

# UTAH STATE HOSPITAL MS BUILDING CHILLER REPLACEMENT

1300 East Center Street Provo, Utah 84603



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State of Utah—Department of Administrative Services

## DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

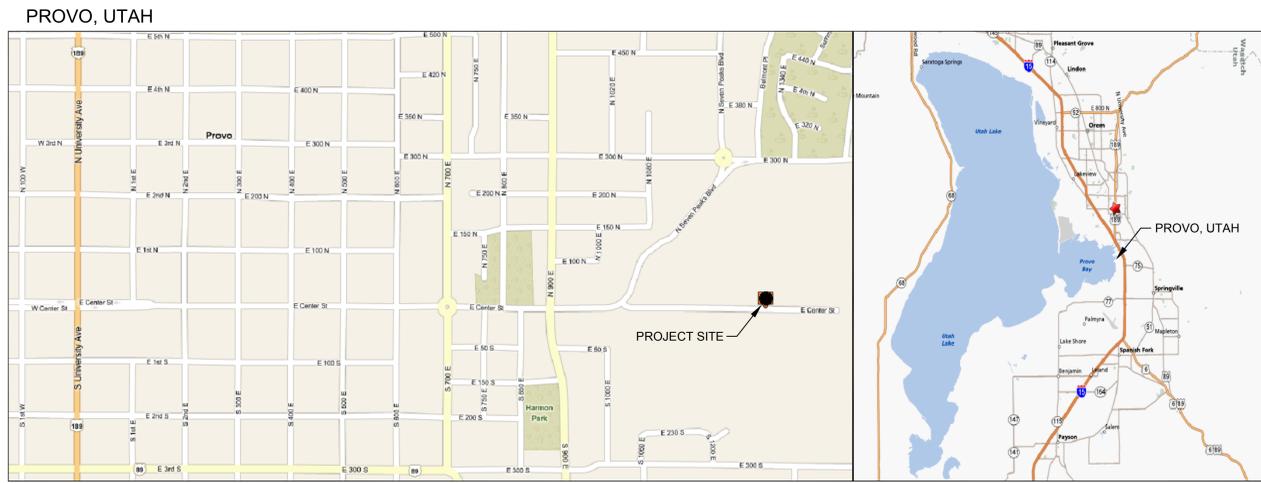
4110 State Office Building / Salt Lake City, Utah 84114 / 538-3018

# DFCM Project No. 10223420 CONSTRUCTION DRAWINGS

### SHEET INDEX

C0.0	COVER SHEET
M1.1	NEW CHILLER PLAN, DETAILS & SCHEDULES
E1.1	NEW CHILLER ELECTRICAL PLAN
E2.1	ELECTRICAL SPECIFICATIONS

UTAH STATE HOSPITAL  
 MS BUILDING CHILLER REPLACEMENT  
 1300 East Center Street  
 Provo, Utah



NORTH  
Vicinity Map

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SHEET CONTENTS  
COVER SHEET

1

2

3

4

5

6

# KEYED NOTES



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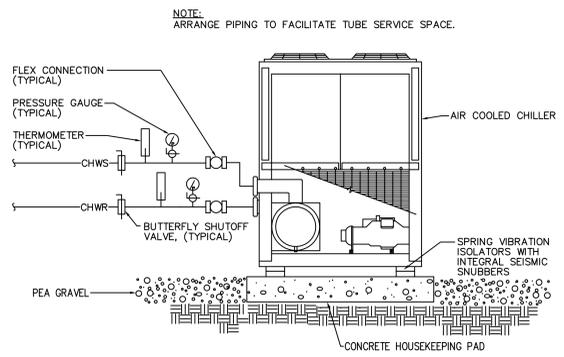
UTAH STATE HOSPITAL MS BUILDING CHILLER REPLACEMENT 1300 East Center Street Provo, Utah

Table with 2 columns: REVISIONS, and 2 columns: VBFA PROJECT #, CHECKED BY, DRAWN BY, CURRENT/BID DATE

SHEET CONTENTS NEW / DEMO CHILLER PLANS DETAILS AND SCHEDULES

M1.1

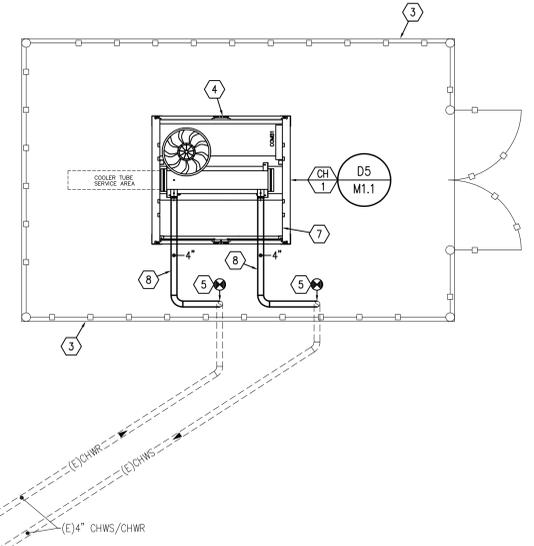
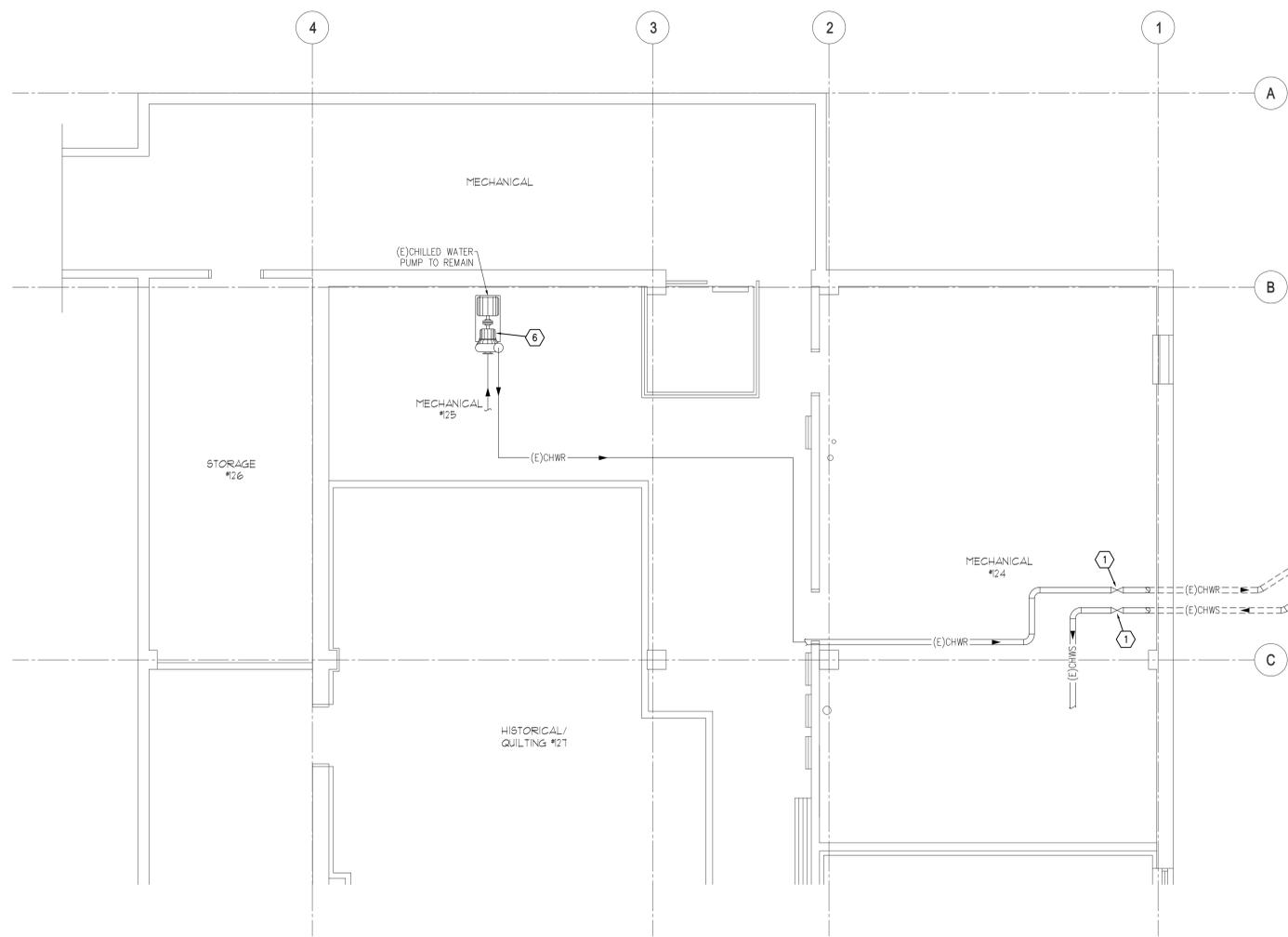
- 1. EXISTING SHUT-OFF VALVES TO REMAIN. FIELD VERIFY EXACT LOCATION.
2. EXISTING CHILLER WATER PIPING TO REMAIN.
3. EXISTING CONCRETE PAD AND ENCLOSED TO REMAIN.
4. REMOVE EXISTING CHILLER INCLUDING ALL ASSOCIATED ACCESSORIES, AND REPLACE WITH NEW. SEE DETAIL AND SCHEDULE.
5. EXTEND AND CONNECT NEW PIPING TO EXISTING.
6. BALANCE EXISTING CHILLED WATER PUMPS TO 190 GPM.
7. AUTOMATIC TEMPERATURE CONTROLS UNDERMINE AND DETERMINE CONTROL CONNECTION TO CHILLER. MAINTAIN ALL CURRENT CONTROLS REGARDING CHILLER INCLUDING START/STOP, CHILLED WATER TEMPS, AND ALARMS. WORK TO BE DONE BY JOHNSON CONTROLS.
8. REMOVE AND REINSTALL EXISTING HEAT TRACE ON PIPING.



D5 CHILLER PIPING DETAIL NO SCALE

AIR-COOLED CHILLER SCHEDULE table with columns for ID, MANUFACTURER AND MODEL NUMBER, LOCATION, TYPE, REFRIG., LOAD (TONS), AIR (AMBIENT ENTERING TEMP. DBWB, °F), FLUID (FLOW RATE, ENTERING/LEAVING TEMP. °F), WORKING FLUID, HEAD LOSS, ELECTRICAL (TOTAL MCA, TOTAL MOCOP, EER), CHILLER AND CONTROL CIRCUIT (VOLT/PHZ), PHYSICAL (LENGTH/WIDTH/HEIGHT (IN)), and NOTES.

- 1. CAPACITIES BASED ON 4500 FEET ELEVATION
2. PROVIDE UNIT WITH SINGLE POINT CONNECTION
3. UNIT TO COME WITH FREEZE PROTECTION
4. UNIT TO COME WITH FILED INSTALLED-NON FUSED DISCONNECT AND STARTER
5. ALLOWABLE CHILLER CAPACITIES: MINIMUM 75 TONS, MAXIMUM TONAGE EQUAL TO 400 AMP MOCOP OR LESS



A3 NEW CHILLER PLAN

SCALE: 1/4\"/>



MECHANICAL EQUIPMENT SCHEDULE											
MARK	DESCRIPTION	ELECTRICAL							DISCONNECT SIZE/POLE	FUSE SIZE	NOTES
		V/PH	LOAD (kW)	HP	FLA	MCA	MOCF				
CH-1	CHILLER	208/3				366.5	400			1	

V/PH/Hz = VOLTAGE / PHASE / HERTZ  
MCA = MINIMUM CIRCUIT AMPACITY  
MOCF = MAXIMUM OVER CURRENT PROTECTION LISTED BY THE MANUFACTURER

NOTES:  
(1) UNIT PROVIDED WITH DISCONNECT.

ELECTRICAL SYMBOL SCHEDULE			
SYMBOL	DEVICE/FIXTURE DESCRIPTION	CATALOG NUMBER	MOUNTING COMMENTS
(Symbol)	MECHANICAL EQUIPMENT	SEE MECHANICAL SCHEDULE	
(Symbol)	WIRING IN CND IN CEILING OR WALL	---	WIRING IN CND IN GROUND OR FLOOR
(Symbol)	CONDUIT TURNED UP	---	CONDUIT TURNED DOWN
(Symbol)	CIRCUIT HOME RUN TO PANEL. 3 CONDUCTORS INCLUDING THE EQUIPMENT GROUND CONDUCTOR.		
(Symbol)	CIRCUIT HOME RUN TO PANEL. NUMBER OF ARROW HEADS INDICATE NUMBER OF CIRCUITS. SLASH MARKS INDICATE NUMBER OF CONDUCTORS. EX. TWO CIRCUITS, FOUR CONDUCTORS, COMMON NEUTRAL AND THREE CIRCUITS WITH 7 CONDUCTORS (SEPARATE NEUTRAL PER CIRCUIT). BOTH EX. INCLUDE AN EQUIP. GROUND.		
(Symbol)	INDICATE NUMBER OF CONDUCTORS (SEPARATE NEUTRAL PER CIRCUIT). BOTH EX. INCLUDE AN EQUIP. GROUND.		

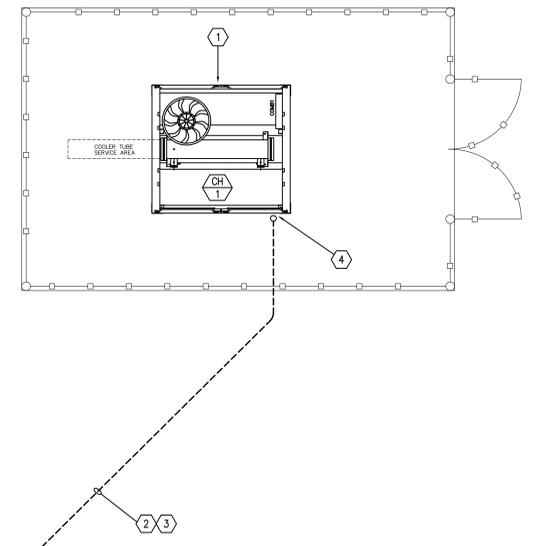
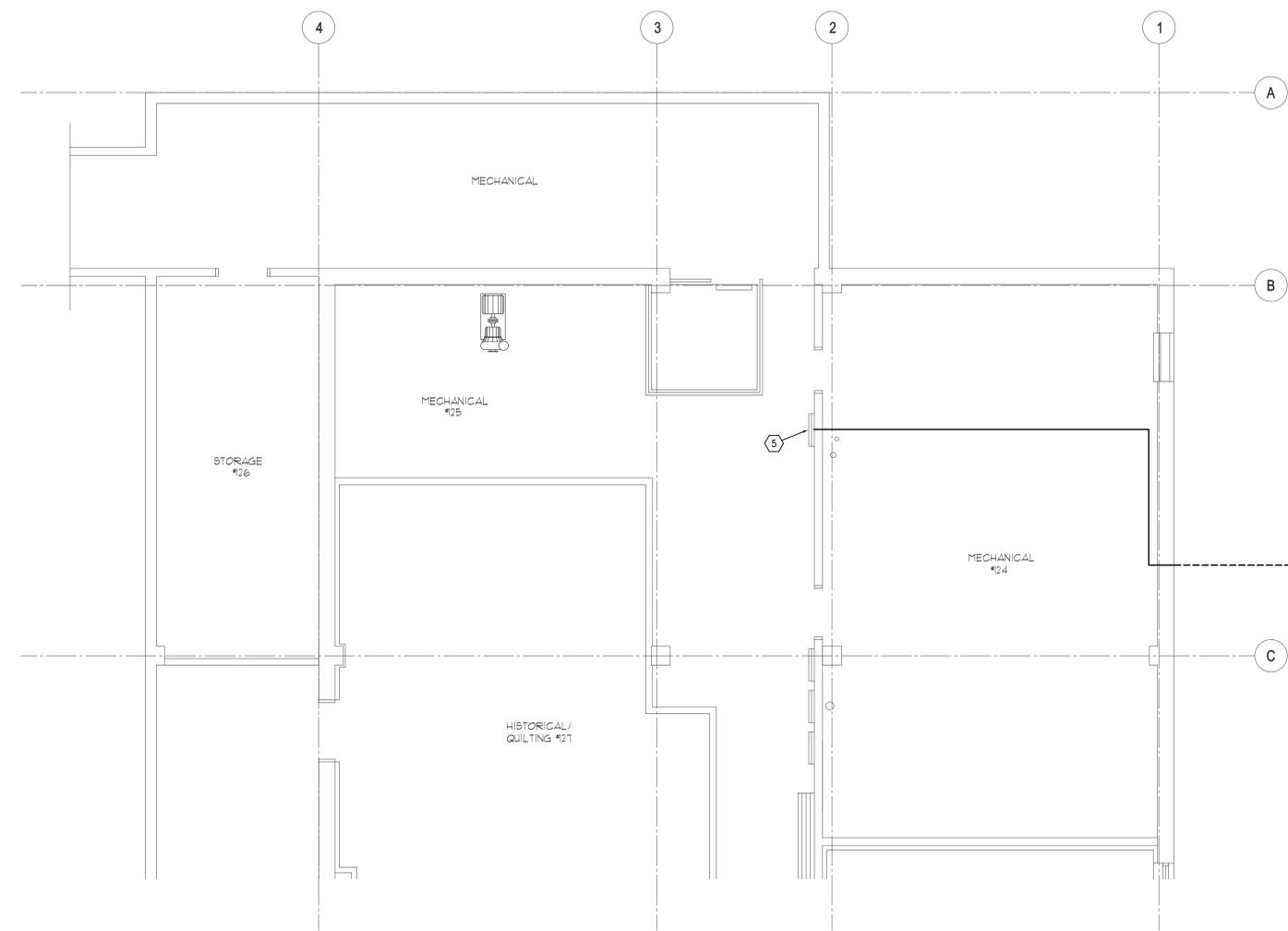
INSTALL CONDUIT AS DRAWN ON THE PLANS. THE ONLY EXCEPTIONS ARE THOSE AUTHORIZED IN WRITING BY THE ENGINEER. ALL CONDUITS SHALL INCLUDE AN EQUIPMENT GROUND CONDUCTOR SIZED PER NEC.

ABBREVIATIONS/NOTES  
AFF - ABOVE FINISHED FLOOR, AFG - ABOVE FINISHED GRADE, AIG - AMPS INTERRUPTING CAPACITY, BC - BARE COPPER, BFC - BELOW FINISHED CEILING, BFG - BELOW FINISHED GRADE, CND. OR C - CONDUIT, CLD - INSTALLED IN CEILING, CT - CURRENT TRANSducer, DFA - DROP FROM ABOVE, (E) - EXISTING, EC - ELECTRICAL CONTRACTOR, EV - ELECTRO VOICE, GC - GENERAL CONTRACTOR, GND - GROUND, MC - MECHANICAL CONTRACTOR, MCA - MINIMUM CIRCUIT AMPS, P.C. - PLUMBING CONTRACTOR, POC - POINT OF CONNECTION, POS - POINT OF SALES, RMC - RIGID METAL CONDUIT, SCA - SHORT CIRCUIT AMPERES, TC - TEMP. CONTROL CONTRACTOR, UNO - UNLESS NOTED OTHERWISE, VA - VOLT/AMPS, VF - VERIFY IN FIELD, WP - WEATHER PROOF/NEMA 3R

- ### GENERAL NOTES
- THE ELECTRICAL SYSTEMS DEFINED BY THESE PLANS AND SPECIFICATIONS ARE TO BE CONSTRUCTED AS COMPLETE AND OPERABLE SYSTEMS AND SHALL BE BID WITH THIS INTENT. THE CONTRACTOR SHALL VISIT THE SITE, READ ALL THE RELEVANT DOCUMENTS AND BECOME FAMILIAR WITH THE TYPE OF CONSTRUCTION AND WORK TO BE ACCOMPLISHED. SHOULD ANY ERROR, OMISSION OR CONFLICT EXIST IN EITHER THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING BEFORE SUBMITTING HIS BID PRICE SO A CHANGE CAN BE ISSUED IN A PRE-BID ADDENDUM. OTHERWISE, THE CONTRACTOR AND/OR EQUIPMENT SUPPLIER SHALL SUPPLY THE PROPER MATERIALS AND LABOR TO INSTALL COMPLETE AND OPERABLE SYSTEMS AT THEIR OWN EXPENSE. WHEN EACH ELECTRICAL SYSTEM IS COMPLETE, THE CONTRACTOR SHALL TEST AND CONFIRM ITS PROPER OPERATION. ANY INCOMPLETE SYSTEM SHALL BE MADE COMPLETE AND OPERABLE.
  - THE MECHANICAL PLANS ARE CONSIDERED A PART OF THE ELECTRICAL DOCUMENTS SO FAR AS ANY ELECTRICAL ITEMS THEY MAY CONTAIN. THE ELECTRICAL CONTRACTOR SHALL REFER TO AND COORDINATE WITH THEM. NO EXTRA COST SHALL BE ALLOWED FOR FAILURE TO COORDINATE THE CONTRACT DOCUMENTS WITH OTHER TRADES AND/OR IF EQUIPMENT DIMENSIONS ARE GREATER THAN SPECIFIED AND/OR DIMENSIONED ON THE PLANS.
  - NO ADDITIONS TO THE CONTRACTOR BID WILL BE ALLOWED FOR CHANGES MADE NECESSARY BY INTERFERENCE WITH OTHER WORK.
  - THE ELECTRICAL CONTRACTOR SHALL PROVIDE EQUIPMENT, MATERIALS AND LABOR FOR THE CONNECTIONS OF ALL EQUIPMENT SHOWN ON THE MECHANICAL PLANS.
  - THIS PROJECT IS TO BE INSTALLED IN STRICT ACCORDANCE WITH LOCAL, STATE AND THE NEC CODES. IF AT ANY TIME DURING CONSTRUCTION, OR AFTER, SOMETHING IS FOUND TO BE INSTALLED IN VIOLATION OF THE CODES LISTED ABOVE, IT SHALL BE CORRECTED AT THE CONTRACTORS EXPENSE.
  - THE EC SHALL INSTALL A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN EACH CONDUIT RUN. CONDUIT SHALL NOT BE USED AS AN EQUIPMENT GROUNDING CONDUCTOR. THE EC SHALL GROUND THE ELECTRICAL SYSTEM IN ACCORDANCE WITH LOCAL AND NATIONAL CODES.
  - THE ELECTRICAL CONTRACTOR SHALL SECURE ALL CONDUIT TO THE STRUCTURE AS IT IS SET IN PLACE USING INDUSTRY STANDARD METHODS AND PRACTICES.
  - LENGTHS OF FLEXIBLE CONDUIT GREATER THAN 48 INCHES SHALL NOT BE INSTALLED ON THIS PROJECT. FLEXIBLE CONDUIT SHALL NOT BE CONCEALED.
  - DURING CONSTRUCTION, THE ELECTRICAL CONTRACTOR SHALL REMOVE, REROUTE, AND/OR RELOCATE ANY EXISTING ELECTRICAL EQUIPMENT THAT CONFLICTS WITH THE REMODEL OR ADDITION. ALL SYSTEMS SHALL BE OPERABLE AT THE COMPLETION OF THE PROJECT. EQUIPMENT THAT IS NOT REUSED, AND NOT WANTED BY THE OWNER IN WRITING, BECOMES THE PROPERTY OF THE ELECTRICAL CONTRACTOR AND SHALL BE REMOVED FROM THE PREMISES.
  - THE ELECTRICAL CONTRACTOR SHALL MAINTAIN ELECTRICAL CONTINUITY TO REMAINING EQUIPMENT WHEN ANY EXISTING ELECTRICAL EQUIPMENT IS REMOVED.
  - ALL COSTS FROM THE USE OF THE EXISTING PANEL SHALL BE INCLUDED IN THE CONTRACTOR'S BASE BID, I.E. CHANGE IN BREAKER SIZE, ETC.
  - ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE EQUIPMENT SUPPLIER ON THE EXACT LOCATIONS OF ALL EQUIPMENT AND ELECTRICAL CONNECTIONS PRIOR TO ROUGH-IN. THE EC SHALL MAKE THE FINAL CONNECTION TO ALL EQUIPMENT.

- ### KEYED NOTES
- EC SHALL DISCONNECT ALL POWER FROM THE EXISTING CHILLER IN PREPARATION FOR IT TO BE REMOVED BY THE MC.
  - THE EXISTING CONDUIT SHALL REMAIN AND BE REUSED.
  - EC SHALL CONFIRM THE EXISTING CONDUCTORS ARE 500MCM COPPER OR LARGER WITH A #3 COPPER GROUND OR LARGER. IF THE CONDUCTORS ARE SMALLER THAN THIS THE EC SHALL REMOVE THEM AND PROVIDE 3#500MCM+1#3GRND THWN-2 IN THE EXISTING CONDUIT.
  - EC SHALL CONNECT THE POWER TO THE NEW CHILLER AFTER IT IS SET IN PLACE. CONFIRM WITH MC THE EXACT CONNECTION LOCATION AND REQUIREMENTS AND PROVIDE ADDITIONAL CONDUIT AND CONDUCTORS AS REQUIRED TO MAKE THE CONNECTION.
  - EXISTING PANELBOARD FEEDING THE EXISTING CHILLER. REUSE THE EXISTING 400AMP BREAKER TO POWER THE NEW CHILLER.

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E  
D  
C  
B  
A



NEW CHILLER ELECTRICAL PLAN  
SCALE: 1/4" = 1'-0"



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REVISIONS	

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SHEET CONTENTS
<b>NEW CHILLER ELECTRICAL PLAN</b>

E

D

C

B

A

PART 3 - EXECUTION

A. GENERAL

1. ALL MATERIALS SHALL BE INSTALLED IN A PROFESSIONAL MANNER INDICATIVE OF THE TRADE. ALL PENETRATIONS OF THE OUTSIDE WALLS OR ROOF SHALL BE SEALED WITH APPROPRIATE SEALANT OR CAULK FOR THE PARTICULAR SURFACE INVOLVED.
1. RACEWAYS SHALL RUN EXPOSED UNLESS OTHERWISE INDICATED. EXPOSED RACEWAY RUNS SHALL BE PARALLEL WITH SUPPORTING WALLS, BEAMS, AND CEILINGS AND WITH EACH OTHER AND SHALL NOT RUN CLOSER THAN 6 INCHES TO ANY WATER PIPE OR HEATER FLUME.
2. RACEWAY ENDS SHALL BE REAMED AFTER THREADING AND AFTER CUTTING AND BE MADE TO BUTT IN THE CENTER OF THE COUPLING. THE USE OF RUNNING THREADS IS PROHIBITED.
3. RACEWAYS SHALL BE INSTALLED AS A COMPLETE SYSTEM, CONTINUOUS FROM OUTLET TO OUTLET, CABINET, BOX OR FITTINGS, AND SHALL BE MECHANICALLY CONNECTED SO THAT ADEQUATE ELECTRICAL CONTINUITY FROM ONE TO ANOTHER IS OBTAINED. CONDUITS SHALL BE SUPPORTED WITH STAMPED STEEL OR MALLEABLE IRON STRAPS (SUCH AS MANUFACTURED BY RACO) DESIGNED FOR SUPPORTING CONDUIT. THE SIZE OF STRAP SHALL MATCH THE SIZE OF THE CONDUIT. NAILS, PERFORATED STRAP, OR PLUMBERS TAPE SHALL NOT BE USED FOR SUPPORT OF RACEWAY.
4. PROVIDE 1/8" POLY PULL CORD IN RACEWAYS WITHOUT CONDUCTORS.
5. FOUR 90 DEGREE BENDS MAXIMUM BETWEEN TERMINATIONS OR BOXES.

C. CONDUCTORS

1. ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT AND COLOR CODED AS FOLLOWS:

PHASE	208/120	480/277
PHASE A	BLACK	BROWN
PHASE B	RED	ORANGE
PHASE C	BLUE	YELLOW
NEUTRAL	WHITE	GREY
GROUND	GREEN	GREEN

2. MAKE JOINTS, SPLICES, TAPS AND CONNECTIONS IN CONDUCTORS WITH SOLDERLESS CONNECTORS.

D. JUNCTION AND PULL BOXES

1. PULL BOXES SHALL BE PROVIDED WHERE INDICATED OR WHERE NECESSARY TO FACILITATE THE PULLING OF CONDUCTORS.

E. GROUNDING

1. INSTALL A CODE SIZED GROUNDING CONDUCTOR IN ALL RACEWAYS. DO NOT USE THE RACEWAY FOR GROUNDING. MAKE GOOD CONTACT AT ALL PANEL BOARDS, OUTLET BOXES, AND JUNCTION OR PULL BOXES TO THE RACEWAY SYSTEM. USE APPROVED BONDING MATERIALS.

H. CUTTING AND PATCHING

1. PERFORM DRILLING, CUTTING, AND PATCHING OF THE GENERAL CONSTRUCTION WORK WHETHER EXISTING OR NEW AS REQUIRED FOR THE INSTALLATION OF ELECTRICAL WORK. PATCH WITH THE SAME MATERIALS, WORKMANSHIP, AND FINISH AS THE ORIGINAL WORK AND ACCURATELY MATCH ALL SURROUNDING WORK. SUCH WORK WILL BE DONE BY A CRAFTSMAN ACCREDITED IN THE APPLICABLE TRADE UNDER THE CONTRACTOR'S SUPERVISION AND BE ACCEPTABLE TO THE OWNER'S REPRESENTATIVE. COORDINATE WITH OTHER TRADES AND GENERAL CONTRACTOR PRIOR TO CUTTING, DRILLING, OR CORING.

J. TESTING

1. DEMONSTRATE THAT ALL COMPONENTS OF THE WORK OF THIS DIVISION HAVE BEEN PROVIDED AND THAT THEY OPERATE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
2. TEST WIRING AND CONNECTORS FOR CONTINUITY, SHORT CIRCUITS AND IMPROPER GROUNDS. TEST EACH INDIVIDUAL POWER CIRCUIT WITH THE POWER EQUIPMENT CONNECTED FOR PROPER OPERATION.
3. PROVIDE DETAILED DOCUMENTATION OF EACH TEST PERFORMED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE, WITH THE NAMES AND THE SIGNATURES OF QUALIFIED INDIVIDUALS WHO CONDUCTED AND WITNESSED EACH TEST.

ELECTRICAL SPECIFICATIONS

PART 1 - GENERAL

A. DESCRIPTION

1. FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND TRANSPORTATION AS REQUIRED TO PROPERLY INSTALL A COMPLETE AND OPERABLE ELECTRICAL SYSTEM.

B. RULES AND REGULATIONS

1. ALL WORK AND MATERIALS SHALL BE INSTALLED AS SHOWN AND HEREIN SPECIFIED.
2. THE LATEST EDITIONS OF THE FOLLOWING SPECIFICATIONS, STANDARDS, AND AMENDMENTS, AS ADOPTED BY THE AUTHORITY HAVING JURISDICTION, SHALL FORM A PART OF THIS SPECIFICATION THE SAME AS IF HEREBY WRITTEN OUT IN FULL (ALL MATERIALS AND INSTALLATIONS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS THEREOF):
  - a) NFPA (NATIONAL FIRE PROTECTION ASSOCIATION), PUBLICATION NUMBER 70, "NATIONAL ELECTRICAL CODE", PUB. NO. 72E, "AUTOMATIC FIRE DETECTORS".
  - b) UL (UNDERWRITERS LABORATORIES, INC.).
  - c) NEMA (NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION).
  - d) IBC (UNIFORM BUILDING CODE) AND STANDARD BUILDING CODE.
  - e) IBC (INTERNATIONAL BUILDING CODE)
  - f) IFC (INTERNATIONAL FIRE CODE)
  - g) IECC (INTERNATIONAL ENERGY CONSERVATION CODE)
  - h) NEC (INTERNATIONAL ELECTRICAL CODE)
  - i) STATE AND LOCAL BUILDING AUTHORITY AND CODES

3. NO REQUIREMENT TO THESE DRAWINGS AND SPECIFICATIONS SHALL BE CONSTRUCTED TO VOID ANY OF THE PROVISIONS OF THE ABOVE SPECIFICATIONS AND STANDARDS.

- C. PERMITS AND INSPECTIONS UNLESS OTHERWISE SPECIFIED, THE CONTRACTOR SHALL APPLY, PAY FOR AND SCHEDULE ALL APPLICABLE PERMITS, FEES AND INSPECTIONS REQUIRED BY ANY AND ALL PUBLIC AUTHORITIES HAVING JURISDICTION AND REQUIRING INSPECTION.

D. WORKMANSHIP AND MATERIALS

1. WORKMANSHIP SHALL BE OF THE BEST QUALITY AND NONE BUT COMPETENT PERSONNEL SKILLED IN THEIR TRADE SHALL BE EMPLOYED. THE CONTRACTOR SHALL FURNISH THE SERVICES OF AN EXPERIENCED SUPERINTENDENT, WHO WILL BE IN CHARGE OF THE EXECUTION OF WORK, UNTIL COMPLETED AND ACCEPTED.
2. UNLESS OTHERWISE HEREIN AFTER SPECIFIED, ALL MATERIALS AND EQUIPMENT UNDER THIS DIVISION OF THE SPECIFICATIONS SHALL BE NEW, OF BEST GRADE AND AS LISTED IN PRINTED CATALOGS OF THE MANUFACTURER. EACH ARTICLE OF ITS KIND SHALL BE THE STANDARD PRODUCT OF A SINGLE MANUFACTURER.
3. THE OWNER'S REPRESENTATIVE SHALL HAVE THE RIGHT TO ACCEPT OR REJECT MATERIAL EQUIPMENT AND/OR WORKMANSHIP AND DETERMINE WHEN THEY HAVE COMPLIED WITH THE REQUIREMENTS HEREIN SPECIFIED.
4. ALL MANUFACTURED MATERIALS SHALL BE CLEARLY MARKED OR STAMPED WITH THE MANUFACTURER'S NAME AND RATING.
5. REFERENCE TO STANDARDS ARE INTENDED TO BE THE LATEST REVISION OF THE STANDARD SPECIFIED, OR THAT ACCEPTED BY THE AUTHORITY HAVING JURISDICTION

E. MANUFACTURER'S RECOMMENDATIONS

1. EQUIPMENT INSTALLED UNDER THIS DIVISION OF THE SPECIFICATIONS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR HEREIN SPECIFIED.

F. GUARANTEE

- ALL MATERIALS AND EQUIPMENT PROVIDED AND INSTALLED UNDER THIS SECTION SHALL BE GUARANTEED FOR A MINIMUM OF ONE YEAR. SHOULD ANY TROUBLE OR MALFUNCTIONS DEVELOP DURING THIS PERIOD DUE TO DEFECTIVE MATERIALS OR FAULTY WORKMANSHIP, THE CONTRACTOR WILL BE HELD LIABLE AND SHALL FURNISH LABOR, MATERIALS AND EQUIPMENT NECESSARY TO CORRECT THE TROUBLE OR MALFUNCTION WITHOUT ADDITIONAL COST TO THE OWNER. ALL DEFECTIVE MATERIAL OR INTERIOR WORKMANSHIP NOTICED DURING THE TIME OF INSTALLATION SHALL BE CORRECTED IMMEDIATELY TO THE ENTIRE SATISFACTION OF THE ARCHITECT AND OWNER, AT NO ADDITIONAL COST.

G. DEFINITIONS

1. FURNISH: TO SUPPLY AND DELIVER, UNLOAD, INSPECT FOR DAMAGE.
2. INSTALL: TO UNPACK, ASSEMBLE, ERECT, APPLY, PLACE, FINISH, CURE, PROTECT, CLEAN, AND MAKE READY FOR USE.
3. PROVIDE: TO FURNISH AND INSTALL.

H. SUBMITTALS

1. PROVIDE SHOP DRAWINGS AND MANUFACTURER'S LITERATURE OF MATERIALS AND EQUIPMENT AS REQUIRED IN THE GENERAL CONDITIONS, AS DIRECTED BY THE OWNER'S REPRESENTATIVE AND AS LISTED BELOW.

THE ABOVE IS A STANDARD SUBMITTAL REQUIREMENT LIST. ELECTRICAL CONTRACTOR SHALL SUBMIT ALL APPLICABLE ITEMS FOR REVIEW. MATERIAL NOT SUBMITTED AND APPROVED BY THE ARCHITECT OR OWNER'S REPRESENTATIVE SHALL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTORS COST IF DIRECTED BY THE ARCHITECT OR THE OWNER'S REPRESENTATIVE.

PART 2 - MATERIALS

A. GENERAL

MATERIALS AND EQUIPMENT SHALL BE STANDARD CATALOGED PRODUCTS OF MANUFACTURERS REGULARLY ENGAGED IN THE MANUFACTURE OF THE PRODUCT. UL LISTED, AND SHALL BE THE LATEST STANDARD DESIGN THAT CONFORMS TO SPECIFIED MATERIALS AND EQUIPMENT.

B. RACEWAY

1. ELECTRICAL METALLIC TUBING (EMT) SHALL BE USED IN INTERIOR DRY LOCATIONS GALVANIZED FLEXIBLE STEEL OR LIQUID TIGHT STEEL CONDUIT SHALL BE USED FOR CONNECTIONS TO MECHANICAL EQUIPMENT AND TRANSFORMERS OR AS INDICATED. LIQUID TIGHT CONDUIT SHALL BE USED IN EXTERIOR OR DAMP LOCATIONS.
2. 3/4" CONDUIT SHALL BE THE MINIMUM SIZE CONDUIT. OUTDOOR AND WET OR DAMP LOCATIONS: PROVIDE RIGID STEEL CONDUIT. PROVIDE CAST METAL OR PVC OUTLET, JUNCTION, AND PULL BOXES.

C. FITTINGS

1. ALL FITTINGS SHALL BE STEEL/MALLEABLE IRON SET SCREW OR COMPRESSION WITH INSULATING BUSHINGS.
- D. OUTLET AND JUNCTION BOXES
  1. BOXES IN INTERIOR DRY LOCATION SHALL BE GALVANIZED ONE-PIECE PRESSED STEEL, KNOCKOUT TYPE, NOT LESS THAN 4 INCHES SQUARE AND 2 1/8" DEEP; APPLETON, RACO, OR EQUAL.
  2. BOXES SHALL BE EQUIPPED WITH PLASTER RINGS, EXTENSION RINGS, AND FIXTURE STUDS AS REQUIRED FOR THE DEVICE OR APPLICATION.
  3. PROVIDE SURFACE MOUNTING OUTLET BOX IN NON-FINISHED AREAS, SURFACE MOUNTING FOR UNFINISHED AREAS.
  4. PROVIDE NEMA 3R BOXES IN WET LOCATIONS.

E. CONDUCTORS

1. ALL CONDUCTORS SHALL BE SOFT DRAWN, ANNEALED COPPER IN RACEWAY SIZED AS SHOWN ON THE PLANS. ALL CONDUCTORS TO BE MINIMUM #12 AWG. #8 AWG AND LARGER SHALL BE STRANDED.
2. CONDUCTORS SHALL BE COPPER, THHN OR THWN-2 COLOR CODED IN ACCORDANCE WITH PART 3, SECTION C. 1. OF THESE SPECIFICATIONS.

F. WIRING CONNECTIONS

1. MAKE ALL ELECTRICAL CONNECTIONS.
2. DO NOT PLACE STRANDED CONDUCTORS DIRECTLY UNDER SCREWS. INSTALL CRIMP-ON, INSULATED, FORK TERMINALS FOR CONDUCTOR TERMINATIONS, OR INSTALL SOLID CONDUCTORS.



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ELECTRICAL SPECIFICATIONS