LEGEND

	CEILING SUPPLY DIFFUSER
	CEILING RETURN AIR GRILLE
	MANUAL VOLUME DAMPER
	FIRE DAMPER, FIRE SMOKE DAMPER
T	THERMOSTAT
	MOTORIZED DAMPER
	NEW WORK
S	SMOKE DETECTOR
T_S	TEMPERATURE SENSOR
	BACKDRAFT DAMPER
	POINT OF CONNECTION
	POINT OF DISCONNECTION
	DOOR UNDERCUT

ABBREVIATIONS

A/C	ABOVE CEILING
AD	ACCESS DOOR
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AUTO	AUTOMATIC
AC	AIR CONDITIONING
AHU	AIR HANDLING UNIT
BAL	BALANCING
BDD	BACKDRAFT DAMPER
B/F	BELOW FLOOR
B/G	BELOW GRADE
B'FLY	BUTTERFLY
BHP	BRAKE HORSEPOWER
BCO	BASE CLEANOUT
CFM	CUBIC FEET PER MINUTE
CBCR	CURVED BLADE CEILING REGISTER
CSD	CEILING SUPPLY DIFFUSER
CU	CONDENSING UNIT
CW	COLD WATER (DOMESTIC)
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
CON	CONCENTRIC
CO	CLEANOUT
COND	CONDENSATE
CD	CEILING DIFFUSER
db	DRY BULB
DN	DOWN
DR	DRAIN
do	DITTO
dB	DECIBELS
DWG	DRAWING
DU	DEHUMIDIFIER
EA	EACH
EAT	ENTERING AIR TEMPERATURE
ECC	ECCENTRIC
EF	EXHAUST FAN
EOD	EMERGENCY OVERFLOW DRAIN
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EFF	EFFICIENCY
EG	EXHAUST AIR GRILLE
F	FAHRENHEIT
FCO	FLOOR CLEAN OUT
FCU	FAN COIL UNIT
FSD	FIRE/SMOKE DAMPER
FD	FIRE DAMPER OR FLOOR DRAIN
FL DR	FLOOR DRAIN (only)
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOT	FLAT ON TOP
FPM	FEET PER MINUITE
FPS	FEET PER SECOND
FT	FEET
G	GATE
GA	GAUGE
GPM	GALLONS PER MINUTE
GL	GLOBE
GCO	GRADE CLEANOUT
HD	HUB DRAIN
HP	HORSEPOWER
HTG	HEATING
HW	HOT WATER (DOMESTIC)
HWR	HOT WATER RETURN
HWRR	HOT WATER REVERSE RETURN
HWS	HOT WATER SUPPLY
Hz	HERTZ
ID	INSIDE DIMENSION
IN	INCHES
KW	KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LB	POUNDS
LG	LINEAR GRILLE
LRG	LINEAR RETURN GRILLE
LWR	LOOP WATER RETURN
LWS	LOOP WATER SUPPLY
MIN	MINIMUM
MAX	MAXIMUM
MD	MANUAL DAMPER
MOD	MOTOR OPERATED DAMPER
MFR	MANUFACTURER
NC	NORMALLY CLOSED
NG	NATURAL GAS
NFWH	NON-FREEZE WALL HYDRANT
NO	NORMALLY OPEN
NOM	NOMINAL
OA	OUTSIDE AIR
OD	OUTSIDE DIMENSION
OBD	OPPOSED BLADE DAMPER
PIU	POWERED INDUCTION UNIT
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR
RAD	RADIUS
RG	RETURN AIR GRILLE
RED	REDUCER
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION / RETURN SLOTS
RTU	ROOFTOP UNIT
RR	RETURN REGISTER
SP	STATIC PRESSURE
SPS	STATIC PRESSURE SENSOR
SA	SUPPLY AIR
SAN	SANITARY
SD	SMOKE DAMPER / SLOT DIFFUSER
SEN	SENSIBLE
SQ	SQUARE
SR	SUPPLY REGISTER
ST	STORM
SS	SPLIT SYSTEM
SG	SUPPLY AIR GRILLE
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VENT
VA	VALVE
VTR	VENT THRU ROOF
VAV	VARIABLE AIR VOLUME
wb	WET BULB
WC	WATER COLUMN
WHA	WATER HAMMER ARRESTOR
WT	WEIGHT
W	WASTE
WMS	WIRE MESH SCREEN

MECHANICAL DRAWING LIST

M-0.1	MECHANICAL ABBREVIATIONS, SYMBOLS & GENERAL NOTES.
M-0.2	MECHANICAL SPECIFICATIONS
M-0.3	MECHANICAL SCHEDULES
M-1.0	MECHANICAL FLOOR PLAN
M-1.1	MECHANICAL ROOF PLAN
M-2.0	MECHANICAL DETAILS (1 OF 2)
M-2.1	MECHANICAL DETAILS (2 OF 2)

APPLICABLE CODES

2021 INTERNATIONAL BUILDING CODE (IBC 2021)

2021 INTERNATIONAL MECHANICAL CODE (IMC 2021)

2021 INTERNATIONAL PLUMBING CODE (IPC 2021)

2021 INTERNATIONAL FUEL GAS CODE (IFGC 2021)

2021 INTERNATIONAL ENERGY CODE (IECC 2021)

2023 INTERNATIONAL ELECTRIC CODE (NEC 2023)

GENERAL NOTES

1.ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER,PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.

2.BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.

3.THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.

4.THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS.WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

5.CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.

6.REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES IN MAKING UP THE WORK PROPOSAL.

7.DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.

8.CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED AREAS. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.

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

10.SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.

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

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

13.WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.

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

15.ACCESS DOORS ARE REQUIRED FOR ALL FANS, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.

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

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

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

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

20.ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE.

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

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

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

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

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

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

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

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

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

30.WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.
DEFINITIONS:
1)"PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
2)"INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
3)"FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
3.THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

GENERAL HVAC NOTES

1. PERFORM ALL WORK IN ACCORDANCE WITH ALL APPLICABLE CODES AND AUTHORITIES HAVING JURISDICTION. PROVIDE ALL PERMITS, INSPECTIONS, LICENSES AND FEES. FURNISH ALL LABOR, EQUIPMENT, SUPPLIES AND MATERIALS NECESSARY TO PROVIDE COMPLETE AND OPERATIONAL SYSTEMS.
2. THE DRAWINGS AND SPECIFICATIONS INDICATE THE GENERAL DESIGN AND ARRANGEMENT OF PIPES, FIXTURES, EQUIPMENT, SYSTEMS, ETC. INFORMATION SHOWN IS DIAGRAMMATIC IN CHARACTER AND DOES NOT NECESSARILY INDICATE EVERY REQUIRED OFFSET, FITTING, ETC. DO NOT SCALE THE DRAWINGS FOR DIMENSIONS. TAKE ALL DIMENSIONS, MEASUREMENTS, EQUIPMENT LOCATIONS, LEVELS, ETC FROM THE ARCHITECTURAL DRAWINGS AND FROM THE EQUIPMENT TO BE FURNISHED. PIPING MAY BE RELOCATED OR OFFSET FOR PROPER CLEARANCES OR TO AVOID CONFLICTS WITH OTHER TRADES. THE DESIGN INTENT (I.E. PITCHES, VELOCITIES, PRESSURE DROPS, VOLTAGE DROPS, ETC) CANNOT BE GREATLY ALTERED WITHOUT THE APPROVAL OF THE ARCHITECT. THE COST OF THESE DEVIATIONS TO AVOID INTERFERENCE'S SHALL BE PART OF THE ORIGINAL CONTRACT BID.
3. CONFER AND COOPERATE WITH ALL OTHER TRADES TO COORDINATE THEIR WORK. COORDINATION SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO MATERIALS AND EQUIPMENT ROUTED IN CEILING AND WALL CAVITIES, EQUIPMENT ARRANGEMENT IN MECHANICAL SPACES, INCLUDING EQUIPMENT CLEARANCE REQUIREMENTS, ELEVATIONS AND DIMENSIONS OF STRUCTURAL MEMBERS AND OPENINGS, ETC. NOTIFY THE ARCHITECT OF ANY CONFLICTS.
4. BASE FINAL INSTALLATION OF MATERIALS AND EQUIPMENT ON ACTUAL DIMENSIONS AND CONDITIONS AT THE PROJECT SITE. FIELD MEASURE FOR MATERIALS AND EQUIPMENT REQUIRING EXACT FIT. NO EXTRAS WILL BE GIVEN FOR THE CONTRACTOR'S FAILURE TO FIELD COORDINATE.
5. THE OWNER OR ENGINEER ARE NOT RESPONSIBLE FOR THE CONTRACTOR'S SAFETY PRECAUTIONS OR FOR MEANS, METHODS, TECHNIQUES, CONSTRUCTION SEQUENCES, OR PROCEDURES REQUIRED TO PERFORM THE WORK.
6. LOCATE ALL EQUIPMENT THAT MUST BE SERVICED, OPERATED, OR MAINTAINED IN FULLY ACCESSIBLE POSITIONS. EQUIPMENT SHALL INCLUDE (BUT NOT LIMITED TO) VALVES, MOTORS, CONTROLLERS, SWITCHGEAR, AND DRAIN POINTS IF REQUIRED FOR BETTER ACCESSIBILITY. FURNISH ACCESS DOORS FOR THIS PURPOSE. MINOR DEVIATIONS FROM THE DRAWINGS MAY BE ALLOWED TO PROVIDE FOR BETTER ACCESSIBILITY. ANY CHANGES SHALL BE APPROVED BY THE ARCHITECT AND CONSTRUCTION MANAGER/GENERAL CONTRACTOR PRIOR TO MAKING THE CHANGE.
7. PROVIDE ACCESS DOORS, WALL OPENINGS, ROOF OPENINGS OR ANY OTHER CONSTRUCTION REQUIREMENT NEEDED TO ACCOMMODATE THE MECHANICAL EQUIPMENT. LOCATIONS OF THESE OPENINGS SHALL BE SUBMITTED IN SUFFICIENT TIME TO BE INSTALLED IN THE NORMAL COURSE OF WORK.
8. CORDINATE ELECTRICAL REQUIREMENTS OF APPROVED MECHANICAL EQUIPMENT WITH THE ELECTRICAL SUB-CONTRACTOR PRIOR TO THE PURCHASE AND INSTALLATION OF ANY ELECTRICAL EQUIPMENT, DEVICES, WIRING, OR CONDUIT.
9. PROVIDE GENERAL CONTROL WIRING, THERMOSTATS, MOTORIZED DAMPERS AND CONDUIT ASSOCIATED WITH HVAC EQUIPMENT. COORDINATE THE LOCATION OF ALL THERMOSTATS, ROOM SENSORS, ETC WITH THE ARCHITECT AND ALL OTHER TRADES PRIOR TO INSTALLATION. IF A CONFLICT WITH MILLWORK, LIGHT SWITCHES, WINDOWS, ETC EXISTS, NOTIFY THE ARCHITECT OF THE POTENTIAL INTERFERENCE PRIOR TO INSTALLATION. INSTALL THERMOSTATS WITH PROTECTIVE LOCKING COVER, CENTERED AT 4'-0" ABOVE FINISHED FLOOR, UNLESS OTHERWISE INDICATED. COMPLY WITH THE PROVISIONS OF THE AMERICANS WITH DISABILITIES ACT (ADA).
10. ALL DIMENSIONS SHOWN ON THE DRAWINGS FOR DUCTWORK ARE NET INSIDE CLEAR DIMENSIONS. FOR RECTANGULAR DUCT, THE FIRST FIGURE OF THE DUCT SIZE INDICATES THE DIMENSION OF THE FACE SHOWN. VERIFY THAT THE DUCTWORK SPECIFIED WILL FIT IN THE SPACE AVAILABLE USING THE ARCHITECTURAL, STRUCTURAL AND ELECTRICAL DRAWINGS AS REFERENCE PRIOR TO FABRICATION AND INSTALLATION. ROUND DUCT OF EQUAL NET INSIDE CLEAR AREA MAY BE USED IN LIEU OF RECTANGULAR DUCT.
11. PROVIDE TURNING VANES ON ALL RECTANGULAR SUPPLY, OUTDOOR AIR, EXHAUST AND RETURN DUCTWORK INCLUDING THE TOP AND BOTTOM OF VERTICAL DUCTS.
12. PROVIDE A LOCKING QUADRANT VOLUME DAMPER AT THE TAP OF EACH RUN-OUT TO DIFFUSERS FOR BALANCING PURPOSES, UNLESS OTHERWISE INDICATED. THE RUN-OUT DUCT SIZE IS THE SAME SIZE AS THE DIFFUSER OR GRILLE NECK SIZE UNLESS OTHERWISE INDICATED.
13. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATION OF ALL FIRE RATED WALLS AND CEILINGS. PROVIDE FIRE DAMPERS AND/OR COMBINATION FIRE/SMOKE DAMPERS IN DUCTWORK AT ALL LOCATIONS WHERE DUCTS PASS THROUGH FIRE RATED ASSEMBLY. MECHANICAL SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING FIRE AND FIRE/SMOKE DAMPERS. COORDINATE CONSTRUCTION REQUIREMENTS AND PROVISIONS FOR CONNECTIONS TO FIRE ALARM SYSTEM.
14. ALL DUCTWORK SHALL BE SHEET METAL FABRICATED IN ACCORDANCE WITH SMACNA STANDARDS. ALL DUCT WORK ASSOCIATED WITH CONSTANT VOLUME SYSTEMS SHALL BE CONSTRUCTED TO 2" W.G. AND SEALED TO SMACNA CLASS B. SEAL ALL SEAMS WITH MASTIC SEALANT UL 181 LISTED FOR THE APPLICATION USED. SEALANT SHALL BE DESIGNED FOR USE ON METAL DUCT AND FLEXIBLE DUCT.
15. ALL RECTANGULAR AND ROUND SUPPLY AND RETURN DUCTWORK LOCATED IN EXPOSED INTERIOR AREAS SHALL BE INTERNALLY LINED WITH DUCT LINER AND EXTERNALLY PAINTED. REFER TO ARCHITECT FOR COLOR SELECTION.
16. PROVIDE VIBRATION ISOLATORS FOR MOTOR DRIVEN EQUIPMENT UNLESS NOTED OTHERWISE. PROVIDE ISOLATION AS INDICATED OR AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER.
17. SOME DUCTS SHOWN ON EACH FLOOR PLAN MAY BE SHOWN WITH AN OFFSET FOR CLARITY.
18. SEAL ALL DUCT PENETRATIONS THROUGH FIRE RATED BUILDING ELEMENTS WITH AN APPROVED FIRE PROOFING MATERIAL.
19. ALL EQUIPMENT SHALL HAVE IDENTIFICATION TAGS. TAGS SHALL BE PLASTIC LAMINATE, WHITE FACE WITH 1/2" TALL BLACK LETTERS. THE TAG SHALL MATCH THE UNIT DESIGNATIONS SHOWN ON THE SCHEDULES.
20. EXPAND OR REDUCE DUCTS AT EQUIPMENT CONNECTIONS BASED ON THE EQUIPMENT PURCHASED, WITH TRANSITIONS NOT TO EXCEED 30 DEGREES. SIZES SHOWN ON SCHEDULES, ETC. ARE FOR GUIDANCE ONLY. ASPECT RATIO SHALL BE NO GREATER THAN 4:1, PER SMACNA'S GUIDELINES.
21. ALL DUCTS WITH A DIMENSION GREATER THAN 12" PASSING THRU A NON-RATED WALL SHALL HAVE THE OPENING FRAMED IN WITH METAL STUDS.
22. WHERE DAMPERS ARE LOCATED ABOVE HARD CEILINGS PROVIDE CONCEALED YOUNG REGULATORS. REGULATORS SHALL NOT BE LOCATED IN CORRIDORS, PATEINT CARE, OR TREATMENT AREAS. EACH REGULATOR SHALL BE LABLE PER THE SPECIFICATIONS.
23. TEST AND BALANCE SHALL BE PERFORMED BY AN AABC LICENSED FIRM IN THE TESTING, ADJUSTING, AND BALANCING (TAB) BUSINESS FOR A MINIMUM OF 10 YEARS. AABC FIRM SHALL SUBMIT A REPORT TO THE ENGINEER OF RECORD INDICATING EQUIPMENT NAMEPLATE DATA, DESIGN PERFORMANCE, INITIAL TESTED PERFORMANCE, AND FINAL ADJUSTED PERFORMANCE. REPORT SHALL BE SUBMITTED IN A TIMELY FASHION PRIOR TO JOB CLOSE-OUT. TAB SHALL BE PERFORMED ON ALL EXISTING SYSTEMS MODIFIED AS PART OF THIS CONTRACT. TAB FIRM SHALL PERFORM A FUNCTIONAL PERFORMANCE TEST OF THE SYSTEM BASED ON THE CONTRACT DOCUMENTS HEREIN SHALL AND RELAY ALL DISCREPANCIES AND OUTSTANDING CONSTRUCTION ITEMS RELATING TO THE MECHANICAL EQUIPMENT AND PERFORMANCE TO THE ENGINEER OF RECORD.

THERMOSTATIC CONTROLS

THERMOSTATIC CONTROL NOTES:

C403.4.1 THERMOSTATIC CONTROLS
THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE WITHIN THE ZONE. WHERE HUMIDIFICATION OR DEHUMIDIFICATION OR BOTH IS PROVIDED, NOT FEWER THAN ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.

C403.4.1.2 DEADBAND
WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CONFIGURED TO PROVIDE A TEMPERATURE RANGE OR DEADBAND OF NOT LESS THAN 5°F (2.8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

C403.4.1.3 SETPOINT OVERLAP RESTRICTION
WHERE A ZONE HAS A SEPARATE HEATING AND A SEPARATE COOLING THERMOSTATIC CONTROL LOCATED WITHIN THE ZONE, A LIMIT SWITCH, MECHANICAL STOP OR DIRECT DIGITAL CONTROL SYSTEM WITH SOFTWARE PROGRAMMING SHALL BE CONFIGURED TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT AND TO MAINTAIN A DEADBAND IN ACCORDANCE WITH SECTION C403.2.4.1.2.

C403.4.2 OFF-HOUR CONTROLS
EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.

C403.4.2.1 THERMOSTATIC SETBACK
THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).

C403.4.2.2 AUTOMATIC SETBACK AND SHUTDOWN
AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR NOT FEWER THAN 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CONFIGURED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.

C403.4.2.3 AUTOMATIC START & STOP
AUTOMATIC START AND STOP CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM. THE AUTOMATIC START CONTROLS SHALL BE CONFIGURED TO AUTOMATICALLY ADJUST THE DAILY START TIME OF THE HVAC SYSTEM IN ORDER TO BRING EACH SPACE TO THE DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED OCCUPANCY. AUTOMATIC STOP CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM WITH DIRECT DIGITAL CONTROL OF INDIVIDUAL ZONES. THE AUTOMATIC STOP CONTROLS SHALL BE CONFIGURED TO REDUCE THE HVAC SYSTEM'S HEATING TEMPERATURE SETPOINT AND INCREASE THE COOLING TEMPERATURE SETPOINT BY NOT LESS THAN 2°F (-16.6°C) BEFORE SCHEDULED UNOCCUPIED PERIODS BASED ON THE THERMAL LAG AND ACCEPTABLE DRIFT IN SPACE TEMPERATURE THAT IS WITHIN COMFORT LIMITS.

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TITLE:

MECHANICAL ABBREVIATIONS, SYMBOLS & GENERAL NOTES.

SHEET NUMBER:

M-0.1

HVAC SYSTEM SPECIFICATIONS

SUPERVISION
THIS HVAC PROJECT REQUIRES A FULL-TIME MECHANICAL SUPERVISOR TO BE ONSITE WHENEVER ANY HVAC CONTRACTOR IS PERFORMING INSTALLATION, COMMISSIONING, OR SERVICE WORK.

ALL HVAC CONTRACTOR PERSONNEL MUST OBTAIN AND WEAR AN OFFICIAL ID BADGE AT ALL TIMES. THE CONTRACTOR, AT THEIR DISCRETION, SHALL APPLY FOR AND SECURE FROM THE SOFTWARE ENGINEERING INSTITUTE A PHOTO ID CREDENTIAL FOR EACH HVAC TECHNICIAN OR FOR DESIGNATED STAFF AUTHORIZED TO LOG OTHER EMPLOYEES IN AND OUT.

PERMITS, CODES & REGULATORY COMPLIANCE
THE HVAC CONTRACTOR SHALL SECURE AND PAY FOR ALL NECESSARY MECHANICAL PERMITS, BUILDING PERMITS, AND INSPECTION CERTIFICATES REQUIRED FOR HVAC INSTALLATION, DUCTWORK FABRICATION, REFRIGERANT PIPING, CONTROLS, AND COMMISSIONING. THE OWNER WILL SECURE ZONING AND OCCUPANCY PERMITS.

ALL HVAC SYSTEM WORK SHALL CONFORM TO STATE AND LOCAL MECHANICAL CODES, ENERGY CODES, AND ALL APPLICABLE ORDINANCES, INCLUDING OSHA SAFETY REQUIREMENTS. IN THE EVENT OF ANY CONFLICT BETWEEN THE HVAC DESIGN AND APPLICABLE CODES (IMC, NFPA, NEC, UL), THE GOVERNING CODES AND STANDARDS SHALL TAKE PRECEDENCE AT NO ADDITIONAL COST TO THE OWNER.

ALL HVAC WORK SHALL FULLY COMPLY WITH THE INTERNATIONAL MECHANICAL CODE (IMC 2009 OR LATEST EDITION), NFPA, NEC, UL, AND OSHA REQUIREMENTS, AS WELL AS ALL MUNICIPAL, COUNTY, STATE, AND FEDERAL REGULATIONS HAVING JURISDICTION OVER HVAC SYSTEMS. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL HVAC-RELATED PERMITS ASSOCIATED WITH THIS PROJECT.

A. IT IS THE RESPONSIBILITY OF THE HVAC CONTRACTOR (IN COORDINATION WITH THE GENERAL CONTRACTOR) TO MAINTAIN COOLING AND CONDITIONED AIR SUPPLY AT ALL TIMES FOR THE MECHANICAL/EQUIPMENT FLOOR AREAS. ALL HVAC DEMOLITION, MODIFICATIONS, AND NEW INSTALLATIONS SHALL BE FULLY COORDINATED AND MAY NOT BEGIN UNTIL A WRITTEN METHOD OF PROCEDURE (MOP) IS REVIEWED AND APPROVED BY THE OWNER AND THE ENGINEER.

B. DURING CONSTRUCTION, THE CONTRACTOR SHALL CAP, SEAL, OR CLOSE OFF ALL DUCTWORK, PIPING, AND HVAC SYSTEM COMPONENTS NOT ACTIVELY UNDER INSTALLATION OR SERVICE, USING AN APPROVED METHOD. THIS IS TO PREVENT THE ENTRY OF DUST, DIRT, AND CONSTRUCTION DEBRIS INTO THE HVAC SYSTEM. SHOULD THE CONTRACTOR FAIL TO PROTECT OPEN ENDS OF DUCTS, CHILLED WATER PIPES, OR REFRIGERANT PIPING, THEY MAY BE REQUIRED TO VACUUM-CLEAN AND FLUSH THE ENTIRE HVAC SYSTEM AND REMOVE CONTAMINATED DUCT SECTIONS FOR INSPECTION.

C. ALL AIR OUTLETS, GRILLES, REGISTERS, AND DIFFUSERS SHALL BE COVERED WITH CHEESECLOTH OR MINIMUM 1-INCH FILTER MEDIA WHENEVER NEW AIR HANDLING UNITS (AHUS), FAN COIL UNITS (FCUS), OR OTHER HVAC SYSTEMS ARE BEING OPERATED TO PREVENT DUST MIGRATION INTO THE SYSTEM.

D. THE CONTRACTOR SHALL DISCONNECT, REMOVE, RELOCATE, OR REPLACE EXISTING HVAC PIPING, CONDUIT, DUCTWORK, AND ACCESSORIES (PART OF THE EXISTING SYSTEM) AS REQUIRED FOR HVAC SYSTEM ALTERATIONS, REROUTING, OR INSTALLATION OF NEW EQUIPMENT, IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS AND SPECIFICATIONS.

E. THE CONTRACTOR SHALL COORDINATE ALL HVAC UTILITY SHUTDOWNS (CHILLED WATER, CONDENSER WATER, HOT WATER, REFRIGERANT LINES, AND POWER TO HVAC SYSTEMS) IN ADVANCE WITH THE OWNER TO MINIMIZE OPERATIONAL IMPACT.

F. ALL HVAC ITEMS DESIGNATED FOR REUSE (E.G., DIFFUSERS, GRILLES, DAMPERS, PIPING, VALVES, DUCT SECTIONS, OR MECHANICAL EQUIPMENT) SHALL BE REMOVED CAREFULLY, STORED SECURELY, AND PROTECTED FROM DAMAGE, MOISTURE, OR THEFT. THE CONTRACTOR SHALL THOROUGHLY INSPECT AND TEST ALL REUSABLE HVAC COMPONENTS FOR DEFECTS PRIOR TO DISCONNECTION AND IMMEDIATELY NOTIFY THE OWNER OF DEFICIENCIES. ANY DAMAGE NOT NOTED AT REMOVAL SHALL BE CONSIDERED THE RESPONSIBILITY OF THE HVAC CONTRACTOR.

G. SALVAGED HVAC MATERIALS
THE OWNER SHALL DETERMINE THE DISPOSITION OF ALL SALVAGED HVAC MATERIALS, DUCT SECTIONS, PIPING, VALVES, DIFFUSERS, AND RELATED COMPONENTS. THE CONTRACTOR SHALL BE FULLY FAMILIAR WITH OWNER REQUIREMENTS FOR SALVAGE, RECYCLING, OR DISPOSAL OF HVAC MATERIALS, AND SHALL ADHERE STRICTLY TO THESE GUIDELINES.

H. BUILDING ENVELOPE & HVAC OPENINGS
ALL OPENINGS TO THE OUTDOORS CREATED BY HVAC PENETRATIONS (DUCTWORK, LOUVERS, REFRIGERANT LINES, PIPING SLEEVES, OR OTHER CONSTRUCTION ACTIVITIES) SHALL BE SEALED OFF AT THE END OF EACH WORKDAY TO MAINTAIN BUILDING PRESSURIZATION, INDOOR AIR QUALITY, AND SECURITY.

MATERIALS, WORKMANSHIP, AND METHODS

ALL HVAC MATERIALS AND EQUIPMENT SHALL BE NEW, FACTORY-CERTIFIED, AND OF THE HIGHEST QUALITY, FULLY CONFORMING TO THESE SPECIFICATIONS. WORKMANSHIP SHALL MEET THE HIGHEST PROFESSIONAL STANDARDS IN DUCT FABRICATION, REFRIGERANT PIPING, HYDRONIC PIPING, INSULATION, CONTROLS WIRING, AND EQUIPMENT INSTALLATION. ALL ITEMS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS, ASHRAE STANDARDS, AND PROJECT SPECIFICATIONS.

THE MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES, AND JOB SITE HVAC SAFETY (INCLUDING REFRIGERANT HANDLING, CONFINED SPACE WORK, AND LOCK-OUT/TAG-OUT PROCEDURES) SHALL REMAIN THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THEIR SUBCONTRACTORS.

OBSTRUCTIONS

THE CONTRACTOR SHALL NOTE THAT HVAC WORK IS BEING PERFORMED WITHIN EXISTING FACILITIES AND NUMEROUS OBSTRUCTIONS (STRUCTURAL BEAMS, EXISTING DUCTWORK, PIPING, CABLE TRAYS, LIGHTING, AND CEILING SYSTEMS) MAY HINDER INSTALLATION. THESE OBSTRUCTIONS MAY NOT BE SHOWN ON DRAWINGS; THEREFORE, THE HVAC CONTRACTOR SHALL INSTALL EQUIPMENT AND DUCTWORK IN SUCH A MANNER AS TO OVERCOME THESE DIFFICULTIES, COORDINATING WITH OTHER TRADES AS REQUIRED.

IF APPLICABLE TO THE INSTALLATION OF HVAC EQUIPMENT, EXISTING LIGHTING FIXTURES SHALL BE TEMPORARILY REMOVED AND RE-INSTALLED IN THEIR ORIGINAL LOCATIONS. THE CONTRACTOR SHALL LOCATE, IDENTIFY, AND DE-ENERGIZE CEILING LIGHTING CIRCUITS IN THE PROPOSED HVAC WORK AREAS, AND SHALL DISCONNECT AND RECONNECT ELECTRICAL BRANCH WIRING AS NEEDED TO FACILITATE HVAC INSTALLATION.

TEMPORARY HVAC VENTILATION

THE CONTRACTOR SHALL PROVIDE TEMPORARY HVAC VENTILATION SYSTEMS AS REQUIRED TO:

- DISSIPATE HUMIDITY AND MOISTURE,
- PREVENT ACCUMULATION OF DUST, CONSTRUCTION DEBRIS, FUMES, VAPORS, AND GASES,
- MAINTAIN ACCEPTABLE INDOOR AIR QUALITY (IAQ) DURING CONSTRUCTION ACTIVITIES.

ALL TEMPORARY VENTILATION PROCEDURES SHALL BE CONDUCTED IN SUCH A MANNER AS TO AVOID DISTURBANCE TO BUILDING OCCUPANTS AND TO COMPLY WITH ASHRAE STANDARDS AND OSHA REQUIREMENTS. WHERE NECESSARY, CONTRACTORS SHALL PROVIDE HEPA-FILTERED NEGATIVE AIR MACHINES, EXHAUST FANS, OR TEMPORARY DUCTED VENTILATION TO CONTROL AIR CONTAMINANTS.

POWDER–ACTUATED FASTENERS (HVAC INSTALLATION)

THE USE OF POWDER-ACTUATED FASTENERS (PAFS) AND THE TOOLS REQUIRED FOR THEIR INSTALLATION SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS, INCLUDING OSHA SAFETY STANDARDS. ONLY TRAINED AND CERTIFIED PERSONNEL SHALL OPERATE POWDER-ACTUATED FASTENING EQUIPMENT ON HVAC PROJECTS.
USE OF POWDER-ACTUATED FASTENERS SHALL BE LIMITED TO ANCHORING HVAC MATERIALS, SUPPORTS, HANGERS, AND FIXTURES INTO CONCRETE FLOORS, MASONRY WALLS, OR OTHER APPROVED SUBSTRATES WHERE SHEAR TRANSFER IS REQUIRED. TYPICAL HVAC APPLICATIONS INCLUDE:

- ANCHORING DUCTWORK SUPPORTS AND TRAPEZE HANGERS,
- SECURING PIPE HANGERS, BRACKETS, AND EQUIPMENT RAILS,
- MOUNTING CONDUIT AND CABLE TRAYS RELATED TO HVAC SYSTEMS.

POWDER-ACTUATED FASTENERS SHALL NOT BE USED FOR MAKING CONNECTIONS TO STRUCTURAL STEEL MEMBERS OR FOR ANY HVAC EQUIPMENT ANCHORAGE REQUIRING ENGINEERED BOLTS, EXPANSION ANCHORS, OR CHEMICAL ADHESIVE ANCHORS.

CONSTRUCTION SCHEDULE
UPON CONTRACT AWARD, THE HVAC CONTRACTOR SHALL PREPARE AND SUBMIT TO THE ENGINEER A DETAILED HVAC CONSTRUCTION SCHEDULE SHOWING:
- PHASING OF MAJOR HVAC SYSTEM INSTALLATION
- KEY MILESTONE DATES FOR EQUIPMENT DELIVERY AND STARTUP,
- TESTING, ADJUSTING, AND BALANCING (TAB) SCHEDULE, COMMISSIONING DATES.
- THE SCHEDULE SHALL BE UPDATED PERIODICALLY TO REFLECT ACTUAL PROGRESS.

SHEETING, BRACING, AND HVAC EQUIPMENT PROTECTION
THE HVAC CONTRACTOR SHALL INSTALL AND MAINTAIN ALL SHEETING, BRACING, AND PROTECTIVE BARRIERS AS REQUIRED TO SAFEGUARD EXISTING MECHANICAL EQUIPMENT, ELECTRICAL SWITCHGEAR, BATTERIES, ADJACENT TRADES, AND STRUCTURAL SYSTEMS DURING HVAC INSTALLATION. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ADEQUACY OF ALL BRACING AND PROTECTIVE SYSTEMS, IN COMPLIANCE WITH OSHA, ASHRAE SAFETY PRACTICES, AND AGC STANDARDS.

CONTRACTOR SHALL CONSTRUCT TEMPORARY HARD OR SOFT PARTITIONS AS DIRECTED BY THE OWNER'S REPRESENTATIVE OR AS REQUIRED BY REAL ESTATE LEASE REQUIREMENTS, HVAC PHASING PLANS, OR CONSTRUCTION DRAWINGS TO ISOLATE HVAC CONSTRUCTION AREAS FROM OCCUPIED SPACES.

WORK BY OTHERS AND COORDINATION WITH TRADES
A. THE ELECTRICAL SUBCONTRACTOR SHALL PERFORM ALL POWER WIRING FOR HVAC SYSTEMS. ALL CONTROL WIRING, BAS (BUILDING AUTOMATION SYSTEM) CONNECTIONS, AND DDC (DIRECT DIGITAL CONTROL) INTERFACES SHALL BE PERFORMED BY THE CONTROLS SUBCONTRACTOR (B.C.I. OR OWNER'S DESIGNATED PROVIDER).
B. THE HVAC CONTRACTOR SHALL COORDINATE FULLY WITH THE GENERAL CONTRACTOR AND OTHER TRADES REGARDING SCHEDULING, WORK SEQUENCING, AND THE ALLOCATION OF SPACE FOR DUCTWORK, PIPING, CONDUIT, EQUIPMENT PADS, AND CEILING PLENUM COORDINATION.

SCHEDULE OF WORK
ALL WORK SHALL BE SCHEDULED TO MINIMIZE DISRUPTION OF BUILDING OPERATIONS. ANY REQUIRED SHUTDOWN OF CHILLED WATER, HOT WATER, CONDENSER WATER, STEAM, OR POWER SYSTEMS SHALL BE COORDINATED IN WRITING WITH THE OWNER IN ADVANCE. CONTRACTOR SHALL PROVIDE A METHOD OF PROCEDURE (M.O.P.) FOR EACH SHUTDOWN AT LEAST 7 DAYS IN ADVANCE FOR OWNER AND ENGINEER REVIEW.

CONTRACTOR'S BID SHALL INCLUDE ALL COSTS FOR OVERTIME LABOR, TEMPORARY DUCT OR PIPING CONNECTIONS, BYPASS CONNECTIONS, AND OTHER MEASURES NECESSARY TO MAINTAIN HVAC SYSTEM FUNCTIONALITY DURING CONSTRUCTION.

ACCESS AND STAGING
THE CONTRACTOR SHALL HAVE LIMITED ACCESS TO THE SITE STAGING AREAS, PARKING LOTS, AND LOADING DOCKS. ANY ADDITIONAL SPACE REQUIRED FOR HVAC EQUIPMENT STORAGE, DUCTWORK STAGING, OR CRANE LIFTS SHALL BE COORDINATED WITH THE OWNER.

MEETINGS
THE CONTRACTOR AND REQUIRED SUBCONTRACTORS (CONTROLS, TAB, INSULATION, SHEET METAL, PIPING, ELECTRICAL, ETC.) SHALL ATTEND WEEKLY PROGRESS MEETINGS. CONTRACTOR'S SUPERINTENDENT SHALL SUBMIT A WRITTEN REPORT DETAILING HVAC WORK COMPLETED DURING THE PRIOR WEEK AND WORK SCHEDULED FOR THE FOLLOWING WEEK.

RECORD DRAWINGS
THE CONTRACTOR SHALL MAINTAIN AT THE SITE A COMPLETE SET OF REDLINED HVAC CONTRACT DRAWINGS SHOWING ALL FIELD DEVIATIONS, APPROVED CHANGES, AND ROUTING ADJUSTMENTS FOR DUCTWORK, PIPING, AND EQUIPMENT LOCATIONS. AT PROJECT COMPLETION, THE CONTRACTOR SHALL PROVIDE A FULL SET OF RECORD DRAWINGS (AS-BUILTS) TO THE ENGINEER OF RECORD AND OWNER FOR TURNOVER.

REVIEW OF SHOP DRAWINGS
THE CONTRACTOR SHALL SUBMIT DOCUMENTATION OF ALL EQUIPMENT AND MATERIALS TO BE USED ON THIS PROJECT FOR REVIEW BY THE ENGINEER OF RECORD AND OWNER PRIOR TO INSTALLATION. SIX (6) COPIES OF EACH SUBMITTAL SHALL BE PROVIDED, INCLUDING BUT NOT LIMITED TO:
- END-SUCTION, BASE-MOUNTED CENTRIFUGAL PUMPS
- INERTIA BASES
- VARIABLE FREQUENCY DRIVES
- PIPE INSULATION
- PIPING AND RELATED ACCESSORIES
- TEST & BALANCE CONTRACTOR INFORMATION AND QUALIFICATIONS
- CONTROLS SYSTEM INFORMATION AS FURNISHED BY B.C.I.
- B.A.S. WIRING DIAGRAMS
- CONCRETE PAD LAYOUT
  EQUIPMENT AND SHOP DRAWINGS AS REQUIRED

SITE VISITATION
THE CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO BIDDING TO VERIFY ALL EXISTING CONDITIONS, INCLUDING.
- EXISTING DUCT AND PIPING ROUTING,
- EQUIPMENT LOCATIONS AND SIZES,
- ABOVE-CEILING CONDITIONS AND ACCESS CLEARANCES.

SUBMISSION OF A BID SHALL SERVE AS CONFIRMATION THAT THE CONTRACTOR HAS VISITED THE SITE, REVIEWED CONDITIONS, AND ACCOUNTED FOR THEM IN THE PROPOSAL. FAILURE TO FAMILIARIZE WITH EXISTING CONDITIONS SHALL NOT BE CONSIDERED GROUNDS FOR ADDITIONAL COST OR TIME.

DRAWINGS AND SPECIFICATIONS
THE CONTRACTOR SHALL CAREFULLY REVIEW ALL DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES IDENTIFIED SHALL BE REPORTED IN WRITING TO THE ENGINEER OF RECORD AND OWNER'S REPRESENTATIVE FOR INSTRUCTIONS PRIOR TO PROCEEDING. NO DEVIATIONS FROM THE CONTRACT DOCUMENTS SHALL BE MADE WITHOUT PRIOR WRITTEN APPROVAL.

IN CASE OF QUESTIONS OR DISPUTES REGARDING INTERPRETATION OF THE DRAWINGS OR SPECIFICATIONS, THE OWNER'S REPRESENTATIVE SHALL PROVIDE CLARIFICATION, WHICH SHALL BE FINAL AND BINDING.

THE DRAWINGS AND SPECIFICATIONS ARE NOT INTENDED TO INDICATE EVERY DETAIL OR MATERIAL REQUIRED FOR THE WORK. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL COMPONENTS, CONNECTIONS, AND ACCESSORIES NECESSARY TO PROVIDE A COMPLETE AND FUNCTIONAL SYSTEM AS IMPLIED BY THE CONTRACT DOCUMENTS.

DRAWINGS ARE DIAGRAMMATIC IN NATURE AND DO NOT SHOW EXACT ROUTING OR LOCATIONS OF EQUIPMENT. THE CONTRACTOR SHALL COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS.

DUE TO THE SCALE OF THE DRAWINGS, NOT ALL OFFSETS OR FITTINGS MAY BE SHOWN. THE CONTRACTOR SHALL INSTALL WORK IN A MANNER THAT AVOIDS INTERFERENCE WITH PIPING, CONDUITS, EQUIPMENT, ARCHITECTURAL, AND STRUCTURAL FEATURES. ANY ADJUSTMENTS OR MODIFICATIONS NECESSARY TO ACCOMMODATE SITE CONDITIONS SHALL BE INCLUDED WITHOUT ADDITIONAL COST TO THE OWNER.

BECAUSE OF LIMITED CEILING SPACE AND THE EXTENT OF DUCTWORK, INSTALLATION OF DUCT SYSTEMS SHALL TAKE PRECEDENCE OVER OTHER TRADES. COORDINATION WITH ALL OTHER CONTRACTORS IS REQUIRED TO MAINTAIN PROPER CLEARANCES.

LOCATIONS
THE CONTRACTOR SHALL OBTAIN DETAILED INFORMATION REGARDING THE ACTUAL LOCATION OF EQUIPMENT AS FIELD CONDITIONS MAY VARY FROM THE DRAWINGS. ANY RELOCATION OR REINSTALLATION REQUIRED DUE TO THE CONTRACTOR'S FAILURE TO VERIFY CONDITIONS SHALL BE COMPLETED AT NO ADDITIONAL COST TO THE OWNER.

THE LAYOUT AND SUPPORTS SHALL BE SUBJECT TO REVISIONS AS REQUIRED TO AVOID CONFLICTS WITH STRUCTURE, ARCHITECTURAL ELEMENTS, AND EXISTING UTILITIES.

EXISTING EQUIPMENT
THE CONTRACTOR SHALL DISCONNECT AND REMOVE EXISTING EQUIPMENT, PIPING, BRANCH DUCTWORK, DIFFUSERS, REGISTERS, AND RELATED AUXILIARIES AS INDICATED.

CLEAN UP
THE CONTRACTOR SHALL PROTECT ALL EQUIPMENT AND MATERIALS UNTIL FINAL COMPLETION AND ACCEPTANCE OF THE PROJECT. ANY DAMAGED ITEMS SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.

DURING CONSTRUCTION, THE CONTRACTOR SHALL CLEAN ALL AREAS AND EQUIPMENT—INCLUDING HOODS, CABINETS, DIFFUSERS, REGISTERS, CONTROL PANELS, THERMOSTATS, FLOORING, AND WINDOWS—TO THE OWNER'S SATISFACTION PRIOR TO PROJECT TURNOVER

INTERRUPTION OF EXISTING SERVICES
NO EXISTING SERVICES SHALL BE INTERRUPTED WITHOUT PRIOR APPROVAL. ANY APPROVED INTERRUPTIONS SHALL BE KEPT TO THE SHORTEST DURATION POSSIBLE.

CONNECTIONS TO EXISTING MATERIALS
WHERE NEW WORK TIES INTO EXISTING SYSTEMS, THE CONTRACTOR SHALL PERFORM ALL CUTTING, ADJUSTMENTS, AND MODIFICATIONS REQUIRED TO ENSURE PROPER AND DURABLE CONNECTIONS, AS SHOWN ON DRAWINGS OR AS REQUIRED BY CONDITIONS.

ALL SUCH WORK SHALL CONFORM TO SPECIFICATIONS. ANY REMOVED PORTION OF A SYSTEM SHALL BE PROPERLY CAPPED, PLUGGED, OR CLOSED OFF. ALL UNUSED DUCTWORK AND PIPING MADE OBSOLETE BY THIS PROJECT SHALL BE REMOVED.

IDENTIFICATION
ALL MATERIALS, EQUIPMENT, AND SYSTEM COMPONENTS PROVIDED SHALL BE IDENTIFIED BY NAMEPLATES INDICATING NAME, SERVICE, FUNCTION, OR CONTROL.NAMEPLATES SHALL BE AT LEAST 1"X3" WITH CHARACTERS NOT LESS THAN 1/4". THEY SHALL BE MADE UP OF TWO LAMINATED BLACK PLASTIC SHEETS BONDED WITH A MIDDLE SHEET OF WHITE PLASTIC AND CHARACTERS ENGRAVED THROUGH ONE BLACK SHEET TO DEPTH OF WHITE PLASTIC.

ACCESS TO EQUIPMENT
IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO INSURE THAT ACCESS IS PROVIDED TO ALL CONCEALED DAMPERS, VALVES, COILS, CONTROL DEVICES, AND OTHER ITEMS REQUIRING PERIODIC MAINTENANCE

WORK BEYOND SCOPE AREAS
IN AREAS OF THE BUILDING NOT DIRECTLY INCLUDED IN THE SCOPE OF WORK, THE CONTRACTOR SHALL PERFORM ALL NECESSARY CUTTING, PATCHING, AND PAINTING REQUIRED TO COMPLETE THE INSTALLATION. ALL DISTURBED AREAS SHALL BE FINISHED TO MATCH THE SURROUNDING CONSTRUCTION AND APPROVED BY THE OWNER'S REPRESENTATIVE.

CUTTING AND PATCHING
ALL OPENINGS IN COMPLETED NEW WORK AND IN EXISTING WALLS AND FLOORS REQUIRED TO INSTALL WORK SHALL BE CUT BY THIS CONTRACTOR. ALL PATCHING MADE NECESSARY BY CONTRACTOR'S CUTTING SHALL BE COMPLETED BY THIS CONTRACTOR. CONTRACTOR'S RESPONSIBILITY AND SHALL BE PERFORMED BY WORKMEN SKILLED IN THIS RESPECTIVE TRADE. SURFACES OF PATCHWORK SHALL MATCH ADJACENT EXISTING CONSTRUCTION SUBJECT TO APPROVAL OF OWNER'S REPRESENTATIVE. HOLES REQUIRED THROUGH EXISTING FLOORS AND WALLS SHALL BE CUT WITH A CORE DRILL AND SHALL BE DRILLED BETWEEN RIBS, BEAMS OR JOISTS. ALL PATCHWORK SHALL BE SUBJECT TO REVIEW AND APPROVAL OF THE OWNER'S REPRESENTATIVE.

WIRING DIAGRAMS (FOR CONTROLS)
CONTRACTOR SHALL PREPARE A FINAL COMPOSITE WIRING DIAGRAM AND SHOW ALL RELATED EQUIPMENT UNDER HIS CONTRACT; HE SHALL SUBMIT 7 COPIES FOR REVIEW. WIRING DIAGRAM SHALL BE COMPATIBLE WITH ALL MISCELLANEOUS SWITCHES, STARTERS, CONTROL PANELS, MOTORS, AND ALL OTHER ELECTRICAL AND CONTROL DEVICES.

PAINTING
PAINTING OF WALLS SHALL BE COMPLETED BY THIS CONTRACTOR. PAINT SHALL BE COMMERCIAL QUALITY AND COLOR AS ACCEPTED BY OWNER, PROVIDE ONE PRIMER COAT AND TWO FINISH COATS. ALL PAINTING IS SUBJECT TO REVIEW AND APPROVAL OF THE OWNER'S REPRESENTATIVE.

LINTELS
CONTRACTOR SHALL PROVIDE ALL STEEL LINTELS FOR OPENINGS IN NEW AND EXISTING MASONRY WALLS REQUIRED FOR ITEMS INSTALLED UNDER THIS CONTRACT. COORDINATE INSTALLATION OF LINTELS WITH OTHER CONTRACTORS.

WARRANTY
WARRANTY PERIOD IS FOR ONE YEAR FROM DATE OF FINAL ACCEPTANCE.
AFTER ACCEPTANCE OF WORK BY OWNER, CONTRACTOR SHALL WARRANT THAT DURING ONE YEAR SPECIFIED PERIOD HE SHALL REPAIR ALL DEFECTIVE WORK AND REPLACE ALL DEFECTIVE MATERIALS FURNISHED OR INSTALLED UNDER CONTRACT, WITHOUT COST TO OWNER.

PERFORMANCE OF EQUIPMENT
ALL MOVING PARTS OF EQUIPMENT AND APPURTENANCES SHALL BE PROPERLY LUBRICATED BY CONTRACTOR AND SHALL BE STARTED UP AND TESTED BY HIM. ALL EQUIPMENT SHALL OPERATE WITHOUT OBJECTIONABLE NOISE OR VIBRATION AS DETERMINED BY OWNER'S REPRESENTATIVE. SHOULD SUCH OBJECTIONABLE NOISE OR VIBRATION BE PRODUCED AND TRANSMITTED TO OCCUPIED PORTIONS OF THE BUILDING BY APPARATUS, PIPING, PUMPS OR OTHER PARTS OF THIS WORK, ANY NECESSARY CHANGES AS APPROVED SHALL BE MADE WITHOUT COST TO OWNER.

SHEET METAL
GENERAL
1. FURNISH AND INSTALL ALL SHEET METAL WORK, GRILLES, DAMPERS, DIFFUSERS, CONTROL EQUIPMENT, ETC., AND ALL OTHER APPURTENANCES REQUIRED TO COMPLETE THE AIR CONDITIONING SYSTEMS AS SHOWN ON THE DRAWINGS OR SPECIFIED HEREIN.
2. THE SIZE AND LOCATION OF ALL DUCTWORK ARE SHOWN ON THE DRAWINGS. IF MEASUREMENTS IN THE FIELD INDICATE THAT CLEARANCES ARE INADEQUATE TO PASS THE DUCTS AS SHOWN, THE DUCTS MAY BE RESIZED OR RELOCATED SUBJECT TO THE REVIEW OF THE ENGINEER, WHERE NECESSARY, TO AVOID CONFLICT WITH THE WORK OF OTHER TRADES, THE LOCATION OF THE DUCTS MAY BE ALTERED SLIGHTLY FROM THAT SHOWN ON THE DRAWINGS, SUBJECT TO THE REVIEW OF THE ENGINEER. WHERE DIMENSIONS ARE NOT SHOWN ON DRAWINGS, DUCTS ARE TO BE SIZED TO FIT GRILLES, DUCT COLLARS, ETC., IN THE CASE OF LINED DUCTS, THE SIZES INDICATED ARE CLEAR INSIDE DIMENSIONS.
3. ALL PLENUMS AND ALL DUCTWORK SHALL BE CONSTRUCTED FROM GALVANIZED SHEET STEEL ALL HANGERS, ANGLES, BRACES, BOLTS, ETC. SHALL BE GALVANIZED. SHEET THICKNESS SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
   WIDTH OF DUCT SIDE-INCHES USS GAGE NO.
   0 TO 24 24
   25 TO 40 22
   41 TO 60 20
   61 & OVER 18
4. ALL RECTANGULAR DUCTS SHALL BE COMPLETE WITH FOUR SIDES AND SHALL BE AIR TIGHT AND STIFFENED WITH BEADING AT 12" CENTERS. BEADING SHALL BE ACROSS THE DUCT ON ALL FOUR SIDES. ALL DUCTS SHALL BE MADE WITH TIGHT JOINTS AND SHALL NOT BE CROSS-BROKEN. POOR WORKMANSHIP IN THE MAKING F SEAMS OR JOINTS SHALL BE SUFFICIENT CAUSE FOR REJECTING DUCTWORK. LL LONGITUDINAL SEAMS IN DUCTS SHALL BE TIGHT DOUBLE LOCK PITTSBURGH TYPE. NO SECTIONS OF DUCT SHALL BE OVER FIVE FEET IN LENGTH.
5. DO NOT HANG DUCTWORK FROM BEAM DROPS OR COLUMNS.
6. ALL TRANSITIONS SHALL BE 5:1 UNLESS NOTED OTHERWISE.
   CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ON ALL SHEET METAL WORK TO BE INSTALLED OR MODIFIED. SHOP DRAWINGS SHALL BE DRAWN TO SCALE. INSULATION - DUCTWORK ALL RECTANGULAR OUTDOOR, MIXED AIR PLENUM SHALL BE INSULATED WITH 1" THICK OWENS CORNING 703 FRK (FIBER RIGID DUCT INSULATION) WITH A FIBERGLASS REINFORCED DRAFT (FRK) JACKET OR SIMILAR PRODUCT AS MANUFACTURED BY KNAUF. ALL JOINTS AND EXPOSED EDGES SHALL BE NEATLY SEALED WITH A 4" STRIP OR PRESSURE SENSITIVE TAPE MADE OF THE JACKET MATERIAL. ALL HOLES IN INSULATION SHALL BE SEALED. FIBERGLASS RIGID VAPOR SEAL WITH UL RATED FACING, INSTALL WITH STICK- KLIPS.
7. ALL EQUIPMENT AND ACCESSORIES IN SHEET METAL ENCLOSURES AND IN DUCTS SHALL BE BOLTED IN POSITION ON NOT MORE THAN 6" CENTERS. ALL ITEMS SHALL BE EASILY REMOVABLE, AND CLEARANCES SHALL BE PROVIDED TO PERMIT REMOVAL OF EACH ITEM WITHOUT CUTTING OR REMOVING THE DUCTWORK. CUT OFF EXCESS BOLT LENGTHS.
   PRIOR TO REMOVING ANY INSTALLED DUCT, OUTER SURFACES OF DUCT MUST BE VACUUMED WITH A HEPA TYPE VACUUM CLEANER AND DUSTED WITH AN OIL IMPREGNATED CLOTH. EACH SECTION OF DUCT REMOVED MUST BE CAPPED WITH PLASTIC PRIOR TO REMOVAL TO ELIMINATE FALLOUT OF INTERIOR DUCT DURING ANY DRILLING OPERATION, A HEPA TYPE VACUUM MUST BE USED TO ELIMINATE DUST. IN ADDITION, A PLUNGER HEAD OR EQUIVALENT MUST BE USED WITH THE DRILL ND VACUUM WHEN DRILLING OVERHEAD.CONTRACTOR TO COVER ALL EXISTING AND NEW SUPPLY OUTLETS WITH CHEESE CLOTH PRIOR TO ANY WORK BEING PERFORMED ON SYSTEM TO PREVENT DIRT, METAL CHIPS/FLAKES, DUST BEING ENTERED IN THE AIRSTREAM. CHEESE CLOTH TO BE REMOVED PRIOR TO SYSTEM BALANCING.
8. MINIMUM INSULATION REQUIREMENTS AS PER 2021 IECC :

	SUPPLY	RETURN
UNCONDITIONED SPACES WITHIN BUILDING:	R-6	R-6
INDIRECTLY CONDITIONED SPACES:	R-12	R-12
OUTSIDE OF BUILDING:	R-12	R-12

TESTING AND BALANCING
THE GENERAL CONTRACTOR SHALL MAKE TESTS DIRECTED BY THE OWNER. THEY SHALL PROVIDE ALL LABOR, TOOLS, EQUIPMENT, INSTRUMENTS AND MATERIALS TO MAKE SUCH TESTS. ALL SYSTEMS SHALL BE LEFT IN GOOD OPERATING CONDITION. IF DEFECTS OF WORKMANSHIP OR MATERIALS IN PIPING AND WIRING SYSTEM OR EQUIPMENT ARE DISCLOSED AS A RESULT OF THESE TESTS AND OPERATION, REPAIRS SHALL BE MADE BY THE CONTRACTOR. TESTS SHALL BE REPEATED UNTIL SATISFACTORY TEST HAS BEEN MADE TO CONTRACTOR'S SATISFACTION. ALL DEFECTIVE APPARATUS SHALL BE REMOVED FROM THE SITE AND REPLACED BY MATERIALS CONFORMING TO REQUIREMENTS OF THESE SPECIFICATIONS. ENTIRE COST OF REPLACEMENTS AND REPAIRS SHALL BE BORNE BY THE GENERAL CONTRACTOR.

THE FOLLOWING OPERATIONS SHALL BE PERFORMED IN PREPARATION FOR FINAL INSPECTION BY THE ENGINEER. THE CONTRACTOR SHALL DEMONSTRATE TO THE ENGINEER THAT THE SYSTEM IS OPERATING IN COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS. ALL TESTS AND INSPECTIONS SHALL BE COMPLETED BEFORE FINAL PAYMENT IS MADE TO THE CONTRACTOR. BEFORE A FINAL WALK THROUGH AND SYSTEM ACCEPTANCE BY THE OWNER, THE CONTRACTOR WILL SUBMIT COMPLETED SYSTEM REPORTS TO THE DESIGN PROFESSIONAL.

WORK
DESCRIPTION OF WORK
AIR BALANCING AND ADJUSTING
THE GENERAL CONTRACTOR SHALL PROVIDE AS PART OF THIS CONTRACT THE SERVICES OF TESTING AND BALANCING FIRM AS LISTED BY THE ASSOCIATED AIR BALANCE COUNCIL (AABC). THE BALANCING FIRM SHALL BE RESPONSIBLE FOR ALL BALANCING

WORK BY THE BALANCING FIRM SHALL BE UNDER THE DIRECT SUPERVISION OF A REGISTERED PROFESSIONAL ENGINEER, WHO IS A FULL TIME EMPLOYEE OF THE FIRM.

TESTING SHALL BE IN STRICT ACCORDANCE WITH PUBLISHED AABC PROCEDURES.ALL INSTRUMENTS SHALL CONFORM TO AABC REQUIREMENTS, WITH AABC FORMS UTILIZED TO RECORD DATA. CERTIFIED TESTING AND BALANCING REPORT SHALL MEET ALL AABC REQUIREMENTS.

THE CONTRACTOR AND PRIOR BALANCING FIRM SHALL REPORT TO THE SITE AND REVIEW THE WORK REQUIRED PRIOR TO BEGINNING OF THEIR WORK. INSPECTIONS OF THE AIR SYSTEMS SHALL BE MADE BY THE BALANCING FIRM AND THEY SHALL REPORT THEIR FINDINGS TO ENGINEER. ALL TESTS REQUIRED SHALL BE PERFORMED DURING OR AFTER CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER. REPAIR ALL EXISTING LEAKS PRIOR TO BALANCING.

AFTER THE VARIOUS PARTS OF THE SYSTEM HAVE BEEN TESTED A PRELIMINARY SYSTEM TEST SHALL BE RUN.

DURING ALL TESTS, IT SHALL BE DEMONSTRATED THAT THE SYSTEMS ARE FREE FROM LEAKS AND THAT ALL PARTS OF THE SYSTEM WILL OPERATE CORRECTLY. THE BALANCING FIRM SHALL MAKE FINAL ADJUSTMENTS TO ALL EQUIPMENT AND CONTROLS AS MAY BE REQUIRED TO PROPER OPERATION MAINTAINING CORRECT TEMPERATURES IN ALL PARTS OF THE BUILDING. CONTROLS SHALL BE ADJUSTED BY THE CONTROL CONTRACTOR'S MECHANICS ON THE ADVICE OF THE BALANCING FIRM.

THE BALANCING FOR NEW AND EXISTING AIR CONDITIONING UNITS SHALL INCLUDE THE FOLLOWING WORK:

DETERMINE THE PERFORMANCE OF EACH AIR CONDITIONING UNIT PRIOR TO INSTALLATION OF BELTS, PULLEYS AND MOTOR SHEAVES AND AFTER THE FANS HAVE BEEN ADJUSTED, NOTE THE FOLLOWING READINGS.

FANS: SUCTION PRESSURE, DISCHARGE PRESSURE, MOTOR RPM, FAN RPM, MOTOR VOLTS AND AMPERES, CFM.

MAKE PITOT TUBE TRAVERSE OF MAIN SUPPLY DUCTS AND OBTAIN DESIGN CFM

TEST AND RECORD SYSTEM STATIC PRESSURE, SUCTION AND DISCHARGE.

TEST AND ADJUST SYSTEM FOR DESIGN AIR CFM.

TEST AND RECORD ENTERING AND LEAVING AIR DRY BULB AND WET BULB.
ADJUST ALL ZONES TO PROPER DESIGN CFM, SUPPLY AND RETURN.

TEST AND ADJUST EACH REGISTER TO WITHIN 10 PERCENT OF DESIGN REQUIREMENTS AND IDENTIFY EACH AS TO LOCATION AND AREA. LIST SIZE AND TYPE OF ALL REGISTERS, FANS, BALANCING DAMPERS AND ALL TESTED EQUIPMENT.
MAKE ANY CHANGES IN PULLEYS, MOTOR SHEAVES, BELTS, AND DAMPERS OR THE ADDITION OF DAMPERS REQUIRED FOR CORRECT BALANCE.

PROVIDE SINGLE LINE DUCTWORK DRAWING LOCATING OUTLETS AND AIR HANDLING UNIT COMPONENTS INDICATING CFM OF EACH OUTLET, S.P. OF EACH COMPONENT OF FAN UNITS.

PROVIDE SINGLE LINE DRAWING OF AIR HANDLING UNIT INDICATING PRESSURE DROPS OF COIL, FILTERS, BLENDER SECTION, DAMPERS, ETC.
SUPPLY REGISTERS SERVING TELEPHONE EQUIPMENT AREAS – DEFLECTION OF VANES TO BE DIRECTED TO SUPPLY AIR BETWEEN EQUIPMENT AISLES.

SUPPLY REGISTERS SERVING TELEPHONE EQUIPMENT AREAS – DEFLECTION OF VANES TO BE DIRECTED TO SUPPLY AIR BETWEEN EQUIPMENT AISLES

CHECK THE OPERATION OF ALL AUTOMATIC TEMPERATURE CONTROL EQUIPMENT,VERIFY ALL THERMOSTAT, HUMIDISTAT,ETC, SET POINTS AND OPERATIONS

DEMONSTRATION OF OPERATION: AFTER COMPLETION OF THE ADJUSTMENT AND BALANCING, THE SYSTEMS SHALL BE OPERATED FOR A PERIOD OF ONE WEEK DURING WHICH TIME THE SYSTEM SHALL DEMONSTRATE TO OWNER AS BEING COMPLETED AND OPERATING IN CONFORMANCE WITH THE SPECIFICATION.

THE SYSTEM SERVING TELEPHONE EQUIPMENT AREA SHALL BE BALANCED WITH A STATIC PRESSURE OF 0.50 IMPOSED AT THE FILTERS.

INCLUDE A SINGLE LINE DIAGRAM OF THE SUPPLY AND RETURN AIR SYSTEM FOR HE AIR HANDLING UNITS, WHICH INCLUDES ALL SUPPLY REGISTERS, DRUM LOUVERS AND RETURN GRILLES

THE BALANCING CONTRACTOR SHALL DETERMINE THE FAN SPEED (RPM) AND SHEAVE SIZES REQUIRED TO DELIVER THE MAXIMUM DESIGN AIRFLOW TO ALL OUTLETS AT THE MAXIMUM DESIGN STATIC PRESSURE DROP FOR THE INITIAL AIR QUANTITIES. THE CONTRACTOR SHALL PROVIDE AND INSTALL FIXED SHEAVES, BELTS AND PULLEYS, TO MEET THIS CONDITION. USING THE DAMPERS TO CONTROL THE MAXIMUM DESIGN FLOW IS PROHIBITED. THE FINAL FIXED SHEAVES, BELTS AND PULLEYS FURNISHED FOR THE FANS SHALL BE ENGINEERED TO OPERATE THE FAN SUCH THAT THE FAN WILL NOT OVERLOAD OR EXCESSIVE STATIC PRESSURE WILL NOT BE PERMITTED TO BUILD UP IN THE DUCT SYSTEM.

THE BALANCING FIRM SHALL PLUG ALL HOLES DRILLED IN DUCTS WITH TYPE 5M REMOVABLE CAPS AS MANUFACTURED BY ROBROY INDUSTRIES.

FINAL ADJUSTMENT AND BALANCING SHALL PROVIDE OPTIMUM CONDITIONS IN ALL AREAS. THE TOTAL AIR QUANTITY OF ANY FAN SHALL BE BALANCED WITHIN PLUS OR MINUS 5%
OF THE RATED FLOW. AIR QUANTITIES AT EACH OUTLET SHALL BE BALANCED WITHIN PLUS OR MINUS 10% OF RATED FLOW. DURING AND FOLLOWING FINAL ADJUSTMENT, THE CONTRACTOR SHALL REPLACE DRIVE SHEAVES, BELTS AND PULLEYS AND INSTALL VOLUME DAMPERS, TO BALANCE THE SYSTEM SATISFACTORILY. DRIVES AND DAMPERS SHALL BE INCLUDED IN THE CONTRACT AMOUNT.

SUBMIT REPORT ON THE SUPPLY AIR SYSTEM. THIS REPORT SHALL CERTIFY TEST METHODS AND INSTRUMENTS USED, ALL READINGS OBTAINED, TEMPERATURE AND PRESSURE DROPS, RPM OF EQUIPMENT, AMPERAGE OF ALL MOTORS, AND QUANTITIES AT EACH SUPPLY REGISTER, DIFFUSER, AND AIR BALANCING PROBLEMS ENCOUNTERED AND SUGGESTIONS. A MINIMUM OF THREE CERTIFIED COPIES OF REPORTS SHALL BE SUBMITTED TO THE ENGINEER AND EACH SHALL INCLUDE DATA ON ALL TEST IN THE FORM NORMALLY USED BY AABC, HOWEVER, VARIED TO SUIT THESE SPECIFICATIONS.

INSTRUCTIONS
A. AFTER ALL TESTS AND ADJUSTMENTS HAVE BEEN MADE, APPROVED FACTORY/AUTHORIZED SYSTEM REPRESENTATIVES AND THE CONTRACTOR SHALL FULLY INSTRUCT THE OWNER IN ALL DETAILS OF OPERATION AND MAINTENANCE OF EQUIPMENT INSTALLED UNDER HIS DESIGNATED CONTRACT. DATES AND TIMES OF SUCH INSTRUCTIONS SHALL BE AS DIRECTED.

OPERATING INSTRUCTIONS
A. THE CONTRACTOR SHALL FURNISH THREE COMPLETE SETS OF OPERATING AND MAINTENANCE INSTRUCTIONS. THIS SHALL INCLUDE FINAL WIRING AND CONTROL DIAGRAMS, CATALOG DATA INCLUDING CONSTRUCTION AND MAINTENANCE INFORMATION ON ALL EQUIPMENT, AND MAINTENANCE INFORMATION ON THE COMPLETE SYSTEM.

WARRANTY
A. CONTRACTOR SHALL SUBMIT UPON COMPLETION OF THE WORK, A SINGLE WARRANTY STATEMENT THAT ALL PORTIONS OF THE WORK UNDER HIS DESIGNATED CONTRACT ARE IN ACCORDANCE WITH CONTRACT REQUIREMENTS, PERFECT AS TO MATERIAL AND WORKMANSHIP, AND WILL SO REMAIN FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE. CONTRACTOR SHALL FURTHER WARRANT THAT DURING THE ONE YEAR SPECIFIED PERIOD HE WILL REPAIR ALL DEFECTIVE WORK AND REPLACE ALL DEFECTIVE MATERIALS FURNISHED OR INSTALLED UNDER THIS DESIGNATED CONTRACT, WITHOUT COST TO THE OWNER.

HVAC FANS

DIRECT DRIVE PREMIUM CEILING MOUNTED CENTRIFUGAL EXHAUST FANS - GREENHECK MODEL SP-A

A. GENERAL DESCRIPTION:
1. BASE FAN PERFORMANCE AT STANDARD CONDITIONS (DENSITY 0.075 LB/FT3)
2. CEILING MOUNTED APPLICATIONS
3. PERFORMANCE CAPABILITIES UP TO 1,600 CUBIC FEET PER MINUTE (CFM) AND STATIC PRESSURE TO 0.75 INCHES OF WATER GAUGE
4. FANS ARE AVAILABLE IN NINETEEN SIZES (50 - 1550 UNIT SIZES)
5. MAXIMUM OPERATING TEMPERATURE IS 130 FAHRENHEIT (54.4 CELSIUS)
6. SOUND LEVELS AS LOW AS 0.7 AMCA SONESSOUND LEVELS AS LOW AS <0.3 AMCA SONES
7. UL/CUL LISTED FOR ABOVE BATHTUB EXHAUST
8. FANS ARE UL/CUL LISTED 507 - ELECTRIC FANS
9. EACH FAN SHALL BEAR A PERMANENTLY AFFIXED MANUFACTURER'S NAMEPLATE CONTAINING THE MODEL NUMBER AND INDIVIDUAL SERIAL NUMBER

B. WHEEL:
1. FORWARD CURVED CENTRIFUGAL WHEEL
2. CONSTRUCTED OF GALVANIZED STEEL OR CALCIUM CARBONATE FILLED POLYPROPYLENE
3. STATICALLY AND DYNAMICALLY BALANCED IN ACCORDANCE TO AMCA STANDARD 204-05

C. MOTORS:
1. AC INDUCTION MOTOR
   a. MOTOR ENCLOSURES: TOTALLY ENCLOSED AIR OVER: (TEAO)- DESIGNED TO BE USED SOLELY IN THE AIRSTREAM, CONSTRUCTED WITH A DUST TIGHT COVER AND A AERODYNAMIC BODY WHICH REPLIES UPON THE STRONG AIRFLOW OF THE FAN TO COOL THE MOTOR, NOT SUITABLE FOR HAZARDOUS ENVIRONMENTS.
   b. MOTORS SHALL BE PERMANENTLY LUBRICATED SLEEVE BEARING TYPE TO MATCH WITH THE FAN LOAD AND FURNISHED AT THE SPECIFIC VOLTAGE AND PHASE.
   c. MOTOR SHALL BE MOUNTED ON VIBRATION ISOLATORS AND BE ACCESSIBLE FOR MAINTENANCE
   d. THERMAL OVERLOAD PROTECTION

D. HOUSING:
1. CONSTRUCTED OF HEAVY GAUGE GALVANIZED STEEL
2. INTERIOR SHALL BE LINED WITH 0.5 INCHES OF ACOUSTICAL INSULATION
3. PROFILE AS LOW AS 10 1/2 INCHES

E. SPRING LOADED ALUMINUM BACKDRAFT DAMPER:
1. PREVENTS AIR FROM ENTERING BACK INTO THE BUILDING WHEN FAN IS OFF
2. ELIMINATES RATTLING OR UNWANTED BACKDRAFTS

F. OUTLET:
1. TYPE OF OUTLET: ROUND
2. FIELD ROTATABLE FROM HORIZONTAL TO VERTICAL DISCHARGE
3. SHALL INCLUDE AN ALUMINUM BACKDRAFT DAMPER

G. EXTERNAL ELECTRICAL ACCESSORIES:
1. ELIMINATES REMOVING THE MOTOR PACK WHICH SAVES TIME ON INSTALLATION

H. MOUNTING BRACKETS:
1. FULLY ADJUSTABLE FOR MULTIPLE INSTALLATION CONDITIONS

END OF SECTION

DIFFUSERS, REGISTERS, AND GRILLES

1.0 GENERAL

1.01 DESCRIPTION

A DRAWINGS COVER THE PROVISIONS OF ALL LABOR, EQUIPMENT, APPLIANCES AND MATERIALS, AND PERFORMING ALL OPERATIONS IN CONNECTION WITH THE CONSTRUCTION AND INSTALLATION OF AIR DISTRIBUTION DEVICES AS SPECIFIED HEREIN AND AS SHOWN. THESE UNITS INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:
1. CEILING DIFFUSERS (CD)
2. RETURN AIR GRILLES (RG)
3. SUPPLY AIR GRILLES (SG)
4. EXHAUST AIR GRILLE (EG)

A. IT IS THE INTENT OF THIS SECTION OF THE SPECIFICATIONS TO PROVIDE COMPLETE, OPERABLE, ADJUSTED AIR DISTRIBUTION DEVICES AS SHOWN AND SPECIFIED WHICH ARE FREE OF EXCESSIVE NOISE, VIBRATION AND AIRFLOW FLUCTUATIONS.

1.03 SELECTION CRITERIA

A. ALL AIR DISTRIBUTION DEVICES SHALL BE SELECTED IN ACCORDANCE WITH THE FOLLOWING MINIMUM CRITERIA UNLESS OTHERWISE NOTED BELOW OR ON THE DRAWINGS:

1. METHOD OF MOUNTING SHALL BE COMPATIBLE WITH THE CEILING, WALL OR DUCT SURFACE WHICH IT MOUNTS ON OR IN; I.E. LAY-IN, SURFACE MOUNTING, PLASTER FRAME, DUCT COLLAR, ETC. THE ARCHITECTURAL DRAWINGS SHALL BE REFERENCED TO DETERMINE THE MOUNTING METHOD FOR EACH DEVICE. ALL FLANGES ON SURFACE MOUNTED DEVICES SHALL BE PROVIDED WITH A GASKET.

2. FINISH OF ALL CEILING MOUNTED DEVICES SHALL BE SELECTED TO MATCH THE COLOR OF THE ADJACENT CEILING. FINISH OF ALL WALL MOUNTED DEVICES SHALL BE PRIMER WHICH IS COMPATIBLE WITH THE FINISH COATING SPECIFIED FOR THE ADJACENT WALL; FINISH COAT WILL BE APPLIED UNDER DIVISION 9.

1.04 BASIS OF DESIGN

A. THE BASIS OF DESIGN IS TITUS. ANY PROPOSED SUBSTITUTIONS SHALL BE PROVEN EQUAL IN ALL RESPECTS TO THE EQUIPMENT SPECIFIED AS THE BASIS OF DESIGN. ANY MODIFICATIONS TO DUCTWORK, CONTROLS, CEILINGS, BUILDING STRUCTURE, ETC, THAT RESULT FROM ANY SUBSTITUTION SHALL BE COORDINATED WITH ALL TRADES. THIS COORDINATION SHALL OCCUR BEFORE DELIVERY OF EQUIPMENT AND ANY MODIFICATIONS SHALL BE PERFORMED WITHOUT INCURRING ADDITIONS TO THE CONTRACT.

SPANISH FORK, UT BUILDING DEPARTMENT NOTES

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

1. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.

2. VENTILATION FOR ALL AREA SHALL COMPLY WITH 2021 INTERNATIONAL MECHANICAL CODE CHAPTER 4.

3. AS PER IECC 2021, CONSTRUCTION DOCUMENT SHALL REQUIRE THAT, WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, RECORD DRAWINGS OF THE ACTUAL INSTALLATION BE PROVIDED TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER.

4. AS PER IECC 2021, CONSTRUCTION DOCUMENT SHALL REQUIRE THAT AN OPERATING MANUAL AND A MAINTAINED MANUAL BE PROVIDED TO THE BUILDING OWNER WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.

5. TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH 2021 INTERNATIONAL BUILDING CODE REQUIREMENTS AS OUTLINES IN SECTION [BC 1704].

6. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.

7. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF THE 2021 INTERNATIONAL MECHANICAL CODE:
   A. VENTILATION SYSTEM BALANCING IMC 2021 - 403.1
   B. SMOKE CONTROL SYSTEMS - IMC 2021 - 513

8. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
   A. STANDARDS OF HEATING -IMC 2021 - 309.1
   B. DUCT CONSTRUCTION AND INSTALLATION-IMC 2021 - 603
   C. AIR INTAKES, EXHAUSTS AND RELIEF - IMC 2021 - 401.5 & 501.3
   D. AIR FILTERS - IMC 2021 - 605
   E. MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR DISTRIBUTION SYSTEMS - IMC 2021 - 513
   F. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
   G. GAS FIRED EQUIPMENT - 2021 IFGC CODE

9. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY IMC 2021 - 403.3

10. SMOKE DETECTION SYSTEMS SHALL BE INSTALLED AND SEQUENCED TO FOLLOW CONTROLS OPERATIONS WITH THE REQUIREMENTS OF SECTION IMC 2021 - 606 TO CLOSE DAMPERS AND AUTOMATICALLY STOP THE FAN.

11. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION & PROVIDE FIRE DAMPER FOR DUCT PENETRATING THOSE WALLS.

12. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

MilkShake FACTORY EST 1914

TITLE:

MECHANICAL SPECIFICATIONS

SHEET NUMBER:

M-0.2

GAS FIRED PACKAGED ROOF TOP UNIT SCHEDULE (PROVIDED BY LL)

UNIT ID	MANUFACTURER	MODEL	NOMINAL TONS	SUPPLY FAN DATA			HEATING				COOLING DATA				ELECTRICAL DATA					EER	IEER	OPERATING WEIGHT (LBS)
				TOTAL	OUTSIDE AIR	EXTERNAL STATIC PRESSURE (IN. W.G.)	TYPE	INPUT	OUTPUT	EFFICIENCY	TOTAL	SENSIBLE	AMBIENT TEMP.	ENTERING TEMP.	VOLTS	PHASE	Hz	MCA(A)	MOCP(A)			
				CFM	CFM			MBH	MBH	%	MBH	MBH	DB (°F)	DB / WB(°F)								
(E) RTU-1	CARRIER	48FEDNB07	6	2400	470	1.0	LOW GAS HEAT	67	54	81	76.4	57.1	95	80/67	208/230	3	60	31	50	11.2	15.0	900

NOTES:

1. ALL EQUIPMENTS MUST BE STANDARD EFFICIENT, MEETING OR EXCEEDING THE BRAND MINIMUM REQUIREMENTS.
2. PROVIDE 8-WIRE, 24VAC, AUTOMATIC CHANGEOVER, 2 STAGE HEAT/COOL, REMOTELY PROGRAMMABLE THERMOSTAT.
3. PROVIDE 5-MINUTE ANTI-SHORT CYCLE TIMER.
4. PROVIDE THRU THE BASE ELECTRICAL AND SINGLE POINT CONNECTION.
5. PROVIDE WITH 2" MERV 8 FILTERS.
6. PROVIDE 14" HIGH ROOF CURBS TO INSTALL UNIT AS PER MANUFACTURERS RECOMMENDATIONS. COORDINATE WITH STRUCTURAL ENGINEERS FOR LOAD.
7. PROVIDE UNPOWERED CONVENIENCE OUTLET.
8. PROVIDE WITH FACTORY INSTALLED NON-FUSED DISCONNECT.
9. PROVIDE MANUFACTURER'S MOTOR AND DRIVE PACKAGE AS REQUIRED TO MEET SCHEDULED AIR CAPACITIES AND PRESSURE DROP.
10. PROVIDE ALL COMPRESSORS WITH 5 YEAR WARRANTY.
11. PROVIDE HOT GAS REHEAT.
12. RUN 1" CONDENSATE DRAIN LINE TO NEAREST APPROVED DRAINAGE LOCATION.
13. PROVIDE CONDENSER COIL HAIL GUARDS.
14. PROVIDE ENTHALPY ECONOMIZER FOR NEW RTU WITH BAROMETRIC RELIEF & FDD.

AIR TERMINAL SCHEDULE

TAG	MANUFACTURER	MODEL	TYPE	CFM RANGE	NECK SIZE	NOMINAL FACE SIZE	REMARKS	NOTES
SG-1	TITUS	S300FL	SPIRAL DUCT MOUNTED SUPPLY AIR GRILLE	150-400	SEE PLAN	SEE PLAN	DUCT MOUNT	1-4
SG-2		300FL	SUPPLY AIR WALL MOUNTED GRILLE	200-400	SEE PLAN	SEE PLAN	WALL MOUNT	1-4
CD-1		OMNI	SUPPLY SQUARE DIFFUSER	0-100	6" DIA	24"X24"	CEILING MOUNT	1-4
				101-200	8" DIA	24"X24"	CEILING MOUNT	1-4
				201-400	10" DIA	24"X24"	CEILING MOUNT	1-4
RG-1		PAR	RETURN DIFFUSER	0-250	8"x8"	24"X24"	CEILING MOUNT	1-4
				250-400	10"x10"	24"X24"	CEILING MOUNT	1-4
				400-600	12"x12"	24"X24"	CEILING MOUNT	1-4
RG-2		350RL	RETURN AIR DUCT/WALL MOUNTED GRILLE	1500-2000	SEE PLAN	SEE PLAN	WALL MOUNT	1-4

NOTES:

1. BORDER/ FRAME TYPE TO BE COMPATIBLE WITH CEILING/WALL TYPE.
2. COLOR AND FINISH TO BE REVIEWED AND APPROVED BY THE ARCHITECT.
3. PROVIDE OPPOSED BLADE DAMPER AS ACCESSARY FOR ALL AIR TERMINAL FOR AIR BALANCING OR ELSE PROVIDE DAMPER IN DUCTS.WHERE LOCATED IN INACCESSIBLE AREAS, PROVIDE CABLE OPERATED DAMPER LOCATED IN THE BRANCH, OPERABLE THROUGH THE FACE OF THE DIFFUSER (KEY OPERATED).
4. INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS.

HEAT PUMP (INDOOR UNIT) SCHEDULE

MAKE:- TRANE-MITSUBISHI (OR EQUIVALENT)

UNIT TAG	LOCATION	AREA SERVED	TYPE	CAP. (TON)	COOLING MBH	HEATING MBH	TOTAL CFM	OUTDOOR CFM	MAX RATED	ELECTRICAL DATA			MAX. SOUND	DIMENSIONS (HXWXD) (IN.)	PIPE SIZE (INCH)			WEIGHT (LBS.)	MODEL NO.
										PH/VOLT/HZ	MCA (A)	MOP (A)			LIQ.	SUCTION	DRAIN (ID)		
(N) AC-1	SEE ON PLAN	SEE PLAN	CEILING CONCEALED DUCTED	2	24	25	740	130	0.6	1/208-230/60	2.25	15	35	10X44X29	1/4"	5/8"	1-1/4"	80	PEAD-AA24NL (OR EQUIVALENT)

NOTES:-

1. SUPPLY AIR CFM BASED ON HIGH SPEED.
2. REFRIGERANT R454B SHALL BE PROVIDED.
3. PROVIDE MOUNTING BRACKETS AND ALL ASSOCIATED ACCESSORIES.
4. ALL REFRIGERANT PIPING TO BE SIZED PER MANUFACTURERS RECOMMENDATIONS.
5. AC UNIT TO BE PROVIDED WITH THE APPROPRIATE FBM FILTER BOXES.
6. INDOOR UNIT ACCESS PANEL FIELD-PROVIDED.
7. CONTRACTOR SHALL PROVIDE A LONG LINE SET FOR REFRIGERANT PIPING IN THE EVENT THAT TOTAL REFRIGERANT LENGTH EXCEEDS THE MANUFACTURER'S STANDARD RECOMMENDED LENGTH.
8. ALL AC TO BE INCLUDED SECONDARY DRAIN PANS AS WELL AS WATER BUG SENSORS TO SHUT DOWN THE CORRESPONDING EQUIPMENT AND NOTIFY IN EVENT OF A WATER LEAKAGE.
9. ALL AC TO BE INSTALLED WITH VIBRATION ISOLATION (RESILIENTLY SUPPORTED) TO MINIMIZE SOUND AND VIBRATION INTO THE SPACE.

BUILDING AIR BALANCE

UNIT TAG	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR
(E) RTU-1	2400	370	2030	-
(N) AC-1	740	130	610	-
(N) EF-1	-	-	-	75 CFM
(N) EF-2	-	-	-	75 CFM
(N) EF-3	-	-	-	75 CFM
TOTAL:	3140 CFM	500 CFM	2640 CFM	225 CFM
BUILDING PRESSURE:			275 CFM	POSITIVE

HEAT PUMP (OUTDOOR UNIT) SCHEDULE

MAKE:- TRANE-MITSUBISHI (OR EQUIVALENT)

UNIT TAG	LOCATION	INDOOR UNIT SERVED	CAP.TR	COOLING MBH	HEATING MBH	ELECTRICAL DATA			MAX. SOUND PRESS.(DBA)	UNIT DIMENSIONS IN.(HXWXD)	PIPE SIZE (INCH)		WEIGHT (LBS.)	EER2/SEER2	HSPF2/COP2	MODEL NO.
						PH/VOLT/HZ	MCA (A)	MOP (A)			LIQ.	SUCTION				
(N) ACCU-1	SEE ON PLAN	(N) AC-1	2	24	25	1/208-230/60	24	40	55	35X34X13	1/4"	5/8"	135	12.2/21.2	10/3.6	SUZ-AA24NL (OR EQUIVALENT)

NOTES:-

1. UNIT SHALL HAVE TEN YEAR EXTENDED WARRANTY FOR COMPRESSORS/PARTS.
2. PROVIDE LOW AMBIENT CONTROL FOR CONDENSING UNIT OPERATION DOWN TO 0°F.
3. PROVIDE COMPRESSOR CYCLE PROTECTOR.
4. STEEL RAILS SUPPORT TO BE PROVIDED BY MECHANICAL CONTACTOR.
5. CONTRACTOR SHALL PROVIDE A LONG LINE SET FOR REFRIGERANT PIPING IN THE EVENT THAT TOTAL REFRIGERANT LENGTH EXCEED THE MANUFACTURER'S STANDARD RECOMMENDED LENGTH.

DEHUMIDIFIER SCHEDULE

UNIT ID	MANUFACTURER & MODEL	AREA SERVED	MOUNTING	WATER REMOVAL (PINTS/DAY)	MAX AIRFLOW (CFM)	REFRIGERANT	REFRIGERANT AMOUNT	AIR FILTER CLASS	AIR FILTER SIZE	CONDENSATE DRAIN SIZE(Ø)	ELECTRICAL DATA						WEIGHT (LBS.)
											VOLTS	PHASE	HZ	MCA(A)	MOCP(A)	POWER CONSUMPTION (W)	
DU-1	QUEST 205	SERVING	CEILING	135	575	R454B	3 lb 2 oz	MERV-13	18"x18"x2"	3/4" THREADED NPT	120	1	60	15	25	1100	130

NOTES:-

1. SCHEDULED CAPACITIES ARE BASED ON 75°F SPACE TEMPERATURE AND 50% RELATIVE HUMIDITY. CAPACITIES OF SUBMITTED UNITS SHALL NOT BE LESS THAN 95% OF SCHEDULED VALUES.
2. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.
3. UNIT SHALL BE CONNECTED VIA CORD AND PLUG, COORDINATE WITH ELECTRICAL.
4. PROVIDE 2" THICK PLEATED FILTER, MERV 13.
5. MINIMUM 5-YEAR COMPRESSOR WARRANTY.
6. PROVIDE HANGING KIT. UNIT SHALL BE MOUNTED LEVEL SUCH THAT TOP OF UNIT IS 12" BELOW CEILING.

ACCESSORIES:

1. HANGING KIT.
2. CONDENSATE DRAIN PUMP.
3. MANUFACTURER'S REMOTE CONTROLLER.

FAN SCHEDULE

BASIS OF DESIGN : GREENHECK (OR EQUIVALENT)

TAG	MANUFACTURER	MODEL	LOCATION	AREA SERVED	FAN PERFORMANCE				MOTOR DATA					WEIGHT	CONTROL
					CFM	ESP	FAN RPM	FLA	MCA	MOP	VOLTS	PHASE	HZ	LBS	
(N) EF-1	GREENHECK	SP-B110	SEE PLAN	SEE PLAN	75	0.8	950	1.15	1.4	15	115	1	60	20	LIGHT SWITCH
(N) EF-2	GREENHECK	SP-B110	SEE PLAN	SEE PLAN	75	0.8	950	1.15	1.4	15	115	1	60	20	LIGHT SWITCH
(N) EF-3	GREENHECK	SP-B110	SEE PLAN	SEE PLAN	75	0.8	950	1.15	1.4	15	115	1	60	20	TIMER

NOTES:

1) PROVIDE FACTORY MOUNTED AND INSTALLED DISCONNECT.
2) ALL EQUIPMENT NORMAL POWER WIRING BY ELECTRICAL CONTRACTOR. COORDINATE EXACT POWER REQUIREMENT WITH ELECTRICAL CONTRACTOR.
3) PROVIDE FAN WITH A BACKDRAFT DAMPER.
4) ALL DIRECT DRIVE FANS TO HAVE ECM MOTORS.

VENTILATION CALCULATION AS PER IMC 2021

SL NO	ROOM NAME	AREA	OCCUPANCY AS PER IMC 2021/1000SQ.FT.	OCCUPANY AS IMC 2021	FINAL OCCUPANCY	CFM/SQ.FT	CFM/PERSON	OA CFM	REQUIRED OA WITH 0.8 EFFECTIVENESS CFM	PROVIDED OA CFM	EXHAUST CFM
1	DINING	570	70	40	24	0.18	7.5	283	354	360	-
2	KITCHEN	201	100	21	5	0.18	7.5	74	93	100	-
3	SERVING	309	100	31	4	0.18	7.5	86	108	110	-
4	OFFICE	138	5	1	1	0.06	5	14	18	30	75
5	RESTROOM 102	46	0	0	0	0	0	0	0	0	75
6	RESTROOM 106	48	0	0	0	0	0	0	0	0	75
-	TOTAL	1312	-	-	34	-	-	457	571	600	225

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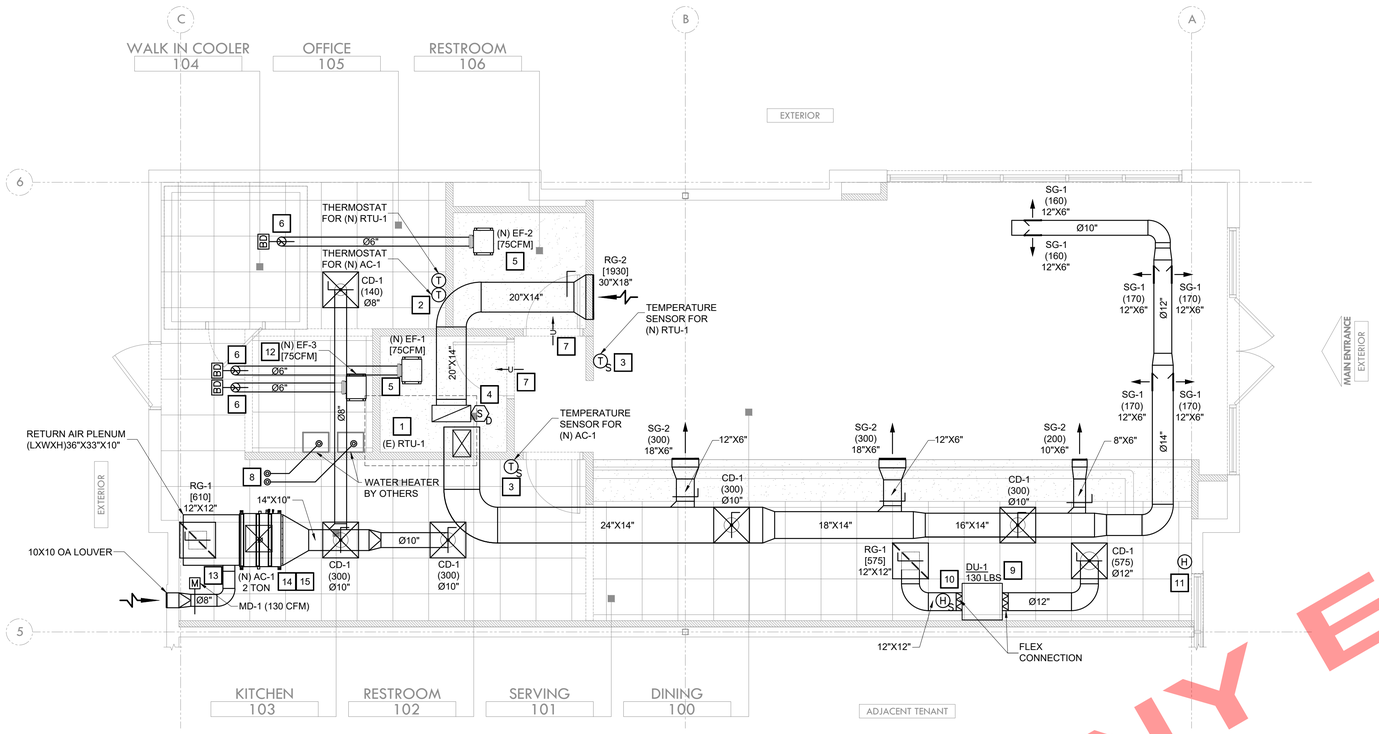
MilkShake EST FACTORY 1914

TITLE:

MECHANICAL SCHEDULES

SHEET NUMBER:

M-0.3



GENERAL NOTES:

1. EXACT LOCATION OF ALL AIR DISTRIBUTION DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL RCP & LIGHTING LAYOUT.
2. IF PLENUM IS USED FOR RETURN AIR. MATERIALS EXPOSED WITHIN PLENUMS SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E 84 OR OTHER APPROPRIATE STANDARDS.
3. COORDINATE ALL WORK ON OTHER FLOORS AND IN OTHER TENANT SPACES WITH OWNERS REP. SO THAT WORK DOES NOT INTERFERE WITH OTHER TENANTS.
4. COORDINATE THE EXACT LOCATION OF ALL THERMOSTATS WITH FINAL FURNITURE LAYOUT, EQUIPMENT LAYOUT, ARCH AND OWNERS REPRESENTATIVE. CONTRACTOR SHALL TIE NEW T-STATS INTO BUILDING EMS AND UPDATE IT ACCORDINGLY.
5. PROVIDE ALL MANUFACTURER AND NEC REQUIRED CLEARANCE FOR ALL EQUIPMENT.
6. ENSURE ALL NEW BUILDING VENTS ARE FITTED WITH ANIMAL SCREENS EXCEPT OTHERWISE NOTED.
7. CONTRACTOR SHALL BALANCE EACH DEVICE WITH THE CFM SHOWN ON PLAN.
8. NEW DUCTWORK SHOWN ON PLAN ARE SCHEMATIC ONLY. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR PIPING AND DUCTWORK ROUTING. OFFSET AND RUN PIPING, DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA PIPING, DUCTWORK, FITTINGS, INSULATIONS AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION.
9. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURAL ENGINEERS.
10. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.
11. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM DIMENSIONS.
12. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
13. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
14. MOUNT DUCTWORK AS HIGH AS POSSIBLE.
15. TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO G.C AND OWNER.
16. NEW DUCTWORK IN CONCEALED AREAS MAY BE RECTANGULAR WITH EQUIVALENT CROSS SECTIONAL FLOW AREA.
17. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS/ROOF PENETRATIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR FIRE RATINGS OF THE WALLS.
18. R-6 INSULATION (INTERNAL FOR EXPOSED DUCTS AND EXTERNAL FOR CONCEALED DUCTS) FOR SUPPLY & RETURN AIR DUCTS. PROVIDE ACOUSTIC INSULATION ON MAIN SUPPLY AND RETURN DUCTS UP TO 10 FT. FROM HVAC UNIT.
19. ALL SUPPLY AND RETURN AIR PLENUMS SHALL BE STENCILED WITH RTU NUMBERS FOR IDENTIFICATION.
20. PROVIDE CABLE OPERATED DAMPER IN INACCESSIBLE CEILINGS.
21. DUCT ROUTING SHALL BE COORDINATED WITH LIGHTING IN DINING AREA AS IT IS CRITICAL.

KEY NOTES MECHANICAL PLAN

1. PROVIDE NEW DUCT PENETRATION AS SHOWN. COORDINATE WITH STRUCTURAL FOR THE EXACT LOCATION OF THE NEW UNIT PROVIDED BY LL. EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM HVAC EQUIPMENT AS SHOWN. ACOUSTICALLY LINE THE FIRST 10-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.
2. PROVIDE NEW 7 DAY PROGRAMMABLE THERMOSTAT. COORDINATE FINAL LOCATION OF THERMOSTAT WITH ARCHITECT, COORDINATE WITH UNIT MANUFACTURER FOR COMPATIBLE THERMOSTAT.
3. PROVIDE NEW REMOTE TEMP./HUMIDITY SENSOR MOUNTED ON WALL. WIRE-BACK TO T-STAT.
4. CONTRACTOR SHALL PROVIDE DUCT SMOKE DETECTOR IN RETURN AIR DUCTWORK. UPON DETECTION OF SMOKE, EQUIPMENT WILL SHUTDOWN AND ACTIVATE ALARM. COORDINATE INSTALLATION LOCATION WITH ACCESS REQUIREMENT.
5. PROVIDE CEILING MOUNTED EXHAUST FAN & INTERLOCK WITH LIGHT SWITCH. PROVIDE BACKDRAFT DAMPER. EXHAUST DUCT SHALL BE GALVANIZED STEEL. FIELD VERIFY ALL ROUTING AND REQUIREMENTS PRIOR TO BID.
6. ROUTE Ø6" EXHAUST DUCT UP TO ROOF AS SHOWN & TERMINATE WITH GOOSE NECK & WIRE MESH. TERMINATION SHALL BE AT LEAST 3FT ABOVE & 10 FT AWAY FROM ANY FRESH AIR INTAKE. CONTRACTOR TO FIELD VERIFY FIRE RATING OF ROOF. PROVIDE FIRE DAMPER AT ROOF PENETRATION AS/IF REQUIRED BY LOCAL CODES.
7. 1" DOOR UNDERCUT FOR AIR PASSAGE. COORDINATE WITH ARCHITECT.
8. PROVIDE Ø2"/Ø4" CONCENTRIC VENT LINE FOR COMBUSTION AIR INTAKE / EXHAUST FROM GAS FIRED EQUIPMENT TO ROOF. ROUTE PIPING FROM RESPECTIVE UNIT LOCATION TO THE ROOF USING ROOF TERMINATION KIT. ROUTE THE VENT MINIMAL AMOUNT OF BENDS AND MINIMUM LENGTH AS REQUIRED BY RESPECTIVE UNIT MANUFACTURER INSTRUCTION. VENT SHALL BE TERMINATED 10' AWAY FROM AND 3' ABOVE ANY MECHANICAL FORCED INTAKE AIR THROUGH RTU/FAN.
9. PROVIDE NEW DEHUMIDIFIER , INSTALL AS PER THE MANUFACTURERS RECOMMENDATION, PROVIDE 3/4" CONDENSATE DRAIN PIPE SLOPED AT 1/8" PER FT. TERMINATE CONDENSATE DRAIN TO NEAREST APPROVED LOCATION WITH AIR GAP FITTING AS PER LOCAL CODE & AHJ. REFER TO PLUMBING DRAWING SHEET NO P-1.0, REFER DETAIL 4 / M-2.0 SHEET FOR DEHUMIDIFIER.
10. PROVIDE REMOTE HUMIDITY SENSOR IN THE RETURN DUCT OF THE DEHUMIDIFIER AND WIRE BACK TO HUMIDISTAT AS SHOWN ON PLAN.
11. PROVIDE PROGRAMMABLE HUMIDISTAT WITH LOCKING COVER. LOCATE HUMIDISTAT AS SHOWN. SEAL WALL OPENINGS WITH CAULK. COORDINATE LOCATION ON SITE WITH GENERAL CONTRACTOR AND EQUIPMENT. AVOID LOCATING NEAR OR ABOVE SOURCES OF HEAT.
12. PROVIDE CEILING MOUNTED EXHAUST FAN & INTERLOCK WITH TIMER. PROVIDE BACKDRAFT DAMPER. EXHAUST DUCT SHALL BE GALVANIZED STEEL. FIELD VERIFY ALL ROUTING AND REQUIREMENTS PRIOR TO BID.
13. INTERLOCK THE OPERATION OF MOTORIZED DAMPER MD-1 WITH (N) AC-1.
14. INSTALL REFRIGERANT PIPING BETWEEN INDOOR AND OUTDOOR UNITS AS PER THE MANUFACTURERS RECOMMENDATIONS. PROVIDE INSULATION TO REFRIGERANT PIPING AS PER THE LOCAL MECHANICAL CODE. COORDINATE REFRIGERANT PIPE ROUTING WITH ARCHITECT/OWNER.
15. FOR CONDENSATE DRAIN PIPING AND TERMINATION LOCATION REFER TO PLUMBING DRAWING. PLUMBING CONTRACTOR TO TERMINATE CONDENSATE DRAIN WITH AIR GAP FITTING

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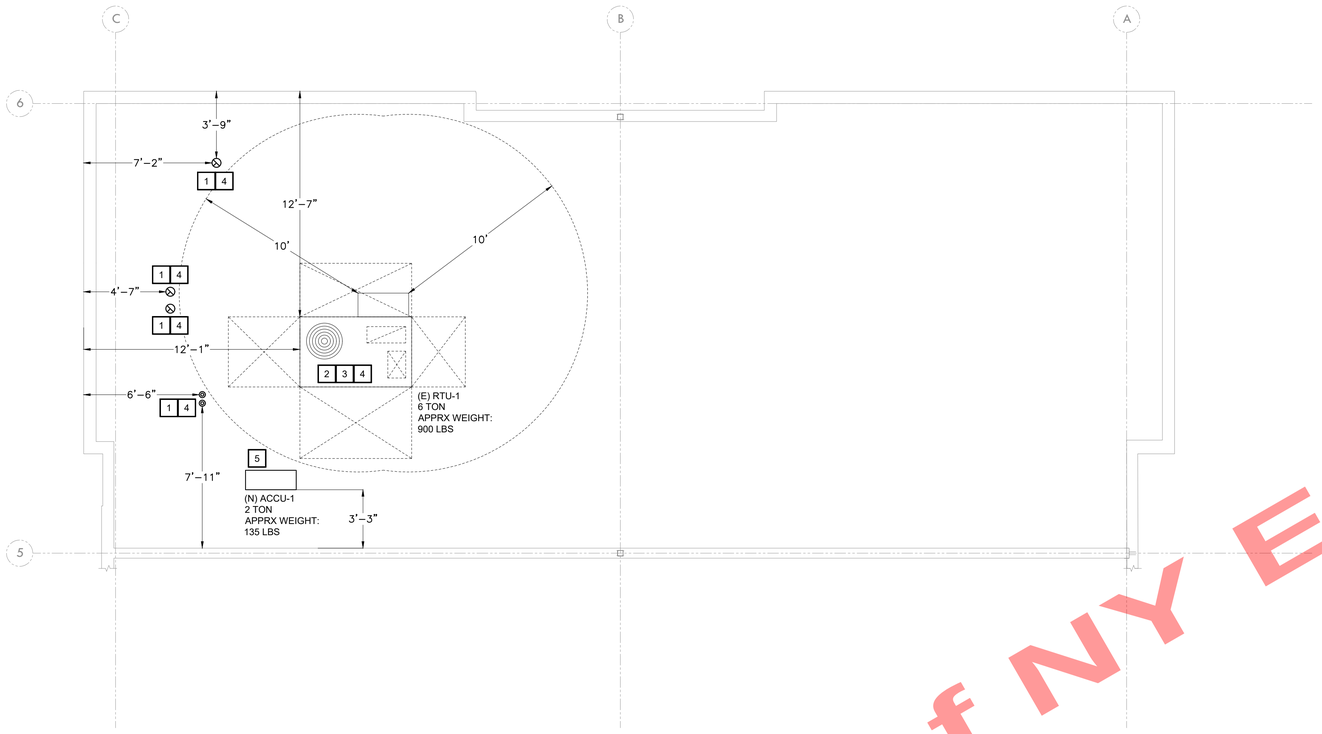
TITLE:

MECHANICAL
FLOOR PLAN

SHEET NUMBER:

M-1.0

1 | SCALE 1 / 4" = 1' - 0" | MECHANICAL FLOOR PLAN



GENERAL NOTES:

1. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS ON FIELD.
2. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.
3. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
4. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST, CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT LENGTH AS NEEDED.
5. ALL PENETRATION SHALL BE THROUGH ROOF.
6. NO PENETRATION IS PERMITTED THROUGH WALL.
7. ALL ROOF PENETRATIONS SHALL USE LL APPROVED INSTALLER.

KEY NOTES MECHANICAL PLAN

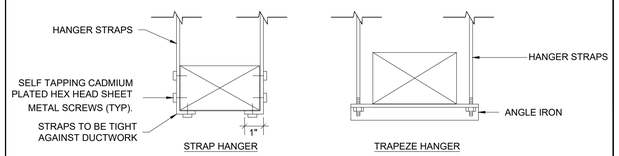
1. ALL EXHAUST AIR TERMINATIONS ON ROOF SHALL BE MINIMUM 10 FEET AWAY OR 3FT ABOVE FROM ANY OUTSIDE AIR INATKE SOURCE, 3 FEET FROM PROPERTY LINES, 3 FEET FROM OPERABLE OPENINGS.
2. EXISTING ROOFTOP UNIT IS PROVIDED BY LL. COORDINATE WITH STRUCTURAL ENGINEER/ ARCHITECT FOR THE FINAL LOCATION OF THE UNIT. PROVIDE FLEXIBLE CONNECTORS ON SUPPLY AND RETURN DUCT CONNECTIONS. SET OUTSIDE AIR AS INDICATED ON ROOFTOP UNIT SCHEDULES. MECHANICAL CONTRACTOR SHALL SCRIBE INTO UNIT POSITION OF OUTSIDE AIR DAMPER AND LABEL OUTSIDE AIR VOLUME AND PERCENT OF OUTSIDE AIR. TRANSITION AND CONNECT SUPPLY AND RETURN DUCTWORK FROM BELOW. COORDINATE ROUTING THROUGH STRUCTURAL TRUSSES AND OFFSET AS REQUIRED IN CURB SPACE.
3. ROUTE CONDENSATE DRAIN FROM RTU ON THE ROOF AND TERMINATE THE DRAIN ON THE NEAREST APPROVED PLACE OF DISPOSAL. PROVIDE HORIZONTAL SLOPE IN THE DIRECTION OF DISCHARGE OF NOT LESS THAN $\frac{1}{8}$ UNIT VERTICAL IN 12 UNIT HORIZONTAL. CONDENSATE SHALL NOT DISCHARGE INTO STREET, ALLEY OR OTHER AREAS SO AS TO CAUSE A NUISANCE.
4. COORDINATE FINAL LOCATION OF ROOF OPENINGS WITH STRUCTURAL.
5. INSTALL THE NEW CONDENSING UNIT ON 6" HIGH PADS WITH VIBRATION ISOLATORS. COORDINATE FINAL LOCATION WITH CLIENT AND ARCHITECT.

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1	SCALE	MECHANICAL ROOF PLAN
	1 / 4" = 1' - 0"	

TITLE:
MECHANICAL ROOF PLAN

SHEET NUMBER:
M-1.1



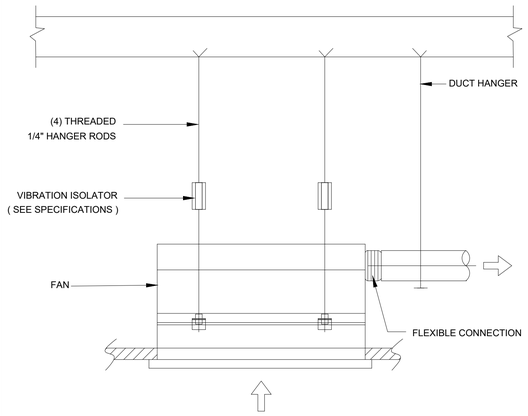
NOTE:
NO POP RIVETS ALLOWED, USE SELF-TAPPING SHEETMETAL SCREWS ONLY.

HANGER SIZES*

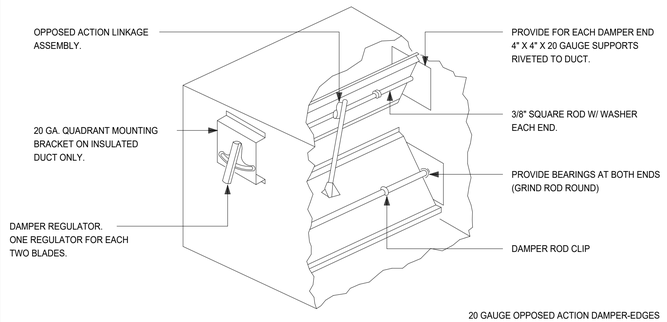
MAX. SIDE	HANGER	HORIZONTAL SUPPORT ANGLE	MAXIMUM SPACING
30"	1"x18" GAUGE STRAP	NONE REQUIRED	10'-0"
36"	1/4" ROD	1-1/2"x1-1/2"x1/8"	8'-0"
48"	1/4" ROD	2"x2"x1/8"	8'-0"
60"	5/16" ROD	2"x2"x1/8"	8'-0"
84"	3/8" ROD	2"x2"x1/8"	8'-0"

* FOR RECTANGULAR DUCTS

1 M-2.0 DUCT HANGING DETAILS N.T.S

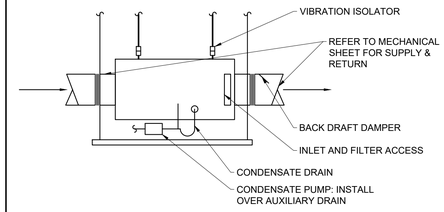


2 M-2.0 CEILING FAN HANGING SUPPORT DETAIL N.T.S

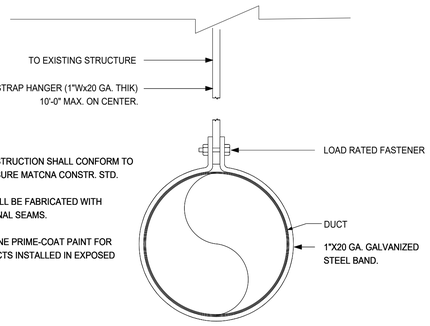


NOTE : 1. FOR DUCTS OVER 29" WIDE AND/OR OVER 12" HIGH.

3 M-2.0 LOW PRESSURE BALANCING DAMPER N.T.S



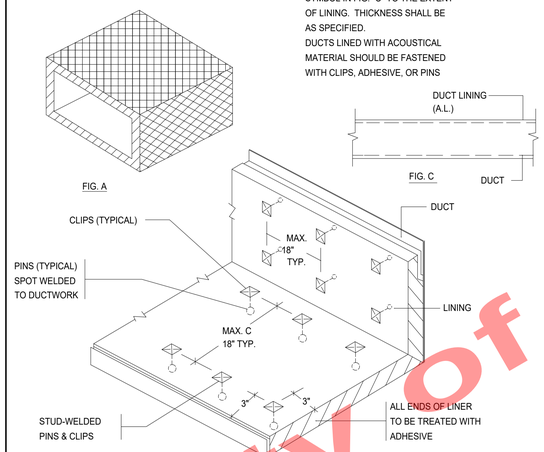
4 M-2.0 DEHUMIDIFIER INSTALLATION DETAILS N.T.S



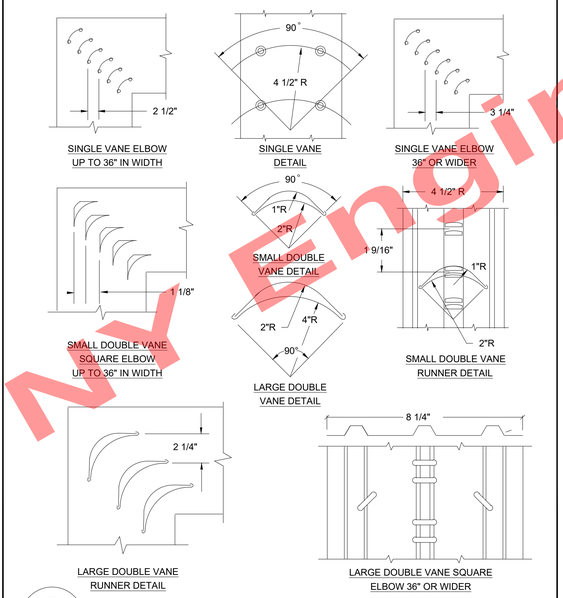
NOTES :

1. DUCT CONSTRUCTION SHALL CONFORM TO LOW PRESSURE MATCNA CONSTR. STD.
2. DUCTS SHALL BE FABRICATED WITH LONGITUDINAL SEAMS.
3. PROVIDE ONE PRIME-COAT PAINT FOR ROUND DUCTS INSTALLED IN EXPOSED AREAS.

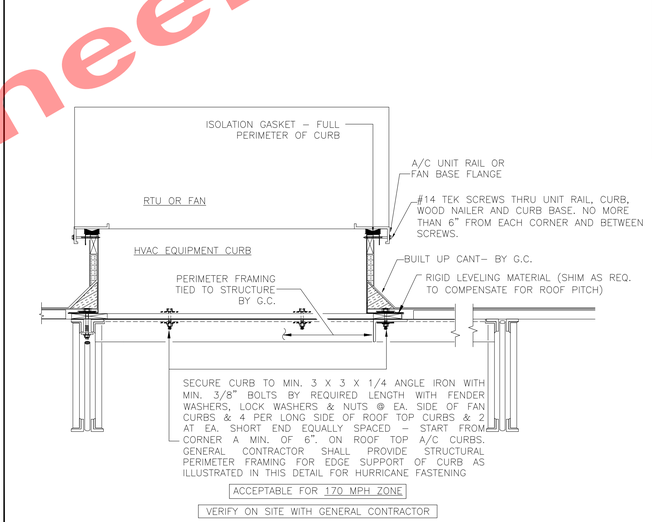
5 M-2.0 ROUND DUCT HANGING DETAIL N.T.S



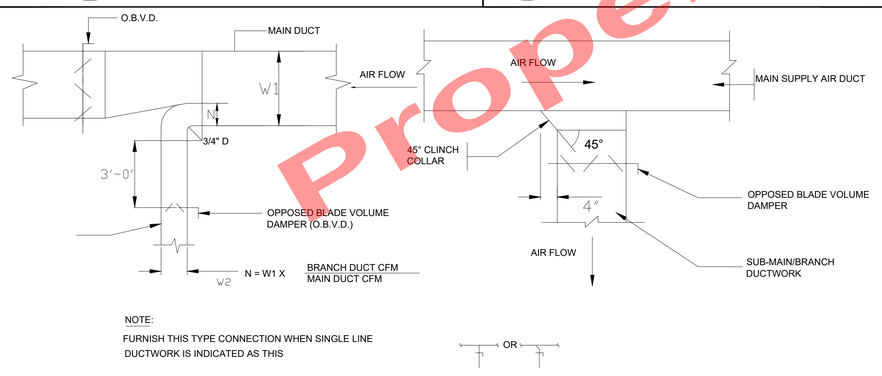
6 M-2.0 ACOUSTICAL TREATMENT DUCT LINING N.T.S



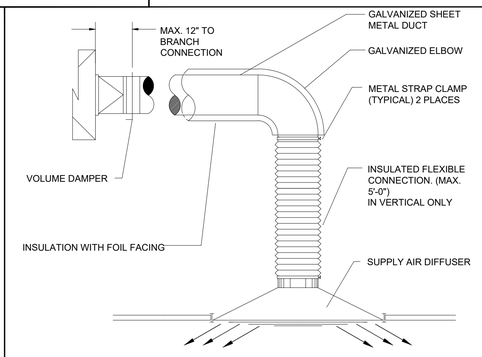
7 M-2.0 LOW VELOCITY DUCTWORK ELBOWS N.T.S



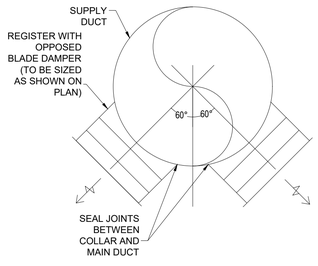
8 M-2.0 RTU INSTALLATION DETAILS N.T.S



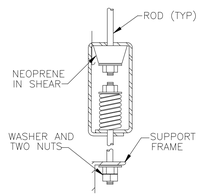
8 M-2.0 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION N.T.S



10 M-2.0 DIFFUSER DETAILS N.T.S



11 M-2.0 DUCT MOUNTED DIFFUSER GRILLES N.T.S



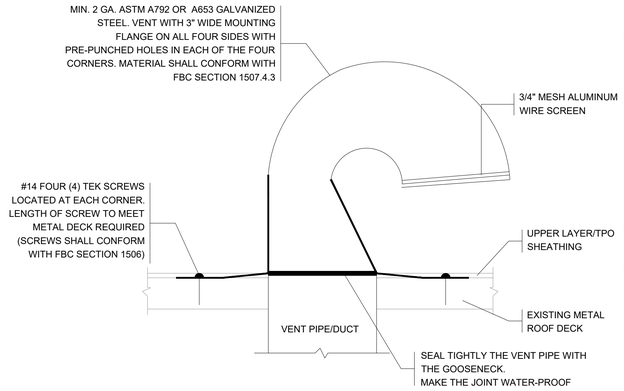
12 M-2.0 VIBRATION ISOLATOR DETAIL N.T.S

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MilkShake EST FACTORY 1914

TITLE:
MECHANICAL DETAILS (1 OF 2)

SHEET NUMBER:
M-2.0



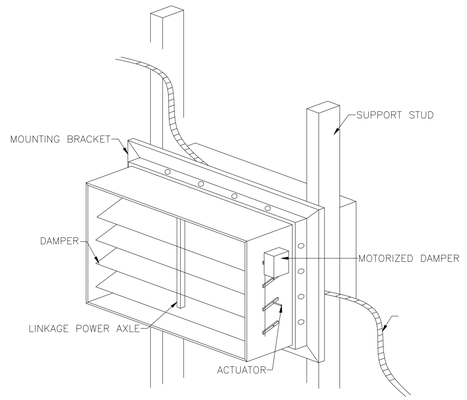
ATTACHMENT METHOD:
CUT OUT THE GOOSENECK VENT OPENING IN THE ROOF SHEATHING ACCORDING WITHIN MAXIMUM DIMENSIONS. DO NOT CUT INTO TRUSSES OR RAFTERS WHEN CUTTING OPENING IN THE ROOF.

REMOVE INTERFERING SHINGLE NAILS AROUND THE PERIMETER OF THE OPENING AND ANY DEBRIS SO THAT THE NAILING FLANGE OF THE VENT LAYS FLAT TO THE ROOF SHEATHING. SLIDE THE TOP AND SIDE FLANGES OF THE VENT UNDERNEATH THE SHINGLES AND ALLOW THE BOTTOM FLANGE TO LIE ON THE TOP OF THE SHINGLES. CARE SHOULD BE TAKEN IN KEEPING THE VENT PROPERLY ALIGNED. VENT PIPE IS SEALED IF UTILIZED. SCREW IN PLACE USING FOUR (4) TEK SCREWS LOCATED AT EACH CORNER (SCREWS SHALL CONFORM WITH FBC SECTION 1506). ROOFING CEMENT SHOULD BE APPLIED TO ALL SHINGLE EDGES NEAR THE OUTER EDGE AND AROUND THE ENTIRE PERIMETER.

ALLOWABLE ROOF COVERINGS: ASPHALT SHINGLES

MAXIMUM DESIGN PRESSURE:
-52.5 PSF FOR INSTALLATIONS OVER PLYWOOD DECK
-22.5 PSF FOR INSTALLATION OVER OSB DECK
PRESSURES CALCULATED USING 2.1 MARGIN OF SAFELY PER 1504.9.

1 / M2.1 TYPICAL DETAIL OF ROOF GOOSENECK
N.T.S



2 / M-2.1 MOTORIZED DAMPER DETAILS
N.T.S

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MilkShake EST FACTORY 1914

TITLE:
MECHANICAL DETAILS (2 OF 2)

SHEET NUMBER:
M-2.1

ELECTRICAL SYMBOLS LIST

SYMBOL	DESCRIPTION
	POWER AND TELECOMMUNICATION
	CIRCUIT HOMERUN TO PANEL
	SINGLE RECEPTACLE OUTLET - WALL MOUNTED
	DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
AC	ABOVE COUNTER DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
	G.F.C.I. DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
AC	ABOVE COUNTER G.F.C.I. DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
IG	ISOLATED GROUND DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
	WALL MOUNTED QUAD RECEPTACLE OUTLET
	SPECIAL PURPOSE RECEPTACLE - WALL MOUNTED (SEE EQUIPMENT SCHEDULE OR NOTES)
	125 / 250V NEMA RECEPTACLE - WALL MOUNTED (SEE EQUIPMENT SCHEDULE OR NOTES)
	DUPLEX RECEPTACLE - FLOOR MOUNTED
	DUPLEX RECEPTACLE - CEILING MOUNTED
	JUNCTION BOX
	FLOOR BOX DEVICES / POKE-THRU DEVICES WITH POWER AND TELE/DATA PER PLANS (SEE DRAWINGS FOR MODEL)
	TELEPHONE / DATA COMBINATION OUTLET - WALL MOUNTED
	TELEPHONE OUTLET - WALL MOUNTED
	DATA OUTLET - WALL MOUNTED
	PANELBOARD WALL/RECESSED MOUNTED (277/480 VOLT, 120/208Y VOLT AS NOTED ON PLANS)
	TRANSFORMER (RATING AND CONFIGURATIONS AS NOTED ON PLANS)
	DISCONNECT SWITCH (FRAME/POLES/FUSE-IF REQUIRED)
M	MOTOR LOAD
S_M	MOTOR RATED TOGGLE SWITCH
	LIGHTING & CONTROLS
	LIGHT FIXTURE HALF SHADED FIXTURE OR"EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY (REFER LIGHTING FIXTURE SCHEDULE ON LIGHTING PLAN)
	CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONAL ARROWS AS INDICATED. SHADED AREA DENOTES FACE(S) (REFER LIGHTING FIXTURE SCHEDULE ON LIGHTING PLAN)
$\$_a$	LIGHTING SWITCH U.O.N. "A" DENOTES LIGHTING FIXTURE CONTROLLED - WALL MOUNTED (48" AFF) UNO '#' 'BLANK' - S.P.S.T. SWITCH '3' - THREE WAY SWITCH '4' - FOUR WAY SWITCH 'D' - DIMMER SWITCH 'T' - TIMER SWITCH 'OV' - OVERRIDE SWITCH
OS	OCCUPANCY SENSOR (DUAL TECHNOLOGY) SWITCH W/ MANUAL OVERRIDE WALL MOUNTED.
OS	OCCUPANCY SENSOR (DUAL TECHNOLOGY) - CEILING MOUNTED
DS	DAYLIGHT SENSOR - CEILING MOUNTED
TC	TIME CLOCK
C	LIGHTING CONTACTORS
	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
S	SMOKE DETECTOR- CEILING MOUNTED
D	DUCT MOUNTED SMOKE DETECTOR
F	FIRE ALARM MANUAL PULL STATION - WALL MOUNTED (48" AFF) UNO
	FIRE ALARM ADA APPROVED VISUAL ALARM - WALL MOUNTED (80" AFF) UNO
F	FIRE ALARM AUDIO/VISUAL ALARM - WALL MOUNTED (80" AFF) UNO
F	FIRE ALARM ADA APPROVED AUDIO/VISUAL ALARM CEILING MOUNTED
	FIRE ALARM ADA APPROVED VISUAL ALARM CEILING MOUNTED
M	MAGNETIC DOOR HOLD DEVICE TO INTERLOCK WITH FIRE ALARM SYSTEM

NOTES:

1. NOT ALL SYMBOLS MAY APPEAR ON DRAWINGS.
2. COORDINATE EXACT LOCATION AND SPECIFIC MOUNTING HEIGHT OF OUTLETS WITH ARCHITECT.
3. MOUNTING HEIGHTS SHALL BE 18" AFF FOR THE OUTLETS, 42" AFF FOR THE LIGHTING SWITCHES OR AS INDICATED IN THE LEGEND UNLESS, OTHERWISE NOTED ON THE PLANS.

ELECTRICAL GENERAL NOTES:

A. DRAWINGS ARE SCHEMATIC IN NATURE AND MAY NOT BE DRAWN EXACTLY TO SCALE. CONTRACTOR IS RESPONSIBLE FOR COORDINATING EXACT ROUTING OF ALL SERVICES WITH EXISTING CONDITIONS AND WITH ALL OTHER TRADES.

B. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR CEILING TYPES AND EXACT LOCATION OF ALL FIXTURES. VERIFY CEILING TYPES WITH ARCHITECT PRIOR TO ORDERING LIGHT FIXTURES TO ENSURE COMPATIBLE FIXTURE TRIMS AND MOUNTING HARDWARE.

C. ALL WORK SHALL COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL AND STATE CODES.

D. ALL CIRCUITS SHALL INCLUDE A GREEN GROUND CONDUCTOR SIZED IN ACCORDANCE WITH 250-95, OR LARGER IF NOTED.

E. ALL PENETRATIONS OF FIRE RATED PARTITIONS DUE TO THE INSTALLATION OF ELECTRICAL SYSTEMS SHALL BE SEALED TO MAINTAIN THE FIRE RATING OF THE WALL.

F. ALL CONDUITS EXPOSED TO PUBLIC VIEW SHALL BE PAINTED. VERIFY COLOR WITH OWNER AND ARCHITECT.

G. CONTRACTOR SHALL CONNECT ALL LIGHTS AND POWER FOR ALL OWNER FURNISHED CASEWORK. REFER TO OWNER'S FURNITURE AND FIXTURE LAYOUT FOR EXACT HEIGHTS AND LOCATIONS.

H. NO MORE THAN (9) CURRENT CARRYING CONDUCTORS SHALL BE INSTALLED IN ANY CONDUIT.

I. ALL CONDUIT PENETRATIONS OF THE ROOF SHALL OCCUR WITHIN THE MECHANICAL CURBS, EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.

J. NO CONDUIT SHALL BE ROUTED IN ANY PARTITION WITH A TILE FINISH.

K. UNDERGROUND PVC CONDUITS SHALL CONVERT TO RIGID GALVANIZED STEEL ELBOW AND CONTINUE AS RIGID GALVANIZED STEEL CONDUIT UNTIL EMERGENCE FROM SLAB OR CONCRETE ENCASEMENT. PROVIDE THREADED CAPS AT BOTH ENDS OF SPARE OR UNUSED CONDUITS.
EXCEPTION: ALL PARTS OF UNDERGROUND LIGHTING BRANCH CIRCUIT CONDUITS MAY BE PVC WITH GROUND WIRE.

L. ALL WALL LIGHT SWITCHES SHALL BE RATED AT 20A. ALL DEDICATED RECEPTACLES SHALL BE RATED 20A. U.N.O.

M. ALL JUNCTION BOXES MOUNTED ABOVE CEILING SHALL BE MOUNTED 1'-0" AFC.

N. ALL EXIT/EMERGENCY SHALL BE ON SAME BRANCH CIRCUIT AS THAT SERVING NORMAL LIGHTING IN THE AREA AND CONNECTED AHEAD OF ANY SWITCH, UNLESS NOTED OTHERWISE.

O. MINIMUM WIRE SIZE TO BE 2#12, 1#12, 3/4"C UNLESS NOTED OTHERWISE. CONTRACTOR SHALL USE #10 WIRING FOR OVER 100FT (10AMPS).

P. EXIT SIGNS AND EMERGENCY EGRESS LIGHTS MUST BE APPROVED BY FIELD INSPECTOR. ADDITIONAL FIXTURES MAY BE REQUIRED BY FIELD INSPECTOR.

Q. REFER TO MECHANICAL DRAWINGS AND COORDINATE WITH MECHANICAL CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL REQUIREMENTS OF MECHANICAL EQUIPMENT.

R. REFER TO PLUMBING DRAWINGS AND COORDINATE WITH PLUMBING CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL REQUIREMENTS OF PLUMBING EQUIPMENT.

S. ALL RECEPTACLES IN BATHROOM AND KITCHEN SHALL BE GFI RATED.

T. ALL RECEPTACLES ON ROOF AND EXTERIOR SHALL BE WEATHERPROOF AND GFI RATED.

U. REFER TO OWNER EQUIPMENT MANUALS AND COORDINATE WITH SUPPLIER FOR EXACT LOCATION AND ELECTRICAL REQUIREMENTS OF EQUIPMENT.

ELECTRICAL DEMOLITION NOTES:

A. PRIOR TO SUBMITTING A PROPOSAL, THE ELECTRICAL CONTRACTOR SHALL VISIT AND CAREFULLY INVESTIGATE THE EXISTING AREAS AFFECTED BY THIS WORK IN ORDER TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. THE CONTRACTOR SHALL BASE HIS BID ACCORDINGLY. SUBMISSION OF PROPOSAL WILL BE CONSTRUED AS CONFIRMATION THAT A THOROUGH EXAMINATION OF THE SITE HAS BEEN MADE BY THE CONTRACTOR. LATER CLAIMS FOR UNFORESEEN EXTRA LABOR, EQUIPMENT OR MATERIALS WILL NOT BE ACCEPTED IF SAID CLAIM(S) COULD HAVE BEEN FORESEEN DURING THE SITE INVESTIGATION.

B. CONTRACTOR'S WORK SHALL COMPLY WITH ALL SAFETY RELATED WORK PRACTICES DETAILED IN THE LATEST EDITION OF NFPA 70E.

C. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL ELECTRICAL FACILITIES RENDERED INACTIVE OR OBSOLETE BY THE SCOPE OF THE ARCHITECTURAL, MECHANICAL AND PLUMBING DEMOLITION WORK. THE CONTRACTOR IS ALERTED THAT SUCH ELECTRICAL FACILITIES MAY NOT BE EXPLICITLY SHOWN ON THE ELECTRICAL DEMOLITION DRAWINGS. THE CONTRACTOR SHALL VISIT THE SITE, REFER TO THE ARCHITECTURAL, MECHANICAL,ELECTRICAL AND PLUMBING DRAWINGS, AND COORDINATE WITH THE GENERAL, MECHANICAL, AND PLUMBING CONTRACTOR(S), AND INCLUDE ALL ELECTRICAL DEMOLITION WORK INCLUDING,HOWEVER NOT NECESSARILY LIMITED TO, THE COMPLETE REMOVAL OF ALL ELECTRICAL AND CONTROL WIRES, CONDUIT,JUNCTION BOXES, ENCLOSURE AND RACEWAY SUPPORT SYSTEMS, DISCONNECT SWITCHES, CIRCUIT BREAKERS ETC. INTENDED FOR REMOVAL AS REQUIRED TO COMPLETE THE WORK.

D. THE INTENT OF THE DEMOLITION WORK REQUIREMENTS INCLUDE ALL LABOR AND EQUIPMENT REQUIRED TO ATTAIN THE FINAL CONDITIONS AS SHOWN ON THE ARCHITECTURAL, MECHANICAL, TEMPERATURE CONTROL, AND PLUMBING, STRUCTURAL, ELECTRICAL NEW WORK PLANS. THE CONTRACTOR SHALL REVIEW ALL OTHER TRADE DRAWINGS, AND COORDINATE WILL ALL OTHER TRADE CONTRACTORS, AND BASE HIS BID ACCORDINGLY.

E. REFER TO THE ARCHITECTURAL DEMOLITION PLANS FOR SCOPE RELATED TO THE LAYOUT OF WALLS, CEILINGS, ETC... TO BE REMOVED.

F. COORDINATE ALL POWER SHUT-DOWNS AND FIRE ALARM SYSTEM MODIFICATIONS, WHERE APPLICABLE, WITH THE ONSITE FACILITIES MANAGEMENT TEAM.

G. REMOVE ALL EXISTING DEVICES (RECEPTACLES, DATA OUTLETS, FIRE ALARM DEVICES, SWITCHES, EMPTY JUNCTION BOXES, ETC...) ASSOCIATED WITH ANY WALLS OR OTHER PARTITIONS IDENTIFIED TO BE REMOVED. REMOVE ALL ASSOCIATED CONDUIT AND WIRING BACK TO ITS SOURCE. RE-LABEL ALL NEW SPARE BREAKERS AS "SPARE" IN THE APPROPRIATE PANEL SCHEDULES.

H. REMOVE ALL EXISTING DEVICES (RECEPTACLES, DATA OUTLETS, FIRE ALARM DEVICES, SWITCHES, EMPTY JUNCTION BOXES, ETC...) ON EXISTING TO REMAIN WALLS, BOTH INTERIOR AND PERIMETER, UNLESS SPECIFICALLY SHOWN AS EXISTING TO REMAIN ON SHEETS ELSEWHERE IN THIS SET. REMOVE ALL ASSOCIATED CONDUIT AND WIRING BACK TO ITS SOURCE. RE-LABEL ALL NEW SPARE BREAKERS AS "SPARE" IN THE APPROPRIATE PANEL SCHEDULES.

I. NO BLANK COVERPLATES SHALL BE ALLOWED. REFER TO ARCHITECTURAL SET FOR DETAILS CONCERNING PATCHING OF EXISTING OPENINGS BASED ON THE PARTITION TYPE IT CURRENTLY RESIDES.

J. REMOVE ALL EXISTING LIGHT FIXTURES AND EXIT SIGNS FROM THE SCOPE OF WORK AREA UNLESS SPECIFICALLY IDENTIFIED AS 'EXISTING TO REMAIN' (E) OR 'EXISTING TO BE RELOCATED (R). REMOVE ALL ASSOCIATED CONDUIT AND WIRING BACK TO ITS SOURCE. RE-LABEL ALL NEWLY SPARED BREAKERS AS "SPARE" IN THE APPROPRIATE PANEL SCHEDULES.

K. FOR ANY MECHANICAL EQUIPMENT BEING REMOVED, REMOVE ALL WIRING, CONDUIT, AND ASSOCIATED DISCONNECTS BACK TO ITS SOURCE. COORDINATE EXACT UNITS BEING REMOVED WITH DIVISION 22 & 23. RE-LABEL ALL NEW SPARE BREAKERS AS "SPARE IN THE APPROPRIATE PANEL SCHEDULES.

L. REFER TO THE FIRE ALARM FLOOR PLANS FOR EXACT FIRE ALARMS DEVICES TO EITHER BE REMOVED, RELOCATED, OR LEFT IN PLACE.

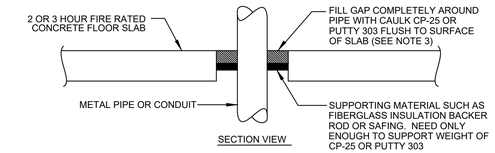
M. REMOVE ALL ABANDONED EMPTY CONDUIT AND JUNCTION BOXES FROM THE CEILING SPACE.

N. ANY EXISTING FLOOR BOX, ABANDONED CONDUIT PENETRATION, ETC... THROUGH THE SLAB WITHIN THE SCOPE OF WORK AREA NOT SPECIFICALLY IDENTIFIED TO REMAIN SHALL BE REMOVED AND THE FLOOR PATCHED TO A LIKE NEW CONDITION.

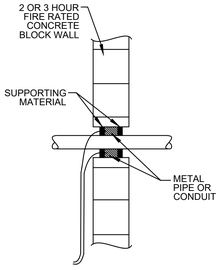
O. COORDINATE WITH THE TENANT AND/OR LANDLORD EXACTLY WHICH DEVICES AND EQUIPMENT ARE REQUIRED TO BE TURNED OVER TO THE OWNER ONCE REMOVED.

P. PROVIDE ADEQUATE PROTECTION OF ANY EXISTING TO REMAIN DEVICE OR FIXTURE SUCH THAT IT IS NOT DAMAGED DURING THE CONSTRUCTION PROCESS.

FIRE STOP DETAILS:



SECTION VIEW



SECTION VIEW

NOTES:

1. FOR CONCRETE BLOCK WALLS, CENTER CAULK CP-25 OR PUTTY 303 WITHIN WALL WITH DAMMING ON BOTH SIDES.
2. RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) FIRE TEST AND UL CLASSIFICATION FIRE STOP SYSTEMS 49, 33 AND 91.
3. UP TO 40% SHRINKAGE OF CP-25 OR PUTTY 303 IS ACCEPTABLE AFTER WET DEPTH INSTALLATION.
4. WHEN ANNULAR SPACE EXCEEDS 3/4" (19mm). A 28 AWG METAL COVER PLATE MUST BE MECHANICALLY SECURED ATOP THE 3M FIRE BARRIER APPLICATION, OR TIGHTLY PACK A NON-COMBUSTIBLE DAMMING MATERIAL ATOP INSTALLED CAULK OR PUTTY.
5. OPTIONS TO MASKING TAPE TO PREVENT SAGGING:
   A. INSTALL ADDITIONAL DAMMING MATERIAL OVER PRODUCT TO HOLD WITHIN OPENING.
   B. REMOVE PRODUCT FROM CONTAINER AND ALLOW TO AIR CURE IN SMALL BATCHES FOR 12 HRS. THEN HAND FORM INTO OPENING.
6. WET INSTALLED DEPTH OF CAULK CP-25 OR PUTTY 303 DEPENDS ON TYPE AND SIZE OF PIPE:

WET DEPTH	PIPE SIZE	FIRE RATING
1/2" (13mm)	MAX. 8" (203mm)	2 HRS.
" (25mm)	MAX. 6" (152mm)	3 HRS.

1" (25mm) DEPTH CAULK CP-25 OR PUTTY 303 WITHIN WALL

ABBREVIATIONS:

NOTE:	NOT ALL ABBREVIATIONS MAY BE USED.
A	AMPERE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AFC	AVAILABLE FAULT CURRENT
AIC	AMPERE INTERRUPTING CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
BLDG	BUILDING
BRKR	BREAKER
C	CONDUIT
CKT	CIRCUIT
CLG	CEILING
CT	CURRENT TRANSFORMER
CU	COPPER
CTR	CENTER
EA	EACH
EGC	EQUIPMENT GROUNDING CONDUCTOR
EOL	ELECTRONIC OVERLOAD
FDR	FEEDER
FLA	FULL LOAD AMPS
GEC	GROUNDING ELECTRODE CONDUCTOR
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
GRS	GALVANIZED RIGID STEEL
HOA	HAND-OFF-AUTO
IG	ISOLATED GROUND
JB	JUNCTION BOX
KVA	KILOVOLT-AMPERE
KW	KILOWATT
L.S.I.G.	LONG, SHORT, INSTANTANEOUS, GROUND FAULT TRIP
LTG	LIGHTING
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCCB	MOLDED CASE CIRCUIT BREAKER
MCP	MOTOR CIRCUIT PROTECTOR
MDP	MAIN DISTRIBUTION PANEL
MFS	MAXIMUM FUSE SIZE
MLO	MAIN LUG ONLY
MOCP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
MTS	MANUAL TRANSFER SWITCH
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
NTS	NOT TO SCALE
OCPD	OVERCURRENT PROTECTION DEVICE
OH	OVERHEAD
P	POLE
PH	PHASE
PNL	PANEL
PWR	POWER
RECEP	RECEPTACLE
RM	ROOM
SW	SWITCH
S/W	SHOW WINDOW RECEPTACLE
SWBR	SWITCHBOARD
SWGR	SWITCHGEAR
TBB	TELECOM BACKBOARD
TELE	TELEPHONE
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
VIF	VERIFY IN FIELD
W/	WITH
W	WIRE
WP	WEATHER PROOF
XFMR	TRANSFORMER

STOP AND READ:

THE CONTRACTOR AND SUB-CONTRACTORS **SHALL NOT INITIATE ANY WORK UNTIL EXISTING FIELD CONDITIONS ARE PROPERLY VERIFIED**.

APPLICABLE CODES:

ALL WORK SHALL COMPLY WITH THE PROVISIONS OF THE SPECIFICATIONS AND DRAWINGS, AND SHALL SATISFY ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS OF ALL GOVERNING BODIES INVOLVED. APPLICABLE CODES INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

1. BUILDING: 2021 INTERNATIONAL BUILDING CODE (IBC 2021).
2. FIRE PREVENTION: UTAH FIRE ALARM CODE 2019 (NFPA 72, 2019 EDITION).
3. ELECTRICAL: 2023 NATIONAL ELECTRICAL CODE (NEC 2023).
4. ENERGY: 2021 INTERNATIONAL ENERGY CONSERVATION CODE (IECC 2021).

ELECTRICAL SYSTEM AND EQUIPMENT

METHOD OF COMPLIANCE

PRESCRIPTIVE ___X___ PERFORMANCE _____

LIGHTING SCHEDULE

LAMP TYPE REQUIRED IN FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-2.0
NUMBER OF LAMPS IN FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-2.0
BALLAST TYPE USED IN THE FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-2.0
NUMBER OF BALLASTS IN FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-2.0
TOTAL WATTAGE PER FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-2.0

TOTAL INTERIOR WATTAGE SPECIFIED VS. ALLOWED

COMMERCIAL STORE DINING: CAFETERIA 1541 SQ. FT.): GROSS AREA OF 0.76 W/SQ. FT.

PER **2021 INTERNATIONAL ENERGY CONSERVATION CODE** STANDARD:

ALLOWABLE	SPECIFIED

SEE COMCHECK COMPLIANCE FORM ON SHEET E-0.1

TOTAL EXTERIOR WATTAGE SPECIFIED VS. ALLOWED
NOT APPLICABLE (TENANT FIT-UP)

EQUIPMENT SCHEDULES WITH MOTORS (NOT USED FOR MECHANICAL SYSTEMS)

MOTOR HORSEPOWER	NONE
NUMBER OF PHASES	N/A
MINIMUM EFFICIENCY	N/A
MOTOR TYPE	N/A
# OF POLES	N/A

PROVIDE A STANDARD RISER DIAGRAM WHICH INDICATES DESIGNATED POINTS FOR CHECK METERING.

PROVIDE A STANDARD PANEL SCHEDULE DESCRIPTION WHICH IDENTIFIES DIFFERENT END USE LOADS.

STANDARD RISER DIAGRAM IS ON SHEET - E-0.3
STANDARD PANEL SCHEDULES ARE ON - E-0.3

ELECTRICAL DESIGNER STATEMENT

I HEREBY CERTIFY THAT THE DESIGN OF THIS BUILDING COMPLIES WITH THE MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT REQUIREMENTS OF THE **2021 INTERNATIONAL ENERGY CONSERVATION CODE**.

SIGNED _____ DATE 08/29/2025

NAME:
TITLE: PROJECT ENGINEER

COMcheck Software Version COMcheckWeb

Interior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	Milkshake Factory, Spanish Fork, UT
Project Type:	Alteration

Construction Site: Owner/Agent: Designer/Contractor:

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-Kitchen/Serving (Common Space Types:Food Preparation)	576	1.09	628
2-Dinning (Common Space Types:Dining Area - Cafeteria/Fast Food)	540	0.40	216
Allowance: Decorative Appearance in lobbbies / Fix. ID: L01	540 (a)	0.90	168 (b)
3-Restroom (Common Space Types:Restrooms)	120	0.63	76
4-Office (Common Space Types:Office - Enclosed)	212	0.74	157
		Total Allowed Watts =	1244

(a) Area claimed must not exceed the illuminated area permitted for this allowance type.
(b) Allowance is (B x C) or the actual wattage of the fixtures given in Proposed Power section, whichever is less.

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
Kitchen/Serving (Common Space Types: Food Preparation, 576 sq.ft.)				
Track Lighting: F-08A: Wattage based on total luminaires	0	0	234	234
LED: F-01: Other:	1	5	30	150
LED: F-04: Other:	1	9	10	86
LED: D-01: Other:	1	5	7	35
Dinning (Common Space Types: Dining Area - Cafeteria/Fast Food, 540 sq.ft.)				
LED: F-02: Other:	1	9	34	306
LED: L01: Other:	1	1	168	168
Restroom (Common Space Types: Restrooms, 120 sq.ft.)				
LED: F-03: Other:	1	4	12	48
Office (Common Space Types: Office - Enclosed, 212 sq.ft.)				
LED: F-01: Other:	1	4	30	120
			Total Proposed Watts =	1147

Interior Lighting PASSES

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2021 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

MICHAEL TOBIAS
Name - Title

Signature

09/30/25
Date

MilkShake EST FACTORY 1914

TITLE:

ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES

SHEET NUMBER:

E-0.1

Property of XYZ Engineers

SUMMARY

A. GENERAL AND SUPPLEMENTARY CONDITIONS WITHIN THE SPECIFICATIONS ARE HEREBY INCORPORATED AND BECOME PART OF THESE SPECIFICATIONS AND AS SUCH SHALL BE APPLICABLE TO THE WORK OF THE ELECTRICAL CONTRACT.
B. PRIOR TO SUBMISSION OF A BID PROPOSAL, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS AND LIMITATIONS THAT IMPACT THE WORK OF THIS CONTRACT. NO ADDITIONAL COSTS TO THE OWNER SHALL BE PERMITTED FOR CHANGES TO THE WORK AS A RESULT OF THE CONTRACTORS FAILURE TO VISIT THE SITE PRIOR TO BIDDING AND IDENTIFY ITEMS THAT WERE ABLE TO BE VERIFIED DURING A SITE VISIT PRIOR TO THE SUBMISSION OF A BID PROPOSAL.
C. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, RIGGING, AND MISCELLANEOUS ITEMS AS REQUIRED FOR A COMPLETE, OPERATIONAL, FUNCTIONAL AND CODE COMPLIANT ELECTRICAL INSTALLATION AS SHOWN ON THE DRAWINGS AND AS SPECIFIED IN THESE SPECIFICATIONS.

LANDLORDS REQUIREMENTS

A. ALL WORK OF THIS CONTRACT SHALL BE COMPLETED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE LANDLORD'S WORK LETTER, LANDLORD'S CONSTRUCTION CRITERIA AND/OR THE TENANT/LANDLORD AGREEMENT. THIS CONTRACTOR SHALL EXAMINE THESE DOCUMENTS PRIOR TO THE SUBMISSION OF A BID PROPOSAL.
B. ALL APPLICABLE REQUIREMENTS OF THE LANDLORD'S WORK LETTER, LANDLORDS CONSTRUCTION CRITERIA AND/OR THE TENANT/LANDLORD AGREEMENT DOCUMENTS SHALL BE CONSIDERED PART OF THESE SPECIFICATIONS.

EXISTING CONDITIONS

A. THE CONTRACT DOCUMENTS ARE BASED ON INFORMATION PROVIDED TO THE CONSULTANT AT THE TIME OF DESIGN. THIS CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING A BID PROPOSAL. BIDS AND SUBSTITUTIONS A.PRIOR TO SUBMISSION OF A BID PROPOSAL, CONTRACTOR SHALL THOROUGHLY REVIEW THE BID INSTRUCTIONS AND ALL CIVIL, ARCHITECTURAL, STRUCTURAL, FOOD SERVICE AND MEPFP CONSTRUCTION DOCUMENTS.
B. SHOULD THE CONTRACTOR WISH TO SUBMIT AN ALTERNATE PRODUCT TO THE MANUFACTURERS NAMED IN THESE SPECIFICATIONS OR ON THE DRAWINGS FOR ANY EQUIPMENT, THE CONTRACTOR SHALL SUBMIT A VOLUNTARY ALTERNATIVE A MINIMUM OF SEVEN (7) CALENDAR DAYS PRIOR TO BID, STATING THE MANUFACTURER'S NAME, MODEL NUMBER, WRITTEN, DETAILED PRODUCT DATA.
C. WORK PERFORMED OR CONSTRUCTED WITH UNAPPROVED EQUALS IS AT CONTRACTOR'S RISK AND ANY REQUIRED CORRECTION OF WORK INCORPORATING UNAPPROVED EQUALS SHALL BE AT CONTRACTOR'S SOLE COST AND EXPENSE.
D. NO SUBSTITUTIONS PERMITTED FOR LIGHTING FIXTURES.

QUALITY ASSURANCE

A. ALL MATERIALS AND EQUIPMENT SHALL BE NEW.
B. PROVIDE PERMITS, INSPECTIONS, FINAL CERTIFICATES OF INSPECTION BY THE AUTHORITY HAVING JURISDICTION, PERMIT AND INSPECTION FEES AND ALL MATERIALS, EQUIPMENT AND LABOR AS REQUIRED FOR A COMPLETE, FUNCTIONAL, FULLY OPERATIONAL AND CODE COMPLIANT ELECTRICAL SYSTEM.
C. THIS CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR AND ACCESSORIES FOR A COMPLETE FUNCTIONAL AND CODE COMPLIANT ELECTRICAL INSTALLATION, WHETHER OR NOT SHOWN ON THE DRAWINGS OR SPECIFIED IN THESE SPECIFICATIONS.
D. EC SHALL VERIFY THE VOLTAGE AND AMPERAGE REQUIREMENTS OF ALL EQUIPMENT DELIVERED TO THE SITE PRIOR TO CONNECTION. EC SHALL NOTIFY THE OWNER OF ANY DIFFERENCES
E. REQUIREMENTS OF REGULATORY AGENCIES:
   1. PERMITS: ARRANGE AND PAY FOR ALL PERMITS, INSPECTIONS AND UTILITY CONNECTIONS REQUIRED.
   2. PROVIDE ALL TESTS AND INSPECTIONS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.
   3. PROVIDE A SIGNED CERTIFICATE OF INSPECTION AT THE COMPLETION OF THE PROJECT. INCLUDE IN OPERATION AND MAINTENANCE MANUALS.
F. CODES AND STANDARDS
   1. COMPLY WITH SPECIFIED CODES AND STANDARDS. IF CONFLICT EXISTS BETWEEN CODES OR STANDARDS AND DRAWINGS, PROJECT MANUAL OR ADDENDA REQUIREMENTS, REQUEST CLARIFICATION FROM ARCHITECT/ENGINEER.
   2. CONFORM TO THE INSTALLATION RULES AND REGULATIONS OF THE CODES AND STANDARDS LISTED INCLUDING ALL SUBSEQUENTLY PUBLISHED AMENDMENTS THERETO ISSUED PRIOR TO THE DATE OF THE BIDDING DOCUMENTS.
   3. CONFORM TO THE REQUIREMENTS OF ALL LOCAL, STATE AND FEDERAL AGENCIES WHICH HAVE AUTHORITY OVER THIS PROJECT.
   4. COMPLY WITH THE APPLICABLE EDITION OF THE FOLLOWING CODES AND STANDARDS THAT HAVE BEEN ADOPTED BY AND ARE ENFORCED BY THE AUTHORITY HAVING JURISDICTION:
      a. INTERNATIONAL BUILDING CODE.
      b. INTERNATIONAL ENERGY CONSERVATION CODE
      c. INTERNATIONAL MECHANICAL CODE
      d. NATIONAL ELECTRICAL CODE
      e. INTERNATIONAL FIRE CODE
      f. LIFE SAFETY CODE, NFPA 101
      g. AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES
      h. ALL LOCAL CODES AND ORDINANCES ADOPTED AND ENFORCED BY THE AUTHORITY HAVING JURISDICTION.
G. REFERENCED STANDARDS:
   1. ALL EQUIPMENT, APPARATUS, MATERIALS AND SYSTEMS SHALL BE RATED, TESTED, FABRICATED AND INSTALLED IN ACCORDANCE WITH THE APPLICABLE INDUSTRY STANDARDS.
   2. ALL EQUIPMENT, APPARATUS, MATERIALS AND SYSTEMS SHALL BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (UL, ETL, ETC)

ELECTRICAL CONTRACT DOCUMENTS

A. THE ELECTRICAL DRAWINGS (DRAWINGS) AND THE SPECIFICATIONS SHALL TOGETHER FORM A SET OF CONTRACT DOCUMENTS FOR THE ELECTRICAL WORK. NEITHER THE DRAWINGS OR THE SPECIFICATIONS SHALL BE COMPLETE WITHOUT THE OTHER. ANY ITEM SHOWN ONLY ON THE DRAWINGS OR SPECIFIED ONLY IN THE SPECIFICATIONS SHALL BE CONSIDERED AS IF SHOWN AND SPECIFIED IN BOTH.
B. ELECTRICAL DRAWINGS AND SPECIFICATIONS: COMPLY WITH THE FOLLOWING REQUIREMENTS:
   1. CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH ALL DRAWINGS AND SPECIFICATIONS WITHIN THE CONTRACT DOCUMENTS, INCLUDING, BUT NOT NECESSARILY LIMITED TO, GEOTECHNICAL, LANDSCAPE, CIVIL, ARCHITECTURAL, STRUCTURAL, FOOD SERVICE, MECHANICAL, PLUMBING, TELECOMMUNICATION AND FIRE PROTECTION DRAWINGS AND SPECIFICATIONS.
   2. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE INTENDED TO INDICATE APPROXIMATE LOCATION ONLY OF ELECTRICAL WORK. THE ACTUAL LOCATION OF ANY ELECTRICAL WORK SHALL NOT INTERFERE WITH THE LOCATION, CLEARANCES, ETC. REQUIRED BY THE WORK OF OTHER TRADES.
   3. PRIOR TO ROUGH-IN, CONTRACTOR SHALL COORDINATE ALL DEVICE LOCATIONS WITH THE ARCHITECTURAL WALL ELEVATIONS, CASEWORK/CABINETRY ELEVATIONS AND DETAILS AND THE FINAL, APPROVED FOOD SERVICE SHOP DRAWINGS.
C. DEFINITIONS: THE FOLLOWING TERMS ARE USED ON THE ELECTRICAL DRAWINGS AND IN THE SPECIFICATIONS AND SHALL BE DEFINED AS FOLLOWS:
   1. CONTRACTOR - THE ELECTRICAL CONTRACTOR OR ANY OF THEIR SUB-CONTRACTORS.
   2. WORK - ALL MATERIAL, LABOR, TRANSPORTATION OF THE ELECTRICAL CONTRACTOR OR ANY OF THEIR SUB-CONTRACTORS.
   3. FURNISH - PURCHASE, SUBMIT FOR REVIEW AND APPROVAL, COORDINATE WITH THE CONTRACT DOCUMENTS AND DELIVER TO THE PROJECT SITE IN NEW, UNDAMAGED CONDITION, STORE AS DIRECTED, PROTECT FROM DAMAGE DURING STORAGE.
   4. INSTALL - INSTALL IN PLACE, MAKE READY FOR CONNECTION TO THE REQUIRED SERVICE.
   5. CONNECT - CONNECT TO THE REQUIRED SERVICE AS REQUIRED FOR PROPER OPERATION, TEST FOR PROPER OPERATION AND FUNCTIONALITY IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND REQUIREMENTS SPECIFIED WITHIN THESE SPECIFICATIONS AND TURN OVER TO THE OWNER IN FULL OPERATING CONDITION.
   6. PROVIDE - FURNISH, INSTALL AND CONNECT AS DEFINED HEREIN FOR A COMPLETE, FUNCTIONAL AND CODE COMPLIANT INSTALLATION READY FOR INTENDED USE.
   7. FINISHED SPACE - SPACES HAVING WALLS PAINTED OR FINISHED WITH WALL COVERING, LAY-IN OR DRYWALL CEILINGS, AND FINISHED FLOORING MATERIALS. EXAMPLES OF FINISHED SPACES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, ALL SPACES IN A DWELLING UNIT, OFFICES, LOBBIES, CORRIDORS, TOILET ROOMS, ETC.
   8. UNFINISHED SPACES - SPACES WITH UNFINISHED WALLS AND FLOORS AND TYPICALLY ARE NOT EQUIPPED WITH A CEILING. EXAMPLES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, MECHANICAL ROOMS, ELECTRICAL ROOMS, SERVICE AREAS, ETC.
   9. SHALL - ACTION THAT IS REQUIRED WITHOUT OPTION OR QUALIFICATION.
   10. REMOVE - DETACH ITEMS FROM EXISTING CONSTRUCTION AND LEGALLY DISPOSE OF THEM OFF SITE UNLESS INDICATED TO BE REMOVED AND SALVAGED OR REMOVED AND RE-INSTALLED.
   11. REMOVE AND SALVAGE - CAREFULLY DETACH FROM EXISTING CONSTRUCTION IN A MANNER TO PREVENT DAMAGE AND DELIVER TO OWNER READY FOR RE-USE.
   12. REMOVE AND REINSTALL - DETACH ITEMS FROM EXISTING CONSTRUCTION, PREPARE FOR RE-USE, RE-INSTALL AND RECONNECT WHERE INDICATED SUCH THAT THE RE-INSTALLED ITEM IS FULLY OPERATIONAL.
   13. EXISTING TO REMAIN - EXISTING ITEMS OF CONSTRUCTION THAT ARE NOT TO BE PERMANENTLY REMOVED AND THAT ARE NOT OTHERWISE INDICATED TO BE REMOVED, REMOVED AND SALVAGED OR REMOVED AND RE-INSTALLED.

SUBMITTALS

A. REVIEW OF THE SHOP DRAWINGS IS RENDERED AS A SERVICE ONLY AND SHALL NOT BE CONSIDERED AS A GUARANTEE OF MEASUREMENTS OR OF BUILDING CONDITIONS; NOR SHALL IT BE CONSTRUED AS RELIEVING THE CONTRACTOR'S OF BASIC RESPONSIBILITIES UNDER HIS CONTRACT. ARCHITECT/ENGINEER WILL REVIEW SHOP DRAWINGS ONLY FOR CONFORMANCE WITH DESIGN CONCEPT OF THE PROJECT. REVIEW BY THE ARCHITECT/ENGINEER SHALL NOT BE CONSTRUED:
   1. AS PERMITTING ANY DEPARTURE FROM THE CONTRACT REQUIREMENTS.
   2. AS RELIEVING THE CONTRACTOR OF THE RESPONSIBILITY FOR ANY ERROR IN DETAILS, DIMENSIONS OR OTHERWISE THAT MAY EXIST.
   3. AS APPROVED DEPARTURES FROM ADDITIONAL DETAILS OR INSTRUCTIONS PREVIOUSLY FURNISHED BY THE ARCHITECT/ENGINEER.

SHOP DRAWINGS:

   1. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESCRIPTIVE LITERATURE OF EQUIPMENT TO BE FURNISHED UNDER THIS CONTRACT. DRAWINGS SHALL STATE CAPACITIES, SIZES, ETC., OF ALL EQUIPMENT AND SHALL BE CERTIFIED. SEE GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS FOR ADDITIONAL REQUIREMENTS.
   2. PROVIDE SUBMITTALS FOR LIGHTING FIXTURES, TRANSFORMERS, PANELBOARDS, LIGHTING CONTROL DEVICES, CONTACTORS, WIRING DEVICES, DISCONNECT SWITCHES, POWER SYSTEM STUDY.

B. THE CONTRACTOR SHALL PERFORM NO PORTION OF THE WORK REQUIRING SUBMITTAL AND REVIEW OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES OR SIMILAR SUBMITTALS UNTIL THE RESPECTIVE SUBMITTALS HAS BEEN APPROVED BY THE ENGINEER.

ELECTRICAL COORDINATION DRAWINGS

A. PREPARE ELECTRICAL COORDINATION DRAWINGS AS REQUIRED BY THE WORK AND AS DIRECTED BY THE GENERAL CONTRACTOR.
B. MEET WITH REPRESENTATIVES OF THE OTHER DISCIPLINES/TRADES TO COORDINATE THE ELECTRICAL WORK WITH THE WORK OF EACH DISCIPLINE AND TO OBTAIN INFORMATION REGARDING THEIR WORK THAT IS TO BE INDICATED ON THE COORDINATION DRAWINGS.

POWER SYSTEM STUDIES - GENERAL

A. PROVIDE COMPUTER-BASED, POWER SYSTEM STUDIES THAT INCLUDES:
A SHORT CIRCUIT STUDY TO DETERMINE THE MINIMUM INTERRUPTING CAPACITY OF CIRCUIT PROTECTIVE DEVICES;
AN ARC-FLASH STUDY TO DETERMINE THE ARC-FLASH HAZARD DISTANCE AND THE INCIDENT ENERGY TO WHICH PERSONNEL COULD BE EXPOSED DURING WORK ON OR NEAR ELECTRICAL EQUIPMENT.
B. STUDIES SHALL BE PERFORMED UTILIZING COMPUTER PROGRAMS THAT ARE DISTRIBUTED NATIONALLY AND ARE IN WIDE USE. SOFTWARE ALGORITHMS SHALL COMPLY WITH REQUIREMENTS OF STANDARDS AND GUIDES SPECIFIED IN THIS SECTION. MANUAL CALCULATIONS ARE UNACCEPTABLE.
C. SOFTWARE DEVELOPERS: SUBJECT TO COMPLIANCE WITH SPECIFIED REQUIREMENTS, PERFORM STUDIES UTILIZING SOFTWARE PRODUCTS BY ONE OF THE FOLLOWING:
   1. EASY POWER
   2. POWER ANALYTICS CORPORATION
   3. SKM SYSTEMS ANALYSIS
D. ALL STUDIES SHALL BE BASED ON THE DEVICE CHARACTERISTICS OF ACTUAL EXISTING COMPONENTS AND THE NEW COMPONENTS BEING INSTALLED.
E. PROVIDE ALL FIELD LABOR AS REQUIRED TO OBTAIN ALL DATA NECESSARY TO CONDUCT THE STUDIES SPECIFIED HEREIN.
F. SUBMIT STUDIES FOR REVIEW BEFORE SUBMITTING THE SYSTEM OVERCURRENT PROTECTIVE DEVICE AND POWER DISTRIBUTION EQUIPMENT SUBMITTALS. SUBMIT STUDY REPORT FOR REVIEW PRIOR TO RECEIVING FINAL APPROVAL OF THE OVERCURRENT PROTECTIVE DEVICE AND DISTRIBUTION EQUIPMENT SUBMITTALS.
G. WHERE FORMAL COMPLETION OF STUDIES WILL CAUSE A DELAY IN THE ORDERING AND MANUFACTURING OF OVERCURRENT PROTECTIVE DEVICES AND POWER DISTRIBUTION EQUIPMENT, OBTAIN APPROVAL FROM ENGINEER FOR PRELIMINARY SUBMITTAL OF SUFFICIENT STUDY DATA TO ENSURE THAT THE SELECTION OF DEVICES AND ASSOCIATED CHARACTERISTICS IS SATISFACTORY AND IN COMPLIANCE WITH THE RESULTS OF THE STUDIES BEING PERFORMED.

SHORT CIRCUIT STUDY

A. PROVIDE A COMPUTER-BASED, SHORT CIRCUIT STUDY TO DETERMINE THE MINIMUM INTERRUPTING CAPACITY OF CIRCUIT PROTECTIVE DEVICES.
B. FOR NEW EQUIPMENT, USE CHARACTERISTICS SUBMITTED UNDER THE PROVISIONS OF ACTION SUBMITTALS AND INFORMATION SUBMITTALS FOR THIS PROJECT.
C. FOR EXISTING RELOCATED EQUIPMENT AND EXISTING EQUIPMENT THAT IS EXISTING TO REMAIN, OBTAIN REQUIRED ELECTRICAL DISTRIBUTION SYSTEM DATA BY FIELD INVESTIGATION AND SURVEYS, CONDUCTED BY QUALIFIED TECHNICIANS AND ENGINEERS. THE QUALIFICATIONS OF TECHNICIANS AND ENGINEERS SHALL BE QUALIFIED AS DEFINED BY NFPA 70E.
D. GATHER AND TABULATE ALL REQUIRED DATA TO SUPPORT THE SHORT-CIRCUIT STUDY. COMPLY WITH RECOMMENDATIONS IN IEEE 551 AS TO THE AMOUNT OF DETAIL THAT IS REQUIRED TO BE ACQUIRED IN THE FIELD.
E. BEGIN SHORT-CIRCUIT CURRENT ANALYSIS AT THE SERVICE, EXTENDING DOWN TO THE SYSTEM OVERCURRENT PROTECTIVE DEVICES AS FOLLOWS:
   1. TO NORMAL SYSTEM LOW-VOLTAGE LOAD BUSES WHERE FAULT CURRENT IS 10 KA OR LESS.

ARC FLASH HAZARD STUDY

A. PROVIDE A COMPUTER-BASED, ARC-FLASH HAZARD STUDY TO DETERMINE THE ARC-FLASH HAZARD DISTANCE AND THE INCIDENT ENERGY TO WHICH PERSONNEL COULD BE EXPOSED DURING WORK ON OR NEAR EXISTING AND NEW ELECTRICAL EQUIPMENT.
B. ELECTRICAL SURVEY DATA: GATHER AND TABULATE ALL REQUIRED INPUT DATA TO SUPPORT STUDY. COMPLY WITH RECOMMENDATIONS IN IEEE 1584 AND NFPA 70E AS TO THE AMOUNT OF DETAIL THAT IS REQUIRED TO BE ACQUIRED IN THE FIELD.
C. FOR NEW EQUIPMENT, USE CHARACTERISTICS SUBMITTED UNDER THE PROVISIONS OF ACTION SUBMITTALS AND INFORMATION SUBMITTALS FOR THIS PROJECT.
D. FOR EXISTING EQUIPMENT, WHETHER OR NOT RELOCATED, OBTAIN REQUIRED ELECTRICAL DISTRIBUTION SYSTEM DATA BY FIELD INVESTIGATION AND SURVEYS, CONDUCTED BY QUALIFIED TECHNICIANS AND ENGINEERS.
E. HAZARD LABELS SHALL HAVE AN ORANGE HEADER WITH THE WORDING, "WARNING, ARC-FLASH HAZARD," AND SHALL INCLUDE THE FOLLOWING INFORMATION TAKEN DIRECTLY FROM THE ARC-FLASH HAZARD ANALYSIS:
   1. LOCATION DESIGNATION.
   2. NOMINAL VOLTAGE.
   3. FLASH PROTECTION BOUNDARY.
   4. HAZARD RISK CATEGORY.
   5. INCIDENT ENERGY.
   6. WORKING DISTANCE.
   7. ENGINEERING REPORT NUMBER, REVISION NUMBER, AND ISSUE DATE.
F. ARC FLASH HAZARD WARNING LABELS SHALL BE A 3.5-BY-5-INCH THERMAL TRANSFER LABEL OF HIGH-ADHESION POLYESTER FOR EACH WORK LOCATION INCLUDED IN THE ANALYSIS.
G. LABELS SHALL BE MACHINE PRINTED, WITH NO FIELD-APPLIED MARKINGS.

RECORD DOCUMENTS

A. DURING THE PROGRESS OF THE WORK, CONTRACTOR SHALL MAINTAIN A CURRENT (DAILY) AS-BUILT SET OF THE DRAWINGS AND SPECIFICATIONS, INDICATING THEREON ALL WORK INSTALLED AT VARIANCE WITH SUCH CONTRACT DOCUMENTS INCLUDING, WITHOUT LIMITATION, WORK COVERED BY ADDENDA, FIELD WORK ORDERS, CHANGE ORDERS, AND ENGINEERS
B. CONTRACTOR SHALL PROVIDE THE TENANT WITH THE FINAL AS-BUILT SET OF DRAWINGS AT THE COMPLETION OF THE WORK.

COORDINATION WITH LANDLORD AND UTILITY COMPANIES

A. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL COORDINATE THE WORK OF THIS CONTRACT WITH THE LANDLORD'S AUTHORIZED REPRESENTATIVE AND AUTHORIZED REPRESENTATIVES OF EACH SERVING UTILITY THAT WILL PROVIDE SERVICE TO THIS SITE, INCLUDING BUT NOT NECESSARILY LIMITED TO, ELECTRIC, TELEPHONE AND CABLE/SATELLITE TV SERVICE PROVIDERS.
B. CONTRACTOR SHALL MEET WITH AUTHORIZED REPRESENTATIVES OF THE LANDLORD AND EACH UTILITY TO DISCUSS LANDLORD UTILITY COMPANY SCOPE OF WORK, CONTRACTOR SCOPE OF WORK, POINT OF SERVICE PICK-UP, DETAILS REGARDING SYSTEM INTERFACE, UTILITY COMPANY STANDARDS TO BE COMPLIED WITH, ETC.

COORDINATION WITH OTHER TRADES

A. ELECTRICAL WORK SHALL BE INSTALLED SO AS TO NOT CONFLICT WITH THE WORK OF OTHER TRADES.
B. SET ALL SLEEVES AND CUT AND PATCH ALL MISCELLANEOUS HOLES NECESSARY FOR THE CONVENIENT AND PROPER INSTALLATION OF THE WORK.
C. CONFER WITH THE OTHER CONTRACTORS REGARDING THE LOCATION AND SIZE OF PIPES, EQUIPMENT, DUCTS, OPENINGS AND SPECIAL ARCHITECTURAL TREATMENTS IN ORDER THAT THERE MAY BE NO INTERFERENCES BETWEEN THE INSTALLATION OR THE PROGRESS OF THE WORK OF ANY CONTRACTOR ON THE PROJECT.
D. ALL LINE VOLTAGE WIRING AND FINAL CONNECTIONS TO COMPLETE MECHANICAL SYSTEMS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.
E. PROVIDE FINAL ELECTRICAL CONNECTIONS TO EQUIPMENT FURNISHED/PROVIDED BY OTHERS, (HVAC EQUIPMENT, PLUMBING EQUIPMENT, COMMERCIAL KITCHEN EQUIPMENT, ETC.
F. COORDINATE THE NEMA CONFIGURATION OF THE RECEPTACLE TO BE PROVIDED WITH THE NEMA PLUG CONFIGURATION OF THE CORD/PLUG ASSEMBLY FURNISHED WITH THE EQUIPMENT TO BE INSTALLED. PROVIDE RECEPTACLES HAVING A NEMA CONFIGURATION THAT MATCHES THE NEMA CONFIGURATION OF THE PLUG ON THE EQUIPMENT.
G. PROVIDE FINAL COORDINATION OF AVAILABLE POWER (VOLTAGE/PHASE) WITH OTHER TRADES PRIOR TO THEIR ORDERING OF EQUIPMENT.
H. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION REGARDING ELECTRICAL WORK TO BE PROVIDED ASSOCIATED WITH MECHANICAL EQUIPMENT.
I. WHERE ELECTRICAL WORK (CONDUIT BOXES, RECEPTACLES, DISCONNECT SWITCHES, ETC.) ARE SECURED DIRECTLY TO THE HOUSING OF MECHANICAL EQUIPMENT, THEY SHALL BE INSTALLED ON A PORTION OF THE EQUIPMENT HOUSING NOT REQUIRED TO BE REMOVED FOR ROUTINE MAINTENANCE. PRIOR TO INSTALLATION, COORDINATE ALL ELECTRICAL WORK AT MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR.

TEMPORARY POWER

A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEMPORARY CONSTRUCTION POWER AND LIGHTING TO ALLOW ALL CONTRACTORS AND SUB-CONTRACTORS TO PERFORM THE WORK OF THEIR CONTRACTS.
B. PRIOR TO THE SUBMISSION OF A BID PROPOSAL, THE CONTRACTOR SHALL CONTACT THE GENERAL CONTRACTOR TO COORDINATE THE TYPE OF EQUIPMENT TO BE UTILIZED DURING THE WORK OF THIS CONTRACT

SEQUENCING AND SCHEDULING

A. COORDINATE ELECTRICAL EQUIPMENT INSTALLATION WITH OTHER BUILDING COMPONENTS AND THE PROJECT PHASING PLAN.

UTILITY COMPANY METERING EQUIPMENT

A. PROVIDE ALL EQUIPMENT REQUIRED FOR ELECTRICITY METERING BY UTILITY COMPANY. ALL METERING EQUIPMENT AND THE INSTALLATION OF THE EQUIPMENT SHALL BE IN COMPLIANCE WITH ALL UTILITY COMPANY REQUIREMENTS.
B. ELECTRICAL SERVICE CONNECTIONS: COORDINATE WITH UTILITY COMPANIES AND COMPONENTS THEY FURNISH AS FOLLOWS:
   1. COMPLY WITH REQUIREMENTS OF UTILITIES PROVIDING ELECTRICAL POWER SERVICES.
   2. COORDINATE INSTALLATION AND CONNECTION OF UTILITIES AND SERVICES, INCLUDING PROVISION FOR ELECTRICITY-METERING COMPONENTS.
C. METERS SHALL BE FURNISHED BY UTILITY COMPANY; INSTALLED BY ELECTRICAL CONTRACTOR.
D. METER SOCKETS: COMPLY WITH REQUIREMENTS OF ELECTRICAL-POWER UTILITY COMPANY. INSTALL ALL CONDUITS AND EQUIPMENT ACCORDING TO UTILITY COMPANY'S WRITTEN REQUIREMENTS. PROVIDE EMPTY CONDUITS FOR METERING LEADS AND EXTEND GROUNDING CONNECTIONS AS REQUIRED BY UTILITY COMPANY.

FIRE STOPPING

A. PROVIDE FIRE STOPPING FOR PENETRATIONS BY CONDUIT OR CABLES AND OTHER EQUIPMENT THROUGH FIRE-RATED VERTICAL BARRIERS (WALLS AND PARTITIONS), HORIZONTAL BARRIERS (FLOOR/CEILING ASSEMBLIES) AND VERTICAL SHAFT WALLS AND PARTITIONS.
B. FIRESTOP SYSTEM INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF ATME E 814 OR UL 1479 TESTED ASSEMBLIES THAT PROVIDE A FIRE RATING EQUAL TO OR GREATER THAN THAT OF THE CONSTRUCTION BEING PENETRATED.

SEISMIC RESTRAINT

A. PROVIDE SEISMIC RESTRAINT FOR ELECTRICAL WORK AND SYSTEMS AND EQUIPMENT IN STRICT ACCORDANCE WITH THE APPLICABLE BUILDING CODE AND THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
B. SUBMIT ALL REQUIRED DETAILS TO THE AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL.

CUTTING & PATCHING

A. PRIOR TO CORE DRILLING OR SAW CUTTING OPERATIONS, CONTRACTOR SHALL X-RAY OR GROUND PENETRTING RADAR (GPR) THE EXISTING SLAB TO DETERMINE THE LOCATION OF ANY EXISTING UTILITIES, STRUCTURAL MEMBERS. ETC. COORDINATE ALL SCANNING, CUTTING AND CORE DRILLING OPERATIONS WITH GC AND LANDLORD PRIOR TO COMMENCEMENT OF WORK.
B. CORE-DRILL OR SAW-CUT EXISTING FLOORS, WALLS, ROOF, ETC., AS REQUIRED FOR THE INSTALLATION OF THE ELECTRICAL WORK. STRUCTURAL COMPONENTS, INCLUDING BUT NOT NECESSARILY LIMITED TO, COLUMNS, BEAMS, GIRDERS, PLATES OR JOISTS SHALL NOT BE CUT.
C. PATCH SURROUNDING AREAS FLUSH WITH ADJACENT SURFACES AND PREPARE TO RECEIVE SPECIFIED FINISHES. PATCH AND REPAIR ROOF TO MATCH EXISTING ROOFING SYSTEM. ALL ROOF WORK SHALL BE PERFORMED TO MEET THE WARRANTY REQUIREMENTS OF THE EXISTING ROOFING SYSTEM.

GROUNDING

A. PROVIDE ELECTRICAL SYSTEM AND EQUIPMENT GROUNDING IN ACCORDANCE WITH APPLICABLE N.E.C. REQUIREMENTS.
B. THE METALLIC CONDUIT SYSTEM SHALL BE GROUNDED AND BONDED TO FORM AN EQUIPMENT GROUNDING CONDUCTOR.
C. PROVIDE AN INSULATED EQUIPMENT GROUND CONDUCTOR WITHIN ALL FEEDERS AND BRANCH CIRCUITS. THIS EQUIPMENT GROUND CONDUCTOR SHALL BE IN ADDITION TO THE EQUIPMENT GROUND CONDUCTOR FORMED BY THE METALLIC CONDUIT SYSTEM.
D. PROVIDE AN ISOLATED GROUND CONDUCTOR IN ADDITION TO THE EQUIPMENT GROUNDING CONDUCTOR IN SELECT BRANCH CIRCUITS AS NOTED ON THE DRAWINGS.
E. PROVIDE A #6 AWG GREEN INSULATED GROUNDING CONDUCTOR FROM THE GROUND BAR AT TELEPHONE TERMINAL BOARD TO THE ELECTRICAL SERVICE GROUND.
F. PROVIDE A COPPER GROUNDING BAR AT THE TELEPHONE TERMINAL BACKBOARD. GROUNDING BAR SHALL BE ¼ INCH X 4 INCHES X 12 INCHES, PRE-DRILLED FOR CONDUCTOR TERMINATIONS, WITH NON-METALLIC STAND-OFF BRACKETS WITH INSULATORS. CHATSWORTH PRODUCTS 10622-012 OR APPROVED EQUAL.

EQUIPMENT IDENTIFICATION

A. PROVIDE EQUIPMENT LABELS ON PANELBOARDS, DISCONNECT SWITCHES, CONTACTORS, TRANSFORMERS, CONTROLS, ETC. EQUIPMENT LABELS SHALL BE ENGRAVED PHENOLIC RESIN NAMEPLATES ATTACHED TO ENCLOSURE WITH MECHANICAL FASTENERS. SELF-ADHESIVE NAMEPLATES ARE NOT ACCEPTABLE. LETTERING SHALL BE 1/2" HIGH, BLACK TEXT ON WHITE BACKGROUND.
B. ENGRAVED NAMEPLATES ATTACHED TO COMPONENTS SHALL IDENTIFY THE EQUIPMENT DESIGNATION, NAME OF THE "UPSTREAM" POWER SOURCE (AS APPLICABLE), VOLTAGE AND PHASE.
C. THE COVERS OF ALL OUTLET AND JUNCTION BOXES INSTALLED ABOVE CEILINGS AND INSTALLED EXPOSED IN UNFINISHED SPACES SHALL BE LABELED TO IDENTIFY THE SERVING PANEL, VOLTAGE, PHASE AND CIRCUIT NUMBERS CONTAINED WITHIN THE BOX. LABEL SHALL BE LEGIBLY HANDWRITTEN WITH BLACK, FELT TIP PERMANENT MARKER.
D. THE COVER PLATES OF ALL WIRING DEVICES SHALL BE LABELED TO IDENTIFY THE SERVING PANEL AND THE CIRCUITS SERVING THE DEVICE. LABELS SHALL BE MACHINE PRINTED, BLACK TEXT ON A CLEAR, SELF ADHESIVE LABEL.

CONDUIT AND FITTINGS

A. ALL INTERIOR AND EXTERIOR CONDUITS SHALL BE INSTALLED AND SUPPORTED IN ACCORDANCE WITH N.E.C. REQUIREMENTS.
B. MINIMUM CONDUIT SIZE SHALL BE ¾" TRADE SIZE. SWITCH LEGS SHALL BE ½" TRADE SIZE.
C. WITHIN INTERIOR FINISHED AREAS, ALL CONDUIT SHALL BE INSTALLED CONCEALED WITHIN NEW AND EXISTING WALLS AND ABOVE NEW AND EXISTING CEILINGS.
D. CONDUIT INSTALLED WITHIN THE INTERIOR OF THE BUILDING SHALL BE GALVANIZED ELECTRICAL METALLIC TUBING (EMT). CONDUIT FITTINGS FOR INDOOR EMT CONDUITS SHALL BE CAST METAL, COMPRESSION TYPE.
E. EMT SHALL BE USED FOR INTERIOR FEEDERS AND BRANCH CIRCUITS INSTALLED EXPOSED IN UNFINISHED SPACES, CONCEALED ABOVE NEW OR EXISTING CEILINGS OR CONCEALED WITHIN EXISTING AND NEW INTERIOR PARTITIONS.
F. CONDUITS INSTALLED EXPOSED ON THE EXTERIOR OF THE BUILDING SHALL BE GALVANIZED RIGID STEEL. FITTINGS SHALL BE THREADED TYPE.
G. CONDUITS INSTALLED UNDER SLAB ON GRADE CONSTRUCTION SHALL BE RIGID NON-METALLIC (RNC), SCHEDULE 40 PVC. RNC COMPLYING WITH NEMA TC 2 AND UL 651 UNLESS OTHERWISE INDICATED. FITTINGS FOR RIGID NON-METALLIC CONDUIT SHALL COMPLY WITH NEMA TC 3; MATCH TO CONDUIT TYPE AND MATERIAL.
H. PROVIDE CONDUIT EXPANSION FITTINGS IN ALL CONDUIT RUNS THAT EXTEND ACROSS BUILDING EXPANSION JOINTS AND WHERE MOVEMENT MAY BE ENCOUNTERED.
I. CONDUIT SHALL BE SUPPORTED FROM STRUCTURE ONLY.
J. PVC CONDUIT SHALL ONLY BE USED BELOW GRADE.
K. PROVIDE FLEXIBLE METAL CONDUIT FOR CONNECTIONS TO VIBRATING EQUIPMENT WITHIN INTERIOR DRY LOCATIONS. MAXIMUM CONDUIT LENGTH SHALL BE 36 INCHES.
L. PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR CONNECTIONS TO VIBRATING EQUIPMENT IN WET OR OUTDOOR LOCATIONS. MAXIMUM CONDUIT LENGTH SHALL BE 36 INCHES.
M. PROVIDE FLEXIBLE METAL CONDUIT FOR FINAL CONNECTIONS TO RECESSED LIGHT FIXTURES (FIXTURE WHIPS). MAXIMUM CONDUIT LENGTH SHALL BE 72 INCHES.
N. PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR FINAL ELECTRICAL CONNECTIONS TO FOOD SERVICE EQUIPMENT.
O. CONDUITS THAT EXTEND UP TO THE ROOF LEVEL TO SERVE ROOF MOUNTED MECHANICAL EQUIPMENT INSTALLED ON A CURB SHALL BE ROUTED WITHIN THE EQUIPMENT CURB. COORDINATE ELECTRICAL WORK WITH MECHANICAL EQUIPMENT INSTALLER.
P. PROVIDE CONDUIT SEALING FITTINGS IN ALL CONDUITS THAT EXTEND FROM NON-REFRIGERATED SPACES TO REFRIGERATED SPACES PER NEC 300.7(A). PROVIDE EXPANSION JOINTS FOR CONDUIT AS REQUIRED TO COMPENSATE FOR THERMAL EXPANSION AND CONTRACTION.
Q. ALL CONDUITS INSTALLED IN ASSOCIATION WITH THE WALK-IN COOLER FREEZER SHALL BE INSTALLED IN ACCORDANCE WITH THE WALK-IN MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS. COORDINATE ALL CONDUIT INSTALLATION WITH WALK-IN EQUIPMENT INSTALLER.
R. ACCEPTABLE MANUFACTURERS FOR GALVANIZED RIGID CONDUIT, EMT, FLEXIBLE METAL CONDUITS AND LIQUID-TIGHT FLEXIBLE METAL CONDUITS SHALL BE ALLIED, REPUBLIC, WHEATLAND, ELECTRI-FLEX AND ANACONDA.
S. ACCEPTABLE MANUFACTURERS FOR CONDUIT FITTINGS SHALL BE THOMAS AND BETTS OR APPROVED EQUAL.

CONDUCTORS

A. ALL CONDUCTORS SHALL BE SOFT DRAWN, ANNEALED COPPER, #12 AWG MINIMUM. CONDUCTORS
B. CONDUCTORS #12 AND #10 AWG SHALL BE SOLID; #8 AWG AND LARGER SHALL BE STRANDED.
C. THE USE OF ALUMINUM CONDUCTORS IS NOT ACCEPTABLE.
D. EXPOSED, INTERIOR FEEDERS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.
E. FEEDERS INSTALLED CONCEALED IN CEILINGS, WALLS, PARTITIONS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.
F. FEEDERS INSTALLED CONCEALED IN CONCRETE, BELOW SLABS-ON-GRADE AND UNDERGROUND: TYPE THHN-THWN, SINGLE CONDUCTORS IN PVC CONDUIT.
G. EXPOSED, INTERIOR, BRANCH CIRCUITS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.
H. BRANCH CIRCUITS CONCEALED IN EXISTING AND NEW CEILINGS, WALLS, AND PARTITIONS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.
I. BRANCH CIRCUITS CONCEALED BELOW SLABS-ON-GRADE, AND UNDERGROUND: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.
J. ACCEPTABLE MANUFACTURERS FOR CONDUCTORS: GENERAL CABLE COMPANY, CAROL, ANACONDA, ROME, SOUTHWIRE.
K. CLASS 1 CONTROL CIRCUITS: TYPE THHN-THWN, IN CONDUIT.
L. CLASS 2 CONTROL CIRCUITS: POWER-LIMITED PLENUM RATED CABLE, CONCEALED IN BUILDING FINISHES.
M. THE USE OF NON-METALLIC-SHEATHED CABLE (TYPE NM) AND ARMORED CABLE (TYPE AC OR BX) IS NOT ACCEPTABLE
N. WIRE CONNECTORS SHALL BE EQUAL TO SCOTCH LOCK FOR #8 AWG AND SMALLER, THOMAS AND BETTS LOCK-TITE FOR #6 AND LARGER.
O. PROVIDE #10 AWG CONDUCTORS FOR BRANCH CIRCUITS HAVING A CONDUCTOR LENGTH LONGER THAN 75 FEET.
P. SIZE OF CONDUCTORS AND CABLES INDICATED OR SPECIFIED ARE IN AMERICAN WIRE GAGE (AWG - BROWN AND SHARPE).
Q. INSTALL ALL WIRING IN APPROVED RACEWAY AND ENCLOSURES, EXCEPT WHERE SPECIFIED OR INDICATED, FOR LOW-VOLTAGE WIRING OR, WHERE TYPE MC CABLE IS INDICATED, SPECIFIED AS ACCEPTABLE, OR BOTH.
R. 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.
S. 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 THE MINIMUM REQUIRED. INSULATE ALL SPLICES, TAPS, AND JOINTS AS REQUIRED BY CODE.
T. ALL MATERIALS USED TO TERMINATE, SPLICE OR TAP CONDUCTORS: DESIGNED, PROPERLY SIZED, AND UL LISTED FOR THE SPECIFIC APPLICATION AND CONDUCTORS INVOLVED, AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, USING THE MANUFACTURER'S RECOMMENDED TOOLS.
U. WHERE WIRING IS INDICATED AS INSTALLED, BUT THE CONNECTION IS INDICATED "FUTURE" OR "BY OTHER DIVISION, TRADES, OR CONTRACTS", LEAVE A MINIMUM OF 3' FOOT "PIGTAIL" AT THE BOX, TAPE THE ENDS OF CONDUCTORS, AND COVER THE BOX.
V. VOLTAGE DROP IN BRANCH CIRCUITS SHALL NOT EXCEED 3 PERCENT.

TYPE MC CABLE

A. USES PERMITTED
   1. TYPE MC CABLE: 600V, UNJACKETED: ANSI E119 AND E814, UL STANDARDS 44 OR 83 (AS APPLICABLE), AND 1569, NFPA 70 ARTICLE 330; ALUMINUM OR GALVANIZED STEEL INTERLOCKED ARMOR; THHM- OR XHHW-INSULATED CONDUCTORS; COLOR CODE: ICEA METHOD 1, WITH GREEN INSULATED GROUNDING CONDUCTOR.
   2. IN LIEU OF FLEXIBLE CONDUIT AND WIRING FROM LIGHT FIXTURES IN ACCESSIBLE CEILINGS TO JUNCTION BOXES (ATTACHED TO BUILDING STRUCTURE) ABOVE THE CEILING. PROVIDE CABLE WHIPS OF SUFFICIENT LENGTHS TO ALLOW FOR RELOCATING EACH LIGHT FIXTURE WITHIN A 5' FOOT RADIUS OF ITS INSTALLED LOCATION, BUT NOT EXCEEDING 6' FEET IN UNSUPPORTED LENGTHS.
   3. FOR VERTICAL DROPS IN STUD WALLS.

B. USES NOT PERMITTED:
   1. HOMERUNS TO PANELBOARDS.
   2. WHERE EXPOSED TO VIEW.
   3. WHERE EXPOSED TO DAMAGE.
   4. HAZARDOUS LOCATIONS.
   5. WET LOCATIONS.
   6. INSTALLED HORIZONTALLY WITHIN STUD WALL.
   7. WHEN RESTRICTED OTHERWISE ABOVE, AND WHEN SPECIFICALLY DISALLOWED BY THE LOCAL AHJ, OWNER OR BOTH.

CONDUCTOR COLOR CODING

A. PROVIDE COLOR CODING SYSTEM AS LISTED BELOW FOR ALL FEEDERS AND BRANCH CIRCUITS AND USED AS A BASIS FOR BALANCING LOAD ON PANELS.
B. COLOR CODING FOR CONDUCTOR #12 AWG THROUGH #6 AWG SHALL CONSIST OF COLOR CODED THERMOPLASTIC INSULATION OF THE COLORS SPECIFIED HEREIN.
C. COLOR CODING FOR CONDUCTORS #8 AWG AND LARGER SHALL BE FIELD APPLIED SELF ADHESIVE TAPE OF THE COLOR SPECIFIED HEREIN FOR THE PARTICULAR PHASE. PHASE A--BLACK, PHASE B--RED, PHASE C--BLUE, NEUTRAL--WHITE,
D. 120/208V: EQUIPMENT GROUND--GREEN, ISOLATED GROUND--GREEN WITH DISTINCTIVE WHITE OR YELLOW MARKINGS.
E. 277/480V: BROWN-A, ORANGE-B YELLOW-C, NEUTRAL - WHITE OR GRAY, EQUIPMENT GROUND - GREEN. .

BOXES AND FITTINGS

A. ALL OUTLET BOXES SHALL BE UL LISTED AND LABELED FOR USE IN THE SPACE THEY OCCUPY AND THE PURPOSE THEY SERVE.
B. SHEET METAL OUTLET AND DEVICE BOXES FOR DRY, INTERIOR APPLICATIONS: COMPLY WITH NEMA OS 1 AND UL 514A.
C. CAST-METAL OUTLET AND DEVICE BOXES FOR EXTERIOR APPLICATIONS: COMPLY WITH NEMA FB 1, FERROUS ALLOY, TYPE FS OR FD, WITH GASKETED COVER.
D. OUTLET BOXES INSTALLED WITHIN FIRE RATED ASSEMBLIES SHALL HAVE A FIRE RATING EQUAL TO OR GREATER THAN THE RATING OF THE WALL IN WHICH IT IS INSTALLED.
E. OUTLET BOXES SHALL BE 4 INCHES SQUARE BY 2 1/8 INCHES DEEP , EXCEPT FOR 2" PARTITIONS SHALL BE AT LEAST 1-1/2" DEEP.
F. OUTLET BOXES FOR VOICE AND DATA DEVICES SHALL BE 4 11/16 INCHES SQUARE BY 2 1/8 INCHES DEEP.
G. ALL PULLBOXES SHALL BE CONSTRUCTED OF GALVANIZED STEEL, OF METAL GAUGE AND PHYSICAL SIZE AS REQUIRED BY THE N.E.C. FOR THE NUMBER AND SIZE OF CONDUITS AND CONDUCTORS ASSOCIATED WITH THE PULLBOX.
H. FIXTURE OUTLET BOXES IN/OR ON CEILINGS SHALL NOT BE LESS THAN 1-1/2" DEEP OR LESS THAN 4" SQUARE. ALL OUTLET BOXES INTENDED TO SUPPORT FIXTURES SHALL BE EQUIPPED WITH 3/8" FIXTURE STUDS FASTENED THROUGH THE BOTTOM OF THE BOX WITH FOUR BOLTS.
I. NEW OUTLET BOXES INSTALLED WITHIN NEW OR EXISTING STUD WALL CONSTRUCTION SHALL BE MOUNTED TO A STUD OR MOUNTED IN A BRACKET THAT SPANS STUD-TO-STUD, CADDY TSGB BRACKET OR APPROVED EQUAL. THE USE OF "OLD WORK" TYPE BOXES THAT.
J. ACCEPTABLE MANUFACTURERS FOR BOXES: APPLETON, STEEL CITY, RACO.

PANELBOARDS

A. PANELBOARDS SHALL BE LIGHTING AND APPLIANCE TYPE, DEAD FRONT, SAFETY TYPE, FURNISHED WITH BRANCH CIRCUIT BREAKER OVERCURRENT PROTECTIVE DEVICES, COPPER PHASE, NEUTRAL AND EQUIPMENT GROUNDING BUS BARS, MAIN CIRCUIT BREAKER OR MAIN LUG ONLY AS NOTED ON THE DRAWINGS. MAIN BUSES AND CONNECTORS SHALL BE HARD DRAWN COPPER OF 98% CONDUCTIVITY. LOAD CENTERS ARE NOT ACCEPTABLE FOR USE.
B. CIRCUIT BREAKERS SHALL BE MOLDED CASE, BOLT-ON TYPE SUITABLE FOR VOLTAGE AND AMPERE RATINGS INDICATED ON DRAWINGS AND IN PANEL SCHEDULES. REFER TO THE PANEL SCHEDULES ON THE DRAWINGS FOR ADDITIONAL ACCESSORIES TO BE PROVIDED AT SELECT CIRCUIT BREAKERS.
C. CIRCUIT BREAKERS SHALL HAVE A MINIMUM AMPERE INTERRUPTING CAPACITY (AIC) OF 10,000 AMPERES FOR 120/208V SYSTEMS, 14,000 FOR 277/480V SYSTEMS
D. D.WHERE THE POWER SYSTEM STUDY IDENTIFIES AVAILABLE FAULT CURRENT VALUES AT EXISTING AND NEW PANELS THAT ARE HIGHER THAN THE MINIMUM AIC RATINGS SPECIFIED HEREIN, PROVIDE CIRCUIT BREAKERS IN THE PANELS THAT HAVE AIC RATINGS GREATER THAN THE AVAILABLE FAULT CURRENT AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY.
E. PROVIDE NEMA 1 ENCLOSURES FOR INTERIOR PANELS.
F. PANEL BOARDS SHALL BE EQUIPPED WITH FLUSH TYPE LOCK AND CATCH. ALL LOCKS SHALL BE KEYED ALIKE, WITH TWO KEYS SUPPLIED WITH EACH LOCK.
G. CIRCUIT BREAKERS SERVING LIGHTING CIRCUITS SHALL BE RATED FOR SWITCH DUTY.
H. CIRCUIT BREAKERS SERVING HVAC EQUIPMENT SHALL BE HACR RATED.
I. ALL LUGS SHALL BE OF THE SOLDERLESS TYPE AND RATED AT A MINIMUM OF 75°C.
J. PROVIDE NEW CIRCUIT DIRECTORIES WITHIN NEW AND EXISTING PANELS TO REFLECT THE WORK OF THIS CONTRACT. DIRECTORY SHALL BE TYPEWRITTEN OR COMPUTER GENERATED. HANDWRITTEN CIRCUIT DIRECTORIES ARE NOT ACCEPTABLE.
K. UTILIZE FINAL, OWNER ASSIGNED ROOM NAMES AND NUMBERS TO IDENTIFY SPACES WITHIN THE CIRCUIT DIRECTORIES. COMPLY WITH NEC 408.4 WHEN IDENTIFYING CIRCUITS IN CIRCUIT DIRECTORIES.
L. PANEL CIRCUITS SHALL BE CONFIGURED SUCH THAT THE LOAD IS DISTRIBUTED EVENLY ACROSS ALL THREE PHASES TO WITHIN 10% IN ACCORDANCE WITH N.E.C. REQUIREMENTS.

ALL NEW AND EXISTING PANEL BOARDS SHALL BE LABELED TO IDENTIFY THE AMOUNT OF FAULT CURRENT AVAILABLE AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY TO BE PERFORMED. LABEL SHALL BE MACHINE PRINTED, BLACK TEXT ON CLEAR, SELF ADHESIVE TAPE. INSTALL LABEL

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1	SCALE: N.T.S.	ELECTRICAL SPECIFICATIONS

MilkShake FACTORY EST 1914

TITLE: ELECTRICAL SPECIFICATIONS SHEET (1 OF 2)

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ADJACENT TO PANEL BOARDS ENGRAVED NAMEPLATE.

N. ALL NEW AND EXISTING PANEL BOARDS SHALL BE LABELED TO IDENTIFY THE ARC FLASH HAZARD CHARACTERISTICS AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY TO BE PERFORMED.
O. ALL "SPARE" CIRCUIT BREAKERS SHALL BE SET TO THE "OFF" POSITION.
P. PROVIDE THREE (3) EMPTY 1 INCH CONDUITS FROM EACH FLUSH MOUNTED PANEL STUBBED UP TO ABOVE ACCESSIBLE CEILING.
Q. PROVIDE HANDLE TIES ON ALL MULTI-WIRE BRANCH CIRCUITS IN ACCORDANCE WITH NEC 210.4(B)
R. ACCEPTABLE MANUFACTURERS FOR PANELBOARDS BY SCHNEIDER, ABB, SIEMENS OR EATON.

SWITCHES

A. TOGGLE SWITCHES SHALL BE SINGLE POLE, 3-WAY OR 4-WAY AS NOTED ON THE DRAWINGS, 20 AMPERES, 120/277 VOLT AC TYPE, SPECIFICATION GRADE WITH SCREW TERMINALS. HUBBELL 1221-X, 1223-X OR 1224-X OR APPROVED EQUIVALENT BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.
B. TOGGLE SWITCHES SHALL BE MOUNTED AT DOORS, INSTALLED ADJACENT TO THE TRIM ON THE STRIKING SIDE OF THE DOOR, REGARDLESS OF THE LOCATION INDICATED ON THE DRAWINGS. VERIFY ALL DOOR SWINGS PRIOR TO INSTALLATION OF OUTLET BOXES FOR SWITCHES.
C. DEVICE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.
D. PROVIDE A NEUTRAL CONDUCTOR TO ALL SWITCH LOCATIONS
E. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SWITCHES: LEGRAND, LEVITON.

RECEPTACLES

A. RECEPTACLES SHALL BE 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R WITH SCREW TERMINALS. HUBBELL 5362-W OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.
B. GFCI RECEPTACLES SHALL BE 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, FEED THROUGH TYPE CAPABLE OF PROTECTING DOWNSTREAM RECEPTACLES ON A SINGLE CIRCUIT, SOLID STATE GROUND FAULT SENSING AND SIGNALING, 5 MILLIAMP TRIP LEVEL, NEMA 5-20R WITH SCREW TERMINALS, HUBBELL GF5362-X OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.
C. ISOLATED GROUND RECEPTACLES SHALL BE ORANGE, 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R WITH SCREW TERMINALS. HUBBELL IG-5362-W OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.
D. PROVIDE SPECIAL PURPOSE RECEPTACLES HAVING NEMA CONFIGURATIONS THAT MATE AND MATCH THE NEMA PLUG CONFIGURATION PROVIDED WITH THE EQUIPMENT TO BE CONNECTED.
E. COVER PLATES FOR EXTERIOR RECEPTACLES SHALL BE RATED FOR "WEATHERPROOF WHILE IN USE".
F. DEVICE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.
G. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SWITCHES AND RECEPTACLES: LEGRAND, LEVITON.

GFCI PROTECTION:

A. ALL KITCHEN SINGLE PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 50 AMPS OR LESS AND THREE PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 100 AMPS OR LESS SHALL HAVE GROUND FAULT CIRCUIT INTERRUPTER PROTECTION FOR PERSONNEL IN ACCORDANCE WITH NEC 210.8, (B), (1) - (10), OR THE EQUIVALENT REQUIREMENT WITHIN THE APPLICABLE ELECTRICAL CODE.
B. THE "GFCI" NOTATION AT A DEVICE OR CIRCUIT BREAKER INDICATES THAT GFCI PROTECTION SHALL BE PROVIDED FOR THE CIRCUIT OR CIRCUITS INDICATED. GFCI PROTECTION SHALL BE PROVIDED BY ONE OF THE FOLLOWING MEANS:

- INTEGRAL GFCI PROTECTION WITHIN THE DEVICE (NEMA 5-20R RECEPTACLES), WHEN THE DEVICE IS ABLE TO BE INSTALLED IN A READILY ACCESSIBLE LOCATION AS DEFINED BY THE APPLICABLE ELECTRICAL CODE.
- GFCI CIRCUIT BREAKER INSTALLED WITHIN THE PANEL FOR SERVICE TO THE CIRCUIT OR CIRCUITS.
- GFCI CIRCUIT BREAKER INSTALLED WITHIN AN INDIVIDUAL ENCLOSURE EXTERNAL TO THE PANEL FOR SERVICE TO THE CIRCUIT.
- DEAD-FRONT GFCI DEVICE INSTALLED IN A READILY ACCESSIBLE LOCATION AS DEFINED BY THE NEC (APPLICABLE TO 20 AMP, 120 VOLT CIRCUITS).
- AN INDIVIDUALLY MOUNTED EXTERNAL SPECIAL PURPOSE GROUND FAULT CIRCUIT INTERRUPTER (SPGFCI) DEVICE SIMILAR TO "SHOCK BLOCK" PRODUCTS AS MANUFACTURED BY LITTLE FUSE, OR APPROVED EQUAL.
- DEAD FRONT DEVISES SHALL BE BE LABELED TO IDENTIFY THE CIRCUIT AND THE LOAD SERVED BY THE DEVICE.

COVER PLATES FOR TOGGLE SWITCHES AND RECEPTACLES

A. COVER PLATES WITHIN NON-FOOD SERVICE AREAS SHALL BE NYLON, OF CONFIGURATION TO MATCH THE WIRING DEVICE.
B. COVER PLATES WITHIN THE FOOD SERVICE AREA SHALL BE STAINLESS STEEL WITH STAINLESS STEEL HARDWARE, UNLESS OTHERWISE NOTED.
C. CONFIGURATION AND COLOR OF COVER PLATE SHALL MATCH THAT OF THE WIRING DEVICE THAT THE PLATE WILL BE INSTALLED ON.
D. COVER PLATE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.
E. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR COVER PLATES: LEGRAND, LEVITON.

MOUNTING HEIGHTS FOR ELECTRICAL DEVICES AND EQUIPMENT

A DEVICES AND EQUIPMENT SHALL BE INSTALLED AT THE MOUNTING HEIGHTS NOTED BELOW UNLESS NOTED OTHERWISE ON THE DRAWINGS OR REQUIRED BY APPLICABLE CODES AND STANDARDS:

- 1TOGGLE SWITCHES, WALL SWITCH OCCUPANCY SENSORS AND DIMMERS FOR LIGHTING CONTROL - TOP OF DEVICE 48" AFF
- CONVENIENCE RECEPTACLES -TOP OF DEVICE 18" AFF
- CONVENIENCE RECEPTACLES AT COUNTERTOPS - BOTTOM OF DEVICE 44" AFF OR AS NOTED ON THE DRAWINGS
- RECEPTACLES AT FOOD SERVICE EQUIPMENT - AS INDICATED ON THE FINAL, APPROVED FOOD SERVICE SHOP DRAWINGS.
- TELEPHONE AND DATA OUTLETS - TOP OF DEVICE 18" AFF OR AS REQUIRED BY THE ADJACENT CASEWORK
- DISCONNECT SWITCHES - TOP OF ENCLOSURE 66" AFF
- PANELBOARDS - TOP OF ENCLOSURE 72" AFF

DISCONNECT SWITCHES

A. DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE, UL LISTED AND LABELED, EQUIPPED WITH A LUG FOR TERMINATION OF THE EQUIPMENT GROUNDING CONDUCTOR.
B. DISCONNECT SWITCHES SHALL HAVE NEMA 1 ENCLOSURES FOR DRY, INDOOR APPLICATIONS; NEMA 3R ENCLOSURES FOR OUTDOOR OR WET LOCATION APPLICATIONS.
C. DISCONNECT SWITCHES INSTALLED EXPOSED IN FOOD SERVICE AREAS SHALL BE NEMA 4X STAINLESS STEEL.
D. ALL DISCONNECT SWITCHES SHALL BE EQUIPPED WITH AN ENGRAVED NAMEPLATE TO IDENTIFY THE SERVING PANEL, CIRCUIT NUMBERS AND THE LOAD SERVED BY THE SWITCH.
E. ACCEPTABLE MANUFACTURERS FOR DISCONNECT SWITCHES: SCHNEIDER, ABB, SIEMENS OR EATON.

DUCT MOUNTED SMOKE DETECTORS

A. PROVIDE A 120 VOLT POWER SOURCE TO ALL DUCT MOUNTED SMOKE DETECTORS INSTALLED WITHIN NEW AND EXISTING MECHANICAL EQUIPMENT
B. PROVIDE A DUCT MOUNTED SMOKE DETECTORS WITHIN NEW AND EXISTING MECHANICAL EQUIPMENT AS REQUIRED BY APPLICABLE CODES. FINAL ELECTRICAL CONNECTION AND ALL INTERLOCK WIRING BY THE ELECTRICAL CONTRACTOR.
C. PROVIDE ALL INTERLOCK WIRING IN CONDUIT BETWEEN ALL DUCT DETECTORS SUCH THAT UPON DETECTING SMOKE IN ANY ONE DETECTOR, ALL ROOF TOP UNITS SHALL BE SHUT DOWN.
D. PROVIDE TEST/RESET SWITCH AND PIEZO ALERT SOUNDER AND REMOTE ANNUNCIATORS ALARM LED MOUNTED AS DIRECTED BY LOCAL AHJ. EC TO PROVIDE ALL REQUIRED INTERLOCK WIRING BETWEEN DUCT DETECTOR AND REMOTE SWITCH.
E. REFER TO DETAILS ON MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.

TESTING

A. PROVIDE ALL TESTS AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.
B. PROVIDE THE TESTS AS OUTLINED HEREINAFTER AND OTHER TESTS REQUIRED TO ESTABLISH THE ADEQUACY, QUALITY, SAFETY, COMPLETED STATUS AND SUITABLE OPERATION OF EACH SYSTEM.
C. PROMPTLY CORRECT ANY FAILURES, DEFICIENCIES AND/OR DEFECTS REVEALED BY THESE TESTS. AFTER CORRECTING FAILURES, DEFICIENCIES OF DEFECTS, CONDUCT NEW TESTING TO VERIFY THAT THE DEFICIENCY HAS BEEN RECTIFIED AND THE SYSTEM IS FUNCTIONING PROPERLY.
D. NEW AND EXISTING PANELBOARDS SHALL HAVE PHASE CURRENTS BALANCED TO WITHIN +/- 10% VARIATION BETWEEN AVERAGE PHASE CURRENT AND MEASURED INDIVIDUAL PHASE.
E. AN OPERATIONAL TEST OF THE EMERGENCY LIGHTING/EXIT SIGNAGE SYSTEM SHALL BE PERFORMED IN THE PRESENCE OF THE OWNER AND THE AUTHORITY HAVING JURISDICTION TO DEMONSTRATE PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND SPECIFIED REQUIREMENTS.

OPERATION AND MAINTENANCE MANUALS

A. THIRTY (30) DAYS PRIOR TO SUBSTANTIAL COMPLETION, SUBMIT OPERATING AND MAINTENANCE MANUALS FOR EQUIPMENT TO ENGINEER FOR APPROVAL. INCLUDE ONE COPY OF EACH FINAL APPROVED SUBMITTAL FOR RECORD PURPOSES, INDICATING THE ACTUAL PRODUCT INSTALLED. INCLUDE SIGNIFICANT CHANGES IN THE PRODUCT DELIVERED TO PROJECT SITE AND CHANGES IN MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLATION.
B. PROVIDE COMPREHENSIVE CONTACT LIST INCLUDING CONTRACTOR AND SUBCONTRACTOR'S NAMES, ADDRESSES, TELEPHONE AND CONTACT PERSON FOR OWNER'S USE.

TRAINING OF OWNER'S DESIGNATED PERSONNEL

A. PREPARE AND SUBMIT OPERATING INSTRUCTIONS AND PROVIDE ON-SITE TRAINING OF OWNER'S PERSONNEL IN USE AND MAINTENANCE OF OPERATING EQUIPMENT.

WARRANTY

A. THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS, EQUIPMENT AND THE INSTALLATION TO BE FREE OF DEFECTS THAT MAY DEVELOP IN ANY PART OF THEIR WORK CAUSED BY FAULTY WORKMANSHIP, MATERIAL OR EQUIPMENT FAILURES, FOR A MINIMUM OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION OR FOR AS LONG AS NORMAL EQUIPMENT MANUFACTURER WARRANTIES ARE IN EFFECT FROM THE DATE OF OWNER ACCEPTANCE OF THE PROJECT, WHICHEVER IS LATER.
B. DURING THE ONE (1) YEAR WARRANTY PERIOD, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PREMISES CAUSED BY DEFECTS IN WORKMANSHIP OR DEFECTS IN THE WORK OR EQUIPMENT FURNISHED AND/OR INSTALLED UNDER THE WORK OF THE ELECTRICAL CONTRACT.

FIRE ALARM SYSTEM

A. FIRE ALARM SYSTEM WORK IS A DELEGATED DESIGN AND IS NOT INCLUDED AS PART OF THE ELECTRICAL SCOPE OF WORK.
B. FIRE ALARM SYSTEM WORK SHALL BE PROVIDED BY THE GENERAL CONTRACTOR AS A DELEGATED DESIGN.
C. GENERAL CONTRACTOR (GC) SHALL BE RESPONSIBLE FOR RETAINING THE SERVICES OF A FIRE ALARM SYSTEM VENDOR/DESIGN PROFESSIONAL TO PREPARE THE FIRE ALARM SYSTEM DESIGN, DETAILS, CALCULATIONS, ETC. AS REQUIRED BY ALL APPLICABLE CODES AND THE AUTHORITY HAVING JURISDICTION.
D. GC/VENDOR/DESIGN PROFESSIONAL SHALL BE RESPONSIBLE FOR VERIFYING ALL APPLICABLE CODE REQUIREMENTS AND ALL LOCAL FIRE ALARM SYSTEM REQUIREMENTS WITH THE LOCAL AUTHORITY HAVING JURISDICTION.
E. GC/VENDOR/DESIGN PROFESSIONAL SHALL BE RESPONSIBLE FOR PROVIDING ALL REQUIRED SUBMITTAL DRAWINGS TO THE AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK.
F. GC/VENDOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FOR THE FIRE ALARM WORK.

HOOD FIRE SUPPRESSION SYSTEM - ELECTRICAL WORK

A. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CONTROL WIRING INSTALLED WITHIN CONDUIT BETWEEN THE HOOD FIRE SUPPRESSION SYSTEM CONTROL PANEL AND ANY COMPONENT REQUIRED TO BE AUTOMATICALLY CONTROLLED OR DISCONNECTED FROM ITS POWER SUPPLY UPON ACTIVATION OF THE HOOD FIRE SUPPRESSION SYSTEM.
B. COMPONENTS TO BE CONNECTED TO THE HOOD FIRE SUPPRESSION SYSTEM CONTROL PANEL INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, THE SHUNT-TRIP CIRCUIT BREAKERS IN AN ELECTRICAL PANEL, THE COIL OF ANY SHUNT-TRIP CONTACTOR, ELECTRICALLY OPERATED GAS VALVE.
C. EC TO COORDINATE ALL ELECTRICAL WORK WITH MECHANICAL CONTRACTOR AND HOOD FIRE SUPPRESSION SYSTEM INSTALLER.

HOME RUNS AND BRANCH WIRING FOR 120 VOLT 16 AMP CIRCUITS SHALL BE AS FOLLOWS TO ACCOUNT FOR VOLTAGE DROP:

LENGTH	HOME RUN WIRE SIZE	CIRCUIT WIRE SIZE
1' TO 65'	12	12
66' TO 104'	10	12
105' TO 156'	8	12
157' TO 263'	6	12
264' TO 419'	4	12

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TITLE:

ELECTRICAL SPECIFICATIONS SHEET (2 OF 2)

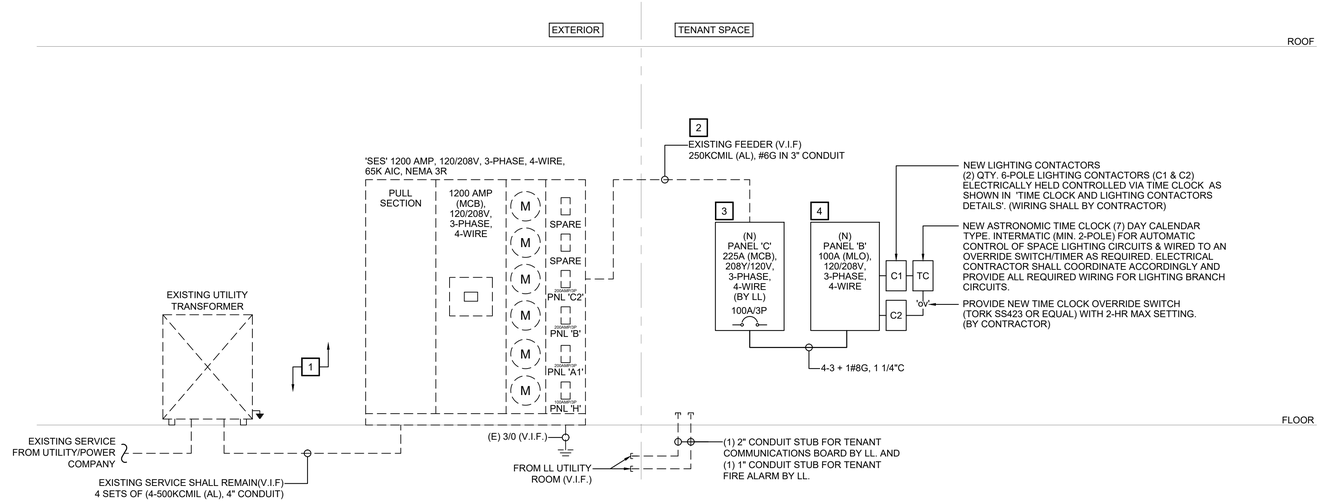
SHEET NUMBER:

E-0.3

1	SCALE	ELECTRICAL SPECIFICATIONS
	N.T.S.	

LEGEND:
NEW
EXISTING

ABBREVIATIONS:
(E) - EXISTING
(R) - EXISTING RELOCATED



ELECTRICAL PANEL SCHEDULE

PANELBOARD			C	VOLTAGE		120 / 208 V	PHASE		3	WIRE		4					
PANEL TYPE			MCB	MAINS		225 A	BUS RATING		225 A	AIC RATING		V.I.F					
NEMA TYPE ENCLOSURE			1	MOUNTING		SURFACE	OPTIONS			NOTE		NEW PANEL					
CKT. NO.	EQT TAG	CKT TAG	DESCRIPTION	POLE	WIRE SIZE	BKR. SIZE	TOTAL WATTS	PHASE	TOTAL WATTS	BKR. SIZE	WIRE SIZE	POLE	DESCRIPTION	CKT TAG	EQT TAG	CKT. NO.
1	E05	(N)	ICE CREAM MACHINE	2	8	45	3,463	A	3,322	50	8	3	(N) RTU-1	(E)		2
3							3,463	B	3,322							4
5	E05	(N)	ICE CREAM MACHINE	2	8	45	3,463	C	3,322							6
7							3,463	A	480	20	12	1	GAS WATER HEATER (IWH-1)	(N)		8
9	E05	(N)	ICE CREAM MACHINE	2	8	45	3,463	B	480	20	12	1	GAS WATER HEATER (IWH-2)	(N)		10
11							3,463	C	1,200	20	12	1	INTERIOR SIGN	(N)	TC	12
13	E05	(N)	ICE CREAM MACHINE	2	8	45	3,463	A	1,200	20	12	1	INTERIOR SIGN	(N)	TC	14
15							3,463	B	900	20	12	1	GENERAL_REC	(N)		16
17	E23	(N)	CHOCOTEMPERING TOP 11 WORK TABLE	1	12	20	1,750	C	360	20	12	1	ROOF_GFI_REC	(N)		18
19	E21A	(N)	GLASS DOOR FRIDGE	1	12	20	300	A	1,560	20	12	1	MICROWAVE	(N)	E19	20
21			SPARE	1		20		B	140	20	12	1	CHOCOLATE MACHINE	(N)	E27	22
23	E09	(N)	FREEZER	1	12	20	660	C	1,200	20	12	1	SHOW WINDOW_REC	(N)	TC	24
25	E09	(N)	FREEZER	1	12	20	660	A	1,200	20	12	1	SHOW WINDOW_REC	(N)	TC	26
27	E21B	(N)	GLASS DOOR FRIDGE	1	12	20	300	B		20		1	SPARE			28
29	E15	(N)	FOOD PROCESSOR	1	12	20	840	C		20		1	SPARE			30
31	E20	(N)	ICE CREAM CABINET TIN FREEZER)	1	12	20	960	A		20		1	SPARE			32
33	E13	(N)	HOT SAUCE PUMPS	1	12	20	1,000	B		20		1	SPARE			34
35	E29	(N)	60" WORKTOP REFRIGERATOR	1	12	20	360	C		20		1	SPARE			36
37	E10	(N)	SCOOP FREEZER	1	12	20	150	A	8,282							38
39	E07	(N)	WORKTOP REFRIGERATOR	1	12	20	360	B	9,882	100	3	3	TO ELECTRICAL PANEL 'B'	(N)		40
41			SPACE					C	7,624							42

ALL PHASES TO BE BALANCED T0 WITHIN 7%

A=	28,503	WATTS
B=	26,773	WATTS
C=	24,242	WATTS

TOTAL CONNECTED LOAD	79,518	WATTS	221 AMPS
TOTAL DEMAND LOAD	67,174	WATTS	187 AMPS

(E) EXISTING TO REMAIN
(N) NEW CIRCUIT
GFCI GROUND FAULT CURRENT INTERRUPTER
IG CIRCUITS WITH ISOLATED GROUND
TC CIRCUITS ON TIMECLOCK
EMS ROUTING TO THE EMS PANEL
C BREAKER LOCK
a,b,c SWITCHES CONTROLLING LIGHTS

ELECTRICAL LOAD SUMMARY

DESCRIPTION	NEC CONNECTED kW	VOLT	PHASE	NEC DEMAND FACTOR	NEC DEMAND kW
LIGHTING- 120V	1.8	120	1	1.25	2.3
INTERIOR SIGN	2.4	120	1	1.25	3.0
RECEPTACLES	6.7	120	1	>10kW=10+[0.5*(kW-10)]	6.7
EXTERIOR SIGN	2.4	120	1	1.25	3.0
S/W OUTLETS	3.6	120	1	1.25	4.5
EXH. FANS	0.2	120	1	1.00	0.2
DEHUMIDIFIER	1.8	120	1	1.00	1.8
AHU	0.3	120	1	1.00	0.3
ROOF TOP UNIT	10.0	208	3	1.00	10.0
ACCU	5.0	208	1	1.00	5.0
REF. EQUIPMENT	1.9	208	1	1.00	1.9
KITCHEN EQUIPMENT	42.6	208	1	0.65	27.7
HOT WATER HEATER	1.0	120	1	1.00	1.0
TOTALS	79.5				67.2

NOTES:
* USE GREATER VALUE OF THE TWO CATEGORIES.
** 125% OF THE LARGEST MOTOR OR COMPRESSOR IN SYSTEM APPLIED ONLY ON ONE UNIT.
*** N.E.C. ARTICLE 220-12 REQUIREMENT (200 VA PER FOOT OF SHOW WINDOW) MINUS ACTUAL SHOW WINDOW LIGHTING kVA.

N.E.C. DEMAND kVA x 1,000 / SYSTEM VOLTAGE x 1.732 = MINIMUM FEEDER AMPERAGE

67.2 x 1000 = 67174 / 208 x 1.732 = 360 — 186.5 AMPS USE (EXISTING) 200AMP FEEDER FROM LANDLORD SWITCHBOARD

ELECTRICAL PANEL SCHEDULE

PANELBOARD			B	VOLTAGE		120 / 208 V	PHASE		3	WIRE		4					
PANEL TYPE			MLO	MAINS		NA	BUS RATING		100A	AIC RATING		V.I.F					
NEMA TYPE ENCLOSURE			1	MOUNTING		SURFACE	OPTIONS			NOTE		NEW PANEL					
CKT. NO.	EQT TAG	CKT TAG	DESCRIPTION	POLE	WIRE SIZE	BKR. SIZE	TOTAL WATTS	PHASE	TOTAL WATTS	BKR. SIZE	WIRE SIZE	POLE	DESCRIPTION	CKT TAG	EQT TAG	CKT. NO.
1	E23	(N)	CHOCOTEMPERING TOP 11	1	12	20	1,750	A	500	20	12	1	HOT SAUCE PUMPS	(N)	E13	2
3		(N)	POS TABLE	1	12	20	360	B	900	20	12	1	DRINK MIXER	(N)	E11	4
5	E18	(N)	LIQUID DISPENSER	1	12	20	360	C	500	20	12	1	FUTURE DISH EQUIPMENT	(N)		6
7	E11	(N)	DRINK MIXER	1	12	20	1,800	A	1,080	20	12	1	OFFICE_REC	(N)		8
9		(N)	WALK-IN COOLER LIGHTS	1	12	20	500	B	1,080	20	12	1	OFFICE_REC	(N)		10
11	E22	(N)	WALK-IN COOLER UNIT	2	12	15	968	C	360	20	12	1	RESTROOM_REC	(N)		12
13							968	A	360	20	12	1	RESTROOM_REC	(N)		14
15	TC	(N)	EXTERIOR SIGN	1	12	20	1,200	B	1,080	20	12	1	DINING AREA_GENERAL_REC	(N)		16
17	TC	(N)	EXTERIOR SIGN	1	12	20	1,200	C	600	20	12	1	SHOW WINDOW_REC	(N)	TC	18
19	TC/c,d	(N)	SERVING AREA LIGHTING	1	12	20	474	A	600	20	12	1	SHOW WINDOW_REC	(N)	TC	20
21	TC/a,b	(N)	DINING AREA LIGHTING	1	12	20	366	B	100	20	12	1	TIME CLOCK	(N)		22
23		(N)	BOH AREA LIGHTING	1	12	20	260	C	720	20	12	1	IT RACK_REC	(N)		24
25		(N)	AC-1	1	12	20	270	A	180	20	12	1	OFFICE_REC	(N)		26
27		(N)	ACCU-1	2	8	40	2,496	B	1,800	25	10	1	DEHUMIDIFIER	(N)		28
29							2,496	C	160	20	12	1	(N) EF-3	(N)		30
31	TC/a,b	(N)	BOTTLE DISPLAY LED LIGHT	1	12	20	200	A	100	20	12	1	MOTORIZED DAMPER	(N)		32
33			SPARE	1		20		B		20		1	SPARE			34
35			SPARE	1		20		C		20		1	SPARE			36
37			SPARE	1		20		A		20		1	SPARE			38
39			SPARE	1		20		B		20		1	SPARE			40
41			SPARE	1		20		C		20		1	SPARE			42

ALL PHASES TO BE BALANCED T0 WITHIN 7%

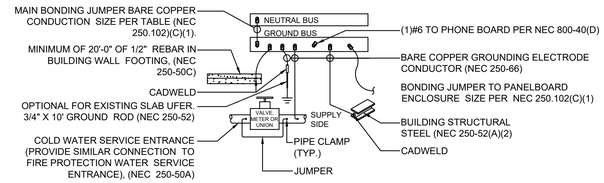
A=	8,282	WATTS
B=	9,882	WATTS
C=	7,624	WATTS

TOTAL CONNECTED LOAD	25,788	WATTS	72 AMPS
TOTAL DEMAND LOAD	25,105	WATTS	70 AMPS

(E) EXISTING TO REMAIN
(N) NEW CIRCUIT
GFCI GROUND FAULT CURRENT INTERRUPTER
IG CIRCUITS WITH ISOLATED GROUND
TC CIRCUITS ON TIMECLOCK
EMS ROUTING TO THE EMS PANEL
C BREAKER LOCK
a,b,c SWITCHES CONTROLLING LIGHTS

VERIFY ALL WIRES SHOWN TO MEET LOCAL CODES. ADJUST AS REQUIRED, PER LOCAL CODES.

NOTE: ALL GROUNDING SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE 250-50 OF THE NATIONAL ELECTRICAL CODE.



2 | SCALE N.T.S. | GROUNDING ELECTRODE SYSTEM DETAILS:

GENERAL NOTES:

1. PROPER CLEARANCE MUST BE MAINTAINED ABOUT ELECTRICAL EQUIPMENT PER N.E.C. FIELD VERIFY EXACT MOUNTING SPACE AVAILABLE IN ELECTRICAL ROOM/AREA PRIOR TO INSTALLATION OF ELECTRICAL EQUIPMENT.
2. MAKE ALL FINAL ELECTRICAL CONNECTIONS FOR A COMPLETE ELECTRICAL DISTRIBUTION SYSTEM. ALL CONNECTIONS/DISCONNECTIONS TO LANDLORDS/UTILITIES SERVICE EQUIPMENT SHALL BE AS DIRECTED BY LANDLORDS/UTILITIES SITE REPRESENTATIVE. TENANT GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TERMINATION/DETERMINATION EXPENSES.
3. SYSTEM SHALL BE GROUNDED TO THE MAIN BUILDING'S GROUNDING SYSTEM.
4. DISCONNECT SWITCHES AND PANELS SHALL BE INSTALLED ON PLYWOOD BACKBOARDS.
5. TENANT CONTRACTOR MUST VERIFY ELECTRICAL SERVICE, SUB-FEED WIRING AND PANELS PRIOR TO START OF TENANT'S ELECTRICAL WORK. TENANT GENERAL CONTRACTOR SHALL MAKE APPLICATION TO THE LOCAL UTILITY FOR CONTINUED METERED ELECTRIC SERVICE IN THE TENANT'S NAME. TENANT GENERAL CONTRACTOR SHALL CONFIRM ALL LOCAL UTILITY GUIDELINES AND REQUIREMENTS PRIOR TO BID, SHALL INCLUDE THE COSTS OF THESE REQUIREMENTS IN THE BID, AND SHALL COMPLY WITH THEM DURING CONSTRUCTION. AVAILABLE FAULT CURRENT AT SERVICE EQUIPMENT SHALL BE LEGIBLY MARKED IN THE FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT PER NATIONAL ELECTRICAL CODE (NEC) OF ARTICLE 110.24.
6. CONTRACTOR SHALL COORDINATE SHORT CIRCUIT RATING (Isc) WITH UTILITY & AHJ, PRIOR TO COMMENCING ANY WORK, TYPICAL FOR ALL ELECTRICAL EQUIPMENT
7. CONTRACTOR SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND DISTRIBUTION.
8. CONTRACTOR SHALL COORDINATE WITH BASE BUILDING FOR THE EXACT LOCATION OF THE EXISTING SWITCH GEAR AND EXACT POWER DISTRIBUTION.
9. CONTRACTOR SHALL VERIFY OPERABLE CONDITION INFIELD OF ALL EXISTING TO REMAIN ELECTRICAL DEVICES/EQUIPMENTS AND REPLACE WITH NEW IF FOUND INOPERABLE.
10. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. ALL CONDUIT ROUTING AND OFFSETS, DROPS AND RISES OF RUNS ARE NOT SHOWN ON THE PLANS AND ARE SHOWN DIAGRAMMATICALLY IN THE RISERS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.

RISER KEYED NOTES:

1. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH BASE BUILDING/LANDLORD/OWNER FOR EXACT POWER DISTRIBUTION PRIOR TO COMMENCING ANY WORK. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCIES. BASE BID ACCORDINGLY.
2. ELECTRICAL CONTRACTOR TO VERIFY IN FIELD IF THE EXISTING FEEDER/CONDUIT IS RATED FOR 200AMP, 120/208V, 3 PHASE, REUSED IT BY REROUTING AND EXTENDING TO THE NEW LOCATION OF THE ELECTRICAL PANEL AS REQUIRED, OTHERWISE PROVIDE NEW AS SHOWN. BASE BID ACCORDINGLY.
3. NEW 225A (MCB), 120/208V, 3 PHASE, 4-WIRE ELECTRICAL PANEL "C" BY LANDLORD. ELECTRICAL CONTRACTOR TO COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION IN FIELD.
4. NEW 100A (MLO), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "B" FOR THE PROJECT SPACE. ELECTRICAL CONTRACTOR TO COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION IN FIELD.

VERIFY THE FOLLOWING PRIOR TO BID/ PRICING:

- EXISTING CONDUIT AND FEEDERS SIZE BETWEEN TENANT SPACE AND LANDLORD SWITCHBOARD.
- EXISTING MAIN SERVICE DISCONNECT RATING.
- EXISTING METER.

IF THE EXISTING SERVICE DISCONNECT AND FEEDERS ARE RATED FOR LESS THAN THE RATING SHOWN ON THIS RISER. NOTIFY THE PROJECT MANAGER AND ENGINEER IMMEDIATELY PRIOR TO SUBMITTING BID/ PRICING PACKAGE SO DRAWINGS CAN BE REVISED AND UPDATED ACCORDINGLY

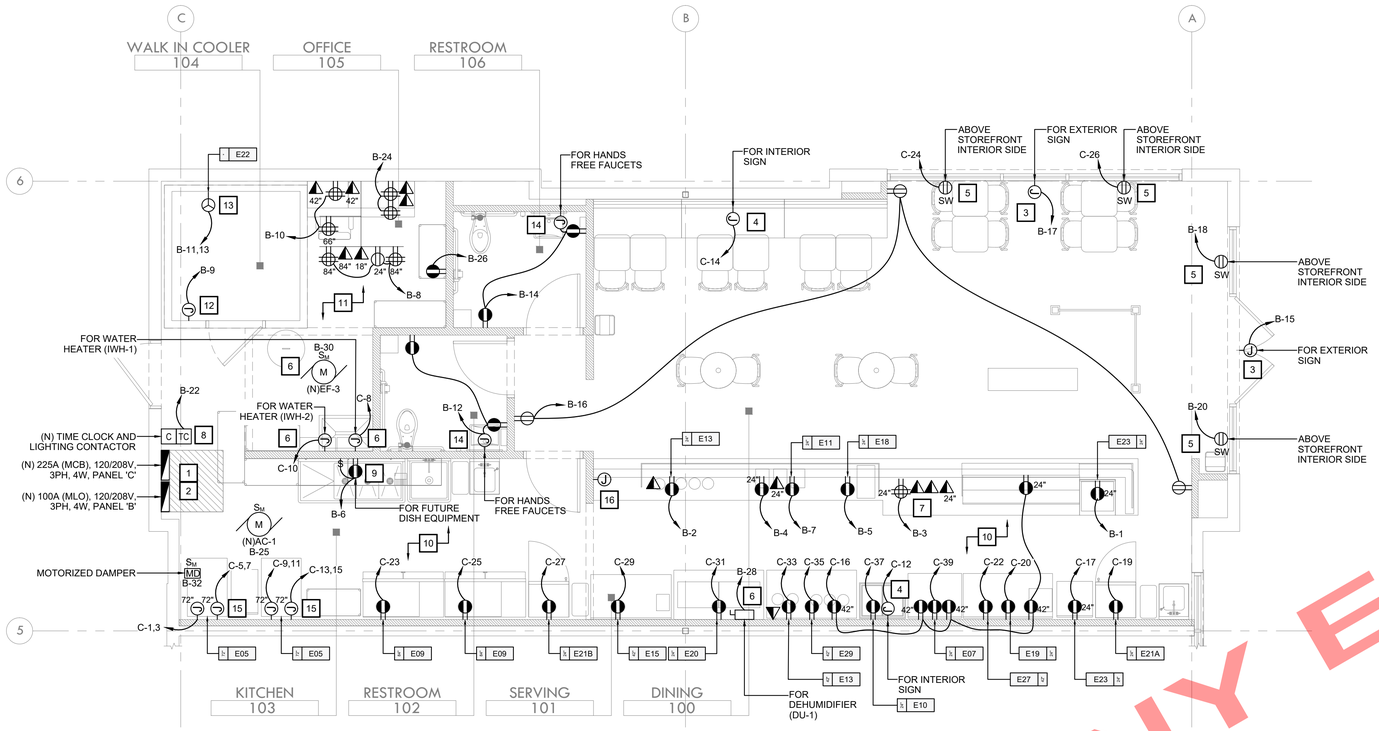
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MilkShake EST FACTORY 1914

TITLE:
ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULES

SHEET NUMBER:
E-0.4

1 | SCALE N.T.S. | ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULES



GENERAL NOTES:

A. COORDINATE ALL DEVICE LOCATIONS AND MOUNTING HEIGHTS WITH THE ARCHITECT & FURNITURE VENDOR PRIOR TO INSTALLATION. RECEPTACLES SHALL BE INSTALLED PER ANSI A117.1.

B. VERIFY KITCHEN EQUIPMENT ELECTRICAL & INSTALLATION REQUIREMENTS WITH EQUIPMENT PROVIDER. COORDINATE ROUGH-IN LOCATIONS WITH THE FOOD SERVICE EQUIPMENT SHOP DRAWINGS, DO NOT SCALE DRAWINGS.

C. LABEL ALL OUTLETS AND JUNCTION BOXES WITH THE CORRESPONDING CIRCUIT DESIGNATION. LABEL TO BE TYPEWRITTEN; BLACK LETTERS ON WHITE BACKGROUND.

D. PROVIDE PULL STRINGS FOR ALL EMPTY CONDUIT. EACH NON-TERMINATED CONDUIT END SHALL BE PROVIDED WITH A BUSHING.

E. DIVISION 26 CONTRACTOR SHALL COORDINATE WITH DIVISION 23 TO MAKE SURE RETURN AIR OPENINGS ARE KEPT CLEAR OF ANY CONDUITS.

F. ALL RECEPTACLES WITHIN 6'-0" OF ANY WATER SOURCE SHALL BE "GFCI" TYPE.

G. FOOD SERVICE EQUIPMENT ELECTRICAL CHARACTERISTICS WERE TAKEN FROM EQUIPMENT CUT SHEETS. ALLOWANCES WERE MADE WHERE NO ELECTRICAL CHARACTERISTICS WERE AVAILABLE. COORDINATE EQUIPMENT DRAWINGS AND NAMEPLATE RATINGS WITH CIRCUIT SIZES. NOTIFY ARCHITECT OF CONFLICTS.

H. PROVIDE ALL CORDS, CAPS, RECEPTACLES, DISCONNECT SWITCHES, CONDUIT AND FITTINGS REQUIRED TO MAKE POWER AND CONTROLS CONNECTIONS TO EQUIPMENT.

I. PER NEC 210.8(B), ALL FOOD SERVICE/FOOD PREP SINGLE-PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 50 AMPERES OR LESS AND THREE-PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 100 AMPERES OR LESS SHALL HAVE GROUND-FAULT CIRCUIT-INTERRUPTER PROTECTION.

J. PROVIDE EQUIPMENT GROUNDING CONDUCTOR WITH ALL FOOD SERVICE EQUIPMENT CIRCUITS. ALL EQUIPMENT SHALL BE SOLIDLY GROUNDED.

K. ALL FLEX CONDUIT CONNECTIONS SHALL BE WITH SEAL-TITE FLEX WITH GROUNDING JUMPER.

L. ALL CONDUITS STUBBED UP IN FLOORS SHALL HAVE A RIGID STEEL COUPLING FLUSH WITH FINISHED FLOOR.

M. MAKE ALL REQUIRED CONNECTIONS THROUGH EQUIPMENT CONTROLLERS WHERE CONTROLS ARE REMOTE FROM EQUIPMENT.

N. WHERE SAFETY SWITCHES AND RECEPTACLES ARE SHOWN FOR A DISCONNECT MEANS, LOCATE WITHIN 3' OF THE CONNECTION POINT IN AN ACCESSIBLE LOCATION. COORDINATE CONNECTION POINTS WITH EQUIPMENT DRAWINGS.

O. ALL CONDUITS MUST BE STUBBED OUT AT THE POINT OF USE OR OTHERWISE ROUTED AND CONCEALED SO AS NOT TO BE A DETERRENT TO CLEANING. SURFACE MOUNTED CONDUIT SHOULD BE AVOIDED, BUT WHERE NECESSARY MUST BE HELD 1'-0" OFF THE WALL AND 6' ABOVE THE FLOOR.

P. ALL EXTERIOR DISCONNECTS SHALL BE WEATHERPROOF.

Q. ALL CIRCUITS SHALL HAVE AN INSULATED GROUND WIRE SIZED PER NEC 250 BUT NOT SMALLER THAN #12 AWG.

R. ALL BUILDING CORE ELECTRIC ROOMS AND PANEL BOARDS SHALL BE CLEANED OF ALL DUST AND DEBRIS UPON COMPLETION OF WORK.

S. ALL ELECTRICAL OUTLETS WITHIN THE LEASED PREMISE WILL BE PROPERLY LABELED TO REFLECT ELECTRICAL PANEL AND BREAKER NUMBERS FROM ELECTRICAL ROOM.

T. ALL GFCI RECEPTACLES SHALL BE INSTALLED IN A READILY ACCESSIBLE LOCATION OR A DEAD FRONT GFI DEVICE INSTALLED IN A READILY ACCESSIBLE LOCATION. OR A GFCI CIRCUIT BREAKER SHALL USED TO FEED THE CIRCUIT NOTED.

U. G.C. TO COORDINATE ALL LOW VOLTAGE LOCATIONS AND REQUIREMENTS WITH TENANT & TENANT LV SUBCONTRACTOR.

KEYED NOTES:

1. NEW 225A (MCB), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "C" FOR THE PROJECT SPACE. ELECTRICAL CONTRACTOR TO COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF NEW ELECTRICAL PANEL "C" IN FIELD. BASE BID ACCORDINGLY. E.C. SHALL MAINTAIN CLEARANCE FOR ELECTRICAL PANEL PER NEC 110.26 (A) (1). REFER SHEET E-0.3 ELECTRICAL RISER DIAGRAM FOR MORE INFORMATION.
2. NEW 100A (MLO), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "B" FOR THE PROJECT SPACE. ELECTRICAL CONTRACTOR TO COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF NEW ELECTRICAL PANEL "B" IN FIELD. BASE BID ACCORDINGLY. E.C. SHALL MAINTAIN CLEARANCE FOR ELECTRICAL PANEL PER NEC 110.26 (A) (1). REFER SHEET E-0.3 ELECTRICAL RISER DIAGRAM FOR MORE INFORMATION.
3. JUNCTION BOX WITH TOGGLE DISCONNECT PER NEC FOR EXTERIOR SIGNAGE. THE ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATION, MOUNTING HEIGHT AND CONNECT TO THE SIGN PER THE MANUFACTURER'S INSTRUCTIONS. ROUTE CIRCUIT TO PANEL VIA EXTERIOR LIGHTING/SIGNAGE'S TIME CLOCK AS REQUIRED
4. JUNCTION BOX FOR THE INTERIOR SIGNAGE. CONTRACTOR TO COORDINATE WITH THE ARCHITECT/OWNER FOR THE EXACT HEIGHT, LOCATION & ELECTRICAL REQUIREMENTS. INSTALL AS PER THE MANUFACTURER'S INSTRUCTIONS. SIGN TO BE CONTROL VIA TIME CLOCK AS REQUIRED.
5. ELECTRICAL CONTRACTOR SHALL FIELD VERIFY THE OPERABLE CONDITION OF EXISTING SHOW WINDOW RECEPTACLE, REUSE IF POSSIBLE OTHERWISE PROVIDE NEW SHOW WINDOW RECEPTACLE AS PER NEC 210.62 AS REQUIRED. ELECTRICAL CONTRACTOR TO COORDINATE WITH ARCHITECT/OWNER FOR EXACT HEIGHT AND LOCATION PRIOR TO ROUGH-IN.
6. ALL PLUMBING & MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH THE REQUIRED ROUGH-INS, MOCP, AND WIRE SIZE REQUIREMENTS. THE ELECTRICAL CONTRACTOR MUST COORDINATE WITH THE MANUFACTURER FOR THE EXACT TYPE OF ROUGH-INS AND WIRE SIZE BEFORE THE COMMENCEMENT OF WORK.
7. ELECTRICAL CONTRACTOR TO PROVIDE RECEPTACLE AND DATA/TELE PORTS FOR THE POS. COORDINATE WITH EQUIPMENT SUPPLIER/OWNER FOR THE EXACT LOCATION, POWER REQUIREMENT & MOUNTING HEIGHT. PROVIDE ACCORDINGLY.
8. NEW TIME CLOCK & LIGHTING CONTACTOR FOR THE PROJECT SPACE. COORDINATE EXACT REQUIREMENT WITH ARCHITECT/OWNER PRIOR TO ROUGH-IN. BASE BID ACCORDINGLY.
9. PROVIDE RECEPTACLE AND SWITCH FOR FUTURE DISH EQUIPMENT. COORDINATE WITH ARCHITECT/OWNER/ EQUIPMENT VENDOR FOR EXACT ELECTRICAL REQUIREMENT FOR FUTURE DISH EQUIPMENT. PROVIDE POWER PROVISION ACCORDINGLY.
10. ELECTRICAL CONTRACTOR TO VERIFY THAT ALL GFCI RECEPTACLES SHALL BE INSTALLED IN A READILY ACCESSIBLE LOCATION IF NOT A GFCI CIRCUIT BREAKER SHALL USED TO FEED THE CIRCUIT AS NOTED. PROVIDE THE PROVISION ACCORDINGLY.
11. PROVIDE 3/4" THICK 2'X2' FIRE TREATED PLYWOOD TELEPHONE BACKBOARD. PROVIDE OR USE EXISTING (IF ANY) CONDUIT FROM MAIN TELECOM ROOM TO NEW TELEPHONE BACKBOARD. PROVIDE TELEPHONE GROUND BAR WITH #6 GROUND BACK TO BUILDING GROUNDING SYSTEM. COORDINATE EXACT LOCATION WITH LV CONTRACTOR. CONTRACTOR TO COORDINATE WITH LV INSTALLER/IT PERSONNEL FOR RECEPTACLES AND DATA OUTLET ELEVATIONS AND PROVIDE ACCORDINGLY.
12. PROVIDE ELECTRICAL CONNECTION FOR WALK-IN COOLER LIGHTS AND DOOR AS REQUIRED. ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS AND EXACT LOCATIONS WITH THE EQUIPMENT VENDOR PRIOR TO ROUGH-IN.
13. PROVIDE L6-15 RECEPTACLE FOR WALK-IN COOLER SELF CONTAINED UNIT. COORDINATE EXACT LOCATIONS AND REQUIREMENTS WITH COOLER MANUFACTURER PRIOR TO ROUGH-IN. IF RECEPTACLE IS OUTSIDE, RECEPTACLE TO BE WEATHER PROOF.
14. PROVIDE HARDWIRED CONNECTION TO HANDS FREE FAUCET. COORDINATE EXACT LOCATIONS AND REQUIREMENTS WITH PLUMBING CONTRACTOR PRIOR TO ROUGH-IN.
15. JUNCTION BOX FOR ICE CREAM MACHINE. PROVIDE (2) ELECTRICAL CONNECTIONS PER BARREL.ELECTRICAL CONTRACTOR TO COORDINATE WITH EQUIPMENT SUPPLIER/OWNER FOR THE EXACT LOCATION, POWER REQUIREMENT & MOUNTING HEIGHT. PROVIDE POWER PROVISION ACCORDINGLY.
16. ELECTRICAL CONTRACTOR TO COORDINATE WITH ARCHITECT/OWNER FOR THE EXACT USE OF JUNCTION BOX NEAR PICKUP COUNTER. PROVIDE POWER & BASE BID ACCORDINGLY.

LOW VOLTAGE, AV SYSTEM NOTES:

- LOW VOLTAGE VENDOR SHALL PROVIDE DATA DEVICES AND CABLING.
- AV VENDOR SHALL PROVIDE AV DEVICES AND CABLING.
- AT LEAST TWO (2) PENDANT-MOUNTED SPEAKERS SHOULD BE PROVIDED IN THE RETAIL/DINING AREA, ZONED TOGETHER.
- IF SPEAKERS ARE INSTALLED IN DRYWALL OR ACT CEILINGS, SPEAKERS SHALL BE RECESSED TYPE WITH TRIM AND SPEAKER FINISH TO MATCH CEILING AND AV RECEIVER AND ALL VOLUME CONTROLS SHALL BE INSTALLED IN THE OFFICE.
- SECURITY VENDOR SHALL PROVIDE ALL SECURITY DEVICES AND CABLING. GENERAL CONTRACTOR SHALL PROVIDE CONDUIT AND PULL STRING WHERE REQUIRED.

EQUIPMENT SCHEDULE:

ITEM NO.	QTY.	EQUIPMENT DISCRIPTION	ELECRTICAL								MANUFACTURER/SUPPLIER	MODEL NUMBER	REMARKS
			VOLTS	PHASE	AMPS	KW	HP	DIRECT	PLUG	NEMA	CIRCUIT BREAKER & POLES			
E05	2	ICE CREAM MACHINE (U421-SINGLE FLAVOR FLOOR MACHINE)	(2)208	(2)1	2)33.3	(2)6.92			X	-	(2)45A/2P	STOELTING	U421-3812	
E07	1	WORKTOP REFRIGERATOR	115	1	2.5	0.36			X	NEMA 5-15P	20A/1P	TURBOAIR	TWR-48SD-N	
E09	2	FREEZER	115	1	5.5	0.66				NEMA 5-15P	-	TURBO AIR	TSF-49SD-N	
E10	1	SCOOP FREEZER	115	1	1.3	0.15			X	-	20A/1P	EXCELLENCE INDUSTRIES	HB-7HC	
E11	3	DRINK MIXER	120	1	-	0.90			X	-	20A/1P	HAMILTON BEACH COMMERCIAL	HMD400	
E13	3	HOT SAUCE PUMPS	120	1	4.2	0.50			X	NEMA 5-15P	20A/1P	SERVER ESSENTIALS	FSP 82060	
E15	1	FOOD PROCESSOR	115	1	7	0.84			X	-	20A/1P	ROBO COUPE	R2BCLR	
E18	1	LIQUID DISPENSER	120	1	3	0.36			X	-	20A/1P	SURESHOT	AC320-FP	
E19	1	MICROWAVE	120	1	13	1.56			X	NEMA 5-15P	20A/1P	AMANA COMMERCIAL	RMS10TSA	
E20	1	ICE CREAM CABINET (TIN FREEZER)	115	1	8	0.96			X	NEMA 5-15P	20A/1P	NELSON	BD8 SE-RB	
E21A/E21B	2	GLASS DOOR FRIDGE	115	1	2.5	0.30			X	NEMA 5-15P	20A/1P	HOSHIZAKI	WR27B	
E22	1	WAL-IN COOLER UNIT	208	1	9.3	1.90			X	NEMA L6-15P	20A/2P	AMERIKOOLER	QC080872WRNBSC	
E23	2	CHOCOTEMPERING TOP 11	110/220	1	-	1.75			X	-	20A/1P	CHOCOTEMPER	14.1.CHOCOTOP11	ADDITIONAL POWER PROVISION PROVIDED FOR FUTURE CHOCOTEMPER MACHINE PER DIP
E27	1	CHOCOLATE MACHINE	115/230	1	-	0.14			X	-	20A/1P	MOL D'ART	SKU:9106	
E29	1	60" WORKTOP REFRIGERATOR	115	1	2.4	0.36			X	NEMA 5-15P	20A/1P	TURBOAIR	TWR-60SD-N	

NOTES:

1. THE CONTRACTOR SHALL COORDINATE THE EXACT RECEPTACLE TYPE FOR EQUIPMENT WITH THE VENDOR/MANUFACTURER AND THE EXACT MOUNTING HEIGHT WITH THE ARCHITECT.
2. ALL EQUIPMENT SHALL BE PROVIDED WITH THE REQUIRED ROUGH-INS, MOCP, AND WIRE SIZE REQUIREMENTS. THE ELECTRICAL CONTRACTOR MUST COORDINATE WITH THE MANUFACTURER FOR THE EXACT TYPE OF ROUGH-INS AND WIRE SIZE FOR THE WORK COMMENCEMENT.

Property of NY Engineers

MilkShake EST FACTORY 1914

TITLE:

ELECTRICAL POWER PLAN

SHEET NUMBER:

E-1.0

1 | SCALE 1 / 4" = 1' - 0" | ELECTRICAL POWER PLAN



LEGEND:
NEW
EXISTING

GENERAL NOTES:

A. COORDINATE ALL DEVICE LOCATIONS AND MOUNTING HEIGHTS WITH THE ARCHITECT & FURNITURE VENDOR PRIOR TO INSTALLATION. RECEPTACLES SHALL BE INSTALLED PER ANSI A117.1.

B. VERIFY KITCHEN EQUIPMENT ELECTRICAL & INSTALLATION REQUIREMENTS WITH EQUIPMENT PROVIDER. COORDINATE ROUGH-IN LOCATIONS WITH THE FOOD SERVICE EQUIPMENT SHOP DRAWINGS. DO NOT SCALE DRAWINGS.

C. LABEL ALL OUTLETS AND JUNCTION BOXES WITH THE CORRESPONDING CIRCUIT DESIGNATION. LABEL TO BE TYPEWRITTEN; BLACK LETTERS ON WHITE BACKGROUND.

D. PROVIDE PULL STRINGS FOR ALL EMPTY CONDUIT. EACH NON-TERMINATED CONDUIT END SHALL BE PROVIDED WITH A BUSHING.

E. DIVISION 26 CONTRACTOR SHALL COORDINATE WITH DIVISION 23 TO MAKE SURE RETURN AIR OPENINGS ARE KEPT CLEAR OF ANY CONDUITS.

F. ALL RECEPTACLES WITHIN 6'-0" OF ANY WATER SOURCE SHALL BE "GFCI" TYPE.

G. FOOD SERVICE EQUIPMENT ELECTRICAL CHARACTERISTICS WERE TAKEN FROM EQUIPMENT CUT SHEETS. ALLOWANCES WERE MADE WHERE NO ELECTRICAL CHARACTERISTICS WERE AVAILABLE. COORDINATE EQUIPMENT DRAWINGS AND NAMEPLATE RATINGS WITH CIRCUIT SIZES. NOTIFY ARCHITECT OF CONFLICTS.

H. PROVIDE ALL CORDS, CAPS, RECEPTACLES, DISCONNECT SWITCHES, CONDUIT AND FITTINGS REQUIRED TO MAKE POWER AND CONTROLS CONNECTIONS TO EQUIPMENT.

I. PER NEC 210.8(B), ALL FOOD SERVICE/FOOD PREP SINGLE-PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 50 AMPERES OR LESS AND THREE-PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 100 AMPERES OR LESS SHALL HAVE GROUND-FAULT CIRCUIT-INTERRUPTER PROTECTION.

J. PROVIDE EQUIPMENT GROUNDING CONDUCTOR WITH ALL FOOD SERVICE EQUIPMENT CIRCUITS. ALL EQUIPMENT SHALL BE SOLIDLY GROUNDED.

K. ALL FLEX CONDUIT CONNECTIONS SHALL BE WITH SEAL-TITE FLEX WITH GROUNDING JUMPER.

L. ALL CONDUITS STUBBED UP IN FLOORS SHALL HAVE A RIGID STEEL COUPLING FLUSH WITH FINISHED FLOOR.

M. MAKE ALL REQUIRED CONNECTIONS THROUGH EQUIPMENT CONTROLLERS WHERE CONTROLS ARE REMOTE FROM EQUIPMENT.

N. WHERE SAFETY SWITCHES AND RECEPTACLES ARE SHOWN FOR A DISCONNECT MEANS, LOCATE WITHIN 3' OF THE CONNECTION POINT IN AN ACCESSIBLE LOCATION. COORDINATE CONNECTION POINTS WITH EQUIPMENT DRAWINGS.

O. ALL CONDUITS MUST BE STUBBED OUT AT THE POINT OF USE OR OTHERWISE ROUTED AND CONCEALED SO AS NOT TO BE A DETERRENT TO CLEANING. SURFACE MOUNTED CONDUIT SHOULD BE AVOIDED, BUT WHERE NECESSARY MUST BE HELD 1"-0" OFF THE WALL AND 6" ABOVE THE FLOOR.

P. ALL EXTERIOR DISCONNECTS SHALL BE WEATHERPROOF.

Q. ALL CIRCUITS SHALL HAVE AN INSULATED GROUND WIRE SIZED PER NEC 250 BUT NOT SMALLER THAN #12 AWG.

R. ALL BUILDING CORE ELECTRIC ROOMS AND PANEL BOARDS SHALL BE CLEANED OF ALL DUST AND DEBRIS UPON COMPLETION OF WORK.

S. ALL ELECTRICAL OUTLETS WITHIN THE LEASED PREMISE WILL BE PROPERLY LABELED TO REFLECT ELECTRICAL PANEL AND BREAKER NUMBERS FROM ELECTRICAL ROOM.

T. ALL GFCI RECEPTACLES SHALL BE INSTALLED IN A READILY ACCESSIBLE LOCATION OR A DEAD FRONT GFI DEVICE INSTALLED IN A READILY ACCESSIBLE LOCATION. OR A GFCI CIRCUIT BREAKER SHALL USED TO FEED THE CIRCUIT NOTED.

U. G.C. TO COORDINATE ALL LOW VOLTAGE LOCATIONS AND REQUIREMENTS WITH TENANT & TENANT LV SUBCONTRACTOR.

KEYED NOTES:

1 ALL PLUMBING & MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH THE REQUIRED ROUGH-INS, MOCP, AND WIRE SIZE REQUIREMENTS. THE ELECTRICAL CONTRACTOR MUST COORDINATE WITH THE MANUFACTURER FOR THE EXACT TYPE OF ROUGH-INS AND WIRE SIZE BEFORE THE COMMENCEMENT OF WORK.

2 CONTRACTOR TO VERIFY IN FIELD ANY RECEPTACLE IS PRESENT WITHIN 25FT OF HVAC UNITS. IF YES, EXISTING RECEPTACLES TO REMAIN. WIRE TO NEW AVAILABLE CIRCUIT AS SHOWN IF NEEDED. VERIFY EXACT LOCATION. ELSE PROVIDE NEW WEATHER PROOF, GFI, 120V, 20A RECEPTACLE WITHIN 25FT OF THE HVAC UNIT. ALL OUTDOOR ELECTRICAL EQUIPMENT SHALL BE NEMA 3R RATED.

Property of NY Engineers

1	SCALE 1 / 4" = 1' - 0"	ELECTRICAL ROOF POWER PLAN

MilkShake EST FACTORY 1914

TITLE:
ELECTRICAL ROOF POWER PLAN

SHEET NUMBER:
E-1.1

LEGEND:
NEW
EXISTING

GENERAL NOTES:

A. COORDINATE EXACT LOCATION AND MOUNTING HEIGHTS WITH ARCHITECTURAL PLANS. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS, DETAILS, AND LIGHTING NOTES FOR FURTHER INFORMATION OF DEVICE PLACEMENT AND OTHER RELEVANT INFORMATION.

B. SEE ELECTRICAL SYSTEM AND EQUIPMENT SCHEDULE FOR LIGHTING POWER DENSITY INFORMATION.

C. EMERGENCY AND EXIT LIGHTS SHALL BE INSTALLED AND CIRCUITED PER THE LATEST NATIONAL ELECTRIC CODE AND ALL LOCAL CODES UNSWITCHED AHEAD OF ALL LIGHTING CONTROLS. ALL EMERGENCY AND EXIT FIXTURES SHALL BE DUAL VOLTAGE (120/277 VOLT INPUT) WITH 90 MINUTE BATTERY BACK UP.

D. ALL SWITCHES FOR LIGHTS, SHADES, ETC. WHICH ARE SHOWN TO BE MOUNTED IN THE SAME GENERAL AREA SHALL BE GANGED TOGETHER AND SHARE A MULTI-GANG COVER PLATE WHERE POSSIBLE.

E. LOWER CASE LETTERS IN LIGHTING FIXTURES AND ADJACENT TO SWITCHES IN EACH INDIVIDUAL ROOM/AREA INDICATE WHICH LIGHT FIXTURE IS TO BE CONTROLLED FROM EACH CORRESPONDING SWITCH IN THAT ROOM/AREA.

F. ALL CONTROL CABLING PROVIDED AS A PART OF ANY LIGHTING CONTROL SYSTEM SHALL BE PLENUM RATED.

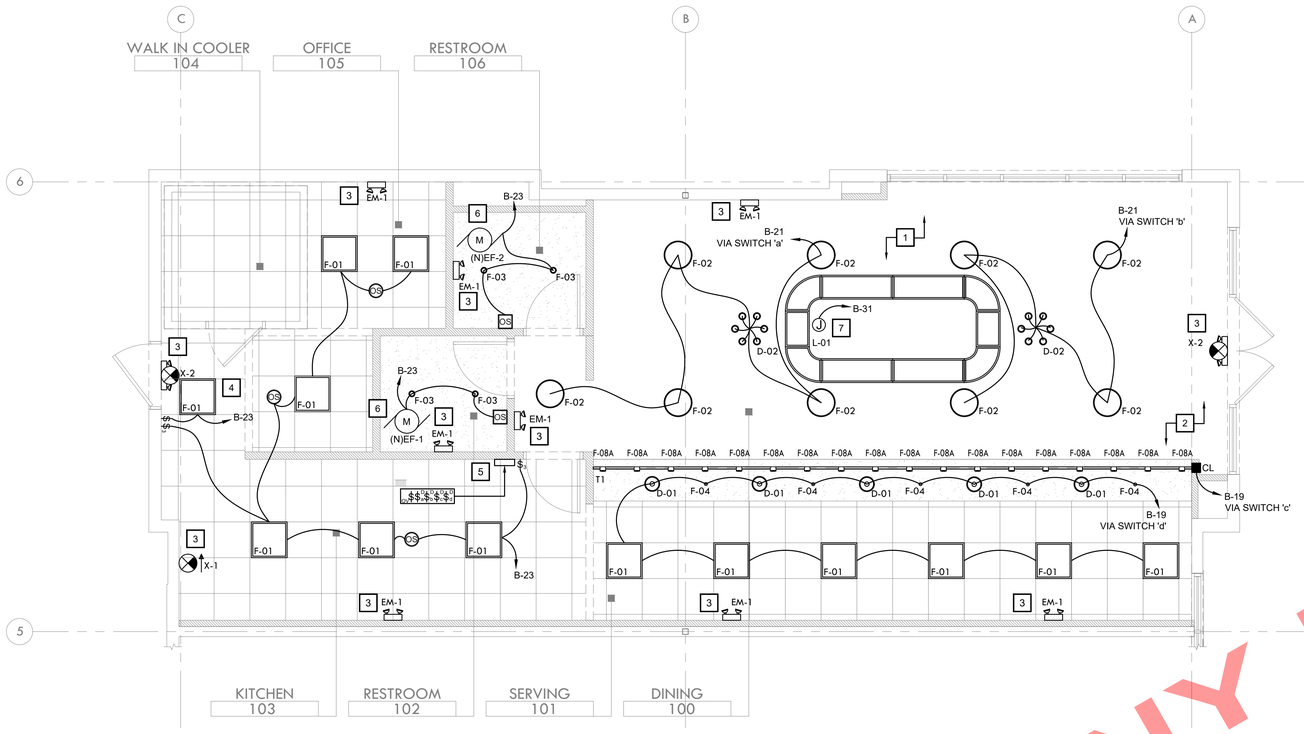
G. DIMMING SWITCHES SHALL BE LUTRON DIVA #DVWCL–153PH–WH WALL MOUNTED DIMMING SWITCHES.

H. 50 FT–CANDLES OF LIGHT MUST BE PROVIDED AT ALL WORKSURFACES.

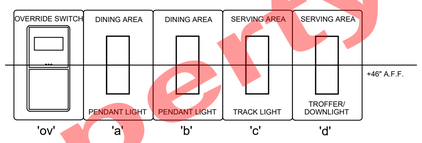
I. ALL LIGHT FIXTURES IN THE FOOD–PREP AREA SHALL BE LENSED AND BE CAPABLE OF EASY CLEANING.

KEYED NOTES:

1. CONTRACTOR SHALL COORDINATE WITH THE LIGHTING VENDOR/ARCHITECT TO CONFIRM DIMMING COMPATIBILITY OF ALL SPECIFIED LIGHT FIXTURES. VERIFY LIGHT FIXTURES REQUIRING (0-10V) DIMMING AND OR ELV/MLV/TRIAC DIMMING. PROVIDE APPROPRIATE DIMMER SWITCHES AND DEDICATED CIRCUITING AS REQUIRED.
2. F-08A AND CORRESPONDING TRACK TO BE INSTALLED 10" UP SIDEWALL OF SOFFITT.
3. FIXTURE SHALL BE PROVIDED WITH INTEGRAL 90-MINUTE MINIMUM BATTERY BACKUP. WIRE ALL EMERGENCY AND EXIT LIGHT TO LIGHTING CIRCUIT AHEAD OF ALL CONTROL & SWITCHING FOR CONTINUOUS OPERATIONS.
4. THIS LIGHT FIXTURE SHALL NOT BE CONTROLLED BY AUTOMATIC MEANS ONLY AS PER 110.26(D).
5. ELECTRICAL CONTRACTOR TO COORDINATE THE FINAL LOCATION OF DIMMER SWITCH BANK WITH ARCHITECT/OWNER. DIMMER SWITCHES SHALL BE RATED FOR A TOTAL LOAD OF SWITCHED CIRCUIT AND LAMP TYPE AS REQUIRED. DIMMERS SHALL BE PROVIDED WITH AN ON/OFF SWITCH. CONFIRM SWITCHBANK WILL FIT WITHIN THIS DESIGNATED AREA AND STACK MULTIPLE SWITCHBANK AT THIS LOCATION IF A SINGLE SWITCHBANK WILL NOT FIT WITHIN THIS DESIGNATED AREA.
6. RESTROOM LIGHTING AND EXHAUST FAN SHALL BE INTERLOCKED AND OPERATE THROUGH AREA OCCUPANCY SENSOR. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MECHANICAL CONTRACTOR FOR EXACT LOCATION AND REQUIREMENTS. BASE BID ACCORDINGLY.
7. JUNCTION BOX FOR BOTTLE DISPLAY LED STRIP (GLASS BOTTLE CHANDELIER). ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ARCHITECT/OWNER/VENDOR FOR THE EXACT LOCATION AND POWER REQUIREMENT IN FIELD. LED STRIP SHALL BE CONTROL VIA TIME CLOCK. BASE BID ACCORDINGLY.



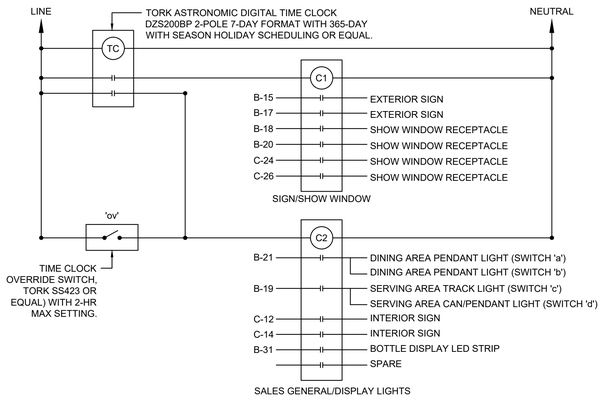
SWITCH BANK DETAILS:



'a,b,c,d' : SINGLE POLE DIMMER SWITCHES FOR CONTROL OF LIGHTING.

'ov' : 2-HR OVERRIDE BYPASS SWITCH. ADJUST TO ON/OFF SCHEDULE DIRECTED BY TENANT REPRESENTATIVE.

TIME CLOCK AND LIGHTING CONTACTOR DETAILS:



TIME CLOCK SCHEDULE NOTES:

CONTRACTOR TO SET TIME CLOCK SETTINGS AND VERIFY WITH OWNER:

1. LIGHTING SHALL BE "ON" DAILY FROM 8:00AM TO 11:00PM.
2. DURING SET "OFF" TIME LIGHTING TO BE CONTROLLED BY A 2-HR MANUAL OVERRIDE SWITCH.

LIGHT FIXTURE SCHEDULE:

SYMBOL	TAG	MANUF.	DESCRIPTION	MODEL	COLOR TEMP	VOL TAG E	WATT AGE	REMARKS
	F-01	PACLIGHTS	2X2 TROFFER	FTFS/2-22D	4000K LED	120	30W	-
	F-02	BROWNLEE	GENERAL LIGHTING PENDANT	METRO PENDANT - 2681-19-BL-R34-FL2-CC1-BL C-30K	3000K LED	120-277	34W	CORD AND SINGLE PENDANT (CC1) - PROVIDE CE1 CABLE EXTENTION AS NEEDED PER SITE CONDITIONS
	F-03	PACLIGHTS	4" RECESSED DOWNLIGHT	FDLA04D12-8	4000K LED	120	12W	FINISH: WHITE
	F-04	CSL LIGHTING	1" RECESSED DOWNLIGHT	ED1NC-709010-12S	4000K LED	120	9.6W	FINISH: WHITE INSTALL WITH ED1-RST TRIM
	F-08A	JUNO	TRACK-LITES 13W LED CYLINDER	R606L - DIMMABLE NARROW FLOOD	4000K LED	120	13W	FINISH: WHITE USE WITH SURFACE MOUNTED TRAC-LITES SYSTEM (WHITE) CUT TO FIT FIELD CONDITION.
	F-08B	JUNO	TRACK-LITES 13W LED CYLINDER	R606L - DIMMABLE NARROW FLOOD	4000K LED	120	13W	FINISH: BLACK USE WITH CABLE HUNG TRAC-LITES SYSTEM (BLACK) 6'-0" LENGTH.
	D-01	KOHLER	DECORATIVE PENDANT	EMBRA PENDANT, 10"	3000K LED	120	7W	INSTALL WITH TYPE A19 "EDISON" STYLE LED BULB, 3000K EMERYALLEN EA-A19-7.0W-E26-3090-D, OR EQUAL.
	D-02	SHADES OF LIGHT	ALGONAC SPHERES CHANDELIER	CH24249	3000K LED	120	30W	INSTALL WITH TYPE B10 5.0W LED BULB, 3000K EMERYALLEN EA-B10-5.0W-3090-D, OR EQUAL
	L-01	ASPECT LED	LED STRIP FOR CHANDELIER	LED TAPE N-SERIES (NARROW) FLEXIBLE LED STRIP-ULTRA BRIGTH (36 LEDs/FT)	120V WARM WHITE 3000K	120	2.92 W/F	
	EM-1	LITHONIA LIGHTING	EMERGENCY LIGHT	ELM2L	N/A	120	<5W	
	X-1	LITHONIA LIGHTING	EXIT SIGN	LQM-S-W-3-R-MVOLT-ELN	N/A	120	<5W	CEILING MOUNTED INSTALLATION; PROVIDE STEM KIT WHERE INSTALLED IN EXPOSED CEILING AREAS
	X-2	LITHONIA LIGHTING	EXIT SIGN / EMERGENCY LIGHT COMBO	LHQM-LED-R	N/A	120	<5W	

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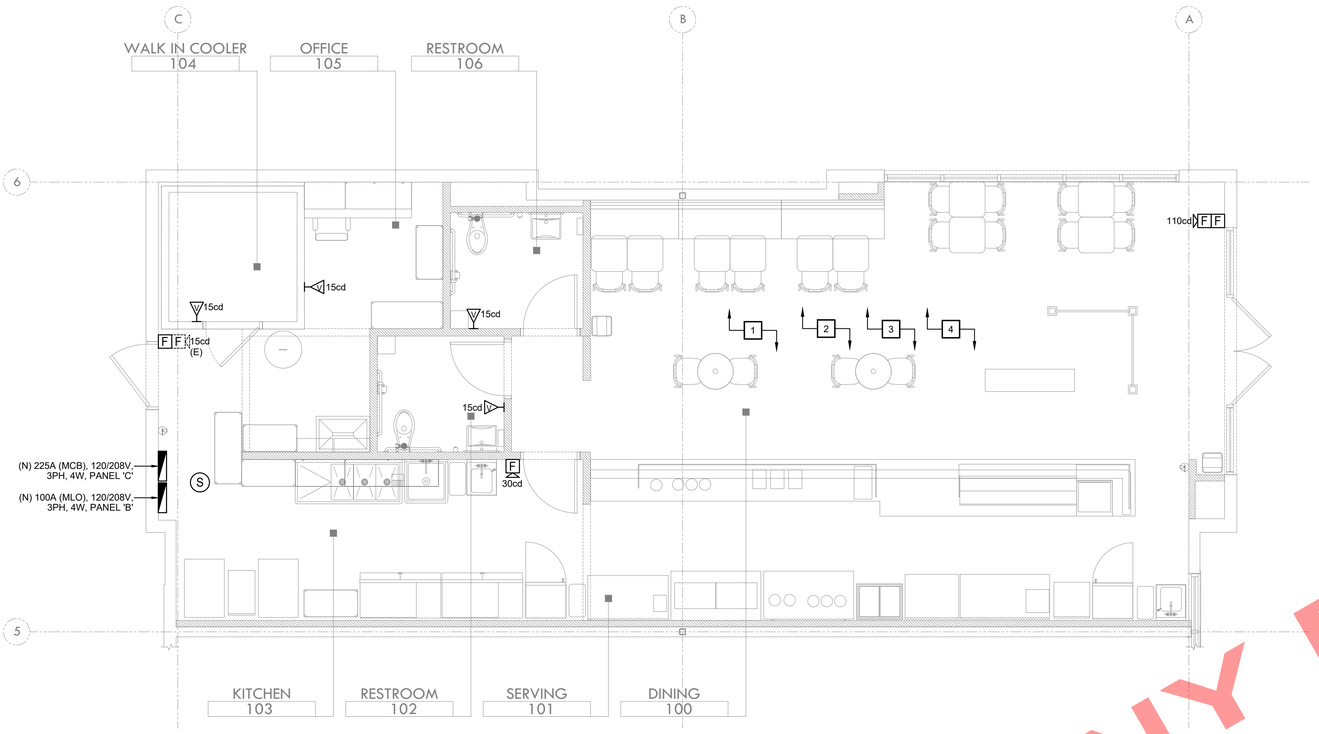
MilkShake EST FACTORY 1914

TITLE:
LIGHTING PLAN

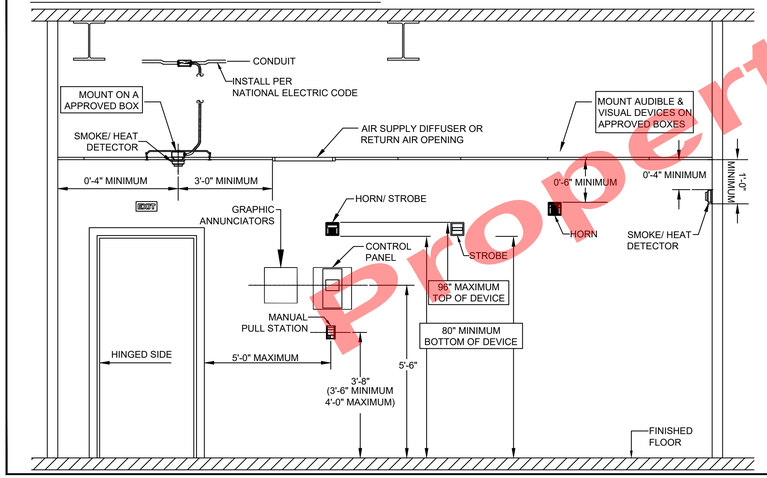
SHEET NUMBER:
E-2.0

1 | SCALE 1 / 4" = 1' - 0" | LIGHTING PLAN

LEGEND:
——————— NEW
- - - - - - - - - - - - - EXISTING

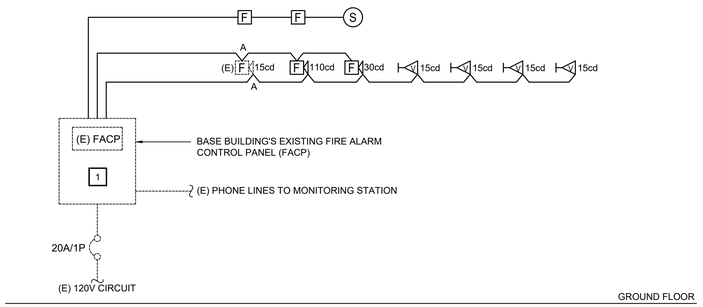


FIRE ALARM DEVICES TYPICAL MOUNTING HEIGHT:



FIRE ALARM RISER KEY NOTES:

1 EXISTING BASE BUILDING'S FACP PANEL. FIRE ALARM CONTRACTOR SHALLVERIFY THE EXACT LOCATION IN FIELD. ALL EXISTING/NEW FA DEVICES SHALL BE CONNECTED TO BASE BUILDING'S EXISTING FIRE ALARM CONTROL PANEL (FACP). CONTRACTOR SHALL COORDINATE THE EXACT LOCATION AND OPERABLE CONDITION IN FIELD IN COORDINATION WITH ARCHITECT/OWNER. BASE BID ACCORDINGLY.



2 | SCALE: N.T.S. | FIRE ALARM RISER

GENERAL NOTES:

1. ALL WORK TO THE FIRE ALARM SYSTEM SHALL COMPLY WITH ALL LOCAL FIRE CODES, LAWS, REGULATIONS, ORDINANCES, AND THE REQUIREMENTS OF UTAH FIRE ALARM CODE 2019 (NFPA 72, 2019 EDITION).
2. ALL NEW FIRE ALARM DEVICES SHALL BE ADA APPROVED. COORDINATE COLOR WITH ARCHITECT AND BASE BUILDING. DEVICES TO MATCH BASE BUILDING SYSTEM MANUFACTURER. PROVIDE ANY ADDITIONAL POWER AMPLIFIERS REQUIRED FOR INSTALLATION OF NEW ADA APPROVED DEVICES.
3. ALL FIRE ALARM DEVICES, INCLUDING SPEAKERS, VISUALS, SMOKE DETECTORS, ETC... SHALL BE CONNECTED TO THE BASE BUILDING FIRE ALARM SYSTEM BY A LICENSED FIRE ALARM CONTRACTOR. COORDINATE CONNECTIONS WITH SYSTEM MANUFACTURER.
4. ALL DEVICES SHALL BE 110 CANDELA, UNLESS OTHERWISE NOTED.
5. THE ENTIRE LENS OF WALL MOUNTED VISUAL FIRE ALARM DEVICES SHALL BE MOUNTED AT LEAST 80" AFF.
6. COORDINATE FIRE ALARM SYSTEM SHUTDOWNS AND REPROGRAMMING WITH LANDLORD.
7. ALL FIRE ALARM DEVICES SHALL BE WHITE UNLESS OTHERWISE NOTED OR REQUIRED.
8. EVACUATION SIGNAL SHALL BE 3 PULSE TEMPORAL.
9. THE FIRE ALARM SYSTEM APPLIANCE LAYOUT INDICATES NEW DEVICE PLACEMENT REQUIREMENTS FOR THIS TENANT UPFIT. NEW DEVICES SHALL BE INSTALLED INTO THE BASE BUILDING FIRE ALARM SYSTEM. PROVIDE ALL PROGRAMMING REQUIRED TO MAKE THE NEW DEVICES FUNCTIONAL AND ANY PROGRAMMING OR NEW EQUIPMENT REQUIRED TO MAKE ALL OF THE VISIBLE NOTIFICATION APPLIANCES ON THE FLOOR FLASH IN SYNCHRONIZATION.
10. FIRE ALARM CONTRACTOR SHALL COORDINATE ALL DEVICE LOCATIONS AND MOUNTING HEIGHTS WITH THE ARCHITECT & FURNITURE VENDOR ALONG WITH REFLECTED CEILING PLAN PRIOR TO INSTALLATION.
11. ALL FIRE ALARM CABLING SHALL BE IN EMT WHERE EXPOSED. ANY FIRE ALARM CABLING ABOVE THE CEILING SHALL BE PLENUM RATED.
12. FOR EXISTING AND/OR RELOCATED DEVICES ADJUST STROBE LEVELS TO APPROPRIATE RATING SHOWN. IF ADJUSTABILITY IS UNAVAILABLE REPLACE WITH NEW.
13. FIRE ALARM SOUND LEVELS AND INTELLIGIBILITY SHALL COMPLY WITH CHAPTER 9 OF THE APPLICABLE STATE BUILDING CODE.
14. VERIFY PROPER FUNCTIONALITY OF ALL EXISTING AND RELOCATED FIRE ALARM DEVICES, INCLUDING THEIR HOUSING, LENSES, ETC.... PROVIDE REPLACEMENTS AS REQUIRED IF ANY ARE NOT OPERATING AS INTENDED OR HAVE ABOVE NORMAL WEAR OR DEFECTS..
15. ALL DEVICES SHALL BE COMPATIBLE WITH AND MAINTAIN THE UL LISTING OF EXISTING FA SYSTEM.
16. G.C. SHALL FIELD VERIFY EXACT REQUIREMENTS FOR FIRE ALARM SYSTEM PRIOR TO BID. SUPPLY AND INSTALL ALL NECESSARY EQUIPMENT AS REQUIRED.
17. REFER TO DRAWING, E-001.0 FOR FIRE ALARM SYMBOL LIST, ABBREVIATIONS.
18. FINAL CONDUIT/CABLE ROUTING SHALL BE DETERMINED IN-FIELD, AND PRIOR TO THE COMMENCEMENT OF WORK, COORDINATED WITH OTHER TRADE CONTRACTORS AND THE OWNER.
19. CONFIRM REQUIRED DEVICES AND SEQUENCE OF OPERATION WITH FIRE ALARM CONTRACTOR.
20. HATCHED AREA NOT IN THIS SCOPE OF WORK. (IF APPLICABLE)
21. 'E' DENOTES EXISTING DEVICE TO REMAIN. 'R' DENOTES EXISTING DEVICE TO BE RELOCATED.

KEYED NOTES:

1 ALL NEW DEVICES SHALL BE CONNECTED TO BASE BUILDING'S EXISTING FIRE ALARM CONTROL PANEL (FACP). CONTRACTOR SHALL COORDINATE THE EXACT LOCATION AND OPERABLE CONDITION IN FIELD IN COORDINATION WITH ARCHITECT/OWNER. BASE BID ACCORDINGLY.

2 ALL DEVICES SHALL BE COMPATIBLE WITH AND MAINTAIN THE UL LISTING OF THE EXISTING FA SYSTEM. CONNECT ALL NEW FIRE ALARM SYSTEM DEVICES TO EXISTING FIRE ALARM CONTROL PANEL AS REQUIRED. BASE BID ACCORDINGLY.

3 EXISTING FIRE ALARM DEVICES TO REMAIN. CONTRACTOR TO FIELD VERIFY THE OPERABLE CONDITION, REUSE IF POSSIBLE OTHERWISE PROVIDE NEW. BASE BID ACCORDINGLY.

4 CONTRACTOR SHALL COORDINATE THE EXACT LOCATION AND OPERABLE CONDITION OF EXISTING TAMPER AND WATER FLOW SWITCHES IN FIELD IN COORDINATION WITH SPRINKLER CONTRACTOR.

SEQUENCE OF OPERATION:

- UPON CHANGE IN STATUS OF ANY DEVICE ON THE SYSTEM, THE FIRE ALARM CONTROL PANEL SHALL ACTIVATE AUDIBLE AND VISIBLE CHANGE INDICATORS AND DISPLAY THE SYSTEM POINT NUMBER, POINT DESCRIPTION, AND MESSAGE ASSOCIATED WITH THE POINT.
- ACTIVATION OF ANY MANUAL STATION, KITCHEN HOOD EXTINGUISHING SYSTEM, WATERFLOW DEVICE, SMOKE DETECTOR, HEAT DETECTOR, SUPERVISORY DEVICE OR OTHER INITIATING DEVICE WILL CAUSE THE FOLLOWING FUNCTIONS TO OCCUR:
- MANUAL STATION OPERATION SHALL:
  a. ACTIVATE AUDIBLE AND VISIBLE STATUS CHANGE INDICATORS AND DISPLAY THE SYSTEM POINT NUMBER, POINT DESCRIPTION, AND ANY MESSAGE ASSOCIATED WITH THE POINT ON THE PANEL.
  b. TRANSMIT AN ALARM SIGNAL TO A UL LISTED SIGNAL STATION.
  c. ACTIVATE THE AUDIBLE AND VISIBLE NOTIFICATION APPLIANCES ON THE FLOOR.
  d. RELEASE THE DOOR LOCKING SYSTEM.
- WATERFLOW SWITCH OPERATION SHALL:
  a. ACTIVATE AUDIBLE AND VISIBLE STATUS CHANGE INDICATORS AND DISPLAY THE SYSTEM POINT NUMBER, POINT DESCRIPTION, AND ANY MESSAGE ASSOCIATED WITH THE POINT ON THE PANEL.
  b. TRANSMIT AN ALARM SIGNAL TO A UL LISTED SIGNAL STATION.
  c. ACTIVATE THE AUDIBLE AND VISIBLE NOTIFICATION APPLIANCES ON THE FLOOR.
- SMOKE DETECTOR OR HEAT DETECTOR OPERATION SHALL:
  a. ACTIVATE AUDIBLE AND VISIBLE STATUS CHANGE INDICATORS AND DISPLAY THE SYSTEM POINT NUMBER, POINT DESCRIPTION, AND ANY MESSAGE ASSOCIATED WITH THE POINT ON THE PANEL.
  b. TRANSMIT AN ALARM SIGNAL TO A UL LISTED SIGNAL STATION.
  c. ACTIVATE THE AUDIBLE AND VISIBLE NOTIFICATION APPLIANCES ON THE FLOOR.
  d. SHUT DOWN AHU'S.
- DUCT SMOKE DETECTOR ACTIVATION SHALL:
  a. ACTIVATE AUDIBLE AND VISIBLE STATUS CHANGE INDICATORS AND DISPLAY THE SYSTEM POINT NUMBER, POINT DESCRIPTION, AND ANY MESSAGE ASSOCIATED WITH THE POINT ON THE PANEL.
  b. TRANSMIT SUPERVISORY SIGNAL TO A UL LISTED SIGNAL STATION.
  c. SHUT DOWN AHU'S
- SUPERVISORY DEVICE ACTIVATION, INCLUDING VALVE SUPERVISORY DEVICES SHALL:
  a. ACTIVATE AUDIBLE AND VISIBLE STATUS CHANGE INDICATORS AND DISPLAY THE SYSTEM POINT NUMBER, POINT DESCRIPTION, AND ANY MESSAGE ASSOCIATED WITH THE POINT ON THE PANEL.
  b. TRANSMIT SUPERVISORY SIGNAL TO A UL LISTED SIGNAL STATION, THIS SIGNAL SHALL BE DISTINCTLY DIFFERENT THAN A TROUBLE SIGNAL.
- REMOVAL OF ANY DEVICE, WIRING DISARRANGEMENT, OR SYSTEM COMPONENT FAILURE SHALL DISPLAY ON THE OPERATOR TERMINAL, THE CHANGE OF STATUS, TIME, DATE, POINT DESCRIPTION ON A POINT BY POINT BASIS, AND THE MESSAGE ASSOCIATED WITH THE POINT AND TRANSMIT A TROUBLE SIGNAL TO A UL LISTED CENTRAL STATION.

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1 | SCALE: 1 / 4" = 1' - 0" | FIRE ALARM PLAN

MilkShake EST FACTORY 1914

TITLE: FIRE ALARM PLAN

SHEET NUMBER: E-3.0

PLUMBING SYMBOLS LIST

PLUMBING LEGENDS		PLUMBING ABBREVIATIONS	
SAN	SANITARY SEWER	AFF	ABOVE FINISH FLOOR
GW	GREASE WASTE	AHJ	AUTHORITY HAVING JURISDICTION
CD	CONDENSATE DRAIN	BFP	BACKFLOW PREVENTER
V	VENT PIPING	CD	CONDENSATE DRAIN
CW	COLD WATER	CO/FCO	CLEANOUT/ FLOOR CLEANOUT
HW	HOT WATER	CW	COLD WATER
HWR	RECIRCULATING HOT WATER	DN	DOWN
	BALANCING VALVE	ETR	EXISTING TO REMAIN
EX.SAN	EXISTING SANITARY	ET	EXPANSION TANK
EX.GW	EXISTING GREASE WASTE	EV	EQUIPMENT VENDOR
EX.CW	EXISTING COLD WATER	F	FRANCHISE
G	GAS PIPE	WCO	WALL CLEANOUT
G(E)	EXISTING GAS PIPE	FD	FLOOR DRAIN
	UNION	FS	FLOOR SINK
	BACKFLOW PREVENTER	GC	GENERAL CONTRACTOR
	POINT OFF CONNECTION	GPM	GALLONS PER MINUTE
	ISOLATION VALVE	GW	GREASE WASTE
	PIPE UP OR DOWN	HD	HUB DRAIN
	PIPE UP	HS	HAND SINK
	RE-CIRCULATION PUMP	HW	HOT WATER
	FLOOR SINK / FLOOR DRAIN	HWR	HOT WATER RETURN
FCO	FLOOR CLEANOUT	IW	INDIRECT WASTE
	CLEANOUT	KW	KILOWATTS
TYP	TYPICAL	LAV	LAVATORY
V	VENT	MS	MOP SINK
VLL	VERIFY WITH LANDLORD	NIC	NOT IN SCOPE
VTR	VENT THRU ROOF	NG	NATURAL GAS
VIF	VERIFY IN FIELD	PC	PLUMBING CONTRACTOR
W	WASTE	PSI	POUNDS PER SQUARE INCH
WC	WATER CLOSET	RCP	RE-CIRCULATION PUMP
IWH	INSTANTANEOUS WATER HEATER	RTU	ROOF TOP UNIT
WHA	WATER HAMMER ARRESTOR	SAN	SANITARY
3-CS	THREE COMPARTMENT SINK	SPS	SEE PLUMBING SCHDULE

PLUMBING DRAWING LIST

P-0.1	PLUMBING SYMBOLS, ABBREVIATIONS, NOTES AND SCHEDULE
P-0.2	PLUMBING SPECIFICATIONS SHEET (01 OF 02)
P-0.3	PLUMBING SPECIFICATIONS SHEET (02 OF 02)
P-1.0	PLUMBING FLOOR PLANS
P-2.0	PLUMBING RISERS
P-3.0	PLUMBING DETAILS

APPLICABLE CODES

2021 INTERNATIONAL BUILDING CODE

2021 INTERNATIONAL MECHANICAL CODE (IPC 2021)

2021 INTERNATIONAL PLUMBING CODE (IPC 2021)

2021 INTERNATIONAL FUEL GAS CODE (IFGC 2021)

2021 INTERNATIONAL ENERGY CODE (IECC 2021)

2023 NATIONAL ELECTRIC CODE (NEC 2023)

TANKLESS WATER HEATER SCHEDULE (GAS FIRED)

TAG	TOTAL NO. OF HEATERS	MANUFACTURER	MODEL	GAS LOAD	TEMP. SET POINT DEG. F.	GAS OPERATING PRESSURE	RECOVERY CAP. GPM @ 70°F RISE	REMARKS
IWH-1 & IWH-2	2	NAVIEN	NPE-180A2	150 MBH (EACH)	120	7" W.C.	4.2	1,2,3,4

NOTES:

1. FURNISH WITH EXPANSION TANK AS SPECIFIED ON PLANS.
2. WATER HEATER WITH BUILT-IN RECIRCULATION PUMP.
3. WATER HEATER MUST BE DIRECT VENTED WITH FORCED COMBUSTION.
4. ALL WATER HEATER VENTING MUST BE INSTALLED PER THE MANUFACTURER'S VENTING REQUIREMENTS USING THE MANUFACTURER'S VENT KIT AND MATERIALS.

PLUMBING FIXTURE SCHEDULE

TAG	FIXTURE	QUANTITY	SAN / WASTE	VENT	COLD WATER	HOT WATER	WASTE FU	WATER FU	FLOW RATE & REMARK
P-01	WATER CLOSET FLOOR MOUNT	2	4"	2"	1"	--	4	10	1.28 GPF
BASIS OF DESIGN	FIXTURES P-01 SHALL BE AMERICAN STANDARD MADERA FLOWISE, MODEL 3043.528.02, FLOOR-MOUNTED, SIPHON JET, ELONGATED STYLE, FLUSH-VALVE WATER CLOSET. FIXTURE SHALL BE 16-1/2" HIGH WATER CLOSET COMPLETE WITH TOUCHLESS SELECTRONIC PISTON FLUSH VALVE, BATTERY POWERED SENSOR TYPE, EXPOSED QUIET-OPERATING CHROME, 1.28 GPF. PROVIDE WITH BATTERIES. INCLUDE BENEKE OPEN FRONT TOILET SEAT WITH CHECK HINGE AND ANTI-MICROBIAL AGENT. FIXTURE SHALL BE INSTALLED TO MEET ALL ADA REQUIREMENTS.								
P-02	WALL MOUNT LAVATORY	2	2"	1-1/2"	1/2"	1/2"	1	2	0.5 GPM
BASIS OF DESIGN	FIXTURE SHALL BE AMERICAN STANDARD DECORUM, MODEL 9024.001EC, WHITE VITREOUS CHINA, WALL HUNG LAVATORY, CONCEALED MOUNTING, REAR OVERFLOW, FAUCET LEDGE, SINGLE HOLE PUNCHING AND MOUNTING HARDWARE. FAUCET SHALL BE AMERICAN STANDARD ELECTRONIC, MODEL:605B.105, ELECTRONIC TOUCHLESS FAUCET WITH VANDAL-RESISTANT CAST SPOUT, 0.5 GPM PRESSURE COMPENSATING VANDAL-RESISTANT MULTI-LAMINAR SPRAY AND GRID DRAIN. PROVIDE POWER KIT AS PER MANUFACTURER REQUIREMENT. PROVIDE WITH POINT OF USE MIXING VALVE ACORN ST-70 SET TO 110°F, TO MEET ASSE 1070, P-TRAP, LOOSE KEY SUPPLY STOPS AND ALL OTHER TRIM FOR A COMPLETE INSTALLATION.								
P-03	MOP SINK	1	3"	2"	3/4"	3/4"	2	3	2.5 GPM
BASIS OF DESIGN	FIXTURES SHALL BE A TERRAZZO FLOOR SERVICE SINK, 36" X 24" X 12" HIGH, COMPLETE WITH ONE-PIECE STAINLESS STEEL CAP ALL-AROUND TOP EDGE, CAST BRASS 3" CAULKED DRAIN WITH STAINLESS STEEL STRAINER; STERN-WILLIAMS "SERVICEPTOR" MODEL SB-300 OR APPROVED EQUAL. FAUCET SET SHALL BE T-10-VB SINK FITTING COMPLETE WITH WALL BRACE, HOSE END, VACUUM BREAKER AND CHROME FINISH. PROVIDE TWO (2) 24" X 36" 20 GAUGE STAINLESS STEEL SPLASH PANELS MOUNTED BEHIND SINK.								
PF-04	3-COMPARTMENT SINK	1	3"	1-1/2"	3/4"	3/4"	5	4	- ROUTE INDIRECT WASTE TO DISCHARGE TO FLOOR DRAIN WITH AIR GAP - PROVIDE FAUCET WITH TWO HOSE BIBB CONNECTION SIDE BY SIDE. - PROVIDE POINT OF USE MIXING VALVE ASSE 1070 APPROVED ACORN ST-70 OR SIMILAR ON EACH HOSE BIBB FOR DETERGENT SET TO 110°F AND SANITIZER AT 70°F.
BASIS OF DESIGN	FIXTURE SHALL BE ADVANCE TABCO MODEL FC-3-1524-24L, THREE-BOWL STAINLESS STEEL SINK WITH THREE (3) 15" X 24" X 14" DEEP BOWL WITH BACKSPLASH, 3-HOLE PUNCHING ON 8" CENTERS BY KEYSTONE CUSTOM FABRICATORS. SINK FAUCET SHALL BE T&S B-0231-CC, WALL-MOUNTED WITH 8" CENTER, 12" SWING NOZZLE, AND ETERNA CARTRIDGE; FURNISHED BY KITCHEN EQUIPMENT AND INSTALLED BY PLUMBING CONTRACTOR. PROVIDE WITH LEVER DRAIN, THREE (3) ELKAY LK-35 BASKET DRAINS, P-TRAP, LOOSE KEY SUPPLY STOPS AND ALL OTHER TRIM FOR A COMPLETE INSTALLATION. FIXTURE TO BE PROVIDED BY KITCHEN EQUIPMENT VENDOR AND INSTALLED BY PLUMBING CONTRACTOR.								
PF-08	HANDWASH SINK	2	2"	1-1/2"	1/2"	1/2"	1	1.4	0.5 GPM
BASIS OF DESIGN	FIXTURE SHALL BE SINGLE BOWL STAINLESS STEEL SINK, 16-3/4" X 15-1/2" X 13", ELKAY CHSB1716C, WALL MOUNTED WITH CENTER DRAIN PLACEMENT. SINK SHALL BE FURNISHED WITH FACTORY-INSTALLED ELKAY LBK400 FAUCET. PROVIDE ELKAY LK-18 GRID DRAIN, 7-PS-48 REMOVABLE UTILITY TRAY, P-TRAP, LOOSE KEY SUPPLY STOPS AND ALL OTHER TRIM FOR A COMPLETE INSTALLATION. PROVIDE WITH POINT OF USE MIXING VALVE ACORN ST-70 SET TO 110°F TO MEET ASSE 1070.								
PF-10	DUMP SINK	1	2"	1-1/2"	1/2"	1/2"	1	1.4	- ROUTE INDIRECT WASTE TO DISCHARGE TO FLOOR DRAIN WITH AIR GAP
BASIS OF DESIGN	FIXTURE SHALL BE ADVANCE TABCO MODEL FC-1-2424, SINGLE-BOWL STAINLESS STEEL SINK WITH ONE BOWL 24" X 24" X 14" DEEP BOWL WITH BACKSPLASH, 1-HOLE PUNCHING ON 8" CENTERS BY KEYSTONE CUSTOM FABRICATORS. SINK FAUCET SHALL BE 5PR-8W12C, 8" WALL MOUNT MIXING FAUCET W/ CERAMIC CARTRIDGES, ADD-ON FAUCET W/ 12" SWING NOZZLE, 5SV-C LOW FLOW SPRAY VALVE 1.20 GPM 6" WALL BRACKET, IN-LINE CHECK VALVES & 1/2" NPT FEMALE INLETS; FURNISHED BY KITCHEN EQUIPMENT AND INSTALLED BY PLUMBING CONTRACTOR. PROVIDE WITH LEVER DRAIN, ONE (1) SCRAP DRAIN SD-65, P-TRAP, LOOSE KEY SUPPLY STOPS AND ALL OTHER TRIM FOR A COMPLETE INSTALLATION. FIXTURE TO BE PROVIDED BY KITCHEN EQUIPMENT VENDOR AND INSTALLED BY PLUMBING CONTRACTOR.								
FD	FLOOR DRAIN	2	3"	2"	-	-	3	-	
BASIS OF DESIGN	FLOOR DRAINS IN TOILETS AND FINISHED AREAS SHALL BE JR SMITH 2000 SERIES WITH 6" TYPE B SQUARE ADJUSTABLE STRAINERS FINISHED IN SATIN NICKEL BRONZE; OR EQUAL PRODUCTS BY JOSAM OR ZURN. PROVIDE VANDALPROOF SECURED TOPS.								
FD-K	FLOOR DRAIN TYPE K	1	3"	2"	-	-	3	-	
BASIS OF DESIGN	TYPE "K" FLOOR DRAINS IN KITCHENS AND FOOD SERVICE AREAS SHALL BE JR SMITH 2000 SERIES WITH SEDIMENT BUCKET AND 8" TYPE "B" SQUARE ADJUSTABLE STRAINER FINISHED IN NICKEL BRONZE; OR EQUAL PRODUCTS BY JOSAM OR ZURN. PROVIDE VANDALPROOF SECURED TOPS.								
FD-R	FLOOR DRAIN TYPE R	3	3"	2"	1/2" TP	--	5	--	
BASIS OF DESIGN	TYPE "R" FLOOR DRAINS IN KITCHENS AND FOOD SERVICE AREAS SHALL BE JR SMITH 2000 SERIES WITH SEDIMENT BUCKET AND 7" TYPE F37 ROUND EXTENDED RIM STRAINER FINISHED IN NICKEL BRONZE; OR EQUAL PRODUCTS BY JOSAM OR ZURN. PROVIDE VANDALPROOF SECURED TOPS.								
FS	FLOOR SINK	2	3"/4"	2"	1/2" TP	--	5	--	
BASIS OF DESIGN	FLOOR SINKS (FS) IN KITCHENS AND FOOD SERVICE AREAS SHALL BE JR SMITH 3007-NB SERIES WITH 6" DEEP TYPE 304 STAINLESS STEEL BODY, REMOVABLE STAINLESS STEEL SEDIMENT BUCKET, 12 1/2" SQUARE NICKEL BRONZE TOP AND NON-PUNCTURING FLASHING CLAMPS OR EQUAL PRODUCTS BY ACO, JOSAM, OR ZURN. GRATE CONFIGURATION SHALL BE COORDINATED WITH KITCHEN EQUIPMENT CONSULTANT TO ENSURE PROPER OPENING FOR EQUIPMENT SERVED; OTHERWISE PROVIDE A FULL GRATE WITH OPENINGS CUT OUT FOR EQUIPMENT SERVED.								
HD	HUB DRAIN	1	3"	2"	--	--	1	--	- ZURN Z415 WITH SQUARE TOP OR SIMILAR

NOTES:
1. PROVIDE WITH ½" TRAP PRIMER (TP), WATTS TP300 OR EQUIVALENT.
2. CONTRACTOR TO CROSS REFERENCE ALL LISTED PLUMBING FIXTURES WITH OWNER PROVIDED DIP TO ENSURE ALL PLUMBING RELATED ITEMS ARE COORDINATED PROPERLY.

GENERAL NOTES

1. THESE DRAWINGS ARE SCHEMATIC IN NATURE AND ARE NOT INTENDED TO SHOW ALL POSSIBLE CONDITIONS. IT IS INTENDED THAT A COMPLETE TENANT PLUMBING SYSTEM BE PROVIDED WITH ALL NECESSARY EQUIPMENT, ACCESSORIES, OPTIONS AND CONTROLS, COMPLETELY COORDINATED WITH ALL DISCIPLINES. ALL ITEMS AND LABOR REQUIRED FOR A COMPLETE TENANT PLUMBING SYSTEM IN ACCORDANCE WITH ALL APPLICABLE CODES, STANDARDS AND THE BASE BUILDING CONTRACT DOCUMENTS SHALL BE FURNISHED WITHOUT INCURRING ADDITIONS TO THE CONTRACT.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY FITTINGS AS REQUIRED BY ALL APPLICABLE CODES AND GOVERNING AUTHORITIES.
3. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT PARTITION LAYOUTS, REFLECTED CEILING PLANS, DIMENSIONS, ETC.
4. VISIT SITE AND CAREFULLY EXAMINE EXISTING CONDITIONS PRIOR TO SUBMITTING BID. THE EXISTING CONDITIONS SHOWN ARE BASED ON DOCUMENTS PROVIDED BY OTHERS AND HAVE NOT BEEN VERIFIED BY THE ENGINEER. IF EXISTING CONDITIONS DIFFER FROM DRAWINGS IN SUCH A MANNER THAT WILL AFFECT PRICING, (I.E., PIPING, WATER HEATERS, FIXTURES, ETC.)CONTRACTOR WILL NOTIFY OWNER SO THAT A RESOLUTION CAN BE MADE PRIOR TO SUBMITTING BIDS. NO ALLOWANCE WILL BE MADE FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS.
5. ALL SANITARY 1/8" AND GREASE WASTE PIPING SHALL HAVE A 1/4" PER FOOT SLOPE UNLESS OTHERWISE NOTED OR PER LOCAL CODE.
6. ALL SANITARY WASTE, VENT, AND WATER PIPING AND INSULATION SHALL BE AS SPECIFIED IN THE BASE BUILDING DOCUMENTS. ALL NEW WORK SHALL CONFORM TO BASE BUILDING STANDARD AS A MINIMUM.
7. VALVES AND FITTINGS SHALL BE OF SAME SIZE OF LINE ON WHICH THEY ARE LOCATED, UNLESS OTHERWISE INDICATED ON DRAWINGS.
8. CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER TRADES.
9. CONTRACTOR SHALL FIELD VERIFY ALL GIVEN MEASUREMENTS PRIOR TO LAYING AND CONNECTING ALL SANITARY AND WASTE PIPING AND NOTIFY ARCHITECT OF ANY DISCREPANCIES.
10. AIR CHAMBERS SHALL NOT BE CONSIDERED AN EQUAL TO WATER ARRESTORS AS SPECIFIED.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING FIRE RATING AND WEATHERPROOFING INTEGRITY OF ALL PIPING AND PENETRATIONS.
12. ALL WATER SUPPLY AND SANITARY LINES SHALL BE RUN AS CLOSE TO PLANS AS POSSIBLE WITH NO CHANGES IN SIZING.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY SUPPORTING DEVICES FOR ALL FIXTURES INCLUDED IN CONTRACT OR HEREIN SPECIFIED OR OTHERWISE.
14. CHANGES IN THE DIRECTION OF SANITARY PIPING SHALL NOT BE MADE WITH FITTINGS WHICH WILL CAUSE EXCESSIVE REDUCTION IN THE VELOCITY OF FLOW OR CREATE ANY OTHER ADVERSE EFFECT UNLESS PHYSICALLY IMPOSSIBLE (IE: USE OF SANITARY TEE IN A HORIZONTAL CONNECTION, USE OF A DOUBLE SANITARY TEE IN A VERTICAL STACK, IN GENERAL, USE OF SHORT-RADIUS FITTINGS FOR BRANCH TO HOUSE DRAIN OR STACK CONNECTION).
15. ALL DRAINAGE PIPING SHALL BE MARKED WITH THE SEAL OF APPROVAL OF THE NATIONAL SANITATION FOUNDATION.
16. PROVIDE ACCESS PANELS TO ALL VALVES WITHIN CHASES OR ABOVE NONACCESSIBLE CEILINGS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
17. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF PLUMBING FIXTURE MOUNTING HEIGHTS, AND DIMENSIONS.
18. CONTRACTOR SHALL VERIFY INVERT ELEVATIONS OF SANITARY AND GREASE TRAPS TO WHICH NEW SEWER LINES ARE TO BE CONNECTED BEFORE INSTALLATION OF NEW SEWER LINE.
19. ALL VENTS THROUGH ROOF SHALL BE MIN. 10'-0" FROM ANY AIR INTAKES.
20. CONTRACTOR SHALL INSTALL DIELECTRIC UNIONS AT CONNECTIONS OF DISSIMILAR METALS.
21. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS (INCLUDING PIPE ROUTING AND EQUIPMENT LOCATIONS) TO ARCHITECT/ENGINEER FOR REVIEW AND APPROVAL PRIOR TO THE INSTALLATION OR PURCHASING OF ANY PIPING AND/OR EQUIPMENT.
22. CLEANOUTS SHALL BE PROVIDED AT THE LOCATIONS INDICATED AND A MINIMUM WHERE REQUIRED BY CODE . FLOOR CLEANOUTS SHALL BE A MINIMUM OF 4" AND SHALL BE COMPLETE WITH A FLUSH PLUG AND REMOVABLE SCORIATED BRONZE FLOOR PLATE, PROVIDE CARPET BUTTONS IN CARPETED AREAS.
23. PROVIDE BACKFLOW PROTECTION DEVICES REQUIRED BY AGENCIES HAVING JURISDICTION. BACKFLOW DEVICES REQUIRING TESTING SHALL BE INSTALLED NO HIGHER THAN 5'-0" A.F.F.
24. PROVIDE CONDENSATE DRAIN FROM A/C UNITS TO APPROVED DRAIN. PROVIDE GAS PIPING TO UNITS. MAKE FINAL CONNECTIONS REQUIRED FOR OPERATION.
25. COORDINATE INSTALLATION OF PLUMBING WORK WITH OTHER TRADES SO AS TO AVOID UNNECESSARY DELAY OR INTERFERENCES.REVIEW ARCHITECTURAL AND EQUIPMENT SHEETS.
26. ALL PROPOSED POKE-THRU AND TRENCHING LOCATIONS TO BE REVIEWED AND APPROVED BY LANDLORD'S STRUCTURAL ENGINEER BEFORE CUTTING OR DRILLING IS PERMITTED.
27. PROVIDE QUARTER-TURN ISOLATION VALVES FOR ALL PLUMBING EQUIPMENTS.

EXPANSION TANK SCHEDULE

TAG	QTY.	LOCATION	SERVICE	TYPE	CONNECTION SIZE	MAX WORKING PRESSURE(PSI)	SHIPPING WT.(LBS)	MAKE	REMARKS
EXPANSION TANK (ET-1)	01	HOT WATER HEATER	HOT WATER	DIAPHRAGM	¾"	150	17	THERM-X-TROL ST-12C-DD	TANK VOLUME - 6.4(GAL.) ASME APPROVED DIMENSIONS- 18"(H)x12"(DIA.)

BACKFLOW PREVENTER DEVICE SCHEDULE

TAG	QUANTITY	LOCATION	SERVICE	SIZE	SERIES	APPROVAL	MAKE	REMARKS
BFP-1	1	KITCHEN (103)	DOMESTIC WATER CONNECTION	1-1/2"	LF009	ASSE 1013, AWWA C511	WATTS	-REDUCED PRESSURE BACKFLOW PREVENTER -LEAD FREE CAST COPPER SILICON ALLOY BODY
BFP-2	1	KITCHEN (103)	HOSE BIBB CONNECTION	3/4"	LFN9-CD	ASSE 1052	WATTS	-TESTABLE HOSE CONNECTION BFP - DURABLE BRASS BODY

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TITLE:

PLUMBING SYMBOLS, ABBREVIATIONS, NOTES AND SCHEDULE

SHEET NUMBER:

P-0.1

1 | SCALE N.T.S. | PLUMBING SYMBOLS, ABBREVIATIONS, NOTES AND SCHEDULE

PLUMBING SPECIFICATIONS

1. GENERAL

THE "ARCHITECTURAL GENERAL CONDITIONS" GOVERN WORK UNDER THIS SECTION.

BEFORE SUBMITTING A PROPOSAL, THIS CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND SHALL CAREFULLY EXAMINE THE DRAWINGS AND SPECIFICATIONS. IT IS EXPRESSLY UNDERSTOOD THAT THIS PROPOSAL IS BASED ON THE ABOVE REQUIREMENTS AND THAT IT COVERS EVERYTHING NECESSARY TO DO AND COMPLETE THE WORK.

2. INSPECTION AND COOPERATION

NO DEVIATION FROM THE DRAWINGS AND /OR SPECIFICATIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF ARCHITECT OR ENGINEER. THIS CONTRACTOR SHALL COOPERATE WITH THE OTHER CONTRACTORS TO ALLOW FOR THE INSTALLATION OF THEIR WORK AS WELL AS HIS OWN.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK FITTING IN PLACE WITHOUT CONFLICT WITH THE OTHER TRADES, WHERE PROPER PLANNING COULD AVOID INTERFERENCE.

3. CODES AND PERMITS

NOTHING IN THE DRAWINGS AND/OR SPECIFICATIONS SHALL BE INTERPRETED TO CONFLICT WITH ANY CITY OR PROVINCIAL LAW, REGULATION, CODE, ORDINANCE, RULING, OR FIRE UNDERWRITER'S REQUIREMENT APPLICABLE TO THIS CLASS OF WORK.

SHOULD THE DRAWINGS AND/OR SPECIFICATIONS CONFLICT WITH SUCH LAWS OR ORDINANCES, THE CONFLICTING PORTION OF THE WORK SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH SUCH LAWS AND ORDINANCES WITHOUT EXTRA COST.

THIS CONTRACTOR SHALL SECURE AND PAY FOR ALL NECESSARY PERMITS AND INSPECTIONS REQUIRED FOR THIS INSTALLATION OF HIS WORK.

4. ACCURACY OF DATA

THE INFORMATION GIVEN HEREIN AND ON THE DRAWINGS IS AS EXACT AS COULD BE SECURED, BUT ITS EXTREME ACCURACY IS NOT GUARANTEED.

THIS CONTRACTOR SHALL EXAMINE THE LOCATIONS AND VERIFY ALL MEASUREMENTS, DISTANCES, ELEVATIONS AND EXISTING PIPE SIZES BEFORE STARTING THE WORK AS ALL PIPING SYSTEMS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC ONLY. THIS CONTRACTOR SHALL PROVIDE ALL NECESSARY OFFSETS, RAISED AND DROPS IN PIPING AND DUCTWORK AS REQUIRED BY BUILDING CONDITIONS AT NO ADDITIONAL COST.

PLUMBING DRAWINGS SHALL NOT BE USED FOR GENERAL CONSTRUCTION DIMENSIONS OR FOR TYPE OF MATERIAL USED. FOR EXACT BUILDING LAYOUT, DIMENSIONS AND BUILDING MATERIAL USED, THIS CONTRACTOR SHALL REFER TO THE ARCHITECTURAL DRAWINGS.

5. SHOP DRAWINGS

SHOP OR INSTALLATION DRAWINGS, FOUNDATION PLANS, EQUIPMENT OR APPARATUS DRAWINGS SHALL BE FURNISHED BY THIS CONTRACTOR. THESE DRAWINGS SHALL BE CLEARLY MARKED INDICATING WHICH ITEMS ARE TO BE SUPPLIED AND SHALL STATE CAPACITIES, SIZES AND GENERAL DESCRIPTION OF ALL EQUIPMENT. ANY CHANGES FROM THE SPECIFIED ITEMS SHALL BE NOTED ON THE SUBMITTALS.

SHOP DRAWINGS OF SPECIAL APPARATUS OR EQUIPMENT WHICH IS TO BE FABRICATED INDIVIDUALLY FOR THIS PROJECT AND IS NOT DESCRIBED BY STANDARD MANUFACTURER'S DRAWINGS OR BULLETINS SHALL BE SUBMITTED FOR PROCESSING BEFORE FABRICATION.

THESE DRAWINGS SHALL BE SUBMITTED IN A TIMELY MANNER.

IT SHALL BE THIS CONTRACTORS RESPONSIBILITY TO MAINTAIN LIAISON WITH ALL PARTIES CONCERNED WITH THE MATERIAL SUBMITTED. THIS CONTRACTOR SHALL NOT PURCHASE ANY EQUIPMENT UNTIL SHOP DRAWINGS HAVE BEEN PROCESSED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY FEES ACCRUED FROM THE RETURN OF FIXTURES PURCHASED PRIOR TO THE REVIEW OF SHOP DRAWINGS AND THAT ARE NOT APPROVED.

THIS CONTRACTOR SHALL SUBMIT NO DRAWINGS WITHOUT NOTATION INDICATING DATE OF CONTRACTOR'S REVIEW AND SIGNATURE OF CHECK FOR CONTRACTOR TOGETHER WITH CONTRACTOR'S NAME AND PROJECT IDENTIFICATION.

ARCHITECT'S PROCESSING WILL NOT CONSTITUTE A COMPLETE CHECK BUT WILL INDICATE ONLY THAT GENERAL METHOD OF CONSTRUCTION AND DETAILING IS SATISFACTORY.

ARCHITECT'S PROCESSING WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS SINCE THIS CONTRACTOR IS SOLELY RESPONSIBLE FOR DIMENSIONS AND DESIGNS OF ADEQUATE CONNECTIONS, DETAILS AND SATISFACTORY CONSTRUCTION OF ALL WORK, AS WELL AS FURNISHING MATERIALS AND WORKMANSHIP REQUIRED BY DRAWINGS AND SPECIFICATIONS WHICH MAY NOT BE INDICATED ON THE SUBMITTALS WHEN APPROVED.

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING ENGINEER REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. REVIEW OF A SPECIFIC ITEM SHALL NOT INCLUDE REVIEW OF AN ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. THE CONTRACTOR IS RESPONSIBLE FOR: EQUIPMENT VOLTAGES AND DIMENSIONS TO BE CONFIRMED AND CORRELATED WITH ALL DISCIPLINES PRIOR TO PURCHASE; INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESSES OR TO THE MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION; COORDINATION OF THE WORK WITH THAT OF ALL OTHER TRADES AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER.

6. SUBSTITUTIONS OF EQUIPMENT OR MATERIAL

THE BRAND NAMES OF EQUIPMENT OR MATERIALS SPECIFIED HEREIN SHALL ESTABLISH QUALITY, CAPACITY, TYPE AND DIMENSIONS TO BE INCLUDED IN THE BASE BID.

APPROVAL OF SUBSTITUTED ITEMS WILL BE BASED ON ABILITY AND CAPACITY TO PERFORM FUNCTION SERVED, QUALITY AND AVAILABILITY OF PARTS AND SERVICE, QUALITY OF EQUIPMENT, DELIVERY SCHEDULE, ETC. THE ARCHITECT SHALL REVIEW ALL SUCH REQUESTS BUT RESERVES THE SOLE RIGHT OF JUDGEMENT TO APPROVE OR REJECT THE PROPOSED SUBSTITUTIONS.

ACCEPTANCE OR REJECTION OF PROPOSED SUBSTITUTIONS SHALL NOT CAUSE ADDITIONAL COST. ANY CHANGES OF PIPING, DUCTWORK, ELECTRICAL CONTROLS OR INSTALLATION REQUIRED BECAUSE OF THE SUBSTITUTION OR EQUIPMENT SHALL BE PAID FOR BY THIS CONTRACTOR PROPOSING THE SUBSTITUTION.

7. ERECTION OF APPARATUS

ALL WORK SHALL BE DONE UNDER THE PERSONAL SUPERVISION OF THIS CONTRACTOR WHO SHALL PROVIDE A COMPETENT FOREMAN TO LAY OUT ALL WORK. ALL WORK SHALL BE LAID OUT WITH DUE REGARD FOR THE SPACE REQUIREMENTS OF THE OTHER CONTRACTORS. THIS CONTRACTOR SHALL REPORT ANY CONFLICTS OR DIFFICULTIES IN REGARD TO THE INSTALLATION IMMEDIATELY.

WHERE CROWDED LOCATIONS EXIST OR WHERE THERE IS A POSSIBILITY OF CONFLICT BETWEEN TRADES, THIS CONTRACTOR SHALL MAKE COMPOSITE DRAWINGS SHOWING THE EXACT LOCATIONS OF PIPES, DUCT, CONDUIT AND EQUIPMENT. DRAWINGS SHALL BE BASED ON FIELD MEASUREMENTS AND AFTER CONSULTATION AND AGREEMENT BETWEEN THE TRADES, SHALL BE APPROVED BY ARCHITECT AND ENGINEER BEFORE INSTALLATION OF THE WORK.

EQUIPMENT OF A TYPE TO REQUIRE REPLACEMENT, SERVICING, ADJUSTING OR MAINTENANCE SHALL BE LOCATED TO ALLOW EASY ACCESS AND SPACE FOR REMOVAL OF INTERNAL ASSEMBLIES, IT REQUIRED.

8. EXCAVATION AND BACKFILL

THIS CONTRACTOR SHALL DO ALL EXCAVATION REQUIRED TO INSTALL PIPES AND EQUIPMENT SHOWN ON THE PLANS OR REQUIRED FOR PROPER OPERATION. EXCESS EXCAVATION BELOW THE REQUIRED LEVEL SHALL BE BACKFILLED WITH EARTH AND THOROUGHLY TAMPED. UTILITIES SERVICES LINES SHALL BE INSPECTED AND APPROVED BY THE PROPER INSPECTION AUTHORITY BEFORE BACKFILLING.

INSTALL PLASTIC PIPE AND FITTINGS IN STRICT ACCORDANCE WITH THE INSTALLATION RECOMMENDATIONS OF THE PIPE AND FITTINGS MANUFACTURER, APPENDIX X1 OF ASTM D2265 (STORAGE AND INSTALLATION PROCEDURES FOR PLASTIC DRAIN, WASTE, AND VENT PIPING) AND FOR BURIED PIPE ASTM D2321 (STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS). SUCH INSTRUCTIONS SHALL INCLUDE BUT ARE NOT LIMITED TO CUTTING, SOLVENT CEMENTING AND PRIMING, JOINTS, CONNECTIONS, TRANSITIONS, ALIGNMENT AND GRADE, TRENCHING, BEDDING, BACKFILL AND COMPACTION, SUPPORTS AND SPACING AND ALLOWANCE FOR THERMAL EXPANSION.

CAST IRON PIPING TRENCHING SHALL BE IN ACCORDANCE TO THE CAST IRON SOIL PIPE AND FITTINGS HANDBOOK ISSUED BY THE CAST IRON SOIL PIPE INSTITUTE.

THE BOTTOM OF TRENCHES SHALL BE TAMPED HARD AN GRADED TO SECURE THE REQUIRED FALL. ROCK, WHERE ENCOUNTERED SHALL BE EXCAVATED TO A DEPTH OF SIX INCHES (6") BELOW THE BOTTOM OF THE PIPE, AND BEFORE THE PIPE IS LAID, THE SPACE BETWEEN BOTTOM PIPE AND ROCK SURFACE SHALL BE FILLED WITH GRAVEL. IF TRENCHES ARE DEEPER THAN BOTTOM OF FLOORING OR CLOSER THAN THREE FEET (3'0") TO FOOTING THEY MUST BE FILLED WITH COHESIVE SOIL AND COMPACTED TO 95% OF MAXIMUM DENSITY, STANDARD PROCTOR, ASTM D- 698. ALL OTHER EXCAVATIONS UNDER FLOOR SLABS COMPACTED TO 95% STANDARD PROCTOR.

WHEN EXCESS DIRT HAS BEEN REMOVED, THE TRENCH SHALL BE BROUGHT TO THE REQUIRED LEVEL WITH SAND AND GRAVEL FIRMLY COMPACTED.

TRENCHES AND EXCAVATION SHALL BE BACKFILLED IN 6" LAYERS OF EARTH, FREE FROM CLODS, AND STONES THOROUGHLY TAMPED TO A DEPTH OF 12" ABOVE THE PIPE. AFTER THAT DEPTH HAS BEEN REACHED, BACKFILLING SHALL BE DONE IN 12" LAYERS, THOROUGHLY TAMPED.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO ANY DAMAGES OR SAGS TO THE PIPING SYSTEMS THAT OCCUR FROM THE IMPROPER EXCAVATION AND BACKFILL METHODS.

9. EQUIPMENT SUPPORTS

ANY STRUCTURAL STEEL MEMBERS REQUIRED TO ADAPT THE EQUIPMENT AND PIPING AS FURNISHED BY THIS CONTRACTOR, TO THE BUILDING STEEL OR STRUCTURE, SHALL BE INCLUDED IN THE BID OF THE CONTRACTOR FURNISHING THE EQUIPMENT OR PIPING. HANGING OF ALL EQUIPMENT AND REQUIRED SUPPORTING STEEL AND BRACING SHALL BE FURNISHED BY THE CONTRACTOR WHO SUPPLIES THE EQUIPMENT.

10. CUTTING AND PATCHING

THIS CONTRACTOR SHALL INCLUDE ALL CUTTING, PATCHING AND PAINTING OF PATCHED AREAS REQUIRED FOR AND RESULTING FROM THE INSTALLATION OF ALL OF THIS CONTRACTOR'S WORK, EXCEPT WHERE NOTED OTHERWISE.

ALL OPENINGS AROUND PIPE PENETRATIONS THROUGH SMOKE OR FIRE-RATED FLOORS, CEILINGS OR WALLS SHALL BE SEALED AIRTIGHT WITH MATERIAL HAVING A RATING EQUAL TO THE MATERIAL OF THE WALL, CEILING AND/OR FLOOR PENETRATED.

ALL PATCHING SHALL BE NEATLY FINISHED TO THE SATISFACTION OF THE ARCHITECT.

11. ACCESS PANELS

THIS CONTRACTOR SHALL LOCATE AND FURNISH FOR INSTALLATION BY THE GENERAL CONTRACTOR, ALL ACCESS PANELS AS REQUIRED FOR ACCESS TO VALVES, AND THE PROPER SERVICING OF EQUIPMENT AND LINES INSTALLED UNDER THE CONTRACT.

ALL PANELS SHALL BE MILCOR, STYLE "M" FOR MASONRY, "A" FOR ACOUSTICAL TILE AND "K" FOR PLASTER; EXCEPT FOR FIRE-RATED UL 1-1/2 HOUR AND "B" LABEL ACCESS PANELS SHALL BE FURNISHED IN FIRE-RATED WALLS AND CEILINGS AS INDICATED ON THE DRAWINGS. ACCESS DOORS SHALL BE 12" X 12" MINIMUM SIZE FOR VALVES.

12. DIELECTRIC UNIONS

FOR THE PREVENTION OF ELECTROLYTIC CORROSION AT CONNECTIONS BETWEEN PIPE OF DISSIMILAR METALS OR BETWEEN PIPE AND EQUIPMENT CONNECTIONS OF DISSIMILAR METALS, PROVIDE DIELECTRIC UNIONS OR FLANGES.

13. MOTORS, STARTERS AND DISCONNECTS

UNLESS SPECIFIED TO BE FURNISHED WITH EQUIPMENT, ALL MOTOR STARTERS AND DISCONNECT SWITCHES SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

14. JOINTS AND FITTINGS

THREADS ON SCREWED PIPE SHALL BE STANDARD, CLEAN BUTT AND TAPERED. PIPE SHALL BE REAMED OF BURRS AND KEPT CLEAN OF SCALE, DIRT AND SHAVINGS. TREADS SHALL BE MADE WITH FLAKED GRAPHITE AND LUBRICATING OIL OR APPROVED PIPE COMPOUND ON THE MALE THREAD ONLY.

COPPER-TO-STEEL AND COPPER-TO-BRASS JOINTS SHALL BE MADE WITH SILVER SOLDER. ALL OTHER COPPER-TO-COPPER JOINTS ABOVE GROUND SHALL BE MADE WITH LEAD FREE SOLDER. COPPER PIPE SHALL BE CUT SQUARE, BURRS REMOVED AND CARE SHALL BE GIVEN TO KEEP THE LINES FREE OF DIRT AND MOISTURE. ALL TUBING AND FITTINGS SHALL BE THOROUGHLY CLEANED.

WELDED PIPE SHALL HAVE BUTT WELDED SINGLE "V" TYPE JOINTS FOR WHICH PIPE HAS BEEN BEVELED TO 45 DEGREES. WELD SHALL BE ONE-FOURTH GREATER THICKNESS THAN THE PIPE. CONNECTIONS TO EQUIPMENT, ACCESSORIES, ETC. SHALL BE MADE BY MEANS OF FLANGES AND/OR ADAPTERS.

UNIONS SHALL BE PROVIDED AT EACH SCREWED VALVE AND UNIONS OR FLANGES AT EACH EQUIPMENT CONNECTION.

15. EXPANSION JOINTS

FURNISH AND INSTALL FLEXONICS EXPANSION JOINTS IN PIPING SYSTEM WHERE SHOWN OR NECESSARY FOR EXPANSION AND CONTRACTION.

EXPANSION JOINTS IN PIPE 4" AND GREATER SHALL BE THE PACKLESS TYPE WITH STAINLESS STEEL BELLOWS AND HAVE WELDED OR FLANGED END. JOINTS SHALL HAVE TRAVERSE AS INDICATED ON THE PLANS. EXPANSION JOINTS SHALL BE OF THE CONTROLLED FLEXING TYPE.

EXPANSION JOINTS IN COPPER PIPE UNDER 4" IN SIZE SHALL BE OF THE COMPENSATOR TYPE CONSTRUCTED OF TWO-PLY STAINLESS STEEL BELLOWS AND CARBON STEEL SHROUDS AND END FITTINGS, INTERNAL GUIDES AND ANTI-TORQUE DEVICES.

EXPANSION JOINTS IN STEEL PIPE UNDER 4" IN SIZE SHALL BE OF THE COMPENSATOR TYPE CONSTRUCTED OF TWO-PLY STAINLESS STEEL ELBOWS AND CARBON STEEL SHROUDS AND END FITTINGS, INTERNAL GUIDES AND ANTI-TORQUE DEVICES.

PROVIDE GUIDES ON EACH SIDE OF EXPANSION JOINT, AT 4 PIPE DIAMETERS, 14 PIPE DIAMETERS, AND A THIRD GUIDE AS RECOMMENDED BY THE MANUFACTURER.

16. PIPE FLEXIBLE CONNECTIONS

FLEXIBLE PIPE CONNECTIONS SHALL BE RESISTOFLEX #R6904 OR APPROVED EQUAL FLEXIBLE CONNECTIONS MADE FROM TEFLON. PROVIDE FOR MOVEMENT IN PIPING BY USE OF SWING JOINTS AT CONNECTION OF ALL BRANCHES TO MAINS AND RISERS. ALL BRANCHES FROM MAINS AND RISERS SHALL HAVE 1/4" CLEARANCE BETWEEN PIPE INSULATION AND SLEEVE TO PERMIT PIPE MOVEMENT.

17. VALVES

THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL VALVES OF ONE MANUFACTURER, FIGURE NUMBER AND TYPE THROUGHOUT THE ENTIRE INSTALLATION OF THE WORK, UNLESS OTHERWISE SPECIFIED. THE FOLLOWING NUMBERS ARE FROM THE CRANE CATALOG. EQUAL VALVES OF REPUTABLE MANUFACTURERS, SUCH AS HAMMOND, NIBCO-SCOTT AND/OR JENKINS WILL BE CONSIDERED EQUIVALENT.

ALL VALVES SHALL BE BUILT FOR A MINIMUM OF 125 PSIG WORKING PRESSURE.

ISOLATION VALVES SHALL BE PROVIDED ON ALL INDIVIDUAL FIXTURES AND FIXTURE GROUPS.

CHECK VALVES 2-1/2" AND SMALLER SHALL BE #36 (SCREWED ENDS) OR #1342 (SOLDER-JOINT ENDS) SWING-TYPE WITH BRONZE BODY AND BRONZE TRIM.

BUTTERFLY VALVES 2" AND LARGER SHALL BE #12F, IRON BODY, CAST-IRON WAFER W/LOCK LEVER. BALL VALVE UP TO 3" IN SIZE SHALL BE APOLLO SERIES #70 BRONZE VALVE WITH CHROME-PLATED BALL AND TEFLON SEAT.

GAS LINE COCKS UP TO 4" SHALL BE #320. 1/2 PSI FOR INDOOR APPLIANCE CONNECTIONS SHALL CONFORM TO ANSI Z21.15 AND CSA 9.1, 5 PSI FOR INDOOR SHUTOFF SHALL CONFORM TO CGA 91-002 AND ASME B16.44.

HOSE END VALVES SHALL BE #438 GATE VALVES WITH HOSE END NIPPLES.

18. PIPE SLEEVES AND COLLARS

THIS CONTRACTOR SHALL LAY OUT ALL HIS WORK AND SET SLEEVES IN NEW CONSTRUCTION AS CONCRETE FORMS AND WALL ARE ERECTED SO AS TO BE ABLE TO INSTALL HIS WORK WITHOUT CUTTING OR BREAKING OF FLOORS OR WALLS. ALL SLEEVES FOR INSULATED PIPING SHALL BE LARGE ENOUGH TO ALLOW INSULATION TO PASS THROUGH SLEEVE.

ALL SLEEVES PASSING THROUGH FLOORS WHICH ARE WATERPROOFED SHALL BE COPPER TUBING SLEEVES EXTENDING 1" ABOVE FINISHED FLOOR. ALL OTHER SLEEVES SHALL BE 24 GAUGE GALVANIZED PIPES AND SLEEVES TO BE THOROUGHLY PACKED WITH WATERPROOF SEALANT AND THE REMAINING SPACE FILLED WITH MASTIC AND MUST BE WATERTIGHT.

ALL SLEEVES PASSING THROUGH INNER WALLS SHALL BE STANDARD PIPE THIMBLES EQUAL TO THE THICKNESS OF THE WALL.

SPACES BETWEEN PIPES AND SLEEVES THROUGH OUTSIDE WALLS, ABOVE GRADE, SHALL BE CAULKED WITH CAULKING COMPOUND; THOSE BELOW GRADE SHALL BE MADE WATERTIGHT.

SPACE AROUND ALL PIPING THROUGH FIRE OR SMOKE RATED PARTITIONS OR FLOORS SHALL BE SEALED AIRTIGHT WITH MATERIALS OR EQUIPMENT AS SPECIFIED UNDER FIRESTOPPING.

ALL PIPE PENETRATIONS OF SLABS ON GRADE SHALL BE WRAPPED WITH #15 BUILDING FELTS OR FOAM WRAP.

19. HANGERS

A. PIPE HANGER AND SUPPORT PRODUCTS INSTALLATION
   a. VERTICAL PIPING: MSS TYPE 8 OR 42 CLAMPS.
   b. INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS: 100 FEET AND LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS HANGERS. LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER HANGERS. LONGER THAN 100 FEET IF INDICATED: MSS TYPE 49, SPRING CUSHION ROLLS.
   c. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET OR LONGER:MSS TYPE 44, PIPE ROLLS. SUPPORT PIPE ROLLS ON TRAPEZE.
   d. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.

B. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
C. ROD DIAMETER MAY BE REDUCED ONE SIZE FOR DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH
D. INSTALL HANGERS FOR ALL PIPING PER MSS SP-69, MANUFACTURERS MANUALS AND AS PER HANGER SUPPORT DETAIL ON DRAWINGS
E. INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET.
F. INSTALL SUPPORTS FOR VERTICAL STEEL PIPING EVERY 15 FEET.
G. SUPPORT PIPING AND TUBING NOT LISTED IN THIS ARTICLE ACCORDING TO MSS SP-69 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.

20. DAMAGE BY LEAKS

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO THE GROUNDS, WALKS, ROADS, ALL BUILDING COMPONENTS AND FINISHES, PIPING SYSTEMS, ELECTRICAL SYSTEMS AND THEIR EQUIPMENT AND CONTENT, CAUSED BY LEAKS IN THE PIPING SYSTEMS BEING INSTALLED OR HAVING BEEN INSTALLED HEREIN. ALL REPAIRS WILL BE MADE AT THIS CONTRACTOR'S EXPENSE.

21. PIPE MARKERS

FURNISH AND INSTALL BRADY #B-350 THIN FILM OR APPROVED EQUAL PIPE MARKERS. MARKERS SHALL BE 1-1/8" HIGH FOR PIPES 3" AND UNDER AND 2-1/4" HIGH FOR PIPES OVER 3". MARKERS SHALL INDICATE TYPE OF SERVICE AND DIRECTION OF FLOW.

PIPE MARKERS SHALL BE LOCATED:
- AT EQUIPMENT CONNECTIONS
- AT ACCESS DOORS, AT BRANCH MAINS
- ON ALL ACCESSIBLE PIPE A MAXIMUM OF 75' BETWEEN MARKERS.
- AT ALL PENETRATIONS ON EITHER SIDE OF PENETRATION

22. FLOOR, WALL AND CEILING PLATES

PIPES PASSING THROUGH FLOORS AND FINISHED CEILINGS, FITTED WITH CHROME- PLATED PLATES OR ESCUTCHEONS LARGE ENOUGH TO COMPLETELY CLOSE OPENING AROUND PIPE OR PIPE COVERING AND FLOOR SUPPORT IN THE CASE OF VERTICAL PIPING, SECURELY HELD IN PLACE; CAULK WATERTIGHT AROUND PIPE IN UNFINISHED ROOMS.

23. FIRE STOPPING

THE PENETRATIONS OF FIRE AND/OR SMOKE RATED WALLS OR FLOORS SHALL BE PROTECTED BY A UL APPROVED MATERIAL TO RETAIN THE INTEGRITY OF THE TIME-RATED CONSTRUCTION BY MAINTAINING AS EFFECTIVE BARRIER AGAINST THE SPREAD OF FLAME, SMOKE AND GASES. IT SHALL BE USED IN ALL DUCT CABLE, CONDUIT AND PIPING PENETRATIONS THROUGH FLOOR SLABS AND TIME-RATED WALLS, AND/OR FLOORS. THE RATING OF THE FIRESTOPPING SHALL EQUAL THE RATING OF THE TIME-RATED ASSEMBLY.

FIRESTOPPING MATERIAL SHALL BE 3M FIRE BARRIER SEALING SYSTEM OF APPROVED EQUAL. FIRESTOPPING MATERIAL SHALL CONSTITUTE ONE OR MORE OF THE FOLLOWING PRODUCTS:
- CAULK: CP-25
- PUTTY: #303
- WRAP/STRIP: FS195
- COMPOSITE SHEET: CS195
- PENETRATING SEALING SYSTEMS: 7900 SERIES

INSTALLATION OF FIRESTOPPING SHALL BE INSTALLED IN ACCORDANCE WITH AND IN STRICT CONFORMITY WITH MANUFACTURER'S PRINTED INSTRUCTIONS AS TO SURFACE PREPARATION, INSTALLATION AND QUALITY CONTROL. AREAS OF WORK SHALL REMAIN ACCESSIBLE UNTIL INSPECTION AND APPROVAL BY THE APPLICABLE CODE AUTHORITIES.

ON INSULATED PIPES, THE FIRE-RATING CLASSIFICATION SHALL NOT REQUIRE REMOVAL OF THE INSULATION.

QUALITY ASSURANCE:
SUBMIT MANUFACTURER'S PRODUCT DATA, LETTER OF CERTIFICATION OR CERTIFIED LABORATORY TEST REPORT THAT THE MATERIAL OR COMBINATION OF MATERIALS MEET THE REQUIREMENTS SPECIFIED IN ASTM E814 AND ARE SO CLASSIFIED IN UL'S BUILDING MATERIALS DIRECTORY. MATERIALS SHALL MEET AND BE ACCEPTABLE FOR USE BY ALL MODEL BUILDING CODES. MATERIALS SHALL MEET THE REQUIREMENTS OF NFPME61- LIFE SAFETY CODE AND NFPA 70 NATIONAL ELECTRICAL CODE.

SUBMITTALS:
SUBMIT SHOP DRAWINGS, PRODUCT DATA, CERTIFICATES AND MANUFACTURER'S INSTALLATION INSTRUCTIONS. SUBMIT MANUFACTURER'S PRODUCT DATA FOR ALL MATERIALS AND PREFABRICATED DEVICES, PROVIDING DESCRIPTIONS SUFFICIENT FOR IDENTIFICATION AT THE JOB SITE. INCLUDE MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.

SUBMIT SHOP DRAWINGS SHOWING PROPOSED MATERIAL, REINFORCEMENT, ANCHORAGE, FASTENINGS, AND METHOD OF INSTALLATION. CONSTRUCTION DETAILS SHALL ACCURATELY REFLECT ACTUAL JOB CONDITIONS.

24. CLEANUP AND ADJUSTMENT

ALL PARTS WORK LEFT CLEAN: EQUIPMENT, FIXTURES, VALVES, PIPES AND FITTINGS CLEANED OF GREASE AND METAL CUTTINGS. ANY DISCOLORATION OR OTHER DAMAGE TO PORTIONS OF BUILDING, ITS FINISH OR FURNISHING DUE TO THIS CONTRACTORS FAILURE TO PROPERLY CLEAN INTERIOR OF PIPING, REPAIRED AT THIS CONTRACTOR'S EXPENSE. ALL AUTOMATIC CONTROL DEVISES ADJUSTED FOR PROPER OPERATION. ALL SURPLUS MATERIALS AND ANY RUBBISH REMOVED AS IT ACCUMULATES. ALL EQUIPMENT LEFT IN SAFE, PROPER OPERATING CONDITION.

DAMAGE TO ANY PORTIONS MUST BE REPAIRED OF THE PART REPLACED BY THIS CONTRACTOR AND ALL PARTS LEFT WITHOUT DENTS, SCRATCHES, THROUGH THE FINISH PAINT, LOOSE PLASTER, STAINS OR OTHER BLEMISHES.

25. PIPE TESTING AND START-UP

ALL PIPING TO BE TESTED IN ACCORDANCE WITH THE FOLLOWING:
- WATER - 100 PSI WATER PRESSURE

ALL TESTING MUST HOLD FOR AT LEAST 24 HOURS WITHOUT LOSS OF PRESSURE OR VACUUM. ALL CONCEALED PIPING SHALL BE TESTED IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE PRIOR TO COVERING. BEFORE STARTING ANY SYSTEM, ALL EQUIPMENT SHALL BE LUBRICATED PER MANUFACTURERS REQUIREMENTS BY THIS CONTRACTOR. TEST ENTIRE BUILDING SYSTEMS UNDER FULL LOAD CONDITIONS FOR A PERIOD OF NOT LESS THAT ONE (1) WEEK DURING WHICH TIME THE OPERATING PERSONNEL SHALL BE FULLY INSTRUCTED IN THE OPERATION AND MAINTENANCE OF THE PLANT. AFTER THE PLANT IS IN FULL OPERATION, THIS CONTRACTOR IS TO FURNISH WHATEVER ADDITIONAL SERVICE IS REQUIRED TO RECALIBRATE AND RESET CONTROLS, VALVES, BALANCING COCKS, ETC. TO ENSURE PROPER OPERATION OF THIS SYSTEM.

26. TESTING AND BALANCING

THIS CONTRACTOR SHALL AT THE TIME OF INSTALLATION ENSURE THAT ALL DEVICES TO COMPLETE TESTING AND BALANCING AS DIRECTED HEREIN ARE FURNISHED AND INSTALLED DURING FABRICATION AND INSTALLATION OF WORK. THIS WORK SHALL BE PERFORMED PRIOR TO TURNOVER TO BUILDING OCCUPANT AND WITH AMPLE TIME TO MAKE ANY NECESSARY REPAIRS OR CHANGES TO ACHIEVE A PROPERLY OPERATING SYSTEM.

27. SEISMIC RESTRAINTS ON PLUMBING EQUIPMENT

ALL PLUMBING EQUIPMENT SHALL BE PROVIDED WITH SEISMIC RESTRAINING SERVICES AS REQUIRED BY LOCAL BUILDING CODES. CONTRACTOR SHALL HAVE LOCAL BUILDING OFFICE REVIEW EACH PIECE OF EQUIPMENT WHEN INSTALLED AND THE CONTRACTOR SHALL INSTALL ALL REQUIRED TIE DOWN, ANCHORS, STRAPS OR OTHER DEVICES REQUIRED.

28. GUARANTEE

THIS CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT, MATERIALS, AND LABOR FURNISHED UNDER THIS CONTRACT TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION AND SHALL REPAIR OR REPLACE ANY EQUIPMENT OR MATERIAL WHICH IS DEFECTIVE OR IMPROPERLY INSTALLED. IN ADDITION, THIS CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO THE BUILDINGS AND ITS CONTENTS OR OTHER EQUIPMENT, CAUSED BY DEFECTS OR IMPROPER INSTALLATION OF EQUIPMENT OR MATERIALS INSTALLED UNDER THIS SECTION OF THE SPECIFICATIONS.

29. TEMPORARY WATER

TEMPORARY WATER SERVICE (IF REQUIRED) TO THE BUILDING SHALL BE PROVIDED BY THIS CONTRACTOR TO THE BUILDING FOR CONSTRUCTION PURPOSES. THIS CONTRACTOR TO MAINTAIN WATER SERVICE AS REQUIRED DURING CONSTRUCTION.

30. DOMESTIC WATER SERVICE

THIS CONTRACTOR SHALL COORDINATE EXACT AVAILABLE DELIVERY PRESSURE AND PROVIDE ALTERNATE FEE FOR A PRESSURE BOOSTING SYSTEM IF PRESSURE IS LESS THAN REQUIRED PRESSURE. PROVIDE PRESSURE REDUCING VALVE WITH STRAINER IN SERVICE LINE IF REQUIRED BY LOCAL CODES OR PRESSURE IS ABOVE 80 PSI.

JOINTS SHALL BE CLEANED AND DEBURRED AS RECOMMENDED BY THE MANUFACTURER AND FEDERAL, STATE, AND LOCAL CODES AND PRESS FITTINGS ARE AN ACCEPTABLE IF ALLOWED BY LOCAL AHJ. WHERE PRESS FITTING S ARE NOT ALLOWED SOLDERED AS LISTED BELOW. FLUX SHALL BE NON-CORROSIVE. VICTAULIC GROUVED COUPLINGS ARE ACCEPTABLE ALTERNATE IF ALLOWED BY LOCAL AHJ.

ABOVE GRADE - WHERE FITTINGS ARE SOLDERED BOTH FITTINGS AND TUBING SHALL BE CLEANED AS DESCRIBED ABOVE. UNDER NO CIRCUMSTANCES SHALL DISSIMILAR METALS COME INTO DIRECT CONTACT WITH COPPER TUBING; E.G., GALVANIZED STRAPPING, HANGERS, OR CLAMPS TO SECURE THE TUBING. BELOW GRADE, OR FLOOR SLAB ON EARTH OR STONE FILL - HIGH TEMPERATURE, SOLDER, 1200 DEG. F OR GREATER MELTING POINT.

NOTE: WATER PIPE TO BE PROPERLY SECURED AND ALIGNED SO AS NOT TO EXERT VERTICAL OR HORIZONTAL STRESSES ON THE SEATING OF THE MATING (MALE AND FEMALE) SURFACES OF THE UNIONS.

MATERIALS - UNDERGROUND: TYPE "K" COPPER TUBE, SOFT TEMPER
MATERIALS - ABOVEGROUND: TYPE "L" COPPER TUBE, HARD DRAWN.
ALTERNATE MATERIALS - PEX-A PIPING IS AN ACCEPTABLE ALTERNATE IF NOT INSTALLED IN A PLENUM AND APPROVED BY LOCAL CODE OFFICIALS. VIEGA, PROPRESS COPPER ½-INCH THROUGH 4-INCH WITH EPDM SEALING ELEMENT AND/OR VIEGA, PROPRESS 304 OR 316 STAINLESS ½-INCH THROUGH 4-INCH WITH EPDM OR FKM SEALING ELEMENT IS ACCEPTABLE IF ALLOWED BY LOCAL CODE.

31. STERILIZATION OF DOMESTIC WATER SYSTEM

THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE FLUSHED CLEAR OF ANY DEBRIS AND THOROUGHLY STERILIZED WITH A SOLUTION CONTAINING NOT LESS THAN 100 PARTS PER MILLION OF AVAILABLE CHLORINE. THE SOLUTION SHALL REMAIN IN THE SYSTEM FOR TWO (2) HOURS DURING WHICH TIME ALL VALVES AND FAUCETS SHALL BE OPENED AND CLOSED SEVERAL TIMES. AFTER STERILIZATION, THE SOLUTION SHALL BE FLUSHED FROM THE SYSTEM WITH CLEAN WATER UNTIL THE RESIDUE CHLORINE CONTENT IS NOT GREATER THAN THE CHLORINE LEVEL OF THE AVAILABLE WATER SUPPLY.

STERILIZATION SHALL BE PERFORMED PRIOR TO TURNOVER TO OCCUPANT AS TO NOT ALLOW FOR THE WATER SYSTEM TO REMAIN STAGNANT FOR LONGER THAN 24 HOURS.

THIS CONTRACTOR SHALL HAVE THE WATER TESTED AND APPROVED BY THE HEALTH DEPARTMENT.

32. SANITARY SEWERS

THIS CONTRACTOR SHALL CONNECT SANITARY SEWER AS INDICATED ON THE DRAWINGS. VERIFY DIRECTION OF FLOW PRIOR TO ANY ROUGH-IN WORK.

EACH PIPE SHALL BE LAID TO THE LINE AND GRADE INDICATED ON THE PLANS AND SUCH A MANNER AS TO FORM A CLOSE CONCENTRIC JOINT WITH THE ADJOINING PIPE AND TO PRESENT OFFSETS IN FLOW LINE. ALL PIPE SHALL BE LAID WITH THE BELLS UPHILL.

THE SUB-GRADES SHALL BE KEPT FREE FROM WATER WHILE PIPES ARE BEING LAID. ALL PIPE SHALL BE LAID WITH ENDS ABUTTING AND TRUE TO LINE AND GRADE. THEY SHALL BE FITTED AND MATCHED SO THAT THEY WILL FORM A SEWER WITH A SMOOTH AND UNIFORM INVERT.

EACH JOINT SHALL BE CLEANED AS IT IS LAID AND ALL BELLS SHALL BE CLEANED BEFORE PIPES ARE JOINED.

DWV PVC / PVC SEWER PIPE MAY BE USED IN LIEU OF THAT SPECIFIED ABOVE IF ALLOWED BY LOCAL CODES.

ABS AND FOAM CORE PVC ARE NOT ACCEPTABLE MATERIALS.

SDR 35 IS NOT ACCEPTABLE FOR UNDER BUILDING USE.

33. WASTE, SOIL, DRAIN, GREASE WASTE AND VENT PIPING

ALL UNDERGROUND WASTE, SOIL & GREASE WASTE AND VENT PIPING SHALL BE PVC, DWV SOLID WALL SCHEDULE 40 WITH SOCKET-TYPE, SOLVENT WELDED JOINTS IN SIZES UP TO 12"; 14" AND LARGER PIPING SHALL BE PVC, DWV SOLID WALL SCHEDULE 80 WITH SOCKET-TYPE, SOLVENT WELDED JOINTS. ALL PVC PIPING SHALL BE INSTALLED IN ACCORDANCE TO ASTM. ABOVE GROUND VENT PIPE MATERIAL SHALL BE PVC.

THE DRAINS, SOIL WASTE, GREASE WASTE AND VENT PIPE AND FITTINGS INCLUDING EXTENSIONS TO SEWERS SHALL BE OF THE SIZES INDICATED ON THE DRAWINGS. PIPE AND FITTINGS TO BE, CYLINDRICAL AND FREE FROM CRACKS OR OTHER DEFECTS.

ALL TRENCHES TO BE DUG WITH GRADUAL FALL, THE PIPING TO BE STRAIGHT AND FREE FROM ANY SAGS.

THE ARRANGEMENT OF THE SYSTEM SHALL BE AS SHOWN ON THE DRAWINGS AND AS DIRECT AS POSSIBLE, AVOIDING ALL UNNECESSARY OFFSETS. THE STACKS SHALL BE FIRMLY SECURED IN POSITION WITH WROUGHT IRON CLAMPS AT EACH FLOOR.

ALL CHANGES IN DIRECTION OF SOIL, GREASE WASTE OR WASTE PIPE SHALL BE MADE BY MEANS OF "Y" BRANCHES AND 1/8 BENDS. NINETY DEGREE SHORT TURN FITTINGS WILL NOT BE PERMITTED EXCEPT TO INDIVIDUAL FIXTURE CONNECTIONS OR WHERE THE FLOW IS FROM THE HORIZONTAL TO THE VERTICAL.

SANITARY WASTE & GREASE WASTE CLEANOUTS ARE TO BE PROVIDED AT EVERY TURN GREATER THAN 45°, AT INTERVALS OF NO GREATER THAN 50', AT ANY STACK ROUTING BELOW GRADE. NOT ALL CLEANOUTS LOCATIONS MAY BE SHOWN ON THE DRAWING.

ALL TRAP SCREWS MUST BE OF FULL SIZE OF PIPE UP TO 4" AND 4" FOR ALL OVER THIS SIZE. CONNECTIONS BETWEEN OUTLETS OF FIXTURES AND SOIL OR WASTE PIPE SHALL BE MADE WITH "Y" BRANCHES TO "TY" BRANCHES WHEREVER POSSIBLE. ALL HORIZONTAL SOIL WASTE AND VENT PIPE SHALL BE GRADED TOWARD OUTLETS AND PIPE NOT BURIED SHALL BE INSTALLED ABOVE THE CEILING OR CLOSE AS POSSIBLE TO THE CONSTRUCTION ABOVE WHERE THERE IS NO CEILING.

THE STACKS SHALL BE EXTENDED THROUGH ROOF OF BUILDING TO POINTS NOT LESS THAT 12" ABOVE ROOF. EXTENSIONS THROUGH ROOF SHALL BE MADE WATER- TIGHT BY MEANS OF A LEAD FLASHING OF FOUR POINTS SHEET LEAD SPREAD OVER A DISTANCE OF NOT LESS THAN TWELVE INCHES (12") AROUND PIPE. THIMBLE TO BE SOLDERED TO BASE AND EXTENDED OVER AND TURNED DOWN INTO END OF PIPE IN AN APPROVED MANNER.

ALL CLEANOUTS IN FLOORS TO BE JOSAM #8360 OR EQUAL. ADJUSTABLE CLEANOUT WITH BODY TO MATCH THE PIPING MATERIAL, CAST BRASS SCORIATED COVER WITH LETTERS C.O. CAST IN TOP AND CONCEALED BRASS PLUG.

CLEANOUTS SHALL BE INSTALLED IN BASE OF EACH STACK. CONCEALED CLEANOUTS SHALL HAVE JOSAM #8600 OR EQUAL. CAST BRASS CHROMIUM PLATED FLAT ACCESS COVER PLATES.

ALL JOINTS OF CAST IRON PIPE SHALL BE MADE WITH MANUFACTURERS RECOMMENDED JOINING MATERIAL. AT THE CONTRACTOR'S OPTION HE MAY USE NO-HUB PIPE, FITTINGS, COUPLING AND GASKETS IN LIEU OF CAULKED JOINTS IF APPROVED BY THE LOCAL CODES AND ORDINANCES.

IF APPROVED BY THE LOCAL CODES, SCHEDULE 40 PVC PIPE WITH DWV FITTINGS MAY BE USED FOR THE WASTE AND VENT SYSTEM. PVC PIPE AND FITTINGS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL CODES. ENCASEMENT OF PVC PIPES WITHIN RATED SHAFTS SHALL BE THE COST OF THIS CONTRACTOR. SCHEDULE 40 PVC SHALL NOT BE INSTALLED WITHIN A PLENUM.

ABS AND FOAM CORE PVC ARE NOT ACCEPTABLE MATERIALS.

SDR 35 IS NOT ACCEPTABLE FOR UNDER BUILDING USE.

34. VENT FLASHING

EACH VENT FLASHING SHALL BE MADE WATER-TIGHT WITH THE ROOF BY PROPER WATER PROOF FLASHING.

35. SANITARY WASTE, GREASE WASTE, VENT AND WATER CONNECTIONS

THE MINIMUM SIZE OF WASTE, VENT, AND WATER CONNECTION TO THE INDIVIDUAL FIXTURES SHALL BE AS SHOWN ON DRAWINGS.

WHERE FIXTURES ARE GROUPED PIPES SHALL BE INCREASED IN PROPORTION: IN ALL CASES THE SIZE ARRANGEMENTS AND CONNECTIONS OF WATER AND VENT PIPING SHALL NOT BE LESS THAN SIZE OF OPENINGS SPECIFIED FOR FIXTURES AND APPEARING IN FIXTURE LIST. NO WATER PIPE LESS THAN 1/2" SHALL BE INSTALLED IN CONCEALED PLACES SUCH AS IN PARTITIONS OR WALLS ETC.

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36. PLUMBING FIXTURES AND TRIM

PLUMBING FIXTURES SHALL BE FURNISHED AND INSTALLED IN A NEAT AND WORKMANLIKE MANNER WITH PROPER CONNECTIONS TO SUPPLY AND DRAINAGE PIPING. ALL FIXTURES SHALL BE FREE OF FLAWS AND DEFECTS OF ANY SORT IN MATERIAL AND WORKMANSHIP AND SHALL OPERATE PERFECTLY WHEN INSTALLED IN ACCORDANCE WITH MANUFACTURER'S DIRECTION.

MATERIALS: FIXTURES SHALL BE THE STANDARD PRODUCT OF ONE OF THE MANUFACTURER'S LISTED IN THE PLUMBING FIXTURE SCHEDULE, OR ANY EQUAL UNIT APPROVED BY THE ENGINEER.

INSTALLATION: THIS CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF THE PLUMBING FIXTURES AND ACCESSORIES DURING CONSTRUCTION. HE SHALL REPLACE AT HIS EXPENSE ANY MATERIAL THAT IS MARRED, SCRATCHED, DEFACED AND/OR BROKEN. FIXTURES SHALL BE COVERED WITH BUILDING PAPER AND WOODEN CRATES DURING CONSTRUCTION.

CONTRACTOR SHALL COORDINATE EXACT AND PROVIDE ROUGH-IN LOCATIONS WITH FIELD CONDITIONS AND PLANS PRIOR TO ANY WORK. CONTRACTOR SHALL CONNECT ALL FIXTURES TO THE PLUMBING SYSTEM.

ALL FIXTURES TO BE INSTALLED TO DIMENSIONS WITH CHROME-PLATED SUPPLIES WITH STOPS. ALL FIXTURES INSTALLED TO DIMENSIONS SHOWN ON THE DRAWINGS. ALL WATER CLOSETS SHALL HAVE CAULKING BETWEEN THE FLOOR AND UNDERSIDE OF THE WATER CLOSET.

PLUMBING EQUIPMENT: (REFER TO SCHEDULE ON THE DRAWINGS).

37. WATER HEATER ** COMMERCIAL TANKLESS GAS WATER HEATER **

A. WATER HEATERS SHALL BE TANKLESS, GAS-FIRED, COMMERCIAL-GRADE UNITS WITH A MINIMUM OPERATING PRESSURE OF 35 PSI AND SHALL MEET THE CAPACITY AND PERFORMANCE AS SCHEDULED ON THE DRAWINGS.

B. THE WATER HEATER SHALL BE AS SCHEDULED. ACCEPTABLE MANUFACTURERS INCLUDE RINNAI, AO SMITH, LOCHINVAR, STATE, RHEEM, AND BRADFORD WHITE, SUBJECT TO SUBSTITUTION REQUIREMENTS. UNITS SHALL BE COMMERCIAL-GRADE AND COMPLY WITH APPLICABLE CODES.

C. THE BURNER SHALL BE STAINLESS STEEL OR ALUMINIZED STEEL, WITH DIRECT ELECTRONIC IGNITION, SELF-ADJUSTING AIR-GAS MIXTURE CONTROL, AND INTEGRAL DIAGNOSTICS.

D. INSTALL ALL WORK IN ACCORDANCE WITH NFPA 54 (NATIONAL FUEL GAS CODE), NFPA 211, AND THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.

E. THE OUTER CASING SHALL BE STEEL WITH BAKED ENAMEL/ACRYLIC FINISH OR EQUIVALENT, DESIGNED FOR WALL MOUNTING, AND SHALL PROVIDE FRONT ACCESS FOR SERVICING CONTROLS AND BURNER.

F. PROVIDE ALL REQUIRED VENTING COMPONENTS, INCLUDING CONCENTRIC FLUE/AIR INTAKE, CONDENSATE DRAIN PROVISIONS, AND ACID NEUTRALIZATION KIT AS SPECIFIED.

G. ELECTRICAL CONNECTIONS SHALL BE PER MANUFACTURER'S REQUIREMENTS, INCLUDING DEDICATED CIRCUIT AND BREAKER SIZING AS SCHEDULED.

38. HOT WATER CIRCULATOR

HOT WATER CIRCULATOR SHALL BE AS SCHEDULED. ACCEPTABLE SUBSTITUTE MANUFACTURERS ARE B&G, GOULDS, AND GRUNDFOS, SUBJECT TO SUBSTITUTION REQUIREMENTS. HOT WATER CIRCULATORS USED IN POTABLE WATER SYSTEMS SHALL BE LEAD-FREE.

39. NATURAL GAS PIPING SYSTEM

ALL PIPING FROM GAS METER TO GAS-FIRED EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THIS CONTRACTOR. ALL GAS PIPING TO BE IN ACCORDANCE WITH LOCAL CODES, NFPA-58, IFGC AND UPC ALL GAS PIPING SHALL BE INSTALLED IN ACCORDANCE WITH NFPA-58, LOCAL CODES, AND REGULATIONS.

ALL GAS PIPING SHALL BE SCHEDULE 40 BLACK OR GALVANIZED STEEL WITH BLACK OR GALVANIZED WITH MALLEABLE SCREWED FITTINGS. USE TEFLON TAPE ON ALL THREADED JOINTS. FITTINGS LARGER THAN TWO INCHES (2") SHALL BE PROVIDE UNIONS AND GAS SHUT-OFF VALVES AT EACH PIECE OF GAS FIRED EQUIPMENT OR APPLIANCE. ANY GAS PIPING CONCEALED IN CHASES AND/OR INACCESSIBLE CEILING IS TO BE WELDED WITH WELDED FITTINGS.

FLEXIBLE CSST PIPING MATERIAL IS AN ACCEPTABLE ALTERNATE ONLY IF ALLOWED BY LOCAL AHJ AND RESIZED PER MANUFACTURERS SIZING GUIDELINES.

ALL FLEXIBLE GAS PIPING SYSTEM COMPONENTS MUST BE:

1. CSA INTERNATIONAL CERTIFIED CORRUGATED STAINLESS STEEL TUBING (CSST) FLEXIBLE GAS PIPING WITH MECHANICAL ATTACHMENT AUTOFLARE® FITTINGS THAT CONFORM TO THE LATEST ANSI STANDARDS FOR SAFE PERFORMANCE ANSI LC-1 /CSA 6.26.

2. UNDERWRITERS LABORATORIES CLASSIFICATION LISTED FOR THRU PENETRATION FIRE STOP REQUIREMENTS RATINGS TO INCLUDE ONE, TWO, THREE AND FOUR HOUR TESTS.

3. LISTED WITH FM (FACTORY MUTUAL) REQUIREMENTS FOR FLAMMABLE GAS PIPING SYSTEMS. FOR SEISMIC RESISTANCE.

4. TUBING SHALL BE TESTED AND LISTED IN ACCORDANCE WITH ICC LC-1024. FOR RESISTANCE TO ARCING FROM TRANSIENT ENERGY.

40. ENERGY CONSERVATION NOTES

1. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE-RETARDANT, FACTORY-APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY-APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH 2021 IECC PORTION OF THE 2021 INTERNATIONAL BUILDING CODE SECTION C-404.4 & TABLE C403.12.3 REFER BELOW TABLE.

MINIMUM PIPE INSULATION THICKNESS							
FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (INCHES)				
	CONDUCTIVITY BTU· IN./ (H. FT2 °F)	MEAN RATING TEMPERATURE, °F	<1	1 to < 1½	1½ to < 4	4 to < 8	≥8
105-140	0.21-0.28	100	1.0	1.0	1.5	1.5	1.5
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0

2. AS PER 2021 IECC PORTION OF THE 2021 INTERNATIONAL BUILDING CODE SECTION C404.6.3 THE CONTROLS ON PUMPS THAT CIRCULATE WATER BETWEEN A WATER HEATER AND A HEATED-WATER STORAGE TANK SHALL LIMIT OPERATION OF THE PUMP FROM HEATING CYCLE STARTUP TO NOT GREATER THAN 5 MINUTES AFTER THE END OF THE CYCLE.

3. AS PER 2021 IECC PORTION OF THE 2021 INTERNATIONAL BUILDING CODE SECTION C404.6.1 HEATED-WATER CIRCULATION SYSTEMS SHALL BE PROVIDED WITH A CIRCULATION PUMP. THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. CONTROLS FOR CIRCULATING HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE IDENTIFICATION OF A DEMAND FOR HOT WATER WITHIN THE OCCUPANCY. THE CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE IS NO DEMAND FOR HOT WATER.

A. THE CONTROLS SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD WATER PIPING TO NOT GREATER THAN 104°F (40°C).

B. THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTING OR APPLIANCE. CONTROLS SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD WATER PIPING TO NOT GREATER THAN 104°F (40°C).

4. HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER 2021 IECC PORTION OF THE 2021 INTERNATIONAL BUILDING CODE SECTION C404.5.1. THE HW PIPE LENGTH FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE.

NOMINAL PIPE SIZE (INCHES)	MAXIMUM PIPING LENGTH (FEET)	
	PUBLIC LAV	OTHER FIXTURES
½"	2'	43'
¾"	0.5'	21'
1"	0.5'	13'
1¼"	0.5'	8'
1½"	0.5'	6'

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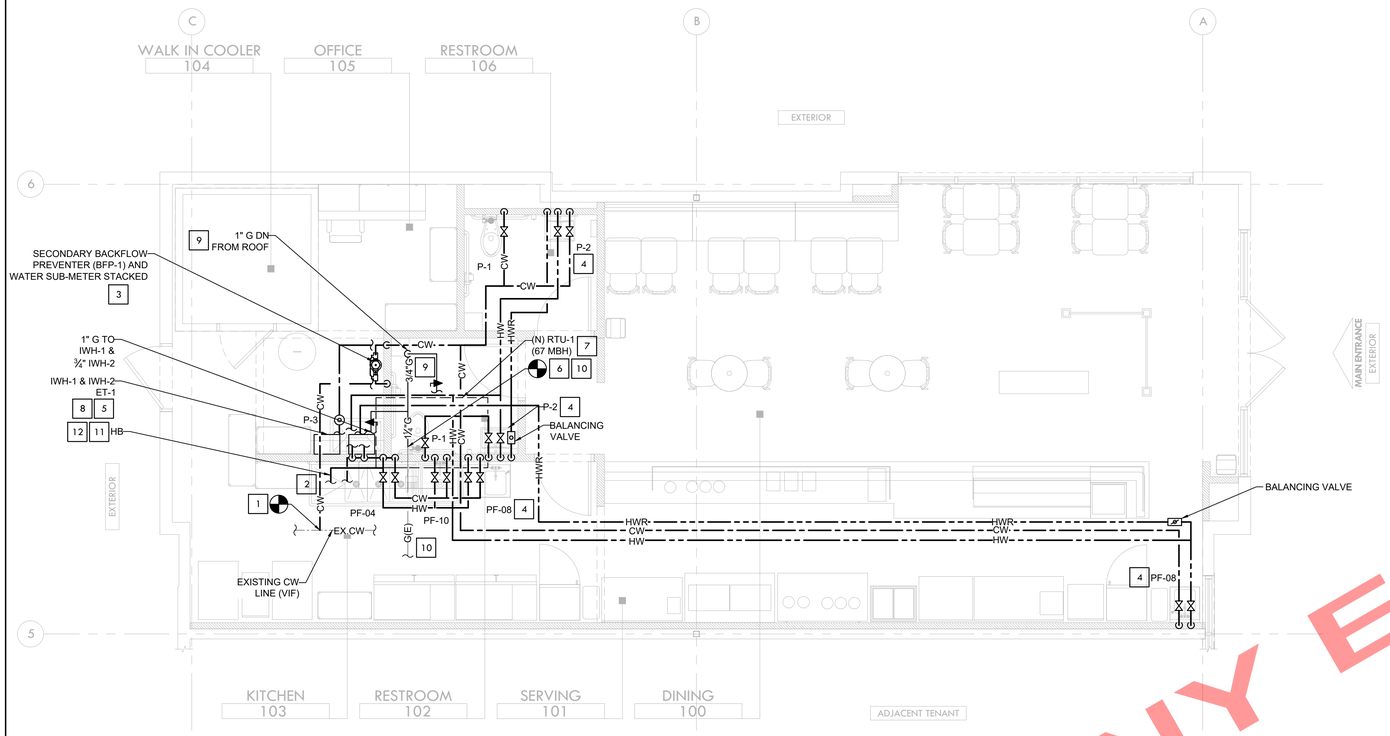
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GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY EXISTING WATER PRESSURE IN FIELD PRIOR TO ANY WORK AND PIPING ROUGH IN.
2. ALL WATER LINES SHALL BE COPPER TUBE TYPE-L PERMITTED (OPTIONAL PIPE MATERIAL SHALL BE CPVC / PEX). THERE SHALL BE NO PIPING JOINTS OF FITTINGS INSTALLED IN WATER PIPING BELOW THE FLOOR SLAB.
3. ALL FLOOR DRAINS ARE REQUIRED TO HAVE TRAP PRIMERS.
4. ANY UNUSED PLUMBING EQUIPMENT, PIPING, ETC., WITHIN OR SERVING THE PREMISES MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. DO NOT ABANDON IN PLACE.
5. ALL FLOOR PENETRATIONS MUST BE CORE BORED, SLEEVED, GROUTED, SEALED AND MADE WATERPROOF. SLEEVES MUST EXTEND A MINIMUM OF 4" AFF.
6. IF NOT ALREADY EXISTING, INSTALL A SHUT OFF VALVE ON DOMESTIC WATER LINE INSIDE SPACE.
7. TENANT IS REQUIRED TO INSTALL A WATERPROOF MEMBRANE IN ALL WET AREAS OF THE SPACE. TENANT SHALL USE A 30 MIL POLYETHYLENE CLEAVAGE MEMBRANE (EQUAL TO NOBLESEAL TS) INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND ANSI A108. MEMBRANE MUST BE EXTENDED UP THE WALL A MINIMUM OF 6" OR EQUAL TO THE HEIGHT OF THE FLOOR BASE.
8. NO ROOF PENETRATIONS PERMITTED WITHIN ROOF WATER PLY, REFER TO ROOF PLAN FOR LOCATIONS.
9. REFER TO RISER DIAGRAM FOR ALL WATER PIPE SIZES.
10. THE SUSPENSION OF ANY ITEMS FROM BASE BUILDING STRUCTURE BY MEANS OF DRILLING, WELDING, SHOOTING ARE PROHIBITED. CONTRACTOR TO MAKE SURE ALL THE EQUIPMENTS AND PIPES TO BE SUPPORTED BY MEANS OF THE BEAM CLAMPS.
11. ROUTE HW WATER LOOP DOWN IN WALL TO FIXTURE. MINIMIZE DISTANCE FROM THE LOOP TO HOT WATER DISCHARGE.
12. COORDINATE OVERALL PIPING DIAMETER (INCLUDING INSULATION) WITH WALL DEPTH.
13. NOTIFY ARCHITECT IF OVER ALL PIPE DIAMETER EXCEEDS WALL DEPTH.
14. CONTRACTOR SHALL VERIFY EXISTING WATER PRESSURE IN FIELD PRIOR TO ANY WORK AND PIPING ROUGH IN.
15. ALL PLUMBING FIXTURES SHALL MEET THE FLOW REQUIREMENTS SPECIFIED IN THE INTERNATIONAL PLUMBING CODE 2021 (IPC 2021).
16. WATER PIPES AND FITTINGS WITH A LEAD CONTENT WHICH EXCEEDS 0.25% SHALL BE PROHIBITED IN SYSTEMS CONVEYING POTABLE WATER.
17. PUBLIC LAVATORIES SHALL HAVE CONTROLS TO LIMIT THE WATER TEMPERATURE TO 110 DEGREES FAHRENHEIT.
18. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
19. ALL PLUMBING SHUTOFF VALVES SHALL BE COORDINATED WITH MECHANICAL EQUIPMENT AND SHALL BE EASILY ACCESSED FOR FUTURE OPERATION.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING AND COORDINATING WITH THE LOCAL UTILITY COMPANIES (WATER AND SEWER) TO INSURE TIMELY INSTALLATION OF UTILITY SERVICES TO THE POINTS SHOWN ON THE PLANS.
21. PROVIDE WATER HAMMER ARRESTOR FOR FLUSH VALVE TYPE WATER CLOSET.

WATER SUPPLY KEYED NOTES

1. EXTEND AND CONNECT NEW 1-1/2" CW LINE TO EXISTING COLD WATER LINE/STUB OUT IN THE SPACE. CONTRACTOR TO FIELD VERIFY EXISTING COLD WATER LINE LOCATION AND SIZE. UPGRADE EXISTING COLD WATER LINE IF REQUIRED. ALSO VERIFY IF ADEQUATE PRESSURE IS AVAILABLE TO SERVE THE FLUSH VALVE TYPE WATER CLOSET. BASE BID ACCORDINGLY.
2. NO TAP OFF TO BE TAKEN BEFORE SECONDARY BFP-1.
3. CONTRACTOR TO COORDINATE WITH LANDLORD / AHJ REQUIREMENT OF SECONDARY BFP-1 AND WATER SUB-METER. PROVIDE SECONDARY BFP-1 (WATTS LF009 OR EQUIVALENT) & WATER SUB-METER AS SHOWN ON THE PLAN IF REQUIRED. INSTALL SECONDARY BFP-1 & WATER SUB-METER AS PER LOCAL AHJ. BASE BID ACCORDINGLY.
4. PROVIDE ASSE 1070 APPROVED THERMOSTATIC MIXING VALVE SET TO 110°F AT LAVATORY (P-2) AND HAND SINK(PF-08).
5. PROVIDE NEW TANKLESS GAS-FIRED WATER HEATERS (IWH-1 & IWH-2) WITH THERMAL EXPANSION TANK (ET-1) & BUILT-IN RECIRCULATION PUMP, ASSOCIATED ACCESSORIES AND FITTINGS. WATER HEATER INSTALL ABOVE MOP SINK(P-3). TERMINATE THE T & P RELIEF DRAIN FORM THE WATER HEATER TO THE MOP SINK, PROVIDING AN APPROVED AIR GAP. REFER PLUMBING SCHEDULE ON SHEET #P-0.1 FOR MORE DETAILS.
6. EXTEND AND CONNECT A NEW 1-1/4" GAS LINE TO THE EXISTING GAS STUB OUT/ LINE IN THE SPACE. CONTRACTOR TO FIELD VERIFY THE EXISTING GAS STUB OUT/LINE LOCATION & SIZE ALSO VERIFY THE GAS METER CAPACITY. UPGRADE THE EXISTING GAS SERVICE IF REQUIRED. BASE BID ACCORDINGLY.
7. CONTRACTOR SHALL PROVIDE AND INSTALL GAS VALVE, DIRT LEG & UNION AS REQUIRED. CONTRACTOR SHALL PROVIDE AND INSTALL PRESSURE REGULATOR VALVE AT INCOMING SERVICE AND/OR BEFORE TIE-IN TO EQUIPMENT.
8. PROVIDE SHUT-OFF VALVE AT AN ACCESSIBLE LOCATION.
9. ROUTE NEW GAS PIPING ON EXTERIOR WALL/ROOF, CONTRACTOR TO RUN PIPE AS PER FIELD CONDITION. PROVIDE NEW GAS PIPE SUPPORTS EVERY 8'-0" MAXIMUM DISTANCE OR AS PER LOCAL CODE. PAINT/COAT AND LABEL PIPING AS REQUIRED BY LOCAL CODE.
10. GENERAL CONTRACTOR TO VERIFY IN FIELD INLET GAS PRESSURE. WE ASSUME THE GAS PRESSURE IS LESS THAN 2 PSI AND A LINE PRESSURE DROP OF 3.0" W.C. THE CONTRACTOR SHALL CONFIRM THAT THE EXISTING GAS PRESSURE AND PIPE SIZE ARE SUFFICIENT FOR THE PROPOSED GAS-FIRED EQUIPMENT. IF NOT, PROVIDE NEW GAS PIPING SIZES AS REQUIRED.
11. PROVIDE CW AND HW CONNECTION FOR HOSE BIBB INSTALLED SIDE BY SIDE OF 3-COMP SINK FAUCET. PROVIDE ASSE 1070 APPROVED MIXING VALVE ON EACH HOSE BIBB, FOR DETERGENT SET TO 110°F AND SANITIZER AT 70°F. HOSE BIBB SHALL BE INSTALLED 60" ABOVE FINISHED FLOOR LEVEL, OR AS DIRECTED BY ARCHITECTURAL INSTRUCTIONS.
12. PROVIDE APPROVED ASSE 1052 BACKFLOW PREVENTER (BFP-2) FOR HOSE CONNECTION.

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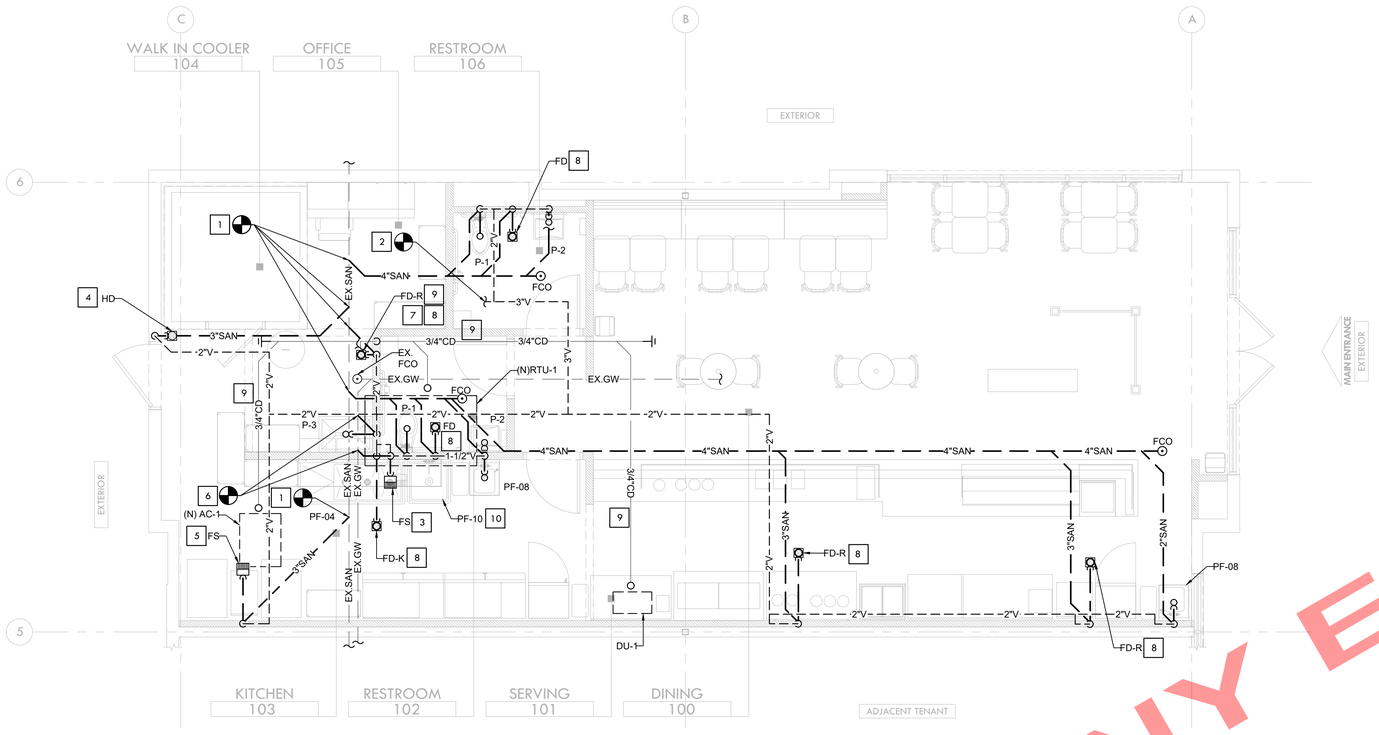
TITLE:

PLUMBING WATER SUPPLY FLOOR PLAN

SHEET NUMBER:

P-1.0

1 | SCALE 1 / 4" = 1' - 0" | PLUMBING WATER SUPPLY FLOOR PLAN



GENERAL NOTES:

1. ALL FLOOR DRAINS ARE REQUIRED TO HAVE TRAP PRIMERS.
2. ANY UNUSED PLUMBING EQUIPMENT, PIPING, ETC., WITHIN OR SERVING THE PREMISES MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. DO NOT ABANDON IN PLACE.
3. ALL FLOOR PENETRATIONS MUST BE CORE BORED, SLEEVED, GROUTED, SEALED AND MADE WATERPROOF. SLEEVES MUST EXTEND A MINIMUM OF 4" AFF.
4. TENANT IS REQUIRED TO INSTALL A WATERPROOF MEMBRANE IN ALL WET AREAS OF THE SPACE. TENANT SHALL USE A 30 MIL POLYETHYLENE CLEAVAGE MEMBRANE (EQUAL TO NOBLESEAL TS) INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND ANSI A108. MEMBRANE MUST BE EXTENDED UP THE WALL A MINIMUM OF 6" OR EQUAL TO THE HEIGHT OF THE FLOOR BASE.
5. NO ROOF PENETRATIONS PERMITTED WITHIN ROOF WATER PLY, REFER TO ROOF PLAN FOR LOCATIONS.
6. REFER TO RISER DIAGRAM FOR ALL SANITARY AND VENT PIPE SIZES.
7. THE SUSPENSION OF ANY ITEMS FROM BASE BUILDING STRUCTURE BY MEANS OF DRILLING, WELDING, SHOOTING ARE PROHIBITED. CONTRACTOR TO MAKE SURE ALL THE EQUIPMENTS AND PIPES TO BE SUPPORTED BY MEANS OF THE BEAM CLAMPS.
8. COORDINATE OVERALL PIPING DIAMETER (INCLUDING INSULATION) WITH WALL DEPTH.
9. NOTIFY ARCHITECT IF OVER ALL PIPE DIAMETER EXCEEDS WALL DEPTH.
10. ALL PLUMBING FIXTURES SHALL MEET THE FLOW REQUIREMENTS SPECIFIED IN THE INTERNATIONAL PLUMBING CODE 2021 (IPC 2021).
11. WATER PIPES AND FITTINGS WITH A LEAD CONTENT WHICH EXCEEDS 0.25% SHALL BE PROHIBITED IN SYSTEMS CONVEYING POTABLE WATER.
12. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
13. ALL PLUMBING SHUTOFF VALVES SHALL BE COORDINATED WITH MECHANICAL EQUIPMENT AND SHALL BE EASILY ACCESSED FOR FUTURE OPERATION.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING AND COORDINATING WITH THE LOCAL UTILITY COMPANIES (WATER AND SEWER) TO INSURE TIMELY INSTALLATION OF UTILITY SERVICES TO THE POINTS SHOWN ON THE PLANS.
15. CONTRACTOR SHALL SCHEDULE ALL WORK WITH BUILDING MANAGEMENT. THERE SHALL BE NO PLUMBING SYSTEM OUTAGES WITHOUT WRITTEN CONSENT FROM OWNER OR OWNER'S REPRESENTATIVE.
16. CONTRACTOR IS RESPONSIBLE FOR DAILY HOUSEKEEPING ENSURING ALL THROUGHWAYS ARE KEPT CLEAR OF MATERIALS, TOOLS ETC. NEW WORK ITEMS SHALL BE STORED IN SAFE PLACE AND PROTECTED FROM ELEMENTS.
17. CONTRACTOR IS RESPONSIBLE FOR ALL WORK SHOWN ON DRAWINGS AND CONTAINED IN SPECIFICATIONS.
18. DRAWINGS ARE SCHEMATIC. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING LOCATIONS OF EXISTING PIPING BEFORE ANY CONSTRUCTION BEGINS.

SANITARY AND VENT KEYED NOTES:

1	EXTEND AND CONNECT NEW 3" / 4" SANITARY PIPING TO THE EXISTING SANITARY LINE. CONTRACTOR SHALL VERIFY THE EXISTING MAIN PIPE SIZE, ROUTING, INVERT, DIRECTION OF FLOW & TIE-IN CONNECTION PRIOR TO BID.
2	CONNECT NEW 3" VENT LINE TO EXISTING LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXISTING LINE AND ITS SIZE. UPGRADE VENT LINE IF REQUIRED. PROVIDE NEW VENT LINE WITH VTR IF REQUIRED. BASE BID ACCORDINGLY.
3	ROUTE INDIRECT WASTE FROM 3-COMPARTMENT SINK TO FLOOR SINK WITH APPROVED AIR GAP.
4	ROUTE INDIRECT WASTE FROM WALK IN COOLER TO HUB DRAIN WITH APPROVED AIR GAP.
5	ROUTE INDIRECT WASTE FROM ICE MACHINE TO FLOOR SINK WITH APPROVED AIR GAP.
6	EXTEND AND CONNECT NEW 3" / 4" GREASE WASTE PIPING TO THE EXISTING GREASE WASTE MAIN LINE RUNNING IN THE SPACE. CONTRACTOR SHALL VERIFY THE EXISTING MAIN PIPE SIZE, ROUTING, INVERT, DIRECTION OF FLOW & TIE-IN CONNECTION PRIOR TO BID.
7	ROUTE INDIRECT WASTE FROM SECONDARY BFP-1 TO FLOOR DRAIN (FD-R) WITH APPROVED AIR GAP.
8	PROVIDE THE TRAP PRIMER FOR ALL THE FLOOR DRAINS.
9	ROUTE 3/4" CONDENSATE DRAIN LINE FROM RTU-1(N) AND DU-1 TO FLOOR DRAIN (FD-R) WITH AN APPROVED AIR GAP.
10	PROVIDE SCRAP BASKET DRAIN FROM EARTHBIO #SD-65 FOR THE DUMP SINK. REFER PLUMBING FIXTURE SCHEDULE ON SHEET P0.1 FOR DETAILS.

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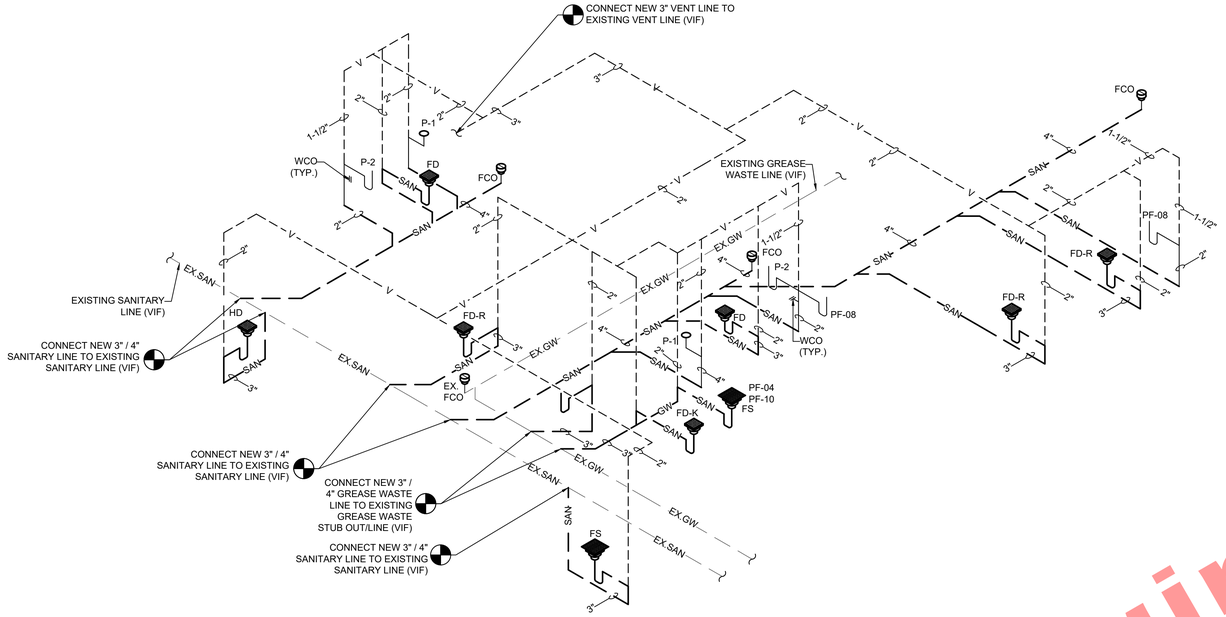
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PLUMBING SANITARY AND VENT FLOOR PLAN

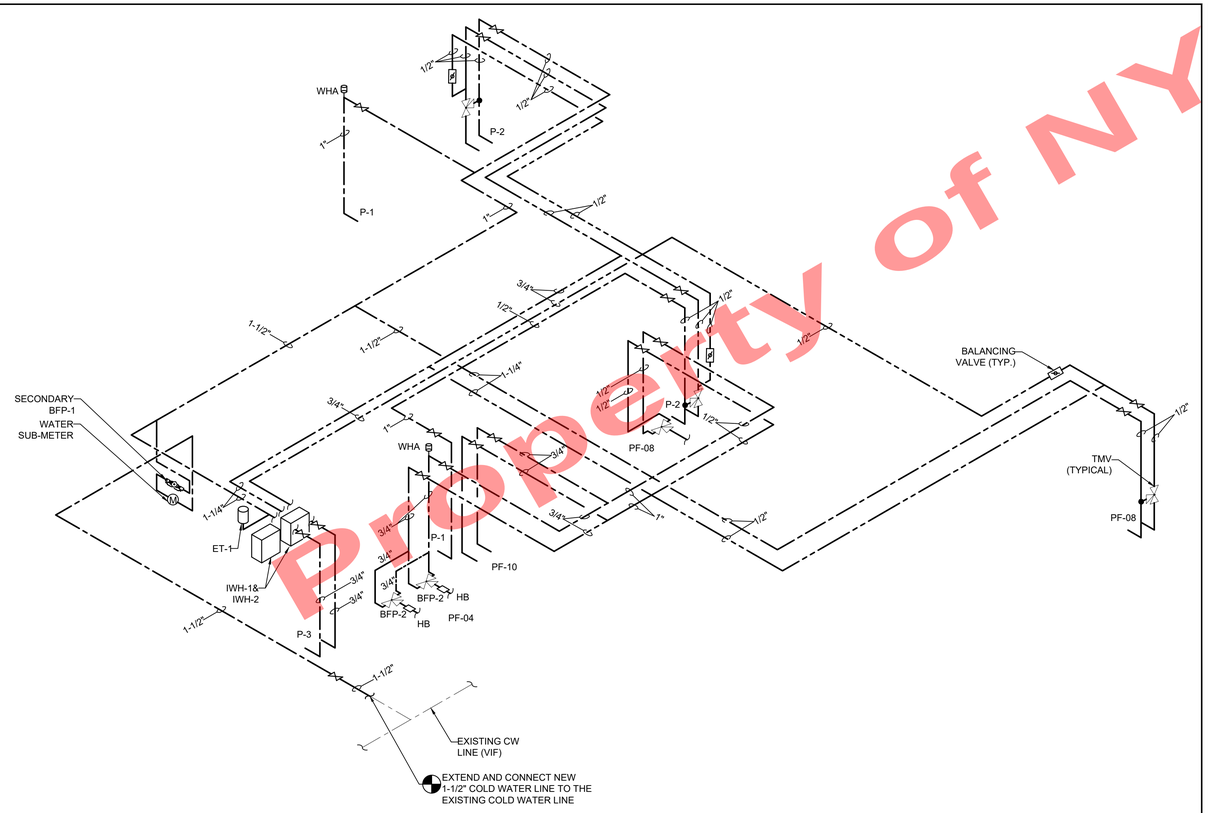
SHEET NUMBER:

P-1.1

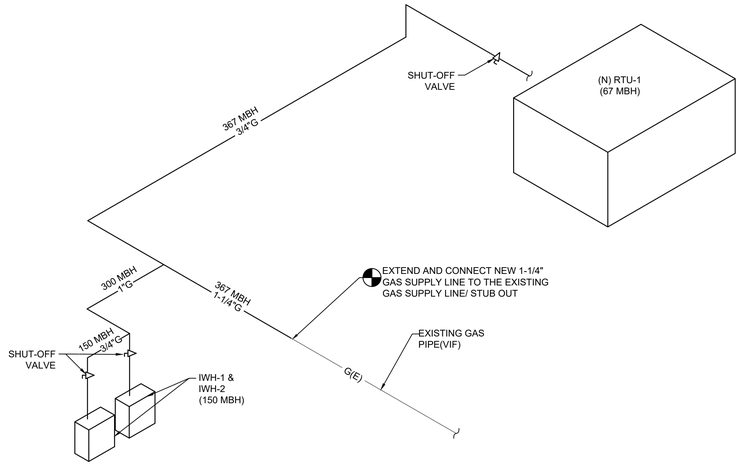
1 | SCALE 1 / 4" = 1' - 0" | PLUMBING SANITARY AND VENT FLOOR PLAN



3 | SCALE N.T.S. | SANITARY AND VENT ISOMETRIC DIAGRAM



1 | SCALE N.T.S. | DOMESTIC WATER ISOMETRIC DIAGRAM



GAS NOTE:

1. PROVIDE SHUT-OFF VALVE AN ACCESSIBLE LOCATION. PROVIDE GAS PRESSURE REGULATOR FOR ALL GAS EQUIPMENT IF REQUIRED.
2. CONTRACTOR SHALL VERIFY ACTUAL GAS PRESSURE AND LONGEST LENGTH OF RUN TO FARTHEST APPLIANCE PRIOR TO INSTALLATION AND NOTIFY ENGINEER IF CONDITION DIFFER THAN SHOWN ON THIS PLAN.

GAS PIPE SIZING PER INTERNATIONAL FUEL GAS CODE 2021, TABLE 402.4(3)
GAS INLET PRESSURE- LESS THAN 2 PSI.
PRESSURE DROP- 3.0" WC
REQUIRED GAS SUPPLY MAIN PIPE SIZE : 1-1/4"
REQUIRED GAS METER CAPACITY : 367 MBH MINIMUM (IF NOT PROVIDE NEW GAS METER)

TOTAL EQUIVALENT LENGTH OF PIPE = 125 FEET (VIF)

GAS LOAD SUMMERY

ITEM NO.	QTY.	DESCRIPTION	MBH
(N) RTU-1	1	ROOF TOP UNIT	67
IWH-1 & 2	2	INSTANTANEOUS WATER HEATER	300 (150 EACH)
		TOTAL LOAD	367

2 | SCALE N.T.S. | GAS ISOMETRIC DIAGRAM

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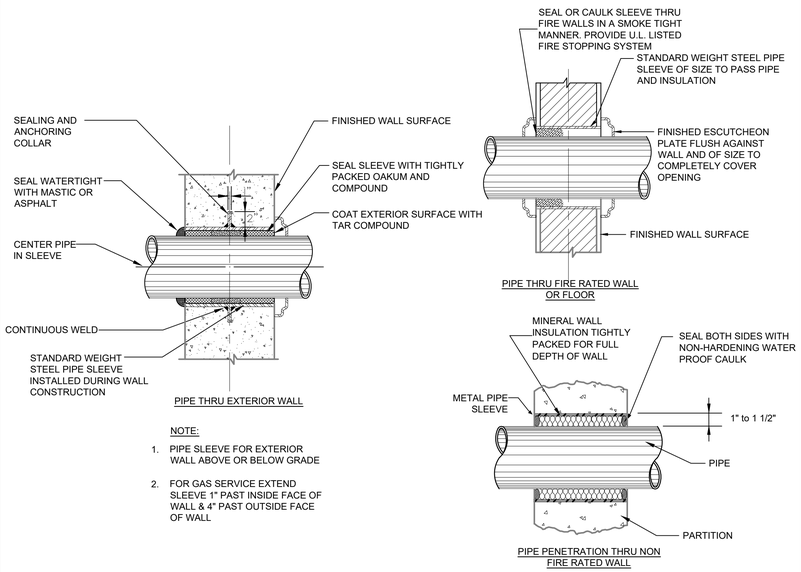
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PLUMBING RISERS

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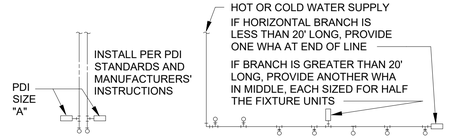
P-2.0



NOTE:

1. PIPE SLEEVE FOR EXTERIOR WALL ABOVE OR BELOW GRADE
2. FOR GAS SERVICE EXTEND SLEEVE 1" PAST INSIDE FACE OF WALL & 4" PAST OUTSIDE FACE OF WALL

1	SCALE	PIPE SLEEVE THROUGH WALL SECTION
	N.T.S.	



SINGLE FIXTURE

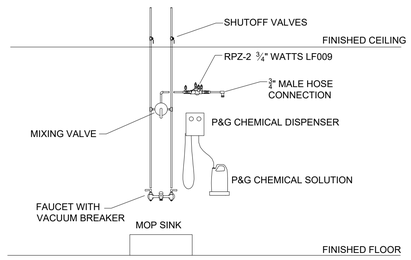
PDI SIZE	PIPE SIZE	FIXTURE UNIT LOAD
A	1/2"	1-11
B	3/4"	12-32
C	1"	33-60
D	1-1/4"	61-113
E	1-1/2"	114-154
F	2"	155-330

MULTIPLE FIXTURES

FIXTURE UNIT TABULATION		
FIXTURE	COLD	HOT
VALVE WATER CLOSET	5	--
URINAL	5	--
COUNTER SINK	1.5	1.5
LAVATORY	1.5	1.5
MOP BASIN	2.25	2.25
WATER COOLER	.25	--

PROVIDE WATER HAMMER ARRESTERS BY SIOUX CHIEF, PRECISION PLUMBING PRODUCTS, WATTS OR APPROVED EQUAL WITH PISTON AND O-RING CONSTRUCTION HAVING PDI #WH-201, ASSE #1010 AND ANSI #A112.26.1M CERTIFICATION. INSTALL IN HORIZONTAL OR VERTICAL POSITION, BUT NEVER UPSIDE DOWN. INSTALL INLINE WITH WATER FLOW DIRECTION IF POSSIBLE. SIZE UNITS PER TABLES ABOVE.

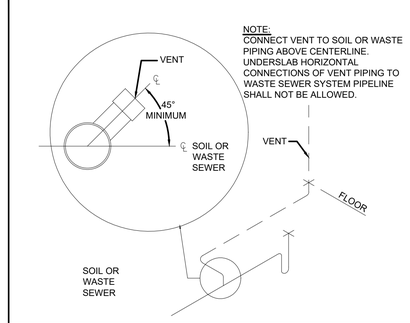
2	SCALE	WATER HAMMER ARRESTOR
	N.T.S.	



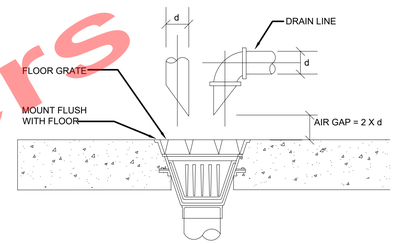
COMMENTS:

1. EACH CHEMICAL DISPENSER MUST HAVE A DEDICATED WATER SUPPLY, LOCATED WITHIN 4 FEET OF THE DISPENSER. IT MUST PROVIDE TEMPERED WATER (ADJUSTABLE FROM 60-120F) WITH A FLOW RATE OF 4 GPM AT 40 PSI DYNAMIC/FLOWING PRESSURE (35 PSID MIN.). THE HOT AND COLD WATER SUPPLY LINES MUST HAVE CHECK VALVES TO PREVENT HOT/COLD WATER CROSSOVER, IF THE TEMPERING VALVE DOES NOT INCLUDE THEM. IT MUST INCLUDE A SHUTOFF VALVE TERMINATING IN A ¾" GARDEN HOSE MALE FITTING.
2. THE DEDICATED WATER SUPPLY SHOULD NOT HAVE ANY BACKFLOW PREVENTION (E.G. NO ATMOSPHERIC VACUUM BREAKER, ETC.), UNLESS REQUIRED BY THE LOCAL PLUMBING CODE OR UTILITY- EACH CHEMICAL DISPENSER INCLUDES AN INTEGRAL BACKFLOW PREVENTOR ASSE 1055 OR ASSE 1013)

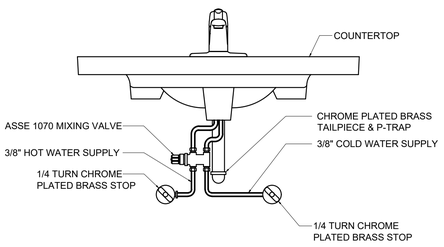
3	SCALE	CHEMICAL SYSTEM AT MOP SINK
	N.T.S.	

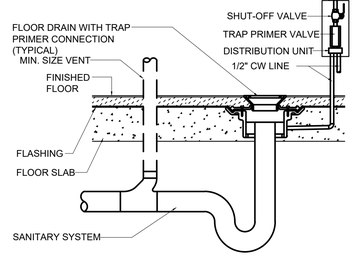


11	SCALE	VENT PIPING INSTALLATION
	N.T.S.	



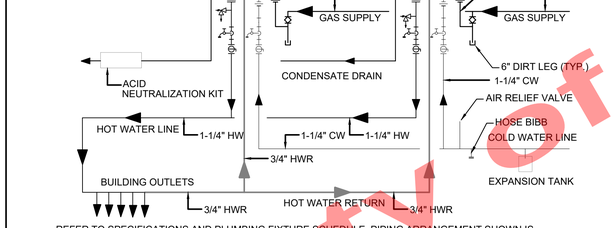
12	SCALE	FLOOR SINK DETAILS
	N.T.S.	





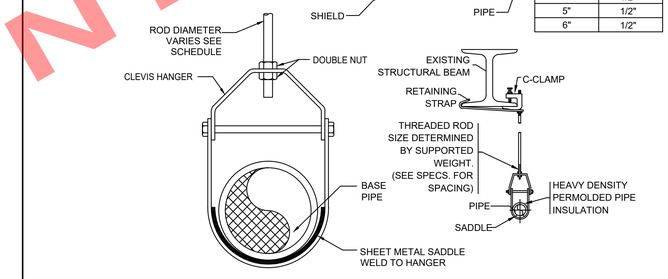
4	SCALE	FLOOR DRAIN WITH TRAP PRIMER
	N.T.S.	

WATER HEATER : NAVIEN-180A2
(BUILT IN RECIRCULATION PUMP)
DIMENSION: 17.3" (W) x 27.4" (H) x 13.2" (D)
WEIGHT: 73 lbs



REFER TO SPECIFICATIONS AND PLUMBING FIXTURE SCHEDULE. PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. REFER TO FLOOR PLAN FOR PIPE SIZES. SET WATER HEATER THERMOSTAT AT 120° FAHRENHEIT. PROVIDE SEISMIC STRAP OR BRACING AND FLEXIBLE CONNECTORS TO WATER AND GAS CONNECTIONS IF/AS REQUIRED BY LOCAL AUTHORITIES.

5	SCALE	TANKLESS GAS WATER HEATERS DETAIL
	N.T.S.	



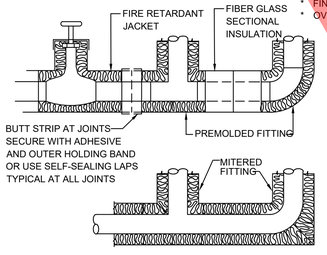
ROD SCHEDULE	
PIPE SIZE	ROD SIZE
1/2"	3/8"
3/4"	3/8"
1"	3/8"
1 1/4"	3/8"
1 1/2"	3/8"
2"	3/8"
2 1/2"	3/8"
3"	3/8"
4"	1/2"
5"	1/2"
6"	1/2"

6	SCALE	HANGER DETAILS
	N.T.S.	

13	SCALE	MIXING VALVE DETAILS
	N.T.S.	

CONCEALED VALVES AND FITTINGS

- WRAP WITH 1-INCH THICK, 1-POUND DENSITY TO REQUIRED PIPE INSULATION THICKNESS
- SECURE WITH WIRE OR TAPE.
- VAPOR SEAL COLD WATER, CHILLED WATER AND STORM WATER PIPING.



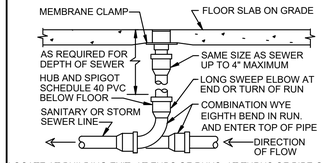
CONCEALED VALVES AND FITTINGS

- PREMOLDED FIBER GLASS OR RADIAL MITERED PIPE INSULATION
- SKIM COAT OF INSULATION CEMENT
- COAT OF MASTIC
- WRAP WITH FIBER GLASS REINFORCING CLOTH.
- FINISH COAT OF MASTIC
- OVERLAP 2-INCHES ON PIPE INSULATION.



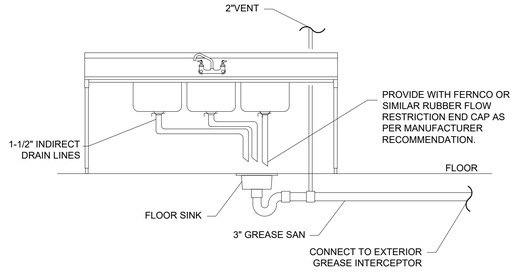
7	SCALE	PIPE INSULATION DETAILS
	N.T.S.	

PROVIDE ROUND SECURED NICKEL BRONZE ADJUSTABLE TOP WITH "CO" CAST IN COVER. PROVIDE CLEANOUT TOP WITH VARIATIONS SUITABLE FOR FLOOR COVERING (CARPET MARKER, RECESSED FOR TILE, SCORIATED FOR UNFINISHED FLOORS). PROVIDE BRONZE PLUG IN CAST IRON BODY.



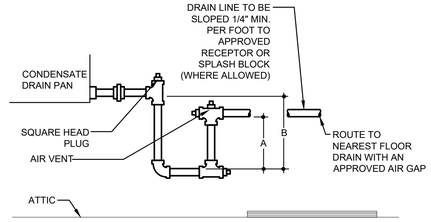
LOCATE AT BUILDING EXIT, AT ENDS OF RUNS, AT TURNS OF PIPE GREATER THAN 45 DEGREES, AT 50' INTERVALS ON STRAIGHT RUNS, AND WHERE SHOWN ON PLANS. PROVIDE BACKFILL PER ARCHITECTURAL SPECIFICATIONS. LOCATE CLEANOUTS WHERE THERE IS 18" CLEAR AROUND. CONSULT LOCAL CODES FOR OTHER FCO REQUIREMENTS.

8	SCALE	FLOOR CLEAN OUT DETAIL
	N.T.S.	



ROUTE DRAIN LINE TO WALL. ROUTE VENT UP, AND GREASE SANITARY DOWN AS SHOWN ON PLANS. ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS OR MEET LOCAL CODE REQUIREMENTS.

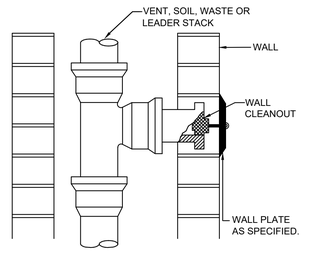
9	SCALE	3-COMPARTMENT SINK DETAILS
	N.T.S.	



NOTES:

1. FILL TRAP MANUALLY ON INITIAL START-UP.
2. TRAP EACH COMPONENT DRAIN CONNECTION.
3. A = NEGATIVE STATIC PRESSURE = 2"
4. B = 2x NEGATIVE STATIC PRESSURE = 4"

10	SCALE	HVAC CONDENSATE DRAIN DETAIL
	N.T.S.	



14	SCALE	WALL CLEAN OUT DETAIL
	N.T.S.	

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TITLE:

PLUMBING DETAILS

SHEET NUMBER:

P-3.0