

WAYNE STATE UNIVERSITY

WSU REUTHER LIBRARY MEP PROJECT No. 2164076

REUTHER LABOR ARCHIVES BUILDING No. 036

5401 CASS AVENUE, DETROIT, MICHIGAN
DESIGN DEVELOPMENT PACKAGE

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www.ghafari.com

ARCHITECTURAL SHEET INDEX

| SHEET | DESCRIPTION |
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| A-0.1 | SHT. INDEX, SYMBOL LIST, LEGENDS, ABBREVIATIONS, & OVERVIEW OF SCOPE |
| A-1.1 | PARTIAL BASEMENT AND FIRST FLOOR PLANS - DEMOLITION & NEW WORK |
| A-5.1 | DETAILS |

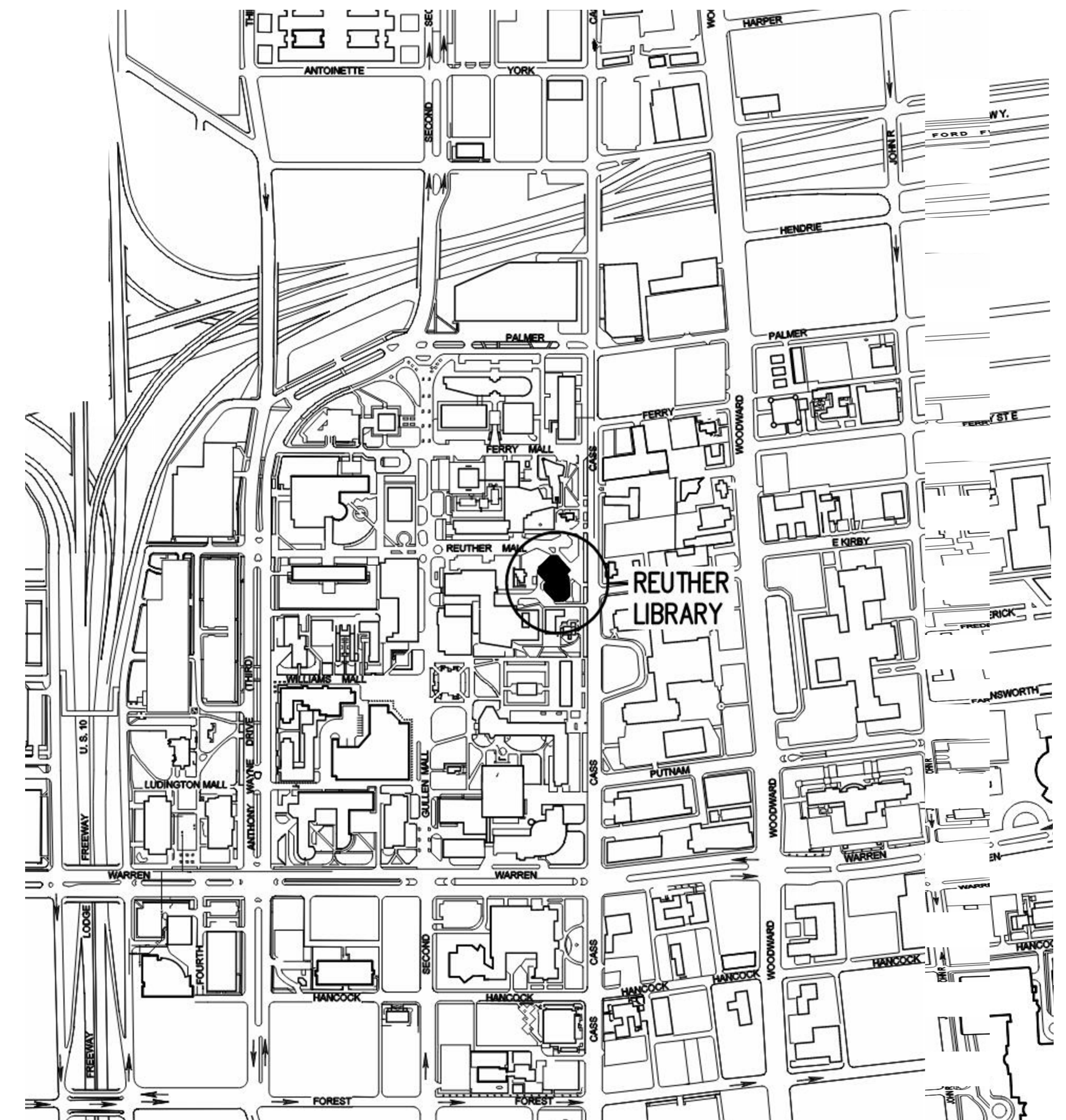
MECHANICAL SHEET INDEX

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ELECTRICAL SHEET INDEX

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| E-6.1 | ELECTRICAL PANEL SCHEDULES |



LOCATION MAP
NOT TO SCALE

SHEET:
ACADFILE:
ISSUED FOR:
DATE:

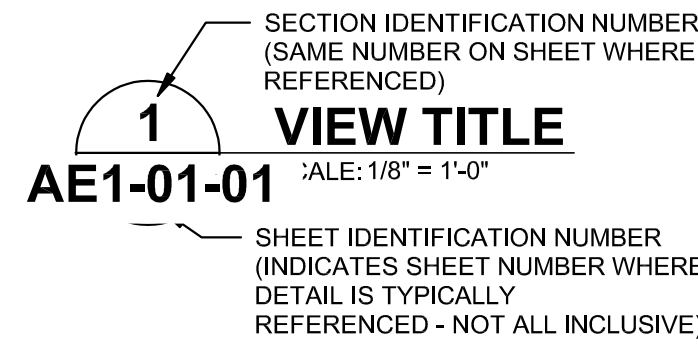
G-0.01
2164076-036-G-0.01
DOC REL 05 - IFB
04/05/24

REFERENCE SYMBOLS

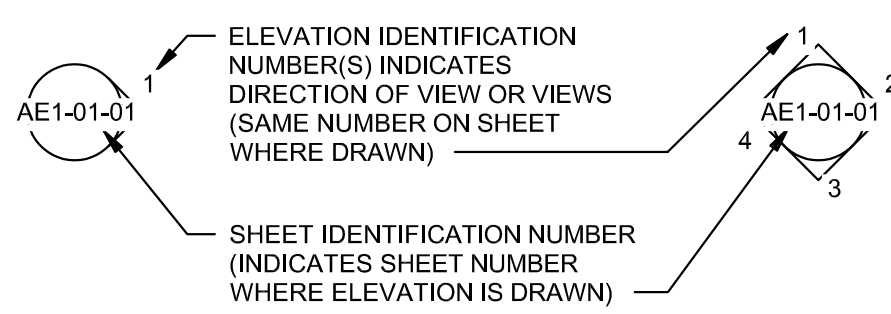
PLAN IDENTIFICATION



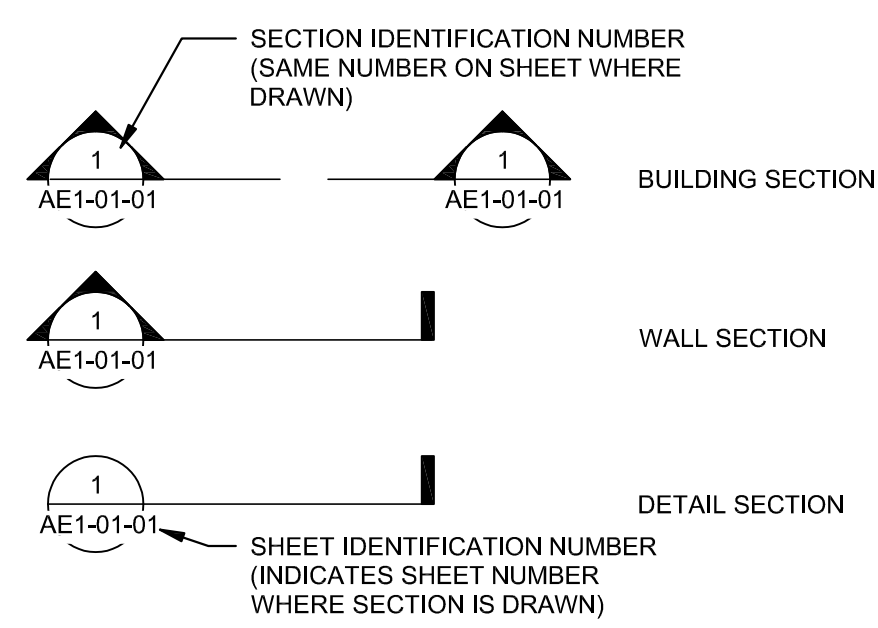
TITLE IDENTIFICATION



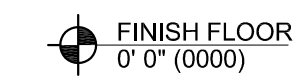
ELEVATION LOCATION IDENTIFICATION



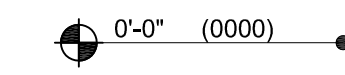
SECTION LOCATION IDENTIFICATION



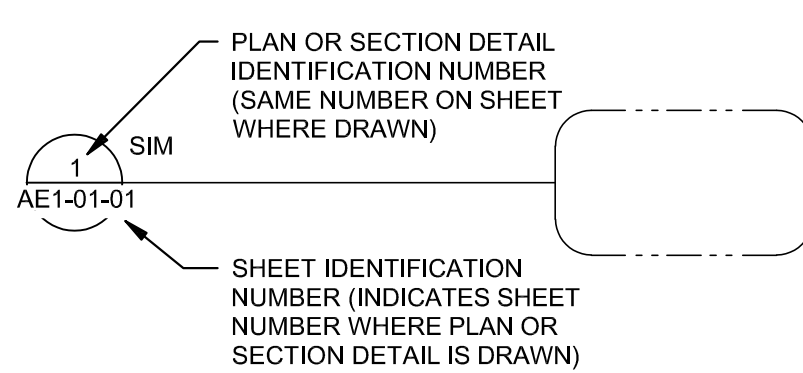
ELEVATION INDICATION - (FLOORS, ETC...)



SPOT ELEVATION



DETAIL LOCATION IDENTIFICATION



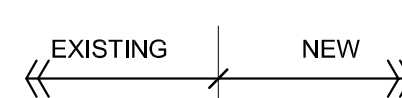
GRAPHIC SCALE



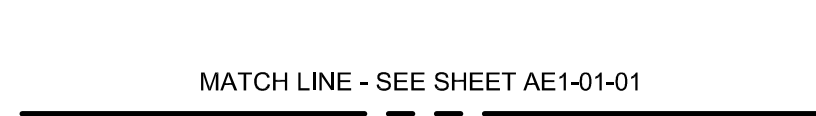
PARTITION TYPE INDICATION



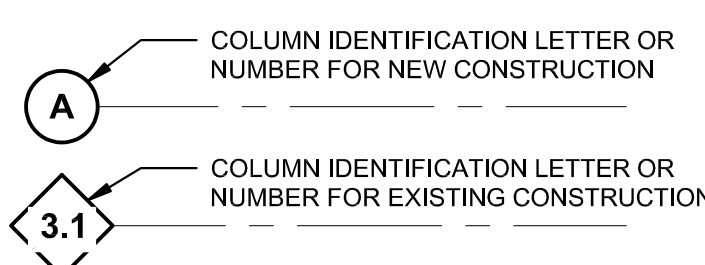
MATERIAL OR WORK DIVISION INDICATION



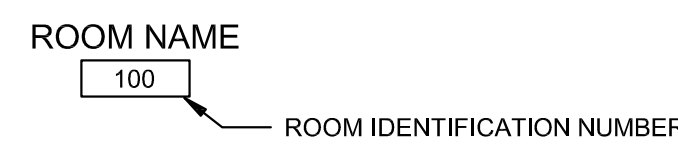
MATCH LINE INDICATION



COLUMN INDICATION



ROOM NAME AND NUMBER INDICATION



DOOR NUMBER INDICATION



WINDOW NUMBER INDICATION



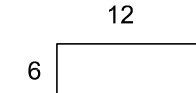
LOUVER NUMBER INDICATION



CEILING TAG



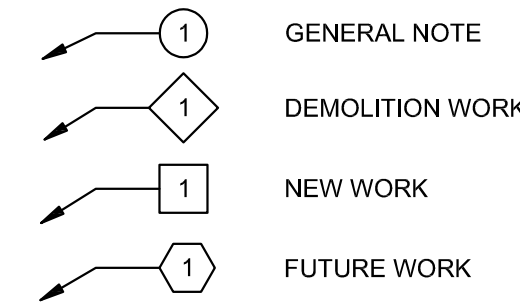
ROOF OR RAMP PITCH INDICATION



ROOF OR RAMP SLOPE INDICATION

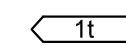


KEYED NOTE SYMBOLS

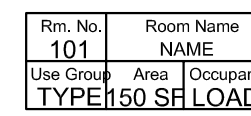


LIFE SAFETY SYMBOLS

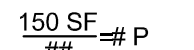
FIRE EXTINGUISHER TAG



OCCUPANCY TAG OPTION 1



OCCUPANCY TAG OPTION 2



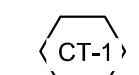
OCCUPANCY DOOR EXIT



AREA NAME AND NUMBER INDICATION



FLOOR FINISH TAG



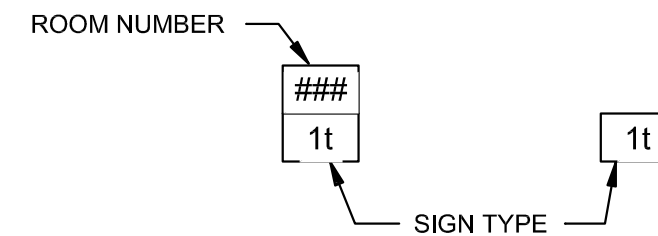
CASEWORK TAG



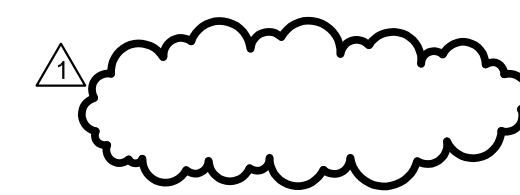
PLUMBING ACCESSORY TAG



SIGNAGE TAG



REVISION INDICATION



ARCHITECTURAL GENERAL NOTES

- 1. ALL WORK IS TO BE COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS WHICH INCLUDES THE DRAWINGS AND SPECIFICATIONS. THE SPECIFICATIONS INCLUDE ADDITIONAL INFORMATION AND REQUIREMENTS WHICH AUGMENT THE DRAWINGS.
2. SUBMIT IN WRITING ALL DRAWING AND SPECIFICATION RELATED QUESTIONS, CLARIFICATIONS, SUBSTITUTIONS AND REQUEST FOR CHANGES TO THE ARCHITECT/ENGINEER AND OWNER, FOLLOW PROCEDURES OUTLINED WITHIN THE GENERAL CONDITIONS.
3. THE WORK INSTALLED AS PART OF THIS CONTRACT SHALL COMPLY WITH ALL APPLICABLE BUILDING CODES AND ORDINANCES.
4. DRAWING INFORMATION WITHIN EXISTING BUILDINGS MAY NOT BE COMPLETE DUE TO CONCEALED CONDITIONS AND LACK OF PRIOR BUILDING ACCESS. FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. WHERE EXISTING CONDITIONS DEVIATE AND WILL AFFECT THE PROPOSED WORK, SUBMIT FOR CLARIFICATION. EXISTING CONDITIONS SHOWN OUTSIDE OF THE CONTRACT AREA ARE RELATIVE AND FOR REFERENCE ONLY.
5. DRAWINGS ARE NOT TO SCALE, DO NOT SCALE THE DRAWINGS.
6. THE CONTRACT DOCUMENTS INCLUDE DRAWINGS AND SPECIFICATIONS FOR NUMEROUS DISCIPLINES; CIVIL, STRUCTURAL, ARCHITECTURAL, MECHANICAL, FIRE PROTECTION, ELECTRICAL, PLUMBING, VOICE/DATA AND OTHER SYSTEMS. REVIEW AND COORDINATE WITH ALL DRAWINGS AND SPECIFICATIONS.
7. SECTIONS AND DETAILS ARE INTENDED TO BE TYPICAL (TYP), UNLESS NOTED OTHERWISE. DEVIATIONS ARE NOTED AS SIMILAR (SIM).
8. REFER TO THE APPROVED SUBMITTAL DRAWINGS FOR EQUIPMENT, FURNITURE AND FURNISHING DIMENSIONS AND OTHER DETAILED INFORMATION.
9. DIMENSIONS FOR WALLS AND PARTITIONS FOR CRITICAL HOLD OR CLEAR DIMENSIONS ARE IDENTIFIED ON THE DRAWINGS. WALL THICKNESSES LISTED ARE ACTUAL AND DO NOT INCLUDE SURFACE FINISHES.
10. PROVIDE FIRE EXTINGUISHERS THROUGHOUT THE DEMOLITION AND CONSTRUCTION AREAS AS REQUIRED BY CODE FOR THE DURATION OF WORK. REMOVE AT THE END OF CONSTRUCTION AND REPLACE WITH NEW.

SELECTIVE DEMOLITION, CUTTING AND PATCHING

- 1. WHERE PORTIONS OF WALLS AND CEILINGS ARE REMOVED, RESTORE THE REMAINING PORTIONS TO MATCH THE ORIGINAL CONSTRUCTION INCLUDING SMOKE AND FIRE RATINGS.
2. WHERE PORTIONS OF MASONRY WALLS ARE REMOVED: RESTORE THE REMAINING PORTIONS USING NEW BRICK AND/OR CMU TO MATCH EXISTING, INCLUDING COLOR, SIZES AND COURSING. SUBMIT BRICK SAMPLES TO ARCHITECT/ENGINEER AND OWNER FOR APPROVAL. TOOTH NEW MASONRY INTO EXISTING, MATCH EXISTING BOND PATTERNS.
3. WHERE CEILINGS ARE INDICATED TO BE REMOVED, ALSO REMOVE FRAMING MEMBERS, HANGERS AND OTHER RELATED ITEMS. WHERE SELECTIVE DEMOLITION IS INDICATED CONTRACTOR TO PATCH AND REPAIR CEILING AS REQUIRED TO INSTALL NEW MECHANICAL EQUIPMENT.
4. WHERE FLOOR FINISHES ARE INDICATED TO BE REMOVED, INCLUDE REMOVAL OF ALL FINISH LAYERS TO EXPOSE THE UNDERLYING SUBSTRATE. FIELD VERIFY NUMBER OF LAYERS.
5. SPRAY APPLIED FIRE RESISTIVE MATERIALS WHICH ARE DAMAGED DURING DEMOLITION AND NEW CONSTRUCTION SHALL BE REPAIRED. FIELD VERIFY MATERIAL TYPE AND THICKNESS. MATCH EXISTING FIRE RATING.

FIRE AND SMOKE RATED ASSEMBLIES

- 1. FIRE AND SMOKE RATED ASSEMBLIES ARE TO BE CONTINUOUS FOR THE ENTIRE LENGTH AND HEIGHT OF THE ASSEMBLY. INSTALL IN FULL ACCORDANCE WITH ALL REQUIREMENTS PER THE LISTED TEST. REFER TO THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR CONSTRUCTION DETAILS AND OTHER INFORMATION.
2. STRUCTURAL MEMBERS WHICH SUPPORT FIRE RATED WALLS REQUIRE THE SAME FIRE RATING AS THE WALL, UNLESS NOTED OTHERWISE.
3. RECESSED CABINETS, PANELS, AND BACK BOXES WHICH ARE LOCATED IN FIRE RATED ASSEMBLIES SHALL BE INSTALLED TO MAINTAIN THE FIRE RATING. INCLUDING INTUMESCENT FIRE STOP PADS FOR LARGE ITEMS.

PENETRATIONS

- 1. SEAL ALL UTILITY AND STRUCTURAL STEEL PENETRATIONS THROUGH FLOOR AND WALLS AS FOLLOWS:
A. FLOORS WITH FIRE RATING: FIRESTOPPING SYSTEM, MATCH FIRE RATING OF FLOOR
B. FLOORS WITHOUT FIRE RATING: ONE HOUR FIRESTOPPING SYSTEM
C. WALLS WITH FIRE RATING: FIRESTOPPING SYSTEM, MATCH FIRE RATING OF WALL
D. WALLS WITHOUT FIRE RATING: ACOUSTICAL SEALANT BOTH SIDES OF WALL; EXCEPT ONE HOUR FIRESTOPPING SYSTEM AT CABLE TRAYS, ELECTRICAL BUSWAYS AND CONDUIT SLEEVES WITH LOW VOLTAGE CABLES
E. SMOKE BARRIERS: SMOKE AND FIRESTOPPING SYSTEM, TESTED AND APPROVED PER CODE REQUIREMENTS
F. SOUND RATED ASSEMBLIES: ACOUSTICAL SEALANT BOTH SIDES OF WALL, REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS

APPLICABLE CODES:

- MICHIGAN MECHANICAL CODE 2015
MICHIGAN PLUMBING CODE 2015
MICHIGAN ELECTRICAL CODE BASED ON 2017 NATIONAL ELECTRIC CODE (N.E.C.) WITH PART 8 STATE OF MICHIGAN AMENDMENTS.
INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS - IEEE
NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
AMERICAN NATIONAL STANDARDS INSTITUTE - ANSI
MICHIGAN FIRE PREVENTION CODE
MICHIGAN ENERGY CODE
N.F.P.A. (WITH MICHIGAN AMENDMENTS)
70- 2017 NATIONAL ELECTRICAL CODE (NEC)
72- NATIONAL FIRE AND SIGNALING CODE
101- LIFE SAFETY CODE
110- STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS
M.I.O.S.H.A. STANDARDS

BUILDING INFORMATION:

Table with 2 columns: Building Information and Value. Includes rows for Use Group, Type of Construction, Number of Stories, Total Building Area, Fire Alarm System, and Suppressed Sprinkler System.

BUILDING SCOPE:

THE REUTHER LIBRARY IS A 73,955 SF, 4 STORY FACILITY. THE ORIGINAL BUILDING WAS BUILT IN 1974 AND A MAJOR ADDITION WAS ADDED IN 1990. THE FACILITY CONTAINS PAPER AND DIGITAL ARCHIVES. THE SCOPE OF WORK INCLUDES REMOVING AND INSTALLING TWO NEW AIR HANDLING UNITS IN THE BASEMENT AND REMOVING NINE EXISTING HUMIDIFICATION MANIFOLDER THAT ARE IN THE EXISTING SUPPLY DUCTWORK.



Facilities Planning & Management
Design Services
5454 Cass Ave.
Detroit MI 48202



17101 MICHIGAN AVENUE
DEARBORN, MI 48126-2736 USA
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REGISTRATION SEAL
NOT FOR CONSTRUCTION

Table with 3 columns: MARK, ISSUE, DATE. Includes rows for DOC REL 05 - IFB, DOC REL 04-95% REVIEW, DOC REL 03 - 100% DD, and DOC REL 02 - 60% DD.

Table with 3 columns: MARK, ISSUE, DATE. Includes rows for DESIGNER, DRAWN, CHECKED, DEPT MGR, and PROJECT MGR.

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

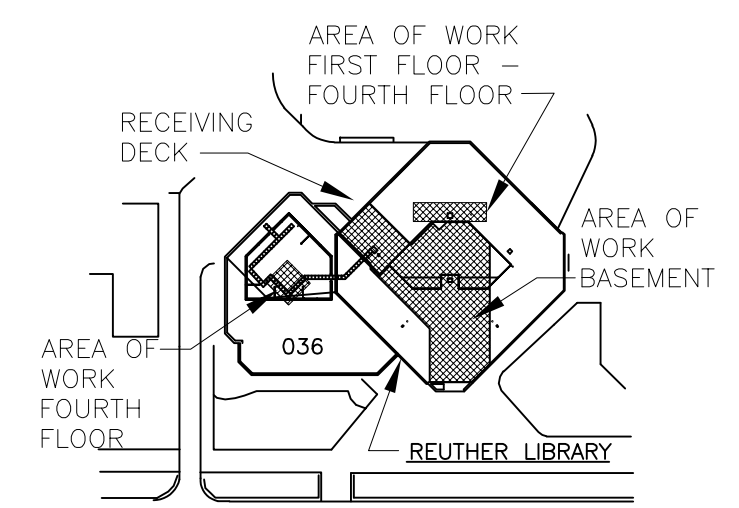
SYMBOL LIST, LEGENDS, ABBREVIATIONS & OVERVIEW OF SCOPE

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
A - 0.1

DSD FILE NAME
2164076-036-A001



KEY PLAN
NO SCALE

These documents are instruments of service for use solely with respect to this project. DSD and DSD's consultants shall be deemed the authors and owners of their respective instruments of service and shall retain all common law, statutory and other reserved rights, including copyrights.

These documents are two dimensional, traditional plan and specification documents that are not intended to be used by the contractor as shop drawings. Final dimensions, equipment access, routing, miscellaneous fittings, final installation and coordination is the contractor's responsibility.

REGISTRATION SEAL

NOT FOR CONSTRUCTION

GENERAL NOTES:

1. VERIFY ALL EX. DIMENSIONS IN FIELD PRIOR TO CONST.. CONTRACTORS TO NOTIFY ENGINEER AND/OR ARCHITECT IMMEDIATELY IF ANY CONFLICTS ARISE, TYP..
2. PROTECT ALL FINISH WORK TO REMAIN FROM DAMAGE DURING DEMO. AND CONST., TYP.. REPAIR OF DAMAGED EX. FINISHES WILL BE AT THE CONTRACTORS EXPENSE, TYP..
3. REFER TO OTHER SHEETS OF THIS DOCUMENT SET & SPECS. FOR COMPLETE CONTRACT REQUIREMENTS, TYP..
4. REFER TO MECH. AND ELEC. DWGS. FOR ADDITIONAL WORK REQUIRED. COORDINATE WORK WITH MECH. AND ELEC. CONTRACTORS. PROVIDE PATCH AND REPAIR TO ALL WALLS, FLOORS, CEILINGS AS REQUIRED TO ACCOMMODATE MECH. AND ELEC. WORK.
5. FILL ALL NEW AND EX. PENETRATIONS WITH FIRE RESISTANT SEALANT AND FIRE SAFE MATERIAL FOR A COMPLETE FIRE RATED WALL ASSEMBLY TYP. AT ALL FIRE RATED WALLS.
6. PROVIDE TEMP. FLOOR PROTECTION ALONG BOILER ACCESS PATHWAY TO AVOID DAMAGING FLOOR, TYP..
7. REFER TO NEW WORK DWGS. FOR SIZES AND EXTENT OF NEW INSTALLATIONS/LAYOUTS. PROVIDE DEMO. AS REQUIRED TO ACCOMMODATE THE ENTIRE NEW SCOPE OF WORK AS DELINEATED IN THESE DWGS.. REFER TO THE COVER SHEET FOR THE COMPLETE DRAWING INDEXES.
8. REFER TO MECH. & ELEC. DWGS. FOR EQUIP. REMOVAL & NEW LAYOUT. COORDINATE IN FIELD W/ MECH. AND/OR ELEC. CONTR. FOR FINAL LOCATIONS, PRIOR TO COMMENCEMENT OF WORK.
9. REFER TO MECH & ELEC DWGS FOR SCOPE OF WORK ON FLOORS 1-4 - WHERE SELECTIVE CEILING DEMOLITION IS REQUIRED TO INSTALL NEW MECH & ELEC EQUIPMENT CONTRACTOR TO PATCH AND REPAIR CEILING AS REQUIRED. EXISTING CEILING GRID AND TILES TO BE PROTECTED FROM DAMAGE DURING ALL WORK. REINSTALL ALL CEILING TILES AND GRID AFTER CONSTRUCTION HAS BEEN COMPLETED.

SHEET NOTES:

1. COORDINATE CONTRACTOR STAGING AREA AND ACCESS TO BOILER ROOM WITH PROJECT MANAGER.

DEMOLITION KEYED NOTES:
(APPLICABLE THIS SHEET ONLY)

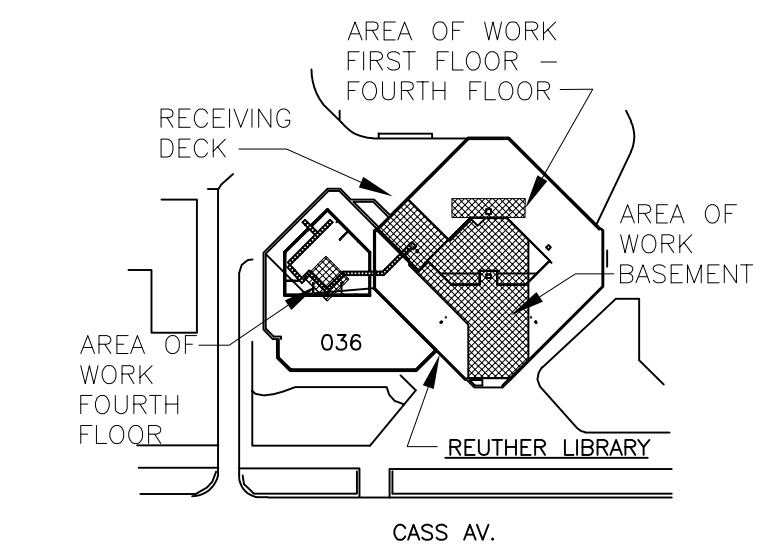
- ① DISCONNECT, REMOVE AND DEMO EXISTING MECHANICAL EQUIPMENT, COORDINATE W/ MECHANICAL DRAWINGS..
- ② REMOVE EXISTING MECHANICAL CONCRETE SUPPORT PADS AS INDICATED. COORDINATE W/ MECHANICAL DRAWINGS..
- ③ REMOVE AND SALVAGE EXISTING LOUVER SYSTEM FOR REINSTALLATION. CONTRACTOR TO COORDINATE STORAGE LOCATION WITH OWNER.

NEW WORK KEYED NOTES:
(APPLICABLE THIS SHEET ONLY)

- ① PATCH & SEAL W/ CONCRETE SEALER COAT FLOOR SLAB AS INDICATED, AFTER COMPLETION OF REPAIR AND PATCHING WORK.
- ② NEW CONC. EQUIPMENT PAD; REFER TO DETAIL 1/A-5.1 FOR MORE INFO. COORDINATE SIZE & LOCATION W/ MECH. CONTRACTOR.

FLOOR PLAN LEGEND

- AREA OF WORK
- AREA NOT IN CONTRACT (N.I.C.)



KEY PLAN
NO SCALE

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| MARK | ISSUE | DATE |
|------|-----------------------|----------|
| | DOC REL 05 - IFB | 04/05/24 |
| | DOC REL 04-95% REVIEW | 03/13/24 |
| | DOC REL 03 - 100% DD | 02/08/24 |
| | DOC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|-------------|
| DESIGNER | A. GAUTHIER |
| DRAWN | A. GAUTHIER |
| CHECKED | R. BARRY |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

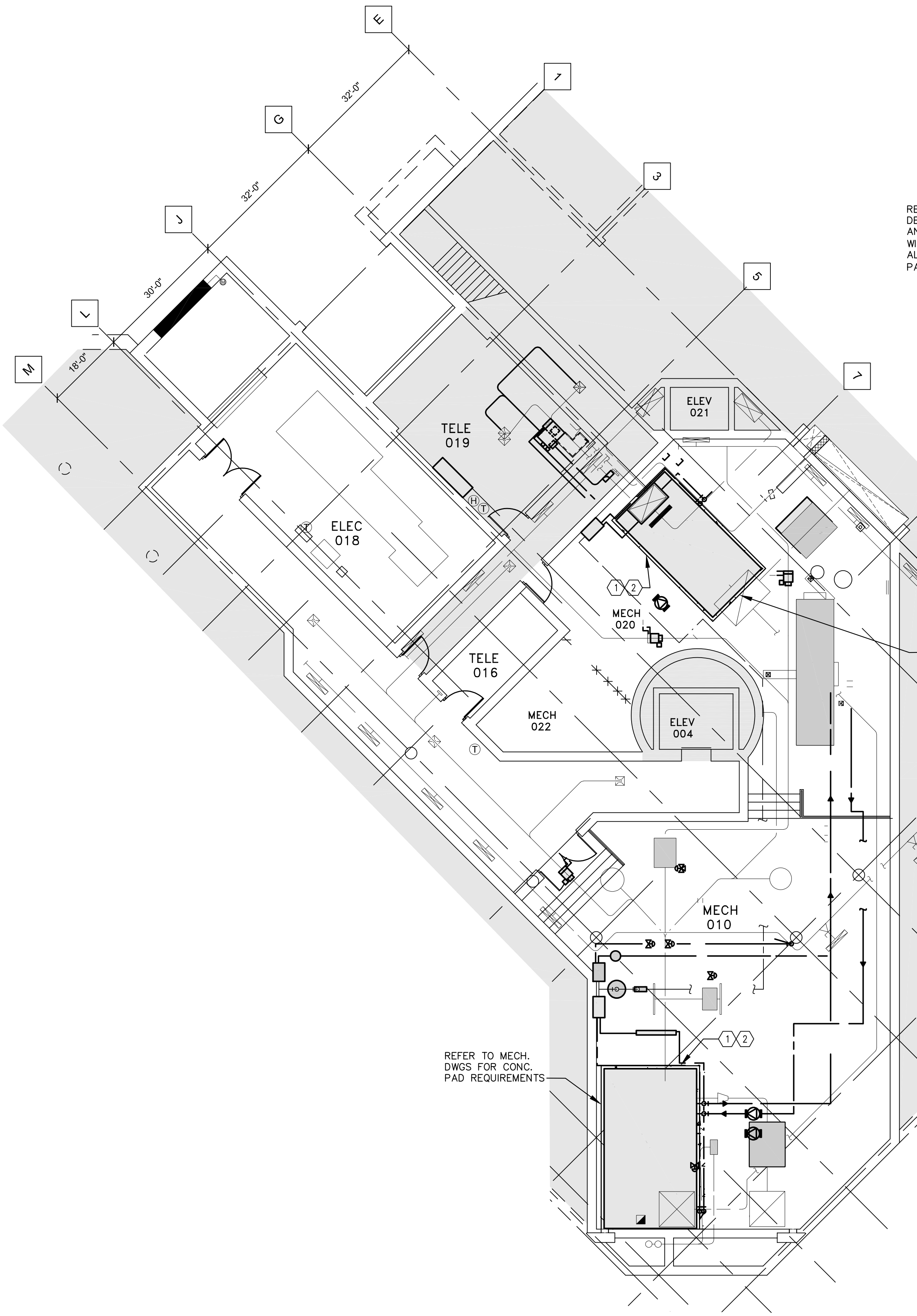
PARTIAL BASEMENT PLANS
DEMOLITION AND
NEW WORK

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
A -1.1

DSD FILE NAME
2164076-036-A101



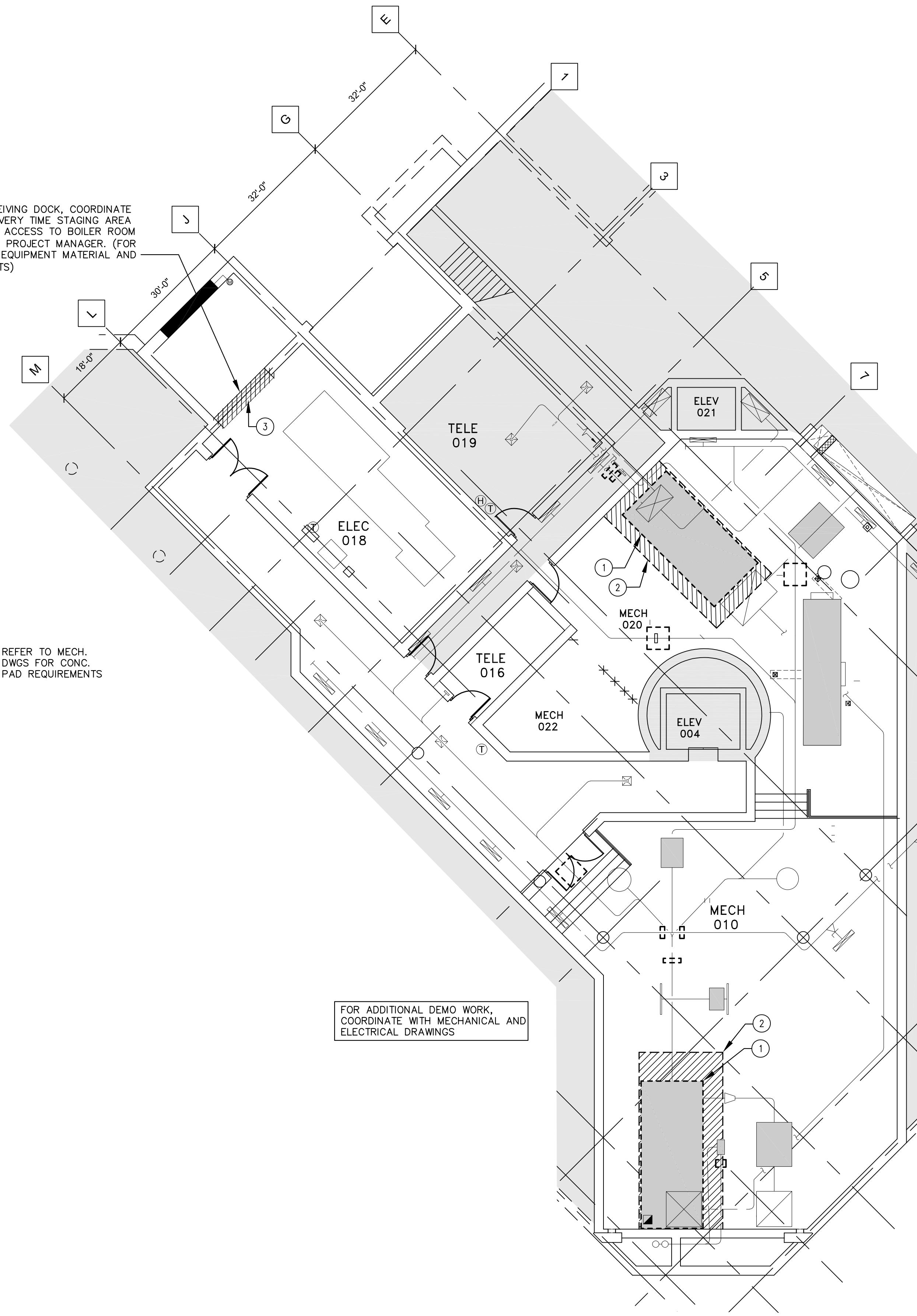
PARTIAL BASEMENT PLAN - NEW WORK

SCALE: 1/8" = 1'-0"
0 4 8 16 32

RECEIVING DOCK, COORDINATE DELIVERY TIME STAGING AREA AND ACCESS TO BOILER ROOM WITH PROJECT MANAGER. (FOR ALL EQUIPMENT MATERIAL AND PARTS)

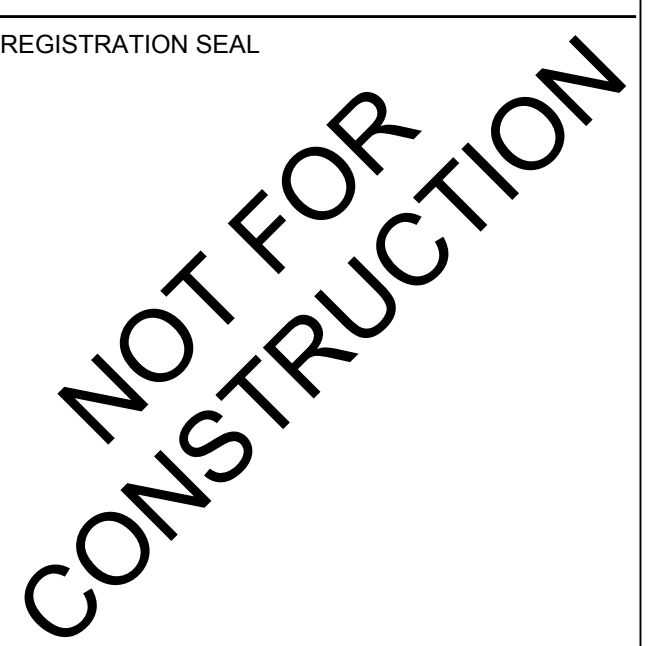
REFER TO MECH. DWGS FOR CONC. PAD REQUIREMENTS

FOR ADDITIONAL DEMO WORK, COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS



PARTIAL BASEMENT PLAN - DEMOLITION

SCALE: 1/8" = 1'-0"
0 4 8 16 32



| MARK | ISSUE | DATE |
|------|-----------------------|----------|
| | DDC REL 05 - IFB | 04/08/24 |
| | DDC REL 04-95% REVIEW | 03/13/24 |
| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

MECHANICAL GENERAL INFORMATION & SYMBOLS

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
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A/E PROJECT NO.
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M-0.1

DSD FILE NAME
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MECHANICAL ABBREVIATIONS

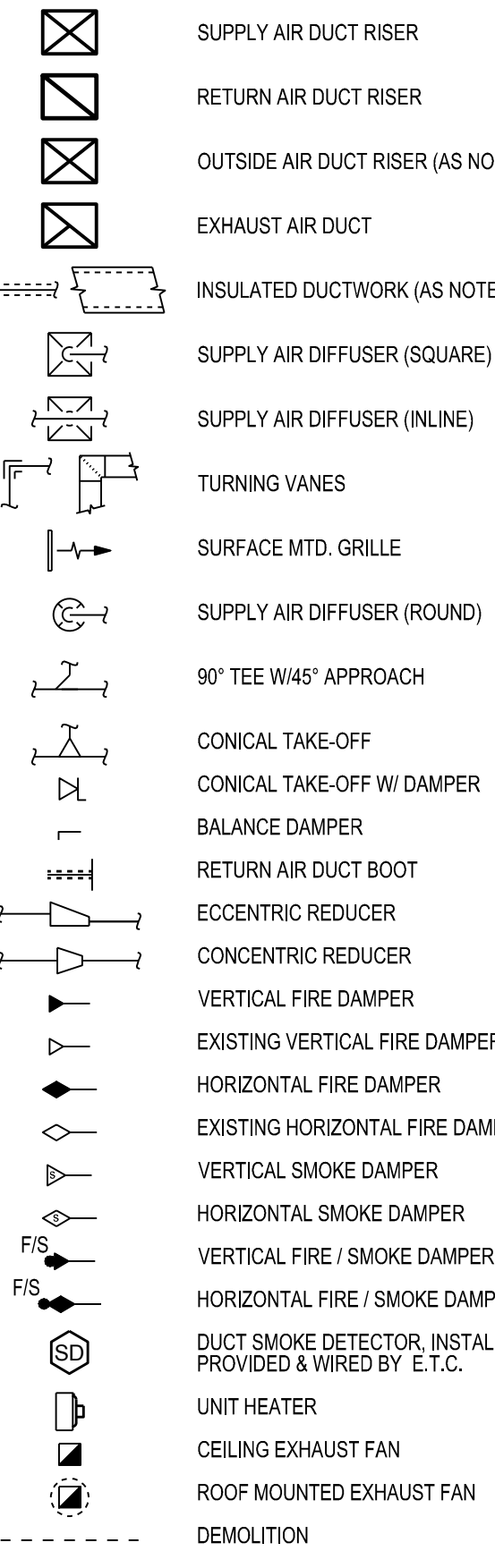
| | | | |
|--------|--|-------------------------|--|
| AFB | ABOVE FINISH FLOOR | ID | INSIDE DIAMETER |
| AC | AIR COMPRESSOR | I.E. | INVERT ELEVATION |
| AHU | AIR HANDLING UNIT | IAH | INTAKE HOOD |
| AS | AIR SEPARATOR | | |
| A.T.C. | ARCHITECTURAL TRADES CONTRACTOR | LAT | LEAVING AIR TEMPERATURE |
| B | BOILER | LH | LATENT HEAT (MBH) |
| B.A.S. | BUILDING AUTOMATION SYSTEM | LWT | LEAVING WATER TEMPERATURE |
| CAF | COMBUSTION AIR FAN | MAX | MAXIMUM |
| CC | COOLING COIL | BTU PER HOUR (THOUSAND) | |
| CFM | CUBIC FEET PER MINUTE | MIN | MINIMUM |
| CHLR | CHILLER | M.T.C. | MECHANICAL TRADES CONTRACTOR |
| CHP | CONDENSE HEAT PUMP | N.C. | NOISE CRITERIA |
| CONV | CONNECTOR | NFPA | NATIONAL FIRE PROTECTION ASSOCIATION |
| CT | COOLING TOWER | NTS | NOT TO SCALE |
| CU | CONDENSING UNIT | | |
| CUH | CABINET UNIT HEATER | P | PUMP |
| CV | CONTROL VALVE | PCR | PUMPED CONDENSATE RETURN |
| CWP | CHILLED WATER PUMP | PD | PRESSURE DROP |
| DB | DRY BULB | RCP | RADIANT CEILING PANEL |
| DFU | DUCT FURNACE | REQD | REQUIRED |
| DIA | DIAMETER | RG | RETURN GRILLE |
| DN | DOWN | RH | RELATIVE HUMIDITY |
| DPR | DAMPER | RLH | RELIEF HOOD |
| DS | DUCT SILENCER | RTU | ROOF TOP UNIT |
| EAT | ENTERING AIR TEMPERATURE | SD | SUPPLY DIFFUSER |
| EF | EXHAUST FAN | SF | SUPPLY FAN |
| EG | EXHAUST GRILLE | SG | SUPPLY GRILLE |
| E.T.C. | ELECTRICAL TRADES CONTRACTOR | SH | SENSIBLE HEAT (MBH) |
| EVR | EVAPORATOR | SM | SHEET METAL |
| EWT | ENTERING WATER TEMPERATURE | SQ. FT. | SQUARE FEET |
| EXH | EXHAUST | SST | SATURATED SUCTION TEMPERATURE |
| EXST | EXISTING | STR | STRAINER |
| FF | FINISH FLOOR | TC | TOTAL COOLING (MBH) |
| FBM | FEET PER MINUTE | TCL | TEMPERATURE CONTROL |
| FT | FEET | T&P | TEMPERATURE & PRESSURE RELIEF VALVE |
| FTR | FINNED TUBE RADIATION | TYP | TYPICAL |
| FU | FURNACE | | |
| GAL | GALLON | UH | UNIT HEATER |
| GFRH | GAS FIRED RADIANT HEATER | VAV | VARIABLE AIR VOLUME BOX |
| GR | GRILLE | VRH | VARIABLE AIR VOLUME REHEAT BOX |
| H | HUMIDIFIER | VPVAV | FAN POWERED VARIABLE AIR VOLUME BOX |
| HC | HEATING COIL | V.F.D. | VARIABLE FREQUENCY DRIVE |
| HD | HEAD (FT) | ZD | ZONE DAMPER |
| HP | HORSE POWER | X-SA | EXISTING ITEM (EXISTING SUPPLY AIR DUCT) |
| HHP | HORIZONTAL HEAT PUMP | | EXISTING |
| HTG | HEATING | | |
| HVAC | HEATING, VENTILATION, & AIR CONDITIONING | | |
| HWP | HEATING WATER PUMP | | |
| HX | HEAT EXCHANGER | | |

GENERAL HVAC NOTES

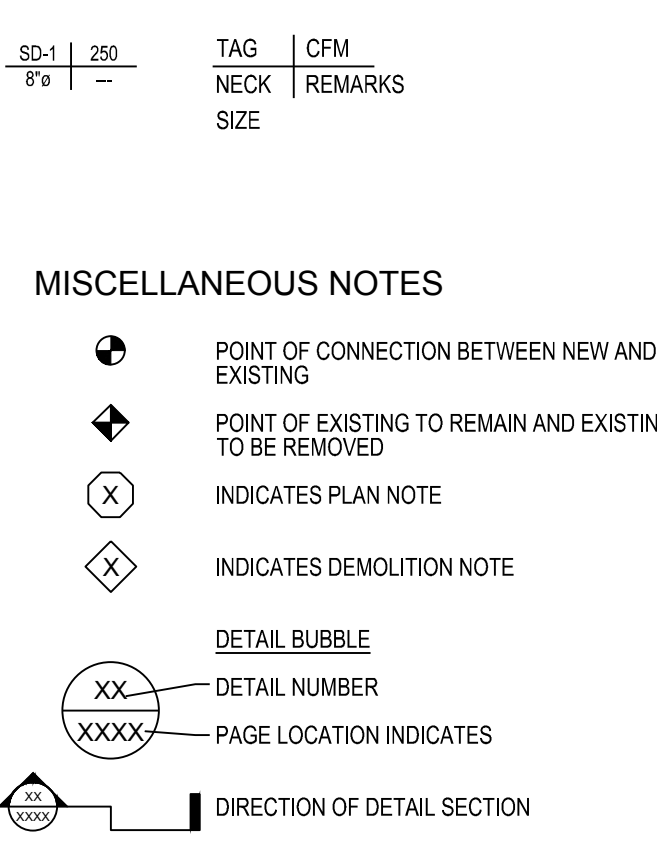
- LOCATE EXHAUST OUTLETS OF VENTILATION SYSTEMS, COMBUSTION EQUIPMENT STACKS, & PLUMBING VENTS AT LEAST 10 FEET FROM OUTDOOR AIR INTAKES.
- INSTALL ALL EQUIPMENT, MATERIALS, AND ACCESSORIES PER MANUFACTURERS WRITTEN INSTRUCTIONS.
- ALL EXISTING SYSTEMS (INCLUDING EXHAUST FANS, AIR HANDLING UNITS, PUMPS) THAT SERVES AREAS BEING RENOVATED SHALL BE REBALANCED AS REQUIRED.
- NOTIFY OWNER OF ANY PIPING OR DUCTWORK DEMOLITION THAT MAY AFFECT NORMAL OPERATION OF OTHER AREAS.
- FIELD VERIFY LOCATIONS OF EXISTING PIPING THAT MAY CONFLICT WITH NEW CONSTRUCTION AND RELOCATE AS NEEDED.
- PROVIDE BALANCE DAMPERS FOR EACH DIFFUSER/GRILLE AND BRANCH DUCT.
- PROVIDE FLEXIBLE DUCT IN ACCESSIBLE CEILINGS. 6 FT MAX LENGTH. KEEP BENDS TO A MINIMUM.
- FIRE DAMPERS & COMBINATION FIRE/SMOKE DAMPERS SHALL MATCH RATING OF WALL, UNLESS NOTED OTHERWISE.
- INTERLOCK FIRE/SMOKE DAMPERS BY ELECTRICAL TRADES. PROVE OPEN BEFORE AIR HANDLING UNITS FAN(S) START.
- SMOKE DETECTORS SHALL BE FURNISHED AND CONNECTED BY ELECTRICAL CONTRACTOR. INSTALLATION BY MECHANICAL CONTRACTOR.
- ALL REHEAT COIL HS&R RUNOUT PIPES SHALL BE 3/4" UNLESS OTHERWISE NOTED.
- PROVIDE ACCESS PANELS ON EACH SIDE OF REHEAT COILS.
- PROVIDE 5 FT MIN BEFORE ANY DUCT TAKEOFF FOR DUCTWORK DOWNSTREAM OF VAV BOXES.
- PROVIDE 1 1/2 DUCT DIAMETERS MIN. DUCT LENGTH OF HIGH PRESSURE BRANCH DUCTWORK ON THE UPSTREAM SIDE OF VAV BOXES.
- COORDINATE LOUVER SIZES WITH ARCHITECTURAL TRADES PRIOR TO CONSTRUCTION.
- CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER DISCIPLINES PRIOR TO CONSTRUCTION TO AVOID CONFLICTS.
- PROVIDE MANUAL AIR VENTS WITH 3/4" HOSE CONNECTION AT ALL HIGH POINTS.
- OFFSET PIPING TO ACCOMMODATE LARGE DUCTWORK.
- THE CONTRACTOR SHALL FIELD VERIFY THE SIZES, LOCATION, ELEVATIONS, AND DETAILS OF ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ALL EQUIPMENT AND MATERIALS IN A "NEW" CONDITION DURING CONSTRUCTION.
- ALL WORK SHALL BE PERFORMED BY LICENSED CONTRACTORS AND SUBCONTRACTORS AS REQUIRED BY LAW.
- ALL WORK SHALL CONFORM TO MICHIGAN MECHANICAL CODE, LATEST APPLICABLE EDITION.
- CONTRACTOR SHALL USE LOW PRESSURE LOSS DUCT FITTINGS IN ACCORDANCE WITH SMACNA. (WYES, RADIUS OR VANED TEES, ETC.) DUCTWORK SHALL BE GALVANIZED SHEET METAL, MIN. 26 GA.
- ALL DUCT DIMENSIONS SHOWN ARE INSIDE CLEAR DIMENSION. INCREASE DUCT SIZE FOR LINING.
- CONSTRUCT ALL TRANSFER DUCTS W/ 1-INCH THICK LINING.
- ALL EXPOSED ROUND DUCTWORK SHALL BE SPIRAL.
- LINE 10'-0" OF SUPPLY DUCTWORK AFTER EACH VAV BOX.
- ALL EXTERNALLY ISOLATED HVAC EQUIPMENT SHALL HAVE FLEXIBLE DUCT CONNECTORS.
- ALL CONDENSATE DRAIN PIPING SET @ MIN. 1% SLOPE.
- ALL CONDENSATE DRAIN PIPING TO TERMINATE TO DRAIN VIA AIR GAP.
- IF THERE IS CONFLICTING INFORMATION IN THE PLANS OR SPECIFICATIONS THE MORE STRINGENT AND GREATER COST ITEM SHALL BE USED.
- DRAWINGS INDICATE REQUIRED SIZES AND POINTS OF TERMINATION OF PIPES AND DUCTS AND SUGGESTED ROUTES. IT IS NOT INTENTION OF DRAWINGS TO INDICATE ALL NECESSARY OFFSETS. INSTALL WORK IN MANNER TO CONFORM TO STRUCTURE. AVOID OBSTRUCTIONS. PRESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR. DO NOT SCALE FROM DRAWINGS.
- ABUSE OF THE REQUEST FOR INFORMATION (RFI) PROCESS WILL NOT BE TOLERATED. RFIS REQUESTING INFORMATION ALREADY CONTAINED IN THE DESIGN DOCUMENTS, INVOLVING MEANS AND METHODS OF CONSTRUCTION, COORDINATION OF WORK BETWEEN TRADES, OR ITEMS NOT PREVIOUSLY AND THOROUGHLY INVESTIGATED AND RESEARCHED BY THE GENERAL CONTRACTOR WILL BE RETURNED UNANSWERED TO THE GENERAL CONTRACTOR. ALLOW TWO WEEKS FOR RFI RESPONSES FROM THE DESIGN TEAM.

MECHANICAL SYMBOLS LEGEND

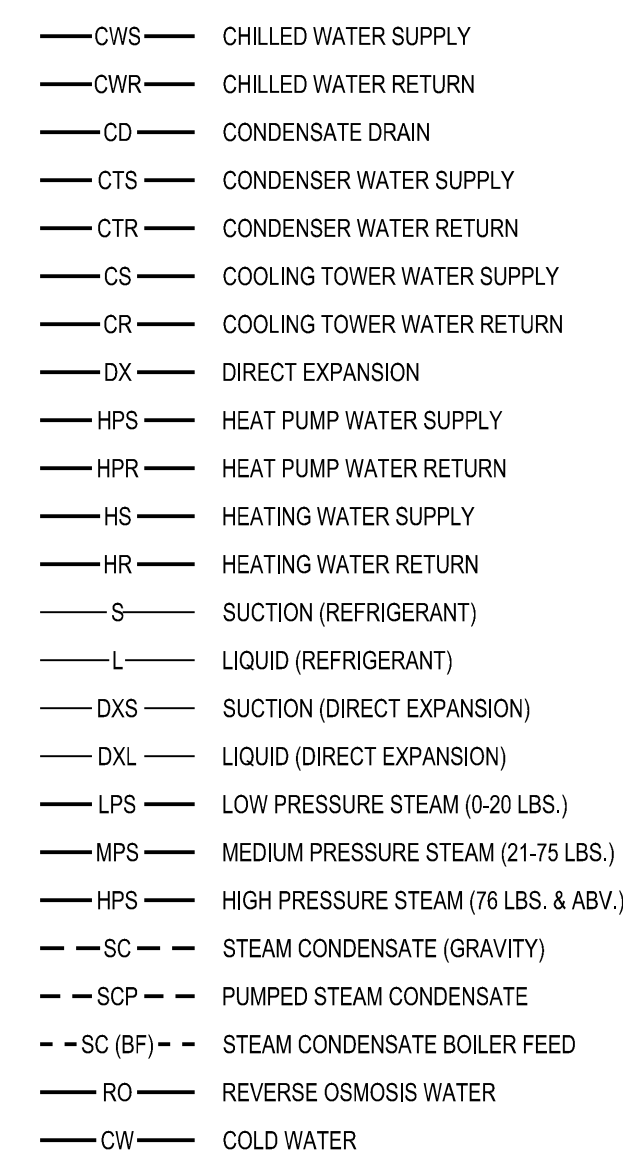
HVAC DUCTWORK SYMBOLS



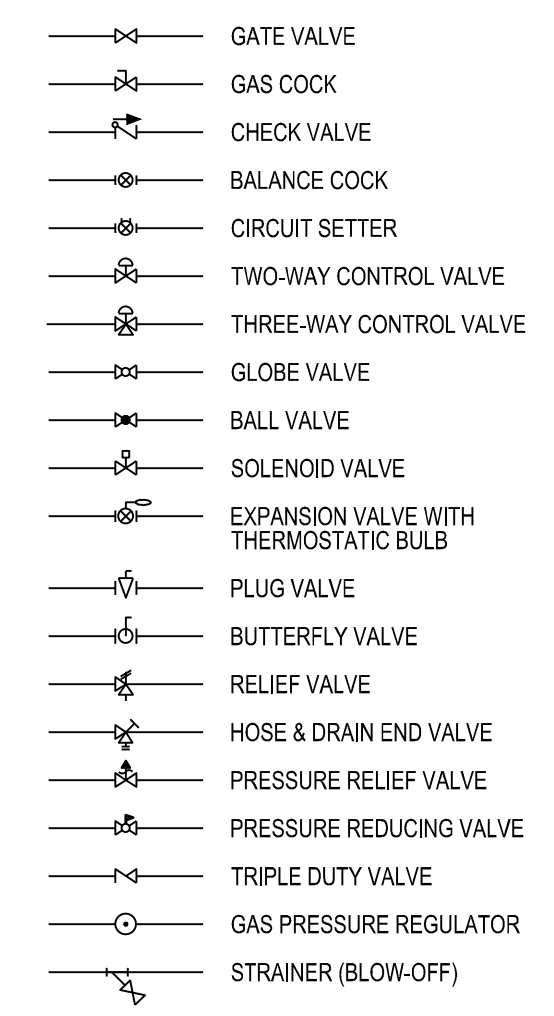
HVAC DUCTWORK & DIFFUSER TAGS



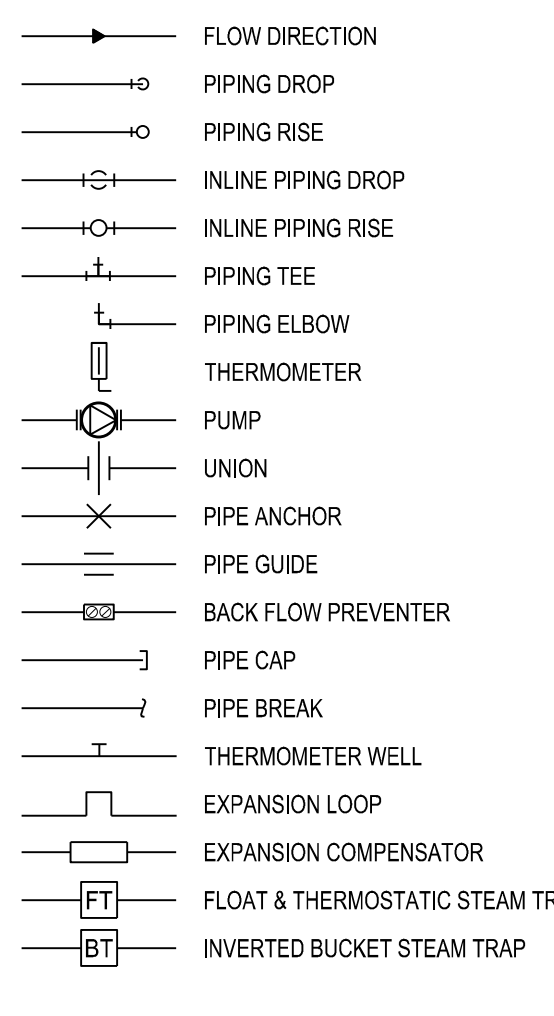
HVAC PIPING



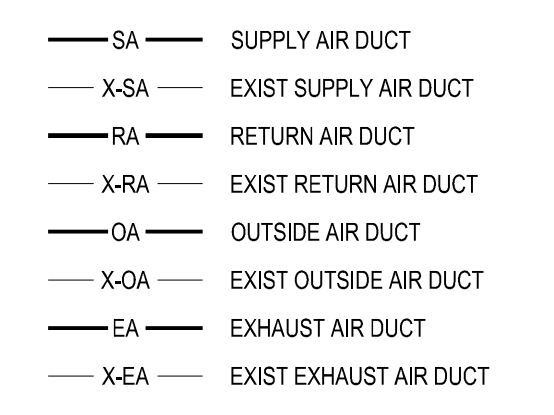
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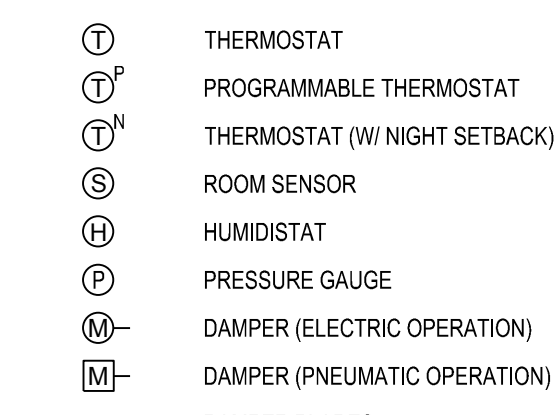
HVAC PIPING SYMBOLS



HVAC DUCTWORK



TEMPERATURE CONTROL SYMBOLS



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DEMOLITION NOTES

- ① DISCONNECT, REMOVE, & DEMO EXISTING AIR HANDLING UNIT ENTIRELY, INCLUDING ALL ACCESSORIES & CONTROLS ENTIRELY. PREPARE AREA FOR REPLACEMENT.
- ② DISCONNECT, REMOVE, & DEMO EXISTING RETURN FAN ENTIRELY. PREPARE AREA FOR REPLACEMENT.
- ③ DISCONNECT, REMOVE, AND DEMO EXISTING CONSTANT VOLUME REHEAT BOX AT LOCATION SHOWN.
- ④ DISCONNECT, REMOVE, AND DEMO EXISTING REHEAT COIL AT LOCATION SHOWN. PREPARE AREA FOR REPLACEMENT WITH FPVAV BOX.
- ⑤ DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER MANIFOLD AT LOCATION SHOWN.
- ⑥ DISCONNECT, REMOVE, AND DEMO EXISTING SUPPLY DUCTWORK TO EXTENTS SHOWN.



BASEMENT FLOOR PLAN - HVAC DEMOLITION
SCALE: 1/8" = 1'-0"

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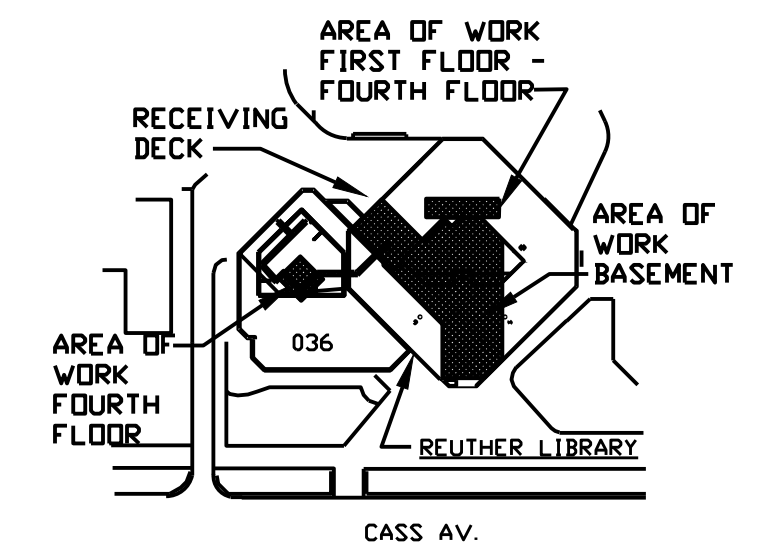
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| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|----------------|------|
| DESIGNER | E. ERNVALL | |
| DRAWN | E. ERNVALL | |
| CHECKED | C. TRIERWEILER | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

BASEMENT FLOOR PLAN HVAC DEMOLITION



WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO. **2164076**

SHEET NO. **M-1.0**

DSD FILE NAME **2164076-036-M-1.0**

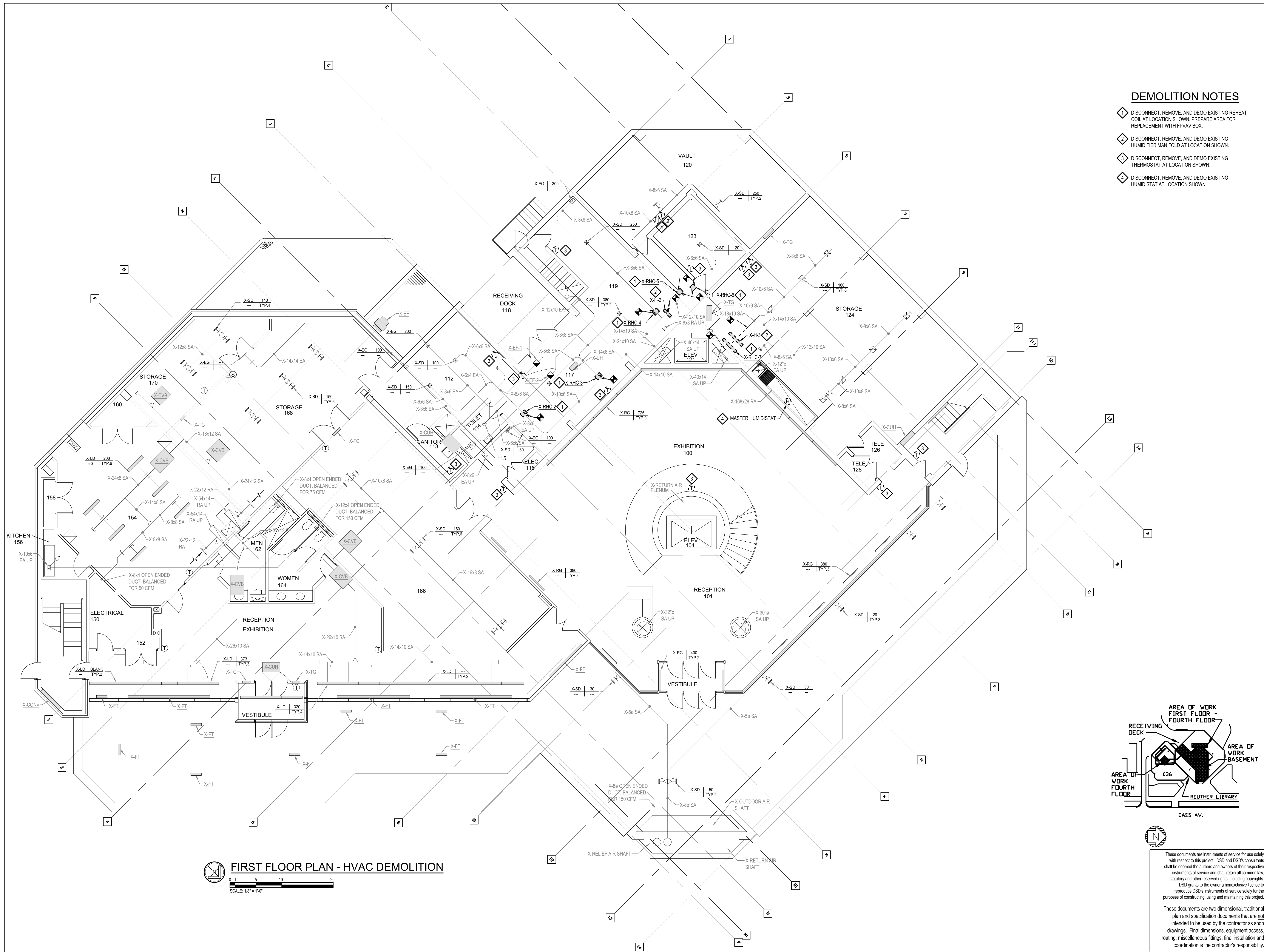
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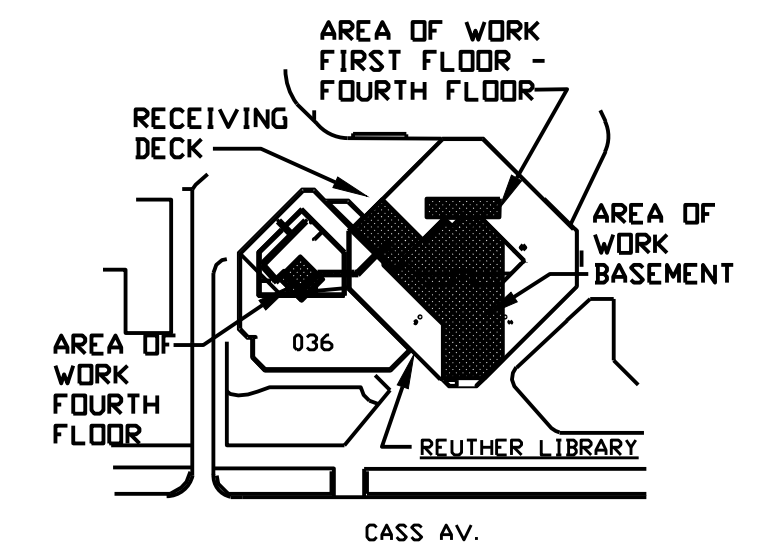
REGISTRATION SEAL
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DEMOLITION NOTES

- 1 DISCONNECT, REMOVE, AND DEMO EXISTING REHEAT COIL AT LOCATION SHOWN. PREPARE AREA FOR REPLACEMENT WITH FPI/AV BOX.
- 2 DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER MANIFOLD AT LOCATION SHOWN.
- 3 DISCONNECT, REMOVE, AND DEMO EXISTING THERMOSTAT AT LOCATION SHOWN.
- 4 DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDISTAT AT LOCATION SHOWN.



FIRST FLOOR PLAN - HVAC DEMOLITION
SCALE: 1/8" = 1'-0"



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| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

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| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

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REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN
FIRST FLOOR PLAN
HVAC DEMOLITION

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

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DSD FILE NAME
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| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

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| DESIGNER | E. ERNVALL | |
| DRAWN | E. ERNVALL | |
| CHECKED | C. TRIERWEILER | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

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SECOND FLOOR PLAN
HVAC DEMOLITION

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WSU BLDG #: 036

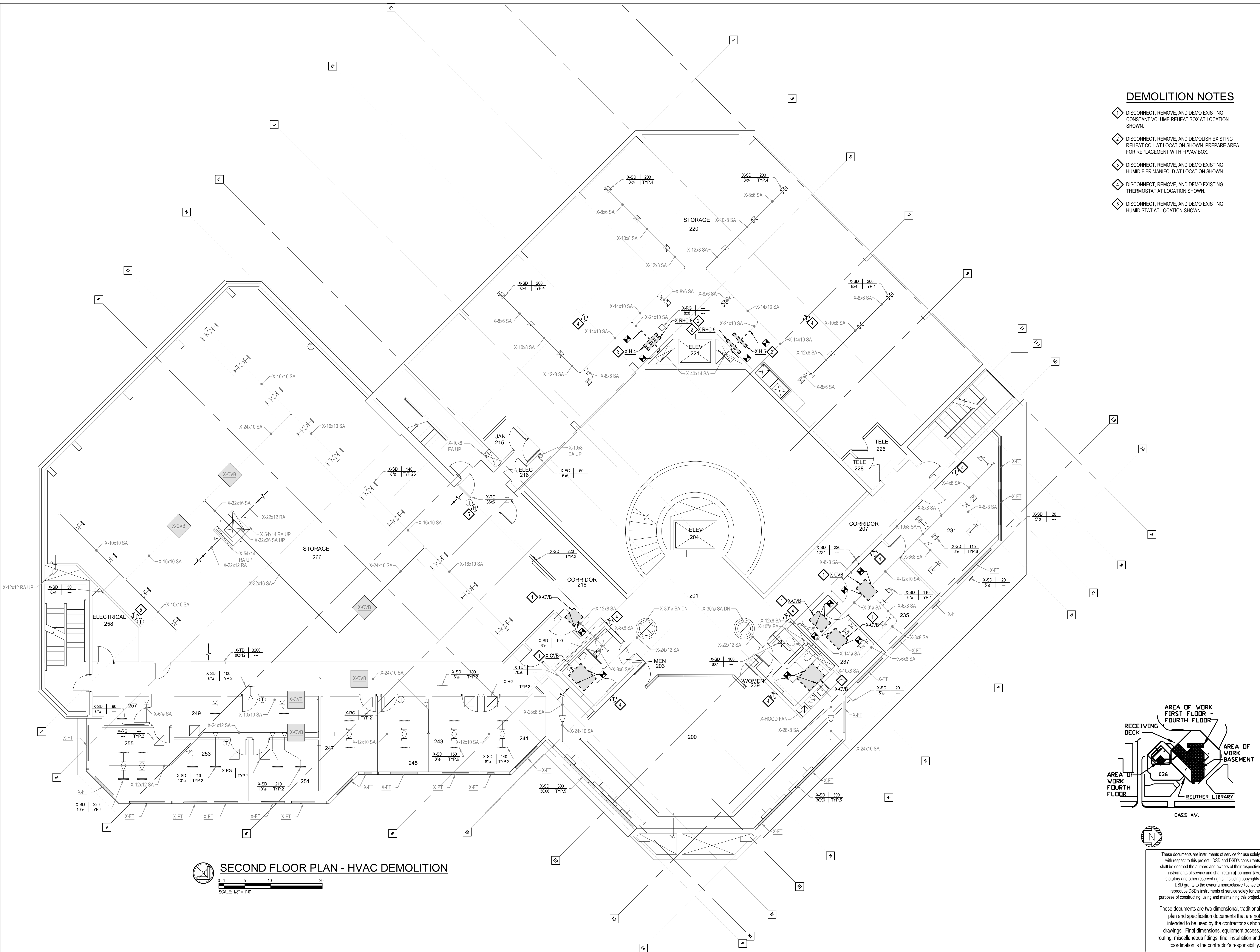
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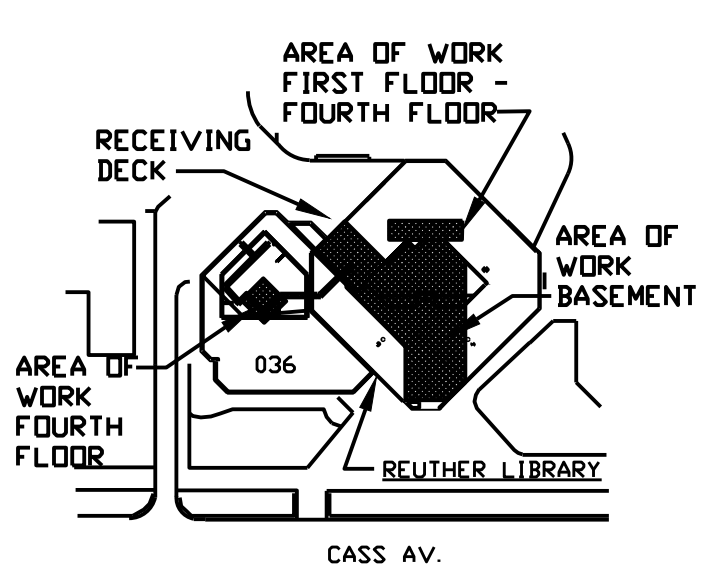
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DEMOLITION NOTES

- ◆ DISCONNECT, REMOVE, AND DEMO EXISTING CONSTANT VOLUME REHEAT BOX AT LOCATION SHOWN.
- ◆ DISCONNECT, REMOVE, AND DEMOLISH EXISTING REHEAT COIL AT LOCATION SHOWN. PREPARE AREA FOR REPLACEMENT WITH FFVAV BOX.
- ◆ DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER MANIFOLD AT LOCATION SHOWN.
- ◆ DISCONNECT, REMOVE, AND DEMO EXISTING THERMOSTAT AT LOCATION SHOWN.
- ◆ DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDISTAT AT LOCATION SHOWN.



SECOND FLOOR PLAN - HVAC DEMOLITION
SCALE: 1/8" = 1'-0"



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THIRD FLOOR PLAN HVAC DEMOLITION

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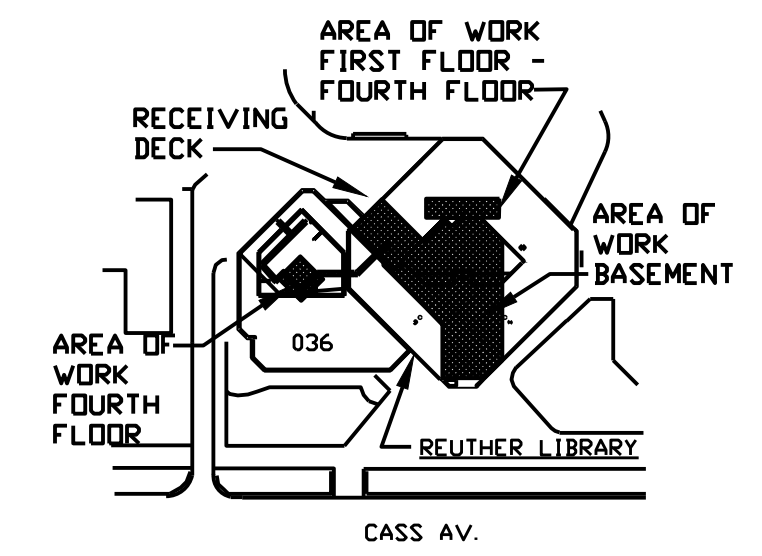
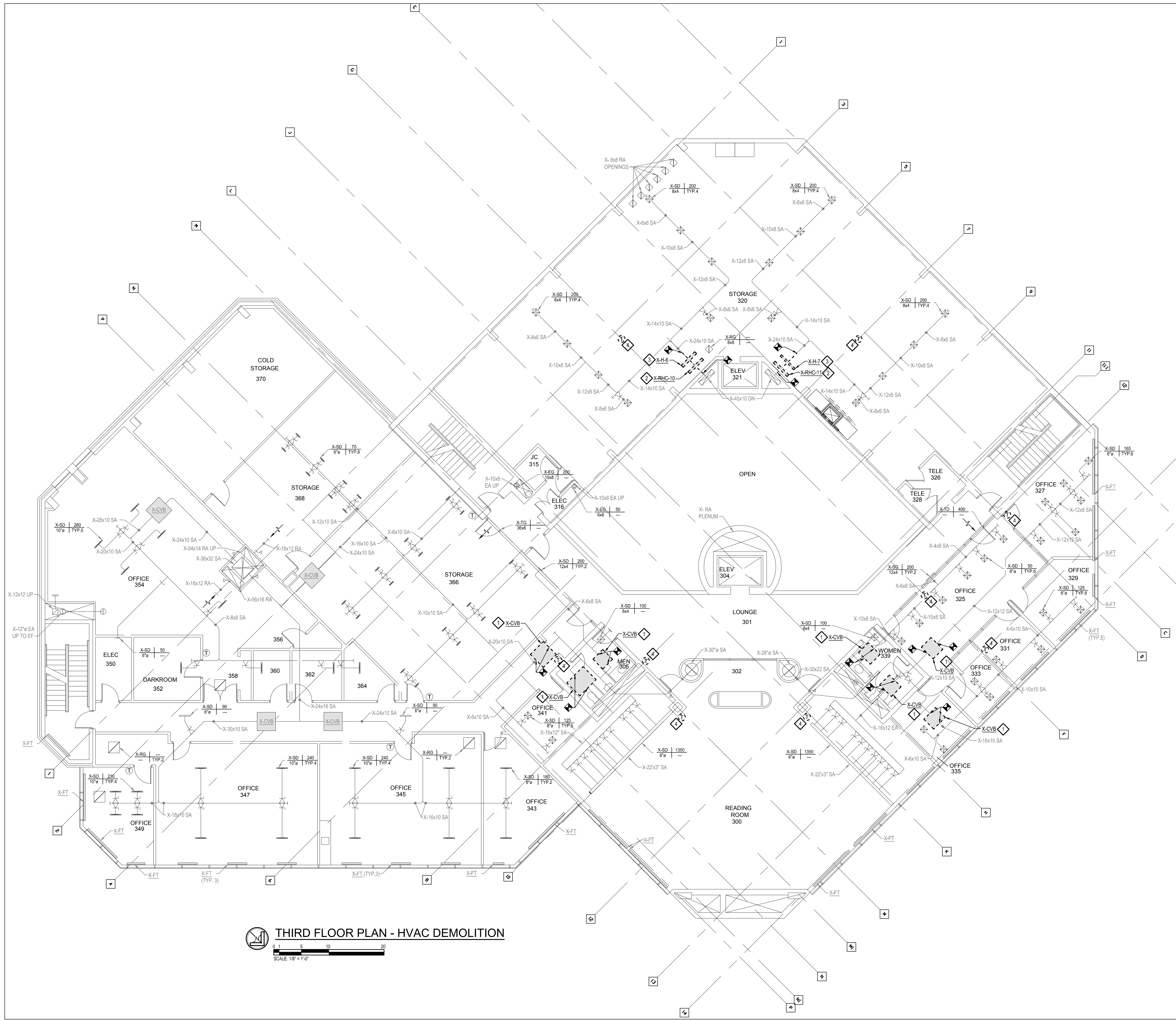
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2164076

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M-1.3

DSD FILE NAME
2164076-036-M-1.3

DEMOLITION NOTES

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- 2 DISCONNECT, REMOVE, AND DEMO EXISTING REHEAT COIL AT LOCATION SHOWN. PREPARE AREA FOR REPLACEMENT WITH FPI/AV BOX.
- 3 DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER MANIFOLD AT LOCATION SHOWN.
- 4 DISCONNECT, REMOVE, AND DEMO EXISTING THERMOSTAT AT LOCATION SHOWN.



THIRD FLOOR PLAN - HVAC DEMOLITION
SCALE: 1/8" = 1'-0"

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| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

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| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
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**FOURTH FLOOR PLAN
HVAC DEMOLITION**

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WSU BLDG NAME: REUTHER LIBRARY
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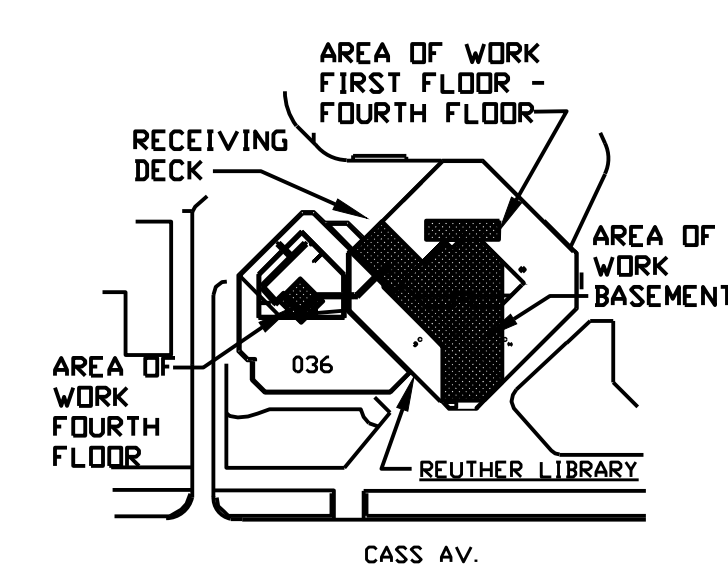
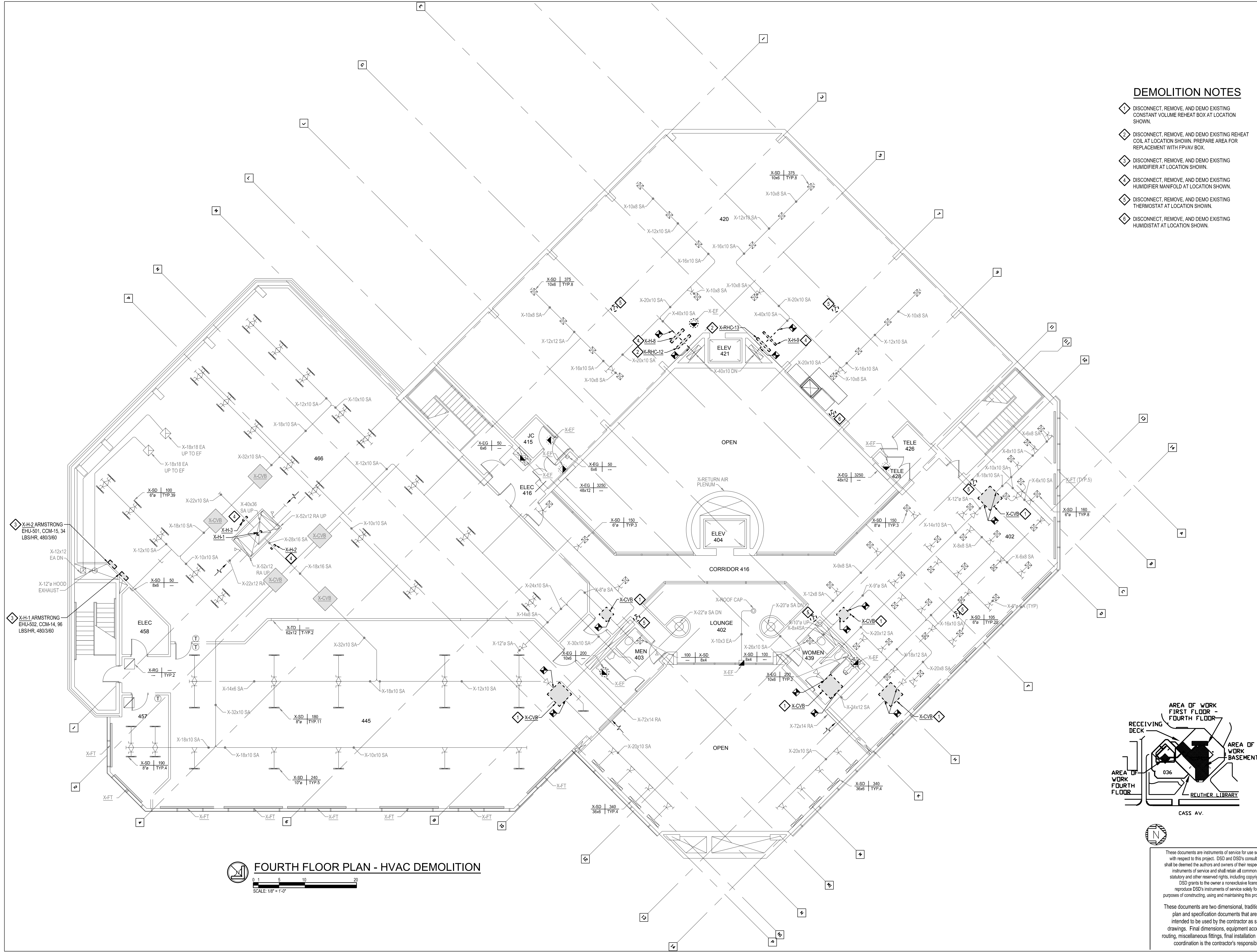
A/E PROJECT NO.
2164076

SHEET NO.
M-1.4

DSD FILE NAME
2164076-036-M-1.4

DEMOLITION NOTES

- 1 DISCONNECT, REMOVE, AND DEMO EXISTING CONSTANT VOLUME REHEAT BOX AT LOCATION SHOWN.
- 2 DISCONNECT, REMOVE, AND DEMO EXISTING REHEAT COIL AT LOCATION SHOWN. PREPARE AREA FOR REPLACEMENT WITH FPVAV BOX.
- 3 DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER AT LOCATION SHOWN.
- 4 DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER MANFOLD AT LOCATION SHOWN.
- 5 DISCONNECT, REMOVE, AND DEMO EXISTING THERMOSTAT AT LOCATION SHOWN.
- 6 DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDISTAT AT LOCATION SHOWN.



FOURTH FLOOR PLAN - HVAC DEMOLITION
SCALE: 1/8" = 1'-0"

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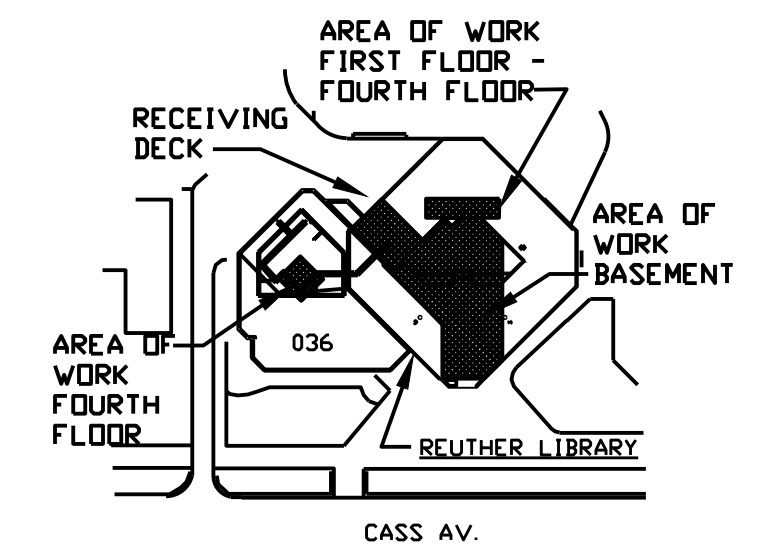
REGISTRATION SEAL
NOT FOR CONSTRUCTION

DEMOLITION NOTES

- 1 DISCONNECT, REMOVE, AND DEMOLISH EXISTING AIR HANDLING UNIT AT LOCATION SHOWN. DISCONNECT ASSOCIATED CHILLED WATER SUPPLY AND RETURN PIPING AS REQUIRED FOR REPLACEMENT.
- 2 DISCONNECT, REMOVE, AND DEMOLISH EXISTING STEAM BOILER, CONDENSATE RETURN/FEEDWATER SYSTEM, AND BLOWDOWN SEPARATOR INCLUDING ALL ASSOCIATED PIPING, FITTINGS, SUPPORTS, ACCESSORIES AND ANCHLAGES. SALVAGE ALL USEFUL PARTS AND RETURN TO OWNER.
- 3 DISCONNECT, REMOVE, AND DEMOLISH EXISTING CONSTANT VOLUME REHEAT BOX AT LOCATION SHOWN. DEMOLISH ASSOCIATED HEATING SUPPLY AND RETURN PIPING AS REQUIRED TO PREPARE FOR VAV BOX INSTALLATION.
- 4 DISCONNECT, REMOVE, AND DEMOLISH EXISTING REHEAT COIL AT LOCATION SHOWN. DEMOLISH ASSOCIATED HEATING SUPPLY AND RETURN PIPING AS REQUIRED TO PREPARE FOR FAN POWERED VAV BOX INSTALLATION.
- 5 DISCONNECT, REMOVE, AND DEMOLISH EXISTING HUMIDIFIER MANIFOLD AT LOCATION SHOWN. DEMOLISH ALL ASSOCIATED PIPING.
- 6 EXISTING BOILERS TO BE REPLACED AS OWNER'S WORK SCOPE.
- 7 DISCONNECT, REMOVE, AND DEMOLISH EXISTING CONTROL VALVE. REPLACE WITH NEW CONTROL VALVE. SEE NEW WORK SHEETS.
- 8 DISCONNECT, REMOVE, AND DEMOLISH EXISTING CONDENSATE RETURN PUMP INCLUDING ALL ASSOCIATED PIPING, ACCESSORIES, AND CONTROLS.



BASEMENT FLOOR PLAN - HYDRONIC DEMOLITION
 SCALE: 1/8" = 1'-0"



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**BASEMENT FLOOR PLAN
 HYDRONIC DEMOLITION**

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A/E PROJECT NO.
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DSD FILE NAME
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|-----------------------|----------|
| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|----------------|------|
| DESIGNER | E. ERNVALL | |
| DRAWN | E. ERNVALL | |
| CHECKED | C. TRIERWEILER | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

**FIRST FLOOR PLAN
HYDRONIC DEMOLITION**

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

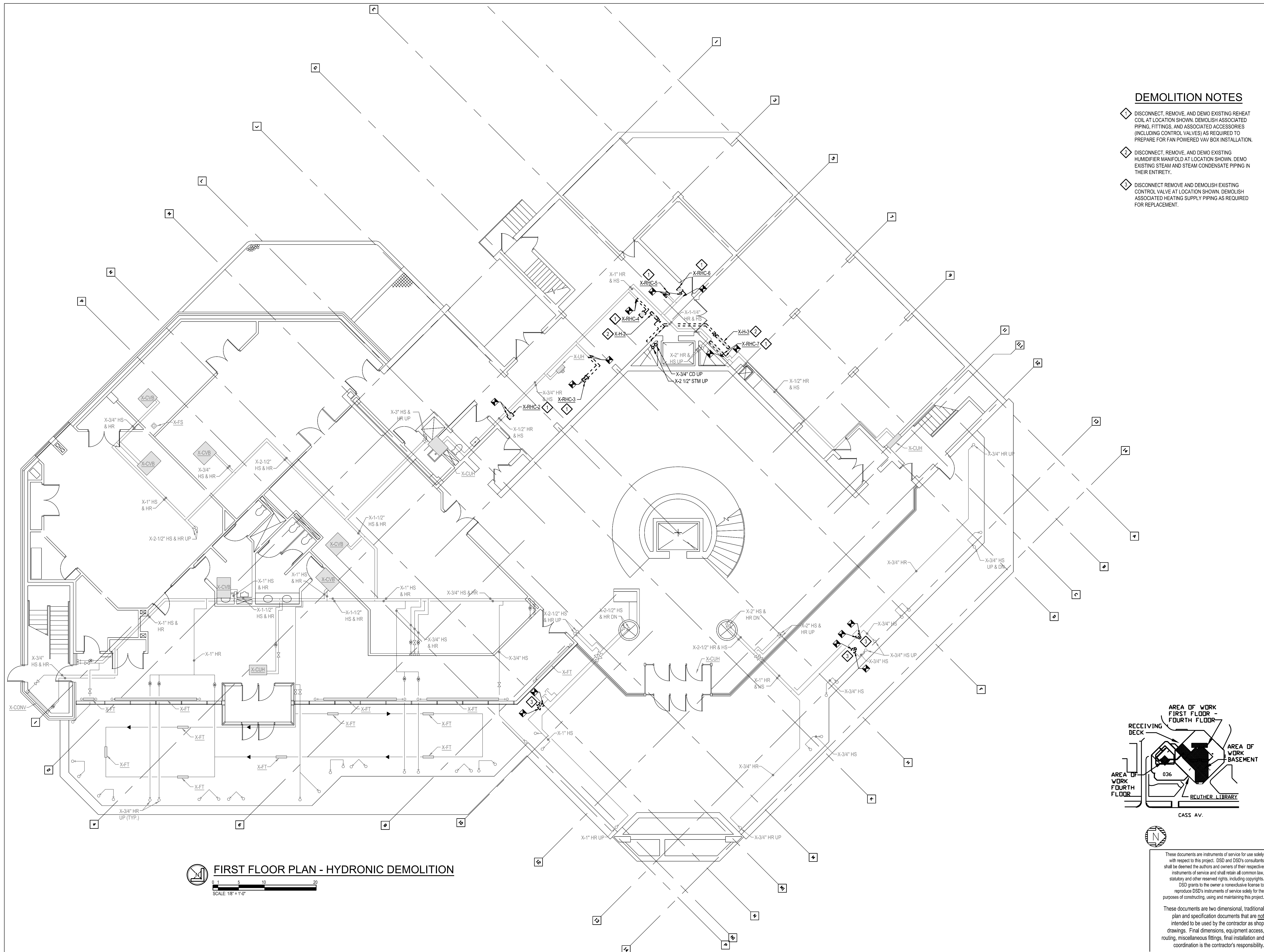
A/E PROJECT NO.
2164076

SHEET NO.
M-2.1

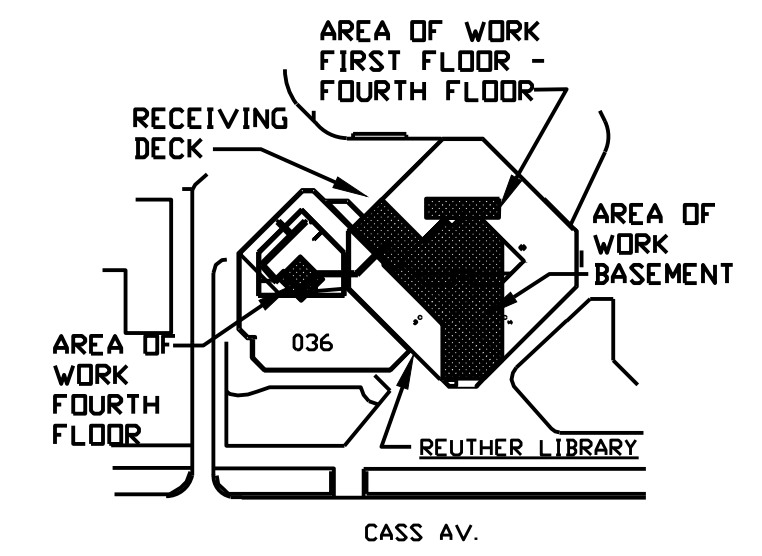
DSD FILE NAME
2164076-036-M-2.1

DEMOLITION NOTES

- 1 DISCONNECT, REMOVE, AND DEMO EXISTING REHEAT COIL AT LOCATION SHOWN. DEMOLISH ASSOCIATED PIPING, FITTINGS, AND ASSOCIATED ACCESSORIES (INCLUDING CONTROL VALVES) AS REQUIRED TO PREPARE FOR FAN POWERED VAV BOX INSTALLATION.
- 2 DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER MANIFOLD AT LOCATION SHOWN. DEMO EXISTING STEAM AND STEAM CONDENSATE PIPING IN THEIR ENTIRETY.
- 3 DISCONNECT REMOVE AND DEMOLISH EXISTING CONTROL VALVE AT LOCATION SHOWN. DEMOLISH ASSOCIATED HEATING SUPPLY PIPING AS REQUIRED FOR REPLACEMENT.



FIRST FLOOR PLAN - HYDRONIC DEMOLITION
SCALE: 1/8" = 1'-0"



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REGISTRATION SEAL

NOT FOR CONSTRUCTION

| MARK | ISSUE | DATE |
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| | DDC REL 05 - IFB | 04/08/24 |
| | DDC REL 04 - 95% REVIEW | 03/13/24 |
| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

SECOND FLOOR PLAN
HYDRONIC DEMOLITION

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

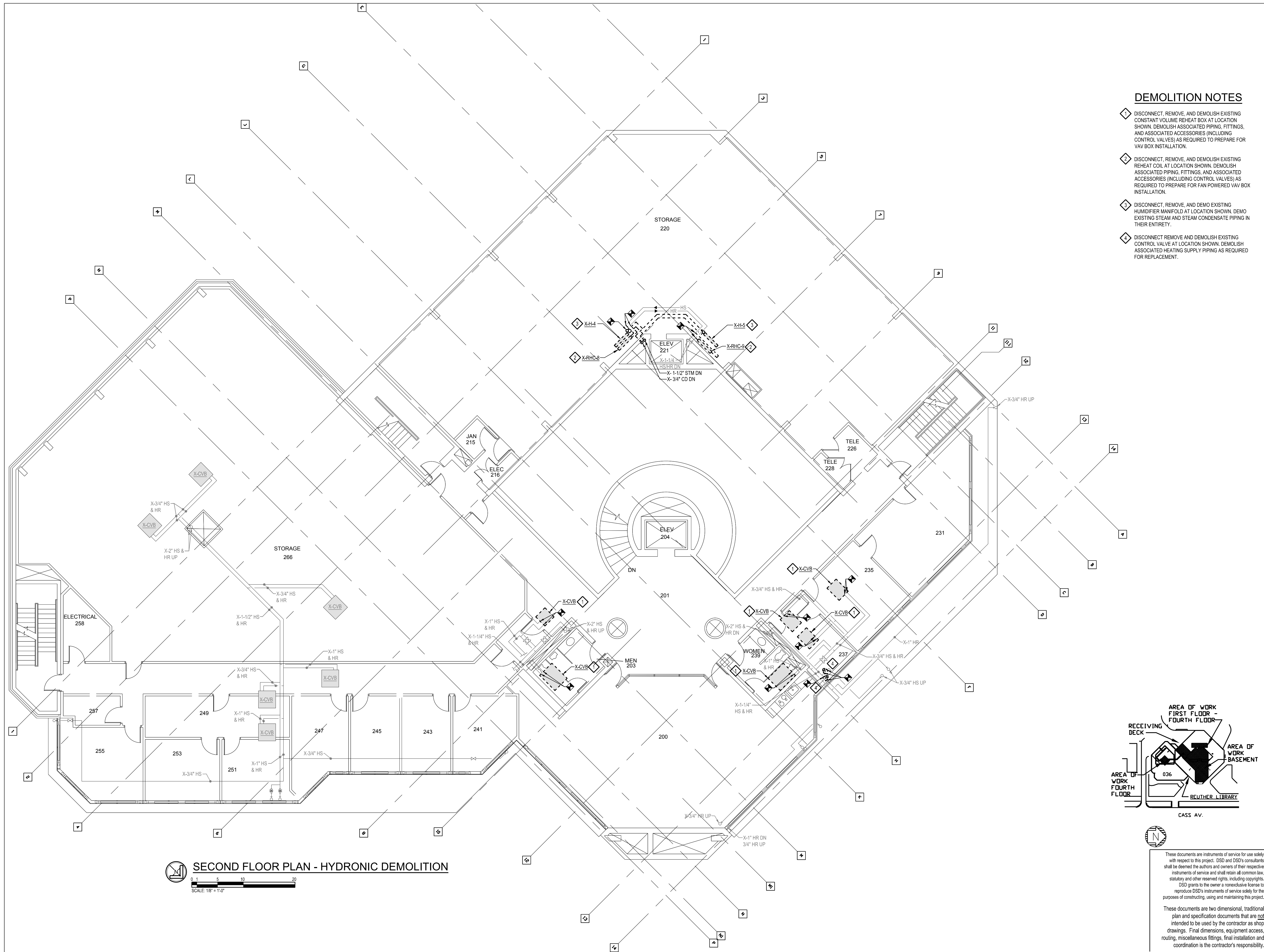
A/E PROJECT NO.
2164076

SHEET NO.
M-2.2

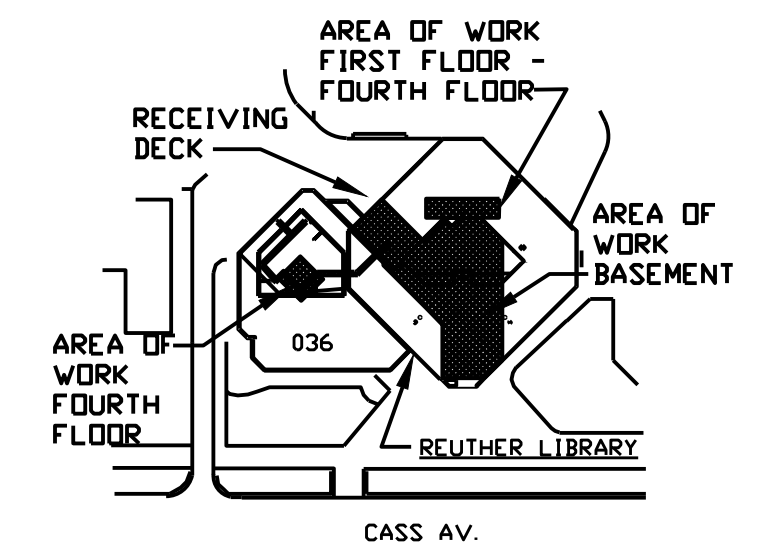
DSD FILE NAME
2164076-036-M-2.2

DEMOLITION NOTES

- DISCONNECT, REMOVE, AND DEMOLISH EXISTING CONSTANT VOLUME REHEAT BOX AT LOCATION SHOWN. DEMOLISH ASSOCIATED PIPING, FITTINGS, AND ASSOCIATED ACCESSORIES (INCLUDING CONTROL VALVES) AS REQUIRED TO PREPARE FOR VAV BOX INSTALLATION.
- DISCONNECT, REMOVE, AND DEMOLISH EXISTING REHEAT COIL AT LOCATION SHOWN. DEMOLISH ASSOCIATED PIPING, FITTINGS, AND ASSOCIATED ACCESSORIES (INCLUDING CONTROL VALVES) AS REQUIRED TO PREPARE FOR FAN POWERED VAV BOX INSTALLATION.
- DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER MANIFOLD AT LOCATION SHOWN. DEMO EXISTING STEAM AND STEAM CONDENSATE PIPING IN THEIR ENTIRETY.
- DISCONNECT REMOVE AND DEMOLISH EXISTING CONTROL VALVE AT LOCATION SHOWN. DEMOLISH ASSOCIATED HEATING SUPPLY PIPING AS REQUIRED FOR REPLACEMENT.



SECOND FLOOR PLAN - HYDRONIC DEMOLITION
SCALE: 1/8" = 1'-0"



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REGISTRATION SEAL

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| MARK | ISSUE | DATE |
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| | DDC REL 05 - IFB | 04/08/24 |
| | DDC REL 04 - 95% REVIEW | 03/13/24 |
| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

THIRD FLOOR PLAN
HYDRONIC DEMOLITION

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

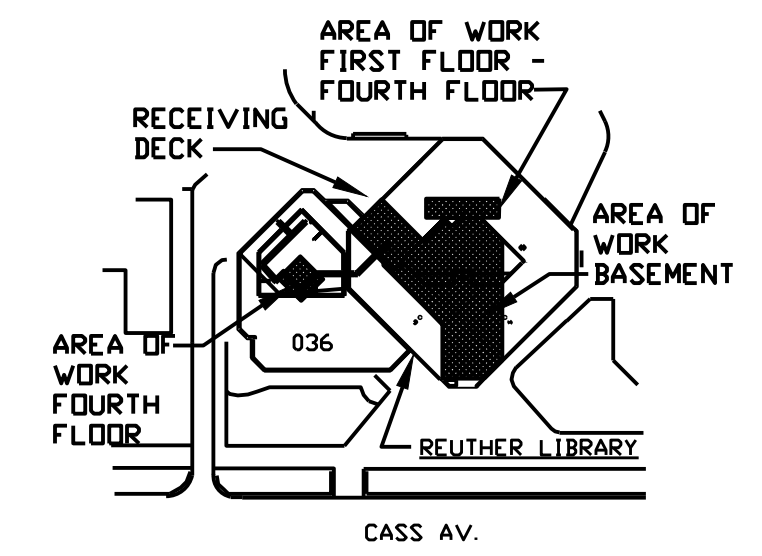
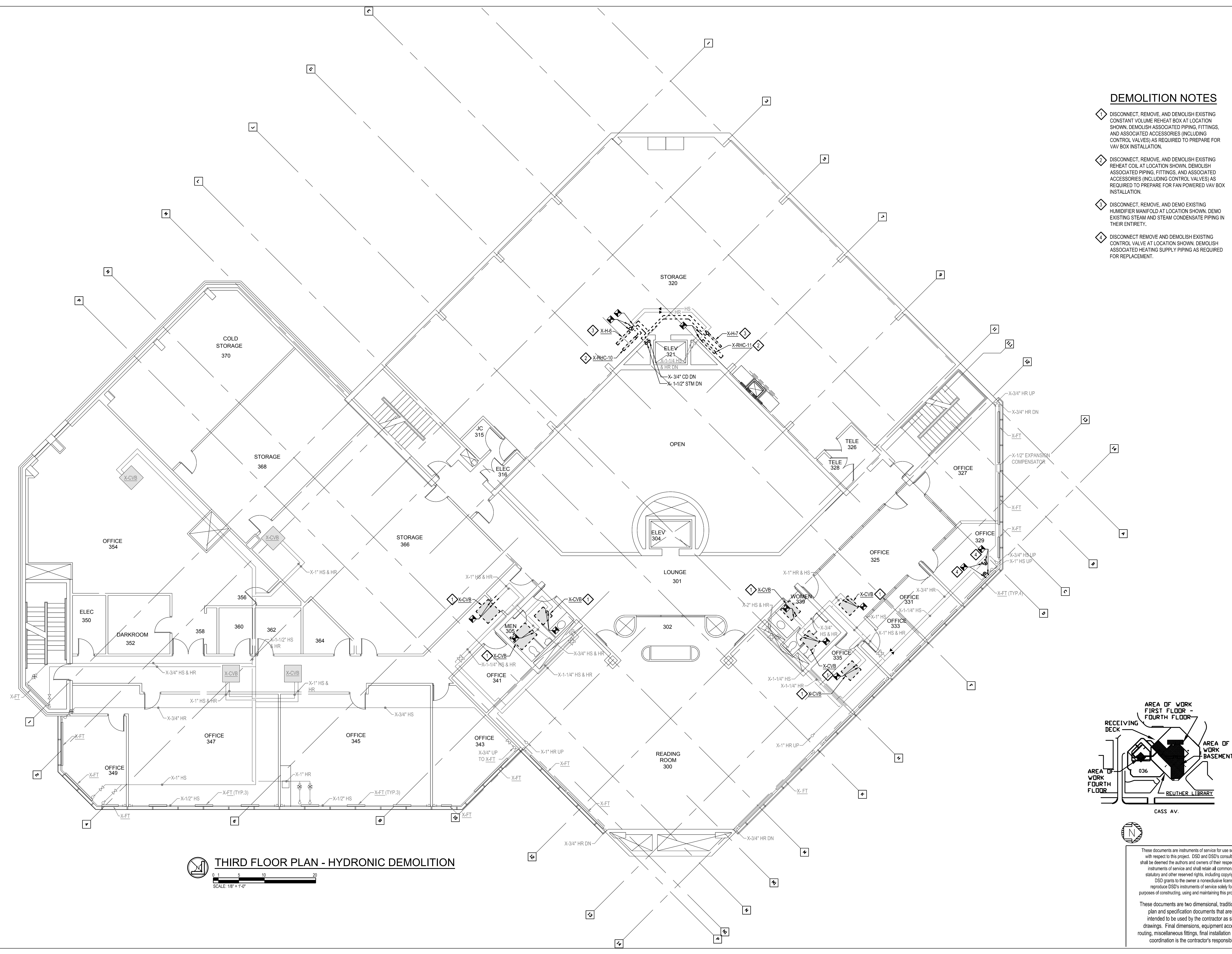
A/E PROJECT NO.
2164076

SHEET NO.
M-2.3

DSD FILE NAME
2164076-036-M-2.3

DEMOLITION NOTES

- DISCONNECT, REMOVE, AND DEMOLISH EXISTING CONSTANT VOLUME REHEAT BOX AT LOCATION SHOWN. DEMOLISH ASSOCIATED PIPING, FITTINGS, AND ASSOCIATED ACCESSORIES (INCLUDING CONTROL VALVES) AS REQUIRED TO PREPARE FOR VAV BOX INSTALLATION.
- DISCONNECT, REMOVE, AND DEMOLISH EXISTING REHEAT COIL AT LOCATION SHOWN. DEMOLISH ASSOCIATED PIPING, FITTINGS, AND ASSOCIATED ACCESSORIES (INCLUDING CONTROL VALVES) AS REQUIRED TO PREPARE FOR FAN POWERED VAV BOX INSTALLATION.
- DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER MANIFOLD AT LOCATION SHOWN. DEMO EXISTING STEAM AND STEAM CONDENSATE PIPING IN THEIR ENTIRETY.
- DISCONNECT REMOVE AND DEMOLISH EXISTING CONTROL VALVE AT LOCATION SHOWN. DEMOLISH ASSOCIATED HEATING SUPPLY PIPING AS REQUIRED FOR REPLACEMENT.



THIRD FLOOR PLAN - HYDRONIC DEMOLITION

0 1 5 10 20
SCALE: 1/8" = 1'-0"



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| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|----------------|------|
| DESIGNER | E. ERNVALL | |
| DRAWN | E. ERNVALL | |
| CHECKED | C. TRIERWEILER | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

**FOURTH FLOOR PLAN
HYDRONIC DEMOLITION**

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

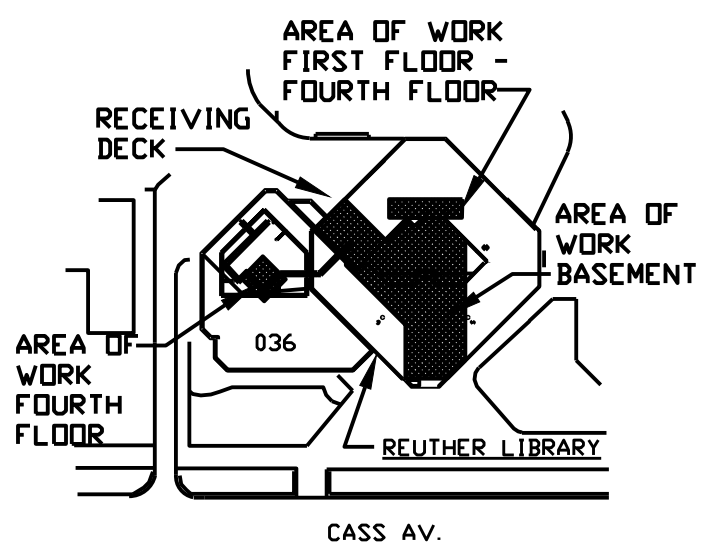
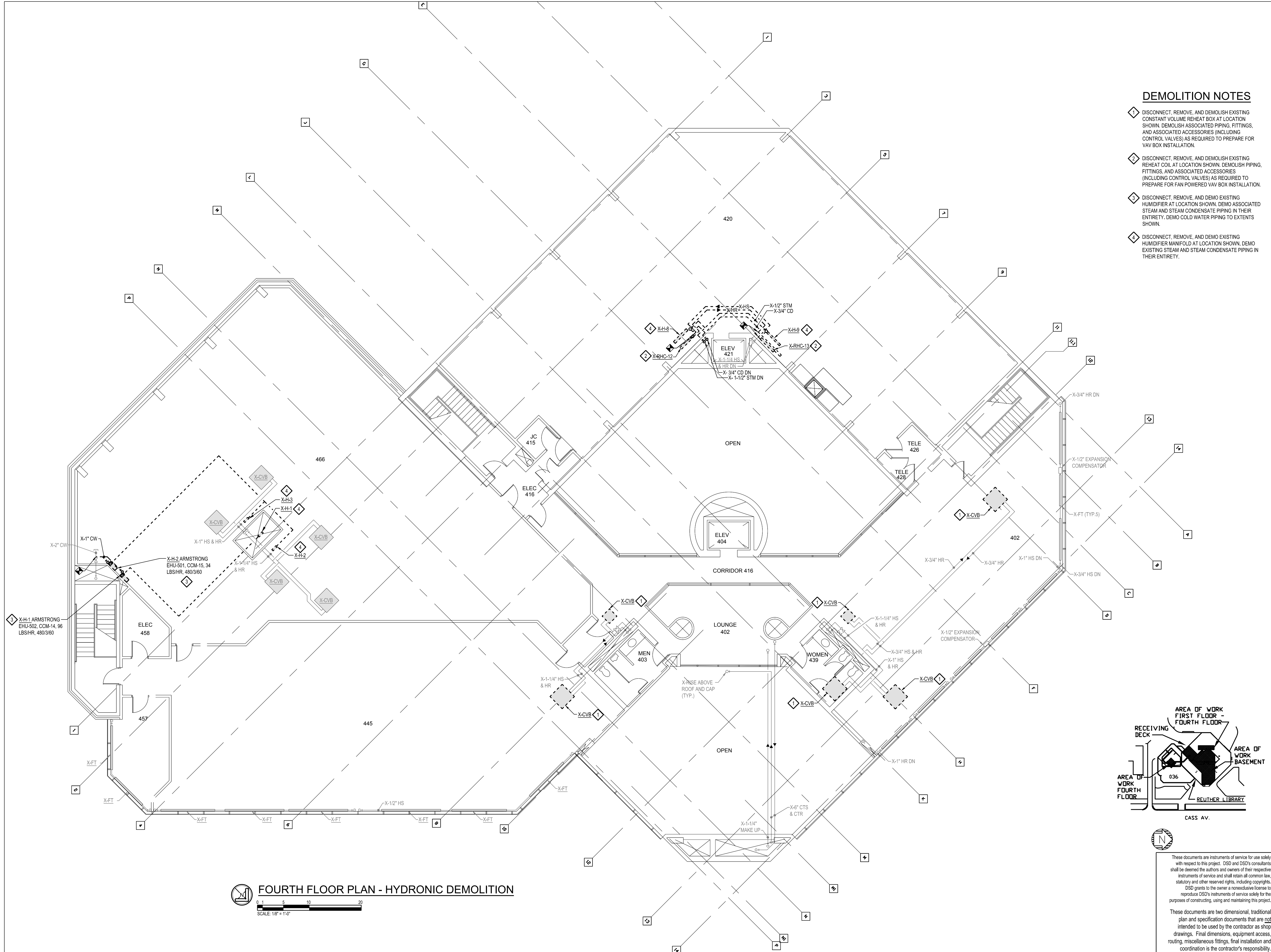
A/E PROJECT NO.
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SHEET NO.
M-2.4

DSD FILE NAME
2164076-036-M-2.4

DEMOLITION NOTES

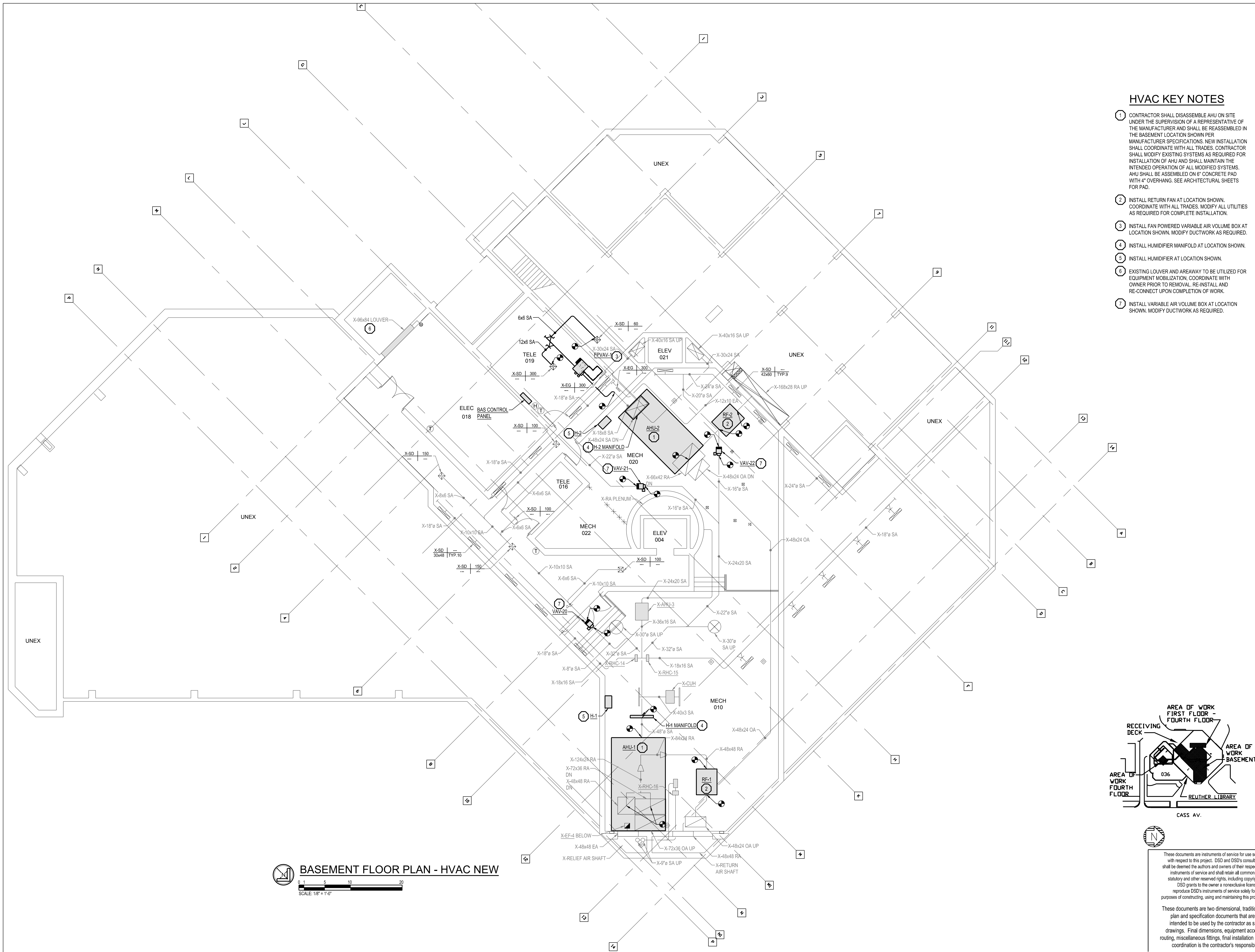
- 1 DISCONNECT, REMOVE, AND DEMOLISH EXISTING CONSTANT VOLUME REHEAT BOX AT LOCATION SHOWN. DEMOLISH ASSOCIATED PIPING, FITTINGS, AND ASSOCIATED ACCESSORIES (INCLUDING CONTROL VALVES) AS REQUIRED TO PREPARE FOR VAV BOX INSTALLATION.
- 2 DISCONNECT, REMOVE, AND DEMOLISH EXISTING REHEAT COIL AT LOCATION SHOWN. DEMOLISH PIPING, FITTINGS, AND ASSOCIATED ACCESSORIES (INCLUDING CONTROL VALVES) AS REQUIRED TO PREPARE FOR FAN POWERED VAV BOX INSTALLATION.
- 3 DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER AT LOCATION SHOWN. DEMO ASSOCIATED STEAM AND STEAM CONDENSATE PIPING IN THEIR ENTIRETY. DEMO COLD WATER PIPING TO EXTENTS SHOWN.
- 4 DISCONNECT, REMOVE, AND DEMO EXISTING HUMIDIFIER MANIFOLD AT LOCATION SHOWN. DEMO EXISTING STEAM AND STEAM CONDENSATE PIPING IN THEIR ENTIRETY.



FOURTH FLOOR PLAN - HYDRONIC DEMOLITION
SCALE: 1/8" = 1'-0"

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BASEMENT FLOOR PLAN - HVAC NEW
SCALE: 1/8" = 1'-0"

HVAC KEY NOTES

- CONTRACTOR SHALL DISASSEMBLE AHU ON SITE UNDER THE SUPERVISION OF A REPRESENTATIVE OF THE MANUFACTURER AND SHALL BE REASSEMBLED IN THE BASEMENT LOCATION SHOWN PER MANUFACTURER SPECIFICATIONS. NEW INSTALLATION SHALL COORDINATE WITH ALL TRADES. CONTRACTOR SHALL MODIFY EXISTING SYSTEMS AS REQUIRED FOR INSTALLATION OF AHU AND SHALL MAINTAIN THE INTENDED OPERATION OF ALL MODIFIED SYSTEMS. AHU SHALL BE ASSEMBLED ON 6" CONCRETE PAD WITH 4" OVERHANG. SEE ARCHITECTURAL SHEETS FOR PAD.
- INSTALL RETURN FAN AT LOCATION SHOWN. COORDINATE WITH ALL TRADES. MODIFY ALL UTILITIES AS REQUIRED FOR COMPLETE INSTALLATION.
- INSTALL FAN POWERED VARIABLE AIR VOLUME BOX AT LOCATION SHOWN. MODIFY DUCTWORK AS REQUIRED.
- INSTALL HUMIDIFIER MANIFOLD AT LOCATION SHOWN.
- INSTALL HUMIDIFIER AT LOCATION SHOWN.
- EXISTING LOUVER AND AREAWAY TO BE UTILIZED FOR EQUIPMENT MOBILIZATION. COORDINATE WITH OWNER PRIOR TO REMOVAL, RE-INSTALL AND RE-CONNECT UPON COMPLETION OF WORK.
- INSTALL VARIABLE AIR VOLUME BOX AT LOCATION SHOWN. MODIFY DUCTWORK AS REQUIRED.

WAYNE STATE UNIVERSITY

Facilities Planning & Management
Design Services
5454 Cass Ave.
Detroit MI 48202

GHAFFARI

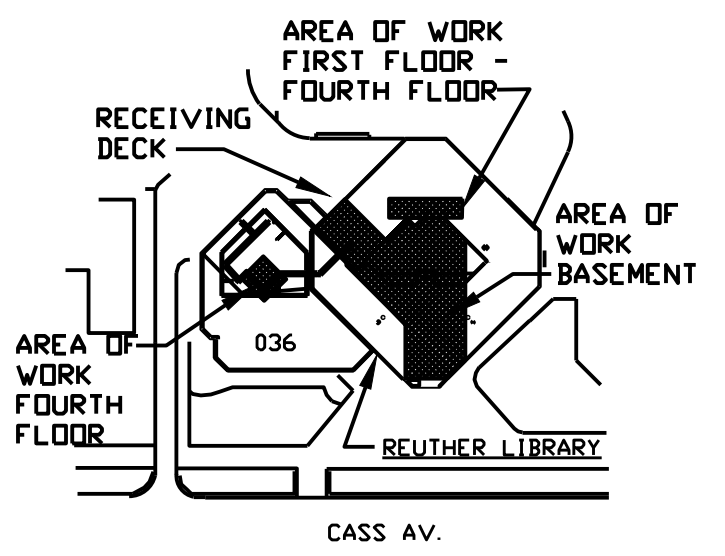
17101 MICHIGAN AVENUE
DEARBORN, MI 48126-2736 USA
TEL +1.313.441.3000
www.gaffari.com

REGISTRATION SEAL
NOT FOR CONSTRUCTION

| MARK | ISSUE | DATE |
|------|-----------------------|----------|
| | DDC REL 05 - IFB | 04/08/24 |
| | DDC REL 04-95% REVIEW | 03/13/24 |
| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**



REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN
BASEMENT FLOOR PLAN HVAC NEW

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
M-3.0

DSD FILE NAME
2164076-036-M-3.0

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REGISTRATION SEAL

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| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
 5401 CASS AVENUE
 DETROIT, MICHIGAN

FIRST FLOOR PLAN
 HVAC NEW

WSU PROJECT #: 036-350464
 WSU BLDG NAME: REUTHER LIBRARY
 WSU BLDG #: 036

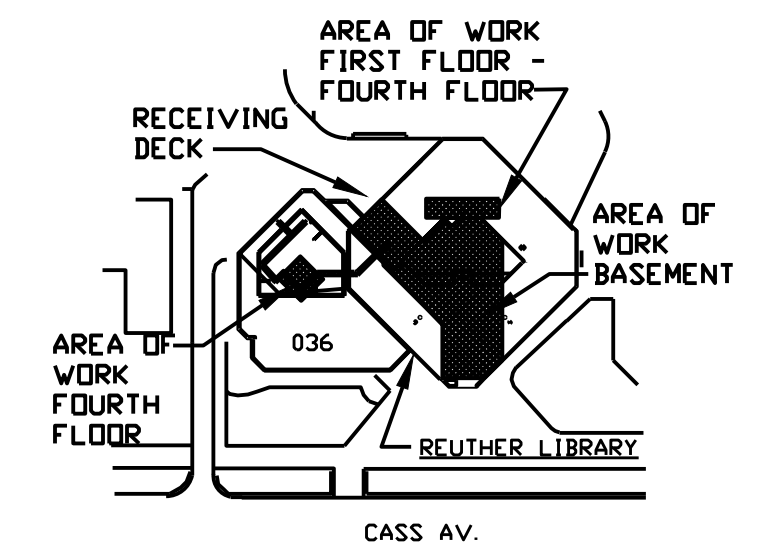
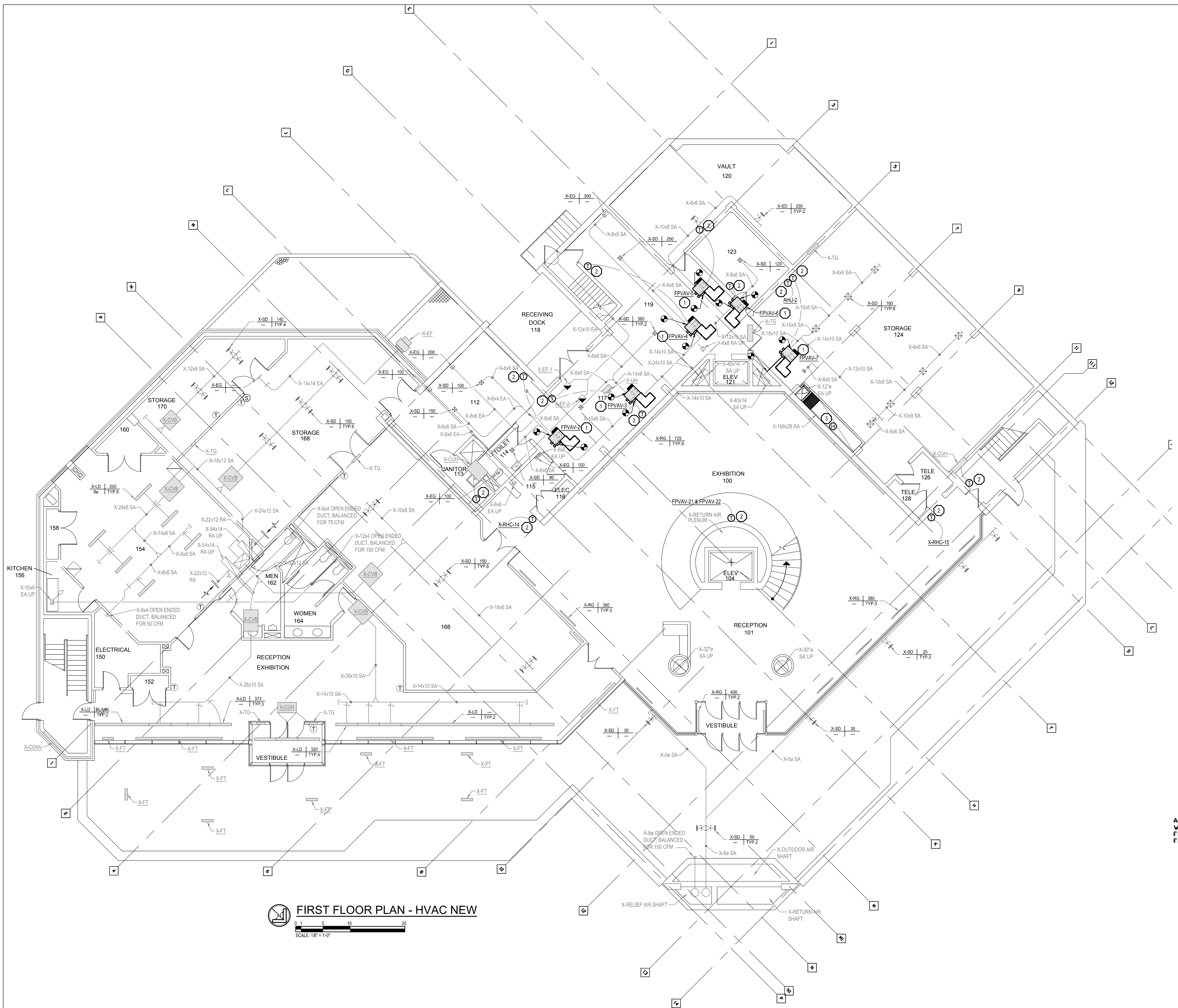
A/E PROJECT NO.
 2164076

SHEET NO.
 M-3.1

DSD FILE NAME
 2164076-036-M-3.1

HVAC KEY NOTES

- 1 INSTALL FAN POWERED VARIABLE AIR VOLUME BOX AT LOCATION SHOWN. MODIFY DUCTWORK AS REQUIRED.
- 2 INSTALL THERMOSTAT AT LOCATION SHOWN. MODIFY/EXTEND/REPLACE EXISTING CONTROLS WIRING AS REQUIRED FOR COMPLETE INSTALLATION.
- 3 INSTALL HUMIDISTAT IN EXISTING RETURN AIR MAIN. MODIFY/EXTEND/REPLACE EXISTING WIRING REQUIRED FOR COMPLETE INSTALLATION.



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| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

**SECOND FLOOR PLAN
HVAC NEW**

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

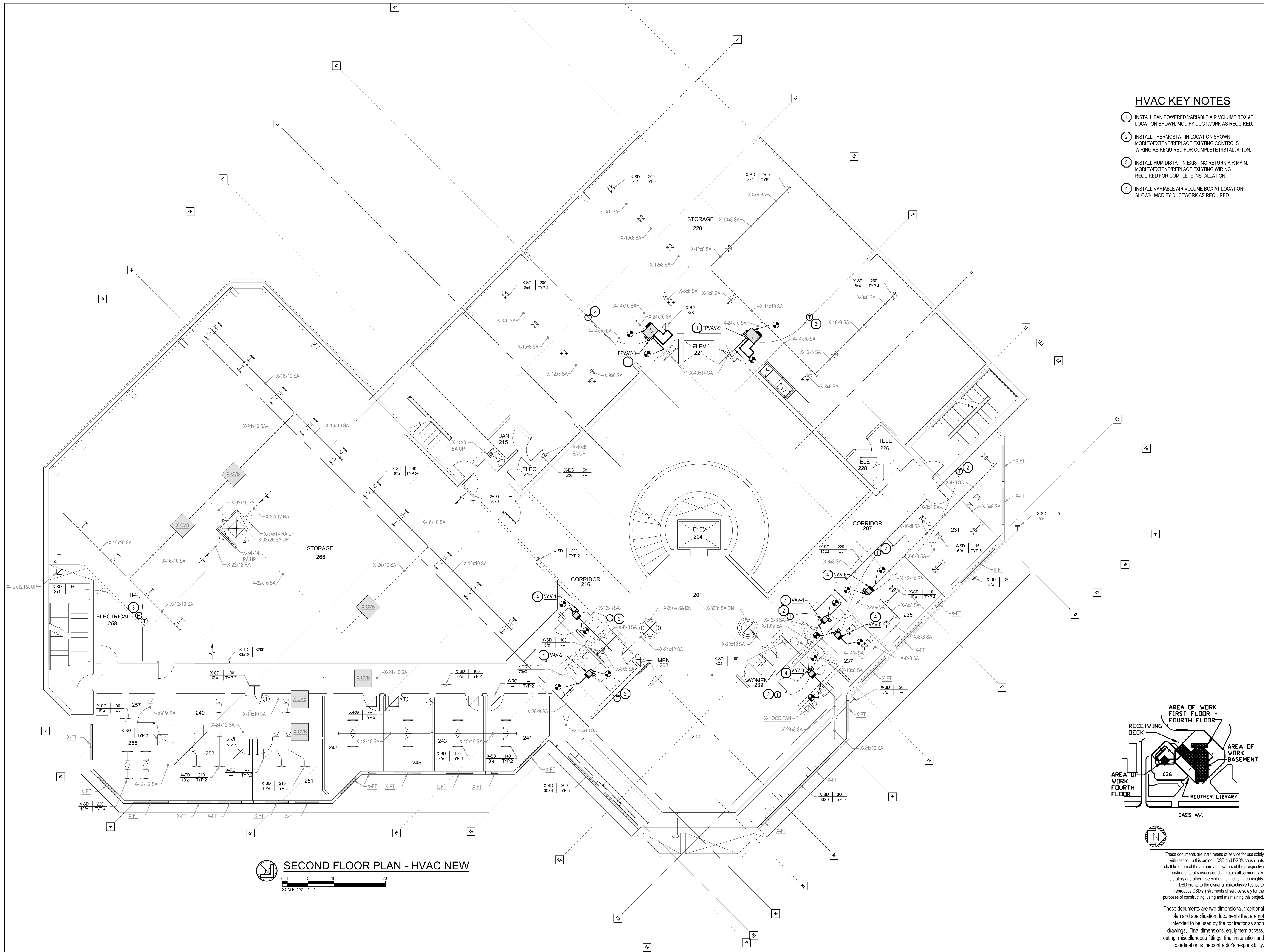
A/E PROJECT NO.
2164076

SHEET NO.
M-3.2

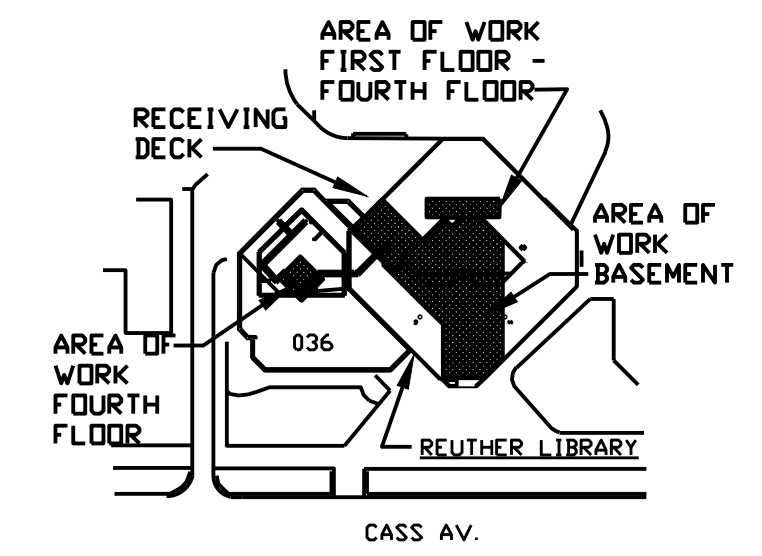
DSD FILE NAME
2164076-036-M-3.2

HVAC KEY NOTES

1. INSTALL FAN POWERED VARIABLE AIR VOLUME BOX AT LOCATION SHOWN. MODIFY DUCTWORK AS REQUIRED.
2. INSTALL THERMOSTAT IN LOCATION SHOWN. MODIFY/EXTEND/REPLACE EXISTING CONTROLS WIRING AS REQUIRED FOR COMPLETE INSTALLATION.
3. INSTALL HUMIDISTAT IN EXISTING RETURN AIR MAIN. MODIFY/EXTEND/REPLACE EXISTING WIRING REQUIRED FOR COMPLETE INSTALLATION.
4. INSTALL VARIABLE AIR VOLUME BOX AT LOCATION SHOWN. MODIFY DUCTWORK AS REQUIRED.



SECOND FLOOR PLAN - HVAC NEW
SCALE: 1/8" = 1'-0"



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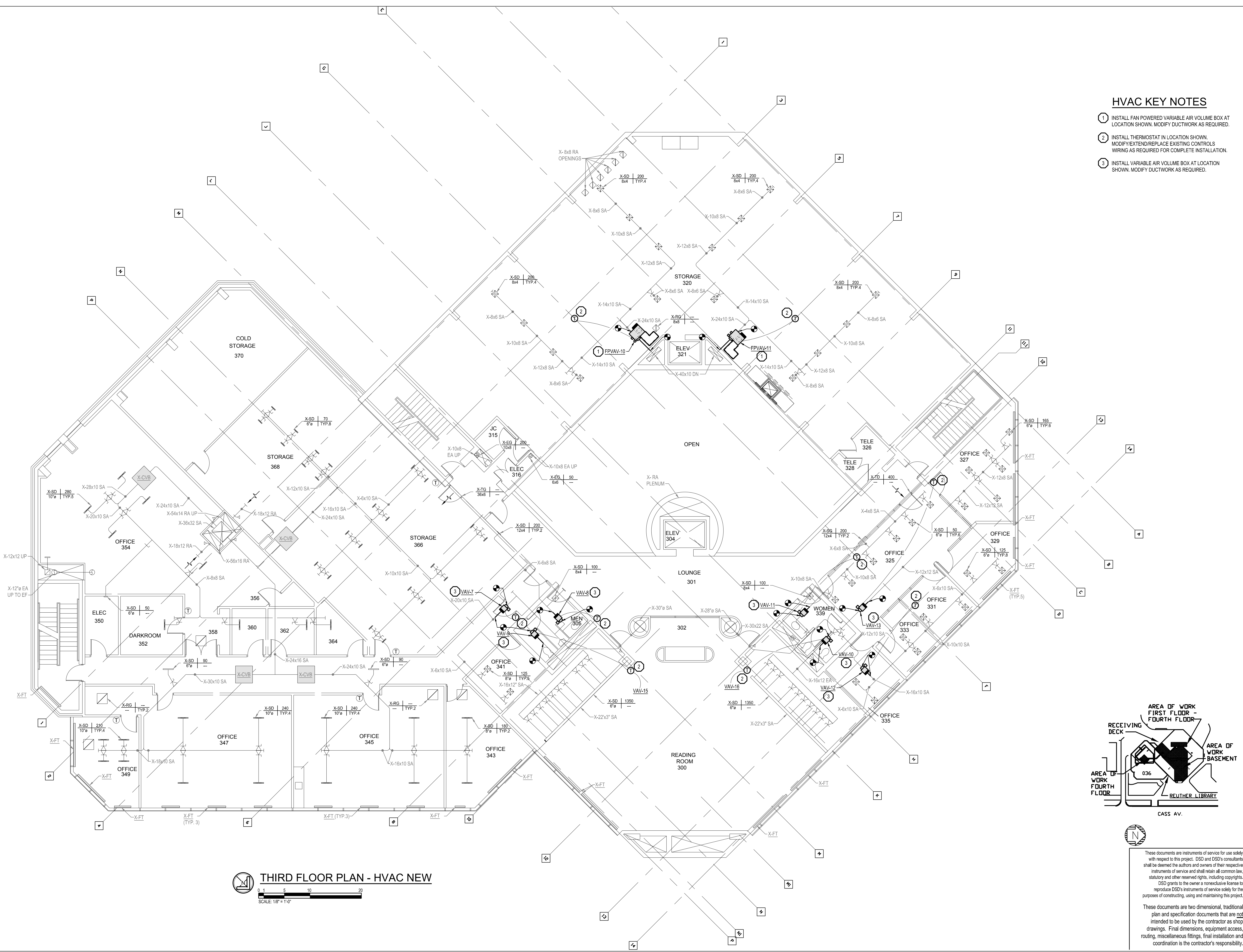
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REGISTRATION SEAL

NOT FOR CONSTRUCTION

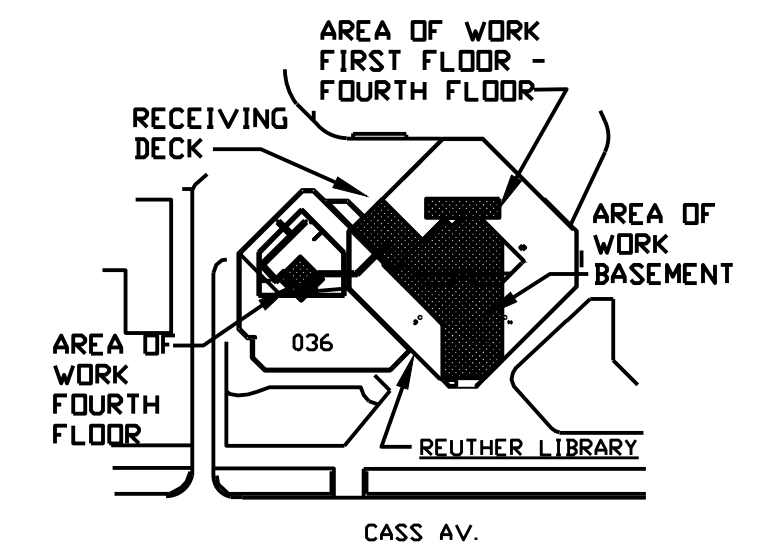
HVAC KEY NOTES

- 1 INSTALL FAN POWERED VARIABLE AIR VOLUME BOX AT LOCATION SHOWN. MODIFY DUCTWORK AS REQUIRED.
- 2 INSTALL THERMOSTAT IN LOCATION SHOWN. MODIFY/EXTEND/REPLACE EXISTING CONTROLS WIRING AS REQUIRED FOR COMPLETE INSTALLATION.
- 3 INSTALL VARIABLE AIR VOLUME BOX AT LOCATION SHOWN. MODIFY DUCTWORK AS REQUIRED.



THIRD FLOOR PLAN - HVAC NEW

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



TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

THIRD FLOOR PLAN
HVAC NEW

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
M-3.3

DSD FILE NAME
2164076-036-M-3.3

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HVAC KEY NOTES

- 1 INSTALL FAN POWERED VARIABLE AIR VOLUME BOX AT LOCATION SHOWN. MODIFY DUCTWORK AS REQUIRED.
- 2 INSTALL HUMIDIFIER AT LOCATION SHOWN.
- 3 INSTALL HUMIDIFIER MANIFOLD AT LOCATION SHOWN. MODIFY SUPPLY DUCTWORK AS REQUIRED FOR INSTALLATION.
- 4 INSTALL THERMOSTAT IN LOCATION SHOWN. MODIFY/EXTEND/REPLACE EXISTING CONTROLS WIRING AS REQUIRED FOR COMPLETE INSTALLATION.
- 5 INSTALL HUMIDISTAT AT LOCATION SHOWN. MODIFY/EXTEND/REPLACE EXISTING WIRING REQUIRED FOR COMPLETE INSTALLATION.
- 6 INSTALL VARIABLE AIR VOLUME BOX AT LOCATION SHOWN. MODIFY DUCTWORK AS REQUIRED.

NOT FOR CONSTRUCTION

| MARK | ISSUE | DATE |
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| | DDC REL 05 - IFB | 04/08/24 |
| | DDC REL 04-95% REVIEW | 03/13/24 |
| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| DESIGNER | E. ERNVALL |
|-------------|----------------|
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN
**FOURTH LEVEL PLAN
HVAC NEW**

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

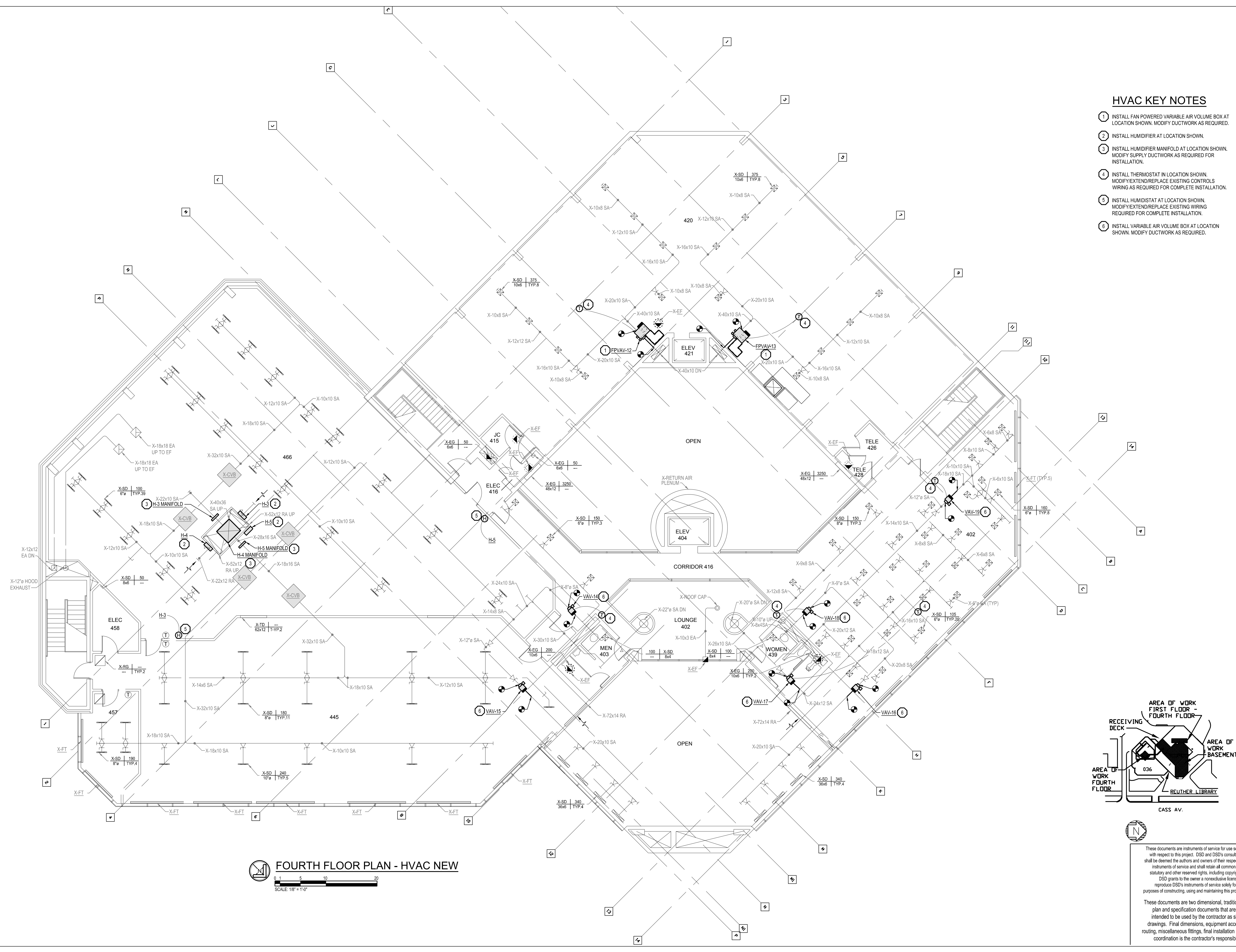
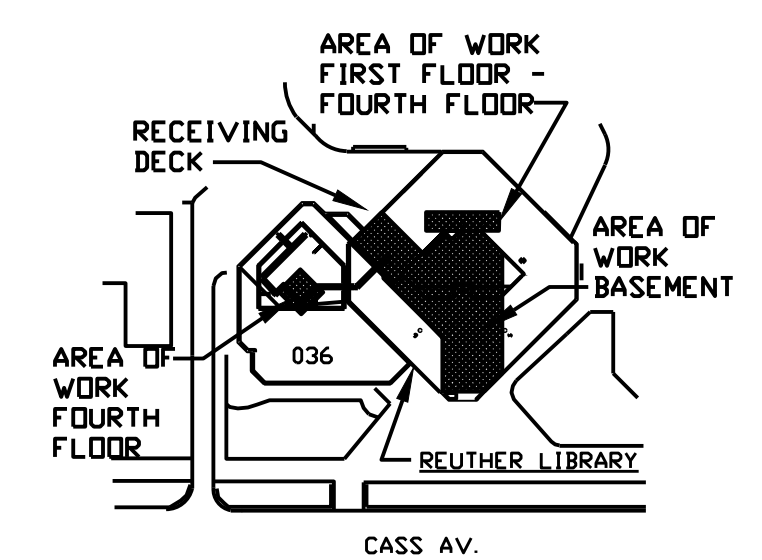
A/E PROJECT NO.
2164076

SHEET NO.
M-3.4

DSD FILE NAME
2164076-036-M-3.4

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FOURTH FLOOR PLAN - HVAC NEW
SCALE: 1/8" = 1'-0"

REGISTRATION SEAL

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|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN
BASEMENT FLOOR PLAN
HYDRONIC NEW

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

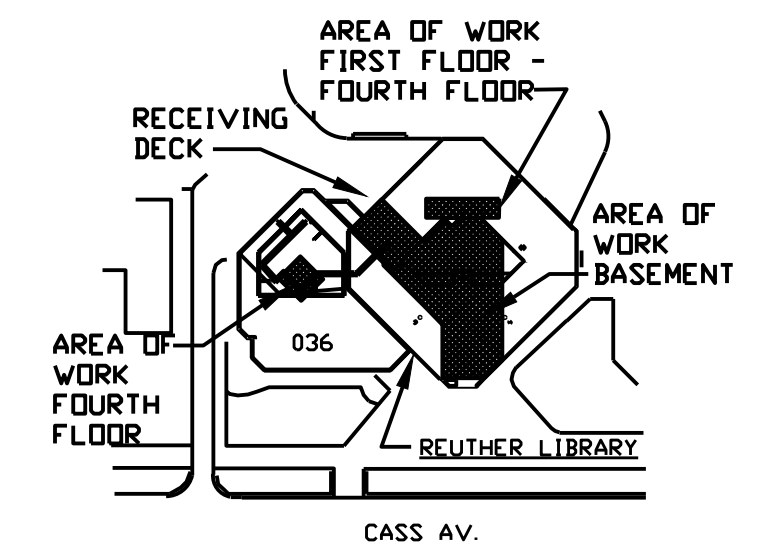
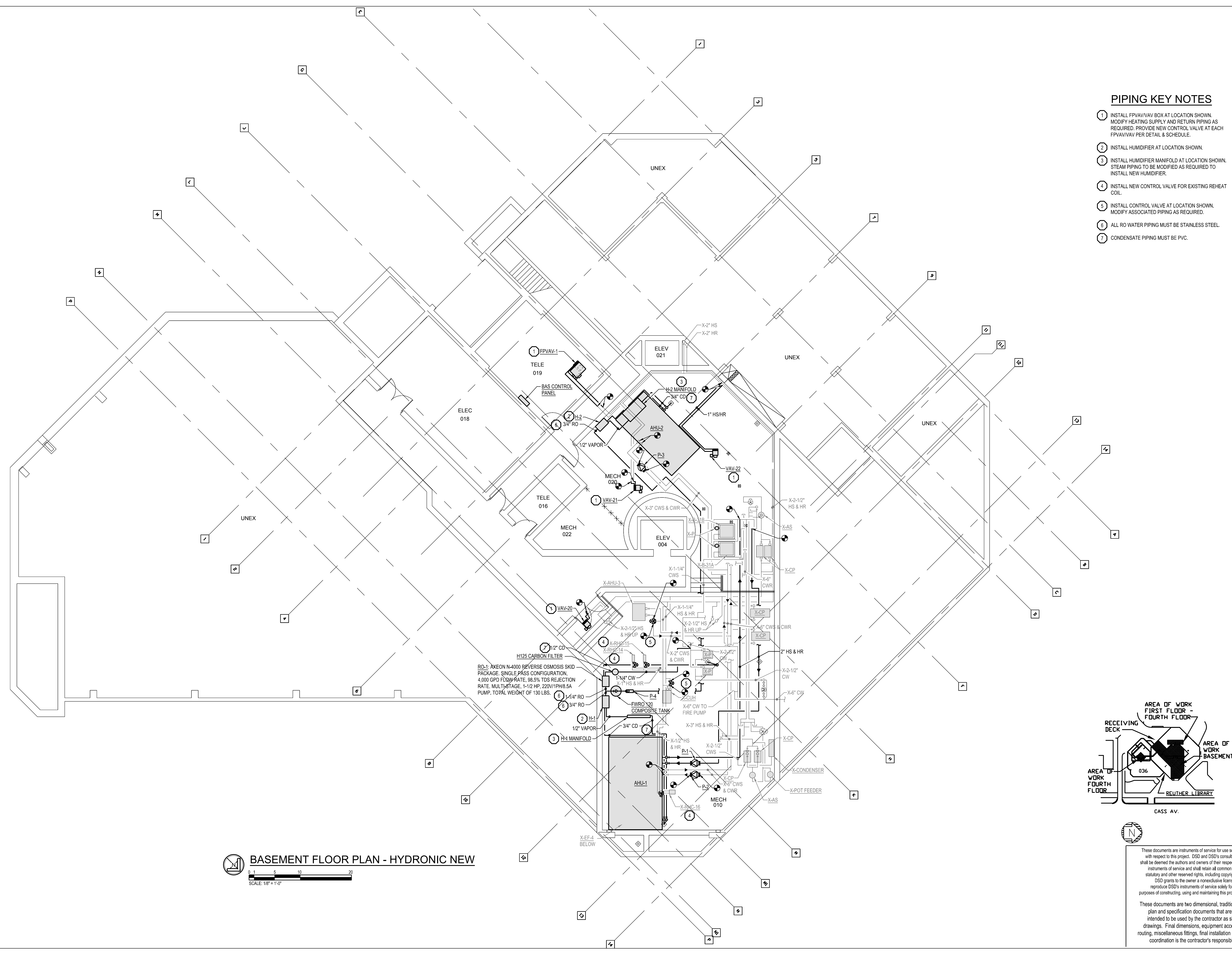
A/E PROJECT NO.
2164076

SHEET NO.
M-4.0

DSD FILE NAME
2164076-036-M-4.0

PIPING KEY NOTES

- 1 INSTALL FPVAV/VAV BOX AT LOCATION SHOWN. MODIFY HEATING SUPPLY AND RETURN PIPING AS REQUIRED. PROVIDE NEW CONTROL VALVE AT EACH FPVAV/VAV PER DETAIL & SCHEDULE.
- 2 INSTALL HUMIDIFIER AT LOCATION SHOWN.
- 3 INSTALL HUMIDIFIER MANIFOLD AT LOCATION SHOWN. STEAM PIPING TO BE MODIFIED AS REQUIRED TO INSTALL NEW HUMIDIFIER.
- 4 INSTALL NEW CONTROL VALVE FOR EXISTING REHEAT COIL.
- 5 INSTALL CONTROL VALVE AT LOCATION SHOWN. MODIFY ASSOCIATED PIPING AS REQUIRED.
- 6 ALL RO WATER PIPING MUST BE STAINLESS STEEL.
- 7 CONDENSATE PIPING MUST BE PVC.



BASEMENT FLOOR PLAN - HYDRONIC NEW

0 1 5 10 20
SCALE: 1/8" = 1'-0"

RO-1: AXEON N-4000 REVERSE OSMOSIS SKID PACKAGE. SINGLE PASS CONFIGURATION, 4,000 GPD FLOW RATE, 98.5% TDS REJECTION RATE. MULTI-STAGE, 1-1/2 HP, 220V/1PH/5.5A PUMP. TOTAL WEIGHT OF 130 LBS.



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REGISTRATION SEAL

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| MARK | ISSUE | DATE |
|------|-----------------------|----------|
| | DDC REL 05 - IFB | 04/08/24 |
| | DDC REL 04-95% REVIEW | 03/13/24 |
| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
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| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN
FIRST FLOOR PLAN
HYDRONIC NEW

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

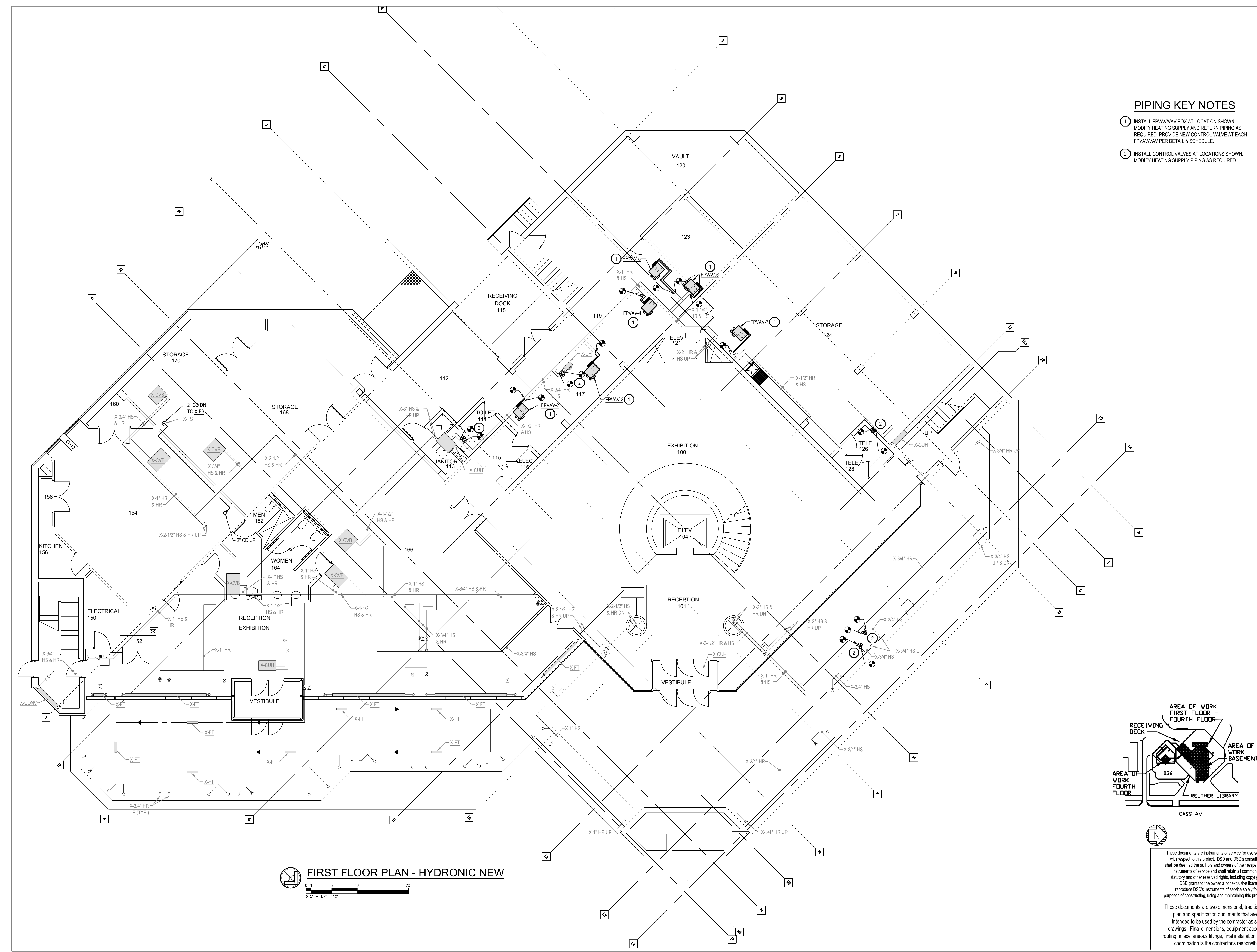
A/E PROJECT NO.
2164076

SHEET NO.
M-4.1

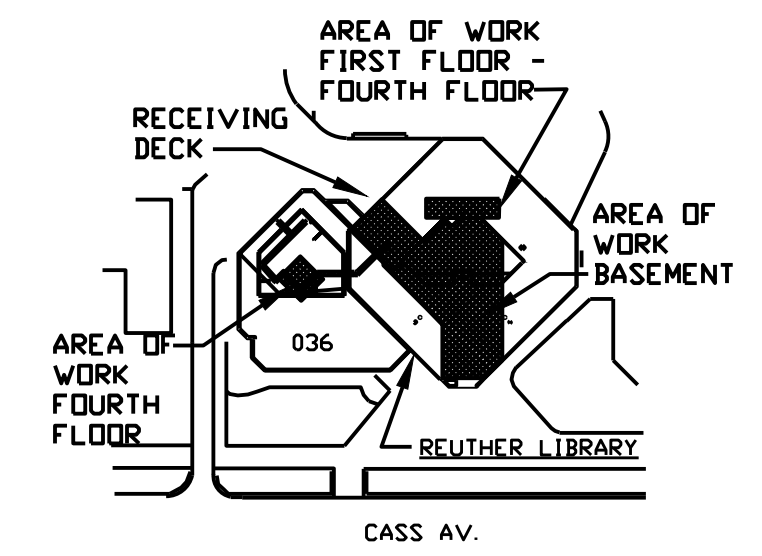
DSD FILE NAME
2164076-036-M-4.1

PIPING KEY NOTES

- 1 INSTALL FPVAV/AV BOX AT LOCATION SHOWN. MODIFY HEATING SUPPLY AND RETURN PIPING AS REQUIRED. PROVIDE NEW CONTROL VALVE AT EACH FPVAV/AV PER DETAIL & SCHEDULE.
- 2 INSTALL CONTROL VALVES AT LOCATIONS SHOWN. MODIFY HEATING SUPPLY PIPING AS REQUIRED.



FIRST FLOOR PLAN - HYDRONIC NEW
SCALE: 1/8" = 1'-0"



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| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
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| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

**SECOND FLOOR PLAN
HYDRONIC NEW**

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

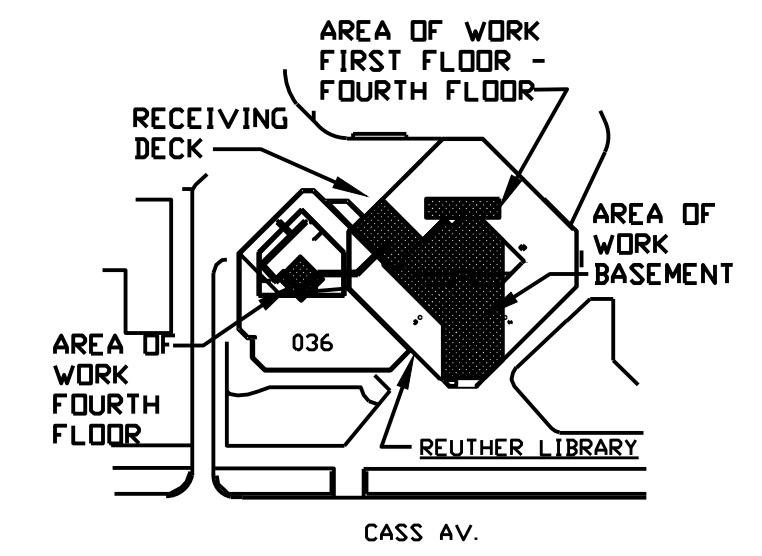
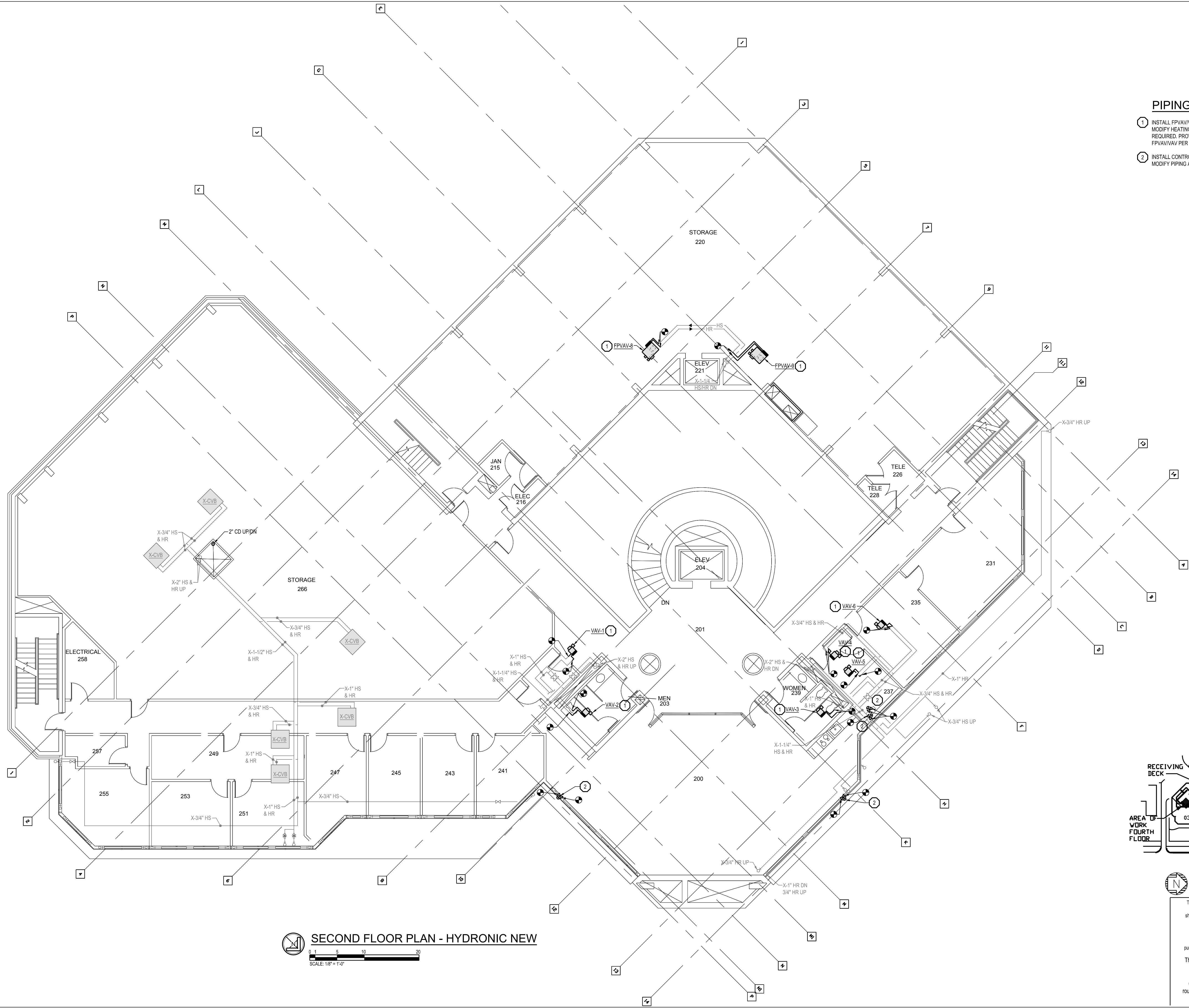
A/E PROJECT NO.
2164076

SHEET NO.
M-4.2

DSD FILE NAME
2164076-036-M-4.2

PIPING KEY NOTES

- INSTALL FPVAV/VAV BOX AT LOCATION SHOWN. MODIFY HEATING SUPPLY AND RETURN PIPING AS REQUIRED. PROVIDE NEW CONTROL VALVE AT EACH FPVAV/VAV PER DETAIL & SCHEDULE.
- INSTALL CONTROL VALVE AT LOCATION SHOWN. MODIFY PIPING AS REQUIRED.



SECOND FLOOR PLAN - HYDRONIC NEW
SCALE: 1/8" = 1'-0"

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| | DDC REL 02 - 60% DD | 08/10/23 |

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|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
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| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

THIRD FLOOR PLAN
HYDRONIC NEW

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

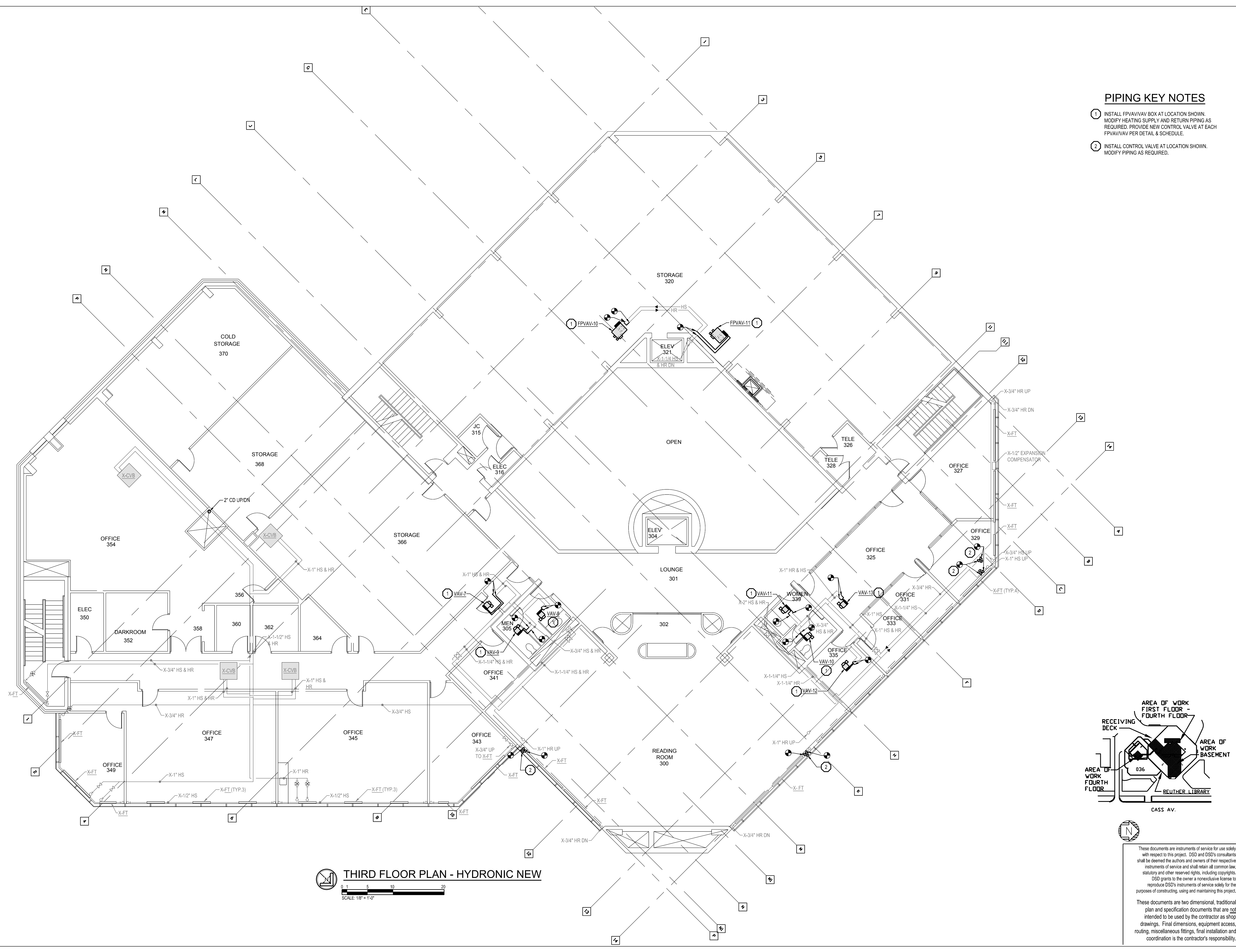
A/E PROJECT NO.
2164076

SHEET NO.
M-4.3

DSD FILE NAME
2164076-036-M-4.3

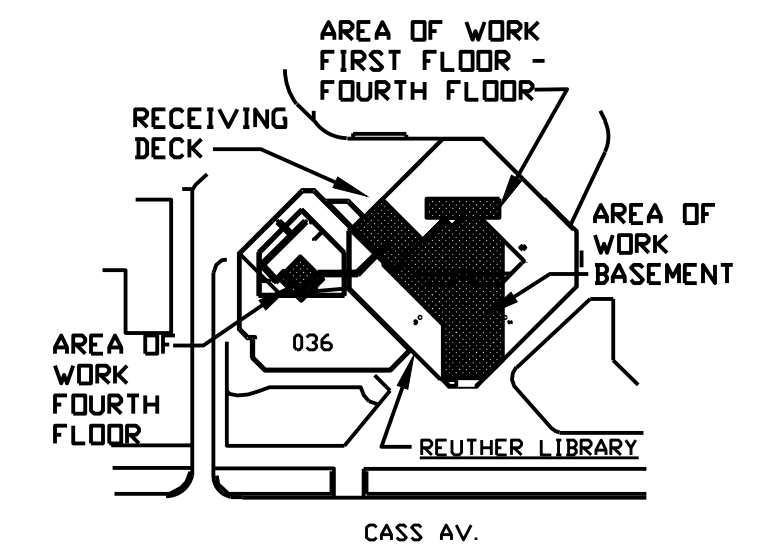
PIPING KEY NOTES

- INSTALL FPVAV/AV BOX AT LOCATION SHOWN. MODIFY HEATING SUPPLY AND RETURN PIPING AS REQUIRED. PROVIDE NEW CONTROL VALVE AT EACH FPVAV/AV PER DETAIL & SCHEDULE.
- INSTALL CONTROL VALVE AT LOCATION SHOWN. MODIFY PIPING AS REQUIRED.



THIRD FLOOR PLAN - HYDRONIC NEW

0 1 5 10 20
SCALE: 1/8" = 1'-0"



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| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN
**FOURTH FLOOR PLAN
HYDRONIC NEW**

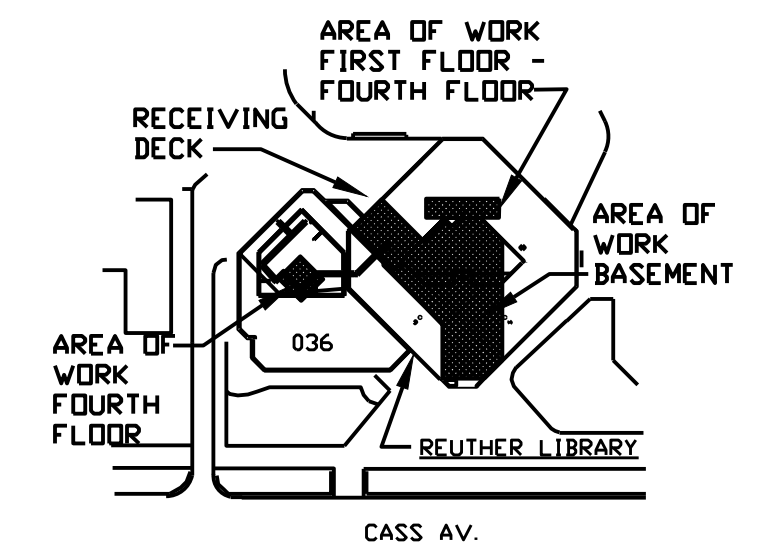
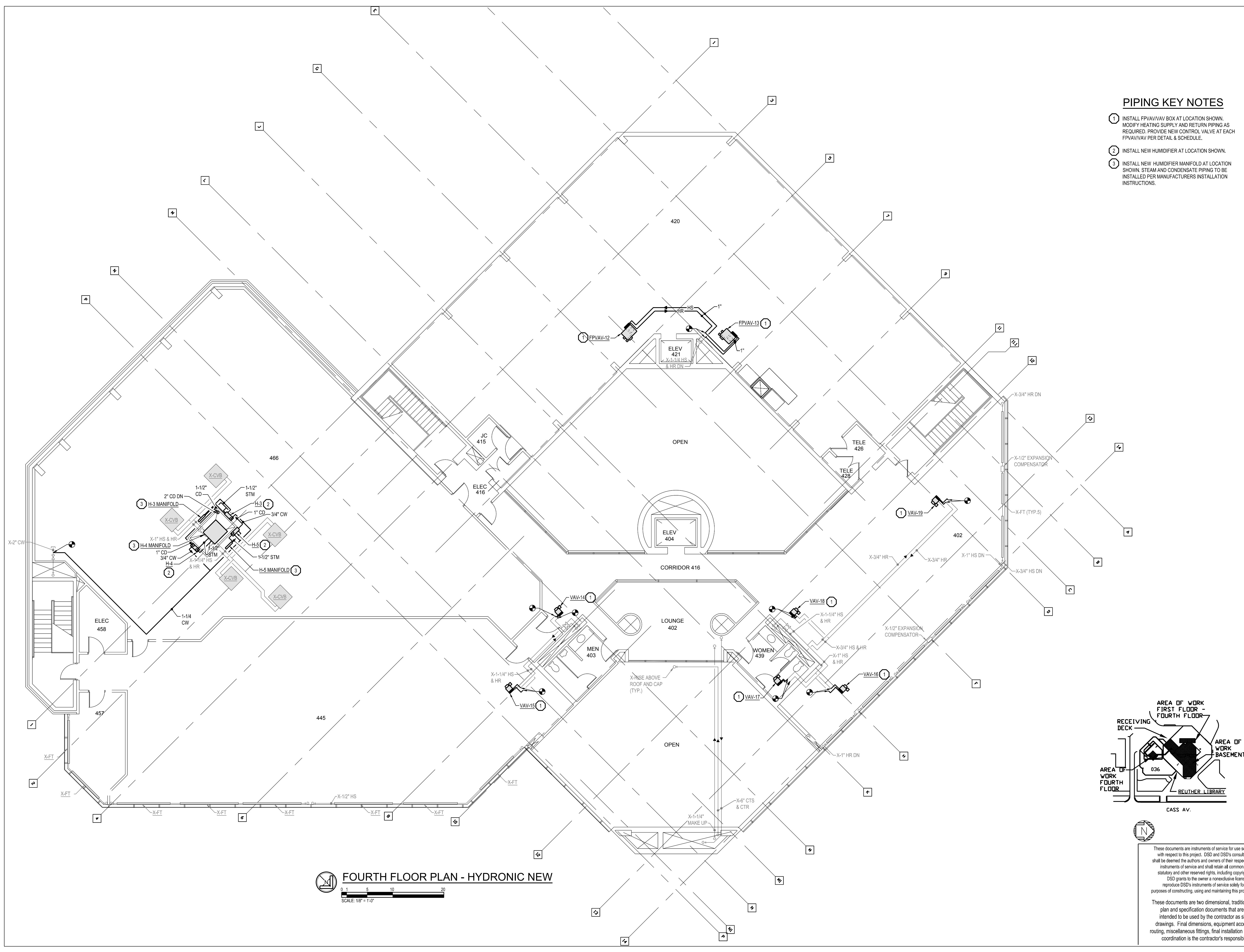
WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
M-4.4

DSD FILE NAME
2164076-036-M-4.4

- PIPING KEY NOTES**
- 1 INSTALL FPVAV/AV BOX AT LOCATION SHOWN. MODIFY HEATING SUPPLY AND RETURN PIPING AS REQUIRED. PROVIDE NEW CONTROL VALVE AT EACH FPVAV/AV PER DETAIL & SCHEDULE.
 - 2 INSTALL NEW HUMIDIFIER AT LOCATION SHOWN.
 - 3 INSTALL NEW HUMIDIFIER MANIFOLD AT LOCATION SHOWN. STEAM AND CONDENSATE PIPING TO BE INSTALLED PER MANUFACTURERS INSTALLATION INSTRUCTIONS.



FOURTH FLOOR PLAN - HYDRONIC NEW
SCALE: 1/8" = 1'-0"

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| | DDC REL 02 - 60% DD | 08/10/23 |

| DESIGNER | E. ERNVALL |
|-------------|----------------|
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN
MECHANICAL DETAILS

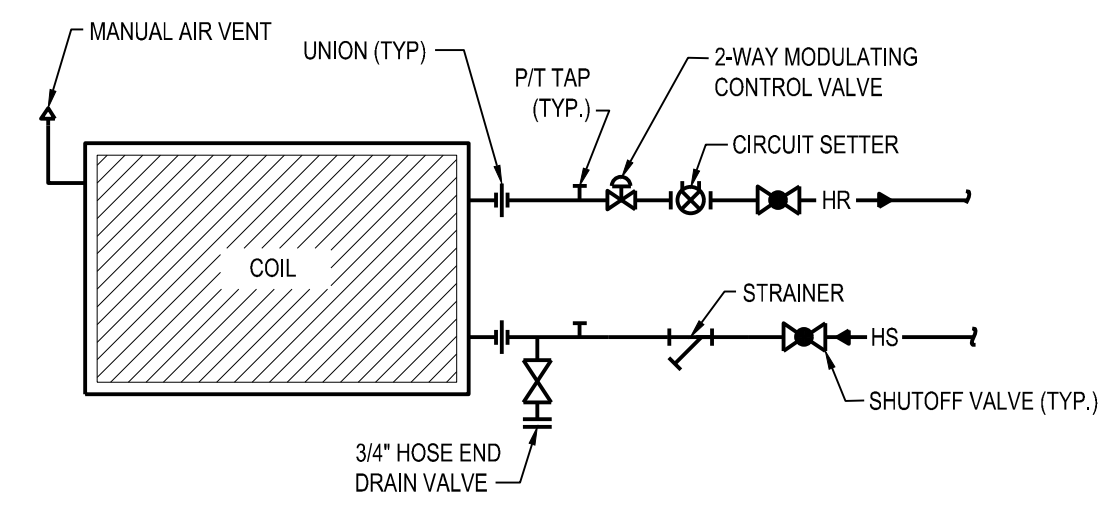
WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

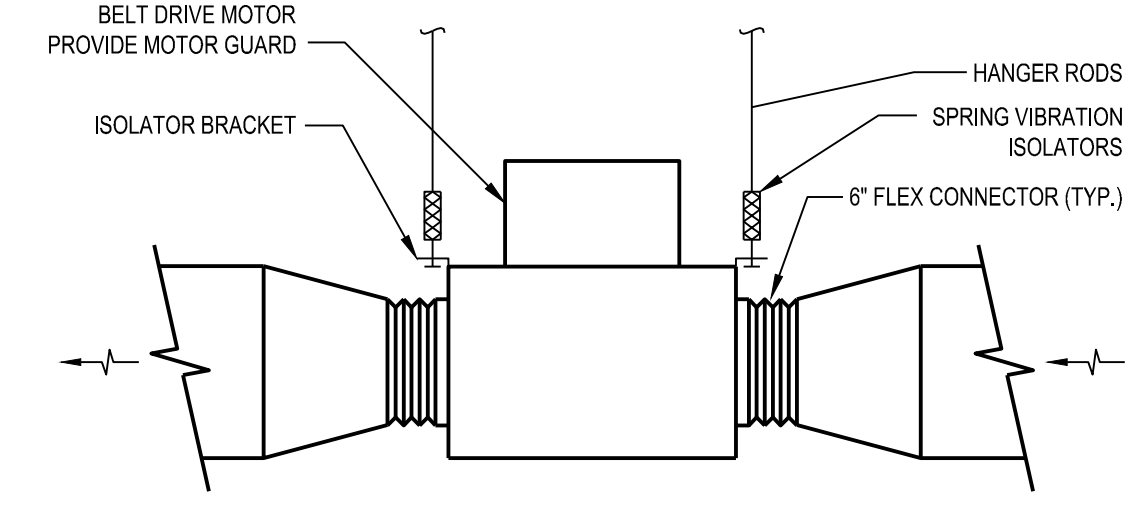
SHEET NO.
M-5.1

DSD FILE NAME
2164076-036-M-5.1

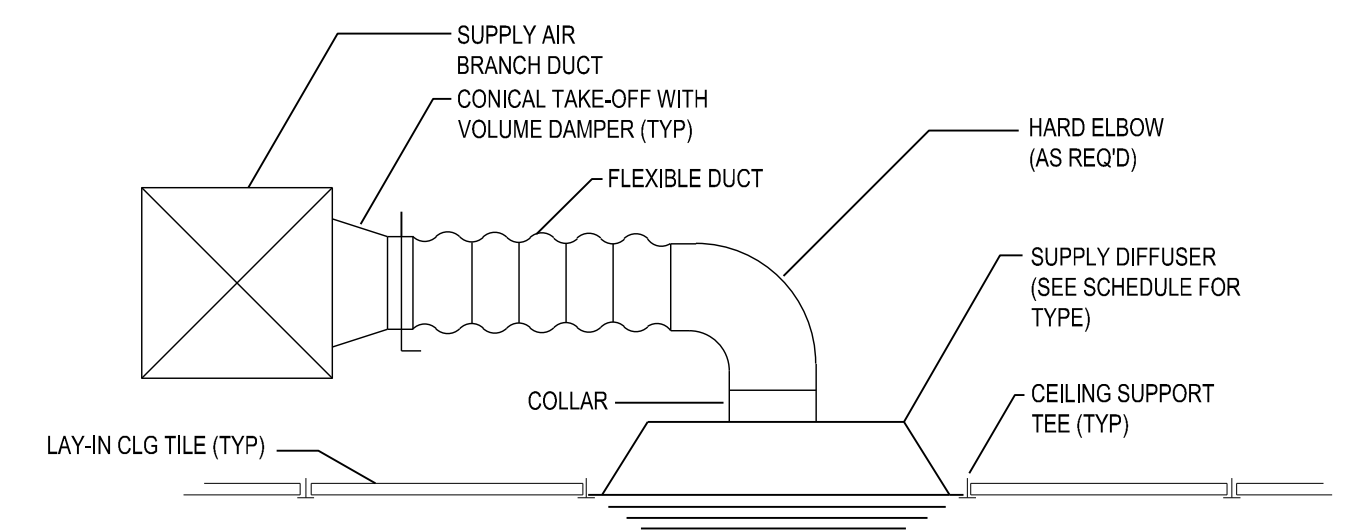
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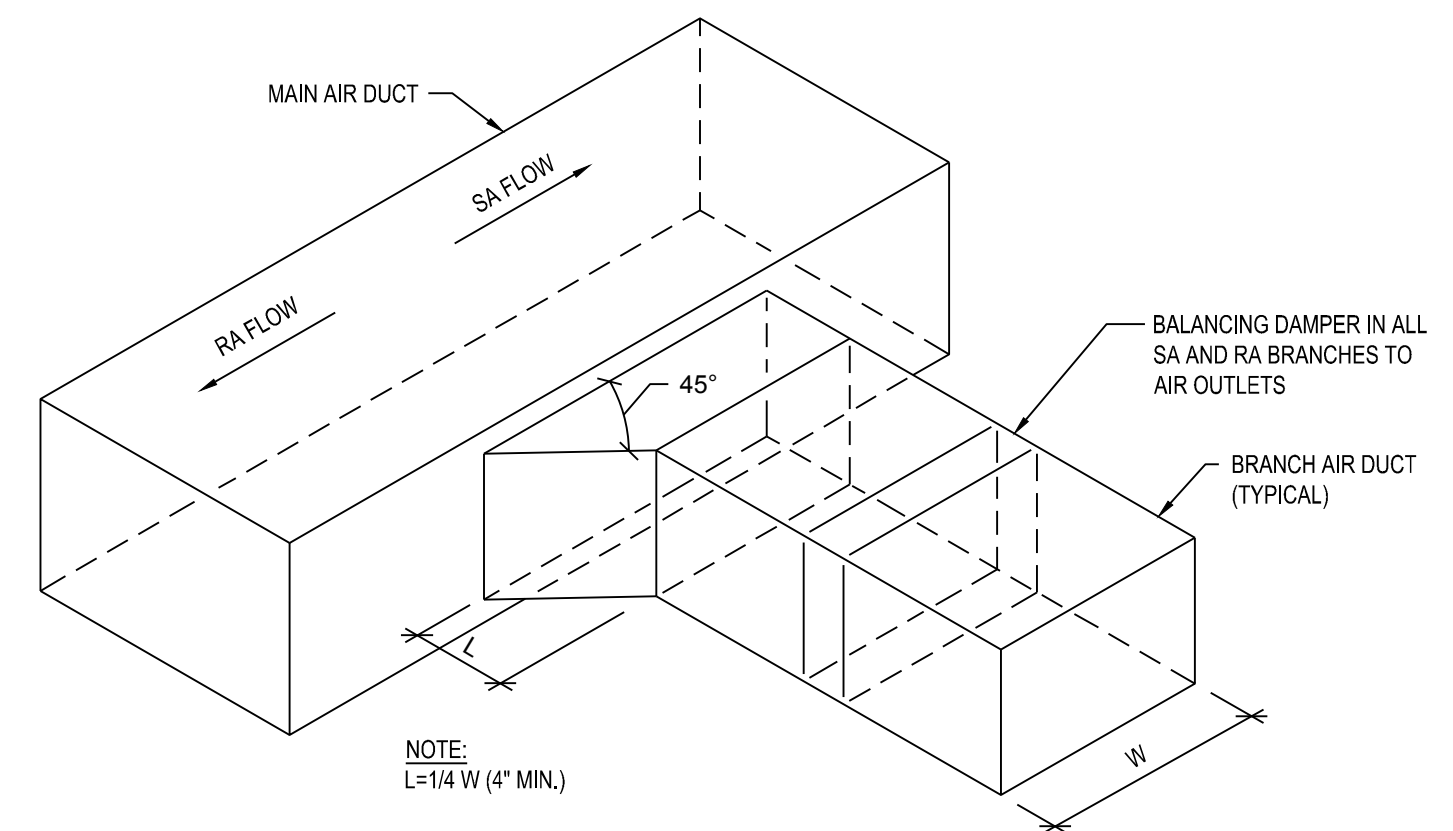
1 TYPICAL VAV TERMINAL UNIT HYDRONIC PIPING DIAGRAM (2-WAY CONTROL VALVE)
SCALE: NTS



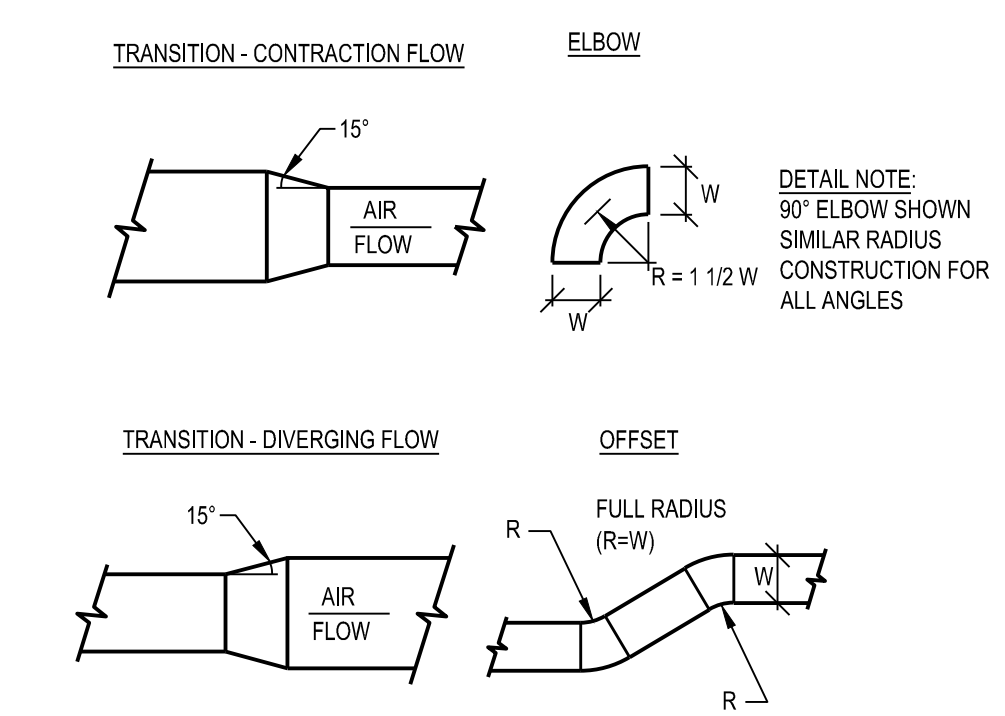
2 RETURN FAN DETAIL
SCALE: NTS



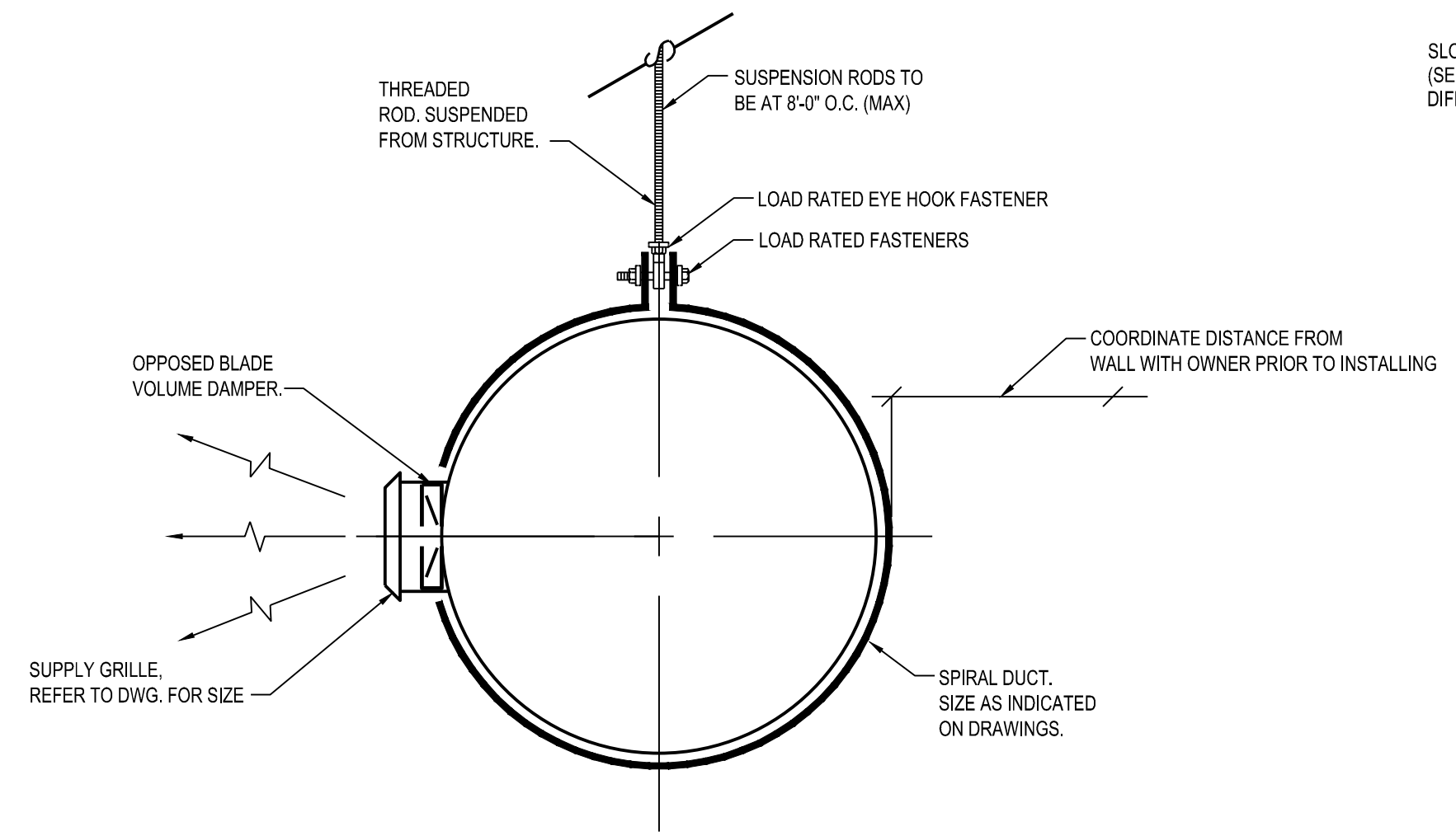
3 SUPPLY AIR DIFFUSER DETAIL
SCALE: NTS



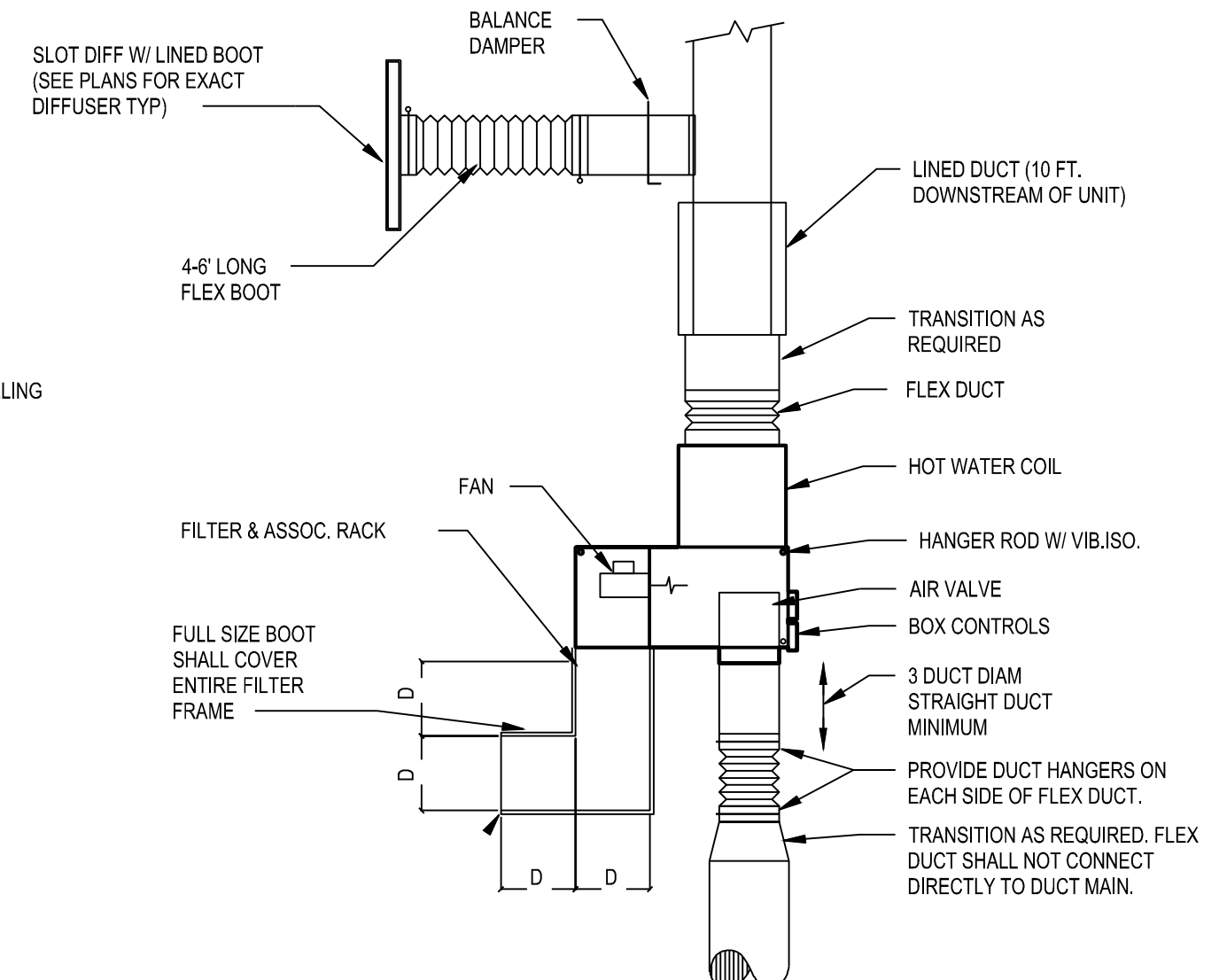
4 DUCT TRANSITION DETAIL
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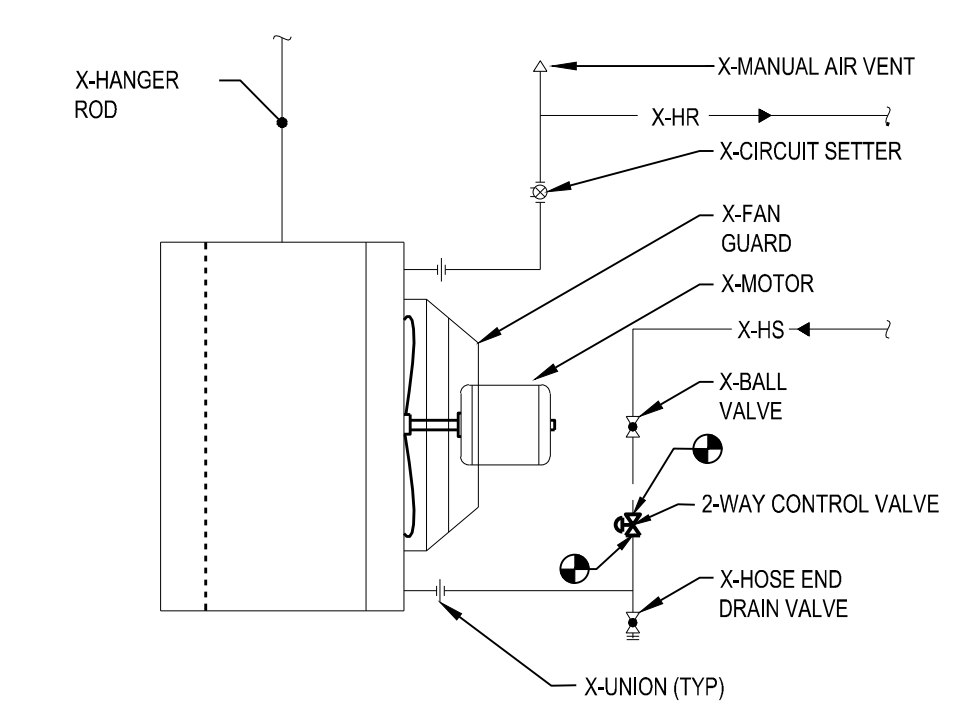
5 OFFSETS, ELBOWS, & TRANSITIONS FOR RECTANGULAR DUCTWORK
SCALE: NTS



6 EXPOSED SUPPLY SPIRAL DUCT DETAIL
SCALE: NTS

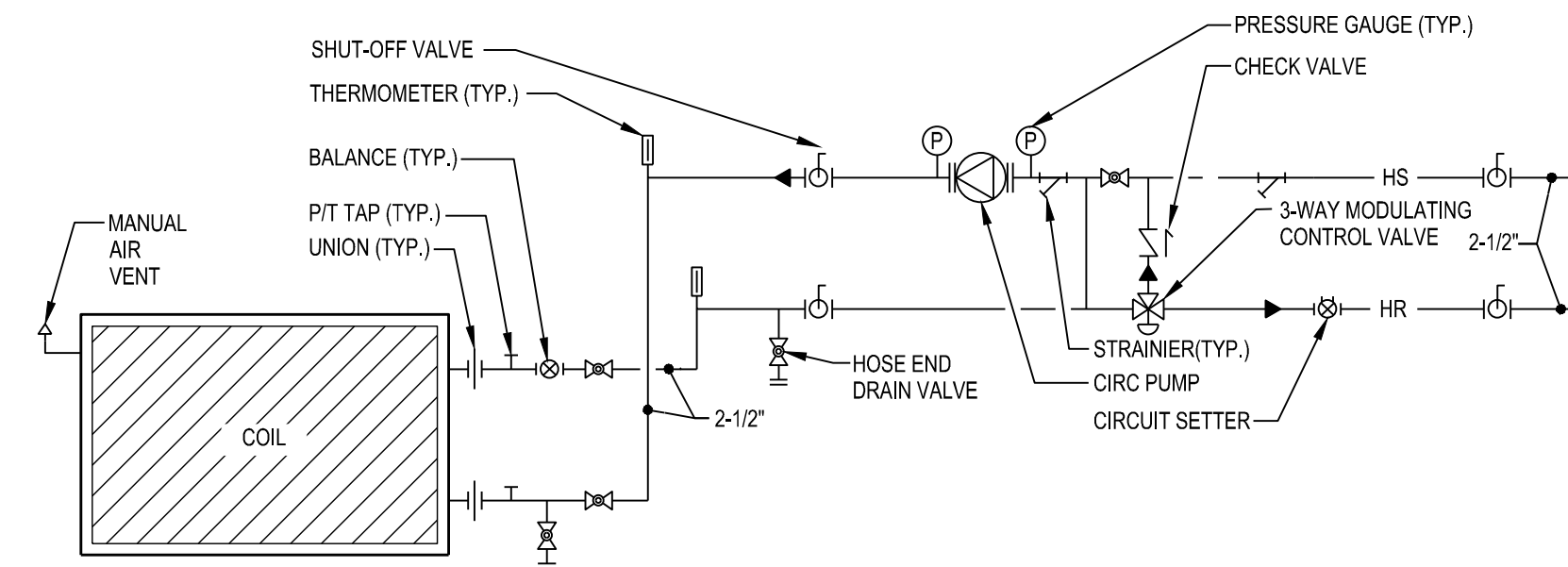


7 PARALLEL FAN POWERED VAV BOX DETAIL
SCALE: NTS

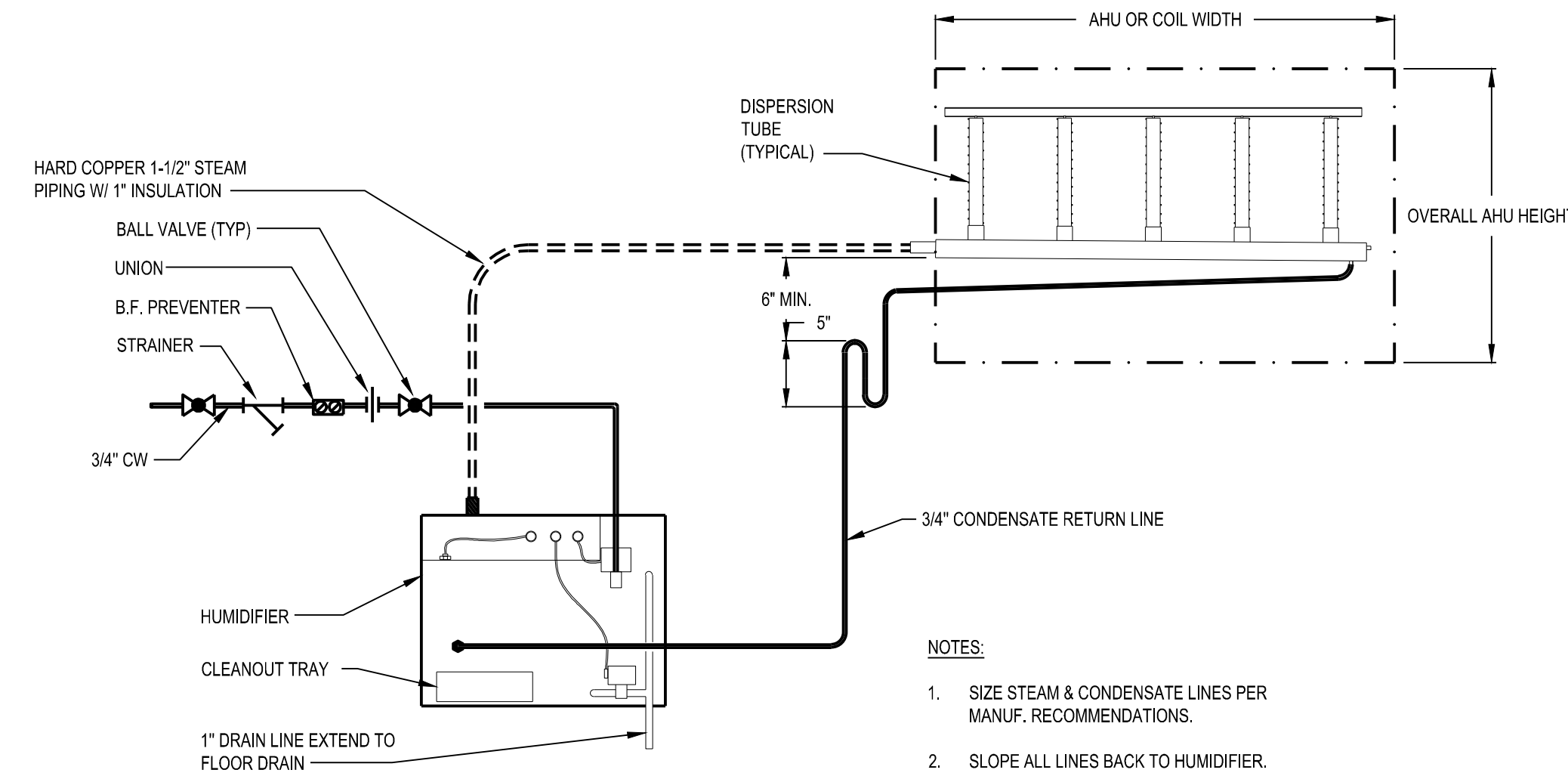


8 UNIT HEATER DETAIL
SCALE: N.T.S.

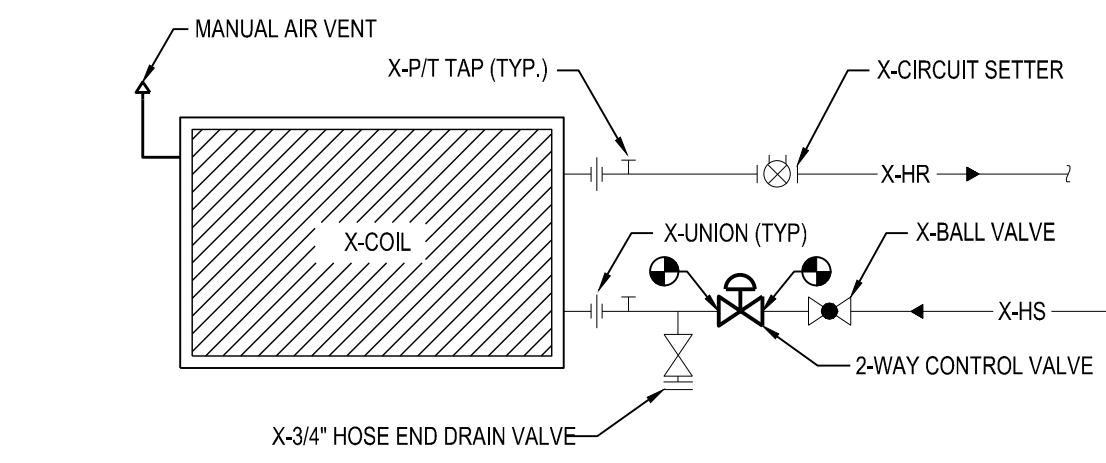
REGISTRATION SEAL
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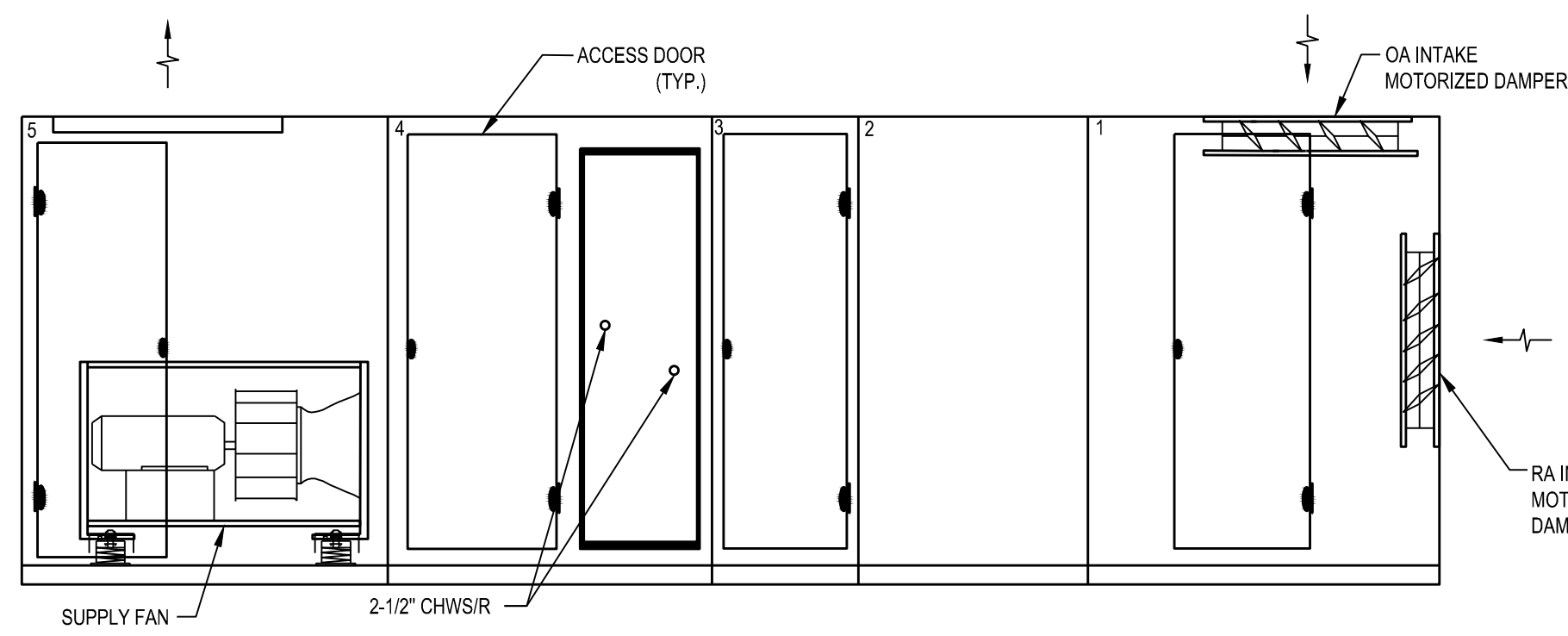
1 AHU-1 HEATING COIL DETAIL
SCALE: NTS



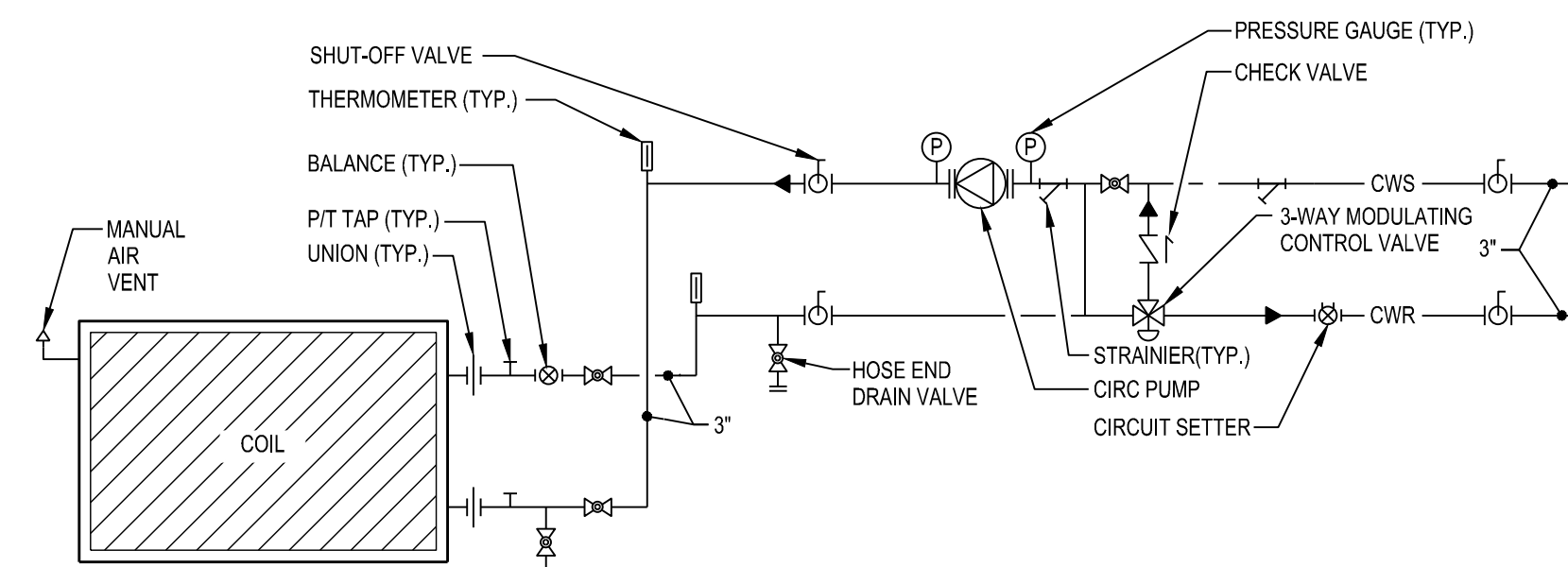
2 ELECTRIC HUMIDIFIER PIPING DIAGRAM
SCALE: NTS



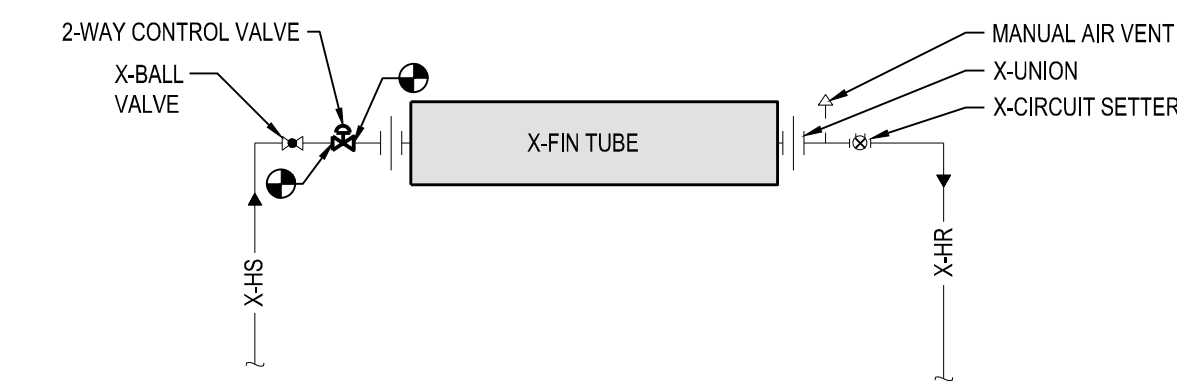
3 CABINET UNIT HEATER HYDRONIC PIPING DIAGRAM
SCALE: NTS



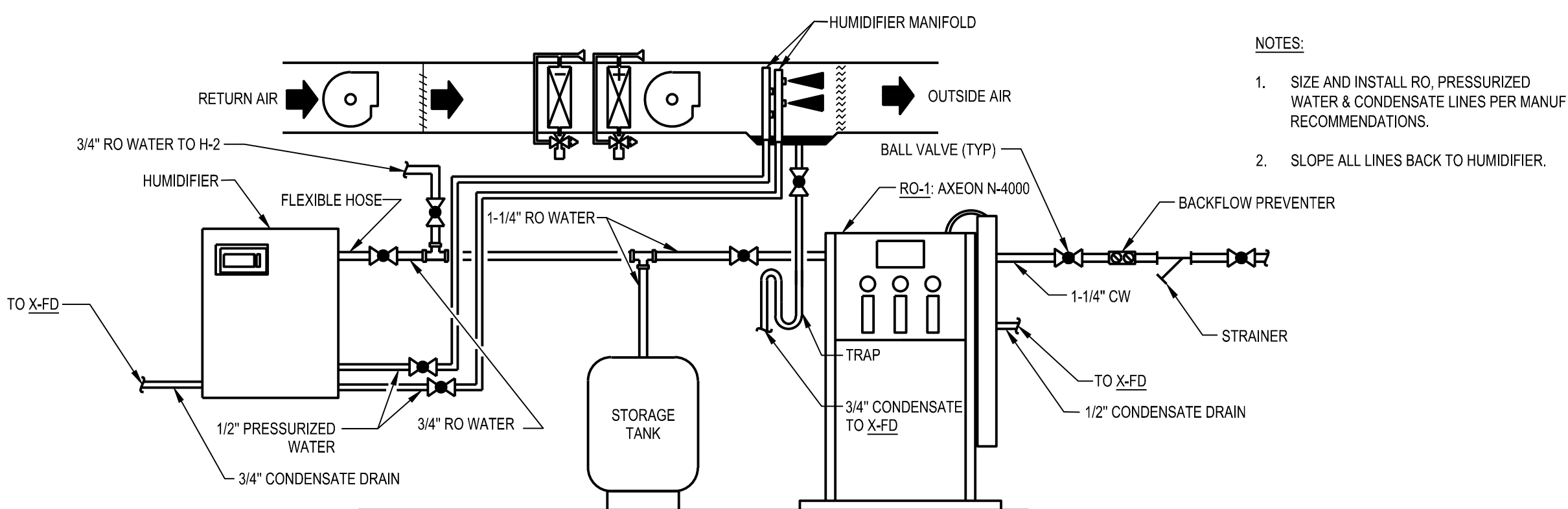
4 AHU-2 ELEVATION VIEW
SCALE: NTS



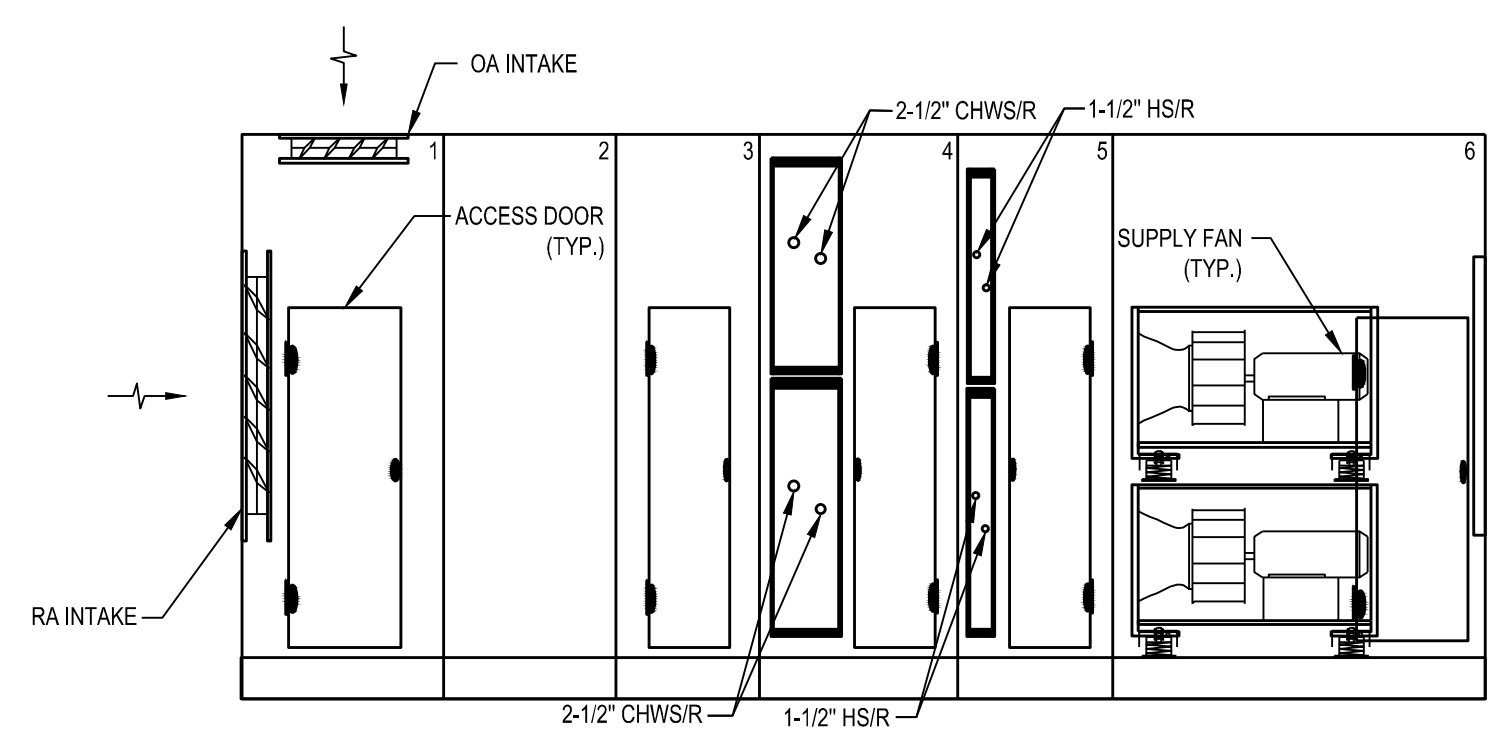
5 TYPICAL AHU COOLING COIL DETAIL
SCALE: NTS



6 FIN TUBE RADIATION DETAIL
SCALE: NTS



7 ADIBATIC HUMIDIFIER PIPING DIAGRAM
SCALE: NTS



8 AHU-1 ELEVATION VIEW
SCALE: NTS

| MARK | ISSUE | DATE |
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| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN
MECHANICAL DETAILS

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
M-5.2

DSD FILE NAME
2164076-036-M-5.2

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SEQUENCE OF OPERATION: AHU-1

SUPPLY FAN CONTROL:

THE VARIABLE SPEED SUPPLY FANS (SF-X-C) WILL BE STARTED BASED ON OCCUPANCY SCHEDULE (OCC-SCHEDULE). WHEN THE ANALOG FAN STATUS (SFA-R) INDICATES SUFFICIENT FANS HAVE STARTED, THE CONTROL SEQUENCE WILL BE ENABLED. THE SUPPLY FANS (SF-X-C) WILL MODULATE IN UNISON TO MAINTAIN THE DISCHARGE STATIC PRESSURE (DA-P) AT SETPOINT (OAP-SP). UPON A LOSS OF AIRFLOW (SFA-R) OF ENOUGH FANS TO DROP BELOW THE MINIMUM REQUIRED (MINIMUM RUNNING DEVICES), THE FANS WILL STOP UNTIL THE UNIT IS MANUALLY RESET (SYS-RESET).

RETURN FAN CONTROL:

AFTER THE SUPPLY FAN HAS BEEN STARTED, THE VARIABLE SPEED RETURN FAN WILL BE STARTED. THE RETURN FAN (RF-O) WILL MODULATE TO MAINTAIN THE BUILDING STATIC PRESSURE AT SETPOINT (BLDGP-SP). EXHAUST AIR DAMPERS (EAD-O) WILL BE ENABLED WHEN BOTH THEIR SUPPLY AND RETURN FANS ARE PROVEN ON, AND THE RETURN FANS ARE CONTROLLING TO BUILDING PRESSURE. THEY WILL BE CLOSED OTHERWISE. EXHAUST DAMPERS WILL BE MODULATED OPEN TO MAINTAIN BUILDING STATIC PRESSURE SETPOINT. ONCE FULLY OPEN, THE BUILDING PRESSURE CONTROL LOOP WILL RESET THE RETURN FAN DISCHARGE STATIC SETPOINT (EFF-RF-SP) FROM (RF-OSP-MIN) TO (RF-OSP-MAX) TO MAINTAIN BUILDING STATIC PRESSURE SETPOINT. UPON A LOSS OF RETURN AIRFLOW (RF-S), THE SYSTEM WILL STOP UNTIL THE UNIT IS MANUALLY RESET (SYS-RESET).

ECONOMIZER CONTROL:

WHEN THE ENTHALPY OF THE OUTDOOR AIR IS LESS THAN THE RETURN AIR (ECON-AVAILABLE), THE ECONOMIZER WILL ACT AS THE INITIAL STAGE OF COOLING, WORKING IN SEQUENCE WITH THE COOLING COIL. THE RETURN AIR CO2 SENSOR (RA-Q) WILL BE USED TO RESET THE DAMPER MINIMUM POSITION.

MINIMUM OA CONTROL:

THE FRESH AIR INTAKE OF THE UNIT WILL BE LIMITED TO PREVENT THE PREHEAT TEMPERATURE (PH-T) FROM FALLING BELOW THE LOW LIMIT SETPOINT (OALT-SP).

TEMPERATURE CONTROL:

THE OUTDOOR AIR TEMPERATURE (OA-T) WILL RESET THE ZONE TEMPERATURE TARGET, WHICH WILL RESET THE DISCHARGE AIR TEMPERATURE SETPOINT (DAT-SP). THE TEMPERATURE SETPOINT (XX-SP) WILL ADDITIONALLY BE SHIFTED BASED ON OUTDOOR AIR TEMPERATURE TO COMPENSATE FOR EXTREME OUTDOOR AIR TEMPERATURES (OA-T).

WARMUP/COOLDOWN MODE:

THE WARMUP/COOLDOWN MODE WILL BE INITIATED BY THE NETWORK INPUT (WC-C), THE UNIT WILL CONTROL TO OCCUPIED SETPOINTS (CLGOCC-S&M;HTGUNOCC-S) DURING WARMUP AND COOLDOWN CYCLES.

OCCUPIED MODE:

THE OCCUPANCY MODE WILL BE CONTROLLED VIA A NETWORK INPUT (OCC-SCHEDULE). THE OCCUPANCY MODE CAN ALSO BE OVERRIDDEN BY A NETWORK INPUT (OCC-OVERRIDE).

UNOCCUPIED MODE:

THE UNIT WILL CYCLE TO MAINTAIN UNOCCUPIED ZONE SETPOINTS (CLGUNOCC-S&M;HTGUNOCC-S) DURING UNOCCUPIED PERIODS.

FREEZE PROTECTION GENERAL:

THIS SEQUENCE CONSISTS OF THREE STAGES USED TO PREVENT THE COILS FROM FREEZING WHEN THE DISCHARGE AIR TEMPERATURE (DA-T) FALLS TOO LOW. THE FIRST STAGE SENDS HEATING HOT-WATER PLANT REQUESTS, SETS THE ECONOMIZER DAMPER(S) TO THE MINIMUM POSITION, AND MODULATES ANY APPLICABLE HEATING COILS AND ENABLES THE COIL PUMP ON THE HEATING COIL. (SEE INDIVIDUAL COIL SECTIONS FOR DETAILS) TO MAINTAIN A STAGE ONE LOW TEMPERATURE SETPOINT (STG1-LT-SP). THE SECOND STAGE FULLY CLOSES ANY ASSOCIATED OUTDOOR AIR DAMPERS FOR ONE HOUR AND SETS A LEVEL 3 ALARM (L3-MIN-VENT-INTR). THE THIRD STAGE SHUTS DOWN THE SUPPLY FAN (SF-C) AND ANY RETURN/RELIEF FAN, CLOSES THE ECONOMIZER DAMPER(S), FULLY OPENS ANY APPLICABLE COOLING COIL, AND SENDS TWO HEATING HOT-WATER REQUESTS. THE THIRD STAGE ALSO MODULATES APPLICABLE HEATING COILS (SEE INDIVIDUAL COIL SECTIONS FOR DETAILS) AND SENDS A LEVEL 2 ALARM (L2-LOW-TEMP).

PREHEAT COIL:

THE PREHEAT (PH-O) WILL MODULATE TO MAINTAIN THE TEMPERATURE SETPOINT. ON A CALL FOR PREHEAT OR A DROP IN THE OUTDOOR AIR TEMPERATURE (OA-T) BELOW THE LOW OUTDOOR AIR TEMPERATURE SETPOINT (OALT-SP), THE COIL PUMP (PHP-C) WILL BE STARTED. UPON A LOSS OF PREHEAT COIL PUMP STATUS (PHP-S), THE PUMP WILL ATTEMPT TO AUTOMATICALLY RESTART UNTIL POSITIVE STATUS IS RECEIVED. WHEN THE UNIT IS SHUTDOWN, THE PREHEAT COIL WILL BE COMMANDED TO A PRESET POSITION SHOULD THE OUTDOOR AIR TEMPERATURE (OAT) FALL BELOW THE LOW OUTDOOR AIR TEMPERATURE SETPOINT (OALT-SP). DURING STAGE 1 FREEZE PROTECTION THE COIL WILL MODULATE TO MAINTAIN THE STAGE ONE LOW TEMPERATURE SETPOINT (STG1-LT-SP). DURING STAGE 3 FREEZE PROTECTION THE COIL WILL MODULATE TO MAINTAIN THE STAGE THREE LOW TEMPERATURE SETPOINT (STG3-LT-SP).

COOLING COIL:

THE COOLING COIL (CLG-O) WILL MODULATE TO MAINTAIN THE TEMPERATURE SETPOINT. ON A CALL FOR COOLING OR A DROP IN THE OUTDOOR AIR TEMPERATURE (OA-T) BELOW THE LOW OUTDOOR AIR TEMPERATURE SETPOINT (OALT-SP), THE COIL PUMP (CP-C) WILL BE STARTED. UPON A LOSS OF COOLING COIL PUMP STATUS (CP-S), THE PUMP WILL ATTEMPT TO AUTOMATICALLY RESTART UNTIL POSITIVE STATUS IS RECEIVED. ON A CALL FOR COOLING OR A DROP IN THE OUTDOOR AIR TEMPERATURE (OA-T) BELOW THE LOW OUTDOOR AIR TEMPERATURE SETPOINT (OALT-SP), THE LEAD COIL PUMP (CPX-C) WILL BE STARTED. WHEN THE UNIT IS SHUTDOWN, THE COOLING COIL WILL BE COMMANDED TO A PRESET POSITION SHOULD THE OUTDOOR AIR TEMPERATURE (OA-T) FALL BELOW THE LOW OUTDOOR AIR TEMPERATURE SETPOINT (OALT-SP). WHEN THE CONDENSATE FLOAT SWITCH IS IN "ALARM" (COND-A), THE COOLING CONTROL SEQUENCE WILL BE DISABLED. THEN THE FANS WILL BE DISABLED VIA A HARD WIRED SHUTDOWN CIRCUIT.

HUMIDIFICATION:

THE HUMIDIFIER WILL BE ENABLED (HUM-C) AND MODULATE (HUM-O) TO MAINTAIN THE ZONE RELATIVE HUMIDITY SETPOINT (HUM-SP) AS SENSED BY THE ZONE RELATIVE HUMIDITY SENSOR (ZN-H). THE HUMIDITY HIGH LIMIT WILL OVERRIDE THE OUTPUT IF NECESSARY TO PREVENT THE DISCHARGE AIR HUMIDITY FROM EXCEEDING DISCHARGE HUMIDITY HIGH LIMIT SETPOINT. SEE HUMIDIFIER SEQUENCE ON SHEET H-7.4.

DEHUMIDIFICATION:

ON A RISE IN THE RETURN AIR HUMIDITY (RA-H), THE COOLING COIL OUTPUT WILL BE OVERRIDDEN TO MAINTAIN THE RETURN AIR HUMIDITY BELOW THE RETURN AIR DEHUMIDIFICATION SETPOINT (DEHUM-SP). THE REHEAT CONTROL WILL MAINTAIN THE TEMPERATURE AT SETPOINT.

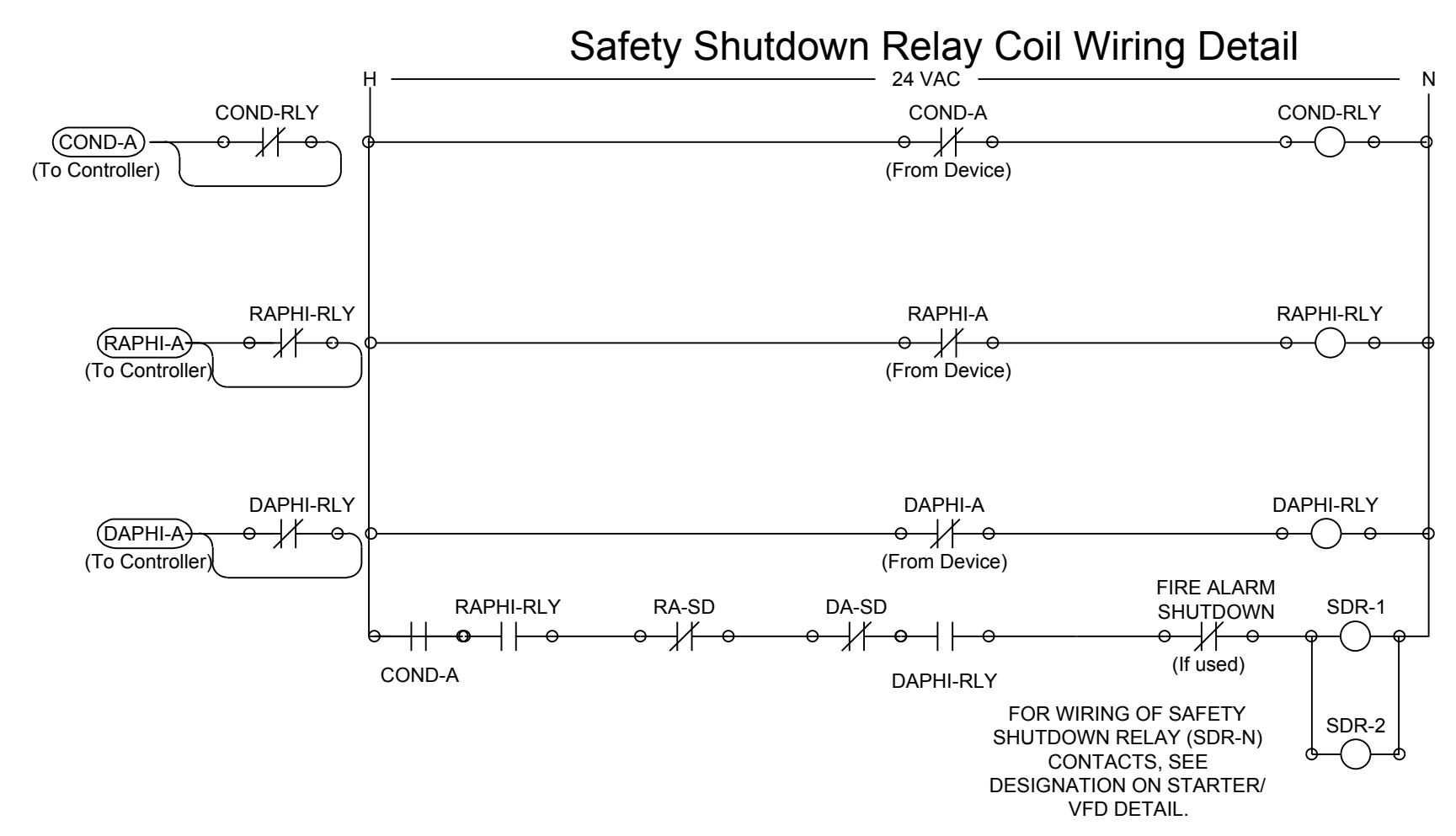
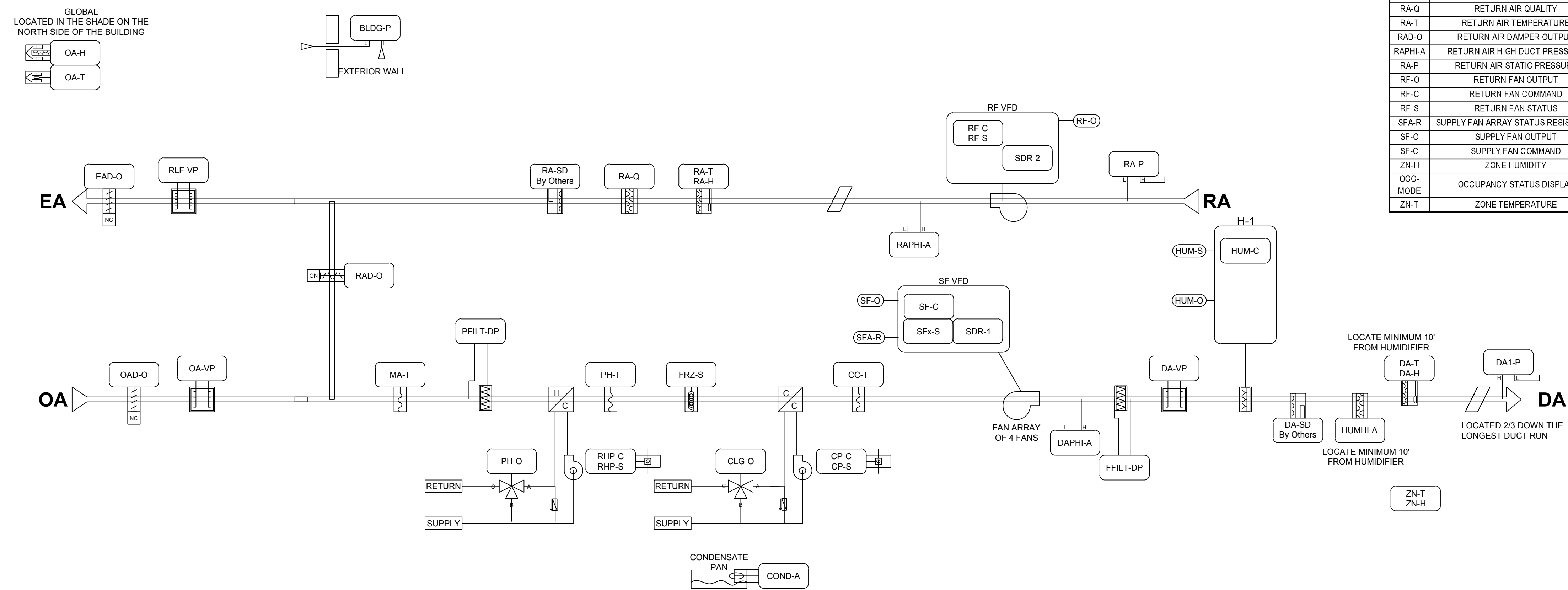
UNIT PROTECTION:

- DISCHARGE AIR HIGH DUCT PRESSURE ALARM (DAPHI-A) - WHEN IN "ALARM", THE CONTROL SEQUENCE WILL STOP RUNNING AND THE FANS WILL BE DISABLED VIA A HARD WIRED SHUTDOWN CIRCUIT.
RETURN AIR HIGH DUCT PRESSURE (RAPHI-A) - WHEN IN "ALARM", THE CONTROL SEQUENCE WILL STOP RUNNING AND THE FANS WILL BE DISABLED VIA A HARD WIRED SHUTDOWN CIRCUIT.
DISCHARGE AIR SMOKE DETECTOR (DA-SD) - DISABLES THE FAN(S) VIA A HARD WIRED SHUTDOWN CIRCUIT.
RETURN AIR SMOKE DETECTOR (RA-SD) - DISABLES THE FAN(S) VIA A HARD WIRED SHUTDOWN CIRCUIT.

ADDITIONAL POINTS MONITORED BY THE FMS:

- OUTDOOR AIR TEMPERATURE (OA-T)
OUTDOOR AIR HUMIDITY (OA-H)
OUTDOOR AIR VELOCITY PRESSURE (OA-VP)
MIXED AIR TEMPERATURE (MA-T)
COOLING COIL DISCHARGE TEMPERATURE (CC-T)
DISCHARGE AIR VELOCITY PRESSURE (DA-VP)
RELIEF AIR VELOCITY PRESSURE (RLF-VP)
PREFILTER DIFF PRESSURE (PFILT-OP)
FINAL FILTER DIFFERENTIAL PRESSURE (FFILT-DP)
HIGH HUMIDITY LIMIT (HUMHI-A)
HUMIDIFIER STATUS (HUM-S)

POINTS LIST: AHU-1
Table with 5 columns: Name, Description, Signal, Point Type, Data Type. Lists various sensors and actuators like BLDG-P, COND-A, CLG-O, CC-T, etc.



1 AHU-1 CONTROL DIAGRAM



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REGISTRATION SEAL table with columns for MARK, ISSUE, and DATE. Contains revision entries like DDC REL 05 - IFB 04/08/24.

Table with columns for DESIGNER, DRAWN, CHECKED, DEPT MGR, PROJECT MGR, and DATE. Lists E. ERNVALL, C. TRIERWEILER, V. LALONDE, and K. RUPP.

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN
MECHANICAL CONTROLS
AHU-1

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO. 2164076

SHEET NO. M-7.1

DSD FILE NAME 2164076-036-M-7.1

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These documents are two dimensional, traditional plan and specification documents that are not intended to be used by the contractor as shop drawings. Final dimensions, equipment access, routing, miscellaneous fittings, final installation and coordination is the contractor's responsibility.

SEQUENCE OF OPERATION: AHU-2

SUPPLY FAN CONTROL:

THE VARIABLE SPEED SUPPLY FANS (SF-X-C) WILL BE STARTED BASED ON OCCUPANCY SCHEDULE (OCC-SCHEDULE). WHEN THE ANALOG FAN STATUS (SFA-R) INDICATES SUFFICIENT FANS HAVE STARTED, THE CONTROL SEQUENCE WILL BE ENABLED. THE SUPPLY FANS (SF-X-C) WILL MODULATE IN UNISON TO MAINTAIN THE DISCHARGE STATIC PRESSURE (DA-P) AT SETPOINT (DAP-SP). UPON A LOSS OF AIRFLOW (SFA-R) OF ENOUGH FANS TO DROP BELOW THE MINIMUM REQUIRED (MINIMUM RUNNING DEVICES), THE FANS WILL STOP UNTIL THE UNIT IS MANUALLY RESET (SYS-RESET).

RETURN FAN CONTROL:

AFTER THE SUPPLY FAN HAS BEEN STARTED, THE VARIABLE SPEED RETURN FAN WILL BE STARTED. THE RETURN FAN (RF-O) WILL MODULATE TO MAINTAIN THE BUILDING STATIC PRESSURE AT SETPOINT (BLDG-SP). EXHAUST AIR DAMPERS (EAD-O) WILL BE ENABLED WHEN BOTH THEIR SUPPLY AND RETURN FANS ARE PROVEN ON, AND THE RETURN FANS ARE CONTROLLING TO BUILDING PRESSURE. THEY WILL BE CLOSED OTHERWISE. EXHAUST DAMPERS WILL BE MODULATED OPEN TO MAINTAIN BUILDING STATIC PRESSURE SETPOINT. ONCE FULLY OPEN, THE BUILDING PRESSURE CONTROL LOOP WILL RESET THE RETURN FAN DISCHARGE STATIC SETPOINT (EFF-RF-DSP) FROM (RF-DSP-MIN) TO (RF-DSP-MAX) TO MAINTAIN BUILDING STATIC PRESSURE SETPOINT. UPON A LOSS OF RETURN AIRFLOW (RF-S), THE SYSTEM WILL STOP UNTIL THE UNIT IS MANUALLY RESET (SYS-RESET).

ECONOMIZER CONTROL:

WHEN THE ENTHALPY OF THE OUTDOOR AIR IS LESS THAN THE RETURN AIR (ECON-AVAILABLE), THE ECONOMIZER WILL ACT AS THE INITIAL STAGE OF COOLING, WORKING IN SEQUENCE WITH THE COOLING COIL. THE RETURN AIR CO2 SENSOR (RA-Q) WILL BE USED TO RESET THE DAMPER MINIMUM POSITION.

MINIMUM OA CONTROL:

THE FRESH AIR INTAKE OF THE UNIT WILL BE LIMITED TO PREVENT THE MIXED AIR TEMPERATURE (MA-T) FROM FALLING BELOW THE LOW LIMIT SETPOINT (OALT-SP).

TEMPERATURE CONTROL:

THE OUTDOOR AIR TEMPERATURE (OA-T) WILL RESET THE ZONE TEMPERATURE TARGET, WHICH WILL RESET THE DISCHARGE AIR TEMPERATURE SETPOINT (DAT-SP). THE TEMPERATURE SETPOINT (XX-SP) WILL ADDITIONALLY BE SHIFTED BASED ON OUTDOOR AIR TEMPERATURE TO COMPENSATE FOR EXTREME OUTDOOR AIR TEMPERATURES (OA-T).

OCCUPIED MODE:

THE OCCUPANCY MODE WILL BE CONTROLLED VIA A NETWORK INPUT (OCC-SCHEDULE). THE OCCUPANCY MODE CAN ALSO BE OVERRIDDEN BY A NETWORK INPUT (OCC-OVERRIDE).

FREEZE PROTECTION GENERAL:

THIS SEQUENCE CONSISTS OF THREE STAGES USED TO PREVENT THE COILS FROM FREEZING WHEN THE DISCHARGE AIR TEMPERATURE (DA-T) FALLS TOO LOW. THE FIRST STAGE SENDS HEATING HOT-WATER PLANT REQUESTS, SETS THE ECONOMIZER DAMPER(S) TO THE MINIMUM POSITION, AND MODULATES ANY APPLICABLE HEATING COILS (SEE INDIVIDUAL COIL SECTIONS FOR DETAILS) TO MAINTAIN A STAGE ONE LOW TEMPERATURE SETPOINT (STG1-LT-SP). THE SECOND STAGE FULLY CLOSES ANY ASSOCIATED OUTDOOR AIR DAMPERS FOR ONE HOUR AND SETS A LEVEL 3 ALARM (L3-MIN-VENT-INTR). THE THIRD STAGE SHUTS DOWN THE SUPPLY FAN (SF-C) AND ANY RETURN/RELIEF FAN, CLOSES THE ECONOMIZER DAMPER(S), FULLY OPENS ANY APPLICABLE COOLING COIL, AND SENDS TWO HEATING HOT-WATER REQUESTS. THE THIRD STAGE ALSO MODULATES APPLICABLE HEATING COILS (SEE INDIVIDUAL COIL SECTIONS FOR DETAILS) AND SENDS A LEVEL 2 ALARM (L2-LOW-TEMP).

COOLING COIL:

THE COOLING COIL (CLG-O) WILL MODULATE TO MAINTAIN THE TEMPERATURE SETPOINT. ON A CALL FOR COOLING OR A DROP IN THE OUTDOOR AIR TEMPERATURE (OA-T) BELOW THE LOW OUTDOOR AIR TEMPERATURE SETPOINT (OALT-SP), THE COIL PUMP (CP-C) WILL BE STARTED. UPON A LOSS OF COOLING COIL PUMP STATUS (CP-S), THE PUMP WILL ATTEMPT TO AUTOMATICALLY RESTART UNTIL POSITIVE STATUS IS RECEIVED. ON A CALL FOR COOLING OR A DROP IN THE OUTDOOR AIR TEMPERATURE (OA-T) BELOW THE LOW OUTDOOR AIR TEMPERATURE SETPOINT (OALT-SP), THE LEAD COIL PUMP (CP-C) WILL BE STARTED. WHEN THE UNIT IS SHUTDOWN, THE COOLING COIL WILL BE COMMANDED TO A PRESET POSITION SHOULD THE OUTDOOR AIR TEMPERATURE (OA-T) FALL BELOW THE LOW OUTDOOR AIR TEMPERATURE SETPOINT (OALT-SP). WHEN THE CONDENSATE FLOAT SWITCH IS IN 'ALARM' (COND-A), THE COOLING CONTROL SEQUENCE WILL BE DISABLED. THEN THE FANS WILL BE DISABLED VIA A HARD WIRED SHUTDOWN CIRCUIT. DURING STAGE 3 FREEZE PROTECTION THE COIL WILL MODULATE TO A FULLY OPEN POSITION AND ENERGIZE THE CHILLED WATER PUMP (CP-C).

HUMIDIFICATION:

THE HUMIDIFIER WILL BE ENABLED (HUM-C) AND MODULATE (HUM-O) TO MAINTAIN THE ZONE RELATIVE HUMIDITY SETPOINT (HUM-SP) AS SENSED BY THE ZONE RELATIVE HUMIDITY SENSOR (ZN-H). THE HUMIDITY HIGH LIMIT WILL OVERRIDE THE OUTPUT IF NECESSARY TO PREVENT THE DISCHARGE AIR HUMIDITY FROM EXCEEDING DISCHARGE HUMIDITY HIGH LIMIT SETPOINT.

DEHUMIDIFICATION:

ON A RISE IN THE RETURN AIR HUMIDITY (RA-H), THE COOLING COIL OUTPUT WILL BE OVERRIDDEN TO MAINTAIN THE RETURN AIR HUMIDITY BELOW THE RETURN AIR DEHUMIDIFICATION SETPOINT (DEHUM-SP). THE REHEAT CONTROL WILL MAINTAIN THE TEMPERATURE AT SETPOINT. SEE HUMIDIFIER SEQUENCE ON SHEET M-7.4.

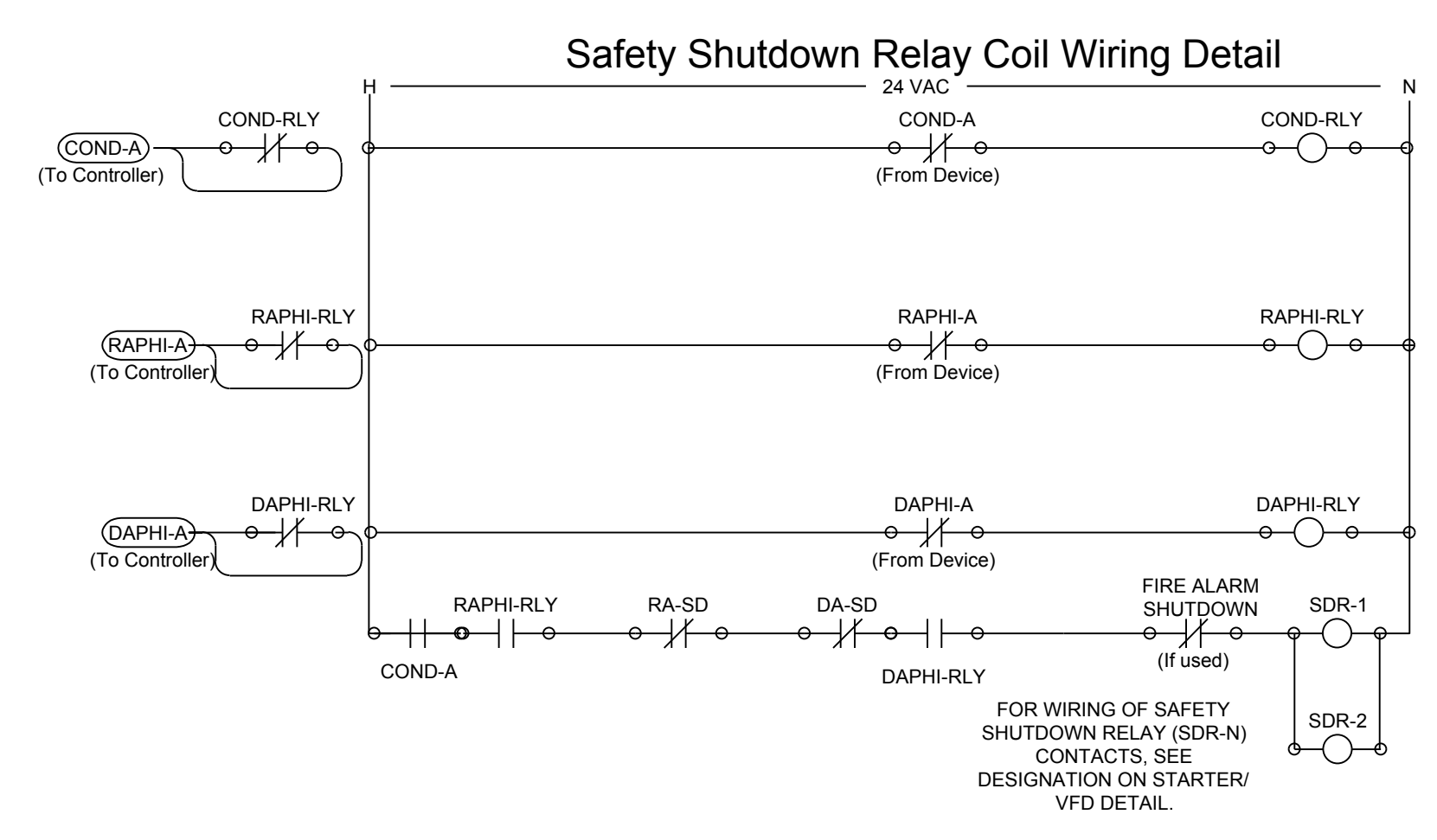
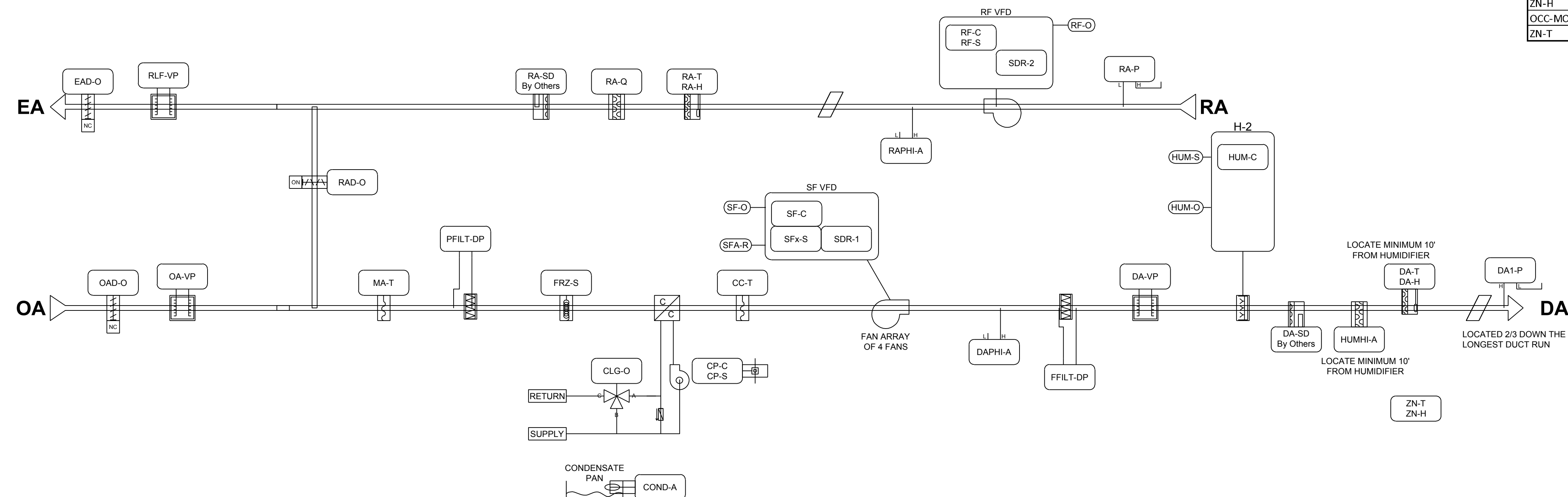
UNIT PROTECTION:

- DISCHARGE AIR HIGH DUCT PRESSURE ALARM (DAPHI-A)-WHEN IN 'ALARM', THE CONTROL SEQUENCE WILL STOP RUNNING AND THE FAN(S) WILL BE DISABLED VIA A HARD WIRED SHUTDOWN CIRCUIT.
- RETURN AIR HIGH DUCT PRESSURE (RAPHI-A)-WHEN IN 'ALARM', THE CONTROL SEQUENCE WILL STOP RUNNING AND THE FAN(S) WILL BE DISABLED VIA A HARD WIRED SHUTDOWN CIRCUIT.
- DISCHARGE AIR SMOKE DETECTOR (DA-SD)-DISABLES THE FAN(S) VIA A HARD WIRED SHUTDOWN CIRCUIT.
- RETURN AIR SMOKE DETECTOR (RA-SD)-DISABLES THE FAN(S) VIA A HARD WIRED SHUTDOWN CIRCUIT.

ADDITIONAL POINTS MONITORED BY THE FMS:

- OUTDOOR AIR TEMPERATURE (OA-T)
- OUTDOOR AIR HUMIDITY (OA-H)-OUTDOOR AIR VELOCITY PRESSURE (OA-VP)
- COOLING COIL DISCHARGE TEMPERATURE (CC-T)-DISCHARGE AIR VELOCITY PRESSURE (DA-VP)
- RELIEF AIR VELOCITY PRESSURE (RLF-VP)
- PREFILTER DIFF PRESSURE (PFILT-DP)
- FINAL FILTER DIFFERENTIAL PRESSURE (FFILT-DP)
- HIGH HUMIDITY LIMIT (HUMHI-A)-HUMIDIFIER STATUS (HUM-S)

| POINTS LIST: AHU-2 | | | | |
|--------------------|------------------------------------|------------------------|-----------|------------|
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
| BLDG-P | BUILDING STATIC PRESSURE | 0-10VDC | INPUT | ANALOG |
| COND-A | CONDENSATE ALARM | DRY CONTACT MAINTAINED | INPUT | BINARY |
| CLG-O | COOLING OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| CC-T | COOLING COIL DISCHARGE TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| CP-C | COOLING PUMP COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| CP-S | COOLING PUMP STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| DA-H | DISCHARGE AIR HUMIDITY | 0-10VDC | INPUT | ANALOG |
| DA-T | DISCHARGE AIR TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| DAPHI-A | DISCHARGE AIR HIGH DUCT PRESSURE | DRY CONTACT MAINTAINED | INPUT | BINARY |
| DA1-P | DISCHARGE AIR STATIC PRESSURE 1 | 0-10VDC | INPUT | ANALOG |
| DA-VP | DISCHARGE AIR VELOCITY PRESSURE | 0-10VDC | INPUT | ANALOG |
| EAD-O | EXHAUST AIR DAMPER OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| FFILT-DP | FINAL FILTER DIFFERENTIAL PRESSURE | 0-10VDC | INPUT | ANALOG |
| FRZ-S | FREEZE STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| HUMHI-A | HUMIDITY HIGH LIMIT | DRY CONTACT MAINTAINED | INPUT | BINARY |
| HUM-O | HUMIDIFIER OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| HUM-S | HUMIDIFIER STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| HUM-C | HUMIDIFIER COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| MA-T | MIXED AIR TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| OA-H | OUTDOOR AIR HUMIDITY | 0-10VDC | INPUT | ANALOG |
| OA-T | OUTDOOR AIR TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| OAD-O | OUTDOOR AIR DAMPER OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| OA-VP | OUTDOOR AIR VELOCITY PRESSURE | 0-10VDC | INPUT | ANALOG |
| PFILT-DP | PREFILTER DIFFERENTIAL PRESSURE | 0-10VDC | INPUT | ANALOG |
| RLF-VP | RELIEF AIR VELOCITY PRESSURE | 0-10VDC | INPUT | ANALOG |
| RA-H | RETURN AIR HUMIDITY | 0-10VDC | INPUT | ANALOG |
| RA-Q | RETURN AIR QUALITY | 0-10VDC | INPUT | ANALOG |
| RA-T | RETURN AIR TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| RAD-O | RETURN AIR DAMPER OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| RAPHI-A | RETURN AIR HIGH DUCT PRESSURE | DRY CONTACT MAINTAINED | INPUT | BINARY |
| RA-P | RETURN AIR STATIC PRESSURE | 0-10VDC | INPUT | ANALOG |
| RF-O | RETURN FAN OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| RF-C | RETURN FAN COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| RF-S | RETURN FAN STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| SFA-R | SUPPLY FAN ARRAY STATUS RESISTANCE | RESISTIVE | INPUT | ANALOG |
| SF-O | SUPPLY FAN OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| SF-C | SUPPLY FAN COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| ZN-H | ZONE HUMIDITY | SAB | INPUT | ANALOG |
| OCC-MODE | OCCUPANCY STATUS DISPLAY | SAB | OUTPUT | MULTISTATE |
| ZN-T | ZONE TEMPERATURE | SAB | INPUT | ANALOG |



1 AHU-2 CONTROL DIAGRAM



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| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

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DESIGNER: E. ERNVALL
DRAWN: E. ERNVALL
CHECKED: C. TRIERWEILER
DEPT MGR: V. LALONDE
PROJECT MGR: K. RUPP

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

MECHANICAL CONTROLS
AHU-2

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
M-7.2

DSD FILE NAME
2164076-036-M-7.2

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SEQUENCE OF OPERATION: AHU-3

UNIT ENABLE:

WHEN THE NETWORK INPUT (UNITEN-MODE) UNIT ENABLE SWITCH IS SET TO OCCUPIED, THE CONTROL SEQUENCE WILL BE ENABLED.

OCCUPIED MODE:

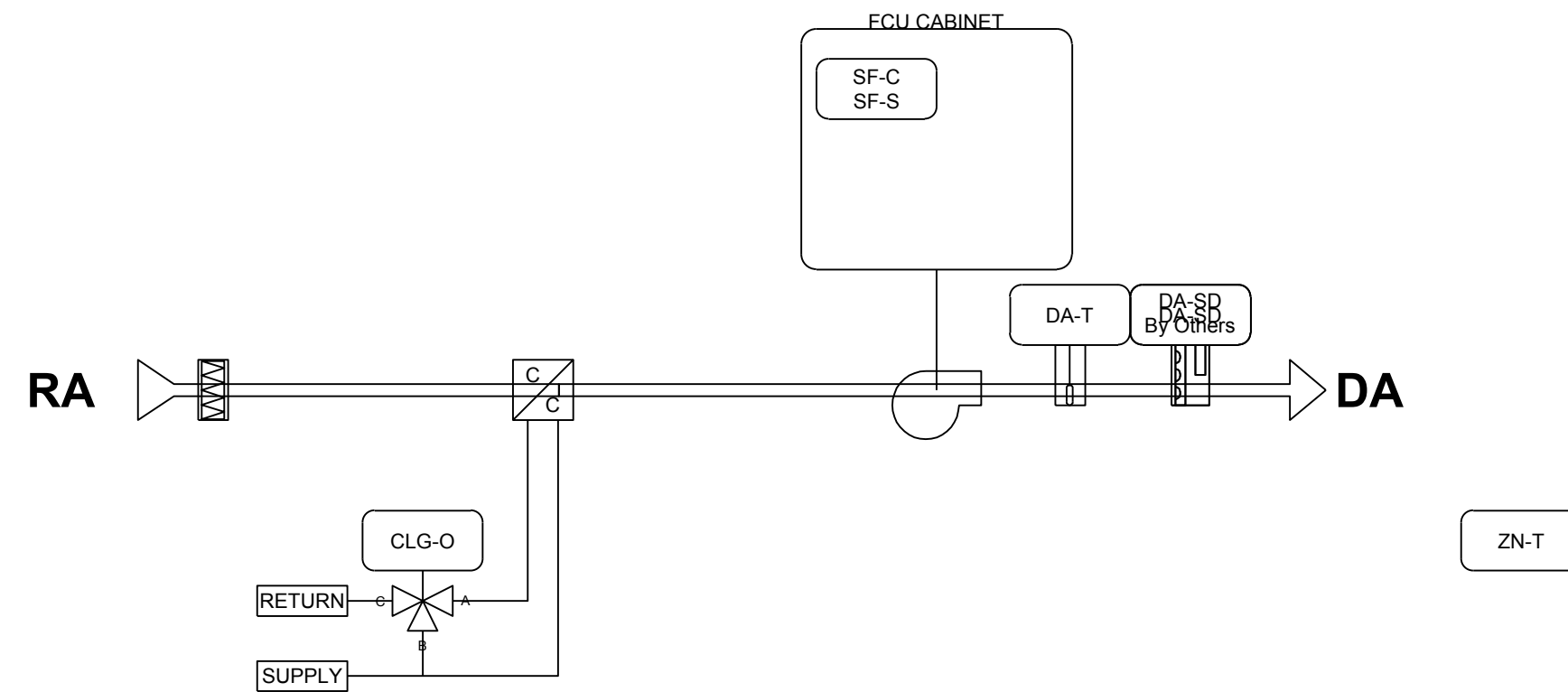
OCCUPANCY MODE WILL BE CONTROLLED VIA A NETWORK INPUT (OCC-SCHEDULE). DURING OCCUPIED MODE, THE CONSTANT SPEED SUPPLY FAN (SF-C) WILL BE STARTED AND WILL RUN CONTINUOUSLY. THE COOLING COIL (CLG-O) WILL MODULATE TO MAINTAIN THE ZONE TEMPERATURE SETPOINT (ZN-SP).

UNOCCUPIED MODE:

THE UNIT WILL CYCLE ON TO MAINTAIN UNOCCUPIED ZONE SETPOINTS (CLGUNOCC-SP & HTGUNOCC-SP) DURING UNOCCUPIED PERIODS.

ADDITIONAL POINTS MONITORED BY THE FMS:

- SUPPLY FAN STATUS (SF-S)
- DISCHARGE AIR SMOKE DETECTOR (DA-SD)
- DISCHARGE AIR TEMPERATURE (DA-T)



1 X-AHU-3 CONTROL DIAGRAM

| POINTS LIST: X-AHU-3 | | | | |
|----------------------|---------------------------|------------------------|-----------|----------------|
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
| CLG-O | COOLING OUTPUT | 24VAC INCREMENTAL | OUTPUT | POSITIONADJUST |
| DA-SD | DISCHARGE AIR SMOKE ALARM | DRY CONTACT MAINTAINED | INPUT | BINARY |
| DA-T | DISCHARGE AIR TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| SF-C | SUPPLY FAN COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| SF-S | SUPPLY FAN STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| OCC-MODE | OCCUPANCY STATUS DISPLAY | SAB | OUTPUT | MULTISTATE |
| ZN-T | ZONE TEMPERATURE | SAB | INPUT | ANALOG |
| WC-ADJ | WARMER/COOLER ADJUST | SAB | INPUT | ANALOG |

SEQUENCE OF OPERATION: FPVAV-1 - FPVAV-13

OCCUPIED:

NORMAL OPERATING MODE FOR OCCUPIED SPACES OR DAYTIME OPERATION. WHEN THE UNIT IS IN THE OCCUPIED MODE THE VAV SHALL MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE OCCUPIED HEATING OR COOLING SETPOINT. APPLICABLE VENTILATION AND AIRFLOW SETPOINTS SHALL BE ENFORCED. THE OCCUPIED MODE SHALL BE THE DEFAULT MODE OF THE VAV.

HEAT/COOL MODE:

THE HEAT/COOL MODE SHALL BE SET BY A COMMUNICATED VALUE OR AUTOMATICALLY BY THE VAV. IN STANDALONE OR AUTO MODE THE VAV SHALL COMPARE THE PRIMARY AIR TEMPERATURE WITH THE CONFIGURED AUTO CHANGEOVER SETPOINT TO DETERMINE IF THE AIR IS "HOT" OR "COLD". HEATING MODE IMPLIES THE PRIMARY AIR TEMPERATURE IS HOT. COOLING MODE IMPLIES THE PRIMARY AIR TEMPERATURE IS COLD.

HEAT/COOL SETPOINT:

THE SPACE TEMPERATURE SETPOINT SHALL BE DETERMINED EITHER BY A LOCAL (E.G., THUMBWHEEL) SETPOINT, THE VAV DEFAULT SETPOINT OR A COMMUNICATED VALUE. THE VAV SHALL USE THE LOCALLY STORED DEFAULT SETPOINTS WHEN NEITHER A LOCAL SETPOINT NOR COMMUNICATED SETPOINT IS PRESENT. IF BOTH A LOCAL SETPOINT AND COMMUNICATED SETPOINT EXIST, THE VAV SHALL USE THE COMMUNICATED VALUE.

COOLING MODE:

WHEN THE UNIT IS IN COOLING MODE, THE VAV CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE COOLING SETPOINT BY MODULATING THE AIRFLOW BETWEEN THE ACTIVE COOLING MINIMUM AIRFLOW SETPOINT TO THE MAXIMUM COOLING AIRFLOW SETPOINT. THE VAV SHALL USE THE MEASURED SPACE TEMPERATURE AND THE ACTIVE COOLING SETPOINT TO DETERMINE THE REQUESTED COOLING CAPACITY OF THE UNIT. THE OUTPUTS WILL BE CONTROLLED BASED ON THE UNIT CONFIGURATION AND THE REQUESTED COOLING CAPACITY. WHEN IN THE OCCUPIED MODE, THE CONTROLLER SHALL USE THE MEASURED SPACE TEMPERATURE AND THE ACTIVE COOLING SETPOINT TO DETERMINE THE REQUESTED COOLING CAPACITY OF THE UNIT. THE OUTPUTS SHALL BE CONTROLLED BASED ON THE UNIT CONFIGURATION AND THE REQUESTED COOLING CAPACITY.

HEATING MODE:

WHEN THE UNIT IS IN HEATING MODE, THE VAV CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT BY MODULATING THE AIRFLOW BETWEEN THE ACTIVE HEATING MINIMUM AIRFLOW SETPOINT TO THE MAXIMUM HEATING AIRFLOW SETPOINT. THE VAV CONTROLLER SHALL USE THE MEASURED SPACE TEMPERATURE AND THE ACTIVE HEATING SETPOINT TO DETERMINE THE REQUESTED HEATING CAPACITY.

OF THE UNIT. THE OUTPUTS WILL BE CONTROLLED BASED ON THE UNIT CONFIGURATION AND THE REQUESTED HEATING CAPACITY.

INTERMITTENT FAN CONTROL:

DURING ALL OCCUPIED MODES, WHEN THE UNIT IS IN COOLING MODE, AS THE SPACE TEMPERATURE FALLS BELOW THE ACTIVE COOLING SETPOINT, THE FAN WILL WORK IN CONJUNCTION WITH REHEAT SEQUENCE, AND THE VAV DAMPER SHALL MODULATE TO ITS MINIMUM COOLING AIRFLOW SETPOINT. UPON A CONTINUED DROP IN TEMPERATURE, THE TERMINAL FAN SHALL BE ENERGIZED AND MODULATES BETWEEN THE MINIMUM AND MAXIMUM FAN AIRFLOW SETPOINTS TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT. IF THE FAN REACHES ITS MAXIMUM FAN AIRFLOW SETPOINT, THE VAV CONTROLLER SHALL INITIATE REHEAT (AS DESCRIBED BELOW) TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT. WHILE THE FAN CONTINUES TO OPERATE AT THE MAXIMUM FAN AIRFLOW SETPOINT. DURING THE UNOCCUPIED MODE, THE VAV DAMPER SHALL MODULATE FULLY CLOSED. THE TERMINAL FAN AND HEAT (AS DESCRIBED BELOW) SHALL CYCLE AS NEEDED TO MAINTAIN SPACE TEMPERATURE ABOVE THE UNOCCUPIED HEATING SETPOINT.

DISCHARGE AIR TEMP SENSOR:

A DISCHARGE AIR TEMP (DA-T) SENSOR IS PROVIDED ON EACH BOX FOR MONITORING PURPOSES.

UNIT ENABLE:

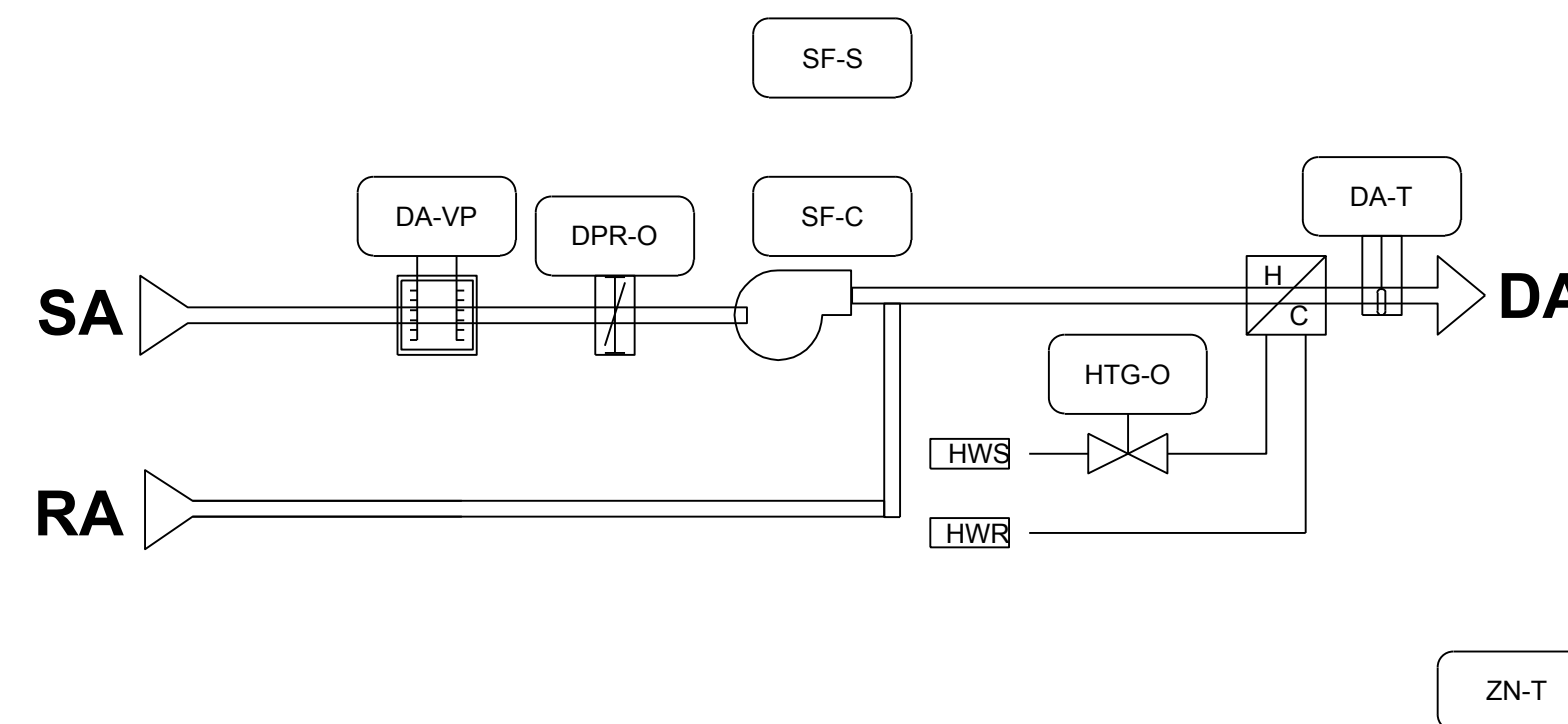
A NETWORK UNIT ENABLE (UNITEN-MODE) SIGNAL WILL CONTROL THE MODE OF THE BOX.

NETWORK WARMUP-COOLDOWN:

WARM-UP AND COOLDOWN MODES WILL BE ACTIVATED BY A NETWORK COMMAND (WC-C). WHEN THE ZONE TEMPERATURE (ZN-T) IS BELOW THE EFFECTIVE HEATING SETPOINT (EFFHTG-SP), THE BOX DAMPER WILL BE MODULATED TO ALLOW WARM AIR FLOW, THEN REHEAT COIL TO MAINTAIN THE ZONE TEMPERATURE (ZN-T). WHEN THE BOX EFFECTIVE HEATING SETPOINT IS SATISFIED THE FLOW WILL REMAIN AT THE WARM-UP MINIMUM POSITION UNTIL THE WARM COMMAND HAS BEEN REMOVED.

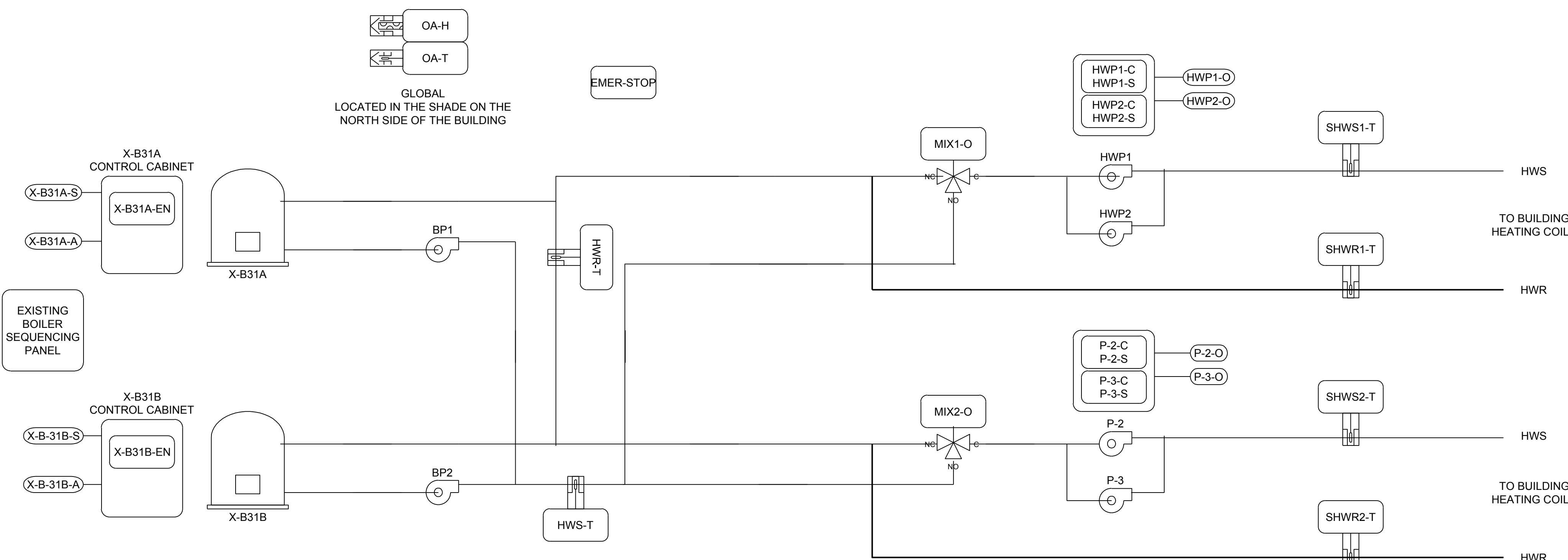
ADDITIONAL POINTS MONITORED BY THE FMS:

- SUPPLY FAN STATUS (SF-S)



2 FPVAV-1 - FPVAV-13 CONTROL DIAGRAM

| POINTS LIST: FPVAV-1 - FPVAV-13 | | | | |
|---------------------------------|---------------------------------|--------------------------------------|-----------|----------------|
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
| HTG-O | HEATING OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| DA-T | DISCHARGE AIR TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| SF-S | SUPPLY FAN STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| SF-C | SUPPLY FAN COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| DPR-O | SUPPLY AIR DAMPER OUTPUT | INTEGRATED | OUTPUT | POSITIONADJUST |
| DA-VP | DISCHARGE AIR VELOCITY PRESSURE | INTEGRATED DIGITAL VELOCITY PRESSURE | INPUT | ANALOG |
| OCC-MODE | OCCUPANCY STATUS DISPLAY | SAB | OUTPUT | MULTISTATE |
| ZN-T | ZONE TEMPERATURE | SAB | INPUT | ANALOG |
| WC-ADJ | WARMER/COOLER ADJUST | SAB | INPUT | ANALOG |



3 X-B-31A & X-B-31B CONTROL DIAGRAM

| POINTS LIST: X-B-31A & X-B-31B | | | | |
|--------------------------------|-----------------------------------|------------------------|-----------|----------|
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
| X-B31A-EN | X-B31A ENABLE | 24VAC MAINTAINED | OUTPUT | BINARY |
| X-B31A-A | X-B31A ALARM | DRY CONTACT MAINTAINED | INPUT | BINARY |
| X-B31A-S | X-B31A STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| X-B31B-EN | X-B31B ENABLE | 24VAC MAINTAINED | OUTPUT | BINARY |
| X-B31B-A | X-B31B ALARM | DRY CONTACT MAINTAINED | INPUT | BINARY |
| X-B31B-S | X-B31B STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| EMER-STOP | EMERGENCY SHUTDOWN | DRY CONTACT MAINTAINED | INPUT | BINARY |
| MIX1-O | MIXING VALVE OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| MIX2-O | MIXING VALVE OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| HWS-T | HW SUPPLY TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| SHWS1-T | SECONDARY HW SUPPLY TEMPERATURE 1 | NICKEL 1K RTD | INPUT | ANALOG |
| SHWS2-T | SECONDARY HW SUPPLY TEMPERATURE 2 | NICKEL 1K RTD | INPUT | ANALOG |
| HWR-T | HW RETURN TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| SHWR1-T | SECONDARY HW RETURN TEMPERATURE 1 | NICKEL 1K RTD | INPUT | ANALOG |
| SHWR2-T | SECONDARY HW RETURN TEMPERATURE 2 | NICKEL 1K RTD | INPUT | ANALOG |
| HWP1-C | HW PUMP 1 COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| HWP1-O | HW PUMP 1 OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| HWP1-S | HW PUMP 1 STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| HWP2-C | HW PUMP 2 COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| HWP2-O | HW PUMP 2 OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| HWP2-S | HW PUMP 2 STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| P2-C | PUMP 2 COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| P2-O | PUMP 2 OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| P2-S | PUMP 2 STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| P3-C | PUMP 3 COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| P3-O | PUMP 3 OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| P3-S | PUMP 3 STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |

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REGISTRATION SEAL

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| MARK | ISSUE | DATE |
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| | DDC REL 05 - IFB | 04/08/24 |
| | DDC REL 04-95% REVIEW | 03/13/24 |
| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

MECHANICAL CONTROLS

X-AHU-3, FPVAV,
X-BOILERS

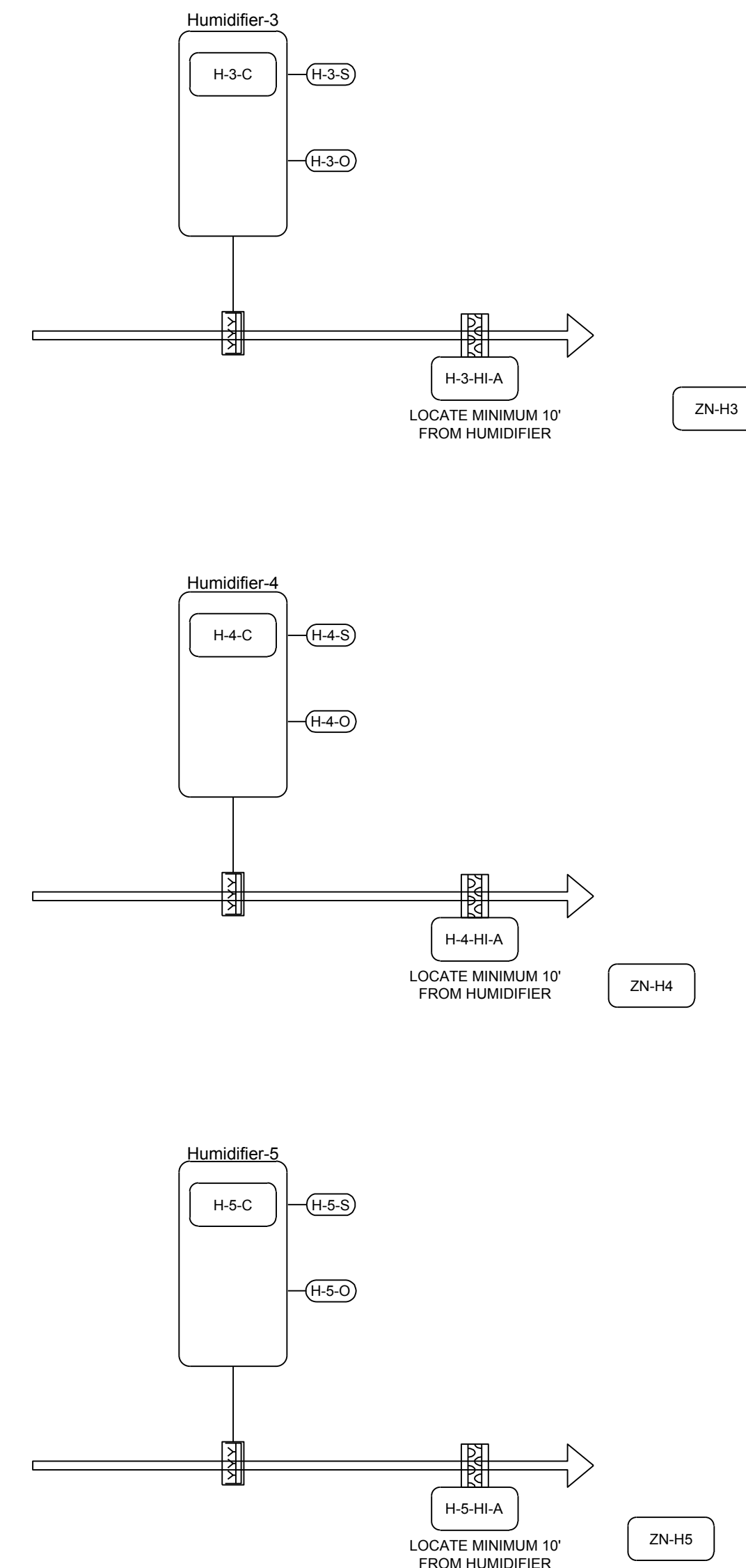
WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
M-7.3

DSD FILE NAME
2164076-036-M-7.3

REGISTRATION SEAL
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1 H-3 - H-5 CONTROL DIAGRAM

SEQUENCE OF OPERATION: H-3 - H-5

HUMIDIFICATION:

THE HUMIDIFIER WILL BE ENABLED (H-X-C) AND MODULATE (H-X-O) TO MAINTAIN THE ZONE RELATIVE HUMIDITY SETPOINT AS SENSED BY THE ZONE RELATIVE HUMIDITY SENSOR (ZN-HX). THE HUMIDITY HIGH LIMIT WILL OVERRIDE THE OUTPUT IF NECESSARY TO PREVENT THE DISCHARGE AIR HUMIDITY FROM EXCEEDING DISCHARGE HUMIDITY HIGH LIMIT SETPOINT.

ADDITIONAL POINTS MONITORED BY THE FMS:

- HUMIDIFIER STATUS (H-X-S)

| POINTS LIST: H-3 - H-5 | | | | |
|------------------------|-------------------|------------------------|-----------|----------|
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
| H-3-HI-A | H-3 HIGH LIMIT | DRY CONTACT MAINTAINED | INPUT | BINARY |
| H-3-O | H-3 OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| H-3-S | H-3 STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| H-3-C | H-3 COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| ZN-H3 | ZONE HUMIDITY H-3 | SAB | INPUT | ANALOG |
| H-4-HI-A | H-4 HIGH LIMIT | DRY CONTACT MAINTAINED | INPUT | BINARY |
| H-4-O | H-4 OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| H-4-S | H-4 STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| H-4-C | H-4 COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| ZN-H4 | ZONE HUMIDITY H-4 | SAB | INPUT | ANALOG |
| H-5-HI-A | H-5 HIGH LIMIT | DRY CONTACT MAINTAINED | INPUT | BINARY |
| H-5-O | H-5 OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| H-5-S | H-5 STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| H-5-C | H-5 COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| ZN-H5 | ZONE HUMIDITY H-5 | SAB | INPUT | ANALOG |

| MARK | ISSUE | DATE |
|------|-----------------------|----------|
| | DDC REL 05 - IFB | 04/08/24 |
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| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
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| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

MECHANICAL CONTROLS
HUMIDIFIERS

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
M-7.4

DSD FILE NAME
2164076-036-M-7.4

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SEQUENCE OF OPERATION: VAV-1, VAV-14, VAV-20 - VAV-22

OCCUPIED MODE:

WHEN THE ZONE TEMPERATURE (ZN-T) IS BETWEEN THE OCCUPIED HEATING (EFFHTG-SP) AND COOLING (EFFCLG-SP) SETPOINTS (INSIDE OF THE BIAS), THE PRIMARY AIR DAMPER (DPR-O) WILL BE AT THE MINIMUM CFM (SA-F) AND THERE WILL BE NO MECHANICAL HEATING. ON A RISE IN ZONE TEMPERATURE (ZN-T) ABOVE THE COOLING SETPOINT (EFFCLG-SP), THE PRIMARY AIR DAMPER (DPR-O) WILL INCREASE THE CFM (SA-F) AND THERE WILL BE NO MECHANICAL HEATING. ON A DROP IN ZONE TEMPERATURE (ZN-T) BELOW THE HEATING SETPOINT (EFFHTG-SP), THE REHEAT COIL WILL BE USED TO MAINTAIN THE ZONE TEMPERATURE (ZN-T) AND THE DAMPER (DPR-O) IS CONTROLLED TO PROVIDE A MINIMUM CFM (SA-F).

UNOCCUPIED MODE:

WHEN IN THIS MODE, WHILE THE ZONE TEMPERATURE (ZN-T) IS BETWEEN THE UNOCCUPIED HEATING (EFFHTG-SP) AND COOLING (EFFCLG-SP) SETPOINTS (INSIDE OF THE BIAS), THE PRIMARY AIR DAMPER (DPR-O) WILL BE AT THE MINIMUM CFM (SA-F) AND THERE WILL BE NO MECHANICAL HEATING. ON A RISE IN ZONE TEMPERATURE (ZN-T) ABOVE THE UNOCCUPIED COOLING SETPOINT (EFFCLG-SP), THE PRIMARY AIR DAMPER (DPR-O) WILL INCREASE THE CFM (SA-F) (IF AVAILABLE) AND THERE WILL BE NO MECHANICAL HEATING. ON A DROP IN ZONE TEMPERATURE (ZN-T) BELOW THE UNOCCUPIED HEATING SETPOINT (EFFHTG-SP), THE REHEAT COIL WILL BE USED TO MAINTAIN THE ZONE TEMPERATURE (ZN-T) AND THE PRIMARY AIR DAMPER (DPR-O) WILL BE AT THE MINIMUM CFM (SA-F).

DISCHARGE AIR TEMP SENSOR:

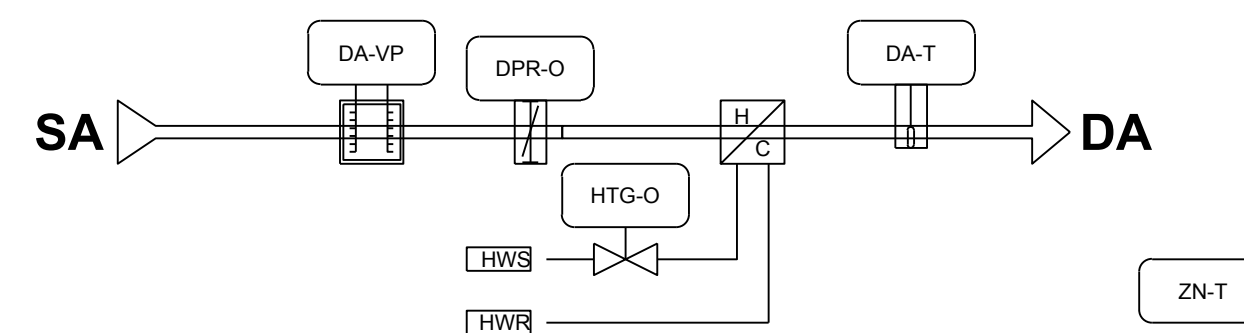
A DISCHARGE AIR TEMP (DA-T) SENSOR IS PROVIDED ON EACH BOX FOR MONITORING PURPOSES.

UNIT ENABLE:

A NETWORK UNIT ENABLE (UNITEN-MODE) SIGNAL WILL CONTROL THE MODE OF THE BOX. ADD "LOCAL REHEAT CONTROL" FROM TRANE 500.

NETWORK WARMUP-COOLDOWN:

WARM-UP AND COOLDOWN MODES WILL BE ACTIVATED BY A NETWORK COMMAND (WC-C), WHEN THE ZONE TEMPERATURE (ZN-T) IS BELOW THE EFFECTIVE HEATING SETPOINT (EFFHTG-SP), THE BOX DAMPER WILL BE MODULATED TO ALLOW WARM AIR FLOW, THEN REHEAT COIL TO MAINTAIN THE ZONE TEMPERATURE (ZN-T), WHEN THE BOX EFFECTIVE HEATING SETPOINT IS SATISFIED THE FLOW WILL REMAIN AT THE WARM-UP MINIMUM POSITION UNTIL THE WARM COMMAND HAS BEEN REMOVED.



1 VAV-1, VAV-14, VAV-20 - VAV-22 CONTROL DIAGRAM

| POINTS LIST: VAV-1, VAV-14, VAV-20 - VAV-22 | | | | |
|---|---------------------------------|--------------------------------------|-----------|----------------|
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
| HTG-O | HEATING OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| DA-T | DISCHARGE AIR TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| DPR-O | SUPPLY AIR DAMPER OUTPUT | INTEGRATED | OUTPUT | POSITIONADJUST |
| DA-VP | DISCHARGE AIR VELOCITY PRESSURE | INTEGRATED DIGITAL VELOCITY PRESSURE | INPUT | ANALOG |
| OCC-MODE | OCCUPANCY STATUS DISPLAY | SAB | OUTPUT | MULTISTATE |
| ZN-T | ZONE TEMPERATURE | SAB | INPUT | ANALOG |
| WC-ADJ | WARMER/COOLER ADJUST | SAB | INPUT | ANALOG |

SEQUENCE OF OPERATION: VAV-2 - VAV-13 & VAV-15 - VAV-19

OCCUPIED MODE:

WHEN THE ZONE TEMPERATURE (ZN-T) IS BETWEEN THE OCCUPIED HEATING (EFFHTG-SP) AND COOLING (EFFCLG-SP) SETPOINTS (INSIDE OF THE BIAS), THE PRIMARY AIR DAMPER (DPR-O) WILL BE AT THE MINIMUM CFM (SA-F) AND THERE WILL BE NO MECHANICAL HEATING. ON A RISE IN ZONE TEMPERATURE (ZN-T) ABOVE THE COOLING SETPOINT (EFFCLG-SP), THE PRIMARY AIR DAMPER (DPR-O) WILL INCREASE THE CFM (SA-F) AND THERE WILL BE NO MECHANICAL HEATING. ON A DROP IN ZONE TEMPERATURE (ZN-T) BELOW THE HEATING SETPOINT (EFFHTG-SP), THE SUPPLEMENTARY HEAT COIL WILL BE FULLY UTILIZED BEFORE THE REHEAT COIL IS ENABLED AND THE DAMPER (DPR-O) IS CONTROLLED TO PROVIDE A MINIMUM CFM (SA-F).

UNOCCUPIED MODE:

WHEN IN THIS MODE, WHILE THE ZONE TEMPERATURE (ZN-T) IS BETWEEN THE UNOCCUPIED HEATING (EFFHTG-SP) AND COOLING (EFFCLG-SP) SETPOINTS (INSIDE OF THE BIAS), THE PRIMARY AIR DAMPER (DPR-O) WILL BE AT THE MINIMUM CFM (SA-F) AND THERE WILL BE NO MECHANICAL HEATING. ON A RISE IN ZONE TEMPERATURE (ZN-T) ABOVE THE UNOCCUPIED COOLING SETPOINT (EFFCLG-SP), THE PRIMARY AIR DAMPER (DPR-O) WILL INCREASE THE CFM (SA-F) (IF AVAILABLE) AND THERE WILL BE NO MECHANICAL HEATING. ON A DROP IN ZONE TEMPERATURE (ZN-T) BELOW THE UNOCCUPIED HEATING SETPOINT (EFFHTG-SP), THE REHEAT COIL WILL BE FULLY UTILIZED BEFORE THE SUPPLEMENTARY HEAT IS ENABLED AND THE PRIMARY AIR DAMPER (DPR-O) WILL BE AT THE MINIMUM CFM (SA-F).

DISCHARGE AIR TEMP SENSOR:

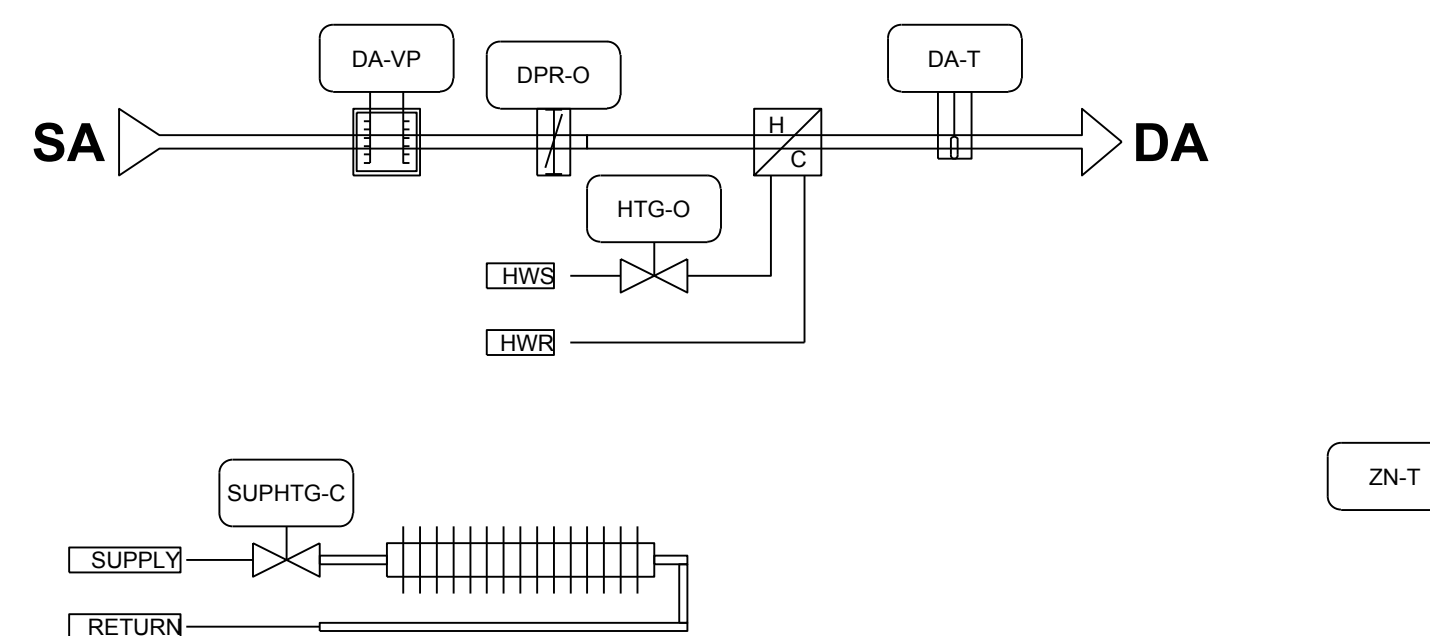
A DISCHARGE AIR TEMP (DA-T) SENSOR IS PROVIDED ON EACH BOX FOR MONITORING PURPOSES.

UNIT ENABLE:

A NETWORK UNIT ENABLE (UNITEN-MODE) SIGNAL WILL CONTROL THE MODE OF THE BOX.

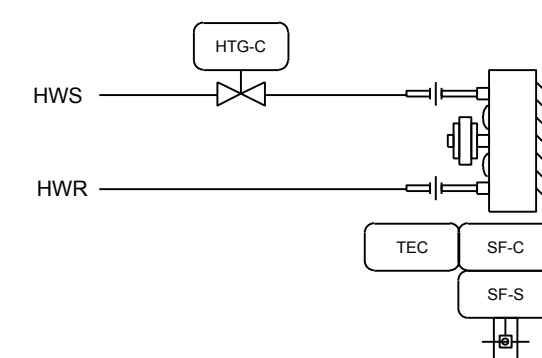
NETWORK WARMUP-COOLDOWN:

WARM-UP AND COOLDOWN MODES WILL BE ACTIVATED BY A NETWORK COMMAND (WC-C), WHEN THE ZONE TEMPERATURE (ZN-T) IS BELOW THE EFFECTIVE HEATING SETPOINT (EFFHTG-SP), THE BOX DAMPER WILL BE MODULATED TO ALLOW WARM AIR FLOW, THEN REHEAT COIL, THEN SUPPLEMENTAL HEATING COIL TO MAINTAIN THE ZONE TEMPERATURE (ZN-T), WHEN THE BOX EFFECTIVE HEATING SETPOINT IS SATISFIED THE FLOW WILL REMAIN AT THE WARM-UP MINIMUM POSITION UNTIL THE WARM COMMAND HAS BEEN REMOVED.



2 VAV-2 - VAV-13 & VAV-15 - VAV-19 CONTROL DIAGRAM

| POINTS LIST: VAV-2 - VAV-13, VAV-15 - VAV-19 | | | | |
|--|---------------------------------|--------------------------------------|-----------|----------------|
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
| HTG-O | HEATING OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| DA-T | DISCHARGE AIR TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| SUPHTG-C | SUPPLEMENTAL HEATING COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| DPR-O | SUPPLY AIR DAMPER OUTPUT | INTEGRATED | OUTPUT | POSITIONADJUST |
| DA-VP | DISCHARGE AIR VELOCITY PRESSURE | INTEGRATED DIGITAL VELOCITY PRESSURE | INPUT | ANALOG |
| OCC-MODE | OCCUPANCY STATUS DISPLAY | SAB | OUTPUT | MULTISTATE |
| ZN-T | ZONE TEMPERATURE | SAB | INPUT | ANALOG |
| WC-ADJ | WARMER/COOLER ADJUST | SAB | INPUT | ANALOG |



SEQUENCE OF OPERATION: X-CUH-1 - X-CUH-3 & X-UH-1

SUPPLY FAN CONTROL:

THIS FAN IS SINGLE SPEED THAT WILL RUN CONTINUOUSLY WHEN HEATING.

TEMPERATURE CONTROL:

THE UNIT WILL CONTROL TO MAINTAIN THE ZONE TEMPERATURE SET POINT AS SENSED BY THE ZONE TEMPERATURE SENSOR.

OCCUPIED MODE:

THE OCCUPANCY MODE WILL BE CONTROLLED VIA A NETWORK INPUT.

UNOCCUPIED MODE:

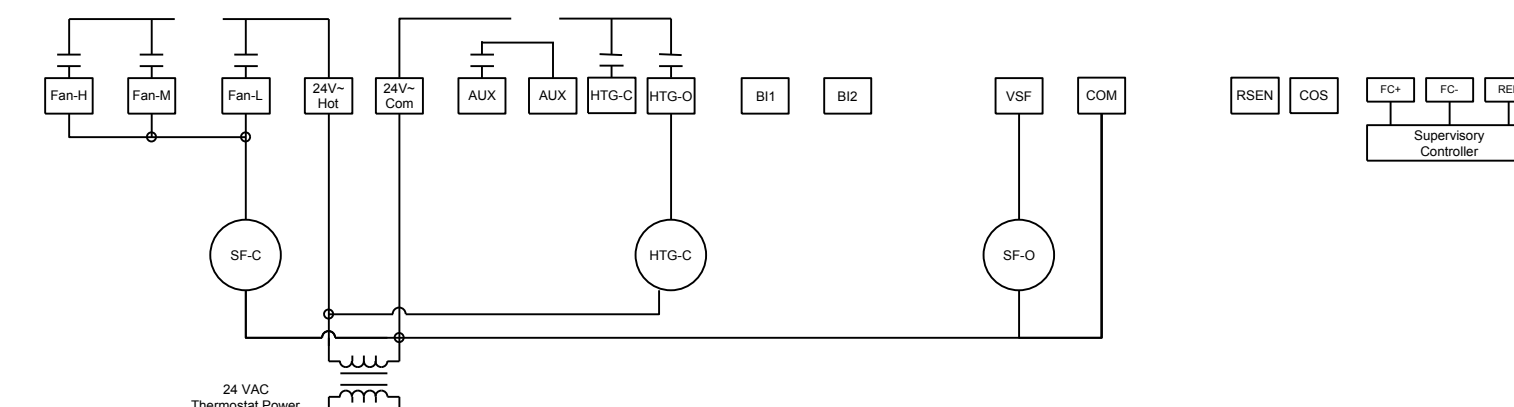
THE ZONE TEMPERATURE SET POINT WILL BE SETBACK IN UNOCCUPIED MODE.

HEATING COIL:

THE HEATING COIL WILL CYCLE OPEN AND CLOSED TO MAINTAIN THE TEMPERATURE SET POINT.

ADDITIONAL POINTS MONITORED BY THE FMS:

- SUPPLY FAN STATUS (SF-S)



3 X-CUH-1 - X-CUH-3 & X-UH-1 CONTROL DIAGRAM

| POINTS LIST: X-CUH-1 - X-CUH-3 & X-UH-1 | | | | |
|---|--------------------|------------------------|-----------|----------|
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
| HTG-C | HEATING OUTPUT | 24VAC MAINTAINED | OUTPUT | BINARY |
| SF-C | SUPPLY FAN COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| SF-S | SUPPLY FAN STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |
| ZN-T | ZONE TEMPERATURE | SAB | INPUT | ANALOG |



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| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|----------------|------|
| DESIGNER | E. ERNVALL | |
| DRAWN | E. ERNVALL | |
| CHECKED | C. TRIERWEILER | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

MECHANICAL CONTROLS

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
M-7.5

DSD FILE NAME
2164076-036-M-7.5

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REGISTRATION SEAL
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| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|----------------|
| DESIGNER | E. ERNVALL |
| DRAWN | E. ERNVALL |
| CHECKED | C. TRIERWEILER |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

MECHANICAL CONTROLS
X-EF, X-FT, X-RHC

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
M-7.6

DSD FILE NAME
2164076-036-M-7.6

POINTS LIST: X-EF

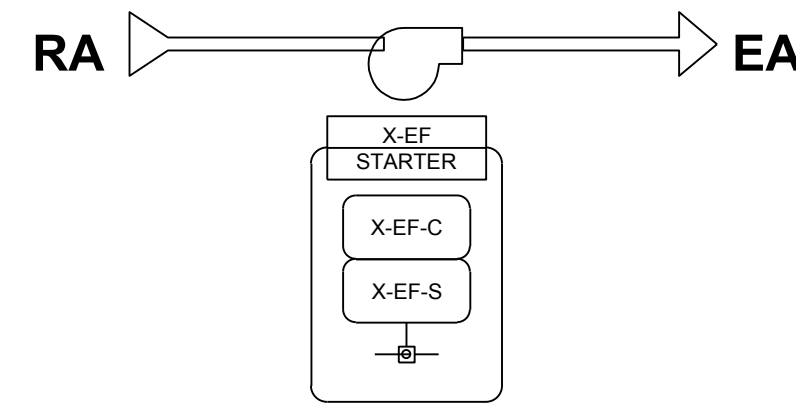
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
|--------|--------------|------------------------|-----------|----------|
| X-EF-C | X-EF COMMAND | 24VAC MAINTAINED | OUTPUT | BINARY |
| X-EF-S | X-EF STATUS | DRY CONTACT MAINTAINED | INPUT | BINARY |

POINTS LIST: X-FT

| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
|-------|------------------|------------------|-----------|----------|
| HTG-C | HEATING OUTPUT | 24VAC MAINTAINED | OUTPUT | BINARY |
| ZN-T | ZONE TEMPERATURE | SAB | INPUT | ANALOG |

POINTS LIST: X-RHC-14 - X-RHC-16

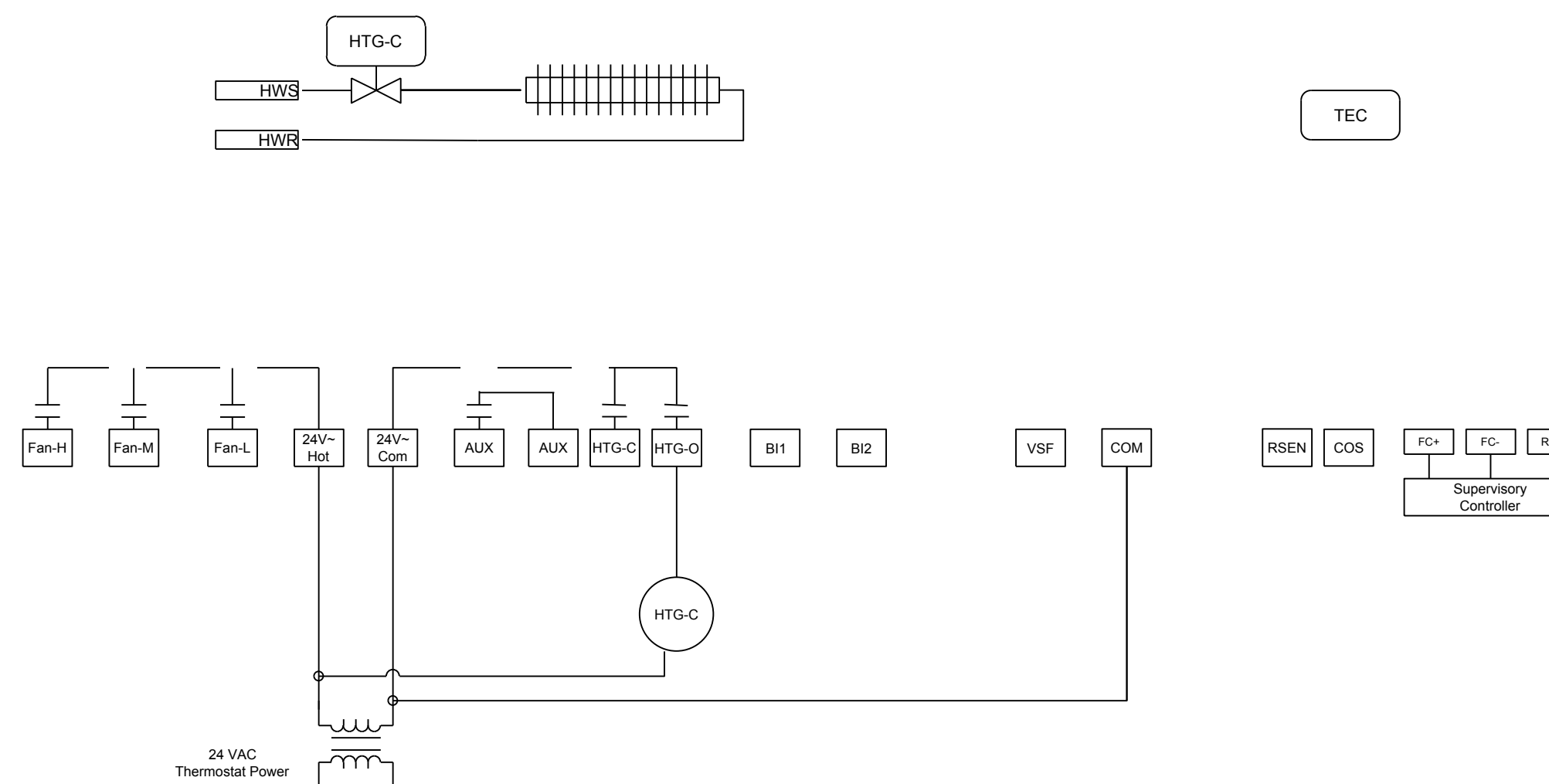
| NAME | DESCRIPTION | SIGNAL | POINTTYPE | DATATYPE |
|-------|---------------------------|---------------|-----------|----------|
| DA-T | DISCHARGE AIR TEMPERATURE | NICKEL 1K RTD | INPUT | ANALOG |
| HTG-O | HEATING OUTPUT | 0-10VDC | OUTPUT | ANALOG |
| ZN-T | ZONE TEMPERATURE | SAB | INPUT | ANALOG |



1 X-EF CONTROL DIAGRAM

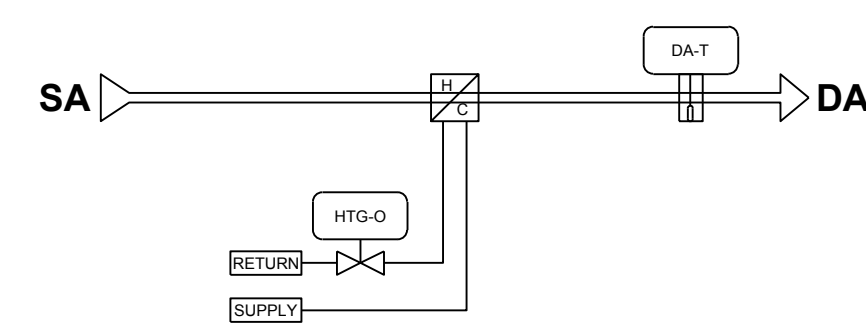
SEQUENCE OF OPERATION: X-EF
ADDITIONAL POINTS MONITORED/CONTROLLED BY THE FMS:

- X-EF STATUS (X-EF-S)
- X-EF COMMAND (X-EF-C)



2 X-FT CONTROL DIAGRAM

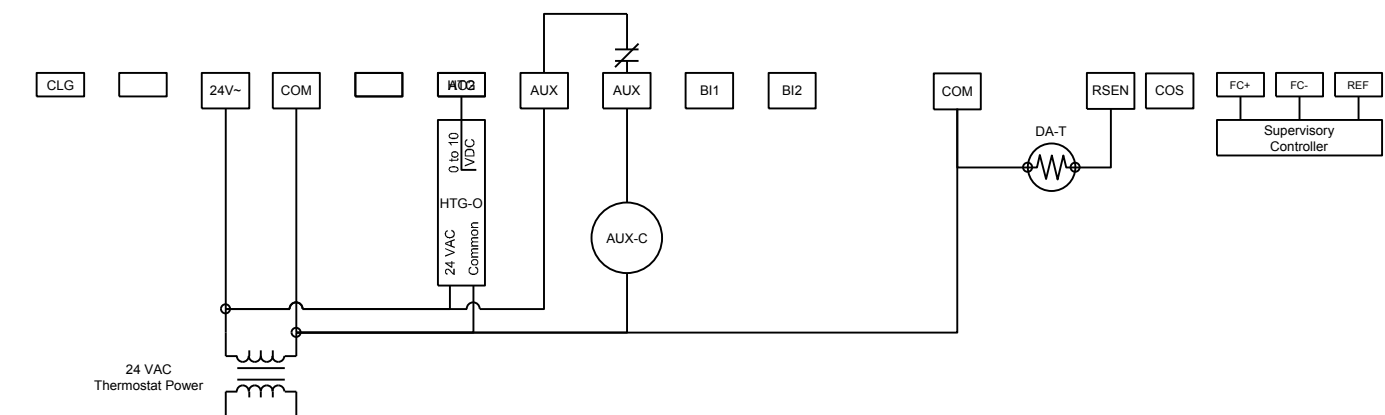
SEQUENCE OF OPERATION: X-FT
TEMPERATURE CONTROL:
THE UNIT WILL CONTROL TO MAINTAIN THE ZONE TEMPERATURE SET POINT AS SENSED BY THE ZONE TEMPERATURE SENSOR.
OCCUPIED MODE:
THE OCCUPANCY MODE WILL BE CONTROLLED VIA A NETWORK INPUT.
UNOCCUPIED MODE:
THE ZONE TEMPERATURE SET POINT WILL BE SETBACK IN UNOCCUPIED MODE.
HEATING COIL:
THE HEATING COIL WILL CYCLE OPEN AND CLOSED TO MAINTAIN THE TEMPERATURE SET POINT.



3 X-RHC-14 - X-RHC-16 CONTROL DIAGRAM

SEQUENCE OF OPERATION: X-CUH-1 - X-CUH-3 & X-UH-1
TEMPERATURE CONTROL:
THE UNIT WILL CONTROL TO MAINTAIN THE ZONE TEMPERATURE SETPOINT.
OCCUPIED MODE:
THE OCCUPANCY MODE WILL BE CONTROLLED VIA A NETWORK INPUT.
HEATING COIL:
THE HEATING COIL WILL MODULATE OPEN AND CLOSE IN SEQUENCE TO MAINTAIN THE TEMPERATURE SETPOINT.
ADDITIONAL POINTS MONITORED BY THE FMS:

- DISCHARGE AIR TEMPERATURE (DA-T)



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| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|------------|------|
| DESIGNER | B. THELEN | |
| DRAWN | B. THELEN | |
| CHECKED | J. SOVIS | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

ELECTRICAL SYMBOLS, ABBREVIATIONS, NOTES, AND SCHEDULES

SCALE: N.T.S.

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

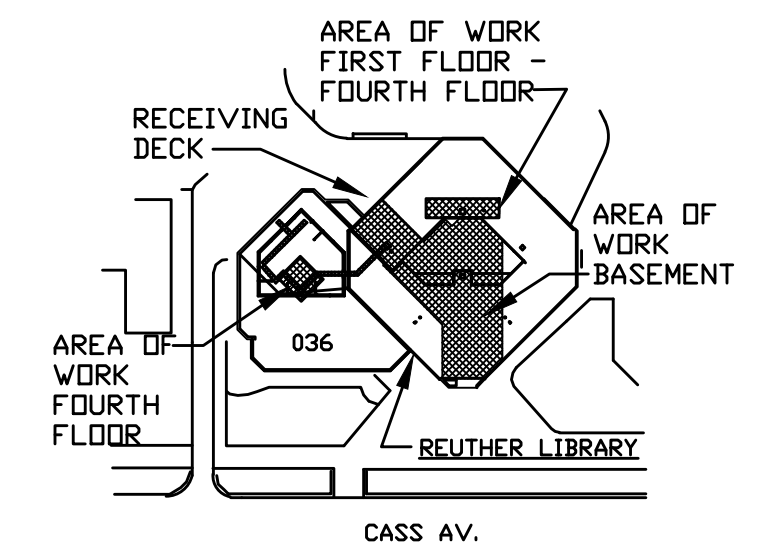
A/E PROJECT NO.
2164076

SHEET NO.
E-0.1

DSD FILE NAME
2164076-036-E-0.1

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ELECTRICAL SYMBOLS LEGEND

| | | |
|---|--|--|
| <p>OUTLETS</p> <ul style="list-style-type: none"> ⊕ SINGLE RECEPTACLE (120 VOLT) ⊕ DUPLEX RECEPTACLE ⊕ EMERGENCY RECEPTACLE ⊕ DOUBLE DUPLEX RECEPTACLE ⊕ F FLUSH FLOOR BOX ⊕ S SURFACE FLOOR BOX ⊕ SPECIAL EQUIPMENT RECEPTACLE ⊕ TELEPHONE OUTLET ▽ DATA OUTLET ▽ TELEPHONE / DATA OUTLET ■ PP POWER POLE ⊕ JUNCTION BOX ⊕ WALL JUNCTION BOX ⊕ PULL (JUNCTION) BOX ⊕ UNDERFLOOR JUNCTION BOX ⊕ CEILING MOUNTED WIFI <p>SWITCHES</p> <ul style="list-style-type: none"> ⊕ SINGLE-POLE SWITCH ⊕ THREE-WAY SWITCH ⊕ FOUR-WAY SWITCH ⊕ SWITCH WITH PILOT LIGHT ⊕ THERMAL OVERLOAD SWITCH ⊕ MANUAL MOTOR SWITCH ⊕ KEY SWITCH ⊕ TIME SWITCH ⊕ DIMMER SWITCH <p>MECHANICAL</p> <ul style="list-style-type: none"> ⊕ SINGLE PHASE MOTOR ⊕ THREE PHASE MOTOR ⊕ RESISTANCE HEATER, KW SHOWN ⊕ PIPE TRACE HEATER ⊕ ELECTRIC UNIT HEATER ⊕ ELECTRIC WATER HEATER <p>NURSE CALL</p> <ul style="list-style-type: none"> ⊕ NCC NURSE CALL CONTROLLER ⊕ M MASTER STATION ⊕ P EMERGENCY PULL STATION ⊕ E EMERGENCY PUSH STATION ⊕ CB CODE BLUE STATION ⊕ A PENDENT INTERFACE ⊕ I BED / LIGHT INTERFACE ⊕ B1 SINGLE BED STATION ⊕ B2 DUAL BED STATION ⊕ DOME LIGHT ⊕ SRS STAFF REGISTER STATION ⊕ S STAFF STATION ⊕ DS DUTY STATION <p>DESIGNATIONS</p> <ul style="list-style-type: none"> ⊕ DEMOLITION NOTE ⊕ PLAN NOTE ⊕ ADDENDUM NOTE | <p>FIXTURES</p> <ul style="list-style-type: none"> ⊕ LIGHT FIXTURE ⊕ STRIP FIXTURE ⊕ EMERGENCY LIGHT FIXTURE ⊕ IN-GRADE LIGHT FIXTURE ⊕ SPOTLIGHT (number of heads shown) ⊕ EXIT SIGN (face & direction as shown) ⊕ WALL MOUNT LIGHT FIXTURE ⊕ CEILING LIGHT FIXTURE ⊕ TRACK & FIXTURE ⊕ STREET TYPE POLE FIXTURE ⊕ POLE MOUNTED LIGHT FIXTURE ⊕ EXTERIOR WALL MOUNT LIGHT FIXTURE ⊕ WALLPACK LIGHT FIXTURE ⊕ SPECIAL PURPOSE LIGHT FIXTURE ⊕ HIGH BAY LIGHT FIXTURE ⊕ EMERGENCY EGRESS LIGHT FIXTURE (number of heads shown) ⊕ DOCK LIGHT FIXTURE <p>CIRCUITRY and RACEWAYS</p> <ul style="list-style-type: none"> — CONDUIT INSTALLED (by E.C.) - - - CONDUIT INSTALLED (by others) — CONDUIT STUB UP — CONDUIT STUB DOWN — 1.3 HOME RUN (with circuit numbers) — END OF CONDUIT RUN — END OF CONDUIT RUN, CAP AND STAKE — "CONDUIT RUN CONTINUES" INDICATION --- FLEXIBLE PIGTAILS/CONNECTIONS — WM WIREMOLD AS SPECIFIED — PM PLUGMOLD AS SPECIFIED — BD BUS DUCT — UFD UNDERFLOOR DUCT <p>SOUND and SIGNAL</p> <ul style="list-style-type: none"> ⊕ SPEAKER ⊕ WALL MOUNTED SPEAKER ⊕ WALL MOUNTED SPEAKER / CLOCK COMBO ⊕ SINGLE FACE CLOCK ⊕ DUAL FACE CLOCK ⊕ VIDEO INPUT ⊕ AUDIO / VIDEO INPUT ⊕ BELL ⊕ VOLUME CONTROL ⊕ BUZZER ⊕ CHIME ⊕ TELEVISION OUTLET ⊕ MICROPHONE OUTLET ⊕ INTERCOM OUTLET ⊕ CAMERA ⊕ DOOR CONTACT ⊕ MOTION DETECTOR ⊕ BEAM DETECTOR ⊕ KEY PAD ⊕ SECURITY SYSTEM CONTROL PANEL ⊕ CCTV CONTROL PANEL ⊕ CARD READER ⊕ STUDENT STATION ⊕ ADMINISTRATION STATION ⊕ TEACHER STATION ⊕ GLASS BREAK | <p>SERVICE and EQUIPMENT</p> <ul style="list-style-type: none"> ⊕ TVSS TRANSIENT VOLTAGE SURGE SUPPRESSION ⊕ VFD VARIABLE FREQUENCY DRIVE ⊕ TRANSFORMER ⊕ DISCONNECT SWITCH ⊕ MAGNETIC STARTER ⊕ COMB. STARTER ⊕ PANELBOARD, SURFACE MOUNTED ⊕ PANELBOARD, FLUSH MOUNTED ⊕ WEATHERHEAD ⊕ UTILITY METER, AS REQUIRED ⊕ DIGITAL EQUIPMENT METER, AS REQUIRED ⊕ CURRENT TRANSFORMERS ⊕ GENERATOR, KW SHOWN ⊕ TELEPHONE TERMINAL BOARD ⊕ GROUND CONNECTION PER N.E.C. ⊕ WIREWAY ⊕ TRANSFER SWITCH ⊕ ENCLOSED CIRCUIT BREAKER ⊕ CAPACITOR <p>CONTROL</p> <ul style="list-style-type: none"> ⊕ THERMOSTAT ⊕ HUMIDISTAT ⊕ PHOTOCELL (voltage as required) ⊕ TIME CLOCK (24 hour U.O.N.) ⊕ PUSHBUTTON STATION (number of buttons indicated) ⊕ CONTROL TRANSFORMER ⊕ LIGHTING CONTACTOR ⊕ IRRIGATION CONTROLLER (120 volt xVA connection by x/C) <p>⊕ WALL MOUNT DUAL TECHNOLOGY SENSOR</p> <p>⊕ OCCUPANCY SENSOR / PHOTOCELL</p> <p>⊕ ULTRASONIC SENSOR - 360° - 2 CIRCUIT</p> <p>⊕ DUAL TECHNOLOGY SENSOR - 360° - 1000 SQ FT</p> <p>⊕ DUAL TECHNOLOGY SENSOR - 360° - 500 SQ FT</p> <p>⊕ SWITCH STYLE OCCUPANCY SENSOR</p> <p>⊕ POWER PACK</p> <p>⊕ DIGITAL TIME SWITCH</p> <p>FIRE ALARM</p> <ul style="list-style-type: none"> ⊕ SMOKE DETECTOR ⊕ HEAT DETECTOR ⊕ DUCT SMOKE DETECTOR ⊕ DUCT SMOKE DETECTOR ⊕ HORN ⊕ HORN & LIGHT ⊕ SPEAKER ⊕ SPEAKER & LIGHT ⊕ PULL STATION ⊕ FIRE ALARM CONTROL PANEL ⊕ ANNUNCIATOR PANEL ⊕ END OF LINE DEVICE ⊕ REMOTE INDICATING LIGHT, WALL MTD. ⊕ REMOTE INDICATING LIGHT, CLG. MTD. ⊕ MAGNETIC DOOR HOLDER ⊕ FIREFIGHTER COMMUNICATION JACK ⊕ FLOW SWITCH (furnished by FP/C) ⊕ TAMPER SWITCH (furnished by FP/C) ⊕ VISUAL ONLY UNIT ⊕ FIRE CONTROL POWER SUPPLY MONITOR MODULE ⊕ CONTROL MODULE ⊕ CARBON MONOXIDE DETECTOR |
|---|--|--|

GENERAL ELECTRICAL NOTES

- ALL WALL AND FLOOR PENETRATIONS ARE TO BE SEALED TO MAINTAIN ORIGINAL RATING.
- ALL CONDUITS TO BE FIELD ROUTED ALONG EXISTING PIPING AND STRUCTURAL STEEL.
- THE DIVISION 26 CONTRACTORS SHALL VISIT THE PROJECT AND DETERMINE THE EXACT EXTENT OF THE DEMOLITION WORK REQUIRED BEFORE BIDDING THE PROJECT.
- REMOVE ALL EXISTING OBSOLETE EXPOSED CONDUIT, WIRE AND UNUSED EQUIPMENT WHERE WORK IS BEING DONE EXCEPT ITEMS NOTED OTHERWISE.
- WHERE BUILDING SURFACES ARE DAMAGED BY THE REMOVAL OF OLD WORK, SURFACES SHALL BE PATCHED TO MATCH ADJACENT.
- EXISTING WORK WHICH IS PRESENTLY CONCEALED AND WHICH WILL REMAIN CONCEALED AND DOES NOT INTERFERE WITH ANY NEW WORK OF ANY TRADE NEED NOT BE REMOVED, HOWEVER, ALL CONDUIT SHALL BE CAPPED BELOW FINISH SURFACE AND THEN PATCHED TO MATCH, OR AS NOTED.
- EXISTING OPENINGS, WHICH ARE TO BE REUSED, SHALL BE MODIFIED OR ENLARGED TO SUIT THE NEW SYSTEMS AS REQUIRED. PROVIDE ALL REQUIRED CUTTING AND PATCHING.
- IF ASBESTOS IS PRESENT, IT WILL BE REMOVED OR RENDERED HARMLESS UNDER SEPARATE CONTRACT BY THE OWNER.
- THE DIVISION 26 CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING THE EXISTING WALLS TO MATCH THE ADJACENT SURFACES BEHIND ALL SURFACE MOUNTED EQUIPMENT.
- CONTRACTOR SHALL FIELD VERIFY ALL EQUIPMENT VOLTAGES AND LOADS PRIOR TO INSTALLING SERVICE TO EQUIPMENT.
- DRAWINGS ARE BASED ON EXISTING RECORD DOCUMENT AND CASUAL FIELD OBSERVATION. REPORT ANY DISCREPANCIES TO ENGINEER FOR CLARIFICATION.

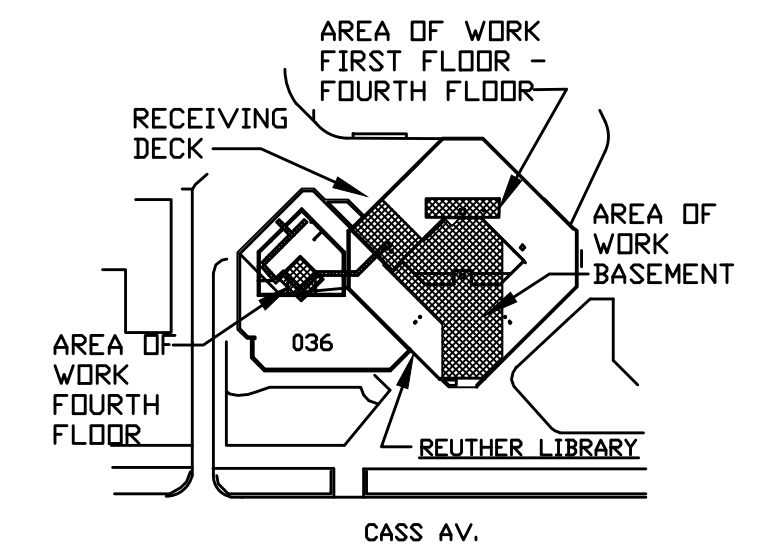
ABBREVIATIONS LEGEND

| | | |
|--|--|--|
| <p>A AMPS</p> <p>AC ABOVE COUNTER</p> <p>AFF AIR CONDITIONING UNIT ABOVE FINISHED FLOOR</p> <p>AHJ AUTHORITY HAVING JURISDICTION</p> <p>AHU-AIR HANDLING UNIT</p> <p>AIC AMPS INTERRUPTING CAPACITY ABOVE SHELF</p> <p>ATS AUTOMATIC TRANSFER SWITCH</p> <p>B- BOILER</p> <p>BC BELOW COUNTER BUILDING</p> <p>BLDG</p> <p>CHLR- CHILLER</p> <p>CND (C) CONDUIT</p> <p>CKT CIRCUIT</p> <p>CKT BKR CIRCUIT BREAKER</p> <p>CT- COOLING TOWER</p> <p>CU- CONDENSING UNIT</p> <p>CUH- CABINET UNIT HEATER</p> <p>DFU- DUCT FURNACE</p> <p>DISC DISCONNECT DRAWING</p> <p>DWG DOMESTIC WATER HEATER</p> <p>DWH-</p> <p>EBB- ELECTRIC BASEBOARD</p> <p>EC ELECTRICAL CONTRACTOR</p> <p>EF- EXHAUST FAN</p> <p>EM EMERGENCY</p> <p>EMT ELECTRICAL METALLIC TUBING</p> <p>EWV ELECTRIC WATER COOLER</p> <p>EXIST (E) EXISTING</p> <p>FLA FULL LOAD AMPS</p> <p>FLEX FLEXIBLE CONDUIT</p> <p>FLR FLOOR</p> <p>FLUOR FLUORESCENT</p> <p>FSES FOOD SERVICE EQUIP. SUPPLIER</p> <p>FIS FIRE/SMOKE</p> <p>FU FURNACE</p> | <p>GC GENERAL CONTRACTOR</p> <p>GFI GROUND FAULT INTERRUPTER</p> <p>GND GROUND</p> <p>H- HUMIDIFIER</p> <p>HOA HIGH INTENSITY DISCHARGE</p> <p>HP HAND-OFF-AUTO SELECTOR SWITCH</p> <p>HR HORSEPOWER</p> <p>HRV HOUR HEATING/VENTILATING/AIR CONDITIONING</p> <p>IG ISOLATED GROUND</p> <p>IMC INTERMEDIATE METAL CONDUIT</p> <p>JB JUNCTION BOX</p> <p>LC LIGHT CONTROL</p> <p>LT LIGHT</p> <p>LTG LIGHTING</p> <p>LT FLEX LIQUID TIGHT FLEXIBLE METAL CONDUIT</p> <p>MAX MAXIMUM</p> <p>MC MECHANICAL CONTRACTOR</p> <p>MCC MOTOR CONTROL CENTER</p> <p>MIN MINIMUM</p> <p>MLO MAIN LUG ONLY</p> <p>MT MOUNT</p> <p>MTD MOUNTED</p> <p>MTG MOUNTING</p> <p>MJAU- MAKE-UP AIR UNIT</p> <p>NC NORMALLY CLOSED</p> <p>NIC NOT IN CONTRACT</p> <p>NL NIGHT LIGHT</p> <p>NO NORMALLY OPEN</p> <p>NTS NOT TO SCALE</p> | <p>P POLE</p> <p>P- PUMP</p> <p>PB PULL BOX</p> <p>PNL PANEL</p> <p>PRV POWER ROOF VENTILATOR</p> <p>PVC POLY VINYL CHLORIDE</p> <p>PWR POWER</p> <p>RECEPT RECEPTACLE</p> <p>RGC RIGID GALVANIZED STEEL CONDUIT</p> <p>RTU ROOF TOP UNIT</p> <p>SF- SUPPLY FAN</p> <p>SPEC SPECIFICATIONS</p> <p>SW SWITCH</p> <p>SWBD SWITCHBOARD</p> <p>TCC TEMPERATURE CONTROL CONTRACTOR</p> <p>TR TAMPER PROOF RECEPTACLE</p> <p>TS TAMPER PROOF SWITCH</p> <p>TYP TYPICAL</p> <p>UF UNDER FLOOR</p> <p>UH- UNIT HEATER</p> <p>UL UNDERWRITERS' LABORATORIES, INC. UNLESS NOTED OTHERWISE</p> <p>V VOLTS</p> <p>VV VERIFY LOCATION WITH OWNER</p> <p>W WATTS</p> <p>W/ WITH</p> <p>W/O WITHOUT</p> <p>WP WEATHER PROOF</p> <p>XFMR TRANSFORMER</p> |
|--|--|--|

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DEMOLITION NOTES

- 1 NO WORK DONE IN THIS AREA, UNLESS NOTED OTHERWISE.
- 2 EXISTING DEVICE TO REMAIN.
- 3 EXISTING EQUIPMENT TO REMAIN.
- 4 DISCONNECT & REMOVE EXISTING DEVICE. REMOVE ASSOCIATED CONDUIT & WIRE.
- 5 DISCONNECT & REMOVE EXISTING EQUIPMENT. REMOVE ASSOCIATED CONDUIT & WIRE.
- 6 DISCONNECT & REMOVE EXISTING EQUIPMENT. ASSOCIATED CONDUIT & WIRE TO REMAIN FOR NEW EQUIPMENT.



ELECTRICAL - BASEMENT FLOOR PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"

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|-------------------------|----------|
| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04 - 95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|------------|------|
| DESIGNER | B. THELEN | |
| DRAWN | B. THELEN | |
| CHECKED | J. SOVIS | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

ELECTRICAL BASEMENT FLOOR PLAN DEMOLITION
SCALE: 1/8" = 1'-0"

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
E-1.0

DSD FILE NAME
2164076-036-E-1.0



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| CHECKED | J. SOVIS |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

ELECTRICAL
FIRST
FLOOR PLAN
DEMOLITION

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

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

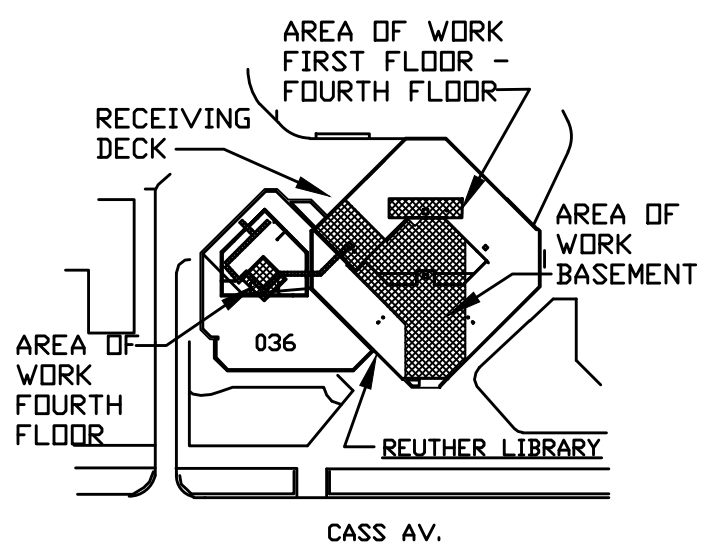
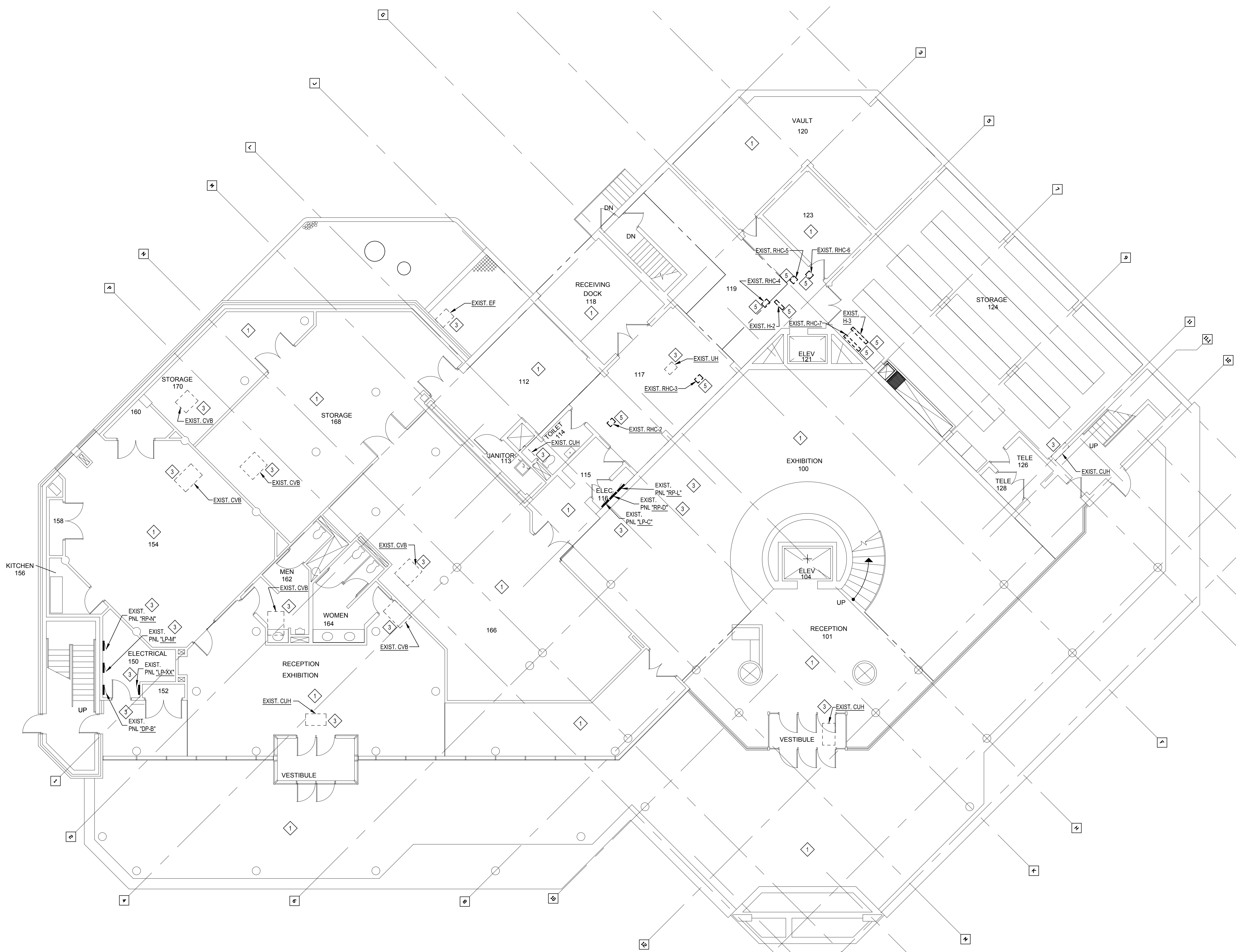
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2164076

SHEET NO.
E-1.1

DSD FILE NAME
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- 3 EXISTING EQUIPMENT TO REMAIN.
- 4 DISCONNECT & REMOVE EXISTING DEVICE. REMOVE ASSOCIATED CONDUIT & WIRE.
- 5 DISCONNECT & REMOVE EXISTING EQUIPMENT. REMOVE ASSOCIATED CONDUIT & WIRE.



ELECTRICAL - FIRST FLOOR PLAN - DEMOLITION

0 1 5 10 20
SCALE: 1/8" = 1'-0"



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| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

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ELECTRICAL SECOND FLOOR PLAN DEMOLITION

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

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WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

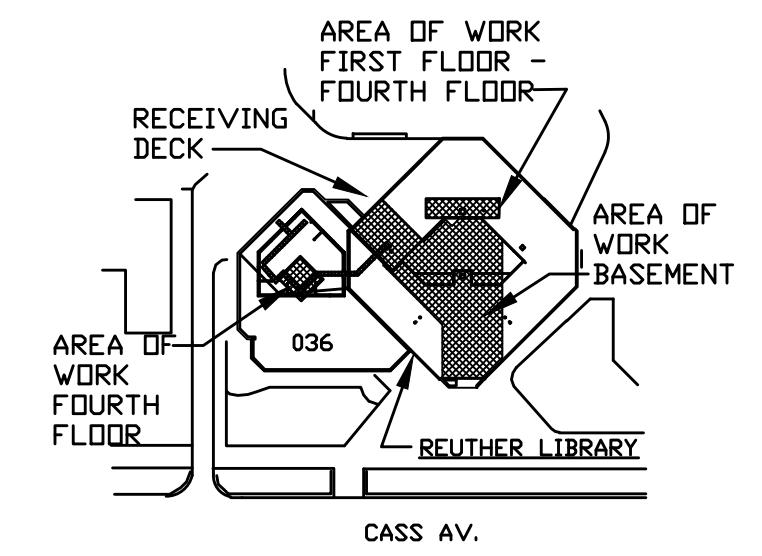
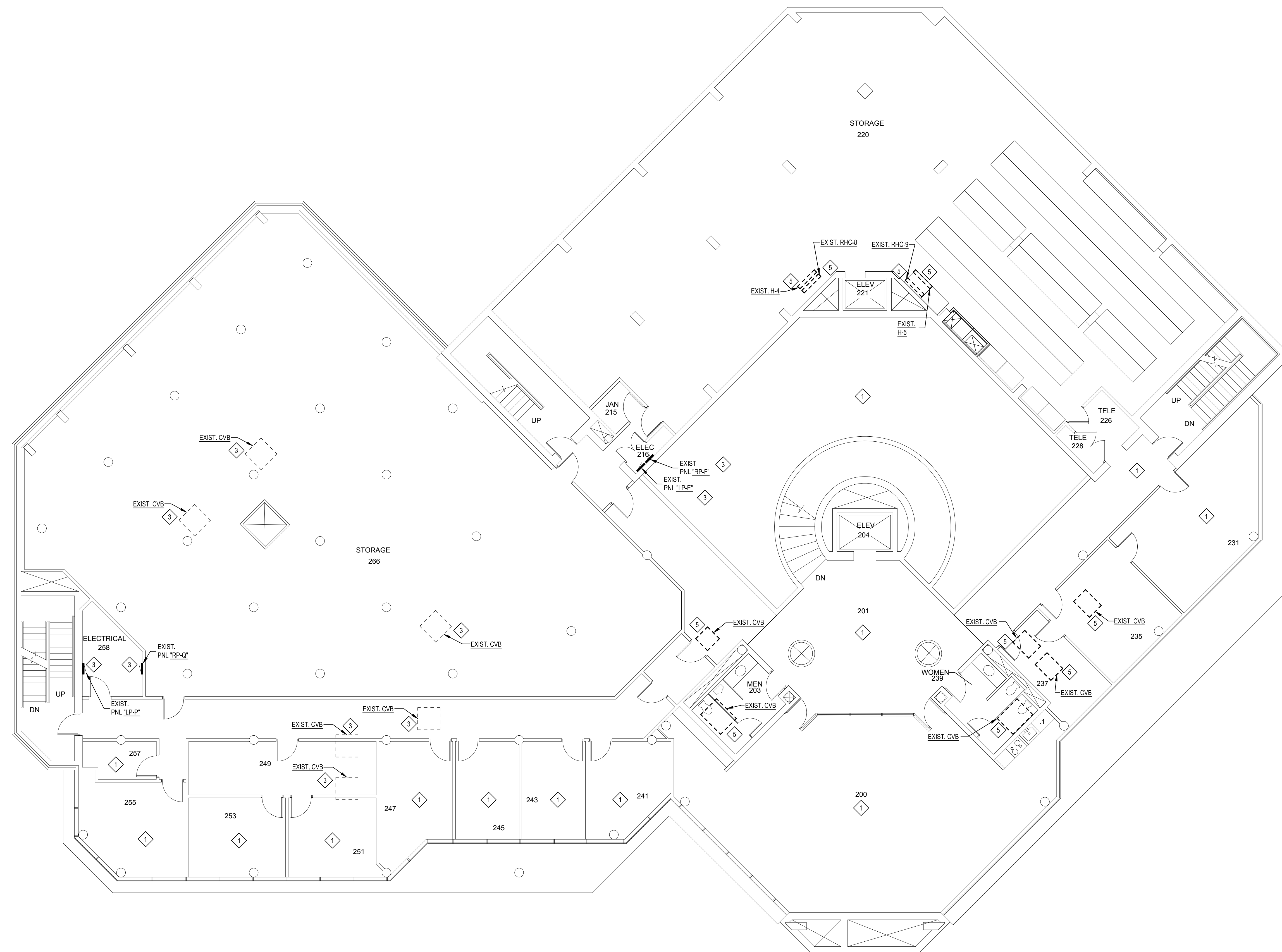
A/E PROJECT NO. 2164076

SHEET NO. E-1.2

DSD FILE NAME 2164076-036-E-1.2

DEMOLITION NOTES

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- 3 EXISTING EQUIPMENT TO REMAIN.
- 4 DISCONNECT & REMOVE EXISTING DEVICE. REMOVE ASSOCIATED CONDUIT & WIRE.
- 5 DISCONNECT & REMOVE EXISTING EQUIPMENT. REMOVE ASSOCIATED CONDUIT & WIRE.



ELECTRICAL - SECOND FLOOR PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"



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| | |
|-------------|------------|
| DESIGNER | B. THELEN |
| DRAWN | B. THELEN |
| CHECKED | J. SOVIS |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: WSU REUTHER LIBRARY MEP

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

ELECTRICAL
THIRD
FLOOR PLAN
DEMOLITION

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

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

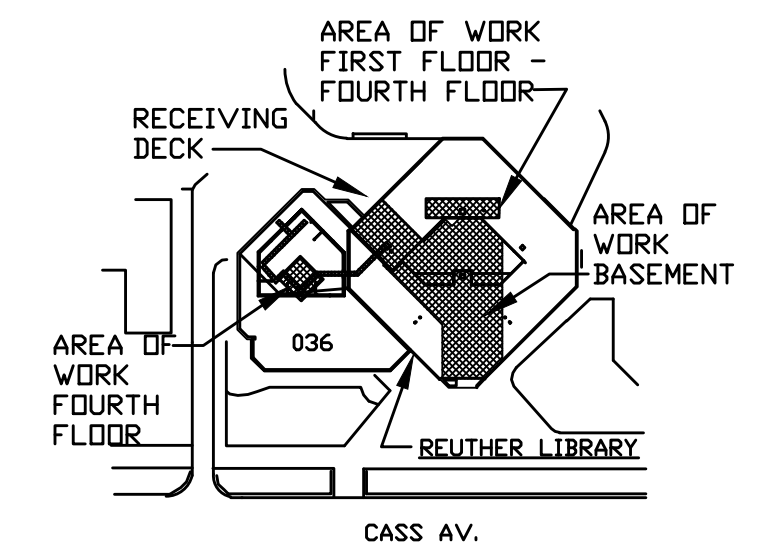
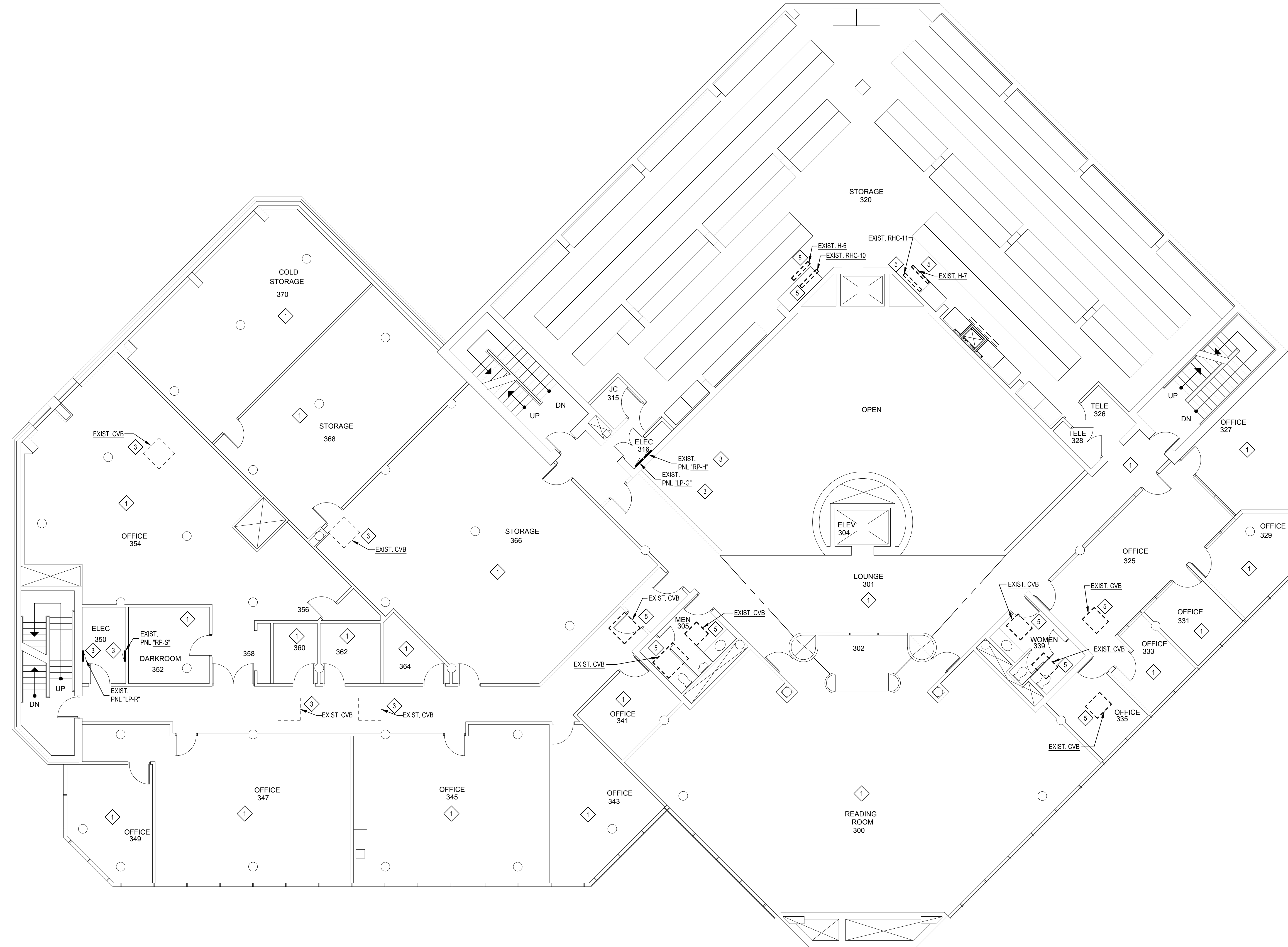
A/E PROJECT NO.
2164076

SHEET NO.
E-1.3

DSD FILE NAME
2164076-036-E-1.3

DEMOLITION NOTES

- 1 NO WORK DONE IN THIS AREA, UNLESS NOTED OTHERWISE.
- 2 EXISTING DEVICE TO REMAIN.
- 3 EXISTING EQUIPMENT TO REMAIN.
- 4 DISCONNECT & REMOVE EXISTING DEVICE. REMOVE ASSOCIATED CONDUIT & WIRE.
- 5 DISCONNECT & REMOVE EXISTING EQUIPMENT. REMOVE ASSOCIATED CONDUIT & WIRE.



ELECTRICAL - THIRD FLOOR PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"



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REGISTRATION SEAL

NOT FOR CONSTRUCTION

| | |
|-----------------------|----------|
| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|-------------|------|
| DESIGNER | B. THELEN | |
| DRAWN | B. THELEN | |
| CHECKED | J. SOVIS | |
| DEPT MGR | V. LALLONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

**ELECTRICAL
FOURTH FLOOR PLAN
DEMOLITION**

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

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

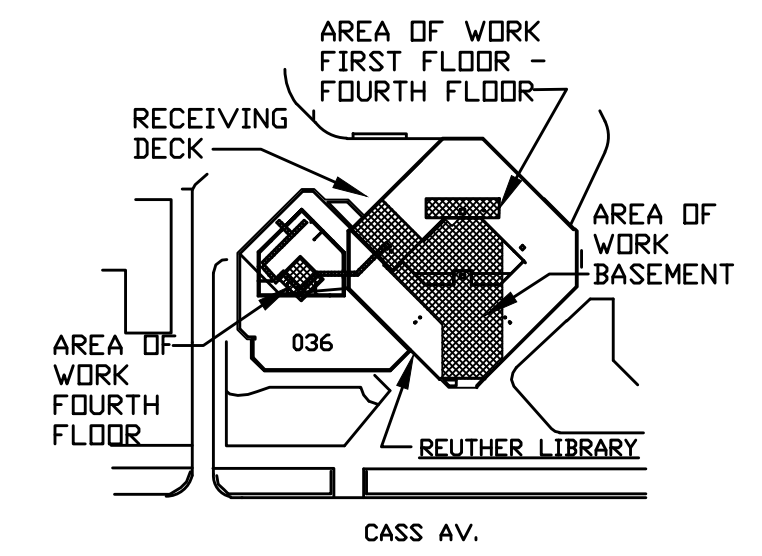
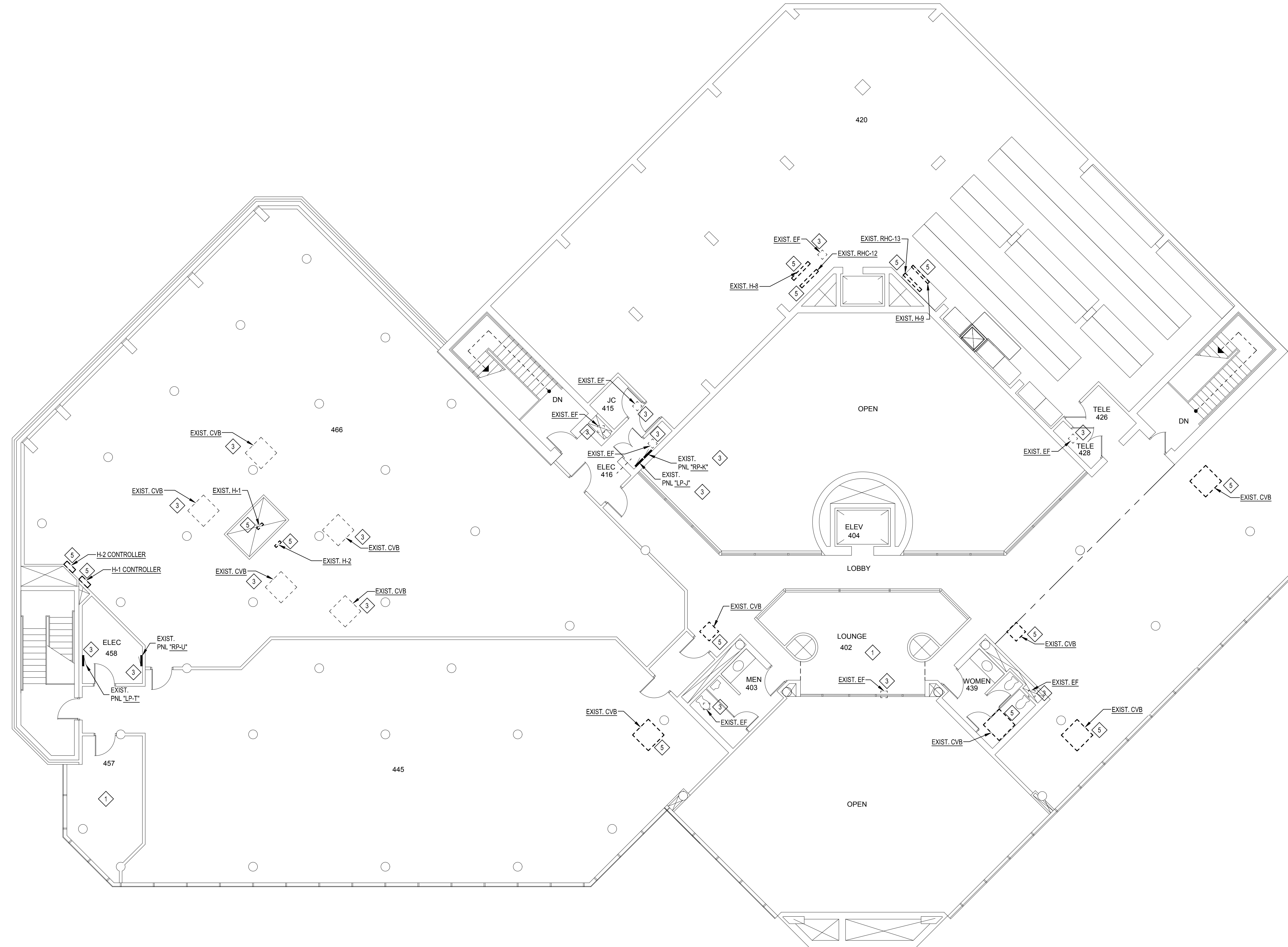
A/E PROJECT NO.
2164076

SHEET NO.
E-1.4

DSD FILE NAME
2164076-036-E-1.4

DEMOLITION NOTES

- 1 NO WORK DONE IN THIS AREA, UNLESS NOTED OTHERWISE.
- 2 EXISTING DEVICE TO REMAIN.
- 3 EXISTING EQUIPMENT TO REMAIN.
- 4 DISCONNECT & REMOVE EXISTING DEVICE. REMOVE ASSOCIATED CONDUIT & WIRE.
- 5 DISCONNECT & REMOVE EXISTING EQUIPMENT. REMOVE ASSOCIATED CONDUIT & WIRE.



ELECTRICAL - FOURTH FLOOR PLAN - DEMOLITION

0 1 5 10 20
SCALE: 1/8" = 1'-0"



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| | DDC REL 04 - 95% REVIEW | 03/13/24 |
| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|------------|
| DESIGNER | B. THELEN |
| DRAWN | B. THELEN |
| CHECKED | J. SOVIS |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

ELECTRICAL BASEMENT FLOOR PLAN NEW

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

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

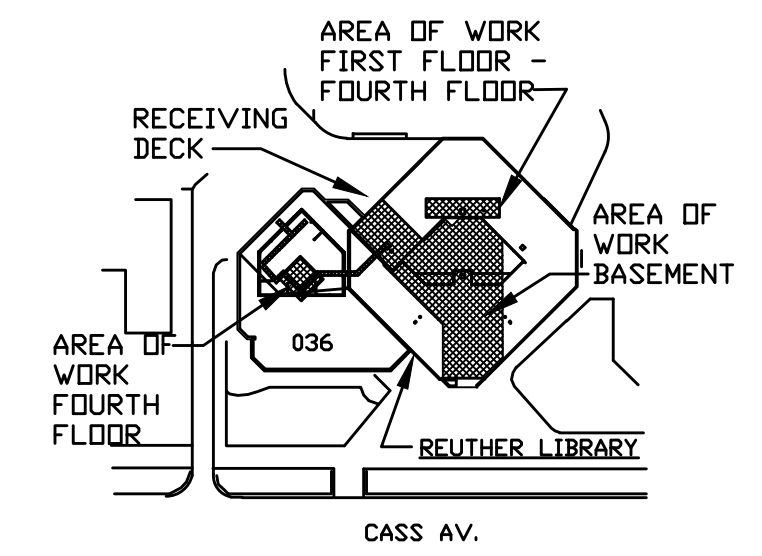
A/E PROJECT NO.
2164076

SHEET NO.
E-2.0

DSD FILE NAME
2164076-036-E-2.0

ELECTRICAL KEY NOTES

- 1 NO WORK IN THIS AREA, UNLESS NOTED OTHERWISE.
- 2 CONTRACTOR SHALL CIRCUIT TO NEAREST AVAILABLE 20A CIRCUIT.
- 3 CONTRACTOR SHALL REPLACE EXISTING 60A FUSES IN MCC WITH NEW 30A FUSES. NEW FUSES SHALL MATCH EXISTING TYPE.
- 4 CONTRACTOR SHALL REPLACE EXISTING 20A FUSES IN MCC WITH NEW 35A FUSES. NEW FUSES SHALL MATCH EXISTING TYPE.
- 5 CONTRACTOR SHALL REPLACE EXISTING 125A FUSES IN MCC WITH NEW 70A FUSES. NEW FUSES SHALL MATCH EXISTING TYPE.
- 6 CONTRACTOR SHALL REUSE EXISTING CIRCUIT FOR NEW EQUIPMENT.
- 7 CONTRACTOR SHALL PROVIDE AND INSTALL NEW 20KVA MINI POWER ZONE WITH 480V INPUT AND 120/240V OUTPUT. MINI POWER ZONE SHALL BE SQUARE D, OR APPROVED EQUAL. COORDINATE LOCATION IN FIELD. CONTRACTOR SHALL PROVIDE AND INSTALL NEW 50A 2P BREAKER IN EXISTING PANEL "LP-A" TO FEED NEW POWER ZONE.
- 8 CONTRACTOR SHALL INSTALL NEW DATA DEVICE FOR MECHANICAL UNIT. DATA SHALL TERMINATE TO NEAREST I.T. CLOSET.



ELECTRICAL - BASEMENT FLOOR PLAN - NEW
SCALE: 1/8" = 1'-0"

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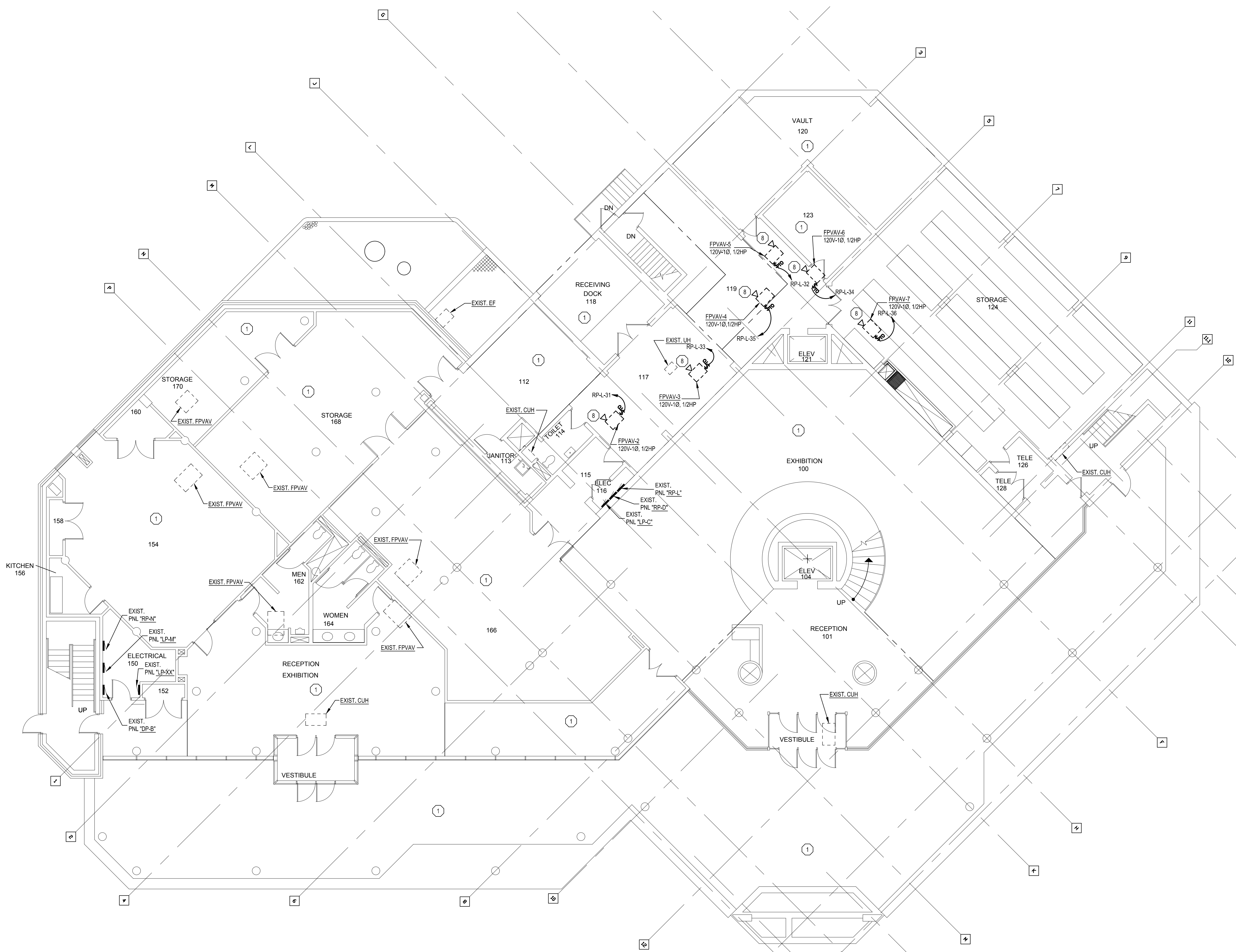
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REGISTRATION SEAL

NOT FOR CONSTRUCTION

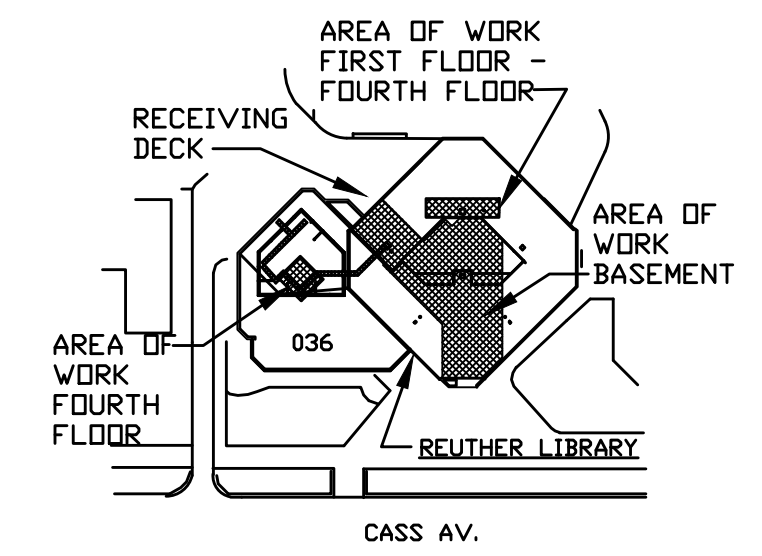
ELECTRICAL KEY NOTES

- 1 NO WORK IN THIS AREA, UNLESS NOTED OTHERWISE.
- 2 NOT USED.
- 3 NOT USED.
- 4 NOT USED.
- 5 NOT USED.
- 6 NOT USED.
- 7 NOT USED.
- 8 CONTRACTOR SHALL INSTALL NEW DATA DEVICE FOR MECHANICAL UNIT. DATA SHALL TERMINATE TO NEAREST I.T. CLOSET.



ELECTRICAL - FIRST FLOOR PLAN - NEW

0 1 5 10 20
SCALE: 1/8" = 1'-0"



| | |
|-----------------------|----------|
| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|------------|------|
| DESIGNER | B. THELEN | |
| DRAWN | B. THELEN | |
| CHECKED | J. SOVIS | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

ELECTRICAL FIRST FLOOR PLAN NEW

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

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
E-2.1

DSD FILE NAME
2164076-036-E-2.1

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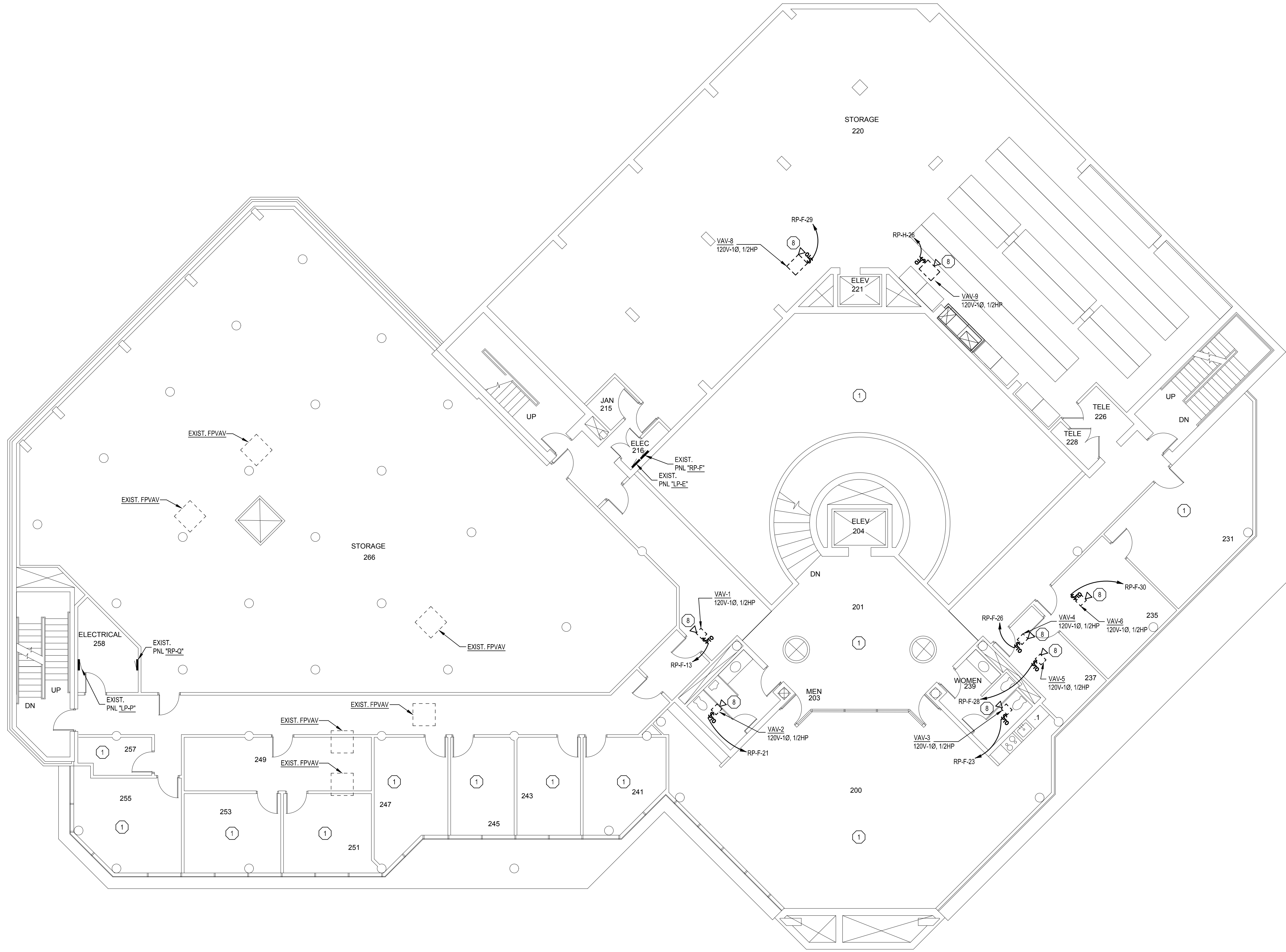
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REGISTRATION SEAL

NOT FOR CONSTRUCTION

ELECTRICAL KEY NOTES

- ① NO WORK IN THIS AREA, UNLESS NOTED OTHERWISE.
- ② NOT USED.
- ③ NOT USED.
- ④ NOT USED.
- ⑤ NOT USED.
- ⑥ NOT USED.
- ⑦ NOT USED.
- ⑧ CONTRACTOR SHALL INSTALL NEW DATA DEVICE FOR MECHANICAL UNIT. DATA SHALL TERMINATE TO NEAREST I.T. CLOSET.



| | |
|-----------------------|----------|
| DDC REL 05 - IFB | 04/08/24 |
| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|------------|------|
| DESIGNER | B. THELEN | |
| DRAWN | B. THELEN | |
| CHECKED | J. SOVIS | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

ELECTRICAL SECOND FLOOR PLAN NEW

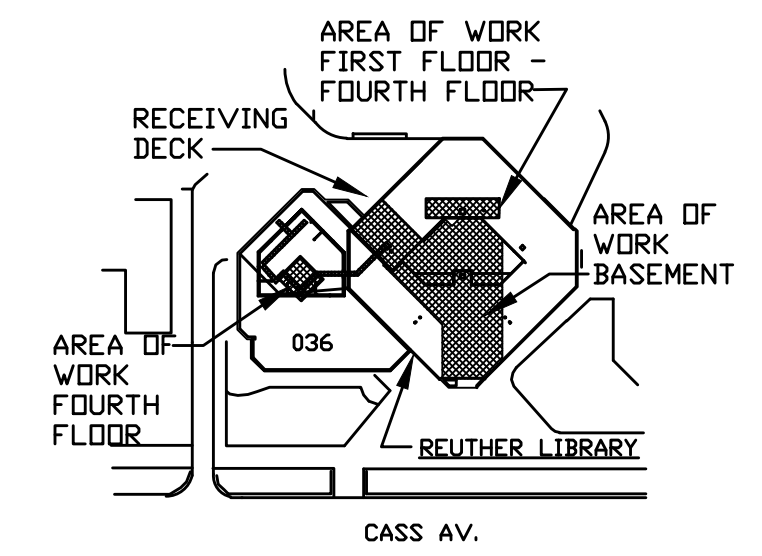
SCALE: 1/8" = 1'-0"

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

A/E PROJECT NO.
2164076

SHEET NO.
E-2.2

DSD FILE NAME
2164076-036-E-2.2



ELECTRICAL - SECOND FLOOR PLAN - NEW

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



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| | DDC REL 05 - IFB | 04/08/24 |
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| | DDC REL 03 - 100% DD | 02/08/24 |
| | DDC REL 02 - 60% DD | 08/10/23 |

| | |
|-------------|------------|
| DESIGNER | B. THELEN |
| DRAWN | B. THELEN |
| CHECKED | J. SOVIS |
| DEPT MGR | V. LALONDE |
| PROJECT MGR | K. RUPP |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

**ELECTRICAL
THIRD
FLOOR PLAN
NEW**

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

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

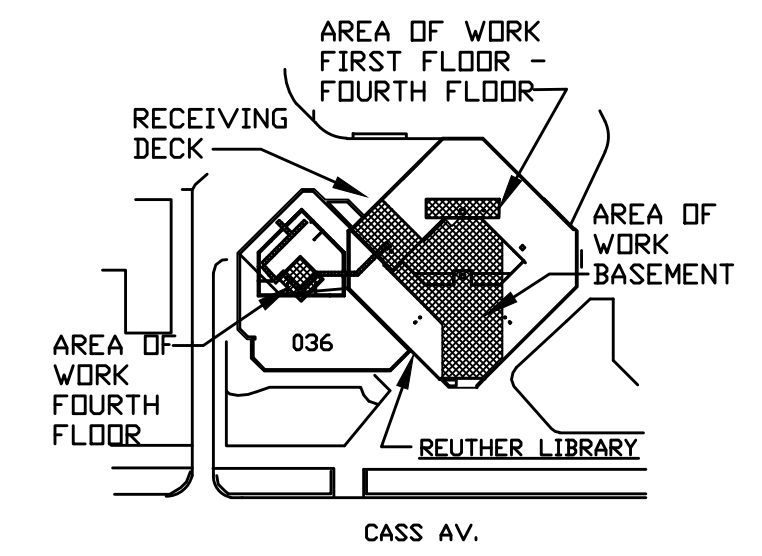
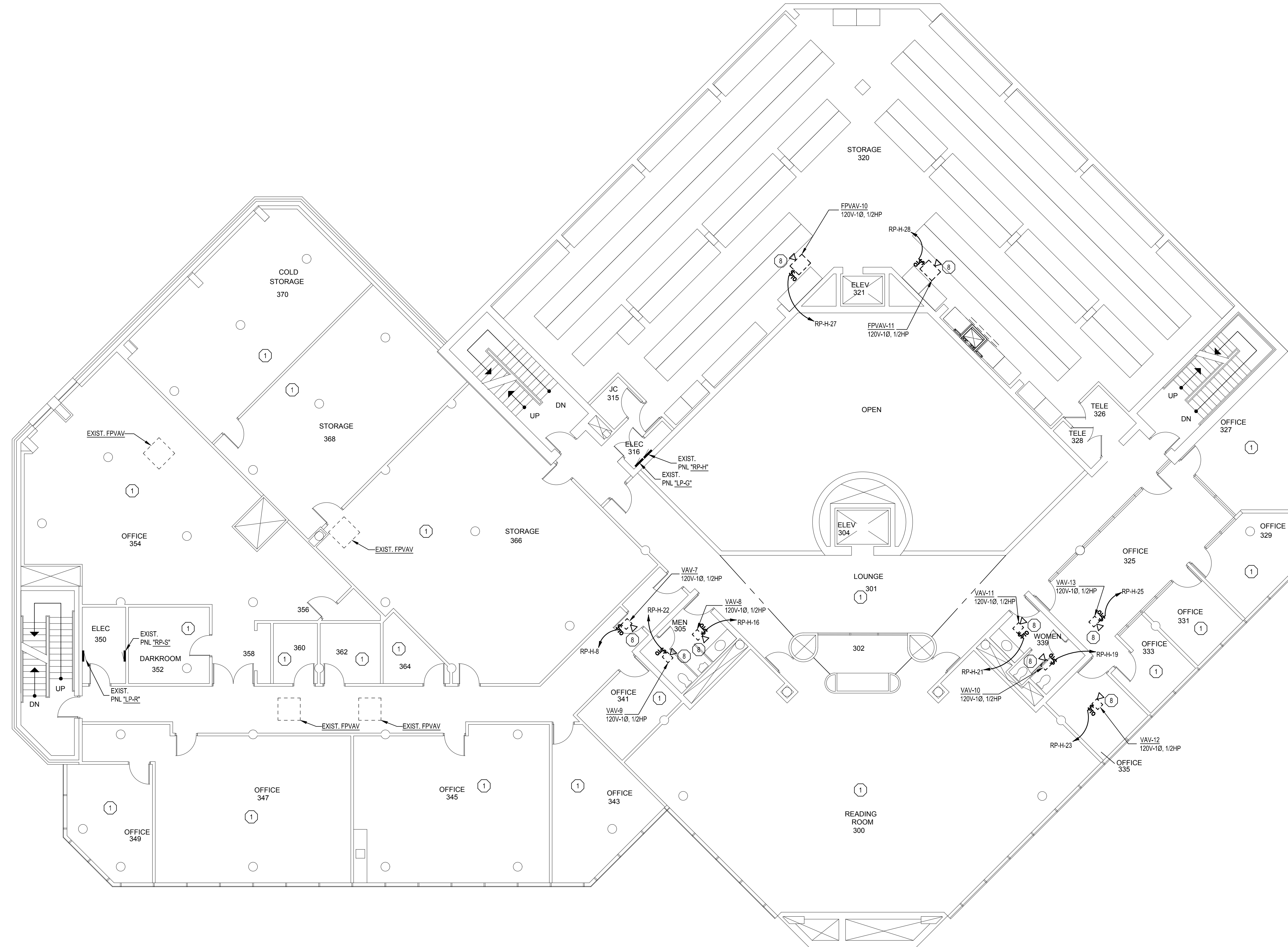
A/E PROJECT NO.
2164076

SHEET NO.
E-2.3

DSD FILE NAME
2164076-036-E-2.3

ELECTRICAL KEY NOTES

- 1 NO WORK IN THIS AREA, UNLESS NOTED OTHERWISE.
- 2 NOT USED.
- 3 NOT USED.
- 4 NOT USED.
- 5 NOT USED.
- 6 NOT USED.
- 7 NOT USED.
- 8 CONTRACTOR SHALL INSTALL NEW DATA DEVICE FOR MECHANICAL UNIT. DATA SHALL TERMINATE TO NEAREST I.T. CLOSET.



ELECTRICAL - THIRD FLOOR PLAN - NEW
SCALE: 1/8" = 1'-0"



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| DDC REL 04-95% REVIEW | 03/13/24 |
| DDC REL 03 - 100% DD | 02/08/24 |
| DDC REL 02 - 60% DD | 08/10/23 |

| MARK | ISSUE | DATE |
|-------------|------------|------|
| DESIGNER | B. THELEN | |
| DRAWN | B. THELEN | |
| CHECKED | J. SOVIS | |
| DEPT MGR | V. LALONDE | |
| PROJECT MGR | K. RUPP | |

TITLE: **WSU REUTHER LIBRARY MEP**

REUTHER LIBRARY
5401 CASS AVENUE
DETROIT, MICHIGAN

**ELECTRICAL
FOURTH FLOOR PLAN
NEW**

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

WSU PROJECT #: 036-350464
WSU BLDG NAME: REUTHER LIBRARY
WSU BLDG #: 036

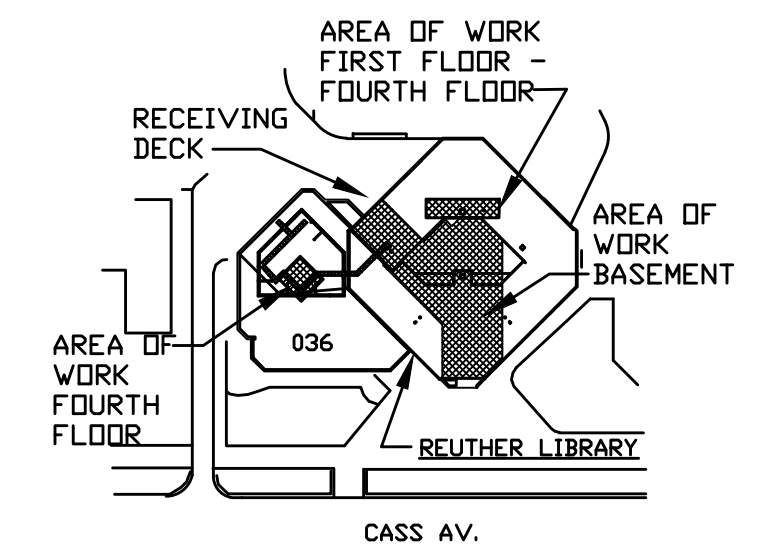
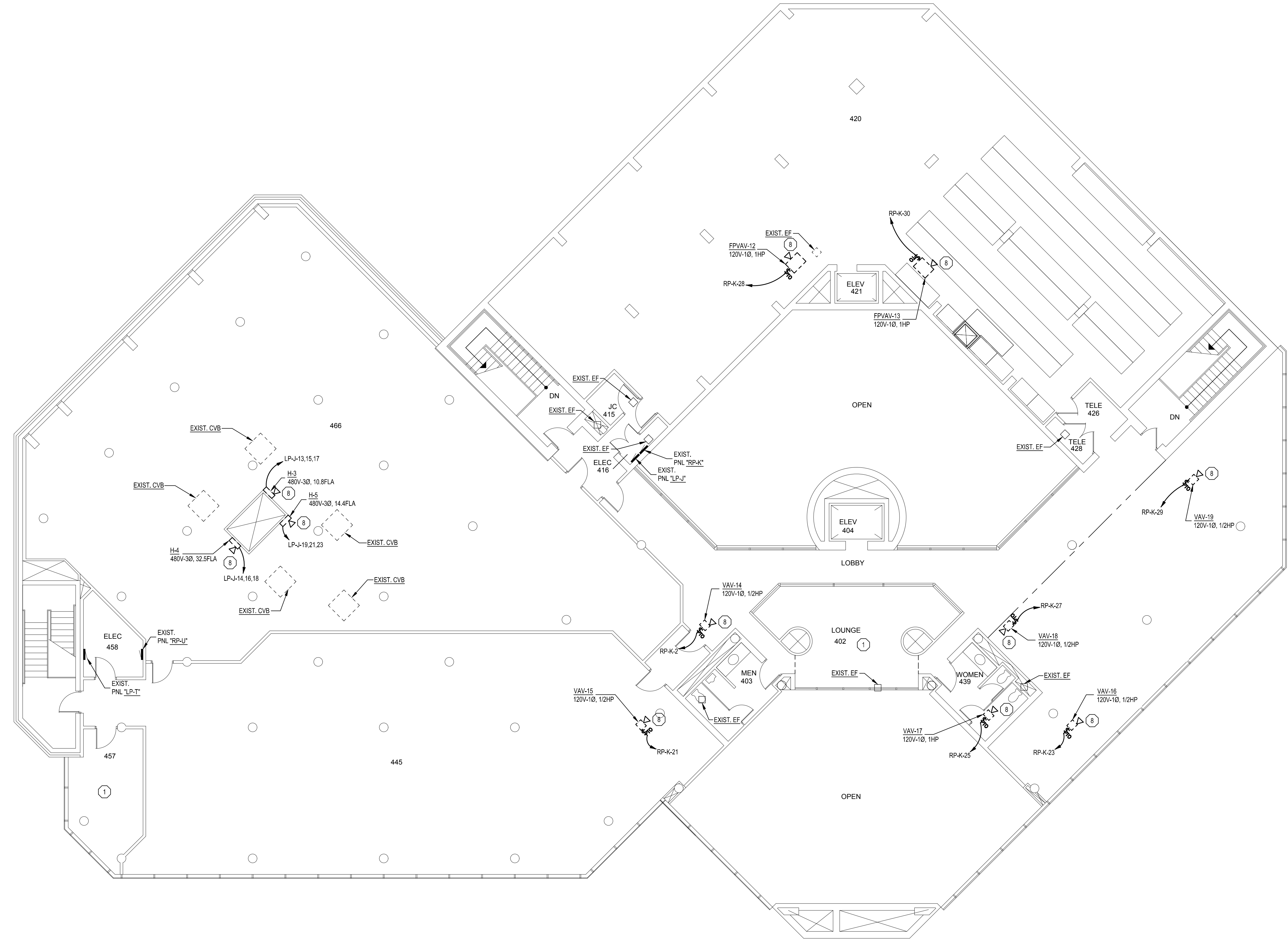
A/E PROJECT NO.
2164076

SHEET NO.
E-2.4

DSD FILE NAME
2164076-036-E-2.4

ELECTRICAL KEY NOTES

- 1 NO WORK IN THIS AREA, UNLESS NOTED OTHERWISE.
- 2 NOT USED.
- 3 NOT USED.
- 4 NOT USED.
- 5 NOT USED.
- 6 NOT USED.
- 7 NOT USED.
- 8 CONTRACTOR SHALL INSTALL NEW DATA DEVICE FOR MECHANICAL UNIT. DATA SHALL TERMINATE TO NEAREST I.T. CLOSET.



ELECTRICAL - FOURTH FLOOR PLAN - NEW
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