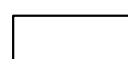
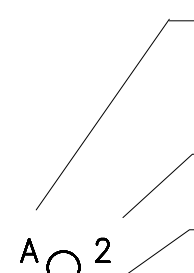




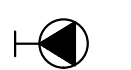






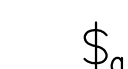



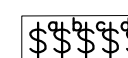

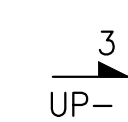


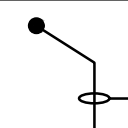
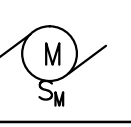


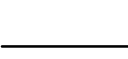
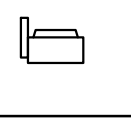

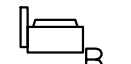



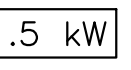
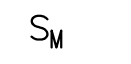
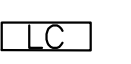
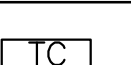
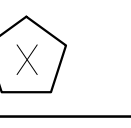
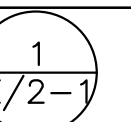



ELECTRICAL SYMBOLS LIST					GENERAL NOTES		
LIGHTING		POWER AND TELECOMMUNICATION		ELECTRICAL ABBREVIATIONS			
    	LIGHTING FIXTURE AND OUTLET BOX.		JUNCTION BOX WITH BLANK COVER PLATE, FLUSH IN FLOOR.	A	AMPERES	EA	EACH
	LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE.		SPECIAL RECEPTACLE AS PER EQUIPMENT SPECIFICATION	A/C, AC	AIR CONDITIONING UNIT	EM	EMERGENCY
	CIRCUIT NUMBER : INDICATED BY NUMBER		DUPLEX GFI RECEPTACLE	AF	AMPERE FRAME/AMP FUSE	EMT	ELECTRICAL METALLIC TUBING
	SWITCHING INDICATED BY LOWER CASE LETTERS.		DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.	AFF	ABOVE FINISHED FLOOR	EQUIP	EQUIPMENT
	EMERGENCY EXIT LIGHT FIXTURE WITH 90 MINUTES BATTERY BACKUP		DEDICATED DUPLEX RECEPTACLE	AS	AMP SWITCH	ER	EXISTING TO BE RELOCATED
EMERGENCY WALL PACK LIGHT FIXTURE AND EXIT SIGN WITH 90 MINUTES BATTERY BACKUP		DEDICATED DUPLEX GFI RECEPTACLE	AIC	AMPS INTERRUPTING CAPACITY	FA	FIRE ALARM	
EMERGENCY WALL PACK LIGHT FIXTURE WITH 90 MINUTES BATTERY BACKUP		DUPLEX CEILING MOUNTED RECEPTACLE	AT	AMP TRIP	E	EXISTING	
SWITCHES AND CONTROLS			DUPLEX FLOOR MOUNTED RECEPTACLE	ATS	AUTOMATIC TRANSFER SWITCH	FL	FLOOR
	20A SPST TOGGLE SWITCH U.O.N. "o" DENOTES LIGHTING FIXTURE CONTROLLED.		DOUBLE DUPLEX RECEPTACLE – 20A–1P, 125V, NEMA 5–20R.	AUTO	AUTOMATIC	G	GROUND
	WALL OCCUPANCY SWITCH		TELEPHONE/DATA OUTLET, 4" SQUARE OUTLET BOX WITH SINGLE GANG COLLAR AND BLANK PLATE. PROVIDE 3/4" E.C., U.O.N., UP TO HUNG CEILING AND TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE.	AWG	AMERICAN WIRE GAUGE	GFI	GROUND FAULT INTERRUPTER
	SWITCH BANK			C	CONDUIT	GP	GENERAL PURPOSE
WIRING SYSTEMS			DATA OUTLET	C/B,CB	CIRCUIT BREAKER	HP	HORSEPOWER
	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 2#12 Ø, 2#12 N. & 2#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.		JUNCTION BOX	CKT	CIRCUIT	HWH	HOW WATER HEATER
	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 3#12 Ø, 3#12 N. & 3#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.	MOTORS AND CONTROLS		CL	CURRENT LIMITER	HZ	HERTZ
	CONDUIT AND WIRE TO BUILDING GROUND.		AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION WITH JUNCTION BOX AND MOTOR SWITCH.	CLG	CEILING	IC	INTERRUPTING CAPACITY
	EXISTING		AC OUTDOOR UNIT MOTOR AS NOTED WITH CONTROLLER AND DISCONNECT SWITCH WITH WEATHER PROOF.	COMM	COMMUNICATION	PP	POWER PANEL
	NEW		NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES AS NOTED.	CT	CURRENT TRANSFORMER	PWR	POWER
			30A/240V NON FUSED DISCONNECT SWITCH	CU	COPPER	R	REMOVE
			60A/240V NON FUSED DISCONNECT SWITCH	DIA	DIAMETER	RE	RELOCATED EXISTING
			100A/240V NON FUSED DISCONNECT SWITCH	DISC	DISCONNECT	REC	RECEPTACLE
			200A/240V NON FUSED DISCONNECT SWITCH	DN	DOWN	RGS	RIGID GALVANIZED STEEL
			COMBINATION MAGNETIC STARTER AND DISCONNECT SWITCH, FURNISHED BY HVAC/CONTRACTOR, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.	DP	DISTRIBUTION PANEL	RR	REMOVE & RELOCATE
			ELECTRICAL HEATER, NUMBER DENOTES HEATER RATING	DWG	DRAWING	SECT	SECTION
			MANUAL MOTOR SWITCH	IG	ISOLATED GROUNDING	SPDT	SINGLE POLE DOUBLE THROW
			LIGHTING CONTACTOR	JB	JUNCTION BOX	SPST	SINGLE POLE SINGLE THROW
			TIME CLOCK	KCMIL	ONE THOUSAND CIRCULAR MILS	SPEC	SPECIFICATION
ELECTRICAL DRAWING LIST		ANNOTATION		KV	KILOVOLT	SW	SWITCH
E0.1	ELECTRICAL SYMBOLS LIST, NOTES AND ABBREVIATIONS		KEYED NOTE REFERENCE	KVA	KILOVOLT–AMPERES	SWBD	SWITCHBOARD
E0.2	ELECTRICAL SPECIFICATIONS SHEET 1 OF 2	+24"	INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR	KW	KILOWATTS	SYM	SYMMETRICAL
E0.3	ELECTRICAL SPECIFICATIONS SHEET 2 OF 2		DETAIL REFERENCE: DETAIL NUMBER INDICATED ON TOP; DRAWING NUMBER INDICATED ON BOTTOM	LTG	LIGHTING	SYS	SYSTEMS
E1.0	ELECTRICAL LIGHTING PLAN	POWER DISTRIBUTION		MAX	MAXIMUM	TELE	TELEPHONE
E2.0	ELECTRICAL POWER PLAN		DISTRIBUTION PANELBOARD, 208V/120V–SURFACE OR FLUSH MOUNTED.	MC	MOTOR CONTROLLER	TEMP	TEMPERATURE
E2.1	ELECTRICAL ROOF POWER PLAN			MCB	MAIN CIRCUIT BREAKER	TXF	TOILET EXHAUST FAN
E3.0	ELECTRICAL RISER DIAGRAM & PANEL SCHEDULE			MLO	MAIN LUGS ONLY	TYP	TYPICAL
E4.0	ELECTRICAL DETAILS			MTD	MOUNTED	UON	UNLESS OTHERWISE NOTED
				MTS	MANUAL TRANSFER SWITCH	V	VOLT/VOLTAGE
				N	NEUTRAL	VA	VOLT AMPERE
				NIC	NOT IN CONTRACT	WP	WEATHER PROOF
				NTS	NOT TO SCALE	Ø	PHASE
				PNL	PANEL	DW	DISHWASHER
				W	WATT		
				REF	REFRIGERATOR		

1. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE CURRENT VERSION OF THE 2017 NATIONAL ELECTRICAL CODE AND 2018 INTERNATIONAL ENERGY CONSERVATION CODE.

2. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.

3. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.

4. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH AT RIGHT ANGLES TO WALLS.

5. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.

6. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.

7. CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.

8. ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.

9. CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE-EXISTING CONDITIONS OR BETTER.

10. MINIMUM SIZE OF CONDUIT SHALL BE ¾", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.

11. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.

12. PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVIDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CANCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.

13. SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.

14. FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.

15. ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAINLIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.

16. ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

17. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.

18. ALL CONDUITS AND EQUIPMENT TO BE CONCEAL ED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.

19. ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.

20. OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE–RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE–RATED BOXES OR PUTTY PADS ARE UTILIZED.

21. COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITH THE ENGINEER AND OWNER BEFORE INSTALLATION.

22. COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.

23. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL LUMINARIES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.

24. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.

25. LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.

26. NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANELBOARD.

ELECTRICAL SYMBOLS LIST,
NOTES AND ABBREVIATIONS

ELECTRICAL SPECIFICATIONS

1. GENERAL:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED, MAINTAIN HEADROOM AND SPACE CONDITIONS.
- C. BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
- D. INSTALL WORK SO AS TO BE READILY ACCESSIBLE. FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS FROM DRAWING MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- E. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.
- F. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES. AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.
- G. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- H. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- I. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
- J. PROVIDE ALL NECESSARY FLASHING AND CONDUIT FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.
- K. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
- L. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- M. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- N. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- O. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- P. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATED OF INSPECTION AND APPROVAL.

2. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. DEFINITIONS:

- 1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE, AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
- 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
- 5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
- 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
- 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
- 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

- B. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.

C. QUALITY ASSURANCE

- 1) QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
- 2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.
- 3) CURRENT CHARACTERISTICS:

- a. SERVICE: 120/208 VOLT, 1 PHASE, 3 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.
- b. DISTRIBUTION: 120/208 VOLT, 1 PHASE, 3 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

4) HEIGHTS OF OUTLETS:

- a. FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:
- RECEPTACLES AND TELEPHONES: 1 FT-6 IN.
 - WALL SWITCHES: 4 FT-0 IN.
 - WALL FIXTURES: 7 FT-0 IN.
 - MOTOR CONTROLLERS: 5 FT-0 IN.
 - CLOCKS: 7 FT 6 IN

- b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.

D. PRODUCT DELIVERY, STORAGE AND HANDLING

- 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
- 2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS SHALL BE PERMITTED, CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

E. MATERIALS

- 1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.
- 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
- 3) INSERTS AND SUPPORTS:
- a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
- SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
 - MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
 - CLIP FORM NAILS FLUSH WITH INSERTS.
 - MAXIMUM LOADING 75 PERCENT OF RATING.
- b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
- c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OR BOLTED ANGLES OR CHANNELS.
- d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.

- F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARKED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.

- G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED, CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.

- H. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT.

- I. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

3. SCOPE OF WORK:

- A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMING WITH THE 2020 NATIONAL ELECTRICAL CODE (NEC) AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
- B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLIED OR SPECIFIED HEREIN.
- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OF ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER, DATE IS EARLIER, THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDED THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR

- D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

- E. CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE 2021 EXISTING INTERNATIONAL BUILDING CODE. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.

- F. AREAS WITH NO ELECTRICAL WORK SHALL REMAIN AS IS. CONTRACTOR SHALL MAINTAIN CONTINUITY OF ALL ELECTRICAL SYSTEMS TO ALL AREAS NOT COVERED BY THIS RENOVATION AND SHALL PROVIDE 48 HOUR NOTICE TO LANDLORD OF ANY PLANNED POWER INTERRUPTIONS OR SIGNAL SYSTEM OUTAGES.

4. SHOP DRAWINGS

- A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

- 1) PROJECT NAME AND LOCATION
- 2) NAME OF ARCHITECT AND ENGINEER
- 3) ITEM IDENTIFICATION
- 4) APPROVAL STAMP OF PRIME CONTRACTOR

C. SUBMISSIONS:

- 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.

- 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.

D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

- 1) SAFETY/DISCONNECT SWITCHES
- 2) FUSES
- 3) CIRCUIT BREAKERS
- 4) PANELBOARDS/LOADCENTER (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).
- 5) RACEWAYS
- 6) WIRE AND CABLE
- 7) WALL SWITCHES
- 8) INSERTION RECEPTACLES
- 9) MOMENTARY CONTACT SWITCHES
- 10) TIME SWITCHES
- 11) LIGHTING FIXTURES.

- E. ASSIST AND PROVIDE ALL NECESSARY INFORMATION, DIAGRAMS, SKETCHES, ETC., TO THE HVAC CONTRACTOR, FOR THE PREPARATION OF COORDINATED SHOP DRAWINGS INDICATING ROUTING OF FEEDERS, CONTROL CONDUITS, RECESSED FIXTURES AND ADJACENT NEARBY PIPING AND DUCTWORK WHERE APPLICABLE, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT FOUR(4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL SHOP DRAWING. PROVIDE SHOP DRAWINGS FOR PANELS, FIXTURES, WIRING DEVICES, CONDUIT, CABLE, DISCONNECT SWITCH, RELAYS, CONTRACTORS, AND OTHER SYSTEMS AS DIRECTED BY THE ENGINEER.

5. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

- A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.

- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.

- D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.

6. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:

- A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.
- B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.
- C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 6808F. THREE-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 7810F. KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE- QUICK-BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.

7. FUSES:

- A. CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.

- B. MOTOR CIRCUITS - ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL-LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.

- C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.

- D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.

- E. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLT-ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP-FREE HANDLE. MULTI-POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT-TRIPPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:

- 1) 120 VOLTS, 100-AMP FRAME: 10,000* AMPS, 1 POLE.
- 2) 120/240 VOLTS, 225-AMP FRAME: 22,000* AMPS MINIMUM

- * AIC RATING SHALL BE COORDINATED WITH THE UTILITY COMPANY. BASE BID ACCORDINGLY.

8. RACEWAYS:

- A. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4 IN.

B. MATERIALS

1) RACEWAYS:

- a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED, THREADED.
- b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.
- c. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.
- d. WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NO. 16 GAUGE. STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.
- e. SURFACE METAL RACEWAY: SIZE AS NOTED, BASE 0.04 IN., COVER 0.25 IN. MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

2) FITTINGS AND ACCESSORIES:

- a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.
- b. ELECTROMETALLIC TUBING: COMPRESSION TYPE. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
- c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.

3) BOXES:

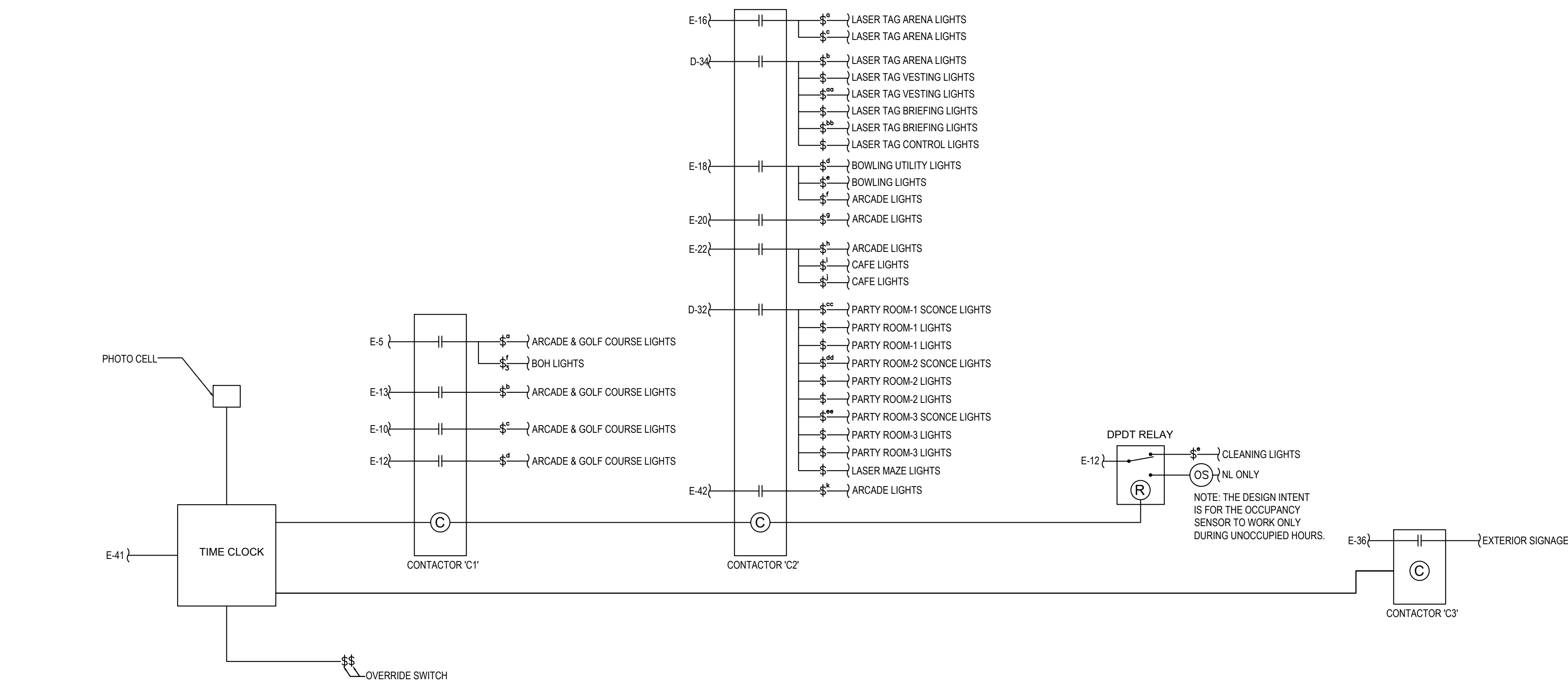
- a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION.
- b. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN 120/208 VOLT AND 265/460 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.

ELECTRICAL SPECIFICATIONS

- C. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.
- PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS, TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.
- SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER NEC 386.56 AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK, NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.
- EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.
- MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.
- EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.
- RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED. EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS. FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS.
- CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.
- ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.
- EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.
- RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.
- D. PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH 2020 NATIONAL ELECTRIC CODE ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE-PIECE PLUG WITH POZI-GRIP WEDGING PLUG AS MANUFACTURED BY 02-GEDNEY.
- INSTALL CABLE SUPPORTS AT THE TOP OF A VERTICAL RISE AND PROVIDE INTERMEDIATE ADDITIONAL SUPPORTS AS REQUIRED TO LIMIT SUPPORTED CONDUCTOR LENGTHS TO NOT GREATER THAN THOSE SPECIFIED IN 2020 NEC TABLE 300.19(A).
- ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.
- PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.
- E. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE-PARTITIONS ROOMS.
- F. PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.
10. WIRE AND CABLE:
- A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.
- B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.
- C. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE

- NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM. OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.
- D. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).
- E. ARMORED CABLE (BX) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS. WHEN USED IN LIEU OF WIRING IN CONDUIT, STATE IN PROPOSAL THAT PRICE IS BASED UPON THE USE OF HOSPITAL GRADE 'BX'.
- F. COLOR CODING SHALL BE AS FOLLOWS:
- 120/208 VOLT SYSTEM:
BLACK FOR A PHASE
RED FOR B PHASE
BLUE FOR C PHASE
- 1) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.
- WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.
- G. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.
- H. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.
- I. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 265/460 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.
- J. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.
- K. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.
- PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.
11. WIRING DEVICES:
- A. WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS OTHERWISE NOTED. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.
- B. LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, RATED 20 AMP, 120/277 VOLT, AC. SIMILAR TO LEVITON DECORA SERIES A5621 (SINGLE POLE), A5623 (3-WAY) AND A5624 (4-WAY).
- C. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.
- D. COLORS: COORDINATE COLORS WITH ARCHITECT.
- E. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.
12. LIGHTING FIXTURES:
- A. FIXTURES TO BE AS SPECIFIED BY ARCHITECT AND SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.
- B. FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.
- C. LED DRIVERS SHALL BE ELECTRONIC TYPE, LABELED AS COMPLIANT WITH RADIO FREQUENCY INTERFERENCE (RFI) REQUIREMENTS OF FCC TITLE 47, PART 15 AND COMPLY WITH NEMA SSL 1 "ELECTRONIC DRIVERS FOR LED DEVICES, ARRAYS OR SYSTEMS". LED DRIVERS SHALL HAVE A SOUND RATING OF "A", HAVE A MINIMUM EFFICIENCY OF 85% AND BE RATED FOR A THD OF LESS THAN 20% AT ALL INPUT VOLTAGES.
- D. DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE. PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE. DIMMABLE LED DRIVERS SHALL BE 0-10V WHERE NOT INDICATED.
- E. CONTINUOUS ROW, TWO LAMP STRIP FIXTURES SHALL BE STAGGERED TYPE.
- F. EXIT SIGNS SHALL BE PRECISION DIE-CAST ALUMINUM HOUSING WITH LASER-FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED FOR USE IN CHELSEA CITY. AC POWERED WITH PREMIUM LONG-LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3-HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

13. GROUNDING AND BONDING:
- A. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND THESE SPECIFICATIONS. THE WIRING SYSTEM SHALL BE INSTALLED AS REQUIRED TO PROVIDE A CONTINUOUSLY GROUNDED SYSTEM. WHERE FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, AN INSULATED GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO GROUNDING BUSHINGS AT EACH END OF THE RUN.
- B. USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.
- C. EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.
- D. WHERE FLEXIBLE METALLIC CONDUIT IS USED AN INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.
- E. IN ADDITION, FURNISH A SEPARATE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR WHERE INDICATED ON DRAWINGS AND FOR THE FOLLOWING BRANCH CIRCUITS:
- 1) CIRCUITS SERVING ANY WALL BOX DIMMER.
- 2) CIRCUITS SERVING ANY ISOLATED GROUND RECEPTACLES. TERMINATE GROUND DIRECTLY AT AN EQUIPMENT GROUNDING CONDUCTOR TERMINAL OF THE SOURCE AT THE SOURCE , OR AS OTHER WISE NOTED ON DRAWINGS.
- 3) CIRCUITS SERVING ANY DUPLEX OR SIMPLEX COMPUTER RECEPTACLES
- 4) ANY CIRCUIT SERVED VIA AN ISOLATION TRANSFORMER OR COMPUTER POWER DISTRIBUTION UNIT.

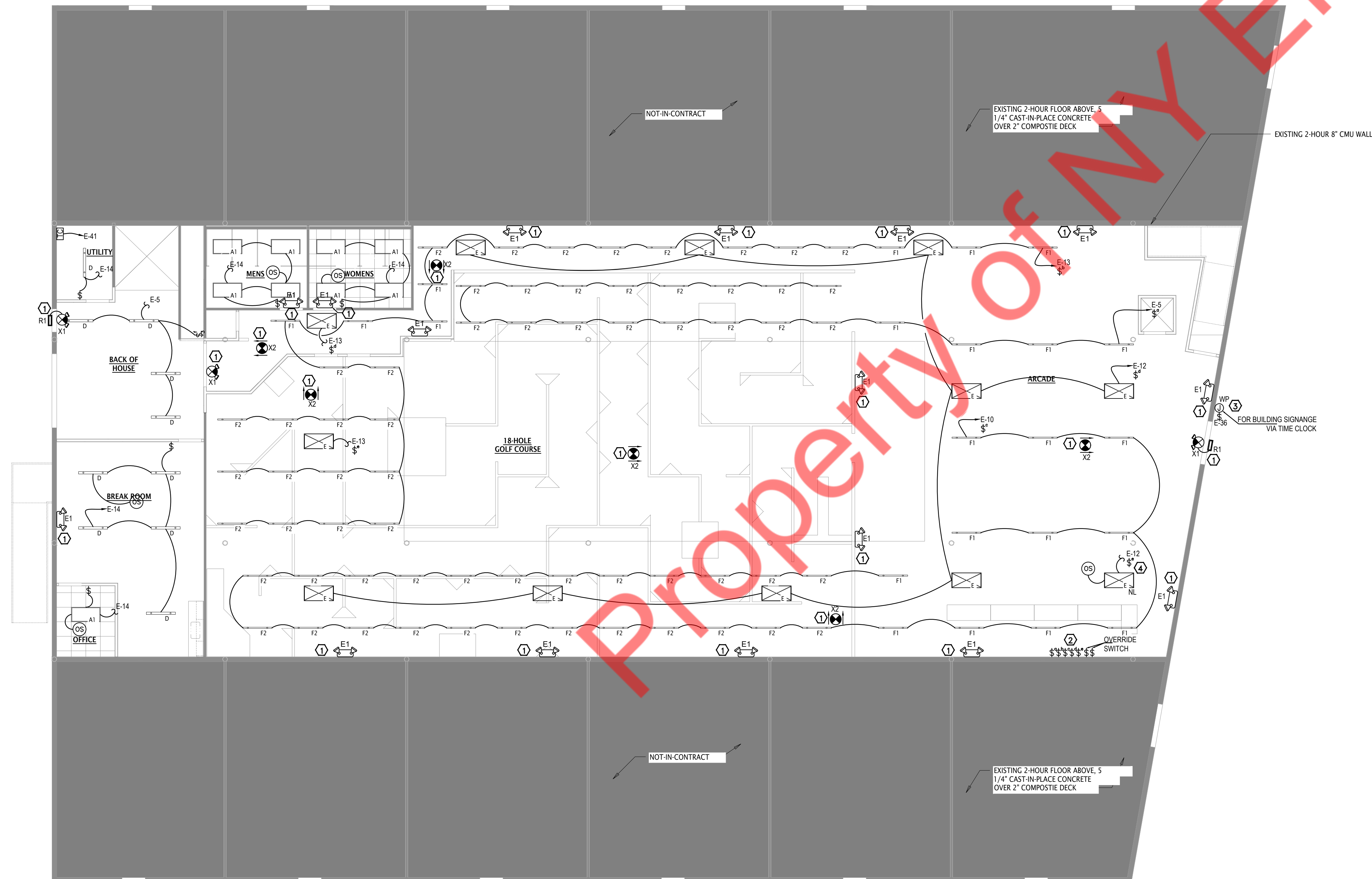


ELECTRICAL LIGHTING PLAN GENERAL NOTES

- A. ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATION & QUANTITY OF ALL THE LIGHT FIXTURES IN FIELD AND PROVIDE NEW LIGHTING CONTROLS AS SHOWN, ALSO VERIFY IF THE EXISTING LIGHT FIXTURES ARE IN OPERABLE CONDITION, REPLACE WITH NEW OF SAME TYPE, IF IN OPERABLE. BASE BID ACCORDINGLY.
- B. ELECTRICAL CONTRACTOR SHALL UPDATE THE EMERGENCY LIGHT FIXTURES QUANTITY AND LOCATION AS REQUIRED BY LOCAL AHJ.
- C. DIMMER TYPE, REQUIREMENT AND QUANTITY SHALL BE AS PER THE SITE REQUIREMENT IN COORDINATION WITH THE LIGHTING VENDOR/OWNER.
- D. EXTERIOR LIGHT FIXTURES & SIGNS WIRING SHALL BE RE ROUTED AND CONTROLLED VIA LIGHTING CONTACTOR (L.C.) WITH TIME CLOCK/PHOTOCELL. CONTRACTOR SHALL PROVIDE LIGHTING CONTACTOR POLES IN COORDINATION WITH LIGHTING VENDOR AND BASE BID ACCORDINGLY.
- E. ELECTRICAL CONTRACTOR SHALL PROVIDE LIGHTING CONTACTOR (L.C.), ALL THE LIGHT FIXTURES ARE CONTROLLED VIA LIGHTING CONTACTOR WITH TIMER. COORDINATE EXACT CONTROL REQUIREMENTS WITH LIGHTING VENDOR AND PROVIDE AUTOMATIC LIGHTING CONTROLS AS PER IECC 2018. BASE BID ACCORDINGLY.
- F. ALL DEVICES, EQUIPMENT, FIXTURES, ETC. MUST BE GROUNDED BY USE OF A PROPERLY SIZED GROUNDING CONDUCTOR. MECHANICAL/ELECTRICAL BONDS OF THE METALLIC RACEWAY SYSTEM SHALL ALSO BE MAINTAINED.
- G. BRANCH CIRCUIT WIRE SIZES (AND CONDUITS) SHALL BE INCREASED FROM THOSE INDICATED ON THE PLANS TO PREVENT EXCESSIVE VOLTAGE DROP. BRANCH CIRCUITS SHALL BE INSTALLED WITH WIRES OF SUFFICIENT SIZE SO THAT VOLTAGE DROP BETWEEN THE PANEL AND THE LOADS DOES NOT EXCEED A LIMIT OF 3%.
- H. CIRCUITS MAY BE COMBINED IN CONDUIT PROVIDED WIRE IS PROPERLY DERATED AND CONDUIT SIZED PER CODE. UNDER NO CIRCUMSTANCES SHALL MORE THAN NINE (9) CURRENT CARRYING CONDUCTORS BE RUN IN A SINGLE CONDUIT.
- I. EXPOSED CONDUITS, WHERE PERMITTED, SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO BUILDING STRUCTURAL MEMBERS.
- J. CONTRACTOR TO COORDINATE FINAL POWER & LOCATION REQUIREMENTS WITH ARCHITECT/OWNER BEFORE INSTALLATION. BASE BID ACCORDINGLY.

ELECTRICAL LIGHTING PLAN KEYED NOTES

1. CONNECT ALL EGRESS/EMERGENCY LIGHTING FIXTURES TO THE NEAREST LIGHTING BRANCH CIRCUIT VIDE HOT WIRE AHEAD OF ALL SWITCHING AND CONTROLS PER STATE AND LOCAL CODES.
2. ELECTRICAL CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF SWITCHES/DIMMER SWITCHES WITH ARCHITECT/OWNER. CONNECT ALL THE SWITCHES/DIMMER SWITCHES TO THE LIGHTING CONTACTOR WITH TIMER.
3. JUNCTION BOX WITH TOGGLE DISCONNECT SWITCH FOR CONNECTION TO EXTERNAL SIGNAGE. ELECTRICAL CONTRACTOR SHALL VERIFY IN FIELD THE EXACT MOUNTING LOCATION AND CONNECTION REQUIREMENTS WITH ARCHITECT/OWNER PRIOR TO ROUGH IN.
4. WIRE LIGHT FIXTURE THRU OCCUPANCY SENSOR FOR NIGHT LIGHTING TO ALLOW ACCESS TO SWITCH BANK. REFER TO LIGHTING CONTROL SCHEMATIC.



1 ELECTRICAL LIGHTING FIRST FLOOR PLAN
E1.0 1/8" = 1'-0"

ELECTRICAL LIGHTING FIRST FLOOR PLAN

E1.0

ISSUED FOR PERMIT

PANEL:		E(NEW)										MOUNTING:		SURFACE									
208Y/120		VOLTS,		3		PHASE,		4		WIRE		PANEL LOCATION: UTILITY ROOM											
MAIN CB:				MLO:		150A		BUS:		EXISTING		MIN,		FED FROM: PANEL-D									
NOTE:NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, E: EQUIPMENT, O : OTHER/MISC. (TYPICAL)																							
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE			MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.								
							A	B	C														
1	20	STORAGE ROOM GENERAL RECEPTACLES	R	0.90		2#12, #12G, 3/4"C	1.44			2#12, #12G, 3/4"C	0.54	R	LASER TAG ARENA CELING RECEPTACLES	20	2								
3	20	KITCHEN-SANDWICH UNIT	E	0.60		2#12, #12G, 3/4"C		1.14		2#12, #12G, 3/4"C	0.54	R	LASER TAG ARENA RECEPTACLES	20	4								
5	20	GOLF COURSE, ARCADE AND BOH LIGHTS	L	0.95		2#12, #12G, 3/4"C			1.49	2#12, #12G, 3/4"C	0.54	R	LASER TAG ARENA RECEPTACLES	20	6								
7	20	SPARE					1.08			2#12, #12G, 3/4"C	1.08	R	BOWLING GENERAL RECEPTACLES	20	8								
9	20	SPARE						1.40		2#12, #12G, 3/4"C	1.40	L	GOLF COURSE AND ARCADE LIGHTS	20	10								
11	20	SPARE							1.66	2#12, #12G, 3/4"C	1.66	L	GOLF COURSE AND ARCADE LIGHTS	20	12								
13	20	GOLF COURSE AND ARCADE LIGHTS	L	1.53		2#12, #12G, 3/4"C	2.00			2#12, #12G, 3/4"C	0.47	L	BREAK ROOM, OFFICE, UTILITY, MENS AND WOMENS REST ROOM	20	14								
15	20	BOWLING MACHINE ROOM RECEPTACLE	R	0.50		2#12, #12G, 3/4"C		2.17		2#12, #12G, 3/4"C	1.67	L	LASER TAG ARENA	20	16								
17	20	BOWLING MACHINE ROOM RECEPTACLE	R	0.50		2#12, #12G, 3/4"C			2.02	2#12, #12G, 3/4"C	1.52	L	BOWLING, BOWLING UTILITY AND ARCADE	20	18								
19	20	BOWLING -QUAD RECEPTACLES	E	0.70		2#12, #12G, 3/4"C	2.03			2#12, #12G, 3/4"C	1.33	L	ARCADE	20	20								
21	20	BOWLING -QUAD RECEPTACLES	E	0.70		2#12, #12G, 3/4"C		2.43		2#12, #12G, 3/4"C	1.73	L	ARCADE, CAFÉ	20	22								
23	20	OFFICE DESKTOP OUTLET & GENERAL RECEPTACLE	R	0.72		2#12, #12G, 3/4"C			4.88		4.16	E		40/2	24								
25	30/2	KITCHEN-PIZZA OVEN	E	2.81		2#10, #10G, 3/4"C	6.97			2#8, #10G, 3/4"C	4.16	E	KITCHEN-TURBO CHEF		26								
27			E	2.81				4.31		2#12, #12G, 3/4"C	1.50	R	OMNI AREA RECEPTACLE	20	28								
29	20	EF-1(N)	M	0.36		2#12, #12G, 3/4"C			1.86	2#12, #12G, 3/4"C	1.50	R	OMNI AREA RECEPTACLE	20	30								
31	20	EF-2(N)	M	0.36		2#12, #12G, 3/4"C	0.36						SPARE	20	32								
33	20	SPARE						0.00					SPARE	20	34								
35	20	SPARE							1.20	2#12, #12G, 3/4"C	1.20	L	EXTERNAL SIGNANGE	20	36								
37	20	SPARE					1.00			2#12, #12G, 3/4"C	1.00	M	MEN'S TOILET HAND DRYER	20	38								
39	20	RCP-1	M	0.50		2#12, #12G, 3/4"C		1.50		2#12, #12G, 3/4"C	1.00	M	WOMEN'S TOILET HAND DRYER	20	40								
41	20	TIME CLOCK	L	0.50		2#12, #12G, 3/4"C			1.70	2#12, #12G, 3/4"C	1.20	L	SPOT LIGHT	20*	42								
TOTAL CONNECTED LOAD (KVA)							14.87	12.95	14.80														

ELECTRICAL LIGHTING PLAN GENERAL NOTES

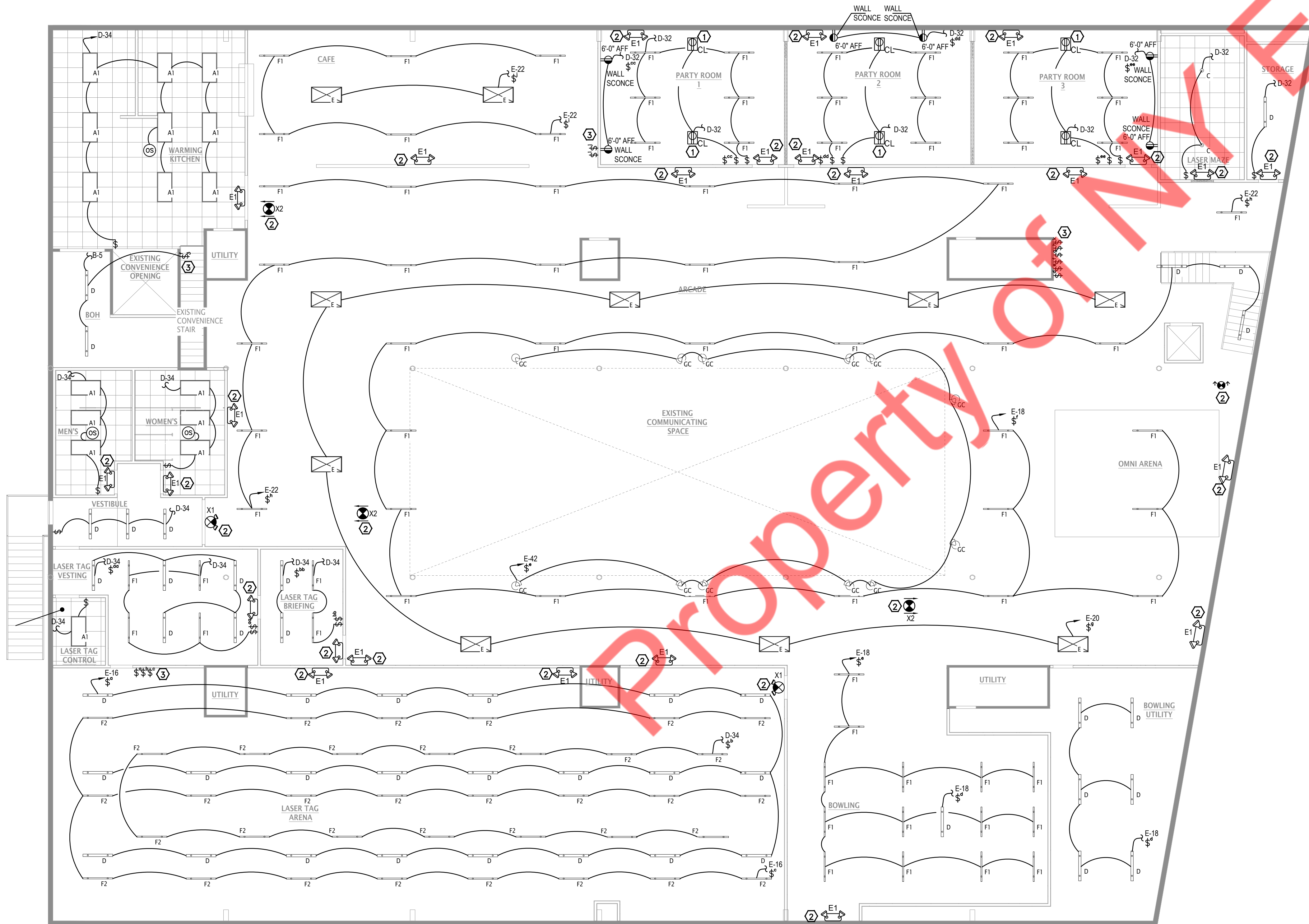
- A. ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATION & QUANTITY OF ALL THE LIGHT FIXTURES IN FIELD AND PROVIDE NEW LIGHTING CONTROLS AS SHOWN, ALSO VERIFY IF THE EXISTING LIGHT FIXTURES ARE IN OPERABLE CONDITION, REPLACE WITH NEW OF SAME TYPE, IF IN OPERABLE. BASE BID ACCORDINGLY.
- B. ELECTRICAL CONTRACTOR SHALL UPDATE THE EMERGENCY LIGHT FIXTURES QUANTITY AND LOCATION AS REQUIRED BY LOCAL AHJ.
- C. DIMMER TYPE, REQUIREMENT AND QUANTITY SHALL BE AS PER THE SITE REQUIREMENT IN COORDINATION WITH THE LIGHTING VENDOR/OWNER.
- D. EXTERIOR LIGHT FIXTURES & SIGNS WIRING SHALL BE RE-ROUTED AND CONTROLLED VIA LIGHTING CONTACTOR (L/C) WITH TIME CLOCK/PHOTOCELL. CONTRACTOR SHALL PROVIDE LIGHTING CONTACTOR POLES IN COORDINATION WITH LIGHTING VENDOR AND BASE BID ACCORDINGLY.
- E. ELECTRICAL CONTRACTOR SHALL PROVIDE LIGHTING CONTACTOR(L/C). ALL THE LIGHT FIXTURES ARE CONTROLLED VIA LIGHTING CONTACTOR WITH TIMER. COORDINATE EXACT CONTROL REQUIREMENTS WITH LIGHTING VENDOR AND PROVIDE AUTOMATIC LIGHTING CONTROLS AS PER IECG 2018. BASE BID ACCORDINGLY.
- F. ALL DEVICES, EQUIPMENT, FIXTURES, ETC. MUST BE GROUNDED BY USE OF A PROPERLY SIZED GROUNDING CONDUCTOR. MECHANICAL/ELECTRICAL BONDS OF HE METALLIC RACEWAY SYSTEM SHALL ALSO BE MAINTAINED.
- G. BRANCH CIRCUIT WIRE SIZES(AND CONDUITS) SHALL BE INCREASED FROM THOSE INDICATED ON THE PLANS TO PREVENT EXCESSIVE VOLTAGE DROP. BRANCH CIRCUITS SHALL BE INSTALLED WITH WIRES OF SUFFICIENT SIZE SO THAT VOLTAGE DROP BETWEEN THE PANEL AND THE LOADS DOES NOT EXCEED A LIMIT OF 3%.
- H. CIRCUITS MAY BE COMBINED IN CONDUIT PROVIDED WIRE IS PROPERLY DERATED AND CONDUIT SIZED PER CODE. UNDER NO CIRCUMSTANCES SHALL MORE THAN NINE(9) CURRENT CARRYING CONDUCTORS BE RUN IN A SINGLE CONDUIT.
- I. EXPOSED CONDUITS, WHERE PERMITTED, SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO BUILDING STRUCTURAL MEMBERS.
- J. CONTRACTOR TO COORDINATE FINAL POWER & LOCATION REQUIREMENTS WITH ARCHITECT/OWNER BEFORE INSTALLATION. BASE BID ACCORDINGLY.

ELECTRICAL LIGHTING PLAN KEYED NOTES

1. PROVIDE CEILING MOUNTED JUNCTION BOX WITH DUPLEX RECEPTACLE FOR SLIM-STRIP PLUG-IN EXACT LOCATIONS TO BE DETERMINED IN FIELD. CIRCUIT AS INDICATED. BASE BID ACCORDINGLY.
2. CONNECT ALL EGRESS/EMERGENCY LIGHTING FIXTURES TO THE NEAREST LIGHTING BRANCH CIRCUIT VIDE HOT WIRE AHEAD OF ALL SWITCHING AND CONTROLS PER STATE AND LOCAL CODES.
3. ELECTRICAL CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF SWITCHES WITH ARCHITECT/OWNER. CONNECT ALL THE SWITCHES/DIMMER SWITCHES TO THE LIGHTING CONTACTOR WITH TIMER.

3 ELECTRICAL PANEL SCHEDULE

E1.1
N.T.S



1 ELECTRICAL LIGHTING SECOND FLOOR PLAN

E1.1
1/8" = 1'-0"

2 LIGHT FIXTURE SCHEDULE

E1.1
N.T.S

Fixture Type	Description	Manufacturer	Model Number	Watts
A1	2x4 LAY-IN TROFFER	LITHONIA	2GTL4-4400LM-LP835	35
C	6" LED DOWN LIGHT	LITHONIA	LDN6-3015-L06WR-LD-MVOLT	21
D	4" LED STRIP LIGHT	LITHONIA	ZL1N-L48-SMR-3000LM-FST-MVOLT-35K-80CRI-WH-HC36	25
E	2x4 LED HIGHBAY FIXTURE WITH WIRE GUARD	LITHONIA	IBE-22LM-MVOLT-40K-WGIBE	166
F1	SLIM STRIP BLACK LIGHT	CHAUVET	UV-18 IRC	51
F1	SLIM STRIP BLACK LIGHT	CHAUVET	UV-18 IRC	51
GC	SPOT LIGHT	UVONIX BLACKSTAR	TRUE 365NM UV LIGHT	120
X1	LED EXIT LIGHT WITH DUAL EMERGENCY HEADS(BLACK)	LITHONIA	LHQM-LED-B-R-SD(BLACK)	3
X2	DIRECTIONAL EMERGENCY EXIT LIGHTS	LITHONIA	BE-WR-UM-M2	3
R1	REMOTE EMERGENCY LIGHT	SIGNETIX	MUE-BB8-10-X-W-DG (BLACK)	1.5
E1	SURFACE MOUNTED BATTERY UNIT WITH SELF DIAGNOSTICS	LITHONIA	ELM2-LED-B-SD (BLACK)	3

ELECTRICAL LIGHTING SECOND FLOOR PLAN

E1.1

ISSUED FOR PERMIT

PANEL:										A (EXISTING)										MOUNTING:		SURFACE			
208Y/120		VOLTS,		3		PHASE,		4		WIRE		PANEL LOCATION:										EXISTING			
MAIN CB:		225A		MLO:				BUS:		EXISTING		MIN,		FED FROM:										EXISTING	
NOTE:NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, E: EQUIPMENT, O : OTHER/MISC. (TYPICAL)																									
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE		MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.											
						A	B	C																	
1	20	26-TAJ MHAL MINI RINGS MX	E	0.96	2#12, #12G, 3/4"C	5.62			EXISTING	4.66	H	AHU-2/ACCU-2(E)	70/2P	2											
3	20	27-WHACK A CLOWN	E	0.60	2#12, #12G, 3/4"C		5.26			4.66	H			4											
5	20	46-PRIZE LOCKER	E	0.72	2#12, #12G, 3/4"C			5.38	EXISTING	4.66	H	AHU-7/ACCU-7(E)	70/2P	6											
7	20	WATER HEATER (E)	E	2.80	EXISTING	7.46				4.66	H			8											
9	20	49-PHOTOMA & 47-SHOWTIME CONSOLE	E	1.20	2#12, #12G, 3/4"C		1.56		2#12, #12G, 3/4"C	0.36	E	25-WATCH N'WIN	20	10											
11	20	28- TOWER OF TICKETS	E	0.66	2#12, #12G, 3/4"C			1.26	2#12, #12G, 3/4"C	0.60	E	24-TONS OF TICKETS	20	12											
13	20*	REDEMPTION COUNTER	R	0.80	2#12, #12G, 3/4"C	2.00			2#12, #12G, 3/4"C	1.20	E	31-GODZILLA KAIJU WARS VR	20	14											
15	20*	29-BIG SHOT	E	1.80	2#12, #12G, 3/4"C		2.70		2#12, #12G, 3/4"C	0.90	E	43-SHOWTIME & 44-E-CLAW	20	16											
17	20*	5-SHIPWRECK	E	1.44	2#12, #12G, 3/4"C			2.04	2#12, #12G, 3/4"C	0.60	E	6-POWER ROLL	20*	18											
19	20*	7-NBA GAME TIME	E	1.20	2#12, #12G, 3/4"C	2.76			2#12, #12G, 3/4"C	1.56	E	8-BREAK THE PLATE & 9-BEAN BAG TOSS	20*	20											
21	20*	10-ICE BALL FX	E	0.72	2#12, #12G, 3/4"C		0.96		2#12, #12G, 3/4"C	0.24	E	50-REDEEM MACHINE	20*	22											
23	20*	1- CONNECT FOUR HOOPS	E	1.20	2#12, #12G, 3/4"C			1.80	2#12, #12G, 3/4"C	0.60	E	11- RING TOSS	20*	24											
25	20*	3- DOWN THE CLOWN	E	0.30	2#12, #12G, 3/4"C	0.90			2#12, #12G, 3/4"C	0.60	E	2-HYPERPITCH	20*	26											
27	20*	19-GRAND PIANO KEYS	E	0.36	2#12, #12G, 3/4"C		0.96		2#12, #12G, 3/4"C	0.60	E	4-LANE MASTER	20*	28											
29	20*	20-POP THE LOCK	E	0.60	2#12, #12G, 3/4"C			1.08	2#12, #12G, 3/4"C	0.48	E	22-MONOPOLY ROLL N GO	20*	30											
31	20*	18-QUIK DROP	E	0.60	2#12, #12G, 3/4"C	1.20			2#12, #12G, 3/4"C	0.60	E	17-WORLD FOOT BALL PRO	20*	32											
33	20*	45-PHOTO MOTION	E	0.60	2#12, #12G, 3/4"C		0.78		2#12, #12G, 3/4"C	0.18	E	16-TICKET MONSTER	20*	34											
35	20*	41-OVER THE EDGE	E	0.72	2#12, #12G, 3/4"C		2.16		2#12, #12G, 3/4"C	1.44	E	39-VIRTUAL RABBIDS THE BIG RIDE	20*	36											
37	20*	34-ASPHALT MOTO BLITZ DX	E	1.80	2#12, #12G, 3/4"C	7.87			4#3, #8G, 1-1/4"C	6.07	O	PANEL-C	100/3*	38											
39	20*	33-NEED FOR SPEED HEAT	E	1.20	2#12, #12G, 3/4"C		7.27			6.07	O			40											
41	20*	32-BOXER GLOVE	E	0.48	2#12, #12G, 3/4"C			6.55		6.07	O			42											
TOTAL CONNECTED LOAD (KVA)						27.81	19.49	20.27	***-NEW MCB AS RATED TO BE REPLACED AS SHOWN IN PANEL SCHEDULE"																

ELECTRICAL POWER PLAN GENERAL NOTES

A.E.C. SHALL COORDINATE WITH OTHER TRADE CONTRACTORS FOR EXACT LOCATION AND POWER REQUIREMENT OF THE EQUIPMENT FROM OTHER TRADES. PROVIDE WIRING AND CONTROLS AS REQUIRED (IF NOT PROVIDED BY THEM), PRIOR TO BID. BASE BID ACCORDINGLY.

B.THE CLEAR WORKING SPACE SHALL BE PROVIDED FOR THE METERS, PANEL BOARDS, AND OTHER ELECTRICAL EQUIPMENT AS PER SECTION 110.26 OF NEC

C.THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE UTILITY/ARCHITECT/OWNER FOR EXACT LOCATION OF THE EXISTING SERVICE METER AND OTHER ELECTRICAL DEVICES. PRIOR TO BID. BASE BID ACCORDINGLY.

D.ALL THE CIRCUITS SUPPLYING KITCHEN EQUIPMENT AND SHOWN "GFI" ON POWER PLAN SHALL BE PROTECTED EITHER AT A PANEL WITH GFI RATED BREAKER OR RECEPTACLE WITH GFI AS PER NEC 210.8. IF GFI RECEPTACLES ARE USED, CONTRACTOR SHALL LOCATE THE GFI RECEPTACLES SUCH THAT THESE ARE READILY ACCESSIBLE PER CODE.

E.E.C. SHALL FOLLOW GROUNDING/BONDING AS PER NEC ARTICLE 250.

F.ALL THE RECEPTACLES SHALL BE RATED PER CIRCUIT. E.C. SHALL VERIFY AND MAKE FINAL CONNECTIONS ACCORDINGLY.

G.ELECTRICAL CONTRACTOR SHALL PROVIDE GFCI PROTECTION FOR ALL THE FLOOR OUTLETS AS PER NEC ARTICLE 406.4(g).

H.ELECTRICAL CONTRACTOR SHALL PROVIDE TYPED PANEL DIRECTORY FOR ALL THE ELECTRICAL PANELS AS PER NEC 408.4(A).

I. ALL DEVICES, EQUIPMENT, FIXTURES,ETC. MUST BE GROUNDED BY USE OF A PROPERLY SIZED GROUNDING CONDUCTOR. MECHANICAL/ELECTRICAL BONDS OF HE METALLIC RACEWAY SYSTEM SHALL ALSO BE MAINTAINED.

J.BRANCH CIRCUIT WIRE SIZES(AND CONDUITS) SHALL BE INCREASED FROM THOSE INDICATED ON THE PLANS TO PREVENT EXCESSIVE VOLTAGE DROP.BRANCH CIRCUITS SHALL BE INSTALLED WITH WIRES OF SUFFICIENT SIZE SO THAT VOLTAGE DROP BETWEEN THE PANEL AND THE LOADS DOES NOT EXCEED A LIMIT OF 3%.

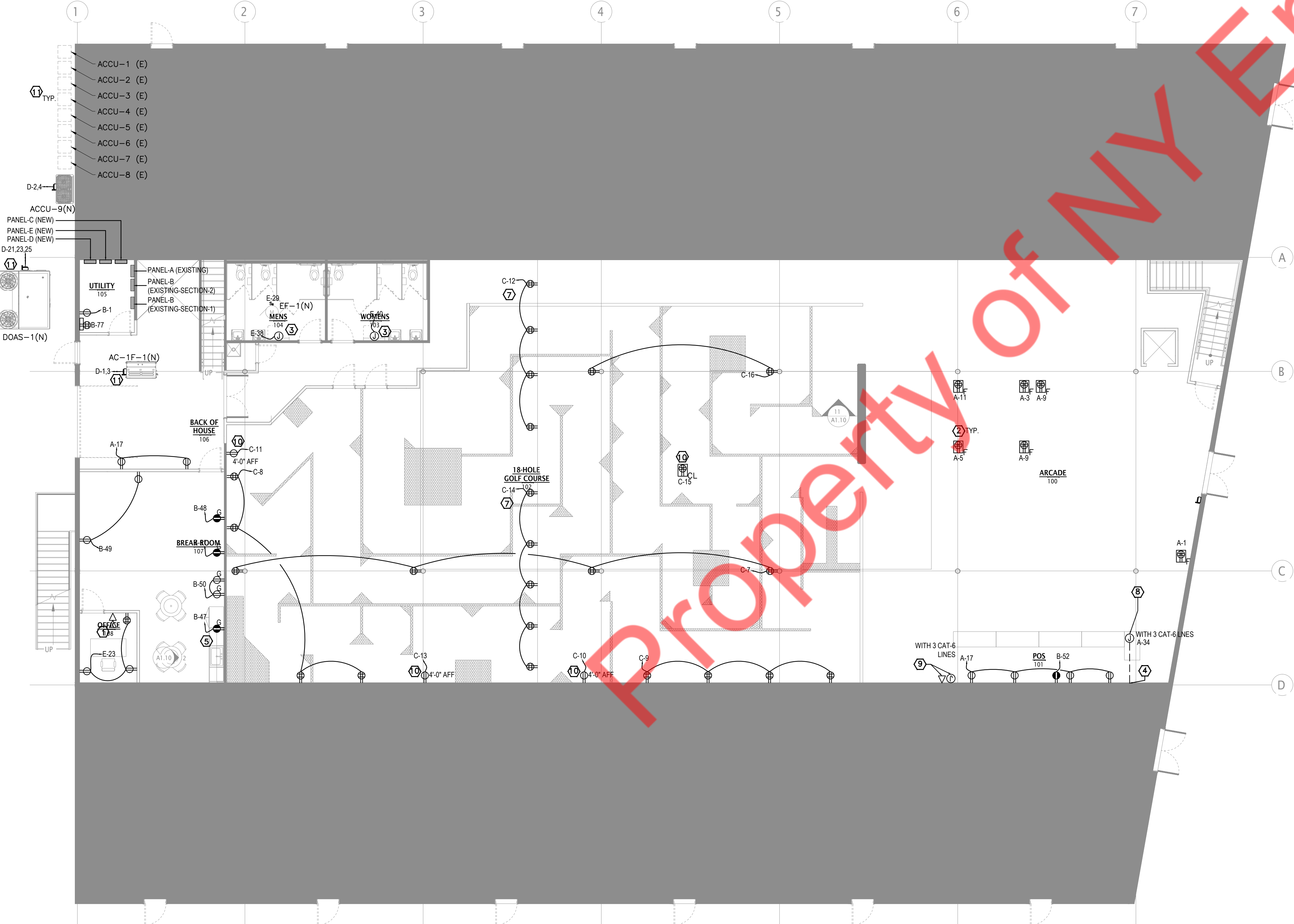
K.CIRCUITS MAY BE COMBINED IN CONDUIT PROVIDED WIRE IS PROPERLY DERATED AND CONDUIT SIZED PER CODE. UNDER NO CIRCUMSTANCES SHALL MORE THAN NINE(9) CURRENT CARRYING CONDUCTORS BE RUN IN A SINGLE CONDUIT.

5. EXPOSED CONDUITS, WHERE PERMITTED, SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO BUILDING STRUCTURAL MEMBERS.

ELECTRICAL POWER PLAN KEYED WORK NOTES

1. PROVIDE DEDICATED 20 AMP OUTLET FOR SECURITY/IT EQUIPMENT(COORDINATE FINAL LOCATION).PROVIDE SEPARATE CIRCUIT FOR WORK STATION.
2. AT ARCADE PROVIDE FLOOR MOUNTED QUAD RECEPTACLE WITH DEDICATED CIRCUIT. COORDINATE LOCATION WITH VENDOR AND ARCHITECT.
3. PROVIDE JUNCTION BOX FOR HAND DRYER AT 48" AFF. VERIFY MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS AND MANUFACTURERS INSTALLATION INSTRUCTIONS PRIOR TO ROUGH-IN.
4. TRENCH POWER AND DATA TO COUNTER. PROVIDE CONSTANT POWER FOR COMPUTERS.
5. COORDINATE LOCATION AND MOUNTING HEIGHT OUTLET WITH TENANT IN FIELD.
6. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH PLUMBING CONTRACTOR AND PROVIDE POWER CONNECTIONS FOR WATER HEATER SUCH THAT THE WATER HEATER SHALL BE OPERATED ON SIMULTANEOUS. BASE BID ACCORDINGLY.
7. AT MINI GOLF AREA PROVIDE UNISTRUT REVISE TO COORDINATE WITH ARCHITECTURAL RECEPTACLES FOR SCAN 360, SPEAKERS AND DISCO BALL. EXACT LOCATIONS TBD. COORDINATE W/ TENANT & THEIR MINI GOLF VENDOR.
 - A. LENGTH 78', DEPTH 1.75"
 - B. HUNG BY 3/8" ALL-THREAD EVERY 8' O.C. MIN. TWO 20 AMP CIRCUIT WITH RECEPTACLES EVERY 6'-0" O.C. TOP MOUNTED QUAD OUTLETS, EVENLY SPACE W.4TH IN CENTER.
8. PROVIDE POWER AND DATA VIA FOUNDATION AT POS.
9. REDEMPTION COUNTER: PROVIDE 20 AMP DEDICATED CIRCUIT TO JUNCTION BOX AT WALL NEXT TO COUNTER. OUTLETS AT REDEMPTION COUNTER TO BE INSTALLED AFTER MILLWORK IS IN PLACE NY TENANT. PROVIDE BACK BOX AND PULL STRING FOR DATA.
10. COORDINATE WITH EQUIPMENT VENDORS FOR EXACT LOCATIONS, QUANTITY AND WIRING REQUIREMENTS OF EQUIPMENT THAT MAY VARY FROM WHAT IS SHOWN ON PLANS.
11. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MECHANICAL CONTRACTOR FOR DISCONNECT SWITCH LOCATIONS & REQUIREMENTS AND PROVIDE POWER CONNECTIONS AS PER REQUIREMENT. BASE BID ACCORDINGLY.

ELECTRICAL PANEL SCHEDULE



ELECTRICAL POWER FIRST FLOOR PLAN

ELECTRICAL POWER FIRST FLOOR PLAN

E2.0

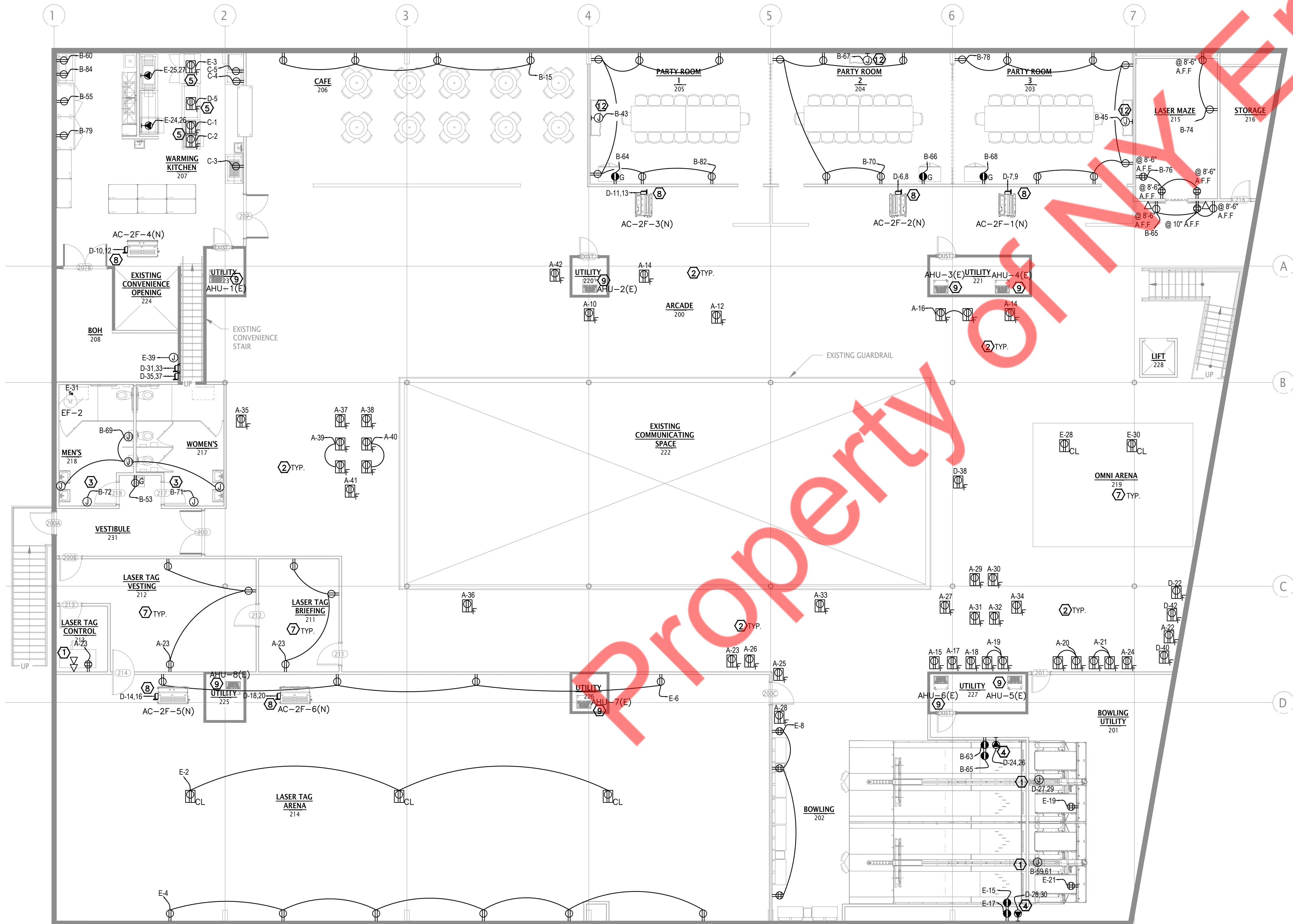
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ELECTRICAL POWER PLAN GENERAL NOTES

- A.E.C. SHALL COORDINATE WITH OTHER TRADE CONTRACTORS FOR EXACT LOCATION AND POWER REQUIREMENT OF THE EQUIPMENT FROM OTHER TRADES. PROVIDE WIRING AND CONTROLS AS REQUIRED (IF NOT PROVIDED BY THEM), PRIOR TO BID. BASE BID ACCORDINGLY.
- B.THE CLEAR WORKING SPACE SHALL BE PROVIDED FOR THE METERS, PANEL BOARDS, AND OTHER ELECTRICAL EQUIPMENT AS PER SECTION 110.26 OF NEC.
- C.THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE UTILITY/ARCHITECT/OWNER FOR EXACT LOCATION OF THE EXISTING SERVICE METER AND OTHER ELECTRICAL DEVICES. PRIOR TO BID. BASE BID ACCORDINGLY.
- D.ALL THE CIRCUITS SUPPLYING KITCHEN EQUIPMENT AND SHOWN "GFI" ON POWER PLAN SHALL BE PROTECTED EITHER AT A PANEL WITH GFI RATED BREAKER OR RECEPTACLE WITH GFI AS PER NEC 210.8. IF GFI RECEPTACLES ARE USED, CONTRACTOR SHALL LOCATE THE GFI RECEPTACLES SUCH THAT THESE ARE READILY ACCESSIBLE PER CODE.
- E.E.C. SHALL FOLLOW GROUNDING/BONDING AS PER NEC ARTICLE 250.
- F.ALL THE RECEPTACLES SHALL BE RATED PER CIRCUIT. E.C. SHALL VERIFY AND MAKE FINAL CONNECTIONS ACCORDINGLY.
- G.ELECTRICAL CONTRACTOR SHALL PROVIDE GFI PROTECTION FOR ALL THE FLOOR OUTLETS AS PER NEC ARTICLE 406.4(g).
- H.ELECTRICAL CONTRACTOR SHALL PROVIDE TYPED PANEL DIRECTORY FOR ALL THE ELECTRICAL PANELS AS PER NEC 408.4(A).
- I. ALL DEVICES, EQUIPMENT, FIXTURES, ETC. MUST BE GROUNDED BY USE OF A PROPERLY SIZED GROUNDING CONDUCTOR. MECHANICAL/ELECTRICAL BONDS OF THE METALLIC RACEWAY SYSTEM SHALL ALSO BE MAINTAINED.
- J.BRANCH CIRCUIT WIRE SIZES(AND CONDUITS) SHALL BE INCREASED FROM THOSE INDICATED ON THE PLANS TO PREVENT EXCESSIVE VOLTAGE DROP.BRANCH CIRCUITS SHALL BE INSTALLED WITH WIRES OF SUFFICIENT SIZE SO THAT VOLTAGE DROP BETWEEN THE PANEL AND THE LOADS DOES NOT EXCEED A LIMIT OF .3%.
- K.CIRCUITS MAY BE COMBINED IN CONDUIT PROVIDED WIRE IS PROPERLY DERATED AND CONDUIT SIZED PER CODE. UNDER NO CIRCUMSTANCES SHALL MORE THAN NINE(9) CURRENT CARRYING CONDUCTORS BE RUN IN A SINGLE CONDUIT.
- L.EXPOSED CONDUITS, WHERE PERMITTED, SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO BUILDING STRUCTURAL MEMBERS.

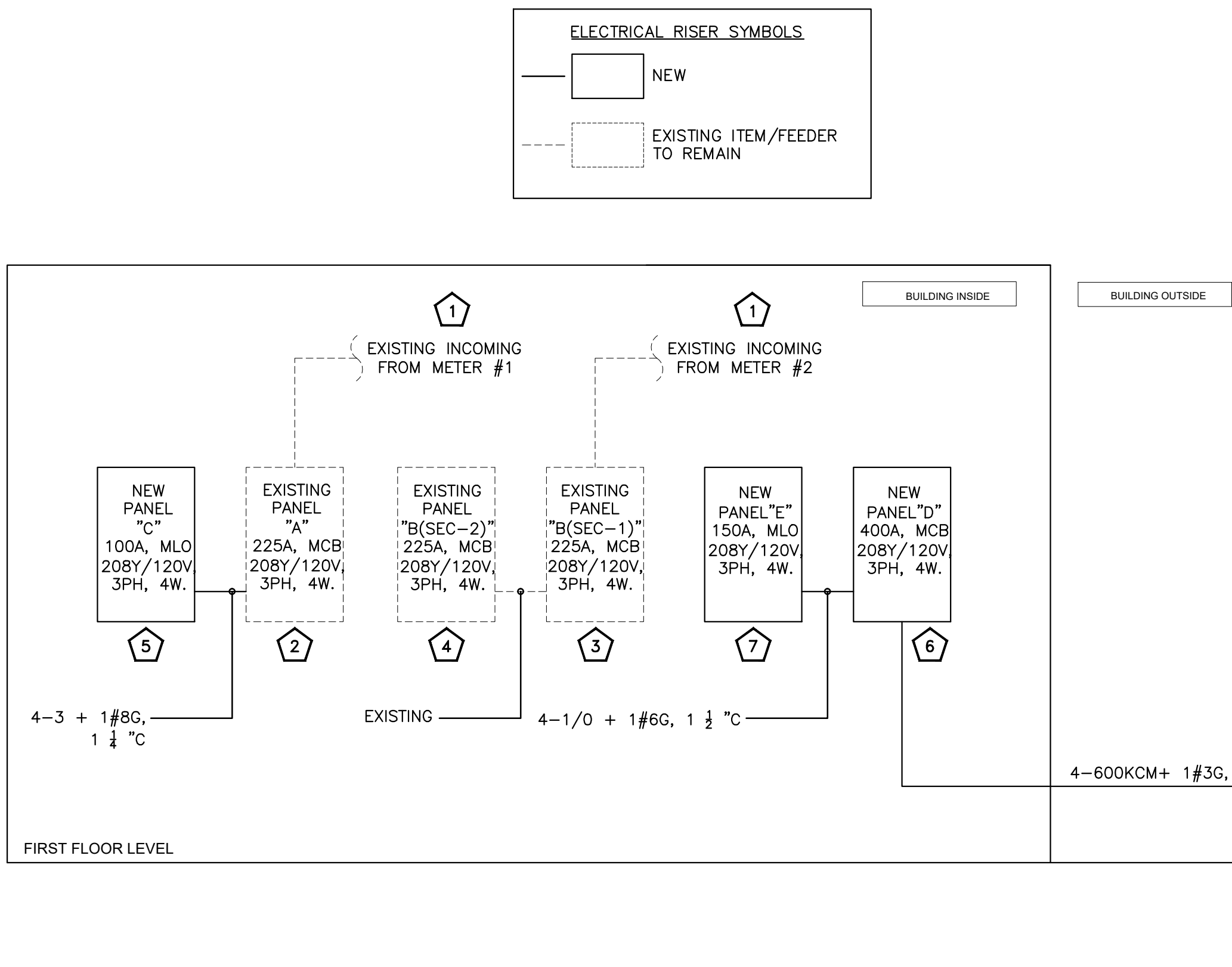
ELECTRICAL POWER PLAN KEYED WORK NOTES

1. PROVIDE JUNCTION BOX FOR BOWLING. PROVIDE SEPARATE CIRCUIT FOR WORK STATION. E.C. SHALL COORDINATE WITH THE EQUIPMENT SUPPLIER FOR BOWLING EQUIPMENTS AND PROVIDE CIRCUITS. BASE BID ACCORDINGLY.
2. AT ARCADE PROVIDE FLOOR MOUNTED QUAD RECEPTACLE WITH DEDICATED CIRCUIT. COORDINATE LOCATION WITH VENDOR AND ARCHITECT.
3. PROVIDE JUNCTION BOX FOR HAND DRYER AT 48" AFF. VERIFY MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS AND MANUFACTURERS INSTALLATION INSTRUCTIONS PRIOR TO ROUGH-IN.
4. AT BOWLING MACHINE PROVIDE, (2) DEDICATED 20AMP, 120V CIRCUITS (1) 20AMP, 208V CIRCUIT. COORDINATE EXACT LOCATION WITH EQUIPMENT VENDOR.
5. ELECTRICAL CONTRACTOR SHALL PROVIDE THE REQUIRED STUB-UP TO POWER THE EQUIPMENTS. THE LOCATION OF RECEPTACLE STUB UP SHALL BE COORDINATED WITH KITCHEN EQUIPMENT VENDOR/ARCHITECT. BASE BID ACCORDINGLY.
6. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH PLUMBING CONTRACTOR AND PROVIDE POWER CONNECTIONS FOR WATER HEATER. BASE BID ACCORDINGLY.
7. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO COORDINATE FINAL/EQUIPMENT REQUIREMENTS WITH OWNER'S VENDOR. COORDINATE WITH ARCHITECT IF REQUIRED.
8. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MECHANICAL CONTRACTOR FOR DISCONNECT SWITCH LOCATIONS & REQUIREMENTS AND PROVIDE POWER CONNECTIONS AS PER REQUIREMENT. BASE BID ACCORDINGLY.
9. ELECTRICAL CONTRACTOR SHALL VERIFY AND RE-USE THE EXISTING ELECTRICAL SWITCH GEAR AND POWER CONNECTIONS FOR THE EXISTING ACCUS/AHUS. REPLACE WITH NEW, IF FOUND IN OPERABLE. BASE BID ACCORDINGLY.

1 ELECTRICAL POWER SECOND FLOOR PLAN
E2.1 1/8" = 1'-0"ELECTRICAL POWER SECOND
FLOOR PLAN

E2.1

ISSUED FOR PERMIT



ELECTRICAL RISER KEY NOTES	
1.	EXISTING 120/208V, 3-PHASE, 4-WIRE ELECTRICAL FEEDER FROM THE EXISTING METER STACK FOR THE PROJECT SPACE. E.C. TO COORDINATE WITH OWNER/UTILITY COMPANY/LANDLORD FOR EXACT POWER DISTRIBUTION. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCIES.
2.	EXISTING 120/208V, 3-PHASE, 4-WIRE 225A, MCB PANEL "A". E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION. E.C. TO VERIFY THE OPERABLE CONDITION OF THE EXISTING PANEL AND REPLACE OR RECTIFY BREAKERS AS SHOWN PER PANEL SCHEDULE. BASE BID ACCORDINGLY.
3.	EXISTING 120/208V, 3-PHASE, 4-WIRE 225A, MCB PANEL "B"(SECTION-1)". E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION. E.C. TO VERIFY THE OPERABLE CONDITION OF THE EXISTING PANEL AND REPLACE OR RECTIFY BREAKERS AS SHOWN PER PANEL SCHEDULE. BASE BID ACCORDINGLY.
4.	EXISTING 120/208V, 3-PHASE, 4-WIRE 225A, MCB PANEL "B"(SECTION-2)". E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION. E.C. TO VERIFY THE OPERABLE CONDITION OF THE EXISTING PANEL AND REPLACE OR RECTIFY BREAKERS AS SHOWN PER PANEL SCHEDULE. BASE BID ACCORDINGLY.
5.	NEW 120/208V, 3-PHASE, 4-WIRE 100A, MLO PANEL "C". E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION.
6.	NEW 120/208V, 3-PHASE, 3-WIRE 400A, MCB PANEL "D". E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION.
7.	NEW 120/208V, 3-PHASE, 4-WIRE 150A, MLO PANEL "E". E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION.
8.	NEW 400A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL SERVICE FROM THE UTILITY COMPANY FOR THE PROJECT SPACE. E.C. TO COORDINATE WITH OWNER/UTILITY COMPANY/LANDLORD FOR EXACT POWER DISTRIBUTION. BASE BID ACCORDINGLY.
9.	NEW 400A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL METER & DISCONNECT FOR THE PROJECT SPACE. E.C. TO COORDINATE WITH OWNER/UTILITY COMPANY/LANDLORD FOR EXACT LOCATION. BASE BID ACCORDINGLY.

ELECTRICAL RISER GENERAL NOTES	
1.	ABOVE RISER DIAGRAM IS FOR REFERENCE PURPOSE ONLY. E.C. TO VERIFY EXACT POWER DISTRIBUTION & OPERABLE CONDITION OF EXISTING DEVICES IN FIELD AND INFORM, ENGINEER FOR ANY DISCREPANCY.
2.	E.C. SHALL VERIFY THE INCOMING SERVICE AMPERAGE, VOLTAGE, NUMBER OF PHASES, WIRE SIZE AND DISTRIBUTION IN FIELD.
3.	E.C. TO COORDINATE FAULT CURRENT (ISC) RATING WITH UTILITY COMPANY AND AHU PRIOR TO COMMENCING ANY WORK.
4.	E.C. SHALL COORDINATE THE SCOPE OF WORK FOR THE ELECTRICAL SERVICE AND DISTRIBUTION WITH UTILITY COMPANY/OWNER. BASE BID ACCORDINGLY.
5.	E.C. SHALL PROVIDE THE NEW TYPED PANEL DIRECTORY FOR ALL THE NEW & EXISTING PANELS AS PER NEC.
6.	ALL THE EXTERIOR EQUIPMENT SHALL BE OF MINIMUM OF NEMA 3R OR AS REQUIRED PER AHJ.

1 ELECTRICAL RISER DIAGRAM
SCALE: NTS

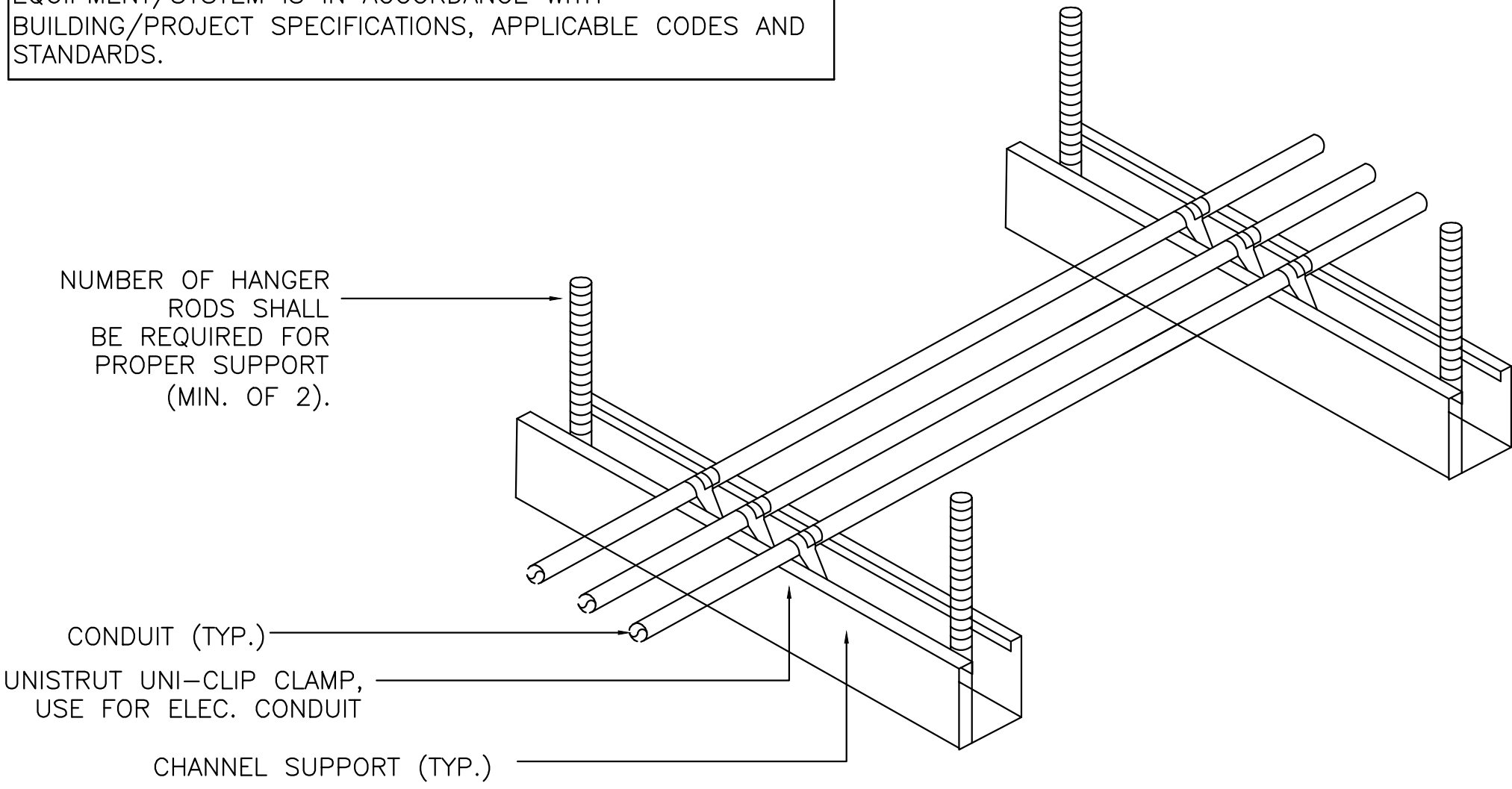
PANEL: B(SECTION-1)(EXISTING)										MOUNTING: SURFACE					
208Y/120		VOLTS,		3		PHASE,		4		WIRE		PANEL LOCATION: EXISTING			
MAIN CB: 225A		MLO:				BUS: EXISTING		MIN,		FED FROM: EXISTING					
NOTE: NOTE: L: LIGHTING, H: HVAC LOAD, M: MOTOR LOAD, R: RECEPTACLES, E: EQUIPMENT, O: OTHER/MISC. (TYPICAL)															
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE		MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
						A	B	C							
1	20	SPARE				0.00						SPARE	20	2	
3	20	SPARE					0.00					SPARE	20	4	
5	20	SPARE						0.00				SPARE	20	6	
7			M	1.90	EXISTING	1.90						SPARE	20	8	
9	20/3	ELEVATOR	M	1.90			1.90					SPARE	20	10	
11			M	1.90				1.90				SPARE	20	12	
13	20	CHAIR LIFT	M	1.92		2#12, #12G, 3/4"C	1.92					SPARE	20	14	
15	20	SPARE						0.00				SPARE	20	16	
17	20	SPARE							0.00			SPARE	20	18	
19	20	SPARE				0.00						SPARE	20	20	
21	20	SPARE						0.00				SPARE	20	22	
23	20	SPARE										SPARE	20	24	
25			H	3.26	EXISTING	6.52			EXISTING	3.26	H	AHU-5/ACCU-5(E)	70/2	26	
27	70/2	AHU-1/ACCU-1(E)	H	3.26			6.52			EXISTING	3.26	H	AHU-6/ACCU-6(E)	70/2	28
29			H	3.26				6.52			3.26	H			30
31	70/2	AHU-3/ACCU-3(E)	H	3.26			6.52			EXISTING	3.26	H	AHU-7/ACCU-7(E)	70/2	32
33			H	3.26	EXISTING			6.52		3.26	H			34	
35			H	3.26					3.26						36
37	70/2	SPARE				0.00						SPARE	20	38	
39							0.00					SPARE	20	40	
41		SPACE						0.00				SPACE		42	
TOTAL CONNECTED LOAD (KVA)						16.87	14.95	14.95	** NEW MCB AS RATED TO BE REPLACED AS SHOWN IN PANEL SCHEDULE**						

PANEL: C(NEW)										MOUNTING: SURFACE					
208Y/120		VOLTS,		3	PHASE,		4	WIRE		PANEL LOCATION: UTILITY LOCATION					
MAIN CB: 100A		TRIP AMPS		MLO:		BUS: EXISTING		MIN.		FED FROM: EXISTING					
NOTE: L- LIGHTING, H- HVAC LOAD, M- MOTOR LOAD, R- RECEPTACLES, E- EQUIPMENT, O- OTHER/MISC. (TYPICAL)															
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD		LOAD TYPE	MINIMUM BRANCH CIRCUIT		PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20	KITCHEN-NACHO CHIP WARMER	E	1.25	2#12, #12G, 3/4"	1.49				2#12, #12G, 3/4"	0.24	E	KITCHEN-GLASS DOOR REFRIGERATOR	20	2
3	20	KITCHEN-HOT DOG ROLLER	E	1.50	2#12, #12G, 3/4"		1.68			2#12, #12G, 3/4"	0.18	R	KITCHEN-HOT DOG ROLLER	20	4
5	20	KITCHEN CONVENIENCE OUTLET(CO1)	R	0.18	2#12, #12G, 3/4"			0.18					SPARE	20	6
7	20	GOLF AREA-GENERAL RCPT	R	1.96	2#12, #12G, 3/4"	3.40				2#12, #12G, 3/4"	1.44	R	QUADS MINI GOLF	20	8
9	20	QUADS MINI GOLF	R	1.44	2#12, #12G, 3/4"		1.62			2#12, #12G, 3/4"	0.18	R	GOLF COURSE GENERAL RCPT	20	10
11	20	GOLF COURSE GENERAL RCPT	R	0.18	2#12, #12G, 3/4"			1.62		2#12, #12G, 3/4"	1.44	R	MINI GOLF UNI-STRUT RECEPTACLE	20	12
13	20	GOLF COURSE GENERAL RCPT	R	0.18	2#12, #12G, 3/4"	1.98				2#12, #12G, 3/4"	1.80	R	MINI GOLF UNI-STRUT RECEPTACLE	20	14
15	20	GOLF COURSE GENERAL RCPT	R	0.91	2#12, #12G, 3/4"		1.45			2#12, #12G, 3/4"	0.54	R	MINI GOLF GENERAL RCPT	20	16
17	20	SPARE						0.00					SPARE	20	18
19	20	SPARE				0.00							SPARE	20	20
21	20	SPARE					0.00						SPARE	20	22
23	20	SPARE						0.00					SPARE	20	24
25	20	SPARE				0.00							SPARE	20	26
27	20	SPARE					0.00						SPARE	20	28
29	20	SPARE						0.00					SPARE	20	30
31	20	SPARE				0.00							SPARE	20	32
33	20	SPARE					0.00						SPARE	20	34
35	20	SPARE						0.00					SPARE	20	36
37	20	SPARE				2.40				2#10, #10G, 3/4"	2.40	E	36-F&F TURBO MOTION	30	38
39	20	SPARE					1.20			2#12, #12G, 3/4"	1.20	E	35-SUPER BIKES 3	20	40
41	20	SPARE						1.20		2#12, #12G, 3/4"	1.20	E	40-DRAKONS REALM KEEPERS	20	42
TOTAL CONNECTED LOAD (KVA)						9.27	5.95	3.00							

PANEL: D [SECTION-2] (EXISTING)										MOUNTING: SURFACE				
208Y/120		VOLTS,		3 PHASE,		4		WIRE		PANEL LOCATION: EXISTING				
MAIN CB: 225A				MLO:		BUS: EXISTING		MIN,		FED FROM: EXISTING				
NOTE: L: LIGHTING, H: HVAC LOAD, M: MOTOR LOAD, R: RECEPTABLES, E: EQUIPMENT, O: OTHER/MISC. (TYPICAL)														
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
					A	B	C							
43	20*	FIRE PLACE	R	0.18	2#12, #12G, 3/4"C	0.18							44	
45	20*	FIRE PLACE	R	0.18	2#12, #12G, 3/4"C		0.18				SPARE	125/3	46	
47	20*	BREAK ROOM MICROWAVE	E	1.00	2#12, #12G, 3/4"C			1.00					48	
49	20	BREAK ROOM ICE MAKER	E	0.50	2#12, #12G, 3/4"C	0.86			2#12, #12G, 3/4"C	0.36	R	BREAK ROOM COUNTER TOP RECEPTALE	20	50
51	20	BREAK ROOM REFRIGERATOR	E	1.00	2#12, #12G, 3/4"C		1.50		2#12, #12G, 3/4"C	0.50	E	REFRIGERATOR	20	52
53	20*	WATER FOUNTAIN	E	0.50	2#12, #12G, 3/4"C			0.50			SPARE	20	54	
55	20*	KITCHEN-REACH-IN FREEZER	E	1.15	2#12, #12G, 3/4"C	1.15					SPARE	20	56	
57	20*	CAFÉ GENERAL RECEPTABLES	E	0.72	2#12, #12G, 3/4"C		1.08		2#12, #12G, 3/4"C	0.36	R	BREAK ROOM RGENERAL RECEPTALE	20*	58
59	20/2*	BOWLING MACHINE	E	0.52	2#12, #12G, 3/4"C			0.70	2#12, #12G, 3/4"C	0.18	R	KITCHEN CONVINIENCE OUTLET(CO1)	20*	60
61			E	0.52	2#12, #12G, 3/4"C	1.24			2#12, #12G, 3/4"C	0.72	R	WARMING KITCHEN RECEPTABLES	20*	62
63	20*	BOWLING MACHINE RECEPTACLE	R	0.50	2#12, #12G, 3/4"C		0.68		2#12, #12G, 3/4"C	0.18	E	REFRIGERATOR	20*	64
65	20*	BOWLING MACHINE ROOM RECEPTACLE	R	0.50	2#12, #12G, 3/4"C		0.68	0.68	2#12, #12G, 3/4"C	0.18	E	REFRIGERATOR	20*	66
67	20*	FIRE PLACE	R	0.18	2#12, #12G, 3/4"C	0.36			2#12, #12G, 3/4"C	0.18	E	REFRIGERATOR	20*	68
69	20*	MENS & WOMENS REST FIXTURE POWER	R	1.00	2#12, #12G, 3/4"C		2.26		2#12, #12G, 3/4"C	1.26	R	PARTY ROOM-2	20*	70
71	20*	WOMENS TOILET HAND DRYER	R	0.50	2#12, #12G, 3/4"C			1.00	2#12, #12G, 3/4"C	0.50	R	MENS TOILET HAND DRYER	20*	72
73	20*	LASER TAG CONTROL ROOM	R	0.36	2#12, #12G, 3/4"C	0.56			2#12, #12G, 3/4"C	0.20	R	LASER MAZE RECEPTACLE	20*	74
75	20*	LASER TAG VESTING RECEPTACLE	R	0.36	2#12, #12G, 3/4"C		0.56		2#12, #12G, 3/4"C	0.20	R	LASER MAZE RECEPTACLE	20*	76
77	20*	TELEPHONE BOARD	R	0.20	2#12, #12G, 3/4"C			1.46	2#12, #12G, 3/4"C	1.26	R	PARTY ROOM-3	20*	78
79	20*	KITCHEN-REACH-IN REFRIGERATOR	E	0.65	2#12, #12G, 3/4"C	1.19			2#12, #12G, 3/4"C	0.54	R	LASER MAZE MONITOR RECEPTABLES	20*	80
81							1.26		2#12, #12G, 3/4"C	1.26	R	PARTY ROOM-1	20*	82
83		SPACE						0.18	2#12, #12G, 3/4"C	0.18	R	KITCHEN CONVINIENCE OUTLET(CO1)	20*	84
TOTAL CONNECTED LOAD (KVA)					5.54	7.52	5.52	** NEW MCB AS RATED TO BE REPLACED AS SHOWN IN PANEL SCHEDULE**						

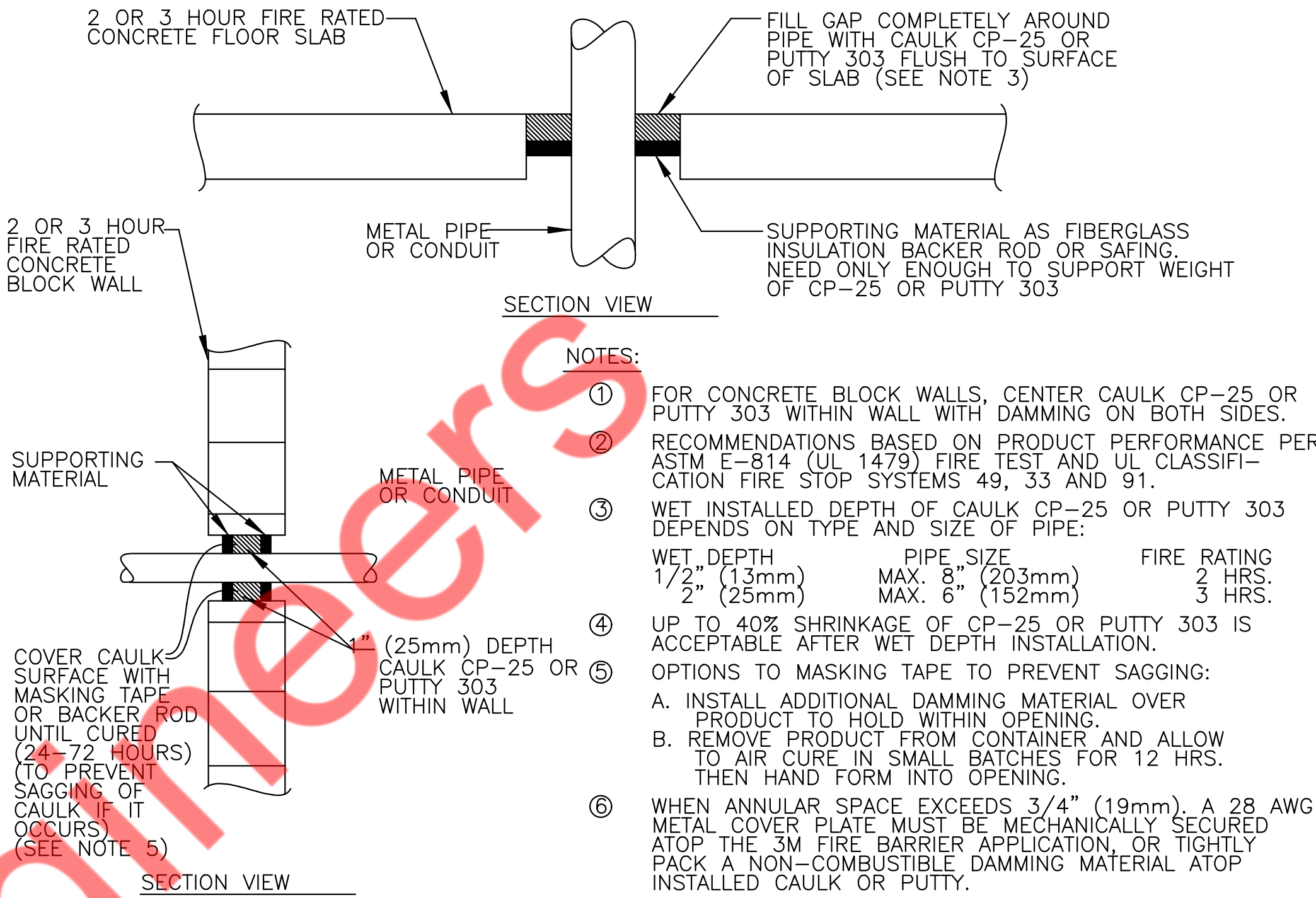
PANEL:		D(NEW)							MOUNTING: SURFACE					
208Y/120		VOLTS,		3	PHASE,		4	WIRE		PANEL LOCATION: UTILITY ROOM				
MAIN CB:		400A		MLO:		BUS:		EXISTING		MIN,		FED FROM: DISCONNECT SWITCH		
NOTE: L: LIGHTING, H: HVAC LOAD, M: MOTOR LOAD, R: RECEPTACLES, E: EQUIPMENT, O: OTHER/MISC. (TYPICAL)														
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
					A	B	C							
1	20/2	AC-1F-1(N)	H	0.26	2#12, #12G, 3/4"	6.28			2#8, #10G, 3/4"	6.02	H	ACCU-9(N)	80/2	2
3	20	KITCHEN-PRETZEL WARMER	E	0.26	2#12, #12G, 3/4"		6.28			6.02	H			4
5	20		E	0.29	2#12, #12G, 3/4"			0.46		0.18	H	2#2-2(N)		6
7	20/2	AC-2F-1(N)	H	0.18	2#12, #12G, 3/4"	0.35			2#12, #12G, 3/4"	0.18	H	AC-2F-2(N)	20/2	8
9			H	0.18			0.44		2#12, #12G, 3/4"	0.26	H	AC-2F-4(N)	20/2	10
11			H	0.18				0.44		0.26	H			12
13	20/2	AC-2F-3(N)	H	0.18	2#12, #12G, 3/4"	0.42			2#12, #12G, 3/4"	0.24	H	AC-2F-5(N)	20/2	14
15			O	15.47		15.71				0.24	H			16
17	150/3	PANEL-E	O	15.47	4#1/0, #6G-1-1/2"		15.73		2#12, #12G, 3/4"	0.26	H	AC-2F-6(N)	20/2	18
19			O	15.47					2#12, #12G, 3/4"	0.26	H		20/2	20
21			O	12.97			13.69		2#12, #12G, 3/4"	0.72	E	15-ANGRY BIRDS COIN CRASH 2 PLAYER	20	22
23	125/3	DOAS-1(N)	O	12.97	4#1/0, #6G-1-1/2"			13.77	2#12, #12G, 3/4"	0.80	E		20/2	24
25			E	0.52		13.77			2#12, #12G, 3/4"	0.80	E	BOWLING EQUIPMENT	20/2	26
27	20/2	BOWLING MACHINE	E	0.29	2#12, #12G, 3/4"		1.32		2#12, #12G, 3/4"	0.80	E	BOWLING EQUIPMENT	20/2	28
29			E	0.52			1.32		2#12, #12G, 3/4"	0.80	E		20/2	30
31			O	2.25		3.57			2#12, #12G, 3/4"	1.32	L	PARTY ROOM-1,2 R3, LASER MAZE AND STORAGE	20	32
33	30/2	WH-1(UPPER ELEMENT)(N)	O	2.25	2#10, #10G, 3/4"	4.04			2#12, #12G, 3/4"	1.80	L	WARMING KITCHEN, VESTIBULE, MENS AND WOMENS REST ROOMS, LASER TAG VESTING, CONTROL & BRIEFING	20	34
35			O	2.25			3.45		2#12, #12G, 3/4"	1.20	L	EXTERNAL SIGNAGE	20	36
37	30/2	WH-2(UPPER ELEMENT)(N)	O	2.25	2#10, #10G, 3/4"	3.09			2#12, #12G, 3/4"	0.84	E	30-AIR FV	20*	38
39	20	SPARE				0.72			2#12, #12G, 3/4"	0.72	E	13-SPONGEBOB PIRATES	20*	40
41	20	SPARE					0.48		2#12, #12G, 3/4"	0.48	E	14-WIZARD OF OZ	20*	42
TOTAL CONNECTED LOAD (KVA)						43.20	42.20	35.65						

NOTE:
THIS INFORMATION MAY NOT CONTAIN ALL DETAILS
REQUIRED FOR CONSTRUCTION. APPROPRIATE MODIFICATION
MAY BE REQUIRED TO ENSURE SUITABILITY OF THESE
DRAWINGS FOR THE SPECIFIC APPLICATION. IT IS THE
USER'S RESPONSIBILITY TO ENSURE INSTALLATION OF THE
EQUIPMENT/SYSTEM IS IN ACCORDANCE WITH
BUILDING/PROJECT SPECIFICATIONS, APPLICABLE CODES AND
STANDARDS.



- NOTES:
1. ALL CONDUIT MAY BE COMBINED ON SAME SUPPORT CHANNEL WHERE PRACTICAL.
 2. SUPPORT CHANNEL LENGTH SHALL NOT BE DETERMINED UNTIL ALL PIPING, CONDUIT, ETC. TO BE SUPPORTED IS COORDINATED.
 3. SUPPORT CHANNEL SPACING SHALL BE NO MORE THAN 10'-0".
 4. UNISTRUT AND CONDUIT INSTALLATION MAY BE REVERSED.

2 CONDUIT SUPPORT DETAIL
E4.0 N.T.S



1 CONDUIT SUPPORT DETAIL
E4.0 N.T.S

PLUMBING LEGEND	
SYMBOL	DESCRIPTION
	SANITARY WASTE (ABOVE FLOOR)
	SANITARY SEWER (UNDER FLOOR)
	VENT PIPING
	COLD WATER
	HOT WATER
	HOT WATER RETURN
	P-TRAP
	PIPE DROP
	PIPE UP
	BALANCING VALVE
	CHECK VALVE
	WATER HAMMER ARRESTOR
	SHUT-OFF VALVE
	POINT OF NEW CONNECTION

PLUMBING ABBREVIATIONS

CO	CLEANOUT
FCO	FLOOR CLEANOUT
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
S	SOIL
ST	STORM
V	VENT
W	WASTE
LAV	LAVATORY
WC	WATER CLOSET
TYP.	TYPICAL
DN	DOWN
EX.	EXISTING
FD	FLOOR DRAIN
SQ. FT.	SQUARE FEET
BFP	BACK FLOW PREVENTER
WH	HOT WATER HEATER
EW	ELECTRIC WATER COOLER
WCO	WALL CLEANOUT

PLUMBING DRAWING LIST

P0.1	PLUMBING SYMBOLS, ABBREVIATIONS, NOTES & SPECIFICATIONS
P1.0	PLUMBING 1ST FLOOR PLAN
P1.1	PLUMBING 2ND FLOOR PLAN
P2.0	PLUMBING DETAILS
P3.0	PLUMBING SCHEDULE AND RISERS

CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

- a.

INTERNATIONAL BUILDING CODE 2021
- b.

INTERNATIONAL MECHANICAL CODE 2021
- c.

INTERNATIONAL PLUMBING CODE 2021
- d.

INTERNATIONAL ELECTRICAL CODE 2021
- e.

INTERNATIONAL ENERGY CONSERVATION CODE 2021
- f.

INTERNATIONAL FUEL GAS CODE 2021

PLUMBING NOTES

1.

ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER, GAS) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2021 INTERNATIONAL PLUMBING CODE, 2021 INTERNATIONAL FUEL GAS CODE & 2021 INTERNATIONAL ENERGY CONSERVATION CODE
2.

INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 702.2
3.

PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 305.
4.

TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 306.
5.

MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 303, PC 605, PC 702, PC 902,PC 1102.
6.

EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE, IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.
7.

DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER PC 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 708
8.

DRAINAGE PIPE CLEANOUTS AS PER SECTION PC 708.
9.

VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 308
10.

WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION PC 601-603, 604, 606, 607, 608, 610
11.

THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION PC 701, 704, 705, 706, 707, 708, 711.
12.

VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 901 THROUGH PC 912 THROUGH PC 917
13.

INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION 108, 312.
14.

GAS PIPING INSTALLATION SHALL BE IN ACCORDANCE WITH 2021 INTERNATIONAL FUEL GAS CODE CHAPTER 4.

PLUMBING SPECIFICATIONS

1. BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS

1.01 SCOPE

A.

PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.

B.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.

C.

OBTAIN ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.

D.

THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISIONAL REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.

E.

THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK. BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.

F.

ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE FREEZE PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.

G.

ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE CONTRACTOR FOR ELECTRICAL WORK. THIS CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING FOR EQUIPMENT INSTALLED UNDER HIS CONTRACT. THE CONTRACTOR FOR ELECTRICAL WORK IS RESPONSIBLE FOR LINE VOLTAGE POWER WIRING ONLY.

H.

COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.

I.

MINOR DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER SHALL BE INCLUDED AS IF SPECIFIED OR INDICATED ON THE DRAWINGS.

J.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS FOR THE INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED FEES.

K.

THE CONTRACTOR IS RESPONSIBLE FOR ALL PAINTING ASSOCIATED WITH CUTTING AND PATCHING. ALL PAINTING IN AREAS WITH COMPLETE FINISH RENOVATIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.
- 1.02 SUBMITTALS

A.

SUBMITTAL REQUIREMENTS SHALL BE COORDINATED WITH THE ARCHITECT AND AUTHORITIES HAVING JURISDICTION. UNLESS OTHERWISE DIRECTED, CONTRACTOR SHALL PROVIDE SUBMITTALS AS LISTED BELOW.

1.

PIPE AND FITTINGS

2.

VALVES

3.

HANGERS AND SUPPORTS

4.

PLUMBING PIPING LAYOUT

5.

TESTS

6.

PLUMBING FIXTURES

7.

WATER HEATERS & ACCESSORIES

8.

FLOOR DRAINS

9.

MIXING VALVES

10.

ALL SCHEDULED PLUMBING EQUIPMENT

B.

SUBMITTALS FROM SUPPLIERS OR MANUFACTURERS WHICH DO NOT BEAR THE STAMP OF THE SUBMITTING CONTRACTOR INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SUBMITTAL FOR CONFORMANCE WITH THE PROJECT REQUIREMENTS WILL BE RETURNED REJECTED.

C.

THE ENGINEER'S REVIEW OF SUBMITTALS IS A COURTESY WHICH DOES NOT RELIEVE THE CONTRACTOR FROM CONFORMING WITH THE CONSTRUCTION DOCUMENTS, REGARDLESS OF THE ACTION INDICATED BY THE SHOP DRAWINGS STAMP.

D.

SUBMIT PROOF OF APPROVAL AND/OR CONFIRMATION OF SATISFACTORY TEST RESULTS TO THE OWNER AND THE ARCHITECT.

E.

SUBMIT TO THE OWNER'S MAINTENANCE PERSONNEL OPERATION AND MAINTENANCE DATA FOR ALL SYSTEM COMPONENTS, SERVICING REQUIREMENTS, INSPECTION DATA, REPLACEMENT PART NUMBERS AND AVAILABILITY AND CONTACT INFORMATION FOR SERVICE/SUPPLY COMPANY.

F.

FOR ALL BELOW GRADE PIPING WHERE ACTUAL INSTALLATION DEVIATES FROM CONSTRUCTION DRAWINGS, THE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS INDICATING BELOW GRADE PIPE LOCATIONS DIMENSIONED TO NEAREST COLUMN LINES.

G.

RECORD AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE OWNER/TENANT AFTER COMPLETION OF THE WORK SHOWING ANY ALTERATIONS, ADDITIONS AND/OR DELETIONS TO THE SYSTEM(S) INSTALLED.
- 1.03 SUBSTITUTIONS

A.

ALL EQUIPMENT SHALL BE PRODUCTS OF THE SPECIFIED MANUFACTURER OR MANUFACTURERS. ALL BIDS SHALL BE BASED ON THE SPECIFIED MANUFACTURER OR MANUFACTURERS EQUIPMENT. FOR SUBSTITUTIONS OF OTHER MANUFACTURER'S EQUIPMENT TO BE CONSIDERED, THE SUBSTITUTION MUST BE INDICATED PRIOR TO BIDDING WITH THE REASON FOR THE PROPOSED SUBSTITUTION IDENTIFIED, AND THE PROPOSED CREDIT TO THE OWNER INDICATED. THE ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF ANY PROPOSED SUBSTITUTIONS.

B.

THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.
- 1.04 DEFINITIONS
- A.

FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.

B.

INSTALL: TO ERRECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.

C.

PROVIDE: TO FURNISH AND INSTALL.

D.

PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.

E.

REFER TO THE 2021 INTERNATIONAL PLUMBING CODE FOR ADDITIONAL DEFINITIONS.
- 1.04 DRAWINGS
- A.

THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT. ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.

B.

PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.

C.

REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.

D.

REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.

E.

VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS AND INFORMATION FURNISHED BY THE OWNER.

F.

LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.
- 1.05 PRODUCTS
- A. SANITARY AND VENT PIPING:
1.

ABOVE GRADE/ UNDERGROUND PIPING SHALL BE CAST IRON PIPE WHICH SHOULD COMPLY WITH ASTM A74 STANDARD/CISPI 301.

2.

SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.).

3.

PVC OR OTHER COMBUSTIBLE PLASTIC PIPING SHALL NOT BE INSTALLED IN CEILING PLENUM SPACES.

4.

ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE (CISPI) AND BE LISTED BY NSF INTERNATIONAL.
- B. DOMESTIC WATER PIPING:
1.

ABOVE GRADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN COPPER TUBE.

2.

FITTINGS IN DOMESTIC WATER PIPING SHALL BE COPPER OR COPPER ALLOY.

3.

JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.

4.

THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.

5.

COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.

6.

AS PER IECC 2021 EDITION, SECTION C404.2, WATER HEATING EQUIPMENT AND HOT WATER STORAGE TANKS SHALL MEET THE REQUIREMENTS OF TABLE 404.2, THE EFFICIENCY SHALL BE VERIFIED THROUGH DATA FURNISHED BY THE MANUFACTURER OR THROUGH CERTIFICATION UNDER AN APPROVED CERTIFICATION PROGRAM.

7.

AS PER IECC 2021 EDITION, SECTION C404.4 ALL PIPING SERVING AS PART OF A HEATING SYSTEM SHALL BE THERMALLY INSULATED IN ACCORDANCE WITH TABLE C403.12.3
- | MINIMUM PIPE INSULATION THICKNESS | | | | | |
|--|----------------------------------|-----------------------------|------------------------------------|--------------|-------------|
| FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F) | INSULATION CONDUCTIVITY | | NOMINAL PIPE OR TUBE SIZE (INCHES) | | |
| | CONDUCTIVITY BTU-IN./ (H·FT²·°F) | MEAN RATING TEMPERATURE, °F | < 1 | 1 to 1½ < 1½ | 1½ to 4 < 4 |
| 105-140 | 0.21-0.28 | 100 | 1.0 | 1.0 | 1.5 |
| 40-60 | 0.21-0.27 | 75 | 0.5 | 0.5 | 1.0 |
8.

AS PER IECC 2021 EDITION, SECTION C404.6 AUTOMATIC-CIRCULATING HOT WATER SYSTEM PUMPS OR HEAT TRACE SHALL BE ARRANGED TO BE CONVENIENTLY TURNED OFF AUTOMATICALLY OR MANUALLY WHEN THE HOT WATER SYSTEM IS NOT IN OPERATION.

9.

THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE, SENSING THE PRESENCE OF A USER OR A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER OR A FIXTURE FITTINGS OR APPLIANCE.

10.

THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F(40°C).
- C. ELECTRIC WATER HEATER
1.

TANK SHALL BE OF MENTIONED CAPACITY AND SHALL HAVE 150 PSI WORKING PRESSURE AND BE EQUIPPED WITH EXTRUDED HIGH DENSITY ANGLE.

2.

ALL INTERNAL SURFACES OF THE HEATER EXPOSED TO WATER SHALL BE GLASS-LINED WITH AN ALKALINE BORO SILICATE COMPOSITION THAT HAS BEEN FUSED-TO-STEEL BY FIRING AT A TEMPERATURE RANGE OF 1400°F TO 1600°F.

3.

ELECTRIC HEATING ELEMENTS SHALL BE LOW WATT DENSITY GOLDENROD 1" SCREW-IN TYPE.

4.

EACH ELEMENT SHALL BE CONTROLLED BY AN INDIVIDUALLY MOUNTED THERMOSTAT AND HIGH TEMPERATURE CUT-OFF SWITCH. ALL INTERNAL CIRCUITS SHALL BE FUSED. THE OUTER JACKET SHALL BE OF BAKED ENAMEL FINISH AND SHALL BE PROVIDED WITH FULL SIZE CONTROL COMPARTMENT FOR PERFORMANCE OF SERVICE AND MAINTENANCE THROUGH HINGED FRONT PANEL AND SHALL ENCLOSE THE TANK WITH FOAM INSULATION. ELECTRICAL JUNCTION BOX WITH HEAVY DUTY TERMINAL BLOCK SHALL BE PROVIDED. THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.

D.

MIXING VALVES

1.

VALVE BODY SHALL BE MADE OF CAST BRASS. THE INTERNAL COMPONENTS SHALL BE MADE OF BRASS OR STAINLESS STEEL.

2.

TYPES A, C & D VALVES: VALVE SHUTS OFF IN FULL COLD POSITION AND MUST PASS THROUGH COLD RANGE BEFORE DELIVERING WARM AND/OR HOT WATER. TEMPERATURE LIMIT SET AT 105°F MAXIMUM DELIVERY TEMPERATURE. IF ONE SUPPLY SHOULD FAIL, THE OTHER WILL AUTOMATICALLY AND INSTANTLY SHUT DOWN. DELIVERY CAPACITY IS 5 GPM @ 45 PSIG DIFFERENTIAL.

3.

TYPES OF VALVES: TYPE A- THERMOSTATICALLY OPERATED BY MEANS OF BI-METALLIC STRIP; OR EXPANSION BELLONIS; TYPE B- SINGLE HANDLE MECHANICAL MIXER, OR INDIVIDUAL HOT AND COLD CONTROL VALVES; TYPE C- PRESSURE BALANCING SHOWER VALVE/PISTON OPERATED MIXING VALVE; TYPE D- BALANCED PRESSURE OPERATION, WITH INTEGRAL DIAL THERMOMETER INDICATING DELIVERED WATER TEMPERATURE.
4.

EACH ELEMENT SHALL BE CONTROLLED BY AN INDIVIDUALLY MOUNTED THERMOSTAT AND HIGH TEMPERATURE CUT-OFF SWITCH. ALL INTERNAL CIRCUITS SHALL BE FUSED. THE OUTER JACKET SHALL BE OF BAKED ENAMEL FINISH AND SHALL BE PROVIDED WITH FULL SIZE CONTROL COMPARTMENT FOR PERFORMANCE OF SERVICE AND MAINTENANCE THROUGH HINGED FRONT PANEL AND SHALL ENCLOSE THE TANK WITH FOAM INSULATION. ELECTRICAL JUNCTION BOX WITH HEAVY DUTY TERMINAL BLOCK SHALL BE PROVIDED. THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.

E.

HANGERS AND SUPPORTS:

1.

HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.

2.

SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.

3.

ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS..

4.

SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.
- F. VALVES:
1.

PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4". PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.

2.

ALL FIXTURES WITH THE EXCEPTION OF FLUSHOMETER-EQUIPPED WATER CLOSETS AND URINALS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE. WHERE SUPPLIES ARE EXPOSED PROVIDE CHROME-PLATED STOPS WITH CHROME-PLATED ESCUTCHEONS ON PIPING PENETRATIONS.

3.

ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE SHUT-OFF VALVES ON SUPPLY LINES.

4.

ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.

5.

ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.

6.

PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.
- G. SLEEVES AND ESCUTCHEONS:
1.

SLEEVES THROUGH STRUCTURAL CONCRETE MEMBERS AND SLEEVES FOR WALLS BELOW GRADE AND FLOORS ON GRADE SHALL BE STANDARD WEIGHT GALVANIZED SCHEDULE 40 STEEL PIPE. SLEEVES THROUGH OTHER THAN STRUCTURAL COMPONENTS OF THE BUILDING SHALL BE 20 GAUGE GALVANIZED SHEET METAL WITH LOCK SEAM JOINTS. USE THERMABEET SAFING INSULATION SHALL BE INSTALLED BETWEEN PIPE AND SLEEVE.

2.

PIPE ESCUTCHEON PLATES SHALL BE INSTALLED WHERE EXPOSED PIPING PASSES THROUGH WALLS, CEILINGS, AND FLOORS AND SHALL BE MINIMUM 20 GAUGE STEEL. PROVIDE CHROME PLATED ESCUTCHEON PLATES IN FINISHED AREAS.
- H. DRAINAGE ACCESSORIES
1.

GENERAL:

a.

INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.

b.

SECURE EXTERNAL COMPONENTS IN PLACE WITH VANDAL RESISTANT FASTENERS OR DEVICES WHICH CANNOT BE REMOVED WITHOUT SPECIAL TOOLS.

2.

DEVICES:

a.

CLEANOUT & CLEANOUT PLUG

•

THREADED PIPE FITTING OR CAST IRON FERRULE WITH GAS TIGHT CLEANOUT PLUG

•

PLUG SHOULD BE CAST BRASS OR BRONZE, WITH THREADED END, AND RAISED OR COUNTERSUNK HEAD.

•

LUBRICATE THREADS OF CLEANOUT PLUG WITH ANTI-SEIZE LUBRICANT BEFORE FINAL INSTALLATION.

b.

CLEANOUT WALL PLATE

•

IT SHOULD BE ROUND, STAINLESS STEEL OR POLISHED CHROME PLATED BRASS COVER PLATE WITH STAINLESS STEEL VANDAL RESISTANT FASTENER TO SECURE TO CLEANOUT PLUG.

c.

CLEANOUT DECK PLATE

•

IT SHOULD BE STANDARD DUTY FLOOR CLEANOUT FITTING WITH COATED CAST IRON BODY; ROUND, POLISHED NICKEL BRONZE SCORATED TOP SECURED TO CLEANOUT PLUG WITH STAINLESS STEEL VANDAL RESISTANT FASTENER. THREADED HEIGHT ADJUSTMENT, CAST IRON HEAD, GAS TIGHT CLEANOUT PLUG, AND CONNECTION TO MATCH PIPING OPTION SELECTED.

I.

IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.

J.

PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.

K.

PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.

L.

PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.

M.

ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.

N.

PROVIDE ANCHOR GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.

O.

IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.

P.

INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL. REMOVE PROTECTIVE COATINGS PRIOR TO INSTALLATION.

Q.

REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.

R.

ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.

S.

WHEN THE WATER PIPING SYSTEM IS COMPLETE, THOROUGHLY FLUSH ALL DIRT, SEDIMENT, SOLDER, ETC., OUT OF THE SYSTEM, REMOVING ALL STRAINERS, VALVE STEM SEATS, ETC., REQUIRED TO ACCOMPLISH THE FLUSHING.

T.

AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.

U.

ALL PIPING INSTALLED ON THE ROOF SHALL BE SUPPORTED BY "PILLOW BLOCK" PIPE STANDS AS MANUFACTURED BY MIRO INDUSTRIES, OR APPROVED EQUAL. WOOD PIPE SUPPORTS SHALL NOT BE ACCEPTABLE. PROVIDE TRAFFIC/WALK PADS BELOW ALL PIPE STANDS.
- V.

INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS, AND CEILINGS, WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH TO ACCOMMODATE INSULATION. SLEEVE SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISH SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.

W.

PROVIDE WATER HAMMER ARRESTERS ON SUPPLY PIPING TO ALL FLUSHOMETER VALVES AND QUICK-CLOSING VALVES.

X.

UNLESS OTHERWISE INDICATED, TRAPS SEALS AT ALL FLOOR DRAINS SHALL BE MAINTAINED BY AN APPROVED TRAP PRINGING DEVICE OR BARRIER TYPE TRAP SEAL PROTECTION DEVICE AS PER CODE APPLICABLE.

Y.

MAINTAIN ALL REQUIRED AND RECOMMENDED CLEARANCES FOR ALL PLUMBING SYSTEM COMPONENTS AND EQUIPMENT.

Z.

MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN ALL PLUMBING V.T.R.S AND ALL OUTDOOR AIR INTAKES. OFFSET VENT STACKS AND STACK VENTS IF AND AS REQUIRED BELOW ROOF TO MAINTAIN SUCH CLEARANCE WHETHER OR NOT SUCH OFFSET IS INDICATED ON THE DRAWINGS. PROVIDE ALL REQUIRED SEISMIC SUPPORTS.
2. INSTALLATION
- 2.01 GENERAL
- A.

ALL WORK WHICH REQUIRES DISRUPTION OF THE ROOFING SHALL BE DONE BY A CONTRACTOR CERTIFIED BY THE ROOFING MANUFACTURER AS REQUIRED TO MAINTAIN ANY EXISTING ROOF WARRANTIES.

B.

EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.

C.

EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.

D.

COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.

E.

REAM PIPE AND TUBE ENDS. REMOVE BURRS, BEVEL FLAIN AND FERROUS END PIPE.

F.

REMOVE SCALE AND FOREIGN MATERIAL FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.

G.

PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.

H.

COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL BUILDING CONDITIONS.

I.

NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.

J.

PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS, THE PLUMBING CONTRACTOR SHALL NOTIFY THE PROPERTY MANAGER AND OFFER A PROPOSED SCHEDULE OF WORK. ESB WILL AUTHORIZE CONNECTIONS AND COORDINATE NECESSARY SHUT DOWNS AND DRAIN DOWNS AS REQUIRED. SHUT DOWNS AND DRAIN DOWNS MAY BE PERFORMED BY THE PLUMBING CONTRACTOR ONLY AFTER RECEIVING ESB AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY MANAGER IS REQUIRED.

K.

THE PLUMBING CONTRACTOR IS ADVISED THAT DUE TO THE NATURE OF THE OPERATIONS AND TENANT REQUIREMENTS, CONNECTIONS TO EXISTING SYSTEMS MAY HAVE TO BE MADE AFTER REGULAR WORKING HOURS. THE PROPERTY MANAGER WILL ADVISE THE PLUMBING CONTRACTOR OF THE TIME CONSTRAINTS UPON RECEIPT AND APPROVAL OF THE PLUMBING CONTRACTOR'S REQUEST FOR SHUT DOWN AND CONNECTION TO EXISTING SYSTEMS.

L.

WHEN CONNECTING TO EXISTING STACKS AND RISERS, PROVISION IS TO BE MADE FOR FUTURE CONNECTIONS BY PROVIDING CAPPER AND VALVED OUTLETS ON DOMESTIC WATER RISERS AND PLUGGED OUTLETS ON THE SANITARY AND VENT STACKS.
- 2.02 ABOVE GRADE
- A.

INSTALL PLUMBING PIPING IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PIPING COMPLIES WITH REQUIREMENTS AND SERVES INTENDED PURPOSES.

B.

ROUTE PIPING IN AN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADELINE. SLOPE PIPING AND ARRANGE SYSTEMS TO DRAIN. IN DOMESTIC WATER SYSTEMS, PROVIDE DRAIN VALVES AT MAIN SHUT-OFF VALVES AND ALL LOW POINTS IN PIPING.

C.

USE EXISTING CONNECTIONS AT MAINS WHERE AVAILABLE FOR NEW BRANCH PIPING. LOCATE ALL RISERS AND PIPING BEFORE CONSTRUCTION COMMENCES AND TAKE CARE NOT TO DAMAGE SAME. ANY DAMAGE OCCURRING TO THE EXISTING PIPING WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- 2.03 INSULATION
- C.

COVER ALL HOT WATER AND HOT WATER RE-CIRCULATION PIPE WITH 1½" THICK FOR PIPE SIZE UP TO 1½" AND 2" THICK FOR PIPE SIZE GREATER THAN 1½". INSTALL ALL INSULATION AS PER MANUFACTURERS RECOMMENDATIONS. ALL INSULATION SHALL COMPLY WITH INTERNATIONAL ENERGY CONSERVATION CODE 2021 EDITION.
3. TESTING
- A.

AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS. CORRECT ALL DEFICIENCIES FOUND.

B.

TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.

C.

THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL PIPING, DEVICES OR ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM, OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, OR BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM.

D.

THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.

E.

ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE UNTIL THE OPERATION IS SATISFACTORY. ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES HAVING JURISDICTION OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THIS CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS, THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.

F.

WHERE ANY EVIDENCE OF STOPPAGE IS FOUND IN PIPING OR EQUIPMENT, THE CONTRACTOR SHALL DISCONNECT, CLEAN, REPAIR AND RECONNECT ALL OBSTRUCTED PIPING OR EQUIPMENT AND SHALL ALSO PAY FOR ALL NECESSARY CUTTING AND REPAIRS TO ADJOINING WORK.

G.

ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY CLEANED INSIDE AND OUT, OF DIRT, CUTTINGS, OILS AND OTHER FOREIGN SUBSTANCES AND SHALL BE LEFT CLEAN.

H.

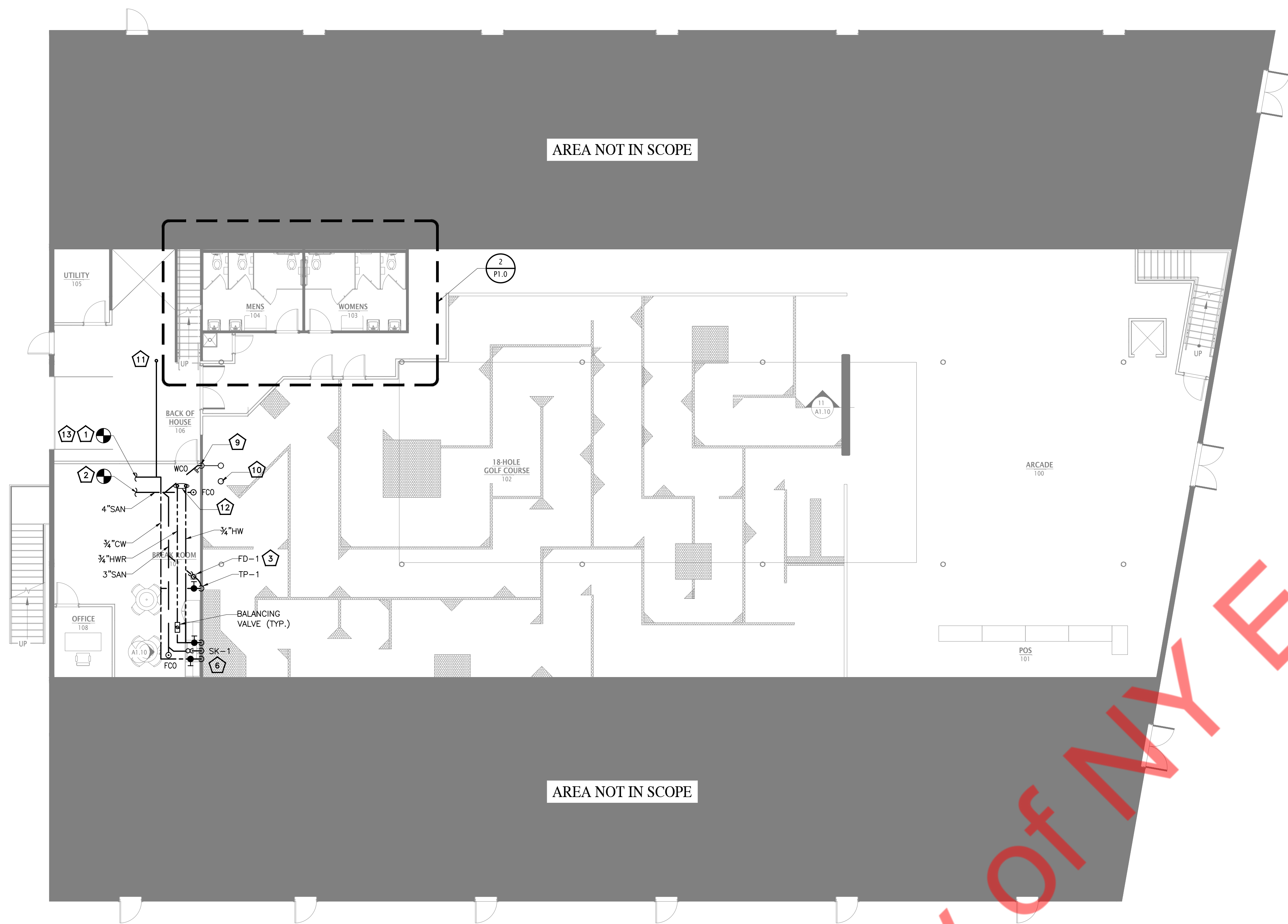
ALL REQUIRED TESTS SHALL BE WITNESSED BY LOCAL AUTHORITIES AND THE OWNER'S REPRESENTATIVE.

I.

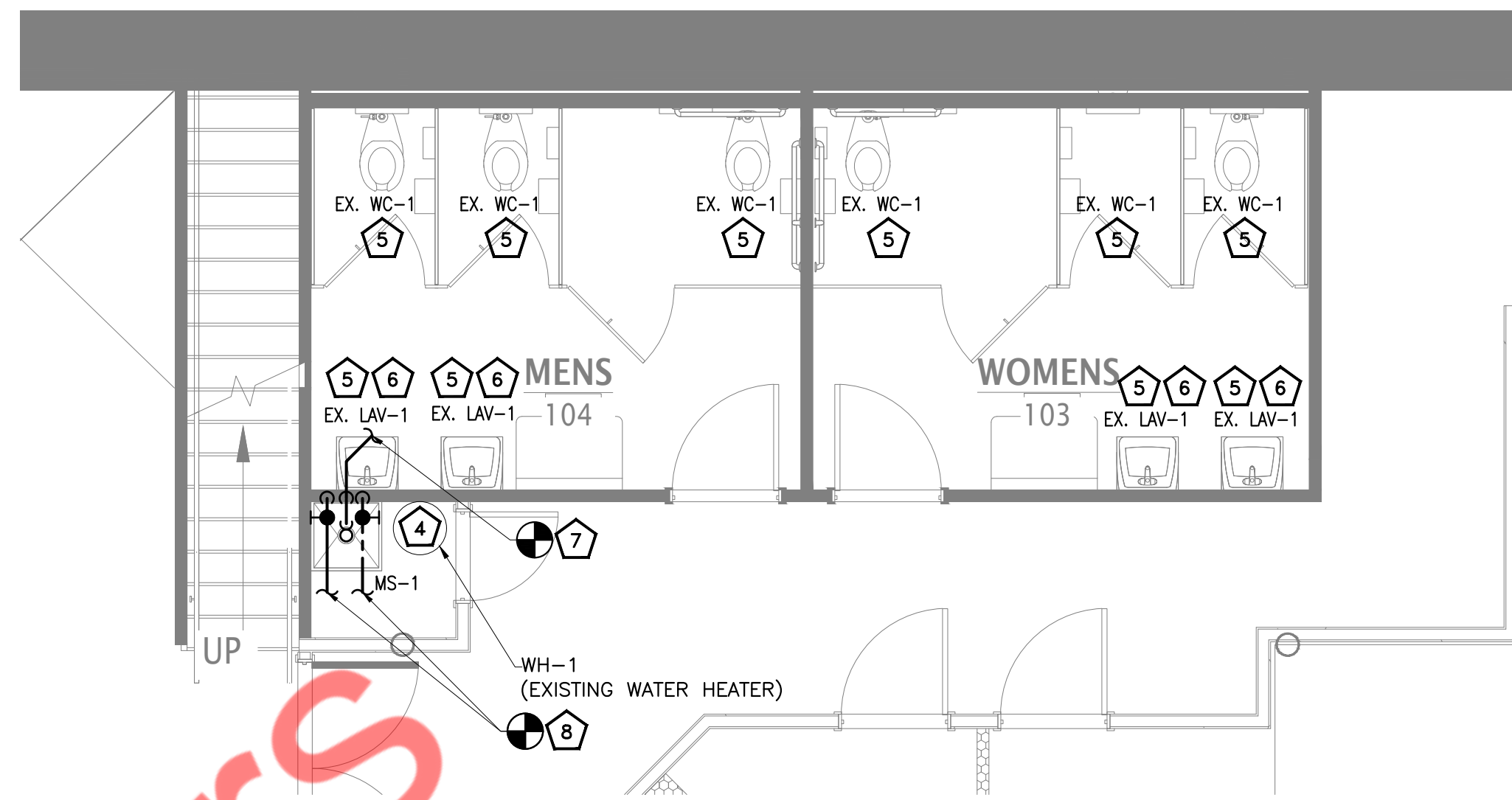
ALL EQUIPMENT WILL BE FACTORY TESTED.

J.

CONTRACTOR SHALL IDENTIFY TO THE OWNER'S REPRESENTATIVE ANY LEAKS OR DAMAGE THAT OCCURS AS A RESULT OF SYSTEM TESTING. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO LIMIT ANY POTENTIAL DAMAGE. CORRECTIVE ACTION REQUIRED AS A RESULT OF TESTING SHALL BE PERFORMED IMMEDIATELY AND AT THE CONTRACTOR'S EXPENSE.
- PLUMBING SYMBOLS, ABBREVIATIONS, NOTES AND SPECIFICATION
- P0.1
- ISSUED FOR PERMIT
- ORIGINAL SHEET SIZE: 30" X 42" ARCH E1



1 PLUMBING 1ST FLOOR PLAN
P1.0 1/8" = 1'-0"



2 PARTIAL PLUMBING SANITARY AND WATER SUPPLY PLAN
P1.0 1/4" = 1'-0"

PLUMBING KEYED NOTES:

- CONNECT NEW 2" CW PIPING WITH THE EXISTING WATER SERVICE LINE IN SPACE. CONTRACTOR TO FIELD VERIFY AVAILABILITY OF EXISTING WATER SUB-METER AND SECONDARY BPF. PROVIDE NEW IF NOT EXISTING AND REROUTE PIPE ACCORDINGLY.
- CONNECT NEW 4" SANITARY PIPE TO EXISTING SANITARY PIPE. CONTRACTOR TO FIELD VERIFY EXISTING SANITARY PIPE SIZE, LOCATION, INVERT AND REROUTE PIPE ACCORDINGLY.
- ROUTE INDIRECT WASTE FROM PROPOSED ICE MACHINE TO FLOOR DRAIN WITH APPROVED AIR GAP.
- EXISTING WATER HEATER (WH-1) WITH THE EXISTING EXPANSION TANK, CIRCULATION PUMP, PIPING AND ACCESSORIES TO REMAIN IN GOOD CONDITION. CONTRACTOR TO FIELD VERIFY. BASE BID ACCORDINGLY.
- EXISTING PLUMBING FIXTURES TO REMAIN WITH EXISTING SANITARY, GREASE, VENT, COLD, HOT, & HOT WATER RETURN LINES WITH ASSOCIATED ACCESSORIES AND FITTINGS. CONTRACTOR SHALL FIELD VERIFY SIZE, LOCATION AND CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED.
- PROVIDE ASSE 1070 OR SIMILAR THERMOSTATIC MIXING VALVE AT ALL HAND SINK AND LAVATORIES IF NOT ALREADY PROVIDED WITH THEM. SET AT 110°F MAXIMUM.
- CONNECT NEW 3" SANITARY LINE TO EXISTING SANITARY LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXISTING SANITARY LINE SIZE, ROUTING AND INVERT PRIOR TO BID. RE-ROUTE SANITARY LINE AS PER SITE CONDITION IF REQUIRED.
- CONNECT NEW 1/2" CW/HW LINE TO EXISTING CW, HW LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXISTING LOCATION AND SIZE OF EXISTING CW, HW LINE, UPSIZE IF REQUIRED.
- NEW 4" SANITARY RISER DOWN THROUGH WALL TO BELOW GRADE. EXTEND TO NEW 4" SANITARY MAIN.
- NEW 3" VENT RISER UP THROUGH 2ND FLOOR WALL TO 2ND FLOOR CEILING SPACE. SEE SHEET P2.
- NEW 1-1/2" COLD WATER RISER UP TO SECOND FLOOR.
- NEW 3/4" HW, HWR LINE DOWN THROUGH SECOND FLOOR.
- CONTRACTOR SHALL VERIFY ACTUAL AVAILABLE WATER PRESSURE AT INCOMING WATER SERVICES. WATER PRESSURE SHOULD NOT BE LESS THEN 65 PSI AT THE REQUIRED FLOW. NOTIFY ENGINEER IF CONDITION DIFFERS.

WATER AND SANITARY PIPING GENERAL NOTES:

- CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER INTERNATIONAL ENERGY CODE 2021 (REFER SHEET P0.1)
- UNLESS OTHERWISE NOTED, SLOPE OF DRAINAGE SYSTEM TO BE 1/8" PER FOOT OF RUN FOR PIPE 3" OR LARGER AND 1/4" PER FOOT FOR PIPE SMALLER THAN 3".
- PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
- CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
- PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
- REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
- REFER RISER DIAGRAM FOR VENT PIPING.
- ALL CLEANOUTS TO BE ACCESSIBLE.
- ANY ROOF PENETRATION SHALL BE PERFORMED BY LANDLORD'S ROOFERS AT LANDLORD OPTION, A BONDED ROOFER APPROVED IN ADVANCE BY LANDLORD.
- PROVIDE TRAP PRIMER/ SEAL IN FLOOR DRAIN AS PER LOCAL JURISDICTION.
- ALL MATERIAL INDICATED AND IMPLIED ON THESE DRAWINGS SHALL BE NEW UNLESS OTHERWISE NOTED.

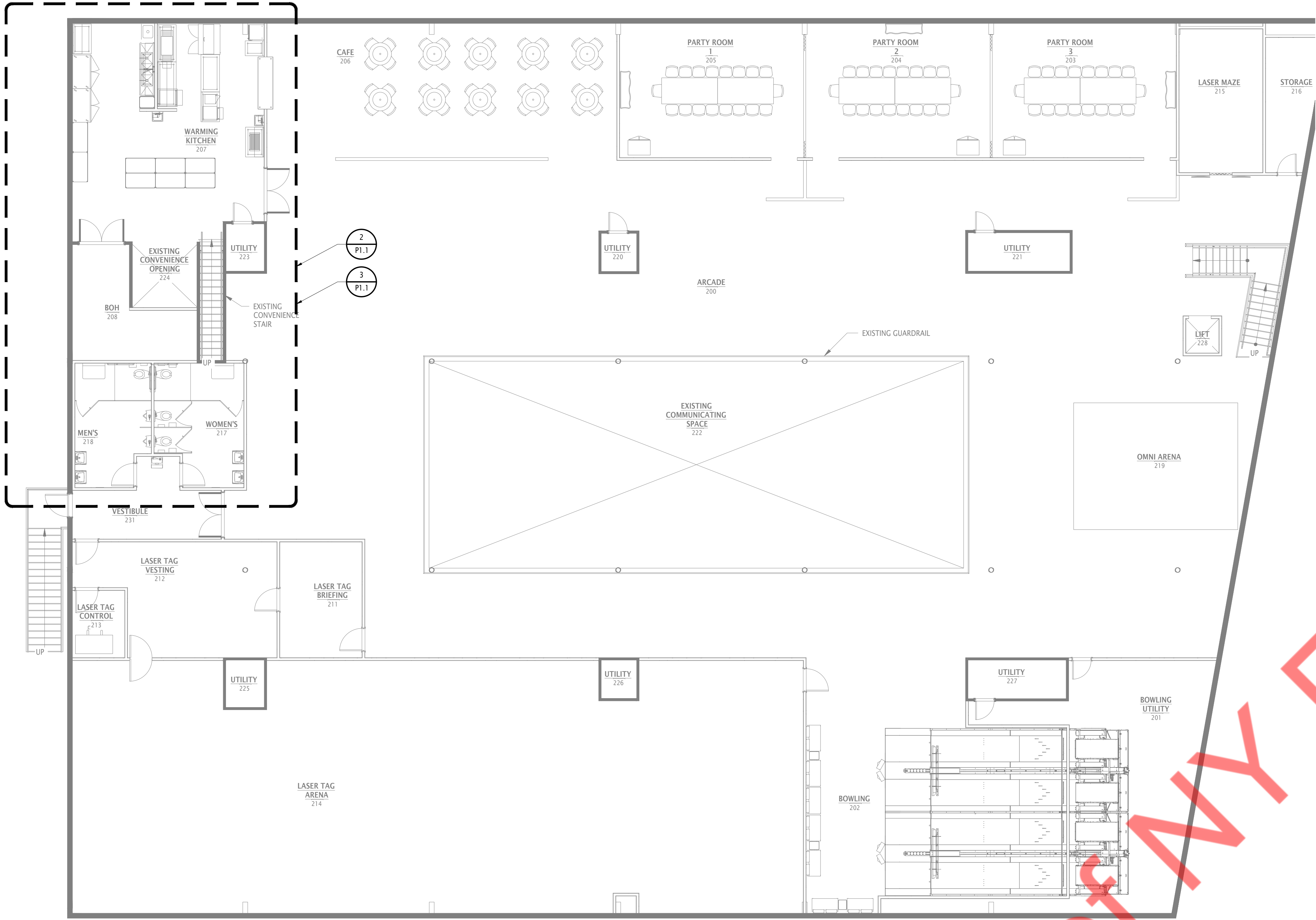
PLUMBING GENERAL NOTES:

- CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATIONS AND SIZES OF ALL UTILITIES, INCLUDING THE DEPTHS OF ALL BELOW GRADE SANITARY SEWERS, PRIOR TO START OF WORK. THIS DRAWINGS IS NOT INTENDED TO INDICATE ALL EXISTING UTILITIES.
- CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING BID AND FIELD VERIFY EXISTING CONDITIONS TO ENSURE THAT THE WORK REPRESENTED ON THE DRAWING AND IN THESE SPECIFICATIONS CAN BE INSTALLED AS INDICATED.
- CONTRACTOR SHALL VERIFY AND COORDINATE ALL UTILITY CONNECTION POINTS, INCLUDING SIZES AND INVERTS WITH EXISTING FIELD CONDITION PRIOR TO START WORK.
- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND INSPECTION RELATED TO THE INSTALLATION OF WORK.
- ALL WORK SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES, LAW, ACTS AND AUTHORITIES HAVING JURISDICTION AND LANDLORD CRITERIA.
- MAINTAIN ALL MANUFACTURERS RECOMMENDED SERVICE CLEARANCES FOR ALL FIXTURE AND EQUIPMENT. REFER TO ARCHITECTURAL PLAN FOR EXACT LOCATIONS OF PLUMBING FIXTURES.
- CONTRACTOR TO VERIFY EXISTING CONDITION AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES WITH THE CONTRACT DOCUMENT BEFORE COMMENCING ANY WORK.
- PROVIDE CUTTING, CORE DRILLING IN WALLS FOR ALL PIPE PENETRATIONS, CONNECTION, AND ALL ASSOCIATED WORK. PROVIDE PATCHING, RESTORATION, AND FINISHING WORK TO MATCH EXISTING CONDITIONS IN ALL ASPECTS.

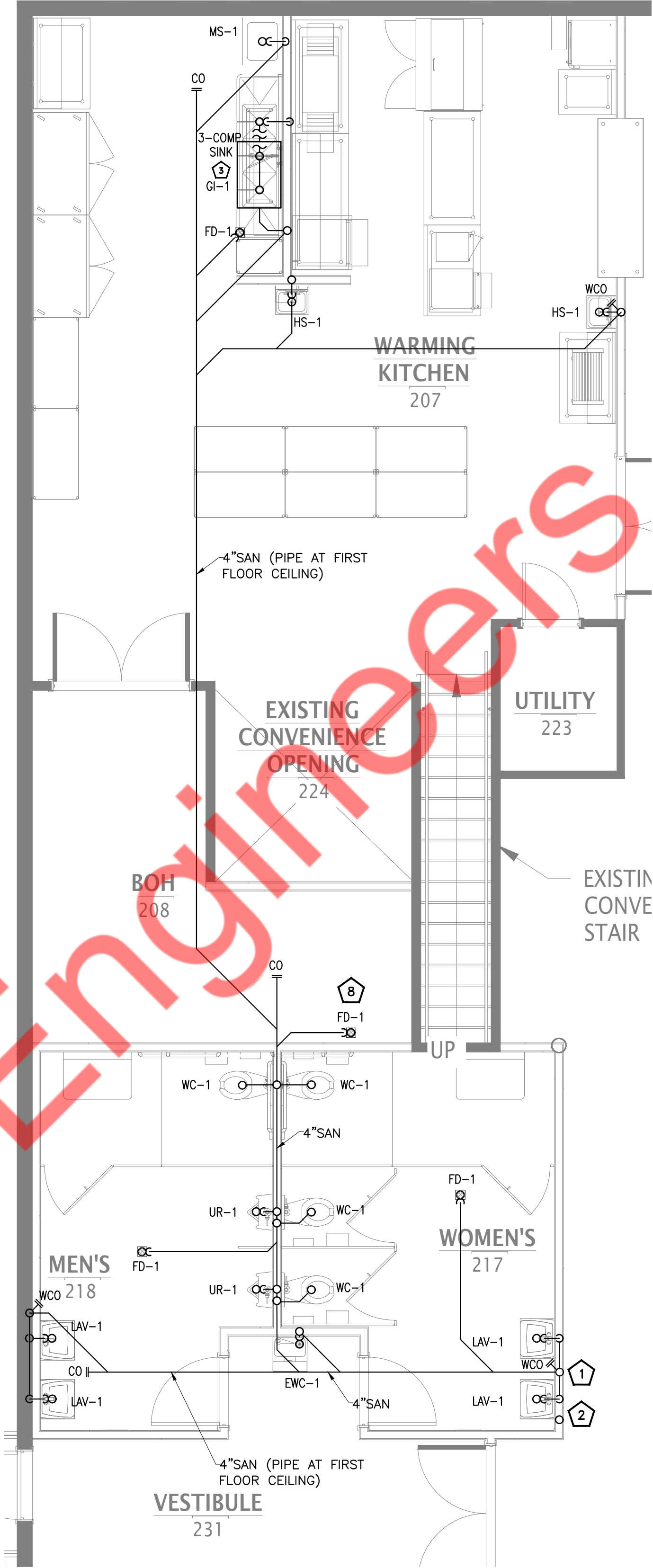
PLUMBING 1ST FLOOR PLAN

P1.0

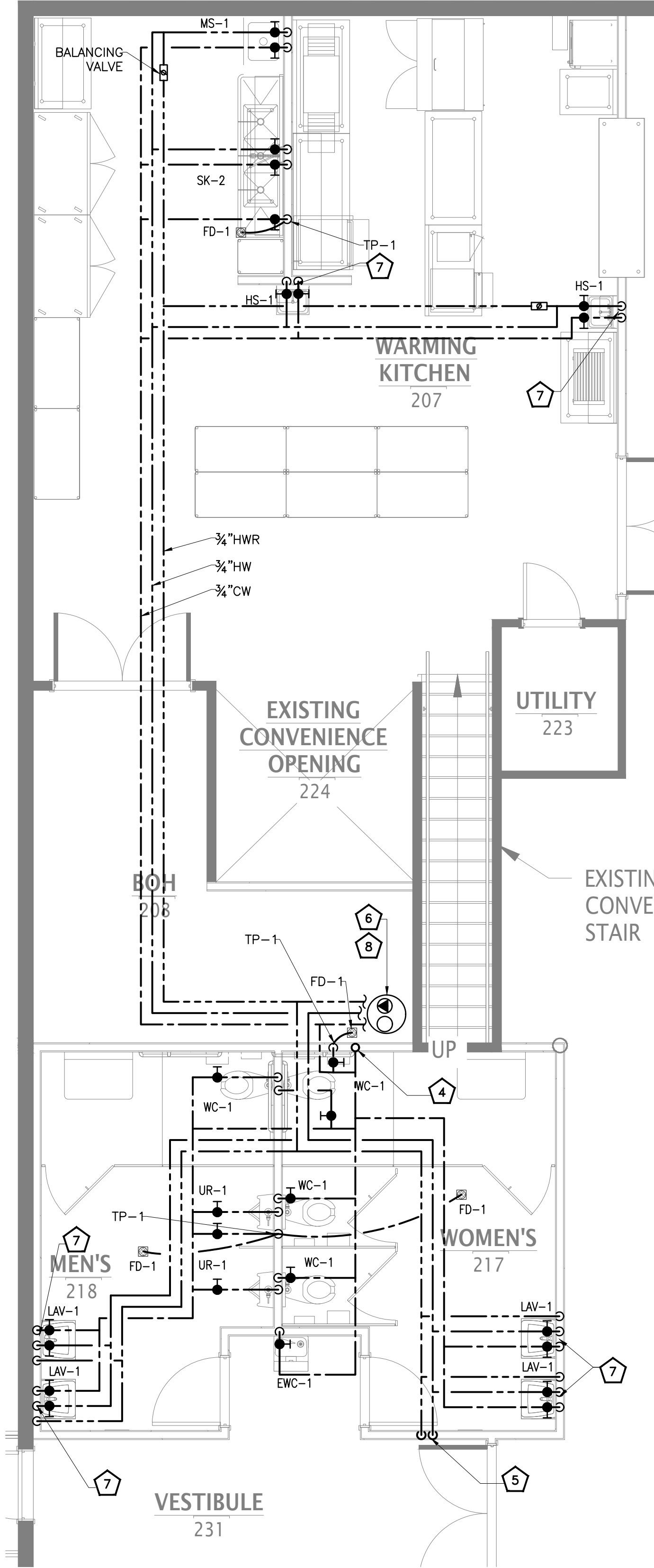
ISSUED FOR PERMIT



1 PLUMBING 2ND FLOOR PLAN
1/8" = 1'-0"



2 PARTIAL PLUMBING SANITARY PLAN
1/4" = 1'-0"



3 PARTIAL PLUMBING WATER SUPPLY PLAN
1/4" = 1'-0"

PLUMBING KEYED NOTES:

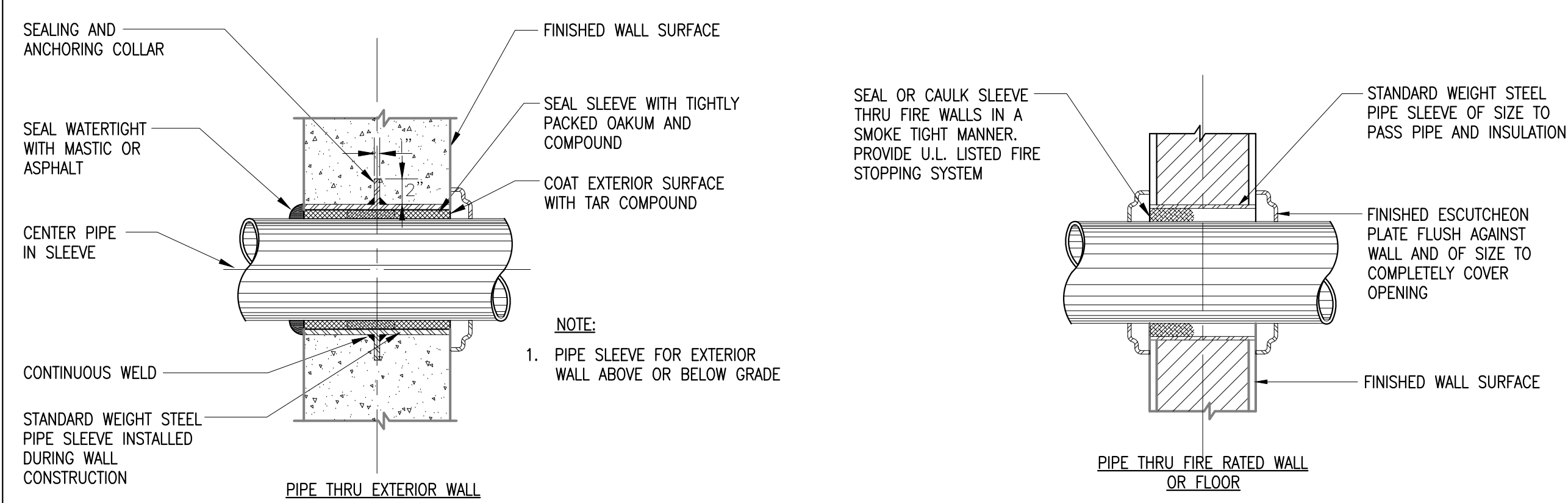
- 1 4" SANITARY WASTE LOCATED IN 1ST FLOOR CEILING SPACE FROM 2ND FLOOR PLUMBING FIXTURES. SEE SHEET P1.1 FOR CONTINUATION
- 2 NEW 3" VENT LINE UP FROM 1ST FLOOR.
- 3 PROVIDE HYDROMECHANICAL GREASE INTERCEPTOR (GI-1) ABOVE FLOOR AS PER SCHEDULE (REFER SHEET P601). INSTALL PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL NECESSARY ACCESSORIES FOR A COMPLETE INSTALLATION.
- 4 NEW 1-1/2" CW LINE UP FROM 1ST FLOOR.
- 5 NEW 3/4" HW, HWR LINE DOWN TO 1ST FLOOR.
- 6 PROVIDE NEW WATER HEATER (WH-2) WITH RE-CIRCULATION PUMP (RCP-1), THERMAL EXPANSION TANK (ET-1) HOT WATER RETURN PIPING, ASSOCIATED ACCESSORIES AND FITTINGS.
- 7 PROVIDE ASSE 1070 OR SIMILAR THERMOSTATIC MIXING VALVE AT ALL HAND SINK AND LAVATOIRES IF NOT ALREADY PROVIDED WITH THEM. SET AT 110°F MAXIMUM.
- 8 SPILL WATER HEATER INDIRECT WASTE TO NEAREST FLOOR DRAIN WITH APPROVED AIR GAP.

PLUMBING GENERAL NOTES:

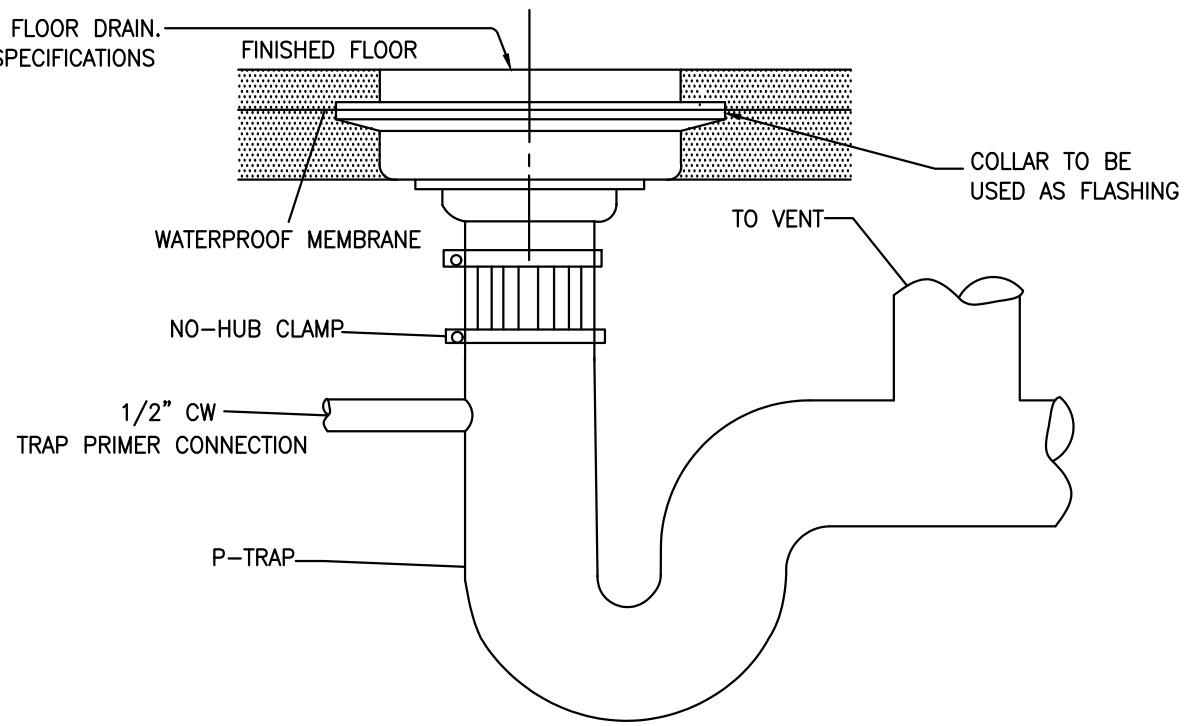
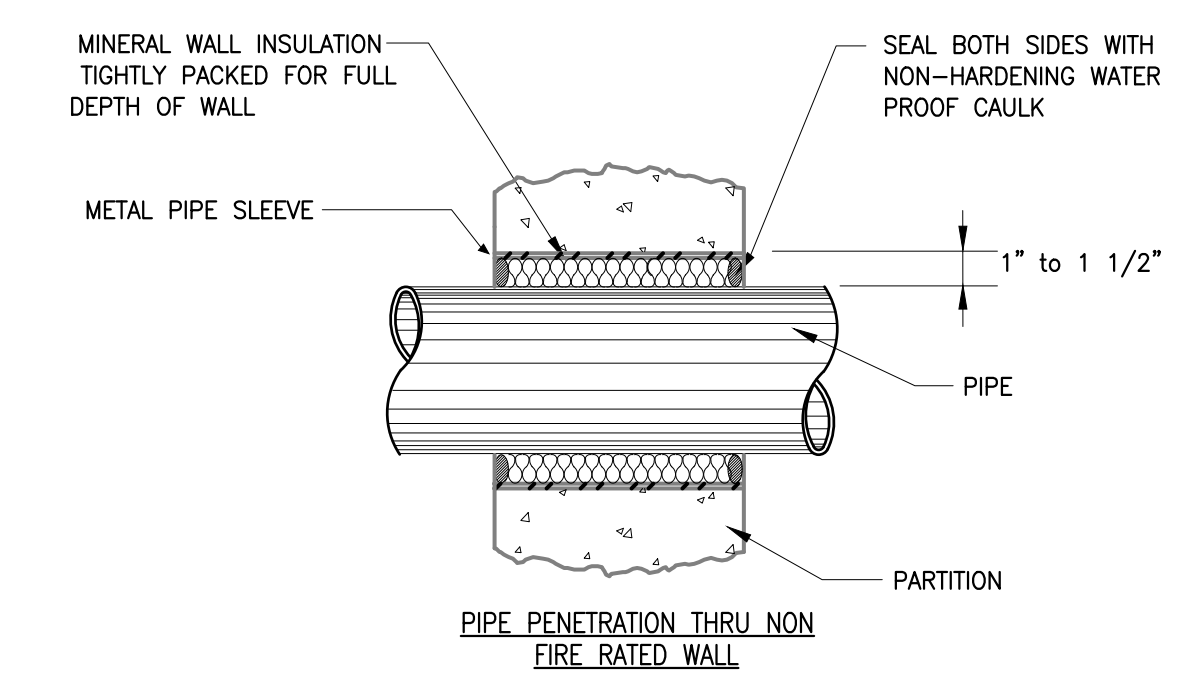
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2. CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING BID AND FIELD VERIFY EXISTING CONDITIONS TO ENSURE THAT THE WORK REPRESENTED ON THE DRAWING AND IN THESE SPECIFICATIONS CAN BE INSTALLED AS INDICATED.
3. CONTRACTOR SHALL VERIFY AND COORDINATE ALL UTILITY CONNECTION POINTS, INCLUDING SIZES AND INVERTS WITH EXISTING FIELD CONDITION PRIOR TO START WORK.
4. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND INSPECTION RELATED TO THE INSTALLATION OF WORK.
5. ALL WORK SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES, LAW, ACTS AND AUTHORITIES HAVING JURISDICTION AND LANDLORD CRITERIA.
6. MAINTAIN ALL MANUFACTURER'S RECOMMENDED SERVICE CLEARANCES FOR ALL FIXTURE AND EQUIPMENT. REFER TO ARCHITECTURAL PLAN FOR EXACT LOCATIONS OF PLUMBING FIXTURES.
7. CONTRACTOR TO VERIFY EXISTING CONDITION AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES WITH THE CONTRACT DOCUMENT BEFORE COMMENCING ANY WORK.
8. PROVIDE CUTTING, CORE DRILLING IN WALLS FOR ALL PIPE PENETRATIONS, CONNECTION, AND ALL ASSOCIATED WORK. PROVIDE PATCHING, RESTORATION, AND FINISHING WORK TO MATCH EXISTING CONDITIONS IN ALL ASPECTS.

WATER AND SANITARY PIPING GENERAL NOTES:

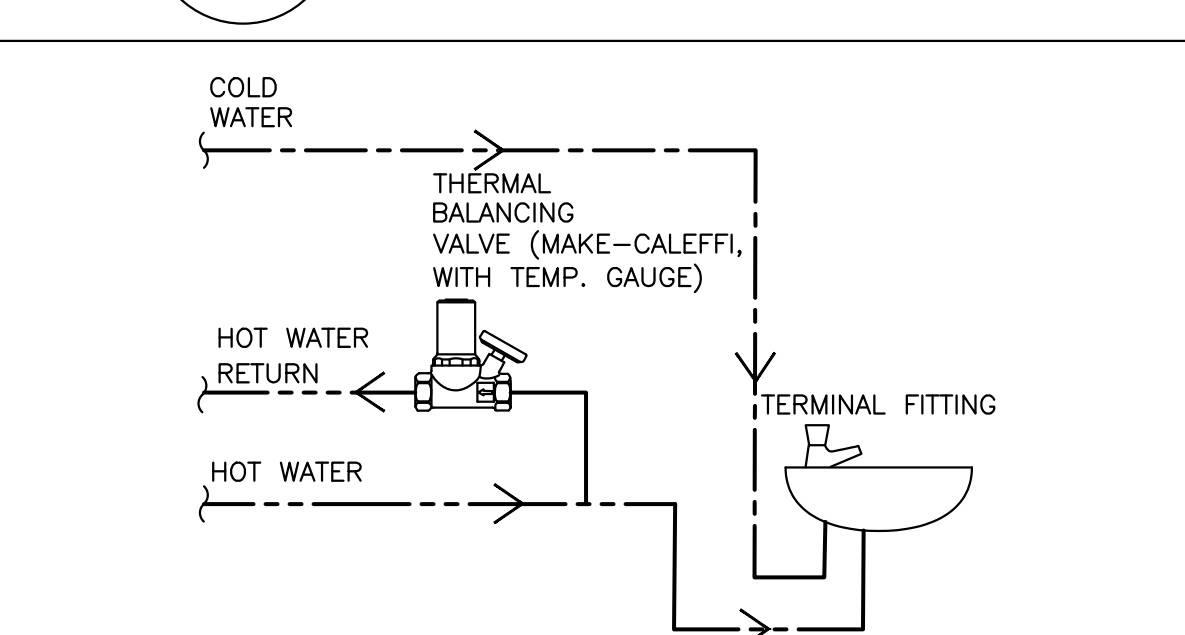
1. CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER INTERNATIONAL ENERGY CODE 2021 (REFER SHEET P0.1)
2. UNLESS OTHERWISE NOTED, SLOPE OF DRAINAGE SYSTEM TO BE 1/8" PER FOOT OF RUN FOR PIPE 3" OR LARGER AND 1/4" PER FOOT FOR PIPE SMALLER THAN 3"
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6. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
7. REFER RISER DIAGRAM FOR VENT PIPING.
8. ALL CLEANOUTS TO BE ACCESSIBLE.
9. ANY ROOF PENETRATION SHALL BE PERFORMED BY LANDLORD'S ROOFERS AT LANDLORD OPTION, A BONDED ROOFER APPROVED IN ADVANCE BY LANDLORD.
10. PROVIDE TRAP PRIMER/ SEAL IN FLOOR DRAIN AS PER LOCAL JURISDICTION.
11. ALL MATERIAL INDICATED AND IMPLIED ON THESE DRAWINGS SHALL BE NEW UNLESS OTHERWISE NOTED.



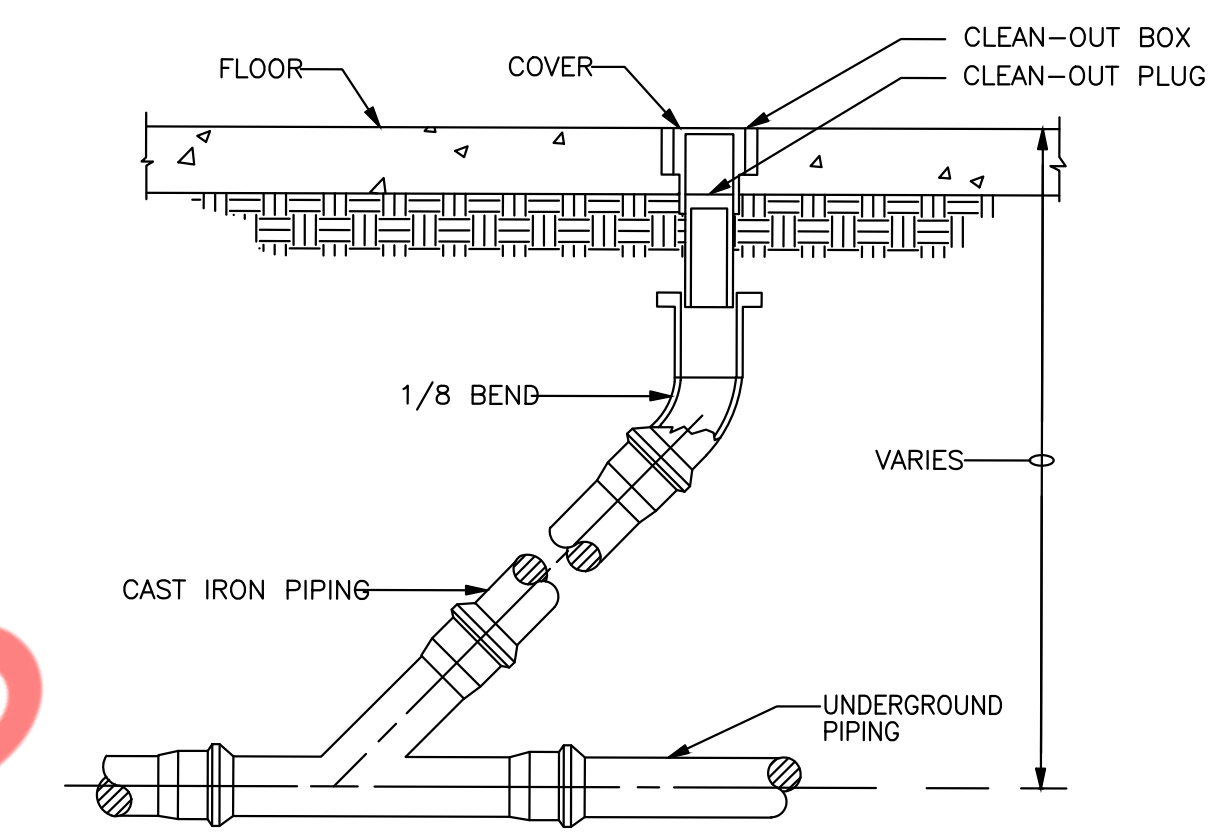
1 PIPE SLEEVE THRU WALL SECTION
P2.0 N.T.S



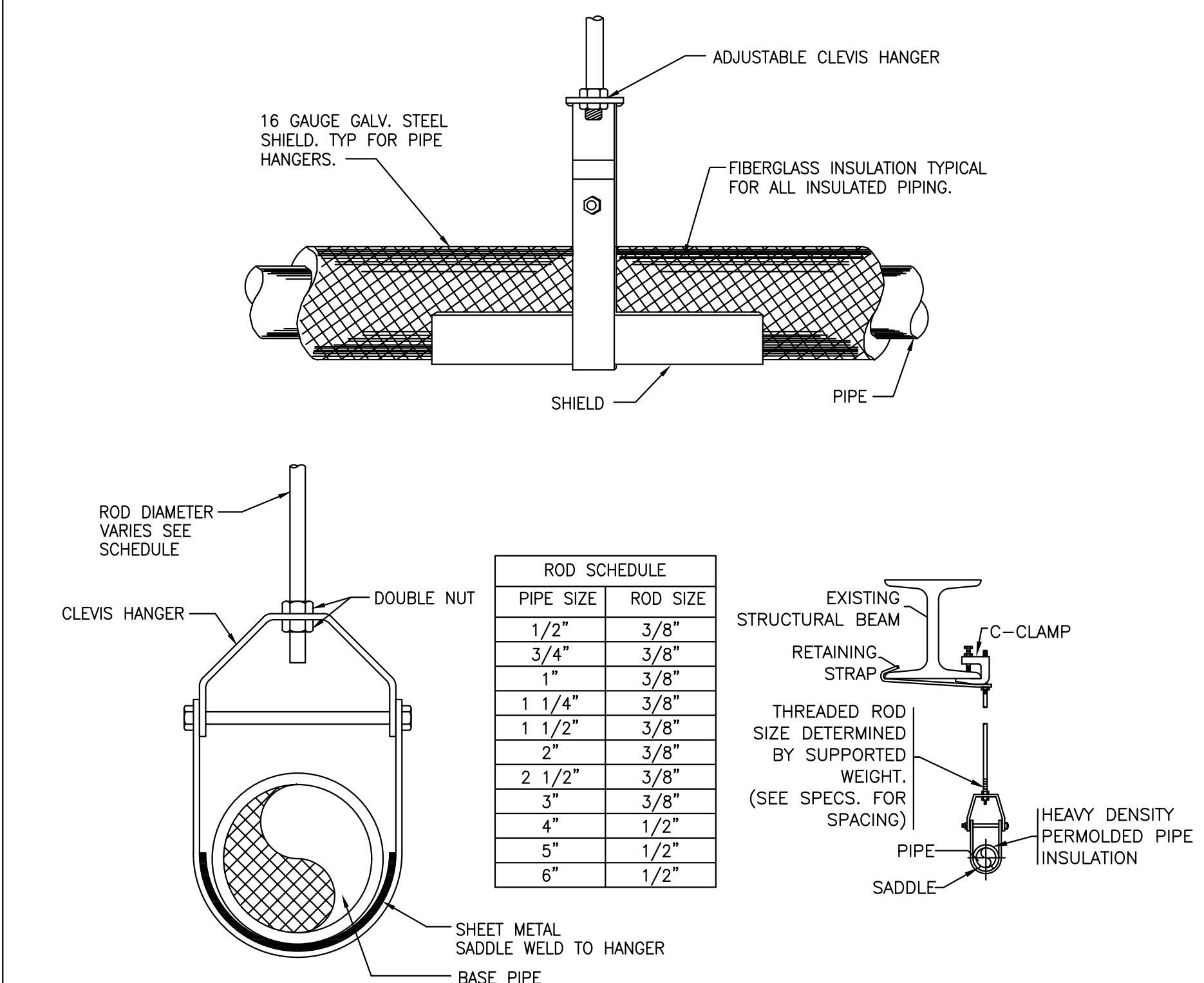
2 FLOOR DRAIN DETAILS
P2.0 N.T.S



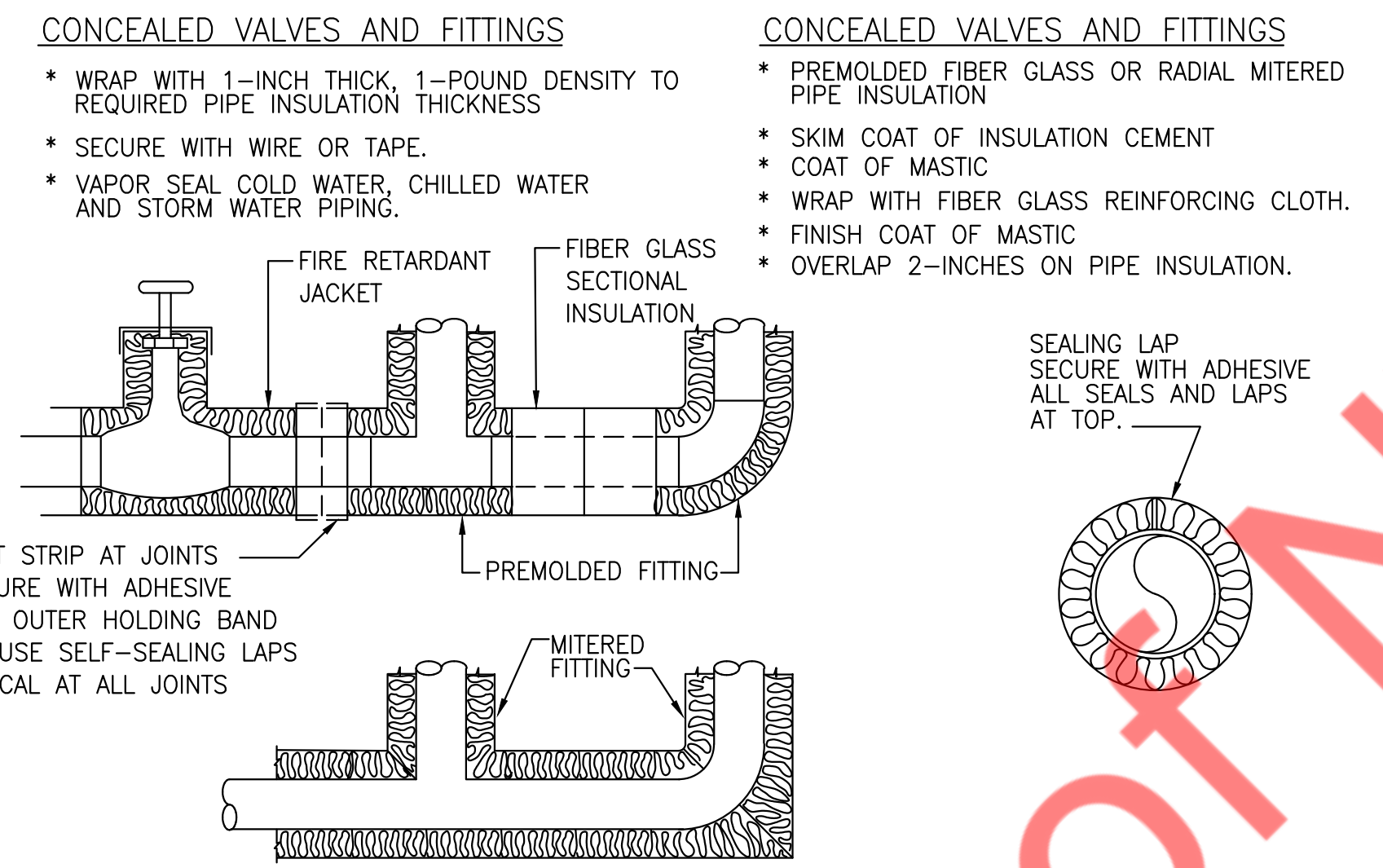
4 HOT WATER HEATER INSTALLATION FLOOR MOUNTED DETAIL
P2.0 N.T.S



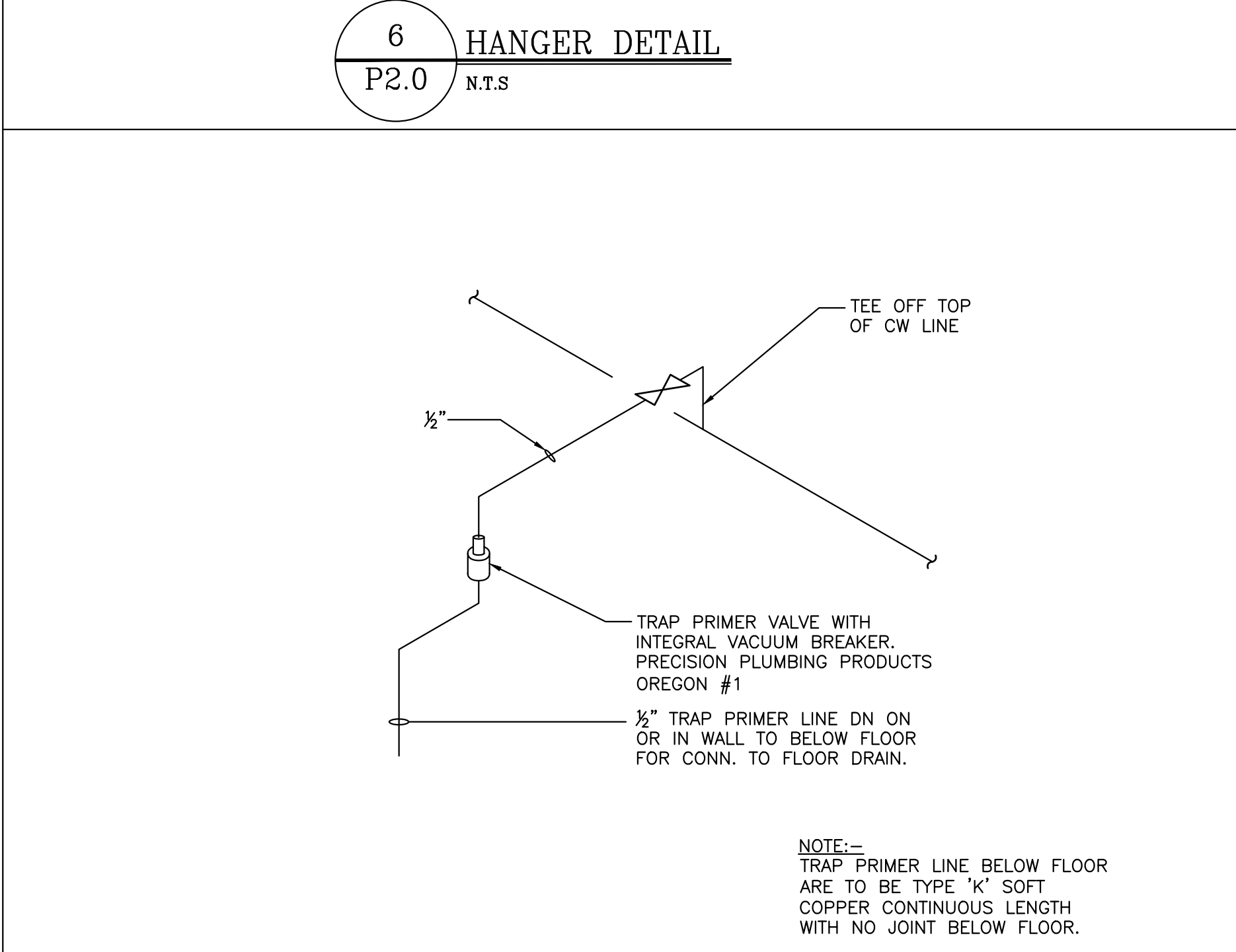
5 FLOOR CLEANOUT DETAIL
P2.0 N.T.S



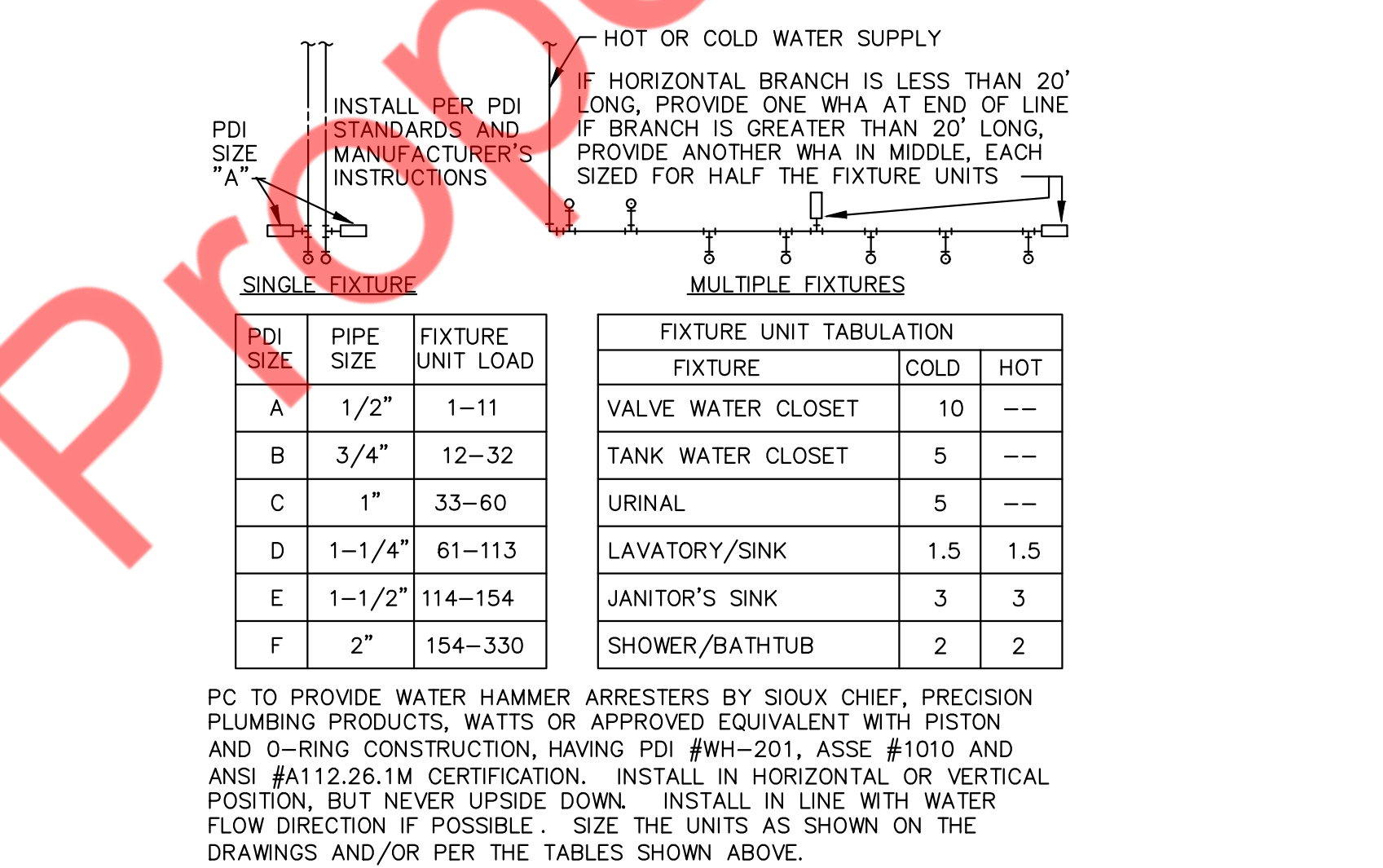
6 HANGER DETAIL
P2.0 N.T.S



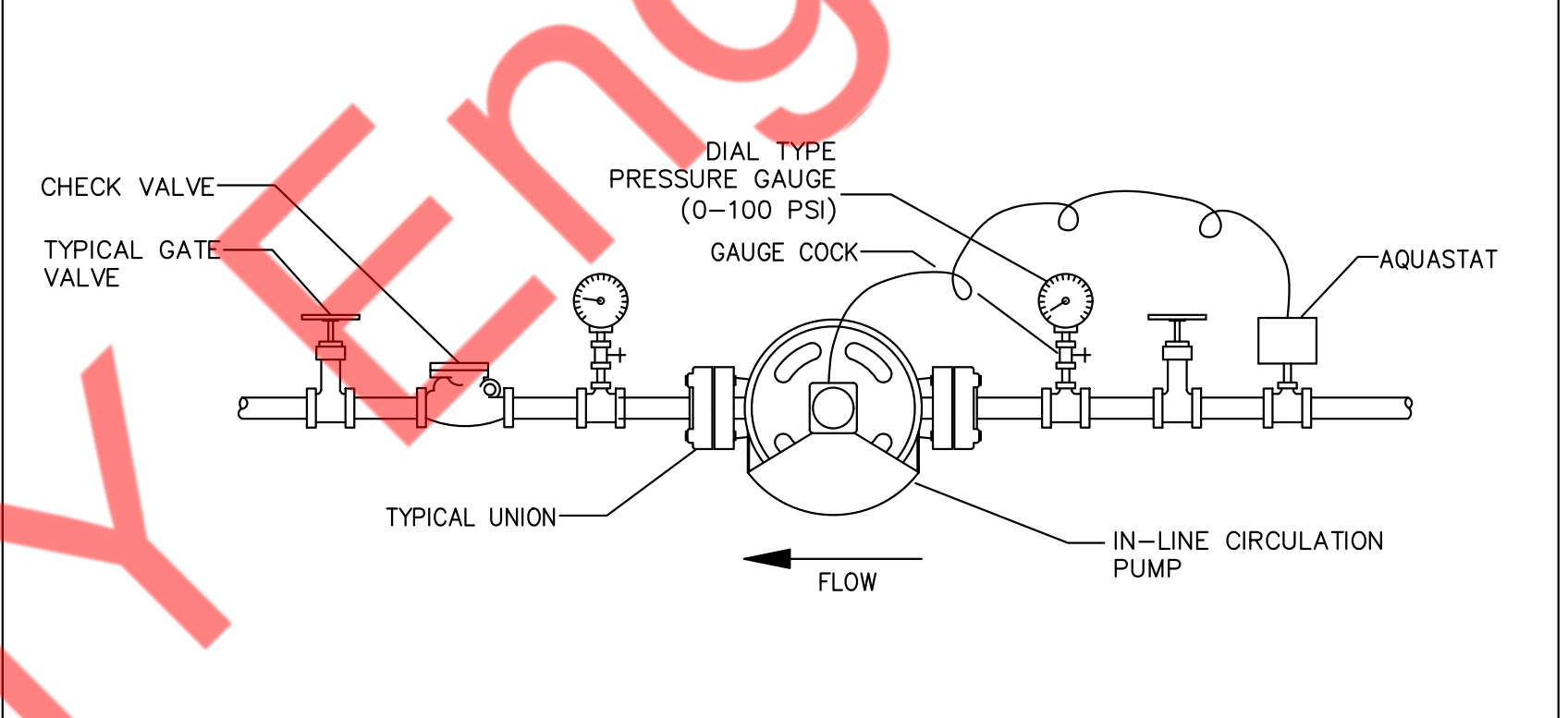
7 INSULATION OF PIPING, VALVES AND FITTINGS FOR EXPOSED AND CONCEALED LOCATIONS
P2.0 N.T.S



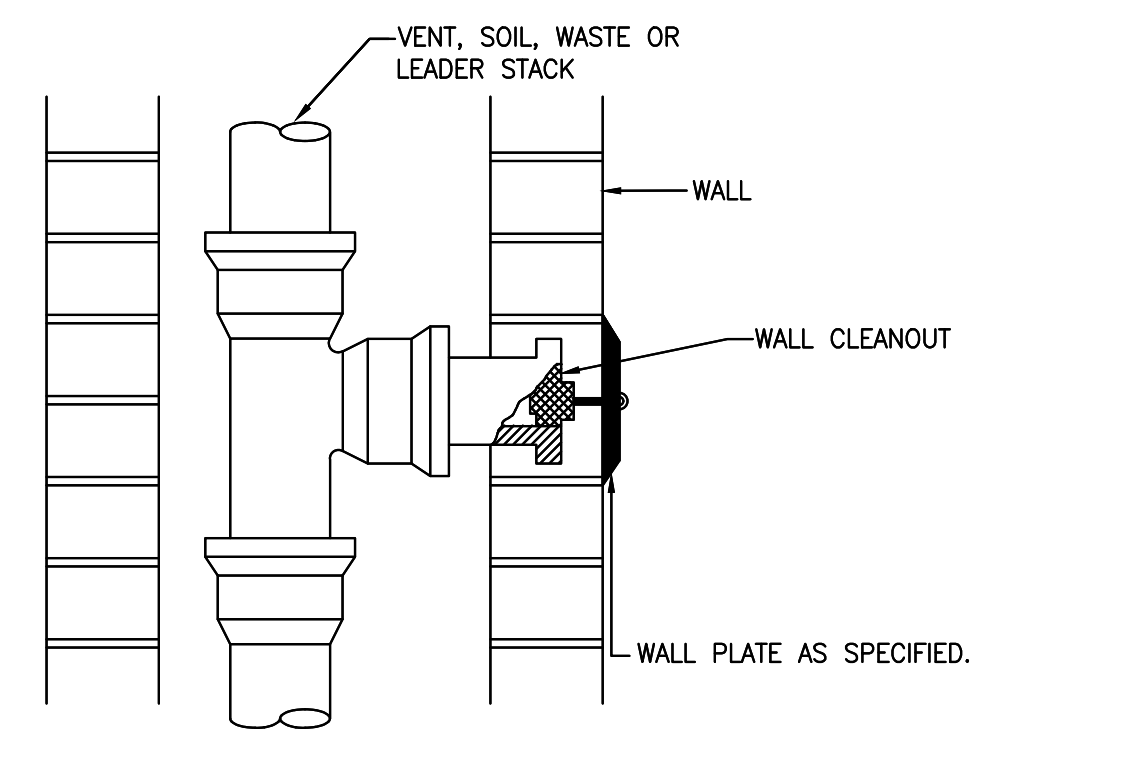
10 FLOOR DRAIN TRAP PRIMER DETAIL
P2.0 N.T.S



11 WATER HAMMER ARRESTORS
P2.0 N.T.S



8 INLINE RECIRCULATING PUMP DETAIL
P2.0 N.T.S



9 WALL CLEANOUT DETAIL
P2.0 N.T.S

SPECIFICATIONS

Notes:

- 4" FPT inlet/outlet with 3" and 4" plain end fittings.
- Unit weight - 40 lbs. (wet weight 216 lbs.)
- Maximum operating temperature: 150° F continuous
- Capacities - Liquid 20 gal.
Grease: 130 lbs. (17.8 gal.) @ 35 GPM
Grease: 127 lbs. (17.3 gal.) @ 50 GPM
Grease (99% - at least 2 units in series): 180 lbs. (24.7 gal.) @ 35 GPM
Solids: 1.8 gal.
- Built-in flow control.
- For gravity drainage applications only.
- Do not use for pressure applications.
- Cover placement allows full access to tank for proper maintenance.
- Vent not required unless per local code.
- Engineered inlet and outlet diffusers are removable to inspect/clean piping.
- Integral air relief/anti-siphon.
- Designed for indoor, on-floor, below-grade or low-profile under sink installations.

ENGINEER SPECIFICATION GUIDE

Schier Great Basin™ grease interceptor model # GB2 shall be lifetime guaranteed and made in USA of seamless, rotationally-molded polyethylene with minimum 5/16" uniform wall thickness. Interceptor shall be furnished for above or below grade installation. Interceptor shall be certified to ASME A112.14.3 (type C) and CSA B481.1, with field cut riser system, built-in flow control and three outlet options. Interceptor flow rate shall be 35 or 50 GPM. Interceptor grease capacity shall be 130 lbs. @ 35 GPM or 127 lbs. @ 50 GPM. Cover shall provide water/gas-tight seal and have minimum 450 lbs. load capacity.

CERTIFIED PERFORMANCE

Great Basin™ hydromechanical grease interceptors are third party performance-tested and listed by IAPMO to ASME #A112.14.3 and CSA B481.1 grease interceptor standards and greatly exceed requirements for grease separation and storage. They are compliant to the Uniform Plumbing Code, the National Standard Plumbing Code, the National Plumbing Code of Canada, and the International Plumbing Code.

MIAMI-DADE COUNTY Satisfies Miami DERM 99% efficiency requirements when at least 2 units are installed in series. Product labels are permanently attached to inside and outside of unit for easy viewing.

GB2

MODEL NUMBER: GB2
PART NUMBER: 4065-001-05

DESCRIPTION: GB2 GREASE INTERCEPTOR 35 GPM / 50 GPM, 4" FPT INLET/OUTLET, WITH 3" AND 4" PLAIN END FITTING ADAPTERS AND PEDESTRIAN RATED COVER

DWG BY: C. SINCLAIR
DATE: 5/5/2022
REV: -
ECO: -

UPC

SCHIER

6455 Woodland Dr
Shawnee, KS 66218
Tel: 913-951-3300
Fax: 913-951-3399
schierproducts.com

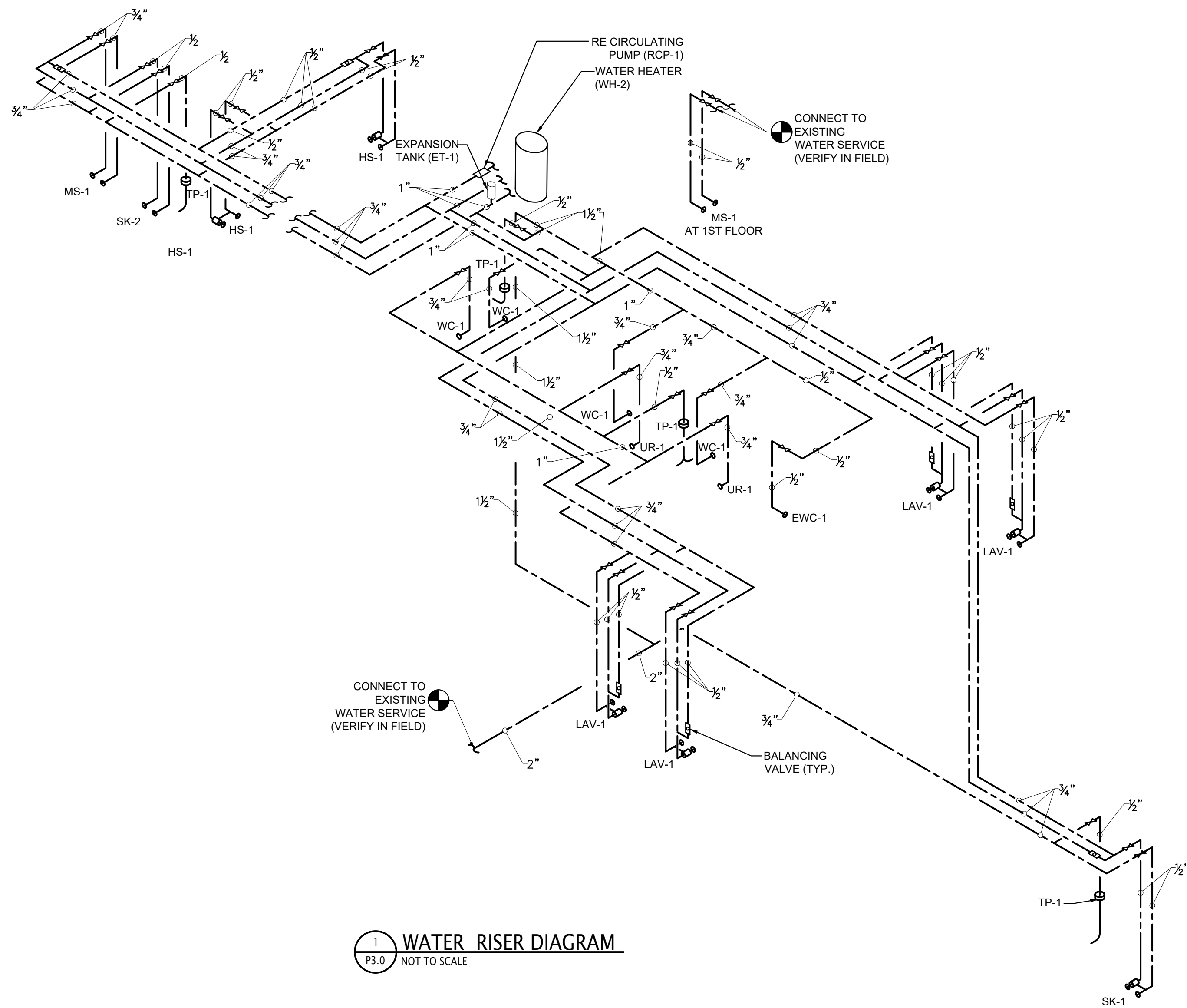
TOP VIEW (COVER REMOVED FOR CLARITY)

ISOMETRIC VIEW

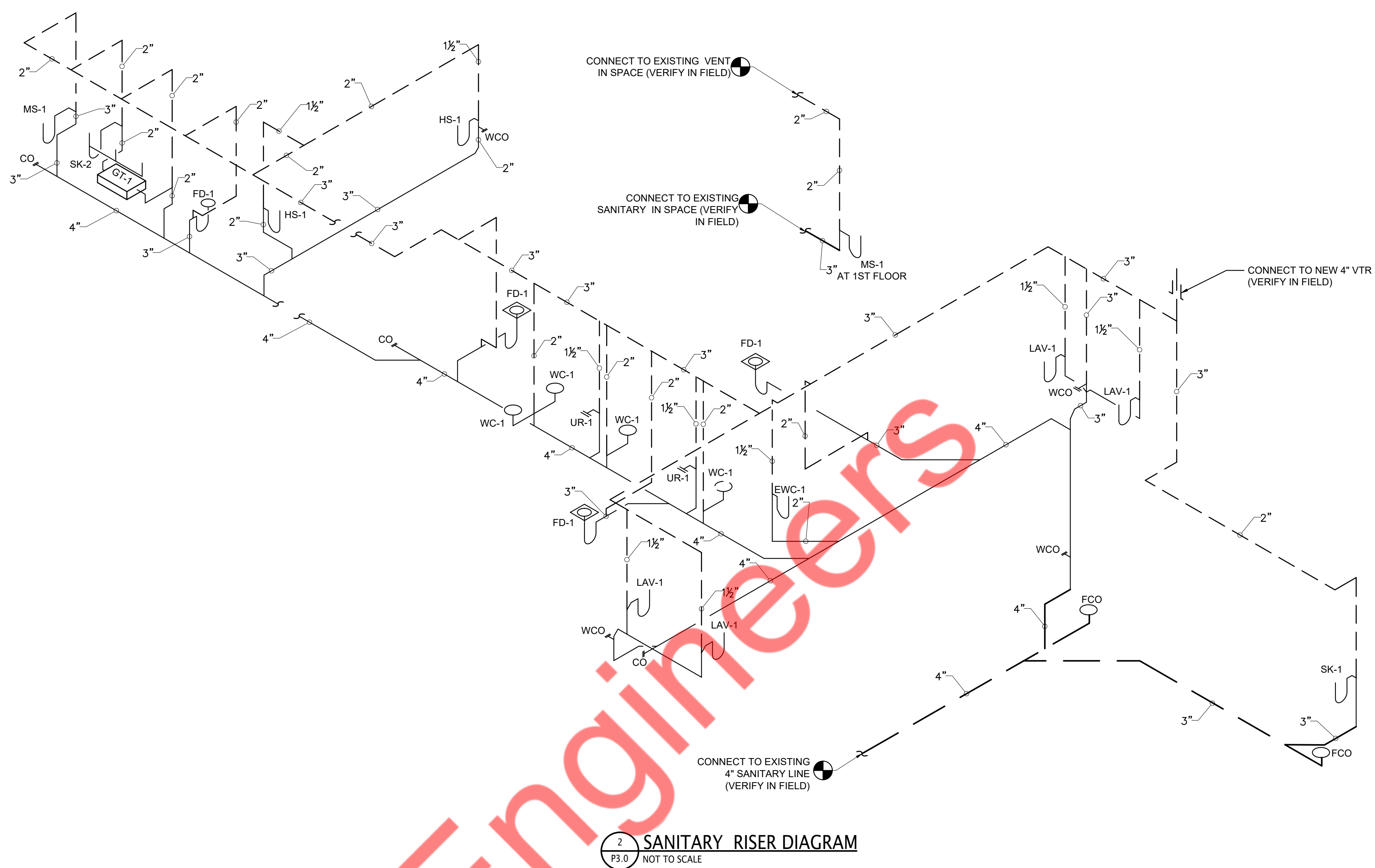
SECTION A-A

END VIEW

12 GREASE TRAP DETAIL
P2.0 N.T.S



1 WATER RISER DIAGRAM
P3.0 NOT TO SCALE



2 SANITARY RISER DIAGRAM
P3.0 NOT TO SCALE

EXPANSION TANKS										
UNIT	NUMBER	MANUFACTURER & MODEL NUMBER	SERVICE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	PRESSURE RATING (PSI)	DIMENSIONS		SHIPPING WEIGHT (LBS)	NOTES
							DIAMETER (INCH)	HEIGHT (INCH)		
ET-1	1	AMTROL	ST-120-DD	6.4	3.2	150	12	18	26	1, 2

GENERAL NOTES:
1. SET THE TANK PRESSURE TO EQUAL THE SYSTEM OPERATING PRESSURE. TANK MUST BE DRAINED BEFORE ADJUSTING SET PRESSURE.
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS ON INCOMING COLD WATER LINE.

PUMP SCHEDULE							
ID	DESCRIPTION	MANUFACTURER	MODEL NO.	VOLT	PH	TRIM AND REMARKS	SUPPLIED BY
RCP-1	RECIRCULATION PUMP	GRUNDFOS	ALPHA2	120 V	1	2 GPM @ 3.0 FT. HD. INSTALL NEAR WATER HEATER PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE AQUASTAT WITH TIMER KIT	PC

ELECTRIC WATER HEATER																		
UNIT	MANUFACTURER & MODEL NUMBER	NO. OF UNITS	LOCATION	MAXIMUM PRESSURE (PSI)	UNIT CAPACITY			SYSTEM OUTLET TEMP (°F)	ELECTRICAL DATA				DIMENSIONS					
					STORAGE (GAL)	RECOVERY (GPH)	DEGREE RISE (°F)		NUMBER OF ELEMENTS	KW PER ELEMENT	SIMULTANEOUS / NON-SIMULTANEOUS	POWER (KW)	V	PH	HZ	HEIGHT (INCH)	DIAMETER (INCH)	SHIPPING WEIGHT (LB)
WH-2	AO SMITH DEL-30	1	BOH ROOM	150	33	46	80	140	2	4.5	SIMULTANEOUS	9	208	3	60	32"	24"	118

THERMOSTATIC MIXING VALVE												
ITEM	LOCATION	QUANTITY	SERVICE	CAPACITY (GPM)	PRESSURE DROP (PSI)	MINIMUM FLOW (GPM)	MAKE	CW INLET	HIGH TEMP. INLET	LOW TEMP. OUTLET	REMARK	
TMV-1	REFER PLAN	7	HOT WATER	1.5	5	0.25	ACRON ST70-12	½"	½" (140°F)	½" (110°F)	-BRONZE BODY CONSTRUCTION AND LEAD FREE CONSTRUCTION -ASSE CERTIFIED	

PLUMBING ROUGHING SIZING SCHEDULE									
SYMBOL	DESCRIPTION	CONNECTION SIZE - INCHES					MANUFACTURER	MODEL	DESCRIPTION
		SOIL / WASTE	VENT	CW	HW	TRAP			
EW-1	ELECTRIC WATER COOLER (WALL HUNG)	2"	1½"	½"	-	2"	OASIS	PG8ACSL	TWIN SET CAPACITY 1/5 HP, 115 VOLT
FCO	FLOOR CLEANOUT	4"	-	-	-	-	JAY R SMITH	4020 SERIES	STAINLESS STEEL ROUND COVER
WCO	WALL CLEANOUT	2"	-	-	-	-	JAY R SMITH	4020 SERIES	STAINLESS STEEL ROUND COVER
FD-1	FLOOR DRAIN	3"	2"	-	-	3"	JAY R SMITH	2005 SERIES	CAST IRON BODY WITH FLASHING COLLAR, NICKEL BRONZE ADJUSTABLE STRAINER SECURED GRATE TOP AND TRAP PRIMER CONNECTION.
FD-2	FLOOR DRAIN	4"	2"	-	-	3"	JAY R SMITH	2005 SERIES	CAST IRON BODY WITH FLASHING COLLAR, NICKEL BRONZE ADJUSTABLE STRAINER SECURED GRATE TOP AND TRAP PRIMER CONNECTION.
LAV-1	LAVATORY (WALL HUNG) ADA APPROVED	2"	1½"	½"	½"	1½"	AMERICAN STANDARD	LUCERNE 0355.012	FAUCET: SYMMONS S-60-G-8, METERING SELF CLOSING FAUCET, DRAIN, P-TRAP, & J.R.SMITH 700 SERIES FLOOR MOUNTED WALL SUPPORT. INSULATE TRAP AND HOT WATER SUPPLY. 0.5 GALLONS PER MINUTE
MS-1	MOP SINK	3"	2"	¾"	¾"	3"	FIAT	MSB-2424	FAUCET: CHICAGO FAUCET NO. 540-LD89SCP
TP-1	TRAP PRIMER	-	-	½"	-	-	PRECISION PLUMBING	OREGON #1	PROVIDE ACCESS PANEL AND SHUT-OFF VALVE AHEAD OF TRAP PRIMER
WC-1	WATER CLOSET (FLOOR MOUNTED) FLUSH TANK	4"	2"	¾"	-	INTERNAL	AMERICAN STANDARD	2467-016-020	VITREOUS CHINA, ELONGATED BOWL, SOLID WHITE OPEN FRONT EAT LESS COVER K-4731SC
UR-1	URINAL	2"	1½"	¾"	-	1½"	AMERICAN STANDARD	ALLBROOK 6541.132	WITH WALL CARRIER, MOUNTED AT HANDICAPPED HEIGHT.
SK-1	BREAK RM SINK	2"	2"	½"	½"	1½"	AMERICAN STANDARD	COLONY 22SB.6151511S.015	AMERICAN STANDARD TWO-HANDLE, BOTTOM MOUNT KITCHEN FAUCET MODEL6404.140, THERMOSTATIC MIXING VALVE, P/N 151 BASKET STRAINER
SK-2	3-COMP. SINK	2"	2"	½"	½"	1½"	-	-	-
HS-1	HAND SINK	2"	1½"	½"	½"	1½"	AMERICAN STANDARD	COLONY 22SB.6151511S.015	AMERICAN STANDARD TWO-HANDLE, BOTTOM MOUNT KITCHEN FAUCET MODEL6404.140, THERMOSTATIC MIXING VALVE, P/N 151 BASKET STRAINER

NOTE:
1. INSTALL SERVICE SHUTOFF & CHECK VALVE, COCKS, STOPS, AIR CUSHIONS, VACCUME BREAKERS AND SAFETY DEVICES WHERE REQUIRED BY CODE, SPECIFICATIONS OR DRAWINGS.
2. EXPOSED P-TRAPS TO BE 17GA CHROME PLATED WITH CLEANOUT AND ESCUTCHEON PLATE.
3. STOP TO BE CHROME PLATED, ½" ANGLE VALVE WITH CHROME PLATED 12" LONG, ½" O.D. FLEXIBLE RISER AND ESCUTCHEON PLATE.
4. ALL DRAIN AND WATER PIPING TO LAVATORIES TO BE INSULATED WITH HANDI 'LAV-GUARD' INSULATION KIT BY TRUEBRO.

PLUMBING SCHEDULE AND RISERS

MECHANICAL SYMBOLS LIST

CONTROLS AND SENSORS	
	EQUIPMENT SYMBOL
	POINT OF NEW CONNECTION TO EXISTING
AIR DEVICES	
	CEILING DIFFUSER SUPPLY
	CEILING DIFFUSER RETURN
	CEILING DIFFUSER EXHAUST
	SIDEWALL GRILLE-SUPPLY
	SIDEWALL GRILLE-RETURN
DUCT ACCESSORIES	
	VOLUME DAMPER W/ ACCESS DOOR
	FIRE DAMPER W/ ACCESS DOOR
	MOTORIZED DAMPER W/ ACCESS DOOR
	BACKDRAFT DAMPER

MECHANICAL ABBREVIATIONS	
AFF	ABOVE FINISHED FLOOR
AL	ACOUSTIC LINING
BOB	BOTTOM OF BEAM
BOD	BOTTOM OF DUCT
BOE	BOTTOM OF EQUIPMENT
COS	CEILING DIFFUSER SUPPLY
CDR	CEILING DIFFUSER RETURN
CFM	CUBIC FEET OF AIR PER MINUTE
EXF	EXHAUST FAN
DN	DOWN
EG	EXHAUST GRILLE
FC	FLEXIBLE CONNECTION
FD/AD	FIRE DAMPER W/ACCESS DOOR
MD	MOTORIZED DAMPER
RTU	ROOF TOP UNIT
RG	RETURN GRILLE
RA	RETURN AIR
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SG	SUPPLY GRILLE
SA	SUPPLY AIR
VD	VOLUME DAMPER
BD	BACKDRAFT DAMPER
EF	EXHAUST FAN
WH	WALL HEATER

MECHANICAL DRAWING LIST	
M0.1	MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS
M0.2	MECHANICAL SPECIFICATIONS
M1.0	MECHANICAL FLOOR PLAN
M1.1	MECHANICAL SECOND FLOOR PLAN
M5.0	MECHANICAL DETAILS
M6.0	MECHANICAL SCHEDULES (1 OF 2)
M6.1	MECHANICAL SCHEDULES (2 OF 2)

CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT.

- 2021 INTERNATIONAL BUILDING CODE
- 2021 INTERNATIONAL PLUMBING CODE
- 2021 INTERNATIONAL MECHANICAL CODE
- 2021 INTERNATIONAL ENERGY CONSERVATION CODE
- 2021 INTERNATIONAL FLUE GAS CODE

CITY OF HAMMONDND BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF THE 2021 INTERNATIONAL BUILDING CODE, AND ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

- ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE / ACCA 183.
- VENTILATION FOR ALL AREA SHALL COMPLY WITH 2021 INTERNATIONAL MECHANICAL CODE,CHAPTER 4.
- TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH 2021 IMC REQUIREMENTS AS OUTLINES IN SECTION.
- THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.
- TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF THE 2018 INTERNATIONAL MECHANICAL CODE:
A. VENTILATION SYSTEMS: BALANCING 2021 INTERNATIONAL MECHANICAL CODE – 403.3
- THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
A. STANDARDS OF HEATING: 2021 IMC 309.1
B. DUCT CONSTRUCTION AND INSTALLATION: 2021 IMC 603
C. AIR INTAKES, EXHAUSTS AND RELIEF: 2021 IMC 401.5
D. AIR FILTERS: 2021 IMC 605
- MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY 2021 INTERNATIONAL MECHANICAL CODE – 403.3
- THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.
- VENTILATION SYSTEMS SHALL BE BALANCED TO MAINTAIN THE MINIMUM VENTILATION AIRFLOW RATE AS SHOWN IN VENTILATION REQUIREMENT TABLE. THIS SYSTEM SHALL BE BALANCED BY APPROVED METHOD. CONTRACTOR TO SUBMIT THE AIR – BALANCE REPORT TO INSPECTOR OF RESPECTIVE BUILDING DEPARTMENT PRIOR TO FINAL INSPECTION.
- A PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES AND RESULTS SHALL BE COMPLETED AND CERTIFIED BY THE LICENSED DESIGN PROFESSIONAL, ELECTRICAL ENGINEER, MECHANICAL ENGINEER OR APPROVED AGENCY AND PROVIDED TO THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT.
- A COMMISSIONING PLAN SHALL BE DEVELOPED BY A LICENSED DESIGN PROFESSIONAL, MECHANICAL ENGINEER OR APPROVED AGENCY.
- MECHANICAL SYSTEMS SHALL BE COMMISSIONED. FINAL COMMISSIONING REPORT SHALL BE DUE WITHIN 90 DAYS OF RECEIPT OF CERTIFICATE OF OCCUPANCY.

GENERAL NOTES

- CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
- ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
- BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMER AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.
- THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.
- WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
- CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.

- PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING OWNER. INSTALL ACCESS VALVES AT POINT OF CONNECTION TO THE EXISTING PIPING. PROVIDE TEMPORARY DUCT CAPS AND/OR CONNECTIONS TO MINIMIZE SHUTDOWN TIME.

- SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH AN END CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.

- PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.

- SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).

- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

- ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.

- REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.

- THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

- UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

- MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

- ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY. PARTS AND FINISHES SHALL BE PROVIDED BY COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE.

- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.

- SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.

- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

- SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY THE EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.

- INSURANCE. IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

- THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS BALANCING TO BALANCE THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

- SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES, WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

- WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

DEFINITIONS:

- "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

SCOPE OF WORK

SCOPE OF WORK

- REUSE THE #8 QTY OF EXISTING AHU AND CONDENSING UNITS. REUSE EXISTING DUCTWORK AS MUCH AS POSSIBLE AND INSTALL THE NEW DUCT WORK AS REQUIRED.
- INSTALL #2 QTY OF TOILET EXHAUST FAN AND #1 QTY OF DOAS UNIT AS SHOWN ON MECHANICAL PLAN.
- INSTALL #1 QTY OF VRF HEAT PUMP UNIT WITH #7 QTY OF DUCTED UNITS AS PER THE MECHANICAL PLAN FOR THE HEATING AND COOLING REQUIREMENT.
- ALL HVAC WORK SHALL BE IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATION.

GENERAL HVAC NOTES

GENERAL:

- PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.

- CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.

- THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.

- WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.

- COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.

- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.

- WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.

- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.

- ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.

- PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.

- LOCATE ALL TEMPERATURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.

- WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZES AND OPENING LOCATIONS. COORDINATION SHALL BE DONE PRIOR TO THE FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.

- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.

- PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.

- MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.

- ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.

- ALL DUCTWORK, PIPING, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.

- LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.

- ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.

- ALL CONDENSATE DRAIN LINES FROM EACH ROOF TOP UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, AND PIPED TO THE NEAREST DRAIN. SEE THE DETAILS SHOWN IN THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR THE DEPTH OF THE AIR CONDITIONING CONDENSATE TRAP.

- REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.

- ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.

- TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.

HVAC DUCTWORK – SHEET METAL

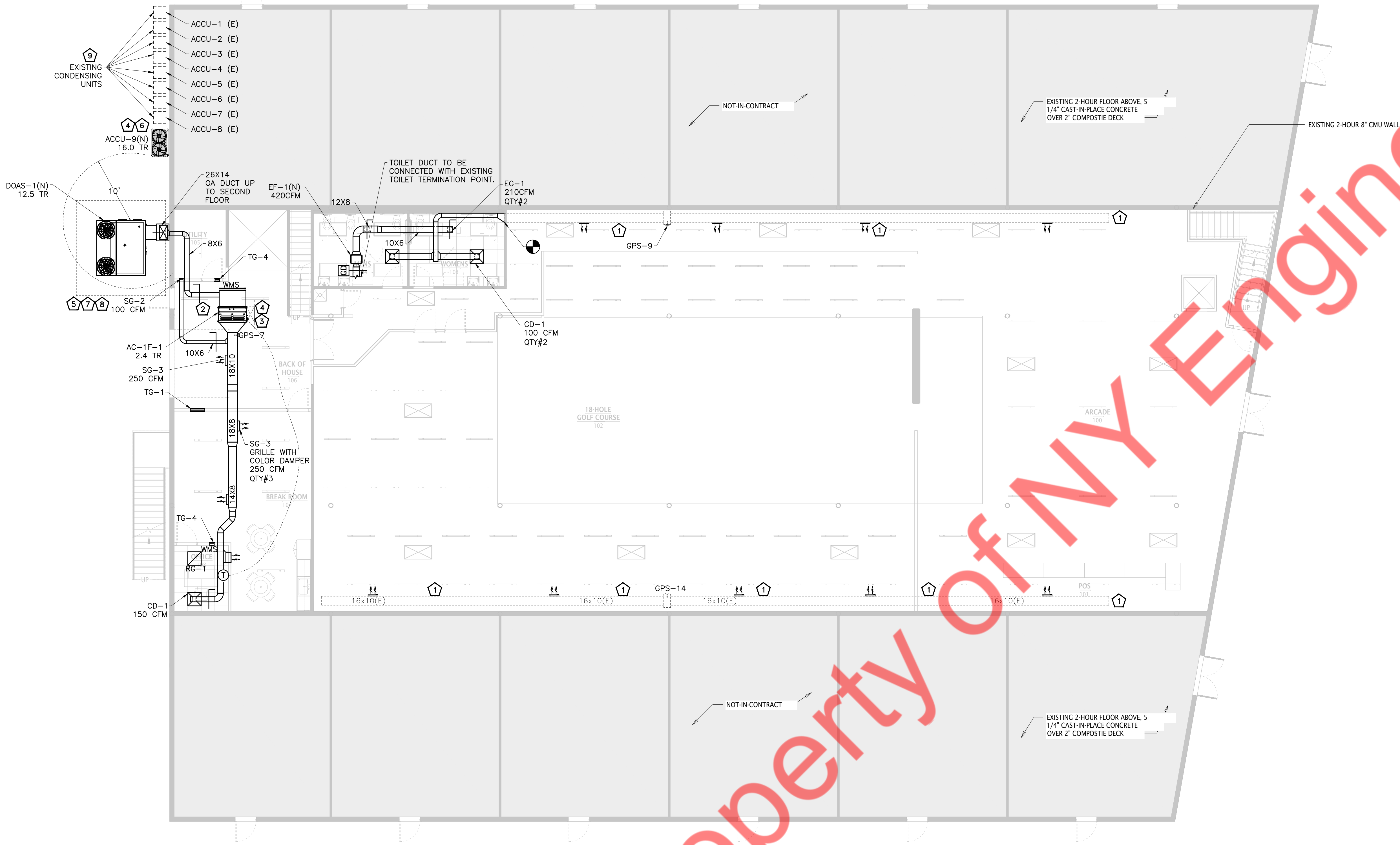
- CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK, ACCESS DOORS, DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS.
- CONTRACTOR TO CHECK AND CORRECT ANY AND ALL DEFICIENCIES IN EXISTING DUCTS. ALL NEW DUCTWORK WILL COMPLY WITH THE LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST HANDBOOKS PUBLISHED BY ASHRAE.
- PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.
- SUPPLY AND RETURN DUCTWORK 20' FROM ALL HVAC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL LINING.
- RE-INSULATE ALL DUCTWORK AND PIPING IN WHICH INSULATION HAS BEEN REMOVED OR DAMAGED WITH INSULATION EQUAL TO THE EXISTING INSULATION.
- 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 REFLECTED CEILING PLAN.
- IN CORRIDORS WHERE CEILING SPEAKERS AND AIR DIFFUSERS ARE INDICATED BETWEEN THE SAME LIGHT FIXTURES, INSTALL BOTH DEVICES AT THE QUARTER POINTS BETWEEN THE FIXTURES.
- UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM THERMOSTATS 4'-0" (CENTER LINE) ABOVE THE FINISHED FLOOR. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE PRECEDING LOCATION CANNOT BE MAINTAINED OR WHERE THERE IS A QUESTION ON LOCATION.
- ALL DUCTWORK SHALL CLEAR DOORS AND WINDOWS.
- ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- PROVIDE ALL 90-DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED. ELBOWS IN DISHWASHER, KITCHEN, AND LAUNDRY EXHAUSTS SHALL BE OF UN-VANED SMOOTH RADIUS CONSTRUCTION WITH A RADIUS EQUAL TO 1-1/2 TIMES THE WIDTH OF THE DUCT. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS WITH TURNING VANES.
- COORDINATE DIFFUSER, REGISTER, AND GRILL LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
- ALL AIR HANDLING UNITS SHALL OPERATE WITHOUT MOISTURE CARRYOVER.
- LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
- PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN, AND EXHAUST) CONNECTED TO AIR HANDLING UNITS, FANS, AND OTHER EQUIPMENT THAT REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.
- UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.
- RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.
- ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK THAT REQUIRE SERVICE AND/OR INSPECTION.
- PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.
- ALL DUCTS SHALL BE GROUNDED ACROSS FLEXIBLE CONNECTIONS WITH FLEXIBLE COPPER GROUNDING STRAPS. GROUNDING STRAPS SHALL BE BOLTED OR SOLDERED TO BOTH THE EQUIPMENT AND THE DUCT.
- SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.
- SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.

MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS

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<div><div>SECTION 0101 — QUALITY OF WORK</div><div><div>1.1 WORKMANSHIP</div><div><div>A. ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.</div><div>B. ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.</div><div>C. UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.</div></div><div>1.2 CODE COMPLIANCE</div><div><div>A. ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.</div></div><div>END OF SECTION 0101</div><div>SECTION 0102 —REQUIRED DOCUMENTS</div><div><div>1.1 SHOP DRAWINGS</div><div><div>A. A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK AND PIPING LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.</div></div><div>1.2 SUBMITTALS</div><div><div>A. EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND ANCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.</div></div><div>1.3 RECORD DRAWINGS</div><div><div>A. UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE SUBMITTED TO THE OWNER, DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.</div></div><div>1.4 EQUIPMENT OPERATING INSTRUCTIONS</div><div><div>A. ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS,EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.</div><div>B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE-RING BINDERS WITH CLEAR ACETATE COVERS. THE CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE ELECTRONIC COPY TO THE ENGINEER.</div><div>C. THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.</div></div><div>END OF SECTION 0102</div><div>SECTION 230517 — SLEEVES AND SLEEVE SEALS FOR HVAC PIPING</div><div><div>1.1 SLEEVE-SEAL SYSTEMS</div><div><div>A. FIELD-ASSEMBLED, MODULAR SEALING-ELEMENT UNIT FOR FILLING ANNULAR SPACE BETWEEN PIPING AND SLEEVE.</div><div><div>1. SEALING ELEMENTS: EPDM RUBBER OR NBR.</div><div>2. PRESSURE PLATES: CARBON STEEL, PLASTIC, STAINLESS STEEL.</div><div>3. CONNECTING BOLTS AND NUTS: CARBON STEEL WITH CORROSION-RESISTANT COATING, STAINLESS STEEL.</div></div><div>B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:</div><div><div>1. ADVANCE PRODUCTS & SYSTEMS, INC.</div><div>2. CALPICO, INC.</div><div>3. METRAFLEX COMPANY (THE).</div><div>4. PIPELINE SEAL AND INSULATOR, INC.</div></div></div><div>1.2 SLEEVE-SEAL FITTINGS</div><div><div>A. MANUFACTURED PLASTIC, SLEEVE-TYPE, PLASTIC OR RUBBER WATER-STOP ASSEMBLY MADE FOR IMBEDDING IN CONCRETE SLAB OR WALL.</div></div><div>1.3 GROUT</div><div><div>A. NON-SHRINK, FACTORY PACKAGED.</div></div><div>1.4 SLEEVE AND SLEEVE-SEAL SCHEDULE</div><div><div>A. USE SLEEVES AND SLEEVE SEALS FOR THE FOLLOWING PIPING-PENETRATION APPLICATIONS:</div><div><div>1. INTERIOR PARTITIONS:</div><div><div>a. PIPING SMALLER THAN NPS 6 (DN 150): GALVANIZED-STEEL-PIPE SLEEVES, PVC-PIPE SLEEVES.</div><div>b. PIPING NPS 6 (DN 150) AND LARGER: GALVANIZED-STEEL-SHEET SLEEVES.</div></div></div></div><div>END OF SECTION 230517</div></div></div></div></div>	<div><div>SECTION 230518 — ESCUTCHEONS FOR HVAC PIPING</div><div><div>PART 2 — PRODUCTS</div><div><div>2.1 ESCUTCHEONS</div><div><div>A. ONE-PIECE, CAST-BRASS TYPE: WITH POLISHED, CHROME-PLATED AND ROUGH-BRASS FINISH AND SETSCREW FASTENER.</div></div><div>2.2 FLOOR PLATES</div><div><div>A. ONE-PIECE FLOOR PLATES: CAST-IRON FLANGE WITH HOLES FOR FASTENERS.</div></div></div><div><div>PART 3 — EXECUTION</div><div><div>3.1 INSTALLATION</div><div><div>A. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FINISHED FLOORS.</div><div>B. INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT COMPLETELY COVERS OPENING.</div></div><div><div>1. ESCUTCHEONS FOR NEW PIPING:</div><div><div>a. PIPING WITH FITTING OR SLEEVE PROTRUDING FROM WALL: ONE-PIECE, DEEP-PATTERN TYPE.</div><div>b. INSULATED PIPING: ONE-PIECE, STAMPED-STEEL TYPE.</div><div>c. BARE PIPING AT WALL AND FLOOR PENETRATIONS IN FINISHED SPACES: ONE-PIECE, CAST-BRASS TYPE WITH POLISHED, CHROME-PLATED FINISH OR STAMPED-STEEL TYPE.</div><div>d. BARE PIPING AT CEILING PENETRATIONS IN FINISHED SPACES: ONE-PIECE, CAST-BRASS TYPE WITH POLISHED, CHROME-PLATED FINISH OR STAMPED-STEEL TYPE.</div></div></div><div>3.2 FIELD QUALITY CONTROL</div><div><div>A. REPLACE BROKEN AND DAMAGED ESCUTCHEONS AND FLOOR PLATES USING NEW MATERIALS.</div></div><div>END OF SECTION 230518</div><div>SECTION 230529 — HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT</div><div><div>1.1 PERFORMANCE REQUIREMENTS</div><div><div>A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.</div><div>B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.</div></div><div>DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND 3.DESIGN SEISMIC-RESTRAINT HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT AND OBTAIN APPROVAL FROM AUTHORITIES HAVING JURISDICTION.</div><div>1.2 SUBMITTALS</div><div><div>A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER</div></div><div>1.3 QUALITY ASSURANCE</div><div><div>A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE — STEEL."</div></div><div>1.4 COMPONENTS</div><div><div>A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL</div><div>B. FIBERGLASS PIPE HANGERS: -CLEVIS, CENTURY COMPOSITES, COOPER B-LINE</div><div>D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER</div><div>E. FIBERGLASS STRUT SYSTEMS: COOPER B-LINE</div><div>F. THERMAL-HANGER SHIELD INSERTS:</div><div>G. FASTENER SYSTEMS: POWDER-ACTUATED FASTENERS OR MECHANICAL-EXPANSION ANCHORS</div><div>H. PIPE STANDS: COMPACT, LOW TYPE, SINGLE PIPE, HIGH TYPE, SINGLE PIPE, HIGH TYPE, MULTIPLE PIPES, CURB-MOUNTED TYPE</div><div>I. EQUIPMENT SUPPORTS.</div></div><div>END OF SECTION 230529</div><div>SECTION 230548 — VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT</div><div><div>PART 1 — GENERAL</div><div>1.1 COMPONENTS</div><div>A. VIBRATION ISOLATORS:</div><div><div>1. ISOLATOR PADS: NEOPRENE, RUBBER, HERMETICALLY AND/OR SEALED COMPRESSED FIBERGLASS</div><div>2. MOUNTS: DOUBLE-DEFLECTION TYPE.</div><div>3. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS WITH SEISMIC RESTRAINT; CAST-DUCTILE-IRON HOUSING.</div><div>4. SPRING ISOLATORS: FREESTANDING, Laterally STABLE, OPEN-SPRING TYPE.</div><div>5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN-SPRING TYPE WITH SEISMIC RESTRAINT.</div><div>6. HOUSED SPRING MOUNTS: DUCTILE-IRON OR STEEL HOUSING, WITH INTEGRAL, VERTICALLY ADJUSTABLE SEISMIC SNUBBERS.</div><div>7. ELASTOMERIC HANGERS: DOUBLE-DEFLECTION TYPE.</div><div>8. SPRING HANGERS: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION.</div><div>9. SPRING HANGERS WITH VERTICAL-LIMIT STOP: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION AND WITH VERTICAL-LIMIT STOP</div><div>10.PIPE RISER RESILIENT SUPPORT: ALL-DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.</div><div>11.RESILIENT PIPE GUIDES.</div></div></div></div></div></div></div></div>	<div><div>B. AIR-MOUNTING SYSTEMS:</div><div><div>1. AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED-AIR BELLOW.</div><div>2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED-AIR BELLOWS.</div></div><div>C. RESTRAINED VIBRATION ISOLATION ROOF-CURB RAILS: FACTORY-ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR- AND WATERTIGHT CURB RAIL; WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.</div><div>D. VIBRATION ISOLATION EQUIPMENT BASES:</div><div><div>1. STEEL BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS.</div><div>2. INERTIA BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS READY FOR FIELD-APPLIED, CAST-IN-PLACE CONCRETE</div></div><div>1.2 FIELD QUALITY CONTROL</div><div><div>A. TESTING: BY EITHER: OWNER-ENGAGED AGENCY, CONTRACTOR-ENGAGED AGENCY, OR CONTRACTOR.</div></div><div><div>PART-2 PRODUCTS</div><div><div>1.1 VIBRATION ISOLATORS & SEISMIC-RESTRAINT DEVICES</div><div><div>A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:</div><div>B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:</div><div><div>1. ACE MOUNTINGS CO., INC.</div><div>2. AMBER/BOOTH COMPANY, INC.</div><div>3. CALIFORNIA DYNAMICS CORPORATION.</div><div>4. HILTI, INC.</div><div>5. ISOLATION TECHNOLOGY, INC.</div><div>6. KINETICS NOISE CONTROL.</div><div>7. LOOS & CO.; CABLEWARE DIVISION.</div><div>8. MASON INDUSTRIES.</div><div>9. TOLCO INCORPORATED; A BRAND OF NIBCO INC.</div><div>10. UNISTRUT; TYCO INTERNATIONAL LTD.</div></div></div></div></div><div>END OF SECTION 230548</div><div>SECTION 230593 — TESTING, ADJUSTING, AND BALANCING FOR HVAC</div><div><div>1.1 SUMMARY</div><div>A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:</div><div><div>1. AIR SYSTEMS: CONSTANT AND VARIABLE VOLUME SYSTEMS.</div><div>2. MOTORS.</div></div><div>1.2 QUALITY ASSURANCE</div><div><div>A. THE CONTRACTOR SHALL PROCURE THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES IN HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS. THE TAB AGENT SHALL HAVE THE FOLLOWING QUALIFICATIONS: AABC, NEBB OR TABB CERTIFIED.</div></div><div>1.3 EXECUTION</div><div><div>A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL EXISTING AIR AND HYDRONIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.</div><div>B. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDRONIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.</div><div>C. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.</div><div>D. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.</div><div>E. THE CONTRACTOR SHALL HAVE FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.</div><div>F. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS SECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.</div><div>G. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.</div><div>H. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.</div><div>I. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.</div><div>J. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.</div></div><div>END OF SECTION 230593</div><div>SECTION 230713 — DUCT INSULATION</div><div><div>1.1 QUALITY ASSURANCE</div><div><div>SURFACE-BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME-SPREAD INDEX OF 25, AND SMOKE-DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE-DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTM E84.</div></div><div>1.2 FIELD QUALITY CONTROL</div><div><div>A. FIELD INSPECTIONS: BY OWNER-ENGAGED AGENCY.</div></div><div>1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE;</div><div><div>A. CONCEALED, RECTANGULAR, ROUND AND FLAT-OVAL, SUPPLY-RETURN, OUTDOOR-AND EXHAUST-AIR DUCT AND AIR PLENUM INSULATION:</div><div>B. FLEXIBLE ELASTOMERIC, MINERAL-FIBER BLANKET, MINERAL-FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS: UNCONDITIONED SPACES WITHIN BUILDING: R-6 WITHIN BUILDING ENVELOPE ASSEMBLY: R-8 OUTSIDE OF BUILDING: R-8</div></div></div></div></div>	<div><div>1.4 ITEMS NOT INSULATED:</div><div><div>1. FIBROUS-GLASS DUCTS.</div><div>2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE ANDASHRAE/IESNA 90.1.</div><div>3. FACTORY-INSULATED FLEXIBLE DUCTS.</div><div>4. FACTORY-INSULATED PLENUMS AND CASINGS.</div><div>5. FLEXIBLE CONNECTORS.</div><div>6. VIBRATION-CONTROL DEVICES.</div><div>7. FACTORY-INSULATED ACCESS PANELS AND DOORS.</div><div>8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.</div></div><div>1.5 PRODUCTS</div><div><div>A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:</div><div><div>1. JOHNS-MANVILLE</div><div>2. OWENS-CORNING</div></div></div><div>1.6 ACOUSTICAL TREATMENT</div><div><div>1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5" THICK R-6 AS MANUFACTURED BY DUCTMATE, 1-1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE, FIBERGLASS DUCT LINER. LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED.</div></div><div>END OF SECTION 230713</div><div>SECTION 233113 — METAL DUCTS</div><div><div>1.1 CONSTRUCTION</div><div><div>A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 2-1/2 INCH WG PRESSURE CLASS IS THE BASIS OF COMPLIANCE WITH THESE STANDARDS, REGARDLESS OF THE VELOCITY IN THE DUCT.</div><div>B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 2" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:</div><div><div>1. DUCTWORK SHALL BE TRANSVERSELY JOINTED BY CONNECTING SEAMS OF COMPANION ANGLES, FORMED FROM 1-1/2"x1-1/2"x1/8" GALVANIZED ANGLES, TACK-WELDED OR RIVETED TO THE DUCT. THE ANGLE FRAME SHALL BE CONTINUOUSLY FLANGED UP INTO UPRIGHT OF ANGLE AND EACH CORNER SHALL BE FILLED IN AND GROUND SMOOTH. JOINTS SHALL BE GASKETED WITH 1/8" THICK REINFORCED GASKET OVERLAPPED AT CORNERS. GASKET SIMILAR TO 3M-1202 OR APPROVED EQUAL.</div><div>2. RECTANGULAR FITTINGS AND ALL TRANSITION PIECES FROM RECTANGULAR TO ROUND SHALL BE NO. 16 GAUGE ALL WELDED CONSTRUCTION.</div><div>3. HORIZONTAL DUCTS SHALL BE SUPPORTED ON NOT MORE THAN 8' CENTERS. VERTICAL RISERS SHALL BE SUPPORTED AT EACH FLOOR.</div><div>4. LONGITUDINAL SEAMS FOR RECTANGULAR DUCTWORK SHALL BE PITTSBURGH LOCK SEAMS WITH SEALING COMPOUND, EQUAL TO BENJAMIN FOSTER NO. 30-03 INSERTED INTO SEAM. ALL SEAMS SHALL BE BRUSHED WITH NO. 30-02 AND COVERED WITH APPROVED SEALING TAPE.</div><div>5. RECTANGULAR DUCTWORK 18 GAUGE AND HEAVIER, FILLER RODS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR IRON AND STEEL GAS WELDING RODS, ASTM A155, AWS A5.2.</div><div>6. ALL FITTINGS SUCH AS ELBOWS, TEES, ETC., SHALL BE NO. 20 GAUGE ZINC COATED STEEL. ELBOWS SHALL BE OF FIVE (5) PIECE WELDED AIRTIGHT CONSTRUCTION.</div></div><div>C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY STATE GAUGES AND/OR STRENGTHENERS TO BE USED OR, WHERE SMACNA STANDARDS REQUIRE INTERPRETATION, THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE USED:</div></div><div>USG MAX. SIDE INCHES TRANSVERSE JOINTS AND BRACING</div><div><div>22 UP TO 12 5 SLIP, DRIVE SLIP, ONE INCH POCKET LOCK ON 8 FOOT CENTERS</div><div>22 13 TO 24 1"x1"x1/8" ANGLES ON 4 FOOT CENTERS</div><div>20 25 TO 35 1"x1"x1/8" ANGLES ON 2 FOOT CENTERS</div></div><div>D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS WHERE SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT PLUGGED TAPPING LOCATED AS FOLLOWS:</div><div><div>1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX.</div><div>2. DOWNSTREAM OF EACH REHEAT COIL AND VAV BOX.</div></div><div>E. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS SHOWN IN FIG. 3-6 AND AS SHOWN IN FIG. 3-1 AND 3-2 FOR ROUND DUCTWORK.</div><div>F. ALL DUCTWORK SHALL BE SEALED TO CLASS "A" AND LEAK TESTED TO MEAT SMACNA CLASS 6 FOR RECTANGULAR AND CLASS 3 FOR ROUND DUCTS.</div></div><div>1.2 MATERIALS</div><div><div>A. SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS.</div><div>B. SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS.</div><div>C. SHEET METAL MATERIALS:</div><div><div>1. GALVANIZED STEEL SHEET.</div><div>2. STAINLESS-STEEL SHEETS.</div><div>3. ALUMINUM SHEETS.</div><div>4. FACTORY-APPLIED ANTI-MICROBIAL COATING.</div></div><div>D. DUCT LINER:</div><div><div>1. FIBROUS GLASS, TYPE I, FLEXIBLE.</div><div>a. WITH ANTI-MICROBIAL EROSION-RESISTANT COATING.</div><div>2. FLEXIBLE ELASTOMERIC.</div><div>3. NATURAL FIBER.</div></div><div>E. SEALANT MATERIALS:</div><div><div>1. TWO-PART TAPE SEALING SYSTEM.</div><div>2. WATER-BASED JOINT AND SEAM SEALANT.</div></div></div></div>	<div><div>3. SOLVENT-BASED JOINT AND SEAM SEALANT.</div><div>4. FLANGED JOINT SEALANT.</div><div>5. FLANGE GASKETS.</div><div>6. ROUND DUCT JOINT O-RING SEALS.</div></div> <div>1.3 DUCT CLEANING</div> <div><div>A. CLEAN EXISTING DUCT SYSTEM(S) BEFORE TESTING, ADJUSTING, AND BALANCING.</div><div>B. CLEAN THE FOLLOWING ITEMS:</div><div><div>1. AIR OUTLETS AND INLETS.</div><div>2. SUPPLY, RETURN, AND EXHAUST FANS.</div><div>3. AIR-HANDLING UNITS.</div><div>4. COILS AND RELATED COMPONENTS.</div><div>5. RETURN-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.</div><div>6. SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.</div><div>7. DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.</div></div></div> <div>1.4 DUCT SCHEDULE</div> <div><div>A. ALL DUCTS SHALL BE GALVANIZED STEEL EXCEPT AS FOLLOWS:</div><div>8. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.</div></div> <div>END OF SECTION 233113</div> <div>SECTION 233713 — DIFFUSERS, REGISTERS, AND GRILLES</div> <div><div>1.1 PRODUCTS</div><div><div>A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS INDICATED ON DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED UNLESS OTHERWISE NOTED IN BAKED WHITE ENAMEL.</div><div>B. MANUFACTURERS: TITUS</div><div><div>1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:</div><div><div>a. CARNES.</div><div>b. HART & COOLEY INC.</div><div>c. KRUEGER.</div><div>d. METALARE, INC.</div><div>e. NALOR INDUSTRIES INC.</div><div>f. RUSKIN</div></div><div>C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.</div><div>D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.</div></div></div><div>END OF SECTION 233713</div><div>1.2 THERMOSTATIC CONTROLS:</div><div><div>C403.4.1 THERMOSTATIC CONTROLS</div><div>THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE WITHIN THE ZONE, WHERE HUMIDIFICATION OR DEHUMIDIFICATION OR BOTH IS PROVIDED, AT LEAST ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.</div><div>EXCEPTION: INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES OR GAINS OR BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED:</div><div><div>1. THE PERIMETER SYSTEM INCLUDES AT LEAST ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN +/- 45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTIGUOUS FEET (15.2 M); AND</div><div>2. THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY A THERMOSTAT(S) LOCATED WITHIN THE ZONE(S) SERVED BY THE SYSTEM.</div></div></div><div>C403.4.1.2 DEBAND (MANDATORY)</div><div><div>WHERE USED TO CONTROL HEATING AND COOLING, ZONE THERMOSTATIC CONTROL SHALL BE CONFIGURED TO PROVIDE A TEMPERATURE RANGE OR DEBAND OF NOT LESS THAN 5° (2.8° C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO MINIMUM.</div></div><div>EXCEPTION:</div><div><div>1. THERMOSTATE REQUIRING MANUAL CHANGEOVER BETWEEN COOLING AND HEATING MODE.</div><div>2. OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN INDOOR TEMPERATURE CONTROL AS APPROVED BY HE CODE OFFICAL.</div></div><div>C 403.4.1.3 SET POINT OVERLAP RESTRICTION</div><div><div>WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL PROVIDE A TEMPERATURE RANGE OR DEADBAND OF AT LEAST 5°F (2.8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS CAPABLE OF BEING SHUT OFF OR REDUCED TO A MINIMUM.</div><div>EXCEPTION: THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.</div></div><div>C403.4.2. OFF-HOUR CONTROLS</div><div><div>EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.</div><div>EXCEPTIONS:</div><div><div>ZONES THAT WILL BE OPERATED CONTINUOUSLY.</div><div>ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 kW) AND HAVING A READILY ACCESSIBLE MANUAL SHUTOFF SWITCH.</div></div></div><div>C403.4.2.1 THERMOSTATIC SETBACK</div><div><div>THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATES THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).</div></div><div>C403.4.2.2 AUTOMATIC SETBACK AND SHUTDOWN</div><div><div>AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR AT LEAST 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CAPABLE OF BEING ADJUSTED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.</div></div></div>	<div><div>A. INSULATE ALL PIPING IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.</div></div> <div><div>SERVICEINSULATION SCHEDULE — PIPING SIZE THICKNESS MATERIAL FINISH</div><div>REFRIGERANT PIPING1.5" P-6</div><div>CONDENSER DRAIN PIPING (IF RUNNING THROUGH EXTERIOR WALL)1.0" P-6</div></div> <div><div>B. PIPING, VALVES AND FITTINGS TO BE INSULATED:</div><div><div>1) LOW TEMPERATURE PIPING SYSTEMS — 0 TO 55 DEG F INCLUDING: a. CHILLED WATER SUPPLY AND RETURN. b. CONDENSER WATER SUPPLY AND RETURN. c. CONDENSATE DRAIN PIPING.</div><div>2) LOW TEMPERATURE PIPING SYSTEMS — 0 TO 55 DEG F INCLUDING: a. GLYCOL WATER SUPPLY AND RETURN.</div><div>3) LOW TEMPERATURE HOT PIPING SYSTEMS — 100 TO 200 DEG F INCLUDING: a. LOW TEMPERATURE HOT WATER SUPPLY AND RETURN. b. PUMPED CONDENSATE DISCHARGE.</div><div>4) PROTECTIVE COVERINGS SHALL BE INSTALLED ON AREAS OF INSULATION THAT ARE EXPOSED TO WEATHER OR SUBJECT TO MECHANICAL DAMAGE. THE PROTECTIVE COVERING SHALL BE: a. ARMA-CHEK SILVER: MULTI-LAYER LAMINATE OF ALUMINUM, COATED WITH A UV PROTECTIVE FILM AND BACKED WITH A FLEXIBLE PVC FILM. THE MATERIAL SHOULD BE ADHERED WITH ARMAFLEX 520 ADHESIVE OR EQUIVALENT, AND ALL JOINS AND SEAMS SECURED WITH "ARMA-CHEK SILVER TAPE." INSTALLATION SHALL BE IN ALL CASES TO THE MANUFACTURER'S RECOMMENDATIONS. OR b. HIGH DENSITY RUBBER CLADDING OF THE "ARMA-CHECK R" TYPE BONDED USING AN APPROPRIATE FULL CONTACT ADHESIVE WITH A MINIMUM 50 MM OVERLAP AT ALL BUTT JOINTS AND LONGITUDINAL SEAMS. WEATHER-PROOF MASTIC SEALANT SHALL BE APPLIED OVER ALL SEAMS AND JOINTS. ALL MATERIAL SHALL BE OVERLAPPED AND STAGGERED IN SUCH A WAY AS TO ENSURE A WATERSEAL IS ALWAYS PROVIDED. INSTALLATION SHALL BE IN ALL CASES TO THE MANUFACTURER'S RECOMMENDATIONS. ALL EXCESS ADHESIVE VISIBLE ON THE SURFACE OF THE COMPLETED ASSEMBLY SHALL BE REMOVED USING AN APPROPRIATE CLEANING MATERIAL. OR c. METAL CLADDING, COMPRISED OF COATED SHEET METAL, WITH ALL EXTERNAL JOINTS AND FIXING MADE WEATHER-PROOF WITH SILICONE SEALANT.</div></div></div> <div><div>C. INSTALLATION:</div><div><div>3) BEFORE APPLYING INSULATION ALL PRESSURE AND LEAK TESTS SHALL BE COMPLETED AND APPROVED.</div><div>4) ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 IN. LAMP STRIPS AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE WHERE REQUIRED. STAPLES NOT PERMITTED. REFRIGERANT PIPING INSULATION SHALL HAVE MITERED FITTINGS.</div><div>5) ALL INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS PASSING THROUGH SLEEVES, HANGERS, ETC., OR OTHER OPENINGS. PROVIDE SADDLES OR SHIELDS FOR PROTECTION AT ALL HANGINGS.</div><div>6) INSULATION FOR STRAINERS OR OTHER FITTINGS OR ACCESSORIES REQUIRING SERVICING OR INSPECTION SHALL HAVE INSULATION REMOVABLE AND REPLACEABLE WITHOUT DAMAGE.</div></div></div>
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MECHANICAL FIRST FLOOR PLAN
M1.0
1/8" = 1'-0"

MECHANICAL FLOOR PLAN KEY NOTES

1

EXISTING AIR DISTRIBUTION DUCT, GRILLES TO BE RE-USED WHEREVER POSSIBLE PER PLAN. CONTRACTOR SHALL CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. VERIFY EXACT LOCATION AND SIZE IN FIELD PRIOR TO BID.

2

1" CD WITH CONDENSATE DRAIN PUMP TO LAVATORY WASTE W/ AIR GAP FITTING. COORDINATE W/ PLUMBING DRAWING.

3

CONTRACTOR SHALL PROVIDE FIELD MANUFACTURED FILTER RACK AT THE UNIT INLET. COORDINATE WITH ARCHITECT FOR ACCESS DOOR FOR FILTER.

4

INSTALL REFRIGERENT PIPING BETWEEN INDOOR AND OUTDOOR UNITS AS PER THE MANUFACTURERS RECOMMENDATIONS. PROVIDE INSULATION TO REFRIGERENT PIPING AS PER 2021 INTERNATIONAL MECHANICAL CODE. COINATE REFRIGERENT PIPE ROUTING WITH ARCHITECT/OWNER.

5

INSTALL NEW DOAS UNIT IN THE SET BACK AREA. COORDINATE WITH ARCHITECT/OWNER TO DETERMINE THE FINAL LOCATION.

6

INSTALL A NEW VRF CONDENSER UNIT NEAR THE EXISTING CONDENSER UNITS SERVING THIS SPACE. CONTRACTOR TO FIELD VERIFY THE LOCATION AND COORDINATE WITH ARCHITECT/OWNER TO CONFIRM THE FINAL LOCATION.

7

AIR INTAKE TO BE TERMINATED 10' AWAY FROM ANY EXHAUST.

8

TERMINATE CONDENSATE DRAIN IN APPROPRIATE LOCATION.

9

EXISTING CONDENSING UNITS TO REMAIN. CONTRACTOR SHALL CLEAN AND REFURBISH TO "LIKE NEW" CONDITION AND VERIFY THE EXACT LOCATION IN FIELD.

GENERAL FLOOR PLAN NOTES:

1.

ALL WORK SHALL COMPLY WITH ALL LOCAL AND STATE CODES AND AUTHORITIES HAVING JURISDICTION.

2.

THE CONTRACTOR SHALL SECURE AND PAY FOR ALL REQUIRED PERMITS AND ARRANGE ALL REQUIRED INSPECTIONS.

3.

THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS AND TRADES.

4.

THESE DRAWINGS, AS PREPARED, ARE DIAGRAMMATIC BUT SHALL BE FOLLOWED AS CLOSELY AS CONSTRUCTION OF THE PROJECT AND THE WORK OF THE TRADES WILL PERMIT. EQUIPMENT LOCATIONS INDICATED ARE APPROXIMATE. COORDINATE EXACT LOCATIONS AND REQUIRED CLEARANCES WITH EQUIPMENT SUPPLIER AND ALL TRADES PRIOR TO INSTALLATION.

5.

THE CONTRACTOR SHALL FURNISH AND INSTALL ALL THE EQUIPMENT INDICATED WITHIN THE MECHANICAL DRAWINGS UNLESS OTHERWISE NOTED. ALL EQUIPMENT SHALL BE UL LISTED. VERIFY LOCATION AND DIMENSIONS IN THE FIELD PRIOR TO FABRICATION AND / OR INSTALLATION.

6.

DUCT SIZES SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS.

7.

ALL METAL DUCT AND AIR DISTRIBUTION DEVICES SHALL BE INSULATED WITH R-6, 75 DENSITY FOIL-BACKED INSULATION WITH FIRE AND SMOKE RATING 25-50.

8.

ALL DUCTWORK SHALL BE FABRICATED, INSTALLED, SEALED, AND INSULATED PER THE LATEST ISSUE OF SMACNA LOW-VELOCITY DUCT MANUAL.

9.

THE CONTRACTOR SHALL COORDINATE DIFFUSER LOCATIONS ON SITE WITH THE MOST RECENT REFLECTED CEILING PLAN.

10.

THE CONTRACTOR IS TO MAKE ALL LOW-VOLTAGE WIRING CONNECTIONS FOR ALL HVAC EQUIPMENT INCLUDING TEMPERATURE CONTROLS, ROOF TOP UNITS, SMOKE DETECTORS AND CONTRACTOR PANEL.

11.

PROVIDE AND INSTALL SMOKE DUCT DETECTORS IN EACH AIR CONDITIONING UNIT RETURN DUCT GREATER THAN 2000 CFM. CONTRACTOR SHALL PROVIDE INTERCONNECTION AND WIRE TO THE FIRE ALARM CONTROL PANEL IF REQUIRED. DUCT DETECTORS SHALL HAVE REMOTE TEST STATIONS LOCATED NEAR THE RESPECTIVE THERMOSTATS. VERIFY CODE REQUIREMENTS FOR DUCT DETECTORS IN BOTH THE SUPPLY AND RETURN AIR STREAMS.

12.

THE ENTIRE INSTALLATION SHALL BE GUARANTEED FREE OF DEFECTS AND CONTRACTOR SHALL REPAIR AND / OR REPLACE ANY DEFECTIVE MATERIALS OR EQUIPMENT AT NO COST TO THE OWNER FOR A MINIMUM PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE BY ARCHITECT OR ENGINEER.

13.

ALL WORK SHALL BE SUBJECT TO THE ACCEPTANCE AND APPROVAL OF THE ARCHITECT AND OWNER. THE ARCHITECT SHALL BE NOTIFIED OF ANY AND ALL DISCREPANCIES BETWEEN FIELD CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK. FAILURE OF PROPER NOTIFICATION DOES NOT RELIEVE THE CONTRACTOR. THE CONTRACTOR SHALL CORRECT ANY AND ALL WORK ARISING FROM SUCH FAILURE TO COORDINATE DISCREPANCIES TO THE SATISFACTION OF THE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.

14.

THE CONTRACTOR SHALL, UPON COMPLETION OF PROJECT, PERFORM A COMPLETE TEST AND BALANCE OF ALL EQUIPMENT. PROVIDE A WRITTEN REPORT TO THE ARCHITECT. ALL CAPACITIES MUST BE SET TO WITHIN ±10% OF AMOUNTS INDICATED ON THE FLOOR PLAN AND SCHEDULES.

15.

PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/ BARRIERS AS PER LOCAL CODE. COORDINATE WITH ARCHITECTURAL DRAWING FOR FIRE RATING OF THE WALLS.

16.

PROVIDE VOLUME DAMPER AT EACH SUPPLY, RETURN AND EXHAUST DUCTWORK BRANCH.

MECHANICAL DUCT INSTALLATION NOTES:

1.

GC TO RUN ALL DUCTWORK BETWEEN STRUCTURE AS FEASIBLE AND/OR TIGHT TO UNDERSIDE OF STRUCTURE, GC TO PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL BY ARCHITECT AND OWNER TO CONFIRM FINAL LAYOUT IS ACCEPTABLE.

LEGENDS:

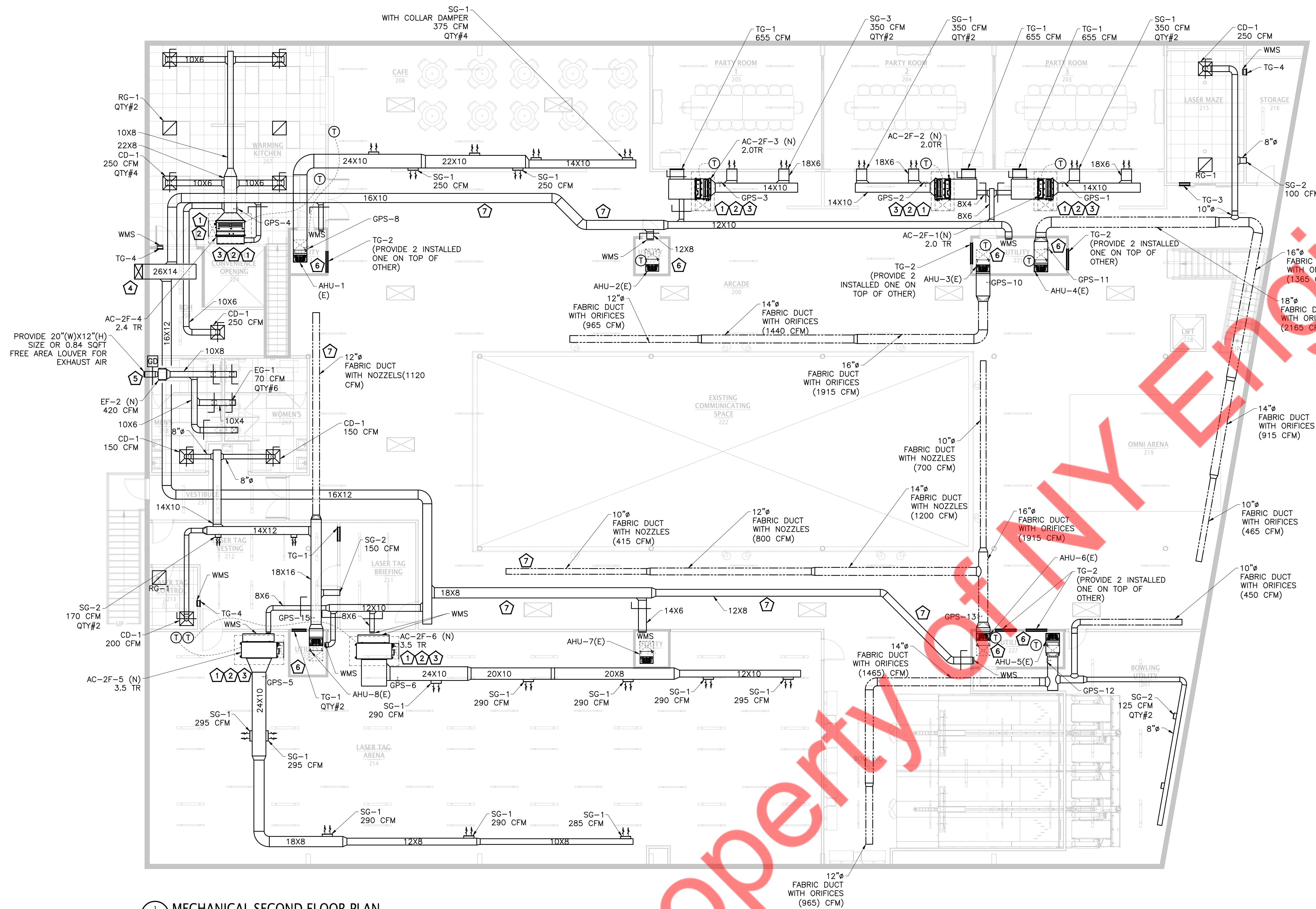
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NEW MECHANICAL SYSTEM

- - - - -

EXISTING MECHANICAL SYSTEM

MECHANICAL FLOOR PLAN



1 MECHANICAL SECOND FLOOR PLAN
M1.1 1/8" = 1'-0"

MECHANICAL FLOOR PLAN KEY NOTES

- 1" CD WITH CONDENSATE DRAIN PUMP TO LAVATORY WASTE W/ AIR GAP FITTING. COORDINATE W/ PLUMBING DRAWING.
- CONTRACTOR SHALL PROVIDE FIELD MANUFACTURED FILTER RACK AT THE UNIT INLET. COORDINATE WITH ARCHITECT FOR ACCESS DOOR FOR FILTER.
- INSTALL REFRIGERENT PIPING BETWEEN INDOOR AND OUTDOOR UNITS AS PER THE MANUFACTURERS RECOMMENDATIONS. PROVIDE INSULATION TO REFRIGERENT PIPING AS PER 2021 INTERNATIONAL MECHANICAL CODE. CORINATE REFRIGERENT PIPE ROUTING WITH ARCHITECT/OWNER.
- 26X14 OA DUCT DOWN TO DOAS UNIT.
- TOILET EXHAUST TO BE TERMINATED WITH LOUVER. TERMINATE 3' FROM ANY BUILDING OPENING AND 10' AWAY FROM ANY AIR INTAKE.
- EXISTING AHU TO REMAIN AND RE-USED. CONTRACTOR MUST VERIFY MAKE & MODEL, TONNAGE, AGE CONDITION AND LOCATION OF THE SYSTEM. CONTRACTOR SHALL CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. REPAIR/REPLACE ANY ACCESSORIES AS REQUIRED TO PROVIDE FULL FUNCTIONING OF THE UNIT. RE-USE THE EXISTING THERMOSTAT AND REPLACE IN KIND IF DAMAGED.
- CONTRACTOR TO RUN THE DUCT BETWEEN JOIST

GENERAL FLOOR PLAN NOTES:

- ALL WORK SHALL COMPLY WITH ALL LOCAL AND STATE CODES AND AUTHORITIES HAVING JURISDICTION.
- THE CONTRACTOR SHALL SECURE AND PAY FOR ALL REQUIRED PERMITS AND ARRANGE ALL REQUIRED INSPECTIONS.
- THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS AND TRADES.
- THESE DRAWINGS, AS PREPARED, ARE DIAGRAMMATIC BUT SHALL BE FOLLOWED AS CLOSELY AS CONSTRUCTION OF THE PROJECT AND THE WORK OF THE TRADES WILL PERMIT. EQUIPMENT LOCATIONS INDICATED ARE APPROXIMATE. COORDINATE EXACT LOCATIONS AND REQUIRED CLEARANCES WITH EQUIPMENT SUPPLIER AND ALL TRADES PRIOR TO INSTALLATION.
- THE CONTRACTOR SHALL FURNISH AND INSTALL ALL THE EQUIPMENT INDICATED WITHIN THE MECHANICAL DRAWINGS UNLESS OTHERWISE NOTED. ALL EQUIPMENT SHALL BE UL LISTED. VERIFY LOCATION AND DIMENSIONS IN THE FIELD PRIOR TO FABRICATION AND / OR INSTALLATION.
- DUCT SIZES SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
- THE CONTRACTOR SHALL COORDINATE DIFFUSER LOCATIONS ON SITE WITH THE MOST RECENT REFLECTED CEILING PLAN.
- PROVIDE AND INSTALL SMOKE DUCT DETECTORS IN EACH AIR CONDITIONING UNIT RETURN DUCT GREATER THAN 2000 CFM. CONTRACTOR SHALL PROVIDE INTERCONNECTION AND WIRE TO THE FIRE ALARM CONTROL PANEL IF REQUIRED. DUCT DETECTORS SHALL HAVE REMOTE TEST STATIONS LOCATED NEAR THE RESPECTIVE THERMOSTATS. VERIFY CODE REQUIREMENTS FOR DUCT DETECTORS IN BOTH THE SUPPLY AND RETURN AIR STREAMS.
- THE ENTIRE INSTALLATION SHALL BE GUARANTEED FREE OF DEFECTS AND CONTRACTOR SHALL REPAIR AND / OR REPLACE ANY DEFECTIVE MATERIALS OR EQUIPMENT AT NO COST TO THE OWNER FOR A MINIMUM PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE BY ARCHITECT OR ENGINEER.
- ALL WORK SHALL BE SUBJECT TO THE ACCEPTANCE AND APPROVAL OF THE ARCHITECT AND OWNER. THE ARCHITECT SHALL BE NOTIFIED OF ANY AND ALL DISCREPANCIES BETWEEN FIELD CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK. FAILURE OF PROPER NOTIFICATION DOES NOT RELIEVE THE CONTRACTOR. THE CONTRACTOR SHALL CORRECT ANY AND ALL WORK ARISING FROM SUCH FAILURE TO COORDINATE DISCREPANCIES TO THE SATISFACTION OF THE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL, UPON COMPLETION OF PROJECT, PERFORM A COMPLETE TEST AND BALANCE OF ALL EQUIPMENT. PROVIDE A WRITTEN REPORT TO THE ARCHITECT. ALL CAPACITIES MUST BE SET TO WITHIN $\pm 10\%$ OF AMOUNTS INDICATED ON THE FLOOR PLAN AND SCHEDULES.
- PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/ BARRIERS AS PER LOCAL CODE. COORDINATE WITH ARCHITECTURAL DRAWING FOR FIRE RATING OF THE WALLS.
- PROVIDE VOLUME DAMPER AT EACH SUPPLY, RETURN AND EXHAUST DUCTWORK BRANCH.
- SUPPLY AND RETURN DUCTWORK 20' DOWNSTREAM OF ALL AC UNITS SHALL BE LINED WITH 1.5" ACOUSTIC LINING. THE DUCT SIZES INDICATED ON THE PLANS ARE CLEAR INTERIOR DIMENSION. INCREASE DUCTS TO RECEIVE ACOUSTIC LINING ACCORDINGLY. AFTER 20' OF DUCT RUN THERMAL INSULATION TO BE PROVIDED FOR BOTH SUPPLY & RETURN DUCTS INSTALLED IN THE CONCEALED SPACES SUCH AS CEILING PLENUM.

MECHANICAL DUCT INSTALLATION NOTES:

- GC TO RUN ALL DUCTWORK BETWEEN STRUCTURE AS FEASIBLE AND/OR TIGHT TO UNDERSIDE OF STRUCTURE. GC TO PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL BY ARCHITECT AND OWNER TO CONFIRM FINAL LAYOUT IS ACCEPTABLE.

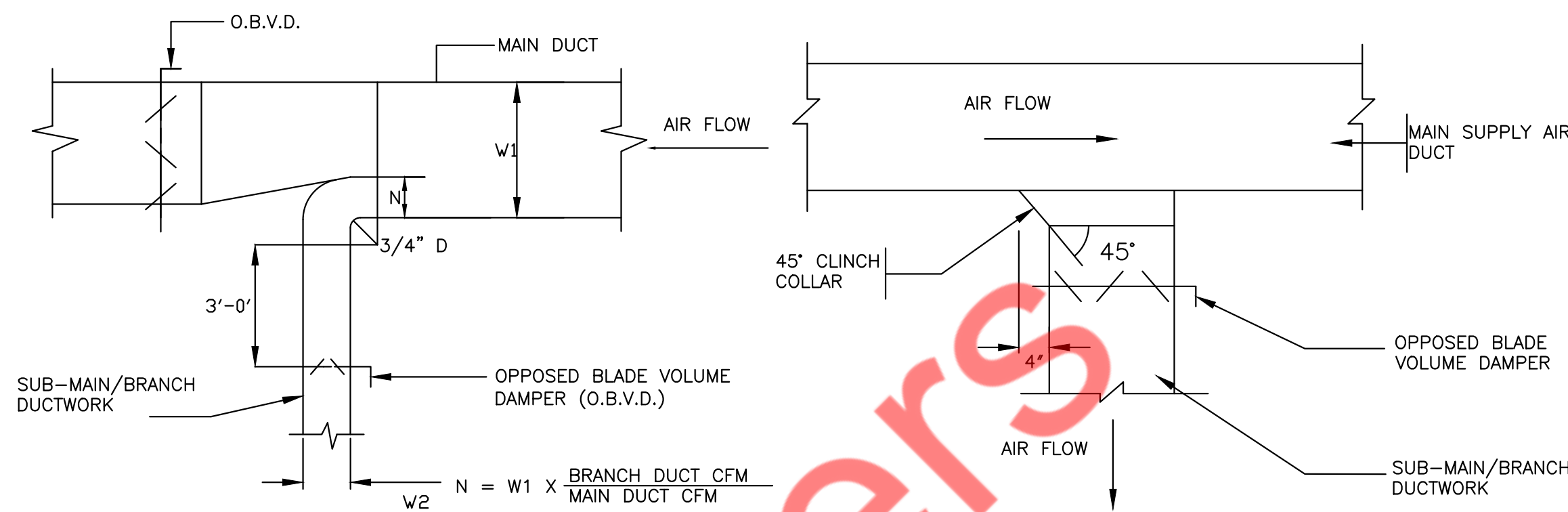
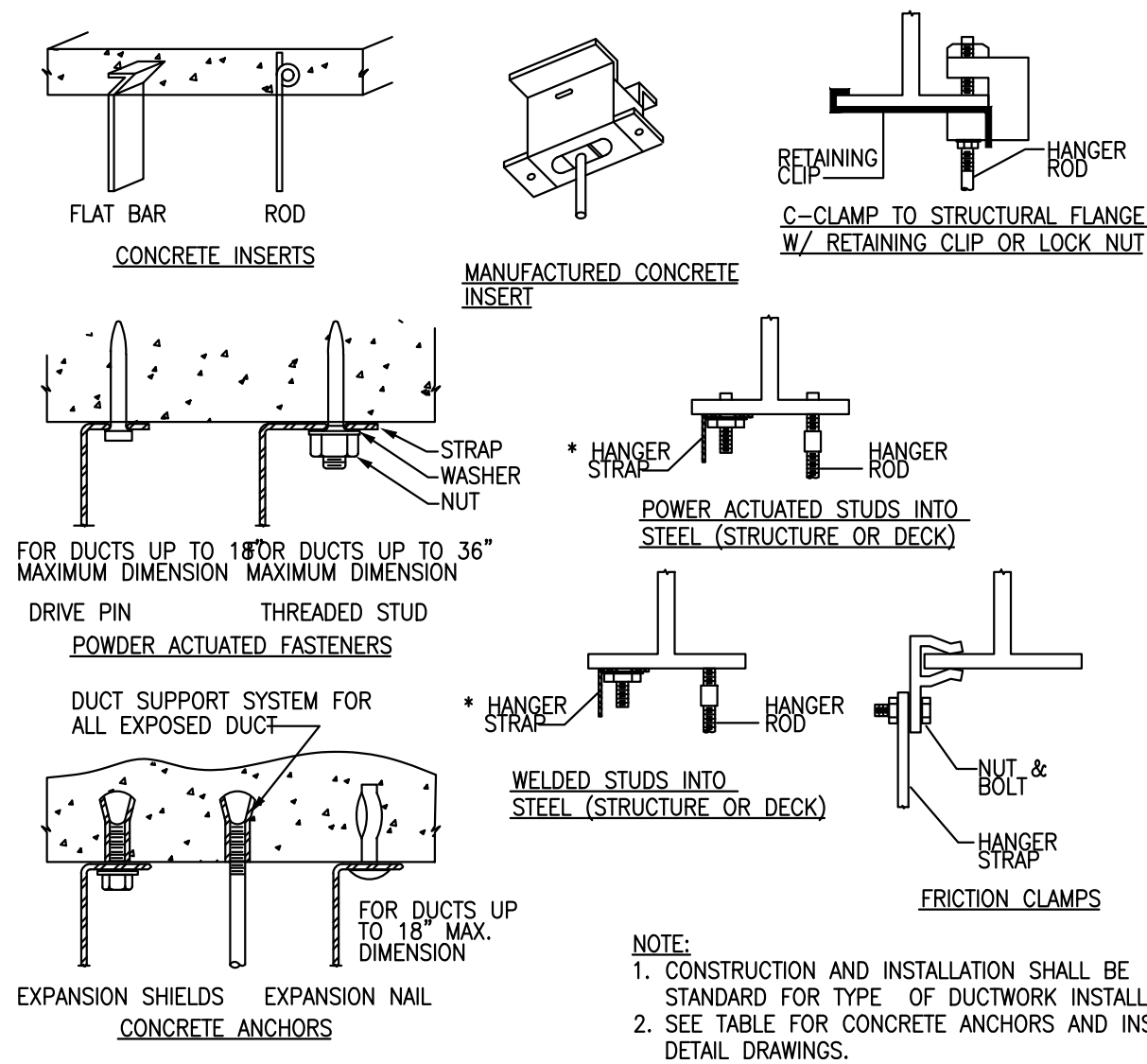
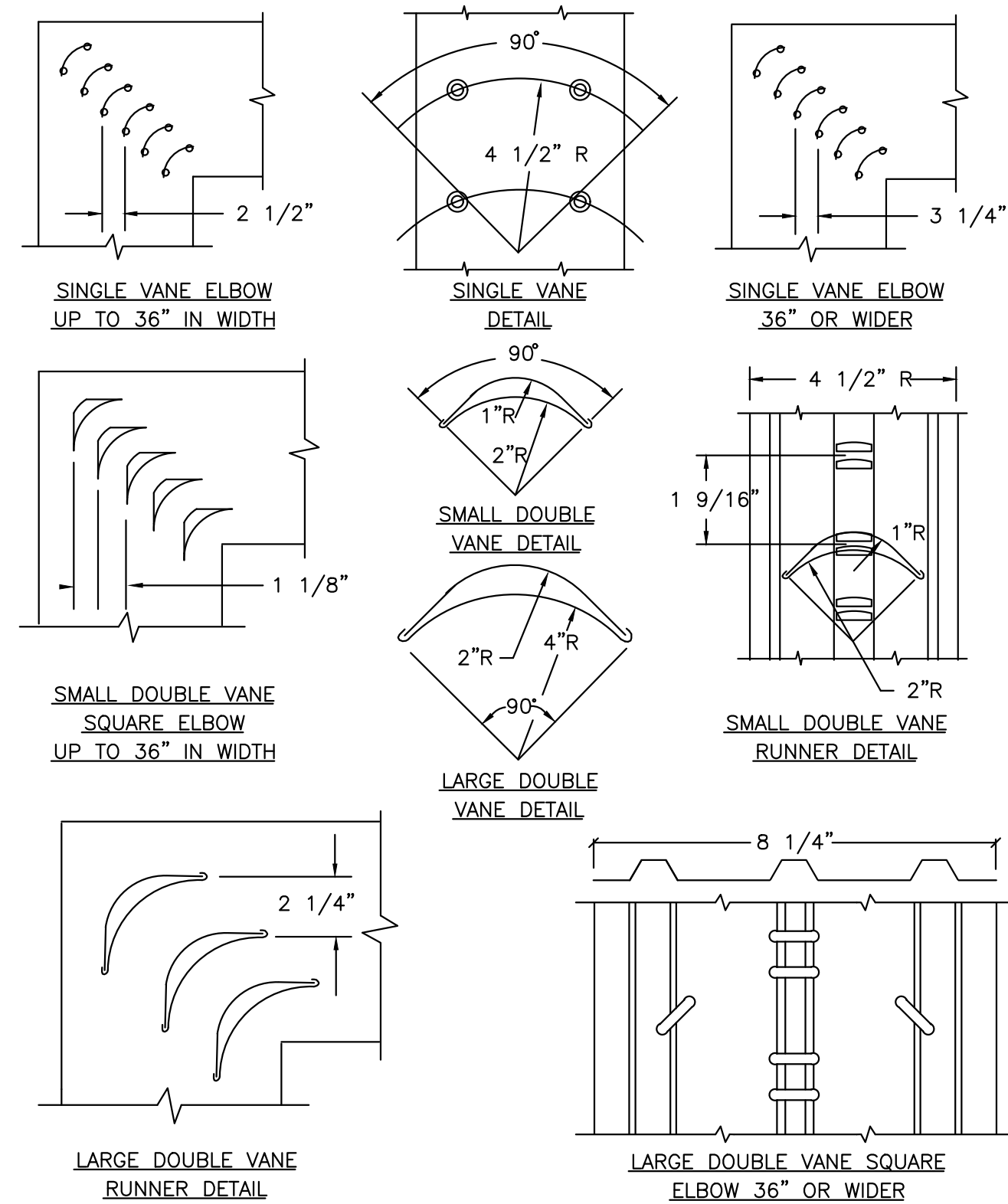
LEGENDS:

- FABRIC DUCT WORK
- METAL DUCT WORK

MECHANICAL ROOF PLAN

M1.1

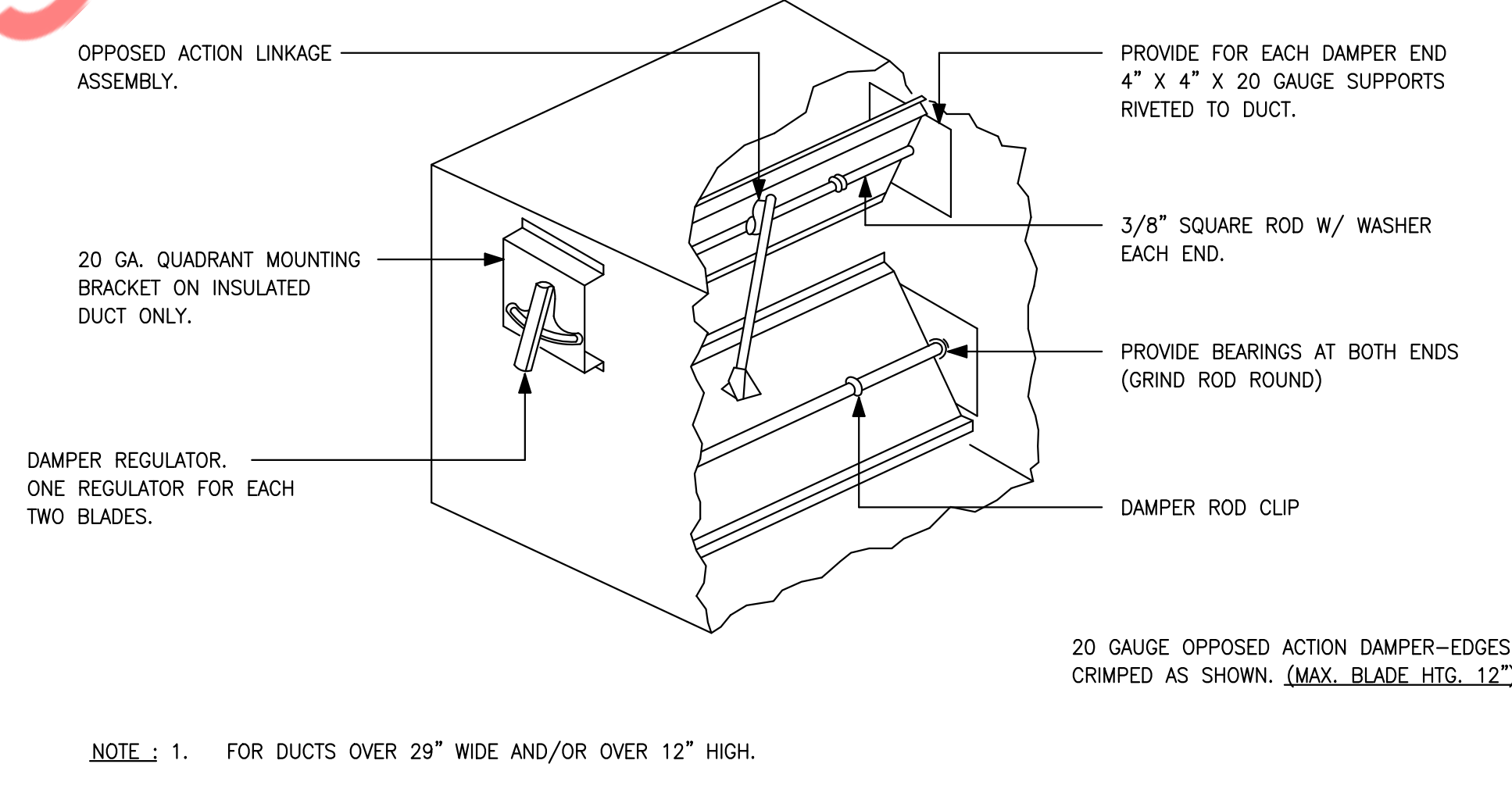
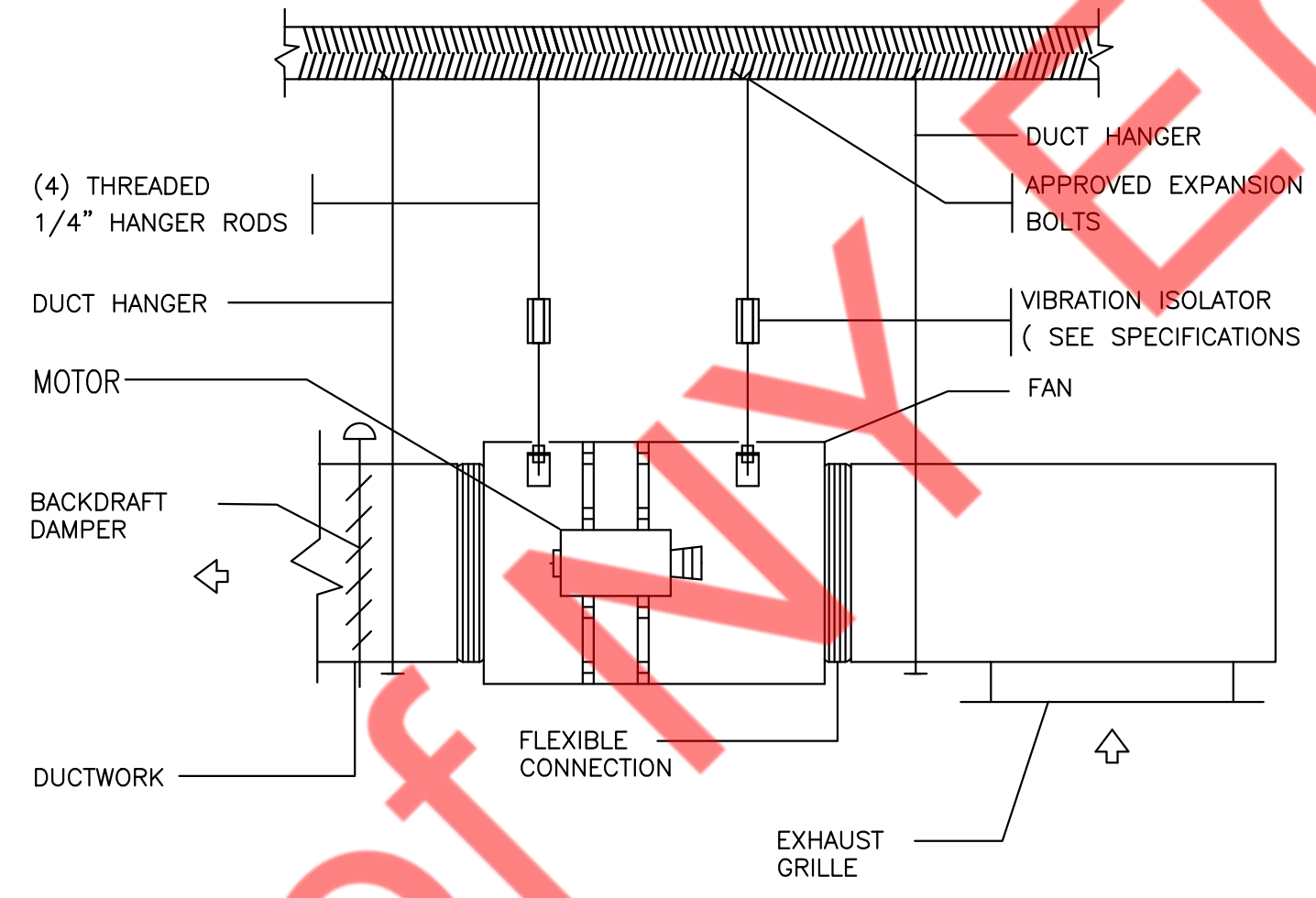
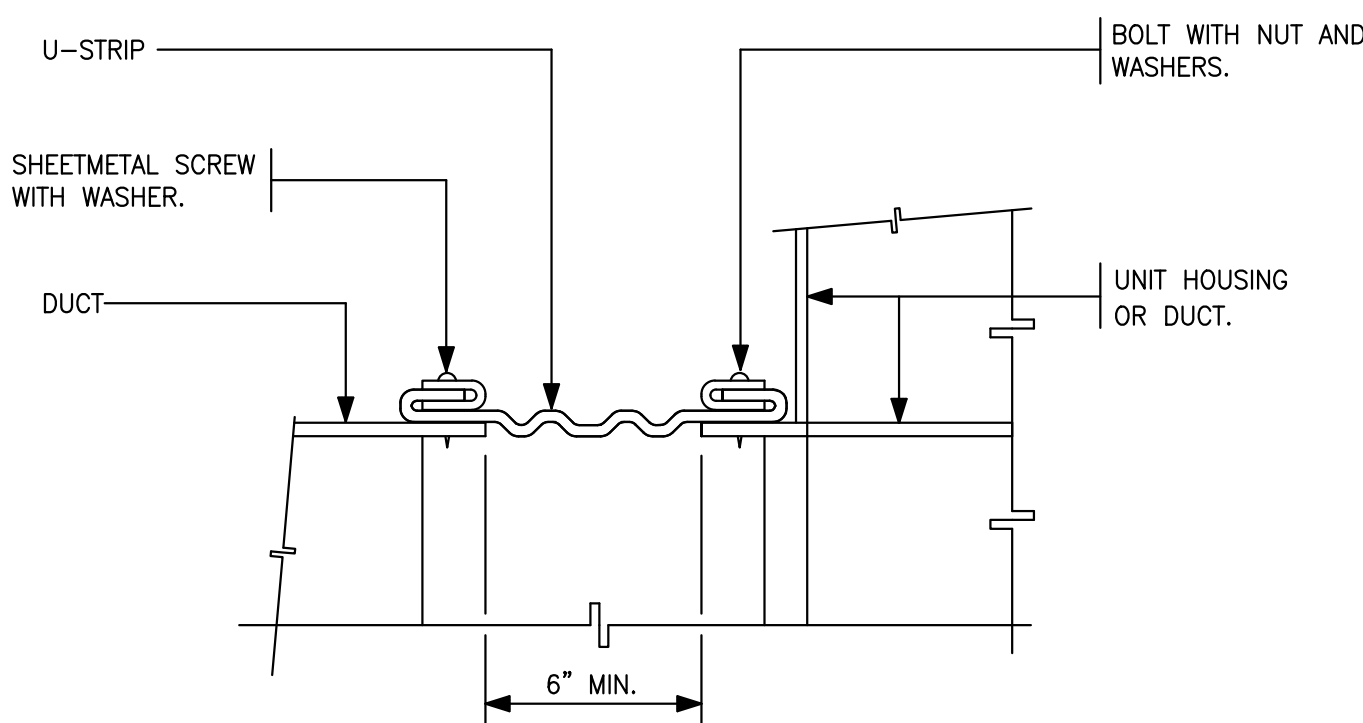
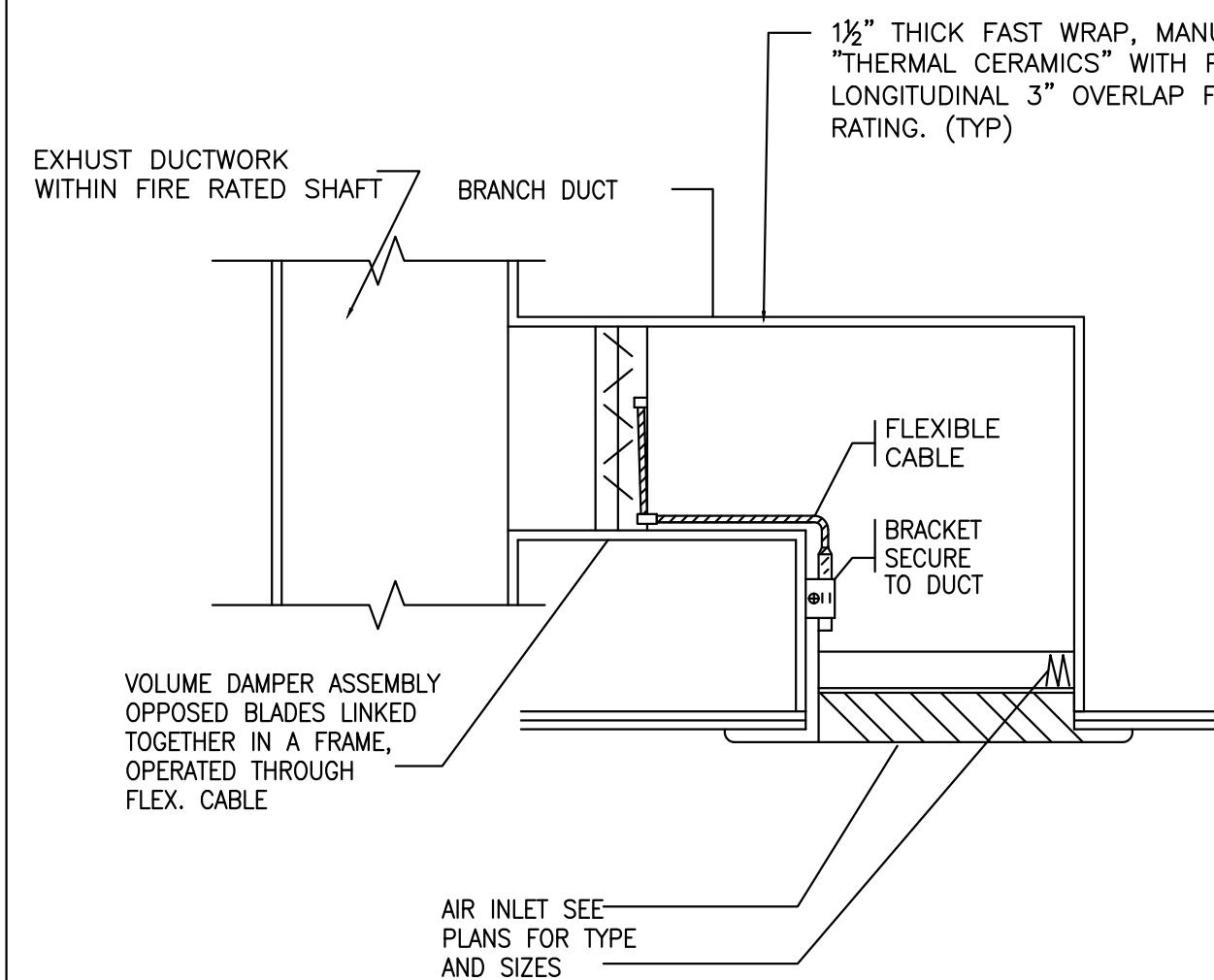
ISSUED FOR PERMIT



1 LOW VELOCITY DUCTWORK ELBOWS
M-5.0 N.T.S

2 UPPER ATTACHMENT METHODS OF HANGING DUCT AND EQUIPMENT DETAIL
M-5.0 N.T.S

3 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION
M-5.0 N.T.S

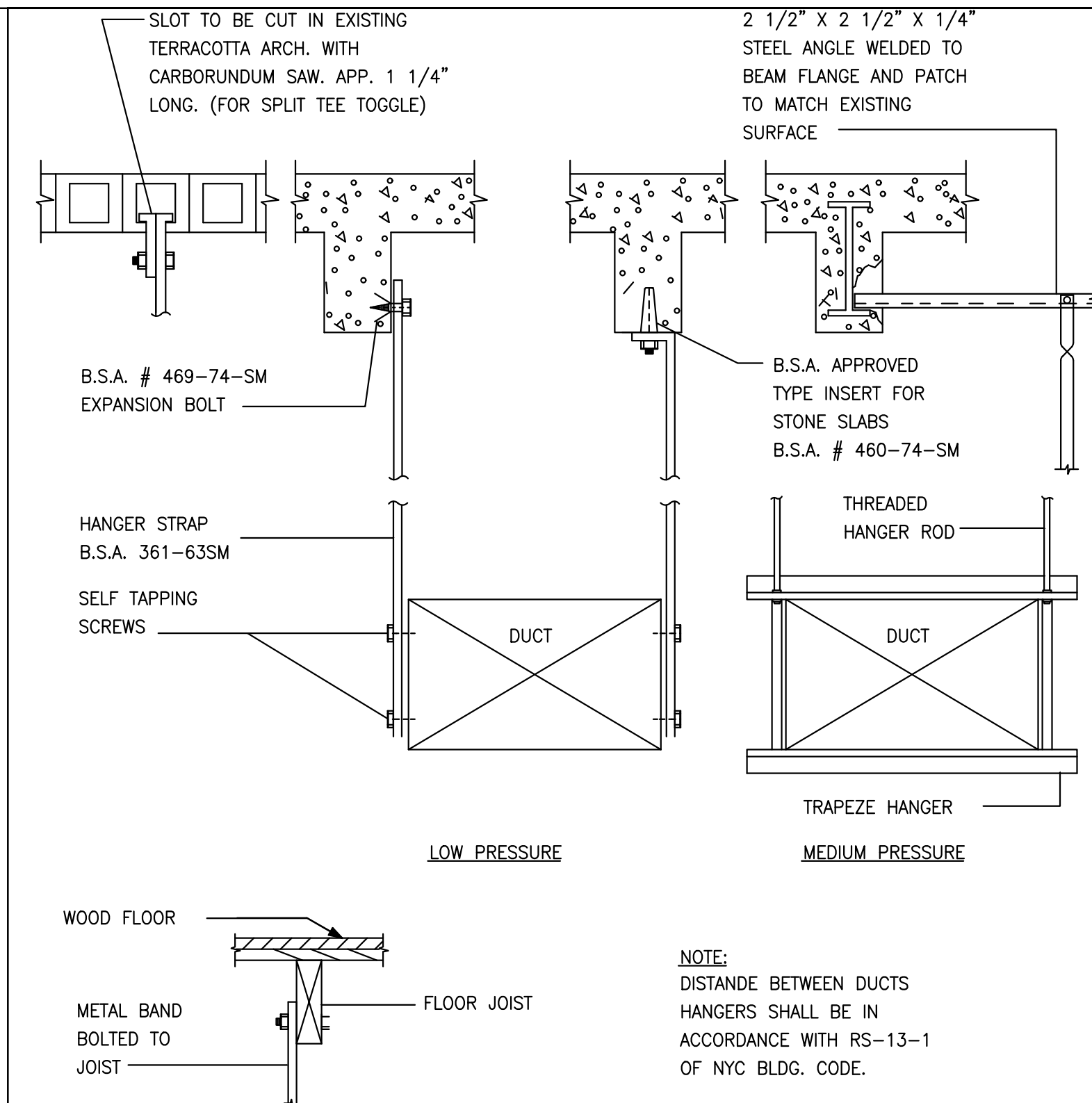
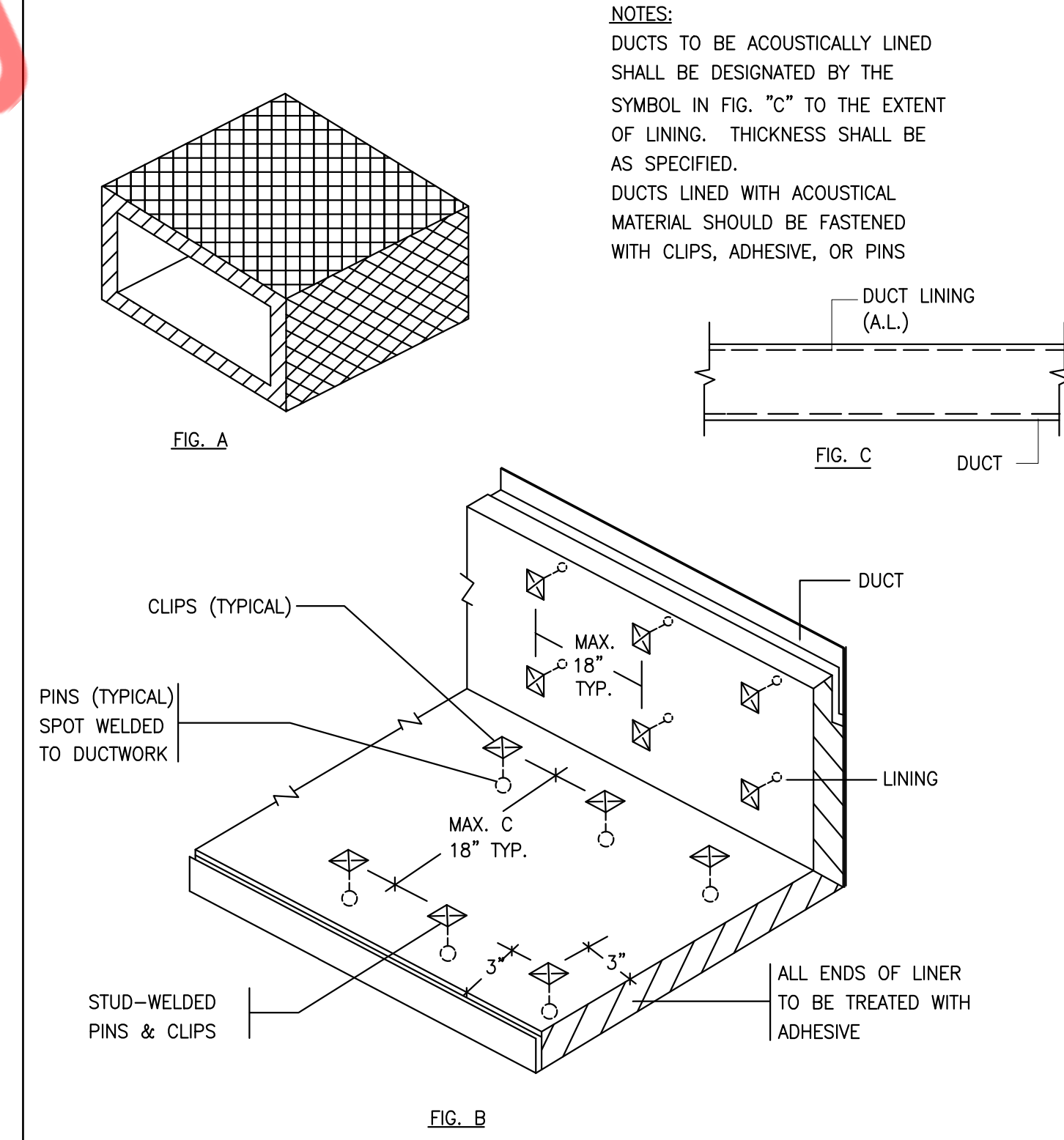
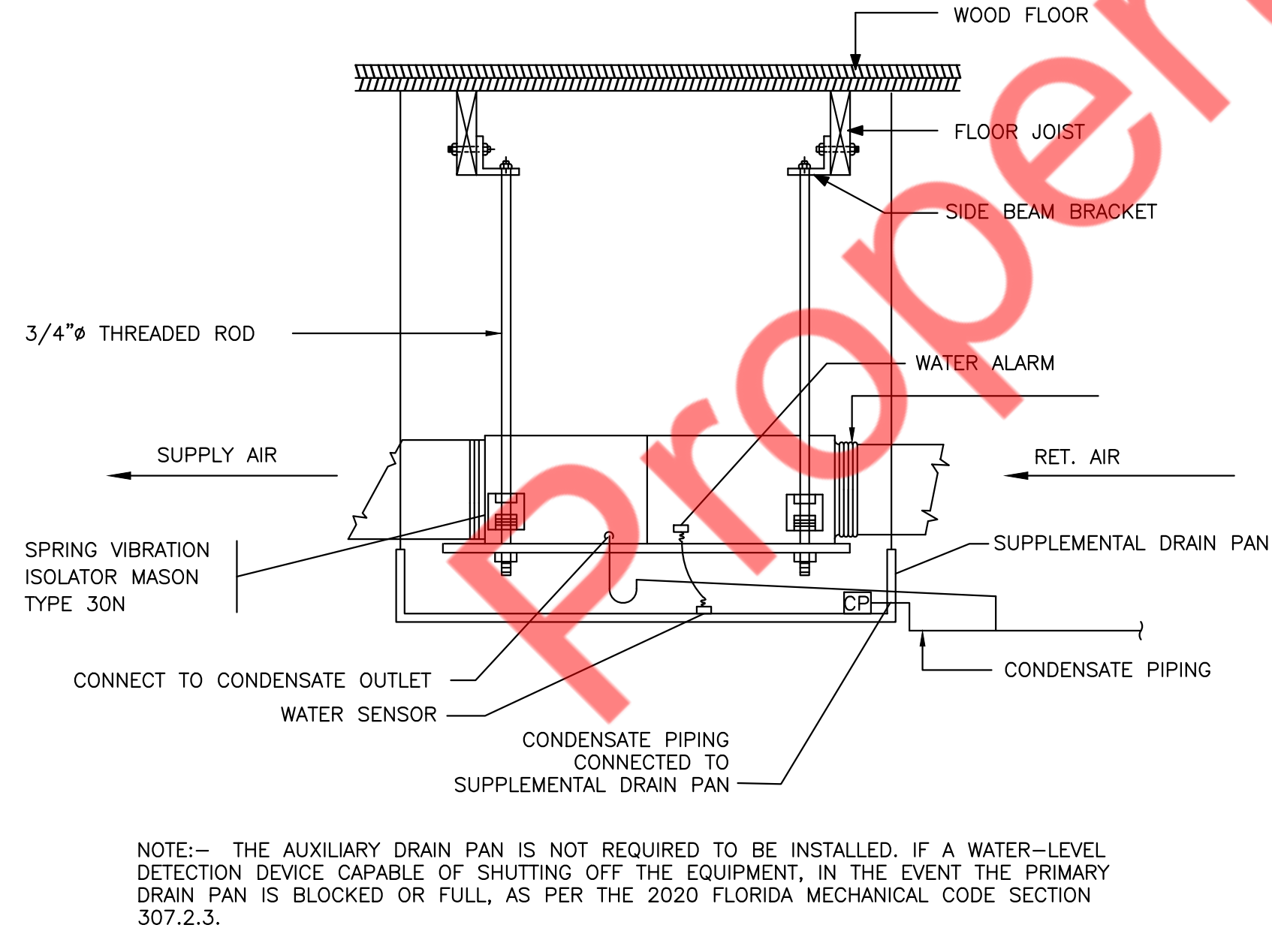
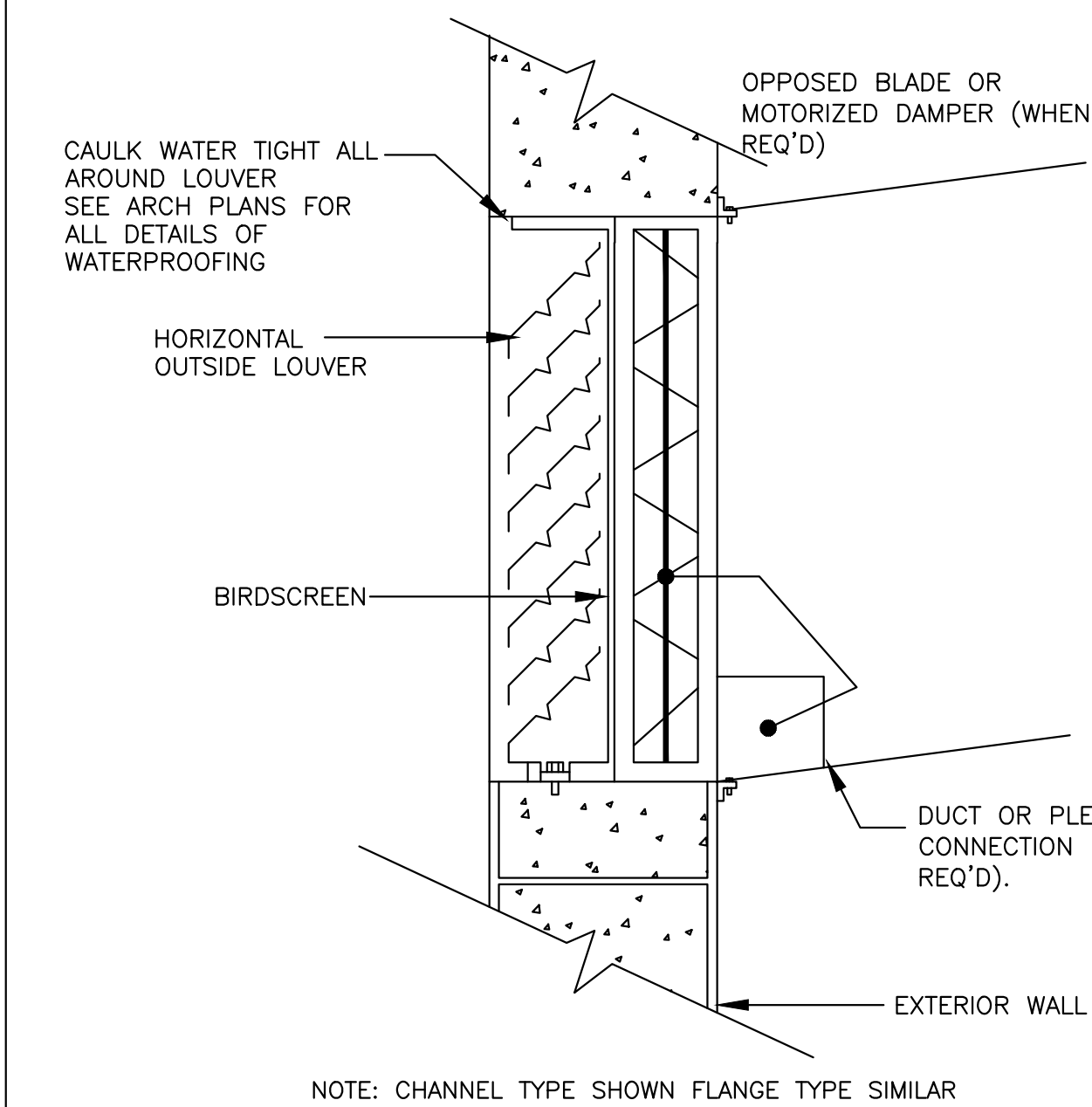


4 EXHAUST GRILLE DETAILS
M-5.0 N.T.S

5 FLEXIBLE CONNECTION (DUCT-EQUIPMENT)
M-5.0 N.T.S

6 INLINE FAN INSTALLATION DETAILS
M-5.0 N.T.S

7 LOW PRESSURE BALANCING DAMPER
M-5.0 N.T.S



8 LOUVER INSTALLATION DETAIL
M-5.0 N.T.S

9 A.C. UNIT INSTALLATION DETAIL
M-5.0 N.T.S

10 ACOUSTICAL TREATMENT DUCT LINING
M-5.0 N.T.S

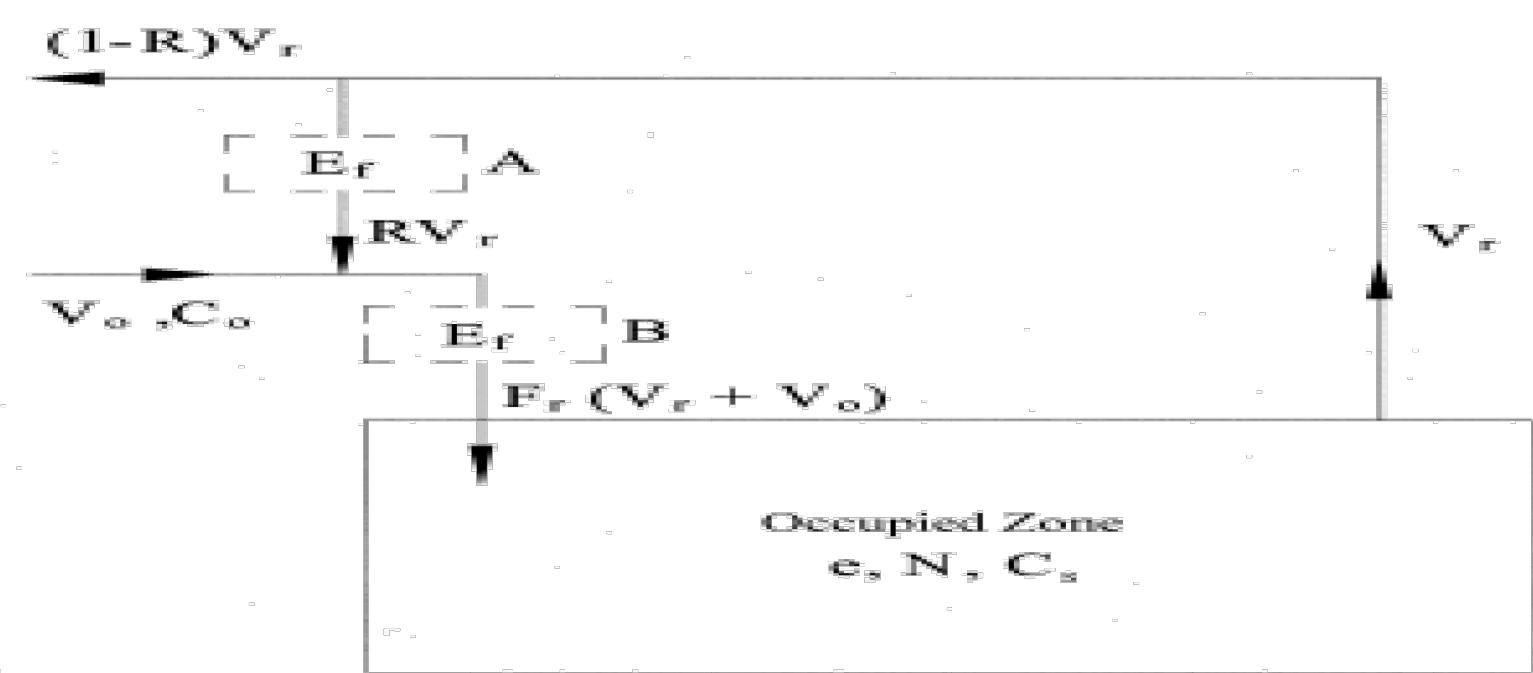
11 METHOD OF HANGING DUCTWORK
M-5.0 N.T.S



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3101 Yorkmont Rd
Suite 400
Charlotte, NC 28208
www.gpsair.com
VERSION 2.2 running ASHRAE 62.1-2016

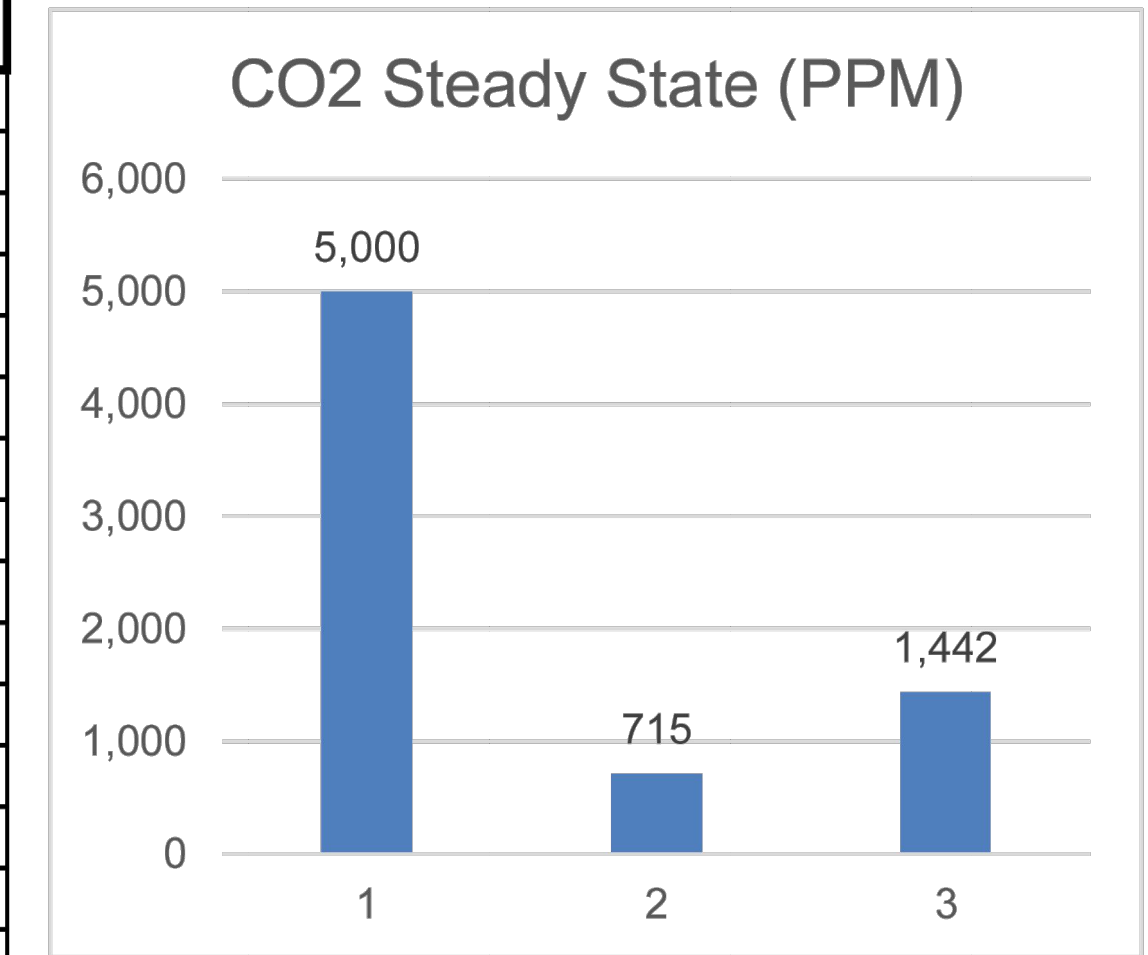
Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA CFM per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp	Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
F-1, AC2F-1TO7 & AC-1 (E)	Sports & Entertainment	Game arcades	28,400.0	200	7.5	0.18	1500	5112	0.8	8265
OA required per VRP										

Zone Height (feet)	10.0
Desired Outside Air (Vo) IAQP (CFM)	2,500
Supply Air Full Flow (Vs) (CFM)	24,600
Supply Air Minimum Flow (Vs) (CFM)	1,200
Return Air (Vr) (CFM)	22100
Recirc. Flow Factor (R)	0.90
Design Flow Reduction Factor (F)	0.05
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	Mild Exercise
Filter Location	B
HVAC Flow Type	VAV
Outdoor Air Flow Type	Constant



Air Changes Per Hour	5.2	VRP OA CFM per person	41.3
Outside Air Per VRP	8265 CFM	IAQ OA CFM per person	12.5
Outside Air Per IAQ	2500 CFM		
Outside Air Savings	5765 CFM	Winter Heating Savings	
OA Summer Drybulb	97.4	OA Winter Design DB (F)	28
OA Summer Wetbulb	79.1	Supply Air DB Setpoint (F)	86.21
Coil Leaving Air Drybulb (F)	56.1	MBH Saved Winter	364.1
Coil Leaving Air Wetbulb (F)	54.7	KW Saved Winter	106.7
OA MBH Saved Summer*	507.8		
OA Tons Saved Summer*	42.3		

Indoor Contaminants		Steady State (lb/ft3) Using the VRP*	Steady State (lb/ft3) Using the IAQ Method	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate (lb/person/min)	Filtration Effectiveness	Cognizant Authority***
Generated By People & From Outdoors	Maximum Threshold Value (PPM)						
Acetaldehyde	100.0	2.23E-09	3.25E-09	Yes	3.25E-08	50%	OSHA
Acetone	250.0	1.01E-08	2.75E-08	Yes	3.27E-07	50%	NIOSH
Ammonia	25.00	2.33E-07	6.44E-07	Yes	7.69E-06	50%	NIOSH
Benzene	1.00	1.16E-08	3.10E-08	Yes	3.68E-07	50%	OSHA
2- Butanone (MEK)	200.0	6.74E-07	1.87E-06	Yes	2.23E-05	50%	NIOSH
Carbon dioxide**	5000	4.68E-05	5.12E-05	Yes	6.22E-05	0%	NIOSH
Chloroform	2.0	2.09E-08	5.78E-08	Yes	6.89E-07	50%	NIOSH
Dioxane	100.0	0.00E+00	0.00E+00	Yes	0.00E+00	50%	OSHA
Hydrogen Sulfide	10.0	0.00E+00	0.00E+00	Yes	0.00E+00	50%	NIOSH
Methane	NA	6.87E-08	6.87E-08	Yes	0.00E+00	0%	NA
Methanol	200.0	8.51E-09	2.81E-08	Yes	2.81E-07	0%	NIOSH
Methylene Chloride	25.0	6.12E-07	1.69E-06	Yes	2.02E-05	50%	OSHA
Propane	1000.0	1.12E-09	1.12E-09	Yes	0.00E+00	0%	NIOSH
Tetrachloroethane	5.0	0.00E+00	0.00E+00	Yes	0.00E+00	50%	OSHA
Tetrachloroethylene	100.0	6.95E-07	1.92E-06	Yes	2.30E-05	50%	OSHA
Toluene	100.0	2.99E-09	5.34E-09	Yes	5.75E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	2.92E-05	8.09E-05	Yes	9.66E-04	50%	NIOSH
Xylene	100.0	6.25E-10	2.62E-10	Yes	0.00E+00	50%	OSHA



1 = NIOSH CO2 Limit
2 = CO2 Level at Ventilation Rate OA Flow Rate
3 = CO2 Level at IAQ Procedure OA Flow Rate

Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

Is IAQ acceptable at reduced outside air levels?	Yes
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**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove CO2 is not a contaminant of concern when using air cleaning devices to control the other contaminants of concern, as found on submarines.

The University of Denmark conducted a study to confirm CO2 levels at 5,000 PPM had no impact on cognitive function. Zhang X, Wargocki P, Lian Z, Human Responses to Carbon Dioxide, a Follow-up Study at Recommended Exposure Limits in Non-industrial Environments, Building and Environment

IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered exception found in Section 4
Exhaust flow rates may differ from Table 6.5 based on ASHRAE 62 IAQP via Section 6.5.2