DM-12 UPSTATE HODGE CENTER CHILLER REPLACEMENT
SC STATE PROJECT #H34-9543-JM

UNIVERSITY OF SOUTH CAROLINA UPSTATE

Spartanburg, South Carolina

DESIGN TEAM

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HODGE CENTER
CHILLER SITE
(BASEMENT)

VICINITY MAP

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CHILLER REPLACEMENT
SC STATE PROJECT #H34-9543-JM
SPARTANBURG, SOUTH CAROLINA

DESIGN: JCP / DRAWN: TMI
CHECKED: JCP
DATE: 03/29/13
JOB NO.: PERITUS #130102
SHEET: T-1
1 OF 1 SHEETS

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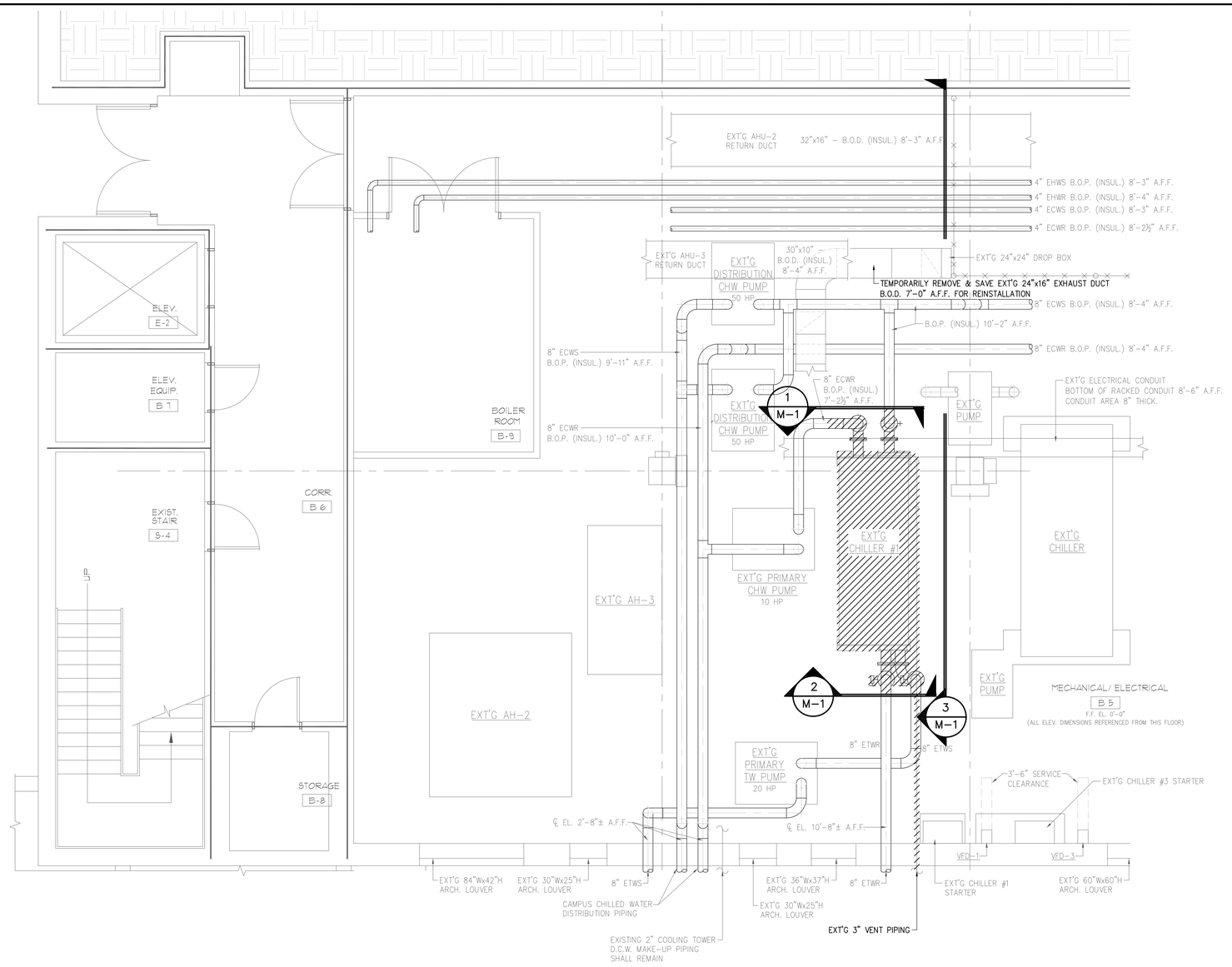
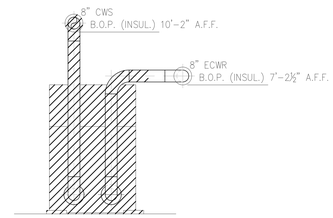


PARTIAL HVAC PIPING DEMOLITION PLAN

SCALE: ¼" = 1'-0"

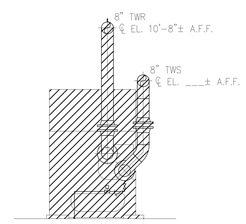
HATCHED AREA INDICATES ITEMS TO BE REMOVED



1 DMP-1 CHILLER PIPING ELEVATION – DEMOLITION

SCALE: ¼" = 1'-0"

ALL ELEV. DIMENSIONS REFERENCED FROM MECHANICAL ROOM FLOOR

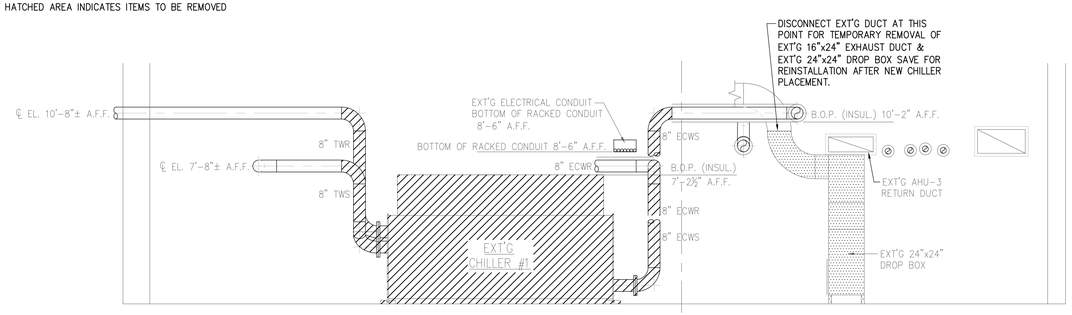


2 DMP-1 CHILLER PIPING ELEVATION – DEMOLITION

SCALE: ¼" = 1'-0"

ALL ELEV. DIMENSIONS REFERENCED FROM MECHANICAL ROOM FLOOR

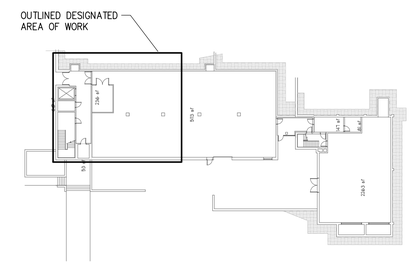
DEMOLITION WORK NOTES:



3 DMP-1 CHILLER PIPING ELEVATION – DEMOLITION

SCALE: ¼" = 1'-0"

ALL ELEV. DIMENSIONS REFERENCED FROM MECHANICAL ROOM FLOOR



KEY PLAN

NO SCALE

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DM-12 UPSTATE HODGE CENTER
CHILLER REPLACEMENT
SC STATE PROJECT #H34-9543-JM
SPARTANBURG, SOUTH CAROLINA

DESIGN	JCP
DRAWN	TMI
CHECKED	JCP
DATE	03/29/13
JOB NO.	PERITUS #130102
SHEET	DMP-1

1 OF 3 SHEETS

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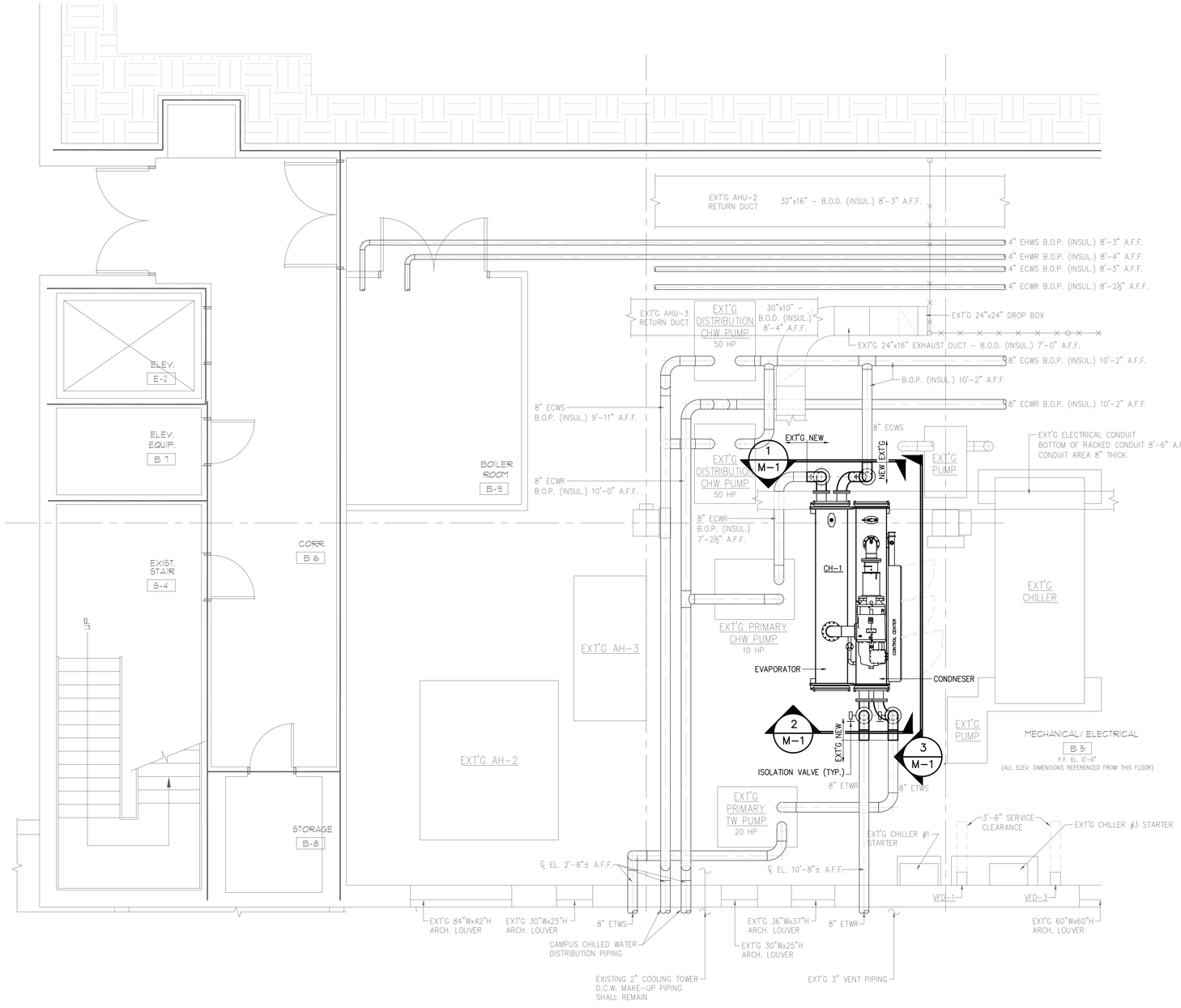
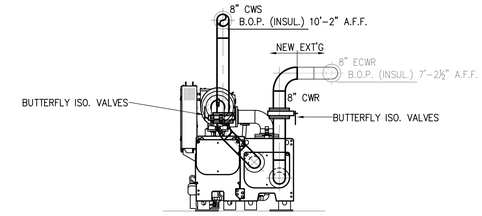


HVAC PIPING PARTIAL NEW WORK PLAN

SCALE: ¼" = 1'-0"

ALL NEW WORK SHOWN IN **BOLD**

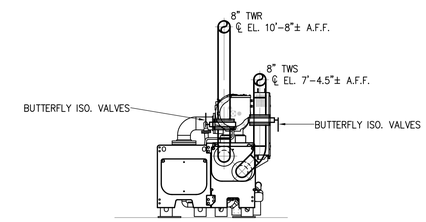


1 MP-1

CHILLER PIPING ELEVATION

SCALE: ¼" = 1'-0"

ALL ELEV. DIMENSIONS REFERENCED FROM MECHANICAL ROOM FLOOR

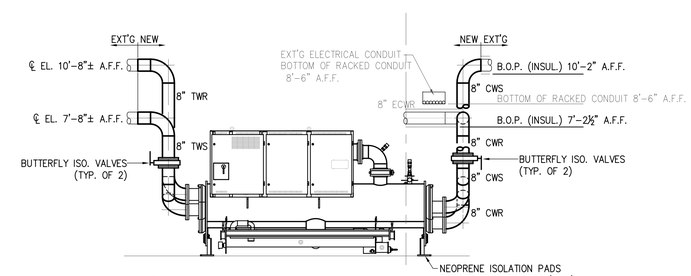


2 MP-1

CHILLER PIPING ELEVATION

SCALE: ¼" = 1'-0"

ALL ELEV. DIMENSIONS REFERENCED FROM MECHANICAL ROOM FLOOR

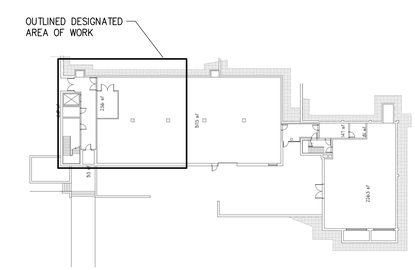


3 MP-1

CHILLER PIPING ELEVATION

SCALE: ¼" = 1'-0"

ALL ELEV. DIMENSIONS REFERENCED FROM MECHANICAL ROOM FLOOR



KEY PLAN

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SPARTANBURG, SOUTH CAROLINA

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WATER–COOLED HELICAL ROTARY (VFD DRIVEN) CHILLER SCHEDULE

UNIT No.	CARRIER MODEL No.	LOADING	DESIGN MAX CAPACITY (TONS)	RATED FULL LOAD MAX K.W. @ DESIGN CAPACITY	FULL LOAD MAX. K.W./TONS (ASHRAE 90.1)	PART LOAD MAX. IPLV	MOTOR RLA	CHILLER RLA @ RATED K.W.	CHILLER SHELL DATA					CONDENSER SHELL DATA					UNIT OPERATING WEIGHT (LB.)	UNIT SHIPPING WEIGHT (LB.)	MCA	MAX FUSE/CB AMPS	VOLTAGE	REMARKS
									EWT°F	LWT°F	G.P.M.	PRESS. DROP (FT. WG.)	FOULING FACTOR	EWT°F	LWT°F	G.P.M.	PRESS. DROP (FT. WG.)	FOULING FACTOR						
CH–1	23XRV3737NQVAA51	100%	350	213	0.609	0.319	308	281	53.9	44.0	840	22.0	0.0001	85.0	94.4	1050	23.4	0.00025	19079	16960	351	600	460/3/60	1–4
		75%	263	106	0.404	–	221	144	51.5	44.0	840	22.1	0.0001	75.0	81.7	1050	24.0	0.00025						
		50%	175	47	0.271	–	164	70	49.0	44.0	840	22.2	0.0001	65.0	69.3	1050	24.6	0.00025						
		25%	88	25	0.287	–	165	43	46.5	44.0	840	22.3	0.0001	65.0	67.2	1050	24.7	0.00025						

NOTES:
1. FACTORY CHARGED WITH DRY NITROGEN.
2. MFR. START–UP TECHNICIAN TO SUPPLY AND INSTALL FULL CHARGE OF REFRIGERANT (APPROX. 760 lbs. R–134a) AND OIL AFTER ASSEMBLY.
3. FACTORY SEPARABLE SHELLS AND COMPRESSOR SHIPPING SPLITS FOR FIELD DISASSEMBLY AND REASSEMBLY.
4. FACTORY WELDED RAISED FACED FLANGES FOR CONDENSER WATER INLET/OUTLET AND CHILLED WATER INLET/OUTLET.

MECHANICAL GENERAL NOTES

1. ALL SCHEDULES SHOWN ARE THE PURPOSE OF AIDING THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CORRECT TOTALS.
2. CO–ORDINATE HVAC INSTALLATION WITH ALL OTHER TRADES, INCLUDING ELECTRICAL.
3. REFER TO ELECTRICAL DRAWINGS FOR POWER CONNECTION POINTS.
4. ALL PIPING INSULATION SHALL COMPLY WITH SECTION 503 OF THE INTERNATIONAL ENERGY CONSERVATION CODE. 2006 EDITION.
5. ALL ELECTRICALLY POWERED EQUIPMENT SHALL BE LISTED AND LABELED PER NATIONAL ELECTRICAL CODE, AND INTERNATIONAL MECHANICAL CODE, 2009 EDITION, CHAPTER 3.
6. ALL EQUIPMENT SHALL BE ACCESSIBLE PER INTERNATIONAL MECHANICAL CODE 2009 EDITION, CHAPTER 3.
7. ALL PIPING ARRANGEMENT AND ROUTING AS SHOWN IS DIAGRAMMATIC AND MAY REQUIRE ALTERATIONS DIFFERENT FROM THAT SHOWN IN ORDER TO ACCOMMODATE STRUCTURE/ARCHITECTURAL FEATURES. CONTRACTOR SHALL FIELD VERIFY AND MAKE ALTERATIONS OR REVISIONS AS REQUIRED.
8. THE HORSEPOWERS SHOWN ARE MIN. REQUIRED FOR PRESENT AND/OR FUTURE GROWTH/OPERATION. IN NO CASE WILL ANY MOTOR H.P. REDUCTION FROM THAT SPECIFIED BE ACCEPTED.
9. CONTRACTOR SHALL RECEIVE AND OFFLOAD NEW CHILLER. COORDINATE EXACT OFFLOADING LOCATION WITH OWNER. CONTRACTOR SHALL PROVIDE FOR THE RIGGING, TRANSPORT, AND PLACEMENT OF NEW CHILLER ON TO EXISTING EQUIPMENT PAD WHEN WORK COMMENCES.

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
ECWS	EXISTING CHILLED WATER SUPPLY PIPING
ECWR	EXISTING CHILLED WATER RETURN PIPING
EHWS	EXISTING HEATING WATER SUPPLY PIPING
EHWR	EXISTING HEATING WATER RETURN PIPING
ETWS	EXISTING TOWER WATER SUPPLY PIPING
ETWR	EXISTING TOWER WATER RETURN PIPING
EXT'G	EXISTING
—D—	DRAIN PIPING
—DCW—	DOMESTIC COLD WATER PIPING
	CLEAN OUT (C.O.)
	BALL VALVE
	CHECK VALVE
	STRAINER ASSEMBLY
	CIRCUIT BALANCER
	BUTTERFLY VALVE (LUG BODY)
	2–WAY CONTROL VALVE
	3–WAY CONTROL VALVE
	PRESSURE REDUCING VALVE
	REDUCER
	UNION
	TRIPLE DUTY VALVE
	PRESSURE GAUGE
	THERMOMETER
N.O.	NORMALLY OPEN
N.C.	NORMALLY CLOSED
	EXISTING PIPE TO REMAIN

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SPARTANBURG, SOUTH CAROLINA

DESIGN JCP / DRAWN TMI
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DATE 03/29/13
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3 OF 3 SHEETS

SYMBOL	DESCRIPTION
———	EXPOSED CONDUIT
○	CONDUIT TURNING UP
●	CONDUIT TURNING DOWN
■	CONNECTION TO A SPECIFIC PIECE OF EQUIPMENT. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH PROVIDER / INSTALLER OF THE EQUIPMENT.

ABBREVIATIONS:

AFF	ABOVE FINISH FLOOR	MCB	MAIN CIRCUIT BREAKER
AFG	ABOVE FINISHED GRADE	MFR	MANUFACTURER
BKR	BREAKER	MSB	MAIN SWITCHBOARD
CU	COPPER	NTS	NOT TO SCALE
CKT	CIRCUIT	PH	PHASE
DWG	DRAWING	PNL	PANEL
EC	ELECTRICAL CONTRACTOR	REQD	REQUIRED
FU	FUSE	SW	SWITCH
FWE	FURNISHED WITH EQUIPMENT	UNO	UNLESS NOTED OTHERWISE
MCC	MOTOR CONTROL CENTER	W/	WITH
MLO	MAIN LUGS ONLY		

ELECTRICAL GENERAL NOTES:

1. INSPECT SITE PRIOR TO SUBMITTING BID. DRAWINGS ARE INTENDED TO COVER THE REQUIRED ELECTRICAL SYSTEMS. DRAWINGS MAY NOT SHOW COMPLETE OR ACCURATE DETAILS OF THE BUILDING OR SYSTEM IN EVERY RESPECT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY ADDITIONAL INFORMATION AS REQUIRED.
2. CONFORM TO THE NATIONAL ELECTRICAL CODE (2011), IBC (2012), APPLICABLE NEMA, ANSI AND IEEE PUBLICATIONS, U.L. AND ADA STANDARDS AND OSHA REQUIREMENTS. COMPLY WITH LOCAL, COUNTY, STATE AND NATIONAL CODES HAVING JURISDICTION.
3. FURNISH AND INSTALL ALL MATERIALS IN A NEAT AND WORKMANLIKE FASHION. ALL MATERIALS SHALL BE NEW, WITH FIRST QUALITY AND UL LABEL.
4. VERIFY ALL DIMENSIONS AND CLEARANCES PRIOR TO INSTALLATION OF EQUIPMENT AND RACEWAYS. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF WORK WITH THAT OF ALL OTHER TRADES AS REQUIRED.
5. INTERIOR CONDUIT SHALL BE IMC FOR BRANCH CIRCUIT WIRING AS ALLOWED BY NEC WITH LIQUID TIGHT FLEX FOR FINAL CONNECTION TO CHILLER. WHERE RUN EXPOSED IN EXTERIOR, OR BELOW 8'-0" SUBJECT TO PHYSICAL DAMAGE CONDUITS SHALL BE RIGID GALVANIZED STEEL. MINIMUM CONDUIT SIZE SHALL BE 3/4". ALL CONDUCTORS SHALL BE TYPE THHN/THWN, STRANDED 600V COPPER BUILDING WIRE. MINIMUM SIZE SHALL BE #12 AWG COPPER UNLESS NOTED.
6. PROVIDE GROUNDING FOR ALL EQUIPMENT IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE. VERIFY CONTINUOUS GROUND TO EXISTING SERVICE GROUND.
7. ALL ENCLOSURES SHALL BE OF THE NEMA TYPE WHICH IS SUITABLE FOR THE APPLICATION.
8. SEAL ALL CONDUIT PENETRATIONS TO MATCH RATING OF WALL BEING PENETRATED.
9. ALL WORK SHALL HAVE PROPER LABELING AND NAMEPLATES. ALL CIRCUITS SHALL BE LABELED AT PANELS AND BOXES AS INDICATED. ALL PANELS AND DISCONNECTS ARE TO BE PERMANENTLY MARKED WITH NAMEPLATE FOR EQUIPMENT SERVED WITH EQUIPMENT ID, VOLTAGE AND SOURCE OF POWER. ALL PANELS ARE TO BE PROVIDED WITH TYPEWRITTEN PANEL SCHEDULES MODIFIED TO SHOW NEW CIRCUITRY.
10. THOROUGHLY CLEAN ALL EQUIPMENT AND SYSTEMS BEFORE PLACING IN OPERATION. RESTORE FINISHED SURFACES IF DAMAGED AND DELIVER THE ENTIRE INSTALLATION IN AN APPROVED CONDITION. INSTRUCT THE OWNERS' PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF THE SYSTEMS. FURNISH TO THE OWNER THREE SETS OF OPERATION AND MAINTENANCE MANUALS FOR EACH SYSTEM.
11. GUARANTEE THE WORK INSTALLED FOR A PERIOD OF ONE YEAR AFTER DATE OF FINAL ACCEPTANCE. DEFECTS WHICH APPEAR AS A RESULT OF NORMAL USAGE SHALL BE REMEDIED BY THE CONTRACTOR TO THE COMPLETE SATISFACTION OF THE OWNER WITHOUT COST TO THE OWNER.
12. CONTRACTOR SHALL KEEP CURRENT A SET OF PLANS FOR THE DURATION OF CONSTRUCTION WITH ALL CHANGES TO WORK NEATLY AND ACCURATELY MARKED IN RED AND SHALL TURN OVER TO OWNER AT COMPLETION OF PROJECT.
13. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED TO MEET SEISMIC REQUIREMENTS OF 2009 IBC AND SHALL BE SUBJECT TO SPECIAL INSPECTION REQUIREMENTS, CHAPTER 17 OF 2006 IBC AS IT RELATES TO ELECTRICAL EQUIPMENT.

SECTION 16999 -- ELECTRICAL TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. MATERIALS SPECIFIED IN THIS SECTION SHALL COMPLY WITH ALL APPLICABLE REQUIREMENTS OF SECTION 16010, GENERAL PROVISIONS.

1.2 SCOPE

A. INSULATION TEST OF CABLE

1. THE CONTRACTOR SHALL PERFORM DC INSULATION TESTS OF THE TYPE SPECIFIED ON ELECTRICAL CABLES UNDER ANY ONE OR MORE OF THE CONDITIONS DESCRIBED AS FOLLOWS: (1) PRIOR TO ENERGIZATION AND/OR PLACING INTO SERVICE AND ACCEPTANCE BY THE OWNER; (2) WHEN DAMAGE TO THE INSULATION IS SUSPECTED OR KNOWN TO EXIST; (3) AFTER MODIFICATIONS TO THE EQUIPMENT AFFECTING THE INSULATION; (7) WHEN EQUIPMENT IS EXISTING TO BE REUSED.

2. INSULATION TESTS ARE REQUIRED OF THE CONTRACTOR AT PRIOR TO ENERGIZATION OF EQUIPMENT. THE EQUIPMENT, CABLE AND SYSTEMS THAT REQUIRE TESTING, THE MAXIMUM TEST VOLTAGES, AND THE TYPE TEST REQUIRED ARE SPECIFIED IN THIS SECTION.

B. GROUNDING SYSTEM TESTING

1. VERIFY THAT EXISTING SERVICE GROUNDING SYSTEM IS CONNECTED, CONNECTIONS TIGHT, AND THAT GROUNDING IS CONTINUOUS TO NEW CHILLERS AND PUMPS.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 INSULATION TEST OF CABLE

A. AT THE CONCLUSION OF ALL DC TESTS, GROUNDS SHALL BE APPLIED TO THE CABLE OR EQUIPMENT WINDINGS FOR AT LEAST TWICE AS LONG AS THE DURATION OF THE APPLIED VOLTAGE. THIS IS NEEDED TO DISCHARGE THE CAPACITIVE VOLTAGE BUILT UP DURING THE TEST.

B. THE PROOF TEST INVOLVES THE APPLICATION OF A DC VOLTAGE IN EXCESS OF THE EQUIPMENT RATING. THE TEST VOLTAGE IS HELD CONSTANT FOR A SPECIFIED TIME, ONE MINUTE UNLESS SPECIFIED OTHERWISE, AND THE BEHAVIOR OF THE INSULATION CURRENT, VOLTAGE, AND RESISTANCE ARE OBSERVED FOR CHANGES THAT MAY INDICATE APPROACHING FAILURE OR POOR INSULATION CONDITION. THE MAGNITUDE OF THE INSULATION RESISTANCE IS ALSO CONSIDERED IN THE EVALUATION OF THE INSULATION. THIS TEST MAY BE CONDUCTED WITH A CONSTANT VOLTAGE MEGGER OR VARIABLE SOURCE AS APPROPRIATE.

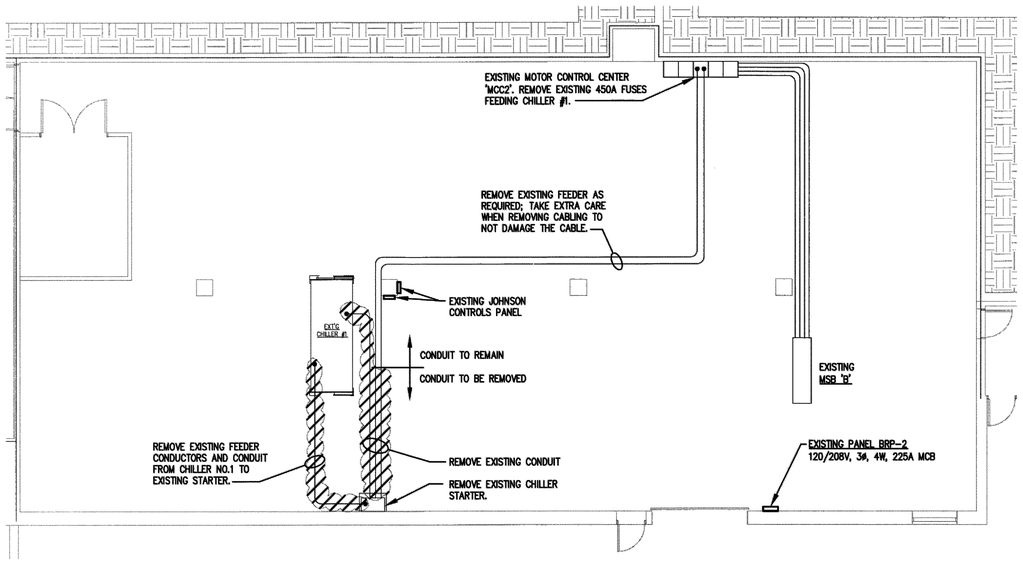
C. THE MEGGER OR INSULATION RESISTANCE TEST IS A SIMPLE, SHORT TEST WHERE DC VOLTAGE OF BETWEEN 100-1500 VOLTS IS APPLIED TO A CABLE OR WINDING FROM A CONSTANT SOURCE OF POTENTIAL SUCH AS JAMES G. BIDDLE COMPANY MEGGER INSULATION TESTER. THE VOLTAGE IS USUALLY CONSIDERABLY BELOW THE MAXIMUM TEST VALUE PERMITTED. THE INSULATION RESISTANCE IS READ OFF THE INDICATOR AND IS IN MEGAOHMS. THE QUALITY OF THE INSULATION IS EVALUATED BASED ON THE LEVEL OF INSULATION RESISTANCE. THIS TEST IS USUALLY THE ROUTINE TEST CONDUCTED BY THE CONTRACTOR OR MAY BE A PRELIMINARY TEST TO A MORE IMPORTANT PROOF TEST TO BE CONDUCTED. APPROPRIATE TEST VOLTAGES SHALL BE CONFIRMED TO THE CONTRACTOR BY THE EQUIPMENT MANUFACTURER. ALL CURRENT CARRYING PHASE CONDUCTORS AND NEUTRALS SHALL BE TESTED AS THEY ARE INSTALLED, AND BEFORE CONNECTIONS ARE MADE, FOR INSULATION RESISTANCE AND ACCIDENTAL GROUNDS. THIS SHALL BE DONE WITH A 500 VOLT MEGGER. SUBMIT PROCEDURE FOR TESTING IF THIS TYPE OF TESTING IS REQUIRED WITH EXPLANATION OF FINDINGS.

3.2 DOCUMENTATION

A. ALL TESTS SPECIFIED SHALL BE COMPLETELY DOCUMENTED INDICATING TIME OF DAY, DATE, TEMPERATURE AND ALL PERTINENT TEST INFORMATION.

B. ALL REQUIRED DOCUMENTATION OF READINGS INDICATED ABOVE SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO, AND AS ONE OF THE PREREQUISITES FOR, FINAL ACCEPTANCE OF THE PROJECT. SUBMIT RECORDED DATA AND VERBAGE FOR ACCEPTABLE RANGES WITH A CONCLUSION ON ACCEPTABILITY OF CABLE FOR REUSE.

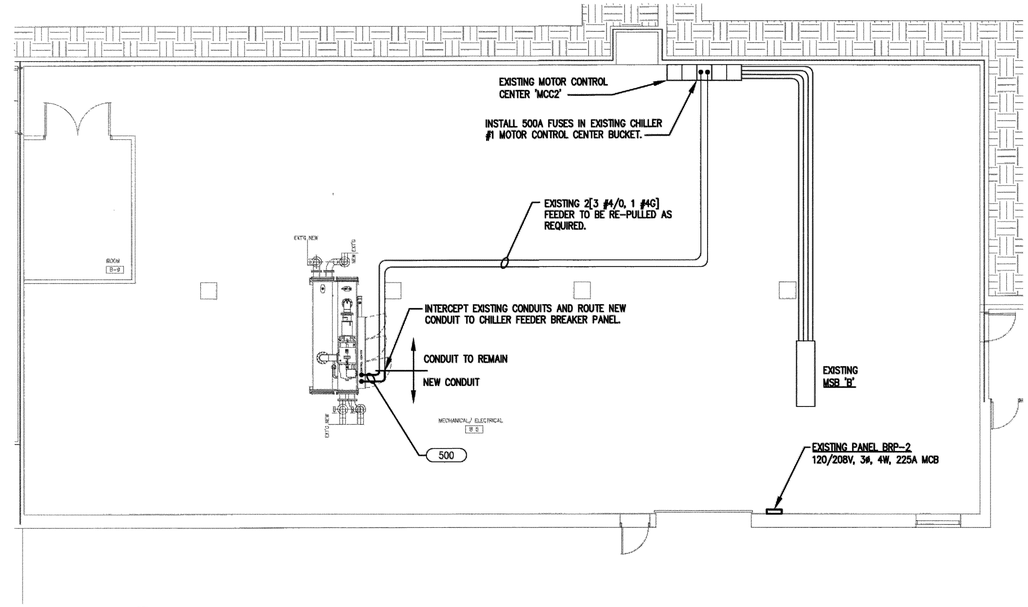
END OF SECTION 16999



PROJECT NORTH

A / E-1 ELECTRICAL DEMOLITION PLAN
SCALE: 1/8" = 1'-0"
8 0 8 16 24
1/8" = 1'-0"

CABLE/CONDUIT SCHEDULE	
TAG	WIRE AND CONDUIT
500	2 [2 1/2"C], EXISTING 2[3 #4/0, 1#4G] FEEDER



PROJECT NORTH

B / E-1 ELECTRICAL POWER PLAN
SCALE: 1/4" = 1'-0"
4 0 4 8 12
1/4" = 1'-0"

PLAN NOTES:

1. CONTRACTOR TO PROVIDE TESTING OF EXISTING FEEDER CABLES AND PROVIDE REPORT WITH RESULTS PRIOR TO ENERGIZING. SEE SPECIFICATIONS TO THE LEFT FOR TESTING REQUIREMENTS.
2. COORDINATE WITH VFD INSTALLER FOR TESTING AND PHASING OF CABLES AS REQUIRED.
3. ANY SHUTDOWN SHALL BE COORDINATED WITH THE OWNER.

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REVISIONS

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SOUTH CAROLINA BURDETTE ENGINEERING INC. No. C00495 CERTIFICATE OF AUTHORIZATION

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DM-12 UPSTATE HODGE CENTER
CHILLER REPLACEMENT
SC STATE PROJECT #H34-9543-JM
SPARTANBURG, SOUTH CAROLINA

DESIGN	DJB
DRAWN	TMP
CHECKED	DJB
DATE	03/29/13
JOB NO.	PERITUS #130102
SHEET	E-1
	1 OF 1 SHEETS

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