

Addendum Number: 01

Addendum Issue Date: July 2, 2021

Owner: Crawford Memorial Hospital

Project Name: RHC Addition and Reno

Project Number: 0200708.00

Containing: 3 Pages; 9 Drawings; 1 Specifications

*This addendum amends the drawings and specifications of the above reference project and is hereby incorporated into the contract documents as part thereof. Bidders must acknowledge receipt of this Addendum in the space provided on the Bid Form. **FAILURE TO DO SO MAY SUBJECT BIDDER TO DISQUALIFICATION.***

General and in response to questions raised at pre-bid meeting:

1. CLARIFY that fencing is not optional. The option of fencing product is by Contractor as acceptable to the Owner.
2. CLARIFY that cavity mortar control drainage does not need to be full-height. See below for specification revisions.
3. CLARIFY that MC cable may only be used as outlined in the electrical specifications.
4. CLARIFY that Coordination of the AMEREN services must be done during the phasing and coordinated between the Contractor and AMEREN Illinois, it is anticipated that both services will be need at the same time.
5. CLARIFY that Hospital grade wiring devices are not required.
6. CLARIFY that existing truss demolition work shown on sheet AD5.11 is based off existing design drawings. Reference details 10 and 21 on sheet S4.1 for trimming requirements for truss top and bottom chords.
7. CLARIFY that standing seam roof removal and reinstallation was discussed with B&L Roofing prior to bidding. B&L Roofing provided consultation on design and details for this work.
8. CLARIFY that per existing drawings sanitary outlet is located on east side of existing building and sanitary flows from west to east. East portion of building to stay operational while west is being renovated by capping off existing piping. There will be slight delay in west side being fully operational as the sanitary mains would need to be connected during the east side construction work. This would need to be main priority in the start of the east side construction. Once the mains are connected, then the renovated west portion would be completely operational, and the rest of the east side renovation could continue.

Drawings:

1. C4.0 – UTILITY PLAN
 - a. REVISE utility transformer location and utility conduit routing as shown.
2. A1.1 – FIRST FLOOR PLAN
 - a. REVISE keynote 07.04 to read as follows “DOWNSPOUT WITH BOOT TO CONNECT STORM SEWER”.
 - b. ADD keynotes 07.04 as shown.
3. A2.1 – ROOF PLAN
 - a. REVISE keynote 07.04 to read as follows “DOWNSPOUT WITH BOOT TO CONNECT STORM SEWER”.

4. A3.1 – EXTERIOR ELEVATIONS
 - a. REVISE keynote 6 to read as follows “DOWNSPOUT W/ BOOT – DARK BRONZE”.
5. M7.1 – CONTROLS DIAGRAMS
 - a. REVISE detail 1 per attached sheet M7.1.
6. M7.2 – CONTROLS DIAGRAMS
 - a. REVISE detail 1 and detail 2 per attached sheet M7.2.
7. M7.3 – CONTROLS DIAGRAMS
 - a. ADD detail 3 per attached sheet M7.3.
8. ES1.1 – ELECTRICAL SITE PLAN
 - a. REVISE utility transformer location and utility conduit routing.
9. E2.1 – FIRST FLOOR POWER PLAN
 - a. ADD power connection for access control doors.
10. E5.2 – SCHEDULES
 - a. ADD circuit for access control doors in panel IT.

Specifications:

1. 00 0010 TABLE OF CONTENTS
 - a. ADD 26 0540 DIRECTIONAL BORING FOR ELECTRICAL SYSTEMS specification in its entirety.
2. 00 2100 INSTRUCTIONS TO BIDDERS
 - a. REVISE section 1.1.R. to read as “The Owner shall provide and obtain the Building and other required Permits...”
3. 01 1000 SUMMARY
 - a. REVISE section 1.5.A. to read as “Items noted NIC (Not in Contract and OFOI (Owner Furnished Owner Installed) will be supplied and installed by Owner before Substantial Completion...”
 - b. REVISE section 1.5.B. to read as “Owner will supply and install the following: some toilet accessories as noted in schedule on drawings, cubicle curtains, window treatments, signage (exterior, interior, and code required), and low voltage work – cameras, speakers, and overhead paging.”
 - c. REVISE section 1.5.C. to read as “Owner will supply the following for installation by Contractor: wall mounted TVs and recessed in-floor scales.”
4. 04 2000 UNIT MASONRY
 - a. REVISE section 2.5.C.1. to read as “Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.”
 - b. REVISE section 2.5.C.1.a.1 to read as “Mortar Net Solutions: www.mortarnet.com”
 - c. REMOVE section 2.5.C.1.a.2 in its entirety.
5. 07 4213.23 METAL COMPOSITE MATERIAL WALL PANELS
 - a. ADD section 2.1.A.4. to read as “Fairview Architectural North America, Vitrabond FR and Arrowhead Panel System is an approved substitute.”
6. 07 7213 MANUFACTURED GUTTERS AND DOWNSPOUTS
 - a. ADD section 2.4.C. to read as “Downspout Boots: Cast Iron; ASTM A48. 1. Manufacturers: a. Downspoutboots.com, a division of J. R. Hoe & Sons; www.downspoutboots.com/#sle. B. Substitutions: See Section 01 6000 – Product Requirements.”

7. 22 10005 PLUMBING PIPING

- a. ADD to section 2.5 "Domestic Water Piping, Above Grade" Grooved copper pipe; Joints: Grooved mechanical couplings.
- b. ADD to section 2.2 "Sanitary Sewer Piping, Buried Within 5 Feet of Building", sub-section B PVC Pipe: ASTM D2665 or ASTM D3034 pipe with PVC fittings and solvent cement welded joints.

8. 23 2113 HYDRONIC PIPING

- a. ADD to section 2.2.C.1.b. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings. (Where exposed in Mechanical Rooms)
- b. ADD to section 2.3.C.1.b. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings. (Where exposed in Mechanical Rooms)

9. 26 0540 DIRECTIONAL BORING FOR ELECTRICAL SYSTEMS,

- a. ADD specification in its entirety.

10. 28 5600 FIRE DETECTION AND ALARM

- a. ADD to 2.1.A "Alarm system shall be provided and installed by FE Moran as a sub-contractor to the Electrical Contractor.

Bids are Due: July 21, 2021 / 2:00 PM local time via email to Brooke McGuire bmcguire@f-w.com

and copy Dave Burnison dburnison@f-w.com

END OF ADDENDUM

Issued By:

FARNSWORTH GROUP, INC.

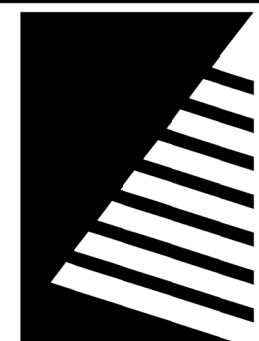
Brooke McGuire

Project Coordinator

Attachments:

Drawings: C4.0, A1.1, A2.1, M7.1, M7.2, M7.3, ES1.1, E2.1, E5.2

Specifications: 26 0540



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Engineers | Architects | Surveyors | Scientists

ISSUE:
DATE: DESCRIPTION:
1 07/02/2021 ADDENDUM 01

BID SET
06/11/2021

PROJECT:
Crawford Memorial Hospital

**RHC Addition And
Reno**

1101 N Allen Street
Robinson, IL 62454

DATE: 04/14/2021

DESIGNED: PJM

DRAWN: GAB

REVIEWED: PJM

FIELD BOOK NO.: -

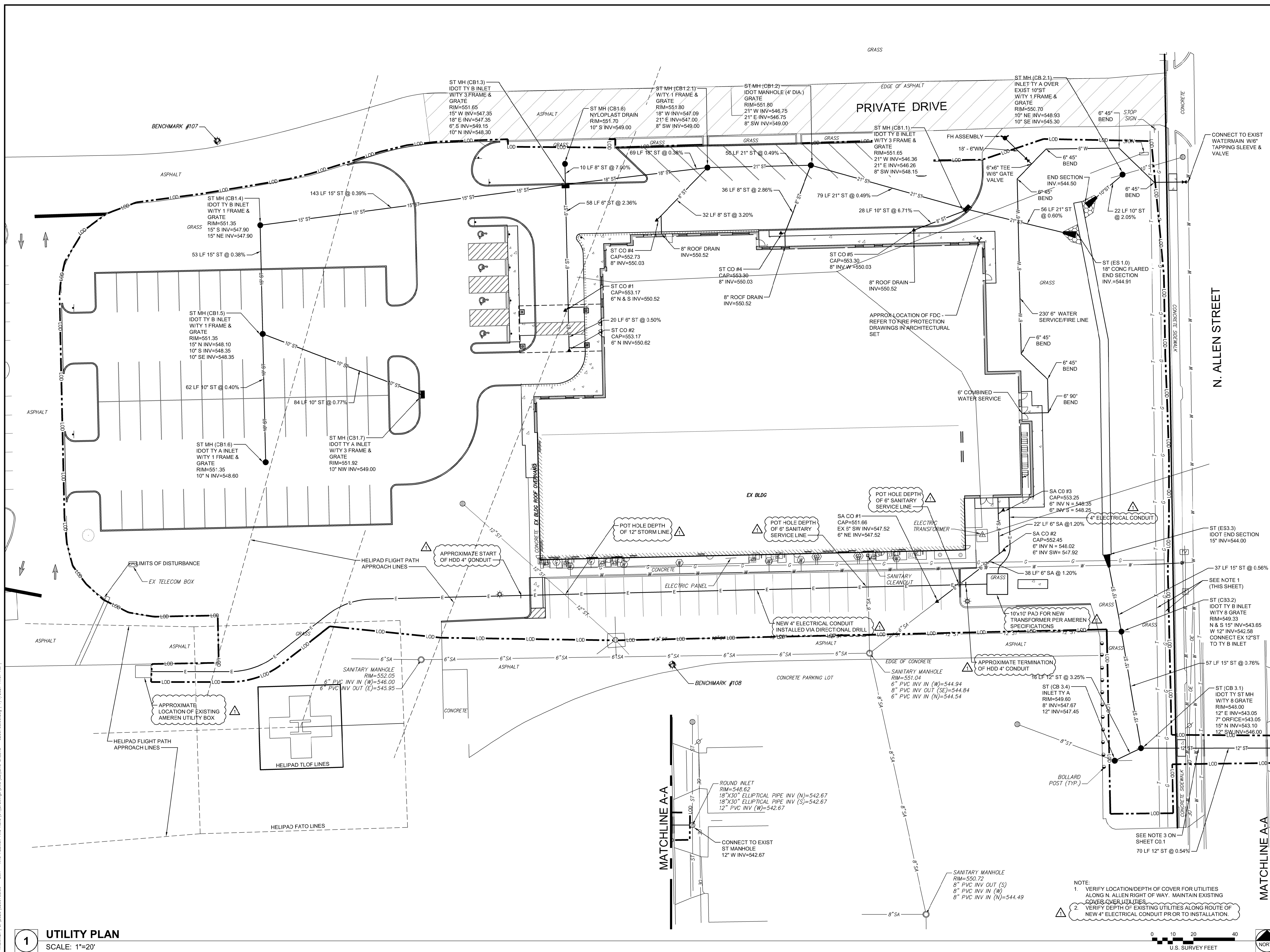
SHEET TITLE:

UTILITY PLAN

SHEET NUMBER:

C4.0

PROJECT NO.: 0200708.00



1 **UTILITY PLAN**
SCALE: 1"=20'

KEYNOTES (BY DIVISION)

DIVISION 03
03.01 PATCH AND REPAIR CONCRETE SLAB FOR NEW WORK
03.02 CONCRETE EQUIPMENT PAD - COORDINATE REQUIREMENTS WITH FINAL EQUIPMENT SELECTION
DIVISION 06
06.01 GROMMET - CENTER POWER AND DATA BELOW
06.02 1" END PANEL - FINISH WHERE EXPOSED
06.03 SIDESPLASH - SEAL ALL EDGES
06.04 SLOPED PLUMB CLOSURE PANEL
06.05 SOLID SURFACE WALL CAP - 1" DEEP W/ 1" OVERHANG ALL OPEN SIDES - ROUND EXPOSED CORNERS
06.06 LINE ENTIRE WALL WITH PLYWOOD UNDERNEATH GYP
DIVISION 07
07.01 2" EXPANSION JOINT AS INDICATED WHERE CONNECTING TO EXISTING BUILDING
07.02 SCURPER, COLLECTOR HEAD, DOWNSPOUT TO SPLASH BLOCK
07.03 OVERFLOW SCURPER, COLLECTOR HEAD, DOWNSPOUT TO SPLASH BLOCK
07.04 DOWNSPOUT WITH BOOT TO CONNECT STORM SEWER
07.05 DOWNSPOUT TO SPLASH BLOCK
07.06 FULLY ADHERED MEMBRANE ROOF SYSTEM OVER R-30 LTTR RIGID ROOF INSULATION SLOPE: 1/4":12" MIN
07.07 2'-0" X 2'-0" WALKWAY PAD
07.08 GUTTER ALONG ALL 4 SIDES OF ROOF
07.09 9'-0" X 3'-0" PREFABRICATED ALUMINUM CANOPY W/ DOWNSPOUT
07.10 ROOF CURB FOR MECHANICAL EQUIPMENT
07.11 ROOF DRAIN
07.12 OVERFLOW ROOF DRAIN
07.13 EXISTING STANDING SEAM METAL PANELS TO BE REINSTALLED - MAINTAIN WARRANTY
07.14 2" CEILING EXPANSION JOIN AS INDICATED - FOLLOW AROUND EDGE OF EXISTING COLUMN
07.15 2" FIRE RATED WALL EXPANSION JOINT AND JOINT COVER ON EACH SIDE OF PARTITION
DIVISION 08
08.01 PASS-THRU UNIT WITH TRANSACTION DRAWER
08.02 24" X 24" ACCESS PANEL IN GYP ON UNDERSIDE OF EXISTING TRUSS - ALIGN WITH FULL CEILING TILE

KEYNOTES (BY DIVISION)

DIVISION 09
09.01 U-CHANNEL REVEAL FOR GLASS SYSTEM IN SOFFIT
09.02 AXIOM TRIM TO SPAN VERTICALLY - SEE RCP DETAILS
09.03 NEW EIFS WALL CONSTRUCTION TO ENCLOSE EXISTING GABLE - SEE DETAIL ON A2.3
09.04 NEW EIFS SOFFIT CONSTRUCTION TO ENCLOSE EXISTING SOFFIT - CAP EXISTING GUTTER
DIVISION 10
10.01 CEILING MOUNTED TRACK AND CURTAINS (OFOI)
10.01a WALL MOUNTED PATIENT POINT TV (OFOI) - PROVIDE NECESSARY BLOCKING
11.02 36" X 36" RECESSED IN-FLOOR SCALE (OFOI)
10.03 FIRE EXTINGUISHER MOUNTED ON BRACKET (CFOI)
DIVISION 11
11.01 WALL MOUNTED TV (OFOI) - PROVIDE NECESSARY BLOCKING
11.01a WALL MOUNTED PATIENT POINT TV (OFOI) - PROVIDE NECESSARY BLOCKING
11.02 36" X 36" RECESSED IN-FLOOR SCALE (OFOI)
11.03 BABY MEDICAL SCALE (OFOI)
11.04 EXAM TABLE (OFOI)
11.05 COUNTER PRINTER (OFOI)
11.06 FLOOR MOUNTED PRINTER (OFOI)
11.07 SHRED BIN (OFOI)
11.08 PHLEBOTOMY CHAIR (OFOI)
11.09 UNDERCOUNTER FRIDGE (OFOI)
11.10 WIRE SHELVING (OFOI)
11.11 REFRIGERATOR - PROVIDE WATER LINE (OFOI)
11.12 MICROWAVE (OFOI)
11.13 WALL MOUNTED SHARPS DISPOSAL (OFOI)
11.14 WASTE CAN (OFOI)
11.15 TRASH CAN (OFOI)
11.16 RECYCLE CAN (OFOI)
11.17 BIOHAZARD BIN (OFOI)
DIVISION 22
22.01 SOLENOID VALVE - SEE PLUMBING
22.02 EYE WASH (CFOI) - SEE PLUMBING

DOOR LEGEND

CR	CARD READER
ES	ELECTRIC STRIKE
EL	ELECTRIC LATCH RETRACTION
PB	PUSH BUTTON
PLY	VERIFY DOOR FRAME ACCOMMODATES PLYWOOD LAYER
TR	TRANSOM BY AUTO SLIDER MFR

PLAN GENERAL NOTES

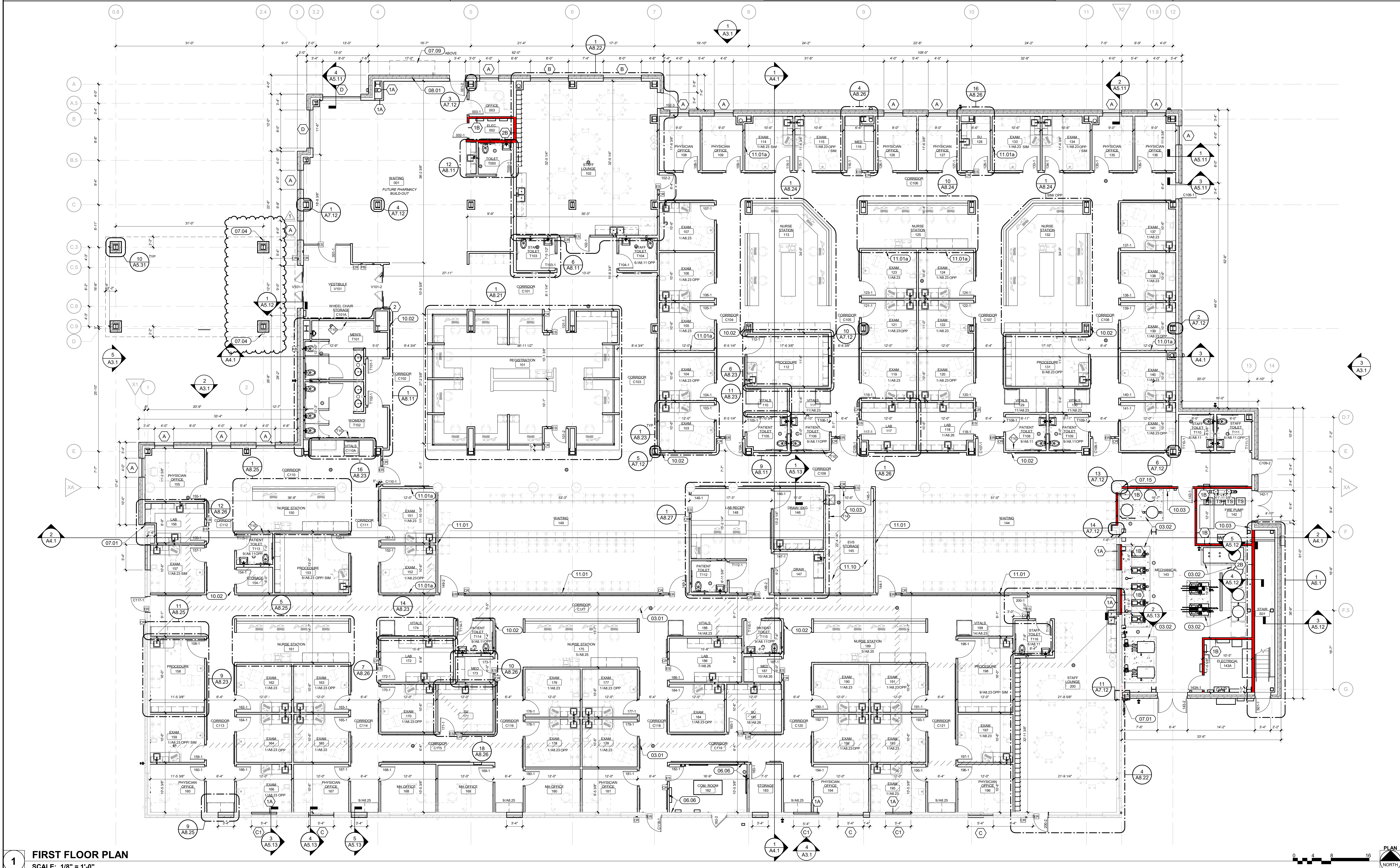
- REFER TO GENERAL INFORMATION
- REFER TO LIFE SAFETY AND PARTITIONS FOR LOCATION OF RATED PARTITIONS, SEPARATION INFORMATION, AND PARTITION TYPES. ALL INTERIOR PARTITIONS ARE TYPE 1 UNLESS OTHERWISE NOTED OR SHOWN.
- ALL DIMENSIONS ARE TO FACE OF STUD, CMU AND/OR CONCRETE UNLESS NOTED OTHERWISE.
- ALL WOOD IN CONTACT WITH CONCRETE SHALL BE PRESSURE TREATED.
- ALL NEW WORK SHALL BE PLUMB TRUE, AND LEVEL UNLESS OTHERWISE NOTED.
- EXTEND FIRE RESISTANT CONSTRUCTION TO STRUCTURE ABOVE. EXTEND PARTITIONS AROUND EQUIPMENT, CABINETS, AND OTHER ITEMS THAT PENETRATE THESE PARTITIONS AND FILL VOIDS IN PARTITIONS ABOVE CEILING TO MAINTAIN DESIGNATED FIRE RESISTANCE. SEE LIFE SAFETY SHEET(S) FOR FURTHER FIRE AND SMOKE RESISTANCE INFORMATION.
- DISSIMILAR FLOOR MATERIALS SHALL MEET UNDER CENTER OF DOOR LEAF
- REFER TO STRUCTURAL DRAWINGS FOR FRAMING INFORMATION AND FRAMING DIMENSIONS.
- VERIFY ALL APPLIANCE DIMENSIONS PRIOR TO FINAL MILLWORK CONSTRUCTION.
- FURNITURE IS SHOWN FOR REFERENCE ONLY AND IS NOT IN CONTRACT.
- HINGE SIDE OF DOOR JAMBS TO BE LOCATED 4" FROM NEAREST WALL INTERSECTION UNLESS OTHERWISE NOTED.

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ISSUE # DATE DESCRIPTION
1 07/02/2021 ADD 01



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

BID SET
06/11/2021

PROJECT:
Crawford Memorial Hospital

RHC Addition and Reno

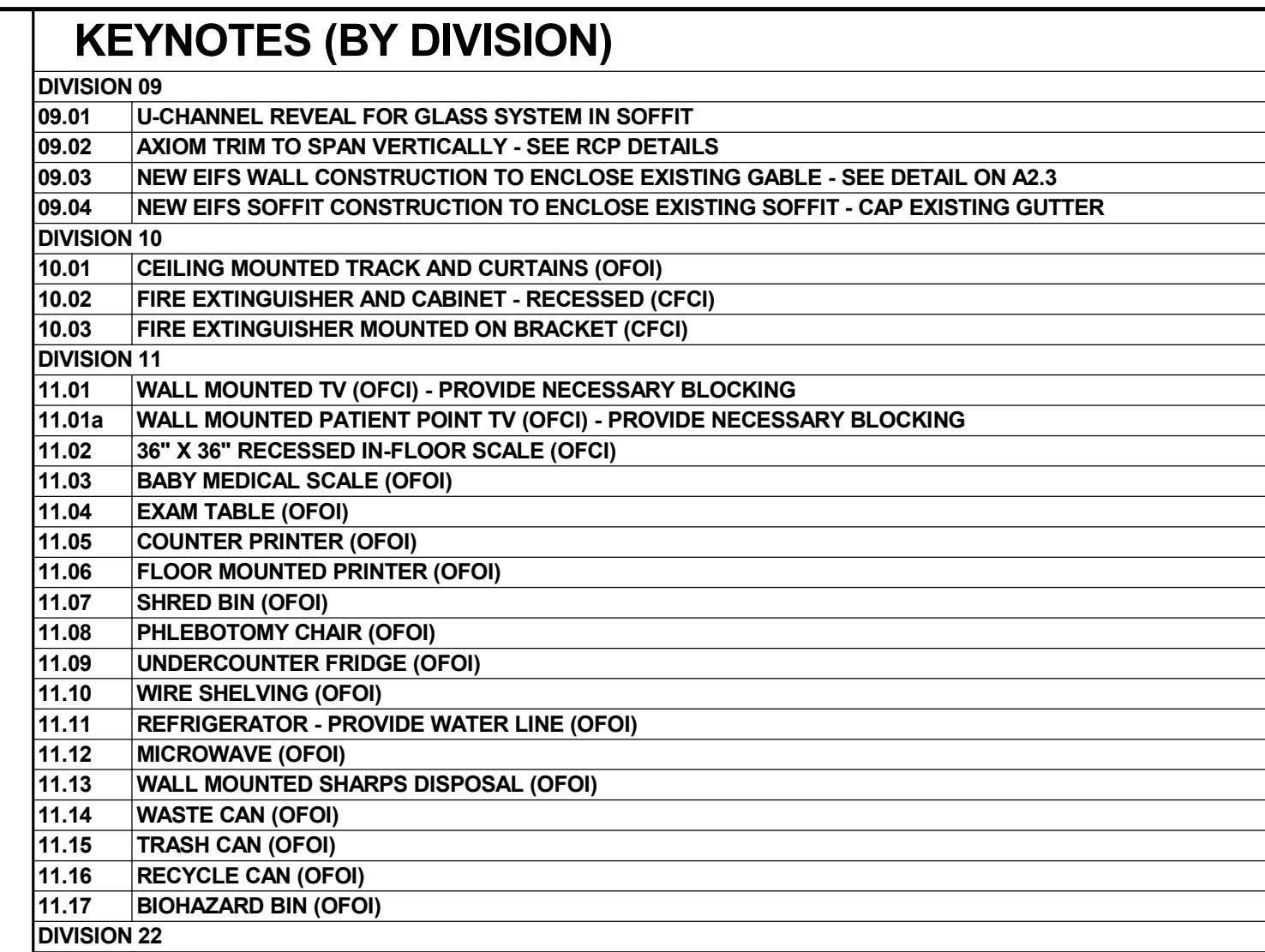
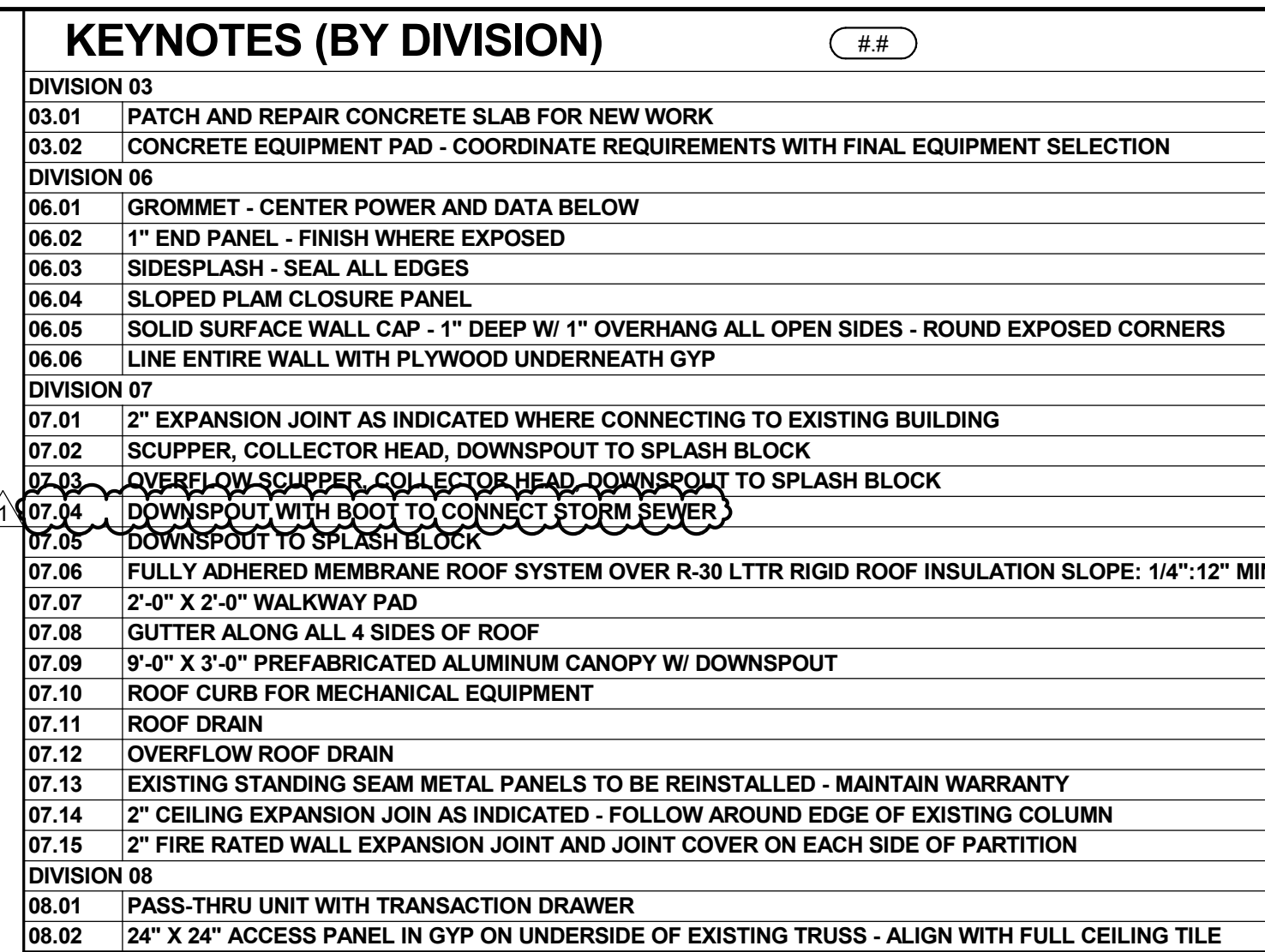
1101 North Allen Street
Robinson, IL 62454

DATE: 06/11/2021
DESIGNED: BMM
DRAWN: BMM
REVIEWED: MCR/DGB

SHEET TITLE:
FIRST FLOOR PLAN

SHEET NUMBER:
A1.1

PROJECT NO.: 0200708.00



 WALKWAY PAD



A2.1

PROJECT NO.: 0200708.00

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TEMPERATURE CONTROLS NOTES

GENERAL

REFER TO SPECIFICATION SECTION 230900 – INSTRUMENTATION AND CONTROL FOR HVAC.
REFER TO SPECIFICATION SECTION 230519 – METERS AND GAGES FOR HVAC PIPING.
REFER TO SPECIFICATION SECTION 260519 – CONDUCTORS AND CABLES.
REFER TO SPECIFICATION SECTION 260529 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS.
REFER TO SPECIFICATION SECTION 260533 – RACEWAYS AND BOXES.
REFER TO EQUIPMENT SCHEDULES TO CROSS-REFERENCE WHICH TEMPERATURE CONTROLS DIAGRAMS APPLY TO WHICH EQUIPMENT.

REFER TO TEMPERATURE CONTROLS PLANS FOR LOCATIONS OF SPACE SENSOR(S), DDC PANEL(S) AND VFD(S).
MOUNT ROOM SENSORS AT 48 INCHES ABOVE FINISHED FLOOR, UNLESS NOTED OTHERWISE. COORDINATE WITH ELECTRICAL.

ALL CONTROL WIRING SHALL BE IN CONDUIT.

ALL LOW-VOLTAGE CABLES SHALL BE SHIELDED TYPE.

NO FILTERED POWER SHALL BE INSTALLED IN THE SAME RACEWAY AS UNFILTERED POWER. ONLY FILTERED POWER SHALL BE PROVIDED TO MICROPROCESSORS.

ALL CONTROL COMPONENTS (E.G. RELAYS, SWITCHES, DDC CONTROLLERS, ETC.) SHALL BE MOUNTED IN STEEL ENCLOSURES WITH STEEL MOUNTING BACK PLATES.

EACH CONTROL PANEL SHALL HAVE A LAMINATED COPY OF THE APPLICABLE SEQUENCE OF OPERATION AND CONTROL DIAGRAM INDICATING THE POINTS, COMPONENTS, AND OPERATION OF EQUIPMENT ASSOCIATED WITH EACH PANEL.

TEMPERATURE CONTROLS DRAWINGS ARE DIAGRAMMATIC IN NATURE AND DO NOT SHOW ALL REQUIRED CONTROL DEVICES AND COMPONENTS. TEMPERATURE CONTROLS CONTRACTOR SHALL VERIFY EXACT QUANTITY, LOCATION, SIZE AND CAPACITY OF ALL APPLICABLE EQUIPMENT & COMPONENTS AND SHALL CROSS-REFERENCE TO SPECIFICATIONS. PLANS SHALL NOT BE SCALED FOR EXACT DIMENSIONS.

ALL WORK SHOWN ON TEMPERATURE CONTROLS DRAWINGS SHALL BE THE SOLE RESPONSIBILITY OF THE TEMPERATURE CONTROLS CONTRACTOR, UNLESS NOTED OTHERWISE. INCLUDE ALL PARTS, MATERIALS, CONTROLLERS, SENSORS, CONDUIT, WIRE, INSTALLATION LABOR, PROGRAMMING, FACTORY START-UP AND COMMISSIONING REQUIRED FOR A COMPLETE INSTALLATION OF ALL SYSTEMS PRESCRIBED HEREIN.

ALL ACTUATORS SHALL BE OF THE ELECTRICAL TYPE UNLESS NOTED OTHERWISE (E.G. PNEUMATIC).

ALL MODULATING DAMPER AND VALVE ACTUATORS INDICATED WITH POSITION FEEDBACK SHALL HAVE DAMPER OR VALVE POSITION DISPLAYED ON A GRAPHICAL SCREEN ADJACENT TO THE DAMPER OR VALVE COMMAND SIGNAL. DISPLAYED POSITION SHALL BE FROM THE FEEDBACK DEVICE, NOT FROM THE BAS.

MODULATING SIGNALS SHALL BE DISPLAYED AS PERCENT OPEN (% OPEN), NOT AS PERCENT CLOSED.

PRESSURE TRANSMITTER SIGNALS UTILIZED FOR MAINTAINING DUCT STATIC PRESSURE SHALL BE WIRED DIRECTLY TO THE CONTROLLER(S) WHICH MODULATE FAN SPEED, COMPLETELY INDEPENDENT FROM THE BAS NETWORK.

PROCESS AND INSTRUMENTATION
DIAGRAM (P&ID) ABBREVIATIONS

NOTE: NOT ALL MAY BE USED ON THIS PROJECT

ADJ	ADJUSTABLE	HP	HEAT PUMP
AFMS	AIRFLOW MEASURING STATION	HPWR	HEAT PUMP WATER RETURN
AI	ANALOG INPUT	HPWS	HEAT PUMP WATER SUPPLY
AO	ANALOG OUTPUT	HPR	HIGH PRESSURE STEAM RETURN
AV	ANALOG VALUE	HPS	HIGH PRESSURE STEAM SUPPLY
BAS	BUILDING AUTOMATION SYSTEM	HRC	HEAT RECOVERY COIL
BI	BINARY INPUT	HRV	HEAT RECOVERY VENTILATOR
BO	BINARY OUTPUT	HS	HUMIDITY SENSOR
BV	BINARY VALUE	HU	HUMIDIFIER
BTUH	BRITISH THERMAL UNITS PER HOUR	HW	HOT (OR HEATING) WATER
CA	COMPRESSED AIR	HWP	HOT (OR HEATING) WATER PUMP
CC	COOLING COIL	HWR	HOT (OR HEATING) WATER RETURN
CF	CEILING (OR CIRCULATING) FAN	HWS	HOT (OR HEATING) WATER SUPPLY
CFM	CUBIC FEET PER MINUTE	HX	HEAT EXCHANGER
CH	CHILLER	IRH	INFRARED RADIANT HEATER
CHP	CHILLED WATER PUMP	KW	KILOWATT
CHR	CHILLED WATER RETURN	L	LOW
CHS	CHILLED WATER SUPPLY	LPR	LOW PRESSURE STEAM RETURN
CO2	CARBON DIOXIDE	LPS	LOW PRESSURE STEAM SUPPLY
CP	CONDENSATE PUMP	M	MOTOR OR MOTORIZED
CR	CONTACT RELAY	MA	MIXED AIR
CRAC	COMPUTER ROOM AIR CONDITIONER	MAU	MAKEUP AIR UNIT
CT	CURRENT TRANSDUCER	MBH	THOUSANDS OF BTU PER HOUR
CU	CONDENSING UNIT	MD	MOTORIZED DAMPER
CUH	CABINET UNIT HEATER	MS	MOTORIZED SHUTTER
CV	CONTROL VALVE	N.C.	NORMALLY CLOSED
CW	(DOMESTIC) COLD WATER	N.O.	NORMALLY OPEN
CWP	CONDENSER WATER PUMP	OA	OUTDOOR AIR
CWR	CONDENSER WATER RETURN	OBD	OPPOSED BLADE DAMPER
CWS	CONDENSER WATER SUPPLY	P	PUMP
DA	DISCHARGE AIR	PBD	PARALLEL BLADE DAMPER
DI	DIGITAL INPUT	PDH	POOL ROOM DEHUMIDIFIER
DC	DRY COOLER	PPM	PARTS PER MILLION
DD	DEHUMIDIFIER	PRV	PRESSURE RELIEF VALVE
DO	DIGITAL OUTPUT	PS	PRESSURE SWITCH
DOAS	DEDICATED OUTDOOR AIR SYSTEM	PSI	POUNDS PER SQUARE INCH
DP	DIFFERENTIAL PRESSURE	PTAC	PACKAGED TERMINAL AIR CONDITIONER
DSU	DUCTLESS SPLIT UNIT	RA	RETURN AIR
DX	DIRECT EXPANSION (COOLING COIL)	RF	RETURN FAN
EA	EXHAUST AIR	RH	ROOF HOOD
EBB	ELECTRIC BASEBOARD (HEATER)	RHC	REHEAT COIL
EF	EXHAUST FAN	RP	RADIANT PANEL
EHC	ELECTRIC HEATING COIL	RTU	ROOFTOP (AIR HANDLING) UNIT
ERP	ELECTRIC RADIANT PANEL	S	SOLENOID
ERV	ENERGY RECOVERY VENTILATOR	SA	SUPPLY AIR
EUH	ELECTRIC UNIT HEATER	SCR	SILICON CONTROLLED RECTIFIER
FA	FRESH AIR	SF	SUPPLY FAN OR SQUARE FOOT
FCU	FAN COIL UNIT	SFD	SMOKE/FIRE DAMPER
FD	FIRE DAMPER	STM	STEAM
FPT	FAN POWERED AIR TERMINAL	T	TEMPERATURE
FTR	FINNED-TUBE RADIATION	TDV	TRIPLE DUTY VALVE
GF	GAS FURNACE	UH	UNIT HEATER
GIH	GRAVITY INTAKE HOOD	UV	UNIT VENTILATOR
GPM	GALLONS PER MINUTE	VAV	VARIABLE AIR VOLUME TERMINAL
GLY	GLYCOL RETURN	VD	VOLUME DAMPER
GS	GLYCOL SUPPLY	VFC	VARIABLE FREQUENCY CONTROLLER
GUH	GAS UNIT HEATER	VFD	VARIABLE FREQUENCY DRIVE
H	HIGH OR HUMIDITY		
HC	HEATING COIL		

P&ID SYMBOLOGY

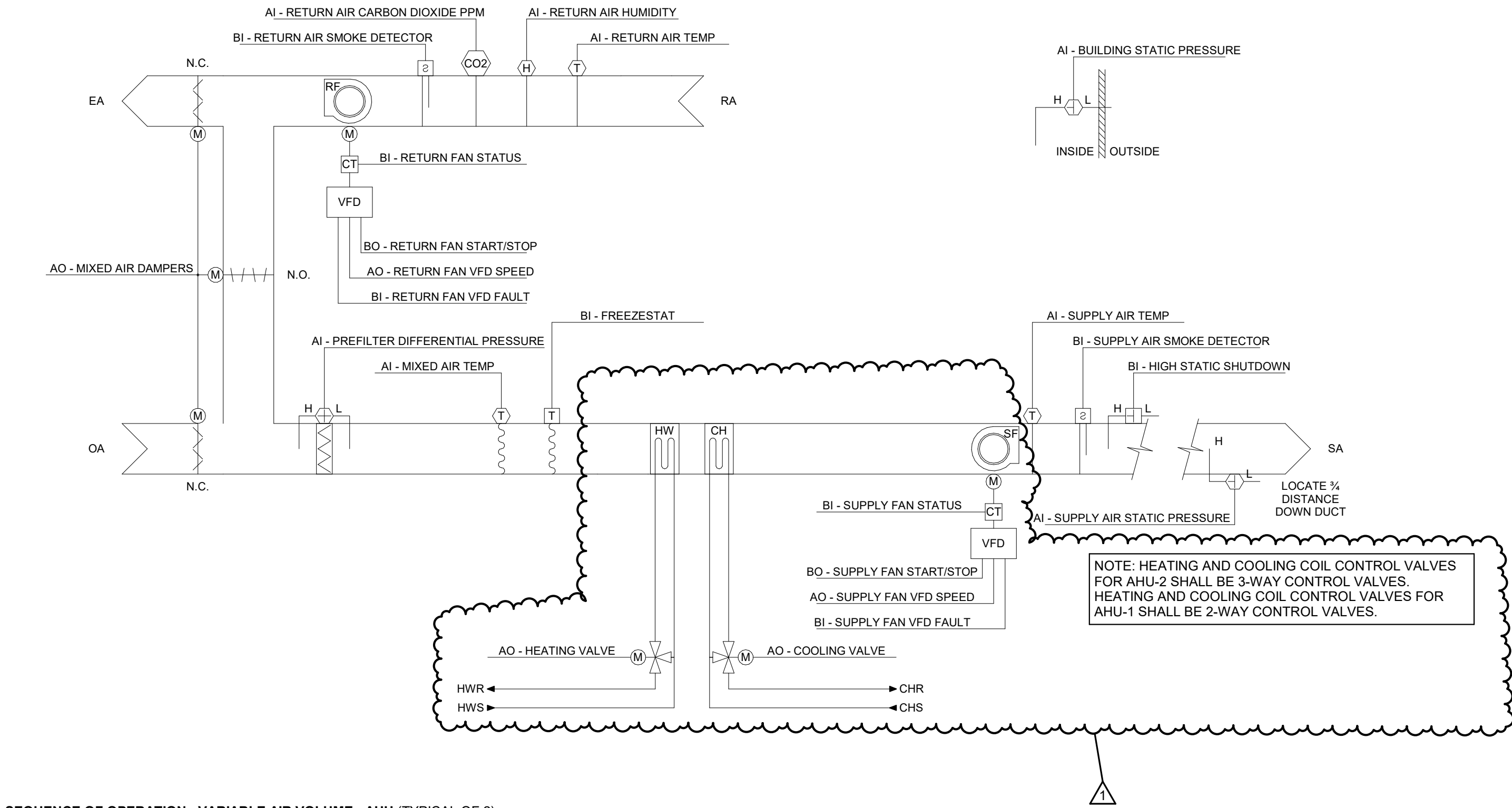
NOTE: NOT ALL MAY BE USED ON THIS PROJECT

M	MOTOR
(T)	TEMPERATURE SENSOR
(H)	HUMIDITY SENSOR
(CT)	CURRENT TRANSDUCER
(T)	THERMOSTAT OR TEMPERATURE PROBE
(SCR)	SILICON-CONTROLLED RECTIFIER
(CO2)	CARBON DIOXIDE SENSOR
(CO)	CARBON MONOXIDE SENSOR
(DP)	DIFFERENTIAL PRESSURE TRANSDUCER
(R)	REFRIGERANT SENSOR
(S)	SOLENOID
(S)	SMOKE DETECTOR
(F)	FILTER
(AVER)	AVERAGING ELEMENT (TEMPERATURE)
(TIP)	STATIC PRESSURE TIP
(PBLD)	PARALLEL BLADE DAMPER
(OPBD)	OPPOSED BLADE DAMPER
(WCOIL)	WATER COIL (HEATING OR COOLING)
(FAN)	FAN (SUPPLY, RETURN OR EXHAUST)
(RES)	ELECTRIC RESISTANCE COIL
(DX)	REFRIGERANT (DX) COIL
(FWS)	FLOW SWITCH
(FMT)	FLOW METER
(VFD)	VARIABLE FREQUENCY DRIVE
(VAV)	DAMPER (VAV)
(HUMDIST)	HUMIDIFIER DISTRIBUTION (STEAM) MANIFOLD
(THERMOWELL)	THERMOWELL
(2WAY)	2-WAY VALVE
(3WAY)	3-WAY VALVE

POINT NAME	HARDWARE POINTS				SOFTWARE POINTS						Show on Graphic
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	
Supply Air Static Pressure	x								x	x	x
Building Static Pressure	x								x		x
Supply Air Humidity	x								x		x
Prefilter Differential Pressure	x								x		
Final Filter Differential Pressure	x								x		
Mixed Air Temp	x								x		x
Return Air Carbon Dioxide PPM	x								x		x
Return Air Humidity	x								x		x
Return Air Temp	x								x		x
Supply Air Temp	x								x		x
Supply Fan VFD Speed		x							x		
Return Fan VFD Speed		x							x		x
Cooling Valve		x							x		x
Heating Valve		x							x		x
Mixed Air Dampers		x							x		x
Humidifier		x							x		x
Freezestat			x						x	x	x
High Static Shutdown			x						x	x	x
Return Air Smoke Detector			x						x	x	x
Supply Air Smoke Detector			x						x	x	x
Supply Fan VFD Fault			x							x	x
Supply Fan Status			x						x		x
Return Fan VFD Fault			x							x	
Return Fan Status			x						x		x
Cooling Coil Pump Status			x						x		x
Heating Coil Pump Status			x						x		x
Supply Fan Start/Stop				x					x		x
Return Fan Start/Stop				x					x		x
Cooling Coil Pump Start/Stop				x					x		x
Heating Coil Pump Start/Stop				x					x		x
Humidifier Enable				x							x
Demand Limit Level					x						x
Supply Air Static Pressure Setpoint					x				x		x
Building Static Pressure Setpoint					x						x
Supply Air Temp Setpoint					x				x		x
Economizer Mixed Air Temp Setpoint					x				x		x
RA Carbon Dioxide PPM Setpoint					x				x		x
Dehumidification Setpoint					x				x		x
Humidifier Setpoint					x						x
Emergency Shutdown						x			x	x	x
Schedule								x			
High Supply Air Static Pressure										x	
Low Supply Air Static Pressure										x	
Supply Fan Failure										x	
Supply Fan In Hand										x	
Supply Fan Runtime Exceeded										x	
High Building Static Pressure										x	
Low Building Static Pressure										x	
Return Fan Failure										x	
Return Fan In Hand										x	
Return Fan Runtime Exceeded										x	
High Supply Air Temp										x	
Low Supply Air Temp										x	
Cooling Coil Pump Failure										x	
Cooling Coil Pump In Hand										x	
Cooling Coil Pump Runtime Exceeded										x	
Heating Coil Pump Failure										x	
Heating Coil Pump In Hand										x	
Heating Coil Pump Runtime Exceeded										x	
High Supply Air Humidity										x	
Low Supply Air Humidity										x	
Prefilter Change Required										x	x
Final Filter Change Required										x	x
High Mixed Air Temp										x	
Low Mixed Air Temp										x	
High Return Air Carbon Dioxide Concentration										x	
High Return Air Humidity										x	
Low Return Air Humidity										x	
High Return Air Temp										x	
Low Return Air Temp										x	
High Supply Air Temp										x	
Low Supply Air Temp										x	

VARIABLE AIR VOLUME - AHU CONTROLS

SCALE: No Scale



SEQUENCE OF OPERATION - VARIABLE AIR VOLUME - AHU (TYPICAL OF 2)

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN BASED UPON AN OPERATOR ADJUSTABLE SCHEDULE.

EMERGENCY SHUTDOWN:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING AN EMERGENCY SHUTDOWN SIGNAL.

FREEZE PROTECTION:
THE UNIT SHALL GENERATE AN ALARM UPON RECEIVING A FREEZESTAT STATUS. UNIT SHALL MODULATE THE MIXED AIR DAMPERS IN SEQUENCE TO GRADUALLY REDUCE THE OUTSIDE AIR UNTIL MIXED AIR TEMPERATURE IS MAINTAINED ABOVE 40 DEG F. (ADJ.)

HIGH STATIC SHUTDOWN:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING AN HIGH STATIC SHUTDOWN SIGNAL.

RETURN AIR SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A RETURN AIR SMOKE DETECTOR STATUS.

SUPPLY AIR SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SUPPLY AIR SMOKE DETECTOR STATUS.

AHU OPTIMAL START:
THE UNIT SHALL START PRIOR TO SCHEDULED OCCUPANCY BASED ON THE TIME NECESSARY FOR THE ZONES TO REACH THEIR OCCUPIED SETPOINTS. THE START TIME SHALL AUTOMATICALLY ADJUST BASED ON CHANGES IN OUTSIDE AIR TEMPERATURE AND ZONE TEMPERATURES.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
• SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
• SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

SUPPLY AIR DUCT STATIC PRESSURE CONTROL:
THE CONTROLLER SHALL MEASURE DUCT STATIC PRESSURE AND MODULATE THE SUPPLY FAN VFD SPEED TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT. THE SPEED SHALL NOT DROP BELOW 30% (ADJ.). THE STATIC PRESSURE SETPOINT SHALL BE RESET BASED ON ZONE COOLING REQUIREMENTS.
• THE INITIAL DUCT STATIC PRESSURE SETPOINT SHALL BE 1.3IN H2O (ADJ.).
• AS COOLING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 1.8IN H2O (ADJ.).
• AS COOLING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 1.3IN H2O (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT.
• LOW SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT.
• SUPPLY FAN VFD FAULT.

RETURN FAN:
THE RETURN FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
• RETURN FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
• RETURN FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
• RETURN FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).
• RETURN FAN VFD FAULT.

BUILDING STATIC PRESSURE CONTROL:
THE CONTROLLER SHALL MEASURE BUILDING STATIC PRESSURE AND MODULATE THE RETURN FAN VFD SPEED TO MAINTAIN A BUILDING STATIC PRESSURE SETPOINT OF 0.09IN H2O (ADJ.). THE RETURN FAN VFD SPEED SHALL NOT DROP BELOW 20% (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH BUILDING STATIC PRESSURE: IF THE BUILDING AIR STATIC PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT.
• LOW BUILDING STATIC PRESSURE: IF THE BUILDING AIR STATIC PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT.

SUPPLY AIR TEMPERATURE SETPOINT - OPTIMIZED:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A SUPPLY AIR TEMPERATURE SETPOINT RESET BASED ON ZONE COOLING AND HEATING REQUIREMENTS

THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET FOR COOLING BASED ON ZONE COOLING REQUIREMENTS AS FOLLOWS:
• THE INITIAL SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 55°F (ADJ.).
• AS COOLING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 53°F (ADJ.).
• AS COOLING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 72°F (ADJ.).

IF MORE ZONES NEED HEATING THAN COOLING, THEN THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET FOR HEATING AS FOLLOWS:
• THE INITIAL SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 82°F (ADJ.).
• AS HEATING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 85°F (ADJ.).
• AS HEATING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 72°F (ADJ.).

COOLING COIL VALVE:
THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL VALVE TO MAINTAIN ITS COOLING SETPOINT.

THE COOLING SHALL BE ENABLED WHENEVER:
• OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.).
• AND THE ECONOMIZER (IF PRESENT) IS DISABLED OR FULLY OPEN.
• AND THE SUPPLY FAN STATUS IS ON.
• AND THE HEATING (IF PRESENT) IS NOT ACTIVE.

THE COOLING COIL VALVE SHALL OPEN TO 50% (ADJ.) WHENEVER THE FREEZESTAT (IF PRESENT) IS ON.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS 5°F (ADJ.) GREATER THAN SETPOINT.

HEATING COIL VALVE:
THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING COIL VALVE TO MAINTAIN ITS HEATING SETPOINT.

THE HEATING SHALL BE ENABLED WHENEVER:
• OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
• AND THE SUPPLY FAN STATUS IS ON.
• AND THE COOLING (IF PRESENT) IS NOT ACTIVE.

THE HEATING COIL VALVE SHALL OPEN WHENEVER:
• SUPPLY AIR TEMPERATURE DROPS FROM 40°F TO 35°F (ADJ.).
• OR THE FREEZESTAT (IF PRESENT) IS ON.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
• LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS 5°F (ADJ.) LESS THAN SETPOINT.

COOLING COIL PUMP:
THE RECIRCULATION PUMP SHALL RUN WHENEVER:
• THE COOLING COIL VALVE IS ENABLED.
• OR THE FREEZESTAT (IF PRESENT) IS ON.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
• COOLING COIL PUMP FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
• COOLING COIL PUMP IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
• COOLING COIL PUMP RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.

HEATING COIL PUMP:
THE RECIRCULATION PUMP SHALL RUN WHENEVER:
• THE HEATING COIL VALVE IS ENABLED.
• OR THE FREEZESTAT (IF PRESENT) IS ON.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HEATING COIL PUMP FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
• HEATING COIL PUMP IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
• HEATING COIL PUMP RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.

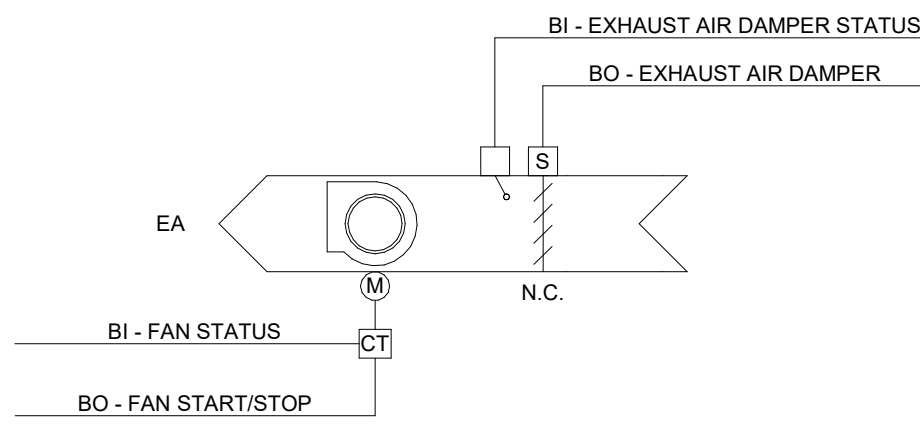
ECONOMIZER:
THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2°F (ADJ.) LESS THAN THE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20% (ADJ.) OPEN WHENEVER OCCUPIED.

THE ECONOMIZER SHALL BE ENABLED WHENEVER:
• OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
• AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
• AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL CLOSE WHENEVER:
• MIXED AIR TEMPERATURE DROPS FROM 40°F TO 35°F (ADJ.).
• OR THE FREEZESTAT (IF PRESENT) IS ON.
• OR ON LOSS OF SUPPLY FAN STATUS.

THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START UP IS AVAILABLE THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

MINIMUM OUTSIDE AIR VENTILATION - CARBON DIOXIDE (CO2) CONTROL:
WHEN IN THE OCCUPIED MODE, THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 LEVELS AND MODULATE THE OUTSIDE AIR DAMPERS OPEN ON RISING CO2 CONCENTRATIONS, OVERRIDING NORMAL DAM



	HARDWARE POINTS				SOFTWARE POINTS							
POINT NAME	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	Show on Graphic	
Exhaust Air Damper Status			x						x		x	
Fan Status			x						x		x	
Fan Start/Stop				x					x		x	
Exhaust Air Damper				x					x		x	
Schedule								x				
Exhaust Air Damper Failure										x		
Exhaust Air Damper in Hand										x		
Fan Failure										x		
Fan In Hand										x		
Fan Runtime Exceeded										x		

SEQUENCE OF OPERATION - EXHAUST FAN - ON/OFF (TYPICAL OF 1)

RUN CONDITIONS - SCHEDULED:
THE FAN SHALL RUN ACCORDING TO A USER DEFINABLE SCHEDULE.

FAN:
THE FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

EXHAUST AIR DAMPER:
THE EXHAUST AIR DAMPER SHALL OPEN ANYTIME THE UNIT RUNS AND SHALL CLOSE ANYTIME THE UNIT STOPS. THE EXHAUST AIR DAMPER SHALL CLOSE 30 SEC (ADJ.) AFTER THE FAN STOPS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- DAMPER FAILURE: COMMANDED OPEN, BUT THE STATUS IS CLOSED.
- DAMPER IN HAND: COMMANDED CLOSED, BUT THE STATUS IS OPEN.

FILTER DIFFERENTIAL PRESSURE MONITOR:

THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FILTER CHANGE REQUIRED: FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

DAMPER STATUS:

THE FAN SHALL BE ENABLED AFTER THE DAMPER STATUS HAS PROVEN.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

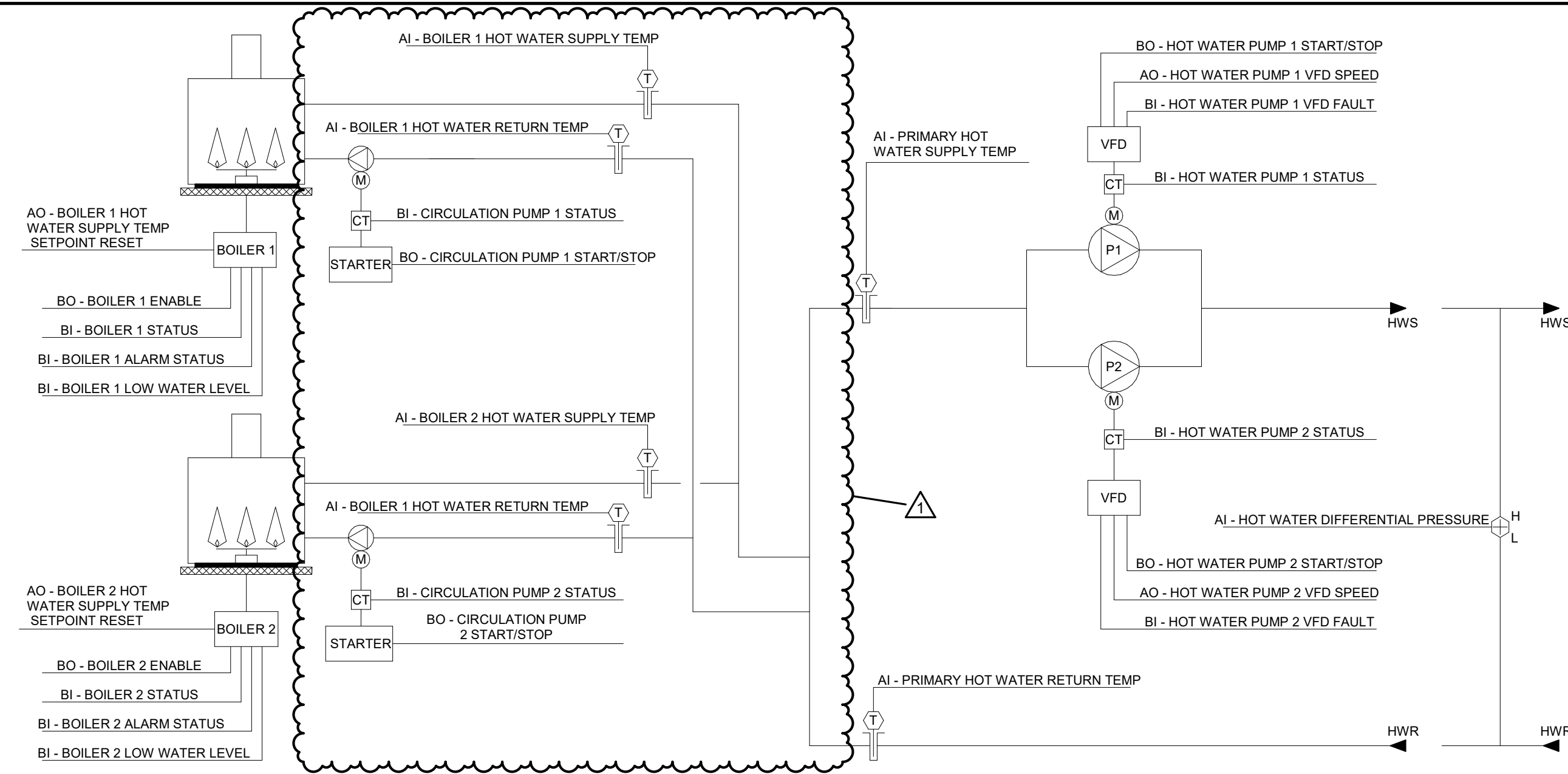
- DAMPER FAILURE: COMMANDED OPEN, BUT THE STATUS IS CLOSED.
- DAMPER IN HAND: COMMANDED CLOSED, BUT THE STATUS IS OPEN.

FAN STATUS:

THE CONTROLLER SHALL MONITOR THE FAN STATUS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- FAN RUNTIME EXCEEDED: FAN STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).



	HARDWARE POINTS				SOFTWARE POINTS							
POINT NAME	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	Show on Graphic	
Hot Water Differential Pressure	x								x		x	
Primary Hot Water Return Temp	x								x		x	
Primary Hot Water Supply Temp	x								x		x	
Boiler 1 Hot Water Return Temp	x								x		x	
Boiler 1 Hot Water Supply Temp	x								x		x	
Boiler 2 Hot Water Return Temp	x								x		x	
Boiler 2 Hot Water Supply Temp	x								x		x	
Hot Water Pump 1 VFD Speed		x							x		x	
Hot Water Pump 2 VFD Speed		x							x		x	
Boiler 1 Hot Water Supply Temp Setpoint Reset		x							x		x	
Boiler 2 Hot Water Supply Temp Setpoint Reset		x							x		x	
Boiler 1 Alarm Status			x						x	x	x	
Boiler 1 Low Water Level			x						x	x	x	
Boiler 2 Alarm Status			x						x	x	x	
Boiler 2 Low Water Level			x						x	x	x	
Hot Water Pump 1 VFD Fault			x							x	x	
Hot Water Pump 2 VFD Fault			x							x	x	
Hot Water Pump 1 Status			x						x		x	
Hot Water Pump 2 Status			x						x		x	
Circulation Pump 1 Status			x						x		x	
Circulation Pump 2 Status			x						x		x	
Boiler 1 Status			x						x		x	
Boiler 2 Status			x						x		x	
Hot Water Pump 1 Start/Stop				x							x	
Hot Water Pump 2 Start/Stop				x							x	
Circulation Pump 1 Start/Stop				x						x	x	
Circulation Pump 2 Start/Stop				x						x	x	
Boiler 1 Enable				x							x	
Boiler 2 Enable				x							x	
Outside Air Temp					x						x	
Hot Water Differential Pressure Setpoint					x					x	x	
High Hot Water Differential Pressure											x	
Low Hot Water Differential Pressure											x	
Hot Water Pump 1 Failure											x	
Hot Water Pump 1 Running in Hand											x	
Hot Water Pump 1 Runtime Exceeded											x	
Hot Water Pump 2 Failure											x	
Hot Water Pump 2 Running in Hand											x	
Hot Water Pump 2 Runtime Exceeded											x	
Circulation Pump 1 Failure											x	
Circulation Pump 1 Running in Hand											x	
Circulation Pump 1 Runtime Exceeded											x	
Circulation Pump 2 Failure											x	
Circulation Pump 2 Running in Hand											x	
Circulation Pump 2 Runtime Exceeded											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	
Lead Boiler Failure											x	x
High Primary Hot Water Supply Temp											x	
Low Primary Hot Water Supply Temp											x	
Boiler 1 High Hot Water Supply Temp											x	
Boiler 1 Low Hot Water Supply Temp											x	
Boiler 2 High Hot Water Supply Temp											x	
Boiler 2 Low Hot Water Supply Temp											x	

SEQUENCE OF OPERATION - TWO BOILER SYSTEM (TYPICAL OF 1)

BOILER SYSTEM RUN CONDITIONS:

- THE BOILER SYSTEM SHALL BE ENABLED TO RUN WHENEVER:
- A DEFINABLE NUMBER OF HOT WATER COILS NEED HEATING.
- AND OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).

TO PREVENT SHORT CYCLING, THE BOILER SYSTEM SHALL RUN FOR AND BE OFF FOR MINIMUM ADJUSTABLE TIMES (BOTH USER DEFINABLE), UNLESS SHUTDOWN ON SAFETIES OR OUTSIDE AIR CONDITIONS.

THE BOILER SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.

THE BOILER SYSTEM SHALL ALSO RUN FOR FREEZE PROTECTION WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN 38°F (ADJ.).

BOILER 1 SAFETIES:

- THE FOLLOWING SAFETIES SHALL BE MONITORED:
- BOILER ALARM.
- LOW WATER LEVEL.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- BOILER ALARM.
- LOW WATER LEVEL ALARM.

BOILER 2 SAFETIES:

- THE FOLLOWING SAFETIES SHALL BE MONITORED:
- BOILER ALARM.
- LOW WATER LEVEL.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- BOILER ALARM.
- LOW WATER LEVEL ALARM.

HOT WATER PUMP LEAD/LAG OPERATION:

THE TWO HOT WATER PUMPS SHALL OPERATE IN A LEAD/LAG FASHION.

- THE LEAD PUMP SHALL RUN FIRST.
- ON FAILURE OF THE LEAD PUMP, THE LAG PUMP SHALL RUN AND THE LEAD PUMP SHALL TURN OFF.
- ON DECREASING HOT WATER DIFFERENTIAL PRESSURE, THE LAG PUMP SHALL STAGE ON AND RUN IN UNISON WITH THE LEAD PUMP TO MAINTAIN HOT WATER DIFFERENTIAL PRESSURE SETPOINT.

THE DESIGNATED LEAD PUMP SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS (USER SELECTABLE):

- MANUALLY THROUGH A SOFTWARE SWITCH
- IF PUMP RUNTIME (ADJ.) IS EXCEEDED
- DAILY
- WEEKLY
- MONTHLY

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HOT WATER PUMP 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.
- VFD FAULT.

HOT WATER PUMP 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.
- VFD FAULT.

HOT WATER DIFFERENTIAL PRESSURE CONTROL:

THE CONTROLLER SHALL MEASURE HOT WATER DIFFERENTIAL PRESSURE AND MODULATE THE HOT WATER PUMP VFDs IN SEQUENCE TO MAINTAIN ITS HOT WATER DIFFERENTIAL PRESSURE SETPOINT.

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 CONTROLLER SHALL MODULATE HOT WATER PUMP SPEEDS TO MAINTAIN A HOT WATER DIFFERENTIAL PRESSURE OF 12LBF/IN2 (ADJ.). THE VFDs MINIMUM SPEED SHALL NOT DROP BELOW 20% (ADJ.).

ON DROPPING HOT WATER DIFFERENTIAL PRESSURE, THE VFDs SHALL STAGE ON AND RUN TO MAINTAIN SETPOINT AS FOLLOWS:

- THE CONTROLLER SHALL MODULATE THE LEAD VFD TO MAINTAIN SETPOINT.
- IF THE LEAD VFD SPEED IS GREATER THAN A SETPOINT OF 90% (ADJ.), THE LAG VFD SHALL STAGE ON.
- THE LAG VFD SHALL RAMP UP TO MATCH THE LEAD VFD SPEED AND THEN RUN IN UNISON WITH THE LEAD VFD TO MAINTAIN SETPOINT.

ON RISING HOT WATER DIFFERENTIAL PRESSURE, THE VFDs SHALL STAGE OFF AS FOLLOWS:

- IF THE VFD SPEEDS DROPS BACK TO 60% (ADJ.) BELOW SETPOINT, THE LAG VFD SHALL STAGE OFF.
- THE LEAD VFD SHALL CONTINUE TO RUN TO MAINTAIN SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH HOT WATER DIFFERENTIAL PRESSURE: IF 25% (ADJ.) GREATER THAN SETPOINT.
- LOW HOT WATER DIFFERENTIAL PRESSURE: IF 25% (ADJ.) LESS THAN SETPOINT.

CIRCULATION PUMP 1:

THE CIRCULATION PUMP 1 SHALL RUN ANYTIME BOILER 1 IS CALLED TO RUN AND SHALL HAVE A USER DEFINABLE DELAY (ADJ.) ON STOP.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- CIRCULATION PUMP 1 FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- CIRCULATION PUMP 1 RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- CIRCULATION PUMP 1 RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER-DEFINABLE LIMIT.

CIRCULATION PUMP 2:

THE CIRCULATION PUMP 2 SHALL RUN ANYTIME BOILER 2 IS CALLED TO RUN AND SHALL HAVE A USER DEFINABLE DELAY (ADJ.) ON STOP.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- CIRCULATION PUMP 2 FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- CIRCULATION PUMP 2 RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- CIRCULATION PUMP 2 RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER-DEFINABLE LIMIT.

BOILER LEAD/LAG OPERATION:

THE TWO BOILERS SHALL OPERATE IN A LEAD/LAG FASHION.

- THE LEAD BOILER SHALL RUN FIRST.
- ON FAILURE OF THE LEAD BOILER, THE LAG BOILER SHALL RUN AND THE LEAD BOILER SHALL TURN OFF.
- AS HOT WATER TEMPERATURE DROPS BELOW A SETPOINT OF 150 F (ADJ.), THE LAG BOILER SHALL STAGE ON AND RUN IN UNISON WITH THE LEAD BOILER TO MAINTAIN HOT WATER TEMPERATURE SETPOINT.
- AS HOT WATER TEMPERATURE RISES BACK TO 20°F ABOVE SETPOINT, THE LAG BOILER SHALL STAGE OFF.

THE DESIGNATED LEAD BOILER SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS (USER SELECTABLE):

- MANUALLY THROUGH A SOFTWARE SWITCH
- IF BOILER RUNTIME (ADJ.) IS EXCEEDED
- DAILY
- WEEKLY
- MONTHLY

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- 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.

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.

LEAD BOILER FAILURE: THE LEAD BOILER IS IN FAILURE AND THE STANDBY BOILER IS ON.

HOT WATER SUPPLY TEMPERATURE SETPOINT RESET:

THE HOT WATER SUPPLY TEMPERATURE SETPOINT SHALL RESET USING A TRIM AND RESPOND ALGORITHM BASED ON HEATING REQUIREMENTS.

AS THE FACILITY'S HOT WATER VALVES OPEN BEYOND A USER DEFINABLE THRESHOLD (90% OPEN, TYP.), THE SETPOINT SHALL RESET TO A HIGHER VALUE (ADJ.). ONCE THE HOT WATER COILS ARE SATISFIED (VALVES CLOSING) THEN THE SETPOINT SHALL GRADUALLY LOWER OVER TIME TO REDUCE HEATING ENERGY USE.

PRIMARY HOT WATER TEMPERATURE MONITORING:

THE FOLLOWING TEMPERATURES SHALL BE MONITORED:

- PRIMARY HOT WATER SUPPLY.
- PRIMARY HOT WATER RETURN.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH PRIMARY HOT WATER SUPPLY TEMP: IF GREATER THAN 200°F (ADJ.).
- LOW PRIMARY HOT WATER SUPPLY TEMP: IF LESS THAN 100°F (ADJ.).

BOILER 1 HOT WATER TEMPERATURE MONITORING:

THE FOLLOWING TEMPERATURES SHALL BE MONITORED:

- BOILER 1 HOT WATER SUPPLY.
- BOILER 1 HOT WATER RETURN.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH HOT WATER SUPPLY TEMP: IF GREATER THAN 200°F (ADJ.).
- LOW HOT WATER SUPPLY TEMP: IF LESS THAN 100°F (ADJ.).

BOILER 2 HOT WATER TEMPERATURE MONITORING:

THE FOLLOWING TEMPERATURES SHALL BE MONITORED:

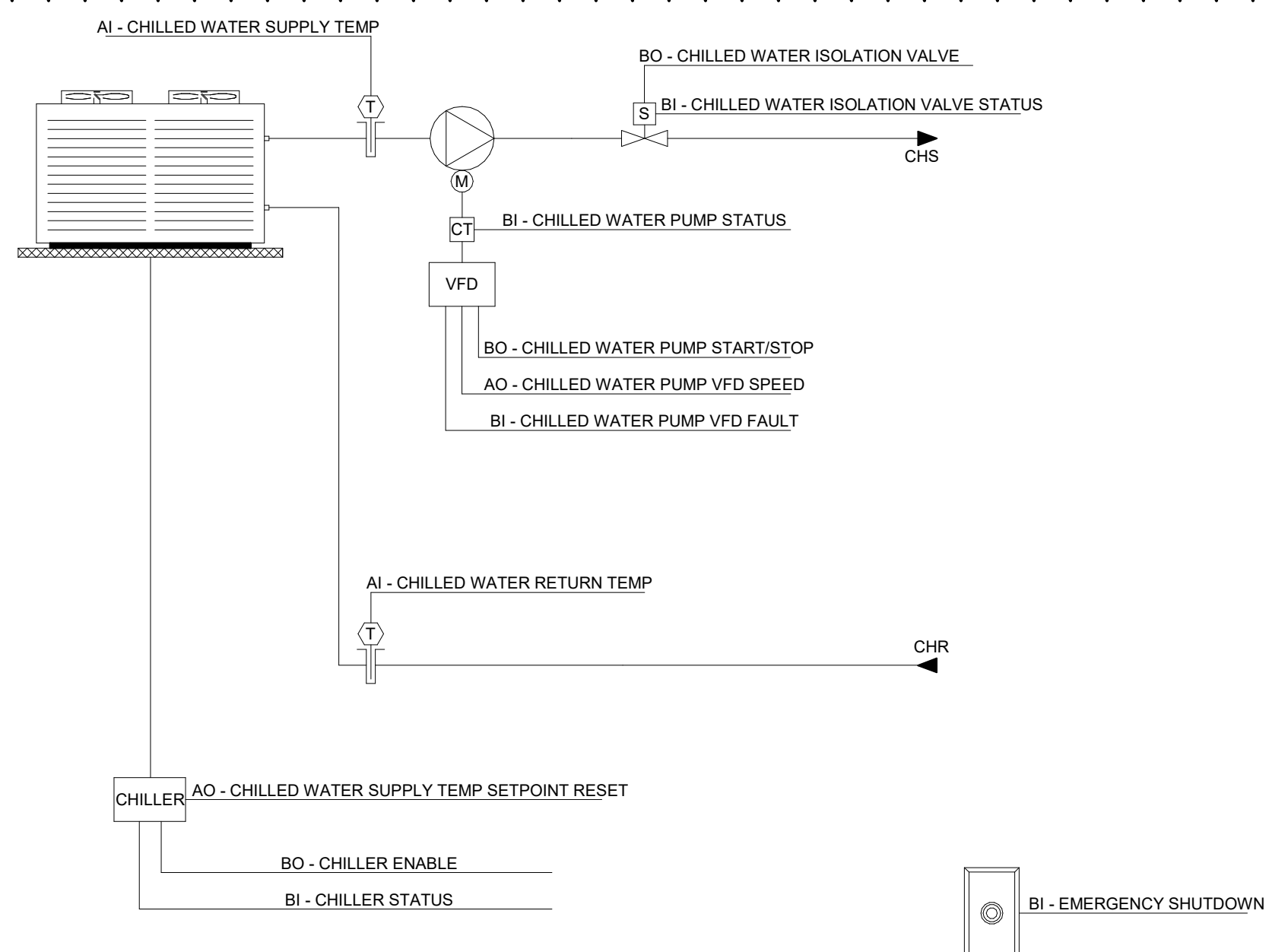
- BOILER 2 HOT WATER SUPPLY.
- BOILER 2 HOT WATER RETURN.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH HOT WATER SUPPLY TEMP: IF GREATER THAN 200°F (ADJ.).
- LOW HOT WATER SUPPLY TEMP: IF LESS THAN 100°F (ADJ.).

3 EXHAUST FAN - ON/OFF CONTROLS

SCALE: No Scale



SEQUENCE OF OPERATION - SINGLE AIR COOLED CHILLER (TYPICAL OF 1)

CHILLER - RUN CONDITIONS:

- THE CHILLER SHALL BE ENABLED TO RUN WHENEVER:
- A DEFINABLE NUMBER OF CHILLED WATER COILS NEED COOLING.
- AND THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 54°F (ADJ.).

TO PREVENT SHORT CYCLING, THE CHILLER SHALL RUN FOR AND BE OFF FOR MINIMUM ADJUSTABLE TIMES (BOTH USER DEFINABLE), UNLESS SHUTDOWN ON SAFETIES OR OUTSIDE AIR CONDITIONS.

THE CHILLER SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.

EMERGENCY SHUTDOWN:

THE CHILLER SHALL SHUT DOWN AND AN ALARM GENERATED UPON RECEIVING AN EMERGENCY SHUTDOWN SIGNAL STATUS.

REFRIGERANT DETECTION:

THE CHILLER SHALL SHUT DOWN AND AN ALARM GENERATED UPON RECEIVING A REFRIGERANT LEAK DETECTION STATUS.

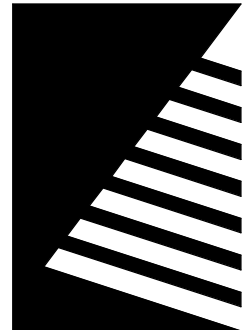
CHILLED WATER ISOLATION VALVE:

THE VALVE SHALL OPEN ANYTIME THE CHILLER IS CALLED TO RUN. THE VALVE SHALL ALSO OPEN WHENEVER THE CHILLED WATER PUMP RUNS FOR FREEZE PROTECTION.

THE VALVE SHALL OPEN PRIOR TO THE CHILLER BEING ENABLED AND SHALL CLOSE ONLY AFTER THE CHILLER IS DISABLED. THE VALVE SHALL THEREFORE HAVE:

- A USER ADJUSTABLE DELAY ON START.
- AND A USER ADJUSTABLE DELAY ON STOP.

THE DELAY TIMES SHALL

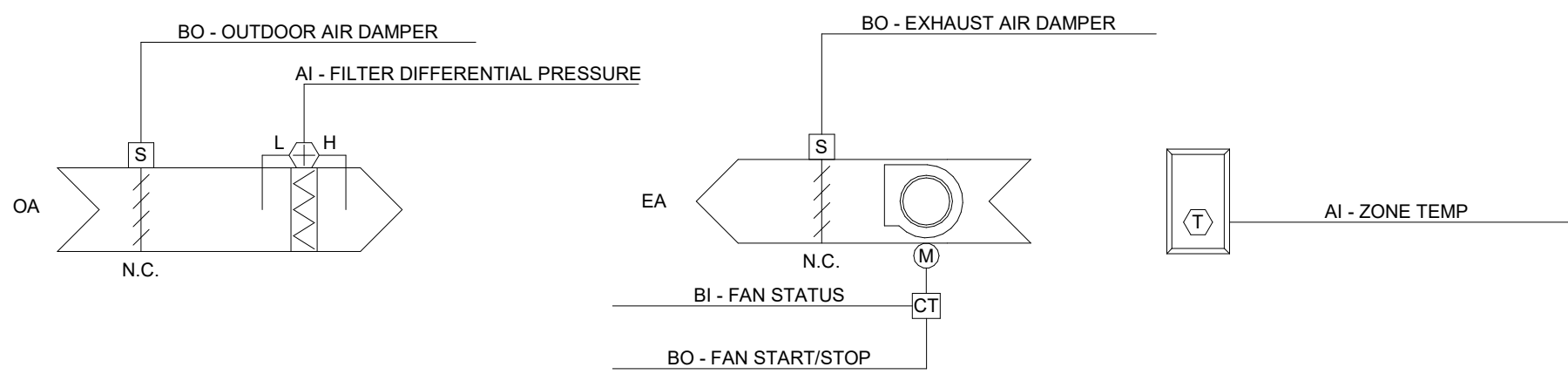


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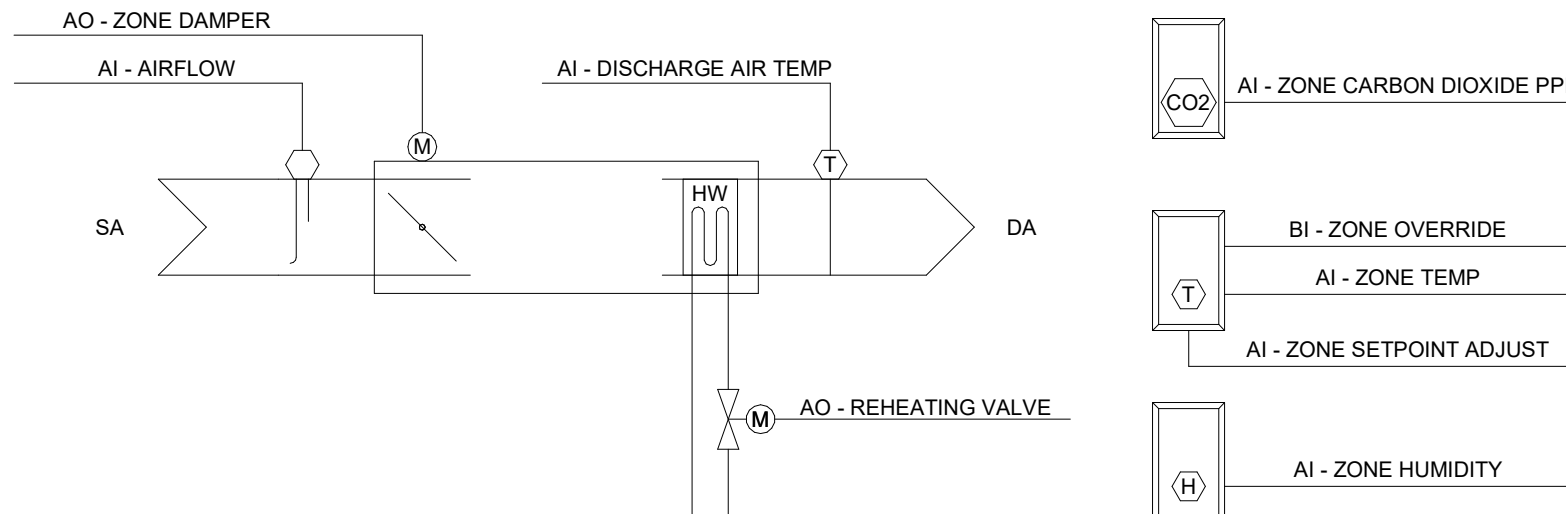
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POINT NAME	HARDWARE POINTS				SOFTWARE POINTS						
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	Show on Graphic
Zone Temp	x								x		x
Filter Differential Pressure	x								x		x
Outdoor Air Damper				x					x		x
Fan Status			x						x		x
Fan Start/Stop				x					x		x
Exhaust Air Damper				x					x		x
Cooling Setpoint					x				x		x
Schedule								x			
High Zone Temp										x	
Filter Change Required										x	
Fan Failure										x	
Fan in Hand										x	
Fan Runtime Exceeded										x	

EXHAUST FAN - COOLING CONTROLS

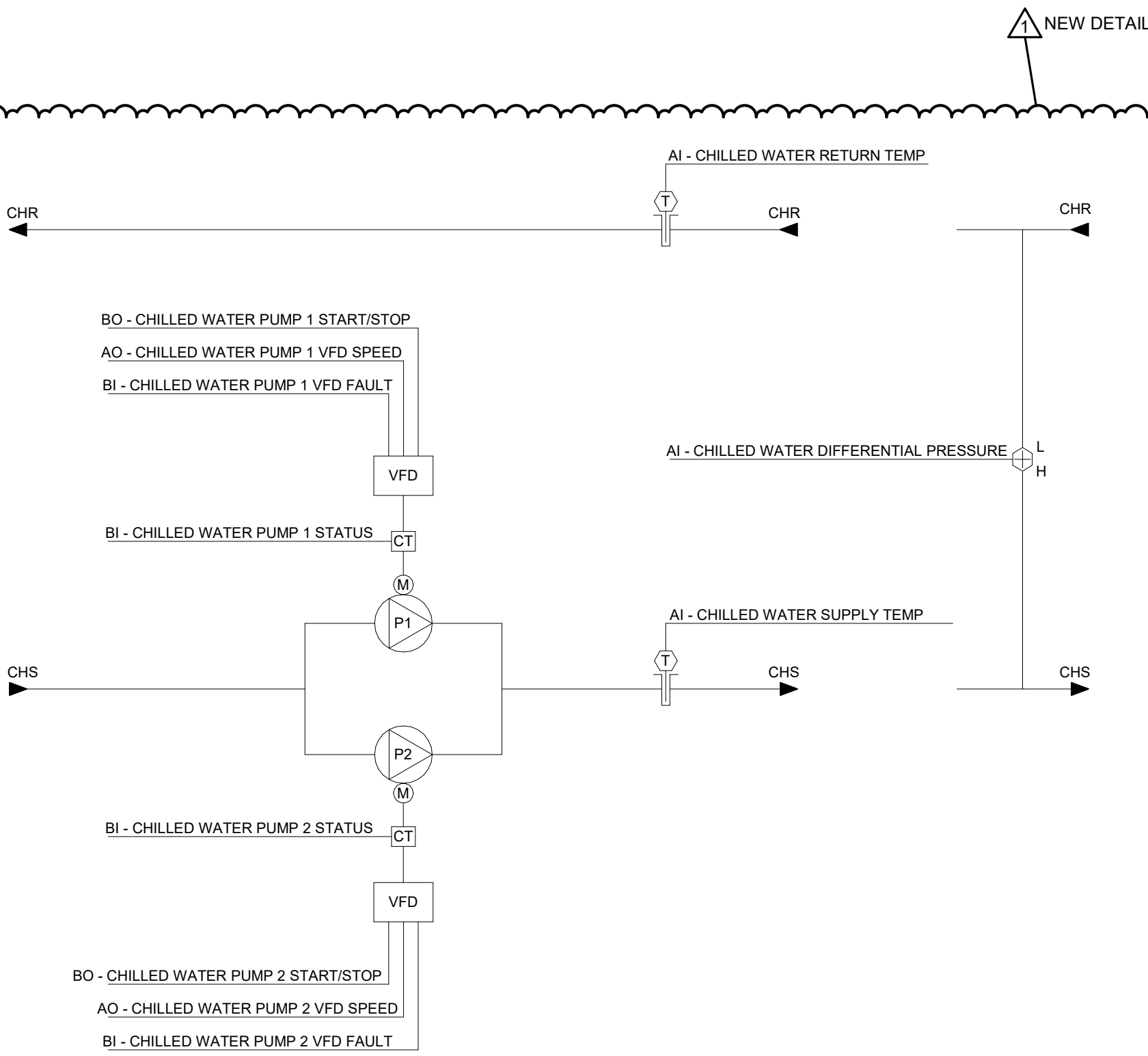
SCALE: No Scale



POINT NAME	HARDWARE POINTS				SOFTWARE POINTS						
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	Show on Graphic
Zone Temp	x								x		x
Zone Setpoint Adjust	x										x
Airflow	x								x		x
Discharge Air Temp	x								x		x
Zone Humidity	x								x		x
Zone Damper		x									x
Reheat Valve		x							x		x
Zone Override			x						x		x
Zone Carbon Dioxide PPM Setpoint					x				x		x
Airflow Setpoint					x				x		x
Heating Mode						x			x		
Schedule								x			
Heating Setpoint									x		x
Cooling Setpoint									x		x
High Zone Temp										x	
Low Zone Temp										x	
High Zone Carbon Dioxide Concentration										x	
High Discharge Air Temp										x	
Low Discharge Air Temp										x	
High Zone Humidity										x	
Low Zone Humidity										x	

VARIABLE AIR VOLUME - TERMINAL UNIT CONTROLS

SCALE: No Scale



SEQUENCE OF OPERATION - CHILLED WATER LOOP PUMPS (TYPICAL OF 1)

CHILLED WATER PUMP SYSTEM - RUN CONDITIONS:
THE CHILLED WATER PUMPS SHALL BE ENABLED WHENEVER:
• A DEFINABLE NUMBER OF CHILLED WATER COILS NEED COOLING.
• AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN 38°F (ADJ.).

TO PREVENT SHORT CYCLING, THE CHILLED WATER PUMP SYSTEM SHALL RUN FOR AND BE OFF FOR MINIMUM ADJUSTABLE TIMES (BOTH USER DEFINABLE).

THE PUMPS SHALL RUN FOR FREEZE PROTECTION ANYTIME THE OUTSIDE AIR TEMPERATURE IS LESS THAN 38°F (ADJ.).

CHILLED WATER PUMP LEAD/LAG OPERATION:
THE TWO VARIABLE SPEED CHILLED WATER PUMPS SHALL OPERATE IN A LEAD/LAG FASHION.

• THE LEAD PUMP SHALL RUN FIRST.
• ON FAILURE OF THE LEAD PUMP, THE LAG PUMP SHALL RUN AND THE LEAD PUMP SHALL TURN OFF.
• ON DECREASING CHILLED WATER DIFFERENTIAL PRESSURE, THE LAG PUMP SHALL STAGE ON AND RUN IN UNISON WITH THE LEAD PUMP TO MAINTAIN CHILLED WATER DIFFERENTIAL PRESSURE SETPOINT.

THE DESIGNATED LEAD PUMP SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS (USER SELECTABLE):

• MANUALLY THROUGH A SOFTWARE SWITCH
• IF PUMP RUNTIME (ADJ.) IS EXCEEDED
• DAILY
• WEEKLY
• MONTHLY

ALARMS SHALL BE PROVIDED AS FOLLOWS:

• CHILLED WATER PUMP 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.
• VFD FAULT.

• CHILLED WATER PUMP 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.
• VFD FAULT.

CHILLED WATER DIFFERENTIAL PRESSURE CONTROL:
THE CONTROLLER SHALL MEASURE CHILLED WATER DIFFERENTIAL PRESSURE AND MODULATE THE CHILLED WATER PUMP VFDS IN SEQUENCE TO MAINTAIN ITS CHILLED WATER DIFFERENTIAL PRESSURE SETPOINT. 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 CONTROLLER SHALL MODULATE CHILLED WATER PUMP SPEEDS TO MAINTAIN A CHILLED WATER DIFFERENTIAL PRESSURE OF 12LB/IN² (ADJ.). THE VFDS MINIMUM SPEED SHALL NOT DROP BELOW 20% (ADJ.).

ON DROPPING CHILLED WATER DIFFERENTIAL PRESSURE, THE VFDS SHALL STAGE ON AND RUN TO MAINTAIN SETPOINT AS FOLLOWS:

• THE CONTROLLER SHALL MODULATE THE LEAD VFD TO MAINTAIN SETPOINT.
• IF THE LEAD VFD SPEED IS GREATER THAN A SETPOINT OF 90% (ADJ.), THE LAG VFD SHALL STAGE ON.
• THE LAG VFD SHALL RAMP UP TO MATCH THE LEAD VFD SPEED AND THEN RUN IN UNISON WITH THE LEAD VFD TO MAINTAIN SETPOINT.

ON RISING CHILLED WATER DIFFERENTIAL PRESSURE, THE VFDS SHALL STAGE OFF AS FOLLOWS:

• IF THE VFDS SPEEDS THEN DROPS BACK TO 60% (ADJ.) BELOW SETPOINT, THE LAG VFD SHALL STAGE OFF.
• THE LEAD VFD SHALL CONTINUE TO RUN TO MAINTAIN SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

• HIGH CHILLED WATER DIFFERENTIAL PRESSURE: IF THE CHILLED WATER DIFFERENTIAL PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT.
• LOW CHILLED WATER DIFFERENTIAL PRESSURE: IF THE CHILLED WATER DIFFERENTIAL PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT.

CHILLED WATER TEMPERATURE MONITORING:
THE FOLLOWING TEMPERATURES SHALL BE MONITORED:

• CHILLED WATER SUPPLY.
• CHILLED WATER RETURN.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

• HIGH CHILLED WATER SUPPLY TEMP: IF THE CHILLED WATER SUPPLY TEMPERATURE IS GREATER THAN 55°F (ADJ.).
• LOW CHILLED WATER SUPPLY TEMP: IF THE CHILLED WATER SUPPLY TEMPERATURE IS LESS THAN 38°F (ADJ.).

POINT NAME	HARDWARE POINTS				SOFTWARE POINTS						
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	Show on Graphic
Chilled Water Differential Pressure	x								x		x
Chilled Water Supply Temp	x								x		x
Chilled Water Return Temp	x								x		x
Chilled Water Pump 1 VFD Speed		x							x		x
Chilled Water Pump 2 VFD Speed		x							x		x
Chilled Water Pump 1 Status			x						x		x
Chilled Water Pump 2 Status			x						x		x
Chilled Water Pump 1 VFD Fault			x							x	x
Chilled Water Pump 2 VFD Fault			x							x	x
Chilled Water Pump 1 Start/Stop				x					x		x
Chilled Water Pump 2 Start/Stop				x					x		x
Outside Air Temp					x						x
Chilled Water Differential Pressure Setpoint					x						x
Chilled Water Pump 1 Failure										x	
Chilled Water Pump 2 Failure										x	
Chilled Water Pump 1 Running in Hand										x	
Chilled Water Pump 2 Running in Hand										x	
Chilled Water Pump 1 Runtime Exceeded										x	
Chilled Water Pump 2 Runtime Exceeded										x	
High Chilled Water Differential Pressure										x	
Low Chilled Water Differential Pressure										x	
High Chilled Water Supply Temp										x	
Low Chilled Water Supply Temp										x	

CHILLED WATER PUMP LOOP PUMP CONTROLS

SCALE: No Scale

BID SET
06/11/2021

PROJECT:
Crawford Memorial Hospital

RHC Addition and
Reno

1101 North Allen Street
Robinson, IL 62454

DATE: 06/11/2021

DESIGNED: WRH

DRAWN: WRH

REVIEWED: DRR

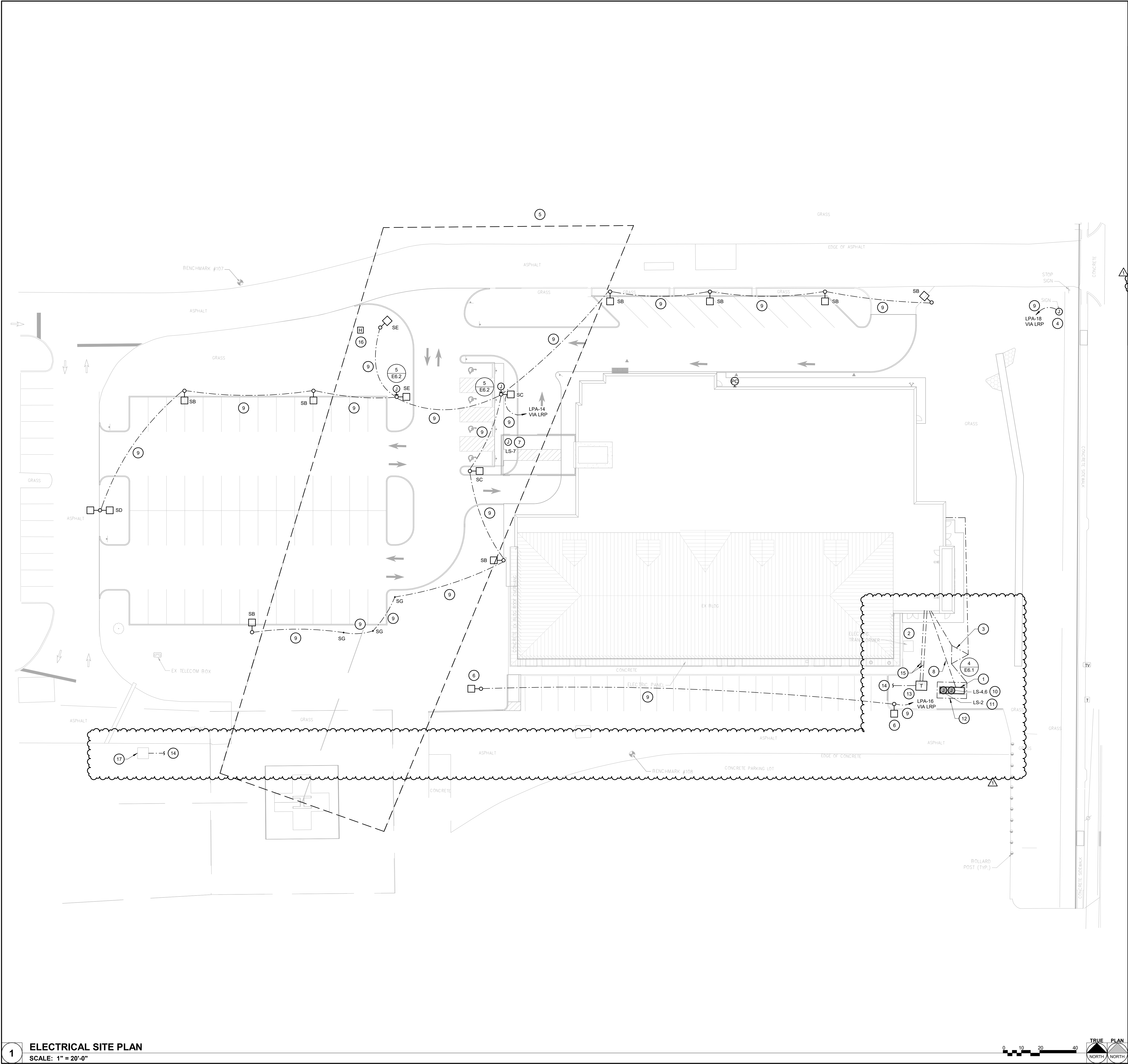
SHEET TITLE:

CONTROLS
DIAGRAMS

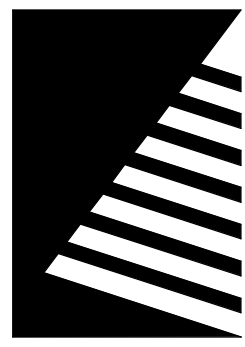
SHEET NUMBER:

M7.3

PROJECT NO.: 0200708.00



- ### GENERAL NOTES
- A. AMEREN ILLINOIS CONTACT:
RYAN CONNOR
E: RCONNOR@AMEREN.COM
P: 618-545-0230
- ### KEYNOTES
- NEW ENGINE GENERATOR.
 - EXISTING AMEREN TRANSFORMER, SEE SHEET ESD1.1 FOR MORE INFORMATION.
 - NEW GROUND FIELD.
 - EXISTING SIGN TO BE RECIRCUITED VIA LIGHTING RELAY PANEL.
 - FLIGHT PATH FOR HELIPORT.
 - EXISTING LUMINAIRE TO BE RECIRCUITED VIA LIGHTING RELAY PANEL.
 - APPROXIMATE LOCATION OF OBSTRUCTION LIGHT ON CANOPY ABOVE. VERIFY EXACT LOCATION PRIOR TO INSTALLATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
 - 1-1/2" FOR CONTROL WIRING TO ENGINE GENERATOR AND POWER WIRING FOR HEATER AND BATTERY CHARGER CIRCUITS FROM PANEL LPA.
 - 2#8, 1#10G, 3/4" FOR BLOCK HEATER, CONFIRM WITH ENGINE GENERATOR UNIT PROVIDED.
 - 3#10, 1#10G, 3/4" FOR BATTERY CHARGER, CONFIRM WITH ENGINE GENERATOR UNIT PROVIDED.
 - GROUND FIELD AROUND GENERATOR PAD, TIED TO MAIN FIELD.
 - NEW AMEREN UTILITY TRANSFORMER, CONTRACTOR TO CONSTRUCT PAD PER AMEREN DIRECTION. COORDINATE EXACT LOCATION WITH AMEREN REPRESENTATIVE PRIOR TO INSTALLATION.
 - (1) 4" DIRECTIONALLY BORED WITH PULL WIRE TO AMEREN, COORDINATE WITH UTILITY. SEE CIVIL DRAWINGS FOR CONTINUATION.
 - SECONDARY TO CT CABINETS, SEE E2.1 AND E4.1.
 - PROVIDE 12" X 12" X 18" HANDHOLE WITH 1" WITH PULL WIRE ROUTED TO LIGHTING RELAY PANEL FOR CONNECTION TO FUTURE SIGN. COORDINATE EXACT LOCATION AND ELECTRICAL REQUIREMENTS WITH OWNER PRIOR TO INSTALLATION.
 - EXISTING AMEREN ABOVE GROUND UTILITY BOX.



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1

07/02/2021

ADD 01

ISSUE # DATE DESCRIPTION

Bid Set

06/11/2021

PROJECT: Crawford Memorial Hospital

RHC Addition and Reno

1101 North Allen Street
Robinson, Illinois 62454

DATE: 06/11/2021

DESIGNED: BPH/JDE

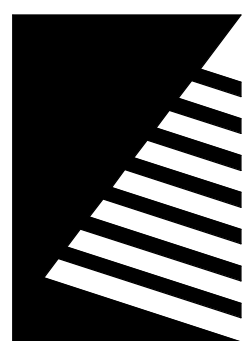
DRAWN: BPH

REVIEWED: BMS

SHEET TITLE: ELECTRICAL SITE PLAN

SHEET NUMBER: ES1.1

PROJECT NO.: 0200708.00



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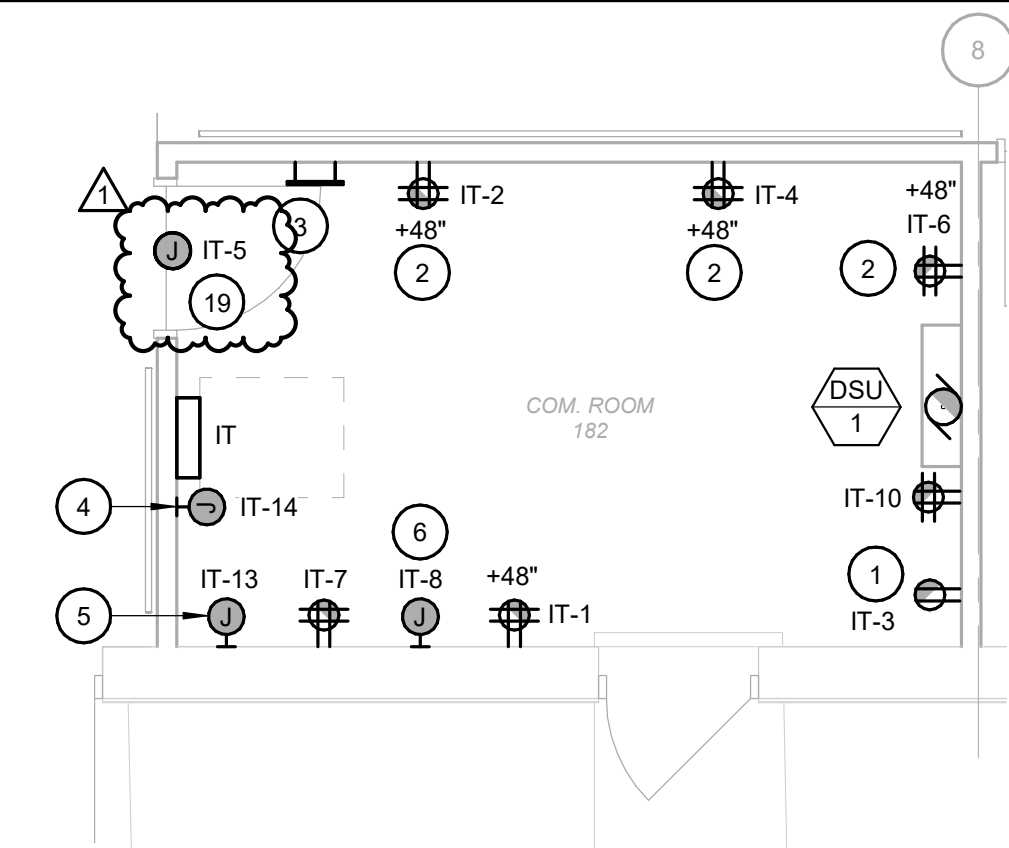
ISSUE # DATE DESCRIPTION
1 07/02/2021 ADD 01

GENERAL NOTES

A. SEE PHASING DIAGRAMS ON SHEET G0.2 FOR ORDER OF CONSTRUCTION.

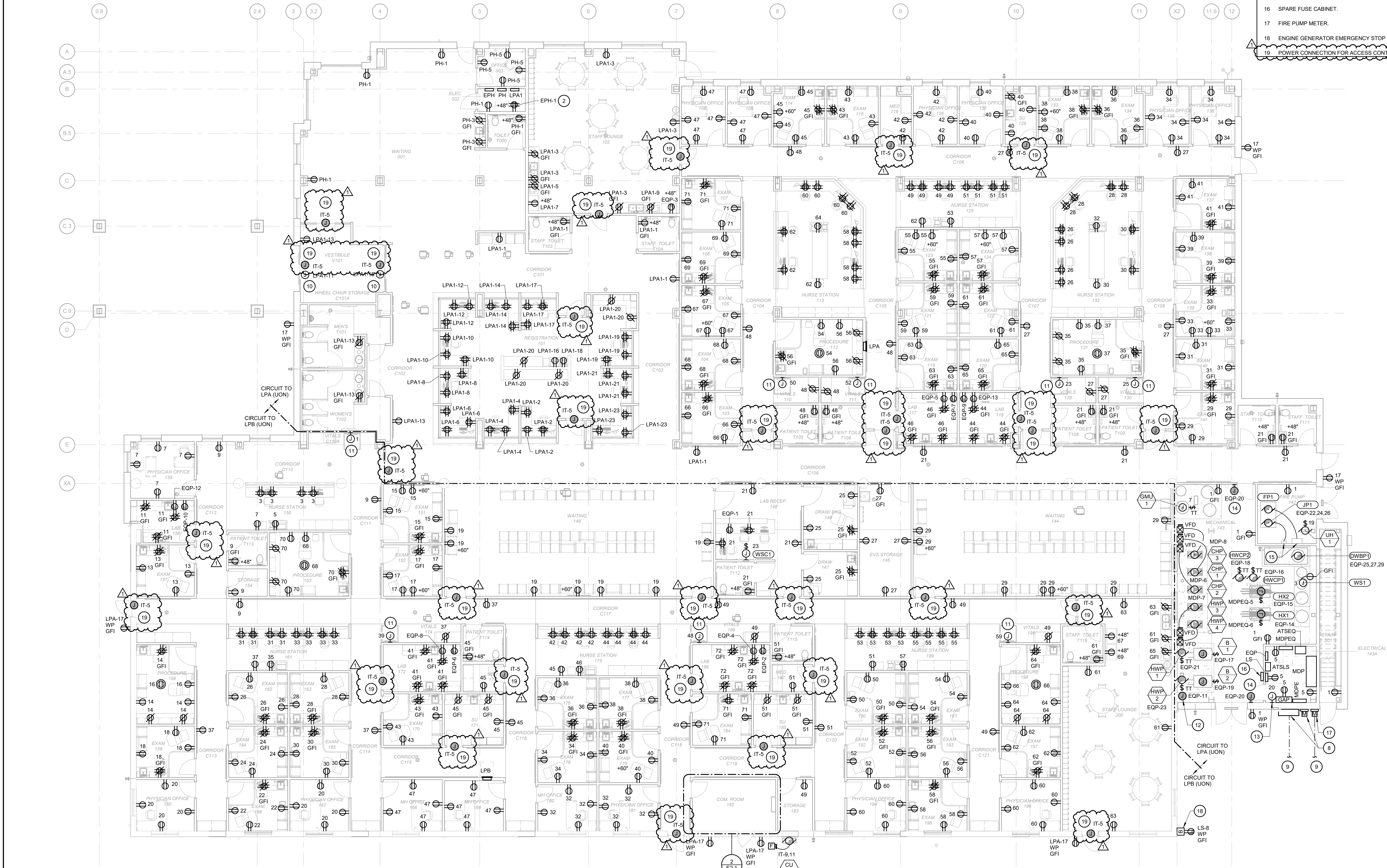
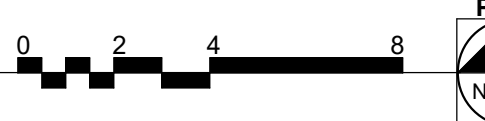
KEYNOTES

- RECEPTACLE FOR OWNER PROVIDED UPS.
- MOUNT ON LEFT EDGE OF PLYWOOD, SEE SHEET E3.1.
- GROUND BAR, SEE DETAIL ON SHEET E6.1.
- POWER CONNECTION FOR FIRE ALARM CONTROL PANEL.
- POWER CONNECTION FOR CCTV.
- POWER CONNECTION FOR ACCESS CONTROL PANEL.
- METER AND CT CABINET.
- TO UTILITY TRANSFORMER, SEE SITE PLAN FOR MORE INFORMATION.
- POWER CONNECTION FOR AUTOMATIC DOORS.
- POWER CONNECTION FOR FLOOR SCALE, VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
- POWER CONNECTION FOR EMERGENCY GAS SHUTOFF SWITCH, CONTROL WIRING TO SOLENOID VALVE BY OTHERS.
- POWER CONNECTION FOR LIGHTING RELAY PANEL.
- POWER CONNECTION FOR EMERGENCY GAS SHUTOFF SWITCH, CONTROL WIRING TO SOLENOID VALVE BY OTHERS.
- FIRE PUMP AND JOCKEY PUMP CONTROLLER PROVIDED BY OTHERS.
- SPARE FUSE CABINET.
- FIRE PUMP METER.
- ENGINE GENERATOR EMERGENCY STOP BUTTON MOUNTED AT 48" AFG.
- POWER CONNECTION FOR ACCESS CONTROL.



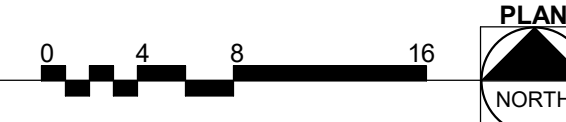
ENLARGED COM. ROOM POWER PLAN

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



FIRST FLOOR POWER PLAN

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



Bid Set
06/11/2021

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RHC Addition and
Reno

1101 North Allen Street
Robinson, Illinois 62454

DATE: 06/11/2021

DESIGNED: BPH/JDE

DRAWN: BPH

REVIEWED: BMS

SHEET TITLE

FIRST FLOOR POWER
PLAN

SHEET NUMBER

E2.1

PROJECT NO.: 0200708.00

PANELBOARD IT															
VOLTAGE: 208/120V PHASE / WIRE: 3Ø / 4W RATED AMPERAGE: 100 A MAIN: 100 A MCB SCC RATING (SYM): 10,000					CONNECTED LOAD PER PHASE A B C 4080 VA 3135 VA 2875 VA 34 A 26 A 24 A						ISOLATED GROUND BUS (Y/N): BUSSING: MOUNTING: RECESSED MCB GROUND FAULT PROTECTION (Y/N): MCB SHUNT TRIP (Y/N): MCB 100% RATED (Y/N):				N SEE SPEC SURFACE N Y N
CKT	IDENTIFICATION	TYPE (*)	BKR SIZE	POLES	A	B	C	POLES	BKR SIZE	TYPE (*)	IDENTIFICATION	CKT			
1	RCPT - COM. ROOM 182	20 A	1	360	360			1	20 A	1	RCPT - COM. ROOM 182	2			
17	ACCESS CONTROL DOOR	20 A	1			1500	360	1	20 A	1	RCPT - COM. ROOM 182	4			
18	ACCESS CONTROL DOOR	20 A	1				1600	360	1	20 A	1	RCPT - COM. ROOM 182	6		
8	ACCESS CONTROL PANEL	20 A	1	360	1000			1	20 A	1	ACCESS CONTROL PANEL	8			
9	DUCTLESS SPLIT SYSTEM (CU-1/DSU-1)	25 A	2			915	360	915	0	1	20 A	1	RCPT - COM. ROOM 182	10	
11	SPARE	20 A	1						1	20 A	1	SPARE	12		
13	CCTV	20 A	1	1000	1000				1	20 A	1	FIRE ALARM CONTROL PANEL	14		
15	SPARE	20 A	1			0	0		1	20 A	1	SPARE	16		
17	SPARE	20 A	1					0	0	1	20 A	1	SPARE	18	
19	SPARE	20 A	1	0	0				1	20 A	1	SPARE	20		
21	SPARE	20 A	1			0	0		1	20 A	1	SPARE	22		
23	SPARE	20 A	1					0	0	1	20 A	1	SPARE	24	
25	SPACE	--	--		0	0			--	--	SPACE	26			
27	SPACE	--	--				0	0		--	--	SPACE	28		
29	SPACE	--	--					0	0	--	--	SPACE	30		
Load Classification					Connected Load		Demand Factor		Demand Load		PANEL TOTALS				
Motor					1830 VA		125.00%		2288 VA		TOTAL CONNECTED LOAD: 10090 VA				
Receptacle					3660 VA		100.00%		3660 VA		TOTAL DEMAND: 10548 VA				
Other Non-Continuous Load					4600 VA		100.00%		4600 VA		TOTAL CONNECTED CURRENT: 28 A				
											TOTAL DEMAND CURRENT: 29 A				
NOTES:															
1. ALL BREAKERS ARE STANDARD UNLESS OTHERWISE NOTED															
2. (*) NUMBER INDICATES BREAKER TYPE: 1 = AFCI, 2 = CLASS A 5mA GFCI, 3 = 30mA GFPE, 4 = SHUNT TRIP ACTIVATED, 5 = PANELBOARD FEEDER SERVING UNIT SHALL BE LOCKABLE USING A PADLOCK, IN ACCORDANCE WITH OSHA LOCK-OUT-TAG RULES, 6 = LSI, 7 = LSIIG.															

PANELBOARD EQP														
VOLTAGE:		208/120V		CONNECTED LOAD PER PHASE					ISOLATED GROUND BUS (Y/N):				SEE SPEC	
PHASE / WIRE		3Ø / 4W		PHASE					BUSSING:				SEE SPEC	
RATED AMPERAGE		225 A		A					MOUNTING:				SURFACE	
MAIN:		225 A MLO		8854 VA					MCB GROUND FAULT PROTECTION (Y/N):				N	
SCC RATING (SYM):		22,000		74 A					MCB SHUNT TRIP (Y/N):				N	
				108 A					MCB 100% RATED (Y/N):				N	
CKT	IDENTIFICATION	TYPE (*)	BKR SIZE	POLES	A	B	C	POLES	BKR SIZE	TYPE (*)	IDENTIFICATION	CKT		
1	RCPT - LAB RECEP 148	20 A	1		180	1000		1	20 A	2	REFRIGERATOR - LAB 186	2		
3	FRIDGE - STAFF LOUNGE 102	2	20 A	1		1000	1000	1	20 A	2	REFRIGERATOR - LAB 186	4		
5	REFRIGERATOR - LAB 117	2	20 A	1			1000	1000	1	20 A	2	REFRIGERATOR - LAB 172	6	
7	REFRIGERATOR - LAB 117	2	20 A	1	1000	1000			1	20 A	2	REFRIGERATOR - LAB 172	8	
9	REFRIGERATOR - LAB 118	2	20 A	1		1000	1000		1	20 A	2	REFRIGERATOR - LAB 156	10	
11	NAT GAS SOLENOID VALVE	50 A	1				3240	1000	1	20 A	2	REFRIGERATOR - LAB 156	12	
13	REFRIGERATOR - LAB 118	2	20 A	1	1000	240			1	15 A	1	HEAT EXCHANGER (HX1)	14	
15	HEAT EXCHANGER (HX2)	15 A	1			240	52		1	15 A	1	CIRC. PUMP (HWCP1)	16	
17	BOILER (B-1)	20 A	1				1920	52	1	15 A	1	CIRC. PUMP (HWCP2)	18	
19	BOILER (B-2)	20 A	1	1920	200				1	20 A	1	EM. GAS SHUTOFF SWITCH	20	
21	PUMP (HWP-1)	20 A	1			1656	901					JOCKEY PUMP (JP1)	22	
23	PUMP (HWP-2)	20 A	1				1656	901	3	20 A			24	
25	DOMESTIC WATER BOOSTER PUMP (DWB1)	30 A	3	2005	901				1	20 A	1	SPARE	26	
27	SPARE	20 A	1			2005	0		1	20 A	1	SPARE	28	
29	SPARE	20 A	1	0	0		2005	0	1	20 A	1	SPARE	30	
31	SPARE	20 A	1			0	0		1	20 A	1	SPARE	32	
33	SPARE	20 A	1			0	0		1	20 A	1	SPARE	34	
35	SPARE	20 A	1			0	0	0	1	20 A	1	SPARE	36	
37	SPARE	20 A	1	0	360				3	60 A		PANEL EPH	38	
39	SPARE	20 A	1			0	0						40	
41	SPARE	20 A	1				0	0					42	
Load Classification		Connected Load		Demand Factor		Demand Load		PANEL TOTALS						
Motor		12134 VA		112.39%		13638 VA		TOTAL CONNECTED LOAD: 31434 VA						
HVAC		4320 VA		100.00%		4320 VA		TOTAL DEMAND: 32168 VA						
Receptacle		11540 VA		93.33%		10770 VA		TOTAL CONNECTED CURRENT: 87 A						
Other Non-Continuous Load		3440 VA		100.00%		3440 VA		TOTAL DEMAND CURRENT: 89 A						

PANELBOARD LS															
VOLTAGE:		208/120V		CONNECTED LOAD PER PHASE						ISOLATED GROUND BUS (Y/N):				N	
PHASE / WIRE		3Ø / 4W		PHASE						BUSSING:				SEE SPEC	
RATED AMPERAGE		60 A		A		B		C		MOUNTING:				SURFACE	
MAIN:		60 A MLO								MCB GROUND FAULT PROTECTION (Y/N):				N	
SCC RATING (SYM):		10,000		2265 VA		2073 VA		1299 VA		MCB SHUNT TRIP (Y/N):				N	
				20 A		18 A		11 A		MCB 100% RATED (Y/N):				N	
CKT	IDENTIFICATION	TYPE (*)	BKR SIZE	POLES	A		B		C		POLES	BKR SIZE	TYPE (*)	IDENTIFICATION	CKT
1	EMERGENCY LIGHTING	20 A	1	1578	500						1	20 A		GEN. BATTERY CHARGER	2
3	EMERGENCY LIGHTING	20 A	1			1073	1000				2	20 A		ENGINE GENERATOR BLOCK HEATER	4
5	EXTERIOR LIGHTING	20 A	1					299	1000		1	20 A		RCPT - GENERATOR	6
7	OBSTRUCTION LIGHT	20 A	1	7	180						1	20 A		SPARE	8
9	SPARE	20 A	1			0	0				1	20 A		SPARE	10
11	SPARE	20 A	1					0	0	1	20 A			SPARE	12
13	SPARE	20 A	1	0	0						1	20 A		SPARE	14
15	SPARE	20 A	1			0	0				1	20 A		SPARE	16
17	SPARE	20 A	1					0	0	1	20 A			SPARE	18
19	SPACE	--	--	--	0	0					--	--	--	SPACE	20
21	SPACE	--	--	--		0	0				--	--	--	SPACE	22
23	SPACE	--	--	--				0	0		--	--	--	SPACE	24
25	SPACE	--	--	--	0	0					--	--	--	SPACE	26
27	SPACE	--	--	--			0	0			--	--	--	SPACE	28
29	SPACE	--	--	--				0	0		--	--	--	SPACE	30
Load Classification				Connected Load		Demand Factor		Demand Load		PANEL TOTALS					
Lighting - Continuous				2957 VA		125.00%		3696 VA		TOTAL CONNECTED LOAD: 5637 VA					
Receptacle				180 VA		100.00%		180 VA		TOTAL DEMAND: 537 VA					
Other Non-Continuous Load				2500 VA		100.00%		2500 VA		TOTAL CONNECTED CURRENT: 16 A					
										TOTAL DEMAND CURRENT: 18 A					
NOTES:															
1. ALL BREAKERS ARE STANDARD UNLESS OTHERWISE NOTED															
2. (*) NUMBER INDICATES BREAKER TYPE: 1 = AFCI, 2 = CLASS A 5mA GFCI, 3 = 30mA GFCPE, 4 = SHUNT TRIP ACTIVATED, 5 = PANELBOARD FEEDER SERVING UNIT SHALL BE LOCKABLE USING A PADLOCK, IN ACCORDANCE WITH OSHA LOCK-OUT-TAG RULES, 6 = LSI, 7 = LSG.															

SECTION 26 0540 - DIRECTIONAL BORING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications, apply to this section.

1.2. SUMMARY

- A. Section Includes:

- 1. The work specified in this section consists of furnishing and installing underground utilities using the directional boring (horizontal directional drilling, HDD) method of installation, also commonly referred to as guided horizontal boring. This work shall include all services, equipment, materials, and labor for the complete and proper installation, testing, restoration of underground utilities and environmental protection and restoration.

1.3. QUALITY ASSURANCE

- A. The requirements set forth in this document specify a wide range of procedural precautions necessary to insure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification. Adherence to the specifications contained herein, or the Engineer's approval of any aspect of any directional bore operations covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract.

1.4. SUBMITTALS

- A. Coordination:

- 1. Prior to beginning work, the Contractor must submit to the Architect a general work plan outlining the procedure and schedule to be used to execute the project. The plan shall document the thoughtful planning required to successfully complete the project.

- B. Equipment:

- 1. The Contractor shall submit specifications on directional boring equipment to be used to ensure that the equipment will be adequate to complete the project. Spares inventory shall be included.

- C. Product Data:

- 1. Submit to the Architect product data on material to be used. Product data shall include the pipe, pipe fittings and any other item which is to be an installed component of the project.

- D. Qualifications:

- 1. Documentation of training and relevant experience of personnel operating the equipment shall be submitted.

PART 2 PRODUCTS

2.1. GENERAL

- A. The directional boring equipment shall consist of a directional boring rig of sufficient capacity to perform the bore and pullback the pipe, a boring fluid mixing and delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide the boring operation and trained, competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in a good working order for the duration of the project.

2.2. BORING SYSTEM

- A. Boring Rig:

1. The directional boring machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand all pulling, pushing and rotating pressures required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power boring operations. The hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during boring and pull-back operations. Sufficient spares shall be kept on hand for any break downs which can be reasonably anticipated.
- B. Bore Head:
 1. The bore head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and boring fluid jets.
- C. Mud Motors (if required):
 1. Mud motors shall be of adequate power to turn the required boring tools.
- D. Drill Pipe:
 1. Shall be constructed of high quality 4130 seamless tubing, grade D or better, with threaded box and pins. Tool joints should be hardened to 32 to 36 RC.
- 2.3. GUIDANCE SYSTEM
 - A. The guidance system shall be of a proven type and shall be setup and operated by personnel trained and experienced with the system. The operator shall be aware of any magnetic anomalies and shall consider such influences in the operation of the guidance system if using a magnetic system.
- 2.4. BORING FLUID (MUD) SYSTEM
 - A. Mixing System:
 1. A self-contained, closed, boring fluid mixing system shall be of sufficient size to mix and deliver boring fluid composed of bentonite clay, potable water and appropriate additives. Mixing system shall be able to molecularly shear individual bentonites particles from the dry powder to avoid clumping and ensure thorough mixing. Mixing system shall continually agitate the boring fluid during boring operations.
 - B. Boring Fluids:
 1. Drilling fluid shall be composed of clean water and an appropriate additive. Water shall be from a clean source with a pH of 8.5 - 10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No hazardous additives may be used. Boring fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall.
 - C. Delivery System:
 1. The delivery system shall have liters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used boring fluid and boring fluid spilled during boring operations shall be contained and properly disposed of. A berm, minimum of 12" high, shall be maintained around boring equipment, boring fluid mixing system, entry and exit pits and boring fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey excess boring fluid from containment areas to storage facilities.
- 2.5. OTHER EQUIPMENT
 - A. Pipe Rollers:

1. Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe.
- B. Pipe Rammers/Pullers
 1. Hydraulic or pneumatic pipe rammers or pullers may only be used if necessary and with the authorization of Engineer.
- C. Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the project.

PART 3 EXECUTION

3.1. GENERAL

- A. The Owners Representative must be notified 48 hours in advance of starting work. The Directional Bore shall not begin until the Owners Representative is present at the job site and agrees that proper preparations for the operation have been made. The Owners Representative's approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract. It shall be the responsibility of the Owners Representative to provide inspection personnel at such times as appropriate without causing undue hardship by reason of delay to the Contractor.

3.2. PERSONNEL REQUIREMENTS

- A. All personnel shall be fully trained in their respective duties as part of the directional boring crew and in safety. Training shall be provided specific to the project if any potential hazards may be encountered which has not already been included in personnel's training.

3.3. BORING PROCEDURE

- A. Site Preparation:
 1. Prior to any alterations to work-site, contractor shall photograph or video tape entire work area, including entry and exit points. One copy of which shall be given to Engineer and one copy to remain with contractor for a period of one year following the completion of the project. Work site as indicated on drawings, within right-of-way, shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.
- B. Bore Path Survey:
 1. Entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If contractor is using a magnetic guidance system, drill path will be surveyed for any surface geomagnetic variations or anomalies.
- C. Environmental Protection:
 1. Contractor shall place silt fence between all boring operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or boring fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations. Fuel or oil may not be stored in bulk containers within 200' of any water-body or wet-land.
- D. Utility Locates:
 1. Contractor shall notify all companies with underground utilities in the work area via the state or local "one-call" to obtain utility locates. Once the utilities have been located Contractor shall

physically identify the exact location of the utilities by vacuum or hand excavation, when possible, in order to determine the actual location and path of any underground utilities which might be within 20 feet of the bore path. Contractor shall not commence boring operations until the location of all underground utilities within the work area have been verified.

E. Safety:

1. Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to Engineer.

F. Pipe:

1. Pipe shall be connected together in one length prior to pull-back operations, if space permits. Steel pipe welds will be X-rayed prior to being placed in bore hole. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe.

G. Pilot Hole:

1. Pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100'. In the event that pilot does deviate from bore path more than 5% of depth in 100', contractor will notify Engineer and Engineer may require contractor to pull-back and re-drill from the location along bore path before the deviation. In the event that a boring fluid fracture, inadvertent returns or returns loss occurs during pilot hole boring operations, contractor shall cease boring, wait at least 30 minutes, inject a quantity of boring fluid with a viscosity exceeding 120 seconds as measured by Marsh funnel and then wait another 30 minutes. If mud fracture or returns loss continues, contractor will cease operations and notify Engineer. Engineer and contractor will discuss additional options and work will then proceed accordingly.

H. Reaming:

1. Upon successful completion of pilot hole, contractor will ream bore hole to a minimum of 25% greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the boring equipment and mud system are designed to safely handle.

I. Pull-back:

1. After successfully reaming bore hole to the required diameter, contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations contractor will not apply more than the maximum safe pipe pull pressure at any time. In the event that pipe becomes stuck, contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, contractor will notify Engineer. Engineer and contractor will discuss options and then work will proceed accordingly.

3.4. PIPE TESTING

- A. Following successful pull-back of pipe, contractor will hydro-test pipe using potable water for a period of 2 hours at a pressure of 100 psi. A calibrated pressure recorder will be used to record the pressure during the test period. This record will be presented to Engineer.
- B. After successful completion of hydro-test, pipe will pigged dry.

3.5. SITE RESTORATION

- A. Following boring operations, contractor will de-mobilize equipment and restore the work-site to original condition. All excavations will be backfilled and compacted to 95% of original density. Landscaping will be restored to original and sufficiently match that of surrounding areas.

3.6. RECORD KEEPING, AS-BUILTS

- A. Contractor shall maintain a daily project log of boring operations and a guidance system log with a copy given to Engineer at completion of project. As-built drawings shall be certified as to accuracy by contractor. Third-party verification of as-built drawings may be done, at owner's expense.

END OF SECTION