





MECHANICAL GENERAL NOTES:

1. DRAWING IS DIAGRAMMATIC IN NATURE. LOCATIONS AND SIZES MAY VARY DURING FIELD COORDINATION & INSTALLATION OF MECHANICAL, PLUMBING, & ELECTRICAL. DRAWINGS DO NOT NECESSARILY INDICATE EVERY REQUIRED OFFSET, FITTING, ETC. DRAWINGS ARE NOT TO BE SCALED FOR DIMENSIONS. TAKE ALL DIMENSIONS FROM ARCHITECTURAL DRAWINGS, CERTIFIED EQUIPMENT DRAWINGS AND FROM THE STRUCTURE ITSELF BEFORE FABRICATING ANY WORK, VERIFY ALL SPACE REQUIREMENTS COORDINATING WITH OTHER TRADES, AND INSTALL THE SYSTEMS IN THE SPACE PROVIDED WITHOUT EXTRA CHARGES TO THE OWNER.

2. ALL REFRIGERANT LINES ARE TO BE LIMITED TO 75' EQUIVALENT LINE LENGTH. ALL REFRIGERANT LINES SHALL BE INSULATED PER IECC REQUIREMENTS. ALL REFRIGERANT LINES SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATION.

3. INDOOR HEAT PUMPS SHALL BE PROVIDED WITH AUXILLARY CONDENSATE PUMP, 240V/1PH/60HZ "ASPEN-PUMP". CONDENSATE SHALL BE ROUTED THROUGH 3/4" TYPE L COPPER TO NEAREST PLUMBING FIXTURE GROUP. DISCHARGE INDIRECTLY THROUGH AIR GAP SIZED PER IPC.

FLAG NOTES:

1. MACURCO CM-6, TX-6-ND CARBON MONOXIDE & NITROGEN DIOXIDE SENSORS. SENSORS TO BE INTERLOCKED WITH EF-2 AND LR-1. EXHAUST FANS SHALL TURN ON AT DETECTION OF 10PPM FOR CO & 50 PPB FOR NO2. ALARMS SHALL BE TRIGGERED AT DETECTION OF 25 PPM FOR CO & 100 PPB FOR NO2. LOUVERS TO OPEN UPON ACTIVATION OF EXHAUST FAN. LOUVERS ARE TO FAIL OPEN. INSTALL CO & NO2 DETECTORS PER MANUFACTURER'S INSTRUCTIONS, EACH SENSOR COVERS A CIRCULAR AREA OF APPROXIMATELY 5,000 SQF. RADIUS OF 39'. INSTALL PER MANUFACTURERS REQUIREMENTS.

2. EF-2 TO BE INTERLOCKED WITH VARIABLE SPEED WALL MOUNTED SWITCH.

3. INFRARED HEATER, MAINTAIN MANUFACTURER'S REQUIRED CLEARANCES FROM ALL COMBUSTIBLES. INSTALL INFRARED HEATER PER MANUFACTURER'S RECOMMENDATIONS.

- 4. ROUTE COMPRESSED AIR TO MEZZANINE
- 5. COMPRESSED AIR FROM LOOP BELOW. PROVIDED WITH QUICK CONNECT FITTING.
- 6. COMPRESSED AIR DROP.
- 7. CIRCLE TO SHOW THE EFFECTIVE RANGE OF CO AND NO2 SENSORS.

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PUBLIC WORKS FACILITY

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Engineer

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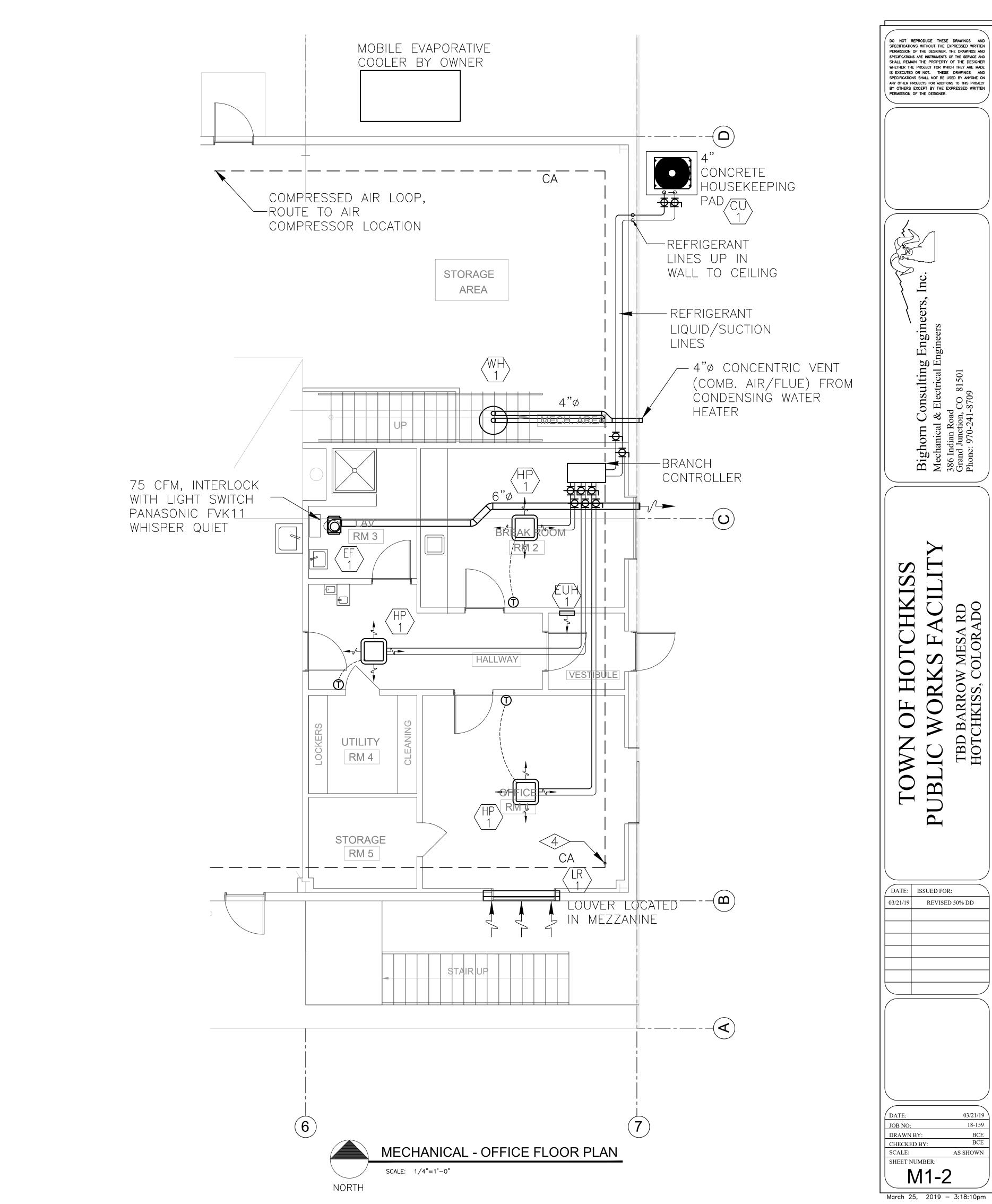
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MECHANICAL PROVISIONS

1. SCOPE OF WORK

- A. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK, MATERIALS, AND LABOR TO SATISFY A COMPLETE WORKING SYSTEM WHETHER
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- OF THIS NATURE THE CONTRACTOR SHALL, BEFORE SUBMITTING ANY PROPOSAL EXAMINE THE PROPOSED SITE AND SHALL DETERMINE FOR HIMSELF
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PERMITS

THE CONTRACTOR SHALL SECURE ALL PERMITS OR APPLICATIONS AND PAY ANY AND ALL FEES.

3. SHOP DRAWINGS

SUBMIT MATERIAL LIST AND SHOP DRAWINGS FOR MAJOR EQUIPMENT TO THE ACHITECT/ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL SUBMIT FIVE SETS OF SHOP DRAWINGS AND THEY SHALL BE CLEARLY

4. FLEXIBLE DUCT WORK

- FLEXIBLE TYPE DUCT SHALL BE OF TWO ELEMENT SPIRAL CONSTRUCTION COMPOSED OF A CORROSION RESISTANT METAL SUPPORTING SPIRAL AND COATED FABRIC WITH A MINERIAL BASE. FLEXIBLE DUCT CONNECTORS SHALL BE LISTED BY U.L., CLASS 1 DUCTS, AND SHALL HAVE A FLAME SPREAD RATING NOT EXCEEDING 25 AND A SMOKE DEVELOPED RATING NOT EXCEEDING 50.
- USE OF FLEXIBLE DUCTWORK SHALL BE LIMITED TO NO MORE THAN
- 6 LINEAR FEET PER RUN. CONTRACTOR SHALL BE CAREFUL SO AS NOT TO KINK OR COLLAPSE FLEXIBLE DUCT.

REFRIGERENT

- A. PIPING CONTRACTOR SHALL PROVIDE AND INSTALL REFRIGERANT PIPING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND IN SUCH A WAY AS TO BE INCONSPICIOUS AND FREE FROM ANY POSSIBLE CONDENSATION.
- INSULATE REFRIGERANT LINES WITH ARMOUR-FLEX TYPE INSULATION, SHALL BE TYPE "K" COPPER TUBING, WITH WROUGHT COPPER SOLDER TYPE FITTINGS SUITABLE FOR CONNECTION WITH SILVER SOLDER.

6. DUCTWORK

- THE DUCTWORK SHALL BE CONSTRUCTED IN ACCORDANCE
- WITH THE "SMACNA" APPLICABLE MANUALS. ALL DUCTWORK SHALL BE THE LOW VELOCITY TYPE, UNLESS SPECIFIED OTHERWISE.
- CONTRACTOR SHALL PROVIDE AND INSTALL APPROVED FIRE DAMPERS AND ACCESS PANELS IN ANY AND ALL DUCTWORK WHICH
- OTHERWISE SHOWN ON DRAWINGS. D. ALL BRANCH DUCTS TO HAVE VOLUME DAMPERS, SMOOTH TURN RADIUS DUCTWORK OR TURNING VANES SHALL BE USED THROUGHOUT WHERE FLOW

PENETRATES A HORIZONTAL OR VERTICAL FIRE PARTITION, OR AS

- EXCEEDS 150 CFM.
- ALL DUCT JOINTS TO BE SEALED IN ACCORDANCE WITH "SMACNA" STANDARDS AND ACCEPTED GOOD PRACTICE.
- ALL DUCT DIMENSIONS SHOWN ARE NET INSIDE VALUES.DIMENSIONS MAY BE CHANGED SO LONG AS THE NET FREE FACE AREA IS MAINTAINED.
- ALL CONCEALED DUCTWORK SHALL BE INSULATED WITH 1-1/2" FIBERGLASS INSULATING BLANKET WITH ALUMINUM FOIL FACING.
- ALL SUPPLY AND RETURN DUCTWORK 15 FEET DOWNSTREAM OF THE HVAC UNIT SHALL BE INTERNALLY LINED WITH A 1/2" ACOUSTICAL DUCT LINER UNLESS OTHERWISE NOTED ON THE DRAWINGS.

7. DRAINAGE PIPING

(CONDENSATE) SHALL BE SCHEDULE 40 PVC OR TYPE L COPPER PER ASTM B306 PIPE WITH SOLVENT JOINTS. PITCH HORIZONTAL LINES 1" IN 10'-0". CONDENSATE DRAINS SHALL BE ROUTED TO FLOOR DRAIN, ROOF DRAIN OR INDIRECT WASTE DRAIN.

8. HVAC CONTROLS

CONTRACTOR TO SUPPLY AND INSTALL ALL CONTROL WIRING AND THERMOSTATS AS REQUIRED.

9. ELECTRICAL

CONTRACTOR TO COORDINATE WITH ELECTRICAL CONTRACTOR FOR LOCATION OF WIRING FOR EACH HVAC UNIT.

10. PIPE SUPPORTS

A. ALL PIPE SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN A NEAT AND WORKMANLIKE MANNER. THE USE OF WIRE OR METAL STRAP TO SUPPORT PIPES WILL NOT BE PERMITTED. SPACING OF PIPE SUPPORTS SHALL NOT EXCEED 8 FEET FOR ALL PIPING. PLASTIC PIPING TO BE SUPPORTED EVERY 4 FEET.

11. GAS PIPING

A. PIPING SHALL BE SCHEDULE 40 BLACK STEEL PIPE WITH MALLEABLE IRON FITTINGS. WHERE GAS PIPE CONNECTS TO EQUIPMENT, IT SHALL BE PROVIDED WITH A DRIP LEG THE FULL SIZE OF THE RUNOUT, A 100% SHUT-OFF VALVE AND A UNION. GAS PIPING CONTAINING PRESSURE GREATER THAN 9" W.G. SHALL BE SCHEDULE 40 BLACK STEEL PIPE WITH WELDED JOINTS.

12. MISCELLANEOUS

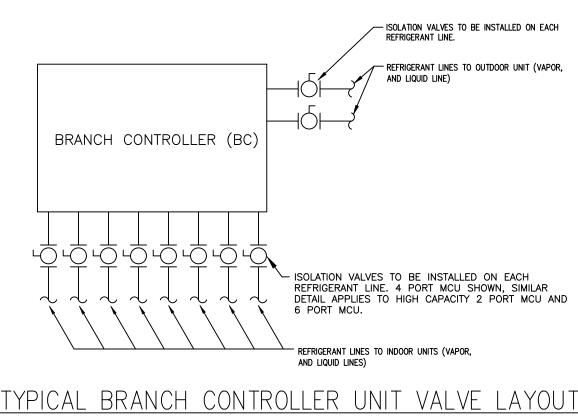
- ALL EXTERIOR OPENINGS TO BE PROPERLY CAULKED AND SEALED WITH A SEALANT OF HIGH QUALITY AND LONG LIFE, TO PREVENT INFILTRATION OF OUTSIDE AIR INTO CONDITIONED SPACE. COORDINATE INSTALLATION OF ALL ROOF FLASHING AT ROOF PENETRATION.
- DO NOT SCALE THIS DRAWING FOR EXACT DIMENSIONS.
- VERIFY ALL FIGURES, CONDITIONS, AND DIMENSIONS AT THE JOB SITE. THE MECHANICAL PLANS ARE INTENDED TO BE DIAGRAMMATIC AND ARE BASED ON ONE MANUFACTURE'S EQUIPMENT. THEY ARE NOT INTENDED TO SHOW EVERY ITEM IN ITS EXACT LOCATION, THE EXACT DIMENSIONS, OR ALL THE DETAILS OF THE EQUIPMENT.
- THE CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS OF THE EQUIPMENT PROPOSED TO ENSURE THAT THE EQUIPMENT WILL FIT IN THE AVAILABLE

13. TESTING AND BALANCING

A. THE HVAC SYSTEM SHALL BE TESTED AND AND BALANCED BY AN INDEPENDENT AGENCY, UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER. A SEALED TYPE WRITTEN REPORT SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER FOR REVIEW AND APPROVAL.

14. GUARANTEE

- MATERIALS, EQUIPMENT AND INSTALLATION SHALL BE GUARANTEED FOR A PERIOD OF ONE(1) YEAR FROM DATE OF ACCEPTANCE. DEFECTS WHICH APPEAR DURING THAT PERIOD SHALL BE CORRECTED AT THIS CONTRACTOR'S EXPENSE
- FOR THE SAME PERIOD, THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO PREMISES CAUSED BY DEFECTS IN WORKMANSHIP OR IN THE WORK OR EQUIPMENT FURNISHED AND/OR INSTALLED BY HIM.

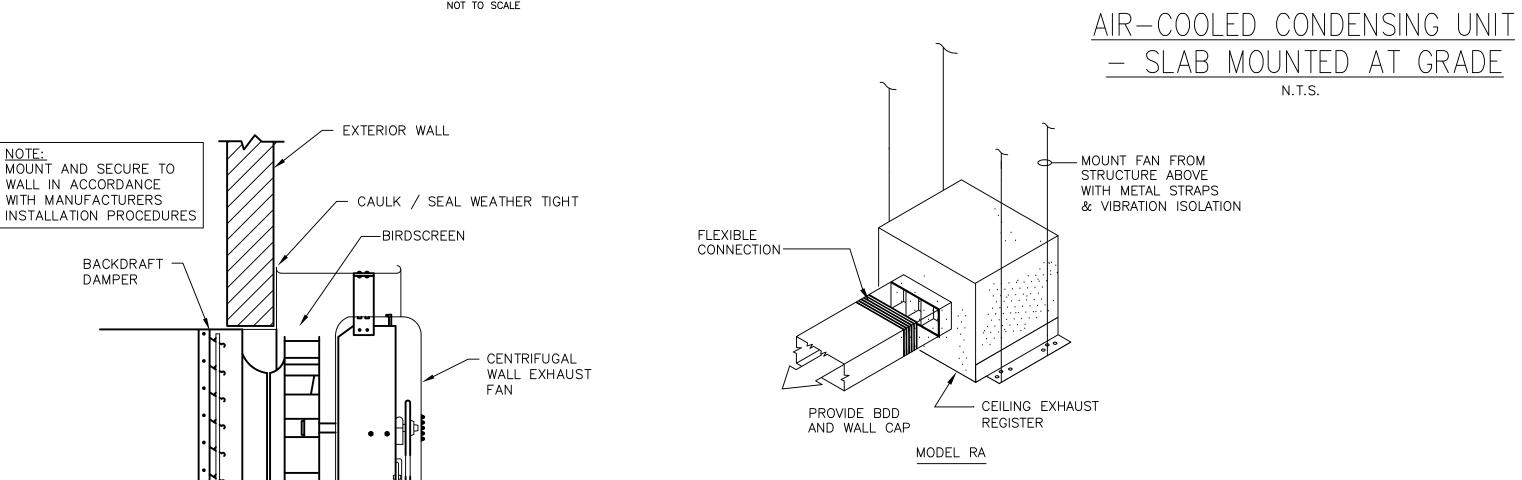


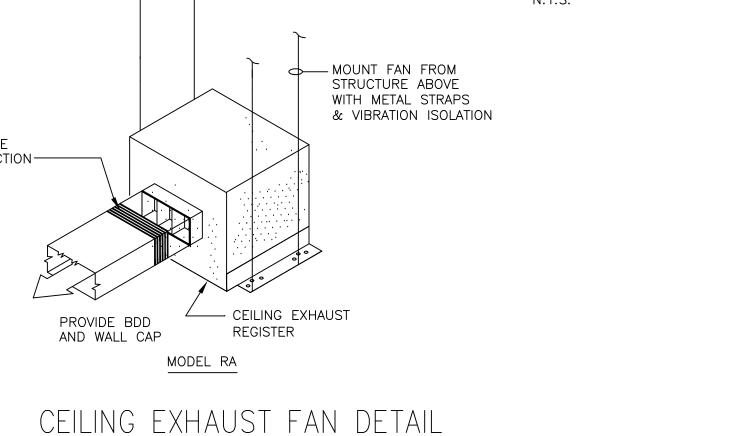
SAFETY DISCONNECT

SWITCH

- INTERNAL WIRING

POST





SIGHT GLASS WITH MOISTURE -

FILTER-DRYER-

INDICATOR

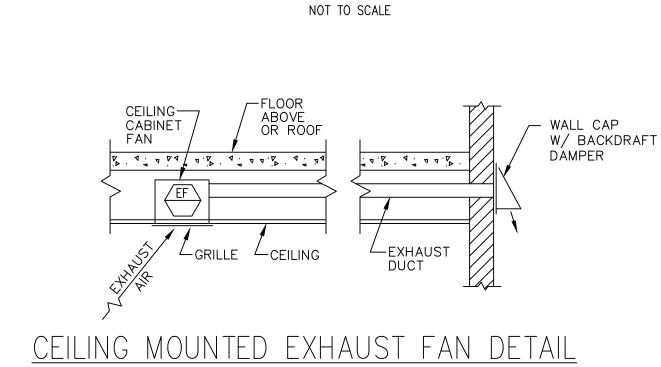
FAN GUARD —

6" THICK CONC. PAD - EXTEND

6" BEYOND UNIT ALL AROUND

NOT TO SCALE

ISOLATION MOUNTING KIT.



GAS VENT THROUGH PITCHED

- SIDEWALL DISCHARGE

						RADIA	ANT HEATER S	CHEDULE				
	HEATING								ELECTRICAL		OPTIONS/ACCES SORIES	
EQUIPMENT NO.	SERVICE	FUEL TYPE	INPUT CAPACITY (MBH)	OUTPUT CAPACITY (MBH)	IGNITION TYPE	TUBE LENGTH(FT)	TUBE DIAMETER	MIN. EFFICIENCY	V./PH./H Z.	AMPS	MANUFACTURER & MODEL	JONES
IR-1	BAY	NATURAL GAS	205	164	DIRECT SPARK	50	4"	78%	120/1/6 0	1.0	SUPERIOR RADIANT PRODUCTS, UXR-205	NOTE-1
NOTES: 1. PROVIDE WITH T												

-CONDENSING UNIT

-REFRIGERANT GAUGE

CONTROL

-BACK-SEATED REFRIGERANT

- REFRIGERANT SUCTION LINE

REFRIGERANT LIQUID LINE

WITH INSULATION

-CONDUIT - POWER AND

CONNECTION

PITCHED -

RAFTERS

ROOF SUPPORT -

ROOF

GAS VENT

ROOF-

STORM -

COLLAR

BRACE

10'-0"

CENTRIFUGAL WALL EXHAUST

EXHAUST DUCT -

NOTE: FOR KITCHEN EXH.

HOOD APPLICATIONS, DUCT

TO BE OF 16 GA. WELDED

AIR CONDITIONING EQUIPMENT SCHEDULE NOMINAL NOMINAL **REFRIGERANT PIPING ELECTRICAL** COOLING HEATING CFM | EER (EFFICIENCY) **MANUFACTURER & MODEL** EQUIPMENT NO. SERVICE OPTIONS/ACCESSORIES CAPACITY CAPACITY MCA (AMPS) LIQUID V./PH./HZ. SUCTION (BTU/HR.) (BTU/HR.) OFFICE 12,000 13,000 335 208-230/1/60 MITSUBISHI - SLZ-KF12NA NOTE-1 HP-1 12 1/4 3/8 0.3 NOTES:

. PROVIDE WITH WALL MOUNTED 7-DAY PROGRAMMABLE THERMOSTAT, POWER DISCONNECT, CONDENSATE PUMP, OUTSIDE AIR SENSOR, GRILLE, DRAIN PAN LEVEL SENSOR, VIBRATION

AIR COOLED CONDENSING UNIT SCHEDULE OPTIONS/ACES **ELECTRIC** REFRIG. PIPING NOMINAL COOLING NOMINAL HEATING **MANUFACTURER & EQUIPMENT** SERVICE SORIES **CAPACITY (BTUH)** CAPACITY (BTUH) V/PH/HZ | MOCP (A) VAPOR MCA (A) LIQUID MITSUBISHI -NOTE-1 208-230/1/ 54,000 CU-1 OFFICE 48,000 19 3/8 MXZ-8C48NAHZ

NOTES: . PROVIDE LINE SET AS RECOMMENDED BY MANUFACTURER, POWER DISCONNECT, CONCRETE HOUSEKEEPING PAD, HYPER-HEAT OPERATION, 18" TALL ANGLE IRON STAND, VIBRATION ISOLATION, 5 PORT BRANCH BOX. SEER = 18.9, EER = 12.0, HSPF = 11.

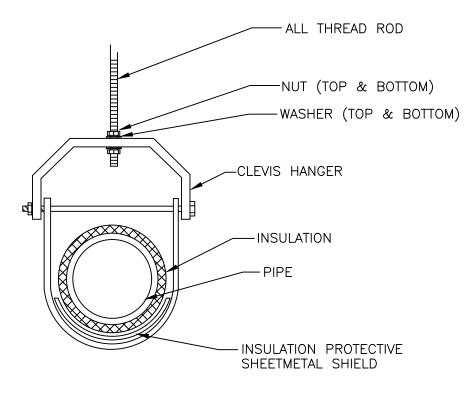
	EXHAUST FAN SCHEDULE											
EQUIPMENT NO.	SERVICE	LOCATION	TION CFM EXTERNAL STATIC PRESS (IN. MOTOR		MANUFACTURER & MODEL	OPTIONS/ACCESSORIES						
EQUIPMENT NO.	SERVICE	LOCATION	CFIVI	W.G.)	WATTS	WATTS HP RPM VOLT/PH/H		VOLT/PH/HZ	MANUFACTURER & MODEL	OF HOROTAGE STORIES		
EF-1	RESTROOM	CEILING	75	0.25	10.00		814	115/1/60	PANASONIC FV-05-11VK1	NOTE - 1		
EF-2	RESTROOM	SIDEWALL	9272	0.375	-	3/4	305	115/1/60	GREENHECK - CUBE-420	NOTE - 2		

1. PROVIDE WITH POWER DISCONNECT, VIBRATION ISOLATION, GRAVITY BACKDRAFT DAMPER, INTERLOCK OPERATION WITH LIGHTSWITCH, EXHAUST TERMINATION

WITH UL LISTED CAP. 2. PROVIDE WITH POWER DISCONNECT, HINGED CURB, BIRD SCREEN, ALUMINUM CONSTRUCTION, PERMATECTOR COATED, MECHANICAL BACKDRAFT DAMPER, MOTOR STARTER, VARIABLE SPEED BELT DRIVEN MOTOR. INTERLOCK OPERATION WITH WALL MOUNTED CO & NO2 MACURACO DETECTION CONTROL PANEL (FAN SHALL RAMP UP TO FULL SPEED AFTER RECIEVING SIGNAL FROM CONTROL PANEL). INTERLOCK OPERATION WITH WALL MOUNTED VARIABLE SPEED SWITCH.

	LOUVER SCHEDULE										
EQUIPMENT NO.	SERVICE	WIDTH (IN)	HEIGHT (IN)	THICKNESS OF LOUVER	MATERIAL	INSECT/BIRD SCREEN	MANUFACTURER & MODEL	OPTIONS/ACCESSORIES			
LR-1	OUTSIDE/EXHAUST	72"	72"	4"	STEEL	1/2" BIRD	GREENHECK FDS-402	NOTE - 1, 2			
NOTES: 1. DRAINABLE LO	DUVER, PROVIDE BIRD	SCREEN ANI	O KYNAR FINIS	SH WITH COLOR TO BE S	ELECTED BY	THE ARCHITECT.					

PROVIDE LOW LEAKAGE MOTORIZED DAMPER IN SLEEVE BEHIND LOUVER. INTERLOCK DAMPER OPERATION WITH EF-2. LOUVER SHALL OPEN WHEN EF-2 IS ENERGIZED.



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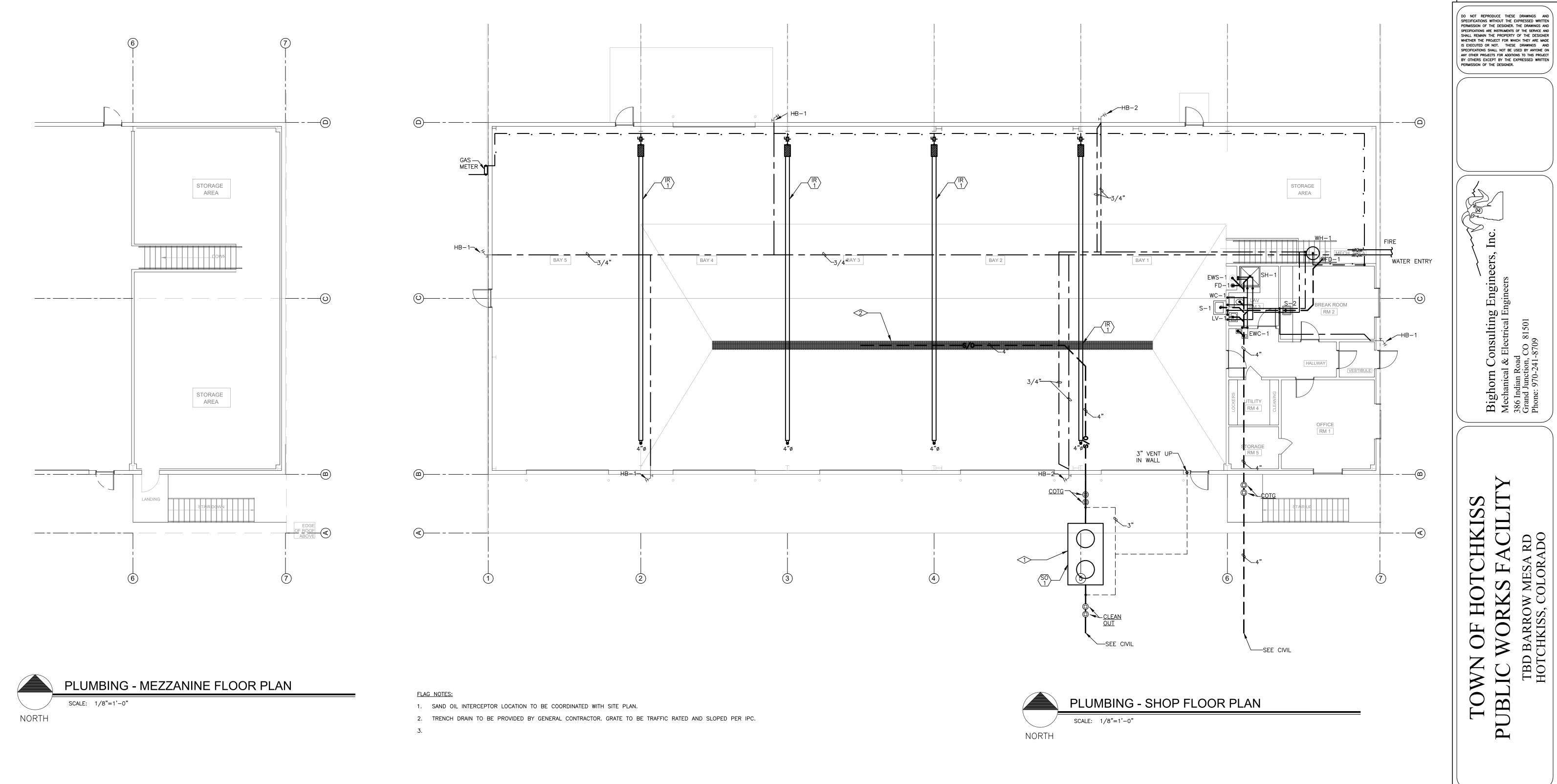
~ADJUSTABLE ROOF

FLASHING

BIRD SCREEN

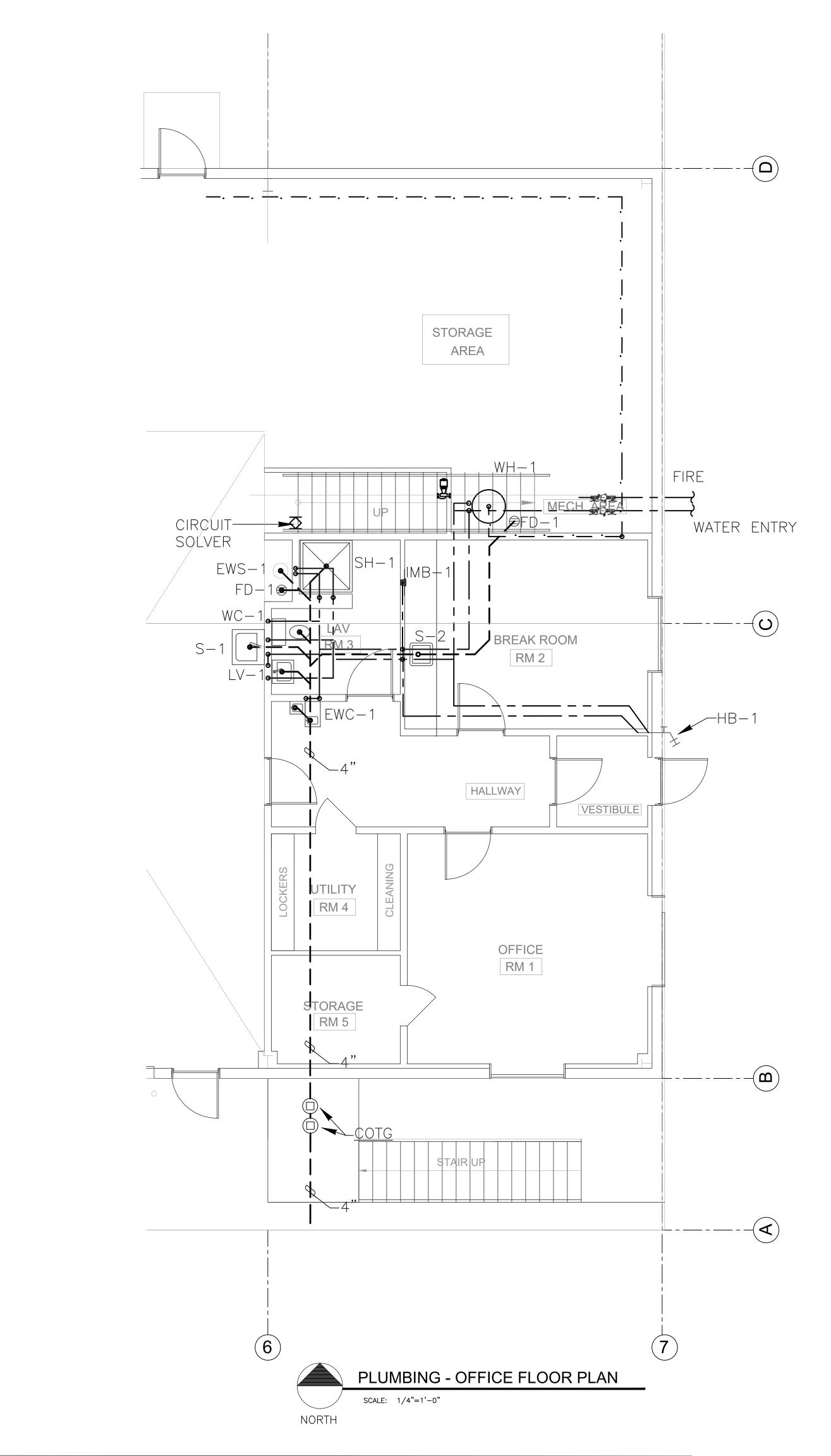
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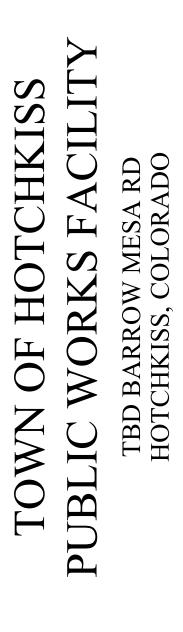
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				PLUMBING FIXTURE SCH	EDULE			
FIXTURE NO.	DESCRIPTION	MANUEAGTURER	MODEL	TRIM	PIPI	NG CONNE	CTIONS	OPTIONS-ACCESSORIES
FIXTURE NO.	DESCRIPTION	MANUFACTURER	MODEL	I KIM	S/W	VENT	C.W.	HW OPTIONS-ACCESSORIES
EWC-1	ELECTRIC WATER COOLER	ELKAY	LZWS-LRPB M28K		1-1/2"	1-1/2"	1/2"	1/2" HIGH-LOW, 304 SS SATIN FINISH, WITH BOTTLE FILLER.
EWS-1	EYE WASH SHOWER	GUARDIAN	GBF1909SS H		-	-	3/4"	3/4" FLOOR MOUNTED, PROVIDE WITH MIXING VALVE, FLOOR DRAIN, HAND PADLE OPERATION. WATER DELIVERE SHOWER SHALL BE TEPID MINIMUM 60°F TO 100°F.
FD-1	FLOOR DRAIN	ZURN	Z300 BRONZE		4"	2"	-	- PROVIDE NICKEL BRONZE STRAINER, MECHANICAL TRAP SEAL SIMILAR TO J.R. SMITH QUAD CLOSE.
HB-1	FREEZE PROOF HOSE BIB	WOODFORD	B67		-	-	3/4"	1/2" PROVIDE LOCKING BOX WITH ANTI-SIPHON AND VACUMN BREAKER, FREEZE PROOF.
HB-2	FREEZE PROOF HOSE BIB	WOODFORD	V22		-	-	3/4"	1/2" PROVIDE LOCKING BOX WITH ANTI-SIPHON AND VACUMN BREAKER, FREEZE PROOF.
LV-1	WALL MOUNTED BATHROOM SINK	AMERICAN STANDARD-REGALYN	4867.008 PROVID FAUCET	E AMERICAN STANDARD MONTERREY .35 GPM	1 1/2"	1 1/2"	1/2"	1/2" GRID DRAIN, P TRAP, LOCAL MIXING VALVE, WALL HANGER KIT.
S-1	1 COMPARTMENT SINK ADA WALL HUNG SINK	JUST	JH-ADA-362 JUST-JS 0-S-CP FAUCET	L-46-AC SELECTRONIC BACKSPLASH MOUNT	1-1/2"	1-1/2"	1/2"	1/2" SINK STRAINER, P-TRAP, LOCAL MIXING VALVE, ADDITIONAL ACCESSORIES COORDINATE WITH OWNER.
S-2	1 COMPARTMENT SINK COUNTER MOUNTED	JUST	SLN-1815-A -GR JUST JV	-174-A COUNTER MOUNTED SINK	1-1/2"	1-1/2"	1/2"	1/2" SINK STRAINER, P-TRAP, LOCAL MIXING VALVE, ADDITIONAL ACCESSORIES COORDINATE WITH OWNER.
SH-1	ADA SHOWER ENCLOSURE	CHICAGO FAUCETS	SH-PB1-00- 013 ADA TER	RRAZO BASIN, TILE WITH GREEN BOARD.	1-1/2"	1-1/2"	1/2"	1/2" TERRAZO BASIN, PRESSURE BALANCED MIXING VALVE POLYPROPYLENE WALLS, CURTAIN ROD, SIONGLE LE VALVE, GRID FLOOR DRAIN, GRAB BARS, SEAT.
SO-1	SAND/ OIL INTERCEPTOR				4"	2"	-	- 4000 PSI CONCRETE, K-25 TRAFFIC RATED.
WC-1	ADA WATER CLOSET	AMERICAN STANDARD-CHAMPION	2034.314	1.6 GPF FLUSH TANK WATER CLOSET	4"	2"	3/4"	- VACUUM BREAKER, COORDINATE COLOR WITH OWNER, PROVIDE ELONGATED SEAT.

PLUMBING SPECIFICATION.

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- D. ALL EQUIPMENT AND MATERIALS SHALL BE AS SPECIFIED OR "APPROVED EQUAL" BY THE ENGINEER OR ARCHITECT.

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3. SHOP DRAWINGS

- A. SUBMIT MATERIAL LIST AND SHOP DRAWINGS FOR MAJOR EQUIPMENT TO THE ACHITECT/ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL SUBMIT FIVE SETS OF SHOP DRAWINGS AND THEY SHALL BE CLEARLY LABELED.
- 4. DOMESTIC WATER SUPPLY PIPING
- A. UNDERGROUND: PROVIDE TYPE "K" SOFT DRAWN COPPER TUBING WITH BRAZED CONNECTIONS.
- B. ABOVE GROUND: PROVIDE TYPE "L" HARD DRAWN COPPER TUBING WITH 125 PSI SOLDER JOINTS, COPPER OR BRASS FITTINGS.
 ALL SOLDER TO BE "NO LEAD" TYPE.
- C. ALL HOT WATER PIPING TO BE INSULATED WITH 1" FIBERGLASS INSULATION.
- D. ALL COLD WATER PIPING TO BE INSULATED WITH $\frac{1}{2}$ " FOAM INSULATION.

5. SANTARY/STORM DRAINAGE AND VENT PIPING.

A. ABOVE GRADE: -2" BELOW: S

- -2"BELOW: SCH.40 GALV. STL. PIPE WITH SCREWED ENDS OR SCH. 40PVC WITH SOLVENT JOINTS OR DWV COPPER WITH SOLDER JOINTS. ALL SOLDER TO BE "NO LEAD" TYPE.

 -3" AND ABOVE: SERVICE WT. CAST IRON WITH NO—HUB OR BELL AND SPIGOT JOINTS; OR SCH 40 PVC WITH SOLVENT
- BELOW GRADE: SERVICE WT. CAST IRON WITH NO-HUB OR BELL AND SPIGOT JOINTS; OR SCH 40 PVC WITH SOLVENT JOINTS.
 C. PVC PIPING SHALL NOT BE USED IN AIR PLENUM CEILINGS AND
- SHALL NOT CROSS FIRE RATED WALLS, CEILINGS, OR FLOORS.

 D. DRAINAGE PIPING SHALL BE RUN AS STRAIGHT AS POSSIBLE
- AND SHALL HAVE LONG TURN FITTINGS.

 E. DRAINAGE PIPING 3" SIZE AND SMALLER SHALL RUN AT A UNIFORM GRADE OF AT LEAST ¼" PER FOOT. AND PIPING LARGER THAN 3" SHALL BE RUN AT A GRADE OF NO LESS THAN 1/8" PER FOOT.
- F. ALL VENT PIPING SHALL BE SLOPED TO DRAIN BACK TO FIXTURES.
 G. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FLASHING OF THE VENT PIPING RUN THROUGH THE ROOF.
- 6. <u>ALL STUB-INS</u> AND/OR SLAB OR WALL PENETRATION TO BE PER INTERNATIONAL PLUMBING CODE (LATEST EDITION).ALL PIPING PENETRATIONS OF BUILDING FOUNDATIONS OR FOOTINGS SHALL

7. PIPE SUPPORTS

BE SLEEVED.

A. ABOVE GRADE

B. BELOW GRADE

- ALL PIPE SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN A NEAT AND WORKMANLIKE MANNER. THE USE OF WIRE AND PERFORATED METAL TO SUPPORT PIPES WILL NOT BE PERMITTED. SPACING OF PIPE SUPPORTS SHALL BE AS SPECIFIED IN INTERNATIONAL PLUMBING CODE (LATEST EDITION).
- EARTH SHALL BE EXCAVATED TO A MINIMUM DEPTH WITH AN EVEN SURFACE TO INSURE SOLID BEARING OF PIPE FOR ITS ENTIRE LENGTH.

 -INTERIOR: THE PIPE SHALL BE INSTALLED (UNLESS OTHERWISE SPECIFIED)
 A MINIMUM OF 4 INCHES BELOW THE BOTTOM OF THE SLAB AND SHALL NOT BE IN ANY DIRECT CONTACT WITH THE CONCRETE AT ANY POINT.

 -EXTERIOR: THE WATER PIPE SHALL HAVE A MINIMUM OF 60" OF COVER AND THE SANITARY WASTE PIPE SHALL HAVE A MINIMUM OF 24" OF COVER.

8. MISCELLANEOUS

- A. COORDINATE INSTALLATION OF ALL ROOFS FLASHING AT ROOF PENETRATION.
 B. DO NOT SCALE THIS DRAWING FOR EXACT DIMENSIONS. VERIFY ALL FIGURES,
- CONDITIONS AND DIMENSIONS AT THE JOB SITE.

 C. THE PLUMBING PLANS ARE INTENDED TO BE DIAGRAMMATIC AND ARE
 BASED ON ONE MANUFACTURE'S EQUIPMENT. THEY ARE NOT INTENDED TO
 SHOW EVERY ITEM IN ITS EXACT LOCATION. THE EXACT DIMENSIONS OR ALL
 THE DETAILS OF THE EQUIPMENT. THE CONTRACTOR SHALL VERIFY THE ACTUAL
 DIMENSIONS OF THE EQUIPMENT PROPOSED TO ENSURE THAT THE EQUIPMENT
 WILL FIT THE AVAILABLE SPACE.

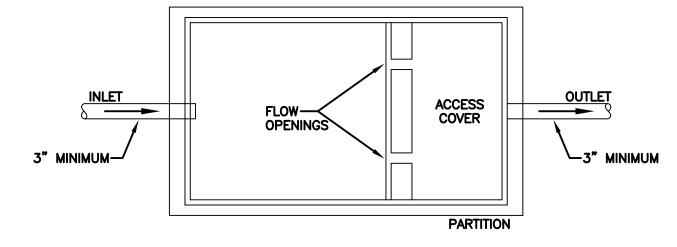
9. TESTING

A. PLUMBING SYSTEM SHALL BE FLOW AND PRESSURE TESTED IN ACCORDANCE WITH THE INTERNATIONAL PLUMBING CODE (LATEST EDITION).

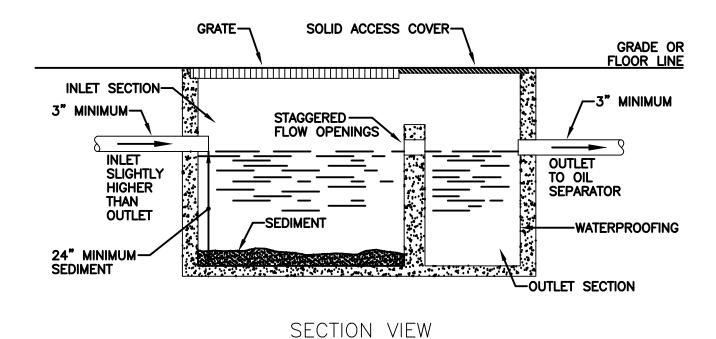
10. GUARANTEE

- A. MATERIALS, EQUIPMENT AND INSTALLATION SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR FROM DATE OF ACCEPTANCE. DEFECTS WHICH APPEAR DURING THAT PERIOD SHALL BE CORRECTED AT THIS
- CONTRACTOR'S EXPENSE.

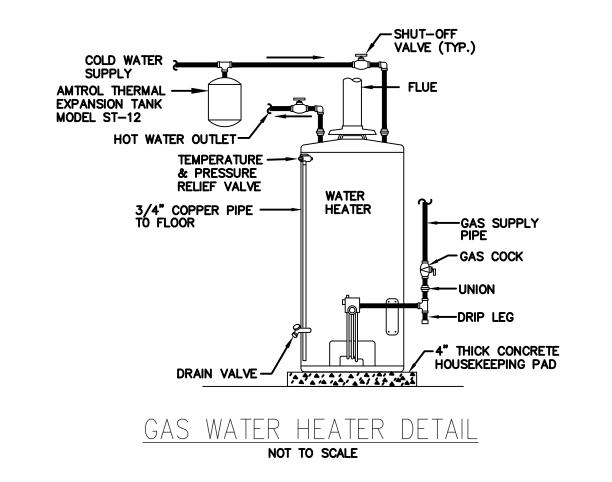
 B. FOR THE SAME PERIOD. THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO PREMISES CAUSED BY DEFECTS IN WORKMANSHIP OR IN THE WORK OR EQUIPMENT FURNISHED AND/OR INSTALLED BY HIM.



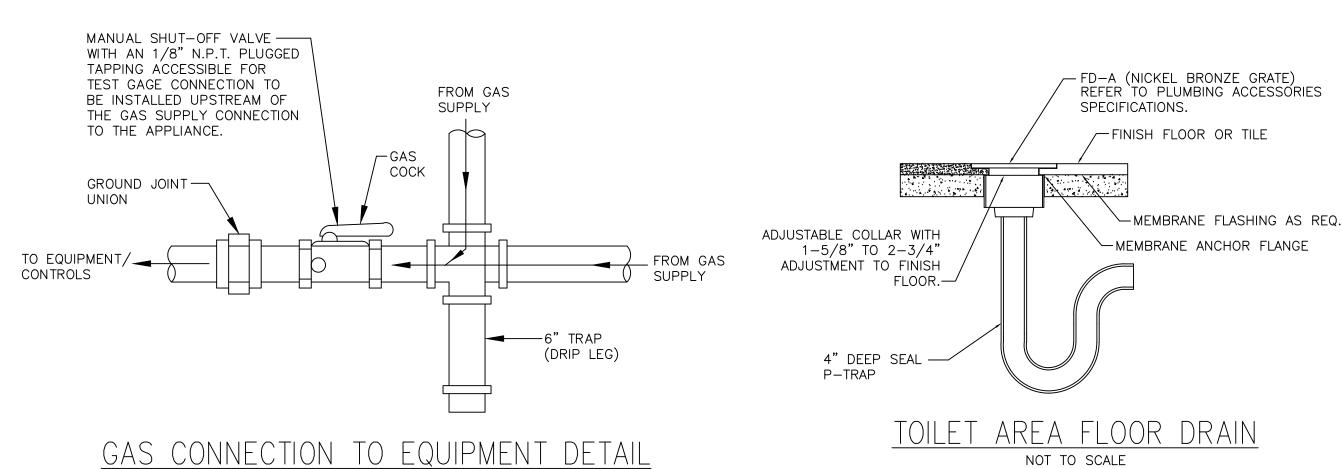
<u>PLAN VIEW</u>

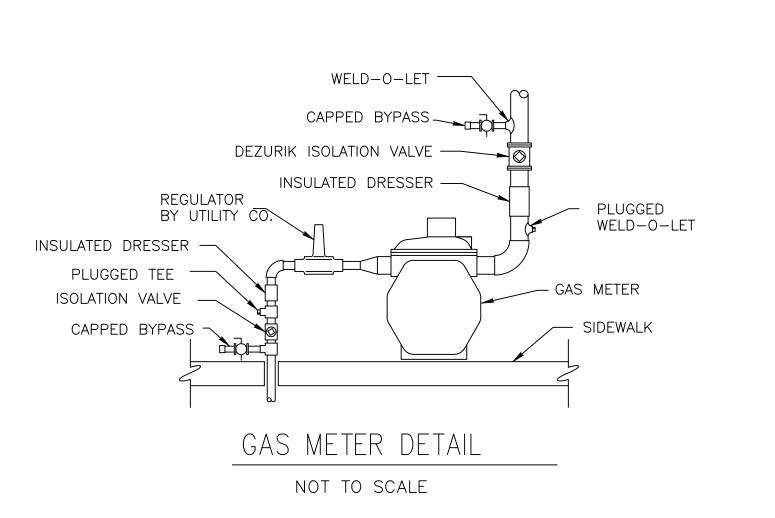


SAND INTERCEPTOR FOR USE
WITH OIL INTERCEPTOR DETAIL
NOT TO SCALE

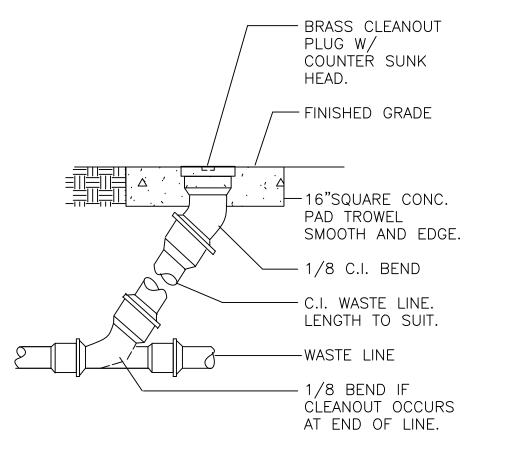


EQUIPMENT NO	CAPACITY (GAL)	RECOVERY @100 DEG F. RISE	BTU PER HR.	GAS CONN.	WATER CONN.	MANUFACTURER & MODEL	OPTIONS/ACCESSORIES
WH-1	80	145	150	1/2"	3/4"	BRADFORD WHITE- PDV-80S-150-3N	NOTE-1





NOT TO SCALE



CLEANOUT TO GRADE NOT TO SCALE

PERMISSION OF THE DESIGNER. THE DRAWINGS AND SPECIFICATIONS ARE INSTRUMENTS OF THE SERVICE AND SHALL REMAIN THE PROPERTY OF THE DESIGNER WHETHER THE PROJECT FOR WHICH THEY ARE MADE IS EXECUTED OR NOT. THESE DRAWINGS AND SPECIFICATIONS SHALL NOT BE USED BY ANYONE OF ANY OTHER PROJECTS FOR ADDITIONS TO THIS PROJECT BY OTHERS EXCEPT BY THE EXPRESSED WRITTEN PERMISSION OF THE DESIGNER. Engine Consulting 1 & Electrical En S RK M 4 DATE: | ISSUED FOR: 03/21/19 REVISED 50% DD

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PLUMBING SPECIFICATION.

1. SCOPE OF WORK

- A. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK, MATERIALS, AND LABOR TO SATISFY A COMPLETE WORKING SYSTEM WHETHER
- SPECIFIED OR IMPLIED.

 B. ALL WORK IS TO BE PERFORMED IN STRICT COMPLIANCE WITH THE INTERNATIONAL PLUMBING CODE (LATEST EDITION), ALL LOCAL CODES AND ALL OTHER REGULATION GOVERNING WORK OF THIS NATURE.
- C. THE CONTRACTOR SHALL, BEFORE SUBMITTING ANY PROPOSAL, EXAMINE THE PROPOSED SITE AND SHALL DETERMINE FOR HIMSELF THE CONDITIONS THAT MAY AFFECT THE WORK. NO ALLOWANCE SHALL BE MADE IF THE CONTRACTOR FAILS TO MAKE SUCH EXAMINATIONS.
- D. ALL EQUIPMENT AND MATERIALS SHALL BE AS SPECIFIED OR "APPROVED EQUAL" BY THE ENGINEER OR ARCHITECT.

2. PERMITS

A. THE CONTRACTOR SHALL SECURE ALL PERMITS OR APPLICATIONS AND PAY ANY AND ALL FEES.

3. SHOP DRAWINGS

A. SUBMIT MATERIAL LIST AND SHOP DRAWINGS FOR MAJOR EQUIPMENT TO THE ACHITECT/ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL SUBMIT FIVE SETS OF SHOP DRAWINGS AND THEY SHALL BE CLEARLY LABELED.

4. DOMESTIC WATER SUPPLY PIPING

- A. UNDERGROUND: PROVIDE TYPE "K" SOFT DRAWN COPPER TUBING
- WITH BRAZED CONNECTIONS.

 B. ABOVE GROUND: PROVIDE TYPE "L" HARD DRAWN COPPER TUBING WITH 125 PSI SOLDER JOINTS, COPPER OR BRASS FITTINGS.

 ALL SOLDER TO BE "NO LEAD" TYPE.
- C. ALL HOT WATER PIPING TO BE INSULATED WITH 1" FIBERGLASS INSULATION.
- D. ALL COLD WATER PIPING TO BE INSULATED WITH 1/2" FOAM INSULATION.

5. SANTARY/STORM DRAINAGE AND VENT PIPING.

A. ABOVE GRADE:

- -2"BELOW: SCH.40 GALV. STL. PIPE WITH SCREWED ENDS OR SCH. 40PVC WITH SOLVENT JOINTS OR DWV COPPER WITH SOLDER JOINTS. ALL SOLDER TO BE "NO LEAD" TYPE.

 -3" AND ABOVE: SERVICE WT. CAST IRON WITH NO—HUB OR BELL AND SPIGOT JOINTS; OR SCH 40 PVC WITH SOLVENT JOINTS.
- B. BELOW GRADE: SERVICE WT. CAST IRON WITH NO-HUB OR BELL AND SPIGOT JOINTS; OR SCH 40 PVC WITH SOLVENT JOINTS.
 C. PVC PIPING SHALL NOT BE USED IN AIR PLENUM CEILINGS AND SHALL NOT CROSS FIRE RATED WALLS, CEILINGS, OR FLOORS.
- SHALL NOT CROSS FIRE RATED WALLS, CEILINGS, OR FLOORS.

 D. DRAINAGE PIPING SHALL BE RUN AS STRAIGHT AS POSSIBLE AND SHALL HAVE LONG TURN FITTINGS.

 E. DRAINAGE PIPING 3" SIZE AND SMALLER SHALL RUN AT A UNIFORM
- GRADE OF AT LEAST 1/4" PER FOOT. AND PIPING LARGER THAN 3"
 SHALL BE RUN AT A GRADE OF NO LESS THAN 1/8" PER FOOT.

 F. ALL VENT PIPING SHALL BE SLOPED TO DRAIN BACK TO FIXTURES.

 G. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FLASHING OF THE VENT PIPING RUN THROUGH THE ROOF.
- 6. <u>ALL STUB-INS</u> AND/OR SLAB OR WALL PENETRATION TO BE PER INTERNATIONAL PLUMBING CODE (LATEST EDITION).ALL PIPING PENETRATIONS OF BUILDING FOUNDATIONS OR FOOTINGS SHALL BE SLEEVED.

7. PIPE SUPPORTS

- A. ABOVE GRADE
 ALL PIPE SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN
 A NEAT AND WORKMANLIKE MANNER. THE USE OF WIRE AND PERFORATED
 METAL TO SUPPORT PIPES WILL NOT BE PERMITTED. SPACING OF PIPE
 SUPPORTS SHALL BE AS SPECIFIED IN INTERNATIONAL PLUMBING
 CODE (LATEST EDITION).
- B. BELOW GRADE
 EARTH SHALL BE EXCAVATED TO A MINIMUM DEPTH WITH AN EVEN SURFACE
 TO INSURE SOLID BEARING OF PIPE FOR ITS ENTIRE LENGTH.

 -INTERIOR: THE PIPE SHALL BE INSTALLED (UNLESS OTHERWISE SPECIFIED)
 A MINIMUM OF 4 INCHES BELOW THE BOTTOM OF THE SLAB AND SHALL
 NOT BE IN ANY DIRECT CONTACT WITH THE CONCRETE AT ANY POINT.

 -EXTERIOR: THE WATER PIPE SHALL HAVE A MINIMUM OF 60" OF COVER
 AND THE SANITARY WASTE PIPE SHALL HAVE A MINIMUM OF 24" OF COVER.

8. MISCELLANEOUS

- A. COORDINATE INSTALLATION OF ALL ROOFS FLASHING AT ROOF PENETRATION.
 B. DO NOT SCALE THIS DRAWING FOR EXACT DIMENSIONS. VERIFY ALL FIGURES, CONDITIONS AND DIMENSIONS AT THE JOB SITE.
- C. THE PLUMBING PLANS ARE INTENDED TO BE DIAGRAMMATIC AND ARE BASED ON ONE MANUFACTURE'S EQUIPMENT. THEY ARE NOT INTENDED TO SHOW EVERY ITEM IN ITS EXACT LOCATION. THE EXACT DIMENSIONS OR ALL THE DETAILS OF THE EQUIPMENT. THE CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS OF THE EQUIPMENT PROPOSED TO ENSURE THAT THE EQUIPMENT WILL FIT THE AVAILABLE SPACE.

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- B. FOR THE SAME PERIOD. THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO PREMISES CAUSED BY DEFECTS IN WORKMANSHIP OR IN THE WORK OR EQUIPMENT FURNISHED AND/OR INSTALLED BY HIM.

ABBREVIATIONS

AAV	AUTOMATIC AIR VENT	DN	DOWN	FTR	FINNED TUBE RADIATION	NC	NORMALLY CLOSED	RM	ROOM
ABV	ABOVE	DWG	DRAWING	FV	FACE VELOCITY	NEG	NEGATIVE	ROD	ROOF OVERFLOW DRAIN
ADR	AREA DRAIN (SEE SYMBOLS)	DX	DIRECT EXPANSION	FXC	FLEXIBLE CONNECTION	NIC	NOT IN CONTRACT	RPM	REVOLUTIONS PER MINUTE
AFF	ABOVE FINISHED FLOOR	EA	EACH	GA	GAUGE	No	NUMBER	SA	SUPPLY AIR
ALUM	ALUMINUM	EAT	ENTERING AIR TEMPERATURE	GAL	GALLON	NO	NORMALLY OPEN	SAD	SUPPLY AIR DIFFUSER
AP	ACCESS PANEL	EC	ELECTRICAL CONTRACTOR	GALV	GALVANIZED	NOM	NOMINAL	SCH	SCHEDULE
ATC	AUTOMATIC TEMPERATURE CONTROL	ECC	ECCENTRIC	GC	GENERAL CONTRACTOR	NTS	NOT TO SCALE	SCHEM	SCHEMATIC
AVER	AVERAGE	EFF	EFFICIENCY	GPM	GALLONS PER MINUTE	OA	OUTSIDE AIR	SH	SENSIBLE HEAT
AWT	AVERAGE WATER TEMPERATURE	EJ	EXPANSION JOINT	GR	GRILLE	OB	OFF BOTTOM	SP	STATIC PRESSURE
BDD	BACK DRAFT DAMPER	EL	ELEVATION	GRS/LB	GRAINS PER POUND	OD	OUTSIDE DIMENSION	SPEC	SPECIFICATION
BFP	BACK FLOW PREVENTOR	ELEC	ELECTRIC	HT	HEIGHT	OC	ON CENTER	SQ	SQUARE
BLDG	BUILDING	ELEV	ELEVATOR	H_2 O	WATER	OCC	OCCUPIED	SS	STAINLESS STEEL
BLW	BELOW	ENT	ENTERING	HB	HOSE BIBB	OGH	OUTSIDE GROUND HYDRANT	STD	STANDARD
BSMT	BASEMENT	EQ	EQUAL	HD	HEAD (SEE SCHEDULES)	OPG	OPENING	STL	STEEL
BTU	BRITISH THERMAL UNIT	EQUIP	EQUIPMENT	HP	HORSEPOWER	OT	OFF TOP	STM	STEAM
CAP	CAPACITY	EQUIV	EQUIVALENT	HR	HOUR	OZ	OUNCE	STR	STRUCTURAL
CBV	CIRCUIT BALANCING VALVE	ER	EXHAUST REGISTER	HTR	HEATER	PART	PARTIAL	SUCT	SUCTION
CFH	CUBIC FEET PER HOUR	ES	END SWITCH	HZ	HERTZ	PDR	PLENUM DRAIN	SYS	SYSTEM
CFM	CUBIC FEET PER MINUTE	EWT	ENTERING WATER TEMPERATURE	ID	INTERNAL DIAMETER	PD	PRESSURE DROP (SEE SCHEDULE)) TAD	TRANSFER AIR DUCT
CHP	CONCRETE HOUSEKEEPING PAD	EX	EXHAUST	IN	INCHES	PERF	PERFORATED	TDH	TOTAL DYNAMIC HEAD
CI	CAST IRON	EXPAN	EXPANSION	INCL	INCLUDING	PH	PHASE	TEMP	TEMPERATURE
¢	CENTER LINE	EXT	EXTERNAL	INT	INTERNAL	PNEU	PNEUMATIC	THT	TOTAL HEAT
CLG	CEILING	°F	DEGREES FAHRENHEIT	INV	INVERT	POS	POSITIVE	TP	TOTAL PRESSURE
CMU	CONCRETE MASONRY UNIT	FA	FROM ABOVE	KW	KILOWATT	PRESS	PRESSURE	TT	TEMPERATURE TRANSMITTER
CO	CLEAN OUT	FB	FROM BELOW	L	LENGTH	PS	PRESSURE SWITCH	TYP	TYPICAL
COL	COLUMN	FC	FAIL CLOSED	LAT	LEAVING AIR TEMPERATURE	PSI	POUNDS PER SQUARE INCH	UC	UNDERCUT
COMP	COMPRESSOR	FCV	FLOW CONTROL VALVE	LB	POUND	PT	PRESSURE TRANSMITTER	UNOCC	UNOCCUPIED
CON	CONCENTRIC	FD	FLOOR DRAIN	LD	LINEAR DIFFUSER	PV	PLUG VALVE	V	VOLTS
CONC	CONCRETE	F/D	FIRE DAMPER	LIN	LINEAR	PVC	POLYVINYL CHLORIDE	VA	VALVE
COND	CONDENSATE	FIN	FINISHED	LIQ	LIQUID	QUAN	QUANTITY	VB	VACUUM BREAKER
CONN	CONNECTION	FL	FLANGE	LRA	LOCK ROTOR AMPS	R	REGISTER	VEL	VELOCITY
CONT'N	CONTINUATION	FLA	FULL LOAD AMPS	LVG	LEAVING	RA	RETURN AIR	VI	VIBRATION ISOLATOR
CONTR	CONTRACTOR	FLEX	FLEXIBLE	LVR	LOUVER	RD	ROOF DRAIN	VOLT	VOLTAGE
DA	DIRECT ACTING	FLR	FLOOR	LWT	LEAVING WATER TEMPERATURE	RE	ROUNDED ENTRANCE/EXIT	VTR	VENT THRU ROOF
DAMP	DAMPER	FO	FAIL OPEN	MC	MECHANICAL CONTRACTOR	REL	RELIEF	W	WIDTH
DB	DRY BULB	FP	FIRE PROTECTION	MBH	THOUSANDS OF BTU PER HOU	RREQD	REQUIRED	W/	WITH
DEPT	DEPARTMENT	FPM	FEET PER MINUTE	MED	MEDIUM	RET	RETURN	W/O	WITHOUT
DIA	DIAMETER	FPS	FEET PER SECOND	MFR	MANUFACTURER	RH	RELATIVE HUMIDITY	WB	WET BULB
DIAG	DIAGRAM	FRICT	FRICTION	МН	MANHOLE	RICW	RUN IN CASEWORK	WC	WATER COLUMN
DIFF	DIFFERENTIAL	FS	FLOW SWITCH	MIN	MINIMUM	RIE	RUN IN ENCLOSURE	WG	WATER GAUGE
DISCH	DISCHARGE	F/S/D	FIRE/SMOKF DAMPFR	MISC	MISCELLANEOUS	RIW	RISE IN WALL		
DIV	DIVISION	1/3/0	FIRE/SMOKE DAMPER WITH ACCESS DOOR	MTD	MOUNTED	RLA	RATED LOAD AMPS		
DIW	DOWN IN WALL	FT	FEET						

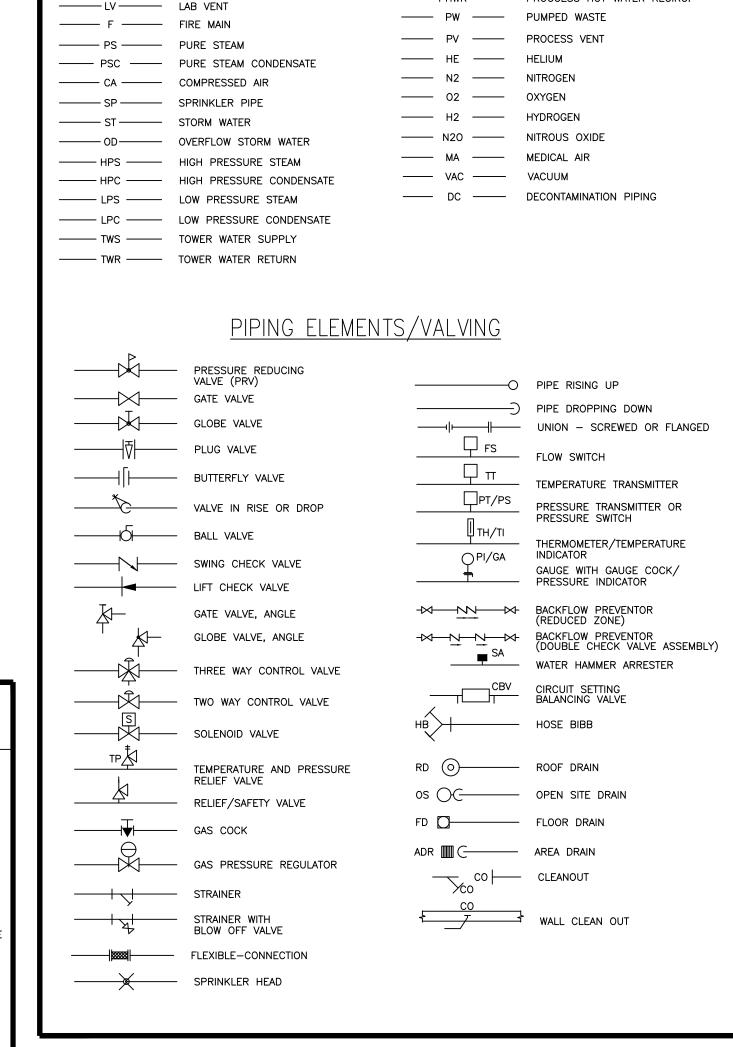
ABBREVIATIONS (CONTINUED)

DOOR LOUVER

EXHAUST REGISTER

AC	AIR CONDITIONING UNIT	ESP	EXTERNAL STATIC PRESSURE	NC	NORMALLY CLOSED
AD	ACCESS DOOR	ET	EXPANSION TANK	NO	NORMALLY OPEN
AFF	ABOVE FINISHED FLOOR	EWT	ENTERING WATER TEMPERATURE	NIC	NOT IN CONTRACT
AH	AIR HANDLER (SPLIT REFRIG)	EWC	ELECTRIC WATER COOLER	NK	NECK
AHU	AIR HANDLING UNIT	FA	FREE AREA	OA	OUTSIDE AIR
AL	ACOUSTICAL LINING	FX	FLEXIBLE CONNECTION	OAI	OUTSIDE AIR INTAKE
AP	ACCESS PANEL	FC	FAN COIL UNIT	OAT	OUTSIDE AIR TEMPERATURE
BB	ELECTRIC BASEBOARD RADIATION	FD	FIRE DAMPER	OC	ON CENTER
В	BOILER	FLR	FLOOR	OD	OUTSIDE DIAMETER
BDD	BACK DRAFT DAMPER	FOB	FLAT ON BOTTOM	OBD	OPPOSED BLADE DAMPER
BFC	BELOW FINISHED CEILING		FLAT ON TOP	PBD	PARALLEL BLADE DAMPER
BOB	BOTTOM OF BEAM	FOP	FUEL OIL PUMP	PRV	PRESSURE REDUCING VALVE
BOD	BOTTOM OF DUCT	FP	FIRE PUMP	PTAC	PACKAGED TERMINAL AIR CONDITIONER
BOP	BOTTOM OF PIPE	FPM	FEET PER MINUTE	RA	RETURN AIR
С	CHILLER	FTR	FINNED TUBE RADIATION	RAG	RETURN AIR GRILLE
CD	CEILING DIFFUSER	GC	GENERAL CONTRACTOR	RAR	RETURN AIR REGISTER
CFM	CUBIC FEET PER MINUTE	GPH	GALLONS PER HOUR	RCP	REFLECTED CEILING PLAN
CHWP	CHILLED WATER PUMP	GPM	GALLONS PER MINUTE	RHC	REHEAT COIL
CHWR	CHILLED WATER RETURN	HD	HAND DAMPER	RF	RETURN FAN
CHWS	CHILLED WATER SUPPLY	HP	HEAT PUMP	SA	SUPPLY AIR
CO	CLEAN OUT	HV	HEATING AND VENTILATING UNIT	SAR	SUPPLY AIR REGISTER
CP	CONDENSATE PUMP	HWC	HOT WATER CONVERTER	SCG	SMOKE CONTROL GRILLE
CWR	CONDENSER WATER RETURN	HWP	HOT WATER PUMP	SD	SMOKE DAMPER
CWS	CONDENSER WATER SUPPLY	HWR	HEATING HOT WATER RETURN	SEF	SMOKE EXHAUST FAN
CT	COOLING TOWER	HWS	HEATING HOT WATER SUPPLY	SF	SUPPLY FAN
CU	CONDENSING UNIT	HX	HEAT EXCHANGER	SP	STATIC PRESSURE
CUH	CABINET UNIT HEATER	HZ	HERTZ	TG	TRANSFER GRILLE
CVB	CONSTANT VOLUME BOX	ID	INSIDE DIAMETER	TYP	TYPICAL
CWP	CONDENSER WATER PUMP	LAT	LEAVING AIR TEMPERATURE	UH	UNIT HEATER
DB	DRY BULB	LWT	LEAVING WATER TEMPERATURE	UON	UNLESS OTHERWISE NOTED
DS	DUCT SILENCER	LD	LINEAR DIFFUSER		VARIABLE AIR VOLUME UNIT
DWP	DOMESTIC WATER PUMP	LF	LINEAR FEET	VD	VOLUME DAMPER
EAT	ENTERING AIR TEMPERATURE	MC	MECHANICAL CONTRACTOR	VTR	VENT THRU ROOF
EC	ELECTRICAL CONTRACTOR	MTD	MOUNTED	WB	WET BULB
EF	EXHAUST FAN	MOD	MOTOR OPERATED DAMPER	WMS	WIRE MESH SCREEN
EJ	EXPANSION JOINT	MUA	MAKE-UP AIR UNIT		

	<u>PLUMBING S</u>	SYMBOLS.	
<u>SYMBOL</u>	DESCRIPTION	SYMBOL	DESCRIPTION
	SOIL OR WASTE PIPE (BELOW GROUND)	<u></u>	VACUUM BREAKER
	SOIL OR WASTE PIPE (ABOVE GROUND)	——(() RD	ROOF DRAIN
	- VENT PIPE (V)	\bigcirc	PRESSURE GAGE
	— COLD WATER PIPE (CW)		TEMPERATURE GAGE
	- HOT WATER PIPE (HW)	<u>—</u> M—	WATER METER
	- HOT WATER RETURN (HWR)	─ \$─	PRESSURE REDUCING VALVE
— т —	- TEMPERED HOT WATER LINE (THW)	$- \nabla$	GAS COCK
—— G——	- NATURAL GAS PIPE	VTR	VENT THROUGH ROOF
sD	STORM DRAIN PIPE	LAV	LAVATORY
──O FD	FLOOR DRAIN	WC	WATER CLOSET
—0 co	CLEAN-OUT(FLOOR)	URN	URINAL
—— co	CLEAN-OUT(WALL)	DF	DRINKING FOUNTAIN
(wh)	HOT WATER HEATER	SH	SHOWER
<i>—</i> Ā—	GATE VALVE	A.D.	ACCESS DOOR
—ø—	CHECK VALVE	SS	SAFETY SHOWER
*-	TEMP./PRESS. RELIEF VALVE		
	FIXTURE ISOLATION VALVE		



PLUMBING LEGEND

LINE DESIGNATIONS

— G — NATURAL GAS

PROPANE GAS

----- DIS ----- DISTILLED WATER SUPPLY

—— DIR —— DISTILLED WATER RETURN

----- DES ----- DEIONIZED WATER SUPPLY

----- DER ----- DEIONIZED WATER RETURN

----- WFIS ----- WATER FOR INJECTION SUPPLY

----- WFIR ----- WATER FOR INJECTION RETURN

----- USPS ----- USP PURIFIED WATER SUPPLY

— (E)(NAME) — EXISTING PIPING TO REMAIN

— - — - — DOMESTIC COLD WATER (CW)

---- SANITARY VENT

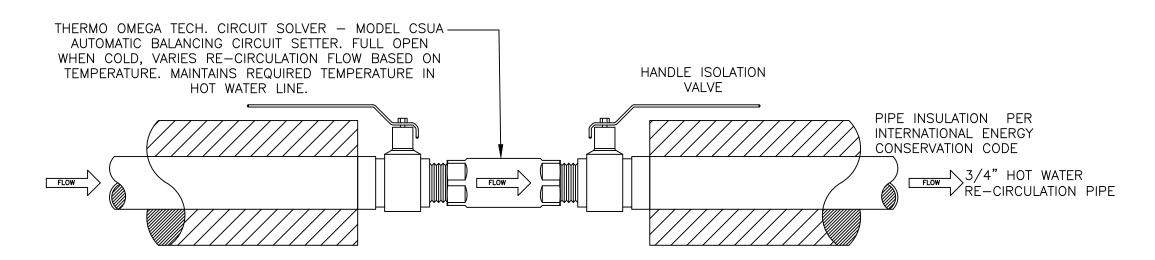
----- LW ------ LAB WASTE

—— D ——— EQUIPMENT DRAIN

----- (NAME) ----- EXISTING PIPING TO BE REMOVED

—--- DOMESTIC HOT WATER RECIR. (HWR)

----- SANITARY DRAIN BELOW GRADE



CIRCUIT SOLVER — AUTOMATIC CIRCUIT SETTER DETAIL

NOT TO SCALE

PLUMBING - LEGEND

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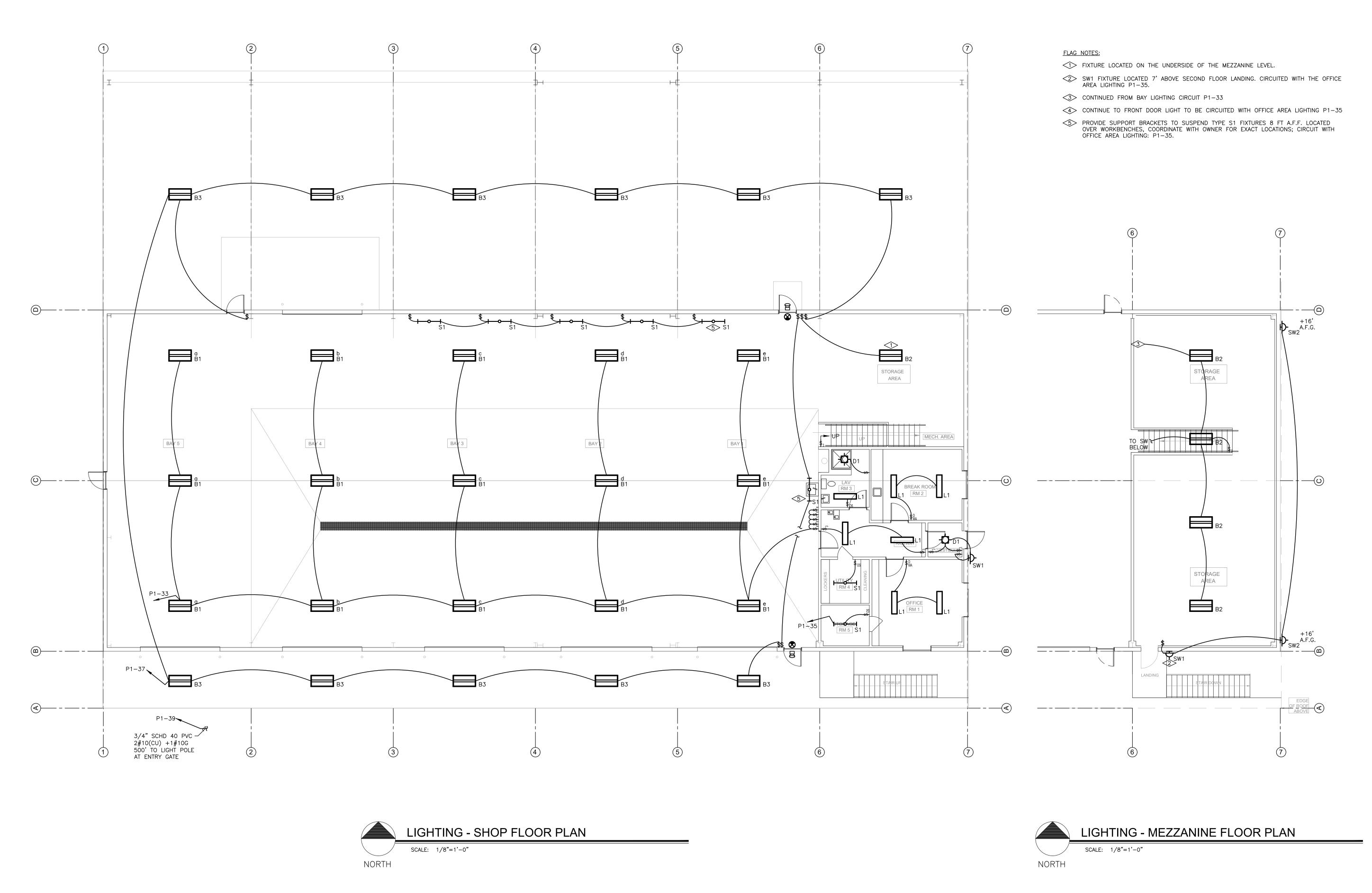
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LIGHTING LEGEND

SYMBOLS SHOWN ARE STANDARD. VARIATION AND/OR COMBINATIONS MAY BE USED ON THE PLANS. THIS LIST SHOWS STANDARD SYMBOLS AND ALL MAY NOT APPEAR ON THE PROJECT DRAWINGS; HOWEVER, WHEREVER THE SYMBOL ON THE PROJECT DRAWINGS OCCUR; THE ITEM SHALL BE PROVIDED AND

INSTALLED. A LOWER CASE LETTER NEXT TO LIGHT FIXTURE OR SWITCH INDICATES A SWITCH DESIGNATION.

AN UPPER CASE LETTER NEXT TO A SWITCH INDICATES THE TYPE OF SWITCH. SEE THE LIST BELOW

AN UPPER CASE LETTER NEXT TO A LIGHT FIXTURE INDICATES THE TYPE OF FIXTURE. REFER TO THE LUMINAIRE SCHEDULE FOR FIXTURE SPECIFICATIONS.

ELECTRICAL EQUIPMENT

BRANCH CIRCUIT PANELBOARD

LA-7 CIRCUITRY HOMERUN: PANEL LA - CIR. #7 CONDUIT OR WIRE CONCEALED IN WALL/CLG.

———— CONDUIT OR WIRE UNDERFLOOR/UNDERGND. ○ CEILING JUNCTION BOX - SURFACE/FLUSH

QH WALL JUNCTION BOX - SURFACE/FLUSH

SWITCHES

\$ SINGLE POLE SWITCH

- \$2 TWO POLE SWITCH \$₃ THREE-WAY SWITCH
- \$₄ FOUR—WAY SWITCH \$n DIMMER SWITCH
- \$3D 3 WAY DIMMER SWITCH (4D INDICATES A 4WAY DIMMER)
- \$0S WALL MOUNTED DUAL TECHNOLOGY VACUITY SENSOR SWITCH \$_{LV} LOW VOLTAGE LIGHT SWITCH
- \$MA MANUAL ON / AUTO OFF LIGHT SWITCH
- \$MA MANUAL ON / AUTO OFF DIMMING LIGHT SWITCH
- (OS) CEILING MOUNTED MOTION SENSOR

LIGHT FIXTURES

ALL FIXTURES: A-UPPER CASE LETTER INDICATES FIXTURE TYPE REFERENCE LUMINAIRE SCHEDULE FOR SPECIFICATIONS a-LOWER CASE LETTER INDICATES SWITCHING CIRCUIT.

ACTUAL FIXTURE ON PLANS MAY VARY SLIGHTLY FROM THE SYMBOL SHOWN HERE

A 2'x4' LED HIGH BAY TYPE FIXTURE, SUSPENDED MOUNTED

A 1'x4' LED TROFFER OR DIRECT/INDIRECT TYPE FIXTURE GRID, FLANGE OR SURFACE MOUNTED 2'x4' LED TROFFER OR DIRECT/INDIRECT TYPE FIXTURE

☑ GRID, FLANGE OR SURFACE MOUNTED A 2'x2' LED TROFFER OR DIRECT/INDIRECT TYPE FIXTURE
GRID FLANGE OR SURFACE MOUNTED

GRID, FLANGE OR SURFACE MOUNTED A |)- WALL BRACKET LIGHT FIXTURE

A-O- RECESSED DOWNLIGHT CAN FIXTURE

A-O- SURFACE CEILING OR PENDANT MOUNTED FIXTURE EX1 SINGLE FACE EXIT SIGN, WALL AND CEILING MOUNTED

EX2 DOUBLE FACE EXIT SIGN, WALL AND CEILING MOUNTED EM OCCO WALL MOUNTED EMERGENCY LIGHT

EMR EMERGENCY EXTERIOR EGRESS FIXTURE

ABBREVIATIONS

DRAWING KEYED NOTE

ROOM DESIGNATION, NAME AND NUMBER

NIGHT/SECURITY LIGHT - DO NOT SWITCH

WP WEATHERPROOF A.F.F. ABOVE FINISHED FLOOR

A.F.G. ABOVE FINISHED GRADE

GFCI OR GF GROUND FAULT CIRCUIT INTERRUPTER

EM EMERGENCY FUNCTION NON-SWITCHED FIXTURE FOR MOUNTING HEIGHT - A.F.F. OR A.F.G. TO CENTERLINE

A.C. ITEM TO BE MOUNTED ABOVE COUNTER HEIGHT

GENERAL LIGHTING NOTES

- 1.1. LIGHTING FIXTURES SHALL BE SUPPORTED FROM THE STRUCTURE ABOVE AND SHALL NOT BE SUPPORTED FROM THE T-BAR CEILING GRID.
- 1.2. THE ELECTRICAL CONTRACTOR IS TO CONFIRM THE LIGHT FIXTURES ORDERED WILL BE COMPATIBLE WITH THE CEILING TYPES AS SHOWN ON THE ARCHITECTURAL REFLECTED CEILING PLANS. NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO
- ORDERING THE FIXTURES. 1.3. COORDINATE THE LOCATION OF LIGHTING EQUIPMENT INCLUDING BUT NOT LIMITED TO THE LUMINAIRES, SWITCHES AND CONTROL COMPONENTS WITH THE ARCHITECTURAL, STRUCTURAL AND MECHANICAL
- DRAWINGS AND ALL OTHER TRADES AS REQUIRED. VERIFY LUMINAIRE MOUNTING REQUIREMENTS AND OVERALL HEIGHT OF ALL PENDANT MOUNTED FIXTURES
- ALL LIGHT FIXTURES NEED TO BE COMPATIBLE WITH THE SWITCHES AND CONTROLS BEING PROVIDED. THE LIGHTING PACKAGE SHALL BE APPROVED BY BOTH ARCHITECTS AND ENGINEERS AS APPROVED EQUAL BEFORE BID. NO LIGHT FIXTURE SHALL BE ORDERED UNTIL THE LIGHT FIXTURE SUBMITTAL PACKAGE HAS

BEEN APPROVED IN WRITING BY THE ARCHITECT,

- GENERAL CONTRACTOR AND ELECTRICAL ENGINEER. 1.7. COORDINATE LUMINAIRE MOUNTING REQUIREMENTS PRIOR TO PLACING ORDER.
- PROVIDE EMERGENCY AND EXIT SIGNS AS PER ALL
- LOCAL CODES. EXIT SIGNS CONNECTED TO A REMOTE EMERGENCY HEAD REQUIRES EXTRA BATTERY CAPACITY TO OPERATE THE REMOTELY LOCATED EMERGENCY HEAD FOR
- EGRESS AWAY FROM THE BUILDING. REFER TO THE PLANS FOR THE NUMBER OF FACES REQUIRED AT EACH EXIT. FIELD ADJUST THE LOCATION OF THE EXIT SIGNS FOR THE BEST VISIBILITY
- ALL LIGHTING FIXTURES DENOTED WITH "EM" SHALL BE PROVIDED WITH AN ENGINEER APPROVED EMERGENCY LED DRIVER OR BALLAST TO OPERATION THE FIXTURE IN AN EMERGENCY MODE TO MEET ALL CURRENT LOCAL CODES AND WILL BE CIRCUITED TO THE
- UNSWITCHED SIDE OF THE LIGHTING CIRCUIT. ALL LIGHT FIXTURES DESIGNATED WITH "EM" OR SPECIFIED WITH AN EM FUNCTION SHALL BE PROVIDE WITH ONE OF THE FOLLOWING;
- 2.4.1. INTEGRAL TEST SWITCH; REMOTE INFRARED HAND HELD DEVICE; INTEGRAL ELECTRONIC DEVICE THAT AUTOMATICALLY
- PERFORMS CODE REQUIRED TESTS. ALL STAIRWELLS AND PATHS OF EGRESS TO THE EXTERIOR DOORS, AND THE EXTERIOR PATH OF EGRESS AWAY FROM THE BUILDING SHALL RECEIVE EMERGENCY LIGHTING PER CODE.
- 3. <u>LIGHTING CONTROLS:</u>
 3.1. ALL LIGHTS IN; RESTROOMS, STORAGE CLOSETS, JANITORS CLOSETS AND STAIRWELLS ARE TO BE SWITCHED WITH A MOTION SENSOR ON/OFF SWITCH WITH A TIME DELAY. SET THE TIME DELAY LENGTH AS DIRECTED BY THE OWNER.
- 3.1.1. EXCEPTION: IN AREAS WHERE THE SWITCH IS LOCATED OUTSIDE THE AREA THE LIGHT IS
- 4. OFFICES WITH MORE THAT ONE FIXTURE WILL BE SWITCHED WITH A MANUAL ON/AUTO OFF DIMMING SWITCH. 5. SWITCHING FOR LIGHTS IN LARGE COMMON AREA ARE AS
- 6. <u>GENERAL NOTES:</u> FIELD COORDINATION DURING CONSTRUCTION IS

SHOWN ON PLAN.

- IMPERATIVE. CONTRACTORS BIDDING THIS WORK MUST MAKE REASONABLE ALLOWANCES FOR UNFORESEEN CONTINGENCIES.
- 7. WIRING:
 ALL WIRING IS SHOWN DIAGRAMMATICALLY ON DRAWING,
- FIELD VERIFY ALL CONDITIONS PRIOR TO ROUGH-IN. ALL WIRE IS TO BE #12 UNLESS NOTED OTHERWISE. 7.2. ALL BRANCH CIRCUITS WITH HOME RUNS OVER 50
- FEET, WILL BE SIZED ONE SIZE LARGER. 7.3. ALL ELECTRICAL WORK TO COMPLY WITH LATEST EDITON OF NEC AND ALL APPLICABLE LOCAL CODES.

ADAPTOR AS REQUIRED STEEL POLE -FLUSH HANDHOLE & COVER BOND 1#6(CU) GROUND FROM -GROUND LUG TO GROUND ROD ANCHOR BOLTS -CHAMFER —— EXPOSED CONCRETE TO HAVE RUBBED FINISH 2' X 3' SONOTUBE FINISHED GRADE -UNDISTURBED EARTH 1" CONDUIT IN CONCRETE CONDUIT BURY 24" 6 # 5 REBAR — # 3 TIES AT 12" O.C.-5/8" DIA. x 10' L CU CLAD— DRIVEN GROUND ROD 4" BELOW 1'-6" / #3 TIES AT 12" O.C. SURFACE AND 6" AWAY FROM ∕—6#5 VERT. REBAR CONCRETE BASE. EXOTHERMIC WELD CONDUCTOR TO ROD.

ENTRY GATE LIGHT - POLE DETAIL

- NOTES:

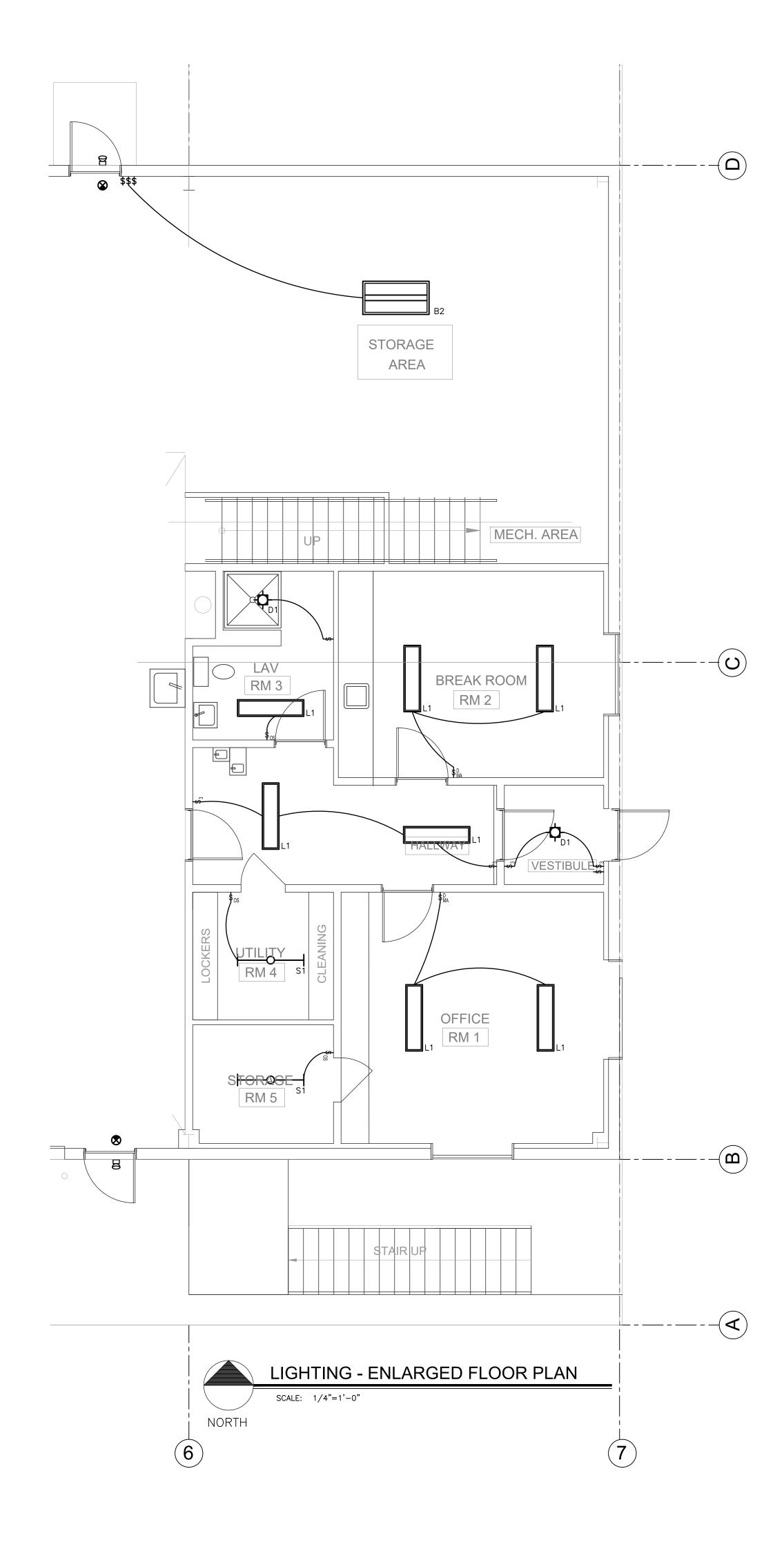
 1. DIMENSION FOR ANCHOR BOLT SPACING BY POLE MANUFACTURER.

 2. CONTRACTOR SHALL INSTALL A FUSE AND WEATHERPROOF FUSEHOLDER AT EACH
- 3. BASE HOLE SHALL BE DRILLED INTO NATURAL, UNDISTURBED SOIL OR PROPERLY COMPACTED FILL.

TYPE	MANUFACTURER CATALOG NO.	MANUFACTURER CATALOG NO.	VOLTAGE MOUNTING # OF LAMPS	BALLAST LAMP TYPE LAMP CAT. #	DESCRIPTION
B1	LITHONIA LIGHTING IBG 15000LM SEF ACL GND MVOLT GZ10 40K 80CRI	APPROVED EQUIVALENT	120-277V SUSPENDED CEILING 1	14059LM, 4000K	24"Lx16"Wx5"H SUSPENDED HIGH BAY LED LIGHTING, LM-80 80,000 HOUR LIFESPAN, DAMP LISTED 5 YEAR WARRANTY, -40°C STARTING TEMPERATURE
B2	LITHONIA LIGHTING IBG 8000LM SEF ACL WD MVOLT GZ10 40K 80CRI	APPROVED EQUIVALENT	120-277V SUSPENDED CEILING 1	7384LM, 4000K	24"Lx16"Wx5"H SUSPENDED HIGH BAY LED LUMINAIRE LM-80 80,000 HOUR LIFESPAN, DAMP LISTED 5 YEAR WARRANTY
В3	LITHONIA LIGHTING IBG 15000LM SEF ACL GND MVOLT GZ10 40K 80CRI LAOZU	APPROVED EQUIVALENT	120-277V SUSPENDED CEILING 1	14059LM, 4000K	24"Lx16"Wx5"H SUSPENDED HIGH BAY LED LIGHTING, LM-80 80,000 HOUR LIFE, DAMP LISTED, 5 YEAR WARRANTY INTEGRAL OCCUPANCY SENSOR, -40°C STARTING TEMPERATURE
D1	LITHONIA LIGHTING LDN4 40/10 LO4 ARLSS MVOLT GZ10	APPROVED EQUIVALENT	120-277V RECESSED CEILING 1	LED DRIVER 13W, 80CRI 1000LM, 4000K	4"DIAx5"H DOWNLIGHT LUMINAIRE WET LISTED, 5 YEAR WARRANTY
L1	LITHONIA LIGHTING BLTX 48L ADP EZ1 LP840	APPROVED EQUIVALENT	120-277V SURFACE CEILING 1	LED DIMMING DRIVER 45W, 80CRI 5261LM, 4000K	12"Lx48"Wx5"H SURFACE ARCHITECTURAL LINEAR LIGHT LONG LIFE LED, DAMP LISTED 5 YEAR WARRANTY
S1	LITHONIA LIGHTING ZL1D L48 5000LM FST MVOLT 40K 80CRI	APPROVED EQUIVALENT	120-277V STRIP LIGHT 1	LED DIMMING DRIVER 41W, 80CRI 5541LM, 4000K	48"Lx24"Wx2"H RECESSED GRID LUMINAIRE LONG LIFE LED, PENDANT MOUNT KIT INTEGRATED LIGHTCLOUD CONTROLLER
00_0	LITHONIA LIGHTING EU2C	APPROVED EQUIVALENT	120/277 SURFACE WALL/CEILING 2	NONE REQUIRED LED WITH UNIT	11"Wx3.5"Dx7.5"H IMPACT RESISTANT THERMO-PLASTIC, BATTERY
Ю	LITHONIA LIGHTING ECG LED HO M6	APPROVED EQUIVALENT	120/277 WALL/CEILING N/A	NONE REQUIRED LED WITH UNIT	14"Wx8"H COMBO EXIT EGRESS LIGHT NICAD BATTERY, UNIVERSAL MOUNTING, 5 YEAR WARRANTY FIELD CONFIGURABLE INDICATION, REMOTE HEAD CAPABLE
9	LITHONIA LIGHTING ELA LED WP M12	APPROVED EQUIVALENT	120/277 WALL/CEILING N/A	NONE REQUIRED LED WITH UNIT	6.5"Wx10.5"Hx4"D EXTERIOR EGRESS LIGHTING WET LOCATION RATED,
SW1	LITHONIA LIGHTING OLWX1 20W 40K PE	APPROVED EQUIVALENT	120-277V WALL MOUNT 1	LED DRIVER 20W, 80CRI 2697LM, 4000K	48"Lx24"Wx2"H EXTERIOR WALL PACK LONG LIFE LED, —20°C STARTING TEMPERATURE IP 65 RATED, FULL CUTOFF, 5 YEAR WARRANTY
SW2	MVOLT PE	APPROVED EQUIVALENT	120-277V WALL MOUNT 1	LED DRIVER 78W, 70CRI 9214LM, 4000K	16"Hx16"Wx8"D EXTERIOR WALL PACK LONG LIFE LED, -20°C STARTING TEMPERATURE IP 65 RATED, 5 YEAR WARRANTY
SP1	LITHONIA LIGHTING DSXO LED P2 40K T3S MVOLT	APPROVED EQUIVALENT	120-277V POLE MOUNT 1	LED DRIVER 78W, 70CRI 9214LM, 4000K	26"Lx13"Wx3"H POLE MOUNTED FIXTURE LONG LIFE LED, —20°C STARTING TEMPERATURE IP 66 RATED, 5 YEAR WARRANTY

INTERIOR LUMINAIRE SCHEDULE

- 1. OCCUPANCY SENSORS ARE DIAGRAMMATICALLY DISPLAYED ON THE PLANS, FIELD ADJUST UNITS TO MEET THE MANUFACTURER'S RECOMMENDED SPACING REQUIREMENTS.
- 2. THE EXIT LIGHT SYMBOL USED IN THIS SCHEDULE IS A GENERIC SYMBOL TO INDICATE AN EXIT LIGHT FIXTURE. REFER TO THE PLANS FOR THE NUMBER OF FACES REQUIRED AT EACH EXIT. INSTALL THE NUMBER OF FACES REQUIRED AT EACH EXIT. FIELD ADJUST THE LOCATION OF THE EXIT SIGNS FOR THE BEST VISIBILITY POSSIBLE. ALL EXIT LIGHTS SHALL COMPLY WITH ALL LOCAL BUILDING CODES
- 3. EXIT AND EMERGENCY EGRESS LIGHTING TO BE CIRCUITED TO THE UNSWITCHED SIDE OF THE LIGHTING CIRCUIT OF THE SPACE IN WHICH IT IS 4. EXTERIOR FIXTURES UNDER THE AWNING ARE TO BE CONTROLLED WITH A PHOTOCELL, PROVIDE A SNAP SWITCH IN SERIES TO CONTROL NORTH
- AWNING AND SOUTH AWNING INDEPENDENTLY OF EACH OTHER. 5. PROVIDE A MEANS FOR AUTOMATIC OFF CONTROL FOR THE FIXTURES IN THE SHOP AREA; SET TIME DELAY PER OWNER.



03/21/19

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ANY OTHER PROJECTS FOR ADDITIONS TO THIS PROJECT

BY OTHERS EXCEPT BY THE EXPRESSED WRITTEN

PERMISSION OF THE DESIGNER.

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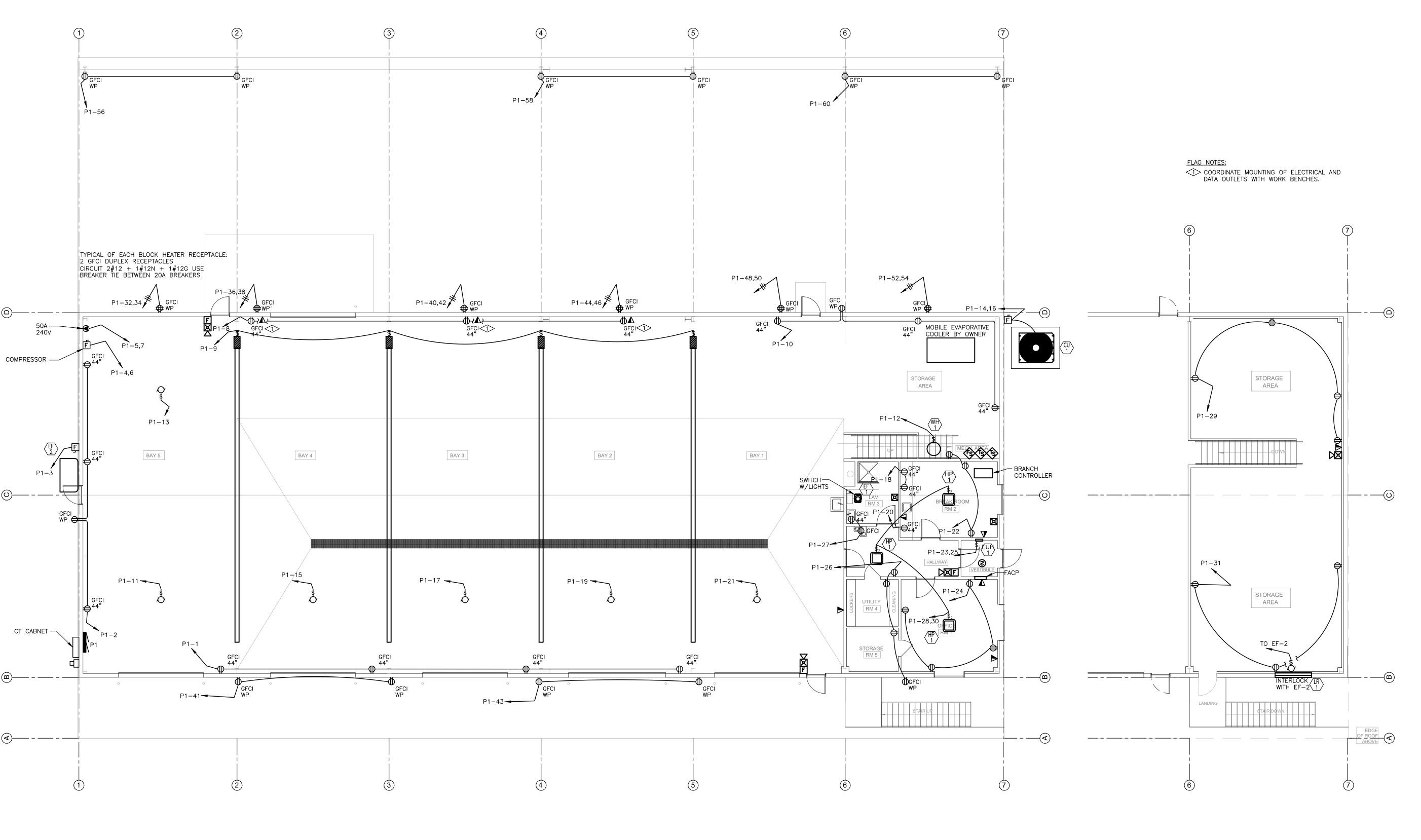
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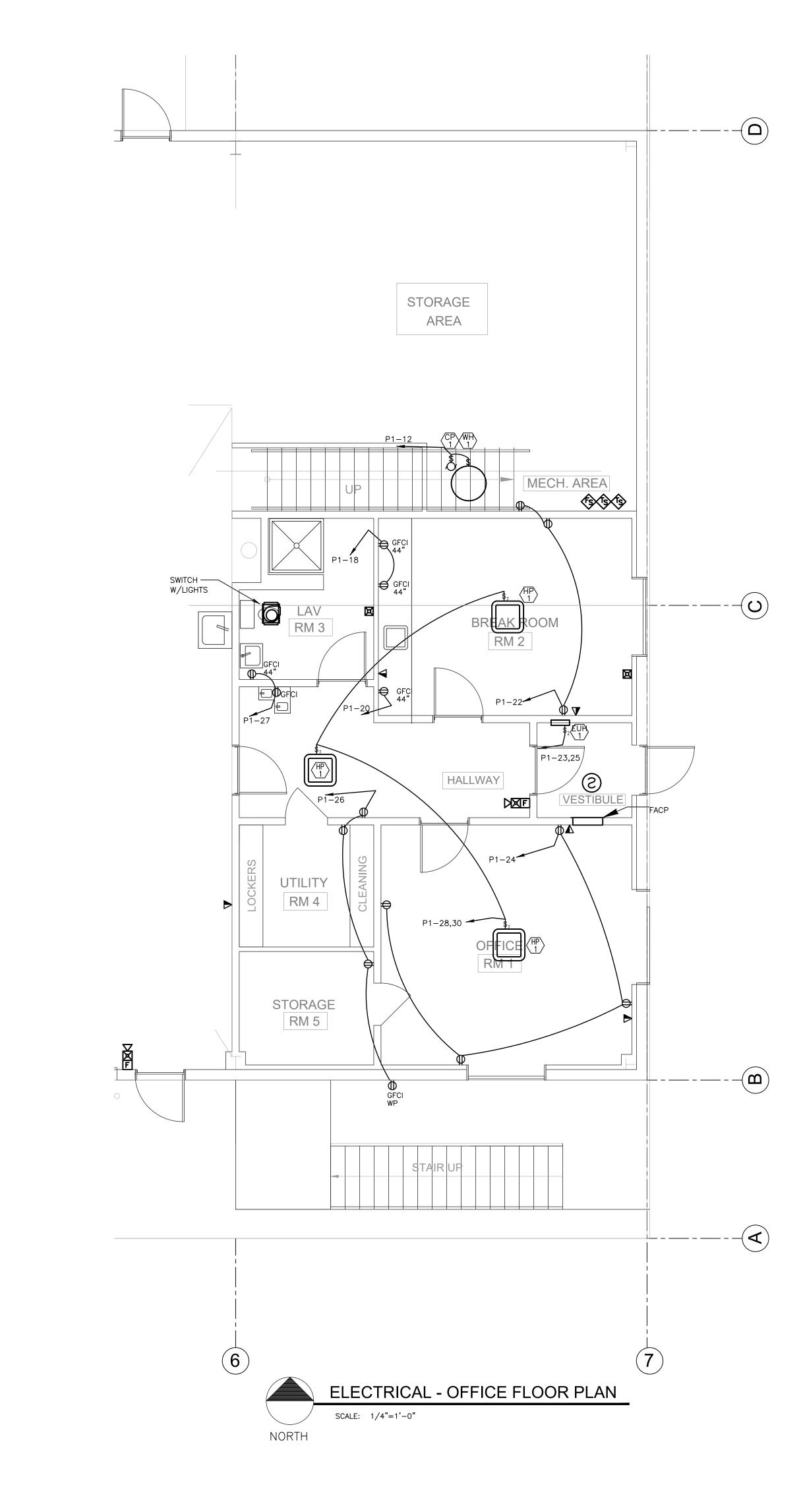
ELECTRICAL - SHOP FLOOR PLAN

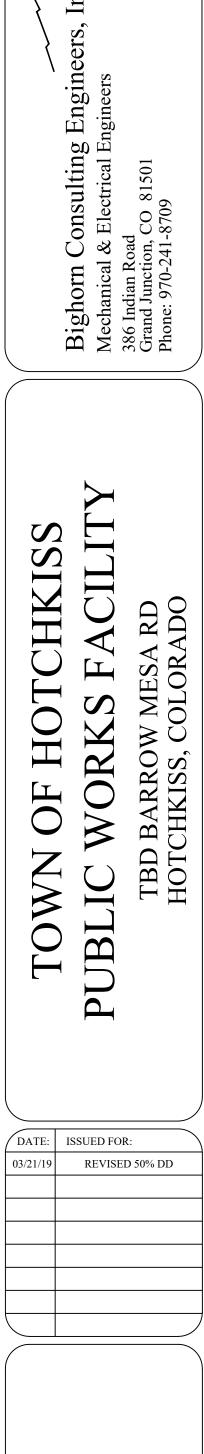
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03/21/19 REVISED 50% DD

SHEET NUMBER:

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





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March 25, 2019 - 4:28:38pm

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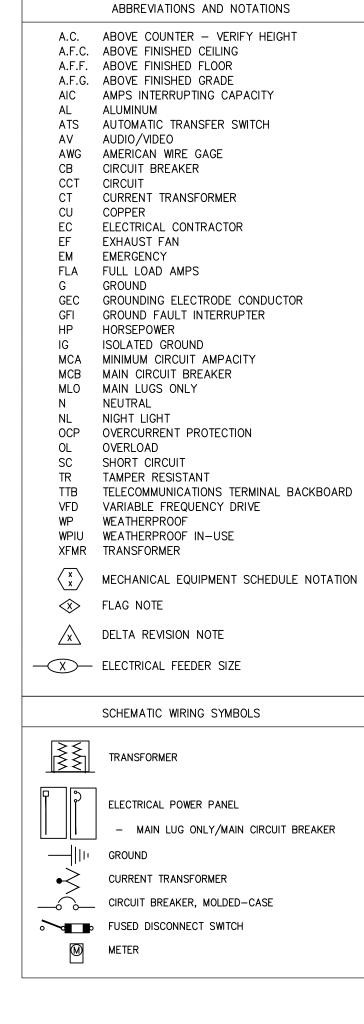
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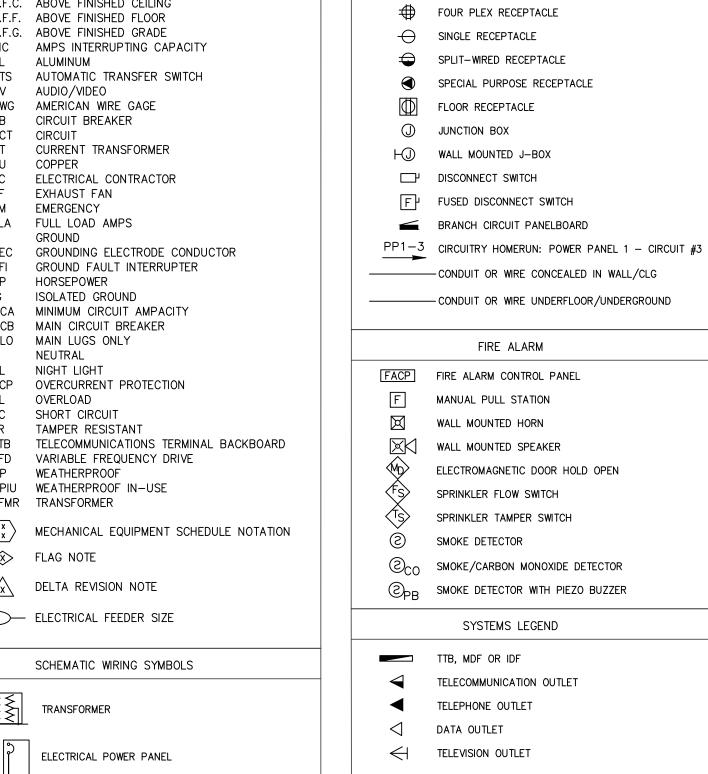
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	MECHA	NIC	AL	E	QUII	PMEI	T	SC	HE	DUL	E	
COMB: MAG:	COMBINATION MOTOR STARTER MAGNETIC MOTOR STARTER		NF P/	i: N	ONE RE PLUG-IN	QUIRED UNIT	CONT MAN: W/U:	: CO MA SU	NTRACT NUAL JPPLIEC	TOR MOTOR S WITH U	TARTER NIT:	
UNIT	FUNCTION	LOAD	VOLTS	ø	FULL	BRANG	CH CIR	CUIT	GRND	BRKR	START	DISC
NO	(NOTES)				LOAD AMPS	CONDUIT SIZE	NO. COND.	WIRE SIZE	WIRE SIZE	SIZE	0171111	FUSE
(CU)	CONDENSING UNIT		240	1	42 A	3/4"	2	8	10	50A	NR	60 50
(EF)	EXHAUST FAN		120	1	1.0A	1/2"	2	12	12	20A	NR	\$
EF 2	EXHAUST FAN	3/4HP	120	1	13.8A	1/2"	2	12	12	20A	NR	\$
(H	INDOOR AC EQUIPMENT		240	1	0.3A	1/2"	2	12	12	20A	NR	\$ ₂
(IR)	RADIANT HEATER		120	1	1.0A	1/2"	2	12	12	20A	NR	\$
(LR)	MOTORIZED LOUVER		120	1	1.0A	1/2"	2	12	12	20A	NR	\$

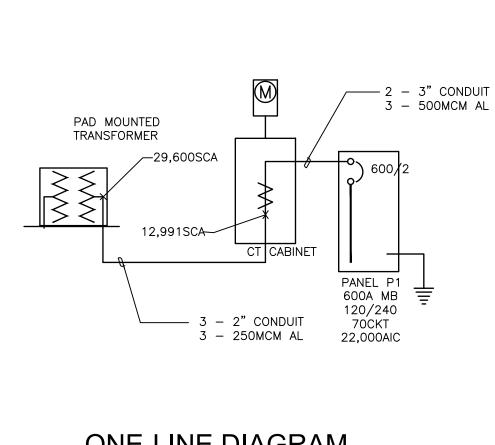
PANEL SCHEDULE -	P1 TYPE: PANELB VOLTAGE: 120/24 ENCLOSURE: NEMA1		MAIN	SIZE: I BRKR NTING:			PHASES: 1 WIRES: 3 SC RATING: 22000	NEUTRAL BUS: YES GROUND BUS: YES
LOAD TYPE	LOAD DESCRIPTION	AMPS POLES	CKT#	Ø	CKT#	AMPS POLES	LOAD TYPE	LOAD DESCRIPTION
RECEPTACLE	SHOP OUTLETS	20A 1P	1 720	A	2 720	20A	RECEPTACLE	SHOP OUTLETS
MECH YEAR ROUND	UNIT EF-2	20A 1P	3 1656	В	4 4000	50A 2P	MOTOR	AIR COMPRESSOR
PROCESS	SHOP OUTLET	50A	5	A	6		MOTOR	
PROCESS		2P	4800 7	В	8	20A	RECEPTACLE	SHOP OUTLETS
MECH HEATING	SHOP HEATERS	20A	4800 9	A	720 10	1P 20A	RECEPTACLE	SHOP OUTLETS
PROCESS	DOOR OPENER	1P 20A	11	В	720 12	1P 20A	MECH YEAR ROUND	WATER HEATER & CIRC PUMP
PROCESS	DOOR OPENER	1P 20A	1500	A	200	1P 45A	MECH YEAR ROUND	UNIT CU-1
PROCESS	DOOR OPENER	1P 20A	1500	В	5040	2P	MECH YEAR ROUND	
PROCESS	DOOR OPENER	1P	1500		5040		RECEPTACLE	
		20A 1P	1500	A	18 360	20A 1P		BREAK ROOM COUNTER OUTLET
PROCESS	DOOR OPENER	20A 1P	19 1500	В	20 180	20A 1P	RECEPTACLE	BREAK ROOM COUNTER OUTLET
PROCESS	DOOR OPENER	20A 1P	21 1500	A	22 360	20A 1P	RECEPTACLE	BREAK ROOM OUTLETS
MECH HEATING	UNIT EUH-1	20A 2P	23 1000	В	24 720	20A 1P	RECEPTACLE	OFFICE OUTLETS
MECH HEATING			25 1000	А	26 720	20A 1P	RECEPTACLE	CONVIENCE OUTLETS
RECEPTACLE	BATHROOM OUTLET	20A 1P	27 360	В	28 250	20A 2P	MECH YEAR ROUND	HP UNITS
RECEPTACLE	MEZZANINE OUTLETS	20A	29 540	A	30		MECH YEAR ROUND	
RECEPTACLE	MEZZANINE OUTLETS	20A	31	В	250 32	20A	RECEPTACLE	BLOCK HEATER 1
LIGHTING	SHOP LIGHTING	1P 20A	33	A	34	1P 20A	RECEPTACLE	PROVIDE BREAKER TIE WITH P1-34 BLOCK HEATER 1
LIGHTING	OFFICE LIGHTING	1P 20A	1400 35	В	1000 36	1P 20A	RECEPTACLE	PROVIDE BREAKER TIE WITH P1-32 BLOCK HEATER 2
LIGHTING	EXTERIOR LIGHTING	1P 20A	1000	A	1000 38	1P 20A	RECEPTACLE	PROVIDE BREAKER TIE WITH P1-38 BLOCK HEATER 2
		1P	1200		1000	1P		PROVIDE BREAKER TIE WITH P1-36
LIGHTING	GATE LIGHTING	20A 1P	39 600	В	40 1000	20A 1P	RECEPTACLE	BLOCK HEATER 3 PROVIDE BREAKER TIE WITH P1-42
RECEPTACLE	EXTERIOR OUTLETS	20A 1P	41 360	A	42 1000	20A 1P	RECEPTACLE	BLOCK HEATER 3 PROVIDE BREAKER TIE WITH P1-40
RECEPTACLE	EXTERIOR OUTLETS	20A 1P	43 360	В	44 1000	20A 1P	RECEPTACLE	BLOCK HEATER 4 PROVIDE BREAKER TIE WITH P1-46
SPARE	UNALLOCATED FUTURE	20A 1P	45 200	А	46 1000	20A 1P	RECEPTACLE	BLOCK HEATER 4 PROVIDE BREAKER TIE WITH P1-44
SPARE	UNALLOCATED FUTURE	20A 1P	47 200	В	48 1000	20A 1P	RECEPTACLE	BLOCK HEATER 5 PROVIDE BREAKER TIE WITH P1-50
SPARE	UNALLOCATED FUTURE	20A 1P	49 200	A	50 1000	20A 1P	RECEPTACLE	BLOCK HEATER 5 PROVIDE BREAKER TIE WITH P1-48
SPARE	UNALLOCATED FUTURE	20A 1P	51 200	В	52 1000	20A 1P	RECEPTACLE	BLOCK HEATER 6 PROVIDE BREAKER TIE WITH P1-54
SPARE	UNALLOCATED FUTURE	20A	53	A	54	20A	RECEPTACLE	BLOCK HEATER 6
SPARE	UNALLOCATED FUTURE	1P 20A	200 55	В	1000 56	1P 20A	RECEPTACLES	PROVIDE BREAKER TIE WITH P1-52 AWNING POLE OUTLET
SPACE		1P	200 57	A	360 58	1P 20A	RECEPTACLES	AWNING POLE OUTLET
SPACE			0 59	В	360 60	1P 20A	RECEPTACLES	AWNING POLE OUTLET
			0		360	1P		
SPACE			61	A	62 200	20A 1P	SPARE	UNALLOCATED FUTURE
SPACE			63 0	В	64 200	20A 1P	SPARE	UNALLOCATED FUTURE
SPACE			65 0	A	66 0		SPACE	
SPACE			67 0	В	68 0		SPACE	
SPACE			69 0	А	70 0		SPACE	
LOADS BY TYPE:			LOADS E	ВҮ РНА	SE:	221115275	0011150750	D.U. W.05
LOAD TYPE	CONNECTED DEMAND DEMAND LOAD (VA) FACTOR LOAD (VA)		PHASE	E_		CONNECTED LOAD (VA)	LOAD (AMPS)	BALANCE (PERCENT)
LIGHTING KITCHEN	4200.00 1.25 5250.00 0.00 0.00 0.00		A B			34250.00 33446.00	285.42 278.72	A-B: 97.7 B-A: 97.7
PROCESS RECEPTACLES RECEPTACLES	18600.00 1.00 18600.00 10000.00 1.00 10000.00 9380.00 0.50 4690.00		<u>С</u> ТОТАІ			67696.00		97.7
MECH HEATING MECH COOLING	2400.00 1.00 2400.00 0.00 1.00 0.00		TOTAL	./ AVERA	·OL	57550.00	202.07	31.1
MECH YEAR ROUND APPLIANCE	12436.00 1.00 12436.00 0.00 1.00 0.00		NOTES:					
MISCELLANEOUS MOTOR	0.00 1.00 0.00 8000.00 1.00 12000.00		1. TH	E LARC	GEST COI	NNECTED MO	TOR LOAD IS INCLUDED	IN MECHANICAL, PROCESS, OR MOTOR LOADS
SPARE LARGEST MOTOR ¹	1600.00 1.00 1600.00 ABOVE 0.25 2520.00							
TOTAL	67696.00 65496.00							





ELECTRICAL SYMBOLS

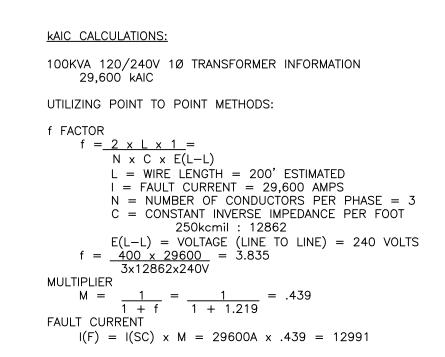
DUPLEX RECEPTACLE

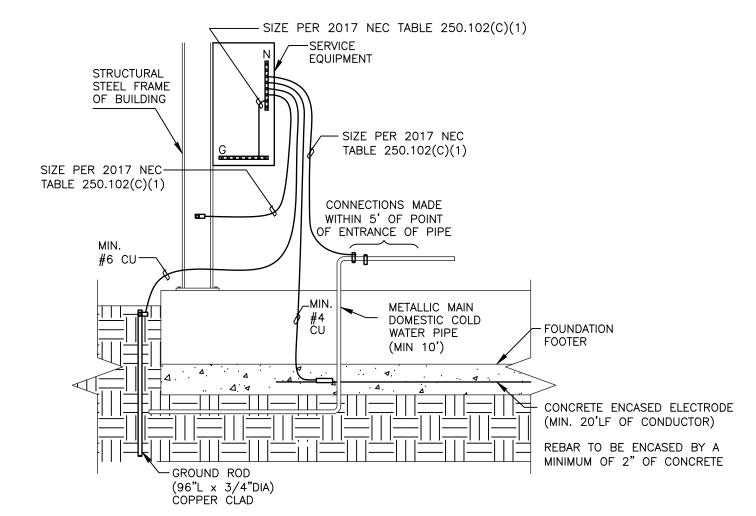


ONE-LINE DIAGRAM

NOT TO SCALE

PROVIDE GROUNDING AND LABELING PER NEC REQUIREMENTS PROVIDE A #6 COPPER CONDUCTOR TO A 10' BY 5/8" DRIVEN ROD.





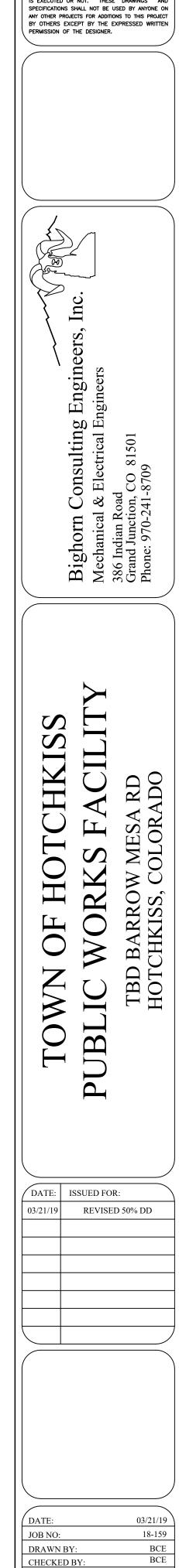
GROUNDING ELECTRODE SYSTEM DETAIL

SCALE: NOT TO SCALE

NOTES:

1. SEE ONE LINE DIAGRAM FOR GROUNDING CONDUCTOR SIZES REQUIRED.

2. PROVIDE A MINIMUM OF TWO SEPARATE GROUND SOURCES, U.O.N. ON ONE LINE DIAGRAM. 3. CADWELD ALL ENCASED GROUND CONNECTIONS



SCALE:

SHEET NUMBER:

AS SHOWN

DO NOT REPRODUCE THESE DRAWINGS AN SPECIFICATIONS WITHOUT THE EXPRESSED WRITTEN
PERMISSION OF THE DESIGNER. THE DRAWINGS AND SPECIFICATIONS ARE INSTRUMENTS OF THE SERVICE AND SHALL REMAIN THE PROPERTY OF THE DESIGNER WHETHER THE PROJECT FOR WHICH THEY ARE MADE IS EXECUTED OR NOT. THESE DRAWINGS AND

SECTION 16010

THE GENERAL CONTRACTOR.

- A. THE ARCHITECTURAL GENERAL AND SPECIAL CONDITIONS FOR THE CONSTRUCTION OF THIS PROJECT SHALL BE A PART OF THE ELECTRICAL SPECIFICATIONS. THE ELECTRICAL CONTRACTOR SHALL EXAMINE THE GENERAL AND SPECIAL CONDITIONS BEFORE SUBMITTING
- B. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK INCLUDED IN THIS SECTION AND THE DELEGATION OF WORK TO THE ELECTRICAL CONTRACTOR. SHALL NOT RELIEVE HIM OF THIS RESPONSIBILITY. THE ELECTRICAL CONTRACTOR AND HIS SUBCONTRACTORS WHO PERFORM WORK UNDER THIS SECTION SHALL BE RESPONSIBLE TO
- C. WHERE ITEMS OF THE GENERAL CONDITIONS OR OF THE SPECIAL CONDITIONS ARE REPEATED IN THIS SECTION OF THE SPECIFICATIONS, IT IS INTENDED TO RE-ENFORCE OR QUALIFY THEM; IT IS NOT INTENDED THAT ANY OTHER PARTS OF THE GENERAL CONDITIONS OR SPECIAL CONDITIONS SHALL BE ASSUMED TO BE OMITTED IF NOT REPEATED HEREIN. D. THE NAMING OF A CERTAIN BRAND OR MAKE OR MANUFACTURER IN THE SPECIFICATIONS IS TO ESTABLISH A QUALITY STANDARD FOR THE ARTICLE DESIRED. THE CONTRACTOR IS NOT RESTRICTED TO THE USE OF THE SPECIFIC BRAND OF THE MANUFACTURER NAMED UNLESS SO
- INDICATED IN THE SPECIFICATIONS. E. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND PRESENT FIVE (5) COPIES OF SHOP DRAWINGS OR BROCHURES FOR ALL FIXTURES, EQUIPMENT, AND ACCESSORIES TO THE ENGINEER FOR THE ENGINEER'S APPROVAL. CHECKING IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE SHOWN IS SUBJECT TO THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR: DIMENSIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE; FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATION OF HIS WORK WITH THAT OF ALL OTHER TRADES AND THE SATISFACTORY PERFORMANCE OF HIS WORK. F. THE ELECTRICAL CONTRACTOR SHALL EXAMINE DRAWINGS RELATING TO WORK OF ALL TRADES AND BECOME FULLY INFORMED AS TO EXTENT AND CHARACTER OF WORK REQUIRED AND ITS
- RELATION TO ALL OTHER WORK IN THE PROJECT G.BEFORE SUBMITTING A BID, THE CONTRACTOR SHALL VISIT THE SITE AND EXAMINE ALL ADJOINING EXISTING BUILDINGS, EQUIPMENT AND SPACE CONDITIONS ON WHICH HIS WORK IS IN ANY WAY DEPENDENT FOR THE BEST WORKMANSHIP AND OPERATION ACCORDING TO THE INTENT OF SPECIFICATIONS AND DRAWINGS. HE SHALL REPORT TO THE ARCHITECT ANY CONDITION WHICH MIGHT PREVENT HIM FROM INSTALLING HIS EQUIPMENT IN THE MANNER
- H.NO CONSIDERATION OR ALLOWANCE WILL BE GRANTED FOR FAILURE TO VISIT SITE, OR FOR ANY ALLEGED MISUNDERSTANDING OF MATERIALS TO BE FURNISHED OR WORK TO BE DONE. I. EXISTING CONDUITS, PIPES, EQUIPMENT, ETC.: REFER TO DIVISION I FOR ADDITIONAL REQUIREMENTS. EXISTING CONDUITS, PIPES, UTILITY LINES, TANKS, EQUIPMENT, OR OTHER OBSTRUCTIONS, WHETHER UNDERGROUND, CONCEALED, OR EXPOSED, ARE NOT IN GENERAL INDICATED ON DRAWINGS. PRIOR TO START OF WORK, HAVE EXISTING UTILITY OBSTRUCTIONS CLEARLY MARKED BY UTILITIES LOCATOR SERVICE. PLAN WORK SO AS TO ROUTE AND LOCATE ALL NEW WORK TO AVOID THESE OBSTRUCTIONS. REPAIR OR REPLACE, AT NO COST TO OWNER, EXISTING INSTALLATIONS WHERE DAMAGED, THAT OCCURRED DURING THE COURSE OF CONSTRUCTION.

END OF SECTION 16010

ELECTRICAL DRAWINGS AND REFERENCE SYMBOLS

- A. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERALLY THE LOCATIONS OF MATERIAL AND EQUIPMENT. THESE DRAWINGS SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE. THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE WORK UNDER THIS SECTION WITH THE ARCHITECTURAL, STRUCTURAL, PLUMBING, HEATING AND AIR CONDITIONING, AND THE DRAWINGS OF OTHER TRADES FOR EXACT DIMENSIONS, CLEARANCES AND ROUGHING-IN LOCATIONS: THIS CONTRACTOR SHALL COOPERATE WITH ALL OTHER TRADES IN ORDER TO MAKE MINOR FIELD ADJUSTMENTS TO ACCOMMODATE THE WORK OF OTHERS. DO NOT RELY ON THE SCALE OF THE DRAWINGS FOR ROUGH-IN MEASUREMENTS, NOR USE THEM AS SHOP
- B. THE DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY, EACH TO THE OTHER, AND THE WORK REQUIRED BY EITHER SHALL BE INCLUDED IN THE CONTRACT AS IF CALLED FOR BY BOTH. C.IF DIRECTED BY THE ARCHITECT, THE CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF OTHER TRADES OR FOR PROPER EXECUTION OF THE WORK D.ELECTRICAL SYMBOLS USED ON THIS PROJECT ARE SHOWN IN A SYMBOL LIST ON THE
- ACCOMPANYING WORKING DRAWINGS. THIS LIST SHOWS STANDARD SYMBOLS AND ALL MAY NOT APPEAR ON THE PROJECT DRAWINGS; HOWEVER, WHEREVER THE SYMBOL ON PROJECT DRAWINGS OCCURS, THE ITEM SHALL BE PROVIDED AND INSTALLED. END OF SECTION 16015

SECTION 16020

A. THE SCOPE OF THE WORK CONSISTS OF ELECTRICAL INSTALLATION AND MODIFICATION AT THE HOTCHKISS SHOP, THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: INSTALLATION OF ELECTRICAL DISTRIBUTION; AND OTHER ITEMS AS CALLED OUT ON THE DRAWINGS FOR THE AREAS OF WORK.THIS WORK WILL ALSO INCLUDE: ELECTRICAL DISTRIBUTION INSTALLATION; POWERING OF MECHANICAL EQUIPMENT: AND OTHER ITEMS AS CALLED OUT ON THE DRAWINGS FOR THE CONSTRUCTION. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL SUPERVISION, LABOR, MATERIALS, EQUIPMENT, MACHINERY, AND ANY AND ALL OTHER ITEMS NECESSARY TO COMPLETE THE SYSTEMS. THE ELECTRICAL CONTRACTOR SHALL NOTE THAT ALL ITEMS OF EQUIPMENT ARE SPECIFIED IN THE SINGULAR: HOWEVER. THE CONTRACTOR SHALL PROVIDE AND INSTALL THE NUMBER OF ITEMS OF EQUIPMENT AS INDICATED ON THE DRAWINGS AND AS REQUIRED FOR COMPLETE SYSTEMS. B.IT IS THE INTENTION OF THE SPECIFICATIONS AND DRAWINGS TO CALL FOR FINISHED WORK,

TESTED AND READY FOR OPERATION. C. ANY APPARATUS, APPLIANCE, MATERIAL OR WORK NOT SHOWN ON DRAWINGS BUT MENTIONED IN THE SPECIFICATIONS, OR VICE VERSA, OR ANY INCIDENTAL ACCESSORIES NECESSARY TO MAKE THE WORK COMPLETE AND PERFECT IN ALL RESPECTS AND READY FOR OPERATION. EVEN IF NOT PARTICULARLY SPECIFIED, SHALL BE FURNISHED, DELIVERED AND INSTALLED BY THE CONTRACTOR WITHOUT ADDITIONAL EXPENSE TO THE OWNER. WITH SUBMISSION OF BID. THE ELECTRICAL CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE ARCHITECT: ANY MATERIALS OR APPARATUS BELIEVED INADEQUATE OR UNSUITABLE, IN VIOLATION OF LAWS, ORDINANCES OR RULES: ANY NECESSARY ITEMS OR WORK OMITTED. IN THE ABSENCE OF SLICH WRITTEN NOTICE, IT IS MUTUALLY AGREED THE CONTRACTOR HAS INCLUDED THE COST OF ALL REQUIRED ITEMS IN HIS PROPOSAL, AND THAT HE WILL BE RESPONSIBLE FOR THE APPROVED SATISFACTORY FUNCTIONING OF THE ENTIRE SYSTEM WITHOUT EXTRA COMPENSATION.

END OF SECTION 16020

SECTION 16030

CODES AND FEES

- A. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH ALL APPLICABLE CODES, SPECIFICATIONS, LOCAL ORDINANCES, INDUSTRY STANDARDS. UTILITY COMPANY AND FIRE INSURANCE CARRIER'S REQUIREMENTS. CONTACT PROPER AUTHORITIES, OBTAIN AND PAY FOR REQUIRED PERMITS, INSPECTIONS AND UTILITY SERVICE CONNECTIONS. DO NOT INCLUDE ANY UTILITY COMPANY CHARGES THAT CAN BE BILLED DIRECTLY TO THE OWNER. B. IN CASE OF DIFFERENCE BETWEEN THE BUILDING CODES, SPECIFICATIONS, STATE LAWS, LOCAL ORDINANCES, INDUSTRY STANDARDS, UTILITY COMPANY REGULATIONS, FIRE INSURANCE CARRIER'S REQUIREMENTS, AND THE CONTRACT DOCUMENTS, THE MOST STRINGENT SHALL GOVERN. THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ARCHITECT IN WRITING OF ANY
- SUCH DIFFERENCE C.NONCOMPLIANCE: SHOULD THE CONTRACTOR PERFORM ANY WORK THAT DOES NOT COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE BUILDING CODES, STATE LAWS, LOCAL ORDINANCES, INDUSTRY STANDARDS, FIRE INSURANCE CARRIER'S REQUIREMENTS, AND UTILITY COMPANY REGULATIONS, HE SHALL BEAR THE COST ARISING IN CORRECTING ANY SUCH

DEFICIENCY. END OF SECTION 16030

SECTION 16100 BASIC METHODS AND MATERIALS

SECTION 16101 GENERAL

- A.PROTECTION: ALL WORK, MATERIALS AND EQUIPMENT SHALL BE COMPLETELY AND ADEQUATELY PROTECTED AT ALL TIMES. PAY FOR ALL DAMAGE, INJURY OR LOSS, EXCEPT SUCH AS MAY BE DIRECTLY DUE TO ERRORS IN THE CONTRACT DOCUMENTS OR BE CAUSED BY AGENTS OR EMPLOYEES OF THE OWNER. POST EFFECTIVE DANGER SIGNS WARNING AGAINST HAZARDS CREATED BY THE WORK.
- B. TRENCHING AND BACKFILLING: PERFORM ALL TRENCHING AND BACKFILL REQUIRED BY WORK UNDER THIS DIVISION OF THE SPECIFICATIONS. TRENCHING AND BACKFILLING SHALL BE DONE IN ACCORDANCE WITH THE "SITE WORK" DIVISION OF THE SPECIFICATIONS AND AS HEREIN SPECIFIED. THIS PORTION OF THE WORK SHALL BE EXECUTED UNDER THE DIRECT SUPERVISION OF THE GENERAL CONTRACTOR. TRENCHES SHALL BE EXCAVATED TO THE B. ALL JOINTS OR SPLICES FOR #10 AWG OR SMALLER SHALL BE MADE WITH UL APPROVED WIRE DEPTH REQUIRED FOR THE UTILITIES INVOLVED. THE TRENCH BOTTOM SHALL BE GRADED TRUE AND FREE FROM DEBRIS, STONES AND SOFT SPOTS. WHERE DIRECT BURIAL CABLES ARE USED FOUR INCHES OF FINE SAND SHALL BE PLACED IN THE BOTTOM OF THE TRENCH PRIOR TO
- CABLE PLACEMENT C.EQUIPMENT, MATERIALS, INSTALLATION;
- 1. ALL EQUIPMENT, ACCESSORIES AND SPECIALTIES CONNECTED TO EQUIPMENT AND ALL ITEMS OF MATERIAL SHALL BE INSTALLED AS RECOMMENDED BY THEIR MANUFACTURERS UNLESS SPECIFICALLY STATED OTHERWISE
- 2. PROVIDE PROPER SUPPORTS, MOUNTS, ETC., AS REQUIRED. 3 COORDINATE WITH THE GENERAL CONTRACTOR.
- 4. OBTAIN INSTRUCTIONS FROM THE ARCHITECT FOR INSTALLATION OF ITEMS NOT COMPLETELY COVERED BY CONTRACT DOCUMENTS OR PUBLISHED MANUFACTURER'S RECOMMENDATIONS. D.EQUIPMENT FINISH: ALL ELECTRICAL EQUIPMENT SHALL BE FURNISHED FACTORY PAINTED OR FINISHED WITH TWO COATS OF HIGH GRADE ENAMEL AND IN THE MANUFACTURER'S STANDARD COLORS UNLESS OTHERWISE SPECIFIED.

- 1. UNPAINTED EQUIPMENT AND MATERIALS, EXCEPT CONDUIT IN CONCEALED SPACES, SHALL BE CLEANED AND PRIMED TO BE PAINTED BY THE PAINTING CONTRACTOR IN ACCORDANCE WITH
- THE PAINTING SECTION OF THESE SPECIFICATIONS. 2. THE COLORS OF ALL EXPOSED ELECTRICAL MATERIAL AND APPARATUS SHALL BE AS SELECTED BY THE OWNER.
- E. CHASES, SLEEVES, CUTTING, PATCHING 1. PROVIDE FOR NECESSARY CHASES, HOLES, SLEEVES, BOXES, INSERTS AND HANGERS BY ARRANGEMENT WITH CONTRACTORS OF THE OTHER APPROPRIATE TRADES. PROVIDE "FLAMESEAL" OR OF THE APPROVED FIRESTOPPING MATERIAL AT ALL PENETRATIONS THROUGH RATED WALLS, FLOORS AND CEILINGS.
- 2. PROVIDE FOR ALL CUTTING AND PATCHING OF HOLES, OPENINGS, AND NOTCHES. OBTAIN WRITTEN APPROVAL OF THE ARCHITECT BEFORE NOTCHING, BORING, CHIPPING, BURNING, DRILLING, WELDING TO STRUCTURAL MEMBERS.
- 1. ALL WORK AND MATERIALS COVERED BY DRAWINGS AND SPECIFICATIONS SHALL BE SUBJECT TO INSPECTION AT ANY AND ALL TIMES BY REPRESENTATIVES OF THE ARCHITECT AND OWNER. IF ANY MATERIAL OR INSTALLATION DOES NOT CONFORM TO THE DRAWINGS AND SPECIFICATIONS, WITHIN THREE DAYS AFTER BEING NOTIFIED BY THE ARCHITECT, REMOVE THE MATERIALS FROM THE PREMISES AND CORRECT THE INSTALLATION TO THE SATISFACTION OF THE ARCHITECT. ASSUME THE ENTIRE COST OF REMOVING AND REPLACING SECTION 16133 THE MATERIAL AND CORRECTING THE INSTALLATION, INCLUDING CUTTING AND PATCHING
- THAT MAY BE NECESSARY 2. WORK SHALL NOT BE CLOSED IN NOR COVERED BEFORE INSPECTION AND APPROVAL BY THE ARCHITECT. PROVIDE FOR UNCOVERING AND MAKING REPAIRS, AT NO EXTRA COST, WHEN UNINSPECTED WORK HAS BEEN CLOSED IN. NOTIFY THE ARCHITECT WHEN WORK IS READY FOR INSPECTION
- 3. NOTIFY PROPER AUTHORITIES WHEN WORK IS READY FOR ANY INSPECTIONS REQUIRED BY APPLICABLE CODES. RULES AND REGULATIONS. ALLOWING SUFFICIENT TIME FOR INSPECTIONS TO BE MADE WITHOUT HINDERING PROGRESS OF THE WORK, AND FURNISH THE OWNER, WITHOUT ADDITIONAL COSTS, PROPER CERTIFICATES OF ACCEPTANCE FROM SUCH
- AUTHORITIES. 4. UPON COMPLETION OF ALL WORK AND ADJUSTMENT OF ALL EQUIPMENT, FINAL INSPECTION SHALL BE MADE UNDER DIRECTION OF THE ARCHITECT. TEST AND OPERATE ALL DEVICES, EQUIPMENT AND SYSTEMS TO DEMONSTRATE THAT THE ELECTRICAL SYSTEM IS COMPLETE AND FUNCTIONAL IN THE MANNER REQUIRED.
- 1. DURING THE COURSE OF THE WORK REMOVE ANY MATERIALS NOT INSTALLED IN THE WORK WHICH CONFLICT WITH THE WORK OF OTHERS IF SO DIRECTED BY THE ARCHITECT. 2. AT COMPLETION OF WORK CLEAN UP AND REMOVE FROM THE PREMISES ALL DEBRIS AND MATERIALS NOT INSTALLED IN THE WORK SO THE PREMISES WILL BE LEFT CLEAN. WASH AND WIPE CLEAN ALL LIGHTING FIXTURES AND LAMPS WHICH MAY HAVE BECOME SOILED DURING INSTALLATION.
- H.RECORD DRAWINGS: AT COMPLETION OF THE WORK FURNISH TO THE ARCHITECT TWO COMPLETE SETS OF ELECTRICAL PRINTS MARKED TO SHOW THE WORK "AS-BUILT". . MAINTENANCE AND OPERATING PROCEDURES: UPON COMPLETION OF ALL WORK AND ADJUSTMENT OF ALL EQUIPMENT, INSTRUCT THE OWNER ON THE CORRECT OPERATION AND MAINTENANCE PROCEDURE FOR THE ELECTRICAL SYSTEM IN TOTAL. FURNISH 3 SETS OF TYPED MAINTENANCE MANUALS CONTAINING CUT SHEETS ON ALL EQUIPMENT, TABLES OF FUSES AND FOR WHAT EQUIPMENT, TABLE OF LAMPS AND BALLASTS AND FOR WHAT FIXTURES. INCLUDE A LIST OF CONTACTS WITH PHONE NUMBERS FOR ALL SYSTEMS FOR OWNERS' USE, IN THE EVENT THE ELECTRICAL SYSTEM REQUIRES SERVICE WORK WITHIN THE WARRANTY PERIOD. J. GUARANTEE: GUARANTEE THAT ALL WORK GOVERNED BY THIS DIVISION SHALL BE NEW AND FREE OF DEFECTIVE WORK, MATERIALS, AND COMPONENTS FOR A PERIOD OF ONE YEAR AFTER WRITTEN ACCEPTANCE. REPAIR, REVISE AND REPLACE DEFECTS AS DIRECTED, WITH NO ADDITIONAL COST TO THE OWNER. (INCANDESCENT LAMPS, FUSES AND ANY EXISTING EQUIPMENT ARE EXEMPT). END OF SECTION 16101

G.CI FAN UP

- A.PVC CONDUIT SHALL BE USED FOR ALL UNDERGROUND FEEDERS AND BRANCH CIRCUITS UNLESS OTHERWISE DIRECTED ON PLANS OR AS APPROVED BY NEC. ALL CONDUIT SHALL BE UL
- THE NEC, INCLUDING PROVISION FOR GREEN EQUIPMENT GROUNDING CONDUCTOR USING 3/4 INCH MINIMUM CONDUIT. THE USE OF 1/2 INCH CONDUIT ELSEWHERE MAY BE APPROVED IF CONDITIONS WARRANT C.SPECIAL CONDUIT FITTINGS SHALL BE APPROPRIATE FOR EACH APPLICATION AND SHALL BE

B. CONDUIT SIZES SHALL BE AS INDICATED ON THE DRAWINGS, OR MINIMUM IN ACCORDANCE WITH

- MANUFACTURED BY T & B OR APPROVED EQUAL. D. CONDUIT SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE
- NEC AND SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER. E. THE ENTIRE CONDUIT SYSTEM SHALL BE INSTALLED TO PROVIDE A CONTINUOUS BOND
- F. ELECTRICAL METALLIC TUBING (EMT) MAY BE USED FOR BRANCH CIRCUITS AND RACEWAYS OTHER THAN FOR SERVICE ENTRANCE AND MAIN FEEDERS UNLESS PROHIBITED BY THE NEC OR LOCAL ORDINANCES. EMT SHALL BE UL APPROVED, GALVANIZED INSIDE AND OUTSIDE, COMPLYING WITH ANSI C-80.3 FOR ZINC COATED EMT WITH FITTINGS OF THE SAME TYPE MATERIAL AND FINISH, OF THE PRESSURE CONNECTED TYPE FOR EXTERIOR INSTALLATION AND OF THE SET SCREW TYPE FOR INTERIOR INSTALLATION.
- G.ALL CONDUIT JOINTS SHALL BE CUT SQUARE, REAMED SMOOTH, AND DRAWN UP TIGHT. BENDS OR OFFSETS SHALL BE MADE WITH AN APPROVED BENDER OR HICKEY, OR HUB-TYPE CONDUIT FITTINGS. NUMBER OF BENDS PER RUN SHALL CONFORM TO THE NEC LIMITATIONS. H. CONCEALED CONDUITS SHALL BE RUN IN A DIRECT LINE WITH LONG SWEEP BENDS AND OFFSETS. EXPOSED CONDUITS SHALL BE PARALLEL TO AND AT RIGHT ANGLES TO BUILDING
- LINES, USING CONDUIT FITTINGS FOR ALL TURNS AND OFFSETS. TRANSITIONS BETWEEN NONMETALLIC CONDUITS AND CONDUITS OF OTHER MATERIALS SHALL BE MADE WITH THE MANUFACTURER'S STANDARD ADAPTERS DESIGNED FOR SUCH PURPOSE. J. EXPOSED CONDUITS SHALL BE SECURELY FASTENED IN PLACE ON MAXIMUM 10 FOOT INTERVALS; AND HANGERS, SUPPORTS OR FASTENERS SHALL BE PROVIDED AT EACH ELBOW AND AT THE END OF EACH STRAIGHT RUN TERMINATING AT A BOX OR CABINET. END OF SECTION 16111

SECTION 16120

- WIRES AND CABLES A. WIRE AND CABLE SHALL MEET ALL STANDARDS AND SPECIFICATIONS APPLICABLE, AND SHALL BE IN CONFORMANCE WITH THE LATEST EDITION OF THE NEC. INSULATED WIRE AND CABLE SHALL HAVE SIZE, TYPE OF INSULATION, VOLTAGE AND MANUFACTURER'S NAME PERMANENTLY MARKED ON OUTER COVERING AT REGULAR INTERVALS NOT EXCEEDING FOUR FEET. WIRE AND CABLE SHALL BE DELIVERED IN COMPLETE COILS OR REELS WITH IDENTIFYING TAGS, STATING
- B. WIRE AND CABLE SHALL BE SUITABLY PROTECTED FROM WEATHER AND OTHER DAMAGE DURING STORAGE AND HANDLING, AND SHALL BE IN FIRST CLASS CONDITION AFTER
- C. WIRE AND CABLE SHALL BE FACTORY COLOR CODED WITH A SEPARATE COLOR FOR EACH PHASE AND NEUTRAL USED CONSISTENTLY THROUGHOUT THE SYSTEM. COLOR CODING SHALL BE AS REQUIRED BY THE NEC. D. ALL CONDUCTORS SHALL BE RATED 600 VOLTS, UNLESS OTHERWISE SPECIFIED OR SHOWN ON
- THE DRAWINGS, OR FOR ELECTRONIC OR COMMUNICATION USE. E. WIRE AND CABLE FOR VARIOUS APPLICATIONS SHALL BE AS FOLLOWS UNLESS OTHERWISE DESIGNATED: WIRE #10 AND SMALLER SHALL BE SOLID; WIRE #8 AND LARGER SHALL BE STRANDED.
- 2. #12 THRU #6 DRY LOCATIONS: TYPE THHN, 90 DEGREES C. 3. #12 THRU #6 IN SLABS, UNDERGROUND, OR WET LOCATIONS: TYPE THWN OR TYPE XHHW, 75 DEGREES C
- 4. #4 AND LARGER: TYPE XHHW OR TYPE THWN 75 DEGREES C. F. WIRE AND CABLE SHALL BE AS MANUFACTURED BY GENERAL ELECTRIC, ANACONDA WIRE & CABLE, ROME CABLE, TRIANGLE CONDUIT & CABLE, OR APPROVED EQUAL. SUBSTITUTION OF
- WIRE AND CABLE MANUFACTURER SHALL BE ONLY WITH THE APPROVAL OF THE ARCHITECT/ENGINEER. G.FOR ANY SPECIFIC USE NOT COVERED HERE ABOVE, COMPLY WITH THE NEC IN CONDUCTOR
- H. ALL CIRCUITS SHALL BE 2#12 CU + G CU UNLESS OTHERWISE NOTED ON DRAWINGS OR IN
- I. ALL 15 AND 20 AMP CIRCUITS WITH LENGTHS OVER 150 FT. SHALL HAVE THEIR CONDUCTOR SIZE INCREASED TO #10 FOR VOLTAGE DROP. J. COMMUNICATION CABLING, OUTLETS AND GEAR TO MEET CAT 6A REQUIREMENTS. END OF SECTION 16120

SECTION 16125

SCHEDULES.

- SECTION 16121 WIRE CONNECTIONS A. JOINTS ON BRANCH CIRCUITS SHALL OCCUR ONLY WHERE SUCH CIRCUIT DIVIDE AS INDICATED ON PLANS AND SHALL CONSIST OF ONE THROUGH CIRCUIT TO WHICH SHALL BE SPLICED THE BRANCH FROM THE CIRCUIT. IN NO CASE SHALL JOINTS IN BRANCH CIRCUITS BE LEFT FOR THE FIXTURE HANGER TO MAKE. NO SPLICES SHALL BE MADE IN CONDUCTOR EXCEPT AT OUTLET BOXES, JUNCTION BOXES, OR SPLICE BOXES.
- NUTS OR COMPRESSION TYPE CONNECTORS. C. ALL JOINTS OR SPLICES FOR #8 AWG OR LARGER SHALL BE MADE WITH A MECHANICAL COMPRESSION CONNECTOR. AFTER THE CONDUCTORS HAVE BEEN MADE MECHANICALLY AND ELECTRICALLY SECURE, THE ENTIRE JOINT OR SPLICE SHALL BE COVERED WITH SCOTCH #33 TAPE OR APPROVED EQUAL TO MAKE THE INSULATION OF THE JOINT OR SPLICE EQUAL TO THE

INSULATION OF THE CONDUCTORS. THE CONNECTOR SHALL BE UL APPROVED. END OF SECTION 16121

- **PULLING CABLES** AND WORKMANLIKE MANNER. ALL EMPTY CONDUITS SHALL HAVE A #14 GALVANIZED PULL WIRE OR NYLON PULLCORD LEFT IN PLACE FOR FUTURE USE.
- B. CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH THE NEC. MAINS, FEEDERS. SUBFEEDERS SHALL BE TAGGED IN ALL PULL, JUNCTION, AND OUTLET BOXES AND IN THE

- GUTTER OF PANELS WITH APPROVED CODE TYPE WIRE MARKERS. C.NO LUBRICANT OTHER THAN POWDERED SOAPSTONE OR APPROVED PULLING COMPOUND MAY
- BE USED TO PULL CONDUCTORS. D. AT LEAST EIGHT (8) INCHES OF SLACK WIRE SHALL BE LEFT IN EVERY OUTLET BOX WHETHER IT BE IN USE OR LEFT FOR FUTURE USE.
- E. ALL CONDUCTORS AND CONNECTIONS SHALL TEST FREE OF GROUNDS, SHORTS AND OPENS BEFORE TURNING THE JOB OVER TO THE OWNER. F. PULL BOXES SHALL BE REQUIRED IN RUNS OVER 100 FEET OR WHEN
- MORE THAN THREE 90-DEGREE BENDS ARE USED, OR AS INDICATED ON THE DRAWINGS. G.FEEDERS ARE TO BE RUN ABOVE GROUND TO ALL POWER PANELS AND LIGHTING PANELS, UNLESS INDICATED OTHERWISE ON DRAWINGS. H. WHERE MOTORS HAVE CONDUIT TERMINAL BOXES, FEEDERS SHALL BE CONNECTED TO SAME
- I. ALL MOTORS WITH SLIDING BASE MOUNTINGS SHALL HAVE NOT LESS THAN 18 INCHES NOR MORE THAN 6 FEET OF CONDUIT CONNECTING RIGID CONDUIT FEED TO MOTOR TERMINAL BOX. J. CONDUCTOR SPLICES SHALL BE MADE ONLY IN JUNCTION BOXES, TERMINAL BOXES, OR PULL

END OF SECTION 16125

END OF SECTION 16133

BY STEEL CITY OR APPROVED EQUAL

OUTLET BOXES

ALL OUTLET BOXES FOR CONCEALED WIRING SHALL BE SHEET METAL A. GALVANIZED OR CADMIUM PLATED, AT LEAST 1 INCHES DEEP, SINGLE OR GANGED, OF SIZE TO ACCOMMODATE DEVICES AND NUMBER OF CONDUCTORS NOTED. BOXES SHALL BE EQUIPPED WITH PLASTER RING OR COVER AS NECESSARY. ALL OUTLET BOXES SHALL BE MANUFACTURED

B. BOXES FOR EXPOSED WIRING SHALL BE MALLEABLE IRON, CADMIUM FINISH, OR CAST ALUMINUM ALLOY, AS MANUFACTURED BY STEEL CITY, AND SHALL NOT BE LESS THAN 4 INCHES SQUARE BY SECTION 16471 1 INCHES DEEP UNLESS OTHERWISE NOTED. C.FIXTURE OUTLET BOXES SHALL BE MINIMUM 4 INCH OCTAGONAL AND, WHERE REQUIRED AS OUTLET AND JUNCTION BOXES, THEY SHALL BE 4 11/16 INCHES BY 2 1/8 INCHES DEEP.

SECTION 16190

- SUPPORTING DEVICES A. THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL METALLIC SUPPORTS AS REQUIRED FOR THE PROPER INSTALLATION OF RACEWAY SYSTEMS AND ALL OTHER EQUIPMENT INSTALLED UNDER THIS DIVISION OF THE CONTRACT CONFORMING TO THE LATEST EDITION OF
- B. CONDUIT SHALL BE SUPPORTED ON APPROVED TYPES OF WALL BRACKETS, CEILING TRAPEZES, STRAP HANGERS OR PIPE SUPPORTS, SECURED BY MEANS OF TOGGLE BOLTS IN HOLLOW MASONRY WALLS OR UNITS. EXPANSION BOLTS WILL BE USED IN CONCRETE OR BLOCK, MACHINE SCREWS ON METAL SURFACES, AND WOOD SCREWS ON WOOD CONSTRUCTION. C.CONDUIT SHALL BE SECURELY FASTENED TO ALL SHEET METAL OUTLETS. JUNCTION AND PULL BOXES WITH TWO GALVANIZED LOCKNUTS AND BUSHING, CARE BEING TAKEN TO SEE THAT THE FULL NUMBER OF THREADS PROJECT THROUGH TO PERMIT THE BUSHING TO BE DRAWN TIGHT AGAINST THE END OF THE CONDUIT, AFTER WHICH THE LOCKNUTS SHALL BE MADE TIGHT SUFFICIENTLY TO DRAW THEM INTO FIRM ELECTRICAL CONTACT WITH THE OUTLET BOX. INSTALL A PLASTIC BUSHING ON END OF PIPE THREADS PROTRUDING INTO JUNCTION BOXES AND OTHER ENCLOSURES TO PROTECT CABLING.
- D. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SUPPORTS REQUIRED FOR THE ELECTRICAL EQUIPMENT AND CONDUIT. END OF SECTION 16190

SECTION 16195

- ELECTRICAL IDENTIFICATION A. THE ELECTRICAL CONTRACTOR SHALL MAINTAIN ACCURATE RECORDS OF ALL DEVIATIONS IN WORK AS ACTUALLY INSTALLED FROM WORK INDICATED ON THE DRAWINGS. UPON COMPLETION OF THE PROJECT, TWO (2) COMPLETE SETS OF MARKED-UP PRINTS SHALL BE DELIVERED TO THE ARCHITECT.
- B. IDENTIFICATION OF EQUIPMENT 1. PROVIDE AND INSTALL LAMINATED BLACK AND WHITE LAMACOID NAMEPLATES FOR ALL SERVICE SWITCHES, DISTRIBUTION SWITCHES, DISTRIBUTION SWITCHBOARDS, BRANCH CIRCUIT PANELBOARDS, SAFETY SWITCHES, CABINETS, STARTERS, AND OTHER EQUIPMENT WITH THEIR CORRECT DESIGNATION. LABEL EQUIPMENT IN AREAS ACCESSIBLE TO THE PUBLIC ON INSIDE OF ENCLOSURE ONLY. NAMEPLATES SHALL BE FIRMLY SECURED TO FRONT
- COVER OR DOOR WITH TWO PROPERLY SIZED POP RIVETS. 2. MOUNT A TYPEWRITTEN DIRECTORY BEHIND PLASTIC ON THE INSIDE OF EACH BRANCH CIRCUIT PANEL DOOR, GIVING THE NUMBER, DESCRIPTION AND LOCATION OF THE CIRCUIT CONTROLLED BY EACH CIRCUIT BREAKER. REVISE EXISTING DIRECTORIES TO REFLECT CIRCUIT MODIFICATIONS UNDER THIS CONTRACT.
- 3. ALL FUSED SAFETY SWITCHES AND FUSED SWITCH UNITS IN SWITCHBOARDS SHALL INDIVIDUALLY BEAR A FUSE LABEL SHOWING PROPER SIZE AND TYPE OF FUSE TO BE USED. 4. INSTALL WIRING DIAGRAMS ON THE INSIDE COVER OF ALL STARTERS, SWITCHES AND OTHER SUCH EQUIPMENT. SUCH DIAGRAMS SHALL NOT BE HANDWRITTEN.

5. ALL JUNCTION BOXES WITH BLANK COVERS SHALL HAVE CIRCUITS CONTAINED THEREIN IDENTIFIED BY MEANS OF PERMANENT BLACK "MAGIC MARKER" ON THE COVER. END OF SECTION 16195

SECTION 16199 ELECTRONIC EQUIPMENT

- A. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION AND CONNECTION OF A PROPER POWER SUPPLY TO ALL ELECTRONIC EQUIPMENT FURNISHED BY OTHERS. HE SHALL VERIFY ALL VOLTAGE, FREQUENCY, ETC., REQUIREMENTS PRIOR TO ENERGIZING THE CIRCUIT. THOSE INSTALLING THE EQUIPMENT WILL BE RESPONSIBLE FOR THE PROPER OPERATION OF THE EQUIPMENT PROVIDED THE PROPER POWER SUPPLY CIRCUIT IS INSTALLED BY THE ELECTRICAL CONTRACTOR. B. PROVIDE TELEPHONE LINES TO EQUIPMENT CONTROL PANELS WITH MODEM ACCESS.
- COORDINATE WITH MECHANICAL CONTRACTOR. END OF SECTION 16199

SECTION 16400 SERVICE AND DISTRIBUTION

GENERAL

- A. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL RELATED DISTRIBUTION EQUIPMENT AS INDICATED ON THE FLOOR PLAN, DIAGRAMS, SCHEDULES, AND NOTES. ALL EQUIPMENT SHALL BE NEW AND UL LISTED. B. RELATED DOCUMENTS: DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING
- GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATIONS SECTION, APPLY TO WORK OF THIS SECTION. END OF SECTION 16401

SECTION 16440 DISCONNECT SWITCHES

- A. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL SAFETY SWITCHES AS INDICATED ON THE DRAWINGS OR AS REQUIRED. ALL SAFETY SWITCHES SHALL BE UL LISTED.
- 1. THE SWITCHES SHALL BE FUSED SAFETY SWITCHES (FSS) OR NON-FUSED SAFETY SWITCHES (NFSS) AS SHOWN ON THE DRAWINGS OR REQUIRED AND SHALL BE MANUFACTURED BY SIEMENS, SQUARE D, OR APPROVED EQUAL.
- 2. SWITCHES SHALL HAVE A QUICK-MAKE AND QUICK-BREAK OPERATING HANDLE AND MECHANISM WHICH SHALL BE AN INTEGRAL PART OF THE BOX. PADLOCKING PROVISIONS SHALL BE PROVIDED FOR PADLOCKING IN THE OFF POSITION WITH AT LEAST THREE PADLOCKS. SWITCHES SHALL BE HORSEPOWER RATED FOR 250 VOLTS AC OR DC OR 600 VOLTS AC AS REQUIRED. LUGS SHALL BE UL LISTED FOR COPPER AND ALUMINUM CABLE. 3. SWITCHES SHALL BE FURNISHED IN NEMA I GENERAL PURPOSE ENCLOSURES WITH
- KNOCKOUTS UNLESS OTHERWISE NOTED OR REQUIRED. SWITCHES LOCATED ON THE EXTERIOR OF THE BUILDING OR IN "WET" LOCATIONS SHALL HAVE NEMA 3R ENCLOSURES 4. THE SAFETY SWITCHES SHALL BE SECURELY MOUNTED IN ACCORDANCE WITH THE NEC. THE
- CONTRACTOR SHALL PROVIDE ALL MOUNTING MATERIALS AND INSTALL FUSES IN THE FSS. THE FUSES SHALL BE DUAL ELEMENT ON MOTOR CIRCUITS. END OF SECTION 16440

SECTION 16450

- A. THE CONDUIT SYSTEMS AND NEUTRAL CONDUCTOR FOR THE WIRING SYSTEM, AND THE TELEPHONE SYSTEM SHALL BE SECURELY GROUNDED. THE GROUNDS SHALL BE NEC GROUNDS IN EACH CASE.
- B. A GROUND SHALL BE ESTABLISHED AND TESTS CARRIED OUT TO INDICATE THAT SATISFACTORY GROUND HAS BEEN ESTABLISHED IN ACCORDANCE WITH THE NEC. C. WRITTEN RESULTS OF THIS TEST SHALL BE FORWARDED TO THE ENGINEER BEFORE CONNECTION TO THE SERVICE

END OF SECTION 16450

- SECTION 16470 PANELBOARDS A.FURNISH AND INSTALL DISTRIBUTION AND POWER PANELBOARDS AS INDICATED IN THE PANELBOARD SCHEDULE AND WHERE SHOWN ON THE DRAWINGS. PANELBOARDS SHALL BE DEAD-FRONT SAFETY TYPE, EQUIPPED WITH QUICK-MAKE, QUICK-BREAK FUSIBLE BRANCH SWITCHES AND APPROVED FOR SERVICE ENTRANCE. THE ACCEPTABLE MANUFACTURERS OF THE PANELBOARD ARE SIEMENS. SQUARE D. AND GE. PROVIDED THEY ARE FULLY EQUAL TO
- A.INSTALL CONDUCTORS IN ALL RACEWAYS AS REQUIRED, UNLESS OTHERWISE NOTED, IN A NEAT B. ALL FUSIBLE BRANCH SWITCHES SHALL BE QUICK-MAKE, QUICK BREAK, WITH VISIBLE BLADES AND DUAL HORSEPOWER RATINGS SWITCH HANDLES SHALL PHYSICALLY INDICATE ON AND OFF 3) POSITIONS. SUCH HANDLES SHALL ALSO BE ABLE TO ACCEPT THREE PADLOCKS HAVING HEAVY-DUTY INDUSTRIAL TYPE SHACKLES. COVERS SHALL BE INTERLOCKED WITH THE SWITCH HANDLES TO PREVENT OPENING IN THE ON POSITION. A MEANS SHALL BE PROVIDED TO ALLOW

- AUTHORIZED PERSONNEL TO RELEASE THE INTERLOCK FOR INSPECTION PURPOSES WHEN A SWITCH IS ON. A CARDHOLDER, PROVIDING CIRCUIT IDENTIFICATION, SHALL BE MOUNTED ON EACH BRANCH SWITCH. SWITCHES SHALL BE PROVIDED WITH FUSES OR AS NOTED ON THE
- C.PANELBOARD BUS STRUCTURE AND MAIN LUGS OR MAIN SWITCH SHALL HAVE CURRENT RATINGS AS SHOWN ON THE PANELBOARD SCHEDULE. THE BUS STRUCTURE SHALL ACCOMMODATE PLUG-ON OR BOLTED BRANCH SWITCHES AND MOTOR STARTERS AS INDICATED IN THE PANELBOARD SCHEDULE WITHOUT MODIFICATION TO THE BUS ASSEMBLY. PROVIDE
- SOLID NEUTRAL ASSEMBLY (S/N). D. SWITCHES AND PANELBOARD BUS STRUCTURE SHALL SAFELY AND WITHOUT FAILURE WITHSTAND SHORT CIRCUITS ON THE SYSTEMS CAPABLE OF DELIVERING UP TO 100,000
- AMPERES RMS SYMMETRICAL, UNLESS OTHERWISE NOTED. E. PANELBOARD ASSEMBLY SHALL BE ENCLOSED IN A STEEL CABINET. THE RIGIDITY AND GAUGE OF STEEL TO BE AS SPECIFIED IN UL STANDARD FOR CABINETS. THE SIZE OF WIRING GUTTERS SHALL BE IN ACCORDANCE WITH UL STANDARD. CABINETS SHALL BE EQUIPPED WITH A FRONT DOOR AND HAVE FULLY CONCEALED, SELF-ALIGNING TRIM CLAMPS. FRONTS SHALL BE FULL-FINISHED STEEL WITH RUST INHIBITING PRIMER AND BAKED ENAMEL FINISH. F. TERMINALS FOR FEEDER CONDUCTORS TO THE PANELBOARD MAINS AND NEUTRAL SHALL BE SUITABLE FOR THE TYPE OF CONDUCTOR SPECIFIED. TERMINALS FOR BRANCH CIRCUIT WIRING, BOTH BREAKER AND NEUTRAL. SHALL BE SUITABLE FOR THE TYPE OF CONDUCTOR SPECIFIED. G. BEFORE INSTALLING PANELBOARDS CHECK ALL OF THE ARCHITECTURAL DRAWINGS FOR

POSSIBLE CONFLICT OF SPACE AND ADJUST THE LOCATION OF THE PANELBOARD TO PREVENT

SUCH CONFLICT WITH OTHER ITEMS. H. THE PANELBOARDS SHALL BE MOUNTED IN ACCORDANCE WITH THE NEC. THE ELECTRICAL CONTRACTOR SHALL FURNISH ALL MATERIAL FOR MOUNTING THE PANELBOARDS. END OF SECTION 16470

BRANCH CIRCUIT PANELBOARD

- A.POWER AND LIGHTING PANELS SHALL BE OF THE DEAD-FRONT, SAFETY TYPE, WITH THERMAL MAGNETIC, QUICK-MAKE, QUICK-BREAK, TRIP FREE, BOLTED-TYPE MOLDED CASE CIRCUIT BREAKERS. VOLTAGE RATINGS, NUMBER OF POLES, FRAME SIZE, TRIP RATINGS, MAIN BREAKER OR LUGS. NEUTRAL BUS, AND GROUND BUS ARE ALL AS SHOWN ON THE DRAWINGS. BUS BARS SHALL BE RECTANGULAR, SOLID COPPER, SECURELY MOUNTED AND BRACED. ALL CONNECTIONS TO BUS BARS SHALL BE SECURELY BOLTED. CABINET BOXES SHALL BE CONSTRUCTED OF CODE GRADE GALVANIZED STEEL. SIZED TO PROVIDE MINIMUM 4-INCH WIDE WIRING GUTTERS ON SIDES, TOP AND BOTTOM. FRONTS SHALL BE CONSTRUCTED OF CODE GRADE STEEL, ADJUSTABLE INDICATING TRIM CLAMPS AND WITH DOOR PROVIDED WITH CONCEALED HINGES AND CYLINDER TYPE LOCK AND CATCH. TWO KEYS PER PANEL SHALL BE FURNISHED, AND ALL LOCKS KEYED ALIKE. FRONT SHALL BE FINISH PAINTED BLUE-GRAY. B. POWER PANELS SHALL BE SIEMENS, TYPE S1, S2, S3, SE, OR ENGINEER APPROVED EQUAL, WITH BRANCH BREAKERS, MAIN BREAKERS OR LUGS, NEUTRAL AND GROUND BUSES, ETC., ALL AS
- C. POWER AND LIGHTING PANEL CONSTRUCTION DETAILS SHALL BE IN ACCORDANCE WITH UL STANDARDS AND SHALL CONFORM TO NEMA STANDARDS. THEY SHALL BEAR THE UL LABEL PANELS SHALL MEET FEDERAL SPECIFICATIONS W-P-115A, TYPE 1, CLASS I. D. ALL PANEL DIRECTORIES SHALL BE TYPED AND TERMINOLOGY APPROVED BY THE OWNER.

END OF SECTION 16471

- OVERCURRENT PROTECTIVE DEVICES A. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL WHERE INDICATED ON THE DRAWINGS OR AS REQUIRED BY THE NEC MOLDED CASE CIRCUIT BREAKERS IN A NEMA TYPE 1 ENCLOSURE. BREAKERS SHALL BE MANUALLY OPERATED, TRIP-FREE AND DESIGNED SO THAT ALL POLES OPEN SIMULTANEOUSLY. TRIPPING MECHANISM SHALL BE (THERMALLY, MAGNETICALLY) OPERATED, SHALL OPEN INSTANTANEOUSLY ON SHORT CIRCUITS AND HAVE TIME DELAY ON OVERLOADS, AND HAVE EFFECTIVE SCALING AGAINST TAMPERING. BREAKERS SHALL BE AS CALLED FOR ON THE DRAWINGS OR IN THE PANELBOARD SCHEDULE AND AS
- MANUFACTURED BY SIEMENS, SQUARE D, OR APPROVED EQUAL B. FUSES. UNLESS INDICATED OTHERWISE, SHALL BE DUAL ELEMENT, TIME LAG, CARTRIDGE TYPE AS MANUFACTURED BY BUSSMAN. FUSES FOR MOTOR CIRCUITS SHALL BE SIZED IN ACCORDANCE WITH THE NEC. LABELS INDICATING THE SIZE AND TYPE OF REPLACEMENT FUSES SHALL BE GLUED TO INSIDE OF DOOR ON ALL FUSIBLE SWITCHES AND PANELBOARDS. C. ALL FUSES SHALL BE OF THE CURRENT AND VOLTAGE RATING AS REQUIRED OR INDICATED. D.SPARES: SPARE FUSES AMOUNTING TO 10% (MINIMUM THREE) OF EACH TYPE AND RATING SHALL BE SUPPLIED BY THE ELECTRICAL CONTRACTOR. THESE SHALL BE TURNED OVER TO THE OWNER UPON PROJECT COMPLETION. END OF SECTION 16475

CONTROLS AND INSTRUMENTATION

- A. ALL EQUIPMENT AND MATERIALS USED IN RELATION TO CONTROL WORK FOR THE PROJECT SHALL BE NEW AND SHALL BEAR THE MANUFACTURER'S NAME AND TRADE NAME. THE EQUIPMENT AND MATERIAL SHALL BE ESSENTIALLY THE STANDARD PRODUCT OF A MANUFACTURER REGULARLY ENGAGED IN THE PRODUCTION OF THE REQUIRED TYPE OF EQUIPMENT AND SHALL BE THE MANUFACTURER'S LATEST APPROVED DESIGN. B. THE ELECTRICAL CONTRACTOR SHALL RECEIVE AND PROPERLY STORE THE EQUIPMENT AN MATERIAL PERTAINING TO THE ELECTRICAL WORK. THE EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT, WATER, CHEMICAL OR MECHANICAL INJURY AND THEFT. THE MANUFACTURER'S DIRECTIONS SHALL BE FOLLOWED COMPLETELY IN THE DELIVERY, STORAGE, PROTECTION AND INSTALLATION OF ALL EQUIPMENT AND MATERIALS C. THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL ITEMS NECESSARY FOR THE COMPLETE INSTALLATION OF THE EQUIPMENT AS RECOMMENDED OR AS REQUIRED BY THE MANUFACTURER OF THE EQUIPMENT OR REQUIRED BY CODE WITHOUT ADDITIONAL COST TO
- THE OWNER, REGARDLESS OF WHETHER THE ITEMS ARE SHOWN ON THE PLANS OR COVERED IN THE SPECIFICATIONS. D.IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO CLEAN THE ELECTRICAL EQUIPMENT, MAKE NECESSARY ADJUSTMENTS AND PLACE THE EQUIPMENT INTO OPERATION BEFORE TURNING EQUIPMENT OVER TO OWNER. ANY PAINT THAT WAS SCRATCHED DURING CONSTRUCTION SHALL BE "TOUCHED-UP" WITH FACTORY COLOR PAINT TO THE SATISFACTION OF THE ARCHITECT. ANY ITEMS THAT WERE DAMAGED DURING CONSTRUCTION SHALL BE
- E. GENERAL 1. UNLESS OTHERWISE INDICATED ALL HEATING, VENTILATING, AIR CONDITIONING, PLUMBING, AND OTHER MECHANICAL EQUIPMENT, MOTORS, AND CONTROLS SHALL BE FURNISHED, SET IN PLACE AND WIRED AS FOLLOWS:

RESPONSIBLE DIVISION

ITEM	FURNISH	ED SET	POWER- WIRED	CONTROL- WIRED
EQUIPMENT	. 15	15	16	
COMBINATION MAGNETIC MOTOR STARTERS, MAGNETIC MOTOR STARTERS AND CONTACTORS	. 15	16	16	15
FUSED AND UNFUSED DISCONNECT SWITCHES, THERMAL OVERLOAD SWITCHES AND HEATERS, MANUAL MOTOR				
STARTERS	. 16(1) 16(1)	16	
MANUAL-OPERATING AND MULTI-SPEED SWITCHES .	. 15	16	16	16
CONTROLS, RELAYS, TRANSFORMERS	. 15	15	16	15
THERMOSTATS (LOW VOLTAGE) AND TIME SWITCHES	. 15	15	16	15
THERMOSTATS (LINE VOLTAGE)	. 15	15	16	16
TEMPERATURE CONTROL PANELS	. 15	15	16	15
MOTOR AND SOLENOID VALVES, DAMPER MOTORS, PE & EP SWITCHES	. 15	15(2)		15(2)
PUSH-BUTTON STATIONS AND PILOT LIGHTS	. 15	15(2)		15(2)
HEATING, COOLING, VENTILATION AND AIR CONDITIONING CONTROL	S 15	15	16	15
EXHAUST FAN SWITCHES .	. 15	16	16	15(2)

- SUBSCRIPT FOOTNOTES
- 1) GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL
- THE TYPE LISTED ON THE DRAWINGS. THE PANELBOARD SHALL BE UL LISTED AND BEAR THE UL SUBCONTRACTOR WORK. UNDER DIVISION 15 IF FURNISHED FACTORY-WIRED AS PART OF FOLIPMENT OR IF FURNISHED WITH COMBINATION STARTERS
 - IF ITEM IS FOR LINE VOLTAGE, SET IN PLACE AND CONNECT LINDER DIVISION 16 WHERE FACTORY MOUNTED ON EQUIPMENT OR ATTACHED TO PIPING OR DUCTS AND USING LINE VOLTAGE FURNISH AND SET UNDER DIVISION 15, CONNECT UNDER DIVISION 16.

- 2. VERIFY LOCATION AND NAMEPLATE DATA OF ALL MECHANICAL EQUIPMENT WITH THE MECHANICAL CONTRACTOR PRIOR TO INSTALLING ELECTRICAL FACILITIES. BE RESPONSIBLE FOR COORDINATION OF REVISIONS AND MODIFICATIONS NECESSARY TO PROPERLY SUPPLY ELECTRICAL FACILITIES TO HEATING, VENTILATING, AIR CONDITIONING, PUMPS, MOTORS, CONTROLS, AND OTHER MECHANICAL EQUIPMENT INSTALLED IN PLACE OF EQUIPMENT SPECIFIED. REQUIRED ELECTRICAL FACILITIES CHANGES SHALL BE CONSIDERED TO BE A PART OF THE MECHANICAL CONTRACT.
- 3. PROVIDE EACH MOTOR WITH A HORSEPOWER RATED DISCONNECT SWITCH AND MOTOR RUNNING OVERCURRENT PROTECTION PER N.E.C. 430-37. TO FACILITATE EASE AND SAFETY OF OPERATION AND MAINTENANCE OF MECHANICAL EQUIPMENT, LOCATE THE DISCONNECT SWITCH IMMEDIATELY ADJACENT TO THE MOTOR, UNLESS OTHERWISE INDICATED. SIZE THERMAL OVERLOAD HEATER UNITS FOR APPROXIMATELY 115% OF FULL LOAD MOTOR CURRENT. SIZE FUSES IN ACCORDANCE WITH THE ACTUAL MOTOR NAMEPLATE RATING AND AS RECOMMENDED BY THE BUSSMAN MFG. CO. CHECK AND COORDINATE ALL STARTERS, FUSES, AND OTHER MOTOR-RUNNING PROTECTIVE DEVICES WITH THE EQUIPMENT THEY CONTROL, AND PROVIDE AND INSTALL THE CORRECT SIZE PROTECTIVE ELEMENTS AS
- 4. DO NOT CONNECT MOTORS WHICH ARE OF A VOLTAGE RATING DIFFERENT THAN SUPPLY VOLTAGE. REPORT SAME TO THE ARCHITECT IN WRITING AND OBTAIN WRITTEN INSTRUCTIONS FOR RESOLUTION.
- 5. USE FLEXIBLE CONDUIT FOR ALL CONNECTIONS TO DEVICES DIRECTLY ATTACHED TO DUCTS, PIPING AND MECHANICAL EQUIPMENT. END OF SECTION 16901

- A. AS SOON AS ELECTRIC POWER IS AVAILABLE AND CONNECTED TO SERVE THE EQUIPMENT IN THE BUILDING, AND EVERYTHING IS READY FOR FINAL TESTING AND PLACING IN SERVICE, A COMPLETE OPERATIONAL TEST SHALL BE MADE. THE CONTRACTOR SHALL FURNISH ALL NECESSARY INSTRUMENTS AND EQUIPMENT AND MAKE ALL TESTS, ADJUSTMENTS, AND TRIAL OPERATIONS REQUIRED TO PLACE THE SYSTEM IN BALANCED AND SATISFACTORY OPERATING CONDITION; FURNISH ALL NECESSARY ASSISTANCE AND INSTRUCTIONS TO PROPERLY INSTRUCT THE OWNER'S AUTHORIZED PERSONNEL IN THE OPERATION AND CARE OF THE
- B. PRIOR TO TESTING THE SYSTEM, THE FEEDERS AND BRANCH CIRCUITS SHALL BE CONTINUOUS FROM MAIN FEEDERS TO MAIN PANELS, TO SUBPANELS, TO OUTLETS, WITH ALL BREAKERS AND FUSES IN PLACE. THE SYSTEM SHALL BE TESTED FREE FROM SHORTS AND GROUNDS. SUCH TESTS SHALL BE MADE IN THE PRESENCE OF THE ENGINEER'S REPRESENTATIVE.
- D. THE RIGHT IS RESERVED TO INSPECT AND TEST ANY PORTION OF THE EQUIPMENT AND/OR MATERIALS DURING THE PROGRESS OF ITS ERECTION. THE CONTRACTOR SHALL FURTHER TEST ALL WIRING AND CONNECTIONS FOR CONTINUITY AND GROUNDS BEFORE CONNECTING ANY FIXTURES OR EQUIPMENT

C. NO CIRCUITS SHALL BE ENERGIZED WITHOUT THE OWNER'S APPROVAL.

E. THE CONTRACTOR SHALL TEST THE ENTIRE SYSTEM IN THE PRESENCE OF THE ARCHITECT OR HIS ENGINEER WHEN THE SYSTEM IS FINALLY COMPLETED TO INSURE THAT ALL PORTIONS ARE FREE FROM SHORT CIRCUITS OR GROUND FAULTS. END OF SECTION 16950

END OF SECTION 16980

END OF DIVISION

- DEMONSTRATION OF ELECTRICAL EQUIPMENT A.THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE ARCHITECT WITH CERTIFICATION OF THE INSPECTION AND APPROVAL OF AN ACTIVE MEMBER OF THE INTERNATIONAL ASSOCIATION OF ELECTRICAL INSPECTORS OF ALL WORK COMPLETED AND INCLUDED IN THE SECTION, IF REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE INSPECTOR WHEN
- WORK REACHES INSPECTION STAGE. B. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE LOCAL AUTHORITY HAVING JURISDICTION IN ORDER THAT LOCAL INSPECTION MAY BE CARRIED OUT AT THE
- C.THE ELECTRICAL CONTRACTOR SHALL PAY FOR ALL PERMITS, INSPECTION FEES. AND INSTALLATION FEES AS REQUIRED TO COMPLETE THE WORK UNDER THIS SECTION OF THE
- D. THIS CONTRACTOR SHALL GUARANTEE THE MATERIALS AND WORKMANSHIP FOR A PERIOD OF TWELVE (12) MONTHS FROM THE TIME THE INSTALLATION IS ACCEPTED BY THE OWNER. IF, DURING THIS TIME, ANY DEFECTS SHOULD SHOW UP DUE TO ANY DEFECTIVE MATERIALS, WORKMANSHIP, NEGLIGENCE OR WANT OF PROPER CARE ON THE PART OF THIS CONTRACTOR HE SHALL FURNISH ANY NEW MATERIALS AS NECESSARY, REPAIR SAID DEFECTS, AND PUT THE SYSTEM IN ORDER AT HIS OWN EXPENSE ON RECEIPT OF NOTICE OF SUCH DEFECTS FROM THE ARCHITECT. THIS SPECIFICATION IS NOT INTENDED TO IMPLY THAT THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR NEGLIGENCE OF THE OWNER.

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