

**Madison Municipal
 Building Renovation**
 BPW Project #7939
 215 Martin Luther King, Jr. Blvd
 Madison, WI 53703

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
 ENGINEER SEAL

Signature: _____
 Print Names: _____ License No: _____

Date: _____

ISSUE

MARK	DATE	DESCRIPTION
1	24.03.2017	BID SET

PROJECT NO: 2014057

PROJECT PHASE: BID SET

DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA

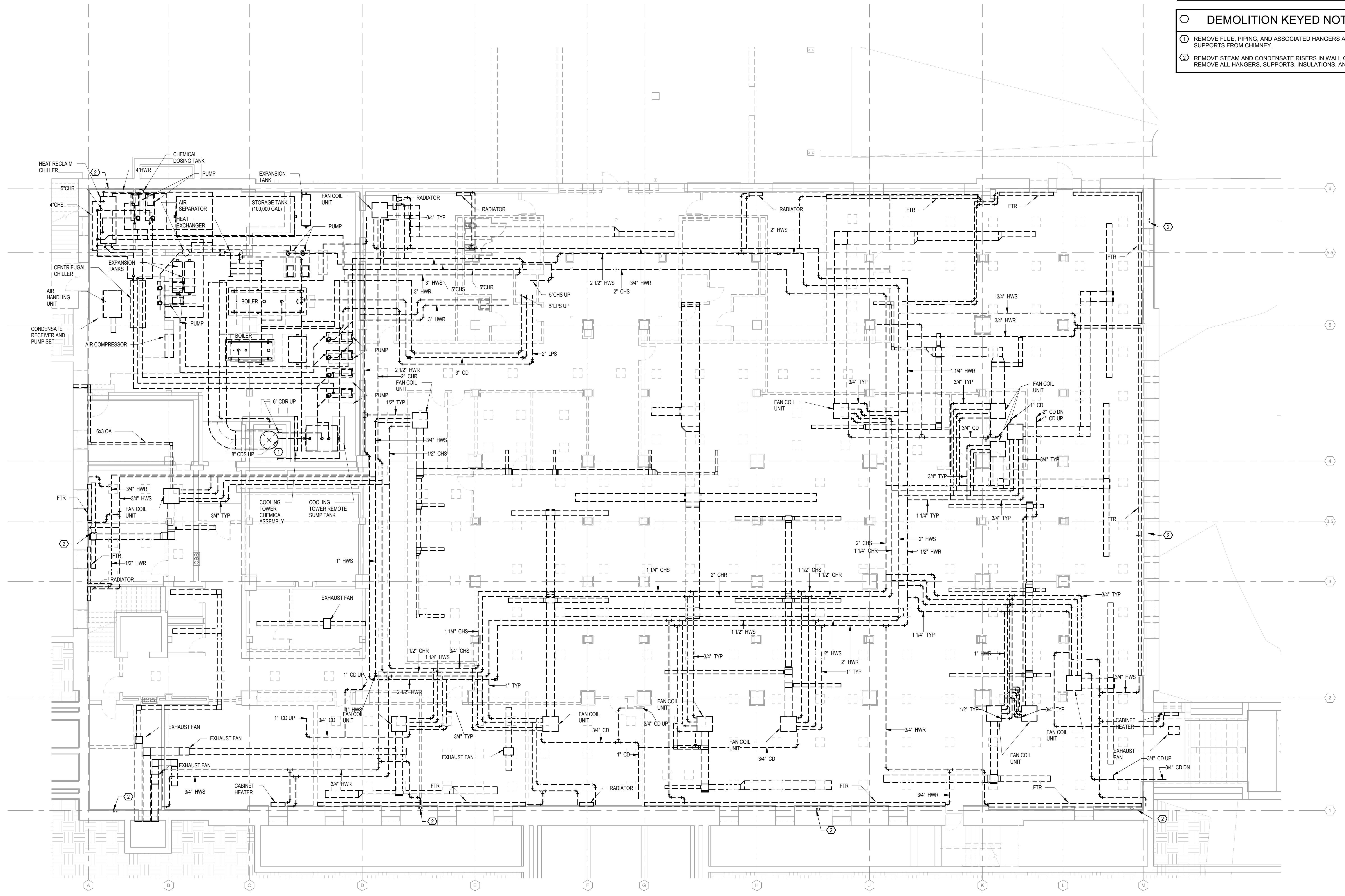
Design 2016 Copyright MSR, Ken Saiki & Associates, Inc.

**GROUND LEVEL
 MECHANICAL
 DEMOLITION PLAN**

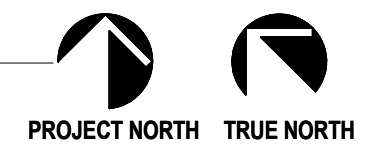
**EXHIBIT I
 MD100**

- GENERAL DEMOLITION NOTES**
1. ALL EQUIPMENT, DUCTWORK, AND PIPING SHOWN OR NOT SHOWN SHALL BE DEMOLISHED UNLESS OTHERWISE NOTED.
 2. CONTRACTOR SHALL REMOVE ALL EQUIPMENT, PIPING, AND DUCTWORK SHOWN DASHED, UNLESS OTHERWISE NOTED. CONTRACTOR SHALL REMOVE ALL SUCH FROM SITE AND DISPOSE OF AS REQUIRED BY CODE. CONTRACTOR SHALL RECYCLE ALL POSSIBLE MATERIALS AND COORDINATE RECYCLING WITH GENERAL CONTRACTOR.
 3. DUCT RUN-OUTS, DIFFUSERS, ETC. ARE NOT SHOWN; ALL SUCH SHALL BE REMOVED. PIPING RUN-OUTS ARE NOT SHOWN; ALL SUCH SHALL BE REMOVED.
 4. DEMOLITION SHALL INCLUDE ALL HANGERS AND SUPPORTS; NO SUCH SHALL BE LEFT IN PLACE.
 5. DEMOLITION SHALL INCLUDE ALL CONTROLS AND BUILDING AUTOMATION SYSTEMS; NO SUCH SHALL BE LEFT IN PLACE.
 6. THIS CONTRACTOR IS RESPONSIBLE FOR DEMOLITION OF NON-STRUCTURAL BUILDING COMPONENTS AS NEEDED TO EXECUTE DEMOLITION. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR DEMOLITION OF STRUCTURAL COMPONENTS SUCH AS FLOORS, STRUCTURAL WALLS, AND STRUCTURAL CEILINGS.
 7. ALL TEMPORARY PATCHING AND FINAL PATCHING NEEDED FOR DEMOLITION AND THROUGH CONSTRUCTION ARE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.

- DEMOLITION KEYED NOTES**
- 1 REMOVE FLUE, PIPING, AND ASSOCIATED HANGERS AND SUPPORTS FROM CHIMNEY.
 - 2 REMOVE STEAM AND CONDENSATE RISERS IN WALL CAVITY. REMOVE ALL HANGERS, SUPPORTS, INSULATIONS, AND VALVING.



1 GROUND LEVEL MECHANICAL DEMOLITION PLAN
 1/8" = 1'-0"



2016/03/24 10:00 AM 1/8" = 1'-0" 2016/03/24 10:00 AM 1/8" = 1'-0"

**Madison Municipal
 Building Renovation**

**BPW Project #7939
 215 Martin Luther King, Jr. Blvd
 Madison, WI 53703**

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____

Print Name: _____

Date: _____ License No: _____

ISSUE

MARK DATE DESCRIPTION

24.03.2017 BID SET

PROJECT NO:

2014057

PROJECT PHASE

BID SET

DRAWN BY:

ALH/BTB/JTG

CHECKED BY:

RCA

Design 2014 Copyright Ken Saiki Design & Associates, Inc.

**LEVEL ONE
 MECHANICAL
 DEMOLITION PLAN**

EXHIBIT I

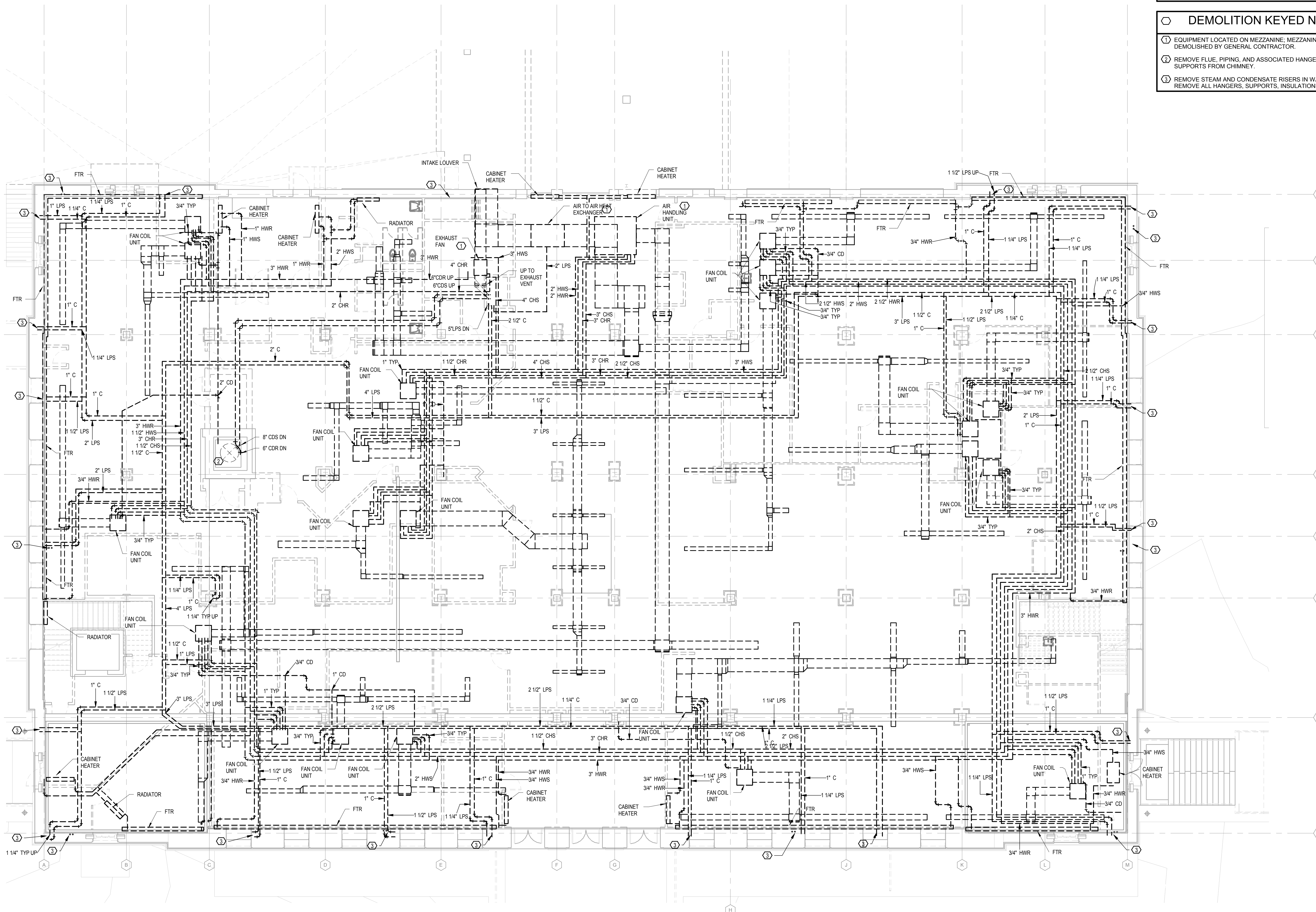
MD101

GENERAL DEMOLITION NOTES

1. ALL EQUIPMENT, DUCTWORK, AND PIPING SHOWN OR NOT SHOWN SHALL BE DEMOLISHED UNLESS OTHERWISE NOTED.
2. CONTRACTOR SHALL REMOVE ALL EQUIPMENT, PIPING, AND DUCTWORK SHOWN DASHED, UNLESS OTHERWISE NOTED. CONTRACTOR SHALL REMOVE ALL SUCH FROM SITE AND DISPOSE OF AS REQUIRED BY CODE. CONTRACTOR SHALL RECYCLE ALL POSSIBLE MATERIALS AND COORDINATE RECYCLING WITH GENERAL CONTRACTOR.
3. DUCT RUN-OUTS, DIFFUSERS, ETC., ARE NOT SHOWN; ALL SUCH SHALL BE REMOVED. PIPING RUN-OUTS ARE NOT SHOWN; ALL SUCH SHALL BE REMOVED.
4. DEMOLITION SHALL INCLUDE ALL HANGERS AND SUPPORTS; NO SUCH SHALL BE LEFT IN PLACE.
5. DEMOLITION SHALL INCLUDE ALL CONTROLS AND BUILDING AUTOMATION SYSTEMS; NO SUCH SHALL BE LEFT IN PLACE.
6. THIS CONTRACTOR IS RESPONSIBLE FOR DEMOLITION OF NON-STRUCTURAL BUILDING COMPONENTS AS NEEDED TO EXECUTE DEMOLITION. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR DEMOLITION OF STRUCTURAL COMPONENTS SUCH AS FLOORS, STRUCTURAL WALLS, AND STRUCTURAL CEILINGS.
7. ALL TEMPORARY PATCHING AND FINAL PATCHING NEEDED FOR DEMOLITION AND THROUGH CONSTRUCTION ARE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.

DEMOLITION KEYED NOTES

- ① EQUIPMENT LOCATED ON MEZZANINE; MEZZANINE TO BE DEMOLISHED BY GENERAL CONTRACTOR.
- ② REMOVE FLUE, PIPING, AND ASSOCIATED HANGERS AND SUPPORTS FROM CHIMNEY.
- ③ REMOVE STEAM AND CONDENSATE RISERS IN WALL CAVITY. REMOVE ALL HANGERS, SUPPORTS, INSULATIONS, AND VALVING.



1 LEVEL 1 MECHANICAL DEMOLITION PLAN
 1/8" = 1'-0"

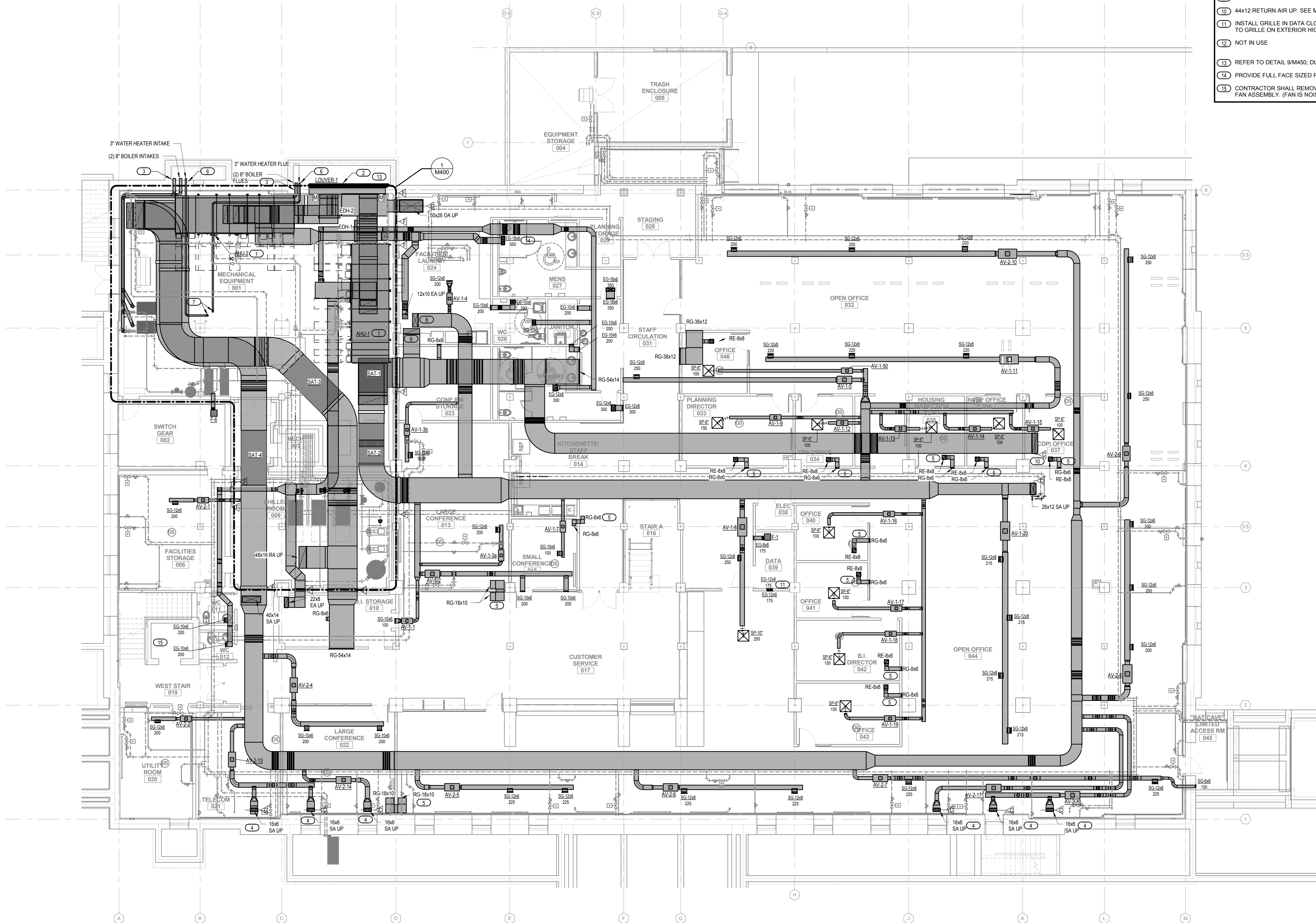


GENERAL NOTES

1. ALL PROVIDED DETAILS APPLY; REFER TO DETAIL SHEET.
2. HYDRONIC PIPING AND EQUIPMENT IS SHOWN ON DUCTWORK PLAN FOR REFERENCE ONLY. REFER TO M200 SERIES FOR HYDRONIC PLANS.
3. ALL EXPOSED TO VIEW DUCTWORK SHALL BE UNINSULATED, AND PREPARED FOR PAINTING.
4. NOTE THAT HISTORICAL / ARCHITECTURAL CONCERNS DICTATE NO PIPING, PLUMBING, OR HVAC ELEMENTS APPEAR IN CERTAIN AREAS. REFER TO ARCHITECTURAL PLANS FOR COORDINATION OF "EXCLUSION ZONES."
5. COMPOUND CEILING PANELS SHOULD GENERALLY NOT BE PENETRATED FOR HANGERS. ARCHITECTURAL PROVIDES UNISTRUT BETWEEN; REFER TO ARCHITECTURAL.
6. OFFSETS FOR DUCTWORK, E.G. AROUND BEAMS, SHALL BE 45 DEGREE MITER OR GORE. 90 DEGREE OFFSETS NOT ALLOWED.
7. REFER TO M200 SHEETS FOR SENSOR LOCATIONS.
8. ACCESS TO FIRE AND COMBINATION DAMPERS SHALL BE ON THE FLOOR IN WHICH THEY ARE SHOWN.
9. ALL FLOORS ARE FIRE BARRIERS; PROVIDE NECESSARY DAMPER AND SEALANT FOR ALL FLOOR PENETRATIONS.

KEYED NOTES

- 1 AIR HANDLERS ARE TO BE SHIPPED DISASSEMBLED. FOR ENTRY INTO BUILDING, THIS CONTRACTOR SHALL ENGAGE FACTORY-AUTHORIZED PERSONNEL TO ASSIST IN ASSEMBLY.
- 2 LOUVER IS BY ARCHITECTURAL. CONTRACTOR SHALL COORDINATE WORK AND MAKE CONNECTION, PER DETAIL.
- 3 ROUTE BOILER VENTING THROUGH EXTERIOR WALL. SEAL WATER-TIGHT, AND TERMINATE WITH MANUFACTURER-FURNISHED INTAKE / EXHAUST CAP. EXHAUST SHALL BE SLOPED BACK TO BOILERS.
- 4 FLOOR DIFFUSER LOCATIONS MUST COORDINATE WITH STRUCTURAL. REFER TO STRUCTURAL PLANS. INCLUDE FIRE DAMPER ASSEMBLY AND SEALING AT FLOOR. DUCTWORK SHALL BE PITCHED TOWARDS FINAL ELBOW, AND PROVIDED WITH AN ACCESS PANEL AT ELBOW, FOR CLEANING.
- 5 TRANSFER AIR DUCT. REFER TO DETAIL 5M451.
- 6 ROUTE WATER HEATER VENTING THROUGH EXTERIOR WALL. SEAL WATER-TIGHT, AND TERMINATE WITH MANUFACTURER-FURNISHED INTAKE / EXHAUST CAP. EXHAUST SHALL BE SLOPED BACK TO WATER HEATER.
- 7 INTAKE AND FLUE VENT DOWN TO WATER HEATER.
- 8 30x12 SUPPLY AIR UP. SEE M101 FOR CONTINUATION.
- 9 36x12 RETURN AIR UP. SEE M101 FOR CONTINUATION.
- 10 44x12 RETURN AIR UP. SEE M101 FOR CONTINUATION.
- 11 INSTALL GRILLE IN DATA CLOSET LOW. CONNECT BY 12x3 DUCT UP TO GRILLE ON EXTERIOR HIGH. REFER TO DETAIL 6M452.
- 12 NOT IN USE.
- 13 REFER TO DETAIL 9M450; DUCT CONNECTION TO LOUVER.
- 14 PROVIDE FULL FACE SIZED PLENUM BOX ABOVE EXHAUST GRILLE.
- 15 CONTRACTOR SHALL REMOVE AND REFURBISH ELEVATOR CAR FAN ASSEMBLY. (FAN IS NOISY/SCRAPES IN USE).



1 GROUND LEVEL MECHANICAL DUCTWORK PLAN
1/8" = 1'-0"

MSR 710 South 2nd Street, 8th Floor
Minneapolis, Minnesota 55401-2282

Architecture 612.375.0336 tel
Interiors and 612.342.2216 fax
Urban Design www.msrdesign.com

Civil Engineering and Landscape Architects

Ken Saiki Design, Inc

303 South Peterson St
Madison, WI 53703
608.251.3600 tel

Structural Engineering, Technology, AV

KJWW

1800 Derring Way, Suite 200
Madison, WI 53713
608.223.9600 tel

MEP Engineers

MEP Associates

880 Blue Gables Road, Suite 175
Eagan, MN 55121
651.379.9120 tel

Lighting Designer

Gallina Design

30233 County 7
Chalfield, MN 55923
507.867.1628 tel

Preservation Architect

Charles Quagliana, AIA

5641 Wiloughby Rd
Madison, WI 53760
608.449.9689 tel

Building Envelope Consultant

Insite Consulting Architects

115 E. Main Street, Suite 200
Madison, WI 53703
608.204.0825 tel

Fire & Code Consultant

Summit Fire Consulting

575 Minnehaha Ave. W.
St. Paul, MN 55103
651.251.1879 tel

Acoustical Consultant

KRA

4828 Chicago Avenue South, Suite 206
Minneapolis, MN 55417
612.374.3800 tel

Civil Engineers

VIERBICHER

999 Fourier Drive, Suite 201
Madison, WI 53717

**Madison Municipal
Building Renovation**

BPW Project #7939
215 Martin Luther King, Jr. Blvd
Madison, WI 53703

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____

Print Names: _____

Date: _____ License No: _____

ISSUE

MARK	DATE	DESCRIPTION
24	03 2017	BID SET

PROJECT NO: 2014057

PROJECT PHASE: BID SET

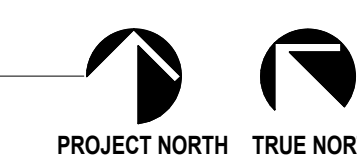
DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA

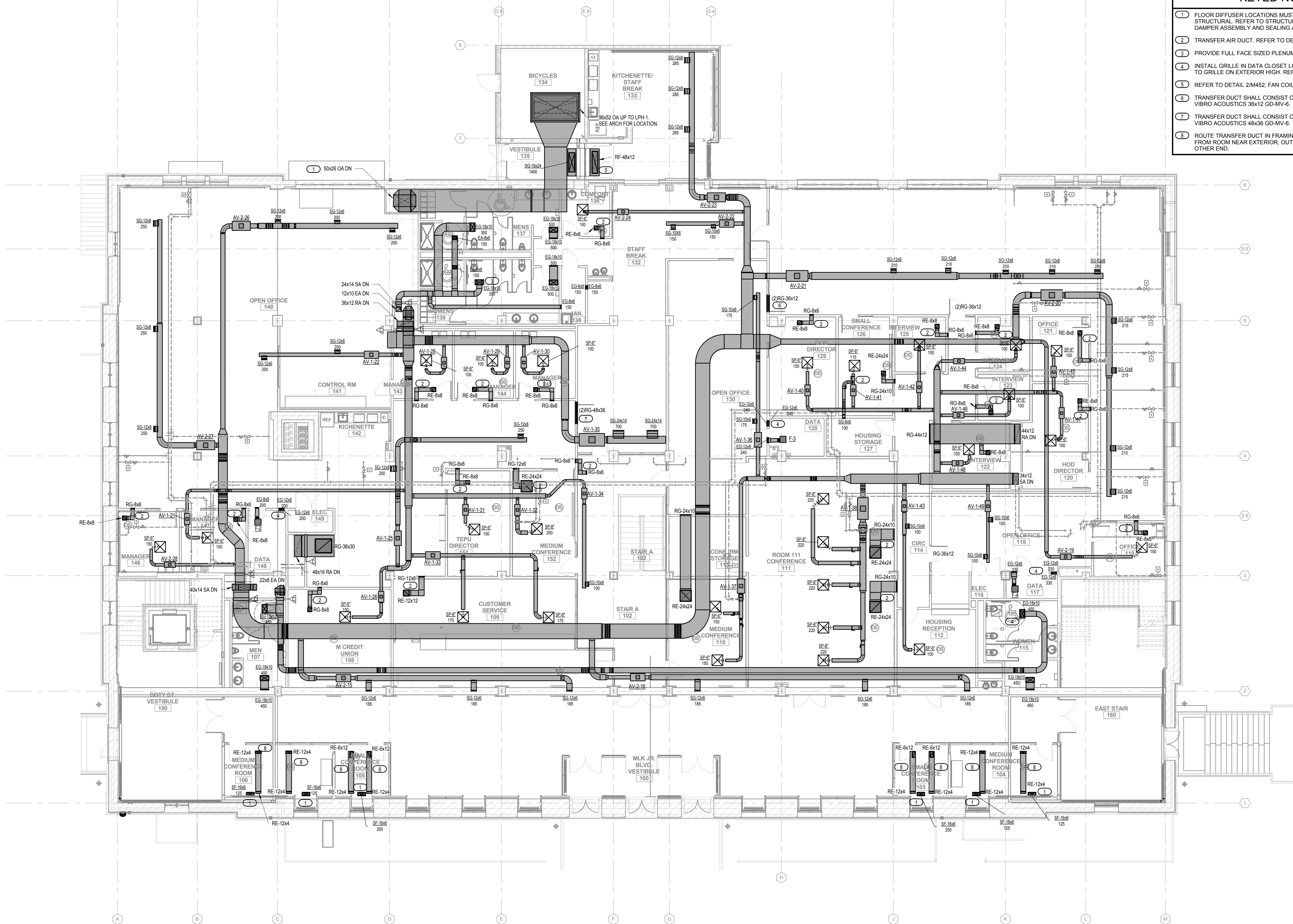
Design 2015 Copyright West, Shook & Partners, LLC

**GROUND LEVEL
MECHANICAL
DUCTWORK PLAN**

EXHIBIT I

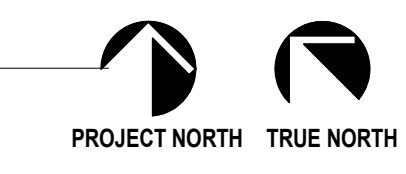
M100





- GENERAL NOTES**
1. ALL PROVIDED DETAILS APPLY; REFER TO DETAIL SHEET.
 2. HYDRONIC PIPING AND EQUIPMENT IS SHOWN ON DUCTWORK PLAN FOR REFERENCE ONLY. REFER TO M200 SERIES FOR HYDRONIC PLANS.
 3. ALL EXPOSED TO VIEW DUCTWORK SHALL BE UNINSULATED, AND PREPPED FOR PAINTING.
 4. NOTE THAT HISTORICAL / ARCHITECTURAL CONCERNS DICTATE NO PIPING, PLUMBING, OR HVAC ELEMENTS APPEAR IN CERTAIN AREAS. REFER TO ARCHITECTURAL PLANS FOR COORDINATION OF EXCLUSION ZONES.
 5. COMPOUND CEILING PANELS SHOULD GENERALLY NOT BE PENETRATED FOR HANGERS. ARCHITECTURAL PROVIDES UNISTRUT BETWEEN. REFER TO ARCHITECTURAL.
 6. OFFSETS FOR DUCTWORK, EG. AROUND BEAMS, SHALL BE 45 DEGREE MITER OR GORE. 90 DEGREE OFFSETS NOT ALLOWED.
 7. REFER TO M200 SHEETS FOR SENSOR LOCATIONS.
 8. ACCESS TO FIRE AND COMBINATION DAMPERS SHALL BE ON THE FLOOR IN WHICH THEY ARE SHOWN.
 9. ALL FLOORS ARE FIRE BARRIERS; PROVIDE NECESSARY DAMPER AND SEALANT FOR ALL FLOOR PENETRATIONS.
- KEYED NOTES**
1. FLOOR DIFFUSER LOCATIONS MUST COORDINATE WITH STRUCTURAL. REFER TO STRUCTURAL PLANS. INCLUDE FIRE DAMPER ASSEMBLY AND SEALING AT FLOOR.
 2. TRANSFER AIR DUCT. REFER TO DETAIL 5M451.
 3. PROVIDE FULL FACE SIZED PLENUM BOX ABOVE EXHAUST GRILLE.
 4. INSTALL GRILLE IN DATA CLOSET LOW. CONNECT BY 12X3 DUCT UP TO GRILLE ON EXTERIOR HIGH. REFER TO DETAIL 6M452.
 5. REFER TO DETAIL 2M452; FAN COIL UNIT MOUNTING.
 6. TRANSFER DUCT SHALL CONSIST OF A SOUND DAMPENER AS VIBRO ACOUSTICS 36X12 GD-MV-6.
 7. TRANSFER DUCT SHALL CONSIST OF A SOUND DAMPENER AS VIBRO ACOUSTICS 48X36 GD-MV-6.
 8. ROUTE TRANSFER DUCT IN FRAMING SPACE ABOVE CEILING. INLET FROM ROOM NEAR EXTERIOR. OUTLET TO OPEN CORRIDOR AT OTHER END.

1 LEVEL 1 MECHANICAL DUCTWORK PLAN
1/8" = 1'-0"



Madison Municipal Building Renovation
BPW Project #7939
215 Martin Luther King, Jr. Blvd
Madison, WI 53703

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____

Print Names: _____

Date: _____ License No: _____

ISSUE

MARK	DATE	DESCRIPTION
1	24.03.2017	BID SET

PROJECT NO: 2014057

PROJECT PHASE: BID SET

DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA

Design ©19 Copyright West, Green & Robinson, LLC

LEVEL ONE MECHANICAL DUCTWORK PLAN

EXHIBIT I

M101

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
 ENGINEER SEAL

Signature: _____
 Print Names: _____
 Date: _____ License No: _____

MARK	DATE	DESCRIPTION
	24.03.2017	BID SET

PROJECT NO: 2014057
 PROJECT PHASE: BID SET
 DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA
Design 2015 Copyright Meyer, Green & Robinson, LLC

**ROOF ATTIC
 MECHANICAL
 DUCTWORK PLAN**

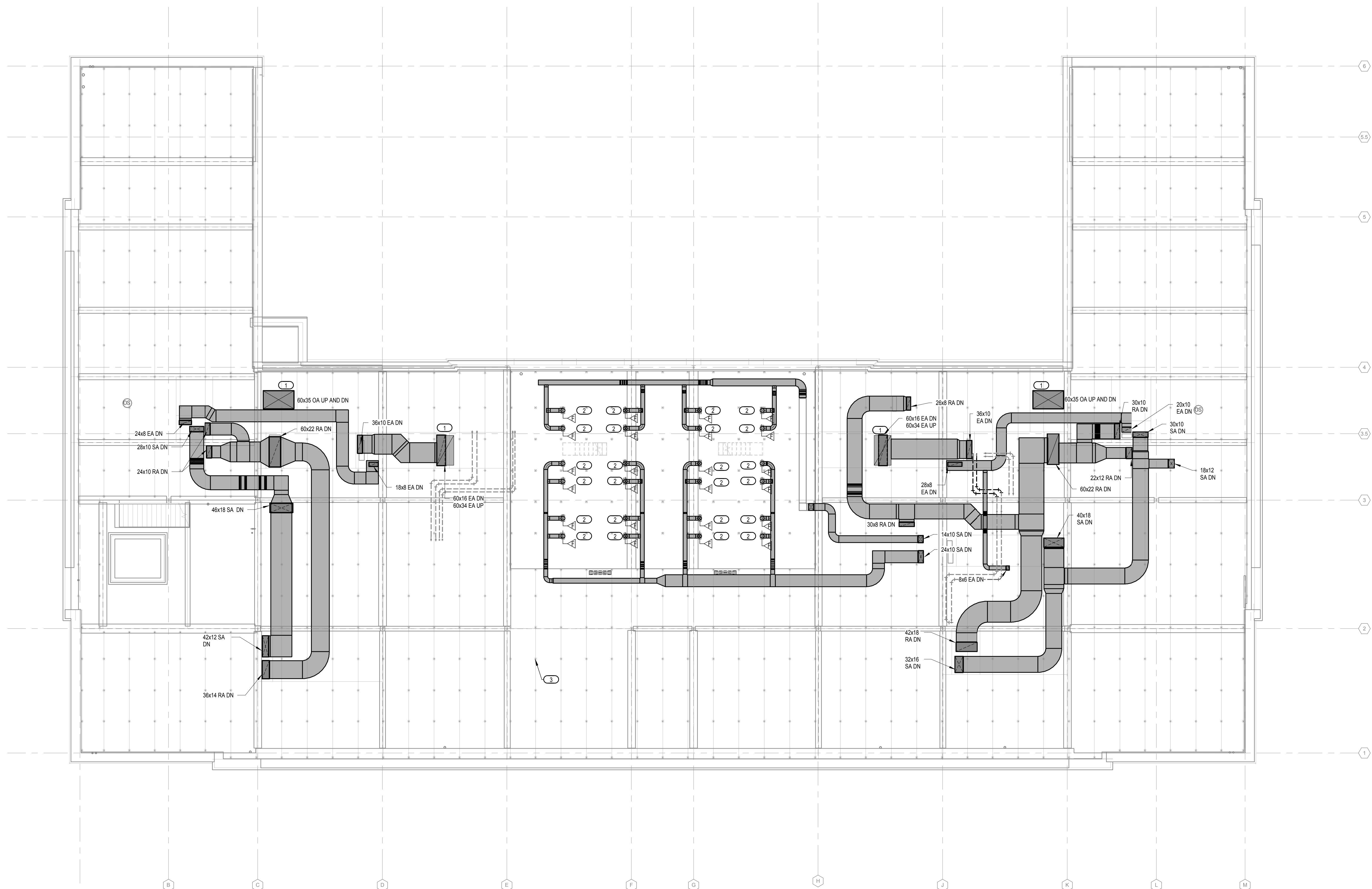
EXHIBIT I
M104

GENERAL NOTES

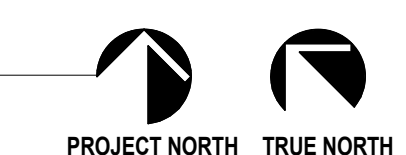
1. ALL PROVIDED DETAILS APPLY; REFER TO DETAIL SHEET.
2. HYDRONIC PIPING AND EQUIPMENT IS SHOWN ON DUCTWORK PLAN FOR REFERENCE ONLY. REFER TO M200 SERIES FOR HYDRONIC PLANS.
3. ALL EXPOSED TO VIEW DUCTWORK SHALL BE UNINSULATED, AND PREPPED FOR PAINTING.
4. NOTE THAT HISTORICAL / ARCHITECTURAL CONCERNS DICTATE NO PIPING, PLUMBING, OR HVAC ELEMENTS APPEAR IN CERTAIN AREAS. REFER TO ARCHITECTURAL PLANS FOR COORDINATION OF "EXCLUSION ZONES."
5. COMPOUND CEILING PANELS SHOULD GENERALLY NOT BE PENETRATED FOR HANGERS. ARCHITECTURAL PROVIDES UNISTRUT BETWEEN. REFER TO ARCHITECTURAL.
6. OFFSETS FOR DUCTWORK, EG. AROUND BEAMS, SHALL BE 45 DEGREE MITER OR GORE. 90 DEGREE OFFSETS NOT ALLOWED.
7. REFER TO M200 SHEETS FOR SENSOR LOCATIONS.
8. ACCESS TO FIRE AND COMBINATION DAMPERS SHALL BE ON THE FLOOR IN WHICH THEY ARE SHOWN.
9. ALL FLOORS ARE FIRE BARRIERS; PROVIDE NECESSARY DAMPER AND SEALANT FOR ALL FLOOR PENETRATIONS.

KEYED NOTES

- CONNECT DUCT TO LOUVERED PENTHOUSE THROAT SIZE PLENUM BOX. REFER TO SCHEDULE. INCLUDE FIRE DAMPER AT ATTIC SPACE DECK, SHOWN BELOW.
- SUPPLY DUCT PENETRATION THROUGH DECK SHALL INCLUDE FIRE DAMPER, AS SHOWN. PENETRATION MUST BE COORDINATED WITH STRUCTURAL. REFER TO STRUCTURAL PLANS. INSTALLATION IS CUSTOM; REFER TO DETAIL 7M450.
- 4x4 POSTS SHOWN FOR REFERENCE ONLY. EXACT LOCATION SHALL BE VERIFIED IN FIELD. CONTRACTOR SHALL LAY OUT DUCT TO AVOID. WHERE NECESSARY, COORDINATE RELOCATION/ALTERATION OF POSTS WITH GENERAL CONTRACTOR. REFER TO STRUCTURAL DRAWINGS.



1 ATTIC SPACE MECHANICAL DUCTWORK PLAN
 1/8" = 1'-0"

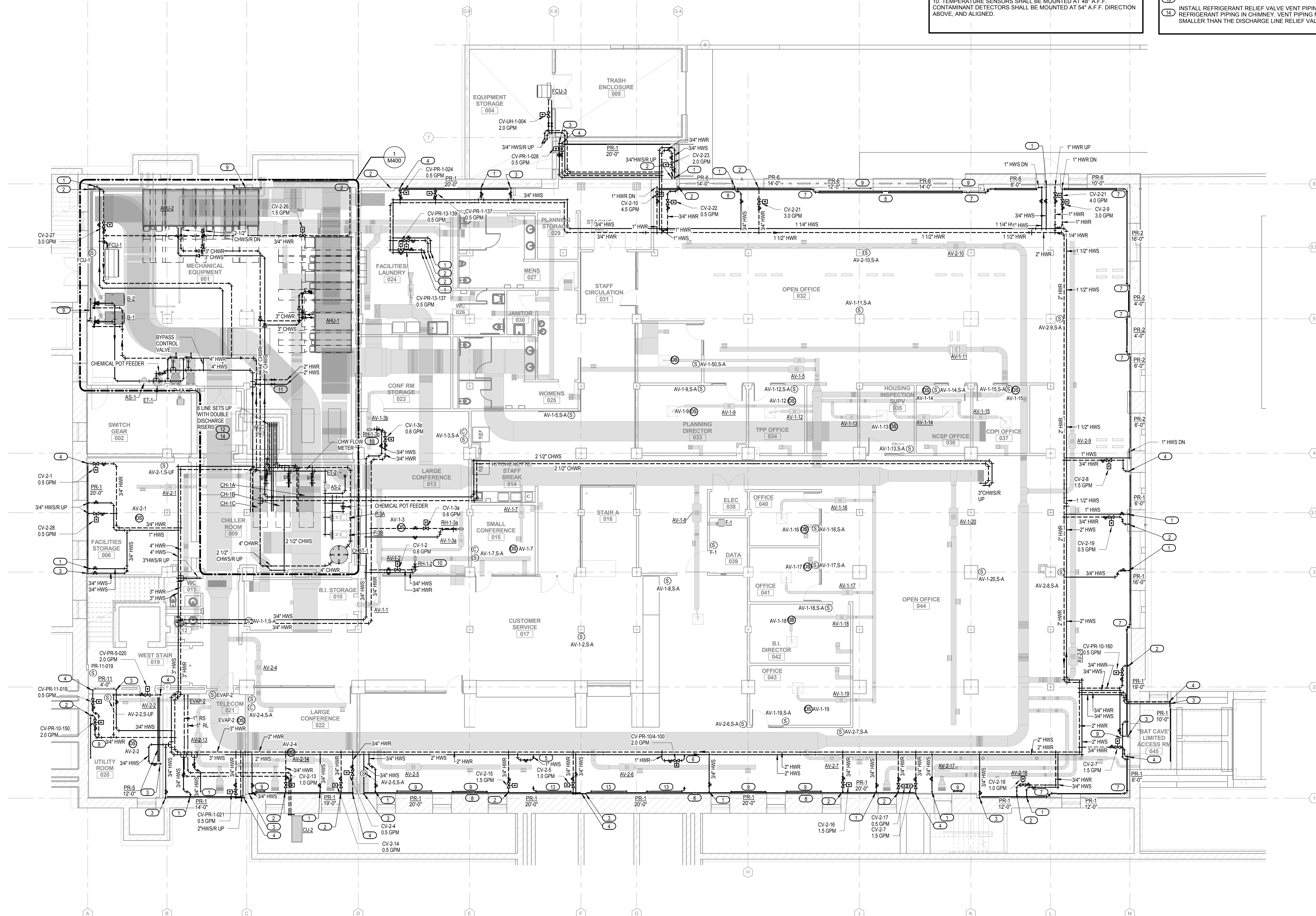


GENERAL NOTES

1. ALL PROVIDED DETAILS APPLY. REFER TO DETAIL SHEET.
2. DUCTWORK IS SHOWN ON HYDRONIC PLAN FOR REFERENCE ONLY. REFER TO M100 SERIES FOR DUCTWORK PLANS.
3. REFER TO HYDRONIC SCHEMATICS FOR ADDITIONAL INFORMATION.
4. NOTE THAT HISTORICAL / ARCHITECTURAL CONCERNS DICTATE NO PIPING, PLUMBING, OR HVAC ELEMENTS APPEAR IN CERTAIN AREAS. REFER TO ARCHITECTURAL PLANS FOR COORDINATION OF EXCLUSION ZONES.
5. ALL PENETRATIONS THROUGH FLOORS SHALL BE FIRE CAULKED. ALL FLOORS ARE FIRE RATED.
6. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL BE FIRE CAULKED. SEE ARCHITECTURAL FOR ALL SUCH.
7. COMPOUND CEILING PANELS SHOULD GENERALLY NOT BE PENETRATED FOR HANGERS. ARCHITECTURAL PROVIDES UNISTRUT BETWEEN. REFER TO ARCHITECTURAL.
8. CONTRACTOR SHALL PROVIDE PANEL RADIATOR END CAPS, TRIM, AND CORNER TRIM PIECES TO CONCEAL PIPING BETWEEN RADIATORS. FOR EXTENDED LENGTHS, CUSTOM PIECES REQUIRING WALL SUPPORT SHALL BE USED.
9. OCCUPANCY SENSORS CEILING MOUNTED, UNLESS OTHERWISE NOTED. REFER TO ELECTRICAL PLANS FOR COORDINATION.
10. TEMPERATURE SENSORS SHALL BE MOUNTED AT 48" A.F.F. CONTAMINANT DETECTORS SHALL BE MOUNTED AT 54" A.F.F. DIRECTION ABOVE, AND ALIGNED.

KEYED NOTES

- 1 3/4" HWS UP TO FLOOR ABOVE.
- 2 3/4" HWR UP TO FLOOR ABOVE.
- 3 3/4" HWS DOWN TO PANEL RADIATION.
- 4 3/4" HWR DOWN TO PANEL RADIATION.
- 5 1" HWS UP TO VESTIBULE RADIATOR; RADIATORS IN VESTIBULE PIPED IN SERIES. ALL VALVING TO BE AT CEILING LEVEL OF THIS FLOOR.
- 6 1" HWR UP TO VESTIBULE RADIATOR.
- 7 PROVIDE OFFSET PANEL COVER(S) IN THIS LOCATION. SUPPORT FROM WALL AS NEEDED.
- 8 END-TO-END CONNECTION. PROVIDE COVER PANEL BETWEEN UNITS.
- 9 3/4" CONNECTION PIPE FOR PANEL RADIATORS ON LEVEL ABOVE.
- 10 REFER TO DETAIL 11M452; HOT WATER REHEAT COIL.
- 11 HWS/HWR VALVED AND CAPPED FOR FUTURE USE.
- 12 REFER TO DETAIL 7M452; REFRIGERANT DOUBLE DISCHARGE RISER.
- 13 1" CONNECTION PIPE FOR PANEL RADIATORS ON LEVEL ABOVE.
- 14 INSTALL REFRIGERANT RELIEF VALVE VENT PIPING ALONG SIDE REFRIGERANT PIPING IN CHIMNEY. VENT PIPING MUST NOT BE SMALLER THAN THE DISCHARGE LINE RELIEF VALVE OUTLET.



1 GROUND LEVEL MECHANICAL HYDRONIC PLAN
1/8" = 1'-0"

**Madison Municipal
Building Renovation**

BPW Project #7939
215 Martin Luther King, Jr. Blvd
Madison, WI 53703

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____

Print Names: _____ License No: _____

Date: _____

MARK DATE DESCRIPTION

24.03.2017 BID SET

PROJECT NO: 2014057

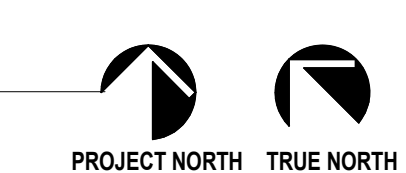
PROJECT PHASE: BID SET

DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA

© 2017 Ken Saiki Design, Inc. All Rights Reserved.

**GROUND LEVEL
MECHANICAL
HYDRONIC PLAN**

**EXHIBIT I
M200**

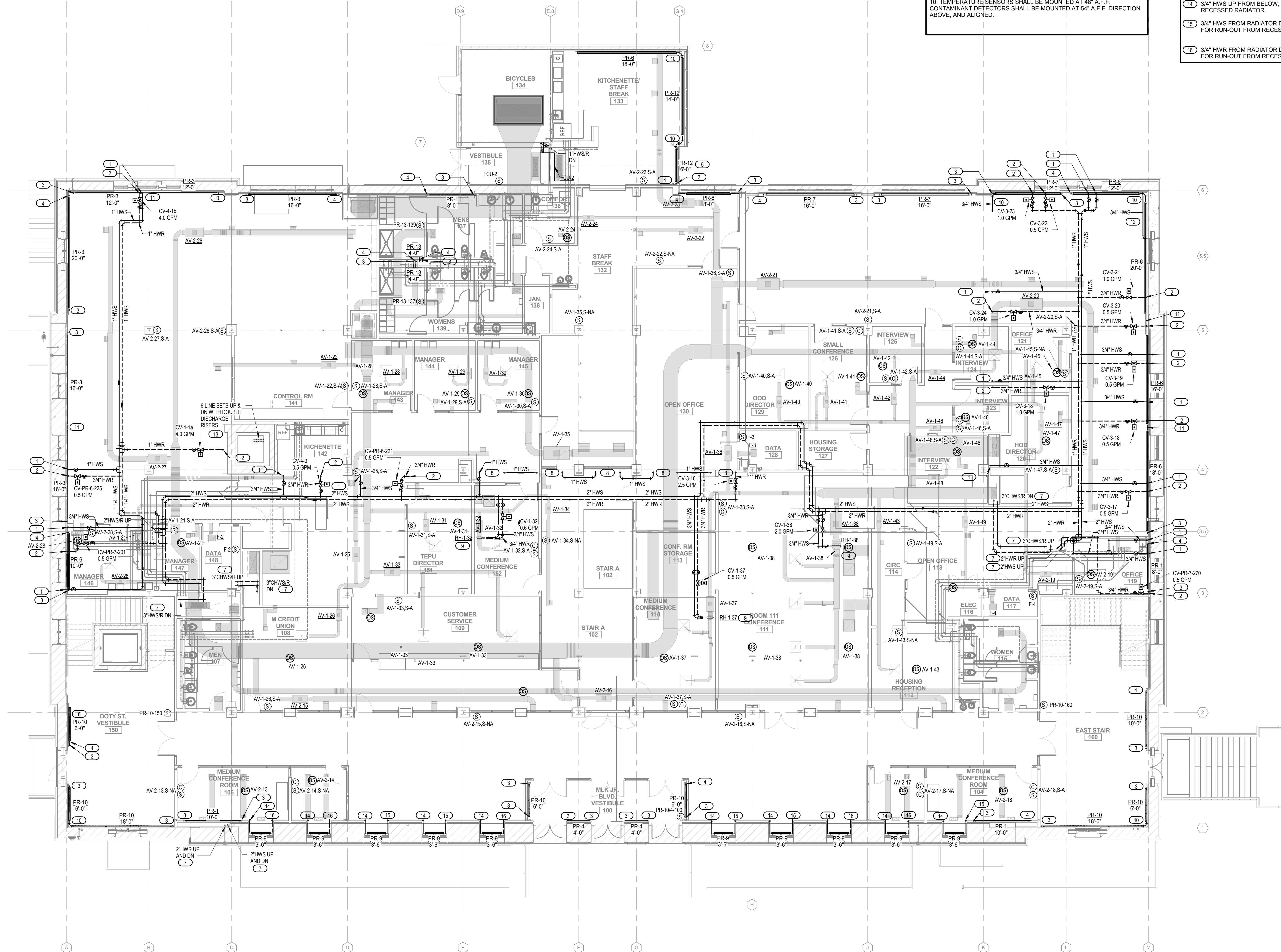


GENERAL NOTES

1. ALL PROVIDED DETAILS APPLY. REFER TO DETAIL SHEET.
2. DUCTWORK IS SHOWN ON HYDRONIC PLAN FOR REFERENCE ONLY. REFER TO M100 SERIES FOR DUCTWORK PLANS.
3. REFER TO HYDRONIC SCHEMATICS FOR ADDITIONAL INFORMATION.
4. NOTE THAT HISTORICAL / ARCHITECTURAL CONCERNS DICTATE NO PIPING, PLUMBING, OR HVAC ELEMENTS APPEAR IN CERTAIN AREAS. REFER TO ARCHITECTURAL PLANS FOR COORDINATION OF "EXCLUSION ZONES".
5. ALL PENETRATIONS THROUGH FLOORS SHALL BE FIRE CAULKED. ALL FLOORS ARE FIRE RATED.
6. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL BE FIRE CAULKED. SEE ARCHITECTURAL FOR ALL SUCH.
7. COMPOUND CEILING PANELS SHOULD GENERALLY NOT BE PENETRATED FOR HANGERS. ARCHITECTURAL PROVIDES UNISTRUT BETWEEN. REFER TO ARCHITECTURAL.
8. CONTRACTOR SHALL PROVIDE PANEL RADIATOR END CAPS, TRIM, AND CORNER TRIM PIECES TO CONCEAL PIPING BETWEEN RADIATORS. FOR EXTENDED LENGTHS, CUSTOM PIECES REQUIRING WALL SUPPORT SHALL BE USED.
9. OCCUPANCY SENSORS CEILING MOUNTED, UNLESS OTHERWISE NOTED. REFER TO ELECTRICAL PLANS FOR COORDINATION.
10. TEMPERATURE SENSORS SHALL BE MOUNTED AT 48" A.F.F. CONTAMINANT DETECTORS SHALL BE MOUNTED AT 54" A.F.F. DIRECTION ABOVE, AND ALIGNED.

KEYED NOTES

- 1 3/4" HWS UP TO FLOOR ABOVE.
- 2 3/4" HWR UP TO FLOOR ABOVE.
- 3 3/4" HWS UP FROM FLOOR BELOW.
- 4 3/4" HWR UP FROM FLOOR BELOW.
- 5 SAME END CONNECTION.
- 6 INSTALL PANEL RADIATOR WITH SAME SIDE PIPE CONNECTIONS.
- 7 HYDRONIC RISERS SHALL USE RESILIENT RISER SUPPORT, PER SPECIFICATIONS.
- 8 HWS/R PIPING TO NEW RADIATORS ON LEVEL ABOVE SHALL USE EXISTING (STEAM PIPING) PENETRATIONS.
- 9 REFER TO DETAIL 1/4M452; HOT WATER REHEAT COIL.
- 10 PROVIDE OFFSET PANEL COVER(S) IN THIS LOCATION. SUPPORT FROM WALL AS NEEDED.
- 11 END-TO-END CONNECTION. PROVIDE COVER PANEL BETWEEN UNITS.
- 12 3/4" CONNECTION PIPE FOR PANEL RADIATORS ON LEVEL ABOVE.
- 13 REFER TO DETAIL 7/4M452; REFRIGERANT DOUBLE DISCHARGE RISER.
- 14 3/4" HWS UP FROM BELOW, INTO WALL, CONCEALED AND TO RECESSED RADIATOR.
- 15 3/4" HWS FROM RADIATOR DOWN TO BELOW. CONCEAL IN WALL FOR RUN-OUT FROM RECESSED RADIATOR.
- 16 3/4" HWR FROM RADIATOR DOWN TO BELOW. CONCEAL IN WALL FOR RUN-OUT FROM RECESSED RADIATOR.



1 LEVEL 1 MECHANICAL HYDRONIC PLAN
1/8" = 1'-0"

Madison Municipal Building Renovation
BPW Project #7939
215 Martin Luther King, Jr. Blvd
Madison, WI 53703

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____

Print Names: _____ License No.: _____

Date: _____

ISSUE

MARK	DATE	DESCRIPTION
24	03 2017	BID SET

PROJECT NO. 2014057

PROJECT PHASE BID SET

DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA

Design 2016 Copyright/Trade Dress & Patents, Ltd.

LEVEL ONE MECHANICAL HYDRONIC PLAN

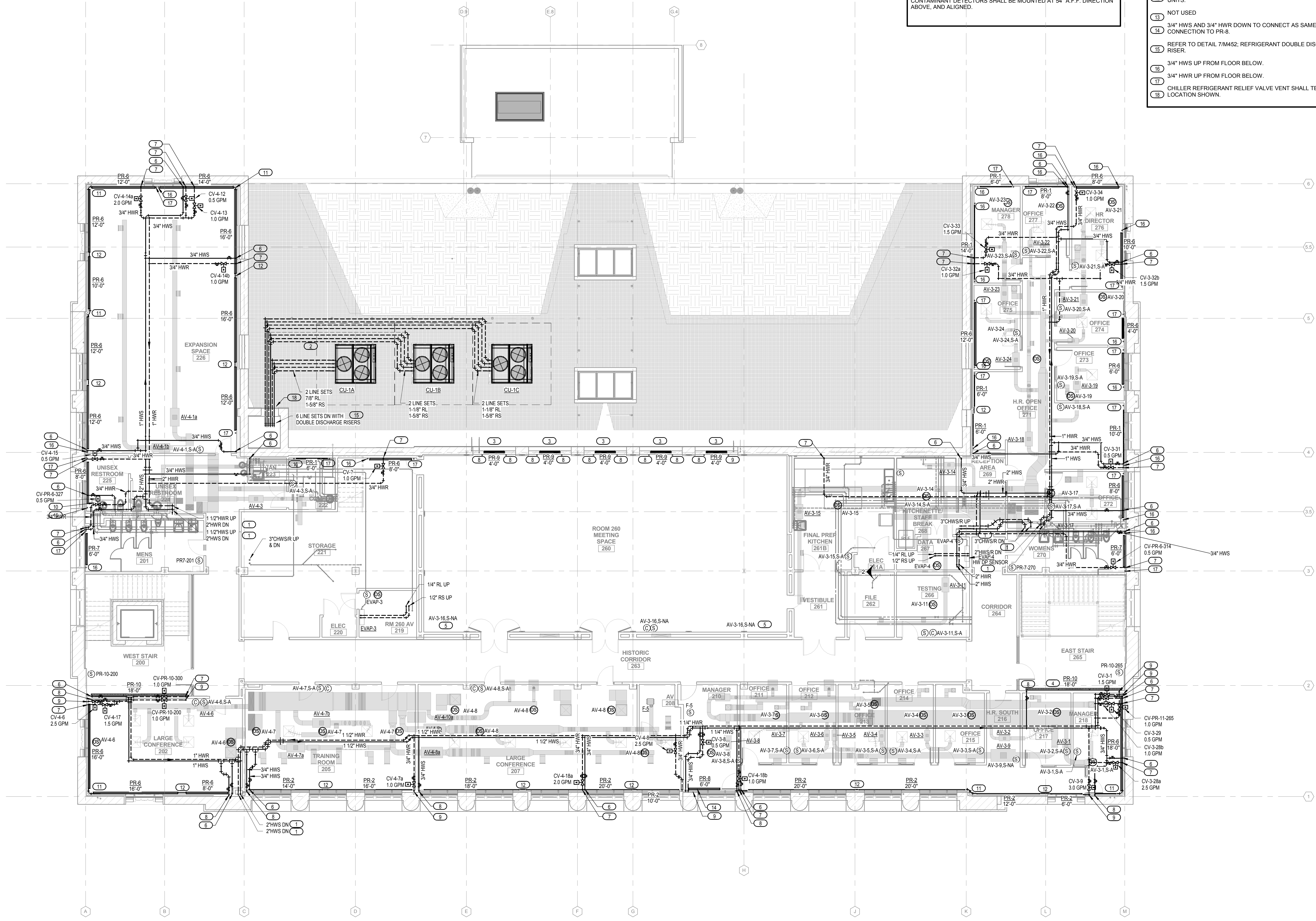
EXHIBIT I

M201



- ### GENERAL NOTES
1. ALL PROVIDED DETAILS APPLY. REFER TO DETAIL SHEET.
 2. DUCTWORK IS SHOWN ON HYDRONIC PLAN FOR REFERENCE ONLY. REFER TO M100 SERIES FOR DUCTWORK PLANS.
 3. REFER TO HYDRONIC SCHEMATICS FOR ADDITIONAL INFORMATION.
 4. NOTE THAT HISTORICAL / ARCHITECTURAL CONCERNS DICTATE NO PIPING, PLUMBING, OR HVAC ELEMENTS APPEAR IN CERTAIN AREAS. REFER TO ARCHITECTURAL PLANS FOR COORDINATION OF "EXCLUSION ZONES".
 5. ALL PENETRATIONS THROUGH FLOORS SHALL BE FIRE CAULKED. ALL FLOORS ARE FIRE RATED.
 6. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL BE FIRE CAULKED. SEE ARCHITECTURAL FOR ALL SUCH.
 7. COMPOUND CEILING PANELS SHOULD GENERALLY NOT BE PENETRATED FOR HANGERS. ARCHITECTURAL PROVIDES UNISTRUT BETWEEN. REFER TO ARCHITECTURAL.
 8. CONTRACTOR SHALL PROVIDE PANEL RADIATOR END CAPS, TRIM, AND CORNER TRIM PIECES TO CONCEAL PIPING BETWEEN RADIATORS. FOR EXTENDED LENGTHS, CUSTOM PIECES REQUIRING WALL SUPPORT SHALL BE USED.
 9. OCCUPANCY SENSORS CEILING MOUNTED, UNLESS OTHERWISE NOTED. REFER TO ELECTRICAL PLANS FOR COORDINATION.
 10. TEMPERATURE SENSORS SHALL BE MOUNTED AT 48" A.F.F. CONTAMINANT DETECTORS SHALL BE MOUNTED AT 54" A.F.F. DIRECTION ABOVE, AND ALIGNED.

- ### KEYED NOTES
1. HYDRONIC RISERS SHALL USE RESILIENT RISER SUPPORTS, PER SPECIFICATIONS.
 2. EXTERIOR REFRIGERATION PIPING SHALL BE INSTALLED ON PIPE PIER OR SIMILAR. INCLUDE INSULATION AND ALUMINUM JACKET, PER SPECIFICATIONS.
 3. NEW RADIATORS INSTALLED, WALL-MOUNTED, IN EXISTING RADIATOR ENCLOSURE. PIPING SHALL BE DOWN THROUGH EXISTING PENETRATIONS THROUGH FLOOR.
 4. RADIATOR SHALL BE MOUNTED 10" ABOVE FINISHED FLOOR.
 5. OCCUPANCY SENSORS ARE WALL-MOUNTED. REFER TO ELECTRICAL, AND PLACE IN SIMILAR POSITION.
 6. 3/4" HWS UP TO FLOOR ABOVE.
 7. 3/4" HWR UP TO FLOOR ABOVE.
 8. 3/4" HWS DOWN TO PANEL RADIATION.
 9. 3/4" HWR DOWN TO PANEL RADIATION.
 10. CONTROL VALVE AND VALVING ASSEMBLY FOR RADIATOR ZONE 4-16 SHALL BE INSTALLED ACCESSIBLE IN THIS AREA.
 11. PROVIDE OFFSET PANEL COVER(S) IN THIS LOCATION. SUPPORT FROM WALL AS NEEDED.
 12. END-TO-END CONNECTION. PROVIDE COVER PANEL BETWEEN UNITS.
 13. NOT USED.
 14. 3/4" HWS AND 3/4" HWR DOWN TO CONNECT AS SAME SIDE CONNECTION TO PR-8.
 15. REFER TO DETAIL 7/M452; REFRIGERANT DOUBLE DISCHARGE RISER.
 16. 3/4" HWS UP FROM FLOOR BELOW.
 17. 3/4" HWR UP FROM FLOOR BELOW.
 18. CHILLER REFRIGERANT RELIEF VALVE VENT SHALL TERMINATE AT LOCATION SHOWN.



1 LEVEL 2 MECHANICAL HYDRONIC PLAN
1/8" = 1'-0"

MSR 710 South 2nd Street, 8th Floor
Minneapolis, Minnesota 55401-2282
Architecture 612.375.0336 tel
Interiors and 612.342.2216 fax
Urban Design www.msrdesign.com

Ken Saiki Design, Inc
303 South Paterson St
Madison, WI 53703
608.251.3600 tel

KJWW
Structural Engineering, Technology, AV
1800 Derring Way, Suite 200
Madison, WI 53713
608.223.9600 tel

MEP Engineers
MEP Associates
880 Blue Genstar Road, Suite 175
Eagan, MN 55121
651.379.9120 tel

Gallina Design
Lighting Designer
30233 County 7
Chalfield, MN 55923
507.867.1628 tel

Charles Quagliana, AIA
Preservation Architect
5641 Willoughby Rd
Madison, WI 53760
608.449.9689 tel

Insite Consulting Architects
Building Envelope Consultant
115 E. Main Street, Suite 200
Madison, WI 53703
608.204.0825 tel

Summit Fire Consulting
Fire & Code Consultant
575 Minnehaha Ave. W.
St. Paul, MN 55103
651.251.1879 tel

KRA
Acoustical Consultant
4828 Chicago Avenue South, Suite 206
Minneapolis, MN 55417
612.374.3800 tel

VIERBICHER
Civil Engineers
999 Fournier Drive, Suite 201
Madison, WI 53717

Madison Municipal Building Renovation
BPW Project #7939
215 Martin Luther King, Jr. Blvd
Madison, WI 53703

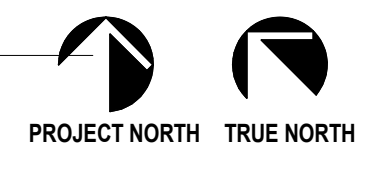
I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature:	
Print Names:	
Date:	License No.:
ISSUE	
MARK DATE DESCRIPTION	
	24.03.2017 BID SET

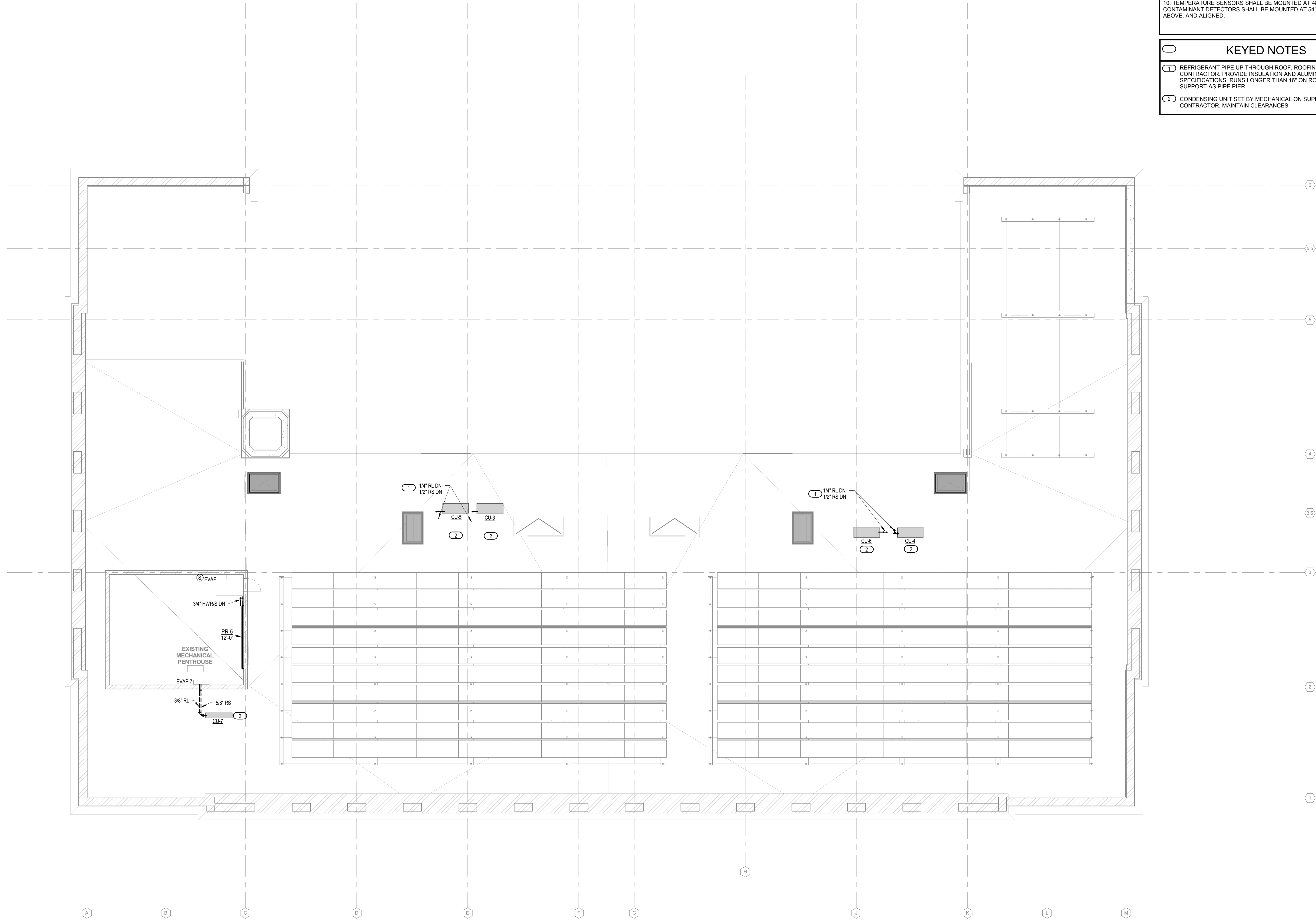
PROJECT NO: 2014057
PROJECT PHASE: BID SET
DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA
Design 2015 Copyright West, Shover & Robinson, LLC

LEVEL TWO MECHANICAL HYDRONIC PLAN

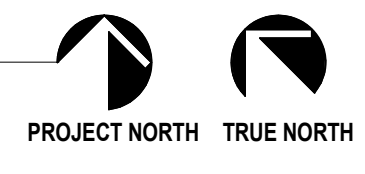
EXHIBIT I
M202



- GENERAL NOTES**
1. ALL PROVIDED DETAILS APPLY; REFER TO DETAIL SHEET.
 2. DUCTWORK IS SHOWN ON HYDRONIC PLAN FOR REFERENCE ONLY. REFER TO M100 SERIES FOR DUCTWORK PLANS.
 3. REFER TO HYDRONIC SCHEMATICS FOR ADDITIONAL INFORMATION.
 4. NOTE THAT HISTORICAL / ARCHITECTURAL CONCERNS DICTATE NO PIPING, PLUMBING, OR HVAC ELEMENTS APPEAR IN CERTAIN AREAS. REFER TO ARCHITECTURAL PLANS FOR COORDINATION OF "EXCLUSION ZONES."
 5. ALL PENETRATIONS THROUGH FLOORS SHALL BE FIRE CAULKED. ALL FLOORS ARE FIRE RATED.
 6. ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL BE FIRE CAULKED. SEE ARCHITECTURAL FOR ALL SUCH.
 7. COMPOUND CEILING PANELS SHOULD GENERALLY NOT BE PENETRATED FOR HANGERS. ARCHITECTURAL PROVIDES UNISTRUT BETWEEN. REFER TO ARCHITECTURAL.
 8. CONTRACTOR SHALL PROVIDE PANEL RADIATOR END CAPS, TRIM, AND CORNER TRIM PIECES TO CONCEAL PIPING BETWEEN RADIATORS. FOR EXTENDED LENGTHS, CUSTOM PIECES REQUIRING WALL SUPPORT SHALL BE USED.
 9. OCCUPANCY SENSORS CEILING MOUNTED, UNLESS OTHERWISE NOTED. REFER TO ELECTRICAL PLANS FOR COORDINATION.
 10. TEMPERATURE SENSORS SHALL BE MOUNTED AT 48" A.F.F. CONTAMINANT DETECTORS SHALL BE MOUNTED AT 54" A.F.F. DIRECTION ABOVE, AND ALIGNED.
- KEYED NOTES**
1. REFRIGERANT PIPE UP THROUGH ROOF. ROOFING BY GENERAL CONTRACTOR. PROVIDE INSULATION AND ALUMINUM JACKET, PER SPECIFICATIONS. RUNS LONGER THAN 16' ON ROOF REQUIRE SUPPORT-AS PIPE PIER.
 2. CONDENSING UNIT SET BY MECHANICAL ON SUPPORT BY GENERAL CONTRACTOR. MAINTAIN CLEARANCES.



1 ROOF MECHANICAL HYDRONIC PLAN
1/8" = 1'-0"



MSR 710 South 2nd Street, 8th Floor
Minneapolis, Minnesota 55401-2282
Architecture 612.375.0336 tel
Interiors and 612.342.2216 fax
Urban Design www.msrdesign.com

Ken Saiki Design, Inc
303 South Peterson St
Madison, WI 53703
608.251.3600 tel

Structural Engineering, Technology, AV
KJWW
1800 Deming Way, Suite 200
Middleton, WI 53713
608.223.9600 tel

MEP Engineers
MEP Associates
680 Blue Genstan Road, Suite 175
Eagan, MN 55121
651.379.9120 tel

Lighting Designer
Gallina Design
30232 County 7
Chalfield, MN 55923
507.867.1628 tel

Preservation Architect
Charles Quagliana, AIA
5641 Willoughby Rd
Mazomanie, WI 53560
608.449.9589 tel

Building Envelope Consultant
Insite Consulting Architects
115 E. Main Street, Suite 200
Madison, WI 53703
608.204.0825 tel

Fire & Code Consultant
Summit Fire Consulting
575 Minnehaha Ave. W.
St. Paul, MN 55103
651.251.1879 tel

Acoustical Consultant
KRA
4828 Chicago Avenue South, Suite 206
Minneapolis, MN 55417
612.374.3800 tel

Civil Engineers
VIERBICHER
999 Fournier Drive, Suite 201
Madison, WI 53717

Madison Municipal Building Renovation
BPW Project #7939
215 Martin Luther King, Jr. Blvd
Madison, WI 53703

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____
Print Names: _____
Date: _____ License No: _____

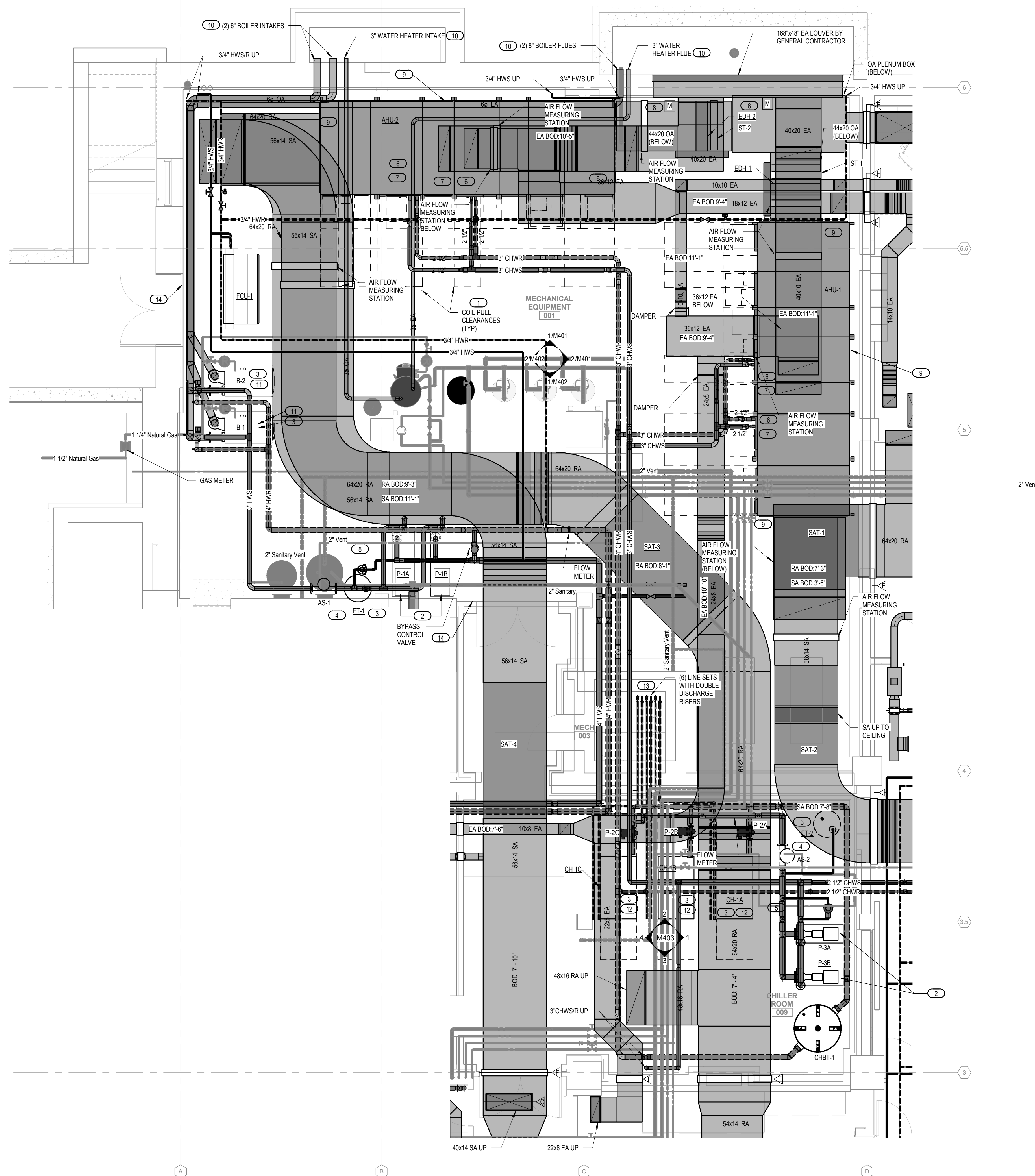
MARK	DATE	DESCRIPTION
	24.03.2017	BID SET

PROJECT NO: 2014057
PROJECT PHASE: BID SET
DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA
© 2017 Copyright by MSR, Johnson & Partners, Inc.

ROOF MECHANICAL HYDRONIC PLAN

EXHIBIT I
M205

2018/03/27 10:48 AM C:\Users\msr\Documents\2018\MSR\20180327\18057\18057.dwg



- GENERAL NOTES**
- ALL DUCTWORK IN THIS VIEW SHALL BE HUNG WITH SPRING HANGERS.
 - ALL HYDRONIC PIPING IN THIS VIEW SHALL BE HUNG WITH SPRING HANGERS.
 - ALL HYDRONIC PIPING IN THIS VIEW SHALL BE PROVIDED WITH PVC JACKET, PER SPECIFICATIONS.
 - FOR ALL EQUIPMENT, MAINTAIN ACCESS/CLEARANCE REQUIREMENTS. FOR DUCT-MOUNTED EQUIPMENT, ENSURE PULL SPACE HORIZONTAL OR VERTICAL, AS REQUIRED BY SPACE CONSTRAINTS.
- KEYED NOTES**
- COIL PULL SPACES AND ACCESS SHOWN DASHED, FOR REFERENCE.
 - PUMP, INSTALLED ON INERTIAL BASE, BY MECHANICAL. REFER TO DETAIL 5/M452.
 - CONCRETE PAD, BY MECHANICAL CONTRACTOR.
 - REFER TO DETAIL 3/M452, EXPANSION TANK/AIR SEPARATOR ASSEMBLY.
 - REFER TO DETAIL 3/M450, CHEMICAL BATCH FEEDER PIPING.
 - REFER TO DETAIL 6/M450, 2-WAY AHU COOLING COIL.
 - REFER TO DETAIL 4/M450, NEGATIVE PRESSURE CONDENSATE DRAIN.
 - MOTORIZED 2-POSITION DAMPER, CONTROLLED BY LOW VOLTAGE (CONTROL) WIRING/ACTUATOR.
 - FINAL CONNECTION TO AHU SHALL MATCH AHU OPENING DIMENSIONS OR CONTRACTOR SHALL PROVIDE BLANK-OFF DUCT CONNECTIONS, INSULATED.
 - TERMINATE FLUES AND COMBUSTION INTAKES WITH MANUFACTURER FURNISHED TERMINATION KITS, BY MECHANICAL.
 - REFER TO DETAIL 8/M451, BOILER DETAIL.
 - REFER TO DETAIL 7/M451, MODULAR SPLIT AIR COOLED CHILLER.
 - REFER TO DETAIL 6/M451, REFRIGERANT PIPING DIAGRAM. REFER TO DETAIL 7/M452 FOR DOUBLE DISCHARGE DETAIL.
 - PROVIDE REMOTE SHUT-DOWN DEVICE OF BOILER, AS REQUIRED BY CODE. COORDINATE WITH ELECTRICAL.

1 ENLARGED GROUND LEVEL MECHANICAL ROOM
1/4" = 1'-0"

**Madison Municipal
Building Renovation**

**BPW Project #7939
215 Martin Luther King, Jr. Blvd
Madison, WI 53703**

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____

Print Name: _____ License No: _____

Date: _____

ISSUE

MARK	DATE	DESCRIPTION
24.03.2017		BID SET

PROJECT NO: 2014057

PROJECT PHASE: BID SET

DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA

ENLARGED GROUND LEVEL MECHANICAL ROOM PLAN

EXHIBIT I

M400

- GENERAL NOTES**
1. ALL DUCTWORK IN THIS VIEW SHALL BE HUNG WITH SPRING HANGERS.
 2. ALL HYDRONIC PIPING IN THIS VIEW SHALL BE HUNG WITH SPRING HANGERS.
 3. ALL HYDRONIC PIPING IN THIS VIEW SHALL BE PROVIDED WITH PVC JACKET, PER SPECIFICATIONS.
 4. FOR ALL EQUIPMENT, MAINTAIN ACCESS/CLEARANCE REQUIREMENTS. FOR DUCT-MOUNTED EQUIPMENT, ENSURE PULL SPACE HORIZONTAL OR VERTICAL, AS REQUIRED BY SPACE CONSTRAINTS.
- KEYED NOTES**
1. COIL PULL SPACES AND ACCESS SHOWN DASHED, FOR REFERENCE.
 2. REFER TO DETAIL 6M450; 2-WAY AHU COOLING COIL.
 3. REFER TO DETAIL 4M450; NEGATIVE PRESSURE CONDENSATE DRAIN.
 4. FINAL CONNECTION SIZED TO AIR HANDLER PER DETAIL 6M452.
 5. TERMINATE FLUES AND COMBUSTION INTAKES WITH MANUFACTURER FURNISHED TERMINATION KITS, BY MECHANICAL.

MSR 710 South 2nd Street, 8th Floor
 Minneapolis, Minnesota 55401-2282
 Architecture 612.375.0336 tel
 Interiors and 612.342.2216 fax
 Urban Design www.msrdesign.com

Ken Saiki Design, Inc
 303 South Peterson St
 Madison, WI 53703
 608.251.3600 tel

Structural Engineering, Technology, AV
KJWW
 1800 Deming Way, Suite 200
 Middleton, WI 53713
 608.223.9600 tel

MEP Engineers
MEP Associates
 880 Blue Gables Road, Suite 175
 Eagan, MN 55121
 651.379.9120 tel

Lighting Designer
Gallina Design
 30233 County 7
 Chalfield, MN 55923
 507.867.1628 tel

Preservation Architect
Charles Quagliana, AIA
 5641 Wilmoughby Rd
 Mazomanie, WI 53560
 608.449.9689 tel

Building Envelope Consultant
Insite Consulting Architects
 115 E. Main Street, Suite 200
 Madison, WI 53703
 608.204.0825 tel

Fire & Code Consultant
Summit Fire Consulting
 575 Minnehaha Ave. W.
 St. Paul, MN 55103
 651.251.1879 tel

Acoustical Consultant
KRA
 4828 Chicago Avenue South, Suite 206
 Minneapolis, MN 55417
 612.374.3800 tel

Civil Engineers
VIERBICHER
 999 Fournier Drive, Suite 201
 Madison, WI 53717

**Madison Municipal
 Building Renovation**
 BPW Project #7939
 215 Martin Luther King, Jr. Blvd
 Madison, WI 53703

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
 ENGINEER SEAL

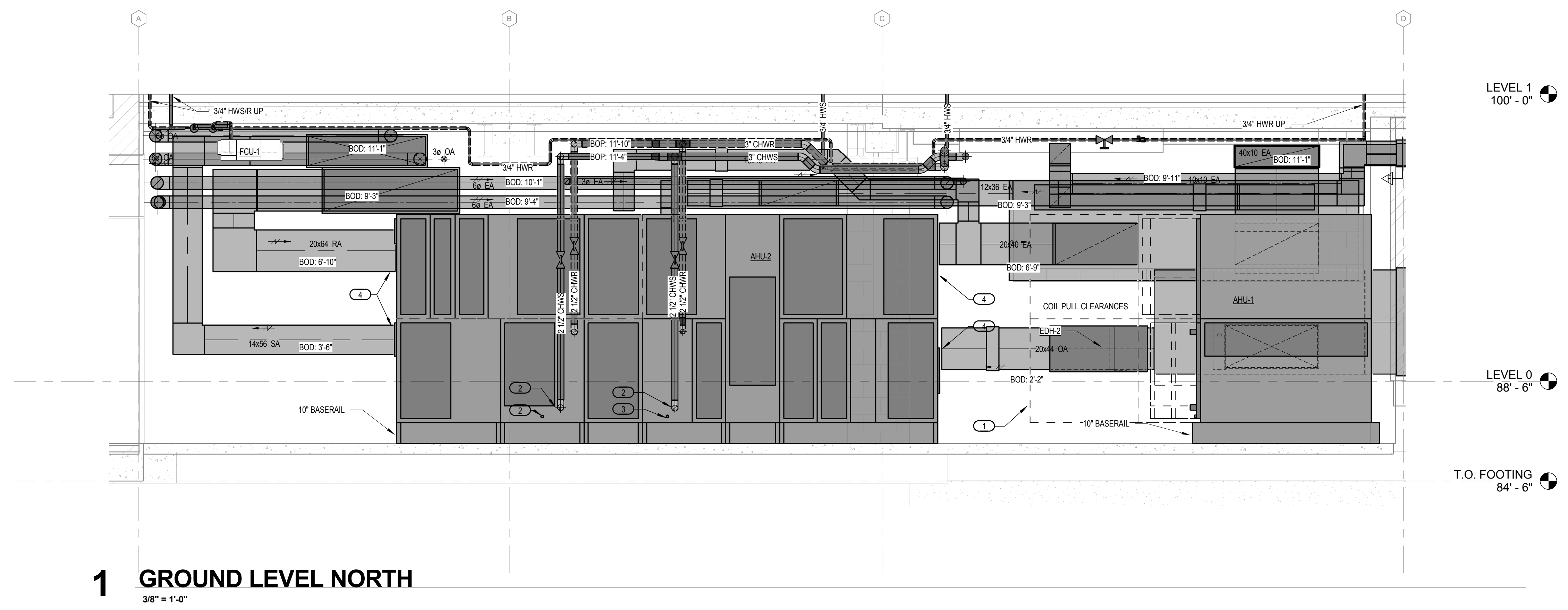
Signature: _____
 Print Names: _____ License No: _____
 Date: _____
 ISSUE

MARK	DATE	DESCRIPTION
	24.03.2017	BID SET

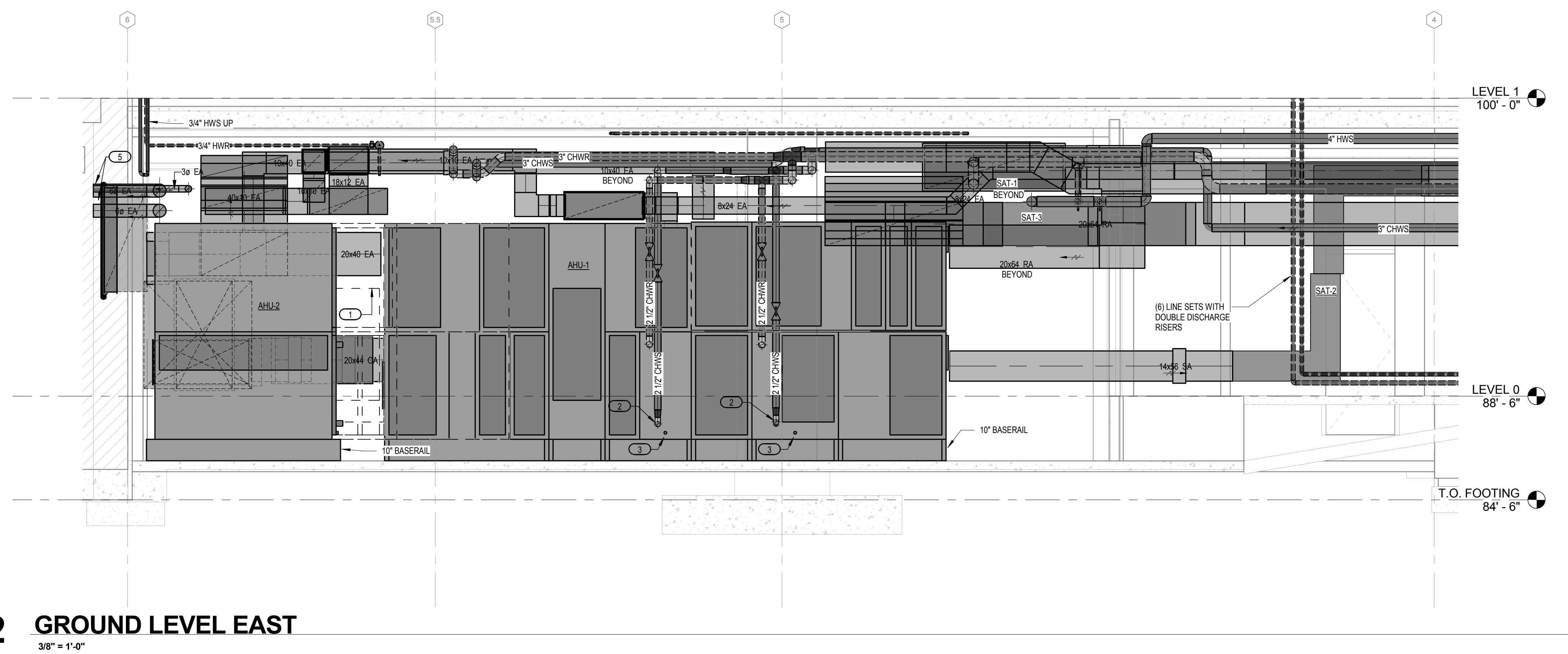
PROJECT NO. 2014057
 PROJECT PHASE BID SET
 DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA
© 2017 Copyright MSR, Johnson & Partners, LLC

**GROUND LEVEL
 MECHANICAL
 ROOM ELEVATIONS**

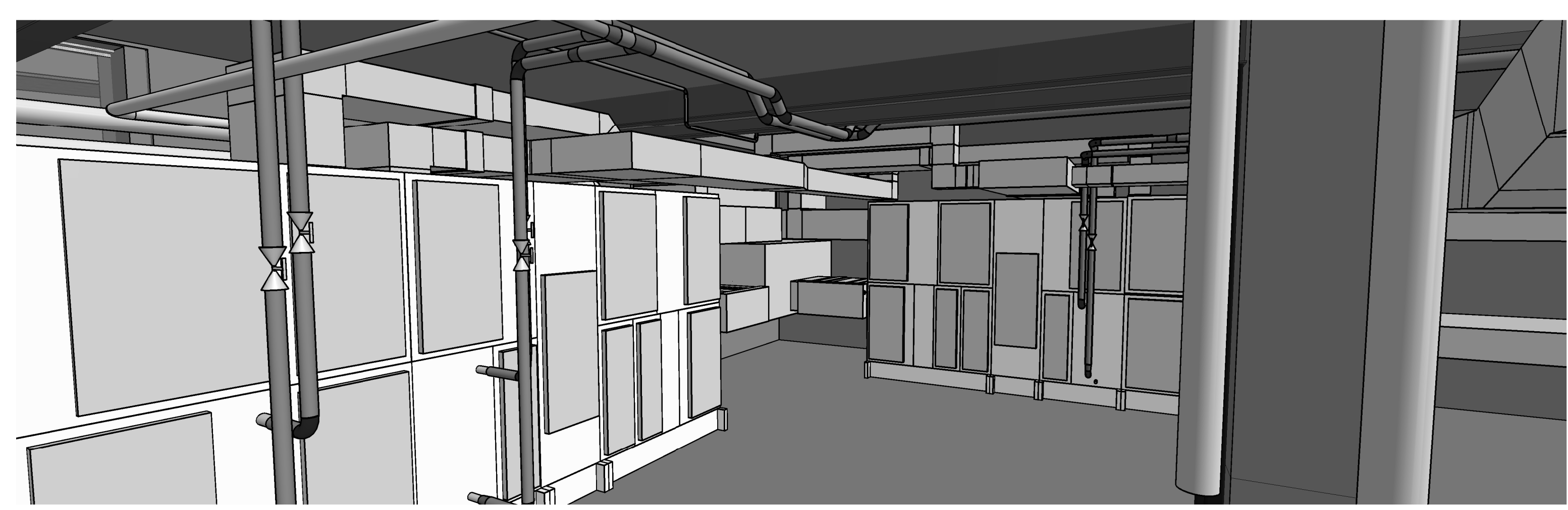
EXHIBIT I
M401



1 GROUND LEVEL NORTH
 3/8" = 1'-0"



2 GROUND LEVEL EAST
 3/8" = 1'-0"



3 GROUND LEVEL MECHANICAL ROOM NORTH-EAST CORNER



4 GROUND LEVEL MECHANICAL ROOM NORTH-WEST CORNER

GENERAL NOTES

1. ALL DUCTWORK IN THIS VIEW SHALL BE HUNG WITH SPRING HANGERS.
2. ALL HYDRONIC PIPING IN THIS VIEW SHALL BE HUNG WITH SPRING HANGERS.
3. ALL HYDRONIC PIPING IN THIS VIEW SHALL BE PROVIDED WITH PVC JACKET, PER SPECIFICATIONS.
4. FOR ALL EQUIPMENT, MAINTAIN ACCESS/CLEARANCE REQUIREMENTS. FOR DUCT-MOUNTED EQUIPMENT, ENSURE PULL SPACE HORIZONTAL OR VERTICAL, AS REQUIRED BY SPACE CONSTRAINTS.

KEYED NOTES

- 1 CHILLER CLEARANCES AND ACCESS SHOWN DASHED, FOR REFERENCE.
- 2 PUMP, INSTALLED ON INERTIAL BASE, BY MECHANICAL. REFER TO DETAIL 5M452.
- 3 SUPPORT FRAME AND CONCRETE PAD, BY MECHANICAL CONTRACTOR.
- 4 REFER TO DETAIL 3M452, EXPANSION TANK/AIR SEPARATOR ASSEMBLY.
- 5 REFER TO DETAIL 3M450, CHEMICAL BATCH FEEDER PIPING.
- 6 REFER TO DETAIL 7M452, REFRIGERANT DOUBLE DISCHARGE RISER.

MSR 710 South 2nd Street, 8th Floor
Minneapolis, Minnesota 55401-2282
Architecture 612.375.0336 tel
Interiors and 612.342.2216 fax
Urban Design www.msrdesign.com

Ken Saiki Design, Inc
Civil Engineering and Landscape Architects
303 South Peterson St
Madison, WI 53703
608.251.3600 tel

Structural Engineering, Technology, AV
KJWW
1800 Deming Way, Suite 200
Middleton, WI 53713
608.223.9600 tel

MEP Engineers
MEP Associates
880 Blue Genian Road, Suite 175
Eagan, MN 55121
651.379.9120 tel

Lighting Designer
Gallina Design
30233 County 7
Chaffield, MN 55923
507.867.1628 tel

Preservation Architect
Charles Quagliana, AIA
5641 Wiloughby Rd
Madison, WI 53760
608.449.9689 tel

Building Envelope Consultant
Insite Consulting Architects
115 E. Main Street, Suite 200
Madison, WI 53703
608.204.0825 tel

Fire & Code Consultant
Summit Fire Consulting
575 Minnehaha Ave. W.
St. Paul, MN 55103
651.251.1879 tel

Acoustical Consultant
KRA
4826 Chicago Avenue South, Suite 206
Minneapolis, MN 55417
612.374.3800 tel

Civil Engineers
VIERBICHER
999 Fournier Drive, Suite 201
Madison, WI 53717

Madison Municipal Building Renovation
BPW Project #7939
215 Martin Luther King, Jr. Blvd
Madison, WI 53703

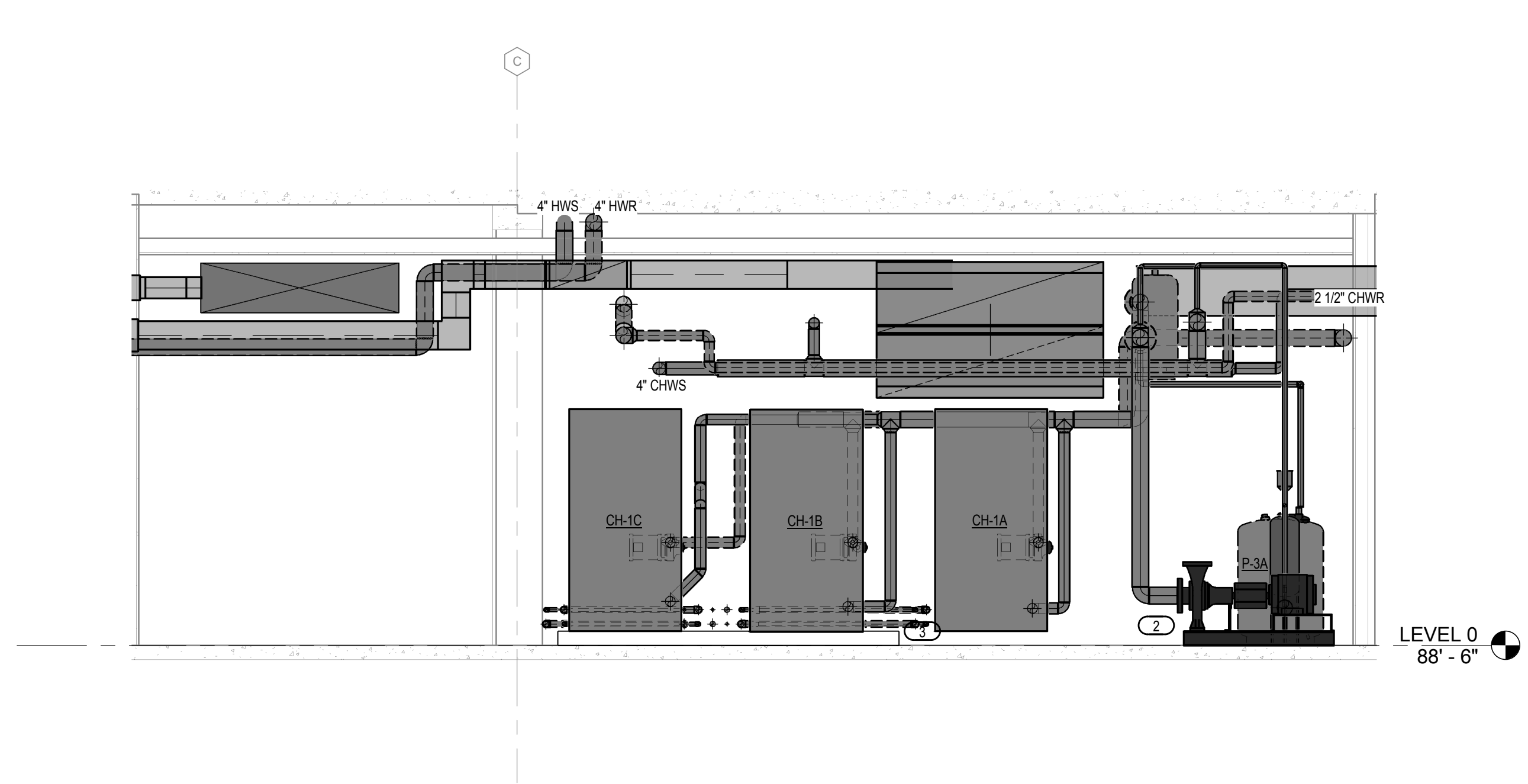
I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____
Print Names: _____ License No: _____
Date: _____
ISSUE
MARK DATE DESCRIPTION
24.03.2017 BID SET

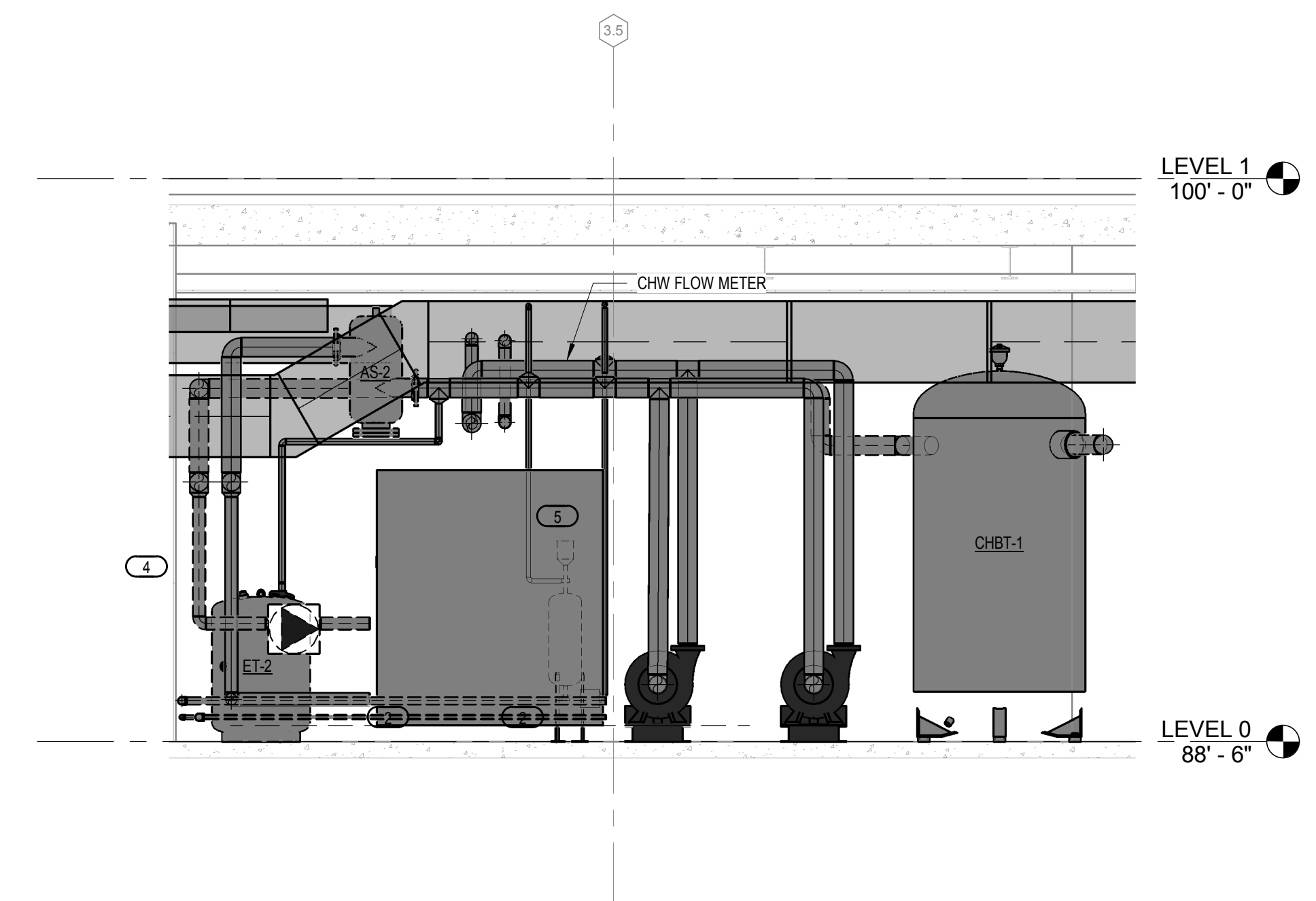
PROJECT NO. 2014057
PROJECT PHASE BID SET
DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA
Design 2014 Copyright Meyer, Shuman & Associates, LLC

GROUND LEVEL CHILLER ROOM ELEVATIONS

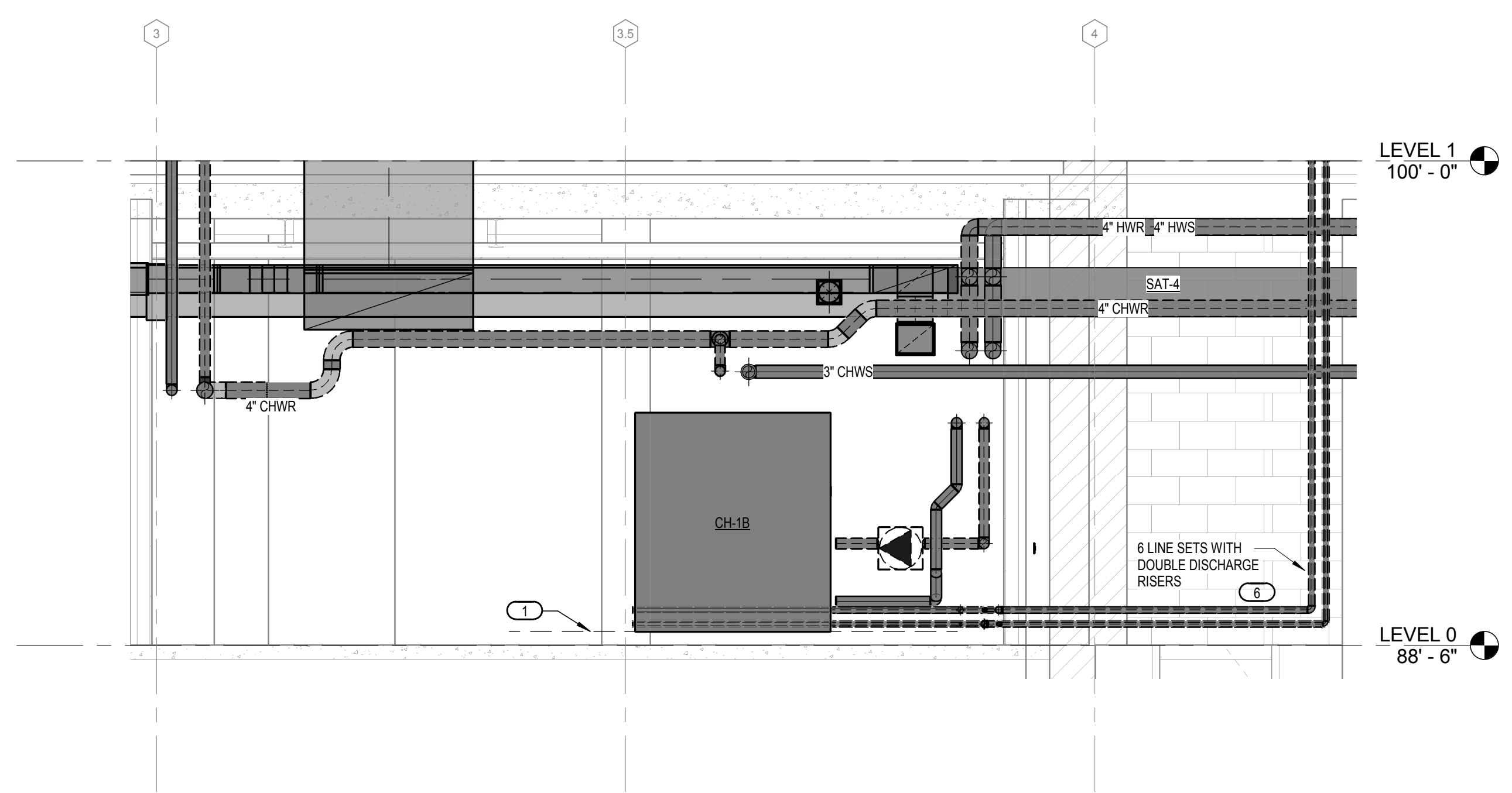
EXHIBIT I
M403



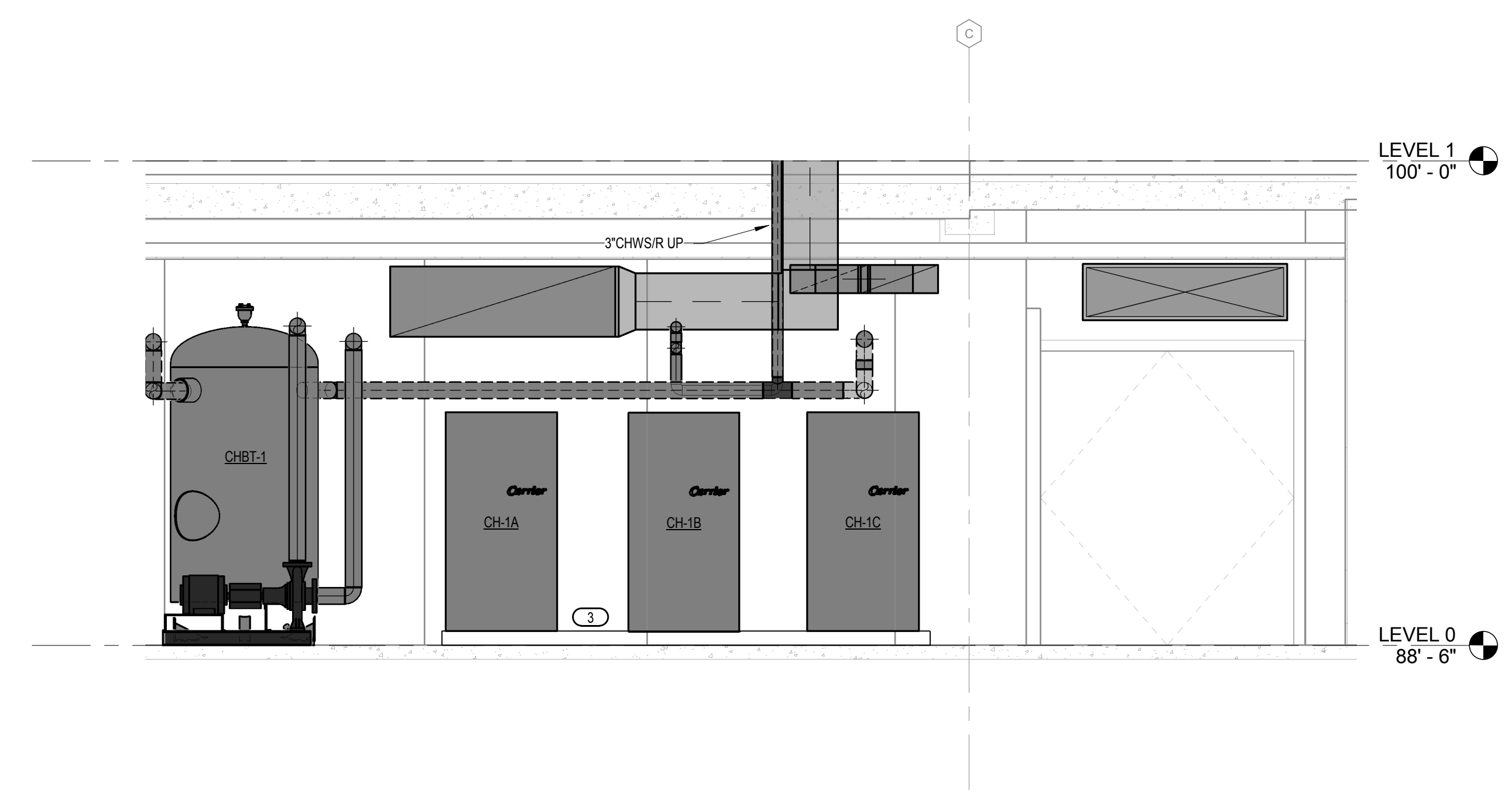
2 CHILLER ROOM NORTH
3/8" = 1'-0"



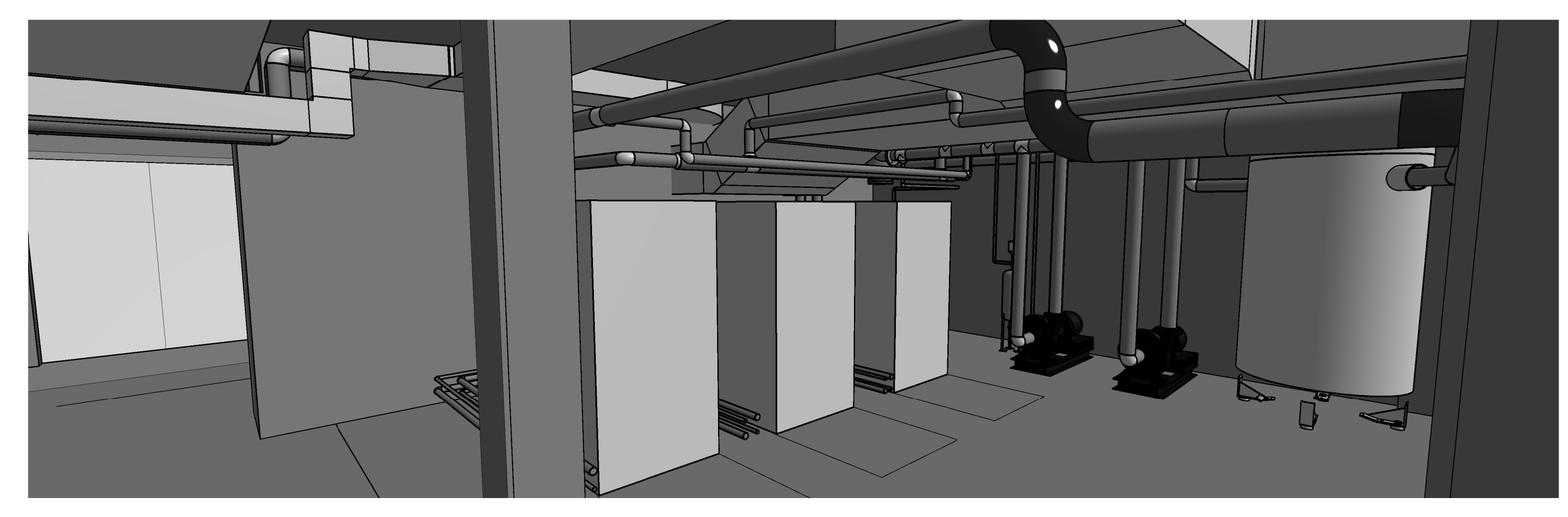
1 CHILLER ROOM EAST
3/8" = 1'-0"



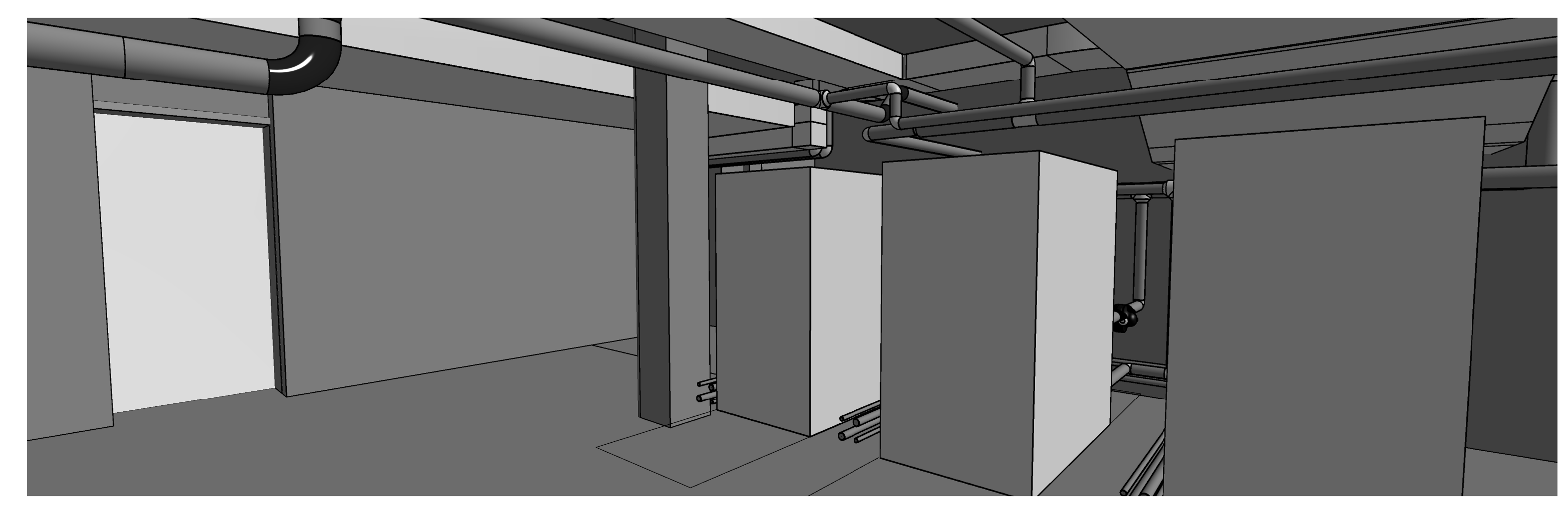
4 CHILLER ROOM WEST
3/8" = 1'-0"



3 CHILLER ROOM SOUTH
3/8" = 1'-0"

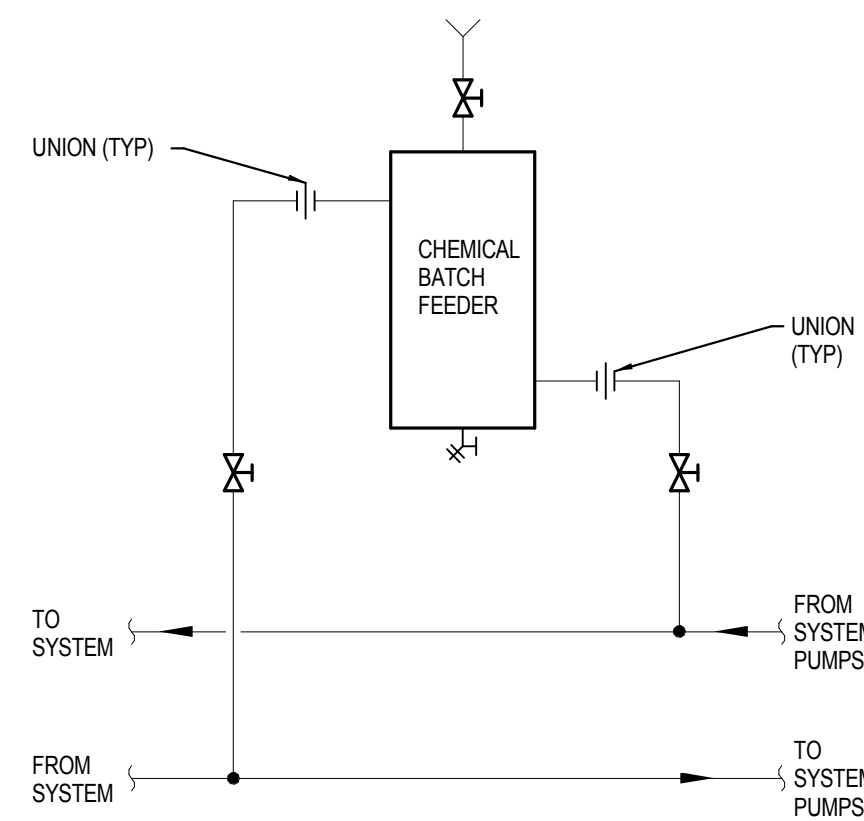


6 CHILLER ROOM NORTH-EAST CORNER

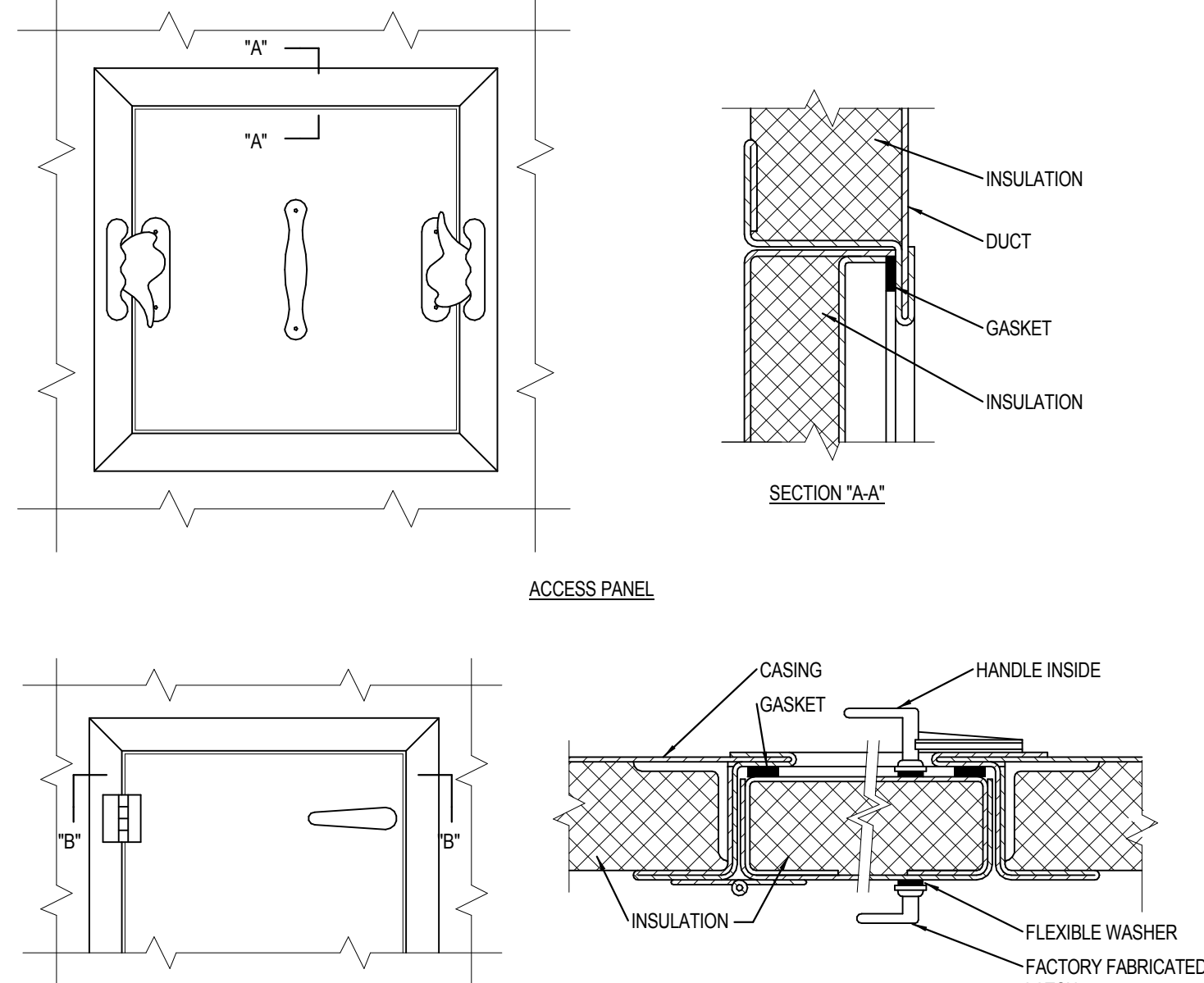


5 CHILLER ROOM NORTH-WEST CORNER

2014057-01 Rev. 03/17/17 ALH/BTB/JTG

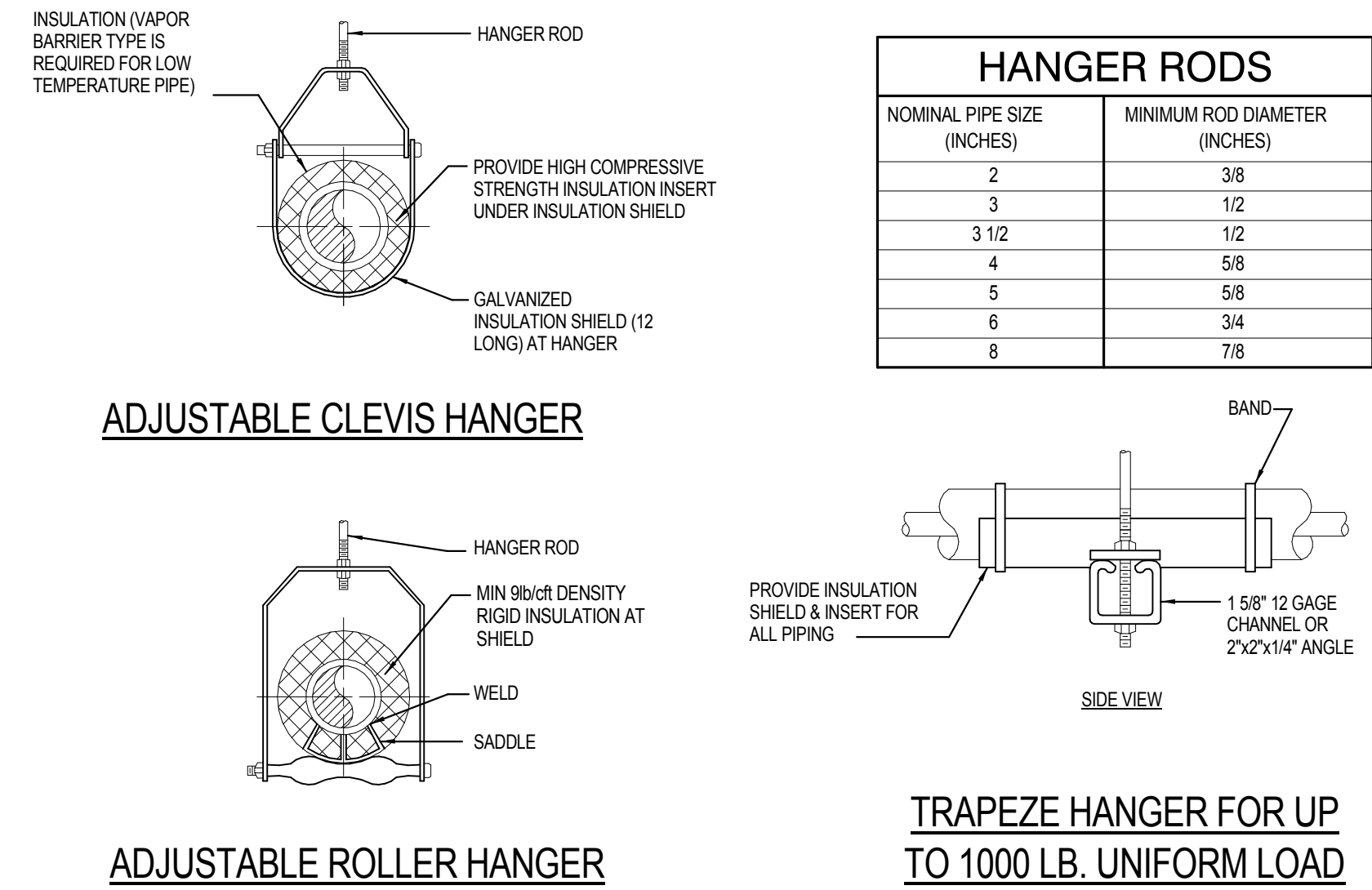


3 CHEMICAL BATCH FEEDER PIPING
NOT TO SCALE



NOTES:
1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.
2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIVE PINS. SEE SMACNA 2005, FIGURE 9-15.

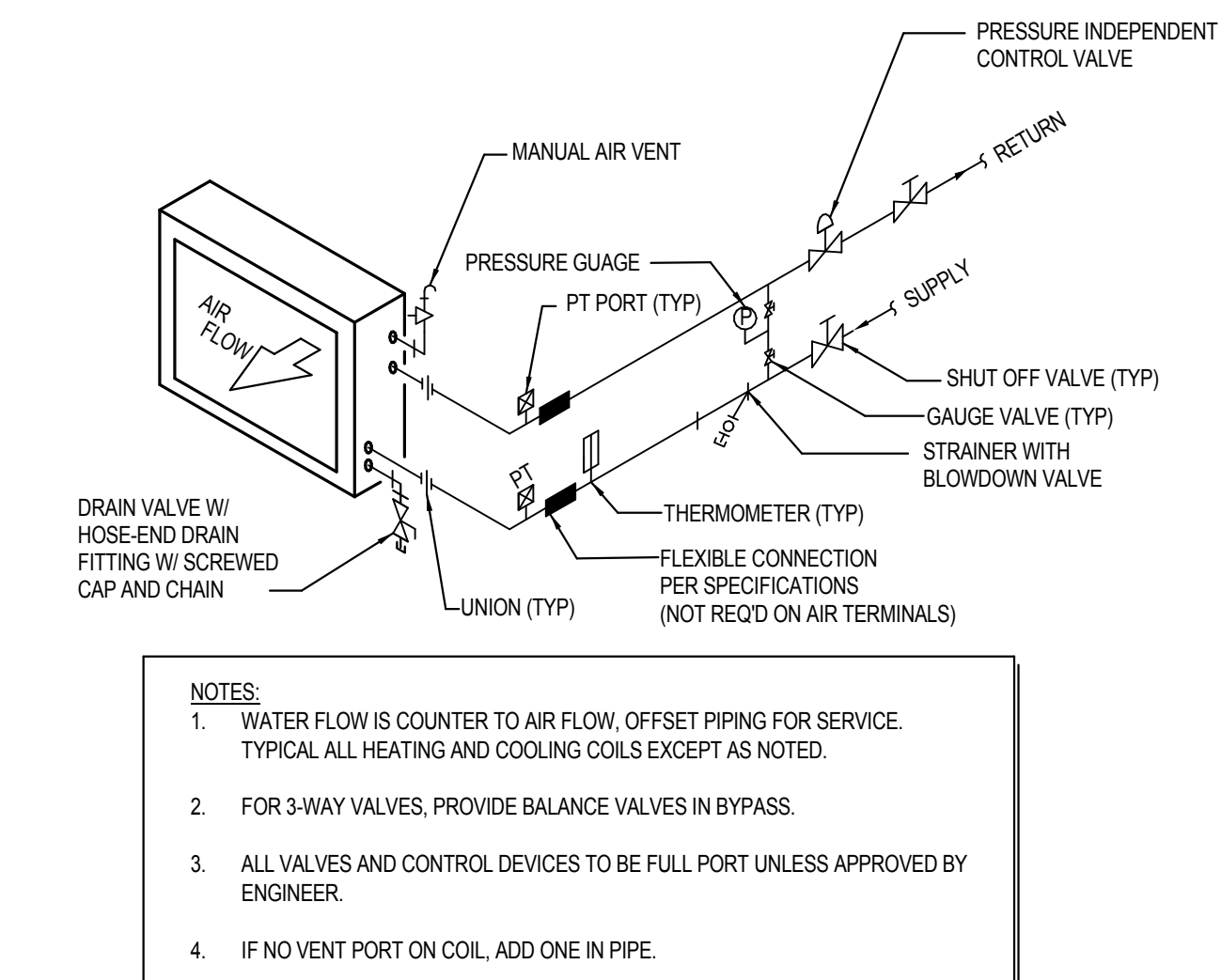
2 ACCESS PANEL AND DOOR DETAIL
NOT TO SCALE



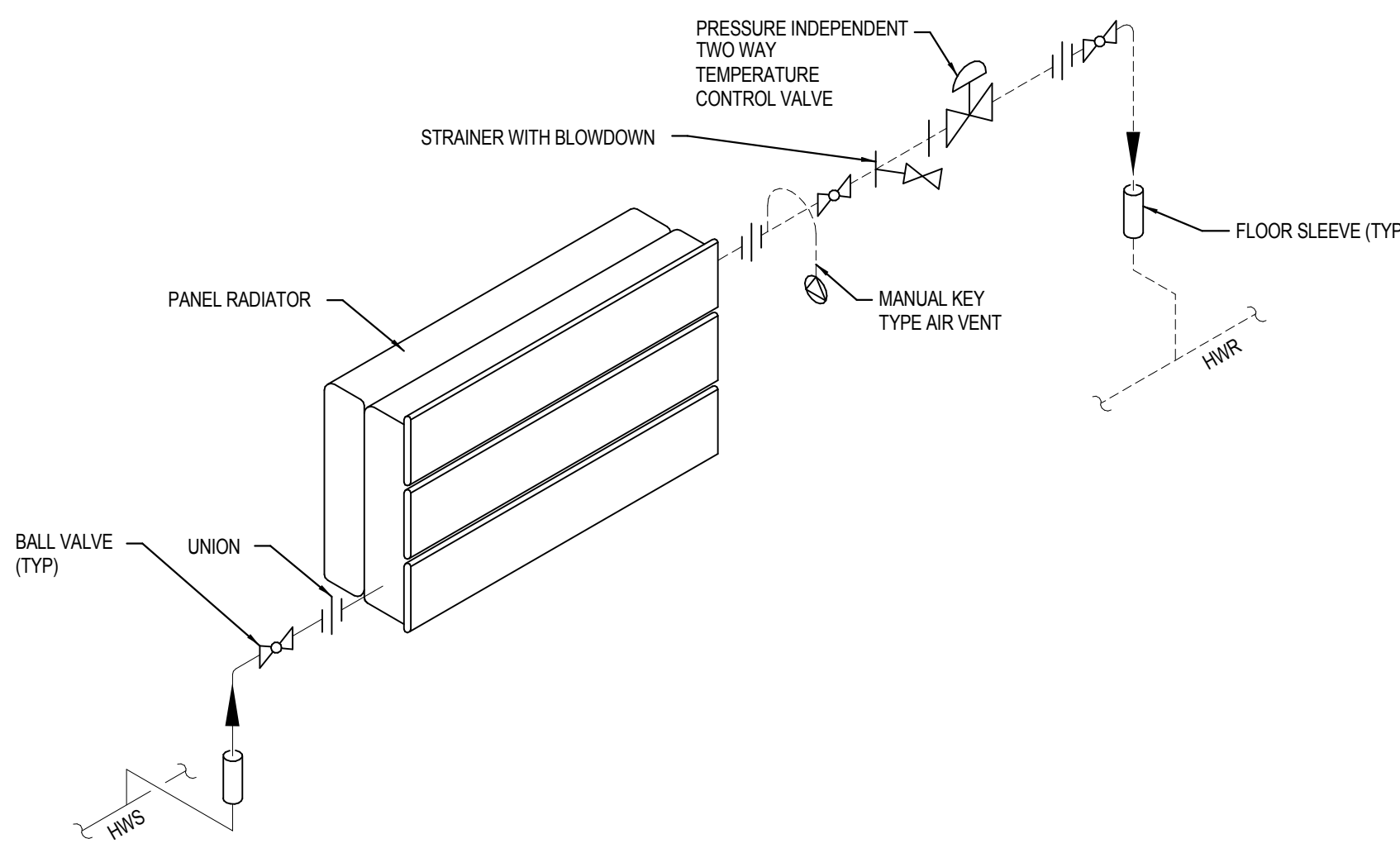
MAXIMUM PIPE/TUBING SUPPORT SPACING (FEET)										
NOM. SIZE	THRU 3/4"	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6
PIPE	6'-6"	6-6	6-6	10	10	10	10	10	10	10
COPPER	5'-0"	5	5	8	8	8	8	8	8	8

NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.

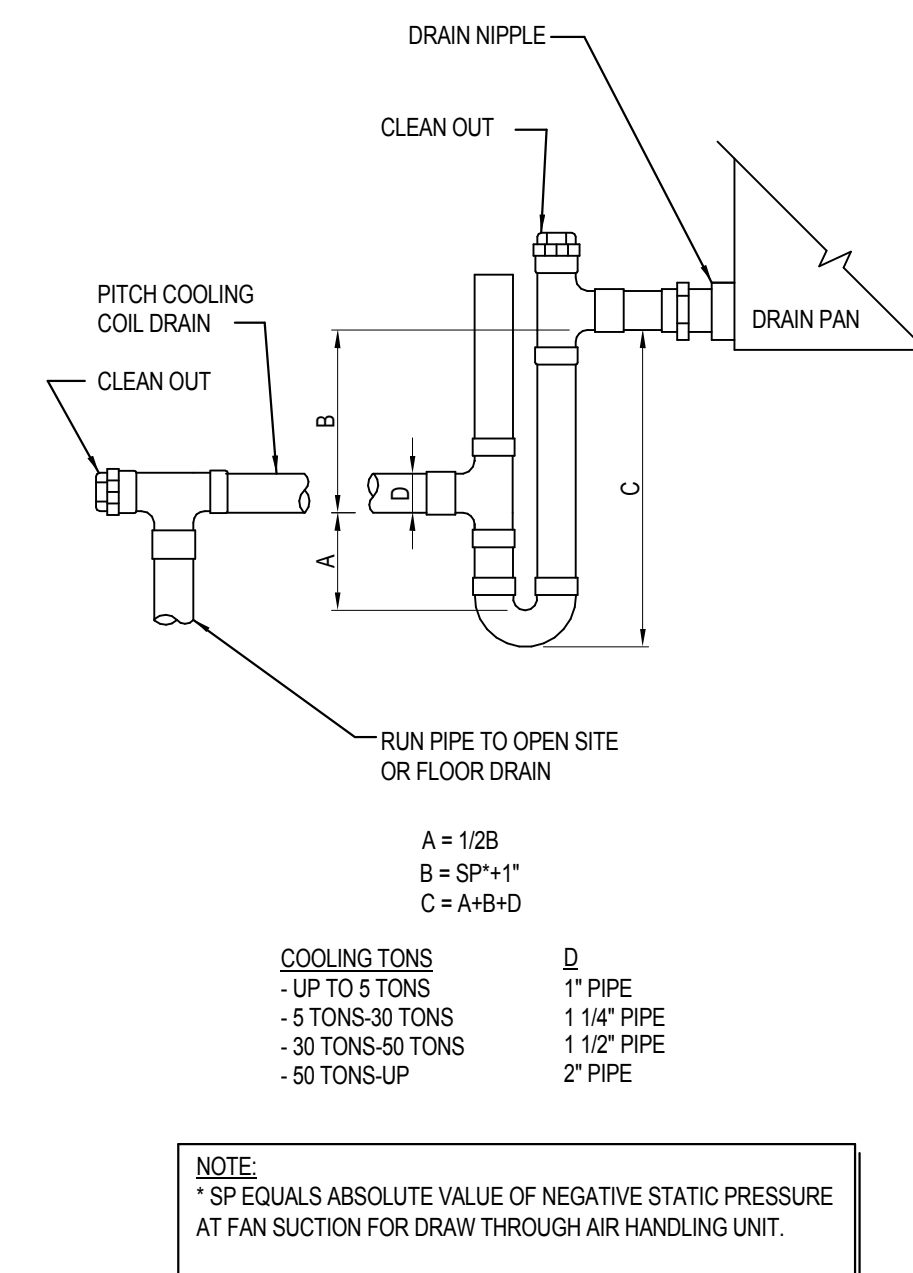
1 TYPICAL PIPE HANGER DETAILS
NOT TO SCALE



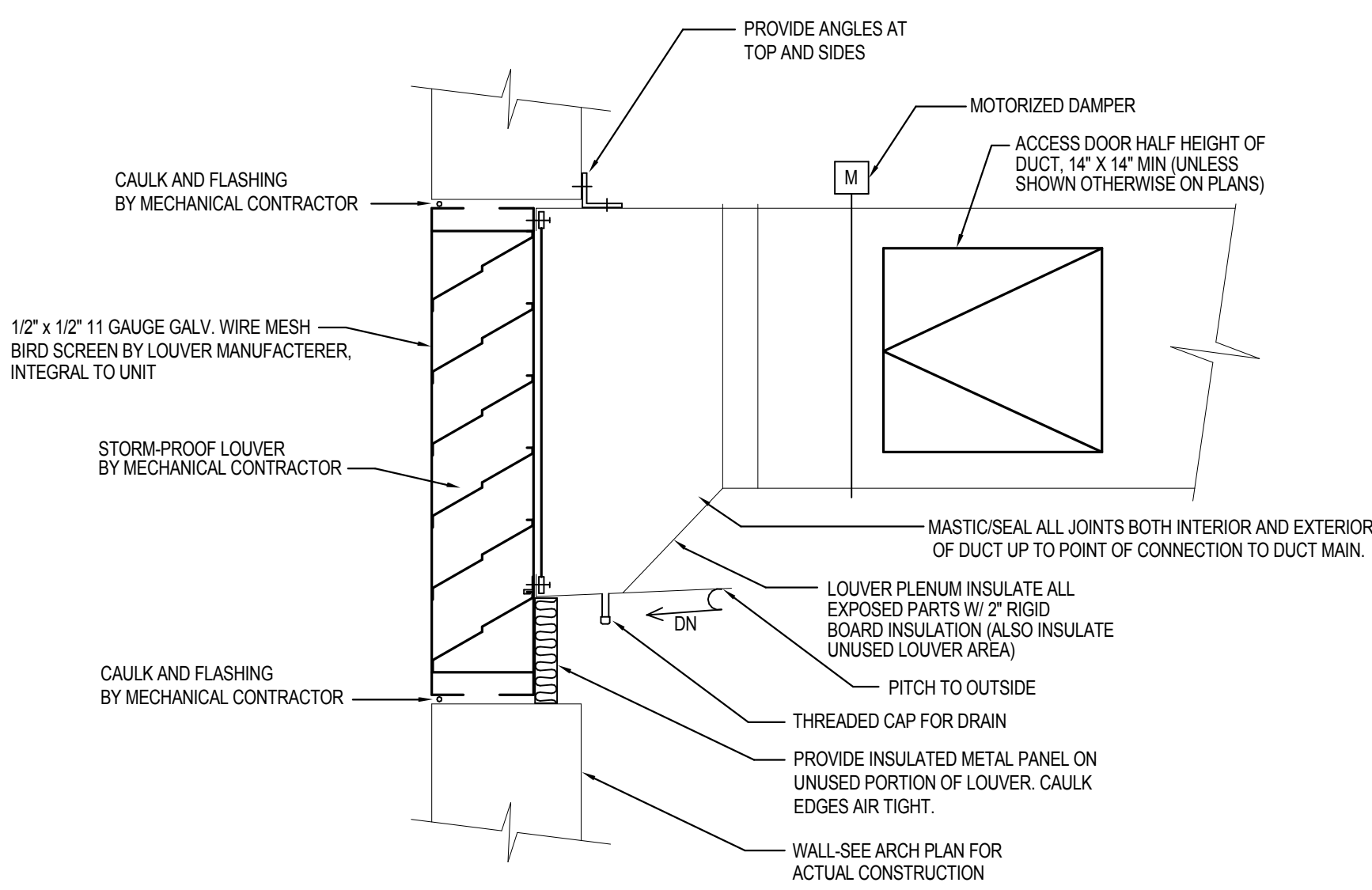
6 2-WAY AHU COOLING COIL DETAIL
NOT TO SCALE



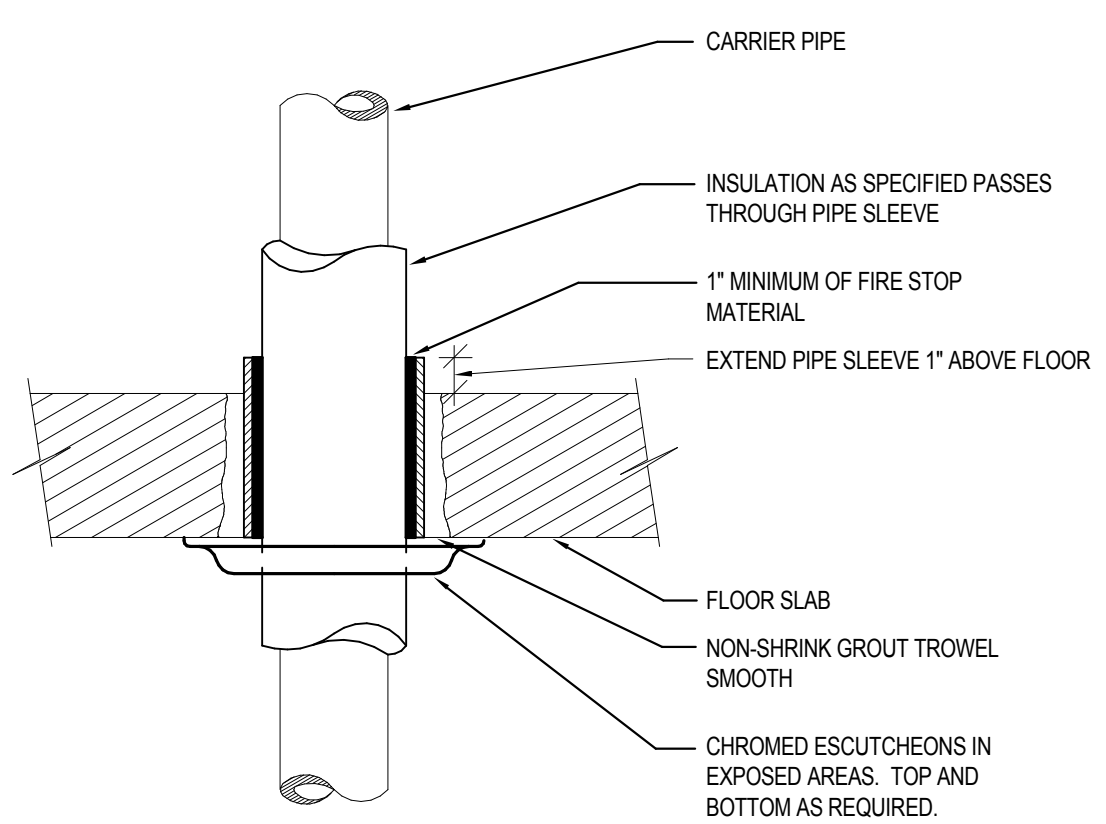
5 RUNTAL PIPING DIAGRAM
NOT TO SCALE



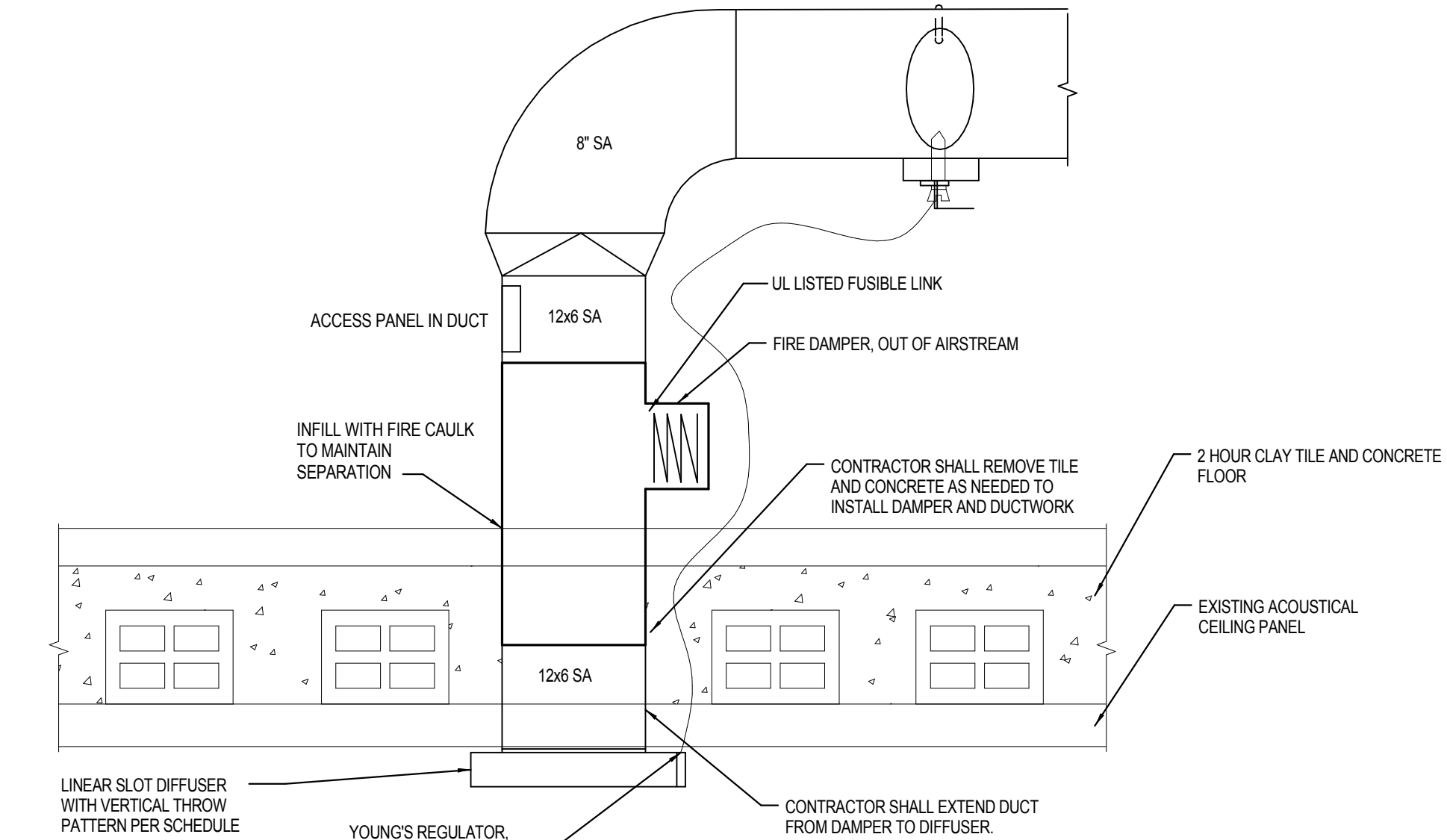
4 NEGATIVE PRESSURE CONDENSATE DRAIN DETAIL
NOT TO SCALE



9 DUCT CONNECTION TO LOUVER
NOT TO SCALE



8 PIPE FLOOR SLAB PENETRATION DETAIL
NOT TO SCALE



7 FIRE DAMPER DETAIL
NOT TO SCALE

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____

Print Names: _____ License No: _____

Date: _____

ISSUE

MARK DATE DESCRIPTION

24.03.2017 BID SET

PROJECT NO: 2014057

PROJECT PHASE: BID SET

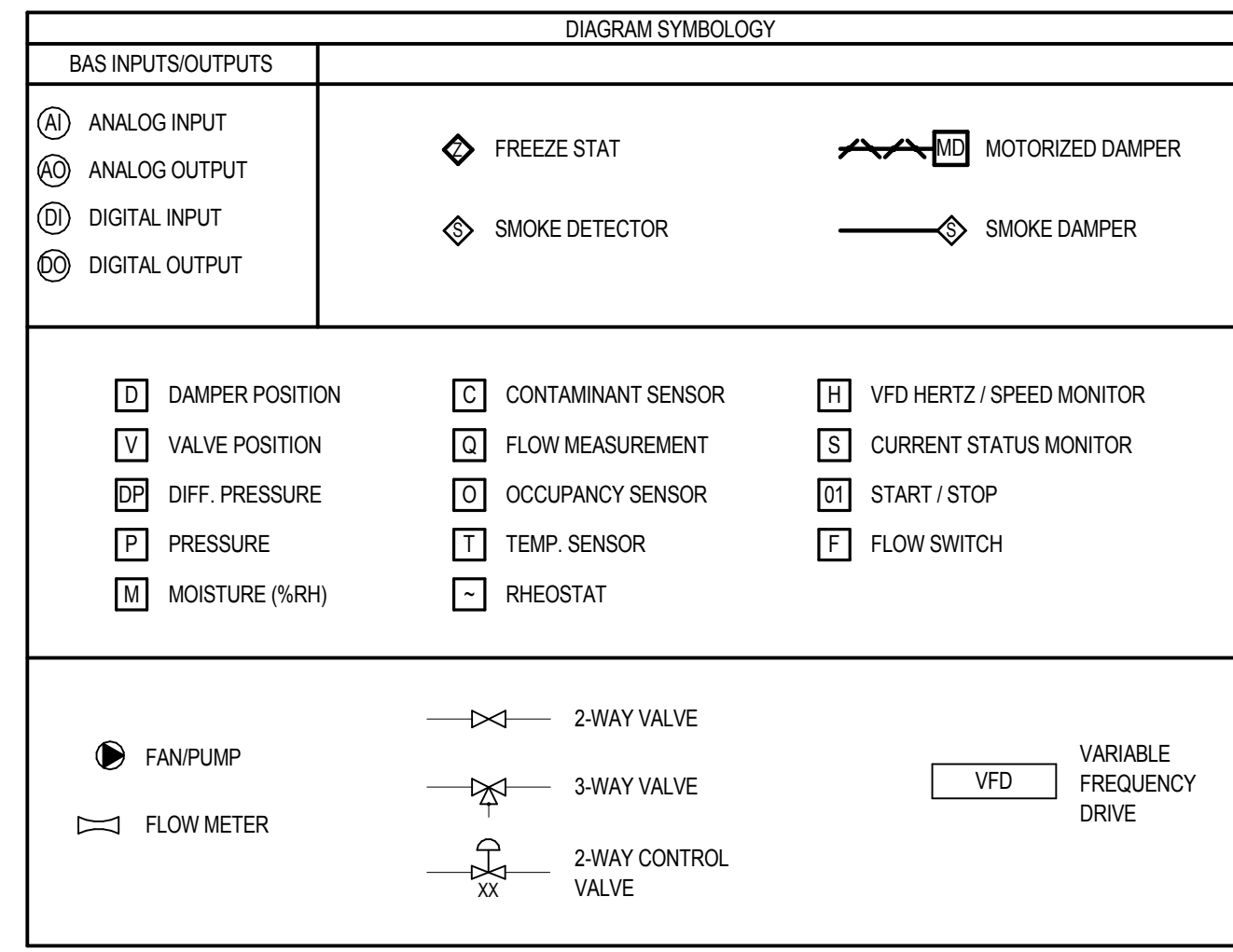
DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA

Revised 2016 Copyright Meyer, Johnson & Associates, LLC

**MECHANICAL
DETAILS**

**EXHIBIT I
M450**

SYMBOLOLOGY



System Description:
Modular variable air volume air handler with enthalpy wheel, supply fan, exhaust fan, return fan, and two cooling coils.

Schedule / Enable:
Air handlers shall be scheduled through the BAS and shall operate under either occupied or unoccupied modes.

Occupied / Unoccupied Modes:

- During unoccupied mode:
 - Unit shall be off (all dampers and valves shall be closed, all fans and the enthalpy wheel shall be off) unless 3 (adj) or more zones exceed their setpoint. Then unit shall enter unoccupied cooling mode. For purposes of this sequence, only zones receiving airflow from the air handler shall be considered; no zones with dedicated cooling systems, heat only systems, or pass-through air only, shall be counted.
 - In unoccupied cooling mode, if conditions do not allow for economizer operation, the recirculation damper shall open and all other dampers shall remain closed. The exhaust fan shall be off. The supply fan and primary cooling coil shall all operate as specified for occupied mode. The return fan shall operate to maintain a flow rate equal to the supply fan. All air valves shall be commanded to a minimum of 5% (adj) airflow, in order to ensure sufficient airflow in the system for fan operation.
 - In unoccupied cooling mode, if conditions allow for economizer mode, the unit shall enter economizer mode, modified as follows. The exhaust fan and enthalpy wheel shall remain off, and the exhaust damper shall be closed. The return air fan shall operate to maintain a flow rate equal to the supply fan. All air valves shall be commanded to a minimum of 5% (adj) airflow, in order to ensure sufficient airflow in the system for proper fan operation.
- The following sequences apply to occupied mode unless specifically noted otherwise.

Cooling Start-up Mode:
Optimized start to allow morning cool-down

- This cycle overrides the unoccupied schedule. If unit was operating in unoccupied cooling or in economizer mode at calculated start time, unit shall continue to do so.
- The DDC system shall measure zone air temperatures associated with air valves and measure outdoor air temperature to determine the minimum runtime required to reach setpoint. Time shall be based on history of similar conditions. Under no circumstances shall the minimum cooling start-up mode runtime be allowed to exceed 120 (adj) minutes.
- When the start time is reached, the unit shall operate in unoccupied cooling mode, or economizer mode if conditions allow.
- When occupied time is reached, the unit shall switch to occupied mode.

Supply Fan:
Fan operates to maintain duct static, with reset

- Fan shall modulate speed to maintain 1.3" w.c. (adj) at the duct static pressure sensor. Final nominal setpoint shall be confirmed and set by the balancing contractor.
- Static pressure setpoint shall be reset using a trim and response logic, within the bounds of 0.7" w.c. (adj) and 1.7" w.c. (adj). Final maximum and minimum setpoints shall be confirmed and set by the balancing contractor based on a worst-case test (i.e. To satisfy worst case zone when all air valves at minimum and at maximum design condition).
- Trim and response is as follows:
 - Pull all air valves. This shall allow for any zone to be removed from poll or added to poll through interface of air valve page.
 - A zone pressure request is generated when an air valve is 95% (adj) or greater than maximum flow. The request is eliminated at 80% (adj) or below of flow.
 - Fan shall adjust speed every 10 (adj) minutes. If more than 3 (adj) zones are sending a pressure request, the setpoint shall be increased by 0.04" w.c. (adj). If less than 3 (adj) zones are sending a pressure request, the setpoint shall be decreased by 0.04" w.c. (adj). If 3 (adj) zones are sending a pressure request, the setpoint shall not change.
 - The controls contractor shall tune the reset after the building has been occupied to eliminate instability, and shall provide a trend graph to show stability.

Exhaust Fan:
Fan operates to exhaust airflow equal to the outdoor airflow.

- Fan shall modulate speed to exhaust airflow (as measured at the exhaust airflow measuring station) equal to the outdoor airflow rate (as measured at the outdoor airflow measuring station).
- This sequence applies in occupied economizer or occupied non-economizer operation.
- During unoccupied operation, the exhaust fan shall be off.

Return Fan:
Fan operates to return an airflow rate equal to supply airflow less outdoor air

- Fan shall modulate speed to return airflow (as measured at the return airflow measuring station) equal to the supply air minus the outdoor airflow rate (as measured at the outdoor airflow measuring station).
- This sequence applies in occupied economizer or occupied non-economizer operation.
- During unoccupied operation, as noted in that section above, shall operate to maintain an airflow equal to supply air.

Discharge Air Temperature Control:
Unit DAT is based on (A/T) with reset.

- Discharge air setpoint reset control shall operate within the following parameters.
- If outdoor air temperature is 60F (adj) or below, minimum unit discharge temperature shall be 55F (adj), and maximum discharge air temperature shall be 65F (adj). At initial start
- If outdoor air temperature is above 60F (adj), minimum unit discharge temperature shall be 55F (adj), and maximum discharge air temperature shall be 56F (adj).
- Discharge air setpoint shall be reset as follows:
 - Pull all air valves. A request for cooling is generated if the air valve is above 99% (adj) of flow and the zone remains above setpoint.
 - Every 10 (adj) minutes, decrease the discharge air setpoint by 0.2F (adj) if there are greater than 3 (adj) cooling requests. If there are less than 3 (adj) requests, increase the discharge air setpoint by 0.2F (adj). If there are 3 (adj) requests, discharge air shall remain at current setpoint.
- At system start-up, discharge air will be set to the maximum temperature allowed based on outdoor air, as noted above.

Outdoor Chilled Water Coil:
Cooling coil operates as pre-heat to primary cooling coil.

- If outdoor air is above 70F (adj), the outdoor air cooling coil shall modulate to maintain a 55F (adj) discharge at the sensor immediately downstream (but prior to recirculation damper).
- If outdoor air is below 70F (adj), the outdoor air cooling coil shall not activate.

Primary Chilled Water Coil:
Cooling coil is last stage to meet discharge air temperature if economizer, energy recovery, or outdoor air cooling coil can do so.

- If discharge air temperature is above setpoint, and economizer is disabled or is at 100%, or enthalpy wheel is at full speed, then modulate valve open to achieve discharge air setpoint.
- If discharge air temperature is below setpoint, and the valve is open, then modulate valve closed to achieve discharge air setpoint.
- The cooling coil shall be locked out below 50F (adj) outdoor air temperature.

Economizer Operation:
Economizer is a floating dry-bulb type.

- Economizer will be enabled when the outdoor air temperature is less than 65F (adj).
- When enabled, the economizer shall open the by-pass dampers, and modulate the outdoor air damper concurrently and inversely to the recirculation damper to achieve the discharge air setpoint.
- Economizer mode damper operations shall not allow outdoor air to drop below minimum outdoor air airflow rates scheduled.
- The lower limit for discharge air temperature during economizer mode is 50F (adj).

Enthalpy Wheel Operation:
Variable speed total energy recovery between exhaust and outdoor air.

- Energy recovery wheel shall be enabled whenever economizer is not.
- Energy recovery will be used to achieve discharge air setpoint.
- If outdoor air is less than discharge air setpoint, the wheel speed will increase speed until discharge air setpoint is met.
 - If wheel speed is at minimum, and if the wheel increases temperature beyond setpoint, the outdoor air wheel by-pass damper shall modulate open to further reduce post-wheel temperature, and achieve setpoint.
- If outdoor air is greater than return air, the enthalpy wheel shall operate at full speed.
- Wheel speed shall be continuously adjusted in either case to achieve setpoint.
- Purge control: when enthalpy wheel is deactivated, but fans are active, the wheel shall run for 20 (adj) seconds at minimum speed every 30 (adj) minutes to keep the rotor surface clean.
- Frost control: if exhaust air temperature (after the wheel) reaches 15F (adj) and if the enthalpy wheel differential pressure is greater than 0.5 (adj) inch water column, the electric heating coil provided in the outdoor air stream shall be activated and pre-heat the outdoor air to 15F (adj).

Ventilation Air Control:
Resets ventilation air air handler based on return air CO2 levels.

- Sequence applies only during occupied mode.
- At the zone level: refer to air valve sequence.
- At the air handler level:
 - The air handler shall be programmed with minimum and reset outdoor air values. Refer to AHU schedule.
 - Nominal / setpoint CO2 level is 1000 (adj) ppm.
 - If CO2 level is below setpoint, the air handler shall operate to maintain the minimum outdoor airflow rate scheduled at the outdoor airflow sensor.
 - If CO2 is above setpoint, the air handler shall revise the outdoor airflow rate from minimum value to scheduled maximum outdoor airflow until the return air CO2 level drops below setpoint, and then shall return to minimum outdoor airflow.

Damper Operations:
Unit includes modulating outdoor air damper (at unit), two-position exhaust air damper (at louver), modulating recirculation damper (in unit), and two-position energy recovery by-pass dampers (in unit).

- Outdoor air damper:
 - Outdoor air damper shall be closed when the unit is in unoccupied mode, unless the unoccupied economizer operation is active.
 - During occupied hours, if the unit is not in economizer mode, the outdoor air damper shall modulate to maintain the minimum outdoor airflow rate scheduled.
 - If the unit is in economizer mode (occupied or unoccupied), the outdoor air damper shall operate as described in the economizer section.
- Exhaust air damper:
 - The exhaust air damper shall be closed when the unit is in unoccupied mode.
 - During occupied hours, and during economizer operation, the relief air damper shall be open.
- Recirculation damper shall at all times operate concurrently to, and in opposition to, the outdoor air damper.
- Energy recovery by-pass dampers shall be open when the unit is in economizer mode. Otherwise, they shall be closed.

Room 260 After-hours Operations - Specific to AHU-3 and AHU-4:
Sequence allows for after-hours operation of building for special events

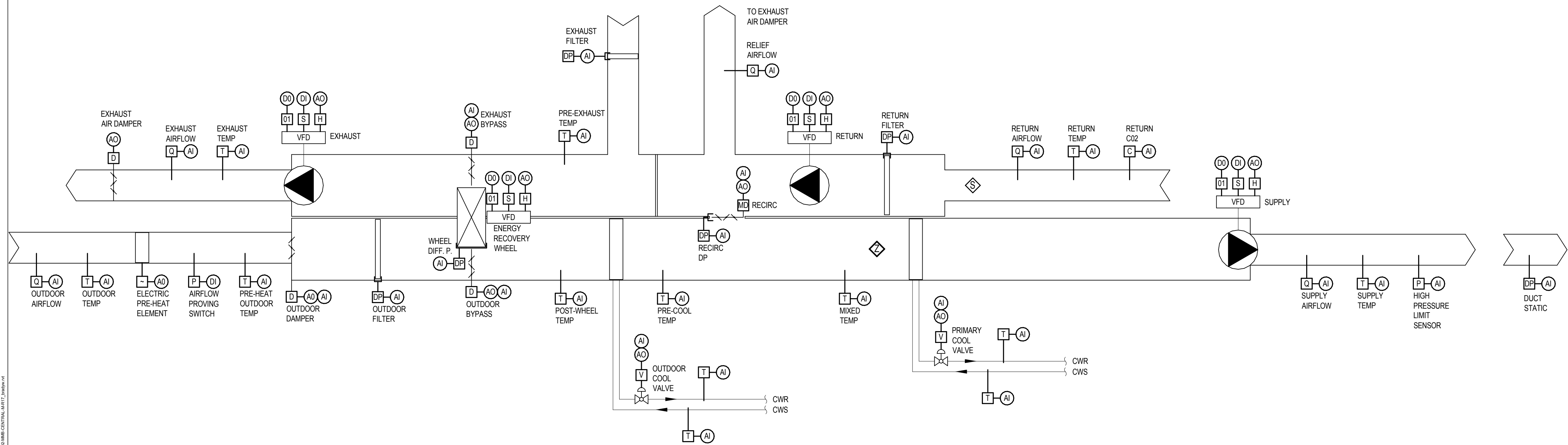
- If local occupancy sensor or local sensor override indicate use of room 260 air handlers AHU-3 and AHU-4 shall enter occupied mode. All sequences, including use of exhaust fan, enthalpy wheel, cooling coils, etc, shall be identical to occupied mode.

Alarms:
See also alarm section in specifications.

- Alarm if any valve fails (all valves shall provide feedback on position).
- Alarm if any damper fails (all dampers shall provide feedback on position).
- Alarm if supply air temperature setpoint cannot be achieved (+/- 2F (adj) within 5 minutes (adj) of setpoint adjustment.
- Alarm if any filter differential pressure exceeds 1" w.c. (adj).
- Alarm if any safety is tripped.
- Enthalpy wheel rotation alarm: the heat wheel includes a factory-furnished proximity switch. Controls contractor shall provide a dry contact input to the bus. If the wheel is indexed to run and 2 (adj) hours are not seen in 10 (adj) minutes, an alarm shall be sent to signal wheel failure.

Safeties:
All safeties shall be wired to the supply, return, and exhaust fan starters of the VFD safety circuits. If any safety is tripped, the starters shall not function in any mode (hand, off, auto). Similarly, VFDs shall not function in any mode (hand, off, auto) or in by-pass mode if a safety is tripped.

- Freeze/ret: freeze/ret shall trip if temperature drops below 35F (adj). Reset of freeze/ret is manual.
- Supply fan high pressure limit: high pressure limit shall trip if the duct-mounted static pressure probe exceeds setpoint, 8" w.c. (adj). Reset of high pressure limit is manual.
- Exhaust fan low pressure limit: low pressure limit shall trip if the duct-mounted static pressure probe drops below setpoint, -4" w.c. (adj). Reset of low pressure limit is manual.
- Return fan low pressure limit: low pressure limit shall trip if the duct-mounted static pressure probe drops below setpoint, -4" w.c. (adj). Reset of low pressure limit is manual.
- Fire alarm: shall trip upon activation of duct smoke detectors. Reset of fire alarm is manual.



1 MODULAR AHU WITH ENTHALPY RECOVERY
NOT TO SCALE

Madison Municipal Building Renovation
BPW Project #7939
215 Martin Luther King, Jr. Blvd
Madison, WI 53703

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____
Print Names: _____
Date: _____ License No.: _____

MARK	DATE	DESCRIPTION
	24.03.2017	BID SET

PROJECT NO: 2014057
PROJECT PHASE: BID SET
DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA
Drawing 010 Copyright Year: 2006 & 2006/06/06, LLC

MECHANICAL CONTROL DIAGRAMS

EXHIBIT I
M501

System Description:
Modular split-type chiller plant with primary/secondary flow and differential pressure pump operation.

Chiller Plant Enable:
Chiller plant shall be enabled when outdoor air temperature is above 50f (adj). Chiller(s) and associated pumps shall not operate unless there is a call for cooling from the system. The BAS shall not start-up the chiller(s) more than 4 (adj) times in an 18 (adj) hour period to match load demand except if the outside temperature drops below adjustable setpoint for chiller enable.

- Water Temperature Control:**
Water temperature control shall be based on zone temperature and sent to the chiller controller by the BAS.
- All zone temperatures and setpoints shall be compared.
 - The zone with temperature furthest from setpoint shall determine supply water setpoint.
 - If the zone furthest from setpoint is 3f (adj) from setpoint, the supply water temperature setpoint shall be 44f (adj).
 - If the zone furthest from setpoint is 0f (adj) from setpoint, the supply water temperature setpoint shall be 48f (adj).
 - Between maximum and minimum distance from setpoint noted, setpoint shall be determined by a linear function between the values given.

Chiller Staging:
Chillers shall be controlled by manufacturer-furnished chiller controller. This contractor is responsible for installing the chiller controller and providing complete control wiring for the installation.

- Chiller supply water temperature shall be maintained internally by the chiller controller.

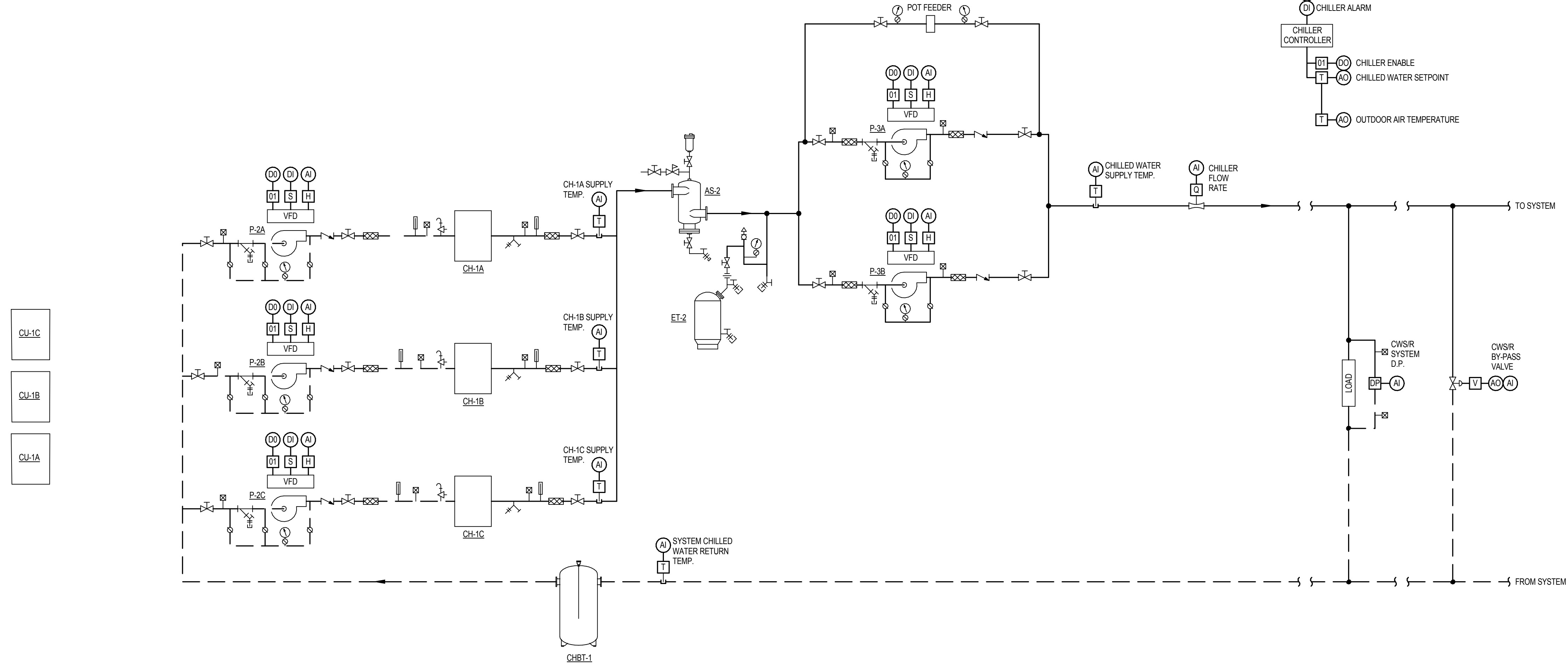
- Chiller primary pumps:**
Primary pumps shall provide constant flow to each active chiller.
- Upon a call for any chiller module to activate, the corresponding primary pump shall start.
 - Upon chiller turning off, associated pump shall shut off.
 - Provide an interlock that will prevent the chillers from operating if the chilled water pumps are off or the flow is not proven.

- Chiller Secondary / System Pumps:**
System pumps shall modulate speed based on system differential pressure, with a pressure reset schedule.
- Pumps operate as lead / lag, as follows:
 - The lead pump shall be able to be chosen through a selectable day of the week and time of day, through the BAS.
 - Coordinate with owner for scheduling switchover and frequency. Unless otherwise directed, switchover shall be 10am Tuesday.
 - In any event, the lag pump shall be commanded on if the lead pump fails.
 - Pumps shall operate only when chillers are enabled and shall receive this signal from the BAS.
 - Pumps shall operate only when any cooling coil is greater than 7% (adj) open; if all valves are closed, pumps shall be off.
 - Lead pump shall modulate speed to maintain differential setpoint.
 - Differential setpoint shall be determined by balancing contractor, but shall be a minimum of 5 psig, and a maximum of 10 psig.
 - Differential pressure shall be reset based on a trim and respond logic using a poll of all system valve positions.
 - If a valve is 99% open, a pressure request shall be sent.
 - Increase pressure setpoint by 0.1 (adj) psig every 10 (adj) minutes if there are 3 (adj) or more pressure requests, up to a maximum of 10 (adj) psi.
 - Decrease pressure setpoint by 0.1 (adj) psig every 10 (adj) minutes if there are less than 3 (adj) pressure requests down to a minimum of 5 (adj) psi.
 - Make no adjustments to pressure setpoint if there are 3 (adj) requests.

Condenser Fans:
Condensers shall be controlled by manufacturer-furnished controller. This contractor is responsible for installing the controller and providing complete control wiring for the installation.

- Condenser fans shall start, stop, and modulate to maintain load pressure.

- Alarms:**
See also alarm section in specifications.
- Alarm if any valve fails (all valves shall provide feedback on position).
 - Alarm if any load unit fails, requiring lag start-up.
 - Alarm if either chiller pump fails, or associated VFD fails / is in fault.
 - Alarm on any chiller controller alarm.
 - Alarm on any condenser controller alarm.
 - Alarm if any chiller is manually shut off.
 - Alarm if any chiller remains off 5 (adj) minutes after commanded on.



1 MODULAR CHILLER, REMOTE CONDENSER, CONTROL DIAGRAM

NOT TO SCALE

System Description:
Two boiler plant with variable primary flow and differential pressure pump operation.

Boiler Plant Enable:
Boiler plant shall be enabled when outdoor air temperature is below 60f (adj) and a minimum of 3 (adj) zones are calling for heat. When outdoor air temperature is less than 35f (adj), the plant shall be enabled with 0 calls for heat.

- Water Temperature Control:**
Water temperature control shall be set by an outdoor air reset schedule, with additional demand-based reset as follows:
- At 50f (adj) outdoor air and above, water setpoint shall be 90f (adj).
 - At -10 (adj) outdoor air and below, water setpoint shall be 140f (adj).
 - Between maximum and minimum outdoor air temperatures noted, setpoint shall be determined by a linear function between the values given.
 - A demand-based component shall be provided based on a poll of all valve positions, and allow up to 10f (adj) to be added or subtracted from the setpoint calculated based on outdoor air temperature.
 - A call for heat is generated when a valve is 99% open.
 - Every 2 minutes (adj) add 0.2f (adj) to the setpoint if there are 3 (adj) or more calls for heat.
 - Every 2 minutes (adj) subtract 0.2f (adj) from the setpoint if there are less than 3 (adj) calls for heat.
 - If there are 3 (adj) calls for heat, setpoint shall remain as determined by outdoor air reset.

Boiler Control Valve:
Each boiler shall be provided with a motorized 2-position control valve.

- Isolation valve shall be proven open prior to boiler fire.
- When boiler is de-activated, valve shall stay open for 2 (adj) minutes, and then close.
- Boiler isolation valve is controlled by boiler controller.

Boiler Staging and Firing:
Boilers shall be controlled by manufacturer-furnished boiler controller. This contractor is responsible for installing the boiler control panel and providing complete control wiring for the installation.

- Boilers operate as lead / lag, as follows:
 - The lead boiler shall be able to be chosen through a selectable day of the week and time of day, through the BAS.
 - Coordinate with owner for scheduling switchover and frequency. Unless otherwise directed, switchover shall be 10am Tuesday.
 - In any event, the lag boiler shall be commanded on if the lead boiler fails.
- The lead boiler will increase input, as required, until 50% fire rate is reached. At that point, the lag boiler shall be commanded on, and both shall run at 30% percent fire rate valve position. The two boilers will continue to increase input, together, as required to meet setpoint.
- Boiler input will modulate down in response in a reverse manner. Each boiler will come off line at the boiler stop level percentage transfer setpoint to maximize condensing. Whether the boiler controller is set in a constant temperature or modulating temperature mode, it will use its modulating ability to prevent header temperature fluctuation and maximize efficiency.

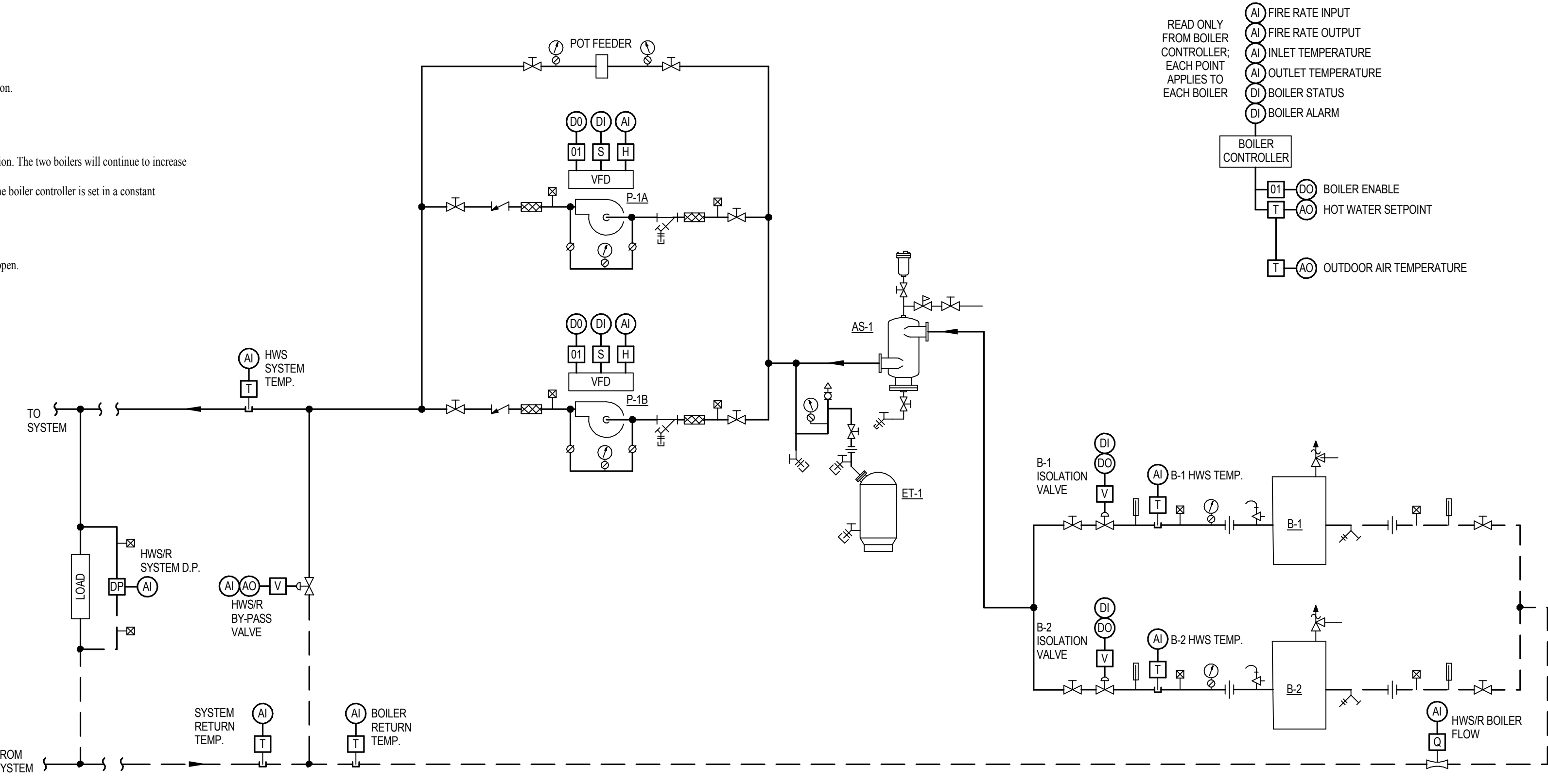
Boiler By-pass Valve:
A by-pass valve shall be provided to ensure minimum flow in the system at all times. Valve shall operate based on system flow rates as provided by the system flow meter.

- Minimum system flow rate is 15 (adj) gpm for one boiler, and 30 gpm for two boilers. Minimum flow rate shall be either of these two values, depending on quantity of isolation valves open.
- By-pass valve shall modulate open to maintain minimum flow rate (measured at the hwsr boiler flow meter).
- By-pass valve shall modulate closed as flow rate exceeds minimum.

- Boiler System Pumps:**
System pumps shall modulate speed based on system differential pressure, with a pressure reset schedule.
- Pumps operate as lead / lag, as follows:
 - The lead pump shall be able to be chosen through a selectable day of the week and time of day, through the BAS.
 - Coordinate with owner for scheduling switchover and frequency. Unless otherwise directed, switchover shall be 10am Tuesday.
 - In any event, the lag pump shall be commanded on if the lead pump fails.
 - Pumps shall operate only when boilers are enabled (operating).
 - Operational pump shall continue to run for 2 (adj) minutes after boiler stops firing.
 - Lead pump shall modulate speed to maintain differential setpoint.
 - Differential setpoint shall be determined by balancing contractor, but shall be a minimum of 5 psig, and a maximum of 10 psig.
 - Differential pressure shall be reset based on a trim and respond logic using a poll of all system valve positions.
 - If a valve is 99% open, a pressure request shall be sent.
 - Increase pressure setpoint by 0.1 (adj) psig every 10 (adj) minutes if there are 3 (adj) or more pressure requests.
 - Decrease pressure setpoint by 0.1 (adj) psig every 10 (adj) minutes if there are less than 3 (adj) pressure requests.
 - Make no adjustments to pressure setpoint if there are 3 (adj) requests.

Alarms:
See also alarm section in specifications.

- Alarm if any valve fails (all valves shall provide feedback on position).
- Alarm if any load unit fails, requiring lag start-up.
- Alarm if either boiler pump fails, or associated VFD fails / is in fault.
- Alarm on any boiler controller alarm.
- Alarm if supply water temperature remains 15f (adj) or more below setpoint for 30 (adj) minutes.
- Alarm if any boiler is manually shut off.
- Alarm if any boiler remains off 5 (adj) minutes after commanded on.



2 2-BOILER, VARIABLE PRIMARY, CONTROL DIAGRAM

NOT TO SCALE

SYMBOLOLOGY		
DIAGRAM SYMBOLOLOGY		
(A) ANALOG INPUT	◆ FREEZE STAT	⚙️ MOTORIZED DAMPER
(AO) ANALOG OUTPUT	◆ SMOKE DETECTOR	⚙️ SMOKE DAMPER
(DI) DIGITAL INPUT		
(DO) DIGITAL OUTPUT		
(D) DAMPER POSITION	(C) CONTAMINANT SENSOR	(H) VFD HERTZ / SPEED MONITOR
(V) VALVE POSITION	(F) FLOW MEASUREMENT	(S) CURRENT STATUS MONITOR
(P) DIFF. PRESSURE	(O) OCCUPANCY SENSOR	(ST) START / STOP
(F) PRESSURE	(T) TEMP. SENSOR	(FS) FLOW SWITCH
(M) MOISTURE (NRH)		
🌀 FANPUMP	↔️ 2-WAY VALVE	⚙️ VFD VARIABLE FREQUENCY DRIVE
📏 FLOW METER	↔️ 3-WAY VALVE	
	⚙️ 2-WAY CONTROL VALVE	

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the Laws of the State of Wisconsin.
ENGINEER SEAL

Signature: _____
Print Names: _____
Date: _____ License No.: _____

ISSUE	MARK	DATE	DESCRIPTION
	24	03 2017	BID SET

PROJECT NO: 2014057
PROJECT PHASE: BID SET
DRAWN BY: ALH/BTB/JTG CHECKED BY: RCA
Drawing 010 Copyright Year: 2016 © K. Saiki Design, Inc.

SPLIT SYSTEM COOLING UNITS														
EXTERIOR						INTERIOR						BOTH		
MARK	LOCATION	MANUFACTURER	MODEL	CAPACITY (NOMINAL TONS)	V@Hz	MARK	LOCATION	MANUFACTURER	MODEL	COOLING CAPACITY (NOMINAL TONS)	V@Hz	EFFICIENCY (SEER)	REFRIGERANT	NOTES
CU-2	AREA WELL	DAIKIN	PUY-A12NH46	1	208/160	EVAP-2	021 TELECOM	DAIKIN	PKA-A12HA6	1	208/160	15.2	R410A	1,2,3
CU-3	ROOF TOP	DAIKIN	PUY-A12NH46	1	208/160	EVAP-3	219 AV FOR ROOM 280	DAIKIN	PKA-A12HA6	1	208/160	15.2	R410A	1,2,3
CU-4	ROOF TOP	DAIKIN	PUY-A12NH46	1	208/160	EVAP-4	287 DATA	DAIKIN	PKA-A12HA6	1	208/160	15.2	R410A	1,2,3
CU-5	ROOF TOP	DAIKIN	PUY-A12NH46	1	208/160	EVAP-5	320 IT/ATA	DAIKIN	PKA-A12HA6	1	208/160	15.2	R410A	1,2,3
CU-6	ROOF TOP	DAIKIN	PUY-A12NH46	1	208/160	EVAP-6	309 DATA	DAIKIN	PKA-A12HA6	1	208/160	15.2	R410A	1,2,3
CU-7	ROOF TOP	DAIKIN	PUY-A36NH46	3	208/160	EVAP-7	PENTHOUSE	DAIKIN	PKA-A36KA6	3	208/160	14.0	R410A	1,2,3

- NOTES:
1. DISCONNECT BY ELECTRICAL, COORDINATE.
2. PROVIDE MANUFACTURER THERMOSTAT, MODEL PAR31MAA FOR EACH SYSTEM.
3. SLEEVE ELECTRICAL CONDUIT THROUGH WALL SEPARATELY FROM REFRIGERANT. COORDINATE WITH ELECTRICAL.

HVAC FANS															
FAN #	ROOM LOCATION	SYSTEM	AIR FLOW W (CFM)	STATIC PRESSURE (IN W.G.)	WHEEL TYPE & SIZE	RPM	V@Hz	AMPS	BACK DRAFT DAMPER	DRIVE	FAN TYPE	WEIGHT	MANUFACTURER	MODEL	NOTES
F-1	DATA 039	TRANSFER AIR	174	0.1	FORWARD CURVE	509	115/160	3.4	INTEGRAL	DIRECT	CEILING MOUNT	42	GREENHECK	CSP-A510-VG	1,2,3
F-2	DATA 148	TRANSFER AIR	199	0.1	FORWARD CURVE	542	115/160	3.4	INTEGRAL	DIRECT	CEILING MOUNT	42	GREENHECK	CSP-A510-VG	1,2,3
F-3	DATA 128	TRANSFER AIR	242	0.1	FORWARD CURVE	601	115/160	3.4	INTEGRAL	DIRECT	CEILING MOUNT	42	GREENHECK	CSP-A510-VG	1,2,3
F-4	DATA 117	TRANSFER AIR	328	0.1	FORWARD CURVE	725	115/160	3.4	INTEGRAL	DIRECT	CEILING MOUNT	42	GREENHECK	CSP-A510-VG	1,2,3
F-5	AV 208	TRANSFER AIR	168	0.1	FORWARD CURVE	503	115/160	3.4	INTEGRAL	DIRECT	CEILING MOUNT	42	GREENHECK	CSP-A510-VG	1,2,3
F-6	SWITCH GEAR 002	TRANSFER AIR	500	0.1	FORWARD CURVE	1045	115/160	3.4	INTEGRAL	DIRECT	CEILING MOUNT	42	GREENHECK	CSP-A510-VG	1,2,3

- NOTES:
1. REFER TO DETAIL FOR TYPICAL DATA/AV ROOM INSTALL.
2. PROVIDE SENSOR, PER CONTROLS SCHEMATIC, TO ACTIVATE UPON RISE IN TEMP.
3. DISCONNECT BY ELECTRICAL, COORDINATE.

SOUND ATTENUATOR																			
SAT #	LOCATION	SERVICE	TYPE	(CFM)	DYNAMIC INSERTION LOSS								FACE VELOCITY (FT/MIN)	MAXIMUM AIR PD (FT)	LENGTH (IN)	DIMENSIONS (WxH) (IN)	MANUFACTURER	MODEL	NOTES
					63	125	250	500	1000	2000	4000	8000							
SAT-1	MECHANICAL 001	AHU-1 RETURN AIR	DOUBLE ELBOW	10000	8	12	23	32	44	44	29	18	-1125	0.27	108	64x20	Vibro-Acoustics	DRED-XV-FX	1,2,3
SAT-2	MECHANICAL 001	AHU-1 SUPPLY AIR	DOUBLE ELBOW	10000	13	30	36	41	40	40	31	31	1837	0.25	169	56x14	Vibro-Acoustics	DERRED-XV-FX	1,2,3
SAT-3	MECHANICAL 001	AHU-2 RETURN AIR	STRAIGHT	10000	5	11	22	30	50	46	29	18	-1125	0.26	60	64x20	Vibro-Acoustics	RD-XV-FX	1,2,3
SAT-4	MECHANICAL 001	AHU-2 SUPPLY AIR	STRAIGHT	10000	5	6	15	30	46	39	26	16	1837	0.18	60	56x14	Vibro-Acoustics	RD-XV-FX	1,2,3
SAT-5	MECHANICAL 313	AHU-3 RETURN AIR	ELBOW	11000	7	9	17	23	38	34	25	19	-1200	0.25	72	60x22	Vibro-Acoustics	RED-XV-FX	1,2,3
SAT-6	MECHANICAL 313	AHU-3 SUPPLY AIR	ELBOW	11000	7	9	15	22	38	39	25	19	1800	0.3	84	40x22	Vibro-Acoustics	RED-XV-FX	1,2,3
SAT-7	MECHANICAL 320	AHU-4 RETURN AIR	ELBOW	11000	7	9	17	23	38	34	25	19	-1200	0.25	72	60x22	Vibro-Acoustics	RED-XV-FX	1,2,3
SAT-8	MECHANICAL 320	AHU-4 SUPPLY AIR	ELBOW	11000	7	9	15	22	38	39	25	19	1913	0.31	84	46x18	Vibro-Acoustics	RED-XV-FX	1,2,3

- NOTES:
1. CONTRACTOR/SILENCER MANUFACTURER SHALL PROVIDE ACOUSTICAL CALCULATIONS WITH PE STAMP FOR BREAKOUT/DUCT BORNE NOISE TO CERTIFY NC 30 IN THE SPACE.
2. CONTRACTOR/SILENCER MANUFACTURER SHALL PROVIDE ACOUSTICAL CALCULATIONS WITH PE STAMP TO CERTIFY THE PRESSURE DROP INCLUDING SYSTEM EFFECTS AS SCHEDULED AT THE TIME OF SUBMITTALS.
3. FOR NON-BASIS OF DESIGN PRODUCTS PROVIDED, CONTRACTOR IS FINANCIALLY RESPONSIBLE TO ENSURE THE REQUIRED NOISE CONTROL SOLUTION IS DELIVERED TO MEET NC 30 CRITERIA.

LOUVERED PENTHOUSE														
LOUVER #	SERVES	THROAT WIDTH (IN)	THROAT LENGTH (IN)	LOUVER HEIGHT (IN)	LOUVERS HIGH	CURB CAP WIDTH (IN)	CURB CAP LENGTH (IN)	THROAT FREE AREA (FT^2)	THROAT VELOCITY (FPM)	LOUVER FACE VELOCITY (FPM)	WEIGHT (LBS)	MANUFACTURER	MODEL	NOTES
LPH-2	AHU-3 OUTDOOR AIR	35	60	27	7	43	68	16.2	723	680	172	GREENHECK	WH	1,2,3,4,5
LPH-3	AHU-3 EXHAUST AIR	34	60	27	7	42	68	16.1	811	690	170	GREENHECK	WRH	1,2,3,4,5
LPH-4	AHU-4 OUTDOOR AIR	35	60	27	7	43	68	16.2	723	680	172	GREENHECK	WH	1,2,3,4,5
LPH-5	AHU-4 EXHAUST AIR	34	60	27	7	42	68	16.1	811	690	170	GREENHECK	WRH	1,2,3,4,5

- NOTES:
1. PENTHOUSE SHALL BE PROVIDED WITH MOTORIZED DAMPERS, FROM THE MANUFACTURER. COORDINATE WITH CONTROLS CONTRACTORS.
2. INTERNAL BIRD SCREEN.
3. PROVIDE MANUFACTURER CURB: 12" HIGH FOR EXHAUST, 18" HIGH FOR INTAKE.
4. HOOD AND CURB SHALL BE PROVIDED WITH MANUFACTURER INSULATION.
5. FACE VELOCITY AT MAXIMUM AHU AIRFLOW.

DUCT HEATER SCHEDULE											
UNIT #	LOCATION	AIR FLOW RATE (CFM)	EAT (F)	LAT (F)	KW	V@Hz	PRESSURE DROP	UNIT SIZE	MANUFACTURER	MODEL	NOTES
EDH-1	MECHANICAL 001	3000 CFM	-15	8	20	480/360	0.05	44X20	INDEECO	QUA	1-3
EDH-2	MECHANICAL 001	2500 CFM	-15	10	20	480/360	0.05	44X20	INDEECO	QUA	1-3
EDH-3	MECHANICAL 313	2500 CFM	-15	10	20	480/360	0.05	60X16	INDEECO	QUA	1-3
EDH-4	MECHANICAL 321	2500 CFM	-15	10	20	480/360	0.05	60X16	INDEECO	QUA	1-3

- NOTES:
1. UNIT PROVIDED BY MECHANICAL CONTRACTOR, WIRING AND DISCONNECT BY ELECTRICAL.
2. UNIT SHALL BE REMOVABLE FROM DUCT, VERTICALLY OR HORIZONTALLY.
3. PROVIDE ACCESS PANELS UPSTREAM AND DOWNSTREAM, PER SPECIFICATIONS.

FAN COIL UNIT																		
FAN COIL UNIT #	LOCATION (ROOM NO.)	SUPPLY (CFM)	MIN OA (CFM)	EXTERNAL STATIC PRESS. (IN W.G.)	V / a / Hz	AMPS	EAT (°F)	LAT (°F)	AIR PRESS. DROP IN W.G.	EWT (°F)	LWT (°F)	WATER PRESS. DROP (FT)	MBH	GPM	ROWS	MANUFACTURER	MODEL	NOTES
FCU-2	VESTIBULE 135	1426	NA	0.15	115/160	5.2	60	85.4	0.22	140	110	8.85	4	2.70	2	ENVIRO-TEC	HPP12	1,2,3,4,5
FCU-3	EQUIPMENT STORAGE 004	1426	NA	0.15	115/160	5.2	60	85.4	0.22	140	110	8.85	4	2.70	2	ENVIRO-TEC	HPP12	2,3,4,5

- NOTES:
1. FCU-2 SHALL HAVE FILTERED RETURN GRILLE. NO FILTER REQUIRED IN UNIT.
2. HOT WATER FLUID IS 100% WATER.
3. INSTALL UNIT ON ELASTOMERIC VIBRATION ISOLATION HANGERS.
4. DISCONNECT BY ELECTRICAL, COORDINATE.
5. ECM MOTORS REQUIRED.

BUFFER TANK													
BUFFER TANK #	SYSTEM	LOCATION	VOLUME (GAL)	DIMENSIONS			OPERATING WEIGHT (LBS)	OPENING (IN)	OPENING TYPE	DRAIN (IN)	MANUFACTURER	MODEL	NOTES
				DIAMETER (IN)	HEIGHT (IN)	OPERATING WEIGHT (LBS)							
CHBT-1	CHILLED WATER	MECHANICAL 009	500	42	90	5700	4	FLANGE	1.5	CE/LINE CORPORATION	V500CW84	1,2,3,4,5	

- NOTES:
1. TANK SIZE BASED ON CHILLER MANUFACTURER REQUIRED 6 GALLONS PER TON OF CAPACITY.
2. TANK SHALL INCLUDE Baffles, INTERNAL.
3. INSULATE TANK PER SPECIFICATIONS (TANK INSULATION BY MANUFACTURER IS AN ACCEPTABLE ALTERNATE IF IN COMPLIANCE WITH SPECIFICATION).
4. INCLUDE BAS TEMPERATURE PROBE.
5. HOUSEKEEPING PAD BY MECHANICAL.

HVAC PUMP															
PUMP #	LOCATION	SERVES	PUMP TYPE	DESIGN FLOW (GPM)	HEAD (FT)	FLUID	V@Hz	MOTOR		PUMP SIZE		IMPELLER (IN)	MANUFACTURER	MODEL	NOTES
								HP	RPM	SUCTION (IN)	DISCHARGE (IN)				
P-1A	MECHANICAL 001	HEATING HOT WATER	BASE-MOUNT	110	50	WATER	460/360	3	1750	2.5	2	7.25	Bell & Gossett	E-1510-2BD	1,2,3,4
P-1B	MECHANICAL 001	HEATING HOT WATER	BASE-MOUNT	110	50	WATER	460/360	3	1750	2.5	2	7.25	Bell & Gossett	E-1510-2BD	1,2,3,4
P-2A	CHILLER ROOM 009	CHILLED WATER	IN-LINE	65	12	WATER	460/360	0.5	1725	2	2	4.13	Bell & Gossett	E-90-2AAC	2,3
P-2B	CHILLER ROOM 009	CHILLED WATER	IN-LINE	65	12	WATER	460/360	0.5	1725	2	2	4.13	Bell & Gossett	E-90-2AAC	2,3
P-2C	CHILLER ROOM 009	CHILLED WATER	IN-LINE	65	12	WATER	460/360	0.5	1725	2	2	4.13	Bell & Gossett	E-90-2AAC	2,3
P-3A	CHILLER ROOM 009	CHILLED WATER	BASE-MOUNT	200	55	WATER	460/360	5	1750	2.5	2	8.25	Bell & Gossett	E-1510-2BD	1,2,3,4
P-3B	CHILLER ROOM 009	CHILLED WATER	BASE-MOUNT	200	55	WATER	460/360	5	1750	2.5	2	8.25	Bell & Gossett	E-1510-2BD	1,2,3,4

- NOTES:
1. INSTALL PUMP ON INERTIAL BASE FRAME WITH OPEN SPRING VIBRATION ISOLATION.
2. PUMP SHALL BE VARIABLE SPEED. VARIABLE SPEED DRIVE SHALL BE PROVIDED BY CONTROLS CONTRACTOR (WITH INTERNAL DISCONNECT); VFD INSTALLED BY ELECTRICAL.
3. PROVIDE GROUNDING RINGS FOR USE WITH VARIABLE DRIVES.
4. REFER TO DETAIL SW462.

BOILER														
BOILER #	MANUFACTURER	MODEL	LOCATION	INPUT MBH	OUTPUT MBH	LWT (F)	EWT (F)	FLOW RATE (GPM)	WATER-SIDE PRESSURE DROP (FT OF HEAD)	COMBUSTION INTAKE	COMBUSTION EXHAUST	ELECTRICAL	EFFICIENCY (%)	NOTES
B-2	AERCO	BMK1000	MECHANICAL 001	1000	968	140	110	90	8.10	6	6	120/180	96.8	1,2,3,4

- NOTES:
1. MECHANICAL CONTRACTOR SHALL PROVIDE ACID NEUTRALIZATION IN-LINE OF CONDENSATE DISCHARGE. PRIOR TO TERMINATION AT FLOOR DRAIN.
2. CONCRETE PAD FOR BOILERS IS BY MECHANICAL CONTRACTOR, PER SPECIFICATIONS.
3. REFER TO SPECIFICATION FOR COMBUSTION AND EXHAUST MATERIALS. ROUTE AS SHOWN ON PLAN, AND PROVIDE MANUFACTURER TERMINATION KITS.
4. DISCONNECT BY ELECTRICAL, COORDINATE.

AIR SEPARATOR									
AIR SEPARATOR #	LOCATION	SYSTEM	GPM	PRESS. DROP (FEET)	SIZE (IN)	MANUFACTURER	MODEL	NOTES	
AS-1	MECHANICAL 001	HEATING HOT WATER	140	1.6	3	SPIROTHERM	VDN-300	1,2,3,4,5	
AS-2	MECHANICAL 009	CHILLED WATER	200	1.4	4	SPIROTHERM	VDN-400	1,2,3,4,5	

- NOTES:
1. UNIT IS COMBINATION AIR ELIMINATOR AND DIRT SEPARATOR.
2. REFER TO DETAIL.
3. WITH REMOVABLE HEAD.
4. TRANSITION TO CONNECTION SIZE 12" BEFORE/AFTER UNIT.
5. THREADED OR FLANGED CONNECTION ACCEPTABLE.

MSR 710 South 2nd Street, 8th Floor
Minneapolis, Minnesota 55401-2282
Architecture 612.375.0336 tel
Interiors and 612.342.2216 fax
Urban Design www.msrdesign.com

Civil Engineering and Landscape Architects

Ken Saiki Design, Inc

303 South Peterson St
Madison, WI 53703
608.251.3600 tel

Structural Engineering, Technology, AV

KJWW

1800 Deming Way, Suite 200
Madison, WI 53713
608.253.9600 tel

MEP Engineers

Map Associates

880 Blue Geyser Road, Suite 175
Eagan, MN 55121
651.379.9120 tel

Lighting Designer

Gallina Design

30232 County 7
Chaffield, MN 55923
507.867.1628 tel

Preservation Architect

Charles Quagliana, AIA

5641 Willoughby Rd
Madison, WI 53760
608.449.9689 tel

Building Envelope Consultant

Insite Consulting Architects

115 E. Main Street, Suite 200
Madison, WI 53703
608.204.0825 tel

Fire & Code Consultant

Summit Fire Consulting

575 Minnehaha Ave. W.
St. Paul, MN 55103
651.251.1879 tel

DUCT REHEAT COIL															
MARK	AIR VALVE #	COIL SIZE (IN)	MAX AIRFLOW (CFM)	MIN AIRFLOW (CFM)	REHEAT AIRFLOW (CFM)	AIR-SIDE PRESSURE DROP (IN. W.C.)	ENTERING AIR (F)	LEAVING AIR (F)	ENTERING WATER (F)	LEAVING WATER (F)	CAPACITY (BTUH)	WATER FLOW (GPM)	FLUID	WATER-SIDE PRESSURE DROP (FOH)	NOTES
RH-1-2	AV-1-2	10X10	400	400	400	0.15	85	80	140	110	10,800	0.6	WATER	0.5	1
RH-1-3a	AV-1-3a	9X8	200	200	200	0.07	85	80	140	110	5,400	0.6	WATER	0.2	1
RH-1-3b	AV-1-3b	9X8	200	200	200	0.07	85	80	140	110	5,400	0.6	WATER	0.2	1
RH-1-3c	AV-1-3c	9X8	200	200	200	0.07	85	80	140	110	5,400	0.6	WATER	0.2	1
RH-1-37	AV-1-37	10X8	300	300	300	0.13	85	80	140	110	8,300	0.6	WATER	0.3	1
RH-1-38	AV-1-38	20X18	1100	1100	1100	0.11	85	80	140	110	30,000	2.0	WATER	0.2	1
RH-3-16A	AV-3-16a	20X12	1000	1000	1000	0.20	85	80	140	110	27,400	1.8	WATER	0.6	1
RH-3-16B	AV-3-16b	30X12	2000	2000	2000	0.52	85	80	140	110	56,900	3.8	WATER	0.6	1

NOTES:
1. REFER TO DETAIL 11M452

AIR VALVE SCHEDULE															
VAV #	LOCATION	SERVES	OCCUPIED				UNOCCUPIED				INLET SIZE	TOTAL ΔP IN W.G.	MANUFACTURER	MODEL	NOTES
			COOLING MAX (CFM)	HEATING MAX (CFM)	COOLING MIN (CFM)	HEATING MIN (CFM)	COOLING MAX (CFM)	HEATING MAX (CFM)	COOLING MIN (CFM)	HEATING MIN (CFM)					
AV-1-1	CUSTOMER SERVICE 017	017,010	100	40	40	40	100	40	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-2	LARGE CONFERENCE 013	017	400	160	160	160	400	160	0	0	8	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-3a	LARGE CONFERENCE 013	013	200	70	70	70	200	70	0	0	6	0.2	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-3b	LARGE CONFERENCE 013	013	200	70	70	70	200	70	0	0	6	0.2	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-4	FACILITIES/LAUNDRY 024	024	200	50	50	50	200	50	0	0	6	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-5	OPEN OFFICE 032	031	250	80	80	80	250	80	0	0	8	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-7	SMALL CONFERENCE 015	015	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-8	OPEN OFFICE 044	044	600	160	160	160	600	160	0	0	10	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-9	PLANNING DIRECTOR 033	033	150	55	55	55	150	55	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-11	OPEN OFFICE 032	032	660	160	160	160	660	160	0	0	10	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-12	TPP OFFICE 034	034	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-13	OPEN OFFICE 032	035	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-14	NCSIP OFFICE 036	036	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-15	CDPI OFFICE	037	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-16	OPEN OFFICE 044	040	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-17	OPEN OFFICE 044	041	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-18	BI DIRECTOR 042	042	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-19	OFFICE 043	043	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-20	OPEN OFFICE 044	044	860	225	225	225	860	225	0	0	10	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-21	MANAGER 147	147	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-22	CONTROL ROOM 141	141,140	400	100	100	100	400	100	0	0	8	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-25	OPEN OFFICE 140	140	500	120	120	120	500	120	0	0	8	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-26	M CREDIT UNION 108	108	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-28	MANAGER 143	143	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-29	MANAGER 144	144	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-30	MANAGER 145	145	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-31	TEPP DIRECTOR 152	152	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-32	MEDIUM CONFERENCE 153	153	200	65	65	65	200	65	0	0	10	0.2	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-33	CUSTOMER SERVICE 109	109	350	85	85	85	350	85	0	0	8	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-34	STAIR A 102	102	100	45	45	45	100	45	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-35	STAFF BREAK 132	132	1400	340	340	340	1400	340	0	0	14	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-36	OPEN OFFICE 130	130	85	25	25	25	85	25	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-37	MEDIUM CONFERENCE ROOM 110	110	300	85	85	85	300	85	0	0	8	0.075	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-38	CONFERENCE 111	111	1100	330	330	330	1100	330	0	0	12	0.2	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-40	OOD DIRECTOR 129	129	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-41	SMALL CONFERENCE 128	128	115	40	40	40	115	40	0	0	6	0.075	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-42	INTERVIEW 125	125	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-43	CIRCULATION 114	114	200	50	50	50	200	50	0	0	6	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-44	INTERVIEW 124	124	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-45	OFFICE 121	121	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-46	CIRCULATION 114	123	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-47	HOD DIRECTOR 120	120	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-48	INTERVIEW 122	122	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-1-49	OPEN OFFICE 118	118	200	55	55	55	200	55	0	0	6	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-1-50	OPEN OFFICE 032	046	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-1	FACILITIES STORAGE 006	006	200	55	55	55	200	55	0	0	6	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-2	UTILITY ROOM 100	020	200	40	40	40	200	40	0	0	6	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-4	CUSTOMER SERVICE 017	022	400	115	115	115	400	115	0	0	8	0.1	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-2-5	OPEN OFFICE 044	044	450	110	110	110	450	110	0	0	8	0.15	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-6	OPEN OFFICE 044	044	450	110	110	110	450	110	0	0	8	0.15	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-7	OPEN OFFICE 044	044	450	110	110	110	450	110	0	0	8	0.15	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-8	OPEN OFFICE 044	044	600	145	145	145	600	145	0	0	10	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-9	OPEN OFFICE 032	032	500	120	120	120	500	120	0	0	8	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-10	OPEN OFFICE 032	032	600	170	170	170	600	170	0	0	10	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-13	TELECOM 021	106	250	80	80	80	250	80	0	0	8	0.05	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-2-14	LARGE CONFERENCE 022	105	250	80	80	80	250	80	0	0	8	0.05	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-2-15	M CREDIT UNION 108	101	555	135	135	135	555	135	0	0	8	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-16	STAIR A 102	101	555	135	135	135	555	135	0	0	8	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-17	OPEN OFFICE 044	103	250	80	80	80	250	80	0	0	8	0.05	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-2-18	OPEN OFFICE 044	104	250	80	80	80	250	80	0	0	8	0.05	ACCUTROL	AV3142-XX-I	1,2,3,4
AV-2-19	OPEN OFFICE 118	119	40	150	150	150	40	150	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-20	OPEN OFFICE 118	118	860	210	210	210	860	210	0	0	12	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-21	OPEN OFFICE 118	118	1050	255	255	255	1050	255	0	0	12	0.15	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-22	STAFF BREAK 132	132	300	80	80	80	300	80	0	0	8	0.075	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-23	BREAKOUT VESTIBULE 133	133	855	205	205	205	855	205	0	0	10	0.2	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-24	STAFF BREAK 132	136	100	30	30	30	100	30	0	0	6	0.05	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-26	OPEN OFFICE 140	140	600	145	145	145	600	145	0	0	10	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-27	OPEN OFFICE 140	140	750	180	180	180	750	180	0	0	10	0.15	ACCUTROL	AV3142-XX-I	1,2,3
AV-2-28	MANAGER 146	146	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-3-1	MANAGER 216	216	350	85	85	85	350	85	0	0	8	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-3-2	HR SOUTH 216	217	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-3-3	OFFICE 214	215	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-3-4	OFFICE 213	214	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-3-5	OFFICE 212	213	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-3-6	OFFICE 212	212	150	40	40	40	150	40	0	0	6	0.1	ACCUTROL	AV3142-XX-I	1,2,3
AV-3-7	OFFICE 211	211	150	40	40	40									