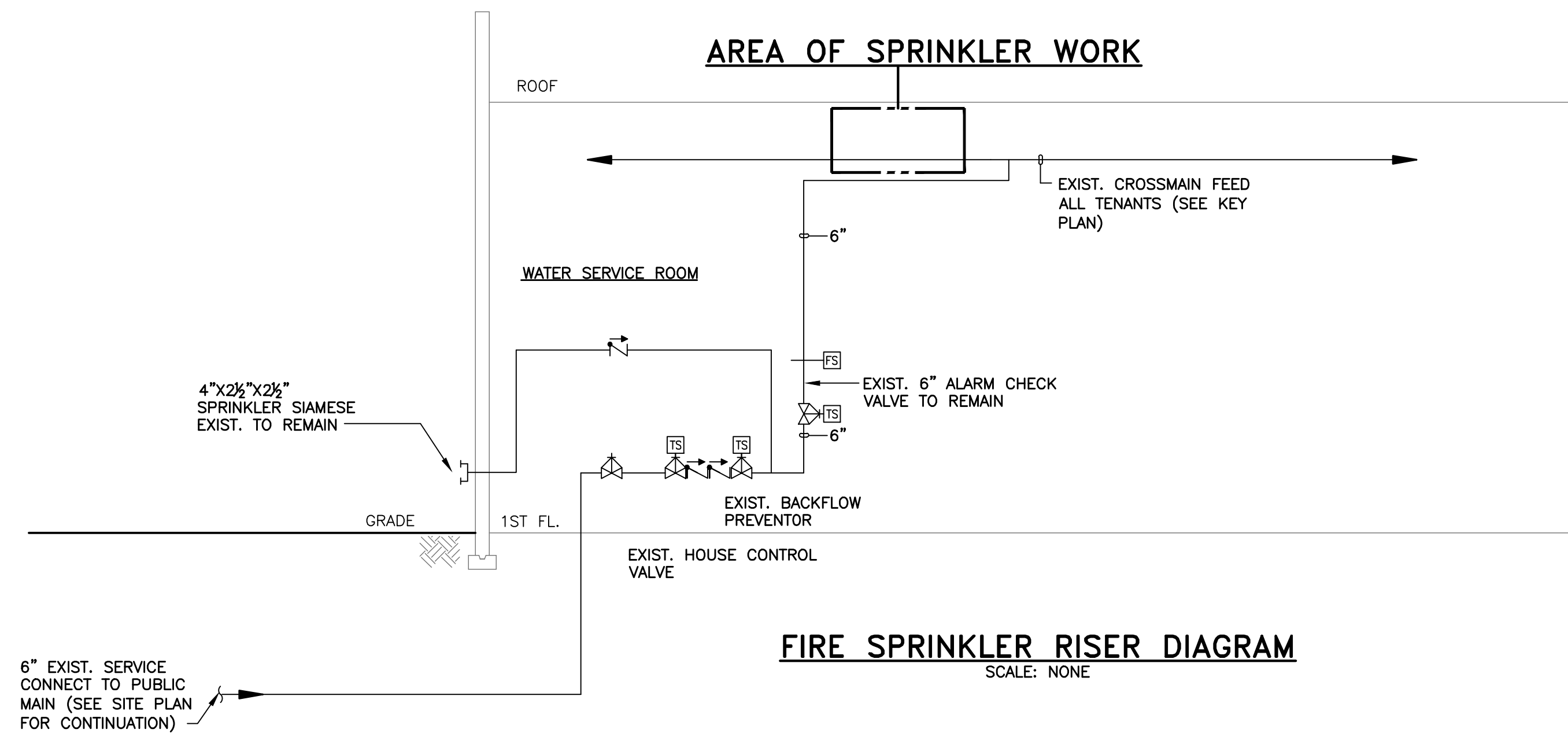
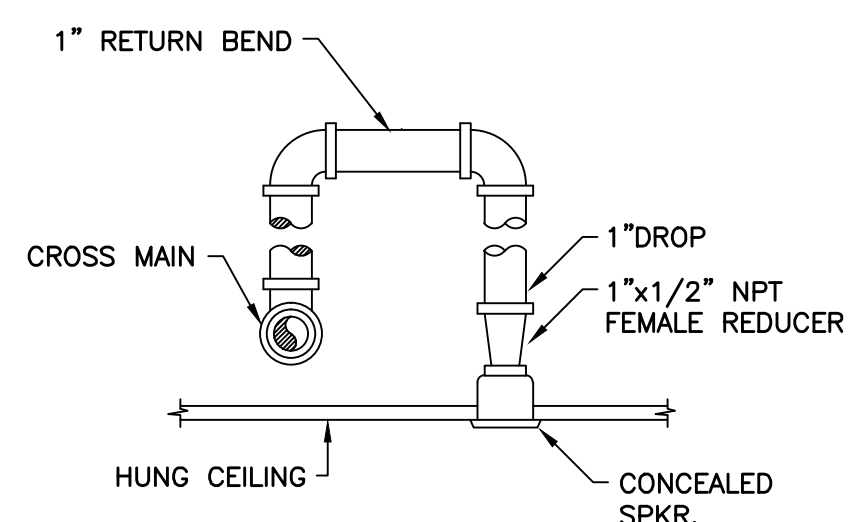


PART PLAN
SCALE: 1/8"=1'-0"

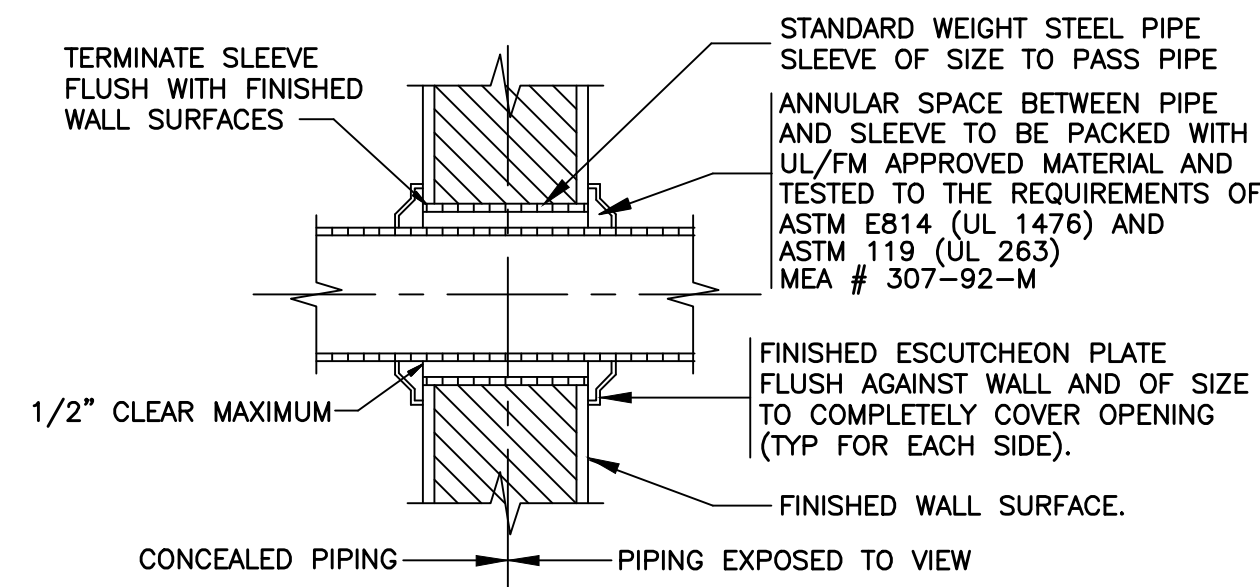


FIRE SPRINKLER RISER DIAGRAM
SCALE: NONE



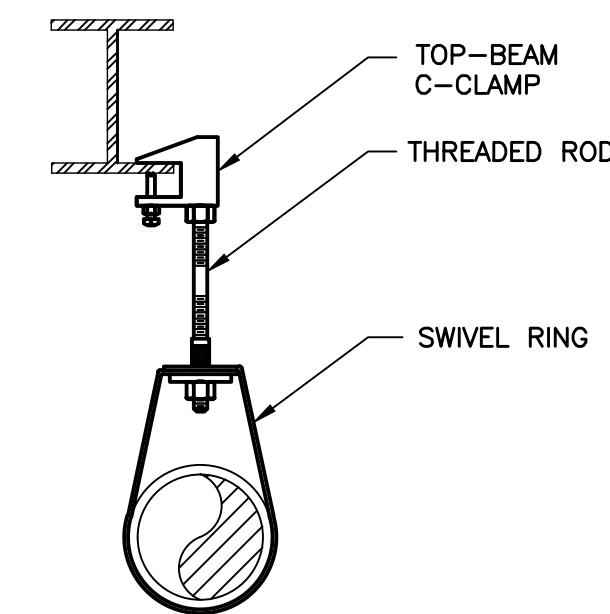
CONCEALED SPRINKLER

SPRINKLER INSTALLATION DETAILS



- NOTES: 1. SEAL OR CAULK SLEEVES THRU FIRE WALLS IN A SMOKE TIGHT MANNER.
2. PENETRATIONS THROUGH FIRE RATED CONSTRUCTION MUST BE FIRESTOPPED USING LISTED AND APPROVED FIRESTOP ASSEMBLIES.

PIPE PENETRATING THROUGH FIRE RATED WALL OR FLOOR



HANGER ROD SIZE	
UP TO AND INCLUDING 4"	3/8" ROD
5", 6" AND 8"	1/2" ROD

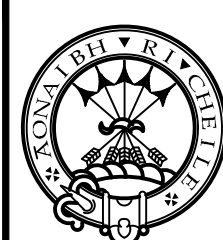
PIPE HANGING DETAIL

PROJECT: OFFICE FILES, EP-100 FIRE PROTECTION GENERAL NOTES AND SAFE PLAN/REV. DATE: 01/21/14. PLOT SCALE: 1/8"=1'-0".

NO.	DATE	REVISION DESCRIPTION	INT.
1	1/21/14	ISSUED FOR FILING	CEA

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PROJECT NAME: **EMPOWER SOLAR**

PROJECT LOCATION: **BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK**

TITLE: **FIRE PROTECTION PART PLAN, RISER AND DETAILS**

DISCIPLINE: **FIRE PROTECTION**

PROJECT ENGINEER: **MH**
 DESIGNED BY: **LM**
 DRAWN BY: **LM**
 CHECKED BY: **LM**

PROJECT NO.: **CE2355A**
 JOB NO.: **CE2355A**
 DATE: **JAN 2014**
 SCALE: **AS SHOWN**

DRAWING NO.: **FP-100**
 DRAWING

GENERAL NOTES:

- DRAWING SPECIFICATIONS ARE PART OF THIS CONTRACT.
- ALL WORK SHOWN ON THESE PLANS SHALL BE PROVIDED UNDER THIS CONTRACT UNLESS SPECIFICALLY CALLED OUT OTHERWISE.
- ALL WORK SHOWN ON THESE PLANS SHALL BE NEW UNLESS SPECIFICALLY CALLED OUT AS EXISTING.
- REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK SHALL BE NECESSARY FOR THE PERFORMANCE OF GENERAL WORK. ALL EXISTING CONDITIONS ARE NOT COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND MAKE ALL NECESSARY CHANGES REQUIRED BASED ON EXISTING CONDITIONS, FOR PROPER DEMOLITION OF EXISTING WORK AND INCLUDE ALL MATERIALS AND LABOR IN HIS BID PRICE. NO ALLOWANCE WILL BE MADE FOR FAILURE TO DO SO.
- THE DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL DUCTWORK, PIPING AND EQUIPMENT AND INDICATE THE REQUIRED SIZE AND POINTS OF TERMINATION OF THE DUCTWORK AND PIPING AND SUGGEST PROPER ROUTING OF SAME. HOWEVER, IT IS NOT THE INTENTION OF THE DRAWINGS TO SHOW ALL NECESSARY OFFSETS, OBSTRUCTIONS OR STRUCTURAL CONDITIONS. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO INSTALL HIS WORK IN SUCH A MANNER THAT IT WILL CONFORM TO THE STRUCTURE, AVOID OBSTRUCTIONS, PRESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR WITHOUT FURTHER CONSTRUCTION OR COST.
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATING, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES OF MAGNITUDE WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHEN NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN CRATED SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AREAS AVAILABLE. ASCERTAIN FROM BUILDING OWNER AT WHAT TIMES OF DAY EQUIPMENT COULD BE MOVED THROUGH THE BUILDING.
- COORDINATE THE EXACT SIZE AND LOCATION OF THE NEW OPENINGS WITH EXISTING STRUCTURE. PATCH AND INSULATE AS REQUIRED. THE CONTRACTOR SHALL FIRESTOP ALL PENETRATIONS OF NEW PIPING, CONDUIT, DUCTWORK, ETC. THROUGH EXISTING FIRE/ SMOKE BARRIERS. FIRE/SMOKE STOPPING SHALL BE 3M FIRE BARRIER CP 25 N/S CAULK UNLESS OTHERWISE NOTED.
- IT IS THE INTENT OF THIS CONTRACT TO KEEP REMAINING SYSTEMS LEFT IN GOOD WORKING ORDER, READY FOR OPERATION, INCLUDING NECESSARY LABOR AND MATERIALS.
- THE CONTRACTOR SHALL TAKE PRECAUTIONS AGAINST DAMAGING OR DISRUPTING BUILDING SYSTEMS, WIRING, GAS PIPING OR CONTROL TUBING. ANY DAMAGE TO THESE ITEMS SHALL BE REPAIRED AT THE CONTRACTOR'S COST, WITHIN COST, WITHIN THIS CONTRACT PERIOD FOR SUBSTANTIAL COMPLETION.
- THE CONTRACTOR SHALL REPAIR AND RESTORE TO ORIGINAL CONDITION ANY EXISTING EQUIPMENT OR MATERIALS DAMAGED IN THE PROCESS OF INSTALLATION, AND DEMOLITION TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE.
- THE CONTRACTOR SHALL MAKE REPAIRS USING THE SAME MATERIALS, AT THE CONTRACTOR'S COST.
- THE CONTRACTOR SHALL INCUR ALL COSTS AND BURDENS ASSOCIATED WITH LOST OR STOLEN EQUIPMENT AND MATERIALS.
- DAILY, DURING DEMOLITION AND DURING THE CONSTRUCTION PERIOD, THE CONTRACTOR SHALL REMOVE ALL RUBBISH AND EXCESS MATERIAL ACCUMULATED AS A RESULT OF HIS OPERATIONS. ALL AREAS AND EQUIPMENT AFFECTED UNDER THIS CONTRACT SHALL BE CLEAN OF DUST AND DEBRIS BEFORE FINAL ACCEPTANCE BY THE OWNER.
- PROVIDE FOR LEGAL REMOVAL AND DISPOSAL OF ALL RUBBISH AND DEBRIS FROM THE BUILDING AND SITE. PROTECT ALL WORK NOT SLATED FOR DEMOLITION.
- THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL OTHER TRADES.
- OBTAIN ALL PERMITS, PAY ALL FEES, CONNECTION CHARGES, ETC.
- PAINT AND TOUCH-UP ALL SURFACES MARRIED BY PERFORMANCE OF THE WORK.
- COORDINATE MOBILIZATION, WORK PROGRESS AND COMPLETION OF WORK WITH LANDLORD AND TENANT.

ABBREVIATIONS

AC AIR CONDITIONING UNIT	ESP EXTERNAL STATIC PRESSURE	No. NUMBER
ACCU AIR COOLED CONDENSING UNIT	HP VOLTS/PHASE	OAI OUTSIDE AIR INTAKE
AD ACCESS DOOR	*F DEGREES FAHRENHEIT	OPER. OPERATING
AFF ABOVE FINISHED FLOOR	FD FIRE DAMPER	P PUMP
AHU AIR HANDLING UNIT	FD/AD FIRE DAMPER W/ ACCESS DOOR	PF PROPELLER FAN
AL ACOUSTICAL DUCT LINING	FLA FULL LOAD AMPS	PH PHASE
BC BLOWER COIL	FPS FEET PER SECOND	PD PUMP DISCHARGE
BTUH BTU/HR	FPM FEET PER MINUTE	PLEAT. PLEATED
BOD BOTTOM OF DUCT	FT FEET	PRESS. PRESSURE
BOT. BOTTOM	FT.W.G. FEET WATER GAUGE	PSI POUNDS PER SQUARE INCH
BSTMT BASEMENT	G.C. GENERAL CONTRACTOR	RET. RETURN
CAP. CAPACITY	GX GENERAL EXHAUST FAN	RF RETURN FAN
CART. CARTRIDGE	H HEIGHT	RPM REVOLUTIONS PER MINUTE
CFM CUBIC FEET PER MINUTE	HG HOT GAS	SP STATIC PRESSURE
CLG COOLING	HP HORSEPOWER	SUP. SUPPLY
C.M. CONSTRUCTION MANAGER	HVU HEATING AND VENTILATING UNIT	TEMP. TEMPERATURE
CU CONDENSING UNIT	IN. INCHES	T.G. TRANSFER GRILLE
CO CLEAN OUT DOOR	IN.W.G. INCHES WATER GAUGE	T.O.F. TOP OF FLOOR
DB DRY BULB	L LENGTH	TX TOILET EXHAUST FAN
DISCH DISCHARGE	LAT LEAVING AIR TEMPERATURE	TYP. TYPICAL
DTR DUAL TEMPERATURE RETURN	LBG LINEAR BAR GRILLE	UH UNIT HEATER
DN DOWN	LIQ LIQUID	HV HEATING AND VENTILATING UNIT
EX EXHAUST FAN	LWT LEAVING WATER TEMPERATURE	V VOLTS
EA. EACH	MAX. MAXIMUM	VEL. VELOCITY
EAT ENTERING AIR TEMPERATURE	MBH THOUSAND BTUH	VOL. VOLUME
EAL EXHAUST AIR LOUVER	MCA MINIMUM CIRCUIT AMPACITY	W WIDTH
EER ENERGY EFFICIENCY RATIO	MIN. MINIMUM	WB WET BULB
EF EXHAUST FAN	NA NOT APPLICABLE	
EBB ELECTRIC BASEBOARD RADIATOR	NC NORMALLY CLOSED	
EFF. EFFICIENCY	NO NORMALLY OPEN	

LEGEND

	NEW DUCTWORK		NEW PIPING
	1" ACOUSTICAL LINING IN NEW DUCTWORK		PLAN ELBOW
	RECTANGULAR SUPPLY DUCT DOWN		PIPE DOWN
	RECTANGULAR SUPPLY DUCT UP		PIPE UP
	RECTANGULAR RETURN DUCT DOWN		PLAN TEE
	RECTANGULAR RETURN DUCT UP		TEE UP
	4-WAY SUPPLY DIFFUSER (C.D.)		TEE DOWN
	3-WAY SUPPLY DIFFUSER (C.D.)		CAPPED PIPE
	2-WAY SUPPLY DIFFUSER (C.D.)		NEW CONNECTION
	RETURN GRILLE / REGISTER (C.R.)		PRESSURE GAUGE
	AIR FLOW RATE IN CFM		THERMOMETER
	THERMOSTAT/TEMPERATURE SENSOR		SAFETY RELIEF VALVE
	WIRELESS SENSOR		CARBON MONOXIDE SENSOR
	MOTORIZED DAMPER		NATURAL GAS SENSOR
	FLEXIBLE DUCT CONNECTION		REFRIGERANT GAS SENSOR
			MANUAL AIR VENT
			SWITCH
			90° ELBOW W/ RADIUS 1.5 TIMES DUCT WIDTH
			SQUARE ELBOW WITH TURNING VANES
			FIRE DAMPER WITH ACCESS DOOR IN DUCT
			SMOKE DETECTOR WITH ACCESS DOOR IN DUCT
			EXHAUST/RETURN/FRESH AIR INTAKE ARROW
			SUPPLY REGISTER

TAG NO.	LOCATION	TYPE	CAPACITY		ELECTRICAL DATA			MANUF.	MODEL NO.	WEIGHT	REMARKS
			CFM	BTU/HR	KW	AMPS	MOTOR HP				
EDH-1	SHOWROOM CEILING	OPEN COIL DUCT MOUNTED	1200	34,100	5.0			208/3/60	INDEECO	QUA-14x12	CONTROL OPTION G
EBB-1	PANTRY	FLOOR MOUNTED FLAT TOP PEDESTAL		13,640	4.0			208/1/60	ARCHITECTURAL HEATING	LBF-PD#8500	NOTES 2,4,5, &6
EBB-2	CONFERENCE RM.	FLOOR MOUNTED FLAT TOP PEDESTAL		13,640	4.0			208/1/60	ARCHITECTURAL HEATING	LBF-PD#8500	NOTES 2,4,5, &6

- NOTES:**
- PROVIDE WALL MOUNTED (2-STAGE) LOW VOLTAGE THERMOSTAT.
 - PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.
 - PROVIDE LEFT & RIGHT SIDE END CAPS.
 - PROVIDE BUILT IN THERMOSTAT THROUGH DISCHARGE GRILLE.
 - FINISH AS SELECTED BY ARCHITECT.

NECK DIAMETER (INCHES)	MOD SIZE	AIR FLOW RATE (CFM RANGE)	DISCHARGE BLOW PATTERN (SEE NOTES 3 & 4 BELOW)
6	12x12 MOD	0-120	4-WAY
8	24x24 MOD	121-220	4-WAY
10	24x24 MOD	225-380	4-WAY

- NOTES:**
- ALL COMMON AREA DIFFUSERS, TILED OR GYPBOARD CEILINGS—BASED ON NAILOR MODEL UNI PLAQUE FACE DIFFUSER, FOR ACOUSTIC TILE LAY-IN AND (SURFACE MOUNT FRAME FOR GYP BOARD).
 - ALL OFFICE DIFFUSERS TO BE RICKARD THERMALLY POWERED VAV DIFFUSER MODEL# VSD-4.
 - ALL CORRIDOR DIFFUSERS TO BE 2-WAY OPPOSITE BLOW.
 - FOR 3-WAY DIFFUSERS PROVIDE NEXT LARGER NECK DIAMETER AS LISTED FOR 4-WAY DIFFUSER. FOR 2-WAY DIFFUSERS PROVIDE TWO SIZES LARGER NECK DIAMETER LISTED FOR 4-WAY DIFFUSER.

ZONE DESIG	LOCATION	SERVICE	UNIT CONFIGURATION	NOMINAL TONS	DX COOL'G COIL		HEATING CAP. MBH	FAN		AIR SIDE				ELECTRICAL				MANUFACTURER: MODEL NO.	NOTES	
					TOTAL CAP. MBH	SENS. CAP. MBH		VOL. FLOW CFM	EXT. SP IN WG	DB °F	WB °F	DB °F	WB °F	FLA	VOLTS/PH/Hz	MCA	MOP			WEIGHT
AC-1	CONFERENCE ROOM	CONF ROOM	CEILING CASSETTE	2	24	18.9	27.0	620	NA	75	63	55	54		208/1/60	0.50	15.0	150	DAIKIN FCQ24PAVJU	1,2,3,4,5,&6
AC-2	SERVER ROOM	SERVER ROOM	WALL MOUNT	1.5	18		20.0	400	NA	75	63	55	54		208/1/60	0.5	20.0	35	DAIKIN FAQ18PVJU	1,2,3,4,5,&6

- NOTES:**
- PROVIDE BUILT-IN CONDENSATE PUMP.
 - PROVIDE WALL MOUNTED PROGRAMMABLE CONTROLLER
 - PROVIDE DISCONNECT SWITCH.
 - PROVIDE 1/4" THREADED RODS & RUBBER IN SHEAR VIBRATION ISOLATORS.
 - EXPOSED WIRING & REFRIG PIPING TO BE RUN IN SLIM-DUCT ENCLOSURE.
 - DAIKIN APPLIED TO PROVIDE ALL SHOP DRAWING SUBMITALS, START-UP SERVICE AND TRAINING.

CFM RANGE	NECK SIZE
0 - 150	8 x 8
151 - 250	10 x 10
251 - 350	12 x 12
351 - 450	14 x 14
451 - 600	16 x 16
601 - 800	18 x 18
801 - 1000	20 x 20
1001 - 1200	22 x 22

- NOTES:**
- PROVIDE NAILOR MODEL 6155H-0.
 - USE FOR DUCTED RETURN/EXHAUST AIR.
 - REFER TO INDIVIDUAL FLOOR PLANS FOR AIR VOLUME.

TYPE	MAX. CFM	NECK SIZE
RETURN	300	12 x 12
RETURN	500	24 x 12
RETURN	1500	24 x 24

- NOTE:** BASED ON NAILOR MODEL 6155H - LAY IN AND SURFACE MOUNT.

SYSTEM NO.	LOCATION	SERVICE	NOMINAL TONS	HEATING CAPACITY BTUH	AMBIENT AIR TEMP. °F	No. OF COMP.	ELECTRICAL DATA			WEIGHT (LB)	EER @ ARI	NOTES	MANUFACTURER: MODEL NO.
							MCA	MFA	VOLTS/Ph/Hz				
CU-1	ROOF	AC-1	2	27,000	95	1	16.5	20	208/1/60	150	16.8	1 THRU 8	DAIKIN RZQ24PVJU
CU-2	ROOF	AC-2	1.5	20,000	95	1	16.5	20	208/1/60	150	16.8	1 THRU 8	DAIKIN FAQ18PVJU

- NOTES:**
- REFER TO DETAILS FOR IN-LINE PIPING COMPONENTS
 - UNIT TO BE MOUNTED ON PREFABRICATED STEEL EQUIPMENT SUPPORTS.
 - PROVIDE LOW AMBIENT DOWN TO 0 DEGREES.
 - DAIKIN NY TO PROVIDE SUBMITALS & START UP
 - PROVIDE CONDENSER FIN GUARDS.
 - PROVIDE SQUARE D DISCONNECT SWITCH.
 - VIBRATION ISOLATION FOR CONDENSING UNIT TO BE BRIDGE BEARING RUBBER PADS: MASON "SUPER W" 6x6 MINIMUM 4 POINTS
 - PROVIDE THE FOLLOWING:
 - LIMITED 5 YEAR COMPRESSOR WARRANTY.
 - LIMITED 1 YEAR LABOR WARRANTY.

FAN NO.	LOCATION	SERVICE	FAN DATA			ELECTRICAL DATA			WEIGHT LBS.	ROOF OPN'G (INCHES)	MANUFACTURER & MODEL NO.	NOTES	
			VOLUME FLOW CFM	EXT. SP IN.WG	DRIVE TYPE	FAN RPM	BHP	HP (WATTS)					VOLTS/Ph/Hz
TX-1	ROOF	TOILET ROOMS	350	0.375	BELT	1238	.08	1/6 HP	120/1/60	50	13-1/2 SQ.	COOK#80C2B	1,2,3&4
GX-1	ROOF	PANTRY	460	0.375	BELT	1404	.12	1/6 HP	120/1/60	50	13-1/2 SQ.	COOK#80C2B	1,2,3&5

- NOTES:**
- PROVIDE ALL FANS WITH UNIT MOUNTED (NEMA 1) DISCONNECT.
 - PROVIDE 16" HIGH CANTED ROOF CURB AND BACKDRAFT DAMPER.
 - PROVIDE ALL FANS WITH HINGED BASE KIT.
 - TOILET EXHAUST FAN SHALL ENERGIZE VIA ROOM OCCUPANCY SENSOR WITH 15 MINUTE TIME DELAY.
 - PANTRY EXHAUST FAN SHALL ENERGIZE VIA ROOM WALL SWITCH WITH PILOT LIGHT.

PROJECT: OFFICE WORKING SET - MECHANICAL GENERAL NOTES AND SCHEDULES FOR BARNUM LANDING, ISLAND PARK, NEW YORK
 DATE: 1/21/14
 DRAWING NO: M-001

NO.	DATE	REVISION DESCRIPTION	INT.
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PROJECT NAME: **EMPOWER SOLAR**

PROJECT LOCATION: **BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK**

TITLE: **MECHANICAL GENERAL NOTES LEGEND AND SCHEDULES**

DISCIPLINE: **MECHANICAL**

PROJECT ENGINEER: **MH**

DESIGNED BY: **JD**

DRAWN BY: **JD**

CHECKED BY: **JD**

PROJECT NO.: **CE2355A**

JOB NO.: **CE2355A**

DATE: **JAN 2014**

SCALE: **AS SHOWN**

M-001

DRAWING

- h. WHERE DUCTS ARE SPECIFIED OR INDICATED ON PLAN TO BE ACOUSTICALLY LINED, THE DUCT SHALL BE INCREASED IN SIZE SO THAT THE CLEAR INSIDE LINING DIMENSIONS MATCH THE DUCT SIZES ON THE DRAWINGS.
- i. MAXIMUM LENGTH OF FLEXIBLE DUCTWORK SHALL BE 3 FEET AND ONLY PROVIDED WHERE SPECIFICALLY CALLED OUT ON DRAWINGS.
- j. MINIMUM DUCT GAUGE THICKNESS SHALL BE 24.
- k. ALL EXPOSED DUCTWORK SHALL BE PRIMED WITH GLIDDEN #5229 GALVANIZED PRIMER OR APPROVED EQUAL AND SHALL BE PROVIDED TWO COATS OF PAINT THAT IS SPECIFICALLY DESIGNED, MANUFACTURED AND WARRANTED FOR THE APPLICATION. COLOR AND PAINT SHALL BE APPROVED BY OWNERS REPRESENTATIVE.
- l. FOR DUCTS WITH WIRE MESH SCREEN OPENINGS, EGG CRATE OPENINGS OR OTHER OPENINGS WHERE OCCUPANTS CAN SEE THE INSIDE OF THE DUCT, THIS CONTRACTOR SHALL SPRAY PAINT THE INSIDE OF THE DUCT FLAT BLACK. PROVIDE TWO COATS OF SPRAY PAINT ON THE INSIDE SURFACE OF THE DUCT ONLY AND SPRAY PAINT FAR ENOUGH INSIDE THE DUCT SO THAT OCCUPANTS CAN ONLY SEE BLACK PAINT AND NO INTERNAL DUCTWORK.

2. ROUND DUCTWORK

- a. ALL ROUND DUCTWORK SHALL BE CONSTRUCTED FROM A "PAINT GRIP" GALVANIZED STEEL WITH SPIRAL WOUND SEAM. DUCTWORK SHALL BE PROVIDED WITH ONE INCH THICK ACOUSTICAL FIBERGLASS BLANKET AND PERFORATED METAL LINER. ACOUSTICAL LINING SHALL HAVE THERMAL CONDUCTIVITY "K" FACTOR OF 0.27 BTU/HR/DEGREES F/SQ.FT.
- b. ALL ROUND DUCTWORK SHALL BE CONNECTED TO ONE ANOTHER WITH SLIP JOINTS AND POP RIVETED TOGETHER IN SYMMETRICAL ORDER. ALL DUCT TO DUCT JOINTS SHALL BE MADE WITH SPIRAL SEAM ROTATED SO THAT THE SEAM FORMS A CONTINUOUS HELICAL PATTERN ACROSS THE JOINT.
- c. ALL ELBOWS SHALL BE STANDING SEAM GORED ELBOWS ACOUSTICAL LINED WITH PERFORATED METAL LINER.
- d. ALL REDUCTIONS IN DUCT RUNS SHALL BE MADE WITH CONCENTRIC REDUCERS.
- e. ALL TAPS FOR BRANCH DUCTWORK SHALL BE MADE WITH STRAIGHT BODY 90 DEGREE CONICAL TAP AND VOLUME DAMPER.
- f. ALL DIFFUSER COLLARS SHALL BE ATTACHED TO DUCTWORK WITH POP RIVETS WITH A FINISHING FILET OF ELASTOMER SEALER APPLIED TO THE COLLAR DUCT JUNCTION.

O. NOT USED

P. DUCTWORK ACCESSORIES

- 1. ALL BRANCHES AND TAKE-OFFS SHALL BE EQUIPPED WITH OPPOSED BLADE TYPE VOLUME DAMPERS.
- 2. PROVIDE DAMPERS WHERE REQUIRED FOR PROPERLY BALANCING THE SYSTEM, WITH LOCKABLE, MARKED QUADRANT. DAMPERS SHALL BE OF THE SAME MATERIAL AS THE DUCT IN WHICH THEY ARE INSTALLED AND SHALL BE SUPPLIED AT THE JUNCTION OF A MAIN DUCT AND EACH BRANCH DUCT.
- 3. TURNING VANES: FABRICATE TO COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE".
- 4. FLEXIBLE CONNECTORS: GLASS FABRIC DOUBLE COATED WITH POLYCHLOROPRENE. MINIMUM WEIGHT: 26 OZ./SQ. YD.

Q. DUCT INSULATION

- 1. INSULATION SHALL BE APPLIED TO DUCTWORK OF MATERIALS AS SPECIFIED HEREIN AND FOR APPLICABLE SYSTEMS OF THIS PROJECT. INSULATION MATERIAL AND THICKNESS SHALL CONFORM TO THE LATEST ENERGY CODE HAVING JURISDICTION.
- 2. INSULATION SHALL BE CONTINUOUS THROUGH WALL AND SLAB OPENINGS.
- 3. INSULATION OF COLD SURFACES WHERE VAPOR BARRIER JACKETS ARE SPECIFIED SHALL BE APPLIED WITH AN UNBROKEN VAPOR SEAL. HANGERS AND SUPPORTS THAT ARE SECURED TO COLD SURFACES SHALL BE ADEQUATELY INSULATED TO PREVENT CONDENSATION.

- a. ALL NEW AND EXISTING SHEET METAL SUPPLY DUCTWORK SHALL BE INSULATED WITH 1-1/2" THICK FLEXIBLE DUCT INSULATION, 0.75 LB./CU.FT. DENSITY WITH A MAX. K FACTOR OF .30 AT 75° MEAN TEMPERATURE, WITH REINFORCED FOIL FACED, FLAME RESISTANT, ALUMINUM FOIL VAPOR BARRIER. INSULATION AND FACING WILL HAVE A COMBINED FLAME SPREAD RATING NO GREATER THAN 25 AND SMOKE DEVELOPED RATING NOT EXCEEDING 50. ALL INSULATION SHALL BE SECURED WITH DUCT ADHESIVE AND SEAMS SEALED BY TWO-INCH SEALING LIP WITH ADHESIVE AND FASTENED WITH 14 GAUGE COPPER WIRE ON 12" CENTERS. ON DUCTS OVER 24" WIDE, WELDED PINS AND CLIPS SHALL BE USED ON THE UNDERSIDE FOR FASTENING INSULATION. ALL JOINTS AND CLIPS SHALL BE SEALED WITH MATCHING STRIPS OF VINYL COATED VAPOR BARRIER LAMINATE SIMILAR TO OWENS CORNING 24 ASJ FOR DUCTS.

R. ACOUSTICAL TREATMENT

- 1. FURNISH AND INSTALL ACOUSTICAL LINING IN DUCTWORK PLENUMS AND CASINGS AS SHOWN ON THE DRAWINGS AND AS SPECIFIED HEREIN.
- 2. MANUFACTURER: OWENS CORNING FIBERGLASS DUCT LINERBOARD.
- 3. MATERIAL: SEMI-RIGID GLASS FIBER DUCTING WITH BINDER COAT ON AIR SIDE, MAXIMUM K FACTOR OF 0.26 AT 75 DEGREE F MINIMUM FOR USE AT AIR VELOCITIES UP TO 6000 FPM. ACOUSTICAL LINING SHALL HAVE A FLAME SPREAD RATING NO GREATER THAN 25 AND SMOKE DEVELOPED RATING NOT EXCEEDING 50. BINDER COAT TO BE BLACK FOR DETECTION OF DAMAGE TO BINDER SURFACE.
- 4. INSTALLATION: INSTALL LINER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. COMPLETELY COVER ALL PORTIONS OF DUCTWORK PLENUMS AND CASINGS WITH APPROVED ADHESIVE. INSTALL LINER WITH ALL TRAVERSE JOINTS NEATLY BUTTED HAVING NO INTERRUPTIONS OR GAPS. COVER ALL EXPOSED EDGES, JOINTS, MECHANICAL FASTENERS AND ANY DAMAGED AREAS WITH ADHESIVE. ADDITIONALLY, SECURE LINER WITH APPROVED MECHANICAL FASTENERS INSTALLED IN ACCORDANCE WITH SMACNA DUCT LINER APPLICATION STANDARD.
- 5. ALL AIR CONDITIONING SUPPLY AIR DUCTWORK SHALL BE ACOUSTICALLY LINED FOR A MINIMUM DISTANCE OF 15 FEET DOWNSTREAM OF A FAN DISCHARGE WITH A MINIMUM OF ONE INCH THICK ACOUSTICAL LINING. ALL RETURN/EXHAUST FAN DUCTWORK SHALL BE ACOUSTICALLY LINED FOR A MINIMUM DISTANCE OF 15 FEET OF THE FAN'S INTAKE AND DISCHARGE OPENINGS WITH A MINIMUM OF ONE INCH THICK ACOUSTICAL LINING.

- S. NOT USED
- T. NOT USED
- U. NOT USED
- V. NOT USED
- W. NOT USED
- X. NOT USED
- Y. REFRIGERANT PIPING

- 1. ALL REFRIGERANT TUBING SHALL BE TYPE AC&R CLEANED, DEHYDRATED AND CAPPED COPPER. TUBE SIZES SHOWN ARE OUTSIDE DIAMETERS. ALL FITTINGS ARE TO BE WROUGHT COPPER TYPE WHICH MEET ANSI B16.22 SPECIFICATIONS AND COMPLY WITH ASTM TEST PROCEDURES. ALL JOINTS ARE TO BE BRAZED WITH SILFOS-5 OR EQUIVALENT. AFTER PIPING IS COMPLETED, SYSTEM IS TO BE PRESSURE TESTED FOR LEAKS. HIGH SIDE REFRIGERANT LINES ARE TO BE NITROGEN TESTED TO 300 PSIG AND LOW SIDE TO 150 PSIG. TEST PRESSURES MUST HOLD FOR 30 MINUTES. ALL INTERCONNECTING REFRIGERANT LINES ARE TO BE DEHYDRATED AND EVACUATED TO 500 MICRONS. VACUUM PUMP TO BE SHUT DOWN AND VACUUM LEVEL TO BE MONITORED FOR A PERIOD OF SIX HOURS. IF VACUUM LEVEL RISE EXCEEDS THE LIMIT, THE SYSTEM SHOULD BE CHECKED FOR SMALL LEAKS, REPAIRED AND RETESTED.

- 2. DURING BRAZING OPERATIONS, FLOW AN INERT GAS SUCH AS NITROGEN THROUGH THE REFRIGERATION PIPING SYSTEM TO PREVENT SCALING AND CONTAMINATION OF INTERNAL PIPING WALLS.
- 3. TRAPS ARE TO BE PROVIDED AT THE BASE OF ALL SUCTION GAS RISERS TO INSURE THE POSITIVE RETURN OF OIL TO THE COMPRESSOR. OIL TRAPS SHALL BE CONSTRUCTED AS SHALLOW AS POSSIBLE TO MINIMIZE THE TRAPPED VOLUME TO AVOID THE CREATION OF LARGE SLUGS OF LIQUID.
- 4. INVERTED TRAPS SHALL BE INSTALLED AT THE TOP OF EACH SUCTION OR HOT GAS RISER TO CHECK THE BACKFLOW OF OIL DOWN THE RISER FROM THE HORIZONTAL RUN DOWNSTREAM.
- 5. WHENEVER THE LIFT OF A RISER WILL EXCEED APPROXIMATELY 20 FEET, PROVIDE INTERMEDIATE TRAPS TO ALLOW THE OIL TO TRAVEL UP IN STAGES.
- 6. ALL REFRIGERANT LINES EXPOSED TO OUTDOOR ELEMENTS AND ALL SUCTION LINES THROUGHOUT SHALL BE WRAPPED IN 1" THICK ARMAFLEX INSULATION. ALL JOINTS SHALL BE MITERED AND TAPED TO ENSURE PROPER VAPOR SEAL. ALL SEAMS ARE TO BE SEALED WITH MANUFACTURER'S RECOMMENDED ADHESIVE. REFER TO SPECIFICATION FOR OUTDOOR PIPING.
- 7. PROVIDE ADEQUATELY SIZED REFRIGERANT LINE SIGHT GLASS AND FILTER DRYERS AS REQUIRED.
- 8. REFRIGERANT PIPING TO BE INSTALLED AND SIZED IN ACCORDANCE TO EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUBMIT LAYOUT OF REFRIGERANT PIPING TO BE INSTALLED IN FIELD. INDICATE ACTUAL ROUTE, ELEVATIONS, LENGTHS, ELBOWS, DEVICES AND EQUIPMENT FOR VERIFICATION OF PIPE SIZE AND INSTALLATION.
- 9. PROVIDE ALL REFRIGERANT PIPING IN COMPLETE ACCORDANCE WITH ALL REQUIREMENTS IN ASHRAE STANDARD 15, 34 AND THE LOCAL MECHANICAL CODE CHAPTER ON REFRIGERATION. ALL REFRIGERANT PIPING SHALL BE ENCLOSED BY SHEATHS IN ACCORDANCE WITH ASHRAE STANDARD 15, REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
- 10. COMPLY WITH ALL REFRIGERANT QUANTITY LIMITS. PROVIDE PLENUM RETURNS, TRANSFER DUCTS (WITH APPLICABLE FD/AD IF REQUIRED), PERMANENT OPENINGS, UNDERCUT DOORS AND/OR HVAC DUCTS AS REQUIRED TO COMPLY.

Z. NOT USED

AB. HANGERS AND SUPPORTS

- 1. PROVIDE ALL HANGERS, HANGER ROD SUPPORTS, INSERTS, ATTACHMENT, CLAMPS, GUIDES, BOLTS, RODS, NUTS, WASHERS, SUPPLEMENTAL STEEL, ANCHORS AND OTHER ACCESSORIES TO SUPPORT SYSTEM LOADS.
- 2. PROVIDE 2" VERTICAL ADJUSTMENT FOR ALL HANGERS. PROVIDE ADDITIONAL SUPPORTS AT CHANGES IN DIRECTION, BRANCH PIPING OVER 5 FEET AND AT LOADS DUE TO VALVES, STRAINERS AND OTHER ACCESSORIES.
- 3. HANGER ROD: ASTM A36; STEEL; THREADED BOTH ENDS; THREADED ALL ONE END OR CONTINUOUSLY THREADED. THREADED RODS SHALL BE GALVANIZED.
- 4. PROVIDE DUCT HANGERS IN ACCORDANCE WITH THE LATEST EDITION OF SMACNA LOW PRESSURE AND MEDIUM PRESSURE DUCT CONSTRUCTION STANDARD MANUALS.
- 5. SUPPORT HORIZONTAL DUCTS WITH HANGERS SECURED TO STRUCTURAL STEEL ABOVE. INSTALL ADDITIONAL STEEL AS REQUIRED.
 - a. PROVIDE HANGERS AND FASTENINGS ADEQUATE TO INSURE PERMANENT STABILITY AND IN COMPLIANCE WITH LOCAL CODE REQUIREMENTS. WHERE REQUIRED, PROVIDE SUPPLEMENTARY STEEL ANGLES OR CHANNELS. DO NOT HANG OR SUPPORT DUCTWORK FROM ANY EQUIPMENT, SUSPENDED CEILING SYSTEM OR ANY SUCH INSTALLATION OTHER THAN FROM SLAB, METAL DECK OR SUPPLEMENTAL SUPPORTS ORIGINATING FROM THE BUILDING STRUCTURE.
- 6. PIPE HANGERS AND SUPPORTS
 - a. PROVIDE PIPE HANGERS IN ACCORDANCE WITH ANSI/MSS SP-69.
 - b. PROVIDE PIPING HANGERS, SUPPORTS, ANCHORS AND GUIDES HAVING A BUILT-IN SAFETY FACTOR OF FIVE (5); IN CONFORMANCE TO THE LATEST ANSI B31.9 CODE FOR PRESSURE PIPING AND MSS STANDARD PRACTICE SP-58 AND SP-69. ALL HANGER SPECIFICATIONS SHALL BE FURNISHED WITH ZINC CHROMATE PRIME PAINT FINISH.
 - c. SUPPORT HANGERS FROM BUILDING STEEL FRAMING WITH APPROVED TYPE CLAMP INSERT. PROVIDE ADDITIONAL STEEL SUPPORTS BETWEEN EXISTING FRAMING MEMBERS AS REQUIRED. ALL PIPE HANGING RODS, INSERTS AND CLAMPS SHALL BE U.L. APPROVED FOR THEIR RESPECTIVE USES. DO NOT HANG PIPING ON ANY OTHER CONSTRUCTION OR CEILING SYSTEM SUPPORT. ONLY FROM BUILDING STEEL, INTERMEDIATE SUPPLEMENTAL STEEL OR SLAB.
 - d. FURNISH AND INSTALL SPRING ISOLATED PIPE HANGERS WITHIN 20' DOWNSTREAM AND UPSTREAM OF ALL PUMPS AND EQUIPMENT TO BE PIPED.
 - e. LOAD DISTRIBUTION: INSTALL HANGERS AND SUPPORTS SO THAT PIPING LIVE AND DEAD LOADS AND STRESSES FROM MOVEMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT.
 - f. PROVIDE PROTECTIVE SADDLES TO SUPPORT INSULATED PIPING.
 - g. PIPE SLOPES: INSTALL HANGERS AND SUPPORTS TO PROVIDE INDICATED PIPE SLOPES AND SO MAXIMUM PIPE DEFLECTIONS ALLOWED BY ASME B31.9, "BUILDING SERVICES PIPING", ARE NOT EXCEEDED.

AD. MECHANICAL IDENTIFICATION OF EQUIPMENT AND CONTROLS

- 1. ALL EQUIPMENT SHALL BE STENCILED OR LABELED WITH LAMACOID PLATES SCREWED THEREON WHICH SHALL INDICATE SYSTEMS SERVICE.
- 2. ALL PIPING SHALL BE LABELED IN ACCORDANCE WITH ASME 13.1 LABEL STANDARDS.
- 3. ALL PIPING SYSTEMS SHALL BE IDENTIFIED INDICATING THEIR SERVICE AND DIRECTION OF FLOW WITH PVC PIPING BANDS ON A MAXIMUM OF 25 FEET OF STRAIGHT RUNS, AT ALL BRANCHES, VALVE LOCATIONS, ON BOTH SIDES OF PENETRATIONS AND ON ALL EXTERIOR PIPING.
- 4. ALL VALVES SHALL BE TAGGED WITH 2" BRASS PLATED TAGS AND CHAINS AND VALVES CHART SCHEDULE FRAMED AND WALL MOUNTED WHERE DIRECTED.
- 5. MOTOR STARTERS SHALL BE PROVIDED WITH LAMACOID PLATES WHICH INDICATE SYSTEM SERVED.

AE. ELECTRICAL WIRING AND WIRING DIAGRAMS

- 1. ELECTRICAL WIRING FOR 120 VOLT POWER AND GREATER SHALL BE BY THE ELECTRICAL CONTRACTOR. WIRING FOR AUTOMATIC TEMPERATURE, SAFETY AND INTERLOCKING CONTROLS FOR MOTORS, MOTOR STARTER AND OTHER MECHANICAL AND CONTROL DEVICES SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR UNDER THIS CONTRACT WORK. AT TIME OF BID THIS CONTRACTOR IS REQUIRED TO INDICATE THE NUMBER OF 120 VOLT (AND GREATER) POINTS OF POWER CONNECTION REQUIRED FOR PRICING AND INSTALLATION BY THE ELECTRICAL CONTRACTOR.
- 2. THE MECHANICAL CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL TERMINAL POINT TO TERMINAL POINT, COMPLETELY COORDINATED AND INTEGRATED WIRING DIAGRAMS FOR ALL WIRING REQUIRING FIELD INSTALLATIONS IN ACCORDANCE WITH THE SEQUENCE OF OPERATION.
- 3. SPECIFIC WIRING DIAGRAMS OF FACTORY INSTALLED EQUIPMENT WIRING SHALL ALSO BE SUBMITTED FOR APPROVAL AND FURNISHED TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION REQUIREMENTS AND OTHER USES.

AH. ELECTRICAL AUTOMATIC TEMPERATURE CONTROL (ATC)

- 1. EM POWER SHALL EMPLOY A CONTROLS CONTRACTOR FOR THIS PROJECT. ALL EQUIPMENT NEEDING CONTROL THERMOSTATS, CONTROL WIRING, AND PROGRAMMING TO BE DONE UNDER THE THIS TENANT'S DIRECTION.

AJ. SEQUENCE OF OPERATION

1. EXISTING ROOFTOP AIR CONDITIONING UNIT "AC-6" CONTROL SEQUENCE

- a. THIS AIR CONDITIONING SYSTEM SHALL BE PROVIDED WITH A PROGRAMMABLE THERMOSTAT HAVING A 7-DAY TIMECLOCK TO START AND STOP THE UNIT. THE TIMECLOCK SHALL HAVE HOLIDAY AND WEEKEND SKIP, MANUAL OVERRIDE SWITCH AND 10-HOUR SPRING-WOUND TIME RESERVE MECHANISM. PROVIDE A REMOTE OVERRIDE SWITCH WITH 0 TO 6 HOUR TIMER MOUNTED IN SWITCH AND LOCATED AS DIRECTED BY OWNERS REPRESENTATIVE. THERMOSTAT SHALL BE SIMILAR TO HONEYWELL T7300 PROGRAMMABLE THERMOSTAT.
- b. WHEN OUTDOOR AIR ENTHALPY IS GREATER THAN RETURN AIR, OUTDOOR AIR DAMPER TO GO TO MINIMUM POSITION AND RETURN AIR DAMPER TO OPEN AND WALL THERMOSTAT TO CONTROL MECHANICAL COOLING (CONSULT UNIT MANUFACTURER FOR NUMBER OF MECHANICAL COOLING STAGES).
- c. WHEN OUTDOOR AIR ENTHALPY IS LESS THAN RETURN AIR, OUTDOOR AIR DAMPER AND RETURN AIR DAMPER TO MODULATE TO MAINTAIN WALL THERMOSTAT SET POINT. A LOW LIMIT SENSOR IN THE MIXED AIR STREAM SHALL PREVENT THE ECONOMIZER CYCLE MIXED AIR TEMPERATURE FROM DROPPING BELOW 52°F. (TO PROTECT AGAINST COIL FREEZE UP). THE ECONOMIZER CYCLE SHALL NOT BE FUNCTIONAL IF THE OUTDOOR AIR TEMPERATURE IS ABOVE 70°F.
- d. WHEN THE WALL THERMOSTAT CALLS FOR HEATING, THE OUTDOOR AIR DAMPER TO BE CLOSED TO MINIMUM POSITION AND RETURN AIR DAMPER TO OPEN.
- e. A REMOTE SENSOR CONTROL WILL PROVIDE LOW AMBIENT LOCKOUT AND LOCKOUT THE REFRIGERANT COMPRESSORS AT 50 DEGREES F (ADJUSTABLE) SETPOINT.
- f. A REMOTE DAMPER POSITION POTENTIOMETER WILL BE PROVIDED TO ALLOW ADDITIONAL SETTING OF OUTSIDE AIR DAMPER OTHER THAN MINIMUM POSITION.
- g. SMOKE DETECTION
 - 1) DUCT MOUNTED SMOKE DETECTOR SHALL BE PROVIDED IN THE SUPPLY AND RETURN DUCT OF THIS SYSTEM TO STOP THE AC UNIT WHEN SMOKE IS SENSED (FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR AND INSTALLED BY THIS CONTRACTOR).
 - 2) WHEN SMOKE IS SENSED BY THE SMOKE DETECTOR SERVING ITS AIR CONDITIONING UNIT, A SIGNAL SHALL BE SENT TO THE BASE BUILDING FIRE ALARM CONTROL PANEL. A SIGNAL WILL THEN BE SENT FROM THE BASE BUILDING FIRE ALARM CONTROL PANEL TO SHUT DOWN THE AIR CONDITIONING UNIT AND ALL ASSOCIATED FANS AND DEVICES.
- h. PROVIDE EACH HVAC UNIT WITH SHUT DOWN RELAY INTERLOCKED WITH FIRE ALARM CONTROL PANEL FOR SHUT DOWN.
- i. FAN TO RUN CONTINUOUSLY DURING OCCUPIED MODE. HEATING SET POINT WILL BE 70 F. COOLING SET POINT WILL BE 75 F. THE ZONE TEMPERATURE SENSORS WILL INTERFACE WITH THE THERMOSTAT TO MAINTAIN ITS TEMPERATURE SETTING THRU THE UNIT MICRO CONTROLS, WITH NIGHT SET-BACK CAPABILITIES FOR COOLING/HEATING IN OCCUPIED MODES.
- j. UNITS MUST BE PROGRAMMED FOR MORNING WARM UP A MINIMUM OF 1 HOUR (ADJUSTABLE) PRIOR TO OCCUPIED MODE.
- k. DUAL ENTHALPY CONTROLLED ECONOMIZER SHALL INCLUDE THE FACTORY INSTALLED COMPARATIVE ENTHALPY SENSORS LOCATED IN THE RETURN AND OUTDOOR AIR STREAMS. CONTROLLER SHALL COMPARE ENTHALPIES AND PROPORTIONALLY ADJUST THE OUTDOOR AIR LEVELS ACCORDINGLY.

L. DAIKIN SPLIT SYSTEMS AC-1 / AC-2

EACH SPLIT SYSTEM (INDOOR UNIT) HAS A DEDICATED REMOTE WALL MOUNTED HARD WIRED CONTROLLER. THE WALL MOUNTED CONTROLLER / THERMOSTAT WILL DETERMINE COOLING OR HEATING AUTOMATICALLY FOR ITS SYSTEM. EACH INDOOR REMOTE CONTROLLER MUST BE PROGRAMMED BY THE USER FOR TIME OF DAY START / STOP AND SET-BACK HEATING MODE (CONF RM) HOWEVER, THE SERVER RM WILL BE IN COOLING MODE 24/7/365. EACH REMOTE CONTROLLER HAS INDEPENDENT TEMPERATURE SETTINGS FOR COOLING AND FOR HEATING FOR OCCUPIED AND UNOCCUPIED TIMES. EACH REMOTE CONTROLLER HAS INDEPENDENT TIME SCHEDULING SETTINGS FOR COOLING AND FOR HEATING, FOR OCCUPIED AND UNOCCUPIED TIMES. EACH REMOTE CONTROLLER HAS INDEPENDENT FAN SPEED SETTINGS. TRAINING OF OFFICE PERSONAL TO BE PERFORMED BY DAIKIN APPLIED TECHNICIANS.

AK. TESTING, ADJUSTING AND BALANCING

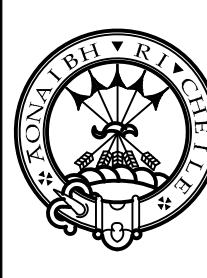
- 1. REQUEST FROM BUILDING ENGINEER TIME FOR TESTING TO BE PERFORMED. REQUEST THAT BUILDING SYSTEMS BE SET AT 100% CAPACITY. BALANCE AIR FLOW TO ALL OUTLETS TO PROVIDE AIR QUANTITIES NOTED. SUBMIT A DETAILED BALANCING REPORT, SHOWING INSTRUMENTS USED, VAV BOX INLET AND OUTLET STATIC PRESSURE AND EXHAUST FANS, SUPPLY, RETURN TEMPERATURES AND ACTUAL VERSUS DESIGN AIR QUANTITIES FROM DIFFUSERS, GRILLES, REGISTERS, ETC. AFTER ADJUSTMENTS.
- 2. MAKE ALL REQUIRED ADJUSTMENTS OF AIR AND WATER SYSTEM DEVICES UNTIL ALL SPECIFIED PERFORMANCES ARE MET.
- 3. AIR AND WATER SYSTEM BALANCING SHALL BE PERFORMED BY AN INDEPENDENT TESTING AND BALANCING FIRM CERTIFIED AND REGISTERED BY THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) HAVING A MINIMUM OF FIVE YEARS' EXPERIENCE. SUBMIT EVIDENCE OF QUALIFICATIONS. TESTING AND BALANCING REPORTS SHALL BEAR THE NEBB STAMP AND SEAL AS REQUIRED.
- 4. WITHIN 90 DAYS OF OWNER OCCUPANCY OR AS DIRECTED BY THE OWNER, THE TESTING AND BALANCING CONTRACTOR SHALL PERFORM ADDITIONAL TESTING AND BALANCING TO VERIFY THAT BALANCED CONDITIONS ARE BEING MAINTAINED THROUGHOUT AND TO CORRECT UNUSUAL CONDITIONS.
- 5. IF INITIAL TESTING AND BALANCING WAS NOT PERFORMED DURING PEAK SUMMER AND PEAK WINTER OUTDOOR CONDITIONS, THEN THE TESTING AND BALANCING CONTRACTOR SHALL PERFORM ADDITIONAL TESTING AND BALANCING DURING PEAK SUMMER AND PEAK WINTER OUTDOOR CONDITIONS.
- 6. AIR BALANCING
 - a. PROVIDE VOLUME DAMPERS AS REQUIRED FOR FINAL BALANCING OF AIR SYSTEMS.
 - b. EXISTING AIR VOLUME QUANTITIES AND TEMPERATURES AT THE POINTS OF CONNECTIONS OF NEW DUCTS WITH EXISTING DUCT RISERS AND OTHER SOURCES SHALL BE MEASURED AND RECORDED IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE AND SHALL BE FORWARDED TO THE CONSULTING ENGINEER PRIOR TO COMMENCEMENT OF CONSTRUCTION.
 - c. THE QUANTITY OF AIR DISCHARGED OR EXHAUSTED BY EACH OUTLET SHALL BE WITHIN 10% OF THE AMOUNT SHOWN ON DRAWINGS
 - d. BALANCE ALL SUPPLY, RETURN, FRESH AIR INTAKE AND EXHAUST DUCTWORK TO THE QUANTITIES INDICATED ON THE DRAWINGS WITH FOLLOWING TOLERANCES:
 - 1) FANS - DESIGN VOLUME PLUS 5%.
 - 2) LEAKAGE - 5% MAXIMUM.
 - 3) OUTLETS - DESIGN VOLUME PLUS 5%.

BLOT SCALE: 1/8"=1'-0" (SEE E.I. PLAN) OFFICE NUMBER: 603 MECHANICAL SPECIFICATIONS SHEET 2.dwg Date: January 21, 2014. Drawn: JAC/JSB PDF: Plotter: Robert W. Liscansky

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PROJECT LOCATION: **BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK**

TITLE: **MECHANICAL SPECIFICATIONS SHEET 2**

DISCIPLINE: **MECHANICAL**

PROJECT ENGINEER: **MH**

DESIGNED BY: **JD**

DRAWN BY: **JD**

CHECKED BY: **JD**

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DATE: **JAN 2014**

SCALE: **AS SHOWN**

DRAWING NO. **M-003**

DRAWING

SCOPE OF WORK AND GENERAL ELECTRICAL NOTES

- AT A MINIMUM, THE CONTRACTOR SHALL FOLLOW AND PROVIDE MATERIAL AND SERVICES FROM THE FOLLOWING SCOPE OF WORK. IN ADDITION TO THIS ABBREVIATED SCOPE OF WORK, THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND SERVICES OUTLINED ON THE CONTRACT DRAWINGS AND IN THE CONTRACT SPECIFICATIONS. WORK SHALL BE IN ACCORDANCE WITH THE 2008 NYC BUILDING CODE AND THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE.
- THE ELECTRICAL CONTRACTOR SHALL CAREFULLY EXAMINE THE DRAWINGS AND SPECIFICATIONS, VISIT THE SITE OF THE WORK AND FULLY BECOME INFORMED AS TO ALL CONDITIONS AND MATTERS THAT CAN, IN ANY WAY, AFFECT THE WORK OR THE COST THEREOF. SHOULD THE ELECTRICAL CONTRACTOR FIND DISCREPANCIES BETWEEN EXISTING CONDITIONS AND NEW WORK FROM THE DRAWINGS, SPECIFICATIONS OR OTHER DOCUMENTS, OR BE IN DOUBT AS TO THEIR MEANING, NOTIFY THE OWNER'S REPRESENTATIVE AT ONCE IN WRITING OF ANY DISCREPANCIES AND OBTAIN CLARIFICATION PRIOR TO SUBMITTING ANY BID. ABSENCE OF SUCH NOTIFICATION SHALL BE INTERPRETED TO INDICATE NO DISCREPANCIES OR CONFLICTS ADDITIONAL COMPENSATION SHALL NOT BE GRANTED AFTER AWARD OF CONTRACT FOR ANY WORK NECESSARY TO COMPLY WITH THESE REQUIREMENTS.
- CONDITIONS AT THE SITE: THE ACT OF SUBMITTING A BID SHALL BE EVIDENCE THAT THE ELECTRICAL CONTRACTOR HAS EXAMINED THE SITE AND FAMILIARIZED HIMSELF WITH ALL EXISTING CONDITIONS WITHIN THE SCOPE OF THIS WORK AND ACCEPTED SUCH CONDITIONS, AND MADE ALLOWANCES THEREFORE IN PREPARING AND SUBMITTING HIS BID.
- ELECTRICAL DRAWINGS: LOCATIONS OF EQUIPMENT ARE SHOWN TO SCALE WHERE POSSIBLE BUT MAY BE DISTORTED FOR CLARITY. IT IS NOT WITHIN THE SCOPE OF THE DRAWINGS TO SHOW ALL NECESSARY BENDS, OFFSETS AND OBSTRUCTIONS. IT SHALL BE THE RESPONSIBILITY OF ELECTRICAL CONTRACTOR TO INSTALL HIS WORK TO CONFORM TO THE STRUCTURE, RESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR.
- THE DRAWINGS MAY NOT SHOW COMPLETE OR ACCURATE DETAILS OF THE EXISTING BUILDINGS IN EVERY RESPECT. EXACT LOCATIONS AND RELATIONSHIPS ARE TO BE DETERMINED IN FIELD AND SHALL BE TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE. THE ELECTRICAL CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL FIELD MEASUREMENTS.
- REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF GENERAL ELECTRICAL WORK. ALL EXISTING CONDITIONS ARE NOT COMPLETELY DETAILED ON THE DRAWINGS. THE ELECTRICAL CONTRACTOR SHALL SURVEY THE SITE AND MAKE ALL NECESSARY MODIFICATIONS REQUIRED BASED ON EXISTING CONDITIONS, FOR DEMOLITION OF EXISTING WORK AND INCLUDE ALL MATERIALS AND LABOR IN HIS BID PRICE.
- COOPERATION WITH OTHER CONTRACTORS: THE ELECTRICAL CONTRACTOR SHALL EXAMINE ALL CONTRACT DRAWINGS AND COOPERATE WITH ALL OTHER CONTRACTORS PROVIDING LABOR, MATERIALS AND ALL WORK SO THAT THE WORK AS A WHOLE SHALL BE EXECUTED AND COMPLETED WITHOUT CONFLICT OR DELAY. VERIFY WITH OTHER TRADES THE LOCATIONS OF MOTORS, EQUIPMENT, VOLTAGE AND PHASE, BEFORE COMMENCING ANY WORK. WORK INSTALLED IMPROPERLY DUE TO NON-COORDINATION SHALL BE CHANGED BY THE ELECTRICAL CONTRACTOR AT HIS OWN EXPENSE.
- FURNISH AND INSTALL ALL NECESSARY PULLBOXES AND CONDUIT SUPPORTS, WHERE NOTED AND AS REQUIRED BY APPLICABLE CODES. ALL LOW TENSION CONDUIT, FIRE ALARM CONDUIT, ETC WHICH HAVE RUNS IN EXCESS OF 200 FEET IN LENGTH AND/OR CONSTRAINING BENDS IN EXCESS OF 270 DEGREES SHALL BE PROVIDED WITH A PULLBOX. ALL PULLBOXES SHALL BE LABELED FOR THEIR INTENDED USE OR VOLTAGE LEVEL, AND ALL WIRE AND CABLE PROVIDED UNDER THIS SECTION SHALL BE TAGGED AT ALL PULLBOXES. PROVIDE ACCESS DOORS WHERE REQUIRED. COORDINATE WITH GENERAL CONSTRUCTION WORK.
- SUBMIT SHOP DRAWINGS TO THE OWNER'S REPRESENTATIVE FOR REVIEW PRIOR TO START OF ANY WORK. ANY WORK OR EQUIPMENT INSTALLED PRIOR TO APPROVAL OF RELEVANT SHOP DRAWINGS FOUND TO BE UNACCEPTABLE SHALL BE REMOVED AND MODIFIED AT THE CONTRACTOR'S SOLE EXPENSE INCLUDING ANY RESULTANT SCHEDULING DELAYS EXPERIENCED BY ANY TRADE.
- PREPARE AND FURNISH TO OWNER'S REPRESENTATIVE FOR REVIEW "AS-BUILT" PLANS ALL WORK INSTALLED.
- ELECTRICAL CONTRACTOR TO COORDINATE ALL DISCONNECT SWITCH REQUIREMENTS AND LOCATIONS WITH HVAC CONTRACTOR, AND/OR THE OWNER'S REPRESENTATIVE.
- ELECTRICAL CONTRACTOR SHALL VERIFY PHASE LOAD BALANCING ON POWER PANELS UPON COMPLETION OF THE ELECTRICAL INSTALLATION.
- ALL CONDUIT AND CABLE HOMERUNS SHALL CONSIST OF THREE CIRCUITS MAXIMUM TO THE PANELBOARD, UNLESS OTHERWISE NOTED. COMBINING OF MULTIPLE HOMERUNS IN A SINGLE CONDUIT SHALL NOT BE PERMITTED.
- ALL 120 VOLT OR 208 VOLT BRANCH CIRCUIT RUNS IN EXCESS OF 100 FEET FROM THE PANEL TO THE DEVICE SHALL BE PROVIDED WITH #10 MINIMUM AWG WIRE FOR ITS ENTIRE LENGTH.
- ALL WORK, WHETHER SHOWN OR INFERRED, UNLESS SPECIFICALLY QUESTIONED, SHALL BE CONSIDERED FULLY UNDERSTOOD IN ALL RESPECTS BY THE ELECTRICAL CONTRACTOR, AND THE ELECTRICAL CONTRACTOR SHALL THEREBY BE RESPONSIBLE FOR ANY INTERPRETATIONS OR CONSEQUENCES THEREOF FOR ALL WORK ON ALL DRAWINGS.
- ALL INSTRUMENTS, APPARATUS AND EQUIPMENT SHALL BE TESTED AND PROVED TO BE ELECTRICALLY AND MECHANICALLY WITHOUT DEFECTS. THE ELECTRICAL SYSTEM SHALL BE TESTED FOR GROUNDS OR SHORTS. IF THERE IS TROUBLE WITHIN THE CIRCUIT WIRING, ALL SHORTED OR GROUNDED WIRES SHALL BE REPLACED AND THEN RETESTED. ALL METERS, CABLES, EQUIPMENT OR APPARATUS NECESSARY FOR MAKING ALL TESTS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.
- THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SCHEDULING DELIVERY, RECEIVING, UNLOADING, STORING, UNCRATING, SETTING IN PLACE, AND PROTECTING FROM DAMAGE, VANDALISM, THEFT OR WEATHER DURING CONSTRUCTION FOR ALL NEW EQUIPMENT PROVIDED BY THE ELECTRICAL CONTRACTOR OR PROVIDED BY OTHER PARTIES TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION BY THE ELECTRICAL CONTRACTOR.
- THE ELECTRICAL INSTALLATION IS TO BE IN THE STRICT ACCORDANCE WILL ALL APPLICABLE LOCAL, STATE AND FEDERAL RULES, REGULATIONS AND CODES OR ANY OTHER AUTHORITIES HAVING LAWFUL JURISDICTION, INCLUDING ANY LOCAL UTILITY COMPANY REQUIREMENTS.
- ALL EQUIPMENT/DEVICES PROVIDED BY THE ELECTRICAL CONTRACTOR SHALL BE NEW AND OF FIRST QUALITY AND SHALL BEAR THE APPROPRIATE UL OR CSA APPROVED LABELS FOR SPECIFIC PURPOSE. ALL MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE (NEC).
- ALL WIRE AND CABLE SHALL BE COPPER WITH 600 VOLT INSULATION. MINIMUM WIRE SIZE SHALL BE SIZE #12 AWG (WITH THE EXCEPTION OF CONTROL WIRING). WIRE SIZE #10 AWG AND SMALLER SHALL BE SOLID AND ALL CABLE SIZE #8 AWG AND ABOVE SHALL BE STRANDED, WITH "TYPES" AS FOLLOWS: "THHN" GREATER THEN OR EQUAL TO #12 AWG FEEDER AND BRANCH CIRCUIT WIRING ABOVE FINISHED FLOORS AND AREAS NOT SUBJECT TO MOISTURE; "XHHW" FEEDER AND BRANCH CIRCUIT WIRE IN FINISHED FLOORS AND/OR SUBGRADE RUNS OR AREAS SUBJECT TO MOISTURE.
- NO HOLES OR RECESSES MAY BE CUT IN WALLS, FLOORS, CEILING, OR ANY PART OF THE BUILDING TO ADMIT CONDUIT OR OTHER WORK OF THIS CONTRACT WITHOUT PRIOR SUBMISSION TO AND REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE. WORK SHALL BE PERFORMED BY COMPETENT PERSONS SKILLED IN THIS FIELD IN A NEAT AND CRAFTSMAN LIKE MANNER. ANY CUTTING, DRILLING, CORING, ETC. SHALL BE DONE WET TO MINIMIZE THE SPREAD OF DUST. PROVIDE DUST PROTECTION AS APPROVED BY OWNER'S REPRESENTATIVE. THE PORTIONS CUT MUST BE RESTORED TO THEIR ORIGINAL CONDITION AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL INCLUDE ALL COSTS FOR ALL CUTTING AND PATCHING REQUIRED FOR THE ELECTRICAL WORK IN HIS BID. EXACT LOCATION OF CONDUIT PENETRATION(S) SHALL BE DETERMINED IN FIELD.
- PROVIDE AND INSTALL SLEEVES FOR PENETRATIONS THROUGH BLOCK OR CONCRETE WALLS AND FLOORS.

- ACCESS TO WORK AREAS, INCLUDING WORK SCHEDULED THEREIN, MUST HAVE PRIOR APPROVAL OF OWNER'S REPRESENTATIVE. ANY WORK REQUIRING EQUIPMENT SHUTDOWN MUST BE COORDINATED WITH THE OWNER'S REPRESENTATIVE PRIOR TO DEACTIVATION. ALL EXISTING EQUIPMENT IS TO REMAIN OPERATIONAL DURING THE CONSTRUCTION PERIOD. ANY TEMPORARY WIRING OR REROUTING OF CIRCUITRY TO ACHIEVE THIS SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. SHUT DOWN OF EXISTING SERVICES SHALL ONLY BE PERMITTED UPON APPROVAL FROM THE OWNER'S REPRESENTATIVE AND THEN ONLY FOR THE DATE AND DURATION AGREED UPON.
- PERMITS, INSPECTIONS AND TESTS: OBTAIN ALL REQUIRED PERMITS AND ARRANGE ALL REQUIRED INSPECTIONS FOR THE EXECUTION OF ELECTRICAL WORK. PROVIDE ALL INSTRUMENTS AND PERFORM ALL TESTS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. CORRECT ALL FAILURES AND REPLACE ANY DAMAGED PORTIONS OF THE WORK RESULTING FROM TESTS. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE TESTS.
- GROUNDING: ALL WORK SHALL BE PERMANENTLY AND EFFECTUALLY GROUNDED WHETHER OR NOT SUCH CONNECTIONS ARE SPECIFICALLY SHOWN OR SPECIFIED. GROUND RESISTANCE AT ANY POINT SHALL NOT EXCEED 25 OHMS.
- CUTTING AND PATCHING: THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING OF ROUGH OR FINISH WORK REQUIRED BY ELECTRICAL INSTALLATIONS. PATCHING SHALL BE OF THE SAME MATERIAL, FINISH, AND WORKMANSHIP AS THE ORIGINAL WORK.
- CLEANING AND CLEANUP: ALL MATERIAL INSTALLED UNDER THIS SECTION OF THE WORK SHALL BE CLEANED OF GREASE, OIL, PLASTER, DIRT/DUST AND THE LIKE. ALL GREASE AND OIL SHALL BE CLEANED FROM FLOORS, CEILING, AND WALLS AND ALL UNUSED CONSTRUCTION MATERIAL AND DEBRIS SHALL BE LEGALLY REMOVED, TRANSPORTED AND DISPOSED OF OFF-SITE.
- ELECTRICAL CONTRACTOR SHALL NOT REDUCE SIZING OF CONDUITS TO SUIT WIRE FILL CAPACITY.
- ALL CONDUIT USED FOR THIS PROJECT SHALL BE 3/4" MINIMUM, EMT, UNLESS OTHERWISE NOTED. PVC SCHEDULE 40 CONDUIT MAY BE USED FOR SUBGRADE AND IN SLAB RUNS. SEE PIPE PENETRATION AND CONDUIT TRANSITION DETAILS.
- ALL SUSPENDED CONDUITS SHALL BE RIGIDLY SUPPORTED FROM THE BUILDING STRUCTURE BY MEANS OF APPROVED CONDUIT FASTENERS, HANGERS, STRAPS, SUPPORTS, CLAMPS, ETC., FIRMLY ANCHORED IN PLACE AND SPACED AT INTERVALS NOT TO EXCEED 10'-0".
- THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL RODS, ANGLES, RAILS, STRUTS, BRACE PLATES, PLATFORMS, ETC., REQUIRED FOR SUSPENSION OR SUPPORT OF CONDUIT AND EQUIPMENT AND ALL STRAPS, CLAMPS, THREADED RODS, TURNBUCKLES, ANCHORS, ETC. AND MISCELLANEOUS SPECIALTIES REQUIRED FOR THE ATTACHMENT OF HANGERS AND SUPPORTS TO THE STRUCTURE.
- ALL CONDUIT INSTALLED (SPARE OR UTILIZED) SHALL HAVE A MINIMUM, ONE (1) 14 AWG ZINC-COATED STEEL OR MONOFILAMENT PLASTIC PULL LINE WITH NOT LESS THAN 200LB TENSILE STRENGTH CHARACTERISTICS. LEAVE 12" (MINIMUM) OF SLACK AT EACH END OF CONDUIT.
- ALL CONDUIT SHALL BE ROUTED PARALLEL OR PERPENDICULAR TO WALLS AND STRUCTURAL MEMBERS WITH 90° BENDS.
- SPARE WIRES INSTALLED SHALL BE NEATLY COILED, BOUND AND PLACED IN SPACE AVAILABLE. LEAVE AT A MINIMUM, 8' OF SLACK AT EACH DESTINATION.
- PULL BOXES, JUNCTION BOXES, CONDUIT BODIES AND EXPANSION JOINTS SHALL BE INSTALLED AS PER NFPA 70.
- IDENTIFICATIONS: IDENTIFY EACH INDIVIDUALLY MOUNTED MOTOR, STARTER, DISCONNECT SWITCH, DISTRIBUTION PANEL, CONTROL PANELS, ETC. WITH A NAMEPLATE BEARING THE DESCRIPTION AND TAG OF THE EQUIPMENT CONTROLLED. THIS SHALL INCLUDE THE AFOREMENTIONED DEVICES PROVIDED BY OTHER CONTRACTORS.
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATING, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS, WITH NO MATERIAL COMPROMISE IN QUALITY, MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES OF MAGNITUDE AND/OR CHANGES WHICH RESULT IN EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL BY THE OWNER'S REPRESENTATIVE.
- ANY DAMAGE, TO EXISTING STRUCTURES, UTILITIES, VEGETATION, ETC. NOT SCHEDULED FOR DEMOLITION OR REMOVAL, INCURRED DURING CONSTRUCTION, WHETHER INCIDENTAL OR ACCIDENTAL, SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.
- FMC (FLEXIBLE METAL CONDUIT) SHALL ONLY BE UTILIZED FOR MOTOR AND TERMINATIONS. NO MORE THAN 6' OF FMC SHALL BE UTILIZED PER CONNECTION AS ABOVE MENTIONED.

TYPICAL RACEWAY SYMBOLS

(NOT ALL RACEWAYS APPLY TO THIS PROJECT)

- EXISTING CONDUIT TO BE REMOVED
- EXISTING CONDUIT/EQUIPMENT TO REMAIN
- CONCEALED CONDUIT OR MC CABLE (AS INDICATED)
- CONCEALED OR EXPOSED CONDUIT(S) WITH CABLES OR PULL ROPE AS INDICATED. MINIMUM CONDUIT SIZE 3/4".
- UNDERGROUND CONDUIT(S) WITH CABLES OR PULL ROPE AS INDICATED. MINIMUM CONDUIT SIZE 3/4".
- CONDUIT TURNING UP
- CONDUIT TURNING DOWN
- UNDERGROUND CCTV WITH CABLES OR PULL ROPE AS INDICATED.
- EXPOSED CONDUITS WITH CAMERA STATION WIRING. INSTALL CONCEALED IN FINISHED AREAS WHEREVER POSSIBLE.
- HOMERUN CONCEALED IN WALLS OR CEILING. NUMERICAL INDICATES PANELBOARD AND CIRCUIT GROUND AND NEUTRAL(S) WIRE INCLUDED. (#.#.#) THREE PHASE CIRCUIT, (#.#) SINGLE PHASE CIRCUIT
- #.#.# MULTIPLE NEUTRAL-HOT LEG CIRCUITS.
- 2#12+1#12G-3/4" FOR ONE HOMERUN CIRCUIT, TYP. U.O.N.
- 3#12+1#12G-3/4" FOR TWO HOMERUN CIRCUITS, TYP. U.O.N.
- 4#12+1#12G-3/4" FOR THREE HOMERUN CIRCUITS, TYP. U.O.N.
- CONDUIT STUB-UP WITH FLEXIBLE EQUIPMENT CONNECTION
- FLEXIBLE EQUIPMENT CONNECTION
- CAPPED CONDUIT

TYPICAL LEGEND

(NOT ALL WIRING DEVICES APPLY TO THIS PROJECT)

- POWER SYMBOLS**
- 20A, 125V FLUSH WALL-MOUNTED DUPLEX RECEPTACLE. 'C' = ABOVE COUNTER TOP, 'UN' = UNDER COUNTER TOP. COORDINATE MOUNTING HEIGHT WITH ARCHITECT (TYP. FOR ALL RECEPT.)
 - 20A, 125V FLUSH WALL-MOUNTED QUAD RECEPTACLE.
 - 20A, 125V FLUSH WALL-MOUNTED GENERAL PURPOSE DUPLEX RECEPTACLE: 'GFI' = DENOTES GROUND FAULT INTERRUPTER
 - WALL-MOUNTED SPECIAL PURPOSE RECEPTACLE: 'A' = INDICATES TYPE OR MATCH NEMA CONFIGURATION WITH EQUIPMENT
 - 20A, 125V FLUSH WALL-MOUNTED SINGLE RECEPTACLE: 'WC' = WATER COOLER
 - 20A, 125V FLUSH WALL-MOUNTED DUPLEX RECEPTACLE: CONTROLLED FROM WALL SWITCH 'Q'
 - 20A, 125V FLUSH WALL-MOUNTED EMERGENCY PURPOSE DUPLEX RECEPTACLE: 'EM' = DENOTES ON GENERATOR POWER CIRCUIT
 - 20A, 125V FLUSH WALL-MOUNTED ISOLATED GROUND QUAD RECEPTACLE
 - 20A, 125V FLUSH WALL-MOUNTED COMBINATION WALL SWITCH AND DUPLEX RECEPTACLE IN SINGLE BOX.
 - 20A, 125V SURFACE WALL-MOUNTED DUPLEX RECEPTACLE.
 - 20A, 125V FLUSH WALL-MOUNTED SURGE SUPPRESSION DUPLEX RECEPTACLE.
 - 20A, 125V FLUSH FLOOR-MOUNTED POKE-THRU QUAD RECEPTACLE. 'V' = VOICE FEED, 'D' = DATA FEED
 - 20A, 125V FLUSH FLOOR-MOUNTED JUNCTION BOX OR POKE-THRU FOR ELECTRIFIED FURNITURE POWER FEED.
 - 'V' = VOICE FEED, 'D' = DATA FEED
 - 20A, 125V FLUSH FLOOR-MOUNTED DUPLEX RECEPTACLE.
 - 20A, 125V FLUSH FLOOR-MOUNTED QUAD RECEPTACLE.
 - FLOOR MOUNTED COMBINATION VOICE/DATA & 20A, 125V DUPLEX RECEPTACLE: 'Z' = NUMBER OF CABLES
 - FLUSH FLOOR-MOUNTED SPECIAL PURPOSE RECEPTACLE: 'A' = INDICATES TYPE OR MATCH NEMA CONFIGURATION WITH EQUIPMENT
 - 20A, 125V FLUSH CEILING-MOUNTED QUAD RECEPTACLE.
 - 20A, 125V FLUSH CEILING-MOUNTED DUPLEX RECEPTACLE.
 - PLUG-IN SURFACE METAL RACEWAY. DUAL PLUG-IN (POWER/DATA/VOICE) 'A' = SPECIAL PURPOSE RECEPTACLE WHERE INDICATED
 - 20A, 277V THERMAL OVERLOAD MOTOR HORSEPOWER RATED DISCONNECT SWITCH-TOGGLE TYPE. MATCH RATING WITH EQUIPMENT
 - 20A, 277V MOTOR HORSEPOWER RATED DISCONNECT SWITCH-TOGGLE TYPE MATCH RATING WITH EQUIPMENT
 - 20A, 277V, DISCONNECT SWITCH-TOGGLE TYPE. MATCH RATING WITH EQUIPMENT
 - '2P' = TWO POLE SWITCH
 - JUNCTION BOX WITH FINAL EQUIPMENT CONNECTION. 'C' = CEILING (TYP.)
 - FLOOR JUNCTION BOX WITH FINAL EQUIPMENT CONNECTION.
 - JUNCTION BOX WITH FINAL EQUIPMENT CONNECTION.
 - SURFACE MOUNTED ELECTRICAL PANEL
 - EXISTING SURFACE MOUNTED ELECTRICAL PANEL
 - RECESSED MOUNTED ELECTRICAL PANEL
 - EXISTING RECESSED MOUNTED ELECTRICAL PANEL
 - LOW VOLTAGE TRANSFORMER
 - SURFACE MOUNTED ELECTRICAL POWER DISTRIBUTION PANELBOARD
 - EXISTING SURFACE MOUNTED POWER ELECTRICAL DISTRIBUTION PANELBOARD
 - TRANSFORMER
 - MOTOR CONTROLLER/STARTER
 - COMBINATION MOTOR CONTROLLER AND DISCONNECT SWITCH. SWITCH AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED. FUSED HORSEPOWER RATED, DISCONNECT SWITCH. HEAVY DUTY AS REQUIRED. PROVIDE SWITCH AMPERE, NUMBER OF POLES AND VOLTAGE RATING AS REQUIRED.
 - UNFUSED HORSEPOWER RATED, DISCONNECT SWITCH. HEAVY DUTY AS REQUIRED. PROVIDE SWITCH AMPERE, NUMBER OF POLES, VOLTAGE RATING AS REQUIRED.
 - ENCLOSED CIRCUIT BREAKER. NA = NON-AUTOMATIC
 - MOTOR. NUMBER INDICATES HORSE POWER
 - PULL BOX. SIZE AS REQUIRED

TYPICAL ABBREVIATIONS

(NOT ALL ABBREVIATIONS APPLY TO THIS PROJECT)

- A AMPS
- AC ALTERNATING CURRENT
- A/C PHASE "A" AND "C" ONLY.
- AFF ABOVE FINISHED FLOOR
- AC-1 AIR CONDITIONER UNIT #1
- ARCH ARCHITECTURAL
- AWG AMERICAN WIRE GAUGE
- BLDG BUILDING
- C CONDUIT
- C/B CIRCUIT BREAKER
- C/C CENTER TO CENTER
- C/K CIRCUIT
- CRAC COMPUTER ROOM AC UNIT
- DWG DISTRIBUTION PANEL H-1 DRAWING
- EC EMPTY CONDUIT
- ELEC ELECTRICAL
- FL FLOOR
- FEET FEET
- FUSED AT FUSED DISCONNECT SWITCH
- GND, G GROUND (INDICATES GREEN GROUND CONDUCTOR)
- H/L HIGH LEG "H" IS 240 VOLTS
- HP HORSEPOWER
- HVAC HEATING VENTILATING AND AIR CONDITIONING
- IN, (") INCHES
- J JUNCTION BOX
- KVA KILOVOLT AMPERES
- LTG LIGHTING
- M MAIN
- MBB MANUAL BYPASS BREAKER
- MBP MANUAL BYPASS PANEL
- MISC MECHANICAL
- MISCH MISCELLANEOUS
- N NEUTRAL
- NEC NATIONAL ELECTRIC CODE
- NEMA NATIONAL ELECTRICAL MANUFACTURERS ASSOC.
- NL ON NIGHT LIGHT CIRCUIT
- P-1 PHASE
- PH CIRCULATION PUMP #1
- PLIC POWERLOGIC INTERFACE CABINET
- PNL PANEL
- REC RECEPTACLE
- RM ROOM
- SPCS SPECIFICATIONS
- STD STANDARD
- TYP TYPICAL
- UPS UNINTERRUPTIBLE POWER SUPPLY
- V VOLTS
- WATTS WATTS
- WP WEATHERPROOF
- Ø PHASE

LIGHTING/SWITCHING

(NOT ALL SWITCHING APPLY TO THIS PROJECT)

- S SINGLE POLE GENERAL PURPOSE SWITCH
- 2 DOUBLE POLE SWITCH
- 3 THREE-WAY SWITCH
- 4 FOUR-WAY SWITCH
- D DIMMER SWITCH
- α = CONTROLLING LIGHT ZONE OR RECEPTACLE
- P = PILOT LIGHT SWITCH
- T = TIME CONTROLLED SWITCH
- MO = MOMENTARY CONTACT SWITCH
- K = KEY OPERATED SWITCH
- OS = AUTOMATIC WALL SWITCH/OCCUPANCY SENSOR COMBINATION
- VA = WSD PDT VA [WHITE] WALL SWITCH DECORATOR VACANCY SENSOR-PASSIVE DUAL TECHNOLOGY (PDT)
- CD = CH[6 BUTTONS] [WHITE] [PLATE COLOR-WHITE] LC&D CHELSEA DIGITAL SWITCH
- PI = WSD [WHITE] WALL SWITCH DECORATOR SENSOR - PASSIVE INFRARED (PIR)
- DT = WSD PDT [WHITE] WALL SWITCH DECORATOR SENSOR - DUAL TECHNOLOGY (PDT)
- SA = sPODM SA [WHITE] ON/OFF TOGGLE, MANUAL ON

FIRE ALARM

(NOT ALL DEVICES APPLY TO THIS PROJECT)

VOICE/DATA/P.A.

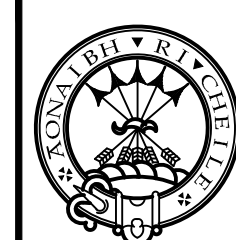
(NOT ALL DEVICES APPLY TO THIS PROJECT)

- S SMOKE DETECTOR S= SOUNDER BASE
- H HEAT DETECTOR
- CO CARBON MONOXIDE DETECTOR
- D DUCT DETECTOR
- R=RETURN
- F HORN-STROBE COMBINATION
- ▽ STROBE
- ▽ MULT TONE HORN 3 TONES (ALARM, SMOKE AND WATER FLOW)
- (AMT)
- B BELL (TROUBLE)
- F MANUAL PULL STATION
- MM SINGLE MONITOR MODULE
- DDMM DUAL MONITOR MODULE
- FS WATER FLOW SWITCH
- TS TAMPER SWITCH
- (FAFDS) FIRE ALARM FUSED DISCONNECT SWITCH
- FSR FAN SHUT DOWN RELAY
- FACP FIRE ALARM CONTROL PANEL
- FARA FIRE ALARM REMOTE ANNUNCIATOR
- LED LED INDICATOR LIGHT
- FD FIRE/SMOKE DAMPER
- SV SOLENOID VALVE
- R RELAY

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PROJECT NAME: **EMPOWER SOLAR**

PROJECT LOCATION: **BARNUM LANDING, AUSTIN BLVD
ISLAND PARK, NEW YORK**

TITLE: **ELECTRICAL LEGENDS AND NOTES**

DISCIPLINE: **ELECTRICAL**

PROJECT ENGINEER: **MH**

DESIGNED BY: **GR**

DRAWN BY: **GR**

CHECKED BY: **GR**

PROJECT NO.: **CE2355A**

JOB NO.: **CE2355A**

DATE: **JAN 2014**

SCALE: **AS SHOWN**

DRAWING NO. **E-001**

DRAWING

BLOT SCALE: 1/8"=1'-0" ELECTRICAL LEGENDS AND NOTES.dwg, Date: 2/11/2014, 1:42:58 PM, Plotted by: Robert W. Lombardi

- C. WIRE AND CABLES:
- WIRE SHALL BE 600 VOLT RATED, COPPER CONDUCTORS, #12 AWG MINIMUM UNLESS OTHERWISE NOTED, TYPE THHN/THWN INSULATION. FIXTURE WIRING SHALL BE TYPE SF-1. ALL WIRE #8 AWG AND SMALLER SHALL BE SOLID, WIRE #6 AWG AND LARGER SHALL BE STRANDED. CONTROL CONDUCTORS SHALL BE #14 AWG. WIRE SHALL BE FACTORY COLOR CODED. BRANCH CIRCUITS SHALL CONTAIN THE NECESSARY NUMBER OF WIRES TO PROVIDE SWITCH CONTROL INDICATED OR REQUIRED.
 - CONNECTIONS FOR CONDUCTORS #8 AWG AND SMALLER SHALL BE PRESSURE TYPE CONNECTORS, SET SCREW CONNECTOR SHALL NOT BE USED. CONNECTORS SHALL BE THOMAS & BETTS SERIES PT-1 IDEAL, SCOTCH-LOCK, BUCHANAN OR APPROVED EQUAL.
 - CONTROL WIRING SHALL BE NOT LESS THAN #16 AWG, STRANDED OR SOLID AS REQUIRED BY THE APPLICATION, IN SINGLE CONDUCTORS OR MULTI-CONDUCTOR CABLES. CONTROL WIRING SHALL CONSIST OF MULTI-CONDUCTOR CABLES WHEREVER POSSIBLE. CABLES SHALL BE PROVIDED WITH AN OVERALL FLAME-RETARDANT EXTRUDED JACKET.
 - CABLES SHALL BE TAPPED IN ALL PULL BOXES, WIREWAYS AND WIRING GUTTERS OF PANELS. TAGS SHALL IDENTIFY WIRE OR FEEDER NUMBER AND/OR EQUIPMENT SERVED AS SHOWN ON DRAWINGS OR HEREIN SPECIFIED. TAG AND IDENTIFY ALL BRANCH CIRCUITS WHICH ARE LOOPED AND TERMINATED IN JUNCTION OR OUTLET BOXES. TAGS SHALL BE OF FLAME-RESISTING ADHESIVE MATERIAL, BRADY B-500 VINYL CLOTH OR APPROVED EQUAL.
 - BRANCH CIRCUIT WIRING FOR SINGLE PHASE APPLICATIONS SHALL BE MULTI-WIRE, UTILIZING COMMON NEUTRALS, IN A MANNER CONSISTENT WITH THE TYPE OF SERVICE FURNISHED TO THE PROJECT. UNDER NO CIRCUMSTANCES SHALL ANY SWITCH OR CIRCUIT BREAKER BREAK A NEUTRAL CONDUCTOR.
 - PROVIDE A GREEN INSULATED GROUND WIRE WITH ALL FEEDERS AND BRANCH CIRCUITS.
 - HOMERUNS AND BRANCH CIRCUIT WIRING FOR 120 VOLT SHALL BE AS FOLLOWS:

LENGTH (FT)	HOME RUN WIRE SIZE	CIRCUIT WIRE SIZE
0 TO 50	NO. 12 AWG	NO. 12 AWG
51 TO 100	NO. 10 AWG	NO. 12 AWG
101 TO 150	NO. 8 AWG	NO. 10 AWG
- D. WIRE CONNECTIONS AND DEVICES:
- COPPER CABLE BRANCH TAPS FROM COPPER CABLE MAIN LINES UNDER 600 VOLTS SHALL BE MADE IN JUNCTION, PANELBOARDS OR PULLBOXES WITH APPROVED CAST COPPER ALLOY SOLDERLESS CONNECTORS IN A HI-IMPACT PHENOLIC INSULATING COVER HAVING AT LEAST TWO SPRING CLIP FASTENERS. CONNECTORS SHALL BE O.Z. TYPE "PM" PARALLEL TAP WITH "PTC" COVER, TYPE "PM" PARALLEL LOOPED TAP WITH "PMC" COVER AND TYPE "T" CABLE TAP WITH TYPE "TC" COVER.
 - SPLICES (600 VOLT AND BELOW) OF COPPER CONDUCTORS SHALL BE MADE IN JUNCTION OR PULLBOXES WITH APPROVED O.Z. TYPE "TW" OR "WX" CAST COPPER ALLOY SOLDERLESS CONNECTOR IN A HI-IMPACT PHENOLIC INSULATING COPPER TYPE "TWC" OR "XWC".
 - CONNECTOR AND LUGS SHALL BE AS MANUFACTURED BY BURNDY, THOMAS & BETTS, O.Z. GEDNEY OR APPROVED EQUAL.
- E. OUTLET BOXES:
- OUTLET BOXES SHALL BE CODE GAUGE HOT DIPPED GALVANIZED STAMPED STEEL. GENERALLY BOXES SHALL BE 4" SQUARE, DEPTH AS REQUIRED. EXTENSION COLLARS SHALL BE USED WHERE REQUIRED TO MEET CONSTRUCTION REQUIREMENTS. OUTLET BOXES SHALL BE PROVIDED FOR ALL INTERIOR OUTLETS FOR LIGHTING, SWITCHES, RECEPTACLES, SIGNALS AND THE LIKE.
 - BOXES SHALL BE AS MANUFACTURED BY APPLETON, RACO, STEEL CITY, OR APPROVED EQUAL.
- F. INSULATING BUSHINGS:
- ALL RIGID CONDUIT TERMINATING IN CABINETS, PANELBOARDS, PULL BOXES, ETC., SHALL HAVE INSULATING BUSHINGS O.Z. TYPE B OR TYPE BLG FOR GROUNDING BUSHINGS OR AS MANUFACTURED BY THOMAS & BETTS OR APPROVED EQUAL.
- G. PULLBOXES, JUNCTION BOXES AND WIREWAYS:
- ALL JUNCTION BOXES, EXCEPT THOSE IN WET LOCATIONS, SHALL BE MADE OF SHEET STEEL OF CODE THICKNESS.
 - UNLESS OTHERWISE SPECIFIED, ALL COVERS, TRIMS AND DOORS ON SUCH BOXES AND ALL EXPOSED BOXES, INCLUDING DOORS AND TRIMS, SHALL BE BONDZERIZED OR TREATED IN SOME EQUIVALENT MANNER TO RESIST RUSTING AND SHALL BE PAINTED WITH TWO COATS OF PROTECTIVE PRIMER PAINT GRAY IN COLOR. ALL FINISH PAINTING WILL BE DONE UNDER THE ARCHITECTURAL SECTION OF THE SPECIFICATIONS.
 - JUNCTION BOXES SHALL BE PROVIDED WHERE INDICATED ON PLANS AND WHEREVER ELSE SUCH BOXES MAY BE DEEMED NECESSARY, PROVIDING LOCATIONS ARE ACCEPTABLE TO THE ARCHITECT, TO FACILITATE THE PULLING OF WIRES AND CABLES.
 - ALL SUCH BOXES SHALL BE MADE ACCESSIBLE AND BUILT IN HEAVY GAUGE STEEL, UNLESS OTHERWISE SPECIFIED, AND SHALL BE BUILT ONLY FROM DETAIL WORKING DRAWINGS.
 - THE COVERS OF THESE BOXES SHALL BE DESIGNED FOR QUICK REMOVAL WHEN THE SYSTEM IS FINISHED.
 - THE BOXES SHALL CONTAIN NO OPENINGS, EXCEPT THAT INTO WHICH THE CONDUIT PASSED.
 - JUNCTION BOXES SHALL NOT BE EXPOSED IN FINISHED SPACES AND MEET THE APPROVAL OF THE OWNER.
 - JUNCTION BOXES OCCURRING IN FINISHED AREAS SHALL HAVE THE REMOVABLE COVER PLATES FLUSH WITH FINISHED CEILING OR SHALL HAVE THE REMOVABLE COVER PLATES FLUSH WITH FINISHED CEILING OR SHALL BE LOCATED IN HUNG CEILING BEHIND READILY IDENTIFIABLE ACCESS DOORS.
 - ALL CABLES WITHIN PULLBOXES SHALL BE PROPERLY TAGGED FOR IDENTIFICATION.
 - SUITABLE INSULATED SUPPORTS SHALL BE PROVIDED IN ALL PULLBOXES TO SUPPORT FEEDERS PASSING THROUGH THE BOXES SO THAT THE CONDUCTORS WILL NOT REMAIN UNSUPPORTED FOR A DISTANCE GREATER THAN THREE FEET AS REQUIRED BY CODE.
 - SUPPORT JUNCTION BOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARINGS ON CONDUITS
- H. WIRING DEVICES:
- SWITCHES:
 - LOCAL SWITCHES SHALL BE TOGGLE TYPE RATED AT 120 VOLTS, AC RATED 20 AMPERES, QUIET-TYPE WITH SILENT OPERATING MECHANISM, GROUNDED BEHIND COMMON PLATE WITH BARRIERED BACK BOX, TOTALLY ENCLOSED IN A MOLDED COMPOSITION BASE. ALL DEVICES SHALL BE FLUSH MOUNTED UNLESS OTHERWISE NOTED.
 - SWITCHES SHALL BE SINGLE POLE OR THREE WAY AS INDICATED ON THE DRAWINGS.
 - MANUAL-STARTING SWITCHES SHALL HAVE QUICK-MAKE, QUICK-BREAK MECHANISM OF TOGGLE TYPE AND SHALL HAVE METHOD OF LOCKING IN THE "OPEN" POSITION. SWITCHES SHALL BE OF HORSEPOWER RATED FOR MOTOR AND INDUCTIVE LOADS, CURRENT RATING, WHICH EXCEEDS THE CONNECTED LOAD. STARTERS SHALL BE MOUNTED FLUSH IN WALL. PROVIDE OVERLOADS WHERE REQUIRED. WATERTIGHT SWITCHES SHALL HAVE NEMA TYPE IV ENCLOSURE.
 - DIMMER SWITCHES AS PER OR AS SPECIFIED BY THE ARCHITECT.
 - COLOR OF SWITCHES SHALL BE WHITE OR AS SPECIFIED BY THE ARCHITECT.
 - APPROVED MANUFACTURERS: LEVITON, LUTRON, HUBBELL AND/OR SPECIFIED BY THE ARCHITECT.
2. VACANCY SENSOR:
- THE PASSIVE INFRARED VACANCY SENSOR SHALL PROVIDE AUTOMATIC SHUTOFF FOR SINGLE POLE LIGHTING CONTROLS, THE VACANCY SENSOR SHALL OPERATE AS A MANUAL ON SENSOR, USERS MUST PUSH THE BUTTON TO TURN LIGHTING ON. IT WILL KEEP LIGHTING ON AS LONG AS IT DETECTS OCCUPANCY.
 - VACANCY SENSOR SHALL BE WALL MOUNTED AND/OR CEILING MOUNTED WHERE NECESSARY AND WHERE NO OBSTRUCTIONS INTERFERE WITH THE PROPER OPERATION OF THE VACANCY SENSOR.
 - APPROVED MANUFACTURERS: WATTSTOPPER, # CS-50
3. RECEPTACLES:
- ALL RECEPTACLES INSTALLED IN THIS PROJECT SHALL BE GROUNDING TYPE, WITH GROUNDING PIN SLOT CONNECTED TO DEVICE GROUND SCREW FOR GROUND WIRE CONNECTION TO CONDUIT SYSTEM. INSTALL VERTICALLY MOUNTED RECEPTACLES WITH GROUNDING POLE ON TOP.
 - DUPLEX RECEPTACLES, 20 AMPERE, 125 VOLT RATED, TOTALLY ENCLOSED IN A MOLDED COMPOSITION BASE, PARALLEL BLADE LOAD CONTACTS AND U-SHAPED GROUNDING CONTACT. COLOR TO BE DETERMINED BY ARCHITECT.
 - SINGLE RECEPTACLES, 20 AMPERE, 125 VOLT RATED TOTALLY ENCLOSED IN A MOLDED COMPOSITION BASE, COLOR TO BE DETERMINED BY ARCHITECT.
 - RECEPTACLES OTHER THAN DESCRIBED ABOVE SHALL BE AS INDICATED.
 - APPROVED MANUFACTURERS: LEVITON, LUTRON, HUBBELL AND/OR SPECIFIED BY THE ARCHITECT.
4. DEVICE PLATES:
- PLATES FOR ALL WIRING DEVICES, EXCEPT AS SPECIFIED OTHERWISE, SHALL BE MOLDED PLASTIC. FLUSH MOUNTED DEVICES SHALL BE WHITE FINISH OF THE STRUCK-UP TYPE.
 - PLATES FOR TELEPHONE AND DATA OUTLETS SHALL HAVE 1" BUSHED OPENING OR AS REQUIRED BY THE TELEPHONE & DATA SERVICE PROVIDER.
 - BOXES WITHOUT DEVICES SHALL HAVE BLANK PLATES.
 - DEVICES LOCATED AT THE SAME POINT/LOCATION SHALL BE UNDER A COMMON PLATE UNLESS OTHERWISE NOTED. VERIFY ALL PLATE TYPES WITH ARCHITECT PRIOR TO INSTALLATION.
 - ON THE INSIDE OF EACH DEVICE PLATE, WRITE THE PANELBOARD DESIGNATION AND CIRCUIT NUMBER OF THE CIRCUIT SERVING THE DEVICE.
5. RECESSED FLOOR BOX FOR POWER, DATA AND AUDIO/VISUAL SOLUTIONS, 4 GANG BOX GALVANIZED STEEL, SHALLOW CONCRETE FLOOR INSTALLATION, WITH REMOVABLE VOLTAGE DIVIDERS, METALIC COVER, COLOR TO BE DETERMINED BY ARCHITECT. APPROVED MANUFACTURERS THOMAS AND BETTS 668 SERIES, WIREMOL/LEGRAM RFB SERIES AND/OR SPECIFIED BY THE ARCHITECT.

I. TAPS, SPLICES, TERMINATION'S:

 - CONNECTORS FOR SPLICES, TAPS AND TERMINATION'S SHALL BE OF THE COMPRESSION TYPE AND SHALL BE THE THOMAS & BETTS SERIES 54000 OR APPROVED EQUAL FOR COPPER CONDUCTORS #8 OR LARGER, CONNECTORS FOR COPPER CONDUCTORS #10 AND SMALLER SHALL MADE WITH APPROVED PRESSURE CONNECTORS.
 - ALL JOINTS SHALL BE COVERED WITH AN INSULATION EQUAL TO THAT OF THE CONDUCTORS. LUGS FOR CONNECTORS #4 AND LARGER SHALL BE OF THE TWO-BOLT TYPE. MANUFACTURERS RECOMMENDED FOR THIS USE ARE HEXAGONAL DIES AND HYDRAULIC TOOLS. PRESSURE CONNECTORS SHALL BE THOMAS & BETTS SERIES PT-1, IDEAL 71B SERIES, SCOTCH-LOCK, BUCHANAN OR APPROVED EQUAL.

J. LIGHTING FIXTURES:

 - PROVIDE NEW LIGHTING FIXTURES AND LAMPS AS INDICATED ON THE DRAWINGS AND SPECIFIED BY THE ARCHITECT.
 - BALLAST: BALLAST FOR FLUORESCENT LAMPS SHALL BE AS SPECIFIED HEREIN OR ON THE DRAWINGS, HIGH POWER FACTOR, CBA, ETL APPROVED, CLASS "P". TWO LAMP BALLAST SHALL BE PROVIDED WHERE PRACTICAL. THREE LAMP BALLAST SHALL NOT BE USED. ALL BALLAST AND TRANSFORMERS SHALL BE REMOVABLE TO FACILITATE REPAIRS. BALLAST SHALL BE FOR USE ON 60 Hz, 120 VOLT CIRCUITS. ALL BALLAST SHALL BE INDIVIDUALLY EQUIPPED WITH A BUILT-IN AUTOMATIC RESETTING THERMAL PROTECTOR. BALLAST SHALL BE LOW ENERGY TYPE NOT TO EXCEED 8.0 WATTS. ALL BALLAST SHALL BE APPROVED AND SHALL MEET U.L. STANDARD.
 - APPROVED MANUFACTURERS: FIXTURES SHALL BE AS SPECIFIED ON DRAWINGS. BALLAST SHALL BE AS MANUFACTURED BY GENERAL ELECTRIC, UNIVERSAL, ADVANCE, MAGNATEK.
 - INCLUDE THE COST OF PURCHASING ALL FIXTURES SPECIFIED IN THE LIGHTING FIXTURE SCHEDULE, INCLUDING PLASTER FRAMES, MOUNTING BRACKETS AND THE LIKE, AS WELL AS THE COST INVOLVED IN RECEIVING, CHECKING, CLEANING, SAFEGUARDING, WIRING, DISPOSAL OF CRATES FROM THE SITE, ETC. ASSEMBLING AND INSTALLATION OF FIXTURES SPECIFIED.
 - LAMPS SHALL BE PROVIDED FOR ALL LIGHTING FIXTURES AND AS SPECIFIED IN THE LIGHTING FIXTURE SCHEDULE, UNLESS OTHERWISE INDICATED LAMPS SHALL BE AS MANUFACTURED BY GE, SYLVANIA, PHILLIPS OR APPROVED EQUAL.

K. PANELBOARDS:

 - PANEL SECTIONS SHALL BE MOUNTED AWAY FROM THE BACK OF THE CABINET TRIM AND FRAMES. GUTTER SPACE SHALL BE PROVIDED ON SIDES, TOP AND BOTTOM AND SHALL OF SUFFICIENT SIZE TO PREVENT OVERCROWDING OF WIRES AND CABLES AND OVERHEATING OF THE CIRCUIT BREAKER.
 - PANEL CONSTRUCTION SHALL BE "DOOR WITHIN A DOOR" TYPE TO FACILITATE VIEWING OF PANEL GUTTERS.
 - CABINETS SHALL BE COMPLETE WITH HINGED DOORS WITH CYLINDER LOCK, DIRECTORY FRAME WITH NONCOMBUSTIBLE TRANSPARENT COVER AND NEATLY TYPED DIRECTORY CHARTS.
 - PROVIDE AND ANGLE PIECE ON THE INSIDE OF THE BOTTOM OF EACH TRIM FOR EASE INSTALLATION.
 - PANELS SHALL BE GENERAL PURPOSE, DEAD FRONT TYPE ASSEMBLES, FLUSH OR SURFACE MOUNTED AS INDICATED.

L. MOTOR STARTERS AND CONTROLS:

 - PRE-WIRED PACKAGED TYPE EQUIPMENT, MOTOR STARTERS, CONTROL DEVICES, CONTROL PANELS AND ALARM PANELS FOR MECHANICAL EQUIPMENT'S WILL BE PROVIDED UNDER OTHER SECTIONS OF THE SPECIFICATION AND INSTALLED AND WIRED UNDER THIS SECTION OF THE SPECIFICATION, EXCEPT AS OTHERWISE NOTED OR REQUIRED UNDER UNION JURISDICTION RULINGS.
 - ALL UTILITY MOTOR SUCH AS FANS, PUMPS, ETC. ARE PROVIDED UNDER APPLICABLE SECTIONS OF THE SPECIFICATION. RECEIVE THESE MOTORS, HANDLE, STORE, IF REQUIRED, AND MAKE ELECTRICAL CONNECTIONS INCLUDING A CHECK FOR CORRECT ROTATION, AS WORK UNDER THIS SECTION.
 - CONNECT EACH MOTOR TO A SEPARATE BRANCH CIRCUIT, EXCEPT WHERE OTHERWISE SHOWN. RUN CIRCUITS TO THE MOTOR VIA STARTING EQUIPMENT. TERMINATE CONDUIT TO MOTORS IN FINAL CONNECTION WITH LIQUID-TIGHT FLEXIBLE CONDUIT.
 - CONTROL DEVICES WHICH HAVE PIPING CONNECTIONS WILL BE INSTALLED UNDER OTHER SECTION OF THE SPECIFICATION AND WIRED UNDER THIS SECTION OF THE SPECIFICATION.
 - WHERE WALL SPACE IS NOT AVAILABLE, SUITABLE ANGLE IRON FRAMEWORK SUPPORTS SHALL BE PROVIDED FOR MOUNTING OF STARTERS AND CONTROLS.
 - POWER WIRING SHALL BE PROVIDED TO ALL MOTORS, STARTERS, MOTOR CONTROLLERS. PROVIDE ALL REQUIRED CONTROL WIRING AND RACEWAYS FOR CONTROL WIRING EXCEPT AS SPECIFICALLY EXCLUDED HEREIN.
 - TAG ALL CONTROL WIRING.
 - WIRE PER APPROVED SHOP DRAWINGS.
 - PERFORM ALL REQUIRED ADJUSTMENTS, WIRING MODIFICATIONS IN CONJUNCTION WITH ANY TESTING AND OPERATION SYSTEM START-UP PROCEDURES.
 - WHERE SHOWN IN THE DRAWINGS OR REQUIRED, THE DISCONNECT SWITCHES SHALL BE GENERAL DUTY ENCLOSED, EXTERNALLY OPERABLE SAFETY SWITCHES, AND SHALL BE UNFUSED EXCEPT WHERE POWER RATED, AND OF THE PROPER VOLTAGE AND AMPERE RATINGS FOR THE REQUIRED MOTOR AND SHALL HAVE THE NUMBER OF POLES REQUIRED TO OPEN ALL UNGROUNDED CONDUCTORS. SWITCHES INSTALLED WHERE EXPOSED TO THE WEATHER IN FAN CASINGS OR PLENUMS SHALL HAVE WEATHERPROOF HOUSING. MEANS SHALL BE PROVIDED FOR PADLOCKING SWITCH IN THE OPEN POSITION. DISCONNECTING DEVICES, WHEN NOT INCLUDED WITH ELECTRICALLY OPERATED EQUIPMENT FURNISHED UNDER OTHER SECTIONS OF THE SPECIFICATIONS, SHALL BE PROVIDED UNDER THIS SECTION TO COMPLY WITH CODE REQUIREMENTS.
 - EACH MOTOR STATER SHALL BE WIRED COMPLETE READY FOR OPERATION. PERFORM WIRING IN ACCORDANCE WITH MANUFACTURER'S WIRING DIAGRAMS AND APPROVED MECHANICAL SHOP DRAWINGS. INTERLOCK WIRING SHALL BE DONE BY MEANS OF AUXILIARY CONTACTS AND/OR RELAYS.
 - ANY REQUIRED INTERLOCKING CONTROL AND/OR TIME DELAY RELAYS, CONTROL TRANSFORMERS, REMOTE PUSH BUTTONS REQUIRED TO PERFORM FUNCTIONS INDICATED ON ELECTRICAL DRAWINGS OR PER LOCAL AUTHORITIES, SHALL BE PROVIDED AND WIRED UNDER THIS SECTION OF THE SPECIFICATIONS.
 - ALL CONTROL WIRING FOR SAFETY AND OPERATIONAL CONTROLS LOCATED ON MACHINE PANELS SHALL BE PROVIDED, INCLUDING DEVICES ON OR ASSOCIATED WITH EACH UNIT. ALL CONTROL WIRING TO COMPLETE EACH MOTOR STATER CIRCUIT FOR DESIRED OPERATION SHALL BE PROVIDED INCLUDING ANY REQUIRED ELECTRIC INTERLOCK WIRING BETWEEN STARTERS, WIRING OF PE SWITCHES, EP RELAYS, DAMPER LIMIT SWITCHES, AUTOMATIC ACTUATION CONTROLS FOR PUMPS, ELECTRIC SOLENOID VALVES, LEVEL CONTROLLERS, OPERATIONAL FLOAT SWITCHES, ELECTRIC OR ELECTRONIC THERMOSTATS, FREEZESTATS, SMOKE DETECTION SHUTDOWN CONTACTS, ETC.
 - WIRE ANY ELECTRIC HATERS INCLUDING LOCAL AND/OR REMOTE DEVICES PACKAGE TO BE FURNISHED BY MECHANICAL CONTRACTOR.
 - PROVIDE WIRE, CONDUIT AND CONNECTIONS FOR ANY MISCELLANEOUS ALARM SYSTEMS AS SPECIFIED UNDER MECHANICAL AND FIRE PROTECTIONS SECTIONS. INSTALLATION WHERE INDICATED OR DESIGNATED ALARM BELLS, ALARM CONTACT DEVICES; PROVIDE REQUIRED INDEPENDENT POWER SUPPLIES.
 - CONTROL WIRING SHALL BE CONNECTED TO BUILDING CONTROL MANAGEMENT SYSTEM. COORDINATE WITH BUILDING FOR TERMINATION OF CONTROL WIRING.

M. GROUNDING SYSTEM:

 - THE ELECTRICAL SYSTEM AND EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ELECTRICAL CODE AND AS SPECIFIED. THE GROUNDING CONDUCTOR SHALL BE AN INSULATED COPPER WIRE OF SIZE INDICATED. WHERE SIZE IS NOT INDICATED, THE CONDUCTOR SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE ELECTRICAL CODE EXCEPT THAT MINIMUM SIZE SHALL BE #12AWG. ACCESSIBLE CONNECTIONS SHALL BE MADE WITH MULTIPLE BOLT SILICON BRONZE CONNECTIONS SPECIFICALLY DESIGNED AND APPROVED FOR THE CONNECTION TO BE MADE.
 - THROUGHOUT THIS SPECIFICATIONS AN EQUIPMENT GROUND CONDUCTOR (GROUNDING CONDUCTOR) SHALL BE DEEMED TO MEAN A COPPER WIRE OF THE GAUGE SHOWN, OR WHERE NOT SHOWN AS SIZED BY LOCAL CODE.
 - PANELBOARDS, PULLBOXES AND ANY OTHER ENCLOSURE TERMINATING A RACEWAY RUN SHALL BE GROUNDED BY BONDING THE EQUIPMENT GROUND CONDUCTOR TO THE PROVIDED GROUND BUS OR TO THE GROUND LUG. IN ADDITION ALL INCOMING AND OUTGOING CONDUITS SHALL BE GROUNDED BY MEANS OF GROUNDING BUSHINGS. BUSHINGS SHALL BE CONNECTED TOGETHER AND TO THE PANEL OR PULLBOX CONNECTED LUG OR GROUND BAR WITH A BONDING JUMPER.
 - CONDUCTOR IN THE SAME RACEWAY WITH THE MOTOR FEEDER CONNECTED TO THE GROUNDING BUSHING AT THE MOTOR TERMINAL BOX AND THE GROUND BUS IN THE MOTOR CONTROL CENTER OR THE INCOMING CONDUIT GROUNDING BUSHING OF AN INDIVIDUALLY MOUNTED MOTOR STARTER.

N. ALL PANELS SHALL CONTAIN A SEPARATE GROUNDING BAR.

O. CABINETS AND TRIMS SHALL BE INDUSTRY STANDARD GAUGE GALVANIZED STEEL.

P. BRANCH CIRCUIT BREAKERS SHALL BE MOLDED CASE, BOLT-ON TYPE, THERMAL MAGNETIC TRIP, SINGLE, TWO (2) OR THREE (3) POLE AS NOTED OR INDICATED ON THE DRAWINGS:
 - ALL MULTIPLE POLE BREAKERS SHALL BE SINGLE HANDLE, COMMON TRIP.
 - BREAKERS SHALL BE RATED 10,000 A.I.C FOR 120/208 VOLT SERVICE, UNLESS OTHERWISE NOTED.
 - PHASE LEGS OF EACH PANEL SHALL BE BALANCED AT SUPPLY POINT. PANEL FOUND WITH UNBALANCED LOADS SHALL HAVE ITS CIRCUITS REARRANGED AS REQUIRED TO BALANCE PHASE LEGS WITHIN 10% OF EACH OTHER. THIS CONTRACTOR SHALL BALANCE PANEL ONE MONTH AFTER MOVE-IN DATE FOR ACTUAL PANEL LOAD.
 - BRANCH CIRCUIT BREAKERS SHALL BE ARRANGED SO THAT EACH BREAKER IS READILY REMOVABLE FROM THE PANEL WITHOUT DISTURBING ADJACENT BREAKERS.
 - PHASE LEGS SHALL BE ALTERNATELY BUSSED TO EACH CIRCUIT BREAKER IN A MANNER TO EFFECT BALANCING THE BRANCH CIRCUIT CONNECTIONS AS NEARLY AS POSSIBLE OVER EACH PHASE.
 - APPROVED MANUFACTURERS: ITE-SIEMENS, CUTTLER-HAMMER (EATON), SQUARE D OR APPROVED EQUAL.

Q. WHEREVER FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, A GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO THE GROUNDING BUSHING AT EACH END OF THE RUN.

R. ALL WORK SHALL BE PERMANENTLY AND EFFECTUALLY GROUNDED WHETHER OR NOT SUCH CONNECTIONS ARE SPECIFICALLY SHOWN OR SPECIFIED.

S. GROUND RESISTANCE AT ANY POINT SHALL NOT EXCEED 25 OHMS.

T. GROUND CONDUCTOR SHALL BE EXTENDED IN CONDUIT TO THE NEAREST 1-1/2" OR LARGER COLD WATER MAIN AND ATTACHED THERE WITH T AND B CONDUIT HUB AND WATER PIPE CLAMPS PER THE LOCAL CODE AUTHORITY.

U. PROVIDE ALL REQUIRED GROUNDING FOR TELEPHONE SYSTEM.

V. DISCONNECT SWITCHES:
 - DISCONNECT SWITCHES SHALL BE VOLTAGE RATED TO SUIT THE CHARACTERISTICS OF THE SYSTEM FROM WHICH THEY ARE SUPPLIED.
 - UNLESS OTHERWISE NOTED, DISCONNECT SWITCHES SHALL BE "QUICK-MAKE", "QUICK-BREAK", HEAVY DUTY TYPE NEMA 1 ENCLOSURE FOR INTERIOR INSTALLATION, FUSED OR UNFUSED AS INDICATED ON THE DRAWINGS. PROVIDE ALL FUSES AS REQUIRED OR PROPERLY PROTECT OR DISCONNECT THE LOAD FOR WHICH THEY WERE INTENDED. PROVIDE REJECTION TYPE FUSE CLIPS WHERE REJECTION TYPE FUSES ARE INSTALLED. PROVIDE WEATHERPROOF DISCONNECT SWITCHES WHERE INSTALLED OUTDOORS OR AS INDICATED ON DRAWINGS.
 - OPERATING MECHANISM SHALL BE DESIGNED SO THAT THE DISCONNECT SWITCHES MAY BE LOCKED IN THE "ON" OR "OFF" POSITIONS.
 - THE SWITCH SHALL HAVE AN INTERLOCK TO PREVENT UNAUTHORIZED OPENING OF THE HINGED COVER WHEN THE SWITCH IS IN THE "ON" POSITION, AND AN INTERLOCK TO PREVENT CLOSING THE SWITCH MECHANISM WITH THE HINGE COVER OPEN.
 - EACH FUSIBLE SWITCH SHALL BE LEFT EQUIPPED WITH A COMPLETE SET OF UL CLASS RK5 DUAL ELEMENT FUSED FOR INDUCTIVE MOTOR LOADS AND JL CLASS RK1 FOR RESISTIVE LOADS, UNLESS OTHERWISE INDICATED. FUSES SHALL BE FUSETRONS, RATED AS INDICATED,
 - APPROVED MANUFACTURERS: ITE, GE SQUARE 'D' (TYPE HD), GENERAL ELECTRIC (TYPE TH) OR APPROVED EQUAL.

W. IDENTIFICATION AND TAGGING:
 - ALL PANELS, CABINETS, ETC. SHALL BE PROPERLY IDENTIFIED WITH PERMANENT NAMEPLATES SECURELY FASTENED WITH SCREWS TO THE FRONT OF EQUIPMENT. "STICK-ON" TYPE LETTERS OR PLATES SHALL NOT BE USED.
 - IDENTIFY EQUIPMENT AND KEY EQUIPMENT COMPONENTS WITH NAMEPLATES OF BLACK LAMINATED PHENOLIC MATERIAL.
 - COORDINATE NAMEPLATES WITH ACTUAL EQUIPMENT INSTALLED.
 - MINIMUM SIZE NAMEPLATES SHALL BE THREE INCHES LONG WITH 1/4 INCH LETTERING.
 - ALL CONDUCTORS IN TROUGHS, PULL BOXES, GUTTERS, ETC. SHALL BE IDENTIFIED BY MEANS OF TAGS INDICATING BOTH TERMINATING POINTS.
 - ALL CIRCUIT BREAKERS IN EXISTING PANELBOARDS WHICH ARE TO BE USED UNDER THIS CONTRACT SHALL HAVE NEW LOADS IDENTIFIED IN UPDATED PANEL DIRECTORY.

X. TELEPHONE AND DATA:
 - CONTRACTOR SHALL PROVIDE EMPTY CONDUITS FOR THE TELEPHONE AND DATA SYSTEM, CABLES SHALL BE INSTALL BY OTHERS AS INDICATED ON THE DRAWINGS.
 - WALL MOUNTED TELEPHONE AND DATA OUTLETS SHALL CONSIST OF 3/4 INCH MINIMUM EMT STUBBED 6 INCHES ABOVE THE HUNG/FINISHED CEILING INCLUDING CONNECTOR AND PLASTIC BUSHING; AND TERMINATING IN GALVANIZED OUTLET BOX COMPLETE WITH PLASTER COVER. PROVIDE NYLON DRAG FOR PULLING OF TELEPHONE AND DATA CABLES. FOR TWO OUTLETS CONTRACTOR SHALL RUN 1 INCH EMT CONDUIT AND FOR THREE OUTLETS 1 1/4 INCH EMT CONDUIT. COORDINATE EXACT REQUIREMENTS WITH ARCHITECT / OWNER'S REPRESENTATIVE.
 - BEFORE SUBMITTING BID CONTRACTOR SHALL VERIFY THE TELEPHONE AND DATA LAYOUT WITH THE TELEPHONE AND DATA SYSTEM INSTALLED AND INCLUDE ANY ADDITIONAL WORK ON CONDUITS AS DIRECTED BY THE TELEPHONE AND DATA INSTALLER / PROVIDER.

Y. FIRE ALARM SYSTEM:
 - THIS CONTRACTOR SHALL PROVIDE NEW FIRE ALARM DEVICES AS SHOWN ON PLANS. WIRING AND DEVICES SHALL BE PROVIDED.
 - COMPLIANCE WITH ALL LOCAL AND NATIONAL AGENCIES RULES AND REGULATIONS HAVING JURISDICTION FOR APPROVAL OF THE COMPLETE FIRE ALARM SYSTEM WILL BE THE RESPONSIBILITY OF THIS CONTRACTOR.
 - FOR A COMPLETE FIRE ALARM SYSTEM SPECIFICATION REFER TO THE FIRE ALARM SYSTEM DRAWINGS.

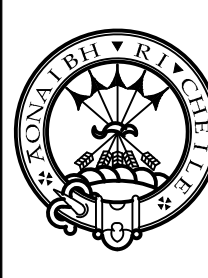
Z. AUDIO VISUAL (A/V) SYSTEM:
 - THIS CONTRACTOR SHALL PROVIDE EMPTY CONDUITS FOR A/V SYSTEM, CABLE SHALL BE PROVIDED BY OTHERS AND INSTALLED BY THIS CONTRACTOR AS INDICATED ON THE DRAWINGS.
 - WALL MOUNTED A/V OUTLETS SHALL CONSIST OF 3/4" INCH MINIMUM EMT STUBBED 6" INCHES ABOVE THE HUNG/FINISHED CEILING INCLUDING CONNECTOR AND PLASTIC BUSHING; AND TERMINATING IN GALVANIZED OUTLET BOX COMPLETE WITH PLASTER COVER. PROVIDE NYLON DRAG LINE FOR PULLING OF A/V SYSTEM CABLES. COORDINATE EXACT REQUIREMENTS WITH ARCHITECT/OWNER'S REPRESENTATIVE.
 - BEFORE SUBMITTING BID CONTRACTOR SHALL VERIFY THE A/V SYSTEM DRAWINGS WITH THE A/V SYSTEM DRAWINGS WITH THE A/V CONTRACTOR AND INCLUDE AND SYSTEM ADDITIONAL WORK OR CONDUITS AS DIRECTED BY THE A/V CONTRACTOR/INSTALLER/PROVIDER.

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