NORTH CAROLINA ZOOLOGICAL PARK
SONORAN DESERT PAVILION HVAC IMPROVEMENTS

4401 ZOO PARKWAY
ASHEBORO, NORTH CAROLINA 27205

SCO ID# 18-18399-01A
CONSTRUCTION DOCUMENTS
MARCH 16, 2023

PME ENGINEER

Spring Stoops McCullen Engineering, PA
3624 Shannon Road, Suite 102
Durham, North Carolina 27707
Ph. (919) 403-8000
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STRUCTURAL ENGINEER

Gardner & McDaniel PA
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Durham, North Carolina 27717
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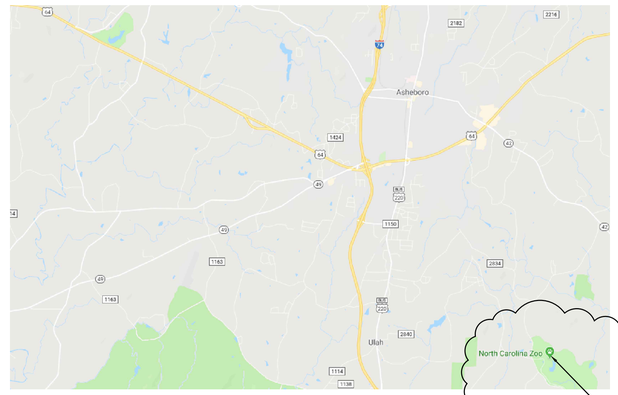
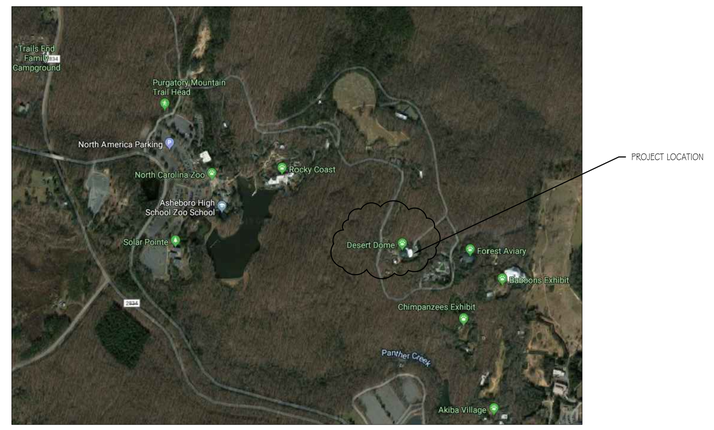
DRAWING LIST



1 AREA PLAN
SCALE: NONE



2 SITE PLAN
SCALE: NONE

BID SET

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019845 CARL A. STUPKA 3/16/23

North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

COVER SHEET

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN	CHECKED
T. PELKEY	C. STUPKA
CLIENT JOB NO.	SSME JOB NO.
--	19049

SHEET C0.01 OF SHEETS

PLOTTED: 3/16/2023 @ 12:52:15 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\19049 - C0.01.dwg

19049 – C0.01.DWG

2018 APPENDIX B
BUILDING CODE SUMMARY
FOR ALL COMMERCIAL PROJECTS
(EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES)
(Reproduce the following data on the building plans sheet 1 or 2)

Name of Project: NC ZOO SONORAN DESERT PAVILION HVAC IMPROVEMENTS
Address: 4401 ZOO PARKWAY, ASHEBORO, NC Zip Code 27205
Owner/Authorized Agent: Martin Kearns Phone # (919) 879 -7450
E-Mail: martin.kearns@nczoo.org
Owned By: ☐ City/County ☐ Private ☒ State
Code Enforcement Jurisdiction: ☐ City_____ ☐ County_____ ☒ State

CONTACT: _____

DESIGNER	FIRM NAME	LICENSE #	TELEPHONE #	E-MAIL
Architectural			( )	
Civil			( )	
Electrical	SSME	21622	(919) 403-8000	steven.mccullen@ssmepa.com
Fire Alarm	SSME	21622	(919) 403-8000	steven.mccullen@ssmepa.com
Plumbing	SSME	29035	(919) 403-8000	carl.stupka@ssmepa.com
Mechanical	SSME	29035	(919) 403-8000	carl.stupka@ssmepa.com
Sprinkler-Standpipe	SSME	29035	(919) 403-8000	carl.stupka@ssmepa.com
Structural Gardner McDaniels	Bill Easterling	028335	(919) 489-0926	bill@gmengrs.com
Retaining Walls >5' High			( )	
Other			( )	

("Others" should include firms and individuals such as truss, precast, pre-engineered, interior designers, etc.)

2018 NC CODE FOR: ☐ New Construction ☐ Addition ☒ Renovation
☐ 1st Time Interior Completion
☐ Shell/Core
☐ Phased Construction – Shell/Core
☐ Renovation

2018 NC EXISTING BUILDING CODE: ☐ **Prescriptive** ☐ Repair ☐ Chapter 14
Alteration: ☐ Level I ☐ Level II ☐ Level III
☐ Historic Property ☐ Change of Use

CONSTRUCTED:(date) 1991 ORIGINAL OCCUPANCY(S) (Ch. 3): Desert Animal Holding, Indoor Viewing, Keeper Office
RENOVATED: (date) _____ CURRENT OCCUPANCY(S) (Ch. 3): Desert Animal Holding, Indoor Viewing, Keeper Office
RISK CATEGORY (table 1604.5) Current: ☐ I ☐ II ☐ III ☐ IV
Proposed: ☐ I ☐ II ☐ III ☐ IV

BASIC BUILDING DATA
Construction Type: ☐ I-A ☐ II-A ☐ III-A ☒ IV ☐ V-A
(check all that apply) ☐ I-B ☐ II-B ☐ III-B ☐ V-B
Sprinklers: ☐ No ☒ Partial ☐ Yes ☐ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
2018 NC Administrative Code and Policies **Appendix B for Building**

Standpipes: ☐ No ☐ Yes Class ☐ I ☐ II ☐ III Wet Dry ☐
Fire District: ☒ No ☐ Yes (Primary) **Flood Hazard Area:** ☐ No ☐ Yes
Special Inspections Required: ☐ No ☐ Yes

Gross Building Area:

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	RENO/ALTER (SQ.FT)	SUB-TOTAL
6th Floor				
5th Floor				
4th Floor				
3rd Floor				
2nd Floor				
Mezzanine	966	0	0	966
1st Floor	13905	0	0	13905
Basement	1768	0	0	1768
TOTAL	16639			16639

ALLOWABLE AREA
Primary Occupancy Classification: SELECT ONE
Assembly ☒ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 Condition 1 ☐ ☐ 2
☐ 1-2 Condition 1 ☐ ☐ 2
☐ 1-3 Condition 1 ☐ ☐ 2 ☐ 3 ☐ 4 ☐ 5
☐ 1-4
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐

Accessory Occupancy Classification(s): _____
Incidental Uses (Table 509): _____
Special Uses (Chapter 4 – List Code Sections) _____
Special Provisions: (Chapter 5 – List Code Sections): _____
Mixed Occupancy: ☐ No ☐ Yes Separation: ____ Hr. Exception: _____
☐ Non-Separated Use (508.3)
The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.
☐ Separated Use (508.4) -
See below for area calculations for each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

$$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} + \cdots \leq 1$$

_____ + _____ + ... = _____ ≤ 1.00

STORY NO.	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 506.24 AREA	(C) AREA FOR FRONTAGE INCREASE1,5	(D) ALLOWABLE AREA PER STORY OR UNLIMITED2,3
1	**Mechanical Space**	**1768**			
2	**Holding, Viewing Office**	**13905**			
3	**Mezzanine**	**966**			

1 Frontage area increases from Section 506.3 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width = _____ (F)
b. Total Building Perimeter = _____ (P)
c. Ratio (F/P) = _____ (F/P)
d. W = Minimum width of public way = _____ (W)
e. Percent of frontage increase If = 100 [F/P - 0.25] x W/30 = _____ (%)
2 Unlimited area applicable under conditions of Section 507.
3 Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2).
4 The maximum area of open parking garages must comply with Table 406.5.4
5 Frontage increase is based on the unsprinklered area value in Table 506.2.

ALLOWABLE HEIGHT

	ALLOWABLE (TABLE 503)	SHOWN ON PLANS	CODE REFERENCE
Building Height in Feet (Table 504.3)			
Building Height in Stories (Table 504.4)			

1 Provide code reference if the "Shown on Plans" quantity is not based on Table 504.3 or 504.4.
2 The maximum height of air traffic control towers must comply with Table 412.3.1
3 The maximum height of open parking garages must comply with Table 406.5.4

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING REQ'D	RATING PROVIDED (W/ REDUCTION)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	DESIGN # FOR RATED PENETRATION	DESIGN # FOR RATED JOINTS
Structural Frame, including columns, girders, trusses							
Bearing Walls							
Exterior							
North							
East							
West							
South							
Interior							
Nonbearing Walls and Partitions							
Exterior walls							
North							
East							
West							
South							
Interior walls and partitions							
Floor Construction Including supporting beams and joists							
Floor Ceiling Assembly				X			
Column Supporting Floors							
Roof Construction, including supporting beams and joists							
Roof Ceiling Assembly							
Column Supporting Roof							
Shaft Enclosures - Exit							
Shaft Enclosures - Other							
Corridor Separation							
Occupancy/Fire Barrier Separation							
Party/Fire Wall Separation							
Smoke Barrier Separation							
Smoke Partition							
Tenant/Dwelling Unit/ Sleeping Unit Separation							
Incidental Use Separation							

* Indicate section number permitting reduction

PERCENTAGE OF WALL OPENING CALCULATIONS

FIRE SEPARATION DISTANCE (FEET FROM PERPERTY LINES	DEGREES OF OPENINGS PROTECTION (TABLE 705.8)	ALLOWABLE AREA (%)	ACTUAL SHOWN ON PLANS (%)

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting: ☐ No ☒ Yes
Exit Signs: ☐ No ☒ Yes
Fire Alarm: ☐ No ☒ Yes
Smoke Detection Systems: ☐ No ☒ Yes ☐ Partial _____
Carbon Monoxide Detection: ☐ No ☒ Yes

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: _____

☐ Fire and/or smoke rated wall locations (Chapter 7)
☐ Assumed and real property line locations (if not on the site plan)
☐ Exterior wall opening area with respect to distance to assumed property lines (705.8)
☐ Occupancy types for each area as it relates to occupant load calculation (Table 1004.1.2)
☐ Occupant loads for each area
☐ Exit access travel distances (1017)
☐ Common path of travel distances (1006.2.1 & 2006.3.2(1))
☐ Dead end lengths (1020.4)
☐ Clear exit widths for each exit door
☐ Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
☐ Actual occupant load for each exit door
☐ A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation and supporting construction for a fire barrier/fire partition/smoke barrier.
☐ Location of doors with panic hardware (1010.1.10)
☐ Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
☐ Location of doors with electromagnetic egress locks (1010.1.9.9)
☐ Location of doors equipped with hold-open devices
☐ Location of emergency escape windows (1030)
☐ The square footage of each fire area (202)
☐ The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
☐ Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE DWELLING UNITS
(SECTION 1107)

TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED

ACCESSIBLE PARKING
(SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES REQUIRED	TOTAL # OF PARKING SPACES PROVIDED	# OF ACCESSIBLE SPACES PROVIDED REGULAR WITH 5' ACCESS AISLE	VAN SPACES WITH 'NC ACCESS AISLE'	VAN SPACES WITH 8' ACCESS AISLE	TOTAL # ACCESSIBLE PROVIDED
TOTAL						

PLUMBING FIXTURE REQUIREMENTS
(TABLE 2902.1)

USE		WATERCLOSETS			URINALS	LAVATORIES			SHOWERS / TUBS	DRINKING FOUNTAINS	
		MALE	FEMALE	UNISEX		MALE	FEMALE	UNISEX		REGULAR	ACCESSIBLE
SPACE	EXIST'G										
	NEW										
	REQ'D										

SPECIAL APPROVALS
Special approval: (Local Jurisdiction, Department of Insurance, SCO, DPI, DHHS, ICC, etc., describe below)
_____
_____
_____

ENERGY SUMMARY

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the North Carolina Energy Conservation Code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Existing building envelope complies with code: No ☐ ☐ Yes (The remainder of this section is not applicable)
Exempt Building: No ☐ ☐ Yes (Provide Code or Statutory reference): _____
Climate Zone: ☐ 3A ☒ 4A ☐ 5A

Method of Compliance:Energy Code ☐ **Performance** ☐ Prescriptive
ASHRAE 90.1 ☐ Performance ☐ Prescriptive
(If "Other" specify source here) _____

THERMAL ENVELOPE (Prescriptive method only)

Roof/ceiling Assembly (each assembly)
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Skylights in each assembly: _____
U-Value of skylight: _____
Total square footage of skylights in each assembly: _____

Exterior Walls (each assembly)
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Openings (windows or doors with glazing)
U-Value of assembly: _____
Solar heat gain coefficient: _____
Projection factor: _____
Door R-Values: _____

Walls below grade (each assembly)
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____

Floors over unconditioned space (each assembly)
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____

Floors slab on grade
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Horizontal/Vertical requirement: _____
Slab Heated: _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
STRUCTURAL DESIGN
(PROVIDE ON THE STRUCTURAL SHEETS IF APPLICABLE)

SEE STRUCTURAL DRAWING S1.1

DESIGN LOADS:

Importance Factors: Snow (IS) _____
Seismic (IE) _____

Live Loads: Roof _____ psf
Mezzanine _____ psf
Floor _____ psf

Ground Snow Load: _____ **psf**

Wind Load: Ultimate Wind Speed _____ mph (ASCE-7)
Exposure Category _____

SEISMIC DESIGN CATEGORY: ☐ B ☐ C ☐ D
Provide the following Seismic Design Parameters:
Occupancy Category (Table 1604.5) ☐ I ☐ II ☐ III ☐ IV
Spectral Response Acceleration SS _____ %g S1 _____ %g
Site Classification (ASCE 7) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F
Data Source: ☐ Field Test ☐ Presumptive Historical Data
Basic structural system: ☐ Bearing Wall ☐ Dual w/Special Moment Frame
☐ Building Frame ☐ Dual w/Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum
Analysis Procedure: ☐ Simplified ☐ Equivalent Lateral Force ☐ Dynamic
Architectural, Mechanical, Components anchored? ☐ **Yes** ☐ **No**

LATERAL DESIGN CONTROL: Earthquake ☐ Wind ☐

SOIL BEARING CAPACITIES:
Field test (provide copy of test report) _____ psf
Presumptive Bearing capacity _____ psf
Pile size, type, and capacity _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
MECHANICAL DESIGN
(PROVIDE ON THE MECHANICAL SHEETS IF APPLICABLE)

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone
winter dry bulb: 0 Deg. F
summer dry bulb: 96 Deg. F

Interior design conditions
winter dry bulb: Staff Area 68 Deg. F. Exhibit Area 70 Deg.F.
summer dry bulb: Staff Area 75 Deg. F. Exhibit Area 85 Deg. F.
relative humidity: 40%

Building heating load: 1,140 MBH

Building cooling load: 1,692 MBH

Mechanical Spacing Conditioning System
Unitary
description of unit: _____
heating efficiency: _____
cooling efficiency: _____
size category of unit: _____
Boiler
Size category. If oversized, state reason.: (2) 1000 MBH Boilers also used to heat domestic hot water Chiller
Size category. If oversized, state reason.: (2) existing 123 Ton Air Cooled Chillers

List equipment efficiencies: Boilers are 94% Efficient
Existing Chillers Min. Full Load (EER) 10.1

2018 APPENDIX B
BUILDING CODE SUMMARY
ELECTRICAL DESIGN
(PROVIDE ON THE ELECTRICAL SHEETS IF APPLICABLE)

SEE ELECTRICAL DRAWINGS

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance: Energy Code: ☐ Prescriptive ☐ Performance
ASHRAE 90.1: ☐ Prescriptive ☐ Performance

Lighting schedule (each fixture type)
lamp type required in fixture
number of lamps in fixture
ballast type used in the fixture
number of ballasts in fixture
total wattage per fixture
total interior wattage specified vs. allowed (whole building or space by space)
total exterior wattage specified vs. allowed

Additional Efficiency Package Options
(When using the 2018 NC Code not required for ASHRAE 90.1)
☐ C406.2 More Efficient Mechanical Equipment
☐ C406.3 Reduced Lighting Power Density
☐ C406.4 Enhanced Digital Lighting Controls
☐ C406.5 On-Site Renewable Energy
☐ C406.6 Dedicated Outdoor Air System
☐ C406.7 Reduced Energy Use in Service Water Heating

NORTH CAROLINA PROFESSIONAL SEAL 029447 ENGINEER CARL A. STUPKA 3/16/2023

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North Carolina Zoo
Sonaran Desert Dome - HVAC
Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

2018 APPENDIX B
BUILDING CODE SUMMARY

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET: **BCS0.01** OF SHEETS

BID SET

PLOTTED: 3/6/2023 @ 12:51:40 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - BCS0.01.dwg

GENERAL NOTES

GENERAL

1. NOTES BELOW ARE NOT INTENDED TO REPLACE SPECIFICATIONS. SEE SPECIFICATIONS FOR REQUIREMENTS IN ADDITION TO GENERAL NOTES.
2. "U.O.N." MEANS "UNLESS OTHERWISE NOTED".
3. DESIGN LIVE LOADS: REFER TO APPENDIX B BELOW
   'MEZZANINE' FOR ACCESS PLATFORM . . . . . 60 PSF
4. MAXIMUM UNIT WEIGHTS FOR FOLLOWING MATERIALS:
   NORMAL CONCRETE NOT OTHERWISE NOTED . . . . . 150 PCF
5. ALL SAFETY REGULATIONS TO BE FOLLOWED STRICTLY. METHODS OF CONSTRUCTION AND ERECTION OF STRUCTURAL MATERIAL IS CONTRACTOR'S RESPONSIBILITY. CONSULT ARCHITECT IN CASE OF QUESTIONS.
6. STRUCTURAL FRAME TO BE BRACED UNTIL ERECTION IS COMPLETE AND PERMANENT CONNECTIONS, BRACING MEMBERS OR STEEL BRACINGS ARE INSTALLED.

STRUCTURAL STEEL

1. STRUCTURAL STEEL: ROLLED SECTIONS WF–ASTM A992 ALL OTHER A36
   PIPES – ASTM A53, TYPE E or S, GRADE B.
2. DESIGN, FABRICATION AND ERECTION: AISC SPECIFICATIONS FOR BUILDINGS.
3. FIELD CONNECTIONS: FIELD WELDED USING E70XX SERIES ELECTRODES, LOW HYDROGEN TYPE. GRIND ALL WELDS TO A NEAT APPEARANCE AND COAT WITH PRIMER PAINT SAME AS SHOP COAT. SEE SPECS.
4. WELDS SHALL BE MADE ONLY BY OPERATORS CERTIFIED BY THE STANDARD QUALIFICATION PROCEDURE OF THE AMERICAN WELDING SOCIETY FOR TYPE OF WELD REQUIRED.
5. RETURN ALL WELDS AT CORNERS TWICE THE NOMINAL SIZE OF THE WELD MINIMUM.
6. WHERE PLATES ARE FILLET WELDED TO MEMBERS AND NO WELD SIZE IS SPECIFIED PROVIDE FULL LENGTH FILLET WELDS BOTH SIDES OF PLATE. WELD SIZES SHALL BE AS FOLLOWS:

PL THICKNESS (In)	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$
WELD SIZE (In)	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$

7. ALL EXTERIOR STEEL TO BE HOT–DIPPED GALVANIZED AFTER FABRICATION ALL WELD SLAG AND GRIND AS REQUIRED FOR ACCEPTABLE APPEARANCE.

EXISTING CONDITIONS AND COORDINATION

1. REMOVE EXISTING EQUIPMENT AND MATERIALS AS DIRECTED BY OWNER. TRAFFIC INTO AND FROM THE WORK AREA SHALL BE COORDINATED WITH THE OWNER.
2. PROVIDE PROTECTION FOR ALL FINISHES TO REMAIN. REPAIR ANY DAMAGE AS DIRECTED BY THE OWNER.
3. CONTRACTOR SHALL TAKE ALL FIELD DIMENSIONS AND ELEVATIONS AS NECESSARY TO VERIFY THE EXISTING CONDITIONS SHOWN. THE RESPONSIBILTY OF ALL FIELD DIMENSIONS IS THE CONTRACTOR'S. CONTROL POINTS FOR ERECTION OF STRUCTURAL COMPONENTS SHALL BE ESTABLISHED AND MAINTAINED FOR THE DURATION OF THE PROJECT.
4. COORDINATE LOCATION OF EXISTING UTILITIES, IF ANY, WITH ON–SITE PERSONNEL.

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
STRUCTURAL DESIGN
(PROVIDE ON THE STRUCTURAL SHEETS IF APPLICABLE)

DESIGN LOADS:

Importance Factors: Snow (IS) 1.1
Seismic (IE) 1.25

Live Loads: Roof 20 psf
Mezzanine 60 psf
Floor 100 psf

Ground Snow Load: 15 psf

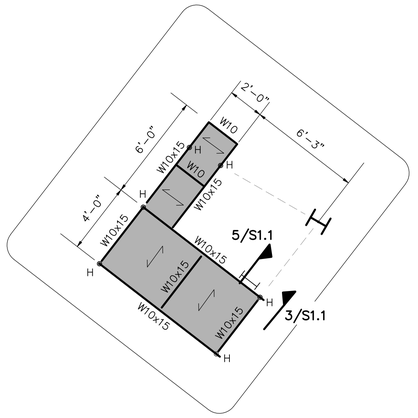
Wind Load: Ultimate Wind Speed 120 mph (ASCE-7)
Exposure Category B

SEISMIC DESIGN CATEGORY: ☐ A ☒ B ☐ C ☐ D

Provide the following Seismic Design Parameters:
Risk Category (Table 1604.5) ☐ I ☐ II ☒ III ☐ IV
Spectral Response Acceleration SS 19 %g S1 9 %g
Site Classification (ASCE 7) A☐ ☐ B ☒ C ☐ D ☐ E ☐ F
Data Source: ☒ Field Test ☐ Presumptive ☐ Historical Data
Basic structural system ☐ Bearing Wall ☐ Dual w/Special Moment Frame
☒ Building Frame ☐ Dual w/Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum
Analysis Procedure: ☐ Simplified ☒ Equivalent Lateral Force ☐ Dynamic
Architectural, Mechanical, Components anchored? ☐ Yes ☒ No

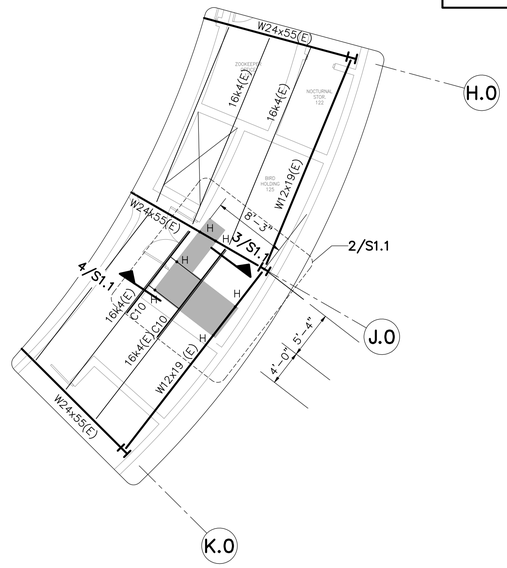
LATERAL DESIGN CONTROL: Earthquake ☒ Wind ☐

SOIL BEARING CAPACITIES:
Field Test (provide copy of test report) 3000 psf
Presumptive Bearing capacity _____ psf
Pile size, type, and capacity _____



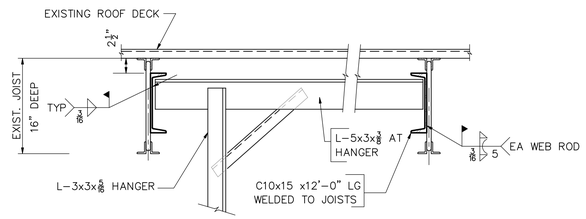
2 FRAMING PLAN MECHANICAL ACCESS PLATFORM 1/4"=1'-0"

NOTES:
1. FIELD VERIFY LOCATION, GEOMETRY, ELEVATIONS OF EXIST. FRAMING
2. TOP OF PLATFORM ELEVATION +10'–0" ABOVE FINISH FLOOR
3. BAR GRATING – WELDED HOT–DIPPED GALVANIZED BAR GRATING WITH $1\frac{1}{2}$x$\frac{3}{16}$ BEARING BARS $1\frac{1}{4}$" O.C. AND $\frac{1}{2}$"ø CROSS BARS AT 4" O.C. PROVIDE STANDARD ATTACHMENT CLIPS TO ANCHOR GRATING TO BEAMS. SPACE CLIPS 24" O.C. MINIMUM OF 2 PER PANEL.
4. 'H' DENOTES LOCATION OF L–3x3x$\frac{3}{16}$ HANGER SUSPENSION FROM EXISTING ROOF FRAMING. SEE DETAILS FOR MORE INFO.
5. W10 DENOTES W10x15 U.O.N.



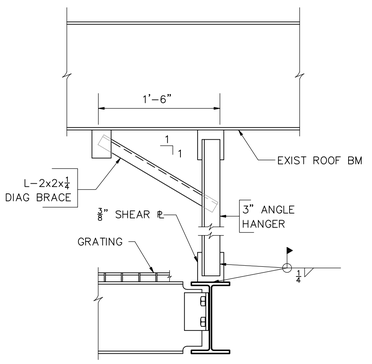
1 FRAMING PLAN EXISTING ROOF FRAMING 1/8"=1'-0"

NOTES:
1. FIELD VERIFY LOCATION, GEOMETRY, ELEVATIONS OF EXIST. FRAMING
2. 'H' DENOTES LOCATION OF L–3x3x$\frac{3}{16}$ HANGER SUSPENSION FROM EXISTING ROOF FRAMING. SEE DETAILS FOR MORE INFO.
3. 'C10' DENOTES LOCATION OF C10x15 CHANNEL REINFORCEMENT WELDED TO BAR JOISTS. REFER TO 4/S1.1 FOR INFO

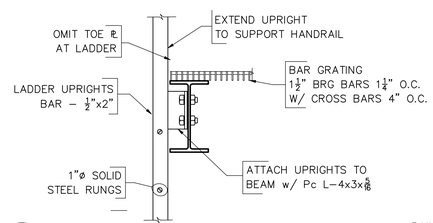


4 SECTION HANGER CONNECTION AT BAR JOISTS SUPPORTING MECH. PLATFORM NO SCALE

1. SEE MECH. FOR LAYOUT/ LOCATION OF ALL DUCT OPENINGS

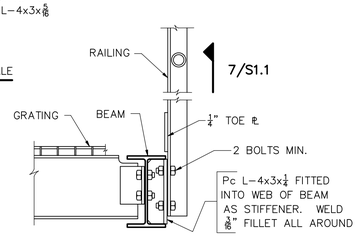


3 SECTION HANGER CONNECTION TO ROOF BM NO SCALE



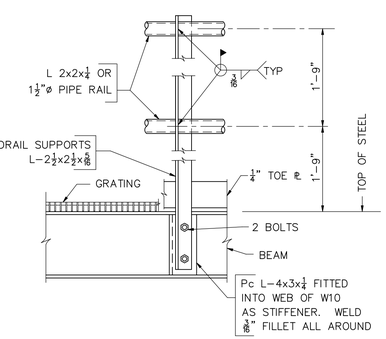
5 SECTION AT LADDER NO SCALE

NOTE: EXTEND LADDER TO GRADE BELOW
REFER TO MECHANICAL REQUIREMENTS FOR LOCATION.

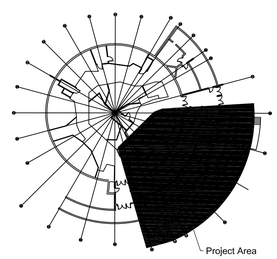


6 SECTION AT RAIL BRACKET NO SCALE

NOTES:
1. GRATING – "BUSTIN" TYPE H1 WITH $1\frac{1}{2}$x$\frac{3}{16}$ BEARING BARS @ $1\frac{3}{16}$" O.C. AND $\frac{1}{2}$"ø CROSS BARS AT 4" O.C. HOT–DIPPED GALVANIZED.
2. ANCHOR GRATING TO SUPPORTS WITH GALVANIZED CLIPS FURNISHED BY THE MANUFACTURER.
3. GRATING SHALL BE FURNISHED IN PANELS THAT DO NOT EXCEED 120 LBS PER PANEL.
4. GRATING SHALL BE FULLY BANDED.



7 SECTION RAIL DETAILS NO SCALE



KEY PLAN - LOWER & MAIN LEVEL
NO SCALE

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SCO ID# 18-18399-01

FRAMING PLAN
DETAILS AND SECTIONS
GENERAL NOTES

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: SKE	CHECKED: WTE
CLIENT JOB NO.	SSME JOB NO. 19049
SHEET S1.1 OF SHEETS	

MECHANICAL SYMBOL SCHEDULE

SYMBOL	DESCRIPTION
	EXISTING DUCTWORK TO REMAIN
	NEW DUCTWORK (SHADED)
	EXISTING DUCTWORK TO BE REMOVED
	FLEXIBLE DUCTWORK
	DUCT TRANSITION
	SQUARE TO ROUND TRANSITION
	RECTANGULAR BRANCH FITTING
	ROUND BRANCH FITTING
BD	BALANCING DAMPER
FD	FIRE DAMPER
FSD	COMBINATION FIRE SMOKE DAMPER
SD	SMOKE DAMPER
WxD	RECTANGULAR DUCT DIMENSIONS (INSIDE)
Dia.'Ø	ROUND DUCT DIAMETER DIMENSION
	SUPPLY AIR DIFFUSER
	RETURN AIR GRILLE OR REGISTER
	EXHAUST AIR GRILLE OR REGISTER
X XXX	SUPPLY DIFFUSER TAG
X XXX	RETURN OR EXHAUST GRILLE TAG
	POINT OF DEMOLITION TERMINATION
	POINT OF CONNECTION TO EXISTING
T	THERMOSTAT - MOUNT 4'-0" A.F.F.
H	HUMIDITY SENSOR - MOUNT 4'-0" A.F.F.
SD	DUCT MOUNTED SMOKE DETECTOR BY E.C.
ES	EMERGENCY STOP SWITCH
(E)	EXISTING (MODIFIER)
SA	SUPPLY AIR DUCT
RA	RETURN AIR DUCT
EA	EXHAUST AIR DUCT
HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
AHU	AIR HANDLING UNIT
RHC	REHEAT COIL
	CONTROL VALVE
	CHECK VALVE
	BALANCING VALVE
	BUTTERFLY VALVE
	BALL VALVE
	PRESSURE GAUGE
	BALANCING VALVE
	THERMOMETER
	UNION
	SHUT-OFF VALVE
	STRAINER W/ BLOW DOWN VALVE
	DUCT ACCESS DOOR
	COLD WATER

PROJECT PHASING NOTES

1. PHASE 1 - PROVIDE PACKAGED TEMPORARY BOILER WITH PUMP SYSTEM TO BE LOCATED OUTSIDE, ADJACENT TO THE EXISTING BOILER ROOM. BOILER SHALL BE 1000 MBH LP GAS FIRED WITH DISTRIBUTION HOT WATER PUMP 160 GPM AT 90 FT. HD. PROVIDE VENTING, TRIM AND ACCESSORIES. KEEP VENTING 10 FT. FROM ANY OUTSIDE AIR INTAKES. PROVIDE 4" HWS AND HWR PIPING AND CONNECT TO EXISTING DISTRIBUTION SYSTEM WITHIN THE BOILER ROOM.
2. PHASE 1 INCLUDES THE REPLACEMENT OF THE BOILERS, AND THE REPLACEMENT OF AIR HANDLING UNITS AHU-2 AND AHU-3, INSTALLATION OF RAF-2, INCLUDING REHEAT COILS RH-1 - 10 AND RH-14 AND 15.
3. PHASE 1 - PROVIDE 11900 CFM PACKAGED TEMPORARY 100 MBH LP GAS FIRED UNIT WITH 4 TON DX COOLING TO SERVE THE JAGURUNDI AND OCELOT HABITAT.
4. PHASE 2 SHALL INVOLVE THE REPLACEMENT OF REHEAT COILS RH-11,RH-12 AND RH-13 IN THE JAGURUNDI AND OCELOT HABITAT.

MECHANICAL GENERAL NOTES

1. ALL DUCTWORK, PIPING AND EQUIPMENT SHALL BE RIGIDLY SUPPORTED FROM THE BUILDING STRUCTURE BY MEANS OF APPROVED HANGERS AND SUPPORTS.
2. DUCTWORK AND PIPING LAYOUTS AND LOCATIONS ARE SCHEMATIC. DO NOT SCALE THESE DRAWINGS. ROUTE ALL DUCTWORK AS HIGH AS POSSIBLE. EXACT ROUTING OF ALL DUCTWORK SHALL BE DETERMINED IN THE FIELD.
3. ALL MECHANICAL WORK SHALL COMPLY WITH THE NORTH CAROLINA STATE MECHANICAL CODE, NFPA AND ADA REQUIREMENTS.
4. ALL AIR AND WATER SYSTEMS SHALL BE BALANCED USING PROCEDURES SET FORTH BY THE ASSOCIATED AIR BALANCE COUNCIL (AABC). SUBMIT CERTIFIED BALANCE REPORT TO THE ENGINEER FOR EVALUATION AND APPROVAL PRIOR TO FINAL ACCEPTANCE OF THE PROJECT. AIR DEVICES SHALL BE BALANCED TO WITHIN TEN (10) PERCENT OF SYSTEM DESIGN AIR QUANTITY.
5. THE MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL AUTOMATIC TEMPERATURE CONTROL SYSTEM COMPONENTS AS REQUIRED FOR PROPER OPERATION OF EACH PIECE OF EQUIPMENT AND SYSTEMS. CONTROLS SHALL INCLUDE BUT ARE NOT LIMITED TO THERMOSTATS, CONTROLLERS, WIRING, RACEWAY, SENSORS, ACTUATORS, PROGRAMMING, AND GRAPHICS.
6. MOUNT ALL NEW THERMOSTATS AND HUMIDITY SENSORS AT MAXIMUM OF 4'-0" ABOVE FINISHED FLOOR (A.F.F.).
7. ALL ELECTRICAL CONDUIT, WIRE, AND NECESSARY CONNECTIONS RELATING TO MECHANICAL EQUIPMENT CONTROLS AND ALL WIRING ASSOCIATED WITH STARTER HOLDING COILS, SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR. ALL WIRING SHALL BE CONCEALED ABOVE CEILINGS AND BEHIND WALLS.

AHU REPLACEMENT NOTES

1. DEMOLITION
   a) REMOVE AND DISPOSE OF EXISTING AIR HANDLING UNIT, DISCONNECT AND REMOVE EXISTING ELECTRICAL POWER WIRING AND CONTROL WIRING. DISCONNECT EXISTING HEATING HOT WATER PIPING AND CHILLED WATER PIPING AND REMOVE BACK TO PIPING MAIN.
   b) REMOVE EXISTING CONCRETE EQUIPMENT SUPPORT RUNNERS AT AHU AND REPAIR FLOOR SLAB TO MATCH EXISTING FINISH.
   c) REMOVE AND DISPOSE OF EXISTING PIPING INSULATION ON PIPING TO BE REPLACED AND AS REQUIRED TO RIG AHU FOR DEMOLITION AND REPLACEMENT.
2. AHU
   a) PROVIDE (FURNISH AND INSTALL) NEW AHU IN ACCORDANCE WITH SCHEDULE.
   b) NEW AHU SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
   c) CONTRACTOR SHALL PROVIDE AN AHU WHICH MEETS THE MANUFACTURER-REQUIRED CLEARANCES WITHIN THE SPACE AVAILABLE IN THE EXISTING MECHANICAL ROOM. CONTRACTOR SHALL MAINTAIN ALL NEC REQUIRED CLEARANCES AROUND EXISTING ELECTRICAL EQUIPMENT (DISCONNECTS, VFD(S), TRANSFORMER, ETC).
   d) CUT-OUT CONCRETE SLAB AS NECESSARY TO PROVIDE PROPER DEPTH FOR P-TRAP AT COOLING COIL.
   e) PROVIDE NEOPRENE ISOLATION PADS BENEATH THE AHU.
   f) PROVIDE NEW CONTROL VALVES, ISOLATION VALVES, THERMOMETERS, AND PRESSURE GAUGES ON CHWS/CHWR AND HWS/HWR LINES SERVING AHU COILS.
   g) PROVIDE SMOKE DAMPERS IN THE SUPPLY DUCT OUTLET OF THE AHU IN ACCORDANCE WITH NFPA 90.
3. ELECTRICAL
   a) PROVIDE NEW CONDUIT AND WIRING AS REQUIRED TO MAKE FINAL CONNECTIONS TO NEW EQUIPMENT.
   b) RECONNECT NEW AHU TO EXISTING ELECTRICAL POWER AT MCC.
4. PIPING
   a) CONNECT NEW AHU COOLING COIL AND PRE-HEAT COIL TO EXISTING PIPING.
   b) LOCATIONS OF PIPING CONNECTIONS ON NEW EQUIPMENT MAY BE DIFFERENT THAN ON EXISTING EQUIPMENT. PROVIDE NEW PIPING AS REQUIRED TO INSTALL NEW EQUIPMENT AND RECONNECT NEW EQUIPMENT TO EXISTING PIPING.
   c) FLUSH ALL NEW PIPING PRIOR TO CONNECTIONS TO NEW EQUIPMENT AND EXISTING PIPING.
   d) PRESSURE TEST ALL NEW PIPING AT 100 PSI AND CONTACT ENGINEER TO WITNESS TEST.
   e) PROVIDE CHEMICAL TREATMENT OF CHILLED & HEATING WATER SYSTEMS IN ACCORDANCE WITH THE OWNER'S CHEMICAL TREATMENT PROGRAM. COORDINATE WITH OWNER REGARDING CHEMICAL REQUIREMENTS.
5. CONTROLS
   a) SEE SHEETS M5.1, M5.2 AND M5.3
6. LABELING
   a) PROVIDE PIPE LABELS ON ALL PIPING AND ENGRAVED PHENOLIC EQUIPMENT TAGS ON NEW EQUIPMENT. COLOR CODE ALL PIPING PER SPECIFICATIONS.
7. OWNER TRAINING
   a) PROVIDE STARTUP AND OWNER TRAINING ON NEW AHU BY A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE.

BID SET

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3/16/2023

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North Carolina Zoo
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SCO ID# 18-18399-01A

SYMBOLS, LEGENDS
NOTES & ABBREVIATIONS

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET
M0.1
OF SHEETS

PLOTTED: 3/16/2023 @ 12:56:20 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - M0.1.dwg

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING HOT WATER PUMPS (E)P-6 AND (E)P-7, INCLUDING HOT WATER SUPPLY AND RETURN PIPING TO POINTS INDICATED. REMOVE ALL ASSOCIATED CONTROLS. EXISTING CONCRETE PADS TO REMAIN.
2. DISCONNECT AND REMOVE BOILER PUMP, PUMP CONTROLS AND PIPING AND ASSOCIATED HANGERS AND SUPPORTS IN ITS ENTIRETY.
3. REMOVE 4" HWR PIPING TO POINT INDICATED AND PREPARE FOR NEW CONNECTION.
4. REMOVE EXPANSION TANK AND ALL ASSOCIATED PIPING AND ACCESSORIES AND CAP AND NEAREST MAINS.
5. REMOVE AIR HANDLING UNIT (E)AHU-2 AND (E)AHU-3 AND ALL ASSOCIATED CONTROLS, VFDS AND APPURTENANCES. REMOVE SUPPLY AND RETURN DUCTWORK TO POINTS INDICATED AND PREPARE FOR NEW CONNECTIONS . REMOVE DUCT SMOKE DETECTOR IN SUPPLY AND RETURN AIR DUCT AND ASSOCIATED ACCESSORIES.
6. REMOVE BOILERS AND FLUES COMPLETELY AND ALL FLUE SUPPORTS ON BUILDING. REMOVE ALL ASSOCIATED PIPING AND CONTROLS. REMOVE BACKFLOW PREVENTER AND MAKEUP WATER AND CAP A NEAREST MAIN. REMOVE CONCRETE PAD AND PATCH FLOOR TO MATCH EXISTING.
7. REMOVE CHILLED WATER PUMP (E) CWP INCLUDING CHILLED WATER SUPPLY AND RETURN PIPING TO POINTS INDICATED AND PREPARE FOR NEW CONNECTIONS.
8. DISCONNECT AND REMOVE EXISTING DUCT SMOKE DETECTOR AND SET ASIDE IN SECURED AREA FOR REINSTALLATION IN NEW RETURN DUCTWORK.
9. FOR (E) OPENING IN BUILDING REFER TO DETAIL 4 OR SHEET M4.2.
10. PROVIDE NEW 10" FLUE FOR WATER HEATER. TURN FLUE UP WALL TO 10 FT ABOVE TOP OF LOUVER.
11. CONNECT TEMPORARY BOILER PIPING TO EXISTING AS SHOWN.
12. CONNECT TEMPORARY PIPING TO TEMPORARY BOILER. COORDINATE WITH EQUIPMENT PROVIDED.
13. 5 W/LF HEAT TRACE FOR PIPING EXPOSED OUTDOORS.
14. PATCH HOLES IN WALL WITH NEW MASONRY BLOCK TO MATCH EXISTING WALL AFTER REMOVAL OF TEMPORARY PIPING.
15. PROVIDE SUPPORT FOR TEMPORARY PIPING.
16. PROVIDE PACKAGED TEMPORARY BOILER WITH PUMP SYSTEM TO BE LOCATED OUTSIDE ADJACENT TO THE EXISTING BOILER ROOM. BOILER SHALL BE 1,000 MBH LP GAS FIRED WITH DISTRIBUTION HOT WATER PUMP 160 GPM AT 90 FT. HD. PROVIDE VENTING, TRIM AND ACCESSORIES. KEEP VENTING 10 FT. FROM ANY OUTSIDE AIR INTAKES. PROVIDE 4" HWS AND HWR PIPING AND CONNECT TO EXISTING DISTRIBUTION SYSTEM WITHIN THE BOILER ROOM.
17. REMOVE EXISTING CONCRETE PAD FOR AHU-2. PREP FLOOR FOR NEW PAD.
18. ALTERNATE M-2 - DISCONNECT EXISTING OA DUCTWORK AT POINT INDICATED AND PROVIDE TEMPORARY SUPPORT OF DUCT. EXISTING OA LOUVER TO BE STORED IN SECURED LOCATION TO PREVENT DAMAGE FOR RE-INSTALLATION.-

KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

1 PARTIAL LOWER LEVEL - DEMOLITION PLAN - MECHANICAL

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

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 029455 ENGINEER CARL A. STUPKA 3/16/2023

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SCO ID# 18-18399-01A

PARTIAL LOWER LEVEL PH .1 DEMOLITION PLAN - MECHANICAL

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049
SHEET: M1.1	OF SHEETS

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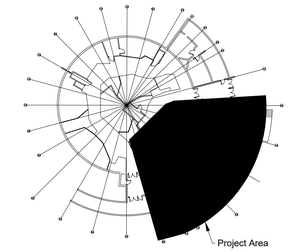
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - M1.1 - option 2 AHU-2 layout Demo.dwg

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING HOT WATER REHEAT COIL AND ASSOCIATED DUCTWORK TO POINTS INDICATED AND PREPARE FOR NEW CONNECTIONS.
2. DISCONNECT AND REMOVE SUPPLY DUCTWORK TO POINTS INDICATED AND PREPARE FOR NEW CONNECTIONS.
3. DISCONNECT AND REMOVE SUPPLY DUCTWORK TO POINTS INDICATED AND CAP.
4. REMOVE EXISTING THERMOSTAT AND HUMIDISTAT AND ALL ASSOCIATED CONTROL WIRING AND PREPARE FOR NEW CONNECTIONS.
5. DISCONNECT AND REMOVE EXHAUST DUCTWORK TO POINTS INDICATED AND PREPARE FOR NEW CONNECTIONS.
6. DISCONNECT AND REMOVE EXISTING EXHAUST FAN ON ROOF AND CONTROLS. REMOVE DUCTWORK TO BELOW ROOF DECK AND CAP. REMOVE FAN AND PROVIDE ALUMINUM INSULATED CAP ON ROOF CURB



KEY PLAN - LOWER & MAIN LEVEL
NO SCALE

1 PARTIAL MAIN LEVEL - DEMOLITION PLAN - MECHANICAL
SCALE: 1/4"= 1'-0"

MECHANICAL

BID SET

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PARTIAL MAIN LEVEL PH. 1
DEMOLITION PLAN - DUCTWORK

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **M1.2** OF SHEETS

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FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - M1.2.dwg

WALL RATING LEGEND

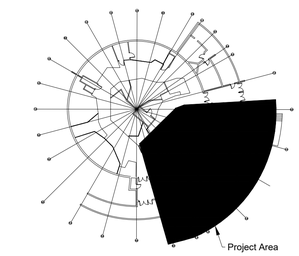
- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING HOT WATER REHEAT COIL, THERMOSTAT AND ALL ASSOCIATED CONTROL WIRING. REMOVE PIPING AND VALVES TO POINT OF DISCONNECTION INDICATED AND PREPARE FOR NEW CONNECTION.
2. DISCONNECT AND REMOVE EXISTING HOT WATER REHEAT COIL, THERMOSTAT AND ALL ASSOCIATED CONTROL WIRING. REMOVE PIPING AND VALVES TO POINT OF DISCONNECTION INDICATED AND CAP.

1 PARTIAL MAIN LEVEL - DEMOLITION PLAN - PIPING

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



KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

BID SET

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SCO ID# 18-18399-01A

PARTIAL MAIN LEVEL PH.1
DEMOLITION PLAN - PIPING

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049
SHEET: **M1.3** OF SHEETS	

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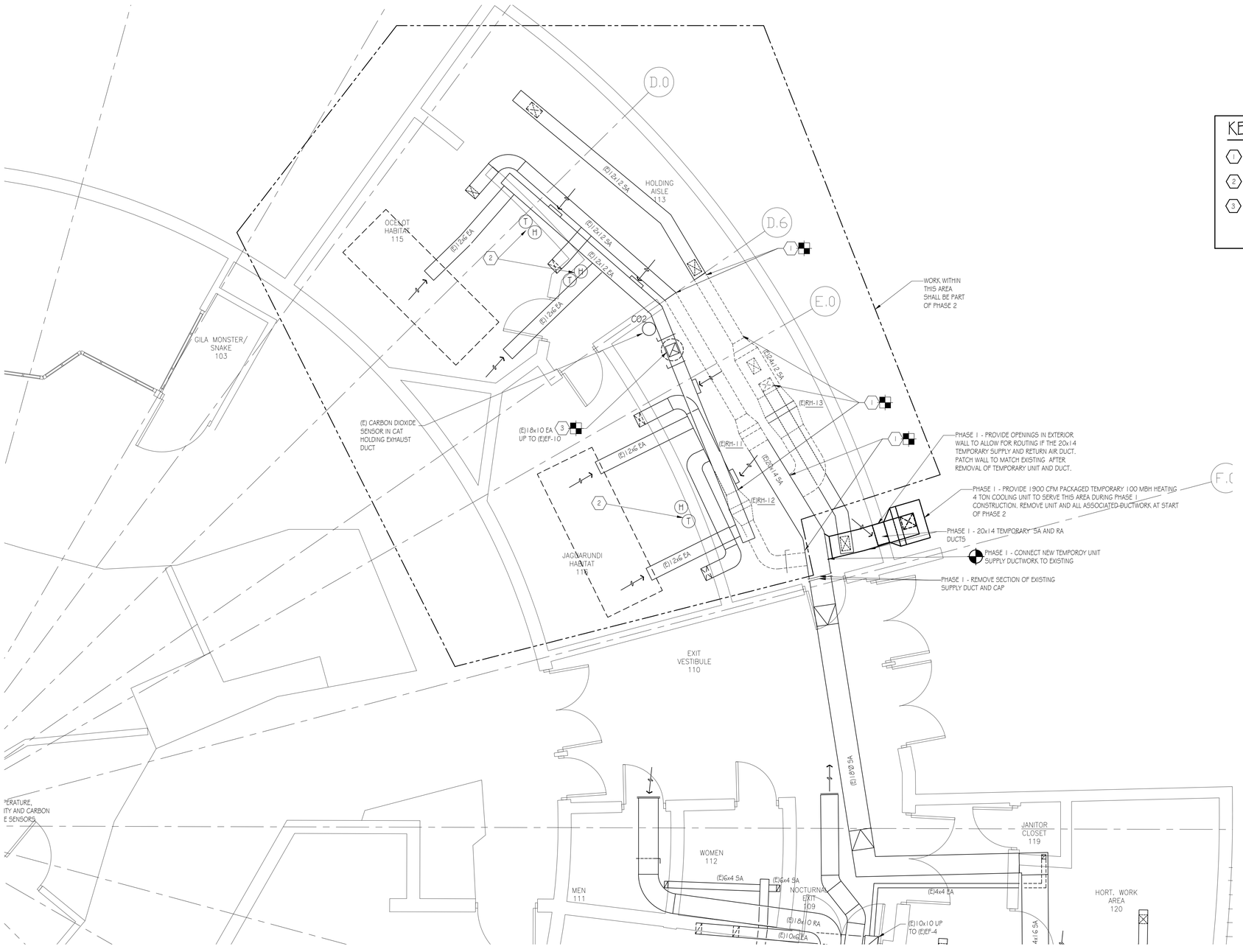
19049 – M1.3.DWG



WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING HOT WATER REHEAT COIL AND ASSOCIATED DUCTWORK TO POINTS INDICATED AND PREPARE FOR NEW CONNECTIONS.
2. DISCONNECT AND REMOVE EXISTING THERMOSTAT AND HUMIDISTAT AND ALL ASSOCIATED CONTROL WIRING AND PREPARE FOR NEW CONNECTIONS.
3. DISCONNECT AND REMOVE EXISTING EXHAUST FAN ON ROOF AND CONTROLS. EXISTING ROOF CURB AND ASSOCIATED DUCTWORK TO REMAIN, PREPARE FOR NEW CONNECTION.

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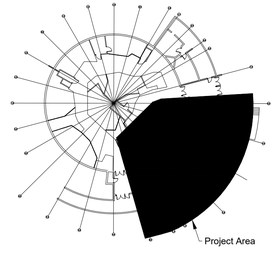
SCO ID# 18-18399-01A

PARTIAL MAIN LEVEL
PH.1 AND PH.2
DEMOLITION PLAN
DUCTWORK

NO.	REVISIONS	BY



KEY PLAN - LOWER & MAIN LEVEL
NO SCALE

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049
SHEET: M1.4	OF SHEETS

1 PARTIAL MAIN LEVEL - DEMOLITION PLAN - MECHANICAL
SCALE: 1/4"= 1'-0"

MECHANICAL

BID SET

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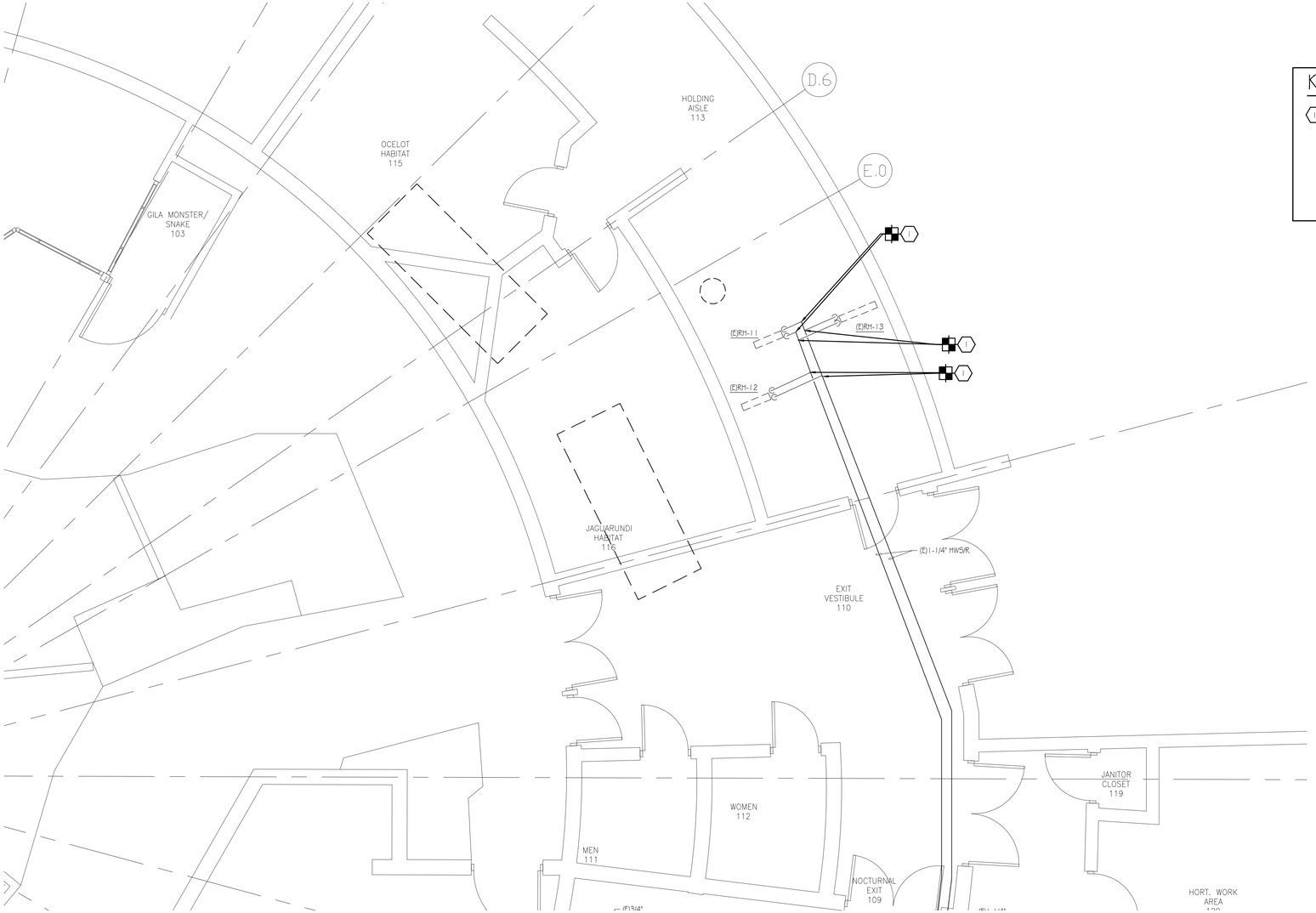
19049 – M1.4.DWG

WALL RATING LEGEND

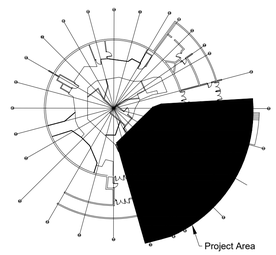
- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING HOT WATER REHEAT COIL AND ALL ASSOCIATED CONTROL WIRING. REMOVE PIPING AND VALVES TO POINT OF DISCONNECTION INDICATED AND PREPARE FOR NEW CONNECTION.



1 PARTIAL MAIN LEVEL - DEMOLITION PLAN - PIPING
SCALE: 1/4"= 1'-0" MECHANICAL



KEY PLAN - LOWER & MAIN LEVEL
NO SCALE

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 039852 ENGINEER CARL A. STUPKA 3/16/2023

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4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

PARTIAL MAIN LEVEL PH.2
DEMOLITION PLAN - PIPING

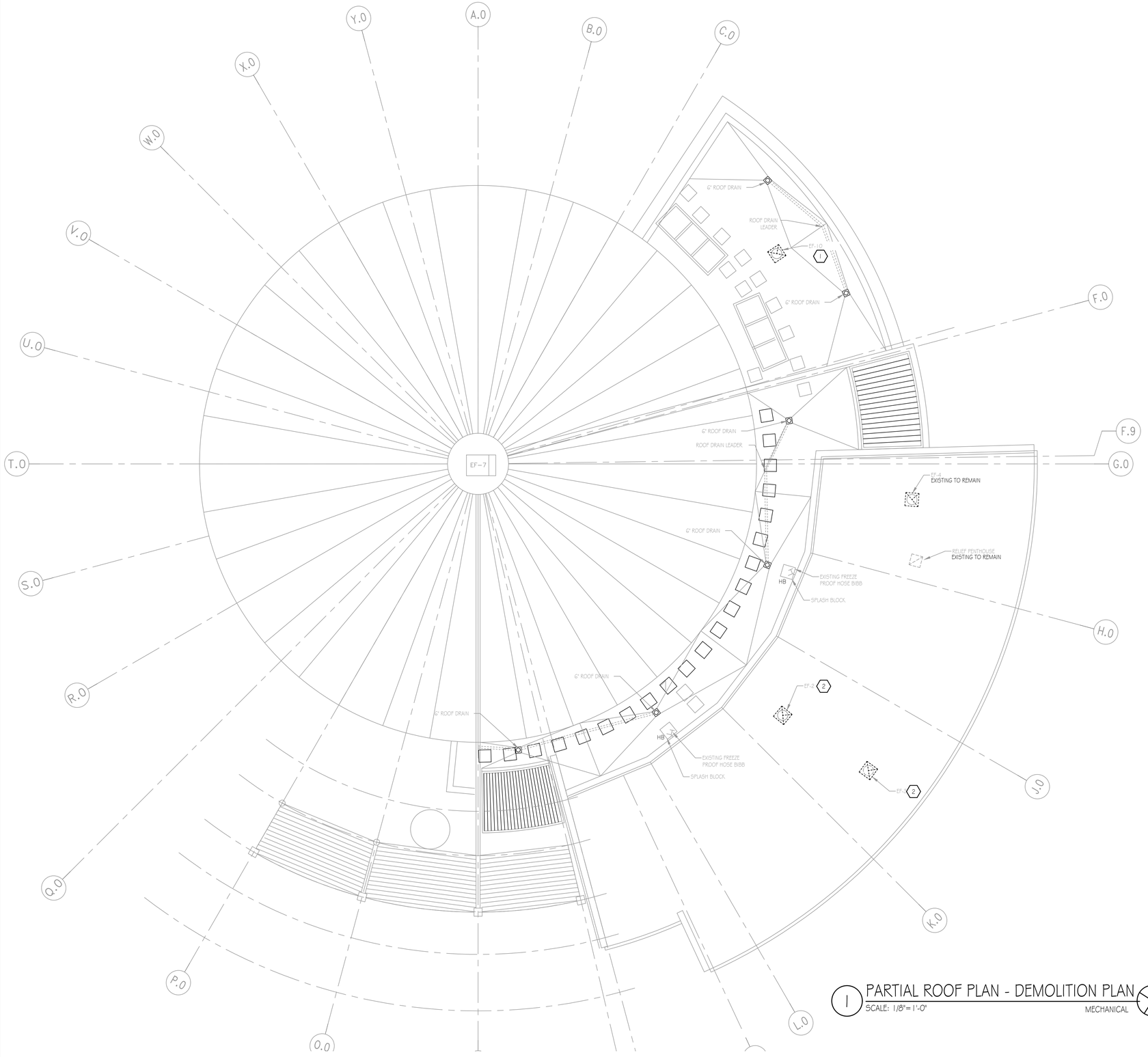
NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **M1.5** OF SHEETS

PLOTTED: 3/16/2023 @ 12:59:04 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\D\19049 - M1.5.dwg

19049 – M1.5.DWG



WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

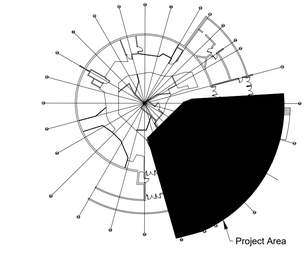
KEYED NOTES

1. PHASE 2: DISCONNECT AND REMOVE EXISTING EXHAUST FAN, EXISTING CURB AND ~~EXHAUST~~ DUCTWORK TO REMAIN. PREPARE FOR INSTALLATION OF NEW EXHAUST FAN.
2. PHASE 1: DISCONNECT AND REMOVE EXISTING EXHAUST FAN. CURB TO REMAIN. ~~PROVIDE~~ INSULATED CURB CAP AND SEAL AIR AND WATER TIGHT.

1 PARTIAL ROOF PLAN - DEMOLITION PLAN

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

MECHANICAL



KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 049457 ENGINEER CARL A. STUPKA

7/14/2023

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ROOF PLAN PH.1 AND PH.2 DEMOLITION PLAN

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

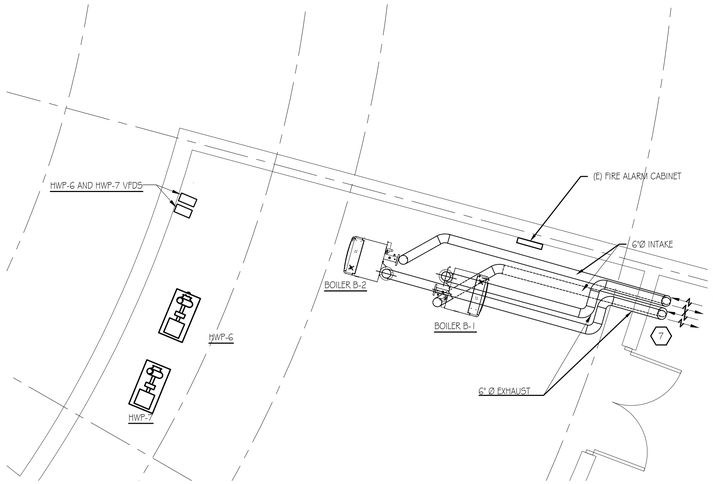
SHEET **M1.6** OF SHEETS

PLOTTED: 3/6/2023 @ 12:59:32 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\D\19049 - M1.6.dwg

19049 - M1.6.DWG

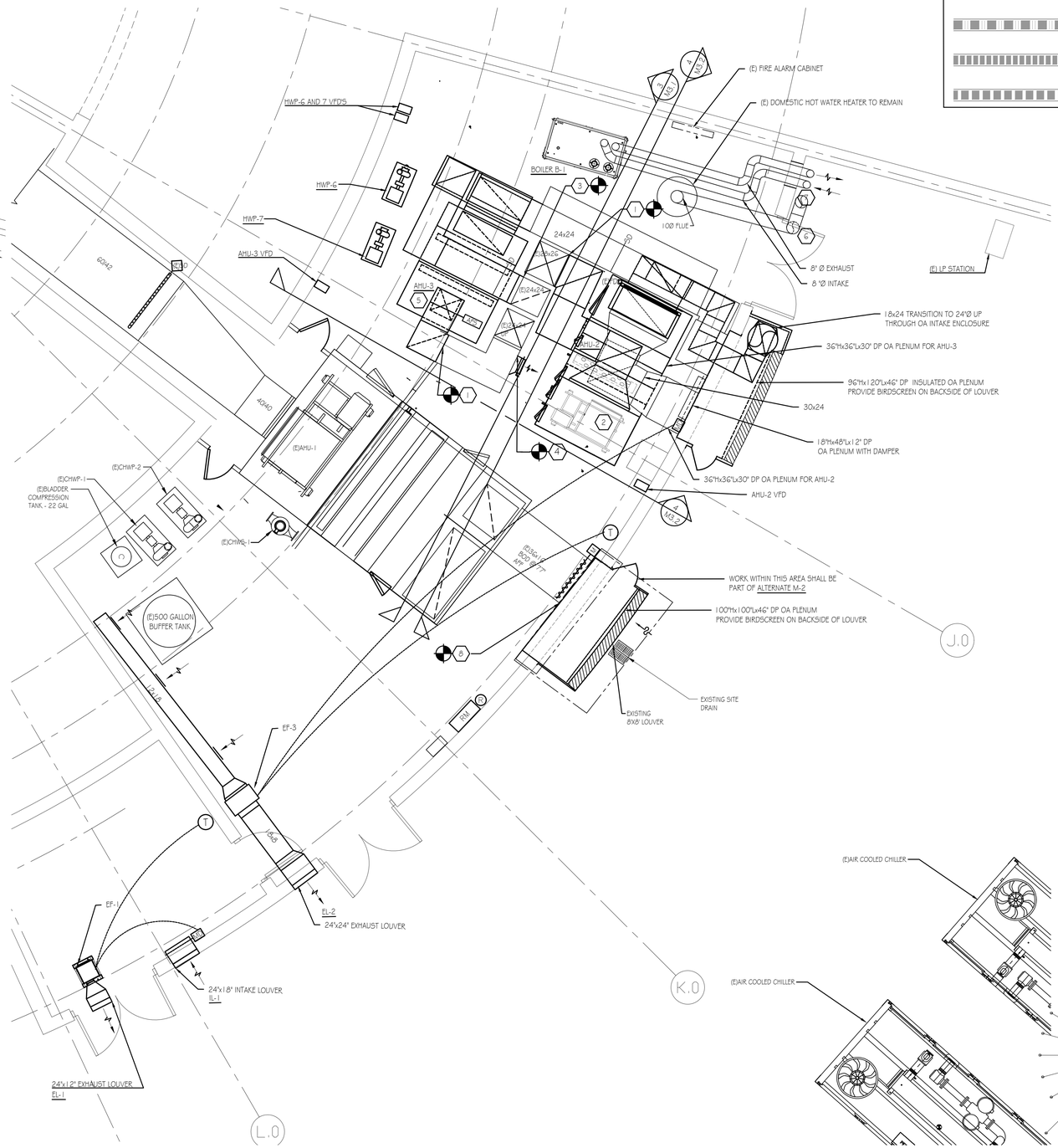
WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL



PARTIAL LOWER LEVEL - RENOVATION PLAN -ALTERNATE M-1

2 — SCALE: 1/4"=1'-0" — MECHANICAL

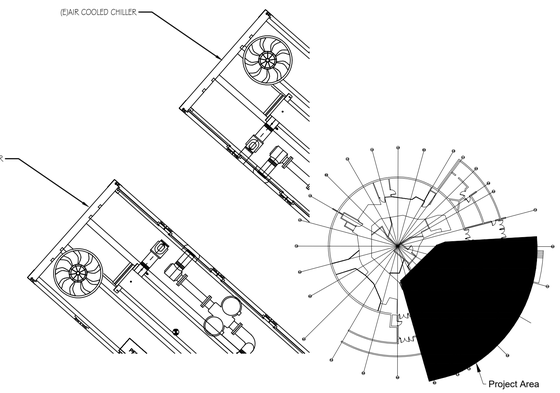


KEYED NOTES

1. CONNECT NEW 24X24 SUPPLY DUCT TO EXISTING AND SEAL AIR TIGHT.
2. INSTALL NEW AHU-2 ON NEW CONCRETE PAD.
3. CONNECT NEW 24X24 RETURN AIR DUCT TO EXISTING AND MAKE AIR TIGHT.
4. CONNECT NEW 12x10 SUPPLY DUCT TO EXISTING. PROVIDE VOLUME DAMPER AND WIRE MESH SCREEN ON OPEN END. BALANCE TO 400 CFM.
5. NEW AHU-3 INSTALLED ON (E) CONCRETE PAD.
6. USE NEW WALL SUPPORT FOR WATER HEATER FLUE TO SECURE NEW FLUE, EXTEND FLUE TO ROOF.
7. SEE DETAIL 4 ON SHEET 4.2 FOR ROUTING OF EXHAUSTS AND INTAKES.
8. CONNECT EXISTING DUCTWORK TO NEW OA PLENUM AND SEAL AIR TIGHT.

PARTIAL LOWER LEVEL - RENOVATION PLAN - MECHANICAL

1 — SCALE: 1/4"=1'-0" — MECHANICAL



KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

BID SET

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PARTIAL LOWER LEVEL PH.1 RENOVATION PLAN - DUCTWORK

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

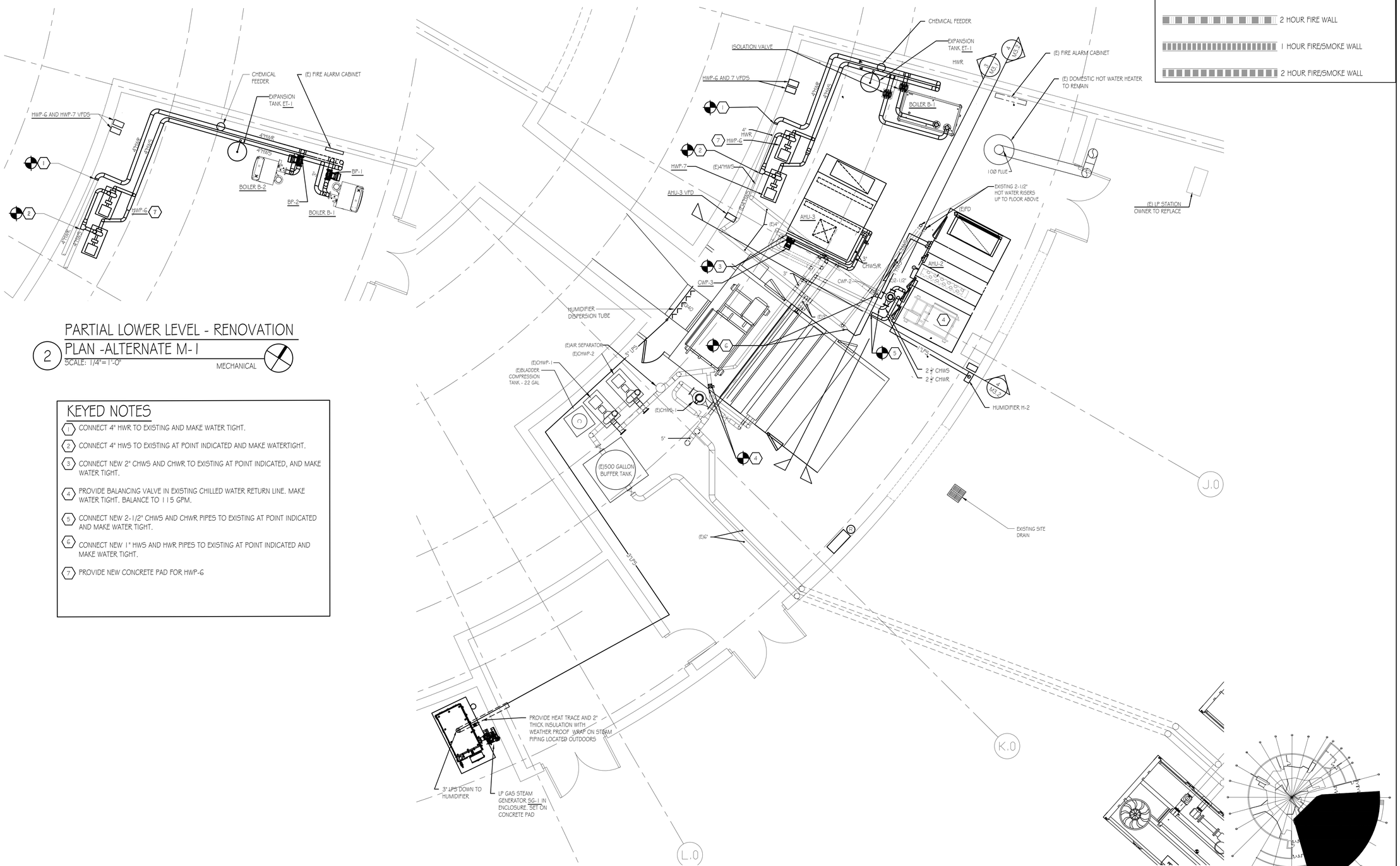
SHEET: **M2.1** OF SHEETS

PLOTTED: 3/6/2023 @ 2:59:59 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\D1 19049 - M2.1 - option 2 AHU-2 layout.dwg

19049 - M2.1 - OPTION 2 AHU-2 LAYOUT.DWG

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL



PARTIAL LOWER LEVEL - RENOVATION PLAN -ALTERNATE M-1

2 SCALE: 1/4"=1'-0" MECHANICAL

KEYED NOTES

1. CONNECT 4" HWR TO EXISTING AND MAKE WATER TIGHT.
2. CONNECT 4" HWS TO EXISTING AT POINT INDICATED AND MAKE WATERTIGHT.
3. CONNECT NEW 2" CHWS AND CHWR TO EXISTING AT POINT INDICATED, AND MAKE WATER TIGHT.
4. PROVIDE BALANCING VALVE IN EXISTING CHILLED WATER RETURN LINE. MAKE WATER TIGHT. BALANCE TO 115 GPM.
5. CONNECT NEW 2-1/2" CHWS AND CHWR PIPES TO EXISTING AT POINT INDICATED AND MAKE WATER TIGHT.
6. CONNECT NEW 1" HWS AND HWR PIPES TO EXISTING AT POINT INDICATED AND MAKE WATER TIGHT.
7. PROVIDE NEW CONCRETE PAD FOR HWP-6

KEY PLAN - LOWER & MAIN LEVEL
NO SCALE

PARTIAL LOWER LEVEL - RENOVATION PLAN - MECHANICAL

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

BID SET

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039575 CARL A. STUPKA 3/16/2023

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PARTIAL LOWER LEVEL PH.1
RENOVATION PLAN - PIPING

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET: **M2.2** OF SHEETS

PLOTTED: 3/6/2023 @ 1:30:42 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - M2.2 MER PIPING PLAN.dwg

19049 – M2.2 MER PIPING PLAN.DWG

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. CONNECT NEW DUCTWORK TO EXISTING AND SEAL AIR TIGHT. PROVIDE ACCESS DOOR IN TRANSITION UPSTREAM OF THE REHEAT COIL FOR CLEANING.
2. CONNECT NEW 10X10 DUCT TO BOTTOM OF EXISTING 24x20 SUPPLY MAIN AND SEAL AIR TIGHT.
3. CONNECT NEW 12X12 DUCT TO BOTTOM OF EXISTING 16x14 SUPPLY MAIN AND SEAL AIR TIGHT.
4. BALANCE EXISTING SUPPLY TO CFM INDICATED.
5. INSTALL NEW REHEAT COIL IN VERTICAL DROP (TYP.). REFER TO MAIN VIEW FOR LOCATIONS.
6. CONNECT NEW DUCT TO EXISTING AT POINT INDICATED, AND SEAL AIR TIGHT.
7. CONNECT NEW DUCT TO BOTTOM OF EXISTING MAIN AND SEAL AIR TIGHT.
8. CAP EXISTING EXHAUST DUCT BELOW ROOF DECK.
9. PROVIDE ALUMINUM CURB CAP WITH 2" BOARD INSULATION AND SEAL AIR AND WATER TIGHT.

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PARTIAL MAIN LEVEL PH.1 RENOVATION PLAN - DUCTWORK

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049
SHEET: **M2.3** OF SHEETS	

BID SET

1 PARTIAL MAIN LEVEL - RENOVATION PLAN - MECHANICAL

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

MECHANICAL

2 SECTION VIEW - A

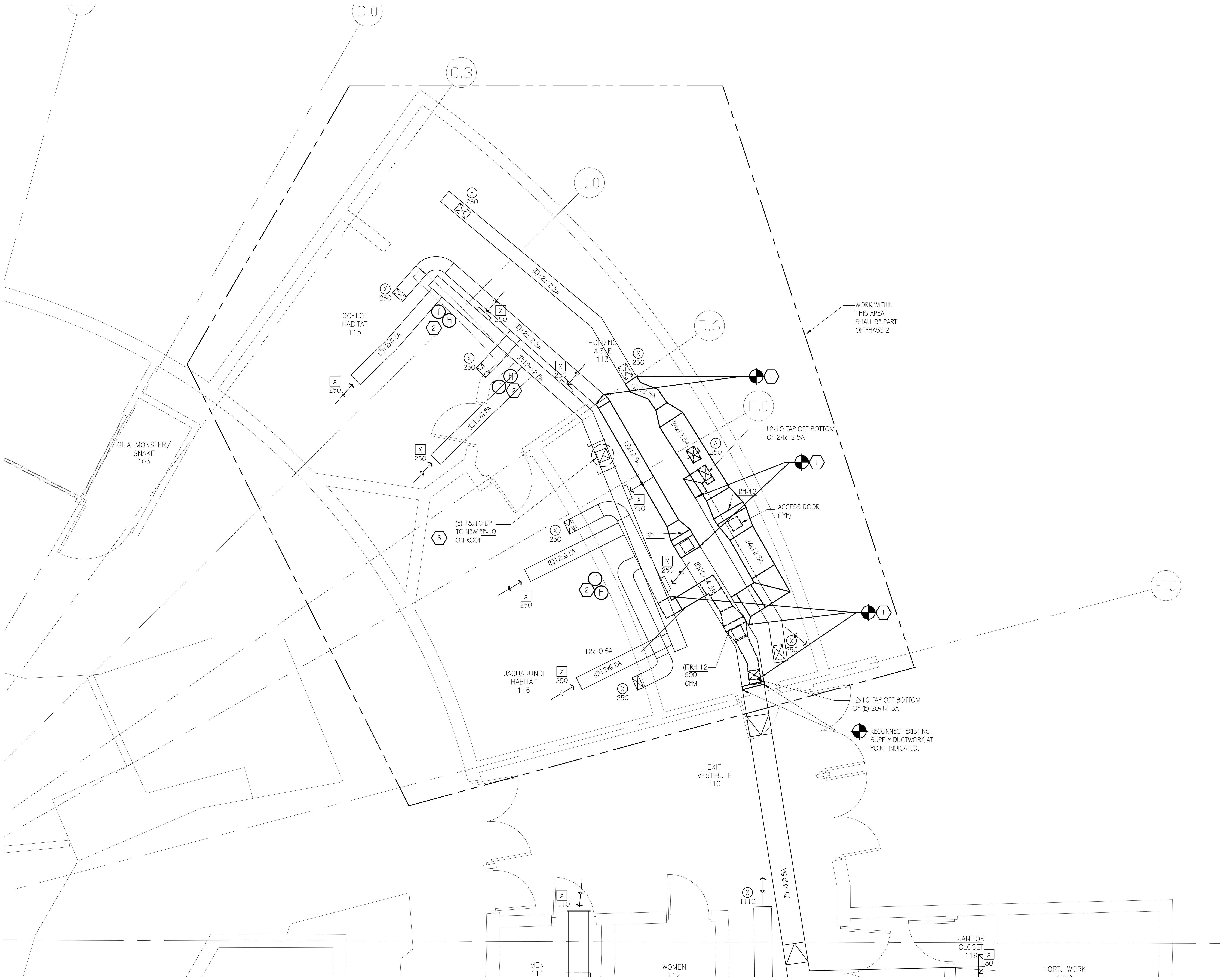
SCALE: 1/4"= 1'-0"
SIMILAR FOR RH-, RH-2, RH-3, RH-4, RH-5, RH-7 AND RH-8

KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

PLOTTED: 3/17/2023 @ 11:49:06 AM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - M2.3.dwg

19049 - M2.3.DWG



PARTIAL MAIN LEVEL - RENOVATION PLAN - MECHANICAL

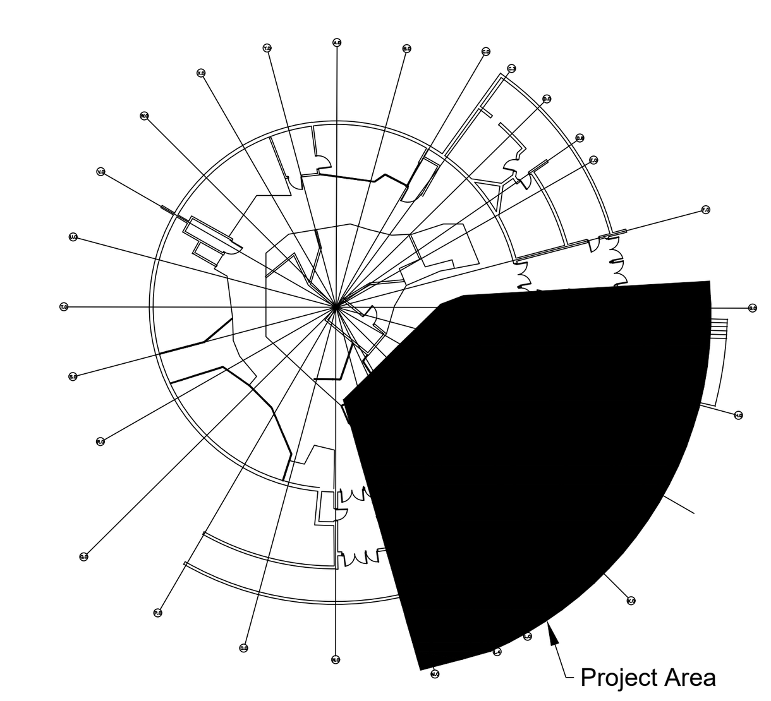
1 SCALE: 1/4"= 1'-0" MECHANICAL

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. CONNECT NEW DUCTWORK TO EXISTING AND SEAL AIR TIGHT.
2. INSTALL NEW THERMOSTAT AND HUMIDISTAT AND CONNECT TO EXISTING CONTROL WIRING.
3. CONNECT EXISTING EXHAUST DUCTWORK TO NEW EXHAUST FAN EF-10 ON ROOF



KEY PLAN - LOWER & MAIN LEVEL
NO SCALE

BID SET

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SCO ID# 18-18399-01A

PARTIAL MAIN LEVEL PH.1 & PH.2 RENOVATION PLANDUCTWORK

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN	CHECKED
T. PELKEY	C. STUPKA
CLIENT JOB NO.	SSME JOB NO.
--	19049

SHEET M2.4 OF SHEETS

WALL RATING LEGEND

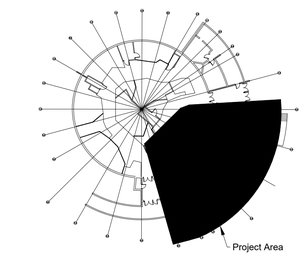
- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. CONNECT NEW HOT WATER PIPING TO EXISTING AND MAKE WATER TIGHT.
2. INSTALL NEW REHEAT COIL IN VERTICAL DROP AT APPROXIMATELY 10'-0" A.F.F. IN A LOCATION THAT ALLOWS FOR SERVICING AND ACCESS TO COILS AND VALVES. COORDINATE WITH EXISTING CONDITIONS. REFER TO SECTION VIEW A ON DRAWING M2.2 REFER TO DETAILS 4 AND 5 OF DRAWING M4.1 FOR PIPING AND VALVE INSTALLATION.
3. INSTALL NEW REHEAT COIL AS LOW AS POSSIBLE (APPROX. 9'-8" A.F.F) AND CLOSE TO CORRIDOR, IN ORDER TO ALLOW FOR EASE OF ACCESS TO COIL AND VALVES.

1 PARTIAL MAIN LEVEL - RENOVATION PLAN - PIPING

SCALE: 1/4"= 1'-0" — MECHANICAL



KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 040084 ENGINEER CARL A. STUPKA 3/16/2023

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PARTIAL MAIN LEVEL PH.1 RENOVATION PLAN PIPING

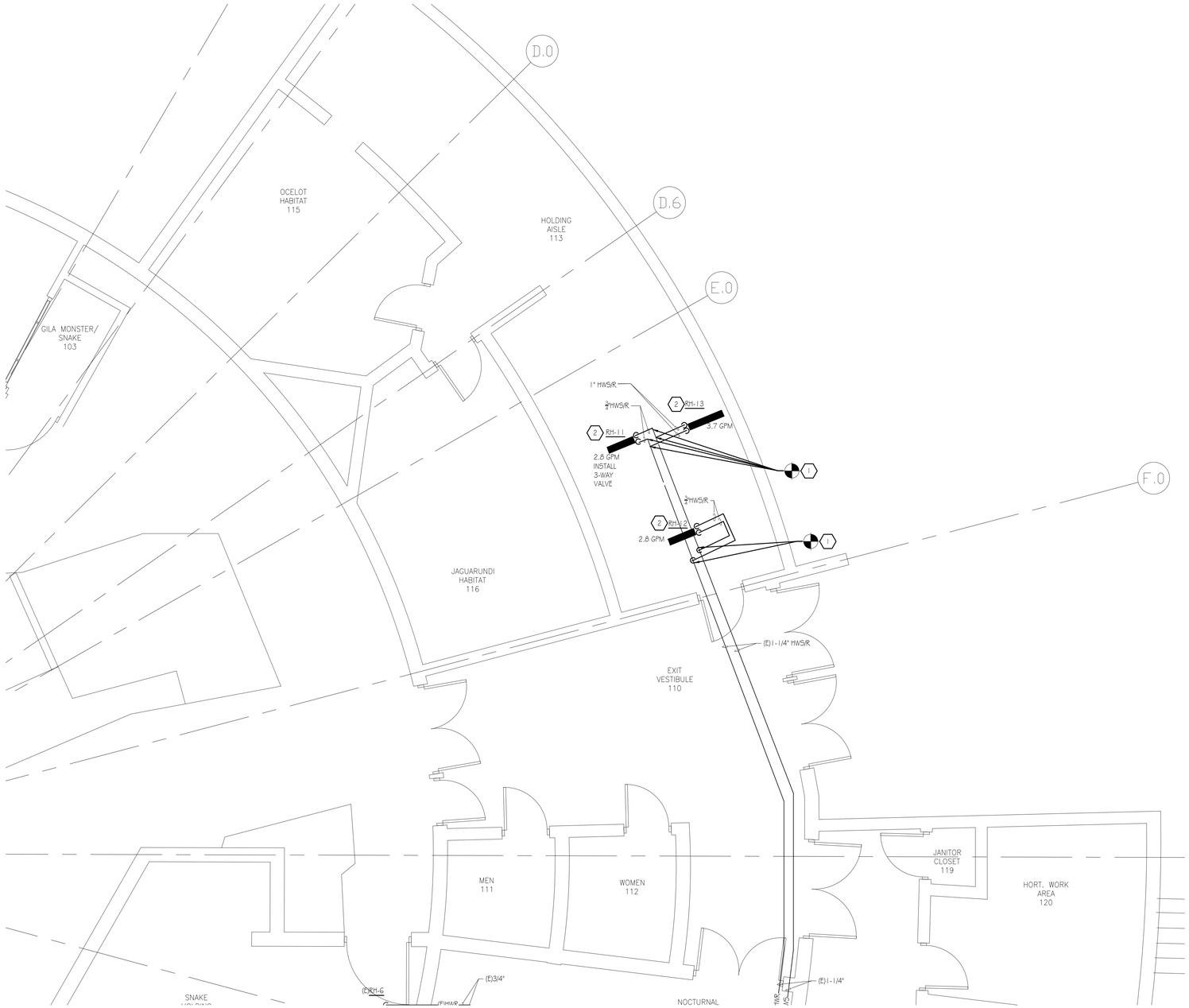
NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **M2.5** OF SHEETS

19049 – M2.5.DWG

PLOTTED: 3/6/2023 @ 1:02:18 PM BY: TROPA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\D\19049 - M2.5.dwg



WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. CONNECT NEW HOT WATER PIPING TO EXISTING AND MAKE WATER TIGHT.
2. INSTALL NEW REHEAT COIL IN A LOCATION THAT ALLOWS FOR SERVICING AND ACCESS TO COILS AND VALVES. COORDINATE WITH EXISTING CONDITIONS. REFER TO DETAILS 4 AND 5 OF DRAWING M4.1 FOR PIPING AND VALVE INSTALLATION.

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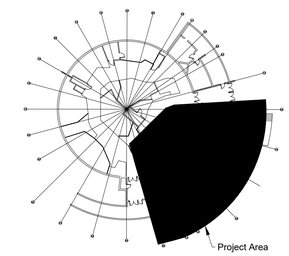
PARTIAL MAIN LEVEL PH.2 RENOVATION PLAN PIPING



KEY PLAN - LOWER & MAIN LEVEL
NO SCALE

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **M2.6** OF SHEETS

1 PARTIAL MAIN LEVEL - RENOVATION PLAN - PIPING
SCALE: 1/4"=1'-0" MECHANICAL

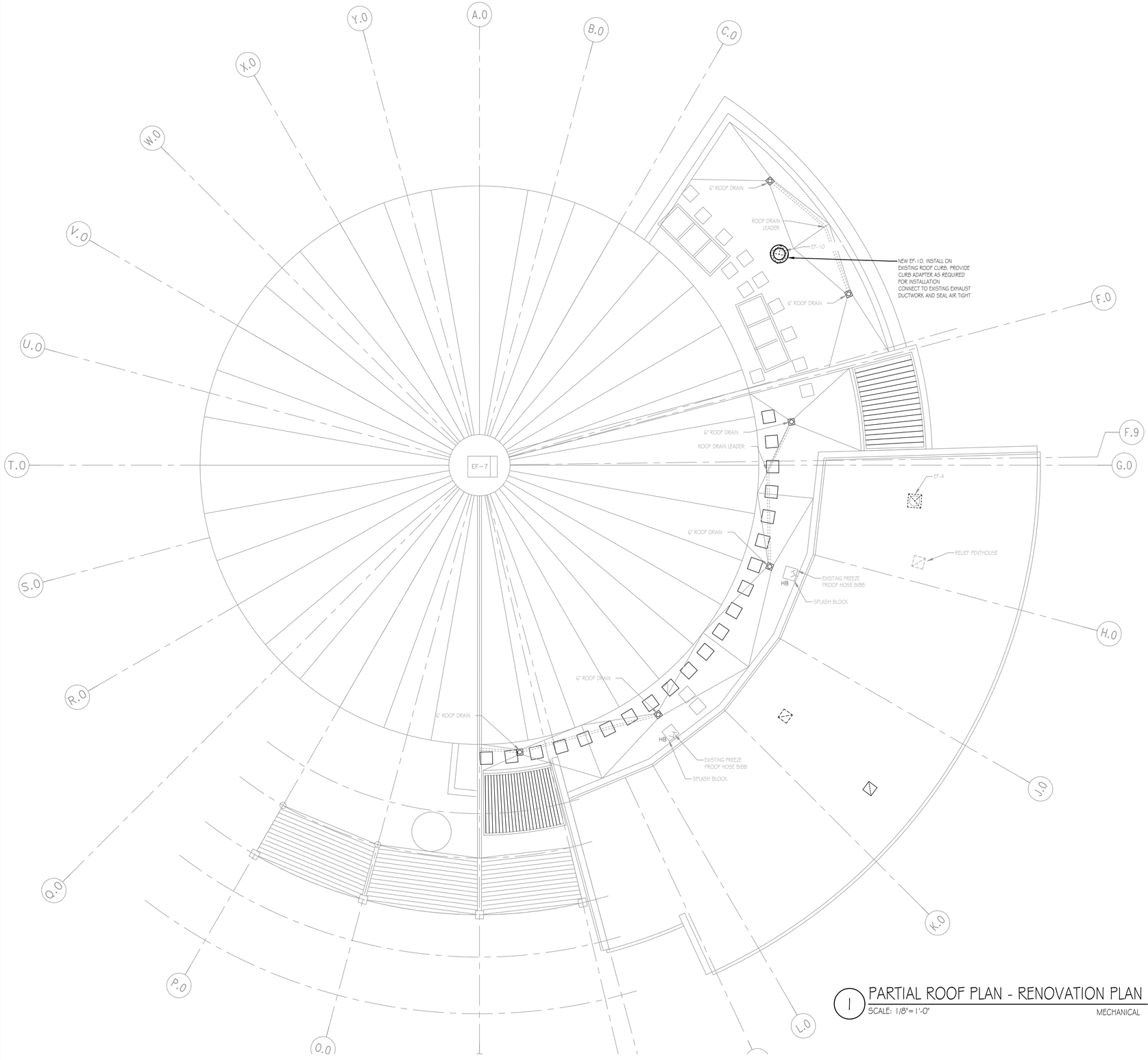
BID SET

PLOTTED: 3/16/2023 @ 1:02:49 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\D1\19049 - M2.6.dwg

19049 – M2.6.DWG

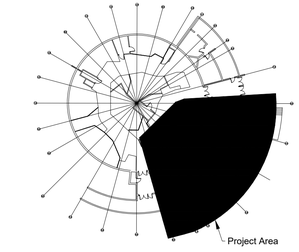
WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL



1 PARTIAL ROOF PLAN - RENOVATION PLAN
SCALE: 1/8"=1'-0"

MECHANICAL



KEY PLAN - LOWER & MAIN LEVEL
NO SCALE

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 029605 ENGINEER CARL A. STUPKA 3/16/23

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SCO ID# 18-18399-01A

PARTIAL ROOF PLAN
PH.2 - RENOVATION

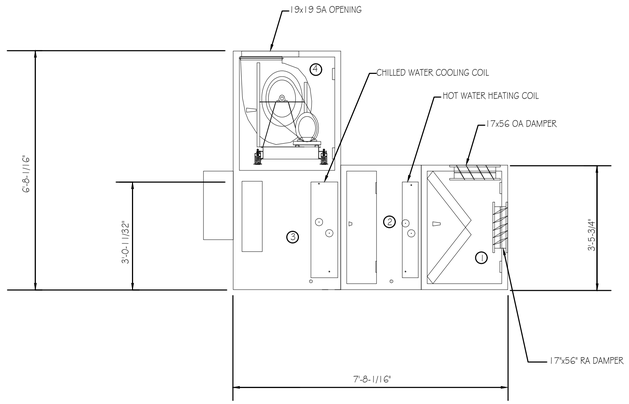
NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN	CHECKED
T. PELKEY	C. STUPKA
CLIENT JOB NO.	SSME JOB NO.
--	19049

SHEET **M2.7** OF SHEETS

PLOTTED: 3/6/2023 @ 1:03:19 PM BY TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\D\19049 - M2.7.dwg

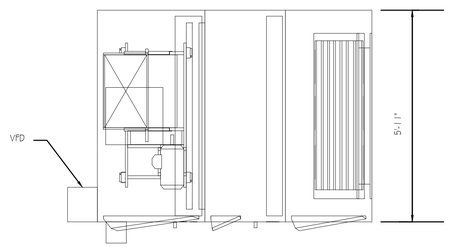
19049 - M2.7.DWG



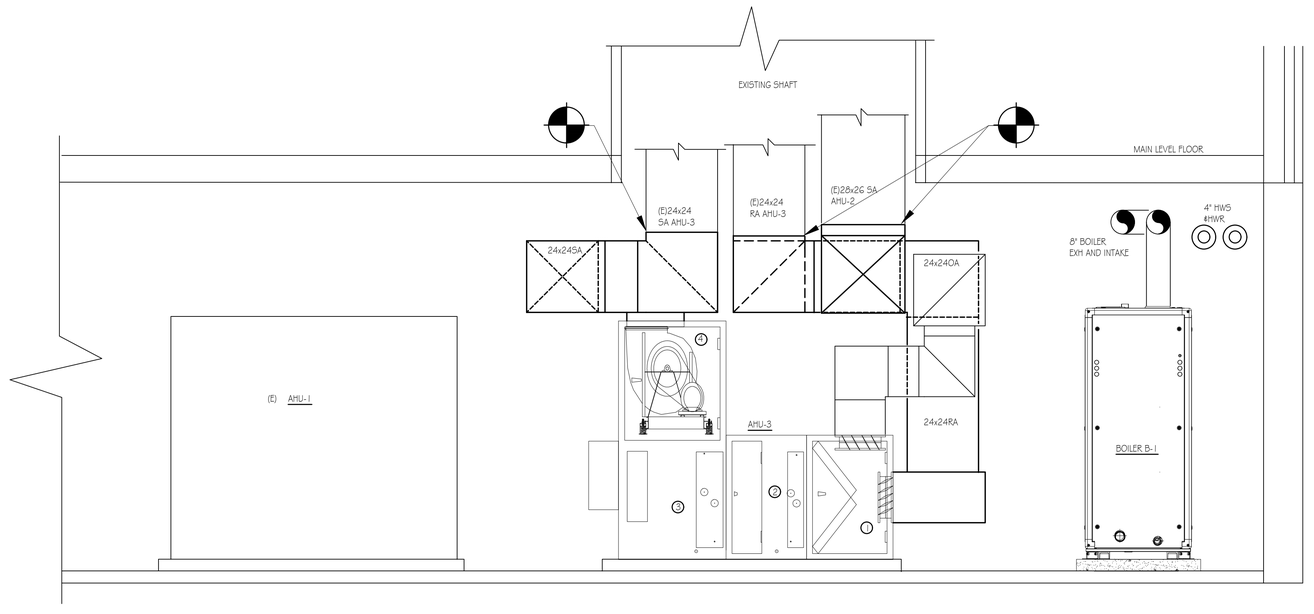
1 AHU-3 ELEVATION VIEW
SCALE: 1/2"=1'-0"

AIR HANDLING UNIT COMPONENTS

1. FILTER MIXING ECONOMIZER SECTION
2. COIL ACCESS SECTION
3. COOLING COIL SECTION
4. FAN SECTION



2 AHU-3 PLAN VIEW
SCALE: 1/2"=1'-0"



3 AHU-3 SECTION VIEW
SCALE: 1/2"=1'-0"

BID SET

PLOTTED: 3/6/2023 @ 1:04:22 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - M3.1 EQUIPMENT PLANS.dwg

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SCO ID# 18-18399-01A

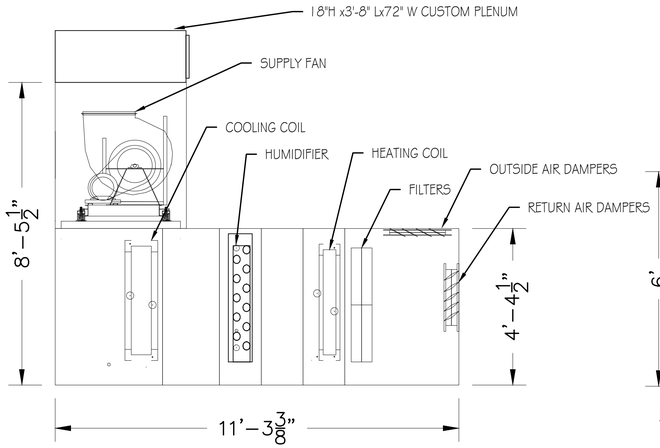
EQUIPMENT PLANS
PH. 1 MECHANICAL

NO.	REVISIONS	BY

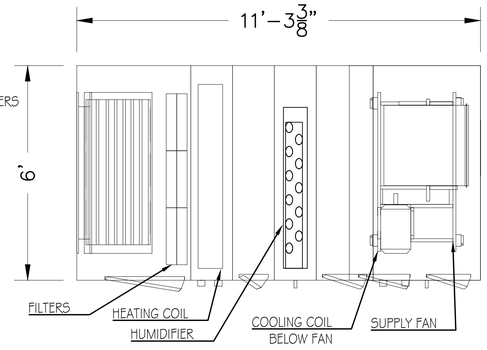
DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **M3.1** OF SHEETS

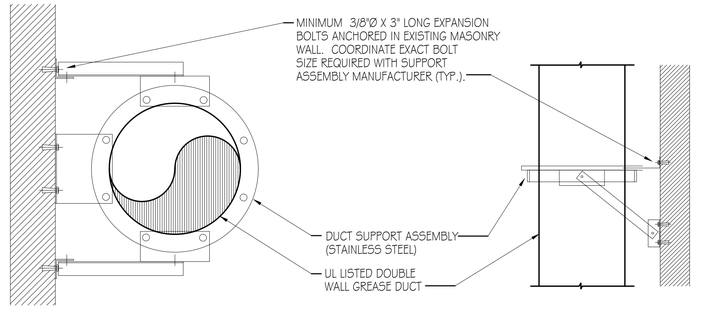
19049 – M3.1 EQUIPMENT PLANS.DWG



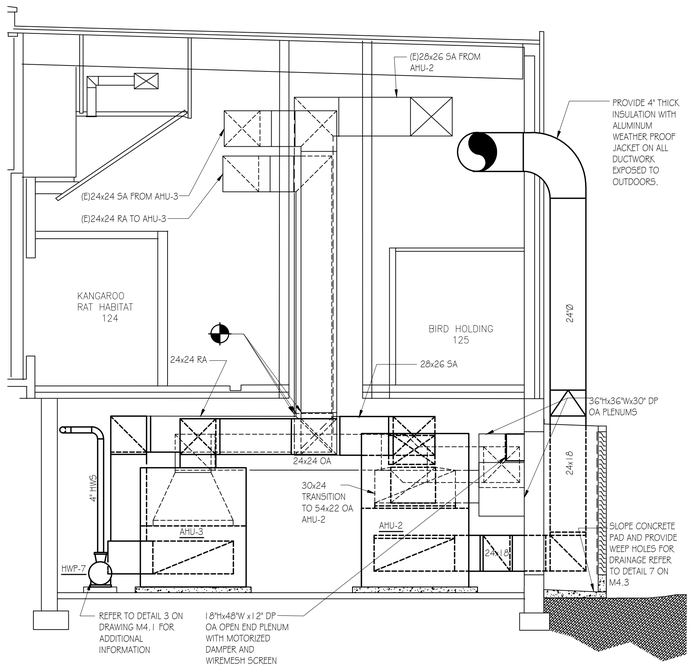
1 AHU-2 ELEVATION VIEW
SCALE: 1/2"= 1'-0"



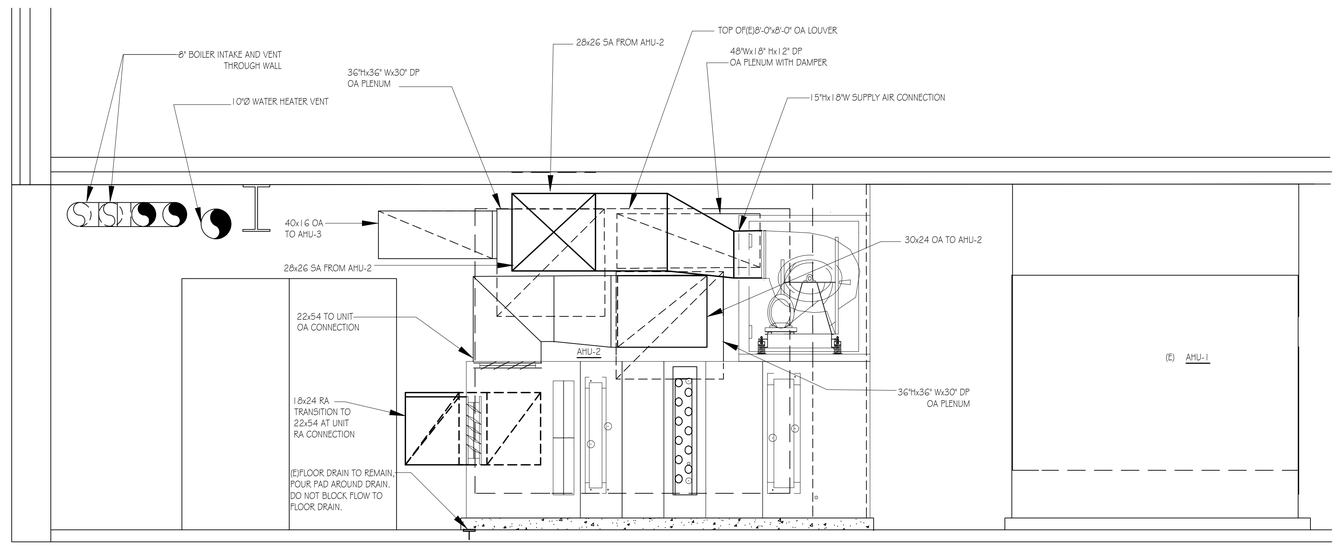
2 AHU-2 PLAN VIEW
SCALE: 1/2"= 1'-0"



5 VERTICAL DUCT SUPPORT/GUIDE ASSEMBLY ANCHORING DETAIL
NO SCALE



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



4 SECTION VIEW
SCALE: 1/2"= 1'-0"

BID SET

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License Number C-2384

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023056 CARL A. STUPKA 3/16/2023

North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

EQUIPMENT PLANS AND SECTIONS PH.1 MECHANICAL

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **M3.2** OF SHEETS

PLOTTED: 3/6/2023 @ 1:04:52 PM By: TRISHA PELKEY
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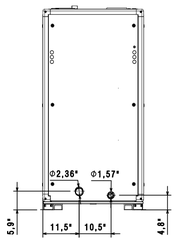
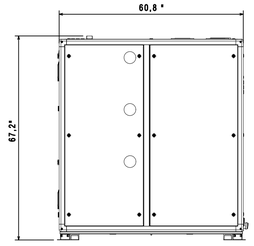
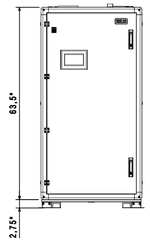


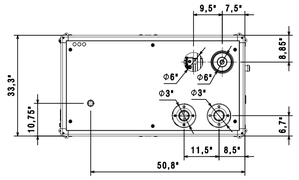
1 BOILER BACK VIEW
SCALE: 1/2"= 1'-0"



2 SIDE ELEVATION VIEW
SCALE: 1/2"= 1'-0"

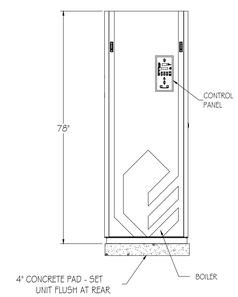


3 BOILER FRONT VIEW
SCALE: 1/2"= 1'-0"

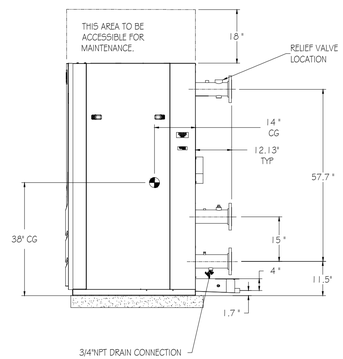


4 BOILER TOP VIEW
SCALE: 1/2"= 1'-0"

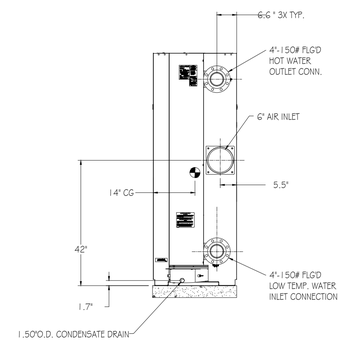
BASE BID BOILER



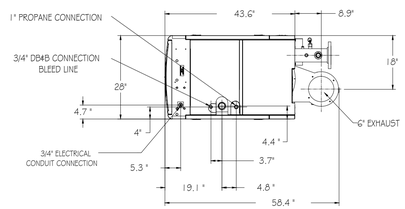
3 BOILER FRONT VIEW
SCALE: 1/2"= 1'-0"



4 SIDE ELEVATION VIEW
SCALE: 1/2"= 1'-0"



5 BOILER BACK VIEW
SCALE: 1/2"= 1'-0"



6 BOILER TOP VIEW
SCALE: 1/2"= 1'-0"

ALTERNATE M-1 BOILER - QTY-2

BID SET

SSME
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029205 CARL A. STUPKA 7/11/2023

North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

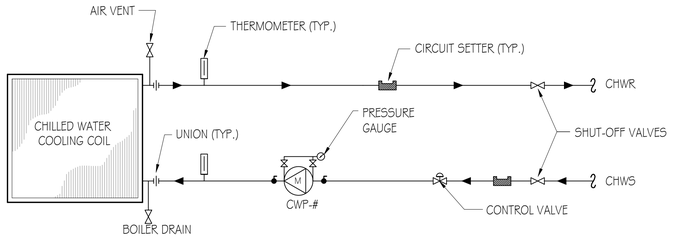
BOILER PLANS PH.1
MECHANICAL

NO.	REVISIONS	BY

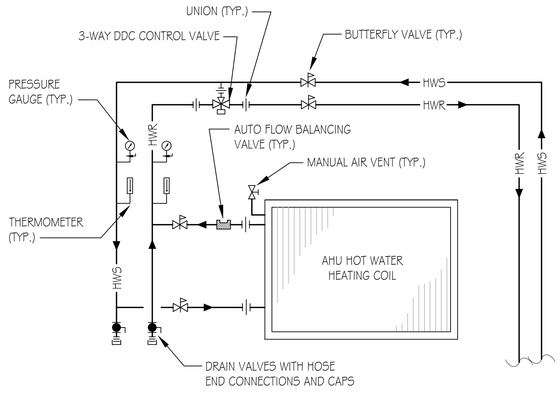
DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET: **M3.3** OF SHEETS

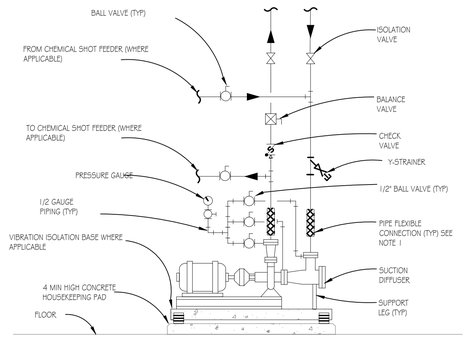
PLOTTED: 3/6/2023 @ 1:05:22 PM By: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\D1 19049 - M3.3 EQUIPMENT PLANS - Boilers.dwg



1 AHU CHILLED WATER COIL WITH PUMP PIPING DIAGRAM
NO SCALE



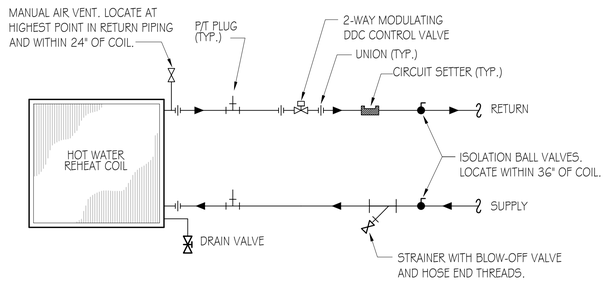
2 AHU HOT WATER COIL PIPING
NO SCALE



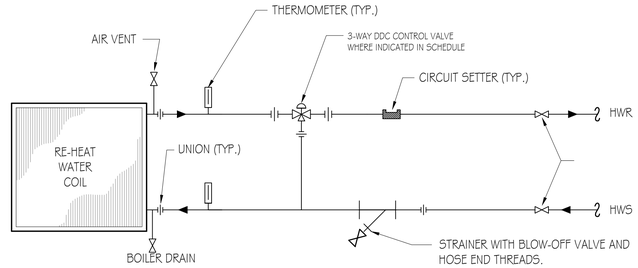
3 BASE MOUNTED END SUCTION PUMP PIPING DIAGRAM
NO SCALE

NOTES:

1. FLEXIBLE COUPLINGS FOR GROOVED SYSTEM MAY BE USED IN LIEU OF FLEXIBLE CONNECTIONS. INSTALL PER MANUFACTURER'S RECOMMENDATIONS
2. REFER TO MSU STANDARDS OF CONSTRUCTION FOR GROUTING SPECIFICS
3. BUTTERFLY VALVE NOT ACCEPTABLE FOR BALANCING
4. TRIPLE DUTY VALVES NOT ACCEPTABLE
5. REFER TO MSU STANDARDS OF CONSTRUCTION FOR INSULATION REQUIREMENTS.
6. EXTEND HOUSEKEEPING PAD AT LEAST 3" WIDER THAN BASE AND SUPPORT LEG AREA.

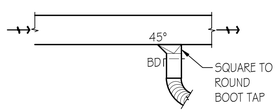


4 HOT WATER DUCT MOUNTED REHEAT COIL PIPING
NO SCALE — ALL RHC'S EXCEPT RHC-1 AND 11

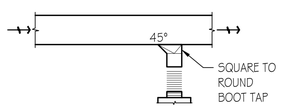


5 DUCT MOUNTED REHEAT COIL PIPING DIAGRAM - 3- WAY RHC-5 AND RHC-11
NO SCALE

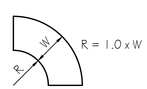
6 CONCRETE EQUIPMENT HOUSEKEEPING PAD
NO SCALE



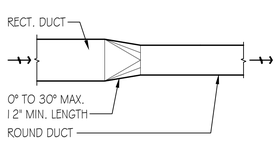
LOW PRESSURE DUCT TAKE-OFF



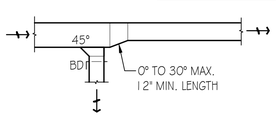
MEDIUM PRESSURE DUCT TAKE-OFF



FULL RADIUS ELBOW



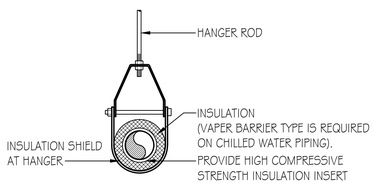
RECTANGULAR TO ROUND TRANSITION



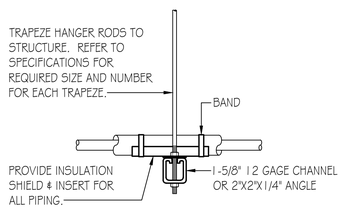
BRANCH TAKE-OFF

7 STANDARD DUCT CONSTRUCTION
SCALE: NONE

NOTE: UNLESS NOTED OTHERWISE ALL MITERED 90° ELBOWS SHALL HAVE TURNING VANES. 45° ELBOWS SHALL NOT HAVE TURNING VANES.



ADJUSTABLE CLEVIS HANGER



TRAPEZE HANGER
(FOR UNIFORM LOADS UP TO 1000 LBS.)

MAXIMUM PIPE / TUBING SUPPORT SPACING (FEET)												
NOM. SIZE	<3/4"	1"	1-1/4"	1-1/2"	2	2-1/2"	3	4	5	6	8	10
PIPE	6	6	6	10	10	10	10	10	12	12	12	12
TUBING	5	5	5	8	8	10	10	10	10	10	10	10

NOTE: SCHEDULE ONLY APPLIES TO INDIVIDUAL CLEVIS TYPE PIPE HANGERS. FOR TRAPEZE HANGERS, SPACING SHALL BE THE MINIMUM OF THE SPACING OF SMALLEST PIPE SIZE ON TRAPEZE, SPACING REQUIRED TO LIMIT EACH TRAPEZE TO LESS THAN 1000 LB LOAD, OR 10'-0" O.C.

8 TYPICAL PIPE HANGER DETAILS
NO SCALE

BID SET

SSME
Spring Stoops McCullen Engineering
3624 Shannon Road
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Durham, NC 27707-3772
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License Number C-2584

NORTH CAROLINA PROFESSIONAL SEAL 029035 ENGINEER CARL A. STUPKA 3/16/2023

North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

DETAILS MECHANICAL

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **M4.1** OF SHEETS

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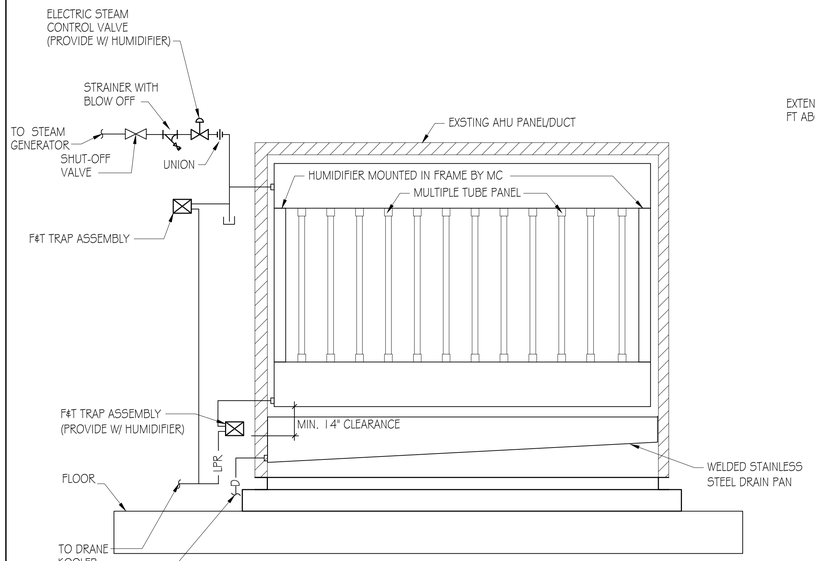
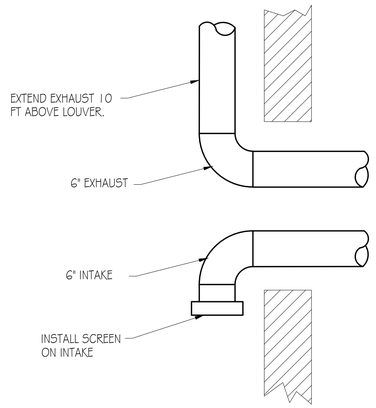
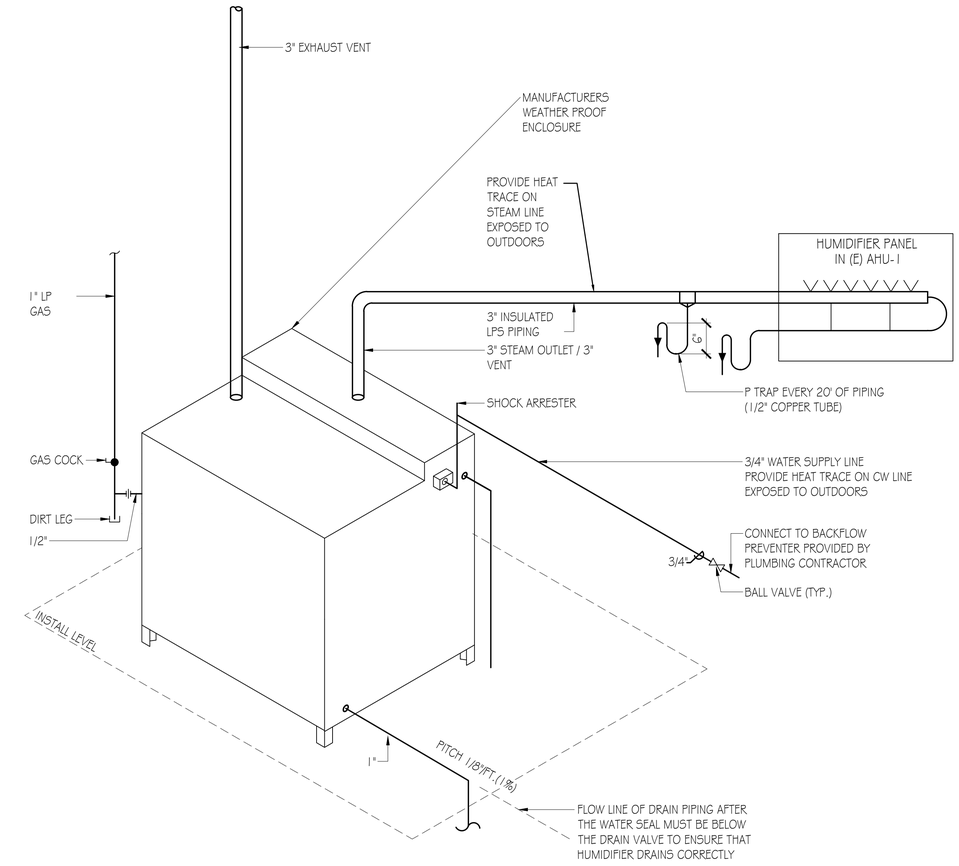


1 HUMIDIFIER PIPING DETAIL
SCALE: NONE

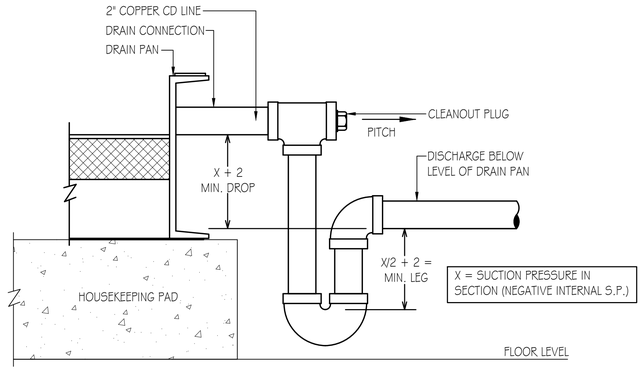


4 VENT TERMINATION WALL WALL PENETRATION DETAIL
SCALE: NONE

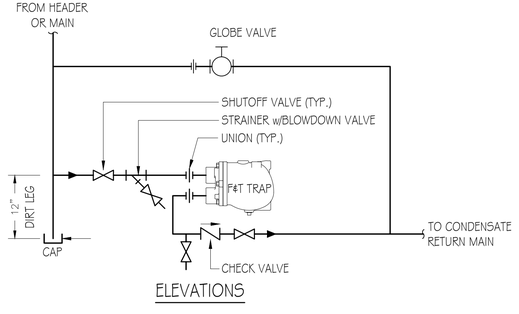


6 LP GAS FIRED STEAM GENERATOR PIPING DETAIL
SCALE: NONE

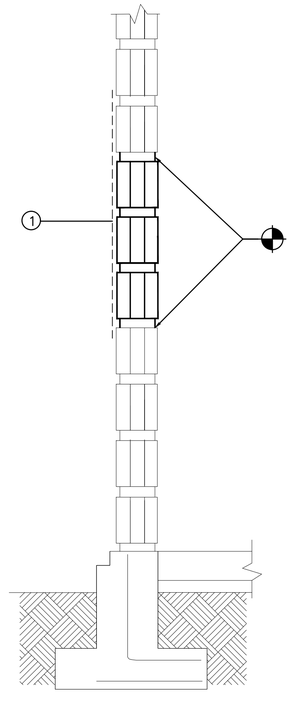
NOTE: UNIT IS PROVIDED WITH MANUFACTURERS WATER TEMPERING DEVICE.



2 AHU CONDENSATE DRAIN P-TRAP DETAIL
NO SCALE

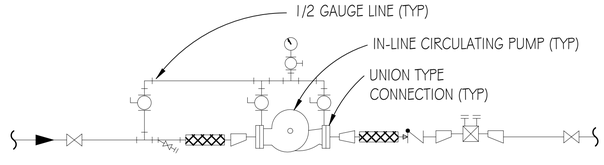


3 F&T STEAM TRAP ASSEMBLY
SCALE: NONE



NOTE: SAW CUT OUT PARTIAL CONCRETE AND REMOVE MORTOR. PROVIDE SUPPORT FOR UPPER BLOCKS. PROVIDE 8" HEAVY WEIGHT CONCRETE BLOCKS AND MORTOR TO INFILL EXSTING OPENING. APPLY ONE SLURRY WATERPROOF COAT AT A RATE OF 1.5 LB./SQ.YD. OF XYPEX CONCENTRATE OR APPROVED EQUAL.

5 CONCRETE WALL REPAIR DETAIL
SCALE: NONE



7 INLINE PUMP DETAIL
SCALE: NONE

BID SET

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Fax: 919-403-8080
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Web: www.ssmepa.com
License Number C-2384

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032958 CARL A. STUPKA 3/16/2023

North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

DETAILS MECHANICAL

NO.	REVISIONS	BY

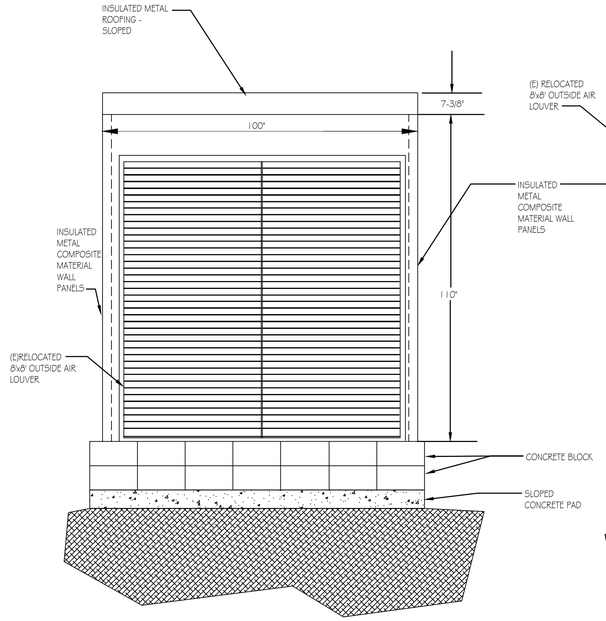
DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **M4.2** OF SHEETS

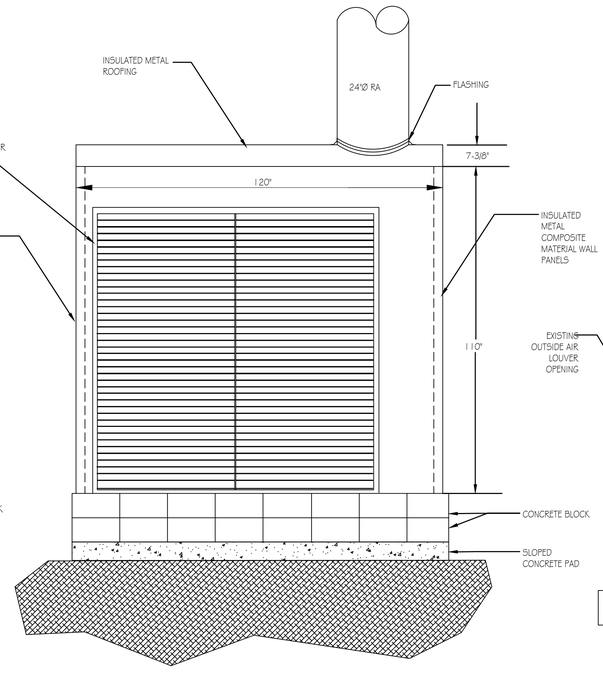
PLOTTED: 3/16/2023 @ 1:07:01 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\D1 19049 - M4.2 DETAILS.dwg

WALL RATING LEGEND

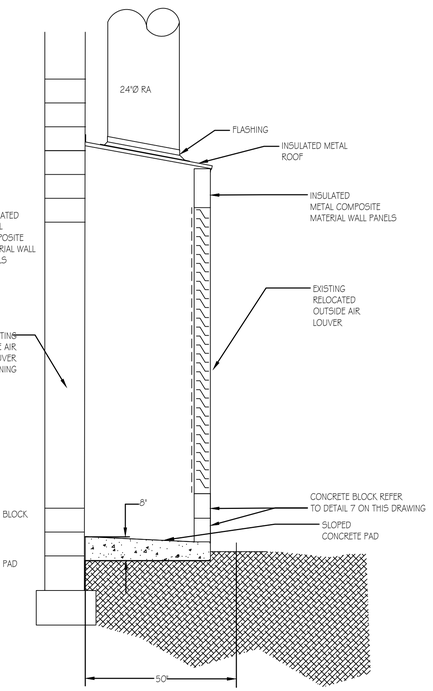
- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL



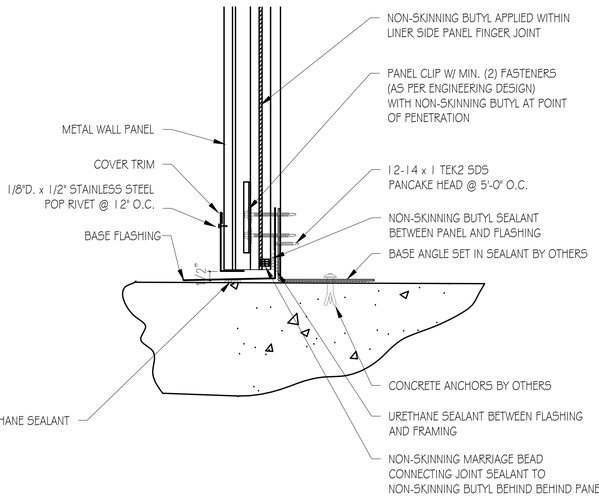
1 (E) AHU-1 OUTSIDE AIR LOUVER ELEVATION
SCALE: 1/2"=1'-0" MECHANICAL - ALTERNATE M-2



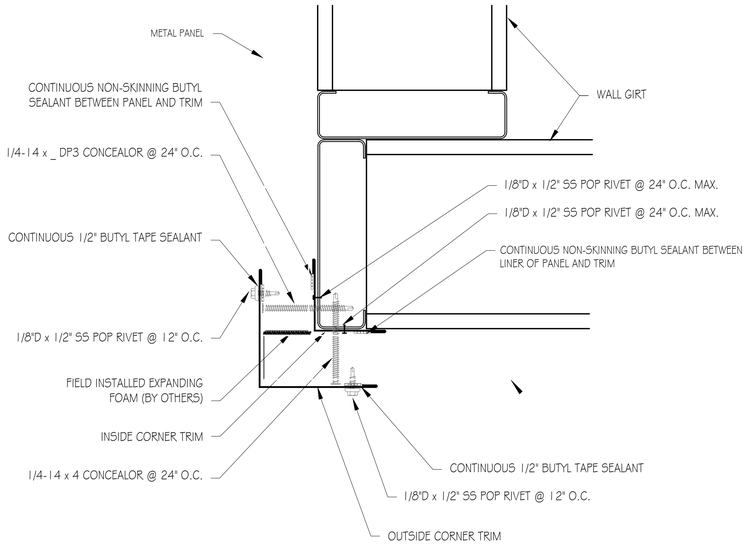
2 AHU-2 OUTSIDE AIR LOUVER ELEVATION
SCALE: 1/2"=1'-0" MECHANICAL



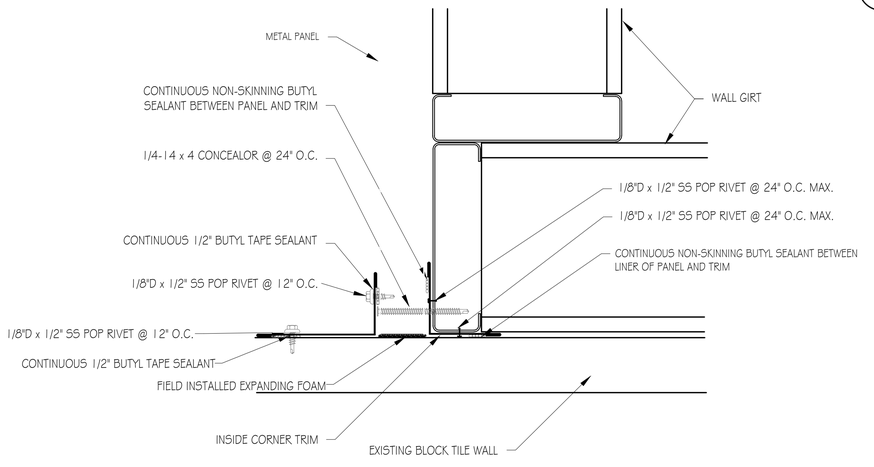
3 TYPICAL SIDE ELEVATION VIEW
SCALE: 1/2"=1'-0" MECHANICAL



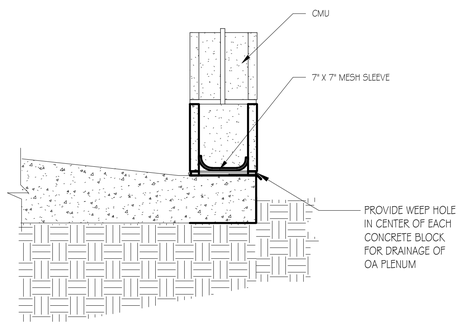
6 METAL BASE FLASHING DETAIL
NO SCALE



4 OUTSIDE CORNER DETAIL
NO SCALE



5 CONNECTOR DETAIL
NO SCALE



7 CMU BLOCK WALL BASE DETAIL
NO SCALE

BID SET

SSME
Spring Stoops McCullen Engineering
3624 Shannon Road
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License Number C-2384

NORTH CAROLINA PROFESSIONAL SEAL 035757 ENGINEER CARL A. STUPKA 3/16/2023

North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

PLENUM ENCLOSURE DETAILS

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049
SHEET: **M4.3**	OF SHEETS

19049 – M4.3 DETAIL.DWG

PLOTTED: 3/6/2023 @ 1:07:40 PM BY: TRISHA PELKEY
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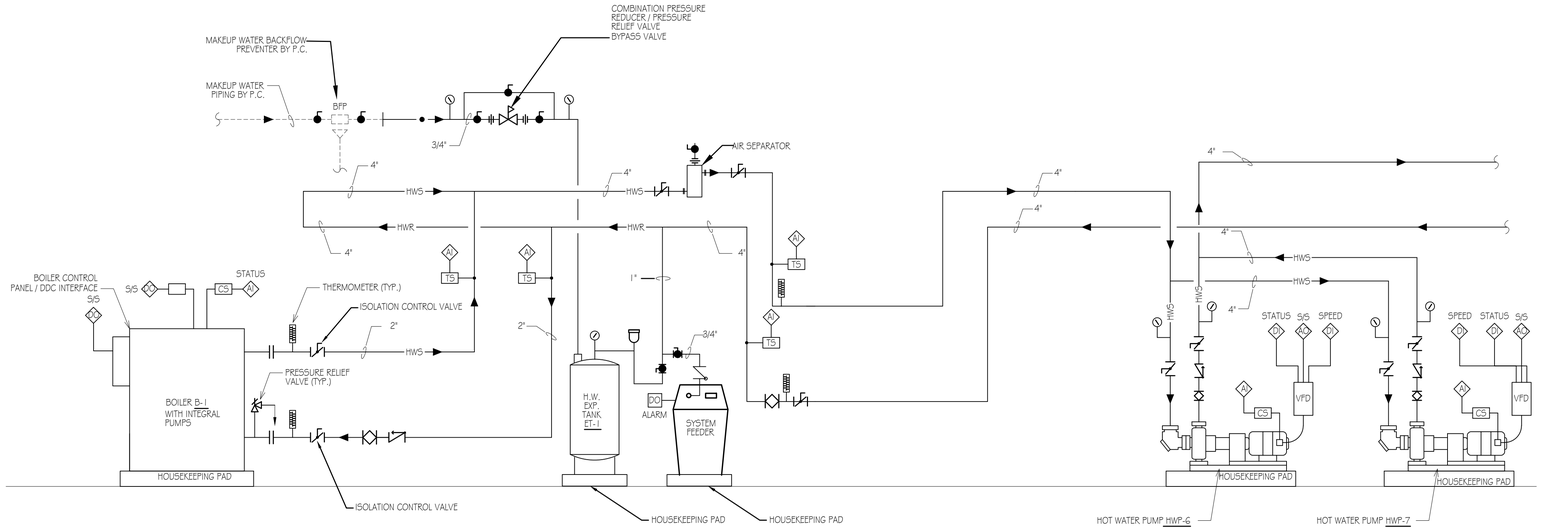


1 HEATING HOT WATER SYSTEM SCHEMATIC - BASE BID

HEATING SYSTEM SEQUENCES OF OPERATION

1. GENERAL
   THE HEATING SYSTEM WILL AUTOMATICALLY START WHEN THE SYSTEM IS ENABLED AND DISABLED THROUGH THE BUILDING ENERGY MANAGEMENT SYSTEM (BEMS)

2. SAFETIES
   2.1. THE UNIT SHALL SHUT DOWN WHEN THE EMERGENCY SHUTDOWN SWITCH IS ACTIVATED.

3. BOILER CONTROL
   3.1. THE SYSTEM CONSISTS OF ONE BOILER B-1 WITH (4) BOILER HEATING MODULES OPERATING . THE BOILER SHALL BE SCHEDULED THROUGH THE (BEMS). THE BURNERS SHALL BE CONTROLLED VIA THEIR INTERNAL CONTROLS . THE BOILER ISOLATION VALVE THROUGH THE BOILER VALVE CONTROLLER SHALL OPEN, AND THE BOILER SHALL MODULATE TO MAINTAIN THE HOT WATER LOOP TEMPERATURE OF 130 DEG. F. WHEN THE BOILER MODULE IS DISABLE THE ASSOCIATED BOILER ISOLATION VALVE, THROUGH THE BOILER VALVE CONTROLLER SHALL BE CLOSED.

   3.2 AN ALARM SHALL SOUND WHEN:
   a) HIGH TEMPERATURE HOT WATER OF 150 DEG F. (ADJ)
   b) LOW HOT WATER SUPPLY FLOW

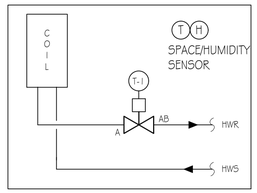
4. BOILER PUMP CONTROL
   4.1 EACH BOILER MODULE HAS IN INTEGRAL HOT WATER PUMP. EACH MODULE AND PUMP SHALL BE ENABLED AND DISABLED WITH ASSOCIATED BURNER TO MAINTAIN HOT WATER LOOP TEMPERATURE SET POINT VIA THE BOILER CONTROLLER. EACH BOILER MODULE AND ASSOCIATED PUMP SHALL BE SCHEDULED VIA THE BOILER CONTROLLER TO OPERATE TO EQUALIZE RUN TIMES.

   4.2 AN ALARM SHALL SOUND WHEN:
   a) PUMP FAILURE - STATUS OFF, COMMAND ON
   b) PUMP IN HAND - STATUS ON, COMMAND OFF

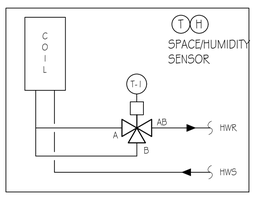
5. SECONDARY LOOP PUMPING:
   5.1 BOTH SECONDARY PUMPS (HWP-6 AND HWP-7) SHALL OPERATE AS LEAD LAG AS SCHEDULED THROUGH THE BEMS. IF SCHEDULED LEAD PUMP DOES NOT START UPON COMMAND, AN ALARM SHALL GENERATE AND THE LAG PUMP SHALL BE ENGAGED. SHOULD THE LAG PUMP FAIL TO OPERATE THE BOILER SHALL BE DISABLED AND AN ALARM SHALL SOUND.
   5.2 AN ALARM SHALL SOUND WHEN:
   a) HIGH TEMPERATURE HOT WATER OF 140 DEG F. (ADJ)
   b) LOW TEMPERATURE HOT WATER OF 110 DEG.F. (ADJ.)
   c) PUMP FAILURE - STATUS OFF, COMMAND ON
   d) PUMP IN HAND - STATUS ON, COMMAND OFF

6. SYSTEM FEEDER

   6.1 AN ALARM WILL SOUND WHEN:
   a.) PUMP IS NOT OPERATIONAL
   b.) FLUID LEVEL IN TANK IS LOW



2-WAY VALVE TYPICAL ALL REHEAT COILS EXCEPT RH-5 AND RH-11 APPLICATION

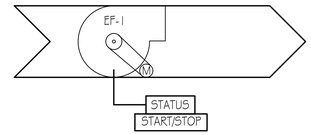


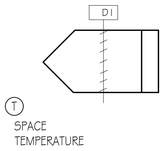
3-WAY VALVE FOR RH-5 AND RH-11 APPLICATION

2 REHEAT COIL CONTROL
NO SCALE

TYPICAL REHEAT COIL SEQUENCE OF OPERATION

1. REHEAT COIL VALVE CONTROL
   THE REHEAT COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT OF 75 DEG F. AS SENSED BY ROOM THERMOSTAT.
2. ALARMS
   2.1 AN ALARM SHALL SOUND WHEN:
   a) HIGH SPACE TEMPERATURE - WHEN SPACE TEMPERATURE IS ABOVE 80 DEG F. (ADJ.)
   b) LOW SPACE TEMPERATURE - WHEN SPACE TEMPERATURE DROPS BELOW 70 DEG. F. 9ADJ.)
   c) HIGH SPACE HUMIDITY - WHEN SPACE IS ABOVE 60 % RH (ADJ.)
   d) LOW SPACE HUMIDITY - WHEN SPACE RH% IS BELOW 35% (ADJ.)





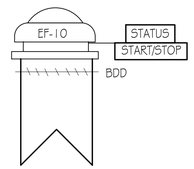
3 EXHAUST FAN CONTROL - EF-1 AND EF-3
NO SCALE

EXHAUST FAN SEQUENCES OF OPERATION

1. GENERAL
   THE EXHAUST FAN WILL AUTOMATICALLY START WHEN THE SPACE TEMPERATURE IS ABOVE 90 DEG F. AS SENSED BY ROOM THERMOSTAT.

2. FAN AND DAMPER CONTROL
   2.1. WHEN THE SPACE TEMPERATURE IS ABOVE 90 DEG. F (ADJ.) THE OA INTAKE DAMPER D-1 SHALL OPEN AND THE EXHAUST FAN SHALL BE ENABLED.
   2.2. WHEN THE SPACE TEMPERATURE IS BELOW 90 DEG .F. (ADJ.) THE DAMPER D-1SHALL CLOSE AND THE FAN WILL BE DISABLED.

   3.2 AN ALARM SHALL SOUND WHEN:
   a) HIGH HIGH SPACE TEMPERATURE OF 110 DEG F. (ADJ.)



4 EF-10 CONTROL
NO SCALE

EXHAUST FAN EF-10 SEQUENCE OF OPERATION

1. GENERAL
   1.1. THE EXHAUST FAN SHALL BE ENABLED WHEN AHU-2 IS ENABLED.
   1.2. WHEN THE FAN IS DISABLED WHEN AHU-2 IS DISABLED

   1.3 AN ALARM SHALL SOUND WHEN:
   a.) WHEN AHU-2 IS OPERATING BUT THE EXHAUST FAN DOES NOT RUN

BID SET

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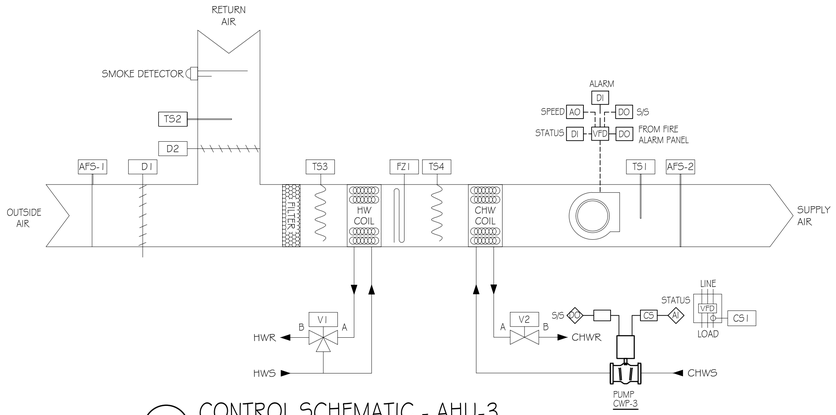
SHEET **M5.1** OF SHEETS

PLOTTED: 3/6/2023 @ 1:24:58 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\19049 - M5.1 Schematics.dwg



1 CONTROL SCHEMATIC - AHU-3

SCALE: NONE

AHU-3 SEQUENCES OF OPERATION

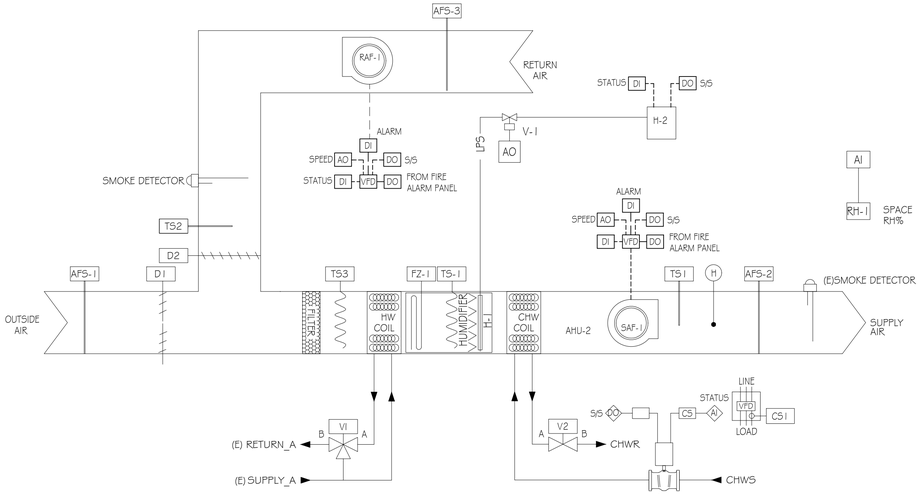
1. GENERAL
   - 1.1. THE UNIT SHALL RUN CONTINUOUSLY UNLESS COMMANDED OFF THRU THE BUILDING AUTOMATION SYSTEM (BAS) OR FIRE ALARM. UPON AHU START, RETURN, MINIMUM OUTDOOR AIR DAMPER SHALL OPEN TO MAINTAIN MINIMUM OUTSIDE AIR AND ACCOUNT FOR GENERAL EXHAUST, AND UPON PROOF OF DAMPER POSITION, SUPPLY FAN SHALL THEN START.
   - 1.2 WHEN UNIT IS DE-ENERGIZED, OUTSIDE AIR DAMPER(S), RETURN AIR DAMPERS, SHALL CLOSE.

2. SAFETIES
   - 2.1. THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A LOW LIMIT THERMOSTAT STATUS. LOW LIMIT THERMOSTAT, FZ-1, SHALL BE SET AT 38°F. PRE-HEAT COIL VALVES SHALL OPEN.
   - 2.2. THE UNIT SHALL MONITOR THE DISCHARGE AIR PRESSURE HI-SENSOR AND SHALL LIMIT THE SPEED OF THE SPEED OF THE SUPPLY FAN IF ITS HI-STATIC PRESSURE SETPOINT OF (2.0 IN WC ADJ) HAS BEEN EXCEEDED. THE SUPPLY FAN SHALL SHUTDOWN IF ITS HI-HI STATIC PRESSURE SETPOINT (5.0 IN WC ADJ) HAS BEEN EXCEEDED. THE SUPPLY FAN VFDS SHALL BE NORMALLY CONTROLLED BY THE SUPPLY STATIC PRESSURE SENSOR LOCATED 2/3 OF THE WAY DOWN THE DUCT AT NORMAL STATIC PRESSURE SETPOINT (1.5 IN WC ADJ). IF THE HIGH STATIC PRESSURE SENSOR CONTROL LOOP OUTPUT IS LESS THAN THE SUPPLY STATIC PRESSURE CONTROL LOOP, THEN THE FAN SPEED SHALL BE THE MINIMUM OUTPUT OF THESE TWO SEPARATE CONTROL LOOPS THAT REGULATE THE SUPPLY FAN SPEED. WHEN THE HI STATIC PRESSURE VALUE EXCEEDS THE HI STATIC SETPOINT, THE AHU SHALL SHUTDOWN.
   - 2.3. SUPPLY FAN SHALL SHUT DOWN UPON RECEIVING A SIGNAL FROM THE FIRE ALARM SYSTEM.

3. AIRFLOW CONTROL
   - 3.1. THE SUPPLY FANS, SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.
   - 3.2. THE CONTROLLER SHALL MEASURE INPUT FROM THE AIRFLOW STATION AFS-1, AND SHALL MODULATE THE SUPPLY FAN SPEED TO MAINTAIN REQUIRED SCHEDULED 5500 SUPPLY AIR CFM.
   - 3.3. IF THE AIR FLOW CFM DROPS BELOW 75% (ADJ.) AN ALARM SHALL BE INITIATED.

4. TEMPERATURE CONTROL
   - 4.1. THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A CONSTANT 50 °F DISCHARGE TEMPERATURE, T-1.
   - 4.2. THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL VALVE, V-3, TO MAINTAIN THIS DISCHARGE TEMPERATURE.
   - 4.3. THE COOLING COIL PUMP SHALL BE ENABLED WHENEVER:
     - 4.3.1. OUTSIDE AIR TEMPERATURE IS GREATER THAN 55 °F.
     - 4.3.2. AND THE ECONOMIZER IS DISABLED AT THE HIGH END OR FULLY OPEN.
     - 4.3.3. AND THE SUPPLY FAN STATUS IS ON.
     - 4.3.4. AND THE HEATING IS NOT ACTIVE.
   - 4.4. THE COOLING COIL VALVE, V-2, SHALL OPEN TO 50% WHENEVER THE FREEZESTAT IS ON.
   - 4.5. THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE, T-3, AND MODULATE THE HEATING COIL THREE WAY VALVE, V-1, TO MAINTAIN CALCULATED PREHEAT SETPOINT T-4 WHICH IS (T-1 SETPOINT - X), WHERE X IS VALUE TO COMPENSATE FOR FAN RISE TO MAINTAIN DESIRED DISCHARGE AIR TEMPERATURE AND NOT EXCEED T-1 SETPOINT.
   - 4.6. THE HEATING COIL SHALL BE ENABLED WHENEVER,
     - 4.6.1. OUTSIDE AIR TEMPERATURE IS LESS THAN 48 °F.
     - 4.6.2. THE SUPPLY FAN STATUS IS ON.
     - 4.6.3. THE COOLING IS NOT ACTIVE.
   - 4.7. THE HEATING COIL VALVE, V-1, SHALL MODULATE OPEN WHENEVER:
     - 4.7.1. THE OUTDOOR AIR DAMPER, D-1, IS AT MINIMUM POSITION AND THE MIXED AIR TEMPERATURE IS LESS THAN 53 °F.
   - 4.8. THE HEATING COIL VALVE, V-1, SHALL OPEN FULLY IF THE FREEZESTAT, FZ-1, IS ON.

5. MINIMUM OUTSIDE AIR VENTILATION:
   - 5.1. OUTSIDE AIR DAMPER D-1 SHALL OPEN TO MINIMUM POSITION. WHEN UNIT IS ENERGIZED IN NORMAL MODE (NON-ECONOMIZER), TO POSITION ESTABLISHED DURING TEST AND BALANCE TO MAINTAIN MINIMUM OUTSIDE AIRFLOW. AIR FLOW STATION AFS-1 SHALL MONITOR OUTSIDE AIRFLOW.



2 CONTROL SCHEMATIC - AHU-2

SCALE: NONE

AHU-2 / RAF-1 SEQUENCES OF OPERATION

1. GENERAL
   - 1.1. THE UNIT SHALL RUN CONTINUOUSLY UNLESS COMMANDED OFF THRU THE BUILDING AUTOMATION SYSTEM (BAS) OR FIRE ALARM. UPON AHU START, RETURN AIR DAMPER AND OUTSIDE AIR DAMPER SHALL OPEN FULLY. UPON PROOF OF DAMPER POSITIONS, THE SUPPLY FAN AND THE RETURN FAN SHALL THEN START.
   - 1.2 WHEN UNIT IS DE-ENERGIZED, OUTSIDE AIR DAMPER AND RETURN AIR DAMPERS, SHALL CLOSE.

2. SAFETIES
   - 2.1. THE UNIT AND RETURN FAN SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A LOW LIMIT THERMOSTAT STATUS. LOW LIMIT THERMOSTAT, FZ-1, SHALL BE SET AT 38°F. PRE-HEAT COIL VALVES SHALL OPEN.
   - 2.2. THE UNIT SHALL MONITOR THE DISCHARGE AIR PRESSURE HI-SENSOR AND SHALL LIMIT THE SPEED OF THE SPEED OF THE SUPPLY FAN IF ITS HI-STATIC PRESSURE SETPOINT OF (2.0 IN WC ADJ) HAS BEEN EXCEEDED. THE SUPPLY FAN SHALL SHUTDOWN IF ITS HI-HI STATIC PRESSURE SETPOINT (5.0 IN WC ADJ) HAS BEEN EXCEEDED. THE SUPPLY FAN VFD SHALL BE NORMALLY CONTROLLED BY THE SUPPLY STATIC PRESSURE SENSOR LOCATED 2/3 OF THE WAY DOWN THE DUCT AT NORMAL STATIC PRESSURE SETPOINT (1.5 IN WC ADJ). IF THE HIGH STATIC PRESSURE SENSOR CONTROL LOOP OUTPUT IS LESS THAN THE SUPPLY STATIC PRESSURE CONTROL LOOP, THEN THE FAN SPEED SHALL BE THE MINIMUM OUTPUT OF THESE TWO SEPARATE CONTROL LOOPS THAT REGULATE THE SUPPLY FAN SPEED. WHEN THE HI STATIC PRESSURE VALUE EXCEEDS THE HI-HII STATIC SETPOINT, THE AHU SHALL SHUTDOWN.
   - 2.3. SUPPLY AND RETURN FANS SHALL SHUT DOWN UPON RECEIVING A SIGNAL FROM THE FIRE ALARM SYSTEM.

3. AIRFLOW CONTROL
   - 3.1. THE SUPPLY FAN, SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.
   - 3.2. THE CONTROLLER SHALL MEASURE INPUT FROM THE AIRFLOW STATION AFS-2, AND SHALL MODULATE THE SUPPLY FAN SPEED TO MAINTAIN REQUIRED SCHEDULED SUPPLY AIR CFM.
   - 3.3. IF THE AIR FLOW CFM DROPS BELOW 75% (ADJ.) AN ALARM SHALL BE INITIATED.
   - 3.2. THE RETURN AIR FAN SHALL BE ENABLED WHEN AHU-2 SUPPLY FAN IS ENABLED. THE CONTROLLER SHALL MEASURE INPUT FROM THE AIRFLOW STATION AFS-3, AND SHALL MODULATE THE RETURN FAN SPEED TO MAINTAIN REQUIRED SCHEDULED RETURN AIR CFM. UPON A SHUT DOWN OF AHU-2, THE RETURN AIR FAN SHALL BE DISABLED.

4. TEMPERATURE CONTROL
   - 4.1. THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A CONSTANT 50 °F DISCHARGE TEMPERATURE, T-1.
   - 4.2. THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL VALVE, V-3, TO MAINTAIN THIS DISCHARGE TEMPERATURE.
   - 4.3. THE COOLING COIL PUMP SHALL BE ENABLED WHENEVER:
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     - 4.3.2. AND THE SUPPLY FAN STATUS IS ON.
     - 4.3.3. AND THE HEATING IS NOT ACTIVE.
   - 4.4. THE COOLING COIL VALVE, V-2, SHALL OPEN TO 50% WHENEVER THE FREEZESTAT IS ON.
   - 4.5. THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE, T-3, AND MODULATE THE HEATING COIL THREE WAY VALVE, V-1, TO MAINTAIN CALCULATED PREHEAT SETPOINT T-4 WHICH IS (T-1 SETPOINT - X), WHERE X IS VALUE TO COMPENSATE FOR FAN RISE TO MAINTAIN DESIRED DISCHARGE AIR TEMPERATURE AND NOT EXCEED T-1 SETPOINT.
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     - 4.6.3. THE COOLING IS NOT ACTIVE.
   - 4.7. THE HEATING COIL VALVE, V-1, SHALL MODULATE OPEN WHENEVER:
     - 4.7.1. THE OUTDOOR AIR DAMPER, D-1, IS AT MINIMUM POSITION AND THE MIXED AIR TEMPERATURE IS LESS THAN 53 °F.
   - 4.8. THE HEATING COIL VALVE, V-1, SHALL OPEN FULLY IF THE FREEZESTAT, FZ-1, IS ON.

5. HUMIDITY CONTROL
   - 5.1 THE HUMIDIFIER CONTROLLER SHALL MAINTAIN SPACE RELATIVE HUMIDIFY OF 50% (ADJ) ON A DROP IN SPACE RELATIVE HUMIDITY BELOW SETPOINT, THE HUMIDIFIER SHALL BE ENABLED UPON PROOF OF AIRFLOW AND CONTROL VALVE SHALL OPEN. ON A RISE IN SPACE HUMIDITY ABOVE SETPOINT, THE REVERSE SHALL OCCUR. THE CONTROLLER SHALL BE MONITORED VIA THE BMS. AN ALARM SHALL BE GENERATED OF SPACE RH% DROPS BELOW SETPOINT.

6. OUTSIDE AIR VENTILATION:
   - 6.1. OUTSIDE AIR DAMPER D-1 SHALL OPEN WHEN UNIT IS ENERGIZED IN NORMAL MODE TO POSITION ESTABLISHED DURING TEST AND BALANCE TO MAINTAIN CONSTANT OUTSIDE AIRFLOW CFM. AIR FLOW STATION AFS-1 SHALL MONITOR OUTSIDE AIRFLOW.

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 029457 ENGINEER CARL A. STUPKA 3/16/2023

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SHEET **M5.2** OF SHEETS

PLOTTED: 3/16/2023 @ 1:25:23 PM BY: TRISHA PELKEY
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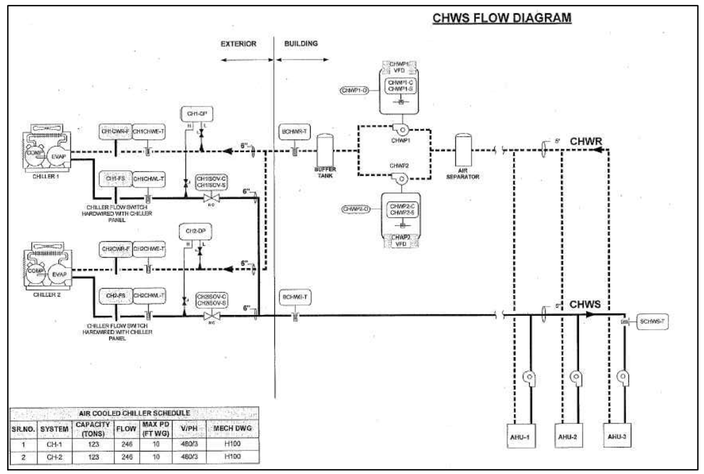
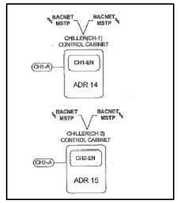


AIR COOLED CHILLER SCHEDULE						
SR.NO.	SYSTEM	CAPACITY (TONS)	FLOW	MAX PD (FT WG)	V/PH	MECH DWG
1	CH-1	123	246	10	460/3	H100
2	CH-2	123	246	10	460/3	H100



EXISTING CHILLED WATER SYSTEM SEQUENCES OF OPERATION

1. ENABLE THE SYSTEM THE THE BUILDING ENERGEY MANAGEMENT SYSTEM (BEMS) OR WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 40 DEG. F. (ADJ.).
2. WHEN ENABLED THE CHILLED WATER SYSTEM WILL START WHEN ANY AIR HANDLING UNIT IS CALLING FOR COOLING OR DEHUMIDIFICATION.

CHILLED WATER SYSTEM START SEQUENCE:

1. MODULATE CHILLED WATER ISOLATION VALVE OPEN FOR THE LEAD CHILLER.
2. MONITOR CHILLED WATER FLOW METER FOR LEAD CHILLER
3. COMMAND PRIMARY CHILLED WATER PUMP ON AT MINIMUM FLOW
4. MONITOR PUMP OPERATION BASED ON MOTOR STATUS.
5. CONFIRM CHILLED WATER FLOW VIA DIFFERENTIAL PRESSURE FLOW SENSOR.

NOTE!!! - IF DIFFERENTIAL PRESSURE FLOW SENSOR INDICATED FLOW FAILURE, TERMINATE START SEQUENCE AND CLOSE CHILLER ISOLATION VALVE(S) AND INITIATE ALARM

6. INCREASE PUMP(S) SPEED TO MAINTAIN REQUIRED FLOW RATE THROUGH THE LEAD CHILLER AS INDICATED BY FLOW METER POINT.
7. COMMAND LEAD CHILLER ON THROUGH INTERFACE WITH CHILLER OEM CONTROLLER.
8. MONITOR LEAD CHILLER STATUS / FAULT.
9. WHEN LEAD CHILLER IS AT 80% (ADJ.) AND THERE IS A CONTINUED CALL FOR COOLING, THE LAG CHILLER SHALL START AND THE LAG PUMP SHALL BE ENGAGED. CHILLER AND PUMP SPEED SHALL NOT INCREASE FASTER THAN A RATE OF 25% PER MINUTE.
10. THE LEAD CHILLER AND PUMP SHALL REDUCE SPEED AT A RATE AT 25% PER MINUTE UNTIL BOTH CHILLER AND PUMPS ARE OPERATING AT EQUAL RATES.
11. AS AN INCREASED CALL FOR COOLING IN NEEDED, BOTH CHILLERS AND PUMPS WILL MODULATE EQUALLY TO SATISFY LOAD.
12. UPON A DECREASE IN COOLING LOAD THE REVERSE SHALL OCCUR.
13. FOR IF OEM INDICATED A CHILLER FAULT, COMMEND CHILLER OFF, CLOSE CHILLER ISOLATION VALVE AND INITIATE ALARM.INITIATE START OF NEXT CHILLER IN SEQUENCE.
14. UPON POWER RECONNECTION AFTER POWER OUTAGE, CHILLER WILL RESTART, IF COMMANDED ON AFTER 3 MINUTE TIME DELAY.

NOTE: ROTATE CHILLERS AND PUMPS ON/OFF IN LEAD / LAG/ CASCADE SEQUENCING OF PARALLEL CONFIGURED COMPONENTS.

15. THE DDC SYSTEM WILL INCORPORATE LEAD/LAG SEQUENCE AS PART OF ANY SEQUENCE OF OPERATION REQUIRING SEQUENTIAL ON/OFF STAGING AND CASCADING OF MULTIPLE HVAC COMPONENTS DESIGNED TO OPERATE IN PARALLEL AS FOLLOWS:
    1.) DESIGNATE EACH HVAC COMPONENT AS LEAD IN THE REVERSE ORDER OF ITS NUMBER OF OPERATIONAL HOURS.
    2.) DESIGNATE EACH HVAC COMPONENT AS LAG IN THE DIRECT ORDER OF ITS NUMBER OF OPERATIONAL HOURS

EXISTING CHILLED WATER SYSTEM TEMPERATURE AND FLOW CONTROL

1. MONITOR CHILLED WATER SUPPLY TEMPERATURE AT EACH CHILLER.
2. MONITOR COMMON CHILLED WATER SUPPLY TEMPERATURE.
3. MONITOR COMMON CHILLED WATER RETURN TEMPERATURE.
4. EACH CHILLERS CHILLED WATER SUPPLY TEMPERATURE SET POINT IS 42 DEG. F.
5. MODULATE PRIMARY CHILLER WATER PUMP(S) SPEED AT A RATE NO FASTER THAN 25% PER MINUTE TO MAINTAIN THE COMMON CHILLED WATER TEMPERATURE AT SET POINT LOCATED AT THE END OF THE SUPPLY LOOP.
6. IF THE CHILLED WATER FLOW THROUGH ANY OPERATING CHILLER FALLS BELOW THE MINIMUM FLOW REQUIRED FOR THE CHILLER MANUFACTURER, AS INDICATED BY THE INDIVIDUAL CHILLER FLOW METERM INCREASE CHILLED WATER PUMP(S) SPEED TO MAINTAIN FLOW RATES AT SET POINT.
7. START STOP FOR EACH CHILLER THROUGH CHILLER OEM IS AS FOLLOWS:
    1.) FOR EACH OPERATING CHILLER, COMPUTE CHILLER PERCENT RUNNING LOAD AMPS (%RLA)
    2.) SET %RLA HIGH LIMIT SET POINT TO 80% (ADJ.)
        SET %RLA LOW LIMIT SET POINT TO 15% WHEN ONLY ONE CHILLER IS OPERATING OR TO 45% WHEN MULTIPLE CHILLERS ARE OPERATING.
    3.) IF LEAD CHILLER S % RLA EXCEED THE HIGH LIMIT SETPOINT FOR 15 MINUTES, COMMAND THE LAG CHILLER ON IN ACCORDANCE TO LEAD CHILLER START SEQUENCE.
    4.) LAG CHILLERS CHILLED WATER ISOLATION VALVE SHALL MODULATE OPEN AT A RATE OF NOT FASTER THAN 25% AND THE LAG CHILLED WATER PUMP SHALL BE ENABLED.
8. PRIMARY CHILLED WATER PUMP(S) WILL CONTINUE TO RUN FOR 1 MINUTE AFTER LAST OPERATING CHILLER IS COMMANDED OFF OR IS CYCLED OFF. BY ITS OEM CONTROLLER.

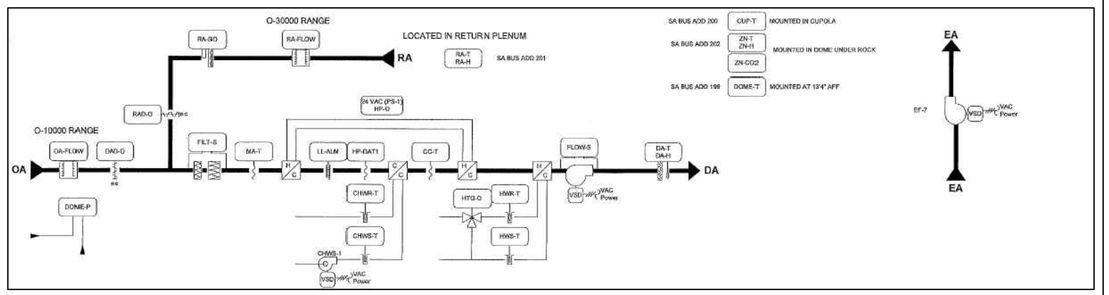
CHILLER CONTROL INTERFACE: PRIMARY CHILLER CONTROL IS PROVIDED BY OEM CONTROLLER INTEFACED WITH DDC SYSTEM.

1. CHILLER LEAVING WATER TEMPERATURE WILL BE CONTROLLED BY OEM CONTROLLER BASED ON CHILLED WATER SUPPLY TEMPERATURE SET POINT.

MONITOR THE FOLLOWING CHILLER OPERATIONS/ STATUS POINTS VIA THE OEM CONTROLLER.

1. CHILLER OPERATING HOURS.
2. EVAPORATOR REFRIGERANT TEMPERATURE.
3. CONDENSER REFRIGERANT TEMPERATURE.
4. PERCENT (%) RATED LOAD AMPS
5. MINIMUM CHILLED WATER SUPPLY STATUS
6. LOW LOAD SHUTDOWN STATUS.
7. CHILLER STATUS/FAULT ALARM.
8. INITIATE ALARM IS CHILLER CONTROLLER STATUS/FAULT ALARM IS ISSUED BY OEM CONTROLLER.
9. EVAPORATOR WATER TEMPERATURE.
10. INITIATE ALARM IS EVAPORATOR WATER TEMPERATURE FALLS BELOW 40 DEG. F.

1 EXISTING CHILLER CONTROL SCHEMATIC
SCALE: NONE



AHU-1

Unit shall run continuously.

Maintain space temperature per attached tables. Do not change or reset zone temperature faster than 2°F per hour.

On a call for cooling, set cooling coil discharge air to 48°F and supply air (reheat) to 65°F. Modulate speed of fan to maintain space temperature set-point as measured at lower elevation mounted sensor.

If the fan reaches 100% speed and on a continued rise in space temperature, reset supply air (reheat) downward. When reheat is fully closed and on a further rise in space temperature, modulate heat pipe control valve closed to reduce supply air temperature as required to a minimum of 60°F.

On a rise in upper elevation temperature, modulate outdoor air damper and increase fan speed as required to maintain dome pressure as EF-7 increases exhaust rate.

If unit reaches minimum speed of 30%, reset supply air (reheat) temperature up as required, to a maximum of 90°F, to maintain space temperature. If the space humidity – as sensed by a wall sensor – rises above set-point of 30% RH (adjustable), increase fan speed and modulate reheat to maintain humidity set point. The cooling air discharge temperature set-point shall remain at 48°F until the space humidity drops and remains below 30% RH (adjustable) for a set period of time. At that point, the system control shall revert back to variable discharge temperature controlled by dome space temperature. If discharge temperature is at 90°F and there is still a call for heat, increase unit speed to maintain space temperature.

If mixed air temperature is below cooling coil discharge set point, close heat pipe control valve.

If CO2 sensor indicates that space CO2 is above 700 ppm, modulate outside air and return dampers to bring in more outside air. If CO2 sensor indicates CO2 is below 400 ppm, modulate outside air damper to minimum required to makeup exhaust.

Partial Economizer: If outdoor enthalpy is below the indoor enthalpy, modulate outside and return air dampers to maximize outdoor air with a minimum mixed air temperature equal to the cooling coil discharge air set-point. Relief air will exit through EF-7 in the cupola. If indoor relative humidity drops below 20% (adjustable) or rises above 30%, cycle out of economizer into normal mechanical cooling.

Unit will stop on a freeze condition through hard wire interlock. Unit will stop on detection of products of combustion through the building fire alarm system.

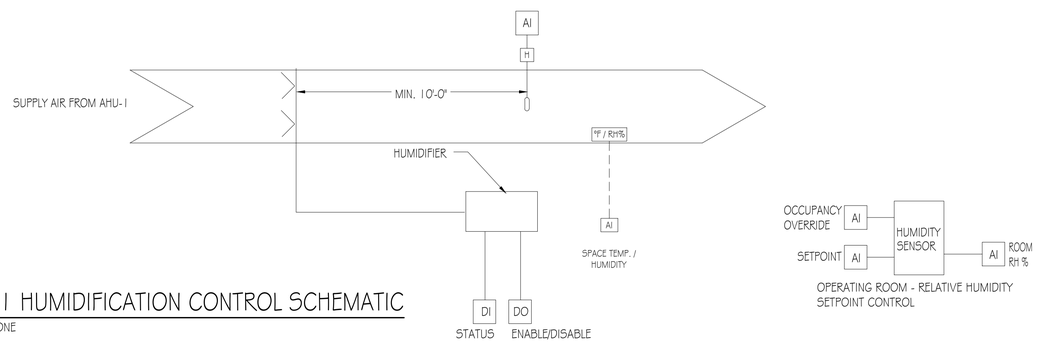
EF-7

Unit shall run as required to maintain dome pressure and upper elevation temperature. Energize and modulate fan speed as required to maintain slightly positive indoor dome pressure relative to outdoor. On a rise in upper elevation temperature above set point (adjustable), energize fan and modulate speed as required to maintain upper elevation set point.

2 EXISTING AHU-1 CONTROL SCHEMATIC
SCALE: NONE

HUMIDIFIER CONTROL SEQUENCE OF OPERATION

1. THE HUMIDIFIER CONTROLLER SHALL MAINTAIN SPACE RELATIVE HUMIDIFY OF 50% (ADJ) ON A DROP IN SPACE RELATIVE HUMIDITY BELOW SETPOINT, THE HUMIDIFIER SHALL BE ENABLED UPON PROOF OF AIRFLOW AND CONTROL VALVE SHALL OPEN. ON A RISE IN SPACE HUMIDITY ABOVE SETPOINT, THE REVERSE SHALL OCCUR. THE CONTROLLER SHALL BE MONITORED VIA THE BMS. AN ALARM SHALL BE GENERATED OF SPACE RH% DROPS BELOW SETPOINT.



3 AHU-1 HUMIDIFICATION CONTROL SCHEMATIC
SCALE: NONE

BID SET

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Spring Stoops McCullen Engineering
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Phone: 919-403-8000
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NORTH CAROLINA PROFESSIONAL SEAL 040325 ENGINEER CARL A. STUPKA 3/16/2023

North Carolina Zoo
Sonaran Desert Dome - HVAC
Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

CONTROL SCHEMATICS
MECHANICAL

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET
M5.3
OF SHEETS

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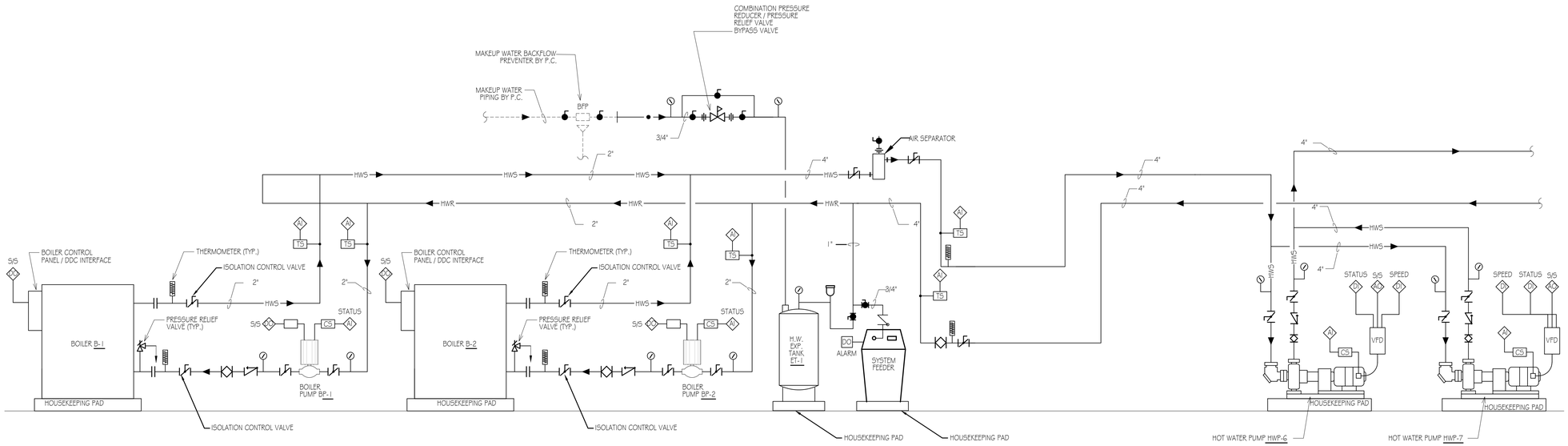
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\19049 - M5.3 Schematics.dwg



1 HEATING HOT WATER SYSTEM SCHEMATIC -ALTERNATE M-1

NO SCALE

HEATING SYSTEM SEQUENCES OF OPERATION

1. GENERAL
THE HEATING SYSTEM WILL AUTOMATICALLY START WHEN THE SYSTEM IS ENABLED AND DOSABLED THROUGH THE BUILDING ENERGY MANAGEMENT SYSTEM (BEMS)

2. SAFETIES
2.1. THE UNIT SHALL SHUT DOWN WHEN THE EMERGENCY SHUTDOWN SWITCH IS ACTIVATED.

3. BOILER CONTROL
3.1. THE SYSTEM CONSISTS OF TWO BOILERS B-1 AND B-2 OPERATING LEAD-LAG AS SCHEDULED THROUGH THE (BEMS). THE BURNERS SHALL BE CONTROLLED VIA THEIR INTERNAL CONTROLS . THE LEAD BOILER ISOLATION VALVES THROUGH THE BOILER VALVE CONTROLLER SHALL OPEN AND THE ASSOCIATED BOILER CIRCULATOR PUMP SHALL BE ENABLED. THE BOILER SHALL MODULATE TO MAINTAIN THE HOT WATER LOOP TEMPERATURE OF 130 DEG. F. THE LAG BOILER ISOLATION VALVES SHALL BE THROUGH THE BOILER VALVE CONTROLLER SHALL BE CLOSED AND THE ASSOCIATED BOILER CIRCULATOR PUMP SHALL BE DISABLED. IF SCHEDULED LEAD BOILER DOES NOT START UPON COMMAND AN ALARM SHALL GENERATE, AND THE LAG BOILER AND BOILER CIRCULATOR PUMP SHALL BE ENGAGED.

3.2 AN ALARM SHALL SOUND WHEN:
a) HIGH TEMPERTURE HOT WATER OF 150 DEG F. (ADJ)
b) LOW HOT WATER SUPPLY FLOW

4. BOILER CIRCULATOR PUMP CONTROL
4.1 EACH BOILER HOT WATER PUMP BP-1 AND BP-2 SHALL BE INTERLOCKED WITH THEIR RESPECTIVE BOILER AND SHALL BE ENABLED AND DISABLED VIA THE BOILER.
4.2 AN ALARM SHALL SOUND WHEN:
a) PUMP FAILURE - STATUS OFF, COMMAND ON
b) PUMP IN HAND - STATUS ON, COMMAND OFF

5. SECONDARY LOOP PUMPING:
5.1 BOTH SECONDARY PUMPS (HWP-6 AND HWP-7) SHALL OPERATE AS LEAD LAG AS SCHEDULED THROUGH THE BEMS. IF SCHEDULED LEAD PUMP DOES NOT START UPON COMMAND, AN ALARM SHALL GENERATE AND THE LAG PUMP SHALL BE ENGAGED. SHOULD THE LAG PUMP FAIL TO OPERATE THE BOILER SHALL BE DISABLED AND AN ALARM SHALL SOUND.
5.2 AN ALARM SHALL SOUND WHEN:
a) HIGH TEMPERTURE HOT WATER OF 140 DEG F. (ADJ)
b) LOW TEMPERATURE HOT WATER OF 110 DEG.F. (ADJ.)
c) PUMP FAILURE - STATUS OFF, COMMAND ON
d) PUMP IN HAND - STATUS ON, COMMAND OFF

6. SYSTEM FEEDER

6.1 AN ALARM WILL SOUND WHEN:
a.) PUMP IS NOT OPERATIONAL
b.) FLUID LEVEL IN TANK IS LOW

BID SET

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029257 CARL A. STUPKA
3/16/2023

North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

CONTROL SCHEMATICS
MECHANICAL
ALTERNATE M-1

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049
SHEET: **M5.4** OF SHEETS	

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AIR HANDLING UNIT SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	SERVES	UNIT SIZE	SUPPLY AIR CFM	MIN OA AIR CFM	MAX. OA AIR CFM	T.S.P. (IN. W.G.)	E.S.P. (IN. W.G.)	COOLING COIL - ENTERING WATER TEMPERATURE 42°F - LEAVING WATER TEMPERATURE 50°F												PREHEAT COIL ENTERING WATER TEMPERATURE 110°F LEAVING WATER TEMPERATURE 95°F							ELECTRICAL		SYSTEM TYPE	REMARKS
										VELOCITY FPM	TOTAL CAPACITY (MBH)	TOTAL CAPACITY (TONS)	SENSIBLE CAPACITY (MBH)	GPM	MAX. WPD. FT. HD.	MAX. APD. IN WG.	EAT DB	EAT WB	LAT DB	LAT WB	FPI	ROWS	HEATING CAPACITY (MBH)	GPM	MAX. WPD. FT. HD	MAX. APD. IN. WG.	FPI	ROWS	EAT	LAT	FAN MOTOR (HP)	VOLT/ PHASE		
AHU-2	TRANE	PERFORMANCE CLIMATE CHANGER (CSAA)	ANIMAL HOLD	17	7,000	2,000	2,000	4.6"	1.75"	467	422.5	35	262.7	57	12.7	.909	83.0	69.0	49.0	48.9	13	8	303.66	31.0	1.74	.249	50	4	10	90.0	15	480/3	MULTI-ZONE CAV	1,2,3,4,5,6,7,8,9,10,11
AHU-3	TRANE	PERFORMANCE CLIMATE CHANGER (CSAA)	OFFICE	12	5,500	1,100	----	3.5"	1.75"	447	305.85	25.5	194.0	77	13.25	0.84	80.0	67.0	48.0	47.8	12	6	95.1	6.0	0.42	0.06	9	1	44.0	60.0	7.5	480/3	MULTI-ZONE CAV	1,2,3,4,5,6,7,8,9,10,11

AIR HANDLING UNIT SCHEDULE REMARKS:

1. DESIGN BASIS - TRANE, APPROVED EQUALS BY CARRIER OR DAIKIN MCQUAY.
2. VERTICAL UNIT ARRANGEMENT.
3. PROVIDE WITH HINGED ACCESS DOORS ON DRIVE SIDE OF UNIT.
4. PROVIDE WITH DOUBLE WALL STAINLESS STEEL DRAIN PAN POSITIVELY SLOPED TO DRAIN CONNECTION.
5. COOLING COIL CAPACITIES AND FLOW RATES BASED ON 42°F EWT AND 50°F LWT.
6. PREHEAT COIL CAPACITIES AND FLOW RATES BASED ON 130°F EWT AND 95°F LWT.
7. PROVIDE WITH 2-WAY DDC CHILLED WATER CONTROL VALVE.
8. PROVIDE WITH UNIT MOUNTED VARIABLE FREQUENCY DRIVES WITH INTEGRAL BYPASS SWITCH.
9. PROVIDE WITH FLAT FILTER SECTION AND 2" PLEATED MERV 13 FILTER MEDIA (MAXIMUM 425 FPM FACE VELOCITY).
10. PROVIDE WITH FAN SECTION WITH BELT DRIVE HOUSED FAN.
11. PROVIDE WITH LARGE ACCESS SECTION

LOUVER SCHEDULE

TAG	MANUFACTURER	SIZE WxH	SERVICE	CFM	VELOCITY FPM	APD (in.w.c.)	SQ.FT.FA
EL-1	GREENHECK EDD-401	24"x12"	EF-1	400	750	.08	1.88
IL-1	GREENHECK EDD-401	24"x18"	ELECTRIC ROOM	400	380	.025	1.23
EL-2	GREENHECK EDD-401	24"x24"	EF-3	1300	750	.08	1.88

GAS FIRED HUMIDIFIER SCHEDULE

NO.	SERVICE	OUTDOOR UNIT							DISPERSION										NOTES
		TYPE	MODEL NO.	QUANTITY	GAS INPUT MBH	CAPACITY (lb/hr.)	VOLT/PH	AMPERAGE	NO.	CFM	MODEL	LOAD (lb/hr)	DUCT SIZE	ABSORPTION DISTANCE	APD (in. w.c.)	ENTERING AIR °F	TUBE DIA.	NO. OF TUBES	
SG-1	(E)AHU-1	PROPANE	PURE GX-4	1	305	250	120/1	4.0	HU-1	25000	PURE INSTY-FAC	250	40"W"x40"H	15"	0.063	49°F	2"	14	1 - 8

GAS FIRED HUMIDIFIER NOTES

1 SELECTION BASED ON DRI-STEEM. MULTIPLE MANIFOLD, INSULATED TUBES.
2 OUTDOOR UNIT TO BE PROVIDED WITH MANUFACTURERS OUTDOOR ENCLOSURE WITH HEATER AND VENT. FAN
3 24V MODULATING STEAM CONTROL VALVE.
4 HUMIDIFIER PROVIDED AND MOUNTED BY MECHANICAL CONTRACTOR
5 PROVIDE WITH MODULATING HIGH LIMIT HUMIDISTAT
6 PROVIDE WITH AIR PROVING SWITCH
7 PROVIDE WITH CONDENSATE NEUTRALIZER
8 PROVIDE WITH INTEGRAL DRAIN TEMPERING.

ELECTRIC HUMIDIFIER SCHEDULE

TAG	QTY	LOAD (LBS/HR)	STEAM GENERATOR MODEL	VOLT/ PHASE	kW	WATER TYPE	GENERATOR OUTPUT (LBS/HR)
H-2	1	99.00	PURE ES-33	480/3	34	POTABLE	102.0

HEATING COIL SCHEDULE

TAG	MANUFACTURER	SIZE	SERVICE	CFM	EAT	FPM	LAT	MBH	GPM	EWT.	LWT	WPD FT HD	APD IN. WG.	ROWS/FIN	SYSTEM
RH-1	AEROFIN	12"x12"	KANGAROO RAT	400	45°F	400	95°F	21.6	1.5	120°F	110°F	0.2	0.34	7/5	AHU-2
RH-2	AEROFIN	12x12"	RINGTAIL CAT	600	45°F	480	95°F	32.4	2.2	120°F	110°F	0.4	0.48	7/5	AHU-2
RH-3	AEROFIN	12"x12"	PALLID BAT	380	45°F	380	95°F	20.5	1.4	120°F	110°F	0.1	0.31	7/5	AHU-2
RH-4	AEROFIN	12"x12"	PALLID BAT	380	45°F	380	95°F	20.5	1.4	120°F	110°F	0.1	0.31	7/5	AHU-2
RH-5	AEROFIN	12"x6	VAMPIRE BAT	90	45°F	90	95°F	4.9	0.5	120°F	110°F	0.01	0.01	4/5	AHU-2
RH-6	AEROFIN	16"x12"	SNAKE HOLDING	525	45°F	394	95°F	28.4	2.0	120°F	110°F	0.7	0.29	6/5	AHU-3
RH-7	AEROFIN	12"x12"	LIZARD HOLDING	300	45°F	300	95°F	16.2	1.1	120°F	110°F	0.2	0.17	6/5	AHU-2
RH-8	AEROFIN	12"x12"	AMPHIBIAN HOLD	225	45°F	225	95°F	12.2	.9	120°F	110°F	0.1	0.1	6/5	AHU-2
RH-9	AEROFIN	12"x12"	BIRD HOLDING	300	45°F	300	95°F	16.2	1.1	120°F	110°F	0.2	0.17	6/5	AHU-2
RH-10	AEROFIN	24"x18"	HOLDING AISLE	1500	45°F	500	95°F	81.0	5.5	120°F	110°F	2.4	0.49	4/9	AHU-2
RH-11	AEROFIN	12"x12"	OCELOT	500	45°F	500	95°F	27.0	2.8	120°F	110°F	0.2	0.59	5/5	AHU-2
RH-12	AEROFIN	12"x12"	JAGUARUNDI	500	45°F	500	95°F	27.0	2.8	120°F	110°F	0.2	0.59	5/5	AHU-2
RH-13	AEROFIN	24x12"	DIURNAL HOLDING	1000	45°F	500	95°F	54.0	3.7	120°F	110°F	1.2	0.52	7/5	AHU-2
RH-14	AEROFIN	40"x30"	VISITOR	4000	45°F	480	95°F	216.1	14.6	120°F	110°F	1.8	0.41	6/5	AHU-3
RH-15	AEROFIN	16"x12"	STAFF ZONE	650	45°F	488	95°F	35.1	2.4	120°F	110°F	1.1	0.49	7/5	AHU-3

FAN SCHEDULE

TAG	SERVICE	LOCATION	TYPE	CFM	E.S.P.	MOTOR				REMARKS	MANUFACTURER - MODEL
						HP	WATTS	VOLT	PH		
EF-1	EXHAUST	ELECTRICAL ROOM	INLINE	400	.3	.06	---	120	1	2,3	GREENHECK CSP-700
EF-10	CAT HOLDING EXHAUST	ROOF	DOME	2000	.60	1/2	--	120	1	1	GREENHECK GB-160
RAF-2	AHU-2 RETURN	LEVEL 1	INLINE	4200	1.75	3	--	460	3	2	GREENHECK BSQ-180
EF-3	EXHAUST	BOILER ROOM	INLINE	1300	.50	---	700	120	1	2,3	GREENHECK CSPA-1410

REMARKS:

1. MOUNT FAN ON EXISTING ROOF CURB. PROVIDED CURB ADAPTER AS NEEDED FOR PROPER FIT,
2. PROVIDE VIBRATION ISOLATION HANGERS TO HANG FAN FROM STRUCTURE.
3. PROVIDE WITH SPEED CONTROLLER

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 042548 ENGINEER CARL A. STUPKA

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License Number C-2584

North Carolina Zoo
Sonaran Desert Dome - HVAC
Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

SCHEDULES

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN	CHECKED
T. PELKEY	C. STUPKA
CLIENT JOB NO.	SSME JOB NO.
--	19049

SHEET
M6.1
OF SHEETS

19049 – M6.1 SCHEDULES.DWG

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BOILER SCHEDULE - ALTERNATE M-1

TAG	MANUFACTURER	MODEL #	SERVICE	LOCATION	TYPE	FUEL TYPE	MAX. GAS PRESS. (in.w.c.)	MIN. GAS PRESS. (in.w.c.)	MAX. INPUT (MBH)	MAX. OUTPUT (MBH)	COMBUST. EFF.	FLUE VENT SIZE	COMB. AIR SIZE	FLUID					ELECTRICAL	REMARKS
														FLUID	GPM	TEMP. IN	TEMP. OUT	P.D.	V/PH	
B-1	AERCO	BMK-1500P	HEATING HOT WATER	MER	HIGH EFFICIENCY CONDENSING	PROPANE	14"	4"	1,500.0	1,395	94.0	6" DIA.	6" DIA.	WATER	96.0	110°F	130°F	6.4'	120/1	1 - 7
B-2	AERCO	BMK-1500P	HEATING HOT WATER	MER	HIGH EFFICIENCY CONDENSING	PROPANE	PROPANE	PROPANE	1,500.0	1,395	94.0	6" DIA.	6" DIA.	WATER	96.0	110°F	130°F	6.4'	120/1	1 - 7

BOILER SCHEDULE REMARKS:

1. DESIGN BASIS - AERCO, APPROVED EQUALS BY WEIL-MCLAIN OR LOCHINVAR.
2. PROVIDE AL29-4C VENT.
3. PROVIDE WITH ADVANCED CONTROL SYSTEM WITH TOUCH SCREEN INTERFACE, CIRCULATOR (PRIMARY PUMP) CONTROL AND OUTDOOR AIR RESET.
4. PROVIDE WITH BACNET CONTROL INTERFACE CARD FOR REMOTE CONTROL AND MONITORING OF BOILER OPERATING POINTS.
5. PROVIDE WITH SEALED COMBUSTION (SIDEWALL DIRECT EXHAUST / FLUE VENT AND COMBUSTION AIR INTAKE).
6. PROVIDE WITH CONDENSATE TRAP ASSEMBLY WITH COOLING CHAMBER / CONDENSATE NEUTRALIZATION KIT.
7. MAXIMUM PHYSICAL DIMENSIONS: 7'-0" LONG x 3'-0" WIDE x 4'-6" HIGH.

ARRAY BOILER SCHEDULE - BASE BID

TAG	MANUFACTURER	MODEL #	SERVICE	LOCATION	TYPE	FUEL TYPE	MAX. GAS PRESS. (in.w.c.)	MIN. GAS PRESS. (in.w.c.)	MAX. INPUT (MBH)	MIN. INPUT (MBH)	COMBUST. EFF.	FLUE VENT SIZE	COMB. AIR SIZE	FLUID					ELECTRICAL	REMARKS
														FLUID	GPM	TEMP. IN	TEMP. OUT	P.D.	V/PH	
B-1	REILLO	AR 2000	HEATING HOT WATER	MER	HIGH EFFICIENCY CONDENSING	PROPANE	20"	8"	2,000	100	96.1.0	8" DIA.	8" DIA.	WATER	107.0	110°F	130°F	6.4'	120/1	1 - 7

BOILER SCHEDULE REMARKS:

1. SINGLE POINT ELECTRICAL CONNECTION.
2. PROVIDE CPVC, STAINLESS STEEL OR AL29-4C FOR VENT
3. PROVIDE WITH ADVANCED CONTROL SYSTEM WITH TOUCH SCREEN INTERFACE, CIRCULATOR (PRIMARY PUMP) CONTROL AND OUTDOOR AIR RESET.
4. PROVIDE WITH BACNET CONTROL INTERFACE CARD FOR REMOTE CONTROL AND MONITORING OF BOILER OPERATING POINTS.
5. PROVIDE WITH SEALED COMBUSTION (SIDEWALL DIRECT EXHAUST / FLUE VENT AND COMBUSTION AIR INTAKE).
6. PROVIDE WITH CONDENSATE TRAP ASSEMBLY WITH COOLING CHAMBER / CONDENSATE NEUTRALIZATION KIT.
7. MAXIMUM PHYSICAL DIMENSIONS: 6'-0" LONG x 3'-0" WIDE x 7'-0" HIGH.
8. BOILER PUMPS ARE INTEGRAL TO BOILER.

PUMP SCHEDULE

TAG	MANUFACTURER	MODEL #	SERVICE	LOCATION	TYPE	CIRCULATING FLUID					CONN. SIZE	EFFICIENCY	ELECTRICAL			COMMENTS	REMARKS
						GPM	HEAD	FLUID	TEMP.	S.G.			HP	V/PH	RPM		
BP-1	TACO	VR-30	BOILER PUMP	MER	INLINE	96	35'	WATER	110°F	1.00	3"	---	2	480/3	---	ALT. M-1	1,2,3,4
BP-2	TACO	VR-30	BOILER PUMP	MER	INLINE	96	35'	WATER	110°F	1.00	3"	---	2	480/3	---	ALT. M-1	1,2,3,4
HWP-6	TACO	FI2009D	PRIMARY HOT WATER PUMP	MER	BASE MOUNTED END SUCTION	160	90'	WATER	130°F	1.00	2-1/2"x1-1/2"	73%	7.5	480/3	1760	BASE BID	1,2,5
HWP-7	TACO	FI2009D	PRIMARY HOT WATER PUMP	MER	BASE MOUNTED END SUCTION	160	90'	WATER	130°F	1.00	2-1/2"x1-1/2"	73%	7.5	480/3	1760	BASE BID	1,2,5
CWP-2	TACO	KV-1506D	AHU-2 CHILLED WATER PUMP	MER	INLINE	57	12'	WATER	42°F	1.00	2"	49%	.50	480/3	1760	BASE BID	1,2,3,4
CWP-3	TACO	KV 2006D	AHU-3 CHILLED WATER PUMP	MER	INLINE	77	20'	WATER	42°F	1.00	2"	76%	.75	480/3	1160	BASE BID	1,2,5

PUMP SCHEDULE REMARKS:

1. DESIGN BASIS - TACO, APPROVED EQUALS BY ARMSTRONG, BELL & GOSSETT PUMPS.
2. PROVIDE WITH PREMIUM EFFICIENCY MOTOR.
3. PROVIDE WITH ECM MOTOR.
4. SELF-SENSING / SELF-BALANCING VARIABLE SPEED PUMP WITH INTEGRAL ON-BOARD ELECTRONIC SPEED CONTROLLER.
5. SELF-SENSING / SELF-BALANCING VARIABLE SPEED PUMP WITH UNIT MOUNTED VFD AND BYPASS.

EXPANSION TANK SCHEDULE

TAG	SERVICE	LOCATION	TYPE	TANK VOL.	ACCEPT. VOL.	SYSTEM TEMP. RANGE		SYSTEM PRESSURES (PSIG)			REMARKS
						MIN. (FILL)	MAX. (OP.)	FILL	TANK	PRV	
ET-1	HEATING HOT WATER	BOILER ROOM	DIAPHRAGM	79.0 GAL.	43.0 GAL.	40°F	150°F	20.0	25.0	30.0	1,2

REMARKS:

1. DESIGN BASIS - TACO # CBX-300. APPROVED EQUALS BY BELL & GOSSET, PATTERSON PUMPS OR ARMSTRONG.
2. MINIMUM 1" SIZE PIPE TO TANK AND 3/4" SIZE PIPE FOR COLD WATER FILL (MAKE-UP WATER).

CONTROL VALVE SCHEDULE

ITEM	SYSTEM	SERVICE	QTY	SIZE	MEDIUM	FLOW GPM	MAX.PRESS DIFF. (psi)	CONFIGURATION	CONNECTION	ACTUATOR CONTROL	FAIL POSITION
1	AHU-3	PREHEAT	1	1/2"	WATER	6.0	5.0	3-WAY	THREADED	24 VAC ON/OFF	NORMAL
2	AHU-3	CHILLED WATER	1	2"	WATER	77	5.0	2-WAY	FLANGED	24 VAC ON/OFF	CLOSED
3	RH-2	REHEAT	1	1/2"	WATER	3.0	5.0	2-WAY	THREADED	0-10 VDC PROP	LAST POSITION
4	RH-3	REHEAT	1	1/2"	WATER	2.0	5.0	2-WAY	THREADED	0-10 VDC PROP	LAST POSITION
5	RH-4	REHEAT	1	1/2"	WATER	2.0	5.0	2-WAY	THREADED	0-10 VDC PROP	LAST POSITION
6	RH-5	REHEAT	1	1/2"	WATER	0.05	5.0	3-WAY	THREADED	0-10 VDC PROP	LAST POSITION

REGISTER. GRILLE AND DIFFUSER SCHEDULE

TAG	MANUF.	MODEL#	TYPE	INLET SIZE	PANEL SIZE	MAXIMUM CFM	PATTERN/ DEFLECTION	MAX. NC	P.D. IN. WG	MATERIAL	FINISH	FRAME	REMARKS
(1)	PRICE	540	DOUBLE DEFLECTION	14"x10"	16"x12"	400	---	15	.022	STEEL	WHITE	LAY-IN	
(X)	EXISTING SUPPLY	----	----	----	----	----	----	----	----	----	----	----	
[A]	PRICE	530	LOUVERED FACE	22"x10"	24"x12"	350	45 DEGREE	15	.016	STEEL	WHITE	LAY-IN	
[X]	EXISTING RETURN/EXHAUST	----	----	----	----	----	----	----	----	----	----	----	

NOTES: A. BASIS OF DESIGN - PRICE. APPROVED EQUALS BY NAILOR, TITUS OR METAL-AIRE.

BID SET

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL CARL A. STUPKA 3/16/2023

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SCO ID# 18-18399-01A

SCHEDULES

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **M6.2** OF SHEETS

PLOTTED: 3/16/2023 @ 1:27:23 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NZ Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - M6.2 SCHEDULES.dwg

ELECTRICAL LEGEND

	SYMBOL	DESCRIPTION	HEIGHT A.F.F.
RACEWAY		120 VOLT HOMERUN	
		277 VOLT HOMERUN	
		208 VOLT HOMERUN	
		480 VOLT HOMERUN	
		UNSWITCHED CIRCUIT	
		SWITCHED CIRCUIT	
		CONDUIT BELOW SLAB OR GRADE	
AREA OF RESCUE	ARS	AREA OF RESCUE STATION	48" TO TOP OF DEVICE
	ARM	AREA OF RESCUE MASTER STATION	48" TO TOP OF DEVICE
	ARR	AREA OF RESCUE RELAY & BATTERY CABINET	48" TO TOP OF DEVICE
FIRE ALARM	F	PULL STATION	48" TO TOP OF DEVICE
		PHOTOELECTRIC SMOKE DETECTOR	CEILING MOUNTED
	C	CONVENTIONAL PHOTOELECTRIC SMOKE DETECTOR. MOUNT ADDRESSABLE MODULE IN CONDITIONED SPACE.	CEILING MOUNTED
		IONIZATION SMOKE DETECTOR	CEILING MOUNTED
		135° FIXED RATE OF RISE HEAT DETECTOR	CEILING MOUNTED
	#	CONVENTIONAL 200° FIXED HEAT DETECTOR. MOUNT ADDRESSABLE MODULE IN CONDITION SPACE.	CEILING MOUNTED
	AM	ADDRESSABLE MODULE	-
	TS	SPRINKLER TAMPER SWITCH	COORDINATE WITH FPC
	FS	SPRINKLER FLOW SWITCH	COORDINATE WITH FPC
		DUCT SMOKE DETECTOR	COORDINATE WITH FPC & MC
	RTS	REMOTE TEST SWITCH	48" TO TOP OF DEVICE
	CM	CONTROL MODULE FOR AHU SHUTDOWN	COORDINATE WITH FPC & MC
	IM	ISOLATION MODULE	48" TO TOP OF DEVICE
		BEAM DETECTOR	COORD. w/ENGINEER PRIOR TO ROUGH-IN
	110	COMBINATION HORN STROBE. NUMBER INDICATES CANDELA	88" TO BOTTOM OF DEVICE
	110	STROBE. NUMBER INDICATES CANDELA	88" TO BOTTOM OF DEVICE
		DEVICE SURFACE MOUNTED WITH WIREMOLD 700	88" TO BOTTOM OF DEVICE
		DEVICE SURFACE MOUNTED WITH WIREMOLD 700	88" TO BOTTOM OF DEVICE
	110	COMBINATION SPEAKER/STROBE. NUMBER INDICATES CANDELLA	88" TO BOTTOM OF DEVICE
	FACP	FIRE ALARM CONTROL PANEL	
	FAAP	FIRE ALARM ANNUNCIATOR PANEL	48" TO TOP OF DEVICE
	DH	DOOR HOLD OPEN	COORDINATE WITH GC
		FIRE ALARM BELL	
	SD	MECHANICAL - SMOKE DAMPER/DETECTOR	
PAGING / INTERCOM	CLG.	SPEAKER CEILING MOUNTED	
	PA	PAGING SPEAKER	CEILING MOUNTED
		MICROPHONE JACK WALL MOUNTED	
		MICROPHONE JACK FLOOR MOUNTED	
		CLOCK LOCATION	
ELECTRIC DOOR HARDWARE	CR	CARD READER	48" TO TOP OF DEVICE
	DPS	DOOR POSITION SWITCH	COORDINATE WITH GC
	PB	AUTOMATIC DOOR PUSH BUTTON	48" TO TOP OF DEVICE
	D	JUNCTION BOX FOR DOOR POWER AND/OR CONTROLS.	COORDINATE WITH GC
	K	SECURITY KEYPAD	48" TO TOP OF DEVICE

ELECTRICAL LEGEND

	SYMBOL	DESCRIPTION	HEIGHT A.F.F.
NURSE CALL	NCP	CONTROL PANEL	66" TO TOP OF DEVICE
	NM	MASTER STATION	COORD. OUTLET LOC. w/CASEWORK
	CB	CODE BLUE	48" TO TOP OF DEVICE
	BS	BEDSIDE STATION WITH PULL CORD AND PILLOW SPEAKER	48" TO TOP OF DEVICE
	DS	DUTY STATION	48" TO TOP OF DEVICE
	SS	STAFF STATION	48" TO TOP OF DEVICE
		DOME LIGHT	CEILING MOUNTED
	SA	STAFF ASSIST/CODE BLUE	48" TO TOP OF DEVICE
	ES	BATH EMERGENCY STATION WITH PULL CORD	48" TO TOP OF DEVICE
	NCA	NURSE CALL ANNUNCIATOR	48" TO TOP OF DEVICE
	E	EMERGENCY CALL STATION	48" TO TOP OF DEVICE
	NCA	NURSE CALL AUXILIARY ALARM INPUT STATION	48" TO TOP OF DEVICE
	BIU	37 PIN NURSE CALL INTERFACE UNIT	
TELECOMMUNICATIONS	W	TELEPHONE OUTLET	48" TO TOP OF DEVICE
		DATA OUTLET	16" TO BOTTOM OF DEVICE
		TELEPHONE/DATA OUTLET	16" TO BOTTOM OF DEVICE
		CAMERA OUTLET	84" TO BOTTOM OF DEVICE
	TV	CATV OUTLET	84" TO BOTTOM OF DEVICE
		WIREWAY	
		CENTER HUNG CABLETRAY	
	CABLE TRAY	BASKET TYPE CABLETRAY	
		DEVICE SURFACE MOUNTED WITH WIREMOLD 2900	48" TO TOP OF DEVICE
		FLOOR MOUNTED DATA	
	W	WIRELESS ROUTER OR DEVICE	WALL OR CEILING MOUNTED
DIMMING SYSTEM	MCM	MASTER CONTROL PANEL	48" TO BOTTOM OF DEVICE
	UU	USHER STATION. ZONE 1-ON	48" TO BOTTOM OF DEVICE
	6S	4 SCENCE SELECTOR STATION	48" TO BOTTOM OF DEVICE
	FDB	FLUORESCENT DIMMING BALLAST INTERFACE	48" TO BOTTOM OF DEVICE
	HP	HI-POWER DIMMING MODULE	LOCATE ABOVE ACCESSIBLE CEILING
	DRX	RS-232 INTERFACE	LOCATE ABOVE ACCESSIBLE CEILING

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT METHODS OF COMPLIANCE:

ENERGY CODE:	[X] PRESCRIPTIVE	[ ] PERFORMANCE
ASHRAE 90.1:	[ ] PRESCRIPTIVE	[ ] PERFORMANCE

LIGHTING SCHEDULE

LAMP TYPE REQUIRED IN FIXTURE:	NOT APPLICABLE
NUMBER OF LAMPS IN FIXTURE:	NOT APPLICABLE
BALLAST TYPE USED IN FIXTURE:	NOT APPLICABLE
NUMBER OF BALLAST IN FIXTURE:	NOT APPLICABLE
TOTAL WATTAGE PER FIXTURE:	NOT APPLICABLE
TOTAL INTERIOR WATTAGE SPECIFIED vs. ALLOWED	N/A WATTS/SQ.FT. SPECIFIED VS. N/A WATTS/SQ.FT. ALLOWED
TOTAL EXTERIOR WATTAGE SPECIFIED vs. ALLOWED	N/A WATTS SPECIFIED VS. N/A WATTS ALLOWED

ADDITIONAL EFFICIENCY PACKAGE OPTIONS:

- [ ] C406.2 MORE EFFICIENT HVAC EQUIPMENT PERFORMANCE
- [ ] C406.3 REDUCING LIGHTING POWER DENSITY
- [ ] C406.4 ENHANCED DIGITAL LIGHTING CONTROLS
- [ ] C406.5 ON-SITE RENEWABLE ENERGY
- [ ] C406.6 DEDICATED OUTDOOR AIR SYSTEM
- [ ] C406.7 REDUCED ENERGY USE IN SERVICE WATER HEATING

DEVICE SUBSCRIPTS

C	INDICATES MOUNTED 6" ABOVE CASEWORK. COORDINATE EXACT LOCATION WITH CASEWORK DRAWINGS.
TV	INDICATES TO BE MOUNTED 84" AFF FOR TELEVISION UNLESS OTHERWISE NOTED

ELECTRICAL LEGEND

	SYMBOL	DESCRIPTION	HEIGHT A.F.F.
POWER	5-20R	SPECIAL RECEPTACLE WITH NEMA CONFIGURATION AS SHOWN	16" TO BOTTOM OF DEVICE
		DUPLEX RECEPTACLE	16" TO BOTTOM OF DEVICE
		TWO DUPLEX RECEPTACLE	16" TO BOTTOM OF DEVICE
		DUPLEX RECEPTACLE ON EMERGENCY POWER. RED.	16" TO BOTTOM OF DEVICE
		TWO DUPLEX RECEPTACLE ON EMERGENCY POWER. RED.	16" TO BOTTOM OF DEVICE
	J_N	JUNCTION BOX FOR NORMAL POWER	COORDINATE WITH HOSPITAL EQUIPMENT
	J_E	JUNCTION BOX FOR EMERGENCY CRITICAL POWER	COORDINATE WITH HOSPITAL EQUIPMENT
	$	20 AMP. 120-277 VOLT TOGGLE SWITCH FOR DISCONNECTING MEANS.	
	$_M	FRACTIONAL HORSEPOWER MANUAL STARTER WITH THERMAL OVERLOAD FOR DISCONNECTING MEANS.	
		DEVICE SURFACE MOUNTED WITH WIREMOLD 700	
	FT	FLOOR POKE THRU DEVICE WITH DUPLEX RECEPTACLE	
		FUSIBLE DISCONNECT SWITCH	
		FLUSH PANEL BOARD	
		SURFACE PANEL BOARD	
		PLUGMOLD. REFER TO SPECS FOR SPACING.	
		WIREMOLD 3000 SURFACE METAL RACEWAY. LOCATE DUPLEX RECEPTACLES AS SHOWN.	
		WIREMOLD 4000 SURFACE METAL RACEWAY WITH DIVIDER. LOCATE DUPLEX RECEPTACLES AND TELECOMMUNICATIONS OUTLET AS SHOWN.	
		MOTOR STARTER	
		COMBINATION MOTOR STARTER	
		FLOOR MOUNTED DUPLEX	
	FP	SERVICE POWER POLE W/ RECEPTACLES & TELECOM OUTLETS	
LIGHTING	A2	LAY-IN FIXTURE	
	C	RECESSED DOWN LIGHT	
	X	STRIP LIGHT	
		EMERGENCY EXIT SIGN	96" TO TOP OF DEVICE
		WALL MOUNTED EMERGENCY EXIT SIGN	96" TO TOP OF DEVICE
	CLG.	CEILING MOUNTED EMERGENCY EXIT SIGN	96" TO TOP OF DEVICE
		COMBINATION EXIT SIGN/EMERGENCY LIGHT.	
		WALL MOUNTED EMERGENCY LIGHT	96" TO TOP OF DEVICE
	$_OS	DUAL TECHNOLOGY SINGLE CIRCUIT OCCUPANCY SENSOR	48" TO TOP OF DEVICE
	OS	CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR	
	$_OS2	DUAL TECHNOLOGY DUAL CIRCUIT OCCUPANCY SENSOR	
	A2	FIXTURE ON CRITICAL POWER	
	A2	FIXTURE ON LIFE SAFETY (UNSWITCHED)	
	A	FIXTURE ON NORMAL CIRCUIT	
		POWER POLE LIGHT	
	FL	FLOOD LIGHT WALL MOUNTED	
	RM	EMERGENCY REMOTE HEAD	
	$	SINGLE POLE TOGGLE SWITCH	48" TO TOP OF DEVICE
	$_3	THREE WAY TOGGLE SWITCH	48" TO TOP OF DEVICE
	$_4	FOUR WAY TOGGLE SWITCH	48" TO TOP OF DEVICE
	$$	TWO SWITCHES FOR DUAL BALLAST. CLOSEST TO DOOR OPERATES INSIDE LAMP(S).	48" TO TOP OF DEVICE
	$_D	DIMMER SWITCH	48" TO TOP OF DEVICE
	$_D3	THREE WAY DIMMER SWITCH	48" TO TOP OF DEVICE

ELECTRICAL ABBREVIATIONS

A, AMP	AMPERE
AC	ALTERNATING CURRENT
AIC	AIR CONDITIONING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINAL GRADE
AHU	AIR HANDLING UNIT
AIC	AMPS INTERRUPTING CAPACITY
ALT	ALTERNATE
ANN	ANNUNCIATOR
APPROX	APPROXIMATELY
ARCH	ARCHITECT
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GUAGE
BFC	BELOW FINISHED CEILING
BFG	BELOW FINISHED GRADE
BLDG	BUILDING
BOD	BOTTOM OF DEVICE
C, CND	CONDUIT
CATV	CABLE TELEVISION
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CLG	CEILING
CONN	CONNECT
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CX	CONNECT TO EXISTING
DC	DIRECT CURRENT
DISC	DISCONNECT
DN	DOWN
DP	DISTRIBUTION PANEL
DPDT	DOUBLE POLE DOUBLE THROW
DT	DOUBLE THROW
DWG	DRAWING
E	EMERGENCY
EA	EACH
EC	EMPTY CONDUIT
ED	EXISTING TO BE DEMOLISHED
EF	EXHAUST FAN
EH	ELECTRIC HEATER
ELECT	ELECTRIC
ERR	EXISTING TO BE REMOVED AND RELOCATED
ETR	EXISTING TO REMAIN
EX	EXISTING
EXP	EXPOSED
EWC	ELECTRIC WATER COOLER
FR	FRAME
FA	FIRE ALARM
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS
FC	FAN COIL
FDR	FEEDER
FLA	FULL LOAD AMPERES
FLR	FLOOR
FU	FUSED / FUSABLE
FUSE	FUSED SAFETY SWITCH
GFI	GROUND FAULT CIRCUIT INTERRUPTER
GFIP	PROT. BY UPSTREAM GRD. FAULT CKT. INTERRUPTER
GFR	GROUND FAULT RELAY
GRD, G	GROUND
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF AUTOMATIC
HP	HORSEPOWER, HEAT PUMP
HPS	HIGH PRESSURE SODIUM
HTR	HEATER
HV	HIGH VOLTAGE
HZ	HERTZ
IG	ISOLATED GROUND
JB	JUNCTION BOX
KCMIL	THOUSAND CIRCULAR MILS
KQH	KILOVAR HOUR
KV	KILOVOLTS
KVA	KILOVOLT AMPERES
KW	KILOWATTS
KWH	KILOWATT HOURS
LC	LIGHTING CONTRACTOR
LTG	LIGHTING
LTNG	LIGHTNING
LP	LIGHTING PANEL
LRA	LOCKED ROTOR AMPERES
MATV	MASTER ANTENNA TELEVISION
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTOL CENTER
MEH	METAL HALIDE
MH	MANHOLE, MOUNTING HEIGHT
MLO	MAIN LUGS ONLY
MSP	MOTOR STARTER PANEL
MTD	MOUNTED
MV	MERCURY VAPOR
NC	NORMALLY CLOSED
NFSS	NON-FUSED SAFETY SWITCH
NO, #	NUMBER
NO	NORMALLY OPEN
OC	ON CENTER
OH	OVERHEAD
Ø, PH	PHASE
P	POLE
PB	PUSH BUTTON
PF	POWER FACTOR
PL	PILOT LIGHT
PNL	PANEL
Pp	POWER PANEL
PT	POKE THRU DEVICE
PVC	POLYVINYL CHLORIDE
PP	PUMP
RCS	REMOTE CONTROL SWITCH
REC	RECEPTACLE
REQD	REQUIRED
RFI	RADIO FREQUENCY INTERFERRENCE
RGS	RIGID GALVANIZED STEEL
RLA	RUNNING LOAD AMPERES
RM	ROOM
RX	REMOVE EXISTING
SN	SOLID NEUTRAL
SP	SURGE PROTECTION
SPDT	SINGLE POLE DOUBLE THROW
SS	SAFETY SWITCH
ST	SINGLE THROW
SW	SWITCH
SWBD	SWITCHBOARD
TBR	TO BE REMOVED
TC	TIME CLOCK
TH	TUNGSTEN HALOGEN
TOD	TOP OF DEVICE
TTB	TELEPHONE TERMINAL BOARD
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
V	VOLTS
W	WATTS, WIRE
w/	WITH
WP	WEATHERPROOF
XFMR	TRANSFORMER

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21622 STEVEN M. McCULLEN
5/16/23

North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

ELECTRICAL SYMBOL LIST AND ABBREVIATIONS

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: D. DIZON	CHECKED: S. McCULLEN
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **E0.1** OF SHEETS

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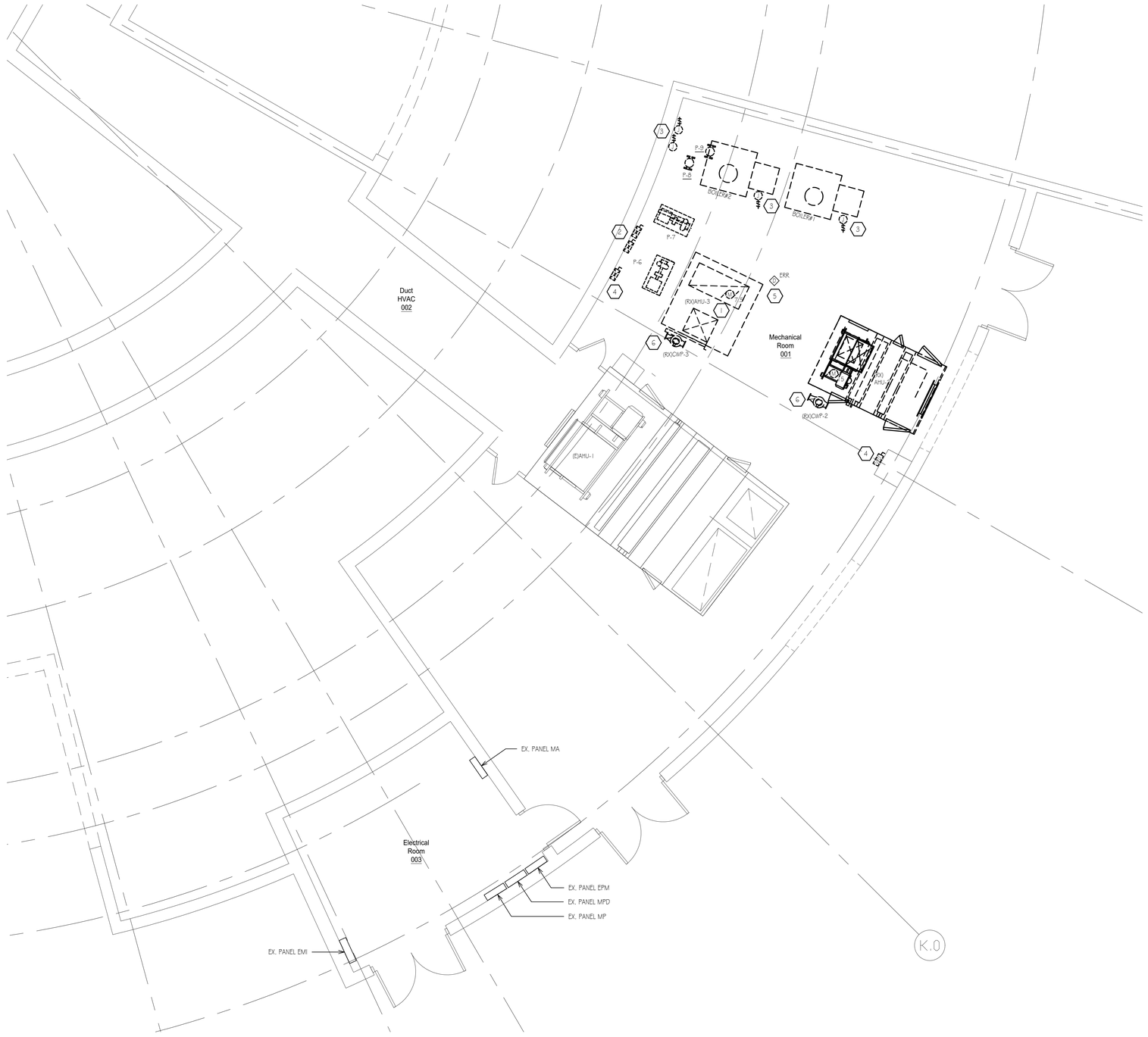
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - E0.1.dwg

19049 – E0.1.DWG



1 PARTIAL LOWER LEVEL - DEMOLITION PLAN - ELECTRICAL

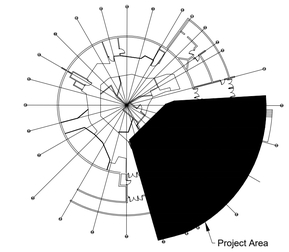
SCALE: 1/4"=1'-0" ELECTRICAL

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. EXISTING AHU-3 IS CURRENTLY FED FROM EXISTING PANEL MA AND WILL BE REWIRED TO THE GENERATOR OPTIONAL STANDBY POWER SYSTEM UNDER A SEPARATE PROJECT THE "STANDBY POWER FROM BACKUP GENERATORS FOR 4 BUILDINGS HVAC AIR DISTRIBUTION RENOVATION" PROJECT, SCO #17-16657-01A.
2. EXISTING PUMPS P-6 & P-7 STARTERS TO BE REMOVED AND REPLACED BY MECHANICAL CONTRACTOR. EC SHALL DISCONNECT POWER CONNECTION PRIOR TO REMOVAL.
3. EXISTING POWER CONNECTIONS FOR PUMPS P-8, P-9 AND BOILERS B-1 & B2. DISCONNECT POWER CONNECTIONS PRIOR TO DEMOLITION OF PUMPS AND BOILERS.
4. EXISTING STARTER FOR AHU-3 AND VFD FOR AHU-2 TO BE REMOVED AND REPLACED BY MECHANICAL CONTRACTOR. EC SHALL DISCONNECT POWER PRIOR TO REMOVAL OF STARTER.
5. CONTRACTOR SHALL COORDINATE THE REMOVAL OF DUCT DETECTOR WITH THE MECHANICAL CONTRACTOR. CONTRACTOR SHALL PROTECT DETECTOR DURING CONSTRUCTION.
6. EXISTING CHILLED WATER PUMPS TO BE REMOVED AND REPLACED BY MECHANICAL CONTRACTOR. EC SHALL DISCONNECT POWER PRIOR TO REMOVAL.



KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 21622 ENGINEER STEVEN M. MCCULLEN 3/16/23

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Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

PARTIAL LOWER LEVEL DEMOLITION PLAN - ELECTRICAL

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN	CHECKED
D. DIZON	S. MCCULLEN
CLIENT JOB NO.	SSME JOB NO.
--	19049

SHEET **E1.1** OF SHEETS

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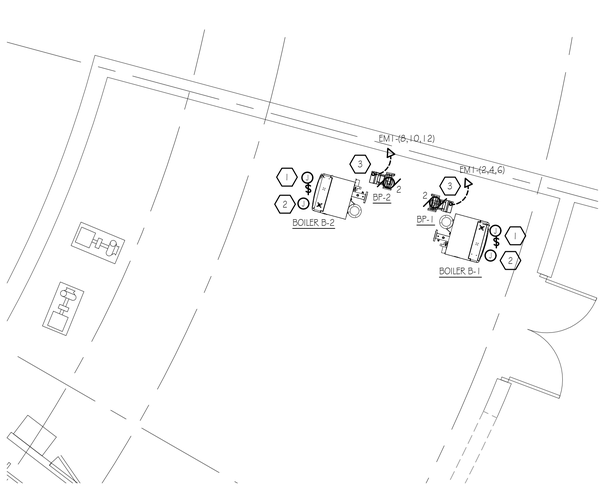
19049 - E1.1.DWG

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL



2 PARTIAL LOWER LEVEL - RENOVATION PLAN - ELECTRICAL

SCALE: 1/4"= 1'-0" ADD ALTERNATE E-1

KEYED NOTES (ADD ALTERNATE E-1)

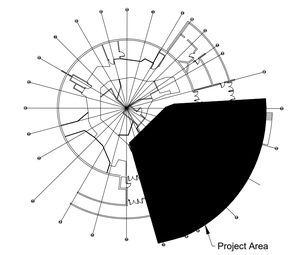
1. NEW JUNCTION BOX FOR BOILERS POWER CONNECTION POINTS. EC SHALL WIRE NEW BOILERS TO THE EXISTING CIRCUITS THAT FEEDS THE DEMOLISHED BOILERS. EXTEND EXISTING BRANCH CIRCUIT TO NEW PUMPS AND BOILER LOCATION. USE 3 #12, 3/4"C. REFER TO PANEL EMP1 FOR BOILER CIRCUIT NUMBERS.
2. JUNCTION BOX FOR BOILER CONTROL CIRCUIT. EC SHALL WIRE NEW BOILER CONTROL TO THE EXISTING CIRCUIT THAT FEEDS THE DEMOLISHED BOILERS. EXTEND EXISTING BRANCH CIRCUIT TO NEW PUMPS AND BOILER LOCATION. USE 3 #12, 3/4"C. REFER TO PANEL EMP1 FOR BOILER CIRCUIT NUMBERS.
3. NEW PUMPS WITH BUILT-IN VFD. CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH THE MC PRIOR TO ROUGH-IN.

KEYED NOTES (BASE BID)

1. CONTRACTOR SHALL PROVIDE 30A/2P FUSED DISCONNECT SWITCH FOR NEW BOILER B-1 POWER CONNECTION. PROVIDE FUSE PER BOILER NAMEPLATE RATING. COORDINATE EXACT LOCATION OF DISCONNECT WITH THE MECHANICAL CONTRACTOR PRIOR TOP ROUGH-IN.
2. NEW VFD'S FOR PUMP HWP-6 & 7 TO BE PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR. CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH THE MC PRIOR TO ROUGH-IN.
3. NEW VFD FOR AHU-3 TO BE PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR. EC SHALL RECONNECT EXISTING WIRING THE THE NEW VFD. PROVIDE ADDITIONAL WIRING AND CONDUIT AS NECESSARY. USE 3 #12, 1 #12G, 3/4"C.
4. NEW PUMPS WITH BUILT-IN VFD. CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH THE MC PRIOR TO ROUGH-IN.
5. JUNCTION BOX FOR HUMIDIFIER POWER CONNECTIONS. CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH THE MC PRIOR TO ROUGH-IN.
6. JUNCTION BOX FOR TEMP. BOILER AND HUMIDIFIER PIPING HEAT TRACE POWER CONNECTIONS. CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH THE MC PRIOR TO ROUGH-IN.
7. DUCT DETECTOR TO BE TEMPORARILY REMOVED DURING DEMOLITION AND RE-INSTALLED BY MECHANICAL CONTRACTOR IN NEW LOCATION SHOWN. CONTRACTOR SHALL EXTEND EXISTING SLC LOOP CIRCUIT TO NE DUCT DETECTOR LOCATION.
8. NEW VFD FOR AHU-2 TO BE PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR. EC SHALL PROVIDE NEW HOMERUN AS SHOWN. REFER TO PANEL SCHEDULE FOR WIRING INFORMATION.
9. CONTRACTOR SHALL PROVIDE 60A/3P FUSED DISCONNECT SWITCH FOR NEW HUMIDIFIER H-2 POWER CONNECTION. PROVIDE FUSE PER HUMIDIFIER NAMEPLATE RATING. COORDINATE EXACT LOCATION OF DISCONNECT WITH THE MECHANICAL CONTRACTOR PRIOR TOP ROUGH-IN.
10. RECEPTACLE FOR TEMPORARY BOILER. COORDINATE EXACT LOCATION WITH THE MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. REMOVE RECEPTACLE INCLUDING WIRING AND CONDUIT BACK TO PANEL EMP1 AFTER THE TEMPORARY BOILER HAS BEEN REMOVED.

1 PARTIAL LOWER LEVEL - RENOVATION PLAN - ELECTRICAL

SCALE: 1/4"= 1'-0" BASE BID



KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 21622 ENGINEER STEVEN M. MCCULLEN 3/16/23

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North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

PARTIAL LOWER LEVEL RENOVATION PLAN - ELECTRICAL

NO.	REVISIONS	BY

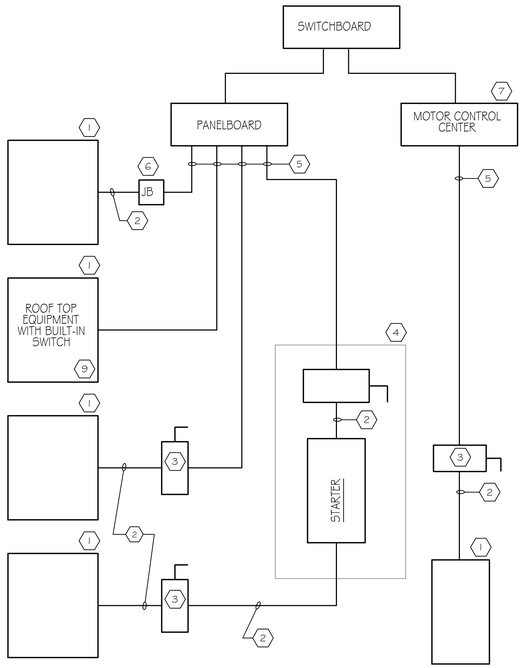
DATE	SCALE
03/16/2023	AS NOTED
DRAWN: D. DIZON	CHECKED: S. MCCULLEN
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET: **E2.1** OF SHEETS

PLOTTED: 3/8/2023 @ 12:53:31 PM BY: TRISHA PEUCKY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - E2.1.dwg

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL



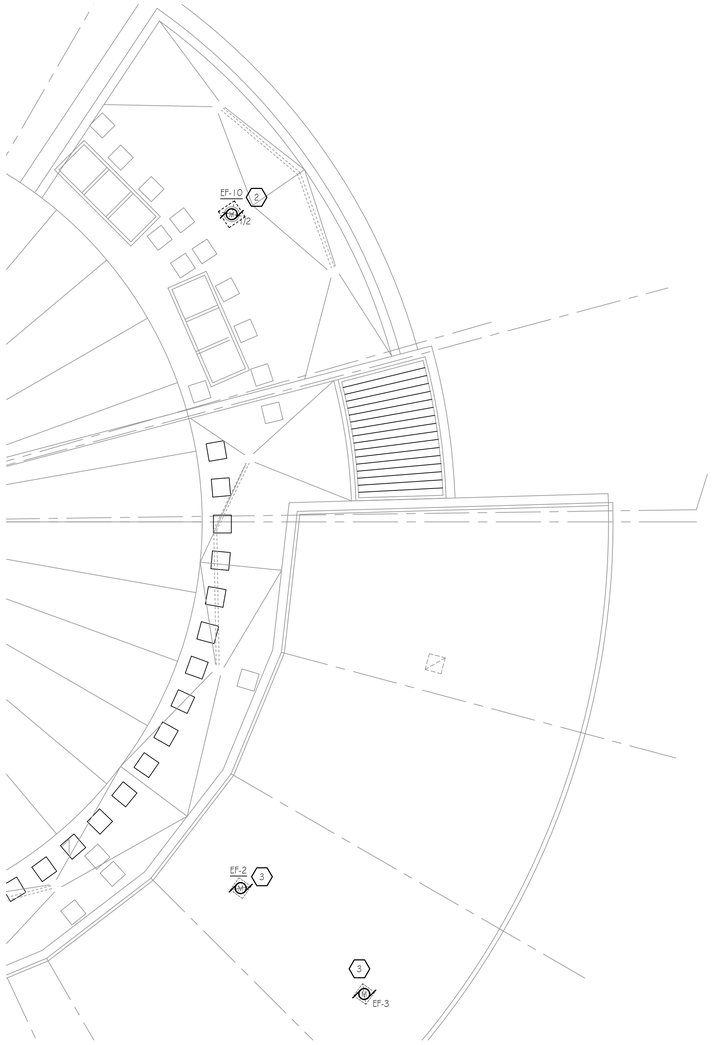
ELECTRICAL NOTES

1. EQUIPMENT OF TRADES OTHER THAN ELECTRICAL.
2. CONDUIT AND WIRING BY HVAC PLUMBING CONTRACTOR OR OTHER TRADES.
3. IF AN ADDITIONAL DISCONNECT IS REQUIRED BY NEC IT SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
4. A COMBINATION STARTER MAY BE USED IN LIEU OF SEPARATE DISCONNECT SWITCH AND STARTER LOCATE ADJACENT EQUIPMENT.
5. FEEDER CIRCUIT WIRING AND CONDUIT IN ELECTRICAL WORK. SEE PANELBOARD SCHEDULES FOR WIRE AND BREAKER SIZES.
6. JUNCTION BOX MAY BE SHOWN ON ELECTRICAL PLANS FOR SOME EQUIPMENT IF NO STARTER OR DISCONNECT IS SUPPLIED A JUNCTION BOX SHALL BE INSTALLED ADJACENT TO EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE LINE SIDE WIRING TO THE JUNCTION BOX. LOAD SIDE WIRING WILL BE PROVIDED BY MECHANICAL CONTRACTOR OR OTHER TRADES.
7. PROJECTS UTILIZING AN MCC THE STARTER CB OR VFD IN THE MCC ARE PROVIDED BY THE ELECTRICAL CONTRACTOR.
8. IN ALL CASES THE EQUIPMENT CONTRACTOR SHALL MAKE FINAL CONNECTIONS, START UP, AND TEST EQUIPMENT.
9. IF THE ROOF TOP EQUIPMENT IS NOT PROVIDED WITH BUILD IN SWITCH, THE ELECTRICAL CONTRACTORS SHALL PROVIDE A DISCONNECT SWITCH.

WHERE ELECTRICAL WIRING REQUIRED BY BY TRADES OTHER THAN COVERED BY DIVISION 26, SPECIFICATIONS FOR THAT SECTION SHALL REFER TO SAME WIRING MATERIALS AND METHODS AS SPECIFIED UNDER DIVISION 26. NO EXCEPTIONS.

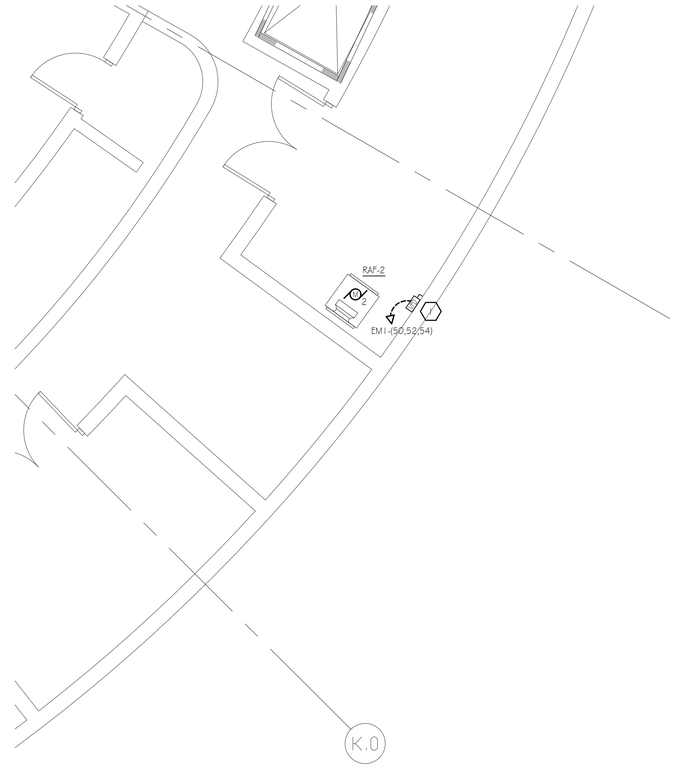
3 ELECTRICAL EQUIPMENT CONNECTION

NO SCALE



1 PARTIAL UPPER LEVEL - RENO & DEMO PLAN - ELECTRICAL

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

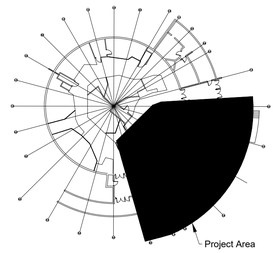


2 PARTIAL MAIN LEVEL - RENOVATION PLAN - ELECTRICAL

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

KEYED NOTES

1. NEW VFD FOR RAF-2 TO BE PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR. REFER TO SHEET E2.1 FOR PANEL EM1 LOCATION.
2. EXISTING EXHAUST FAN EF-10 TO BE REMOVED AND REPLACED BY MC. EC SHALL DISCONNECT EXHAUST FAN AND RECONNECT THE NEW EXHAUST FAN TO THE EXISTING CIRCUIT. PROVIDE ADDITIONAL WIRING AND CONDUIT AS NECESSARY. USE 3 #12, 3/4"C.
3. EXISTING EXHAUST FAN EF-2 & EF-3 TO BE REMOVED BY THE MC. EC SHALL DISCONNECT POWER PRIOR TO REMOVAL. REMOVE ALL ASSOCIATED WIRING AND CONDUIT BACK TO PANEL EMP1. REFER TO SHEET E2.1 FOR PANEL EMP1 LOCATION.



KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 21622 ENGINEER STEVEN M. MCCULLEN
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North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
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SCO ID# 18-18399-01A

PARTIAL MAIN LEVEL RENOVATION PLAN - ELECTRICAL

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN	CHECKED
D. DIZON	S. MCCULLEN
CLIENT JOB NO.	SSME JOB NO.
--	19049

SHEET **E2.2** OF SHEETS

PLOTTED: 3/8/2023 @ 12:54:01 PM BY: TRISHA PEUKERT
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CAD\19049 - E2.2.dwg

19049 – E2.2.DWG

TYPE:	NORMAL	VOLTAGE LINE OT NEUTRAL:	277
LOCATION:	MAIN ELECTRICAL ROOM	VOLTAGE LINE TO LINE:	480
MOUNTING:	SURFACE	PHASES:	3
MANUF.:	SQUARE D NEHB	BUS AMPS:	225
AIC:	48,000	MAIN CIRCUIT BREAKER:	MLO

EX. PANEL MA

PANEL NOTES:
EQUIPPED WITH GROUND BUS
EQUIPPED WITH FULL SIZE NEUTRAL BUS
* -INDICATES CB IS EQUIPPED WITH "LOCK-ON" DEVICE
** -INDICATES CB IS GFCI TYPE
*** -INDICATES NEW CIRCUIT BREAKER

KVA LOAD	DESCRIPTION	WIRE # CONDUIT	C/B	CIRCUIT NUMBER			C/B	WIRE # CONDUIT	DESCRIPTION	KVA LOAD
0.00	EX. LOAD - CWP-1		15/3	1	A	2	15/3		EX. LOAD - CWP-2	0.00
0.00				3	B	4				0.00
0.00				5	C	6				0.00
0.00	EX. LOAD - COOLING TOWER		100/3	7	A	8			SPACE	0.00
0.00				9	B	10			SPACE	0.00
0.00				11	C	12			SPACE	0.00
0.00	EX. LOAD - CWP-4		20/3	13	A	14	20/3		EX. LOAD - CHWP-1	0.00
0.00				15	B	16				0.00
0.00				17	C	18				0.00
0.00	EX. LOAD - AHU-3 (TO BE REWIRED TO THE GEN. POWER UNDER SEPARATE PROJECT)		15/3	19	A	20	30/3		SPARE	0.00
0.00				21	B	22				0.00
0.00				23	C	24				0.00
0.00	SPARE		15/3	25	A	26	15/3		SPARE	0.00
0.00				27	B	28				0.00
0.00				29	C	30				0.00
0.00	SAPRE		15/3	31	A	32	15/3		SPARE	0.00
0.00				33	B	34				0.00
0.00				35	C	36				0.00
11.33	HUMDIFIER H-2	3 #4, #10G	60/3	37	A	38	20/1		SPARE	0.00
11.33				39	B	40	20/1		SPARE	0.00
11.33				41	C	42	20/1		SPARE	0.00

LOADS	CONNECTED LOAD (KVA)	DIVERSITY FACTOR	DEMAND LOAD (KVA)
LIGHTING	0.00	125%	0.00
HVAC COOLING	0.00	125%	0.00
HVAC HEATING	33.99	125%	42.49
MOTORS	0.00	125%	0.00
KITCHEN EQUIPMENT	0.00	100%	0.00
RECEPTACLES (FIRST 10 KVA AT 100%)	0.00	100%	0.00
REMAINING RECEPTACLE LOAD AT 50%	0.00	50%	0.00
MISCELLANEOUS	0.00	50%	0.00
FUTURE LOAD - 25% OF TOTAL CONN. LOAD	0.00	100%	0.00
TOTALS (KVA)	33.99		42.49

PANEL PHASE LOADING - (WITHOUT FUTURE LOAD)

PHASE	CONNECTED (KVA)	DEMAND (KVA)	DEMAND (AMPS)
A	11.33	14.16	51.13
B	11.33	14.16	51.13
C	11.33	14.16	51.13
3-PHASE TOTAL	33.99	42.49	51.13

TYPE:	OPTIONAL STAND-BY	VOLTAGE LINE OT NEUTRAL:	277
LOCATION:	MAIN ELECTRICAL ROOM	VOLTAGE LINE TO LINE:	480
MOUNTING:	SURFACE	PHASES:	3
MANUF.:	SQUARE D HCM	BUS AMPS:	400
AIC:	25,000	MAIN CIRCUIT BREAKER:	400

EX. PANEL EM1

PANEL NOTES:
EQUIPPED WITH GROUND BUS
EQUIPPED WITH FULL SIZE NEUTRAL BUS
* -INDICATES CB IS EQUIPPED WITH "LOCK-ON" DEVICE
** -INDICATES CB IS GFCI TYPE
*** -INDICATES NEW CIRCUIT BREAKER

KVA LOAD	DESCRIPTION	WIRE # CONDUIT	C/B	CIRCUIT NUMBER			C/B	WIRE # CONDUIT	DESCRIPTION	KVA LOAD
0.00	EX. LOAD - CONTROL AIR COMPRESSOR		15/3	1	A	2	15/3	3 #12, 1 #12G	BOILER PUMP BP-1 (2 HP) (ADD ALTERNATE E-1)	0.90
0.00				3	B	4				0.90
0.00				5	C	6				0.90
0.00	SPARE		20/1	7	A	8	15/3	3 #12, 1 #12G	BOILER PUMP BP-2 (2 HP) (ADD ALTERNATE E-1)	0.90
0.00	SPARE		20/1	9	B	10				0.90
0.00	SPARE		20/1	11	C	12				0.90
0.00	EX. LOAD - AHU-1 (30 HP)		80/3	13	A	14	***40/3	3 #10, #10G	NEW AHU-2 (15 HP) (REPLACEMENT)	0.00
0.00				15	B	16				0.00
0.00				17	C	18				0.00
0.00	SPARE		20/1	19	A	20	15/3		EX. LOAD - EXHAUST FAN EF-7 (3 HP)	0.00
0.00	SPARE		20/1	21	B	22				0.00
0.00	SPARE		20/1	23	C	24				0.00
0.00	SPARE		20/1	25	A	26	20/1		SPARE	0.00
0.00	SPARE		20/1	27	B	28	20/1		SPARE	0.00
0.00	SPARE		20/1	29	C	30	20/1		SPARE	0.00
2.93	HOT WATER PUMP HWP-6 (7 1/2 HP)	3 #12, 1 #12G	***25/3	31	A	32	100/3		SPARE	0.00
2.93				33	B	34				0.00
2.93				35	C	36				0.00
2.93	HOT WATER PUMP HWP-7 (7 1/2 HP)	3 #12, 1 #12G	***25/3	37	A	38	125/3		EX. LOAD - PANEL EPM1 VI TRANSFORMER T-2 (75 KVA)	0.00
2.93				39	B	40				0.00
2.93				41	C	42				0.00
0.27	CHILLED WATER PUMP CWP-2 (1/2 HP)	3 #12, 1 #12G	***15/3	43	A	44			SPACE	0.00
0.27				45	B	46			SPACE	0.00
0.27				47	C	48			SPACE	0.00
0.37	CHILLED WATER PUMP CWP-3 (3/4 HP)	3 #12, 1 #12G	***15/3	49	A	50	***15/3	3 #12, #12G	RETURN AIR FAN RAF-2 (2 HP)	0.90
0.37				51	B	52				0.90
0.37				53	C	54				0.90

LOADS	CONNECTED LOAD (KVA)	DIVERSITY FACTOR	DEMAND LOAD (KVA)
LIGHTING	0.00	125%	0.00
HVAC COOLING	0.00	125%	0.00
HVAC HEATING	0.00	125%	0.00
MOTORS	27.60	125%	34.50
KITCHEN EQUIPMENT	0.00	100%	0.00
RECEPTACLES (FIRST 10 KVA AT 100%)	0.00	100%	0.00
REMAINING RECEPTACLE LOAD AT 50%	0.00	50%	0.00
MISCELLANEOUS	0.00	50%	0.00
FUTURE LOAD - 25% OF TOTAL CONN. LOAD	0.00	100%	0.00
TOTALS (KVA)	27.60		34.50

PANEL PHASE LOADING - (WITHOUT FUTURE LOAD)

PHASE	CONNECTED (KVA)	DEMAND (KVA)	DEMAND (AMPS)
A	9.20	11.50	41.52
B	9.20	11.50	41.52
C	9.20	11.50	41.52
3-PHASE TOTAL	27.60	34.50	41.52

TYPE:	NORMAL	VOLTAGE LINE OT NEUTRAL:	120
LOCATION:	ELECTRICAL ROOM	VOLTAGE LINE TO LINE:	208
MOUNTING:	SURFACE	PHASES:	3
MANUF.:	SQUARE D NQOD	BUS AMPS:	100
AIC:	10,000	MAIN CIRCUIT BREAKER:	MLO

EX. PANEL MP

PANEL NOTES:
EQUIPPED WITH GROUND BUS
EQUIPPED WITH FULL SIZE NEUTRAL BUS
* -INDICATES CB IS EQUIPPED WITH "LOCK-ON" DEVICE
** -INDICATES CB IS GFCI TYPE
*** -INDICATES NEW CIRCUIT BREAKER

KVA LOAD	DESCRIPTION	WIRE # CONDUIT	C/B	CIRCUIT NUMBER			C/B	WIRE # CONDUIT	DESCRIPTION	KVA LOAD
0.00	EX. LOAD - WATER HEATER FAN		20/1	1	A	2	20/1		EX. LOAD - GP/CHILL	0.00
0.00	EX. LOAD - WATER HEATER CONTROL		20/1	3	B	4			SPACE	0.00
0.00	EX. LOAD - C.W. PUMP P-3		20/1	5	C	6	20/1		EX. LOAD - PUMP P-8	0.00
0.00	SPARE		20/1	7	A	8	20/1		EX. LOAD - PUMP P-9	0.00
0.00	EX. LOAD - PUMP P-9		20/1	9	B	10	20/1		EX. LOAD - RECIRCULATING PUMP	0.00
0.00	EX. LOAD - INST. WATER HEATER - HABITAT CONTROL RM. 104A		25/3	11	C	12	20/1		EX. LOAD- EXH. FAN EF-9	0.00
0.00				13	A	14	***20/1	3 #12	EF-1 (.06 HP)	0.15
0.00				15	B	16	***20/1	3 #12	EF-3 (700 WATTS)	0.70
0.00	EX. LOAD - WATER PUMP - RM 104A		20/1	17	C	18	20/1		EX. LOAD - CHILLER CONT. CIR. SPARE	0.00
0.00	EX. LOAD - INST. WATER HEATER - ROCK SQUIRREL HOLDING		25/3	19	A	20	20/1		EX. LOAD - HEAT TAPE CHILLER	0.00
0.00				21	B	22	20/1		EX. LOAD - HEAT TAPE CHILLER	0.00
0.00				23	C	24	20/1		EX. LOAD- HEAT TAPE CHILLER	0.00

LOADS	CONNECTED LOAD (KVA)	DIVERSITY FACTOR	DEMAND LOAD (KVA)
LIGHTING	0.00	125%	0.00
HVAC COOLING	0.00	125%	0.00
HVAC HEATING	0.00	125%	0.00
MOTORS	0.85	125%	1.06
KITCHEN EQUIPMENT	0.00	100%	0.00
RECEPTACLES (FIRST 10 KVA AT 100%)	0.00	100%	0.00
REMAINING RECEPTACLE LOAD AT 50%	0.00	50%	0.00
MISCELLANEOUS	0.00	50%	0.00
FUTURE LOAD - 25% OF TOTAL CONN. LOAD	0.00	100%	0.00
TOTALS (KVA)	0.85		1.06

PANEL PHASE LOADING - (WITHOUT FUTURE LOAD)

PHASE	CONNECTED (KVA)	DEMAND (KVA)	DEMAND (AMPS)
A	0.15	0.19	1.56
B	0.70	0.88	7.29
C	0.00	0.00	0.00
3-PHASE TOTAL	0.85	1.06	2.95

TYPE:	OPTIONAL STAND-BY	VOLTAGE LINE OT NEUTRAL:	120
LOCATION:	ELECTRICAL ROOM	VOLTAGE LINE TO LINE:	208
MOUNTING:	SURFACE	PHASES:	3
MANUF.:	SQUARE D NQOD	BUS AMPS:	225
AIC:	10,000	MAIN CIRCUIT BREAKER:	225

EX. PANEL EMP1

PANEL NOTES:
EQUIPPED WITH GROUND BUS
EQUIPPED WITH FULL SIZE NEUTRAL BUS
* -INDICATES CB IS EQUIPPED WITH "LOCK-ON" DEVICE
** -INDICATES CB IS GFCI TYPE
*** -INDICATES NEW CIRCUIT BREAKER
**** -INDICATES NEW CIRCUIT BREAKER WITH 30mA GFP

KVA LOAD	DESCRIPTION	WIRE # CONDUIT	C/B	CIRCUIT NUMBER			C/B	WIRE # CONDUIT	DESCRIPTION	KVA LOAD
0.00	EX. LOAD - HVAC CONTROL PANEL		20/1	1	A	2	20/1	3 #12	NEW BOILER NO. 2 (ADD ALTERNATE)	1.00
0.00	EX. LOAD - AIR DRYER		20/1	3	B	4	20/1	3 #12	NEW BOILER NO. 2 CONTROL (ADD ALT.)	0.50
0.00	EX. LOAD - RECEPT. MECH ROOM		20/1	5	C	6	20/1	3 #12	NEW BOILER NO. 1 (ADD ALTERNATE)	1.00
0.00	EX. LOAD- RECEPT., LTG. TUNNEL		20/1	7	A	8	20/1	3 #12	NEW BOILER NO. 1 CONTROL (ADD ALT.)	0.50
0.00	EX. LOAD - NEW CONTROL PANEL		20/1	9	B	10	***30/1	EX. 3 #12	NEW EF-2 (3/4 HP) - REPLACEMENT	1.60
0.00	SPARE		20/1	11	C	12	20/1		BECOME SPARE	0.00
0.00	SPARE		20/1	13	A	14	20/3		EX. LOAD - GENERATOR LOAD CENTER	0.00
0.00	SPARE		20/1	15	B	16				0.00
0.00	EX. LOAD - RECEPT., RM. 002, 003		20/1	17	C	18				0.00
0.00	EX. LOAD - PANEL EP1		50/3	19	A	20	15/2		SPARE "OFF"	0.00
0.00				21	B	22				0.00
0.00				23	C	24	***30/3	2 #10, #10G	BOILLER B-1 (BASE BID)	1.61
0.00	EX. LOAD - FIRE DOOR		20/1	25	A	26				1.61
0.00	EX. LOAD - HVAC CONTROL - EF-2, 3, & 10		20/1	27	B	28	20/1		SPARE	0.00
0.00	EX. LOAD - HVAC		20/1	29	C	30	20/1		SPARE	0.00
0.00	EX. LOAD- REPTILE ALARM		20/1	31	A	32	***20/1	3 #12	HUMIDIFIER SG-1	1.08
0.00	EX. LOAD - HVAC		20/1	33	B	34	****20/1	3 #12	HEAT TRACE -SG-1 PIPING	0.50
0.00	SPARE		20/1	35	C	36			SPACE	0.00
0.00	SPARE "OFF"		40/3	37	A	38			SPACE	0.00
0.00				39	B	40	***50/2	3 #6, 1 #10G	TEMPORARY BOILER	1.80
0.00				41	C	42				1.80

LOADS	CONNECTED LOAD (KVA)	DIVERSITY FACTOR	DEMAND LOAD (KVA)
LIGHTING	0.00	125%	0.00
HVAC COOLING	0.00	125%	0.00
HVAC HEATING	11.40	125%	14.26
MOTORS	1.60	125%	2.00
KITCHEN EQUIPMENT	0.00	100%	0.00
RECEPTACLES (FIRST 10 KVA AT 100%)	0.00	100%	0.00
REMAINING RECEPTACLE LOAD AT 50%	0.00	50%	0.00
MISCELLANEOUS	0.00	50%	0.00
FUTURE LOAD - 25% OF TOTAL CONN. LOAD	0.00	100%	0.00
TOTALS (KVA)	13.00		16.26

PANEL PHASE LOADING - (WITHOUT FUTURE LOAD)

PHASE	CONNECTED (KVA)	DEMAND (KVA)	DEMAND (AMPS)
A	4.19	5.24	43.67
B	4.40	5.50	45.83
C	4.41	5.52	45.96
3-PHASE TOTAL	13.00	16.26	45.15

EXISTING PANEL EM1 LOAD SUMMARY		
EXISTING CONNECTED LOAD:	44.60	KVA
LOAD REMOVED:	-1.60	KVA
NEW CONNECTED LOAD:		
LIGHTING	0.00	KVA
HVAC COOLING	0.00	KVA
HVAC HEATING	0.00	KVA
MOTORS	27.60	KVA
KITCHEN EQUIPMENT	0.00	KVA
RECEPTACLES (FIRST 10 KVA AT 100%)	0.00	KVA
REMAINING RECEPTACLE LOAD AT 50%	0.00	KVA
MISCELLANEOUS	0.00	KVA
FUTURE LOAD - 25% OF TOTAL CONN. LOAD	0.00	KVA
TOTAL NEW LOAD:	27.60	KVA
TOTAL CONNECTED LOAD:	70.60	KVA
AMPS AT 480-VOLTS:	84.96	AMPS

EXISTING PANEL MP LOAD SUMMARY		
EXISTING CONNECTED LOAD:	22.35	KVA
LOAD REMOVED:	0.00	KVA
NEW CONNECTED LOAD:		
LIGHTING	0.00	KVA
HVAC COOLING	0.00	KVA
HVAC HEATING	0.00	KVA
MOTORS	0.85	KVA
KITCHEN EQUIPMENT	0.00	KVA
RECEPTACLES (FIRST 10 KVA AT 100%)	0.00	KVA
REMAINING RECEPTACLE LOAD AT 50%	0.00	KVA
MISCELLANEOUS	0.00	KVA
FUTURE LOAD - 25% OF TOTAL CONN. LOAD	0.00	KVA
TOTAL NEW LOAD:	0.85	KVA
TOTAL CONNECTED LOAD:	23.20	KVA
AMPS AT 208-VOLTS:	64.44	AMPS

EXISTING PANEL MA LOAD SUMMARY		
EXISTING CONNECTED LOAD:	73.04	KVA
LOAD REMOVED:	0.00	KVA
NEW CONNECTED LOAD:		
LIGHTING	0.00	KVA
HVAC COOLING	0.00	KVA
HVAC HEATING	33.99	KVA
MOTORS	0.00	KVA
KITCHEN EQUIPMENT	0.00	KVA
RECEPTACLES (FIRST 10 KVA AT 100%)	0.00	KVA
REMAINING RECEPTACLE LOAD AT 50%	0.00	KVA
MISCELLANEOUS	0.00	KVA
FUTURE LOAD - 25% OF TOTAL CONN. LOAD	0.00	KVA
TOTAL NEW LOAD:	33.99	KVA
TOTAL CONNECTED LOAD:	107.03	KVA
AMPS AT 480-VOLTS:	128.80	AMPS

EXISTING PANEL EMP1 LOAD SUMMARY		
EXISTING CONNECTED LOAD:	31.10	KVA
LOAD REMOVED:	0.00	KVA
NEW CONNECTED LOAD:		
LIGHTING	0.00	KVA
HVAC COOLING	0.00	KVA
HVAC HEATING	11.40	KVA
MOTORS	1.60	KVA
KITCHEN EQUIPMENT	0.00	KVA
RECEPTACLES (FIRST 10 KVA AT 100%)	0.00	KVA
REMAINING RECEPTACLE LOAD AT 50%	0.00	KVA
MISCELLANEOUS	0.00	KVA
FUTURE LOAD - 25% OF TOTAL CONN. LOAD	0.00	KVA
TOTAL NEW LOAD:	13.00	KVA
TOTAL CONNECTED LOAD:	44.10	KVA
AMPS AT 208-VOLTS:	122.51	AMPS

BID SET

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21622 ENGINEER STEVEN M. MCCULLEN 3/16/23

North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

ELECTRICAL PANEL SCHEDULES

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: D. DIZON	CHECKED: S. MCCULLEN
CLIENT JOB NO.: --	SSME JOB NO.: 19049
SHEET: E3.1 OF SHEETS	

PLOTTED: 3/6/2023 @ 12:54:41 PM BY: TRISHA PELKEY
FILENAME: P:\SSME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - E3.1.dwg

19049 - E3.1.DWG

PLUMBING GENERAL NOTES

A. THE PLUMBING CONTRACTOR SHALL INSPECT AND TEST ALL DOMESTIC WATER PIPING FOR LEAKS BEFORE INSULATION COVERING IS APPLIED AND BEFORE CONCEALING WITHIN THE STRUCTURE. A HYDROSTATIC PRESSURE TEST OF 125 PSI FOR EIGHT (8) HOURS WITHOUT VARIATION.

B. COVER WATER PIPE WITH 1" THICK FIRE, MOISTURE AND MILDEW RESISTANT 3 LB/FT3 MINIMUM DENSITY FIBERGLASS SELF SEALING LAP INSULATION. INSULATION SHALL MEET ASTM E-84, UL 723 OR NFPA 255 AND NOT EXCEED A 25 FLAME SPREAD AND 50 SMOKE DEVELOPMENT. IN- WALL PIPING ONLY INSULATION MAY BE REDUCED TO 1/2". INSTALL INSULATION PER THE MANUFACTURES GUIDELINES AND RECOMMENDATIONS. SEAL ALL JOINTS.

PLUMBING LEGEND

SYMBOL	DESCRIPTION
(E)	EXISTING PIPING
	EXISTING PIPING TO BE DEMOLISHED
W	SANITARY WASTE PIPING
V	VENT PIPING
CW	DOMESTIC COLD WATER PIPING
HW	DOMESTIC HOT WATER PIPING
HWR	DOMESTIC HOT WATER RECIRC PIPING
LP	LOW PRESSURE GAS PIPING (PROPANE)
D	DRAIN PIPING
	PIPE ELBOW UP
	PIPE ELBOW DOWN
	PIPING BELOW FLOOR / SLAB
	BALL VALVE
	PIPE CAP
	FLOOR CLEANOUT (F.C.O.)
	CLEANOUT (CO) / WALL CLEANOUT (WCO)
FD	FLOOR DRAIN
EX., (E)	EXISTING (ABBREVIATION)
CO	CLEAN OUT
(ETR)	EXISTING TO REMAIN
	POINT OF DISCONNECTION
	POINT OF RECONNECTION
	BACK FLOW PREVENTER
	ISOLATION VALVE
	THERMOMETER

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 029347 ENGINEER CARL A. STUPKA
3/14/2023

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North Carolina Zoo
Sonaran Desert Dome - HVAC
Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

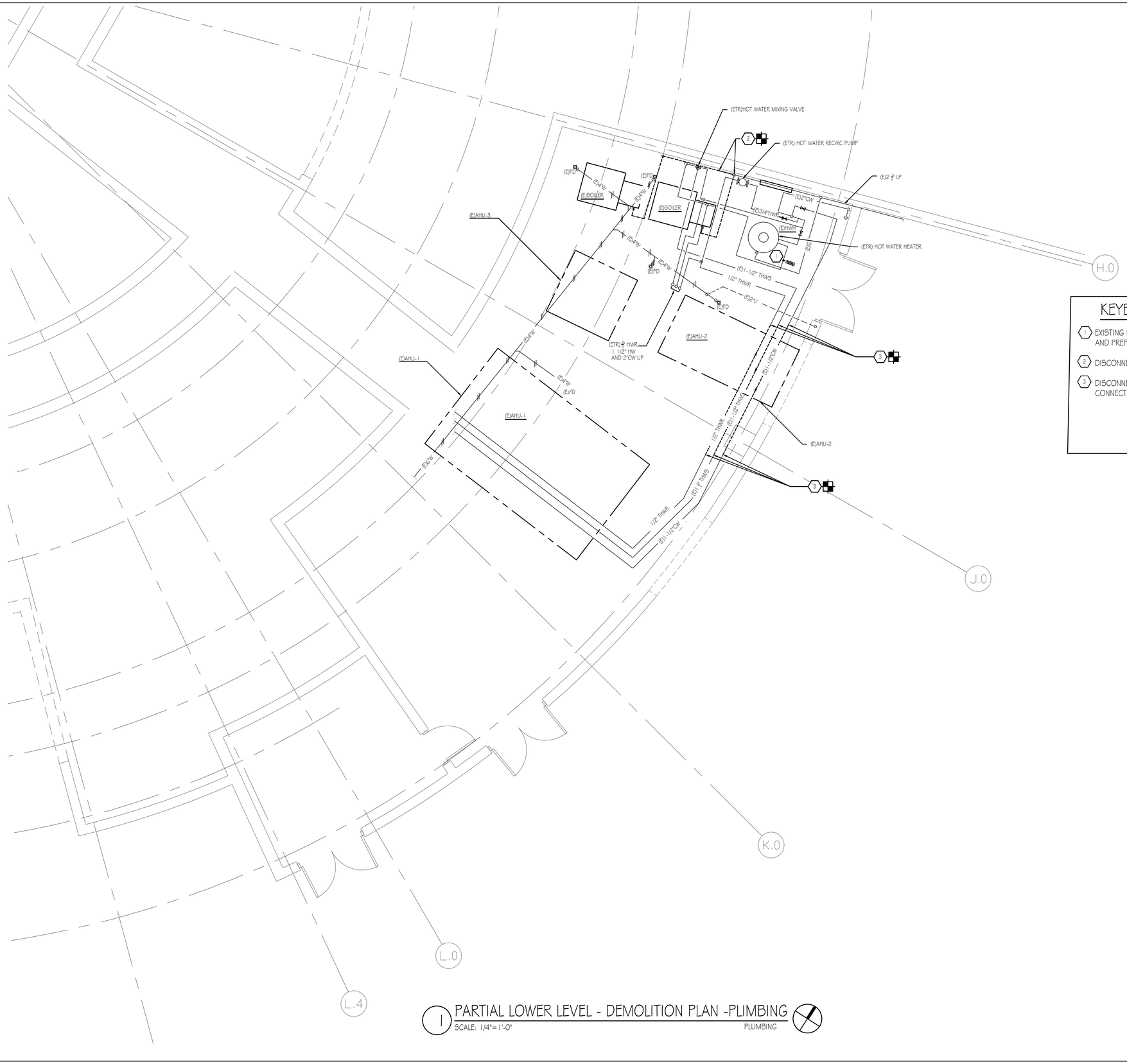
SCHEDULES, SYMBOLS, LEGENDS, NOTES & ABBREVIATIONS

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049
SHEET: **P0.1** OF SHEETS	

PLOTTED: 3/6/2023 @ 1:28:00 PM BY: TRISHA PELKEY
FILENAME: P:\SME Projects\2019 Projects\19049 - NC Zoo - Desert Pavilion HVAC Upgrades\CADD\19049 - P0.1 .dwg

19049 - P0.1.DWG



KEYED NOTES

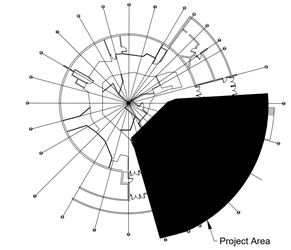
1. EXISTING DOMESTIC HOT WATER HEATER TO REMAIN REMOVE EXISTING FLUE AND PREPARE FOR NEW FLUE CONNECTION.
2. DISCONNECT LP GAS PIPING AT POINT INDICATED AND CAP.
3. DISCONNECT PIPING AT POINT INDICATED AND PREPARE FOR NEW CONNECTIONS,

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

1 PARTIAL LOWER LEVEL - DEMOLITION PLAN -PLIMBING

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



KEY PLAN - LOWER & MAIN LEVEL

NO SCALE

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 029400 ENGINEER CARL A. STUPKA
3/16/23

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Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

PARTIAL LOWER LEVEL DEMOLITION PLAN - PLUMBING

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049

SHEET **P1.1** OF SHEETS

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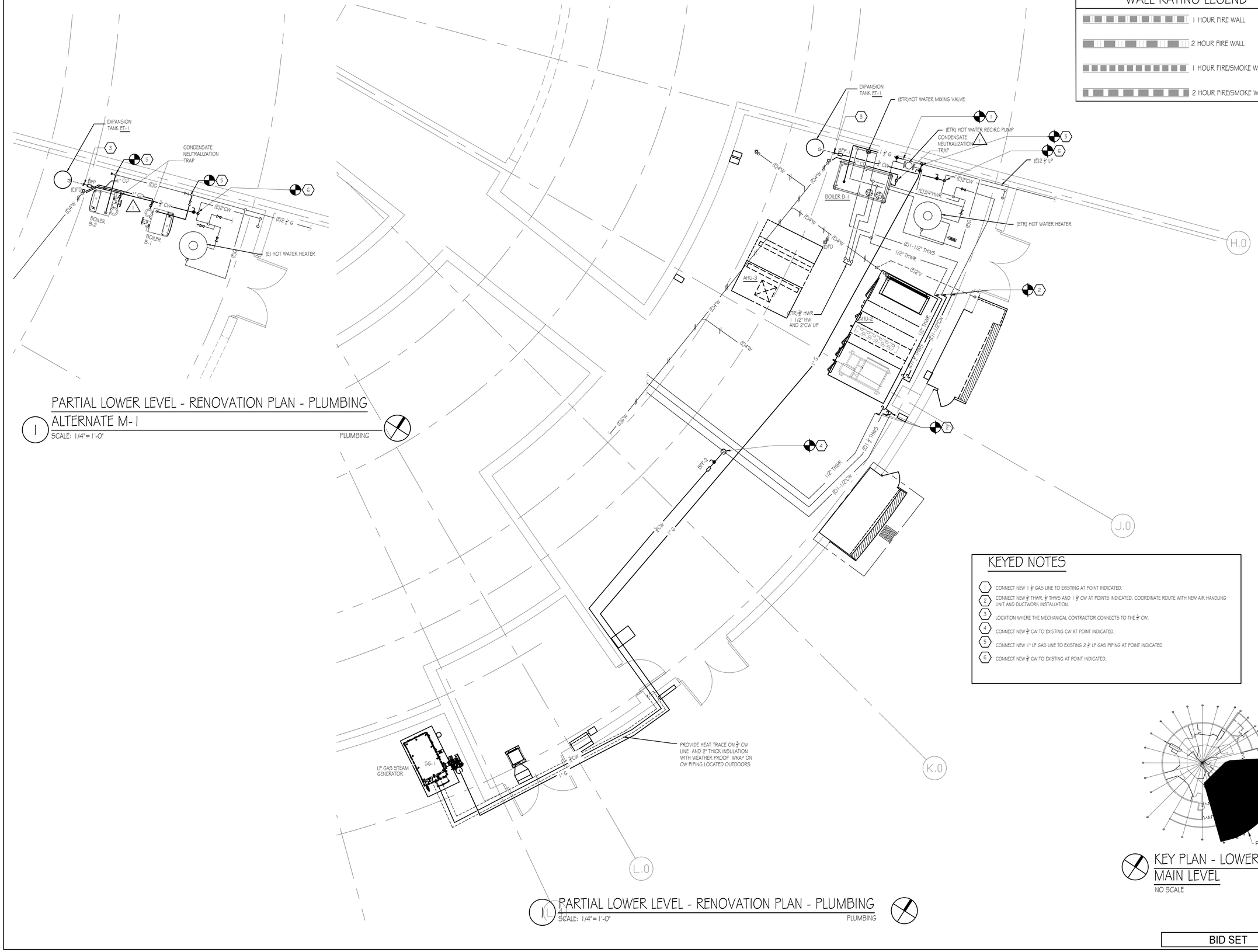
19049 – P1.1.DWG



PARTIAL LOWER LEVEL - RENOVATION PLAN - PLUMBING
ALTERNATE M-1

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

PARTIAL LOWER LEVEL - RENOVATION PLAN - PLUMBING

L4 SCALE: 1/4"= 1'-0" PLUMBING

WALL RATING LEGEND

- 1 HOUR FIRE WALL
- 2 HOUR FIRE WALL
- 1 HOUR FIRE/SMOKE WALL
- 2 HOUR FIRE/SMOKE WALL

KEYED NOTES

1. CONNECT NEW 1 ½" GAS LINE TO EXISTING AT POINT INDICATED.
2. CONNECT NEW ½" THWR, ½" THWS AND 1 ½" CW AT POINTS INDICATED. COORDINATE ROUTE WITH NEW AIR HANDLING UNIT AND DUCTWORK INSTALLATION.
3. LOCATION WHERE THE MECHANICAL CONTRACTOR CONNECTS TO THE ¾" CW.
4. CONNECT NEW ¾" CW TO EXISTING CW AT POINT INDICATED.
5. CONNECT NEW 1" LP GAS LINE TO EXISTING 2 ½" LP GAS PIPING AT POINT INDICATED.
6. CONNECT NEW ¾" CW TO EXISTING AT POINT INDICATED.

KEY PLAN - LOWER & MAIN LEVEL
NO SCALE

BID SET

NORTH CAROLINA PROFESSIONAL SEAL 039856 ENGINEER CARL A. STUPKA 3/16/2023

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North Carolina Zoo
Sonaran Desert Dome - HVAC Improvements
4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

PARTIAL LOWER LEVEL RENOVATION PLAN - PLUMBING

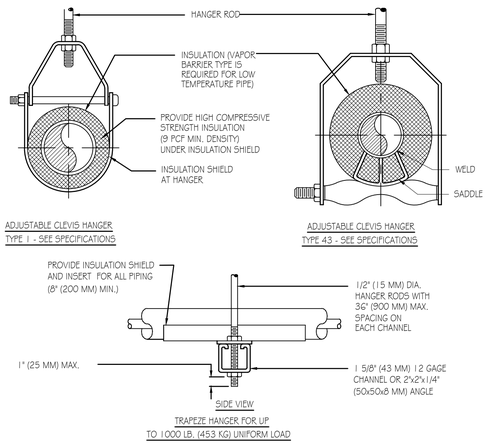
NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN	CHECKED
T. PELKEY	C. STUPKA
CLIENT JOB NO.	SSME JOB NO.
--	19049

SHEET **P2.1** OF SHEETS

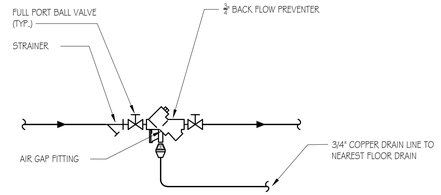
PLOTTED: 3/16/2023 @ 1:29:01 PM BY: TRISHA PELKEY
FILENAME: P:\SME Projects\2019 Projects\19049 - NCZoo - Desert Pavilion HVAC Upgrades\CADD\19049 - P2.1.dwg

19049 – P2.1.DWG

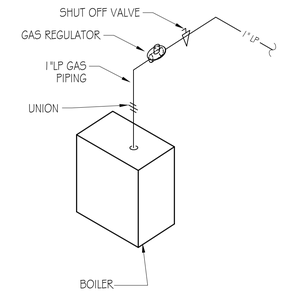


MAXIMUM PIPE/TUBING SUPPORT SPACING																		
NOM. SIZE	IN. (MM)	THRU 3/4 THRU (20)	1 (25)	1 1/4 (32)	1 1/2 (40)	2 (50)	2 1/2 (65)	3 (75)	4 (100)	5 (125)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)	20 (500)	24 (600)
PIPE	FT. (M)	7 (2.1)	7 (2.1)	7 (2.1)	9 (2.7)	10 (3.0)	11 (3.4)	12 (3.7)	14 (4.1)	16 (4.9)	17 (5.2)	19 (5.8)	22 (6.7)	23 (7.0)	25 (7.6)	27 (8.2)	28 (8.5)	30 (9.1)	32 (9.6)
TUBING	FT. (M)	5 FT 5 FT	6 (1.8)	7 (2.1)	8 (2.4)	8 (2.4)	9 (2.7)	10 (3.0)	12 (3.7)	13 (4.0)	14 (4.1)	16 (4.9)	- -	- -	- -	- -	- -	- -	- -
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																			

1 TYPICAL PIPE HANGERS
NO SCALE



2 BACKFLOW PREVENTER DETAIL
NO SCALE



3 TYPICAL GAS TRAIN PIPING
NOT TO SCALE

PLUMBING FIXTURE SCHEDULE

TAG	DESCRIPTION	BASIS OF DESIGN	WASTE	VENT	C.W.	H.W.
BFP-1	BACK FLOW PREVENTER	ZURN 975-XL2	3/4"	---	3/4"	---
BFP-2	BACK FLOW PREVENTER	ZURN 975-XL2	3/4"	---	3/4"	---

BID SET

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NORTH CAROLINA PROFESSIONAL SEAL 039044 ENGINEER CARL A. STUPKA 3/16/2023

North Carolina Zoo
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4401 Zoo Parkway, Asheboro, North Carolina 27205
SCO ID# 18-18399-01A

DETAILS AND SCHEDULES
PLUMBING

NO.	REVISIONS	BY

DATE	SCALE
03/16/2023	AS NOTED
DRAWN: T. PELKEY	CHECKED: C. STUPKA
CLIENT JOB NO.: --	SSME JOB NO.: 19049
SHEET: P3.1 OF SHEETS	

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