

# OGDEN / WEBER ATC ELECTRICAL / HVAC UPGRADE

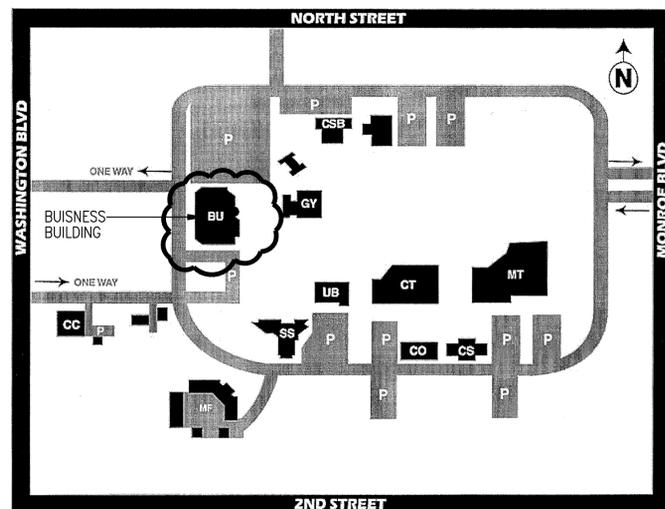
DFCM PROJECT No.  
08309240

OGDEN-WEBER APPLIED TECHNOLOGY COLLEGE  
200 NORTH WASHINGTON BLVD.  
OGDEN, UTAH 84404

MARCH 2009

## DRAWING INDEX

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BU- Business Building  
CC- Corporate Training Center  
CO- Cosmetology  
CS- Children's School Buildings  
CSB- College Services Building  
CT- Construction Technology Building  
GY- Gymnasium Building  
MF- Maintenance Facility  
MT- Manufacturing Technology Building  
P- Parking  
SS- Student Services Building  
UB- Union Building

CAMPUS MAP  
SCALE: NONE

Energy Compliance Certificate	
<b>Project Title:</b>	Ogden / Weber ATC - Electrical / HVAC Upgrade
<b>Location:</b>	Ogden / Weber ATC, 200 North Washington Blvd, Ogden, UT
<b>DFCM Project Number:</b>	8309240
<b>Project Description:</b>	Upgrade existing campus computer server room and telecom room from an existing rooftop HVAC unit that is not applicable to this application to a dedicated computer room unit with backup. Replace the existing building cooling system cooling tower to a tower of adequate size to match the existing chiller system. Upgrade the condenser water pumps between the new tower and the chillers to match the required flow of the chillers. The old tower and old pumps are undersized for the existing chillers. Provide a new UPS system to serve the campus computer server and install a dedicated emergency generator to serve the same. Provide all necessary electrical upgrades to support all changes.
<b>Mechanical System Energy Code Requirements: (COMcheck Version 3.6.0)</b>	
Computer Room Unit -	no EER rating because these are process cooling and not comfort cooling therefore they are not ARI rated equipment.
Open Circuit Cooling Towers -	Tower must have automatic bypass valve for condenser water control. This project installs a new bypass valve for water temperature control.  Tower performance must be greater than 38.2 gpm/hp. New tower ASHRAE 90.1 performance is 168 gpm/hp.
Pumps -	Pump motors to be high efficiency. New pump motors will be Premium Efficiency Motors.
<b>Savings Calculations:</b>	
Computer Room Unit -	No savings over original equipment because old rooftop unit was wrong application for computer room. The new unit is a dedicated computer room unit correct for this application.
Pumps -	No savings - old pump were 5 hp each, new pumps are 7.5 hp each. The increase in size is due to required increase in flow from 260 gpm to 312 gpm necessary for the existing chillers to operate properly. Condenser water flow and tower capacity has been a problem with the chilled water system since the original installation.
Cooling Tower -	Existing tower fan = 10 hp at 208 volts = 32.2 amps = 11.6 kw New tower fan = 3 hp at 208 volts = 11.0 amps = 3.96 kw
<b>Savings:</b>	Existing: 11.6 kw X 8 hr/day X 125 days/yr = 11,600 kwh/yr New: 3.96 kw X 8 hr/day X 125 days/yr = 3,960 kwh/yr <b>savings = 7,640 kwh/yr</b> <b>% savings = 66%</b>

INTERMOUNTAIN  
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ELECTRICAL/HVAC UPGRADE  
OGDEN-WEBER TECHNOLOGY COLLEGE  
COVER SHEET

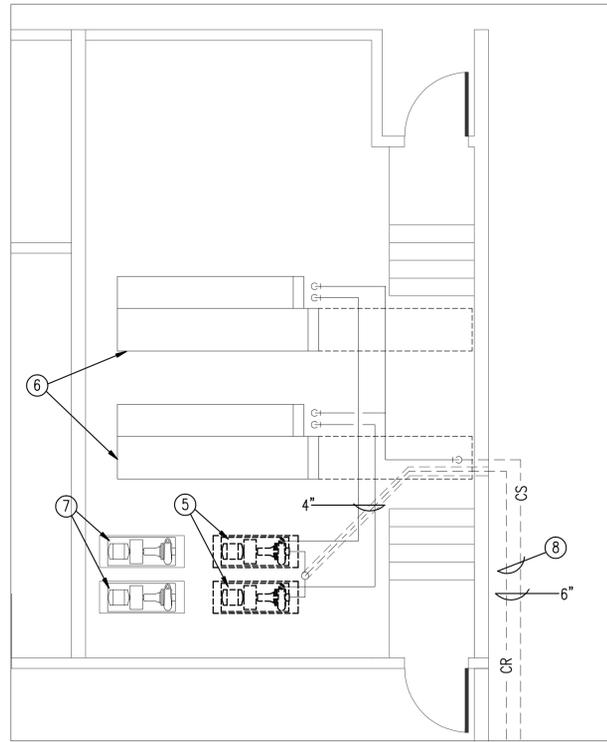
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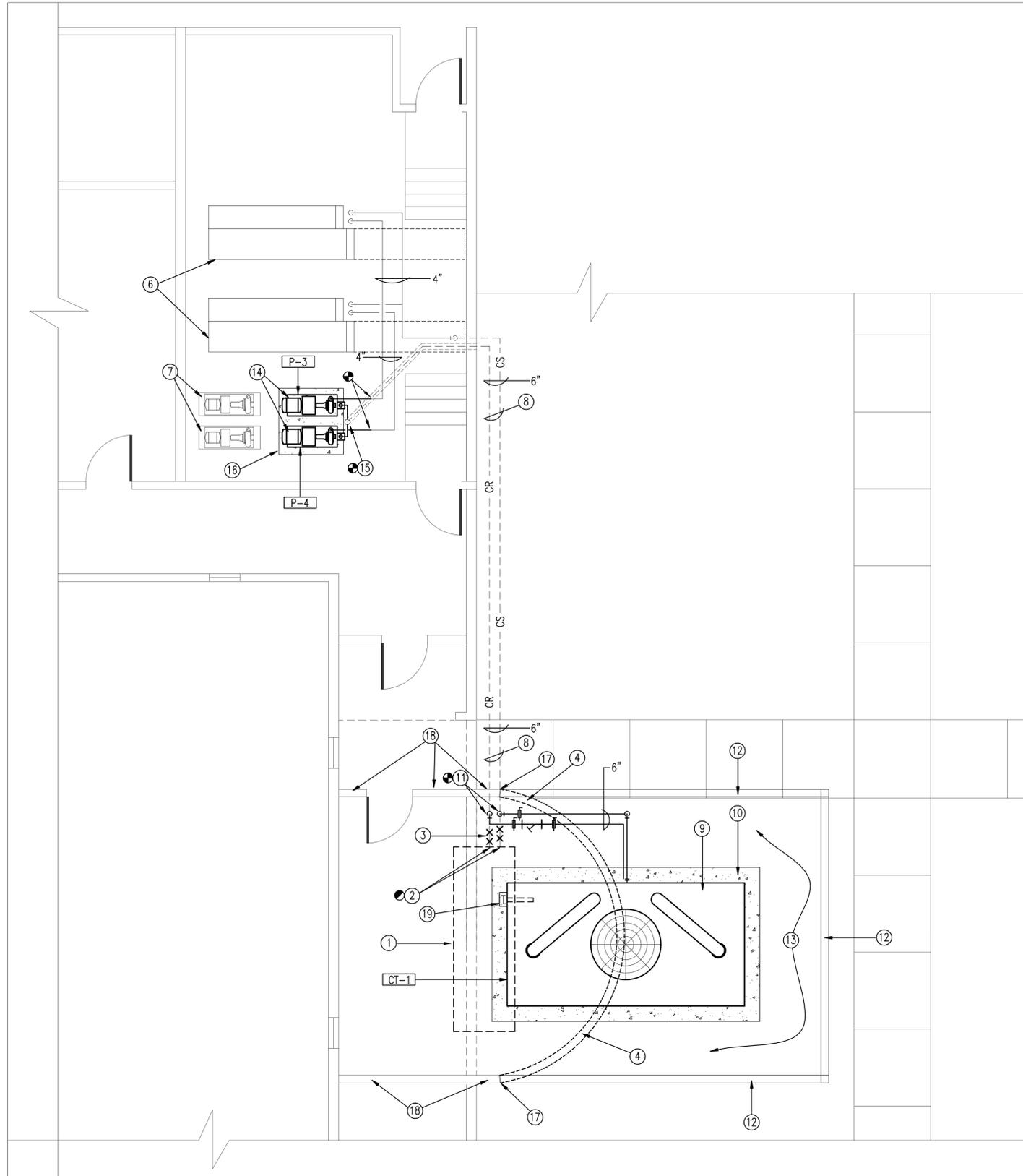
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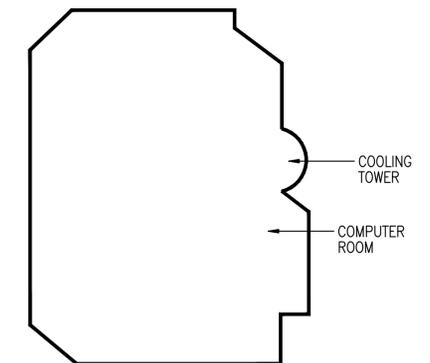
PLAN NORTH  
**MECHANICAL ROOM DEMOLISHING PLAN**  
 SCALE: 1/4"=1'-0"



PLAN NORTH  
**COOLING TOWER/MECHANICAL ROOM PLAN**  
 SCALE: 1/4"=1'-0"

## Keyed Notes

- ① REMOVE EXISTING COOLING TOWER AND PROPERLY DISPOSE OF ALL PARTS.
- ② EXISTING CONDENSER WATER PIPING TO BE DISCONNECTED FROM EXISTING COOLING TOWER.
- ③ DEMOLISH EXISTING CONDENSER WATER PIPING IN THIS SECTION.
- ④ DEMOLISH EXISTING 7' HIGH CURVED BRICK-FACE SCREEN WALL AND FOUNDATION WALL. EXCAVATE TO APPROXIMATE 2' BELOW GRADE ALL AREA FOR NEW COOLING TOWER. ALSO SEE KEYED NOTES #17 & 18.
- ⑤ REMOVE EXISTING CONDENSER WATER PUMPS AND TURN BACK TO SCHOOL. DEMOLISH HOUSEKEEPING PADS. PROPERLY DISPOSE OF ALL PARTS. DISCONNECT EXISTING CONDENSER WATER PIPING FROM EXISTING PUMPS.
- ⑥ EXISTING CHILLER TO REMAIN.
- ⑦ EXISTING PUMPS TO REMAIN.
- ⑧ EXISTING CONDENSER WATER PIPING TO REMAIN.
- ⑨ INSTALL NEW COOLING TOWER PER MANUFACTURER RECOMMENDATIONS. MAINTAIN REQUIRED CLEARANCE. VERIFY PROPER CONTROL SEQUENCE ONCE TOWER IS INSTALLED.
- ⑩ PROVIDE HOUSEKEEPING PAD. SEE STRUCTURAL DRAWING FOR DETAIL.
- ⑪ CONNECT NEW CONDENSING WATER PIPING TO EXISTING AT THIS APPROXIMATE LOCATION.
- ⑫ SEE STRUCTURAL DRAWING S-1 DETAIL 3/S-1 FOR FOOTING AND FOUNDATION DETAIL. SCREEN WALL WILL BE BY OTHERS.
- ⑬ FILL AREA WITH WASHED RIVER RUN GRAVEL TO MATCH EXISTING.
- ⑭ INSTALL NEW CONDENSER WATER PUMPS. SEE DETAIL 3/M-3. PROVIDE ALL NEW VALVES, CHECK VALVE, BALANCING VALVES, GAUGES AND THERMOMETERS AS PER PUMP DETAIL. VERIFY PROPER CONTROL SEQUENCE ONCE PUMPS ARE INSTALLED.
- ⑮ RE-CONNECT NEW CONDENSER WATER PUMPS TO EXISTING CONDENSER WATER RISER. ADJUST AS NEEDED. REPAIR AND REPLACE EXISTING PIPING INSULATION AS REQUIRED.
- ⑯ INSTALL NEW 4" HOUSEKEEPING PAD FOR CONDENSER WATER PUMPS. SEE STRUCTURAL DETAIL.
- ⑰ CUT EXISTING SCREEN WALL AT VERTICAL JOINT AT START OF CURVE.
- ⑱ THIS PORTION OF SCREEN WALL TO REMAIN.
- ⑲ CONNECT NEW TEMPERATURE SENSOR AND CONTROL VALVE TO EXISTING TOWER WATER TEMPERATURE CONTROL CIRCUIT.



**KEY PLAN**

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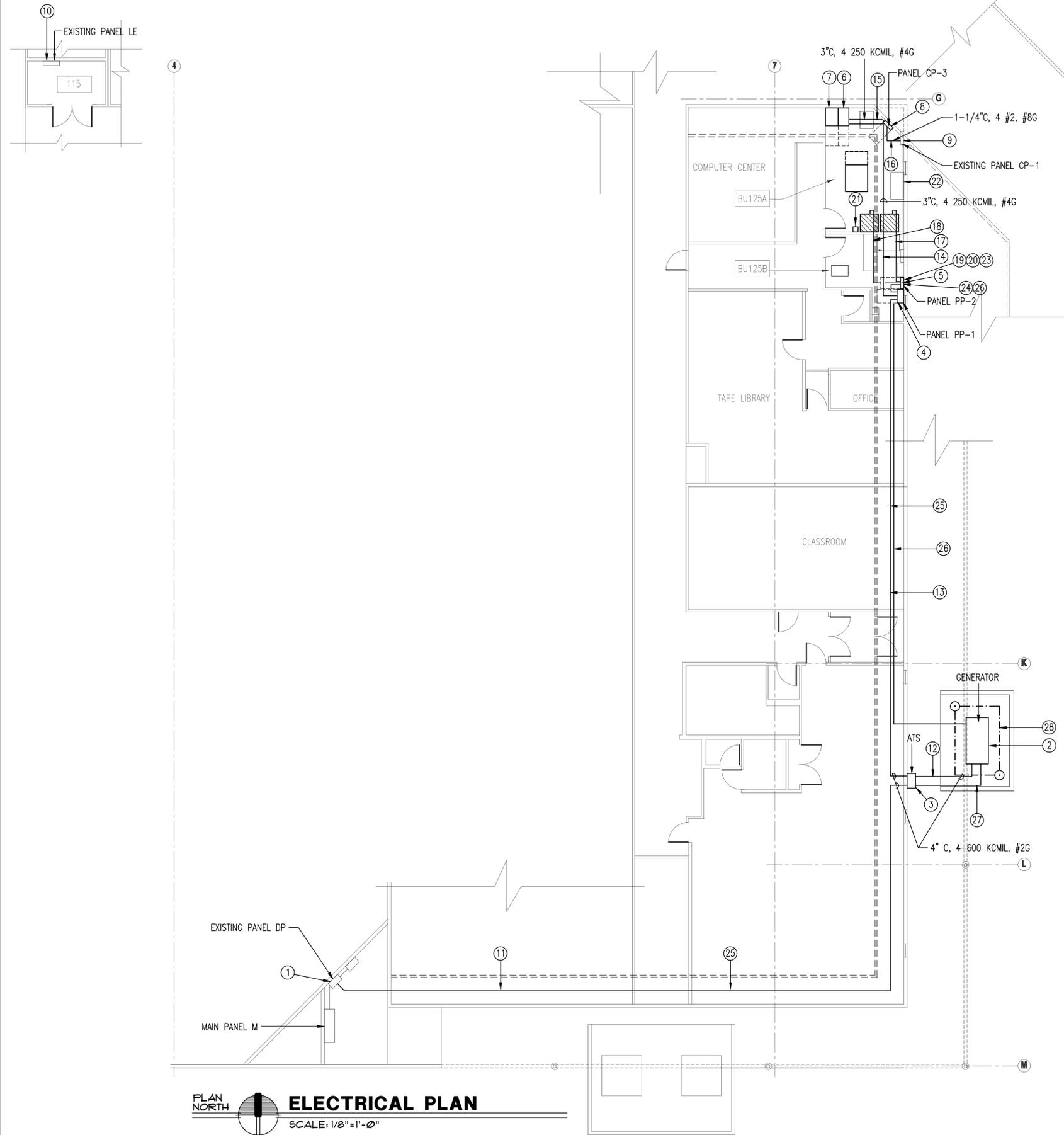
  

ENGINEERING	DATE	DRAFTING	DATE	TITLE
ENGINEERED	03/03/09	DRAWN	03/03/09	ELECTRICAL/HVAC UPGRADE
APPROVED	03/03/09	CHECKED	03/03/09	OGDEN-WEBER TECHNOLOGY COLLEGE
				COOLING TOWER/MECHANICAL ROOM PLANS

SCALE: AS NOTED
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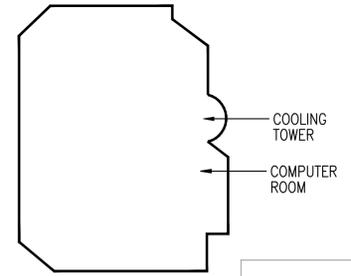


## Keyed Notes

- ① INSTALL 400A, 3P, 208V, ADJUSTABLE TRIP BREAKER IN EXISTING PANEL DP IN ELECTRIC ROOM. SET AT 350A.
- ② INSTALL 100 KW, 120/208V GENSET IN WP ENCLOSURE OUTSIDE EAST WALL, SOUTH OF THE COURTYARD. (400A BREAKER INCLUDED. SET AT 350A) 96" H X 83"L X 40"W. 4500 LBS.
- ③ INSTALL 400A, 3P, 208V AUTOMATIC TRANSFER SWITCH, OUTSIDE, ON EAST WALL NEAR GENSET. NEMA 3R ENCLOSURE 58"H X 28"W X 20"D.
- ④ INSTALL 400A, 3PH 4W, 120/208V, NEMA 1 PANEL PP-1 ON INSIDE EAST WALL OF ROOM BU125B CONSISTING OF A 400A, 3P SHUNT TRIP MAIN BREAKER, 200A, 100% RATED 3P BRANCH BREAKER FOR UPS & 225A, 3P BRANCH BREAKER FOR PANEL PP-2. 48"H X 24"W X 12"D.
- ⑤ INSTALL 225A, 3PH4W, 120/208V, 24 CIRCUIT NEMA 1 PANEL PP-2 ON INSIDE EAST WALL OF ROOM BU125B, ADJACENT TO PANEL PP-1, CONSISTING OF A 2 - 60A, 3P BRANCH BREAKERS FOR CRU-1 & CRU-2 A/C UNITS, 2 - 20A, 3P BRANCH BREAKERS FOR CONDENSING UNITS CU-1 & CU-2 ON ROOF, 1 - 20A, 1P, 120V BREAKER FOR MAINTENANCE RECEPTACLE ON ROOF, & 1 - 20A, 1P, 120V BREAKER FOR GENSET BLOCK HEATER. 24"H X 20"W X 6"D.  
 CRU-1 & CRU-2 SHALL BE FURNISHED WITH A NON-FUSIBLE SAFETY SWITCH. CU-1 & CU-2 SHALL BE FURNISHED WITH A NON-FUSIBLE SAFETY SWITCH.
- ⑥ INSTALL A 60 KVA 120/208V UPS IN NW CORNER OF ROOM BU125A. 74"H X 19"W X 32"D. 580 LBS.
- ⑦ INSTALL THE UPS BATTERY CABINET IN THE NE CORNER OF ROOM BU125A ADJACENT TO UPS. 74"H X 22"W X 32"D.
- ⑧ INSTALL IN ROOM 125A, A 225A, 120/208V, 3 PHASE, 4 WIRE, 42 CIRCUIT, SURFACE MOUNTED PANEL CP-3 WITH 200A, 100% RATED, 3P MAIN BREAKER WITH THE FOLLOWING BRANCH BREAKERS: 40"H X 20"W X 6"D.
  - a. 1 - 100A, 3P SUB-FEED BREAKER FOR EXISTING PANEL CP-1.
  - b. 2 - 30A, 2P BREAKERS FOR EVA 4400 (1 REDUNDANT CIRCUIT).
  - c. 4 - 30A, 3P BREAKERS FOR HP C7000 (2 REDUNDANT CIRCUITS).
  - d. 2 - 20A, 1P BREAKERS FOR HP DL380.
  - e. 4 - 20A, 1P SPARE BREAKERS.
  - f. 4 - 30A 1P SPARE BREAKERS.
  - g. 13 - SPACES.
- ⑨ LEAVE ALL CIRCUITS IN PANEL CP-1 INTACT.
- ⑩ DISCONNECT UPS PANEL CP-1 CIRCUIT FROM EXISTING PANEL LE LOCATED IN ROOM 115. LEAVE ALL OTHER CIRCUITS FED FROM PANEL LE INTACT.
- ⑪ INSTALL 4" C, 4 - 600 KCML, #2G FROM PANEL DP TO AUTOMATIC TRANSFER SWITCH. RUN CIRCUIT IN TUNNEL.
- ⑫ INSTALL 4"C, 4 - 600 KCML, #2G FROM GENERATOR TO TRANSFER SWITCH FOR EMERGENCY POWER. RUN UNDERGROUND FROM GENSET TO ATS.
- ⑬ INSTALL 4"C, 4 - 600 KCML, #2G FROM TRANSFER SWITCH TO PANEL PP-1. RUN CIRCUIT IN TUNNEL.
- ⑭ INSTALL 3"C, 4-250 KCML, #4G FROM PANEL PP1 TO UPS. RUN CIRCUIT IN TUNNEL.
- ⑮ INSTALL 3"C, 4-250 KCML, #4G FROM UPS TO PANEL CP-3. SURFACE MOUNT CONDUIT ON WALL.
- ⑯ INSTALL 1 1/4"C, 4 #2, #8G FROM PANEL CP-3 TO EXISTING PANEL CP-1. SURFACE MOUNT CONDUIT ON WALL.
- ⑰ INSTALL 1"C, 3 #6, #10G FROM PANEL PP2 TO CRU-1.
- ⑱ INSTALL 1"C, 3 #6, #10G FROM PANEL PP2 TO CRU-2.
- ⑲ INSTALL 3/4"C, 3 #12, #12G FROM PANEL PP-2 TO CU-1 ON ROOF. SEE DRAWING M-1 FOR LOCATION.
- ⑳ INSTALL 3/4"C, 3 #12, #12G FROM PANEL PP-2 TO CU-2 ON ROOF. SEE DRAWING M-1 FOR LOCATION.
- ㉑ CONNECT EXISTING E-STOP SWITCH TO UPS AND TO SHUNT TRIP BREAKER IN PANEL PP-1.
- ㉒ REMOVE EXISTING UPS FROM ROOM BU125A.
- ㉓ FURNISH AND INSTALL ONE 120V GFCI MAINTENANCE RECEPTACLE IN WP ENCLOSURE NEAR CONDENSING UNITS ON ROOF. SEE DWG E-2.
- ㉔ INSTALL 3/4"C, 2- #12, #12G FROM PANEL PP-2 TO GFCI MAINTENANCE RECEPTACLE ON ROOF.
- ㉕ ALL 600V WIRING SHALL BE THHN/THWN.
- ㉖ INSTALL 3/4"C, 2 #12, #12G FROM PANEL PP2 TO GENSET BLOCK HEATER. RUN CIRCUIT IN TUNNEL.
- ㉗ INSTALL 3/4"C, 4 #12, #12G FOR BATTERY CHARGER CONTROL WIRING FROM ATS TO GENSET.
- ㉘ GROUND GENSET. INSTALL TWO 3/4"x10' CW GROUND RODS WITH A #4/0 BSCU CABLE AROUND GENSET PAD. BURY #4/0 BSCU 24" AND CONNECT TO GENSET SKID IN TWO PLACES. USE APPROVED GROUNDING CONNECTORS.

## General Notes

1. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO BECOME FULLY AWARE OF THE EXISTING CONDITIONS. VERIFY DIMENSIONS AND EQUIPMENT LOCATIONS. BY SUBMITTING A BID FOR THIS WORK, THE ELECTRICAL CONTRACTOR ACKNOWLEDGES THAT HE IS FULLY AWARE OF THE INTENT OF THESE DRAWINGS AND WILL PROVIDE A COMPLETE AND OPERATIONAL SYSTEM. ALL WORK AND MATERIALS ARE TO BE PROVIDED UNDER THIS BID.
  2. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING, PATCHING, PAINTING, AND REPAIR OF SURFACES DAMAGED, REMOVED OR MODIFIED AS A RESULT OF THIS INSTALLATION.
  3. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2008 NEC.
  4. ALL 600V WIRE SHALL BE THHN/THWN COPPER: #12 & #10 - SOLID, #8 & LARGER - STRANDED.
  5. AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE RUN IN ALL CONDUITS SIZED IN ACCORDANCE WITH NEC TABLE 250-122. GROUND WIRES IN CONDUITS SHALL BE INSULATED, COLOR - GREEN.
  6. WORKING SPACE AROUND ELECTRICAL EQUIPMENT SHALL BE PROVIDED IN ACCORDANCE WITH NEC TABLE 110.26(A)(1), 151-600V CATEGORY (208V). THIS EQUIPMENT INCLUDES:
    - a. GENERATOR - OUTDOORS.
    - b. AUTOMATIC TRANSFER SWITCH - OUTDOORS.
    - c. PANEL PP-1 - INDOORS.
    - d. PANEL PP-2 - INDOORS.
    - e. PANEL CP-1, EXISTING - INDOORS.
    - f. PANEL CP-3 - INDOORS.
    - g. UPS - INDOORS.
    - h. BATTERIES - INDOORS.
    - i. ELECTRONIC RACKS.
- GLASS WALL IS CONSIDERED CONDITION 1 (3' - 0").  
 OUTSIDE WALL IS CONSIDERED CONDITION 2 (3' - 6").  
 ELECTRICAL EQUIPMENT FACING EACH OTHER IS CONSIDERED CONDITION 3 (4' - 0").
7. INSTALL TWIST-LOK RECEPTACLES FOR ELECTRONIC EQUIPMENT UNDER FLOOR IN ROOM BU125A AS DIRECTED BY DATA CENTER MANAGER.
  8. EMT IS ACCEPTABLE INSIDE THE BUILDING.
  9. RGS SHALL BE USED IN UTILITY TUNNEL AND OUTDOORS.
  10. SCHEDULE 40 PVC SHALL BE USED UNDERGROUND WITH RGS ELBOWS WRAPPED WITH VINYL TAPE.
  11. FOR ANCHORS IN CONCRETE, USE STEEL DROP-IN. NO PLASTIC ANCHORS ALLOWED.
  12. SEAL ALL PENETRATIONS THROUGH OUTSIDE WALLS WEATHERTIGHT.
  13. WHERE INSTALLING WIRE & CABLE IN EXISTING CONDUIT, PULL A MANDREL OR PLUG CLOSELY APPROXIMATING THE INNER DIAMETER OF THE CONDUIT, TO LOOSEN BURRS AND LOCATE OBSTRUCTIONS. FOLLOW THIS WITH A SWAB TO CLEAN OUT ANY REMAINING DIRT OR FOREIGN MATTER.
  14. PROVIDE TO ENGINEER SEVEN COPIES OF SUBMITTALS FOR ALL ITEMS ON EQUIPMENT LIST.
  15. MAINTAIN A MARKED-UP SET OF DRAWINGS, SHOWING ANY CHANGES MADE ON PROJECT, AND SUBMIT MARKED-UP DRAWINGS TO ENGINEER AT COMPLETION OF PROJECT SO AS-BUILTS CAN BE MADE.
  16. CONNECT ATS EQUIPMENT GROUNDING CONDUCTOR TO GENSET GROUNDING SYSTEM.



**KEY PLAN**

PLAN NORTH  
**ELECTRICAL PLAN**  
 SCALE: 1/8" = 1'-0"

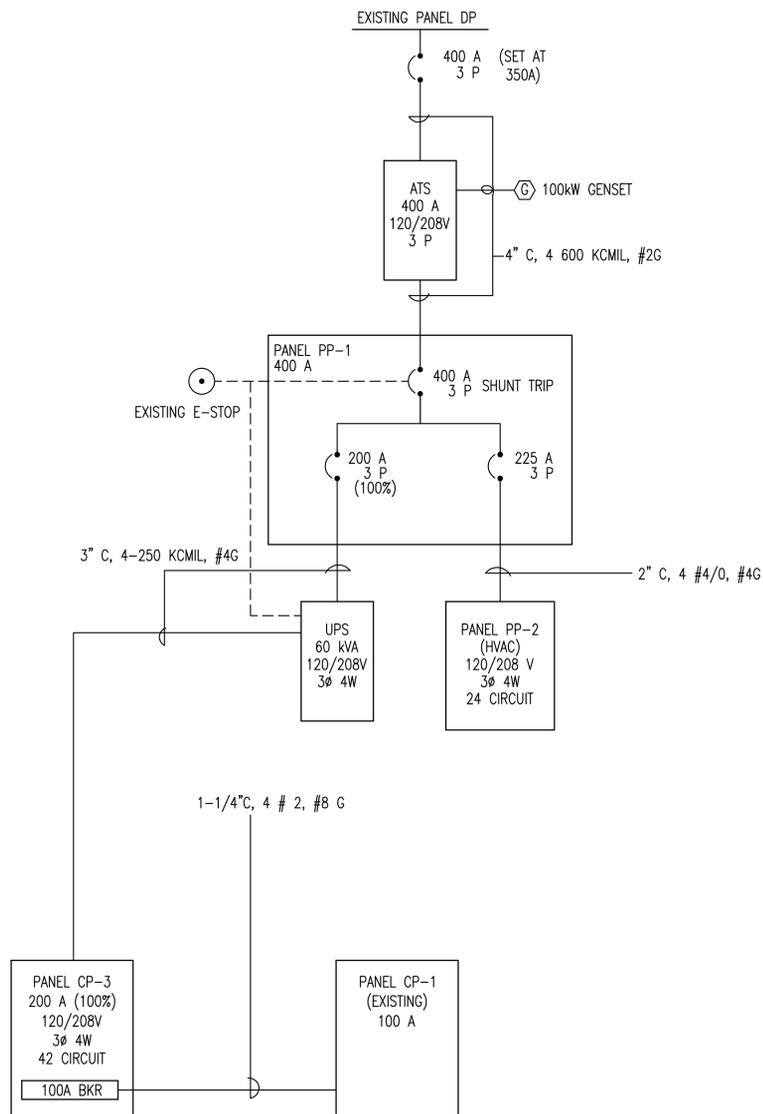
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TITLE: **ELECTRICAL/HVAC UPGRADE**  
 OGDEN-WEBER TECHNOLOGY COLLEGE  
 ELECTRICAL PLANS AND NOTES

ENGINEERING	DATE	DRAWING	DATE	BY	DATE	BY	DATE	BY
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SCALE: AS NOTED

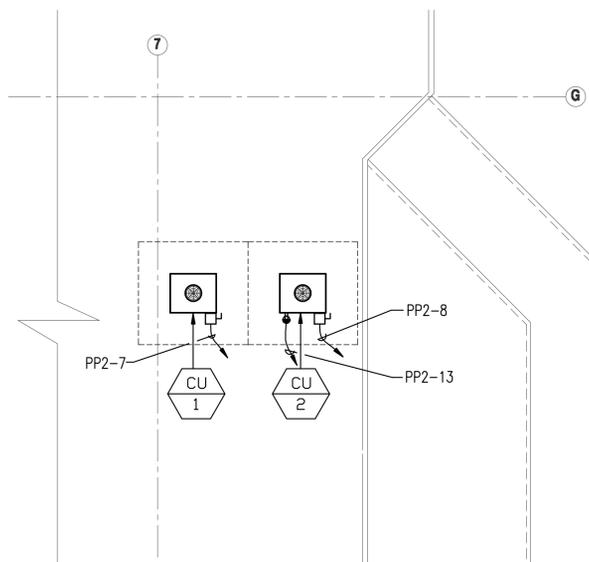
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**POWER RISER DIAGRAM**  
SCHEMATIC

## Equipment List

- GENSET: 100 KW 120/208V 3PH 4W .8 PF WITH 400A ADJUSTABLE BREAKER, SET AT 350A, C/W 24 HR DIESEL STORAGE TANK IN BASE, DRIPPROOF ENCLOSURE, MUFFLER/SILENCER, AUTOMATIC STARTING UPON FAILURE OF NORMAL POWER, WEEKLY EXERSIZER. SEE PACKAGED ENGINE GENERATOR SPECIFICATION.
- AUTOMATIC TRANSFER SWITCH: 400A 3P 120/208V OUTDOOR ENCLOSURE. SEE TRANSFER SWITCH SPECIFICATION.
- 400A 3P 208V ADJUSTABLE BREAKER FOR PANEL DP. SET AT 350A.
- 400A 3PH 4W PANEL PP-1 WITH MAIN 400A 3P SHUNT TRIP BREAKER, ONE 225A 3P BREAKER & ONE 200A, 3P BREAKER 100% RATED IN NEMA 1 ENCLOSURE. SEE PANELBOARDS SPECIFICATION.
- 225A 3PH 4W 24 CIRCUIT PANEL PP-2 WITH 225A BUS IN NEMA 1 ENCLOSURE, SEE PANEL SCHEDULE PP-2 AND PANEL BOARDS SPECIFICATION.
- 225A 3PH 4W 42 CIRCUIT PANEL CP-3 WITH 200A, 100% RATED MAIN BREAKER IN NEMA 1 ENCLOSURE, SEE PANEL SCHEDULE CP-3 AND PANEL BOARDS SPECIFICATION.
- UNINTERRUPTIBLE POWER SYSTEM (UPS); 60 KVA/54 KW 120/208V 3PH 4W INPUT/OUTPUT, 4 % TOTAL HARMONICS, IGBT TECHNOLOGY, INTERNAL BYPASS SWITCH, 8 MINUTE FULL LOAD BATTERY RUNTIME, SNMP/WEB NETWORK CARD. SEE STATIC UNINTERRUPTIBLE POWER SUPPLY SPECIFICATION.
- FOUR TWIST-LOCK RECEPTACLE, NEMA L6-30R, 2P, 3W, 250V, 30A, HUBBELL #HBL2620.
- FOUR TWIST-LOCK RECEPTACLE, NEMA L15-30R, 3P 4W 250V, 30A HUBBELL #HBL2720.
- TWO TWIST-LOCK RECEPTACLE, NEMA L5-20R, 2P, 3W, 125V, 20A HUBBELL #HBL2310.
- 30A, 3P, 208V BREAKER AND 3 HP VFD IN MCC FOR C.T. FAN. SEE VFD SPEC.
- TWO 50A, 3P, 208V BREAKERS IN MCC.
- 30A, 3P, 208V, NEMA 3R NON-FUSIBLE SAFETY SWITCH.



**ELECTRICAL ROOF PLAN**  
SCALE: 1/8"=1'-0"

## PANELBOARD SCHEDULE

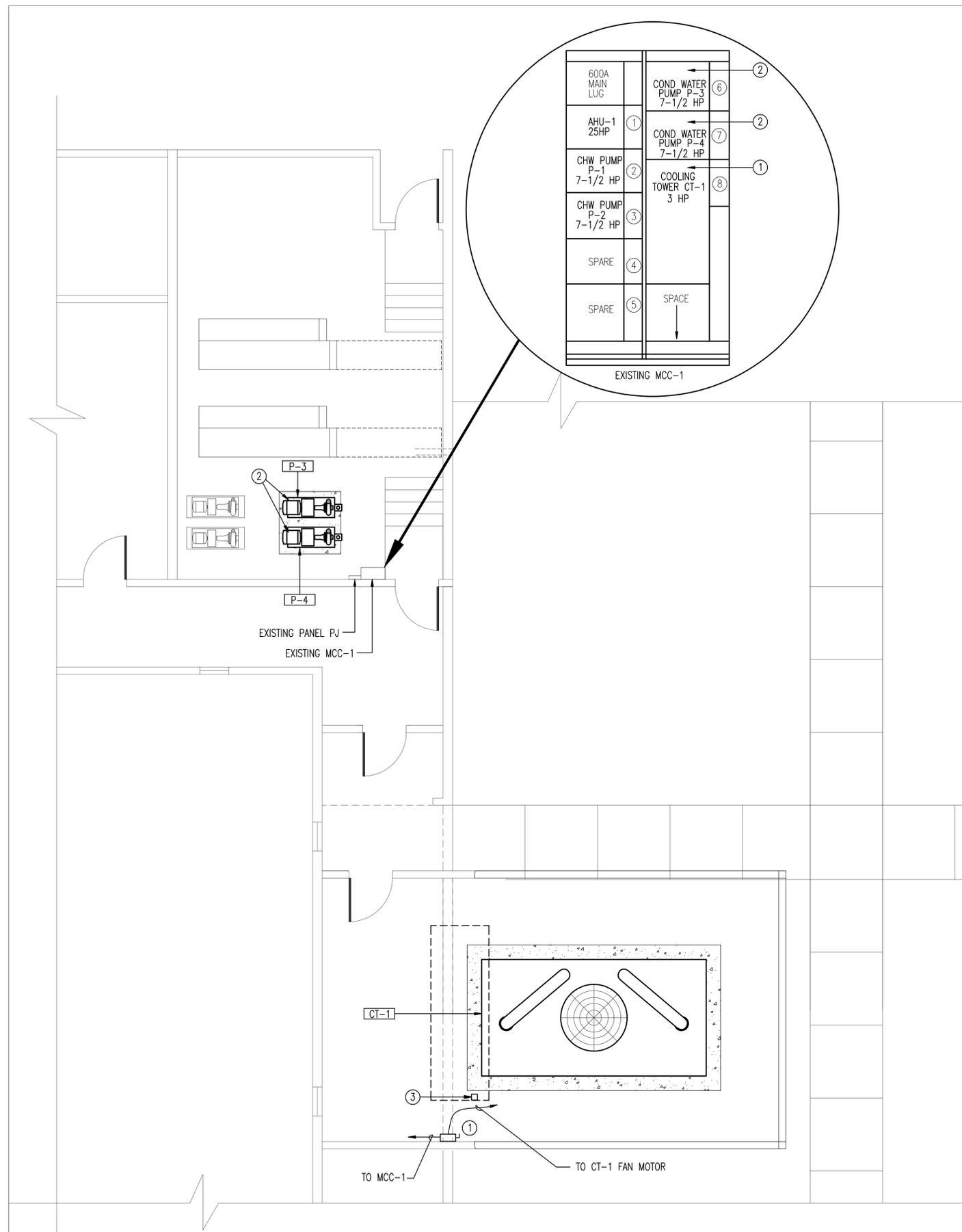
PANEL NAME		CP-3		VOLTAGE/PHASE/WIRE		120/208V, 3Ø, 4W						
PANEL TYPE		NEMA 1		MAIN BUS AMPERAGE		225 A						
PANEL DIMENSIONS		20"W x 6"D x 40"H		MAIN CIRCUIT BREAKER AMPERAGE		200A 100% RATED						
MOUNTING		SURFACE		AMPS RMS SYM.		10 KAIC						
LOAD DESCRIPTION	AMPS	POLE	WIRE SIZE	CKT	LEFT	RIGHT	CKT	AMPS	POLE	WIRE SIZE	LOAD DESCRIPTION	
HP C 7000	30	3	#10	1	22		2	30	3	#10	HP C 7000	
				3	22		4					
				5		22	6					
HP C 7000	30	3	#10	7	22		8	30	3	#10	HP C 7000	
				9		22	10					
				11			12					
HP DL380	20	1	#12	13	9		14	20	1	#12	HP DL380	
EVA 4400	30	2	#10	15	17		16	30	2	#10	EVA 4400	
				17		17	18					
EXISTING PANEL CP-1	100	3	#2	19	50		20	20	1	-	SPARE	
				21	50		22	20	1	-		
				23			24	20	1	-		
SPARE	30	1	-	25		50	26	20	1	-		
	30	1	-	27			28					
	30	1	-	29			30					
	30	1	-	31			32					
				33			34					
				35			36					
				37			38					
				39			40					
				41			42					
COLUMN TOTALS				103	111	111	53	61	61			
PHASE TOTALS				156	172	172						
AMPERAGE PER PHASE TOTALS				156	172	172	60		TOTAL CONNECTED KW LOAD			

NOTES:

## PANELBOARD SCHEDULE

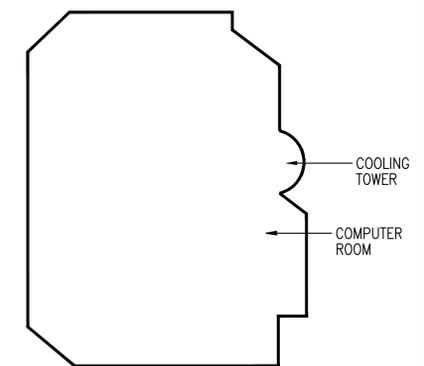
PANEL NAME		PP-2		VOLTAGE/PHASE/WIRE		120/208V, 3Ø, 4W						
PANEL TYPE		NEMA 1		MAIN BUS AMPERAGE		225 A						
PANEL DIMENSIONS		20"W x 6"D x 24"H		MAIN CIRCUIT BREAKER AMPERAGE		-						
MOUNTING		SURFACE		AMPS RMS SYM.		10 KAIC						
LOAD DESCRIPTION	AMPS	POLE	WIRE SIZE	CKT	LEFT	RIGHT	CKT	AMPS	POLE	WIRE SIZE	LOAD DESCRIPTION	
CRU-1	60	3	#6	1	40		2	60	3	#6	CRU-2	
				3	40		4					
				5		40	6					
CU-1	20	3	#12	7	5		8	20	3	#12	CU-2	
				9	5		10					
				11		5	12					
GFCI RECEPT ON ROOF	20	1	#12	13		12	14	20	1	#12	GEN BLOCK HTR	
				15			16					
				17			18					
				19			20					
				21			22					
				23			24					
COLUMN TOTALS				45	45	45	57	45	45			
PHASE TOTALS				90	102	90						
AMPERAGE PER PHASE TOTALS				90	102	90	33		TOTAL CONNECTED KW LOAD			

NOTES:



## Keyed Notes

- THE EXISTING 10 HP, 208V COOLING TOWER FAN CT-1 IS BEING REPLACED WITH A 3 HP, 208V COOLING TOWER FAN. IN EXISTING MCC-1 RETROFIT 10 HP SIZE 2 COMBINATION STARTER WITH A 30A BREAKER AND A 3 HP VFD. THE BREAKER AND VFD WILL FIT IN THE SPACE VACATED BY THE COMBINATION STARTER AND THE 20" VERTICAL SPACE BELOW THE EXISTING STARTER. REPLACE EXISTING OUTDOOR SAFETY SWITCH WITH NEW 30A, 3P, NON-FUSIBLE, NEMA 3R SAFETY SWITCH. REPLACE EXISTING WIRING WITH 3 #12, #12G IN EXISTING CONDUIT BETWEEN STARTER AND SAFETY SWITCH. INSTALL NEW 3/4"C, 3 #12, #12G BETWEEN SAFETY SWITCH AND COOLING TOWER FAN MOTOR.
- TWO EXISTING 5 HP, 208V CONDENSING WATER PUMPS P-3 AND P-4 ARE BEING REPLACED WITH TWO 7-1/2 HP PUMPS. RE-USE EXISTING SIZE 1 STARTERS IN MCC-1. CHANGE HEATERS FOR 7-1/2 HP MOTORS. REPLACE 40A BREAKERS WITH 50A BREAKERS. REPLACE EXISTING WIRING WITH 3 #8, #10G IN EXISTING CONDUIT BETWEEN STARTERS AND NEW MOTORS.
- REMOVE EXISTING 3 KW, 208V CT-1B IMMERSION HEATER AND ASSOCIATED WIRE AND CONDUIT. LEAVE CT-1B BREAKER IN EXISTING PANEL PJ AS A SPARE.



**KEY PLAN**



## COOLING TOWER/ELECTRICAL ROOM PLAN

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

REVISIONS		DATE		BY / APPROVED	

NO.	
TITLE	<b>ELECTRICAL/HVAC UPGRADE</b>
	ODDEN-WEBER TECHNOLOGY COLLEGE
	COOLING TOWER/MECHANICAL ROOM PLANS

DATE	03/03/09	BY	ERK
DATE	03/03/09	BY	CJH
DATE	03/03/09	BY	
DATE	03/03/09	BY	

ENGINEERING	
APPROVED	
SCALE:	AS NOTED

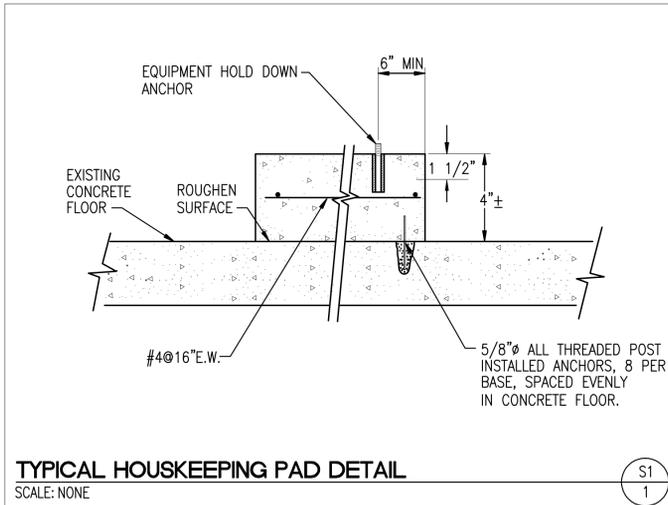
EDIT BY	
JOB NO.	451-003
CADFILE	451-003E3
DRAWING	<b>E-3</b>
REVISION	0

# Concrete Notes

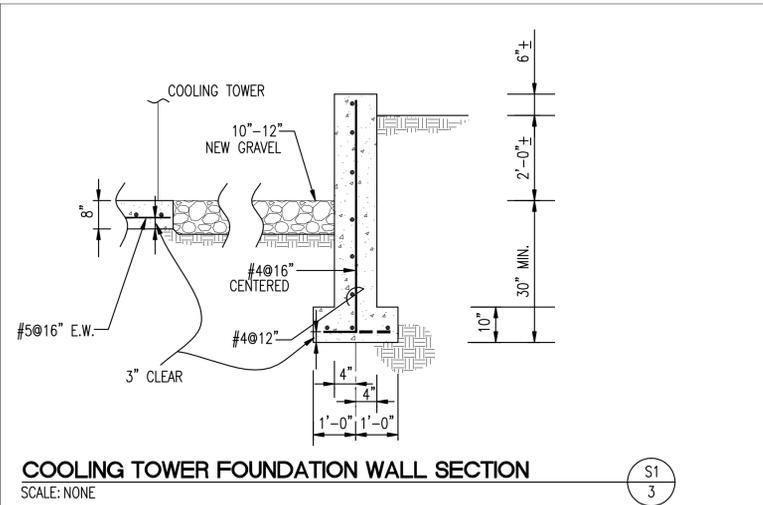
- CONCRETE MATERIALS, CONSTRUCTION AND WORKMANSHIP SHALL CONFORM TO ACI 318-05, ACI 301 AND IBC-06 REQUIREMENTS.
- MATERIALS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
  - CONCRETE AGGREGATE - ASTM C33 (MAXIMUM SIZE 1 INCH)
  - REINFORCING STEEL (REBAR) - ASTM A615, GRADE 60
  - CEMENT - PORTLAND CEMENT, ASTM C150, TYPE II OR III, TRICALCIUM ALUMINATE - 8% MAXIMUM
  - FLY ASH - ASTM C618, CLASS C OR F, 15% MAXIMUM AS CEMENT REPLACEMENT
  - COMPRESSIVE STRENGTH AT 28 DAYS (F'c) - 3000 PSI MINIMUM
  - SLUMP - 4 INCHES MAXIMUM
  - WATER TO CEMENT RATIO - 0.45 MAXIMUM
  - AIR ENTRAINMENT - 5 +/- 1.5 PERCENT
  - CONCRETE WEIGHT - NORMAL
  - CHEMICAL ADMIXTURES - ASTM C494
  - CALCIUM CHLORIDE - NONE ALLOWED
  - EMBEDDED ITEMS - CONFORM TO ASTM A36 UNO
- PROVIDE MINIMUM REBAR COVER CONFORMING TO ACI 318, CHAPTER 7 AS FOLLOWS:
  - CONCRETE DEPOSITED DIRECTLY AGAINST GROUND - 3"
  - CONCRETE EXPOSED TO WEATHER OR GROUND - #5 AND SMALLER 1-1/2" #6 & LARGER - 2"
  - CONCRETE NOT EXPOSED TO WEATHER OR GROUND - 1 1/2" FOR COLUMNS, BEAMS AND GIRDERS AND 3/4" FOR OTHERS
- REBAR SPLICES SHALL CONFORM TO ACI 318, SECTIONS 12.2 & 12.15, WITH LENGTHS (IN INCHES) AS FOLLOWS:

BAR SIZE	TOP BARS	OTHER BARS	BAR SIZE	TOP BARS	OTHER BARS
#4	32	25	#8	80	61
#5	40	31	#9	90	69
#6	48	37	#10	101	78
#7	70	53	#11	112	86

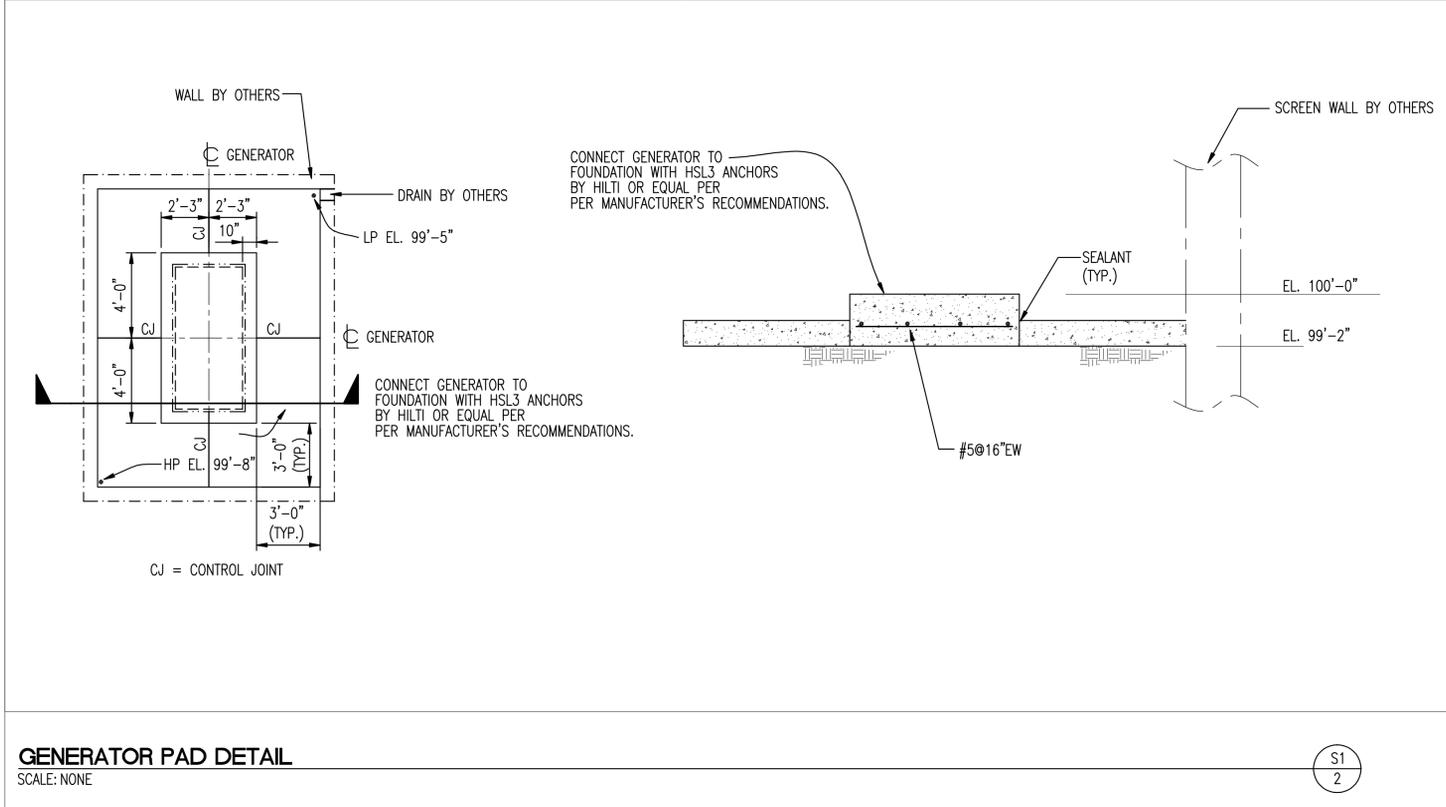
- TOP BARS - HORIZONTAL WITH GREATER THAN 12 INCHES OF CONCRETE CAST BELOW BAR.  
 REBAR SPACING - CLEAR DISTANCE GREATER THAN TWICE REBAR DIAMETER. REBAR WELDING LOCATIONS SHALL BE APPROVED AND CONFORM TO AWS D1.4, STRUCTURAL WELDING CODE - REINFORCING STEEL.
- REBAR SHALL BE CONTINUOUS AT STRUCTURE CORNERS AND INTERSECTIONS. VERTICAL REBAR SHALL BE DOWELED INTO SUPPORTING FOOTING OR STRUCTURE BELOW.
  - CONCRETE PLACED ON GRADE SHALL REST ON FIRM, UNDISTURBED SOIL OR GRAVEL OR ON APPROVED GRANULAR FILL COMPACTED TO 95% PER ASTM D1557 IN 8 INCH LOOSE LIFTS.
  - SLAB ON GRADE CONTROL JOINT MAXIMUM SPACING SHALL BE 30 TIMES THE SLAB THICKNESS AND SLAB JOINT LENGTH TO WIDTH RATIO SHALL BE 1.5:1 MAXIMUM. CONSTRUCTION JOINTS SURFACES SHALL HAVE 1/4 INCH PROFILE MINIMUM AND HAVE REBAR CONTINUOUS THRU JOINT. CONTROL JOINTS SHALL HAVE REBAR THRU JOINT CUT AND HAVE SIKAFLEX 2c SEALANT BY SIKA OR THC 900 OR 901 SEALANT BY TREMCO. EXPANSION JOINTS SHALL BE 1/2 INCH THICK AND CONFORM TO ASTM D1751, D1752 OR D2628. CONCRETE JOINT LOCATIONS NOT SHOWN ON DRAWINGS SHALL BE APPROVED.
  - EXPOSED CONCRETE FINISH SHALL BE AS FOLLOWS:
    - EXTERIOR SLABS - LIGHT BROOM
    - INTERIOR SLABS - SMOOTH TROWEL
    - OTHER HORIZONTAL - WOOD FLOAT
    - VERTICAL - SMOOTH WITHOUT HONEYCOMBING OR FORM MARKS
  - EXPOSED CORNERS SHALL HAVE A 3/4 INCH x 45 DEGREE CHAMFER.
  - CONCRETE WORK IN HOT WEATHER (90+ DEGREES F) SHALL CONFORM TO ACI STANDARD 305, ALONG WITH SHADING, WIND PROTECTION, USE OF AN EVAPORATION RETARDANT AND CURING AS SOON AS POSSIBLE.
  - CONCRETE WORK IN COLD WEATHER (40- DEGREES F) SHALL CONFORM TO ACI STANDARD 306.
  - EXPOSED (NON-FORMED) CONCRETE SURFACES SHALL HAVE SEVEN DAYS MOIST CURE OR A CURING COMPOUND APPLIED CONFORMING TO THE FOLLOWING:
    - ASTM C309 AND ASTM C1315
    - THIRTY PERCENT MINIMUM SOLIDS BY WEIGHT
    - APPLIED AT 200 SQUARE FEET PER GALLON
  - ANCHOR RODS (BOLTS) SHALL CONFORM TO ASTM F1554, GRADE 36, AND AISC STEEL CONSTRUCTION MANUAL, 13th EDITION, HAVE A WASHER CONFORMING TO ASTM F844 AND A NUT EXPOSED AND HAVE A NUT OR HEAD EMBEDDED. OTHER EMBEDDED ITEMS SHALL BE A36 STEEL. EXPOSED EMBEDDED METAL ITEMS SHALL BE GALVANIZED PER ASTM A123. POST INSTALLED ANCHORS COMPLYING WITH IBC 06 AND REPORTS ACI 193 OR AC 308 MAY BE SUBSTITUTED FOR EMBEDDED ANCHORS WHERE APPROVED.
  - ANCHOR ROD PLACEMENT TOLERANCES SHALL BE AS FOLLOWS:
    - LOCATION, +/- 1/8 INCH AT TOP OF ROD AND TOP OF CONCRETE
    - PROJECTION, + 1/4 INCH, - 0 INCH
    - PLUMB +/- 1/16 INCH/FOOT OF LENGTH
  - WATERSTOP SHALL BE SWELLSTOP BY GREENSTEAK.
  - CONCRETE SHALL BE PLACED AND CONSOLIDATED PER ACI REQUIREMENTS WITH THE USE OF INTERNAL VIBRATION.
  - EQUIPMENT CONNECTION ANCHOR SIZE AND LOCATIONS SHALL BE AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER.



**TYPICAL HOUSKEEPING PAD DETAIL**  
 SCALE: NONE



**COOLING TOWER FOUNDATION WALL SECTION**  
 SCALE: NONE



**GENERATOR PAD DETAIL**  
 SCALE: NONE

NO.	REVISIONS	DATE	BY	APPROVED

ENGINEERING	BY	DATE	TITLE
APPROVED	ERK	03/03/09	ELECTRICAL/HVAC UPGRADE
	NRH	03/03/09	ODDEN-WEBER TECHNOLOGY COLLEGE