

ADDENDUM NUMBER 2

MILWAUKEE COUNTY ZOOLOGICAL GARDENS
AQUATIC REPTILE CENTER
HVAC EQUIPMENT REPLACEMENT AND
SOLAR WATER HEATING SYSTEM ADDITION
Site #355, Bldg. #4440
10001 West Bluemound Road
Milwaukee, WI

Project Number: Z014-09475

Date of Addendum: March 28, 2012

This Addendum to the Contract Documents is issued to modify, explain or correct the original documents, dated February 29, 2012, and is hereby made part of the Contract Documents. Acknowledge receipt of this Addendum in the space provided on the Bid Form, or bid may be rejected.

SPECIFICATIONS

Section 23 05 00

1. Paragraph 2.4 SOLAR SYSTEM FOR HEATING OF THE TROPICAL FISH TANK

ADD: "(Contract 2)" Following paragraph heading.

Section 23 05 23

2. ADD new specification section 23 05 23 attached.

Section 23 05 29

3. Paragraph 1.6
ADD sub paragraph as follows: "H. Solar Panels and solar pipe supports (Contract 2)"

Section 23 05 93

4. Subparagraph 1.1, D: Delete item number 2. "Existing Equipment"
5. Paragraph 1.6: Delete Subparagraph B
6. Paragraph 3.2 EXISTING EQUIPMENT: Delete the entire paragraph

Section 23 09 14

7. Add Paragraph 2.11 as follows:
"2.11 Controls for the Tropical Fish Tank Heating
A. Provide an Caleffi iSolar 2 or approved equivalent controller to start/stop CP-3. The controller shall also open and close the actuator for the AQR control valve. Provide relays, contacts, accessories and transformers to perform the control sequence as stated in 23 09 93."

Section 23 09 93

8. Add Paragraph 3.6 as follows:
"3.6 Solar Heating for Tropical Fish Tank
A. The solar system shall operate from the solar control panel as noted in specification section 23 09 14, section 2.10. A pre-programmed differential controller with energy meter and web-interface.

- B. ST-1 and ST-2 shall store water for the tropical fish tank and shall be maintained at 85°F. The solar heating system shall provide hot water to the storage tanks. If the solar heating system cannot maintain the storage tank water temperature at 85°F then the tropical tank controller shall close the AQR valve actuator 100% and operate the HWS from the existing boilers as stated on drawing M200.
- C. The tropical fish tank controller shall send a signal to the solar heating system when CP-1 is on. The controller shall monitor ST-1 and ST-2 temperature and start CP-1 and open the AQR actuator when the temperature of ST-1 and ST-2 is 85°F. The controller shall also open the HWS control valve actuator to 100% when CP-1 is off and close it to 90% when CP-1 is on.
- D. Connect the existing tropical fish tank temperature sensor to the new tropical fish tank controller. If the existing tropical fish tank water temperature exceeds the maximum as set by the existing controls then CP-1 shall stop, the AQR control valve actuator shall close 100% and the HWS control valve actuator shall open 100%. Temperature of tropical fish tank shall be verified by the building zoo keeper or curator."

Section 23 21 13

- 9. Paragraph 2.7, Subparagraph A: Add the following manufacturers :–
Solar Hot USA.
- 10. Paragraph 2.7, Subparagraph D: Add new subparagraph as follow:-
"D. Evacuated Tube Collectors may be substituted for flat collector panels – contractor shall take the responsibility of design for the substitution."
- 11. Paragraph 2.8, Subparagraph A Add the following manufacturers:-
Lochinvar.
- 12. Paragraph 2.12, Subparagraph A: Change entire text to read as follows:-
"All piping to comply with the requirements of Hydronic Piping Heating Hot Water piping in Specification Section 23 21 13. "
- 13. Paragraph 2.12, Subparagraph B: Change entire text to read as follows
"All piping to be insulated with the requirements of Hot Water Supply Piping in Specification Section 23 07 00. All exterior piping to be protected with PVC jacket. See Specification Section 23 07 00 for PVC jacket information. "

Section 23 34 00

- 14. Change alternate bid identification from "Alternate 1" to "Alternate A".

Section 23 62 13

- 15. Subparagraph 2.1-A: Add the following Manufacturers:-
Carrier, York and McQuay.

Section 23 73 13

- 16. Subparagraph 2.1-A: Add the following Manufacturers:-
Carrier, York and McQuay.

Section 23 82 00

17. Change alternate bid identification from "Alternate 1" to "Alternate A".
18. Subparagraph 2.1-A: Add the following Manufacturers:-
Sigma Radiation.

DRAWINGS

Sheet M000

19. Add the following notes:

"CONTRACT NOTES:

Contract 1 - HVAC Equipment Replacement - The replacement of 2 existing RTU with 2 new RTU as scheduled, the replacement of 2 indoor AHU as scheduled and specified, and the replacement of 2 existing air cooled compressor and condensing units with 2 new air cooled compressor and condensing units matched for their associated indoor AHU. For all equipment noted include power, controls, ductwork, piping and supports. Alternate A is included in Contract 1.

Contract 2 - Solar Water Heating - All solar heating equipment, power and controls related to the required tropical fish tank heating equipment including but not limited to tanks, pumps, control panels, heat exchangers, piping, supports and roof curbs."

20. Add detail bubble, revise Alternate bid identification and detail notes as shown in attached sketch M1 attached to this addendum.

Sheet M100

21. Add detail bubble, revise Alternate bid identification and detail notes as shown in attached sketch M1 attached to this addendum.
22. Revise Alternate Bid A note for boundary and bid identification as shown in attached sketch M2.

Sheet M102

23. Add existing natural gas piping as shown in attached sketches M3, M4, & M5

Sheet M200

24. Relocate OA sensor and add control damper point of connection as shown in attached sketch M6.
25. Add Alternate A notes, equipment tags and detail call-outs as shown in attached sketch M7.

Sheet M201

26. Remove existing t-stats symbols in vestibule and revise Alternate 1 to Alternate A as shown in attached sketch M8.
27. Move existing Alternate A note out of boundary and add space between note at "eqpt connect". as shown in attached sketch M9.

Sheet M202

28. Add existing natural gas piping and move 1 ½" solar return pipe from mezzanine roof as shown in attached sketch M10.
29. Add existing natural gas piping and detail bubbles as shown in attached sketch M11.
30. Add existing natural gas piping and detail bubbles as shown in attached sketch M12.

Sheet M300

31. Modify the schedules as shown in attached sketches M13, M14, and M15.
32. Clarification: Solar panels shall use Detail 8, Roof Mounted Equipment Support Detail. Contractor may hang solar piping from solar panel supports as well as use Detail 7, Pipe or Duct Support on Roof Detail when support from solar panels structure is not possible.
33. Clarification: Flat Plate Heat Exchanger Schedule (Contract 2) HWX-1 is the same as HEX-1. No sketch.
34. Clarification: Flat Plate Heat Exchanger Schedule (Contract 2) add HWX-2 with the following data located in the Basement, Taco model TFP10X20-130, Tropical Water Heat, 319,680 BTU/H, 168 SQ FT, .0005 fouling factor, side A fluid is water, 32 GPM/0.4psi, 85°F EWT/ 65°F LWT, Side B fluid is water, 32 GPM/0.4psi, 60°F EWT/ 80°F LWT. HWX-2 is the same as HEX-2 on drawing M200. No sketch.

Sheet M400

35. Detail 9: Revise note to left of solar array stating '(16) 4'x8' solar collectors (256 sq. ft.) 2 arrays of 8 collectors each" to read as follows: '(16) 4'x10' solar collectors (256 sq. ft.) 2 arrays of 8 collectors each." No sketch.
36. Detail 9 Solar Loop Schematic (Drain Back) – Clarification: A BTU meter is required for the project as stated. Find BTU Meter in specification section 23 09 14 Electric Instrumentation and control devices for HVAC, 2.10, I. BTU Meter (Integral w/ controller). No sketch.
37. Packaged Rooftop Unit Schedule: Add note 3 to RTU-1 and RTU-2 remarks column. Add note 3 to the notes below the schedule to read "3. MCQUAY, YORK AND CARRIER EQUIVALENT MODELS ARE ACCEPTABLE OR APPROVED EQUIVALENT." No sketch.

End of Addendum No. 2

SECTION 23 05 23
GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 SCOPE

- A. This section includes valve specifications for all HVAC systems except where indicated under Related Work. Included are the following topics:
- B. PART 1 - GENERAL
 - 1. Scope
 - 2. Related Work
 - 3. Reference
 - 4. Quality Assurance
 - 5. Submittals
 - 6. Operation and Maintenance Data
 - 7. Design Criteria
- C. PART 2 - PRODUCTS
 - 1. Manufacturers
 - 2. Bypass Valves
 - 3. Water System Valves
 - a) Ball Valves
 - b) Swing Check Valves
 - c) Balance Valves
 - d) Drain Valves
 - e) Combination Shut-off, Check, and Balancing Valves
 - f) Water Relief Valves
 - g) Self Contained Control Valves
 - 4. Natural Gas Systems
 - a) Shut-off Valves
 - b) Gas Pressure Regulators
 - 5. Specialty Valves and Valve Accessories
 - a) Gauge Valves
 - b) Stem Extensions
- D. PART 3 - EXECUTION
 - 1. General
 - 2. Shut-off Valves
 - 3. Balancing Valves
 - 4. Calibrated Balancing Valves
 - 5. Drain Valves
 - 6. Safety Relief Valves
 - 7. Spring Loaded Check Valves
 - 8. Swing Check Valves
 - 9. Combination Shut-off, Check, and Balancing Valves
 - 10. Gas Pressure Regulators

1.2 RELATED WORK

- A. Section 23 05 15 - Piping Specialties
- B. Section 23 09 14 - Pneumatic and Electric Instrumentation and Control Devices for HVAC

1.3 REFERENCE

- A. Applicable provisions of Division 1 govern work under this section.

1.4 QUALITY ASSURANCE

- A. Refer to Division 1, General Conditions, Equals and Substitutions.

1.5 SUBMITTALS

- A. Refer to Division 1, General Conditions, Submittals.
- B. Contractors shall submit a schedule of all valves indicating type of service, dimensions, materials of construction, and pressure/temperature ratings for all valves to be used on the project. Temperature ratings specified are for continuous operation.

1.6 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.7 DESIGN CRITERIA

- A. Where valves are specified for individual mechanical services (i.e. hot water heating, steam, etc.) all valves shall be of the same manufacturer unless prior written approval is obtained from A/E.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Anvil, Armstrong, Bell & Gossett, Cash-Acme, Consolidated, Conval, Crane, Crosby, DeZurik, Durco, Fisher, Grinnell, Griswald, Hammond, Hancock, Hoffman, Illinois, Jamesbury, Keystone, Kunkle, Leslie, Lunkenheimer, Metraflex, Milwaukee, Mission, Mueller, Newco, Nexus, Nibco, Powell, RP&C, Sarco, Spence, Stockham, Taco, Tasco, Thrush-Amtrol, Vogt, Watts, or approved equal.

2.2 WATER SYSTEM VALVES

- A. All water system valves to be rated at not less than 125 psig water working pressure at 240°F unless noted otherwise.
- B. BALL VALVES:
1. 2" and smaller: Two piece bronze body; threaded or soldered ends, as appropriate to the pipe material; stainless steel or chrome plated brass/bronze ball; conventional port; glass filled teflon seat; threaded packing gland follower; blowout-proof stem; 600 psig WOG.
 2. Valve stems shall allow operators to clear insulation without interference. Provide stem extensions when valve operators interfere with pipe insulation.
 3. Apollo 70-100/200 series, Hammond 8301/8311, Milwaukee BA100/150, Nibco T/S 585-70, Stockham S206/216.
- C. SWING CHECK VALVES:
1. 2" and smaller: Class 125, bronze body, threaded or soldered ends, regrindable seat, bronze disc, threaded cap, suitable for installation in a horizontal or vertical line with flow upward.
 2. Crane 137/1342, Hammond IB912/IB940, Lunkenheimer 2144/2145, Milwaukee 509/1509, Nibco T-413-B/S-413-B, Powell 578/1825, Stockham B-309/B-319.

D. BALANCE VALVES:

1. 2" and smaller: Bronze or copper alloy body with calibrated ball, globe or venturi/valve arrangement, integral pointer and calibrated scale to register degree of valve opening, memory stop, drain tapping, threaded or soldered ends, with or without integral unions, P/T or Shraeder pressure taps with integral check valves and seals, adjustable memory stop, suitable for 200 psig water working pressure at 250°F.
2. Armstrong CBV, Bell & Gossett Circuit Setter Plus, Griswald Quickset, Illinois 6000 series, Nexus Orturi, Nibco 1710 Series, Taco Accu-Flo, Tour & Anderson STAS/STAD, Victaulic series 786/787.

E. DRAIN VALVES:

1. Use 3/4 inch ball valve with threaded hose adapter except strainer blowdown valves to be the same size as the blowdown connection.

F. WATER RELIEF VALVES:

1. Iron or bronze body, direct pressure actuated, teflon seat, stainless steel stem and spring, suitable for 125 psig water working pressure at 240° F and ASME stamped, with Btu capacity and set point as scheduled.
2. Bell & Gossett, Cash-Acme, Consolidated, Kunkle, Watts.

G. SELF CONTAINED CONTROL VALVES:

1. Cast bronze or forged brass body, actuator with integral temperature sensor and adjustment-spring balanced bellows, stainless steel spindle riding against an O-ring within the packing gland, O-ring packing gland replaceable while the system is in operation with standard tools and without any need for isolation valves, suitable for 125 psig water working pressure at 240°F. Valves to return to the open position upon failure of temperature control unit.
2. Bell & Gossett, Danfoss, Taco.

2.3 NATURAL GAS SYSTEMS

A. SHUT OFF VALVES:

1. 2" and smaller: Ball valve, bronze body, threaded ends, stainless steel ball, full or conventional port, teflon seat, blowout-proof stem, two-piece construction, suitable for 150 psig working pressure, U.L. listed for use as natural gas shut-off.
2. DeZurik, Homestead, Rockwell, Walworth.

B. GAS PRESSURE REGULATORS:

1. 2" and smaller: Cast iron body, aluminum spring and diaphragm, Nitrile diaphragm, threaded ends, 150 psi W.O.G., -20°F to 150°F.

2.4 SPECIALTY VALVES AND VALVE ACCESSORIES

A. GAUGE VALVES:

1. Water Service: Use 1/4" ball valves.

B. STEM EXTENSIONS:

1. Provide stem extensions when valve operators interfere with pipe insulation.

PART 3 - EXECUTION

3.1 GENERAL

- A. Properly align piping before installation of valves in an upright position; operators installed below the valves will not be accepted.
- B. Install valves in strict accordance with valve manufacturer's installation recommendations. Do not support weight of piping system on valve ends.
- C. Install all temperature control valves.
- D. Install all valves with the stem in the upright position. Valves may be installed with the stem in the horizontal position only where space limitations do not allow installation in an upright position or where large valves are provided with chain wheel operators. Where valves 2-1/2" and larger are located more than 12'-0" above mechanical room floors, install valve with stem in the horizontal position and provide a chain wheel operator. Valves installed with the stems down, will not be accepted.
- E. Install stem extensions when shipped loose from valve.
- F. Prior to flushing of piping systems, place all valves in the full-open position.

3.2 SHUT-OFF VALVES

- A. Install shut-off valves at all equipment, at each branch take-off from mains, and at each automatic valve for isolation or repair.
- B. WATER SYSTEM:
 - 1. Butterfly valves installed at the location of a flow sensing device are to have a memory stop.

3.3 BALANCING VALVES

- A. Provide balancing valves for all major equipment and at each major branch takeoff and at the discharge of each pump as indicated on drawings and details.

3.4 CALIBRATED BALANCING VALVES:

- A. Install where indicated on the drawings and details for balancing of hydronic systems.

3.5 DRAIN VALVES

- A. Provide drain valves for complete drainage of all systems. Locations of drain valves include low points of piping systems, equipment locations specified or detailed including reheat coils, other locations required for drainage of systems.

3.6 SAFETY RELIEF VALVES

- A. Use air pressure to clean piping prior to installation of safety relief valves.
- B. Install relief valves in locations indicated on drawings, downstream of all pressure reducing valves, and on all boilers.
- C. Install valves in the vertical position, with drain holes, including those from dip pan elbows, piped to the nearest drain.
- D. Inlet and outlet piping connecting to valves must be the same size as valve connections or larger.
- E. Vent steam safety valves to a location outside of building, in the most direct manner possible. Install drip pan elbow as detailed at first vertical rise of the vent pipe. Keep pipe between safety valve and drip pan elbow as short and straight as possible.

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Milwaukee County Zoological Gardens
Aquatic-Reptile Center HVAC Equipment Replacement

F. Support piping and drip pan elbow independently to prevent stress at connections to safety valves. Install vent pipe so that its weight does not rest on the drip pan elbow. Extend drain line from drip pan elbow and relief valve to nearest drain.

G. Pipe discharge from water system relief valves to nearest drain.

3.7 SWING CHECK VALVES

A. Provide swing check valves where specified, detailed, and at steam condensate lines where they rise at outlet of traps. In such cases, provide isolation valves to allow repair or replacement of check valve.

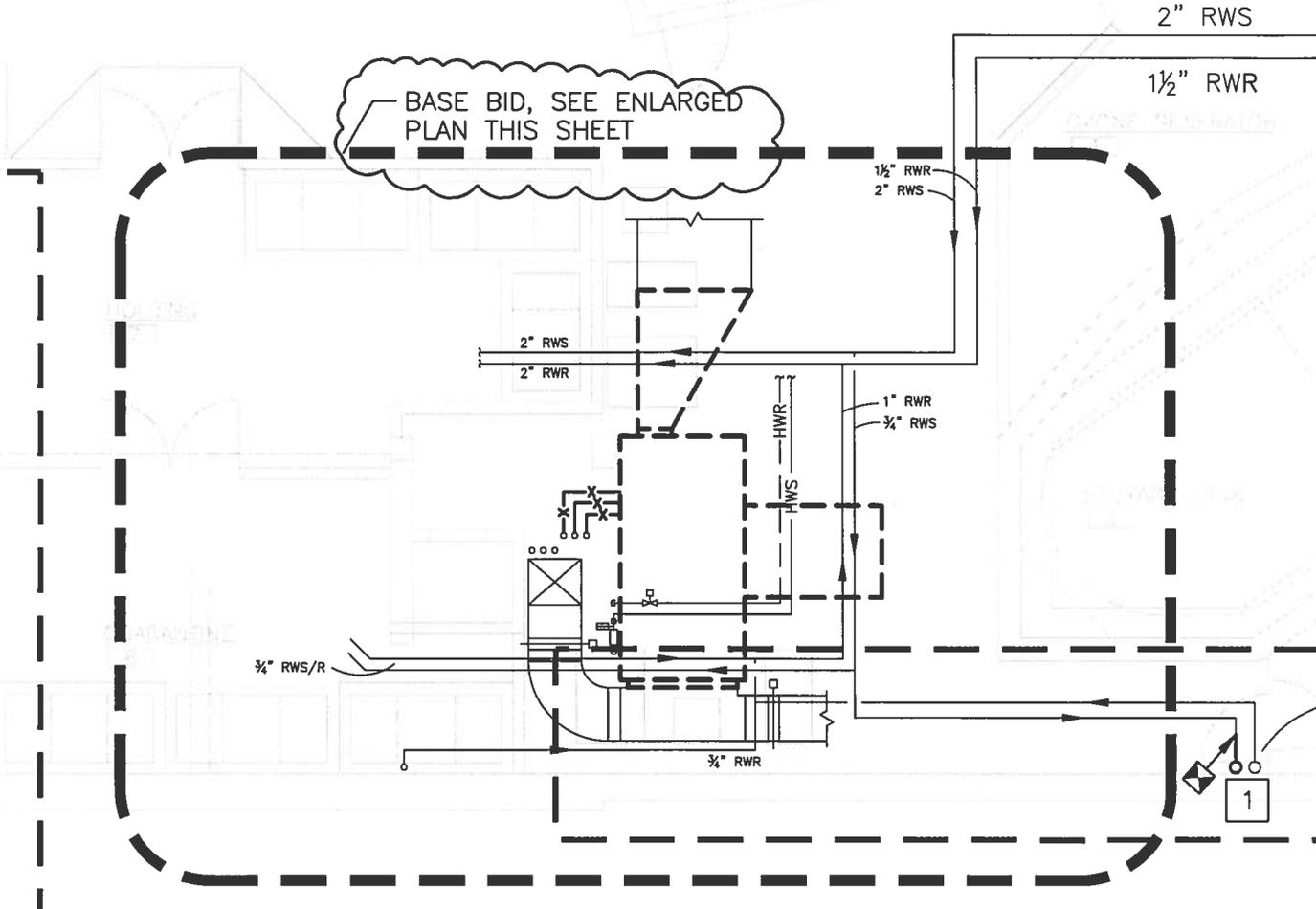
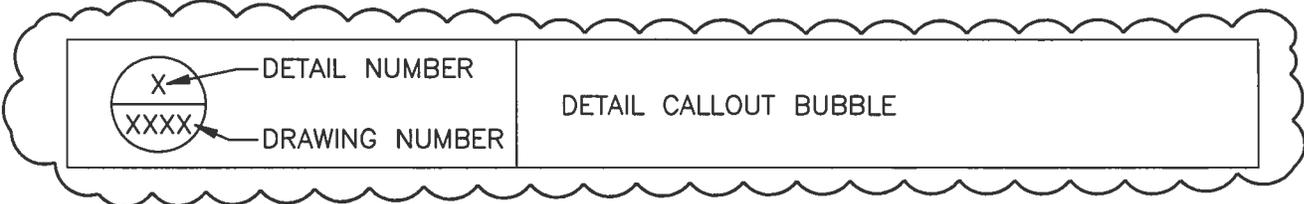
3.8 COMBINATION SHUT-OFF, CHECK, AND BALANCING VALVES

A. Contractor may use combination shut-off, check and balancing valves where separate shut-off valve, check valve, and balancing valve are specified or detailed in pump discharge piping.

3.9 GAS PRESSURE REGULATORS

A. When the gas pressure regulator is equipped with a vent connection, run a connection size vent to outside air in accordance with codes. Use a larger size vent when required by the manufacturer's installation instructions.

END OF SECTION



ALT. A KEYED NOTES - DEMOLITION

1. REMOVE 3/4" RWS UP, CAP PIPE, PATCH FLOOR TO MATCH EXIST.
2. CUT EXIST 18/10 DUCT FOR NEW CONTROL DAMPER.

BASEMENT DEMOLITION PLAN - HVAC

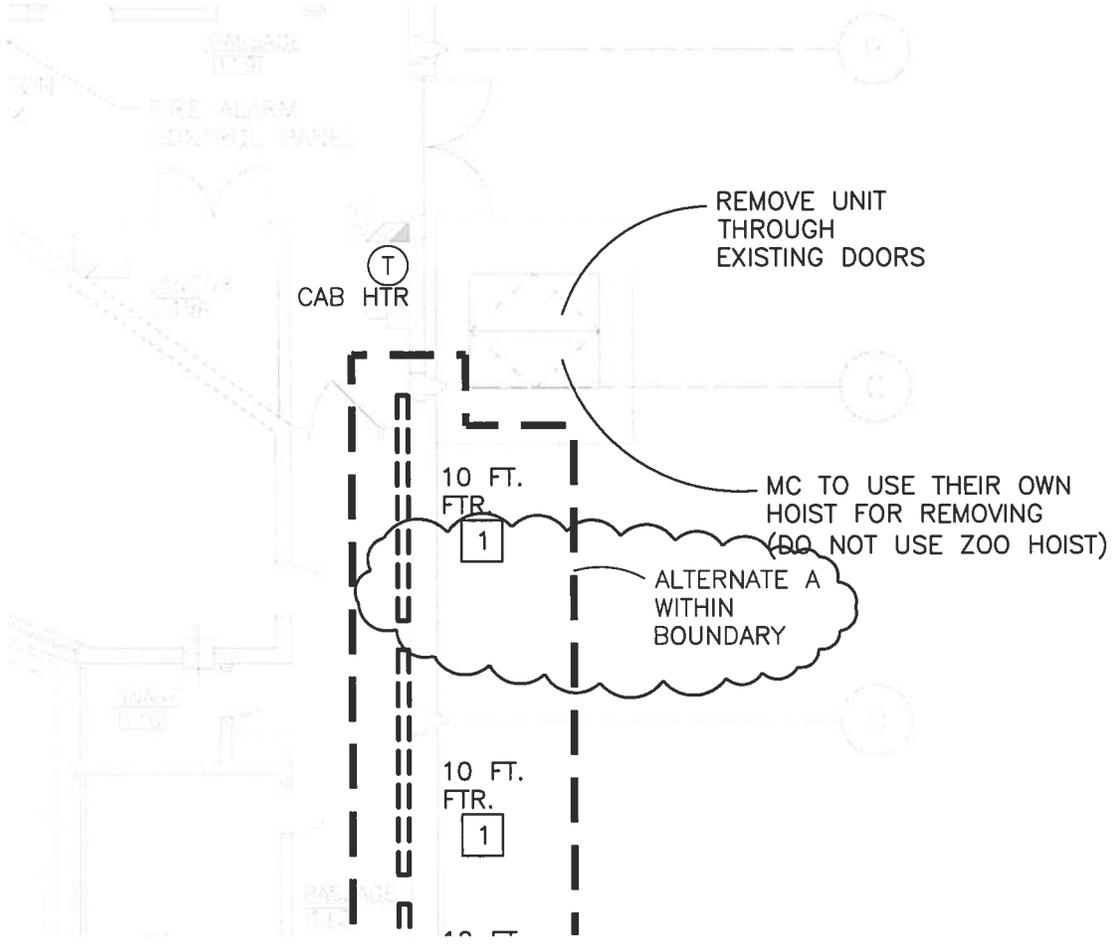


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10-022

Project: MILWAUKEE COUNTY ZOO, AQUATIC REPTILE CENTER
 HVAC EQUIPMENT REPLACEMENT
Project Number: Z014-09475 **Drawn By:** JMD
Checked By: JMD **Date:** 03/22/12 **Drawing Reference**
 Sheet No.: M000 AND M100

M1



ALT. A KEYED NOTES - DEMOLITION

1. REMOVE EXIST FTR
2. REMOVE EXIST CONTROL WIRING TO FTR

FIRST FLOOR DEMOLITION PLAN - HVAC

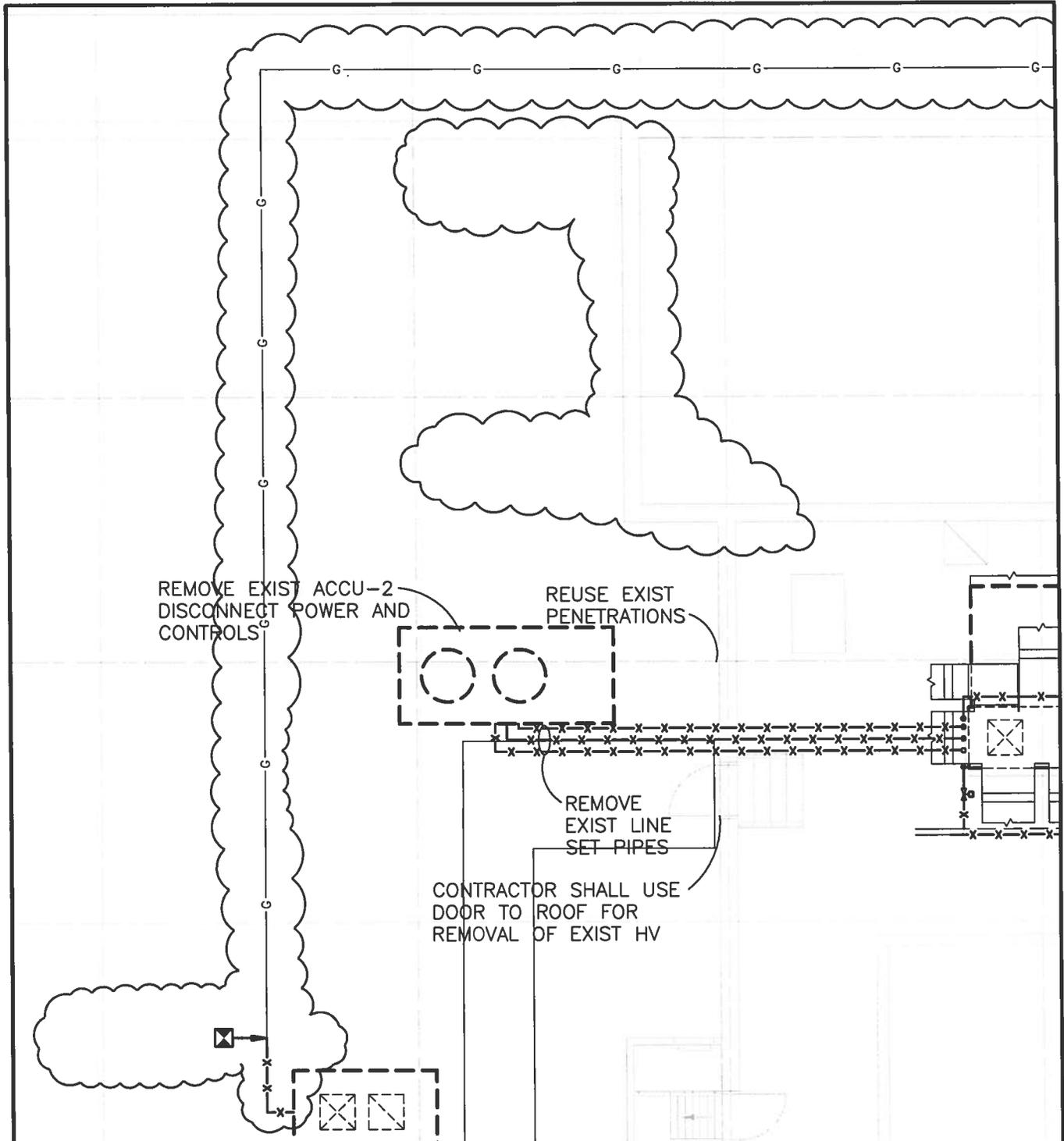


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Project Number: Z014-09475 **Drawn By:** JMD
Checked By: JMD **Date:** 03/22/12 **Drawing Reference Sheet No.:** M101

M2

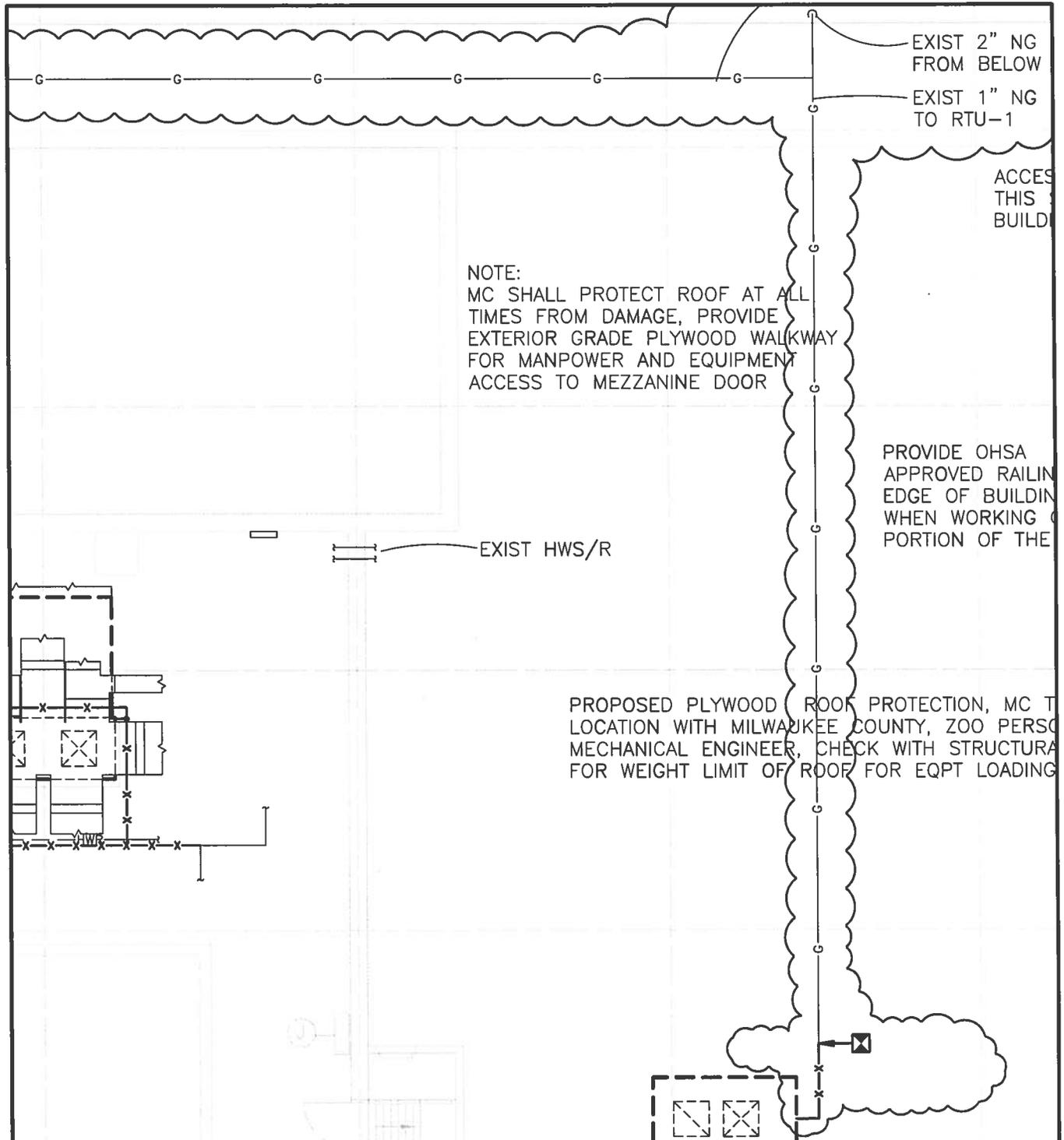


MEZZANINE DEMOLITION PLAN - HVAC




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Project Number: 2014-09475 **Drawn By:** JMD
Checked By: JMD **Date:** 03/22/12 **Drawing Reference Sheet No.:** M102



NOTE:
 MC SHALL PROTECT ROOF AT ALL
 TIMES FROM DAMAGE, PROVIDE
 EXTERIOR GRADE PLYWOOD WALKWAY
 FOR MANPOWER AND EQUIPMENT
 ACCESS TO MEZZANINE DOOR

EXIST 2" NG
 FROM BELOW
 EXIST 1" NG
 TO RTU-1

ACCES
 THIS
 BUILD

PROVIDE OSHA
 APPROVED RAILIN
 EDGE OF BUILDIN
 WHEN WORKING
 PORTION OF THE

EXIST HWS/R

PROPOSED PLYWOOD ROOF PROTECTION, MC T
 LOCATION WITH MILWAUKEE COUNTY, ZOO PERSON
 MECHANICAL ENGINEER, CHECK WITH STRUCTURA
 FOR WEIGHT LIMIT OF ROOF FOR EQPT LOADING

MEZZANINE DEMOLITION PLAN - HVAC



NORTH



TRUE NORTH

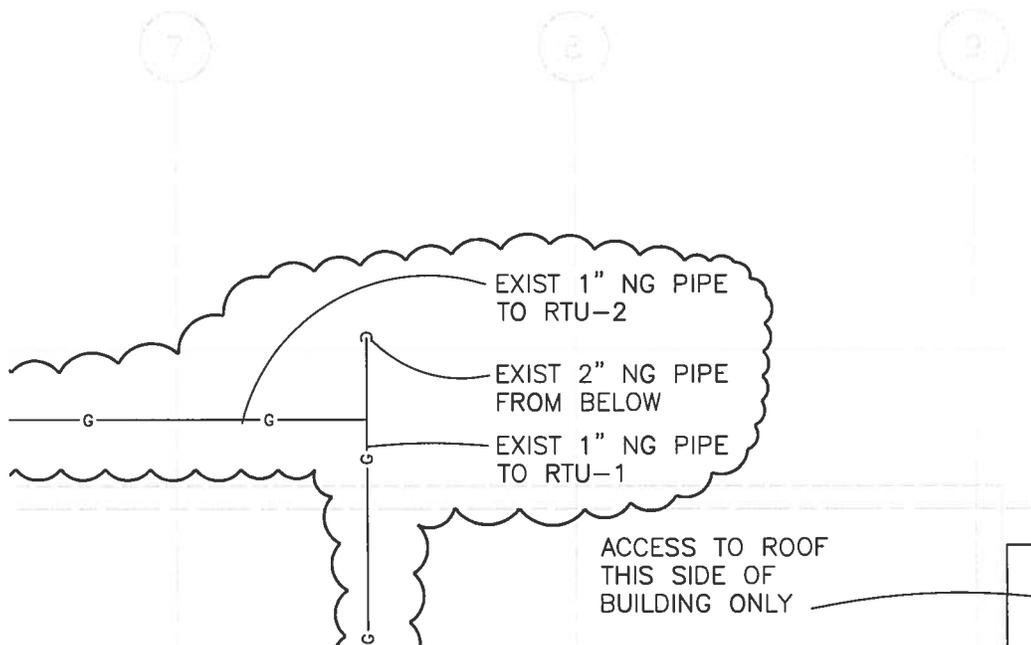
1/8" = 1'-0"
 1 INCH

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M4



KEYED NOTES - DEMOLITION

1. REMOVE EXISTING AHU-2, DISCONNECT POWER, CONTROLS, DUCTWORK AND PIPING.
2. REMOVE TWO SUPPLY AIR OUTLET DUCTS FROM AHU-2 TO PLENUM.
3. DISCONNECT LINE SETS AND HWS/R.
4. DISCONNECT CONDENSATE DRAIN.
5. DISCONNECT AHU-2 AT FILTER BOX AND RETURN DUCT.

MEZZANINE DEMOLITION PLAN - HVAC



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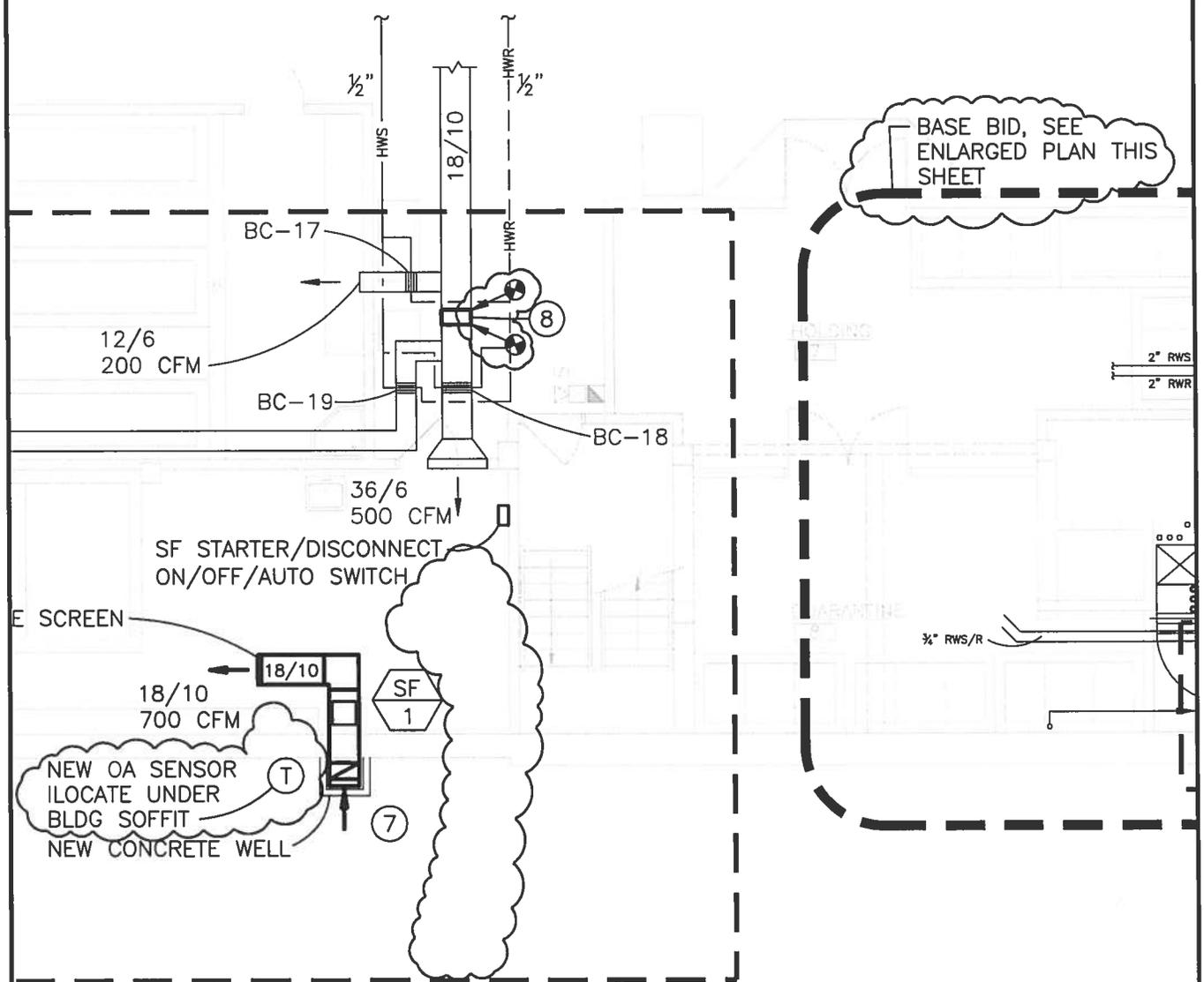
Project Number: Z014-09475 **Drawn By:** JMD

Checked By: JMD **Date:** 03/22/12 **Drawing Reference Sheet No.:** M102

M5

LAKE WISCONSIN WATER STORAGE

NOTE: (TYP ALL
RWS = RADIATIO
RWR = RADIATIO



BASE BID, SEE
ENLARGED PLAN THIS
SHEET

BASEMENT PLAN - HVAC



NORTH



TRUE NORTH

1/8" = 1'-0"



1 INCH



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Checked By: JMD	Date: 03/22/12
Drawing Reference Sheet No.: M200	

M6

ALT. A KEYED NOTES

1. CORE NEW HOLE IN FLOOR, PROVIDE NEW $\frac{3}{4}$ " RWS UP TO NEW FTR-1
2. CORE NEW HOLE IN FLOOR, PROVIDE NEW $\frac{3}{4}$ " RWR UP TO FTR-1. SEE DETAIL FOR VALVES AND CONTROLS.
3. CORE NEW HOLE IN FLOOR, PROVIDE NEW $\frac{3}{4}$ " RWS TO FTR-2
4. CORE NEW HOLE IN FLOOR, PROVIDE NEW $\frac{3}{4}$ " RWR UP TO NEW FTR-2. SEE DETAIL FOR VALVES AND CONTROLS.
5. CORE NEW HOLE IN FLOOR, PROVIDE NEW $\frac{3}{4}$ " RWS UP TO FTR-3
6. CORE NEW HOLE IN FLOOR, PROVIDE NEW $\frac{3}{4}$ " RWR UP TO FTR-3. SEE DETAIL FOR VALVES AND CONTROLS.
7. NEW FILTERED IN-TAKE HOOD, SEE DETAIL
8. PROVE NEW 18/10 CONTROL DAMPER. DAMPER IS NORMALLY OPEN, INTERLOCK TO SF-1 FOR CONTROL DAMPER. CONTROL DAMPER SHALL CLOSE WHEN SF-1 IS OPERATING. PROVIDE ON/OFF/AUTO SWITCH. WHEN OA SENSOR IS 70°F OR ABOVE, START SF-1 AND CLOSE CONTROL DAMPER.

CUT IN NEW CONTROL VALVE AND ACTUATOR. WIRE CONTROL TO SOLAR SYSTEM. CLOSE 90% WHEN SOLAR IS ON, OPEN 100% WHEN SOLAR IS OFF.

1 1/2" AQS/R, UP
SEE SHEET M201
FOR CONTINUATION

SEE DETAIL 10
ON DWG M400

TO SOLAR SYSTEM
CONTROL PANEL, ROUTE
IN CONDUIT

36"Ø x 89" HIGH
STORAGE TANKS
4" CONCRETE PAD, SIZE FOR
2 NEW TANKS, 6" ALL AROUND
AND 12" BETWEEN TANKS

BASEMENT PLAN - HVAC



NORTH TRUE NORTH

1/8" = 1'-0"



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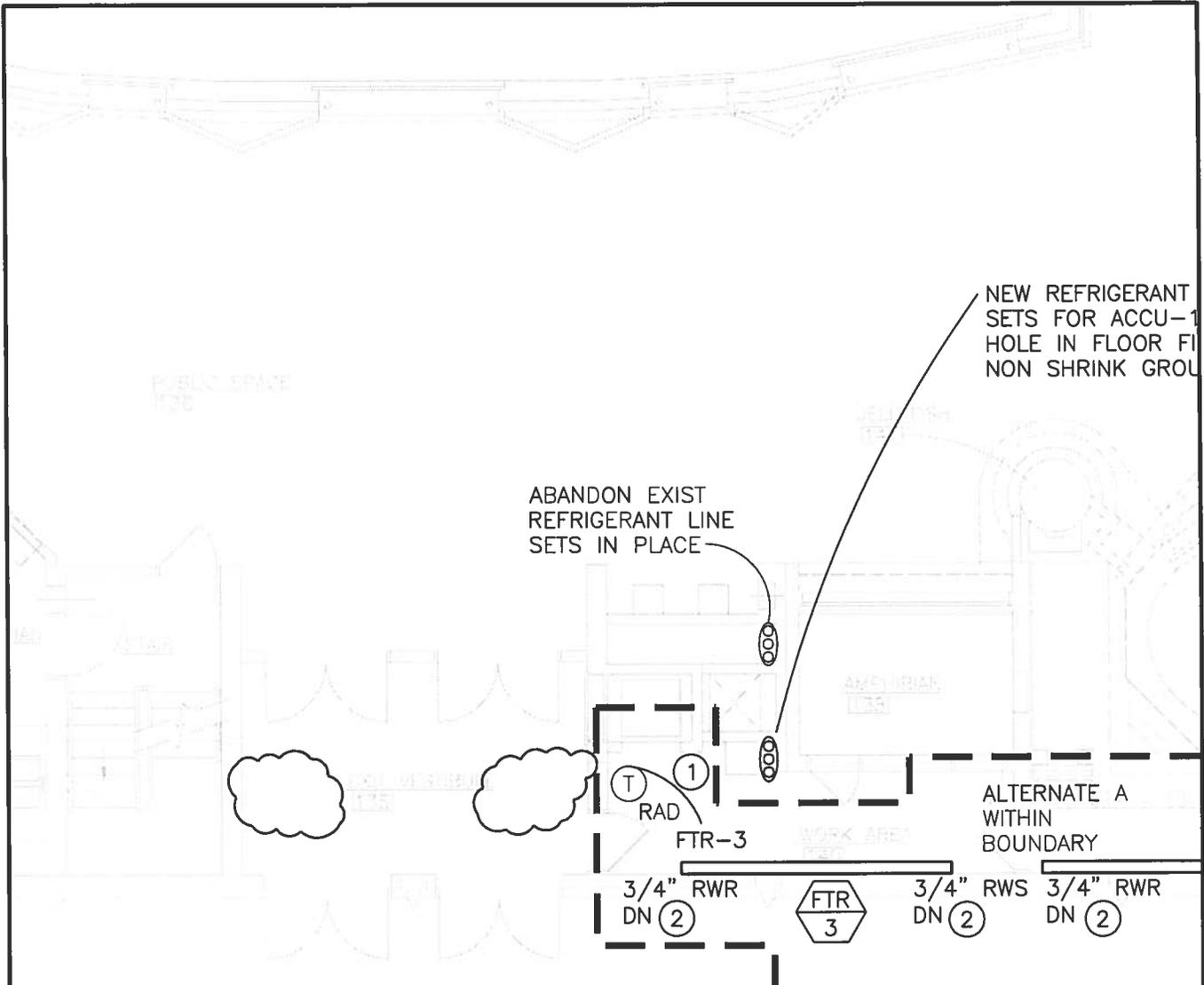
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Checked By: JMD **Date:** 03/22/12 **Drawing Reference Sheet No.:** M200

M7



ALT A KEYED NOTES

1. PROVIDE NEW CONTROL WIRING TO NEW FTR CONTROL VALVE AT EXISTING HVAC THERMOSTAT, EXISTING CONTROL DEVICES SHALL REMAIN IN SERVICE
2. CORE HOLE IN FLOOR FOR NEW PIPE

FIRST FLOOR PLAN - HVAC



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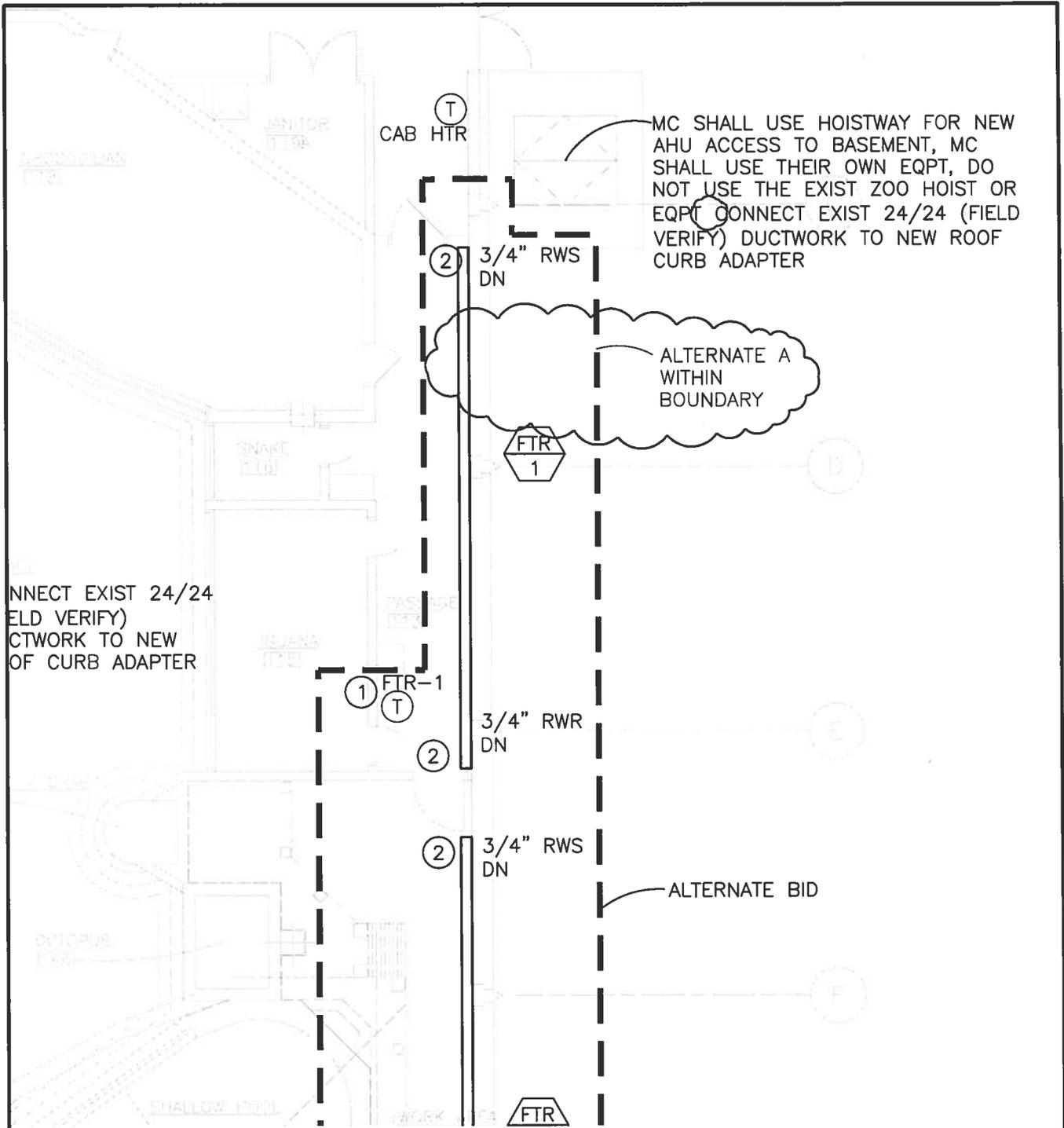
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Project Number: Z014-09475 **Drawn By:** JMD

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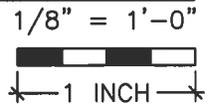
M8



FIRST FLOOR PLAN - HVAC



NORTH TRUE NORTH



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10-022

Project: MILWAUKEE COUNTY ZOO, AQUATIC REPTILE CENTER
 HVAC EQUIPMENT REPLACEMENT

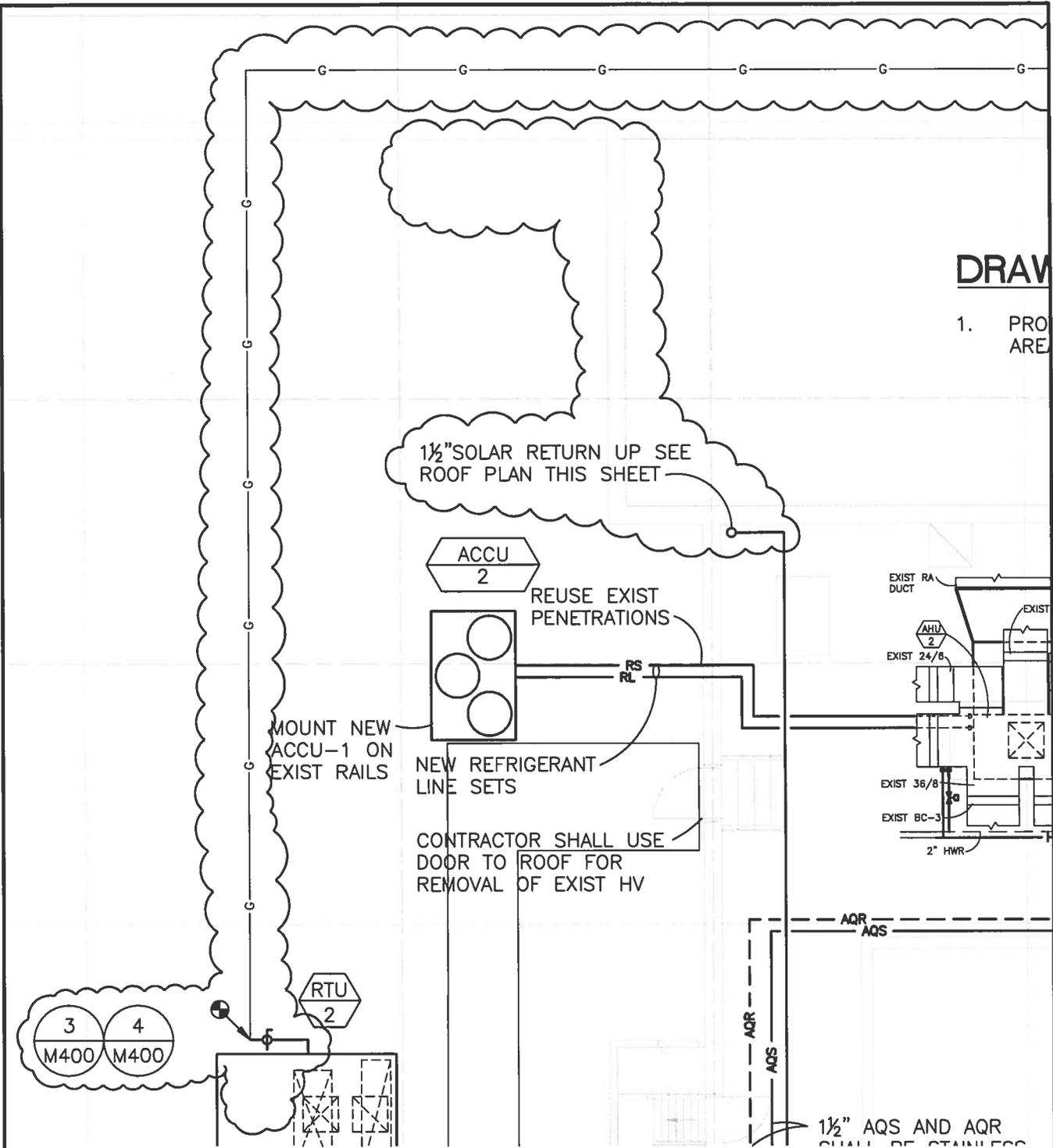
Project Number: Z014-09475 **Drawn By:** JMD

Checked By: JMD **Date:** 03/22/12 **Drawing Reference Sheet No.:** M201

M9

DRAW

1. PRO
ARE



MEZZANINE PLAN - HVAC



NORTH



TRUE NORTH

1/8" = 1'-0"



1 INCH



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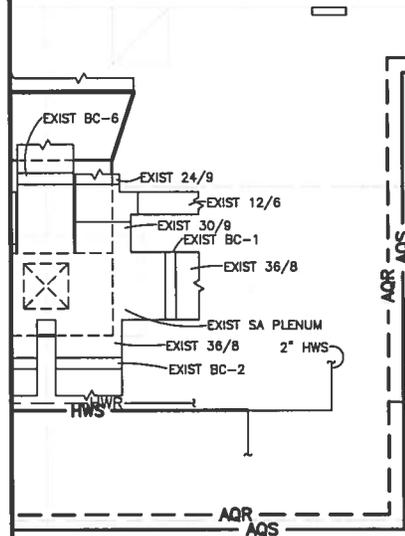
M10

DRAWING NOTES

PROTECT ROOF FROM DAMAGE IN AREAS OF CONSTRUCTION ACTIVITY.

NOTE:
MC SHALL PROTECT ROOF AT ALL TIMES FROM DAMAGE, PROVIDE EXTERIOR GRADE PLYWOOD WALKWAY FOR MANPOWER AND EQUIPMENT ACCESS TO MEZZANINE DOOR

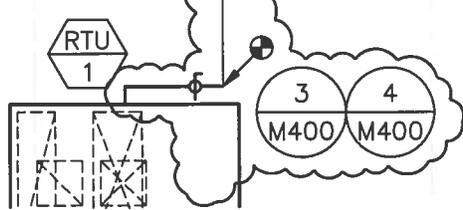
PROVIDE OSHA APPROVED RAILING EDGE OF BUILDING WHEN WORKING ON PORTION OF THE



EXIST HWS/R
1 1/2\" AQS/R DN
SEE SHEET M201 FOR CONTINUATION

PROPOSED PLYWOOD ROOF PROTECTION, MC TO LOCATION WITH MILWAUKEE COUNTY, ZOO PERSONAL MECHANICAL ENGINEER, CHECK WITH STRUCTURAL FOR WEIGHT LIMIT OF ROOF FOR EQPT LOADING

1 1/2\" AQS AND AQR SHALL BE STAINLESS STEEL PIPES



MEZZANINE PLAN - HVAC



NORTH



TRUE NORTH

1/8" = 1'-0"

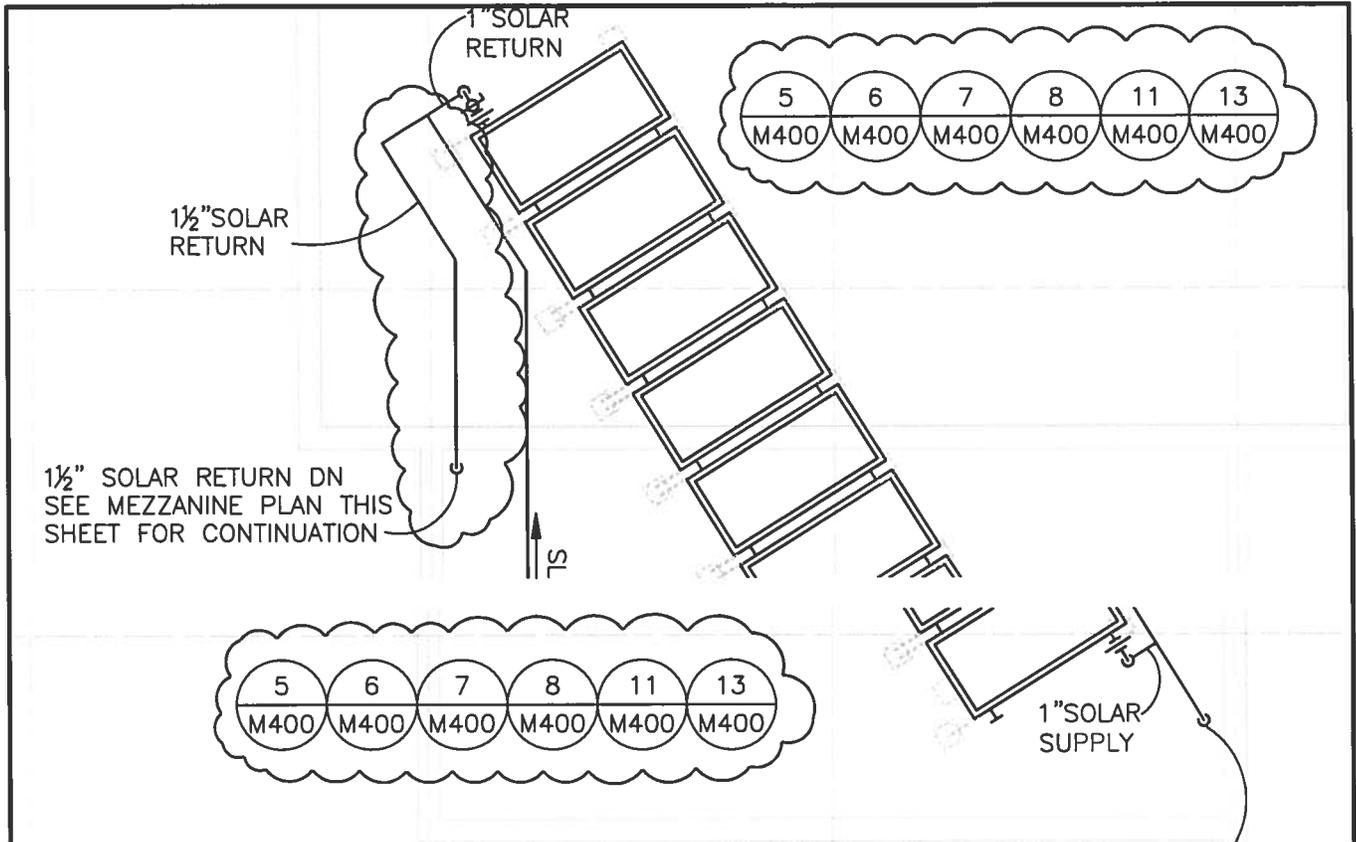


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MEZZANINE ROOF PLAN - HVAC



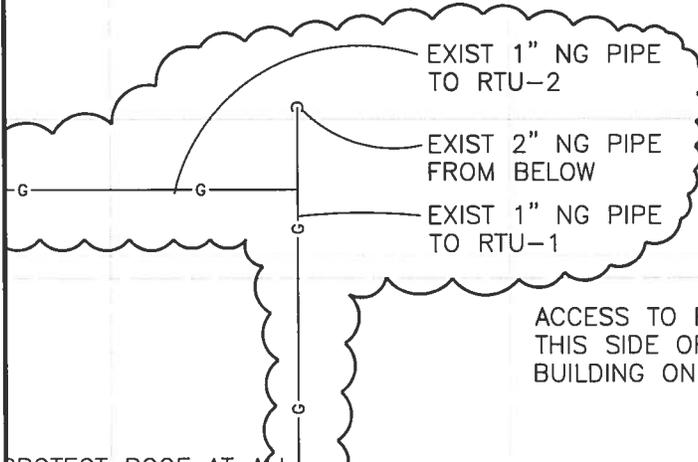
NORTH



TRUE NORTH

1/8" = 1'-0"

 1 INCH



ACCESS TO ROOF
 THIS SIDE OF
 BUILDING ONLY

MEZZANINE PLAN - HVAC



NORTH



TRUE NORTH

1/8" = 1'-0"

 1 INCH



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M12

AIR HANDLING UNIT

MARK	LOCATION	SERVICE	MIN. O.A. CFM	SUPPLY FAN				
				CFM	TYPE	NO. OF WHEELS	WHEEL DIA. INCHES	E.S.P. INCHES W.C.
AHU-1	BASEMENT	BASEMENT	3700	6000	FC	1	18	1.5
AHU-2	MEZZANINE	GROUND FLOOR	2400	7000	FC	1	18	1.5

NOTES:

1. 1643 POUNDS INSTALLED WEIGHT, ACCESS LEFT SIDE OF UNIT
2. MC SHALL BREAK AHU DOWN TO FIT THROUGH EXISTING OPENINGS, REASSEMBLE UNIT ON-SITE AND INSTALL
3. MFR UNIT IN SMALLEST SPLITS POSSIBLE

SCHEDULE

T.S.P. INCHES W.C.	HP	EQUIPMENT VOLTS/PH/Hz	AHU COILS		MANUFACTURER		REMARKS
			COOLING	HEATING	MAKE	MODEL NO.	
1.5	5	208/3/60	DX-1	HWC-1	TRANE	CSAA012	1,2,3
1.5	7.5	208/3/60	DX-2	HWC-2	TRANE	CSAA017	1,2,3



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MARK	SERVES	NOMINAL TONS	EVAPORATOR FAN		REFRIG. TYPE	EVAPORATOR COIL				MBH TOTAL	
			CFM	EXT. SP INCHES W.C.		HP	E.A.T. °F	D.B.	W.B.		L.A.T. °F
RTU-1	NORTH PUBLIC VIEWING	15	5000	0.75	3	R410A	79.8	66.5	56.26	54.77	181.5
RTU-2	SOUTH PUBLIC VIEWING	15	5000	0.75	3	R410A	79.8	66.5	56.26	54.77	181.5

NOTES: 1. PROVIDE 120V, 15 AMP CONVENIENCE OUTLET, AS SPECIFIED BY MANUFACTURER.
 2. PROVIDE GAS PRESSURE REGULATOR AT EACH RTU, SIZE PER MANUFACTURER RECOMENDATION AND FOR REQD C

PACKAGED ROOFTOP UNIT SCHEDULE

MBH TOTAL	MBH SENS.	CONDENSER		COMPRESSOR			HEATING			VOLTS/ PHASE/ HERTZ	MCA	MOCP	
		AMB. TEMP	FAN HP (EA)	QTY.	TYPE	LRA (EA)	GAS INPUT MBH	OUTPUT MBH	STAGES				TEMP RISE
181.5	131.9	95	0.5	2	SCROLL	164	250	203	1	37.4	208/3/60	74	90
181.5	131.9	95	0.5	2	SCROLL	164	250	203	1	37.4	208/3/60	74	90

REQD GAS PRESSURE

FILTERS	EFF. %	MINIMUM O.A. CFM	MANUFACTURER		REMARKS
			MAKE	MODEL NO.	
2"	65	1250	TRANE	YCDE181E	NOTES 1, 2, 2424 LB OPERATING WEIGHT
2"	65	1250	TRANE	YCDE181E	NOTES 1, 2, 2424 LB OPERATING WEIGHT



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FIN TUBE SCHEDULE (ALTERNATE A)

MAKE	TYPE	STYLE	NUMBER OF ELEMENTS	ELEM. SIZE		LOAD (BTU/LF)	WATER					MFR.		REMARKS		
				FINS	TUBES		LENGTH	MBH	EWT	LWT	EAT	GPM (FT HD)	MAKE		MODEL	
FTR-1	WALL	E3	1	32	2	1660	28	33.3	180°F	160°F	65°F	3.3	-	RITTLING	EXO	2, 3
FTR-2	WALL	E3	1	40	1	1020	SEE NOTE	49.4	180°F	160°F	65°F	4.9	-	RITTLING	EXO	1, 3, 4
FTR-3	WALL	E3	1	40	1	1020	13.5	16.1	180°F	160°F	65°F	1.6	-	RITTLING	EXO	3, 4

NOTES:
 1. TWO CABINETS ON EITHER SIDE OF THE MILLWORK, 26FT. EAST WALL, 24FT. SOUTH WALL
 2. COPPER TUBES/ALUMINUM FINS, 3/4"C-4 1/4"-4 1/4"-32, 10 1/2" HEIGHT ENCLOSURE
 3. EXPANDED 1/2" DIAMOND PATTERN STEEL BLACK
 4. COPPER TUBES/ALUMINUM FINS, 3/4"C- 4 1/4"x4 1/4"-40, 4 1/2" HEIGHT ENCLOSURE

SUPPLY FAN (ALTERNATE A)

MAKE	LOCATION	SERVICE	FAN DATA			DRIVE	TYPE	WHEEL DIA.	ESP	SONES
			CFM	RPM	BHP					
SF-1	QUARANTINE ROOM IN BASEMENT	HEATING	700	2016	0.38	BELT	INLINE	10"	0.5"	15.5

NOTES:
 1. PROVIDE INLET AND OUTLET FLEXIBLE CONNECTIONS. HANGING SPRING MOUNT, BDD, DISCONNECT, THERMOSTA

NATE A

MOTOR DATA			MANUFACTURER		REMARKS
HP	V/φ/HZ	RPM	MAKE	MODEL	
1/2"	208/1/60	1725	97	GREENHECKBSQ-80-5	1.

TAT OPERATION, SEE SEQUENCE OF OPERATION



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