMA 1	Sub-Feed Brkr #1	None
		SCCR			
		SE Rated	No	Sub-Feed Brkr #2	None
		Pnl MCA	33 A		
Comments:				SPD	
				Iso Grd	

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	EF-13	1	20/1	1,176			600			20/1	2	MAU-6/7 LIGHTS/RECEPTS	
	EF-16	3	20/1		1,176			1,440		20/1	4	MAU-6 FURNACE	
	EF-19	5	20/1			1,623			1,440	20/1	6	MAU-7 FURNACE	
	(4) ROOF RECEPT	7	20/1	720			1,440			20/1	8	MAU-8 FURNACE	
	MAU-6 TCP	9	20/1		500			0			10	SPACE	
	MAU-7 TCP	11	20/1			500			0		12	SPACE	
	MAU-8 TCP	13	20/1	500			0				14	SPACE	
	EF-14	15	20/1		696			0			16	SPACE	
	SPARE	17	20/1			0			0		18	SPACE	
	SPARE	19	20/1	0			0				20	SPACE	
	SPARE	21	20/1		0			0			22	SPACE	
	SPARE	23	20/1			0			0		24	SPACE	
	SPARE	25	20/1	0			0				26	SPACE	
	SPARE	27	20/1		0			0			28	SPACE	
	SPARE	29	20/1			0			0		30	SPACE	

Key Notes:A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GRD S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING E=EXISTING

Panelboard: Panel 1RNL2

Bus Ampacity	225	Volts	208Y/120	Panel Source:	1MCCNHA
Branch Brkr Space	30 Poles	Phase	3	Feed-Thru Lugs	None
Main Type	MCB	Wires	4		
MCB Amps	110	Delta/Wye	Wye	Sub-Feed Lugs	None
		Mounting	Surface		
		Enclosure	NEMA 12	Sub-Feed Brkr #1	None
		SCCR			
		SE Rated	No	Sub-Feed Brkr #2	None
		Pnl MCA	22 A		
Comments:				SPD	
				Iso Grd	

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	MAU-4/5 LIGHTS/RECEPTS	1	20/1	600			1,176			20/1	2	EF-4	
	(4) ROOF RECEPT	3	20/1		720			288		20/1	4	EF-6	
	MAU-4 FURNACE	5	20/1			1,440			528	20/1	6	EF-8	
	MAU-5 FURNACE	7	20/1	1,440			120			20/1	8	EF-9	
	(4) ROOF RECEPT	9	20/1		720			0			10	SPACE	
	MAU-4 TCP	11	20/1			500			0		12	SPACE	
	MAU-5 TCP	13	20/1	500			0				14	SPACE	
	SPARE	15	20/1		0			0			16	SPACE	
	SPARE	17	20/1			0			0		18	SPACE	
	SPARE	19	20/1	0			0				20	SPACE	
	SPARE	21	20/1		0			0			22	SPACE	
	SPARE	23	20/1			0			0		24	SPACE	
	SPARE	25	20/1	0			0				26	SPACE	
	SPARE	27	20/1		0			0			28	SPACE	
	SPARE	29	20/1			0			0		30	SPACE	

Key Notes:A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GRD S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING E=EXISTING

Panelboard: Panel 1ROL3

Bus Ampacity	100	Volts	208Y/120	Panel Source:	MMCCOHC
Branch Brkr Space	30 Poles	Phase	3	Feed-Thru Lugs	None
Main Type	MCB	Wires	4		
MCB Amps	60	Delta/Wye	Wye	Sub-Feed Lugs	None
		Mounting	Surface		
		Enclosure	NEMA 12	Sub-Feed Brkr #1	None
		SCCR			
		SE Rated	No	Sub-Feed Brkr #2	None
		Pnl MCA	6 A		
Comments:				SPD	
				Iso Grd	

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	ERV-5 FURNACE	1	20/1	1,440			0				2	SPACE	
	ERV-5 LIGHTS/RECEPTS	3	20/1		300			0			4	SPACE	
	ERV-5 TCP	5	20/1			500			0		6	SPACE	
	SPARE	7	20/1	0			0				8	SPACE	
	SPARE	9	20/1		0			0			10	SPACE	
	SPARE	11	20/1			0			0		12	SPACE	
	SPARE	13	20/1	0			0				14	SPACE	
	SPARE	15	20/1		0			0			16	SPACE	
	SPARE	17	20/1			0			0		18	SPACE	
	SPARE	19	20/1	0			0				20	SPACE	
	SPARE	21	20/1		0			0			22	SPACE	
	SPARE	23	20/1			0			0		24	SPACE	
	SPARE	25	20/1	0			0				26	SPACE	
	SPARE	27	20/1		0			0			28	SPACE	
	SPARE	29	20/1			0			0		30	SPACE	

Key Notes:A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GRD S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING E=EXISTING

Panelboard: Panel 1ROL2

Bus Ampacity	225	Volts	208Y/120	Panel Source:	1MCCO...
Branch Brkr Space	30 Poles	Phase	3	Feed-Thru Lugs	None
Main Type	MCB	Wires	4		
MCB Amps	110	Delta/Wye	Wye	Sub-Feed Lugs	None
		Mounting	Surface		
		Enclosure	NEMA 12	Sub-Feed Brkr #1	None
		SCCR			
		SE Rated	No	Sub-Feed Brkr #2	None
		Pnl MCA	7 A		
Comments:				SPD	
				Iso Grd	

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	(1) ROOF RECEPT	1	20/1	180			0				2	SPACE	
	ERV-3 FURNACE	3	20/1		1,440			0			4	SPACE	
	ERV-3 LIGHTS/RECEPTS	5	20/1			300			0		6	SPACE	
	ERV-3 TCP	7	20/1	500			0				8	SPACE	
	SPARE	9	20/1		0			0			10	SPACE	
	SPARE	11	20/1			0			0		12	SPACE	
	SPARE	13	20/1	0			0				14	SPACE	
	SPARE	15	20/1		0			0			16	SPACE	
	SPARE	17	20/1			0			0		18	SPACE	
	SPARE	19	20/1	0			0				20	SPACE	
	SPARE	21	20/1		0			0			22	SPACE	
	SPARE	23	20/1			0			0		24	SPACE	
	SPARE	25	20/1	0			0				26	SPACE	
	SPARE	27	20/1		0			0			28	SPACE	
	SPARE	29	20/1			0			0		30	SPACE	

Key Notes:A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GRD S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING E=EXISTING

OCCUPANCY/PHOTO SENSOR SCHEDULE

SENSOR ID	VOLTAGE	PIR	US	PATTERN	COVERAGE	DESCRIPTION	MOUNTING	KEYED NOTE
OS7	12/24V	X	X	360	UP TO 28' @ 9' MH; UP TO 36' @ 15' MH	CEILING MOUNTED PROGRAMMABLE WITH ADJUSTABLE TIME DELAY, SIMILAR TO ACUITY CONTROLS SERIES CM, COVERAGE TYPE HALLWAY	CEILING	

GENERAL NOTES:

1. COLOR OF DEVICES SHALL BE COORDINATED/MATCHING COLOR OF RECEPTACLES AND SWITCHES AS IDENTIFIED IN SPECIFICATION SECTION 26 27 26.
2. PROVIDE ADEQUATE SUPPORT FOR CONTROL WIRING, REFER TO WIRING DIAGRAMS SUPPLIED WITH SELECTED DEVICES. FOLLOW MANUFACTURER INSTRUCTIONS.
3. FOR ADDITIONAL INFORMATION REFER TO SPECIFICATION SECTION 26 09 42.23.
4. ALL LOW VOLTAGE SENSORS SHALL BE PROVIDED WITH 20A RATED POWER PACKS WITH ZERO CROSS SWITCHING TECHNOLOGY AND MANUAL ON MODE.
5. PROVIDE 8' OF ADDITIONAL WIRING ABOVE ACCESSIBLE CEILING.
6. ALL POWER PACKS AND SLAVE PACKS SHALL BE INSTALLED IN APPROVED ENCLOSURES RATED FOR THE ENVIROMENTAL SPACES WHERE THEY ARE INSTALLED.
7. WHERE OCCUPANCY SENSORS CONTROLLING LIGHTS OF A DIFFERENT VOLTAGES A SEPARATE POWER/SLAVE PACK SHALL BE PROVIDED.
8. POWER PACKS ARE NOT SHOWN ON THE PLANS, IT SHALL BE CONTRACTOR/SUPPLIER RESPONSIBIILTY TO VERIFY AND COORDINATE ALL REQURIED QUANTITIES.
9. WHERE DAYLIGHT HARVESTING IS SELECTED - PROVIDE ALL REQUIRED LABOR TO SET UP DAYTIME AND NIGHT TIME TRESHOLDS PER MANUFACTURER RECOMMENDATIONS.
10. SENSOR SWITCH MANUFACTURER CAT # /SERIES ARE SHOWN IN THIS SCHEDULE AS A BASIS OF DESIGN - REFER TO SPECIFICATION SECTION 26 09 23 FOR ACCEPTABLE SUBSTITUTIONS.

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metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

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DATE: November 7, 2019
DESIGNED BY: MAM
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DO NOT SCALE DRAWINGS

SHEET CONTENTS
SCHEDULES

SHEET NO.:
E-602

ONE-LINE GENERAL NOTES:

1. REFER TO ELECTRICAL EQUIPMENT WIRING SCHEDULE FOR MOTOR BRANCH CIRCUIT CONDUCTOR SIZE AND CONDUIT SIZE UNLESS OTHERWISE NOTED ON ONE-LINE DIAGRAMS
2. REFER TO DRAWING E-601 FOR ELECTRICAL EQUIPMENT WIRING SCHEDULE.

KEYED NOTES

9.304 PROVIDE NEW BREAKER IN SPACE MADE AVAILABLE DURING DEMOLITION. PROVIDE ALL REQUIRED MOUNTING HARDWARE, MOUNTING PLATES, ETC.

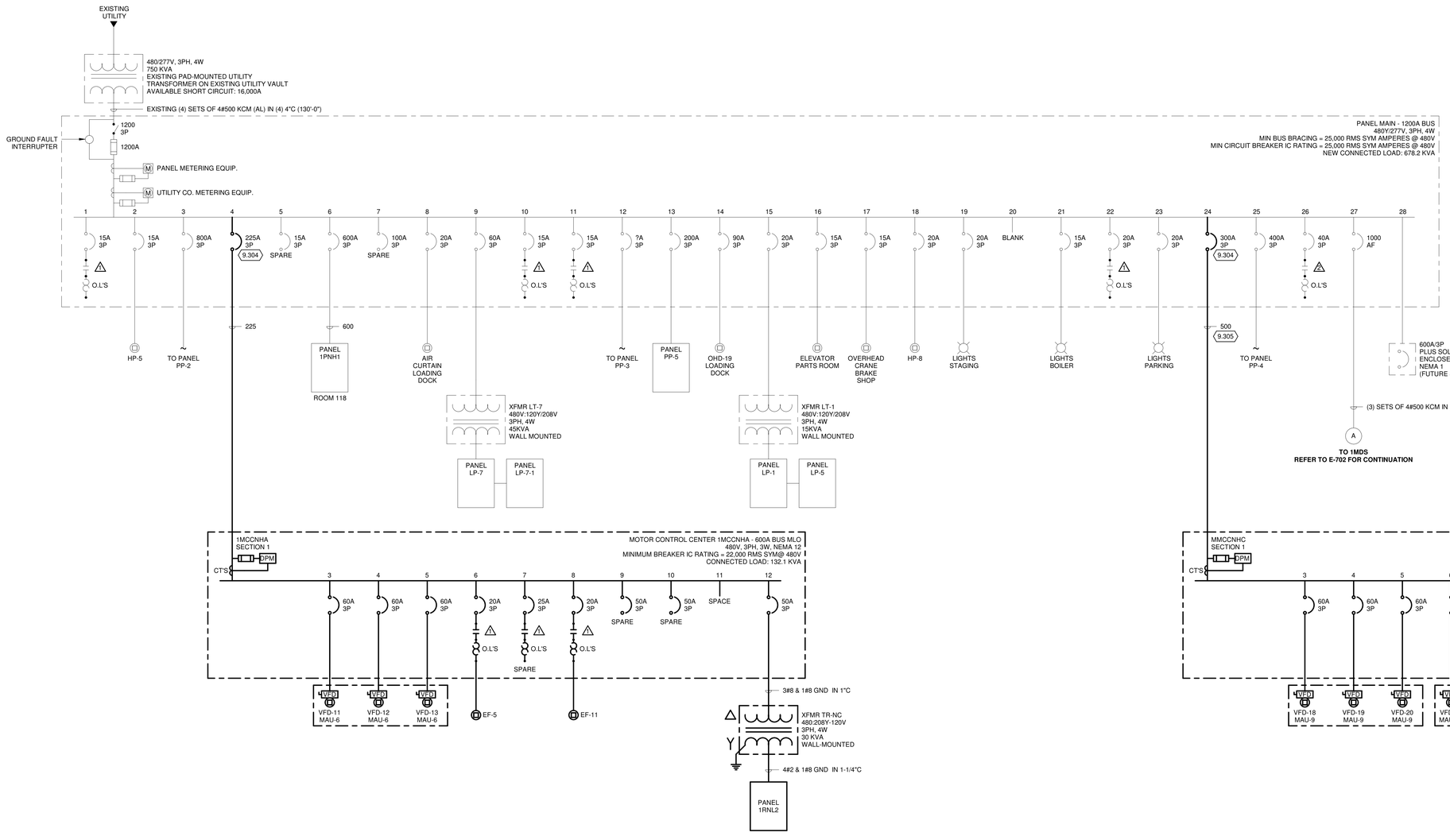
9.305 FEEDER SIZE HAS BEEN ADJUSTED TO ALLOW 3% VOLTAGE DROP.

COPPER FEEDER SCHEDULE

MARK	AMPACITY	NO. OF SETS	CONDUCTOR SIZES (AWG or KCMIL)				CONDUIT SIZE
			PHASE	NEUTRAL	EQ GND	ISO GND	
100	100	1	3 - # 1	-	1 - # 8		1-1/2"
150	150	1	3 - # 1/0	-	1 - # 6	-	1-1/2"
225	225	1	3 - # 4/0	-	1 - # 4	-	2"
250	250	1	3 - 250	-	1 - # 4	-	2-1/2"
350	350	1	3 - 500	-	1 - # 3	-	3"
500	500	2	3 - 250	-	1 - # 2	-	2-1/2"
600	600	2	3 - 350	-	1 - # 1	-	3"

FEEDER SCHEDULE NOTES:

1. THE SCHEDULE IS A SCHEDULE OF TYPICAL FEEDERS AND SOME OF THE SIZES MAY NOT APPLY TO THIS PROJECT.
2. ALL THE CONDUCTOR AMPACITIES ARE BASED ON TABLE 310.15(B)(16) OF THE NEC FOR COPPER CONDUCTORS (75 DEGREE CELSIUS CHART).
3. FEEDER SIZES SHOWN ON THE RISER DIAGRAM INDICATE FEEDER AMPACITIES AND DO NOT NECESSARILY CORRESPOND TO THE CIRCUIT BREAKER AMPACITIES. CERTAIN FEEDERS MAY BE SIZED FOR DERATION FACTORS AND/OR OVERSIZED FOR VOLTAGE DROP PER NEC REQUIREMENTS.



1 ONE-LINE POWER DIAGRAM
NO SCALE

Mead & Hunt

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

metro transit

CITY OF MADISON WISCONSIN

CITY OF MADISON
METRO TRANSIT PHASE 2 - HVAC REPLACEMENT

1101 EAST WASHINGTON AVE.
MADISON, WI 53703

ISSUED
11/07/19 BID SET

CONTRACT NO.: 8462
M&H NO.: 4503500-170148.07
DATE: November 7, 2019
DESIGNED BY: MAM
DRAWN BY: KAS
CHECKED BY: SDL
DO NOT SCALE DRAWINGS

SHEET CONTENTS
ONE-LINE DIAGRAM

SHEET NO.:
E-701

COPPER FEEDER SCHEDULE

MARK	AMPACITY	NO. OF SETS	CONDUCTOR SIZES (AWG or KCMIL)				CONDUIT SIZE
			PHASE	NEUTRAL	EQ GND	ISO GND	
100	100	1	3 - # 1	-	1 - # 8	-	1-1/2"
150	150	1	3 - # 1/0	-	1 - # 6	-	1-1/2"
225	225	1	3 - # 4/0	-	1 - # 4	-	2"
250	250	1	3 - 250	-	1 - # 4	-	2-1/2"
350	350	1	3 - 500	-	1 - # 3	-	3"
500	500	2	3 - 250	-	1 - # 2	-	2-1/2"
600	600	2	3 - 350	-	1 - # 1	-	3"

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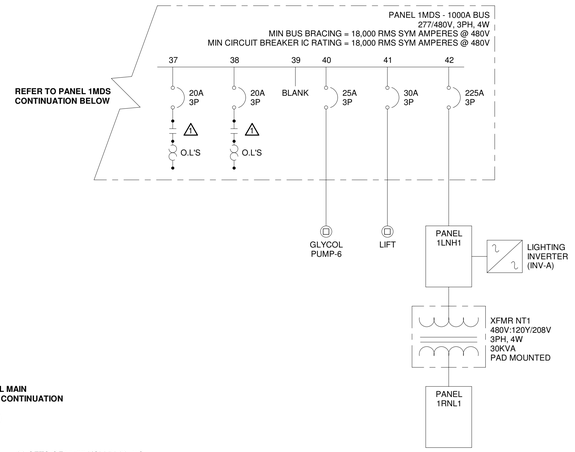
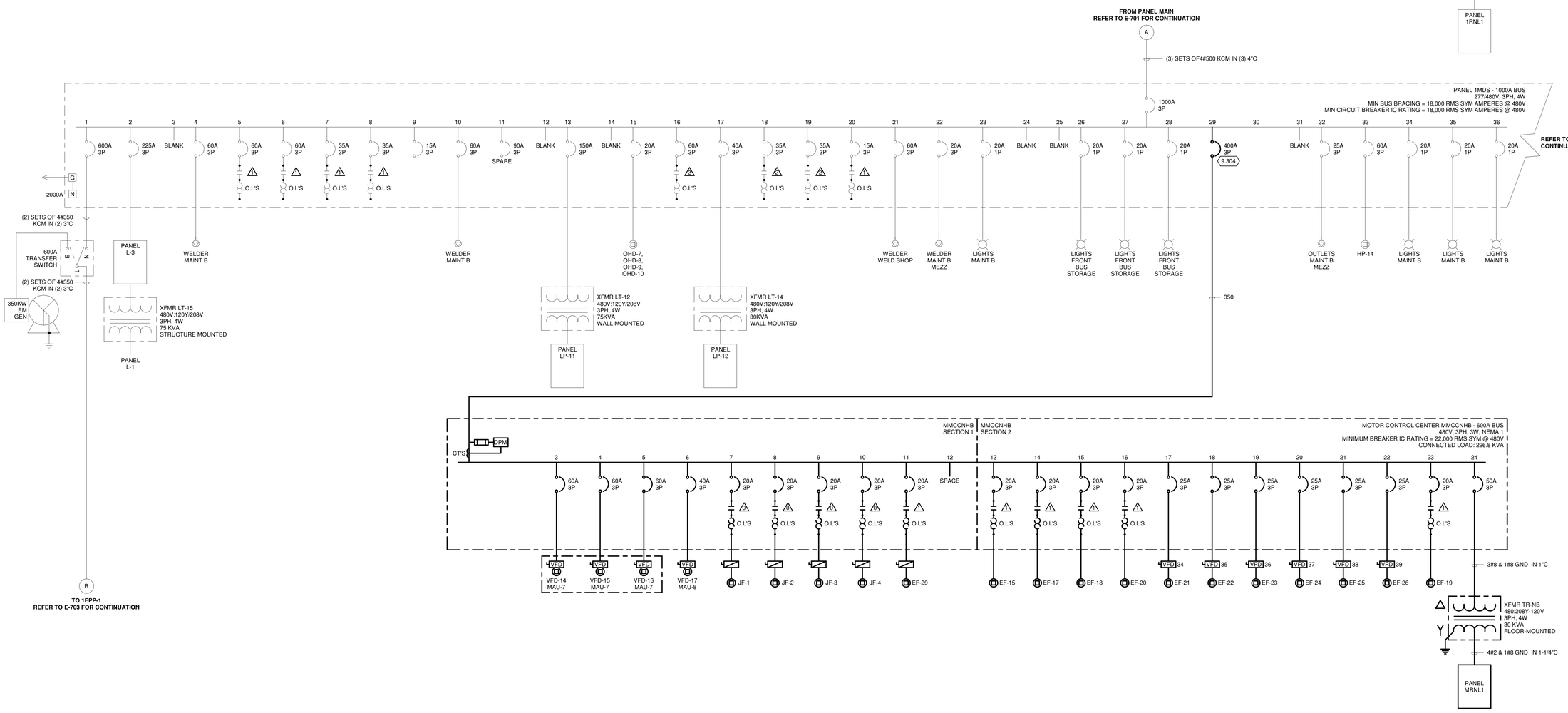
ONE-LINE GENERAL NOTES:

1. REFER TO ELECTRICAL EQUIPMENT WIRING SCHEDULE FOR MOTOR BRANCH CIRCUIT CONDUCTOR SIZE AND CONDUIT SIZE UNLESS OTHERWISE NOTED ON ONE-LINE DIAGRAMS
2. REFER TO DRAWING E-601 FOR ELECTRICAL EQUIPMENT WIRING SCHEDULE.

KEYED NOTES

9.304 PROVIDE NEW BREAKER IN SPACE MADE AVAILABLE DURING DEMOLITION. PROVIDE ALL REQUIRED MOUNTING HARDWARE, MOUNTING PLATES, ETC.





1 **ONE-LINE POWER DIAGRAM**
NO SCALE

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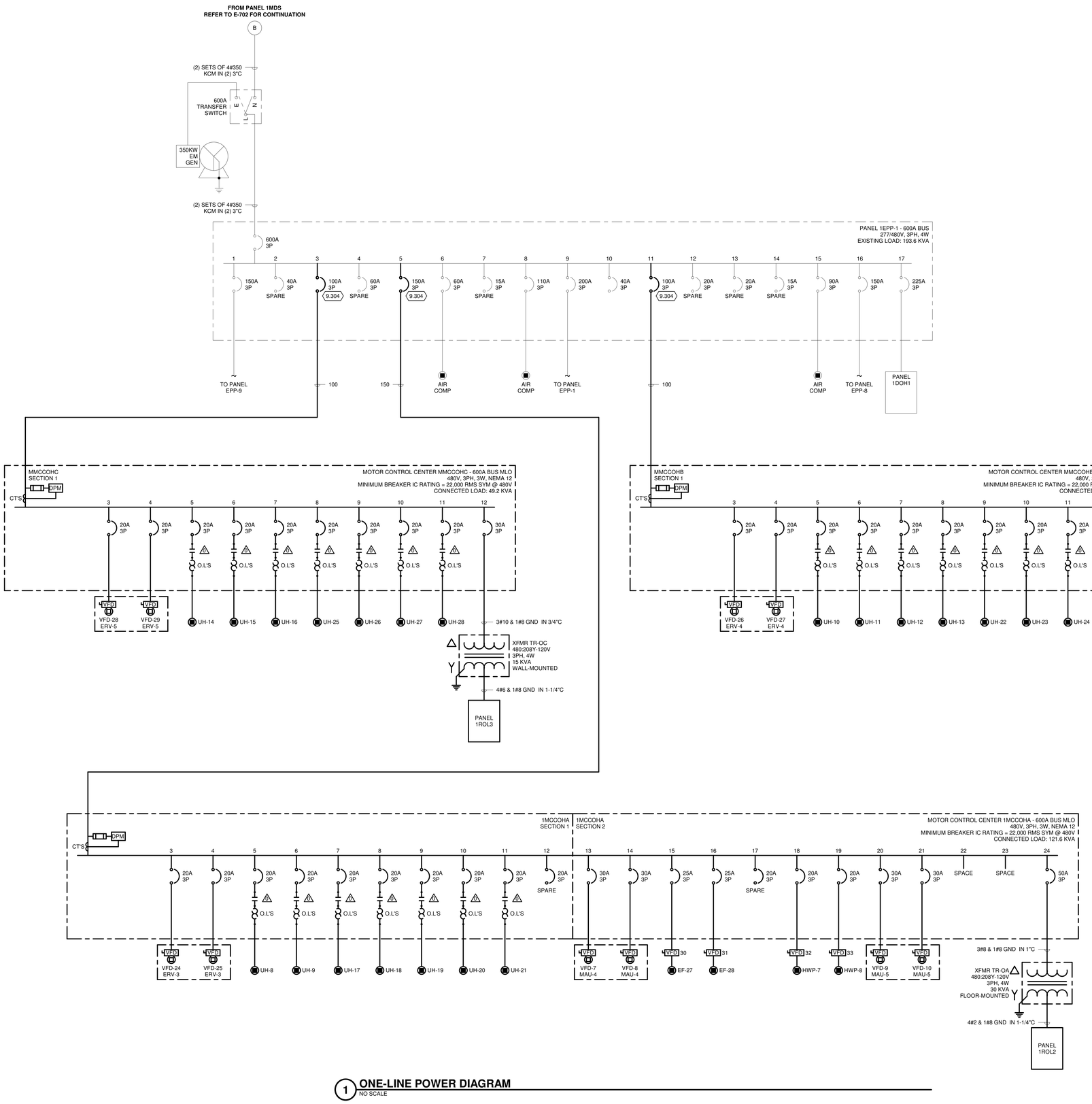
SHEET CONTENTS
ONE-LINE DIAGRAM

SHEET NO.:
E-702



1 ONE-LINE POWER DIAGRAM
NO SCALE

ONE-LINE GENERAL NOTES:

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KEYED NOTES

9.304 PROVIDE NEW BREAKER IN SPACE MADE AVAILABLE DURING DEMOLITION. PROVIDE ALL REQUIRED MOUNTING HARDWARE, MOUNTING PLATES, ETC.

COPPER FEEDER SCHEDULE

MARK	AMPACITY	NO. OF SETS	CONDUCTOR SIZES (AWG or KCMIL)				CONDUIT SIZE
			PHASE	NEUTRAL	EQ GND	ISO GND	
100	100	1	3 - # 1	-	1 - # 8	-	1-1/2"
150	150	1	3 - # 1/0	-	1 - # 6	-	1-1/2"
225	225	1	3 - # 4/0	-	1 - # 4	-	2"
250	250	1	3 - 250	-	1 - # 4	-	2-1/2"
350	350	1	3 - 500	-	1 - # 3	-	3"
500	500	2	3 - 250	-	1 - # 2	-	2-1/2"
600	600	2	3 - 350	-	1 - # 1	-	3"

FEEDER SCHEDULE NOTES:

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SHEET CONTENTS
ONE-LINE DIAGRAM

SHEET NO.:
E-703