CEILING

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LIGHTING FIXTURE, LETTER SUBSCRIPT INDICATES SCHEDULED

EMERGENCY LIGHTING FIXTURE, LETTER SUBSCRIPT

INDICATES SCHEDULED FIXTURE TYPE.

INDICATES SCHEDULED FIXTURE TYPE.

INDICATES SCHEDULED FIXTURE TYPE.

20 AMP, 120/277 VOLT

20 AMP, 120/277 VOLT

20 AMP, 120/277 VOLT

20 AMP, 120/277 VOLT

FAN SPEED CONTROL SWITCH

20 AMP, 120/277 VOLT

SINGLE POLE KEY SWITCH

20 AMP, 120/277 VOL

20 AMP, 120/277 VOLT

SPECIALTY SWITCH

SINGLE POLE TOGGLE TYPE A/C SWITCH

DOUBLE POLE TOGGLE TYPE A/C SWITCH

THREE WAY TOGGLE TYPE A/C SWITCH

FOUR WAY TOGGLE TYPE A/C SWITCH

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

(FURNISHED BY MC, INSTALLED & WIRED BY EC)

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

AUTOMATIC WALL SWITCH - OCCUPANCY (AUTO ON)

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

AUTOMATIC WALL SWITCH - VACANCY (MANUAL ON)

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

*-PRESET FOR MAXIMUM OF 2 HOUR OVERIDE.

WATTSTOPPER DW-100 OR APPROVED EQUAL

WATTSTOPPER DW-100 OR APPROVED EQUAL

WATTSTOPPER DW-200 OR APPROVED EQUAL MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

WATTSTOPPER DW-200 OR APPROVED EQUAL

WATTSTOPPER DW-200 OR APPROVED EQUAL

WATTSTOPPER DW-311 OR APPROVED EQUAL

WATTSTOPPER DW-311 OR APPROVED EQUAL

AUTOMATIC WALL SWITCH W/ FAN DELAY OFF

WATTSTOPPER DT300 OR APPROVED EQUAL

WATTSTOPPER DT200 OR APPROVED EQUAL

WATTSTOPPER WT2250 OR APPROVED EQUAL

WATT STOPPER DT300 OR APPROVED EQUAL

LOWERCASE LETTER INDICATES LINKED SENSORS

MOUNT BELOW ANY PENDANT MOUNTED LIGHTING

WATTSTOPPER DT200 OR APPROVED EQUAL

WATTSTOPPER WT2250 OR APPROVED EQUAL

WATT STOPPER DT300 OR APPROVED EQUAL

WATTSTOPPER DT200 OR APPROVED EQUAL

WATTSTOPPER WT2250 OR APPROVED EQUAL

MOMENTARY ON-OFF WALL SWITCH

LOWERCASE LETTER INDICATES LINKED SENSORS

MOUNT BELOW ANY PENDANT MOUNTED LIGHTING

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

DAYLIGHTING/VACANCY DIGITAL ROOM CONTROLLER

1 IS LMRC-211, 2 IS LMRC-212, 3 IS LMRC-213

WATTSTOPPER LMLS-500 OR APPROVED EQUAL

WATTSTOPPER LMDC-100 OR APPROVED EQUAL

WATTSTOPPER LMDX-100 OR APPROVED EQUAL

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

ROOM CONTROLLER DIGITAL DIMMING WALL SWITCH

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

ROOM CONTROLLER DIGITAL WALL SWITCH

PHOTOELECTRIC CELL - POINT NORTH MOUNT AS INDICATED ON DRAWINGS

10

WATTSTOPPER LMRC UNIT OR APPROVED EQUAL X INDICATES QUANTITY OF RELAYS (1, 2 OR 3)

DUAL LEVEL MOMENTARY ON-OFF WALL SWITCH

LOWERCASE LETTER INDICATES LINKED SENSORS

MOUNT BELOW ANY PENDANT MOUNTED LIGHTING

CORRIDOR CEILING MOUNTED OCCUPANCY SENSOR

LEVITON OSSMD-FT OR APPROVED EQUAL

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

AUTOMATIC DIMMING WALL SWITCH - OCCUPANCY (AUTO ON)

AUTOMATIC DIMMING WALL SWITCH - VACANCY (MANUAL ON)

DUAL TECHNOLOGY CEILING MOUNTED OCCUPANCY SENSOR (AUTO ON)

DUAL TECHNOLOGY WALL MOUNTED OCCUPANCY SENSOR (AUTO ON)

DUAL TECHNOLOGY CEILING MOUNTED VACANCY SENSOR (MANUAL ON)

DUAL TECHNOLOGY WALL MOUNTED VACANCY SENSOR (MANUAL ON)

DUAL TECHNOLOGY CEILING MOUNTED VACANCY/OCCUPANCY SENSOR

DUAL TECHNOLOGY WALL MOUNTED VACANCY/OCCUPANCY SENSOR

CORRIDOR CEILING MOUNTED VACANCY/OCCUPANCY SENSOR

LOW VOLTAGE WATTSTOPPER LVSW-101 OR APPROVED EQUAL

LOW VOLTAGE WATTSTOPPER LVSW-102 OR APPROVED EQUAL

ROOM CONTROLLER CEILING MOUNTED DIGITAL PHOTOSENSOR

ROOM CONTROLLER CEILING MOUNTED DIGITAL OCCUPANCY SENSOR

ROOM CONTROLLER WALL MOUNTED DIGITAL OCCUPANCY SENSOR

LOW VOLTAGE WATTSTOPPER LMSW-101 OR APPROVED EQUAL

LOW VOLTAGE WATTSTOPPER LMDM-101 OR APPROVED EQUAL

CORRIDOR CEILING MOUNTED VACANCY SENSOR (MANUAL ON)

AUTOMATIC TIMER SWITCH - TORK #SSA200

THREE POSITION TWO CIRCUIT MAINTAINED CONTACT SWITCH (SPDT)

DUAL LEVEL LIGHTING AUTOMATIC WALL SWITCH - OCCUPANCY (AUTO ON)

DUAL LEVEL LIGHTING AUTOMATIC WALL SWITCH - VACANCY (MANUAL ON)

DUAL LEVEL LIGHTING AUTOMATIC WALL SWITCH - VACANCY/OCCUPANCY

SINGLE POLE 1500W 3 WAY DIMMER SWITCH

SINGLE POLE 1500W DIMMER SWITCH

SINGLE POLE PILOT LIGHT TOGGLE TYPE A/C SWITCH

SCHEDULED FIXTURE TYPE.

FIXTURE TYPE.

FIXTURE TYPE.

NIGHT LIGHT FIXTURE, LETTER SUBSCRIPT

FIXTURE TYPE. LOWERCASE LETTER INDICATES SWITCH CIRCUIT.

WALL-WASH LIGHTING FIXTURE. LETTER SUBSCRIPT INDICATES

TRACK LIGHT. LETTER SUBSCRIPT INDICATES SCHEDULED

NORMAL/EMERGENCY EXIT SIGN. ARROWS INDICATE DIRECTION

OF EXIT. SOLID FILL INDICATES NUMBER OF FACES, LETTER

EMERGENCY LIGHTING BATTERY UNIT TO PROVIDE 1 1/2 HOURS

OF EMERGENCY LIGHT. LETTER SUBSCRIPT INDICATES SCHEDULED

LOW VOLTAGE REMOTE EMERGENCY LIGHTS. LETTER SUBSCRIPT

SUBSCRIPT INDICATES SCHEDULED FIXTURE TYPE.

FOR DATA WHIP IN-FEED

FOR DATA WHIP IN-FEED

FOR POWER WHIP IN-FEED

FOR POWER WHIP IN-FEED

FURNITURE JUNCTION BOX, FLOOR

FURNITURE JUNCTION BOX, WALL

FURNITURE JUNCTION BOX. FLOOR

PANELBOARD - SURFACE MOUNTED

RATINGS AS INDICATED ON DRAWINGS

RATINGS AS INDICATED ON DRAWINGS

MOTOR OR MOTORIZED EQUIPMENT

SIZE AS INDICATED ON DRAWINGS

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 \Box

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_____ES____

_____ T ____

_____0E____

FUSE - SIZE AS INDICATED ON DRAWINGS

PANELBOARD - FLUSH MOUNTED

MOUNT 6'-0" TO TOP OF HIGHEST BREAKER

MOUNT 6'-0" TO TOP OF HIGHEST BREAKER

VOLTAGE, NEMA TYPE ENCLOSURE AS INDICATED.

MOUNT 4'-0" AFF TO CENTERLINE OF HANDLE

MOUNT 4'-0" AFF TO CENTERLINE OF HANDLE

MOUNT 4'-0" AFF TO CENTERLINE OF HANDLE.

TYPE/SIZE AS INDICATED ON DRAWINGS

UNDERGROUND TELEPHONE SERVICE

OVERHEAD AERIAL ELECTRICAL SERVICE

EXISTING BRANCH CIRCUITRY TO REMAIN

BRANCH CIRCUIT RUN BELOW GRADE

MINIMUM COVER, DEPTH AS PER NEC

3/4" CND, UNLESS OTHERWISE NOTED

3/4" CND, UNLESS OTHERWISE NOTED

CONDUIT TURNING DOWN

1 CIRCUIT HOME RUN TO PANEL

2 CIRCUIT HOME RUN TO PANEL

3 CIRCUIT HOME RUN TO PANEL

DIRECT CURRENT CIRCUIT RUN CONCEALED

CONDUIT TURNING UP

BRANCH CIRCUIT RUN CONCEALED - 2 #12 & 1 #12G,

PROVIDE ADDITIONAL SWITCHED CONDUCTORS AS REQUIRED

PROVIDE ADDITIONAL SWITCHED CONDUCTORS AS REQUIRED

#4/O AWG BARE COPPER GROUND CONDUCTOR RUN 2'-6"

2 #12 & 1 #12G, 3/4" CND, UNLESS OTHERWISE NOTED

4 #12 & 1 #12G, 3/4" CND, UNLESS OTHERWISE NOTED

6 #12 & 1 #12G, 3/4" CND, UNLESS OTHERWISE NOTED

3/4" X 10'-0" COPPER-CLAD STEEL GROUND ROD

BELOW FINISHED GRADE, UNLESS OTHERWISE NOTED

EMERGENCY BRANCH CIRCUIT RUN CONCEALED - 2 #12 & 1 #12G,

UNDERGROUND CATV SERVICE

UNDERGROUND PRIMARY ELECTRICAL SERVICE

UNDERGROUND SECONDARY ELECTRICAL SERVICE

ELECTRICAL TRANSFORMER

DISCONNECT SWITCH. NUMBER OF POLES, AMPERE RATING,

COMBINATION MAGNETIC MOTOR STARTER, FULL VOLTAGE NON-

REVERSING. SIZE AND NEMA TYPE ENCLOSURE AS INDICATED.

FUSE SIZE AND NEMA TYPE ENCLOSURE AS INDICATED.

ENCLOSED MOLDED CASE CIRCUIT BREAKER. NUMBER OF

INDICATED. MOUNT 4'-0" AFF TO CENTERLINE OF HANDLE

POLES. AMPERE RATING AND NEMA TYPE ENCLOSURE AS

FUSED DISCONNECT SWITCH. NUMBER OF POLES, AMPERE RATING,

ABBREVIATIONS HEIGHT INDICATES RECEPTACLE TO BE ISOLATED GROUND TYPE NUMBER AMPERE INCANDESCENT AIR CONDITION INFORMATION ALTERNATING CURRENT AIR COOLED CONDENSING UNIT JUNCTION BOX THOUSAND AMPS INTERRUPTING CURRENT AIR CONDITIONING UNIT 1000 CIRCULAR MILLS KCM ACCESS DOOR KILOVOLT-AMPERE KVA AMP FRAME KILOWATT ABOVE FINISHED FLOOR ABOVE FINISHED GRADE LABORATORY LINEAR FOOT ALUMINUM LENGTH APPROX APPROXIMATELY LIGHTING AMMETER SWITCH MAXIMUM MECHANICAL CONTRACTOR AUXILIARY MAIN CIRCUIT BREAKER MCB AVERAGE MECH MECHANICAL AMERICAN WIRE GAUGE MEZZANINE BASEBOARD RADIATION MAN HOLE Breaker MINIMUM BLDG **BUILDING** MISCELLANEOUS BSMNT BASEMENT MAIN LUGS ONLY MLO MSWBD MAIN SWITCH BOARD MTD MOUNTED CIRCUIT BREAKER NOT APPLICABLE CONCRETE NORMALLY CLOSED CLOSED CIRCUIT TELEVISION CCTV NATIONAL ELECTRICAL CODE CABINET HEATER NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION CIRCUIT NOT IN CONTRACT CENTER LINE NORMALLY OPEN CEILING NOT TO SCALE CMU CONCRETE MASONRY UNIT MOUNT 8" ABOVE COUNTERTOP CNTR PUSH BUTTON COMPANY PLUMBING CONTRACTOR CONT CONTINUATION PNEUMATIC CONTRACTOR POWER FACTOR CONTROL POWER TRANSFORMER CONTROL RELAY CATHODE RAY TUBE PLACES Panel CURRENT TRANSFORMER PRIMARY DIRECT CURRENT DUAL ELEMENT TIME DELAY DETD PACKAGED TERMINAL AIR CONDITIONING UNIT DISCONNECT PACKAGED TERMINAL HEAT PUMP POLY VINYL CHLORIDE ELECTRIC BASEBOARD RADIATION PVC RCP RADIANT CEILING PANEL ELECTRICAL CONTRACTOR RECEPTACLE EXHAUST FAN REFERENCE ELEVATION ELECTRIC, ELECTRICAL REVISION RADIO FREQUENCY INTERFERENCE ELEVATOR RIGID STEEL **EMER** EMERGENCY RATED LOAD AMPS ELECTROMAGNETIC FIELD RLA ELECTROMAGNETIC INTERFERENCE REVOLUTIONS PER MINUTE ELECTRICAL METALLIC TUBING RPM SATC SUSPENDED ACOUSTICAL TILE CEILING ELECTRIC-PNEUMATIC SMOKE DAMPER EXISTING RELOCATED ELECTRIC WATER COOLER SECONDARY EXISTING TO REMAIN SOLID NEUTRAL EXPLOSION PROOF **SPECIFICATION** EXISTING SWITCHBOARD **SWITCHGEAR** FIRE ALARM ANNUNCIATOR PANEL SWGR TIME DELAY FACP FIRE ALARM CONTROL PANEL TYPICAL FULL LOAD AMPS UNLESS OTHERWISE NOTED UON FLUORESCENT UNIT VENTILATOR FLOW SWITCH VOLTAGE, VOLTS FULL VOLTAGE NON REVERSING FULL VOLTAGE REVERSING WITHOUT GAUGE WALL HEATER GENERAL CONTRACTOR WATER HEATER MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED GENERATOR WATT HOUR METER GROUND FAULT WEATHERPROOF COMBINATION FIXED TEMPERATURE RATE-OF-RISE HEAT PUMP BY (BETWEEN DIMENSIONS) THERMAL DETECTOR — CEILING MOUNT HORSEPOWER TRANSFORMER HIGH POWER FACTOR IMPEDANCE PHOTOELECTRIC SMOKE DETECTOR - CEILING MOUNT PHOTOELECTRIC SMOKE DETECTOR - DUCT MOUNT IONIZATION SMOKE DETECTOR - CEILING MOUNT SMOKE DETECTOR - CEILING MOUNT MANUAL FIRE ALARM PULL STATION MOUNT @ 3'-8" AFF, UNLESS OTHERWISE NOTED FIRE ALARM BELL WITH VISUAL INDICATING LIGHT FIRE ALARM HORN WITH VISUAL INDICATING LIGHT MOUNT @ 7-6" AFF # = CANDELA RATING WHEN HIGHER THAN 15 FIRE ALARM VISUAL INDICATING LIGHT ONLY (ADA APPROVED) MOUNT @ 7'-6" AFF # = CANDELA RATING WHEN HIGHER THAN 15 FIRE ALARM CONTROL MODULE FIRE ALARM MONITORING MODULE FIREFIGHTER TELEPHONE JACK

SPRINKLER SYSTEM FLOW SWITCH (FURNISHED BY OTHERS)

ELECTRICAL CONTRACTOR SHALL PROVIDE MONITORING MODULE

SPRINKLER SYSTEM TAMPER SWITCH (FURNISHED BY OTHERS)

ELECTRICAL CONTRACTOR SHALL PROVIDE MONITORING MODULE

MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED

CONNECT NEW TO EXISTING

REFER TO INDICATED DEMOLITION NOTE

REFER TO INDICATED NEW WORK POWER NOTE

REFER TO INDICATED NEW WORK LIGHTING NOTE

REFER TO INDICATED NEW WORK MECHANICAL POWER NOTE

McCARTHY www.McCarthy-Engineering.com 2500 East High Street, Suite 630 Pottstown, PA 19464 Phone: 610.373.8001 Project No.

230004

JCM ISSUED FOR BID JULY 19, 2023 PROJECT NO. NOT FOR CONSTRUCTION 230004

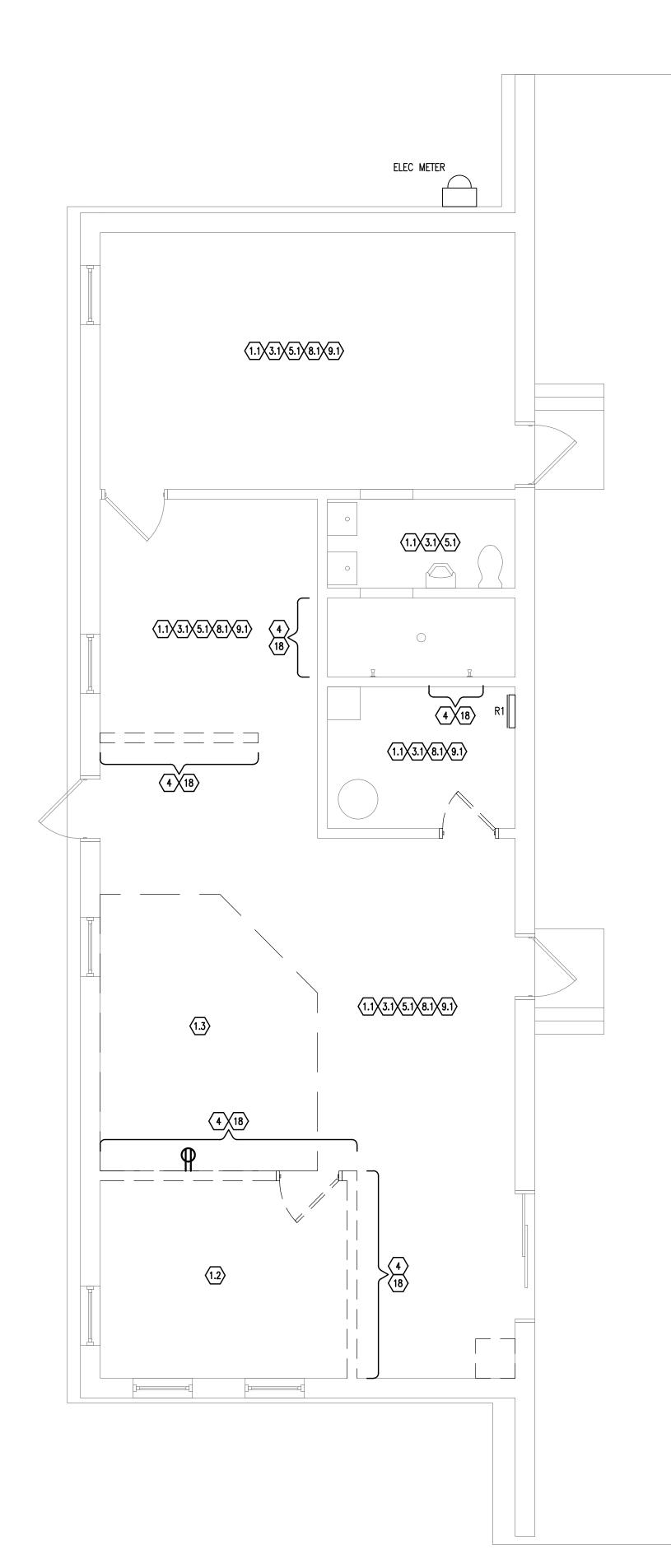
SW

INCIPAL:

NEC

SCALE:





DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

DEMOLITION GENERAL NOTES:

- 1. WHERE IT IS INDICATED THAT A CIRCUIT, CONDUIT OR WIRING IS TO BE REMOVED IN ITS ENTIRETY, THIS SHALL MEAN THAT THE WIRE, CONDUIT, HANGERS, CONNECTORS, COUPLINGS, CONTROLS, DISCONNECT SWITCHES, ETC. SHALL BE REMOVED FROM THE DEVICE TO THE SOURCE, EXCEPT THAT CONDUIT EMBEDDED IN WALLS OR FLOORS NOT BEING DEMOLISHED MAY BE ABANDONED IN PLACE AS LONG AS THE WIRE IS REMOVED AND THE CONDUIT ENDS ARE SATISFACTORILY CLOSED.
- 2. CIRCUITS TO EQUIPMENT OR DEVICES INDICATED TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY EVEN IF THE CIRCUIT OR SOURCE IS OUTSIDE THE DEFINED AREA OF DEMOLITION.
- 3. CIRCUITS WHICH ORIGINATE IN OR PASS THROUGH THE AREA OF DEMOLITION BUT WHICH SUPPLY LOADS OUTSIDE OF THE AREA OF DEMOLITION OR WHICH FEED EQUIPMENT IN THE AREA OF DEMOLITION WHICH IS TO REMAIN, SHALL BE RETAINED, UNLESS OTHERWISE NOTED. PORTIONS OF SUCH CIRCUITS WHICH CONFLICT WITH CLEARANCES FOR NEW CONSTRUCTION SHALL BE REMOVED AND WIRE AND CONDUIT (MATCH EXISTING TYPE AND SIZE) SHALL BE PROVIDED TO EXTEND THE CIRCUIT TO ITS ORIGINAL SOURCE AND TO MAINTAIN THE FUNCTIONALITY OF THE CIRCUIT.
- 4. CIRCUITS WHICH SUPPLY DEVICES BOTH INSIDE AND OUTSIDE OF THE AREA OF DEMOLITION SHALL BE REMOVED ONLY WITHIN THE AREA OF DEMOLITION. REMOVE THE CIRCUITS TO THE NEAREST JUNCTION BOX OR DEVICE OUTSIDE THE AREA OF DEMOLITION. PORTIONS OF THE CIRCUITS WHICH SUPPLY DEVICES OUTSIDE THE AREA OF DEMOLITION OR DEVICES TO REMAIN INSIDE THE AREA OF DEMOLITION SHALL REMAIN AND WIRE AND CONDUIT (MATCH EXISTING TYPE AND SIZE) SHALL BE PROVIDED TO EXTEND THE CIRCUIT TO ITS ORIGINAL SOURCE AND TO MAINTAIN THE FUNCTIONALITY OF THE CIRCUIT, UNLESS OTHERWISE NOTED.
- 5. EXISTING PANELBOARDS AND THEIR FEEDER CIRCUITS SHALL BE RETAINED, UNLESS OTHERWISE NOTED.
- 6. DRAWING DEMOLITION NOTES LISTED UNDER THE DEMOLITION AREA IDENTIFICATION SHALL APPLY TO ALL ROOMS/AREAS WITHIN THE AREA OF DEMOLITION. OTHER INDIVIDUAL DRAWING DEMOLITION NOTES ARE IN ADDITION TO THOSE UNDER THE AREA IDENTIFICATION AND APPLY ONLY TO INDIVIDUAL ROOMS OR EQUIPMENT.
- 7. ABANDONED WIRE, CONDUIT, DEVICES AND CIRCUITS IN THE AREA OF DEMOLITION OR INDIVIDUALLY IDENTIFIED SHALL BE REMOVED IN THEIR ENTIRETY.
- 8. OWNER EQUIPMENT SHALL BE RETURNED TO OWNER, UNLESS OTHERWISE DIRECTED.
- 9. CONTRACTOR SHALL FIELD VERIFY QUANTITY AND LOCATION OF ALL WIRING DEVICES PRIOR TO BID. ANY ADDITIONAL DEVICES LOCATED SHALL BE TREATED THE SAME AS OTHER DEVICES IN THE SAME AREA.
- 10. NON-POWER WIRING IN GOOD CONDITION MAY BE PULLED BACK FROM DEVICES BEING REMOVED AND WIRING MAY BE REUSED FOR NEW DEVICES WHERE WIRING LENGTH IS NO LONGER THAN THE ORIGINAL LENGTH. WIRING SHALL NOT BE SPLICED. WIRING WHICH CANNOT BE REUSED SHALL BE REMOVED IN ITS ENTIRETY.
- 11. DEVICE BOXES WITH USABLE CONDUIT TO ACCESSIBLE SPACES LOCATED IN THE SAME LOCATION AS NEW DEVICES MAY BE REUSED WITH NEW WIRING AND DEVICES. DEVICE BOXES NOT BEING USED AND LOCATED IN WALLS NOT BEING REMOVED MAY REMAIN BUT MUST BE CLOSED WITH A BLANK COVERPLATE. 12. NOT ALL KEYNOTES ARE BEING USED.

DEMOLITION KEYNOTES: (#)

- 1. REMOVE ALL LIGHT FIXTURES, EMERGENCY LIGHT FIXTURES, EXIT SIGNS, LIGHT SWITCHES, LIGHT CONTROLS AND LIGHTING CIRCUITS IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.
- LIGHTING AND LIGHT CONTROLS ARE EXISTING TO REMAIN.
 REMOVE SWITCH AND RELOCATE SWITCH DEVICE BOX TO LOCATION AS SHOWN ON NEW PLAN. RETAIN FIXTURES AND CIRCUIT IN ROOM.
- REMOVE FIXTURE WHIPS FROM FIXTURES OUTSIDE OF THIS DASHED BOX. 2. REMOVE AND STORE THE LIGHT FIXTURES. REMOVE INTERCONNECTING WIRING AND SWITCH CIRCUITS. RETAIN THE BRANCH CIRCUIT FOR REUSE DURING CONSTRUCTION.
- 3. REMOVE ALL RECEPTACLES, DEVICE BOXES AND RECEPTACLE CIRCUITS IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.
- 3.1. RECEPTACLES ARE EXISTING TO REMAIN.
- 4. REMOVE THE RECEPTACLES, DEVICE BOXES AND RECEPTACLE CIRCUIT TO THE NEXT DEVICE(S) TO REMAIN. RETAIN THE BRANCH CIRCUITS FOR REUSE DURING
- 5. REMOVE ALL FIRE ALARM SYSTEM DEVICES, DEVICE BOXES AND FIRE ALARM CIRCUITS IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED. 5.1. ALL FIRE ALARM SYSTEM DEVICES ARE EXISTING TO REMAIN.
- 6. REMOVE AND STORE FIRE ALARM SYSTEM DEVICE(S). REMOVE FIRE ALARM CIRCUITS TO NEXT DEVICE(S) TO REMAIN. FIRE ALARM CIRCUITS MAY BE REUSED AS DESCRIBED BY THE GENERAL DEMOLITION NOTES.
- 7. REMOVE ALL SECURITY DEVICES, DEVICE BOXES AND SECURITY CIRCUITS IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.
- 8. REMOVE ALL TELEPHONE OUTLETS, DEVICE BOXES AND TELEPHONE CIRCUITS IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.
- 8.1. ALL TELEPHONE OUTLETS, DEVICE BOXES AND TELEPHONE CIRCUITS ARE EXISTING TO REMAIN.
- 9. REMOVE ALL LOCAL AREA NETWORK DEVICES, DEVICE BOXES AND LOCAL AREA NETWORK CIRCUITS IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.
- 9.1. ALL LOCAL AREA NETWORK DEVICES, DEVICE BOXES AND LOCAL AREA NETWORK CIRCUITS ARE EXISTING TO REMAIN.
- 10. REMOVE ALL SOUND SYSTEM SPEAKERS, SPEAKER BOXES, VOLUME CONTROLS AND SOUND SYSTEM CIRCUITS IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.
- 11. REMOVE ALL CATV OUTLETS, DEVICE BOXES AND CATV CIRCUITS IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.
- 12. REMOVE IN THEIR ENTIRETY ALL CIRCUITS TO MECHANICAL AND/OR PLUMBING EQUIPMENT WHICH IS BEING REMOVED. SEE MECHANICAL AND PLUMBING DRAWINGS FOR LOCATION AND DEFINITION OF EQUIPMENT TO BE REMOVED.
- 13. REMOVE KITCHEN SERVING EQUIPMENT, OWNER'S EQUIPMENT, ETC. AND THEIR CIRCUITS IN THEIR ENTIRETY, EXCEPT WHERE OTHERWISE NOTED. VERIFY OWNER EQUIPMENT TO BE REMOVED WITH OWNER PRIOR TO START OF DEMOLITION. 14. REMOVE ALL PROJECTORS, PROJECTOR SCREENS AND THEIR CIRCUITS IN THEIR ENTIRETY,
- UNLESS OTHERWISE NOTED. 15. REMOVE IN THEIR ENTIRETY ALL CIRCUITS AND CONTROLS FOR ELEVATORS TO ALLOW
- REMOVAL OF THE ELEVATORS.
- 16. REMOVE CIRCUIT FOR EXISTING EQUIPMENT EXCEPT THAT REUSABLE PORTIONS OF CONDUIT IN GOOD CONDITION MAY BE REUSED FOR NEW EQUIPMENT. REMOVE PORTIONS OF CIRCUIT NOT REUSED IN ITS ENTIRETY.
- 17. AFTER OTHER DEMOLITION IS COMPLETE, DISCONNECT THE PANEL FEEDER CIRCUIT AND ALL REMAINING BRANCH CIRCUITS TO AN ACCESSIBLE LOCATION BUT RETAIN FOR EXTENSION TO NEW PANEL LOCATION AS PART OF NEW WORK.
- 18. REMOVE AND/OR RELOCATE DEVICES AND CIRCUITS IN/ON WALL OR NEW DOOR OPENING TO ALLOW WALL REMOVAL.

CHAIN-LINK TO DIVIDE SPACE-ELEC METER 5. SEE MECHANICAL DRAWINGS FOR MECHANICAL EQUIPMENT SCHEDULES. WATER BUILDING & METER GROUNDS STORAGE STORAGE E1Ø5 E106 EX. RR / SHOWER FUTURE OFFICE E1Ø2 E1Ø3 OFFICE 3/×10' NON-OF E100

POWER PLAN SCALE: 1/4" = 1'-0"

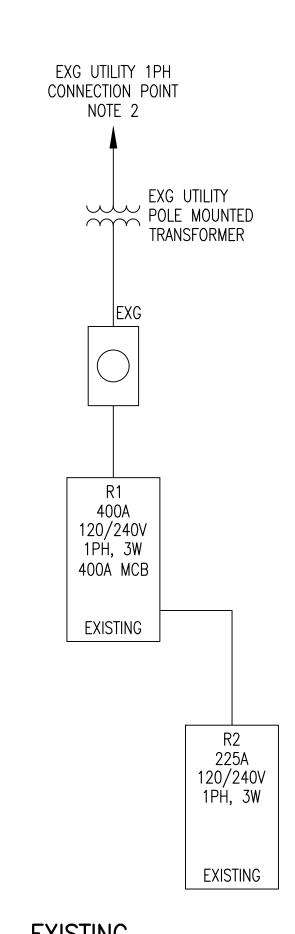
POWER GENERAL NOTES:

1. THIS FACILITY IS BEING CONSTRUCTED WITH OPEN CEILING SPACES IN MANY AREAS. WHILE IT IS UNDERSTOOD THAT CONDUIT, CABLE AND EQUIPMENT WILL BE VISIBLE, IT IS THE INTENT OF THIS DESIGN THAT ALL SUCH EQUIPMENT, MATERIAL, CIRCUITS, CABLES, ETC. BE INSTALLED IN AN AESTHETICALLY PLEASING MANNER. ALL CIRCUITS SHALL BE ROUTED PARALLEL, PERPENDICULAR AND/OR PLUMB TO THE BUILDING STRUCTURE AND SHALL BE TIGHT TO ROOF/FLOOR DECKS, DUCTS, JOISTS, COLUMN, ETC. ALL INSTALLATION TECHNIQUES SHALL BE REVIEWED WITH AND APPROVED BY THE OWNER. THE CONTRACTOR SHALL INCLUDE CONTINGENCY IN HIS BID FOR ANY ADDITIONAL EFFORT OR WORK ABOVE NORMAL.

- 2. BOXES, ENCLOSURES AND EQUIPMENT WHICH ARE NOT AESTHETICALLY PLEASING MAY HAVE TO BE LOCATED ABOVE CEILINGS OR IN "OUT OF THE AREA" HIDDEN SPACES. THE CONTRACTOR SHALL INCLUDE CONTINGENCY IN HIS BID FOR ANY ADDITIONAL EFFORT OR WORK ABOVE NORMAL.
- 3. INSTALL BACKBOX AND STUB UP 3/4" EMT CONDUIT TO ABOVE CEILING FOR EACH COMMUNICATION / DATA DEVÍCE.
- 4. INSTALL BACKBOX AND STUB UP 3/4" EMT CONDUIT TO ABOVE DROP CEILING FOR EACH CARD READER DEVICE.

LIGHTING KEY NOTES: **(*)**

- 1. CONNECT EXISTING FIXTURES TO NEW SWITCH.
- . INSTALL SWITCH ACCESSIBLE LOCATION ABOVE DROP CEILING. REUSE CIRCUIT FROM ORIGINAL EXISTING EXHAUST FAN.



SINGLE LINE/SERVICE NOTES:

- 1. CONTRACTOR SHALL PROVIDE ALL MATERIAL, LABOR AND WORK REQUIRED FOR A NEW ELECTRICAL SERVICE AS DESCRIBED IN THE LOCAL UTILITY SERVICE AND INSTALLATION REGULATIONS. ANY LOCAL UTILITY COMPANY CHARGES FOR PROVISION OF ELECTRICAL SERVICE SHALL BE INCLUDED IN THE CONTRACTOR'S BASE PRICE. AS A MINIMUM, THE INSTALLATION SHALL MEET THE SERVICE AND INSTALLATION REGULATIONS OF THE LOCAL
- 2. EXISTING SERVICE TO EXISTING BUILDING SHALL BE RETAINED.
- 3. CONDUCTORS OF THIS CIRCUIT ARE OVERSIZED TO COMPENSATE FOR VOLTAGE DROP.
 PROVIDE INCREASED SIZE LUGS AS POSSIBLE BUT WHERE THE CONDUCTOR SIZE EXCEEDS THE MAXIMUM CAPACITY OF ANY EQUIPMENT TERMINATION LUGS AVAILABLE, PROVIDE A JUNCTION BOX WITH SPLICE WITHIN TEN FEET OF THE TERMINATION AND REDUCE THE CONDUCTOR SIZE TO THE LARGEST SIZE WHICH CAN BE ACCOMMODATED BY THE
- 4. ALL FEEDERS AND SERVICE ENTRANCE CONDUCTORS AND CONDUITS ARE EXISTING TO

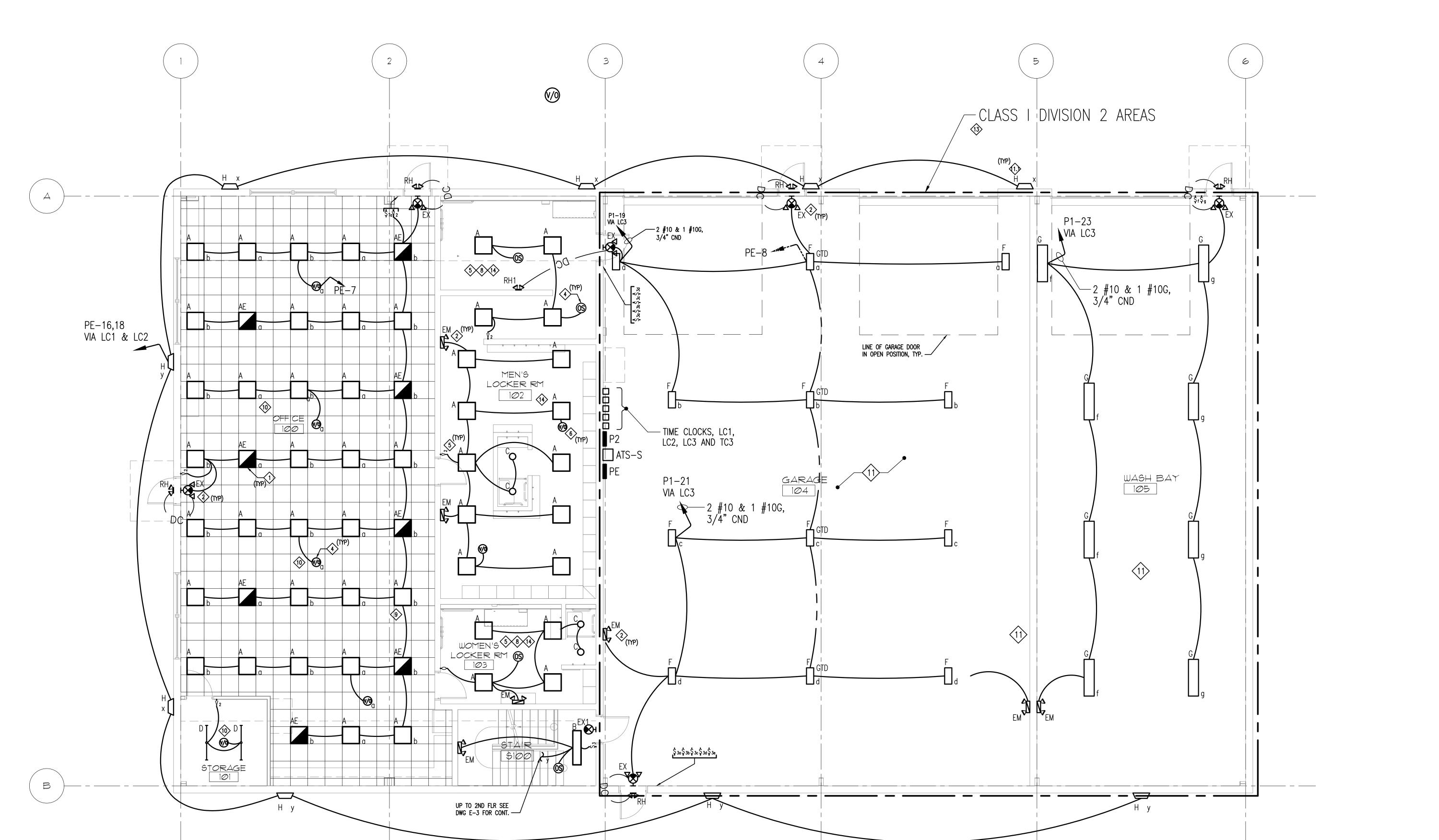
LOCATI	ON: UTILITY E103			PAI	NEL R1	SCHED	JLE				
EXISTIN	G PANEL		PHAS	E: 1	WIRE:	3 \	OLTS: 2	40/120			22 KAIC
			С	URRENT RA	ATING: 400	AMP - MA	IN BREAKI	ER			
СКТ		BRE	AKER		KVA L	OADS		BRE	AKER		СКТ
NO	DESCRIPTION	TRIP	POLE	CKT	Α	В	СКТ	POLE	TRIP	DESCRIPTION	NO
1	LTS WATER/SEWER 104	20	1	0.72	1.44		0.72	1	20	SUPERVISOR 105 & UTIL 103 LTS	2
3	SUPERVISOR 105 & UTIL 103 LTS	20	1	0.72		1.44	0.72	1	20	LTS STORAGE 109	4
5	LTS STORAGE 109	20	1	0.96	1.92		0.96	1	20	RECP - 105 & 103	6
7	ELEC WATER COOLER	20	1	0.99		1.99	1.00	1	20	VENDING & LUNCH RECP	8
9	TOILET & SHOWER RECP	20	1	1.00	2.00		1.00	1	20	WTR,SEWER,LUNCH,EXT RECP	10
11	WTR,SEWER,SUPERVIS RECP	20	1	1.00		2.00	1.00	1	20	SUPERV 105 RECP	12
13	SOTR 109 RECP	20	1	1.20	2.10		0.90	1	20	LTS STOR 109	14
15	BASEBOARD HEAT 109	20	-	3.00		4.20	1.20	1	20	BASEB HEAT WTR,SEWR,104,102	16
17	SPARE	20	2	0.00	0.00		0.00	1	20	SPARE	18
19	"	-	-	0.00		0.18	0.18	1	20	RECEPT - KITCHENETTE	20
21	SPARE	20	-	0.00	3.72		3.72	-	30	YARD LTS EAST WALL	22
23	SECURITY LITE N,S,W, EXT;GATE	30	-	1.44		5.16	3.72	1	20	SPARE	24
25	REFRIG - KITCHENETTE	20	1	0.50	1.50		1.00	1	20	TELEPH RECP,COFFEE	26
27	SPARE	20	1	0.00		1.08	1.08	1	20	EXECUTONE SYS	28
29	SPARE	20	1	0.00	0.00		0.00	1	20	SPARE	30
31	SPARE	20	1	0.00		0.00	0.00	1	20	SPARE	32
33	RECEPT - OFFICE E100	20	1	0.36	0.36		0.00	1	15	SPARE	34
35	RECEPT - KITCHENETTE	20	1	0.18		4.68	4.50	2	30	CONDENS UNIT OUTSIDE	36
37	PANEL R2	225	2	35.96	40.46		4.50	-	-	"	38
39	"	-	-	36.21		36.57	0.36	1	20	RECEPT - OFFICE E101	40
	ER LOCKON DEVICE	CIRC	UIT TOTALS:	84.24			26.56			NOTES:	
	*SHUNT TRIP BREAKER **HACR BREAKER		PHASE	E TOTALS:	53.50	57.30		1) BOLD INDICATES NEW CIRCUIT AND/OR B			ER
	AKER PADLOCK OFF DEVICE		TOTAL	L CONNECT	TED LOAD:	111	KVA				
			TOTAL	L CONNECT	462	AMP					

ISSUED FOR BID JULY 19, 2023 NOT FOR CONSTRUCTION

 $\mathcal{F}_{\mathbf{i}}$

SW NEC JCM DRAWIN





LIGHTING NOTES:

1. FOR NEW WORK LIGHTING NOTES SEE DRAWING E-3.

LIGHTING KEY NOTES: �

- CONNECT ALL EMERGENCY LIGHT FIXTURE EMERGENCY BALLASTS TO THE UNSWITCHED HOT LEG OF THE AREA LIGHTING CIRCUIT AND THE NORMAL BALLASTS TO THE SWITCHED HOT LEG SUCH THAT FIXTURES ARE SWITCHED WITH NORMAL FIXTURES BUT ARE ON AT APPROXIMATELY FULL BRIGHTNESS ON LOSS OF POWER.
- CONNECT ALL WALL BATTERY PACKS AND EXIT SIGNS TO AN UNSWITCHED HOT LEG OF THE AREA LIGHTING CIRCUIT.
- CONNECT LIGHT SWITCHES DOWNSTREAM OF OCCUPANCY SENSORS. SEE OCCUPANCY SENSOR SYSTEM ELEMENTARY DIAGRAM (TYPICAL) BELOW.
- 4. LOCATE CEILING OCCUPANCY SENSORS WITHIN 16 FEET OF THE ROOM ENTRANCE(S). COORDINATE SENSOR LOCATION WITH ANY SURFACE OR PENDANT MOUNTED FIXTURES/DEVICES SUCH THAT THE LINE OF SIGHT BETWEEN THE SENSOR AND ENTRANCE IS NOT OBSTRUCTED.
- 5. CONNECT MOMENTARY OCCUPANCY/VACANCY WALL SWITCH TO OCCUPANCY OR VACANCY SENSOR SYSTEM. SEE OCCUPANCY OR VACANCY SENSOR SYSTEM ELEMENTARY DIAGRAM (TYPICAL) ON DRAWING E-6.
- 6. LINK SENSORS WITH THE SAME DESIGNATOR SUCH THAT ANY ONE SENSOR TURNS ON ALL FIXTURES IN THE AREA.
- 7. VACANCY CONTROL WITH DIMMING IS REQUIRED IN THIS CONFERENCE ROOM. PROVIDE OCCUPANCY/VACANCY SENSORS, DIMMERS/SWITCHES AND THREE RELAY DIGITAL ROOM CONTROLLERS AS SHOWN ON THE DRAWINGS. SEE THE DAYLIGHTING/VACANCY CONTROL SYSTEM ELEMENTARY DIAGRAM (TYPICAL) ON DRAWING E-6. THE FIRST TWO RELAYS SHALL CONTROL THE ROOM FIXTURES. THE THIRD RELAY SHALL CONTROL THE FRONT CONFERENCE ROOM FIXTURES WITH ALL FIXTURES BEING MANUAL ON.
- 8. OCCUPANCY CONTROL IS REQUIRED IN RESTROOMS. PROVIDE CEILING SENSOR AS SHOWN ON THE DRAWINGS. ALL LIGHT FIXTURES SHALL BE AUTO ON. SEE THE OCCUPANCY SENSOR SYSTEM ELEMENTARY DIAGRAM (TYPICAL) ON DRAWING E-6.
- 9. ALTERNATE CORRIDOR LIGHTING FIXTURES SUCH THAT ONLY EVERY OTHER FIXTURE IS CONTROLLED (AUTO ON) BY THE OCCUPANCY SENSOR (AUTOMATIC LIGHTING). LOCAL SWITCHES AND THE TIME CLOCK SHALL CONTROL BOTH STANDARD AND AUTOMATIC LIGHTING. SEE TIME CLOCK LIGHTING CONTROL WIRING DIAGRAM (TYPICAL) ON DRAWING
- 10. PROVIDE DUAL LEVEL SWITCHING BY CONNECTING APPROXIMATELY HALF THE ROOM FIXTURES TO EACH OF THE TWO POLES OF THE AUTOMATIC CEILING SENSOR. ALTERNATE FIXTURES IN BOTH DIRECTIONS UNLESS OTHERWISE NOTED. HALF THE FIXTURES SHALL BE AUTO ON AND HALF THE FIXTURES SHALL BE MANUAL ON. SEE THE DUAL LEVEL VACANCY/OCCUPANCY SENSOR SYSTEM ELEMENTARY DIAGRAM (TYPICAL) ON DRAWING E-6.
- 11. PROVIDE TIME CLOCK CONTROL. REFER TO E-5.0 FOR WIRING DIAGRAMS
 11.1. SEE TIME CLOCK LIGHTING CONTROL WIRING DIAGRAM
 11.2. SEE SITE LIGHTING CONTROL WIRING DIAGRAM
- 12. AIM FLOOD LIGHT TO ILLUMINATE AREA IN FRONT OF SALT SHED.
- 13. ALL REPAIR/SERVICE AREAS PER NEC 511 SHALL BE CLASS I DIVISION 2 HAZARDOUS AREAS FROM THE FLOOR TO 18 INCHES ABOVE FLOOR (AND FROM THE CEILING TO 18 INCHES BELOW THE CEILING WHERE LIGHTER—THAN—AIR FUELED VEHICLES ARE REPAIRED/STORED). PITS AND WORK AREAS BELOW THE FLOOR SHALL BE CLASSIFIED AS CLASS 1 DIVISION 1. ALL WIRING AND CIRCUITS IN OR ROUTED THROUGH THESE AREAS SHALL CONFORM TO NEC 501 AND SHALL HAVE MATERIALS AND CONDUIT SEALS PER NEC 501. ALL RECEPTACLES, EQUIPMENT AND DEVICES SHALL BE MOUNTED ABOVE OR BELOW THESE AREAS TO AVOID REQUIREMENT FOR SPECIAL EQUIPMENT. ALL CONDUIT IN THE HAZARDOUS AREAS SHALL BE RGS, IMC OR EMT WITH COMPRESSION FITTINGS. CONDUIT ABOVE/BELOW HAZARDOUS AREAS MAY BE EMT WITH COMPRESSION COUPLINGS. ALL 15A AND 20A RECEPTACLES SHALL BE GFCI TYPE RECEPTACLES. ALL RECEPTACLES SHALL BE MOUNTED AT 48" AFF. CIRCUITS FOR OTHER EQUIPMENT MAY BE RUN THROUGH THIS AREA, BUT THEY SHALL MAINTAIN STRICT COMPLIANCE WITH THE METHODS OF NEC 501.
- 14. CEILING GRID ARE NOT SHOWN. LAY FIXTURES ON CEILING GRID NEAR WHERE THEY ARE SHOWN ON PLAN.

ENVIRONMENT: CR - CORROSIVE; DL - DAMP LOCATION; HZ - HAZARDOUS; IN - INDOOR; WL - WET LOCATION MOUNTING TYPE/HEIGHT: B - BOLLARD: CH - CHAIN HUNG: P - PENDANT: PL - POLE: R - RECESSED: S - SURFACE: T - TRACK: W - WALL: CLG HT - CEILING HEIGHT MANUFACTURER CAT NO DESCRIPTION ENVIR TYPE HEIGHT VOLTS WATTS REMARKS 2,700 LUMEN LED | IN | R | CLG HT | UNV | 23 COLUMBIA LCAT22-35LWG-EDU 2X2 TROFFER LCAT22-35LWG-EDU-ELL14 2,700 LUMEN LED IN R CLG HT UNV 23 COLUMBIA 2X2 TROFFER w/ BATTERY PACK COLUMBIA LAW4-35XW-EDU 4' WRAPAROUND 2,300 LUMEN LED IN S CLG HT UNV 19 PRESCOLITE LC4SL-4LCSL10L35K8WT 4" DOWNLIGHT 1,000 LUMEN LED IN R CLG HT UNV 14 4' STRIP 3,200 LUMEN LED | IN | CH | * | UNV | 27 | NOTE 2 COLUMBIA MPS4-35VW-CW-EU 14,000 LUMEN LED | IN | CH | 16' 0" | UNV | 100 | NOTE 2 2' HIGH BAY COLUMBIA CLB2-40MM-W-EDU 16,000 LUMEN LED | WL | CH | 16' 0" | UNV | 122 | NOTE 2 COLUMBIA LXEW4-40M-FAW-EU 4' ENCLOSED HIGH BAY 6,800 LUMEN LED | WL | W | 13' 6" | UNV | 55 | NOTES 1 & 2 HUBBELL PVL3-180L-604K7-U-*-20F WALL PACK 16,000 LUMEN LED | WL | W | * | UNV | 135 | NOTES 1 & 2 FLOOD LIGHT KFL3-60L-135-4K7-WF-UNV-Y-* **EMERGI-LITE** ELXN400R-2SQLR-AD EXIT SIGN W/ HEADS & REMOTE CAPACITY LED IN W 7'6" UNV 3 EX1 **EMERGI-LITE** EXIT SIGN WPREMDNR EM BATTERY PACK IN W 7'6" UNV 36 EMERGI-LITE 12JSM36-210LG-AD WL W 7'6" 4 4 **EMERGI-LITE** EF44D-LEDWP REMOTE HEADS LED EF10D(LG) LG IN W 7'6" 12 4 **EMERGI-LITE** REMOTE HEADS *See REMARKS section.

NOTES:
1. VERIFY FIXTURE TRIM, COLOR AND/OR FINISH WITH THE ARCHITECT.
2. COORDINATE MOUNTING HEIGHT WITH OWNER/ARCHITECT.

ISSUED FOR BID JULY 19, 2023 NOT FOR CONSTRUCTION

MCCATING ASSOCIATES, and Road MMM MCCATING PROGRESSION OF THE PROJUCE OF THE PROJ

EN 555 Van Reed Road MWI Suite 2 MWI Willow PA 19610

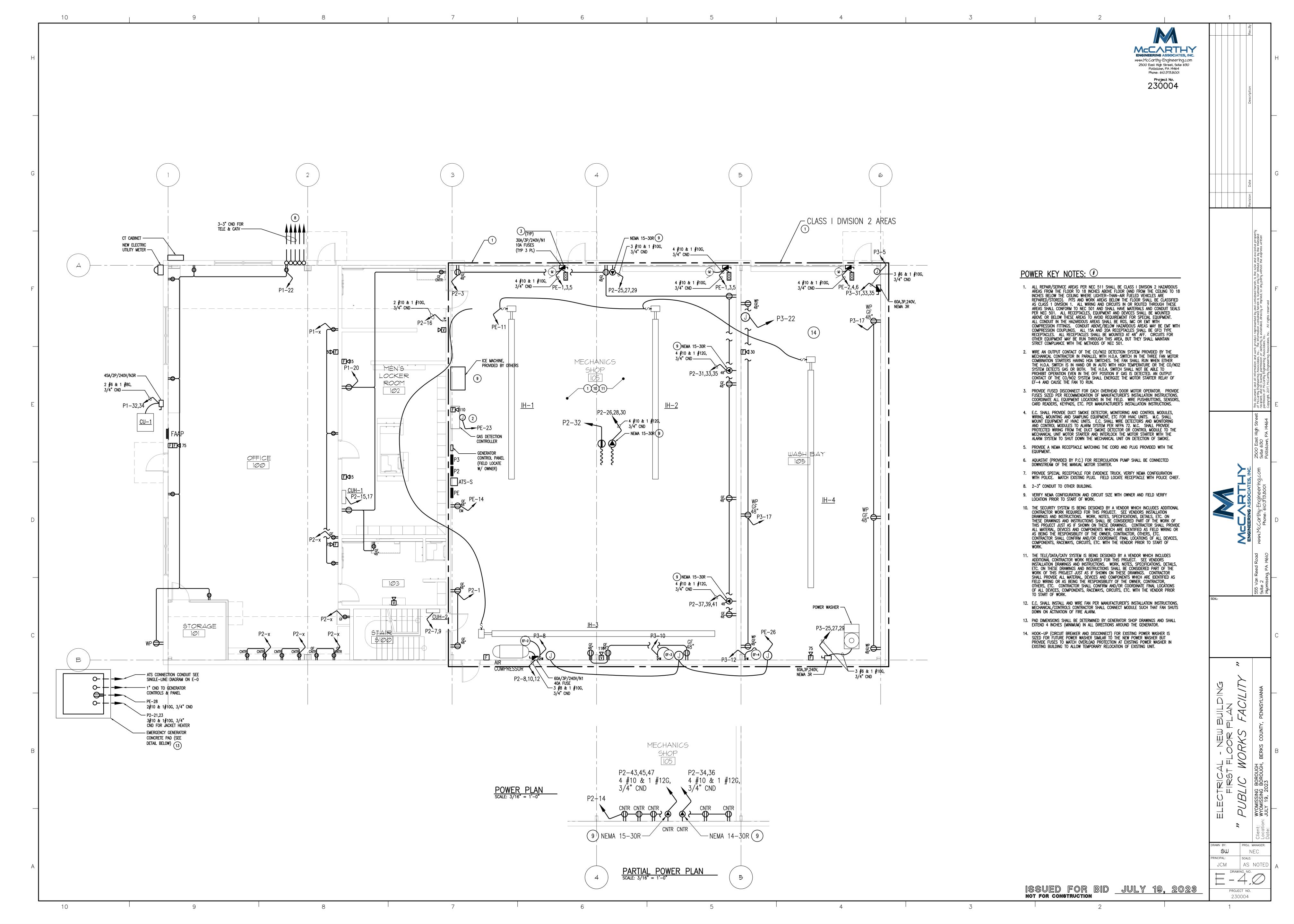
EXISTING BUILDING
FLOOR PLAN

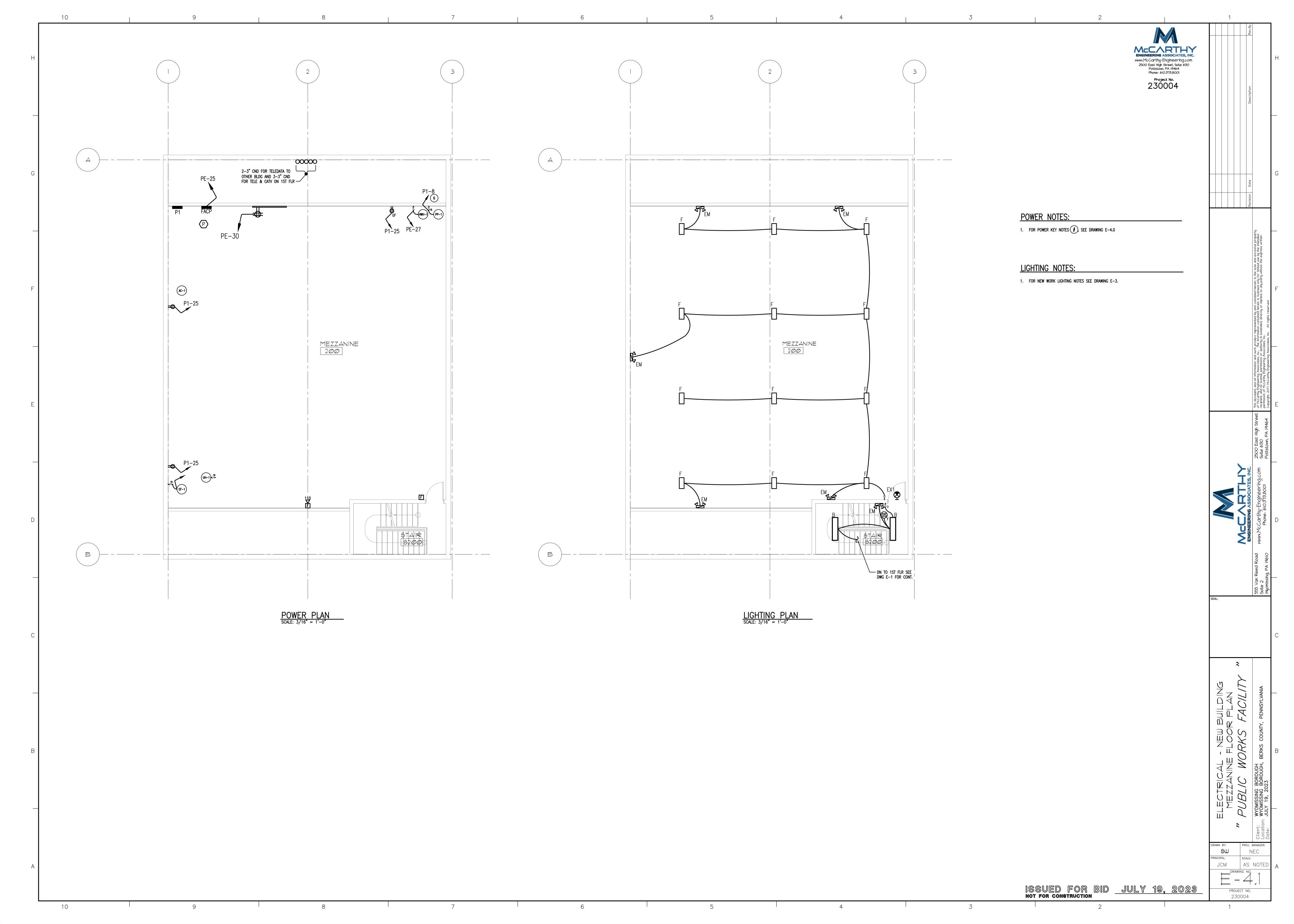
L/C WORKS FAC/L/TY

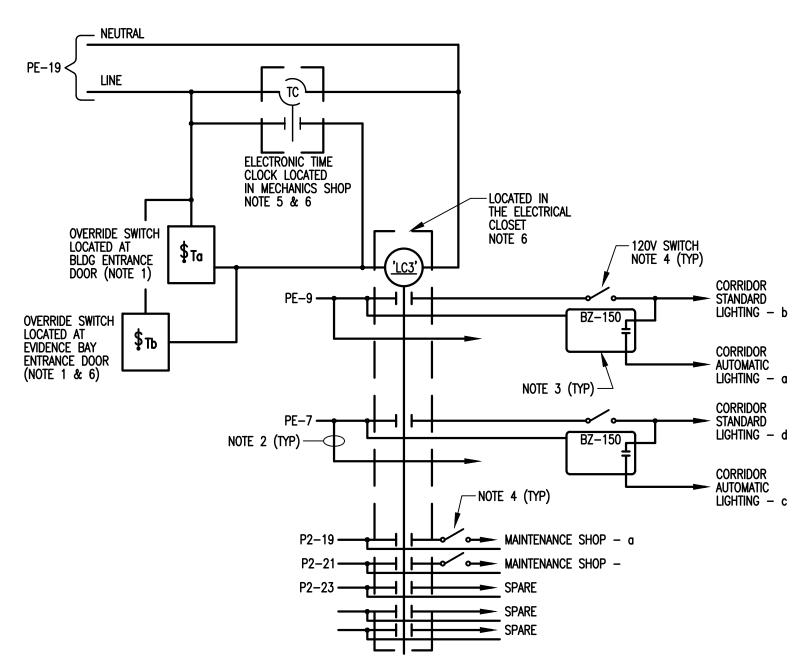
NG BOROUGH, BERKS COUNTY, PENNSYLVANIA

MEC Client: WYOMISSING BOROUG

PROJECT NO.

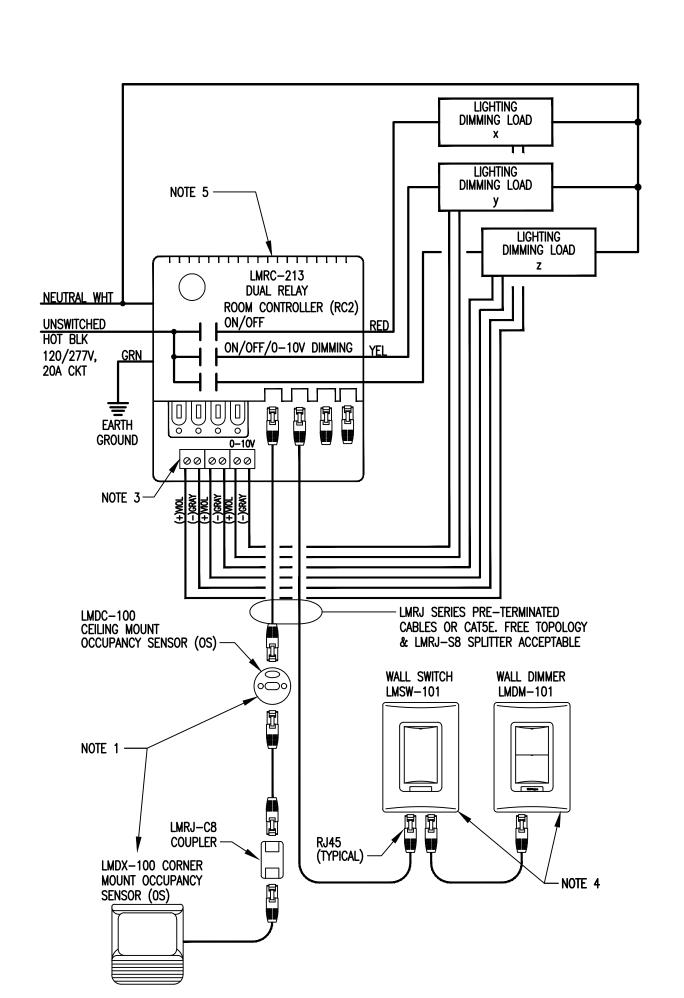






TIME CLOCK LIGHTING CONTROL WIRING DIAGRAM (TYPICAL)

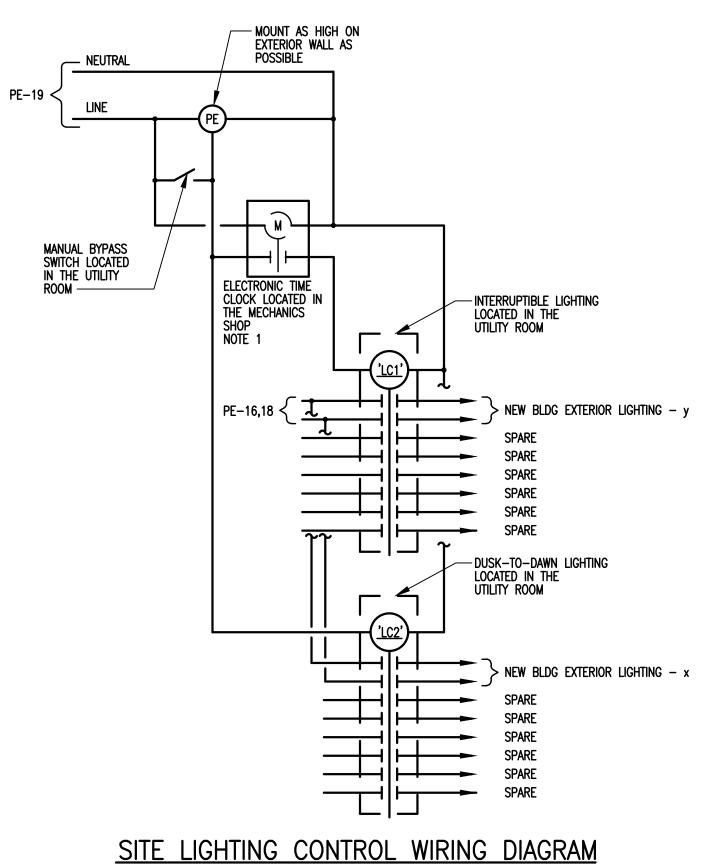
- 1. TWO HOUR OVERRIDE AUTOMATIC TIMER SWITCH. LABEL SWITCH "NIGHT TIME OVERRIDE". SWITCH SHALL BE TORK SSA200 OR EQUAL. VERIFY LOCATION IN THE FIELD WITH THE OWNER.
- 2. UNSWITCHED HOT LEG FOR NIGHTLIGHTS, OCCUPANCY SENSORS, EMERGENCY BALLASTS, EXIT SIGNS AND OTHER AREA LIGHTING.
- 3. SEE OCCUPANCY SENSOR SYSTEM ELEMENTARY DIAGRAM (TYPICAL) FOR LOW VOLTAGE CONTROL WIRING OF THE BZ UNITS.
- 4. PROVIDE STANDARD SINGLE OR THREE-WAY TOGGLE SWITCHING CONTROLS AS SHOWN ON THE LIGHTING PLANS.
- 5. PROVIDE A FOUR INDEPENDENTLY PROGRAMMABLE CONTACT ELECTRONIC TIME SWITCH (INTERMATIC ET8415C).
- 6. PROVIDE ADDITIONAL DEVICES AS TC2, LC4 & BYBASS SWITCH To IN THE EXISTING BUILDING VEHICLE PARKING EX101. WIRE CIRCUITS R3-5&7 SIMILAR TO MAINTENANCE SHOP.



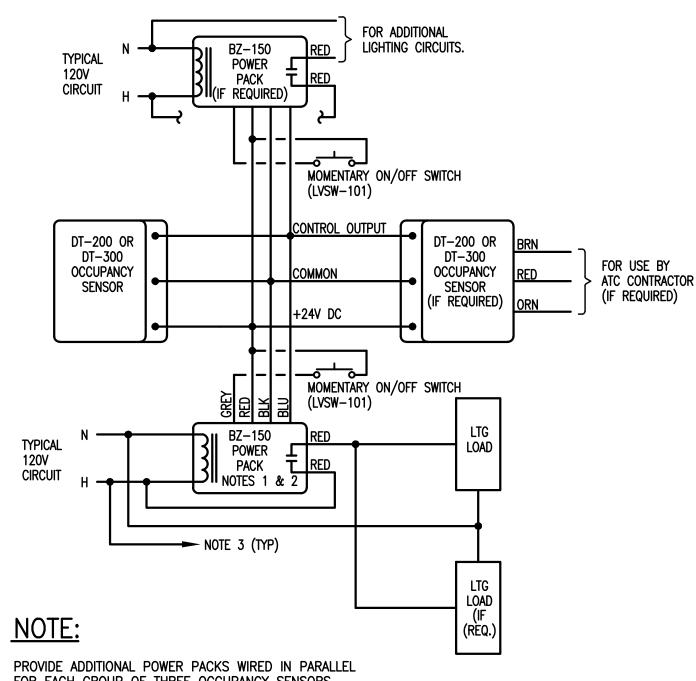
DAYLIGHTING/VACANCY CONTROL DIAGRAM (TYP) NO SCALE

- 1. PROVIDE OCCUPANCY SENSORS AS SHOWN ON THE PLANS. CEILING MOUNT LMDC-100 DUAL TECHNOLOGY SENSOR HAS TWO RJ45 PORTS. CORNER MOUNT LMDX-100 HAS PIGTAIL AND SUPPLIED COUPLER. OCCUPANCY SENSORS WITH THE SAME
- 2. USE LMLS-500 PHOTOSENSOR MOUNTED 3 FEET FROM THE WINDOW AND AIMED AT THE WINDOW FOR MULTIPLE DAYLIGHTING ZONES. PHOTOSENSOR SHALL CONTROL THE INDICATED DIMMING ZONES (z1, z2, ETC.) SHOWN ON THE PLAN. THE LIGHTING OUTPUT FOR THE FIXTURES IN A DIMMING ZONE SHALL BE DECREASED LINEARLY AS THE DAYLIGHT INCREASES IN ORDER TO PROVIDE A CONSTANT AND UNIFORM LIGHT LEVEL IN THE AREA.
- 3. PROVIDE A SEPARATE 0-10V CONNECTION TO DIMMING BALLASTS OF EACH DIMMING ZONE. LIGHTING LOAD SWITCHING CIRCUITS (a, b, etc.) and dimming zones (z1, z2, etc.) shall be determined from the lighting floor plan. Note that fixtures of THE SAME DIMMING ZONE MAY BE CONNECTED TO DIFFERENT SWITCHING CIRCUITS.
- 4. PROVIDE DIMMERS AND/OR SWITCHES FOR THE VARIOUS SWITCHING CIRCUITS (a, b, ETC.) AS SHOWN ON THE LIGHTING FLOOR PLAN. MULTIPLE DIMMERS AND/OR SWITCHES MAY BE SERIES CONNECTED TO PROVIDE CONTROLS AS SHOWN ON THE PLAN.
- 5. PROVIDE QUANTITY OF LMRC-211, LMRC-212, AND/OR LMRC-213 ROOM CONTROLLERS AS SHOWN ON THE PLAN (NOTE -DIAGRAM ABOVE IS TYPICAL FOR ONE CONTROLLER). EACH CONTROLLER SHALL HAVE ITS OUTPUTS LINKED TO THE CONTROL SWITCHING DIMMING CIRCUIT (a, b, ETC.) AS SHOWN ON THE DIAGRAM ABOVE, AND BY THE LIGHTING FIXTURE SUBSCRIPTS ON THE PLAN. STANDARD SEQUENCE OF OPERATION IS FOR THE FIRST LMRC OUTPUT TO DEFAULT TO AUTOMATIC-ON/AUTOMATIC-OFF AND FOR THE SECOND OUTPUT TO DEFAULT TO MANUAL-ON/AUTOMATIC OFF. USE AN LMCT-100 DIGITAL CONFIGURATION TOOL TO
- PROGRAM THE OPERATION MODE TO BE AS DESCRIBED BY THE DRAWING NOTES. 6. PROVIDE TWO LMCT-100 DIGITAL CONFIGURATION TOOLS TO THE OWNER.

10



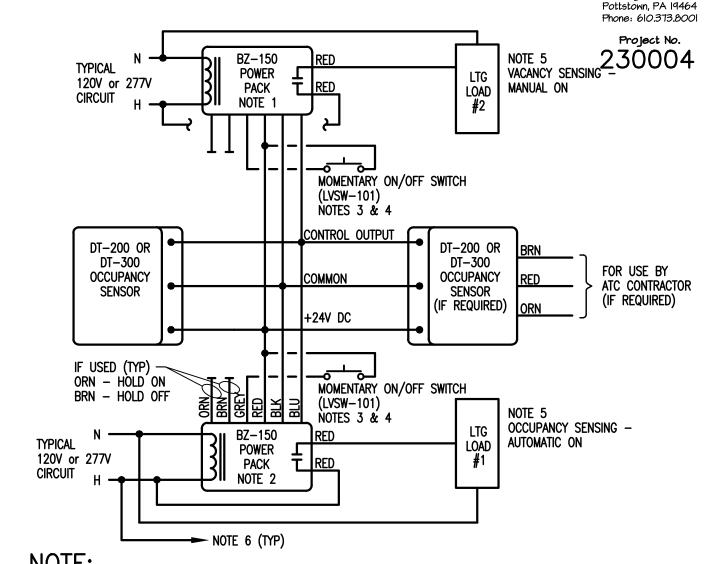
1. PROVIDE A FOUR INDEPENDENTLY PROGRAMMABLE CONTACT ASTRONOMICAL ELECTRONIC TIME SWITCH (INTERMATIC ET8415C).



PROVIDE ADDITIONAL POWER PACKS WIRED IN PARALLEL FOR EACH GROUP OF THREE OCCUPANCY SENSORS.

2. SET BZ UNIT TO AUTO ON FOR OCCUPANCY SWITCHING. ROUTE UNSWITCHED HOT LEG TO EMERGENCY FIXTURES, NIGHTLIGHTS, EXIT SIGNS AND ADDITIONAL OCCUPANCY SENSORS.

OCCUPANCY OR VACANCY SENSOR SYSTEM <u>ELEMENTARY DIAGRAM (TYPICAL)</u>



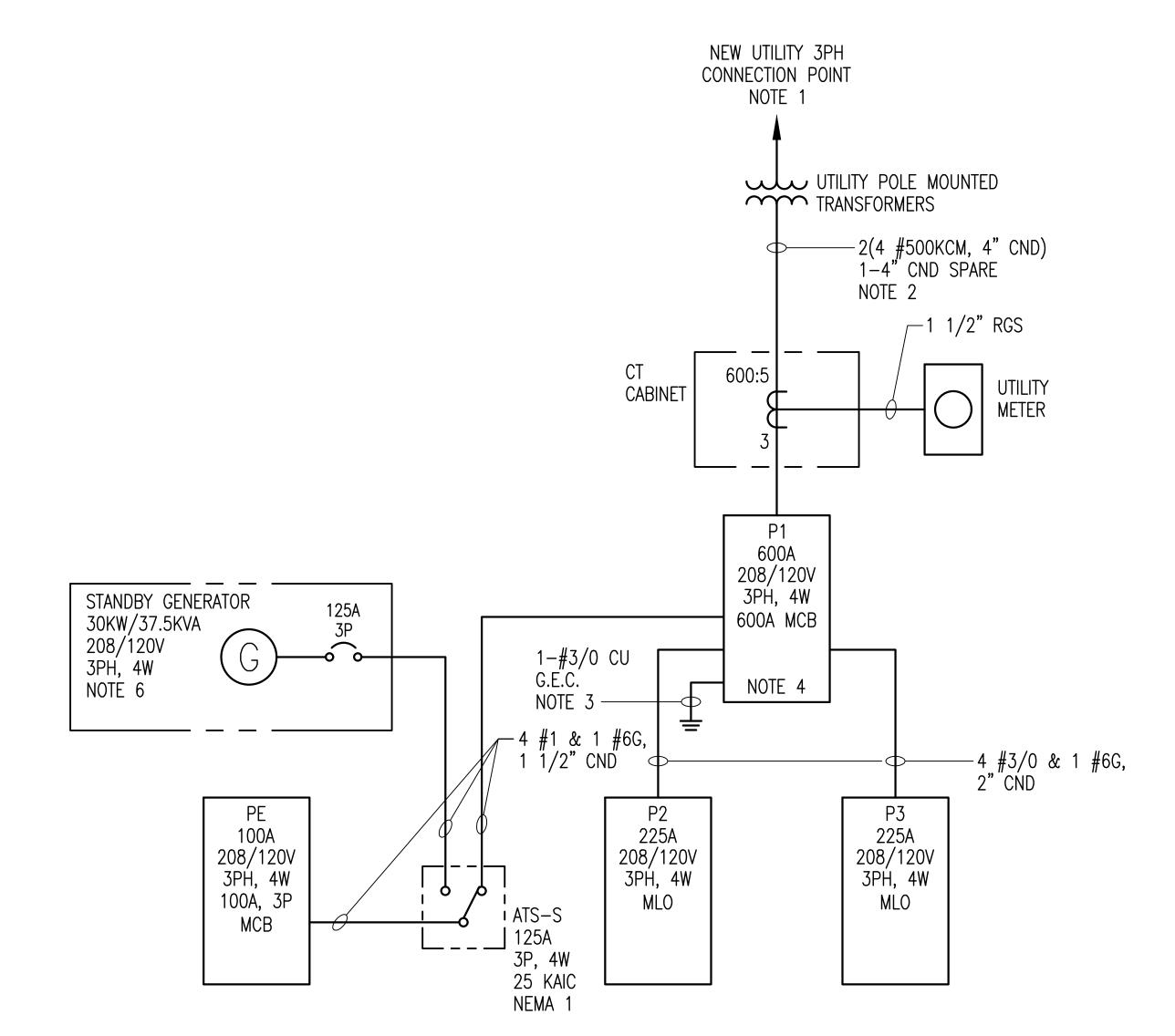
McCARTHY

www.McCarthy-Engineering.com 2500 East High Street, Suite 630

NOTE:

- 1. SET BZ UNIT TO MANUAL ON FOR VACANCY SENSING. PROVIDE ADDITIONAL POWER PACKS WIRED IN PARALLEL FOR EACH
- GROUP OF THREE OCCUPANCY SENSORS. 2. SET ONE BZ UNIT TO AUTO ON FOR OCCUPANCY SENSING. PROVIDE ADDITIONAL POWER PACKS WIRED IN PARALLEL FOR EACH
- GROUP OF THREE OCCUPANCY SENSORS. 3. PROVIDE ADDITIONAL MOMENTARY SWITCHES IN PARALLEL AS NEEDED
- FOR ADDITIONAL DOORS.
- 4. TWO MOMENTARY LVSW-101 ON/OFF SWITCHES MAY BE REPLACED BY ONE LVSW-102 DUAL SWITCH.
- 5. ALTERNATE FIXTURE MOUNTING IN BOTH DIRECTIONS WHERE POSSIBLE TO PROVIDE A CHECKERBOARD EFFECT UNLESS OTHERWISE NOTED.
- 6. ROUTE UNSWITCHED HOT LEG TO EMERGENCY FIXTURES, NIGHTLIGHTS, EXIT SIGNS AND ADDITIONAL OCCUPANCY SENSORS.

DUAL LEVEL VACANCY/OCCUPANCY SENSOR SYSTEM **ELEMENTARY DIAGRAM (TYPICAL)**



NEW BUILDING SINGLE LINE DIAGRAM

SINGLE LINE/SERVICE NOTES:

- CONTRACTOR SHALL PROVIDE ALL MATERIAL, LABOR AND WORK REQUIRED FOR A NEW ELECTRICAL SERVICE AS DESCRIBED IN THE LOCAL UTILITY SERVICE AND INSTALLATION REGULATIONS. ANY LOCAL UTILITY COMPANY CHARGES FOR PROVISION OF ELECTRICAL SERVICE SHALL BE INCLUDED IN THE CONTRACTOR'S BASE PRICE. AS A MINIMUM, THE INSTALLATION SHALL MEET THE SERVICE AND INSTALLATION REGULATIONS OF THE LOCAL
- 2. PROVIDE BURIED PVC SECONDARY CONDUIT AND SECONDARY CONDUCTORS FROM THE UTILITY TRANSFORMER TO THE MAIN PANELBOARD. CONFIRM CONDUIT AND CONDUCTOR QUANTITIES AND SIZES WITH THE LOCAL UTILITY PRIOR TO START OF WORK. INCREASE QUANTITIES AND SIZES AS REQUIRED TO MEET LOCAL UTILITY SERVICE AND INSTALLATION REGULATIONS.
- 3. PROVIDE A GROUNDING ELECTRODE CONDUCTOR SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND CONNECTED TO THE GROUNDING ELECTRODE SYSTEM INCLUDING FOUNDATION REBAR IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
- 4. THE SHORT CIRCUIT RATINGS ARE BASED ON AN AVAILABLE SHORT CIRCUIT CURRENT OF 27,800A AT THE UTILITY TRANSFORMER SECONDARY. VERIFY THAT THE UTILITY SHORT CIRCUIT AVAILABLE CURRENT DOES NOT EXCEED THIS VALUE PRIOR TO ORDERING MDP.
- 5. EXISTING SERVICE TO EXISTING BUILDING SHALL BE RETAINED.
- 6. CONNECT THE GENERATOR NEUTRAL TO THE NORMAL SYSTEM NEUTRAL AT THE TRANSFER SWITCH. DO NOT GROUND THE NEUTRAL AT THE GENERATOR. THIS GENERATOR IS NOT A SEPARATELY DERIVED SYSTEM.
- 7. PROVIDE AN 80A, 2P BREAKER FOR FEEDER TO NEW PANEL R3.
- 8. CONDUCTORS OF THIS CIRCUIT ARE OVERSIZED TO COMPENSATE FOR VOLTAGE DROP. JUNCTION BOX WITH SPLICE WITHIN TEN FEET OF THE TERMINATION AND REDUCE THE CONDUCTOR SIZE TO THE LARGEST SIZE WHICH CAN BE ACCOMMODATED BY THE EQUIPMENT.

SW

JCM

NEC

SCALE:

PROJECT NO.



_	ON: NEW BLDG 2ND FLR UTILITY				PANEL	P1 SCH	EDULE					
RM			PHASE:	3	V	VIRE: 4		VOLTS:	208/120			25 KAIC
				CURRE	NT RATING	G: 600 AMP	- MAIN BRI	EAKER				
СКТ		BRE	AKER	KVA LOADS					BREAKER			СКТ
NO	DESCRIPTION	TRIP	POLE	СКТ	Α	В	С	СКТ	POLE	TRIP	DESCRIPTION	NO
1	PANEL P2	200	3	17.52	28.93			11.41	3	200	PANEL P3	2
3	"	-	-	22.77		33.61		10.84	-	-	"	4
5	"	-	-	21.23			33.29	12.06	-	-	"	6
7	LTG - STORAGE	20	1	0.22	0.77			0.55	1	20	RECIRC PUMP	8
9	TIMECLOCK & L-12 DAMPER	20	1	0.36		0.36		0.00	1	20	SPARE	10
11	SPARE	20	1	0.00			0.50	0.50	1	20	CONF RM 203 PROJECTOR	12
13	SPARE	20	1	0.00	0.00			0.00	1	20	SPARE	14
15	SPARE	20	1	0.00		1.08		1.08	1	20	RECP - OFFICE AREA 101	16
17	SPARE	20	1	0.00			0.60	0.60	1	20	EWC	18
19	LTG - MECHANICS SHOP 105	20	1	1.80	3.24			1.44	1	20	RECP - MEN'S LOCKER RM 103	20
21	LTG - MECHANICS SHOP 105	20	1	1.50		2.94		1.44	1	20	RECP - BREAK RM 102	22
23	LTG - POLICE DEPT 106	20	1	1.22			2.22	1.00	1	20	VENDING MACHINE	24
25	WATER HEATER	20	1	0.18	1.18			1.00	1	20	VENDING MACHINE	26
27	SPARE	20	1	0.00		0.90		0.90	1	20	RECP-CORR 200, RM 201, RM 202	28
29	MICROWAVE	20	1	1.44			2.52	1.08	1	20	RECP - CONF. RM. 203	30
31	SPARE	20	1	0.00	7.28			7.28	2	60	CU-1	32
33	RECP - TOOL RM 105A	20	1	0.36		7.64		7.28	-	-	"	34
35	RECP - TOOL RM 105A	20	1	0.36			0.36	0.00	1	-	SPACE	36
37	PANEL PE	125A	3	7.49	7.49			0.00	1	-	SPACE	38
39	"	-	-	9.08		9.08		0.00	1	-	SPACE	40
41	"	-	-	9.09			9.09	0.00	1	-	SPACE	42
	ER LOCKON DEVICE	CIRC	UIT TOTALS:	94.62				58.46				
	HUNT TRIP BREAKER HACR BREAKER		PHASE	TOTALS:	48.89	55.61	48.58					
	AKER PADLOCK OFF DEVICE			TOTA	L CONNEC	TED LOAD:	153	KVA]			
				TOTA	L CONNEC	TED LOAD:	425	AMP				

LOCATI	ON: MECHANICS SHOP 105				PANEL	P2 SCH	EDULE					
			PHASE:	3	\	NIRE: 4		VOLTS:	208/120			10 KAIC
				CURREI	NT RATING	: 225 AMP -	MAIN LUG	S ONLY				
СКТ		BRE	AKER			KVA LOADS			BREA	AKER		СКТ
NO	DESCRIPTION	TRIP	POLE	СКТ	Α	В	С	СКТ	POLE	TRIP	DESCRIPTION	NO
1	RECP - MECHANICS SHOP 105	20	1	1.26	1.26			0.00	1	20	SPARE	2
3	RECP - MECHANICS SHOP 105	20	1	1.08		1.08		0.00	1	20	SPARE	4
5	RECP - SHOP STORAGE 105B&C	20	1	0.54			0.54	0.00	1	20	SPARE	6
7	CUH-2	20	2	1.50	4.70			3.20	3	60	AIR COMPRESSOR	8
9	"	-	-	1.50		4.70		3.20	-	-	"	10
11	SPARE	20	1	0.00			3.20	3.20	-	-	"	12
13	BREAK RM 102 CNTR RECPS	20	1	0.36	1.26			0.90	1	20	RECP - MECHANICS SHOP 105	14
15	CUH-1	20	2	1.50		2.68		1.18	1	25	EF-6	16
17	"	-	-	1.50			1.68	0.18	1	15	BATH FAN TIMER	18
19	SPARE	20	1	0.00	0.00			0.00	1	20	SPARE	20
21	GENERATOR JACK HEATER	20	2	1.00		3.19		2.19	2	30	CLNG FANS CF-13,14,15	22
23	"	-	-	1.00			3.19	2.19	-	-	"	24
25	PORTABLE LIFT	30	3	2.90	4.94			2.04	3	30	LIFT	26
27	"	-	-	2.90		4.94		2.04	-	-	"	28
29	"	-	-	2.90			4.94	2.04	-	-	"	30
31	SPECIAL RECP - MECHANICS SHOP 105	30	3	2.88	3.06			0.18	1	20	RECP - LIFT	32
33	"	-	-	2.88		5.38		2.50	2	30	SPECIAL RECP - MECHANICS SHOP 105	34
35	"	-	-	2.88			5.38	2.50	-	ı	"	36
37	SPECIAL RECP - MECHANICS SHOP 105	30	3	0.18	0.68			0.50	1	20	ICE MACHINE (1)	38
39	"	-	-	0.18		0.18		0.00	1	20	SPARE	40
41	"	-	-	0.18			0.18	0.00	1	20	SPARE	42
43	SPECIAL RECP - MECHANICS SHOP 105	30	3	0.18	0.18			0.00	1	20	SPARE	44
45	"	-	-	0.18		0.18		0.00	1	20	SPARE	46
47	"	-	-	0.18			0.18	0.00	1	-	SPACE	48
49	SPACE	-	1	0.00	0.00			0.00	1	-	SPACE	50
51	SPACE	-	1	0.00		0.00		0.00	1	-	SPACE	52
53	SPACE	-	1	0.00			0.00	0.00	1	-	SPACE	54
**SHUN	ER LOCKON DEVICE T TRIP BREAKER	CIRCUIT TOTALS: 29.66 PHASE TOTALS: 16.08 22.33				19.29	28.04	NOTE: 1) SEE POWER KEYNOTE #9 ON E-4.0				
	R BREAKER AKER PADLOCK OFF DEVICE							KVA				
= : \= /	SKEAKERT ABLOOK OFF BEVIOL		TOTAL CONNECTED LOAD:						+			

LOCATION: NEW BLDG 1ST FL VEHICLE BAY	R EVIDENCE				PANEL	P3 SCH	EDULE					
VERICLE BAY			PHASE:	3	\	VIRE: 4		VOLTS:	208/120			10 KAIC
				CURREI	NT RATING	: 225 AMP -	MAIN LUG	S ONLY				
СКТ		BREA	KER		KVA LOADS				BREA	AKER		СКТ
NO DESCRIPTION	ON	TRIP	POLE	CKT	Α	В	С	СКТ	POLE	TRIP	DESCRIPTION	NO
1 SPACE		-	1	0.00	0.00			0.00	1	20	SPARE	2
3 SPACE		-	1	0.00		0.00		0.00	1	20	SPARE	4
5 SPACE		-	1	0.00			0.00	0.00	1	20	SPARE	6
7 SPARE		20	1	0.00	0.53			0.53	1	15	EF-2	8
9 SPARE		20	1	0.00		0.86		0.86	1	20	EF-3	10
11 SPACE		-	1	0.00			1.18	1.18	1	25	EF-4	12
13 SPACE		-	1	0.00	0.90			0.90	1	15	EF-5	14
15 SPACE		-	1	0.00		0.00		0.00	1	-	SPACE	16
17 RECP - WASH	BAY	20	1	1.08			1.08	0.00	1	-	SPACE	18
19 SPACE		-	1	0.00	0.18			0.18	1	15	OIL SEPERATOR ALARM	20
21 SPACE		-	1	0.00		0.18		0.18	1	15	EF-3 TIMER	22
23 SPACE		-	1	0.00			0.00	0.00	1	-	SPACE	24
25 POWER WAS	HER	60	3	4.90	4.90			0.00	1	-	SPACE	26
27 "		-	-	4.90		4.90		0.00	1	-	SPACE	28
29 "		-	-	4.90			4.90	0.00	1	-	SPACE	30
31 EXG POWER WA	ASHER	60	3	4.90	4.90			0.00	1	-	SPACE	32
33 "		-	-	4.90		4.90		0.00	1	-	SPACE	34
35 "		-	-	4.90			4.90	0.00	1	-	SPACE	36
37 SPACE		-	1	0.00	0.00			0.00	1	-	SPACE	38
39 SPACE		-	1	0.00		0.00		0.00	1	-	SPACE	40
41 SPACE		-	1	0.00			0.00	0.00	1	-	SPACE	42
BREAKER LOCKON DEVICE		CIRCU	JIT TOTALS:	30.48				3.83				
SHUNT TRIP BREAKER *HACR BREAKER		PHASE	TOTALS:	11.41	10.84	12.06						
****BREAKER PADLOCK OFF DE			TOTA	L CONNEC	TED LOAD:	34	KVA					
				TOTA	L CONNEC	TED LOAD:	95	AMP				

LOCATI	CATION: MECHANICS SHOP 105				PANEL	PE SCH	EDULE					
			PHASE:	3	1	WIRE: 4		VOLTS:	208/120			10 KAIC
				CURR	ENT RATIN	G: 100 AMP	MAIN BRE	AKER				
СКТ		BRE	AKER		KVA LOADS			BREAKER				СКТ
NO	DESCRIPTION	TRIP	POLE	CKT	Α	В	С	СКТ	POLE	TRIP	DESCRIPTION	NO
1	GARAGE DOOR OPENERS	30	3	1.26	2.52			1.26	3	30	GARAGE DOOR OPENERS	2
3	"	-	-	1.26		2.52		1.26	-	-	"	4
5	"	-	-	1.26			2.52	1.26	-	-	"	6
7	LTG - BREAK RM 102	20	1	0.99	1.59			0.60	1	20	EM. GARAGE,EVIDENCE VEH LTS	8
9	LTG - CORRIDOR 200	20	1	0.87		2.07		1.20	1	20	RECP - EVIDENCE TRUCK	10
11	IH-1,2,3,4	20	1	2.32			3.52	1.20	1	20	RECP - EVIDENCE TRUCK	12
13	AC-3	15	1	1.27	1.63			0.36	1	20	BREAK RM 102 CNTR RECP	14
15	AC-1	15	1	1.27		1.60		0.33	2	20	LTG - EXTERIOR	16
17	AC-2	15	1	1.27			1.60	0.33	-	-	"	18
19	LTG CONTROLS	20*	1	0.60	1.15			0.55	3	15	EF-1	20
21	REFRIGERATOR	20	1	1.00		1.55		0.55	-	-	"	22
23	GAS DETECTION SYSTEM	20*	1	0.54			1.09	0.55	-	-	п	24
25	FACP	20*	1	0.60	0.60			0.00	1	20	SPARE	26
27	HOT WATER HEATER VENT	20	1	0.34		1.34		1.00	1	20	GENERATOR BATT CHGER & RECP	28
29	SPARE	20	1	0.00			0.36	0.36	1	20	RECP - TELE/DATA MEZZANINE	30
31	SPARE	20	1	0.00	0.00			0.00	1	-	SPACE	32
33	SPARE	20	1	0.00		0.00		0.00	1	-	SPACE	34
35	SPARE	20	1	0.00			0.00	0.00	1	-	SPACE	36
	ER LOCKON DEVICE	CIRC	UIT TOTALS:	14.85				10.81		1		-
	HUNT TRIP BREAKER IACR BREAKER		PHASE	TOTALS:	7.49	9.08	9.09					
	*BREAKER PADLOCK OFF DEVICE			TOTA	L CONNEC	TED LOAD:	26	KVA				
				TOTA	L CONNEC	TED LOAD:	71	AMP				
												T

SW PRINCIPAL: NEC JCM AS NOTED

DRAWING NO. PROJECT NO. 230004

- 1.1 THE ARCHITECTURAL GENERAL CONDITIONS SHALL APPLY TO AND FORM A PART OF THE ELECTRICAL SECTION OF THESE SPECIFICATIONS.
- 1.2 PROVIDE ALL MATERIALS, LABOR, EQUIPMENT, AND TOOLS NECESSARY FOR A COMPLETE AND WORKABLE ELECTRICAL SYSTEM AS INDICATED ON THE DRAWINGS. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC), LOCAL AND STATE CODES HAVING JURISDICTION, AND APPLICABLE MANUFACTURER'S RECOMMENDATIONS.
- 1.3 UNLESS NOTED OTHERWISE, THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL CONTROL DEVICES TOGETHER WITH CONTROL WIRING, CONDUIT, AND ALL APPURTENANCES AND ACCESSORIES NECESSARY TO PERFORM THE OPERATING FUNCTIONS AS SPECIFIED. CONTROL DEVICES SHALL INCLUDE, BUT NOT BE LIMITED TO, MOTOR STARTERS, THERMOSTATS, SWITCHING RELAYS, CONTROL RELAYS. AND TRANSFORMERS. WIRING MATERIALS AND INSTALLATION SHALL CONFORM WITH THE NATIONAL ELECTRIC CODE. CONTROL WIRING SHALL INCLUDE, BUT IS NOT LIMITED TO, 120 VOLT CONTROL WIRING AS WELL AS LOW VOLTAGE DIMMING WIRING, OCCUPANCY SENSOR WIRING, AND OTHER LOW VOLTAGE WIRING. ALL CONTROL SYSTEM WIRING EXCEPT LOW VOLTAGE WIRING, SHALL BE 14 AWG MINIMUM INSTALLED IN 1/2-INCH DIAMETER MINIMUM CONDUIT. FLEXIBLE METAL CONDUIT SHALL BE PERMITTED TO MAKE RUNS OF THREE FEET OR LESS FOR FINAL EQUIPMENT CONNECTIONS. LOW VOLTAGE, CONTROL WIRING SHALL BE OPEN, PLENUM RATED, CABLE, ROUTED IN ACCESSIBLE, CONCEALED SPACES ON J HOOKS WITH CLOSURE TIES ON FIVE FOOT CENTERS WHEREVER POSSIBLE. IN INACCESSIBLE SPACES, INCLUDING IN WALLS. LOW VOLTAGE CONTROL WIRING SHALL BE ROUTED IN 3/4-INCH CONDUIT. OPEN CONTROL WIRING SHALL NOT REST ON OR IMPEDE THE REMOVAL OF CEILING TILES.
- 1.4 THE CONTRACTOR SHALL VISIT THE SITE, EXAMINE ALL CONDITIONS, AND MAKE ALLOWANCES FOR DIFFICULTIES AND CONTINGENCIES AFFECTING THE PROPER EXECUTION OF THIS CONTRACT.
- 1.5 THE CONTRACTOR SHALL OBTAIN AND PAY ALL FEES NECESSARY FOR PERMITS AND INSPECTIONS REQUIRED WITH HIS WORK. ALL ELECTRICAL WORK SHALL BE INSPECTED AND CERTIFIED BY AN INDEPENDENT INSPECTION AGENCY SUCH AS THE MIDDLE DEPARTMENT INSPECTION AGENCY (MDIA).
- 1.6 ALL MATERIALS SHALL BE MANUFACTURED WITHIN THE SCOPE OF THE UNDERWRITER'S LABORATORIES, SHALL CONFORM TO UL STANDARDS, CARRY UL APPROVED.
- 1.7 ALL EQUIPMENT, MATERIALS, AND WORKMANSHIP SHALL BE GUARANTEED FOR A MINIMUM OF ONE YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER.
- 1.8 WHERE PRODUCTS ARE SPECIFIED BY BRAND NAME, CATALOG NUMBERS, OR BY NAMES OF MANUFACTURERS, THE REFERENCE IS INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND IS SOLELY FOR THE PURPOSE OF INDICATING THE TYPE OF QUALITY OF ITEM THAT WILL BE ACCEPTABLE. AN APPROVED EQUAL WILL BE CONSIDERED UNLESS INDICATED OTHERWISE.
- 1.9 SHOP DRAWINGS SHALL BE SUBMITTED AND REVIEWED PRIOR TO ORDERING ANY EQUIPMENT.
- 1.10 THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH ALL OTHER TRADES
- 1.11 ALL CUTTING AND PATCHING OF EVERY NATURE REQUIRED IN CONNECTION WITH THIS CONTRACT SHALL BE DONE BY THE CONTRACTOR WITH MECHANICS EXPERIENCED IN THEIR RESPECTIVE TRADES. ALL PATCHING SHALL MATCH ADJACENT FINISHES.
- 1.12 CONTRACTOR SHALL ENGAGE THE SERVICES OF A FIRE PROTECTION CONTRACTOR TO REVIEW THE DRAWINGS AND INSTALL FIRE PROTECTION PRODUCTS TO MAINTAIN THE INTEGRITY OF ALL PIPE, WIRE, CONDUIT, AND SIMILAR. PENETRATIONS THROUGH ANY AND ALL FIRE RATED WALLS, FLOORS, BARRIERS, AND ASSEMBLIES. FIRE STOP TRAINING AND PRODUCTS SHALL BE 3M OR APPROVED EQUAL.
- 1.13 ALL EXCAVATIONS SHALL HAVE SOLID, UNDISTURBED BOTTOMS, SUBJECT TO APPROVAL BY THE OWNER'S REPRESENTATIVE PRIOR TO CONDUIT PLACEMENT. SHOULD BOTTOMS BECOME SOFT OR WET BEFORE CONDUIT IS PLACED, ALL SUCH UNSUITABLE BOTTOMS MUST BE REMOVED AT NO COST TO THE OWNER AND FILLED WITH CONCRETE. NO SLOPING BEARING WILL BE PERMITTED.
- 1.14 CONDUIT SHALL BE CONCEALED WHERE POSSIBLE UNLESS APPROVED OTHERWISE BY THE OWNER.
- 1.15 CONDUIT SHALL BE 3/4—INCH MINIMUM, UNLESS NOTED OTHERWISE, AND SHALL BE IN ACCORDANCE WITH THE FOLLOWING TYPES OF USAGE:
- A. EMT USE FOR INTERIOR EXPOSED AND CONCEALED WORK NOT SUBJECT TO DAMPNESS OR SEVERE PHYSICAL DAMAGE. DO NOT USE FOR EXTERIOR WORK. DO NOT USE WHEN IN CONTACT WITH CINDER FILL UNLESS PROTECTED BY AT LEAST TWO INCHES OF CONCRETE OR UNLESS TUBING IS AT LEAST 18 INCHES UNDER THE FILL. DO NOT USE EMT IN HAZARDOUS LOCATIONS. USE WITH SET SCREW FITTINGS.
- B. RIGID METAL CONDUIT USE FOR INTERIOR WORK SUBJECT TO CORROSIVE INFLUENCES, DAMPNESS AND/OR SEVERE PHYSICAL DAMAGE. USE FOR EXTERIOR WORK. RIGID GALVANIZED STEEL CONDUIT MAY PASS THROUGH CONCRETE WALLS AND SLABS BUT SHALL ONLY BE EMBEDDED IN WALLS AND/OR SLABS WHEN APPROVED BY A LICENSED PROFESSIONAL STRUCTURAL ENGINEER.
- C. PVC USE SCHEDULE 40 FOR BELOW GRADE CONCEALED AREAS AND FOR ENCASED IN CONCRETE UNDERGROUND DUCT BANK INSTALLATIONS. DO NOT USE FOR SUPPORT OF FIXTURES OR EQUIPMENT, WHERE SUBJECT TO PHYSICAL DAMAGE, WHERE SUBJECT TO HIGH AMBIENT TEMPERATURES, IN RETURN AIR PLENUMS, OR WITH CONDUCTORS WHOSE INSULATION TEMPERATURE LIMITATIONS EXCEED THOSE FOR WHICH THE CONDUIT IS APPROVED. DO NOT USE PVC CONDUIT IN HAZARDOUS LOCATIONS.
- D. ALL CONCEALED BRANCH CIRCUIT WIRING ABOVE GRADE IN NON-HAZARDOUS LOCATIONS MAY BE METAL CLAD CABLE, TYPE MC, MINIMUM SIZE #12 AWG, MAXIMUM SIZE #8 AWG, UNLESS NOTED OTHERWISE. UNIVERSAL TYPE FASTENING DEVICES SHALL BE USED TO PROPERLY SECURE THE MC CABLES PARALLEL TO THE WOOD OR METAL FRAMING MEMBER. DEVICE SHALL BE INSTALLED IN CENTER OF MEMBER ON INTERVALS NO GREATER THAN FOUR FEET SIX INCHES.
- 1.16 INSTALL FLEXIBLE METALLIC CONDUIT AT ALL MOTOR CONNECTIONS INSIDE THE BUILDING AND LIQUID—TIGHT FLEXIBLE METAL CONDUIT AT MOTOR CONNECTIONS OUTSIDE THE BUILDING. CONDUIT SHALL NOT EXCEED 18 INCHES IN LENGTH.
- 1.17 UNLESS OTHERWISE NOTED, ALL WIRE SHALL BE OF SOFT DRAWN COPPER, SOLID OR STRANDED OF 98 PERCENT CONDUCTIVITY WITH INSULATION RATED 600 VOLTS. ALL SIZES SHOWN ON THE DRAWINGS ARE BASED ON COPPER. ALUMINUM CONDUCTORS FOR #2 AWG AND LARGER MAY BE USED WHERE PERMITTED BY OWNER, WHEN RESIZED IN STRICT ACCORDANCE WITH NEC REQUIREMENTS. CONDUCTORS SHALL BE AS FOLLOWS:
- A. #8 AND LARGER SHALL BE STRANDED WITH TYPE THHN/THWN INSULATION.

- B. #10 AND SMALLER SHALL BE SOLID WITH TYPE THHN/THWN INSULATION.
- C. #12 SHALL BE MINIMUM SIZE CONDUCTOR EXCEPT #14 MAY BE USED FOR CONTROL CIRCUIT WIRING AND #10 SHALL BE THE MINIMUM SIZE FOR CIRCUITS OVER 100 FEET LONG.
- 1.18 WIRE CONNECTIONS FOR SPLICING #8 AWG AND SMALLER SHALL BE MADE WITH PRESSURE CONNECTORS CONSISTING OF CONE—SHAPED COIL SPRINGS WITH INSULATED COVERS. SPLICING OF CONDUCTORS LARGER THAN #8 SHALL BE MADE USING MECHANICAL SPLICING OR COMPRESSION TYPE DEVICES.
- 1.19 ALL LUGS AND/OR CIRCUIT BREAKER LUG CONNECTORS SHALL BE COPPER OR HIGH PERCENTAGE COPPER ALLOY RATED FOR USE WITH 75 DEGREE C WIRING.
- 1.20 PIN ADAPTER TERMINALS SHALL BE INSTALLED ON ALL ALUMINUM CONDUCTOR TERMINATIONS. TERMINALS SHALL CONSIST OF A TIN-PLATED STRANDED COPPER WIRE PIGTAIL AND A TIN-PLATED ALUMINUM BARREL PRE-FILLED WITH OXIDE INHIBITOR AND CAPPED. PIN ADAPTER TERMINALS SHALL BE PROVIDED WITH COMPATIBLE INSULATING COVERS AND HAVE A 90 DEGREES C RATING PER UL 486B.
- 1.21 LED DIMMER SWITCHES SHALL BE MATCHED TO THE DIMMING DRIVER AND SHALL BE SIMILAR TO FLUORESCENT DIMMER SWITCHES ABOVE.
- 1.22 OUTLET BOXES OF PROPER TYPE AND NOT LESS THAN FOUR INCHES SQUARE SHALL BE USED AT ALL LIGHTING, RECEPTACLE AND SWITCH LOCATIONS.
 PLASTER RINGS SHALL BE USED AT EACH BOX LOCATION WHERE NECESSARY.
 SURFACE MOUNTED WIRING DEVICES SHALL BE INSTALLED IN "HANDY BOX"
 TYPE OUTLET BOXES WITH CORRESPONDING COVER PLATES. OUTLET BOXES SHALL BE AS MANUFACTURED BY AMERICAN ELECTRIC, RACO, CARLON, OR APPROVED EQUAL.
- 1.23 JUNCTION BOXES OF AMPLE SIZE SHALL BE PROVIDED AS REQUIRED BY CONSTRUCTION IN ACCORDANCE WITH THE NEC. BOXES SHALL BE CONSTRUCTED OF CAST RUST—RESISTING METAL OR OF 14 GAUGE GALVANIZED STEEL WITH RIVETED OR WELDED JOINTS AND PROVIDED WITH COVERS OF THE SAME MATERIAL WHICH SHALL BE SCREWED OR HINGED TO THE BOX. BOXES SHALL BE FLANGED AND TAPPED TO RECEIVE MACHINE SCREWS. HOLES IN COVERS SHALL BE IN ALIGNMENT WITH TAPPED HOLES IN BOX. WHERE NO SIZES ARE GIVEN ON THE DRAWINGS, BOXES SHALL BE NO SMALLER THAN THE MINIMUM SIZE ALLOWED BY NEC. WHERE FEEDERS OF DIFFERENT SYSTEMS OR VOLTAGES PASS THROUGH THE SAME BOX, BARRIERS SHALL BE PROVIDED FOR PROPER SEPARATION.
- 1.24 FLOOR BOXES SHALL CONSIST OF A CONCEALED MOUNTING BOX AND A FLUSH TRIM PLATE AND COVER. THE CONCEALED MOUNTING BOX SHALL BE AN ADJUSTABLE SHALLOW STAMPED STEEL BOX, WHICH ACCEPTS TWO DEVICE PLATES. BOX SHALL BE STEEL CITY, CATALOG NO. 642 OR APPROVED EQUAL. COVERPLATES SHALL BE ALUMINUM WHICH FIT INTO THE TRIM PLATES WITH THE TOP FLUSH WITH THE CONCRETE OR TILE FLOOR. TRIM PLATE AND COVER MATERIAL SHALL BE VERIFIED WITH THE OWNER'S REPRESENTATIVE. COVERPLATE SHALL BE STEEL CITY, CATALOG NO. P—64—DS OR APPROVED EQUAL. COORDINATE FLOOR BOX DEPTH WITH SLAB AND FLOOR COVERING THICKNESS PRIOR TO ORDERING.
- 1.25 SWITCHES SHALL BE SPECIFICATION GRADE, 120/277 VOLTS AC, TOGGLE TYPE RATED 20 AMPERES. DIMMER SWITCHES SHALL BE MATCHED TO THE DIMMING BALLAST OR DRIVER AND SHALL HAVE A CAPACITY GREATER THAN THE COMBINED FIXTURE LOAD TO BE DIMMED. SWITCH TYPE AND NUMBER OF POLES SHALL BE AS INDICATED ON THE DRAWINGS. SWITCHES SHALL BE AS MANUFACTURED BY LEVITON, HUBBELL, GENERAL ELECTRIC, OR APPROVED
- 1.26 OCCUPANCY/VACANCY SENSING SYSTEM
- A. CEILING OR WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSORS SHALL HAVE COMBINED PASSIVE INFRARED TECHNOLOGY AND ULTRASONIC TECHNOLOGY. THE ULTRASONIC OCCUPANCY SENSOR SHALL BE CAPABLE OF DETECTING PRESENCE, IN THE CONTROL AREA, BY DETECTING SONIC SHIFTS IN TRANSMITTED ULTRASOUND. THE PASSIVE INFRARED SENSORS SHALL BE CAPABLE OF DETECTING PRESENCE, IN CONTROL AREA, BY DETECTING CHANGES IN INFRARED ENERGY. THE CEILING SENSOR SHALL BE LOW PROFILE, CEILING MOUNTED WITH A COVERAGE AREA OF 38 FEET DIAMETER. 360 DEGREE CIRCULAR PATTERN. THE WALL SENSOR SHALL BE CORNER WALL MOUNTED WITH A COVERAGE AREA OF 38 FEET IN A 90 DEGREE PATTERN. SENSOR SHALL BE MOUNTED WITHIN 20 FEET OF THE AREA ENTRANCE. ONCE LIGHTING IS ON. DETECTION BY EITHER TECHNOLOGY SHALL HOLD LIGHTING ON. EACH SENSOR SHALL CONTAIN A SHUNT PROVISION, WHICH WILL ENABLE BYPASS OF THE SENSOR IN THE EVENT OF FAILURE. EACH SENSOR SHALL BE FIELD SET SO THAT ONLY ONE TECHNOLOGY IS NEEDED TO TRIGGER LIGHTING ON. SENSOR SHALL BE TEMPERATURE AND HUMIDITY RESISTANT WITH LESS THAN A 6 DB SHIFT IN THE TEMPERATURE RANGE OF -4 DEGREES F TO 140 DEGREES F. TIME DELAY RANGE SHALL BE ADJUSTABLE FROM 5 TO 30 MINUTES AND SET FOR 20 MINUTES UNLESS OTHERWISE NOTED. SENSORS SHALL OPERATE ON 24 VOLTS DC PROVIDED FROM A SYSTEM COMPATIBLE POWER PACK AND DRAW A MAXIMUM OF 43 MILLIAMPS. SENSORS SHALL BE WATT STOPPER MODEL DT-300 OR DT-200.
- B. CEILING OR WALL MOUNTED DUAL TECHNOLOGY VACANCY SENSORS SHALL HAVE COMBINED PASSIVE INFRARED TECHNOLOGY AND ULTRASONIC TECHNOLOGY. THE ULTRASONIC SENSOR SHALL BE CAPABLE OF DETECTING PRESENCE IN THE CONTROL AREA. BY DETECTING SONIC SHIFTS IN TRANSMITTED ULTRASOUND. THE PASSIVE INFRARED SENSORS SHALL BE CAPABLE OF DETECTING PRESENCE IN CONTROL AREA BY DETECTING CHANGES IN INFRARED ENERGY. THE CEILING SENSOR SHALL BE LOW PROFILE, CEILING MOUNTED WITH A COVERAGE AREA OF 38 FEET DIAMETER, 360 DEGREE CIRCULAR PATTERN. THE WALL SENSOR SHALL BE CORNER WALL MOUNTED WITH A COVERAGE AREA OF 38 FEET IN A 90 DEGREE PATTERN. A SENSOR SHALL BE MOUNTED WITHIN 20 FEET OF EACH AREA ENTRANCE. ONCE LIGHTING IS ON, DETECTION BY EITHER TECHNOLOGY SHALL HOLD LIGHTING ON. EACH SENSOR SHALL CONTAIN A SHUNT PROVISION, WHICH WILL ENABLE BYPASS OF THAT SENSOR IN THE EVENT OF FAILURE. EACH SENSOR SHALL BE FIELD SET SO THAT MANUAL ACTIVATION BY A WATT STOPPER LVSW-101 LOW VOLTAGE MOMENTARY WALL SWITCH IS NEEDED TO TRIGGER LIGHTING ON. SENSOR SHALL BE TEMPERATURE AND HUMIDITY RESISTANT WITH LESS THAN A 6 DB SHIFT IN THE TEMPERATURE RANGE OF -4 DEGREES F TO 140 DEGREES F. TIME DELAY RANGE SHALL BE ADJUSTABLE FROM 5 TO 30 MINUTES BUT SET TO 20 MINUTES UNLESS OTHERWISE NOTED. SENSORS SHALL OPERATE ON 24 VOLTS DC PROVIDED FROM A SYSTEM COMPATIBLE POWER PACK AND DRAW A MAXIMUM OF 43 MILLIAMPS. SENSORS SHALL BE WATT STOPPER MODEL DT-300 OR DT-200.
- C. SENSOR POWER PACKS SHALL BE A SELF-CONTAINED TRANSFORMER DESIGNED WITH A 1/2-INCH SNAP-IN NIPPLE FOR MOUNTING IN 1/2-INCH KNOCK-OUT ON A SURFACE MOUNT TYPE MOUNTING BOX. POWER PACKS SHALL HAVE TWO DRY CONTACTS CAPABLE OF SWITCHING A 20 AMPERE BALLAST LOAD AT 120 VAC AND PROVIDE 24 VDC AT 150MA OUTPUT CAPABLE OF CONTROLLING UP TO THREE DUAL TECHNOLOGY OCCUPANCY SENSORS. POWER PACK SHALL BE WATT STOPPER CATALOG NO. BZ-50, BZ-150 OR BZ-200 AS SHOWN ON THE DRAWINGS OR APPROVED EQUAL. PROVIDE MULTIPLE POWER PACKS OF THE PROPER TYPE WHERE COMBINED OCCUPANCY OR VACANCY AND/OR PLUG CONTROL IS INDICATED ON THE DRAWINGS.
- 1.27 DUPLEX RECEPTACLES SHALL BE SPECIFICATION GRADE, POLARIZED, GROUNDED, NEMA 5-20R, 20 AMPERE, 125 VOLTS AC. RECEPTACLES SHALL BE AS MANUFACTURED BY LEVITON, HUBBELL, GENERAL ELECTRIC, OR APPROVED

- EQUAL. RECEPTACLES WITH INTEGRAL GROUND FAULT CIRCUIT INTERRUPTING CAPACITY SHALL BE PROVIDED AS INDICATED ON THE DRAWINGS.

 WEATHERPROOF DUPLEX RECEPTACLES SHALL BE WEATHER RESISTANT, GROUND FAULT CIRCUIT INTERRUPTING TYPE MOUNTED IN A WEATHERPROOF ENCLOSURE WHICH RETAINS ITS RATING WHILE IN USE.
- 1.28 WIRING DEVICES AND COVER PLATES ARE TO BE COLOR COORDINATED WITH THE OWNER'S REPRESENTATIVE. ONE—PIECE DEVICE COVER PLATES SHALL BE PROVIDED FOR ALL OUTLETS. PLATES SHALL BE SMOOTH THERMOPLASTIC TYPE AS MANUFACTURED BY LEVITON, HUBBELL, GENERAL ELECTRIC, OR APPROVED EQUAL.
- 1.29 SAFETY SWITCHES SHALL BE THE SIZE AND TYPE AS SHOWN ON THE DRAWINGS. FUSE SIZE, IF REQUIRED, SHALL BE AS SHOWN ON THE DRAWINGS. SWITCHES SHALL BE HEAVY DUTY WITH QUICK—MAKE, QUICK—BREAK OPERATING MECHANISM. THE HANDLE AND MECHANISM SHALL BE AN INTEGRAL PART OF THE BOX AND NOT THE COVER WITH POSITIVE PAD LOCKING PROVISIONS IN THE "OFF" POSITION. SWITCHES SHALL BE NEMA 1 (INTERIOR) AND NEMA 3R (EXTERIOR) AND SHALL BE AS MANUFACTURED BY SQUARE D, SIEMENS, GENERAL ELECTRIC, OR APPROVED EQUAL.
- 1.30 PROVIDE FOR EVERY FUSE CLIP TO WHICH A CIRCUIT HAS BEEN CONNECTED, A NONRENEWABLE CARTRIDGE FUSE OF THE SIZE INDICATED ON THE DRAWINGS OR AS REQUIRED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. ALL FUSES SHALL BE DUAL ELEMENT TIME DELAY UNLESS NOTED OTHERWISE.
- 1.31 CIRCUIT BREAKERS SHALL BE ENCLOSED MOLDED CASE, BOLT-ON (EXCEPT THAT SQUARE D I-LINE BREAKERS ARE ACCEPTABLE), WITH QUICK-MAKE, QUICK-BREAK TOGGLE MECHANISM. NON-FUSIBLE CONTACTS. AND INVERSE TIME SHORT CIRCUIT CHARACTERISTICS. BREAKERS SHALL BE TRIP-FREE ON OVERLOAD AND SHALL INDICATE CLEARLY WHETHER THEY ARE OPENED. CLOSED. OR TRIPPED. MULTI-POLE UNITS SHALL HAVE THERMAL ELEMENT IN EACH POLE AND SHALL HAVE A SINGLE HANDLE. CIRCUIT BREAKER SHORT CIRCUIT RATINGS SHALL BE 120 PERCENT OF THE AVAILABLE SHORT CIRCUIT CURRENT ON THE EXISTING ELECTRICAL SYSTEM; 10,000 AMPERES SYMMETRICAL MINIMUM FOR 208/120 VOLT SYSTEM. CONTRACTOR SHALL OBTAIN SYSTEM SHORT CIRCUIT CURRENTS FROM THE POWER COMPANY AND SHALL INCLUDE THIS INFORMATION IN HIS SHOP DRAWING SUBMITTAL TO THE OWNER'S REPRESENTATIVE. SERIES RATING OF CIRCUIT BREAKERS TO IMPROVE THE SHORT CURCIUT RATING IS NOT ALLOWED. CIRCUIT BREAKERS WITH A CONTINUOUS CURRENT TRIP SETING OF 1200A OR HIGHER OR WHICH CAN BE ADJUSTED TO 1200A OR HIGHER WITHOUT MODIFYING THE PROTECTED CIRCUIT BUS AND/OR LOAD SHALL BE PROVIDED WITH ENERGY REDUCING MAINTENANCI SWITCHING WITH LOCAL STATUS INDICATOR UNLESS THE BREAKER HAS AN APPROVED FOUIVALENT METHOD TO REDUCE CLEARING TIME AND MITIGATE ARC FLASH. BREAKERS SHALL BE COMPATIBLE WITH PANELBOARDS PROVIDED. ALL 20 AMPERE, SINGLE POLE CIRCUIT BREAKERS FOR LIGHTING CIRCUITS SHALL BE "SWD" RATED. CIRCUIT BREAKERS FOR DWELLING UNIT BEDROOMS SHALL BE AFCI RATED AND CIRCUIT BREAKERS FOR AIR CONDITIONING AND REFRIGERATION UNITS SHALL BE HACR RATED. BREAKER PADLOCK OFF DEVICES SHALL BE OSHA LOCKOUT-TAGOUT APPROVED DEVICES PERMANENTLY AFFIXED TO THE BREAKER AND MANUFACTURED BY THE BREAKER MANUFACTURER.
- 1.32 LIGHTING FIXTURES AND LAMPS SHALL BE AS SCHEDULED ON THE DRAWINGS OR APPROVED EQUAL.
- 1.33 LED FIXTURES SHALL COMPLY WITH UL 1598 AND UL 8750. LED MODULES SHALL BE UL RECOGNIZED COMPONENTS WHICH COMPLY WITH IESNA LM-79 AND LM-80 STANDARDS. INDOOR LUMINAIRES SHALL BE UL LISTED FOR 25 DEGREES C AMBIENT ENVIRONMENTS. FIXTURES SHALL INCLUDE LONG-LIFE LED SYSTEMS COUPLED WITH AN ELECTRICAL DRIVER TO DELIVER OPTIMAL PERFORMANCE. FIXTURES SHALL HAVE A PROJECTED LIFE OF 60,000 HOURS MINIMUM AT 70 PERCENT LUMEN OUTPUT. THE DRIVER SHALL HAVE A UNIVERSAL VOLTAGE RATING OF 120-277V AND SHALL INCLUDE 0-10V DIMMING AS A STANDARD FEATURE. THE DIMMING DRIVER SHALL BE MATCHED TO THE DIMMER SWITCH. UNLESS OTHERWISE NOTED, FIXTURES SHALL BE 3500K WITH A CRI OF 85.
- 1.34 THE ELECTRICAL CONTRACTOR SHALL CONSULT THE ROOM FINISH SCHEDULE AS TO THE TYPE OF CEILING CONSTRUCTION. HE SHALL BE RESPONSIBLE FOR ORDERING THE PROPER FIXTURES WITH HARDWARE FOR INSTALLATION IN OR ON THE TYPE OF CEILING SPECIFIED.
- 1.35 ALL UNHEATED SPACES SHALL BE PROVIDED WITH A ZERO DEGREE MINIMUM STARTING TEMPERATURE BALLAST OR DRIVER.
- 1.36 ALL ADDITIONAL WIRING AND/OR CONDUCTORS REQUIRED FOR LIGHTING CONTROL INCLUDING THAT REQUIRED FOR SWITCHED RECEPTACLES, THREE—WAY SWITCHING, UNSWITCHED CONDUCTORS FOR EXIT SIGNS, EMERGENCY LIGHTS, NIGHT LIGHTS, AND OCCUPANCY SENSORS; AND LOW VOLTAGE WIRING FOR OCCUPANCY SENSING AND DIMMING CONTROL SHALL BE PROVIDED EVEN THOUGH NOT SPECIFICALLY SHOWN ON THE DRAWINGS.
- 1.37 MANUAL MOTOR STARTERS SHALL BE NEMA 1, FRACTIONAL HORSEPOWER TYPE FOR "ON-OFF" CONTROL OF SMALL MOTORS. PROVIDE STARTER WITH MELTING ALLOY TYPE THERMAL OVERLOAD RELAY. STARTERS SHALL BE AS MANUFACTURED BY SQUARE D, GENERAL ELECTRIC, SIEMENS, OR APPROVED FOLIAL
- 1.38 TELEPHONE/DATA SYSTEM
- A. TELEPHONE/DATA SYSTEM WIRING IN WALLS AND CONCEALED LOCATIONS SHALL BE INSTALLED IN 3/4-INCH EMT TO AN ACCESSIBLE LOCATION, UNLESS NOTED OTHERWISE. ALL CONDUIT WITH PULL WIRE SHALL BE STUBBED ABOVE SUSPENDED CEILING FOR INSTALLATION OF OPEN PLENUM RATED WIRING TO TELEPHONE AND/OR DATA EQUIPMENT AREA BY OTHERS.
- B. THE CONTRACTOR SHALL LOCATE TELEPHONE AND/OR DATA OUTLETS AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH OWNER'S REQUIREMENTS. PROVIDE OUTLET BOX WITH BLANK COVER OR COVER WITH BUSHED OPENING AS DIRECTED BY THE OWNER OF THE SAME COLOR AS OTHER DEVICES IN THE AREA.
- 1.39 FIRE ALARM SYSTEM
- A. THIS SECTION OF THE SPECIFICATIONS COVERS THE FURNISHING OF ALL LABOR, MATERIALS, AND ACCESSORIES NECESSARY FOR, BUT NOT NECESSARILY LIMITED TO, THE INTEGRATION OF FIRE ALARM SYSTEM COMPONENTS INTO THE EXISTING FIRE ALARM SYSTEM, AS LISTED HEREIN AND AS SHOWN ON THE DRAWINGS. ALL DEVICES SHALL HAVE A SIMILAR PHYSICAL APPEARANCE OF EXISTING SYSTEM EQUIPMENT AND HAVE ELECTRICAL CHARACTERISTICS COMPATIBLE WITH THE EXISTING SYSTEM.
- B. THE SYSTEM SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF NFPA 70, 72, 99, AND 101.
- C. PROVIDE SUBMITTALS FROM AN APPROVED FIRE ALARM SYSTEM MANUFACTURER OF CUT SHEETS WITH DEVICE LOADS, A RISER DIAGRAM WITH DEVICE QUANTITY AND WIRE SIZES, AND WIRING PLANS WITH WIRING ROUTING AND LENGTHS. INCLUDED WITH THE SUBMITTALS SHALL BE BATTERY SIZING CALCULATIONS AND VOLTAGE DROP CALCULATIONS USING THE ABOVE INFORMATION TO CONFIRM THAT THE SYSTEM IS CODE COMPLIANT.
- D. SMOKE DETECTORS SHALL BE PHOTOELECTRIC TYPE. DETECTOR CIRCUITS

- SHALL BE OF THE TWO-WIRE TYPE WHEREBY THE DETECTOR OPERATING POWER IS TRANSMITTED OVER THE SAME CONDUCTORS AS THE INITIATING CIRCUIT. DETECTORS SHALL BE COMPATIBLE WITH THE CONTROL PANEL AND SHALL BE SUITABLE FOR USE IN A SUPERVISED CIRCUIT.
- E. ALARM HORNS SHALL BE SEMI-FLUSH ELECTRO-MECHANICAL DESIGN WITH ELECTRONIC OPTICAL CONTROL FOR USE IN AN ELECTRICALLY SUPERVISED CIRCUIT AND SHALL HAVE A SOUND OUTPUT RATING OF AT LEAST 87DBA AT 10-FEET. HORNS SHALL BE PAINTED RED AND MOUNTED ON A STANDARD FOUR INCH SQUARE BY TWO INCH DEEP WALL BOX.
- F. VISUAL ALARM INDICATORS SHALL BE SEMI-FLUSH, CONTAIN A XENON FLASHTUBE AND BE SUITABLE FOR USE IN AN ELECTRICALLY SUPERVISED CIRCUIT. VISUAL ALARM INDICATORS SHALL HAVE PHOTOMETRIC PROPERTIES AND BE LOCATED IN ACCORDANCE WITH THE VISUAL ALARM TABLES OF NFPA 72. LAMPS SHALL BE PROTECTED BY A THERMOPLASTIC LENS AND LABELED "FIRE" IN LETTERS AT LEAST 1/2-INCH HIGH.
- G. AUDIBLE/VISUAL ALARM INDICATORS SHALL BE A FACTORY ASSEMBLED COMBINATION DEVICE COMPRISED OF A BELL OR HORN AND A XENON FLASHTUBE AS SPECIFIED ABOVE. COMBINATION DEVICES SHALL BE MOUNTED ON A STANDARD FOUR INCH SQUARE MOUNTING BOX.
- H. INSTALLATION OF ALL WIRING FOR FIRE ALARM SYSTEMS SHALL BE IN CONDUIT, OR ELECTRICAL METALLIC TUBING. CONDUCTOR SUPPORT THROUGH THE USE OF BRIDLE RINGS, TIE WRAPS, ELECTRICAL TAPE, OR "HOMEMADE" HANGERS IS NOT PERMITTED. CONDUCTORS SHALL NOT REST ON SUSPENDED CEILINGS OR BE TIED TO CEILING WIRE SUPPORTS. ALL CIRCUIT CONDUCTORS SHALL BE IDENTIFIED WITHIN EACH ENCLOSURE WHERE A TAP, SPLICE, OR TERMINATION IS MADE.
- I. THE CONTRACTOR AND EQUIPMENT MANUFACTURER SHALL JOINTLY GUARANTEE ALL WIRING AND EQUIPMENT FOR THIS SYSTEM TO BE FREE OF DEFECT IN WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
- J. THE ENTIRE FIRE ALARM SYSTEM INCLUDING ANY PREVIOUSLY EXISTING PORTIONS SHALL BE TESTED IN THE PRESENCE OF THE OWNER AND LOCAL AUTHORITIES. EXTENDED FIRE ALARM SYSTEMS REQUIRING ONLY NEW INDICATING, INITIATING, CONTROL, AND/OR MONITORING DEVICES SHALL BE TESTED IN ACCORDANCE WITH NFPA 72 REACCEPTANCE TESTING. THE CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT, AND MATERIAL NEEDED FOR THE TEST WITHOUT ADDITIONAL CHARGE.

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PROJECT NO.

230004

NOT FOR CONSTRUCTION

- 1.1 THE ARCHITECTURAL GENERAL CONDITIONS SHALL APPLY TO AND FORM A PART OF THIS SECTION OF THESE SPECIFICATIONS.
- 1.2 PROVIDE ALL MATERIALS, LABOR, EQUIPMENT, TOOLS AND SUPERVISION AND PERFORM ALL OPERATIONS NECESSARY FOR THE PROPER AND COMPLETE EXECUTION OF ALL FIRE SUPPRESSIONS SYSTEM WORK IN STRICT ACCORDANCE WITH THESE SPECIFICATIONS AND DRAWING PLANS. WORK SHALL INCLUDE BUT NOT BE LIMITED TO: A NEW FIRE SUPPRESSION SYSTEM WATER SERVICE SUPPLY LINE, SERVICE ENTRANCE AND ALARM CHECK RISER ASSEMBLY EQUIPMENT, SPRINKLERS, SPRINKLER DROPS, SPRINKLERS BRANCH PIPING, CROSS AND FEED MAIN AND ALL RELATED FITTINGS, VALVES, HANGERS, ETC., AS REQUIRED.
- 1.3 ALL FIRE SUPPRESSION WORK SHALL BE UNDER THE SUPERVISION OF AND BY A QUALIFIED FIRE SUPPRESSION CONTRACTOR. ALL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE SECTIONS OF THE PENNSYLVANIA UNIFORM CONSTRUCTION CODE, NATIONAL FIRE PROTECTION ASSOCIATION, NATIONAL ELECTRIC CODE, OSHA AND ALL OTHER STATE AND LOCAL AUTHORITIES HAVING JURISDICTION AND APPLICABLE MANUFACTURER'S RECOMMENDATIONS.
- 1.4 THE SPRINKLER SYSTEM DESIGN AND INSTALLATION SHALL BE BY A RECOGNIZED SPRINKLER CONTRACTOR WHO IS AN EXPERIENCED SPECIALIST IN DESIGN AND CONSTRUCTION OF AUTOMATIC SPRINKLER SYSTEMS. THE CONTRACTOR SHALL SUBMIT TO THE OWNER OR THE OWNER'S REPRESENTATIVE IN WRITING, EVIDENCE OF COMPARABLE EXPERIENCE PRIOR TO BEGINNING THE PROJECT.
- 1.5 DESIGN REQUIREMENTS
- A. THE CONTRACTOR SHALL DESIGN AND INSTALL A WET PIPE SPRINKLER SYSTEM TO PROVIDE COMPLETE FIRE PROTECTION COVERAGE FOR ALL HEATED SPACES AND STAIRWELLS. THE SPRINKLER SYSTEM PIPE SIZING SHALL BE BY HYDRAULIC DESIGN
- 1. THE DESIGN OF OFFICE AND ALL SIMILAR AREAS SHALL BE LIGHT HAZARD WITH A DENSITY OF 0.10 GPM PER SQUARE FEET OVER 1500 SQUARE FEET.
- THE DESIGN OF GARAGE, WASH BAY AND STORAGE AREAS SHALL BE ORDINARY HAZARD GROUP II WITH A DENSITY OF 0.20 GPM PER SQUARE FEET OVER 1500 SQUARE FEET.
- 3. THE SYSTEM DESIGN SHALL INCLUDE A 250 GPM HOSE STREAM ALLOWANCE.
- B. CONTRACTOR SHALL OBTAIN MOST CURRENT PRESSURE AND FLOW READINGS FROM LOCAL WATER AUTHORITY OR THE LOCAL FIRE MARSHALL. PRESSURE AND FLOW READING SHALL BE OBTAINED FROM A LOCATION AT OR NEAR THE PROJECT SITE. IF PRESSURE AND FLOW READINGS ARE OUTDATED OR NOT AVAILABLE, THE CONTRACTOR SHALL PERFORM A FLOW TEST OR MAKE APPROPRIATE ARRANGEMENTS WITH THE LOCAL AUTHORITY TO HAVE ONE PERFORMED AT OR NEAR THE PROJECT SITE.
- C. PROVIDE NEW FIRE PROTECTION SERVICE ENTRANCE EQUIPMENT AND ALARM CHECK RISER VALVE. THE FIRE SUPPRESSION SYSTEM SERVICE ENTRANCE WORK SHALL INCLUDE BUT NOT BE LIMITED TO; 6 INCH WATER SUPPLY LINE, DOUBLE CHECK BACKFLOW ASSEMBLY, FIRE DEPARTMENT SIAMESE CONNECTION AND 6 INCH ALARM CHECK VALVE ASSEMBLY WITH FLOW SWITCH AND MAIN DRAIN
- D. PRIOR TO INSTALLATION, THE FIRE PROTECTION CONTRACTOR SHALL PREPARE DESIGN DRAWINGS OF THE AUTOMATIC SPRINKLER SYSTEM AT A SCALE OF NOT LESS THAN 1/8 INCH = 1 FOOT 0 INCHES AND SUBMIT THEM AND EQUIPMENT TO BE USED TO THE LOCAL FIRE MARSHAL AND THE OWNER'S INSURANCE COMPANY FOR REVIEW AND APPROVAL. A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED SHALL SEAL THE DRAWINGS. AFTER APPROVAL, THE DRAWINGS SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR REVIEW IN ACCORDANCE WITH SECTION 15700: PLUMBING AND FIRE PROTECTION GENERAL. NO WORK SHALL BE DONE ON THE SYSTEM OR MATERIALS ORDERED, UNTIL DRAWINGS HAVE BEEN APPROVED.
- 1.6 THE CONTRACTOR SHALL VISIT THE SITE; EXAMINE ALL CONDITIONS AND MAKE ALLOWANCES FOR DIFFICULTIES AND CONTINGENCIES AFFECTING THE PROPER EXECUTION OF THIS WORK.
- 1.7 THE CONTRACTOR SHALL OBTAIN AND PAY ALL FEES NECESSARY FOR PERMITS AND INSPECTIONS REQUIRED WITH HIS WORK.
- 1.8 SUBMISSION OF A BID OR PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT THE CONTRACTOR HAS FAMILIARIZED THEMSELF WITH THE PLANS, SPECIFICATIONS AND BUILDING SITE. CLAIMS MADE SUBSEQUENT TO BIDS FOR MATERIAL AND/OR LABOR DUE TO DIFFICULTIES ENCOUNTERED WILL NOT BE RECOGNIZED, UNLESS DIFFICULTIES COULD NOT HAVE BEEN FORESEEN EVEN THOUGH PROPER EXAMINATION HAD BEEN MADE.
- 1.9 ALL MATERIALS SHALL BE NEW, CLEAN AND WITHOUT DEFECTS. ANY DEFECTIVE MATERIALS SHALL BE REMOVED FROM THE JOB SITE. ALL MATERIALS AND EQUIPMENT SHALL CONFORM TO NFPA 13. ALL EQUIPMENT SHALL BE TESTED, LISTED AND LABELED BY AN APPROVED AUTHORITY (ANSI, ASME, ASTM, FM, UL) AND SHALL BE INSTALLED IN ACCORDANCE WITH ITS LISTING.
- 1.10 STANDARDS
- A. MEET REQUIREMENTS AND RECOMMENDATIONS OF APPLICABLE PORTIONS OF THE LATEST EDITION OF THE STANDARDS LISTED.
- 1. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
- 2. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

 3. NATIONAL FIRE PROTECTION ASSOCIATION (NEPA 13 & 2)
- 3. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA 13 & 24)
- 4. UNDERWRITERS LABORATORIES (UL)

 5. FACTORY MUTUAL (FM)
- 5. FACTORY MUTUAL (FM)
- 6. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
- 7. INTERNATIONAL BUILDING CODE (2015)
- 8. INTERNATIONAL FIRE CODE (2015)
- 1.11 MATERIALS AND EQUIPMENT

 A. ALL MATERIALS AND EQUIPMENT SHALL BE OF MAKE AND TYPE LISTED BY UNDERWRITERS' LABORATORIES, INC. OR APPROVED BY THE FACTORY MUTUAL LABORATORIES. MATERIALS SHALL BE OF APPROVED, STANDARD QUALITY, AND THE ENTIRE INSTALLATION SHALL BE ACCOMPLISHED IN A THOROUGH AND WORKMANLIKE MANNER. ALL WORK AND MATERIALS SHALL CONFORM TO CURRENT REQUIREMENTS OF THE NFPA AS PUBLISHED IN THEIR STANDARD NO. 13 AND 24. THE PROVISIONS, INCLUDING APPENDICES, OF THE STANDARDS, UNLESS OTHERWISE SPECIFIED, SHALL BE FOLLOWED IN TOTAL, WHETHER THE
- STIPULATIONS LISTED THEREIN ARE DIRECTED OR RECOMMENDED.

 B. PIPE AND FITTINGS

- 1. BURIED PIPE SHALL BE CEMENT LINED, DUCTILE IRON WATER PIPE WITH STANDARDIZED MECHANICAL JOINTS IN ACCORDANCE WITH NFPA. ALL BURIED PIPE LOCATED OUTSIDE THE BUILDING SHALL HAVE A MINIMUM COVER OF 36 INCHES.
- 2. ALL PIPE ABOVE GROUND AND WITHIN THE BUILDING SHALL BE SCHEDULE 40 BLACK STEEL WITH SCREWED OR MECHANICAL COUPLING JOINTS (WITH ROLLED GROOVE ENDS) AS PERMITTED BY NFPA. DRY SYSTEM PIPING SHALL BE SCHEDULE 40 GALVANIZED STEEL. ALL PIPING AND FITTINGS SHALL BE RATED FOR THE MAXIMUM PRESSURE. PIPING MATERIALS AND DIMENSIONS SHALL COMPLY WITH NFPA. PIPING INSTALLATION SHALL ADHERE TO THE MANUFACTURER'S INSTALLATION GUIDELINES. THE MATERIALS SHALL ALSO COMPLY WITH THE FOLLOWING:
- a. SPECIFICATION FOR BLACK AND HOT DIPPED ZINC COATED (GALVANIZED) WELDED AND SEAMLESS STEEL PIPE FOR FIRE
- PROTECTION, ASTM A795.

 b. SPECIFICATION FOR WELDED AND SEAMLESS PIPE, ASTM A53.
- c. WROUGHT STEEL PIPE, ANSI B36.10M.
- d. SPECIFICATION FOR ELECTRIC RESISTANCE WELDED STEEL PIPE, ASTM
- e. STANDARD VICTAULIC FITTINGS MAY BE USED FOR TEES, ELBOWS, REDUCERS, AND ADAPTORS. OTHER SPECIAL VICTAULIC DEVICES MAY BE USED IN THE SPRINKLER PIPING BUT ONLY IF THEY HAVE SPECIFIC UL APPROVAL. VICTAULIC DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- C. METAL PIPE SUPPORTS, SWAY BRACES, HANGERS, CLAMPS, ETC. AND ALL OTHER ACCESSORIES SHALL BE OF AN APPROVED PATTERN AND PLACED TO CONFORM TO THE REQUIREMENTS OF NFPA 13. HANGERS SHALL NOT UNDER

- ANY CIRCUMSTANCES PIERCE ANY DUCTWORK.
- D. VALVES
- ALL VALVES SHALL BE RATED FOR THE MAXIMUM WORKING PRESSURE TO WHICH THEY ARE EXPOSED (175 PSI MINIMUM).
- 2. VERTICAL POST INDICATOR VALVE, STOCKHAM VALVES FIG-951A AND ATTACHMENTS, FITTINGS SUITABLE FOR USE WITH STOCKHAM VALVES FIG-632 NON-RISING STEM SHUTOFF VALVE. PROVIDE A SUPERVISORY TAMPER SWITCH FOR WIRING TO THE FIRE ALARM SYSTEM.
- DOUBLE CHECK DETECTOR ASSEMBLY: ANSI/ASSE 1048, AWWA C510-97. THE ASSEMBLY SHALL CONSIST OF TWO POSITIVE SEATING CHECK VALVES LOCATED BETWEEN TWO RESILIENT SEATED SHUTOFFS WITH A HYDRAULICALLY BALANCED BYPASS LINE AND FOUR TEST COCKS. THE MAIN VALVE BODY SHALL BE MANUFACTURED FROM 300 SERIES STAINLESS STEEL TO PROVIDE CORROSION RESISTANCE. THE CHECK VALVES SHALL BE OF THERMOPLASTIC CONSTRUCTION WITH STAINLESS STEEL HINGE PINS. CAM ARM, AND CAM BEARING. THE CHECK VALVES SHALL UTILIZE A SINGLE TORSION SPRING DESIGN TO MINIMIZE PRESSURE DROP THROUGH THE ASSEMBLY. THE CHECK VALVES SHALL BE MODULAR AND SHALL SEAL TO THE MAIN VALVE BODY BY THE USE OF AN O-RING. THERE SHALL BE NO BRASS OR BRONZE PARTS USED WITHIN THE CHECK VALVE ASSEMBLY THE CHECK VALVE SEATS SHALL BE OF MOLDED THERMOPLASTIC CONSTRUCTION. THE USE OF SEAT SCREWS AS A RETENTION METHOD IS PROHIBITED. ALL INTERNAL PARTS SHALL BE ACCESSIBLE THROUGH A SINGLE COVER OF THE VALVE ASSEMBLY. THE VALVE COVER SHALL B HELD IN PLACE THROUGH THE USE OF A SINGLE GROOVED STYLE TWO BOLT COUPLING. THE BYPASS LINE SHALL BE HYDRAULICALLY SIZED TO ACCURATELY MEASURE LOW FLOW. THE BYPASS LINE SHALL CONSIST OF A METER. A SMALL DIAMETER DOUBLE CHECK ASSEMBLY WITH TEST COCKS. AND ISOLATION VALVES. THE BYPASS LINE DOUBLE CHECK VALVE SHALL HAVE A SINGLE ACCESS COVER, TWO INDEPENDENTLY OPERATING MODULAR POPPET CHECK VALVES. AND TOP MOUNTED TEST COCKS. THE ASSEMBLY SHALL BE A WATTS REGULATOR COMPANY SERIES 774DCDA.
- 4. FIRE DEPARTMENT CONNECTION: FLUSH MOUNT WALL TYPE, TWO WAY OUTLET WITH THREAD SIZE TO SUIT FIRE DEPARTMENT HARDWARE REQUIREMENTS, INDIVIDUAL DROP CLAPPER VALVES, TOGETHER WITH PLUGS, THREADED DUST CAP, AND CHAINS OF MATCHING MATERIALS AND FINISH. 3/4 INCH AUTOMATIC DRIP DRAIN TO EXTERIOR, ESCUTCHEON LETTERED "AUTO SPRINKLER," FINISH SHALL BE CHROME PLATED. CONNECTION SHALL BE ALLEN CO. NO. 232 PROJECTING SIAMESE WITH SILL COOK.
- 5. GATE VALVES WITHIN THE BUILDINGS SHALL BE OS&Y TYPE, IRON BODY WITH BRASS TRIM. SCREWED END GATE VALVES SHALL BE BRONZE. CHECK VALVES SHALL BE OF A TYPE HAVING IRON BODY, BRASS SEAT AND DISCS, CLEARWAY SWINGING, WITH DRIP CONNECTIONS. SCREWED END ANGLE AND GLOBE VALVES SHALL BE BRONZE. PROVIDE POST-INDICATING VALVES ON ALL SERVICE SHUTOFFS WHERE REQUIRED BY THE LOCAL AUTHORITY.
- 6. SHUTOFF VALVES 2-1/2 INCHES AND LARGER SHALL BE IRON BODY, BRONZE TRIMMED, OS&Y GATE WITH RENEWABLE WEDGE AND FLANGED CONNECTIONS. SHUTOFF VALVES TWO INCHES AND SMALLER SHALL BE BRONZE, OS&Y GATE, WEDGE DISC.
- 7. DRAIN VALVES SHALL BE GLOBE VALVES, BRONZE BODY, RUBBER DISC, AND UNION BONNET, 175 WWP, NIBCO KT-65.
- 8. ALARM CHECK VALVE SHALL BE EQUIPPED WITH A REMOVABLE COVER/CLAPPER ASSEMBLY. ALARM VALVE SHALL BE LISTED FOR INSTALLATION IN THE VERTICAL OR HORIZONTAL POSITION. ALARM VALVE SHALL BE EQUIPPED WITH GAUGE CONNECTIONS ON THE SYSTEM SIDE AND SUPPLY SIDE OF THE VALVE CLAPPER. ALARM VALVE SHALL BE EQUIPPED WITH AN EXTERNAL BYPASS TO ELIMINATE FALSE WATER FLOW ALARMS. ALARM VALVE TRIM PIPING SHALL BE GALVANIZED. VALVE TRIM SHALL INCLUDE A CONNECTION FOR A NON-INTERRUPTIBLE PRESSURE SWITCH. ALARM VALVE BODY SHALL BE DUCTILE IRON AND AVAILABLE WITH GROOVED BY GROOVED, FLANGED BY GROOVED, AND FLANGED BY FLANGED SUPPLY AND DISCHARGE OUTLETS, RESPECTIVELY. MAXIMUM WATER WORKING PRESSURE SHALL BE 250 PSI (17 BAR). ALARM CHECK VALVE SHALL BE VIKING CORPORATION MODEL J—1.
- a. PORTED ALARM CONNECTIONS ON SPRINKLER RISER VALVE SHALL BE PIPED TO A RETARD CHAMBER TO ABSORB VARIABLE PRESSURE SURGES. CIRCUIT CLOSER SHALL BE INSTALLED ON RETARD CHAMBER WITH CIRCUIT CLOSER VENT TRIM TO ELIMINATE VAPOR OR HYDRAULIC LOCK AGAINST CIRCUIT CLOSER. RETARD CHAMBER SHALL BE VIKING CORPORATION MODEL C-1. PROVIDE OPTIONAL PRESSURE SWITCH FOR INITIATING ALARM.
- b. WATER FLOW WILL ACTIVATE AN ALARM BY WAY OF AN ALARM PRESSURE SWITCH. THE ALARM PRESSURE SWITCH SHALL BE COMPATIBLE WITH SYSTEM DEVICES. ALARM PRESSURE ENCLOSURE SHALL BE UL LISTED AND FACTORY MUTUAL APPROVED FOR THE APPLICATION IN WHICH IT IS USED. ALARM PRESSURE SWITCH SHALL HAVE THE ABILITY TO BE WIRED FOR CLASS A OR B SERVICE WITH A FACTORY PRESET NON-ADJUSTABLE PRESSURE SETTING OF 4 TO 8 PSI ON RISE IN PRESSURE. ALARM PRESSURE SWITCH SHALL HAVE A 1/2-INCH BRASS THREADED BASE. ALARM PRESSURE SWITCH SHALL BE VIKING CORPORATION MODEL 09470 OR 09471.
- 9. ALARM CHECK VALVES EQUIPPED WITH A FLOW INDICATING PRESSURE SWITCH OR WATER MOTOR ALARM SHALL BE EQUIPPED WITH A MAIN DRAIN VALVE CAPABLE OF A TEST FLOW THROUGH THE MAIN DRAIN VALVE EQUAL TO THAT OF THE SMALLEST SPRINKLER ORIFICE INSTALLED IN THE SPRINKLER SYSTEM. THIS TEST FLOW SHALL BE DIRECTED THROUGH A PRESSURE—RETARDING CHAMBER TO THE ALARM—INITIATING DEVICE. MAIN DRAIN VALVE CAPABLE OF TEST FLOW SHALL HAVE TWO INCH SUPPLY AND DISCHARGE CONNECTIONS. THE TWO—INCH TEST VALVE SHALL BE LABELED AS TO THE POSITION OF THE DRAIN. VALVE HANDLE WILL DISTINGUISH WHICH FLOW IS BEING DISCHARGED, SYSTEM DRAIN OR SYSTEM TEST. THE TWO—INCH TEST VALVE SHALL BE MANUFACTURED TO PROVIDE AN AVAILABLE MEANS OF LOCKING VALVE IN THE CLOSED OR NON—WATER FLOW POSITION. THE TWO—INCH TEST VALVE SHALL BE OF THE SAME MANUFACTURER AS ALARM CHECK VALVE AND ASSOCIATED APPURTENANCES. THE TEST VALVE SHALL BE VIKING TEST AND DRAIN VALVE MODEL A—1.
- 10. SUPERVISORY DEVICES
- a. PROVIDE SUPERVISORY SWITCH ON ALL OS&Y GATE VALVES TO DETECT AND INDICATE WHEN THE SUPERVISED VALVE HAS BEEN CLOSED, WHEN THE DEVICE HAS BEEN REMOVED, OR WHEN DEVICE COVER HAS BEEN TAMPERED WITH. DEVICE SHALL BE UL LISTED AND SO MARKED AND FACTORY MUTUAL APPROVED.
 1) VALVE SUPERVISORY SWITCH FOR OS&Y VALVES SHALL BE MODEL
- OSYU—A AS MANUFACTURED BY POTTER ELECTRIC SIGNAL COMPANY OR APPROVED EQUAL. CONTACT SHALL BE ONE OR TWO SETS OF SPDT (FORM C) CONTACTS AS REQUIRED.
- 11. PROVIDE A LISTED AUDIBLE ALARM ON THE EXTERIOR OF THE BUILDING IN ACCORDANCE WITH NFPA 13. THE ALARM DEVICE MAY BE A MECHANICALLY ACTIVATED WATER MOTOR GONG DEVICE OR AN ELECTRONIC GONG, BELL, HORN, OR SIREN ACTUATED BY A FLOW SWITCH. ALL REQUIRED POWER, WIRING, AND CONTROL OF THE ALARM SHALL BE THE RESPONSIBILITY OF THE FIRE PROTECTION CONTRACTOR. ALL ELECTRONIC DEVICES SHALL BE IN ACCORDANCE WITH NFPA 72 AND THE NATIONAL ELECTRICAL CODE AND MUST BE FULLY COORDINATED WITH THE ELECTRICAL CONTRACTOR. THE ALARM DEVICE SHALL BE ACTIVATED BY THE WATER FLOW FROM A SINGLE SPRINKLER HEAD. COORDINATE LOCATION WITH THE ARCHITECT.
- 12. PROVIDE ALL CONTROL AND SIGNAL WIRING REQUIRED FOR PROPER OPERATION OF THE SPRINKLER SYSTEM FLOW SWITCHES AND TAMPER SWITCHES. PROVIDE SIGNAL WIRING BACK TO THE BUILDING FIRE ALARM SYSTEM CONTROL PANEL. ALL WIRING SHALL BE IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATION SECTIONS.
- E. IDENTIFICATION OF VALVES
- ALL CONTROL, DRAIN, AND TEST CONNECTION VALVES SHALL BE PERMANENTLY MARKED (TAGGED) IN ACCORDANCE WITH NFPA 13.
- F. METAL PIPE SUPPORTS, SWAY BRACES, HANGERS, CLAMPS, ETC. AND ALL OTHER ACCESSORIES SHALL BE OF AN APPROVED PATTERN AND PLACED TO CONFORM TO THE REQUIREMENTS OF NFPA 13. HANGERS SHALL NOT UNDER ANY CIRCUMSTANCES PIERCE ANY DUCTWORK.
- G. STEEL PIPE SLEEVES SHALL BE PROVIDED FOR ALL PIPES PASSING THROUGH MASONRY WALLS, FLOORS, AND CEILINGS. SLEEVES SHALL EXTEND COMPLETELY THROUGH CONSTRUCTION AND, IN THE CASE OF FLOORS, EXTEND TWO INCHES ABOVE THE FLOOR. UNLESS OTHERWISE INDICATED, SLEEVES SHALL BE OF SUCH SIZE AS TO PROVIDE APPROXIMATELY 1/4—INCH ALL AROUND CLEARANCE BETWEEN UNCOVERED PIPE AND SLEEVE. A ONE INCH ALL AROUND CLEARANCE SHALL BE PROVIDED BETWEEN THE SLEEVE AND PASSING PIPE OF COMBUSTIBLE MATERIALS. SLEEVES IN BEARING WALLS SHALL BE STEEL OR CAST IRON PIPE. SLEEVES IN OTHER WALLS AND IN

- FLOORS SHALL BE GALVANIZED STEEL HAVING A MINIMUM NOMINAL THICKNESS OF 0.0396 INCH (20 GAUGE) OR OTHER APPROVED MATERIAL. THE SPACE BETWEEN PASSING PIPES AND SLEEVES SHALL BE SEALED WITH AN APPROVED FIRESTOPPING MATERIAL. PLATES SHALL BE PROVIDED AT ALL FINISHED SURFACES WHERE EXPOSED PIPING, BARE OR COVERED, PASSES THROUGH FLOORS, WALLS, OR CEILINGS. PLATES SHALL BE FASTENED SECURELY TO PIPE OR COVERING AND SHALL COMPLETELY COVER THE SLEEVE.
- H. WATER PRESSURE GAUGES SHALL HAVE THE ABILITY TO RECORD PRESSURES OF 150 PSI WHERE SUPPLY PRESSURES ARE NO GREATER THAN 150 PSI. WHERE SUPPLY PRESSURES EXCEED 150 PSI, THE PRESSURE GAUGES SHALL HAVE THE ABILITY TO RECORD PRESSURES OF 300 PSI. GAUGES SHALL BE UL LISTED AND FACTORY MUTUAL APPROVED. GAUGES SHALL HAVE AN ACRYLONITRILE BUTADIENE STYRENE CASE WITH A POLYCARBONATE WINDOW. THE DIAL SHALL HAVE BLACK FIGURES ON A WHITE BACKGROUND. GAUGES SHALL HAVE A 1/4-INCH BRASS NPT INLET. GAUGES SHALL BE VIKING CORPORATION PRESSURE GAUGE PART NUMBER 01934A.
 I. SPRINKLERS
- 1. SPRINKLERS SHALL BE PENDENT TYPE IN FINISHED AREAS WITH CEILINGS. IN AREAS WITHOUT CEILINGS (EXPOSED PIPING) SPRINKLERS SHALL BE UPRIGHT TYPE. SIDEWALL TYPE SPRINKLERS SHALL BE USED ONLY WHERE NECESSARY. ALL SPRINKLERS SHALL HAVE AN ORDINARY TEMPERATURE
- RATING (155 DEGREES F), UNLESS REQUIRED OTHERWISE.

 2. ALL SPRINKLERS SHALL BE UL LISTED AS REQUIRED BY NFPA AND SHALL BE RATED FOR THE MAXIMUM SYSTEM PRESSURE (175 PSI MINIMUM). NO
- MIXING OF SPRINKLER BRANDS SHALL BE PERMITTED.

 3. CONCEALED PENDENT SPRINKLERS SHALL BE QUICK RESPONSE TYPE WITH WHITE COVER PLATE (135 DEGREE F). VIKING MIRAGE MODEL VK462 OR EQUIVALENT.
- 4. RECESSED PENDENT TYPE SPRINKLERS SHALL BE QUICK RESPONSE FUSIBLE LINK TYPE WITH RECESSED ESCUTCHEON AND WHITE FINISH. VIKING MODEL M OR EQUIVALENT.
- 5. RECESSED EXTENDED COVERAGE QUICK RESPONSE FUSIBLE LINK TYPE WITH RECESSED ESCUTCHEON AND WHITE FINISH. VIKING MODEL M OR EQUIVALENT.
- 6. UPRIGHT TYPE SPRINKLERS SHALL BE QUICK RESPONSE FUSIBLE LINK TYPE WITH BRASS FINISH. VIKING MODEL M OR EQUIVALENT.

 J. SPRINKLER CABINET WITH APPROVED NUMBER OF SPRINKLER HEADS (OF ALL

TYPES AND RATINGS INSTALLED), A SPRINKLER WRENCH AND A PAIR OF

- SPRINKLER TONGS SHALL BE PROVIDED FOR EACH SYSTEM.

 1. SPRINKLER CABINETS SHALL BE INSTALLED WHERE DIRECTED BY THE OWNER OR THE OWNER'S REPRESENTATIVE.
- 1.12 NOTIFYING
- A. NOTIFY TRADES THAT MAY HAVE WORK ASSOCIATED WITH THE SPRINKLERS OF INSTALLATION REQUIREMENTS AND SCHEDULE.
- B. INFORM OWNER'S REPRESENTATIVE OF INSTALLATION SCHEDULE TO ALLOW SUFFICIENT TIME, WITHOUT DELAYING WORK, FOR INSPECTION.
- SUFFICIENT TIME, WITHOUT DELAYING WORK, FOR INSPECTION.

 C. COORDINATE WORK TO AVOID CUTTING WORK IN PLACE AND TO AVOID
- INTERFERENCE WITH OTHER WORK.

 D. COORDINATE THE LOCATION OF ALL FIRE PROTECTION EQUIPMENT WITH THE OWNER'S REPRESENTATIVE AND ALL CONTRACTORS WORKING IN THESE AREAS.
- 1.13 SHOP DRAWINGS
 A. SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL IN ACCORDANCE WITH SECTION 15700: PLUMBING AND FIRE PROTECTION — GENERAL.
- B. SHOW SIZES AND LOCATIONS, BY DIMENSIONING, OF PIPING, FITTINGS, HOSE CABINETS, SPRINKLER HEADS, EQUIPMENT, AND OTHER SPRINKLER ITEMS. IDENTIFY MATERIALS AND EQUIPMENT BY DESCRIPTION AND NUMBER.
- C. SHOW MANUFACTURER'S NAMES, TRADE NAMES, CATALOG NUMBERS, ACCESSORIES, SPECIAL FEATURES, AND RATING DATA FOR ALL EQUIPMENT USED.
- D. INDICATE REQUIRED CLEARANCES FOR OPERATING PARTS, FOR REMOVAL AND REINSTALLING, AND FOR SERVICING.E. INCLUDE PROOF OF THE REVIEW AND APPROVAL OF THE OWNER'S INSURANCE
- COMPANY AND THE LOCAL FIRE MARSHAL.
- F. INCLUDE COPIES OF HYDRAULIC CALCULATIONS FOR REVIEW.
- WATER SERVICE FLOW TEST.

 2. HYDRAULIC CALCULATIONS SHALL INCLUDE MAXIMUM FLOWS THROUGH ALL PIPING, FITTINGS, AND EQUIPMENT FROM THE POINT WHERE WATER PRESSURE AND FLOW DATA WERE OBTAINED (AT THE WATER MAIN), TO THE HYDRAULICALLY MOST REMOTE DESIGN AREA. HYDRAULIC CALCULATIONS SHALL TAKE INTO ACCOUNT CHANGES IN ELEVATION OF THE SYSTEM PIPING. THESE ELEVATIONS SHALL BE LISTED ON THE SHOP DRAWINGS

1. HYDRAULIC CALCULATIONS SHALL INCLUDE ALL DATA OBTAINED FROM THE

- AND IN THE CALCULATIONS.

 1.14 AS-BUILT DRAWINGS AND OPERATION AND MAINTENANCE MANUAL
- A. AS-BUILT DRAWINGS AND OPERATION AND MAINTENANCE MANUAL SHALL BE SUBMITTED UPON COMPLETEION OF ALL WORK
- B. SHOW EXACT LOCATIONS AND SIZES, AS ACTUALLY INSTALLED, OF PIPING VALVES, AND OTHER ITEMS THAT WILL NOT BE EASILY ACCESSIBLE AFTER
- C. INCLUDE COPIES OF ALL PERMITS, INSPECTIONS AND TEST REPORTS REQUIRED FOR SYSTEM INSTALLATION IN THE OPERATION AND MAINTENANCE MANUAL.
- 1.15 PROTECTING
 A. HANDLE FIRE PROTECTION ITEMS TO AVOID INJURY TO PERSONS AND TO AVOID DAMAGE TO MATERIALS OR WORK IN PLACE. SATISFACTORILY REPAIR OR REMOVE AND REPLACE WORK THAT HAS BEEN DAMAGED.
- B. PLUG OR CAP PIPES AND FITTINGS, WHEN NOT IN USE, TO PREVENT ENTRANCE
- OF EXTRANEOUS MATERIALS.

 C. COVER HOLES AND TRENCHES WHEN NOT IN USE. FASTEN OR SECURE PIPES AND OTHER SPRINKLER ITEMS DURING INTERRUPTIONS IN WORK, TO PREVENT DANGER OR DAMAGE.
- 1.16 DELIVERING AND STORING
- A. DELIVER FIRE PROTECTION ACCESSORIES, SMALL—UNMARKED PARTS, AND INCIDENTAL ITEMS TO SITE IN MANUFACTURER'S ORIGINAL, UNOPENED, LABELED CONTAINERS.
- B. STORE MATERIALS AND FIXTURES TO PREVENT DAMAGE AND INJURY. STORE FERROUS MATERIALS TO PREVENT RUSTING. STORE FIXTURES TO PREVENT STAINING AND DISCOLORING.
- 1.17 INSTALLATION
- A. INSPECTOR'S TEST VALVES SHALL BE INSTALLED AT THE HIGHEST AND MOST REMOTE PART OF EACH SYSTEM IN RELATION TO THE RISER ASSEMBLY AND SHALL DISCHARGE OUTSIDE THE BUILDING OR TO A DRAIN CAPABLE OF ACCEPTING FULL FLOW UNDER SYSTEM PRESSURE. IN NO CASE SHALL A DIRECT CONNECTION BE MADE TO ANY COMPONENT OF THE SEWER SYSTEM. TEST VALVES SHALL BE CONVENIENTLY ACCESSIBLE WITHIN SEVEN FEET OF THE
- B. INSTALLATION OF SPRINKLER SYSTEM SHALL CONFORM TO NFPA 13 AND 24 AND ALL LOCAL REQUIREMENTS.
- C. ALL PIPING SHALL BE ACCURATELY CUT TO MEASUREMENTS ESTABLISHED BY THE CONTRACTOR AND SHALL BE WORKED INTO PLACE WITHOUT SPRINGING OR FORCING. IN ANY SITUATIONS WHERE BENDING OF PIPE IS REQUIRED, SUCH BENDING SHALL BE ACCOMPLISHED THROUGH THE USE OF A STANDARD PIPE—BENDING TEMPLATE. PIPE COMPOUND SHALL BE APPLIED TO MALE THREADS ONLY. THE USE OF TEFLON TAPE WILL NOT BE PERMITTED. DRIPS AND DRAINS SHALL BE INSTALLED WHERE NECESSARY AND SHALL DISCHARGE OUTSIDE OF THE BUILDING. IN NO CASE SHALL A DIRECT CONNECTION BE MADE TO ANY COMPONENT OF THE SEWER SYSTEM.
- D. SUPPORT PIPING AS CLOSE TO COLUMN SUPPORTS AS POSSIBLE AND AT PANEL POINTS OF JOISTS OR JOIST GIRDERS ONLY. IF HANGER LOAD EXCEEDS 500 POUNDS, THE LOAD SHOULD BE DISTRIBUTED TO AS MANY MEMBERS AS REQUIRED TO REDUCE EACH HANGER LOAD TO LESS THAN 500 POUNDS.
- E. ALL MAIN DRAINS SHALL BE PIPED TO DISCHARGE OUTSIDE THE BUILDINGS. VERIFY FINAL LOCATIONS IN THE FIELD WITH THE OWNERS' REPRESENTATIVE.
- F. THE INSTALLATION OF ALL SPRINKLER HEADS SHALL BE COORDINATED WITH ALL DIFFUSERS, REGISTERS, GRILLES, LIGHTING, AND ALL OTHER HVAC AND ELECTRICAL EQUIPMENT IN EACH SPACE. IN AREAS WITH ACOUSTICAL TILE

- CEILINGS, SPRINKLER HEADS SHALL BE POSITIONED IN THE CENTER OF THE CEILING TILES IN AT LEAST ONE DIRECTION UNLESS DIRECTED OTHERWISE BY THE OWNER'S REPRESENTATIVE.
- G. ALL EXPOSED PIPING LOCATED IN FINISHED SPACES SHALL BE PAINTED (COLOR SHALL BE SELECTED BY THE ARCHITECT).
- 1.18 TESTS
- A. UPON COMPLETION OF THE INSTALLATION THE SYSTEMS SHALL BE HYDROSTATICALLY TESTED AND FLUSHED AS SPECIFIED IN NFPA 13, IN THE PRESENCE OF THE OWNER OR THE OWNER'S REPRESENTATIVE. THE CONTRACTOR SHALL SUBMIT A SIGNED AND DATED CERTIFICATE TO THE OWNER OR THE OWNER'S REPRESENTATIVE AS STIPULATED IN NFPA 13.
- B. TESTING OF BACKFLOW PREVENTION ASSEMBLIES
- 1. PROVIDE TEST AT THE TIME OF INSTALLATION AND IMMEDIATELY AFTER REPAIRS AND OR RELOCATION FOR THE FOLLOWING: REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER ASSEMBLIES, DOUBLE CHECK-VALVE ASSEMBLIES, PRESSURE VACUUM BREAKER ASSEMBLIES, REDUCED PRESSURE DETECTOR FIRE PROTECTION BACKFLOW PREVENTION ASSEMBLIES, DOUBLE CHECK DETECTOR FIRE PROTECTION BACKFLOW PREVENTION ASSEMBLIES, HOSE CONNECTION BACKFLOW PREVENTERS AND SPILLPROOF VACUUM BREAKERS.
- a. CERTIFIED INDIVIDUALS APPROVED BY AN AGENCY ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION SHALL PERFORM TESTING AND REPAIR OF DEVICES. TESTER QUALIFICATIONS SHALL BE IN ACCORDANCE WITH ASSE 5000 SERIES STANDARDS OR EQUIVALENT. CERTIFICATION FOR REPAIR SHALL BE IN ACCORDANCE WITH ASSE 5030 OR EQUIVALENT. CERTIFICATION SHALL INCLUDE NOT LESS THAN 32 HOURS OF COMBINED CLASSROOM AND PRACTICE TRAINING AND SUCCESSFUL COMPLETION OF A WRITTEN AND PRACTICAL EXAMINATION.
- 2. PERFORM TESTING PROCEDURES IN ACCORDANCE WITH ONE OF THE FOLLOWING STANDARDS: ASSE 5013, ASSE 5015, ASSE 5020, ASSE 5013, ASSE 5047, ASSE 5048, ASSE 5052, ASSE 5056, CSA B64.10 OR CSA B64.10.1.
- S. WHERE TESTS INDICATE THAT THE DEVICE IS NOT FUNCTIONING PROPERLY, IT SHALL BE SERVICED OR REPAIRED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND BE RETESTED.
- D. COPIES OF TEST REPORTS FOR THE INITIAL INSTALLATION SHALL BE SENT TO THE OWNER, AUTHORITY HAVING JURISDICTION AND TO THE WATER SUPPLIER.
- ANNUAL INSPECTIONS SHALL BE MADE OF ALL BACKFLOW PREVENTION ASSEMBLIES AND AIR GAPS TO DETECT WHETHER THEY ARE OPERABLE.
- 1.19 INSPECTING
- A. PROVIDE, AS A PART OF THIS WORK, FOUR INSPECTIONS BY SPRINKLER INSTALLER DURING FIRST OPERATIONAL YEAR.
- B. SUBMIT INSPECTION REPORTS IN TRIPLICATE, TO THE OWNER OR THE OWNER'S REPRESENTATIVE WITHIN 15 DAYS FROM DATE OF INSPECTION.

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230004

LEGEND AND ABBREVIATIONS

ABOVE FINISH FLOOR ALT ALTERNATE APPROX APPROXIMATELY BLDG BUILDING BLW BELOW ————O PIPE TURNING UP CEILING CONT CONTINUATION ——O—— PIPE TEE UP DEPT DEPARTMENT DN DOWN ———— PIPE TEE DOWN DRAWING ELECTRICAL CONTRACTOR UPRIGHT SPRINKLER FIRE DEPARTMENT CONNECTION FLOOR DRAIN PENDENT SPRINKLER FLOOR FIRE SUPPRESSION CONCEALED PENDENT SPRINKLER GALVANIZED GENERAL CONTRACTOR SIDE WALL SPRINKLER GPM GALLONS PER MINUTE FIRE DEPARTMENT INVERT ELEVATION STORTZ CONNECTION MECHANICAL CONTRACTOR NO NUMBER O.S.&Y. GATE VALVE P.C. PLUMBING CONTRACTOR PLACES PROJ FLOW SWITCH PROJECT REF REFERENCE TAMPER SWITCH SQUARE FEET TYP **TYPICAL**

WITH

GENERAL NOTES:

MAIN FIRE ALARM PANEL.

I. THE ENTIRE INSTALLATION OF THE FIRE SUPPRESSION SYSTEM SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF NFPA PAMPHLETS #13 AND #24, THE INTERNATIONAL BUILDING

CODES, THE OWNER'S INSURANCE CARRIER AND THE LOCAL FIRE DEPARTMENT.

- 2. THE INTENT OF FIRE SUPPRESSION DRAWINGS IS FOR APPROVAL PURPOSES ONLY AND TO AID THE FIRE PROTECTION CONTRACTOR IN SYSTEM LAYOUT FOR BIDDING. THE DRAWINGS IDENTIFY SPACE ALLOCATIONS FOR MAJOR ELEMENTS OF THE FIRE PROTECTION SYSTEM, BASIC AREAS OF COVERAGE AND DEVICE TYPES AND AREAS WHICH REQUIRE SPECIAL ATTENTION AND DEVICES. THE SUCCESSFUL FIRE PROTECTION CONTRACTOR IS RESPONSIBLE FOR PROVIDING APPROVED AND COMPLETE DESIGN DRAWINGS AND HYDRAULIC CALCULATIONS.
- COORDINATE ALL SPRINKLER LOCATIONS WITH LIGHTS, CONDUITS, DUCTS, DIFFUSERS, REGISTER, GRILLES AND IN PARTICULAR ARCHITECTURAL AND STRUCTURAL ELEMENTS TO ASSURE FINAL SYSTEM HARMONIZES WITH THE ARCHITECTURAL FEATURES OF THE BUILDING. ALL SPRINKLERS LOCATIONS SHALL BE COORDINATED WITH ALL SUPPLY AIR DUCTS AND OUTLETS. FINAL SPRINKLER LOCATIONS SHALL BE IN ACCORDANCE WITH NFPA 13 SPACING
- 4. INSTALL SPRINKLERS ABOVE AND ALL FIXED OBSTRUCTIONS (OVER 48") WIDE AS REQUIRED. COORDINATE WITH H.V.A.C. AND ELECTRICAL CONTRACTORS. SPECIFIC ATTENTION IS CALLED TO GENERAL LIGHTING AND MAIN SUPPLY AND RETURN DUCTWORK FROM MECHANICAL UNITS.
- 5. PROVIDE SHEET METAL HOODS OR SHIELDS TO PROTECT IMPORTANT ELECTRICAL EQUIPMENT FROM SPRINKLER DISCHARGE.

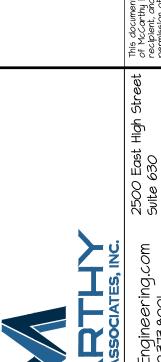
6. PROVIDE DRAIN VALVES AND PIPING TO ALLOW COMPLETE DRAINAGE OF ALL SPRINKLER

- SYSTEM PIPING.PROVIDE ALARM WIRING FROM SPRINKLER VALVE TAMPER SWITCHES AND ALARM CHECK TO
- 8. THERE IS NO FIRE SUPPRESSION SYSTEM WORK ASSOCIATED WITH OUTDOOR STORAGE STRUCTURES OR THE EXISTING BUILDING RENOVATION WORK.

FIRE PROTECTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DESIGN AND CONSTRUCTION IN ACCORDANCE WITH

ALL LOCAL, STATE, AND FEDERAL CODES AND REGULATIONS

ISSUED FOR BID JULY 19, 2023
NOT FOR CONSTRUCTION



MCCArthy-Engineering.C

555 Van Reed Road Suite 2

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FIRE SUPPRES
COVER SHE
PUBLIC WORKS

AWN BY:

PROJ. MANAGER:

EPG

INCIPAL:

JCM

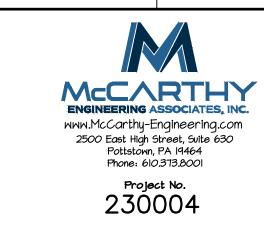
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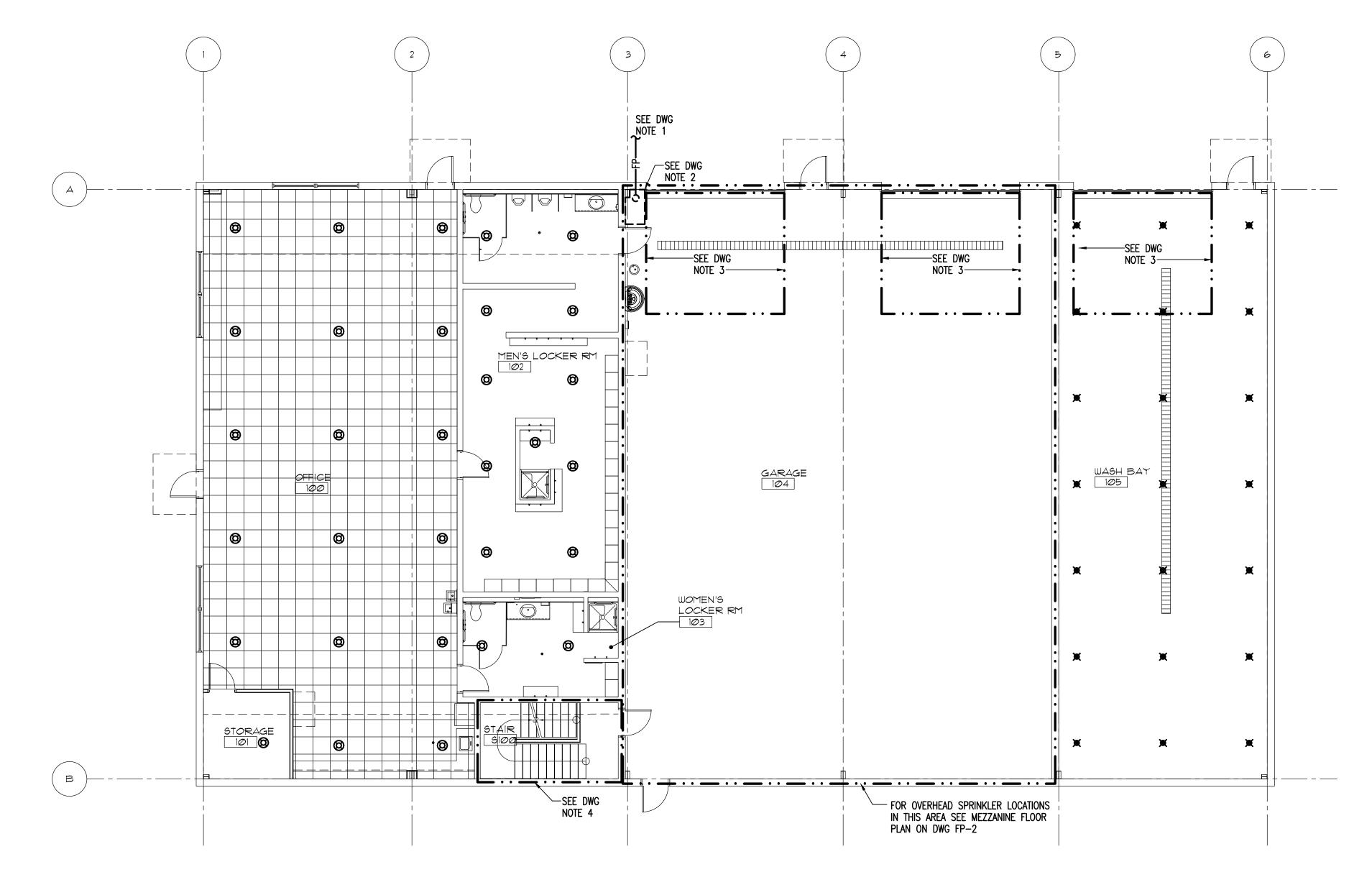
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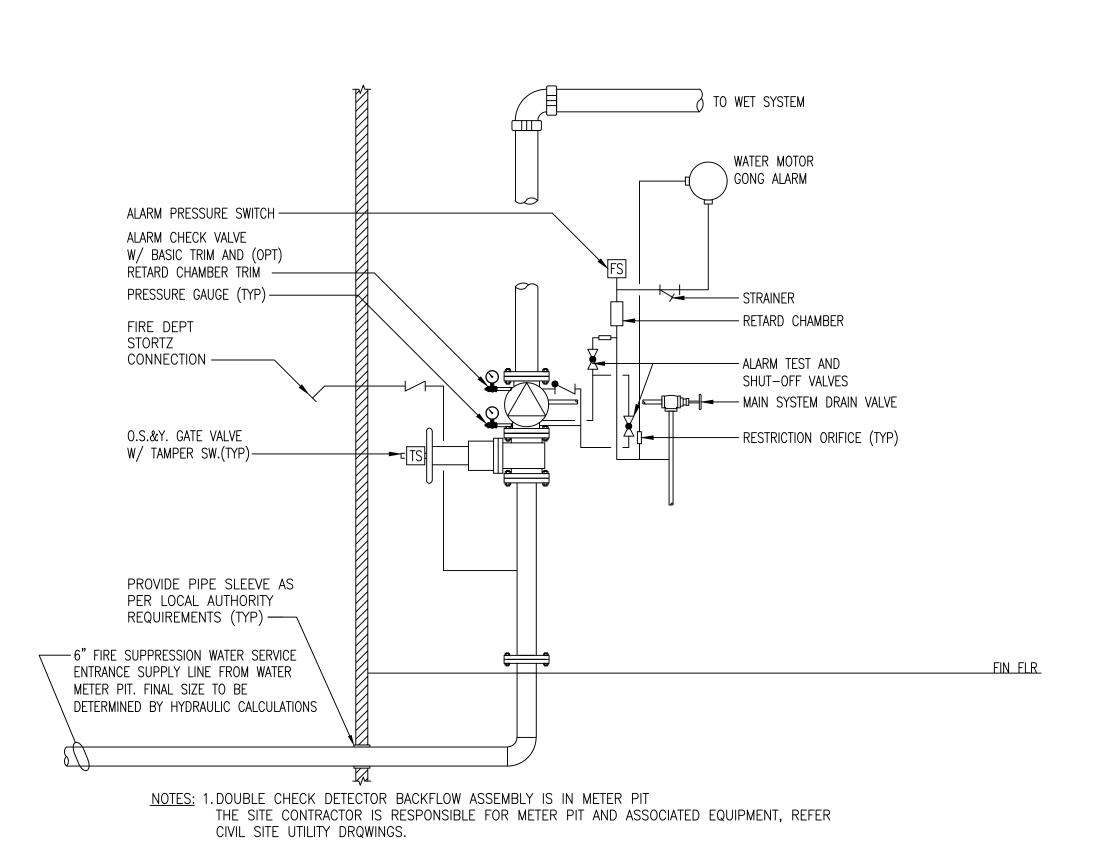
FP-0

PROJECT NO.





FIRE PROTECTION FIRST FLOOR PLAN SCALE: 1/8" = 1'-0"



FIRE SERVICE ENTRANCE & ALARM CHECK RISER VALVE DIAGRAM NO SCALE

2. WIRE TAMPER SWITCHES AND FLOW ALARM PRESSURE SWITCH

TO TO BUILDING FIRE ALARM SYSTEM.

10

DRAWING NOTES:

- FIRE SUPPRESSION SYSTEM WATER SUPPLY LINE, REFER TO CIVIL ENGINEERS SITE UTILITY PLANS. COORDINATE FIRE SUPPRESSION WATER SERVICE ENTRANCE SUPPLY LINE LOCATION WITH THE SITE CONTRACTOR.
- 2. FIRE SUPPRESSION SERVICE ENTRANCE EQUIPMENT, FOR PIPING AND VALVE ARRANGEMENT, SEE "FIRE SERVICE ENTRANCE AND ALARM CHECK RISER VALVE DIAGRAM" ON THIS DRAWING SEE PLUMBING DRAWING P-1 FOR BUILDING DOMESTIC WATER SERVICE SUPPLY LINE.
 COORDINATE LOCATION OF FIRE SUPPRESSION WATER SERVICE ENTRANCE EQUIPMENT WITH
 DOMESTIC SERVICE ENTRANCE EQUIPMENT.
- 3. PROVIDE SPRINKLERS WITH GUARDS FOR COVERAGE OF THE AREA BELOW GARAGE DOORS WHEN OVERHEAD DOOR IS IN THE OPEN POSITION.
- 4. PROVIDE SPRINKLERS AT TOP OF STAIR TOWER AND UNDER LANDING/SLOPING STAIR AT BOTTOM OF STAIR TOWER FOR COMPLETE COVERAGE OF STAIR TOWER.
- 5. SEE DRAWING FP-0 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS

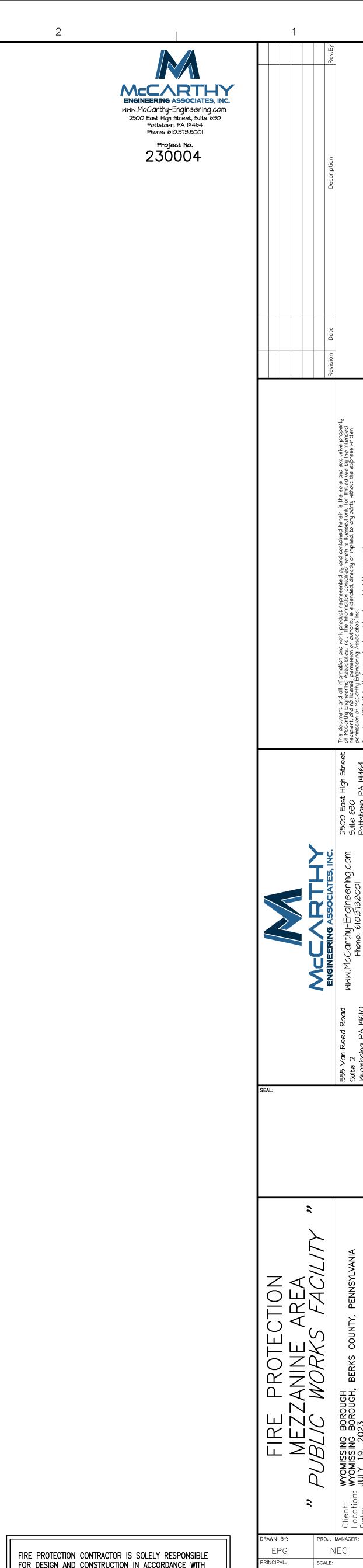
FIRE PROTECTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DESIGN AND CONSTRUCTION IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL CODES AND REGULATIONS

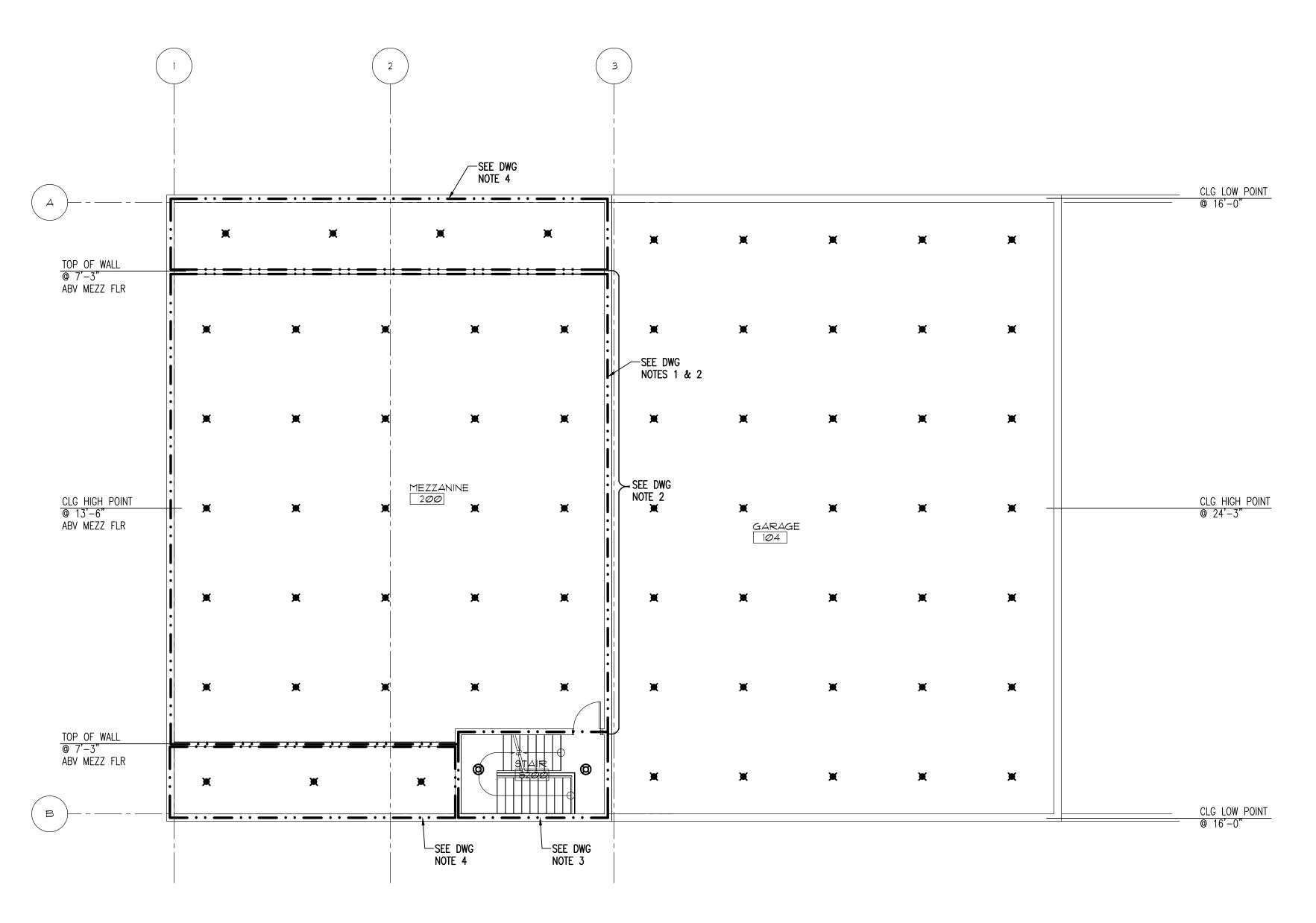
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FIRE FIR

EPG NEC INCIPAL: SCALE: JCM AS NOTED DRAWING NO.

FP-1PROJECT NO. 230004





FIRE PROTECTION MEZZANINE AREA PLAN
SCALE: 1/8" = 1'-0"

10

DRAWING NOTES:

1. THE CEILING OF MEZZANINE (STORAGE) AREA SLOPES FROM HIGH POINT TO KNEE WALLS HEIGHTS AS INDICATED. RACKS IN THIS AREA CAN ACCOMMODATE STORAGE OF ITEMS UP TO 8'-0" ABOVE FINISH FLOOR. STORAGE OF ITEMS INCLUDES, BUT IS NOT LIMITED TO, BOXED MISCELLANEOUS SPARE PARTS, OIL FILTERS, SPARE TOOLS. PROVIDE PENDENT SPRINKLERS WITH GUARDS FOR COVERAGE THROUGHOUT STORAGE AREA.

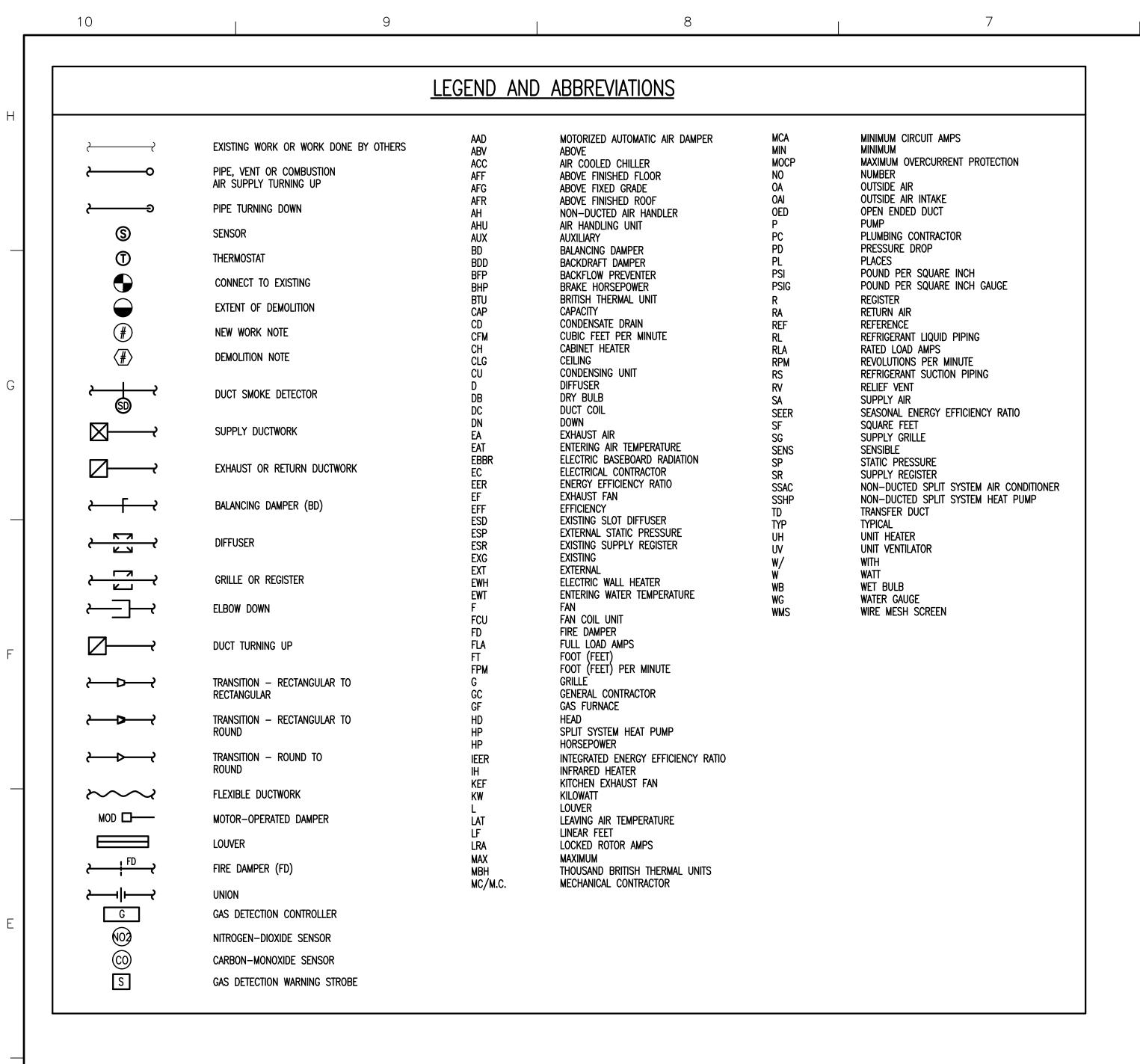
- MEZZANINE FLOOR (STORAGE) SPACE IS OPEN ALONG THIS AREA (RAILING WITH GATE OPENING) TO THE ADJACENT GARAGE AREA.
- 3. PROVIDE SPRINKLERS AT TOP OF STAIR TOWER AND UNDER LANDING/SLOPING STAIR AT BOTTOM OF STAIR TOWER FOR COMPLETE COVERAGE OF STAIR TOWER.
- 4. THIS AREA IS A CONCEALED SPACE AS FORMED BY KNEE WALL CONSTRUCTION TO DEFINE AREA OF STORAGE.
- 5. SEE DRAWING FP-0 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

FIRE PROTECTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DESIGN AND CONSTRUCTION IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL CODES AND REGULATIONS

JCM AS NOTED DRAWING NO.

FP-2

PROJECT NO. 230004



	GENERAL NOTES:
1.	THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL INTENT OF THE WORK. PROVIDE SHEET METAL SYSTEMS COMPLETE PER SPECIFICATION, SMACNA STANDARDS, AND PE APPLICABLE CODES INCLUDING ALL NECESSARY OFFSETS, FITTINGS, AND SPECIAL RADIUS OR MITERED ELBOWS WHICH ARE REQUIRED DUE TO SPACE CONSTRAINTS OR OTHER CONDITIONS.
2.	CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY SUPPLY DIFFUSERS AND RETURN AIR REGISTERS WHERE INDICATED ON THE DRAWING. COORDINATE LOCATION OF DIFFUSERS AND REGISTERS WITH ARCHITECTURAL DRAWINGS. CENTER CEILING DIFFUSERS AND REGISTERS ON LIGHT FIXTURE PATTERN UNLESS OTHERWISE NOTED. COORDINATE APPROPRIATE BORDER SELECTION WITH CEILING TYPE AND ARCHITECTURAL PLANS. COORDINATE FINISH AND FINAL COLOR WITH ARCHITECTURAL PLANS.
3.	DUCT BRANCH TAKEOFF DETAILS WITH VOLUME DAMPER SHOWN ON DETAIL DRAWING APPLY TO ALL LOW VELOCITY DUCTS, SUPPLY DUCTS IN CONSTANT VOLUME SYSTEMS, RETURN AND EXHAUST DUCTS AND OPEN END RETURN DUCTS. PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT.
4.	WHERE INTERNAL DUCT INSULATION OR ACOUSTICAL LINING IS SPECIFIED ON THE DRAWINGS OR IN THE SPECIFICATIONS, THE DUCT SIZES SHALL BE INCREASED TO ACCOMMODATE THE THICKNESS OF INTERNAL INSULATION AND PROTECTION SHEET AS SPECIFIED. DUCT DIMENSION ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS.
5.	COORDINATE EXACT LOCATIONS OF THERMOSTATS, TEMPERATURE SENSORS AND FAN SWITCHES WITH ARCHITECTURAL DRAWINGS.
6.	PROVIDE FIRE DAMPER OR FIRE SMOKE DAMPER WHERE DUCT PENETRATES RATED WALLS, PARTITIONS OR SLABS AS SHOWN ON PLANS AND ON THE DETAIL SHEETS. MECHANICAL CONTRACTOR TO REVIEW ARCHITECTURAL DRAWINGS AND VERIFY ALL RATED PARTITIONS.
7.	THIS CONTRACTOR SHALL INSTALL DUCT SMOKE DETECTORS AND COORDINATE THE LOCATIONS WITH ELECTRICAL CONTRACTOR.
8	CONTRACTOR MUST FIFLD VERIFY ALL DIMENSIONS AND CONDITIONS OF THE SITE AND/OR

•	COORDINATE EXACT LOCATIONS OF THERMOSTATS, TEMPERATURE SENSORS AND FAN SWITCHES, WITH ARCHITECTURAL DRAWINGS.
•	PROVIDE FIRE DAMPER OR FIRE SMOKE DAMPER WHERE DUCT PENETRATES RATED WALLS, PARTITIONS OR SLABS AS SHOWN ON PLANS AND ON THE DETAIL SHEETS. MECHANICAL CONTRACTOR TO REVIEW ARCHITECTURAL DRAWINGS AND VERIFY ALL RATED PARTITIONS.
•	THIS CONTRACTOR SHALL INSTALL DUCT SMOKE DETECTORS AND COORDINATE THE LOCATIONS WITH ELECTRICAL CONTRACTOR.
•	CONTRACTOR MUST FIELD VERIFY ALL DIMENSIONS AND CONDITIONS OF THE SITE AND/OR BUILDING.
•	ADEQUATELY BRACE AND PROTECT ALL WORK DURING CONSTRUCTION AGAINST DAMAGE. BREAKAGE, COLLAPSE, DISTORTIONS, AND ALL ALIGNMENTS ACCORDING TO CODES AND STANDARDS OF GOOD PRACTICE.
0.	FIRE STOPPING SHALL BE INSTALLED AT ALL PENETRATIONS OF FIRE RATED CONSTRUCTION AS PER SPECIFICATIONS.
1.	CONTRACTOR SHALL COORDINATE THE WORK SHOWN ON THESE DRAWINGS WITH ALL OTHER TRADES (E.G., SPRINKLER, ELECTRICAL, TELECOMM, ETC.) FOR WORK IN FINISHED CEILINGS.
2.	MAXIMUM LENGTH OF FLEXIBLE DUCT SHALL BE 6'-0" AT DROPS TO DIFFUSERS.
3.	WHERE LOW PRESSURE DUCTWORK SIZES ARE NOT INDICATED, USE THE FOLLOWING SCHEDULE:

CFM	DUCT SIZE								
0-220	12x10								
221-400	16x10								
401-700	30x10								
701-1100	30x14								
1101-1400	34x14								
SIZES INDICATE CLEAR INSIDE DIMENSION.									

- 14. ALL OTHER MEDIUM PRESSURE BRANCH TAKE—OFFS SHALL BE SIZED AT A FRICTION LOSS OF 0.10"/100 FEET. PROVIDE A CONICAL CONNECTION FOR CIRCULAR TAKE—OFFS. PROVIDE A 45° SHOE—TAP CONNECTION FOR RECTANGULAR TAKE—OFFS.
- 15. PROVIDE VOLUME DAMPERS AT EACH LOW PRESSURE SUPPLY, RETURN AND EXHAUST DUCT BRANCH TAKE—OFF.

GF	RILLES, F	REGIST	ERS, AND	DIFFUS	SERS :	SCHEDUI	_E	
TAG	MANUFACTURER	MODEL	TYPE	FACE SIZE (IN x IN)	NECK SIZE	CONSTRUCTION	DEFLECTION	REMARK
D-1	PRICE	SPD	PLAQUE LAY-IN	24x24	6 " ø	STEEL	-	1, 2
D-2	PRICE	SPD	PLAQUE LAY-IN	24x24	8 " ø	STEEL	_	1, 2
G-1	PRICE	500	LOUVERED RETURN	24x24	22x22	STEEL	-	1, 2
G-2	PRICE	PDDR	PERF EXHAUST	24x24	8ø	STEEL	_	1, 2
G-3	PRICE	PDDR	PERF EXHAUST	12x12	6ø	STEEL	-	1, 2

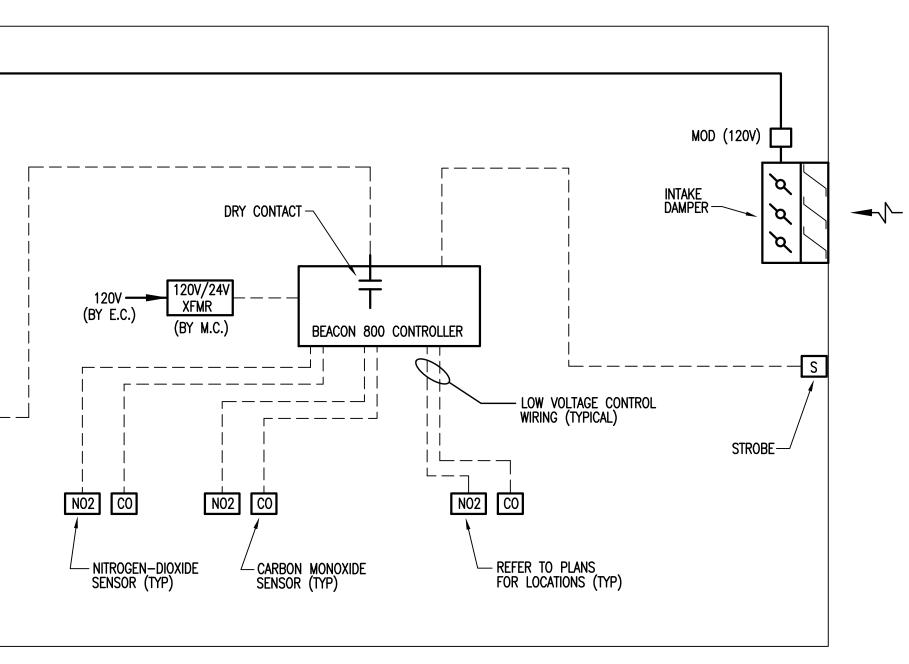
NOTES:

COORDINATE FRAME TYPE WITH CEILING TYPE.
 COLOR/FINISH SHALL BE SELECTED BY THE ARCHITECT.

LOUVER SCHEDULE											
TAG	MANUFACTURER / MODEL	FACE SIZE (W x H)	MAX. PRESSURE DROP (IN. W.G.)	SERVICE							
L-1	GREENHECK MODEL ESD-435	4 IN.	12x12	0.08	EXHAUST						
L-2	GREENHECK MODEL ESD-435	4 IN.	36x36	0.08	EXHAUST						
L-3	GREENHECK MODEL ESD-435	4 IN.	36x36	0.08	EXHAUST						
L-4	GREENHECK MODEL ESD-435	4 IN.	36x36	0.08	INTAKE						
L-5	GREENHECK MODEL ESD-435	4 IN.	36x36	0.08	INTAKE						
L-6	GREENHECK MODEL ESD-435	4 IN.	24x18	0.08	INTAKE						
I–7	GREENHECK MODEL ESD-435	4 IN.	18x18	0.08	EXHAUST						

NOTES:

PROVIDE WITH BIRDSCREEN AND FLANGED FRAME.
 COLOR/FINISH SHALL BE SELECTED BY THE ARCHITECT.



GAS DETECTION SYSTEM CONTROL SCHEMATIC NOT TO SCALE

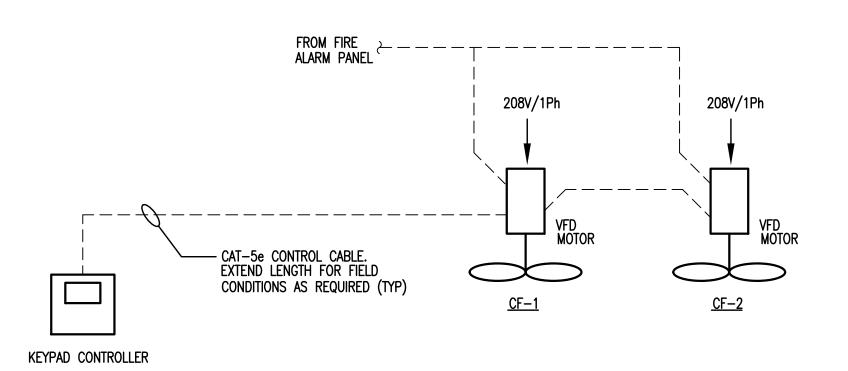
<u>EF-3</u>

MOD (120V)

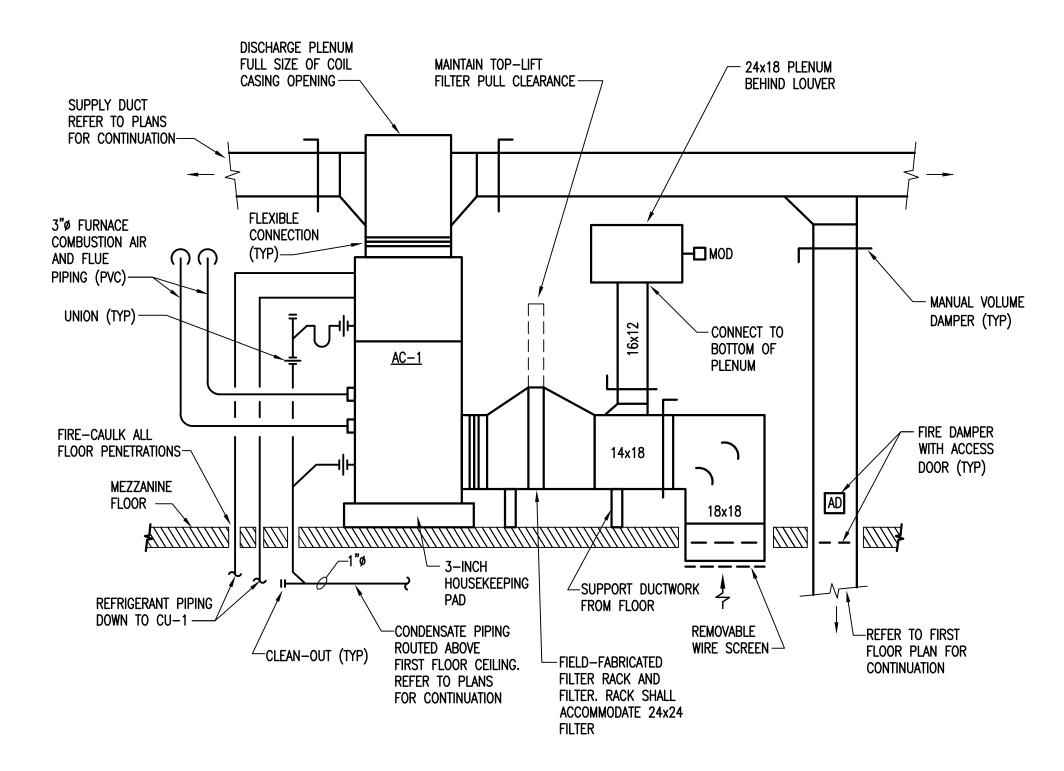
STARTER (BY E.C.)

SPACE THERMOSTAT

120V DRY CONTACT (TYP) —



CEILING FAN CONTROL SCHEMATIC NOT TO SCALE



AC-1 INSTALLATION DETAIL - ELEVATION
NO SCALE

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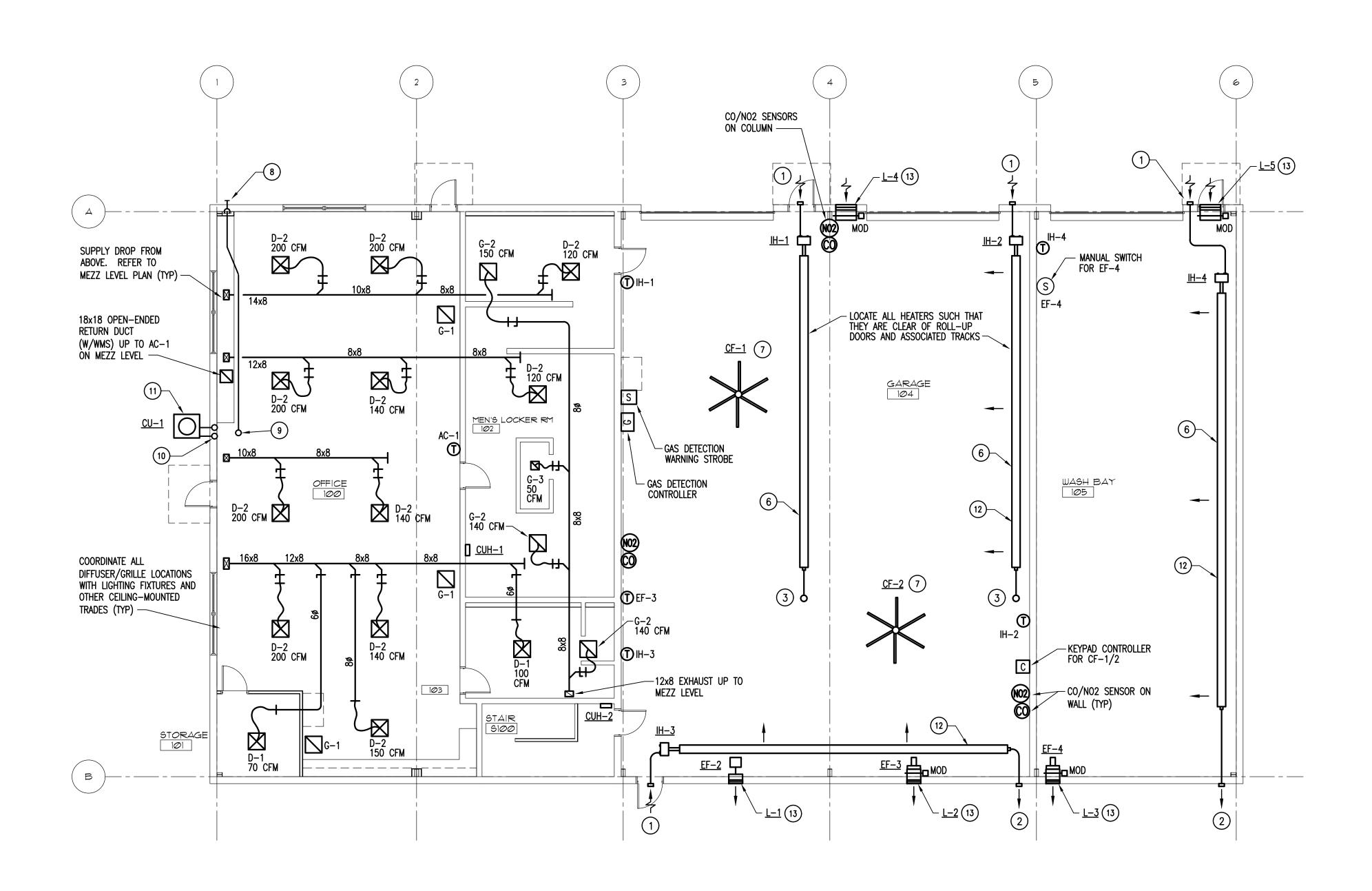
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Phone: 610.373.8001

Project No.





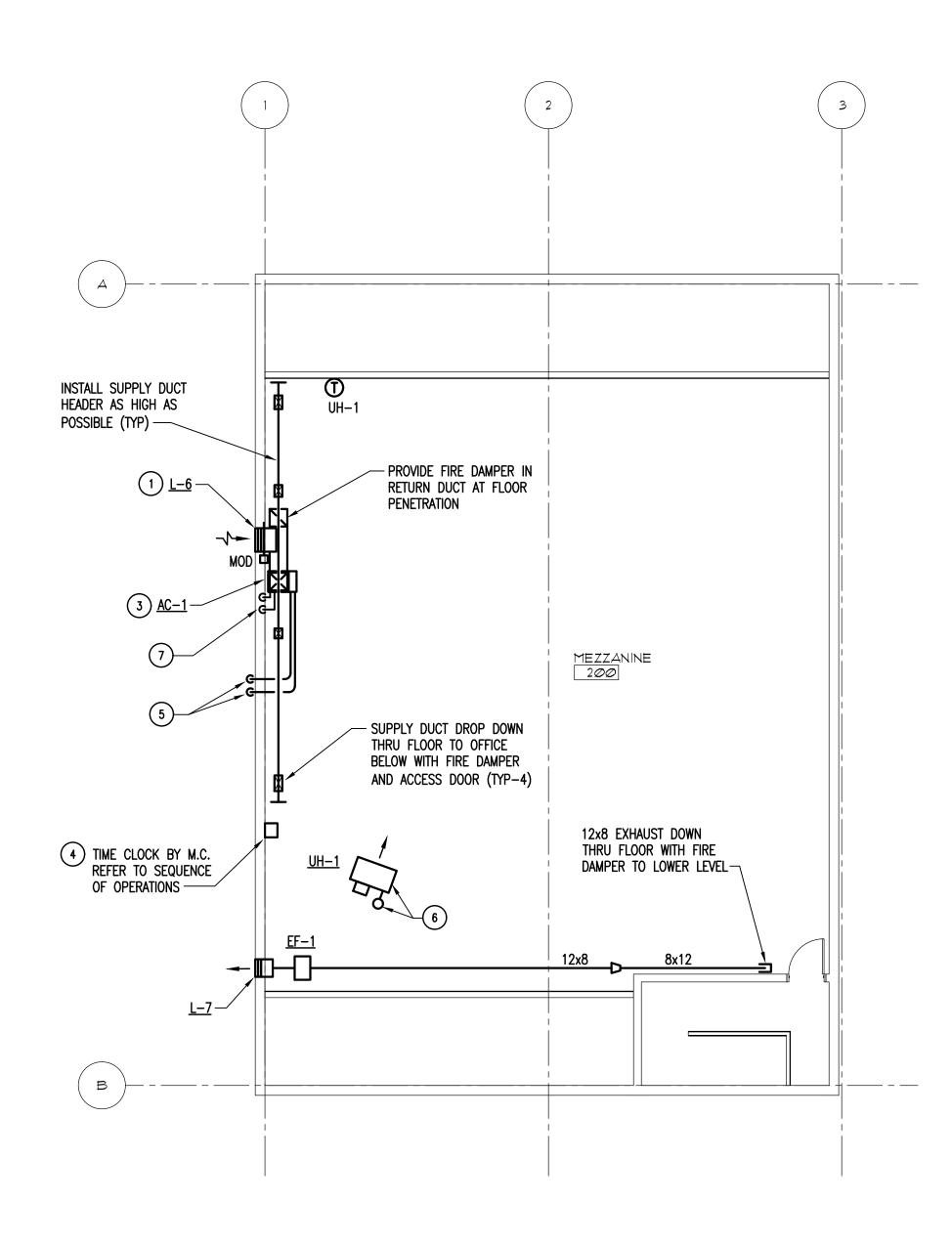
NEW BUILDING — FIRST FLOOR — MECHANICAL NEW WORK PLAN
SCALE: 1/8" = 1'-0"

NEW WORK NOTES:

- 1 FIELD LOCATE COMBUSTION AIR INTAKE. MAINTAIN MINIMUM 10'-0" CLEARANCE FROM ALL SOURCES OF EXHAUST. PROVIDE WITH FACTORY 4" SIDEWALL CAP FOR COMBUSTION AIR INTAKE.
- FIELD LOCATE EXHAUST VENT. MAINTAIN MINIMUM 10'-0" CLEARANCE FROM ALL FRESH AIR AND COMBUSTION AIR INTAKES AND OPERABLE DOORS. PROVIDE WITH FACTORY 4" SIDEWALL VENT KIT.
- FIELD LOCATE EXHAUST VENT UP THRU ROOF. MAINTAIN MINIMUM 10'-0" CLEARANCE FROM ALL FRESH AIR AND COMBUSTION AIR INTAKES AND OPERABLE DOORS. PROVIDE WITH FACTORY 4" ROOFTOP VENT PACKAGE, INCLUDING ROOF THIMBLE AND RAIN COLLAR. VENT SHALL TERMINATE A MINIMUM 3 FT ABOVE ROOF. PROVIDE ROOF THIMBLE, TERMINATION CAP, AND RAIN COLLAR.
- PROVIDE LOUVER AT LOCATION SHOWN, MOUNTED AS HIGH AS POSSIBLE. PROVIDE PLENUM BEHIND LOUVER AS SHOWN WITH MOTORIZED DAMPER. INSULATE PLENUM WITH 1-INCH BOARD INSULATION. FOR INTAKE LOUVERS, SLOPE PLENUM AND ANY CONNECTED DUCTWORK TOWARD
- EXTEND 3-INCH FURNACE COMBUSTION AIR AND FLUE VENTING THRU EXTERIOR WALL, TERMINATING WITH DOWN-TURNED ELBOWS HAVING BIRD SCREENS. SEAL WALL PENETRATION WATER-TIGHT.
- 6 INSTALL RADIANT HEATER SUCH THAT THERE IS A MINIMUM OF 18'-6" CLEAR ABOVE THE FLOOR FOR VEHICULAR TRAFFIC.
- COORDINATE EXACT CEILING FAN LOCATION WITH LIGHTING FIXTURES AND FIRE PROTECTION SPRINKLERS.
- 8 EXTEND 1-INCH CONDENSATE FROM AC-1 DOWN WITHIN WALL CAVITY AND TERMINATE OUTSIDE 6 INCHES ABOVE GRADE. PROVIDE SPLASH BLOCK.
- 9 1-INCH CONDENSATE DOWN FROM AC-1 ON MEZZANINE LEVEL. ROUTE PIPING HIGH WITHIN JOIST SPACE, PITCHED A MINIMUM 1/8-INCH PER FOOT.
- ROUTE REFRIGERANT PIPING WITHIN WALL CAVITY UP TO AC-1 ON MEZZANINE LEVEL.
- PROVIDE POURED—IN—PLACE CONCRETE PAD FOR CONDENSING UNIT. PAD SHALL BE 4 INCHES THICK WITH WELDED WIRE MESH REINFORCEMENT, ATOP 6 INCH CRUSHED STONE BED.
- ORIENT HEAT REFLECTOR AT A 45-DEGREE ANGLE INWARD TOWARD SPACE.
- PROVIDE LOUVER AT LOCATION SHOWN AS HIGH AS POSSIBLE. PROVIDE PLENUM BEHIND LOUVER AS SHOWN. FOR INTAKE PLENUMS, SLOPE PLENUM AND CONNECTED DUCTWORK TOWARD LOUVER. MAINTAIN A MINIMUM OF 10'-0" BETWEEN FRESH AIR INTAKES AND ALL SOURCES OF EXHAUST.

BUILDING LAN 4*C/L/TY* SAS RINCIPAL: NEC SCALE: JCM AS NOTED DRAWING NO. M-1PROJECT NO. 230004





NEW BUILDING — MEZZANINE — MECHANICAL NEW WORK PLAN SCALE: 1/8" = 1'-0"

NEW WORK NOTES:

- PROVIDE LOUVER AT LOCATION SHOWN BELOW SUPPLY DUCTWORK. PROVIDE PLENUM BEHIND LOUVER AS SHOWN. SLOPE PLENUM AND CONNECTED DUCTWORK TOWARD LOUVER. MAINTAIN A MINIMUM OF 10'-0" BETWEEN FRESH AIR INTAKES AND ALL SOURCES OF EXHAUST.
- (2) INSULATE EXHAUST DUCTWORK AND LOUVER PLENUM BETWEEN FAN DISCHARGE AND LOUVER.
- 3) REFER TO AC INSTALLATION DETAIL.
- PROVIDE TIME CLOCK FOR CONTROL OF AC-1 OA DAMPER AND EXHAUST FAN EF-1. TIMER SHALL BE INTERMATIC ELECTROMECHANICAL MODEL T7401B OR APPROVED EQUAL.
- 5 TERMINATE 3-INCH PVC FURNACE VENTING WITH DOWN-TURNED ELBOWS WITH STAINLESS STEEL BIRD SCREENS. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- 6 INSTALL UNIT HEATER AS HIGH AS POSSIBLE. PROVIDE FIELD-FURNISHED COMBUSTION AIR DUCTING FOR USE WITH MANUFACTURER'S CONCENTRIC THRU-THE-ROOF VENTING KIT. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- 7 REFRIGERANT PIPING FROM BELOW.

BUILDING AN AC/L/77 - NEW ZANINE PL WORKS F CHANICAL MEZZ/ SAS
PRINCIPAL:
JCM AS
DRAWING NO. NEC AS NOTED M-2PROJECT NO. 230004



EXISTING OUTSIDE AIR
INTAKE TO REMAIN

EXISTING COUTSIDE AIR
INTAKE TO REMAIN

EXISTING EXHAUST
OUTSIDE EXHAUST
FAN AND INJECTED

EXISTING COMBUSTION
AIR INJECT TO REMAIN

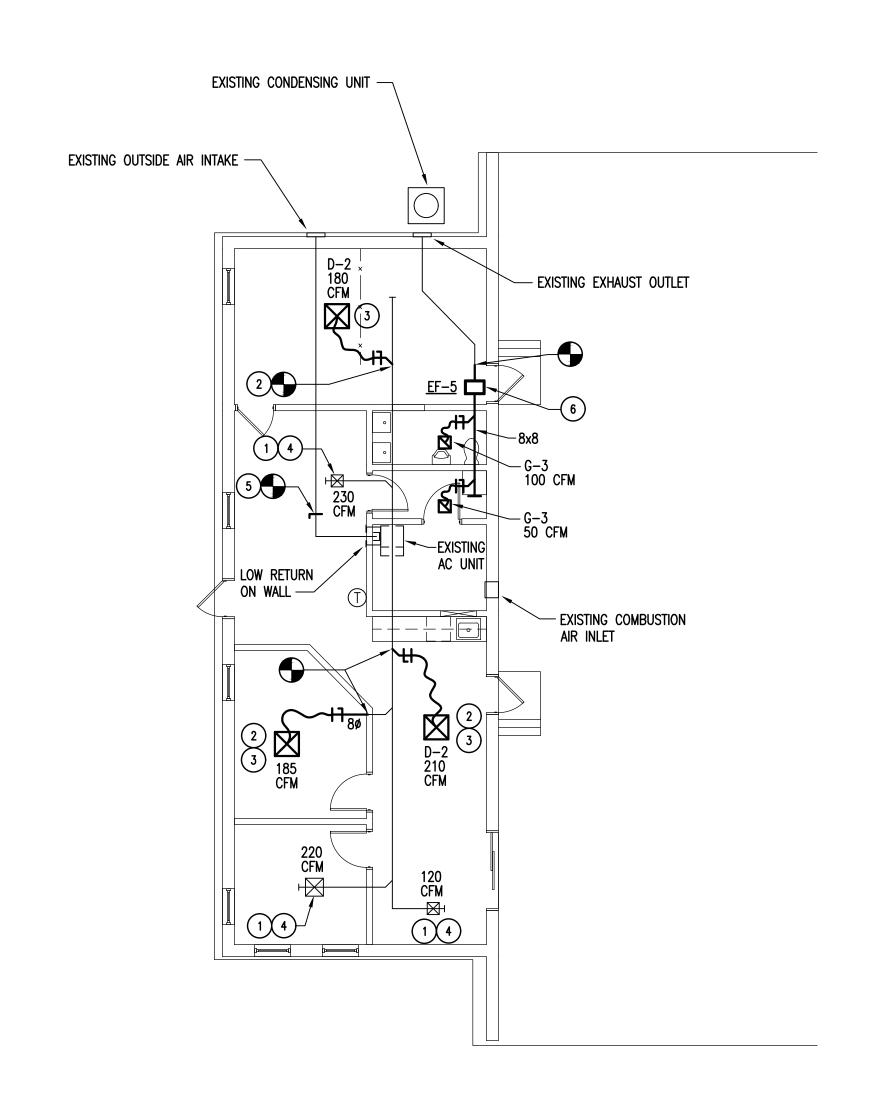
EXISTING COMBUSTION
AIR INJECT TO REMAIN

EXISTING COMBUSTION
AIR INJECT TO REMAIN

EXISTING BUILDING — MECHANICAL DEMOLITION PLAN

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

10



EXISTING BUILDING — MECHANICAL NEW WORK PLAN SCALE: 1/8" = 1'-0"

NEW WORK NOTES:

- 1) RELOCATE EXISTING DIFFUSER INTO NEW CEILING. ADAPT DIFFUSER BRANCH AS REQUIRED.
- PROVIDE NEW DIFFUSER AND DUCT BRANCH. CONNECT INTO EXISTING DUCT MAIN WHERE SHOWN.
- 3 BALANCE NEW DIFFUSER TO AIR FLOW INDICATED.
- 4 REBALANCE EXISTING DIFFUSER TO AIR FLOW INDICATED.
- 5) PROVIDE NEW BALANCING DAMPER IN EXISTING OUTSIDE AIR DUCT, AND BALANCE TO 90 CFM.
- 6 NEW EXHAUST FAN ABOVE CEILING. REFER TO IN-LINE FAN INSTALLATION DETAIL FOR SUSPENSION AND DUCT CONNECTION INFORMATION.

BUILDING 1ECHANICAL FLO(" PUBLIC") SAS
PRINCIPAL:
JCM AS
DRAWING NO. NEC AS NOTED M-3PROJECT NO. 230004

ISSUED FOR BID JULY 19, 2023

NOTES: 1. PROVIDE WITH MODEL 4TXCC009DS3 DIRECT-EXPANSION ACCESSORY COOLING COIL.

2. M.C. TO COORDINATE AND FIELD-CUT SIDE RETURN OPENING INTO SIDE OF UNIT PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

3. COOLING CAPACITIES INDICATED ARE AT A COINCIDENT OUTDOOR AMBIENT TEMPERATURE OF 95F. 4. PROVIDE WITH MANUFACTURER'S HARD-WIRED 7-DAY PROGRAMMABLE THERMOSTAT, WITH AUTO-CHANGE-OVER FEATURE AND BATTERY BACK-UP.

CONDENSING UNIT SCHEDULE (OUTDOOR UNIT)													
TAG	TYPE	LOCATION	REFRIGERANT	FANS	COMPRESSORS		ELECTRIC	CAL CHARA	CTERISTICS				
IAG				CAPACITY (MBH)	(4 2 :)	(QUANTITY)	UNIT MCA	VOLTS	PHASE	HERTZ	МОСР	BASIS OF DESIGN	NOTES
CU-1	AIR-COOLED	GRADE	R410A	5.0	1	1	35.0	208-230	1	60	60A	TRANE MODEL 4TTR6060N1	ALL
NOTES:													

I. PROVIDE ALL INTER-CONNECTING CONTROL WIRING BETWEEN INDOOR SECTION AND OUTDOOR CONDENSING UNIT.

2. PROVIDE ALL INTER-CONNECTING REFRIGERANT PIPING BETWEEN INDOOR UNIT AND OUTDOOR UNIT. FIELD-CHARGE REFRIGERANT LINES ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

3. SIZE REFRIGERANT PIPING ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

	FAN	SCHEDULE									
	REF NO	MANUFACTURER / MODEL NO.	LOCATION	FLOW (CFM)	SPEED (RPM)	STATIC EXT PRESS ("WG)	MOTOR (HP/WATTS)	DRIVE TYPE	V–Ph–Hz	TYPE	NOTES
Ī	EF-1	PENN-BARRY ZEPHYR MODEL Z10H	MEZZANINE	440	1550	0.55	390 W	DIRECT	120-1-60	CABINET CENTRIF.	1,3
	EF-2	PENN-BARRY ZEPHYR MODEL Z8S	MAINTENANCE SHOP	175	1050	0.25	77 W	DIRECT	120-1-60	CABINET CENTRIF.	1,3
	EF-3	PENN-BARRY BREEZEWAY MODEL P16RA	MAINTENANCE SHOP	2400	1550	0.25	1/2 HP	DIRECT	120-1-60	WALL PROPELLER	2
	EF-4	PENN-BARRY BREEZEWAY MODEL P20SA	WASH BAY	2000	1300	0.30	1/3 HP	DIRECT	120-1-60	WALL PROPELLER	2
	EF-5	PENN-BARRY ZEPHYR MODEL Z8S	EXISTING BUILDING	150	1050	0.375	77 W	DIRECT	120-1-60	CABINET CENTRIF.	1,3
	CF-1,2	GREENHECK DS-6-8-70HV	MAINTENANCE SHOP	28,600	142	0.00	2/3 HP	DIRECT/VFD	208-1-60	CEILING FAN	4

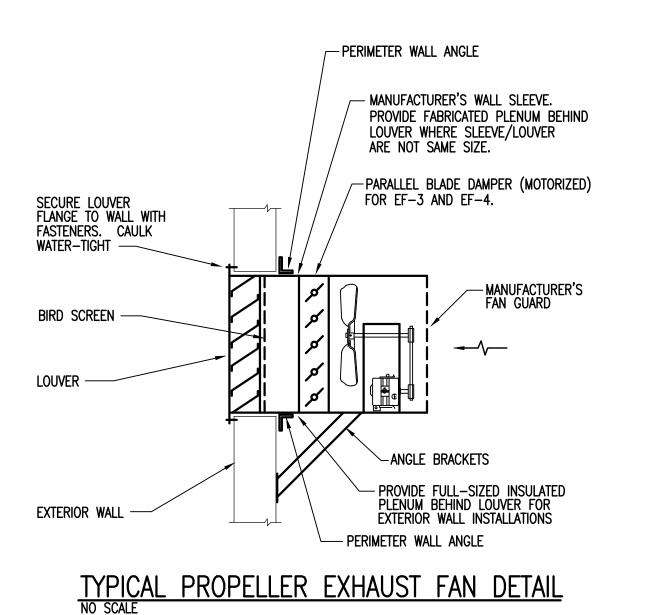
I. PROVIDE WITH GRAVITY BACKDRAFT DAMPER. STATIC PRESSURE INDICATED DOES NOT REFLECT GRAVITY DAMPER.

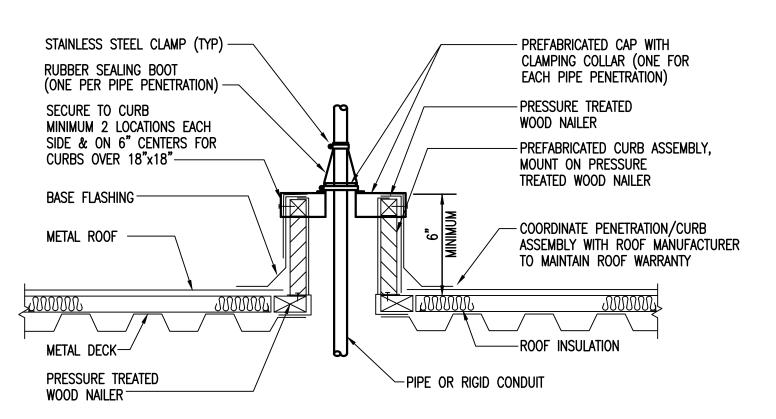
PROVIDE WITH WALL SLEEVE AND MANUFACTURER'S FAN GUARD.

PROVIDE WITH MANUFACTURER'S SPEED CONTROLLER FOR BALANCING.

PROVIDE THE FOLLOWING FACTORY OPTIONS/ACCESSORIES: FACTORY—INTEGRAL VFD DRIVE, MILL FINISH, Z—PURLIN MOUNTING KIT, 6—FT DROP TUBE EXTENSION, IMPELLER HUB/PLATE, POWER WIRING PIGTAIL, NETWORK COMMUNICATION WIRING, 150FT OF TWISTED PAIR CAT—5e CONTROL CABLE, LOW—VOLTAGE FIRE ALARM INTERFACE RELAY, SAFETY CABLE, GUY WIRES, CABLE CLAMP

HARDWARE, NEMA-3R TOGGLE SWITCH, IP40 KEYPAD (WALL-MOUNTED) TO CONTROL BOTH FANS.





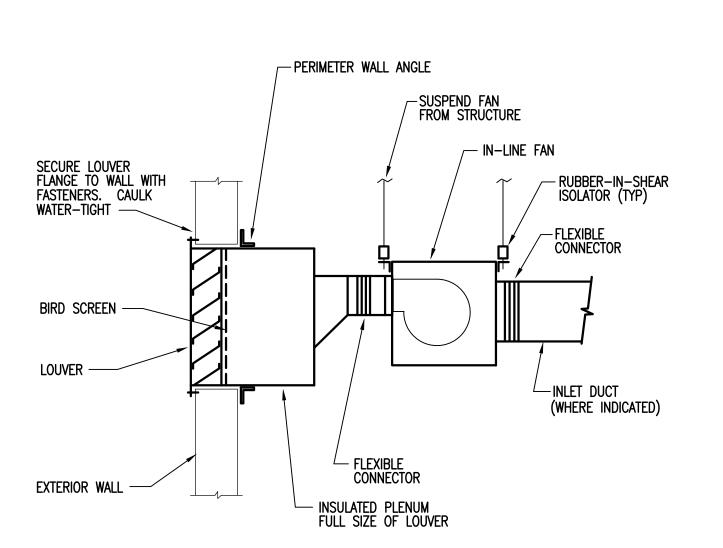
NOTES:

1. PIPE CAP ASSEMBLY SHALL BE A PREFABRICATED ASSEMBLY CONSTRUCTED FOR ONE OR MULTIPLE PIPE PENETRATIONS.

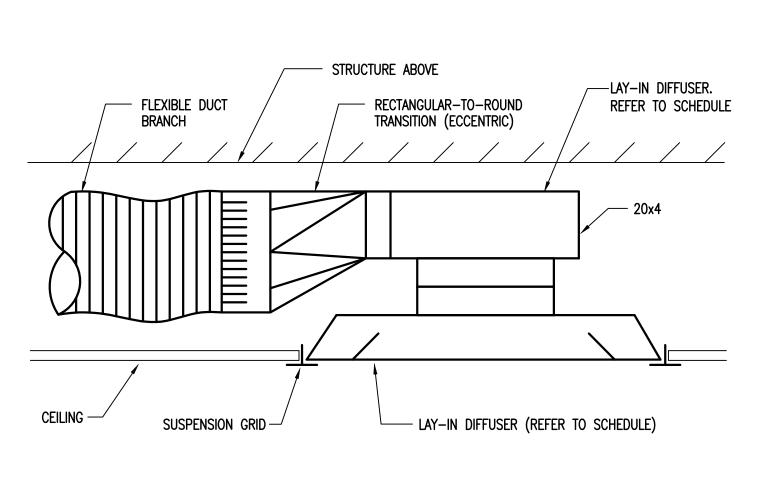
PER PATE MODEL 'PCA' SERIES OR EQUAL. 2. PIPE CURB ASSEMBLY SHALL BE PATE MODEL 'PCA' SERIES OR EQUAL.

TYPICAL PIPE OR CONDUIT ROOF PENETRATION DETAIL

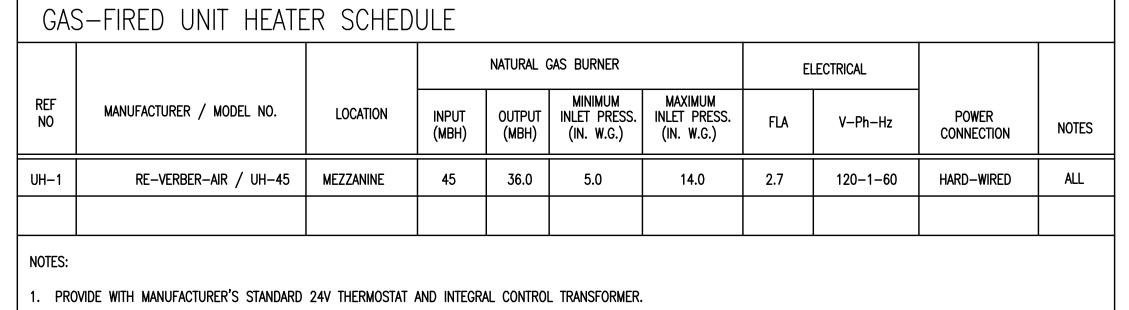
NO SCALE



TYPICAL IN-LINE FAN DETAIL
NO SCALE



CONFINED SPACE DIFFUSER INSTALLATION DETAIL
NO SCALE



2. PROVIDE WITH MANUFACTURER'S SUPPORT HANGERS/ANGLES.

3. PROVIDE WITH SEPARATED COMBUSTION, POWERED EXHAUST, THRU-THE-ROOF CONCENTRIC VENTING KIT WITH B-VENT AND RAIN CAP, AND VIBRATION ISOLATION KIT.

INFRA	ARED HEATER SCHEDU	JLE									
			OVERALL		NATURAL GAS I	BURNER		ELECTRICAL			
REF NO	MANUFACTURER / MODEL NO.	LOCATION	LENGTH (FT)	HIGH-FIRE INPUT (MBH)	MINIMUM INLET PRESS. (IN. W.G.)	MAXIMUM INLET PRESS. (IN. W.G.)	V-Ph-Hz	STARTING AMPS	RUNNING AMPS	POWER CONNECTION	NOTES
IH-1,2,3	RE-VERBER-RAY / HL3-40-75	MAINTENANCE SHOP	41'-1"	75	5.0	14.0	120-1-60	4.8	1.1	PLUG-AND-CORD	1,2,3,4
IH-4	RE-VERBER-RAY / HL3-50-150	WASH BAY	50'-9"	150	5.0	14.0	120-1-60	4.8	1.1	PLUG-AND-CORD	1,2,3,4,5

1. PROVIDE WITH MANUFACTURER'S STANDARD 24V THERMOSTAT.

2. PROVIDE WITH MANUFACTURER'S HANGERS, TUBE CLAMPS, AND CENTER SUPPORTS.

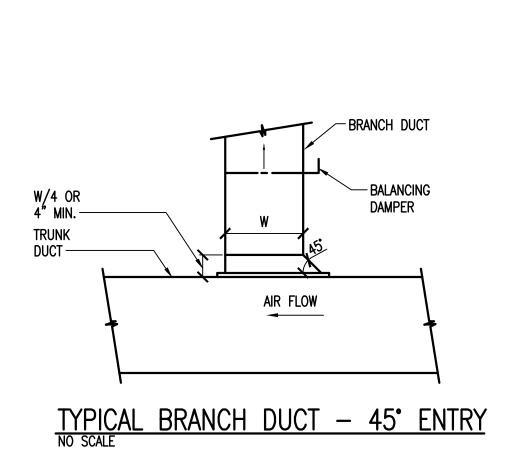
3. PROVIDE WITH MANUFACTURER'S REFLECTOR END CAPS.

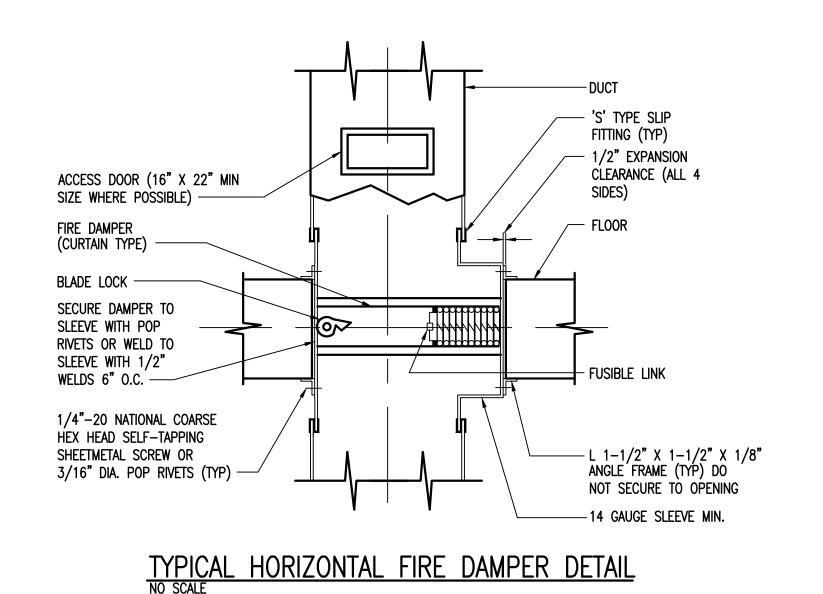
4. PROVIDE WITH MANUFACTURER'S FLEXIBLE GAS CONNECTOR HOSE.

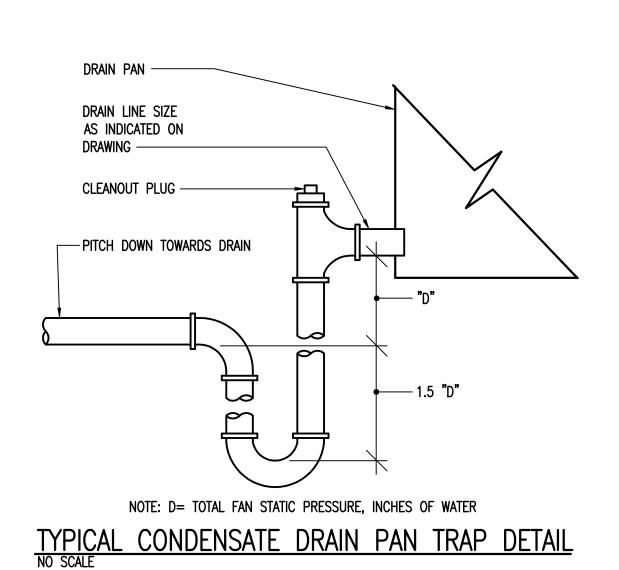
5. PROVIDE WITH ALUMINIZED STEEL TUBES, AND STAINLESS STEEL BURNER/BOX, HANGERS, AND REFLECTORS/CAPS.

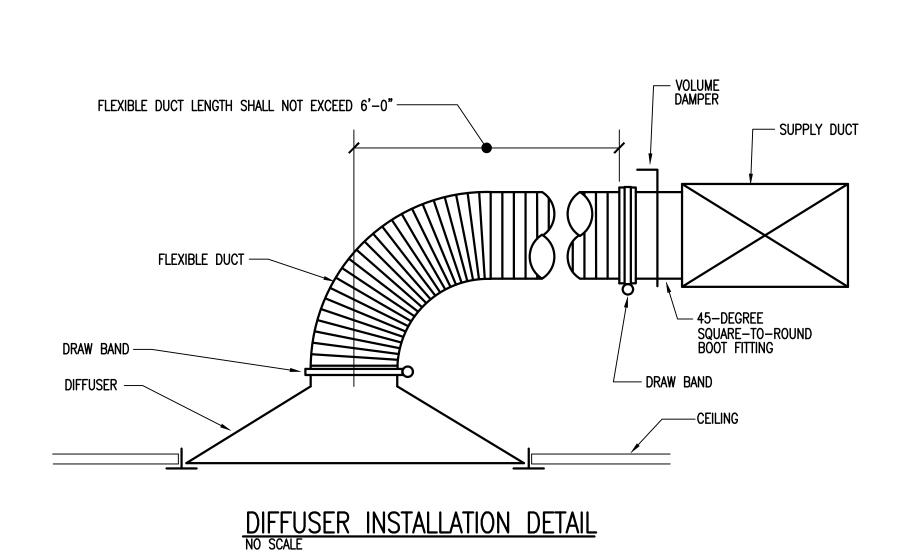
REF	TYPE	AIR FLOW	CAPACITY		ECTRICAL CTERISTICS		BASIS OF DESIGN	NOTES	
NO		(CFM)	(WATTS)	VOLTS	PHASE	HERTZ			
CUH-1,2	SURFACE-MOUNTED WALL HEATER	100	3000	208	1	60	BERKO MODEL CWH3404F	ALL	

PROVIDE WITH SURFACE MOUNTING FRAME, INTEGRAL ON/OFF SWITCH, INTEGRAL THERMOSTAT, AND MANUAL RESET THERMAL OVERHEAT PROTECTOR.









ISSUED FOR BID <u>JULY 19, 2023</u> NOT FOR CONSTRUCTION

McCARTHY

www.McCarthy-Engineering.com

2500 East High Street, Suite 630 Pottstown, PA 19464

Phone: 610.373.8001

Project No.

230004

DETAIL! AND AND PRKS

SCHEDULE "PUBLIC I NEC SCALE: AS NOTED

INCIPAL: JCM DRAWING NO. M-4PROJECT NO.

230004

SAS

- 1.1 THE ARCHITECTURAL GENERAL CONDITIONS SHALL APPLY TO AND FORM A PART OF THIS
- SECTION OF THESE SPECIFICATIONS. 1.2 PROVIDE ALL MATERIALS, LABOR, EQUIPMENT AND TOOLS NECESSARY FOR COMPLETE AND WORKABLE SYSTEMS AS INDICATED ON THE DRAWINGS. ALL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE SECTIONS OF THE NATIONAL FIRE PROTECTION ASSOCIATION, NATIONAL ELECTRICAL CODE, OSHA, LATEST INTERNATIONAL MECHANICAL CODE, AND ALL OTHER LOCAL OR STATE AUTHORITIES HAVING JURISDICTION AND MANUFACTURER'S RECOMMENDATIONS.
- 1.3 THE CONTRACTOR SHALL VISIT THE SITE, EXAMINE ALL CONDITIONS AND MAKE ALLOWANCES FOR DIFFICULTIES AND CONTINGENCIES AFFECTING THE PROPER EXECUTION OF THIS CONTRACT PRIOR TO SUBMITTING A PROPOSAL.
- 1.4 THE CONTRACTOR SHALL OBTAIN AND PAY ALL FEES NECESSARY FOR PERMITS AND INSPECTIONS REQUIRED WITH THIS WORK.
- 1.5 THE CONTRACTOR SHALL VERIFY ALL UTILITY SERVICE INFORMATION SHOWN ON THE DRAWINGS WITH THE LOCAL UTILITY COMPANY PRIOR TO SUBMITTING A BID. ANY CHANGES OR SERVICE CHARGES IMPOSED BY THE UTILITY COMPANY SHALL BE QUALIFIED AND INCLUDED IN THE BID.
- 1.6 ALL EQUIPMENT SHALL BE TESTED, LISTED, AND LABELED BY AN APPROVED AUTHORITY (UL, AGA, ETL) AND SHALL BE INSTALLED IN ACCORDANCE WITH ITS LISTING.
- 1.7 ALL EQUIPMENT, MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A MINIMUM OF ONE YEAR (FIVE YEARS FOR ALL COMPRESSORS) FROM THE DATE OF ACCEPTANCE BY THE
- 1.8 WHERE PRODUCTS ARE SPECIFIED BY BRAND NAME, CATALOG NUMBERS OR BY NAMES OF MANUFACTURERS, THE REFERENCE IS INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND IS SOLELY FOR THE PURPOSE OF INDICATING THE TYPE OF QUALITY OF ITEM THAT WILL BE ACCEPTABLE. AN APPROVED EQUAL WILL BE CONSIDERED UNLESS INDICATED OTHERWISE.
- 1.9 SHOP DRAWINGS SHALL BE SUBMITTED AND REVIEWED PRIOR TO ORDERING ANY EQUIPMENT.
- 1.10 SUBSTITUTIONS FOR SPECIFIED EQUIPMENT ARE PERMITTED UNDER THE CONDITIONS THAT NO ADDITIONAL CHARGE TO THE PROJECT BE PERMITTED FOR ASSOCIATED CHANGES IN POWER REQUIREMENTS, PIPE/DUCT SIZE, GAS CONSUMPTION, WEIGHT, SUPPORT, ETC. THE CONTRACTOR SHALL FULLY REVIEW THE PROPOSED SUBSTITUTION TO ENSURE ALL ASPECTS OF PERFORMANCE, SERVICE CLEARANCE, PHYSICAL SUPPORT, POWER FEEDS, ETC. ARE COORDINATED AND ACCOUNTED FOR PRIOR TO SUBMITTING THE ALTERNATIVE EQUIPMENT FOR
- 1.11 THE CONTRACTOR RESPONSIBLE FOR WORK COVERED BY THESE SPECIFICATIONS SHALL COORDINATE AND COOPERATE WITH ALL OTHER TRADES.
- 1.12 ALL CUTTING AND PATCHING OF EVERY NATURE REQUIRED IN CONNECTION WITH THIS CONTRACT SHALL BE DONE BY THIS CONTRACTOR WITH MECHANICS EXPERIENCED IN THEIR RESPECTIVE TRADES. ALL PATCHING SHALL MATCH ADJACENT FINISHES/CONSTRUCTION.
- 1.13 THE CONTRACTOR SHALL CONTACT PENNSYLVANIA ONE CALL SYSTEM, INC. AT 1-800-242-1776 FOR COORDINATION OF POSSIBLE INTERFERENCES WITH UNDERGROUND UTILITIES PRIOR TO ANY EXCAVATION.
- 1.14 CONTRACTOR SHALL ENGAGE THE SERVICES OF A FIRE PROTECTION CONTRACTOR TO REVIEW THE DRAWINGS AND INSTALL FIRE PROTECTION PRODUCTS TO MAINTAIN THE INTEGRITY OF ALL PIPE, WIRE, CONDUIT, DUCT, DIFFUSER, REGISTER, GRILLE, ETC. PENETRATIONS THROUGH ANY AND ALL FIRE RATED WALLS, FLOORS, BARRIERS, AND ASSEMBLIES. FIRE STOP TRAINING AND PRODUCTS SHALL BE 3M OR APPROVED EQUAL.
- 1.15 ALL EXCAVATIONS REQUIRED FOR INSTALLATION OF PIPE SHALL HAVE SOLID. LINDISTURBED BOTTOMS AND SHALL BE SUBJECT TO APPROVAL BY THE ARCHITECT PRIOR TO PIPING PLACEMENT. SHOULD BOTTOMS BECOME SOFT OR WET BEFORE PIPING IS PLACED, ALL SUCH UNSUITABLE BOTTOMS SHALL BE REMOVED AT NO COST TO THE OWNER AND FILLED WITH
- 1.16 BACKFILL ALL EXCAVATIONS PERFORMED UNDER THIS CONTRACT AS REQUIRED TO SATISFY FINISHED GRADE REQUIREMENTS.
- 1.17 THE CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY HANGERS, INSERTS, SUPPORTS SUPPLEMENTARY STEEL, ETC., TO PROPERLY SUPPORT ALL EQUIPMENT, DUCTWORK AND PIPING IN AN APPROVED MANNER AND IN FULL ACCORDANCE WITH THE MANUFACTURER'S
- 1.18 DEMOLITION
- A. THE CONTRACTOR SHALL PERFORM ALL DEMOLITION WORK AS INDICATED ON THE DRAWINGS AND AS DESCRIBED BELOW AS PART OF THIS CONTRACT. THE CONTRACTOR SHALL CUT AND PATCH AS REQUIRED TO PERFORM THE DEMOLITION WORK. ALL OPENINGS CREATED SHALL BE REPAIRED TO MATCH EXISTING CONDITIONS.
- PROVIDE SLEEVES FOR ALL PIPING PENETRATIONS OF WALLS AND FLOORS.
- 1.20 VIBRATION ISOLATORS FOR THE HVAC EQUIPMENT SHALL BE INSTALLED TO PROPERLY ISOLATE THE TRANSMISSION OF VIBRATION OR NOISE TO ANY PART OF THE BUILDING. ISOLATORS SHALL INCLUDE FLEXIBLE DUCT CONNECTORS WHERE DUCTWORK CONNECTS TO EQUIPMENT CONTAINING ROTATING PARTS, RUBBER/NEOPRENE ISOLATORS AT EQUIPMENT SUPPORTS. FLEXIBLE PIPE CONNECTORS AT CONNECTION TO TERMINAL EQUIPMENT CONTAINING ROTATING PARTS, ETC.
- 1.21 FIRE STOPPING
- A. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL FIRE—STOPPING MATERIALS AND/OR SYSTEMS WHERE HIS WORK PENETRATES FIRE AND/OR SMOKE RATED PORTIONS OF THE BUILDING. ALL MATERIALS USED SHALL BE MANUFACTURED SUCH THAT THEY ARE INTENDED TO RESIST THE SPREAD OF FIRE AND THE PASSAGE OF SMOKE. THIS INCLUDES BUT IS NOT LIMITED TO RATED WALLS, FLOORS, SHAFTS, AND CEILINGS. ALL FIRE STOPPING MATERIALS USED SHALL HAVE A FIRE RESISTANCE RATING EQUAL TO OR GREATER THAN THE RATED ASSEMBLY FOR WHICH THEY ARE INSTALLED.
- 1.22 DUCTWORK AND GAS APPLIANCE VENTS
- A. DUCTWORK SHALL BE GALVANIZED STEEL DESIGNED FOR 2 INCH PRESSURE CLASS FOR SUPPLY AND RETURN SYSTEMS AND 1 INCH FOR EXHAUST SYSTEMS IN ACCORDANCE WITH SMACNA. ALL ELBOWS SHALL BE PROVIDED WITH SINGLE THICKNESS TURNING VANES OR LONG RADIUS ELBOWS. ALL SUPPLY AND OUTSIDE AIR DUCTWORK (AND INTAKE PLENUMS BEHIND LOUVERS) SHALL BE INSULATED WITH 1-1/2 INCH DUCT WRAP OR RIGID DUCT BOARD WITH A MINIMUM INSTALLED R-VALUE OF SIX (6) IN UNCONDITIONED AND/OR CONCEALED SPACES. ALL OUTSIDE AIR DUCTWORK. AND RETURN PLENUM/DUCTWORK, SHALL BE INSULATED FROM THE POINT OF CONNECTION OF OA DUCTWORK TO THE RETURN SYSTEM, UP TO THE POINT OF CONNECTION TO THE UNIT/AIR HANDLER. EXHAUST DUCTWORK AND EXHAUST LOUVER PLENUMS SHALL BE INSULATED BETWEEN THE EXHAUST FAN DISCHARGE AND THE LOUVER. INSULATION SHALL BE JOHNS MANVILLE DUCT WRAP. INSULATION SHALL BE INSTALLED WITH THE APPROPRIATE THICKNESS AND LAYERS IN ORDER TO ACHIEVE THE AFOREMENTIONED R-VALUES. ALL DUCTS SHALL BE SEALED WITH A DUCT SEALER SUCH AS HARDCAST.
- B. FLEXIBLE DUCTWORK SHALL BE UL 181 CLASS 1 COMPLETE WITH AN INSULATING FIBERGLASS BLANKET, FOIL—FACED VAPOR BARRIER AND DESIGNED TO WITHSTAND PRESSURES UP TO SIX INCHES POSITIVE PRESSURE W.G. DUCTWORK SHALL BE LABELED AS "FLEXIBLE DUCT". FLEXIBLE DUCT RUNS SHALL BE A MAXIMUM OF 10 FEET IN LENGTH AND SHALL BE TYPE 5M-INSULATED AS MANUFACTURED BY FLEXMASTER USA, INC. WITH A MINIMUM R-VALUE OF SIX
- . VENT AND COMBUSTION PIPING FOR HIGH— EFFICIENCY (CATEGORY IV) CONDENSING TYPE GAS-FIRED FURNACE SHALL BE SCHEDULE 40 PVC. ASTM D1785. VENT SHALL BE COMPLETE WITH MANUFACTURER'S CONCENTRIC TERMINATION OR SEPARATE INTAKE/EXHAUST PER MANUFACTURER'S INSTRUCTIONS. INTAKE AND GAS VENTS SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND ALL GOVERNING CODES INCLUDING NFPA 54.
- D. VENTING FOR GAS-FIRED INFRARED HEATERS SHALL BE SINGLE-WALL, GAS-TIGHT (POSITIVE PRESSURE RATED) 4-INCH PIPING, WITH OVERLAPPING/CLAMPED CONNECTIONS, OF AL29-4C

- CONSTRUCTION, EQUAL TO "FASNSEAL". WHERE COMBUSTION VENTING PENETRATES A BUILDING WALL/ROOF ASSEMBLY. SUCH VENTING SHALL BE DOUBLE WALL TYPE "B" GAS VENT AS MANUFACTURED BY SELKIRK METALBESTOS OR APPROVED EQUAL WITH TYPE 430 STAINLESS STEEL INNER LINER AND ALUMINIZED STEEL OUTER JACKET. VENT SHALL BE COMPLETE WITH VENTILATED ROOF/WALL THIMBLE, WEATHER HOOD FLASHING AND BIRD PROOF VENT CAP. GAS VENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND ALL GOVERNING CODE REQUIREMENTS, INCLUDING NFPA 54.
- . CONTROL DAMPERS SHALL BE INSULATED AIRFOIL TYPE WITH NEOPRENE EDGE SEALS, CLASS 1A, EQUAL TO RUSKIN MODEL TED50. DAMPER ACTUATORS SHALL BE TWO-POSITION, POWER-OPEN, SPRING-CLOSE, 120V, BY BELIMO MODEL TFB120 OR APPROVED EQUAL.
- 1.23 FIRE DAMPERS SHALL BE AS MANUFACTURED BY AIR BALANCE INC. OR APPROVED EQUAL. FIRE DAMPERS SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS, SHALL PROVIDE THE REQUIRED FIRE SEPARATION AND SHALL BE INSTALLED IN ACCORDANCE WITH UL REQUIREMENTS.
- 1.24 GAS-FIRED FURNACES
- A. GAS-FIRED FURNACES SHALL BE CONDENSING HIGH EFFICIENCY TYPE (CAT IV), WITH A MINIMAL THEMRAL EFFICIENCY FO 91% AFUE, AGA CERTIFIED, AND SHALL BE COMPLETE WITH ELECTRONIC IGNITION, REDUNDANT GAS VALVE, GAS CONTROLS (2 FIRING STAGES), FLUE OUTLET, BURNER BLOWER, INTERNAL SAFTIES, AND FIELD-FURNISHED ILTERS (MERV 8). FURNACE SHALL HAVE CAPACITY INDICATED ON THE DRAWINGS AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. GAS FURNACES SHALL BE BY TRANE, OR APPROVED
- 1.25 COOLING COIL AND CONDENSING UNIT
- A. COOLING COIL AND ASSOCIATED AIR—COOLED CONDENSING UNIT SHALL BE MATCHED COMPONENTS WITH COMBINATION CAPACITIES AS INDICATED ON THE DRAWINGS. COOLING COIL SHALL BE ENCASED WITH INTERNAL DRAIN PAN AND EXTERNAL REFRIGERANT LINE AND CONDENSATE DRAIN CONNECTIONS. COILS SHALL BE RIGIDLY SUPPORTED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, AND BE COMPATIBLE WITH THE FURNACE SECTION TO WHICH THEY ARE ATTACHED. AIR—COOLED CONDENSING UNIT SHALL BE UL LISTED AND ARI CERTIFIED AND SHALL BE COMPLETE WITH SCROLL COMPRESSOR, PROPELLER CONDENSING FAN, FILTER DRIER, AND LIQUID LINE SOLENOID VALVE.
- 1.26 ELECTRIC WALL HEATERS
- A. WALL HEATERS SHALL BE SELF-CONTAINED, UL-LISTED ASSEMBLIES FURNISHED WITH BLOWER FAN, ELECTRIC-RESISTANCE HEATING ELEMENT(S), INTEGRAL DISCONNECT, CONTROL TRANSFORMER, AND INTEGRAL THERMOSTAT. HEATING ELEMENTS SHALL BE 80/20 NICKEL/CHROME, RATED FOR THE VOLTAGE INDICATED. HEATERS SHALL BE SUITABLE FOR SURFACE-MOUNTING ON WALL.
- 1.27 INFRARED TUBE HEATERS
- A. PROVIDE DETROIT RADIANT PRODUCTS COMPANY: RE-VERBER-RAY HL3 SERIES. BURNER SHALL BE DESIGNED FOR NATURAL GAS HAVING CHARACTERISTICS SAME AS THOSE OF GAS AVAILABLE AT PROJECT SITE. OPERATION SHALL INCLUDE A DEFINED INPUT DIFFERENTIAL. HEATER MUST BE UL/NFPA 54 DESIGN CERTIFIED TO OPERATE AT AN INPUT DIFFERENTIAL OF AT LEAST 30% BETWEEN THE LOW AND NOMINAL RATED INPUT MODES. COMBUSTION CHAMBER SHALL BE 4 INCH O.D. 16 GA. TITANIUM STABILIZED ALUMINIZED STEEL (150-200MBH TO ALLOW FOR THE OPERATING TEMPERATURE TO EXCEED THE 1030F AS SET FORTH IN THE ANSI Z83.20 STANDARD) OR ALUMINIZED STEEL (BELOW 150 MBH), FINISHED WITH A HIGH EMISSIVITY RATED, CORROSION RESISTANT, BLACK COATING WITH AN EMISSIVITY LEVEL DOCUMENTED AT .92 OR HIGHER. EMITTER TUBE SHALL BE 4 INCH O.D. 16 GA. ALUMINIZED STEEL FINISHED WITH A HIGH EMISSIVITY RATED, CORROSION RESISTANT, BLACK COATING WITH AN EMISSIVITY LEVEL DOCUMENTED AT .92 OR HIGHER. BURNER SHALL BE A POSITIVE PRESSURE POWER BURNER WITH A COMBUSTION FAN UPSTRFAM OF THE BURNER AND FXHAUST GASES FOR COMPONENT LONGEVITY, MAXIMUM COMBUSTION EFFICIENCY, AND ENERGY TRANSFER. NEGATIVE PRESSURE (PULL THROUGH) TYPE APPLIANCES WILL NOT BE ALLOWED. FAN ENCLOSURE: COMBUSTION FAN SHALL BE TOTALLY HOUSED INSIDE BURNER CONTROL BOX AND NOT EXPOSED. APPLIANCES WITH EXPOSED COMBUSTION/EXHAUSTER FANS SHALL NOT BE PERMITTED. BURNER SHALL BE STAINLESS-STEEL VENTURI TYPE. THE FLAME ANCHORING SCREEN SHALL HAVE A MINIMUM TEMPERATURE RATING EQUIVALENT TO 304 GRADE STAINLESS STEEL. NON STAINLESS STEEL BURNERS SHALL NOT BE PERMITTED. THE HEATER'S COMBUSTION CHAMBER AND RADIANT EMITTER TUBE SHALL INCORPORATE A 4-INCH SLIP-FIT, INTERLOCKING CONNECTION IN WHICH THE UPSTREAM TUBE SLIDES INTO THE NEXT TUBE AND IS HELD BY A BOLTED CLAMP. A BUTTED TUBE CONNECTION SYSTEM SHALL NOT BE PERMITTED. IGNITION SYSTEM: HOT SURFACE SILICON CARBIDE CAPABLE OF TEMPERATURES ACHIEVING 2400 F; IGNITOR SHALL BE READILY ACCESSIBLE AND SERVICEABLE WITHOUT THE USE OF TOOLS. SPARK IGNITION SYSTEMS SHALL not be permitted.
- B. REFLECTORS: SHALL BE .025 POLISHED ALUMINUM WITH A MULTI-FACETED DESIGN WHICH INCLUDES REFLECTOR END CAPS. REFLECTOR SHALL HAVE A POLISHED BRIGHT FINISH WITH CLEAR VISUAL REFLECTION ABILITY. REFLECTOR SHALL HAVE A MINIMUM OF 7 SHEET METAL BENDS IN ITS FABRICATION TO OPTIMIZE DOWNWARD RADIATION. REFLECTORS SHALL BE ROTATABLE FROM 0 TO 45 DEGREES WHEN REQUIRED. THE HEATER'S REFLECTOR HANGING SYSTEM SHALL BE DESIGNED TO PERMIT EXPANSION WHILE MINIMIZING NOISE AND/OR RATTLES. REFLECTOR FOR WASH BAY AREA SHALL BE 304 STAINLESS STEEL.
- C. CONTROL BOX: HEATER'S EXTERIOR CONTROL CHASSIS SHALL BE CONSTRUCTED OF CORROSION RESISTANT ENAMELED STEEL. THE HEATER'S TOP COVER SHALL BE CONSTRUCTED OF ABS PLASTIC MATERIAL. AN AIR INTAKE COLLAR SHALL BE SUPPLIED AS PART OF THE BURNER CONTROL ASSEMBLY TO ACCEPT A 4 INCH O.D. SUPPLY DUCT. THE HEATER'S CONTROL COMPARTMENT SHALL BE ACCESSIBLE WITHOUT THE USE OF TOOLS AND SERVICEABLE WHILE HEATER IS OPERATING. CONTROL BOX FOR WASH BAY AREA SHALL BE 304 STAINLESS STEEL.
- D. HEATERS SHALL BE EQUIPPED WITH A SIGHT GLASS ALLOWING A VISUAL INSPECTION OF IGNITOR AND BURNER OPERATION FROM THE FLOOR. SIGHT GLASS VISIBLE ONLY AT AN APPLIANCE LEVEL SHALL NOT BE PERMITTED. THE HEATERS SHALL USE A DOWNSTREAM TURBULATOR BAFFLE FOR MAXIMUM HEAT TRANSFER. HEATER SHALL BE SUPPLIED WITH A STAINLESS STEEL FLEXIBLE GAS
- E. BURNER SAFETY CONTROLS: HEATER CONTROLS SHALL INCLUDE A SAFETY DIFFERENTIAL PRESSURE SWITCH TO MONITOR COMBUSTION AIR FLOW, AS TO PROVIDE COMPLETE BURNER SHUTDOWN DUE TO INSUFFICIENT COMBUSTION AIR OR FLUE BLOCKAGE. THE HEATER SHALL INCORPORATE A SELF-DIAGNOSTIC IGNITION MODULE, AND RECYCLE THE HEATER AFTER AN INADVERTENT SHUTDOWN. THE HEATER'S CONTROL SYSTEM SHALL BE DESIGNED TO SHUT OFF THE GAS FLOW TO THE MAIN BURNER IN THE EVENT EITHER A GAS SUPPLY OR POWER SUPPLY INTERRUPTION OCCURS. THE HEATER'S BLOWER MOTOR SHALL BE THERMALLY PROTECTED AND THE MOTOR'S IMPELLER SHALL BE BALANCED. HEATER CONTROL ASSEMBLY SHALL INCLUDE THREE INDICATOR LIGHTS THAT DEFINE THE UNITS OPERATING INPUT RANGES. ONE INDICATOR SHALL VALIDATE AIR FLOW. TWO INDICATOR LIGHTS SHALL INDICATE LOW AND HIGH STAGES. THE HEATER'S AIR FLOW CONTROL SYSTEM SHALL PROVIDE A 45 SECOND PRE-PURGE PRIOR TO INITIATING BURNER OPERATION AND A 90 SECOND POST-PURGE UPON COMPLETION, EFFECTIVELY REMOVING ALL PRODUCTS OF COMBUSTION FROM HEAT EXCHANGER AND/OR RADIANT TUBES. NO CONDENSATION SHALL FORM AS A RESULT OF COMBUSTION IN THE COMBUSTION CHAMBER OR RADIANT TUBES WHILE AT OPERATING TEMPERATURES. THERMOSTAT CONTROL SHALL BE
- TWO-STAGE OPERATING ON 24 VOLTS. F. VENTING SHALL BE PER MANUFACTURER APPROVAL AND SPECIFICATIONS.
- G. THERMOSTAT: 2-STAGE, 24V, DIGITAL PROGRAMMABLE WALL-MOUNTING TYPE WITH 50 TO 90 DEG F (10 TO 32 DEG C) OPERATING RANGE, WITH THERMOSTAT GUARD FOR MOUNTING TO JUNCTION BOX. CONTROL TRANSFORMER SHALL BE INTEGRALLY MOUNTED. THERMOSTAT SHALL BE DETROIT RADIANT PRODUCTS CO. MODEL TH-BR52 OR APPROVED EQUAL.
- 1.27B GAS-FIRED UNIT HEATERS
- A. GAS-FIRED HEATERS SHALL BE A SINGLE PACKAGED ASSEMBLY FROM THE MANUFACTURER BEARING UL, ETA, AND AGA LISTINGS. HEATERS SHALL BE NATURAL GAS FIRED, AND SHALL HAVE PROVISIONS FOR DIRECT-VENTING OF COMBUSTION AIR AND FLUE PRODUCTS. COMPLETE WITH ROOF THIMBLE, RAIN COLLAR, AND VENT CAP. HEATERS SHALL BE AVAILABLE WITH A MANUFACTURER-FURNISHED CONCENTRIC VENTING KIT. AND REMOTE LOW-VOLTAGE THERMOSTAT. HEATERS SHALL BE SINGLE-STAGE, AND BE 120V WITH INTEGRAL CONTROL TRANSFORMER,

MINIMUM 80% AFUE EFFICIENCY, AND COME WITH GAS VALVE, PROPELLER TYPE FAN, ALUMINIZED

- STEEL TUBE TYPE HEAT EXCHANGER, POWDER-COATED ENAMEL HOUSING, AND STAINLESS STEEL DISCHARGE LOUVERS.
- A. IN-LINE FANS SHALL BE AS MANUFACTURED BY PENN-BARRY OR APPROVED EQUAL. FANS
- SHALL BE IN-LINE TYPE EQUIPPED WITH BACKDRAFT DAMPER ON OUTLET AND INLET GRILLE WHERE INDICATED. FAN SHALL HAVE MODEL NUMBER AND CAPACITIES INDICATED ON THE
- B. SIDE WALL PROPELLER FANS SHALL BE AS MANUFACTURED BY PENN-BARRY OR APPROVED EQUAL. FAN SHALL BE EQUIPPED WITH OSHA APPROVED MOTOR GUARD AND WALL SLEEVE. FANS SHALL BE BELT OR DIRECT DRIVE AS INDICATED ON THE DRAWING SCHEDULE. FANS SHALL BE CONTROLLED BY A THERMOSTAT (WHERE INDICATED) AND SHALL HAVE THE CAPACITIES INDICATED ON THE DRAWING SCHEDULE.
- . CEILING FANS: HIGH-VOLUME, LOW-SPEED FANS SHALL BE AS MANUFACTURED BY GREENHECK CORP. OR APPROVED EQUAL. FANS SHALL BE DIRECT—DRIVE AND EQUIPPED WITH INTEGRAL UL-LISTED VARIABLE-FREQUENCY DRIVE (ONE PER FAN), NEMA-3R DISCONNECT SWITCH, AND COMMUNICATION INTERFACE CONNECTORS FOR USE WITH REMOTE KEYPAD. FANS SHALL ALSO BE PROVIDED WITH THE FOLLOWING: STANDARD MILL FINISH, Z-PURLIN MOUNTING KIT, 5-FOOT DROP TUBE LENGTH, POWER WIRING PIGTAIL 910 FT WITH PRE-WIRED PLUG), INTERNAL COMMUNICATION WIRING, CAT-5e CONNECTOR CABLES FIRE ALARM RELAY AND PIGTAIL WIRING 96 FT), SAFETY CABLE AND GUY WIRES/BRACES WITH ASSOCIATED HARDWARE, 1-YEAR ELECTRICAL PARTS WARRANTY, AND 10-YEAR MECHANICAL PARTS WARRANTY.
- 1.29 GAS DETECTION EQUIPMENT
- A. GAS DETECTION EQUIPMENT: PROVIDE A COMPLETE DEDICATED GAS DETECTION SYSTEM FOR THE INDOOR SHOP/MAINTENANCE AREA. SYSTEM SHALL INCLUDE A CENTRAL 24V DC CONTROLLER TO MONITOR GAS SENSORS IN EACH AREA, CARBON-MONOXIDE (CO) SENSORS, NITROGEN-DIOXIDE (NO2) SENSORS, MOUNTING HARDWARE, SHIELDED LOW-VOLTAGE WIRING, CONDUIT, ALARM STROBE, ETC. CONTROLLER SHALL BE CAPABLE OF ACCOMMODATING A MINIMUM OF EIGHT EXTERNAL SENSORS, WHICH SHALL BE POWERED FROM THE CENTRAL CONTROLLER. THE CONTROLLER SHALL HAVE A MINIMUM OF TWO FUSED DRY CONTACT CLOSURES RATED AT 4 AMPS EACH TO SELECTIVELY CLOSE UPON DETECTION IN A GIVEN ZONE (ASSIGNED AT TIME OF SET-UP). CONTROLLER SHALL HAVE A GRAPHICAL LCD DISPLAY WITH LED BACK LIGHT, NEMA 4X ENCLOSURE, AND COME WITH A 1-YEAR WARRANTY. Basis—of—design is rki model "beacon 800" or approved equal. Co sensors shall be OF THE CATALYTIC-BEAD TYPE WITH MAGNETIC SWITCHES FOR NON-INTRUSIVE CALIBRATION, AND BE LOW-VOLTAGE DC POWERED, WITH TWO INDIVIDUALLY CONFIGURABLE ALARMS, FRONT PANEL LED INDICATORS, WITH 4-20mA OUTPUT OPTIONS. BASIS-OF-DESIGN IS RKI MODEL T3A OR APPROVED EQUAL. NO2 SENSORS SHALL BE OF THE ELECTRO-MECHANICAL TYPE, AND BE LOW-VOLTAGE DC POWERED. WITH TWO INDIVIDUALLY CONFIGURABLE ALARMS, FRONT PANEL LED INDICATORS, WITH 4-20mA OUTPUT OPTIONS. BASIS-OF-DESIGN IS RKI MODEL S2 OR APPROVED EQUAL. STROBES SHALL BE RKI MODEL 51-0098-RED, OR APPROVED EQUAL. THE SYSTEM AND ITS COMPONENTS ARE NOT REQUIRED TO BE EXPLOSION-PROOF. PROVIDE ALL INTER-CONNECTING LOW-VOLTAGE WIRING SIZED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS FOR TOTAL LENGTH. WIRING SHALL BE SHIELDED, AND INSTALLED IN METALLIC CONDUIT.
- 1.30 DIFFUSERS, REGISTERS AND GRILLES
- A. SUPPLY AIR DIFFUSERS SHALL BE COMPLETE WITH WHITE ENAMEL FINISH OR APPROVED EQUAL. DIFFUSERS SHALL BE AS MANUFACTURED BY TITUS, KREUGER, PRICE, OR APPROVED EQUAL, WITH SIZES AND MODEL NUMBERS AS SCHEDULED.
- B. RETURN AIR GRILLES SHALL BE COMPLETE WITH WHITE ENAMEL FINISH. GRILLES SHALL BE AS MANUFACTURED BY TITUS OR APPROVED EQUAL WITH SIZES AND MODEL NUMBERS AS
- A. LOUVERS NOT SPECIFIED WITH EQUIPMENT SHALL HAVE 0.08-INCH THICK FOUR-INCH DEEP ALUMINUM CHANNEL FRAME, WITH 0.08-INCH THICK DRAINABLE ALUMINUM STORM BLADES AT 45 DEGREES WITH A FINISH/COLOR AS DIRECTED BY THE OWNER'S REPRESENTATIVE. LOUVERS SHALL BE COMPLETE WITH INTEGRAL SLOPING SILL AND HEAD, INSTALLATION FLANGE, AND AN ALUMINUM 1/2-INCH MESH BIRD SCREEN. LOUVERS SHALL BE OF THE SIZES INDICATED ON THE DRAWINGS AND SHALL BE BY GREENHECK OR APPROVED EQUAL.
- A. REFRIGERANT PIPING SHALL BE SEAMLESS TYPE "ACR" COPPER ASTM B-88 AND SHALL BE INSULATED WITH 3/4 INCH THICK JOHNS-MANVILLE AEROTUBE OR EQUAL. REFRIGERANT LINE SIZES BETWEEN INDOOR COIL AND OUTDOOR COMPRESSOR UNIT SHALL BE SIZED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR CAPACITIES REQUIRED AND ACTUAL PIPE LENGTHS AND FITTINGS TO BE INSTALLED. INSULATED OUTDOOR REFRIGERANT PIPING SHALL BE PROVIDED WITH PVC JACKETING.
- B. THE CONTRACTOR SHALL PROVIDE A TRAPPED TYPE "L" COPPER CONDENSATE DRAIN LINE ON ALL COOLING COIL DRAIN PANS. SEE DETAIL ON DRAWING. ALL DRAIN LINES SHALL HAVE ADEQUATE CLEAN-OUT CONNECTIONS AND SHALL TERMINATE WHERE SHOWN ON THE DRAWINGS. SLOPE DRAIN LINES AT A MINIMUM OF 1/8"/FOOT. INSULATE PIPING WITH 1/2-INCH PRE-FORMED FIBERGLASS INSULATION WITH VAPOR BARRIER JACKETING, OR 1/2-INCH ELASTOMERIC INSULATION.
- 1.33 CONTROLS
- A. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY CONTROL COMPONENTS INCLUDING, BUT NOT LIMITED TO, RELAYS, AUTOMATIC DAMPERS, DAMPER OPERATORS, THERMOSTATS, CONTROLLERS, TIME CLOCKS, ETC. AND WIRING AS REQUIRED TO PROVIDE AUTOMATIC TEMPERATURE CONTROL. ALL WIRING SHALL BE DONE IN ACCORDANCE WITH THE LOCAL AND STATE CODES AND THE NATIONAL ELECTRICAL CODE. ALL CONTROL WIRING SHALL BE INSTALLED IN METALLIC CONDUIT WHERE EXPOSED, AND SHALL BE PLENUM-RATED WHERE
- B. THERMOSTATS FOR SPLIT SYSTEMS (COOLING COIL, AND ASSOCIATED CONDENSING UNIT), SHALL BE HONEYWELL VISIONPRO 8000 TB8220 SERIES WITH SEVEN-DAY PROGRAMMING FOR NIGHT SETBACK OR APPROVED EQUAL. THERMOSTAT SHALL BE MOUNTED 60 INCHES AFF. THERMOSTATS FOR INFRARED HEATERS SHALL BE AS SPECIFIED UNDER THOSE EQUIPMENT SECTIONS. THERMOSTATS CONTROLLING EXHAUST FANS SHALL BE COOLING-ONLY, 24V, WITH A MINIMUM ADJUSTMENT RANGE FROM 50F TO 90F.
- C. A TIME CLOCK SHALL BE PROVIDED IN THE NEW BUILDING MEZZANINE LEVEL, TO PROVIDE AUXILIARY CONTROL OF THE OUTSIDE AIR DAMPER FOR AC-1 AND EF-1 EXHAUST SYSTEM.
- 1.34 SEQUENCE OF OPERATIONS

A. EXHAUST FANS:

1. EF-1: TIME CLOCK SHALL START EF-1 AT THE BEGINNING OF THE OCCUPIED PERIOD. AND SHALL DE-ENERGIZE FAN AT THE END OF THE OCCUPIED PERIOD. CONTRACTOR

SHALL ADJUST TIMER FOR OCCUPIED PERIODS IN ACCORDANCE WITH OWNER'S DIRECTION.

- 2. EF-3: HIGH-RATE PURGE VENTILATION NEW MECHANICS SHOP: EITHER OF TWO INPUTS TO THE FAN MOTOR STARTER SHALL START THE FAN: 1. UPON DETECTION OF HIGH LEVELS OF EITHER CARBON-MONOXIDE (CO) OR NITROGEN-DIOXIDE (NO2) BY THE RESPECTIVE GAS SENSORS IN THE SPACE, THE GAS DETECTION SYSTEM CONTROLLER SHALL OPEN EF-3 DISCHARGE DAMPER AND START EXHAUST FAN EF-3 (VIA DRY CONTACT CLOSURE TO THE FAN STARTER), AND OPEN THE ASSOCIATED INTAKE DAMPER WIDE OPEN. WHEN SPACE CO/NO2 LEVELS SUBSEQUENTLY FALL TO ACCEPTABLE SETPOINT LEVELS. THE FAN SHALL DE-ENERGIZE. THE DISCHARGE DAMPER SHALL CLOSE AND THE INTAKE DAMPER SHALL CLOSE. 2. UPON THE SPACE DRY BULB TEMPERATURE RISING TO 80 DEG F (ADJUSTABLE) AS DETERMINED BY THE DEDICATED SPACE THERMOSTAT, THE FAN STARTER, VIA DRY CONTACT CLOSURE, SHALL OPEN EF-3 DISCHARGE DAMPER AND START EXHAUST FAN EF-3, AND OPEN THE ASSOCIATED INTAKE DAMPER WIDE OPEN. UPON A SUBSEQUENT FALL IN SPACE TEMPERATURE TO 75 DEG F (ADJUSTABLE). THE REVERSE SHALL OCCUR. OCCUPANT SHALL ALSO HAVE THE ABILITY TO TEMPORARILY MANUALLY LOWER THE THERMOSTATIC SETPOINT TO FORCE THE STARTING of the fan when desired.
- 3. EF-2: SERVING NEW MECHANICS SHOP: FAN SHALL OPERATE CONTINUOUSLY TO PROVIDE MINIMUM EXHAUST REQUIREMENTS.

- 4. EF-4: WASH BAY EXHAUST: FAN SHALL BE PROVIDED WITH A MANUAL TIMED START SWITCH. USER SHALL ADJUST LINE-VOLTAGE TIMER SWITCH TO DESIRED LENGTH OF TIME. UPON BEING STARTED AT THE WALL SWITCH, THE MOTORIZED INTAKE DAMPERS SHALL OPEN, THE FAN DISCHARGE DAMPERS SHALL OPEN, AND THE FAN SHALL START. UPON SUBSEQUENTLY BEING SWITCHED TO THE "OFF" POSITION AT THE WALL SWITCH, OR
- 5. EF-5: EXISTING BUILDING EXHAUST: FAN SHALL OPERATE CONTINUOUSLY TO PROVIDE MINIMUM VENTILATION REQUIREMENTS.

UPON THE PRESET TIME EXPIRING, THE REVERSE SHALL OCCUR.

- 6. CF-1/2: CEILING FANS SERVING MECHANICS SHOP: FANS ARE VFD-DRIVEN, AND BOTH SHALL OPERATE IN UNISON AT THE SAME SPEED. THE FANS SHALL BE CONTROLLED VIA A MANUFACTURER-SUPPLIED WALL INTERFACE/KEYPAD. FAN ENERGIZING/DE-ENERGIZING, ROTATION DIRECTION, AND SPEED SELECTION SHALL BE MANUAL, AS ENTERED AT HE KEYPAD. CONTRACTOR SHALL INSTALL ALL CONTROL DEVICES, AND ALL NECESSARY INTERFACING CABLES (CAT-5e) FROM FAN-TO-FAN, AND FROM FANS TO FIRE ALARM PANEL. UPON RECEIVING A WATER FLOW ALARM FROM THE FIRE ALARM PANEL, THE
- B. SPLIT SYSTEMS (AC-1/CU-1):

CEILING FANS SHALL DE-ENERGIZE.

- 1. INDIVIDUAL SYSTEM PROGRAMMABLE THERMOSTATS SHALL BE PROGRAMMED WITH OCCUPIED AND UNOCCUPIED PERIODS AND CORRESPONDING TEMPERATURE SETPOINTS (COORDINATE WITH OWNER FOR SETTINGS).
- 2. AC-1/AC-2: UPON THE START OF THE OCCUPIED PERIOD, THE SUPPLY FAN SHALL START AND RUN CONTINUOUSLY, AND THE OUTSIDE AIR DAMPER SHALL OPEN (VIA TIME CLOCK - DAMPER REMAINS CLOSED DURING UNOCCUPIED PERIODS). DURING UNOCCUPIED PERIODS, THE SUPPLY FAN OF AC-1 SHALL CYCLE WITH A CALL FOR
- 3. HEATING: IF THE RESPECTIVE SPACE TEMPERATURE FALLS BELOW SETPOINT, THE RESPECTIVE SYSTEM'S GAS FURNACE SHALL FIRE IN STAGES, AS PRESCRIBED BY THE MANUFACTURER'S FIRING CONTROLS, TO MAINTAIN SPACE HEATING TEMPERATURE SETPOINT.
- 4. COOLING: UPON A RISE IN SPACE TEMPERATURE ABOVE SETPOINT, THE UNIT CONTROLLER SHALL ENGAGE THE ASSOCIATED CONDENSING UNIT TO PROVIDE COOLING AS REQUIRED TO MAINTAIN SPACE COOLING SETPOINT.
- C. ELECTRIC WALL HEATERS (CUH):
- 1. WALL HEATERS SHALL OPERATE UNDER THEIR INTEGRAL CONTROLS AND INTEGRAL THERMOSTAT TO MAINTAIN SPACE HEATING TEMPERATURE SETPOINT. INITIAL HEATING TEMPERATURE SETPOINTS SHALL BE SET AT 68 DEG F, ADJUSTABLE.
- D. INFRARED GAS-FIRED TUBE HEATERS (IH):
 - GAS-FIRED HEATERS ARE FURNISHED WITH FACTORY 7-DAY PROGRAMMABLE THERMOSTAT, ONE PER HEATER. CONTRACTOR SHALL PROGRAM EACH THERMOSTAT WITH THE OCCUPIED AND UNOCCUPIED HOURS AND CORRESPONDING TEMPERATURE SETPOINTS. COORDINATE WITH OWNER. UPON A CALL FOR HEAT FROM THE SPACE THERMOSTAT, THE UNIT'S INTEGRAL FIRING CONTROLS SHALL FIRE ONE OR BOTH STAGES OF CAPACITY AS
- E. GAS DETECTION EQUIPMENT:
- 1. THE CONTRACTOR SHALL WIRE ALL GAS DETECTION CONTROLLERS AND SENSORS AS INDICATED ON PLANS AND WITHIN THESE SPECIFICATIONS REFER ALSO TO EXHAUST FAN SEQUENCES OF OPERATION. UPON DETECTION OF EITHER NITROGEN—DIOXIDE OR CARBON MONOXIDE ABOVE THE PREDETERMINED MAXIMUM PPM LEVEL, THE DRY CONTACTS WITHIN THE CONTROLLER OF THE AFFECTED SPACE SHALL CLOSE, AND INITIATE THE RESPONSIVE EXHAUST ACTION DESCRIBED. ALL HIGH LEVEL ALARM EVENTS SHALL BE RECORDED IN THE CONTROLLER'S MEMORY, INCLUDING TIMES, SENSOR LOCATIONS, AND MAGNITUDE
- 1.35 THE EQUIPMENT AND MATERIALS SHALL BE COMPLETELY CLEANED PRIOR TO TESTING, INSULATING AND PLACING THE SYSTEM IN OPERATION.

REQUIRED TO MAINTAIN SPACE HEATING TEMPERATURE SETPOINT.

- 1.36 THE REFRIGERATION SYSTEM SHALL BE TESTED AND PROVEN TIGHT PRIOR TO PLACING IN OPERATION. UNITS SHALL BE CHECKED FOR PROPER REFRIGERANT CHARGE AND OPERATION AND ADJUSTED AS PER THE MANUFACTURER'S RECOMMENDATIONS.
- 1.37 SYSTEM BALANCING: THE COMPLETE SUPPLY, RETURN AND EXHAUST AIR DUCT SYSTEMS. INCLUDING FANS, DAMPERS, OUTLETS AND APPURTENANCES SHALL BE PROPERLY BALANCED TO DELIVER AIR VOLUMES WITHIN +/- 10 PERCENT OF THE VALUES INDICATED. THE TOTAL SYSTEM LEAKAGE THROUGH DUCT JOINTS AND CONNECTIONS SHALL NOT EXCEED THREE PERCENT. TEMPERATURE, AMPERE AND RPM READINGS SHALL ALSO BE PROVIDED TO VERIFY SYSTEM PERFORMANCE. SUBMIT THREE COPIES OF THE BALANCING REPORTS AT COMPLETION OF THE BALANCING.
- 1.38 THE CONTRACTOR SHALL FURNISH THREE SETS OF O&M AND INSTRUCTION MANUALS TO THE OWNER AT THE COMPLETION OF CONSTRUCTION.
- 1.39 START-UP: ALL EQUIPMENT AND MATERIALS SHALL BE COMPLETELY CLEANED PRIOR TO TESTING, INSULATING, AND PLACING THE SYSTEM IN OPERATION. REFRIGERATION SYSTEMS SHALL BE TESTED AND PROVEN TIGHT PRIOR TO PLACING IN OPERATION. UNITS SHALL BE CHECKED FOR PROPER REFRIGERANT CHARGE AND OPERATION AND ADJUSTED AS PER THE MANUFACTURER'S RECOMMENDATIONS. SPLIT SYSTEMS SHALL BE PROVIDED WITH NEW FILTERS PRIOR TO OWNER OCCUPATION.

-END OF MECHANICAL SPECIFICATIONS-

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ISSUED FOR BID JULY 19, 2023 NOT FOR CONSTRUCTION

SAS JCM AS NOTE DRAWING NO.

					PLUMBIN	G FIXTURE	E PIPING SCHEDULE
REF NO	FIXTURE	CW (IN)	HW (IN)	SAN (IN)	TRAP (IN)	VENT (IN)	REMARKS
P-1	WATER CLOSET	1/2		4		2	ADA ACCESSIBLE, PRESSURE-ASSISTED TANK TYPE, SEE NOTE 1
P-2	URINAL	3/4		2	2	1 1/4	ADA ACCESSIBLE, WALL MOUNT, BATTERY POWERED SENSOR OPERATED ACTIVATED ASSEMBLY FLUSHOMETER VAI
P-3	LAVATORY	1/2	1/2	2	1 1/2	1 1/4	ADA ACCESSIBLE, UNDER MOUNT, COUNTER MOUNT MANUAL FAUCET ASSEMBLY, SEE NOTES 2 & 3
P-4	HAND WASHFOUNTAIN	1/2	1/2	2	1 1/2	1 1/4	ADA ACCESSIBLE, WALL MOUNT, INFRARED SENSOR-ACTIVATED CONVECTIONAL FAUCETS
P-5	SHOWER	1/2	1/2	2	2	1 1/4	ADA ACCESSIBLE, ONE PIECE TRANSFER SHOWER ENCLOSURE, PRESSURE BALANCE SHOWER VALVE
P-6	SINK	1/2	1/2	2	1 1/2	1 1/4	COUNTER MOUNT. MANUAL FAUCET ASSEMBLY SEE NOTE 3
P-7	HOSE BIBB	3/4					WALL MOUNT, RECESSED HOSE BOX WITH LOCKABLE COVER
P-8	WATER COOLER	1/2		2	1 1/4	1 1/4	ADA ACCESSIBLE, WALL MOUNT, BI-LEVEL, FRONT PUSHBUTTON
P-9	EMERGENCY EYEWASH	1/2*	1/2*				*TEPID WATER SUPPLY, SEE NOTE 4
P-10	MOP SERVICE BASIN	1/2	1/2	3	3	2	FLOOR MOUNT, WALL MOUNT MANUAL FAUCET ASSEMBLY
OTEO	<u> </u>	•		•	•	•	

NOTES:

COORDINATE FLUSHING HANDLE LOCATION WITH WIDE SIDE OF TOILET ROOM OR STALL FOR EACH FIXTURE.
 COORDINATE COUNTER TOP ROUGH-IN HOLE REQUIREMENTS WITH THE GENERAL CONTRACTOR.
 MOUNT INDIVIDUAL THERMOSTATIC MIXING VALVE BELOW FIXTURE.

4. TEPID WATER SUPPLY FROM EMERGENCY TEMPERING VALVE ASSEMBLY.

SYM	FIXTURE	DESCRIPTION	SPECIFICATIONS
P-1	WATER CLOSET ADA	FLOOR MOUNT, BOTTOM OUTLET, ELONGATED BOWL, 12 " ROUGH-IN, HIGH EFFICIENCY, ULTRA LOW CONSUMPTION 1.1 GPF, 16-1/2 " RIM HEIGHT.	AMERICAN STANDARD CADET FLOWISE PRESSURE-ASSISTED SIPHON JET ACTION HIGH EFFICIENCY TANK TYPE TOILET, MODI 2467.100, WHITE VITREOUS CHINA WITH EVERCLEAN SURFACE CLOSE-COUPLED FLUSHOMETER TANK, SPEED CONNECT TANI COUPLING SYSYTEM AND 2 BOLT CAPS. COMMERCIAL HEAVY DUTY WHITE OPEN FRONT SEAT. PROVIDE FLEXIBLE SUPPLY WITH FLANGES AND LOOSE KEY STOP. SEE NOTE 1
P-2	URINAL ADA	WALL HUNG, 3/4 INCH INLET, TOP SPUD, LOW CONSUMPTION, HIGH EFFICIENCY, ULTRA LOW CONSUMPTION 0.125 GPF	AMERICAN STANDARD DECORUM HIGH EFFICIENCY URINAL SYSTEM, MODEL 6042.633, WHITE VITREOUS CHINA WITH EVERCLE SURFACE, MODERN DEEP SUMP DESIGN WASHOUT WITH STRAINER, 2" THREADED OUTLET CONNECTION AND EXPOSED BATTERY POWERED SELECTRONIC FLUSHOMETER VALVE. PROVIDE FIXTURE SUPPORT CONSTRUCTED OF CAST IF AND/OR STEEL AND COMPLETELY CONCEALED BEHIND THE FINISHED WALL SURFACE. SUPPORT SHALL BE COMPLETE WITH A FACEPLATE AND FLOOR ANCHORS. FIXTURE LOADING SHALL NOT BE ON THE WALL.
P-3	LAVATORY ADA	UNDER-MOUNT RECTANGULAR BASIN , 20-1/4" X 15-11/16" X 7-5/16" OVERALL DIMENSIONS CENTER DRAIN AND FRONT OVERFLOW	KOHLER CAXTON MODEL K-20000, WHITE VITREOUS, NO FAUCET HOLES REQUIRES COUNTER - MOUNT FAUCET. KOHLER KUMIN MODEL K-98827-4, MANUAL SINGLE HANDLE FAUCET FAUCET, CERAMIC DISK VALVES, HIGH-TEMPERATURE LIN SETTING AND POP-UP DRAIN WITH 1-1/4" TAIL PIECE. PROVIDE P-TRAP, FLEXIBLE SUPPLIES WITH WALL FLANGES AND LOOSE I STOPS. SEE NOTE 2
P-4	HAND WASHFOUNTAIN ADA	WALL MOUNT, STAINLESS STEEL, 36" SEMI-CIRCULAR, INFRARED.	BRADLEY MODEL SN2023, ACCOMMODATES 3 USERS AT ONE TIME, SECTIONAL SPRAYHEAD MODULE IS CONTROLLED BY INFESSION SENSOR-ACTUATED SOLENOID. THERMOSTATIC MIXING VALVE AND FLOW RESTRICTOR KEEPS FLOW RATE CONSTANT 0.5 GP STATION.
P-5	SHOWER ADA	ONE-PIECE ENCLOSURE, PRE-LEVELED BASE, CENTER DRAIN, 3/4" SKIRT, NO THRESHOLD, EXTERIOR NOMINAL DIMENSIONS 38" X 38-1/4" X 77"	AQUATIC ACCESSIBLE TRANSFER SHOWER, MODEL 1363BFSC, WHITE ACRYLX APPLIED ACRYLIC SURFACE, SHALL BE FURNISH COMPLETE WITH GRAB BARS, FOLD-UP SEAT, PRESSURE BALANCE MIXING VALVE, HAND-HELD SHOWER ASSEMBLY WITH SLID CUTAIN ROD AND SHOWER CURTAIN.
P-6	SINK ADA	SINGLE BOWL UNDERMOUNT WITH 33 X 22 X 9" OVERALL DIMENSIONS AND REAR CENTER DRAIN	AMERICAN STANDARD EDGEWATER MODEL 18SB.9332211.075, 18 GAUGE 304 STAINLESS STEEL WITH A POLISHED SATIN FINISH HOLE, ZERO RADIUS CORNERS, FULL SPRAY SIDES AND BOTTOM SOUND PADS, BOTTOM AND STRAINER. PROVIDE MOUNTING HARDWARE. MOEN ARBOR MODEL 7594, PULL-DOWN KITCHEN FAUCET ASSEMBLY, HIGH-ARCH-SPOUT WITH THREE-FUNCTION PULL-DOWN SPRAY, SINGLE HANDLE DURALAST CARTRIDGE, 1.5 GPM MAXIMUM FLOW RATE. P-TRAP ASSEMBLY, FLEXIBLE SUF WITH WALL FLANGES AND LOOSE KEY STOPS. SEE NOTE 2.
P-7	HOSE BIBB	ROUGH BRASS FINISH	WOODFORD MODEL 24. ANTI-SIPHON FAUCET, 3/4 INCH HOSE CONNECTION WITH VACUUM BREAKER AND METAL HANDLE WHE
P-8	WATER COOLER ADA	WALL MOUNT, BI-LEVEL, STAINLESS STEEL	ELKAY MODEL LZSTL8SC. FILTERED REFRIGERATION UNIT WITH SELF-CLOSING EASY-TOUCH CONTROLS ON FRONT AND BOTH AND LEFT SIDES.
P-9	EMERGENCY EYEWASH	FREE STANDING PEDESTAL MOUNT	STAINLESS STEEL BOWL, SCHEDULE 40 GALVANIZED PIPE AND FITTINGS, 1/2 INCH U.S. MADE CHROME-PLATED BRASS STAY-O VALVE, POWDER-COATED CAST ALUMINUM FLAG HANDLE AND FLOOR FLANGE. UNIT SHALL HAVE (2) POLYPROPYLENE GS-PLU SPRAY HEADS WITH INTEGRAL "FLIP-TOP" DUST COVERS, FILTERS AND 1.6 GPM FLOW CONTROL ORIFICES MOUNTED ON A CHROME-PLATED BRASS EYEWASH ASSEMBLY. UNIT SHALL INCLUDE ANSI COMPLIANT SIGN. UNIT SHALL BE HYDROSTATICAL TESTED TO MEET OR EXCEED ANSI Z358.1 – 2014, AND COME WITH A FULL 2-YEAR WARRANTY; GUARDIAN EQUIPMENT G1825 CAPPROVED EQUAL. SEE NOTE 3
P-10	MOP SERVICE BASIN	FLOOR MOUNT, SERVICE BASIN, 24 X 24 X 10 INCH NOMINAL DIMENSIONS WITH 1 INCH WIDE SHOULDERS, STAINLESS STEEL BOTTOM OUTLET STRAINER.	FIAT PRODUCTS MOLDED STONE, MODEL MSB 2424 WITH MODEL MSG STAINLESS STEEL WALL GUARDS. T & S BRASS MODEL B-0655-BSTP WALL MOUNT SERVICE SINK FAUCET ASSEMBLY, 8 INCH CENTERS, LEVER HANDLES WITH CO CODED INDEXES, SPOUT WITH VACUUM BREAKER, PAIL HOOK AND 3/4 INCH HOSE CONNECTION, BUILT-IN SERVICE STOPS. 3 INCH DEEP SEAL TRAP

	PLUMBING DRAINAGE SPECIALTIES SCHEDULE				
REF NO	DESCRIPTION	SAN (IN)	TRAP (IN)	VENT (IN)	REMARKS
FCO	FLOOR CLEANOUT - SHALL BE JAY R. SMITH MFG. CO., SERIES 4220S, RATED FOR HEAVY LOAD TRAFFIC; ADJUSTABLE CLEANOUT WITH SCORIATED COVER	4			
FD1	FLOOR DRAIN - SHALL BE WADE, 1100-A5, CAST IRON DRAIN BODY WITH FLANGE, INTEGRAL CLAMPING COLLAR, SEEPAGE OPENINGS AND FIVE (5) INCH ROUND ADJUSTABLE SATIN FINISH NICKEL BRONZE TOP.	2	2	2	TOILET ROOMS & MECH SPACES SEE NOTE 1
FD2	FLOOR DRAIN - SHALL BE WADE, 1100-A5, CAST IRON DRAIN BODY WITH FLANGE, INTEGRAL CLAMPING COLLAR, SEEPAGE OPENINGS AND FIVE (5) INCH ROUND ADJUSTABLE SATIN FINISH NICKEL BRONZE TOP.	3	3	2	NEW BUILDING MEZZANINE SEE NOTE 1
FS	FLOOR SINK - SHALL BE ZURN MODEL Z-1901-33 A.R.E. SANI-FLOR RECEPTOR 12 X 12 X 8 INCH DEEP, CAST IRON BODY, MEDIMUM DUTY GRATE WITH SLOTS, WHITE ACID RESISTING PORCELAIN ENAMEL INTERIOR AND TOP, WHITE ACID RESISTANT COATED ANTI-SPLASH BOTTOM DOME STRAINER.	4	4	2	SEE NOTE 1 & 3
TD1	TRENCH DRAIN SYSTEM SHALL BE ZURN Z886 WITH 80" LONG CHANNELS, 6-1/4" WIDE REVEAL AND A 4" THROAT. MODULAR CHANNEL SECTIONS SHALL BE MADE OF 0% WATER ABSORBENT HIGH DENSITY POLYETHYLENE (HDPE). CHANNELS SHALL HAVE A POSITIVE MECHANICAL CONNECTION BETWEEN CHANNEL SECTIONS THAT WILL NOT SEPARATE DURING THE INSTALLATION AND MECHANICALLY LOCK INTO THE CONCRETE SURROUND A MINIMUM OF EVERY 10". CHANNELS WEIGH LESS THAN 2.31 LBS. PER LINEAR FOOT, HAVE A SMOOTH, 1-1/2" RADIUSED SELF CLEANING BOTTOM WITH A MANNING'S COEFFICIENT OF 0.009 AND .75% OR NEUTRAL 0% BUILT IN SLOPE. CHANNELS HAVE REBAR CLIPS STANDARD TO SECURE TRENCH IN ITS FINAL LOCATION. CHANNELS ARE PROVIDED WITH STANDARD DGC GRATES THAT LOCK DOWN WITH LOCKDOWN BARS TO THE CHANNEL AND IS NOT INTENDED FOR DYNAMIC TRAFFIC LOADINGS. ZURN 5-3/8" WIDE REVEAL DUCTILE IRON SLOTTED GRATE CONFORMING TO ASTM SPECIFICATION A536-84, GRADE 80-55-06. DUCTILE IRON GRATE IS RATED CLASS C PER THE DIN EN1433 TOP LOAD CLASSIFICATIONS. SUPPLIED IN 20" [508MM] NOMINAL LENGTHS WITH 1/2" WIDE SLOTS, AND 3/4" BEARING DEPTH. GRATE HAS AN OPEN AREA OF 28.1 SQ. IN PER FT.	4	4	2	NEW BUILDING GARAGE [104] SEE NOTE 2
TD2	TRENCH DRAIN SYSTEM SHALL BE ZURN MODEL Z874-12, 80" LONG CHANNELS, 17" WIDE REVEAL AND A 12" WIDE THROAT. MODULAR CHANNEL SECTIONS SHALL BE MADE OF 0% WATER ABSORBENT HIGH DENSITY POLYETHYLENE (HDPE). CHANNELS SHALL HAVE A POSITIVE MECHANICAL CONNECTION BETWEEN CHANNEL SECTIONS THAT WILL NOT SEPARATE DURING INSTALLATION AND SHALL MECHANICALLY LOCK INTO CONCRETE SURROUND A MINIMUM OF EVERY 10". CHANNELS SHALL WEIGH LESS THAN 6.6 LBS. PER LINEAR FOOT HAVE SMOOTH 3.5" RADIUSED SELF-CLEANING BOTTOM WITH A MANNING'S COEFFICIENT OF 0.009 AND 1.00% OR NEUTRAL 0% BUILT-IN SLOPE. CHANNELS SHALL HAVE ALL GRATES LOCKED DOWN. CHANNELS COME WITH CLIPS ATTACHED TO THE FRAME TO ACCOMMODATE VERTICAL RE-BAR FOR POSITIONING AND ANCHORING PURPOSES. SHALL BE PROVIDED WITH THE STANDARD DGC GRATE, ZURN 16-1/4" WIDE DUCTILE IRON SLOTTED GRATE, WHICH LOCKS DOWN TO THE FRAME WITH 4 INDIVIDUAL BOLT ANCHORS PER GRATE. DUCTILE IRON CONFORMS TO ASTM SPECIFICATION A536-84, GRADE 80-55-06. DUCTILE IRON GRATE IS RATED CLASS C PER THE DIN EN1433 TOP LOAD CLASSIFICATIONS. SUPPLIED IN 20" NOMINAL LENGTHS WITH 13/16" WIDE SLOTS, AND 1-3/4" BEARING DEPTH. GRATE HAS AN OPEN AREA OF 118 SQ. IN. PER FT. THE 1/4" THICK CARBON STEEL FRAME ASSEMBLY CONFORMS TO ASTM SPECIFICATION A36 WITH 10 - 4" LONG CONCRETE ANCHORS PER 80". THE FRAME SHALL HAVE A POWDER COATED FINISH. ALL WELDS MUST BE PERFORMED BY A CERTIFIED WELDER PER ASTM STANDARD AWS D1.1. FRAMES SHALL BE PRODUCED IN THE USA.	4	4	2	NEW BUILDING WASH BAY [105] SEE NOTE 2

NOTES:
1. PROVIDE WITH BARRIER TYPE FLOOR DRAIN TRAP SEAL PROTECTION DEVICE COMPLYING WITH ASSE 1072.

1.COORDINATE FIXTURE FLUSHING HANDLE LOCATION WITH WIDE SIDE OF TOILET ROOM OR STALL FOR EACH FIXTURE.

3.PROVIDE EMERGENCY TEMPERING VALVE ASSEMBLY WHICH COMPLIES WITH ASSE 1071 AND ANSI Z358.1 FOR TEPID WATER SUPPLY TO COMBINATION SHOWER AND EYE/FACE WASH UNIT.

2. PROVIDE INDIVIDUAL THERMOSTATIC MIXING VALVE WHICH COMPLIES WITH ASSE 1070.

2. SUBMIT MANUFACTURERS' LAYOUT PLAN FOR EACH TRENCH DRAIN SYSTEM SHOWING OVERALL LENGTH, CATCH BASIN/OULET LOCATIONS AND

LISTING OF ALL UNITS BEING FURNISHED. COORDINATE EACH TRENCH SYSTEM FINAL OVERALL LENGTH AND CATCH BASIN/OUTLET LOCATIONS WITH THE ARCHITECTURAL DRAWINGS. PROVIDE (2) TWO TRENCH DRAIN SHOVELS FOR DRAIN CLEANOUT. PROVIDE (5) FIVE EXTRA TRENCH

GRATES. TURN GRATES OVER TO THE OWNER UPON PROJECT FINAL COMPLETION.

3. COORDINATE GRATE OPENING REQUIREMENT WITH INDIRECT DRAINS FROM ICE MACHINE.

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Project No.
230004

LEGEND A	<u>ND</u>	AB	<u>BRE</u>	VIA	<u> 1017</u>	1
	EXISTI	NG OR	WORK	BY	OTHERS	

WORK BY THIS CONTRACTOR

SANITARY PIPING (SAN)

---- SANITARY VENT PIPING (SV)

—— — — HOT WATER RECIRCULATING PIPING (HWR)

GAS PIPING (G)

PIPE TURNING DOWN

Q WATER HAMMER ARRESTOR (WHA)

BALL VALVE

CHECK VALVE

GATE VALVE

PRESSURE REDUCING VALVE (PRV)

TEMPERATURE & PRESSURE VALVE

THERMOSTATIC MIXING VALVE

GAS COCK

GAS COCK

THERMOMETER

, DD500/D5 0//05 W/ 000

PRESSURE GAUGE W/ COCK

CIRCULATING PUMP (INLINE TYPE)

FIXTURE REFERENCE NUMBER

METER

G GAS METER

DFU

& AND
ABV ABOVE
BLDG BUILDING
BLW BELOW
CLG CEILING
CO CLEANOUT
CONT CONTINUE
DF DRINKING FOUNTAIN

CONNECT TO EXISTING

DRAINAGE FIXTURE UNIT

DN DOWN
DWG DRAWING
ELEC ELECTRIC
EMERG EMERGENCY
EXG EXISTING
FAI FRESH AIR INLET
FCO FLOOR CLEANOUT

FLOOR DRAIN

FLOOR
GRADE CLEANOUT
HOSE BIBB
LAVATORY
THOUSAND BRITISH THERMAL UNIT
MOP SERVICE BASIN

MSB MOP SERVICE BASIN
RECIRC RECIRCULATION
SHWR SHOWER
TD TRENCH DRAIN
URI URINAL
VTR VENT THRU ROOF
WC WATER CLOSET

WALL CLEANOUT

EMERGENCY STATION DESIGN NOTES:

THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), 29 CFR 1910.151, REQUIRES THAT: "WHERE THE EYES OR BODY OF ANY PERSON MAY BE EXPOSED TO INJURIOUS CORROSIVE MATERIALS, SUITABLE FACILITIES FOR QUICK DRENCHING OR FLUSHING OF THE EYES AND BODY SHALL BE PROVIDED WITHIN THE WORK AREA FOR IMMEDIATE EMERGENCY USE." DEPARTMENT OF ENERGY (DOE) HEALTH AND SAFETY REGULATIONS, FOUND IN 10 CFR 851, FOLLOW MOST OSHA REGULATIONS. DOE HAS STATED "WHERE THIS INJURIOUS EXPOSURE OF CORROSIVE MATERIALS TO THE EYES OR BODY POTENTIAL EXISTS, THERE MUST BE AN EMERGENCY EYE WASH FACILITY THAT MEETS ANSI STANDARDS." EQUIPMENT DESIGN BASIS IS PER THE INTERNATIONAL PLUMBING CODE (IPC) SECTION 411, WHICH REQUIRES THE USE OF ANSI/ISEA Z358.1 COMPLIANT EQUIPMENT WHENEVER EYEWASH OR SHOWER EQUIPMENT IS NEEDED, AND THAT WASTE CONNECTIONS SHALL NOT BE REQUIRED FOR EMERGENCY SHOWERS AND EYEWASH STATIONS. DESIGN BASIS FOR EMERGENCY STATIONS IS EYE WASH STATION IN MECHANICS SHOP [105] AREA.

2. THE EYE WASH STATION EQUIPMENT SELECTION HAS CAPACITY TO DELIVER 0.4 GALLONS OF WATER PER MINUTE FOR 15 MINUTES AT A 100 DEGREE FAHRENHEIT TEMPERATURE RISE FOR A TEPID WATER SUPPLY TEMPERATURE OF 70 DEGREES FAHRENHEIT BASED ON A DOMESTIC WATER SUPPLY AMBIENT TEMPERATURE OF 40 DEGREE FAHRENHEIT.

3. THE OWNERS FACILITIES SAFETY REPRESENTATIVE AND OR INSURANCE CARRIER SHALL CONFIRM FINAL EMERGENCY EQUIPMENT TYPE(S), LOCATION(S) AND WATER DELIVERY TEMPERATURES MEET HAZARD ASSESSMENT AND OPERATIONAL REQUIREMENTS FOR HAZARDS MATERIALS ENCOUNTERED OR GENERATED IN WORK AREAS.

GENERAL NOTES:

- 1. ALL PLUMBING WORK SHALL CONFORM TO THE LATEST PLUMBING CODE OF THE BOROUGH OF WYOMISSING, PA AND SUBSEQUENT AMENDMENTS THERETO.
- 2. DRAWINGS ARE DIAGRAMMATIC. COORDINATE ALL FIXTURE LOCATIONS AND NEW PIPE ROUTING WITH EXISTING FIELD CONDITIONS, INCLUDING BUT NOT LIMITED TO EXISTING PLUMBING SYSTEMS PIPING, STRUCTURAL COMPONENTS AND ARCHITECTURAL DETAILS PRIOR TO INSTALLATION.
- 3. VERIFY LOCATIONS, MOUNTING HEIGHTS, TRIM LOCATIONS, ETC. FOR ALL PLUMBING FIXTURES WITH THE ARCHITECT PRIOR TO INSTALLATION. P—____ DESIGNATES FIXTURE AND FIXTURE TRIM. MOUNTING OF ALL ADA FIXTURES AND RELATED TRIM TO MEET THE AMERICAN DISABILITIES ACT GUIDELINES AND ANSI REQUIREMENTS FOR PEOPLE WITH DISABILITIES.
- 4. CONCEAL ALL PIPING IN WALLS/CHASE SPACE, BELOW FLOORS, AND ABOVE CEILINGS UNLESS OTHERWISE NOTED. INSTALL ALL WATER SUPPLY PIPING IN EXTERIOR WALLS ON THE INSIDE (WARM SIDE) OF THE BUILDING INSULATION. SEAL ALL PIPING PENETRATIONS THROUGH RATED ASSEMBLIES ACCORDINGLY. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE AND SOUND RATED PARTITIONS, CEILINGS, AND FLOORS.
- 5. DRAWING INDICATES THE GENERAL SCOPE OF WORK ASSOCIATED WITH THE REMOVAL OF EXISTING MATERIALS, EQUIPMENT, AND PIPING SYSTEMS, BUT IS NOT NECESSARILY INCLUSIVE OF EVERY EXISTING CONDITION. THE FULL EXTENT OF REMOVAL WORK SHALL BE DETERMINED IN THE FIELD BASED ON THE ACTUAL CONDITIONS ENCOUNTERED AND AS REQUIRED FOR THE PROPER EXECUTION OF ALL TRADES WORK.
- 6. THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE TO CLEARLY IDENTIFY ALL PLUMBING FIXTURES AND EQUIPMENT THAT IS TO BE REMOVED AND REVIEW WITH THE OWNER'S REPRESENTATIVE PRIOR TO STARTING ANY DEMOLITION WORK.
- 7. REMOVAL OF ALL EQUIPMENT, PIPING, FIXTURES, ETC. SHALL INCLUDE ALL RELATED SUPPORTS, HANGERS, ETC. WHERE PIPING IS NOTED TO BE ABANDONED IN WALLS OR FLOORS, PIPING SHALL BE REMOVED TO BEYOND FINISH SURFACE, CAPPED OR PLUGGED IN APPROVED MANNER. PATCH SURFACE AND FINISH TO MATCH ADJACENT CONDITIONS. CLOSE OFF AND SEAL TIGHT ALL WALL, FLOOR, AND ROOF PENETRATIONS NOT BEING UTILIZED FOR NEW PIPING SYSTEMS SO AS TO MAINTAIN STRUCTURAL INTEGRITY OF SURROUNDING ASSEMBLY. THE REMOVAL OF ALL FIXTURE BRANCH PIPING SHALL BE BACK TO LAST ACTIVE PIPING TAKE—OFF, THERE SHALL BE NO DEAD END SECTIONS OF PIPE. CAP AND PLUG ALL OPEN END PIPE IN CODE APPROVED MANNER.
- 8. ALL MATERIALS, EQUIPMENT, FIXTURES NOT REUSED OR CLAIMED BY THE OWNER SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND BE REMOVED PROMPTLY FROM THE PREMISES BY THE CONTRACTOR. ANY DEMOLITION ITEMS IN QUESTION SHALL BE REVIEWED WITH THE OWNERS REPRESENTATIVE PRIOR TO REMOVAL. ALL SPACES SHALL BE KEPT FREE OF DEBRIS AT ALL TIMES.

NG HEI S

ABI SY SY

EPG

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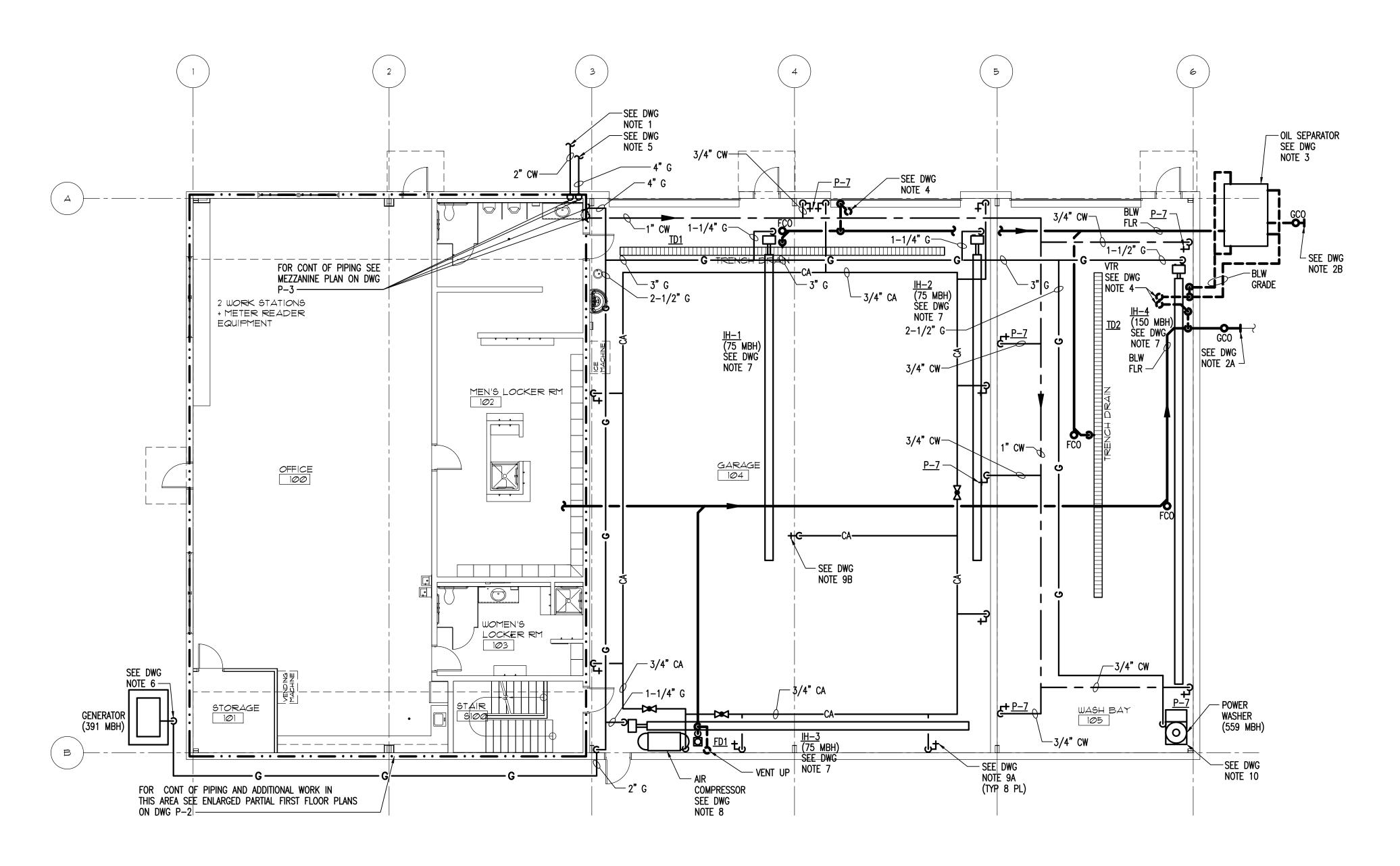
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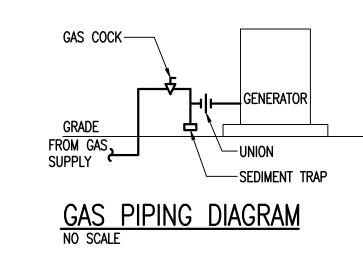
PROJECT NO. 230004

AS NOTED





PLUMBING FIRST FLOOR PLAN — DOMESTIC WATER, DRAINAGE, GAS AND COMPRESSED AIR SYSTEMS PIPING SCALE: 1/8" = 1'-0"



DRAWING NOTES:

- 1. PROVIDE BUILDING DOMESTIC WATER SUPPLY LINE AND DISTRIBUTION PIPING AS SHOWN. WATER SUPPLY LINE SHALL BE EXTENSION OF EXISTING WATER SERVICE SERVING THE EXISTING BUILDING. SEE EXISTING/NEW WORK BUILDING PLANS ON DRAWING P-4 FOR ADDITIONAL INFORMATION AND REFER TO CIVIL SITE UTILITY PLANS FOR ROUTING OF EXTERIOR PIPING. PRIOR TO THE START OF ANY NEW WATER SUPPLY SYSTEM WORK THIS CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF TIE-IN POINT AND PIPE ROUTING WITH CIVIL SITE UTILITIES DRAWINGS.
- 2A. PROVIDE SANITARY BUILDING DRAINAGE PIPING AS SHOWN AND CONNECT TO SANITARY BUILDING SEWER. REFER TO SITE UTILITY PLANS FOR FINAL LOCATION. PRIOR TO THE START OF ANY NEW SANITARY DRAINAGE SYSTEM WORK THIS CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF INVERT ELEVATION AT TIE-IN POINT AND ROUTING WITH BUILDING FOOTINGS.
- 2B. PROVIDE GARAGE AND WASH BAY BUILDING DRAINAGE PIPING AS SHOWN AND CONNECT TO SANITARY BUILDING SEWER. REFER TO SITE UTILITY PLANS FOR FINAL LOCATION. PRIOR TO THE START OF ANY NEW SANITARY DRAINAGE SYSTEM WORK THIS CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF INVERT ELEVATION AT TIE—IN POINT AND ROUTING WITH BUILDING FOOTINGS.
- 3. EXTERIOR OIL SEPARATOR, SEE OIL SEPARATOR DESIGN EQUIPMENT NOTES AND OIL SEPARATOR RISER DIAGRAM ON DRAWING P—6.
- 4. ROUTE NEW VENT PIPING AS SHOWN ON SANITARY RISER DIAGRAM AND AS HIGH AS POSSIBLE ABOVE NEW CEILINGS (WHERE APPLICABLE) AND CONNECT TO VENT THROUGH ROOF. PRIOR TO THE START OF ANY VENT SYSTEM WORK THIS CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF VENT PIPE ROUTING AND VENT TERMINAL LOCATION WITH THE OWNER.
- 5. PROVIDE BUILDING GAS SUPPLY LINE AND DISTRIBUTION PIPING AS SHOWN. GAS SUPPLY LINE SHALL BE EXTENSION OF EXISTING GAS SERVICE SERVING THE EXISTING BUILDING., SEE FLOOR PLAN ON DRAWING P-4 FOR ADDITIONAL INFORMATION AND REFER TO CIVIL SITE UTILITY PLANS FOR ROUTING OF EXTERIOR PIPING. PRIOR TO THE START OF ANY NEW GAS SUPPLY SYSTEM WORK THIS CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF PIPE ROUTING WITH CIVIL SITE UTILITIES DRAWINGS.FOR GAS LOAD ESTIMATE AND SIZING INFORMATION SEE "GAS METER MANIFOLD PIPING DIAGRAM" ON DRAWING P-5.
- 6. THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR FINAL GAS CONNECTION TO GENERATOR, CONNECTION SHALL BE COMPLETE WITH A SHUTOFF VALVE, UNION, SEDIMENT TRAP AND ANY REGULATORS NECESSARY TO ENSURE PROPER EQUIPMENT OPERATION (COORDINATE WITH THE RECOMMENDATIONS OF THE EQUIPMENT MANUFACTURER). SEE GAS PIPING DIAGRAM ON THIS
- 7. THE PLUMBING CONTRACTOR SHALL CONNECT GAS LINE TO MECHANICAL UNIT, CONNECTION TO BE COMPLETE WITH DIRT LEG, ISOLATION GAS VALVE AND UNION. PRIOR TO THE START OF ANY NEW GAS SUPPLY SYSTEM WORK THIS CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF PIPE ROUTING AND POINT OF CONNECTION TO UNIT WITH THE MECHANICAL CONTRACTOR.
- 8. PROVIDE COMPRESSED AIR SYSTEM SOURCE EQUIPMENT AND PIPING AS SHOWN, SEE "AIR COMPRESSOR PIPING DIAGRAM" AND "COMPRESSED AIR SYSTEM EQUIPMENT & MATERIALS NOTES" ON DRAWING P-3.
- 9A. PROVIDE COMPRESSED AIR OUTLET SEE "COMPRESSED AIR DROP DIAGRAM" ON DRAWING P-3. PRIOR TO THE START OF ANY COMPRESSED AIR SUPPLY SYSTEM WORK THIS CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF PIPE ROUTING AND LOCATIONS OF DROPS IN THE FIELD WITH THE OWNER.
- 9B. PROVIDE A COMPRESSED AIR OUTLET HIGH IN SPACE AT BOTTOM OF ROOF STRUCTURE FOR HOSE CONNECTION FROM PORTABLE VEHICLE LIFT. PRIOR TO THE START OF ANY COMPRESSED AIR SUPPLY SYSTEM WORK THIS CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF PIPE ROUTING AND LOCATION OF OUTLET IN THE FIELD WITH THE OWNER.
- 10. PROVIDE POWER WASHER SEE "POWER WASHER PIPING DIAGRAM" AND "POWER WASHER EQUIPMENT & MATERIALS NOTES" ON DRAWING P-5. COORDINATE FINAL LOCATION OF UNIT IN THE FIELD WITH THE OWNER.
- 11. SEE DRAWING P-0 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

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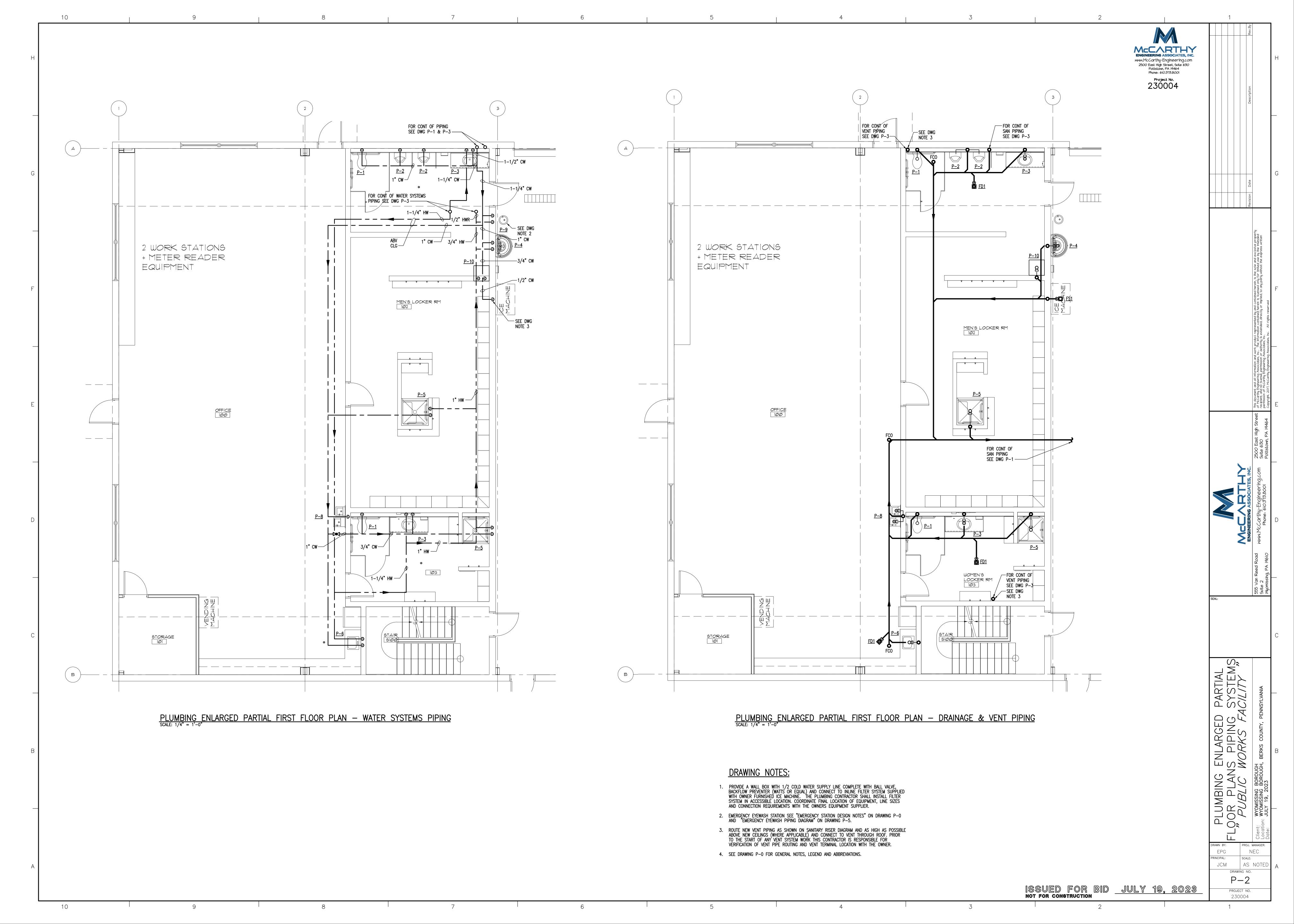
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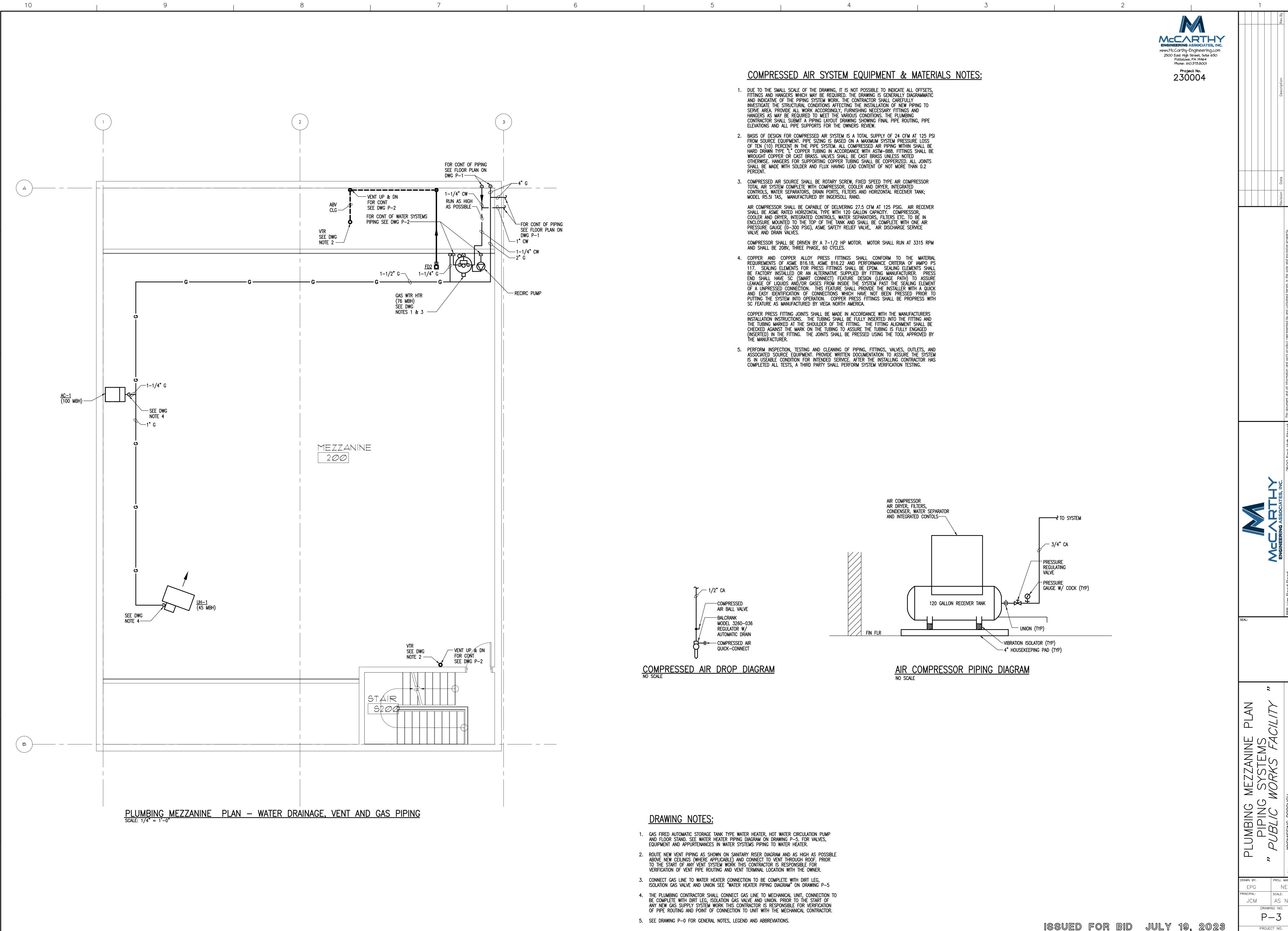
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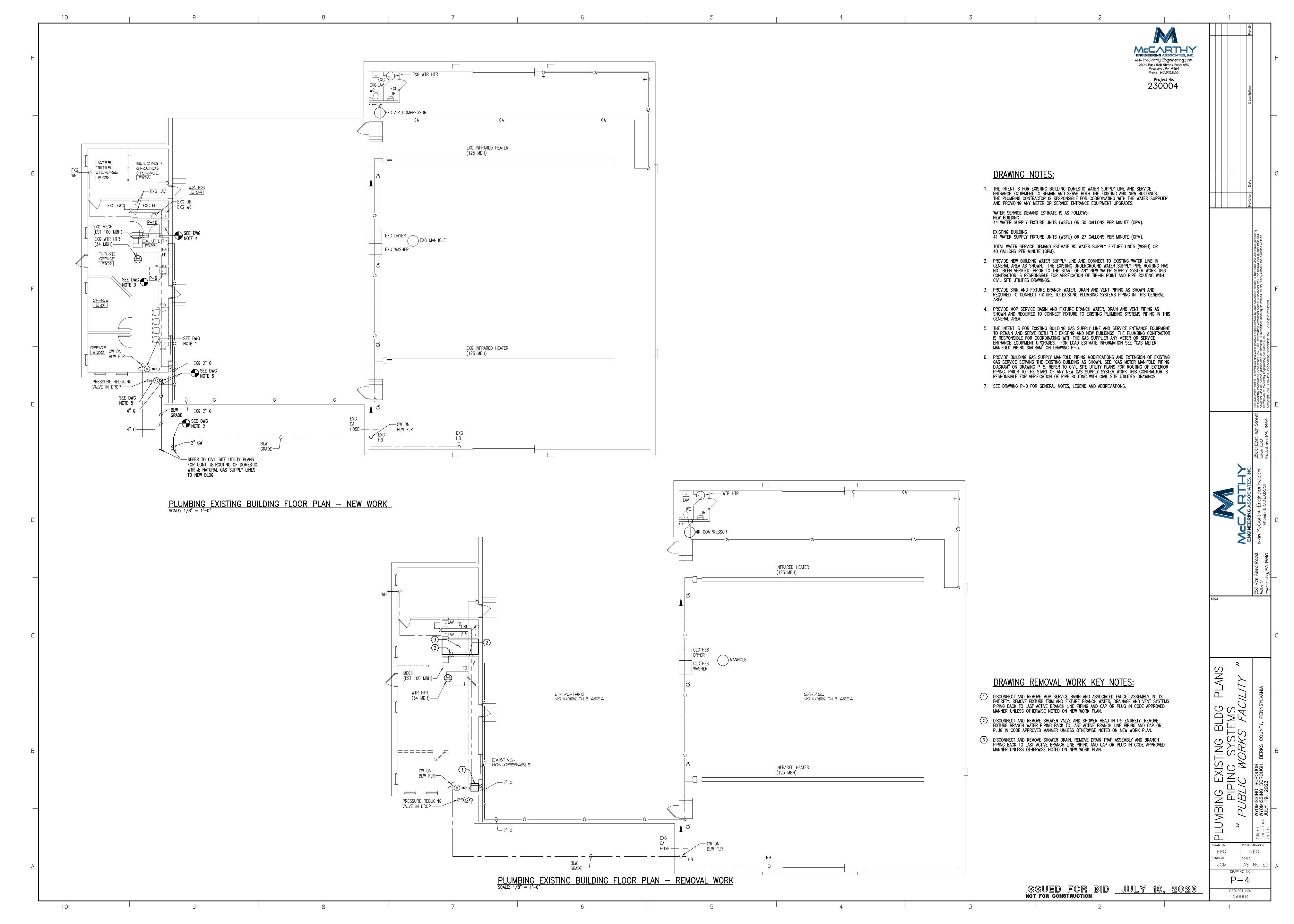
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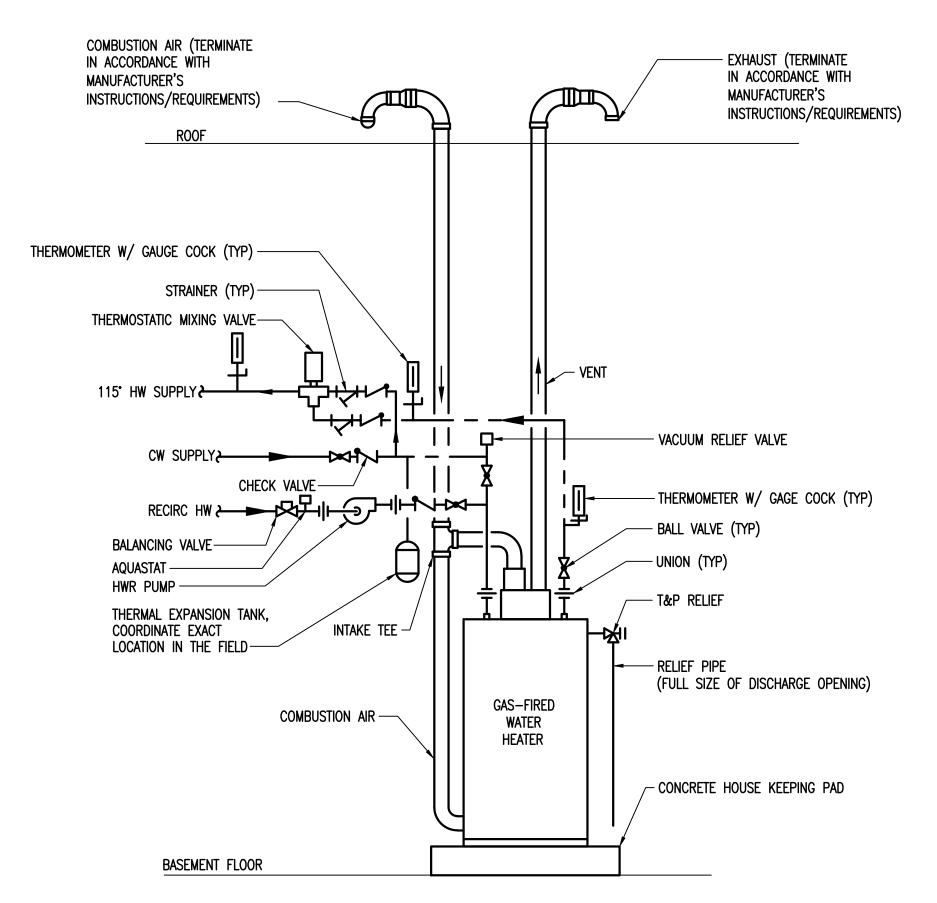
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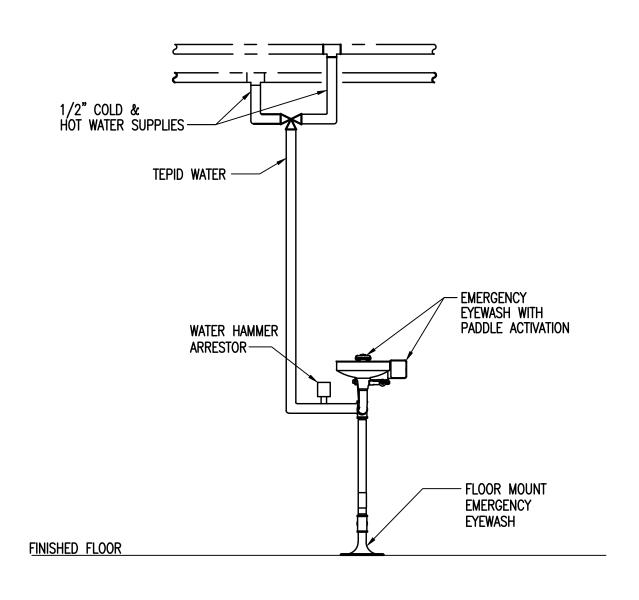




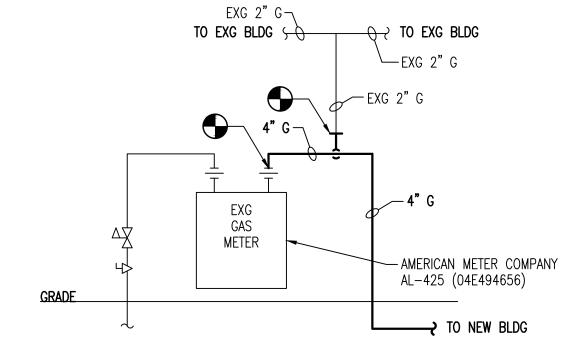
NOTES:
1. COORDINATE FINAL ROUTING OF VENTING IN THE FIELD.
2. VENT PIPING CONNECTOR LENGTHS SHALL NOT EXCEED THE MAXIMUM NUMBER OF FEET STRAIGHT PIPE (INTAKE & EXHAUST), CORRESPONDING TO TOTAL NUMBER OF ELBOWS (INTAKE & EXHAUST) INSTALLED, PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. THE 90' TERMINAL ELBOWS, SUPPLIED WITH THE HEATER, MUST BE INSTALLED AT THE EXTREME ENDS OF INTAKE AND EXHAUST VENTING OUTSIDE THE BUILDING. THE END TERMINAL WITH EXTERIOR SCREEN, SUPPLIED WITH THE WATER HEATER, MUST BE INSTALLED ON THE INTAKE VENT.

WATER HEATER PIPING DIAGRAM NO SCALE

4. PROVIDE MANUFACTURER'S CONDENSATE TRAP KIT AND DISCHARGE TO FUNNEL/FLOOR DRAIN.



EMERGENCY EYEWASH PIPING DIAGRAM



GAS METER MANIFOLD PIPING DIAGRAM
NO SCALE

THIS CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF NATURAL GAS SERVICE METER UPGRADE WITH THE GAS UTILITY COMPANY (UGI 353812). VERIFY ALL SERVICE REQUIREMENTS AND SERVICE EQUIPMENT WITH THE GAS SUPPLIER AND OWNER PRIOR TO START OF ANY WORK. GAS LOADS ESTIMATE BREAKDOWN IS AS FOLLOWS:

7 INCH WC IS REQUIRED AT EACH PIECE OF EQUIPMENT.
NEW BUILDING PIPE SIZING IS BASED ON 2018 INTERNATIONAL FUEL GAS CODE TABLE 402.4(1), 400 EQUIVALENT FEET LENGTH OF PIPE FOR INLET PRESSURE
UNDER TWO POUNDS AT 0.3 INCH WATER COLUMN PRESSURE DROP, AND GAS WITH 0.60 SPECIFIC GRAVITY.

			TANK	GAS	ATER SCHE TEMP RISE	GALLON			ELECTRICA	AL	
REF NO	MANUFACTURER/ MODEL NO	MODEL NO	CAPACITY GALLON	MBH INPUT	DEGREES F	PER HOUR RECOVERY	VENT PIPE	VOLTS	PHASE	HERTZ	REMARKS
WTR HTR	BRADFORD WHITE	LC2PDV50H765N	48	76	100	81	3 IN	120	1	60	SEE NOTES

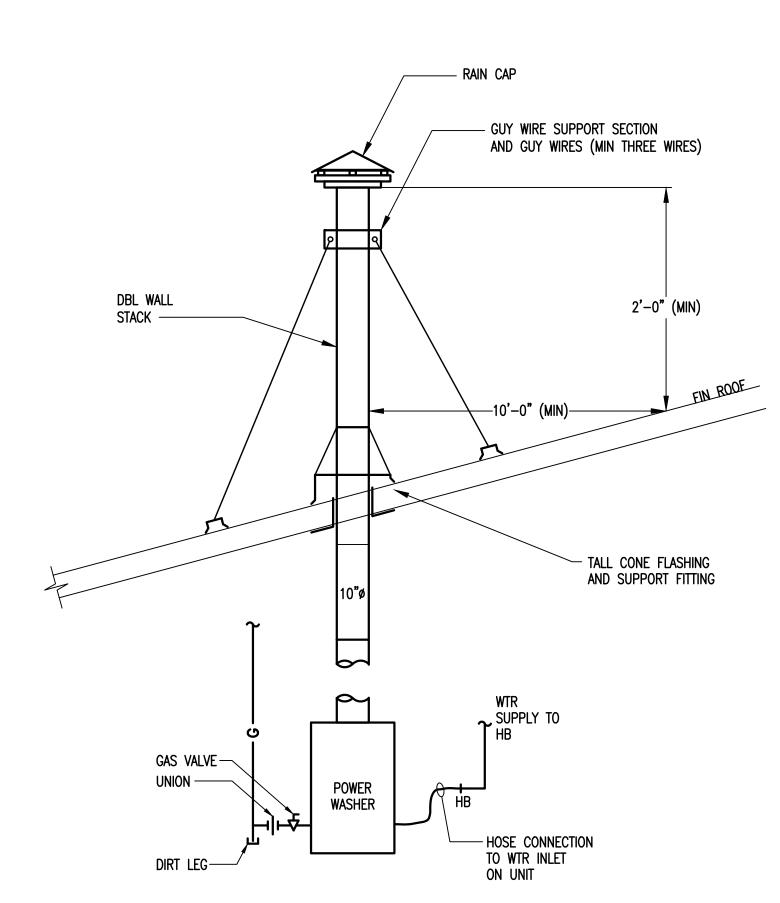
1. FACTORY INSTALLED TEMPERATURE AND PRESSURE RELIEF VALVE.
2. COORDINATE WATER HEATER VENT CONFIGURATION AND SIZING WITH EXISTING FIELD CONDITIONS ENCOUNTERED AND INSTALL IN ACCORDANCE WITH MANUFACTURERS INSTALLATION INSTRUCTIONS.
3. 5-YEAR WARRANTY

	PLUMBING PUMP SCHEDULE ELECTRICAL MOTOR CHARACTERISTICS												
REF	MANUFACTURER/ MODEL NO	SYSTEM SERVED	FLOW (GPM)	TDH FEET	MOTOR		CHARACTERISTICS						
NO					(WATT)	(RPM)	VOLTS	PHASE	HERTZ	REMARKS			
PP-1	BELL & GOSSETT / NBF-10	WATER HEATER	1	15	52	2800	115	1	60	SEE NOTE 1			
TES: 1. PR	OVIDE AQUASTAT AND SEVEN DAY TIM	IE CLOCK.											

POWER WASHER EQUIPMENT & MATERIALS NOTES:

1. THE POWER WASHER SHALL BE A STATIONARY ASSEMBLY (MACHINE DIMENSIONS L 51" X W 31" X H 54") WITH CAPACITY TO DELIVER A FLOW OF 6.0 GALLON PER MINUTE/360 GALLONS PER HOUR AT 3000 PSI FOR HEAVY DUTY CLEANING CAPABILITY. ELECTRIC—POWERED 208V/3PHASE WASHER (TOTAL MACHINE AMPERAGE OF 41 AMPS) WITH NATURAL GAS TO FIRE THE BURNER. UNIT SHALL HAVE GAS INPUT OF 558,050 BTU/HR AND BE EQUIPED WITH A GAS PRESSURE REGULATOR VALVE TO PROVIDE OPERATING GAS MANIFOLD PRESSURE OF 3.5 INCH WATER COLUMN AND MINIMUM GAS INPUT OF 6 INCH WATER COLUMN. ASSEMBLY SHALL INCLUDE A STAINLESS—STEEL COIL, TEN (10) INCH DRAFT DIVERTER AND TEN (10) INCH EXHAUST STACK. UNIT CONTROLS TO FEATURE PROGRAMMABLE SMART CONTROL AUTOMATION TO ALLOW AUTO START/STOP AND SHUT DOWN CAPABILITY. THE 15 HP MOTOR SHALL BE PROTECTED BY REMOVABLE PANELS FOR EASY SERVICING ACCESS AND POWERED BY A HIGHLY EFFICIENT TRIPLEX BELT DRIVE PUMP AND INCLUDE 50' HOSE WITH, WAND AND HIGH—PRESSURE NOZZLE. ASSEMBLY SHALL CARRY A 7—YEAR LIMITED WARRANTY AND BE ETL CERTIFIED FOR SAFETY; MODEL 1832SS—208, MANUFACTURED BY HOTSY'S. SUBMIT INSTALLATION DRAWINGS, MATERIAL LIST AND INSTALLATION AND MAINTENANCE MANUAL.

2. PROVIDE EXHAUST VENT SYSTEM FOR POWER WASHER. EXHAUST VENT SYSTEM SHALL CONFORM TO THE REQUIREMENTS OF NFPA 54 AND NFPA 211, AND COMPLY WITH UL 1738, ULC S636 STANDARD FOR VENTING SYSTEMS FOR CATEGORY II, III, AND IV GAS-BURNING APPLIANCES, AND ALSO APPROVED FOR USE WITH TYPE L VENTING SYSTEMS (GAS OR OIL) IN ACCORDANCE WITH UL 641. ALL FLUE-GAS CARRYING COMPONENTS OF THE VENT SYSTEM SHALL BE OBTAINED THROUGH ONE SOURCE. THE VENT SYSTEM SHALL BE FACTORY-BUILT STAINLESS STEEL SPECIAL GAS TYPE, DOUBLE WALL, ENGINEERED AND DESIGNED FOR USE AS SPECIFIED BY THE EQUIPMENT MANUFACTURER. THE JOINT CLOSURE SYSTEM SHALL BE AN INNER WALL MECHANICAL LOCKING STRAP DESIGN. JOINTS SHALL NOT USE SCREWS OR FASTENERS THAT PENETRATE THE INNER CONDUIT. VENT SHALL BE CONSTRUCTED WITH A FACTORY INSTALLED GASKET USED TO SEAL THE JOINT. USE OF GASKET LUBE, AVAILABLE FROM THE FACTORY, SHOULD BE USED FOR MAXIMIZING GASKET LIFE AND EASE OF INSTALLATION. INNER WALL JOINTS SHALL BE DESIGNED WITH A MALE AND FEMALE OVERLAPPING METAL-METAL CONNECTION TO MAINTAIN CONDENSATE ON THE AL29-4C STAINLESS STEEL. PROPER 1/4 INCH PER FOOT PITCH MUST ALWAYS BE MAINTAINED AND CONDENSATE SHOULD FLOW BACK TOWARD THE APPLIANCE TO THE REQUIRED NUMBER OF DRAINS. THE OUTER WALL CASING SHALL BE CONSTRUCTED OF 430 STAINLESS STEEL THAT SHALL NOT REQUIRE ADDITIONAL SURFACE PREPARATION, SUCH AS PAINTING, TO WITHSTAND THE OUTDOORS OR HIGH HUMIDITY ENVIRONMENTS. INNER CONDUIT AND OUTER WALL CASING SHALL BE CONSTRUCTED WITH A ONE-INCH AIR SPACE BETWEEN THEM AND IN SUCH A FASHION THAT PREVENTS CROSS-ALLOY CONTAMINATION. TEES AND ELBOWS SHALL PROVIDE A PRESSURE DROP LESS THAN 15 FEET EQUIVALENT HORIZONTAL VENT. FITTINGS THAT INCREASE OR DECREASE VENT DIAMETER SHALL BE ASYMMETRIC IN CONSTRUCTION WITH A FLAT WALL THAT MAINTAINS A STRAIGHT LINE WITH ADJOINING PARTS IN ORDER TO FACILITATE THE UNOBSTRUCTED FLOW OF ALL CONDENSATE. ALL PARTS SHALL BE COMPATIBLE WITH OTHER SINGLE WALL AND DOUBLE WALL PRODUCTS OF THE SAME MANUFACTURER. GENERAL ELECTRIC RTV106 (AKA MOMENTIVE) OR DOW CORNING 736 HIGH TEMPERATURE SEALANT SHALL BE USED TO`SEAL ALL JOINTS ON SYSTEMS WHERE THE MAXIMUM FLUE GAS TEMPERATURE WILL NOT EXCEED 550°F. A FACTORY INSTALLED 550°F COMPATIBLE SILICONE RUBBER GASKET SHALL BE USED TO SEAL JOINTS. SYSTEM IS TO BE SIZED IN ACCORDANCE WITH THE APPLIANCE MANUFACTURER'S SPECIFICATIONS, NFPA 54-NATIONAL FUEL GAS CODE (ANSI Z223.1), ASHRAE RECOMMENDATIONS, AND OTHER APPLICABLE CODES. ALL COMPONENTS SHALL BE INSTALLED IN STRICT COMPLIANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND ALL PERTINENT LOCAL, REGIONAL, NATIONAL, AND INTERNATIONAL BUILDING AND MECHANICAL CODES AND REGULATIONS. AVAILABLE MANUFACTURER SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: HEATFAB SAF-T VENT CI PLUS, METAL-FAB SELKIRK METALBESTOS OR EQUAL. VENT SYSTEM SHALL BE WARRANTED BY THE MANUFACTURER AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF FIFTEEN (15) YEARS FROM THE DATE OF MANUFACTURE. SUBMIT INSTALLATION DRAWINGS, MATERIAL LIST AND INSTALLATION MANUAL.

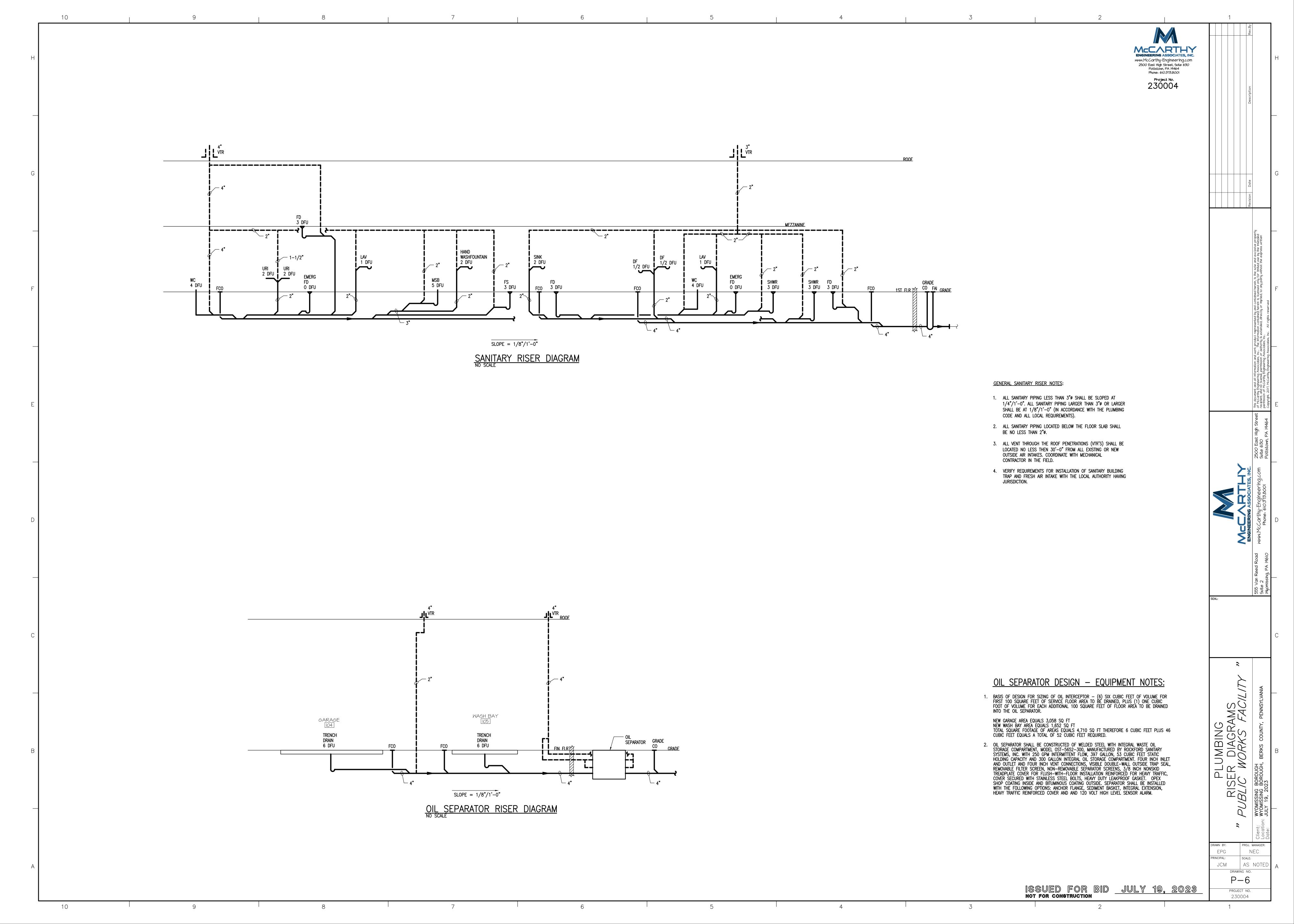


DVIDE STAINLESS STEEL DOUBLE WALL INSULATED VENT PIPE AND ACCESSORIES, MODEL SAF-T-CI PLUS AS MANUFACTURED BY HEAT-FAB, INC. ESSORIES SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING: HEATER ADAPTOR, INSULATED DOUBLE WALL PIPE (ONE INCH INSULATION) JBLE WALL ELBOW FITTINGS, STAINLESS STEEL TALL CONE- FLASHING AND STAINLESS SUPPORT FITTING, STAINLESS GUY WIRE SUPPORT SECTION AND INLESS GUY WIRES AND RAIN CAP, ALL IN ACCORDANCE WITH THE MANUFACTURERS INSTALLATION INSTRUCTIONS, PROVIDE MANUFACTURERS LAYOUT WINGS PRIOR TO INSTALLATION.

OF THE ROOF CAP SHALL BE (2) TWO FEET HIGHER THAN TOP OF ADJACENT ROOFTOP SLOPE 2. COORDINATE WITH THE MECHANICAL

BET STATE BORDOUGH BERKS COUNTY, PENNSYLVANIA

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- 1.1 THE ARCHITECTURAL GENERAL CONDITIONS SHALL APPLY TO AND FORM A PART OF THIS SECTION OF THESE SPECIFICATIONS.
- 1.2 PROVIDE ALL MATERIALS, LABOR, EQUIPMENT, TOOLS AND SUPERVISION AND PERFORM ALL OPERATIONS NECESSARY FOR THE PROPER AND COMPLETE EXECUTION OF ALL PLUMBING WORK IN STRICT ACCORDANCE WITH THE SPECIFICATIONS AND DRAWINGS.
- 1.3 ALL WORK SHALL BE IN ACCORDANCE WITH PENNSYLVANIA UNIFORM CONSTRUCTION CODE AND ALL APPLICABLE SECTIONS OF THE NATIONAL FIRE PROTECTION ASSOCIATION, NATIONAL ELECTRIC CODE, OSHA, 2015 INTERNATIONAL PLUMBING CODE, 2015 INTERNATIONAL FUEL GAS CODE AND ALL OTHER STATE AND LOCAL AUTHORITIES HAVING JURISDICTION AND APPLICABLE MANUFACTURER'S RECOMMENDATIONS.
- 1.4 THE CONTRACTOR SHALL VISIT THE SITE, EXAMINE ALL CONDITIONS, AND MAKE ALLOWANCES FOR DIFFICULTIES AND CONTINGENCIES AFFECTING THE PROPER EXECUTION OF THIS CONTRACT.
- 1.5 THE CONTRACTOR SHALL OBTAIN AND PAY ALL FEES NECESSARY FOR PERMITS AND INSPECTIONS REQUIRED WITH THIS WORK.
- 1.6 THE CONTRACTOR SHALL VERIFY ALL UTILITY SERVICE INFORMATION SHOWN ON THE DRAWINGS WITH THE LOCAL UTILITY COMPANY PRIOR TO SUBMITTING A BID. ANY CHANGES OR SERVICE CHARGES IMPOSED BY THE UTILITY COMPANY SHALL BE QUALIFIED AND INCLUDED IN THE BID.
- 1.7 ALL EQUIPMENT SHALL BE TESTED. LISTED AND LABELED BY AN APPROVED AUTHORITY (UL, AGA, ETL) AND SHALL BE INSTALLED IN ACCORDANCE WITH ITS LISTING.
- 1.8 ALL EQUIPMENT, MATERIALS, AND WORKMANSHIP SHALL BE GUARANTEED FOR A MINIMUM OF ONE YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER.
- 1.9 WHERE PRODUCTS ARE SPECIFIED BY BRAND NAME, CATALOG NUMBERS OR BY NAMES OF MANUFACTURERS. THE REFERENCE IS INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND IS SOLELY FOR THE PURPOSE OF INDICATING THE TYPE AND QUALITY OF ITEM. AN APPROVED EQUAL WILL BE GIVEN CONSIDERARTION UNLESS INDICATED OTHERWISE. SUBSTITUTIONS FOR SPECIFIED EQUIPMENT WILL IS UNDER THE CONDITIONS THAT NO ADDITIONAL CHARGE TO THE PROJECT IS PERMITTED FOR ASSOCIATED CHANGES IN POWER REQUIREMENTS, PIPE SIZE, GAS CONSUMPTION, WEIGHT, SUPPORT, ETC. THE CONTRACTOR SHALL FULLY REVIEW THE PROPOSED SUBSTITUTION TO ENSURE ALL ASPECTS OF PERFORMANCE, SERVICE CLEARANCE, PHYSICAL SUPPORT, POWER FEEDS, ETC. COORDINATE AND ARE ACCOUNTED FOR PRIOR TO SUBMITTING THE ALTERNATIVE EQUIPMENT FOR REVIEW.
- 1.10 SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO ORDERING ANY EQUIPMENT
- 1.11 THE CONTRACTOR RESPONSIBLE FOR WORK COVERED BY THESE SPECIFICATIONS SHALL COORDINATE AND COOPERATE WITH ALL OTHER TRADES. TRADES THAT HAVE WORK CONNECTED WITH THE PLUMBING WORK SHALL BE NOTIFIED FOR INSTALLATION REQUIREMENTS AND SCHEDULING. THE CONTRACTOR SHALL SCHEDULE HIS WORK TO AVOID ANY INTERRUPTION OF ANY UTILITY SERVICES TO THE OPERATION AREAS OF THE BUILDING DURING NORMAL WORKING HOURS. INTERRUPTION OF SERVICES SHALL BE DONE DURING OFF HOURS AT NO ADDITIONAL COST TO THE OWNER.
- 1.12 THE CONTRACTOR SHALL PERFORM ALL DEMOLITION AS REQUIRED AND SHALL CUT AND PATCH AS REQUIRED TO PERFORM THE DEMOLITION WORK. ALL OPENINGS MUST BE REPAIRED TO MATCH ADJACENT FINISHES. THE OWNER SHALL BE GIVEN THE OPPORTUNITY TO RETAIN OWNERSHIP OF ALL REMOVED MATERIALS AND EQUIPMENT.
- 1.13 ALL CUTTING AND PATCHING OF EVERY NATURE REQUIRED IN CONNECTION WITH THIS CONTRACT SHALL BE DONE BY THIS CONTRACTOR WITH MECHANICS EXPERIENCED IN THEIR RESPECTIVE TRADES. ALL PATCHING SHALL MATCH ADJACENT FINISHES. ALL WORK SHALL BE COORDINATED TO AVOID CUTTING OF WORK IN PLACE AND INTERFERING WITH OTHER OPERATIONS.
- 1.14 IN COMPLIANCE WITH ACT 38, CONTACT INDIVIDUAL COMPANIES TO HAVE UTILITY LOCATIONS MARKED IN THE FIELD AND TO OTHERWISE LOCATE UNDERGROUND OBJECTS AS MAY BE NECESSARY PRIOR TO THE START OF CONSTRUCTION. PENNSYLVANIA LAW REQUIRES THREE WORKING DAYS NOTICE FOR THE CONSTRUCTION PHASE AND TEN WORKING DAYS IN DESIGN STAGE. CALL PENNSYLVANIA ONE CALL SYSTEM, INC. (1-800-242-1776, AS OF THIS WRITING).
- 1.15 ALL EXCAVATIONS REQUIRED FOR INSTALLATION OF PIPE SHALL HAVE SOLID, UNDISTURBED BOTTOMS, AND SHALL BE SUBJECT TO APPROVAL BY THE OWNER'S REPRESENTATIVE PRIOR TO PIPING PLACEMENT. SHOULD BOTTOMS BECOME SOFT OR WET BEFORE PIPING IS PLACED, ALL SUCH UNSUITABLE BOTTOMS SHALL BE REMOVED AT NO COST TO THE OWNER AND FILLED WITH
- 1.16 BACKFILL ALL EXCAVATIONS PERFORMED UNDER THIS CONTRACT AS REQUIRED TO SATISFY FINISHED GRADE REQUIREMENTS.
- 1.17 FURNISH AND INSTALL ALL NECESSARY HANGERS, INSERTS, SUPPORTS SUPPLEMENTARY STEEL, ETC., TO PROPERLY SUPPORT ALL EQUIPMENT AND PIPING IN AN APPROVED MANNER AND IN FULL ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- 1.18 ALL DOMESTIC COLD, HOT AND HOT WATER CIRCULATION WATER PIPING WITHIN THE BUILDING SHALL BE HARD DRAWN TYPE "L" COPPER TUBING IN ACCORDANCE WITH ASTM-B88. FITTINGS SHALL BE WROUGHT COPPER OR CAST BRASS. VALVES SHALL BE CAST BRASS UNLESS NOTED OTHERWISE. HANGERS FOR SUPPORTING COPPER TUBING SHALL BE COPPERIZED. ALL WATER PIPING BELOW FINISH FLOOR SHALL BE TYPE "K" COPPER ASTM B-88. FITTINGS SHALL BE WROUGHT COPPER. ALL JOINTS SHALL BE MADE WITH SOLDER AND FLUX HAVING A LEAD CONTENT OF NOT MORE THAN 0.2
- 1.19 ALL SANITARY AND VENT PIPING ABOVE THE FINISHED FLOOR SHALL BE NO-HUB SERVICE WEIGHT CAST IRON IN ACCORDANCE WITH ASTM A74; JOINTS SHALL BE A NEOPRENE GASKET WITH STAINLESS STEEL CLAMP AND SHIELD ASSEMBLY, INSTALL IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. SANITARY AND VENT PIPING LOCATED BELOW THE FLOOR SHALL BE SERVICE WEIGHT CAST IRON WITH HUB AND SPIGOT ENDS. JOINTS SHALL BE CONNECTED WITH NEOPRENE PUSH-ON COMPRESSION GASKETS INSTALL IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
- A. WHERE PERMITTED BY THE LOCAL AUTHORITY, SANITARY AND VENT PIPING SCHEDULE 40 PVC, ASTM D2665, D2949, WITH PVC FITTINGS (DWV TYPE) AND SOLVENT WELD JOINTS WILL BE GIVEN CONSIDERATION. PVC PIPING SHALL NOT BE USED IN RETURN AIR PLENUM TYPE CEILINGS OR IN FIRE-RATED CEILING ASSEMBLIES (CONTRACTOR TO VERIFY THESE AREAS WITH ARCHITECT). PVC PIPING SHALL NOT BE USED WITHOUT WRITTEN AUTHORIZATION FROM THE LOCAL AUTHORITY HAVING JURISDICTION, THE LOCAL FIRE MARSHALL AND OWNERS APPROVAL.
- 1.20 FUEL GAS PIPING ABOVE THE FLOOR INSIDE THE BUILDING SHALL BE SCHEDULE 40 BLACK STEEL WITH MECHANICAL JOINTS UP TO 2-1/2 INCHES INSTALLED IN ACCORDANCE WITH THE INTERNATIONAL FUEL GAS CODE, WELDED FOR THREE (3) INCHES AND ABOVE. ALL FUEL GAS PIPING LOCATED OUTSIDE THE BUILDING BELOW GRADE SHALL BE POLYETHYLENE WITH HEAT-FUSION JOINTS IN ACCORDANCE WITH THE INTERNATIONAL FUEL GAS CODE. BRANCH PIPING TO APPLIANCES SHALL BE COMPLETE WITH A SHUTOFF VALVE, UNION, DIRT LEG AND ANY REGULATORS NECESSARY TO ENSURE PROPER EQUIPMENT OPERATION (COORDINATE WITH THE RECOMMENDATIONS OF THE EQUIPMENT MANUFACTURER).

- 1.21 WHERE PIPING PASSES THROUGH FIRE RESISTING PORTIONS OF THE STRUCTURE, AN APPROVED FIRE-STOPPING DEVICE SHALL BE INSTALLED TO MAINTAIN THE FIRE RATING OF THAT PORTION OF THE STRUCTURE. ALL FIRE STOPPING DEVICES USED SHALL BE LISTED INTUMESCENT MATERIALS SUCH AS A CAULK, SEALANT, PUTTY, WRAP STRIPS, ETC. AS REQUIRED TO PROPERLY FIRE STOP ALL VOIDS. FIRE STOPPING MATERIAL SHALL BE AS MANUFACTURED BY 3M, HILTI, PRO-SET SYSTEMS OR EQUAL.
- 1.22 ALL SHUTOFF VALVES SHALL BE BALL VALVES. ALL BALL AND CHECK VALVES SHALL BE ALL BRONZE, SWEATED PATTERN SUITABLE FOR 125-PSI WORKING
- A. ALL VALVES AND PIPING EXPOSED TO VIEW SHALL BE CHROME PLATED BRASS.
- B. GAS SHUTOFF VALVES SHALL HAVE A QUARTER-TURN OPERATION AND SHALL BE AGA APPROVED AND U.L. LISTED FOR SYSTEM PRESSURE. INSTALL IN ACCORDANCE WITH THE NATIONAL FUEL GAS CODE REQUIREMENTS.
- C. FOR GAS SYSTEMS THAT EXCEED 14 INCHES W.C. (0.5 PSIG): INSTALL A GAS PRESSURE REGULATING VALVE. IN ADDITION TO THE REGULATOR SUPPLIED WITH THE EQUIPMENT. INSTALL AN INLINE REGULATOR JUST UPSTREAM OF THE REGULATOR THAT IS SUPPLIED WITH THE EQUIPMENT. REGULATOR SHALL BE CAPABLE OF REDUCING THE HIGH PRESSURE IN THE SUPPLY LINE DOWN TO 11 INCHES W.C. VENT EACH REGULATOR INDIVIDUALLY TO OUTSIDE THE BUILDING IN ACCORDANCE WITH THE NATIONAL FUEL GAS CODE AND ALL LOCAL REQUIREMENTS. GAS PRESSURE REGULATING VALVES SHALL BE AS MANUFACTURED BY MAXITROL (OR APPROVED EQUAL) AND SHALL BE SIZED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
- D. VACUUM RELIEF VALVE (WATER HEATERS ONLY) SHALL BE BRONZE CONSTRUCTION WITH A SILICONE DISC. MAXIMUM WATER PRESSURE. 200 POUNDS; MAXIMUM WATER TEMPERATURE, 250 DEGREES F; MODEL 36A, MANUFACTURED BY WATTS.
- 1.23 WATER HAMMER ARRESTORS SHALL BE ZURN, MODEL NO. Z-1700 OR EQUAL AND SHALL BE INSTALLED WHERE INDICATED ON THE DRAWINGS.
- A. INSULATE ALL COLD WATER, HOT WATER, HOT WATER RECIRCULATION PIPING, PIPE FITTINGS, BACKFLOW ASSEMBLIES, AND VALVES WITH MATERIALS HAVING A "K" FACTOR OF 0.27 AT 75 DEGREES F MEAN TEMPERATURE. A FLAME SPREAD RATING OF 25 OR LESS AND SMOKE DEVELOPED RATING OF 50 OR LESS.
- 1. THICKNESS:

1/2-INCH THICK

- COLD WATER AND HOT WATER RUNOUTS UP TO TWO INCHES =
- COLD WATER MAINS UP TO ONE INCH = 1/2-INCH THICK - COLD WATER MAINS 1-1/4 TO 2 INCHES = 3/4-INCH THICK - HOT WATER MAINS UP TO 2 INCHES = 1 INCH THICK
- 2. MATERIALS:
 - VAPOR BARRIER ALL SERVICE JACKETED FIBERGLASS WITH FITTINGS COVERED WITH PRE-SHAPED PLASTIC COVERS.
 - FOAMED CELLULAR FLEXIBLE ELASTOMERIC INSULATION WITH MITER CUT FITTINGS WITH VAPOR BARRIER JACKET (FOR THICKNESS UP TO ONE INCH). ALL JOINTS SHALL BE GLUED IN ACCORDANCE WITH THE INSULATION MANUFACTURER'S RECOMMENDATIONS.
- 3. MANUFACTURERS CERTAINTEED, MANVILLE, OWENS CORNING, KNAUF, ARMSTRONG OR APPROVED EQUAL.
- 1.25 CLEANOUT FITTINGS SHALL BE INSTALLED WHERE INDICATED AND AS REQUIRED. CLEANOUTS SHALL BE MADE BY MEANS OF LONG SWEEP ELL OR Y AND BEND. CLEANOUTS SHALL BE THE SAME SIZE PIPING UP TO AND INCLUDING 4 INCH SIZE. CLEANOUTS SHALL BE PROVIDED IN HORIZONTAL RUNS AT NOT OVER 50 FEET INTERVALS, CLEANOUTS IN FLOORS FOR CONCEALED PIPING SHALL BE ADJUSTABLE COATED CAST IRON BODY, TAPERED THREADED BRONZE PLUG. HEAVY-DUTY NICKALOY DECK TYPE, SCORIATED COVER WITH VANDALPROOF SCREWS. CLEANOUTS IN WALLS FOR CONCEALED PIPING SHALL BE CAST IRON T BRANCH CLEANOUT WITH BRONZE RAISED HEAD PLUG, LEAD SEAL AND
- 1.26 PLUMBING FIXTURES
- A. INCLUDES THE FOLLOWING PLUMBING FIXTURES AND RELATED COMPONENTS:

VANDALPROOF POLISHED STAINLESS-STEEL ROUND ACCESS COVER.

- . WATER CLOSETS. 2. URINALS
- 3. Lavatories. 4. HAND WASH FOUNTAIN
- 5. SHOWERS
- S. SINKS 7. MOP SERVICE BASIN
- 8. UTILITY SINK 9. FAUCETS FOR LAVATORIES, SHOWERS AND SINKS. 10. FLUSHOMETER VALVES FOR URINALS
- 11. TOILET SEATS. 12. PROTECTIVE SHIELDING GUARDS
- B. FIXTURES SHALL BE OF THE TYPE AND QUALITY INDICATED. FIXTURES SHALL BE COMPLETE WITH ALL NECESSARY TRIM AND APPURTENANCES NECESSARY FOR A COMPLETE INSTALLATION. ALL EXPOSED TRIM AND PIPING SHALL BE 17-GAUGE CHROME-PLATED BRASS. TRIM INCLUDES ONE-PIECE CHROME-PLATED ESCUTCHEONS ON ALL EXPOSED WATER SUPPLY AND WASTE PIPING PENETRATING WALLS OR FLOORS. ALL SUPPLY PIPING SHALL BE VALVED AT EACH FIXTURE. STOP VALVES SHALL BE CHROME-PLATED BRASS WITH 'T'-HANDLE.
- C. ALL FAUCET CONTROL VALVES, ETC., NOT INCLUDING STOPS IN WATER SUPPLIES, SHALL HAVE RENEWABLE SEATS OR REMOVABLE BARRELS CONTAINING SEATS. ALL FAUCETS SHALL BE REQUIRED TO MEET THE REQUIREMENTS OF ANSI/NSF STANDARD #61, DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS, SHALL BE CERTIFIED TO MEET THE COMMERCIAL REQUIREMENTS AND SUBMITTAL DATA SHALL INDICATE CERTIFICATION RATING.
- D. FIXTURES SHALL BE SET PLUMB AND SQUARE. JOINTS FORMED WHERE FIXTURES COME IN CONTACT WITH WALLS AND/OR FLOORS SHALL BE SEALED AND GROUTED.
- E. FIXTURES SHALL BE TURNED OVER TO THE OWNER ABSOLUTELY SOLID IN ITS POSITION AND POLISHED AND CLEANED CONDITION.
- F. DEFINITIONS
- . ABS: ACRYLONITRILE—BUTADIENE—STYRENE PLASTIC. 2. ACCESSIBLE FIXTURE: PLUMBING FIXTURE THAT CAN BE APPROACHED, ENTERED, AND USED BY PEOPLE WITH DISABILITIES. 3. CAST POLYMER: CAST-FILLED-POLYMER-PLASTIC MATERIAL. THIS
- MATERIAL INCLUDES CULTURED-MARBLE AND SOLID-SURFACE MATERIALS. 4. CULTURED MARBLE: CAST-FILLED-POLYMER-PLASTIC MATERIAL WITH SURFACE COATING.
- 5. FITTING: DEVICE THAT CONTROLS THE FLOW OF WATER INTO OR OUT OF THE PLUMBING FIXTURE. FITTINGS SPECIFIED IN THIS SECTION INCLUDE SUPPLIES AND STOPS, FAUCETS AND SPOUTS, SHOWER HEADS AND TUB SPOUTS, DRAINS AND TAILPIECES, AND TRAPS AND WASTE PIPES. PIPING AND GENERAL-DUTY VALVES ARE INCLUDED WHERE INDICATED. 6. FRP: FIBERGLASS-REINFORCED PLASTIC.
- 7. PVC: POLYVINYL CHLORIDE PLASTIC. 8. MMA: POLYMETHYL METHACRYLATE (ACRYLIC) PLASTIC.
- 9. SOLID SURFACE: NONPOROUS, HOMOGENEOUS, CAST-POLYMER-PLASTIC MATERIAL WITH HEAT-. IMPACT-. SCRATCH-. AND STAIN-RESISTANCE QUALITIES.

G. QUALITY ASSURANCE

- 1. SOURCE LIMITATIONS: OBTAIN PLUMBING FIXTURES, FAUCETS, AND OTHER COMPONENTS OF EACH CATEGORY THROUGH ONE SOURCE FROM A SINGLE MANUFACTURER. EXCEPTION: IF FIXTURES, FAUCETS, OR OTHER COMPONENTS ARE NOT AVAILABLE FROM A SINGLE MANUFACTURER, OBTAIN SIMILAR PRODUCTS FROM OTHER MANUFACTURERS SPECIFIED FOR THAT
- 2. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70. ARTICLE 100. BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
- REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN ICC A117.1, "ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES"; PUBLIC LAW 90-480. "ARCHITECTURAL BARRIERS ACT": AND PUBLIC LAW 101-336. "AMERICANS WITH DISABILITIES ACT"; FOR PLUMBING FIXTURES FOR PEOPLE WITH DISABILITIES.
- 4. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 102-486. "ENERGY POLICY ACT," ABOUT WATER FLOW AND CONSUMPTION RATES FOR PLUMBING FIXTURES. 5. NSF STANDARD: COMPLY WITH NSF 61, "DRINKING WATER SYSTEM

COMPONENTS—HEALTH EFFECTS," FOR FIXTURE MATERIALS THAT WILL BE

IN CONTACT WITH POTABLE WATER. 6. SELECT COMBINATIONS OF FIXTURES AND TRIM, FAUCETS, FITTINGS, AND OTHER COMPONENTS THAT ARE COMPATIBLE.

H. FIXTURES AND MISCELLANEOUS TRIM

- 1. VITREOUS CHINA FIXTURES (WATER CLOSET, URINAL , LAVATORY)
- a. COMPLY WITH THE FOLLOWING APPLICABLE STANDARDS AND OTHER REQUIREMENTS SPECIFIED FOR PLUMBING FIXTURES: ASME A112.19.2M. b. AVAILABLE MANUFACTURES SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: AMERICAN STANDARD, KOHLER, MANSFIELD OR EQUAL.

2. STAINLESS STEEL FIXTURES (HAND WASH FOUNTAIN AND SINK)

- a. COMPLY WITH THE FOLLOWING APPLICABLE STANDARDS AND OTHER REQUIREMENTS SPECIFIED FOR PLUMBING FIXTURES: ASME A112.19.3,
- ASME A112.18.1,ICC/ANSI 117.1 b. AVAILABLE MANUFACTURES SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: SINK - AMERICAN STANDARD, KOHLER, JUST OR EQUAL. HAND WASH FOUNTAIN - BRADLEY, ACORN, WILLOUGHBY OR EQUAL

3. SHOWER ENCLOSURE

- a. COMPLY WITH THE FOLLOWING APPLICABLE STANDARDS AND OTHER REQUIREMENTS SPECIFIED FOR PLUMBING FIXTURES: PLASTIC SHOWER ENCLOSURES; ANSI Z124.2. SLIP-RESISTANT BATHING SURFACES: ASTM
- . AVAILABLE MANUFACTURES SUBJECT TO COMPLIANCE WITH REQUIREMENTS. PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: AQUATIC BATH, AQUA BATH, AQUARIUS, COMFORT DESIGNS, LASCO BATHWARE OR EQUAL.

4. SHOWER VALVE

- a. COMPLY WITH THE FOLLOWING APPLICABLE STANDARDS AND OTHER REQUIREMENTS SPECIFIED FOR PLUMBING FIXTURES. SHOWER VALVE;
- ASME A112.18.1, ASSE 1016 b. AVAILABLE MANUFACTURES SUBJECT TO COMPLIANCE WITH REQUIREMENTS. PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

5. PLASTIC PLUMBING FIXTURES

POWERS, SYMMONS OR EQUAL.

- a. COMPLY WITH THE FOLLOWING APPLICABLE STANDARDS AND OTHER REQUIREMENTS SPECIFIED FOR PLUMBING FIXTURES: PLASTIC PLUMBING FIXTURES: IAMPO Z124-11
- b. AVAILABLE MANUFACTURES SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: DUPONT, FIAT OR APPROVED EQUAL.

6. FAUCETS

- a. COMPLY WITH THE FOLLOWING APPLICABLE STANDARDS AND OTHER REQUIREMENTS SPECIFIED FOR FAUCETS AND SUPPLY FITTINGS; ASME
- b. AVAILABLE MANUFACTURES SUBJECT TO COMPLIANCE WITH REQUIREMENTS. PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: MOEN COMMERCIAL, DELTA, SLOAN OR APPROVED EQUAL.

7. FLUSHOMETER VALVES

- a. COMPLY WITH THE FOLLOWING APPLICABLE STANDARDS AND OTHER REQUIREMENTS SPECIFIED FOR FLUSH VALVES AND SPUDS FOR URINALS; ASME A112.19.5
- b. AVAILABLE MANUFACTURES SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: SLOAN OR APPROVED EQUAL.

8. FLOOR DRAINS

- a. DURA-COATED CAST IRON BODY WITH TWO INCH BOTTOM OUTLET,
- SEEPAGE PAN. SIX (6) INCH DIAMETER STRAINER. b. AVAILABLE MANUFACTURERS SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: JAY R. SMITH, WADE, ZURN OR EQUAL
- 9. PROVIDE TRAP SEALING COMPONENT AT ALL FLOOR DRAINS AND FUNNEL DRAINS. THE INSTALLATION OF A SEALING COMPONENT ON THE FIXTURE DRAIN OUTLET TO REDUCE TRAP SEAL LOSS SHALL BE PERMITTED IN LIEU OF A TRAP PRIMER WHERE APPROVED BY THE LOCAL AUTHORITY.
- a. TRAP SEALING COMPONENT SHALL BE PROSET TRAP GUARD. MANUFACTURED BY PROSET SYSTEMS. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

1.27 GAS FIRED WATER HEATER

- A. FURNISH AND INSTALL A COMMERCIAL GAS WATER HEATER WHERE SHOWN ON THE DRAWINGS IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. WATER HEATER SHALL BE UL LISTED AND AGA CERTIFIED AS AN AUTOMATIC STORAGE TYPE UNIT AND ASME STAMPED WORKING PRESSURE. WATER HEATER STORAGE TANK SHALL MEET OR EXCEED THE THERMAL EFFICIENCY AND STANDBY LOSS REQUIREMENTS OF ASHRAE STANDARD 90.1B-2001
- B. GAS FIRED WATER HEATER SHALL BE SUITABLE FOR SEALED COMBUSTION DIRECT VENTING USING A FOUR INCH DIAMETER ABS AIR INTAKE PIPE AND FOUR INCH DIAMETER ABS EXHAUST PIPE FOR A TOTAL DISTANCE OF 120 EQUIVALENT FEET OF VENT AND 120 EQUIVALENT FEET OF INTAKE. THE HEATER SHALL BE FACTORY ASSEMBLED AND TESTED. THE POWER BURNER SHALL BE OF A DESIGN THAT REQUIRES NO SPECIAL CALIBRATIONS ON START-UP. THE HEATER SHALL BE APPROVED FOR ZERO INCH CLEARANCES TO COMBUSTIBLES. THE CONTROL SHALL BE AN INTEGRATED SOLID-STATE TEMPERATURE AND IGNITION CONTROL DEVICE WITH INTEGRAL DIAGNOSTICS, LED FAULT DISPLAY CAPABILITY AND A DIGITAL DISPLAY OF TEMPERATURE SETTINGS. THE TANK SHALL BE FOAM INSULATED AND EQUIPPED WITH A FACTORY INSTALLED ASME RATED TEMPERATURE PRESSURE RELIEF VALVE. THIS HEATER SHALL BE LISTED BY SCAOMD RULE 1146.2 LOW NOV, WATER HEATER SHALL BE OF THE SEAMLESS GLASS LINED STEEL TANK CONSTRUCTION IN WHICH THE GLASS COATING IS APPLIED TO THE WATERSIDE SURFACES OF THE TANK AFTER THE TANK HAS BEEN ASSEMBLED AND WELDED. THE CONDENSING FLUE COIL SHALL BE COATED ON THE FLUE GAS SIDE WITH ACID RESISTANT GLASS LINING DESIGNED FOR USE IN CONDENSING HEATERS. PIPE THE DISCHARGE FROM RELIEF VALVE TO NEAREST FLOOR DRAIN. PROVIDE BALL TYPE DRAIN VALVE ON HEATER FOR DRAINING PURPOSES.

- C. WATER HEATER SHALL BE AS MANUFACTURED BY A.O. SMITH, BRADFORD WHITE OR STATE INDUSTRIES. SEE SCHEDULE ON DRAWING FOR CAPACITIES, MODEL NUMBER AND ADDITIONAL ACCESSORIES.
- 1.28 TANKLESS ELECTRIC WATER HEATER
- A. FURNISH AND INSTALL COMMERCIAL ELECTRIC TANKLESS WATER HEATERS WHERE SHOWN ON THE PLANS. THE ELEMENTS SHALL BE SIZED SPECIFICALLY FOR THE VOLTAGE GIVEN.
- B. TANKLESS WATER HEATER SHALL BE COMPLETE WITH DIGITAL MICROPROCESSING TEMPERATURE CONTROL CAPABLE OFMAINTAINING OUTLET TEMPERATURE OF +/-1°F ACCURACY AND USES AN ASSE 1070 APPROVED INTEGRATED MIXING VALVE TO CONFORM TO UPC 407.3. ELEMENT SHALL BE REPLACEABLE CARTRIDGE INSERT. UNIT SHALL HAVE REPLACEABLE FILTER IN THE INLET CONNECTOR. ELEMENT SHALL BE IRON FREE, NICKEL CHROME MATERIAL. HEATER SHALL BE FITTED WITH 1/2" PIPE COMPRESSION FITTINGS (5/8" OD) OR 3/8" (1/2" OD) FITTINGS, TO ELIMINATE NEED FOR SOLDERING, MAXIMUM OPERATING PRESSURE OF 150 PSI.
- C. TANKLESS WATER HEATER SHALL BE AS MANUFACTURED BY EEMAX OR APPROVED EQUAL. MODEL AND CAPACITIES SHALL BE AS LISTED IN SCHEDULE ON DRAWINGS.

1.29 EXPANSION TANK

- A. WELDED STEEL TESTED AND STAMPED IN ACCORDANCE WITH ASME SPECIFICATIONS, RATE FOR WORKING PRESSURE 125 PSIG, WITH FLEXIBLE DIAPHRAGM SEALED INTO TANK, INLINE MODEL (PROVIDE SUPPORT PER MANUFACTURER'S RECOMMENDATIONS). FOR USE WITH POTABLE WATER SYSTEMS.
- B. MODEL ST-12-C MANUFACTURED BY AMTROL.
- 1.30 HOT WATER CIRCULATION PUMP
- A. IN-LINE CIRCULATING PUMP SHALL BE OF THE HORIZONTAL SYSTEM LUBRICATED TYPE SPECIFICALLY DESIGNED AND GUARANTEED FOR QUIET OPERATION. THE PUMP BODY SHALL BE LEAD-FREE BRONZE SUITABLE FOR 230°F (110°C) AND OPERATION AT 150 PSIG WORKING PRESSURE. PUMP SHALL HAVE A CERAMIC SHAFT SUPPORTED BY CARBON BEARINGS. BEARINGS ARE TO BE LUBRICATED BY THE CIRCULATING FLUID. MOTOR STATOR TO BE ISOLATED FROM CIRCULATING FLUID THROUGH USE OF STAINLESS-STEEL CAN. ROTOR TO BE SHEATHED IN STAINLESS STEEL, MOTORS SHALL BE NON-OVERLOADING AT ANY POINT ON THE PUMP CURVE. MOTORS TO HAVE BUILT-IN IMPEDANCE PROTECTION.
- B. PUMP CONTROL SHALL BY AN AQUASTAT AND TIME CLOCK. COORDINATE ALL ELECTRICAL CHARATERISTICS AND WIRING WITH THE ELECTRICAL CONTRACTOR.
- C. PUMP SHALL BE AS MANUFACTURED BY XYLEM BELL & GOSSETT OR APPROVED EQUAL OF TACO OR GROUNDFOS. PUMP MODEL, CAPACITIES AND ELECTRICAL CHARACTERISTICS SHALL BE AS LISTED IN SCHEDULE ON
- 1.31 THERMOSTATIC MIXING VALVES

DRAWINGS.

- A. MIXING VALVE SHALL BE THERMOSTATIC TYPE WITH UNION INLET STRAINERS, CHECK STOPS. THERMOMETER. SHUTOFF VALVES AND ROUGH BRONZE FINISH MODEL LFLM495, MANUFACTURED BY POWERS. VALVE SHALL BE ASSE 1017 COMPLIANT. INSTALL AND SET UP SYSTEM IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. SET MIXING VALVE TO SUPPLY DOMESTIC HOT WATER AT 140 DEGREES F.
- B. INDIVIDUAL MIXING VALVES SHALL BE PROVIDED AT ALL LAVATORIES AND SINKS. MIXING VALVE SHALL BE THERMOSTATIC TYPE WITH UNION INLET STRAINERS, CHECK STOPS, THERMOMETER, SHUTOFF VALVES AND ROUGH BRONZE FINISH; MODEL LFG480, MANUFACTURED BY POWERS. VALVE SHALL BE ASSE 1070 COMPLIANT DOWN TO 0.25 GPM. INSTALL AND SET UP SYSTEM IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. SET MIXING VALVE TO SUPPLY DOMESTIC HOT WATER AT 110 DEGREES F.
- C. THE EMERGENCY MIXING VALVE SHALL BE IN COMPLIANCE WITH ANSI Z358.1 TO CONTROL AND MAINTAIN THE TEMPERATURE OF THE TEPID WATER TO THE SAFETY STATION . MIXING VALVE WILL CLOSE DOWN ON FAILURE OF COLD-WATER SUPPLY AND INCLUDE SPECIAL INTERNAL COLD-WATER BYPASS CAPABLE OF 20 GPM AT 30 PSI UPON FAILURE OF HOT WATER SUPPLY. UNIT SHALL BE SELF-CONTAINED AND INCLUDE A THERMOSTATIC WATER MIXING VALVE, A DIAL THERMOMETER ON THE OUTLET, UNION ANGLE CHECKSTOPS, WALL MOUNTING BRACKET, PIPING AND FITTINGS FACTORY ASSEMBLED AND TESTED. TOP INLETS AND TOP OUTLET. EMERGENCY MIXING VALVE SHALL BE MODEL TM-800-LF, MANUFACTURED BY LEONARD VALVE, POWERS' MODEL ETV20BQ000 OR APPROVED EQUAL.

1.32 GENERAL PIPE INSTALLATION

- A. IN GENERAL, INSTALL ALL PIPING SO AS TO PRESERVE ACCESS TO ALL VALVES, TRAPS, EQUIPMENT, ETC. ALL PIPING, VALVES, FITTINGS, ETC., SHALL BE KEPT A SUFFICIENT DISTANCE FROM THE OTHER WORK TO PERMIT A CLEARANCE OF NOT.LESS THAN 1 INCH BETWEEN THE FINISHED COVERING ON SUCH PIPING AND ALL ADJACENT WORK, WEATHER UNDER THIS OR OTHER TRADES. ALL PIPING SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO WALLS, CEILINGS, COLUMNS (CONSISTENT WITH PROPER SPACE FOR COVERING, REMOVAL OF PIPE, ETC. SO AS TO OCCUPY THE MINIMUM OF SPACE HORIZONTAL RUNS OF PIPING SHALL BE SUBSTANTIALLY SUPPORTED FROM THE BUILDING STRUCTURE TO MAINTAIN THE REQUIRED PITCH AND GRADE OF THE PIPE LINES. HANGER RODS SHALL BE CONNECTED TO THE BEAM CLAMPS, INSERTS OR HANGER CLIPS WELDED TO THE STRUCTURAL STEEL. THE HANGING OF ONE PIPE FROM ANOTHER SHALL NOT BE PERMITTED. PROPER CARE SHALL BE EXERCISED IN THE ERECTION OF ALL PIPING TO ENSURE PROPER DRAINAGE AND CIRCULATION, INCLUDING PROPER PROVISION FOR EXPANSION AND CONTRACTION OF PIPING. POCKETS OR TRAPS WHEREIN AIR CAN COLLECT SHALL NOT BE PERMITTED. ALL PIPING SHALL BE REAMED TO REMOVE CUTTING BURRS AND SHARP EDGES. ALL COPPER TUBING SHALL BE CUT WITH SQUARE ENDS AND ALL BURRS AND FINS REMOVED. TUBING SHALL BE CAREFULLY HANDLED AND PROTECTED TO AVOID DAMAGE. REDUCING FITTINGS SHALL BE USED WHEREVER POSSIBLE. THE USE OF BUSHINGS SHALL BE PROHIBITED. ECCENTRIC REDUCERS SHALL BE USED. THREADS FOR SCREW FITTINGS SHALL BE AMERICAN STANDARD TAPER PIPE THREADS. ALL PIPING SHALL BE CAPPED DURING INSTALLATION TO KEEP THE SYSTEM CLEAN. LOCATE ALL WATER PIPING WITHIN HEATED SPACES WITH PROVISIONS
- FOR DRAINING ALL LINES. B. DURING CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN A RECORD SET OF INSTALLATION PRINTS. RECORD THESE PRINTS, ALL DEVIATIONS FROM THE CONTRACT DRAWINGS, INCLUDING BUT NOT LIMITED TO, PIPE ROUTING, SYSTEM CONNECTION POINTS, PIPE SIZES AND EQUIPMENT LOCATION CHANGES. AT THE COMPLETION OF THE WORK. THE CONTRACTOR SHALL TRANSFER THIS NEATLY ONTO THREE SETS OF PRINTS AND FORWARD THESE PRINTS AND THE AS-BUILT PRINTS TO THE OWNER AND TENANT.

1.33 BALANCING

A. PROVIDE BALANCING OF HOT WATER RECIRCULATION PIPING UNDER THE DIRECT SUPERVISION OF A QUALIFIED PROFESSIONAL ENGINEER WITH ACCURATELY CALIBRATED INSTRUMENTS AND SUBMIT SIX COPIES OF COMPLETE TEST DATA FOR REVIEW PRIOR TO FINAL INSPECTION ON AABC OR NEBB FORMS.AFTER THE COMPLETION OF THE INSTALLATION OF ALL PIPING AND CIRCUIT SETTERS AND FLUSHING OF THE SYSTEM, OPERATE THE SYSTEM AND MAKE ALL REQUIRED ADJUSTMENTS AND ALTERATIONS TO DELIVER THE FLOWS SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL PROVIDE THE NECESSARY GAUGE CONNECTIONS, TEMPERATURE CONNECTIONS, FLOW FITTINGS, TEST EQUIPMENT ETC. TO OBTAIN THE DATA REQUIRED.CHECK, ADJUST AND RECORD THE FLOW RATES AND DELTA PRESSURES AT EACH CIRCUIT SETTER.CHECK AND RECORD THE PUMP SUCTION AND DISCHARGE PRESSURES, TOTAL DYNAMIC HEAD, SYSTEM FLOWS AND ZONE FLOWS.CHECK AND RECORD THE INLET WATER TEMPERATURE, FLOW AND OUTLET TEMPERATURES AT ALL THERMOSTATIC MIXING VALVES.SUBMIT A STARTUP REPORT INDICATING FLOW CONDITIONS, PRESSURES AND TEMPERATURES.

- B. SET UP EACH MASTER MIXING VALVE IN ACCORDANCE WITH THE MANUFACTURES RECOMMENDATIONS. SET MIXING VALVES TO SUPPLY WATER TEMPERATURES LISTED. ENGAGE THE SERVICES OF THE VALVE MANUFACTURE REPRESENTATIVE TO CONFIRM PROPER SETUP FLOWS.
- C. CHECK AND SET OPERATION OF ALL ELECTRONIC FAUCETS AND FLUSH VALVES. SET FAUCET TIME OUT ADJUSTMENT SETTINGS TO MEET EACH INDIVIDUAL APPLICATION. VERIFY SETTING WITH OWNERS' REPRESENTATIVE.
- D. THE "START-UP" OF THE WATER HEATER SYSTEM SHALL BE CARRIED OUT BY THE CONTRACTOR, THE CONTRACTOR SHALL CHECK THE OPERATION OF ALL WATER HEATER THERMOSTAT SETPOINTS AND OPERATIONS.
- E. THE CONTRACTOR SHALL CHECK THE OUTET TEMPERATURE AT LAVATORY AND SINK FIXTURES, THERMOSTATIC MIXING VALVE(S) AND WATER HEATER THERMOSTAT SETPOINTS AND OPERATIONS.

1.34 STERILIZATION OF DOMESTIC WATER SYSTEM

TEST AND LEAKAGE TEST.

- A. BEFORE BEING PLACED IN SERVICE, ALL DOMESTIC WATER LINES SHALL BE CHLORINATED USING A METHOD THAT IS SATISFACTORY TO THE WATER AUTHORITY OR THE AUTHORITY HAVING JURISDICTION. IN THE ABSENCE OF A PRESCRIBED METHOD, THE PROCEDURE AS DESCRIBED BELOW SHALL BE USED.
- B. PRIOR TO CHLORINATION, ALL DIRT AND FOREIGN MATTER SHALL BE REMOVED BY A THOROUGH FLUSHING. THIS SHALL BE DONE AFTER THE PRESSURE
- C. A CHLORINE HYPOCHLORITE SOLUTION SHALL BE APPLIED BY MEANS OF A SOLUTION FEED DEVICE OR THE GAS SHALL BE FED DIRECTLY FROM A CHLORINE CYLINDER EQUIPPED WITH PROPER DEVICES FOR REGULATING THE

RATE OF FLOW AND THE EFFECTIVE DIFFUSE OF GAS WITHIN THE PIPE.

- D. WATER SHALL BE CONTROLLED TO FLOW SLOWLY INTO THE SYSTEM DURING THE APPLICATION OF CHLORINE IN SUCH PROPORTIONS THAT THE CHLORINE DOSE APPLIED TO THE WATER ENTERING THE PIPE SHALL BE AT LEAST 40 TO
- 50 PARTS PER MILLION. . TREATED WATER SHALL BE RETAINED IN THE SYSTEM LONG ENOUGH TO DESTROY ALL NON-SPORE FORMING BACTERIA. THIS PERIOD SHALL BE AT LEAST TWENTY-FOUR HOURS. A LONGER CHLORINE CONTACT TIME MAY BE REQUESTED BY THE OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST TO
- THE OWNER. F. AFTER THE CHLORINE TREATED WATER HAS BEEN RETAINED FOR THE REQUIRED TIME, THE CHLORINE RESIDUAL AT THE PIPE EXTREMITIES AND AT OTHER

REPRESENTATIVE POINTS SHALL BE AT LEAST FIVE PARTS PER MILLIONS.

- G. FOLLOWING CHLORINATION. ALL TREATED WATER SHALL BE THOROUGHLY FLUSHED FROM THE SYSTEM AT ITS EXTREMITIES UNTIL THE REPLACEMENT WATER THROUGHOUT ITS LENGTH SHALL, UPON TEST, BE EQUAL TO THE WATER QUALITY SERVED FROM THE WATER SUPPLY SYSTEM.
- H. SHOULD THE INITIAL TREATMENT IN THE OPINION OF THE OWNER'S REPRESENTATIVE PROVE INEFFECTIVE, THE CHLORINATION PROCEDURE SHALL BE REPEATED UNTIL CONFIRMED TESTS SHOW THAT WATER SAMPLED FROM THE SYSTEM CONFORMS TO THE REQUIREMENTS.

1.35 TEST OF DRAINAGE SYSTEM

- A. ALL PLUMBING AND DRAINAGE PIPING SHALL BE TESTED BY PLUGGING ALL OPENINGS AND FILL SYSTEM WITH WATER TO THE TOP OF ALL VENT PIPES. THE WATER SHALL STAND FOR 30 MINUTES FOR INSPECTION. ALL TESTS MUST COMPLY WITH LOCAL AUTHORITY REQUIREMENTS.
- 1.36 TEST OF DOMESTIC WATER PIPING A. ALL WATER LINES SHALL BE TESTED TO A HYDROSTATIC PRESSURE EQUAL TO
- 1-1/2 TIMES THE MAXIMUM OPERATING PRESSURE. THE SYSTEM SHALL BE LEAK-FREE FOR 24 HOURS AT THIS PRESSURE
- 1.37 TEST OF GAS PIPING
- A. ALL GAS LINES SHALL BE TESTED TO A HYDROSTATIC PRESSURE OF 60 PSIG FOR A MINIMUM OF EIGHT (8) HOURS WITHOUT A LOSS OF PRESSURE. FOLLOWING INSTRUCTIONS 2.11 AND 2.12 IN NFPA MANUAL 54.
- 1.38 THE CONTRACTOR SHALL FURNISH THREE SETS OF INSTRUCTION MANUALS TO THE OWNER AT COMPLETION OF CONSTRUCTION.

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