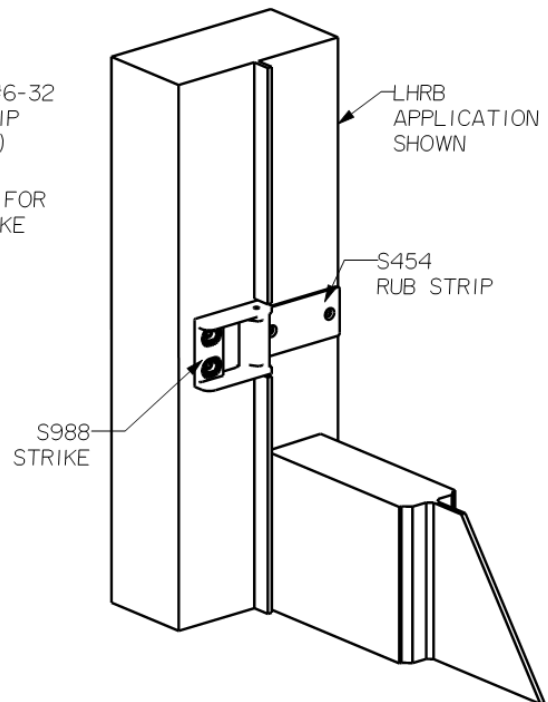
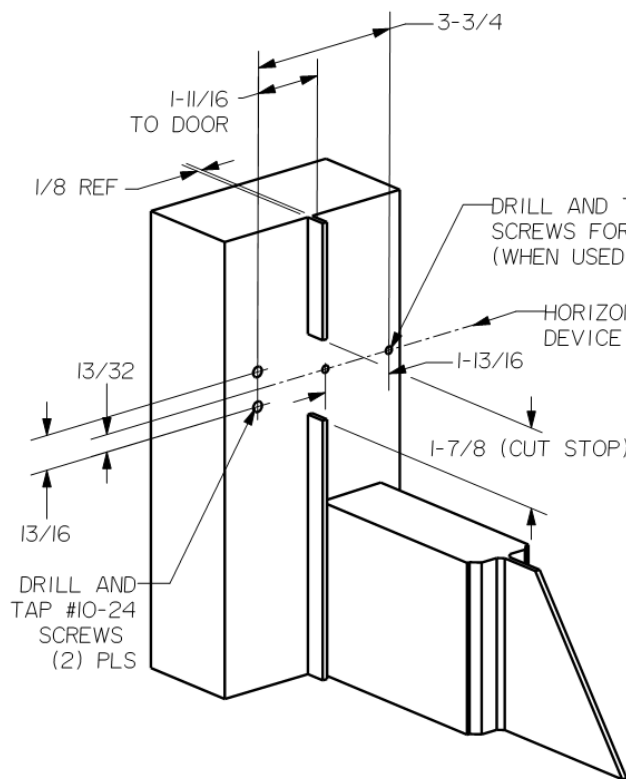




APPENDIX C – WCPSS PROVIDED STANDARD DETAILS

2019 Edition

S988 STRIKE AND RUB STRIP INSTRUCTIONS

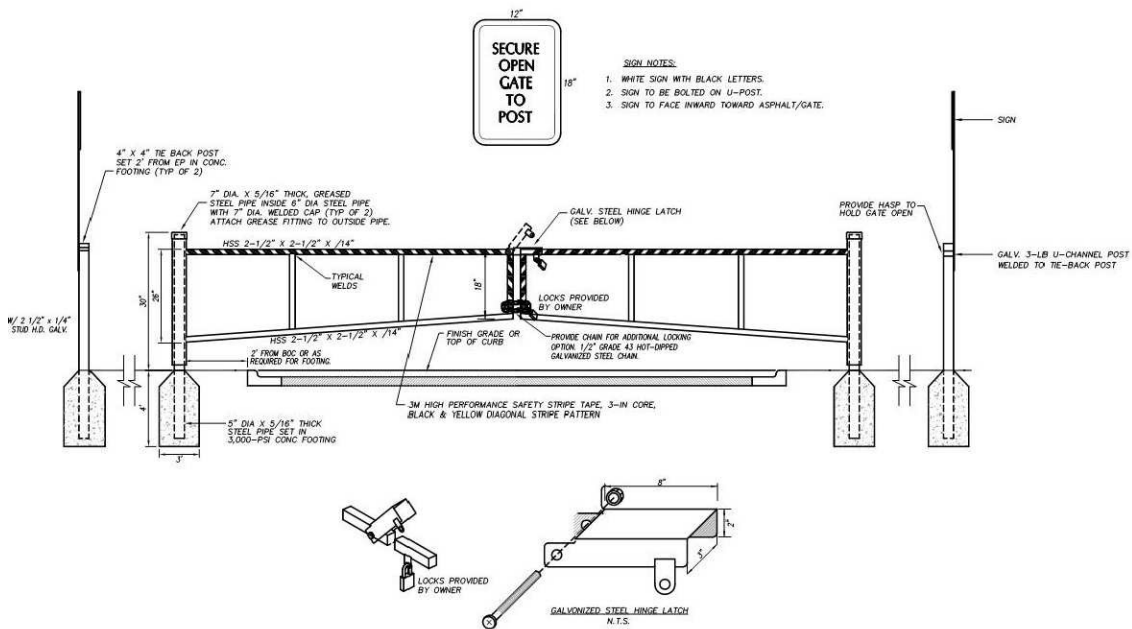


STANLEY

DRWG 01795-11-000 DATE 4/15/03 REVISION A

phi

Precision Hardware
a Division of Stanley Security Solutions, Inc.
www.stanleysecuritysolutions.com

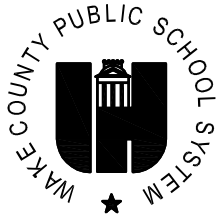


PAINING SPECIFICATIONS:

1. MANUFACTURER: THEMEC COMPANY, INC.; CARY, NC (919-859-3737)
2. SYSTEM TYPE: EPOXY-POLYURETHANE
3. SURFACE PREPARATION: SSPV-SP AND BRUSH OFF BLAST CLEAN
4. PRIMER: SERIES 27 (FIELD-COATED) TYPOLXY OR 69 HI-BUILD EPOXOLINE
5. FINISH PAINT: SERIES 73 ENDURA-SHIELD, SEMI-GLOSS, COLOR = SAFETY YELLOW
6. CONTRACTOR TO COORDINATE WITH LOCAL FIRE MARSHAL TO DETERMINE IF KNOX BOX/KNOX LOCK IS REQUIRED. INSTALL AS DIRECTED.

NOTES:

1. ALL STEEL SHALL BE HOT-DIPPED GALVANIZED
2. SUBMIT SHOP DRAWING FOR REVIEW AND APPROVAL PRIOR TO FABRICATION AND ASSEMBLY.
3. ENSURE GATE LEAFS ARE PROPERLY SPACED SO LOCKING FLANGES ON HINGE LATCH ASSEMBLY ALIGN.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE REQUIRED FENCE LENGTHS BASED ON EXISTING CONDITIONS.

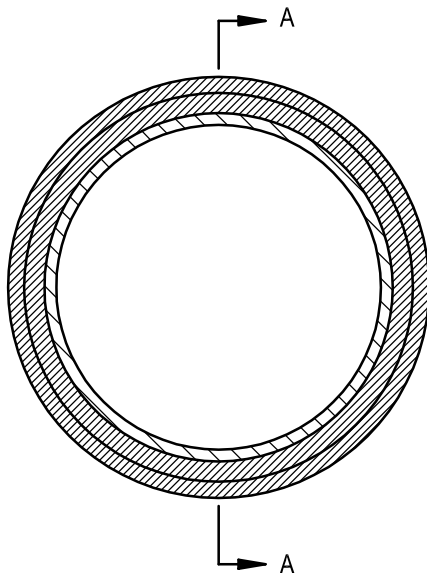


WAKE COUNTY PUBLIC SCHOOL SYSTEM

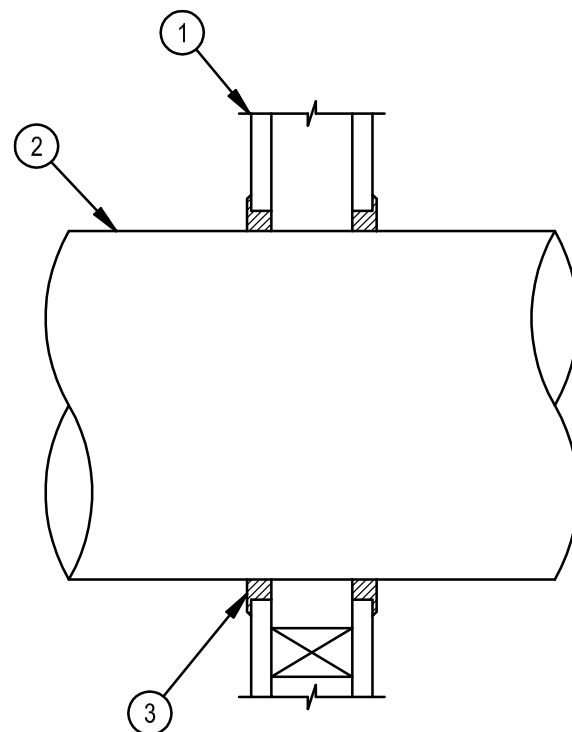
1429 Rock Quarry Road, Suite 116
Raleigh, NC 27610
(919) 588-3608

U.L. SYSTEM NO. WL1052
METAL PIPE THROUGH 1-HR. GYPSUM WALL
F RATING = 1-HR.
T RATING = 0-HR.

FRONT VIEW



SECTION A-A



1. 1-HR. FIRE-RATED GYPSUM WALL ASSEMBLY.
2. 10" DIA. (OR SMALLER) STEEL PIPE, 4" DIA. (OR SMALLER) COPPER PIPE, EMT OR CONDUIT.
3. MIN. 5/8" DEPTH HILTI FS 601.

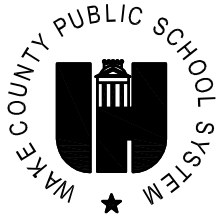
NOTE: NOMINAL ANNULAR SPACE OF 1/4" TO 1" REQUIRED

SEE HILTI FIRESTOP INSTALLATION MANUAL FOR ADDITIONAL INSTRUCTIONS
HILTI, INC. TULSA, OK 1-800-879-8000

P1.01

1-HR GYPSUM WALL U.L. DETAIL

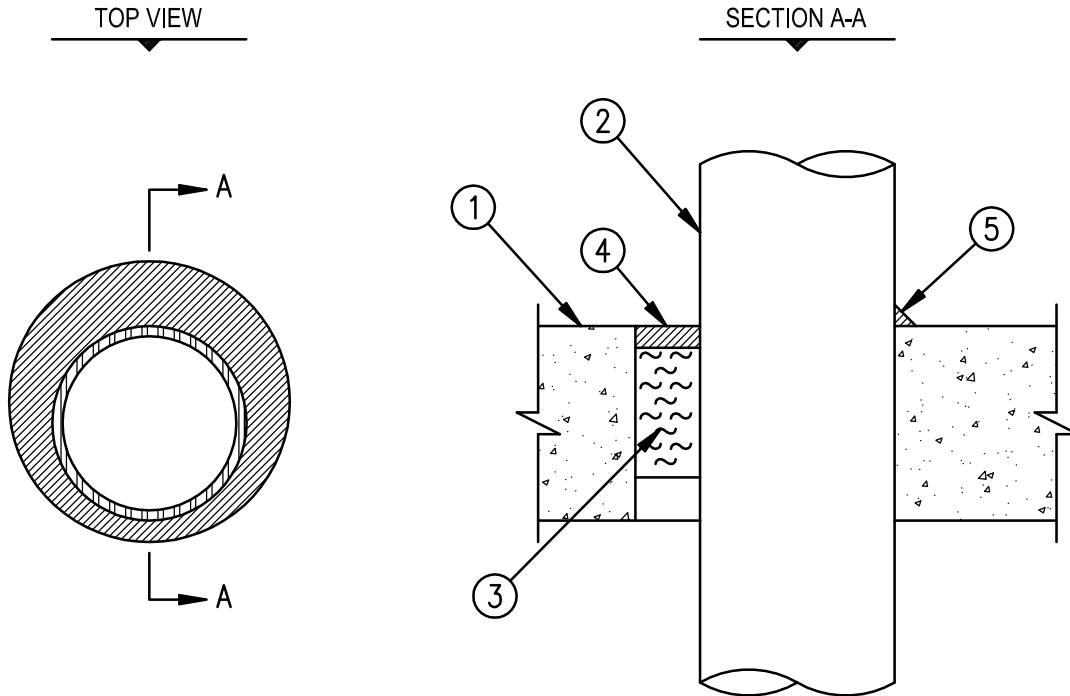
SCALE: NONE



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U.L. SYSTEM NO. CAJ1149
METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL
F RATING = 2-HR.
T RATING = 0-HR.



1. A. MIN. 4-1/2" THICK CONCRETE FLOOR.
B. MIN. 4-1/2" THICK CONCRETE WALL.
C. ANY U.L. CLASSIFIED CONCRETE BLOCK WALL.
2. 4" DIA. (OR SMALLER) STEEL PIPE, COPPER PIPE, EMT, OR CONDUIT.
3. MIN. 3" THICK MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
4. MIN. 1/2" DEPTH HILTI FS 601 FIRESTOP SEALANT.
5. 1/2" BEAD HILTI FS 601 FIRESTOP SEALANT.

NOTE:

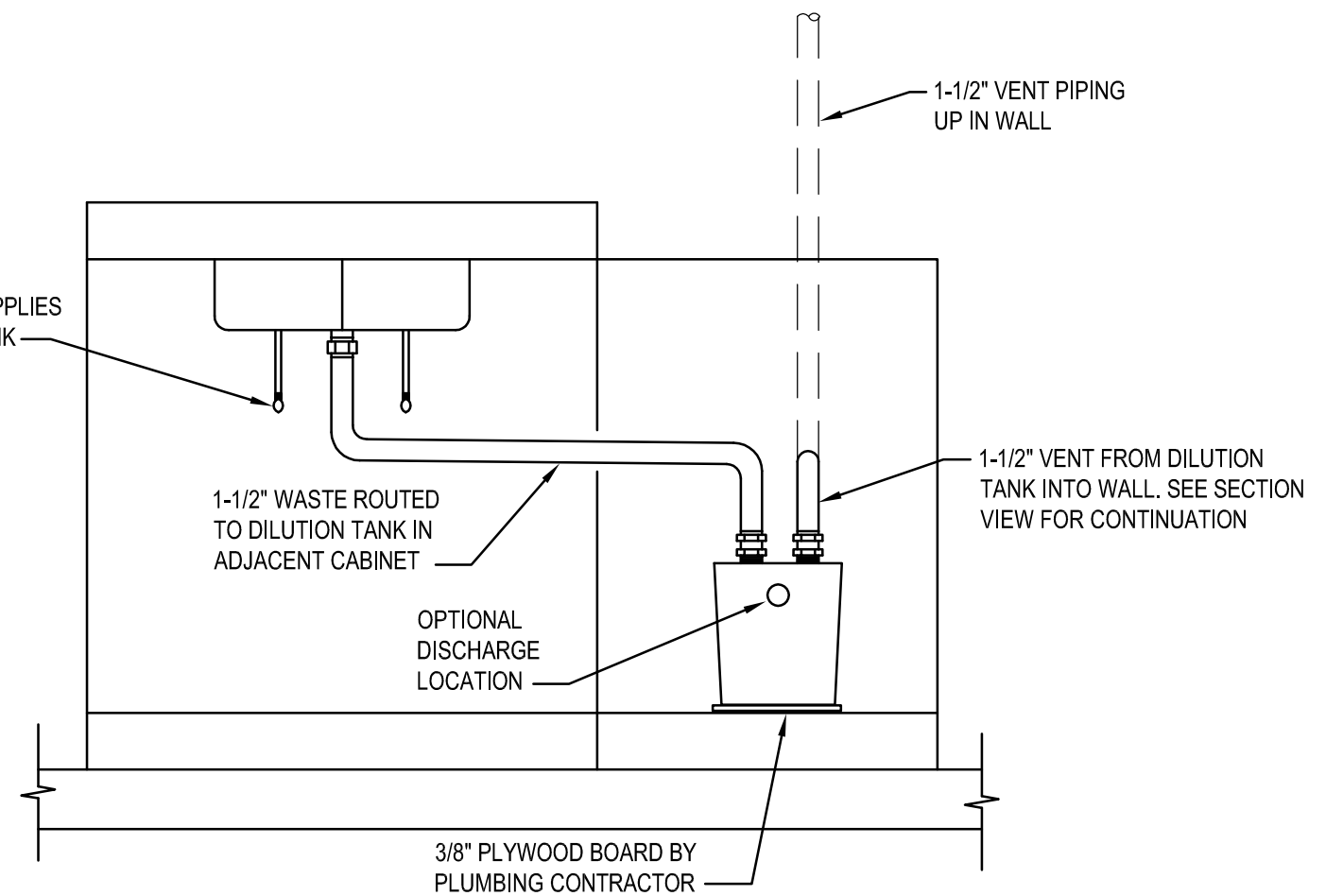
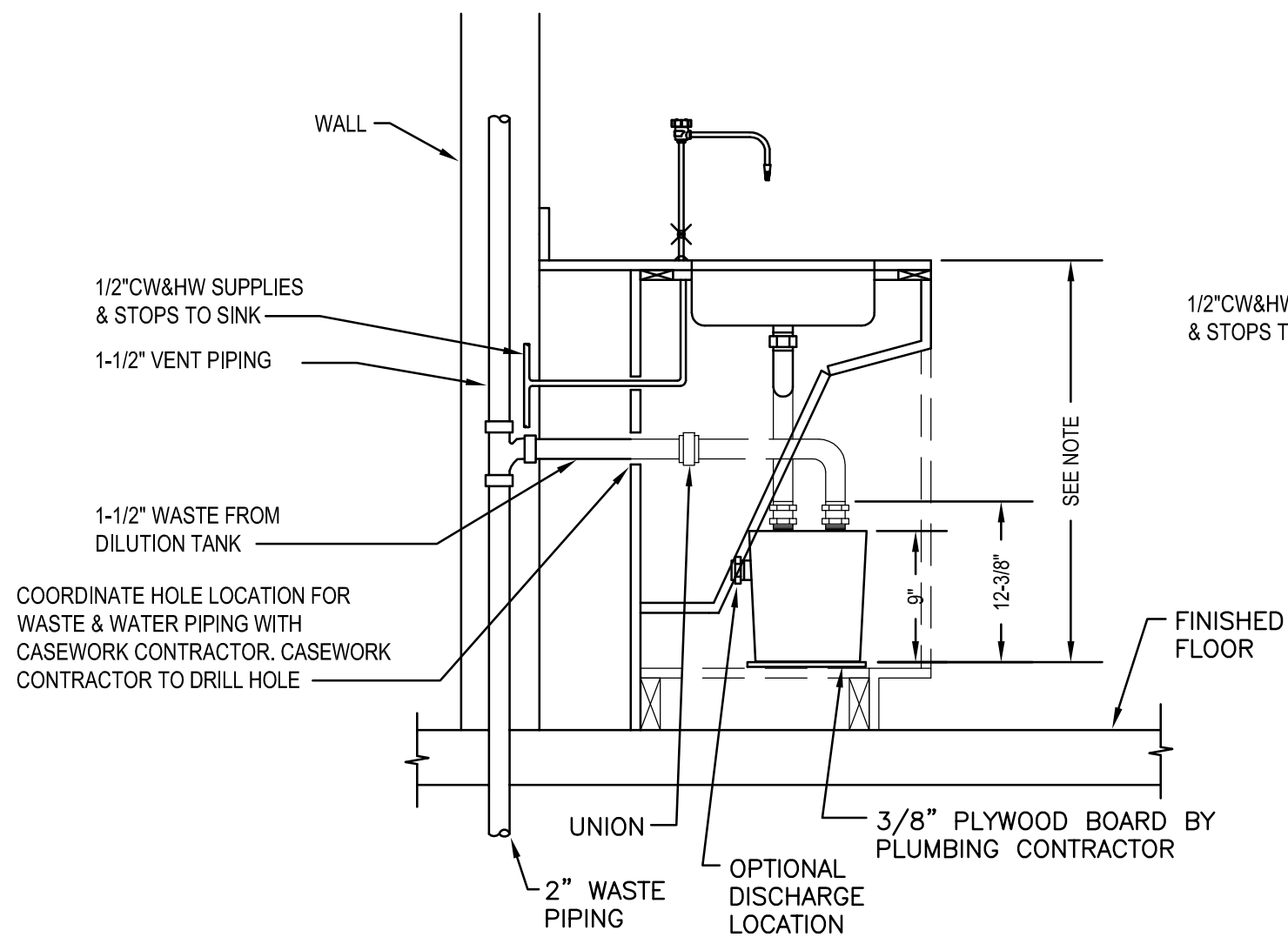
1. MAXIMUM DIAMETER OF OPENING = 6".
2. ANNULAR SPACE = MIN. 0" (POINT CONTACT), MAX. 2".
3. WALLS REQUIRE 1/2" OF SEALANT FLUSH WITH BOTH SIDES.

SEE HILTI FIRESTOP INSTALLATION MANUAL FOR ADDITIONAL INSTRUCTIONS
HILTI, INC. TULSA, OK 1-800-879-8000

P1.02

2-HR CONCRETE WALL/FLR/ BLOCK WALL U.L. DETAIL

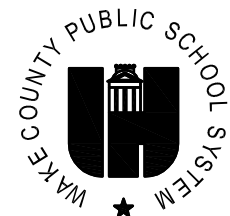
SCALE: NONE



P1.03

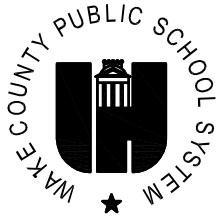
ACID DILUTION TRAP INSTALLATION DETAIL

SCALE: NONE



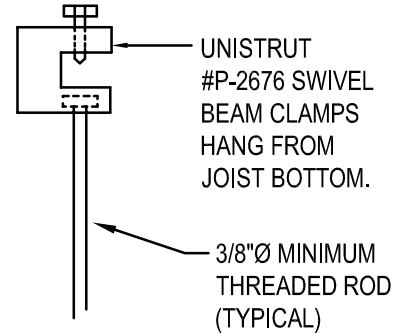
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SCHOOL SYSTEM**

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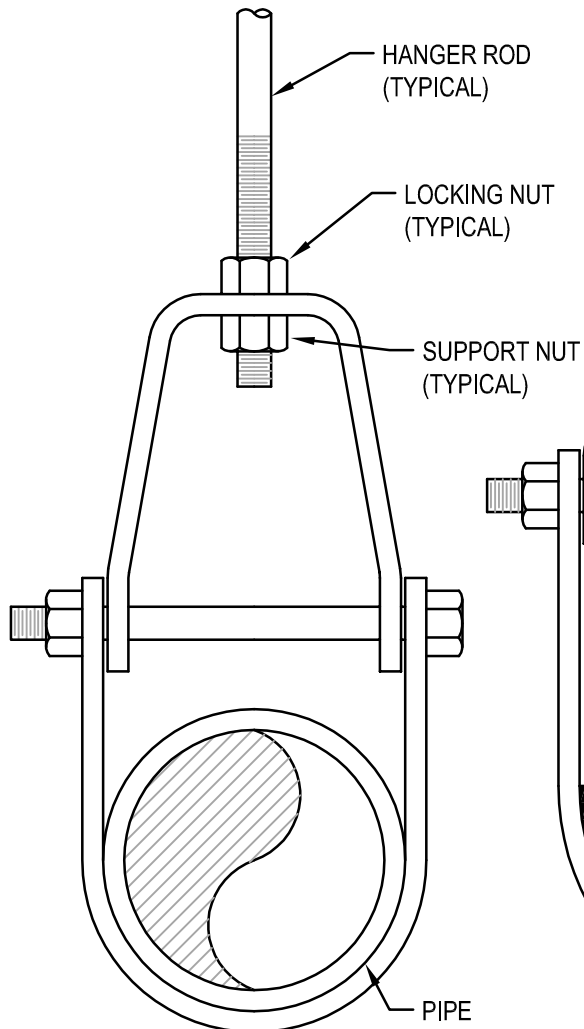
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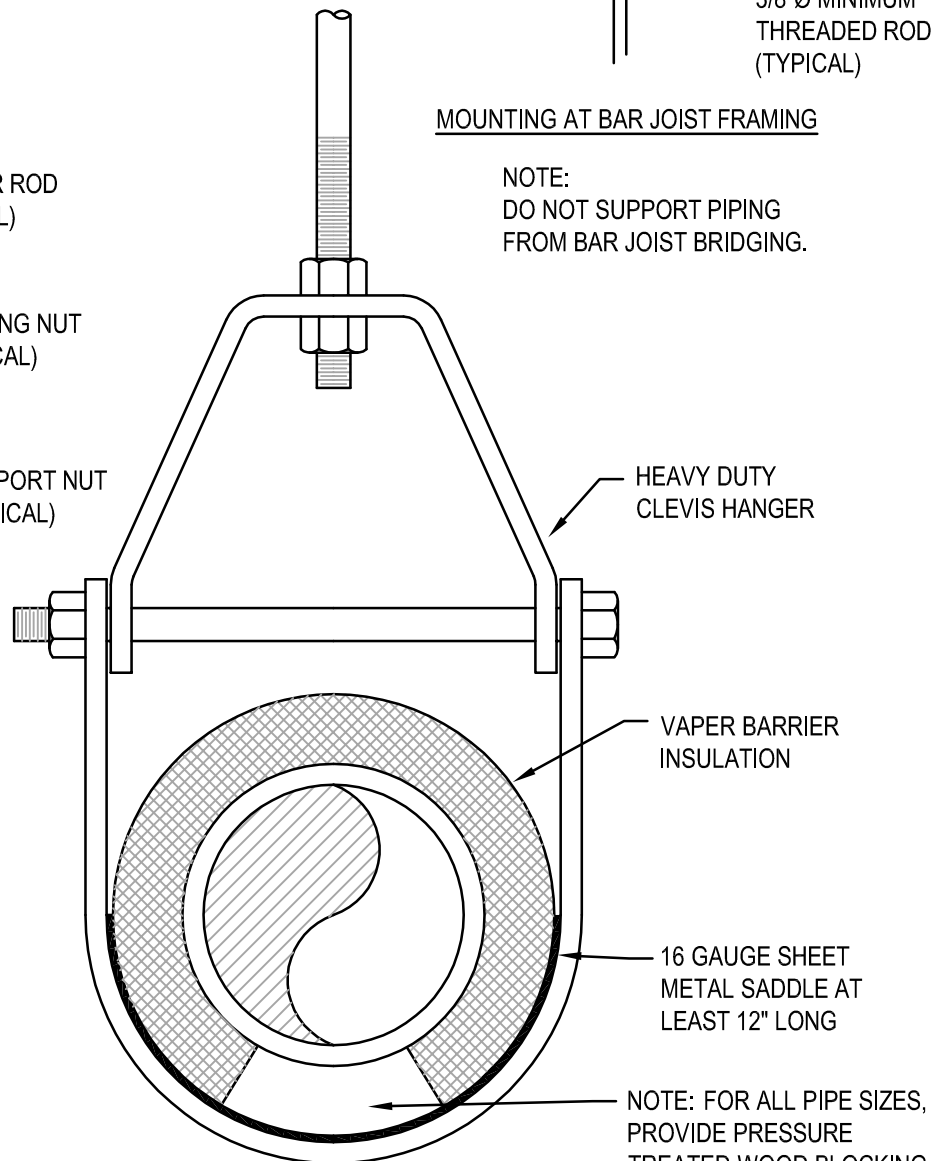


MOUNTING AT BAR JOIST FRAMING

NOTE:
DO NOT SUPPORT PIPING
FROM BAR JOIST BRIDGING.



SINGLE HORIZONTAL RUNS
NO INSULATION

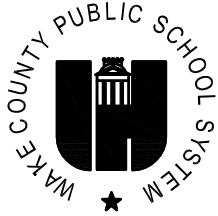


SINGLE HORIZONTAL RUNS
WITH VAPOR BARRIER INSULATION

P1.04

CLEVIS HANGER SUPPORT DETAIL

SCALE: NONE

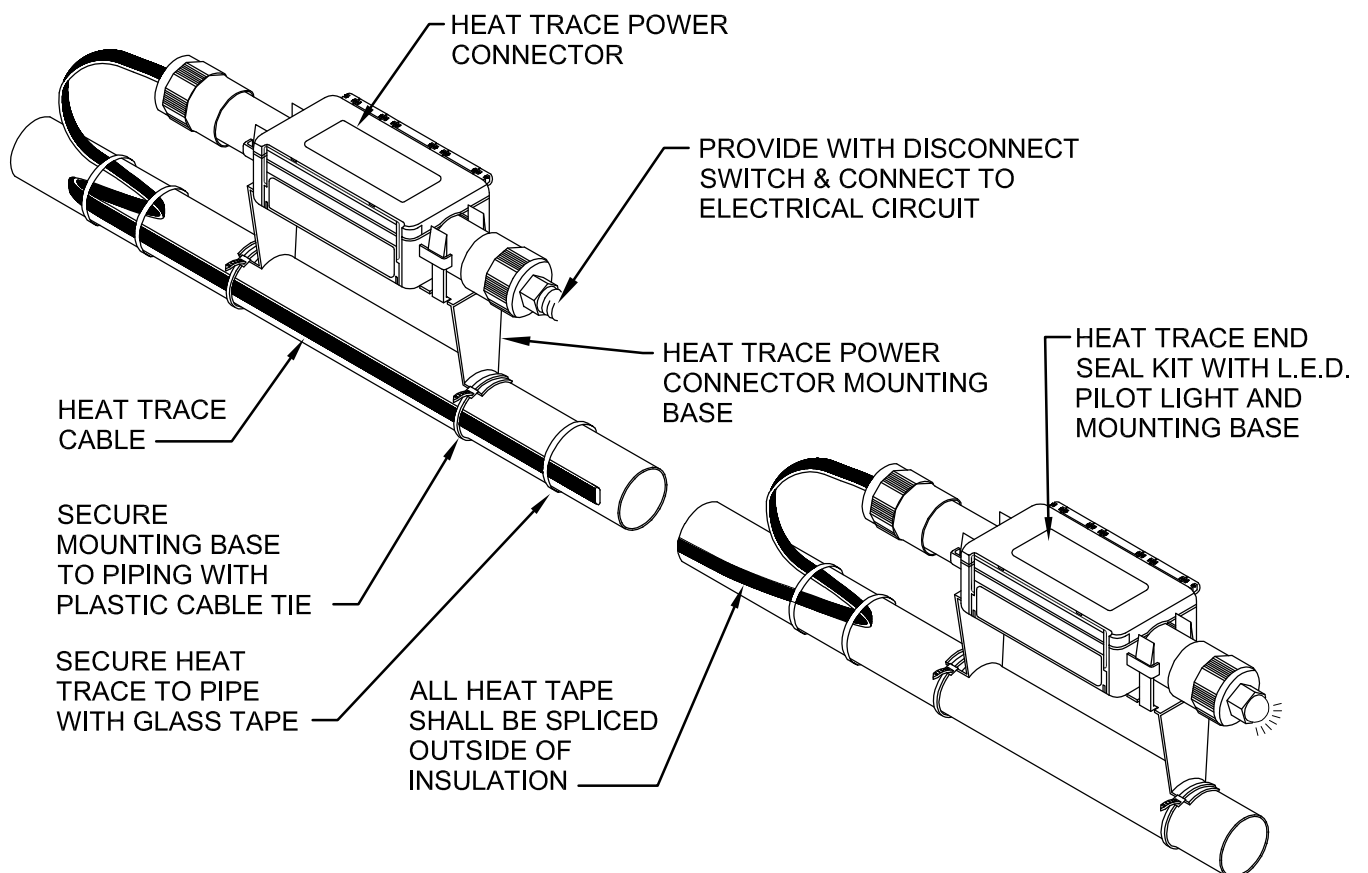


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HEAT TRACE SPECIFICATION:

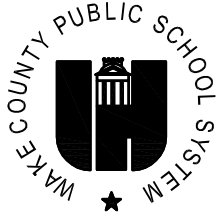
HEAT-TRACING CABLES: 5 W/FT OUTPUT. SELF-REGULATING, ELECTRIC HEATING CABLES SUITABLE FOR FREEZE PROTECTION OF METAL PIPING. CABLES: PAIR OF PARALLEL NO. 16 AWG TINNED-COPPER BUS WIRES EMBEDDED IN CROSS-LINKED CONDUCTIVE POLYMER CORE, WHICH VARIES POWER OUTPUT IN RESPONSE TO TEMPERATURE ALONG ITS LENGTH. CABLE SHALL BE CAPABLE OF CROSSING OVER ITSELF WITHOUT OVERHEATING. HEAT OUTPUT: AT LEAST 90 PERCENT OF RATING OVER A TEMPERATURE RANGE FROM 40 TO 150 DEG F PIPE TEMPERATURE. CABLE COVER: FABRICATED OF CROSS-LINKED, MODIFIED, POLYOLEFIN DIELECTRIC JACKET; WITH ULTRAVIOLET INHIBITOR. PIPE THERMOSTAT: UNIT WITH ADJUSTABLE TEMPERATURE RANGE FROM 35 TO 50 DEG F SNAP ACTION; OPEN-ON-RISE, SINGLE-POLE SWITCH WITH 25-A RATING; AND REMOTE BULB FOR DIRECTLY SENSING PIPE-WALL TEMPERATURE.



P1.05

HEAT TRACE CABLE INSTALLATION DETAIL

SCALE: NONE



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BRANCH CIRCUIT AND CONDUIT IN
ELECTRICAL WORK. SEE
PANELBOARD SCHEDULES FOR WIRE
AND BREAKER SIZES TO HVAC AND
PLUMBING EQUIPMENT.

* A COMBINATION STARTER MAY BE
USED IN LIEU OF A SEPARATE
DISCONNECT SWITCH AND STARTER.

EXTERNALLY OR INTERNALLY
MOUNTED DISCONNECT SWITCH
FURNISHED UNDER DIV. 23 WORK,
AND INSTALLED UNDER DIV. 26 WORK

EXTERNALLY MOUNTED STARTER
FURNISHED UNDER DIV. 23 WORK.
INSTALLED UNDER DIV. 26 WORK.
LINE AND LOAD CONNECTIONS
UNDER DIV. 26 WORK. CONTROL
CONNECTIONS BY OTHERS. *

JUNCTION MAY BE
SHOWN ON ELECTRICAL
PLANS FOR SOME
EQUIPMENT (NOT
NECESSARY IF WIRING IS
CONNECTED DIRECTLY
TO STARTER OR
DISCONNECT SWITCH.)

WIRING IN
ELECTRICAL WORK

PANELBOARD

WIRING IN ELECTRICAL WORK

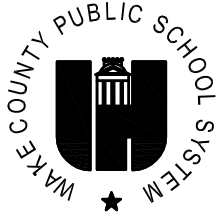
FINAL CONNECTIONS INSIDE
EQUIPMENT TO BE MADE
UNDER DIVISION 22 WORK.

EQUIPMENT IN HVAC OR PLUMBING
WORK OR WORK OF OTHER
TRADES. SEE HVAC, PLUMBING AND
ARCHITECTURAL DRAWINGS FOR
LOCATION OF ALL EQUIPMENT.

P1.06

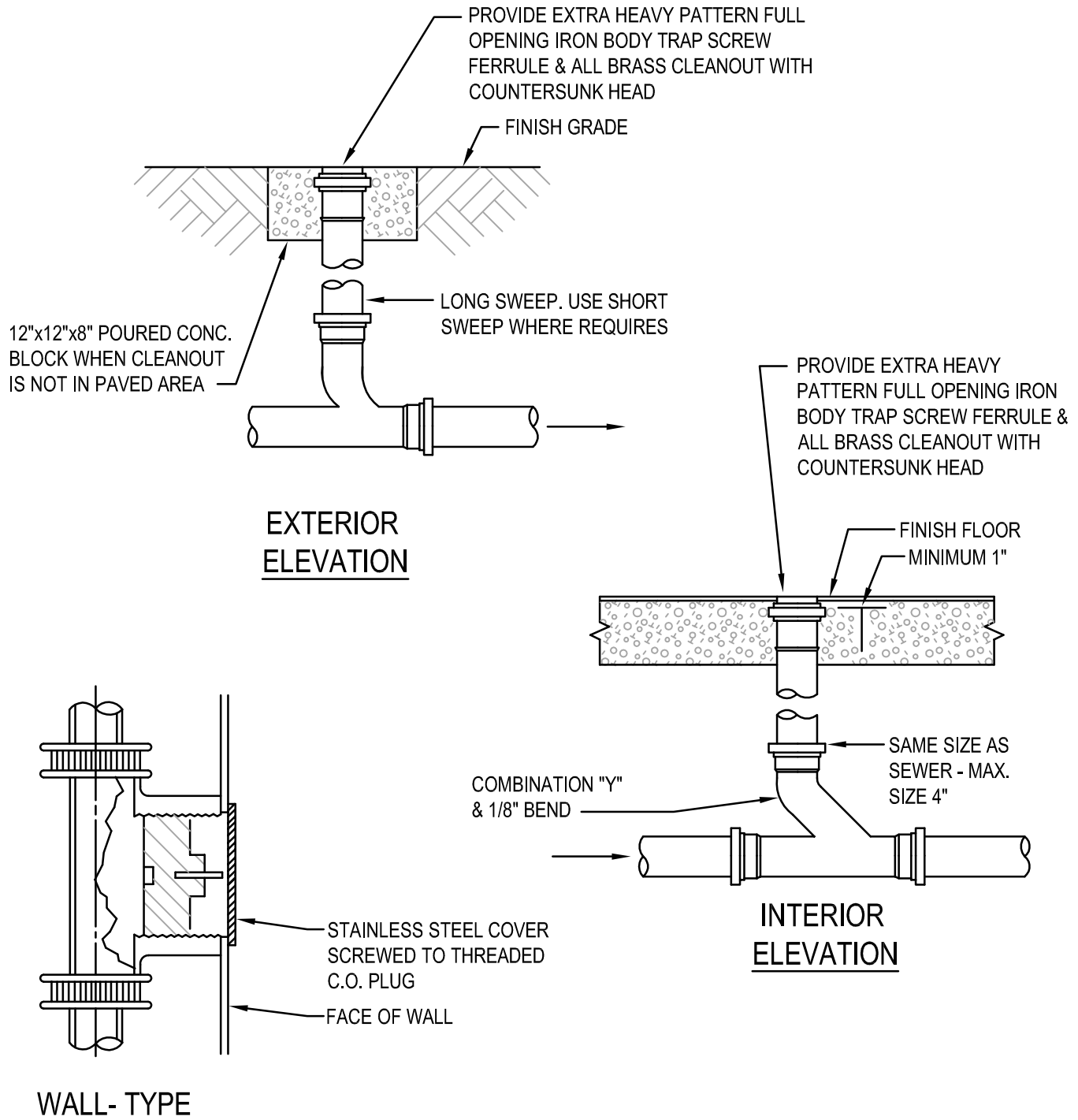
PLUMBING EQUIPMENT ELECTRICAL CONNECTION DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

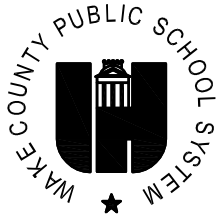
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P1.07

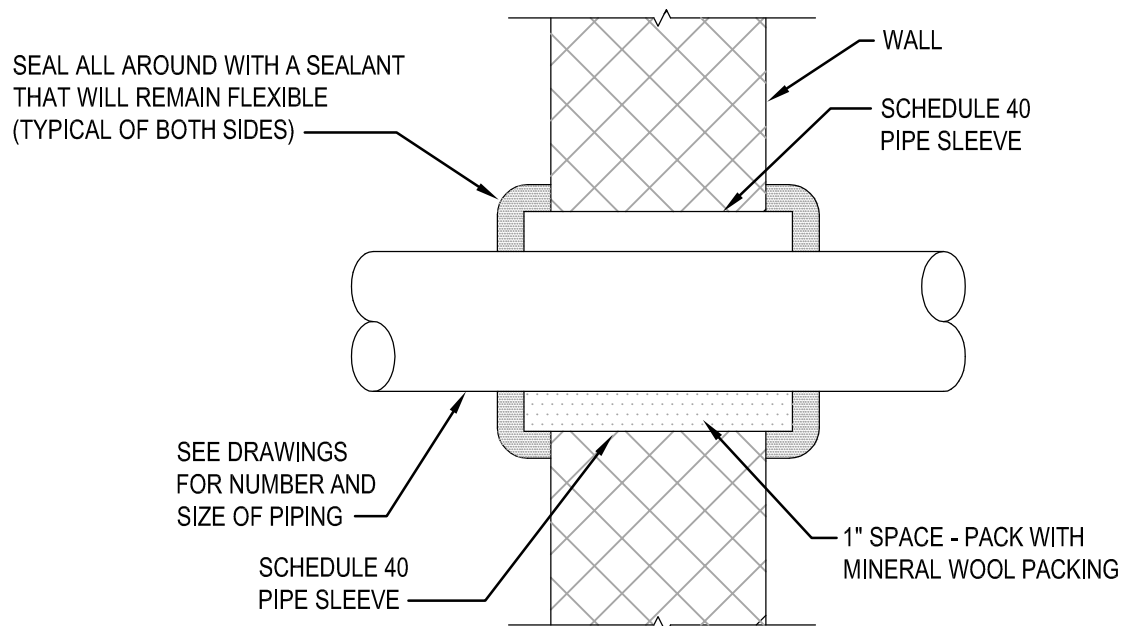
TYPICAL CLEANOUT DETAIL

SCALE: NONE



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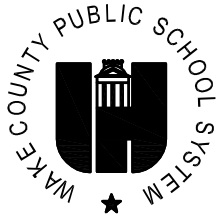
NOTES:

1. THE VOID BETWEEN FIBROUS PACKING AND SLEEVE SHALL BE FILLED WITH CAULKING MATERIAL.
2. SEE FLOOR PLANS FOR LOCATION OF ALL RATED WALLS.
3. CHROME ESCUTCHEONS TO BE PROVIDED FOR ALL EXPOSED PENETRATIONS.

P1.08

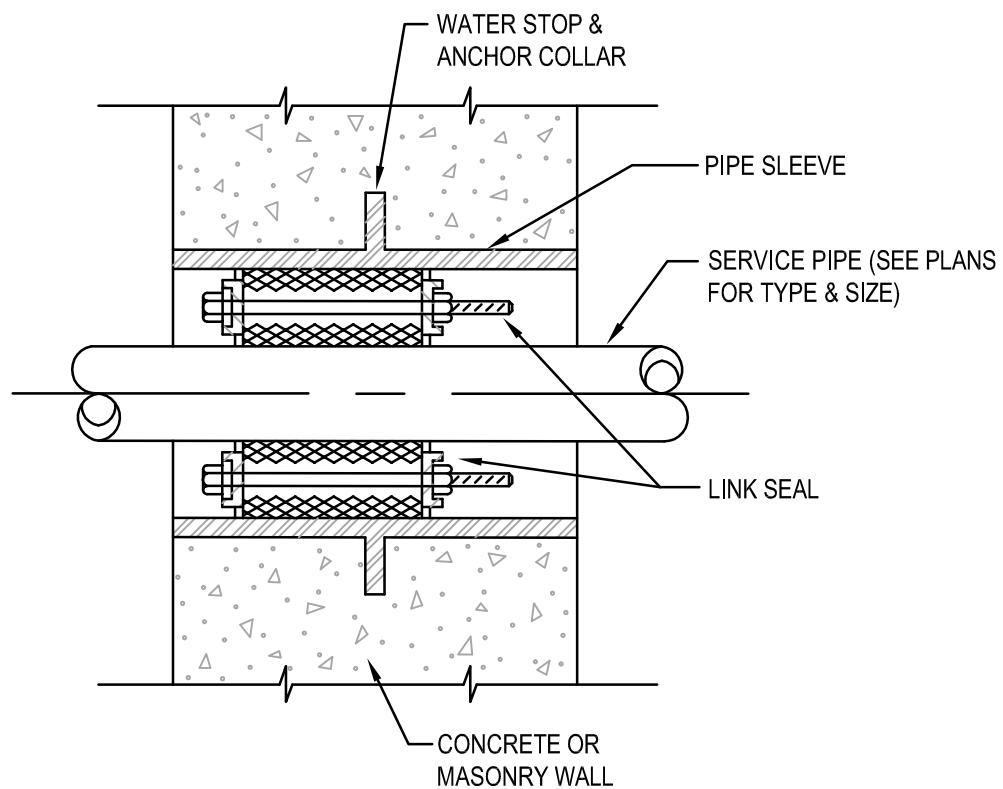
TYPICAL NON-RATED WALL PIPING SLEEVE DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

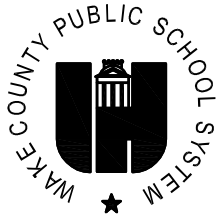
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P1.09

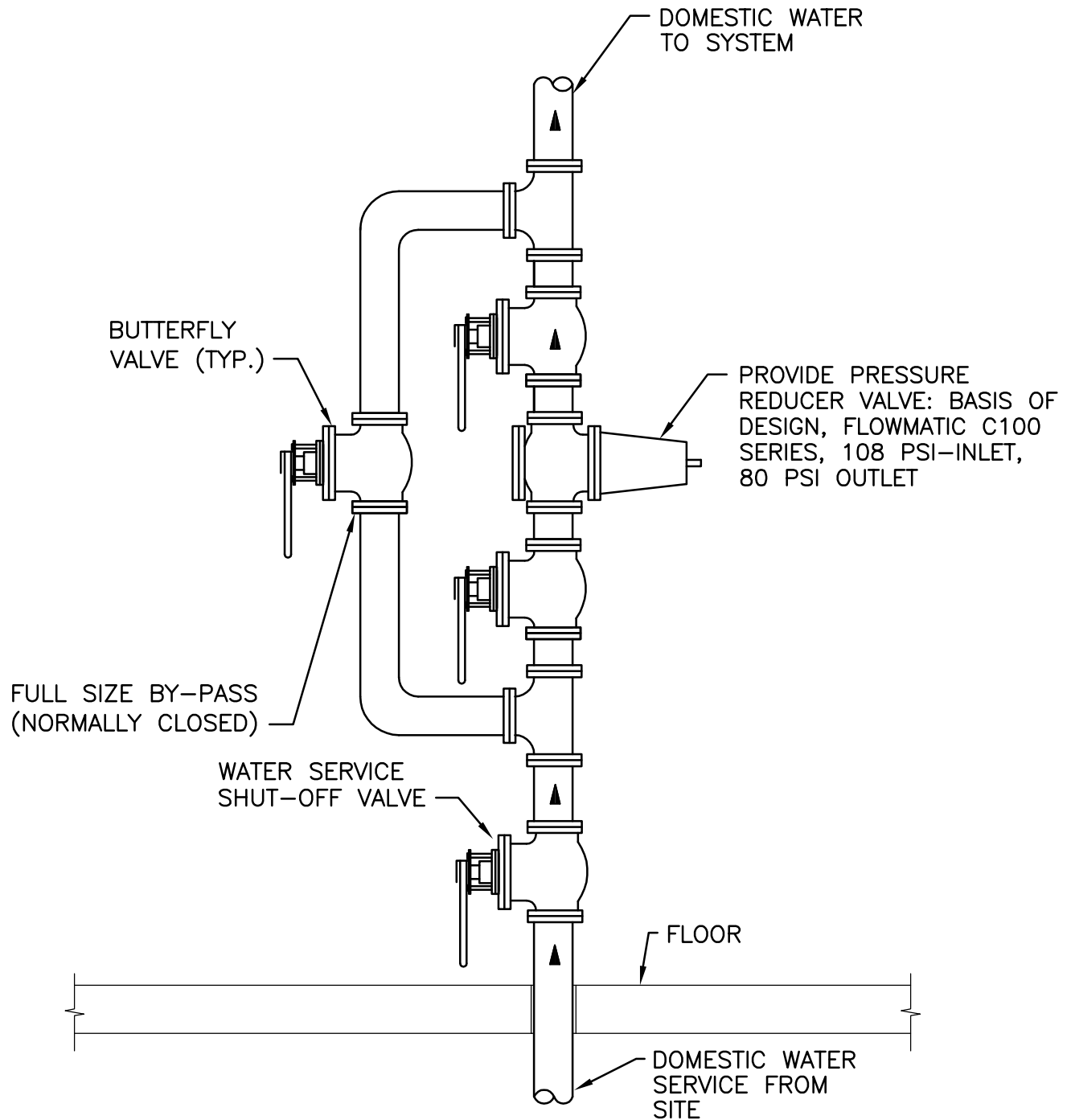
TYPICAL UNDERGROUND PIPING SLEEVE DETAIL

SCALE: NONE



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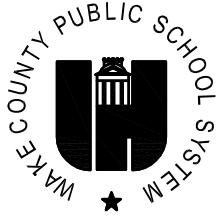
NOTES:

MIN. CLEARANCE ON EITHER SIDE OF PRV SHALL BE 18".
MIN. CLEARANCE IN FRONT SHALL BE 36"

P1.10

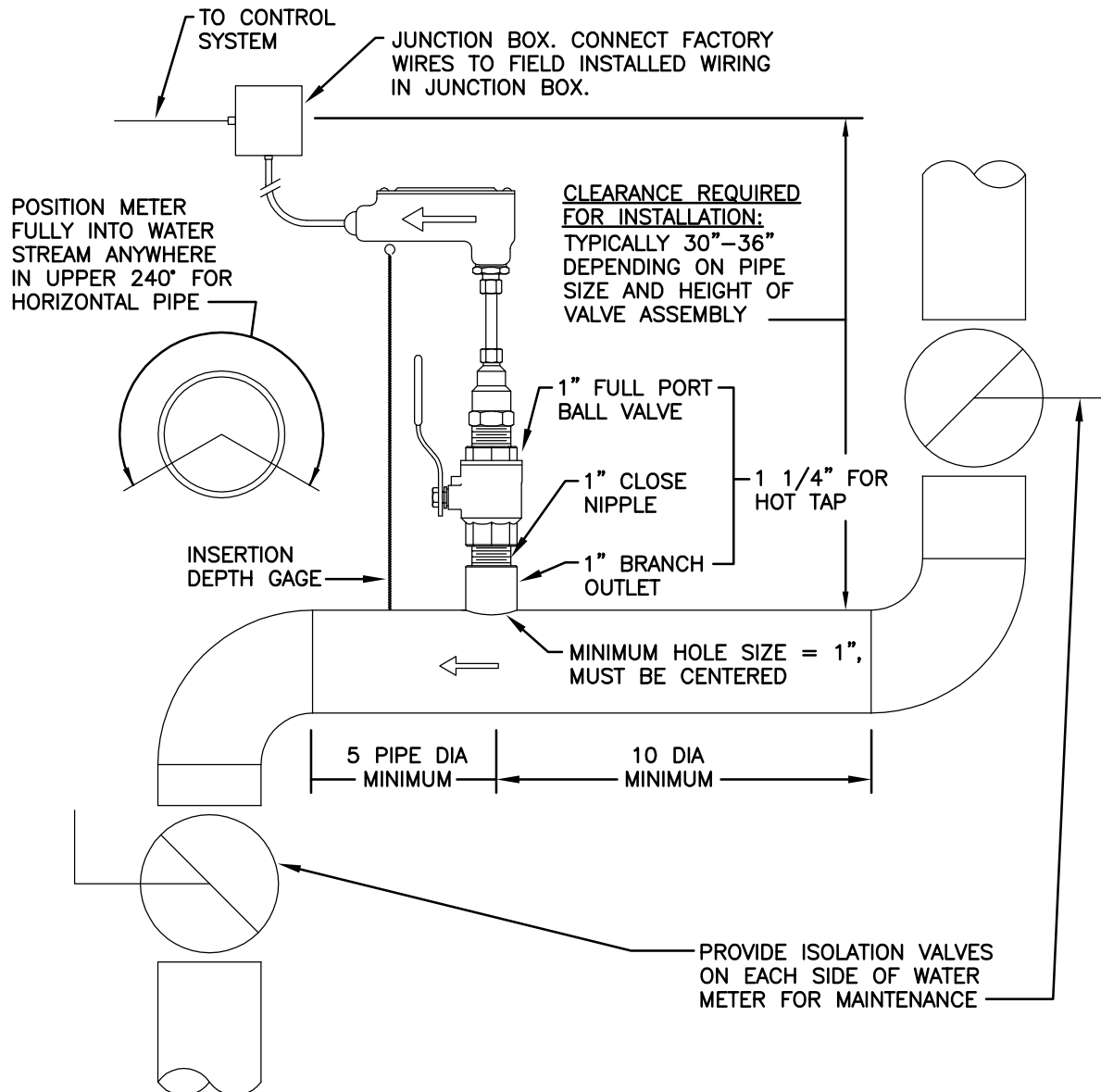
TYPICAL DOMESTIC WATER RISER DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

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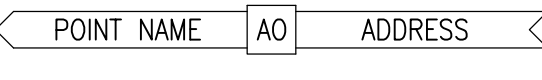
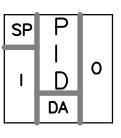
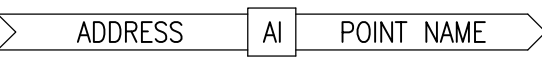
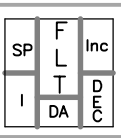
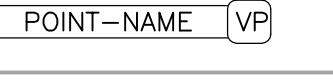
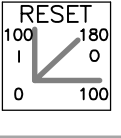
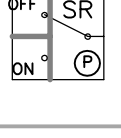
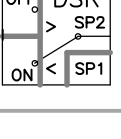
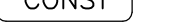
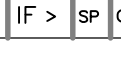
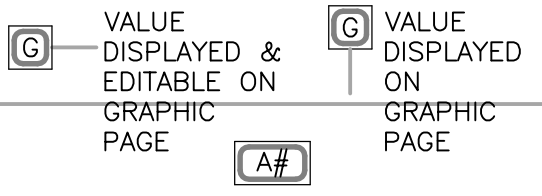
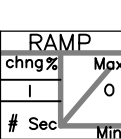
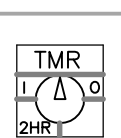
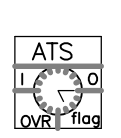
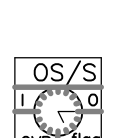
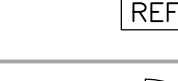
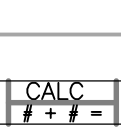
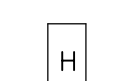
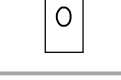
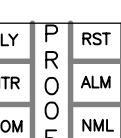
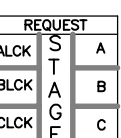
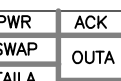
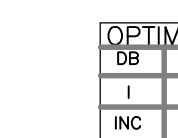
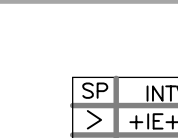
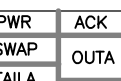
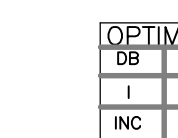
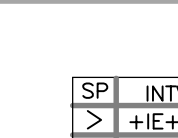
NOTE:

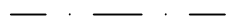
1. INSTALLATION KITS VARY BASED ON PIPE MATERIAL AND APPLICATION. FOR INSTALLATIONS IN PRESSURIZED SYSTEMS, USE "HOT TAP" 1 1/4" INSTALLATION KIT AND DRILL HOLE USING A 1" WET TAP DRILL.
2. METER IS ACCEPTABLE TO INSTALL IN VERTICAL PIPE
3. WATER METER SHALL BE ONICON, INC. MODEL F-1210, OR EQUAL. METER SHALL BE FURNISHED BY CONTROLS CONTRACTOR AND INSTALLED BY PLUMBING CONTRACTOR.
4. WATER METER SHALL BE INSTALLED IN AN ACCESSIBLE FASHION. CONTRACTOR SHALL MEET WITH ENGINEER AND INDICATE INSTALLATION LOCATION, PRIOR TO INSTALLING.

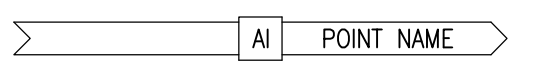
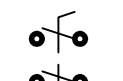
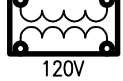
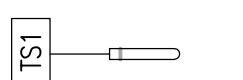
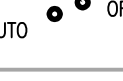
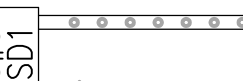
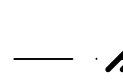
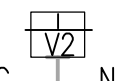
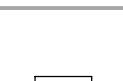
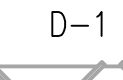
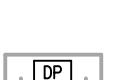
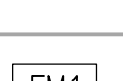
P1.11

TYPICAL BAS WATER METER INSTALLATION DETAIL

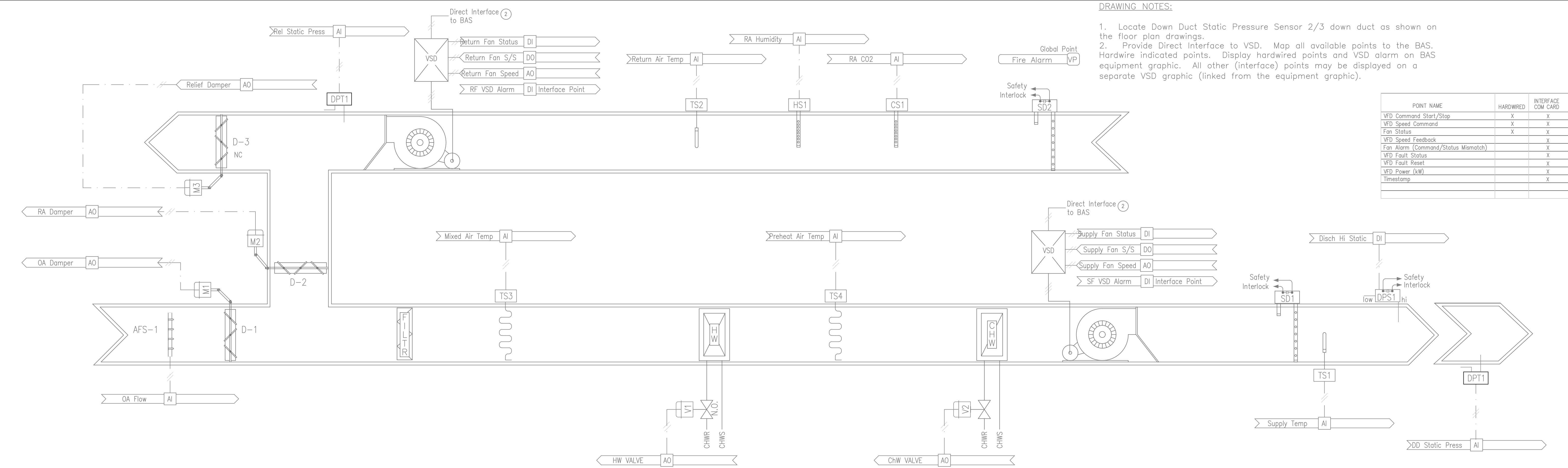
SCALE: NONE

DDC FUNCTION BLOCK LOGIC SYMBOLS			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	OUTPUT POINT – TRANSMITS A VALUE FROM THE FB TO A PHYSICAL OUTPUT CHANNEL ON THE CONTROLLER. DESCRIPTOR – CONTROLLER ADDRESS, POINTNAME AND POINT TYPE AO – ANALOG OUTPUT DO – DIGITAL OUTPUT		PID CONTROLLER – PROPORTIONAL, INTEGRAL, DERIVATIVE LOOPS USE STANDARD ALGORITHMS TO CALCULATE AN OUTPUT BASED ON A VARIABLE INPUT. PROPORTIONAL IS BASED ON THE DIFFERENCE BETWEEN THE INPUT AND THE SETPOINT. INTEGRAL IS BASED ON THE THE TIME THE INPUT DEVIATES FROM THE SETPOINT. DERIVATIVE IS BASED ON THE THE RATE THE INPUT IS APPROACHING THE SETPOINT. THE PID CAN BE EITHER DIRECT ACTING (DA) OR REVERSE ACTING (RA). IN A DA PID WHEN THE INPUT INCREASES THE OUTPUT INCREASES. IN A RA PID WHEN THE INPUT INCREASES THE OUTPUT DECREASES. OPTIONALLY, AN ADDITIONAL DIGITAL TRIGGER MAY BE ASSIGNED TO THE INPUT SECTION THAT WILL ENABLE/DISABLE CALCULATION OF THE PID LOOP.
	INPUT POINT – READS A VALUE FROM A PHYSICAL INPUT ON THE CONTROLLER AND CONVERTS FOR USE INSIDE THE FB. DESCRIPTOR – CONTROLLER ADDRESS, POINTNAME AND POINT TYPE AI – ANALOG INPUT DI – DIGITAL INPUT		FLOATING CONTROLLER – OUTPUT WILL INCREASE OR DECREASE INCREMENTALLY AS INPUT DEVIATES FROM SETPOINT.
	VIRTUAL POINT – ANALOG OR DIGITAL VALUE USED WITHIN A FB OR BROADCAST ACROSS THE LAN.		RESET CONTROLLER – USER DEFINED OUTPUT VALUE WILL RESET IN A LINEAR RELATIONSHIP BASED ON USER DEFINED INPUT VALUE.
	DIGITAL WIRE – DIGITAL LOGIC CONNECTION BETWEEN FB'S		SWITCHING RELAY – SWITCHES OUTPUT BETWEEN TWO INPUTS WHEN DIGITAL PILOT INPUT IS 'ON'. SWITCH SHOWN IN NORMAL POSITION
	ANALOG WIRE – ANALOG LOGIC CONNECTION BETWEEN FB'S		DEADBAND SWITCHING RELAY – DIGITAL OUTPUT CHANGES WHEN INPUT VALUE RISES/FALLS ABOVE/BELOW SETPOINT 1 (SP1). DIGITAL OUTPUT RESTORES TO NORMAL WHEN INPUT RISES/FALLS ABOVE/BELOW SETPOINT 2 (SP2). SWITCH SHOWN IN NORMAL POSITION
	CONSTANT – CONSTANT VALUE INPUTS		LOGICAL IF EXPRESSION – THE OUTPUT IS ON IF THE INPUT MEETS THE CONDITION OF THE SETPOINT.
	GRAPHIC INTERFACE – VALUE APPEARS ON GRAPHIC SCREEN. WHEN BLOCK PRECEEDS (IS TO THE LEFT OF) A CONSTANT BLOCK OR VIRTUAL POINT BLOCK, THE VALUE SHALL BE EDITABLE FROM THE GRAPHIC SCREEN. ALARM & PRIORITY – TRANSMITS AN ALARM AND ALARM PRIORITY TO THE ENTERPRISE BUILDING MANAGEMENT SYSTEM (EBMS).		RAMP CONTROLLER – LIMITS THE RATE OF CHANGE OF AN OUTPUT ON AN INCREASE IN VALUE OR A DECREASE IN VALUE. CHNG% = % OF TOTAL MAXIMUM OUTPUT VALUE ALLOWED FOR OUTPUT CHANGE # = TIME IN SECONDS MAX = MAXIMUM OUTPUT VALUE MIN = MINIMUM OUTPUT VALUE
	MESSAGE AND NUMBER – TRANSMITS A MESSAGE AND MESSAGE NUMBER TO THE ENTERPRISE BUILDING MANAGEMENT SYSTEM (EBMS).		TIMER – OUTPUT IS ON FOR A USER SPECIFIED TIME AFTER INPUT CHANGES FROM OFF TO ON
	TREND – ESTABLISHES TREND IN CONTROLLER.		AUTOMATIC TIME SCHEDULER – INCLUDES SCHEDULES ENTERED INTO CONTROLLER FOR 7 DAY SCHEDULING WITH HOLIDAYS AND OVERRIDE SCHEDULES. INCLUDES OVERRIDE INPUT FOR UNSCHEDULED OVERRIDE. OUTPUTS REFERENCE FLAGS CAN INCLUDE : HEATING SETBACK, COOLING SETBACK, AND UNOCCUPIED
	RUN TIME MONITOR – ACCUMULATES RUNTIME FOR DIGITAL OUTPUT AND CONVERTS TIME TO HOURS.		OPTIMUM START/STOP TIME SCHEDULER – INCLUDES SCHEDULES ENTERED INTO CONTROLLER FOR 7 DAY SCHEDULING WITH HOLIDAYS AND OVERRIDE SCHEDULES. INCLUDES OPTIMUM START STOP ROUTINE. OUTPUTS REFERENCE FLAGS CAN INCLUDE : WARM-UP, COOL-DOWN, HEATING SETBACK, COOLING SETBACK, AND UNOCCUPIED. INCLUDES OVERRIDE INPUT (OVR) FOR UNSCHEDULED OVERRIDE
	REFERENCE FLAG – USED AS CONNECTION TO FB'S BY REFERENCE INSTEAD OF WIRES.		CALCULATION BLOCK – OUTPUT IS EQUAL TO CALCULATION USING INPUT(S). EQUATION CAN BE MATHEMATICAL OR A PREDEFINED INDUSTRY STANDARD ALGORITHM (ie. CFM, VELOCITY PRESSURE, ENTHALPY, DEW POINT ETC.)
	DIGITAL AND GATE – OUTPUT IS ON IF ALL INPUTS ARE TRUE		HIGH SELECTOR – SELECTS HIGHER OF INPUT VALUES
	DIGITAL OR GATE – OUTPUT IS ON IF ANY INPUT IS TRUE.		LOW SELECTOR – SELECTS LOWER OF INPUT VALUES
	DIGITAL EXCLUSIVE OR GATE – OUTPUT IS ON IF ONLY ONE INPUT IS TRUE.		AVERAGING BLOCK – MATHEMATICALLY AVERAGES INPUT VALUES.
	INVERSE (NOT) – IF INPUT = ON, OUTPUT = OFF; CONVERSELY IF INPUT =OFF, OUTPUT =ON		PROOFING MODULE – GENERATES VALUES BASED ON A COMPARISON OF COMMAND AND MONITORING INPUTS. DLY – PROOFING DELAY PERIOD MTR – MONITOR (INPUT FOR PROOF) COM – COMMAND (INPUT FOR PROOF) RST – RESET (IF LATCHING IS USED) ALM – (ON WHEN MONITOR INPUT IS NOT EQUAL TO COMMAND INPUT) NML – OUTPUT IS ON WHEN MONITOR AND COMMAND INPUTS ARE ON AND NORMAL CONDITIONS ARE MET
	LATCH OFF – OUTPUT IS OFF WHENEVER INPUT IS ON. OUTPUT REMAINS OFF UNTIL RESET CHANGES FROM OFF TO ON.		TIME AVERAGE BLOCK – OUTPUT IS EQUAL TO SUM OF INPUTS FROM USER SPECIFIED PREVIOUS TIME PERIOD (OR NUMBER OF SCANS) TO CURRENT TIME (OR SCAN) DIVIDED BY NUMBER OF DISCRETE POINTS IN THE SUMMATION PERIOD. OUTPUT IS A ROLLING TIME BASED AVERAGE OF THE INPUT VALUE.
	LATCH ON – OUTPUT IS ON WHENEVER INPUT IS ON. OUTPUT REMAINS ON UNTIL RESET CHANGES FROM ON TO ON.		STAGER BLOCK – OUTPUT IS EQUAL TO SUM OF REQUESTS FROM USER SPECIFIED INPUTS. ROTATION SHALL BE DETERMINED BY USER DEFINED PARAMETERS. EACH INDIVIDUAL OUTPUT CAN BE LOCKED OUT BY USER DEFINED INDIVIDUAL INPUTS. LOCKED OUT OUTPUTS SHALL BE SKIPPED IN ROTATION. (SEE SEQUENCE OF OPERATION FOR DETAILS)
	ON/OFF DELAY TIMER – AFTER INPUT IS ON, OUTPUT IS ON/OFF AFTER A PREDETERMINED TIME (#) HAS ELAPSED.		LEAD/STANDBY BLOCK – ON RUN COMMAND, LEAD OUTPUT IS SELECTED. LEAD OUTPUT CAN BE SWAPPED MANUALLY OR BY A TIME SCHEDULE. WHEN THE LEAD EQUIPMENT FAILS, THE STANDBY OUTPUT IS SELECTED. (SEE SEQUENCE OF OPERATION FOR DETAILS)
	CYCLE DELAY TIMER – WHEN SET TIME HAS ELAPSED, THE FIRST TIME INPUT IS ON, OUTPUT IS ON AND TIMER RESETS. BEFORE SET TIME HAS ELAPSED, OUTPUT IS OFF WHEN INPUT IS OFF. IF INPUT GOES FROM OFF TO ON BEFORE SET TIME HAS ELAPSED, OUTPUT WILL REMAIN OFF.		
	POWER FLAG – ON WHEN CONTROLLER IS INITIALLY POWERED ON AND NO PHASE LOSS IS DETECTED		SAMPLE & DUMP – CHANGE IN OUTPUT (WITH DEFINED MINIMUM & MAXIMUM VALUES) BY A DEFINED AMOUNT WHEN INPUT DEVIATES FROM SETPOINT (SP) BY A DEFINED AMOUNT AT A DEFINED INTERVAL. I – INPUT O – OUTPUT MX – MAXIMUM OUTPUT MIN – MINIMUM OUTPUT INTVL – INTERVAL > +IE, +OA – WHEN INPUT RISES ABOVE SETPOINT BY AMOUNT '+IE', OUTPUT IS INCREASED BY AMOUNT '+OA' < -IE, -OA – WHEN INPUT FALLS BELOW SETPOINT BY AMOUNT '-IE', OUTPUT IS REDUCED BY AMOUNT '-OA'
	FLIP FLOP – CHANGE STATE OF OUTPUT WHEN INPUT CHANGES FROM OFF TO ON; OUTPUT SET TO OFF WHEN RESET (R) GOES CHANGES FROM OFF TO ON		
	SETPOINT OPTIMIZATION – RESET OF OUTPUT FROM A MAXIMUM VALUE TO A MINIMUM VALUE BASED ON VALUES OR REQUESTS DB – DEAD BAND INC – INCREMENT/DECREMENT VALUE HI – MAXIMUM RESET VALUE LO – MINIMUM RESET VALUE		
	SAMPLE & DUMP – CHANGE IN OUTPUT (WITH DEFINED MINIMUM & MAXIMUM VALUES) BY A DEFINED AMOUNT WHEN INPUT DEVIATES FROM SETPOINT (SP) BY A DEFINED AMOUNT AT A DEFINED INTERVAL. I – INPUT O – OUTPUT MX – MAXIMUM OUTPUT MIN – MINIMUM OUTPUT INTVL – INTERVAL > +IE, +OA – WHEN INPUT RISES ABOVE SETPOINT BY AMOUNT '+IE', OUTPUT IS INCREASED BY AMOUNT '+OA' < -IE, -OA – WHEN INPUT FALLS BELOW SETPOINT BY AMOUNT '-IE', OUTPUT IS REDUCED BY AMOUNT '-OA'		

LEGEND	
TUBING DESIGNATIONS	
	TUBING
WIRING DESIGNATIONS	
	WIRING

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	DDC POINT DESCRIPTOR WITH NAME AI – ANALOG INPUT DI – DIGITAL INPUT AO – ANALOG OUTPUT DO – DIGITAL OUTPUT		DISCONNECT SWITCH
	TEMPERATURE SENSOR WITH AVERAGING ELEMENT		CONTROL TRANSFORMER
	TEMPERATURE SENSOR WITH SINGLE POINT ELEMENT		RELAY COILS
	TEMPERATURE SENSOR WITH PIPE WELL		FUSE
	SPACE TEMPERATURE SENSOR		THERMAL OVERLOAD
	HUMIDITY SENSOR		NORMALLY OPEN AND NORMALLY CLOSED CONTACTS
	CURRENT SENSOR		HAND-OFF-AUTO SELECTOR SWITCH
	SMOKE DETECTOR		WIRING DESIGNATION. (NO. OF HATCHES INDICATES NO. OF CONDUCTORS)
	DIFFERENTIAL PRESSURE SWITCH		WIRING CONNECTION
	WATER FLOW SWITCH		ON-OFF SELECTOR SWITCH
	TWO WAY CONTROL VALVE		THREE WAY CONTROL VALVE
	DAMPER ACTUATOR		LIMIT SWITCH
	AIR DIFFERENTIAL PRESSURE TRANSMITTER (0 – 5" W.C.)		CONTROL DAMPER
	VARIABLE SPEED DRIVE		HYDRONIC DIFFERENTIAL PRESSURE TRANSMITTER
	FREEZESTAT		HYDRONIC FLOWMETER
	AIRFLOW MEASURING STATION		THERMOSTAT
	FAN INLET AIRFLOW MEASURING STATION		

ABBREVIATIONS			
ALM	ALARM	NC	NORMALLY CLOSED
AH	AIR HANDLER	NO	NORMALLY OPEN
BLDG	BUILDING	OA	OUTSIDE AIR
C	COMMON	OVRD	OVERIDE
CL	COIL	RA	RETURN AIR
CHPS	CHILLED WATER PUMP, SECONDARY	REQ	REQUEST
CHWP	CHILLED WATER PUMP	RF	RETURN FAN
CHWR	CHILLED WATER RETURN	RUF	RELIEF FAN
CHWS	CHILLED WATER SUPPLY	S/S	START / STOP
COV	CHANGE OF VALUE	SA	SUPPLY AIR
CW	CONDENSER WATER	SD	SMOKE DETECTOR
CWP	CONDENSER WATER PUMP	SEC	SECONDARY OR SECONDS
CWR	CONDENSER WATER RETURN	SF	SUPPLY FAN
CWS	CONDENSER WATER SUPPLY	SCHWR	SECONDARY CHILLED WATER RETURN
DD	DOWN-DUCT	SCHWS	SECONDARY CHILLED WATER SUPPLY
DP	DIFFERENTIAL PRESSURE	SHWR	SECONDARY HOT WATER RETURN
EF	EXHAUST FAN	SHWS	SECONDARY HOT WATER SUPPLY
FBK	FEEDBACK	T	TEMPERATURE
FC	FAN COIL	TB	TERMINAL BOX
HCA	HAND – OFF – AUTOMATIC	TW	TEMPERED WATER
HT	HEAT	TWP	TEMPERED WATER PUMP
HWP	HOT WATER PUMP	TWR	TEMPERED WATER RETURN
HWPS	HOT WATER PUMP, SECONDARY	TWS	TEMPERED WATER SUPPLY
HWR	HOT WATER RETURN	VP	VELOCITY PRESSURE
HWS	HOT WATER SUPPLY	VSD	VARIABLE SPEED DRIVE
ISO	ISOLATION		
MA	MIXED AIR		



DRAWING NOTES:

1. Locate Down Duct Static Pressure Sensor 2/3 down duct as shown on the floor plan drawings.
2. Provide Direct Interface to VSD. Map all available points to the BAS. Hardwire indicated points. Display hardwired points and VSD alarm on BAS equipment graphic. All other (interface) points may be displayed on a separate VSD graphic (linked from the equipment graphic).

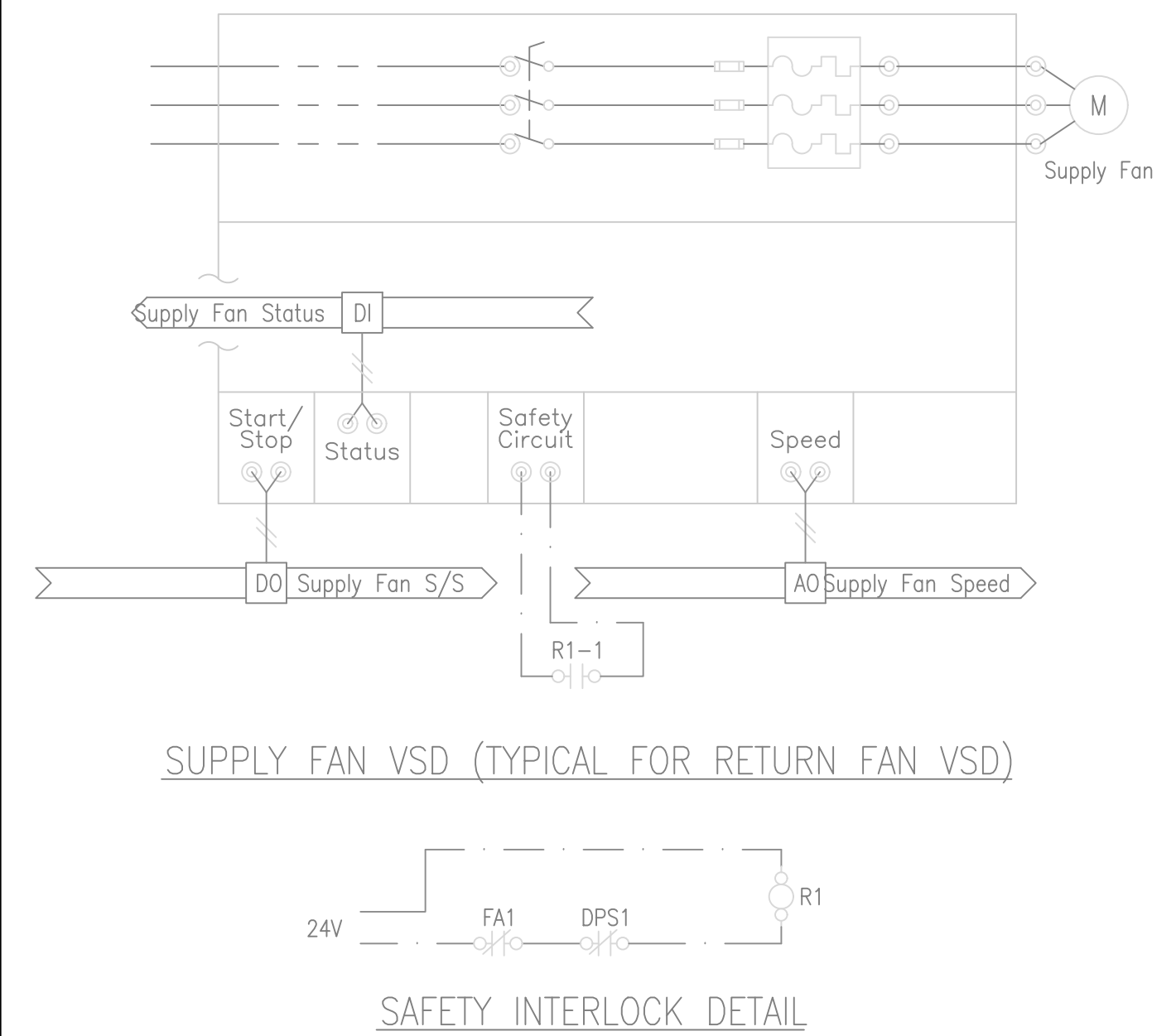
POINT NAME	HARDWIRED	INTERFACE COM CARD	GUI DISPLAY
VFD Command Start/Stop	X	X	HARDWIRED
VFD Speed Command	X	X	HARDWIRED
Fan Status	X	X	HARDWIRED
VFD Speed Feedback	X	X	COM
Fan Alarm (Command/Status Mismatch)	X	X	COM
VFD Fault Status	X	X	COM
VFD Fault Reset	X	X	COM
VFD Power (kW)	X	X	COM
Timestamp		X	COM

POINTS LIST									
POINT DESCRIPTOR	POINT TYPE					TREND	ALARM	ALARM CONDITION	REMARKS
Supply Fan S/S						COV			
Supply Fan Status	•					COV			
SF VSD Alarm	•					COV	•	NOT EQUAL TO COMMAND	Interface Point
Supply Fan Speed				•		COV			
Return Fan S/S					•	COV			
Return Fan Status	•					COV			
RF VSD Alarm	•					COV	•	NOT EQUAL TO COMMAND	Interface Point
Return Fan Speed				•		COV			
DD Static Press		•				15 MIN			
Supply Temp		•				15 MIN			
Fire Alarm				•		COV			Global Point
Disch Hi Static	•					COV	•	ABOVE HIGH LIMIT SETPOINT	
PH Coil DAT		•				15 MIN			
Mixed Air Temp		•				15 MIN	•	BELOW FREEZESTAT SETPOINT	
Return Air Temp		•				15 MIN			
RA Humidity		•				15 MIN			
RA CO2		•				15 MIN	•	ABOVE MAX SETPOINT	
CHW Valve				•		COV			
HW Valve				•		COV			
Rel Static Press		•				15 MIN			
Relief Damper				•		COV			
OA/RA Damper				•		COV			
OA Flow		•				15 MIN			

LOGIC VARIABLES

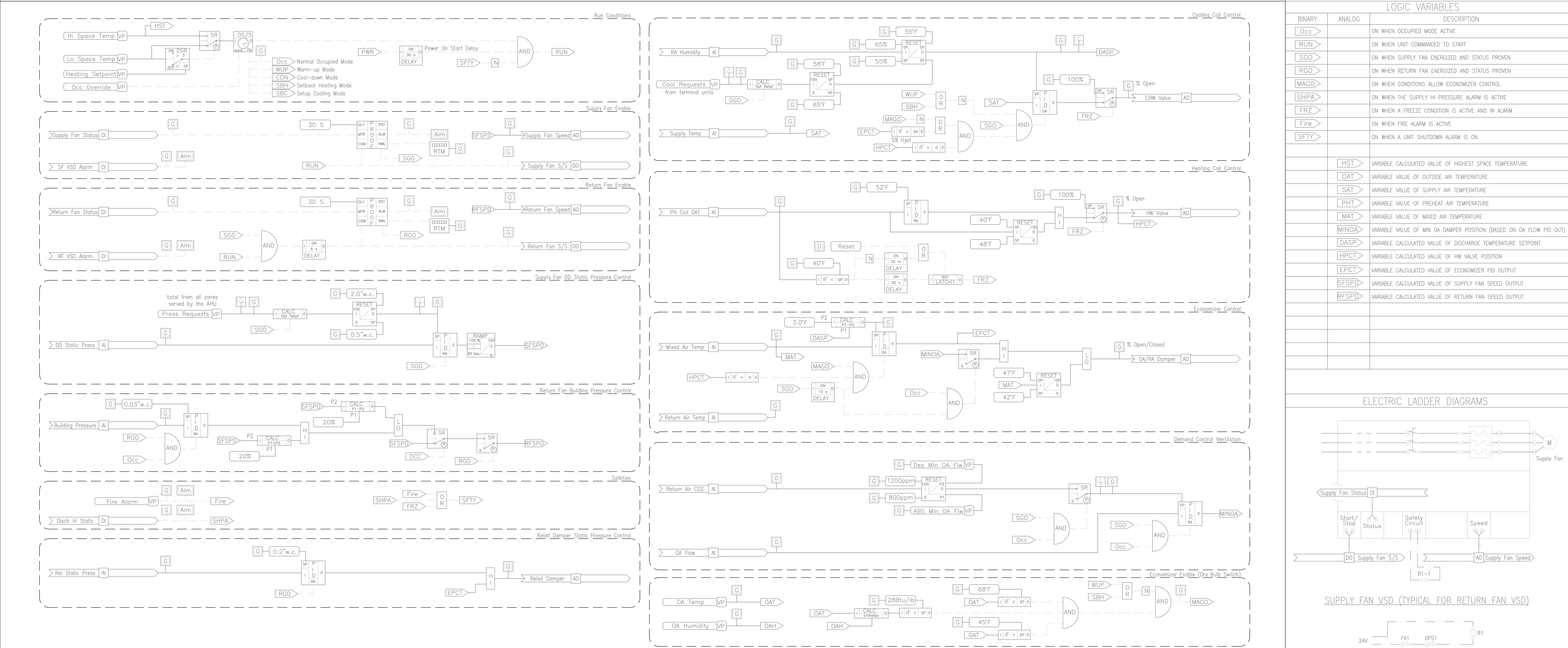
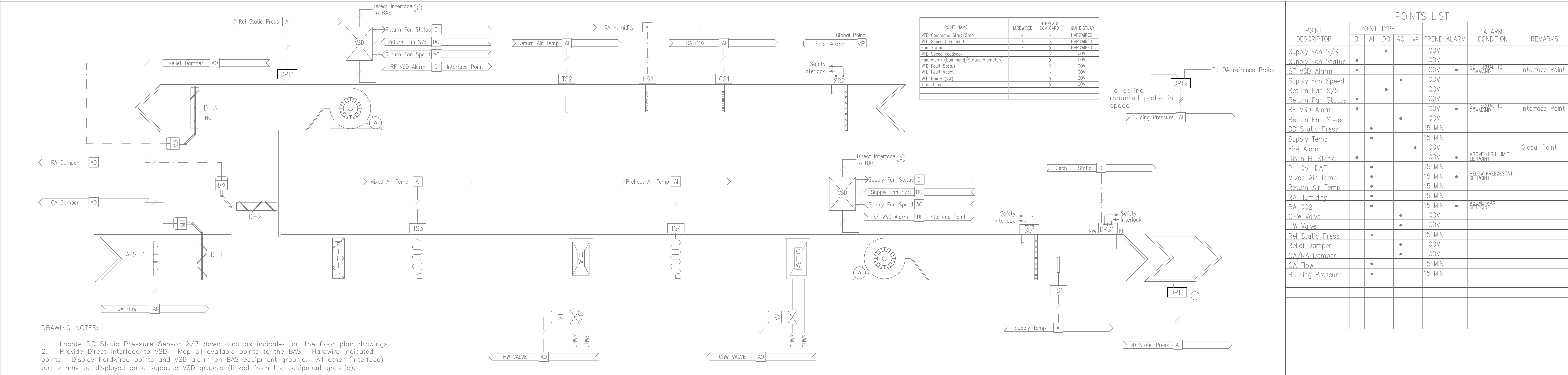
BINARY	ANALOG	DESCRIPTION
[Occ]		ON WHEN OCCUPIED MODE ACTIVE
[RUN]		ON WHEN UNIT COMMANDED TO START
[SGO]		ON WHEN SUPPLY FAN ENERGIZED AND STATUS PROVEN
[RGO]		ON WHEN RETURN FAN ENERGIZED AND STATUS PROVEN
[MAGO]		ON WHEN CONDITIONS ALLOW ECONOMIZER CONTROL
[SHPA]		ON WHEN THE SUPPLY HI PRESSURE ALARM IS ACTIVE
[FRZ]		ON WHEN A FREEZE CONDITION IS ACTIVE AND IN ALARM
[Fire]		ON WHEN FIRE ALARM IS ACTIVE
[SFTY]		ON WHEN A UNIT SHUTDOWN ALARM IS ON
	[HST]	VARIABLE CALCULATED VALUE OF HIGHEST SPACE TEMPERATURE
	[OAT]	VARIABLE VALUE OF OUTSIDE AIR TEMPERATURE
	[SAT]	VARIABLE VALUE OF SUPPLY AIR TEMPERATURE
	[PHT]	VARIABLE VALUE OF PREHEAT AIR TEMPERATURE
	[MAT]	VARIABLE VALUE OF MIXED AIR TEMPERATURE
	[MINOA]	VARIABLE VALUE OF MIN OA DAMPER POSITION (BASED ON OA FLOW PID OUT)
	[DASP]	VARIABLE CALCULATED VALUE OF DISCHARGE TEMPERATURE SETPOINT
	[HPCT]	VARIABLE CALCULATED VALUE OF HW VALVE POSITION
	[EPCT]	VARIABLE CALCULATED VALUE OF ECONOMIZER PID OUTPUT
	[SFSPD]	VARIABLE CALCULATED VALUE OF SUPPLY FAN SPEED OUTPUT
	[SFMIN]	SPEED THE SUPPLY FAN RUNS WHEN ALL TUs AT MIN (DETERMINED BY TAB)
	[SFMAX]	SPEED THE SUPPLY FAN RUNS WHEN ALL TUs AT MAX (DETERMINED BY TAB)
	[RFMIN]	SPEED THE RETURN FAN RUNS WHEN ALL TUs AT MIN (DETERMINED BY TAB)
	[RFMAX]	SPEED THE RETURN FAN RUNS WHEN ALL TUs AT MAX (DETERMINED BY TAB)
	[RFSPD]	VARIABLE CALCULATED VALUE OF RETURN FAN SPEED OUTPUT

ELECTRIC LADDER DIAGRAMS



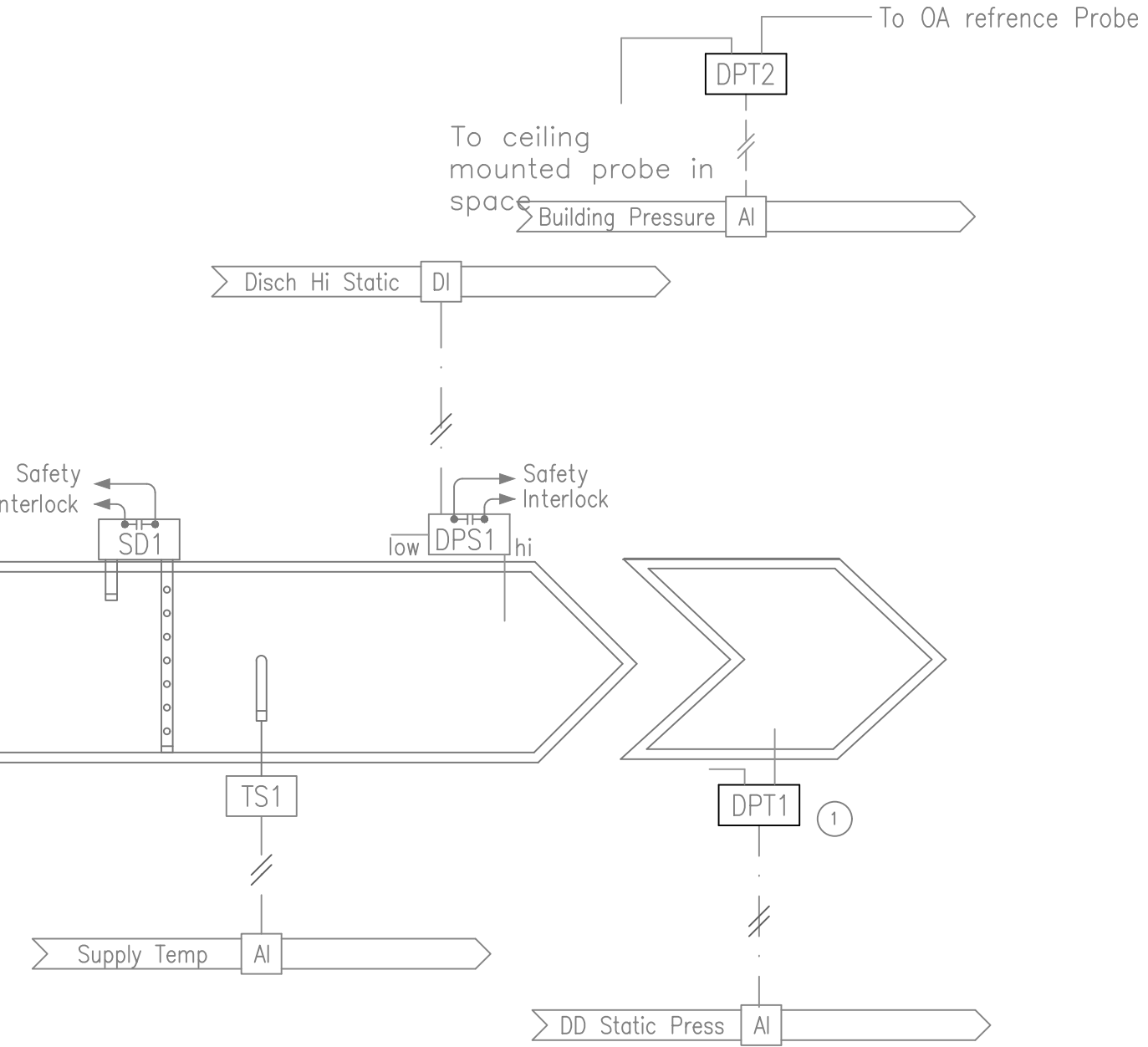
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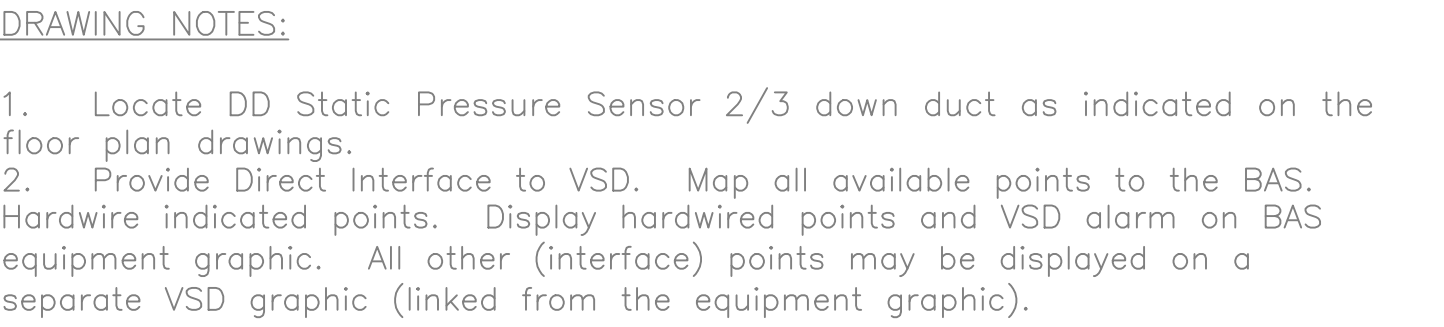
1. USE WRITTEN SEQUENCES FOR CONSTRUCTION DOCUMENTS. LOGIC DIAGRAM IS FOR DESIGN REFERENCE ONLY.
2. IF EQUIPMENT DIAGRAM IS USED, EDIT POINTS SHOWN TO MATCH VERBIAGE OF SEQUENCE OF OPERATIONS.



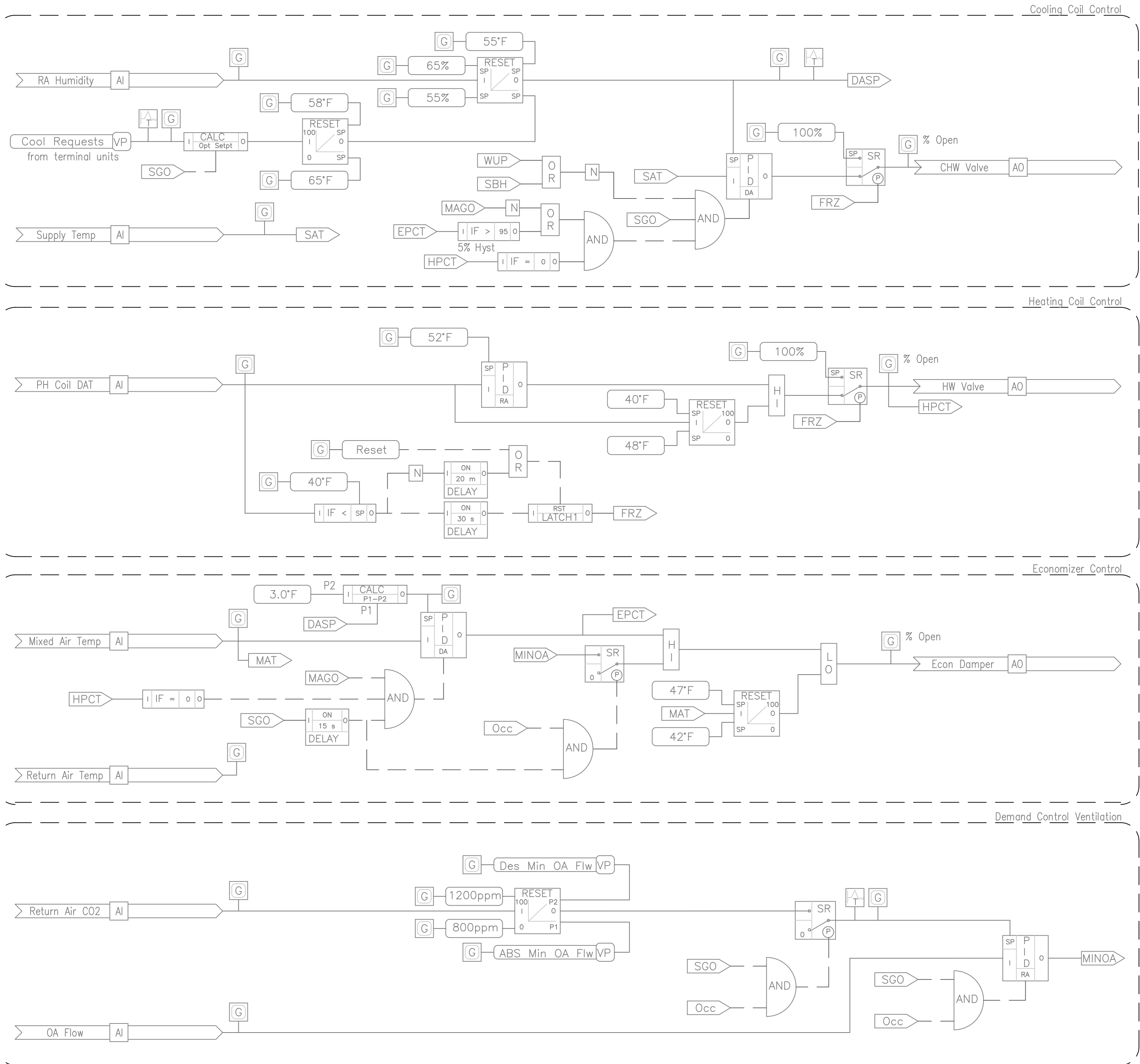
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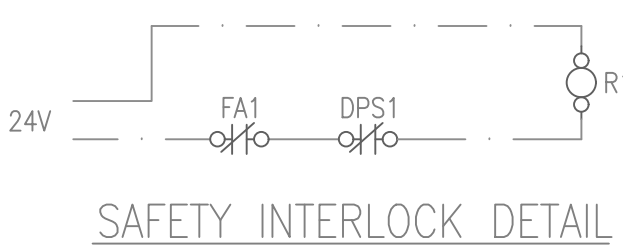




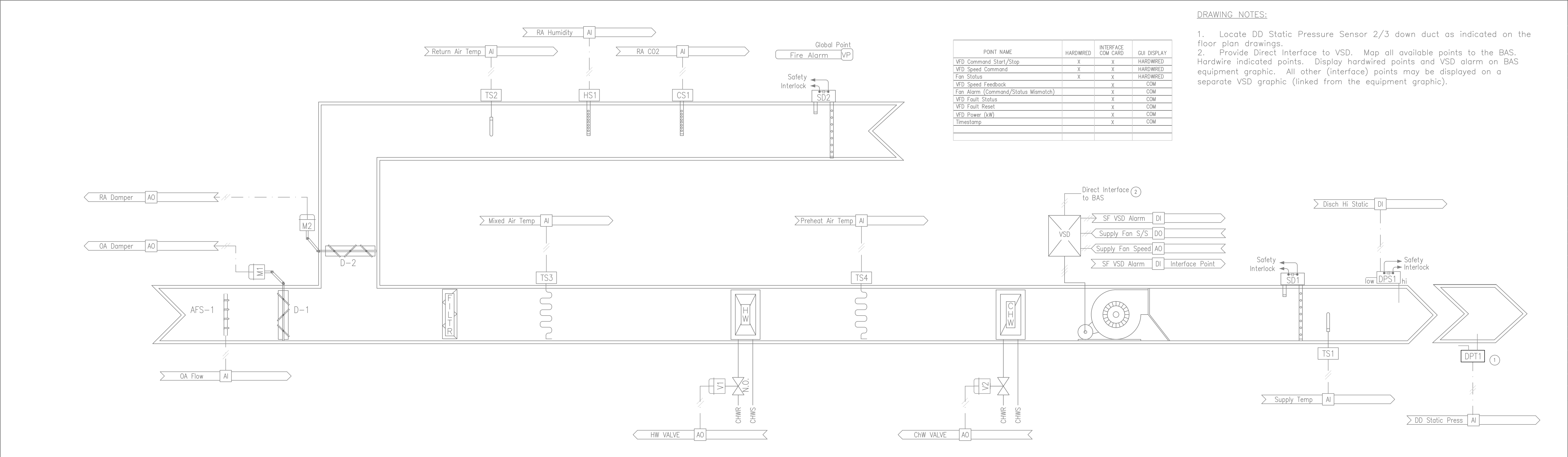
LOGIC VARIABLES		
BINARY	ANALOG	DESCRIPTION
Occ		ON WHEN OCCUPIED MODE ACTIVE
RUN		ON WHEN UNIT COMMANDED TO START
SGO		ON WHEN SUPPLY FAN ENERGIZED AND STATUS PROVEN
MAGO		ON WHEN CONDITIONS ALLOW ECONOMIZER CONTROL
SHPA		ON WHEN THE SUPPLY HI PRESSURE ALARM IS ACTIVE
FRZ		ON WHEN A FREEZE CONDITION IS ACTIVE AND IN ALARM
Fire		ON WHEN FIRE ALARM IS ACTIVE
SFTY		ON WHEN A UNIT SHUTDOWN ALARM IS ON



ELECTRIC LADDER DIAGRAMS



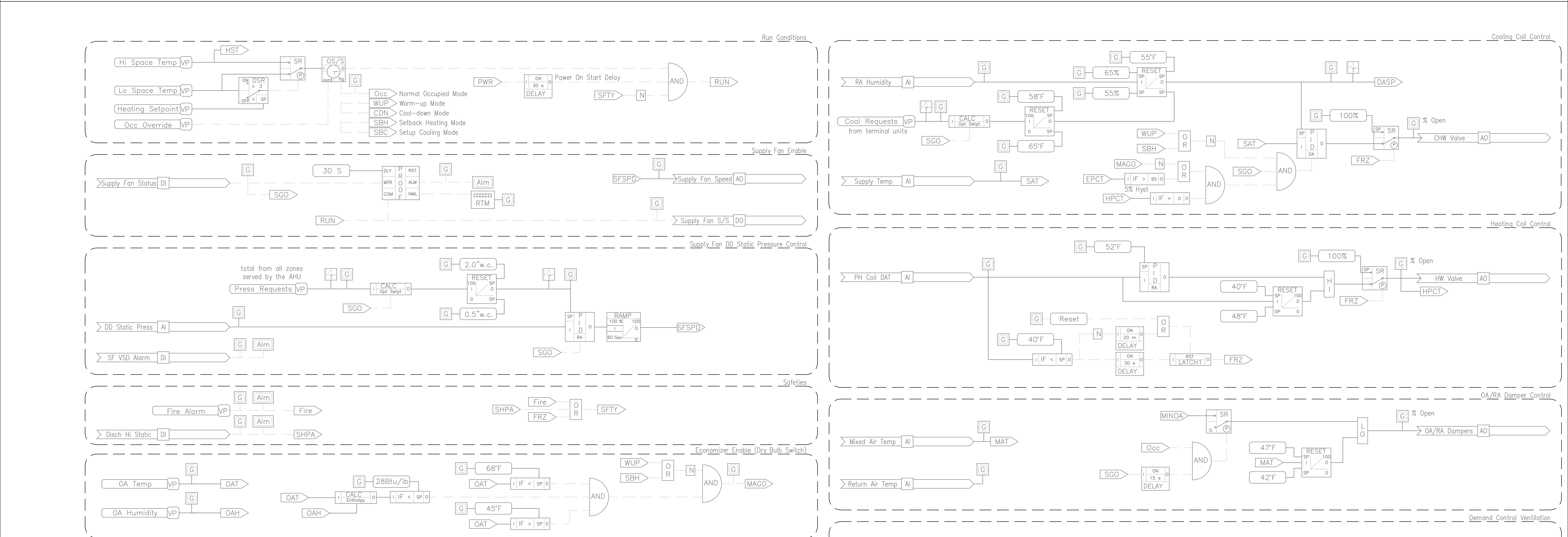
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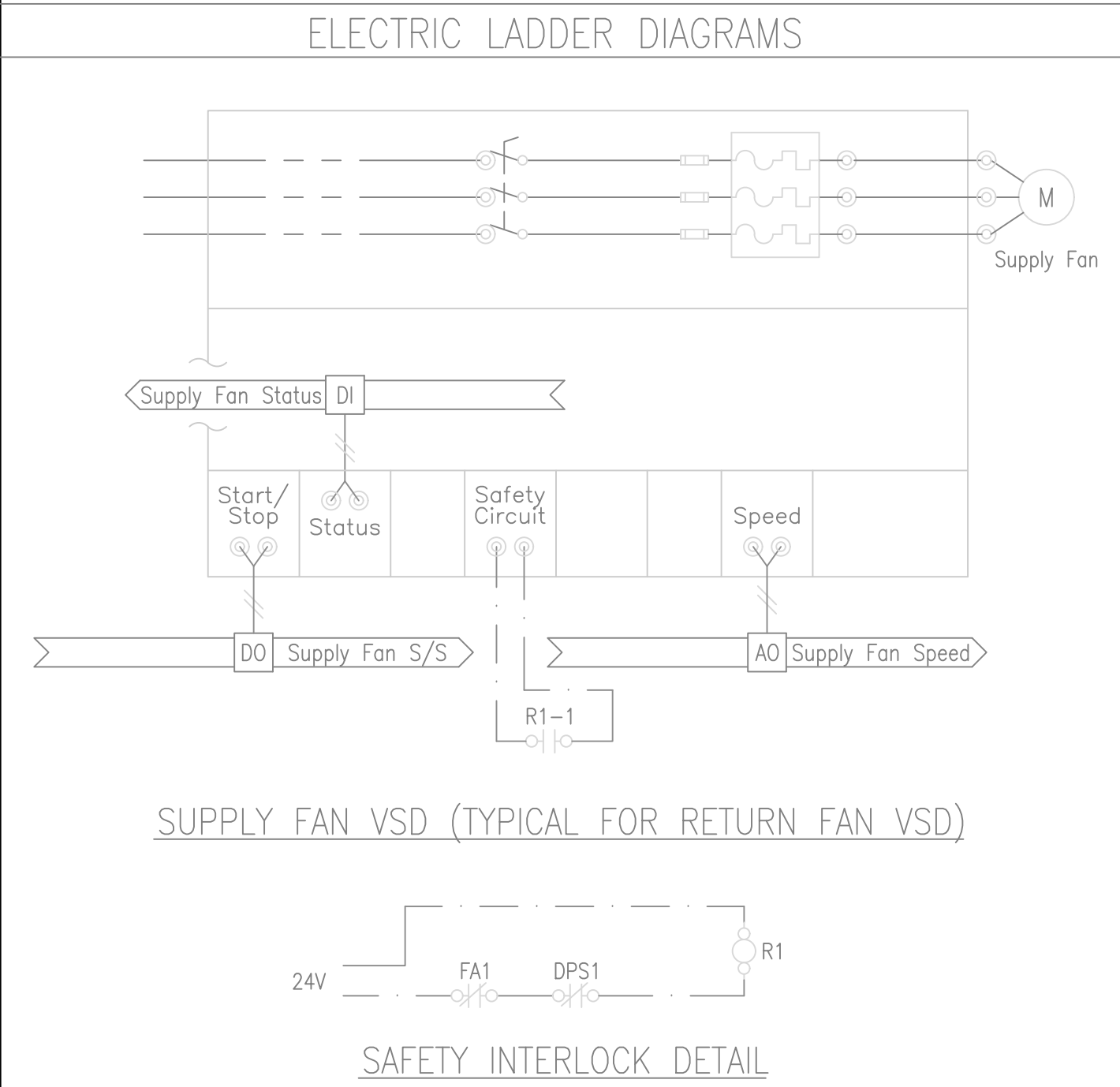
POINT NAME	HARDWIRED	INTERFACE COM CARD	GUI DISPLAY
VFD Command Start/Stop	X	X	HARDWIRED
VFD Speed Command	X	X	HARDWIRED
Fan Status	X	X	HARDWIRED
VFD Speed Feedback		X	COM
Fan Alarm (Command/Status Mismatch)		X	COM
VFD Fault Status		X	COM
VFD Fault Reset		X	COM
VFD Power (kW)		X	COM
Timestamp		X	COM

- DRAWING NOTES:
1. Locate DD Static Pressure Sensor 2/3 down duct as indicated on the floor plan drawings.
 2. Provide Direct Interface to VSD. Map all available points to the BAS. Hardware indicated points. Display hardware points and VSD alarm on BAS equipment graphic. All other (interface) points may be displayed on a separate VSD graphic (linked from the equipment graphic).

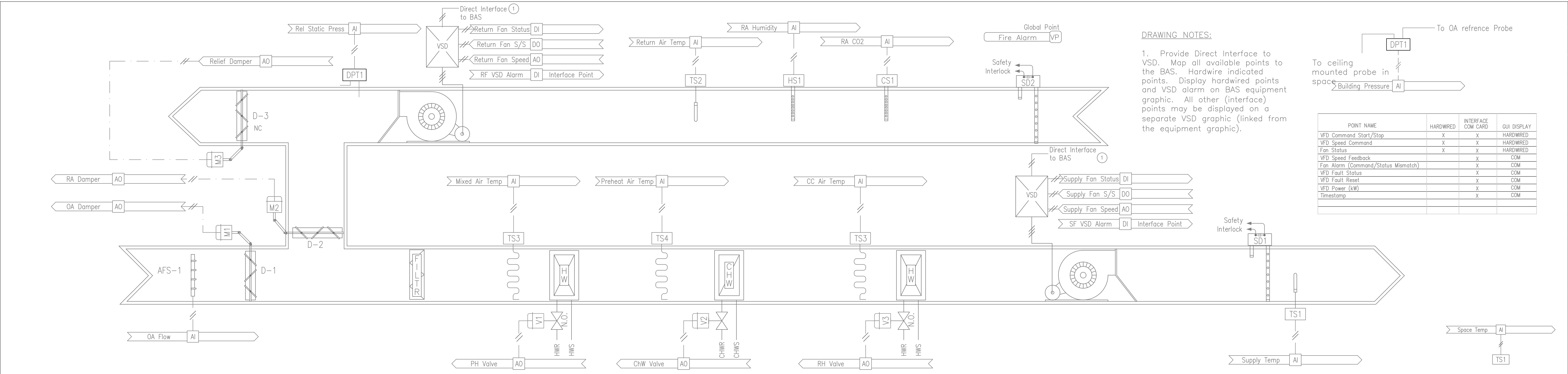
POINT DESCRIPTOR	POINT TYPE				TREND	ALARM	ALARM CONDITION	REMARKS
	DI	AI	DO	AO				
Supply Fan S/S					COV			
Supply Fan Status	•				COV			
SF VSD Alarm	•				COV	•	NOT EQUAL TO COMMAND	Interface Point
Supply Fan Speed				•	COV			
DD Static Press		•			15 MIN			
Supply Temp		•			15 MIN			
Fire Alarm				•	COV			Global Point
Disch Hi Static	•				COV	•	ABOVE HIGH LIMIT SETPOINT	
PH Coil DAT		•			15 MIN			
Mixed Air Temp		•			15 MIN	•	BELOW FREEZESTAT SETPOINT	
Return Air Temp		•			15 MIN			
RA Humidity		•			15 MIN			
RA CO2		•			15 MIN	•	ABOVE MAX SETPOINT	
CHW Valve				•	COV			
HW Valve				•	COV			
OA/RA Damper				•	COV			
OA Flow		•			15 MIN			



LOGIC VARIABLES		
BINARY	ANALOG	DESCRIPTION
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	[HST]	VARIABLE CALCULATED VALUE OF HIGHEST SPACE TEMPERATURE
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	[MINOA]	VARIABLE VALUE OF MIN OA DAMPER POSITION (BASED ON OA FLOW PID OUT)
	[DASP]	VARIABLE CALCULATED VALUE OF DISCHARGE TEMPERATURE SETPOINT
	[HPCT]	VARIABLE CALCULATED VALUE OF HW VALVE POSITION



- DESIGNER NOTES:
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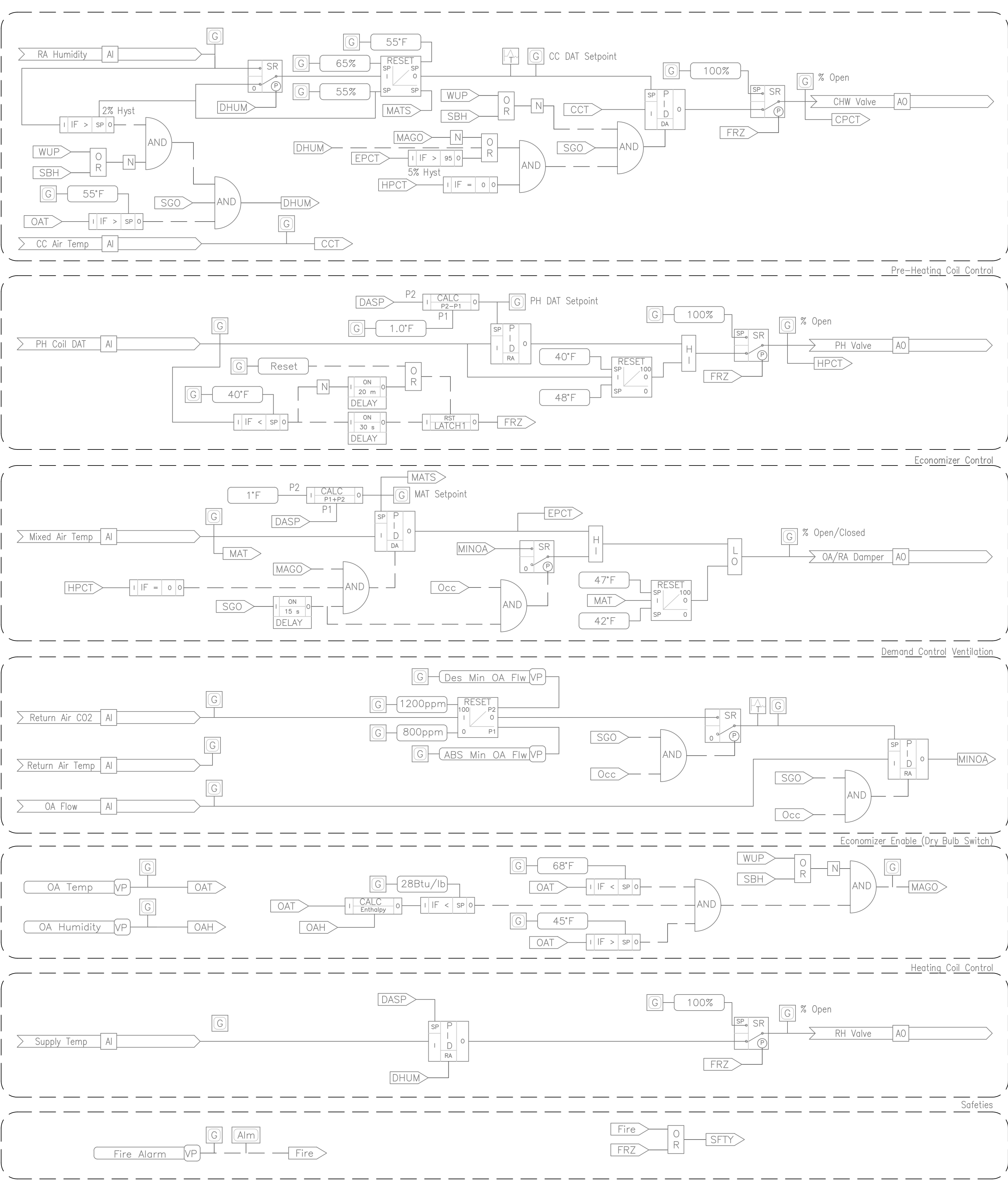
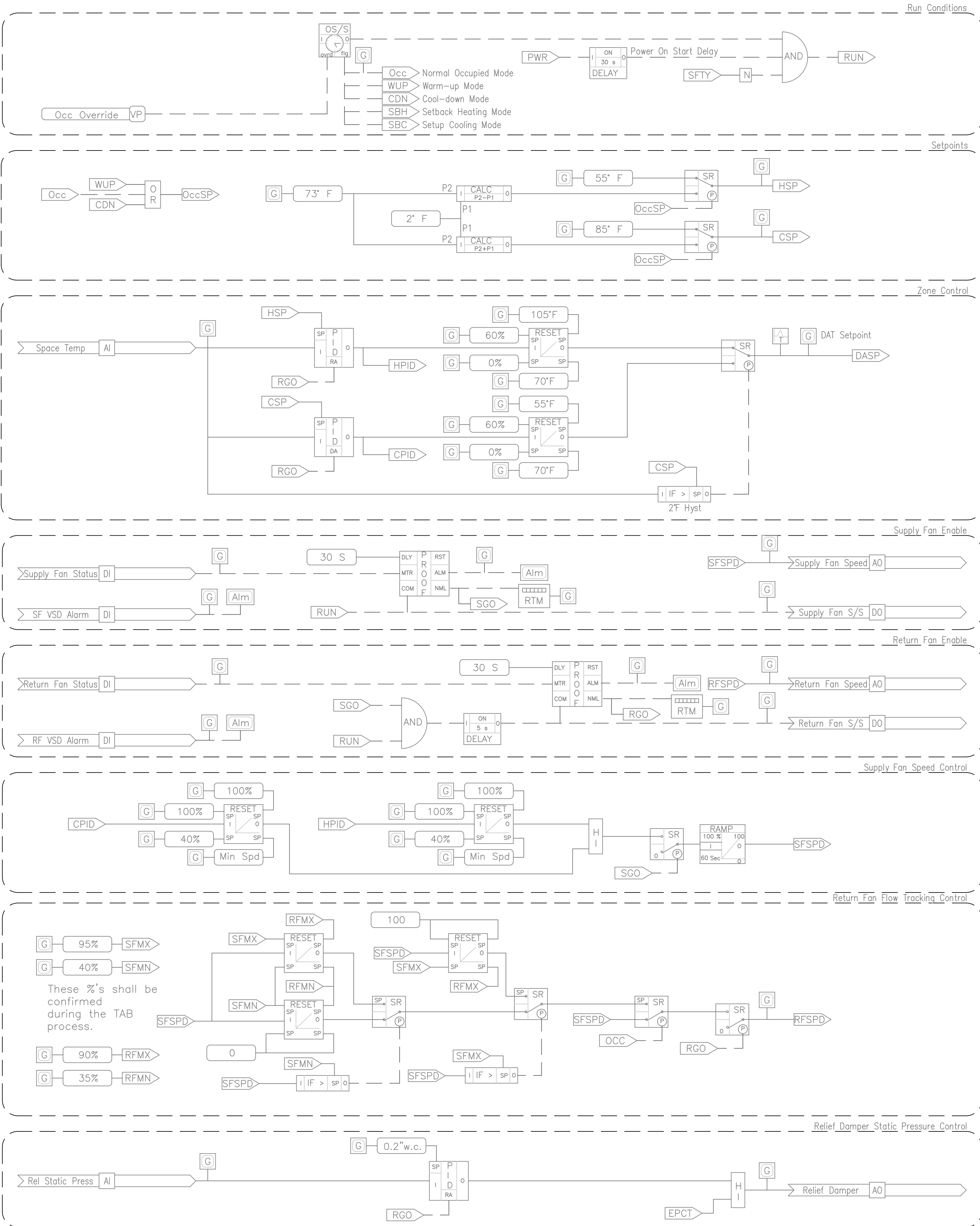


DRAWING NOTES:

1. Provide Direct Interface to VSD. Map all available points to the BAS. Hardware indicated points. Display hardwired points and VSD alarm on BAS equipment graphic. All other (interface) points may be displayed on a separate VSD graphic (linked from the equipment graphic).

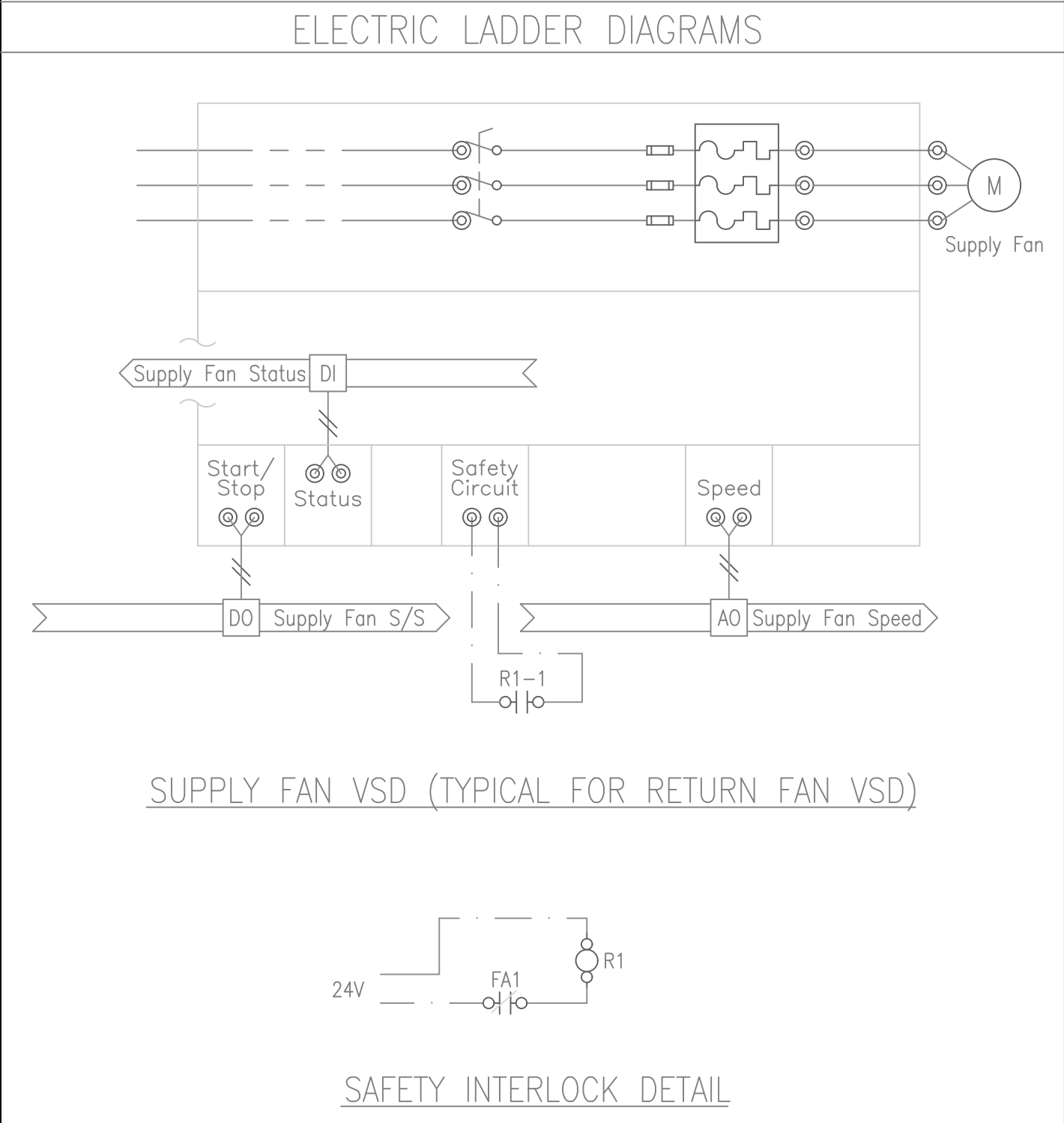
The diagram illustrates the connection between a DPT1 sensor and a Building Pressure point. The DPT1 sensor is connected to a ceiling probe in a space, which is then connected to the Building Pressure point.

POINT NAME	HARDWIRED	INTERFACE COM CARD	GUI DISPLAY
VFD Command Start/Stop	X	X	HARDWIRED
VFD Speed Command	X	X	HARDWIRED
Fan Status	X	X	HARDWIRED
VFD Speed Feedback	X	X	COM
VFD Fault Status	X	X	COM
Fan Alarm (Command/Status Mismatch)	X	X	COM
VFD Fault Reset	X	X	COM
VFD Power (kW)	X	X	COM
Timestamp	X	X	COM



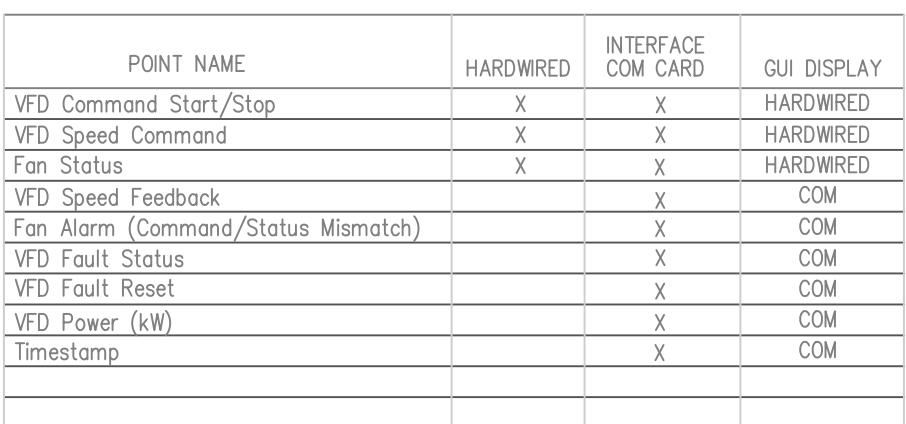
POINTS LIST									
POINT DESCRIPTOR	DI	AI	DO	AO	VP	TREND	ALARM	ALARM CONDITION	REMARKS
Supply Fan S/S						COV			
Supply Fan Status						COV			
SF VSD Alarm						COV		NOT EQUAL TO COMMAND	Interface Point
Supply Fan Speed						COV			
Return Fan S/S						COV			
Return Fan Status						COV			
RF VSD Alarm						COV		NOT EQUAL TO COMMAND	Interface Point
Return Fan Speed						COV			
Building Pressure						15 MIN			
Supply Temp						15 MIN			
Fire Alarm						COV			Global Point
CC Air Temp						15 MIN			
PH Coil DAT						15 MIN			
Mixed Air Temp						15 MIN		BELOW FREEZESTAT SETPOINT	
Return Air Temp						15 MIN			
RA Humidity						15 MIN			
RA CO2						15 MIN		ABOVE MAX SETPOINT	
Space Temp						15 MIN			
CHW Valve						COV			
HW Valve						COV			
RH Valve						COV			
Relief Static Press						15 MIN			
Relief Damper						COV			
OA/RA Damper						COV			
OA Flow						15 MIN			

LOGIC VARIABLES		
BINARY	ANALOG	DESCRIPTION
[Occ]		ON WHEN OCCUPIED MODE ACTIVE
[RUN]		ON WHEN UNIT COMMANDED TO START
[SGO]		ON WHEN SUPPLY FAN ENERGIZED AND STATUS PROVEN
[RGO]		ON WHEN RETURN FAN ENERGIZED AND STATUS PROVEN
[MAGO]		ON WHEN CONDITIONS ALLOW ECONOMIZER OPERATION
[OccSP]		ON WHEN THE UNIT IS CONTROLLING TO OCCUPIED SPACE TEMP SETPOINTS
[DHUM]		ON WHEN THE UNIT IS OPERATING IN THE DEHUMIDIFICATION MODE
[FRZ]		ON WHEN A FREEZE CONDITION IS ACTIVE AND IN ALARM
[Fire]		ON WHEN FIRE ALARM IS ACTIVE
[SFTY]		ON WHEN A UNIT SHUTDOWN ALARM IS ON
[HSP]		VARIABLE CALCULATED VALUE OF ACTIVE HEATING SETPOINT
[CSP]		VARIABLE CALCULATED VALUE OF ACTIVE COOLING SETPOINT
[OAT]		VARIABLE VALUE OF OUTSIDE AIR TEMPERATURE
[OAH]		VARIABLE VALUE OF OUTSIDE AIR RELATIVE HUMIDITY
[CCT]		VARIABLE VALUE OF COOLING COIL DISCHARGE AIR TEMPERATURE
[MAT]		VARIABLE VALUE OF MIXED AIR TEMPERATURE
[MINOA]		VARIABLE VALUE OF MIN OA DAMPER POSITION (BASED ON OA FLOW PID OUT)
[DASP]		VARIABLE CALCULATED VALUE OF DISCHARGE TEMPERATURE SETPOINT
[CPCT]		VARIABLE CALCULATED VALUE OF CHW VALVE POSITION
[HPCT]		VARIABLE CALCULATED VALUE OF PH VALVE POSITION
[EPCT]		VARIABLE CALCULATED VALUE OF ECONOMIZER PID OUTPUT
[SFSPD]		VARIABLE CALCULATED VALUE OF THE SUPPLY FAN SPEED OUTPUT
[RHSP]		VARIABLE CALCULATED VALUE OF CHW VALVE POSITION FOR DEHUMIDIFICATION
[HPID]		VARIABLE CALCULATED VALUE OF THE SPACE TEMP HEATING PID LOOP OUTPUT
[CPID]		VARIABLE CALCULATED VALUE OF THE SPACE TEMP COOLING PID LOOP OUTPUT
[RFSPD]		VARIABLE CALCULATED VALUE OF THE RETURN FAN SPEED OUTPUT

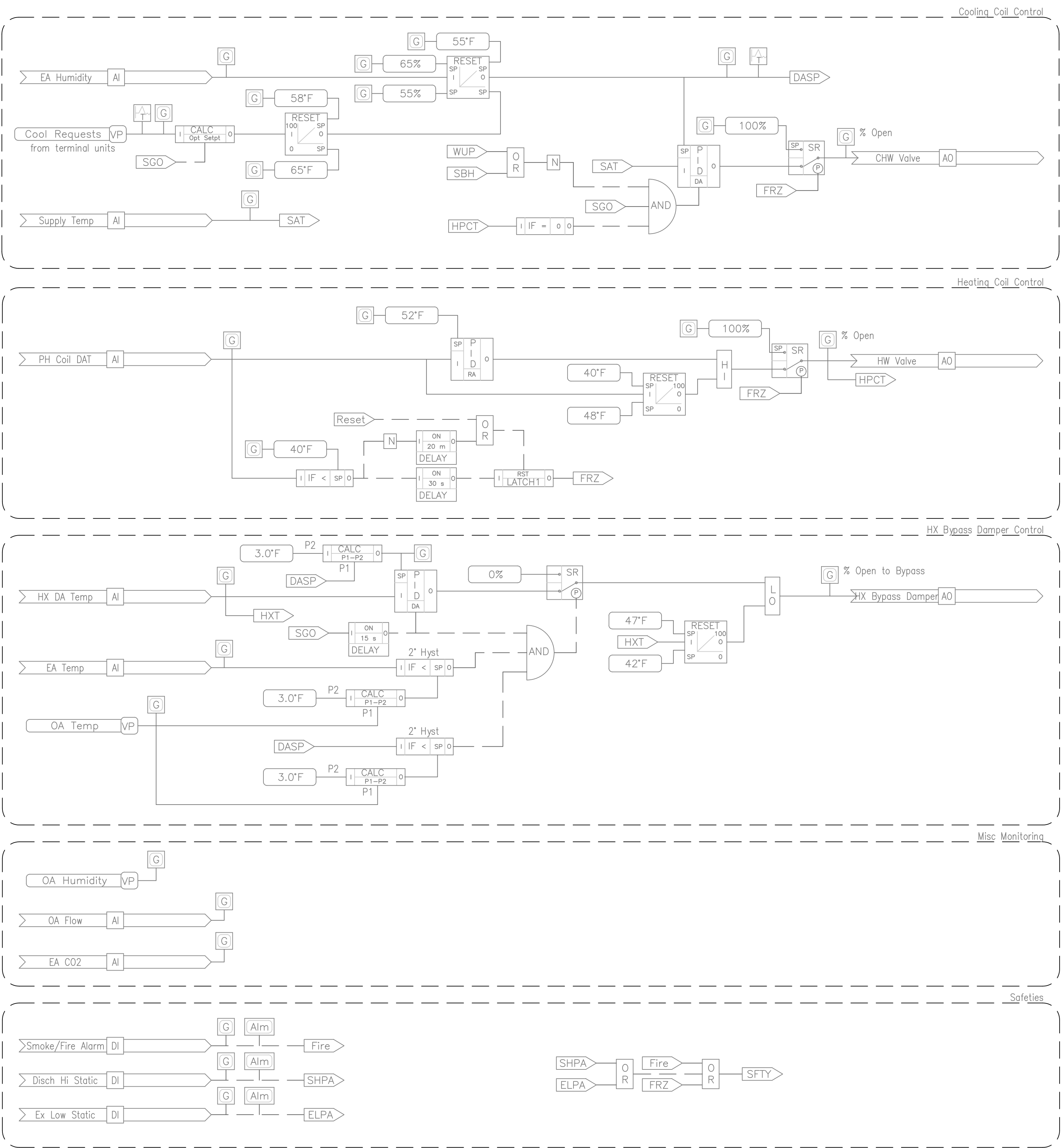


DESIGNER NOTES:

- USE WRITTEN SEQUENCES FOR CONSTRUCTION DOCUMENTS. LOGIC DIAGRAM IS FOR DESIGN REFERENCE ONLY.
- IF EQUIPMENT DIAGRAM IS USED, EDIT POINTS SHOWN TO MATCH VERBIAGE OF SEQUENCE OF OPERATIONS.

[illegible]

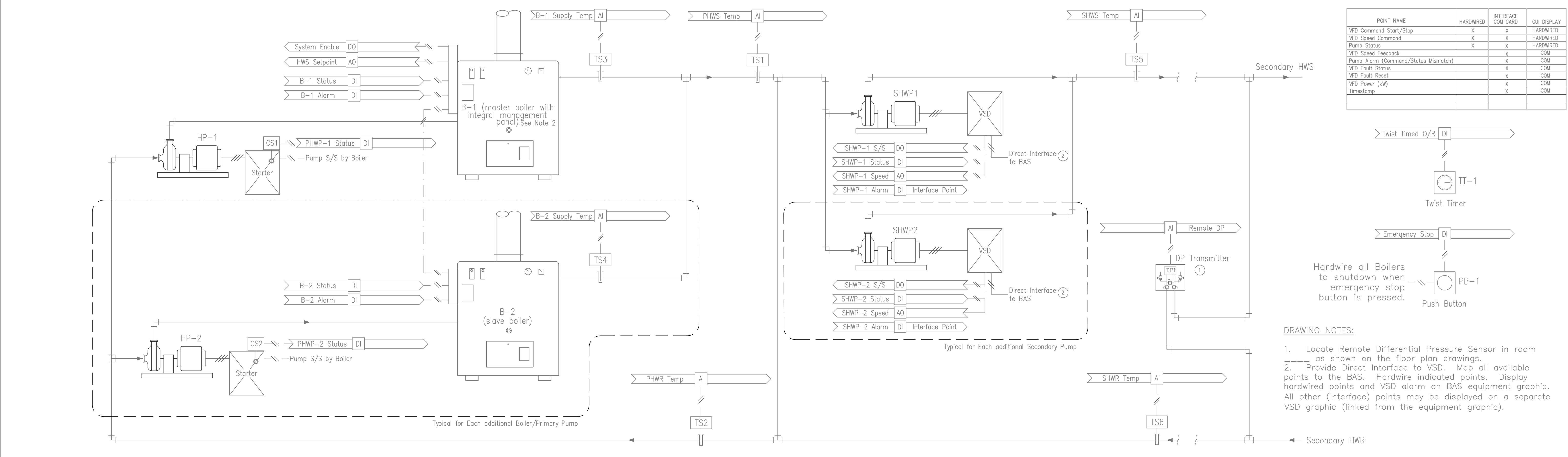
1. Locate DD Static Pressure Sensor 2/3 down duct as indicated on the floor plan drawings.
2. Provide Direct Interface to VSD. Map all available points to the BAS. Hardware indicated points. Display hardwired points and VSD alarm on BAS equipment graphic. All other (interface) points may be displayed on a separate VSD graphic (linked from the equipment graphic).



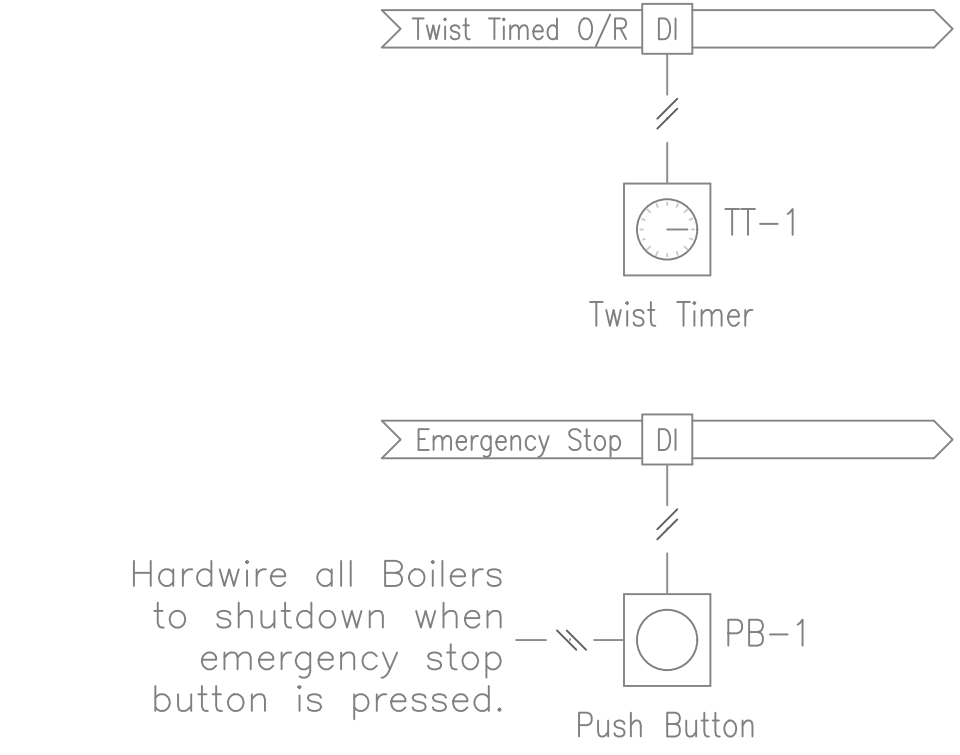
LOGIC VARIABLES		
BINARY	ANALOG	DESCRIPTION
[Occ>		ON WHEN OCCUPIED MODE ACTIVE (see logic diagram for Unocc modes)
[RUN>		ON WHEN UNIT COMMANDED TO START
[SGO>		ON WHEN SUPPLY FAN ENERGIZED AND FAN AND DAMPER STATUS PROVEN
[EGO>		ON WHEN EXHAUST FAN ENERGIZED AND FAN AND DAMPER STATUS PROVEN
[Reset>		ON WHEN USER RESETS ALL LATCHING ALARMS ON THE UNIT (TOGGLE POINT)
[SHPA>		ON WHEN THE SUPPLY HI PRESSURE ALARM IS ACTIVE
[ELPA>		ON WHEN THE EXHAUST LOW PRESSURE ALARM IS ACTIVE
[FRZ>		ON WHEN A FREEZE CONDITION IS ACTIVE AND IN ALARM
[Fire>		ON WHEN FIRE ALARM IS ACTIVE
[SFTY>		ON WHEN A UNIT SHUTDOWN ALARM IS ON
[SFAIL>		ON WHEN SUPPLY SIDE OF THE UNIT IS ASSESSED AS FAILED
[EFAIL>		ON WHEN EXHAUST SIDE OF THE UNIT IS ASSESSED AS FAILED
	[HST>	VARIABLE CALCULATED VALUE OF HIGHEST SPACE TEMPERATURE
	[OAT>	VARIABLE VALUE OF OUTSIDE AIR TEMPERATURE
	[SAT>	VARIABLE VALUE OF SUPPLY AIR TEMPERATURE
	[PHT>	VARIABLE VALUE OF PREHEAT AIR TEMPERATURE
	[HXT>	VARIABLE VALUE OF HEAT EXCHANGER DISCHARGE AIR TEMPERATURE (OA SIDE)
	[MINOA>	VARIABLE VALUE OF MIN OA DAMPER POSITION (BASED ON OA FLOW PID OUT)
	[DASP>	VARIABLE CALCULATED VALUE OF DISCHARGE TEMPERATURE SETPOINT
	[HPCT>	VARIABLE CALCULATED VALUE OF HW VALVE POSITION
	[EPCT>	VARIABLE CALCULATED VALUE OF ECONOMIZER PID OUTPUT
	[SFSPD>	VARIABLE CALCULATED VALUE OF SUPPLY FAN SPEED OUTPUT

A schematic diagram of a safety interlock circuit. It shows a 24V AC power source connected to a series of three safety components: a fuse (FA1), a normally closed contact (DPS1), and another normally closed contact (DPS2). The circuit then passes through a resistor (R1) before returning to the power source. The diagram is labeled "SAFETY INTERLOCK DETAIL" below it.

1. USE WRITTEN SEQUENCES FOR CONSTRUCTION DOCUMENTS. LOGIC DIAGRAM IS FOR DESIGN REFERENCE ONLY.
2. IF EQUIPMENT DIAGRAM IS USED, EDIT POINTS SHOWN TO MATCH VERBIAGE OF SEQUENCE OF OPERATIONS.



POINT NAME	HARDWIRED	INTERFACE COM CARD	GUI DISPLAY
VFD Command Start/Stop	X	X	HARDWIRED
VFD Speed Command	X	X	HARDWIRED
Pump Status	X	X	HARDWIRED
VFD Speed Feedback		X	COM
Pump Alarm (Command/Status Mismatch)		X	COM
VFD Fault Status		X	COM
VFD Fault Reset		X	COM
VFD Power (kW)		X	COM
Timeslamp		X	COM



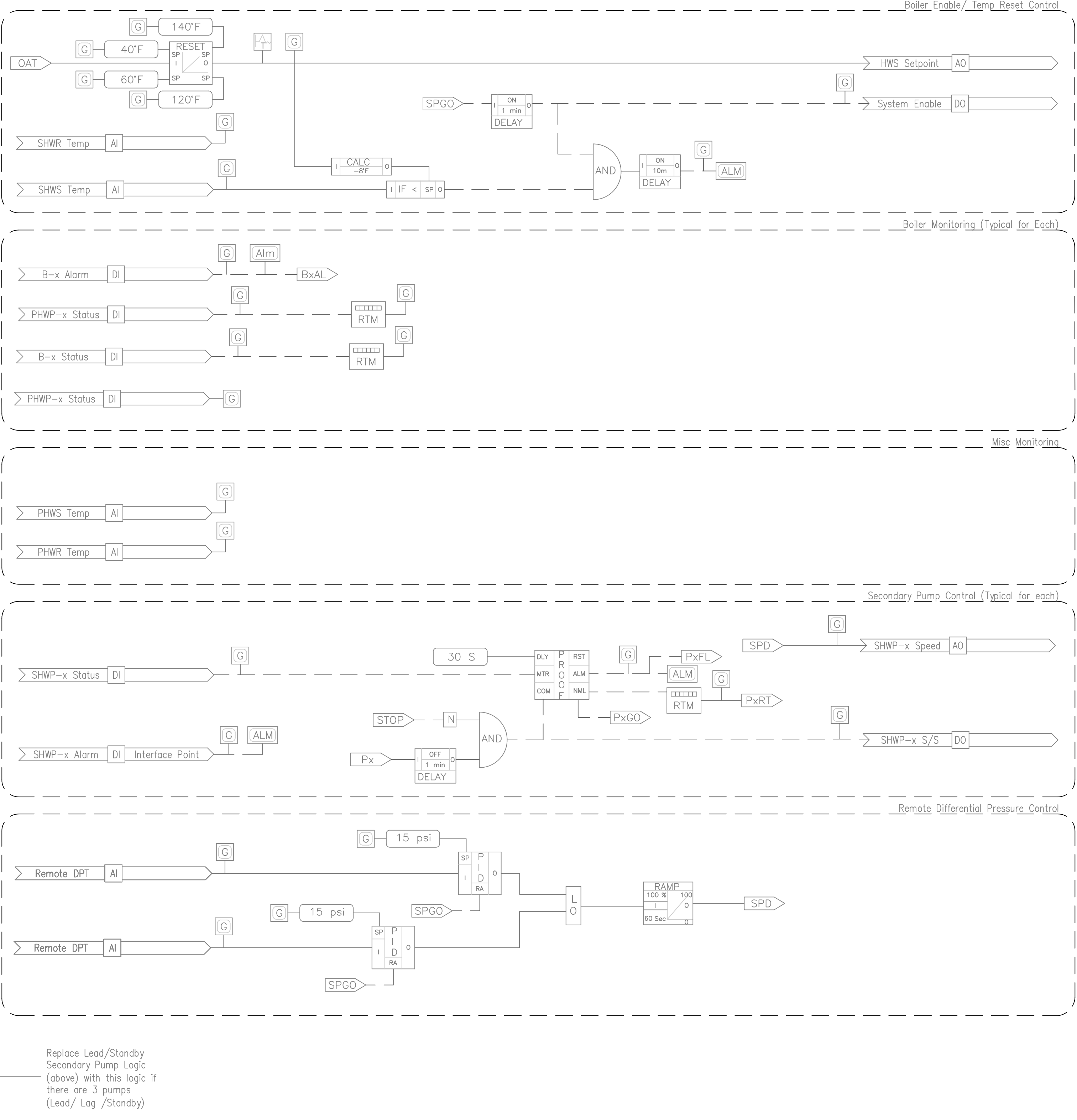
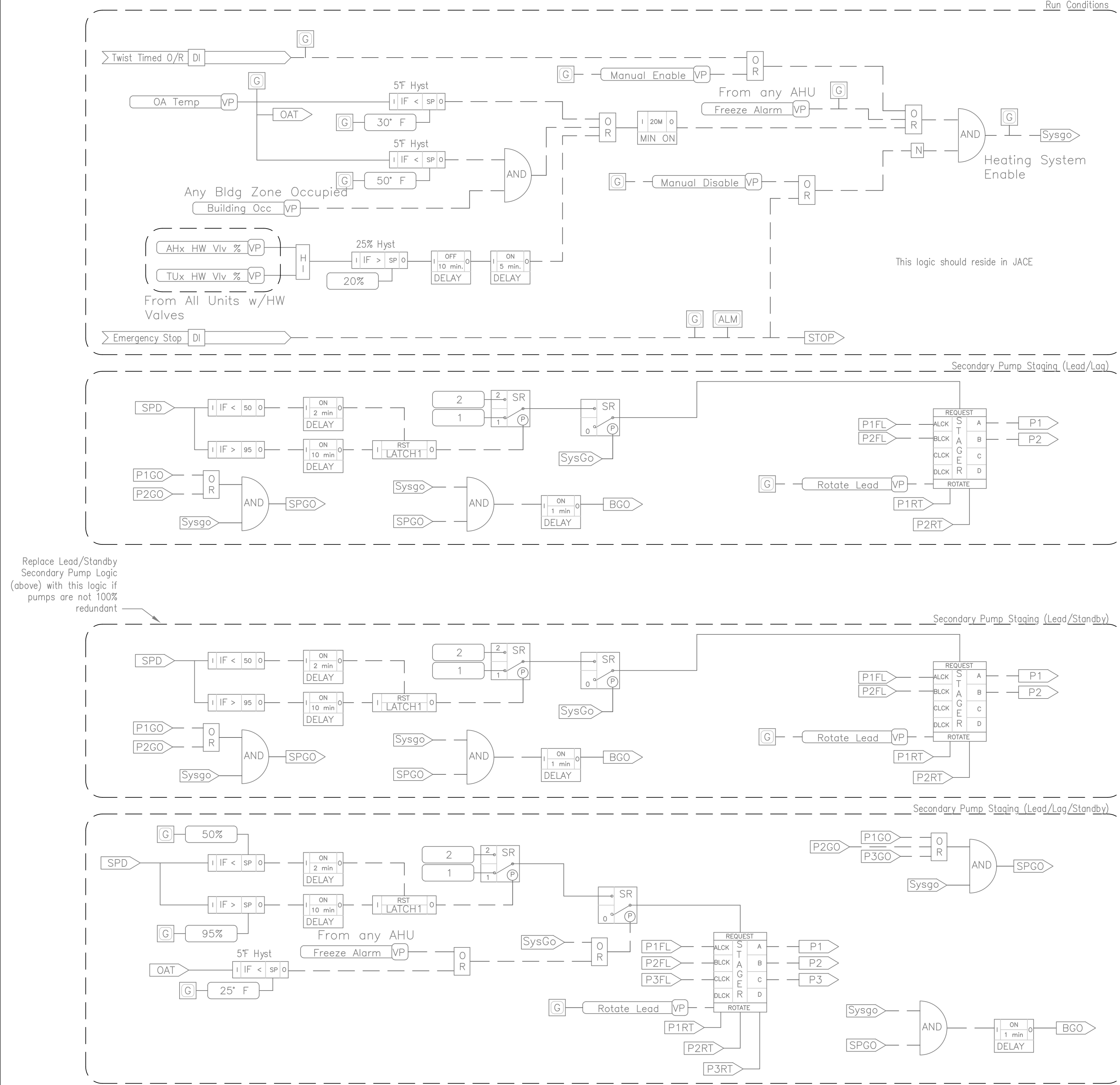
DRAWING NOTES:

1. Locate Remote Differential Pressure Sensor in room as shown on the floor plan drawings
2. Provide Direct Interface to VSD. Map all available points to the BAS. Hardwire indicated points. Display hardwired points and VSD alarm on BAS equipment graphic. All other (interface) points may be displayed on a separate VSD graphic (linked from the equipment graphic).

POINTS LIST									
POINT DESCRIPTOR	POINT TYPE				TREND	ALARM	ALARM CONDITION		REMARKS
	DI	AI	DO	AO					
PHWS Temp		•			15 MIN				
PHWR Temp		•			15 MIN				
System Enable			•		COV				
HWS Setpoint				•	COV				
PHWP-x Status	•				COV				
B-x Supply Temp		•			15 MIN				
B-x Alarm	•				COV	•			
B-x Status		•			COV				
Remote DP		•			15 MIN				Typical for each
SHWP-x S/S			•		COV				
SHWP-x Status	•				COV				
SHWP-x Speed				•	COV				
SHWP-x Alarm	•				COV	•	NOT EQUAL TO COMMAND		Interface Point
SHWS Temp		•			15 MIN				
SHWR Temp		•			15 MIN				
Twist Timed O/R	•								
Emergency Stop	•								
Outdoor Temp		•			15 MIN				
Outdoor Humidity		•			15 MIN				
Outdoor Enthalpy		•			15 MIN				

LOGIC VARIABLES

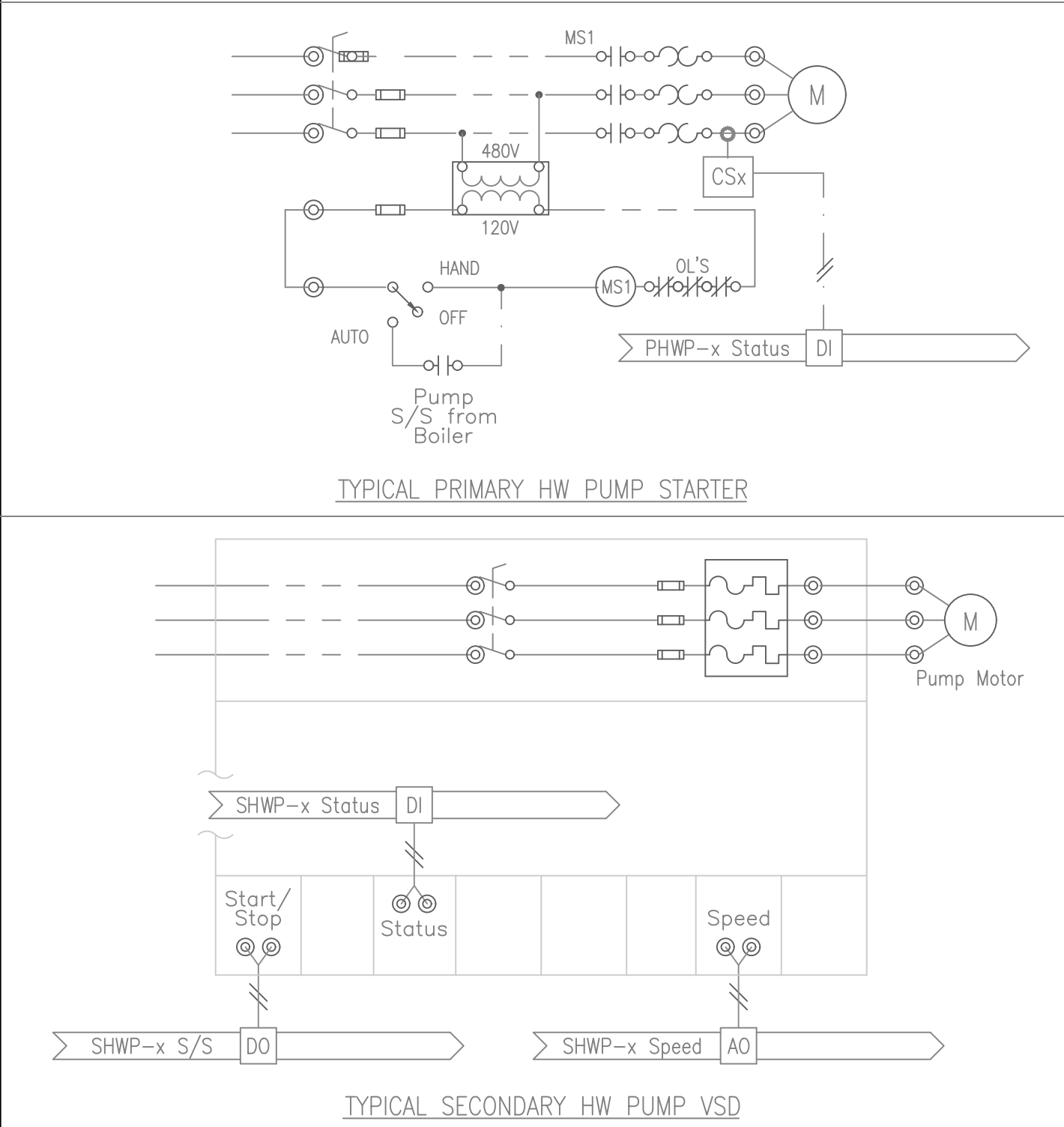
BINARY	ANALOG	DESCRIPTION
[Sysgo]		ON WHEN CHILLED WATER SYSTEM IS REQUESTED TO RUN
[Px]		ON WHEN PUMP Px IS REQUESTED TO RUN
[PxGO]		ON WHEN PUMP Px IS REQUESTED TO RUN AND STATUS IS PROVEN
[SPGO]		ON WHEN EITHER SECONDARY PUMP IS REQUESTED AND STATUS IS PROVEN
[STOP]		ON WHEN THE EMERGENCY STOP BUTTON IS ON
[PxFL]		ON WHEN SECONDARY PUMP Px IS ASSESSED AS FAILED
[PPxFL]		ON WHEN PRIMARY PUMP Px IS ASSESSED AS FAILED
[BxAL]		ON WHEN BOILER B-x's ALARM POINT IS ON
[BxRT]		TOTALIZED VALUE OF BOILER B-x's RUNTIME
[PxRT]		TOTALIZED VALUE OF PUMP Px's RUNTIME
[OAT]		VARIABLE VALUE OF OUTSIDE AIR TEMPERATURE
[SPD]		VARIABLE CALCULATED VALUE OF REMOTE DP PID LOOP OUTPUT (PUMP SPEED)
[BFR]		VARIABLE CALCULATED VALUE OF THE BOILER FIRING RATE

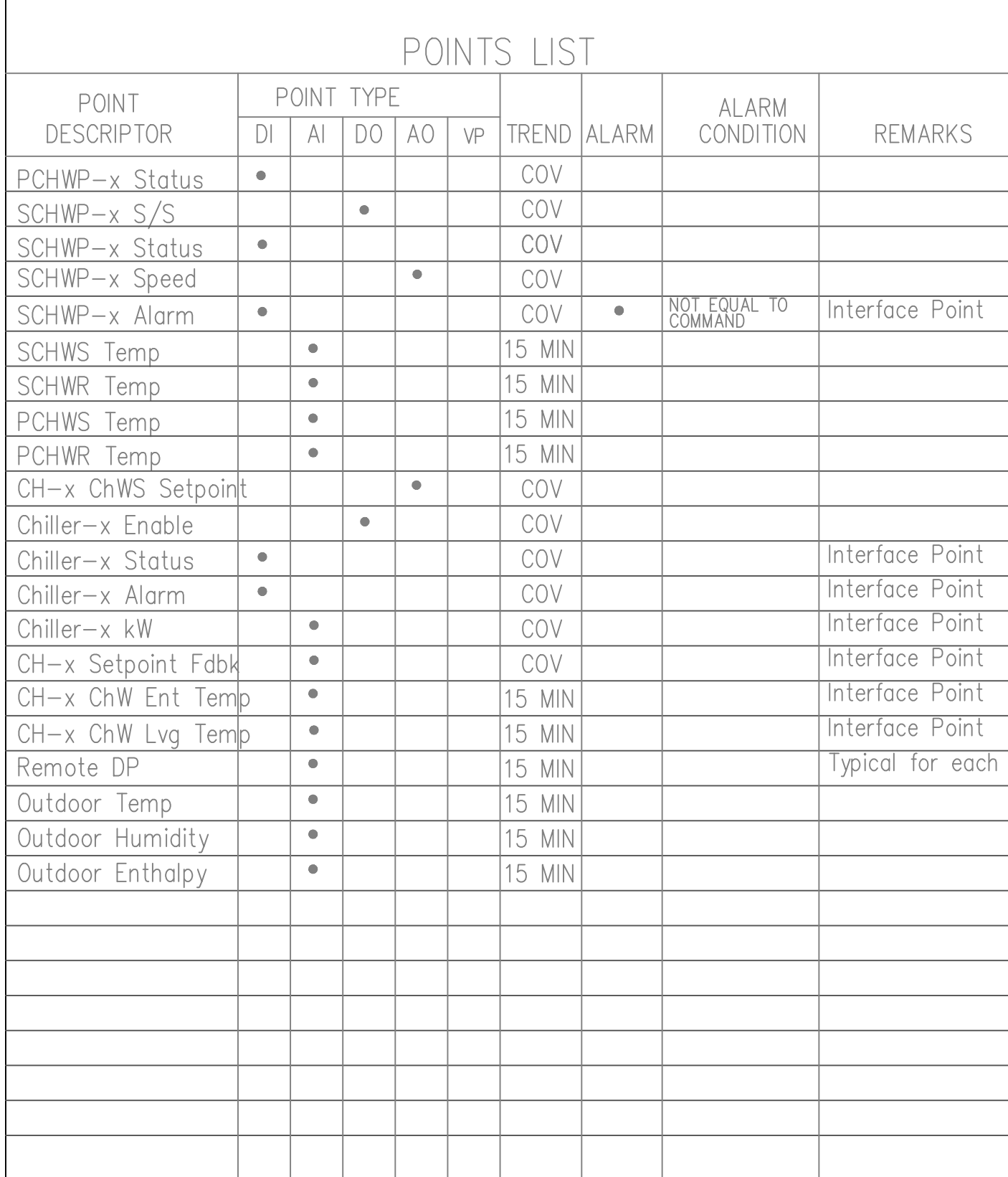


DESIGNER NOTES:

1. USE WRITTEN SEQUENCES FOR CONSTRUCTION DOCUMENTS. LOGIC DIAGRAM IS FOR DESIGN REFERENCE ONLY.
2. IF EQUIPMENT DIAGRAM IS USED, EDIT POINTS SHOWN TO MATCH VERBIAGE OF SEQUENCE OF OPERATIONS.

ELECTRIC LADDER DIAGRAM

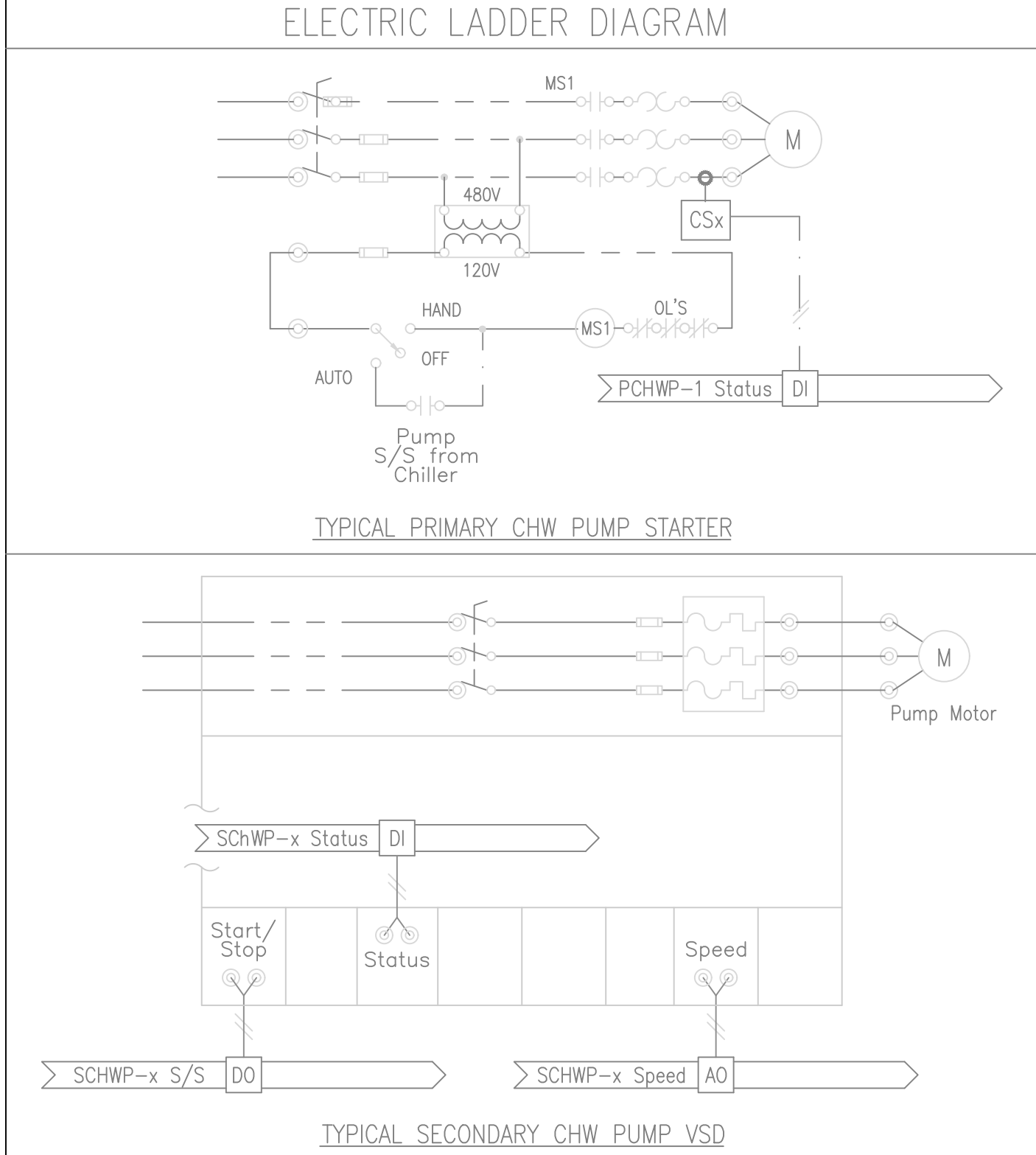




LOGIC VARIABLES		
BINARY	ANALOG	DESCRIPTION
☐ SysGO		ON WHEN CHILLED WATER SYSTEM IS REQUESTED TO RUN
☐ PxGO		ON WHEN SECONDARY PUMP Px IS REQUESTED TO RUN AND STATUS IS PROVEN
☐ Px		ON WHEN SECONDARY PUMP Px IS REQUESTED TO RUN
☐ CHGO		ON WHEN THE PRIMARY SYSTEM IS REQUESTED TO RUN
☐ SPGO		ON WHEN ANY SECONDARY PUMP IS REQUESTED AND STATUS IS PROVEN
☐ Cx		ON WHEN THE CHILLER-x IS ENABLED
☐ CxFL		ON WHEN THE CHILLER-x IS ASSESSED AS FAILED
☐ LAG		ON WHEN THE LAG CHILLER IS REQUESTED

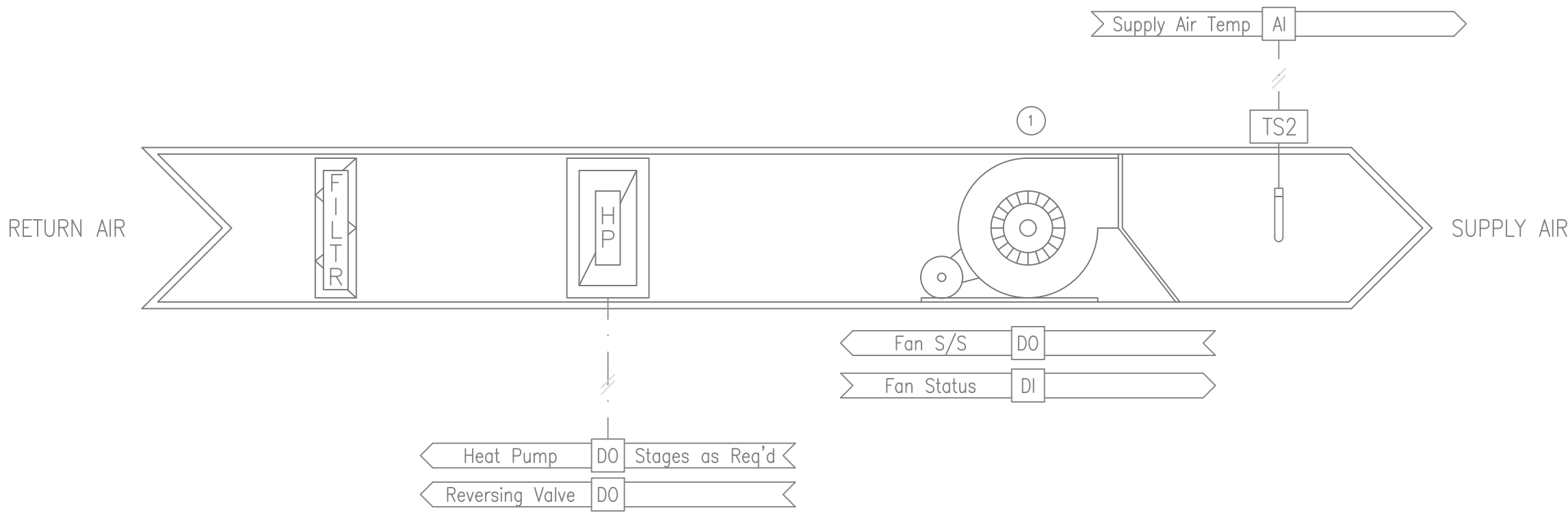
DRAWING NOTES:

1. Typical for each, quantity as indicated. Locate Remote Differential Pressure Sensors in rooms _____ as shown on the floor plan drawings. Control to lowest reading if more than 1 required.
2. Provide Direct Interface to VSD. Map all available points to the BAS. Hardwire indicated points. Display hardwired points and VSD alarm on BAS equipment graphic. All other (interface) points may be displayed on a separate VSD graphic (linked from the equipment graphic). Reference VSD Schematic/Logic detail for more information.
3. Provide Direct Interface to Chiller. Map all available points to the BAS. Hardwire indicated points. Display hardwired points and Chiller alarm on BAS System graphic. All other (interface) points may be displayed on a separate Chiller graphic (linked from the System graphic).



DESIGNER NOTES:

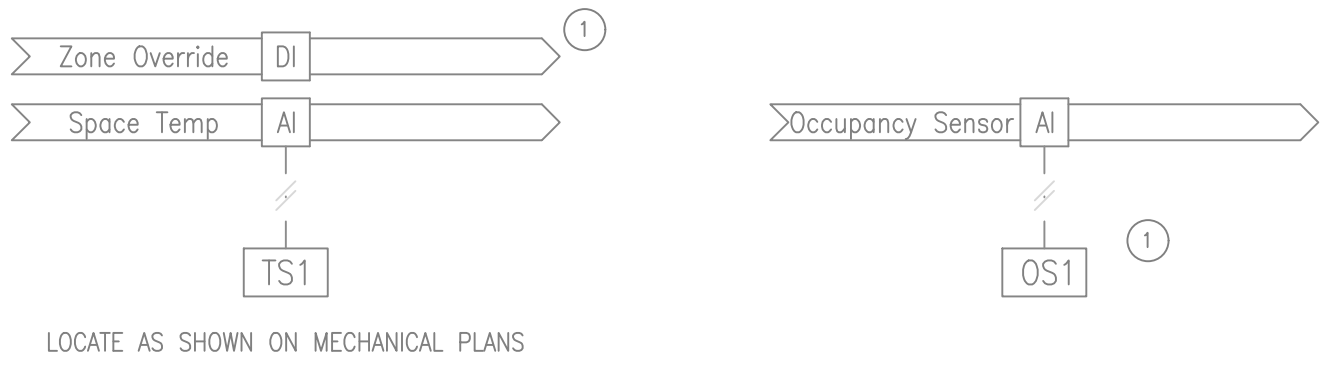
1. USE WRITTEN SEQUENCES FOR CONSTRUCTION DOCUMENTS. LOGIC DIAGRAM IS FOR DESIGN REFERENCE ONLY.
2. IF EQUIPMENT DIAGRAM IS USED, EDIT POINTS SHOWN TO MATCH VERBIAGE OF SEQUENCE OF OPERATIONS.



NOTES

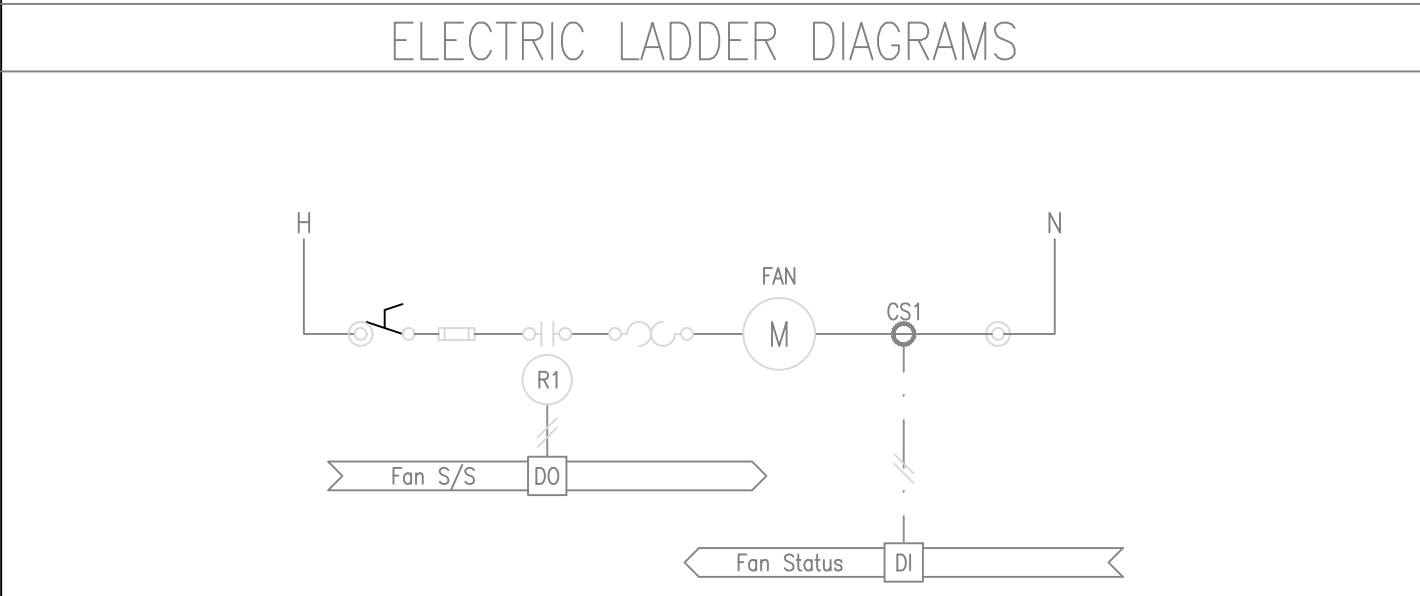
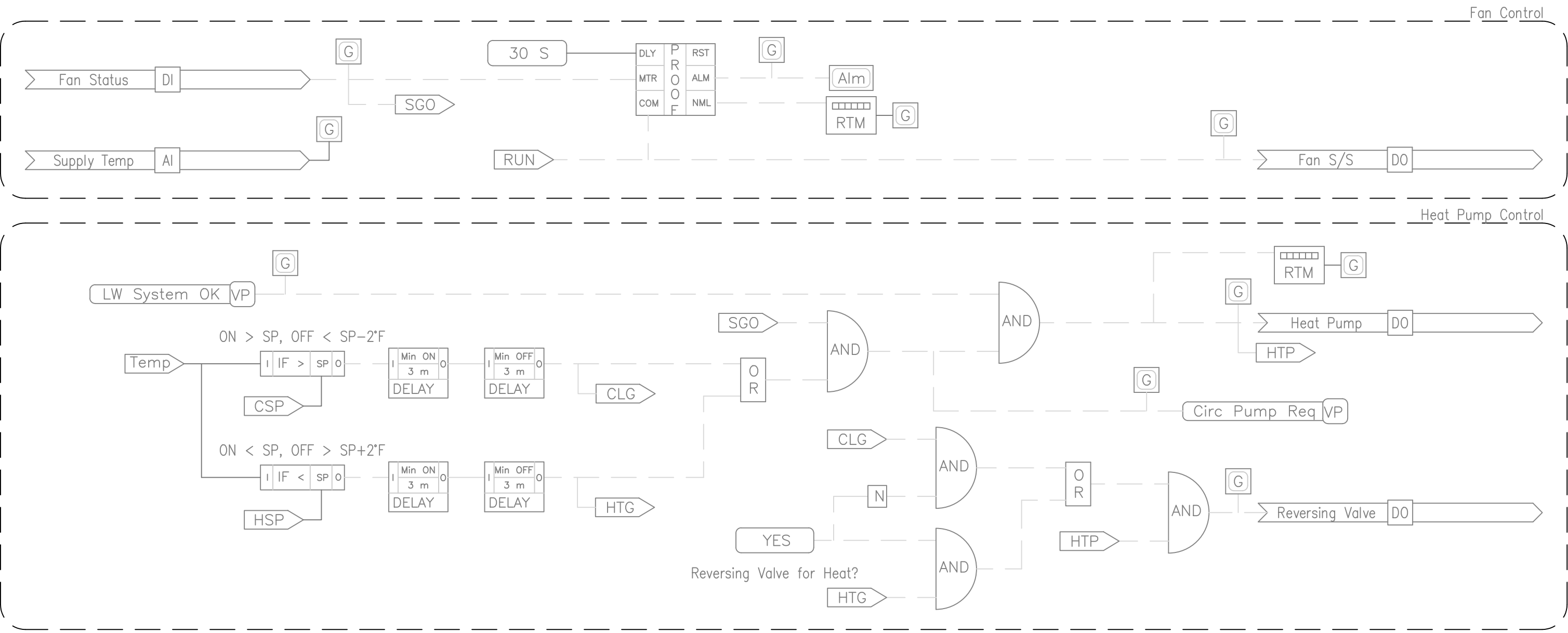
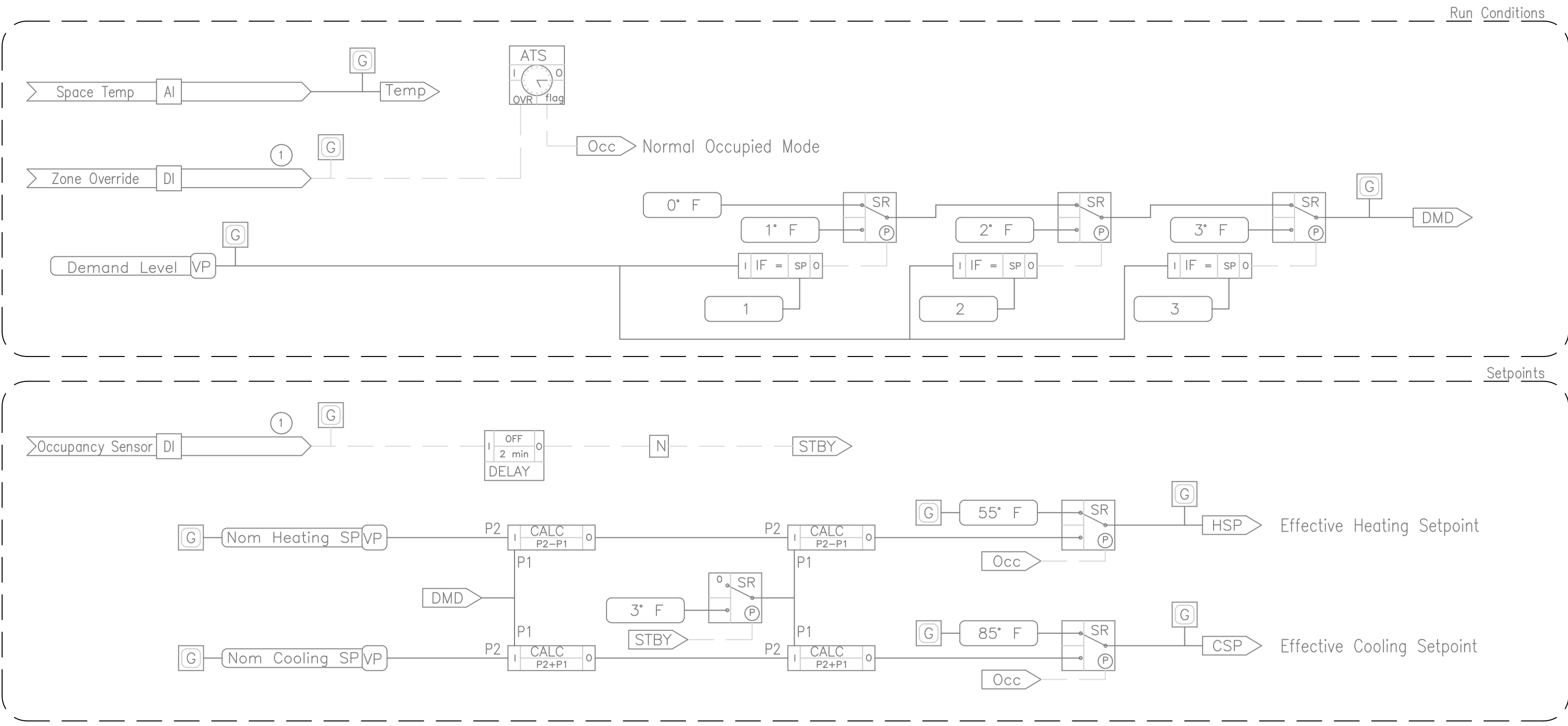
1. Where applicable

2. Physical configuration of FCU to be determined by designer including draw-through or blow-through fan



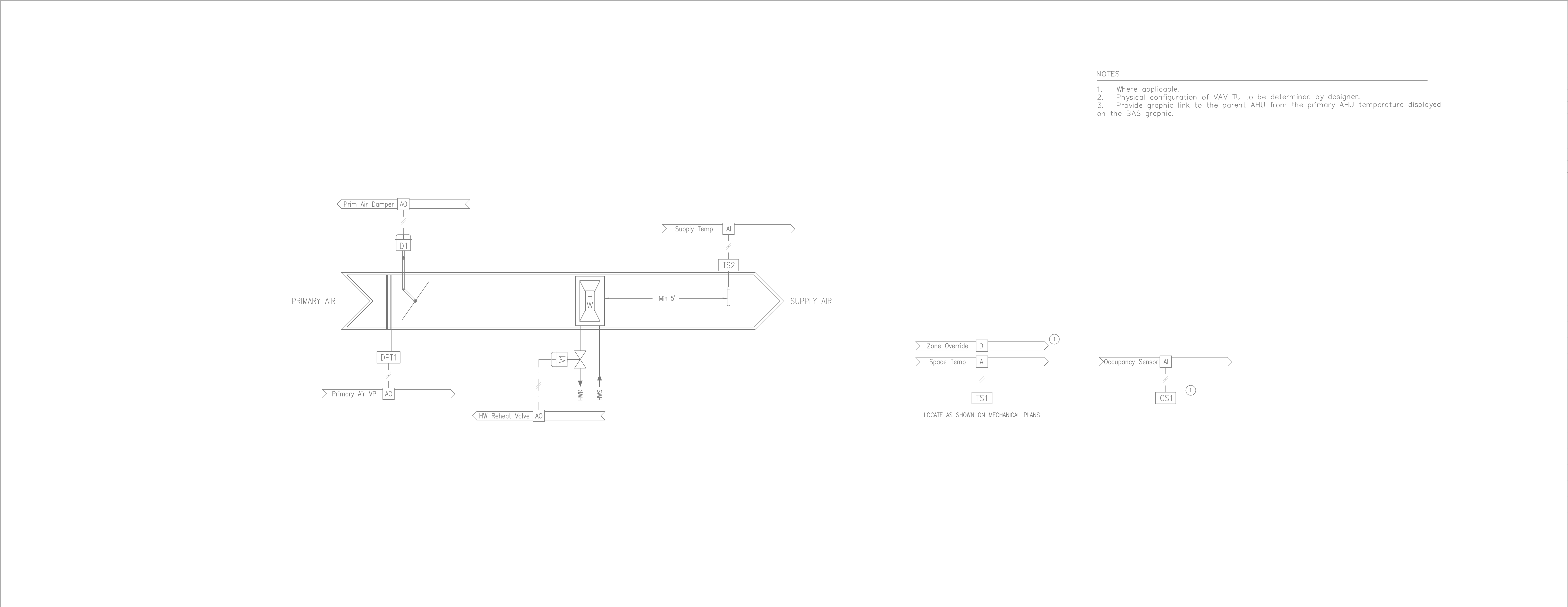
POINTS LIST									
POINT DESCRIPTOR	POINT TYPE					TREND	ALARM	ALARM CONDITION	REMARKS
	DI	AI	DO	AO	VP				
Space Temp		•				15 MIN			
Occupancy Sensor	•					COV			Where Applicable
Zone Override	•					COV			Where Applicable
Heat Pump			•			COV			
Reversing Valve			•			COV			
Fan S/S			•			COV			
Fan Status	•					COV			
Supply Air Temp		•				15 MIN			
Alarm	•					COV	•		

LOGIC VARIABLES		
BINARY	ANALOG	DESCRIPTION
[Occ]		ON WHEN OCCUPIED MODE ACTIVE
[RUN]		ON WHEN FCU REQUESTED TO RUN
[SGO]		ON WHEN SUPPLY FAN IS PROVEN ON
[HTG]		ON WHEN ZONE REQUIRES HEATING
[CLG]		ON WHEN ZONE REQUIRES COOLING
[HTP]		ON WHEN THE HEAT PUMP COMPRESSOR IS ENABLED
[Temp]		VARIABLE VALUE OF SPACE TEMPERATURE
[HSP]		VARIABLE VALUE OF THE HEATING SPACE TEMPERATURE SETPOINT
[CSP]		VARIABLE VALUE OF THE COOLING SPACE TEMPERATURE SETPOINT



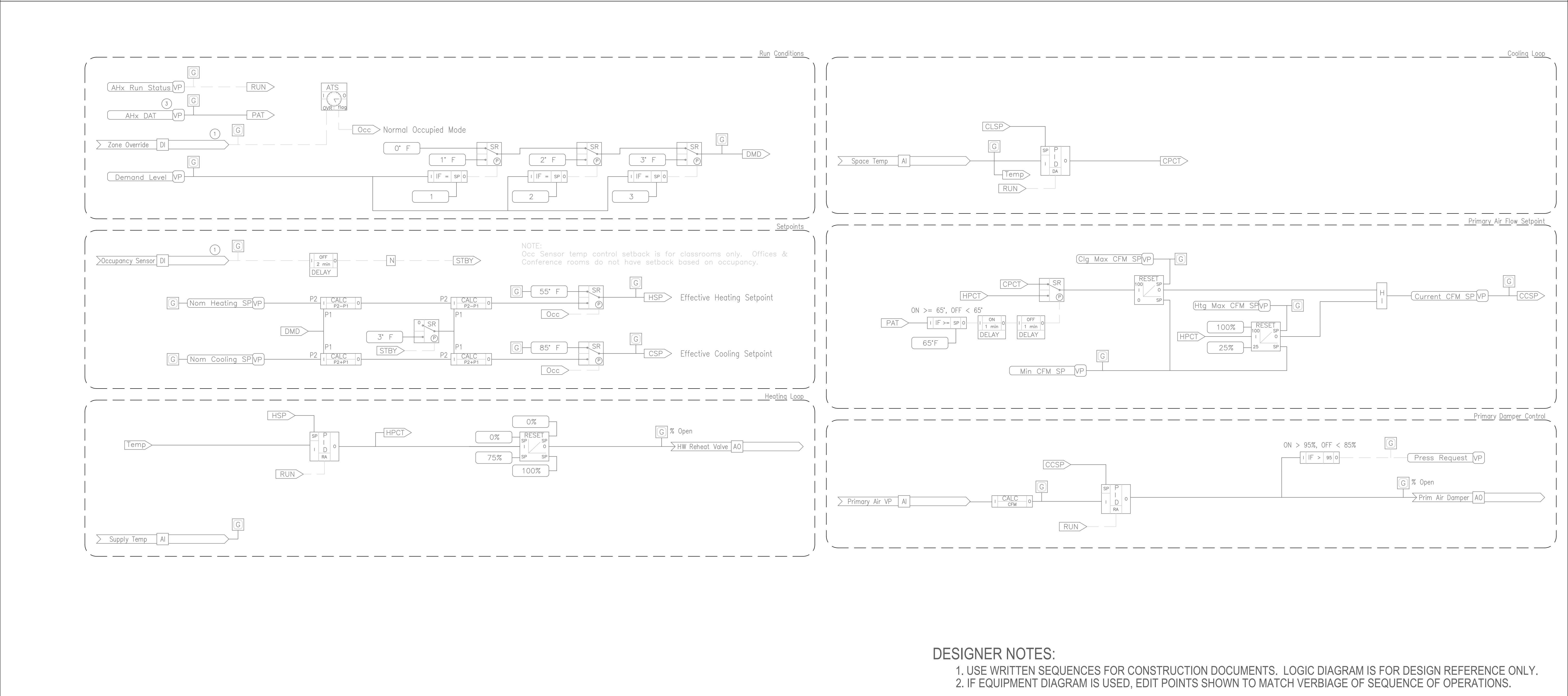
DESIGNER NOTES:

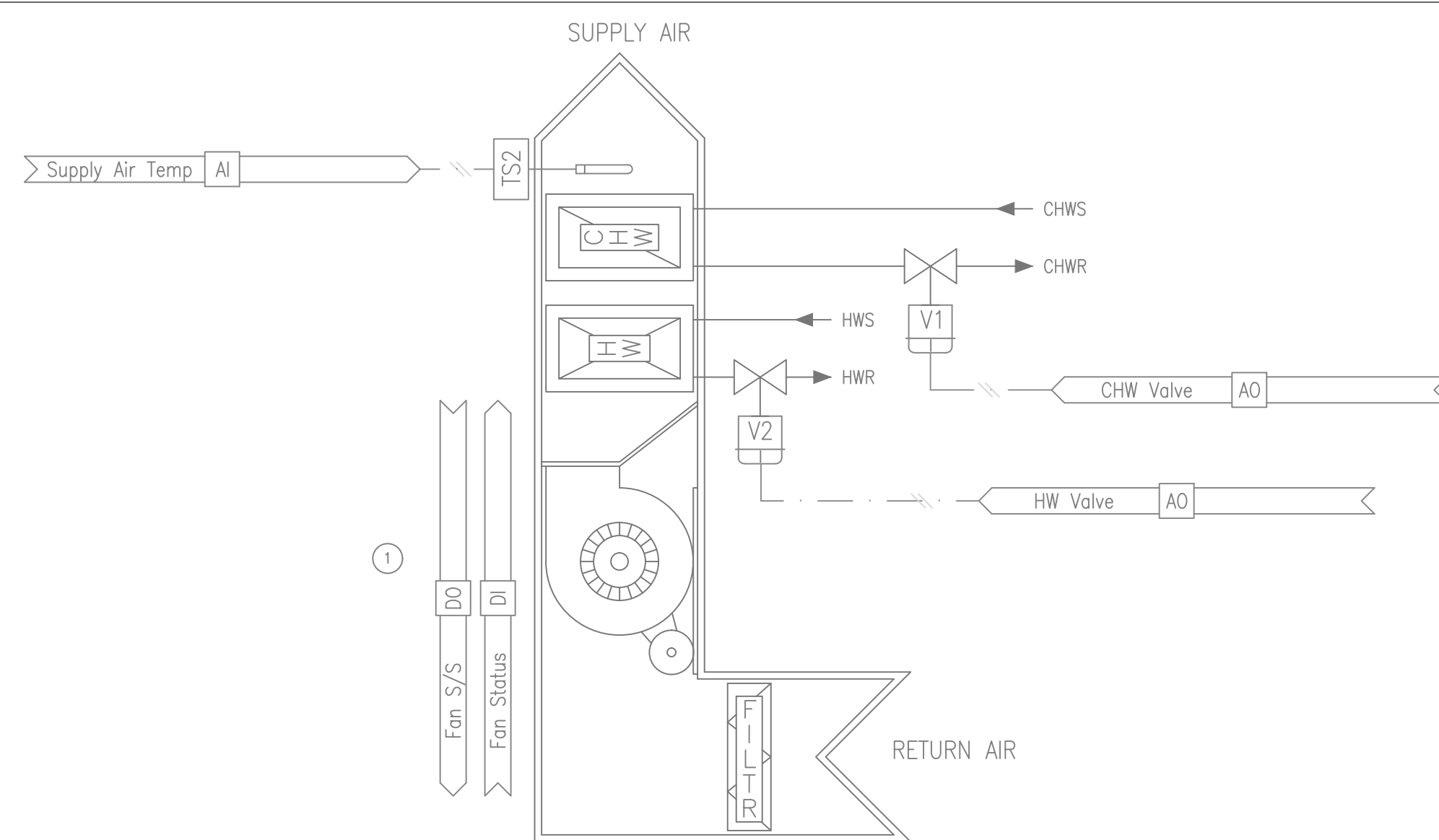
1. USE WRITTEN SEQUENCES FOR CONSTRUCTION DOCUMENTS. LOGIC DIAGRAM IS FOR DESIGN REFERENCE ONLY.
2. IF EQUIPMENT DIAGRAM IS USED, EDIT POINTS SHOWN TO MATCH VERBIAGE OF SEQUENCE OF OPERATIONS.



POINTS LIST									
POINT DESCRIPTOR	POINT TYPE					TREND	ALARM	ALARM CONDITION	REMARKS
	DI	AI	DO	AO	VP				
Space Temp		•				15 MIN			
Prim Air Damper				•		COV			
Primary Air VP		•				15 MIN			
Supply Air Temp		•				15 MIN			
HW Reheat Valve				•		COV			
Setpoint Adjust		•				COV			
Zone Override	•								

LOGIC VARIABLES									
BINARY	ANALOG	DESCRIPTION							
Occ		ON WHEN OCCUPIED MODE ACTIVE							
RUN		ON WHEN UNIT COMMANDED TO START							
STBY		ON WHEN ZONE IS IN THE "STANDBY" MODE (OCCUPANCY SENSOR NOT ON)							
	Temp	VARIABLE VALUE OF SPACE TEMPERATURE							
	HSP	VARIABLE CALCULATED VALUE OF ACTIVE HEATING SETPOINT							
	CSP	VARIABLE CALCULATED VALUE OF ACTIVE COOLING SETPOINT							
	CCSP	VARIABLE CALCULATED VALUE OF CURRENT CFM SETPOINT							
	CPCT	VARIABLE CALCULATED VALUE OF THE COOLING LOOP OUTPUT (COOLING %)							
	HPCT	VARIABLE CALCULATED VALUE OF THE HEATING LOOP OUTPUT (HEATING %)							
	PAT	VARIABLE VALUE OF THE PRIMARY AIR TEMPERATURE (PARENT AHU TEMP)							
	DMD	VARIABLE VALUE OF THE DEMAND LEVEL SPACE TEMPERATURE SETPT OFFSET							





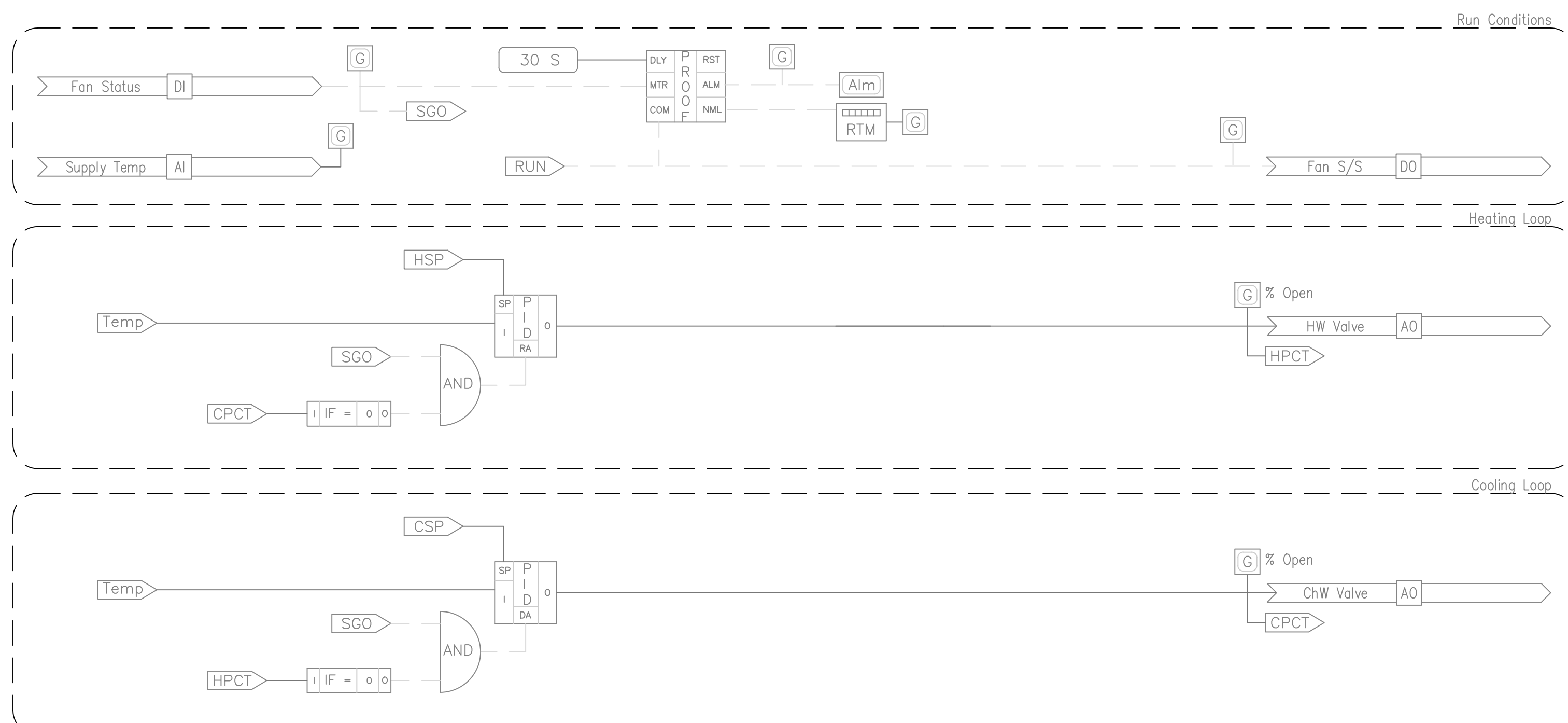
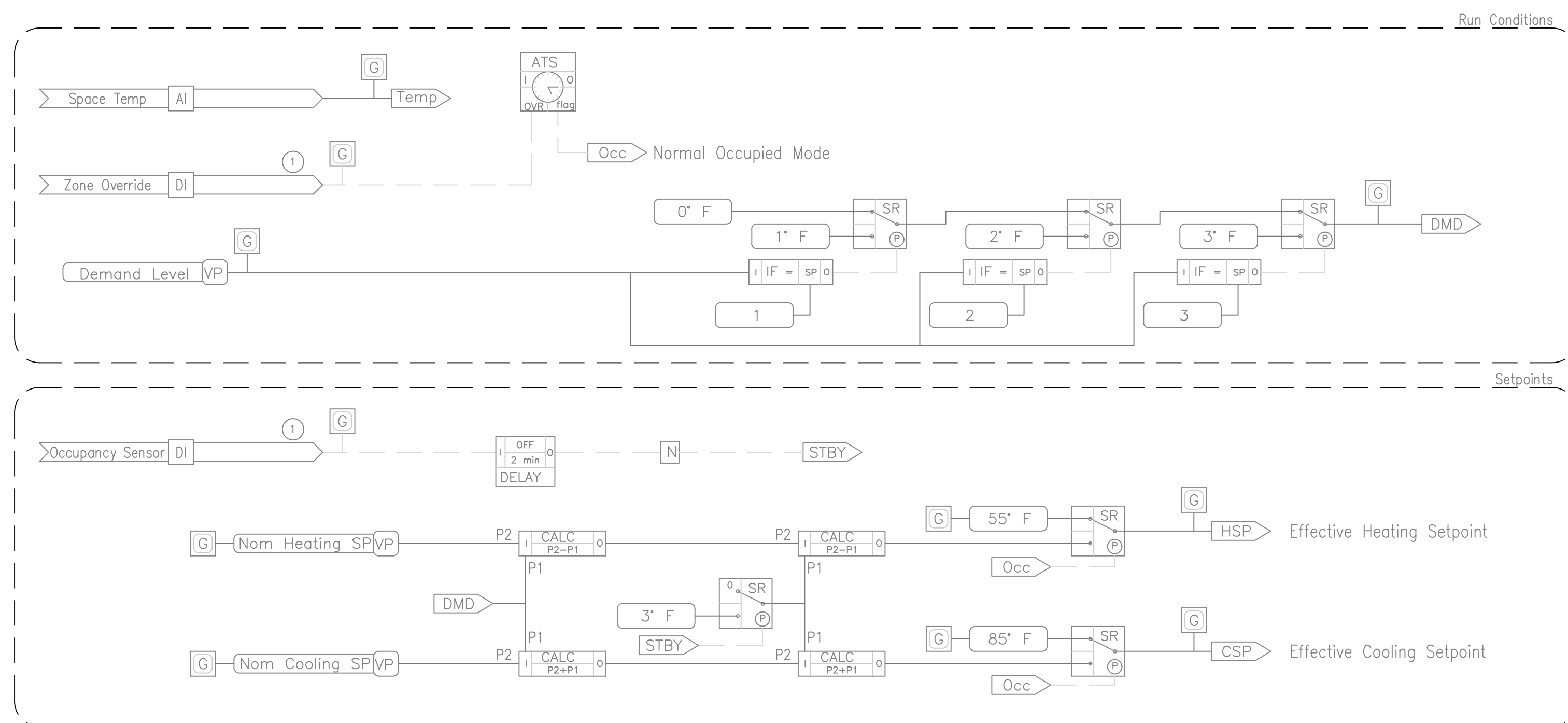
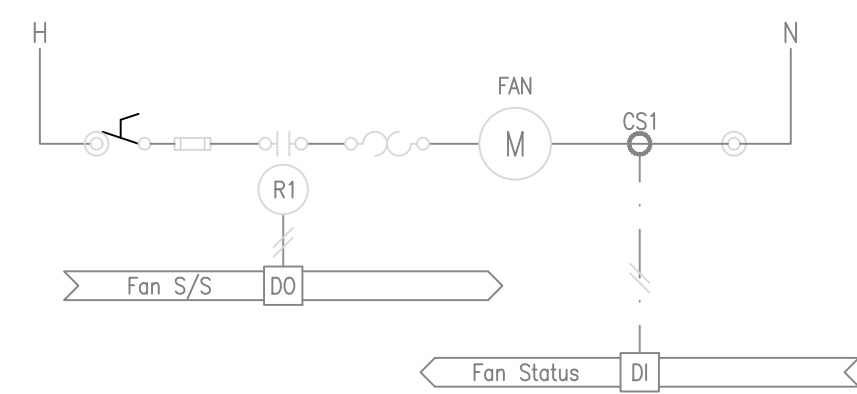
NOTES

1. Where applicable.
2. Physical configuration of FCU to be determined by designer including draw-through or blow-through fan.

[illegible]

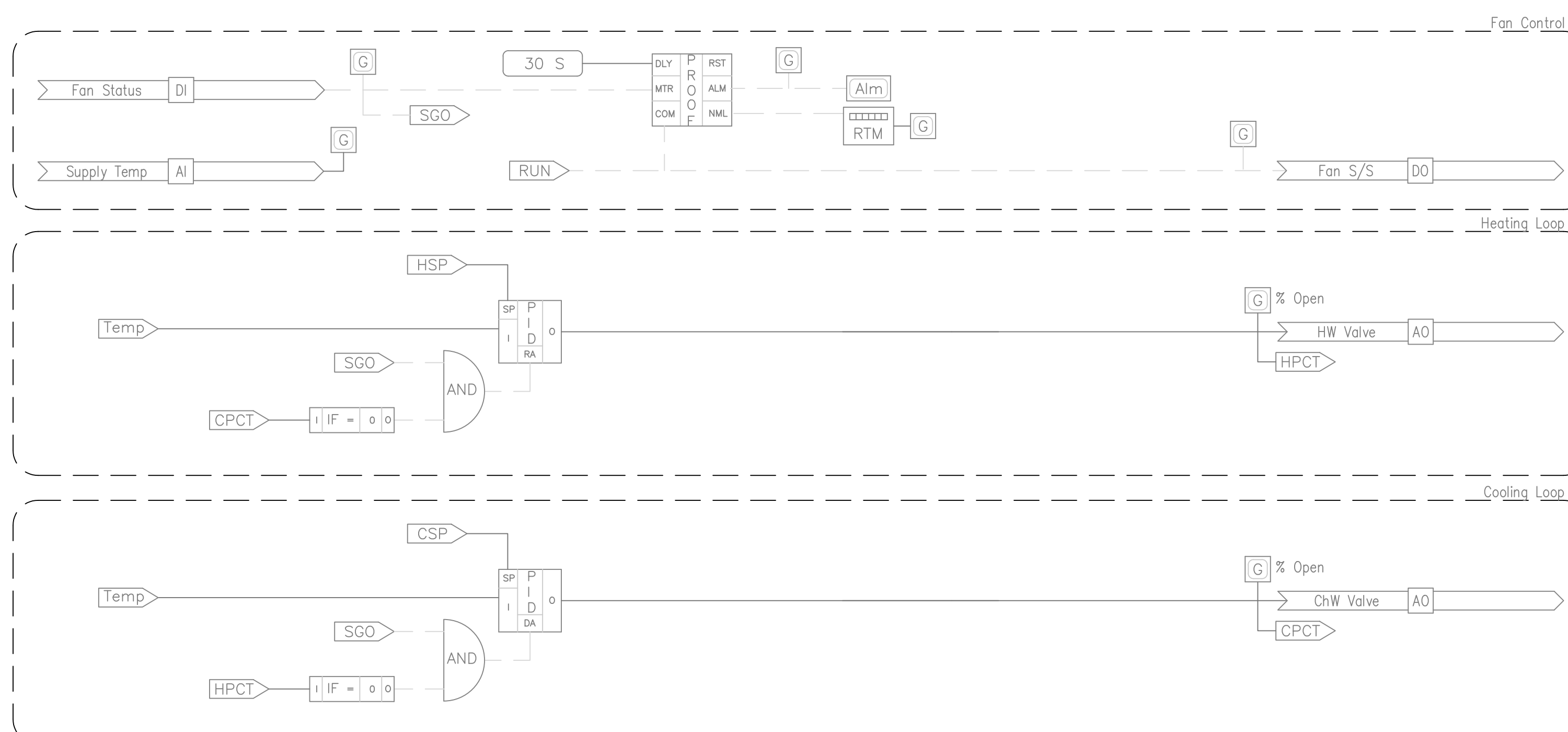
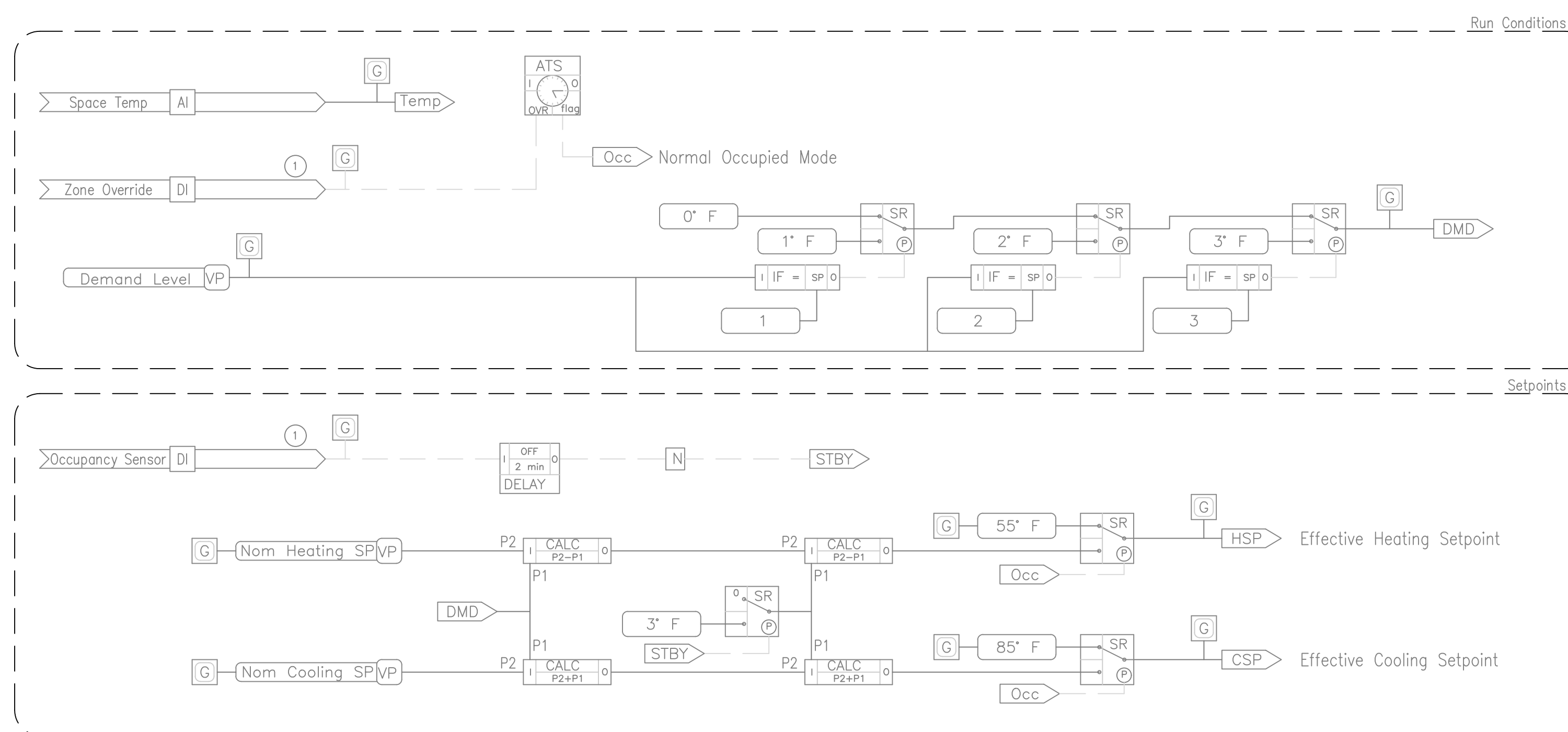
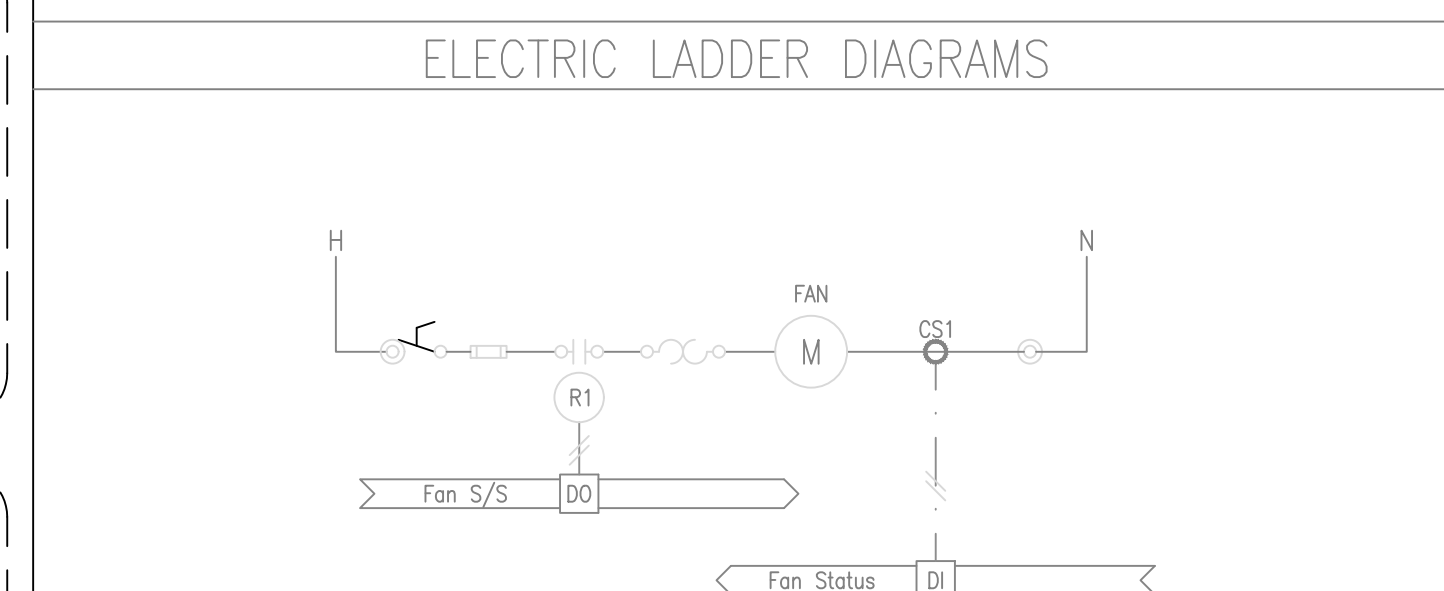
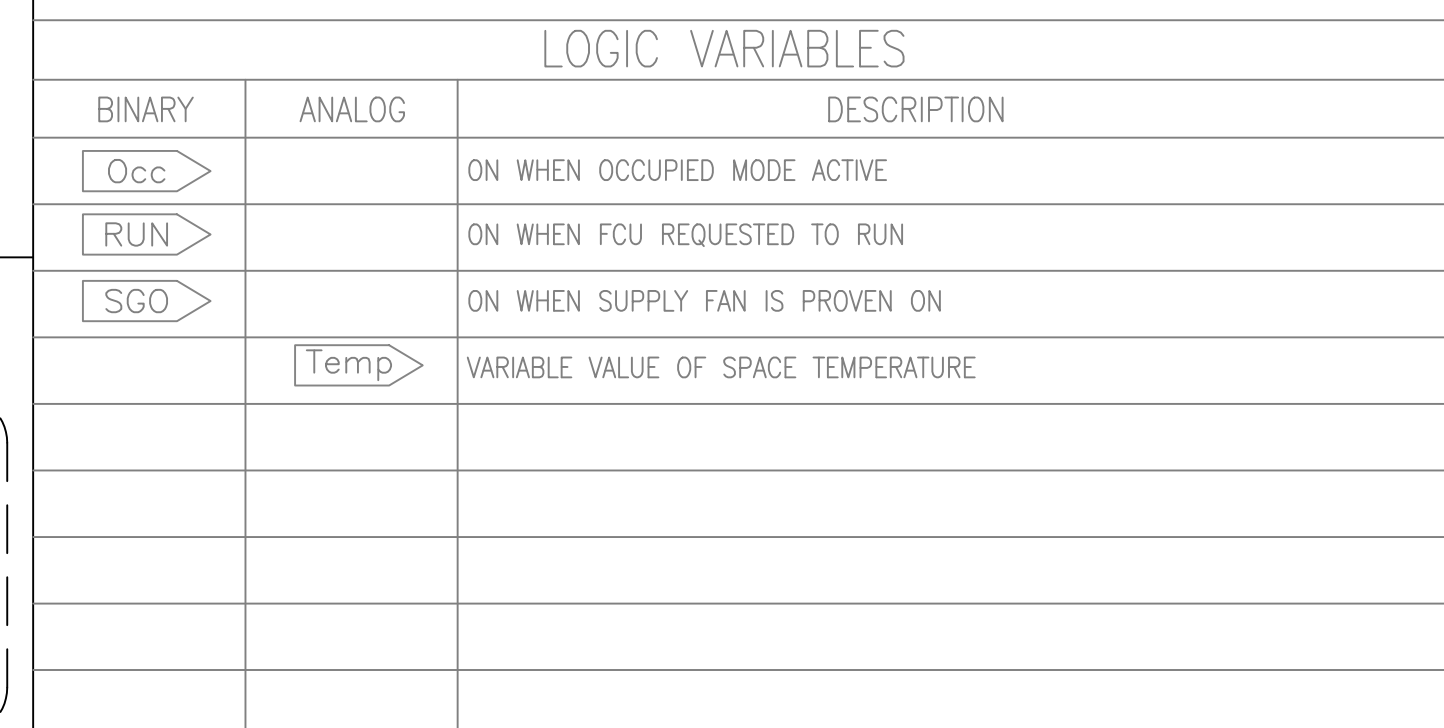
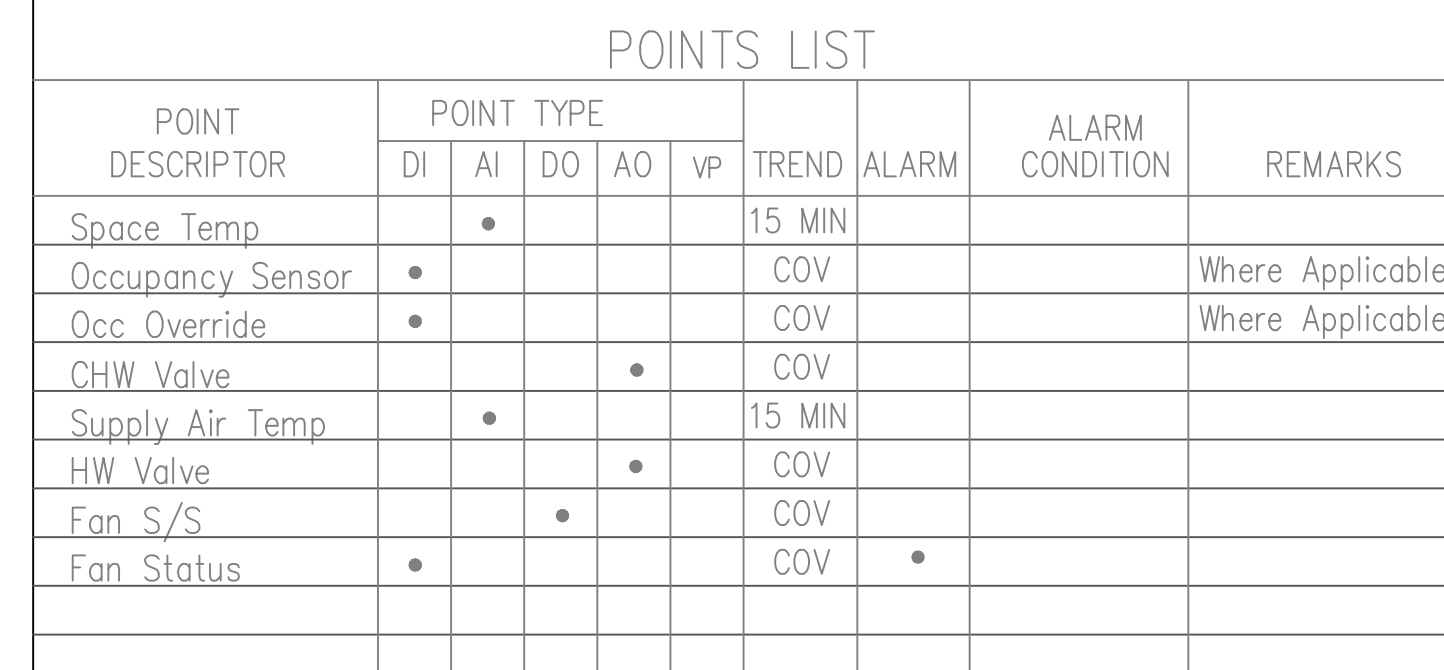
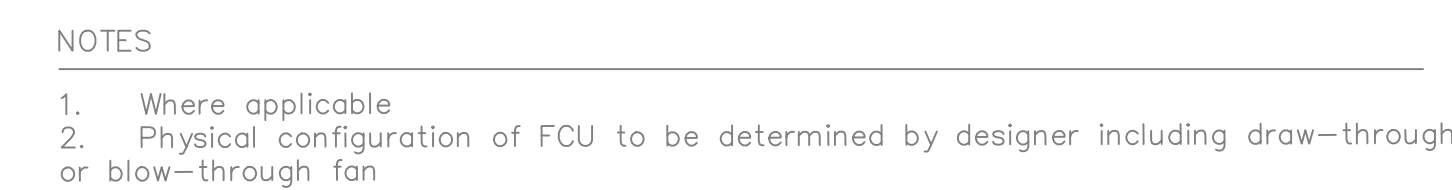
LOGIC VARIABLES		
BINARY	ANALOG	DESCRIPTION
		ON WHEN OCCUPIED MODE ACTIVE
		ON WHEN SETBACK HEATING MODE ACTIVE
		ON WHEN SETBACK COOLING MODE ACTIVE
		ON WHEN FCU REQUESTED TO RUN
		ON WHEN SUPPLY FAN IS PROVEN ON
		VARIABLE VALUE OF SPACE TEMPERATURE

ELECTRIC LADDER DIAGRAMS



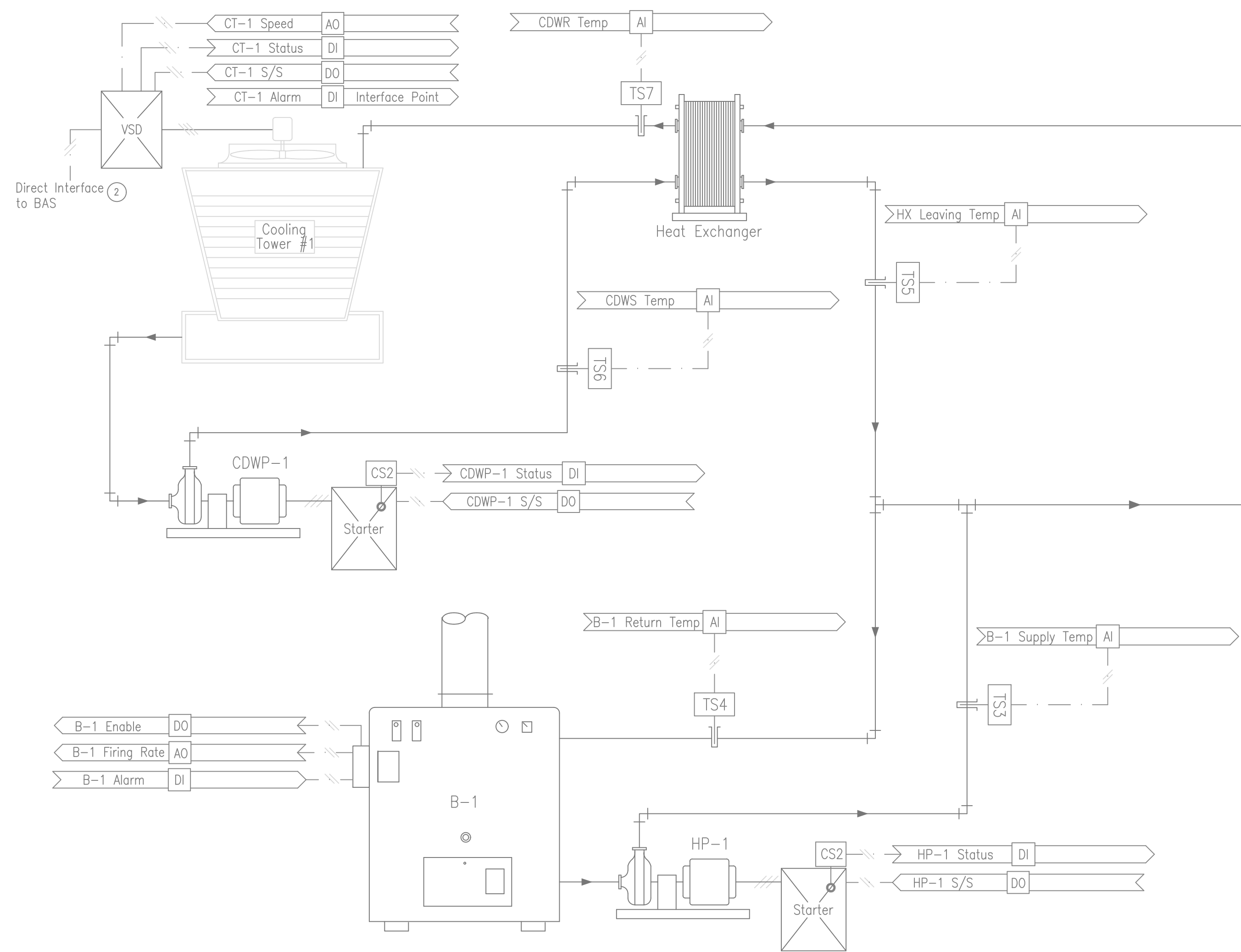
DESIGNER NOTES:

1. USE WRITTEN SEQUENCES FOR CONSTRUCTION DOCUMENTS. LOGIC DIAGRAM IS FOR DESIGN REFERENCE ONLY.
2. IF EQUIPMENT DIAGRAM IS USED, EDIT POINTS SHOWN TO MATCH VERBIAGE OF SEQUENCE OF OPERATIONS.



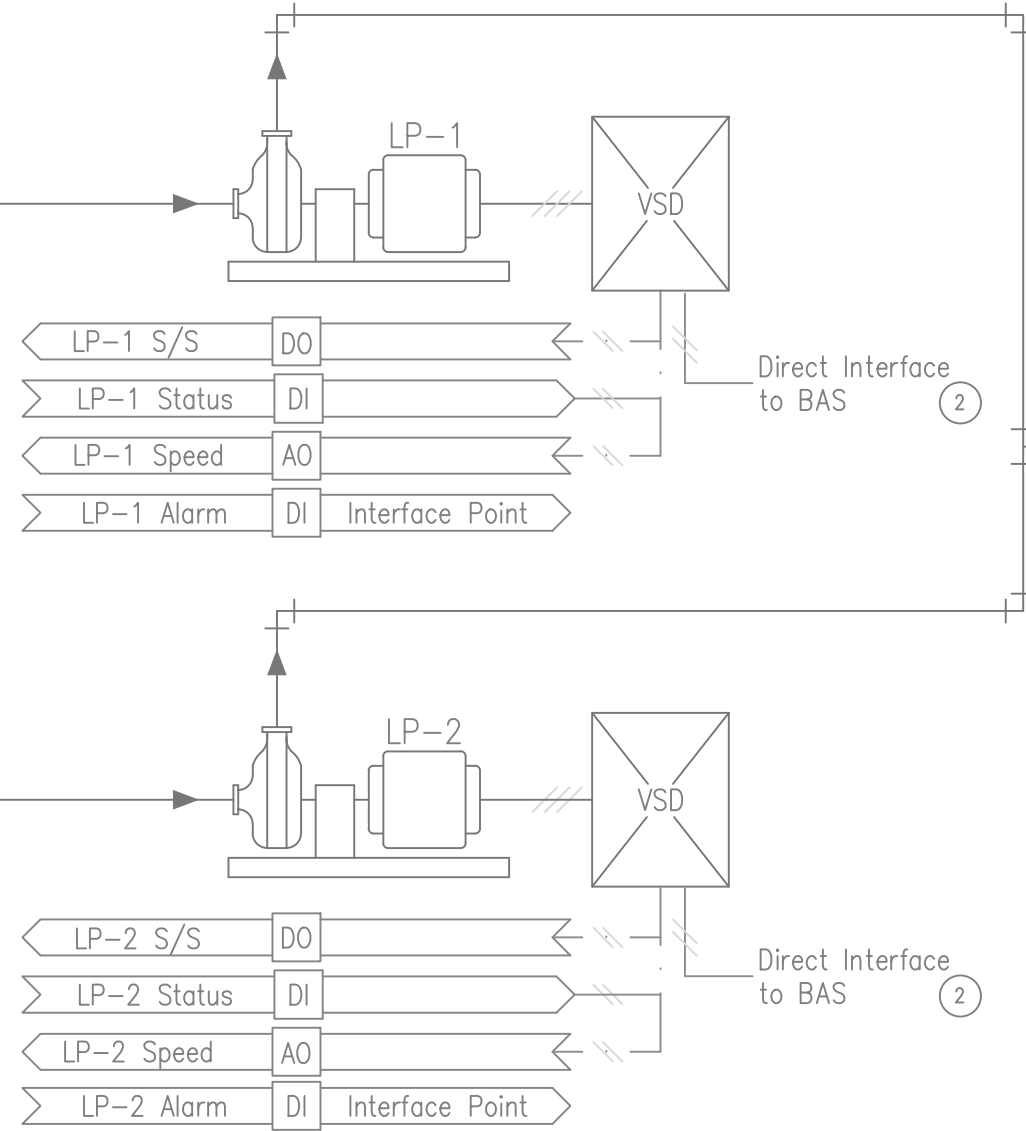
DESIGNER NOTES:

1. USE WRITTEN SEQUENCES FOR CONSTRUCTION DOCUMENTS. LOGIC DIAGRAM IS FOR DESIGN REFERENCE ONLY.
2. IF EQUIPMENT DIAGRAM IS USED, EDIT POINTS SHOWN TO MATCH VERBIAGE OF SEQUENCE OF OPERATIONS.



DRAWING NOTES:

1. Locate Remote Differential Pressure Sensor in room ---- as shown on the floor plan drawings.
2. Provide Direct Interface to VSD. Map all available points to the BAS. Hardwire indicated points. Display hardwired points and VSD alarm on BAS equipment graphic. All other (interface) points may be displayed on a separate VSD graphic (linked from the equipment graphic).

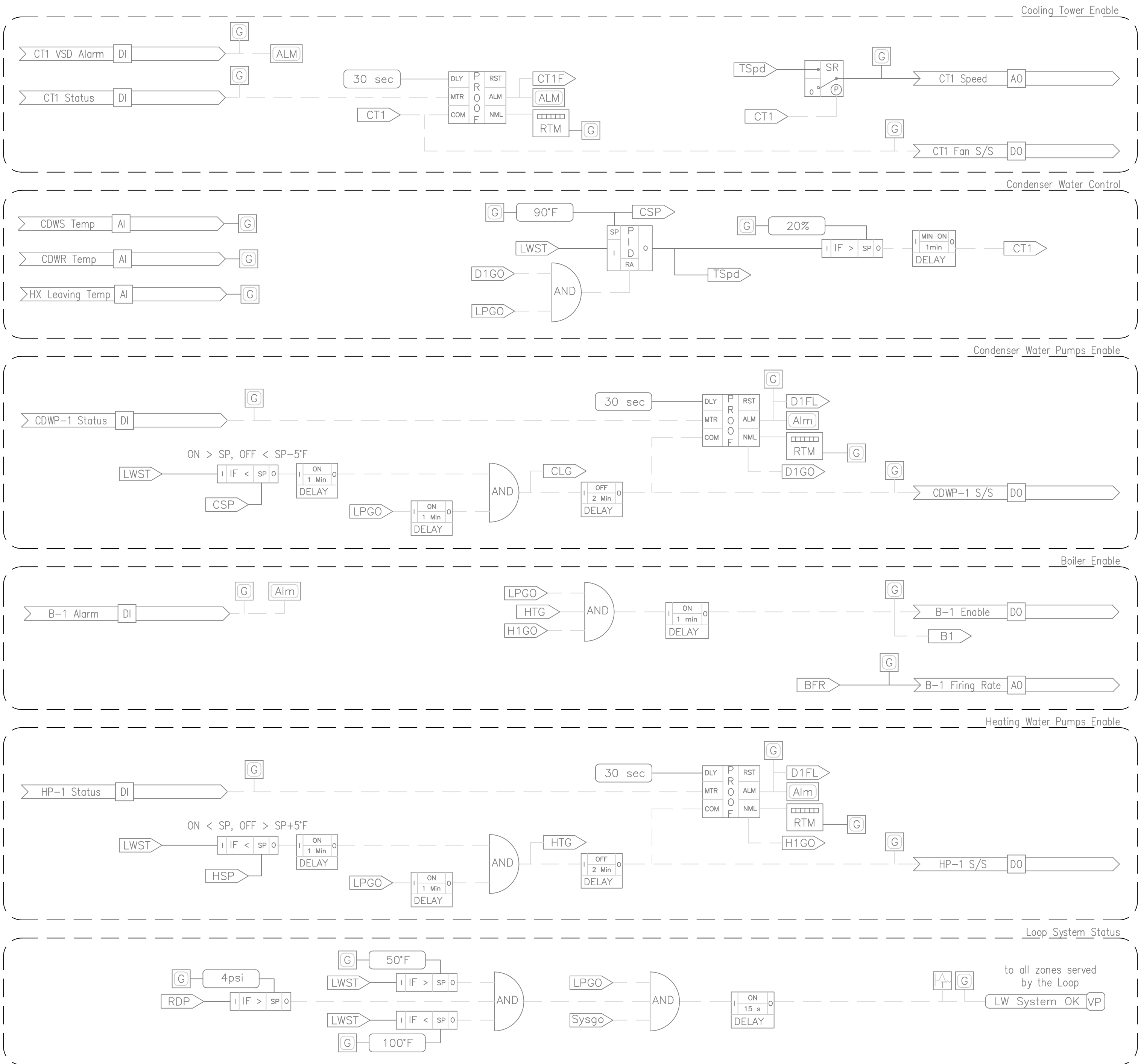
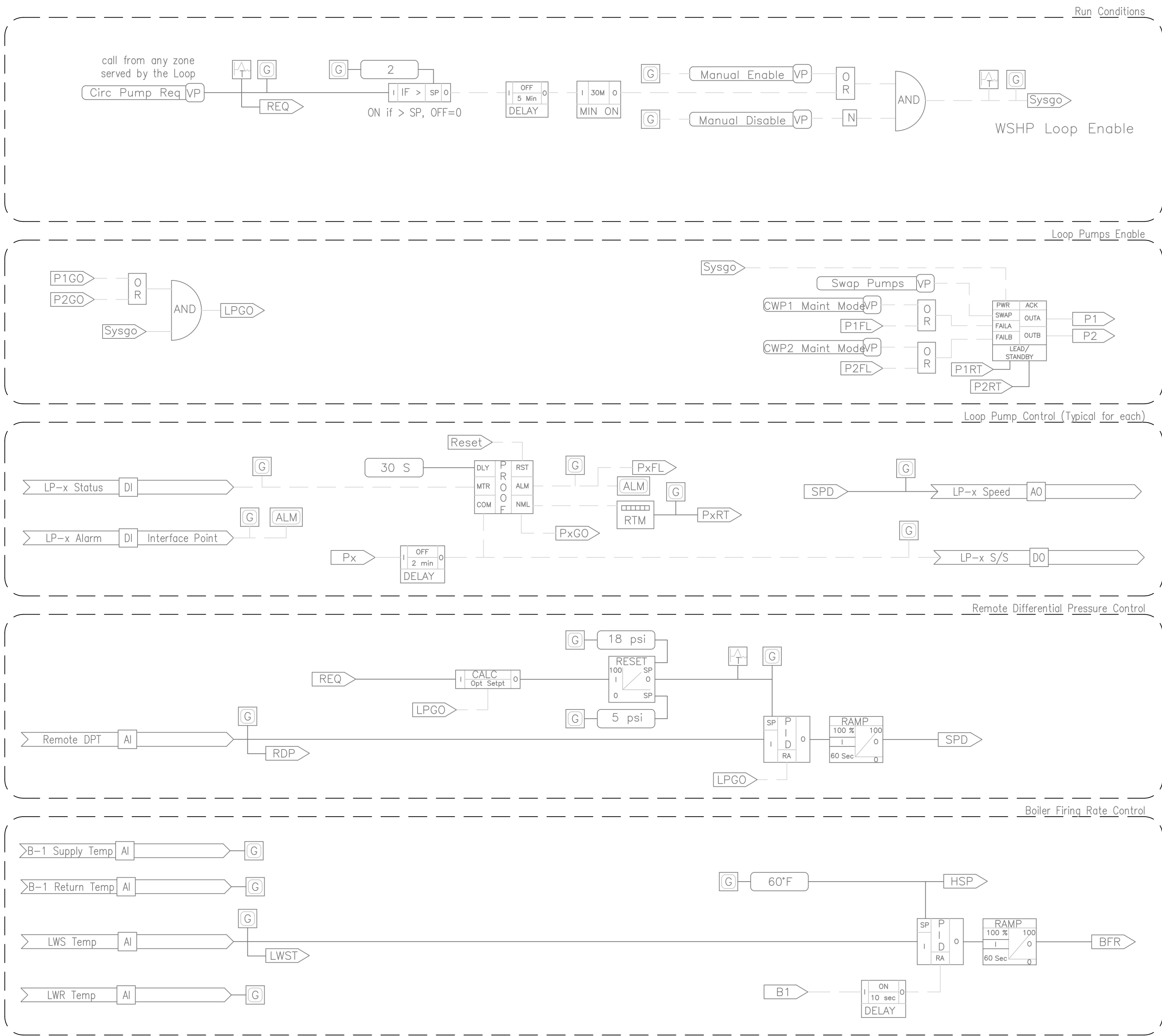


POINT NAME	HARDWIRED	INTERFACE COM CARD	GUI DISPLAY
VFD Command Start/Stop	X	X	HARDWIRED
VFD Speed Command	X	X	HARDWIRED
Fan Status	X	X	HARDWIRED
VFD Speed Feedback		X	COM
Fan Alarm (Command/Status Mismatch)		X	COM
VFD Fault Status		X	COM
VFD Fault Reset		X	COM
VFD Power (kW)		X	COM
Timestamp		X	COM

POINTS LIST									
POINT DESCRIPTOR	POINT TYPE					TREND	ALARM	ALARM CONDITION	REMARKS
CDWP-1 S/S						COV			
CDWP-x Status						COV		NOT EQUAL TO COMMAND	
LP-x S/S						COV			
LP-x Status						COV			
LP-x Speed						COV			
LP-x Alarm						COV			Interface Point
CT-1 S/S						COV			
CT-1 Status						COV			
CT-1 Alarm						COV			Interface Point
CT-1 Speed						COV			
LWS Temp						15 MIN			
LWR Temp						15 MIN			
CDWS Temp						15 MIN			
CDWR Temp						15 MIN			
B-1 Firing Rate						15 MIN			
B-1 Enable						COV			
B-1 Alarm						COV			
HP-1 S/S						COV			
HP-1 Status						COV		NOT EQUAL TO COMMAND	
B-1 Supply Temp						15 MIN			
B-1 Return Temp						15 MIN			
HX Leaving Temp						15 MIN			
Remote DP						15 MIN			
Outdoor Temp						15 MIN			
Outdoor Humidity						15 MIN			
Outdoor Enthalpy						15 MIN			

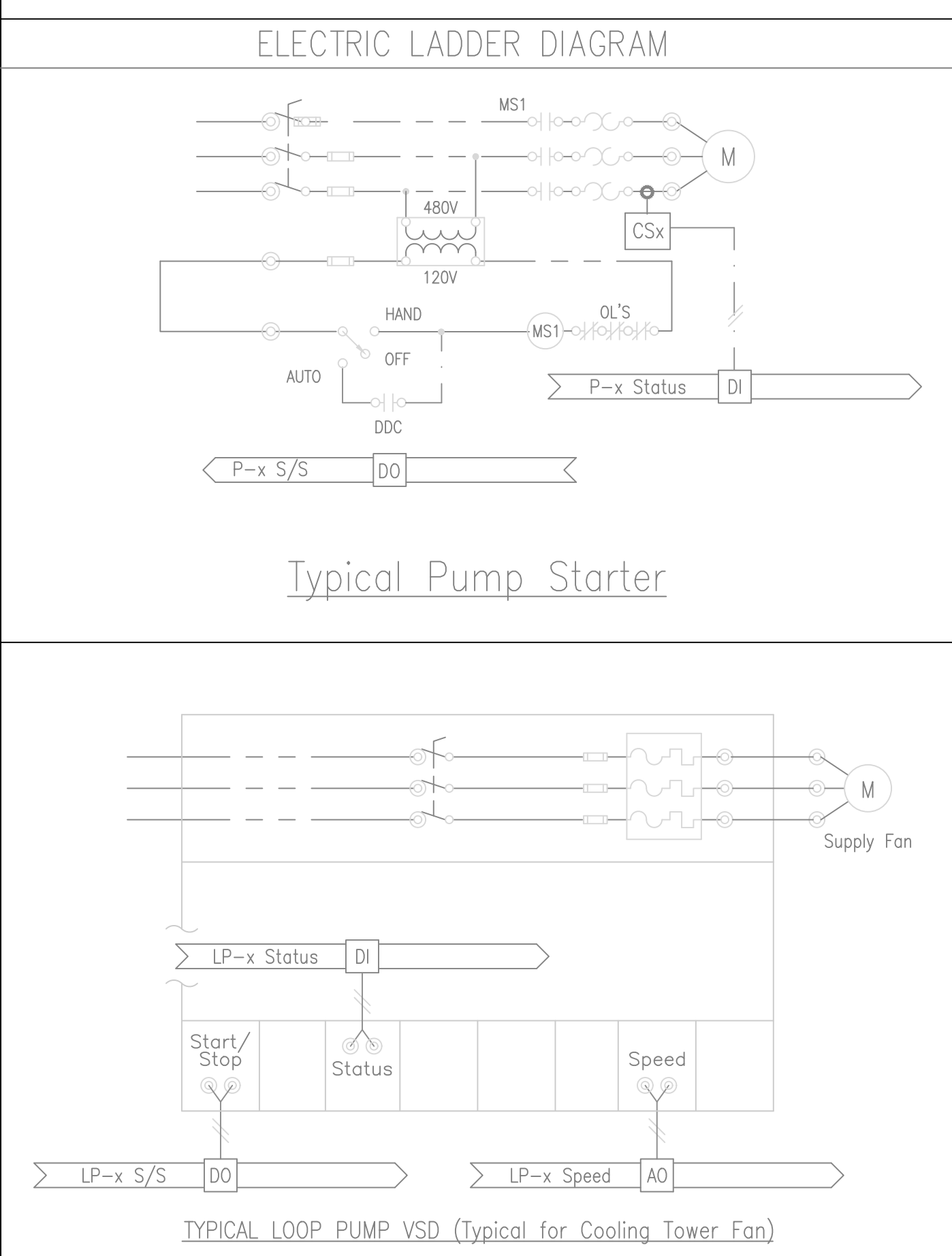
LOGIC VARIABLES		
BINARY	ANALOG	DESCRIPTION
[Sysgo]		ON WHEN LOOP WATER SYSTEM IS REQUESTED TO RUN
[Reset]		ON WHEN USER RESETS ALL LATCHING ALARMS ON THE UNIT (TOGGLE POINT)
[Px]		ON WHEN LOOP PUMP Px IS REQUESTED TO RUN
[PxGO]		ON WHEN LOOP PUMP Px IS REQUESTED TO RUN AND STATUS IS PROVEN
[PxFL]		ON WHEN LOOP PUMP Px IS ASSESSED AS FAILED
[D1GO]		ON WHEN CONDENSER PUMP IS REQUESTED TO RUN AND STATUS IS PROVEN
[H1GO]		ON WHEN BOILER PUMP IS REQUESTED TO RUN AND STATUS IS PROVEN
[LPGO]		ON WHEN EITHER LOOP PUMP IS REQUESTED AND STATUS IS PROVEN
[HTG]		ON WHEN THE LOOP REQUIRES HEATING
[CLG]		ON WHEN THE LOOP REQUIRES COOLING
[CT1]		ON WHEN COOLING TOWER 1 IS ENABLED
[B1]		ON WHEN BOILER 1 IS ENABLED
[PxRT]		TOTALIZED VALUE OF LOOP PUMP Px'S RUNTIME
[RDP]		VARIABLE VALUE OF THE REMOTE DIFFERENTIAL PRESSURE
[TSpd]		VARIABLE CALCULATED VALUE OF CT FAN PID LOOP OUTPUT (SPEED)
[SPD]		VARIABLE CALCULATED VALUE OF REMOTE DP PID LOOP OUTPUT (SPEED)
[HSP]		VARIABLE VALUE OF LOOP WATER SUPPLY TEMPERATURE HEATING SETPOINT
[CSP]		VARIABLE VALUE OF LOOP WATER SUPPLY TEMPERATURE COOLING SETPOINT
[LWST]		VARIABLE VALUE OF LOOP WATER SUPPLY TEMPERATURE
[BFR]		VARIABLE CALCULATED VALUE OF BOILER FIRING RATE

Water Source Heat Pump Loop – Cooling tower w/CV pump, Condensing Boiler



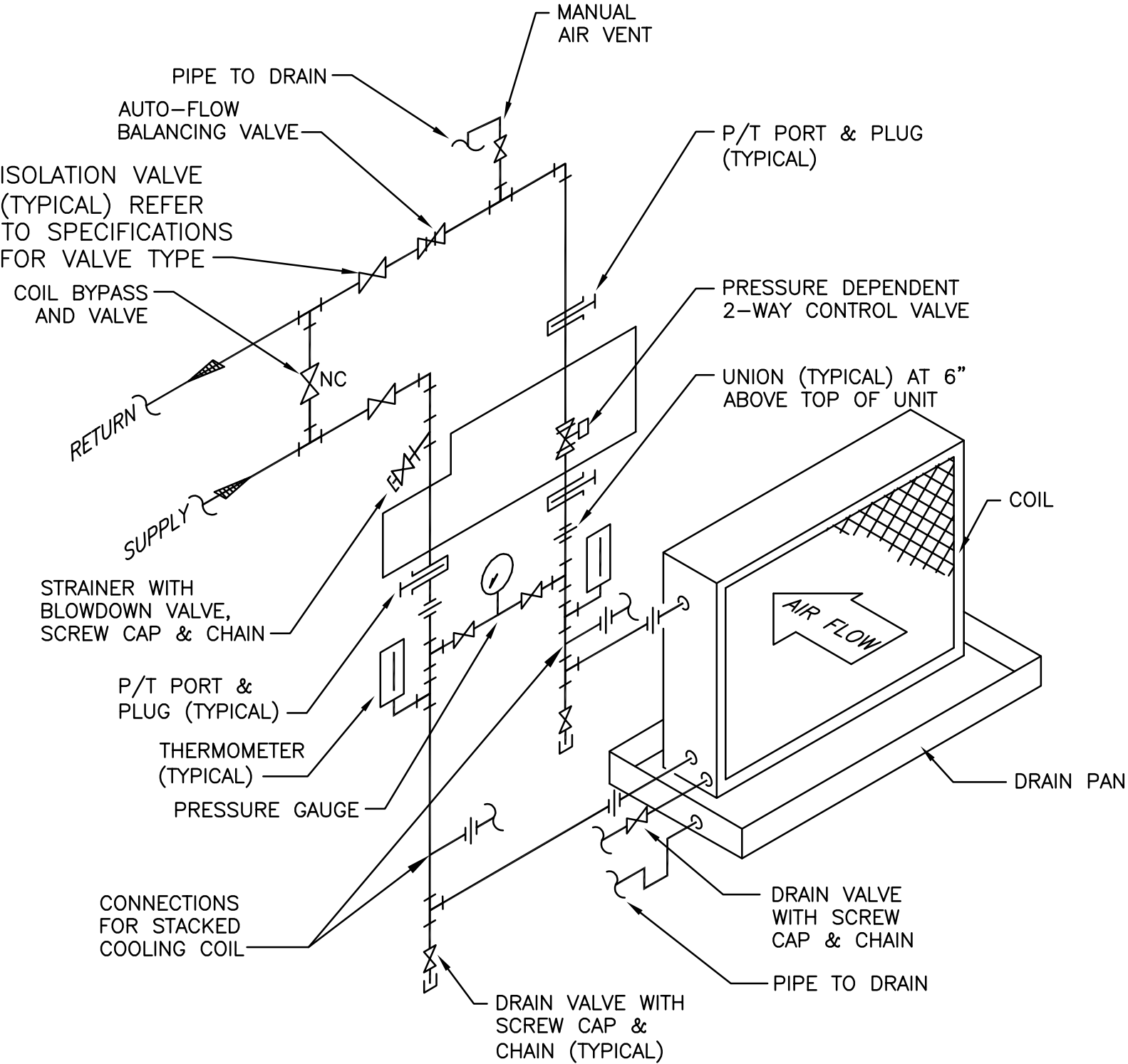
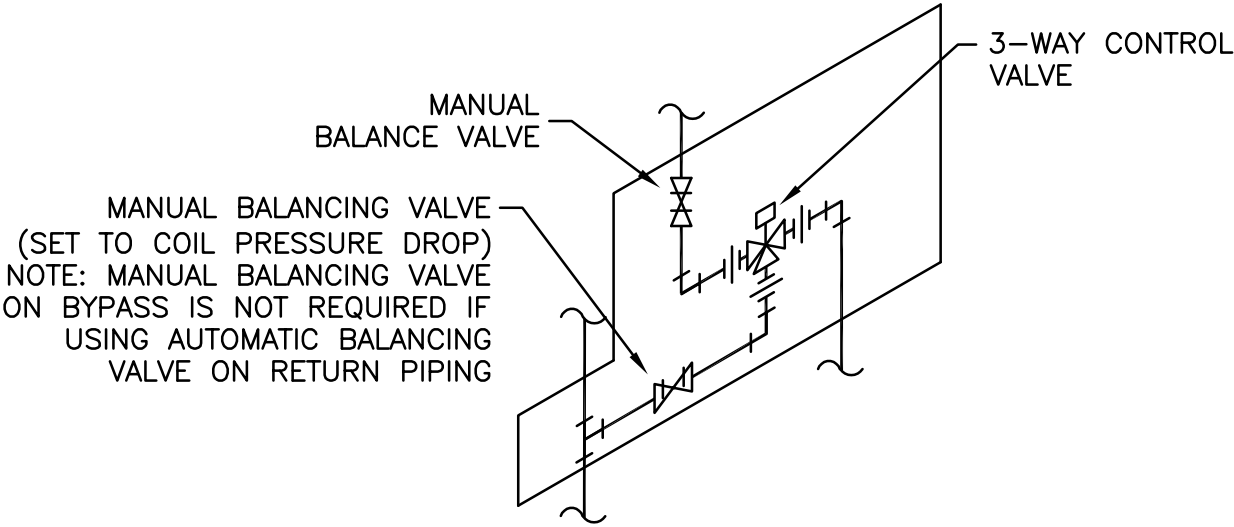
DESIGNER NOTES:

1. USE WRITTEN SEQUENCES FOR CONSTRUCTION DOCUMENTS. LOGIC DIAGRAM IS FOR DESIGN REFERENCE ONLY.
2. IF EQUIPMENT DIAGRAM IS USED, EDIT POINTS SHOWN TO MATCH VERBIAGE OF SEQUENCE OF OPERATIONS.



NOTES:

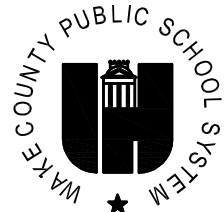
1. REFER TO SPECIFICATIONS FOR CONTROL AND BALANCING VALVE TYPES.
2. MANUAL BALANCING VALVE ON BYPASS IS NOT REQUIRED IF USING AUTOMATIC BALANCING VALVE
3. PROVIDE DRAIN PAN OVERFLOW SWITCH FOR COOLING COIL



M1.01

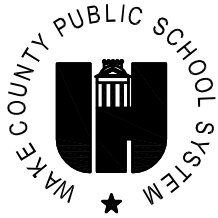
AIR HANDLING UNIT COIL DETAIL

SCALE: NONE



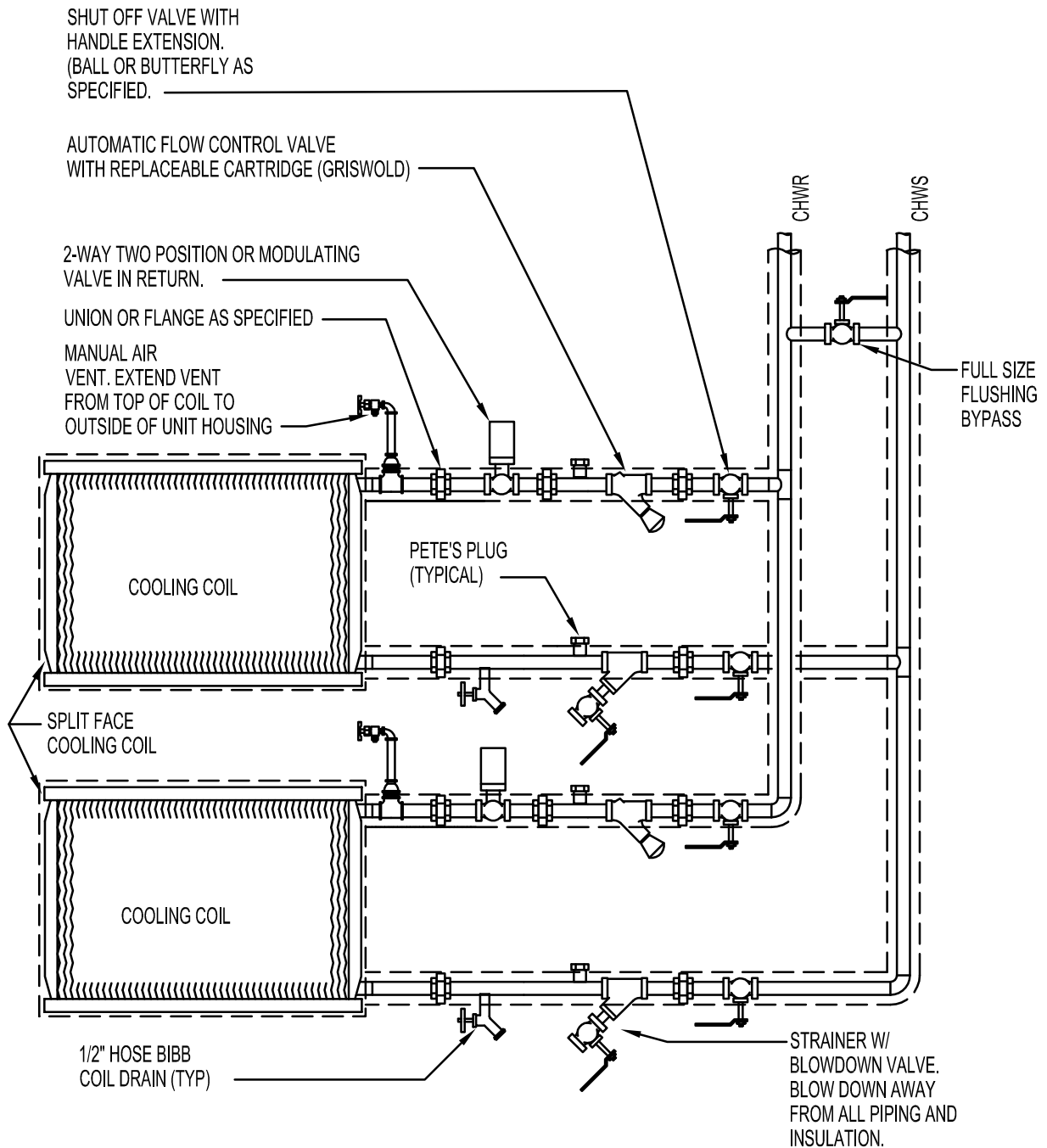
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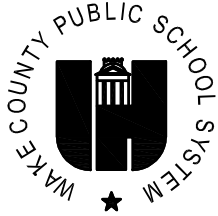
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M1.02

SPLIT FACE COIL DETAIL

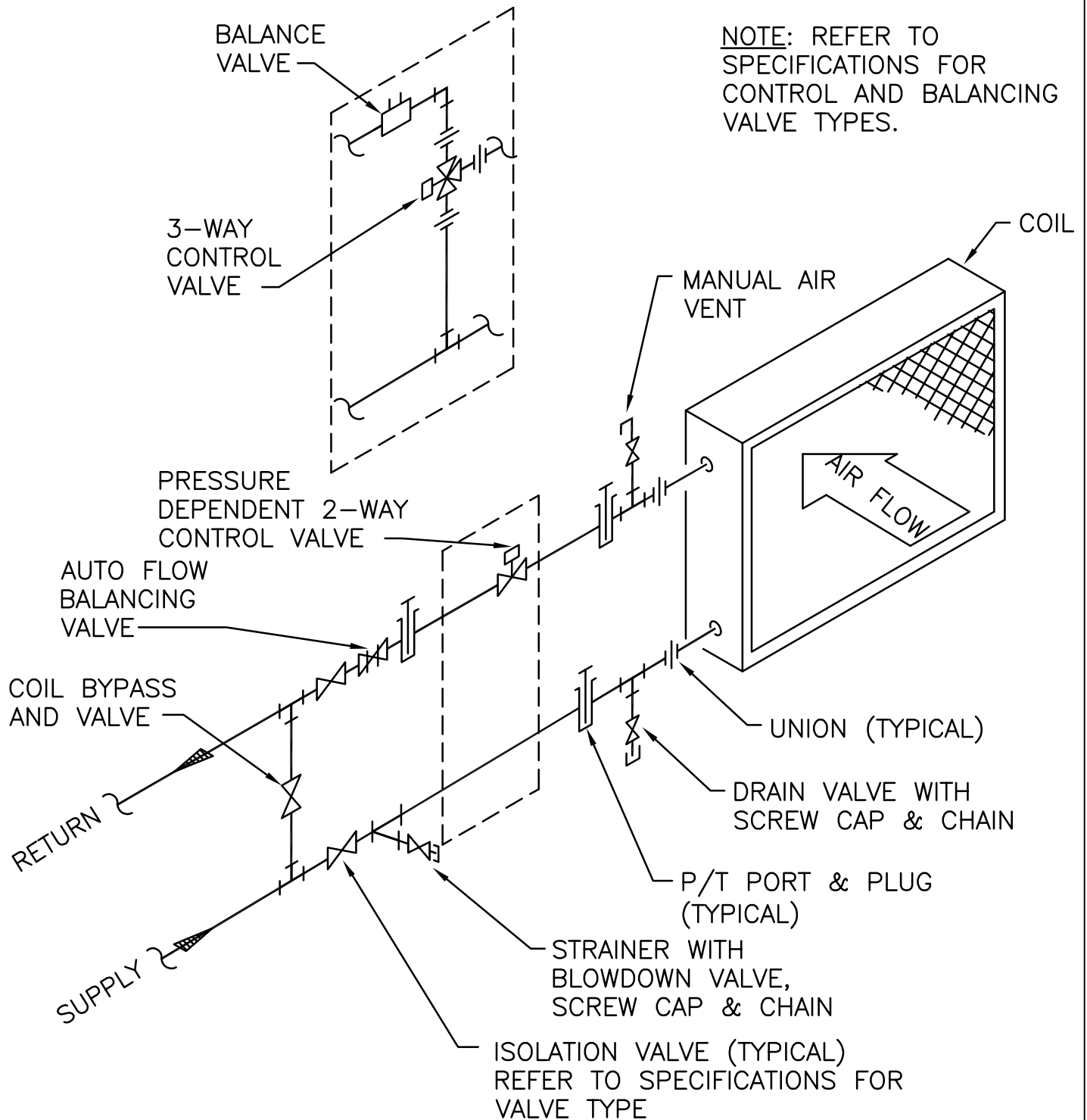
SCALE: NONE



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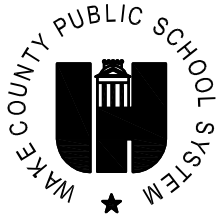
NOTE: REFER TO
SPECIFICATIONS FOR
CONTROL AND BALANCING
VALVE TYPES.



M1.03

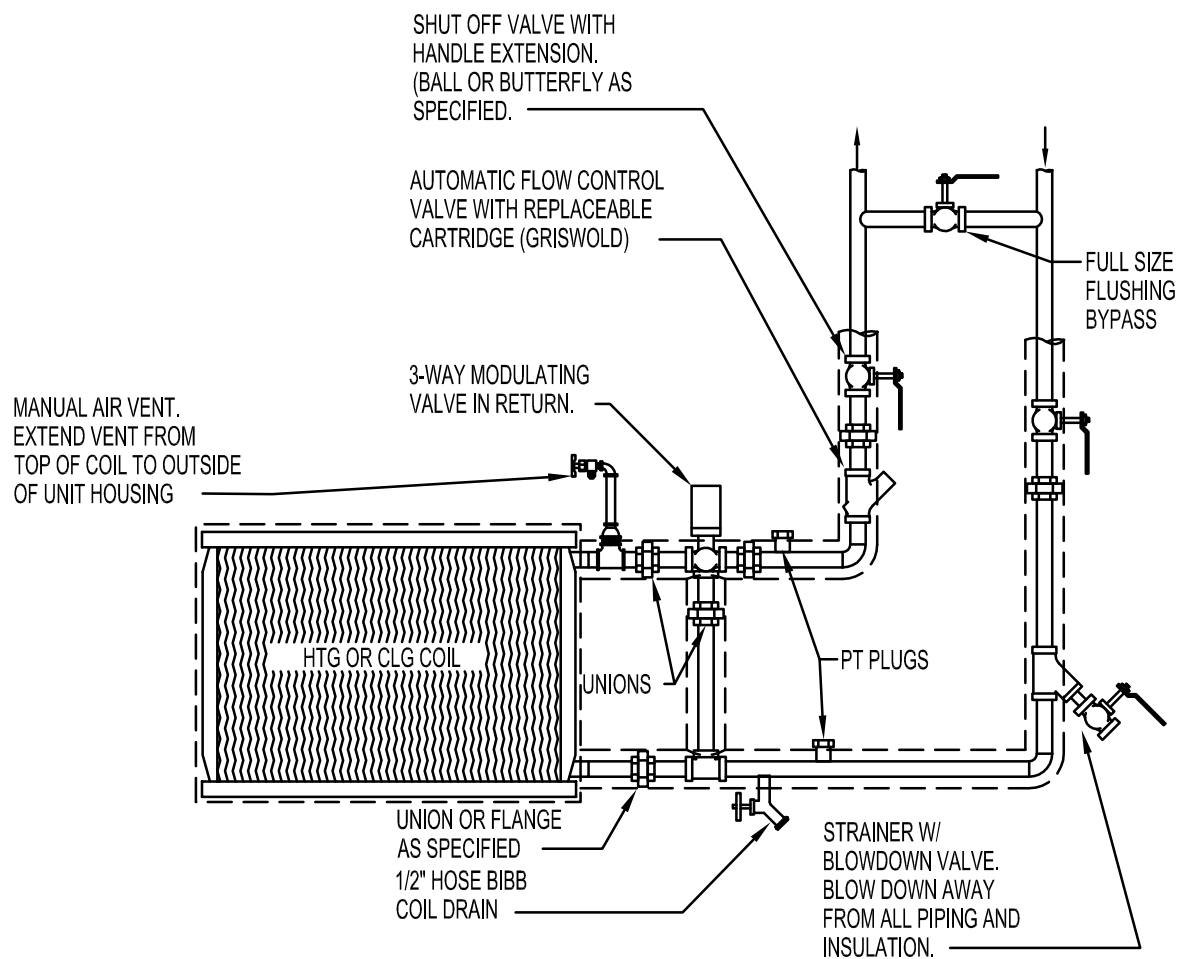
TERMINAL UNIT COIL DETAIL

SCALE: NONE



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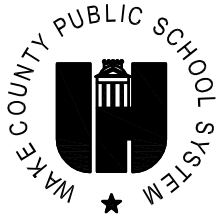
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M1.04

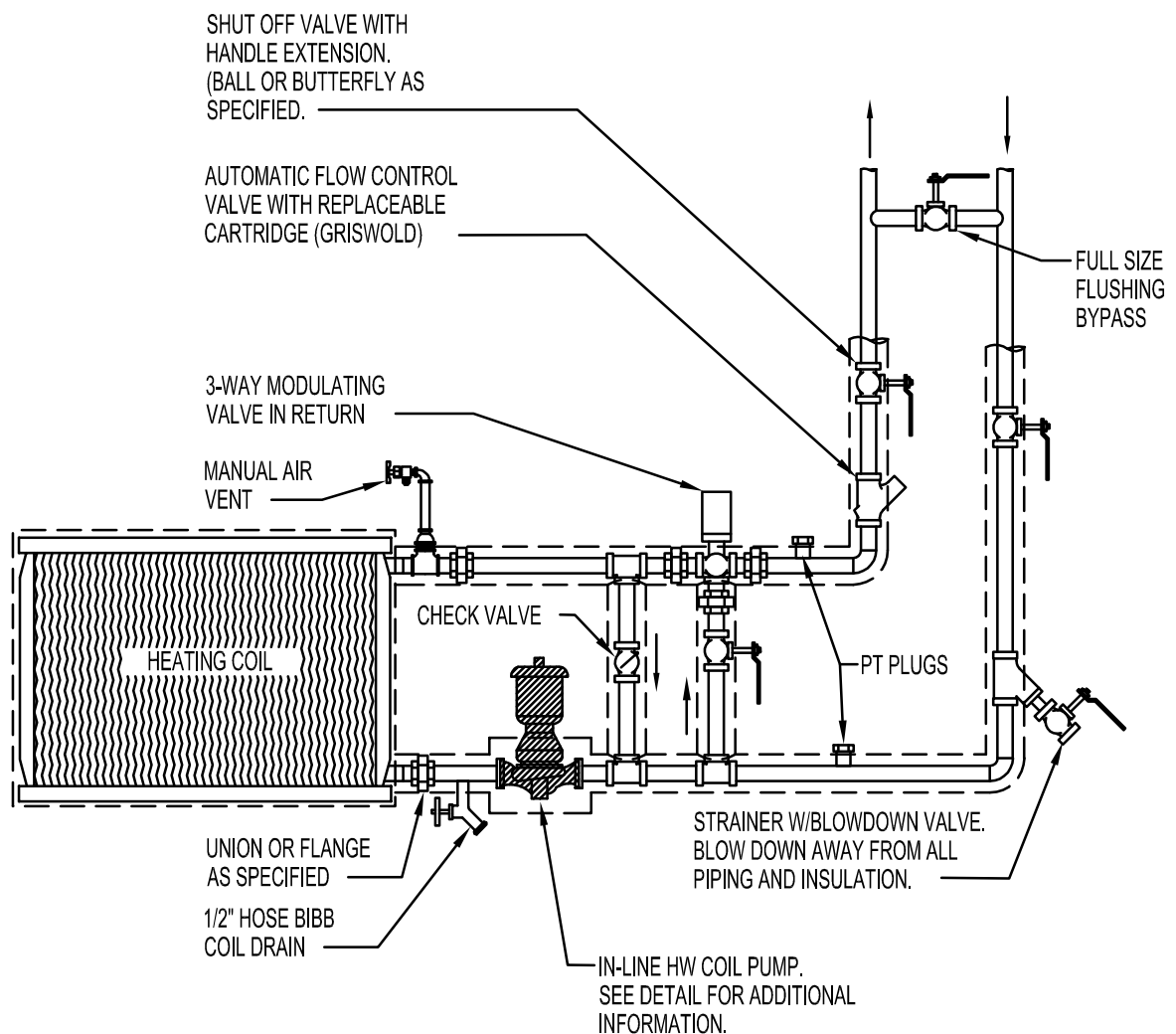
THREE WAY COIL DETAIL

SCALE: NONE



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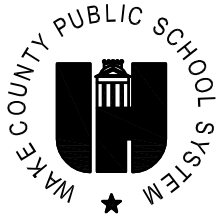
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M1.05

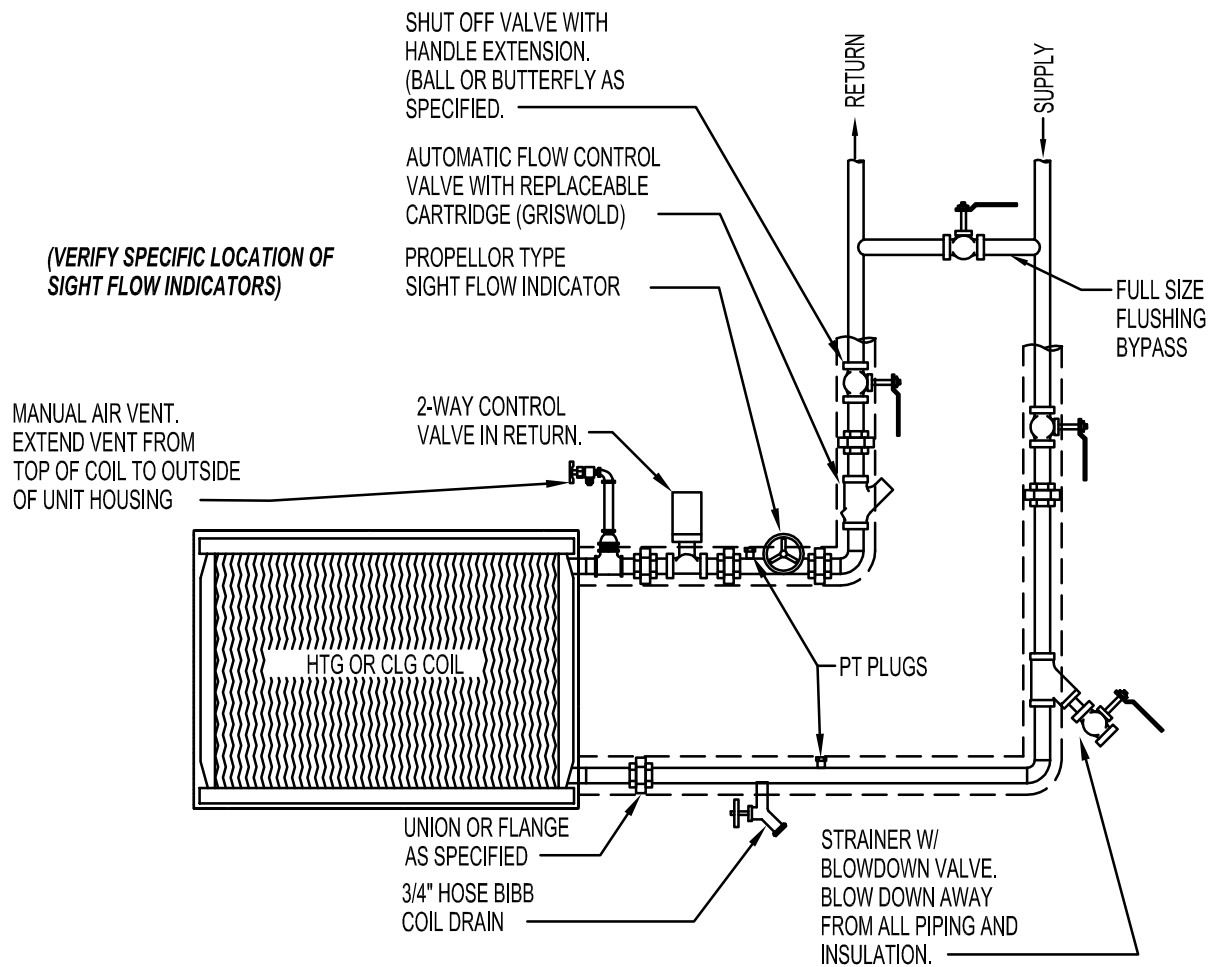
THREE WAY COIL WITH PUMP DETAIL

SCALE: NONE



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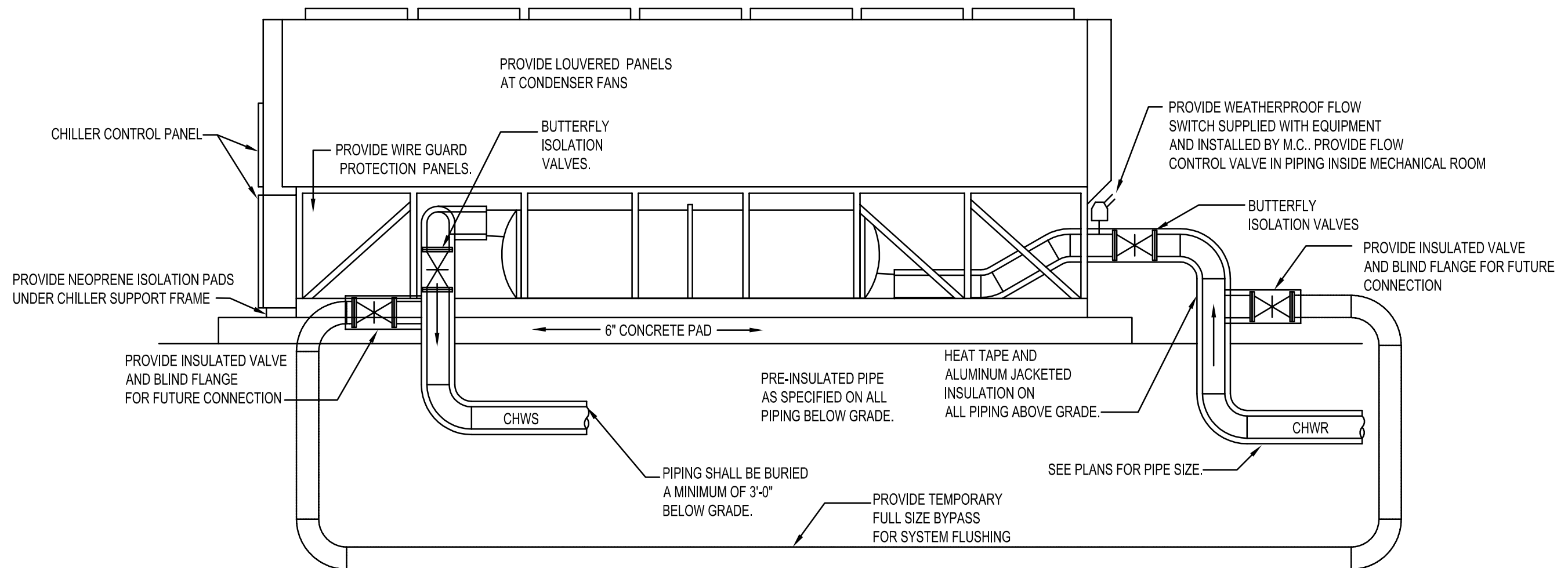
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M1.06

TWO WAY COIL DETAIL

SCALE: NONE



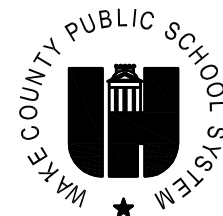
NOTES:

1. PROVIDE LOUVERED PANELS AT CONDENSER FANS.
2. PPR PIPE AS SPECIFIED ON ALL PIPING BELOW GRADE.

M1.11

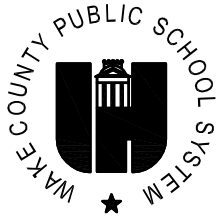
AIR COOLED CHILLER DETAIL

SCALE: NONE



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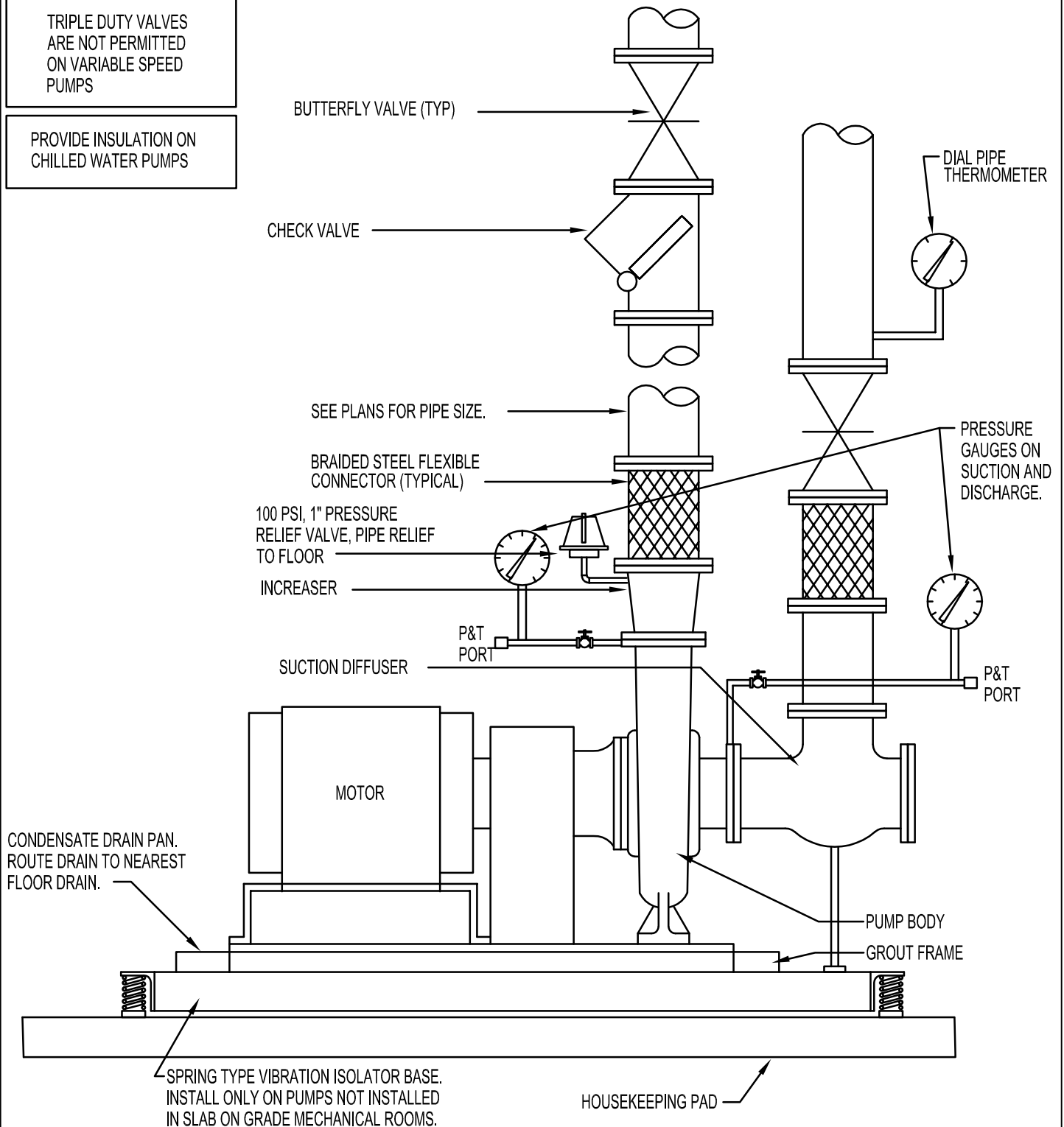


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TRIPLE DUTY VALVES
ARE NOT PERMITTED
ON VARIABLE SPEED
PUMPS

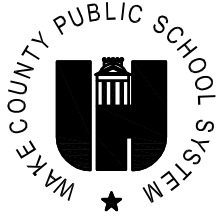
PROVIDE INSULATION ON
CHILLED WATER PUMPS



M1.12

BASE MOUNTED PUMP DETAIL

SCALE: NONE

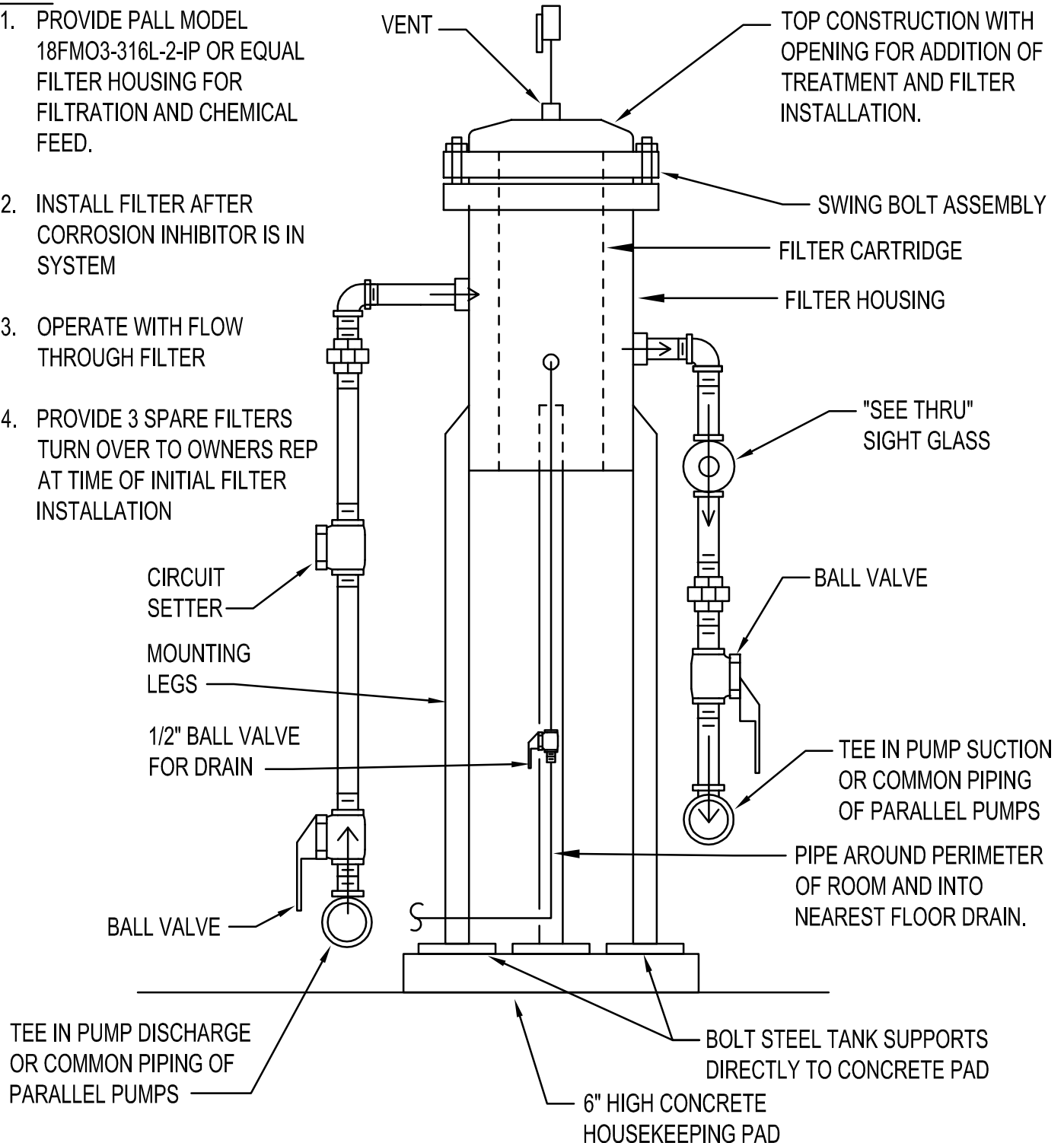


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NOTES:

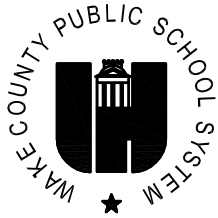
1. PROVIDE PALL MODEL 18FM03-316L-2-IP OR EQUAL FILTER HOUSING FOR FILTRATION AND CHEMICAL FEED.
2. INSTALL FILTER AFTER CORROSION INHIBITOR IS IN SYSTEM
3. OPERATE WITH FLOW THROUGH FILTER
4. PROVIDE 3 SPARE FILTERS TURN OVER TO OWNERS REP AT TIME OF INITIAL FILTER INSTALLATION



M1.13

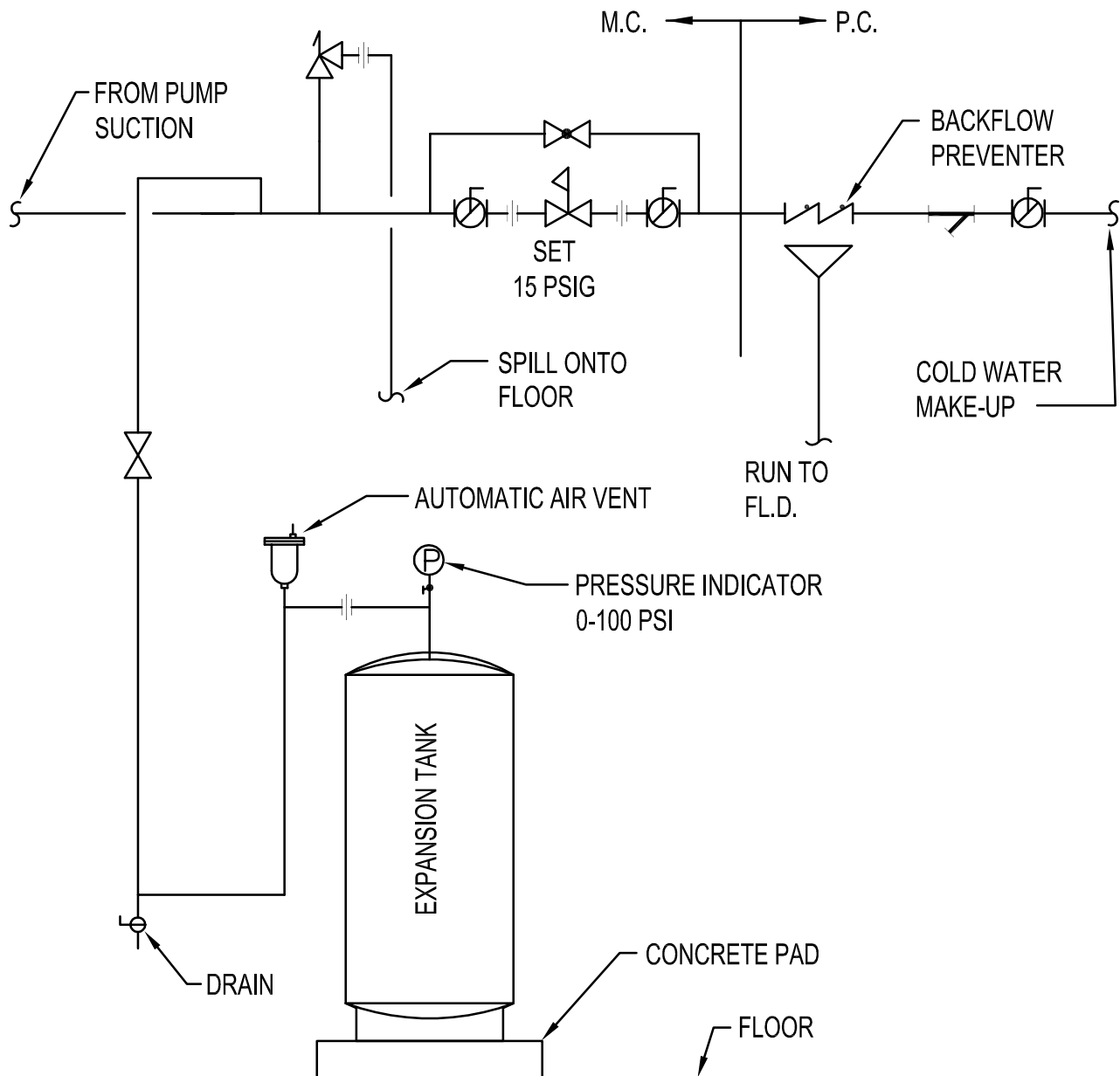
CHEMICAL FEEDER DETAIL

SCALE: NONE



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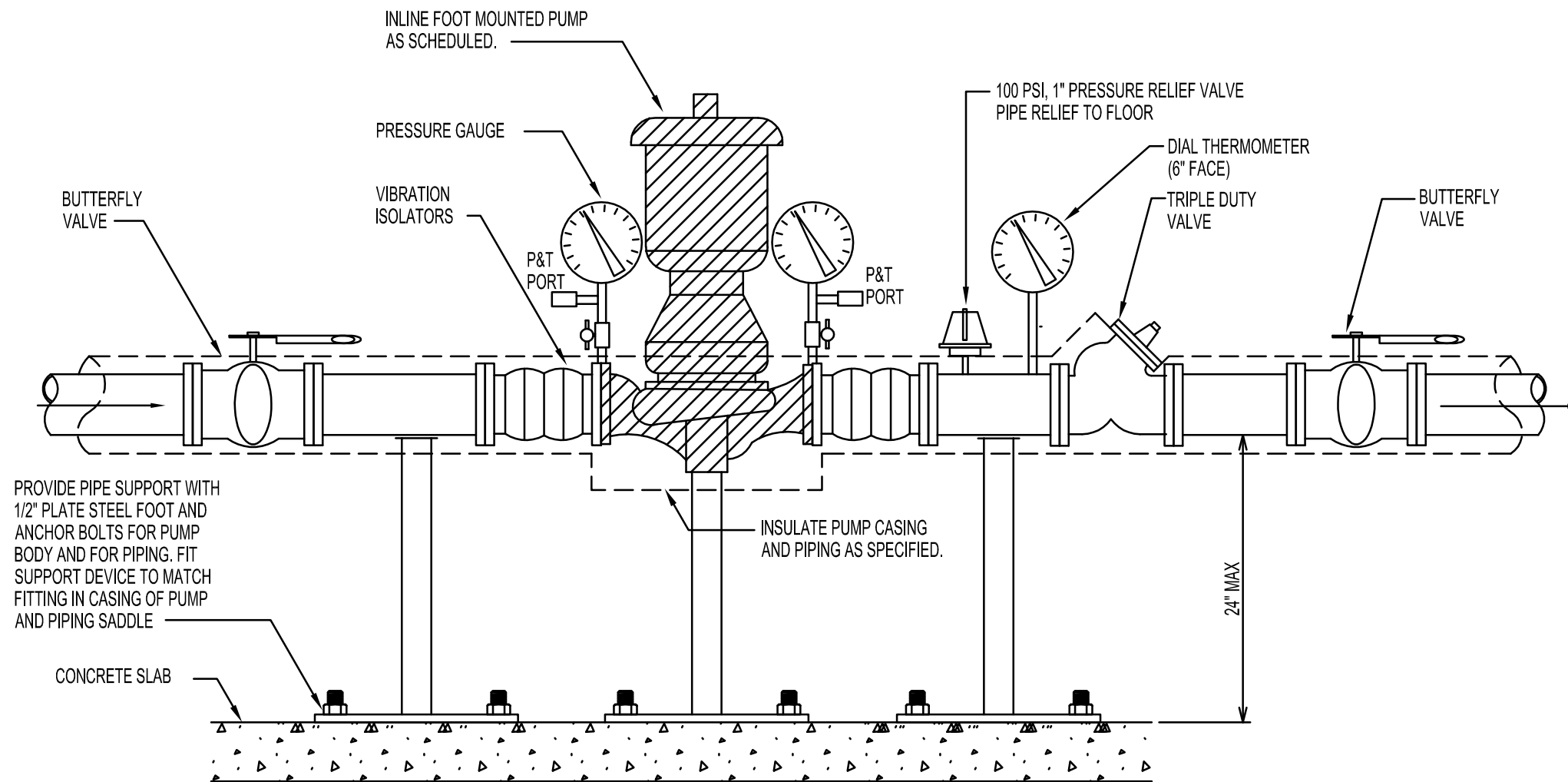
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M1.14

EXPANSION TANK PIPING INSTALLATION DETAIL

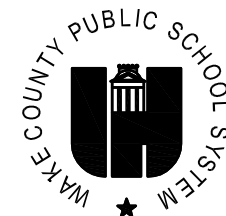
SCALE: NONE



M1.15

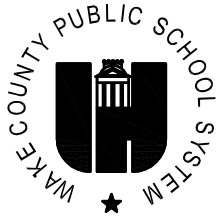
FLOOR MOUNTED INLINE CIRCULATION PUMP DETAIL

SCALE: NONE



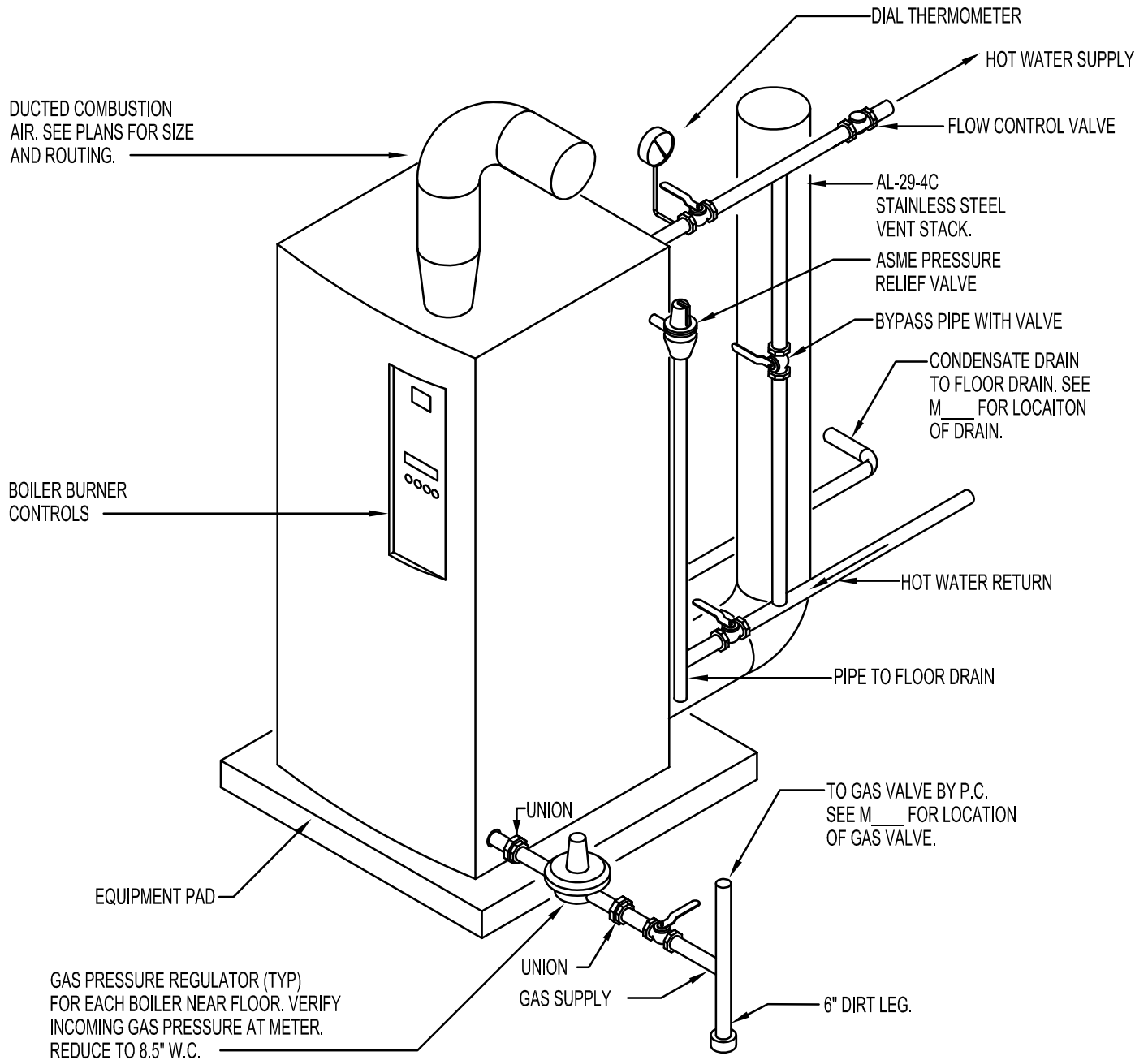
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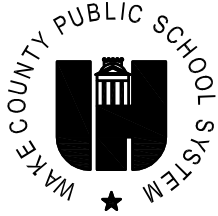
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M1.16

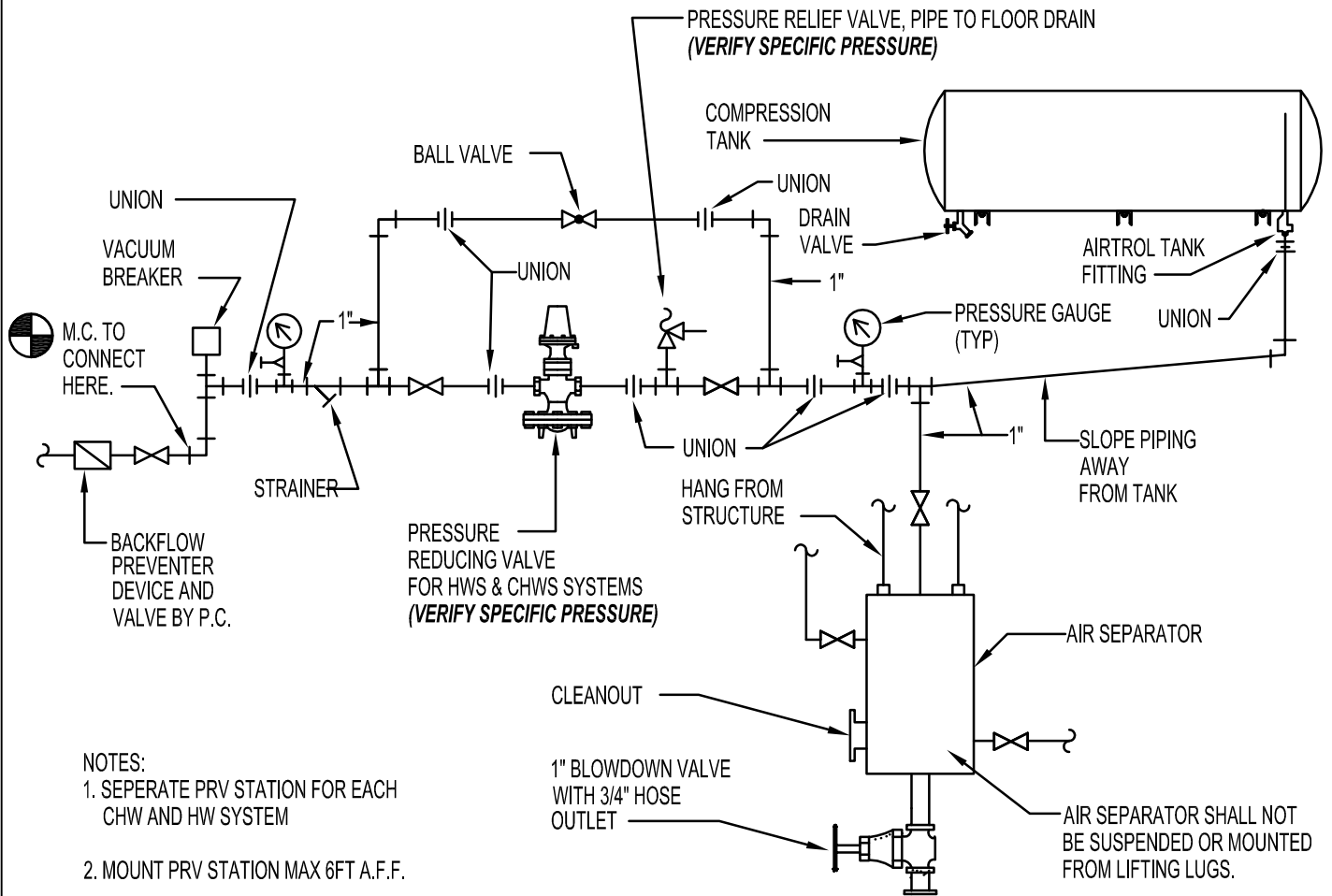
LARGE CONDENSING BOILER DETAIL

SCALE: NONE



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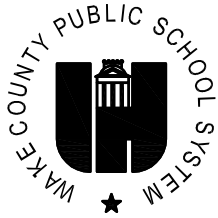
NOTES:

1. SEPERATE PRV STATION FOR EACH CHW AND HW SYSTEM
2. MOUNT PRV STATION MAX 6FT A.F.F.

M1.17

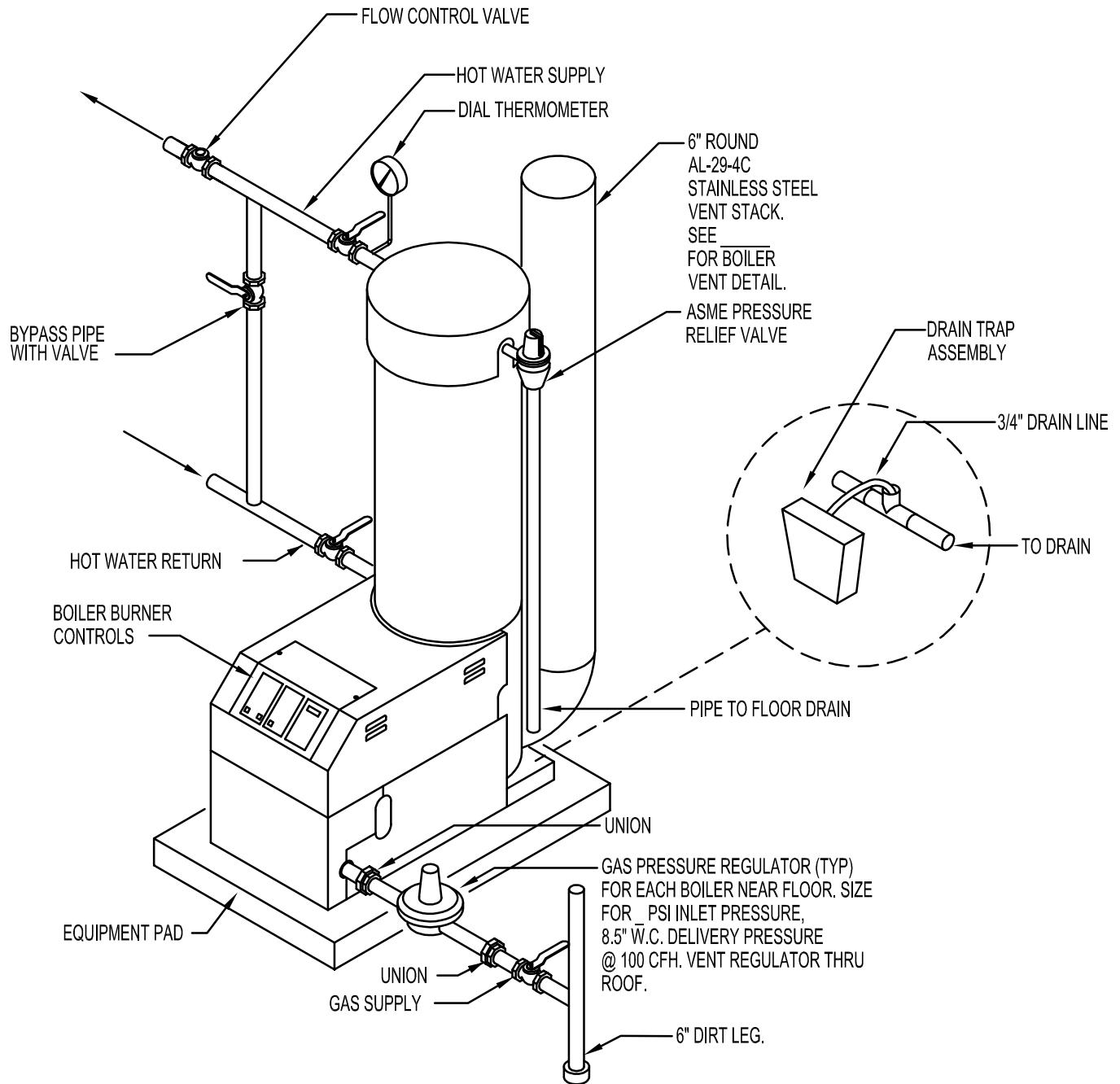
MAKEUP WATER STATION DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

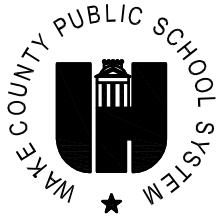
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M1.18

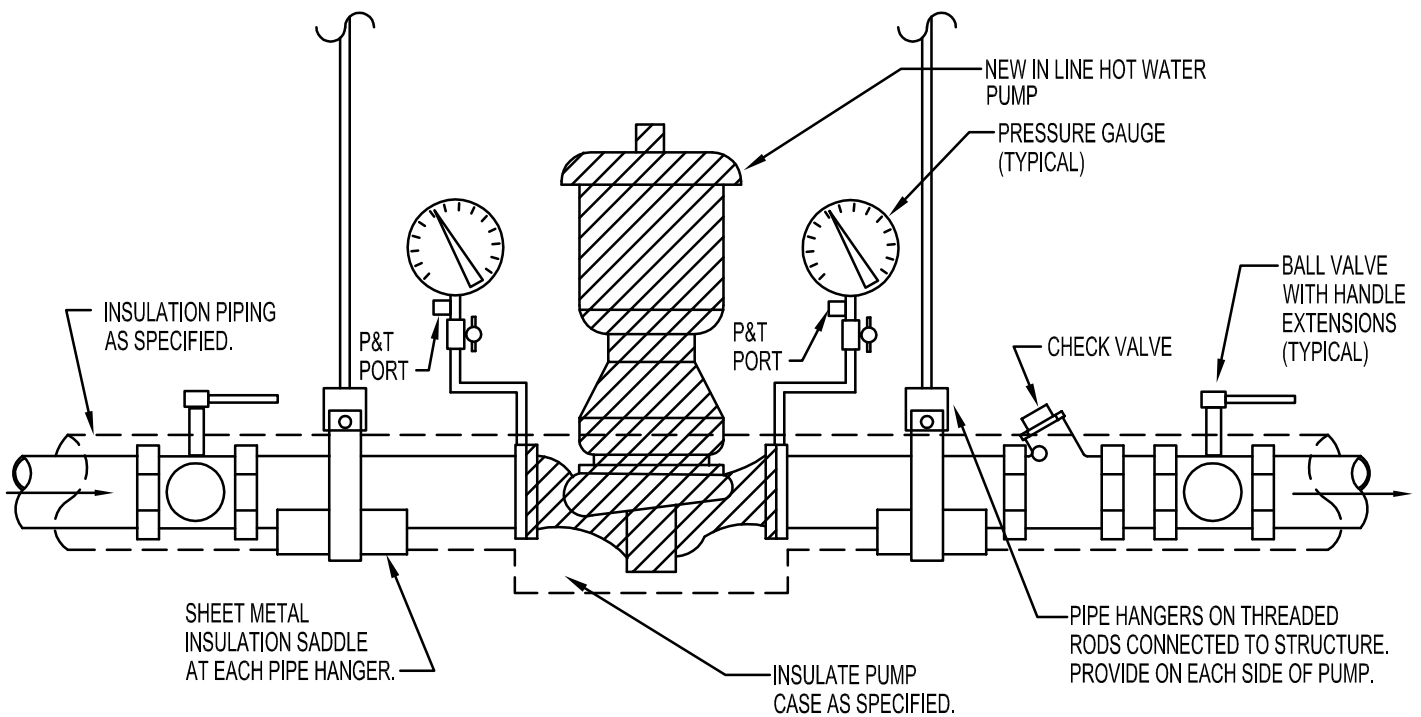
SMALL BOILER DETAIL

SCALE: NONE



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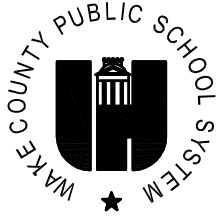
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M1.19

SUSPENDED INLINE CIRCULATION PUMP DETAIL

SCALE: NONE



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DIRECT DRIVE MOTOR
EXCEPT WHERE SCHEDULED
DIFFERENTLY

WIRING FROM
DISCONNECT TO FAN
MOTOR BY FACTORY

DISCONNECT PROVIDED
WITH EQUIPMENT

ALUMINUM BIRD
SCREEN

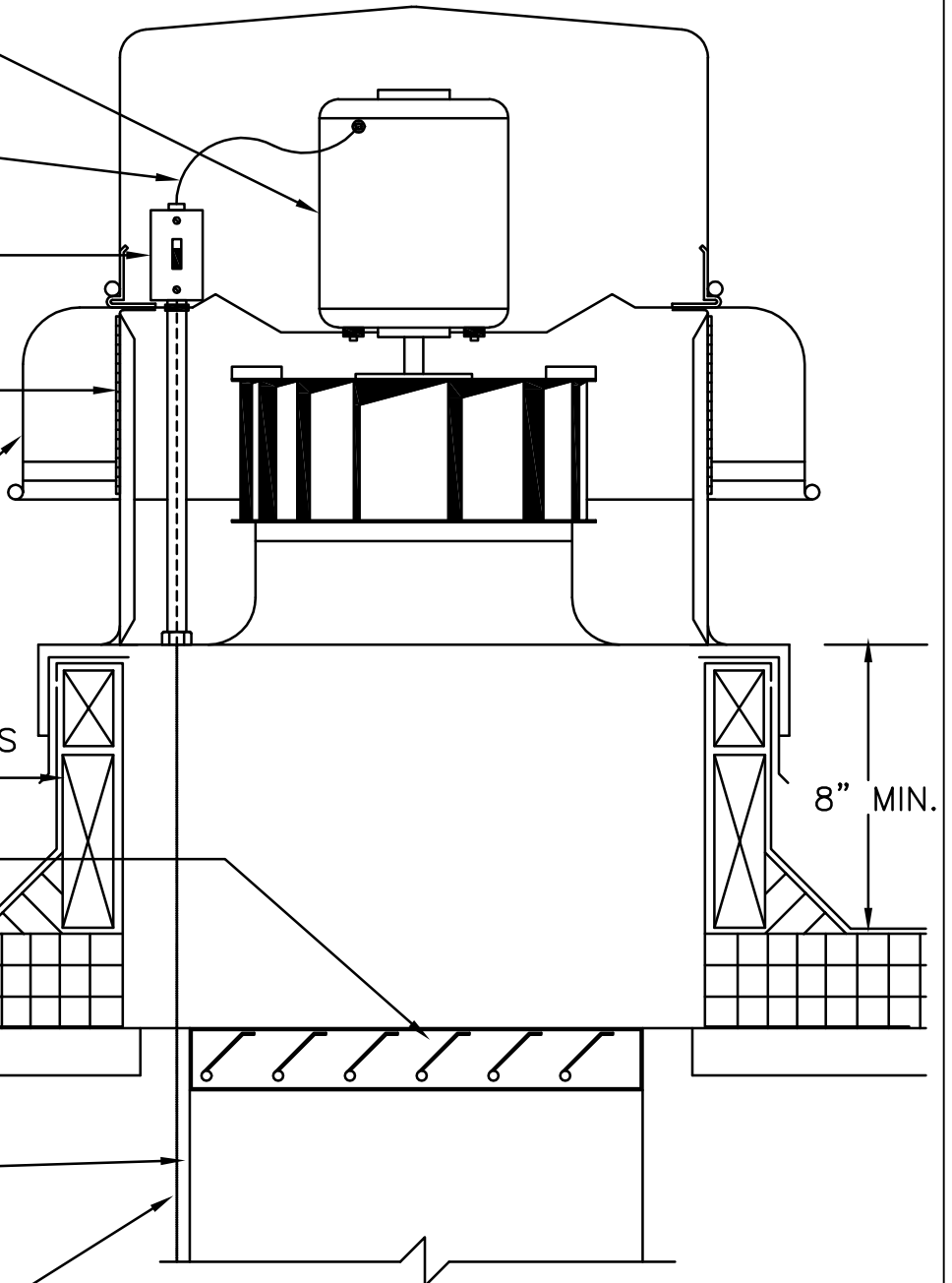
ALUMINUM HOUSING

CURB FURNISHED WITH
EQUIPMENT BY M.C.
COORDINATE REQUIREMENTS
FOR CURB AND FLASHING

BACKDRAFT DAMPER

SEE PLANS FOR
DUCT SIZE

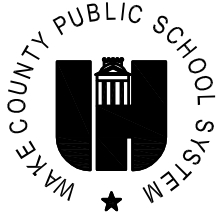
WIRING AND CONDUIT
FROM MOTOR STARTER
TO DISCONNECT BY
ELEC. CONTR.



M1.20

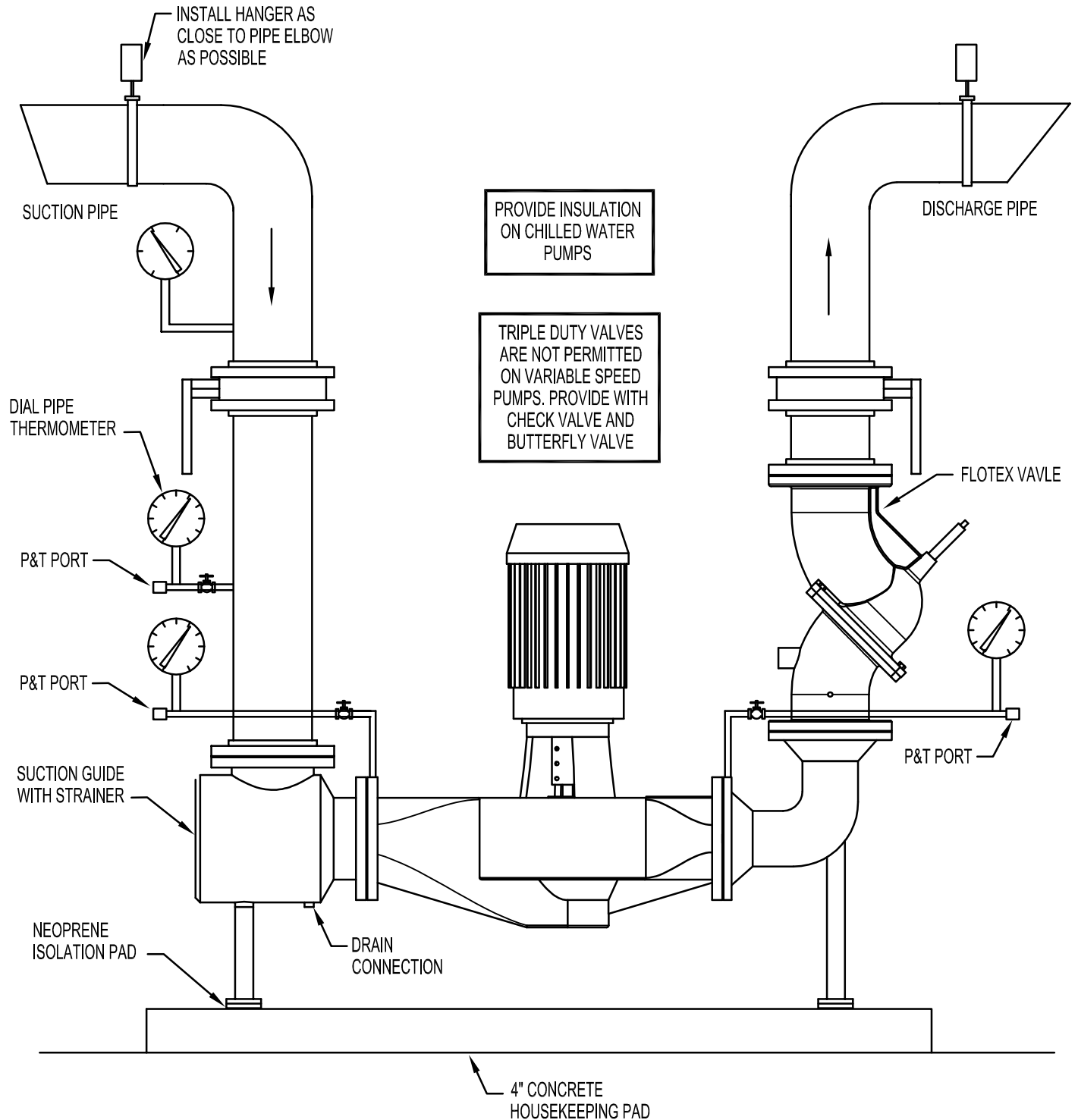
ROOF MOUNTED FAN DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

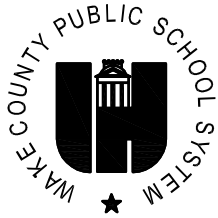
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M1.21

PAD MOUNTED VERTICAL PUMP INSTALLATION DETAIL

SCALE: NONE

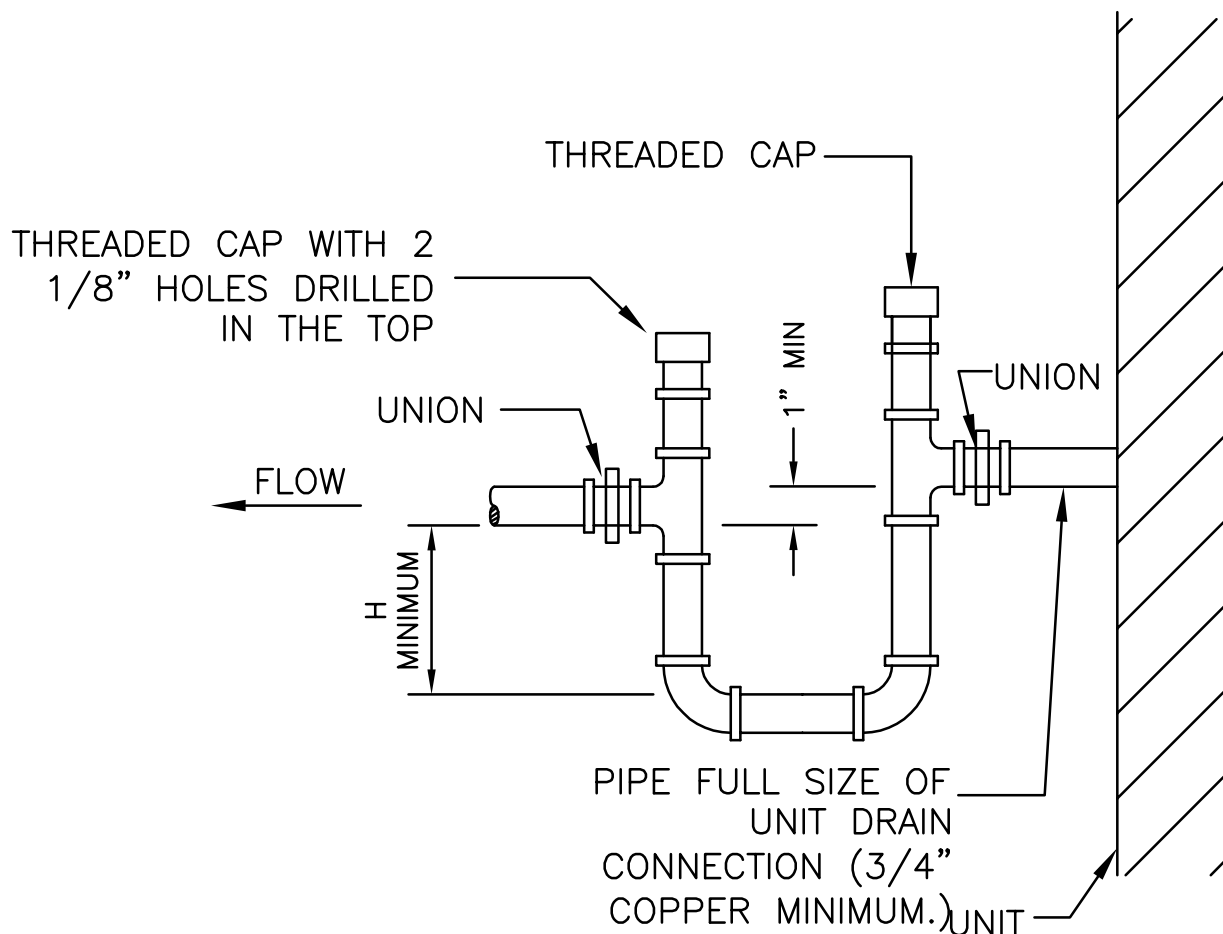


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NOTES:

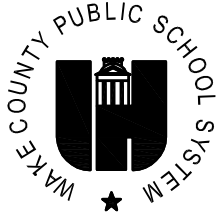
1. LOCATE TRAP SO AS TO BE ACCESSIBLE FOR CLEANING.
2. H = FAN OUTLET PRESSURE (IN. W.C.)
+ 1 IN. MINIMUM



M1.31

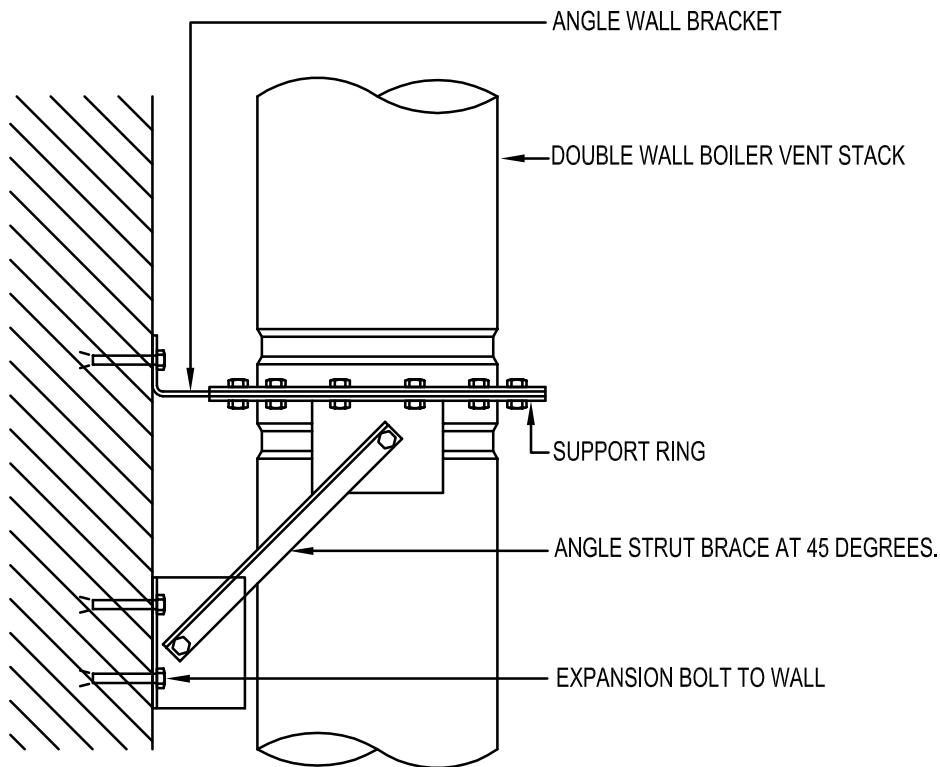
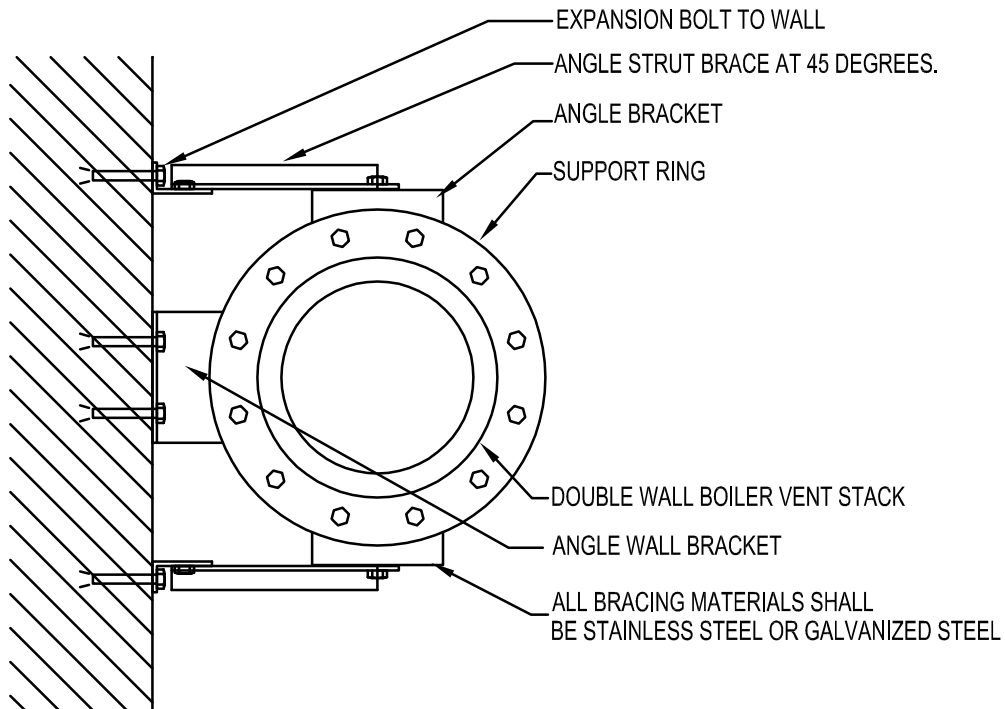
BLOW-THRU CONDENSATE DRAIN DETAIL

SCALE: NONE



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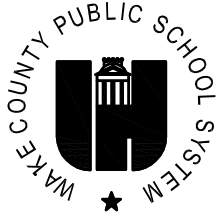


NOTE:
INSTALL AT JOINT DIRECTLY ABOVE TEE
AT WALL PENETRATION AND EVERY 15'-0"
O.C. VERTICAL. EXTEND BOILER VENT
MINIMUM 3'-0" ABOVE ROOF / PARAPET.

M1.32

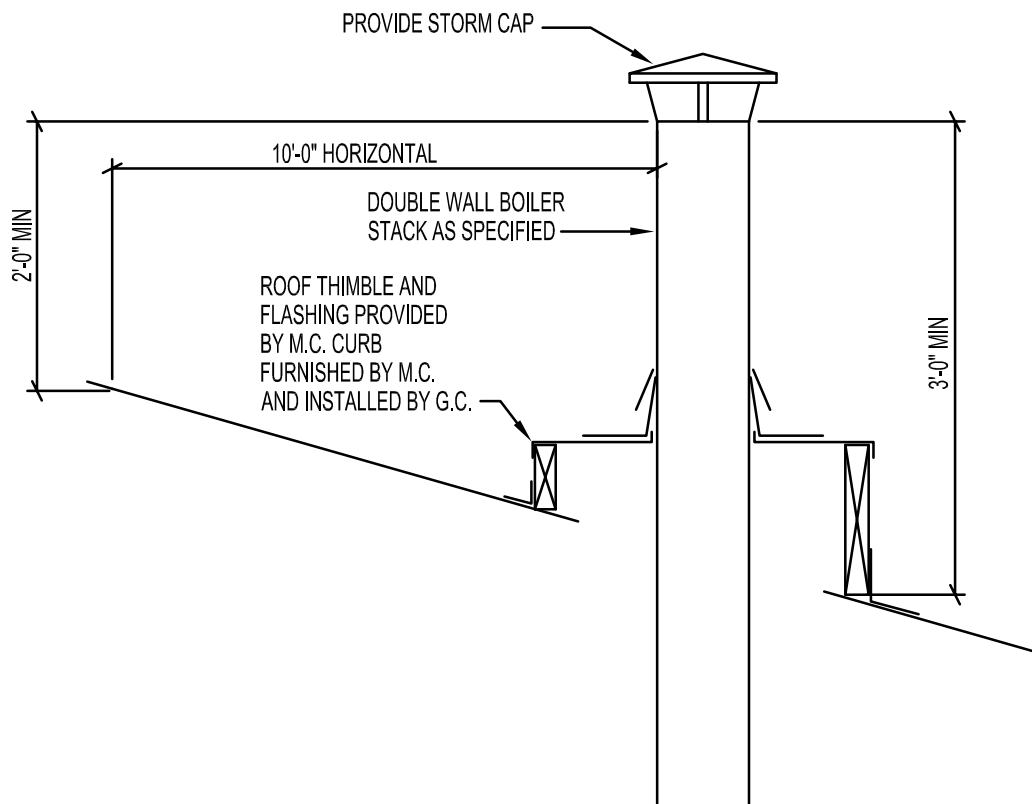
BOILER STACK SUPPORT DETAIL

SCALE: NONE



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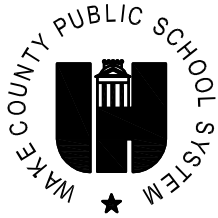
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M1.33

BOILER STACK THRU SLOPED ROOF DETAIL

SCALE: NONE

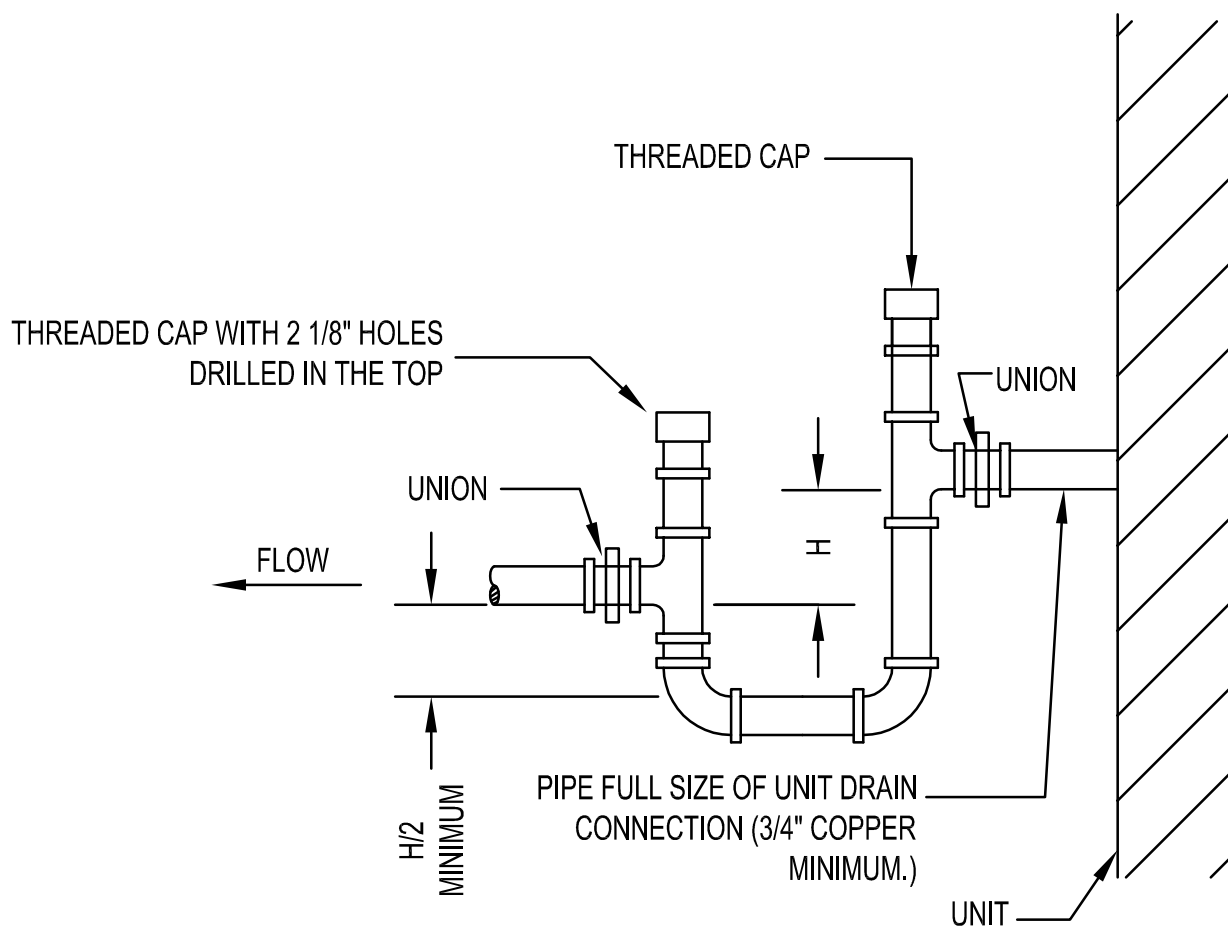


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NOTES:

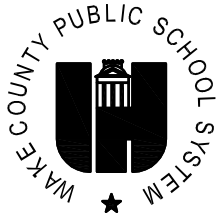
1. LOCATE TRAP SO AS TO BE ACCESSIBLE FOR CLEANING.
2. $H = \text{FAN INLET PRESSURE (IN. W.C.)} + 1 \text{ IN.}$



M1.34

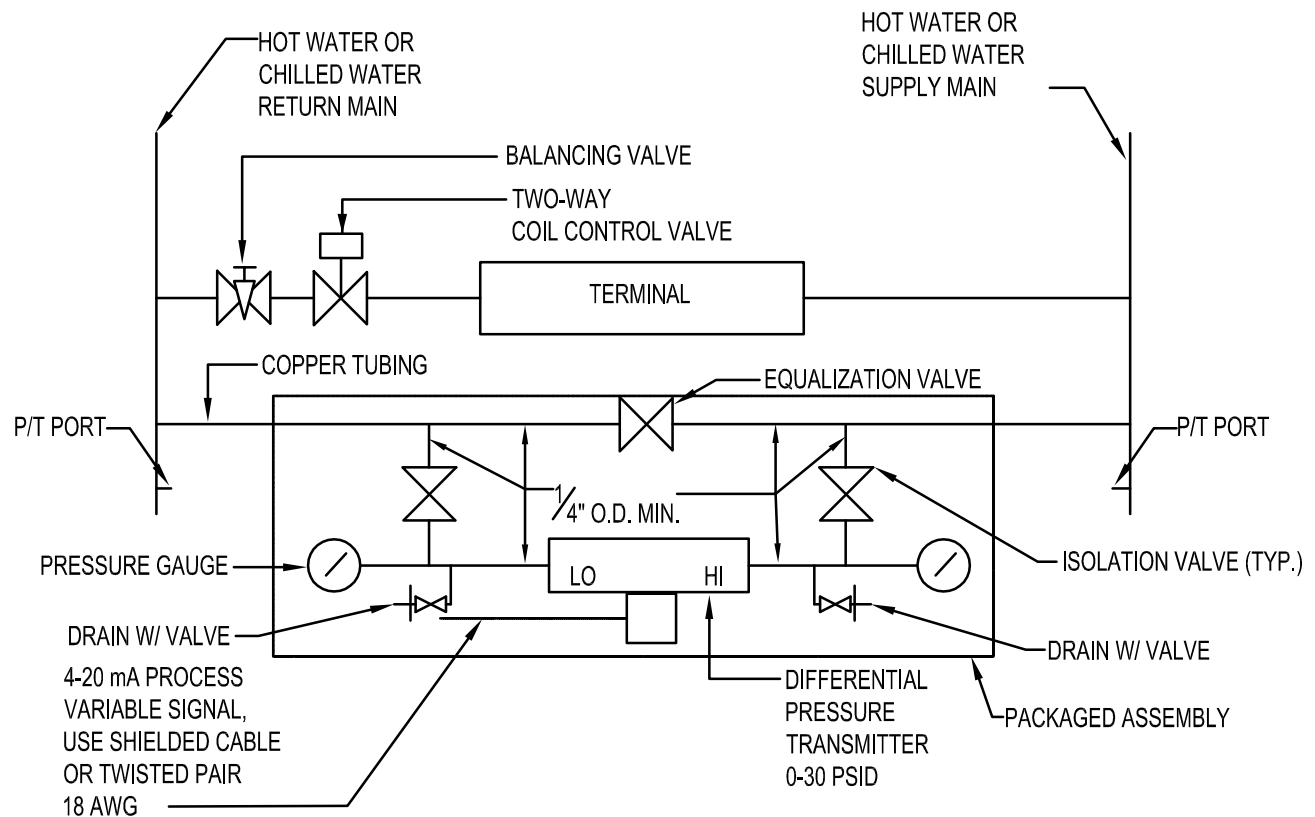
DRAW THROUGH CONDENSATE DRAIN DETAIL

SCALE: NONE



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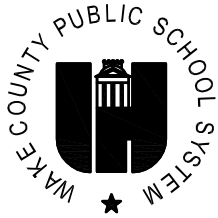
NOTES:

1. GROUND SHIELD AT CONTROL PANEL ONLY.
2. PURGE AIR FROM TUBING PRIOR TO START-UP USING VENT VALVES ON TRANSMITTER.
3. OPEN EQUALIZATION VALVE TO BALANCE PRESSURE, CLOSE PRIOR TO SYSTEM START-UP.
4. PIPING SHALL BE TYPE 'L' RIGID COPPER ONLY WITH SOLDERED FITTINGS. NO SOFT COPPER ALLOWED.

M1.41

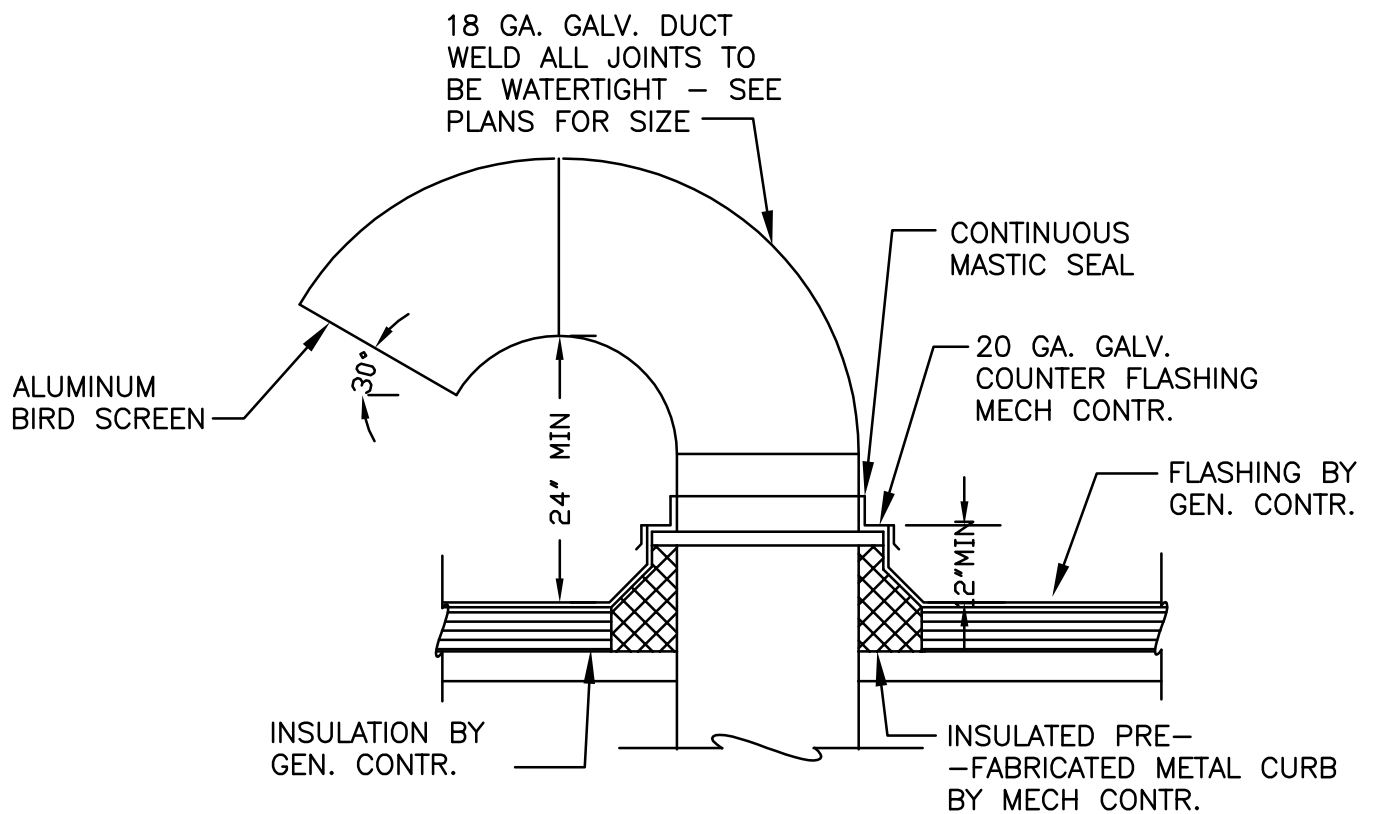
DIFFERENTIAL PRESSURE TRANSMITTER DETAIL

SCALE: NONE



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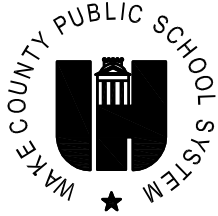
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M1.42

GOOSENECK ROOF PENETRATION DETAIL

SCALE: NONE

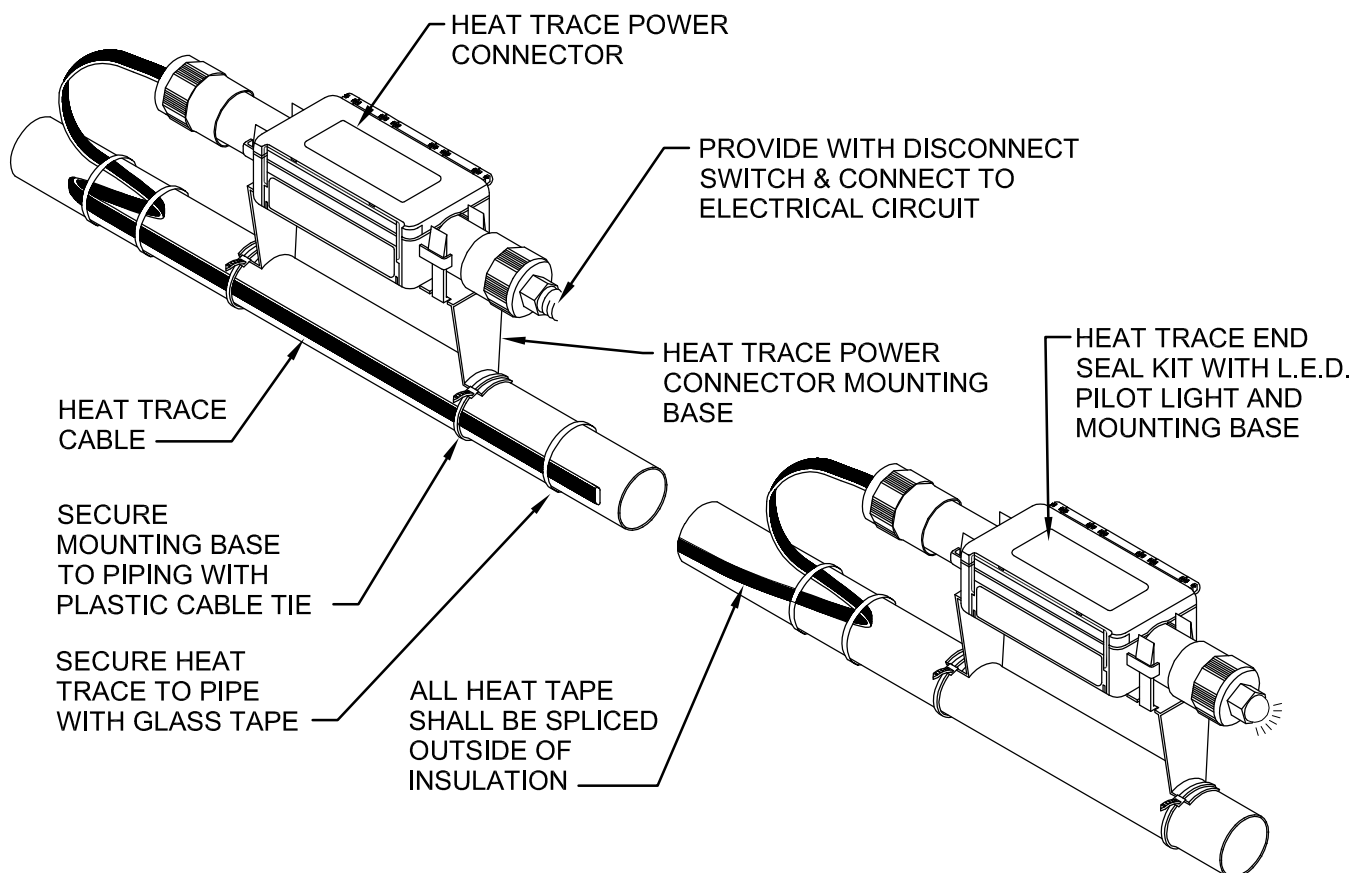


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HEAT TRACE SPECIFICATION:

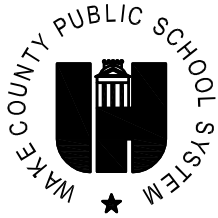
HEAT-TRACING CABLES: 5 W/FT OUTPUT. SELF-REGULATING, ELECTRIC HEATING CABLES SUITABLE FOR FREEZE PROTECTION OF METAL PIPING. CABLES: PAIR OF PARALLEL NO. 16 AWG TINNED-COPPER BUS WIRES EMBEDDED IN CROSS-LINKED CONDUCTIVE POLYMER CORE, WHICH VARIES POWER OUTPUT IN RESPONSE TO TEMPERATURE ALONG ITS LENGTH. CABLE SHALL BE CAPABLE OF CROSSING OVER ITSELF WITHOUT OVERHEATING. HEAT OUTPUT: AT LEAST 90 PERCENT OF RATING OVER A TEMPERATURE RANGE FROM 40 TO 150 DEG F PIPE TEMPERATURE. CABLE COVER: FABRICATED OF CROSS-LINKED, MODIFIED, POLYOLEFIN DIELECTRIC JACKET; WITH ULTRAVIOLET INHIBITOR. PIPE THERMOSTAT: UNIT WITH ADJUSTABLE TEMPERATURE RANGE FROM 35 TO 50 DEG F SNAP ACTION; OPEN-ON-RISE, SINGLE-POLE SWITCH WITH 25-A RATING; AND REMOTE BULB FOR DIRECTLY SENSING PIPE-WALL TEMPERATURE.



M1.43

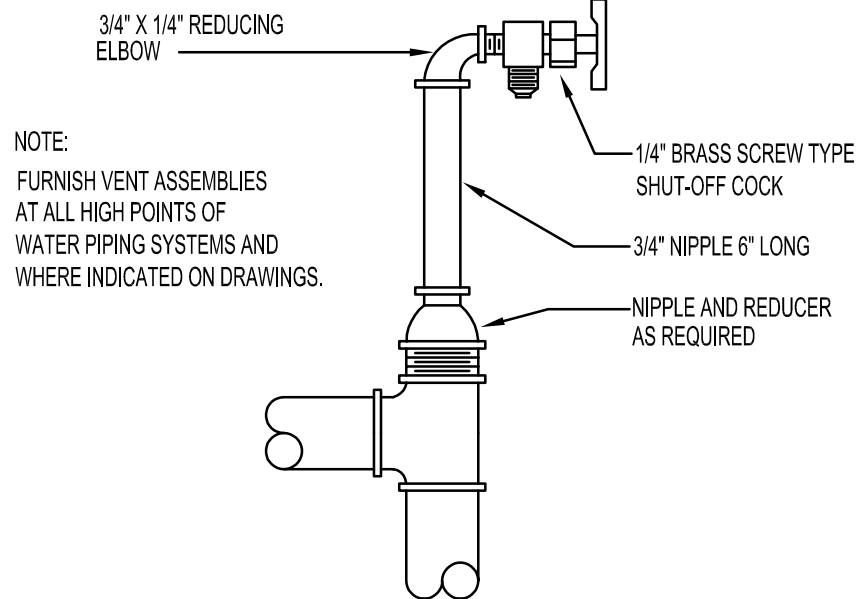
HEAT TRACE CABLE INSTALLATION DETAIL

SCALE: NONE



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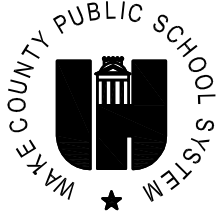
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M1.44

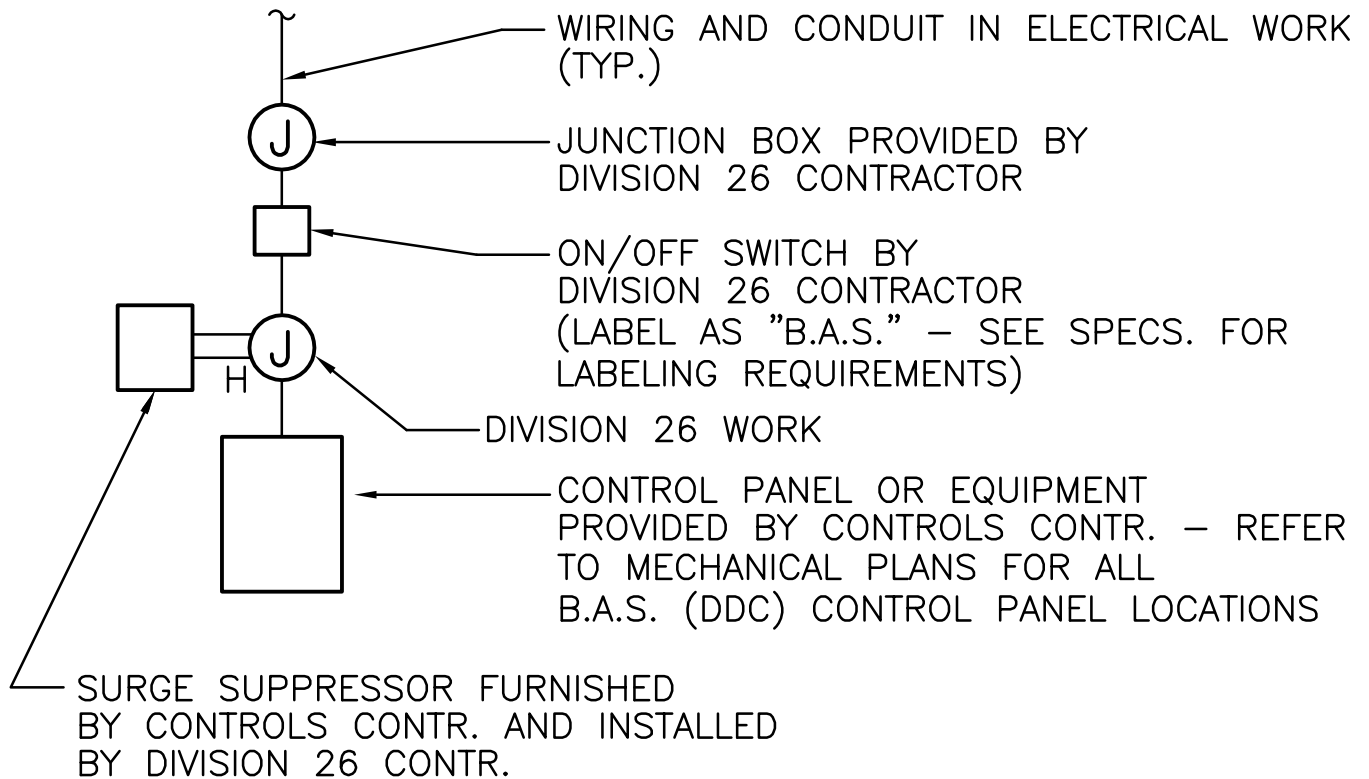
MANUAL AIR VENT DETAIL

SCALE: NONE



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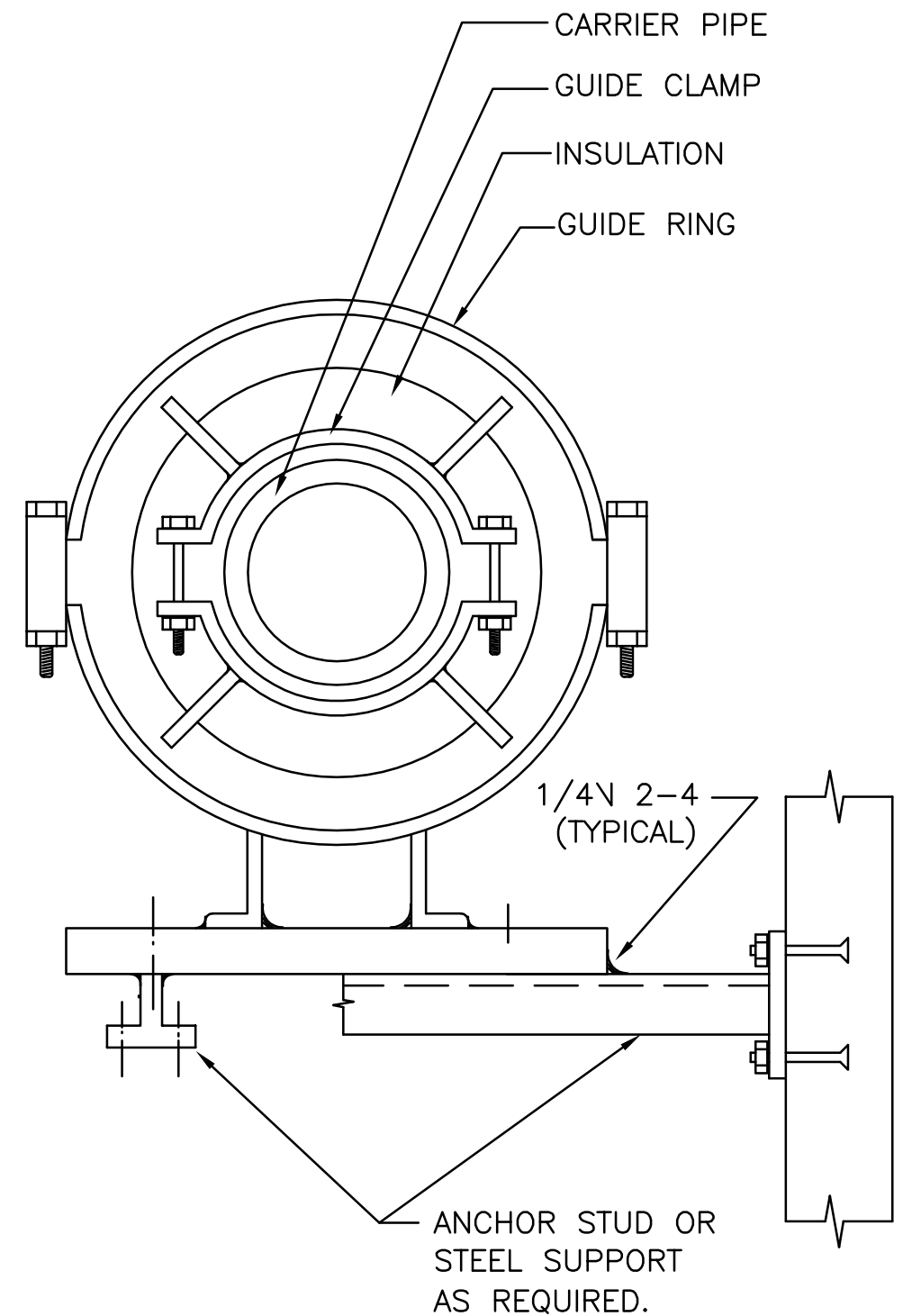
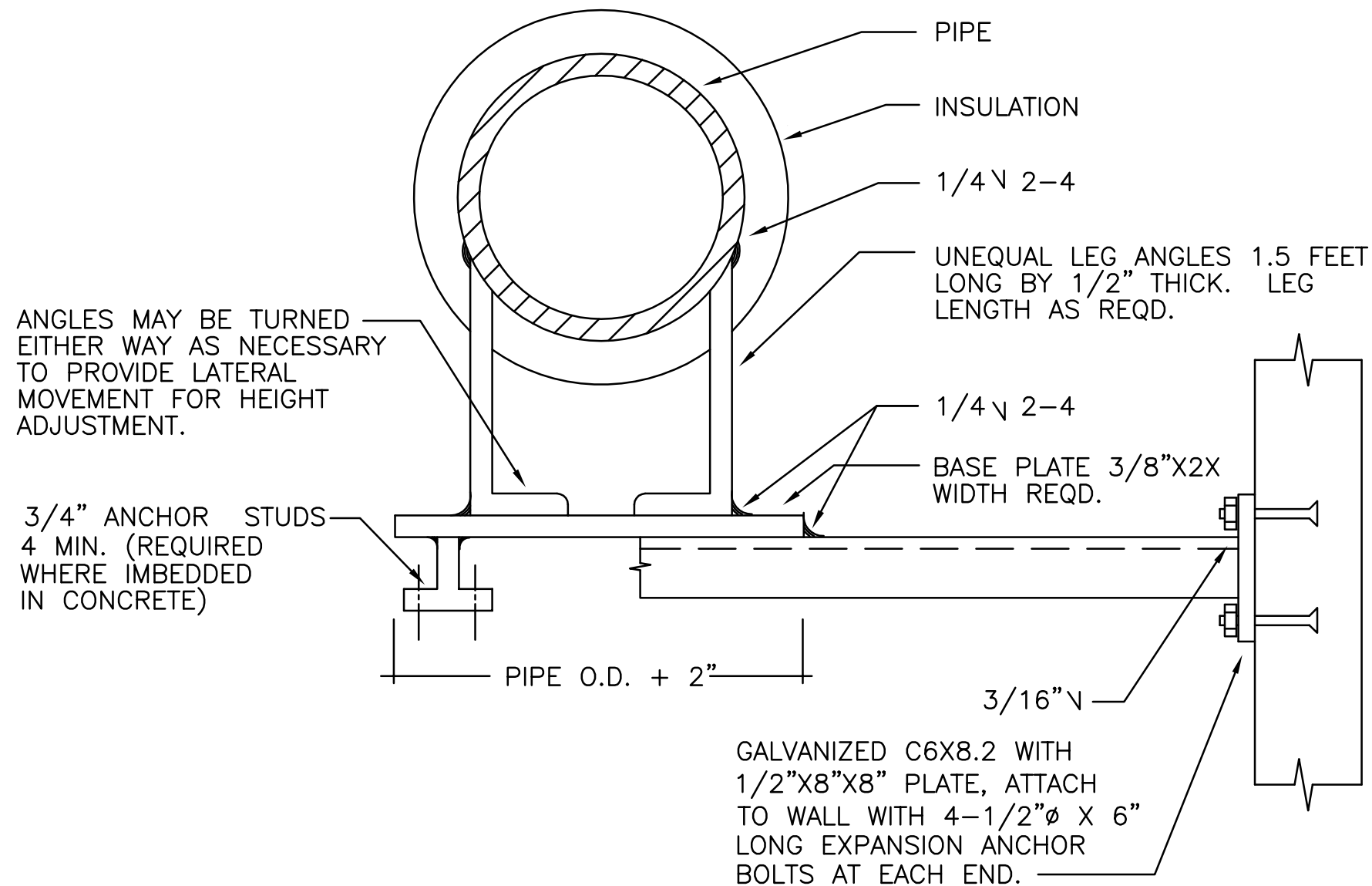
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M1.45

POWER SUPPLY FOR CONTROLS DETAIL

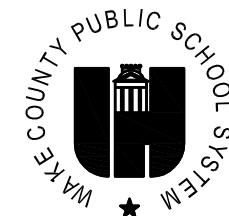
SCALE: NONE



M1.51

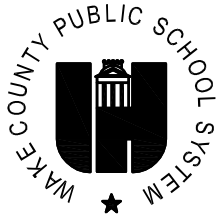
PIPE EXPANSION ANCHOR AND GUIDE DETAIL

SCALE: NONE



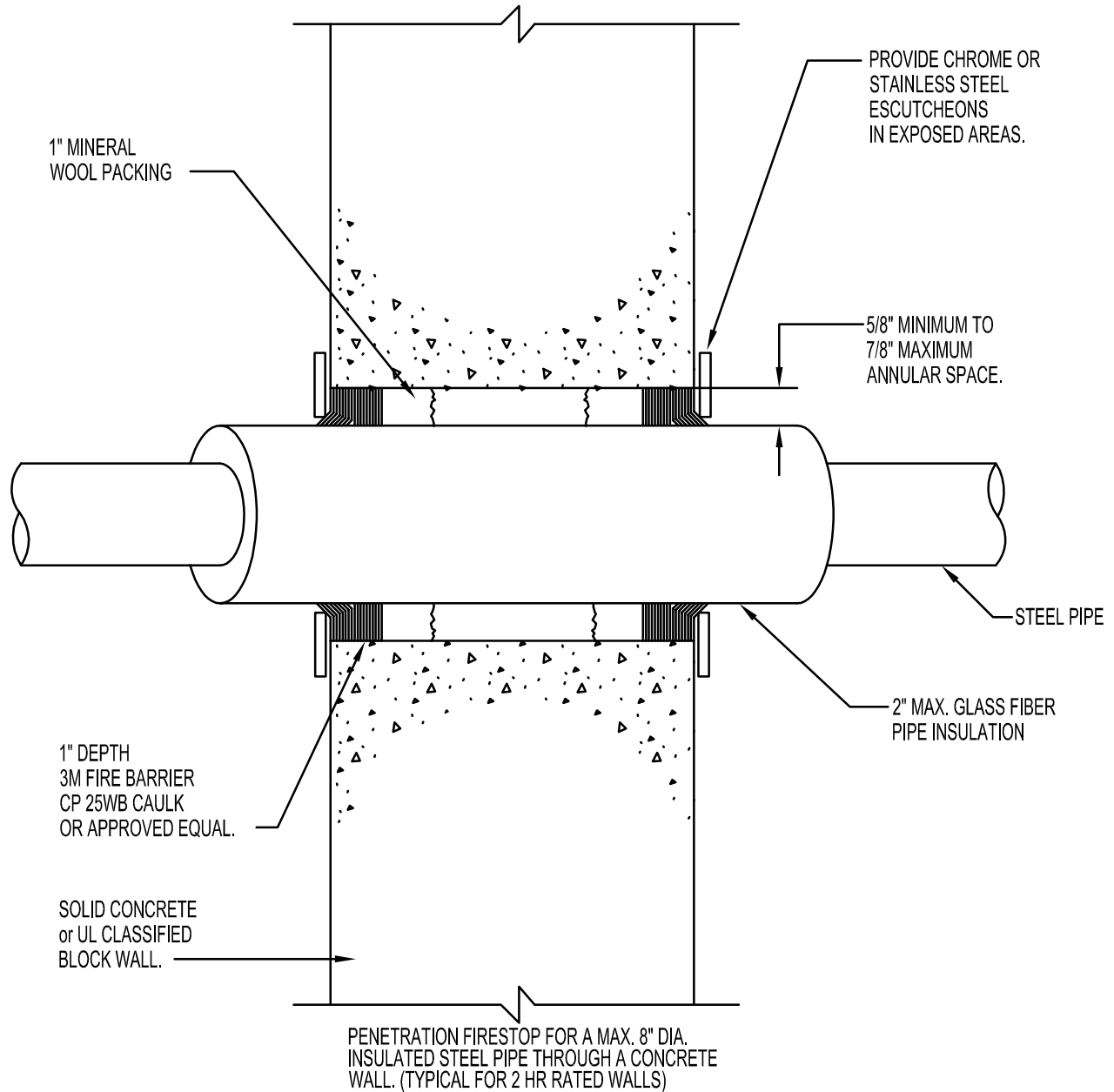
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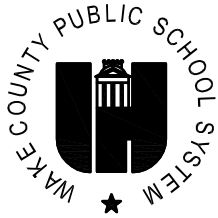


NOTE:
FOR NON-FIRE RATED WALL PENETRATIONS
INSTALL AS DETAILED ABOVE AND SUBSTITUTE
ACRYLIC SILICONE CAULK FOR FIRE BARRIER
CAULK.

M1.52

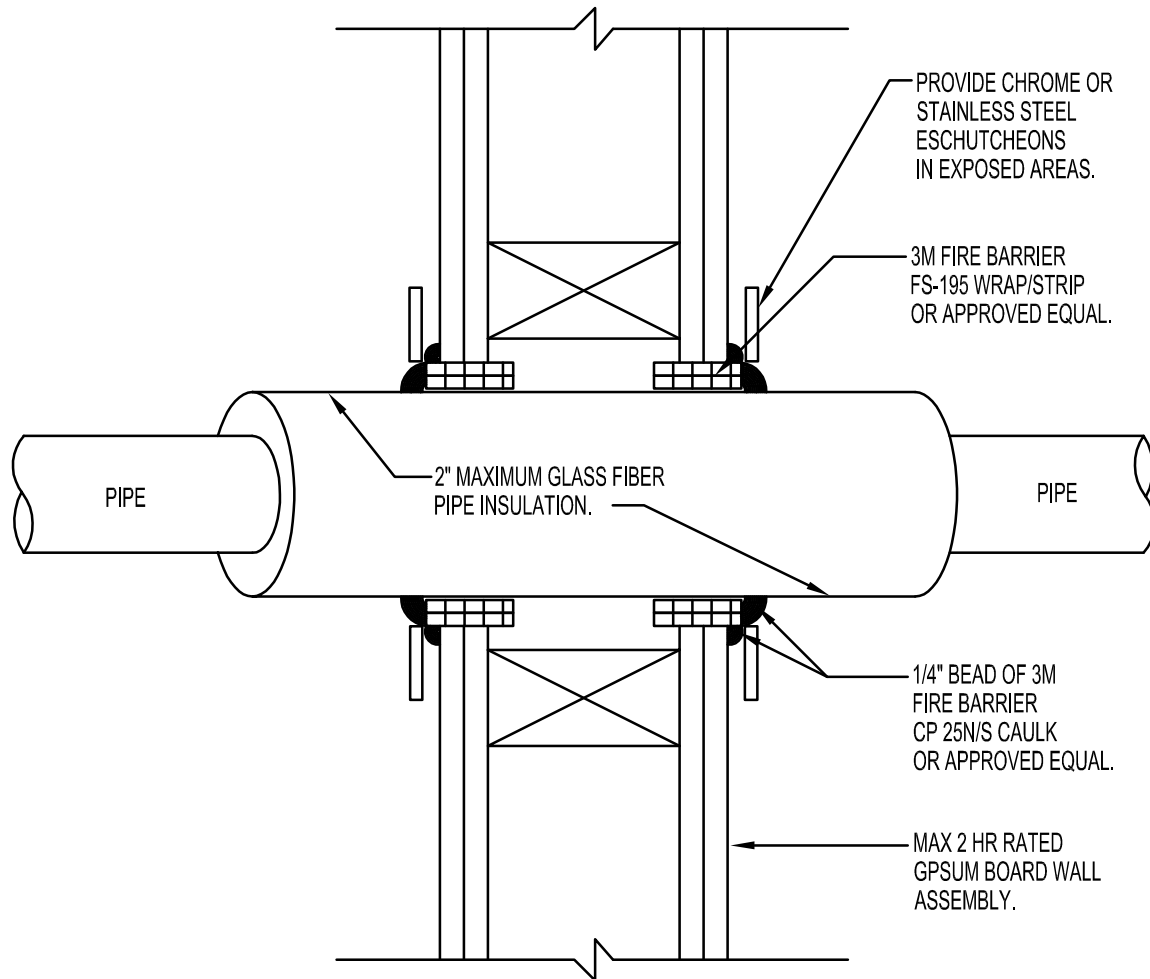
PIPING PENETRATION THRU CONCRETE WALL DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

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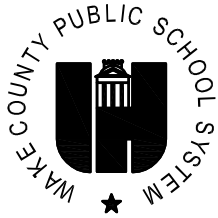
PENETRATION FIRESTOP FOR A MAX. 12" DIA.
INSULATED STEEL PIPE THROUGH A GYPSUM BOARD
WALL. (UL SYSTEM WL1002 TYPICAL FOR 1 & 2HR.
RATED WALLS)

NOTE:
FOR NON-FIRE RATED WALL PENETRATIONS
INSTALL AS DETAILED ABOVE AND SUBSTITUTE
ACRYLIC SILICONE CAULK FOR FIRE BARRIER
CAULK.

M1.53

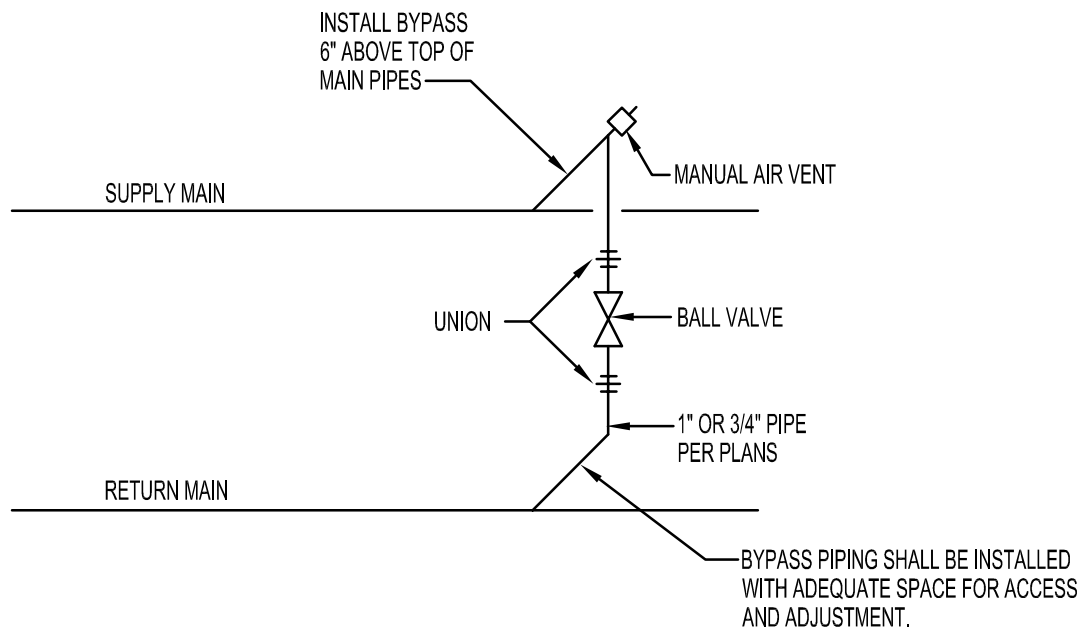
PIPING PENETRATION THRU STUD WALL DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

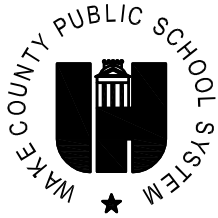
1429 Rock Quarry Road, Suite 116
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M1.54

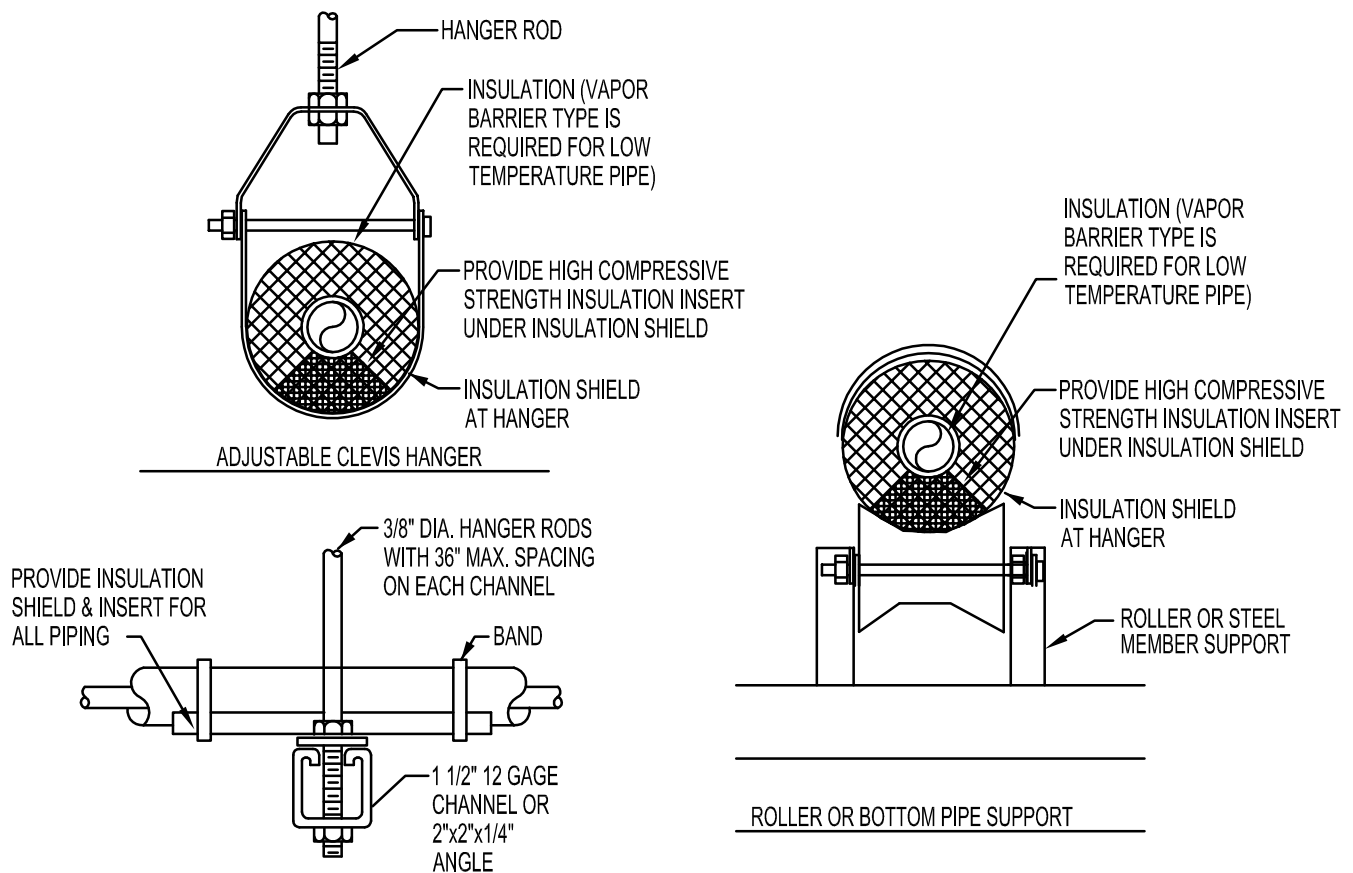
PIPING BYPASS DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

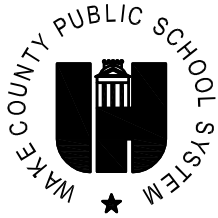
1429 Rock Quarry Road, Suite 116
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M1.55

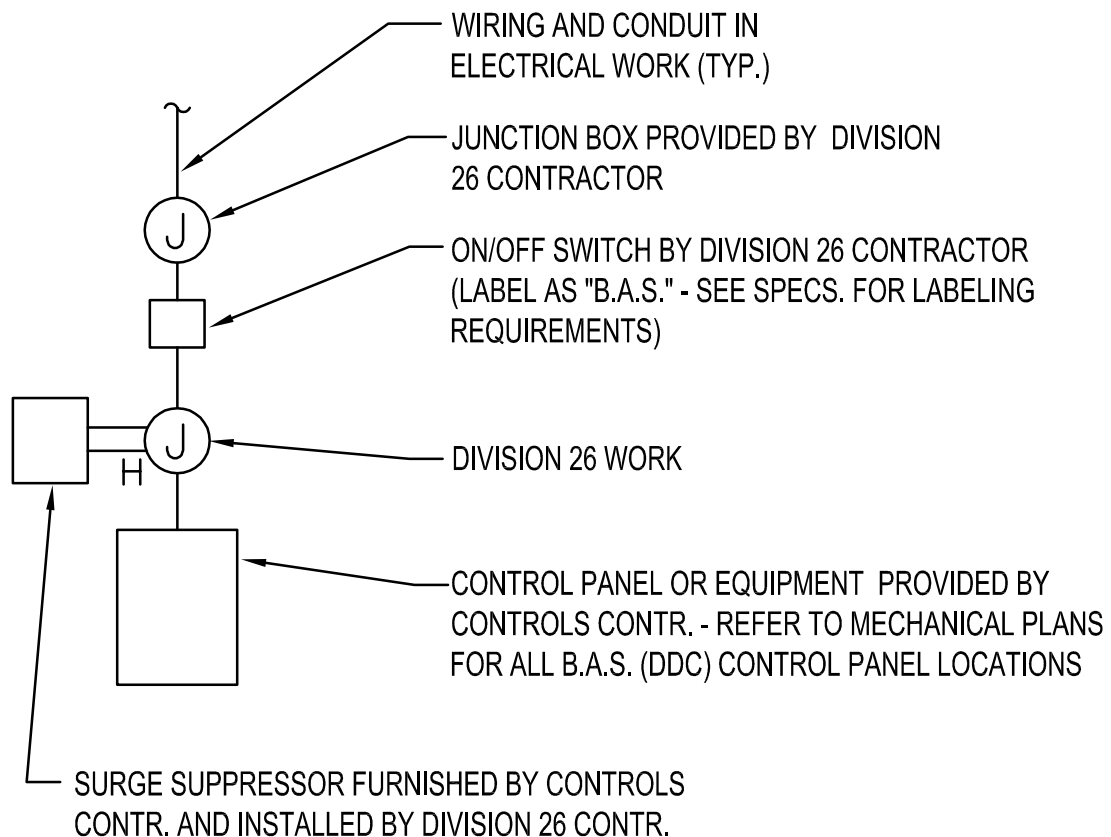
PIPING SUPPORT DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

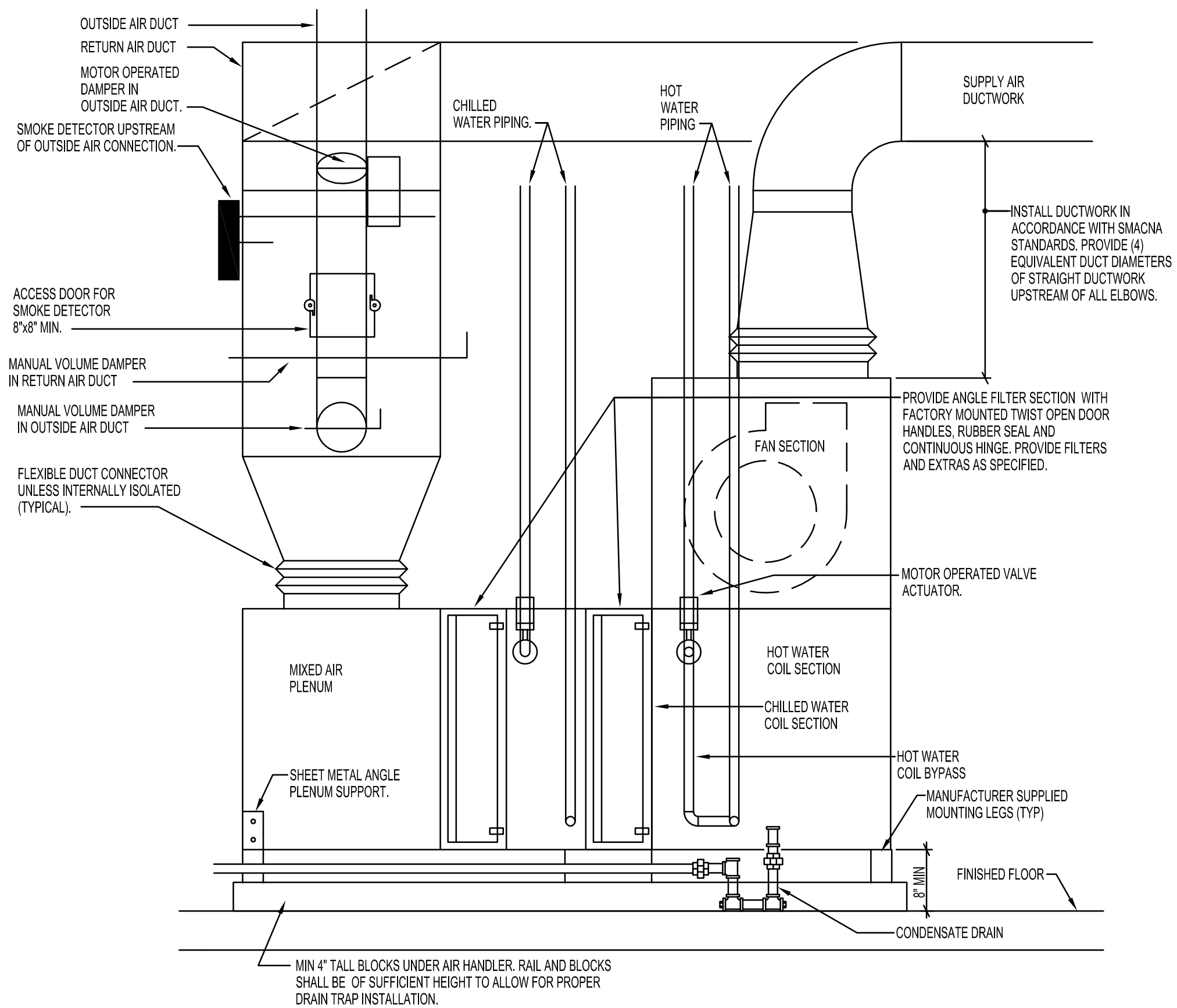
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M1.56

TYPICAL ELECTRICAL CONNECTION DETAIL

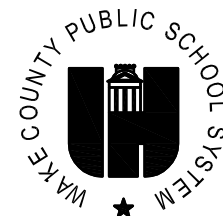
SCALE: NONE



M2.01

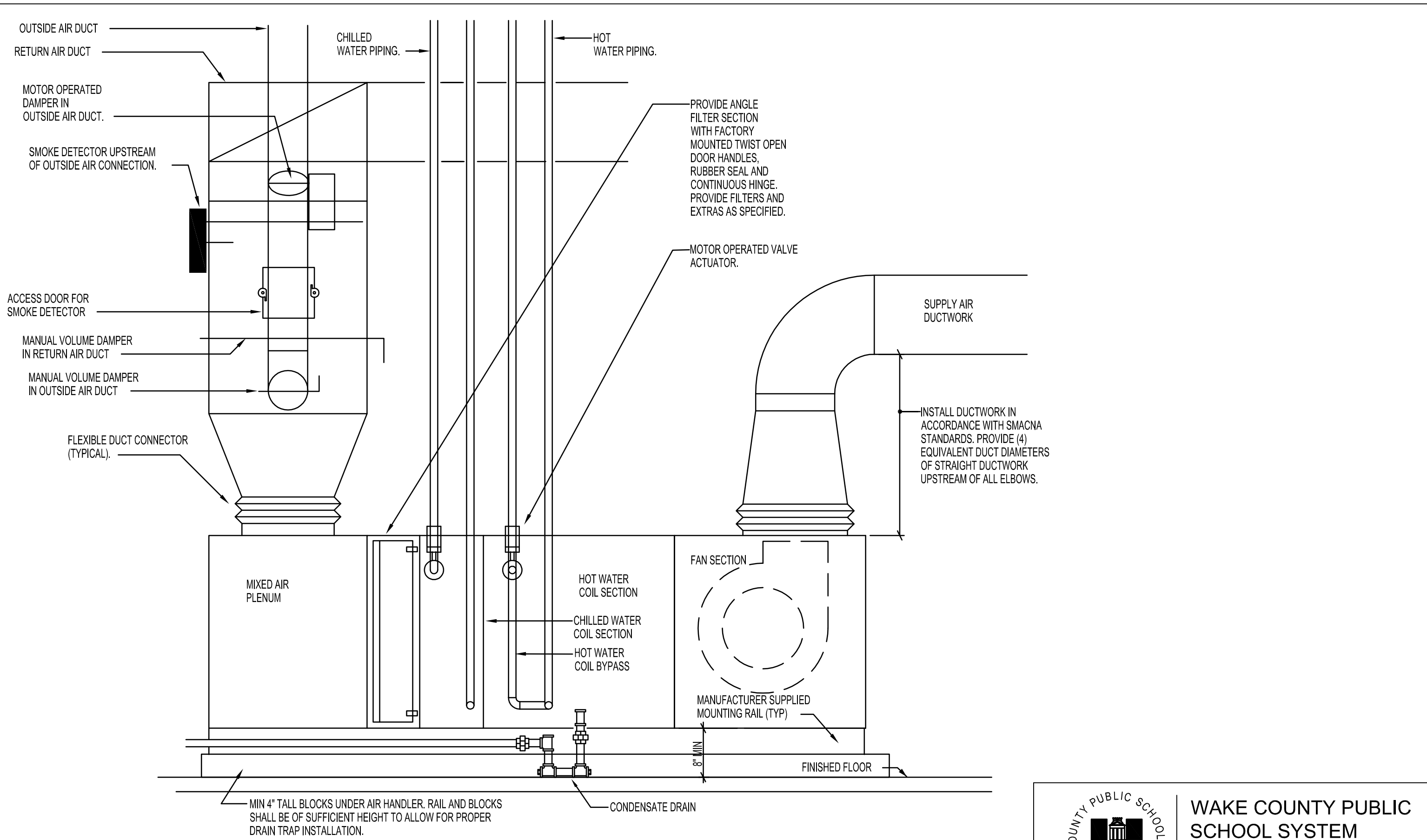
CONSTANT VOLUME AIR HANDLING UNIT DETAIL

SCALE: NONE



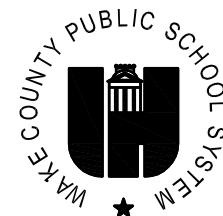
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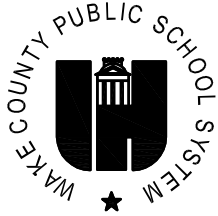
M2.02

CONSTANT VOLUME HORIZONTAL AIR HANDLING UNIT DETAIL



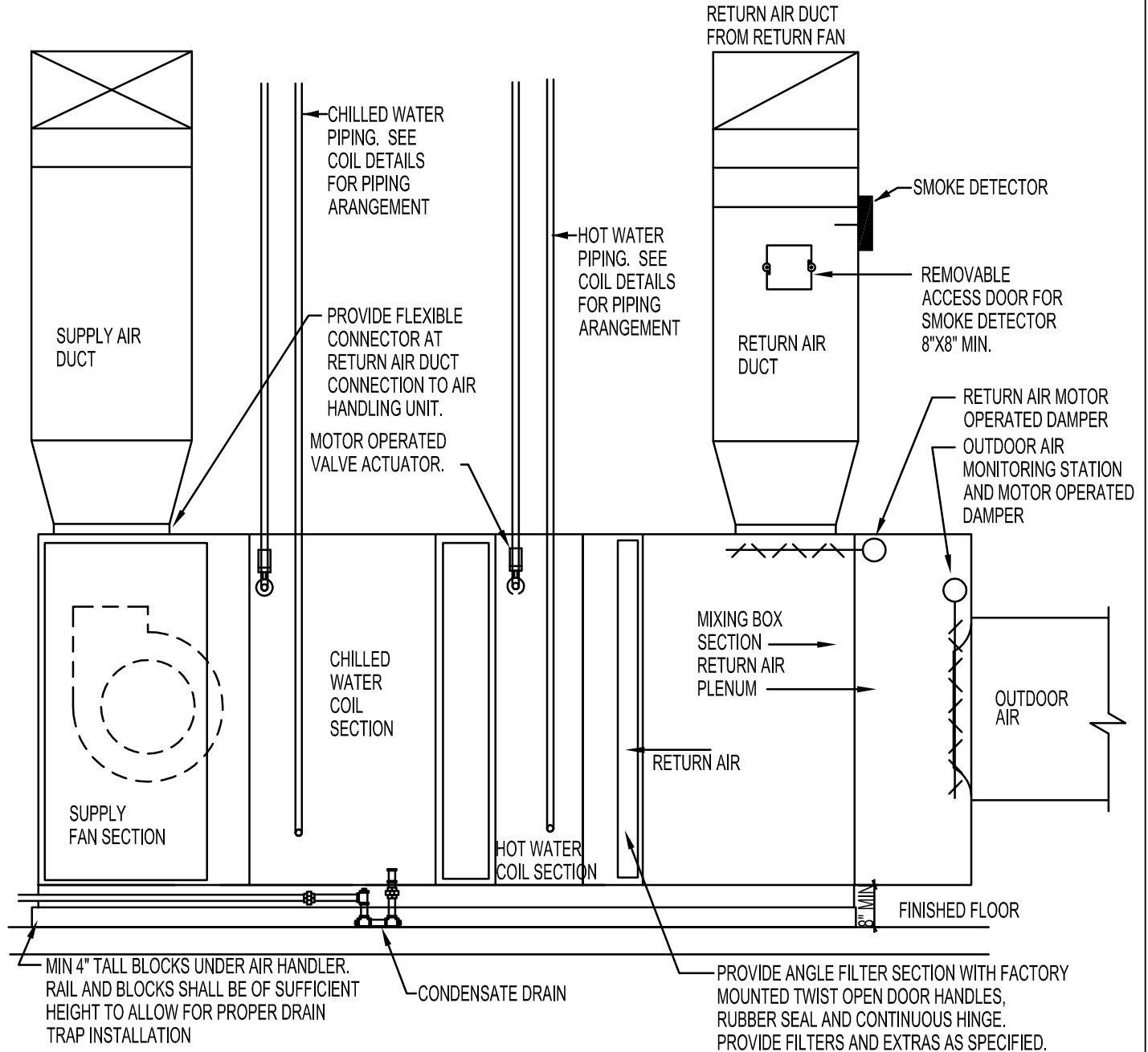
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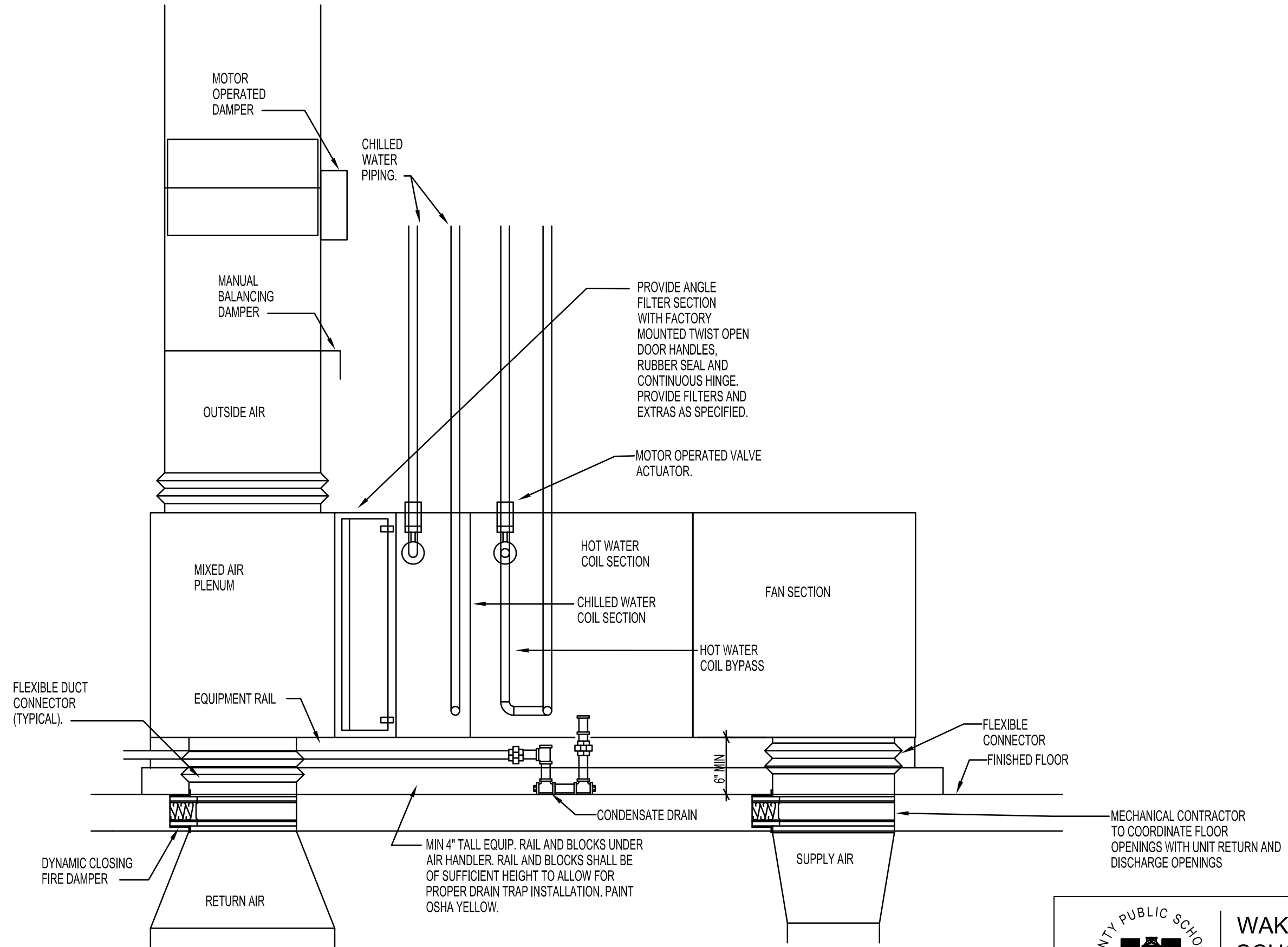
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M2.03

CONSTANT VOLUME HORIZONTAL AHU WITH ECONOMIZER

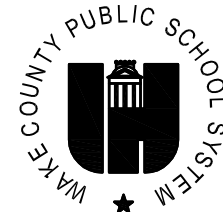
SCALE: NONE



M2.04

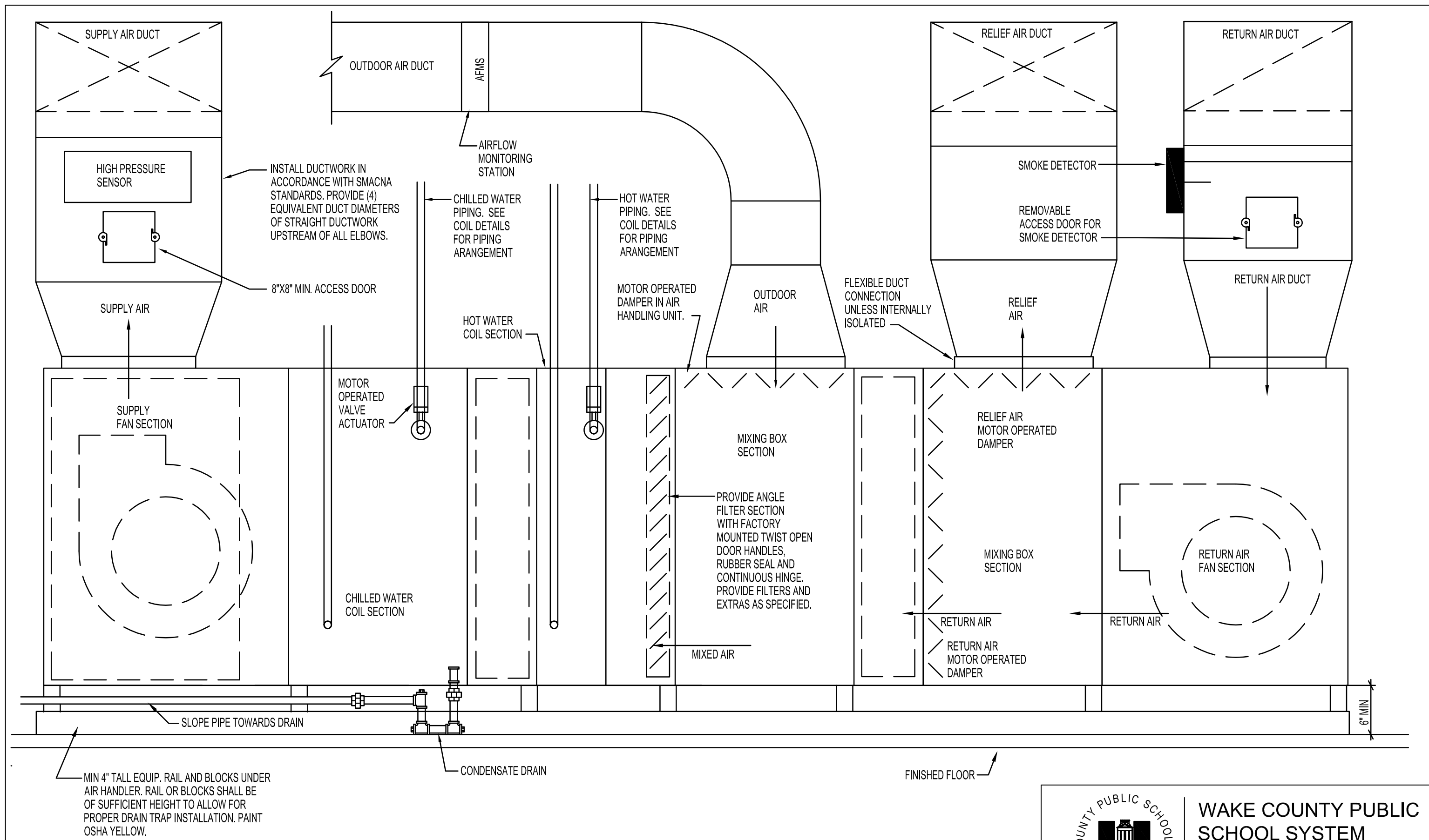
CONSTANT VOLUME HORIZONTAL AIR HANDLING UNIT DETAIL

SCALE: NONE



**WAKE COUNTY PUBLIC
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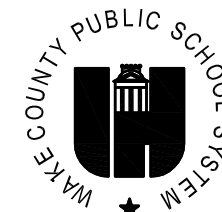
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M2.05

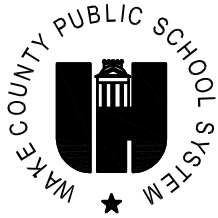
VARIABLE VOLUME AIR HANDLING UNIT DETAIL

SCALE: NONE



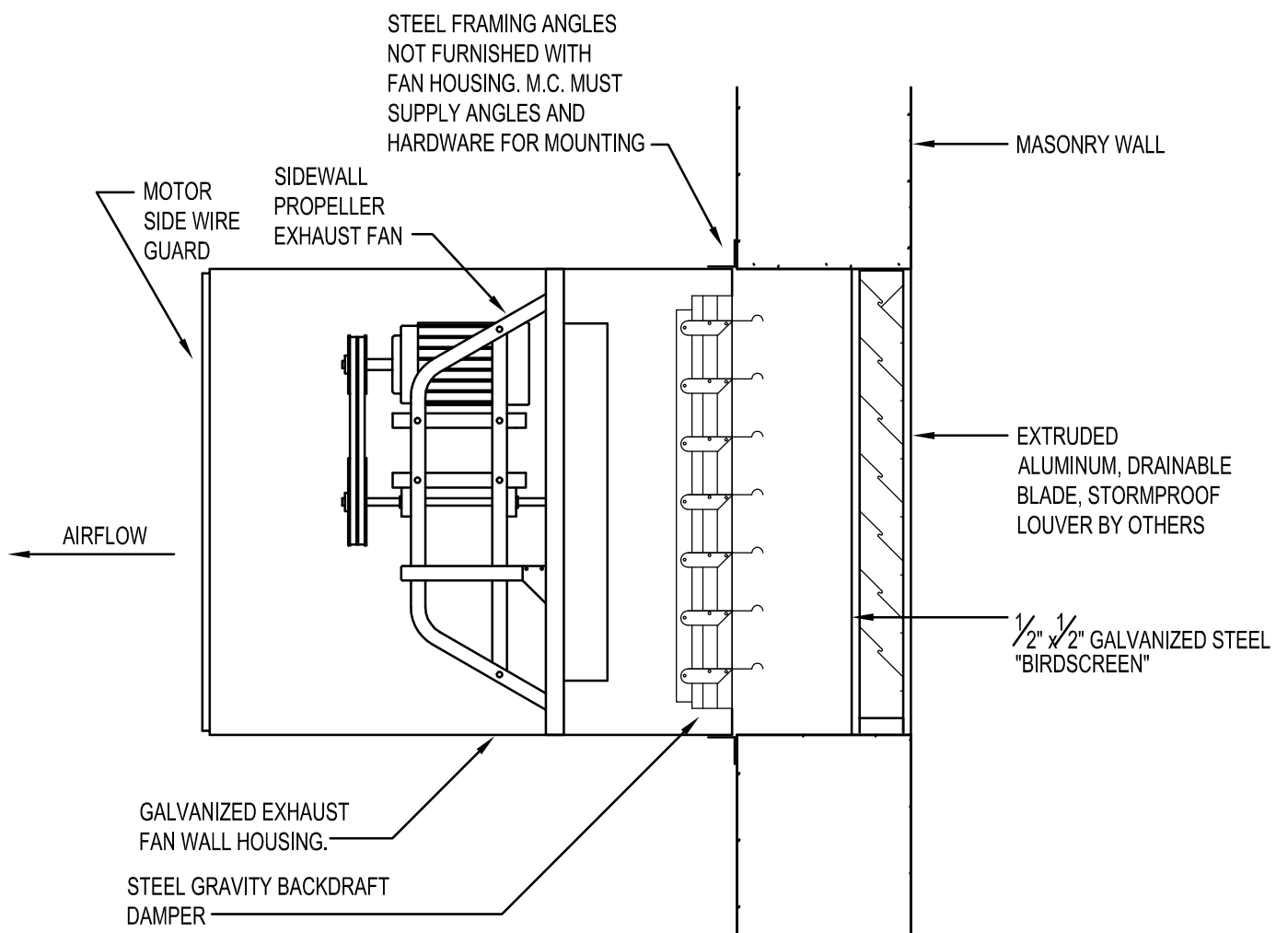
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WAKE COUNTY PUBLIC SCHOOL SYSTEM

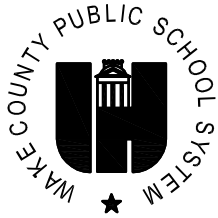
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M2.07

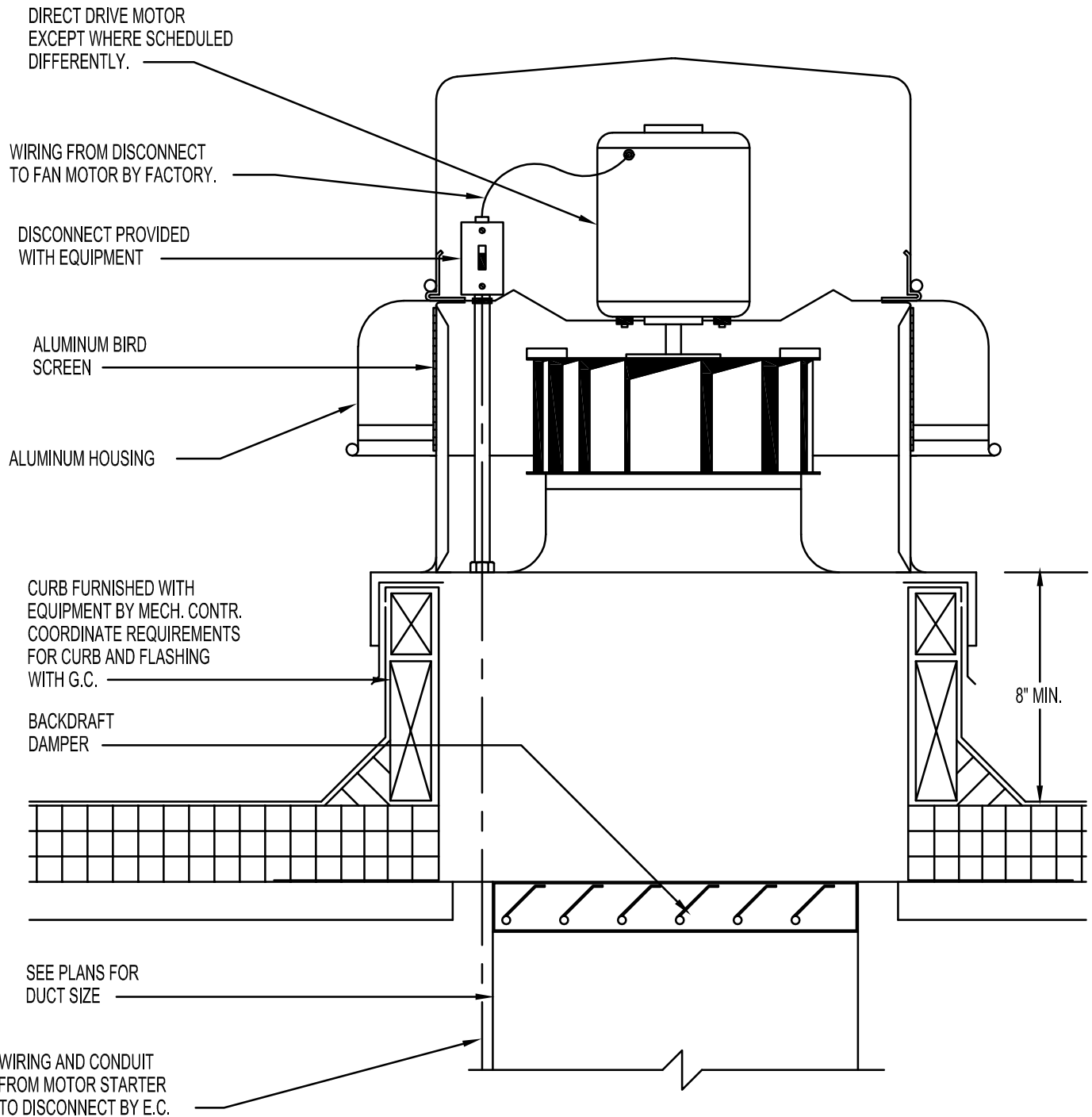
PROPELLER FAN DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

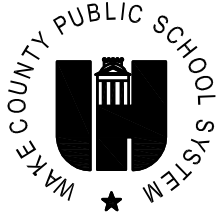
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M2.08

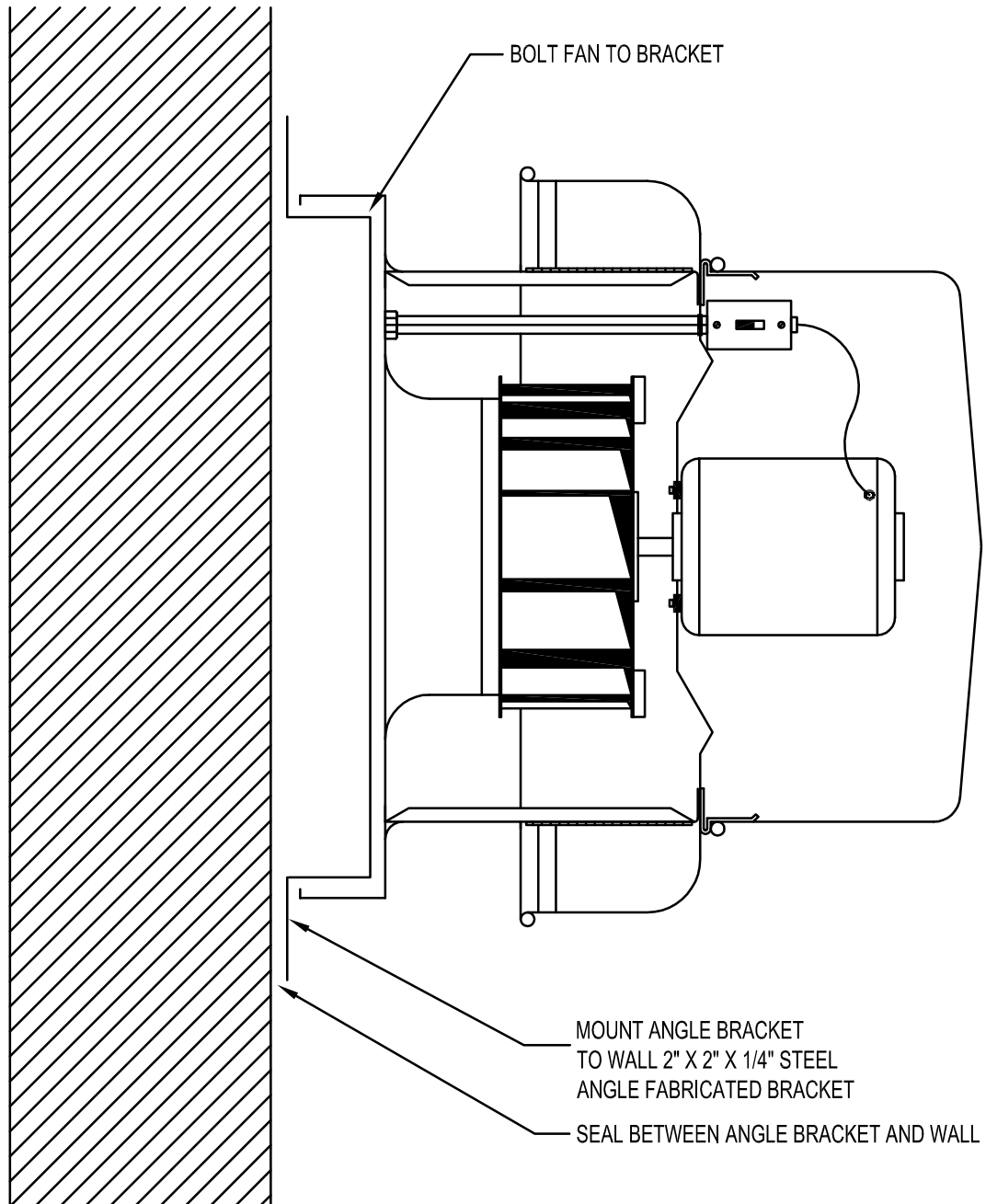
ROOF MOUNTED FAN INSTALLATION DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

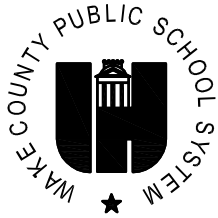
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M2.09

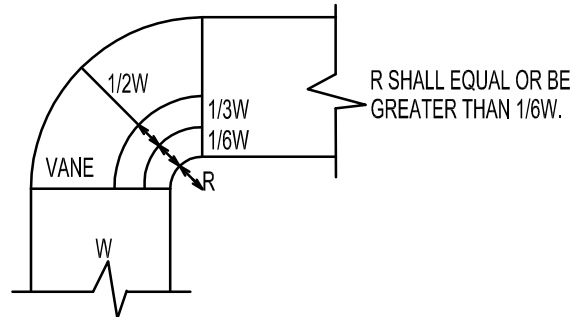
WALL MOUNTED FAN INSTALLATION DETAIL

SCALE: NONE

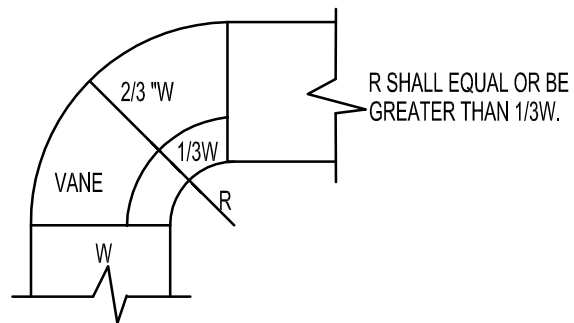


WAKE COUNTY PUBLIC SCHOOL SYSTEM

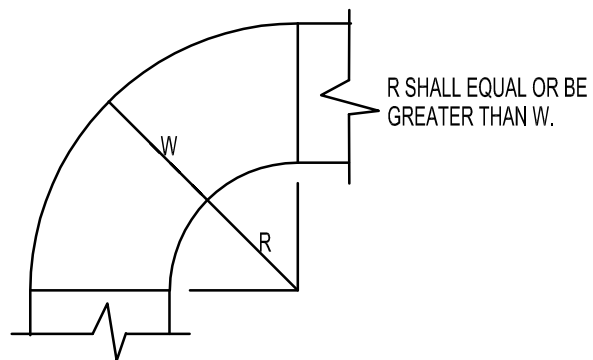
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SHORT RADIUS ELBOW WITH TWO VANES



SHORT RADIUS ELBOW WITH ONE VANE



STANDARD RADIUS ELBOW

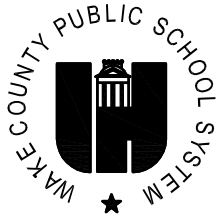
NOTES:

1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND
2. ALL STANDARD RADIUS ELBOWS SHOWN ON PLANS MAY BE MADE SHORT RADIUS ELBOW. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

M2.11

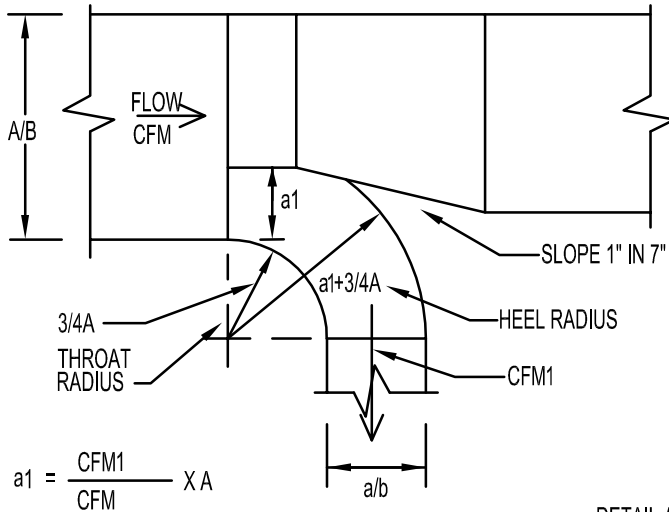
EXPOSED DUCT PENETRATION DETAIL

SCALE: NONE

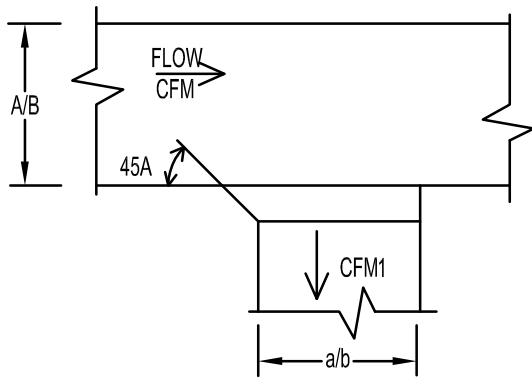
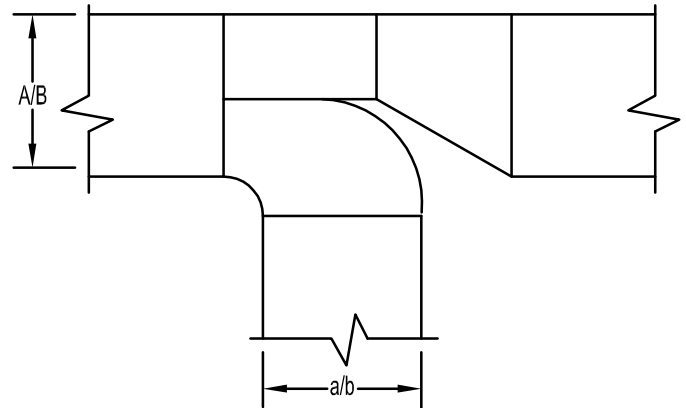


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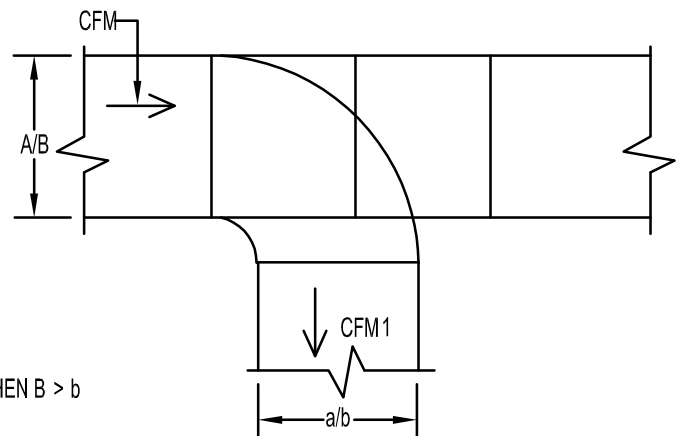
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DETAIL A



DETAIL B



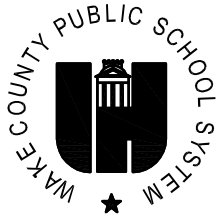
DETAIL C

WHEN $\frac{CFM1}{CFM} \leq 0.1$

M2.12

DUCT TAKEOFF DETAIL

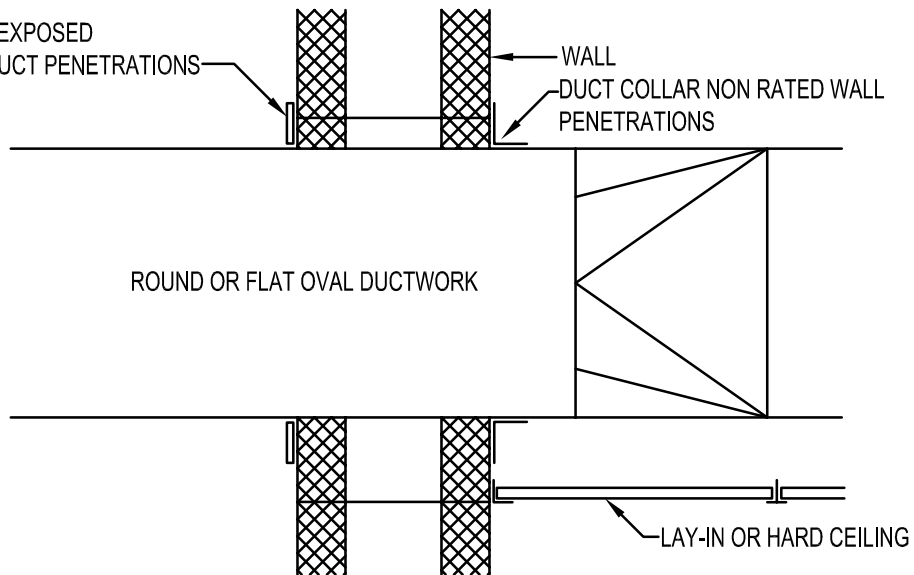
SCALE: NONE



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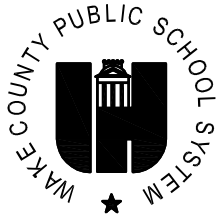
PROVIDE TRIM RING ON EXPOSED
ROUND OR FLAT OVAL DUCT PENETRATIONS



M2.13

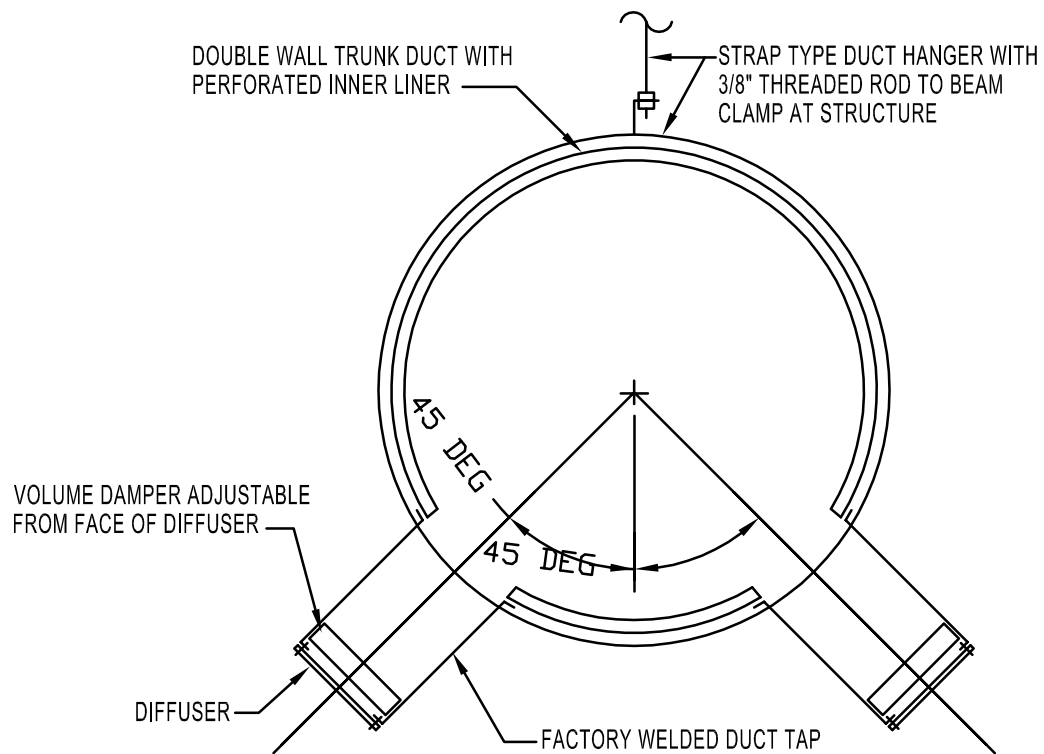
EXPOSED DUCT PENETRATION DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

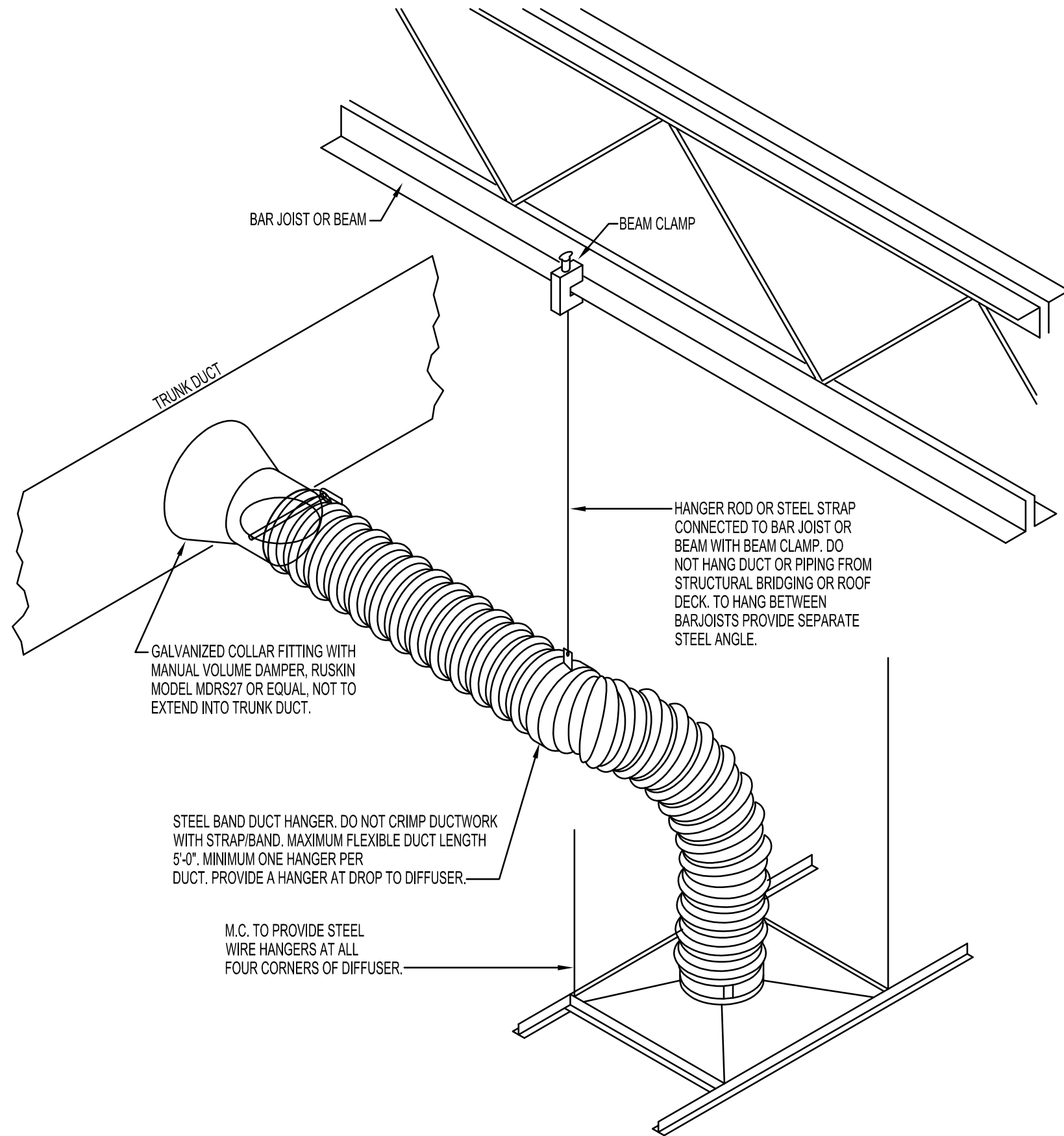
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M2.14

EXPOSED SPIRAL DUCT DETAIL

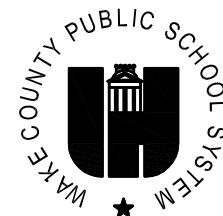
SCALE: NONE



M2.15

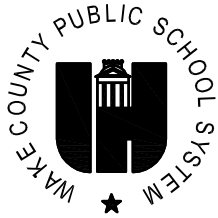
FLEXIBLE DUCTWORK INSTALLATION DETAIL

SCALE: NONE



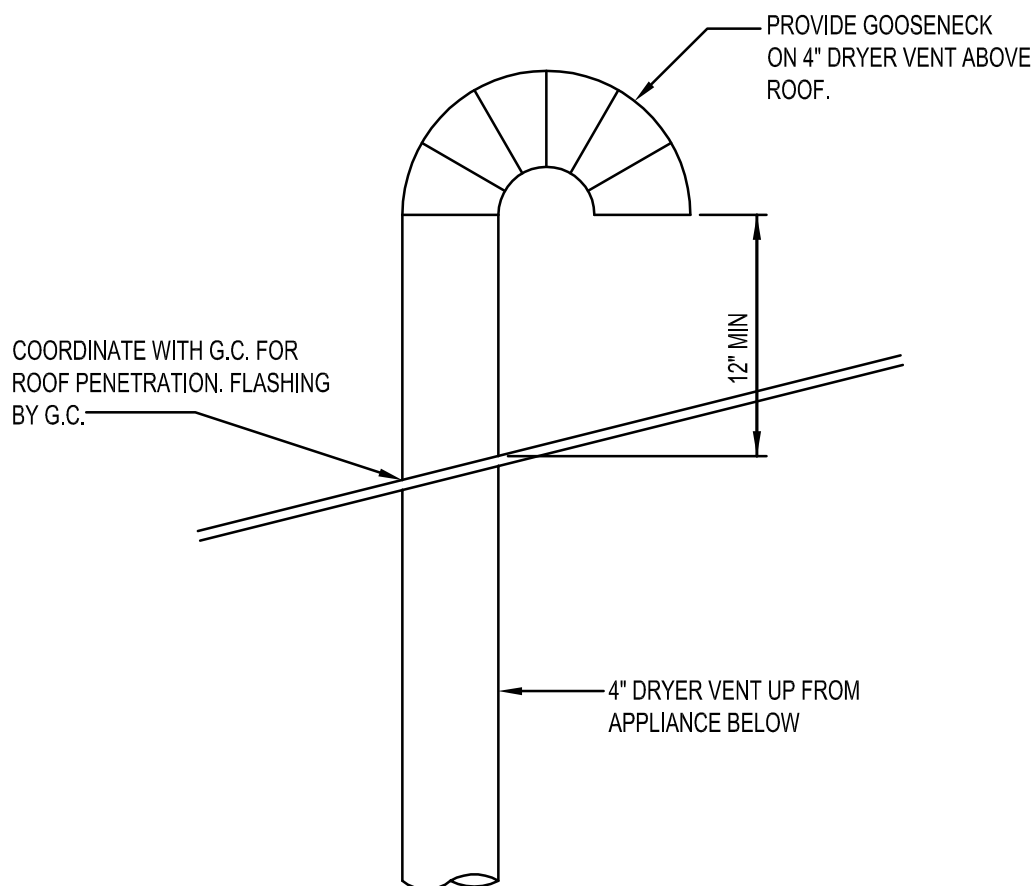
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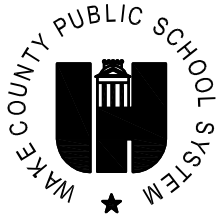
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M2.16

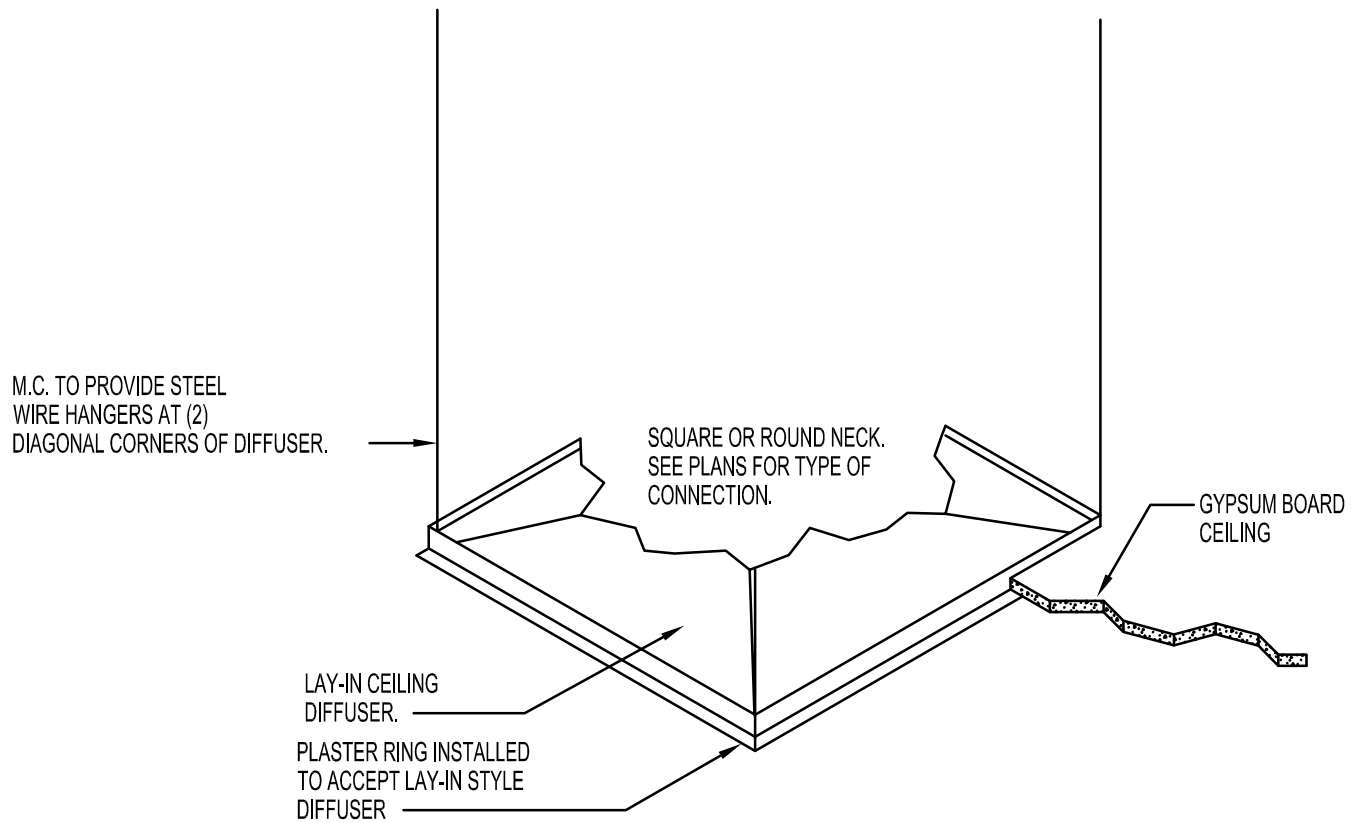
DRYER VENT ROOF PENETRATION DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

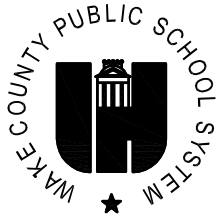
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M2.21

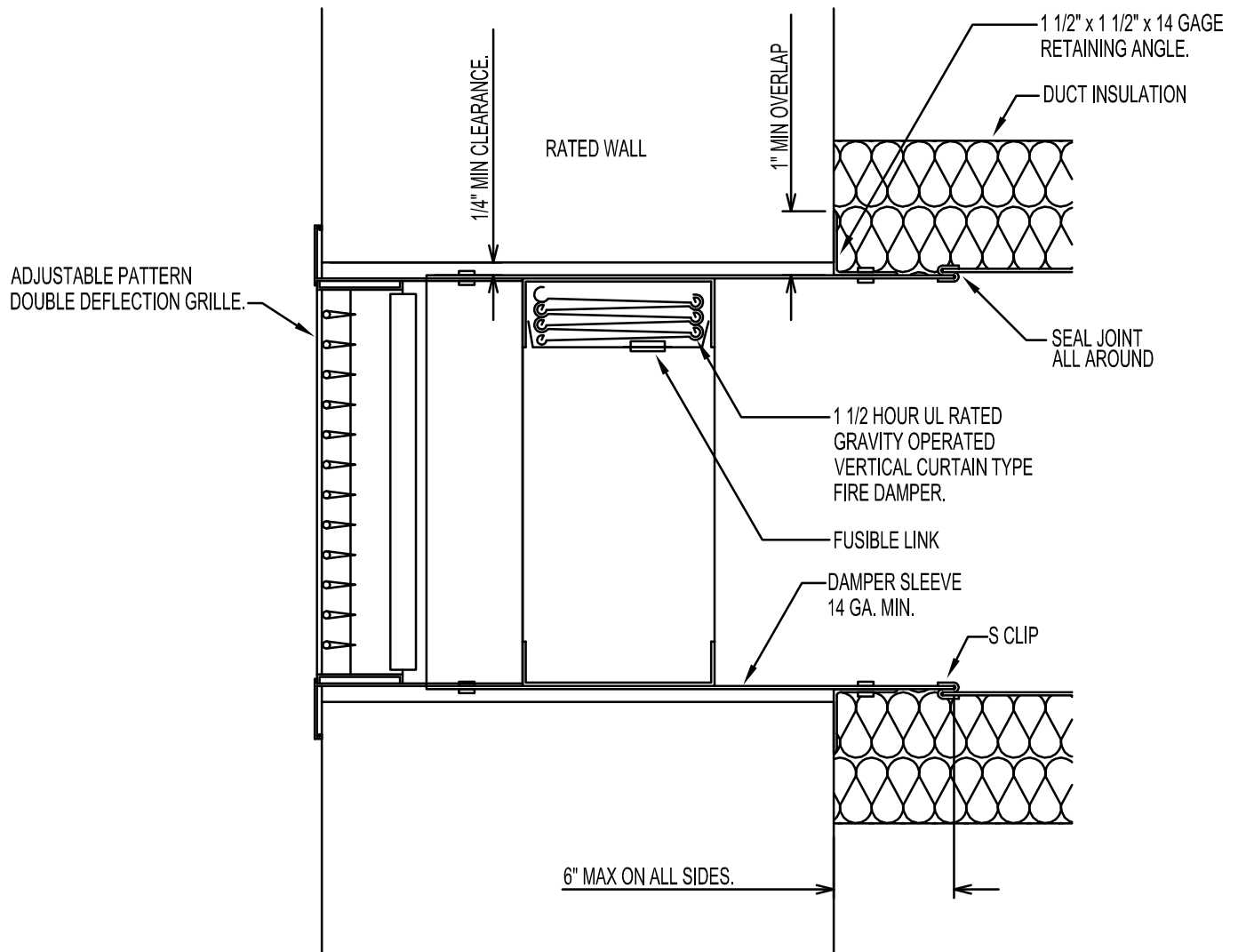
GYPSUM CEILING DIFFUSER INSTALLATION DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

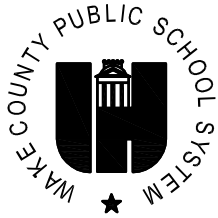
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M2.22

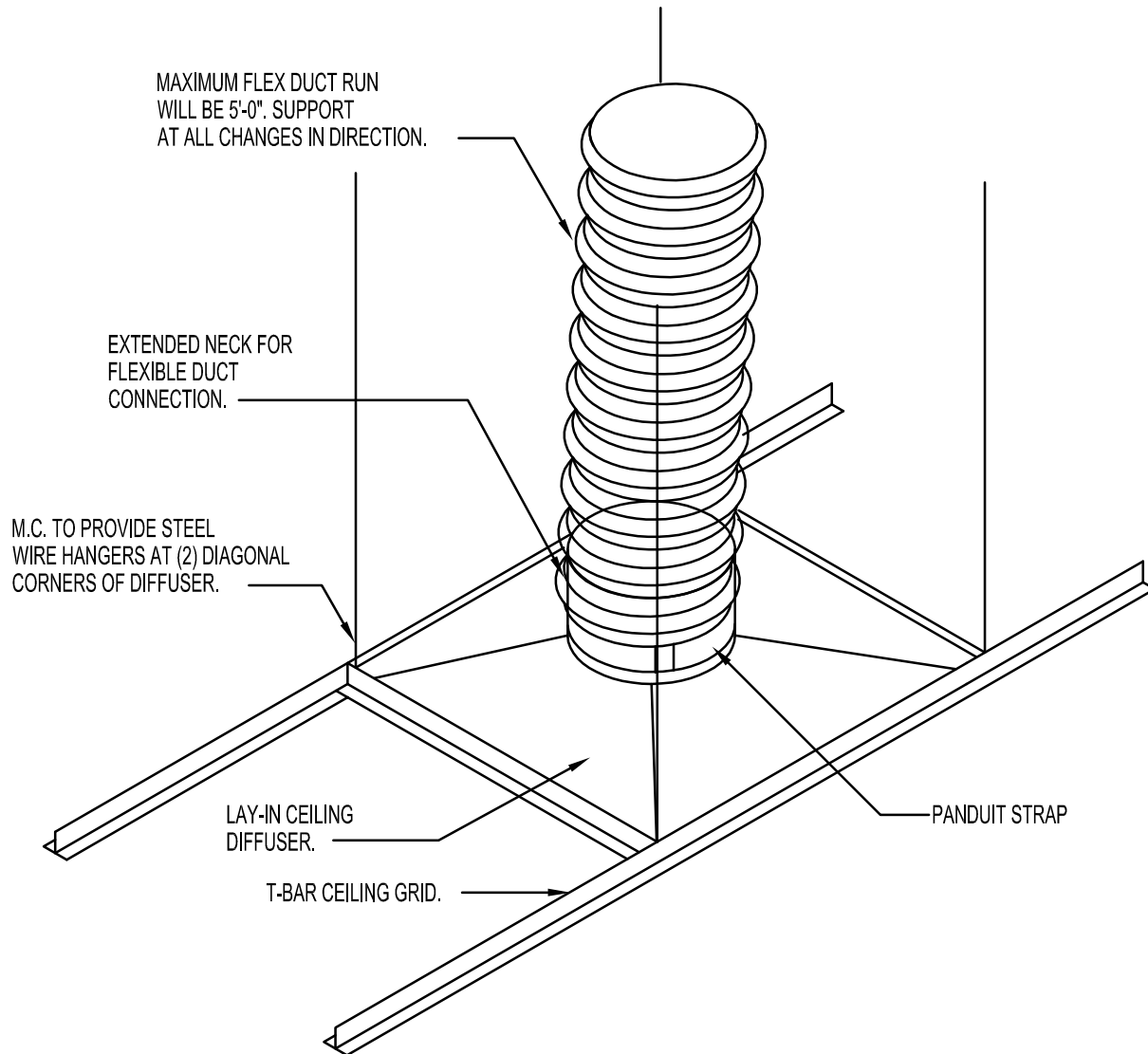
RATED SIDEWALL GRILLE DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

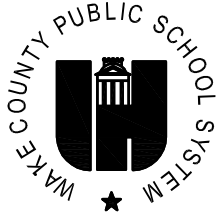
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M2.23

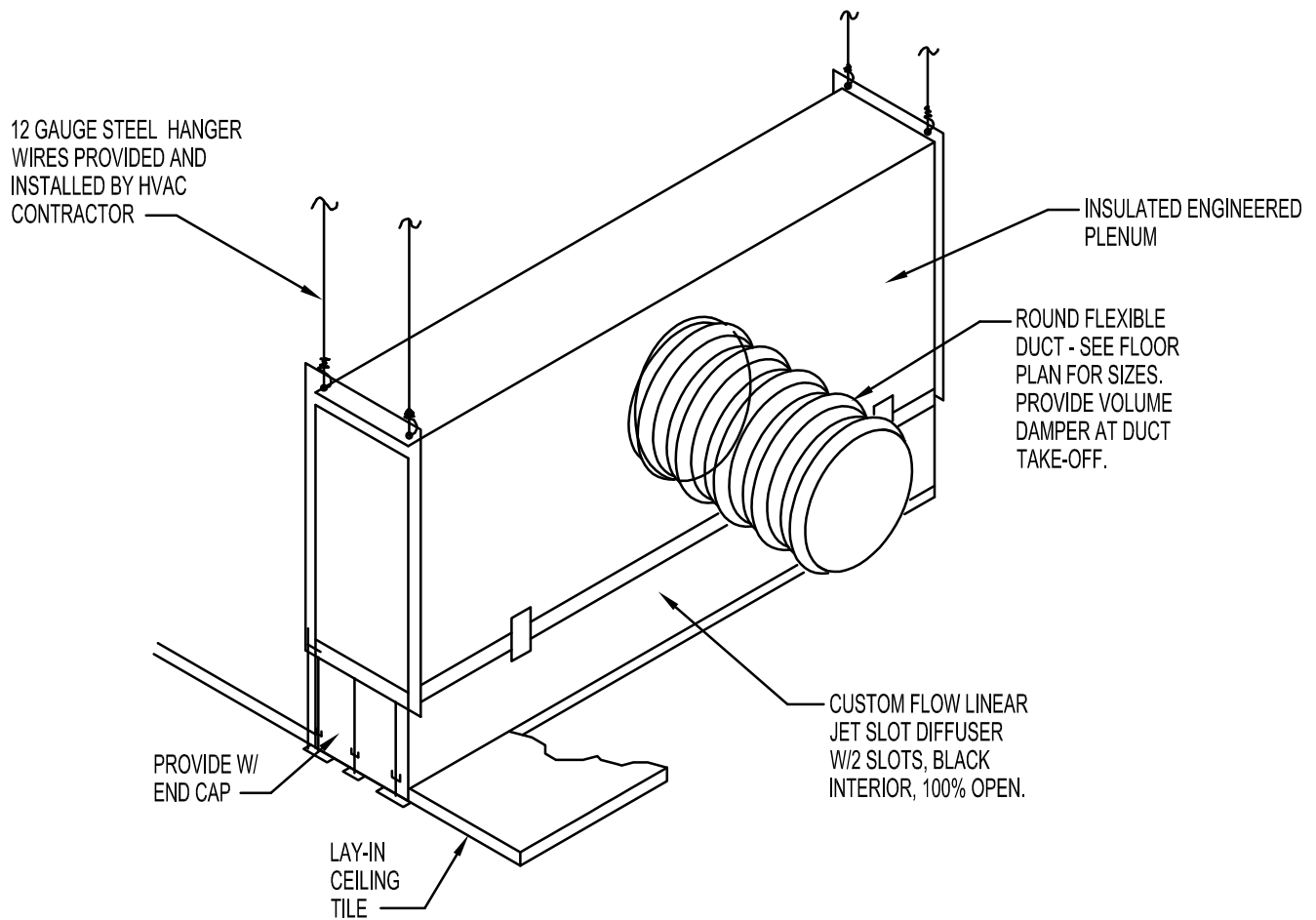
ROUND NECK LAY-IN DIFFUSER DETAIL

SCALE: NONE



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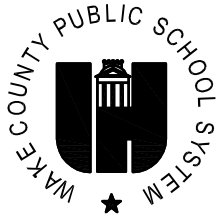
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M2.24

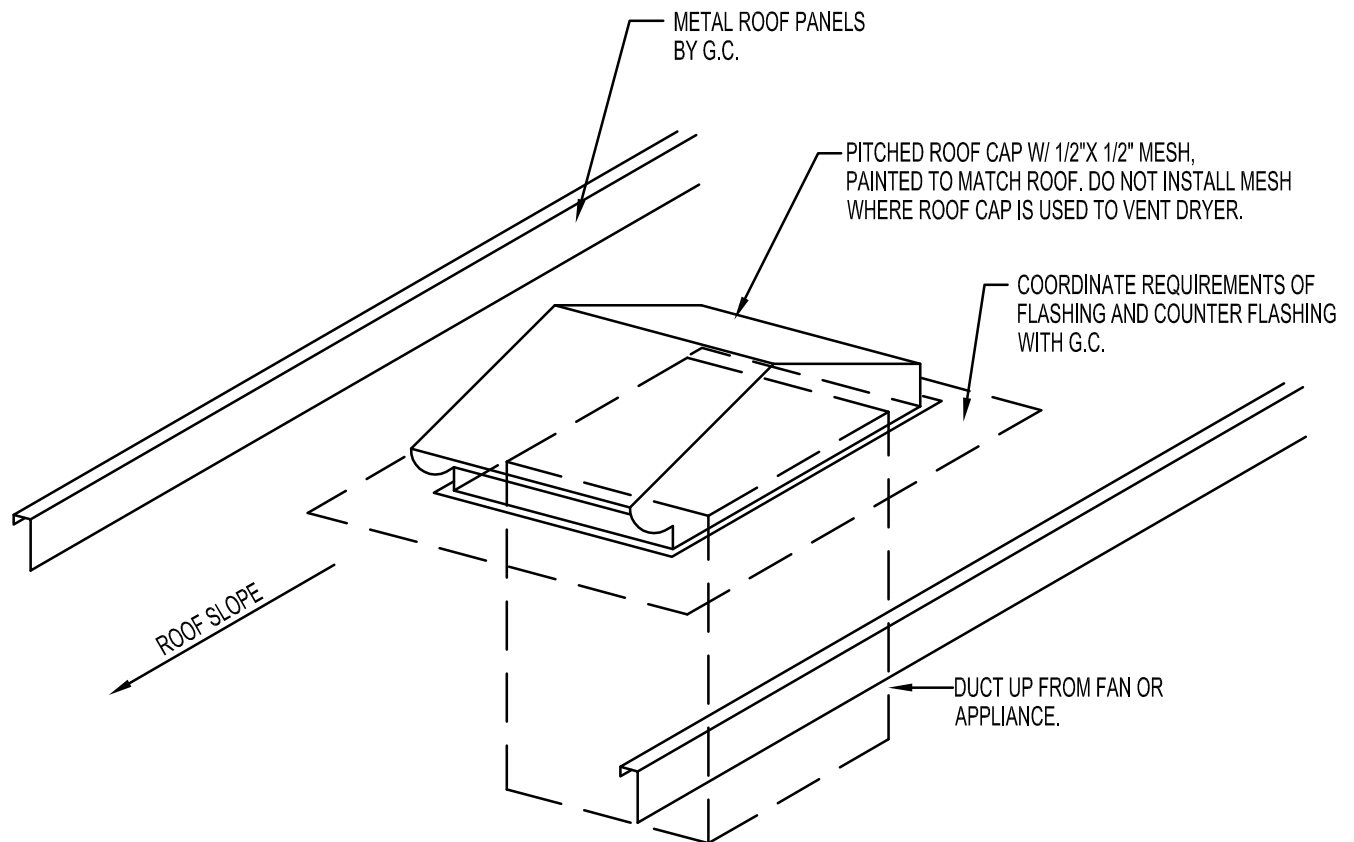
SLOT DIFFUSER DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

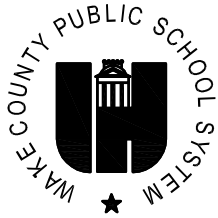
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M2.31

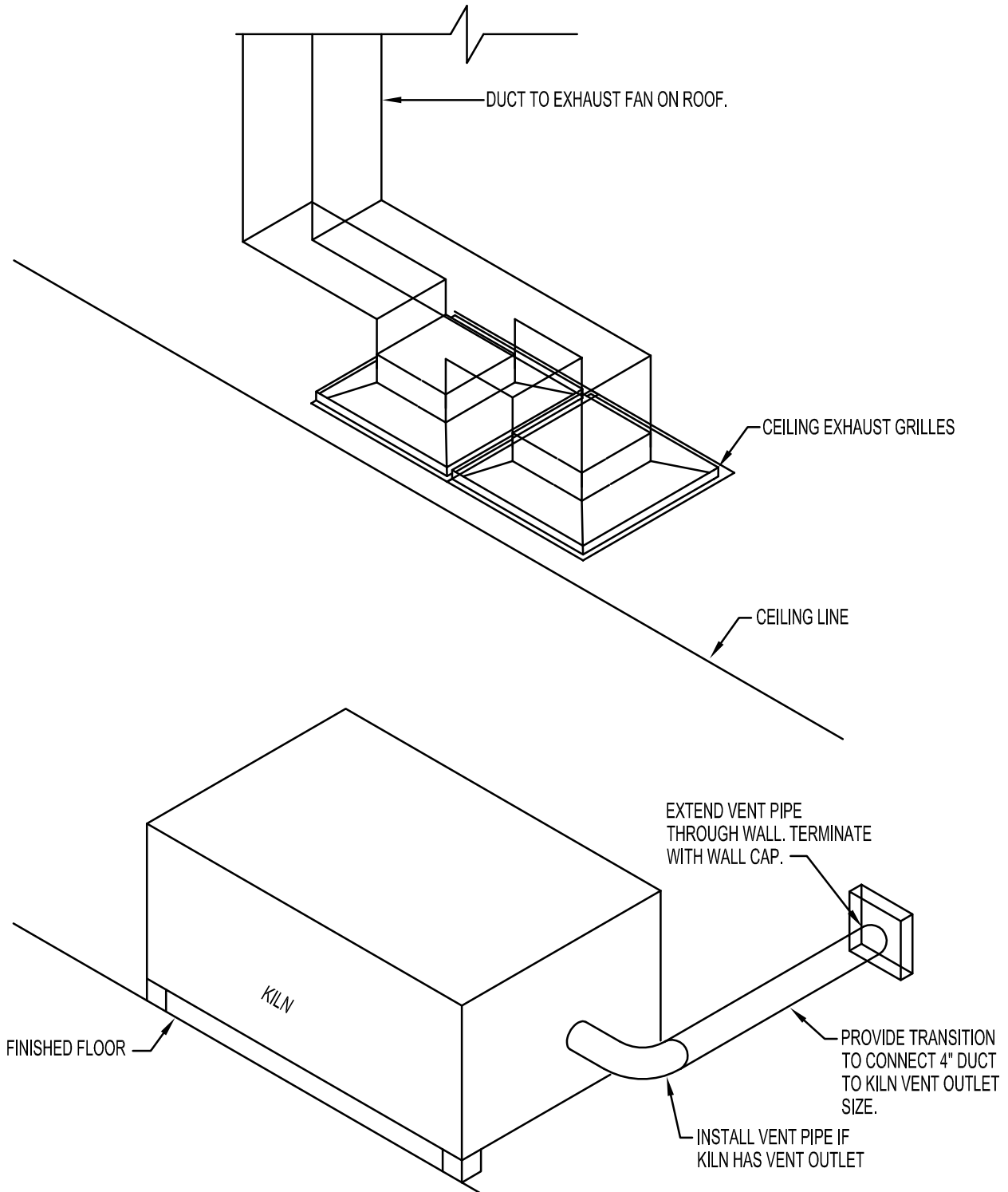
SLOPED ROOF CAP DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

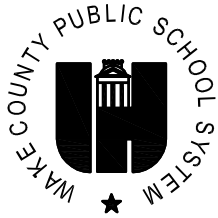
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M2.41

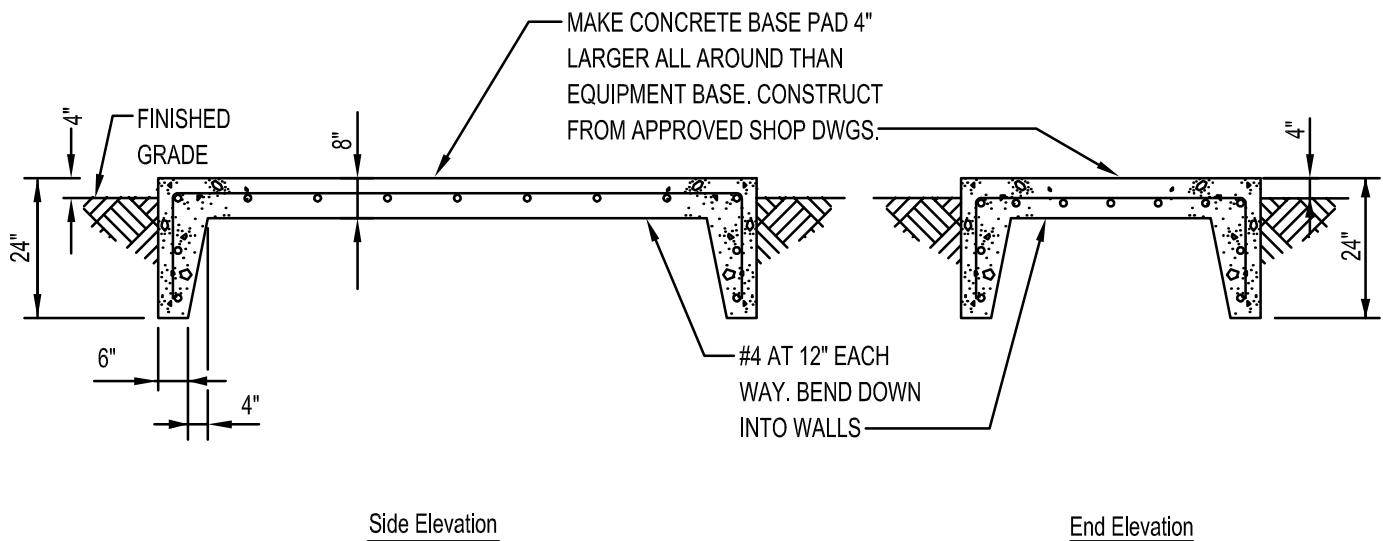
KILN EXHAUST DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

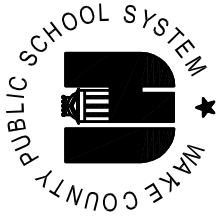
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M2.51

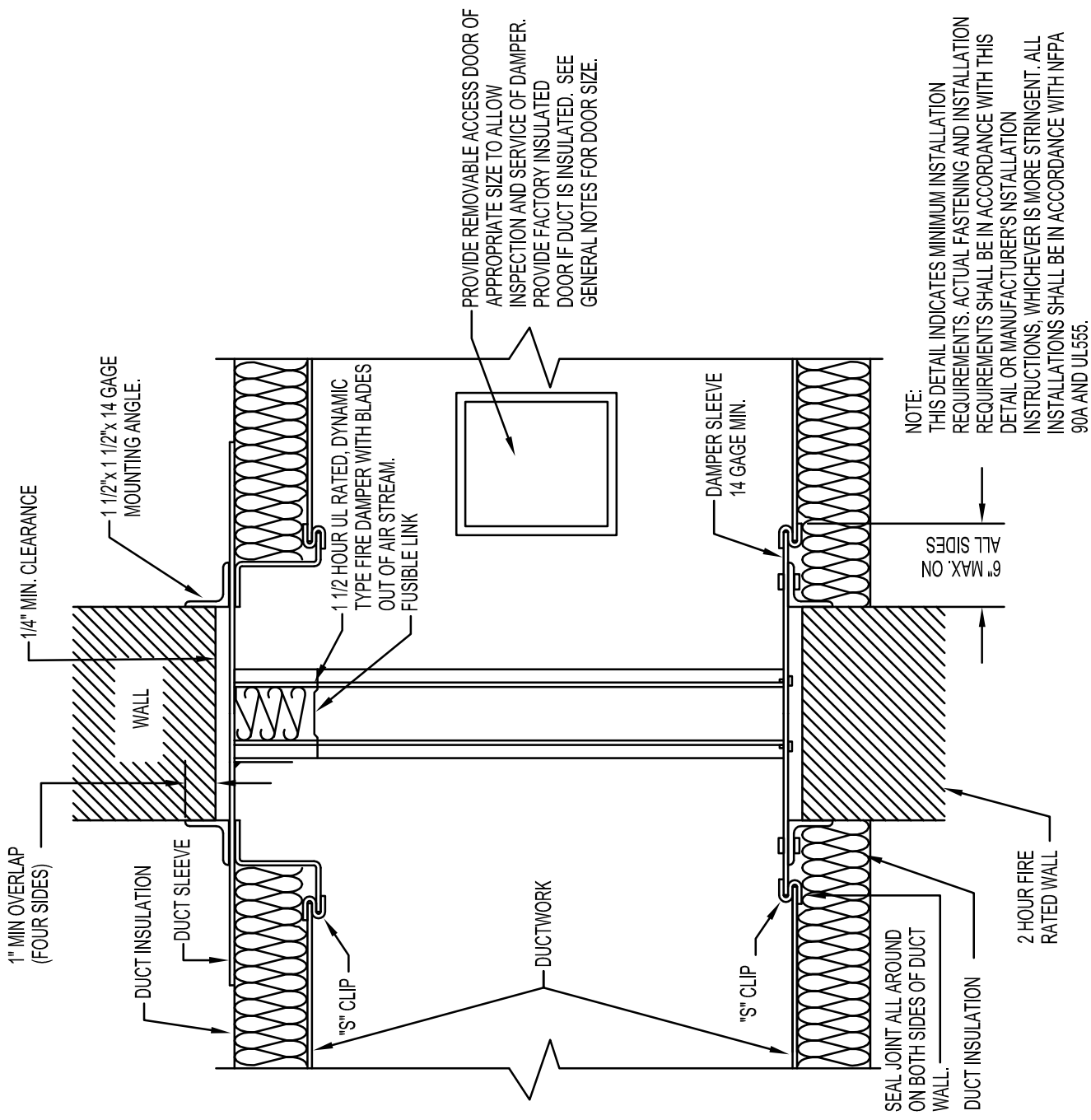
CONCRETE EQUIPMENT PAD DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

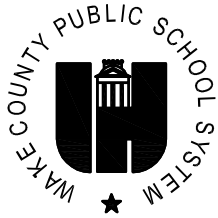
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M2.52

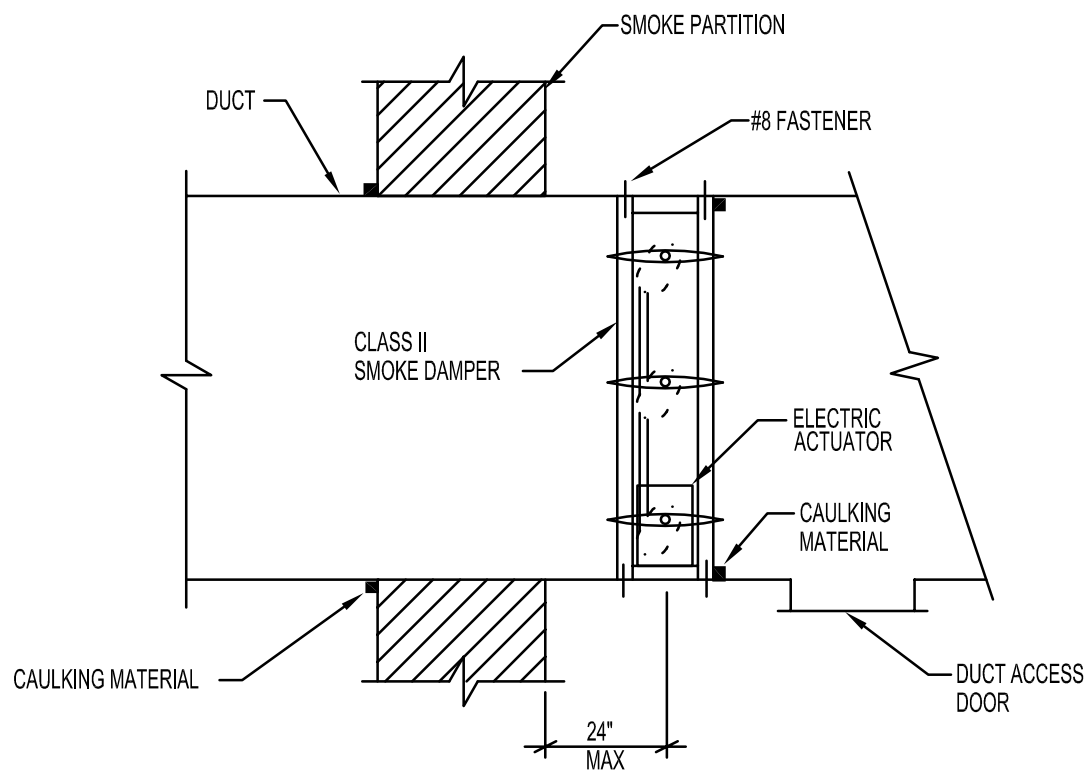
FIRE DAMPER DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

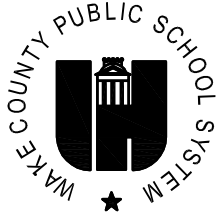
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M2.53

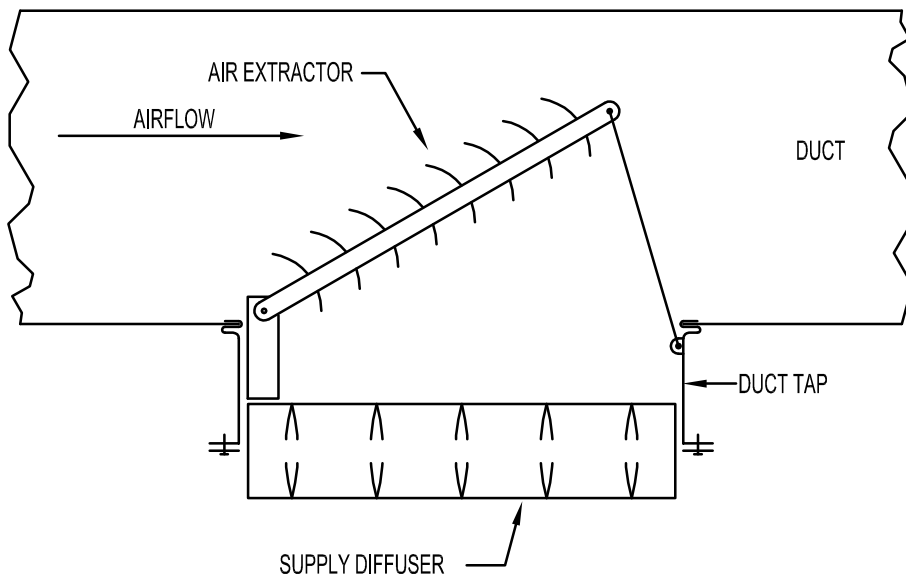
SMOKE DAMPER DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

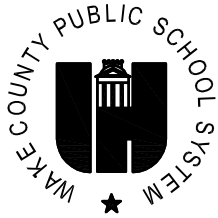
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M2.54

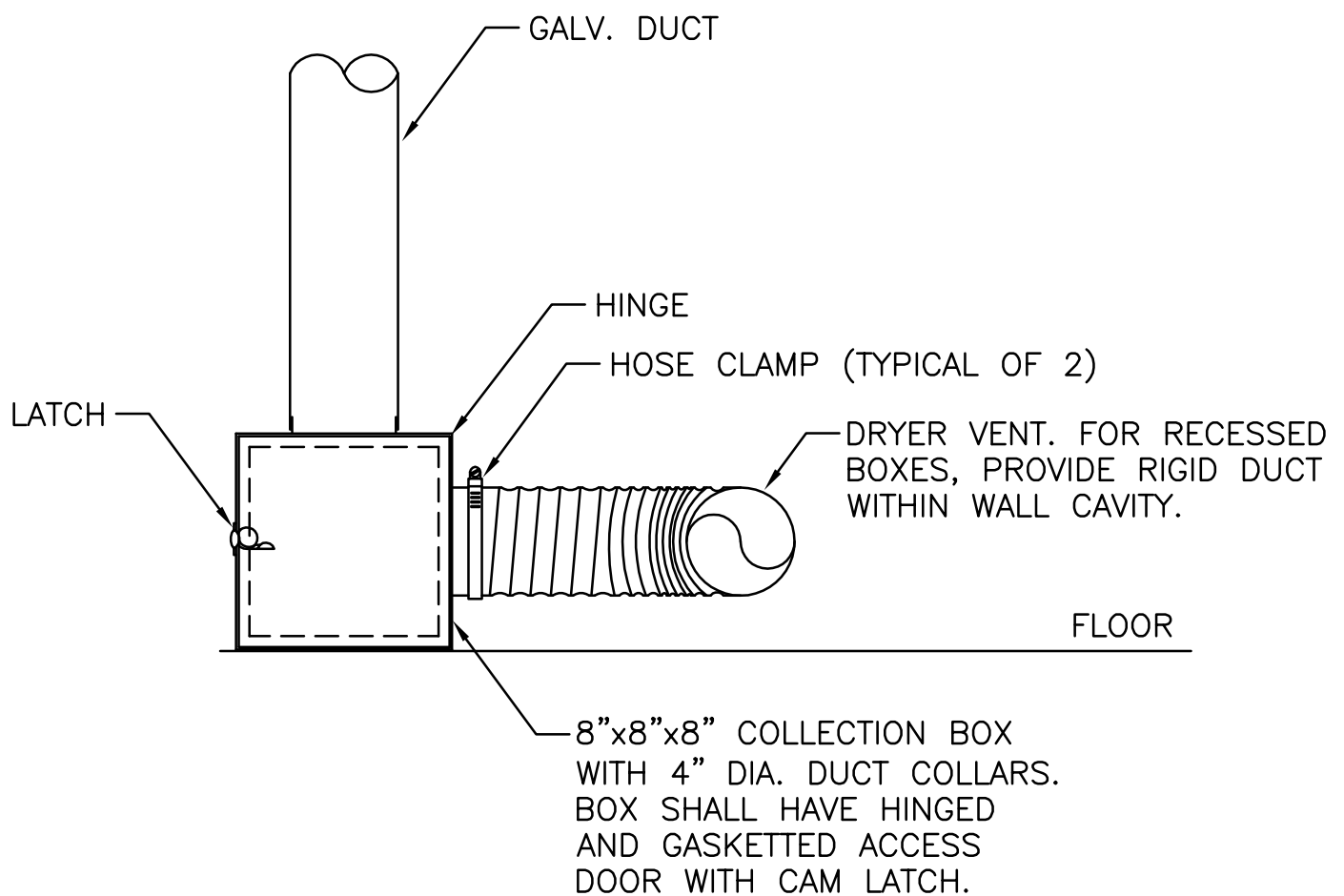
AIR EXTRACTOR DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

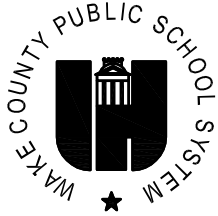
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M2.55

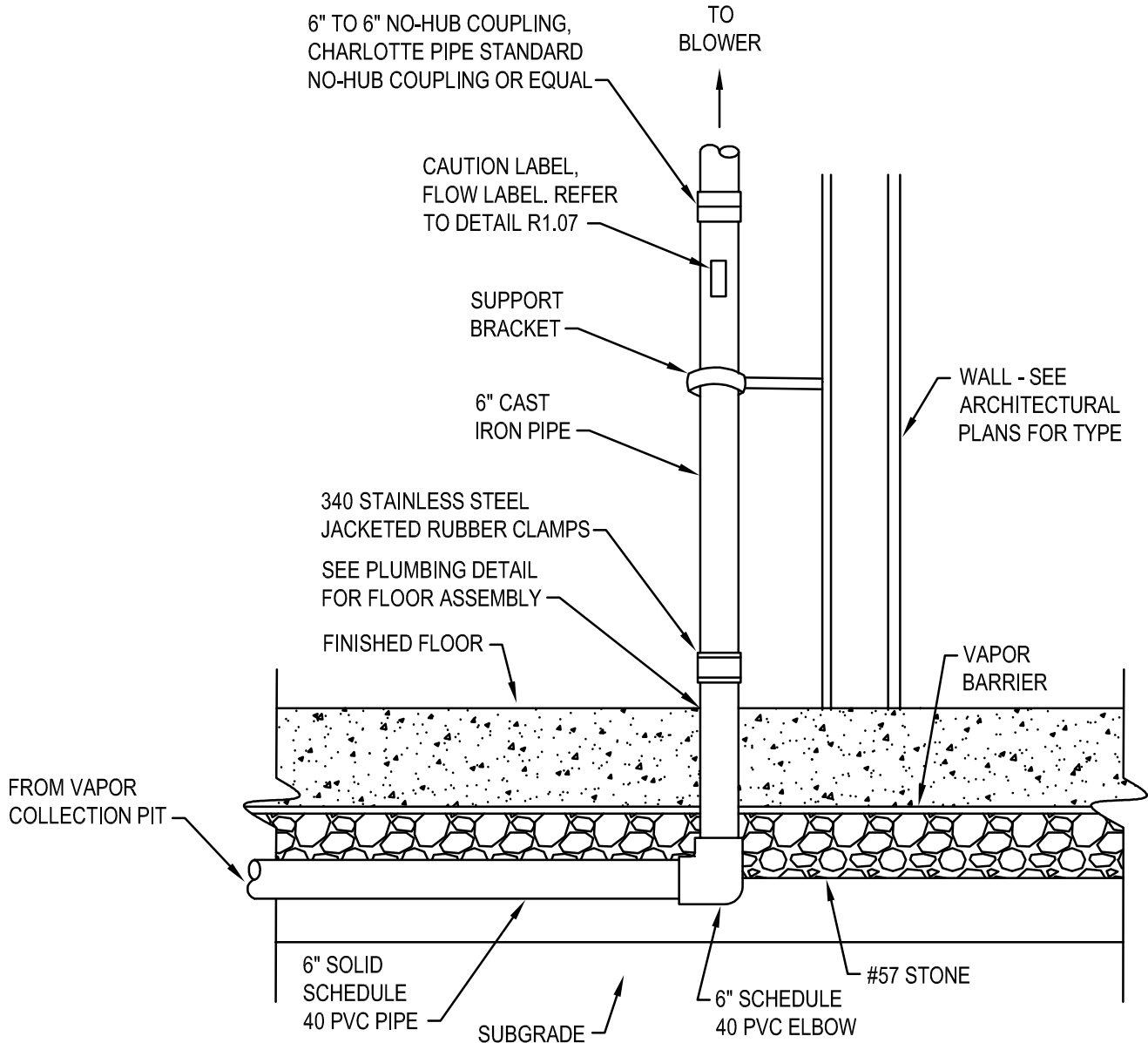
DRYER VENT COLLECTION BOX DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

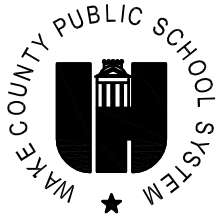
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V1.01

VAPOR MITIGATION SYSTEM - VENT PIPE AT RISER DETAIL

SCALE: NONE



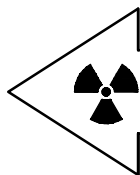
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VAPOR MITIGATION
VENT



CAUTION

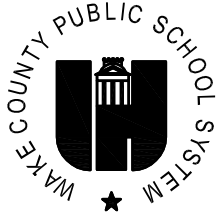


VAPOR FLOW
VAPOR FLOW

V1.02

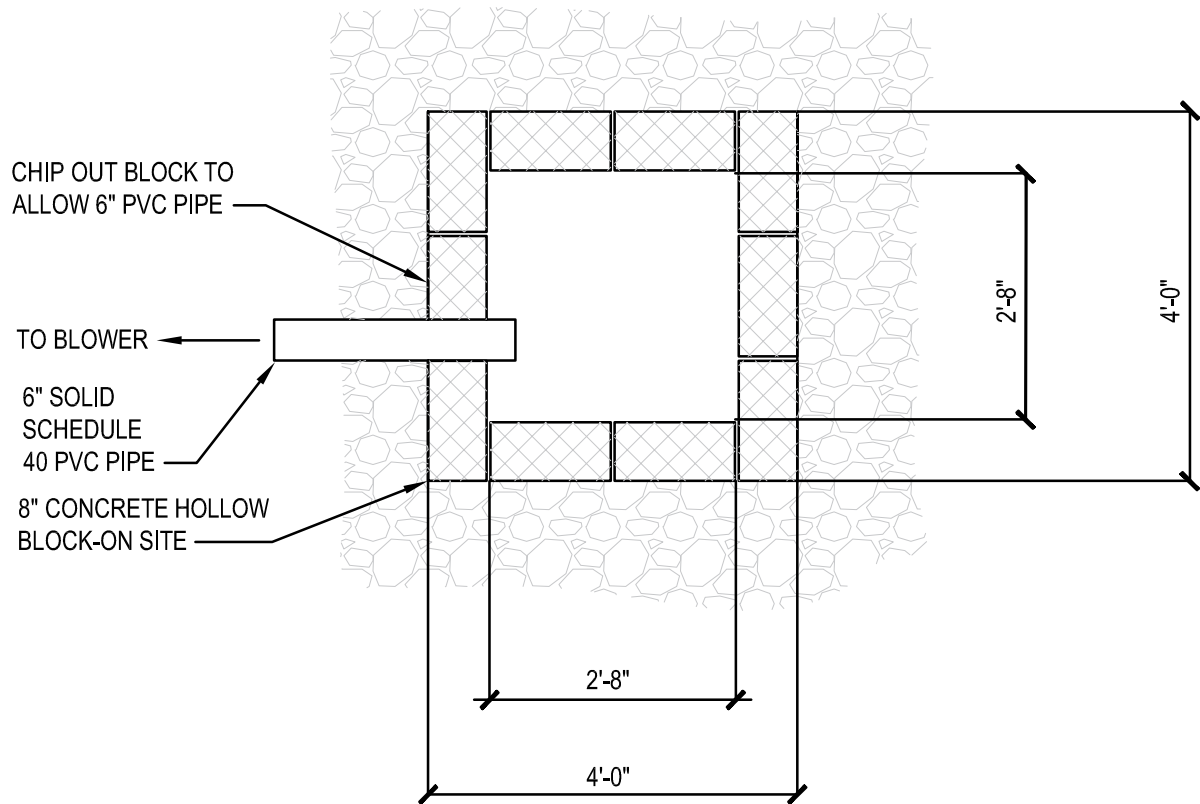
VAPOR MITIGATION SYSTEM - CAUTION AND FLOW LABEL DETAIL

SCALE: NONE

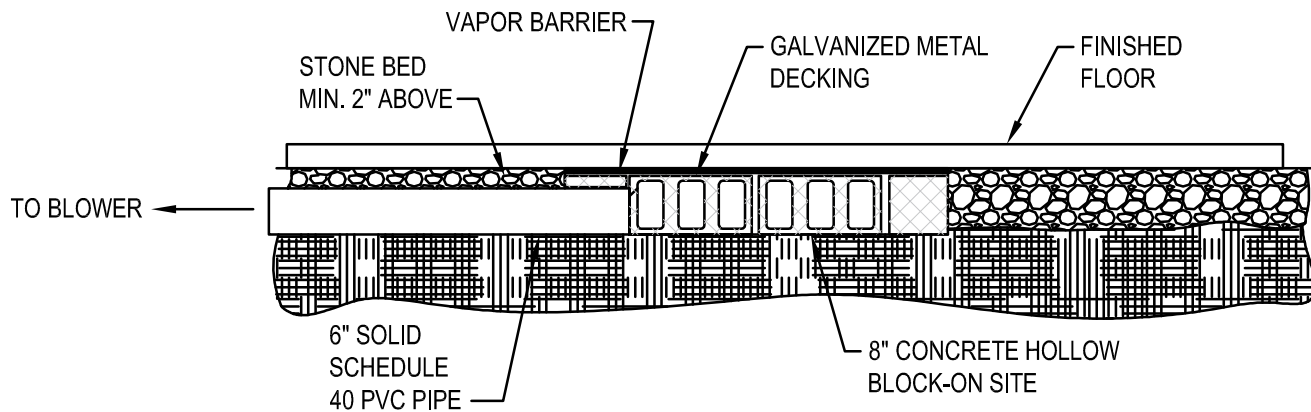


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TOP VIEW

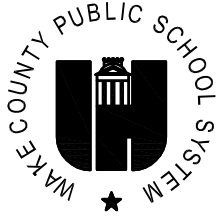


SIDE VIEW

V1.03

VAPOR MITIGATION SYSTEM - SUCTION PIT DETAIL

SCALE: NONE



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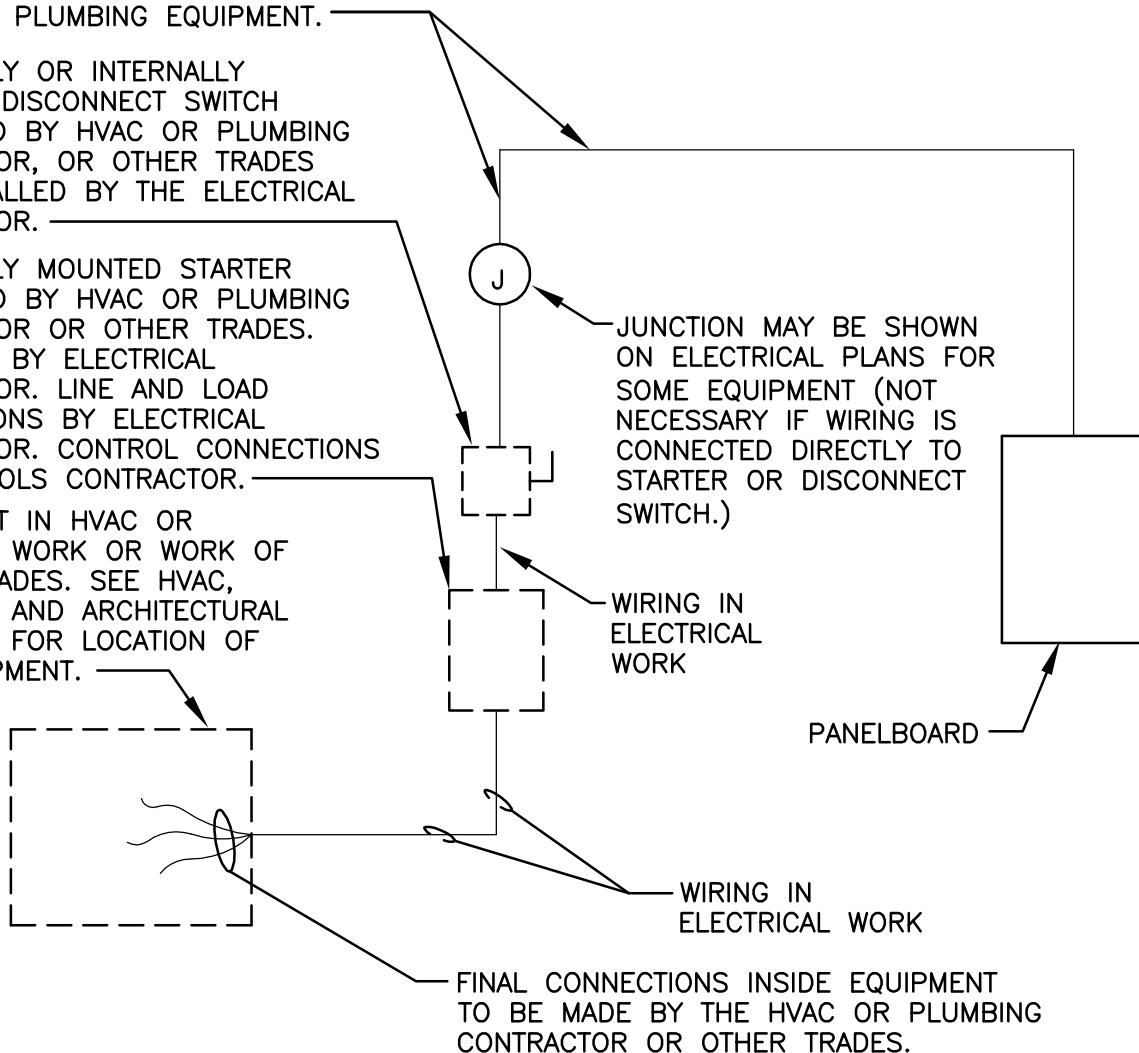
BRANCH CIRCUIT AND CONDUIT
IN ELECTRICAL WORK. SEE
PANELBOARD SCHEDULES FOR
WIRE AND BREAKER SIZES TO
HVAC AND PLUMBING EQUIPMENT.

EXTERNALLY OR INTERNALLY
MOUNTED DISCONNECT SWITCH
FURNISHED BY HVAC OR PLUMBING
CONTRACTOR, OR OTHER TRADES
AND INSTALLED BY THE ELECTRICAL
CONTRACTOR.

EXTERNALLY MOUNTED STARTER
FURNISHED BY HVAC OR PLUMBING
CONTRACTOR OR OTHER TRADES.
INSTALLED BY ELECTRICAL
CONTRACTOR. LINE AND LOAD
CONNECTIONS BY ELECTRICAL
CONTRACTOR. CONTROL CONNECTIONS
BY CONTROLS CONTRACTOR.

EQUIPMENT IN HVAC OR
PLUMBING WORK OR WORK OF
OTHER TRADES. SEE HVAC,
PLUMBING AND ARCHITECTURAL
DRAWINGS FOR LOCATION OF
ALL EQUIPMENT.

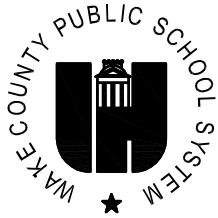
A COMBINATION STARTER MAY BE
USED IN LIEU OF A SEPARATE
DISCONNECT SWITCH AND STARTER.



E1.01

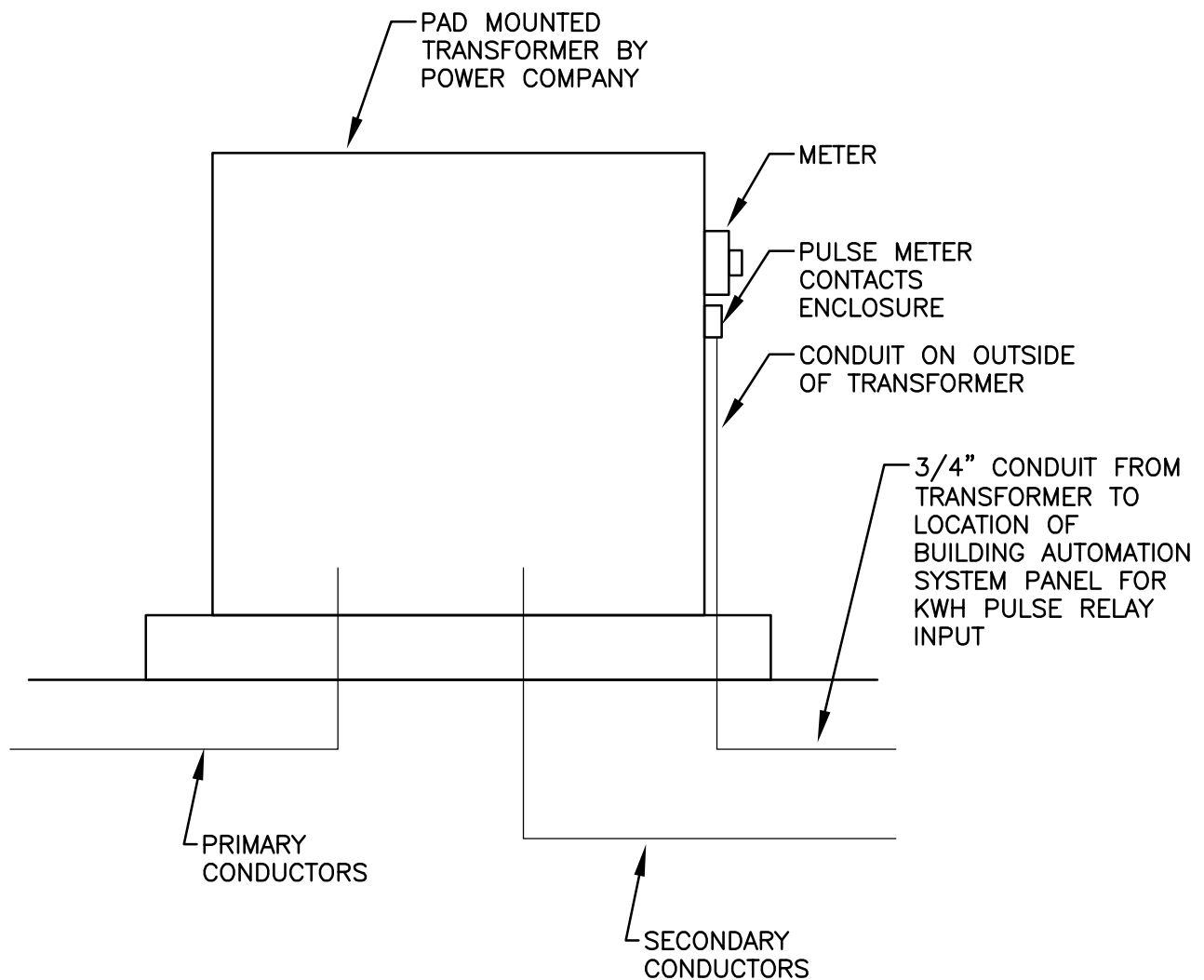
TYPICAL MECH EQUIPMENT ELECTRICAL CONNECTION DETAIL

SCALE: NONE



WAKE COUNTY PUBLIC SCHOOL SYSTEM

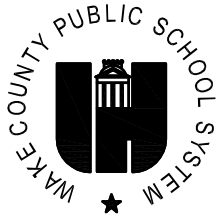
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E1.02

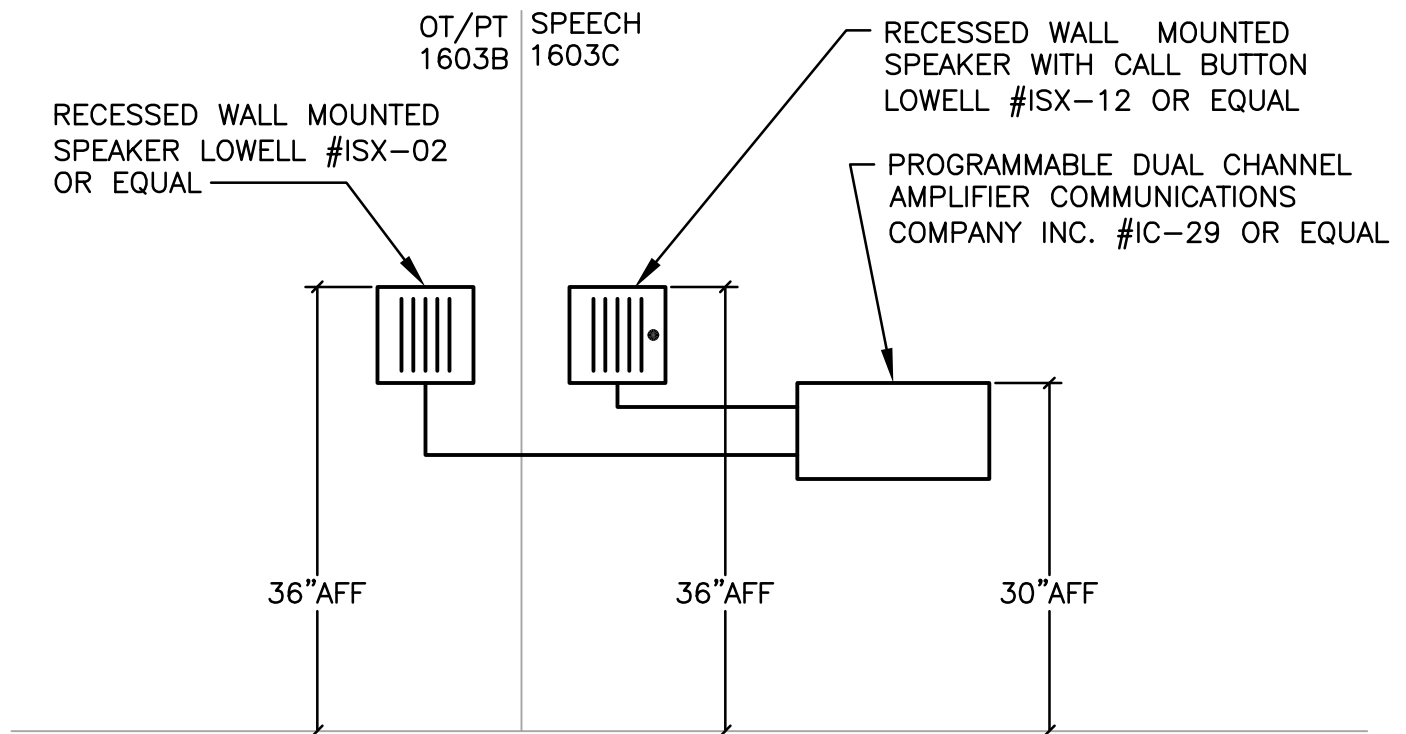
STANDARD PULSE RELAY CONDUIT DETAIL

SCALE: NONE



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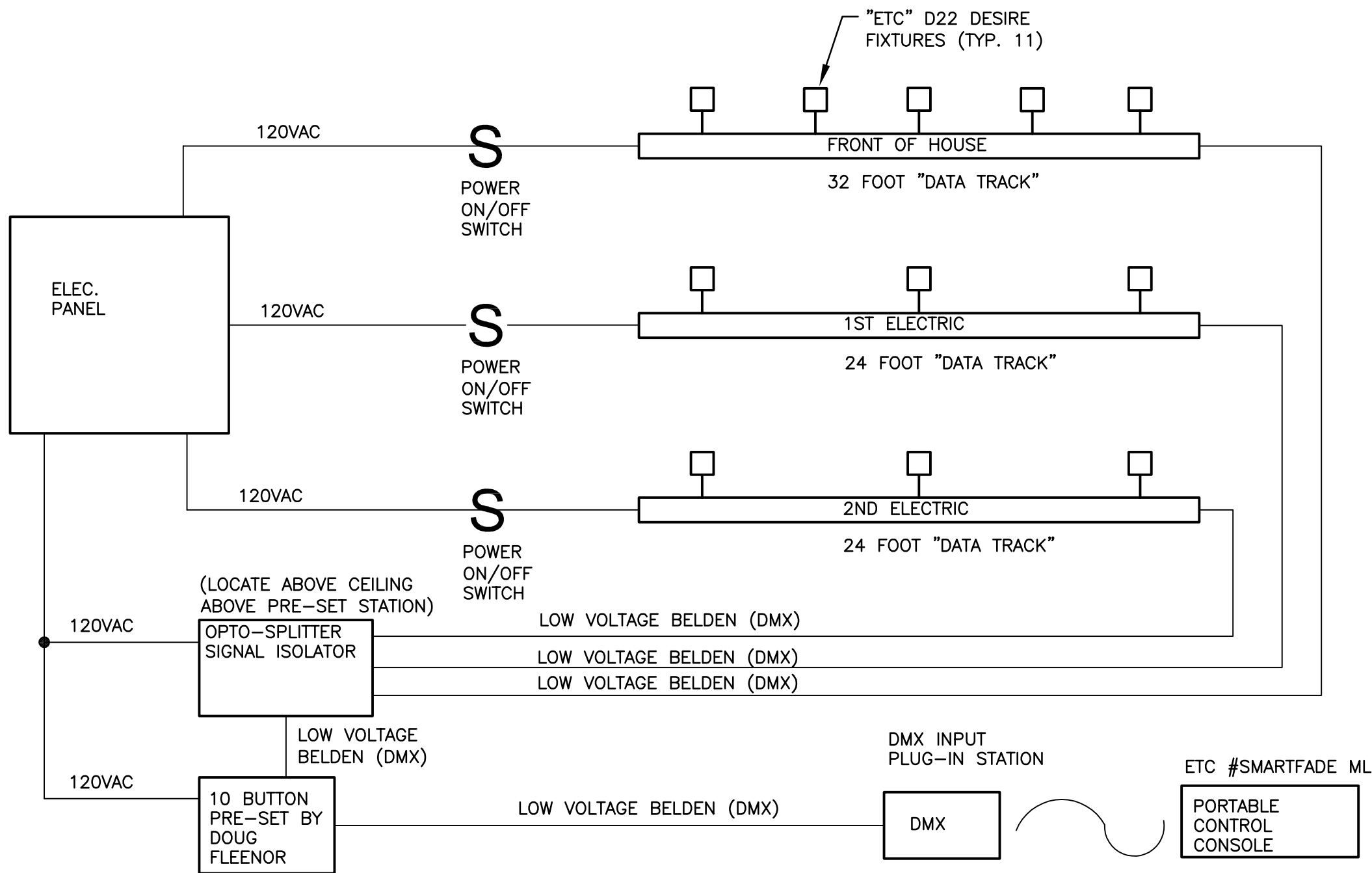
NOTES:

1. WALL MOUNTED SPEAKERS REQUIRE A STANDARD 2-GANG BACKBOX THAT WILL ACCOMODATE A 2 1/2" DEEP DEVICE.
2. PROVIDE ALL COMPONENTS FOR A COMPLETE OPERATING SYSTEM.
3. PROVIDE ALL WIRING PER MANUFACTURERS SPECIFICATIONS.
4. PROVIDE SPEAKER-TO-SPEAKER, PUSH TO TALK CONNECTION WITH SPEAKER IN SPEECH ALWAYS RETURNING TO LISTEN.
5. CONNECT TO NEAREST RECEPTACLE CIRCUIT.

E1.03

OT/PT & SPEECH LOCAL INTERCOM SYSTEM DETAIL

SCALE: NONE



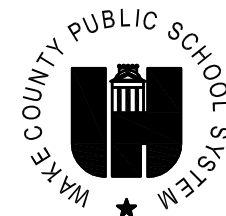
PLATFORM DIMMING RISER GENERAL NOTES:

1. THE PLATFORM DIMMING SYSTEM IS A PREFERRED BRAND ALTERNATE, REFER TO SPECIFICATIONS.
2. PROVIDE ALL NECESSARY PARTS, SUPPORTS, AND ACCESSORIES FOR A COMPLETE SYSTEM.
3. ALL WIRING SHALL BE IN CONDUIT (3/4" MINIMUM).
4. COORDINATE TRACK AND FIXTURE LOCATION WITH MANUFACTURER FOR OPTIMUM LOCATION.
5. REFER TO PLANS FOR EXACT EQUIPMENT LOCATION AND CIRCUIT INFORMATION.
6. DMX CABLING NOT SHOWN ON PLANS FOR CLARITY.

E1.04

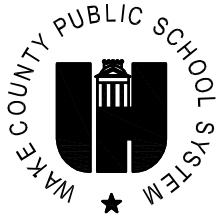
PLATFORM DIMMING RISER DIAGRAM

SCALE: NONE



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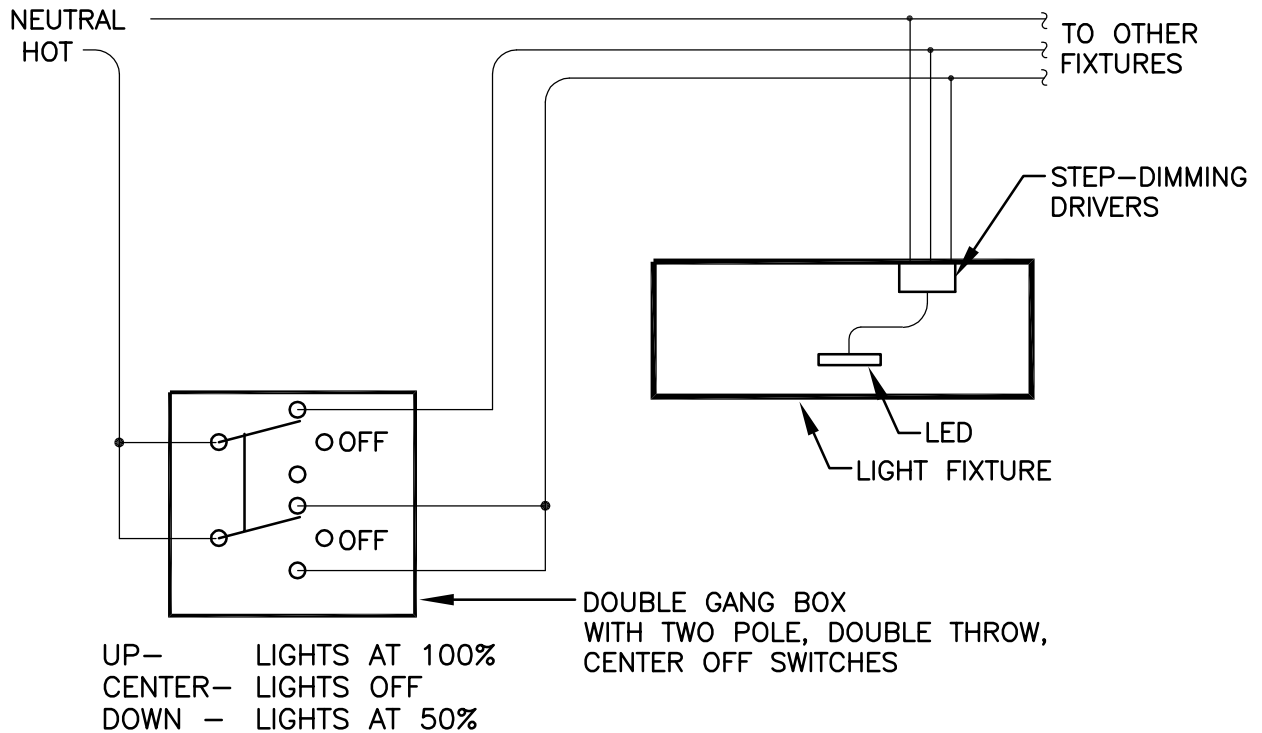
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NOTE:
DETAIL IS TYPICAL FOR
SWITCHES INDICATED ON
LIGHTING PLAN BY "S₂".



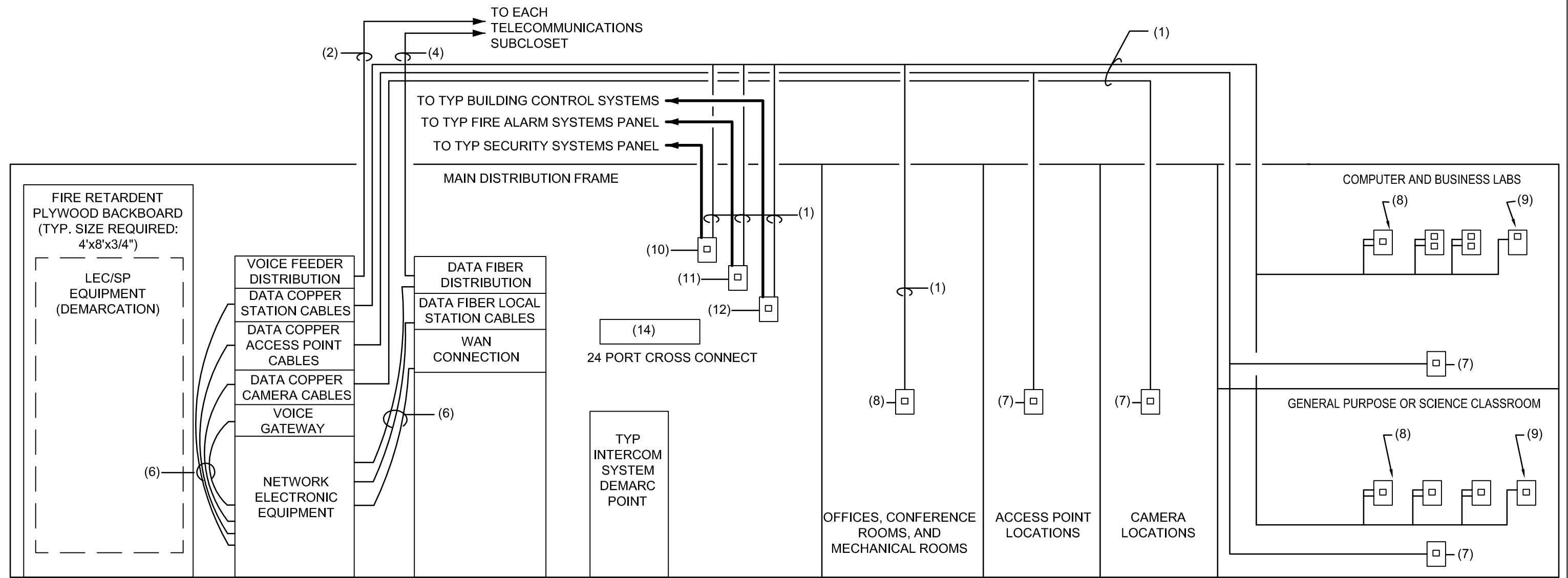
E1.05

BI-LEVEL DIMMING CONTROL DIAGRAM

SCALE: NONE

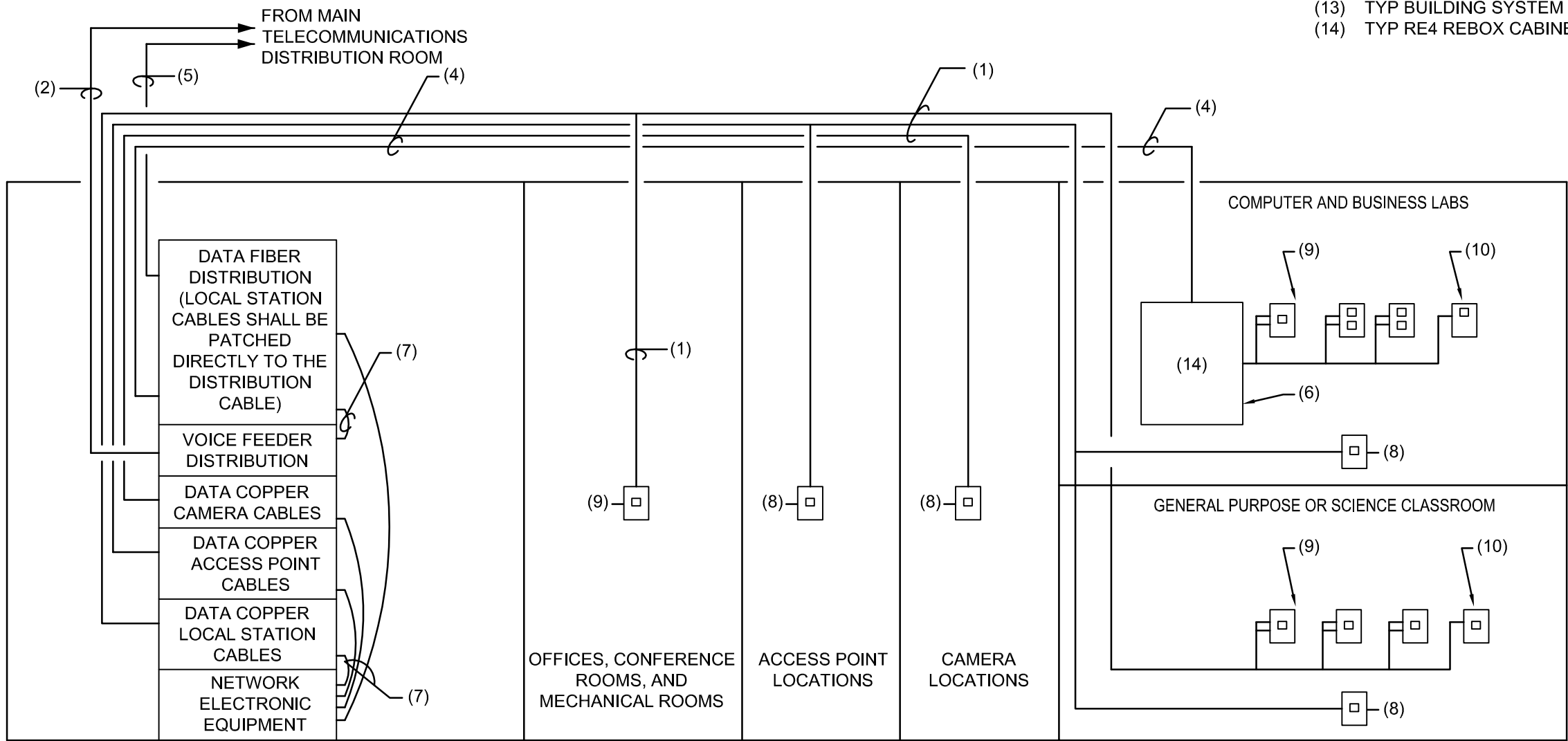
CABLE SCHEDULE

MARKS	DESCRIPTION
(1)	1 - 4 PAIR Cat6 CABLE FOR DATA PER PORT.
(2)	MULTI-PAIR Cat3 CABLE FOR VOICE DISTRIBUTION.
(3)	1 - 2 STRAND MULTIMODE FIBER CABLE FOR DATA TO SWITCH ENCLOSURE.
(4)	MULTIPLE STRANDS OF MULTIMODE FIBER CABLE FOR DATA DISTRIBUTION TO MAIN BUILDING. SINGLEMODE TO ALL OUTBUILDINGS.
(5)	COPPER PATCH CORDS TO BE PROVIDED BY CONTRACTOR AND INSTALLED BY WCPSS.
(6)	PATCH CORDS TO BE PROVIDED AND INSTALLED BY WCPSS.
(7)	ACCESS POINT OR CAMERA DROP TERMINATED WITH A MODULAR RJ45 PLUG.
(8)	TYPICAL TCO - REFER TO 270000 FOR REQUIRED QUANTITY PER LOCATION.
(9)	TCO FOR WALL MOUNTED TELEVISION.
(10)	TYP FIRE PANEL DEMARCATION POINT
(11)	TYP SECURITY DEMARCATION POINT
(12)	TYP BUILDING SYSTEM CONTROL DEMARCATION POINT
(13)	FOUR POST RACK (TWO RACKS FOR ELEMENTARY AND MIDDLE, THREE FOR HIGH SCHOOLS.) POSTS ARE TO BE INSTALLED WITH 32" FRONT TO BACK.
(14)	24 PORT PATCH PANEL TO CROSS CONNECT "VOICE" CONNECTIONS FOR LIFE SAFETY,BUILDING CONTROL, SECURITY, AND INTERCOM SYSTEMS. PORTS SHOULD CONNECT TO PORTS 1 - 24 ON COPPER DATA PATCH PANEL.



CABLE SCHEDULE

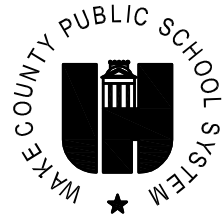
MARKS	DESCRIPTION
(1)	1 - 4 PAIR Cat6 CABLE FOR DATA PER PORT.
(2)	MULTI-PAIR Cat3 CABLE FOR VOICE DISTRIBUTION.
(3)	1 - 2 STRAND MULTIMODE FIBER CABLE FOR DATA TO SWITCH ENCLOSURE.
(4)	1 - 6 STRAND MULTIMODE FIBER CABLE FOR DATA TO EACH REBOX CABINET IN COMPUTER LAB AND BUSINESS LABS.
(5)	MULTIPLE STRANDS ON MULTIMODE FIBER CABLE FOR DATA DISTRIBUTION.
(6)	COPPER PATCH CORDS TO BE PROVIDED BY CONTRACTOR AND INSTALLED BY WCPSS.
(7)	PATCH CORDS TO BE PROVIDED AND INSTALLED BY WCPSS.
(8)	ACCESS POINT OR CAMERA DROP TERMINATED WITH A MODULAR RJ45 PLUG.
(9)	TYPICAL TCO - REFER TO 270000 FOR REQUIRED QUANTITY PER LOCATION.
(10)	TCO FOR INTERACTIVE WHITE BOARD.
(11)	TYP FIRE PANEL DEMARCATION POINT
(12)	TYP SECURITY DEMARCATION POINT
(13)	TYP BUILDING SYSTEM CONTROL DEMARCATION POINT
(14)	TYP RE4 REBOX CABINET IN EACH COMPUTER AND BUSINESS LAB



E2.01

TELECOMMUNICATIONS SUBCLOSET TYPICAL DESIGN

SCALE: NONE



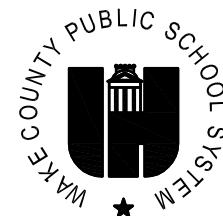
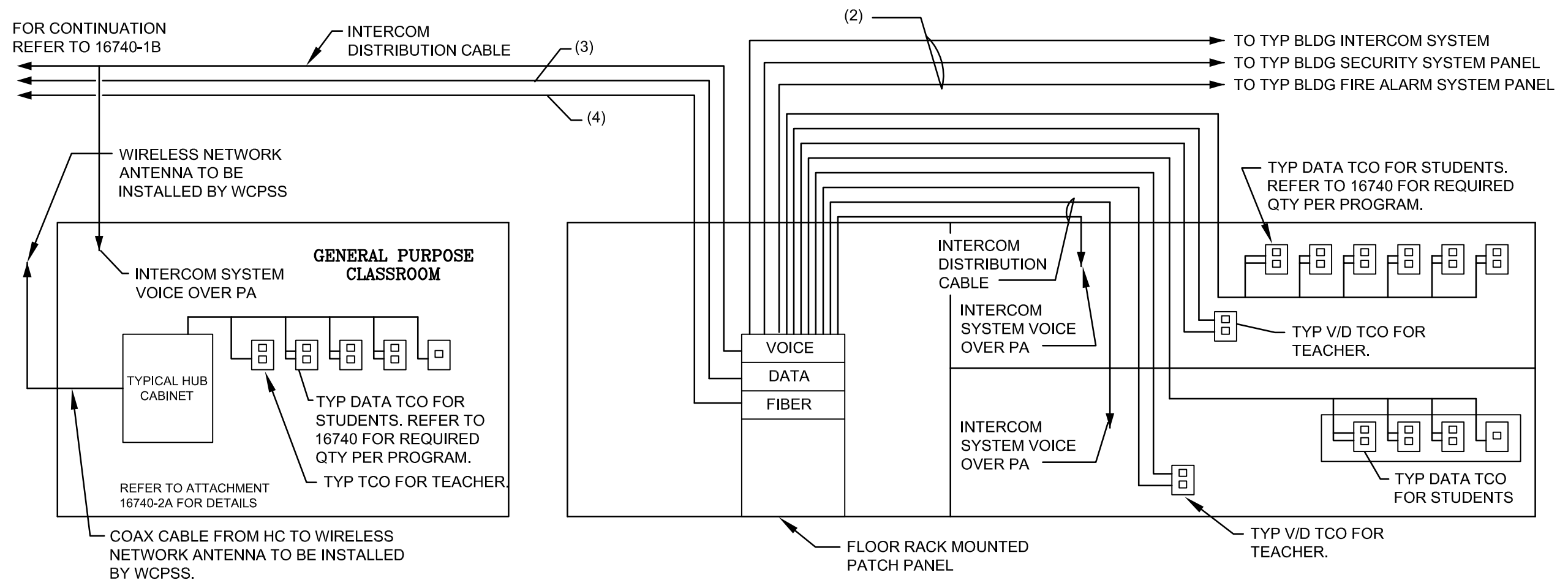
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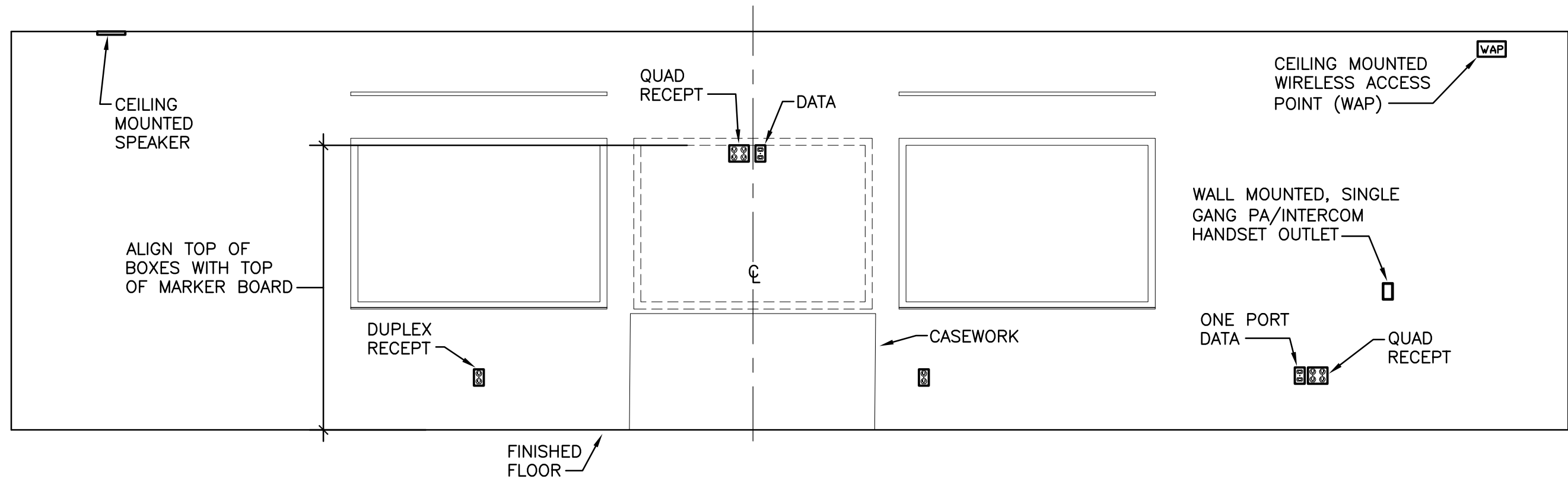
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CABLE SCHEDULE

<u>MARKS</u>	<u>DESCRIPTION</u>
--------------	--------------------

- (1) 1 - 4 PAIR Cat5e CABLE FOR DATA.
- (2) 1 - 4 PAIR Cat5e CABLE FOR VOICE.
- (3) MULTI-PAIR Cat3 INDOOR/OUTDOOR CABLE FOR VOICE DISTRIBUTION.
- (4) 1 – 12 STRAND MULTIMODE FIBER CABLE FOR DATA TO OPEN 7FT RACK IN SINGLE OR MODULAR COMPLEX TELECOMMUNICATIONS SUB CLOSET.

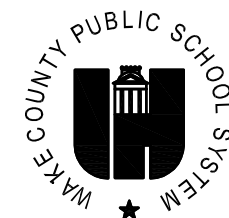




E2.03

PRIMARY TEACHER WALL ELECTRICAL REQUIREMENTS

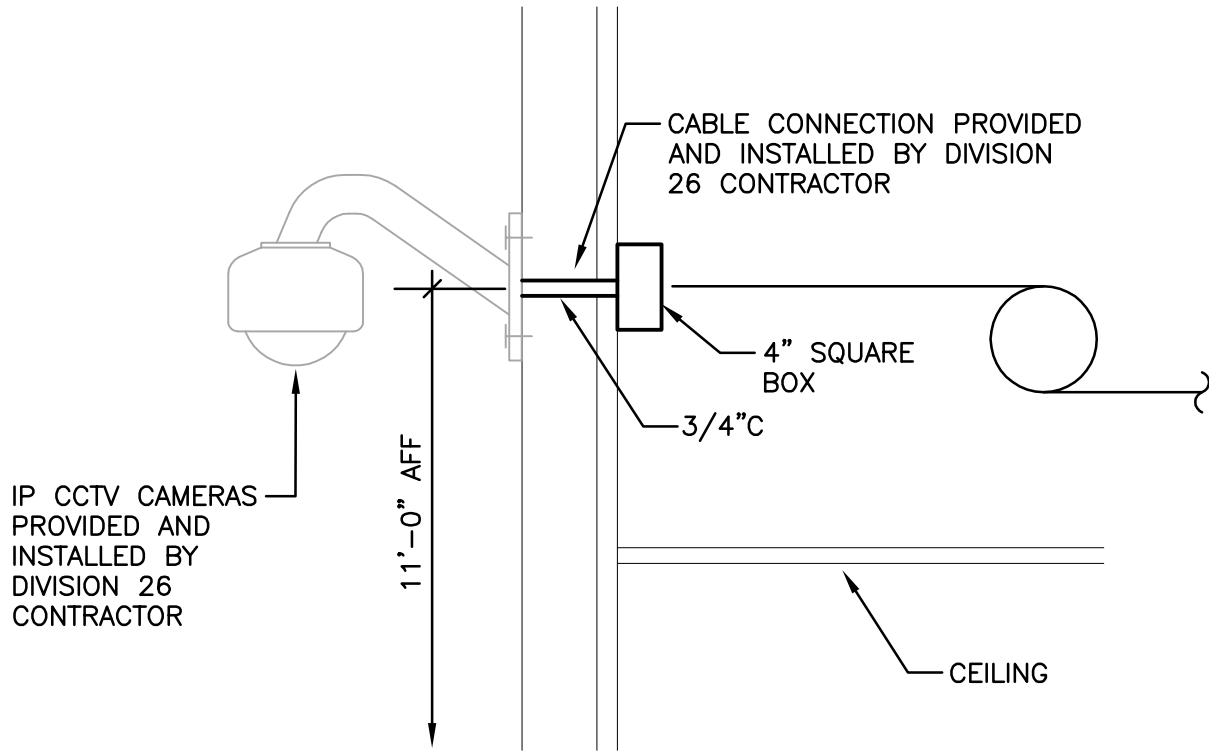
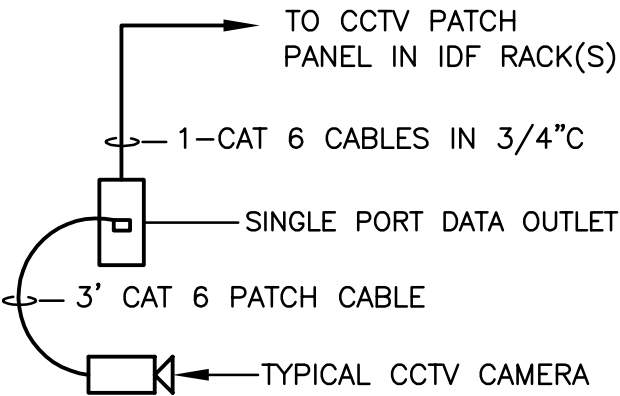
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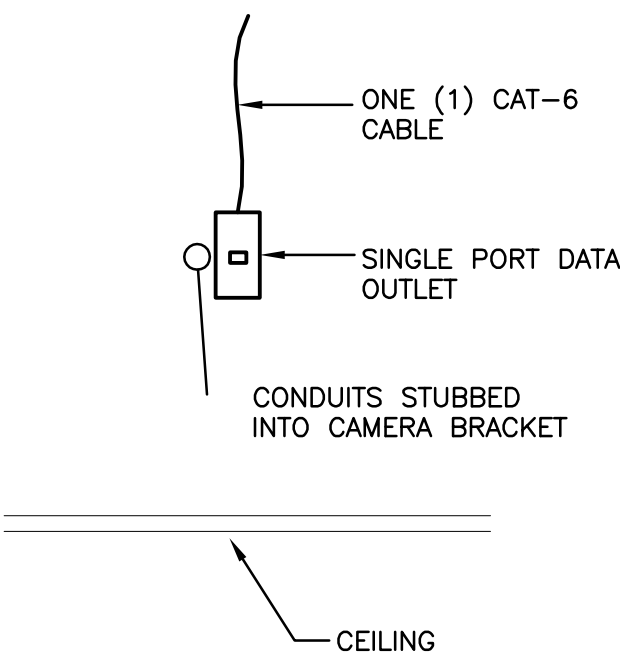
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- NOTES:
- 1. ALL CONDUIT AND OUTLET BOXES BY ELECTRICAL CONTRACTOR.
 - 2. ALL CAMERA CABLING SHALL BE GREEN AND PROVIDED AND INSTALLED BY STRUCTURED WIRING CONTRACTOR.
 - 3. SEE SPECIFICATIONS FOR FURTHER INSTALLATION REQUIREMENTS.
 - 4. PROVIDE 15'-0" SERVICE LOOP AT EACH CAMERA LOCATION.
 - 5. PLEASE NOTE: BECAUSE THE CAMERAS ARE OWNER PROVIDED AND INSTALLED, THE CAMERAS MAY BE ISNTALLED LATER. THE CONTRACTOR SHALL PLACE A YELLOW DOT ON CEILING WITH THE RESPECTIVE CABLE NUMBER. THE CABLE NUMBER SHALL BE TAGGED ON THE CABLE JACKET ABOVE THE CEILING. COORDINATE ALL WORK WITH THE OWNERS IT AND SECURITY DEPARTMENTS PRIOR TO INSTALLATION/ROUGH-IN.
 - 6. CAMERAS CABLES SHALL BE TERMINATED ON SEPARATE PATCH PANEL IN DATA RACK AT MDF/IDF TELECOM CLOSETS. NETWORK POE SWITCHES SHALL BE PROVIDED AND INSTALLED BY THE OWNER.
 - 7. PLENUM RATED CAT-6 CAMERA DATA CABLE LENGTHS SHALL NOT EXCEED 90 METERS. CONTRACTOR SHALL TAKE CARE IN MAINTAINING THESE LENGTHS.
 - 8. ALL CAMERA CABLES SHALL BE TESTED IN COMPLIANCE WITH THE DATA CABLE REQUIREMENTS.
 - 9. REFER TO ARCHITECT'S DIVISION 1 ALTERNATES SECTION.



SECTION



PLAN VIEW

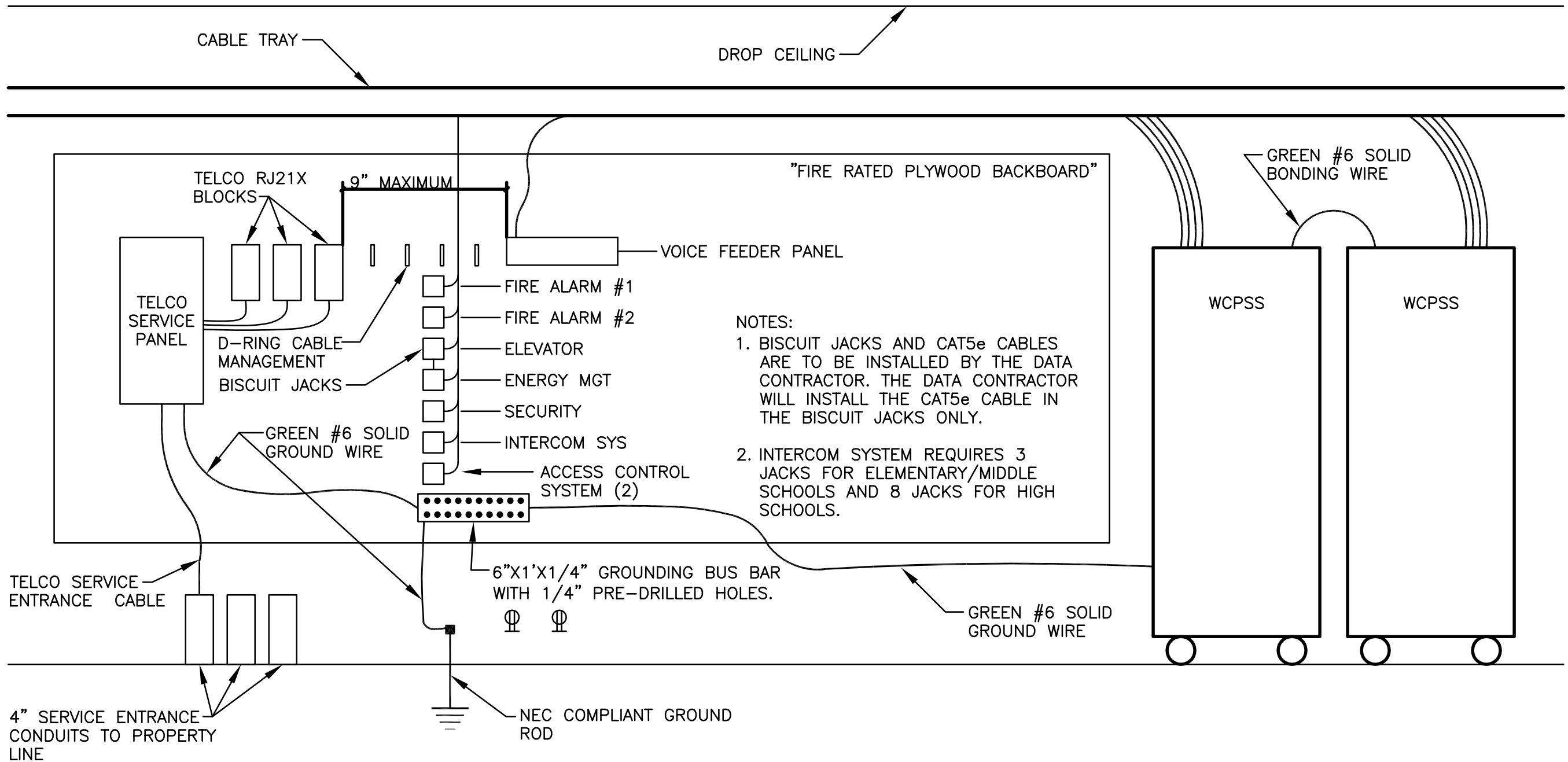
E2.04

CCTV EXTERIOR CAMERA TERMINATION DETAIL

SCALE: NONE



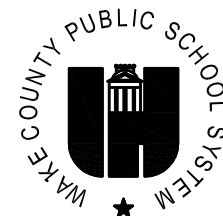
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E2.05

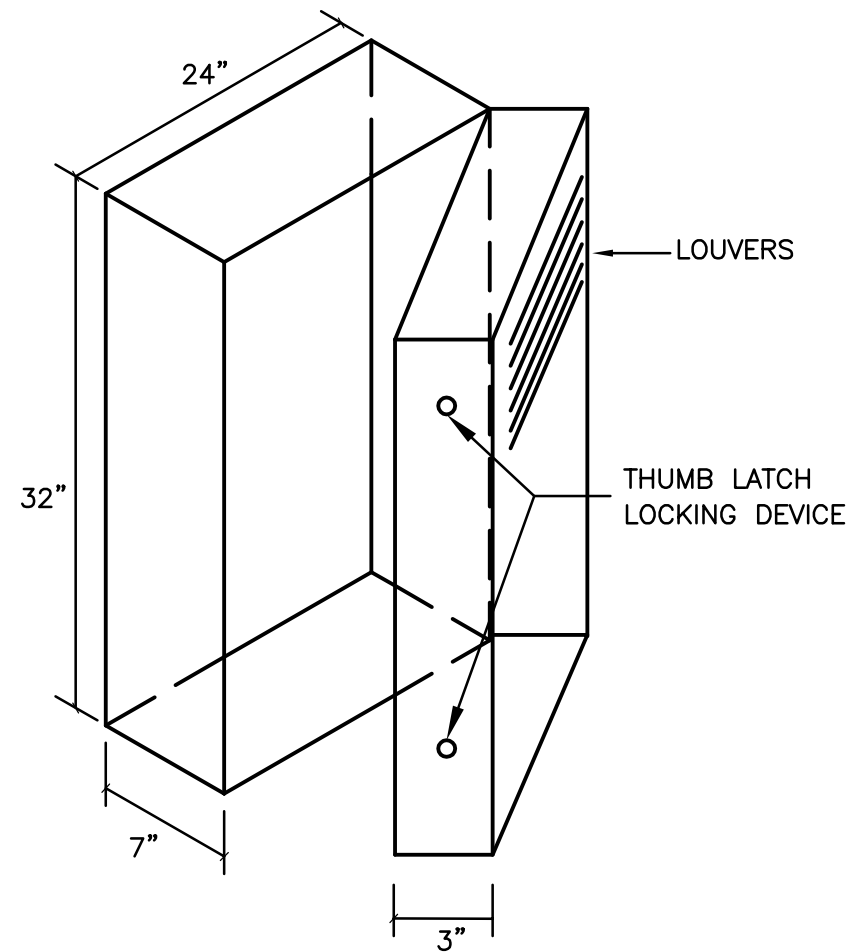
MDF/DEMARC ROOM GROUNDING SYSTEM DETAIL

SCALE: NONE



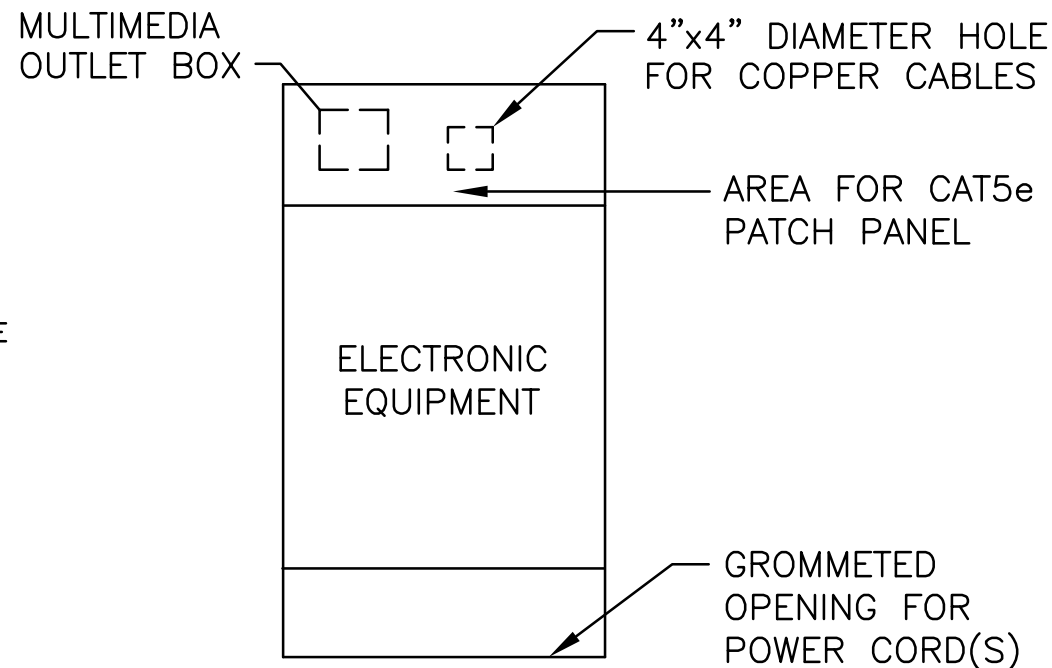
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REBOX DETAIL (RE4 ONLY)

(HUBBELL RE-4 OR EQUAL)



REBOX EQUIPMENT ARRANGEMENT

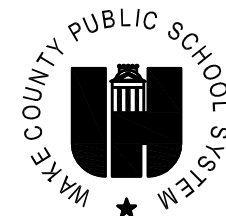
NOTES (REBOX – RE4 ONLY):

1. CABINET SHALL BE CONSTRUCTED FROM 16 GAUGE COLD ROLLED STEEL. HINGES SHALL BE FORMED STEEL TYPE OR EQUIVALENT AND SWING FROM SIDE. FRONT PANEL SHALL HAVE LOUVERS TO AID IN THE DISSIPATION OF HEAT. UNIT SHALL HAVE THUMB LATCH LOCKING DEVICE. UNIT SHALL HAVE A POLYESTER POWDER ENAMEL OR EQUIVALENT TYPE FINISH (GRAY IN COLOR). MOUNT CABINET WITH LOUVERS HORIZONTAL.
2. CABINET SHALL BE EQUIPPED WITH 2 SETS OF UNIVERSAL MOUNTING RAILS WITH EIA STANDARD HOLE PATTERN FOR MOUNTING UP TO FOUR (4) 19" RACK MOUNT DEVICES. CABINET SHALL PROVIDE HINGED MOUNTING FOR 19" PATCH PANEL TO ALLOW FRONT ACCESS TERMINATION. UNIT SHALL PROVIDE GROUND STUDS FOR PROPER GROUNDING OF DOOR AND BASE, AND SHALL BE CAPABLE OF RECEIVING AN OPTIONAL FAN FOR EXTRA HEAT DISSIPATION.
3. CABINET SHALL CONTAIN A MULTIMEDIA OUTLET BOX WITH SC-SC FIBER CONNECTOR ADAPTER PLATE.
4. CONTRACTOR SHALL TERMINATE FIBER WITH SC STYLE CONNECTORS.
5. CABINET SHALL BE MOUNTED TO WALL WITH FOUR (4) 1/4" BOLTS INTO WALL ANCHORS. USE TOGGLE BOLTS FOR HOLLOW WALL PARTITIONS AND LEAD ANCHORS FOR SOLID MASONRY WALLS. BOLTS SHALL PASS THROUGH THE CABINET AND INTO THE WALL ANCHOR.
6. CONTRACTOR TO SUPPLY CAT5e CABLE FROM REBOX TO DEVICES IN RACEWAY OR BOX. CABLE SHALL BE ROUTED TO CABINET AS FOLLOWS:
7. NEW CONSTRUCTION – (REBOX MUST BE FED WITH A MINIMUM OF ONE (2) – 2" DIAMETER CONDUIT. ROUGHED IN WALL TO A DOUBLE GANG OUTLET BOX) CABINET SHALL HAVE A GROMMETED 4"x4" OPENING IN BACK AND BE MOUNTED DIRECTLY OVER THE OUTLET BOX IN SUCH A MANNER TO ALLOW FOR THE INSTALLATION OF THE STATION COPPER CABLES. THE FIBER CABLE MUST HAVE ONE (1) 1" DIAMETER CONDUIT FOR THE MULTIMEDIA OUTLET BOX.

E2.06

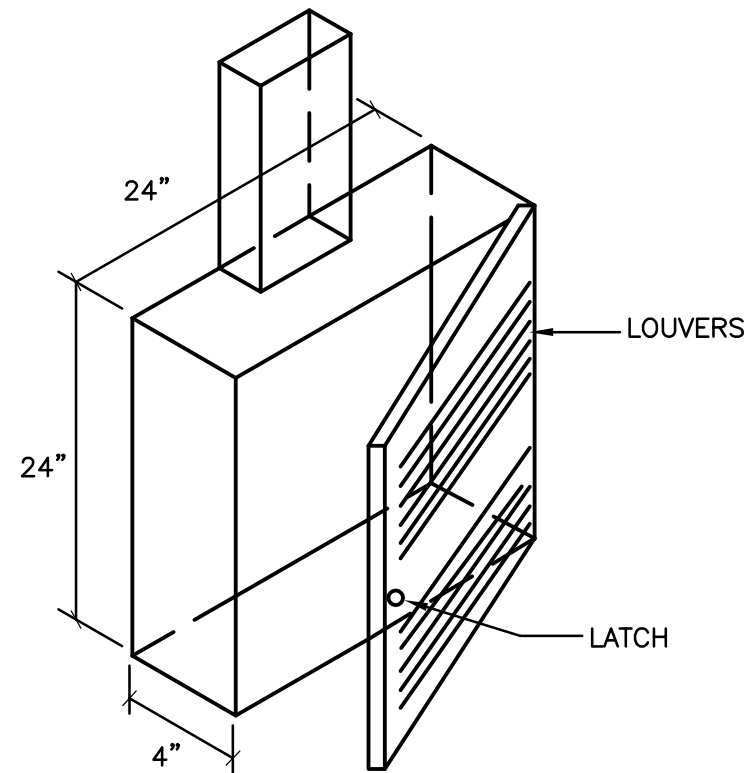
REBOX DETAIL

SCALE: NONE



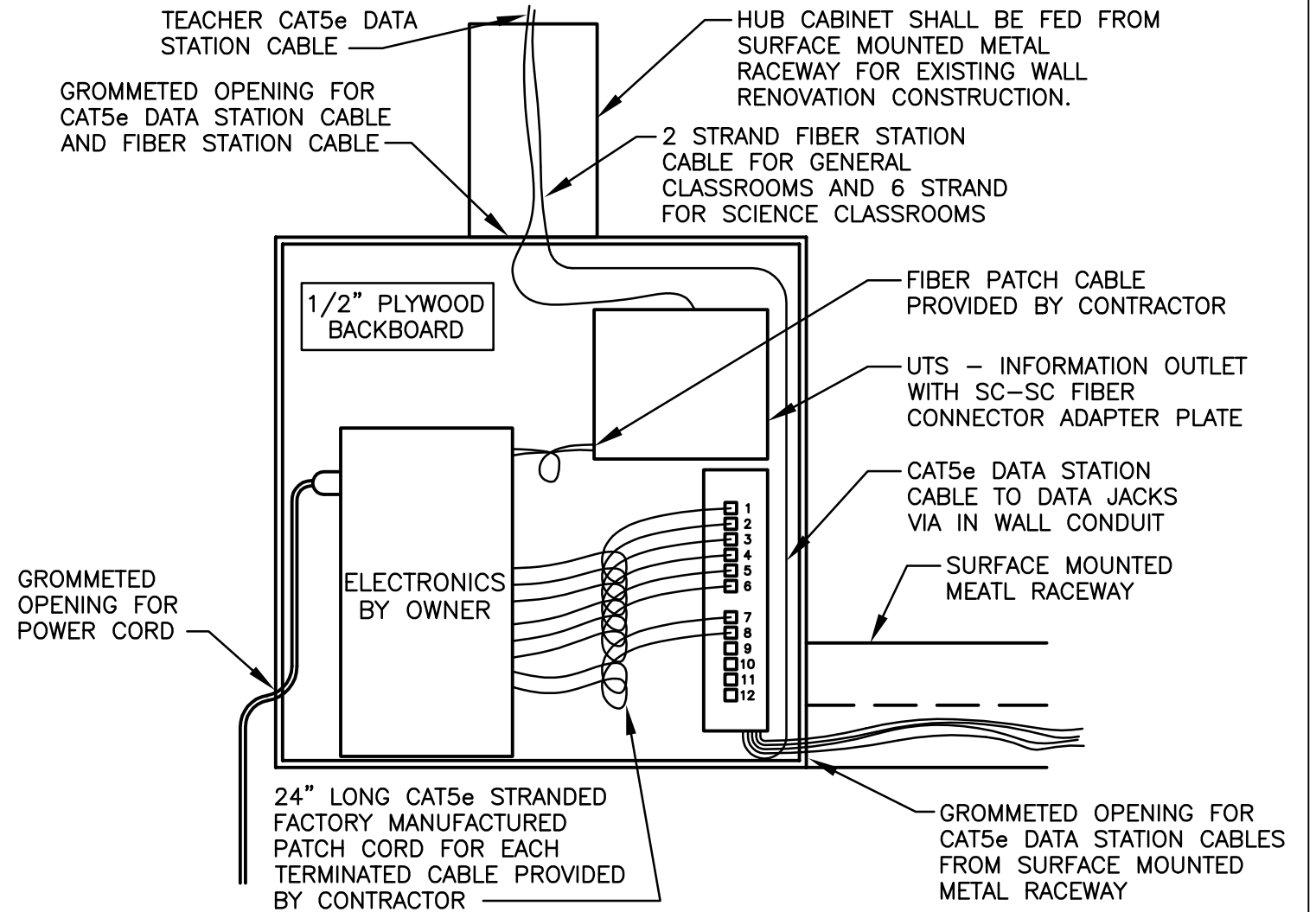
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NOTES: (HUB CABINET SURFACE MOUNTED)

1. CABINET SHALL BE CONSTRUCTED FROM 16 GAUGE COLD ROLLED STEEL. HINGES SHALL BE FORMED STEEL TYPE OR EQUIVALENT AND SWING FROM SIDE. FRONT PANEL SHALL HAVE LOUVERS TO AID IN THE DISSIPATION OF HEAT. UNIT SHALL HAVE THUMB LATCH LOCKING DEVICE. UNIT SHALL HAVE A POLYESTER POWDER ENAMEL OR EQUIVALENT TYPE FINISH. MOUNT CABINET WITH LOUVERS HORIZONTAL.
2. CABINET SHALL BE MOUNTED TO WALL WITH FOUR (4) 1/4" BOLTS INTO WALL ANCHORS. USE TOGGLE BOLTS FOR HOLLOW WALL PARTITIONS AND LEAD ANCHORS FOR SOLID MASONRY WALLS. BOLTS SHALL PASS THROUGH THE 1/2" PLYWOOD CABINET BACKBOARD, THE CABINET AND INTO THE WALL ANCHOR.
3. CABINET SHALL HAVE 1/2" PLYWOOD BACKBOARD TO MOUNT EQUIPMENT. CABINET SHALL HAVE SEALED RUBBER CABLE ENTRY GROMMETS WHERE REQUIRED. OWNER TO SUPPLY AND INSTALL ELECTRONICS ONLY.
4. CABINET SHALL CONTAIN A UTS INFORMATION OUTLET WITH SC-SC FIBER CONNECTOR ADAPTER PLATE.
5. CONTRACTOR SHALL TERMINATE FIBER WITH PRE-POLISHED, CRIMP-ON, SC STYLE CONNECTORS.
6. CABINET SHALL HAVE A 12 PORT VERTICAL CAT5e PATCH PANEL.
7. CONTRACTOR SHALL PROVIDE CAT5e 24" LONG STRANDED FACTORY MANUFACTURED PATCH CORDS ONE PER CABLE TERMINATED.
8. CONTRACTOR TO SUPPLY CAT5e CABLE FROM HUB CABINET TO ALL NEW OUTLETS.
9. HUB CABINET SHALL BE FED FROM SURFACE MOUNTED METAL RACEWAY FOR EXISTING WALL RENOVATION CONSTRUCTION.



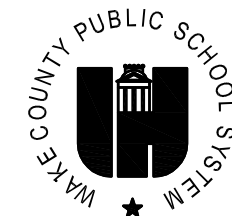
NOTES:

1. CABINET SHALL HAVE 1/2" PLYWOOD BACKBOARD TO MOUNT EQUIPMENT.
2. CABINET SHALL CONTAIN A UTS INFORMATION OUTLET WITH SC-SC FIBER CONNECTOR ADAPTER PLATE.
3. CONTRACTOR SHALL TERMINATE FIBER WITH PRE-POLISHED, CRIMP-PM, SC STYLE CONNECTORS.
4. CABINET SHALL HAVE A 12 PORT VERTICAL CAT5e PATCH PANEL AND A VERTICAL PATCH CORD MANAGER.
5. CONTRACTOR SHALL PROVIDE CAT5e 24" LONG STRANDED FACTORY MANUFACTURED PATCH CORDS FOR EACH TERMINATED CABLE.
6. CONTRACTOR TO SUPPLY CAT5e CABLE FROM HUB CABINET TO ALL NEW DEVICES.
7. NEW WALL - HOLLOW WALL: CABINET SHALL HAVE A SINGLE OPENING TO ACCOMODATE THE COPPER AND FIBER CONDUITS MOUNTED DIRECTLY IN THE WALL AS STATED IN ATTACHMENT 16740-2B.

E2.07

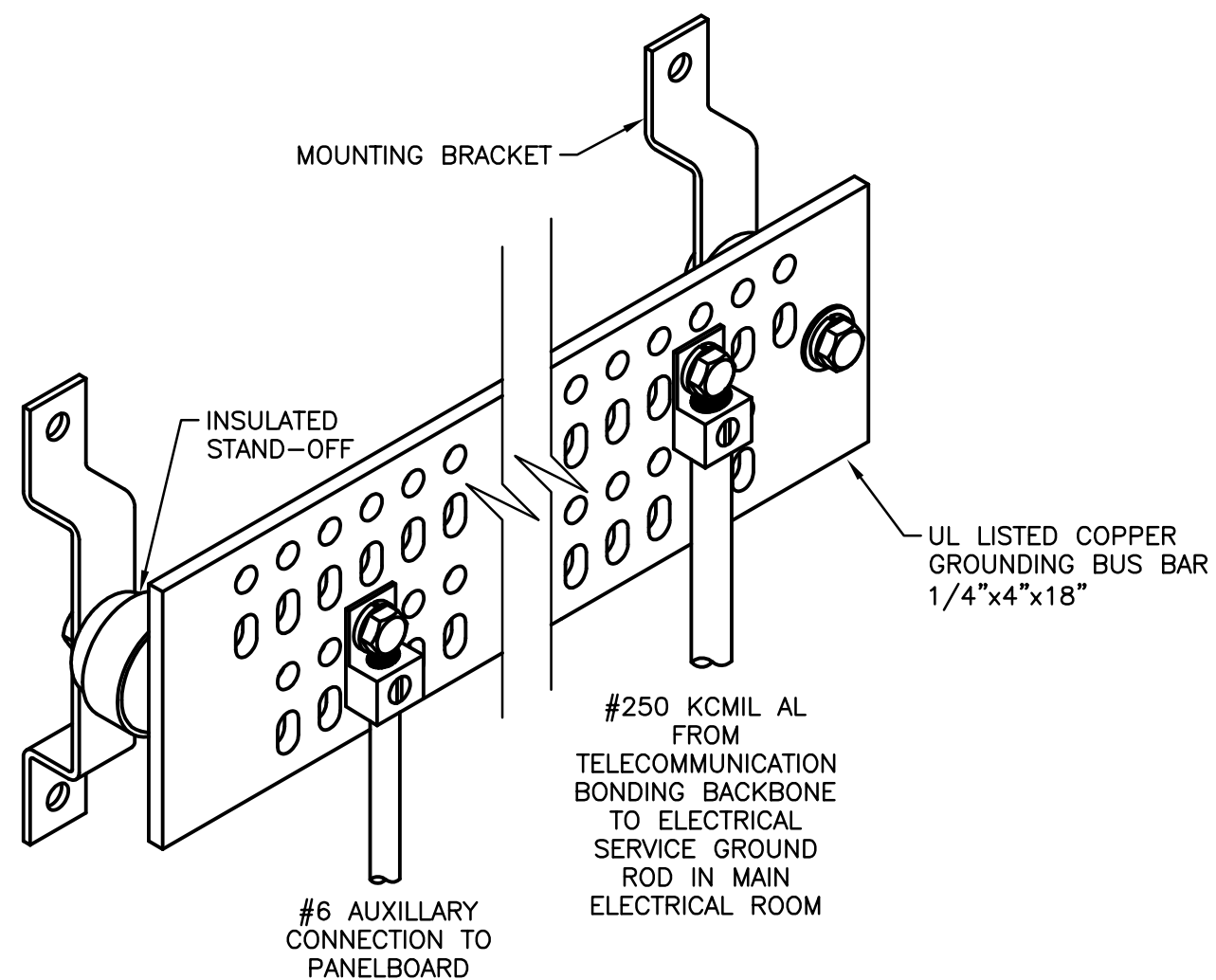
SWITCH ENCLOSURE DETAIL

SCALE: NONE

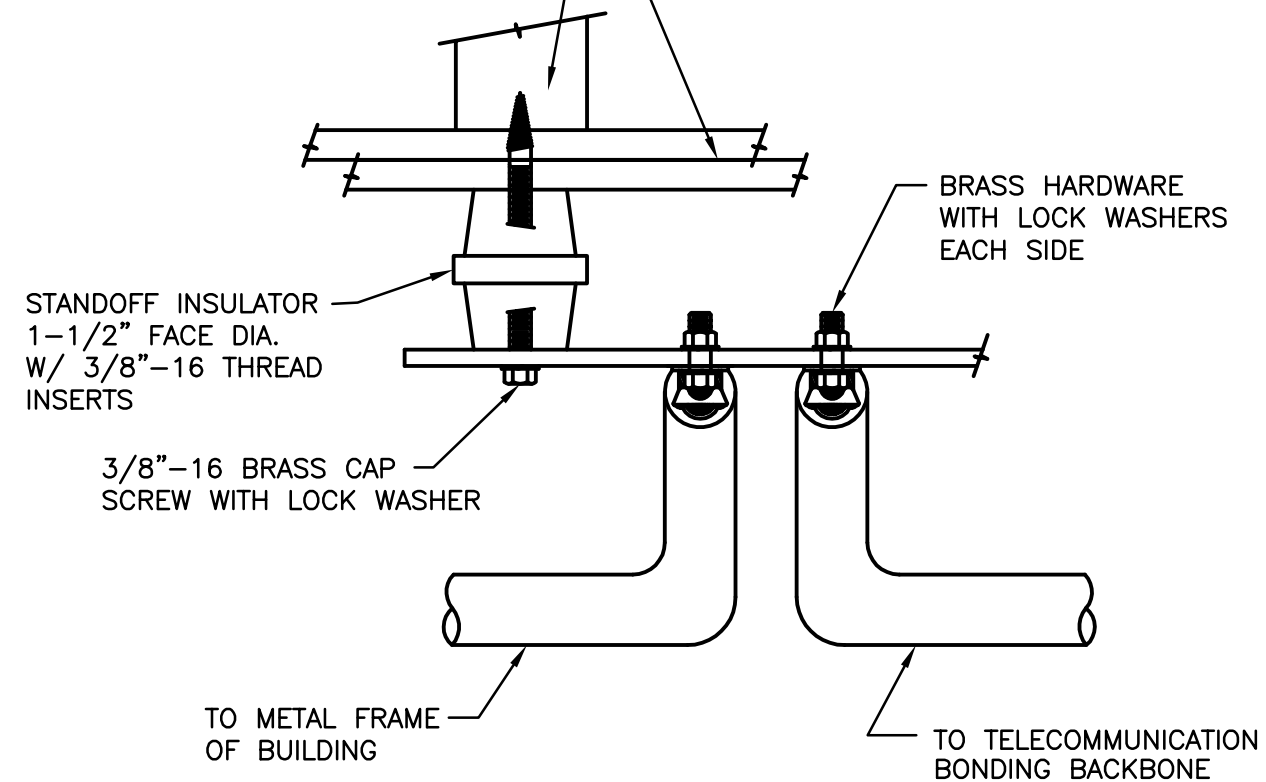


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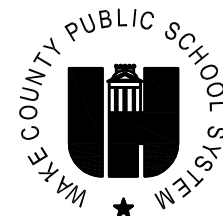
PLYWOOD, SHEETROCK WALLBOARD, & STUD SHOWN; ACTUAL MATERIAL MAY DIFFER. USE APPROPRIATE ANCHOR TO MATCH WALL CONSTRUCTION.



E2.08

TELECOMMUNICATIONS GROUNDING BUSSBAR DETAIL

SCALE: NONE



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