

# OPC Chiller and Cooling Tower Replacement

Owner



**ST. JOHNS  
RIVER**  
STATE COLLEGE

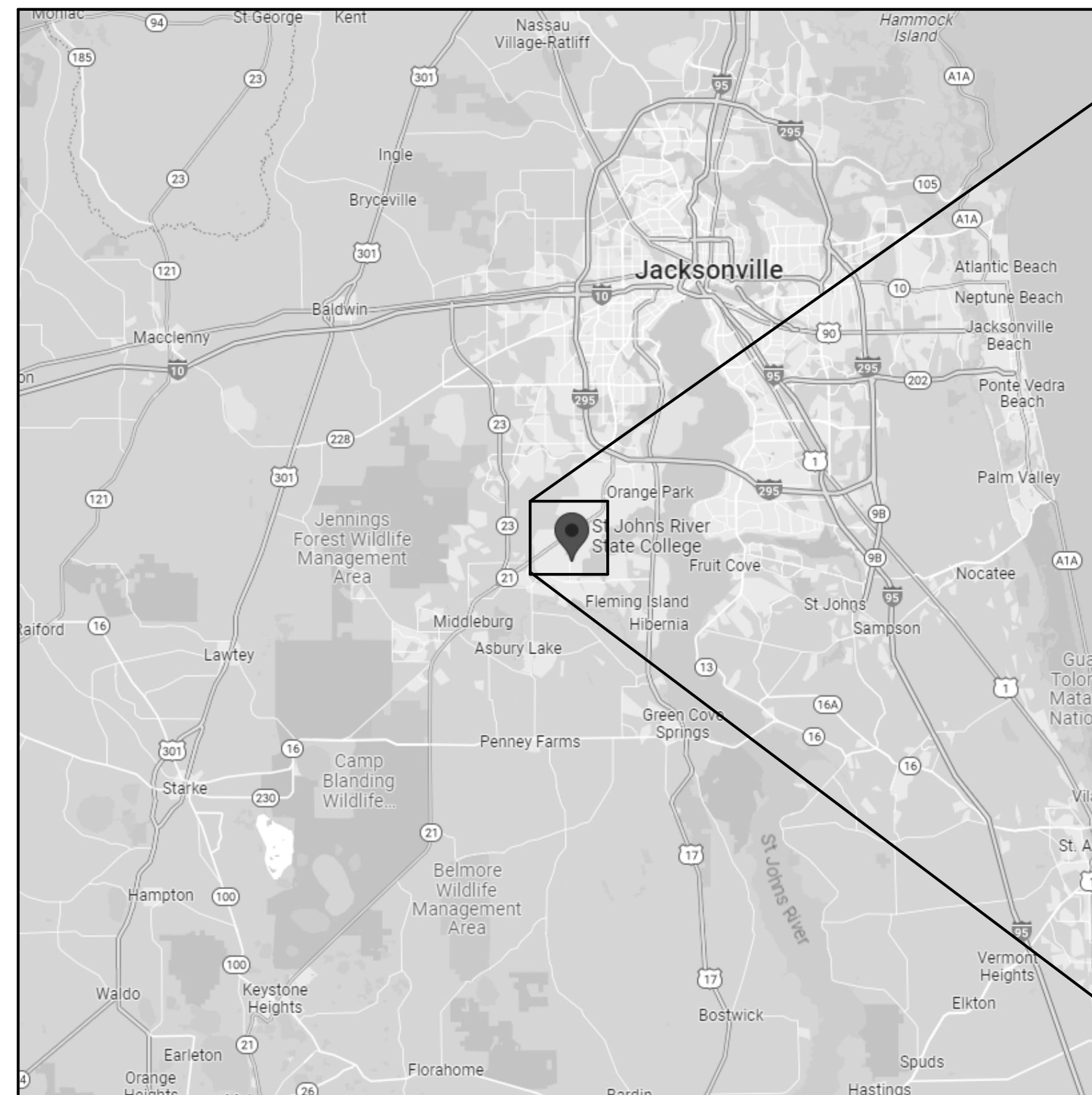
Bid Documents  
4/05/2024  
Moses Project #23130

**Project Narrative:**

The purpose of this project is to install a primary chilled water pump, cooling tower, and chiller of a similar size and capacity to existing.

**DRAWING INDEX**

M001	LEGEND, ABBREVIATIONS, CODES AND STANDARDS
M100	SCHEDULES
M201	MECHANICAL - DEMOLITION
M301	MECHANICAL - NEW WORK
M401	DETAILS
M501	CONTROLS
M502	CONTROLS
E001	LEGEND, ABBREVIATIONS, CODES AND STANDARDS
E101	ELECTRICAL - DEMOLITION
E201	ELECTRICAL - NEW WORK



Project Address:  
283 College Dr, Orange Park, FL 32065

Location Map



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**MECHANICAL LEGEND - GENERAL**

(UNABRIDGED)

	CEILING DIFFUSER. "X" = TYPE AS NOTED IN SPECS "24" = FACE SIZE, "108" = NECK DIAMETER 4-WAY THROW OR AS SHOWN ON PLANS
	CEILING RETURN. SIZE AND TYPE SHOWN "X" = TYE AS NOTED IN SPECS PROVIDE ADAPTER AS REQUIRED
	CEILING EXHAUST. SIZE AND TYPE SHOWN "X" = TYPE AS NOTED IN SPECS PROVIDE ADAPTER AS REQUIRED
	DUCT-MOUNTED SMOKE DETECTOR W/ ACCESS PANEL
	MECHANICAL EQUIPMENT TAG
	CONNECT TO EXISTING
	EXTENT OF DEMOLITION
	DIRECTION OF AIR FLOW
	SPEED CONTROLLER
	CENTERLINE
	ROOM HUMIDISTAT
	ROOM THERMOSTAT
	AIRFLOW MEASURING STATION
	GRAVITY DAMPER
	FIRE DAMPER
	FIRE & SMOKE DAMPER
	SMOKE DAMPER
	MOTORIZED DAMPER

**MECHANICAL LEGEND - DOUBLE LINE**

	BACKFLOW PREVENTER - PLAN VIEW
	BACKFLOW PREVENTER - TOP VIEW
	BALL VALVE - PLAN VIEW
	BALL VALVE - TOP VIEW
	BALANCING VALVE - PLAN VIEW
	BALANCING VALVE - TOP VIEW
	CHECK VALVE - PLAN VIEW
	CHECK VALVE - TOP VIEW
	GATE VALVE - SECTION VIEW
	GATE VALVE - TOP VIEW
	MANUAL BALANCING DAMPER
	PIPE UP
	PIPE DOWN
	NEW DUCTWORK/PIPING
	EXISTING DUCTWORK/PIPING
	EXISTING DUCTWORK/PIPING TO BE REMOVED
	SUPPLY DUCT SECTION - RECTANGULAR AND ROUND
	RETURN DUCT SECTION - RECTANGULAR AND ROUND
	EXHAUST DUCT SECTION - RECTANGULAR AND ROUND

**MECHANICAL LEGEND - SINGLE LINE**

(UNABRIDGED)

	MANUAL BALANCING DAMPER
	AIRTROL FITTING
	AUTOMATIC AIR VENT WITH VALVE
	AUTOMATIC BALANCING VALVE
	MANUAL ISOLATION VALVE. SEE SPECIFICATION FOR TYPE.
	CALIBRATED BALANCING VALVE
	CHECK VALVE
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	FILL VALVE
	FLEXIBLE PIPE CONNECTION
	PRESSURE GAUGE
	PRESSURE OR TEMPERATURE TEST PORT
	INLINE STRAINER
	INLINE STRAINER WITH BLOWDOWN VALVE WITH THREADED HOSE CONNECTION AND CAP
	PIPE DOWN
	PIPE UP
	PLUG VALVE
	PRESSURE REDUCING VALVE
	RELIEF VALVE
	STEAM TRAP
	TWO-WAY MOTORIZED CONTROL VALVE. SEE SPECIFICATIONS FOR TYPE
	THREE-WAY MOTORIZED CONTROL VALVE. SEE SPECIFICATIONS FOR TYPE
	THERMOMETER
	THERMOMETER WELL
	UNION. DIELECTRIC WATERWAY (SEE SPECIFICATIONS)
	VENTURI FLOW METER
	WATER METER

**CONTROLS LEGEND**

	AIR MONITORING SENSOR		LOW PRESSURE SAFETY
	ANALOG INPUT		CONDENSATION MONITOR
	ANALOG OUTPUT		HIGH PRESSURE LIMIT
	DIGITAL INPUT		LOW PRESSURE LIMIT
	DIGITAL OUTPUT		HUMIDITY HIGH LIMIT
	CURRENT SENSING RELAY		LOW LIMIT SAFETY (FREEZE/STAT)
	BAS COMMUNICATION LINK		CONDENSATE LEVEL ALARM
	DUCT SMOKE DETECTOR (BY DIV 16)		CARBON DIOXIDE SENSOR
	DIFFERENTIAL PRESSURE TRANSMITTER / SWITCH		SILICON CONTROLLED RECTIFIER
	DAMPER END SWITCH		THERMOSTAT WITH LOCAL ADJUSTMENT
	VARIABLE FREQUENCY DRIVE		FLOW SWITCH
	HUMIDITY SENSOR		PRESSURE SENSOR
	STATIC PRESSURE SENSOR		FLUID FLOW METER
	MOTORIZED ACTUATOR (ELECTRIC)		HARDWIRED INTERLOCK
	TEMPERATURE SENSOR		

**MECHANICAL ABBREVIATIONS**

(UNABRIDGED)

A	AMPS	GPH	GALLONS PER HOUR
AAV	AUTOMATIC AIR VENT	GPM	GALLONS PER MINUTE
AC	AIR CONDITIONING UNIT	HG	HOT GAS
ACH	AIR CHANGE PER HOUR	HHW	HEATING HOT WATER
AD	ACCESS DOOR	HHP	HEATING HOT WATER PUMP
AFF	ABOVE FINISHED FLOOR	HHWR	HEATING HOT WATER RETURN
AFR	ABOVE FINISHED ROOF	HHWS	HEATING HOT WATER SUPPLY
AH	ATOMIZING HUMIDIFIER	HP	HORSEPOWER
AHJ	AUTHORITY HAVING JURISDICTION	HPS	HIGH PRESSURE STEAM
AHU	AIR HANDLING UNIT	HPU	HEAT PUMP UNIT
AMS	AIRFLOW MEASURING STATION	HR	HOUR
AL	ALUMINUM	HT	HEIGHT
AP	ACCESS PANEL	HX	HEAT EXCHANGER
AS	AIR SEPARATOR	HZ	HERTZ
AUX	AUXILIARY	ID	INSIDE DIAMETER
AWG	AMERICAN WIRE GAUGE	IN. WG	INCHES OF WATER, GAUGE
B	BOILER	KW	KILOWATTS
BD	BALANCING DAMPER	KWH	KILOWATT HOUR
BFF	BELOW FINISHED FLOOR	LAT	LEAVING AIR TEMPERATURE
BFP	BACKFLOW PREVENTER	LB	POUND
BHP	BREAK HORSEPOWER	LD	LINEAR DIFFUSER
BLDG	BUILDING	LPS	LOW PRESSURE STEAM
BOB	BOTTOM OF BEAM	LVG	LEAVING
BOD	BOTTOM OF DUCT	LWT	LEAVING WATER TEMPERATURE
BOJ	BOTTOM OF JOIST	MAX	MAXIMUM
BTU	BRITISH THERMAL UNITS	MBH	THOUSANDS OF BTUS
BTUH	BTU PER HOUR	MCA	MAXIMUM CURRENT AMPACITY
CAC	CONTROL AIR COMPRESSOR	MCF	THOUSANDS OF CUBIC FEET
CB	CHILLED BEAM	MD	MOTORIZED DAMPER
CBWP	CHILLED BEAM WATER PUMP	MIN	MINIMUM
CBWS	CHILLED BEAM WATER SUPPLY	MICPP	MINIMUM OVERCURRENT PROTECTION
CBWR	CHILLED BEAM WATER RETURN	NC	NORMALLY CLOSED
CD	CONDENSATE DRAIN	NIC	NOT IN CONTRACT
CF	CUBIC FEET	NO	NORMALLY OPEN
CFH	CUBIC FEET PER HOUR	NTS	NOT TO SCALE
CFM	CUBIC FEET PER MINUTE	OA	OUTDOOR AIR
CH	CHILLER	OAI	OUTDOOR AIR INTAKE
CHW	CHILLED WATER	OAL	OUTDOOR AIR LOUVER
CHWP	CHILLED WATER PUMP	OC	ON CENTER
CHWR	CHILLED WATER RETURN	OD	OUTSIDE DIAMETER
CHWS	CHILLED WATER SUPPLY	P	PUMP
CO	CLEANOUT	PAS	PORTABLE AIR SCRUBBER
CR	CONDENSATE RETURN (STEAM)	PCW	PROCESS COOLING WATER
CSR	CURRENT SENSING RELAY	PCWP	PROCESS COOLING WATER PUMP
CS	CURRENT SENSING (AMPS)	PCWR	PROCESS COOLING WATER RETURN
CT	COOLING TOWER	PCWS	PROCESS COOLING WATER SUPPLY
CU	CONDENSING UNIT	PD	PRESSURE DROP
CV	COEFFICIENT OF VALVE	PH	PHASE
CWP	CONDENSER WATER PUMP	PHC	PRE-HEAT COIL
CWS	CONDENSER WATER SUPPLY	PL	PLATE
CWR	CONDENSER WATER RETURN	PRV	PRESSURE REDUCING VALVE
DB	DRY BULB	PSI	POUNDS PER SQUARE INCH
DC	DUST COLLECTOR	PSIG	PSI GAUGE
DCW	DOMESTIC COLD WATER	PT	PRESSURE TREATED
DDC	DIRECT DIGITAL CONTROLS	PVC	POLYVINYL CHLORIDE
DEFL	DEFLECTION	R	RADIUS
DG	DOOR GRILLE	RA	RETURN AIR
DIA	DIAMETER	RD	ROOF DRAIN
DS	DUCT SILENCER	RAQ	RETURN AIR GRILLE
DTW	DUAL TEMPER WATER	RH	RELATIVE HUMIDITY
DTWR	DUAL TEMPER WATER RETURN	RHC	REHEAT COIL
DTWS	DUAL TEMPER WATER SUPPLY	RL	REFRIGERANT LIQUID
EA	EXHAUST AIR	RLA	RATED LOAD AMPS
EAT	ENTERING AIR TEMPERATURE	RR	REFRIGERANT RELIEF
EAV	EXHAUST AIR VALVE	RP	REDUCED PRESSURE
EDH	ELECTRIC DUCT HEATER	RPM	REVOLUTIONS PER MINUTE
EF	EXHAUST FAN	RS	REFRIGERANT SUCTION
EG	EXHAUST GRILLE	RV	ROOF VENT
EH	EXHAUST HOOD	SA	SUPPLY AIR
ENT	ENTERING	SCR	SILICON CONTROLLED RECTIFIER
EOR	ENGINEER OF RECORD	SCH	SCHEDULE
ESP	EXTERNAL STATIC PRESSURE	SD	SMOKE DAMPER
EWT	ENTERING WATER TEMPERATURE	SF	SQUARE FEET
EX	EXISTING	SG	SOFFIT GRILLE
F	DEGREES FAHRENHEIT	SIM	SIMILAR
FA	FREE AREA	SMS	SHEETMETAL SCREW
FCB	FLORIDA BUILDING CODE	SP	STATIC PRESSURE
FCU	FAN COIL UNIT	SPEC	SPECIFICATION
FD	FIRE DAMPER	SR	SIDEWALL REGISTER
FEV	FUME EXHAUST VALVE	SS	STAINLESS STEEL
FG	FILTER GRILLE	STD	STANDARD
FH	FUME HOOD	STL	STEEL
FLA	FULL LOAD AMPS	STM	STEAM
FM	FLOW METER	SAV	SUPPLY AIR VALVE
FO	FLAT OVAL	TAB	TEST, ADJUST, BALANCE
F.O.R.	FUEL OIL RETURN	TEMP	TEMPERATURE
F.O.S.	FUEL OIL SUPPLY	TSP	TOTAL STATIC PRESSURE
FPM	FEET PER MINUTE	TYP	TYPICAL
FRP	FIBERGLASS REINFORCED PLASTIC	UC	UNDERCUT DOOR - 3/4"
FSC	FAN SPEED CONTROLLER	UG	UNDERGROUND
FSD	FIRE/SMOKE DAMPER - COMBINATION	UH	UNIT HEATER
FT	FEET	V	VOLTS
FT WG	FEET OF WATER GAUGE	VAV	VARIABLE AIR VOLUME
FTU	FAN TERMINAL UNIT	VFD	VARIABLE FREQUENCY DRIVE
FV	FACE VELOCITY	VFM	VENTURI FLOW METER
GA	GAUGE	VLV	VALVE
GAL	GALLONS	VRF	VARIABLE REFRIGERANT FLOW
GALV	GALVANIZED	VRV	VARIABLE REFRIGERANT VOLUME
GC	GENERAL CONTRACTOR	VVU	VARIABLE VOLUME UNIT
GEV	GENERAL EXHAUST VALVE	WB	WET BULB
		WPD	WATER PRESSURE DROP

	TEMPERATURE SENSOR (AVERAGING)
	TEMPERATURE SENSOR (POINT)
	MOTORIZED OPPOSED BLADE DAMPER
	MOTORIZED PARALLEL BLADE DAMPER
	THREE WAY CONTROL VALVE
	TWO WAY CONTROL VALVE
	STARTER
	TEST PORT
	CHECK VALVE

**MECHANICAL GENERAL NOTES**

THE FOLLOWING NOTES ARE TO DEMONSTRATE MINIMUM MECHANICAL CODE COMPLIANCE ONLY. CONTRACTOR IS RESPONSIBLE FOR THE FULL WRITTEN SPECIFICATIONS. IF ANY INCONSISTENCIES ARE PRESENT, THE FULL WRITTEN SPECIFICATIONS PREVAIL.

**EQUIPMENT:**

- PROVIDE FULL SIZE HARD DRAWN COPPER, INSULATED CONDENSATE PIPING FROM ALL UNITS TO DISPOSAL POINT INDICATED ON THE DRAWINGS.
- PROVIDE A TRAP ON ALL CONDENSATE DRAIN OUTLETS. SLOPE ALL CONDENSATE DRAIN PIPING -1/8" INCH PER FOOT DOWN TOWARDS DISPOSAL POINT. PROVIDE CLEANOUTS AT ALL 90° CHANGES IN DIRECTION.
- CONTRACTOR SHALL INSTALL ALL EQUIPMENT, PIPING, AND DUCTWORK SUCH THAT MANUFACTURER'S RECOMMENDED CLEARANCES ARE MET FOR ALL ACCESS PANELS, MOTORS, FANS, BELTS, FILTERS, AIR INTAKES AND GENERAL SERVICE.
- PROVIDE VIBRATION ISOLATORS FOR ALL UNITS. SEE SPECIFICATIONS AND DETAILS.
- PROVIDE ACCESS PANELS IN ALL NON-ACCESSIBLE CONSTRUCTIONS (INCLUDING CEILINGS, WALLS, ETC) SIZED AND LOCATED AS REQUIRED TO PROVIDE PROPER SERVICE ACCESS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION FOR ALL HVAC EQUIPMENT INCLUDING DAMPERS AND VALVES.
- ALL HVAC EQUIPMENT TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND UNDER SUPERVISION OF MANUFACTURER'S REPRESENTATIVE.

**CONTROLS:**

- MAINTAIN A MINIMUM OF 3'-6" SEPARATION BETWEEN THE HVAC CONTROL WIRING AND OTHER DATA, TV, OR PHONE WIRING TO PREVENT ANY INTERFERENCE.
- ALL LOW VOLTAGE CONTROL WIRING SHALL COMPLY WITH SPECIFICATIONS AND IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS REQUIREMENTS.
- PROVIDE ALL SOFTWARE, PROGRAMMING, GRAPHICS, AND RELATED INTERFACE TO MONITOR THE HVAC SYSTEM VIA INTERNET LOGIN.

**GENERAL:**

- PRIOR TO COMMENCING ANY WORK, THE CONTRACTOR SHALL SATISFY HER/HIMSELF AS TO THE ACCURACY OF ALL DATA AS INDICATED IN THESE PLANS AND/OR AS PROVIDED BY THE OWNER. SHOULD THE CONTRACTOR DISCOVER ANY INACCURACIES, ERRORS, OR OMISSIONS IN THE DATA, SHE SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN ORDER THAT PROPER ADJUSTMENTS CAN BE ANTICIPATED AND ORDERED.
- COMMENCEMENT BY THE CONTRACTOR OF ANY WORK SHALL BE HELD AS AN ACCEPTANCE OF THE DATA BY HER/HIM AFTER WHICH TIME THE CONTRACTOR HAS NO CLAIM AGAINST THE OWNER RESULTING FROM ALLEGED ERRORS, OMISSIONS, OR INACCURACIES OF THE SAID DATA.
- ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED AND COMPLETED IN A FIRST-CLASS WORKMANLIKE MANNER AND IN ACCORDANCE WITH THE BEST MODERN METHODS AND PRACTICE. ANY MATERIALS INSTALLED WHICH DO NOT PRESENT AN ORDERLY AND REASONABLY NEAT AND/OR WORKMANLIKE APPEARANCE, OR DO NOT ALLOW ADEQUATE SPACE FOR MAINTENANCE, SHALL BE REMOVED AND REPLACED BY THE INSTALLING CONTRACTOR WHEN SO DIRECTED BY THE ARCHITECT/ENGINEER.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL EQUIPMENT AND DEVICES THAT MAY REQUIRE MAINTENANCE AND OPERATION ARE MADE EASILY ACCESSIBLE, REGARDLESS OF THE DIAGRAMMATIC LOCATION SHOWN ON THE DRAWINGS.
- THE CONTRACTOR SHALL PROTECT EQUIPMENT AND MATERIAL AT ALL TIMES AND HE SHALL REPLACE ALL EQUIPMENT AND MATERIAL WHICH ARE DAMAGED AS A RESULT OF INADEQUATE PROTECTION.
- THOROUGHLY CLEAN ALL EXPOSED PARTS OF APPARATUS AND EQUIPMENT AND REMOVE ALL OIL AND GREASE SPOTS, REPAIR OR TOUCH UP AS REQUIRED TO LOOK LIKE NEW. DURING PROGRESS OF WORK CONTRACTOR IS TO CAREFULLY CLEAN UP AND LEAVE PREMISES AND ALL PORTIONS OF BUILDING FREE FROM DEBRIS AND IN A CLEAN AND SAFE CONDITION, UNLESS SPECIFICALLY NOTED OTHERWISE. ALL DEBRIS AND WASTE MATERIALS SHALL BE REMOVED FROM THE WORK AREA AND LEGALLY DISPOSED OF OFFSITE, OR AS DIRECTED BY THE OWNER.
- DURING THE PROGRESS OF THE WORK, THE CONTRACTOR SHALL RECORD ON THEIR FIELD SET OF DRAWINGS (AS-BUILTS) THE EXACT LOCATION, AS INSTALLED, OF ALL PIPING, DUCTWORK, EQUIPMENT, AND OTHER SYSTEMS WHICH ARE NOT INSTALLED EXACTLY AS SHOWN ON THE CONTRACT DOCUMENTS.

**DIVISION 23 CODES & STANDARDS**

**GENERAL:**

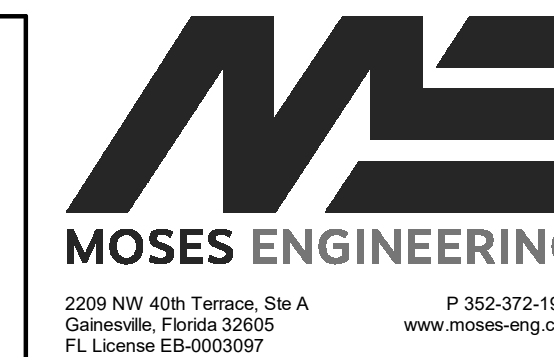
- THE WORK COVERED BY THIS DIVISION CONSISTS OF PROVIDING ALL LABOR, EQUIPMENT AND MATERIALS AND PERFORMING ALL OPERATIONS NECESSARY FOR THE INSTALLATION OF THE MECHANICAL WORK AS HEREIN CALLED FOR AND SHOWN ON THE DRAWINGS.

**CODES:**

- ALL WORK UNDER DIVISION 23 SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CODES LISTED HEREIN. THE DESIGN HAS BEEN BASED ON THE REQUIREMENTS OF THESE CODES; AND WHILE IT IS NOT THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT ALL WORK CALLED FOR COMPLIES WITH THESE CODES, HE SHALL BE RESPONSIBLE FOR CALLING TO THE ARCHITECT/ENGINEER'S ATTENTION ANY DRAWINGS OR SPECIFICATIONS THAT ARE NOT IN CONFORMANCE WITH THESE OR OTHER CODES PRIOR TO ORDERING EQUIPMENT OR INSTALLING WORK.
- COMPLY WITH REGULATIONS AND CODES OF UTILITY SUPPLIERS.
- WHERE NO SPECIFIC METHOD OR FORM OF CONSTRUCTION IS CALLED FOR IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL COMPLY WITH CODE REQUIREMENTS WHEN CARRYING OUT SUCH WORK.
- WHERE CODE CONFLICT EXISTS, GENERALLY THE MOST RESTRICTIVE REQUIREMENT APPLIES, COMPLY WITH CURRENT CODE EDITION, UNLESS NOTED.
- ADDITIONAL CODES OR STANDARDS APPLYING TO A SPECIFIC PART OF THE WORK MAY BE INCLUDED IN THAT SECTION.
- THE FOLLOWING CODES GOVERN THE WORK:
  - FLORIDA BUILDING CODE - BUILDING - EIGHTH EDITION (2023).
  - FLORIDA BUILDING CODE - MECHANICAL - EIGHTH EDITION (2023).
  - FLORIDA BUILDING CODE - ENERGY CONSERVATION - EIGHTH EDITION (2023).
  - FLORIDA BUILDING CODE - FUEL GAS - EIGHTH EDITION (2023).
  - FLORIDA BUILDING CODE - TEST PROTOCOLS FOR HIGH VELOCITY HURRICANE ZONES - EIGHTH EDITION (2023).
  - NATIONAL ELECTRIC CODE (NFPA 70) - 2020.
  - INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS (NFPA 90A) - 2015.
  - INSTALLATION OF SPRINKLER SYSTEMS (NFPA 13) - 2019.
    - FLORIDA FIRE PREVENTION CODE - 2023
      - FIRE CODE (NFPA 1) - 2021 FLORIDA EDITION
      - LIFE SAFETY CODE (NFPA 101) - 2021 FLORIDA EDITION

**STANDARDS:**

- ALL DIVISION 23 MATERIALS, INSTALLATION AND SYSTEMS SHALL MEET THE REQUIREMENTS OF THE FOLLOWING STANDARDS, INCLUDING THE LATEST ADDENDA AND AMENDMENTS, TO THE EXTENT REFERENCED:
  - UNDERWRITERS' LABORATORIES (UL)
  - AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
  - AMERICAN SOCIETY OF TESTING MATERIALS (ASTM)
  - NATIONAL FIRE PROTECTION (NFPA)
  - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
  - AIR CONDITIONING AND REFRIGERATION INSTITUTE (ARI)
  - SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA)
  - AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE)
    - AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA)
    - STANDARDS OF THE HYDRONIC INSTITUTE (BRI)



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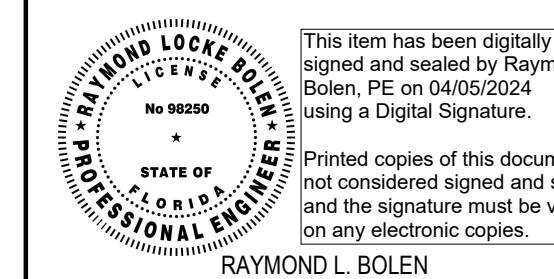
Project Name:

**OPC Chiller and Cooling Tower Replacement**

Submital:

**Bid Documents**

Seal:



Moses Project #: 23130  
 Drafted By: JSD  
 Checked By: RLB  
 Date: 4/05/2024

No.	Revision Description	Date

Sheet Title:  
 LEGEND, ABBREVIATIONS, CODES AND STANDARDS

Sheet #: **M001**

Autodesk Docs://23130 OPC Chiller and Cooling Tower Replacement/23130 OPC Chiller and Cooling Tower Replacement/MEP R24.rvt

Project Name:  
**OPC Chiller and Cooling Tower Replacement**

PUMP SCHEDULE	
MARK	CHWP-2
DUTY	CHILLED WATER PUMP
MANUFACTURER	BELL AND GOSSETT
MODEL	e-1510
SIZE	6BD
SPEED (RPM)	1800
TYPE	BASE MOUNTED END SUCTION
CAPACITY (GPM)	1680
TOTAL HEAD (FT HD)	45
MINIMUM EFFICIENCY (%)	81
IMPELLER DIAMETER (IN)	9
MAX IMPELLER DIAMETER (IN)	9 1/2
MOTOR (HP)	30
VOLTS-PHASE	480-3
DRIVE TYPE	ACROSS THE LINE STARTER
SCHEDULE NOTES	
SCHEDULE NOTES	

WATER COOLED CHILLER SCHEDULE	
MARK	CH-2
MANUFACTURER	YORK
MODEL	YKK5KGH9
MINIMUM CAPACITY (TONS)	700
WEIGHT (LB)	33,522
VOLTS-PHASE	480-3
MAXIMUM KW/TON (FULL LOAD)	0.57
EVAPORATOR SECTION	
WATER TEMP ENT (°F)	54.00
WATER TEMP LVG (°F)	44.00
WATER FLOW (GPM)	1675
MAXIMUM PRESSURE DROP (FT HD)	12.9
FOULING FACTOR	0.0001
CONDENSER SECTION	
WATER TEMP ENT (°F)	85
WATER TEMP LVG (°F)	94.24
WATER FLOW (GPM)	2100
MAXIMUM PRESSURE DROP (FT HD)	17.1
FOULING FACTOR	0.00025
SCHEDULE NOTES	(1)
SCHEDULE NOTES	
(1) PROVIDE FACTORY INSULATION ON ALL CHILLER COMPONENTS	

**CONSTRUCTION PHASING SEQUENCE (BASE BID, ALT. NO. 1 & 2)**

THIS PHASING SEQUENCE IS INTENDED TO DEMONSTRATE THE INSTALLATION SEQUENCE OF MAJOR EQUIPMENT AND IS NOT A COMPREHENSIVE SCOPE OF WORK. ALL WORK AND OUTAGES TO BE PHASED AND COORDINATED WITH CAMPUS OPERATIONS AND ACTIVITIES. CONTRACTOR TO SUBMIT A DETAILED PHASING SCHEDULE NOTING EQUIPMENT AND SYSTEM OUTAGES COORDINATED WITH PUBLIC CAMPUS SCHEDULE TO OWNER FOR REVIEW PRIOR TO CONSTRUCTION. IF ALT. NO. 3 IS EXECUTED, INSTALL ASSOCIATED EQUIPMENT AND PIPING DURING STEP 5 OF THIS SEQUENCE.

1. PROVIDE ACCH-1 AND ACCH-2 AND INSTALL IN TEMPORARY LOCATION AS INDICATED ON NEW WORK PLAN.
2. CUT-IN VALVED STUB-OUT FOR SCHWP RECIRCULATION LINE INTO CAMPUS CHWS. CONNECT ACCH CHWS TO THIS STUB-OUT AND CONNECT ACCH CHWR TO CAMPUS CHWR. SEE PLANS FOR NOTES LABELING THESE PIPES.
3. DEMOLISH EX 300-TON CHILLER, COOLING TOWER, AND ASSOCIATED PUMPS, PIPES, AND ACCESSORIES AS INDICATED.
4. PROVIDE NEW CHWP-2 AND PIPING.
5. PROVIDE NEW CH-2 AND PIPING.
6. PROVIDE NEW PAD FOR ACCH-1 AND ACCH-2 AND INSTALL IN PERMANENT LOCATION. PROVIDE PIPING, ACCESSORIES, AND CONTROLS AS INDICATED ON PLANS AND DETAILS.

**ADDITIVE ALTERNATE NO. 1**

THE SCOPE OF THIS ALTERNATE IS TO PROVIDE THE EQUIPMENT AND MATERIALS INDICATED BY THE SCHEDULE AND PLANS. COST OF LABOR SHALL BE PROVIDED AS ALTERNATE NO. 2.

**AIR COOLED CHILLER SCHEDULE**

MARK	ACCH-1	ACCH-2
MANUFACTURER	LG ELECTRONICS	LG ELECTRONICS
MODEL	ACHH060VBAB	ACHH060VBAB
MINIMUM CAPACITY (TONS)	60	60
MINIMUM NPLV (BTU/W.H)	19.46	19.46
DESIGN AMBIENT AIR TEMP (F)	95	95
VOLTS-PHASE	480-3	480-3
EWT (F)	54	54
LWT (F)	44	44
OUTDOOR TEMP (F)	91	91
CHW DESIGN FLOW (GPM)	133	133
CHW MIN FLOW (GPM)	66	66
MINIMUM % LOAD	20	20
STAGES	6	6
SCHEDULE NOTES	(1)	(1)
SCHEDULE NOTES		
(1) PROVIDE SEACOAST COATING		

**ADDITIVE ALTERNATE NO. 2**

THE SCOPE OF THIS ALTERNATE IS TO DEMOLISH AND INSTALL EQUIPMENT AS INDICATED ON THE PLANS. COST FOR EQUIPMENT AND MATERIALS SHALL BE PROVIDED AS ALTERNATE NO. 1.

**ADDITIVE ALTERNATE NO. 3**

**VFD SCHEDULE**

SERVICE	CT-2C
MANUFACTURER	ABB
MODEL	ACS880
ELECTRICAL CHAR(V-Ø)	480-3
MOTOR (HP)	20
INPUT IMPEDENCE	5%
SCCR (KA)	65
ENCLOSURE RATING	NEMA 1
SCHEDULE NOTES	(1) (2)
SCHEDULE NOTES	
(1) PROVIDE ELECTRONIC CONTACTOR BYPASS	

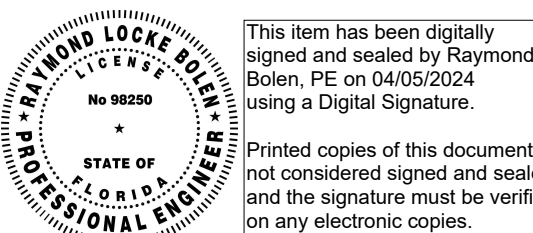
**COOLING TOWER SCHEDULE**

MARK	CT-2C
MANUFACTURER	EVAPCO
MODEL	AT 212-3L24
CONSTRUCTION	PVC FILL
UNIT TYPE	COUNTERFLOW
WEIGHT (LBS)	15,180
MOTOR SECTION	
DRIVE TYPE	VFD
NUMBER OF FANS	1
FAN MOTOR SIZE (HP)	20
VOLTS-PHASE	480-3
PERFORMANCE SECTION	
TOTAL CAPACITY (TONS)	350
WATER FLOW (GPM)	1050
WATER TEMP ENT (°F)	95.0
WATER TEMP LVG (°F)	85.0
AMBIENT WET BULB TEMP (°F)	80.0
SCHEDULE NOTES	(1)
SCHEDULE NOTES	
(1) PROVIDE ELECTRIC BASIN HEATER, MOTOR HEATER, AND VIBRATION SWITCH	

Submittal:

**Bid Documents**

Seal:



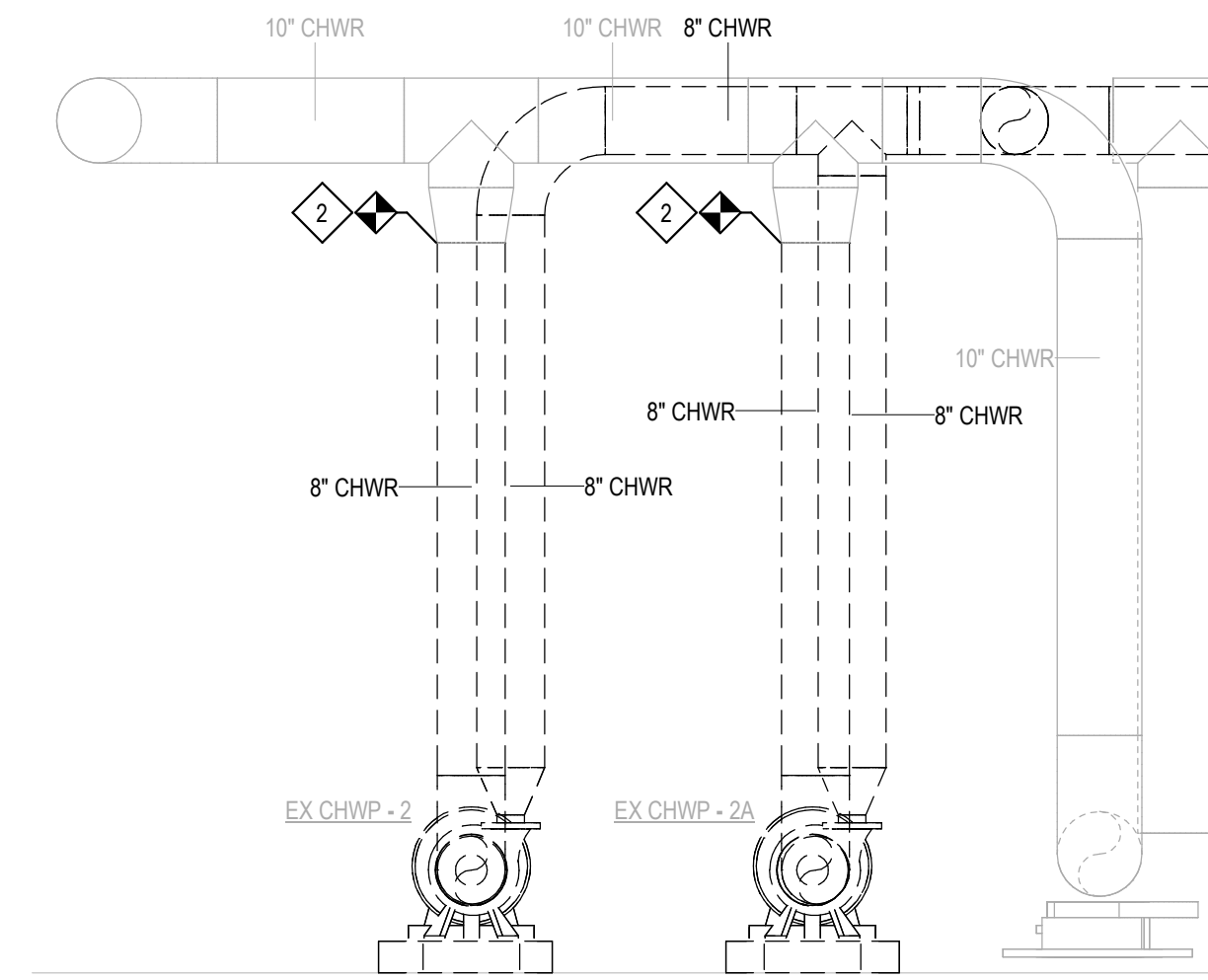
This item has been digitally signed and sealed by Raymond L. Bolen, PE on 04/05/2024 using a Digital Signature.  
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RAYMOND L. BOLEN  
 PE - 0098290

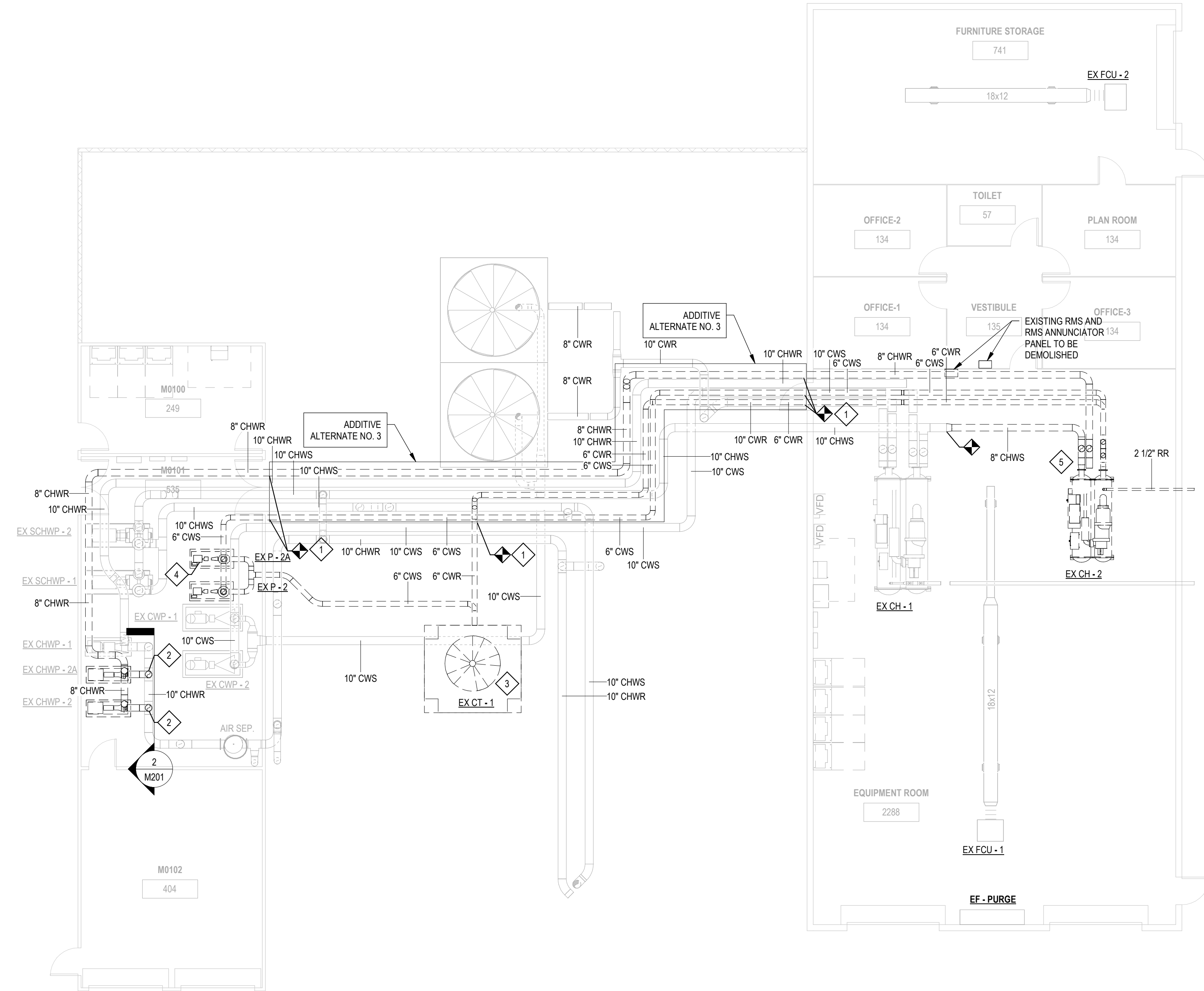
Moses Project #:	23130	
Drafted By:	JSD	
Checked By:	SRF	
Date:	4/05/2024	
No.	Revision Description	Date

Sheet Title:  
 SCHEDULES

Sheet #:  
 M100



**2 PCHWP SECTION VIEW - DEMOLITION**  
 SCALE: 1/2" = 1'-0"



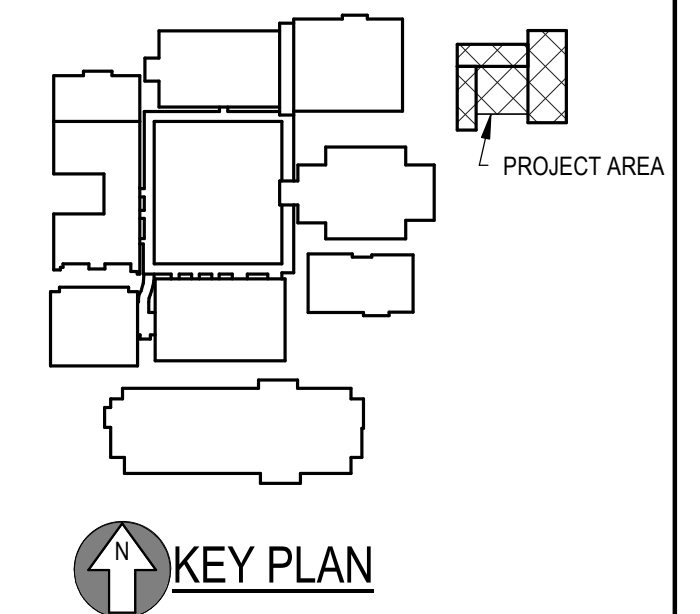
**1 GROUND FLOOR PLAN - DEMOLITION**  
 SCALE: 1/8" = 1'-0"

**DEMOLITION GENERAL NOTES**

- A. PATCH ALL WALL PENETRATIONS FROM DEMOLISHED PIPING TO MATCH EXISTING.

**DEMOLITION KEY NOTES**

1. PIPING SHALL BE DEMOLISHED TO INDICATED POINT, CAPPED, AND PIPING ON EXTERIOR STANDS SHALL BE ABANDONED IN PLACE IF ONLY BASE BID IS EXECUTED. CAP EXISTING TO REMAIN PIPING AT POINT OF DEMOLITION. IF ALTERNATE NO. 3 IS ALSO EXECUTED, DISREGARD DEMOLITION POINT AND DEMOLISH ALL PIPING AS INDICATED ON PLAN.
2. CAP PIPING AT POINT OF DEMOLITION.
3. DEMOLISH EX CT AND CONCRETE SUPPORTS.
4. TURN PUMP MOTOR OVER TO OWNER.
5. DEMOLISH WATER TREATMENT SYSTEM ASSOCIATED WITH 300-TON CHILLER CONDENSING WATER LOOP.



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**Bid Documents**

Seal:

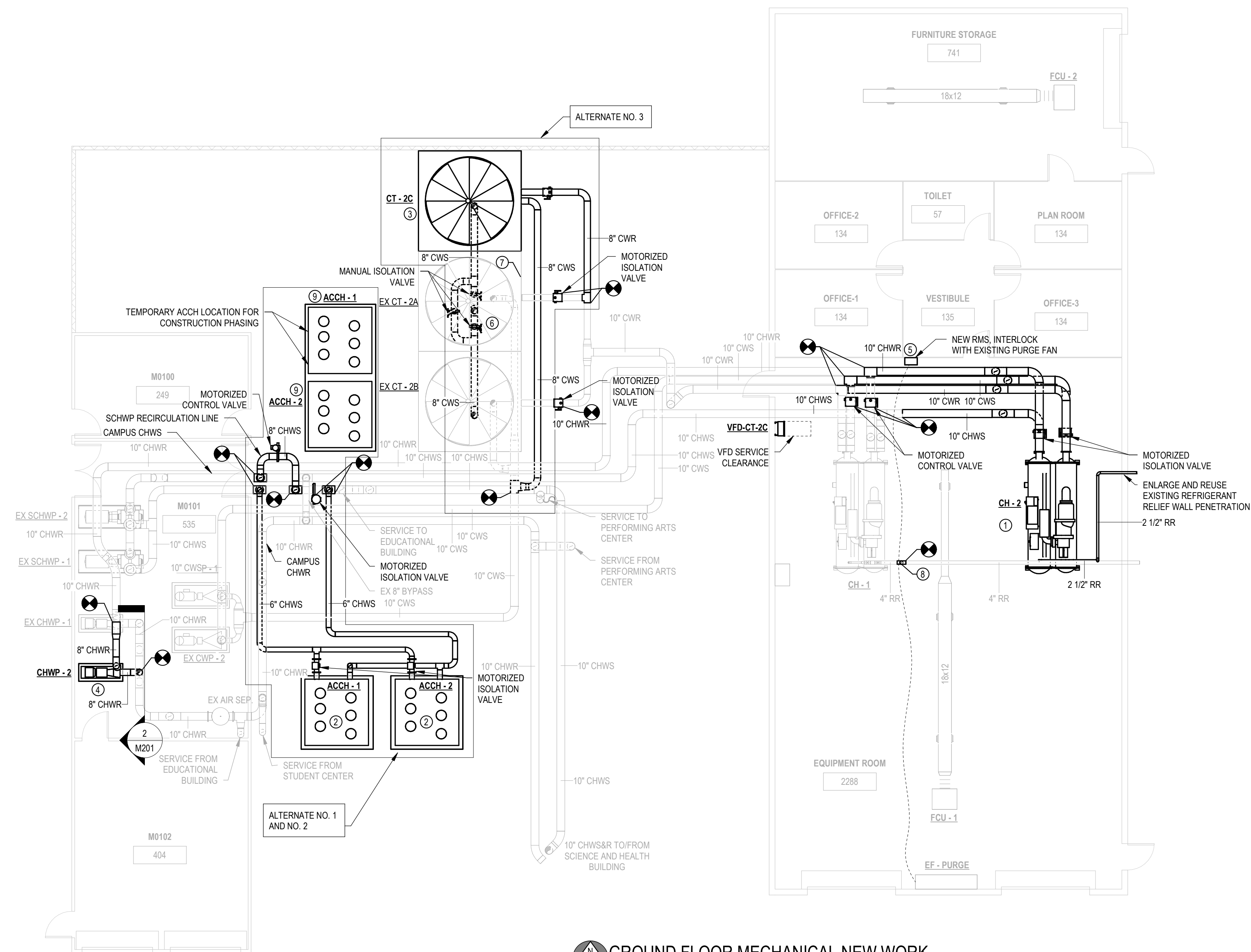
This item has been digitally signed and sealed by Raymond L. Bolen, PE on 04/05/2024 using a Digital Signature.  
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**RAYMOND L. BOLEN**  
 PE - 0098250

Moses Project #:	23130
Drafted By:	JSD
Checked By:	RLB
Date:	4/05/2024

No.	Revision Description	Date
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Sheet Title:  
 MECHANICAL - DEMOLITION

Sheet #:  
**M201**



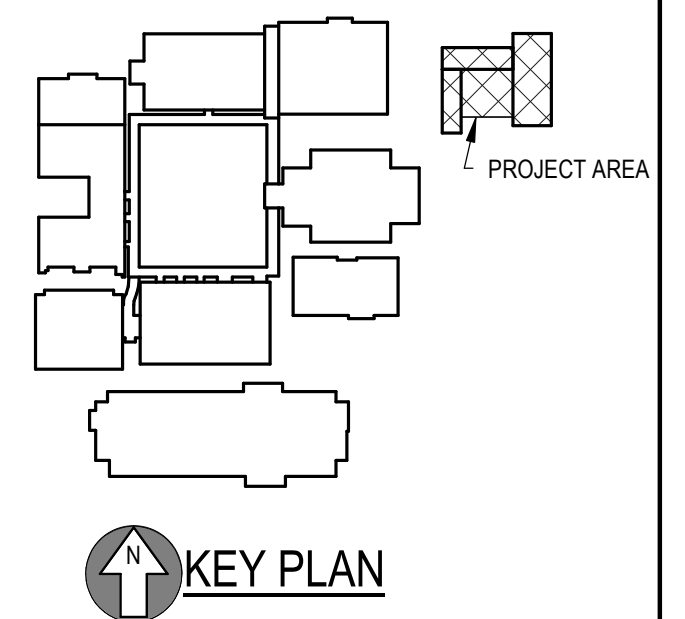
**GROUND FLOOR MECHANICAL NEW WORK**  
 SCALE: 1/8" = 1'-0"

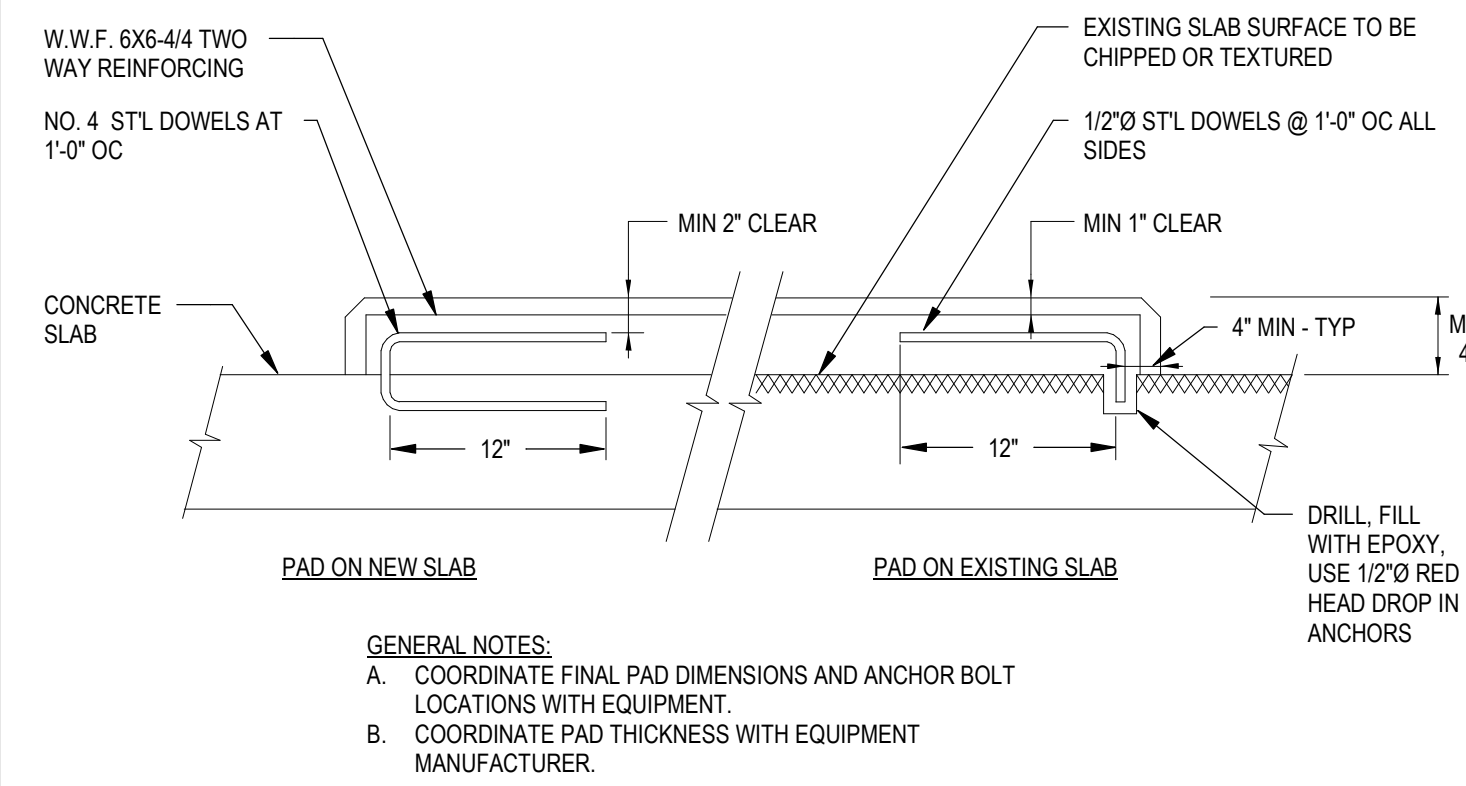
**NEW WORK KEY NOTES**

- PROVIDE NEW WATER COOLED CHILLER. MOUNT ON EXISTING CHILLER SUPPORTS. ENLARGING AS REQUIRED (MATCH EXISTING). SEE SCHEDULE FOR REQUIRED PIPING ACCESSORIES. PROVIDE NEW CHILLER REFRIGERANT VENT AND ROUTE THROUGH ROOF. SEE DETAIL.
- CONTRACTORS OPTION TO PROVIDE CONCRETE PAD FOR NEW AIR COOLED CHILLERS AS INDICATED. AIR-COOLED CHILLERS SHALL HAVE 6" RUNOUTS. PIPE AS SHOWN TO EQUALIZE PRESSURE DROP ACROSS BOTH CHILLERS.
- PROVIDE NEW COOLING TOWER. SEE SCHEDULE. PROVIDE COOLING TOWER SUPPORTS. SEE DETAIL.
- PROVIDE NEW PUMP AS SHOWN. CONNECT WITH 8" PIPE TO MAINS. SEE SCHEDULE FOR REQUIRED ACCESSORIES. PROVIDE HOUSEKEEPING PAD PAINTED YELLOW. SEE DETAIL.
- PROVIDE NEW RMS, HALOGUARD IR OR APPROVED EQUAL. PROVIDE REMOTE SENSORS AT EACH CHILLER AND ELSEWHERE AS RECOMMENDED BY MANUFACTURER. PROVIDE SNIFFERS CAPABLE OF DETECTING R-513A FOR NEW CH-2 AND R-134A FOR EX CH-1. PROVIDE AUDIO AND VISUAL ANUNCIATORS AT EACH ENTRANCE TO THE MACHINERY ROOM AS REQUIRED BY ASHRAE 15.
- PROVIDE NEW 8" BASIN EQUALIZER AS SHOWN. PROVIDE MANUAL ISOLATION VALVES AS SHOWN SUCH THAT EACH BASIN CAN BE ISOLATED FOR MAINTENANCE.
- RELOCATE BASIN HEATER AND SENSORS ON EXISTING CT-2A TO EAST SIDE OF COOLING TOWER SUCH THAT THEY ARE NOT BLOCKED BY NEW COOLING TOWER.
- CUT IN NEW DIRT LEG TO EXISTING REFRIGERANT RELIEF PIPE. SEE DETAIL. MATCH EXISTING PIPE SIZE.
- INSTALL AIR-COOLED CHILLERS IN TEMPORARY LOCATION AS SHOWN ON CONCRETE PADS OR OTHER SUPPORTS AS RECOMMENDED BY MANUFACTURER. CONNECT CHILLERS TO CAMPUS CHILLED WATER SUPPLY AND RETURN WITH FLEXIBLE PIPE. PROVIDE ISOLATION VALVES FOR EACH CHILLER.

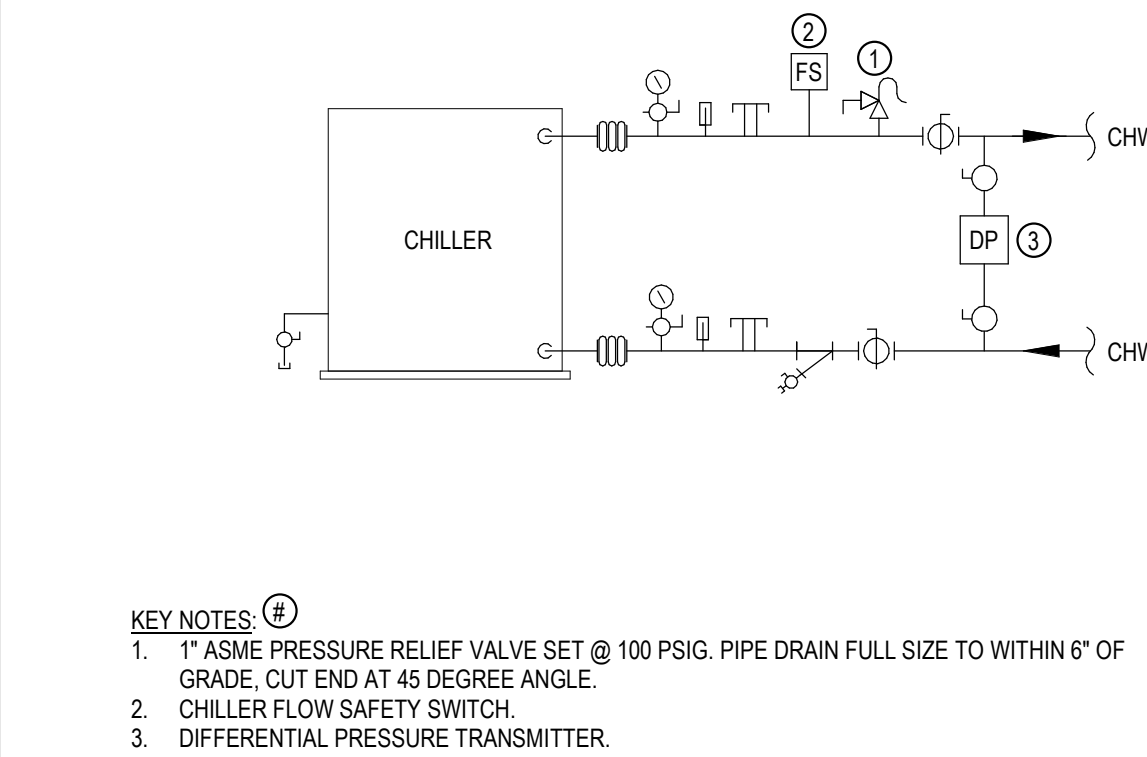
**NEW WORK GENERAL NOTES**

- CONTRACTOR TO FIELD VERIFY THAT ACCESSORIES SUCH AS CHECK VALVES, SENSORS, ECT. FOR EXISTING PUMPS AND CHILLER MATCH THOSE INDICATED FOR NEW EQUIPMENT ON DETAILS. PROVIDE MISSING ACCESSORIES AS REQUIRED.
- CONTRACTOR TO FIELD VERIFY THAT ACCESSORIES SUCH AS CHECK VALVES, SENSORS, ECT. FOR EXISTING COOLING TOWERS MATCH THOSE INDICATED FOR NEW EQUIPMENT ON DETAILS. PROVIDE MISSING ACCESSORIES AS REQUIRED. - ADDITIVE ALTERNATE NO. 3.

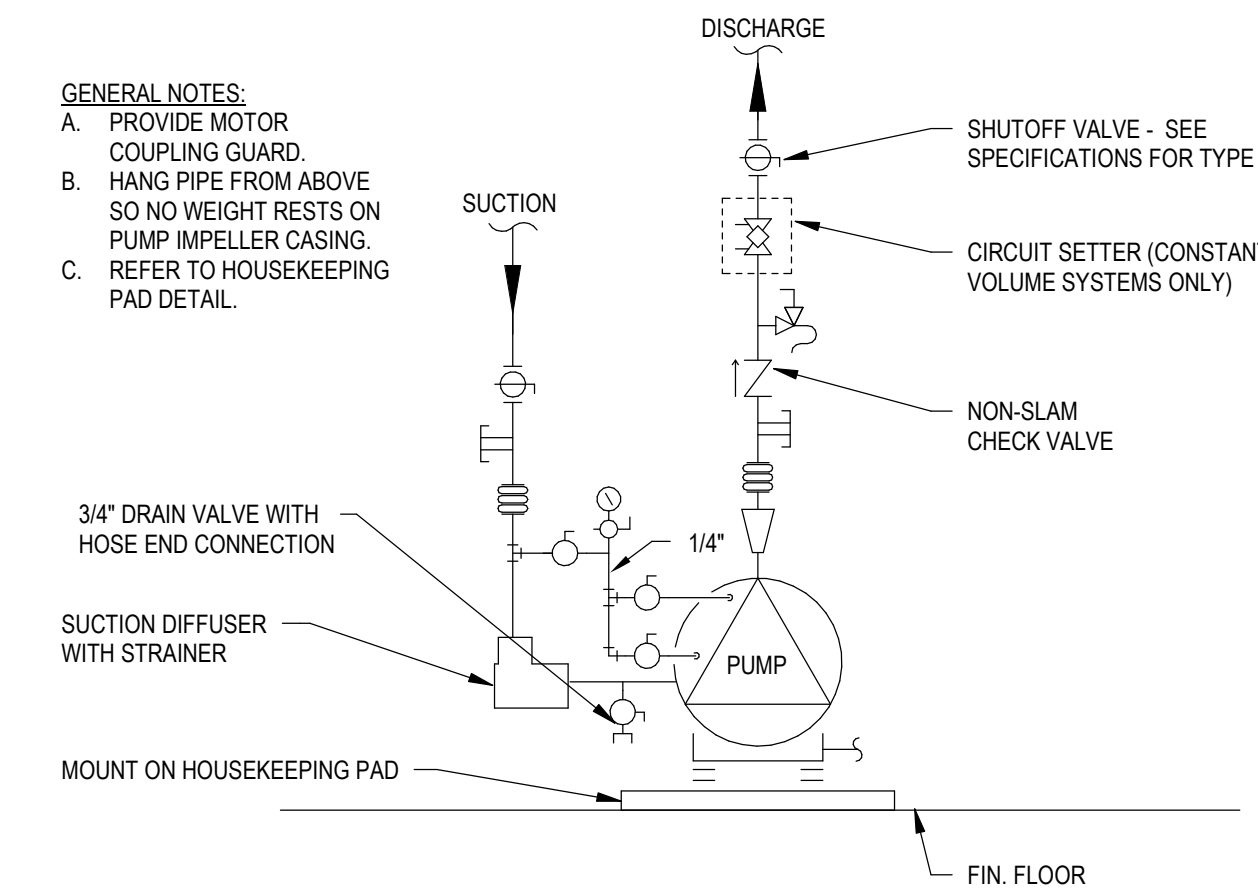




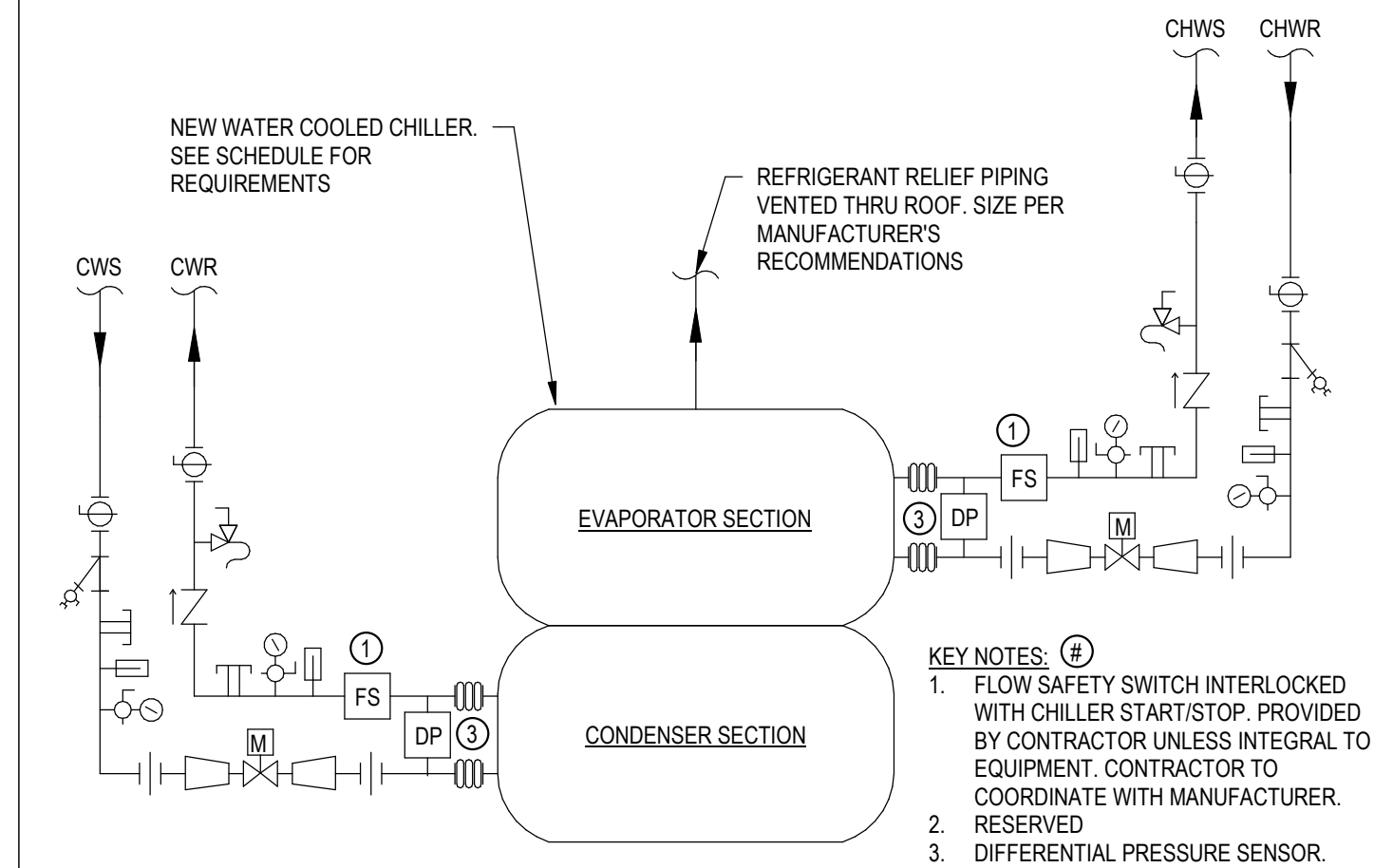
**1 HOUSEKEEPING PAD - ON SLAB**  
 NO SCALE



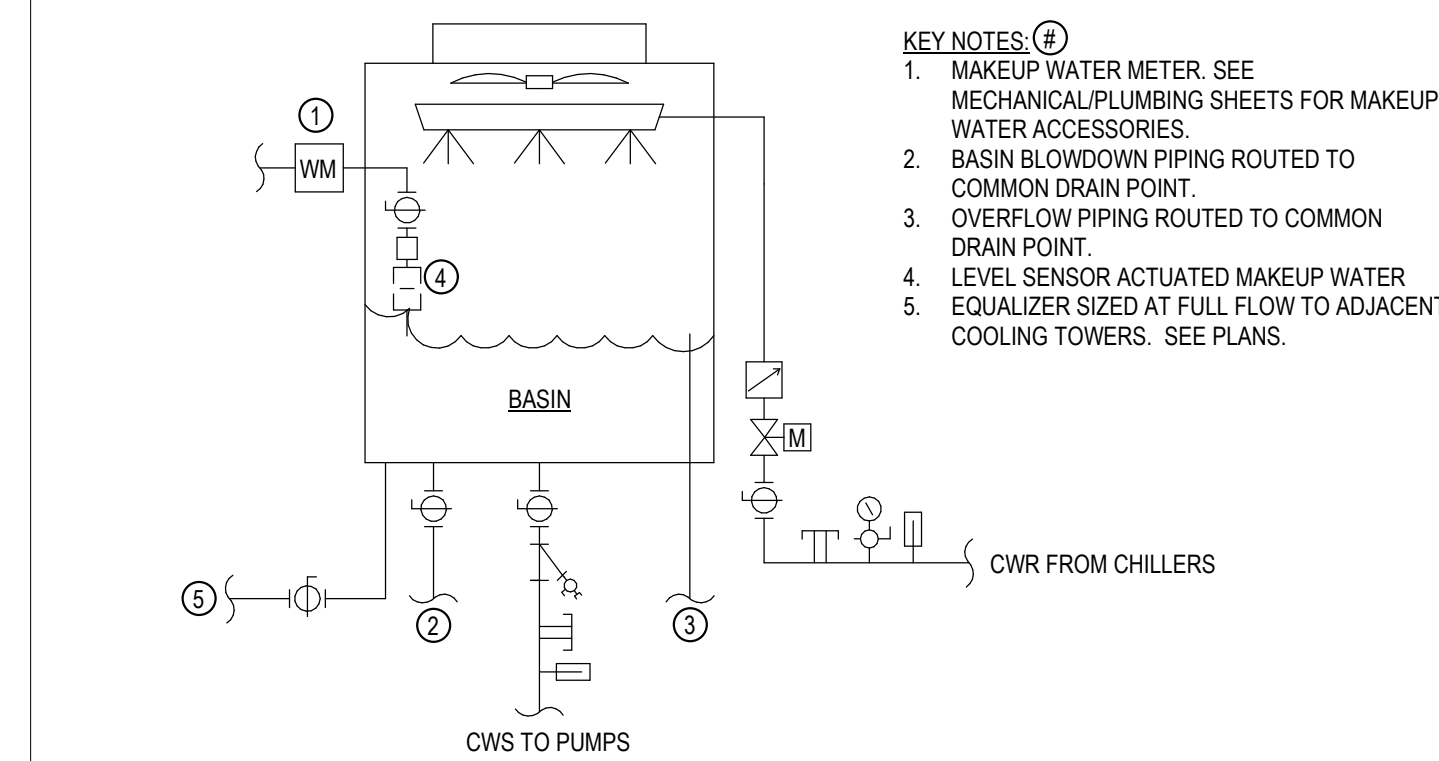
**3 PACKAGED AIR COOLED CHILLER DIAGRAM**  
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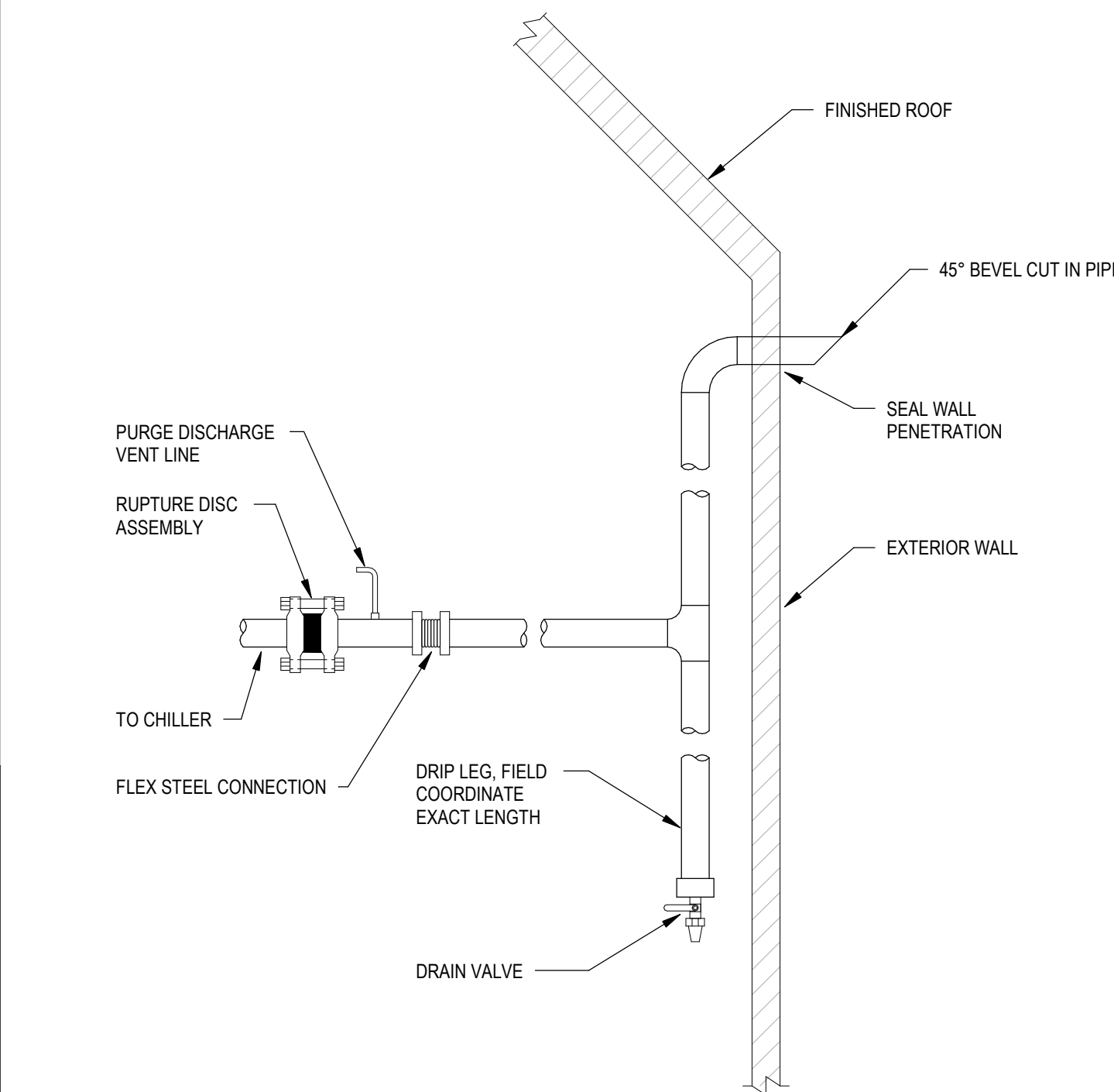
**2 PUMP DIAGRAM - BASE MOUNTED END SUCTION**  
 NO SCALE



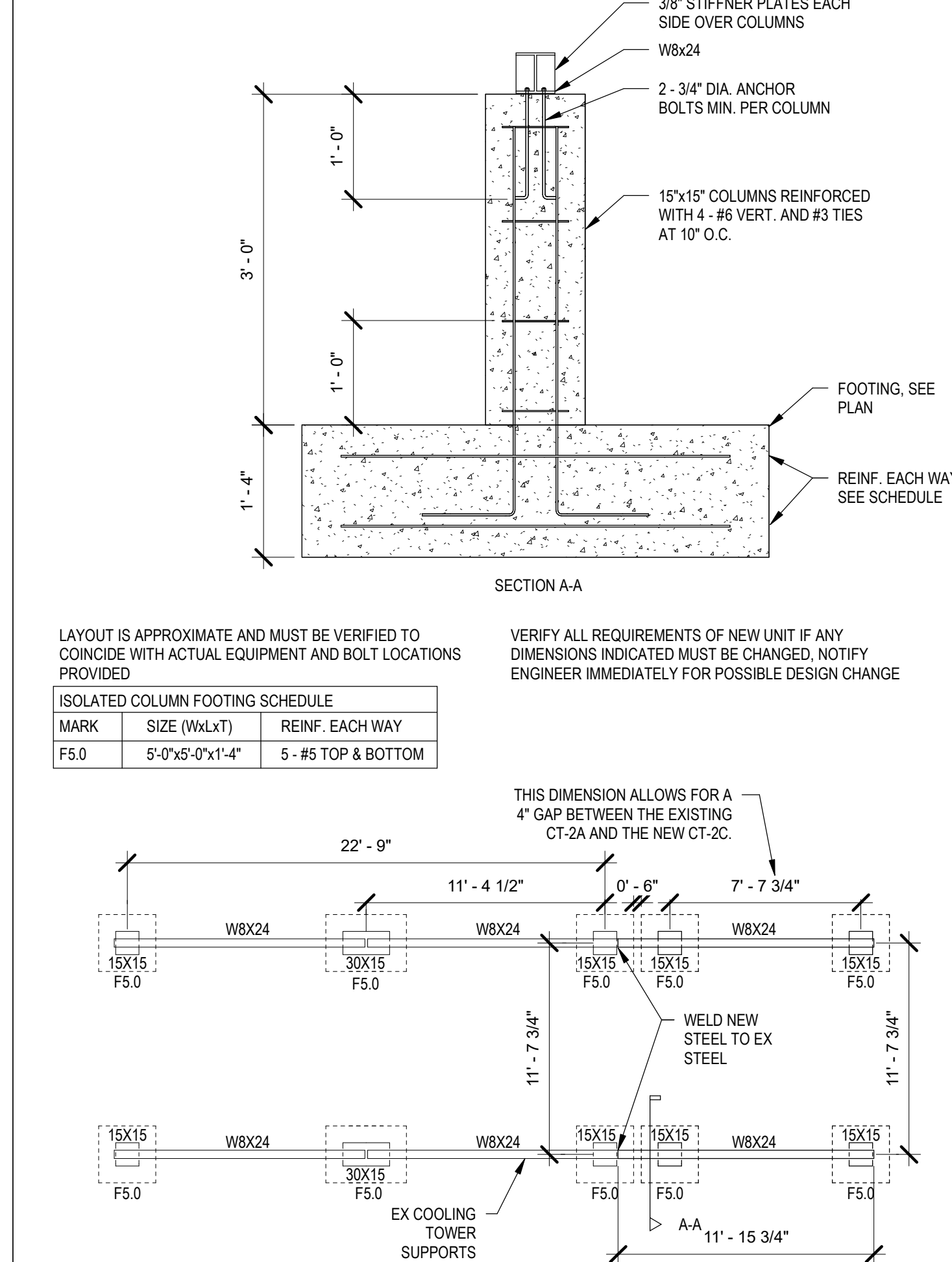
**4 WATER COOLED CHILLER PIPING DIAGRAM**  
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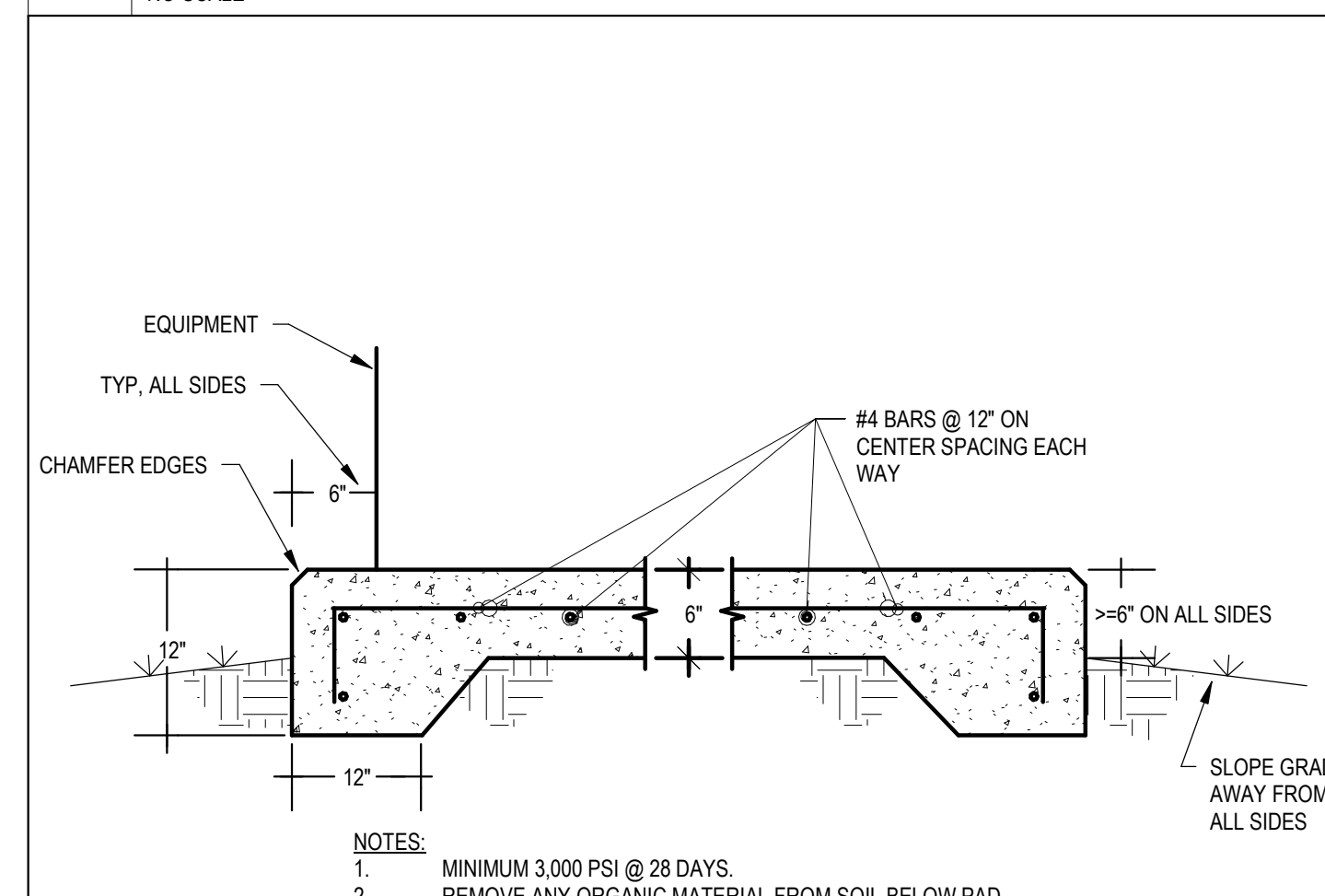
**5 2-WAY COOLING TOWER PIPING DIAGRAM**  
 NO SCALE



**7 CHILLER REFRIGERANT VENT PIPING**  
 NO SCALE



**8 COOLING TOWER SUPPORT DETAIL**  
 NO SCALE



**6 HOUSEKEEPING PAD - ON GRADE**  
 NO SCALE



**PROVIDE THE FOLLOWING FOR CHILLED WATER SYSTEMS:**

1. APPROPRIATE TEMPERATURE, FLOW AND PRESSURE SENSORS.
2. CONNECTION TO EXISTING BAS.
3. DIFFERENTIAL PRESSURE SENSORS FOR PUMP CONTROL.
4. NORMAL OPERATION MODE: WHEN ENABLED, ENABLE CHILLED WATER SYSTEM STARTUP SEQUENCE.
5. ACCH OPERATION MODE: WHEN ENABLED, ENABLE ACCH CHILLED WATER SYSTEM START SEQUENCE.

THE CHILLED WATER SYSTEM SHALL OPERATE UNDER NORMAL OPERATION MODE WHEN REQUIRED BY AHU STATUS AND UTILITY POWER IS AVAILABLE TO THE CAMPUS. THE CHILLED WATER SYSTEM SHALL OPERATE UNDER ACCH OPERATION MODE WHEN UTILITY POWER IS LOST, THE EMERGENCY GENERATOR IS RUNNING, AND THE EOC IS OPERATIONAL. IT SHALL ALSO OPERATE UNDER ACCH OPERATION WHEN THE CAMPUS CHILLED WATER DEMAND IS EQUAL OR LESS THAN 120 TONS AS DETERMINED BY THE BAS. WHEN SWITCHING TO ACCH MODE DUE TO A LOW DEMAND CONDITION, THE SYSTEM SHALL NOT BE ALLOWED TO SWITCH BACK TO NORMAL OPERATION FOR 15 MINUTES (ADJ).

**CHILLED WATER SYSTEM STARTUP SEQUENCE (NORMAL OPERATION)**

THIS SEQUENCE SHALL BE ENABLED UPON BAS COMMAND TO ENABLE NORMAL OPERATION MODE.

1. DUTY/STANDBY SELECTION SEQUENCE SHALL BE ENABLED.
2. DUTY CHILLER ISOLATION VALVES SHALL BE OPENED (CHILLED AND CONDENSER WATER VALVES).
3. CLOSE ALL ISOLATION VALVES LABELED "ACCH SYSTEM ISOLATION VALVE".
4. CLOSE VALVE LABELED "SCHWP RECIRCULATION VALVE".
5. OPEN VALVE LABELED "ACCH BYPASS VALVE".
6. DUTY PRIMARY CHILLED WATER PUMP SHALL BE STARTED. IN THE EVENT THAT THE DUTY PRIMARY CHILLED WATER PUMP FAILS TO START AFTER A PERIOD OF 1 MINUTE (ADJ), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY PRIMARY CHILLED WATER PUMP AS DUTY AND OPERATE ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE. THE FAILED PRIMARY CHILLED WATER PUMP SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.
7. DUTY CONDENSER WATER PUMP SHALL BE STARTED. IN THE EVENT THAT THE DUTY CONDENSER WATER PUMP FAILS TO START AFTER A PERIOD OF 1 MINUTE (ADJ), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY CONDENSER WATER PUMP AS DUTY AND OPERATE ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE. THE FAILED CONDENSER WATER PUMP SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.
8. THE COOLING TOWER STARTUP AND CONTROL SEQUENCE SHALL BE ENABLED.
9. UPON VERIFICATION OF CHILLED WATER AND CONDENSER WATER FLOW THROUGH THE DUTY CHILLER VIA INTERNAL FLOW SWITCH, THE DUTY CHILLER SHALL BE STARTED AND OPERATE UNDER INTERNAL CONTROLS TO MAINTAIN A CHILLED WATER SETPOINT OF 44 DEG (ADJ).
10. IN THE EVENT THAT THE DUTY CHILLER FAILS TO START AFTER A PERIOD OF 1 MINUTE (ADJ), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY CHILLER AS DUTY AND OPERATE ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE. THE FAILED CHILLER SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.
11. DUTY SECONDARY CHILLED WATER PUMP SHALL BE ENABLED AND THE SECONDARY PUMPING SEQUENCE SHALL BE ENABLED.
12. ENABLE FAILURE AND ALARM SEQUENCE.

**DUTY/STANDBY SELECTION SEQUENCE (NORMAL OPERATION)**

1. ONE WATER-COOLED CHILLER SHALL BE DESIGNATED AS THE DUTY CHILLER AND THE OTHER AS THE STANDBY CHILLER. THE DUTY/STANDBY DESIGNATION SHALL BE ROTATED ON A WEEKLY BASIS AND EVERY TIME THE SYSTEM IS STARTED ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE.
2. ONE PRIMARY CHILLED WATER PUMP (CHWP-1 OR CHWP-2) SHALL BE DESIGNATED AS THE DUTY PRIMARY CHILLED WATER PUMP AND THE OTHER AS THE STANDBY PRIMARY CHILLED WATER PUMP. THE DUTY/STANDBY DESIGNATION SHALL BE ROTATED ON A WEEKLY BASIS AND EVERY TIME THE SYSTEM IS STARTED ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE.
3. ONE SECONDARY CHILLED WATER PUMP SHALL BE DESIGNATED AS THE DUTY SECONDARY CHILLED WATER PUMP AND THE OTHER AS THE STANDBY SECONDARY CHILLED WATER PUMP. THE DUTY/STANDBY DESIGNATION SHALL BE ROTATED ON A WEEKLY BASIS AND EVERY TIME THE SYSTEM IS STARTED ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE.
4. ONE CONDENSER WATER PUMP SHALL BE DESIGNATED AS THE DUTY CONDENSER WATER PUMP AND THE OTHER AS THE STANDBY CONDENSER WATER PUMP. THE DUTY/STANDBY DESIGNATION SHALL BE ROTATED ON A WEEKLY BASIS AND EVERY TIME THE SYSTEM IS STARTED ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE.
5. COOLING TOWERS SHALL BE DESIGNATED AS DUTY/STANDBY ACCORDING TO THE FOLLOWING LISTS SUCH THAT TWO COOLING TOWERS ARE DESIGNATED AS DUTY AND ONE IS DESIGNATED AS STANDBY. THE DUTY/STANDBY DESIGNATION SHALL BE ROTATED ON A WEEKLY BASIS AND EVERY TIME THE SYSTEM IS STARTED ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE.

DESIGNATION 1:	DESIGNATION 2:	DESIGNATION 3:
CT-2 (DUTY)	CT-2 (STANDBY)	CT-2 (STANDBY)
CT-2B (DUTY)	CT-2B (STANDBY)	CT-2B (DUTY)
CT-2C (STANDBY)	CT-2C (DUTY)	CT-2C (DUTY)

INITIAL DUTY/STANDBY DESIGNATION IS AT CONTRACTOR'S DISCRETION.

**COOLING TOWER STARTUP AND CONTROL SEQUENCE (NORMAL OPERATION)**

1. DUTY COOLING TOWER ISOLATION VALVES SHALL OPEN.
2. DUTY COOLING TOWER FANS SHALL BE STARTED AND SHALL MODULATE IN PARALLEL TO MAINTAIN A CONDENSER WATER SETPOINT OF 64 DEG (ADJ) AS DETERMINED BY DUTY CHILLER ENTERING CONDENSER WATER TEMPERATURE SENSOR.
3. IN THE EVENT THAT A COOLING TOWER FAN FAILS TO START AFTER A PERIOD OF 1 MINUTE (ADJ), THE STANDBY COOLING TOWER SHALL BE DESIGNATED AS A DUTY COOLING TOWER AND OPERATE ACCORDING TO THE COOLING TOWER STARTUP AND CONTROL SEQUENCE. THE DUTY COOLING TOWER WITH THE FAILED FAN SHALL BE DESIGNATED AS STANDBY AND ITS ISOLATION VALVES SHALL CLOSE. AN ALARM SHALL BE INITIATED AT THE BAS AND IT SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.

**SECONDARY PUMPING SEQUENCE (NORMAL OPERATION)**

1. UPON CONFIRMATION THAT THE DUTY SECONDARY CHILLED WATER PUMP IS ON VIA CURRENT SENSING RELAY, THE DUTY SECONDARY CHILLED WATER PUMP SHALL MODULATE TO MAINTAIN THE DIFFERENTIAL PRESSURE SETPOINT. THIS SETPOINT SHALL BE DETERMINED BY TAB TO ESTABLISH THE MINIMUM DIFFERENTIAL PRESSURE NEEDED TO SUPPORT THE ENTIRE CAMPUS CHILLED WATER DEMAND.
2. IN THE EVENT THAT THE DUTY SECONDARY CHILLED WATER PUMP FAILS TO START AFTER A PERIOD OF 1 MINUTE (ADJ), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY SECONDARY CHILLED WATER PUMP AS DUTY AND OPERATE ACCORDING TO THE SECONDARY PUMPING SEQUENCE. THE FAILED PUMP SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.

**FAILURE AND ALARM SEQUENCE (NORMAL OPERATION)**

1. IN THE EVENT THAT THE DUTY CHILLER GENERATES A CRITICAL ALARM AT THE BAS WHICH PERSISTS FOR LONGER THAN TWO MINUTES (ADJ), DISABLE THE DUTY CHILLER AND DESIGNATE THE STANDBY CHILLER AS DUTY AND OPERATE ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE. THE FAILED CHILLER SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET. CLOSE THE ISOLATION VALVE OF THE FAILED CHILLER.
2. IN THE EVENT THAT THE DUTY PRIMARY CHILLED WATER PUMP FAILS (VIA CURRENT SENSING RELAY), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY PRIMARY CHILLED WATER PUMP AS DUTY AND OPERATE ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE. THE FAILED PUMP SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.
3. IN THE EVENT THAT THE DUTY CONDENSER WATER PUMP FAILS (VIA CURRENT SENSING RELAY), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY CONDENSER WATER PUMP AS DUTY AND OPERATE ACCORDING TO THE CHILLED WATER SYSTEM STARTUP SEQUENCE. THE FAILED PUMP SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.
4. IN THE EVENT THAT THE DUTY SECONDARY CHILLED WATER PUMP FAILS (VIA CURRENT SENSING RELAY), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY SECONDARY CHILLED WATER PUMP AS DUTY AND OPERATE ACCORDING TO THE SECONDARY PUMPING SEQUENCE. THE FAILED PUMP SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.
5. IN THE EVENT OF A FAN FAILURE (VIA CURRENT SENSING RELAY), THE STANDBY COOLING TOWER SHALL BE DESIGNATED AS A DUTY COOLING TOWER AND OPERATE ACCORDING TO THE COOLING TOWER STARTUP AND CONTROL SEQUENCE. THE DUTY COOLING TOWER WITH THE FAILED FAN SHALL BE DESIGNATED AS STANDBY AND ITS ISOLATION VALVES SHALL CLOSE. AN ALARM SHALL BE INITIATED AT THE BAS AND IT SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.

**CHILLED WATER SYSTEM SHUTDOWN SEQUENCE (NORMAL OPERATION)**

THIS SEQUENCE SHALL BE ENABLED UPON BAS COMMAND TO STOP THE CHILLED WATER SYSTEM.

1. DISABLE CHILLED WATER SYSTEM STARTUP SEQUENCE AND DISABLE DUTY CHILLER, DUTY PRIMARY CHILLED WATER PUMP, AND DUTY CONDENSER WATER PUMP.
2. DISABLE DUTY/STANDBY SELECTION SEQUENCE.
3. DISABLE COOLING TOWER STARTUP AND CONTROL SEQUENCE AND DISABLE DUTY COOLING TOWERS.
4. DISABLE SECONDARY PUMPING SEQUENCE AND DISABLE DUTY SECONDARY CHILLED WATER PUMP.
5. DISABLE FAILURE AND ALARM SEQUENCE.
6. CLOSE ALL ISOLATION VALVES ON DUTY CHILLER AND DUTY COOLING TOWERS AFTER A PERIOD OF TWO MINUTES (ADJ).

**ACCH CHILLED WATER SYSTEM START SEQUENCE (ACCH OPERATION)**

NOTE: DURING ACCH OPERATION, SCHWP-1 AND SCHWP-2 FUNCTION AS PRIMARY PUMPS FOR THE AIR-COOLED CHILLERS. HOWEVER, THEY ARE REFERRED TO AS SECONDARY PUMPS IN THE FOLLOWING SEQUENCE TO MAINTAIN CONSISTENCY WITH THEIR NAMES AND THE PREVIOUS SEQUENCE.

THIS SEQUENCE SHALL BE ENABLED UPON BAS COMMAND TO ENTER ACCH OPERATION MODE.

1. IF THE CHILLED WATER SYSTEM IS OPERATING VIA THE CHILLED WATER SYSTEM STARTUP SEQUENCE, ACTIVATE THE CHILLED WATER SYSTEM SHUTDOWN SEQUENCE.
2. OPEN ALL ISOLATION VALVES LABELED "ACCH SYSTEM ISOLATION VALVE".
3. OPEN VALVE LABELED "SCHWP RECIRCULATION VALVE".
4. CLOSE VALVE LABELED "ACCH BYPASS VALVE".
5. ONE SECONDARY CHILLED WATER PUMP (SCHWP-1 OR SCHWP-2) SHALL BE DESIGNATED AS THE DUTY SECONDARY CHILLED WATER PUMP AND THE OTHER AS THE STANDBY SECONDARY CHILLED WATER PUMP. THE DUTY/STANDBY DESIGNATION SHALL BE ROTATED ON A WEEKLY BASIS AND EVERY TIME THE SYSTEM IS STARTED ACCORDING TO THE ACCH CHILLED WATER SYSTEM START SEQUENCE.
6. START DUTY SECONDARY CHILLED WATER PUMP WITH AN INITIAL SPEED OF 20 HZ (ADJ). IN THE EVENT THAT THE DUTY SECONDARY CHILLED WATER PUMP FAILS TO START AFTER A PERIOD OF 1 MINUTE (ADJ), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY SECONDARY CHILLED WATER PUMP AS DUTY AND OPERATE ACCORDING TO THE ACCH CHILLED WATER SYSTEM START SEQUENCE. THE FAILED SECONDARY CHILLED WATER PUMP SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.
7. ENABLE ACCH PUMPING SEQUENCE.
8. UPON VERIFICATION OF CHILLED WATER FLOW THROUGH THE CHILLERS (ACCH-1 AND ACCH-2) VIA FLOW SWITCH, BOTH CHILLERS SHALL BE STARTED AND OPERATE UNDER INTERNAL CONTROLS AND SAFETY CONTROLS AS ESTABLISHED BY MANUFACTURER TO MAINTAIN A CHILLED WATER SETPOINT OF 44 DEG (ADJ).
9. ENABLE ACCH SYSTEM FAILURE AND ALARM SEQUENCE.

**ACCH PUMPING SEQUENCE (ACCH OPERATION)**

1. UPON CONFIRMATION THAT THE DUTY SECONDARY CHILLED WATER PUMP IS ON VIA CURRENT SENSING RELAY, THE DUTY SECONDARY CHILLED WATER PUMP SHALL TURN DOWN TO THE MINIMUM RECOMMENDED SPEED RECOMMENDED BY THE MANUFACTURER OR THE MINIMUM SPEED REQUIRED TO MEET THE COMBINED AIR-COOLED CHILLER SCHEDULED CHILLED WATER FLOW AS DETERMINED BY TAB, WHICHEVER VALUE IS HIGHER.
2. IN THE EVENT THAT THE DUTY SECONDARY CHILLED WATER PUMP FAILS TO START AFTER A PERIOD OF 1 MINUTE (ADJ), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY SECONDARY CHILLED WATER PUMP AS DUTY AND OPERATE ACCORDING TO THE ACCH PUMPING SEQUENCE. THE FAILED PUMP SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.
3. THE BAS SHALL BEGIN MODULATING THE CONTROL VALVE LABELED "SCHWP RECIRCULATION VALVE" TO MAINTAIN THE DIFFERENTIAL PRESSURE SETPOINT OF THE DP SENSOR LABELED "ACCH DP SENSOR". THE INITIAL SETPOINT OF THIS SENSOR SHALL BE DETERMINED BY TAB AS THE DIFFERENTIAL PRESSURE REQUIRED FOR THE SCHEDULED CHILLED WATER FLOW THROUGH THE AIR-COOLED CHILLERS.

**ACCH SYSTEM FAILURE AND ALARM SEQUENCE (ACCH OPERATION)**

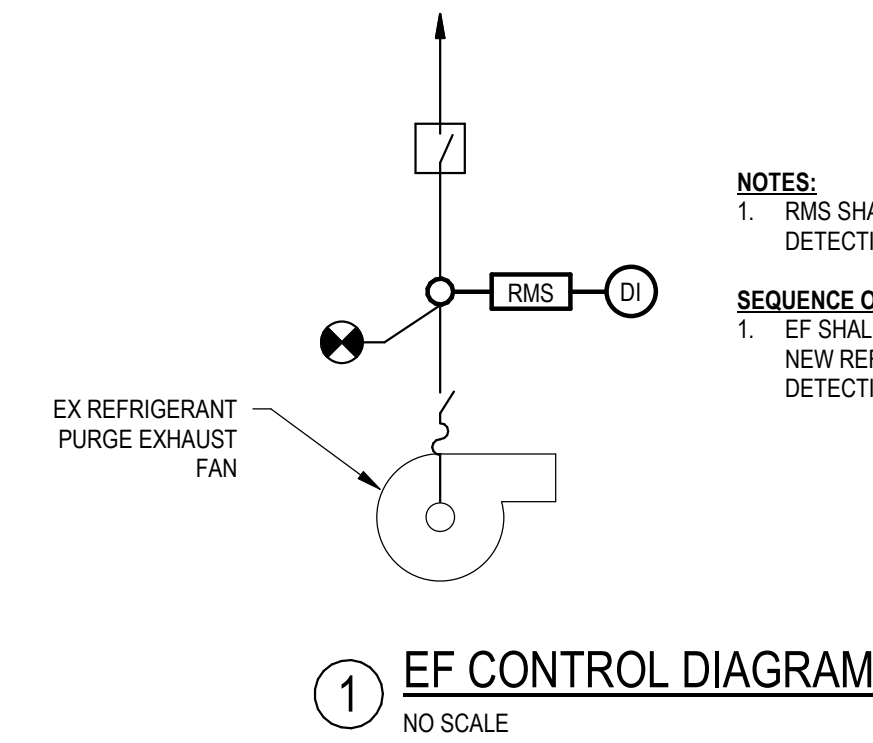
1. IN THE EVENT THAT THE DUTY SECONDARY CHILLED WATER PUMP FAILS (VIA CURRENT SENSING RELAY), INITIATE AN ALARM AT THE BAS AND DESIGNATE THE STANDBY SECONDARY CHILLED WATER PUMP AS DUTY AND OPERATE ACCORDING TO THE ACCH PUMPING SEQUENCE. THE FAILED PUMP SHALL BE DESIGNATED AS STANDBY AND SHALL BE PREVENTED FROM BEING REDESIGNATED AS DUTY BY A BAS OPERATOR RESET.

**ACCH CHILLED WATER SYSTEM STOP SEQUENCE (ACCH OPERATION)**

THIS SEQUENCE SHALL BE ENABLED UPON BAS COMMAND TO STOP THE AIR-COOLED CHILLER SYSTEM.

1. DISABLE ACCH CHILLED WATER SYSTEM START SEQUENCE.
2. DISABLE ACCH PUMPING SEQUENCE.
3. DISABLE ACCH SYSTEM FAILURE AND ALARM SEQUENCE.
4. CLOSE ALL ISOLATION VALVES LABELED "ACCH SYSTEM ISOLATION VALVE" AFTER A PERIOD OF TWO MINUTES (ADJ).
5. CLOSE VALVE LABELED "SCHWP RECIRCULATION VALVE".
6. OPEN VALVE LABELED "ACCH BYPASS VALVE".

**CHILLED WATER SYSTEM CONTROLS SEQUENCE**  
 NOT TO SCALE



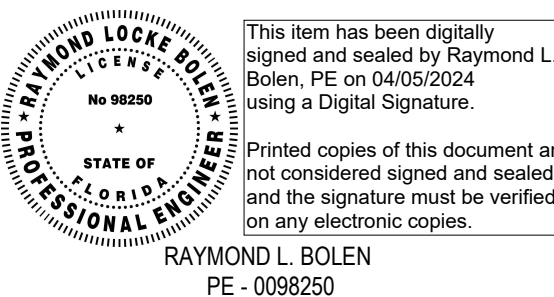
**NOTES:**

1. RMS SHALL ISSUE ALARM TO BAS UPON DETECTION OF A REFRIGERANT LEAK.

**SEQUENCE OF OPERATION:**

1. EF SHALL BE INTERLOCKED TO RUN WITH NEW REFRIGERANT MONITOR UPON DETECTION OF A REFRIGERANT LEAK.

Seal:



Moses Project #:	23130	
Drafted By:	RLB	
Checked By:	RLB	
Date:	4/05/2024	
No.	Revision Description	Date

Sheet Title:  
 CONTROLS



**ELECTRICAL LEGEND**

- RECEPTACLES:**  
 SUBSCRIPT INDICATES AS FOLLOWS:  
 WP - GFI DEVICE WITH CLEAR WEATHERPROOF (IN-USE) COVERPLATE. IN EXTERIOR LOCATIONS MOUNT 30" AFG.  
 Ⓢ DUPLEX RECEPTACLE NEMA 5-20R. MOUNT 18" AFF UNLESS NOTED OTHERWISE. VERIFY DUPLEX MOUNTING REQUIREMENTS WITH ARCHITECTURAL DRAWINGS PRIOR TO ROUGH-IN.  
**SWITCHES:**  
 Ⓢ SINGLE POLE LIGHTING SWITCH. MOUNT 48" AFF TO TOP UNLESS NOTED OTHERWISE.
- DISTRIBUTION & POWER EQUIPMENT:**  
 2P1A PANELBOARD.  
 4MDS SWITCHBOARD, SWITCHGEAR OR MCC.  
 TPA TRANSFORMER.  
 VFD VARIABLE FREQUENCY DRIVE W/INTEGRAL DISCONNECT. FURNISHED BY MECHANICAL, INSTALLED BY ELECTRICAL.  
 ☒ ENCLOSED MOTOR STARTER.  
 ☒ COMBINATION ENCLOSED MOTOR STARTER DISCONNECT.  
 ☒ ENCLOSED CIRCUIT BREAKER.  
 ☒ HEAVY DUTY SAFETY SWITCH.  
 ATSE/ATS AUTOMATIC TRANSFER SWITCH.  
**MISCELLANEOUS EQUIPMENT:**  
 ○ MOTOR.  
 ○ JUNCTION BOX.  
 ○ ELECTRICAL CONNECTION TO EQUIPMENT.

- OTHER:**  
 ○ CIRCUIT RUN CONCEALED ABOVE CEILING OR IN WALL.  
 ○ HOMERUN TO PANELBOARD. UNDERLINED TEXT INDICATES PANEL & CIRCUIT DESIGNATION.  
 AHU-1 MECHANICAL EQUIPMENT IDENTIFICATION TAG. SEE MECHANICAL EQUIPMENT ELECTRICAL SCHEDULE.  
 1 KEY NOTE TAG.  
 2P1A BOLD UNDERLINED TEXT ADJACENT TO PLAN SYMBOL INDICATES ELECTRICAL EQUIPMENT IDENTIFICATION TAG. TYPICAL FOR PANELS, LIGHT FIXTURES, FLOORBOXES, TRANSFORMERS, ETC.  
**LINE TYPE LEGEND:**  
 ○ EXISTING TO REMAIN.  
 ○ NEW WORK.  
 ○ EXISTING TO BE DEMOLISHED.

**CODES AND STANDARDS**

- THIS PROJECT WAS DESIGNED IN ACCORDANCE WITH THESE CODES:**  
 1. FLORIDA BUILDING CODE (FBC)  
 A. BUILDING - 2020 7TH EDITION  
 B. TEST PROTOCOLS FOR HIGH VELOCITY HURRICANE ZONES - 2020 7TH EDITION  
 2. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)  
 A. NATIONAL ELECTRIC CODE (NFPA 70) - 2017  
 B. NATIONAL FIRE ALARM CODE (NFPA 72) - 2016  
 3. FLORIDA FIRE PREVENTION CODE - 2020 7TH EDITION  
 A. FIRE CODE (NFPA 1) - 2018 FLORIDA EDITION  
 B. LIFE SAFETY CODE (NFPA 101) - 2018 FLORIDA EDITION
- ALL SYSTEMS SHALL MEET THE REQUIREMENTS OF THE FOLLOWING STANDARDS:**  
 1. AMERICAN NATIONAL STANDARD INSTITUTES (ANSI)  
 2. ILLUMINATING ENGINEERING SOCIETY (IES)  
 3. INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)  
 4. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATIONS (NEMA)  
 5. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)  
 6. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)  
 7. UNDERWRITER'S LABORATORIES, INC. (UL)  
 8. OWNER'S CONSTRUCTION STANDARDS

**ABBREVIATIONS**

- A AMPS  
 ACS ACCESS CONTROL SYSTEM  
 AF AMP FRAME  
 AFF ABOVE FINISHED FLOOR  
 AFG ABOVE FINISHED GRADE  
 AHU AIR HANDLING UNIT  
 AL ALUMINUM  
 ARCH ARCHITECT OR ARCHITECTURAL  
 AT AMP TRIP  
 ATS AUTOMATIC TRANSFER SWITCH  
 ATU AIR TERMINAL UNIT  
 AWG AMERICAN WIRE GAUGE  
 BAS BUILDING AUTOMATION SYSTEM  
 BJ BONDING JUMPER  
 BKR CIRCUIT BREAKER  
 BLDG BUILDING  
 BOD BASIS OF DESIGN  
 C CONDUIT  
 CB, CB CIRCUIT BREAKER  
 CL CURRENT LIMITING  
 CL CENTERLINE  
 CLG CEILING  
 CKT CIRCUIT  
 CT CURRENT TRANSFORMER  
 CU COPPER  
 DEMO DEMOLISH  
 EC ELECTRICAL CONTRACTOR  
 EGC EQUIPMENT GROUNDING CONDUCTOR  
 ELEC ELECTRICAL  
 EMGB ELECTRICAL MAIN GROUNDING BUSBAR  
 EF EXHAUST FAN  
 EX EXISTING TO REMAIN  
 EXT EXTERIOR  
 EWC ELECTRIC WATER COOLER  
 EMT ELECTRICAL METALLIC TUBING  
 EQUIP EQUIPMENT  
 FMC FLEXIBLE METAL CONDUIT  
 FACP FIRE ALARM SYSTEM CONTROL PANEL  
 FU FUSE  
 FA, F/A FIRE ALARM  
 FLA FULL LOAD AMPS  
 FLR FLOOR  
 FSS FUSED SAFETY SWITCH  
 FVNR FULL VOLTAGE NON-REVERSING  
 GFI GROUND FAULT INTERRUPTER  
 G GROUND  
 GC GENERAL CONTRACTOR  
 GND GROUNDING ELECTRODE CONDUCTOR  
 GEC  
 HH HANDHOLE  
 HOA HAND-OFF-AUTOMATIC  
 HP HEAT PUMP OR HORSEPOWER  
 HVAC HEATING, VENTILATION & AIR-CONDITIONING  
 IG ISOLATED GROUND  
 IMC INTERMEDIATE METAL CONDUIT  
 JB, JBBOX JUNCTION BOX  
 K KILO  
 KAIC KILO-AMPERE INTERRUPTING CAPABILITY  
 KC MIL THOUSAND CIRCULAR MILS  
 LCP LIGHTING CONTROL PANEL  
 LTG LIGHTING  
 LFMC LIQUID TIGHT FLEXIBLE METAL CONDUIT  
 LV LOW VOLTAGE  
 LS LIFE SAFETY  
 LS MAXIMUM  
 MC MECHANICAL CONTRACTOR  
 MCA MINIMUM CIRCUIT AMPACITY  
 MCC MOTOR CONTROL CENTER  
 MCE MAIN COMMUNICATIONS EQUIPMENT ROOM  
 MCM THOUSAND CIRCULAR MILS  
 MH MANHOLE  
 MIN MINIMUM  
 MISC MISCELLANEOUS  
 MLO MAIN LUGS ONLY  
 MNT MOUNTING HEIGHT  
 MTG MOUNTING  
 MTS MANUAL TRANSFER SWITCH  
 MV MEDIUM VOLTAGE  
 N1 NEMA 1  
 N3R NEMA 3R  
 N/A, NA NOT APPLICABLE  
 NEC NATIONAL ELECTRICAL CODE  
 NESC NATIONAL ELECTRICAL SAFETY CODE  
 N, NEU NEUTRAL  
 OCPD OVERCURRENT PROTECTION DEVICE  
 OFOI OWNER FURNISHED OWNER INSTALLED  
 OFCI OWNER FURNISHED CONTRACTOR INSTALLED  
 OH OVERHEAD  
 OHE OVERHEAD ELECTRIC  
 OHP OVERHEAD PRIMARY  
 OHS OVERHEAD SECONDARY  
 P POLE OR PHASE  
 PBD PANELBOARD  
 PF POWER FACTOR  
 PNL PANELBOARD  
 PT POTENTIAL TRANSFORMER  
 PWR POWER  
 RCPT RECEPTACLE  
 REQD REQUIRED  
 RM ROOM  
 RGS RIGID GALVANIZED STEEL CONDUIT  
 RNC RIGID NON-METALLIC CONDUIT  
 RVSS REDUCED VOLTAGE SOLID STATE SURGE ARRESTER  
 SA SHORT CIRCUIT AMPS  
 SCCA SHORT CIRCUIT CURRENT RATING  
 SF SUPPLY FAN  
 SPD SURGE PROTECTIVE DEVICE  
 SPEC SPECIFICATION  
 SS SAFETY SWITCH  
 SWBD SWITCHBOARD  
 SWGR SWITCHGEAR  
 TBB TELECOMMUNICATIONS BONDING BACKBONE  
 TR TELECOMMUNICATIONS ROOM  
 TGB TELECOMMUNICATIONS GROUNDING BUSBAR  
 TMSS TELECOMMUNICATIONS MAIN GROUNDING BUSBAR  
 TVSS TRANSIENT VOLTAGE SURGE SUPPRESSION  
 TX TRANSFORMER  
 TYP TYPICAL  
 UFR UNDERFLOOR RACEWAY  
 UG UNDERGROUND  
 UGE UNDERGROUND ELECTRIC  
 UGP UNDERGROUND PRIMARY  
 UGS UNDERGROUND SECONDARY  
 UL UNDERWRITERS' LABORATORIES  
 UNO UNLESS NOTED OTHERWISE  
 UPS UNINTERRUPTIBLE POWER SUPPLY  
 V VOLT  
 VA VOLT-AMPERES  
 VAR VOLT-AMPERES REACTIVE  
 VAV VARIABLE AIR VOLUME UNIT  
 W WATTS OR WIRE  
 WAO WORK AREA OUTLET  
 WP WEATHERPROOF  
 WSR WITHSTAND RATING  
 XDMR EXISTING TO BE DEMOLISHED  
 XP TRANSFORMER  
 XP EXPLOSION PROOF  
 XR EXISTING TO BE RELOCATED  
 ∅ PHASE  
 72° DEGREES  
 Δ DELTA  
 Ω OHMS

**LOAD STUDY NOTE**

PROVIDE A 30-DAY LOAD STUDY COMPLIANT WITH NEC 220.87 ON SWITCHBOARD MSB. START THE LOAD STUDY IMMEDIATELY SO THAT THE RESULTS OF THE STUDY CAN BE CONFIRMED WITH THE DESIGN ASSUMPTIONS MADE IN TIME TO ISSUE CHANGES IF NEEDED WITHOUT AFFECTING OVERALL PROJECT SCHEDULE.

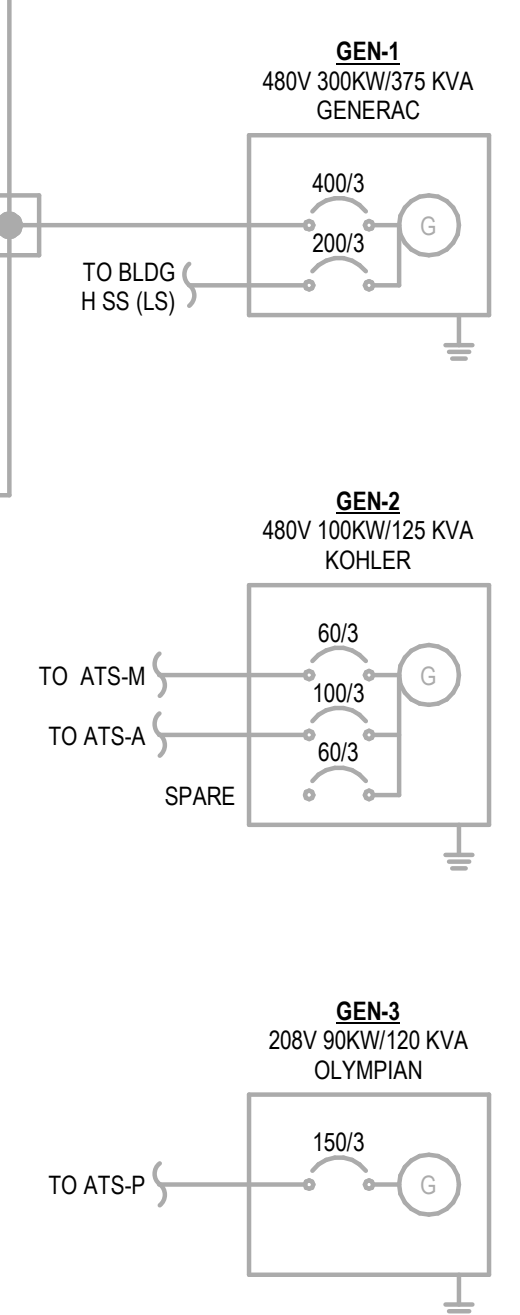
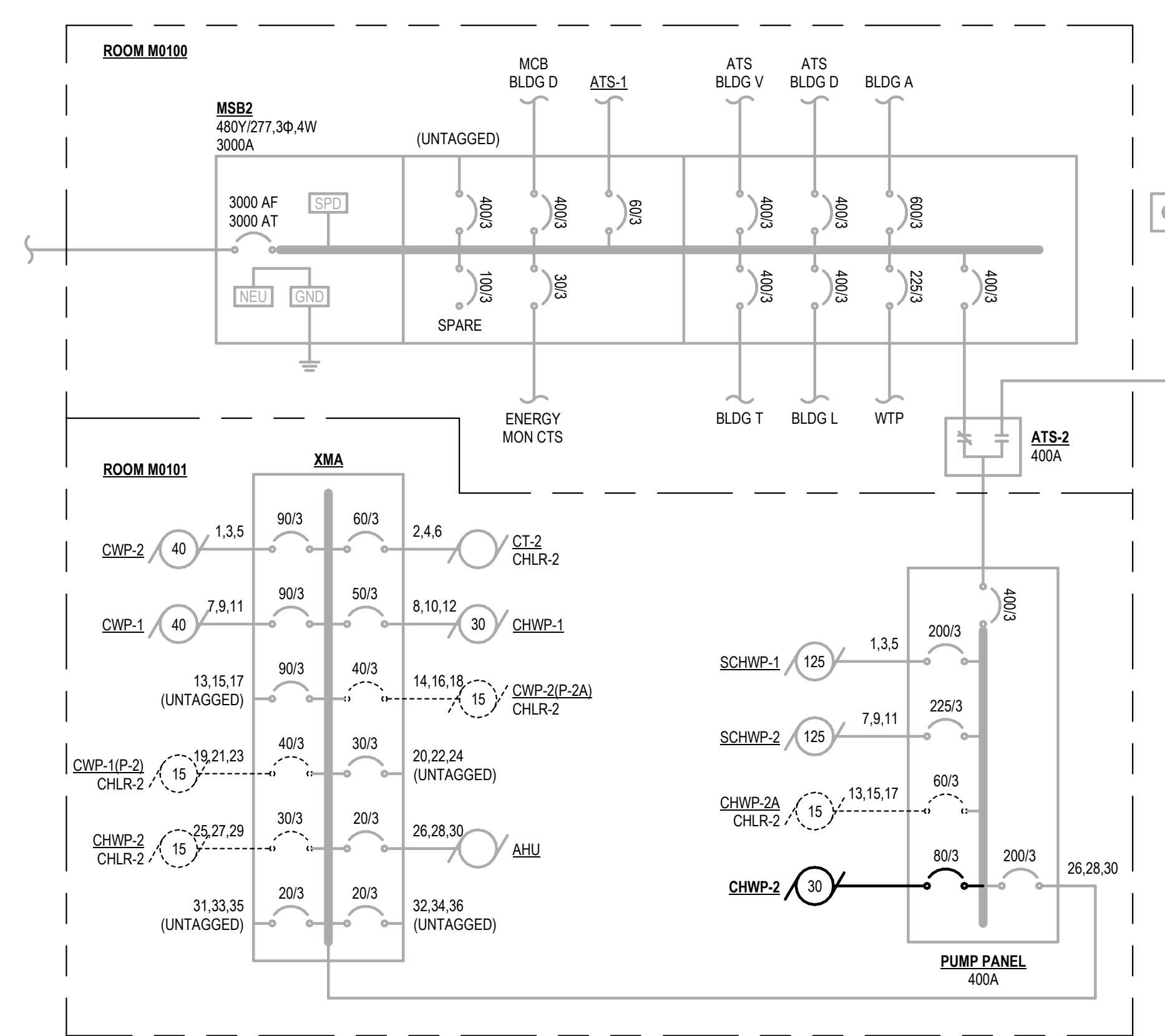
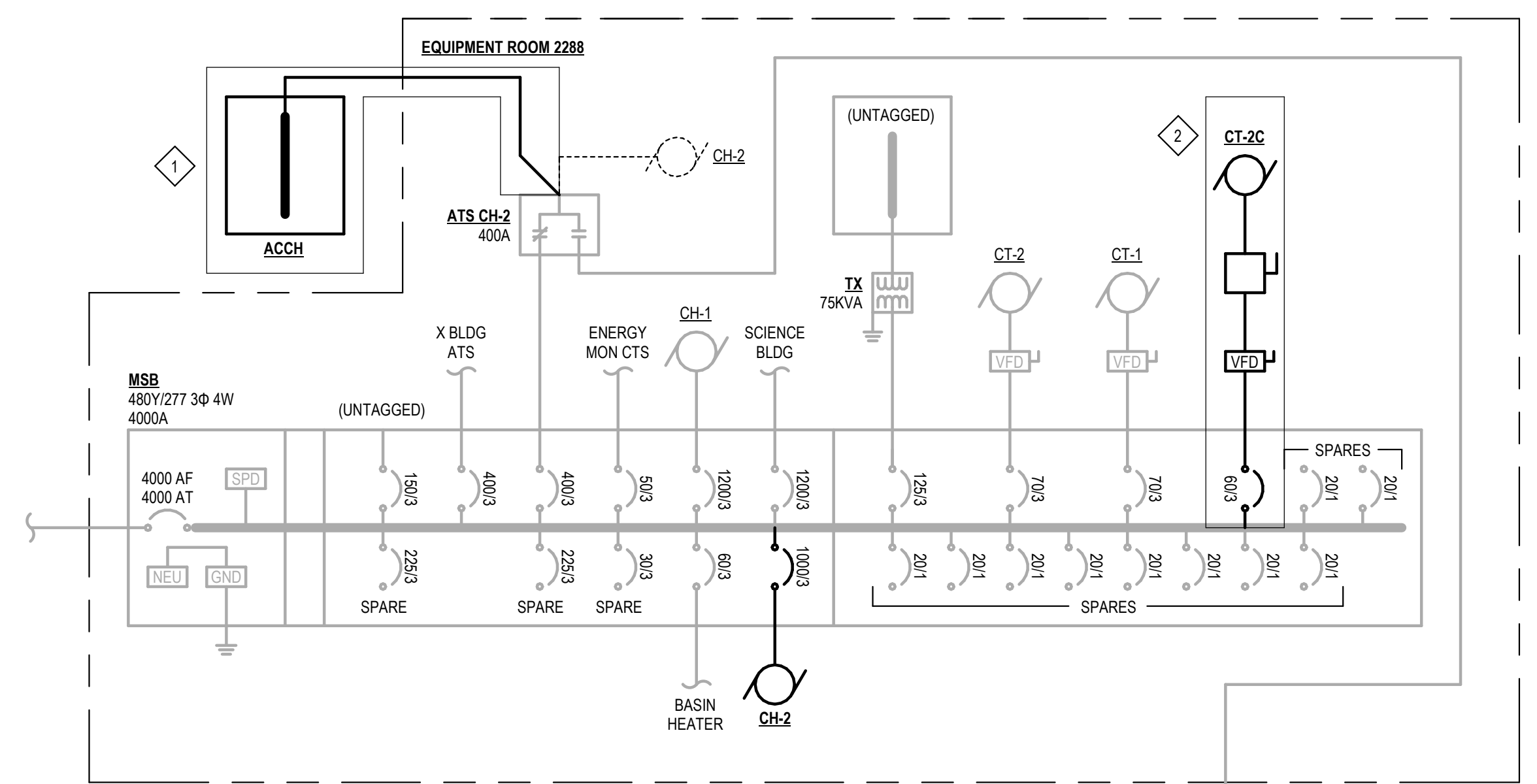
**SINGLE LINE DIAGRAM KEY NOTES**

- NEW PANELBOARD ACCH SCOPE IS PART OF ADDITIVE ADD ALTERNATE #1.
- NEW COOLING TOWER CT-2C SCOPE IS PART OF ADDITIVE ADD ALTERNATE #3.

**LOAD NOTE PUMP PANEL**

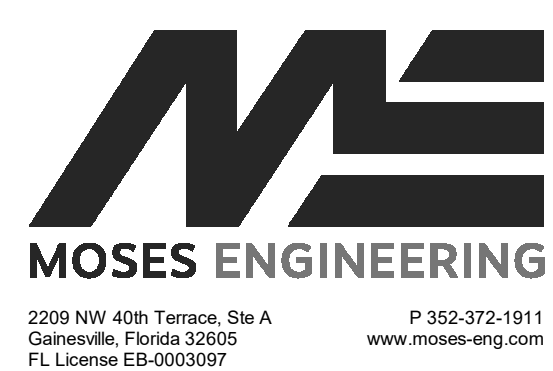
LOAD BEING ADDED (NEW CHWP-2 30HP): 40A  
 LOAD BEING REMOVED (CHWP-2 15HP): -21A  
 LOAD BEING REMOVED (CHWP-2A 15HP): -21A  
 LOAD BEING REMOVED (CWP-1P-2 15HP): -21A  
 LOAD BEING REMOVED (CWP-2P-2A 15HP): -21A  
 NET LOAD INCREASE: -44A

PUMP PANEL CURRENT LOAD WILL DECREASE BY 44A. NO 30-DAY LOAD STUDY IS REQUIRED.



- LINE TYPE LEGEND:**  
 ○ NEW WORK  
 ○ EXISTING TO REMAIN  
 ○ EXISTING TO BE DEMOLISHED BY CONTRACTOR

**PARTIAL SINGLE LINE DIAGRAM - CEP**  
 NOT TO SCALE



Project Name:  
**OPC Chiller and Cooling Tower Replacement**

Submittal:  
**Bid Documents**

Seal:

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 ZACHARY S. FRASIER  
 PE - 0090383

Moses Project #:	23130
Drafted By:	JUN
Checked By:	ZSF
Date:	4/05/2024

No.	Revision Description	Date

Sheet Title:  
 LEGEND, ABBREVIATIONS, CODES AND STANDARDS

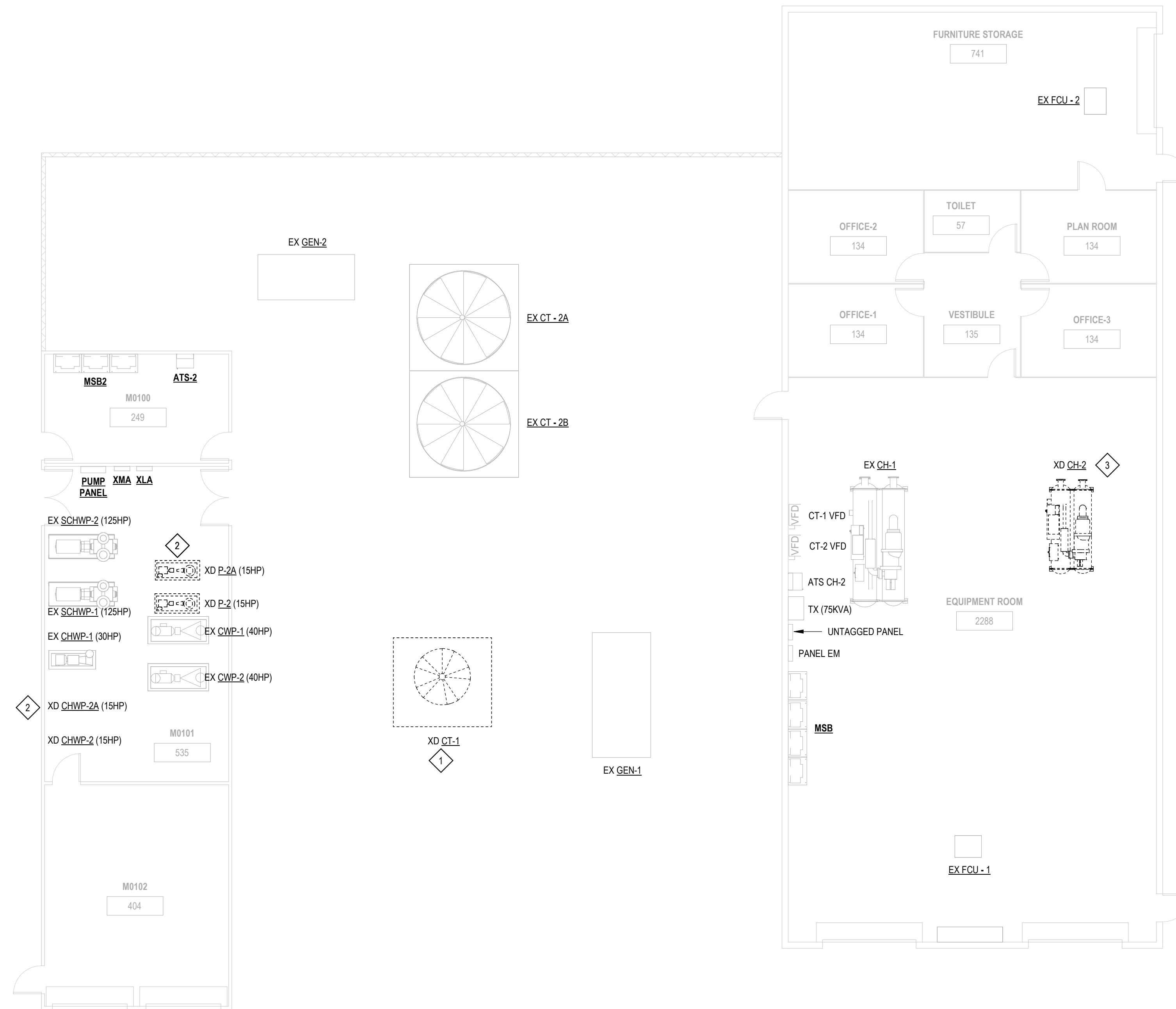
Sheet #:  
**E001**

**GENERAL DEMOLITION NOTES**

1. PROVIDE MATERIALS AND LABOR AS NECESSARY TO:
  - A. REMOVE ALL ELECTRICAL ITEMS INDICATED TO BE REMOVED OR DEMOLISHED.
  - B. REMOVE, STORE, CLEAN, AND REINSTALL ALL ELECTRICAL ITEMS INDICATED AS EXISTING TO BE RELOCATED OR REINSTALLED.
  - C. MAINTAIN IN SERVICE - TO THE ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND THE ENGINEER - ANY ELECTRICAL ITEMS OUTSIDE OF THE RENOVATION AREA WHICH ARE SERVED BY OR SUPPLIED BY ELECTRICAL ITEMS WITHIN THE RENOVATION AREA.
  - D. PERFORM ELECTRICAL DEMOLITION NECESSARY TO ACCOMMODATE ARCHITECTURAL WORK SPECIFIED ON DEMOLITION SHEET. COORDINATE EXACT REQUIREMENTS WITH ARCHITECTURAL DOCUMENTS AND FIELD CONDITIONS PRIOR TO BID.
  - E. REPAIR OR REPLACE - TO THE ORIGINAL CONDITION & TO THE SATISFACTION OF THE OWNER AND THE ENGINEER - ANY EXISTING DEVICES, FINISHES, SURFACES, OR EQUIPMENT TO REMAIN WHICH IS DAMAGED DURING DEMOLITION OR CONSTRUCTION WITH NO CHANGE TO THE CONTRACT AMOUNT OR TIME SCHEDULE.
2. DO NOT DISTURB ANY OTHER ELECTRICAL ITEMS EXCEPT AS NECESSARY TO ACCOMMODATE OTHER WORK SPECIFIED.
3. ALL EXISTING DEVICES & EQUIPMENT SHALL BE CONSIDERED TO BE EXISTING TO REMAIN UNLESS SPECIFICALLY INDICATED OTHERWISE.
4. REMOVE ALL UNUSED CONDUCTORS BACK TO SOURCE OR TO THE FIRST JUNCTION POINT SUPPLYING EXISTING OR NEW LOADS TO REMAIN.
5. ALL EXPOSED UNUSED CONDUIT SHALL BE REMOVED. ALL UNUSED CONCEALED CONDUIT SHALL BE ABANDONED IN PLACE AFTER INSTALLING A PULL-STRING.
6. DEVICES SHOWN INSIDE THE RENOVATION AREA ARE NOT INTENDED TO REPRESENT ALL DEVICES WITHIN SPACE. ADDITIONAL DEMOLITION WORK MAY BE REQUIRED FOR INSTALLING NEW WORK. CONTRACTOR SHALL ASSUME ADDITIONAL ITEMS NOT INDICATED ARE PRESENT AND SHALL THOROUGHLY INSPECT PROJECT AREA PRIOR TO BIDDING.
7. DEMOLITION SHALL INCLUDE ANY REMOVAL AND REPLACEMENT OF EXISTING MATERIALS TO MAKE PROVISION FOR NEW FINISHES IF REQUIRED TO ACCOMMODATE WORK BY OTHER DIVISIONS OF THIS CONTRACT.

**DEMOLITION KEY NOTES**

1. DEMOLISH ALL ELECTRICAL CKTS, CONDUIT, DEVICES, ETC SERVING COOLING TOWER.
2. DEMOLISH ALL ELECTRICAL CKTS, CONDUIT, DEVICES, ETC SERVING PUMPS.
3. DEMOLISH ALL ELECTRICAL CKTS, CONDUIT, DEVICES, ETC SERVING CHILLER.



**GROUND FLOOR ELECTRICAL POWER - DEMOLITION**  
 SCALE: 1/8" = 1'-0"

Submital:  
**Bid Documents**

Seal:

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**ZACHARY S. FRASIER**  
 PE - 0090383

Moses Project #:	23130	
Drafted By:	JJN	
Checked By:	ZSF	
Date:	4/05/2024	
No.	Revision Description	Date

Sheet Title:  
 ELECTRICAL - DEMOLITION

Sheet #:  
 E101

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**ZACHARY S. FRASIER**  
 PE - 0090383

Moses Project #: 23130  
 Drafted By: JIN  
 Checked By: ZSF  
 Date: 4/05/2024

No.	Revision Description	Date

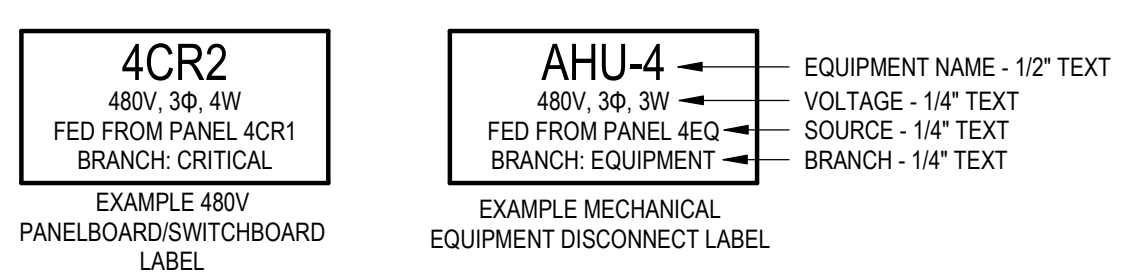
Sheet Title:  
 ELECTRICAL - NEW WORK

### BRANCH PANEL: ACCH

<b>BASIS OF DESIGN: NF</b>		<b>BUSS RATING: 400 A</b>		<b>FEEDER</b>	
<b>SUPPLY FROM: ATS CH-2</b>		<b>MCB OR MLO: MLO</b>		<b>PHASES: 3/0</b>	
<b>MOUNTING: SURFACE</b>		<b>MCB OR MLO SIZE: 400 A</b>		<b>NEUTRAL: 3/0</b>	
<b>ENCLOSURE: NEMA 3R</b>		<b>NEUTRAL RATING: 100%</b>		<b>GROUND: 3</b>	
<b>VOLTS: 480/277 Wye</b>		<b>PQM: NO</b>		<b>CONDUIT: 2-1/2"</b>	
<b>PHASES: 3</b>		<b>SPD: YES</b>		<b># OF RUNS: 2</b>	
<b>WIRES: 4</b>		<b># OF SECTIONS: 1</b>		<b>TOTAL AMPACITY: 400</b>	
<b>KAIC: 65</b>		<b>SERVICE RATED: NO</b>			

**NOTES**

CKT	DESCRIPTION	TRIP	P	A	B	C	A	B	C	P	TRIP	DESCRIPTION	CKT
ACCH-1	AIR COOLED CHILLER (ACCH-1)	125 A	3	21.67 kVA			21.67 kVA					AIR COOLED CHILLER (ACCH-2)	ACCH-2
ACCH-3					21.67 kVA		21.67 kVA						ACCH-4
ACCH-5						21.67 kVA		21.67 kVA					ACCH-6
ACCH-7	SPARE	20 A	1	0.00 kVA			0.00 kVA			1	20 A	SPARE	ACCH-8
ACCH-9	SPARE	20 A	1	0.00 kVA	0.00 kVA		0.00 kVA	0.00 kVA		1	20 A	SPARE	ACCH-10
ACCH-11	SPARE	20 A	1			0.00 kVA			0.00 kVA	1	20 A	SPARE	ACCH-12
ACCH-13	SPACE	-	1	-	-	-	-	-	-	1	-	SPACE	ACCH-14
ACCH-15	SPACE	-	1	-	-	-	-	-	-	1	-	SPACE	ACCH-16
ACCH-17	SPACE	-	1	-	-	-	-	-	-	1	-	SPACE	ACCH-18
ACCH-19	SPACE	-	1	-	-	-	-	-	-	1	-	SPACE	ACCH-20
ACCH-21	SPACE	-	1	-	-	-	-	-	-	1	-	SPACE	ACCH-22
ACCH-23	SPACE	-	1	-	-	-	-	-	-	1	-	SPACE	ACCH-24
ACCH-25	SPACE	-	1	-	-	-	-	-	-	1	-	SPACE	ACCH-26
ACCH-27	SPACE	-	1	-	-	-	-	-	-	1	-	SPACE	ACCH-28
ACCH-29	SPACE	-	1	-	-	-	-	-	-	1	-	SPACE	ACCH-30
<b>TOTAL CONNECTED LOAD</b>				43.33 kVA			43.33 kVA						
<b>TOTAL AMPS</b>				156.4 A			156.4 A						

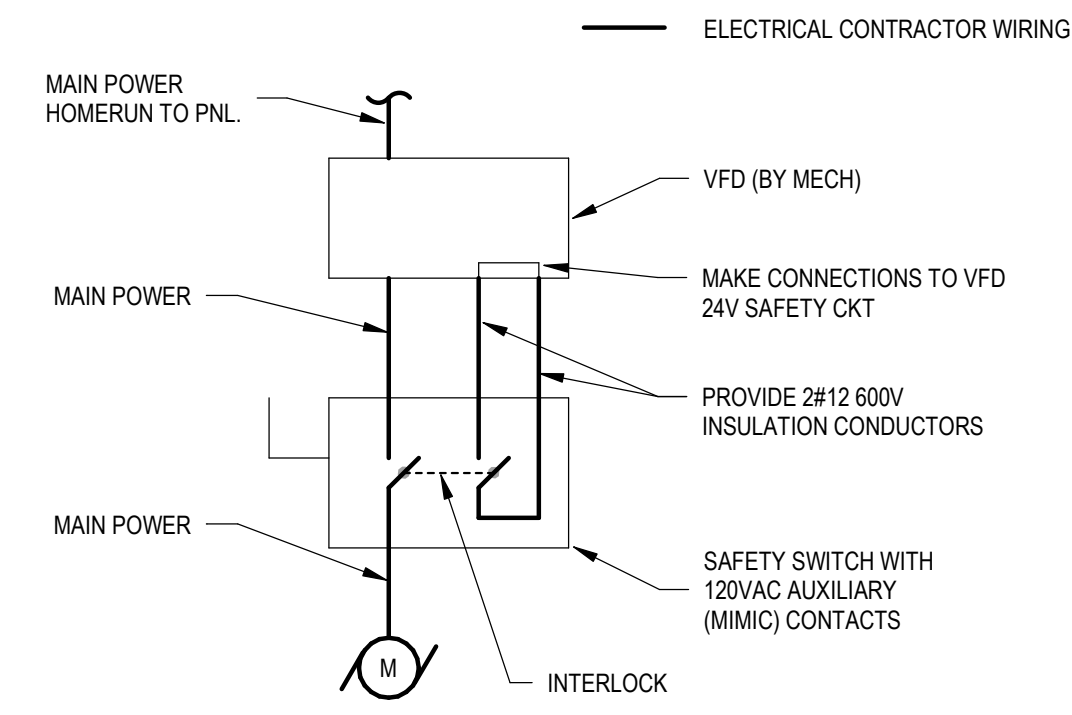


- NOTES:**
- ENGRAVED 1/16" THICK PLASTIC TAG.
  - TAG SHALL HAVE ALL EDGES BEVELED AND SMOOTH.
  - SECURE TAG WITH A MINIMUM OF 2 CHROME (STAINLESS STEEL FOR WET OR DAMP LOCATIONS) SCREWS. ADHESIVE BACKING, TAPE, ETC IS NOT ALLOWED.
  - DIMENSIONS SHALL BE AS REQUIRED TO FIT APPROPRIATE TEXT. COLORS AS FOLLOWS:

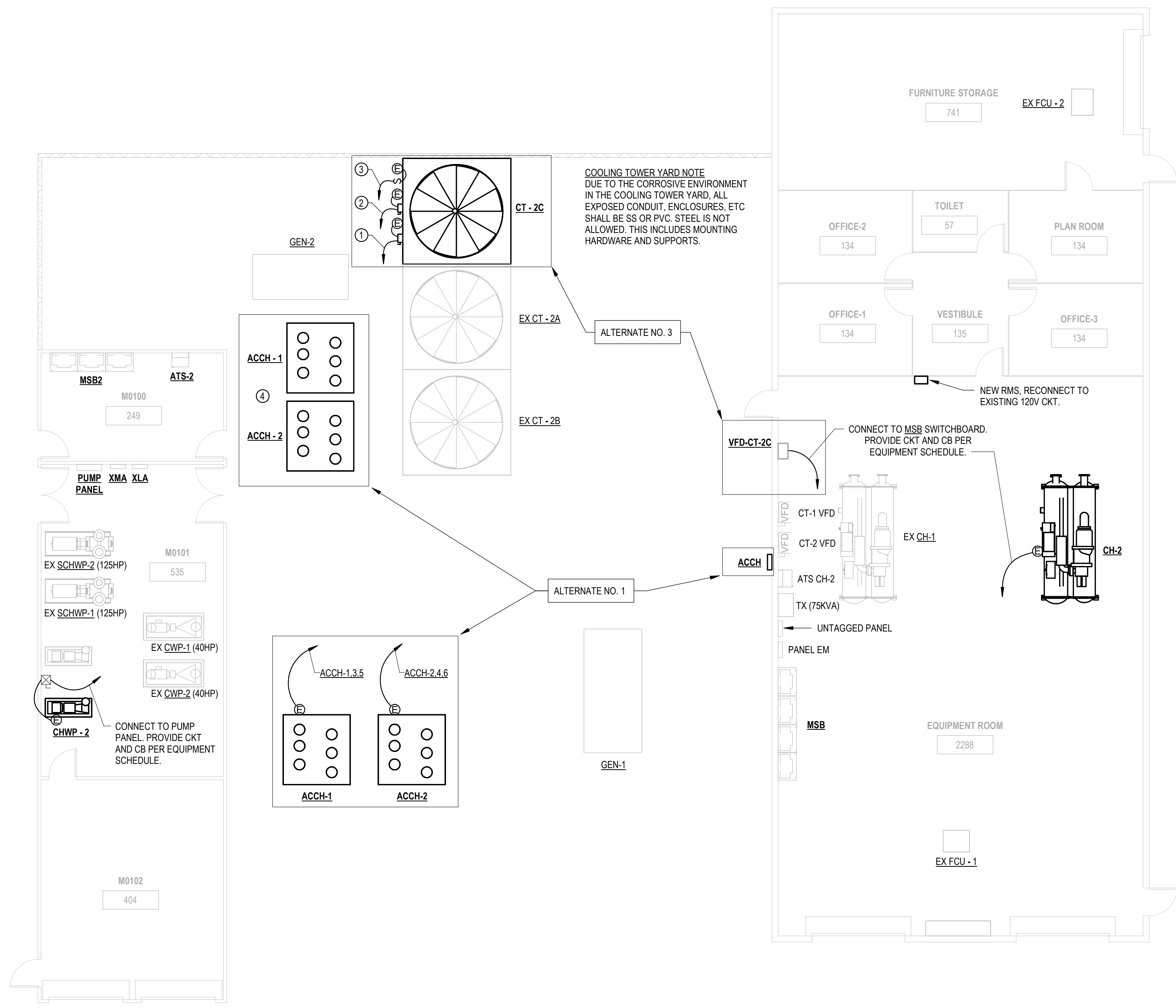
**COLORS AS FOLLOWS:**

BRANCH	LETTERS	BACKGROUND
NORMAL	WHITE	BLACK
OPTIONAL STANDBY	BLACK	YELLOW
GENERATOR	WHITE	PURPLE
EMERGENCY/LIFE SAFETY	WHITE	RED

**2 TYPICAL EQUIPMENT LABELING DETAIL**  
 NOT TO SCALE



**3 VFD INTERLOCK CIRCUIT**  
 NOT TO SCALE



**1 GROUND FLOOR ELECTRICAL POWER - NEW WORK**  
 SCALE: 1/8" = 1'-0"

- KEY NOTES**
- CONNECT TO VFD IN CHILLER PLANT. PROVIDE CONTACTS IN SAFETY SWITCH AND INTERLOCK WITH VFD SUCH THAT VFD SHUTDOWNS IF SAFETY SWITCH IS OPENED. SEE DETAIL 3 ON THIS SHEET.
  - BASIN HEATERS CIRCUIT. CONNECT TO MSB SWITCHBOARD. PROVIDE CKT AND CB PER EQUIPMENT SCHEDULE.
  - MOTOR HEATERS CIRCUIT. CONNECT TO UNTAGGED 208/120 V PANELBOARD. PROVIDE CKT AND CB PER EQUIPMENT SCHEDULE.
  - AIR COOLED CHILLERS TO BE INSTALLED IN TEMPORARY LOCATION. PROVIDE TEMPORARY POWER FOR CHILLERS FROM PANELBOARD ACCH AS INDICATED IN EQUIPMENT SCHEDULE. REMOVE TEMPORARY POWER AND RECONNECT WHEN CHILLERS ARE INSTALLED IN FINAL LOCATION. COORDINATE ALL WORK WITH MECHANICAL CONTRACTOR.

### EQUIPMENT ELECTRICAL SCHEDULE

TAG	EQUIPMENT DESCRIPTION	VOLTAGE	PHASE	WIRE	LOAD	DISCONNECT		STARTER		SPD	SERVING PANEL	OCPD TRIP	MCA	CIRCUIT				KEY NOTES			
						TYPE	BY	TYPE	BY					QTY RUNS	PHASE	NEUTRAL	GROUND		CONDUIT	°C RATING	AMPACITY
CH-2	WATER COOLED CHILLER	480	3	3	511A	CB	ELEC	INTEGRAL	MECH	NO	MSB	1000	639	2	(3) # 400	# N/A	# 2/0	3"	75°	670 A	
CT-2C	COOLING TOWER	480	3	3	20 HP	60/60/3 N4X FSS	ELEC	VFD	MECH	YES	MSB	60	34	1	(3) # 8	# N/A	# 10	3/4"	60°	40 A	2
	CT BASIN HEATERS	480	3	3	12KW	20/30/3 N4X FSS	ELEC	N/A	N/A	YES	MSB	20	18	1	(3) # 12	# N/A	# 12	1/2"	60°	20 A	2
CHWP-2	CT MOTOR HEATERS	120	1	2	2A	20/1 N4X TS	ELEC	N/A	N/A	YES	UNTAGGED	20	3	1	(1) # 12	# 12	# 12	1/2"	60°	20 A	2
	CHILLED WATER PUMP	480	3	3	30 HP	SEE STARTER	ELEC	FVNR	ELEC	NO	XMA	80	50	1	(3) # 6	# N/A	# 8	1"	60°	55 A	
ACCH-1	AIR COOLED CHILLER	480	3	3	65KW	CB	ELEC	INTEGRAL	MECH	NO	ACCH	125	132	1	(3) # 1/0	# N/A	# 6	1-1/2"	75°	150 A	1
ACCH-2	AIR COOLED CHILLER	480	3	3	65KW	CB	ELEC	INTEGRAL	MECH	NO	ACCH	125	132	1	(3) # 1/0	# N/A	# 6	1-1/2"	75°	150 A	1

**GENERAL NOTES**  
 DISCONNECT ABBREVIATIONS: SS = SAFETY SWITCH, FSS = FUSED SAFETY SWITCH, CB = SERVING CB, TS = TOGGLE SWITCH, TSM = MOTOR RATED TS, C&P = CORD & PLUG, RELAY, ELEV DISC = SPECIAL ELEVATOR DISCONNECT (FOR EXAMPLE: 90/100/3 N1 FSS INDICATES A 3 POLE 100A NEMA 1 FUSED SAFETY SWITCH WITH 90A FUSES)  
 STARTER ABBREVIATIONS: RELAY = MOTOR RATED POWER RELAY, FVNR = FVNR MAGNETIC MOTOR STARTER WIDISCONNECT, RVSS = REDUCED VOLTAGE SOLID STATE STARTER WIDISCONNECT, VFD = VARIABLE FREQUENCY DRIVE WIDISCONNECT  
 OTHER ABBREVIATIONS: N1 = NEMA 1 ENCLOSURE, N3R = NEMA 3R ENCLOSURE, N4X = NEMA 4X STAINLESS STEEL ENCLOSURE, WP = WEATHERPROOF, 60/3 = 60A 3 POLE, ELEC = BY ELECTRICAL, MECH = BY MECHANICAL, EQUIP = BY EQUIPMENT, SPD = PROVIDE SPD AT UNIT  
 OCPD, CONDUIT, WIRE, DISCONNECT, STARTER, ETC SIZES/RATINGS INDICATED ARE FOR THE BASIS OF DESIGN EQUIPMENT. EXACT SIZES/RATINGS SHALL BE PROVIDED THAT MATCH THE INSTALLED MECHANICAL EQUIPMENT REQUIREMENTS.  
 SIZE ALL MOTOR STARTERS AND OVERLOADS AS REQUIRED FOR EQUIPMENT BEING POWERED.

**KEY NOTES**  
 1. ADD ALTERNATE #1  
 2. ADD ALTERNATE #3

