

### AIR DISTRIBUTION SYMBOLS

	RECTANGULAR DUCT. (FIRST NUMBER IS SIDE SHOWN) DIMENSIONS IN INCHES
	12" ROUND DUCT
	MOTORIZED DAMPER
	FLEXIBLE DUCT
	DUCT FLEXIBLE CONNECTOR (FC)
	DUCT DROPS AND RISES IN DIRECTION OF AIR FLOW
	RETURN DUCT TURNED UP OR DOWN (DASHED)
	SUPPLY DUCT TURNED UP OR DOWN (DASHED)
	EXHAUST DUCT TURNED UP OR DOWN (DASHED)
	ACOUSTICAL LINING (DUCT DIM. FOR NET FREE AREA)
	ROUND DUCT ELBOW DOWN
	ROUND DUCT ELBOW UP
	SQUARE TO ROUND TRANSITION
	CAP (DUCT AND/OR PIPE)
	INDICATES DUCT, PIPING, EQUIPMENT TO BE REMOVED.
	EA EXHAUST AIR
	RA RETURN AIR
	SA SUPPLY AIR
	VOLUME DAMPER
	FIRE DAMPER
	SMOKE DAMPER
	COMBINATION SMOKE/FIRE DAMPER
	RECTANGULAR ELBOW W/TURNING VANES
	DIRECTION OF AIR FLOW (IN)
	DIRECTION OF AIR FLOW (OUT)
	HUMIDISTAT OR HUMIDITY SENSOR
	THERMOSTAT (T'STAT) OR TEMP. SENSOR
	SMOKE DETECTOR
	S-3 DIFFUSER, REGISTER OR GRILLE TAG 300 CFM AIR FLOW QUANTITY TYP. 3
	FIR-2 FINNED TUBE TAG 20 LENGTH OF FINNED ELEMENT
	A1 DETAIL NO. M401 SHEET NO. WHERE DETAIL IS LOCATED
	GLH EQUIPMENT TAG 2 EQUIPMENT NO.

### PIPING SYMBOLS

	UNION		ORIFICE FLOWMETER
	FLANGE		FLEXIBLE PIPE CONNECTOR
	PIPE ANCHOR		EXPANSION JOINT
	PIPE GUIDE OR SLEEVES		STEAM TRAP (FLOAT AND THERMOSTATIC INDICATED T.T. THERMOSTAT, B.T. BUCKET TRAP, T.D. THERMODYNAMIC TRAP)
	PIPE ELBOW TURNED DOWN		CONCENTRIC REDUCER/INCREASER
	PIPE ELBOW TURNED UP		ECCENTRIC REDUCER/INCREASER
	PIPING TEE-DOWN		HOSE BIBB
	PIPING TEE-UP		WALL HYDRANT
	PIPE RISER		DIRECTION OF FLOW
	FLOOR CLEAN OUT		FIRE DEPARTMENT CONNECTION
	CLEAN OUT		PUMP
	WALL CLEAN OUT		WATER HAMMER SUPPRESSER
	PIPE PITCHES DOWN		FINNED TUBE BASEBOARD
	GENERIC VALVE. SEE SPECIFICATIONS FOR TYPE		HUMIDIFIER
	GATE VALVE		DIFFERENTIAL PRESSURE TRANSMITTER
	BALL VALVE		SPRINKLER HEAD
	BUTTERFLY VALVE (MANUAL)		GAS TURRET
	2-WAY CONTROL VALVE		MEDICAL OXYGEN OUTLET
	3-WAY CONTROL VALVE		MEDICAL VACUUM INLET
	BALANCING VALVE (CIRCUIT SETTER)		MEDICAL AIR OUTLET
	CHECK VALVE		NITROUS OXIDE OUTLET
	PLUG VALVE		PIPE ELBOW TURNED DOWN - VALVE IN VERTICAL
	GLOBE VALVE		PIPE ELBOW TURNED UP - VALVE IN VERTICAL
	NEEDLE VALVE		
	BACK FLOW PREVENTER		
	SOLENOID VALVE		
	PRESSURE REDUCING OR REGULATING VALVE		
	PRESSURE RELIEF VALVE		
	STRAINER		
	STRAINER W/BLOWDOWN		
	MANUAL AIR VENT		
	AUTOMATIC AIR VENT		
	PRESSURE SWITCH		
	FLOW SWITCH		
	PRESSURE GAUGE AND COCK		
	THERMOMETER AND WELL		
	TEMPERATURE & PRESSURE TAP (PETE'S PLUG)		
	HOSE END DRAIN VALVE WITH CAP		

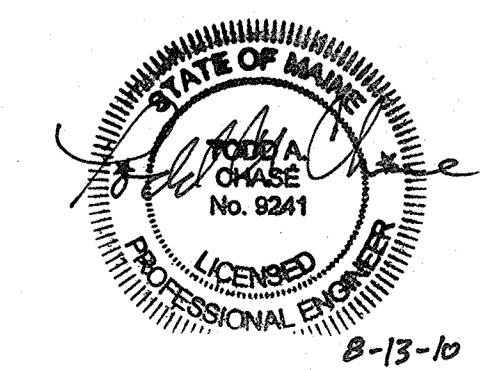
### ABBREVIATIONS

AAV	AUTOMATIC AIR VENT	DIW	DOWN IN WALL	OA	OUTSIDE AIR
ACC	AIR COOLED CONDENSER	DN	DOWN	OBD	OPPOSED BLADE DAMPER
ACU	AIR CONDITIONING UNIT	DS	DOWNSPOUT	OED	OPEN ENDED DUCT
AD	ACCESS DOOR	DT	DROP AND TRANSITION	P-#	PLUMBING FIXTURE TAG
AE	ACID EXHAUST	DWG	DRAWING	PAE	PROCESS ACID EXHAUST
AFF	ABOVE FINISHED FLOOR	DWH	DOMESTIC WATER HEATER	PHE	PROCESS HEAT EXHAUST
AFMS	AIR FLOW MEASURING STATION	EA	EXHAUST AIR	PSE	PROCESS SOLVENT EXHAUST
AHU	AIR HANDLING UNIT	EF	EXHAUST FAN	PP	POLY-PROPYLENE
AP	ACCESS PANEL	ENC	ENCLOSURE	PPE	PRE PURCHASED EQUIPMENT
ATC	AUTOMATIC TEMPERATURE CONTROL	ER	EXHAUST REGISTER	PRS	PRESSURE REDUCING STATION
AV	AIR VENT	(E)	EXISTING	PRV	PRESSURE REDUCING VALVE
BA	BREATHING COMPRESSED AIR	EXIST.	EXISTING	PVD	PNEUMATIC VOLUME DAMPER
BB	BASEBOARD	FBO	FURNISHED BY OWNER	(R)	REMOVE
BDD	BACKDRAFT DAMPER	FBP	FACE AND BYPASS	RA	RETURN AIR
BG	BLAST GATE	FC	FLEXIBLE CONNECTION	RD	ROOF DRAIN
BFP	BACKFLOW PREVENTER	FCO	FLOOR CLEANOUT	(REL.)	RELOCATED
BLDG	BUILDING	FD-#	FLOOR DRAIN TAG	RF	RETURN FAN
BOD	BOTTOM OF DUCT	FD	FIRE DAMPER	RG	RETURN GRILLE
BOP	BOTTOM OF PIPE	FG	FIBERGLASS	RHC	REHEAT COIL
BTU	BRITISH THERMAL UNIT	F & T	FLOAT AND THERMOSTATIC	RM	ROOM
CBD	COUNTER BALANCED DAMPER	FO	FLAT OVAL	RPZ	REDUCED PRESSURE ZONE BFP
CD	CEILING DIFFUSER	FRHB	FREEZE RESISTANT HOSE BIBB	RR	RETURN REGISTER
CFF	CAPPED FOR FUTURE	FTR	FINNED TUBE RADIATION	RV	RELIEF VALVE
CFM	CUBIC FEET PER MINUTE	FS	FLOW SWITCH	SA	SUPPLY AIR
CLG	CEILING	GC	GENERAL CONTRACTOR	SCV	SELF CONTAINED VALVE
CO	CLEANOUT	GPM	GALLONS PER MINUTE	SD	SMOKE DETECTOR
CONT	CONTINUATION	H	HUMIDIFIER	SF	SUPPLY FAN
COORD	COORDINATE	HB	HOSE BIB	SG	SUPPLY GRILLE
CP	CONDENSATE PUMP & RECEIVER	HRU	HEAT RECOVERY UNIT	SR	SUPPLY REGISTER
CT	COOLING TOWER	HTR	HEATER	SS	STAINLESS STEEL
CTE	CONNECT TO EXISTING	H & V	HEATING AND VENTILATION	TE	TEMPERATURIZED ELEMENT (SENSOR)
CU	COPPER	HVAC	HEATING, VENTILATING AND AIR CONDITIONING	TG	TRANSFER GRILLE
CUH	CABINET UNIT HEATER	HW	HOT WATER	TOD	TOP OF DUCT
CV	CONTROL VALVE	HX	HEAT EXCHANGER	TOP	TOP OF PIPE
CW	COLD WATER	IN WG	INCHES WATER GAUGE	TTS	TIGHT TO STEEL
CW-P	CITY WATER-PROCESS	LD	LINED DUCT	TV	TURNING VANE(S)
DC	DOUBLE CONTAINED	MAU	MAKE UP AIR UNIT	TYP	TYPICAL
DCO	DANDY CLEANOUT	MAX	MAXIMUM	UH	UNIT HEATER
DDC	DIRECT DIGITAL CONTROL	MBH	1000 BTU/HR.	UIC	UP IN CHASE
DIA	DIAMETER	ME	MECHANICAL ENGINEER	UIW	UP IN WALL
DIC	DOWN IN CHASE	MFR	MANUFACTURER	UV	UNIT VENTILATOR
		MIN	MINIMUM	VAV	VARIABLE AIR VOLUME BOX
		MD	MOTOR OPERATED DAMPER	VB	VACUUM BREAKER
		MPV	MULTI-PURPOSE VALVE	VTR	VENT THRU ROOF
		MTD	MOUNTED	VD	MANUAL VOLUME DAMPER
		MUA	MAKE UP AIR	VCF	VALVED AND CAPPED FOR FUTURE
		NPW	NON-POTABLE WATER	VOC	VOLATILE ORGANIC COMPOUNDS
		NTS	NOT TO SCALE	VFD	VARIABLE FREQUENCY DRIVE
		P-#	PLUMBING FIXTURE TAG	W/	WITH
		PEA	ALKALI EXHAUST	WCO	WALL CLEANOUT
		PEH	HEAT EXHAUST	WH	WALL HYDRANT

### PIPING SYSTEMS

10:1 HF	10:1 HF	---GCR---	GRAVITY STEAM CONDENSATE RETURN	---MV---	MEDICAL VACUUM	---TW---	TEMPERED WATER
AV	ACID VENT	---GLY---	GLYCOL	---N2NP---	NON-PROCESS NITROGEN	---TWS---	TEMPERED CHILLED WATER SUPPLY
AD	ACID DRAIN	---GV---	GAS VENT	---N2---	PROCESS NITROGEN	---TWR---	TEMPERED CHILLED WATER RETURN
---AD---	ACID DRAIN (BELOW SLAB)	---H---	HYDROGEN	---NG---	NATURAL GAS	---VAC---	PLANT VACUUM
BA	BREATHING AIR	---H2O2---	HYDROGEN PEROXIDE	---HNG---	HIGH PRESSURE NATURAL GAS	---ZB---	ZONE VALVE BOX
CD	CONDENSATE DRAIN	---HCR---	HOT/ CHILLED WATER RETURN	---NO2---	NITROUS OXIDE	-----TEMP-----	DOMESTIC HOT WATER (TEMP °F)
CDA	COMPRESSED DRY AIR	---HCS---	HOT/ CHILLED WATER SUPPLY	---NEG. SOLV.---	NEGATIVE SOLVENT DRAIN	-----TEMP-----	RECIRC. DOMESTIC HOT WATER (TEMP °F)
CHWS	CHILLED WATER SUPPLY	---HCV---	HOUSE CLEAN VACUUM	---NPW---	NON POTABLE COLD WATER	-----CW-----	DOMESTIC COLD WATER
---CHWR---	CHILLED WATER RETURN	---HG---	HOT GAS	---O2---	OXYGEN	-----HW-----	DOMESTIC HOT WATER (120° F)
CWS	CONDENSER WATER SUPPLY	---HPS---	HIGH PRESSURE STEAM	---OFA---	OIL FREE COMPRESSED AIR	-----RHW-----	RECIRCULATED DOMESTIC HOT WATER (120° F)
---CWR---	CONDENSER WATER RETURN	---HPR---	HIGH PRESSURE CONDENSATE RETURN	---PCWR---	PROCESS COOLING WATER RETURN	---S, W or KW---	S SANITARY, W WASTE & KW KITCHEN WASTE
DB	DISTRIBUTION VALVE BOX	---HWS---	HOT WATER SUPPLY	---PC---	PUMPED STEAM CONDENSATE	---S, W or KW---	S SANITARY, W WASTE & KW KITCHEN WASTE (EXIST.)
DIS	DEIONIZED WATER SUPPLY	---HWR---	HOT WATER RETURN	---PD---	PUMPED DISCHARGE	---S, W or KW---	S SANITARY, W WASTE & KW KITCHEN WASTE (BELOW SLAB)
---DIR---	DEIONIZED WATER RETURN	---IAD---	ISOPROPYL ALCOHOL DRAIN	---POS. SOLV.---	POSITIVE SOLVENT DRAIN	---S, W or KW---	S SANITARY, W WASTE & KW KITCHEN WASTE (BELOW SLAB-EXIST.)
EKCD	EKC DRAIN	---LP---	LIQUID PROPANE GAS	---PW---	POTABLE WATER	---SD---	SD STORM DRAIN
ESEW	EYEWASH	---HLP---	HIGH PRESSURE LIQUID PROPANE GAS	---R---	RELIEF LINE	---SD---	SD STORM DRAIN (EXIST.)
FCS	FREE COOLING SUPPLY	---LPS---	LOW PRESSURE STEAM	---RL---	REFRIGERANT LIQUID	---SD---	SD STORM DRAIN (BELOW SLAB)
---FCR---	FREE COOLING RETURN	---LPR---	LOW PRESSURE RETURN	---RS---	REFRIGERANT SUCTION	---SD---	SD STORM DRAIN (BELOW SLAB-EXIST.)
FOS	FUEL OIL SUPPLY	---MA---	MEDICAL AIR	---SLD---	MIXED SOLVENT DRAIN	---V---	V SANITARY VENT
---FOR---	FUEL OIL RETURN	---MPS---	MEDIUM PRESSURE STEAM	---SV---	SOLVENT	---V---	V SANITARY VENT (EXIST.)
FOV	FUEL OIL VENT	---MPR---	MEDIUM PRESSURE RETURN	---SP---	SPRINKLER	---V---	V SANITARY VENT (BELOW SLAB)
						---V---	V SANITARY VENT (BELOW SLAB-EXIST.)

**GENERAL NOTE**  
 1. ALL GENERAL NOTES, SYMBOL LISTS, AND DETAILS ARE TO BE CONSIDERED AS APPLICABLE TO ALL HVAC AND PLUMBING DRAWINGS FOR THIS PROJECT. SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET ARE FOR REFERENCE ONLY AND DO NOT INDICATE THEIR INCORPORATION INTO THE DESIGN.



**LEGEND AND ABBREVIATIONS**  
 SCALE: NONE

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Revisions:  
 ISSUED FOR PERMIT & CONSTRUCTION

Project Number: 10089  
 Designer: TAC Drawing Date: 8-12-10  
 Drafter: BAL Drawing Scale: NONE

Wells Fargo Approval:  
 Client Approval:

Drawing Number:  
**M-001**  
 Sheet: # of ##

## MECHANICAL SPECIFICATIONS:

### GENERAL

- CONTRACTOR SHALL VISIT THE SITE TO DETERMINE PRE-EXISTING CONDITIONS AND ALL WORK NECESSARY, PRIOR TO BIDDING. VERIFY ALL MEASUREMENTS AND EXISTING CONDITIONS IN THE FIELD. GENERAL SCHEMATIC LAYOUT IS INDICATED; ALL OFFSETS, OBSTRUCTIONS, AND EXISTING CONFIGURATIONS AND CONSTRAINTS MUST BE FIELD VERIFIED.
- OBTAIN NECESSARY PERMITS AND PAY ASSOCIATED FEES.
- COORDINATE ANY SERVICE DISRUPTIONS WITH THE OWNER.
- INSTALL ALL COMPONENTS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ALL LOCAL CODES AND STANDARDS.
- DRAWINGS ARE DIAGRAMMATIC ONLY; FIELD-VERIFY ALL EXISTING CONDITIONS. COORDINATE INSTALLATIONS WITH OTHER TRADES. COORDINATE ELECTRICAL POWER REQUIREMENTS FOR ALL MOTORS.
- THE INTENTION OF THESE CONTRACT DOCUMENTS IS TO CALL FOR FINISHED WORK, FULLY TESTED AND READY FOR OPERATION. ANY COMPONENTS OR LABOR NOT MENTIONED IN THE CONTRACT DOCUMENTS BUT REQUIRED FOR FUNCTIONING SYSTEMS SHALL BE PROVIDED. SHOULD THERE APPEAR TO BE ANY DISCREPANCIES OR QUESTIONS OF INTENT, THE CONTRACTOR SHALL REFER THE MATTER TO THE ARCHITECT FOR DECISION BEFORE START OF ANY RELATED WORK.
- PERFORM WORK IN ACCORDANCE WITH LOCAL CODES.
- SEAL ALL DUCT AND PIPE PENETRATIONS WITH FIRE SEALANT.
- OBSERVE THE OWNER'S CLEANLINESS PROTOCOLS.

### FIRE PROTECTION

- OBTAIN ALL REQUIRED PERMITS AND APPROVALS FOR THE WORK. PERFORM ALL DESIGN, COORDINATION, INSTALLATION AND TESTING TO YIELD COMPLETE AND OPERATIONAL FIRE SPRINKLER SYSTEMS.
- GENERATE AND SUBMIT SHOP DRAWINGS, (PLANS AND DETAILS) AND HYDRAULIC CALCULATIONS FOR REVIEW BY SMRT, THE OWNER, AND AUTHORITIES HAVING JURISDICTION. SUBMIT PROPOSED PRODUCT DATA ALONG WITH SHOP DRAWINGS FOR APPROVAL PRIOR TO COMMENCING WITH THE WORK.
- DESIGNS, (DRAWINGS AND CALCULATIONS) TO BE STAMPED AND SIGNED BY A REGISTERED FIRE PROTECTION ENGINEER, (ME REGISTRATION).
- SUBMIT RECORD DRAWINGS, CALCULATIONS, PRODUCT DATA AND MAINTENANCE DATA FOR THE WORK ONCE COMPLETE.
- DESIGNS AND INSTALLATIONS SHALL COMPLY WITH THE 2003 INTERNATIONAL BUILDING CODE AND NFPA 13.
- PERFORM A HYDRANT FLOW TEST TO SERVE AS THE BASIS FOR HYDRAULICALLY CALCULATED SYSTEM DESIGNS.
- 2-INCH AND SMALLER PIPING TO BE SCHEDULE 40 STEEL WITH THREADED FITTINGS. 2-1/2-INCH AND LARGER PIPING TO BE SCHEDULE 10 STEEL WITH ROLLED GROOVE FITTINGS.
- PROVIDE NEW SPRINKLER COVERAGE PER NFPA 13, LIGHT HAZARD OCCUPANCY. PROVIDE PIPED ARM-OVERS TO DROPS IN THE NEW CEILING.
- NEW SPRINKLER HEADS TO BE RECESSED, QUICK RESPONSE TYPE WITH WHITE FINISH.
- ALL SYSTEMS, TAMPER SWITCHES AND FLOW SWITCHES TO BE SUPERVISED BY THE EXISTING FACILITY FIRE ALARM SYSTEM. COORDINATE WITH ELECTRICAL CONTRACTOR.
- INSTALLATIONS SHALL BE SEISMICALLY BRACED PER NFPA 13 AND THE INTERNATIONAL BUILDING CODE.
- SYSTEM IMPAIRMENTS SHALL BE LIMITED TO FOUR HOURS OR LESS. BEFORE SHUTTING OFF A SECTION OF THE SPRINKLER SYSTEM TO MAKE SPRINKLER TIE-INS, NOTIFY THE LOCAL FIRE DEPARTMENT, PLAN THE WORK CAREFULLY, AND ASSEMBLE ALL MATERIALS TO ENABLE COMPLETION IN THE SHORTEST TIME POSSIBLE. WORK STARTED ON CONNECTIONS SHOULD BE COMPLETED WITHOUT INTERRUPTION AND PROTECTION RESTORED AS PROMPTLY AS POSSIBLE. DURING THE IMPAIRMENT, PROVIDE EMERGENCY HOSE EXTINGUISHERS AND MAINTAIN EXTRA WATCH SERVICE IN THE AFFECTED AREAS.

### METAL DUCTWORK

- GALVANIZED STEEL DUCTWORK: ASTM A653 GALVANIZED STEEL SHEET, LOCK-FORMING QUALITY, AND G90 ZINC COATING. ALL DUCTWORK SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH SMACNA STANDARDS. CONSTRUCT DUCT SYSTEMS SO THAT LEAKAGE DOES NOT EXCEED ONE PERCENT OF THE TOTAL AIR QUANTITIES. SEAL ALL DUCT JOINTS WITH GASKETED CONNECTIONS, DUCTMATE, OR EQUAL.
- LABORATORY EXHAUST DUCTWORK: TYPE 316L STAINLESS STEEL WITH NOT TO EXCEED 0.03% CARBON. SHEET METAL SHALL BEAR VISIBLE MANUFACTURER'S INSCRIPTIONS. GAUGE SHALL PERMIT WELDING WITHOUT DISTORTION, AND SHALL BE NO. 18 MINIMUM FOR DUCTS 22" DIAMETER AND SMALLER. DUCTS LARGER 22" SHALL BE 16-GAUGE MINIMUM. GAUGE SHALL PERMIT WELDING WITHOUT DISTORTION, AND SHALL BE NO. 18 MINIMUM FOR DUCTS 22" DIAMETER AND SMALLER. DUCTS LARGER 22" SHALL BE 16-GAUGE MINIMUM. CONNECTION TO HOODS: TIGHT SLIP FIT, 3" INSERTION, WITH FIRE-RETARDANT ADHESIVE; STAINLESS STEEL RIVETS; SHALL MATCH THE HOOD OUTLET SIZE; ANY CONDENSATE IN DUCT TO DRAIN INTO HOOD.
- PROVIDE VOLUME DAMPERS AT ALL BRANCH DUCTS.

### MECHANICAL INSULATION

- ALL SUPPLY DUCTS SHALL BE EXTERNALLY INSULATED WITH FIBERGLASS DUCT WRAP EQUAL TO SCHULLER MICOLITE TYPE 75, ASTM C533, NONCOMBUSTIBLE BLANKET, 1-1/2" THICK.
- ALL CHILLED WATER PIPING SHALL BE INSULATED WITH 1" THICK FIBERGLASS PIPE INSULATION WITH FSK JACKET AND VAPOR BARRIER.
- ALL HOT WATER PIPING SHALL BE INSULATED WITH 1" THICK FIBERGLASS PIPE INSULATION WITH FSK JACKET.
- ALL COOLING COIL CONDENSATE PIPING SHALL BE INSULATED WITH 1/2" FIBERGLASS INSULATION WITH FSK JACKET.

### PLUMBING FIXTURES

- FIXTURES TO BE COMMERCIAL GRADE, LOW CONSUMPTION, AND ADA COMPLIANT WHERE INDICATED ON THE PLANS AND WHERE REQUIRED BY CODE.
- PROVIDE ALL FIXTURES WITH STOP VALVES AND SUPPLIES AND FIXTURE TRAPS AS REQUIRED.
- REFER TO ARCHITECTURAL DOCUMENTS FOR EXACT LOCATIONS AND MOUNTING HEIGHTS OF ALL PLUMBING FIXTURES.

### PLUMBING EQUIPMENT AND SPECIALTIES

- CLEANOUTS SHALL BE COMMERCIAL GRADE BRASS. APPROVED MANUFACTURERS INCLUDE ZURN, WADE, J.R. SMITH, JOSAM, OR APPROVED EQUAL.
- TRAP PRIME ALL FUNNEL DRAIN TRAPS REQUIRED FOR INDIRECT WASTE USING PRESSURE DIFFERENTIAL OR SIMILAR TYPE VALVES.
- SHOCK ABSORBERS AND AIR CHAMBERS: PROVIDE WATER HAMMER ARRESTORS ON WATER SUPPLIES TO QUICK CLOSING SOLENOID VALVES. WHERE NOT PROVIDED, CONNECT TO FIXTURES USING AIR CHAMBERS.
- PROVIDE ACCESS AND ACCESS PANELS TO PROVIDE ACCESSIBLE EQUIPMENT AND SPECIALTIES. WHERE NECESSARY, PROVIDE METAL UNITS WITH LOCKS. CONFIGURATION AND TRIM AS REQUIRED BY FINISH WALL SURFACE. APPROVED MANUFACTURERS INCLUDE KARP, MILCOR, NYSTROM, OR APPROVED EQUAL.

### PLUMBING PIPING

- PROVIDE ALL PIPING COMPLETE WITH FITTINGS, VALVES, STRAINERS, MOTORIZED VALVE OPERATORS, STRAINERS, HANGERS, SUPPORTS, GUIDES, SLEEVES, AND ACCESSORIES.
- ALL PRESSURIZED PIPING TO BE TESTED HYDROSTATICALLY TO 150 PSI OR 150% OF OPERATING PRESSURE, WHICHEVER IS GREATER, BUT NEVER EXCEED TEST PRESSURE ANSI B16.1 BASIS. TEST DURATION TO BE 2 HOURS WITH NO PRESSURE CHANGE CORRECTED FOR TEMPERATURE CHANGE.
- DRAINAGE AND VENT PIPING SHALL BE TESTED. CAP ALL OUTLETS AND FILL PIPING SYSTEM TO OVERFLOWING FROM A POINT AT LEAST 10 FT ABOVE THE FLOOR. WATER LEVEL SHALL REMAIN CONSTANT THROUGHOUT A 2 HOUR TEST DURATION.
- REPAIR OR REPLACE LEAKS OR DEFECTS WITHOUT ADDITIONAL COST.
- PROVIDE DIELECTRIC FITTINGS WHERE DISSIMILAR METALS ARE TO BE JOINED.
- PROVIDE ADEQUATE SUPPORT FOR PIPE AND CONTENTS TO PREVENT SAGGING, VIBRATION, OR SWAYING AND ALLOW FOR EXPANSION AND CONTRACTION. PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE STRUCTURE CANNOT SUPPORT POINT LOADS.
- ALL EXPOSED PIPING PASSING THROUGH WALLS, FLOORS, CEILINGS, AND PARTITIONS SHALL BE PROVIDED WITH CHROME PLATED CAST BRASS ESCUTCHEONS HELD IN PLACE WITH SET SCREWS.
- PROVIDE CONTINUOUS 1" FIBERGLASS INSULATION FOR ALL DOMESTIC HW PIPING. PROVIDE CONTINUOUS 1/2" FIBER-GLASS INSULATION FOR ALL DOMESTIC CW AND CD PIPING.
- ALL INSULATION SHALL HAVE COMPOSITE FIRE AND SMOKE HAZARD RATINGS THAT SHALL NOT EXCEED A FLAME SPREAD OF 25 AND A SMOKE DEVELOPED RATING OF 50.
- ABOVE GRADE SANITARY DRAINAGE AND VENT PIPING: HUBLESS CAST IRON SOIL PIPE AND FITTINGS WITH ANCON FOUNDRY HUSKY SERIES 4000 EXTRA WIDE HEAVY DUTY GASKETED HUBLESS COUPLINGS.
- DOMESTIC CW AND HW PIPING SHALL BE COPPER, TYPE L, HARD DRAWN IN ACCORDANCE WITH ASTM B88, AND LEAD-FREE SOLDER JOINTS.
- INSPECTIONS AND TESTS SHALL BE PERFORMED ON THE PIPING INSTALLATION AS REQUIRED BY CODE.
- PITCH SANITARY DRAINAGE PIPING AT 1/4" PER FT. PITCH DOMESTIC CW, HW, AND VENT PIPING TOWARDS SOURCE.

### MEDICAL GAS AND VACUUM PIPING

- PROVIDE ALL PIPING COMPLETE WITH FITTINGS, VALVES, HANGERS, SUPPORTS, GUIDES, SLEEVES, AND ACCESSORIES.
- INSTALL ALL MEDICAL GAS PIPING TO NFPA 99, LEVEL 1 REQUIREMENTS.
- PROVIDE DISS MEDICAL GAS OUTLETS, ZONE VALVE BOX, AND AREA ALARM PANEL AS SHOWN ON THE DRAWINGS. ACCEPTABLE MANUFACTURERS ARE: AMICO, ALLIED, BEACON MEDAES, OR ENGINEER APPROVED EQUAL.
- MEDICAL AIR AND OXYGEN PIPING SHALL BE TYPE "L" COPPER, CLEANED AND SEALED FOR OXYGEN SERVICE. MEDICAL VACUUM PIPING SHALL BE TYPE "L" COPPER.
- ALL JOINTS SHALL BE BRAZED. BRAZING FILLER METALS SHALL BE AWS A5.8, BCUP SERIES ALLOYS. FLUX IS PROHIBITED UNLESS USED WITH BRONZE FITTINGS.
- VALVES SHALL BE FACTORY CLEANED FOR OXYGEN SERVICE, EXCEPT FOR VALVES IN VACUUM PIPING.
- ZONE VALVES: MSS SP-110, 3-PIECE-BODY, FULL-PORT COPPER-ALLOY BALL VALVE RATED FOR 300-PSIG MINIMUM WORKING PRESSURE; WITH CHROME-PLATED BRASS BALL, PTFE OR TFE SEATS, BLOWOUT-PROOF STEM, THREADED OR SOLDER-JOINT ENDS, AND HANDLE DESIGNED FOR QUARTER TURN BETWEEN OPENED AND CLOSED POSITIONS.
  - INCLUDE UNION-TYPE BODY WITH BOLTED SWING-AWAY CENTER SECTION.
  - INCLUDE FACTORY-INSTALLED ASTM B 819, TYPE K OR L, COPPER-TUBE EXTENSIONS WITH PRESSURE GAGE FOR PRESSURE SYSTEMS AND VACUUM GAGE FOR VACUUM SYSTEMS.ZONE VALVE BOXES: FORMED STEEL FOR RECESSED MOUNTING, WITH HOLES FOR MEDICAL GAS PIPING AND ANCHORS. INCLUDE BOXES FOR SINGLE- OR MULTIPLE-VALVE INSTALLATION WITH PRESSURE GAGE AND IN SIZES TO PERMIT MANUAL OPERATION OF VALVES.
  - INTERIOR FINISH: FACTORY-APPLIED WHITE ENAMEL.
  - COVER PLATE: ANODIZED ALUMINUM WITH FRANGIBLE OR REMOVABLE WINDOWS.
  - VALVE-BOX WINDOWS: CLEAR OR TINTED TRANSPARENT PLASTIC WITH LABELING THAT INCLUDES ROOMS SERVED, ACCORDING TO NFPA 99.
- A. INTERRUPTION OF EXISTING MEDICAL GAS SERVICE:
  - CONTRACTOR SHALL NOT INTERRUPT MEDICAL GAS SERVICE TO OCCUPIED FACILITIES. UNDER NO CONDITIONS SHALL MEDICAL GAS SERVICE VALVES (EXISTING OR NEW) BE CLOSED BY THE CONTRACTOR.
  - OWNER SHALL BE RESPONSIBLE FOR ISOLATING PORTIONS OF EXISTING SYSTEMS AND CLOSING SERVICE VALVES AS REQUIRED; INCLUDING VERIFYING PROPER SERVICE VALVE OR ZONE VALVE LABELING, AND EXACT AREAS AND ROOMS CONTROLLED.
- B. MEDICAL GAS SYSTEM ISOLATION:
  - TOTAL ISOLATION BETWEEN NEW SYSTEMS AND EXISTING SYSTEMS SHALL BE MAINTAINED UNTIL ALL NEW PIPING IS TESTED FOR LEAKS AND TESTED FOR CROSS CONNECTIONS PER NFPA 99 BY THE CONTRACTOR.
- ALL MEDICAL GAS AND VACUUM PIPING SHALL BE TESTED AND CERTIFIED AS REQUIRED IN NFPA 99.

### HYDRONIC PIPING

- PROVIDE ALL PIPING COMPLETE WITH FITTINGS, VALVES, STRAINERS, MOTORIZED VALVE OPERATORS, STRAINERS, HANGERS, SUPPORTS, GUIDES, SLEEVES, AND ACCESSORIES.
- ALL PRESSURIZED PIPING TO BE TESTED HYDROSTATICALLY TO 150 PSI OR 150% OF OPERATING PRESSURE, WHICHEVER IS GREATER, BUT NEVER EXCEED TEST PRESSURE ANSI B16.1 BASIS. TEST DURATION TO BE 2 HOURS WITH NO PRESSURE CHANGE CORRECTED FOR TEMPERATURE CHANGE.
- REPAIR OR REPLACE LEAKS OR DEFECTS WITHOUT ADDITIONAL COST.
- PROVIDE DIELECTRIC NIPPLES WHERE DISSIMILAR METALS ARE TO BE JOINED. DIELECTRIC UNIONS ARE NOT ACCEPTABLE.
- PROVIDE ADEQUATE SUPPORT FOR PIPE AND CONTENTS TO PREVENT SAGGING, VIBRATION, OR SWAYING AND ALLOW FOR EXPANSION AND CONTRACTION. PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE STRUCTURE CANNOT SUPPORT POINT LOADS.
- PROVIDE CONTINUOUS 1" FIBERGLASS INSULATION FOR ALL HEATING HOT WATER PIPING.
- ALL INSULATION SHALL HAVE COMPOSITE FIRE AND SMOKE HAZARD RATINGS THAT SHALL NOT EXCEED A FLAME SPREAD OF 25 AND A SMOKE DEVELOPED RATING OF 50.
- HYDRONIC PIPING SHALL BE COPPER, TYPE L, HARD DRAWN IN ACCORDANCE WITH ASTM B88, AND LEAD-FREE SOLDER JOINTS, OR THREADED STEEL.
- INSPECTIONS AND TESTS SHALL BE PERFORMED ON THE PIPING INSTALLATION AS REQUIRED BY CODE.

### TESTING, ADJUSTING, AND BALANCING

- TESTING AND BALANCING CONTRACT SHALL BE THROUGH THE GENERAL CONTRACTOR. SEE ARCHITECTURAL SPECIFICATIONS.
- CONTRACTOR SHALL PROVIDE TESTING, ADJUSTING, AND BALANCING FOR ALL AIR SYSTEMS AND HYDRONIC SYSTEMS.
- THE HOT LAB SHALL BE ADJUSTED TO 0.02" W.C. NEGATIVE PRESSURE IN RELATION TO THE CORRIDOR OUTSIDE THE ROOM.
- ADJUST ALL AIRFLOWS TO PLUS/MINUS 5% OF VALUES SHOWN ON THE DRAWINGS.
- TAB CONTRACTOR SHALL CONFIRM THAT ALL EQUIPMENT IS INSTALLED CORRECTLY AND STARTED UP CORRECTLY PRIOR TO BALANCING.
- TAB CONTRACTOR SHALL CONFIRM THAT CONTROLS AND TERMINAL BOXES ARE CALIBRATED PRIOR TO BALANCING.
- TAB CONTRACTOR SHALL SUBMIT A TAB REPORT AT THE COMPLETION OF WORK.

### MECHANICAL IDENTIFICATION

- PROVIDE PIPE LABELS ON ALL PIPING. ALL MEDICAL GAS PIPING SHALL BE LABELED AS REQUIRED BY NFPA 99.
- PROVIDE A TAG WITH "AHU-22" ON THE AIR HANDLING UNIT.
- PROVIDE DUCT LABELS ON ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK.
- PROVIDE VALVE TAGS ON ALL VALVES. PROVIDE A VALVE TAG SCHEDULE.

### INSTRUMENTATION AND CONTROLS

- REMOVE ALL EXISTING PNEUMATIC CONTROLS AND TUBING IN THE NUCLEAR MEDICINE DEPARTMENT. REMOVE THE COMPRESSOR IF ALL CONTROLS ATTACHED TO IT HAVE BEEN REMOVED.
- PROVIDE A NEW STAND-ALONE DDC CONTROL SYSTEM FOR THE NUCLEAR MEDICINE DEPARTMENT.
- SEQUENCE OF OPERATION: REFER TO M-650 SERIES DRAWINGS.

### MODULAR OUTDOOR AIR HANDLING UNIT

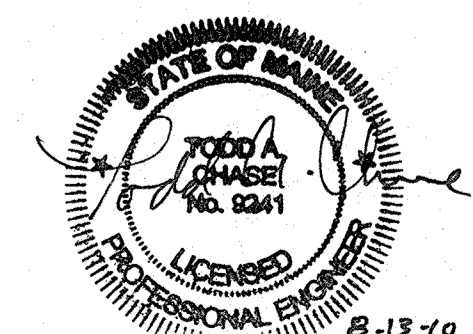
- PROVIDE AND INSTALL A MODULAR OUTDOOR AHU AS SCHEDULED.
- AHU BASIS OF DESIGN IS TRANE T SERIES.

### TERMINAL BOXES

- PROVIDE AND INSTALL TERMINAL BOXES WITH HOT WATER REHEAT COILS AS SCHEDULED.
- TERMINAL BOXES SHALL BE DOUBLE WALLED, WITH SOLID SHEET METAL INTERIOR LINER COVERING ALL INSULATION.
- BASIS OF DESIGN: TRANE MODEL VCWF.

### TESTING, ADJUSTING, AND BALANCING

- 



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420 Montgomery Street  
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Revisions:  
ISSUED FOR PERMIT &  
CONSTRUCTION

Project Number: 10089

Designer: TAC Drawing Date: 8-12-10

Drafter: BAL Drawing Scale: NONE

Wells Fargo Approval:

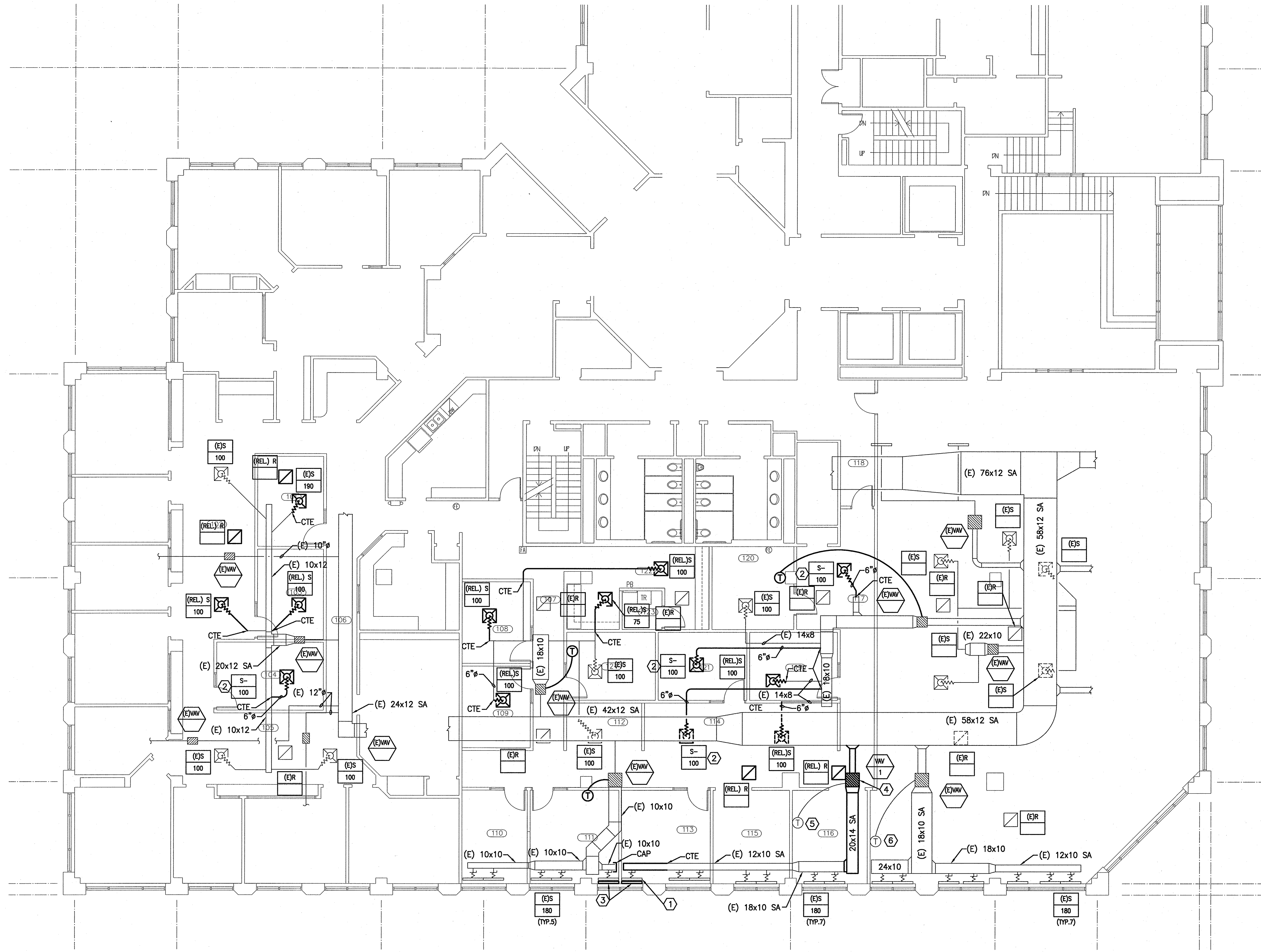
Client Approval:

Drawing Number:

M-002

Sheet: # of ##





- NOTE:**
- SEE SHEET M-001 FOR LEGEND AND ABBREVIATIONS.
  - INSTALL NEW VOLUME DAMPERS ON ALL BRANCH DUCTS.
- KEYED NOTES:**
- ADJUST SLOT DIFFUSERS TO AVOID PARTITION WALL.
  - 6"Ø DIFFUSER TO MATCH EXISTING.
  - MARKEL 3700 SERIES ELECTRIC BASEBOARD HEATER. 36" LONG, 277 VOLTS, 600 WATTS. COLOR TO MATCH EXISTING.
  - VAV-1 - TRANE MODEL VPEF, 10"Ø INLET, 1,260 CFM MAX COOLING AIRFLOW, 400 CFM MIN COOLING AIRFLOW, 600 CFM UNIT HEATING AIRFLOW, 400 CFM VALVE HEATING AIRFLOW. 85°F HEATING DISCHARGE AIR TEMPERATURE, 5 KW HEATER, 277 V, 2-STAGE CONTROL. 1/8 HP, 277V ECM MOTOR.
  - NEW PNEUMATIC THERMOSTAT TO CONTROL VAV BOX AND ELECTRIC HEAT. CONTROLS SHALL BE STAGED TO MATCH EXISTING CONTROL SEQUENCES.
  - EXISTING PNEUMATIC CONTROLS SHALL BE RECONFIGURED TO CONTROL SECTION OF ELECTRIC BASEBOARD SERVED BY VAV BOX.

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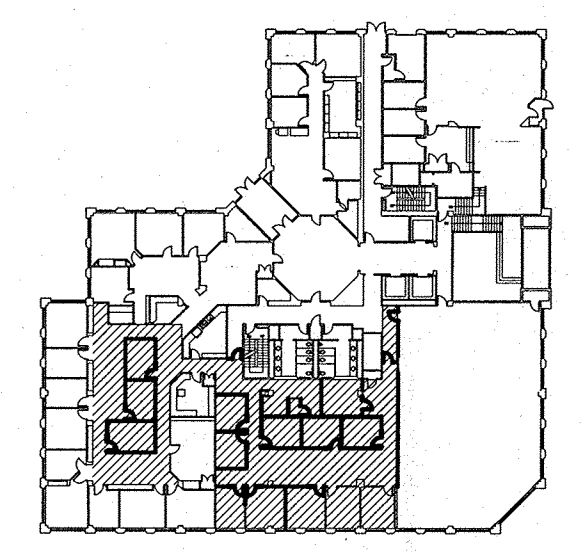
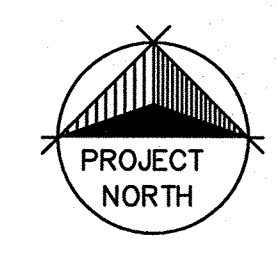
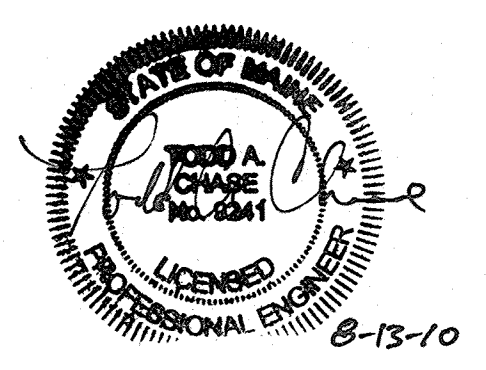
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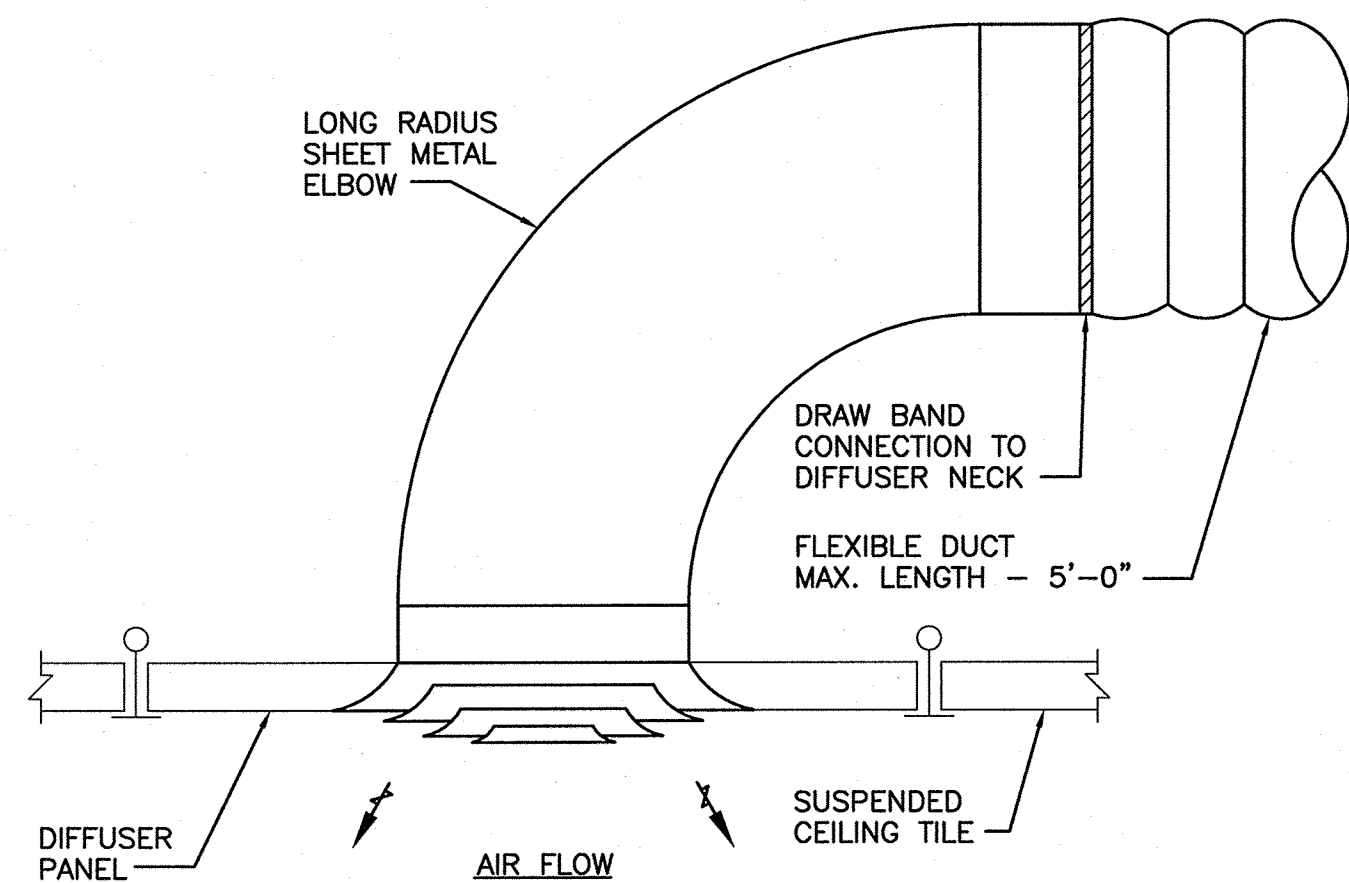
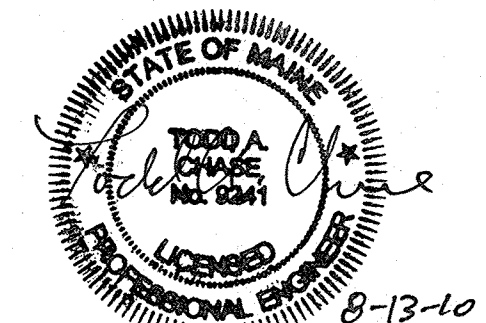
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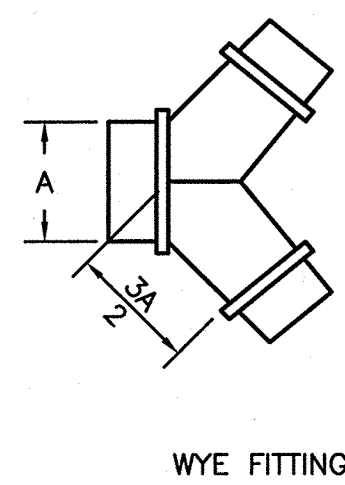
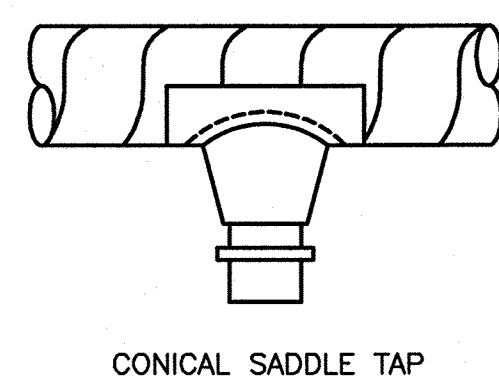
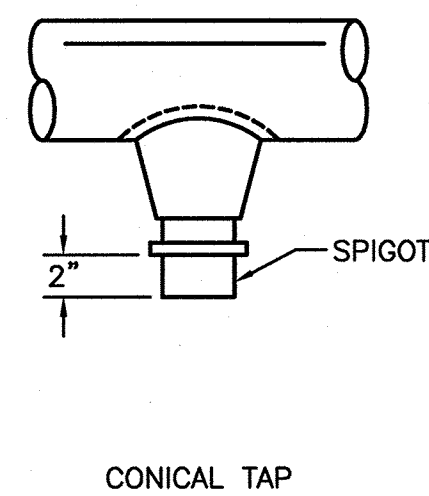
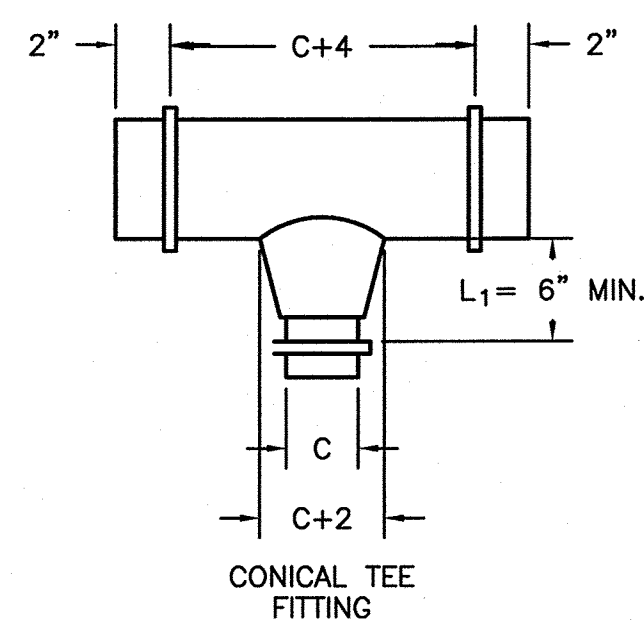
KEY PLAN

Revisions:	
ISSUED FOR PERMIT & CONSTRUCTION	
Project Number:	10089
Designer:	TAC
Drawing Date:	8-12-10
Drafter:	BAL
Drawing Scale:	1/8"=1'-0"
Wells Fargo Approval:	
Client Approval:	
Drawing Number:	
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Sheet:	# of ##

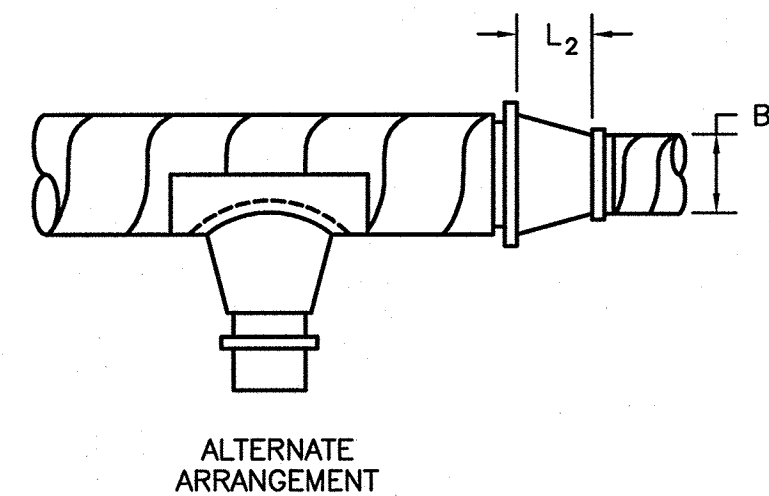
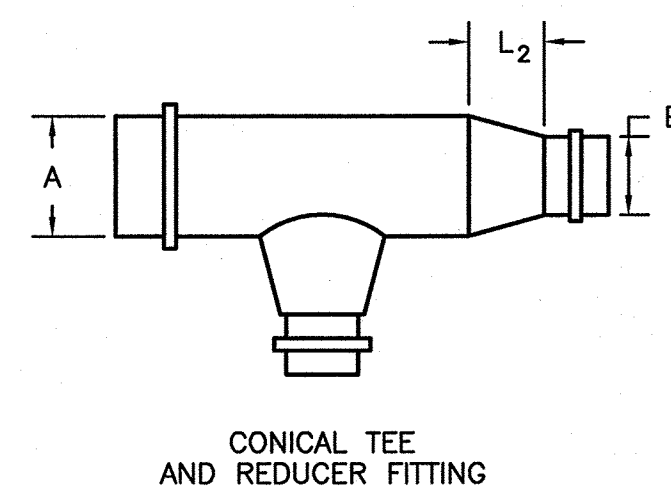


**3 FLEXIBLE DUCT**

NOT TO SCALE

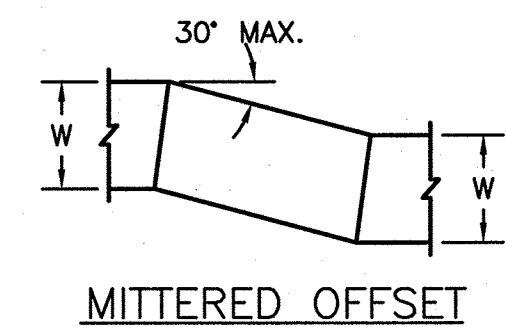
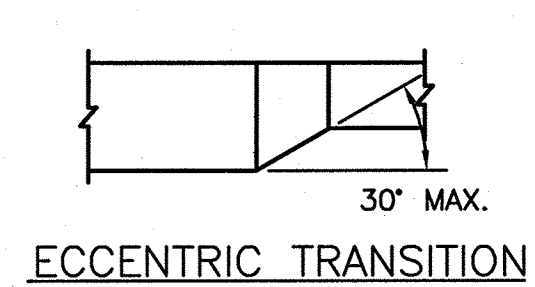
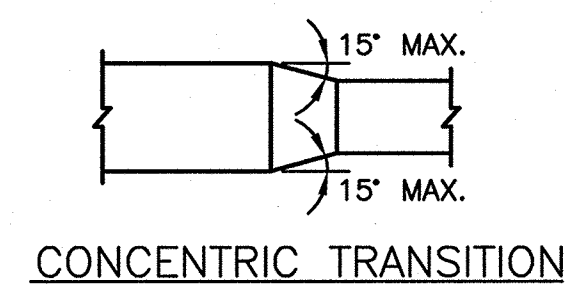
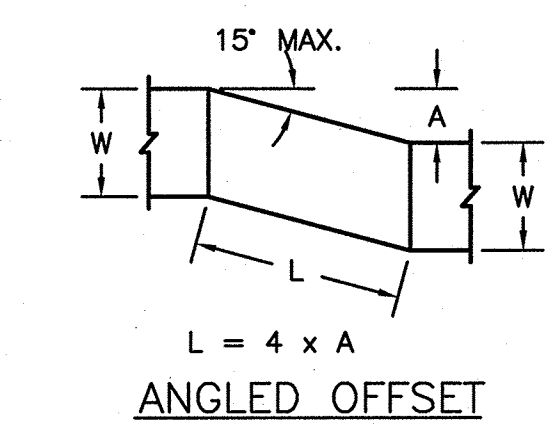
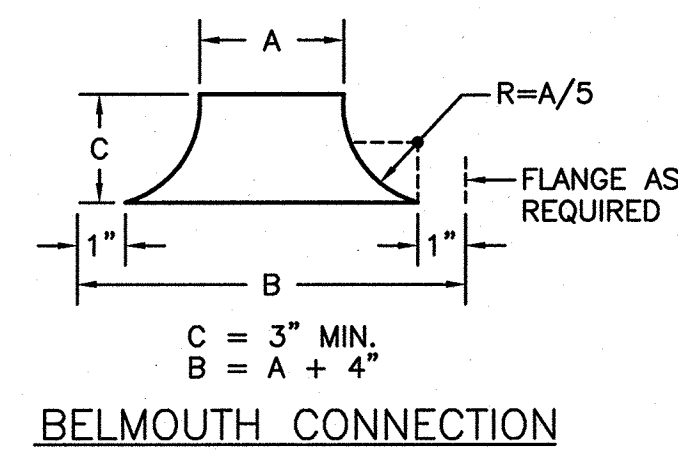
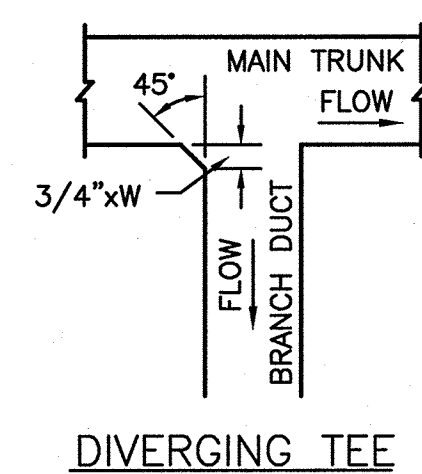
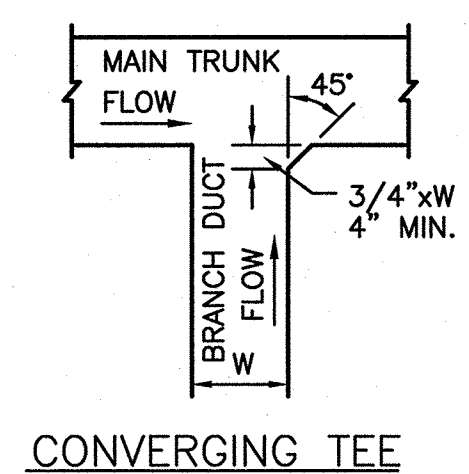


TAPS MAY HAVE SCREWS  
 $L_2 = A - B(4" \text{ MIN.})$



**1 CONICAL TEES**

NOT TO SCALE



**2 DUCT TRANSITIONS**

NOT TO SCALE

## LIGHTING

	2x4 FLUORESCENT FIXTURE ASSOCIATED CONTROL DEVICE FIXTURE TYPE (SEE LIGHT FIXTURE SCHEDULE)
	1x4 FLUORESCENT FIXTURE
	2x2 FLUORESCENT FIXTURE
	FIXTURE WIRED TO UNSWITCHED NORMAL CIRCUIT
	FIXTURE WIRED TO UNSWITCHED EMERGENCY CIRCUIT
	FIXTURE WIRED TO SWITCHED EMERGENCY CIRCUIT
	DOWN LIGHT
	FLUORESCENT STRIP
	WALL MOUNTED FIXTURES
	TRACK LIGHTING
	POLE MOUNTED SITE LIGHTING FIXTURE FIXTURE TYPE (SEE LIGHT FIXTURE SCHEDULE)
	FLOOD LIGHT
	WALL WASH LIGHT FIXTURE
	EXIT SIGN, CEILING MOUNTED ARROW INDICATES EGRESS DIRECTION SHADING INDICATES SIGN FACE
	EXIT SIGN, WALL MOUNTED SHADING INDICATES SIGN FACE
	DUAL HEAD EMERGENCY LIGHT BATTERY PACK TD - TIME DELAY RESET
	REMOTE EMERGENCY LIGHTING HEAD
	WALL PACK
	3-WAY TOGGLE SWITCH
	SINGLE POLE TOGGLE SWITCH INDICATES CONTROLLED FIXTURE
	4-WAY TOGGLE SWITCH
	DUAL LEVEL SWITCHING
	DIMMER SWITCH, INCANDESCENT OR FLUORESCENT AS REQUIRED.
	TOGGLE SWITCH WITH PILOT LIGHT
	TIMER SWITCH, SPRING WOUND
	SINGLE POLE DOUBLE THROW TOGGLE SWITCH, CENTER POSITION OFF
	WEATHER PROOF
	EXPLOSION PROOF
	OCCUPANCY SENSOR SWITCH
	UNSWITCHED CONTINUATION OF BRANCH CIRCUIT
	HOME RUN
	OCCUPANCY SENSOR a. INDICATES CONTROLLED FIXTURE INDICATES AIMING DIRECTION
	OCCUPANCY SENSOR RELAY
	DAYLIGHT SENSOR LIGHTS CONTROLLED BY SENSOR

## COMMUNICATION & DATA SYSTEMS

	TELEPHONE SYSTEM WALL OUTLET BOX W-INDICATES WALL MOUNTED AT 60" AFF P-INDICATES PAYPHONE (2)-INDICATES 2 OUTLETS, SINGLE BOX
	BOX SYSTEM OUTLET
	COMBINATION VOICE/DATA SYSTEM OUTLET BOX
	UNDERFLOOR TELEPHONE SYSTEM OUTLET BOX
	UNDERFLOOR DATA SYSTEM OUTLET BOX
	UNDERFLOOR VOICE & DATA OUTLET BOX
	CABLE TELEVISION SYSTEM OUTLET BOX. MOUNT 18" AFF UNLESS OTHERWISE NOTED
	CLOSED CIRCUIT TELEVISION OUTLET BOX. MOUNT 18" AFF UNLESS OTHERWISE NOTED
	PAGING SYSTEM CONTROL PANEL AND PAGING AMPLIFIER
	PAGING SYSTEM SPEAKER. CEILING MOUNTED
	PAGING SYSTEM SPEAKER. WALL MOUNT AT 7'-6" AFF 1. FLUSH, 2. SURFACE, 3. HORN, 4. DUAL HORN
	VOLUME CONTROL
	INTERCOM SYSTEM HAND KEY
	CLOCK SPEAKER
	INTERCOM SYSTEM HAND SET
	WALL MOUNTED CLOCK
	CEILING MOUNTED TELEPHONE SYSTEM OUTLET
	CEILING MOUNTED DATA SYSTEM OUTLET
	CEILING MOUNTED VOICE & DATA OUTLET

## POWER

	NON-FUSED SAFETY SWITCH AMPERE RATING
	NEMA ENCLOSURE RATING
	FUSED SAFETY SWITCH. TOP NUMBER INDICATES SWITCH AMPERE RATING. LOWER NUMBER INDICATES FUSE RATING
	NEMA ENCLOSURE
	MAGNETIC MOTOR STARTER. FVNR UNLESS INDICATED OTHERWISE
	NEMA ENCLOSURE RATING
	NEMA SIZE (TYPICAL)
	COMBINATION CIRCUIT BREAKER/MAGNETIC MOTOR STARTER FIRST NUMBER INDICATES CIRCUIT BREAKER AMPERE RATING SECOND NUMBER INDICATES NEMA STARTER SIZE
	COMBINATION FUSED DISCONNECT/MAGNETIC MOTOR STARTER NUMBERS INDICATE DISCONNECT AMPERE RATING/FUSE RATING/NEMA STARTER SIZE
	NON-FUSED DISCONNECT/MAGNETIC MOTOR STARTER FIRST NUMBER INDICATES CIRCUIT BREAKER AMPERE RATING SECOND NUMBER INDICATES NEMA STARTER SIZE
	MANUAL MOTOR STARTER. TOGGLE OPERATED, 1, 2 OR 3 POLE AS REQUIRED. OVERLOAD PROTECTION
	MANUAL MOTOR SWITCH, TOGGLE OPERATED, SINGLE PHASE. 1 OR 2 POLE AS REQUIRED (NO OVERLOAD PROTECTION)
	ENCLOSED CIRCUIT BREAKER AMPERE RATING
	ELECTRIC MOTOR, NUMBER INDICATES HORSEPOWER RATING
	EXPLOSION PROOF MOTOR
	VARIABLE AIR VOLUME CONTROL ACTUATORS
	LOCAL SELECTOR SWITCH H/O/A - HAND/OFF/AUTO
	EMERGENCY OFF BREAK GLASS STATION
	PUSHBUTTON STATION
	JUNCTION BOX
	TRANSFORMER
	POWER POLE
	CONDUIT TURNING UP
	CONDUIT TURNING DOWN
	EY CONDUIT SEAL
	DUPLEX RECEPTACLE, NEMA 5-20R. INSTALLED ON EMERGENCY CIRCUIT (TYPICAL)
	HOSPITAL GRADE DUPLEX RECEPTACLE, NEMA 5-20R
	HOSPITAL GRADE GFCI DUPLEX RECEPTACLE, NEMA 5-20R
	HOSPITAL GRADE ISOLATED GROUND DUPLEX RECEPTACLE, NEMA 5-20R
	SINGLE RECEPTACLE, NEMA 5-20R (CLOCK)
	DOUBLE DUPLEX (QUADRUPLEX) RECEPTACLE, NEMA 5-20R
	HOSPITAL GRADE DOUBLE DUPLEX RECEPTACLE NEMA 5-20R
	SWITCHED RECEPTACLE
	FLOOR OUTLET, DUPLEX RECEPTACLE, NEMA 5-20R
	POWER RECEPTACLE, 480 VOLT NEMA CONFIGURATION AS NOTED.
	POWER RECEPTACLE, 240 VOLT NEMA CONFIGURATION AS NOTED.
	PANELBOARD, NORMAL POWER
	PANELBOARD, EMERGENCY POWER
	MULTI OUTLET ASSEMBLY

## GROUNDING

	GROUND ROD
	EXOTHERMIC WELD CONNECTION
	BOLTED CONNECTION
	BARE COPPER CONDUCTOR RUN EXPOSED
	BARE COPPER CONDUCTOR EMBEDDED IN CONCRETE OR BURIED

## NURSE CALL SYSTEM

	NURSE CALL CALL LIGHT
	PATIENT CALL BUTTON
	NURSE CALL PULL CORD
	NURSE CALL MASTER STATION

## LINE TYPES

	EXISTING
	NEW
	DEMOLITION

## FIRE ALARM

	FIRE ALARM CONTROL PANEL
	FIRE ALARM ANNUNCIATOR
	FIRE ALARM MASTER BOX
	FIRE ALARM MANUAL PULL STATION
	FIRE ALARM SPEAKER/STROBE UNIT
	FIRE ALARM AUDIBLE/VISIBLE NOTIFICATION APPLIANCE (GENERAL EVACUATION)
	FIRE ALARM AUDIBLE/VISIBLE NOTIFICATION APPLIANCE (LOCAL)
	FIRE ALARM VISIBLE ONLY NOTIFICATION APPLIANCE CANDLEA INTENSITY-15/75 UNLESS OTHERWISE NOTED CEILING MOUNTED
	PHOTOELECTRIC SMOKE DETECTOR. CEILING MOUNTED INDICATES AUXILIARY CONTACT.
	FIXED TEMPERATURE HEAT DETECTOR. CEILING MOUNTED. INDICATES EQUIPMENT INTERLOCKED WITH THE DETECTOR
	CLEAN ROOM SMOKE DETECTOR
	INDICATES EQUIPMENT INTERLOCKED WITH THE SMOKE DETECTOR
	COMBINATION RATE-OF-RISE/FIXED TEMPERATURE HEAT DETECTOR. CEILING MOUNTED
	DUCT SMOKE DETECTOR, PHOTOELECTRIC WITH AUXILIARY CONTACT.
	SPRINKLER SYSTEM FLOW SWITCH
	SPRINKLER SYSTEM TAMPER SWITCH
	FIRE ALARM SYSTEM MAGNETIC DOOR HOLDER
	INTERLOCK RELAY
	SMOKE DAMPER
	DUCT SMOKE DETECTOR REMOTE TEST INDICATOR
	KNOX BOX

## SECURITY SYSTEMS

	2-WAY CEILING MOUNTED INTERCOM SPEAKER
	CEILING MOUNTED PAGING SPEAKER
	WALL MOUNTED PAGING HORN
	CEILING OR WALL MOUNTED FIXED CAMERA
	CEILING OR WALL MOUNTED PTZ CAMERA
	PAGING CONTROL EQUIPMENT
	INTERCOM MASTER STATION
	DOOR CONTROL EQUIPMENT
	MONITORED DOOR POSITION SWITCH AND CONTROLLED DOOR HARDWARE
	MONITORED DOOR POSITION SWITCH
	STANDARD INTERCOM STATION
	VISITATION TELEPHONE
	WALL MOUNTED DURESS BUTTON
	GRAPHIC CONTROL PANEL
	TOUCH SCREEN WORKSTATION
	CCTV CONTROL OR DISPLAY EQUIPMENT
	PERIMETER CONTROL EQUIPMENT
	DURESS CONTROL EQUIPMENT
	DURESS ALARM RECEIVER
	OFFICER CONTROLLED COLLECT-ONLY PUBLIC TELEPHONE
	OFFICER CONTROLLED FIRE SPRINKLER (DELUGE) HEAD
	DUAL TECHNOLOGY VOLUMETRIC SENSOR
	LOCAL DOOR RELEASE BUTTON
	OFFICER CONTROLLED SHOWER WATER SUPPLY
	OFFICER CONTROLLED LIGHTING AND ELECTRICAL OUTLETS
	DOOR CONTACT
	CARD READER
	KEY PAD
	CLOSED CIRCUIT TELEVISION CAMERA
	ELECTRIC STRIKE
	MAG LOCK

## ONE LINE DIAGRAM

	MEDIUM VOLTAGE DRAWOUT CIRCUIT BREAKER
	LOW VOLTAGE DRAWOUT CIRCUIT BREAKER AF - AMP FRAME AT - AMP TRIP EO - ELECTRICALLY OPERATED
	MOLDED CASE CIRCUIT BREAKER
	SHUNT TRIP
	GROUND FAULT
	ELECTRICALLY OPERATED
	DISCONNECT, ISOLATION OR SAFETY SWITCH
	FUSED CUTOUT
	FUSED LOAD BREAK SWITCH
	MEDIUM VOLTAGE MOTOR STARTER
	MAGNETIC MOTOR STARTER. NUMERAL INDICATES NEMA SIZE FVNR UNLESS OTHERWISE NOTED. FVR - FULL VOLTAGE REVERSING RVAT - REDUCING VOLTAGE AUTO TRANSFORMER 2S - TWO SPEED
	CAPACITOR
	VARIABLE FREQUENCY DRIVE
	POWER TRANSFORMER OA - LIQUID TYPE SELF COOLED AA - DRY TYPE SELF COOLED FA - FAN COOLED CONNECTION
	SHIELDED ISOLATION TRANSFORMER
	POTENTIAL TRANSFORMER RATIO NUMBER REQUIRED
	CURRENT TRANSFORMER RATIO NUMBER REQUIRED
	GROUND FAULT CURRENT TRANSFORMER
	MOTOR, NUMBER INDICATES HORSEPOWER
	GENERATOR
	ATS - AUTOMATIC TRANSFER SWITCH MTS - MANUAL TRANSFER SWITCH
	METER A - AMMETER V - VOLTMETER W - WATTMETER WH - WATT HOURMETER KWH - KILOWATT HOUR KVAR - KILOVAR METER VAR - VAR METER HZ - FREQUENCY METER PF - POWER FACTOR METER
	DIGITAL POWER METER
	METER TRANSFER SWITCH AS - AMMETER SWITCH VS - VOLTMETER SWITCH
	TRANSIENT VOLTAGE SURGE SUPPRESSOR
	LIGHTNING ARRESTOR
	KEY INTERLOCK
	FUSE
	ELECTRONIC POWER FUSE
	DRAWOUT DEVICE
	GROUND

## ABBREVIATIONS

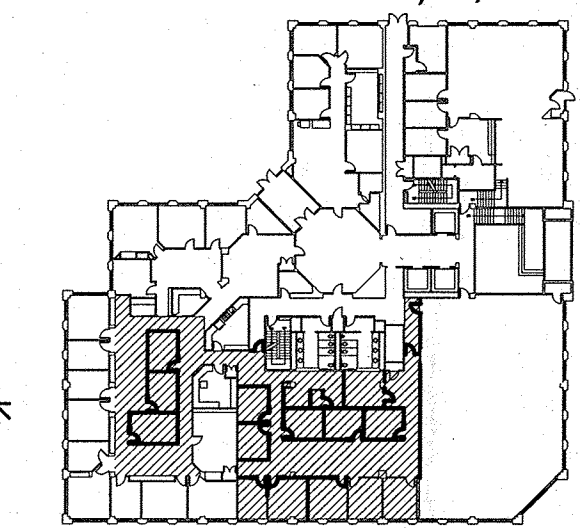
A/AMP	AMPERE	LA	LIGHTNING ARRESTER
AF	ABOVE FINISHED FLOOR	LTG	LIGHTING
AFG	ABOVE FINISHED GRADE	MC	METAL CLAD
AHJ	AUTHORITY HAVING JURISDICTION	MCB	MAIN CIRCUIT BREAKER
AIC	AMPERE INTERRUPTING CAPACITY	MFR	MANUFACTURER
AWG	AMERICAN WIRE GAUGE	MI	MINERAL INSULATED
BFG	BELOW FINISHED GRADE	MLO	MAIN LUG ONLY
BOS	BOTTOM OF STEEL	MTD	MOUNTED
C	CONDUIT, CONDUCTOR	MV	MEDIUM VOLTAGE
CATV	CABLE TELEVISION	NC	NORMALLY CLOSED
CB	CIRCUIT BREAKER	NEC	NATIONAL ELECTRICAL CODE
CCTV	CLOSED CIRCUIT TELEVISION	NEG	NEGATIVE
CPT	CONTROL POWER TRANSFORMER	NEUT	NEUTRAL
CT	CURRENT TRANSFORMER	NIC	NOT IN CONTRACT
CU	COPPER	NO	NORMALLY OPEN
DACT	DIGITAL ALARM COMMUNICATOR	NTS	NOT TO SCALE
DB	DIRECT BURIED	PF	POWER FACTOR
DISC	DISCONNECT	PH	PHASE
DN	DOWN	PVC	POLYVINYL CHLORIDE
DMT	ELECTRICAL METALLIC TUBING	RGS	RIGID STEEL CONDUIT
EWC	ELECTRIC WATER COOLER	RSC	RIGID STEEL CONDUIT
FAA	FIRE ALARM ANNUNCIATOR	RTD	RESISTANCE TEMPERATURE DETECTOR
FACP	FIRE ALARM CONTROL PANEL	SN	SOLID NEUTRAL
FBO	FURNISHED BY OTHERS	STP	SHIELDED TWISTED PAIR
FU	FUSE	STT	SHIELDED TWISTED TRIPLET
FWE	FURNISHED WITH EQUIPMENT	SWBD	SWITCHBOARD
GEN	GENERATOR	SWGR	SWITCHGEAR
GFCI	GROUND FAULT CIRCUIT BREAKER	TOS	TOP OF STEEL
GND	GROUND	TRANSF	TRANSFORMER
HP	HORSEPOWER	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
HTR	HEATER	V	VOLT
IG	ISOLATED GROUND	VA	VOLT-AMPERE
IMC	INTERMEDIATE METAL CONDUIT	VAR	VOLT-AMPERE REACTIVE
K	KILO	WM	WATT METER
KCMIL	THOUSAND CIRCULAR MILS	WP	WEATHER PROOF
KV	KILOVOLT	XFMR	TRANSFORMER
KVA	KILOVOLT-AMPERE	XP	EXPLOSION PROOF
KVAR	KILOVOLT-AMPERE REACTIVE		
KW	KILOWATT		
KWH	KILOWATT-HOUR		

## GENERAL NOTES:

- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH NFPA-70, NATIONAL ELECTRICAL CODE (NEC).
- ALL MOTOR SAFETY SWITCHES, DISCONNECTS AND MOTOR STARTERS ARE PROVIDED BY DIVISION 16000 UNLESS NOTED AS FURNISHED WITH EQUIPMENT (FWE).
- UNLESS OTHERWISE NOTED CONVENIENCE RECEPTACLES SHALL BE MOUNTED 18-INCHES AFF. LIGHTING TOGGLE SWITCHES 48-INCHES AFF. DATA SYSTEM OUTLETS 18-INCHES AFF. FIRE ALARM NOTIFICATION DEVICES 80-INCHES AFF OR 6-INCHES BELOW CEILING, WHICHEVER IS LOWER, AND FIRE ALARM MANUAL PULL STATIONS 48-INCHES TO TOP OF DEVICE.
- ALL PENETRATIONS THROUGH FLOORS, RATED WALLS AND PARTITIONS SHALL BE SEALED WITH UL APPROVED FIRE SEALANT MATERIAL TO MAINTAIN THE RATING OF SEPARATION.
- ALL ENCLOSURES, CONDUIT BODIES AND THEIR COVERS CONTAINING FIRE ALARM SYSTEM CONDUCTORS SHALL BE PAINTED RED.
- AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED WITH EVERY FEEDER AND BRANCH CIRCUIT.
- UNLESS OTHERWISE NOTED WIRING SHALL BE #12 AWG CONDUCTORS AND #12 GND. HOME RUNS FED FROM 20A-1P CIRCUITS IN EXCESS OF 100 FEET SHALL BE #10 AWG.
- FLEXIBLE CONNECTIONS TO MOTORS SHALL BE LIQUID TIGHT FLEXIBLE METAL CONDUIT, UNLESS OTHERWISE NOTED.
- LIGHTING TOGGLE SWITCHES SHALL BE COMMERCIAL SPECIFICATION GRADE 277 VOLT, SIDE WIRED AND PROVIDED WITH GROUNDING SCREW. LEVITON, PASS AND SEYMOUR OR APPROVED EQUAL COORDINATE COLOR WITH ARCHITECT.
- CONVENIENCE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE GROUNDING TYPE NEMA 5-20R, SIDE WIRED. LEVITON, PASS AND SEYMOUR OR APPROVED EQUAL COORDINATE COLOR WITH ARCHITECT.
- PROVIDE WALL PLATES FOR ALL WIRING DEVICES, NYLON SMOOTH TYPE IN FINISHED AREAS AND GALVANIZED IN UNFINISHED AREAS.
- ALL WIRING SHALL BE 600V, COPPER WITH THHN/THWN INSULATION.

## GENERAL NOTE

1. ALL GENERAL NOTES, SYMBOL LISTS, AND DETAILS ARE TO BE CONSIDERED AS APPLICABLE TO ALL ELECTRICAL DRAWINGS FOR THIS PROJECT. SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET ARE FOR REFERENCE ONLY AND DO NOT INDICATE THEIR INCORPORATION IN THE DESIGN.



LEGEND AND GENERAL NOTES  
SCALE: NONE

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Revisions:  
ISSUED FOR PERMIT & CONSTRUCTION

Project Number: 10089

Designer: WRH Drawing Date: 8-12-10

Drafter: CDS Drawing Scale: NONE

Wells Fargo Approval:

Client Approval:

Drawing Number: E-001

Sheet: of

**SPECIFICATIONS:**

**SECTION 16010**

**GENERAL REQUIREMENTS FOR ELECTRICAL WORK**

**PART 1 - GENERAL**

**1.1 REFERENCES**

A. CONDITIONS OF THE CONTRACT, SPECIFICATIONS, CHANGE ORDERS, ADDENDA, DRAWINGS AND DIVISION 1 GENERAL REQUIREMENTS, APPLY TO WORK OF THIS SECTION. WHERE PARAGRAPHS OF THIS SECTION CONFLICT WITH SIMILAR PARAGRAPHS OF DIVISION 1, REQUIREMENTS OF THIS SECTION SHALL PREVAIL.

B. AS USED IN THIS SECTION, "PROVIDE" MEANS "FURNISH AND INSTALL"; "FURNISH" MEANS "TO PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH EVERY NECESSARY APPURTENANCE AND SUPPORT AND TO STORE IN A SECURE AREA IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS", AND "INSTALL" MEANS "TO UNLOAD AT THE DELIVERY POINT AT THE SITE OR RETRIEVE FROM STORAGE, MOVE TO POINT OF INSTALLATION AND PERFORM EVERY OPERATION NECESSARY TO ESTABLISH SECURE MOUNTING AND CORRECT OPERATION AT THE PROPER LOCATION IN THE PROJECT".

**1.2 EXAMINATION OF SITE**

A. BEFORE SUBMITTING A BID, THE ELECTRICAL CONTRACTOR SHALL VISIT AND CAREFULLY EXAMINE SITE TO IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT MAY AFFECT THE WORK OF THIS SECTION. NO EXTRA PAYMENT WILL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS.

B. BEFORE STARTING WORK IN A PARTICULAR AREA OF THE PROJECT, THE ELECTRICAL CONTRACTOR SHALL EXAMINE THE CONDITIONS UNDER WHICH WORK MUST BE PERFORMED INCLUDING PREPARATORY WORK PERFORMED UNDER OTHER SECTIONS OF THE CONTRACT, OR BY THE OWNER AND REPORT CONDITIONS WHICH MIGHT ADVERSELY AFFECT THE WORK IN WRITING TO THE ARCHITECT. DO NOT PROCEED WITH WORK UNTIL DEFECTS HAVE BEEN CORRECTED AND CONDITIONS ARE SATISFACTORY. COMMENCEMENT OF WORK SHALL BE CONSTRUED AS COMPLETE ACCEPTANCE OF EXISTING CONDITIONS AND PREPARATORY WORK.

**1.3 SCOPE**

A. THE WORK TO BE ACCOMPLISHED UNDER THESE SPECIFICATIONS INCLUDES PROVIDING ALL LABOR, MATERIALS, EQUIPMENT, CONSUMABLE ITEMS, SUPERVISION, ADMINISTRATIVE TASKS, TESTS AND DOCUMENTATION REQUIRED TO INSTALL COMPLETE AND FULLY OPERATIONAL ELECTRICAL SYSTEMS AS DESCRIBED HEREIN AND SHOWN ON THE DRAWINGS. THE ELECTRICAL CONTRACTOR SHALL COMPLETELY COORDINATE THE WORK OF THIS SECTION WITH THE WORK OF OTHER TRADES.

B. THE ELECTRICAL CONTRACTOR SHALL FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY FEES AND OBTAIN NECESSARY INSPECTIONS AND APPROVALS FROM AUTHORITIES THAT HAVE JURISDICTION, AS REQUIRED TO PERFORM WORK IN ACCORDANCE WITH ALL LEGAL REQUIREMENTS.

C. THE WORK SHALL BE COMPLETE FROM POINT OF SERVICE TO EACH OUTLET OR DEVICE WITH ALL ACCESSORY CONSTRUCTION AND MATERIALS REQUIRED TO MAKE EACH ITEM OF EQUIPMENT OR SYSTEM COMPLETE AND READY FOR OPERATION. THE WORK SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING. THE ELECTRICAL CONTRACTOR SHALL PROVIDE:

1. OVERCURRENT DEVICES, RACEWAY, CABLE AND WIRE.

A. OVERCURRENT DEVICES SHALL BE TRIP-FREE, BOLT-ON, THERMAL MAGNETIC CIRCUIT BREAKERS. PROVIDE BOLT-ON OR CLAMP-ON BREAKERS AS REQUIRED BY EXISTING PANELS USED.

2. BRANCH CIRCUITS AND DEVICES FOR CONVENIENCE RECEPTACLES AND LIGHTING CIRCUITS.

3. ALL MOTOR WIRING, SAFETY DISCONNECTS, AND MOTOR STARTERS UNLESS INTEGRAL WITH EQUIPMENT.

A. SAFETY DISCONNECTS SHALL BE 240VAC, HEAVY DUTY, HORSEPOWER RATED, VISIBLE BLADE TYPE. FUSED SWITCHES SHALL BE PROVIDED WITH CLASS RK1, DUAL-ELEMENT, TIME DELAY FUSES.

4. COMPLETE INTERIOR LIGHTING SYSTEM, AS SHOWN ON THE DRAWINGS, INCLUDING NORMAL AND EMERGENCY FIXTURES, EXIT SIGNS, LAMPS, CONTROLS, TRIM AND ACCESSORIES.

5. COMPLETE TELECOMMUNICATIONS RACEWAYS AND BOXES.

6. ALL SUPPORT MATERIAL AND HARDWARE FOR RACEWAY AND ELECTRICAL EQUIPMENT.

8. DEMOLITION OF EQUIPMENT, DEVICES, WIRING AND RACEWAY AS INDICATED ON THE DRAWINGS.

9. TERMINATION OF ALL CABLE AND WIRE UNLESS OTHERWISE NOTED.

10. BUILDING WALL, FLOOR AND ROOF PENETRATIONS FOR RACEWAY.

11. MODIFICATION TO THE EXISTING FIRE ALARM SYSTEM.

**1.4 RELATED WORK IN OTHER SECTIONS**

A. THE FOLLOWING WORK IS NOT INCLUDED IN THIS SECTION AND SHALL BE PERFORMED UNDER OTHER SECTIONS:

1. CUTTING AND PATCHING OF MASONRY, CONCRETE, TILE, AND OTHER PARTS OF STRUCTURE, WITH THE EXCEPTION OF DRILLING FOR HANGERS AND PROVIDING HOLES AND OPENINGS IN METAL DECKS.
2. INSTALLATION OF ACCESS PANELS IN CEILINGS AND WALL CONSTRUCTION.
3. PAINTING, EXCEPT AS SPECIFIED HEREIN.
4. TEMPORARY WATER, HEAT, GAS AND SANITARY FACILITIES FOR USE DURING CONSTRUCTION AND TESTING.

B. THE ELECTRICAL CONTRACTOR SHALL IDENTIFY LOCATIONS OF PENETRATIONS, STRUCTURAL SUPPORTS, ETC. REQUIRED FOR THE COMPLETION OF THE WORK OF THIS SECTION TO THE GENERAL CONTRACTOR IN A TIMELY MANNER.

**1.5 CODES, STANDARDS, AND AUTHORITIES**

A. ALL WORK SHALL BE PERFORMED STRICTLY AS REQUIRED BY RULES, REGULATIONS, STANDARDS, CODES, ORDINANCES, AND LAWS OF LOCAL, STATE, AND FEDERAL GOVERNMENTS, AND OTHER AUTHORITIES THAT HAVE LAWFUL JURISDICTION. MATERIALS AND EQUIPMENT SHALL BE MANUFACTURED, INSTALLED AND TESTED AS SPECIFIED IN LATEST EDITIONS OF PUBLICATIONS, STANDARDS, RULINGS, AND DETERMINATIONS OF:

1. LOCAL AND STATE BUILDING, PLUMBING, MECHANICAL, ELECTRICAL, FIRE AND HEALTH DEPARTMENT AND PUBLIC SAFETY CODES AGENCIES.
2. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
3. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
4. FACTORY MUTUAL ASSOCIATION (FM)
5. NATIONAL ELECTRICAL CODE (NEC)
6. NATIONAL ELECTRICAL SAFETY CODE (NESC).
7. THE BOCA NATIONAL BUILDING CODE.

A. ALL MATERIALS AND EQUIPMENT SHALL BE LISTED BY UNDERWRITERS LABORATORIES (UL), AND APPROVED FOR INTENDED SERVICE.

B. WHEN REQUIREMENTS CITED IN THIS PARAGRAPH CONFLICT WITH EACH OTHER OR WITH CONTRACT DOCUMENTS, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN CONDUCT OF WORK. THE ENGINEER MAY RELAX THIS REQUIREMENT WHEN SUCH RELAXATION DOES NOT VIOLATE THE RULING OF AUTHORITIES THAT HAVE JURISDICTION. APPROVAL FOR SUCH RELAXATION SHALL BE OBTAINED IN WRITING.

8. INTERNATIONAL BUILDING CODE (IBC)

**1.6 WARRANTY**

A. REFER TO DIVISION 1 GENERAL REQUIREMENTS FOR WARRANTY REQUIREMENTS.

**1.7 CONTRACT DRAWINGS**

A. WORK TO BE PERFORMED UNDER THIS SECTION IS SHOWN ON THE ELECTRICAL DRAWINGS LISTED IN DIVISION 1 GENERAL REQUIREMENTS.

B. THE LISTING OF ELECTRICAL DRAWINGS DOES NOT LIMIT RESPONSIBILITY OF DETERMINING FULL EXTENT OF WORK REQUIRED BY CONTRACT DOCUMENTS. THE ELECTRICAL CONTRACTOR SHALL REFER TO ARCHITECTURAL, PLUMBING AND HVAC DRAWINGS AND OTHER SECTIONS THAT INDICATE TYPES OF CONSTRUCTION WITH WHICH WORK OF THIS SECTION MUST BE COORDINATED. THE ELECTRICAL CONTRACTOR SHALL CHECK WITH THE GENERAL CONTRACTOR AND OTHER SUBCONTRACTORS TO DETERMINE WHETHER THERE WILL BE ANY INTERFERENCE BY SUCH TRADES WITH THE ELECTRICAL WORK. IF THE ELECTRICAL CONTRACTOR FAILS TO CHECK WITH THE GENERAL CONTRACTOR AND SUBCONTRACTORS AND THE ELECTRICAL WORK IS LATER FOUND TO INTERFERE WITH THEIR WORK, THEN HE SHALL MAKE NECESSARY CHANGES, WITHOUT ADDITIONAL COST TO THE OWNER, TO ELIMINATE SUCH INTERFERENCE.

C. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WORK WITH THE BUILDING OWNER'S ELECTRICAL CONTRACTOR SO THAT EXISTING CIRCUITS SERVING EXISTING DEVICES BOTH INSIDE AND OUTSIDE OF THE WORK AREA MAY BE PROPERLY SEPARATED TO MAINTAIN CORRECT METERING OF ALL AREAS AFFECTED BY THE WORK.

D. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN CONTRACT. INFORMATION AND COMPONENTS SHOWN ON RISER DIAGRAMS OR CALLED FOR IN THE SPECIFICATIONS BUT NOT SHOWN ON PLANS, AND VICE VERSA, SHALL APPLY AND SHALL BE PROVIDED AS THOUGH REQUIRED EXPRESSLY BY BOTH. IT IS NOT INTENDED TO SPECIFY OR TO SHOW EVERY OFFSET, FITTING, OR COMPONENT; HOWEVER, CONTRACT DOCUMENTS REQUIRE COMPONENTS AND MATERIALS WHETHER OR NOT INDICATED OR SPECIFIED AS NECESSARY TO MAKE ELECTRICAL INSTALLATION COMPLETE AND OPERATIONAL.

**1.8 DISCREPANCIES IN DOCUMENTS**

A. IT SHALL BE THE RESPONSIBILITY OF EACH BIDDER TO EXAMINE THE DRAWINGS AND SPECIFICATIONS CAREFULLY BEFORE SUBMITTING HIS BID. ANY DISCREPANCIES DISCOVERED SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT FOR CORRECTION. SHOULD ANY OF THE AFOREMENTIONED DISCREPANCIES EXIST IN EITHER OR BOTH THE DRAWINGS AND SPECIFICATIONS, THE ELECTRICAL CONTRACTOR SHALL HAVE THE SAME EXPLAINED AND ADJUSTED IN WRITING BEFORE SIGNING THE CONTRACT OR PROCEEDING WITH WORK. FAILURE TO NOTIFY THE ARCHITECT IN WRITING OF SUCH IRREGULARITIES WILL CAUSE THE ARCHITECT'S INTERPRETATION OF THE CONTRACT DOCUMENTS TO BE FINAL. NO ADDITIONAL COMPENSATION WILL BE APPROVED BECAUSE OF DISCREPANCIES THUS RESOLVED.

C. THE DRAWINGS AND THESE SPECIFICATIONS ARE INTENDED TO COMPLY WITH ALL THE ABOVE MENTIONED RULES AND REGULATIONS. IF DISCREPANCIES OCCUR, THE ELECTRICAL CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF SAID DISCREPANCIES AND APPLY FOR AN INTERPRETATION AND, UNLESS AND INTERPRETATION IS OFFERED IN WRITING BY THE ARCHITECT PRIOR TO THE EXECUTION OF THE CONTRACT, THE APPLICABLE RULES AND REGULATIONS SHALL BE COMPLIED WITH AS A PART OF THE CONTRACT.

D. IN CASE OF DIFFERENCE BETWEEN BUILDING CODES, SPECIFICATIONS, STATE LAWS, INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS, THE MOST STRINGENT SHALL GOVERN. SHOULD THE ELECTRICAL CONTRACTOR PERFORM ANY WORK THAT DOES NOT COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE BUILDING CODES, STATE LAWS, AND INDUSTRY STANDARDS, HE SHALL BEAR ALL COSTS ARISING IN CORRECTING THESE DEFICIENCIES.

**1.9 EQUIPMENT AND MATERIALS**

A. ALL EQUIPMENT AND MATERIALS SHALL BE NEW AND OF THE QUALITY SPECIFIED. ALL MATERIALS SHALL BE FREE FROM DEFECTS AT THE TIME OF INSTALLATION. MATERIALS OR EQUIPMENT DAMAGED IN SHIPMENT OR OTHERWISE DAMAGED DURING CONSTRUCTION SHALL NOT BE REPAIRED AT THE JOBSITE, BUT SHALL BE REPLACED WITH NEW MATERIALS.

**1.10 RECORD DRAWINGS**

A. AS WORK PROGRESSES, AND FOR DURATION OF THE CONTRACT, THE ELECTRICAL CONTRACTOR SHALL MAINTAIN A COMPLETE AND SEPARATE SET OF PRINTS OF CONTRACT DRAWINGS AT JOB SITE AT ALL TIMES AND RECORD WORK COMPLETED AND ALL CHANGES FROM ORIGINAL CONTRACT. DRAWINGS SHALL CLEARLY AND ACCURATELY INCLUDE WORK INSTALLED AS A MODIFICATION OR ADDED TO THE ORIGINAL DESIGN.

B. AT COMPLETION OF WORK AND PRIOR TO FINAL REQUEST FOR PAYMENT, THE ELECTRICAL CONTRACTOR SHALL SUBMIT A COMPLETE SET OF REPRODUCIBLE RECORD DRAWINGS SHOWING ALL SYSTEMS AS ACTUALLY INSTALLED.

**1.11 SHOP DRAWINGS**

A. AFTER THE CONTRACT IS AWARDED, BUT PRIOR TO PROCEEDING WITH THE WORK, THE ELECTRICAL CONTRACTOR SHALL OBTAIN COMPLETE SHOP DRAWINGS FOR THE LIGHT FIXTURES. A MINIMUM PERIOD OF TEN WORKING DAYS, EXCLUSIVE OF TRANSMITTAL TIME WILL BE REQUIRED IN THE ENGINEER'S OFFICE EACH TIME SHOP DRAWINGS ARE SUBMITTED OR RESUBMITTED FOR REVIEW. THIS TIME PERIOD SHALL BE CONSIDERED BY THE ELECTRICAL CONTRACTOR WHEN SCHEDULING HIS WORK.

B. REFER TO DIVISION 1 FOR SPECIFIC SUBMITTAL REQUIREMENTS AND QUANTITY OF COPIES TO BE SUBMITTED.

C. THE SHOP DRAWING SUBMITTAL SHALL INCLUDE ALL DATA NECESSARY FOR INTERPRETATION AS WELL AS MANUFACTURER'S NAME AND CATALOG NUMBER. SIZES, CAPACITIES, COLORS, ETC., SPECIFIED ON THE DRAWINGS SHALL BE SPECIFICALLY NOTED OR MARKED ON THE SHOP DRAWINGS.

D. SUBMITTALS SHALL CONTAIN ONLY INFORMATION SPECIFIC TO SYSTEMS, EQUIPMENT AND MATERIALS REQUIRED BY CONTRACT DOCUMENTS FOR THIS PROJECT. DO NOT SUBMIT CATALOGS THAT DESCRIBE PRODUCTS, MODELS, OPTIONS OR ACCESSORIES, OTHER THAN THOSE REQUIRED, UNLESS IRRELEVANT INFORMATION IS MARKED OUT OR UNLESS RELEVANT INFORMATION IS HIGHLIGHTED CLEARLY. MARKS ON SUBMITTALS, WHETHER BY CONTRACTOR, SUBCONTRACTOR, MANUFACTURER, ETC SHALL NOT BE MADE IN RED INK. RED IS RESERVED FOR REVIEW PROCESS.

E. MANUFACTURER'S NAMES ARE LISTED HEREIN AND ON THE DRAWINGS TO ESTABLISH A STANDARD FOR QUALITY AND DESIGN. WHERE ONE MANUFACTURER'S NAME IS MENTIONED, PRODUCTS OF OTHER MANUFACTURERS WILL BE ACCEPTABLE IF, IN THE OPINION OF THE ENGINEER, THE SUBSTITUTE MATERIAL IS OF QUALITY EQUAL TO OR BETTER THAN THAT OF THE MATERIAL SPECIFIED. WHERE TWO OR MORE MANUFACTURER'S NAMES ARE SPECIFIED, MATERIAL SHALL BE BY ONE OF THE NAMED MANUFACTURERS ONLY.

**1.12 BULLETINS, MANUALS, AND INSTRUCTIONS**

A. REFER TO DIVISION 1 FOR SPECIFIC SUBMITTAL REQUIREMENTS AND QUANTITY OF COPIES TO BE SUBMITTED.

**1.13 MARKING AND LABELING**

A. CARDHOLDERS FOR NEW AND EXISTING PANELBOARDS SHALL BE FILLED OUT WITH TYPENWRITTEN IDENTIFICATION OF EACH NEW CIRCUIT, EXCEPT THAT THE WORD "SPARE" SHALL BE WRITTEN IN SOFT PENCIL TO IDENTIFY ALL CIRCUIT BREAKERS INSTALLED THAT ARE NOT USED.

B. ALL RECEPTACLES, LIGHT SWITCHES AND EQUIPMENT TO BE LABELED WITH PANELBOARD AND CIRCUIT THAT FEEDS DEVICE. LABELS SHALL BE SELF ADHESIVE "BROTHER PTOUCH" OR EQUAL.

**1.14 WORK IN EXISTING FACILITIES**

A. ALL WORK SHALL BE ACCOMPLISHED WHILE THE OWNER'S FACILITY IS IN NORMAL OPERATION. ALL CONSTRUCTION ACTIVITIES SHALL BE CONDUCTED WITH MINIMAL DISRUPTION TO THE OWNER'S OPERATION.

B. POWER OUTAGES, IF REQUIRED, AND THE LIKE SHALL BE SCHEDULED IN WRITING WITH THE OWNER.

**1.15 WIRING METHODS**

A. WIRING SHALL BE INSTALLED AS FOLLOWS:

1. ALL FEEDERS AND BRANCH CIRCUITS SHALL BE INSTALLED IN EMT WHEN RUN EXPOSED AND TYPE MC CABLE WHEN RUN ABOVE CEILING AND WITHIN WALL CAVITIES. ALL CONDUIT AND MC CABLE TO BE SUPPORTED FROM STRUCTURE.
2. ALL VOICE/DATA RACEWAY SHALL BE EMT WITHIN ALL NEW WALLS. IT SHALL BE PERMITTED TO BE FISHED IN EXISTING WALLS. VOICE/DATA WIRING TO BE BY OWNER.

**1.16 DEVICES**

A. RECEPTACLES SHALL BE SPECIFICATION GRADE, NEMA 5-20R. COLOR SELECTED BY ARCHITECT.

B. LIGHT SWITCHES SHALL BE SPECIFICATION GRADE, 20 AMP, 277 VOLT.

C. DEVICE PLATES: SMOOTH NYLON TO MATCH DEVICE.

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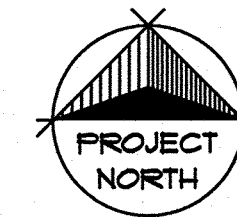
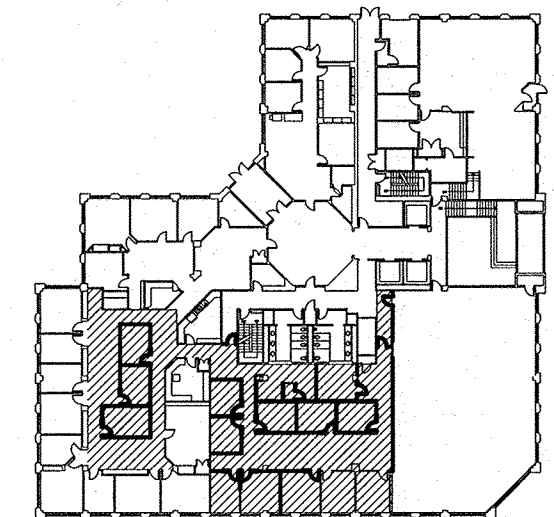
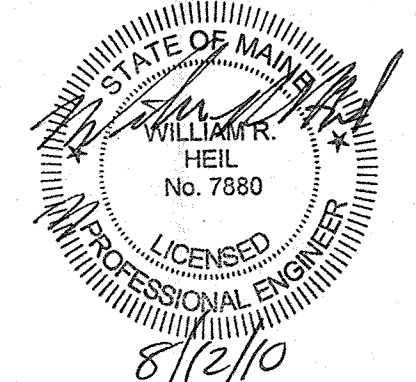
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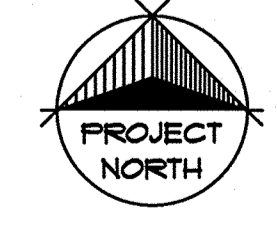
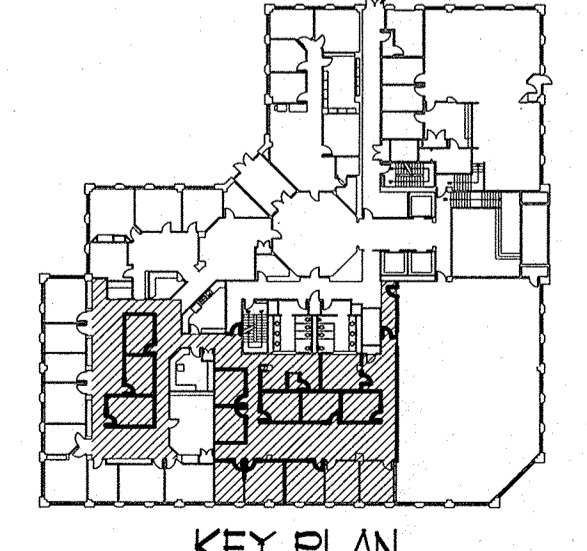
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Designer: WRH Drawing Date: 8-12-10  
Drafter: CDS Drawing Scale: NONE  
Wells Fargo Approval:  
Client Approval:  
Drawing Number: E-002  
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**NOTES:**

- SEE SHEET E-001 FOR LEGEND AND GENERAL NOTES.
- REMOVE CIRCUITS BACK TO SOURCE PANELBOARD. COORDINATE WITH BUILDING OWNER'S ELECTRICIAN.

**KEYED NOTES:**

- REMOVE AND SAVE EXISTING FIRE ALARM DEVICE FOR REINSTALLATION UNDER NEW WORK. SEE DRAWING EY101.
- AREA CIRCUITS TO BE RE-FED BY BUILDING OWNER'S ELECTRICIAN. COORDINATE ELECTRICAL DEMOLITION WORK WITH BUILDING OWNER'S ELECTRICIAN SO THAT ALL CIRCUITS ARE RE-ENERGIZED AT COMPLETION OF WORK.
- REMOVE EXISTING DEVICE. OUTLET BOX AND CONDUIT/WIRE REMAINS FOR REUSE.
- REMOVE EXISTING TELE/DATA JACK. OUTLET BOX & CONDUIT REMAIN FOR REUSE.
- EXISTING ELECTRIC BASEBOARD HEATER TO BE REMOVED. EXISTING 277V CIRCUIT TO REMAIN.



**ELECTRICAL POWER & SYSTEMS  
 DEMOLITION PLAN**  
 SCALE: 1/8"=1'-0"





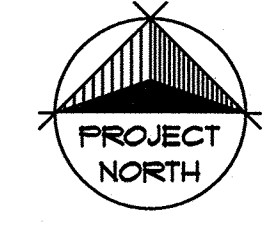
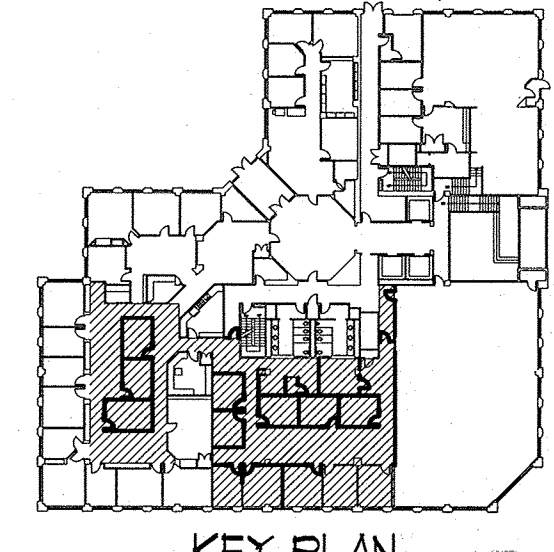
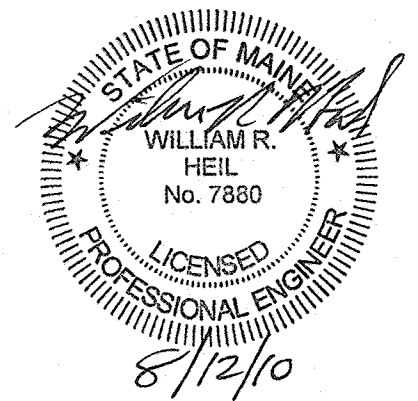
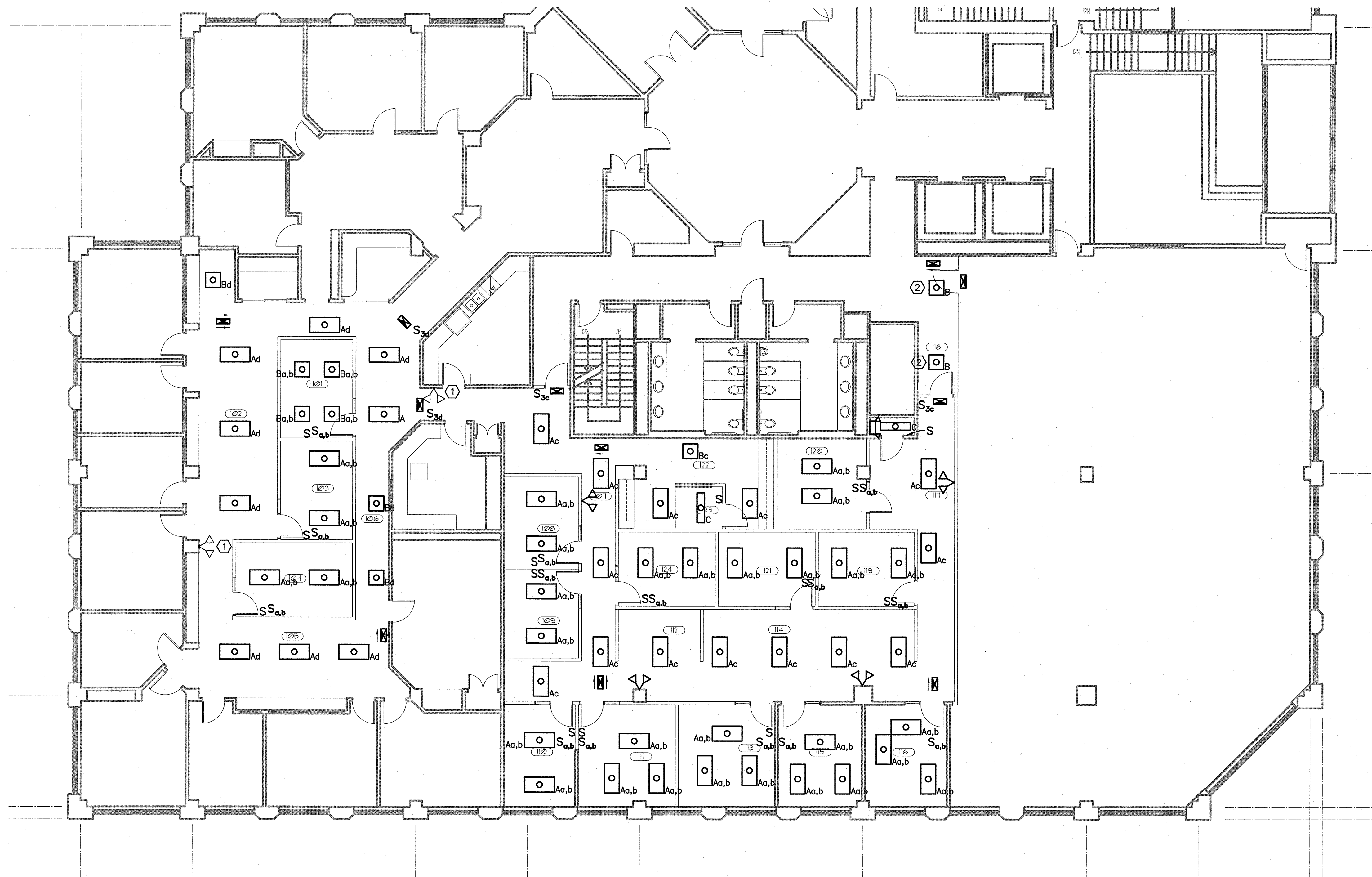
LIGHT FIXTURE SCHEDULE					
TYPE	DESCRIPTION	MFR.	LAMPS	MOUNTING	NOTES
A	2x4 18 CELL PARABOLIC FIXTURE WITH INSTANT START ELECTRONIC BALLAST 277V	COLUMBIA P424-332G-LD36-A-EU	3-32WT8 3500K	CEILING RECESSED	-PROVIDE LAMP/BALLAST COMBINATION MEETING EFFICIENCY MAINE INCENTIVE REQUIREMENTS. -PROVIDE BALLAST FOR DOUBLE SWITCHING WHERE INDICATED ON PLANS.
B	2x2 9-CELL PARABOLIC FIXTURE WITH INSTANT START ELECTRONIC BALLAST 277V	COLUMBIA P422-232U6G-LD33-A-EU	2-17WT8 3500K	CEILING RECESSED	-PROVIDE LAMP/BALLAST COMBINATION MEETING EFFICIENCY MAINE INCENTIVE REQUIREMENTS. -PROVIDE BALLAST FOR DOUBLE SWITCHING WHERE INDICATED ON PLANS.
C	4' STRAIGHT SIDED UTILITY CHANNEL STRIP LIGHT 277V	COLUMBIA CS4-132-EU	1-32WT8 3500K	SURFACE MOUNT CEILING	-PROVIDE LAMP/BALLAST COMBINATION MEETING EFFICIENCY MAINE INCENTIVE REQUIREMENTS.
⊠	LED EXIST SIGN 120/277V	DUAL-LITE LXURW-EI	LED	SURFACE MOUNT WALL/CEILING	-PROVIDE WITH SELF DIAGNOSTIC ELECTRONICS. CONNECT TO EXISTING EXIT SIGN CIRCUIT.
⊠	HIGH CAPACITY THERMOPLASTIC EMERGENCY UNIT 120/277V	DUAL-LITE CVEC100-12V-I	2-7.2W INCANDESCENT 12 VOLT	SURFACE WALL	-PROVIDE WITH SELF DIAGNOSTIC ELECTRONICS.
⊠	INDOOR REMOTE LIGHTING HEADS 12V	DUAL-LITE SRHDW-1207	2-7.2W INCANDESCENT 12 VOLT	SURFACE WALL	

**NOTE:**

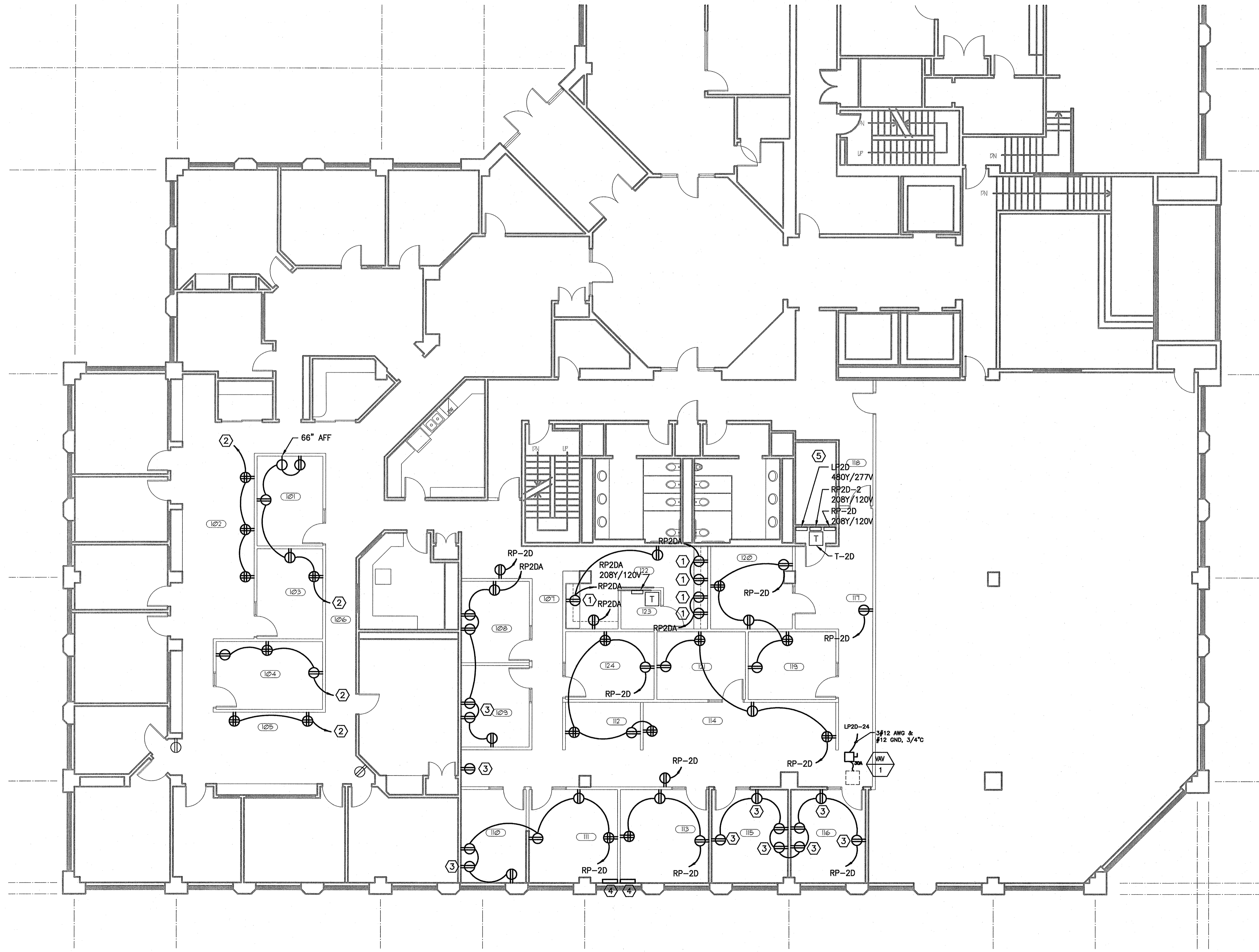
- SEE SHEET E-001 FOR LEGEND AND GENERAL NOTES.
- CONNECT LIGHT FIXTURES TO EXISTING 277 VOLT LIGHT CIRCUITS.

**KEYED NOTE:**

- EXISTING EMERGENCY LIGHT REMOTE HEADS REMAIN.
- CONNECT TO EXISTING PUBLIC CORRIDOR LIGHTING CIRCUIT.

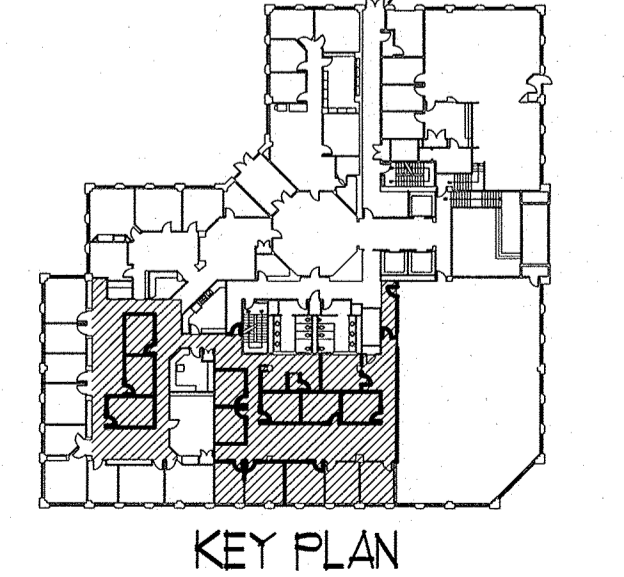


**LIGHTING FLOOR PLAN**  
SCALE: 1/8"=1'-0"



- NOTES:**
- SEE SHEET E-001 FOR LEGEND AND GENERAL NOTES.
  - ELECTRICAL CONTRACTOR SHALL VERIFY ALL CIRCUITS PRIOR TO WORK. CIRCUITS INDICATED ARE FOR REFERENCE ONLY. CONTRACTOR SHALL INDICATE FINAL CIRCUIT NUMBERS ON RECORD DRAWINGS.
  - SEE ARCHITECTURAL PLANS FOR DEVICE LOCATIONS.

- KEYED NOTES:**
- MOUNT AT 48" AFF. OR AS REQUIRED BY ARCHITECTURAL DRAWINGS.
  - USE EXISTING LOCAL 120 VOLT CIRCUIT MADE SPARE DURING DEMOLITION WORK.
  - PROVIDE NEW DEVICE IN EXISTING OUTLET BOX.
  - CONNECT TO EXISTING 277V CIRCUIT. COORDINATE WITH MECHANICAL AND CONTROLS CONTRACTOR FOR NEW CONTROL SCHEME.
  - PROVIDE NEW 20A, 1-POLE BREAKER IN EXISTING PANEL "LP2D", POLE 24.



POWER FLOOR PLAN  
SCALE: 1/8"=1'-0"

**McCormick Architects+ Designers, Inc.**  
Ice House, Studio 115  
100 43rd Street  
Pittsburgh, Pennsylvania 15201  
Telephone 412.687.2200  
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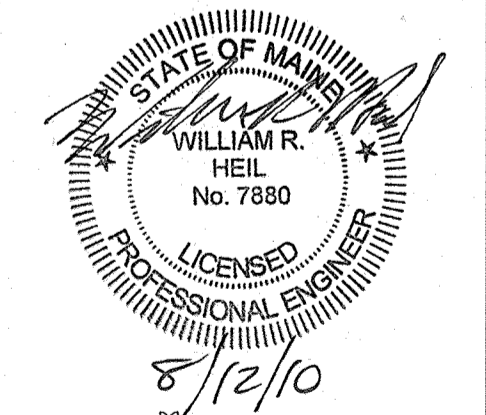
144 Fore Street/P.O. Box 618  
Portland, Maine 04104  
Tel. (207) 772-3846  
Fax. (207) 772-1070  
www.mccormick.com

ARCHITECTURE  
ENGINEERING  
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INTERIOR DESIGN  
COMMISSIONING

**SMART**

**PCG - PORTLAND, ME**  
Business Entity # 145194  
2nd Flr, 2 Portland Square  
Portland, ME 04101

**Wells Fargo Bank, N.A.**  
420 Montgomery Street  
San Francisco, CA 94104



Revisions:  
ISSUED FOR PERMIT & CONSTRUCTION

Project Number: 10089  
Designer: WRH Drawing Date: 8-12-10  
Drafter: CDS Drawing Scale: 1/8"=1'-0"

Wells Fargo Approval:

Client Approval:

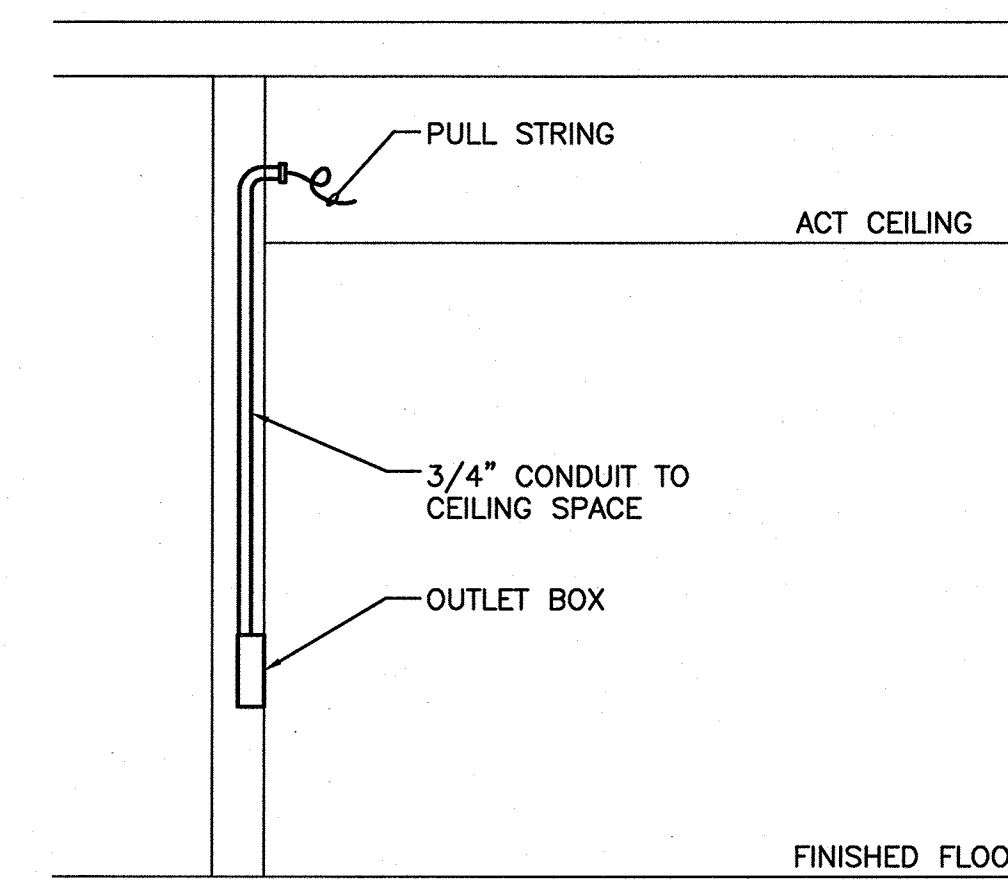
Drawing Number: EP101  
Sheet: of

**NOTES:**

- SEE SHEET E-001 FOR LEGEND AND GENERAL NOTES.
- PROVIDE ADDITIONAL FIRE ALARM DEVICES AS REQUIRED. RETURN SURPLUS FIRE ALARM DEVICES TO BUILDING OWNER.
- SEE ARCHITECTURAL PLANS FOR DEVICE LOCATIONS.

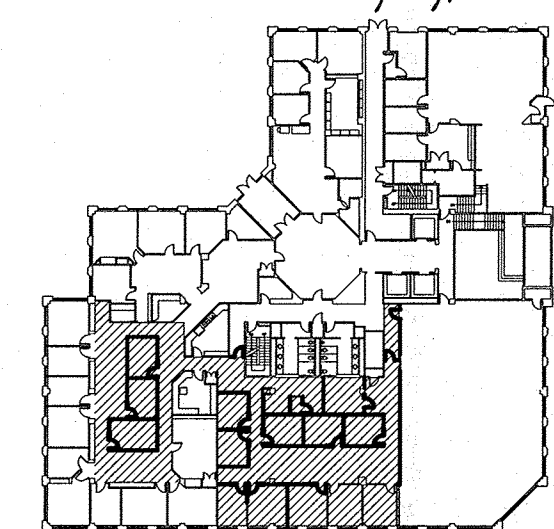
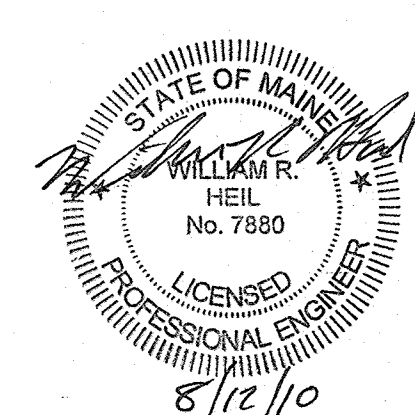
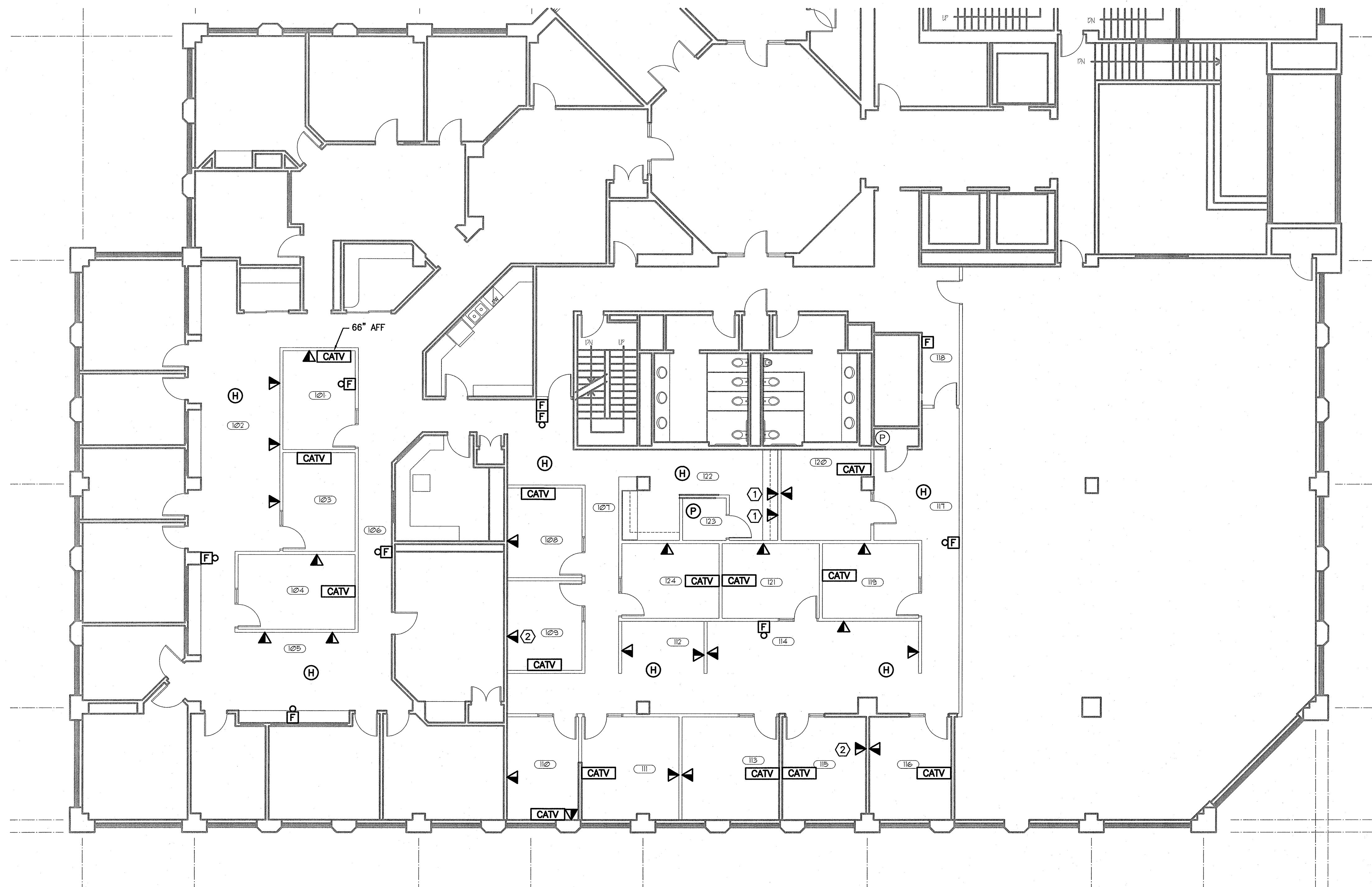
**KEYED NOTES:**

- MOUNT AT 48" AFF. OR AS REQUIRED BY ARCHITECTURAL DRAWINGS.
- EXISTING OUTLET BOX REMAINS.

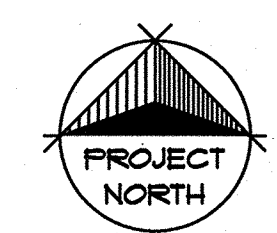


**TELE/DATA BOX DETAIL**

SCALE : NONE



KEY PLAN



**SYSTEMS FLOOR PLAN**  
SCALE : 1/8"=1'-0"