MECHANICAL GENERAL NOTES:

1. THESE GENERAL NOTES APPLY TO ALL MECHANICAL DRAWINGS. REFER TO DIVISION 23 SPECIFICATIONS FOR ADDITIONAL MECHANICAL SYSTEMS SPECIFICATIONS AND REQUIREMENTS.
2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF DUCTWORK, PIPING AND EQUIPMENT. DO NOT SCALE DRAWINGS. THE EXACT LOCATION AND ROUTING OF EQUIPMENT DUCTWORK, PIPING, ETC., UNLESS SPECIFICALLY DIMENSIONED ON THE DRAWINGS, SHALL BE DETERMINED IN THE FIELD. MAKE REASONABLE MODIFICATIONS IN THE INSTALLATION SO ALL DUCTWORK FITS PROPERLY AND EQUIPMENT CAN BE SERVICED.
3. MATERIALS AND EQUIPMENT SHALL BE NEW AND INSTALLED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS. THEY SHALL BE INSTALLED PLUMB, LEVEL AND TRUE-TO-LINE WITH ADJACENT WORK WHERE INSTALLATION METHODS ARE NOT SPECIFICALLY COVERED BY THE DRAWINGS AND/OR SPECIFICATION, FIRST CLASS TRADE PRACTICES AND MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS SHALL GOVERN.
4. CAREFULLY EXAMINE ALL ARCHITECTURAL, STRUCTURAL, PLUMBING, HVAC, FIRE PROTECTION, AND ELECTRICAL DRAWINGS PERTAINING TO CONSTRUCTION. COOPERATE WITH OTHER TRADES IN LOCATING DUCTWORK, PIPING, EQUIPMENT, ETC. IN ORDER TO AVOID CONFLICT WITH OTHER TRADE'S WORK. NO CLAIM FOR COSTS WILL BE ALLOWED FORE RELOCATING EQUIPMENT, PIPING, DUCTWORK, ETC. WHICH INTERFERES WITH OTHER TRADE'S WORK.
5. HVAC EQUIPMENT, DUCTS AND INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION, BUILDING DEPARTMENTS, APPLICABLE TO THE LATEST EDITION OF THE APPROVED BUILDING CODES, APPLICABLE OSHA AND NFPA STANDARDS, COUNTY AND CITY BUILDING REGULATIONS AND CODES.
6. FABRICATION AND INSTALLATION OF DUCTWORK SHALL BE IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS, STATE MECHANICAL CODE AND APPLICABLE NFPA STANDARDS.
7. ALL DUCT SIZES SHOWN ARE INSIDE CLEAR DIMENSIONS.
8. PROVIDE AIR TURNING VANES IN ALL SQUARE ELBOWS.
9. REFER TO TYPICAL DETAILS FOR PIPING AND INSTALLATION OF EQUIPMENT.
10. PERSONNEL SHALL BE THOROUGHLY TRAINED AND EXPERIENCED IN THE PRODUCTS INVOLVED AND RECOMMENDED METHODS FOR THEIR FABRICATION AND INSTALLATION SHALL BE MADE FOR LACK OF SKILL ON THE PART OF THE WORKMAN IN THE ACCEPTANCE AND/OR REJECTION OF COMPLETED WORK.
11. MECHANICAL CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, TOOLS, AND EQUIPMENT TO INSTALL ALL HVAC SYSTEMS AS INDICATED ON THESE DRAWINGS.
12. MECHANICAL CONTRACTOR SHALL ARRANGE AND PAY FOR MECHANICAL PERMITS AND INSPECTIONS AS REQUIRED BY LOCAL ORDINANCES.
13. DELIVER MATERIALS TO PROJECT IN GOOD CONDITION. STORE MATERIALS OFF OF GROUND AND PROTECT FROM WEATHER AND THE ELEMENTS.
14. VERIFY DIMENSIONS IN THE FIELD. VERIFY STRUCTURAL DETAILS BEFORE INSTALLING DUCTWORK. NO EXTRA COMPENSATION WILL BE CONSIDERED BECAUSE OF DIFFERENCED BETWEEN ACTUAL MEASURED DIMENSIONS AND THOSE INDICATED ON THE DRAWINGS.
15. ALL PENETRATIONS THROUGH WALLS SHALL BE PROVIDED WITH PROPERLY SIZED SLEEVES. SEAL ALL PIPE SLEEVES WITH APPROPRIATE CAULKING. ALL PIPE PENETRATIONS THROUGH FIRE RATED WALLS AND/OR FLOORS SHALL BE INSTALLED IN ACCORDANCE WITH APPROPRIATE 3M FIRESTOP SYSTEM (OR APPROVED EQUAL). ALL PIPING SLEEVES SHALL BE SCHEDULE 40, CARBON STEEL, ASTM A53, GRADE B.
16. ANY CUTTING OR PATCHING OF NEW OR EXISTING SURFACES THAT IS REQUIRED SHALL BE BY THIS CONTRACTOR AND SHALL BE REPLACED WITH MATERIAL OF THE SAME QUALITY AND THICKNESS AS THE EXISTING SURFACE. ANY DAMAGES TO EXISTING MATERIALS SHALL BE REPAIRED OR REPLACED TO MATCH EXISTING.
17. ALL DUCTWORK SHALL BE IDENTIFIED AFTER INSULATION WITH PLASTIC DUCT SIGNAGE/MARKERS. THESE MARKERS SHALL BE THE MANUFACTURER'S STANDARD LAMINATED PLASTIC IN THE FOLLOWING COLOR CODES INDICATING BACKGROUND COLOR THEN LETTER COLOR: A. BLUE / WHITE: SUPPLY AIR B. RED / WHITE: RETURN AIR C. GREEN / WHITE: OUTSIDE AIR / INTAKE AIR D. YELLOW / BLACK: RELIEF AIR / EXHAUST AIR.
18. ENGAGE AN INDEPENDENT TESTING, ADJUSTING AND BALANCING (TAB) AGENT CERTIFIED BY EITHER AABC OR NEBB FOR ALL TESTING, ADJUSTING AND BALANCING. SEE THE TAB SPECIFICATION FOR MORE INFORMATION.
19. THERMOSTATS SHALL BE LOCATED AS PER PLANS 48 INCHES ABOVE FINISHED FLOOR.
20. MECHANICAL CONTRACTOR SHALL HAVE THE FINAL START-UP OR ALL HVAC EQUIPMENT SUPERVISED AND MONITORED BY A FACTORY AUTHORIZED TECHNICIAN. HVAC GENERAL NOTES

SCOPE OF FIRE SUPPRESSION

CONTRACTOR SHALL MODIFY EXISTING FIRE SUPPRESSION SYSTEM TO ACCOMMODATE THIS PROJECT SCOPE. REFER TO SPECIFICATIONS FOR REQUIREMENTS, PRODUCT SPECIFICS AND INSTALLATION PROCEDURES. SPRINKLER SYSTEM SHALL BE MONITORED BY THE FIRE ALARM SYSTEM. CONTRACTOR SHALL PROVIDE NECESSARY CONTROLS AS REQUIRED. SYSTEM SHALL BE QUICK RESPONSE TYPE FOR APPROPRIATE HAZARD CLASSIFICATION.

CONTRACTOR SHALL COORDINATE WITH OTHER TRADES AND ARCHITECTURAL PLANS FOR ROUTING OF PIPING AND PLACEMENT OF SPRINKLER HEADS. PROVIDE SHOP DRAWINGS FOR APPROVAL PRIOR TO INSTALLATION SHOWING COORDINATION OF SPRINKLER PIPING AND SPRINKLER HEADS WITH OTHER TRADES.

FIRE SPRINKLER DESIGN CRITERIA

ENGINEERING DOCUMENTS SHALL BE BASED UPON THE FOLLOWING CODES AND STANDARDS (AND LIST THEM ON THE LAYOUT DOCUMENTS):

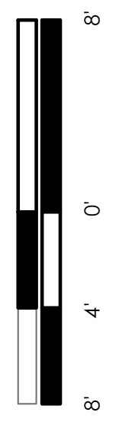
1. NFPA 13 - CURRENT EDITION

ENGINEERING DOCUMENTS SHALL ALSO LIST AND/OR SHOW THE FOLLOWING:

1. OCCUPANCY TYPE - AS LISTED ON ARCHITECTURAL CODE PLANS
2. CONSTRUCTION TYPE: AS LISTED ON ARCHITECTURAL CODE PLANS
3. DESIGN APPROACH (STATE THE FOLLOWING: RESPONSE TYPE, DENSITY, HEAD SPACING.)
4. INTERIOR OCCUPIED SPACES SYSTEM
   - 4.1. SYSTEM TYPE - WET
   - 4.2. HAZARD CLASSIFICATION - LIGHT
     - 4.2.1. SYSTEM RESPONSE TYPE - QUICK
     - 4.2.2. DENSITIES - 0.10 GPM/SF FOR 1,500 SF
     - 4.2.3. MAXIMUM HEAD SPACING - 225 SF
   - 4.3. HAZARD CLASSIFICATION - ORDINARY GROUP 1
     - 4.3.1. SYSTEM RESPONSE TYPE - QUICK
     - 4.3.2. DENSITIES - 0.15 GPM/SF FOR 1,500 SF
     - 4.3.3. MAXIMUM HEAD SPACING - 130 SF
5. CHARACTERISTICS OF WATER SUPPLY TO BE USED, INCLUDING MAIN SIZE AND LOCATION
6. THE POINT OF SERVICE FOR THE FIRE PROTECTION WATER SUPPLY
7. SYSTEM VALVING AND ALARM REQUIREMENTS:
   - 7.1. SYSTEM SHALL BE MONITORED BY THE FIRE ALARM SYSTEM OR A SEPARATE MONITORING SYSTEM PANEL, DIALER AND ANNUNCIATION ACCESSORIES AS REQUIRED BY LOCAL ADOPTED CODES.
   - 7.2. ALL CONTROL VALVES SHALL BE EQUIPPED WITH TAMPER AND FLOW SWITCHES WIRED TO THE MONITORING SOURCE PANEL.

ACCEPTANCE TESTING OF FIRE PROTECTION SYSTEM SHALL BE IN ACCORANCE WITH THE FOLLOWING CODES AND STANDARDS:

1. NFPA 25 - CURRENT EDITION



PLUMBING GENERAL NOTES:

1. THESE GENERAL NOTES APPLY TO ALL PLUMBING DRAWINGS. REFER TO DIVISION 22 SPECIFICATIONS FOR ADDITIONAL PLUMBING SYSTEMS SPECIFICATIONS AND REQUIREMENTS.
2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF ALL MATERIALS, PIPING AND EQUIPMENT. DO NOT SCALE DRAWINGS. THE EXACT LOCATION AND/OR ROUTING OF EQUIPMENT, PLUMBING, SANITARY PIPING, ETC., SHALL BE FOLLOWED AS CLOSELY AS BUILDING CONSTRUCTION AND ALL OTHER WORK WILL PERMIT.
3. MATERIALS AND EQUIPMENT SHALL BE NEW AND INSTALLED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS. THEY SHALL BE INSTALLED PLUMB, LEVEL AND TRUE-TO-LINE WITH ADJACENT WORK. WHERE INSTALLATION METHODS ARE NOT SPECIFICALLY COVERED BY THE DRAWINGS AND/OR SPECIFICATIONS, FIRST CLASS TRADE PRACTICES AND MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS SHALL GOVERN.
4. ALL WORK SHALL COMPLY WITH THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION, BUILDING DEPARTMENTS, APPLICABLE TO THE LATEST EDITION OF THE APPLICABLE BUILDING CODE, PROVINCIAL FIRE CODE, APPLICABLE OSHA AND NFPA STANDARDS, COUNTY AND CITY BUILDING REGULATIONS AND CODES.
5. CAREFULLY EXAMINE ALL ARCHITECTURAL, STRUCTURAL, PLUMBING, HVAC, FIRE PROTECTION, AND ELECTRICAL DRAWINGS PERTAINING TO CONSTRUCTION. COOPERATE WITH OTHER TRADES IN LOCATING DUCTWORK, PIPING, EQUIPMENT, ETC., IN ORDER TO AVOID CONFLICT WITH OTHER TRADE'S WORK. NO CLAIM FOR COSTS WILL BE ALLOWED FOR RELOCATING EQUIPMENT, PIPING, DUCTWORK, ETC., WHICH INTERFERES WITH OTHER TRADES WORK.
6. VERIFY ALL ROUGH-IN LOCATION AND COORDINATE PIPING AND EQUIPMENT LOCATIONS WITH WORK UNDER OTHER DIVISIONS OF THE SPECIFICATIONS TO AVOID CONFLICTS. CONTRACTOR MUST COORDINATE WITH OTHER TRADES FOR ALL STRUCTURES, PIPING, CONDUIT, DUCTWORK, LIGHTING, ETC. TO PROPERLY BE INSTALLED. ANY CONFLICTS SHALL BE RESOLVED AT NO EXPENSE TO THE OWNER.
7. LABEL ALL PLUMBING PIPING WITH ADHESIVE PIPE LABELS INDICATING SERVICE AND DIRECTION OF FLOW. PIPE LABELS SHALL BE LOCATED NEAR ALL BRANCH CONNECTIONS, NEAR ALL FLOOR AND WALL PENETRATIONS, AND AT MAXIMUM INTERVALS OF 10 FEET ALONG EACH RUN.
8. PLUMBING SYSTEMS INCLUDE, BUT ARE NOT LIMITED TO: a. PLUMBING FIXTURES AND EQUIPMENT b. FIRE STOPPING c. DOMESTIC WATER SYSTEM d. SANITARY WASTE AND VENT SYSTEM 8. PROVIDE COMPLETE FIXTURES AND INCLUDE SUPPLIES, STOPS, VALVES, FAUCETS, DRAINS, TRAPS, TAILPIECES, ESCUTCHEONS, ETC. EXPOSED COPPER OR BRASS MATERIALS SHALL BE CHROME PLATED.
9. SEAL ALL EDGES OF PLUMBING FIXTURES IN CONTACT WITH FLOORS, WALLS OR COUNTERTOPS USING SANITARY-TYPE, ONE-PART, MILDEW RESISTANT SILICONE SEALANT. MATCH SEALANT COLOR TO FIXTURE COLOR.
10. FIRE STOP ALL PENETRATIONS, BY PIPING OR CONDUITS, OF FIRE RATED WALLS, FLOORS, AND PARTITIONS. PROVIDE DEVICE(S) OR SYSTEM(S) WHICH HAS BEEN TESTED AND LISTED AS COMPLYING WITH ASTM E-814 AND INSTALL IN ACCORDANCE WITH THE CONDITIONS OF THEIR LISTING. PROVIDE DEVICE(S) OR SYSTEM(S) WITH AN 'F' RATING EQUAL TO THE RATING OF THE ASSEMBLY BEING PENETRATED.
11. FURNISH AND INSTALL A COMPLETE SYSTEM OF DOMESTIC HOT AND COLD WATER FROM EXISTING SUPPLIES TO ALL FIXTURES AND/OR EQUIPMENT REQUIRING DOMESTIC WATER SUPPLIES. VERIFY LOCATION OF BEGINNING POINTS.
12. ALL PIPE INSULATION SHALL RUN CONTINUOUSLY THROUGH WALLS AND PARTITIONS.
13. SHUT-OFF VALVES SHALL BE NIBCO TWO-PIECE, BRONZE, FULL PORT, BALL-TYPE. PROVIDE SHUT-OFF VALVES WHERE INDICATED ON THE SCHEDULES. INSTALL VALVES IN A LOCATION THAT PERMITS ACCESS FOR SERVICE AND OPERATION WITHOUT DAMAGE TO THE BUILDING OR FINISHED MATERIALS. PROVIDE ACCESS DOORS IF REQUIRED.
14. PROTECT COPPER PLATING AGAINST CONTACT WITH DISSIMILAR METALS. ALL HANGARS, ANCHORS, AND CLIPS SHALL BE COPPER OR COPPER-PLATED.
15. FURNISH AND INSTALL COMPLETE SYSTEMS OF SANITARY WASTE AND VENT PIPING FROM ALL PLUMBING FIXTURES AND/OR EQUIPMENT REQUIRING WASTE AND VENT CONNECTIONS. ALL WASTE AND VENT PIPING SHALL BE CONCEALED IN THE BUILDING CONSTRUCTION WHERE POSSIBLE.
16. INVERTS ELEVATIONS SHALL BE ESTABLISHED AND VERIFIED BEFORE SANITARY PIPING IS INSTALLED IN ORDER THAT PROPER SLOPES WILL BE MAINTAINED.
17. INSTALL CLEANOUTS IN A LOCATION THAT PERMITS ACCESS FOR SERVICE WITHOUT DAMAGE TO THE BUILDING OR FINISHED MATERIALS. CLEANOUT PLUGS SHALL BE IN ACCORDANCE WITH PLUMBING CODE REQUIREMENTS.
18. PROVIDE WATER HAMMER ARRESTORS CONFORMING TO PDI-WH201 OR ASSE 1010, INSTALLED PER MANUFACTURER'S SPECIFICATIONS, WHERE QUICK CLOSING VALVES ARE UTILIZED. A QUICK CLOSING VALVE IS A VALVE OR FAUCET THAT CLOSES AUTOMATICALLY WHEN RELEASED, OR THAT IS CONTROLLED BY MECHANICAL MEANS FOR FAST-ACTION CLOSING. REFER TO WATER HAMMER ARRESTOR SCHEDULE.

VOLTAGE DROP

ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR UPSIZING ALL BRANCH CIRCUIT AND FEEDER CONDUCTORS AS REQUIRED TO COMPLY WITH VOLTAGE DROP REQUIREMENTS AS OUTLINED IN THE NEC.

UPSIZE WIRE ON 120V CIRCUIT HOMERUNS AS LISTED BELOW UNLESS OTHERWISE SHOWN ON PLANS:

1. LESS THAN 100 FEET IN CONDUCTOR LENGTH:
   #12 PHASE/NEUTRAL CONDUCTORS & #12 GROUND
2. 100 TO 150 FEET IN CONDUCTOR LENGTH:
   #10 PHASE/NEUTRAL CONDUCTORS & #10 GROUND
3. GREATER THAN 150 FEET IN CONDUCTOR LENGTH:
   #8 PHASE/NEUTRAL CONDUCTORS & #8 GROUND

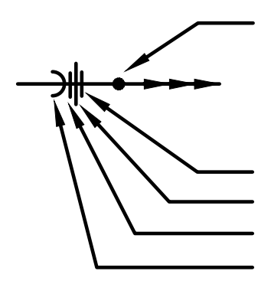
ELECTRICAL GENERAL NOTES:

1. THESE GENERAL NOTES APPLY TO ALL ELECTRICAL AND SPECIAL SYSTEMS DRAWINGS. REFER TO DIVISION 26 SPECIFICATIONS FOR ADDITIONAL ELECTRICAL AND SPECIAL SYSTEMS SPECIFICATIONS AND REQUIREMENTS.
2. PROVIDE PULL BOXES AS REQUIRED TO PROPERLY INSTALL THE RACEWAYS AND CIRCUITS INDICATED.
3. REFER TO ARCHITECTURAL DRAWINGS FOR TYPICAL ROOM INTERIOR ELEVATIONS. COORDINATE EXACT DIMENSIONED DEVICE LOCATIONS AND MOUNTING HEIGHTS OF ALL LIGHT FIXTURES, LIGHTING DEVICES, SWITCHES, RECEPTACLES, ETC. WITH ARCHITECT PRIOR TO ROUGH-IN.
4. COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH THE LASTEST ADOPTED VERSION OF THE NATIONAL ELECTRICAL CODE, STATE AND LOCAL CODES, AND REQUIREMENTS OF THE AHJ.
5. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH ROT-PROOF PULL-TAPE, LABELED AT EACH END. ALL CONDUITS SHALL BE PROVIDED WITH PLASTIC BUSHINGS WHERE TERMINATED OPEN-ENDED.
6. COORDINATE ALL WIRING DEVICE LOCATIONS SHOWN AT MILLWORK LOCATIONS WITH THE MILLWORK CONTRACTOR AND GENERAL CONTRACTOR PRIOR TO ANY ROUGH-IN OR INSTALLATION. ALL WIRING DEVICES SHALL BE INSTALLED IN ACCESSIBLE LOCATIONS AND SHALL NOT BE CONCEALED.
7. CONTRACTOR SHALL CONCEAL ALL CONDUIT, FITTINGS, AND DEVICES FROM VIEW WHERE POSSIBLE.
8. SEAL ALL PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES AS NECESSARY TO RESTORE FIRE-RESISTANCE RATING OF ASSEMBLY. REFERTO ARCHITECTURAL PLANS AN SPECIFICATIONS OR RATED ASSEMBLIES, FIRE STOPPING MATERIALS, AND REQUIREMENTS. WHERE ANY DEVICE JUNCTION BOXES ARE RECESSED WITHIN OPPOSITE SIDES OF A FIRE RATED WALL AND ARE WITHIN 24" OF EACH OTHER MEASURED HORIZONTALLY, PROVIDE AN INTUMESCENT MOLDABLE FIRE STOP PUTTY PAD AROUND EACH JUNCTION BOX.
9. EACH CONTRACTOR AND SUB-CONTRACTOR OR TRADE IS REQUIRED TO REVIEW THE CONSTRUCTION DOCUMENTS AS A WHOLE, INCLUDING ALL OTHER TRADES' DRAWINGS AND PROVIDE ANY MISC. MATERIALS, WORK, ETC. REQUIRED TO COMPLETE THE WORK AS SHOWN ON ALL DOCUMENTS. THIS REQUIREMENT APPLIES TO ALL TRADES. STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING, CIVIL, EQUIPMENT VENDORS, ETC. REQUIREMENTS AND RELATED WORK ARE INDICATED THROUGHOUT THE DOCUMENTS AND SHOULD B REVIEWED WITH THE SPECIFIC MEP, STRUCTURAL, ARCHITECTURAL, EQUIPMENT DRAWINGS FOR OVERALL SCOPE OF WORK.
10. REFER TO THE MECHANICAL DRAWINGS FOR EXACT LOCATIONS AND QUANTITY OF ALL MECHANICAL EQUIPMENT AND FIRE/SMOKE AND/OR SMOKE DAMPERS. LOCATIONS AND QUANTITY SHOWN ON THE ELECTRICAL DRAWINGS ARE APPROXIMATE AND MAY NOT REFLECT FINAL POSITION OR QUANTITY.
11. ELECTRICAL CONTRACTOR SHALL PROVIDE FINAL CONNECTION TO ALL MECHANICAL & PLUMBING EQUIPMENT. WHERE EQUIPMENT IS SHOWN ON THE MECHANICAL PLANS, BUT NOT SHOWN ON THE ELECTRICAL PLANS, ELECTRICAL CONTRACTOR SHALL PROVIDE POWER TO THE EQUIPMENT BASED ON EQUIPMENT REQUIREMENTS AND INCLUDE ALL COSTS IN THE BASE BID.
12. LOCATION SHOWN OF ELECTRICAL CONNECTION TO MECHANICAL & PLUMBING EQUIPMENT IS SCHEMATIC AND MAY NOT REFLECT ACTUAL CONNECTION POINTS. ROUGH-IN AND CONNECTION TO EQUIPMENT SHALL BE PER THE EQUIPMENT MANUFACTURER'S REQUIREMENTS AND THE NATIONAL ELECTRICAL CODE. PROVIDE STRUCTURAL SUPPORTS AS REQUIRED FOR MOUNTING OF DISCONNECTING MEANS. VERIFY ALL ROUGH-IN REQUIREMENTS WITH THE MECHANICAL CONTRACTOR AND EQUIPMENT MANUFACTURER PRIOR TO ANY ROUGH-IN.
13. PROVIDE FINAL CONNECTION TO ALL EQUIPMENT, INCLUDING ANY CORD AND PLUG SETS FOR EQUIPMENT NOT PROVIDED WITH IT (WHETHER SPECIFICALLY NOTED OR NOT). COORDINATE ALL WORK WITH THE EQUIPMENT SUPPLIER AND OWNER; AND VERIFY ALL ROUGH-IN LOCATIONS AND REQUIREMENTS PRIOR TO ANY ROUGH-IN.
14. ALL THERMOSTAT WIRING IS PROVIDED BY MECHANICAL CONTRACTOR, INSTALLED BY ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED.
15. WHERE DEVICES ARE LOCATED ADJACENT TO EACH OTHER ON PLANS, DEVICES SHALL BE INSTALLED AS CLOSE TOGETHER AS POSSIBLE
16. REFER TO MOUNTING HEIGHTS DETAIL FOR MOUNTING HEIGHTS OF ALL DEVICES NOT INDICATED OTHERWISE.
17. COORDINATE THE MOUNTING OF SUSPENDED LIGHT FIXTURES UTILIZING INDIRECT LIGHT SO THAT CONDUIT, DUCTWORK, STRUCTURAL MEMBERS, ETC. ARE NOT LOCATED DIRECTLY ABOVE THE LIGHT FIXTURE. MAINTAIN A MINIMUM OF 24" CLEARANCE FROM THESE ITEMS WHENEVER POSSIBLE.
18. ANY ELECTRICAL AND LOW VOLTAGE DEVICES THAT ARE SHOWN AS EXISTING TO REMAIN SHALL BE REPLACED WITH NEW DEVICES AND NEW FACEPLATES OF THE SAME TYPE AND COLOR AS THE NEW DEVICES TO BE INSTALLED AND RECONNECTED TO THE SAME CIRCUIT UNLESS OTHERWISE NOTED. DEVICE AND FACEPLATE TYPE AND COLOR SHALL BE COORDINATED WITH THE ARCHITECT PRIOR TO FURNISHING.
19. DEVICES SHOWN TO BE DEMOLISHED SHALL HAVE THE WALL PATCHED AND REPAIRED. BLANK FACEPLATES ARE NOT ALLOWED FOR DEVICES TO BE REMOVED.

COORDINATION NOTES:

1. COORDINATE WITH LOCAL UTILITY PROVIDERS FOR THEIR REQUIREMENTS FOR SERVICE CONNECTIONS AND PROVIDE ALL NECESSARY PAYMENTS, MATERIALS, LABOR AND TESTING TO ACCOMPLISH THE WORK.
2. COORDINATE REQUIREMENTS FOR INSTALLATION OF SYSTEMS AND EQUIPMENT WITH ALL OTHER TRADES.
3. THE CONTRACTOR SHALL COORDINATE THE ROUTING AND PATH OF ALL SYSTEMS, CONDUITS, PIPES, DUCTS, ETC WITH THE POSITION AND LAYOUT OF THE STRUCTURE. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING NECESSARY OFFSETS, TURNS, RISES AND DROPS FOR SYSTEMS AND COMPONENTS AS NEEDED TO INSTALL THE MEP SYSTEMS TO CLEAR STRUCTURE, CEILINGS, ETC AND OTHER SYSTEMS IN POTENTIAL CONFLICT WITH ROUTING.
4. WHEREVER THE WORK IS OF SUFFICIENT COMPLEXITY, PREPARE ADDITIONAL COORDINATION DRAWINGS AND ORGANIZE ON-SITE MEETINGS WITH ALL RELATED SUBCONTRACTORS TO COORDINATE THE WORK BETWEEN TRADES . DRAWINGS SHALL CLEARLY SHOW THE WORK AND ITS RELATION TO THE WORK OF OTHER TRADES, AND BE SUBMITTED FOR REVIEW PRIOR TO COMMENCING SHOP FABRICATION OR ERECTION IN THE FIELD.
5. COORDINATE WORK WITH OTHER TRADES TO INSTALL SYSTEMS ABOVE CEILING HEIGHTS INDICATED ON ARCHITECTURAL PLANS.
6. CHECK SPACE REQUIREMENTS WITH OTHER TRADES AND STRUCTURE/CONSTRUCTION TO ENSURE THAT ALL MATERIALS AND EQUIPMENT CAN BE INSTALLED IN THE SPACE ALLOTTED INCLUDING FINISHED SUSPENDED CEILINGS AND OTHER SPACES, CHASES, ETC WITHIN THE BUILDING. MAKE MODIFICATIONS THERETO AS REQUIRED AND APPROVED.
7. ADJUST LOCATION OF PIPING, DUCTWORK, ETC. TO PREVENT INTERFERENCES, BOTH ANTICIPATED AND ENCOUNTERED. DETERMINE THE EXACT ROUTE AND LOCATION OF EACH ITEM PRIOR TO FABRICATION. MAKE OFFSETS, TRANSITIONS AND CHANGES IN DIRECTION IN SYSTEMS AS REQUIRED TO MAINTAIN ADEQUATE CLEARANCES AND HEADROOM.
8. DRAWINGS SHOW THE GENERAL RUNS OF CONDUITS, PIPING AND DUCTWORK AND APPROXIMATE LOCATION OF OUTLETS. ANY SIGNIFICANT CHANGES IN LOCATION OF ITEMS NECESSARY IN ORDER TO MEET FIELD CONDITIONS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT/ENGINEER AND RECEIVE HIS APPROVAL BEFORE SUCH ALTERATIONS ARE MADE. ALL SUCH MODIFICATIONS SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER.
9. COORDINATE, PROJECT AND SCHEDULE WORK WITH OTHER TRADES IN ACCORDANCE WITH THE CONSTRUCTION SEQUENCE.
10. WHEREVER WORK INTERCONNECTS WITH WORK OF OTHER TRADES, COORDINATE WITH THOSE TRADES TO ENSURE THAT ALL SUBCONTRACTORS HAVE THE INFORMATION NECESSARY SO THAT THEY MAY PROPERLY INSTALL ALL CONNECTIONS AND EQUIPMENT. IDENTIFY ALL ITEMS OF WORK THAT REQUIRE ACCESS SO THAT THE CEILING TRADE WILL KNOW WHERE TO INSTALL ACCESS DOORS AND PANELS.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION AND REPAIR OF SURFACES, AREAS AND PROPERTY THAT MAY BE DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES.
12. TRANSMIT TO OTHER TRADES ALL INFORMATION REQUIRED FOR WORK TO BE PROVIDED UNDER THEIR RESPECTIVE SECTIONS IN AMPLE TIME FOR INSTALLATION.

ELECTRICAL SYMBOLS



DENOTES SHARED (PARTIAL) CIRCUIT
BRANCH CIRCUIT CONCEALED IN CEILING OR WALL. ARROWS INDICATE HOMERUNS TO PANEL. ALL CONDUCTORS ARE MINIMUM NO.12 UNLESS NOTED OTHERWISE.
PHASE CONDUCTORS
NEUTRAL CONDUCTOR
SWITCH-LEG AND OR TRAVELER
GROUND CONDUCTOR

- 120/240V, 1-phase: black, red, Neutral white.
- 120/240V, 3-phase: black, orange, blue, Neutral white.
- 208Y/120V, 1-phase: black, red, Neutral white.
- 208Y/120V, 3-phase: black, red, blue, Neutral white.
- 480Y/277V, 3-phase: brown, orange, yellow, Neutral gray.
- Green shall be used for ground wire conductor.
- Unless local AHJ dictates otherwise. Contractor shall use the following color designations and be consistent throughout the project. Color designation for switch legs and or travelers: Violet, Pink or Purple may be used. (The only exception, when NM or MC cable used, and wires must be re-identified, reference specifications)

LP1-10	PANEL - BREAKER NUMBER (IDENTIFICATION)
1,3 / 1,3,5	INDICATES X/X= 2-POLE C.B., X/X/X = 3-POLE C.B.
⟩╫ ➤➤➤	INDICATES THREE SEPARATE CIRCUITS
⟝———⟞	CONDUIT CONCEALED IN CEILING OR WALL WITH THREE CONDUCTORS: 1-PHASE; 1-NEUTRAL; 1-GROUND WIRE, MINIMUM NO.12 WIRE UNLESS OTHERWISE SPECIFIED ON DRAWINGS.
– – – – – – –	CONDUIT RUN UNDERGROUND OR CONCEALED IN FLOOR SLAB.
——)——	GROUNDING CONDUCTOR NO.12 WIRE EXCEPT AS NOTED
⊗	EXIT LIGHT, WALL OR CEILING AS INDICATED.
	BATTERY-OPERATED EMERGENCY LIGHT (WALL / CEILING)
	COMBINATION EXIT / EMERGENCY LIGHT (WALL / CEILING)
▭ ◩	GRID-MOUNTED TROFFER LIGHT FIXTURE (DIAGONAL SHADING DENOTES EMERGENCY BATTERY)
▬	STRIP LIGHT FIXTURE (DIAGONAL SHADING DENOTES EMERGENCY BATTERY)
◉ ◑ ▣ ◪	SQUARE / ROUND DOWNLIGHT (DIAGONAL SHADING DENOTES EMERGENCY BATTERY)
	WALL-MOUNTED LIGHT FIXTURE (DIAGONAL SHADING DENOTES EMERGENCY BATTERY)
	PANELBOARD (SURFACE OR FLUSH) TOP MOUNTED 6'-0" AFF
▨▨	SWITCHBOARD, NUMBER OF SECTIONS AS INDICATED.
▨	DISTRIBUTION PANEL (SURFACE OR FLOOR MOUNTED).
○—	CONDUIT UP / CONDUIT DOWN
├─┤	CONDUIT STUBBED THRU WALL WITH BUSHINGS ON BOTH ENDS
	GROUND
●	POWER CONNECTION POINT
	DISCONNECT SWITCH, SIZE AND TYPE AS NOTED TOP MOUNTED 5'-0" AFF
Ⓙ	WALL MOUNTED OR CEILING MOUNTED JUNCTION BOX
$	SINGLE POLE SWITCH
$3	THREE-WAY SWITCH
$T	DIGITAL TIME SWITCH, TYPE AS INDICATED
$M	MOTION SENSOR SWITCH, TYPE AS INDICATED
a,b,c,d	SWITCH DESIGNATION
Ⓜ	WALL / CEILING MOUNTED MOTION DETECTOR, TYPE AS INDICATED
PC	WALL / CEILING MOUNTED DAYLIGHT SENSOR, TYPE AS INDICATED
⏀	SIMPLEX RECEPTACLE
	DUPLEX RECEPTACLE (STRIKETHROUGH DENOTES ABOVE COUNTER)
(WP, GFI, IG, ETC.)	SPECIAL DUPLEX RECEPTACLE, TYPE AS INDICATED
	DOUBLE DUPLEX RECEPTACLE (STRIKETHROUGH DENOTES ABOVE COUNTER)
20	SPECIAL NEMA RECEPTACLE, TYPE AS INDICATED ON PLANS.
	INDICATES WIRING DEVICE ABOVE RE: DRAWING
PT	RECESSED STYLE POKE THRU DEVICE, POWER AND DATA OR AS SPECIFIED
FB	RECESSED STYLE ON-GRADE FLOOR BOX, POWER AND DATA OR AS SPECIFIED
◀	LOW VOLTAGE OUTLET, DOUBLE GANG BOX WITH SINGLE GANG PLASTER RING. INSTALL 1" CONDUIT STUBBED UP OUT OF TOP OF BOX TO ABOVE AN ACCESSIBLE CEILING.
TV	TV OUTLET (SAME ROUGH-IN AS LOW VOLTAGE OUTLET) WITH COAX AND RJ-6 JACK AND FACEPLATE
	CEILING MOUNTED PHOTO-ELECTRIC SMOKE DETECTOR
	DUCT MOUNTED PHOTO-ELECTRIC SMOKE DETECTOR
	CEILING MOUNTED HEAT DETECTOR
⊠	FA VISUAL FIRE ALARM STROBE LIGHT (WALL / CEILING)
⊠◁	FA COMBINATION HORN/STROBE (WALL / CEILING)
F	FIRE ALARM MANUAL PULL STATION.
FS	SPRINKLER ALARM SYSTEM FLOW SWITCH
TS	SPRINKLER ALARM SYSTEM TAMPER SWITCH
FSD	FIRE AND SMOKE DAMPER 120V, 1Ø
FACP	FIRE ALARM CONTROL PANEL
FAAP	FIRE ALARM ANNUNCIATOR PANEL (FLUSH)

MARK NO. SUPPLY (S_), RETURN (R_), EXHAUST (E_)

ELECTRICAL NOTATIONS

E##	ELECTRICAL PLAN NOTE
XX-X	MECHANICAL/PLUMBING EQUIPMENT TAG
+4'-0"	HEIGHT TO CENTERLINE OF OUTLET BOX ABOVE FINISHED FLOOR
AFF	ABOVE FINISH FLOOR
FA	FIRE ALARM
GFI	GROUND FAULT INTERRUPTER
AFF	ABOVE FINISHED FLOOR
UGE	UNDERGROUND ELECTRICAL
OHE	OVERHEAD ELECTRICAL
(R)	RELOCATED FIXTURE / DEVICE

SHEET INDEX

MEP100	MEP COVER SHEET
MEP101	MEP SPECIFICATIONS
MEP200	MEP FLOOR PLAN

MECHANICAL SYMBOLS

OR – –	EXISTING DUCTWORK TO BE REMOVED
OR ——	EXISTING DUCTWORK TO REMAIN
OR ——	NEW DUCTWORK
⊠	SUPPLY DUCT
▱	RETURN DUCT
⊳	EXHAUST DUCT
⊠	SUPPLY DIFFUSER
◸	RETURN GRILLE
⊠	EXHAUST GRILLE
R R/D	RISE OR DROP IN DUCT
Ⓣ	THERMOSTAT
– –	MANUAL VOLUME DAMPER
⊠	SUPPLY DUCT DOWN
⊠	SUPPLY DUCT UP
◸	RETURN DUCT DOWN
◸	RETURN DUCT UP
⊠	EXHAUST DUCT DOWN
⊠	EXHAUST DUCT UP
▭	WALL MOUNTED DIFFUSER/GRILLE
]—[	FLEXIBLE DUCT CONNECTION
AHU-1	EQUIPMENT TYPE AND DESIGNATION
SA 200	CFM
◕	CONNECT TO EXISTING
M##	MECHANICAL PLAN NOTE

PLUMBING SYMBOLS

——	EXISTING TO REMAIN
—✕——✕—	EXISTING TO BE REMOVED
——	NEW PIPING
——➤——	FLOW ARROW
—— CW ——	COLD WATER
—— HW ——	HOT WATER
—— V ——	SANITARY VENT ABOVE GROUND/FLOOR
– – V – –	SANITARY VENT BELOW GROUND/FLOOR
—— W ——	SANITARY WASTE BELOW GROUND/FLOOR
—⋈—	SHUT OFF VALVE
—‖—	UNION
—‖—	FLANGE CONNECTION
▨ OR ●	FLOOR DRAIN OR EQMT FLOOR DRAIN
—○	PIPE DROP/PIPE RISE
—○—	BOTTOM OUTLET TEE
—○—	TOP OUTLET TEE
WCO ├—	WALL CLEAN OUT
▣ FFCO	FINISHED FLOOR CLEANOUT
DWH-1	EQUIPMENT TYPE AND DESIGNATION
⬭	PLUMBING FIXTURE DESIGNATION
◕	CONNECT TO EXISTING
P##	PLUMBING PLAN NOTE

bc DESIGN GROUP

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MO Certificate of Authority Number
A-2011037290

Project Team:

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Elliot's Electric Lee's Summit
2818 NE INDEPENDENCE AVE | LEE'S SUMMIT, MO 64064

BEN HOLLON
NUMBER PE-2022000238
06/05/2023

Issue Date: 06.05.2023

#	Issue:	Date:

Drawn by: BLH

Project Number: 2309.2

MEP100

MEP Coversheet

PERMIT SET

GENERAL REQUIREMENTS AND MECHANICAL SPECIFICATIONS

GENERAL MEP REQUIREMENTS

1. SUMMARY OF WORK

A. The contract documents require the furnishing and installing of complete functioning mechanical systems, and each element thereof, as specified or indicated in the contract documents or reasonably inferred, to completely construct and leave ready for operation the systems as shown on the drawings and herein described, including every article, device or accessory, whether or not specifically called for by item. Elements of the work include materials, labor, supervision, supplies, equipment, transportation, and utilities.

B. Specifications and drawings are complementary and what is called for in one shall be as binding as is called for by both.

C. All work performed under this section shall be done in a neat and workmanlike manner by experienced mechanics of the proper trade.

2. COORDINATION, MEASUREMENTS AND LAYOUTS

A. The contractor shall inspect the site where this work is to be performed and fully familiarize himself with all conditions related to this project.

B. The contractor shall employ a competent foreman on the job to see that work is done in accordance with the best practices and in a satisfactory and workmanlike manner. The foreman shall keep informed as to the work of other trades engaged in the construction of the project, and shall execute their work in such a manner as not to interfere with or delay the work of other trades.

C. Drawings show the general arrangement of all systems and components covered under this section. Where local conditions necessitate a rearrangement, the contractor shall prepare, and submit for approval, drawings of the proposed rearrangement. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. The contractor shall carefully investigate the structural and finish conditions affecting all of their work and shall arrange such work accordingly, furnishing such offsets, fittings and accessories as may be required to meet such conditions at no additional cost to the owner. The contractor shall verify all dimensions. Drawings shall not be scaled to determine dimension.

3. PERMITS AND FEES

A. The contractor shall obtain and pay for all required permits and licenses and shall make all deposits and pay all fees required for the performance of work under this section, other than those deposits or fees which are fully refundable to the owner.

4. SUBMITTALS, MATERIALS AND EQUIPMENT

A. All items of materials and equipment shall be new unless otherwise specified herein, free from defects and of the best quality normally used for the purpose in good commercial practice.

B. As soon as possible after the award of the contract, the contractor shall submit for review six copies of shop drawings for all equipment to be furnished for this project. Submittals shall include manufacturer's name, model number, descriptive engineering data and all necessary information as to finish, material gauges and accessories. After such shop drawings are processed, three copies will be returned to the contractor. The contractor shall, upon receipt of reviewed shop drawings proceed with the procurement and installation of such equipment.

5. CODES, LAWS, AND STANDARDS

A. All work shall be installed in compliance with all governing codes, applicable local laws, regulations, ordinances or statutes of regulatory bodies having jurisdiction. The work shall be executed in accordance with said laws, regulations, ordinances, statues or codes, without increased cost to the owner. Any point in question shall be referred to the engineer for approval. Work indicated on the documents that is in excess of code requirements shall not be reduced in quality and/or quantity.

B. Comply with rules and regulations of public utilities and municipal departments affected by connections of services.

6. RECORD DOCUMENTS

A. Operating and Maintenance Brochure:

1) On completion of the project, the Contractor shall provide project manuals electronically (PDF format unless otherwise instructed) containing complete product information for all installed or provided equipment and components including cut sheets, parts lists, wiring and installation diagrams, operating, service and lubrication instructions. Provide manufacturer guarantee and warranty certificates.

B. Record Drawings:

1) On completion of the project, the Contractor shall provide record drawings with all field changes clearly and neatly noted. The original routing and layout shall be clearly marked out. References to other documents, drawings, addenda, RFI's or otherwise for additional information shall not be accepted.

2) The Contractor shall submit record drawings electronically in PDF format (unless otherwise instructed).

7. GUARANTEES AND WARRANTIES

A. The contractor shall guarantee complete system operation and that the material and equipment furnished and installed will be free from defects in workmanship and materials and will give satisfactory service under the specified operating conditions. The contractor agrees to replace, without expense to the owner, any part of the apparatus which proves or becomes defective within one year after the system is accepted. No equipment warranty or guarantee shall start until the time of building acceptance.

B. All warranties issued by equipment manufacturers shall be filled out in the owner's name and given to the owner prior to final acceptance of work performed under this section.

8. FINAL INSPECTION

A. After completion of the entire project the contractor shall request final inspection of this project in written form addressed to the architect along with a statement to the effect that all installations have been completed, checked, adjusted and balanced in accordance with requirements of this project. Upon receipt of written notification of completion and request for final inspection the engineer will perform a final inspection of this work and, if all installations are as represented by the contractor, the engineer will submit written recommendation of acceptance.

9. CLEANING

A. Dirt and refuse resulting from the performance of the work shall be removed to keep the premises reasonable clean at all times.

B. After completion of the work described in this specification and shown on the drawings, the contractor shall thoroughly clean all exposed surfaces and equipment, remove all dirt, debris, crating, cartons, etc., and leave all installations finished and ready for operation.

10. OPENINGS AND SLEEVES

A. In fire-rated walls: caulking shall be a pure ceramic fiber made of alumina-silica, "Cerafiber-fs" by johns-Manville. Sealant shall be gun grade. An acrylic 2-part gun applied, fire retardant elastic sealant, "Dymeric" by Tremco or equal by Permatite no. 1113fr.

1) Limit the size of the space between the wall or floor and the outside of the pipe or duct to 1 inch maximum. This space is sufficient to allow some movement of the pipes or duct without cracking the caulking or sealant.

2) For openings in walls, the caulking shall be applied to a minimum of 3 inch total depth. Sealant shall then be applied on both sides of the wall opening a minimum of 1/2 inch in depth, finished flush with the wall. D.

B. For openings in floors, the caulking shall be applied from the upper side to a minimum of 3 inch total depth recessed 1/2 inch below the finished floor. This 1/2 inch recess shall then be filled with sealant to flush with finished floor.

11. CUTTING AND PATCHING

A. The contractor shall be responsible for any cutting of walls, floors, ceilings and roofs required for performance of their work.

B. No structural member shall be cut without permission from the architect.

C. Patch all openings to match adjacent construction in both material and finish.

D. All cutting of existing concrete floors/slabs on grade in the interior of the building shall be performed by "saw cutting" and shall be performed by this contractor.

12. EXCAVATION AND BACKFILL

A. All excavation and backfill required for the installation of the work shall be the complete responsibility of the contractor.

B. No excavation and backfill shall be done within drip line of trees to remain. No tree shall be removed without prior approval of the owner's representative.

C. Contractor shall provide protection for trees within 15 feet of utility excavation.

D. Contractor shall be responsible for protecting all trench areas and maintaining a dry excavation. Any dewatering of trenches/excavation shall be provided prior to installing any material.

E. The contractor shall be required to provide all necessary barricades, fencing, bracing, sheet piling, shoring, warning signs, pumps, etc., for the protection of workers, general public, and properties. Excavation work shall comply with ASA standard a10.2 "safety code for building construction" and AGC standard "manual of accident prevention in construction" and the department of labor occupational safety and health (OSHA) standards.

F. Locate existing underground utilities in areas of excavation work. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions.

G. All trenches shall be uniformly graded and be free of soft spots and stone. Provide a 4 inch sand bed.

H. Backfill shall not begin until installation has been tested and inspected. Contractor shall consult with the authority having jurisdiction and the architect/engineer prior to backfilling.

1) Initial backfill shall be sand to a point 6 inches above top of installed work.

2) Final backfill shall be installed in layers not exceeding 12 inches. Fill shall be well tamped before additional backfill material is placed. Backfill shall consist of earth or sand free of stone, bricks, or foreign matter.

I. All excess earth and other material resulting from the excavation shall be removed from site by the contractor or may be piled at a location designated and approved by the owner. All debris, rock and trash shall not be allowed to accumulate and shall be removed from the site. Streets, roadways and private property shall be kept in a clean condition.

J. When the excavation is within the area where finished site work is to be done under the general contract work, backfill to the height of rough grade. Final surfacing will be under general contract work.

K. When the excavation is beyond the area of general construction work, final surface and adjacent disturbed areas shall be restored to match the original condition by sodding, seeding, asphalt paving, concrete, etc., as required. Work shall conform to applicable sections of these specifications.

L. When the excavation is on public property, restoration of surface conditions shall meet the requirements of authorities having jurisdiction.

M. When services are to be run side-by-side, a common trench may be used providing the required vertical and horizontal separation between the various services are maintained and providing the methods of bedding and backfill meet the approval of the engineer. Contractors involved shall make their own agreement as to the sharing of the cost of the common trenching and backfill work.

13. DEMOLITION AND NEW WORK

A. The contractor shall do all demolition, alterations and rework indicated and/or required to maintain the operation of all existing systems and to integrate the new systems in the renovated building as required. The contractor shall include all work which may be required to alterations and demolition work. This shall include all removal, relocation and reworking of piping, items of equipment, etc. Existing systems and new systems shall be completely integrated as intended and as indicated on the plans and in the specifications.

B. The contractor shall remove from the premises and dispose of properly all existing material and equipment which no longer serves a purpose in altered areas. The contractor shall remove unused ductwork and piping. Remove piping connected to equipment back to main and cap. Unless otherwise noted, the contractor shall maintain services to all existing areas requiring such services. The contractor shall reroute as required such services where are disrupted due to architectural changes in the existing structure. Any equipment which is designated to be reused and which is damaged in the process shall be replaced by the contractor with new equipment of like kind at no cost to the owner.

C. The contractor shall replace any existing devices including air devices, thermostats and electrical devices to match new devices unless instructed otherwise.

14. INTERRUPTION OF SERVICES

A. The contractor shall schedule any service interruptions to the existing building with the owner's representative. Such interruptions shall be planned so as to be at times to cause the least inconvenience and interruption to the facility's schedule.

15. EXISTING CONDITIONS

A. All existing conditions shown on the drawings and described in the specifications for this project have been determined from available drawings and field investigations. Contractors making proposals for this work shall investigate all existing conditions and base their proposals on their observations to provide complete and functioning installations in accordance with the intent of the drawing and specifications for this project and all applicable governing codes, rules, regulations and ordinances. Failure to determine existing conditions which cause additional work will not constitute grounds for additional compensation.

END OF GENERAL MEP REQUIREMENTS

DIVISION 23000 - HEATING, VENTILATING AND AIR CONDITIONING

1. general:

A. The work included under this contract consists of providing all labor, materials, tools, transportation, services, etc., necessary to complete the installation of the heating, ventilating and air conditioning systems and other items herein listed and as described in these specifications, as illustrated in the accompanying drawings or as directed by the Architect/Engineer.

B. Existing equipment including, but not limited to, rooftop units, heating only units and electric heating units shall be inspected for functionality. Any deficiencies or operational issues with the existing equipment shall be presented to the tenant, Architect, and Engineer in writing prior to project closeout

2. sheet metal ductwork:

A. Sheet metal ducts and connections shall be constructed of G-90 galvanized sheets of mild steel. The ducts shall be constructed to the sheet metal and air conditioning contractors national association (SMACNA) pressure class standards. No duct shall be constructed with less than 24 guage metal. Local codes requiring heavier gauges shall govern.

Leakage class minimum requirements are:

1) Up thru 2" WG pressure - rectangular - Class 24, round - Class 12.

Seal class minimum requirements are:

1) Up thru 2" WG pressure - class A for all duct joints.

B. Duct sections shall be joined in accordance with the recommendations of the sheet metal and air conditioning contractors national association and requirements of the building code having jurisdiction.

C. Curved elbows shall be constructed with inside radius not less than the duct width in the same plane. Square elbows shall have turning vanes. Turning vanes shall be designed in accordance with ASHRAE recommendations. Manufactured vanes shall be by Greenheck or approved equal.

D. Crossbreak all ductwork surfaces over 18 inches in width.

E. Full areas shall be maintained in transitions where a change in the configuration of the duct occurs. All tapering joints shall be reduced gradually.

F. Joints in ducts shall be made practically airtight and any open corner shall be neatly patched and soldered tight. Duct tape will not be accepted as a joint patch. Low pressure system duct leakage shall not exceed 2%.

G. Concealed round ducts shall be constructed to SMACNA 2" w.g. Standards with grooved longitudinal seams and sleeved type transverse joints.

2. duct liner:

A. All rectangular outside air intake, supply, return and transfer air ductwork shall be lined with 1/2" thick 2 lb. Density Certainteed Tough Gard duct liner or equal from Manville, Knauf insulation, or Owens Corning unless noted otherwise on the drawings. All duct liner is to comply and be installed in accordance to NAIMA fibrous glass duct liner standard and SMACNA.

3. FLEXIBLE DUCT:

A. Flexible ducts shall be UL-181 class Thermaflex M-KE, or approved equal, shall not be longer than 5 feet and shall not have any air flow obstruction.

4. DUCTWORK SUPPORTS:

A. All horizontal ducts shall be supported with hangers spaced not more than 8'-0" apart. Hangers for ducts smaller than 31 inches shall consist of 22 guage galvanized steel straps securely fastened to the duct and the building construction. Ducts over 31 inches in width shall be hung with 1/4 inch steel angle on the bottom of the duct supported with steel rods of appropriate size securely fastened to the building structure. All supports to meet SMACNA standards.

5. DUCTWORK INSULATION:

A. All concealed round ducts shall be insulated with 1-1/2 inch thick, 1 pound per cubic foot density, certain-teed duct wrap insulation faced on one side with .002 inch aluminum foil with a 2 inch tab, or equal products by Manville, Knauf insulation, or Owens Corning unless noted otherwise on the drawings. Insulation shall be applied in strict compliance with the manufacturer's recommendations.

B. All insulation shall be UL listed; flame spread/fuel contributed/smoke developed rating of 25/50/50 or less in accordance with ASTM E84, NFPA 255 and UL 723.

6. GRILLES, REGISTERS, DIFFUSERS AND LOUVERS:

A. Furnish and install all grilles, registers, diffusers and louvers as shown and described on the drawings or comparable products of Titus or Price.

B. The contractor shall inform the general contractor of the requirements for opening sizes and framing for all equipment and shall coordinate the installation of all such equipment with the structural requirements of this project.

7. HVAC EQUIPMENT

A. Air conditioning units shall be as scheduled or by acceptable equal. Units shall be standard catalogued products with the appropriate approval or certification by AGA, ARI and UL. Efficiencies shall conform to ASHRAE 90 standards.

B. Should an alternate manufacturer's equipment be provided that differs in size, weight or configuration from the manufacturer listed as the basis of design, the contractor shall reimburse the architect and engineer for all costs associated with modifying the construction documents to accommodate the alternate manufacturer's equipment. The contractor also shall be responsible for all costs associated with modification to electrical, plumbing, mechanical and structural systems from the original construction documents to accommodate alternate equipment.

C. Commercial quality fans shall be AMCA rated by Greenheck or acceptable equal by Cook, Acme, Carnes, Penn Barry.

8. OPERATING AND MAINTENANCE MANUALS:

A. The equipment manufacturer shall furnish the owner two bound sets of operating and maintenance instructions for all systems.

9. START-UP/TESTING, ADJUSTING, BALANCING:

A. The contractor shall complete all equipment installations, check all control wiring, start up and adjust all equipment and place all systems in operation.

B. After completion and start-up of all systems the contractor shall arrange for testing, adjusting and balancing of all air systems.

C. Testing, adjusting and balancing of all air systems shall be performed in complete accordance with NEBB or SMACNA standards.

D. Upon completion of testing, adjusting and balancing, a complete report of all findings shall be submitted to the engineer prior to final acceptance of this project. Three copies of the report shall be provided.

10. ACCESSORIES:

A. Provide single thickness turning vanes in all supply duct turns.

B. Provide duct access doors for all internal mounted equipment. Access doors shall be insulated double wall, constructed airtight in accordance with SMACNA standards for the appropriate pressure class where they are installed. They shall have butt or piano hinged with cam latches. Minimum size shall be 12"x12" or 12"x duct depth unless noted otherwise.

C. Branch take-offs to air terminal units shall be high efficiency type.

D. All take-offs to diffusers and grilles shall be made with high efficiency take-offs, 45º take-offs or conical fittings unless specifically indicated otherwise on drawings. Provide locking quadrant volume damper at take-offs in accessible ceilings, unless shown otherwise. Extractors and scoops are not permitted

E. Duct splits, elbows and reducing fittings shall be fabricated per SMACNA standards. "Ductmate" or acceptable equal flanged and gasketed joint systems are approved.

F. Provide dampers where shown and required. Dampers shall be by Greenheck or acceptable equal by Ruskin, American Warming & Ventilating, Air Balance, Inc., Carnes, Krueger, Nailor, United Enertech.

G. Volume balancing dampers shall be Ruskin CD-35/CDR-25 or approved equal. The dampers shall be constructed of 16 gauge galvanized steel, 6-inch wide opposed blades and the linkage concealed in frame.

H. Backdraft dampers shall be tested and rated in accordance with AMCA 500D. They shall have extruded aluminum frames and blades with adjustable counter balance weights. Provide with vinyl blade seals.

11. CONTROLS:

A. All temperature controls unless otherwise noted shall be the responsibility of the Mechanical Contractor.

B. Controls system shall be electric/electronic with stand-alone programmable digital thermostats. Controls shall be interfaced and compatible with the existing building energy management control system.

C. Provide control installation to accomplish the indicated or required sequence of operation including thermostats/ sensors, controllers, actuators, wiring, piping and tubing, software, graphics and other components as required for a complete operating system. Where no sequence is indicated, contractor shall submit a proposed sequence for approval.

12. PAINTING:

A. Painting, except as specified herein, shall be done by others.

B. Equipment which has damaged finish shall be repainted to match the original factory finish.

C. All exposed ferrous metal furnished under this contract, such as hangers, struts, structural steel, etc., shall be given one coat of Tnemec gray primer.

END OF DIVISION 23000

DIVISION 22000 - PLUMBING

1. GENERAL

A. The work included under this contract consists of providing all labor, materials, tools, transportation, services, etc., necessary to complete the installation and to provide complete working systems of the Plumbing Systems, including hot and cold water, waste and vent, storm drainage, fixtures, equipment and other items described in these specifications, as illustrated in the accompanying drawings or as directed by the Architect/Engineer.

2. TRAPS

A. All floor drains and fixtures with waste connections shall be separately trapped with a water sealed trap placed as close to the fixture or drain as possible. The contractor shall furnish and install all traps required including traps not furnished in combination with fixtures and equipment. All exposed traps in finished spaces shall be chromium plated brass. Provide deep seal traps and running traps where required.

B. In lieu of deep seat traps, floor drains can be provided with Proset systems trap guard or equal.

3. PIPING INSTALLATION

A. Ends of pipe shall be reamed and all burrs removed before installation. Piping shall be cut accurately to measurements taken on the job and shall be installed with ample clearance for installation of coverings.

B. Piping passing through walls or floor shall be run free, using pipe sleeves and shall not be grouted in place. Sleeves for piping to be insulated shall be sized to allow for insulation thickness. Piping shall be installed concealed in finished rooms and wherever possible. Exposed pipes, where passing through floors, finished wall, or finished ceilings shall be fitted with chromium plated escutcheon plates. Plates shall be large enough to completely close the holes around the pipes and shall be round, not less than 1-1/2" larger than the diameter of the pipe. Plates shall be securely fastened in place.

C. At least one pipe union shall be installed adjacent to all valves that are screwed. Hot and cold supplies to each fixture and water heater shall be valved separately at the fixture. All supply pipes terminating at valves or fixtures shall be provided with a water hammer arrestor of sufficient capacity to prevent water hammer.

D. All hot and cold-water branch lines shall be valved in an accessible location.

E. All hot and cold-water piping shall be arranged to drain the lowest point and drain valves with hose threads shall be provided so that the entire system can be emptied.

4. PIPING JOINTS

A. Threaded joints shall be cut full and clean, with not more than three threads exposed beyond fittings. Joints shall be made up tight with graphite base pipe joint compound applied to male threads only. Exposed threads of ferrous pipe shall be painted with acid-resisting paint after piping has been tested and proven tight. No caulking, lamp wick or other material will be allowed for correction of defective joints.

B. Sweat or soldered joints in copper water piping shall be made by the appropriate use of approved brass water fittings properly sweated or soldered together. Flared joints where specified for soft copper tubing shall be made with fittings meeting approved standards. Surfaces to be soldered or sweat shall be cleaned bright, properly fluxed with approved noncorrosive paste type flux and made with 95-5 or 94-6 solder. The use of self-cleaning fluxes, 50-50 solder or paste type solder is prohibited. Flared joints shall be made by expanding the tube with a proper flaring tool. All tubes shall be properly reamed.

C. Joints in bell and spigot cast iron soil pipe shall be of soft pig lead and oakum with lead not less than 1" deep, and installed in one pour or Tyler ty-seal gaskets underground only.

D. Joints for no-hub pipe shall be neoprene with stainless steel bands.

E. Joints for plastic pipe, when permitted, shall be solvent welded in accordance with the pipe manufacturer's recommendations.

5. DOMESTIC HOT AND COLD-WATER PIPING

A. All domestic hot and cold-water piping within the building shall be copper. Underground water service outside of the building may be type "k" soft temper copper or ductile iron or cast iron pipe with super bell-tite, mechanical or flanged joints.

B. Copper piping installed underground shall be soft temper type "k" and installed without joints.

C. All other copper piping shall be hard temper type "l". All copper piping shall conform to astm-b-88 requirements. Service piping of cast iron of ductile iron pipe shall conform to USAIA, AWWA and federal specifications.

D. Fittings for use with type "k" and "l" copper piping shall be wrought copper solder-joint. Unions shall be ground joint type and shall be installed where necessary to provide ease of disconnection of the piping system. Press fittings for copper water piping are acceptable where permitted by governing codes.

E. When a connection between copper pipe and ferrous pipe is necessary, said connection shall be made by using brass converter fitting.

F. Drains indicated on the drawings and at low points in connection with the hot and cold-water distribution system shall consist of 1/2" faucet with hose threads. Drains shall be installed at low points in the hot and cold-water piping and all piping shall grade to drain.

6. VALVES FOR DOMESTIC WATER

A. For piping 1/2" - 2": Milwaukee ba-150 ball vale, bronze, Teflon seats and packing, 400 lbs w.o.g., solder end.

B. For piping 2-1/2" and larger: Milwaukee ml224e butterfly valve, full lug body, EPDM seats, stainless steel disc, lever operator.

7. CROSS CONNECTIONS AND INTERCONNECTIONS

A. No installation shall be made of plumbing fixture, device or piping that will provide a cross connection or interconnection between a distributing water supply for drinking or domestic purposes and a polluted supply such as a drainage system or a soil or waste pipe that will permit or make possible a backflow of sewage, polluted water or waste into the water supply system.

8. SOIL, WASTE, DRAIN AND VENT PIPING

A. Underground soil, waste, drain and vent pipe and fittings, throughout the building below the base slab to the locations noted outside of the building, shall be coated hub-and- spigot service weight cast iron. Schedule 40 PVC solid plastic pipe may be used where permitted by governing codes. No-hub pipe will not be permitted underground.

B. Soil, waste, drain, vent pipe, and fittings above ground inside of the building shall be service weight hub-and- spigot or no-hub cast iron pipe. Schedule 40 PVC solid plastic pipe may be used where permitted by governing codes. PVC piping run in return air plenum space shall be installed with a 1 hour rated covering over all pipe, fittings and valves.

C. Changes in pipe size on soil, waste, and drain lines shall be made with reducing fittings. Changes in direction in drainage piping shall be made by the appropriate use of 45 degree y's, long or short sweep quarter bends, sixth, eighth, or sixteenth bends, or by a combination of these or equivalent fittings. Single and double sanitary tees and short quarter bends may be used in drainage lines only where the direction of flow is from the horizontal to the vertical. Quarter bends may be used in soil and waste lines on the discharge from water closets in slab on grade areas.

D. Sewer lines shall be located in general as shown on the drawings. The exact locations shall be determined by the contractor in such a manner as to maintain proper clearances and sufficient slope to insure drainage.

E. Horizontal soil, waste, and drain pipes shall be given a grade of not less than 1/4" per foot for sizes up to 3" unless otherwise shown on the drawings or approved in writing by the engineer. Horizontal soil, waste, and drain pipes shall be given a grade of not less than 1/8" per foot for sizes 4" and larger when first approved by the administrative authority.

F. Vent stacks shall be extended full size through the roof and flashed with 4 pound lead sheets turned down into the stack at least 2" and extended 12" in all directions from the pipe at the roof line. Vents through roof shall not be less than 3". PVC piping shall not be used for vent piping through the roof.

G. Where applicable for the roofing system used, provide flashing via pleated EPDM cone in lieu of lead.

H. Vents shall be air and watertight.

I. Vent connections shall be installed on all fixtures and equipment connected to soil and waste systems and all floor drains shall be vented or connected to a vented line as shown on the drawings and as required by code.

J. All vent stacks in or at outside walls shall be offset 1'-6" minimum from outside walls before going through the roof, to facilitate flashing.

K. Risers shall be installed absolutely plumb and straight. Branches shall be run in straight lines and pitch uniformly to mains.

L. Risers, branches and mains shall be concealed in the construction except where shown otherwise. Branches for closets shall be finished at the wall line with proper flange to receive the fixture when set, and they shall be true and level so that closet base will have full bearing on the wall.

M. All soil and vent stacks shall offset where required to miss obstructions and as required to clear floor beams and spandrel beams at floor lines and hug wall construction above floor.

N. Prohibited fittings. The drilling and tapping of building drains, soil, waste or vent pipe and the use of saddle hubs or bands is prohibited. Any fitting or connection which has an enlargement chamber or recess with a ledge, shoulder or reduction of the pipe area that offers an obstruction to the flow is prohibited.

O. Prohibited connections. No fixtures, devices or construction shall be installed which would allow a backflow connection between a distribution system of water for drinking and domestic purposes to the drainage system, soil or waste piping so as to permit or make possible the backflow of sewage or waste into the water system.

9. INSULATION

A. All cold-water piping shall be insulated with certain-teed 1/2" thick glass fiber pipe insulation in molded sections with factory applied all service vapor barrier jacket or approved equal. The end joint strips and overlap seams shall be sealed with a vapor barrier mastic and stapled with outward clinching staples spaced not to exceed 4" centers. Staples and seams shall be sealed with a coat of vapor barrier mastic. Joints shall be covered by joint tape.

B. All domestic hot water piping shall be insulated with 1" thick certain-teed glass fiber pipe insulation in molded sections with factory applied all service jacket or approved equal. This insulation shall be closely butted together and secured by joint tape matching the insulation cover.

C. All piping surfaces to be insulated shall be clean and dry and piping shall have been tested and approved before the insulation is applied.

D. All valves, fittings and flanges shall be insulated with certain-teed glass fiber pipe insulation, or approved equal. Insulation shall be securely held in place and covered with Zeston pre-molded PVC fitting covers. Fitting covers may be provided with fiberglass insulation inserts.

E. All pipe insulation shall be installed in a neat and workmanlike manner by an insulation contractor regularly engaged in insulation work.

F. Provide heavy density rigid foam inserts at all hanger locations on lines 2" and larger to be insulated, unless otherwise noted or specified.

10. WATER HAMMER ARRESTORS

A. Water hammer arrestors shall be provided for all quick closing valves including but not limited to drinking fountains, dishwashers, faucets, flushometer valves, ice makers, self-closing valves, spring loaded valves, and washing machines and as required by the local inspection authority having jurisdiction.

B. Water hammer arrestors shall be installed per manufactures specifications and shall conform to asse 1010 and per standard PDI-WH-201.

C. Water hammer arrestor shall be Sioux chief model or approved equal. Air chambers are not permitted.

11. PLUMBING EQUIPMENT

A. Water heaters, pumps, expansion tanks and other equipment shall be as scheduled or by acceptable equal by one of the following:

B. Water Heaters and Accessories:

1) Water Heaters: A.O. Smith, State, Rheem.

2) Expansion Tanks: Watts, Amtrol, Armstrong, Taco, Wessels.

C. Water Heater Installation

1) Pipe water heater drains and/or pan drains to indirect waste per code and as noted or detailed. Water heater P&T relief valves shall be piped independently, indirectly wasted 6" above receptor per code and as noted or detailed.

2) Install vacuum relief valve on each bottom fed storage water heater, installed above the top of the water heater on cold water inlet piping.

3) Mount water heaters on concrete floor pads, suspended from structure on steel rods, on steel floor stands or wall bracket steel frames as indicated on drawings.

4) High efficiency gas fired water heaters shall have a condensate neutralization kit.

5) Water piping connections to water heaters shall be metallic, no plastic piping is permitted within 18" of a water heater connection. Provide 18" minimum flexible corrugated copper or braided stainless steel connector hoses with compression ends for water heaters with 3/4" water connections.

D. Pumps used for potable water system applications shall be of lead free all bronze or stainless steel construction.

12. PIPE HANGERS AND SUPPORTS

A. All non-insulated copper piping shall be supported by Anvil figure CT65 copper plated carbon steel hangers.

B. Non-insulated steel piping 2" and smaller shall be supported by anvil figure 108 split pipe ring hanger with figure 114 turnbuckle adjuster. Non-insulated steel piping 2-1/2" and larger shall be supported by Anvil 260 hangers with turnbuckle adjusters.

C. All cast iron pipe shall be supported with Anvil figure 260 clevis hangers with turnbuckle adjusters.

D. All schedule 40 solid plastic PVC piping shall be supported with anvil figure 260 adjustable clevis hangers with #168 shield.

E. All insulated piping shall be provided with anvil figure 260 adjustable clevis hanger with #168 shield. Hanger shall be installed exterior to insulation unless otherwise noted or specified.

F. All hangers shall utilize threaded rods. No perforated strap iron hangers or wire hangers will be allowed.

G. Hangers and supports shall be spaces as follows:

1) Copper pipe: 1-1/4" and smaller - 6 feet, 1-1/2" and larger - 10 feet.

2) Steel pipe: 1" and smaller - 8 feet, 1-1/4" and larger - 10 feet.

3) Cast iron pipe: all sizes - 5 feet. (10 feet with 10' lengths of pipe. Minimum one hanger at each joint.)

4) PVC pipe: 4 feet.

H. Provide anvil figure ct-121 riser clamp for copper piping up through 4". Provide vertical support every 10 feet.

I. Steel and cast iron pipe provide Anvil figure 261 riser clamp for piping 1-1/2" and smaller and figure 40 riser clamp for piping above 2". Provide vertical support every 15 feet.

13. TESTING

A. All plumbing systems installed under this section of these specifications shall be tested and approved as herein described and as required by the local inspection authority having jurisdiction.

B. The new drainage and vent system shall be tested by plugging all openings with test plugs, except those at the tops of stacks, and filling the system with water. Test results will be satisfactory if the water level remains stationary for not less than one hour when all parts of the system are subjected to a pressure of at least 10 feet of water. If leaks develop, they shall be remedied and the test repeated after the system is made tight.

C. The water system test procedure shall consist of charging the entire system to operating pressure and then isolating the system from its source. The system shall remain closed for a period of 24 hours with no fixture being used. The pressure differential for this 24-hour period shall not exceed 5 psig.

D. The inspection authority having jurisdiction and the architect shall be notified at least 24 hours prior to performance of all tests so that the tests may be witnessed if deemed necessary.

E. All plumbing fixtures and accessories shall be tested, adjusted and made free of leaks.

14. WATER SYSTEM FLUSHING AND STERILIZATION

A. Immediately upon completion of the new water distribution system and prior to placing this system in service, the entire new system shall be flushed and sterilized.

B. This system shall be filled with water slowly and carefully so that air may readily escape through open drains and fixture valves. All drains and fixture valves shall be opened, starting with valves nearest the water service entry, and water run until it has run clear from all outlets for not less than 10 minutes.

15. ACCESS DOORS

A. The plumbing contractor shall be responsible for reviewing the architectural plans/ specifications and advising the general contractor prior to bidding of the need for access doors in sheetrock or plastered ceilings and walls and all other locations where access is required for plumbing components.

B. Access doors shall be flush-mounted of a style specifically suited for the type of construction in which they are to be used, and sizes and colors shall be submitted to the architect for approval. In areas where there are removable ceilings, access doors may be omitted, provided ceiling panels used for access are clearly marked. The type of access door used shall be Milcor, or an approved equal.

C. Access doors shall be furnished by the plumbing contractor for installation by the general contractor.

D. In the event that the plumbing contractor fails to advise the general contractor of required access doors prior to bidding, the cost to furnish and install access doors shall be the responsibility of the plumbing contractor.

16. PLUMBING FIXTURES

A. All fixtures shown or scheduled on the drawings shall be furnished and installed, set firm and true, connected to all required piping services, thoroughly cleaned, and left ready for use.

B. All exposed fittings and piping at the fixtures shall be chrome plated. Supply piping shall be valved at each fixture.

C. All China fixtures shall be new, of the best grade vitreous ware, without pit holes or blemishes, and the outlines shall be generally true. All fixtures of the same type shall be of one manufacturer throughout the entire installation. The engineer reserves the right to reject any equipment which, in their opinion, is faulty. All fixtures and flanges on soil pipe shall be made absolutely gastight and watertight. Rubber gaskets or putty will not be permitted for this connection. Closet bolts shall be stainless steel and not less than 1/4" in diameter and shall be equipped with chromium plated nuts and washers. Fixtures with outlet flanges shall be set at the proper distance from floor or wall to make a first-class joint with the closet setting compound or gasket and the fixtures used.

D. Plumbing fixtures shall be as specified, or equivalent products manufactured by Eljer, Crane, or American standard. All water closets, lavatories, urinals and sinks shall be products of one manufacturer. Fixtures shall be installed complete with all necessary accessories and trim. Installation of countertop sinks shall be coordinated with the countertop supplier.

E. Drains and accessories shall be as specified or equivalent products of wade, Jay R. Smith, or Josam.

F. Insulate exposed lavatory "p" trap on ADA listed fixtures with Plumberex trap gear or equal.

17. PAINTING

A. Painting, except as specified herein, shall be done by others.

B. Equipment which has damaged finish shall be repainted to match the original factory finish.

C. All exposed ferrous metal furnished under this contract, such as hangers, struts, structural steel, etc. Shall be given one coat of Tnemec gray primer.

END OF DIVISION 22000

DIVISION 21000 - FIRE PROTECTION

1. SCOPE:

A. Fire protection shall be governed by all applicable provisions of the Contract Document.

B. Provide a complete and operational fire protection system as required by NFPA, systems shall include:

1) Wet sprinkler system -- NFPA 13.

2) Systems shall be compliant with NFPA 70, 72, FM and UL as applicable.

C. All fire protection components shall be UL and FM approved devices where applicable as required by NFPA.

D. Upon completion of the work, system acceptance testing shall be performed by the sprinkler contractor in accordance with requirements of NFPA with a completed copy of 'Contractor's Material and Test Certificate' provided.

E. All cable ties for controls and other cable systems located in plenums utilized for air movement that are not installed in conduit shall be 25/50 flame and smoke rated, Hellermann Tyton T50R2C2UL or equivalent.

F. Provide permanent identification of all valves, piping, electrical components and equipment in accordance with NFPA 13 and 14.

G. Upon completion of the project, perform all flushing and testing of the system including pressure and flow tests and testing of all electrical, controls and safety components.

2. WET SPRINKLER AND STANDPIPE SYSTEMS:

A. Systems shall be in accordance with NFPA 13 and complete in every respect to provide complete coverage of all areas in the building, or throughout the area of work as indicated. Sprinkler system shall be hydraulically designed per appropriate hazard class.

B. Sprinkler system shall be a delegated design, contractor shall be responsible for layout and design of the fire sprinkler system. Submit all necessary documentation (plans, calculations, cut sheet literature and flow tests) and obtain necessary permits for approval and installation of the system. Provide PE or NICET stamp on submittal drawings.

C. As required by application, system shall include but not be limited to pipe and hangers, sprinklers, valves, inspector tests, fire department connection, audible and visible alarms, flow and tamper switches, gages, wiring, etc. Conform to the requirements of Division 16, FM and UL or IRI where required by owner.

1) System shall be an extension of and/or modifications to the existing building system.

3. PIPING, FITTING AND VALVES:

A. Fire protection piping and components above ground -

1) Pipe -

i) 2" and smaller - Schedule 40, black steel, malleable iron threaded, flanged or welded fittings; roll or cut groove mechanical joints with wrought or forged steel fittings or roll grooved end couplings.

ii) Contractor to match existing building piping material standards.

B. Sprinkler piping shall be independently supported from all other systems, no other system or component may bear on any sprinkler pipe or support. In accordance with NFPA 25 or where required by local authority, sprinkler piping shall not be subjected to external loads by materials either hung from or resting on sprinkler piping.

C. Sprinklers may be supplied by UL 2443 listed 1" minimum 304 stainless steel (braided or unbraided corrugated) 175 PSIG rated flexible hoses with all associated UL listed fittings, threaded ends, brackets and other attachments, 6' maximum length. Victaulic Vic-Flex or acceptable equivalent.

4. SPRINKLERS:

A. Provide quick response sprinklers, standard response, extended coverage or dry sprinklers as required by application.

B. Sprinklers shall be of the following styles, subject to application.

C. Recessed white brass with 2-piece adjustable escutcheon in gypsum and lay-in tile ceilings.

D. Upright chrome plated brass in finished areas with exposed structure.

E. Where not otherwise indicated, sprinkler type, style, appearance and coverage to match existing.

F. Any sprinklers removed shall be replaced with new sprinklers.

G. Locate sprinklers at center of 2 x 2 lay-in tiles or 2 x 2 portion of 2 x 4 lay-in tiles. Align sprinklers in a row when in gypsum board ceilings. All location tolerances shall be +/- 1/2".

H. Refer to reflected ceiling plans for coordination with lights, diffusers, exit signs, etc.

END OF DIVISION 21000

SECTION 26000 - ELECTRICAL

1. GENERAL ELECTRICAL REQUIREMENTS

A. Refer to GENERAL MECHANICAL, ELECTRICAL and PLUMBING requirements.

2. IDENTIFICATION OF ELECTRICAL EQUIPMENT

A. All cabinets, safety switches, panelboards, transformers, and other apparatus used for operation and control of circuits, appliances, and equipment shall be identified by means of manufactured engraved plastic plates, black with white letters.

All receptacles and switches to have printed tape style label indicating Panel and Circuit number.

B. Panels to have typewritten panel schedules. Where electrical equipment is installed as service entrance equipment, contractor shall furnish and install nameplate listing the following: Equip Short-Circuit Current Rating in Amps (RMS SYM), as indicated on the drawings, Whether or not equipment is fully or series-rated, Available Fault Current in Amps. Contractor shall perform available fault current calculation to obtain available fault at Service Equipment, Date fault current calculations were performed.

Identify each circuit branch circuit with wire markers when enclosure label and wire colors do not provide enough information to identify each circuit without tracing. Identify feeders and branch circuit home runs with wire marker with panel and circuit number. Box covers above lay-in ceilings neatly marked with indelible marker.

3. GROUNDING

A. Grounding system, including all conductors, motor frames, raceways, cabinets, etc. that require grounding, shall comply with article 250 of the national electrical code, drawings, those of the serving utility and local authorities having jurisdiction, and as specified. Grounding conductors shall be as shown on plans or if not specifically shown shall be no smaller than that required by NEC.

For service entrances, install per article 250 of the NEC and per service entrance grounding detail as described on the drawings.

B. Provide individual separate equipment grounding conductors for branch circuit home runs shown on drawings and terminate at branch circuit panelboard, switchboard, or other distribution equipment.

Single phase branch circuits for lighting and power shall consist of phase and neutral conductors and green ground conductor installed in common conduit which shall serve as grounding conductor.

4. SAFETY SWITCHES

A. Disconnect (safety) switches: Square D, Siemens, Cutler Hammer, or General Electric fused or non-fused (as indicated on drawings or required).

Switches shall be NEMA KS1, heavy duty, externally operated, visible-blade safety switches; NEMA enclosure type indicated on drawings or suitable for environment in which installed.

B. Provide switches where not furnished with starting equipment, motors, at all other points required by NFPA 70, and where indicated on drawings.

5. FUSES

A. Furnish and install cartridge and plug type fuses by bussman manufacturing company, gould/shawmut, cefco, or approved equal, in all fusible equipment. Time-delay trionic or fusetron fuses, ul class rk5, shall be installed on all motor circuits. Non time-delay amp-trap (a2k or a6k) or bussman limitron (ktn or kts), ul class rk1 shall be installed on circuits feeding panelboards. All other circuits shall be protected by fault-trap, ul class rk5, fuses or approved equal. Class k fuses are not acceptable.

6. CONDUIT

A. All electrical wiring, including low voltage wiring, shall be installed in conduit as herein specified. All conduit shall be minimum 3/4" trade size.

Underground conduit shall be schedule 40 EPC-40-PVC. All conduits shall be installed with minimum 24 inch cover.

B. Conduit installed in concrete slabs or above ground shall be galvanized rigid steel or EPC-40-PVC.

When PVC conduits penetrate concrete floor construction, contractor shall use rigid steel or imc elbows and extension. PVC conduit/fittings shall not be permitted to be exposed above the floor.

C. Thinwall tubing shall be EMT.

Conduit installed below grade shall be Schd. 80 PVC heavy wall plastic conduit meeting NEMA standards and UL listed for underground and exposed use. Provide GRS radius bends and risers as conduits rise above grade or above floor slab.

D. Provide GRS for all conduits run exposed to weather or exposed to other hazardous conditions. Provide any GRS installed below grade with corrosion resistant bonded-plastic or approved mastic coating. This shall include 90-degree elbow below grade and entire vertical transition to above grade.

All other raceway may be EMT where approved by local code. Use compression type fittings for EMT, with all fittings UL listed for environment in which they are used.

E. All fittings shall be of the compression type and watertight for underground and in slab locations. Compression or screwed fittings for indoor.

Use FMC for final connection to each motor and transformer, and to any device that would otherwise transmit motion, vibration, or noise. Use LFMC where exposed to liquids, vapors or sunlight. Provide all FMC and LFMC with an insulated bonding conductor.

F. Conduit for interior wiring, in general, shall be thinwall tubing unless otherwise noted.

Conduits shall be protected during construction; plug and keep clean and dry. Conduit ends shall be butted in centers of couplings. No cracks or flattened sections will be permitted at bends or elsewhere. All ends of conduit shall be reamed to remove rough edges. Running threads will not be permitted.

G. Conduits shall be concealed within the walls, ceilings, and floors where possible and unless otherwise noted. Exposed conduit shall be run parallel to or at right angles with the building lines.

Wire shall be in non-flexible metallic conduit (EMT, IMC or RMC) for:

1) All circuits and feeders greater than 30A.

Kitchen circuits.

2) Home runs.

H. MC cable acceptable for branch convenience circuits and lighting circuit WHIPS ONLY. Do not daisy chain light fixtures. Provide cable whips of sufficient lengths to allow for relocating each light fixture within 5-foot radius of its installed location, but not exceeding 6 feet in unsupported lengths.

1) Do not use MC cable for following: homeruns to panelboards, where exposed to view or damage, hazardous locations, in concrete, block walls or wet locations, and when disallowed by local AHJ or landlord.

Where required, provide health care rated MC for patient care areas (as defined by the NEC) when not in conduit.

7. WIRE AND CONDUCTORS

A. All wiring, cabling, and conductors shall be copper unless noted otherwise.

No. 10 AWG and smaller conductors shall be solid and no. 8 AWG and larger conductors shall be stranded.

B. Lighting and receptacle circuit conductors shall be copper THHN-THWN-2 600 volt, 75 deg c, color coded as described under applicable codes. No romex, plastic flex tubing etc permitted unless expressly noted on the drawings for R-2 applications. Light fixture wire insulation shall have temp rating not less than individual fixture manufacturers recommended rating.

Circuits with no. 8 or larger conductors, motor circuits, power and feeder circuits and building service feeders shall be copper THHN-THWN-2 600 volt, 75 deg c.

C. Wire size indicated on home runs shall be run throughout the entire circuit.

8. RACEWAY INSTALLATION

A. Install raceways parallel and perpendicular to building lines.

Install all conductors and cable in raceways continuous without taps or splices. Splice or tap only in approved boxes and enclosures with approved solderless connectors, or crimp connectors and terminal blocks for control wiring, and keep to minimum required. Insulate all splices, taps, and joints as required by codes.

B. Install all circular raceways concealed above suspended ceilings or concealed in walls or floors wherever possible except where otherwise indicated.

1) All conduit, junction boxes, etc. Above ceilings shall be supported from structure. Pipe sleeves, hangers and supports shall be furnished and set and contractor shall be responsible for proper and permanent locations.

Support all conductors and cables in vertical installations, as required by NFPA 70, by installing cable supports or plug-type conduit riser supports, or wire-mesh safety grips.

C. Install raceways to requirements of structure and to requirements of all other work on project. Install raceway to clear all openings, depressions, pipes, ducts, reinforcing steel, and other immovable obstacles. Install raceways set in forms for concrete structure in such manner that installation will not affect strength of structure.

Install raceways continuous between connections to outlets, boxes and cabinets with minimum possible number of bends and not more than equivalent of four 90-degree bends between connections. Use manufactured elbows for all 45- and 90-degree bends, unless approved by engineer in advance. Make other bends smooth and even and without flattening raceway or flaking galvanizing or enamel. Radii of bends shall be as long as possible and never shorter than corresponding trade elbow. Use long radius elbows where necessary, indicated, or both.

D. Securely fasten raceways in place with approved straps, hangers and steel supports as required. Attach raceway supports to building structure. Hang single raceways for feeders with malleable split ring hangers with rod and turnbuckle suspension from inserts spaced not over 10 feet apart in construction above.

Clamp groups of horizontal feeder raceways to steel channels that are suspended from inserts spaced not over 10 feet apart in construction above. Securely clamp vertical feeder raceways to structural steel members attached to structure. Install cable clamps for support of vertical feeders where required. Add raceway supports within 12 inches of all bends, on both sides of bends. Do not support raceways from suspended ceiling components.

E. Align and install true and plumb all raceway terminations at panelboards, switchboards, motor control equipment and junction boxes.

Install approved expansion/deflection fittings where raceways pass through (if embedded) or across (if exposed) expansion joints.

F. Install pull wire in each empty raceway that is left for installation of conductors or cables under other divisions or contracts. Use polypropylene or monofilament plastic line. Leave min. 24" slack at each end.

Effectively seal raceways, by installing conduit fitting at boundary of two spaces, and filling it with an approved pliable material, after conductors or cables have been installed and tested, whenever raceways pass from non-cooled to cooled spaces or transition from outside facility or enclosure to inside, whether buried or exposed.

9. BUSHINGS and LOCKNUTS

A. Rigidly terminate conduits entering sheet metal enclosures to enclosure with bushing and locknut on inside and locknut or an approved hub on outside. Conduit shall enter enclosure squarely.

Provide bushings and locknuts made of galvanized malleable iron with sharp, clean-cut threads. Where EMT enters box, provide approved EMT compression connectors.

B. Use insulated, grounding, or combination, bushings wherever connection is subject to vibration or moisture when required by NFPA 70, or both.

10. JUNCTION and OUTLET BOXES

A. All boxes including light fixture, switch, receptacle, and similar outlet boxes: National Electrical, Appleton, Steel City, Raco, or approved equal, galvanized steel knockout boxes, suitable in design to purpose they serve and space they occupy. Size as required for specific function or as required by NFPA 70, whichever is larger.

1) Lighting fixture boxes in ceilings shall not be less than 4" octagonal knockout type.

B. Set all outlet boxes in walls, columns, floors, or ceilings so they are flush with finished surface, accurately set, and rigidly secured in position. Provide plaster rings, extension rings and/or masonry rings as required for flush mounting. Provide approved cast outlet boxes, with hubs and weatherproof covers, in all areas subject to damp, wet, or harsh conditions.

Coordinate locations of outlet boxes. Outlets are only approx located on small scale drawings. Use great care in actual location by consulting various large scale detailed drawings used by other division trades, and by securing definite locations from architect.

C. All outlets, shall be mounted with bottom at 18" AFF and switches with bottom at 44" AFF floor unless noted otherwise on plans. Refer to arch for other required elevations and cabinetry coordination.

11. MECHANICAL AND PLUMBING EQUIPMENT WIRING AND CONTROL WIRING

A. Provide all raceways and power wiring for all mechanical and plumbing equipment requiring electrical connections, and all line voltage control and interlock wiring not provided under division 22/23. Connect per manufacturers' wiring diagrams. Coordinate with division 22/23 for disconnects furnished with equipment, and provide all disconnect switches as required. After installing wiring, verify that each motor load has correct phase rotation.

Verify actual MOCP device ratings and MCA conductor sizing for mechanical equipment from equipment nameplate. Reduction of wire sizes based on equipment provided that is smaller than what the drawings indicate shall not be allowed without engineer review. Wiring that varies due to equipment provided versus the equipment specified shall be provided without extra cost to owner. Notify engineer of all changes required in electrical installation due to equipment variances so that effects on feeders, branch circuits, panelboards, fuses and circuit breakers can be checked prior to purchasing and installation.

B. Provide all raceways, power wiring, and line-voltage control and interlock wiring not provided under division 23, for all thermostats, temperature control devices, and controls, including, but not limited to, night-stats, water heater interlocks, time switches and override timers. See mechanical drawings for locations and temperature control diagrams.

12. PANELBOARDS

A. Branch circuit 208/240v panels shall be capacity shown with tin plated copper bussing and braced for minimum of 10,000a aic or as otherwise noted or required (series rated acceptable). Bolt on circuit breakers. 480v panels same except 14,000a aic min. or as otherwise noted. Minimum 20" wide with galv steel enclosure with hinged door and keyed lock. Coord trim with mounting location. Typewritten card directory.

Distribution panels shall be capacity shown and shall be Square D I-Line with tin plated copper bussing. 65kaic min or as otherwise noted/required. Bolt on circuit breakers (series rated acceptable). Galv steel enclosure. CB's labeled with plastic printed labels to load served.

B. Equivalent by Square D, Siemens, Cutler Hammer, Or GE.

13. WIRING DEVICES

A. Switches:

1) Light switches - spec grade 20 amp toggle switches with stainless steel wall plates.

Wall motion switches - spec grade, PIR, override.

2) Wall motion switches (bathroom) - dual relay, spec grade, PIR, 2nd relay for operation of exhaust fan delay.

Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters. Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472. 600W or 1200W as required by load.

LED Dimmers: Universal type; compatible with dimming drivers in fixture(s); if other than 0-10V dimming is provided, verify dimmer is compatible with driver for full range of dimming (100-10%).

3) Equivalent devices by Leviton, Bryant, Hubbell, Wattstopper, Lithonia, Sensor Switch.

B. Convenience outlets:

1) Spec grade 20 amp duplex with ground and SS wall plates. Other outlets shall be verified with equipment suppliers for proper NEMA configurations. Provide GFCI rated devices where indicated and as required per code.

Equivalent devices by Cooper/Eaton, Hubbell, Leviton, Pass and Seymour/Legrand

C. Weatherproof cover plates:

1) Provide GFCI receptacles for weatherproof receptacles.

For wet locations: in-use NEMA 3R, UL-labeled plates die cast metal and lockable.

2) For damp locations: UL-listed for wet locations with cover(s) closed; die-cast aluminum or type 302 SS; single-cover for switches and vertically mounted receptacles; double-cover for horizontally mounted receptacles; self-closing covers.

D. Color of devices and associated wall plates as directed by architect.

14. LUMINAIRES, LAMPS and DRIVERS

A. Refer to lighting fixture schedule plans for fixture types.

Equivalent luminaires by Hubbell, Acuity Brands, Williams, Eaton [Cooper], Signify [Philips].

B. LED Fixtures:

1) Lamps and modules: Philips, General Electric, Osram/Sylvania, Cree, Nichia.

LED components, lamps, drivers, and fixtures shall comply with: PCC 47 CFR Part 15; UL 8750; ANSI/NEMA Standards C78.377, NEMA SSL-1, C82.77, IESNA Standards TM-16-05, RP-16, LM-79, LM-80 and TM-21.

2) Drivers shall be integral to the fixture unless otherwise shown or specified.

C. Emergency drivers/batteries/inverters - shall be Bodine, Iota. Coordinate voltages and outputs for min. 90 minute operation with fixtures scheduled and controls indicated and provided.

Provide lighting fixtures with lamps and accessories required for hanging. Coord mounting of lighting fixtures with architect and G/C. Additional fixture supports shall be provided by E/C. Supports shall comply with latest edition of NEC. Provide lighting fixture securing clips as required. Consult arch plans for ceiling types and provide surface and recessed lighting fixtures with appropriate mounting components and accessories.

D. Fixtures mounted in fire rated ceilings shall be provided and installed with fire rated enclosures to maintain ceiling integrity.

Poles and support components: comply with AASHTO LTS-4. Provide steel poles in color as specified or selected by architect. Provide bolt covers. Provide concrete base for pole and ground rod.

15. DIGITAL LIGHTING CONTROLS

A. Provide DLM systems consisting of lighting control panels, room controllers, motion sensors, daylight sensors, and other other controls as necessary to achieve lighting switching and dimming control indicated on the drawings.

Provide all interconnecting wiring, controls, programming and owner training for the system(s).

B. Provide systems by: Hubbell (NX), Watt Stopper (DLM), Lutron (Athena), Acuity (nLight).

Execution:

1) Calibrate all sensor time delays and sensitivity for proper detection of occupants and energy savings. Adjust time delays.

Provide documentation of room by room system configuration including: sensor parameters, time delays, sensitivities, and daylighting setpoints, sequence of operation, load parameters.

2) Post start-up tuning - 30 days after occupancy contractor shall adjust sensors to meet the owner's requirements. Provide a detailed report to the architect / owner of post start-up activity.

16. ADJUSTING. ALIGNING and TESTING

A. Adjust, align, and test all electrical equipment on this project provided under this division and all electrical equipment furnished by others for installation or wiring under this division for proper operation. Test all systems and equipment according to requirements in NETA ATS (latest edition) and all additional requirements specified in this specification.

END OF DIVISION 26000

SECTION 27000 - COMMUNICATIONS

1. GENERAL ELECTRICAL REQUIREMENTS

A. Refer to GENERAL MECHANICAL, ELECTRICAL and PLUMBING requirements.

2. TELECOMMUNICATIONS SYSTEMS PROVISIONS

A. Provide incoming telephone and/or data service raceways as indicated on drawings or as required by serving telecommunications company.

Provide 3/4-inch thick plywood board, fire-retardant- treated and stamped FRT, securely anchored to wall, at location and of size as indicated on drawings.

B. Provide flush mounted telephone and/or data outlet boxes with 3/4-inch EMT stub-up concealed to accessible ceiling space at locations as indicated on drawings.

3. DATA OUTLETS

A. Provide two-gang outlet box, min. 2-1/4" deep with 3/4" conduit and pullstring, up to above accessible ceiling space for low voltage cabling by others.

4. TELECOMMUNICATIONS EXECUTION

A. Conduit:

1) Route conduit up to above accessible ceiling space, with a long sweep elbow and bushing. Where exposed to view (no ceiling and open to structure), route conduit over to above accessible ceiling space such that no exposed data cabling will occur. Utilize long sweep elbows and pull boxes after every two turns.

END OF DIVISION 27000

SECTION 28000 - SAFETY and SECURITY

1. GENERAL ELECTRICAL REQUIREMENTS

A. Refer to GENERAL MECHANICAL, ELECTRICAL and PLUMBING requirements.

2. EXISTING FIRE ALARM SYSTEM MODIFICATIONS

A. Provide following new equipment, compatible with, or of same manufacturer as, existing fire alarm control panel and system, at locations indicated on drawings, as required by building codes, landlord, or all three, and connect to existing fire alarm control panel:

1) Additional initiating devices, indicating appliances, and interconnecting circuits.

Additional zone modules required by new zoning.

2) New amplifiers and other equipment that may be required to incorporate new initiating devices and indicating appliances into existing system.

A new zone map, including all existing zones and all new zones, framed, mounted under glass, and installed adjacent to fire alarm control panel. Horn/strobes shall meet all requirements of ADA.

B. Install all wiring in raceway.

Where acceptable to AHJ, plenum rated cables may be used above suspended accessible ceilings.

C. Execution:

1) Submit shop drawings with wiring diagrams and battery calcs for approval to Fire Marshal and AHJ.

Coordinate to provide power and shutdown or operation of fire/smoke dampers, door hold opens, power to door locks andaccess control and other similar systems.

2) Installed and tested per NFPA 72 and applicable sections of NFPA 70. Provide complete fire alarm system as described herein and shown to be wired, connected, and in first class condition. Include sufficient control unit(s), annunciator(s), manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, and all necessary material for complete operating system.

END OF DIVISION 28000

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MO Certificate of Authority Number
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Project Title:
ELLIOT ELECTRIC
Elliot's Electric Lee's Summit
2818 NE INDEPENDENCE AVE | LEE'S SUMMIT, MO 64064

BEN HOLLON
NUMBER
PE-2022000238
06/05/2023

Issue Date: 06.05.2023
Issue: Date:

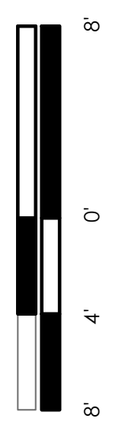
Drawn by: BLH

Project Number: 2309.2

MEP101

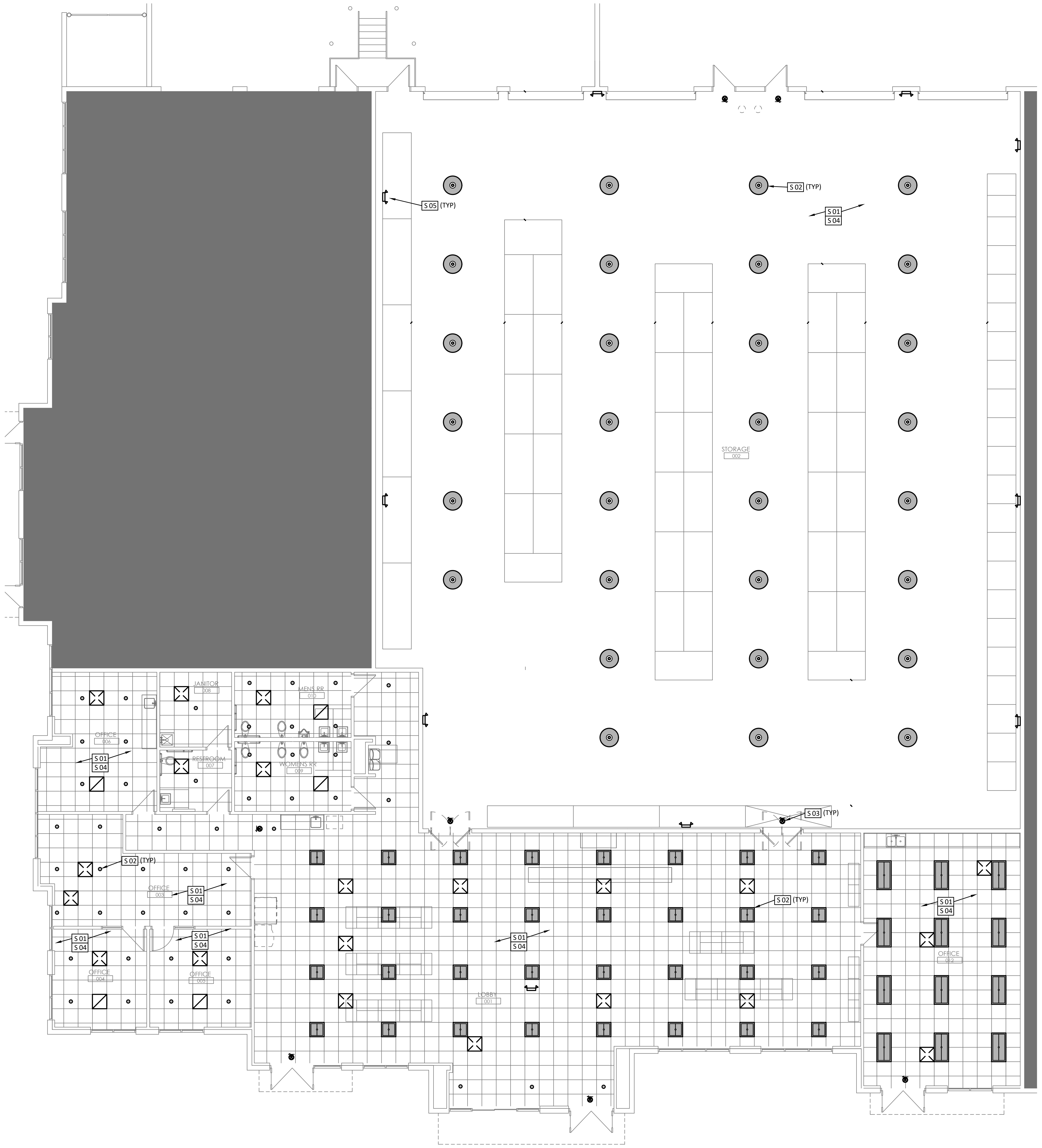
MEP Specifications

PERMIT SET



S ## PLAN NOTES

1. BALANCE EXISTING HVAC SYSTEM IN THIS AREA TO 1.0 CFM PER SQUARE FOOT, PROVIDE ADDITIONAL SUPPLY AND RETURN GRILLES AS NECESSARY.
2. REMOVE EXISTING LIGHT FIXTURE AND INSTALL OWNER FURNISHED LED LIGHT FIXTURE IN SAME LOCATION, CONNECT TO EXISTING CIRCUIT.
3. PROVIDE EMERGENCY SIGN AS REQUIRED FOR BUILDING EGRESS, CONNECT TO UNSWITCHED HOT, FIELD VERIFY.
4. RELOCATE EXISTING FIRE ALARM DEVICE IN THIS ROOM AS REQUIRED, FIELD VERIFY.
5. PROVIDE EMERGENCY BUG EYE AS REQUIRED FOR BUILDING EMERGENCY LIGHTING, CONNECT TO UNSWITCHED HOT, FIELD VERIFY.



FLOOR PLAN - MEP

1/8" = 1'-0"

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MEP100

MEP Floor Plan

PERMIT SET