SYMBOLS

D"▯ ROUND DUCT
D=INSIDE DIAMETER DIMENSION

SQUARE TO ROUND

DEMOLITION HATCH INDICATION

EQUIPMENT, PIPE, DUCT, FITTINGS, ETC TO BE DEMOLISHED WILL BE INDICATED SPECIFICALLY OR BY DIAGONAL HATCH MARKING.

◇# DEMOLITION KEYNOTE

▯# KEYNOTE

CONNECT TO EXISTING AT THIS POINT

DEMOLISH BACK TO THIS POINT

END SUCTION PUMP

AIR/DIRT SEPARATOR

CHEMICAL SHOT FEEDER

EXPANSION TANK

D"▯ PIPE CONTINUES UP
D=INSIDE DIAMETER DIMENSION

D"▯ PIPE CONTINUES DOWN
D=INSIDE DIAMETER DIMENSION

THERMOMETER

PRESSURE GAUGE

MOTORIZED 3-WAY CONTROL VALVE

MOTORIZED 2-WAY CONTROL VALVE

BUTTERFLY ISOLATION/SHUT-OFF VALVE

GATE ISOLATION/SHUT-OFF VALVE

BALL ISOLATION/SHUT-OFF VALVE

PLUG ISOLATION/SHUT-OFF VALVE

PRESSURE REDUCING VALVE

PRESSURE RELIEF VALVE

UNION

FLEXIBLE CONNECTION

CHECK VALVE

STRAINER

RE-CIRCULATION PUMP

ABBREVIATION

ALL MAY NOT APPLY

ADS	AIR/DIRT SEPARATOR
B	BOILER
BP	BOILER PUMP
BRP	BOILER RE-CIRCULATION PUMP
BTU	BRITISH THERMAL UNIT
CD	CONDENSATE
CKV	CHECK VALVE
CV	CONTROL VALVE
ΔP	DIFFERENCE IN PRESSURE
ΔT	DIFFERENCE IN TEMPERATURE
DEG. F	DEGREES FAHRENHEIT
DDC	DISTRIBUTED DIGITAL CONTROLS
DN	DOWN
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
GPM	GALLONS PER MINUTE
HHWS	HEATING HOT WATER SUPPLY
HHWR	HEATING HOT WATER RETURN
In W.C.	INCHES OF WATER COLUMN
IV	ISOLATION VALVE
LWT	LEAVING WATER TEMPERATURE
MBH	1,000 BTUS PER HOUR
MFG.	MANUFACTURER
OA	OUTSIDE AIR
PG	PRESSURE GAUGE
RA	RETURN AIR
RND	ROUND
RPM	REVOLUTIONS PER MINUTE
STR	STRAINER
THM	THERMOMETER
TSP	TOTAL STATIC PRESSURE
UNO	UNLESS NOTED OTHERWISE
V/PZ	VOLT/PHASE
VFD	VARIABLE FREQUENCY DRIVE
VSD	VARIABLE SPEED DRIVE
XT	EXPANSION TANK

CODE REFERENCE

THE LATEST EDITIONS OF THE ESTABLISHED STANDARDS OF THE FOLLOWING ORGANIZATIONS, AND INDIVIDUAL STANDARDS NAMED SHALL BE FOLLOWED THE SAME AS IF THEY WERE FULLY WRITTEN HEREIN AND CONSTITUTE A PART OF THE SPECIFICATION REQUIREMENTS EXCEPT WHERE OTHERWISE SPECIFIED:

FBC, BUILDING	FLORIDA BUILDING CODE 7TH EDITION
FBC, MECHANICAL	FLORIDA BUILDING CODE 7TH EDITION
FBC, EXISTING BUILDING	FLORIDA BUILDING CODE 7TH EDITION
FBC, FUEL GAS	FLORIDA BUILDING CODE 7TH EDITION
FBC, ENERGY CONSERVATION	FLORIDA BUILDING CODE 7TH EDITION
FFPC	FLORIDA FIRE PREVENTION CODE, 2020 7TH EDITION
NFPA 13	STANDARD FOR THE INSTALLATION OF FIRE SPRINKLER SYSTEMS
NFPA 51B	STANDARD FOR FIRE PREVENTION DURING WELDING, CUTTING AND OTHER HOT WORK
NFPA 54	NATIONAL FUEL GAS CODE
NFPA 90A	STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS
NFPA 90B	STANDARD FOR THE INSTALLATION OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS
NFPA 101	LIFE SAFETY CODE
NFPA 101A	GUIDE ON ALTERNATIVE APPROACHES TO LIFE SAFETY
NFPA 101B	CODE FOR MEANS OF EGRESS FOR BUILDINGS AND STRUCTURES
NFPA 900	BUILDING ENERGY CODE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ADA	AMERICAN WITH DISABILITIES ACT
UL	UNDERWRITERS LABORATORIES

THESE CODE AND STANDARDS SHALL BE CONSIDERED A MINIMUM REQUIREMENT. THE CONTRACTOR SHALL NOT RELIEVED FROM PROVIDING HIGHER GRADE MATERIALS, PRODUCTS AND WORKMANSHIP WHICH MAY BE SPECIFIED WITHIN THESE DOCUMENTS

ENERGY SYSTEMS - GENERAL

1. PROVIDE A TEST AND BALANCE OF THE SYSTEM IN COMPLIANCE WITH FBC-EC SECTION 408.2.2 IN ACCORDANCE WITH THE LATEST NEBB, ASHRAE, OR EQUIVALENT GUIDELINES FOR SUCH WORK. TAB CONTRACTORS SHALL BE PRE APPROVED BY THE ENGINEER OF RECORD.
2. PROVIDE OWNER A COMPLETE SET OF OPERATIONS AND MAINTENANCE MANUALS FOR ALL EQUIPMENT WITHIN 90 DAYS OF SYSTEM ACCEPTANCE.
3. HVAC EQUIPMENT EFFICIENCY MUST BE VERIFIED PER TABLES C403.2.3(1-11) UNDER FBC CHAPTER 4, C403.2.3.
4. DRAWINGS, MANUALS, SYSTEM BALANCING REPORTS, AND A FINAL COMMISSIONING REPORT SHALL BE PROVIDED TO THE BUILDING OWNER WITHIN 90 DAYS OF THE RECEIPT OF THE CERTIFICATE OF OCCUPANCY.
5. A COMMISSIONING PLAN SHALL BE DEVELOPED BY A REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY IN ACCORDANCE WITH FBC CHAPTER 4, C408.2.1.
6. HVAC EQUIPMENT SHALL UNDERGO FUNCTIONAL PERFORMANCE TESTING AS SPECIFIED UNDER FBC CHAPTER 4, SECTIONS C408.2.3.1-3. THIS INCLUDES ALL CONTROL SYSTEMS. TESTING SHALL SHOW EFFECTIVE OPERATION IN ACCORDANCE WITH ALL APPROVED PLANS AND SPECIFICATIONS.
7. ALL PIPING SERVING AS PART OF A HEATING OR COOLING SYSTEM SHALL BE THERMALLY INSULATED IN ACCORDANCE WITH FBC CHAPTER 4, TABLE C403.2.10. WHERE PIPING IS INSTALLED IN OR UNDER A SLAB, VERIFICATION MAY NEED TO OCCUR DURING FOUNDATION INSPECTION.
8. AUTOMATIC START CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM. THE CONTROLS SHALL BE CAPABLE OF AUTOMATICALLY ADJUSTING THE DAILY START TIME OF THE HVAC SYSTEM IN ORDER TO BRING EACH SPACE THE DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED OCCUPANCY.
9. HVAC WATER-HEATING CONTROL SYSTEMS SHALL BE TESTED TO DOCUMENT THAT CONTROL DEVICES, COMPONENTS, EQUIPMENT, AND SYSTEMS ARE CALIBRATED AND ADJUSTED AND OPERATE IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS. SEQUENCES OF OPERATION SHALL BE FUNCTIONALLY TESTED TO DOCUMENT THEY OPERATE IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS.
10. HVAC PERFORMANCE EFFICIENCY SHALL BE CONSISTENT WITH WHAT IS SHOWN IN THE APPROVED PLANS.

ENERGY SYSTEMS - HYDRONIC SYSTEMS

1. THREE-PIPE HYDRONIC SYSTEMS ARE NOT PERMITTED TO USE A COMMON RETURN FOR BOTH HOT WATER AND CHILLED WATER.
2. TWO-PIPE HYDRONIC SYSTEMS THAT USE A COMMON DISTRIBUTION SYSTEM TO SUPPLY HEATED WATER SHALL BE DESIGNED WITH OPERATION CONTROLS, CHANGEOVER DEADBAND, AND TEMPERATURE CONTROLS IN ACCORDANCE WITH FBC CHAPTER 4, C403.4.3.2.
3. HYDRONIC SYSTEMS 300,000 BTU/H OR GREATER IN DESIGN OUTPUT CAPACITY SHALL INCLUDE CONTROLS WHICH HAVE THE CAPABILITY TO AUTOMATICALLY RESET SUPPLY-WATER TEMPERATURE AND REDUCE SYSTEM PUMP FLOW IN ACCORDANCE WITH FBC CHAPTER 4, C403.4.3.4.
4. BOILER PLANTS WITH MULTIPLE BOILERS SHALL HAVE THE CAPABILITY TO AUTOMATICALLY REDUCE FLOW THROUGH THE PLANT WHEN A BOILER IS SHUT DOWN.

HYDRONIC PIPING

1. ALL HYDRONIC PIPING SHALL BE WELDED STEEL, 2-1/2" TO 6" FLANGED AND ¾" TO 2" THREADED.
2. ALL HYDRONIC PIPING SHALL BE INSULATED. INTERIOR WITH 1-1/2" MINIMUM, EXTERIOR 2" MINIMUM, CLOSED CELL INSULATION. ALL PIPING SHALL BE ALUMINUM JACKETED, SEALED AS RECOMMENDED BY THE MANUFACTURER, SECURED WITH STAINLESS STEEL BANDS 12" O.C.
3. PIPE SHALL BE HUNG WITH CLEVIS OR UNISTRUT PRODUCTS WITH THREADED RODS IN COMPLIANCE WITH FBC-M SECTION 305.
4. PIPE PENETRATIONS THROUGH FIRE RATED ASSEMBLIES SHALL BE SEALED WITH FIRE CAULKING EQUAL TO METACAULK: UL-CAJ2134, UL-WL2135

HVAC GENERAL NOTES

1. ONLY NEW EQUIPMENT SHALL BE PROVIDED UNLESS INDICATED AS EXISTING TO REMAIN.
2. ALL CONNECTIONS TO EQUIPMENT SHALL BE MADE WITH FLEXIBLE REGIONS FOR VIBRATION ISOLATION.
3. ALL EQUIPMENT SHALL BE LABELED SO THAT USERS CAN IDENTIFY EACH PIECE OF EQUIPMENT. LABELS SHALL BE CONSISTENT WITH EQUIPMENT TAGS THAT ARE LISTED IN THE SCHEDULES WITHIN THESE DOCUMENTS.
4. ALL EQUIPMENT SHALL BE INSTALLED PER MANUFACTURERS WRITTEN INSTRUCTIONS AND RECOMMENDATIONS.
5. INSTALL DUCTWORK AND PIPING AS HIGH AS POSSIBLE ABOVE CEILING.
6. COORDINATE THE INSTALLATION OF DUCTWORK AND PIPING WITH ELECTRICAL EQUIPMENT SO THAT THE REQUIRED CODE CLEARANCES TO ELECTRICAL EQUIPMENT IS MAINTAINED.
7. DUCTWORK AND PIPING INSTALLATIONS SHALL ALLOW FOR EQUIPMENT RECOMMENDED MAINTENANCE CLEARANCES. CONVENIENT ACCESS FOR REMOVAL OF FILTERS SHALL BE MAINTAINED.
8. ENSURE ALL EQUIPMENT HAS BEEN CLEANED AT THE END OF THE PROJECT.
9. DO NOT LOCATE AIR INTAKES CLOSER THAN 10 FEET FROM ANY VENT OR EXHAUST OUTLETS. ROUTE TOILET EXHAUST TO LOCATION SHOWN ON PLANS. WALL CAPS SHALL BE ALUMINUM CONSTRUCTION WITH BACKDRAFT DAMPER, BIRD AND INSECT SCREENS.

DESIGN CRITERIA

BUILDING TYPE	GROUP B, BUSINESS
CLIMATE ZONE	2A, LEON COUNTY, FLORIDA
OUTDOOR DESIGN CONDITIONS (SUMMER)	95 DEG Fdb, 77 DEG Fwb
OUTDOOR DESIGN CONDITIONS (WINTER)	20 DEG Fdb
INTERIOR DESIGN CONDITIONS	75 DEG F COOLING, 72 DEG F HEATING

SUBMITTAL REQUIREMENTS

1. USE OF AN APPROVAL STAMP ON SUBMITTAL DOCUMENTS CERTIFIES THAT THE CONTRACTOR HAS COMPLIED WITH THE CONTRACT DOCUMENT REQUIREMENTS.
2. THE CONTRACTOR SHALL NOT BE RELIEVED OF RESPONSIBILITY FOR DEVIATIONS FROM REQUIREMENTS OF THE CONTRACT DOCUMENTS BY THE ARCHITECT/ENGINEER'S APPROVAL OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES, OR SIMILAR SUBMITTAL ITEMS UNLESS THE CONTRACTOR HAS SPECIFICALLY INFORMED THE ARCHITECT/ENGINEER IN WRITING OF SUCH DEVIATION AT THE TIME OF SUBMITTAL AND THE ARCHITECT/ENGINEER HAS GIVEN WRITTEN APPROVAL TO THE SPECIFIC DEVIATION. THE CONTRACTOR SHALL NOT BE RELIEVED OF RESPONSIBILITY FOR ERRORS OR OMISSIONS IN SHOP DRAWINGS, PRODUCT DATA, SAMPLES, OR SIMILAR SUBMITTAL ITEMS BY THE ARCHITECT/ENGINEER'S APPROVAL THEREOF.
3. CONTRACTOR SHALL SUPPLY TO THE ARCHITECT SUBMITTALS ON THE FOLLOWING WHERE APPLICABLE (ALL MAY NOT APPLY):
   - 3.1. HVAC EQUIPMENT (BOILERS, PUMPS AND ACCESSORIES)
     - 3.1.1. INCLUDING PERFORMANCE DATA AT LISTED ENTERING CONDITIONS
   - 3.2. DUCTWORK MATERIALS AND CONSTRUCTION METHODS
   - 3.3. DUCT FITTINGS
   - 3.4. INSULATION MATERIALS
   - 3.5. DUCT ACCESSORIES AND SPECIALITIES
   - 3.6. PIPING
   - 3.7. CONTROLS
   - 3.8. ROOF EQUIPMENT AND MOUNTING

COMMISSIONING

1. BUILDING MECHANICAL SYSTEMS SHALL BE COMMISSIONED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE, ENERGY CONSERVATION, SECTION C408 'SYSTEM COMMISSIONING'.
2. BUILDING POWER AND LIGHTING SYSTEMS SHALL BE COMMISSIONED IN ACCORDANCE WITH FLORIDA BUILDING CODE, ENERGY CONSERVATIONS, SECTION C408 'SYSTEMS COMMISSIONING'. TESTING SHALL ENSURE THAT CONTROL HARDWARE AND SOFTWARE ARE CALIBRATED, ADJUSTED, PROGRAMMED, AND IN PROPER WORKING CONDITION IN ACCORDANCE WITH CONSTRUCTION DOCUMENTS AND MANUFACTURER'S INSTALLATION INSTRUCTIONS. TESTING SHALL BE PERFORMED ON SYSTEMS, INCLUDING OCCUPANT SENSORS, TIME SWITCHES, PROGRAMMABLE SCHEDULE CONTROLS, PHOTO SENSORS, AND DAYLIGHT CONTROLS.
3. A COMMISSIONING PLAN SHALL BE DEVELOPED BY AN APPROVED COMMISSIONING AUTHORITY (REGISTERED DESIGN PROFESSIONAL OR AGENCY) AND SHALL INCLUDE THE FOLLOWING ITEMS: (1) A NARRATIVE DESCRIPTION OF THE ACTIVITIES THAT WILL BE ACCOMPLISHED DURING EACH PHASE OF COMMISSIONING, INCLUDING THE PERSONNEL INTENDED TO ACCOMPLISH EACH OF THE ACTIVITIES; (2) A LISTING OF THE SPECIFIC EQUIPMENT, APPLIANCES OR SYSTEMS TO BE TESTING AND A DESCRIPTION OF THE TESTS TO BE PERFORMED; (3) FUNCTIONS TO BE TESTED, INCLUDING BUT NOT LIMITED TO, CALIBRATIONS AND CONTROLS; CONDITIONS UNDER WHICH THE TEST WILL BE PERFORMED, INCLUDING BUT NOT LIMITED TO, AFFIRMING WINTER AND SUMMER DESIGN CONDITIONS AND FULL OUTSIDE AIR CONDITIONS; (5) MEASURABLE CRITERIA FOR PERFORMANCE.
4. PRIOR TO PASSING THE FIRST MECHANICAL INSPECTION, THE COMMISSIONING AUTHORITY SHALL PROVIDE EVIDENCE OF MECHANICAL SYSTEMS COMMISSIONING AND COMPLETION. PROVIDE A COMPLETED PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES AND RESULTS TO THE OWNER, CERTIFIED BY COMMISSIONING AUTHORITY. THE REPORT SHALL BE IDENTIFIED AS "PRELIMINARY COMMISSIONING REPORT" AND SHALL IDENTIFY: (1) ITEMIZATION OF DEFICIENCIES FOUND DURING TESTING THAT HAVE NOT BEEN CORRECTED AT THE TIME OF THE REPORT PREPARATION; (2) DEFERRED TESTS THAT CANNOT BE PERFORMED
5. PROVIDE FINAL COMMISSIONING REPORT TO OWNER WITHIN 90 DAYS OF CERTIFICATE OF OCCUPANCY. THE REPORT SHALL BE IDENTIFIED AS "FINAL COMMISSIONING REPORT" AND SHALL INCLUDE: (1) RESULTS OF FUNCTIONAL PERFORMANCE TESTS; (2) DISPOSITION OF DEFICIENCIES FOUND DURING TESTING, INCLUDING DETAILS OF CORRECTIVE MEASURES USED OR PROPOSED; (3) FUNCTIONAL PERFORMANCE TEST ACCEPTANCE, PROVIDE FOR REPEATABILITY. EXCEPTION: DEFERRED TESTS WHICH CANNOT BE PERFORMED AT THE TIME OF REPORT PREPARATION FOR CLIMATIC CONDITIONS.
6. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE SERVICES OF AN APPROVED COMMISSIONING AUTHORITY.

GENERAL NOTES

1. THE ENGINEER SHALL NOT BE HELD RESPONSIBLE FOR ANY MISUSE AND/OR MISREPRESENTATION OF THIS SET OF DOCUMENTS.
2. THE CONTRACTOR ASSUMES RESPONSIBILITY FOR THE USE OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL MAKE THEMSELVES AWARE OF PROJECT CONDITIONS AND OWNER REQUIREMENTS PRIOR TO PROCUREMENT OF EQUIPMENT AND SERVICES. CHANGES IN PROJECT COST WILL NOT BE GRANTED DUE TO FIELD CONFLICTS AND OR PROJECT CONDITIONS.
3. THIS SET OF DRAWINGS AND SPECIFICATIONS SHALL NOT BE CONSIDERED A SET OF CONSTRUCTION DOCUMENTS UNLESS A SIGNATURE AND DATE ARE AFFIXED TO THE DRAWINGS AND SPECIFICATIONS BY THE ENGINEER OF RESPONSIBLE CHARGE OF THE GIVEN DISCIPLINE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED UNLESS EMBOSSED AND THE SHA AUTHENTICATION CODE MUST BE VERIFIED ON ELECTRONIC COPIES.
4. CONFLICTS BETWEEN THIS SET OF DRAWINGS AND THE CONTRACT SPECIFICATIONS SHALL BE RESOLVED BY THE ENGINEER OF RECORD. THE CONTRACTOR DOES NOT HAVE THE AUTHORITY TO INTERPRET CONFLICTS AND RESOLVE ISSUES WITHOUT WRITTEN DIRECTION FROM THE ENGINEER OF RECORD.
5. ANY CONFLICTS IN THE FIELD OR WITHIN THESE DOCUMENTS SHALL BE RECORDED AND PROVIDED TO THE ENGINEER OF RECORD ON THE CONTRACTOR'S STANDARD LETTERHEAD. WRITTEN DIRECTION RESOLVING CONFLICT WILL BE ISSUED BY THE ENGINEER OF RECORD.
6. PRIOR TO INSTALLATION, COORDINATE AND ADJUST THE FINAL LOCATION OF ALL WALL MOUNTED DEVICES AND EQUIPMENT WITH ALL CASEWORK, SHELVING OR OTHER WALL MOUNTED FURNISHINGS.
7. PLANS ARE DIAGRAMMATIC IN NATURE AND INTENDED TO SHOW THE GENERAL SCOPE OF THE WORK TO BE PERFORMED. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ALL DIMENSIONS.
8. DUE TO THE SMALL SCALE OF THE DRAWINGS, AND TO UNFORESEEN JOB CONDITIONS, ALL REQUIRED OFFSETS, TRANSITIONS AND FITTINGS MAY NOT BE SHOWN BUT SHALL BE PROVIDED AT NO ADDITIONAL COST.
9. THE CONTRACTOR SHALL COORDINATE WITH OTHER TRADES AND EXISTING EQUIPMENT TO ENSURE THE EQUIPMENT SPECIFIED WILL WORK FOR THE SPACES PROVIDED. FINAL DIMENSIONS OF SYSTEMS SHOWN ON THESE PLANS SHALL BE COORDINATED IN THE FIELD. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR PROVIDING OFFSETS AND TRANSITIONS TO FIT IN SPACES PROVIDED AND AT NO COST TO THE OWNER.
10. THE CONTRACTOR IS RESPONSIBLE FOR ANY SPECIAL REQUIREMENTS INVOLVED IN INSTALLING EQUIPMENT IN THE BUILDING. DISMANTLING AND REASSEMBLING OF ANY EQUIPMENT SHALL BE DONE AS REQUIRED TO BRING INTO THE BUILDING AND EQUIPMENT ROOMS.
11. ALL WORK PERFORMED AS PART OF THIS PROJECT SHALL BE PERFORMED BY EXPERIENCED TRADESMEN WHO ARE TRAINED, EXPERIENCED, AND SKILLED IN THE TASKS INCIDENTAL TO THE PROJECT.
12. ALL WORK SHALL COMPLY WITH APPLICABLE OSHA AND EPS REGULATIONS AND GUIDELINES.
13. THE CONTRACTOR PERFORMING WORK ON THIS PROJECT WILL BE RESPONSIBLE FOR REGULARLY CLEANING THE WORK AREA OF ANY DEBRIS ASSOCIATED WITH THE WORK BEING PERFORMED. THE SITE SHALL BE CLEAN OF ALL CONSTRUCTION DEBRIS AT THE COMPLETION OF THE JOB, BEFORE FINAL PAYMENT IS MADE.
14. REASONABLE PRECAUTIONS SHALL BE MADE FOR SAFETY AND HEALTH INCLUDING BUT NOT LIMITED TO WARNING SIGNS, SAFETY PRECAUTIONS, AND BARRICADES FOR PEDESTRIANS.
15. COORDINATE ALL DEMOLITION, CLEANING, AND CONSTRUCTION WORK. CONTRACTOR SHALL PROVIDE OWNER A FULL CONSTRUCTION SCHEDULE.
16. CONTRACTOR SHALL BE HELD TO PROVIDED SCHEDULE. THEY SHALL BE RESPONSIBLE FOR PROVIDING SUFFICIENT MANPOWER AND EQUIPMENT TO COMPLETE THE WORK IN THE TIME INDICATED.
17. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION AND SECURITY OF ALL EQUIPMENT AND MATERIALS. THE LOCATION OF STORAGE SHALL BE RESTRICTED SPECIFICALLY TO THE AREA ALLOTTED BY THE OWNER.
18. ALL ITEMS INSTALLED UNDER THE SCOPE OF THIS PROJECT SHALL BE NEW, CLEAN, AND FREE OF DEFECTS.
19. IF DRAWING CHANGES ARE NEEDED FOR INSPECTION DUE TO FIELD CHANGES MADE BY THE CONTRACTOR WITHOUT PRIOR APPROVAL OF THE ENGINEER AND AGREED UPON TERMS, THEN THE CONTRACTOR SHALL PAY HOURLY RATES TO THE ENGINEER OF RECORD FOR MAKING NECESSARY CHANGES.
20. SUPPORTS, HANGERS, WIRING, AND PIPING SHALL BE INSTALLED IN A NEAT FASHION AND IN AN ORDERLY APPEARANCE.
21. ALL ROOF EQUIPMENT SHALL BE SECURED TO STRUCTURE TO RESIST A 130 MPH WIND LOAD.
22. PROTECT THE ROOF FROM DAMAGE WHENEVER ANY WORK ON THE ROOF IS REQUIRED.
23. CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF ALL PARTITIONS LABELED WITH A SPECIAL LISTING ON THE ARCHITECTURAL PLANS. THIS INCLUDES FIRE, SMOKE ACOUSTICAL AND OTHER UL WALL OR CEILING ASSEMBLIES.
24. STRUCTURAL PENETRATIONS INCLUDING BUT NOT LIMITED TO WALL, FLOOR, OR BEAM SHALL BE APPROVED BY THE STRUCTURAL ENGINEER. ALL BEAM SLEEVES AND REINFORCING APPROVED BY STRUCTURAL ENGINEER SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
25. CONTRACTOR SHALL GUARANTEE THE WORK AND MATERIALS FOR PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE. THIS GUARANTEE SHALL BE IN ADDITION TO THE WARRANTIES PROVIDED BY THE MATERIAL SUPPLIES AND MANUFACTURERS.
26. VALUE ENGINEERING OR CHANGES TO PLANS MUST BE APPROVED BY THE ENGINEER OF RECORD AND RESUBMITTED THROUGH THE BUILDING DEPARTMENT PRIOR TO BEING INSTALLED.

BOILER SCHEDULE

TAG	B-1 & B-2
MANUFACTURER	PATTERSON KELLY
MODEL NUMBER	STORM - ST-2000
GAS INPUT (MBH)	2000
HEATING OUTPUT(MBH)	1940
MIN GAS INPUT PRESSURE ("W.C)	3.5
MAX GAS INPUT PRESSURE ("W.C)	14
EFFICIENCY (%)	97%
ENTERING TEMP (F)	140
LEAVING TEMP (F)	160
MAX FLOW (GPM)	170
MIN FLOW (GPM)	54
WEIGHT (LBS)	1305
ELECTRICAL (V/PH)	208/1
OPERATING CURRENT (AMPS)	20
MINIMUM CIRCUIT CAPACITY	20

NOTES
1. BOILER INSTALLATION SHALL COMPLY WITH THE INTERNATIONAL BUILDING CODE-MECHANICAL AND THE BOILER SAFETY ACT (F.S. 554) AND ALL REFERENCED STANDARDS ASSOCIATED WITH THESE SECTIONS OF LAW.

2. PROVIDE BOILER CONTROLLER FROM MANUFACTURER. (BACNET COMPATIBLE)

3. PROVIDE WITH A PRESSURE RELIEF VALVE/PRESSURE-TEMPERATURE GAUGE

4. PROVIDE TURNDOWN RATIO OF 10:1

5. PROVIDE STAINLESS STEEL HX

6. PROVIDE 10 YEAR PARTS AND LABOR WARRANTY (OR MAXIMUM AVAILABLE)

PUMP SCHEDULE

MARK	PP-1&PP-2	BP-1&BP-2
MANUFACTURER	TACO	TACO
MODEL	3007D	SCI3007D-A-4P-PD
TYPE	INLINE	CCES
SERVICE	BOILER PRIMARY HHW	BUILDING HHW
FLUID TEMP	160	160
FLUID SERVICE	WATER	WATER
LOCATION	RA GRAY BUILDING MECHANICAL ROOM	RA GRAY BUILDING MECHANICAL ROOM
WEIGHT (LBS)	220	220
FLOW (GPM)	170	289
MINIMUM FLOW (GPM)	54	30
TOTAL DYNAMIC HEAD (FT)	35	40
MAXIMUM SPEED (RPM)	1760	1760
MINIMUM EFFICIENCY (%)	88	65
MAX BREAK HORSEPOWER (BHP)	1.9	3.51
NAMEPLATE HORSEPOWER (HP)	3	5
ELECTRICAL (V/PH/HZ)	460/3	460/3
ESTIMATED AMP DRAW	5.3	6.9

NOTES:
1. PROVIDE FACTORY MOUNTED VFD, SELF SENSING WITH INSTALLED DP SENSOR IN THE PIPING SYSTEM. THE VFD SHOULD NOT CONTAIN A BYPASS.
2. PUMPS INSTALLED MUST BE BACNET COMPATIBLE.

EXPANSION TANK SCHEDULE

TAG	XT
MANUFACTURER	TACO
MODEL NUMBER	CW600
MAX WORKING PRESSURE (PSI)	125
APPROX WEIGHT (LBS)	620
MAX VOLUME	158
DIAMETER INCHES	30
HEIGHT INCHES	74

MECHANICAL SHEET INDEX

FSM Engineering
150 John Knox Road
Tallahassee, FL, 32303
p.850.222.5683
FL CA 28968

ROBERT E GELHARDT II LICENSED NO. 77568 STATE OF FLORIDA PROFESSIONAL ENGINEER
NOT FOR CONSTRUCTION

Robert Gelhardt II, PE FL 77568

RA GRAY BUILDING BOILER REPLACEMENT

100 % CHECK SET

500 S. BRONOUGH STREET
TALLAHASSEE, FL 32399

REVISION

No.	Date	Description
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

DRAWN BY: REGII
CHECKED BY: REGII
APPROVED BY: REGII

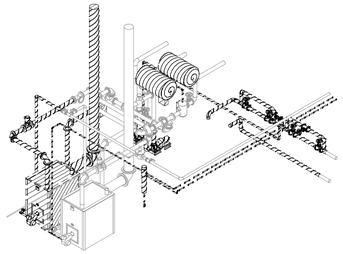
PROJECT: 22067
DATE: 05/19/2023

GENERAL NOTES LEGENDS, SHEET INDEX, SCHEDULES - MECH

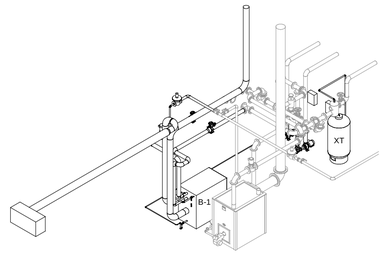
M001

DEMOLITION KEYED NOTES

1	DEMOLISH EXISTING BOILER, POWER, SUPPORTS, CONTROLS, AND OTHER APPURTENANCES AS NECESSARY FOR COMPLETE REMOVAL.
2	DEMOLISH THE EXISTING HOT WATER RETURN PIPING BACK TO THE APPROXIMATE LIMITS INDICATED OR AS NEEDED TO PIPE IN THE NEW TEMPORARY BOILER.
3	DEMOLISH EXISTING GAS PIPING BACK TO JUST BEFORE THE BTU METER. OR AS NEEDED FOR PROPER INSTALLATION OF NEW TEMPORARY BOILER.
4	DEMOLISH EXISTING HOT WATER SUPPLY PIPING BACK TO LIMITS INDICATED OR NEDED FOR PROPER INSTALLATION OF NEW TEMPORARY BOILER.
5	DEMOLISH EXISTING PIPING BACK TO WALL AND CAP AIR AND WATER TIGHT.
6	DEMOLISH EXISTING ABANDONED FUEL OIL PIPING AND ACCESSORIES BACK TO AN APPORPRIATE LOCATION OUTSIDE OF THIS MECHANICAL ROOM. CAP AND ABANDON REMAINING PIPING.
7	DEMOLISH MIDDLE TOP SECTION OF THE SHEET METAL COVER OF THE EXISTING LOUVER TO ALLOW FOR INSTALLATION OF COMBUSTION AIR INTAKE PLENUM IN RENO PHASE. COORDINATE EXACT SIZE ON SITE.
8	DEMOLISH EXISTING FLUE THRU ROOF, NEW FLUE WILL BE INSTALLED IN NEXT PHASE.
9	EXISTING BOILER EMERGENCY SHUTOFF SWITCH SHALL REMAIN.



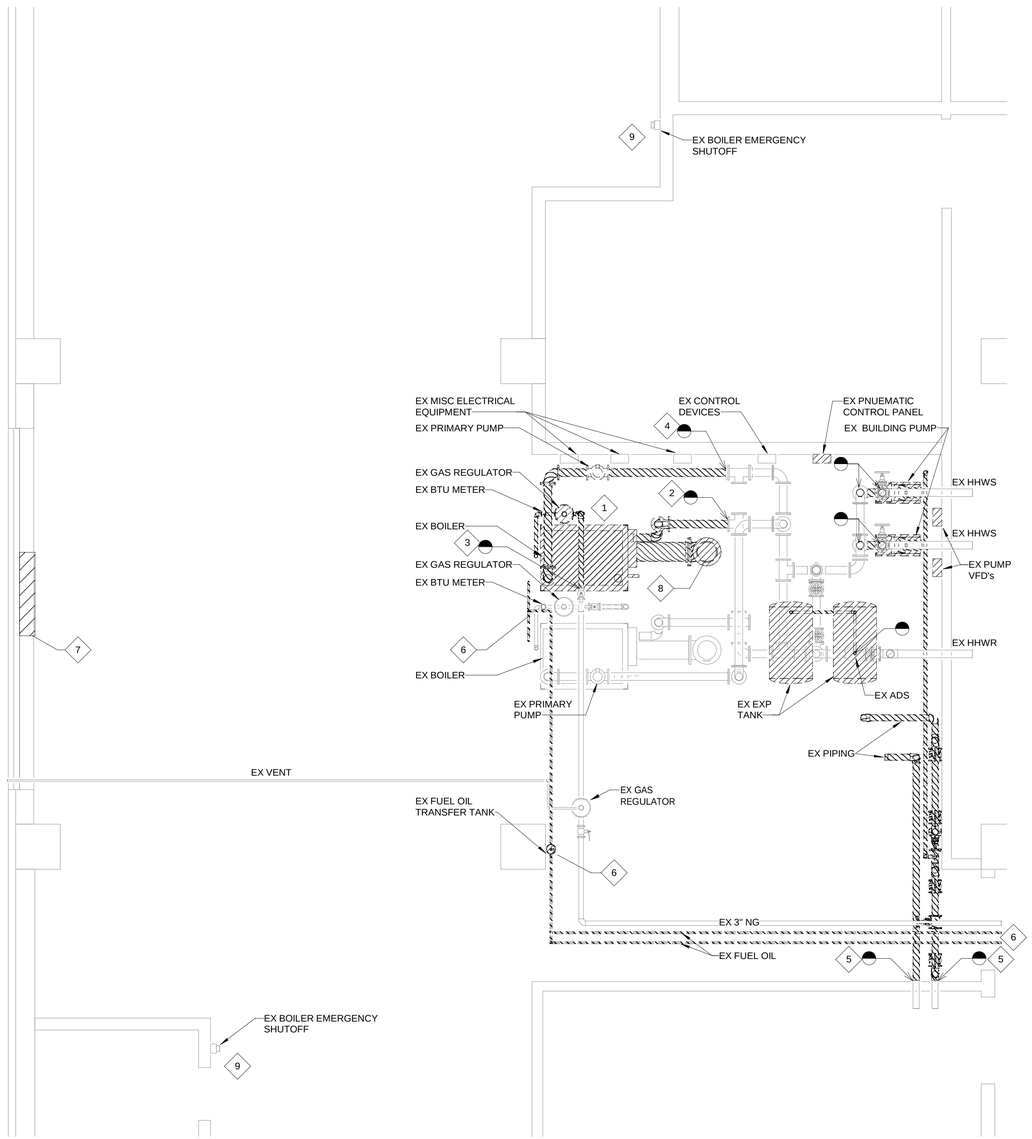
3 M101 **PHASE 1 DEMO ISOMETRIC**
No Scale



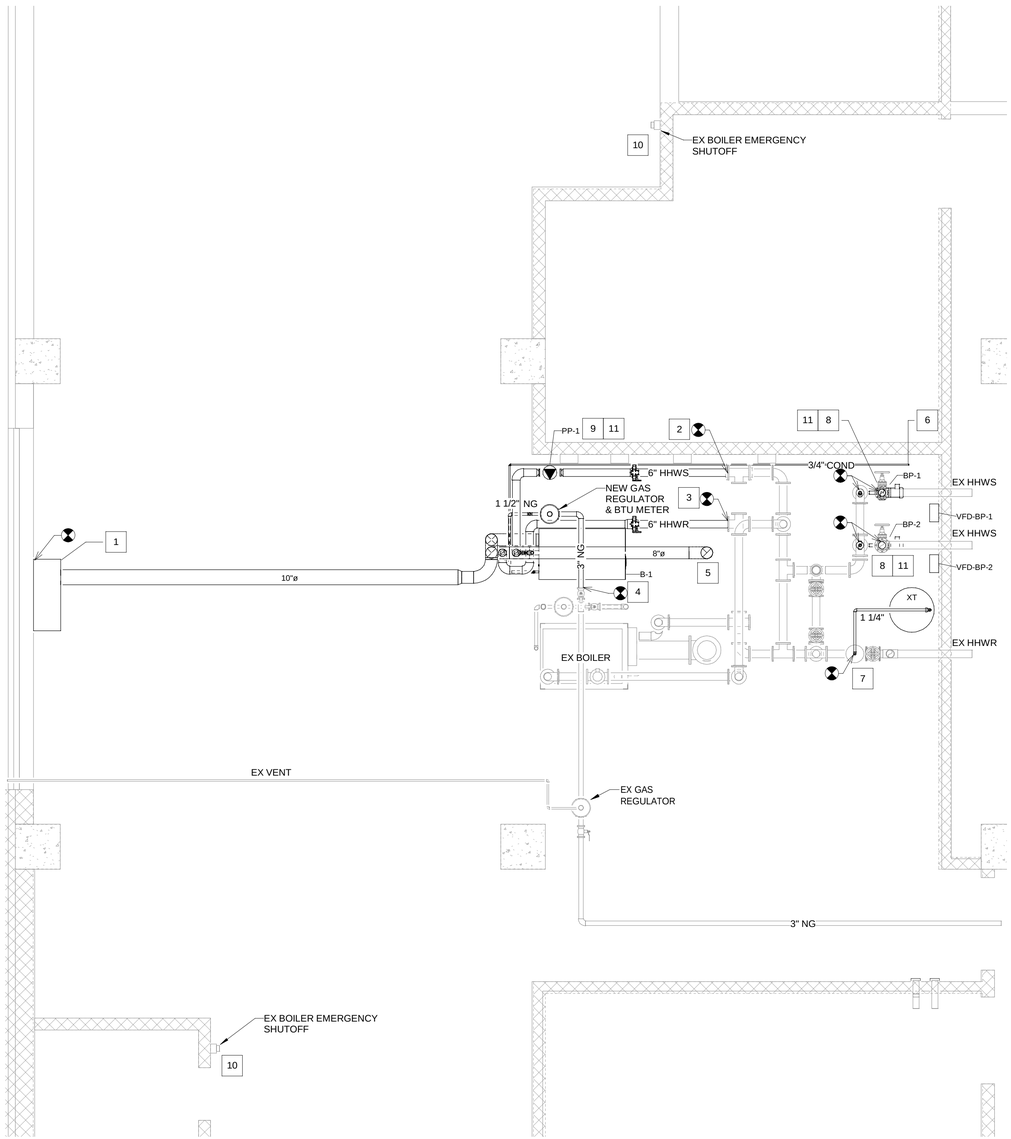
4 M101 **PHASE 1 RENO ISOMETRIC**
No Scale

RENOVATION KEYED NOTES

1	INSTALL NEW COMBUSTION AIR PLENUM ON BACK OF EXISTING LOUVER SECTION. SEAL AIR AND WATER TIGHT, PROVIDE BIRD SCREEN.
2	CONNECT NEW SUPPLY PIPING TO EXISTING SUPPLY CONNECTION IN THIS APPROXIMATE LOCATION. TRANSITION AS NECESSARY.
3	CONNECT NEW RETURN PIPING TO EXISTING RETURN CONNECTION IN THIS APPROXIMATE LOCATION. TRANSITION AS NECESSARY.
4	CONNECT NEW NATURAL GAS PIPING TO EXISTING GAS PIPING IN THIS APPROXIMATE LOCATION. TRANSITION AS NECESSARY. PROVIDE NEW BTU METER TO TIE INTO EX BAS. PROVIDE NEW REGULATOR OF PROPER TYPE.
5	ROUTE NEW FLUE DUCT THROUGH THE ROOF AND FLASH AND SEAL ANY PART OF THE OPENING NOT NEEDED DUE TO THE REDUCED SIZE OF THE DUCT. PROVIDE RAIN CAP AS RECOMMENDED BY MANUFACTURER.
6	ROUTE CONDENSATE FROM BOILER TO FLOOR DRAIN IN THIS APPROXIMATE LOCAITON. SECURE AND PROTECT FROM DAMAGE AND TERMINATE WITH OPEN AIR GAP.
7	INSTALL NEW BLADDER TYPE EXPANSION TANK AND CONNECT INTO EXISTING AIR DIRT SEPERATOR IN THIS APPROXIMATE LOCATION.
8	INSTALL NEW BUILDING PUMPS, VFD'S AND ACCESSORIES AS DETAILED IN THIS APPROXIMATE LOCATION.
9	INSTALL NEW PRIMARY BOILER PUMP, VFD AND ACCESSORIES AS DETAILED IN THIS APPROXIMATE LOCATION.
10	TIE EXISTING BOILER SHUT OFF TO BOTH BOILERS THROUGH THIS PHASE. MOUNT RED ENGRAVED BOILER E-STOP LABEL ON WALL. FONT SHALL BE LARGE ENOUGH TO BE READABLE FROM ACROSS THE ROOM.
11	PROVIDE NEW FLEXIBLE PUMP CONNECTIONS. TYPICAL FOR ALL NEW PUMPS.



1 M101 **PHASE 1 DEMOLITION PLAN - MECHANICAL**
Scale: 1/4" = 1'-0"



2 M101 **PHASE 1 RENOVATION PLAN - MECHANICAL**
Scale: 1/4" = 1'-0"

FSM Engineering
150 John Knox Road
Tallahassee, FL, 32303
p.850.222.5683
FL CA 28968

ROBERT E GELHARDT II LICENSED NO. 77568 STATE OF FLORIDA PROFESSIONAL ENGINEER
NOT FOR CONSTRUCTION

Robert Gelhardt II, PE FL 77568

RA GRAY BUILDING BOILER REPLACEMENT

100 % CHECK SET

500 S. BRONOUGH STREET
TALLAHASSEE, FL 32399

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CHECKED BY:	REGII
APPROVED BY:	REGII

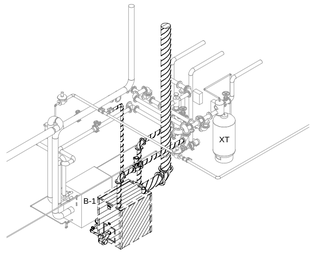
PROJECT: 22067
DATE: 05/19/2023

MECHANICAL PHASE 1 PLAN

M101

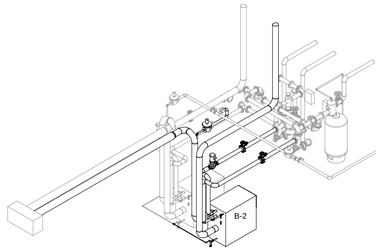
DEMOLITION KEYED NOTES

1	DEMOLISH EXISTING BOILER, POWER, SUPPORTS, CONTROLS, AND OTHER APPURTENANCES AS NECESSARY FOR COMPLETE REMOVAL.
2	DEMOLISH THE EXISTING HOT WATER RETURN PIPING BACK TO THE APPROXIMATE LIMITS INDICATED OR AS NEEDED TO PIPE IN THE NEW TEMPORARY BOILER.
3	DEMOLISH EXISTING GAS PIPING BACK TO JUST BEFORE THE BTU METER. OR AS NEEDED FOR PROPER INSTALLATION OF NEW TEMPORARY BOILER.
4	DEMOLISH EXISTING HOT WATER SUPPLY PIPING BACK TO LIMITS INDICATED OR NEDED FOR PROPER INSTALLATION OF NEW TEMPORARY BOILER.
5	DEMOLISH EXISTING FLUE THRU ROOF, NEW FLUE WILL BE INSTALLED IN NEXT PHASE.
6	EXISTING BOILER EMERGENCY SHUTOFF SWITCH SHALL REMAIN.



3 M102 **PHASE 2 DEMO ISOMETRIC**

Scale:

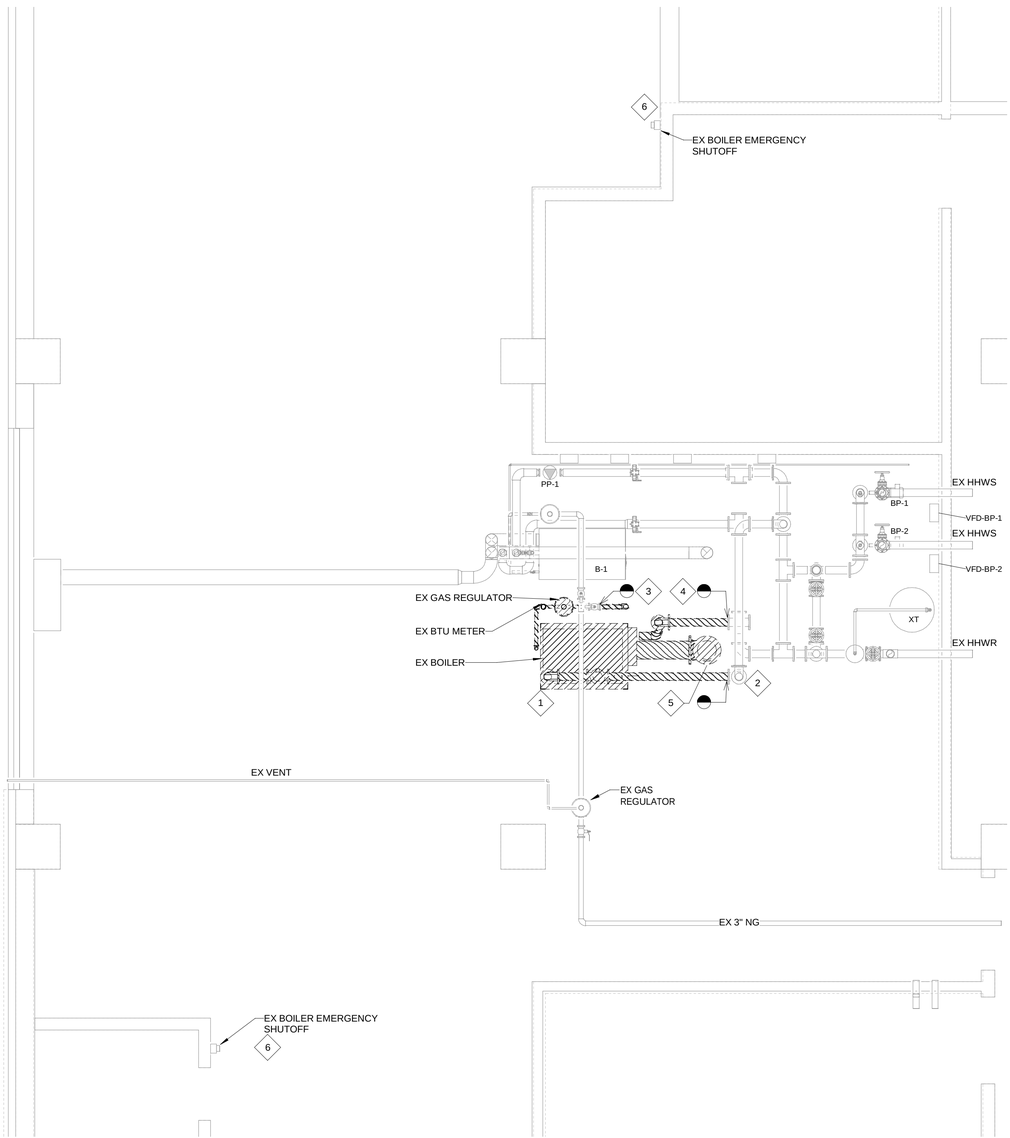


4 M102 **PHASE 2 RENO ISOMETRIC**

Scale:

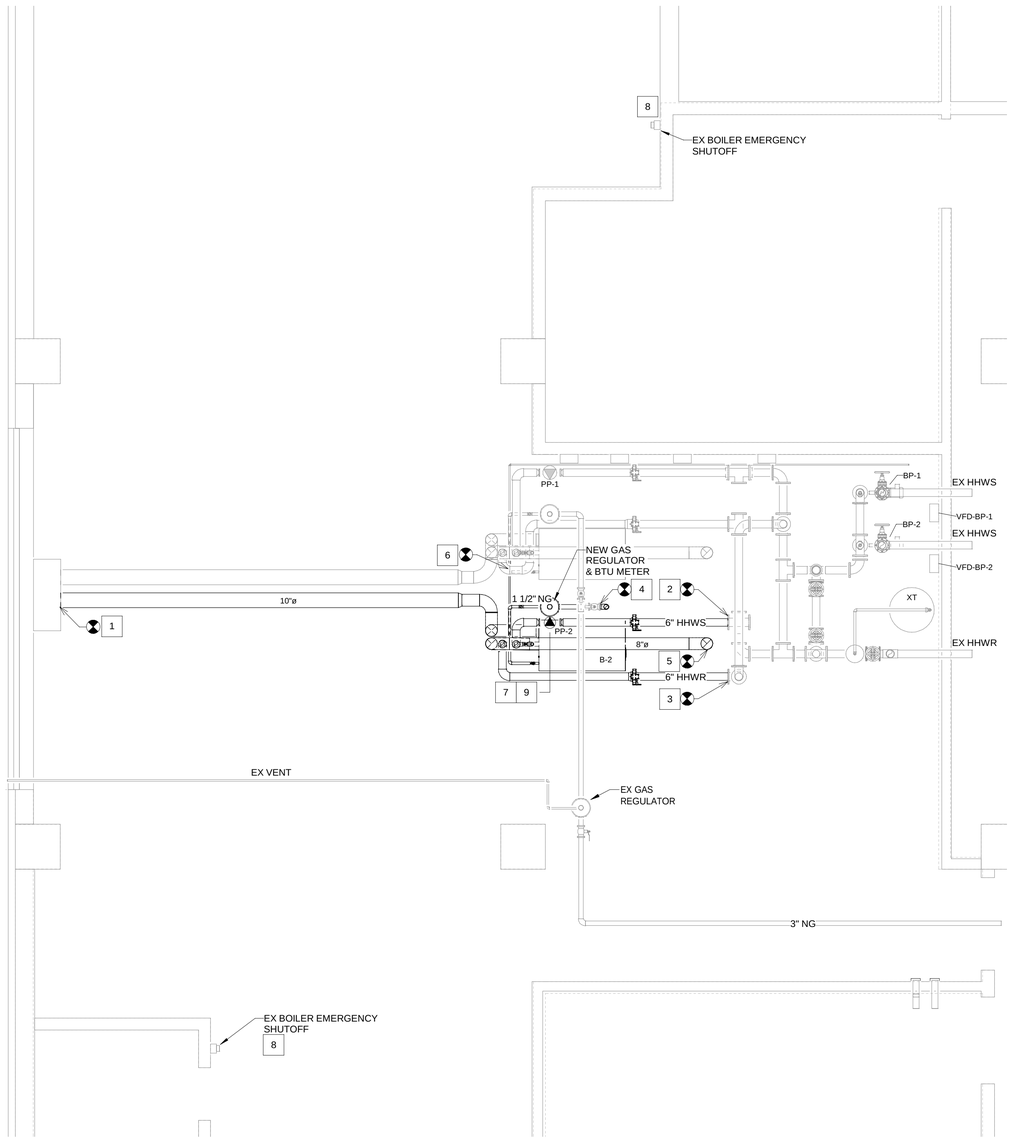
RENOVATION KEYED NOTES

1	CONNECT NEW COMBUSTION AIR DUCT INTO PHASE 1 COMBUSTION AIR PLENUM.
2	CONNECT NEW SUPPLY PIPING TO EXISTING SUPPLY CONNECTION IN THIS APPROXIMATE LOCATION. TRANSITION AS NECESSARY.
3	CONNECT NEW RETURN PIPING TO EXISTING RETURN CONNECTION IN THIS APPROXIMATE LOCATION. TRANSITION AS NECESSARY.
4	CONNECT NEW NATURAL GAS PIPING TO EXISTING GAS PIPING IN THIS APPROXIMATE LOCATION. TRANSITION AS NECESSARY. PROVIDE NEW BTU METER TO TIE INTO EX BAS. PROVIDE NEW REGULATOR OF PROPER TYPE.
5	ROUTE NEW FLUE DUCT THROUGH THE ROOF AND FLASH AND SEAL ANY PART OF THE OPENING NOT NEEDED DUE TO THE REDUCED SIZE OF THE DUCT. PROVIDE RAIN CAP AS RECOMMENDED BY MANUFACTURER.
6	ROUTE CONDENSATE FROM BOILER TO PHASE 1 CONDENSATE LINE AT B-1 AND CONNECT WITH BFP.
7	INSTALL NEW PRIMARY BOILER PUMP. VFD AND ACCESSORIES AS DETAILED IN THIS APPROXIMATE LOCATION.
8	TIE EXISTING BOILER SHUT OFF TO BOTH BOILERS THROUGH THIS PHASE IF NOT ALREADY ACCOMPLISHED. MOUNT RED ENGRAVED BOILER E-STOP LABEL ON WALL. FONT SHALL BE LARGE ENOUGH TO BE READABLE FROM ACROSS THE ROOM.
9	PROVIDE NEW FLEXIBLE PUMP CONNECTIONS. TYPICAL FOR ALL NEW PUMPS.



1 M102 **PHASE 2 DEMOLITION PLAN - MECHANICAL**

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



2 M102 **PHASE 2 RENOVATION PLAN - MECHANICAL**

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

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150 John Knox Road
Tallahassee, FL, 32303
p.850.222.5683
FL CA 28968

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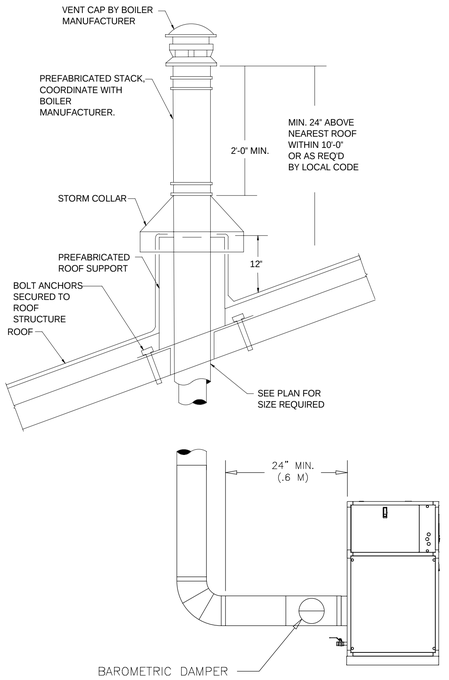
APPROVED BY:	REGII

PROJECT: 22067
DATE: 05/19/2023

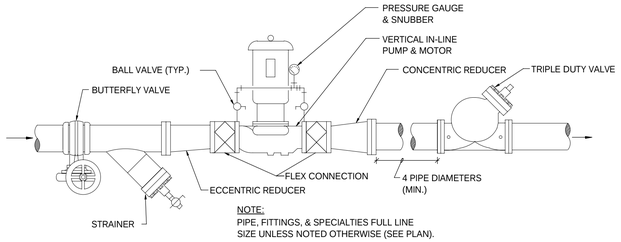
MECHANICAL PHASE 2 PLAN

M102



1 BOILER EXHAUST DETAIL

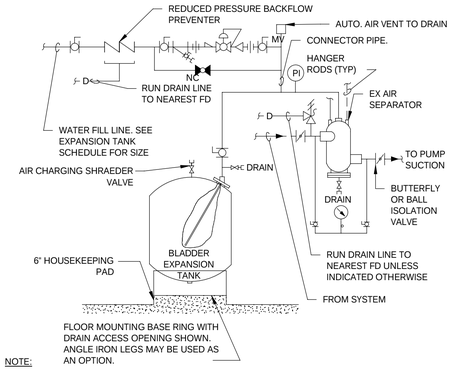
SCALE:NONE



NOTE:
PIPE, FITTINGS, & SPECIALTIES FULL LINE SIZE UNLESS NOTED OTHERWISE (SEE PLAN).

2 VERTICAL IN-LINE PUMP PIPE MOUNTED TYPE

SCALE:NONE

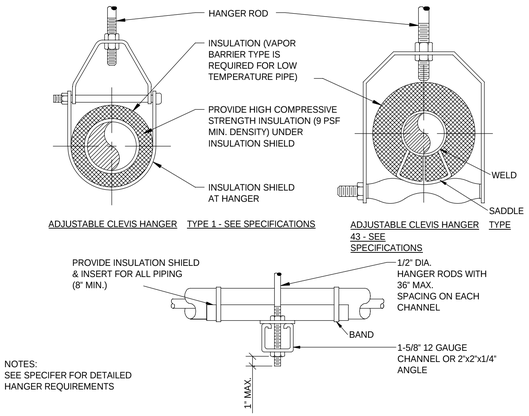


NOTE:

1. SEE EXPANSION TANK SYSTEM SCHEDULE FOR COMPONENT SIZES.
2. SET PRESSURE REDUCING VALVE SO PRESSURE AT HIGHEST POINT IN SYSTEM HAS A MINIMUM OF 4 PSIG.

3 FLOOR MOUNTED EXPANSION TANK - PIPING CONNECTIONS

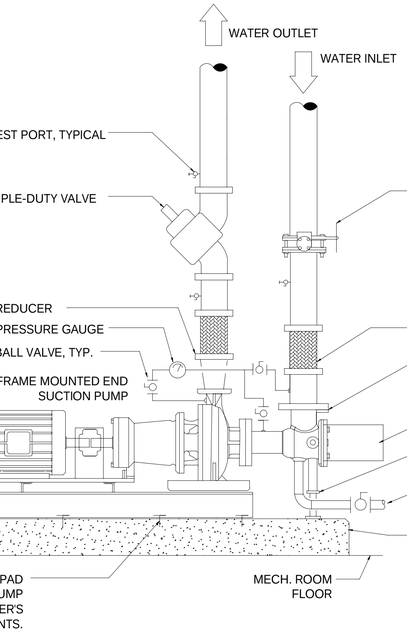
SCALE:NONE



MAXIMUM PIPE/TUBING SUPPORT SPACING																		
NOM. SIZE	IN.	THRU 3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
PIPE	FT.	7	7	7	9	10	11	12	14	16	17	19	22	23	25	27	28	30	32
TUBING	FT.	5 FT	6	7	8	8	9	10	12	13	14	16	-	-	-	-	-	-	-
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																			

4 PIPE HANGERS

SCALE:NONE

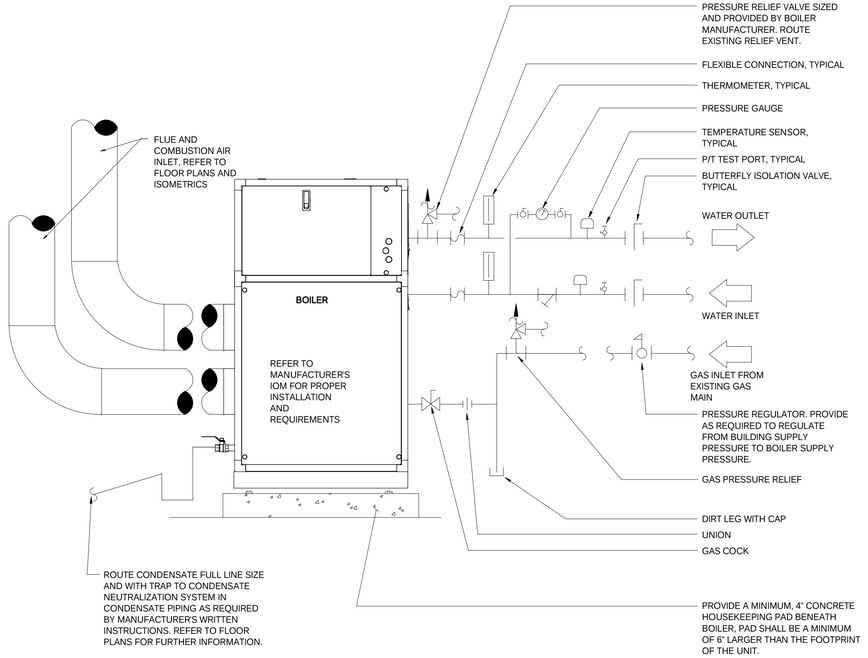


DETAIL NOTES:

1. VALVES AND PIPING SPECIALTIES SHALL BE FULL LINE SIZE UNLESS NOTED OTHERWISE.
2. PRESSURE GAGE LINES SHALL BE A MINIMUM OF 1/4".
3. SUPPORT PIPING INDEPENDENTLY OF PUMP.
4. PROVIDE WELLS WHERE REQUIRED FOR SWITCHES AND OTHER DEVICES FOR CONTROLS. COORDINATE WITH CONTROLS VENDOR IN FIELD.

5 END SUCTION PUMP

SCALE:NONE



6 BOILER CONNECTION DETAIL

SCALE:NONE

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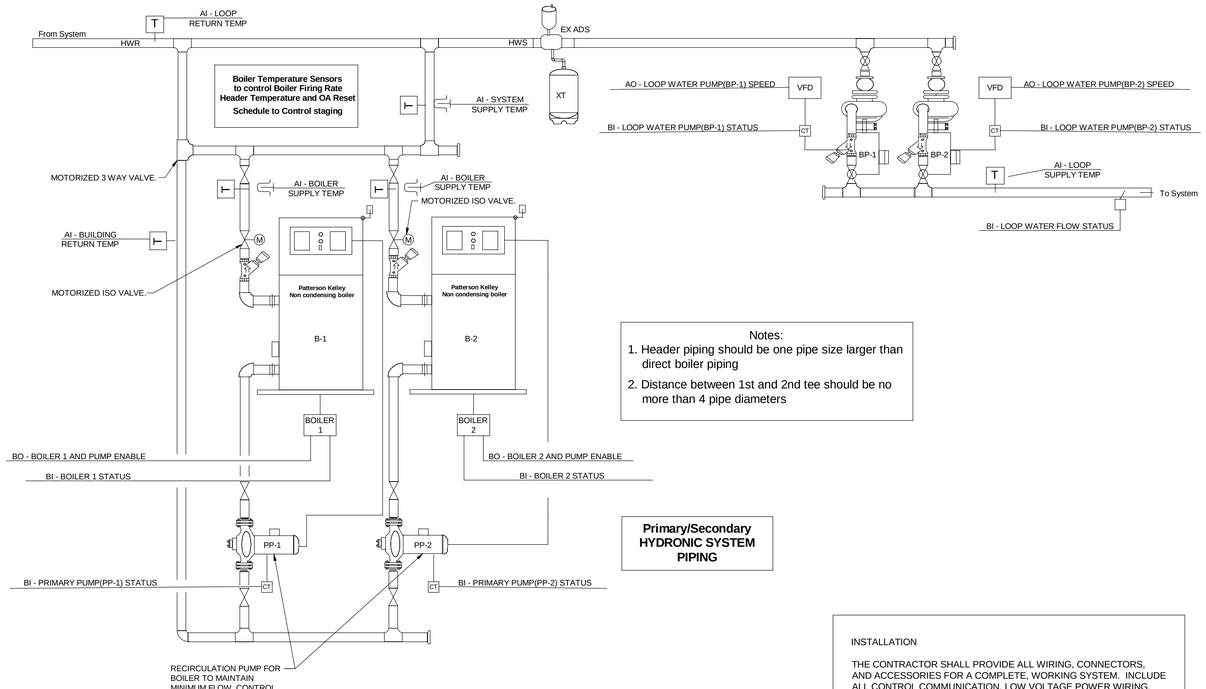
PROJECT: 22067
DATE: 05/19/2023

MECHANICAL DETAILS

M501

Primary/Secondary Loop Diagram



Notes:

1. Header piping should be one pipe size larger than direct boiler piping
2. Distance between 1st and 2nd tee should be no more than 4 pipe diameters

Primary/Secondary HYDRONIC SYSTEM PIPING

INSTALLATION

THE CONTRACTOR SHALL PROVIDE ALL WIRING, CONNECTORS, AND ACCESSORIES FOR A COMPLETE, WORKING SYSTEM. INCLUDE ALL CONTROL COMMUNICATION, LOW VOLTAGE POWER WIRING, AND ANY REQUIRED LOW VOLTAGE STEP-DOWN TRANSFORMERS. NOT ALL WIRING AND ACCESSORIES ARE SHOWN ON THIS DIAGRAM.

WIRING

REFER TO THE CONTROLS MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR WIRING REQUIREMENTS. THE SPECIFIED SYSTEM REQUIRES SHIELDED "LEVEL 4" COMMUNICATION WIRE AS MANUFACTURED BY WINDY CITY WIRE OR CONNECT AIR.

ALL NIAGARA INSTANCES SHALL CONTAIN AN OPEN NIAGARA CAPABILITY STATEMENT WHERE ALL ATTRIBUTES ARE "*" FOR OPEN.

HVAC CONTROLS

1. GENERAL SCOPE
 1.1. NEW APPLICATION SPECIFIC CONTROLLER, UTILIZING DIRECT DIGITAL CONTROLS. NIAGRA BASED
 1.2. FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND SERVICE NECESSARY FOR A COMPLETE AND OPERATING BOILER CONTROL SYSTEM (BCS), UTILIZING DIRECT DIGITAL CONTROLS (DDC) AS SHOWN ON THE DRAWINGS AND DESCRIBED HEREIN.
 1.3. THE BCS SHALL PERFORM CONTROL ALGORITHMS, CALCULATIONS AND ALL MONITORING FUNCTIONS. THE BCS SHALL PROVIDE OPERATOR INTERACTION AND DYNAMIC PROCESS MANIPULATION, INCLUDING OVERALL SYSTEM SUPERVISION, COORDINATION AND CONTROL.
 1.4. THIS SHALL INCLUDE BOILER CONTROL, METERING, ENERGY MANAGEMENT, ALARM MONITORING, AND ALL TRENDING, REPORTING AND MAINTENANCE MANAGEMENT FUNCTIONS RELATED TO NORMAL BOILER OPERATIONS ALL AS INDICATED ON THE DRAWINGS OR ELSEWHERE IN THIS SPECIFICATION.
2. SYSTEM DESCRIPTION
 2.1. SCOPE: NEW BOILERS AND HYDRONIC PUMPS WILL BE TIED TO NEW NIAGRA BASED JACE TO FEED ITS MONITORING DATA TO THE EXISTING OPCON CONTROL SYSTEM. THE MANUFACTURER SHALL PROVIDE JACE BOILER CONTROLLER. JACE WILL DIRECTLY CONTROL THE BOILERS, HYDRONIC PUMPS, AND MONITORING SYSTEMS.
  2.1.1. THE CONTROLS CONTRACTOR SHALL ASSUME COMPLETE RESPONSIBILITY FOR THE ENTIRE CONTROLS SYSTEM AS A SINGLE SOURCE. HE SHALL CERTIFY THAT HE HAS ON STAFF UNDER HIS DIRECT EMPLOY ON A DAILY BASIS, FACTORY TRAINED TECHNICAL PERSONNEL. THESE EMPLOYEES SHALL BE QUALIFIED TO PROJECT MANAGE, ENGINEER, COMMISSION, AND SERVICE ALL PORTIONS OF THE CONTROL SYSTEM.
  2.1.2. THE CONTROL SYSTEM SHALL BE DESIGNED SUCH THAT EACH MECHANICAL SYSTEM WILL BE ABLE TO OPERATE UNDER STAND-ALONE CONTROL. AS SUCH, IN THE EVENT OF A NETWORK COMMUNICATION FAILURE, OR THE LOSS OF ANY OTHER CONTROLLER, THE CONTROL SYSTEM SHALL CONTINUE TO INDEPENDENTLY OPERATE.
 2.2. BASIC SYSTEM FEATURES:
  2.2.1. EQUIPMENT MONITORING AND ALARM FUNCTION INCLUDING INFORMATION FOR DIAGNOSING EQUIPMENT PROBLEMS AND ALARM DIAL OUT TO REMOTE SITES OR PAGERS.
  2.2.2. THE COMPLETE SYSTEM, INCLUDING FIELD INSTALLED CONTROLLERS SHALL AUTO-RESTART, WITHOUT OPERATOR INTERVENTION, ON RESUMPTION OF POWER AFTER A POWER FAILURE. DATABASE STORED IN FIELD INSTALLED CONTROLLER MEMORY SHALL BE BATTERY BACKED UP FOR A MINIMUM OF 1 YEAR. BATTERIES ON UNITARY CONTROLLERS SHALL NOT BE ALLOWED.
  2.2.3. MODULAR SYSTEM DESIGN OF PROVEN RELIABILITY.
  2.2.4. EACH FIELD PANEL CAPABLE OF INDEPENDENT CONTROL.
  2.2.5. ALL SOFTWARE AND/OR FIRMWARE INTERFACE EQUIPMENT FOR CONNECTION TO REMOTE MONITORING STATION FROM FIELD HARDWARE.
  2.2.6. THE SYSTEM SHALL BE CAPABLE OF RECORDING EQUIPMENT RUNTIME TOTALIZATION OF BOILERS, PUMPS ETC., AND ALSO CAPABLE OF ALARM GENERATION AND ALARM DIAL OUT TO REMOTE SITES.
  2.2.7. COMMUNICATION WIRING FOR FIELD CONTROLLERS SHALL NOT BE RUN IN STAR PATTERNS.
  2.2.8. ALL DDC HARDWARE AND SOFTWARE SHALL BE DESIGNED AND MANUFACTURED BY U.S. CORPORATIONS. ALL HARDWARE SHALL BE LISTED UNDERWRITERS LABORATORY FOR OPEN ENERGY MANAGEMENT EQUIPMENT (PAZX) UNDER THE U.L. STANDARD FOR SAFETY 916, WITH INTEGRAL LABELS SHOWING RATING.
3. PRODUCT QUALIFICATION:
 3.1. ALL PRODUCTS USED IN THIS INSTALLATION SHALL BE NEW, CURRENTLY UNDER MANUFACTURE, AND SHALL NOT BE USED AS A TEST SITE FOR ANY NEW PRODUCTS UNLESS EXPLICITLY APPROVED BY THE ENGINEER IN WRITING. SPARE PARTS SHALL BE AVAILABLE FOR AT LEAST 5 YEARS AFTER COMPLETION OF THIS CONTRACT.
 3.2. ALL CONTROLLERS SHALL BE CAPABLE OF CONTAINING AND EXECUTING FACTORY DESIGNED AND TESTED, PRE-ENGINEERED CONTROL ALGORITHMS. FACTORY TESTED ALGORITHMS SHALL BE UTILIZED TO MEET THE SEQUENCE OF OPERATION (EXCEPT AS NOTED).
 3.3. OPERATION AND MAINTENANCE MANUALS:
 3.4. MANUALS WILL BE PROVIDED PRIOR TO FINAL ACCEPTANCE AND SHALL INCLUDE:
  3.4.1. INSTALLATION INSTRUCTIONS.
  3.4.2. PRINCIPLES OF OPERATION AND A DETAILED SYSTEM DESCRIPTION.
  3.4.3. STARTUP AND OPERATING INSTRUCTIONS.
 3.5. SYSTEM LAYOUT AND INTERCONNECTION SCHEMATIC DIAGRAMS.
 3.6. ROUTINE PREVENTIVE MAINTENANCE PROCEDURES AND CORRECTIVE DIAGNOSTIC
 3.7. TROUBLESHOOTING PROCEDURES.
 3.8. NAME, ADDRESS AND TELEPHONE NUMBER OF THE DDC SYSTEMS FIELD REPRESENTATIVE.
 3.9. COMPLETE RECOMMENDED SPARE PARTS LIST.
4. WARRANTY
 4.1. WARRANTY SHALL COVER ALL COSTS FOR PARTS, LABOR, ASSOCIATED TRAVEL, AND EXPENSES FOR A PERIOD OF TEN YEAR FROM COMPLETION AND ACCEPTANCE BY THE OWNER, EXCEPT FOR DAMAGES FROM OTHER CAUSES. IF TEN YEAR WARRANTY IS NOT AVAILABLE, OFFER MAXIMUM WARRANTY AVAILABLE.
 4.2. HARDWARE AND SOFTWARE PERSONNEL SUPPORTING THIS WARRANTY AGREEMENT SHALL PROVIDE ON-SITE OR OFF-SITE SERVICE IN A TIMELY MANNER AFTER FAILURE NOTIFICATION TO THE VENDOR. THE MAXIMUM ACCEPTABLE RESPONSE TIME TO PROVIDE THIS SERVICE AT THE SITE SHALL BE 24 HOURS DURING NORMAL BUSINESS HOURS.
 4.3. THIS WARRANTY SHALL APPLY EQUALLY TO BOTH HARDWARE AND SOFTWARE AND BE AT NO COST TO THE OWNER.

SEQUENCE NOTES

SYSTEM DESCRIPTION:

THE HEATING HOT SYSTEM SHALL CONSIST OF BOILERS, PUMPS AND A SERIES OF EXISTING HYDRONIC AIR HANDLING UNITS. THE BOILERS SHALL BE CONTROLLED BY NEW JACE CONTROLLER, PROVIDED BY MANUFACTURER. THE BOILERS AND PUMPS SHALL BE TIED TO THE EXISTING OPCON REMOTE SITE FOR MONITORING AND BE CAPABLE OF TIEING INTO A NEW BAS SYSTEM WHEN THE TIME COMES THAT THE SYSTEM IS UPGRADED IN THE NEAR FUTURE. COORDINATION WITH THE SITE FOR PROPER TIE IN WILL BE REQUIRED. THE CONTROLLER SHALL HAVE ENOUGH POINTS TO CONTROL BOILER SYSTEM IN ACCORDANCE WITH SEQUENCE OF OPERATIONS HEREIN. PER THE BUILDING DEMAND OR EXISTING OCCUPIED SCHEDULE, THE BOILERS SHALL BE ENABLED TO MEET THE WATER SET POINT. THE PUMPS SHALL OPERATE IN A LEAD/STANDBY FASHION. THE BOILER MANUFACTURER AND CONTROL VENDOR ARE RESPONSIBLE FOR PROVIDING HARDWARE AND SOFTWARE EXPANSION DEVICES WHERE ADDITIONAL POINTS ARE REQUIRED.

ON-DEMAND OPERATION:

THE BOILER PLANT SHALL BE ENABLED IF ANY OF THE EXISTING AIR HANDLING EQUIPMENT UTILIZING HOT WATER CONTROL VALVES INDICATE AN OPEN POSITION. THE BOILER SHALL COMMAND THE LEAD HEATING HOT WATER PUMP TO ENERGIZE. ONCE PROOF THAT THE PUMP HAS ENERGIZED VIA THE FLOW METER AND BOILER SUPPLIED FLOW SWITCH, THE BOILER SHALL BE ALLOWED TO START. ONCE STARTED, THE BOILER SHALL FIRE IN STAGES AS REQUIRED TO MAINTAIN THE DESIRED HEATING HOT WATER SET POINT AS SENSED BY THE HEATING HOT WATER SUPPLY TEMPERATURE SENSOR. THE HEATING WATER RETURN TEMPERATURE SENSOR SHALL MONITOR THE RETURN HEATING HOT WATER TEMPERATURE AND INDICATE VALUE ON BOILER PANEL. THE HEATING HOT WATER PUMP SHALL MODULATE TO MAINTAIN FLOW AS SCHEDULED. MAINTAIN MINIMUM FLOWS BY BOILER RE-CIRCULATION PUMP. COORDINATE MINIMUM FLOWS WITH BOILER MANUFACTURER AS NEEDED.

OCCUPIED OPERATION:

BUILDING LOOP RUN CONDITIONS:
THE BOILER SHALL RUN WHENEVER:
1. THE BOILER PLANT SHALL BE ENABLED IF ANY OF THE EXISTING AIR HANDLING EQUIPMENT UTILIZING HOT WATER CONTROL VALVES INDICATE AN OPEN POSITION.

THE FOLLOWING LOOP WATER CONDITIONS SHALL BE MONITORED:
1. FLOW STATUS.
2. SUPPLY TEMPERATURE.
3. RETURN TEMPERATURE.

ALARMS AND A UNIT SHUTDOWN SIGNAL SHALL BE GENERATED UPON ANY OF THE FOLLOWING LOOP WATER CONDITIONS:
1. NO LOOP FLOW.
2. HIGH LOOP WATER SUPPLY TEMP SHUTDOWN: IF THE LOOP WATER SUPPLY TEMPERATURE IS GREATER THAN SETPOINT +5 °F (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. HIGH LOOP WATER SUPPLY TEMP: IF THE LOOP WATER SUPPLY TEMPERATURE IS GREATER THAN SETPOINT +5 °F (ADJ.).
2. LOW LOOP WATER SUPPLY TEMP: IF THE LOOP WATER SUPPLY TEMPERATURE IS LESS THAN SETPOINT -25°F (ADJ.) FOR MORE THAN 1 HOUR.

LOOP WATER PUMP LEAD/STANDBY OPERATION:
THE TWO LOOP WATER PUMPS SHALL OPERATE IN A LEAD/STANDBY FASHION.
1. ANY PUMP CAN BE THE LEAD OR LAG PUMP AT ANY TIME. THE PUMPS SHALL BE ROTATED ON A BI-WEEKLY BASIS.
2. THE LEAD PUMP SHALL RUN FIRST.
3. ON FAILURE OF THE LEAD PUMP, THE STANDBY PUMP SHALL RUN AND THE LEAD PUMP SHALL TURN OFF.

THE DESIGNATED LEAD PUMP SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS (USER SELECTABLE):
1. MANUALLY THROUGH A SOFTWARE SWITCH
2. IF PUMP RUNTIME (ADJ.) IS EXCEEDED
3. DAILY
4. WEEKLY(INITIAL SETTING)
5. MONTHLY

ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. BOILER PUMP 1
 FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
 RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
2. BOILER PUMP 2
 FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
 RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

BOILER SYSTEM RUN CONDITIONS:
THE BOILER SYSTEM SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.
THE BOILER SYSTEM SHALL BE ENABLED TO RUN WHENEVER:
1. THE BOILER IS ENABLED BY BUILDING LOOP REQUIREMENTS.
2. AND OUTSIDE AIR TEMPERATURE IS LESS THAN 68°F (ADJ.).

BOILERS LOOP WATER TEMPERATURE CONTROL:
THE CONTROLLER SHALL MEASURE THE LOOP WATER SUPPLY TEMPERATURE AND ENABLE THE BOILERS TO MAINTAIN SETPOINTS. THE TWO BOILERS SHALL RUN SUBJECT TO THEIR OWN INTERNAL SAFETIES AND CONTROLS. THE TWO BOILERS SHALL OPERATE SIMULTANEOUSLY PER THEIR MANUFACTURE BACNET CONTROLLER.

THE FOLLOWING SETPOINTS ARE RECOMMENDED VALUES. ALL SETPOINTS SHALL BE FIELD ADJUSTED DURING THE COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS.
THE BOILER SHALL BE ENABLED TO MAINTAIN SETPOINTS AS FOLLOWS:
1. BOILER SETPOINT 160°F(ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. BOILER 1
 FAILURE: COMMANDED ON BUT THE STATUS IS OFF.
 RUNNING IN HAND: COMMANDED OFF BUT THE STATUS IS ON.
 RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.
2. BOILER 2
 FAILURE: COMMANDED ON BUT THE STATUS IS OFF.
 RUNNING IN HAND: COMMANDED OFF BUT THE STATUS IS ON.
 RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.
3. BOILER FAILURE: BOILER IS IN FAILURE.

Point Name	Hardware Points: AI	AO	BI	BO	Software Points: AV	BV	Loop	Sched	Trend	Alarm	Show On Graphic
Boiler 1 Supply Temp	x								x		x
Boiler 2 Supply Temp	x								x		x
Boiler 1 Status			x						x		x
Boiler 2 Status			x						x		x
Boiler 1 & Pump Enable				x							x
Boiler 2 & Pump Enable				x							x
Outside Air Temp					x						x
Boiler 1 Failure										x	
Boiler 1 Running in Hand										x	
Boiler 1 Runtime Exceeded										x	
Boiler 2 Failure										x	
Boiler 2 Running in Hand										x	
Boiler 2 Runtime Exceeded										x	
Low Boiler Supply Temp										x	
Low Boiler Supply GPM										x	
Totals	3	0	2	2	1	0	0	0	5	8	8
	Total Hardware (7)				Total Software (14)						

Point Name	Hardware Points: AI	AO	BI	BO	Software Points: AV	BV	Loop	Sched	Trend	Alarm	Show On Graphic
Loop Water Return Temp	x								x		x
Loop Water Supply Temp	x								x		x
Loop Water Flow Status			x								x
Loop Water Pump(BP-1) Status			x						x		x
Loop Water Pump(BP-2) Status			x						x		x
Loop Water Pump(BP-1) Speed		x									x
Loop Water Pump(BP-2) Speed		x									x
Outside Air Temp					x						x
High Loop Water Supply Temp										x	
High Loop Water Supply Temp Shutdown										x	
Loop Water Pump 1 Failure										x	
Loop Water Pump 1 Running in Hand										x	
Loop Water Pump 1 Runtime Exceeded										x	
Loop Water Pump 2 Failure										x	
Loop Water Pump 2 Running in Hand										x	
Loop Water Pump 2 Runtime Exceeded										x	
Low Loop Water Supply Temp										x	
Low Loop Water Supply Temp Shutdown										x	
No Loop Flow										x	
Totals	2	2	3	0	1	0	0	0	4	11	8
	Total Hardware (7)				Total Software (16)						

FSM Engineering
150 John Knox Road
Tallahassee, FL, 32303
p.850.222.5683
FL CA 28968

ROBERT E. GELHARDT II LICENSED NO. 77568 STATE OF FLORIDA PROFESSIONAL ENGINEER
NOT FOR CONSTRUCTION

Robert Gelhardt II, PE FL 77568

RA GRAY BUILDING BOILER REPLACEMENT

100% CHECK SET

500 S. BRONOUGH STREET
TALLAHASSEE, FL 32399

REVISION

No.	Date	Description
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
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-	-	-
-	-	-

DRAWN BY:	REGII
CHECKED BY:	REGII
APPROVED BY:	REGII

PROJECT: 22067
DATE: 05/19/2023

MECHANICAL CONTROLS

M701