

MECHANICAL SYMBOLS

NOTE: THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS, ETC. ARE NECESSARILY USED ON THE DRAWINGS.

HVAC EQUIPMENT & DUCTWORK

NOTE: ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE INSIDE DIMENSIONS.

EXISTING DUCTWORK OR EQUIPMENT TO REMAIN

EXISTING DUCTWORK OR EQUIPMENT TO BE REMOVED

BRANCH DUCT WITH 45° RECTANGLE-ROUND BRANCH FITTING AND MANUAL VOLUME DAMPER

ELBOW WITH TURNING VANES

LINEAR SLOT DIFFUSER

INSULATED FLEXIBLE DUCT (MAX. 5'-0" LONG)

EXHAUST AIR DUCT UP

EXHAUST AIR DUCT DOWN

RETURN AIR DUCT UP

RETURN AIR DUCT DOWN

SUPPLY OR OUTSIDE AIR DUCT UP

SUPPLY OR OUTSIDE AIR DUCT DOWN

DUCT ROOF PENETRATION

EQUIPMENT WITH FLEXIBLE DUCT CONNECTION

108 CD-1 300 CFM
NECK SIZE, TYPE, CFM OF SUPPLY DIFFUSER OR REGISTER

24x24 EG-1 800 CFM
SIZE, TYPE, CFM OF EXHAUST OR RETURN GRILLE

MANUAL VOLUME DAMPER

SQUARE TO ROUND TRANSITION

DUCT MOUNTED SMOKE DETECTOR
(SD=SUPPLY/RD=RETURN)

RD

AV AUDIO/VISUAL ALARM

FD FIRE DAMPER

FSD FIRE SMOKE DAMPER

SD SMOKE DAMPER

MD MOTORIZED DAMPER

BD BACKDRAFT DAMPER

CO CARBON MONOXIDE SENSOR

CO2 CARBON DIOXIDE SENSOR

HS HUMIDITY SENSOR

PS PULL STATION

SP STATIC PRESSURE SENSOR

TS TEMPERATURE SENSOR

H HUMIDISTAT

T THERMOSTAT

W WALL SWITCH & UNIT DESIGNATION

ABBREVIATIONS

AFF ABOVE FINISHED FLOOR	MBH 1000 BTU PER HOUR
BAS BUILDING AUTOMATION SYSTEM	MC MECHANICAL CONTRACTOR
BFF BELOW FINISHED FLOOR	MIN MINIMUM
BFG BELOW FINISHED GRADE	NC NOISE CRITERIA
BD BACKDRAFT DAMPER	OA OUTSIDE AIR
CFM CUBIC FEET PER MINUTE	PPM PARTS PER MILLION
DDC DIRECT DIGITAL CONTROL	RA RETURN AIR
DX DIRECT EXPANSION	SA SUPPLY AIR
EA EXHAUST AIR	TFA TO FLOOR ABOVE
ETR EXISTING TO REMAIN	TFB TO FLOOR BELOW
FFA FROM FLOOR ABOVE	TYP TYPICAL
FFB FROM FLOOR BELOW	UNO UNLESS NOTED OTHERWISE
GPM GALLONS PER MINUTE	W/ WITH
IN WC INCHES OF WATER COLUMN	W/O WITHOUT
MAX MAXIMUM	

STANDARD MOUNTING HEIGHTS

MECHANICAL (AFF, AFG, UNLESS NOTED OTHERWISE)

THERMOSTATS (USER ADJUSTABLE)(TOP OF DEVICE) 48"

CONTROLS (TOP OF DEVICE) 48"

ANNOTATION

1 MECHANICAL PLAN CALLOUT

RTU 1 MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)

1 CONNECTION POINT OF NEW WORK TO EXISTING

1 1 DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER

1 1 SECTION CUT DESIGNATION

GENERAL MECHANICAL NOTES:

- A. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS OF THE PROJECT. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL REQUIREMENTS WHICH MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT, ENGINEER AND/OR OWNER OF CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
- B. COORDINATE THE INSTALLATION OF THE MECHANICAL SYSTEMS WITH OTHER TRADES TO ENSURE A NEAT AND ORDERLY INSTALLATION. INSTALL DUCTWORK AS TIGHT TO STRUCTURE AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS. COORDINATE INSTALLATION OF DUCTWORK TO AVOID CONFLICTS WITH ELECTRICAL PANELS, LIGHTING FIXTURES, ETC. ANY MODIFICATIONS REQUIRED DUE TO LACK OF COORDINATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AT NO EXTRA COST TO THE OWNER.
- C. NEW MECHANICAL EQUIPMENT AND DUCTWORK ARE SHOWN AT APPROXIMATE LOCATIONS. FIELD MEASURE FINAL DUCTWORK LOCATIONS PRIOR TO FABRICATION AND MAKE ADJUSTMENTS AS REQUIRED TO FIT THE DUCTWORK AND PIPING WITHIN THE AVAILABLE SPACE. VERIFY THAT FINAL EQUIPMENT LOCATIONS MEET MANUFACTURER'S RECOMMENDATIONS REGARDING SERVICE CLEARANCE AND PROPER AIRFLOW CLEARANCE AROUND EQUIPMENT.
- D. REFER TO ARCHITECTURAL DRAWINGS FOR RELATED CONSTRUCTION DETAILS AS APPLICABLE TO THE HVAC SYSTEM. VERIFY CHASES AND PENETRATIONS SHOWN ON ARCHITECTURAL DRAWINGS THAT ARE INTENDED FOR DUCTWORK AND PIPING MEET REQUIREMENTS.
- E. COORDINATE LOCATION OF ROOF MOUNTED HVAC EQUIPMENT AND ROOF PENETRATIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
- F. INDOOR AIR QUALITY MEASURES: PROTECT INSIDE OF (INSTALLED AND DELIVERED) DUCTWORK AND HVAC UNITS FROM EXPOSURE TO DUST, DIRT, PAINT AND MOISTURE. REPLACE INSULATION THAT HAS GOTTEN WET AT ANY TIME DURING CONSTRUCTION, DRYING THE INSULATION IS NOT ACCEPTABLE. SEAL ANY TEARS OR JOINTS OF INTERNAL FIBERGLASS INSULATION. REMOVE DEBRIS FROM CEILING/RETURN AIR PLENUM INCLUDING DUST. AN INDEPENDENT, PROFESSIONAL AIR CLEANING COMPANY SHALL VACUUM CLEAN ANY DUCTWORK CONNECTED TO HVAC UNITS THAT WERE OPERATED DURING THE CONSTRUCTION PERIOD AFTER NEW FILTERS, MINIMUM MERV-13, ARE INSTALLED AND PRIOR TO TURNING SYSTEM OVER TO THE OWNER.
- G. INSTALL DUCTWORK PARALLEL TO BUILDING COLUMN LINES UNLESS OTHERWISE SHOWN OR NOTED.
- H. OVERHEAD HANGERS AND SUPPORTS FOR EQUIPMENT, DUCTWORK SHALL BE FASTENED TO BUILDING JOISTS OR BEAMS. DO NOT ATTACH HANGERS AND SUPPORTS TO THE ABOVE FLOOR SLAB OR ROOF EXCEPT WHERE CONCRETE INSERTS IN CONCRETE SLABS ARE ALLOWED BY THE SPECIFICATIONS.
- I. COORDINATE LOCATION OF EQUIPMENT SUPPORTS WITH LOCATION OF EQUIPMENT ACCESS PANELS/DOORS TO ENABLE SERVICE OF EQUIPMENT AND/OR FILTER REPLACEMENT.
- J. SEAL PENETRATIONS THROUGH THE BUILDING COMPONENTS IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. FIREPROOF PENETRATIONS THROUGH FIRE RATED COMPONENTS IN ACCORDANCE WITH U.L. REQUIREMENTS.
- K. COORDINATE THE EXACT MOUNTING SIZE AND FRAME TYPE OF DIFFUSERS, REGISTERS AND GRILLES WITH THE SUPPLIER TO MEET THE CEILING, WALL AND DUCT INSTALLATION REQUIREMENTS.
- L. ADJUST LOCATION OF CEILING DIFFUSERS, REGISTERS AND GRILLES AS REQUIRED TO ACCOMMODATE FINAL CEILING GRID AND LIGHTING LOCATIONS.
- M. LOCATE AND SET THERMOSTATS SENSORS AT LOCATIONS SHOWN ON PLANS. VERIFY EXACT LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION. INSTALL THERMOSTATS WITH TOP OF DEVICE AT MAXIMUM 48" AFF TO MEET ADA REQUIREMENTS UNLESS NOTED OTHERWISE ON PLANS. TEMPERATURE SENSORS SHALL BE MOUNTED AT A MAXIMUM OF 72" AFF. INSTALL WIRING IN CONDUIT PROVIDED BY DIVISION 16.
- N. PROVIDE A MANUAL BALANCING DAMPER IN EACH BRANCH DUCT TAKEOFF FROM MAIN SUPPLY, RETURN, OUTDOOR AND EXHAUST AIR DUCTS.
- O. PROVIDE A PREFABRICATED 45 DEGREE, HIGH EFFICIENCY, RECTANGULAR/ROUND BRANCH DUCT TAKEOFF FITTING WITH MANUAL BALANCING DAMPER AND LOCKING QUADRANT FOR BRANCH DUCT CONNECTIONS AND TAKE-OFFS TO INDIVIDUAL DIFFUSERS, REGISTERS AND GRILLES.
- P. BRANCH DUCTWORK TO AIR OUTLETS SHALL BE SAME SIZE AS OUTLET NECK SIZE UNLESS OTHERWISE NOTED.
- Q. RIGID DUCTWORK INSULATION: PROVIDE 3/4 LB DENSITY, MINIMUM R-6.0 DUCT WRAP, 2" THICK, INSULATION WRAP ON RIGID ROUND, CONCEALED, SUPPLY AND RETURN AIR DUCTS. PROVIDE 1-1/2" (R-6.0) THICK 1-1/2 LB DENSITY INTERNAL DUCT LINER ON RECTANGULAR SUPPLY AND RETURN AIR DUCTS. DUCT SIZES ON MECHANICAL PLANS INDICATE CLEAR INSIDE AIRFLOW DIMENSIONS, INCREASE SHEET METAL SIZES ACCORDINGLY.
- R. PROVIDE THERMAFLEX TYPE M-KE, FLEXMASTER TYPE 8, OR APPROVED EQUAL FLEXIBLE DUCTWORK. FLEXIBLE DUCTWORK SHALL BE LISTED UNDER UL 181 AS CLASS 1 AIR DUCT AND BE PROVIDED WITH INTEGRAL R-6.0, 3/4 LB DENSITY FIBERGLASS INSULATION. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0" IN LENGTH AND SHALL BE INSTALLED AND SUPPORTED TO AVOID SHARP BENDS AND SAGGING.
- S. PROVIDE A NEW SET OF AIR FILTERS IN UNITS PRIOR TO TESTING, ADJUSTING AND BALANCING. AND BEFORE TURNING SYSTEM(S) OVER TO OWNER.
- T. PROVIDE A COPY OF THE AIR BALANCE REPORT TO THE CITY INSPECTOR AT THE TIME OF INSPECTION.

EXISTING ROOFTOP UNIT SCHEDULE (NATURAL GAS HEAT)

MARK	NOMINAL CAPACITY (TONS)	MANUFACTURER	MODEL	SUPPLY FAN			COOLING COIL			HEAT EXCHANGER				MIN. O/A CFM	IEER/SEER	ELECTRICAL			WEIGHT LBS.	NOTES	
				FAN TYPE	AIRFLOW (CFM)	MIN HP	ESP (IN)	REFR. TYPE	TOTAL (MBH)	SENSIBLE (MBH)	EAT DB/WB (°F)	LAT DB/WB (°F)	MIN. OUTPUT (MBH)			EFFICIENCY (%)	NOM. INPUT (MBH)	NO. OF STAGES			MIN. LAT DB (°F)
RTU-1(E)	7.5 (V.I.F)	YORK (V.I.F)	ZR090S18R2D5AAA1A1 (V.I.F)	S.A.E	3000 (V.I.F)	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	180 (V.I.F)	S.A.E	S.A.E	208-230/3 (V.I.F)	38.8 (V.I.F)	50 (V.I.F)	S.A.E	A-F

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

- NOTES:
- A. S.A.E - SAME AS EXISTING. V.I.F - VERIFY IN FIELD.
- B. EXISTING RTU WITH ALL ACCESSORIES TO REMAIN SAME AND TO BE REUSED.
- C. CONTRACTOR TO CONFIRM IF EXISTING RTU IS WORKING AT ITS 100% RATED CAPACITY.
- D. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND CONFIGURATION OF RTU ON SITE.
- E. CONTRACTOR TO RE-BALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON EXISTING RTU TO MATCH VALUES MENTIONED IN ABOVE TABLE
- F. REPLACE ALL AIR FILTERS WITH NEW MERV-13 FILTERS BEFORE HANDING OVER THE SPACE TO THE OWNER / TENANT.

EXHAUST FAN SCHEDULE

MARK	SERVICE	QUANTITY	MANUFACTURER	MOUNTING	MODEL	AIRFLOW CFM	DRIVE	ELECTRICAL			WEIGHT LBS.	NOTES
								V/PH	MCA	MOCP (A)		
EF-1(N)	EXHAUST	1	GREENHECK (OR EQUIVALENT)	CEILING	SP-A390	260	DIRECT	115/1	1.8		30	A,B,C

- NOTES:
- A. INSTALL EXHAUST FAN AS PER MANUFACTURER'S RECOMMENDATIONS
- B. PROVIDE BACKDRAFT DAMPER AND DISCONNECT SWITCH.
- C. INTERLOCK EF-1(N) WITH RTU-1(E).

OUTSIDE AIR REQUIREMENTS (IMC TABLE 403.3)

AREA PURPOSE	GROSS FLOOR AREA (SQ. FT)	CODE OUTSIDE AIR REQUIREMENTS						SYSTEM NUMBER	ACTUAL OUTSIDE AIR (CFM PER UNIT)
		CFM PER SQ. FT	CFM REQD.	CFM PER PERSON	OCCUPANCY DENSITY	NO. OF PEOPLE	CFM REQD.		
101 SERVICE	264	0.12	32	7.5	1	4	30		
102 BARISTA STATION	370	0.12	44	7.5	5	7	53		
103 BACK OF HOUSE	312	0.12	37	0.0	0	0	0		
106 OFFICE	35	0.06	2	5.0	1	1	5		
	981		TOTAL = 115				88	TOTAL = 300	

AIR BALANCE SCHEDULE

EXHAUST EQUIPMENT	AREA SERVED	EXHAUST (CFM)	TOTALS (CFM)
EF-1(N)	SEE PLAN	260	260
TOTAL AIRFLOW		260	260

OUTDOOR AIR EQUIPMENT	AREA SERVED	SUPPLY AIR (CFM)	OA DESIGN (CFM)	PERCENT OA/SA
RTU-1(E)	SEE PLAN	3,000	300	10.0%
TOTAL AIRFLOW		3,000	300	10.0%
TOTAL POSITIVE AIRFLOW			40	86.66%
PERCENT POSITIVE AIR FLOW				

GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	MODEL	FACE TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX NC	MAX PRESS. DROP (IN. W.C.)	NOTES
CD-1	TITUS	TMS	CONE	LAY IN	24x24	25	0.05	A-D
CD-2	TITUS	TMS	CONE	LAY IN	12x12	25	0.05	A-D
RG-1	TITUS	PAR	PERFORATED	LAY IN	24x24	25	0.05	A,C,D

- NOTES FOR NEW:
- A. NECK SIZE SHOWN ON DRAWINGS. BRANCH DUCT SIZE SHALL BE SAME AS NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
- B. 4-WAY THROW PATTERN UNLESS OTHERWISE SHOWN ON DRAWINGS.
- C. BAKED ENAMEL FINISH, WHITE TO MATCH CEILING COLOR.
- D. FRAME TYPE TO MATCH MOUNTING LOCATION CONSTRUCTION MATERIAL. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLAN.

EXHAUST AIR REQUIREMENTS

AREA PURPOSE	FIXTURE QUANTITY	GROSS FLOOR AREA (SQ. FT)	CODE EXHAUST AIR REQUIREMENTS IMC TABLE 403.3			SYSTEM NUMBER	ACTUAL EXHAUST AIR CFM
			CFM PER SQ. FT	CFM PER FIXTURE	CFM REQD.		
102 BARISTA STATION	0	370	0.7	0	259		
	0	370			TOTAL = 259	TOTAL = 260	

CLIENT:

New Tenant Renovation:



REVISIONS:

#	DESCRIPTION	DATE
	ISSUED FOR PERMIT	10/27/25
	PERMIT COMMENTS	12/05/25

PROJECT NUMBER:
DRAWN BY: REVIEWED BY:
SHEET TITLE:

MECHANICAL SCHEDULES

SHEET NO.

M0.1

MECHANICAL SPECIFICATIONS:

GENERAL REQUIREMENTS

REQUIREMENTS UNDER DIVISION ONE AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS SHALL BE A PART OF THIS SECTION. CONTRACTOR SHALL BECOME THOROUGHLY ACQUAINTED WITH ITS CONTENTS AS TO REQUIREMENTS THAT AFFECT THIS DIVISION OR SECTION. THE WORK REQUIRED UNDER THIS SECTION INCLUDES MATERIAL, EQUIPMENT, APPLIANCES, TRANSPORTATION SERVICES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE SYSTEM AS SHOWN ON THE DRAWINGS AND SPECIFICATIONS. THE GENERAL SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND PORTIONS OF THE WORK DESCRIBED IN ONE SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED. DEFINITIONS FURNISH: THE TERM "FURNISH" IS USED TO MEAN "SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION AND SIMILAR OPERATIONS." INSTALL: THE TERM "INSTALL" IS USED TO DESCRIBE OPERATIONS AT THE PROJECT SITE INCLUDING THE ACTUAL UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS. PROVIDE: THE TERM "PROVIDE" MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE, FURNISHED BY OWNER OR FURNISHED BY OTHERS; THE ITEM WILL BE FURNISHED BY THE OWNER OR OTHERS. IT IS TO BE INSTALLED AND CONNECTED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE AND READY FOR OPERATION, INCLUDING ITEMS INCIDENTAL TO THE WORK, INCLUDING SERVICES NECESSARY FOR PROPER INSTALLATION AND OPERATION. THE INSTALLATION SHALL BE INCLUDED UNDER THE GUARANTEE REQUIRED BY THIS DIVISION. AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY (AUTHORITY) HAVING JURISDICTION OVER THE WORK. THE TERMS "APPROVED EQUAL", "EQUIVALENT", OR "EQUAL" ARE USED SYNONYMOUSLY AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURER SPECIFIED." THE TERM "APPROVED" SHALL MEAN LABELED, LISTED, OR BOTH, BY A NATIONALLY RECOGNIZED TESTING LABORATORY (E.G. UL, ETL, CSA), AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

COORDINATION

COORDINATE WORK WITH THAT OF OTHER TRADES SO THAT THE VARIOUS COMPONENTS OF THE SYSTEMS WILL BE INSTALLED AT THE PROPER TIME, WILL FIT THE AVAILABLE SPACE, AND WILL ALLOW PROPER SERVICE ACCESS TO THOSE ITEMS REQUIRING MAINTENANCE. COMPONENTS WHICH ARE INSTALLED WITHOUT REGARD TO THE ABOVE SHALL BE RELOCATED AT NO ADDITIONAL COST TO THE OWNER. UNLESS OTHERWISE NOTED, THE GENERAL CONTRACTOR WILL PROVIDE CHASES AND OPENINGS IN BUILDING CONSTRUCTION REQUIRED FOR INSTALLATION OF THE SYSTEMS SPECIFIED HEREIN. CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH INFORMATION WHERE CHASES AND OPENINGS ARE REQUIRED. KEEP INFORMED AS TO THE WORK OF OTHER TRADES ENGAGED IN THE CONSTRUCTION OF THE PROJECT AND EXECUTE WORK IN A MANNER AS TO NOT INTERFERE WITH OR DELAY THE WORK OF OTHER TRADES. FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALE DIMENSIONS. CONTRACTOR SHALL TAKE OWN MEASUREMENTS AT THE BUILDING AS VARIATIONS MAY OCCUR. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ERRORS THAT COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION. PROVIDE MATERIALS WITH TRIM THAT WILL PROPERLY FIT THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED. MODEL NUMBERS LISTED IN THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT INTENDED TO DESIGNATE THE REQUIRED TRIM.

WARRANTIES

WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKSMANSHIP, DESIGN OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS. THE MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS. REMEDY ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND DIVISION 1. WARRANTIES SHALL INCLUDE LABOR AND MATERIAL AND MAKE REPAIRS OR MAKE ELEMENTS WITHIN THE WARRANTY PERIOD TO THE OWNER. PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNER.

AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD, EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE OWNER AND STATING THE COMMENCEMENT DATE AND TERM.

CUTTING AND PATCHING

PERFORM CUTTING OF WALLS, FLOORS, CEILING, ETC. AS REQUIRED TO INSTALL WORK UNDER THIS SECTION. OBTAIN PERMISSION FROM THE ARCHITECT PRIOR TO CUTTING. DO NOT CUT OR DISTURB STRUCTURAL MEMBERS WITHOUT PRIOR APPROVAL FROM THE ARCHITECT. CUT HOLES AS SMALL AS POSSIBLE. GENERAL CONTRACTOR SHALL PATCH WALLS, FLOORS, ETC. AS REQUIRED BY WORK UNDER THIS SECTION. PATCHING SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION. REPAIR AND FINISH AREAS DISTURBED BY WORK TO THE CONDITION OF ADJOINING SURFACES IN A MANNER SATISFACTORY TO THE ARCHITECT.

CONCRETE BASES

PROVIDE CONCRETE BASES FOR EQUIPMENT WHERE INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN. CONCRETE BASES SHALL HAVE CHAMFERED EDGES. SIZE OF PAD SHALL BE A MINIMUM OF 4" GREATER THAN THE FOOTPRINT OF THE EQUIPMENT THAT IT IS SUPPORTING AND SHALL HAVE A MINIMUM HEIGHT OF 3-1/2". CONSTRUCT EQUIPMENT BASES AND HOUSEKEEPING PADS OF A MINIMUM 28 DAY, 4000 PSI CONCRETE CONFORMING TO AMERICAN CONCRETE INSTITUTE STANDARD BUILDING CODE FOR REINFORCED CONCRETE (ACI 318-19) AND THE LATEST APPLICABLE RECOMMENDATIONS OF THE ACI STANDARD PRACTICE MANUAL. CONCRETE SHALL BE COMPOSED OF CEMENT CONFORMING TO ASTM C 150 TYPE 1, AGGREGATE CONFORMING TO ASTM C33, AND POTABLE WATER. EXPOSED EXTERIOR CONCRETE SHALL CONTAIN 5 TO 7 PERCENT AIR ENTRAINMENT. PROVIDE GALVANIZED ANCHOR BOLTS FOR EQUIPMENT PLACED ON CONCRETE EQUIPMENT BASES AND HOUSEKEEPING PADS OR ON CONCRETE SLABS. ANCHOR BOLTS SIZE, NUMBER AND PLACEMENT SHALL BE AS RECOMMENDED BY THE MANUFACTURER OF THE EQUIPMENT.

ACCESS DOORS

PROVIDE ACCESS DOORS IN CEILING, WALLS, ETC. WHERE INDICATED OR REQUIRED FOR ACCESS OR MAINTENANCE TO CONCEALED VALVES AND EQUIPMENT INSTALLED UNDER THIS SECTION. PROVIDE CONCEALED HINGES, SCREWDRIVER-TYPE LOCK, ANCHOR STRAPS, MANUFACTURED BY MILCOR, ZURN, TITUS, OR EQUAL. OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION AND COLOR BEFORE ORDERING.

PENETRATIONS

PROVIDE SLEEVES FOR PIPES PASSING THROUGH ABOVE GRADE CONCRETE OR MASONRY WALLS, CONCRETE FLOOR OR ROOF SLABS. SLEEVES ARE NOT REQUIRED FOR CORE DRILLED HOLES IN EXISTING MASONRY WALLS, CONCRETE FLOORS OR ROOFS. PROVIDE TO GAUGE GALVANIZED STEEL SLEEVES FOR SLEEVES 6" AND SMALLER. PROVIDE GALVANIZED SHEET METAL SLEEVES FOR LARGER THAN 6". SCHEDULE 40 PVC SLEEVES ARE ACCEPTABLE FOR INSTALLATION IN AREAS WITHOUT RETURN AIR PLENUMS.

SEAL ELEVATED FLOOR, EXTERIOR WALL AND ROOF PENETRATIONS WATERTIGHT AND WEATHERTIGHT WITH NON-SHRINK, NON-HARDENING COMMERCIAL SEALANT. PACK WITH MINERAL WOOL AND SEAL BOTH ENDS WITH MINIMUM OF 1/2" OF SEALANT. SEAL AROUND PENETRATIONS OF FIRE RATED ASSEMBLIES. COORDINATE FIRE RATINGS AND LOCATIONS WITH THE ARCHITECTURAL DRAWINGS. REFER TO ARCHITECTURAL SPECIFICATIONS FOR FIRE STOPPING. PROVIDE A PRODUCT SCHEDULE FOR UL LISTING, LOCATION, WALL OR FLOOR RATING AND INSTALLATION DRAWING FOR EACH PENETRATION FIRE STOP SYSTEM. EXTEND PIPE INSULATION FOR INSULATED PIPE THROUGH FLOOR, WALL AND ROOF PENETRATIONS, INCLUDING FIRE RATED WALLS AND FLOORS. THE VAPOR BARRIER SHALL BE MAINTAINED. SIZE SLEEVE FOR A MINIMUM OF 1" ANNULAR CLEAR SPACE BETWEEN INSIDE OF SLEEVE AND OUTSIDE OF INSULATION.

PROVIDE PREFABRICATED ROOF CURBS MANUFACTURED BY CUSTOM CURB, INC., PATE COMPANY, THYCOR, OR APPROVED EQUAL. PROVIDE ROOF CURBS WITH FACTORY INSTALLED WOOD NAILER; WELDED, 18 GAUGE GALVANIZED STEEL SHELL, BASE PLATE AND FLASHING; 1-1/2" THICK, 3 POUND RIGID INSULATION; FULLY MITERED 3-INCH RAISED CANT; COVER OF WEATHER-RESISTANT, WEATHER-PROOF MATERIAL AND PIPE COLLAR OF WEATHER-RESISTANT MATERIAL WITH STAINLESS STEEL PIPE CLAMPS.

PROVIDE BOX FRAMES FOR RECTANGULAR OPENINGS WELDED 12 GAUGE GALVANIZED STEEL. PROVIDE TO FORMS AND OF A MAXIMUM DIMENSION ESTABLISHED BY THE ARCHITECT. NOTIFY THE GENERAL CONTRACTOR OR ARCHITECT BEFORE INSTALLING ANY BOX OPENINGS NOT SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS.

SEAL CONCRETE OR MASONRY EXTERIOR WALL PENETRATIONS BELOW GRADE WITH "WALL PIPES" AND MECHANICAL SLEEVE SEALS. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WAITS OR ZURN. PROVIDE MODULAR MECHANICAL SLEEVE SEALS, MANUFACTURED BY THUNDERLINE / LINK SEAL, CALPICO, INC. AND METRAFLEX. SEAL ELEVATED CONCRETE SLAB WITH WATERPROOF MEMBRANE PENETRATIONS WITH "WALL PIPES" AND WATER PROOF SEALANT. SECURE WATERPROOF MEMBRANE FLASHING BETWEEN "WALL PIPE" CLAMPING FLANGE AND CLAMPING RING. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WAITS OR ZURN.

PROVIDE SLEEVES FOR HORIZONTAL PIPE PASSING THROUGH OR UNDER FOUNDATION. SLEEVES SHALL BE CAST IRON SOIL PIPE TWO NOMINAL PIPE SIZES LARGER THAN THE PIPE SERVED.

PROVIDE SCHEDULE 40 PVC PIPE SLEEVES FOR VERTICAL PRESSURE PIPE PASSING THROUGH CONCRETE SLAB ON GRADE. SLEEVES SHALL BE ONE NOMINAL PIPE SIZE LARGER THAN THE PIPE SERVED AND TWO PIPE SIZES LARGER THAN PIPE SERVED FOR DUCTILE IRON PIPES WITH RESTRAINING RODS. SEAL WATER-TIGHT WITH SILICONE CAULK.

PROVIDE 1/2" THICK CELLULAR FOAM INSULATION AROUND PERIMETER OF NON-PRESSURE PIPE PASSING THRU CONCRETE SLAB ON GRADE. INSULATION SHALL EXTEND TO 2" ABOVE AND BELOW THE CONCRETE SLAB.

ELECTRICAL WIRING

LINE VOLTAGE WIRING SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR. LINE VOLTAGE CONTROL AND INTERLOCK WIRING FOR MECHANICAL SYSTEMS SHALL ALSO BE PROVIDED BY ELECTRICAL CONTRACTOR. LOW VOLTAGE CONTROL WIRING SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR. FURNISH WIRING DIAGRAMS TO THE ELECTRICAL CONTRACTOR AS REQUIRED FOR PROPER EQUIPMENT HOOKUP. COORDINATE WITH THE ELECTRICAL CONTRACTOR THE ACTUAL WIRE SIZING AMPS FOR MECHANICAL EQUIPMENT (FROM THE EQUIPMENT NAMEPLATE) TO ENSURE PROPER INSTALLATION.

FINAL TESTING AND ADJUSTMENTS

FINAL SYSTEM TESTING, BALANCING AND ADJUSTMENTS SHALL BE PERFORMED BY A CONTRACTOR CERTIFIED BY THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), ASSOCIATED AIR BALANCE COUNCIL (AABC) OR OTHER APPROVED AGENCY. PERFORM TEST READINGS ON FANS, UNITS, COILS, ETC. AND ADJUST EQUIPMENT TO DELIVER SPECIFIED AMOUNTS OF AIR. PREPARE TESTING AND BALANCING REPORT LOG SHOWING AIR SUPPLY QUANTITIES, AIR ENTERING AND LEAVING TEMPERATURES, AND PRESSURES, FAN AND UNIT TEST READINGS, MOTOR VOLTAGE AND AMP DRAWS, ETC., AND SUBMIT SIX COPIES OF THE FINAL COMPLETION OF DATA TO THE ARCHITECT FOR EVALUATION AND APPROVAL BEFORE FINAL INSPECTION OF THE PROJECT. BALANCE AIR SYSTEMS TO WITHIN PLUS OR MINUS 10 PERCENT FOR TERMINAL DEVICES AND BRANCH LINES AND PLUS OR MINUS 5 PERCENT FOR MAIN DUCTS AND AIR HANDLING EQUIPMENT OF THE AMOUNT OF AIR SHOWN ON THE DRAWINGS. FURTHER ADJUSTMENTS SHALL BE MADE TO OBTAIN UNIFORM TEMPERATURE IN SPACES. ADJUST EQUIPMENT TO OPERATE AS INTENDED BY THE SPECIFICATION. ALIGN BEARINGS AND REPLACE BEARINGS THAT HAVE DIRT OR FOREIGN MATERIAL IN THEM WITH NEW BEARINGS WITHOUT ADDITIONAL COST TO THE OWNER. BALANCE CONTRACTOR SHALL INCLUDE IN THE REPORT ANY IMPROPERLY INSTALLED OR MISSING BALANCING DEVICES THAT WOULD NEGATIVELY IMPACT THE SYSTEM OPERATION.

ADJUST THERMOSTATS AND CONTROL DEVICES TO OPERATE AS INTENDED. ADJUST BURNERS, PUMPS, FANS, ETC. FOR PROPER AND EFFICIENT OPERATION. CERTIFY TO ARCHITECT THAT ADJUSTMENTS HAVE BEEN MADE AND THAT SYSTEM IS OPERATING SATISFACTORILY. FURTHER ADJUSTMENTS SHALL BE MADE TO OBTAIN UNIFORM TEMPERATURE IN SPACES. CALIBRATE, SET, AND ADJUST AUTOMATIC TEMPERATURE CONTROLS. CHECK PROPER SEQUENCING OF INTERLOCK SYSTEMS, AND OPERATION OF SAFETY CONTROLS.

EQUIPMENT FURNISHED BY OTHERS

PROVIDE NECESSARY EQUIPMENT AND ACCESSORIES THAT ARE NOT PROVIDED BY THE EQUIPMENT SUPPLIER OR OWNER TO COMPLETE INSTALLATION OF COOKING EQUIPMENT, WASHING EQUIPMENT, ETC., FURNISHED BY OTHERS, IN LOCATIONS AS INDICATED ON THE DRAWINGS AND/OR DESCRIBED IN THE GENERAL NOTES TO THIS CONTRACTOR. EQUIPMENT AND ACCESSORIES NOT PROVIDED BY THE EQUIPMENT SUPPLIER MAY INCLUDE FLUES, VENTS, INTAKES, ASSOCIATED ROOF JACKS AND CAPS TO OUTDOORS, DAMPERS, IN-LINE FANS, ROOF FANS, CONTROL INTERLOCKS, ETC. AS REQUIRED FOR PROPER OPERATION OF THE COMPLETE SYSTEM IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECT ROUGH-IN DIMENSIONS AND SHALL VERIFY SAME WITH ARCHITECT AND/OR EQUIPMENT SUPPLIER PRIOR TO SERVICE INSTALLATIONS.

DUCT INSULATION

PROVIDE DUCT LINER IN CONCEALED RECTANGULAR SUPPLY AND RETURN AIR DUCTWORK. LINER SHALL BE 1-1/2" THICK, 1-1/2" POUND DENSITY FIBERGLASS, MINIMUM R-6.0 CERTAINTEE CORP. "TOUGHGUARD" OR EQUIVALENT OWENS-CORNING OR KNAUF LONG TEXTILE FIBER DUCT LINER. LINER SURFACE SHALL SERVE AS A BARRIER AGAINST INFILTRATION OF DUST AND DIRT, SHALL MEET ASTM C 1338 FOR FUNGI RESISTANCE AND SHALL BE CLEANABLE USING DUCT CLEANING METHODS AND EQUIPMENT OUTLINED BY NORTH AMERICAN INSULATION MANUFACTURERS' ASSOCIATION (NAIMA) DUCT CLEANING GUIDE. INSTALL WITH LINER ADHESIVE AND MECHANICAL FASTENERS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. DUCTWORK SIZES SHOWN ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS. INCREASE SHEET METAL BY LINER THICKNESS IN BOTH DIRECTIONS WHERE LINER IS INSTALLED.

COVER CONCEALED, RIGID DUCTWORK WITH 2" THICK, 3/4 POUND DENSITY, MINIMUM R-6.0 DUCT WRAP, CERTAINTEE OR EQUIVALENT OWENS-CORNING OR KNAUF WITH HEAVY-DUTY FOIL-SCRIM-KRAFT FACING, AND WITH JOINTS TAPED WITH 3" WIDE FOIL TAPE AS FOLLOWS:

- A. ROUND AND/OR RECTANGULAR SUPPLY AND RETURN AIR DUCTWORK.
- B. ROUND AND RECTANGULAR OUTSIDE AIR DUCTWORK.
- C. ROUND AND RECTANGULAR EXHAUST AND RELIEF AIR DUCTWORK WITHIN 10 FEET OF EXTERIOR DISCHARGE.

INSULATING MATERIALS, ADHESIVES, COATINGS, ETC., SHALL NOT EXCEED FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPED RATING OF 50 PER ASTM E 84. CONTAINERS FOR MASTICS AND ADHESIVES SHALL HAVE U.L. LABEL.

FOR DUCTWORK THAT IS LOCATED EXTERIOR TO THE BUILDING AND INSTALLED WITH SEAMS SEALED WITH SEALANT, PROVIDE 2" (MINIMUM R-12) THICK, 3 POUND DENSITY LINER. FOR WELDED DUCTWORK THAT IS EXTERIOR TO THE BUILDING, INSULATE WITH 2" (MINIMUM R-12) THICK FIBROUS BOARD INSULATION AND PROVIDE MINIMUM 2" GAUGE ALUMINUM JACKET OR 2" (MINIMUM R-12) THICK FLEXIBLE ELASTOMERIC CLOSED CELL INSULATION SIMILAR TO ARMACELL ARMATUFF PLUS WITH A WEATHER AND UV RESISTANT LAMINATED METAL FOIL AND POLYESTER MEMBRANE AROUND A SCRIM REINFORCED CORE. SEAL ALL EXPOSED EDGES.

DUCTWORK

PROVIDE GALVANIZED STEEL DUCTWORK AND HOUSINGS AS SHOWN ON DRAWINGS. CONSTRUCT DUCTWORK INCLUDING FITTINGS AND TRANSITIONS IN CONFORMANCE WITH CURRENT SMACNA STANDARDS RELATIVE TO GAUGE, BRACING, JOINTS, ETC. MINIMUM DUCTWORK SIZE SHALL BE 26-GAUGE SHEET METAL. RENEWABLE HOUSINGS AND DUCTWORK OVER 30" WITH 1-1/4" ANGLES NOT LESS THAN 5" ON CENTERS, AND CLOSER IF REQUIRED FOR SUFFICIENT RIGIDITY TO PREVENT VIBRATION. SUPPORT HORIZONTAL RUNS OF DUCT FROM STRAP IRON HANGERS ON CENTERS NOT TO EXCEED 8'-0". DO NOT SUPPORT CEILING GRID, CONDUITS, PIPES, EQUIPMENT, ETC. FROM DUCTWORK. COORDINATE BRACING OF DUCTWORK WITH OTHER CONTRACTORS SUCH THAT PIPING, ELECTRICAL CONDUIT, AND ASSOCIATED SUPPORTS ARE NOT ROUTED THROUGH THE DUCTWORK.

CONSTRUCT SUPPLY DUCTS TO MEET SMACNA POSITIVE PRESSURE OF 2" W.G. CONSTRUCT RETURN, OUTDOOR AND EXHAUST DUCTWORK UPSTREAM OF FANS TO MEET SMACNA NEGATIVE PRESSURE OF 2" W.G. CONSTRUCT EXHAUST DUCTWORK DOWNSTREAM OF FANS TO MEET SMACNA POSITIVE PRESSURE OF 2" W.G.

PROVIDE MILL PHOSPHATIZED OR GALVANEALD FINISH FOR EXPOSED DUCTWORK TO BE FIELD PAINTED. SHOP TREATED SHEET METAL SHALL HAVE GALVANIZING METAL PRIMER APPLIED IN THE SHOP AFTER FABRICATION AND PRIOR TO SHIPPING.

DUCTWORK ABOVE ROOF OR OTHERWISE EXTERIOR TO BUILDING SHALL BE MINIMUM #18 GAUGE WITH LONGITUDINAL AND TRANSVERSE JOINTS WELDED OR SEALED AIRTIGHT WITH WEATHERPROOF HEAVY LIQUID SEALANT APPLIED ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

SEAL DUCTWORK WITH HEAVY LIQUID SEALANT, HARDCAST IRONGRIP 601, DESIGN POLYMER DP 1010, UNITED MCGILL DUCT SEALER OR APPROVED EQUAL, APPLIED ACCORDING TO SEALANT MANUFACTURER'S INSTRUCTIONS. FOR DUCTS WITH PRESSURE CLASSIFICATION OF 2" W.G. AND GREATER SEAL LONGITUDINAL AND TRANSVERSE DUCTWORK JOINTS AIRTIGHT TO MEET SMACNA CLASS B. FOR DUCTS WITH PRESSURE CLASSIFICATION LESS THAN 2" W.G. SEAL TRANSVERSE JOINTS AIRTIGHT TO MEET SMACNA CLASS C. TAPES AND MASTICS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A.

PROVIDE RADIUS ELBOWS, TURNS, AND OFFSETS WITH A MINIMUM CENTERLINE RADIUS OF 1-1/2 TIMES THE DUCT WIDTH WHERE SPACE DOES NOT PERMIT FULL RADIUS ELBOWS. PROVIDE SHORT RADIUS ELBOWS WITH A MINIMUM OF TWO CONTINUOUS SPLITTER VANES. VANES SHALL BE THE ENTIRE LENGTH OF THE BEND. PROVIDE MITERED ELBOWS WHERE SPACE DOES NOT PERMIT RADIUS ELBOWS, WHERE SHOWN ON THE DRAWINGS, OR AT THE OPTION OF THE CONTRACTOR WITH THE ENGINEER'S APPROVAL. MITERED ELBOWS FEET IN 45 DEGREES SHALL NOT REQUIRE TURNING VANES. MITERED ELBOWS 45-DEGREES AND GREATER SHALL HAVE SINGLE THICKNESS TURNING VANES OF SAME GAUGE AS DUCTWORK, RIGIDLY FASTENED WITH GUIDE STRIPS IN DUCTWORK. VANES FOR MITERED ELBOWS SHALL BE PROVIDED IN ALL SUPPLY AND EXHAUST DUCTWORK AND IN RETURN AND OUTSIDE AIR DUCTWORK THAT HAS AN AIR VELOCITY EXCEEDING 1000 FPM. DO NOT INSTALL VANES IN GREASE DUCTWORK.

DUCTS SHALL BE CONNECTED TO FANS, FAN CASINGS AND FAN PLENUMS BY MEANS OF FLEXIBLE CONNECTORS. FLEXIBLE CONNECTORS SHALL BE NEOPRENE COATED GLASS CLOTH CANVAS CONNECTIONS, DURO-DYNE, ELGEN, VENTFABRIC OR EQUAL. FLEXIBLE CONNECTORS SHALL HAVE A FLAME SPREAD OF 25 OR LESS AND SMOKE DEVELOPED RATING NOT HIGHER THAN 50. MAKE AIRTIGHT JOINTS AND INSTALL WITH MINIMUM 1-1/2" SLACK.

PROVIDE BALANCING DAMPERS, MANUFACTURED BY RUSKIN, GREENHECK, NALOR INDUSTRIES, CESCO, LOUVERS & DAMPERS, POTTORFF OR APPROVED EQUAL, WHERE SHOWN ON DRAWINGS AND WHEREVER NECESSARY FOR COMPLETE CONTROL OF AIR FLOW. SPLITTER DAMPERS SHALL BE CONTROLLED BY LOCKING QUADRANTS; PROVIDE YOUNG REGULATOR OR VENTLOK, END BEARINGS FOR THE DAMPER ROD. RECTANGULAR VOLUME DAMPERS SHALL BE OPPOSED BLADE INTERLOCKING TYPE. ROUND VOLUME DAMPERS SHALL BE BUTTERFLY TYPE CONSISTING OF CIRCULAR BLADE MOUNTED TO A SHAFT. DAMPER LEAKAGE FOR OUTSIDE AIR DAMPERS SHALL NOT EXCEED 4.0 CFM/SQUARE FOOT IN FULL CLOSED POSITION AT 1" WG PRESSURE DIFFERENTIAL ACROSS DAMPER. REFERENCE MANUFACTURER AND MODEL NUMBER FOR OUTSIDE AIR DAMPERS IS RUSKIN MODEL CD-50. PROVIDE FLEXMASTER MODEL STO OR EQUAL 45 DEGREE RECTANGULAR/ROUND SIDE TAKEOFF FITTING WITH MODEL SLEO DOUBLE BEARING DAMPER WITH INSULATION BUILD OUT FOR ROUND DUCTWORK ROUND TAKEOFFS TO INDIVIDUAL AIR DEVICES. OMIT DAMPER AT TAKEOFF FITTING WHEN DAMPER IS LOCATED DOWNSTREAM OF TAKEOFF.

WHERE ACCESS TO DAMPERS THROUGH A HARD CEILING IS REQUIRED, PROVIDE A METROPOLITAN AIR TECHNOLOGY MODEL 2950 OR EQUAL "Y" YOUNG'S REGULATOR CONCEALED, CABLE OPERATED VOLUME DAMPER WITH REMOTE OPERATOR. DAMPER SHALL BE ADJUSTABLE THROUGH THE DIFFUSER FACE OR FRAME WITH STANDARD 1/4" NUTDRIVER OR FLAT SCREWDRIVER. CABLE ASSEMBLY SHALL ATTACH TO DAMPER AS ONE PIECE WITH NO LINKAGE ADJUSTMENT. POSITIVE, DIRECT, TWO-WAY DAMPER CONTROL SHALL BE PROVIDED. SLEEVES, SPRINGS AND SCREW ADJUSTMENTS TO COME LOOSE AFTER INSTALLATION. SUPPORT CABLE ASSEMBLY TO AVOID BENDS AND KINKS IN CABLE WHERE APPROVED BY ARCHITECT, A CEILING CUP WITH COVER PLATE CAN BE USED FOR ACCESS TO CABLE OPERATOR.

ROUND OR oval DUCTWORK SHALL BE SEMCO, UNITED, WESCO OR EQUAL, SHEETMETAL. MET THE SHORTER DIMENSION WITH LOW PRESSURE (DUCT PRESSURE CLASS UP TO AND INCLUDING 2" W.G.) ROUND DUCTWORK GAUGES PER THE FOLLOWING TABLE (REFERENCE SMACNA HVAC DUCT CONSTRUCTION STANDARDS FOR GAUGES WHEN PRESSURES EXCEED 2" W.G.):

SIZE	DUCT GAUGE	FITTING GAUGE
14" & UNDER	26	24
15" THRU 26"	24	22
28" THRU 36"	22	20
38" THRU 50"	20	20

LINDAB SPIROSAFE, LEWIS & LAMBERT OR APPROVED EQUAL FACTORY-MANUFACTURED ROUND DUCTWORK AND FITTINGS MAY BE SUBSTITUTED FOR SPECIFIED ROUND BRANCH DUCTWORK, AT CONTRACTORS OPTION. HEAVY LIQUID JOINT SEALANT MAY BE OMITTED ON FACTORY-MANUFACTURED ROUND DUCTWORK.

LOW PRESSURE (DUCT PRESSURE CLASS UP TO AND INCLUDING 2" W.G.) FITTINGS 24" IN DIAMETER AND LESS SHALL BE PREFABRICATED, SPOTWELDED AND INTERNALLY SEALED. CONTINUOUSLY WELD FITTINGS LARGER THAN 24" IN DIAMETER. FITTING GAUGE SHALL BE 22 GAUGE FOR 36" FITTINGS AND UNDER, 20 GAUGE FOR LARGER SIZES. 90 DEGREE TEE'S SHALL BE CONICAL TYPE. SEAL LONGITUDINAL AND TRANSVERSE DUCTWORK JOINTS AIRTIGHT WITH HEAVY LIQUID SEALANT APPLIED ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

FLEXIBLE DUCT

LOW PRESSURE (DUCT PRESSURE CLASS UP TO AND INCLUDING 2" W.G.) AND MEDIUM PRESSURE (DUCT PRESSURE CLASS 2.1" TO 6" W.G.) FLEXIBLE DUCT SHALL BE FLEXMASTER TYPE 8B, THERMAFLEX TYPE G-KM, M-KE, OR EQUAL (FIRE RETARDANT POLYETHYLENE) PROTECTIVE VAPOR BARRIER, UL181 CLASS 1, ACOUSTICAL INSULATED DUCT, R-6.0 FIBERGLASS INSULATION. PROVIDE CPD LINER WITH STEEL WIRE HELIX MECHANICALLY LOCKED OR PERMANENTLY BONDED TO THE LINER.

FLEXIBLE DUCT RUNS SHALL NOT EXCEED 5 FEET IN LENGTH AND SHALL BE INSTALLED FULLY STRAIGHT AS POSSIBLE AVOIDING TIGHT TURNS. INSTALL FLEXIBLE DUCT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. SUPPORT FLEXIBLE DUCT AT MAXIMUM 5 FEET ON CENTER AND WITHIN 6 INCHES OF BENDS. BENDS SHALL NOT EXCEED A CENTERLINE RADIUS OF ONE DUCT DIAMETER. DUCT SAC SHALL NOT EXCEED 1/2" INCH. SUPPORTING MATERIAL IN DIRECT CONTACT WITH THE DUCT SHALL NOT BE LESS THAN 1-1/2" INCHES IN WIDTH.

CONNECT FLEXIBLE DUCT TO RIGID METAL DUCT OR AIR DEVICES AS RECOMMENDED BY THE MANUFACTURER. AT A MINIMUM, INSTALL TWO WRAPS OF DUCT TAPE AROUND THE INNER CORE CONNECTION AND A METALLIC OR NON-METALLIC CLAMP OVER THE TAPE AND TWO WRAPS OF DUCT TAPE OR A CLAMP OVER THE OUTER JACKET. DUCT CLAMPS SHALL BE LABELED IN ACCORDANCE WITH UL-181B AND MARKED 181B-C. DUCT TAPE SHALL BE LABELED IN ACCORDANCE WITH UL 181B AND MARKED ED18-FX.

FIRE DAMPERS

PROVIDE FIRE DAMPERS WHERE SHOWN ON DRAWINGS, AND AS REQUIRED BY CODE ENFORCING AUTHORITY. DAMPER RATINGS SHALL BE AS REQUIRED TO MAINTAIN THE FIRE AND/OR SMOKE RATINGS NOTED ON THE ARCHITECTURAL DRAWINGS. PROVIDE FIRE DAMPERS CONFORMING TO NFPA-90A AND UBC STANDARD 43-7 WITH RECOMMENDED STEEL SIZES AND ANGLES AS REQUIRED TO MEET THE INSTALLATION LOCATION, 165°F FUSIBLE LINK, SPRING CATCHES AND NON-CORROSIVE BEARINGS. DAMPERS SHALL BE U.L. LISTED, MANUFACTURED BY RUSKIN, GREENHECK, AIR BALANCE, CESCO, UNITED AIR OR NALOR INDUSTRIES. PROVIDE ACCESS DOOR, SIZED ACCORDING TO MINIMUM SIZE OF 10" BY 10", IN DUCT FOR INSPECTION AND SERVICE TO FIRE DAMPER AND FUSIBLE LINK.

PROVIDE DUCT ACCESS DOOR(S) WITHIN 12 INCHES OF THE DEVICE TO ALLOW FOR REPAIRS AND MAINTENANCE. LABEL EACH DOOR WITH MINIMUM 1" LETTERING INDICATING WHICH DAMPER TYPE IS SERVED. DOOR SHOULD BE CAPABLE OF BEING FULLY OPENED OR PROVIDE REMOVABLE DOOR. PROVIDE REMOVABLE SECTION OF DUCT WHERE DUCT SIZE IS TOO SMALL FOR 10" BY 10" ACCESS DOOR. PROVIDE ACCESS DOOR IN CEILING OR WALL AS REQUIRED TO ACCESS DAMPER.

COMBINATION FIRE/SMOKE DAMPERS

PROVIDE COMBINATION FIRE/SMOKE DAMPERS WHERE SHOWN ON DRAWINGS AND AS REQUIRED BY CODE ENFORCING AUTHORITY WITH FIRE/SMOKE RATINGS AS REQUIRED TO MAINTAIN THE FIRE RATING NOTED ON THE ARCHITECTURAL DRAWINGS. DAMPERS SHALL MEET UL 555 CLASSIFICATION FOR FIRE RATING AND UL 555S CLASSIFICATION OF LEAKAGE CLASS II SMOKE DAMPER; DAMPER SHALL BEAR A UL LABEL ATTESTING TO THESE CLASSIFICATIONS. PROVIDE FIRE DAMPER WITH A 165°F RESISTANT TEMPERATURE DEVICE. RATE FIRE/SMOKE DAMPERS FOR A MINIMUM VELOCITY OF 2,000 FPM AND PRESSURE OF 4" W.G. PROVIDE MANUFACTURER RECOMMENDED STEEL SLEEVE OF LENGTH AS REQUIRED TO MEET THE INSTALLED LOCATION. PROVIDE 1" QUALIFIED ELECTRICAL CONTRACTOR TO VERIFY THE DAMPER IS INSTALLED BY MANUFACTURER AT TIME OF DAMPER FABRICATION. ACTUATORS SHALL BE RATED FOR A MINIMUM OF 20,000 CYCLES OF OPERATION, SHALL COMPLY WITH THE LOCALLY ADOPTED BUILDING CODE AND SHALL OPEN IN 15 SECONDS OR LESS AND CLOSE IN 15 SECONDS OR LESS. PROVIDE ACCESS DOOR WITHIN 12 INCHES OF THE DEVICE TO ALLOW FOR TESTING AND MAINTENANCE. LABEL EACH DOOR WITH MINIMUM 1" LETTERING INDICATING WHICH DAMPER TYPE IS SERVED. DOOR SHOULD BE CAPABLE OF BEING FULLY OPENED OR PROVIDE REMOVABLE DOOR. PROVIDE REMOVABLE SECTION OF DUCT WHERE DUCT SIZE IS TOO SMALL FOR 10" BY 10" ACCESS DOOR. PROVIDE ACCESS DOOR IN CEILING OR WALL AS REQUIRED TO ACCESS DAMPER.

PROVIDE ACCESS DOOR, SIZED PER SMACNA WITH MINIMUM SIZE OF 10" BY 10", IN DUCT FOR INSPECTION AND SERVICE TO FIRE DAMPER AND FUSIBLE LINK. PROVIDE DUCT ACCESS DOOR(S) WITHIN 12 INCHES OF THE DEVICE TO ALLOW FOR TESTING AND MAINTENANCE. LABEL EACH DOOR WITH MINIMUM 1" LETTERING INDICATING WHICH DAMPER TYPE IS SERVED. DOOR SHOULD BE CAPABLE OF BEING FULLY OPENED OR PROVIDE REMOVABLE DOOR. PROVIDE REMOVABLE SECTION OF DUCT WHERE DUCT SIZE IS TOO SMALL FOR 10" BY 10" ACCESS DOOR. PROVIDE ACCESS DOOR IN CEILING OR WALL AS REQUIRED TO ACCESS DAMPER.

REFRIGERANT PIPING AND INSULATION

REFRIGERANT PIPING, CLEANED AND SEALED AT THE FACTORY, AND SPECIFICALLY DESIGNED FOR REFRIGERANT. FITTINGS SHALL BE HARD DRAWN AND HAVE LONG READING TURNS. SOLDER JOINTS WITH "SILFOS" (15 PERCENT SILVER, 5 PERCENT PHOSPHORUS), 80 PERCENT COPPER, 1300 DEGREES FAHRENHEIT FLOW TEMPERATURE) SOLDER JOINTS WITH A SLOW STREAM OF DRY NITROGEN PASSING THROUGH THE PIPING.

INSULATE SUCTION LINES WITH 1" AND LIQUID LINES WITH 1/2" FOAMED PLASTIC INSULATION, ARMAFLEX OR EQUAL. PIPING INSULATION SHALL HAVE A FLAME SPREAD OF 25 OR LESS, AND A SMOKE DEVELOPED RATING OF 50 OR LESS WHEN TESTED IN ACCORDANCE WITH ASTM E84. COAT INSULATION THAT IS EXPOSED TO THE ELEMENTS WITH A PROTECTIVE SEALER. INSTALL AND SUPPORT PIPING TO KEEP NOISE AND VIBRATION TO A MINIMUM. SUPPORT AND SECURE PIPING TO UNISTRUT TYPE SUPPORTS SO THAT NO VIBRATION PASSES TO THE BUILDING STRUCTURE. PIPE ATTACHMENTS SHALL BE PROVIDED WITH NON-METALLIC GASKETS OR WASHERS TO PREVENT ELECTROLYTIC PROTECTION WHERE ATTACHMENTS ARE IN DIRECT CONTACT WITH COPPER TUBING. INSTALL A SUPPORT WITHIN ONE FOOT OF EACH CHANGE OF DIRECTION. MOUNT PIPE HANGERS AROUND THE OUTSIDE OF THE INSULATION WITH SADDLES TO PREVENT HANGERS FROM RUPTURING THE INSULATION. REPLACE INSULATION THAT IS CUT OR BROKEN BY THE HANGERS.

RUN REFRIGERANT LINES PARALLEL AND PERPENDICULAR TO WALL AND FLOOR LINES AND PANEL TIME SWITCHES, OVERRIDE TIMERS, DAMPER MOTORS, AND RELAYS REQUIRED SLIGHTLY (1" IN 20') TOWARDS THE COMPRESSOR. PROVIDE OIL TRAPS AT THE BASE OF VERTICAL SUCTION RISERS OVER 6 FEET HIGH.

INSTALL LIQUID LINE SIGHT GLASSES IN LIQUID LINES NEAREST THE EXPANSION VALVE. FACTORY MOUNT EXPANSION VALVES WITH THE SENSING BULBS SHIPPED LOOSE. FIELD MOUNT EXPANSION VALVE BULB AFTER REFRIGERANT PIPING IS COMPLETE (DAMAGE MAY OCCUR IF BULBS COME IN CONTACT WITH HEAT).

FOR SYSTEMS OF 5 TON CAPACITY AND SMALLER, THE CONTRACTOR SHALL HAVE THE OPTION TO PROVIDE COPPER REFRIGERANT TUBING LINE SET SIZED AS RECOMMENDED BY EQUIPMENT MANUFACTURER AND OF LENGTH AS REQUIRED FOR THE INSTALLATION. PROVIDE 1" THICK FOAMED PLASTIC INSULATION, ARMAFLEX OR EQUAL, ON THE SUCTION LINE. PROVIDE QUICK-CLOSE INSULATION TUBING COMPRESSION FITTING OR SOLDER CONNECTIONS AS REQUIRED TO MATCH THE CONNECTIONS OF THE CONDENSING UNIT AND EVAPORATOR COIL.

TEMPERATURE CONTROLS

GENERAL REQUIREMENTS

PROVIDE A SYSTEM OF TEMPERATURE CONTROLS INCLUDING THERMOSTATS, CONTROL PANELS, TIME SWITCHES, OVERRIDE TIMERS, DAMPER MOTORS, AND RELAYS REQUIRED TO PROVIDE THE DESIRED SEQUENCE OF OPERATION. PROVIDE INTEGRATED WIRING DIAGRAMS SHOWING INTERCONNECTIONS BETWEEN FIELD INSTALLED EQUIPMENT AND PACKAGE WIRING FURNISHED WITH THE HVAC EQUIPMENT. CONTROL WIRING SHALL BE SIZED TO ACCOMMODATE THE VOLTAGE DROP ASSOCIATED WITH THE DISTANCE BETWEEN THE CONTROL DEVICE AND THE CONTROLLER. PROVIDE SUPERVISION AND ON-JOB CHECKOUT SERVICE AS REQUIRED TO ENSURE THAT INSTALLATION MEETS REQUIREMENTS OF THE SPECIFICATION. THE SYSTEM SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FOLLOWING THE ACCEPTANCE OF THE SYSTEM BY THE ARCHITECT/ENGINEER. CORRECT DEFECTS OCCURRING DURING THIS PERIOD AT NO ADDITIONAL COST TO THE OWNER.

EQUIPMENT

MANUFACTURERS AND MODEL NUMBERS ARE LISTED FOR REFERENCE AS TO QUALITY AND FEATURES REQUIRED FOR THE CONTROL DEVICES. PROVIDE CONTROL DEVICES BY CARRIER, HONEYWELL, JOHNSON CONTROLS, TRANE OR WHITE RODGERS WITH QUALITY AND FEATURES AS INDICATED.

SEVEN DAY PROGRAMMABLE, OCCUPIED/UNOCCUPIED THERMOSTATS FOR CONTROL OF MULTIPLE STAGES OR MODULATION OF HEATING AND COOLING SYSTEMS AND FOR CONTROL OF ECONOMIZER SYSTEM SHALL BE HONEYWELL SERIES TH000 OR EQUAL. PROVIDE REMOTE SENSOR WITH OVERRIDE BUTTON AND +/-3 DEGREE SETPOINT ADJUSTMENT AT REMOTE SENSOR. INSTALL THERMOSTATS AT 48" AFF TO MEET ADA REQUIREMENTS UNLESS OTHERWISE NOTED ON THE PLANS.

PROVIDE DAMPER OPERATOR FOR EACH AUTOMATIC DAMPER WITH SUFFICIENT CAPACITY TO OPERATE THE DAMPER UNDER ALL CONDITIONS AND TO GUARANTEE TIGHT CLOSE-OFF OF DAMPERS AGAINST SYSTEM PRESSURE ENCOUNTERED. EACH OPERATOR SHALL BE PROVIDED WITH SPRING-RETURN FOR NORMALLY CLOSED OR NORMALLY OPEN POSITION FOR FAIL SAFE OPERATION TO ACCOUNT FOR FIRE, LOW TEMPERATURES, OR POWER INTERRUPTION AS REQUIRED BY THE SEQUENCE OF OPERATION. DAMPER OPERATORS SHALL BE MANUFACTURED BY BELIMO, JOHNSON CONTROLS OR APPROVED EQUAL.

ROOFTOP UNIT CONTROL (FIXED DRY BULB ECONOMIZER)

SPECIFIER'S NOTE: USE 65 F IN HUMID CLIMATES AND 70 F IN DRY CLIMATES. DURING OCCUPIED HOURS OPERATE ROOFTOP UNIT SUPPLY FAN CONTINUOUSLY AND OPEN OUTDOOR AIR DAMPER TO MINIMUM POSITION TO MAINTAIN MINIMUM VENTILATION. CYCLE STAGE(S) OF COOLING AND HEATING TO MAINTAIN ROOM THERMOSTAT SET POINT (75 DEGREES FAHRENHEIT COOLING, 72 DEGREES FAHRENHEIT HEATING). ENABLE DRY BULB TYPE OUTDOOR AIR ECONOMIZER FOR FIRST STAGE COOLING TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT (55 DEGREES F, ADJUSTABLE) WHEN OUTDOOR AMBIENT TEMPERATURE REACHES 70 DEGREES FAHRENHEIT OR BELOW. RETURN THE ECONOMIZER TO MINIMUM POSITION WHEN AMBIENT TEMPERATURE IS ABOVE 70 DEGREES FAHRENHEIT OR WHEN DISCHARGE AIR TEMPERATURE DROPS BELOW 50 DEGREES FAHRENHEIT. SMOKE DETECTORS SHALL SHUTDOWN UNIT UPON ALARM.

DURING UNOCCUPIED HOURS, CYCLE THE ROOFTOP UNIT SUPPLY FAN AND COOLING OR HEATING SYSTEM TO MAINTAIN UNOCCUPIED SETBACK TEMPERATURE SET POINTS. OUTDOOR AIR DAMPER SHALL BE CLOSED DURING UNOCCUPIED HOURS.

CLIENT: [Redacted]

New Tenant Renovation.



EST. 1998
SCOOTERS COFFEE

REVISIONS:		
#	DESCRIPTION	DATE
	ISSUED FOR PERMIT	10/27/25
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PROJECT NUMBER: [Redacted]

DRAWN BY: [Redacted] REVIEWED BY: [Redacted]

SHEET TITLE: MECHANICAL SPECIFICATIONS

SHEET NO. M3.0

PLUMBING SYMBOLS

NOTE: THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS, ETC. ARE NECESSARILY USED ON THE DRAWINGS.

ANNOTATION

- ① PLUMBING PLAN NOTE CALLOUT
- ① PLUMBING EQUIPMENT DESIGNATION. (CONTRACTOR FURNISHED AND INSTALLED). REFER TO PLUMBING FIXTURE SCHEDULES.
- 1 EQUIPMENT DESIGNATION (OWNER FURNISHED, CONTRACTOR INSTALLED)
- CU MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)
- CONNECTION POINT OF NEW WORK TO EXISTING
- ① 1 DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	MAX	MAXIMUM
AFG	ABOVE FINISHED GRADE	MBH	1000 BTU PER HOUR
BFF	BELOW FINISHED FLOOR	MIN	MINIMUM
BFG	BELOW FINISHED GRADE	ORD	OVERFLOW ROOF DRAIN
BOP	BOTTOM OF PIPE	FDI	PLUMBING DRAINAGE INSTITUTE
BOS	BOTTOM OF STRUCTURE	PVC	POLYVINYL CHLORIDE
BTU	BRITISH THERMAL UNIT	PRV	PRESSURE REDUCING VALVE
CPVC	CHLORINATED POLYVINYL CHLORIDE	RD	ROOF DRAIN
DN	DOWN	RP	REVOLUTIONS PER MINUTE
DS	DOWNSPOUT	SF	SQUARE FEET, SUPPLY FAN
ETR	EXISTING TO REMAIN	SP	SUMP PUMP
FFA	FROM FLOOR ABOVE	TDH	TOTAL DYNAMIC HEAD
FFB	FROM FLOOR BELOW	TFA	TO FLOOR ABOVE
FF	FINISHED FLOOR	TFB	TO FLOOR BELOW
FLA	FULL LOAD AMPS	TYP	TYPICAL
FLR	FLOOR	UL	UNDERWRITERS LABORATORIES, INC.
GPM	GALLONS PER MINUTE	W	VENT STACK
HD	HEAD, HUB DRAIN	VTR	VENT THROUGH ROOF
IE	INVERT ELEVATION	W/	WITH
IN WC	INCHES OF WATER COLUMN	W/O	WITHOUT
KW	KILOWATT	WC	WATER COLUMN
MAU	MAKE-UP AIR UNIT	WS	WASTE STACK

PIPING

---	DOMESTIC COLD WATER (CW)
---SCW---	SOFTENED COLD WATER (SCW)
---FW---	FILTERED COLD WATER (FW)
---	DOMESTIC HOT WATER (HW)
---	DOMESTIC HOT WATER RECIRC. (HWR)
---140'---	140' DOMESTIC HOT WATER (140')
---T---	TRAP PRIMER LINE (T)
---	SOIL PIPING - ABOVE FLOOR (S)
---	SOIL PIPING - BELOW FLOOR (S)
---	WASTE PIPING - ABOVE FLOOR (W)
---	WASTE PIPING - BELOW FLOOR (W)
---GW---	GREASE WASTE - ABOVE FLOOR (GW)
---GW---	GREASE WASTE - BELOW FLOOR (GW)
---	STORM DRAIN - ABOVE FLOOR (ST)
---	STORM DRAIN - BELOW FLOOR (ST)
---	OVERFLOW STORM DRAIN - ABOVE FLOOR (OST)
---	VENT BELOW GRADE (VBG)
---	VENT BELOW FLOOR (VBF)
---	CONDENSATE DRAIN (CD)
---	SUMP OR SEWAGE PUMP DISCHARGE (SPD)
---	NATURAL GAS (G)
---	NATURAL GAS ON ROOF (G)
---	MEDIUM PRESSURE NATURAL GAS (MPG)
---	MEDIUM PRESSURE NATURAL GAS ON ROOF (MPG)
---	LIQUIFIED PETROLEUM GAS (LPG)
---	EXISTING PIPING TO BE REMOVED
---	EXISTING PIPING TO REMAIN (ETR)
---	VENT PIPING (V)
---	BALL VALVE
---	CONTROL VALVE
---	SHUTOFF VALVE
---	CHECK VALVE
---	BALANCING VALVE WITH PRESSURE PORTS
---	WATER METER
---	STRAINER
---	STRAINER WITH BLOWOFF
---	RELIEF/SAFETY VALVE
---	SOLENOID VALVE
---	PRESSURE REDUCING VALVE
---	GAS PRESSURE REGULATOR
---	THERMOSTATIC MIXING VALVE
---	BACKFLOW PREVENTER
---	PRESSURE GAUGE
---	THERMOMETER
---	UNION
---	FLANGE CONNECTION
---	HOSE BIBB (HB)
---	NONFREEZE WALL HYDRANT (NW)
---	MANUAL/AUTOMATIC AIR VENT OR RELIEF VALVE
---	CLEANOUT
---	CAP
---	WALL CLEANOUT (WCO)
---	FLOOR CLEANOUT (FCO)
---	EXTERIOR CLEANOUT (ECO)
---	ELBOW UP
---	ELBOW DOWN
---	TEE UP
---	TEE DOWN
---	WATER HAMMER ARRESTER (WHA)
---	RECIRCULATION PUMP
---	P-TRAP
---	GAS COCK
---	TRAP PRIMER
---	TRAP PRIMER WITH DISTRIBUTION UNIT

GENERAL PLUMBING NOTES:

- A. DRAWINGS ARE DIAGRAMMATIC ONLY AND REPRESENT THE GENERAL SCOPE OF THE WORK. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE TO OBSERVE THE EXISTING CONDITIONS OF THE PROJECT. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND PLANS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY OWNER'S CONSTRUCTION MANAGER OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
- B. PROVIDE A CONSTRUCTION RECORD SET OF "AS-BUILT" DOCUMENTS TO THE OWNER'S CONSTRUCTION MANAGER REFLECTING ANY VARIANCES OF INSTALLED PIPING LOCATIONS OR EQUIPMENT CONTRARY TO THE CONSTRUCTION DOCUMENTS, REFER TO SPECIFICATIONS.
- C. PROVIDE TO THE OWNER'S CONSTRUCTION MANAGER A COPY OF INSPECTION REPORTS AND APPROVAL CERTIFICATES FROM LOCAL AND STATE INSPECTIONS, REFER TO SPECIFICATIONS.
- D. INSTALLATION SHALL COMPLY WITH LEGALLY CONSTITUTED CODES AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION AND ALSO MEET ALL REQUIREMENTS OF THE LANDLORD. OBTAIN A COPY OF THE LANDLORD'S REQUIREMENTS AND REVIEW PRIOR TO SUBMITTING BID.
- E. PLANS AND SPECIFICATIONS GOVERN WHERE THEY EXCEED CODE REQUIREMENTS.
- F. VERIFY LOCATION AND DEPTH OF UTILITIES AT POINTS OF CONNECTION BEFORE START OF PIPING INSTALLATION.
- G. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF PLUMBING FIXTURES.
- H. DO NOT SCALE FLOOR PLANS FOR EXACT HORIZONTAL LOCATION OF PIPE ROUTING.
- I. INSTALL CONCEALED PIPING TIGHT TO THE STRUCTURE AND AS HIGH AS POSSIBLE. INSTALL EXPOSED PIPING TIGHT TO THE STRUCTURE, WALL OR CEILING AND AS HIGH AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS.
- J. VALVES SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
- K. PIPING IN FINISHED AREAS SHALL BE ROUTED CONCEALED; EXPOSED PIPING, WHERE NECESSARY, SHALL BE ROUTED AS HIGH AS POSSIBLE AND TIGHT TO WALLS.
- L. COORDINATE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
- M. COORDINATE PIPING INSTALLATION WITH STRUCTURAL GRADE BEAMS, FOOTINGS, COLUMN PIERS, ETC. SLEEVE PIPING THROUGH GRADE BEAMS, FOOTING, ETC. WHERE REQUIRED AND AS NOTED ON PLANS. COORDINATE SLEEVE INSTALLATIONS WITH THE ARCHITECT, STRUCTURAL ENGINEER, STRUCTURAL CONTRACTOR AND GENERAL CONTRACTOR BEFORE CONCRETE IS INSTALLED.
- N. CLEAN FAUCET AERATORS AND PIPE STRAINERS PRIOR TO TURNING BUILDING OVER TO THE OWNER.
- O. PROVIDE TRAP PRIMERS WHERE REQUIRED BY LOCAL AUTHORITIES.
- P. COORDINATE PIPE ROUTING AWAY FROM ELECTRICAL PANELS. DO NOT INSTALL PIPING OVER ELECTRICAL PANELS.
- Q. PAINT ALL EXPOSED GAS AND WATER PIPING USING RUST INHIBITOR PAINT. PAINT AND COLOR SHALL BE COORDINATED WITH THE ARCHITECT AND / OR OWNER.
- R. COORDINATE ALL ROOF PENETRATIONS WITH OTHER TRADES. MAINTAIN 10" MINIMUM CLEARANCE FROM ALL AIR INTAKES. MAINTAIN 2' CLEARANCE FROM ALL OTHER EQUIPMENT.
- S. INSULATE PIPING ROUTED IN EXTERIOR BUILDING WALLS WITH MINIMUM 2" BATT INSULATION TO PREVENT FREEZING.
- T. SEAL ALL PENETRATIONS THROUGH RATED WALLS AND CEILINGS.
- U. EXAMINE THE CONTRACT DRAWINGS AND ALL AVAILABLE INFORMATION CONCERNING EXISTING INSTALLATION, STRUCTURE, AND LOCAL CONDITIONS. VISIT THE SITE TO UNDERSTAND THE NATURE AND SCOPE OF ALL WORK TO BE PERFORMED AND VERIFY EXISTING CONDITIONS. THE SUBMISSION OF A BID WILL BE TAKEN AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND THAT ALL EXISTING CONDITIONS HAVE BEEN CONSIDERED. NO ALLOWANCES WILL BE MADE AFTER THE PROJECT HAS BEEN AWARDED FOR FAILURE TO VERIFY EXISTING CONDITIONS. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THAT OF THESE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.

PLUMBING FIXTURE SCHEDULE:

FIXTURES IN THIS SCHEDULE OR THEIR APPROVED EQUIVALENT ARE PROVIDED BY THE PLUMBING CONTRACTOR. SUBMIT SHOP DRAWINGS ON EACH OF THESE ITEMS. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION AND INSTALLATION REQUIREMENTS. VERIFY ROUGH-IN REQUIREMENTS WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS. REFER TO THE ARCHITECTURAL DRAWINGS FOR THE PLUMBING FIXTURE MOUNTING HEIGHTS.

- (BFP-1) DUAL CHECK VALVE WITH ATMOSPHERIC PORT: ZURN WILKINS 740, 300 STAINLESS STEEL BODY, 3/8" INLET AND OUTLET, ATMOSPHERIC PORT, AND WYE PATTERN STRAINER. MEETS ASSE 1022 STANDARDS.
- (BFP-2) DUAL CHECK VALVE BACKFLOW PREVENTOR: ZURN WILKINS, #950XLT LEAD FREE CAST BRONZE BODY, QUARTER TURN TEST COCKS, QUARTER TURN BALL VALVES, AND STRAINER. MEETS ASSE 1015 STANDARDS.
- (BFP-3) REDUCES PRESSURE ZONE BACKFLOW PREVENTOR: ZURN WILKINS 975XLS2(G) LEAD FREE CAST BRONZE BODY, QUARTER TURN TEST COCKS, QUARTER TURN BALL VALVES, BRONZE STRAINER, AND AIR GAP. MEETS ASSE 1013 STANDARDS.
- (ET) EXPANSION TANK: AMTROL "THERM-X-TROL" # ST-5, WELDED STEEL PRESSURE TANK, POLYPROPYLENE LINING, FLEXIBLE BUTYL DIAPHRAGM, AIR CHARGING VALVE, 150 PSI MAXIMUM WORKING PRESSURE, 2.0 GALLON CAPACITY, 0.45 MAXIMUM ACCEPTANCE FACTOR, 3/4" PIPE CONNECTION. SET THE AIR CHARGE PRESSURE TO MATCH EXISTING WATER SYSTEM PRESSURE.
- (FCO) FLOOR CLEANOUT: ZURN C02450-AB3 ADJUSTABLE FLOOR CLEANOUT, 3 INCH ABS HUB CONNECTION, 4" SIZE AVAILABLE. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
- (FD) FLOOR DRAIN: ZURN # FD2210, PVC OR ABS BODY, ADJUSTABLE NICKEL BRONZE HEAD AND SECURED GRATE.
- (FS) FLOOR SINK: SIOUX CHIEF 861, PVC BODY WITH SCH 40 HUB CONNECTION, PVC STRAINER.
- (GT) GREASE TRAP: EXISTING 1500 GALLONS GREASE INTERCEPTOR TO REMAIN.
- (HB) HOSE BIBB: PRIER PRODUCTS # C-244, ANTI-FREEZING, ANTI-SIPHON VACUUM BREAKER, POWDER COATED CAST ALUMINUM HANDLE, INTEGRAL BACKFLOW CHECK VALVE, VANDAL PROOF EXTENDED LOCKSHIELD AND OPERATING KEY, SOLID BRASS BODY, AVAILABLE VARIOUS 1/2" & 3/4" INLET STYLES.
- (LV) WALL MOUNTED LAVATORY (ADA ACCESSIBLE): TOTO MODEL #L307 21" x 18-1/4" RECTANGULAR WALL MOUNTED WHITE VITREOUS CHINA FIXTURE WITH FAUCET LEDGE AND FRONT OVERFLOW. SINGLE HOLE. FAUCET: CHICAGO FAUCET #802-V2805KKCP 4" CENTERSET VANDAL RESISTANT, FAUCET WITH #390 LEVER HANDLES, CERAMIC QUARTER TURN CARTRIDGES AND #E2805 0.5 GPM OPERATOR. TRIM: MCGUIRE #1551 GRID DRAIN WITH TAILPIECE, MCGUIRE #2165CCLX LOOSE KEY COMPRESSION ANGLE STOP VALVES WITH RISERS AND ESCUTCHEONS, MCGUIRE #B8872CF 1-1/4" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON, CONCEALED ARM CARRIER WITH STANCHIONS TO FLOOR, AND PLUMBEREX "PRO-EXTREME" #X-4222 INSULATION KIT FOR WATER AND WASTE PIPES.
- (MS) MOP SINK: STERN-WILLIAMS # MTB-2424, 24" X 24" X 10" HIGH TERRAZZO BASIN WITH INTEGRAL STAINLESS STEEL DRAIN BODY. FAUCET: CHICAGO FAUCET # 897-CP FAUCET WITH WALL BRACE, INTEGRAL VACUUM BREAKER, PAIL HOOK, AND 3/4" MALE HOSE THREADED OUTLET. SECURE FAUCET IN WALL WITH BACKBOARD. TRIM: # BP TYPE 304, 20 GAUGE, STAINLESS STEEL WALL SURROUNDS, # T-35 THREE FOOT LONG REINFORCED HOSE WITH 3/4" CHROME COUPLING AND WALL HOOK, # V-70 EXTRUDED VINYL BUMPER GUARD, AND # T-40 24" STAINLESS STEEL MOP HANGER.
- (RPZ) REDUCED PRESSURE ZONE BACKFLOW PREVENTER: WATTS # LF090T-S, LEAD FREE CAST BRONZE BODY, QUARTER TURN TEST COCKS, QUARTER TURN BALL VALVES, BRONZE STRAINER, AND # 909AG AIR GAP FITTING.
- (TMV) THERMOSTATIC MIXING VALVE: POWERS # e480, SOLID BRASS BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 2.2 GPM WITH A 90 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.5 GPM. SET TEMPERATURE TO 110F FOR DUEL TEMPERATURE LAVATORIES AND HAND SINKS, 100F FOR SINGLE TEMPERATURE LAVATORIES AND HAND SINKS AND 120F FOR SINKS. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S).
- (TS) TRAP SEAL: ProSet SYSTEMS "TRAP GUARD" INSERT FOR ACTUAL FLOOR DRAIN MODEL AND SIZE PROVIDED, FLEXIBLE ELASTOMERIC PVC MATERIAL MOLDED INTO SHAPE OF DUCK'S BILL, OPEN ON TOP WITH CURVE CLOSURE AT BOTTOM. ALLOWS WASTEWATER TO OPEN AND ADEQUATELY DISCHARGE FLOOR DRAIN THROUGH ITS INTERIOR. CLOSURES AND RETURNS TO ORIGINAL MOLDED SHAPE AFTER WASTEWATER DISCHARGE IS COMPLETE.
- (WC) FLOOR-MOUNTED WATER CLOSET (ADA ACCESSIBLE): NIAGARA MODEL # LEFT HANDLE COMBO SKU: C44.302.01 RIGHT HANDLE COMBO SKU: C44.303.01 "BARRON" TANK TYPE WHITE VITREOUS CHINA FIXTURE WITH ELONGATED BOWL, 1.28 GALLON PER FLUSH, CLOSE COUPLED TANK WITH PRESSURE ASSISTED SIPHON JET ACTION SYSTEM. INSTALL SIDE MOUNTED CHROME TRIP LEVER ON THE WIDE SIDE OF THE STALL. LEFT HANDLE TANK MODEL 44.0322.01LCH RIGHT HANDLE TANK MODEL 44.0322.01RCH REFERENCE DRAWINGS FOR EXACT NUMBER OF RIGHT AND LEFT HAND TRIP LEVER TANKS REQUIRED. TRIM: CENTOCO 5005TSC-001 WHITE OPEN-FRONT CONTOURED, SOLID PLASTIC, HEAVY DUTY, SEAT LESS COVER WITH SELF-SUSTAINING CHECK HINGES AND STAINLESS STEEL BOLTS, MCGUIRE # 2166CC ANGLE STOP VALVE WITH RISER AND CHROME-PLATED ESCUTCHEON.
- (WCO) WALL CLEANOUT: SIOUX CHIEF #873 SERIES, BRASS COUNTERSUNK PLUG, 20 GAUGE STAINLESS STEEL COVER AND SCREW. CLEANOUT TEE TO BE PROVIDED SEPARATELY. REFER TO SPECIFICATIONS FOR INSTALLATION.

GREASE TRAP SIZING (IL ADMIN SECTION 890.510)

1	Count all contributing fixtures, measure and calculate capacities as follows:
Fixture Tag No.	No. of Compartments
10	3
MS	1
21C	2
32	1
1-A	TOTAL =
2	152.6 Total Gallons from 1-A x 0.75 (fill factors) / 2 minute drain down period = 57.2 GPM
3	4 Number of Floor Sinks or Drains (Except Indirect Wastes from Above) = 2.4 GPM
	Calculated Grease Trap Flow = 60 GPM
	Rated flow of specified Grease Trap = 75 GPM
	Grease required volume (1/2 holding capacity of fixture) = 76 Gallons
	Rated volume of specified Grease Trap = 125 Gallons

LOW PRESSURE GAS PIPE SIZING CHART

PIPE SIZE	LOAD (CFH)
3/4"	127
1"	239
1-1/4"	490

OPERATING PRESSURE ("WC) = 7
 PRESSURE DROP ("WC) = 0.5
 DEVELOPED LENGTH (FEET) = 70
 TOTAL LOAD (CFH) = 75.0
 BASED ON 2015 INTERNATIONAL FUEL GAS CODE TABLE 402.4(2)

WATER CALCULATIONS

TOTAL WATER SUPPLY FIXTURE UNITS	13.0
WATER GPM	10.0
PREDOMINANT WATER CLOSET FIXTURE TYPE	FLUSH TANK
PIPE SIZE (IN.)	1"
PIPING DEVELOPED LENGTH W/ 25% FOR FITTINGS (FT)	150
PRESSURE AT WATER METER (PSI)	80
1.00" METER LOSS INCLUDING TAP (PSI)	-0.7
1.00" BACKFLOW PREVENTER LOSS (PSI)	-14.0
HIGHEST FIXTURE ELEVATION (FT)	10
STATIC PRESSURE LOSS TO HIGHEST FIXTURE (H x 0.434)	-4.3
PRESSURE REQUIRED AT MOST REMOTE FIXTURE (PSI)	-20.0
TOTAL PRESSURE AVAILABLE FOR FRICTION LOSS	41.0
ALLOWABLE FRICTION FACTOR (40.96 PSI / 150 FT) x 100	27.3

USE 27 PSI PER 100 FEET PRESSURE DROP CHART

PLUMBING PIPE MATERIAL SCHEDULE

PIPING SYSTEM	ABBREVIATION	PIPING MATERIAL
SANITARY DRAINAGE & VENT (ABOVE GRADE)	S, W, GW OR V	PVC DWV (HUBLESS CAST IRON AS REQUIRED BY LOCAL AHJ)
SANITARY DRAINAGE & VENT (BELOW GRADE)	S, W, GW OR V	PVC DWV (SERVICE WEIGHT CAST IRON AS REQUIRED BY LOCAL AHJ)
POTABLE WATER (ABOVE GRADE)	CW, HW OR HWR	TYPE L HARD DRAWN COPPER (PEX TUBING UP TO 2" OPTIONAL)
POTABLE WATER - 2" & SMALLER (BELOW GRADE)	CW, HW OR HWR	TYPE K SOFT ANNEALED COPPER (CPVC SCHEDULE 80 OPTIONAL)
NATURAL GAS (ABOVE GRADE & ON ROOF)	G	SCHEDULE 40 BLACK STEEL
NATURAL GAS (BELOW GRADE)	G	APPROVED PE PIPE FOR GAS
CONDENSATE DRAIN - 1" & SMALLER	CD	TYPE M HARD DRAWN COPPER (PVC DWV OPTIONAL)
INDIRECT DRAIN - 1-1/4" & LARGER	ID	TYPE DWV HARD DRAWN COPPER
REVERSE OSMOSIS	RO	CPVC PLASTIC SCHED 40 OR PEX TUBING

REFER TO SPECIFICATIONS FOR FITTINGS, INSTALLATION REQUIREMENTS AND FURTHER INFORMATION. PIPING MATERIALS WITHIN AIR PLENUMS SHALL BE NONCOMBUSTIBLE OR SHALL BE LISTED AND LABELED AS HAVING 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 E84 OR UL 723. A PLENUM IS AN ENCLOSED PORTION OF THE BUILDING STRUCTURE, OTHER THAN AN OCCUPIABLE SPACE BEING CONDITIONED, THAT IS DESIGNED TO ALLOW AIR MOVEMENT.

KITCHEN FIXTURE CONNECTION SCHEDULE

TAG #	FIXTURE/EQUIPMENT	HOT WATER (IN.)	COLD WATER (IN.)	WASTE		GAS	NOTES
				INDIRECT	DIRECT		
2A	R/C ICE MAKER, CUBE-STYLE		1/2"	3/4"			BFP, DRAIN TO FS
2B	ICE STORAGE BIN			3/4"			DRAIN TO FS
6	COFFEE BREWER		1/2"				BFP
9	ESPRESSO MACHINE		1/2"	3/4"			BFP, DRAIN TO FS
10	3-COMPARTMENT SINK	3/4"	3/4"	3"			DRAIN TO FS
12	WATER STATION		1/2"	3/4"			DRAIN TO FS
17	MOBILE ICE STORAGE BIN			3/4"			DRAIN TO FS
18	DECK MOUNT SINGLE FAUCET	1/2"					DRAIN TO FS
21B	PITCHER RINSER SINK	1/2"	1/2"	2"			DRAIN TO FS
21C	HAND SINK W/ SPLASH GUARD	1/2"	1/2"		2"		TMV
22A	WATER TREATMENT SYSTEM		1/2"	1/4"			FILTER WATER SYSTEM, RPZ DRAIN TO FD
23A	WATER SOFTNER		1"				
27	BUILT-IN DIPPER WELL W/ FAUCET		1/2"	1-1/2"			DRAIN TO FS

GAS WATER HEATER SCHEDULE (TANKLESS)

MARK	MANUFACTURER/ MODEL#	AREA SERVED	ENERGY SOURCE	INPUT (MBH)	ENERGY FACTOR	ACTIVATION FLOW	RECOVERY RATE (GPM)	NOTES
WH-1	RINNAI CX199IN	KITCHEN	NATURAL GAS	199	0.80	0.2	4.8	A,B,E

NOTES:
 A. PROVIDE WITH ANTI-SCALE SYSTEM FOR EACH UNIT.
 B. 80°F TEMPERATURE RISE WITH 140°F OPERATING TEMPERATURE.
 E. FURNISH WITH FACTORY CONCENTRIC COMBUSTION AIR INTAKE AND EXHAUST KIT.

RECIRCULATION PUMP SCHEDULE (IF REQUIRED)

MARK	MANUFACTURER / MODEL#	SERVICE	GPM	HEAD (FT.)	SUCTION & DISCHARGE SIZE	IMPELLER SIZE (IN.)	ELECTRICAL DATA			NOTES
							VOLTS	PHASE	FLA	
RP-1	BELL & GOSSETT # NBF-9U/LW	WH-1	2	7.0	SEE PLAN	N/A	120	1	0.40	A-D

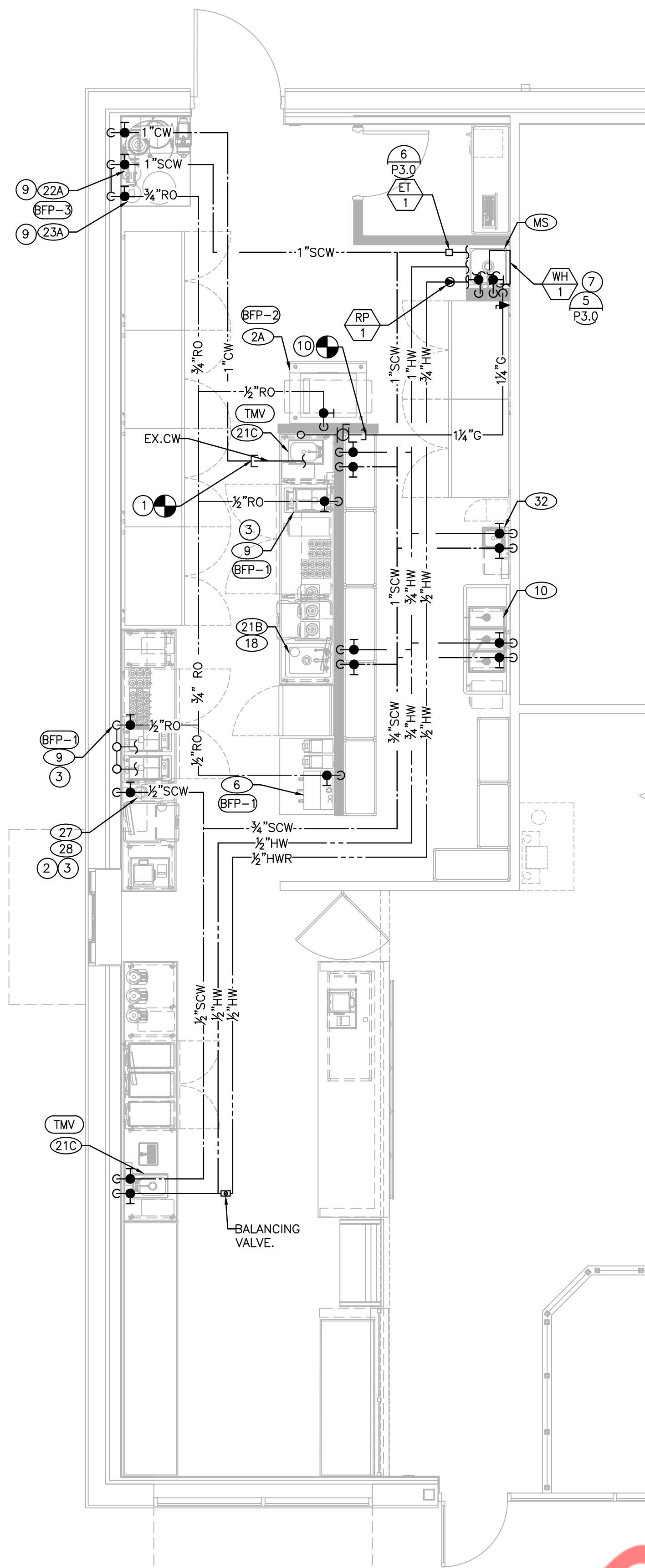
NOTES:
 A. ALL BRONZE BOOSTER.
 B. PROVIDE WITH STRAINER UPSTREAM OF PUMP.
 C. PROVIDE ADJUSTABLE, SURFACE MOUNTED AQUASTAT - HONEYWELL L6006C OR EQUIVALENT.
 D. SET AQUASTAT TO SHUT OFF RECIRCULATION PUMP AT WATER HEATER SET POINT AND ON AT 10F BELOW SET POINT.

WATER & WASTE FIXTURE UNITS IL 890.TABLE E & M

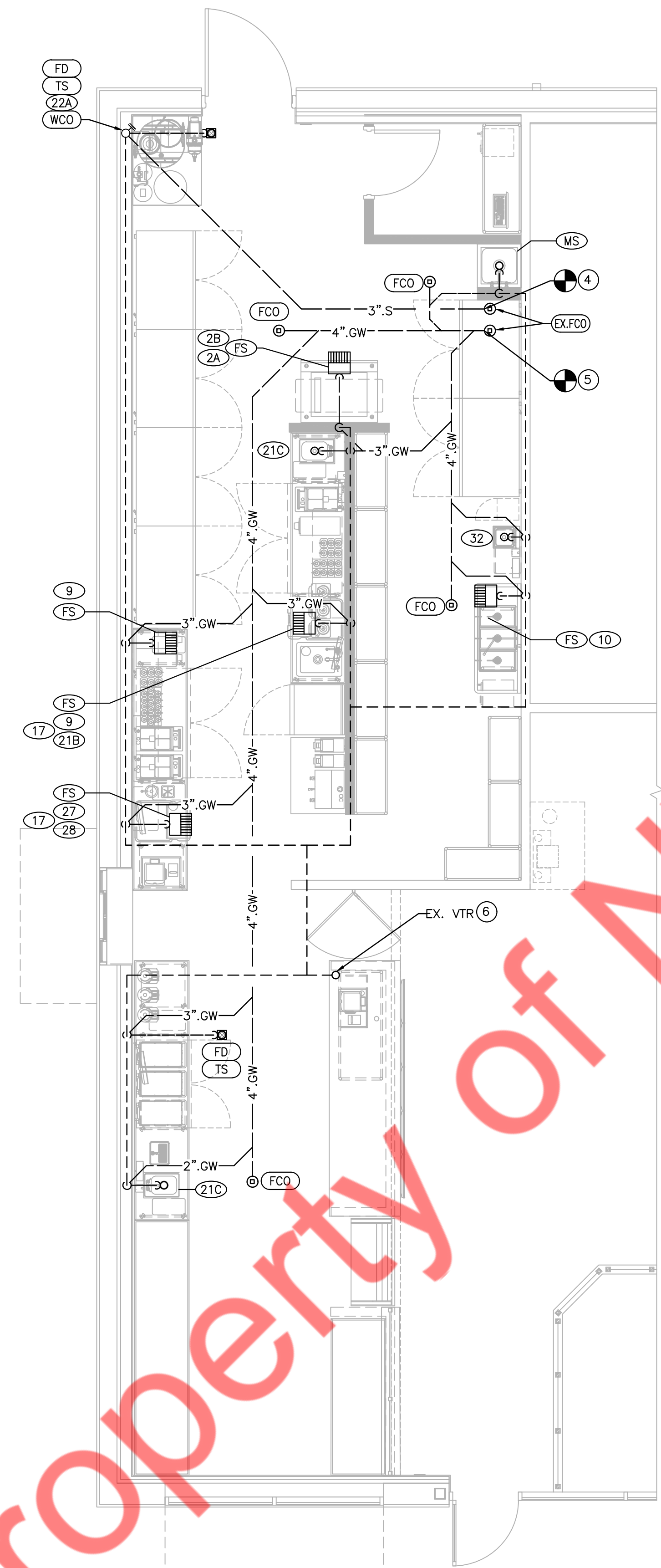
FIXTURE TYPE	QTY	D.F.U. (EA)	TOTAL D.F.U.	HOT S.F.U. (EA)	COLD S.F.U. (EA)	COMBINED S.F.U. (EA)	TOTAL S.F.U. (HOT)	TOTAL S.F.U. (COLD)	TOTAL SERVICE S.F.U.
SERVICE SINK (MOP BASIN)	1	3.0	3.0	2.00	2.00	3.00	2	2	3.0
FLOOR DRAIN (3"DW)	4	3.0	12.0	0.00	0.00	0.00	0	0	0.0
SPECIALTY KITCHEN EQUIP.									
R/C ICE MAKER, CUBE-STYLE (2A)	1	0.5	0.5	0.00	0.25	0.25	0	0.25	0.25
COFFEE BREWER (6)	1	0.5	0.5	0.00	0.25	0.25	0	0.25	0.25
ESPRESSO MACHINE (9)	2	0.5	1.0	0.00	0.25	0.25	0	0.50	0.50
3-COMPARTMENT SINK (10)	1	3.0	3.0	2.00	2.00	3.00	2	2	3.0
WATER STATION (12)	1	0.5	0.5	0.00	0.25	0.25	0	0.25	0.25
DECK MOUNT SINGLE FAUCET (18)	1	0.5	0.5	0.00	0.25	0.25	0	0.25	0.25
PITCHER RINSER SINK (21B)	1	3.0	3.0	2.00	2.00	3.00	1	1	2.00
HAND SINK W SPLASH GUARD (21C)	2	2.0	4.0	0.75	0.75	1.00	1.5	1.5	2.0
BUILT-IN DIPPER WELL W FAUCET (27)	1	0.5	0.5	0.00	0.25	0.25	0	0.25	0.25
BUILT-IN PITCHER RINSER (28)	1	0.5	0.5	0.00	0.25	0.25	0	0.25	0.25
WALL MOUNT HAND SINK (32)	1	2.0	2.0	0.75	0.75	1.00	0.75	0.75	1.00
TOTAL UNITS:	18		31.0				7.3	9.3	13.00

WATER PIPE SIZING CHART

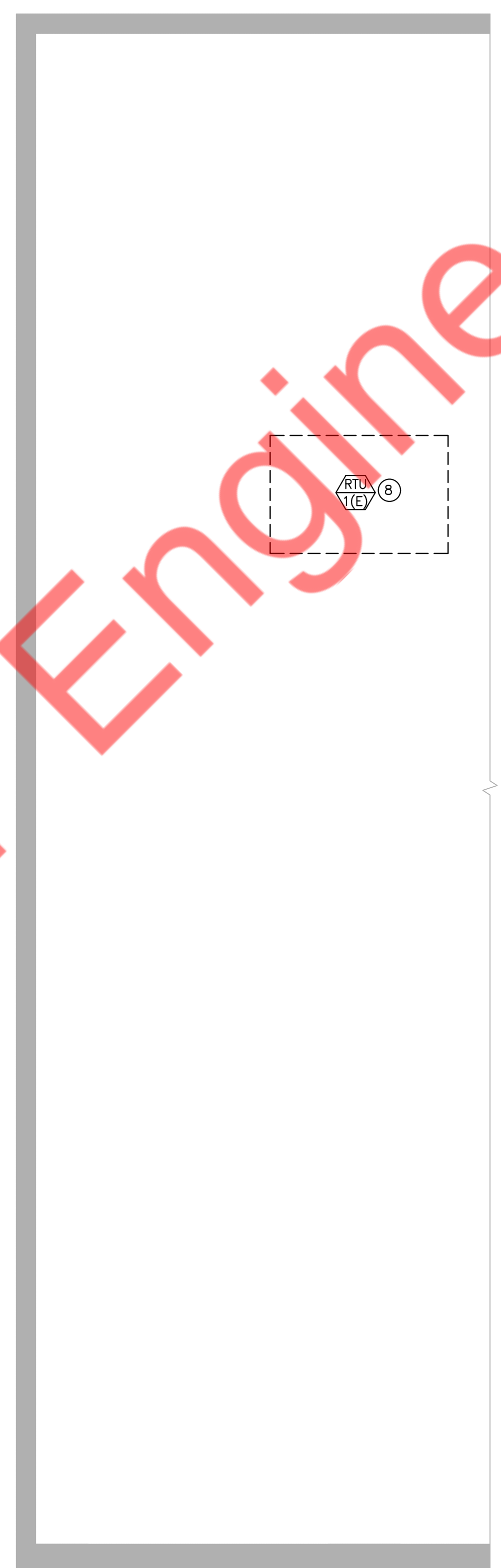
FIXTURE UNITS VS. PRESSURE LOSS									
IN PSI / 100 FEET WITH Copper Type L PIPING MATERIAL									
COLD WATER @ 10 PSI / 100'					HOT WATER @ 10 PSI / 100'				
PIPE SIZE	FLUSH TANK SFU (CW)	FLUSH							



1 WATER & GAS FLOOR PLAN
SCALE: 1/4"=1'-0"



2 SANITARY & VENT FLOOR PLAN
SCALE: 1/4"=1'-0"



3 PLUMBING ROOF PLAN
SCALE: 1/4"=1'-0"

PLUMBING PLAN NOTES:

1. EXTEND AND CONNECT NEW 1" WATER LINE TO EXISTING WATER LINE. CONTRACTOR TO VERIFY AVAILABILITY OF EXISTING BFP AND WATER METER, PROVIDE NEW IF NOT EXISTING. INSTALL BFP AND WATER METER AS PER LOCAL JURISDICTION REQUIREMENT. BASE BID ACCORDINGLY.
2. 1/2" SOFTENED COLD WATER DOWN IN WALL FOR 1/2" COLD WATER CONNECTION TO DIPPER WELL (27) AND RINSE SINK (28).
3. PROVIDE 1/2" SHUT-OFF VALVE, FINAL CONNECTION TO MACHINE MADE BY OTHERS.
4. EXTEND AND CONNECT NEW 3" SANITARY LINE TO EXISTING SANITARY LINE IN SPACE. PLUMBING CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION, SIZE AND INVERT OF EXISTING SANITARY LINE PRIOR TO ROUGH-IN.
5. EXTEND AND CONNECT NEW 4" GREASE SANITARY LINE TO EXISTING GREASE SANITARY LINE IN SPACE. PLUMBING CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION, SIZE AND INVERT OF EXISTING GREASE SANITARY LINE PRIOR TO ROUGH-IN.
6. EXTEND AND CONNECT NEW 3" VENT LINE TO EXISTING VTR IN SPACE. PLUMBING CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION, SIZE OF EXISTING VTR PRIOR TO ROUGH-IN.
7. TANKLESS WATER HEATER ABOVE MOP SINK. ROUTE COLD WATER LINE AND GAS LINE TO WATER HEATER, AND HOT WATER LINE TO PLUMBING FIXTURES. CONNECT HOT WATER RETURN LINE TO WATER HEATER COLD LINE FROM RECIRCULATION PUMP.
8. EXISTING RTU-1(E) WITH EXISTING ACCESSORIES, FITTINGS AND GAS PIPING TO REMAIN. CONTRACTOR TO FIELD VERIFY THE CONDITION OF EXISTING GAS PIPING, REPLACE IF REQUIRED.
9. REFER TO MANUFACTURER SPECIFICATION AND INSTALLATION MANUAL FOR ROUTING OF RO WATER SYSTEM.
10. EXTEND AND CONNECT NEW 1-1/4" GAS LINE TO EXISTING GAS LINE. CONTRACTOR TO FIELD VERIFY EXISTING GAS METER CAPACITY IS EQUAL TO OR MORE THAN 379 CFH. UPGRADE EXISTING GAS METER IF REQUIRED. COORDINATE ALL WORK WITH LANDLORD AND UTILITY COMPANY.

Property of NY Engineers

CLIENT:

New Tenant Renovation:



REVISIONS:	
#	DESCRIPTION

PROJECT NUMBER: _____

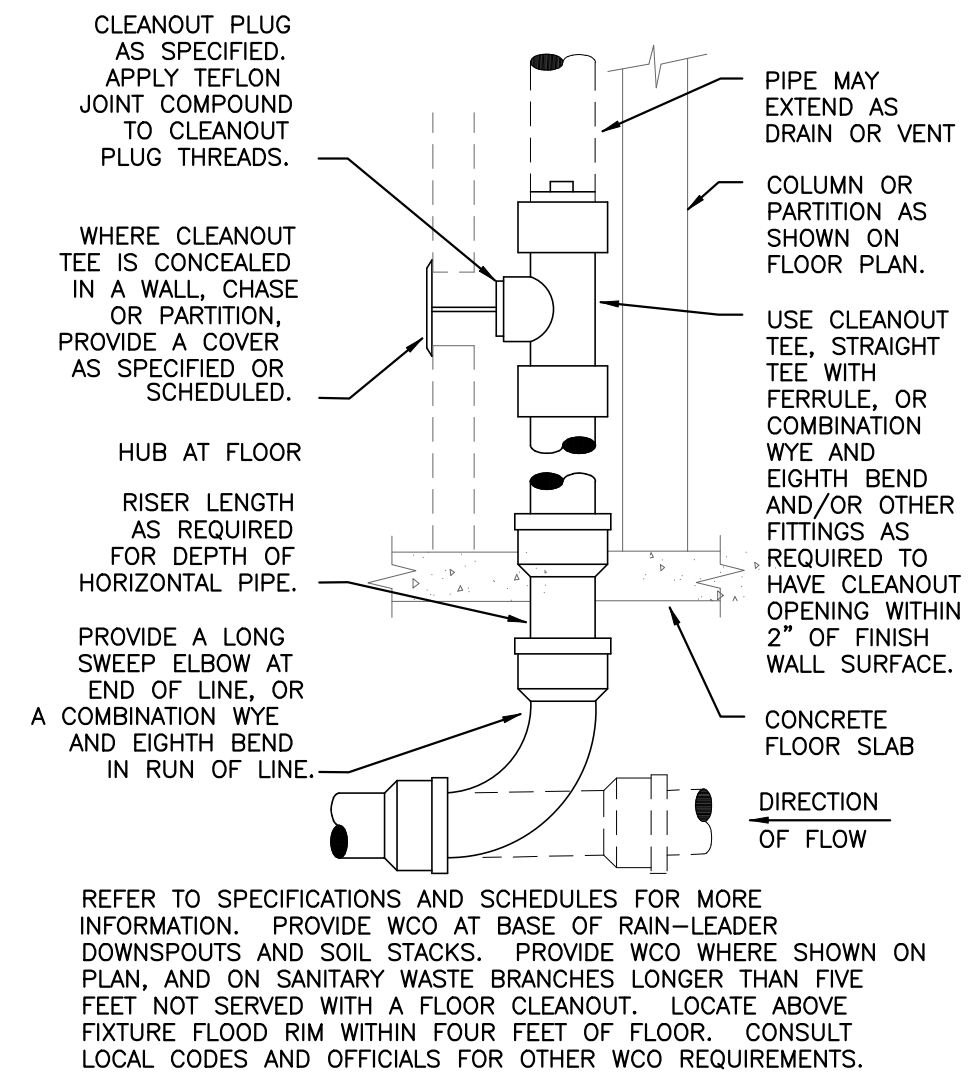
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SHEET TITLE: _____

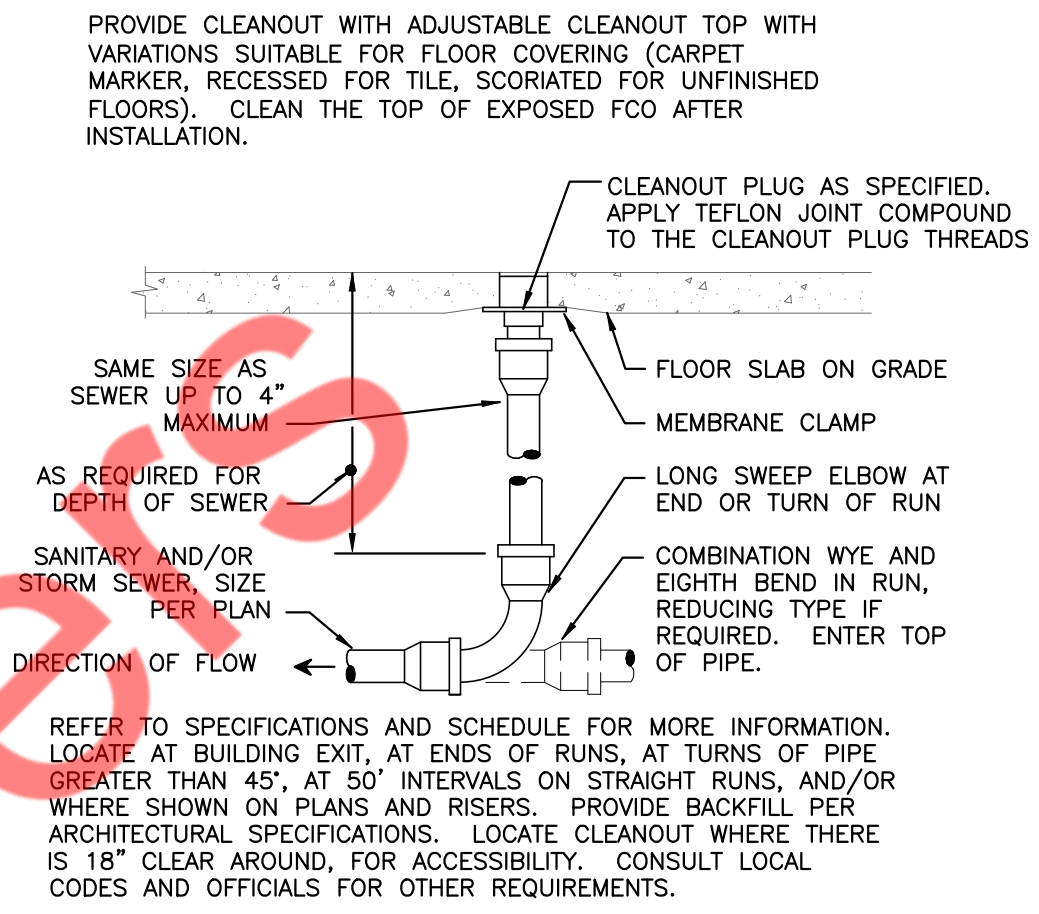
PLUMBING FLOOR PLANS

SHEET NO. _____

P1.0



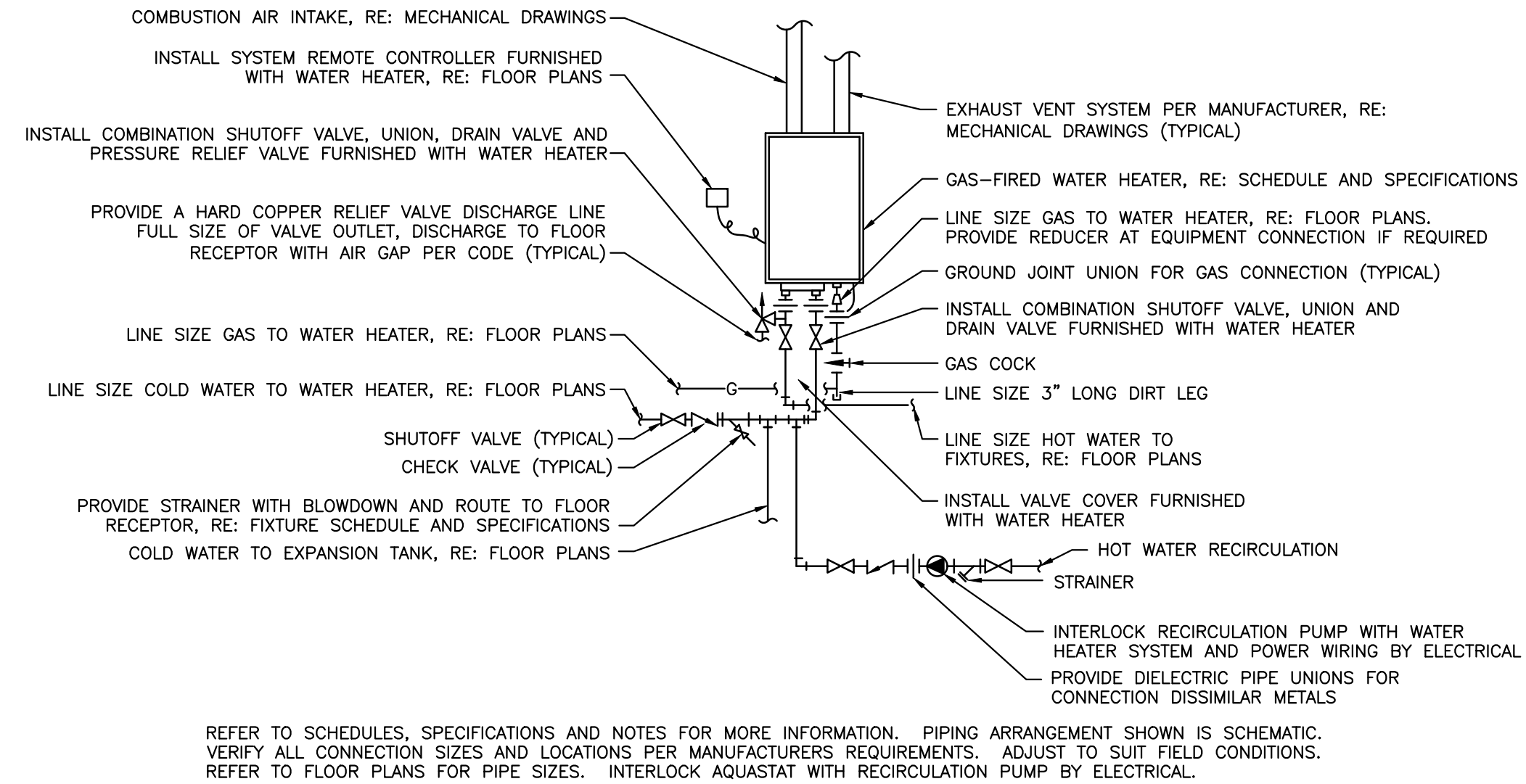
2 WALL CLEANOUT
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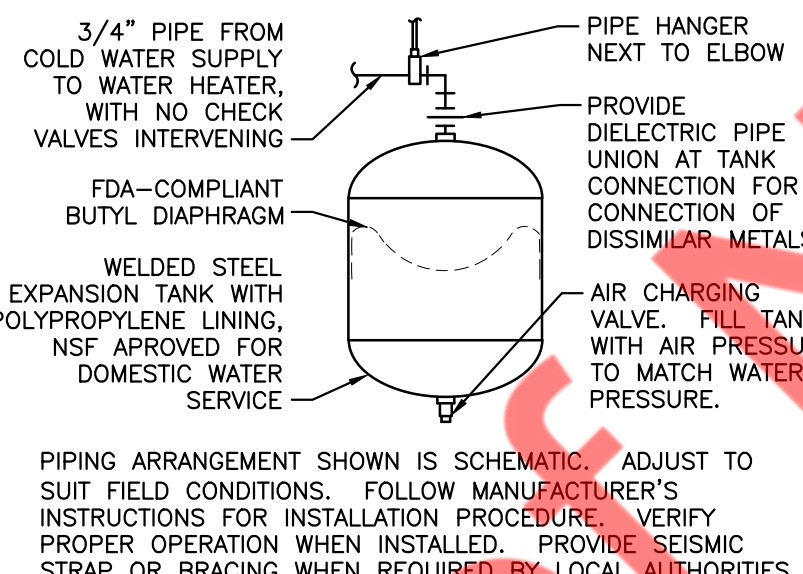
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1 NOT USED
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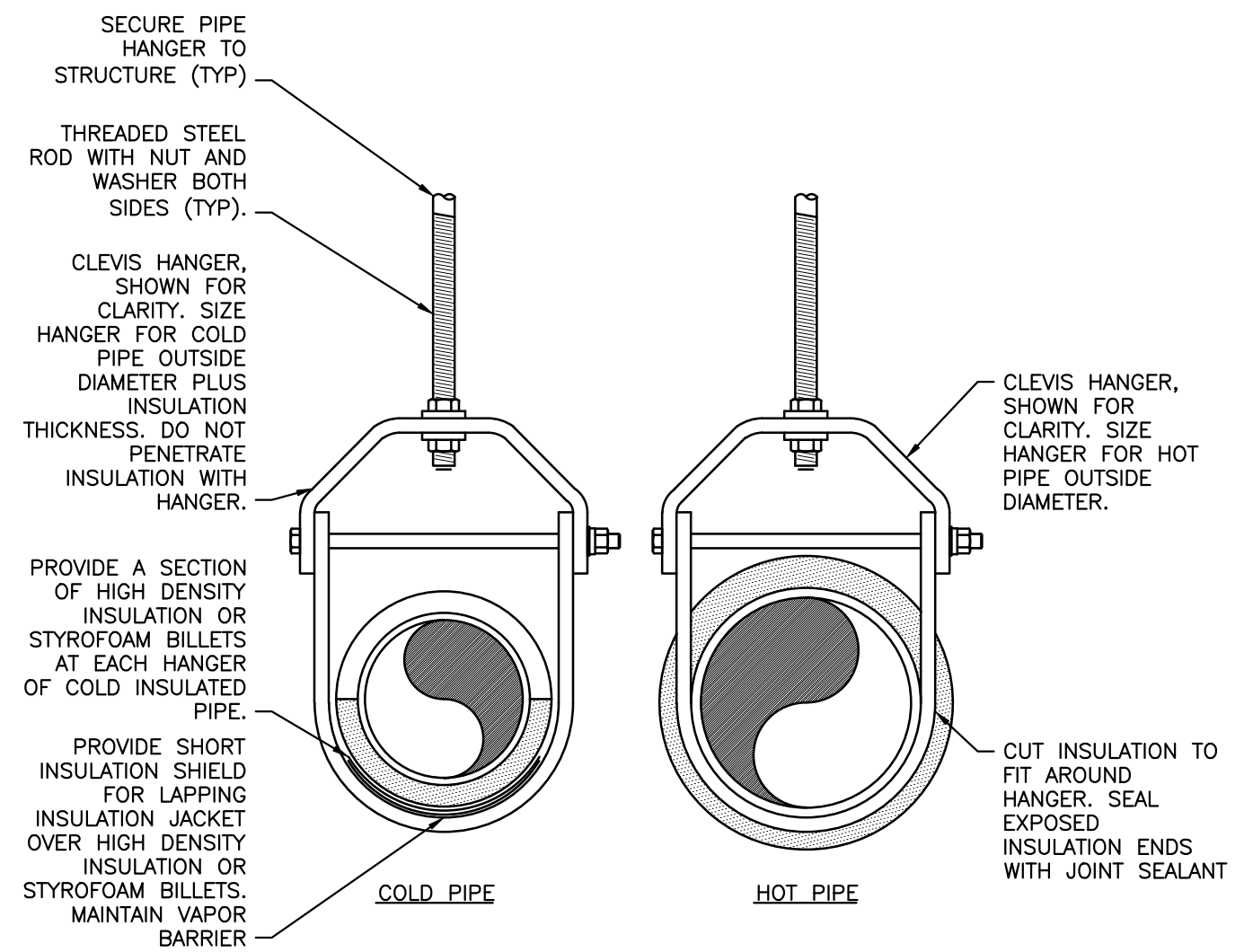
3 NOT USED
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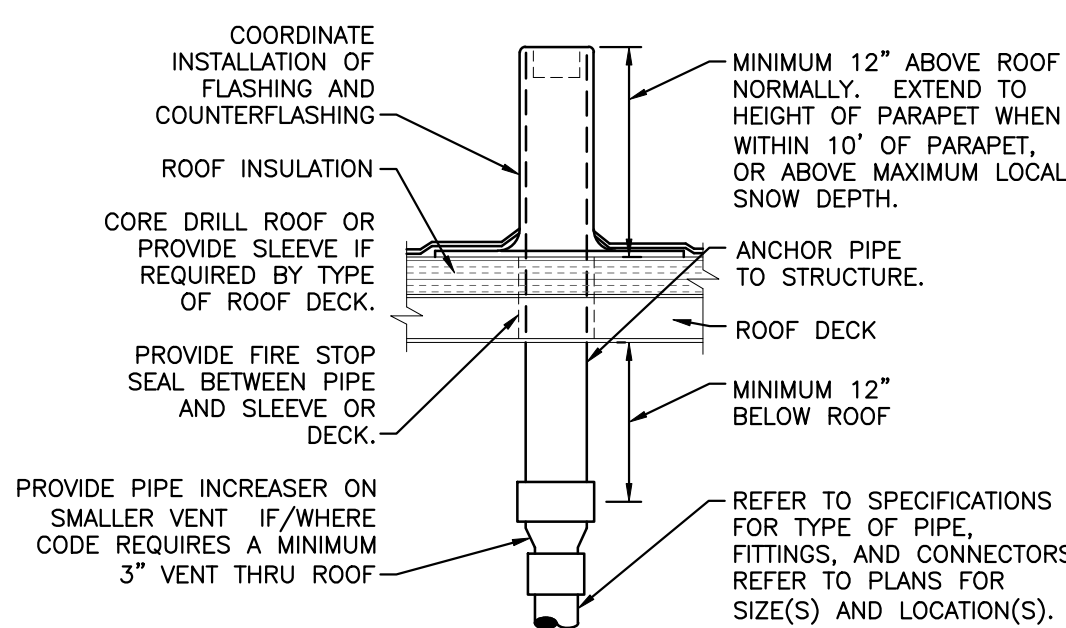
5 SINGLE INDOOR INSTANTANEOUS GAS WATER HEATER CONNECTIONS WITH RECIRCULATION SYSTEM
NO SCALE



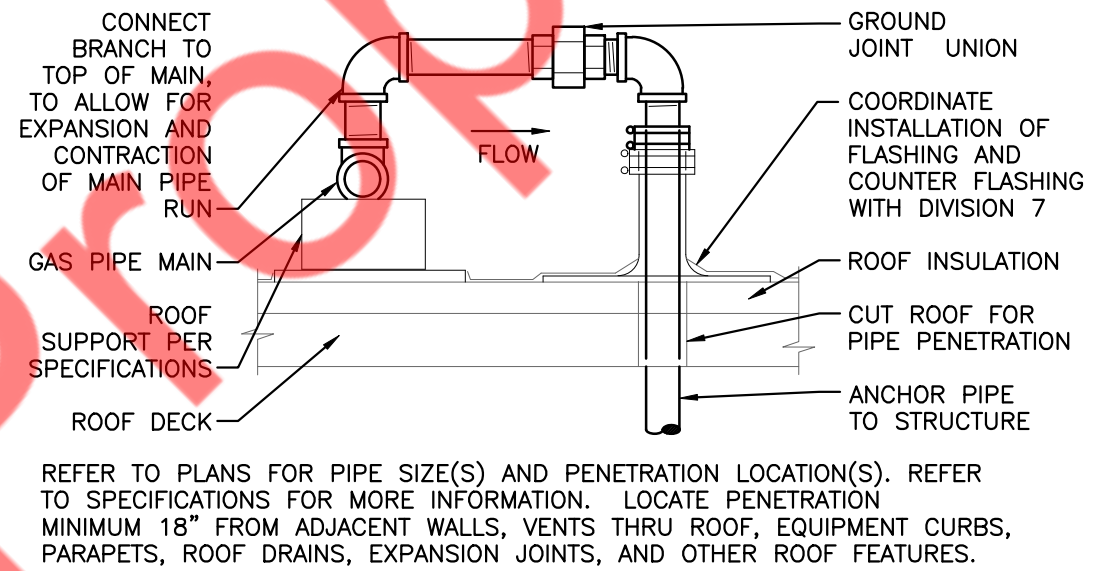
6 SMALL EXPANSION TANK
NO SCALE



8 INSULATED PIPE HANGER DETAIL
NO SCALE



9 VENT THRU ROOF (\"/>



10 GAS PIPE ROOF PENETRATION
NO SCALE

11 NOT USED
NO SCALE

CLIENT:

New Tenant Renovation:

#	DESCRIPTION	DATE
	ISSUED FOR PERMIT	10/27/25
△	PERMIT COMMENTS	12/05/25

PROJECT NUMBER: _____

DRAWN BY: _____ REVIEWED BY: _____

SHEET TITLE: _____

PLUMBING DETAILS

SHEET NO. _____

P3.0

PLUMBING SPECIFICATIONS

GENERAL REQUIREMENTS

REQUIREMENTS UNDER DIVISION ONE AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS SHALL BE A PART OF THIS SECTION. THE CONTRACTOR SHALL BE RESPONSIBLE TO BECOME THOROUGHLY ACQUAINTED WITH ITS CONTENTS AS TO REQUIREMENTS THAT AFFECT THIS DIVISION OF THE WORK REQUIRED UNDER THIS SECTION. THIS INCLUDES MATERIAL, EQUIPMENT, APPLIANCES, TRANSPORTATION, SERVICES AND LABOR REQUIRED TO COMPLETE THE ENTIRE PLUMBING SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS.

THE SPECIFICATIONS AND THE DRAWINGS ARE COMPLEMENTARY, AND ANY PORTION OF WORK DESCRIBED IN ONE SHALL BE PROVIDED AS IF DESCRIBED IN THE OTHER. IN THE EVENT OF A DISCREPANCY BETWEEN THE DRAWINGS AND SPECIFICATIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF SAME PRIOR TO PROCEEDING WITH THE WORK INVOLVED, IN ORDER THAT CORRECT PROGRESS OF THE WORK MAY BE PERFORMED.

DEFINITIONS

FURNISH: TO SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION AND SIMILAR OPERATIONS.

INSTALL: TO PERFORM ALL OPERATIONS AT THE PROJECT SITE INCLUDING, BUT NOT LIMITED TO, THE ACTUAL UNLOADING, UNPACKING, ASSEMBLY, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TESTING, COMMISSIONING, STARTING UP AND SIMILAR OPERATIONS, COMPLETE, AND READY FOR THE INTENDED USE.

PROVIDE: TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE.

FURNISHED BY OWNER OR FURNISHED BY OTHERS: AN ITEM FURNISHED BY THE OWNER OR UNDER OTHER DIVISIONS OR CONTRACTS, AND INSTALLED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE, AND READY FOR THE INTENDED USE, INCLUDING ALL ITEMS AND SERVICES INCIDENTAL TO THE WORK NECESSARY FOR PROPER INSTALLATION AND OPERATION, INCLUDE THE INSTALLATION UNDER THE WARRANTY REQUIRED BY THIS DIVISION.

AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY (AUTHORITY) HAVING JURISDICTION OVER THE WORK.

THE TERMS "APPROVED EQUAL," "EQUIVALENT," OR "EQUAL" ARE USED SYNONYMOUSLY AND SHALL MEAN TO BE APPLICABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURER SPECIFIED. THE TERM "APPROVED" SHALL MEAN LABELED, LISTED, OR BOTH, BY AN NRTL, AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

COORDINATION

COORDINATE WORK WITH THAT OF OTHER TRADES SO THAT THE VARIOUS COMPONENTS OF THE SYSTEMS WILL BE INSTALLED AT THE PROPER TIME, WILL FIT THE AVAILABLE SPACE, AND WILL ALLOW PROPER SERVICE ACCESS TO THOSE ITEMS REQUIRING MAINTENANCE. COMPONENTS WHICH ARE INSTALLED WITHOUT REGARD TO THE ABOVE SHALL BE RELOCATED AT NO ADDITIONAL COST TO THE OWNER.

UNLESS NOTED ELSEWHERE, GENERAL CONTRACTOR WILL PROVIDE CHASES AND OPENINGS IN BUILDING CONSTRUCTION REQUIRED FOR INSTALLATION OF THE SYSTEMS SPECIFIED HEREIN. CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH INFORMATION REGARDING CHASES AND OPENINGS WHEN REQUIRED. CONTRACTOR SHALL KEEP INFORMED AS TO THE WORK OF OTHER TRADES ENGAGED IN THE CONSTRUCTION OF THE PROJECT AND SHALL EXECUTE HIS WORK IN SUCH A MANNER AS NOT TO INTERFERE WITH OR DELAY THE WORK OF OTHER TRADES.

FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALED DIMENSIONS. CONTRACTOR SHALL TAKE HIS OWN MEASUREMENTS AT THE BUILDING, AS VARIATIONS MAY OCCUR. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ERRORS WHICH COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND VERIFICATION.

PROVIDE MATERIALS WITH TRIM THAT WILL PROPERLY FIT THE TYPES OF CEILING, WALL OR FLOOR FINISHES ACTUALLY INSTALLED. MODEL NUMBERS LISTED IN THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT INTENDED TO DESIGNATE THE REQUIRED TRIM.

GUARANTEE

THE WORK TO BE PERFORMED UNDER THIS CONTRACT SHALL INCLUDE THE FURNISHING, INSTALLATION, AND CONNECTION OF PLUMBING SYSTEMS INDICATED ON THE DRAWINGS AND SPECIFICATIONS. BY SIGNING THE CONTRACT, THE CONTRACTOR ACKNOWLEDGES THAT HE HAS ACQUIRED HIMSELF WITH THE SITE AND THE EXISTING CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED, AND THE DRAWINGS AND SPECIFICATIONS CONTAINING THE REQUIREMENTS THAT HE WILL COMPLY WITH THE REQUIREMENTS AND INTENT OF PERTINENT DOCUMENTS IN THE PERFORMANCE OF THE WORK.

GUARANTEE THAT THE PLUMBING INSTALLED UNDER THIS CONTRACT IS FREE OF DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF JOB ACCEPTANCE BY THE OWNER. THIS SHALL INCLUDE A GUARANTEE OF FREE CIRCULATION OF LIQUIDS THROUGHOUT THE SYSTEM AS INTENDED WITHOUT LEAKS, EXCESSIVE NOISE, OR WATER HAMMER.

IF DEFECTS OCCUR DURING THE ONE YEAR GUARANTEE PERIOD, REPAIR OR REPLACE SUCH DEFECTS AT NO EXPENSE TO THE OWNER, AND TO THE SATISFACTION OF THE OWNER, ARCHITECT AND ENGINEER.

WARRANTIES

WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO ACTUAL WORKMANSHIP, DESIGN OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS OR MANUFACTURER'S STANDARD WARRANTY EXCEEDS THE 12 MONTH PERIOD. THE CONTRACTOR'S WARRANTY WITHIN THE WARRANTY PERIOD(S), WARRANTIES SHALL INCLUDE LABOR AND MATERIAL MAKE REPAIRS OR REPLACEMENTS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER. PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNER.

AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD. EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE OWNER AND STATING THE COMMENCEMENT DATE AND TERM.

EXCAVATION AND BACKFILLING

PERFORM EXCAVATION AND BACKFILL REQUIRED FOR INSTALLATION OF UNDERGROUND WATER PIPING. EXCAVATION TRENCHES SHALL BE OF SUFFICIENT WIDTH, CRIB OR BRACE TRENCHES TO PREVENT CAVE-IN OR SETTLEMENT. DO NOT EXCAVATE TRENCHES CLOSE TO COLUMNS AND WALLS OF NEW BUILDINGS WITHOUT PRIOR CONSULTATION WITH THE ARCHITECT. EXCAVATION INCLUDING BACKFILL IF REQUIRED TO KEEP TRENCHES FREE OF WATER. BACKFILL TRENCHES IN MAXIMUM 6" LAYERS OF WELL-TAMPED DRY EARTH IN A MANNER TO PREVENT FUTURE SETTLEMENT.

COMMON EXCAVATION SHALL COMPRISE THE SATISFACTORY REMOVAL AND DISPOSITION OF MATERIAL OF WHATEVER SUBSTANCES AND OF EVERY DESCRIPTION EXCEPT THE DRAWINGS AND SPECIFICATIONS. THE DEPTH OF THE WORK AS SPECIFIED AND SHOWN ON THE DRAWINGS. EXCAVATION SHALL BE PERFORMED TO THE LINES AND GRADES INDICATED ON THE DRAWINGS. EXCAVATED MATERIALS WHICH ARE CONSIDERED UNSUITABLE FOR BACKFILL AND SURPLUS OF EXCAVATED MATERIAL WHICH IS NOT REQUIRED FOR BACKFILL, SHALL BE DISPOSED OF BY THE CONTRACTOR AT HIS OWN EXPENSE AND RESPONSIBILITY, AND TO THE SATISFACTION OF THE ARCHITECT.

CUTTING AND PATCHING

OBTAIN PERMISSION FROM THE ARCHITECT BEFORE CUTTING WALLS, FLOORS, CEILING, ETC. AS REQUIRED BY THE PROJECT. DO NOT DISTURB STRUCTURAL MEMBERS WITHOUT PRIOR APPROVAL FROM THE ARCHITECT. CUT HOLES AS SMALL AS POSSIBLE. GENERAL CONTRACTOR SHALL PATCH FLOORS UNDER THE WORK UNDER THE PROJECT. THE PRESSURE DIFFERENTIAL PATCHING SHALL MATCH ORIGINAL MATERIAL AND CONSTRUCTION. REPAIR AND FINISH AREAS DISTURBED BY WORK TO THE CONDITION OF ADJOINING SURFACES IN A MANNER SATISFACTORY TO THE ARCHITECT.

CONCRETE BASES

PROVIDE CONCRETE BASES FOR HIS EQUIPMENT WHERE INDICATED ON THE DRAWINGS. CONCRETE BASES SHALL HAVE CHAMFERED EDGES. SIZE OF PAD SHALL BE A MINIMUM OF 4" GREATER THAN THE FOOTPRINT OF THE EQUIPMENT THAT IT IS SUPPORTING.

CONSTRUCT EQUIPMENT BASES AND HOUSEKEEPING PADS OF A MINIMUM 28 DAY, 4000 PSI CONCRETE CONFORMING TO AMERICAN CONCRETE INSTITUTE STANDARD BUILDING CODE FOR REINFORCED CONCRETE (ACI 318-19) AND THE LATEST APPLICABLE RECOMMENDATIONS OF THE ACI STANDARD PRACTICE MANUAL. CONCRETE SHALL BE COMPOSED OF CEMENT CONFORMING TO ASTM C 150 TYPE I, AGGREGATE CONFORMING TO ASTM C33, AND POTABLE WATER. EXPOSED EXTERIOR CONCRETE SHALL CONTAIN 5 TO 7 PERCENT AIR ENTRAINMENT.

PROVIDE GALVANIZED ANCHOR BOLTS FOR EQUIPMENT PLACED ON CONCRETE EQUIPMENT BASES AND HOUSEKEEPING PADS OR ON CONCRETE SLABS. ANCHOR BOLTS SIZE, NUMBER AND PLACEMENT SHALL BE AS RECOMMENDED BY THE MANUFACTURER OF THE EQUIPMENT.

ACCESS DOORS

PROVIDE ACCESS DOORS IN CEILING AND WALLS WHERE INDICATED OR REQUIRED FOR ACCESS TO CONCEALED VALVES AND EQUIPMENT INSTALLED UNDER THIS SECTION. PROVIDE CONCEALED HINGES, SCREWDRIVER-TYPE LOCK, ANCHOR STRAPS, MANUFACTURED BY MILGOR, ZURN, TITUS, OR EQUAL. OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION, AND COLOR BEFORE ORDERING.

PENETRATIONS

PROVIDE SLEEVES FOR PIPES PASSING THROUGH ABOVE GRADE CONCRETE OR MASONRY WALLS, CONCRETE FLOOR OR ROOF SLABS. SLEEVES ARE REQUIRED FOR CORE DRILLED HOLES IN CONCRETE OR MASONRY WALLS, CONCRETE FLOORS OR ROOFS. PROVIDE 10 GAUGE GALVANIZED STEEL SLEEVES FOR SLEEVES 6" AND SMALLER. PROVIDE GALVANIZED SHEET METAL SLEEVES FOR LARGER THAN 6". SCHEDULE 40 PVC SLEEVES ARE ACCEPTABLE FOR INSTALLATION IN AREAS WITHOUT RETURN AIR PLENUMS.

SEAL ELEVATED FLOOR, EXTERIOR WALL AND ROOF PENETRATIONS WATER TIGHT AND WEATHER TIGHT WITH NON-SHRINK, NON-HARDENING GROUT OR SCHEDULE 40 STEEL PIPE WITH BEVEL EDGE FOR WELDING AND WITH MINIMUM OF 1/2" OF SEALANT.

SEAL AROUND PENETRATIONS OF FIRE RATED ASSEMBLIES. COORDINATE FIRE RATING AND LOCATION WITH THE ARCHITECTURAL DRAWINGS. REFER TO ARCHITECTURAL SPECIFICATIONS FOR FIRE STOPPINGS. PROVIDE A PRODUCT SCHEDULE FOR UL LISTING, LOCATION, WALL OR FLOOR RATING AND INSTALLATION DRAWING FOR EACH PENETRATION FIRE STOP SYSTEM.

EXTEND PIPE INSULATION FOR INSULATED PIPE THROUGH FLOOR, WALL AND ROOF PENETRATIONS, INCLUDING FIRE RATED WALLS AND FLOORS. THE VAPOR BARRIER SHALL BE MAINTAINED. SIZE SLEEVE FOR A MINIMUM OF 1" ANNUAL CLEAR SPACE BETWEEN INSIDE OF SLEEVE AND OUTSIDE OF INSULATION.

SEAL CONCRETE OR MASONRY EXTERIOR WALL PENETRATIONS BELOW GRADE WITH "WALL PIPES" AND MECHANICAL SLEEVE SEALS. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WATTS OR ZURN. PROVIDE MODULAR MECHANICAL SLEEVE SEALS, MANUFACTURED BY THUNDERLINE / LINK SEAL, CALPICO, INC. AND METAFLEX.

SEAL ELEVATED CONCRETE SLAB WITH WATERPROOF MEMBRANE PENETRATIONS WITH "WALL PIPES" AND WATER PROOF SEALANT. SECURE WATERPROOF MEMBRANE FLASHING BETWEEN "WALL PIPE" CLAMPING FLANGE AND CLAMPING RING. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WATTS OR ZURN.

PROVIDE SLEEVES FOR HORIZONTAL PIPE PASSING THROUGH OR UNDER FOUNDATION. SLEEVES SHALL BE CAST IRON SOIL PIPE TWO NOMINAL PIPE SIZES LARGER THAN THE PIPE SERVED.

PROVIDE SCHEDULE 40 PVC PIPE SLEEVES FOR VERTICAL PRESSURE PIPE PASSING THROUGH CONCRETE SLAB ON GRADE. SLEEVES SHALL BE ONE NOMINAL PIPE SIZE LARGER THAN THE PIPE SERVED AND TWO PIPE SIZES LARGER THAN PIPE SERVED FOR DIAPHRAGM IRON PIPES WITH RESTRAINING RODS. SEAL WATER-TIGHT WITH SILICONE CAULK.

PROVIDE 1/2" THICK CELLULAR FOAM INSULATION AROUND PERIMETER OF HIGH PRESSURE PIPE PASSING THROUGH CONCRETE SLAB ON GRADE. INSULATION SHALL EXTEND TO 2" ABOVE AND BELOW THE CONCRETE SLAB.

ELECTRICAL WIRING

LINE VOLTAGE WIRING SHALL BE PROVIDED BY ELECTRICAL. LINE VOLTAGE CONTROL AND INTERLOCK WIRING FOR PLUMBING SYSTEMS SHALL ALSO BE PROVIDED BY ELECTRICAL CONTRACTOR. LOW VOLTAGE CONTROL WIRING SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR. FURNISH WIRING DIAGRAMS TO THE ELECTRICAL CONTRACTOR AS REQUIRED FOR COOPER EQUIPMENT. HOOKUP, COORDINATE WITH THE ELECTRICAL CONTRACTOR THE ACTUAL WIRE SIZING AMPS FOR PLUMBING EQUIPMENT (FROM THE EQUIPMENT NAMEPLATE) TO ENSURE PROPER INSTALLATION.

SYSTEM TESTING AND ADJUSTING

UPON COMPLETION OF EACH PHASE OF THE INSTALLATION, TEST EACH SYSTEM IN CONFORMANCE WITH LOCAL CODE REQUIREMENTS AND AS NOTED BELOW. FURNISH LABOR AND EQUIPMENT TO CONDUCT PROPER PLUMBING WORK INSTALLED UNDER THIS CONTRACT, AND ASSUME COSTS INVOLVED IN MAKING THE TESTS, AND REPAIRING AND/OR REPLACING DAMAGE RESULTING THEREFROM.

NOTIFY THE ARCHITECT AND THE AUTHORITY HAVING JURISDICTION, THREE (3) WORKING DAYS PRIOR TO MAKING PLUMBING SYSTEM TESTS. LEAVE CONCEALED WORK UNCOVERED UNTIL THE REQUIRED TESTS HAVE BEEN COMPLETED, BUT IF NECESSARY MAKE REPAIRS AND EXPOSED IN TESTS ON PORTIONS OF THE WORK MAY BE MADE, AND WHEN SATISFACTORY, THE WORK MAY BE CONCEALED. TEST PIPING BEFORE INSULATION IS INSTALLED, AND BEFORE BACKFILL, PIPES, JOINTS, FLANGES, VALVE STEMS, ETC., SHALL BE LEAK TIGHT. REPAIR OR REPLACE SYSTEM DEFECTS WITH NEW MATERIALS. CAULKING OF DEFECTIVE JOINTS, CRACKS OR HOLES WILL NOT BE PERMITTED. REPEAT TESTS AFTER DEFECTS HAVE BEEN ELIMINATED. MAKE TESTS IN THE PRESENCE OF THE ADMINISTRATIVE AUTHORITY AND/OR THE OWNER'S AUTHORIZED REPRESENTATIVE.

UPON COMPLETION OF THE SYSTEMS INSTALLATION, AND PRIOR TO ACCEPTANCE BY THE ARCHITECT AND ENGINEER, MAKE GENERAL OPERATING TESTS TO DEMONSTRATE THAT EQUIPMENT AND SYSTEMS ARE IN PROPER WORKING ORDER, AND ARE FUNCTIONING IN CONFORMANCE WITH THE INTENT OF THE DRAWINGS AND SPECIFICATIONS AS A PART OF THESE TESTS, OPEN EVERY WATER OUTLET TO ENSURE COMPLETE SYSTEM FLUSHING, REMOVE AND CLEAN FAUCET AERATORS, CLEAN STRAINERS, LIGHT PILOT LIGHTS, AND OPERATE EVERY PIECE OF EQUIPMENT INSTALLED UNDER THIS CONTRACT TO DEMONSTRATE PROPER FUNCTIONING.

TEST THE DRAINAGE AND VENT SYSTEM BY PLUGGING OPENINGS WITH TEST PLUGS, EXCEPT THOSE AT THE TOP OF THE STACKS. FILL THE SYSTEM WITH WATER; TEST RESULTS WILL BE SATISFACTORY IF THE WATER LEVEL REMAINS STATIONARY FOR NOT LESS THAN ONE (1) HOUR. SUSPECT THE DRAINAGE AND VENT SYSTEM TO A PRESSURE OF AT LEAST TEN (10) FEET OF WATER. IF LEAKS DEVELOP, REPAIR THEM AND REPEAT THE TEST.

TEST THE DOMESTIC WATER SYSTEM BY FILLING IT WITH WATER AND THEN ISOLATING THE SYSTEM FROM ITS SOURCE. KEEP THE SYSTEM CHARGED FOR A PERIOD OF TWENTY-FOUR HOURS, WITH NO FUTURE BEING USED. THE PRESSURE DIFFERENTIAL FOR THIS TEST PERIOD SHALL NOT EXCEED 10 PSIG. TEST WATER PIPING TO A 125 PSI HYDROSTATIC PRESSURE.

FOR LOW PRESSURE NATURAL GAS SYSTEMS, SUBJECT THE PIPE TO 10 PSIG AIR PRESSURE FOR A PERIOD OF ONE HOUR, THE RESULTANT PRESSURE DIFFERENTIAL FOR THIS PERIOD SHALL BE 0 PSIG. TEST PER GAS COMPANY REQUIREMENTS WHERE REQUIRED. FOR WELDED NATURAL GAS SYSTEMS AND SYSTEMS WITH AN OPERATING PRESSURE IN EXCESS OF 14" WATER COLUMN, SUBJECT THE PIPE TO 80 PSIG AIR PRESSURE FOR A PERIOD OF ONE HOUR. THE RESULTANT PRESSURE DIFFERENTIAL FOR THIS PERIOD SHALL BE 0 PSIG. TEST PER GAS COMPANY REQUIREMENTS WHERE REQUIRED.

PLUMBING PIPING MATERIALS

MATERIALS SPECIFIED OR NOTED ON THE DRAWINGS ARE SUBJECT TO THE APPROVAL OF LOCAL CODE AUTHORITIES. VERIFY APPROVAL BEFORE INSTALLING ANY MATERIAL OR JOINING METHOD.

DOMESTIC WATER (COLD, HOT AND HOT WATER RECIRCULATION): DOMESTIC WATER PIPING INSTALLED ABOVE THE FLOOR SLAB INSIDE THE BUILDING SHALL BE TYPE "L" HARD TEMPER COPPER TUBE WITH WROUGHT COPPER FITTINGS AND SOLDERED CONNECTIONS MADE UP WITH 95/5 SOLDER. BRAZED MECHANICALLY FORMED TEE CONNECTIONS (T-DRILL) MAY BE USED IN COPPER LINES WHERE APPROVED BY CODE; CONNECTION SHALL BE MADE WITH BRAZED SILVER SOLDER (SILFOS) JOINTS IN CONFORMANCE WITH MANUFACTURER'S INSTRUCTIONS. FOR 2" AND SMALLER APPROVED LINKED POLYETHYLENE (PEX) TUBING MEETING ASTM F876, ASTM F877, NSF 14, AND NSF 61, WITH A PRESSURE RATING OF 160PSI AT 73°F OR 150 BLUE OR RED COLORED CODED. FOR COLD INSTALL, PEX TUBING IN RETURN AIR PLENUM CEILING, PEX TUBING MAY BE INSTALLED IN THE RETURN AIR PLENUM CEILING IF INSULATED WITH PLENUM WRAP WHERE APPROVED BY THE AUTHORITY HAVING JURISDICTION.

UNDERGROUND DOMESTIC WATER PIPING 2" AND SMALLER SHALL BE TYPE "K" SOFT TEMPER COPPER TUBING WITH FLARED COPPER ALLOY FITTINGS AND CONNECTIONS, OR TYPE "K" HARD TEMPER COPPER TUBING WITH SCREWDRIVER-TYPE LOCK, ANCHOR STRAPS, MANUFACTURED BY MILGOR, JOINTS. INSTALL AS FEW UNDERGROUND COPPER PIPING JOINTS AS POSSIBLE. AT BUILDING SERVICE ENTRANCE, NO JOINTS SHALL BE INSTALLED UNDER OR WITHIN 5 FEET OF THE BUILDING. INSTALL UNDERGROUND PIPING BELOW GRADE OUTSIDE BUILDING AT ADEQUATE DEPTH TO PREVENT FREEZING.

INTERIOR WASTE AND VENT BELOW SLAB: ABOVE / BELOW GRADE PIPING SHALL BE POLYVINYL CHLORIDE (PVC) PLASTIC PIPE IN IPS DIAMETERS, INCLUDING SCHEDULE 40, DR 22 (PS 200), AND DR 24 (PS 140) WITH A SOLID, CELLULAR CORE OR COMPOSITE WALL AS PER ASTM D2665, ASTM F891, ASTM F1488, OR CSA B181.2 STANDARDS.

INTERIOR WASTE AND VENT ABOVE SLAB: SLOPE OF DRAINAGE SYSTEM SHALL BE 1/16" PER FOOT OF RUN FOR PIPE 8" OR LARGER (I.D.) AND 1/8" PER FOOT OF RUN FOR PIPE 3" TO 6" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 2"-1/2" AND SMALLER (I.D.). VENT PIPING SHALL BE PITCHED TO DRAIN.

INTERIOR STORM: INSIDE BUILDING SHALL BE SAME AS SPECIFIED FOR INTERIOR WASTE AND VENT PIPE.

NATURAL GAS: GAS PIPING ABOVE GROUND SHALL BE SCHEDULE 40 BLACK STEEL WITH MALLEABLE IRON SOLDER FITTINGS, OR STANDARD WELDED FITTINGS. UNDERGROUND GAS PIPING SHALL BE HIGH DENSITY OR ULTRAHIGH DENSITY POLYETHYLENE PIPE AS REQUIRED BY THE GAS UTILITY COMPANY. POLYETHYLENE PIPE SHALL CONFORM TO ASTM D1248.

UNDERGROUND GAS PIPING SHALL BE POLYETHYLENE PIPE SHALL BE PHILLIPS DISCOPIPE SERIES 6500, OMEGA ENGINEERING, PEPCO, OR APPROVED EQUAL. INSTALLATION SHALL BE IN CONFORMANCE WITH UTILITY COMPANY RULES. PROVIDE POLYETHYLENE TO STEEL TRANSITION FITTINGS BY FLECTON CORPORATION, WYLLIE CENTRAL PLASTICS AT TRANSITIONS FROM BELOW GRADE TO ABOVE GRADE. FACTORY ASSEMBLED AND PRESSURE TESTED ONE PIECE DESIGN, WITH STEEL HALF POLYETHYLENE HALF SHALL BE OF AMPLE LENGTH FOR MAKING WELDS. STEEL PIPE SHALL HAVE EPOXY PROTECTIVE COATING.

CONNECTIONS TO PLUMBING FIXTURES AND EQUIPMENT: 1-1/4" AND LARGER WASTE CONNECTIONS FROM FIXTURE TRAPS TO CAST IRON PIPE SHALL BE "DWV" COPPER WITH WROUGHT COPPER DRAINAGE PATTERN FITTINGS WITH COPPER SWEAT OR COMPRESSION JOINTS AT FIXTURE TRAP CONNECTIONS AND THREADED JOINTS AT CONNECTIONS TO CAST IRON PIPE.

INDIRECT AND CONDENSATE DRAIN INSIDE BUILDING: PVC SCHEDULE 40 DWV ASTM D2665 PIPE WITH PVC MEETING ASTM B1784, "SOLID WALL" CELL CLASS 12454-B WITH ASTM 2665 SOCKET FITTINGS WITH SOLVENT WELD JOINTS IS ALSO PERMITTED WHERE APPROVED BY CODE.

INDIRECT AND CONDENSATE DRAIN OUTSIDE BUILDING: PVC SCHEDULE 40 DWV ASTM D2665 PIPE WITH PVC MEETING ASTM B1784, "SOLID WALL" CELL CLASS 12454-B WITH ASTM 2665 SOCKET FITTINGS WITH SOLVENT WELD JOINTS IS ALSO PERMITTED WHERE APPROVED BY CODE. (NOTE: PVC PIPING IS NOT ALLOWED IN CEILING RETURN AIR PLENUMS)

SUMP PUMP DISCHARGE: SUMP PUMP DISCHARGE PIPING ABOVE GRADE SHALL BE ASTM A53 SCHEDULE 40 GALVANIZED STEEL PIPE WITH GALVANIZED MALLEABLE IRON FITTINGS. SUMP PUMP DISCHARGE PIPING BELOW GRADE SHALL BE ASTM D-1785 SCHEDULE 40 PVC PIPE WITH SOCKET WELD PRESSURE FITTINGS.

PIPING AND EQUIPMENT INSULATION

INSULATE DOMESTIC COLD WATER, HOT WATER, HOT WATER RECIRCULATION, WITH ONE-PIECE FIBERGLASS COVERING PIPE WITH APPLIANCE VENTS, COORDINATE WITH THE ELECTRICAL CONTRACTOR A CONTINUOUS VAPOR BARRIER BY CERTAINTED, OWENS-CORNING OR ARMSTRONG. INSULATE INTERIOR CONDENSATE DRAINPIPE (WITHIN BUILDING) AND INTERIOR HORIZONTAL STORM DRAIN PIPING, THAT IS CONCEALED ABOVE THE CEILING WITH 1" THICK ONE-PIECE FIBERGLASS COVERING FOR HOT PIPING, PROVIDE PIPE HANGERS AND RISER CLAMPS SIZED FOR THE OUTSIDE DIAMETER OF PIPING. BUTT INSULATION TO HANGER OR RISER CLAMP FOR VERTICAL PIPE. SEAL EXPOSED INSULATION WITH INSULATION SEALER. EXCEPTION: VERTICAL PIPING: PROVIDE CLAMPS SIZED FOR THE OUTSIDE DIAMETER OF THE VERTICAL PIPE AND EXTEND CLAMP THROUGH INSULATION. SEAL PENETRATIONS OF INSULATION AND VAPOR BARRIER WITH NET COAT OF VAPOR BARRIER LAJ CEMENT, AND SADDLE HUBS WITH INSULATION. PROVIDE LONG SECTIONS OF HIGH DENSITY, HIGH TEMPERATURE CALCIUM SILICATE BY JOHNS-MANVILLE, FIBERGLASS BY KNAUF, OR 8" LONG STYROFOAM BILLETS BY DOW OR FLEXIBLE UNICELLULAR PIPING INSULATION MEETING ASTM C 534-01A, TYPE I WITH MALLEABLE HIGH DENSITY PIPE SUPPORTS AND EXPOSED IN STEEL INSULATION SHIELD BY COOPER B-LINE / ARMACELL OR APPROVED EQUAL. INSULATION SHALL BE CONTINUOUS ALONG THE PIPE SURFACE, EXCEPT AT VALVES, UNIONS, AND WHERE PIPING IS EXPOSED AT FIXTURES. PROVIDE INSULATION PROTECTION SHIELD AT EACH HANGER FOR INSULATED PIPING.

FOR HOT AND COLD WATER PIPING INSTALLED INSIDE MASONRY UNITS OF WALLS, PROVIDE FLEXIBLE UNICELLULAR INSULATION BY ARMACELL.

COVER FITTINGS WITH ZESTON, KNAUF, OR EQUAL ONE-PIECE PVC PREMOULDED INSULATING COVERS. FITTING COVERS, JACKETS AND ADHESIVES SHALL NOT EXCEED FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPMENT RATING OF 50 PER ASTM E84. AT ALL ELBOWS AND TEES, FLIP VOIDS BETWEEN COVERS AND PIPING WITH FIBERGLASS INSULATION AND TAPE JOINTS. INSTALL PIPE INSULATION IN COMPLIANCE WITH MANUFACTURER'S RECOMMENDATIONS. WHERE PREMOULDED INSULATING FITTINGS ARE NOT APPROVED BY LOCAL AUTHORITIES, MITER INSULATION AT FITTINGS.

PROVIDE 1" THICK FIBERGLASS INSULATION ON VENT PIPING WITH SIX FEET OF VENT THROUGH THE OF ROOF.

PIPING JOINTS

COPPER TUBING: JOINTS IN HARD TEMPER TUBING SHALL BE SOLDERED JOINTS USING LEAD-FREE 95/5 SOLDER EXCEPT WHERE TUBING IS INSTALLED BELOW GRADE OR BELOW THE BASE SLAB, IN WHICH CASE

JOINTS SHALL BE SOLDERED WITH SILVER SOLDER (SILFOS). JOINTS IN SOFT TEMPER COPPER TUBING SHALL BE OF THE FLARED TYPE INSTALLED IN COMPLIANCE WITH THE FITTING MANUFACTURER'S RECOMMENDATIONS.

THREADED STEEL PIPE: THREADED JOINTS SHALL BE FULL AND CLEAN, CUT WITH NOT MORE THAN THREE (3) THREADS EXPOSED BEYOND THE FITTINGS. MAKE JOINTS TIGHT WITH GRAPHITE BASE PIPE JOINT COMPOUND AND PAINT EXPOSED THREADS OF FERROUS PIPE WITH ACID-RESISTING PAINT AFTER PIPING HAS BEEN TESTED AND PROVEN TIGHT. NO CAULKING, LAMP-WICK OR OTHER MATERIAL WILL BE PERMITTED FOR CORRECTION OF DEFECTIVE JOINTS.

WELDED STEEL PIPE: WELDED JOINTS SHALL BE OF THE BUTT WELDED SINGLE "V" TYPE. BEVEL PIPE AT A 45 DEGREE ANGLE TO WITHIN 1/16" OF THE INSIDE WALL AND BUILD UP THE WELD TO ONE FOURTH GREATER DEPTH THAN THE PIPE WALL THICKNESS. WELDING SHALL BE EITHER ELECTRIC OR OXY-ACETYLENE, PERFORMED IN CONFORMANCE WITH THE ASME CODE FOR PRESSURE PIPE WELDING, AND ONLY BY EXPERIENCED CERTIFIED WELDERS.

CAST IRON PIPE BELOW GRADE: JOINTS IN BELL AND SPIGOT CAST IRON WASTE AND VENT PIPE SHALL BE NEOPRENE COMPRESSION GASKETS, TYSERAL OR EQUAL.

CAST IRON PIPE ABOVE GRADE: JOINTS IN HUBLESS PIPE SHALL BE STANDARD CISPI 310 NSF CERTIFIED BY ANACO, IDEAL, MISSION OR TYLER. JOINTS IN STORM PIPING, INCLUDING CONNECTIONS TO ROOF DRAINS, SHALL BE HEAVY DUTY CAST IRON JOINTS WITH SIDE SEAM IN FL80, ANACO HUSKY #5D-4000" OR CLAMP-ALL "HI TORQUE" 125-11NB.

PVC PIPE: CLEAN JOINTS FREE FROM DEBRIS AND MOISTURE. APPLY PVC PRIMER MEETING ASTM F656 TO EACH JOINT. APPLY SOLVENT CEMENT MEETING ASTM D2564 AND MAKE JOINT WHILE WET AND IN ACCORDANCE WITH ASTM D2855.

PEX TUBE: THE FITTINGS ARE ENGINEERED POLYMER AND LEAD-FREE BRASS COLD EXPANSION TYPE WITH PEX REINFORCING RINGS IN COMPLIANCE WITH ASTM F1982 PEX HOSE BARB FITTINGS MEETING ASTM 1807 OF BRASS FOR USE WITH PEX TUBING WITH COPPER CRIMP RING. CUT ENDS OF TUBING STRAIGHT AND TRUE, MANUFACTURED BY IPEX PLUMBETTER PEX TUBING, VIEGA, WIRSBO OR ZURN INDUSTRIES.

PIPE ADAPTERS: MAKE CONNECTION OF NEW WASTE PIPE TO NEW OR EXISTING DISSIMILAR WASTE PIPE USING ADAPTER COUPLINGS. PROVIDE FERROX, PROFLEX 3000 SERIES OR MISSION SEWER COUPLINGS WITH NEOPRENE ADAPTER GASKET AND HOSE CLAMPS FOR CONNECTIONS DISSIMILAR PIPES ABOVE GRADE. PROVIDE FERROX, 1056 SERIES OR MISSION SEWER COUPLINGS WITH NEOPRENE ADAPTER GASKET AND HOSE CLAMPS FOR CONNECTIONS DISSIMILAR PIPES BELOW GRADE AND CO. STAINLESS STEEL BANDS WITH MASTIC.

CPVC PIPE: CLEAN JOINTS FREE FROM DEBRIS AND MOISTURE. APPLY CPVC PRIMER MEETING ASTM F656 TO EACH JOINT. APPLY SOLVENT CEMENT MEETING ASTM F493 AND MAKE JOINT WHILE WET AND IN ACCORDANCE WITH ASTM D2855.

PIPING INSTALLATION

GENERAL: CLEAN PIPE THOROUGHLY PRIOR TO INSTALLATION. REAM ENDS OF PIPE TO REMOVE BURRS. CUT PIPE ACCURATELY TO MEASUREMENTS TAKEN ON THE JOB. INSTALL WITH ADEQUATE CLEARANCE FOR INSTALLATION OF COVERINGS WHERE REQUIRED. PIPE SHALL NOT BE SPRUNG OR BENT UNDER LOADS. SUPPORTS SHALL BE INSTALLED AND SUPPORT IT FROM THE BUILDING STRUCTURE WITH HANGERS AS SPECIFIED BELOW. PROVIDE CHROME-PLATED ESCUTCHEONS ON PIPES PASSING THROUGH CEILING, FLOORS OR WALLS OF FINISHED SPACES. RUN PIPES FROM FLOOR AND WALLS WITH SLOPE AND WITH DIAPHRAGM IRON PIPES SLEEVES. DO NOT GROUT IN PLACE UNLESS REQUIRED FOR STRUCTURAL FIRE INTEGRITY. INSTALL PIPE CONCEALED IN FINISHED SPACES WHEREVER POSSIBLE. USE A DIELECTRIC UNION WHERE FERROUS AND COPPER PIPES MEET. CONNECT WITH COPPER OR COPPER AND ZINC-PLATED STEEL BODY, A THREADED NYLON INSERT, AND INSULATING PRESSURE GASKET. NO FERROUS METAL--TO-COPPER CONNECTION MADE WITHOUT INSULATING UNIONS WILL BE ALLOWED.

HANGER & SUPPORTS: PIPE HANGERS SHALL BE AS DESCRIBED IN THE SPECIFICATIONS BY B-LINE OR EQUAL BY ANVIL, MICHIGAN, TRUSCON, OR EQUAL. HANGERS SHALL BE 3" AND LARGER SHALL BE B-LINE OR EQUAL CONNECTORS AND ALL THREADED HANGER RODS. PROVIDE ENGINEERED SUPPORT STRUTS BETWEEN JOISTS AND OTHER STRUCTURAL MEMBERS AS REQUIRED TO PROVIDE A RIGID HANGING INSTALLATION. DO NOT HANG HANGERS FROM OTHER PIPES, OTHER EXISTING HANGERS, HANGER RODS AND SPACE HANGERS AT INTERVALS AS SPECIFIED IN "HANGER SPACING." PROVIDE SUPPORT WITHIN 1' OF EACH ELBOW AND TEE. PROVIDE SUPPORTS WITHIN 1' OF EACH EQUIPMENT CONNECTION. PROVIDE TWO NUTS ON THREADED SUPPORTS TO SECURELY FASTEN THE SUPPORT. INSTALL HANGER TYPES OR SUPPORTS FOR VARIOUS PIPING AS FOLLOWS:

PEX TUBE: PEX TUBING SHALL NOT BE INSTALLED WITHIN THE FIRST 18 INCHES OF PIPING CONNECTED TO THE HOT WATER HEATER. PEX TUBING SHALL NOT BE INSTALLED WITHIN 6 INCHES HORIZONTALLY OR WITHIN 12 INCHES VERTICALLY FROM ANY SOURCE OF HEAT, SUCH AS GAS APPLIANCE VENTS, LIGHT FIXTURES, OR OTHER HEAT SOURCES. PEX TUBING SHALL NOT BE INSTALLED IN LOCATIONS WHERE EXPOSED TO DIRECT SUNLIGHT. THESE TUBES SHALL NOT BE DEFORMED OR KINKED, TUBING PASSING THROUGH DRILLED OR NOTCHED METAL STUDS OR JOIST OR HOLLOW SHELLS. MASONRY WALLS SHALL BE PROTECTED FROM ABRASION DUE TO THERMAL EXPANSION AND CONTRACTION BY ELASTOMERIC OR PLASTIC SLEEVES. TUBING PENETRATING FRAMING MEMBERS WITHIN ONE INCH OF THE EXPOSED FRAMING SHALL BE PROTECTED BY STEEL BRACKETS. LONG SWEEEPING "ELLS", COMBINATION "Y" AND 1/8 BEND FITTINGS, OR 45 DEGREE "ELLS" (1/8 BEND FITTINGS), 1/8 BEND OR 1/16 BEND AND "Y" FITTINGS. PROVIDE A SMOOTH AND UNIFORM INVERT IN THE SYSTEM, DRILLING OR TAPPING OF SOIL AND WASTE LINES, AND SADDLE HUBS AND BANDS ARE NOT PERMITTED. INSTALL SOIL AND WASTE LINES AS INDICATED ON THE DRAWINGS. DETERMINE EXACT LOCATIONS IN SUCH A MANNER AS TO MAINTAIN PROPER CLEARANCE. PRIOR TO INSTALLATION OF ANY BUILDING DRAINPIPE, VERIFY ELEVATION OF GROUND JOINTS TO SECURELY FASTEN THE SUPPORT. EXISTING TENANT CONNECTIONS INDICATED ON THE DRAWINGS.

PLUMBING VENT: CONNECT PLUMBING VENT PIPES TO FIXTURE DRAINPIPS AS INDICATED ON THE DRAWINGS OR AS REQUIRED BY THE INSTALLATION PRACTICES ADOPTED AND ENFORCED BY LOCAL CODES OFFICIAL AND EXTEND VENT PIPES FULL SIZE THROUGH THE ROOF LINE. GRADE PIPE TO A UNIFORM SLOPE SO AS TO DRAIN BACK BY GRAVITY TO THE DRAINAGE PIPING SYSTEM. VENTS PASSING THROUGH THE ROOF SHALL BE MINIMUM 3" SIZE (EXCEPT IN TROPICAL CLIMATES, PER LOCAL CODES). TURN FLASHING DOWN INTO STACK AT LEAST 2" AND EXTEND FLASHING 24" IN ALL DIRECTIONS FROM THE PIPE AT THE ROOF LINE. APPLY WATER LEAD POPE DOG ON MALE STEEL PIPE THREADS. VENT LINES SHALL BE AIR AND WEATHER TIGHT. VENT FLOOR DRAINS INDIVIDUALLY OR CONNECT THEM TO A HORIZONTALLY VENTED LINE AS SHOWN ON THE DRAWINGS.

DOMESTIC WATER: ARRANGE COLD, HOT, AND HOT WATER RECIRCULATION PIPING TO DRAIN AT THE LOWEST POINT IN EACH. INSTALL AT LEAST ONE PIPE UNION JOINT IN EACH SHUT-OFF VALVE. AT CONNECTION POINTS OF LOWEST POINT OF EQUIPMENT, AND ELSEWHERE IN THE SYSTEM WHERE REQUIRED TO ALLOW PROPER MAINTENANCE, PROVIDE UNION OF GROUND JOINTS. TEST MAKE OWNERS OF EXPANSION AND CONTRACTION WHERE REQUIRED BY THE INSTALLATION. WHERE WATER PIPING OCCURS IN EXTERIOR WALLS, HOLD PIPE AS CLOSE AS POSSIBLE TO THE INTERIOR FACE OF WALL AND INSTALL INSULATION BAT OR OTHER INSULATION (MINIMUM R8) BETWEEN PIPING AND THE EXTERIOR WALL FACE. INSTALL PLASTIC UNDERGROUND WARNING TAPE WITH NAME OF SERVICE INSTALLED CONTINUOUSLY ALONG ITS LENGTH FOR DOMESTIC WATER PIPE FIVE FEET OUTSIDE THE BUILDING.

NATURAL GAS: PITCH NATURAL GAS PIPING AND PROVIDE ACCESSIBLE DIRT LEGS AT THE LOW POINTS. TAKE BRANCH PIPES OFF THE TOP OR SIDES OF MAIN PIPES TO PREVENT ACCUMULATION OF WATER IN THE BRANCHES. INSTALL GAS PIPING VALVES AND UNIONS ONLY IN ACCESSIBLE LOCATIONS. DO NOT INSTALL GAS PIPE BELOW THE BASE SLAB.

PIPING SANITIZATION

Sanitize the entire domestic water piping system (cold, hot, and hot water return) with a solution containing not less than 50 ppm available chlorine. The solution shall be in contact with the minimum of 24 hours, with each valve being operated several times during the period. After completion, flush system with city water.

HANGER SPACING, ROD SIZES & CONNECTORS: CONNECT RODS TO STEEL

BEAMS OR JOISTS WITH B-LINE #B3031 OR #B3033BEM CLAMPS AS REQUIRED. CONNECT RODS TO CONCRETE WITH B-LINE #3014 MALLEABLE IRON SINGLE TUBE INSERTS WITH MALLEABLE IRON NUT. CONNECT RODS IN WOOD CONSTRUCTION WITH B-LINE #B3058 SIDE BEAM CONNECTORS. HANG AND SUPPORT PIPING WITH SPACING AND ROD SIZES AS FOLLOWS:

PEX TUBE: PEX TUBING 1" AND SMALLER SHALL BE SUPPORTED AT 32" INTERVALS FOR HORIZONTAL RUNS, PEX TUBING 1-1/4" AND LARGER SHALL BE SUPPORTED AT FEET INTERVALS FOR HORIZONTAL RUNS. PEX TUBE SHALL BE SUPPORTED AT 32" INTERVALS AT EACH FLOOR FOR VERTICAL RUNS. FURTHERMORE, VERTICAL RUNS SHALL BE PROVIDED WITH MID-STORY GUIDES.

COPPER TUBE: 1-1/2" AND SMALLER - EVERY 6' WITH 3/8"HANGER RODS; 2" EVERY 10' WITH 3/8"HANGER RODS; 2-1/2" EVERY 10' WITH 3/8" HANGER RODS; 3" EVERY 10' WITH 1/2" RODS, 4" EVERY 10' WITH 5/8" HANGER RODS. SUPPORT VERTICAL COPPER TUBE EVERY 10'.

STEEL PIPE: 1" AND SMALLER - EVERY 8' WITH 3/8" HANGER RODS; 1-1/4" TO 2" EVERY 10' WITH 3/8" HANGER RODS; 2-1/2" AND 3" EVERY 10' WITH 1/2" HANGER RODS, 4" EVERY 10' WITH 5/8" HANGER RODS. SUPPORT VERTICAL STEEL PIPE EVERY 10'.

CAST IRON PIPE: EVERY 10' AND WITHIN 1' OF EACH JOINT. 2" AND SMALLER WITH 3/8" HANGER RODS; 3" WITH 1/2" HANGER RODS; 4" WITH 5/8" HANGER RODS; 6" WITH 3/4" HANGER RODS; 8" AND LARGER WITH 7/8" HANGER RODS. SUPPORT VERTICAL CAST IRON PIPE EVERY 15'.

PVC PIPE: SUPPORT ALL PIPES SIZES EVERY 4', 1-1/2" AND SMALLER WITH 3/8" HANGER RODS; 2" WITH 1/2" HANGER RODS; 2-1/2" AND 3" WITH 1/2" HANGER RODS, 4" AND LARGER WITH 5/8" HANGER RODS. SUPPORT VERTICAL PVC PIPE EVERY 4'.

SUPPORTS ON ROOF: SUPPORT PIPING ON

ELECTRICAL SYMBOLS LEGEND	
SYMBOLS	DESCRIPTION
	FLUORESCENT FIXTURE, WITH FIXTURE DESIGNATED BY LETTER.
NL	NIGHT LIGHT - NOT SWITCHED
	CEILING OR WALL MOUNTED FIXTURE
	JUNCTION BOX
	SINGLE/DOUBLE FACED EXIT SIGN - NOT SWITCHED
	DOUBLE HEAD EMERGENCY LIGHT WITH BATTERY BACK UP.
S	SINGLE POLE SWITCH, +48"
S ₃	THREE WAY SWITCH, +48" A.F.F.
S ₀	OUTLET CONTROL INDICATOR
S _D	DIMMER SWITCH
S _{OS}	OCCUPANCY SENSOR SWITCH
S _T	THERMAL OVERLOAD SWITCH
	DUPLEX RECEPTACLE, +18" A.F.F.
	SIMPLEX RECEPTACLE, +18" A.F.F.
	DUPLEX RECEPTACLE ABOVE COUNTER, VERIFY HEIGHT
	FOURPLEX RECEPTACLE, +18" A.F.F.
	HALF SWITCHED DUPLEX RECEPTACLE
	POWER/PHONE/DATA FLUSH FLOOR OUTLET
	250 VOLT RECEPTACLE PER UNIT REQUIREMENTS
	600 VOLT RECEPTACLE PER UNIT REQUIREMENTS
	TELEPHONE/DATA SYSTEM OUTLET, 4" SQUARE BOX AND COVERPLATE, 3/4"C. TO CEILING SPACE UNLESS SHOWN WITH HOMERUN, +18" A.F.F.
	TELEVISION OUTLET PLASTER RING AT +18" A.F.F. (U.N.O.) HUBBELL COVERPLATE, 3/4"C. TO CEILING SPACE UNLESS SHOWN WITH HOMERUNS.
	DATA SYSTEM OUTLET, +18" A.F.F.
	CONDUIT BELOW FLOOR OR UNDERGROUND
	CONDUIT IN WALL OR ABOVE CEILING
LA 1,3	HOMERUN TO PANEL (SEE GROUNDING NOTE)
	MOTOR CONNECTION
	DISCONNECT SWITCH
	FUSED DISCONNECT
	DUCT SMOKE DETECTOR
	LIGHTNING ARRESTER
*** ALL SYMBOLS ON LEGEND MAY NOT APPLY TO DRAWING(S). ***	

ELECTRICAL NOTES

- PRIOR TO SUBMITTING BID, CONTRACTOR SHALL EXAMINE ALL GENERAL CONSTRUCTION DRAWINGS AND VISIT THE CONSTRUCTION SITE TO BECOME FAMILIAR WITH EXISTING CONDITIONS UNDER WHICH THE CONTRACTOR WILL HAVE TO OPERATE AND WHICH IN ANY WAY AFFECTS THE WORK UNDER HIS CONTRACT. NO SUBSEQUENT ALLOWANCE WILL BE MADE IN BEHALF OF THE CONTRACTOR FOR ANY ERROR OR NEGLIGENCE ON HIS PART.
- THE CONTRACTOR SHALL BE HELD FULLY RESPONSIBLE FOR THE PROPER RESTORATION OF ALL EXISTING SURFACES REQUIRING PATCHING, PLASTERING, PAINTING AND /OR OTHER REPAIR DUE TO THE INSTALLATION OF ELECTRICAL WORK UNDER THE TERMS OF THE CONTRACT. CLOSE ALL OPENINGS, REPAIR ALL SURFACES, ETC., AS REQUIRED.
- SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, ELEVATIONS AND BUILDING DETAILS. VERIFY LOCATION OF ALL OUTLETS, SWITCHES, AND WALL MOUNTED LIGHTING FIXTURES WITH ARCHITECTURAL DRAWINGS AND ACTUAL CONDITIONS. SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF LIGHTING FIXTURES. VERIFY ALL CEILING TYPES WITH ARCHITECTURAL DRAWINGS BEFORE ORDERING FIXINGS.
- PRIOR TO ROUGH-IN AND FINAL CONNECTION, VERIFY ELECTRICAL CHARACTERISTICS AND EXACT LOCATION OF EQUIPMENT.
- GROUT AND SEAL ALL CONDUIT PENETRATIONS OF WALLS AND FLOOR SLABS TO PRESERVE FIRE RATING AND WATER/TIGHT INTEGRITY.
- ALL WIRING TO BE INSTALLED IN RACEWAYS. TYPE OF RACEWAY SHALL BE AS REQUIRED BY CODE. MINIMUM CONDUIT SIZE SHALL BE 3/4"C. FOR POWER AND 1"C. FOR DATA. RACEWAYS RUN ACROSS ROOF SHALL BE MINIMUM 4" ABOVE ROOF.
- BRANCH CIRCUIT WIRING SHALL BE THHN/THWN INSULATION. EXTERIOR WIRING SHALL BE THWN-2. PANEL FEEDERS SHALL BE TYPE XHHW. ALL WIRE SHALL BE COPPER. MINIMUM WIRE SIZE SHALL BE #12. PER THE 2020 NEC CODE ADOPTED BY THE VILLAGE OF NORTH AURORA, SEPARATE NEUTRAL TO BE PROVIDED FOR EACH CIRCUIT OR PROVIDE MULTI-POLE HANDLE TIE FOR EACH MULTI-WIRE CIRCUIT
 - PROVIDE CODE SIZED GROUNDING CONDUCTOR WIRE IN ALL CONDUITS.
 - ALL ELECTRICAL EQUIPMENT SHALL BE NEW, U.L. APPROVED AND COMMERCIAL GRADE.
 - ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE VILLAGE OF NORTH AURORA, LATEST ADOPTED 2020 NATIONAL ELECTRICAL CODE (NEC), AND ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES.
 - IT SHALL BE THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO PROVIDE ONE (1) SET OF COMPLETE CONSTRUCTION DRAWINGS.
 - PROVIDE NEW PANEL DIRECTORIES INDICATING SPECIFIC CIRCUIT INFORMATION TO DISTINGUISH EACH CIRCUIT FROM ANY OTHER PER NEC.
 - ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL DEMOLITION OF DEVICES, WIRE & CONDUIT. WHERE THESE ITEMS ARE NO LONGER USED ALL UNUSED WIRE SHALL BE REMOVED BACK TO THE PANEL. ANY DOWNSTREAM EQUIPMENT TO REMAIN IN USE SHALL BE RECONNECTED.

ABBREVIATIONS	
E	EXISTING LIGHT OR DEVICE TO REMAIN
ER	EXISTING LIGHT OR DEVICE TO BE REMOVED OR RELOCATED
R	RELOCATED LIGHT OR DEVICE
N	NEW LIGHT OR DEVICE
A.F.F.	ABOVE FINISHED FLOOR
C	CONDUIT
E.C.	EMPTY CONDUIT WITH PULLWIRE
E.D.F.	ELECTRICAL DRINKING FOUNTAIN.
GND	GROUND
MLO	MAIN LUGS ONLY
MCB	MAIN CIRCUIT BREAKER
S.E.S.	SERVICE ENTRANCE SECTION
WP	WEATHER PROOF
WR	WATER RESISTANT
GF/GFCI	GROUND-FAULT CIRCUIT INTERRUPTER
U.N.O.	UNLESS NOTED OTHERWISE
	SECURITY CAMERA
	SPEAKER
S.U.S.E	SUITABLE FOR USE AS SERVICE EQUIPMENT

SCOPE OF WORK
 PROVIDE LIGHTING & POWER FOR A 1400 SQ. FT. COFFEE SHOP UTILIZING UTILITY COMPANY TRANSFORMER. TO FEED AN EXISTING 400 AMP SERVICE. USE EXISTING 400A PANEL AND PROVIDE A NEW 100 AMP PANEL TO FEED NEW EQUIPMENT THROUGH OUT THE PROPERTY SITE & TENANT SPACE FOR PERMIT.

SPECIFICATIONS

16001 SCOPE OF WORK
 THE WORK DESCRIBED UNDER THIS SECTION OF THE SPECIFICATIONS INCLUDES FURNISHING ALL MATERIAL LABOR AND EQUIPMENT, EXCEPT AS FURNISHED UNDER OTHER SECTIONS OF THE SPECIFICATIONS, TO INSTALL ALL ELECTRICAL WORK AS SHOWN IN THE DRAWINGS AND AS SPECIFIED AND REFERRED TO HEREIN.
.01 EXAMINATION OF THE PREMISES
 THE CONTRACTOR WILL BE HELD TO HAVE EXAMINED THE PREMISES AND SATISFIED HIMSELF AS TO EXISTING CONDITIONS UNDER WHICH HE WILL BE OBLIGATED TO OPERATE IN PERFORMING HIS PART OF THE WORK OR THAT WHICH WILL IN ANY MANNER AFFECT THE WORK UNDER HIS CONTRACT.
 PRIOR TO ORDERING ANY MATERIALS OR DOING ANY WORK, VERIFY THE DIMENSIONS AT THE SITE, CORRECTNESS OF DIMENSIONS WILL BE THIS CONTRACTORS RESPONSIBILITY. NO EXTRA CHARGES OR COMPENSATION WILL BE ALLOWED FOR DIFFERENCES BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE DRAWINGS. IMMEDIATELY REPORT DIFFERENCES TO THE ARCHITECT AND DO NOT PROCEED WITH WORK UNTIL ARCHITECT RENDERS HIS DECISION.
.02 REGULATIONS, PERMITS, AND INSPECTIONS
 REGULATIONS: COMPLY WITH ALL APPLICABLE CODES, RULES, AND REGULATIONS. ALL MATERIALS, EQUIPMENT, AND WORK MUST COMPLY WITH THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE AND THE APPLICABLE NATIONAL AND LIFE SAFETY CODES.
 PERMITS: OBTAIN AND PAY FOR ALL PERMITS, FEES, AND LICENSES REQUIRED TO PERFORM WORK DESCRIBED HEREIN. INSPECTIONS: ALL WORK MUST BE INSPECTED AND APPROVED BY LOCAL AUTHORITIES. PRIOR TO FINAL APPROVAL, FURNISH THE ARCHITECT WITH CERTIFICATES OF INSPECTION AND APPROVALS BY THE LOCAL AUTHORITIES.
.04 EXISTING SERVICES AND REMODEL AREAS
 MAINTAIN ALL WIRINGS, POWER, SOUND, TELEPHONE, ETC. TO EXISTING BUILDINGS OR AREAS. INTERRUPTIONS OF SERVICES REQUIRED FOR "CUT-OVER" OR CONNECTIONS OF NEW CABLES, ETC. SHALL BE DONE AT THE CONVENIENCE OF THE TENANT AND BE APPROVED IN WRITING BY THE TENANT PRIOR TO THE INTERRUPTION.
.05 TEMPORARY POWER
 PROTECT TEMPORARY POWER AS REQUIRED BY THE GENERAL CONTRACTOR. THIS SERVICE SHALL BE MAINTAINED THROUGHOUT THE ENTIRE JOB AS THE WORK PROGRESSES. PROVIDE OUTLETS AT CONVENIENT POINTS AND IN SUFFICIENT NUMBERS SO THAT NO EXTENSION COORD IS OVER 50 FEET IN LENGTH IS REQUIRED TO REACH ANY WORK POINT. MAINTAIN GENERAL LIGHTING IN CORRIDORS, STAIRS, BASEMENT AND OTHER AREAS NOT RECEIVING DAYLIGHT REQUIRED FOR SAFETY. REMOVE TEMPORARY WORK AS RAPIDLY AS REQUIRED FOR OR ALLOWED BY INSTALLATION OF PERMANENT WORK.
16420 SERVICE ENTRANCE EQUIPMENT
 SERVICE ENTRANCE EQUIPMENT TO HAVE SHORT CIRCUIT CURRENT RATING EQUAL TO OR GREATER THAN AVAILABLE FAULT CURRENT AND MEET ALL THE REQUIREMENTS OF U.L. STANDARD NO. 891 OUTDOOR GEAR TO BE NEMA 3R. ALL SWITCHGEAR TO BE FREE STANDING, UNLESS OTHERWISE INDICATED, MOUNTED ON 4" CONCRETE PAD EXTENDING A MINIMUM OF 6 INCHES IN FRONT OF EQUIPMENT.
 END SECTION SHALL BE PROVIDED WITH FULL CAPACITY THROUGH BUS FOR FUTURE EXTENSION TO FUTURE SECTIONS.
16425 SWITCHBOARDS
 SWITCHBOARDS TO BE SQUARED 2" TYPE QMB OR QMB. FREE STANDING, 90" HIGH, MIN. 14" DEEP WITH TYPE QMB SWITCHES. END SECTION WITH FULL CAPACITY THRU - BUS FOR FUTURE SECTION. MOUNT ON 4" CONCRETE PAD EXTENDING A MINIMUM OF 6 INCHES IN FRONT OF SWITCHBOARDS.
16440 SAFETY SWITCHES
 SAFETY SWITCHES SHALL BE HEAVY DUTY TYPE, WHERE OUTLET FROM THE BUILDING. SWITCHES SHALL BE RAINTIGHT TYPE NEMA 3R. ALL SWITCHES SHALL BE LOCKABLE.
16471 PANELS
 PANEL TYPE AS INDICATED ON THE DRAWINGS. NEW FLUSH PANELS TO HAVE (3) 3/4" EMPTY CONDUITS STUBBED INTO ACCESSIBLE CEILING SPACE.
 PROVIDED A GROUND BUS IN ALL PANELS INCLUDING EXISTING PANELS WHEREIN WORK IS DONE OR ADDED.
 BREAKERS: REPLACE DEFECTIVE BREAKERS IN AFOREMENTIONED PANELS.
 VERIFY THE INTERRUPTING CAPACITY OF ALL BREAKERS WITH REQUIREMENT INDICATED ON THE DRAWINGS. REPLACE EXISTING BREAKERS NOT MEETING REQUIRED A.I.C. RATING.
16461 DRY-TYPE TRANSFORMERS (IF ANY)
 SHALL BE EQUAL TO SQUARE D, 150 DEGREE TEMPERATURE RISE, SERIES 7141/7127. ALL AROUND PER NEC. PER MANUFACTURERS RECOMMENDATION. PROVIDE ISOLATION PADS.
16510 LIGHTING FIXTURES
 ALL LIGHTING FIXTURES SHALL BE LED TYPE WITH DRIVERS AS SPECIFIED ON THE LIGHTING SCHEDULE.
16195 NAME PLATES
 PROVIDE CONTRAST PLASTIC EMBOSING TAPE, ADHESIVE BAKED NAMEPLATES FOR ALL STARTERS AND DISCONNECT SWITCHES.
 PROVIDE LAMICOD NAMEPLATES FOR ALL DISTRIBUTION SWITCHES, BREAKERS, LIGHTING AND POWER PANELS INDICATING ITEMS SERVED. SIZE OF LETTERS SHALL BE MINIMUM OF 3/16" HIGH.
16120 WIRE
 ALL WIRE AND CABLE SHALL BE NEW, 600 VOLT INSULATED, OF TYPES SPECIFIED BELOW. ALL WIRE AND CABLE SHALL BEAR THE UNDERWRITERS' LABEL AND SHALL BE BROUGHT TO THE JOB IN UNBROKEN PACKAGES. WIRE SHALL BE COLOR CODED PER NEC. BRANCH CIRCUIT WIRING SHALL BE A MINIMUM #12 AWG COPPER WIRE AND CABLE NO. 4 AWG AND SMALLER SHALL BE TYPE THW OR THHN/THWN WIRE AND CABLE LARGER THAN NO. 4 AWG SHALL BE TYPE XHHW. ALL AIR CONDITIONING FEEDERS SHALL BE TYPE XHHW.
 ALL WIRING IN PANELBOARDS, SWITCHBOARDS, AND GUTTERS SHALL BE NEATLY ARRANGED AND HELD TOGETHER BY RAPS. WIRES SHALL BE CONNECTED TO CIRCUIT BREAKERS, SWITCHES AND OTHER DEVICES PERPENDICULAR TO TERMINAL LUGS.
 ALL WIRING IN MANHOLES, PULL BOXES OR JUNCTION BOXES OVER 12 INCHES IN LENGTH SHALL BE BUNDLED IN A NEAT AND ORDERLY MANNER.
 AFTER COMPLETION OF UNDERGROUND SPLICES AND SPLICES IN MANHOLES, SEAL SPLICES WITH SCOTCHGLOD #22 COATING OR EQUAL TO MOISTURE PROOF CABLES.
 LEAVE NO LESS THAN 6 INCHES OF WIRE AT EACH OUTLET FOR CONNECTION TO LIGHTING FIXTURES, SWITCHES, RECEPTACLES AND OTHER PIECES OF EQUIPMENT. WHERE WIRES FEED THROUGH AN OUTLET OR JUNCTION BOX, NEATLY TUCK 6 INCH LOOP IN BOTTOM OF BOX.
 LIGHTING AND POWER CIRCUITS SHALL BE IDENTIFIED BY PANEL LETTER AND CIRCUIT NUMBER WITH BRADY WRAPAROUND CLOTH WIRE MARKERS AT ALL TERMINATIONS AND JUNCTIONS.
 ALL BRANCH CIRCUIT AND FEEDER CONDUCTORS SHALL BE COLOR-CODED AS FOLLOWS:
 FOR ALL 120 V TO GROUND CIRCUITS, PHASE CONDUCTORS - BLACK, RED, BLUE NEUTRAL CONDUCTOR - WHITE
 FOR ALL 277 V TO GROUND CIRCUITS, PHASE CONDUCTORS - BROWN, ORANGE, YELLOW NEUTRAL CONDUCTORS - GRAY
 LARGE FEEDER CONDUCTORS SHALL BE CODED BY COLORED TAPE WRAPPED AROUND THE CONDUCTOR AT EACH PULLBOX, TERMINATION POINT AND SPLICE.

ALL CONNECTIONS TO CIRCUIT BREAKERS AND SWITCHES AND ALL JOINTS IN WIRES SHALL BE MADE AS NOTED BELOW:
 CONNECTIONS TO CIRCUIT BREAKERS AND SWITCHES: NO. 12 WIRE SHALL BE FORMED AROUND BINDING POST OR SCREW.
 NO. 8 WIRE - BUCHANAN, "TERMINED" OR APPROVED EQUAL, LOCKING TONGUE LUG. NO. 6 WIRE AND LARGER - BURNDY "QUICK-LUG" TYPE ODA, OR APPROVED EQUAL, ROUND FLANGE SOLDERLESS LUG.
 CONNECTIONS: CIRCUIT WIRING CONNECTIONS TO FIXTURE WIRE SHALL BE MADE WITH PRESSURE-TYPE SOLDER-LESS CONNECTORS - BUCHANAN, SCOTCHLOC OR WING NUT OR APPROVED EQUAL, COMPLETE WITH INSULATOR AND SECURITY RING.
 JOINTS IN WIRES AND LARGER - BURNDY OR APPROVED EQUAL, NO. 8 WIRE AND SMALLER - BUCHANAN, SCOTCHLOC, WING NUT, OR EQUAL, PRESSURE-TYPE SOLDERLESS CONNECTORS COMPLETE WITH INSULATOR AND SECURITY RING.
 ALL OTHER STANDARD WIRING TO SCREW CONNECTIONS SHALL BE PROVIDED WITH T AND B STA-KON TERMINALS.
 SOLL CONDUCTORS SHALL LOOP TIGHTLY AND COMPLETELY AROUND TERMINAL SCREWS ON ALL WIRING DEVICES.
 UNSOLDERED SOLDERLESS CONNECTORS TO BE INSULATED AS FOLLOWS: TAPE WITH A COVERING OF RUBBER TAPE, EQUAL IN THICKNESS TO THE INSULATION. THIS SHALL BE FOLLOWED WITH AN OUTER COVERING OF FRICTION TAPE IN TWO LAYERS. ONE COAT OF WATERPROOF PAINT SHALL BE APPLIED WHEN SUBJECT TO MOISTURE.
 WIRE AND CABLE TO BE PULLED INTO CONDUITS WITHOUT STRAIN, USE POWDERED SAPSTONE, MINERALAC, OR OTHER APPROVED LUBRICANT. WIRE SHALL NOT BE RE-PULLED IF SAME HAS BEEN PULLED OUT OF A CONDUIT RUN. NO CONDUCTOR SHALL BE PULLED INTO CONDUIT UNTIL CONDUIT SYSTEM IS COMPLETE, INCLUDING JUNCTION BOXES, PULL BOXES, ETC., WITHOUT PERMISSION OF ARCHITECT.
16110 CONDUIT
 IN GENERAL, ELECTRICAL METALLIC TUBING SHALL BE USED FOR ALL WIRING EXCEPT IN OR UNDER CONCRETE. RIGID OR FILL. ELECTRICAL METALLIC TUBING MAY BE USED IN FURRED SPACES, WOOD FRAME WALLS WHERE CONDUITS DO NOT EXCEED 2 1/2" IN SIZE, BRICK, BLOCK, TILE, AND CONCRETE WALLS ARE NOT CONSIDERED HOLLOW AND RIGID CONDUIT SHALL BE PROVIDED FOR THESE AREAS.
 RIGID STEEL CONDUITS OR INTERMEDIATE METAL CONDUITS SHALL BE USED IN CONCRETE SLABS, IN SOLID GROUTED CELLS OR CONCRETE MASONRY WALLS, BRICK, OR TILE WALLS, FOR ALL EXPOSED CONDUIT OUTSIDE OF THE BUILDING, AND FOR CONDUITS EXCEEDING 2 1/2" IN SIZE. IN ADDITION ALL WIRING IN OR UNDER CONCRETE, EARTH, OR FILL SHALL BE RIGID GALVANIZED OR SHERARDIZED STEEL RIGID CONDUIT UNDER CONCRETE, IN EARTH, OR FILL SHALL BE COATED WITH POLYETHYLENE TAPE, SCOTCH NO. 50, OR APPROVED EQUAL, SPIRAL WRAPPED 1/2" LAPPED TO AN OVERALL THICKNESS OF NOT LESS THAN 15 MILS.
.02 USE FLEXIBLE METAL CONDUITS
 RECESSED FIXTURES, MOTOR, TRANSFORMER AND OTHER EQUIPMENT SUBJECT TO MOVEMENT, USE LIQUID TIGHT TYPE WHERE EXTERIOR OR SUBJECT TO LIQUID SPRAY OR DRIPPING.
.03 UL LISTED SCHEDULE 40 PVC CONDUIT MAY BE USED FOR UNDERGROUND RUNS. EXPANSION JOINTS AT 75 FEET ON CENTER OR AS REQUIRED BY MFR. ALL BENDS SHALL BE MANUFACTURED.
.04 NON-METALLIC CONDUIT INSTALLED BELOW CONCRETE FLOORS MAY BE INSTALLED IN THE FILL, HOWEVER, A PORTION OF THE CONCRETE FILL MATERIAL MUST BE PLACED AROUND THE CONDUIT FOR RIGID SUPPORT. NON-METALLIC CONDUIT OUTSIDE THE FILL SHALL BE BURIED A MINIMUM OF 18" BELOW GRADE. NON-METALLIC CONDUIT SHALL BE PROVIDED WITH ODE SIZE COPPER BOND WIRE INSIDE THE CONDUIT FOR ELECTRICAL CONTINUITY, AND SHALL BE INSTALLED IN ACCORDANCE TO NEC ARTICLE NO. 250.
 WRAPPED RIGID STEEL ELBOWS SHALL BE USED FOR RISERS ON PVC CONDUIT RUNS AND SHALL BE GROUNDED. CONDUIT PLACED IN A CONCRETE SLAB SHALL BE LARGER THAN 3/4" TRADE SIZE DIAMETER AND CONDUIT SMALLER THAN 3/4" SHALL BE USED FOR UNDERGROUND CIRCUITS. CONDUIT SHALL HAVE MINIMUM 1" CONCRETE COVER. NO CONDUIT SHALL BE IMBEDDED IN A SLAB THAT IS LESS THAN 3-1/2" THICK, EXCEPT FOR LOCAL OFFSETS. NO CONDUIT SHALL BE PLACED BETWEEN THE REINFORCING STEEL AND THE BOTTOM OF THE SLAB.
 ALL CONDUIT UNDER CONCRETE DRIVES OR ANY LOCATION WHERE SUBJECT TO DAMAGE BY HEAVY EQUIPMENT SHALL BE INSTALLED A MINIMUM OF 24" BELOW GRADE OR 18" BELOW GRADE ENCASED IN A 3" THICK CONCRETE ENVELOPE.
 TRENCHING, BACKFILLING, AND CONCRETE WORK FOR ELECTRICAL WORK SHALL BE DONE UNDER THIS SECTION AND AS REQUIRED BY LOCAL AND/OR RULING AUTHORITIES AND REGULATING AGENCIES.
 THE CONTRACTOR SHALL PROVIDE ALL NECESSARY SLEEVES AND CHASES REQUIRED WHERE CONDUITS PASS THROUGH FLOORS OR WALLS, AND SHALL SEAL ALL OPENING AND FINISH TO MATCH ADJACENT SURFACES. WHERE EXPOSED CONDUITS PASS THROUGH WALLS, FLOORS, OR CEILING, ESCUTCHEON PLATES SHALL BE PROVIDED.
 ALL NECESSARY SERVICES AND BLOCKOUTS SHALL BE PROVIDED.
 ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULL WIRE.
.05 RIGID CONDUIT FITTINGS
 PROVIDE DOUBLE LOCKNUTS AND BUSHINGS EXCEPT AT THREADED HUBS.
.06 EMT OR FLEX FITTINGS
 FOR EMT, OR MALLEABLE IRON, COMPRESSION TYPE ONLY, FOR FLEXIBLE CONDUIT, PROVIDE CLAMP TYPE CONNECTORS SHALL HAVE INSULATED THREADS.
.07 MC CABLE
 METAL CLAD CABLE MAY BE USED IN LIEU OF EMT CONDUIT AND WIRE FOR BRANCH CIRCUIT WIRING IF ACCEPTABLE TO AUTHORITIES.
16140 WIRING DEVICES
 RECEPTACLES SHALL BE FURNISHED AS INDICATED BELOW:
 (1) 20 AMP 120 VOLT DUPLEX, HUBBELL #5362 W/#PB COVERPLATE
 (2) 20 AMP 120 VOLT DUPLEX, HUBBELL #F-5362 W/#P26 GROUND FAULT COVERPLATE
 (3) 20 AMP 120 VOLT FOURPLEX HUBBELL (2) #5362 /#P92 COVERPLATE
 (4) 20 AMP 120 VOLT DUPLEX, HUBBELL # 1G-5362 W/#BISOLATEGROUND COVERPLATE
 WHEN SURFACE WEATHERPROOF MOUNTING IS REQUIRED, RECEPTACLES SHALL BE MOUNTED IN AN FS CONDUIT BOX. ELEVATION OF EACH RECEPTACLE SHALL BE AT THE FLOOR PLUS 18" TO CENTER UNLESS OTHERWISE NOTED.
 ALL SWITCHES SHALL BE FURNISHED IN ACCORDANCE WITH THE FOLLOWING TABLE. SWITCHES SHALL BE OF THE SAME MANUFACTURER AS THE RECEPTACLES FURNISHED.
 \$ 20 AMP 1 POLE HUBBELL #1221-1 WITH #P1 COVERPLATE
 \$320 AMP 3 POLE HUBBELL #1223-1 WITH #P1 COVERPLATE

COVERPLATES FOR RECEPTACLES, SWITCHES AND OUTLETS SHALL GENERALLY BE PLASTIC, WITH COLOR AS SELECTED BY THE ARCHITECT.
16130 BOXES
 BOXES IN EXPOSED OR WET LOCATIONS SHALL BE CAST STEEL CONDUIT BODIES. IN CONCEALED LOCATIONS, THEY SHALL BE CAST STEEL BOXES WITH GALVANIZED OR SHERARDIZED FINISH, OR NEOPRENE GASKETED, SCREWED COVERS.
 SHEET STEEL BOXES SHALL BE STANDARD ONE-PIECE KNOCKOUT BOXES. WHERE OUTLETS ARE INSTALLED IN CONCRETE SLABS, BOXES SHALL BE CONCRETE CAST TYPE BOXES. BOXES SHALL NOT BE LESS THAN 4" IN DIAMETER AND 1-1/2" DEEP. OUTLET BOXES SET IN CONCRETE SHALL BE SET TO HAVE FINAL OPENING FLUSH WITH FINISH SURFACE.
 CAST-METAL CONDUIT BODIES SHALL BE CROUSE-HINDS CONDUITS, APPLITION UNLETS, OR APPROVED EQUIVALENT. BOXES SHALL BE ARRANGED WITH THREADED CONNECTORS FOR RIGID CONDUIT. ALL CONDUIT BODIES SHALL HAVE SUITABLE DEVICES WHICH SHALL BE PROVIDED WITH GASKET FOR EXTERIOR AND MOST LOCATIONS.
 POWER / PHONE FLOOR OUTLETS SHALL BE STEEL CITY #664 WITH # 664CST COVER (VERIFY COLOR) #664-BP PHONE PLATE #664RP OR #664RPL PLATE AND 20A DUPLEX RECEPTACLE PHONE COMPARTMENT TO HAVE 3/4" E.C. TO CEILING SPACE VIA FLOOR/WALL.
 OUTLETS SET IN FURRED CEILING AND STUD WALLS SHALL BE ANCHORED TO THE CEILING OR WALL STRUCTURE WITH SUITABLE STEEL STRAPS.
 OUTLET BOXES SHALL BE USED AS PULL AND JUNCTION BOXES WHEREVER POSSIBLE AND WHERE REQUIRED. BOXES IN PLASTERED WALLS OR CONCRETE BLOCK WALLS IN FINISHED AREAS AND CEILING SHALL HAVE TWO GANG RAISED PLASTER BOXES AND BLANK WALL PLATE. OTHER BOXES SHALL HAVE BLANK COVERS.
 WHERE OTHER THAN OUTLET BOXES ARE REQUIRED, PULL AND JUNCTION BOXES SHALL BE CONSTRUCTED OF GALVANIZED STEEL CONDUIT TO MEET THE REQUIREMENTS OF THE BOXES SHALL BE WEATHERPROOF CONSTRUCTION AND SHALL BE PROVIDED WITH NEOPRENE COVER GASKETS. BOXES SHALL BE ANCHORED TO THE STRUCTURE, INDEPENDENT OF ANY CONDUIT SUPPORT.
 HANGERS / INSERTS
 FURNISH AND INSTALL ALL UNISTRUT, HANGERS, SUPPORTS, ETC. REQUIRED FOR WIRING. THIS DIVISION SUPPORT CONDUIT FROM BUILDING STRUCTURE NOT FROM CEILING SUPPORTS. BRANCH CIRCUIT CONDUIT 3/4" AND SMALLER MAY BE RUN FROM CEILING SUPPORTS USING STEEL CLIPS.
CONCRETE, EXCAVATION, BACKFILL, AND STEEL
 ALL CONCRETE, FILL, BACKFILL, STEEL, ETC. WHERE REQUIRED SHALL BE IN STRICT ACCORDANCE WITH SPECIFICATIONS SET UP IN OTHER DIVISIONS OF THE SPECIFICATIONS.
WORK LOCATIONS AND FINISH FEATURES
 SHALL BE ACCOMPLISHED IN THE FIELD, SUBJECT TO THE APPROVAL OF THE ARCHITECT. THE LOCATION OF ALL SWITCHES, FIXTURES, PANELS, ETC. AND THEIR PROXIMITY AND RELATIONSHIP TO ALL FINISH FEATURES OF EQUIPMENT COMPLETED BY OTHER TRADES, SHALL BE MADE KNOWN TO THE ARCHITECT. IN CASE OF CONFLICT BETWEEN TRADES, OR WHERE A TRADE HAS A REQUEST FOR A CHANGE IN THE ARCHITECT SHALL BE FINAL AND HIS INSTRUCTIONS IN THESE MATTERS SHALL BE FOLLOWED BY ALL CONCERNED.
PAINTING
 ALL EXPOSED ELECTRICAL EQUIPMENT, CONDUIT, FLUSH PANEL FROM TRANSFORMERS, SWITCHBOARDS, PANELS AND SIMILAR ITEMS SHALL BE PAINTED AS SPECIFIED UNDER THE PAINTING SECTION OF THESE SPECIFICATIONS.
CLEANING UP PREMISES
 AT ALL TIMES KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIAL OR RUBBISH CAUSED BY EMPLOYEES. METAL FLOOR PANS SHALL BE PROVIDED PIPE THREADING MACHINES AND CHISELS AND SHALL BE USED AT ALL TIME TO CLEAN UP. AS THE WORK BECOMES OF SOAKED. UPON COMPLETION OF THE JOB, REMOVE ALL DEBRIS, CLEAN ALL SWITCHPLATES, FIXTURES, PANEL TRIMS AND IN GENERAL, LEAVE THE PREMISES IN A CLEAN AND TIDY CONDITION.
ACCEPTABLE MANUFACTURERS
 THE FOLLOWING IS A LIST OF MANUFACTURERS WHOSE SPECIFICATION GRADE EQUIPMENT IS ACCEPTABLE AS TO MANUFACTURER, SUBSTITUTIONS SHALL NOT CAUSE OR CONTRIBUTE TO CHANGES UNLESS THESE CHANGES ARE APPROVED BY THE ARCHITECT PRIOR TO SUBSTITUTION. ITEMS CAREFUL CHECKING MUST BE MADE TO VERIFY THAT EQUIPMENT WILL MEET ALL CAPACITIES, REQUIREMENTS, SPACE ALLOCATIONS, AND THAT THE WEIGHTS ARE NOT EXCESSIVE.
 POWER DISTRIBUTION EQUIPMENT: SUN VALLEY ELECTRIC SQUARE D, BENDIS, CHALLENGER
 WIRE AND CABLES: GENERAL CABLE, ANACONDA, CAPITOL, CIRCLE AW, GENERAL ELECTRIC, OKONITE, ROME, SIMPLEX, KAISER.
 LOCAL WALL SWITCHES, RECEPTACLES, PILOT LIGHTS: PASS AND SEYMOUR, SIERRA, BRYANT, CIRCLE F, GENERAL ELECTRIC, HUBBELL, RUSSELL & STOLL, ARROW-HART.
 DEVICE SLATER, HUBBELL SLATER, PASS AND SEYMOUR, SIERRA, BRYANT, ARROW-HART, LEVITON.
 LAMPS: GENERAL ELECTRIC, PHILLIPS, SYLVANIA.
 CONDUIT: TRIANGLE, NATIONAL ELECTRIC CO., JONES-MCLAUGHLIN REPUBLIC.
 FITTINGS: THOMAS AND BETTS, APPLETON, CROUSE-HINDS.
 CAST OUTLET BOXES: CROUSE-HINDS, APPLETON.
 BALLASTS: ADVANCE GENERAL ELECTRIC, JEFFERSON, PHILIPS, PHILIPS, SYLVANIA, UNIVERSAL ELECTRIC.
 FLOOR BOXES: HUBBELL, LEW STEEL CITY.
 OUTLET BOXES: RACO, STEEL CITY, SLATER.
SHOP DRAWINGS
 ALL DATA SHALL BE SUBMITTED AT ONE TIME, BOUND AND FILED IN AN ORDERLY MANNER. PRIOR TO STARTING THE WORK, SUBMIT TO THE ARCHITECT FOR APPROVAL, SIX (6) SETS OF SHOP DRAWINGS OF SERVICE ENTRANCE SECTION, LIGHTING, SWITCHBOARDS, PANELBOARDS, AND EXACT LOCATION OF FIXTURES, TRANSFORMERS AND ALL EQUIPMENT TO BE FABRICATED.
 FINAL INSPECTION AND TEST
 FURNISH WITH METERS, CABLES, CONNECTIONS AND APPARATUS NECESSARY FOR MAKING TESTS.
 MEGGER ALL SYSTEM NEUTRALS IN THE PRESENCE OF THE ENGINEER TO INSURE THE NEUTRAL IS NOT GROUNDED WITHIN THE SYSTEM. PROVIDE MAXIMUM OVERCURRENT RATING ALL BRANCH CIRCUIT WIRING IS INSTALLED AND CONNECTED.
GROUNDING
 THE NEUTRAL CONDUCTORS AND ALL OTHER EXPOSED NON-CURRENT CARRYING METAL PARTS AS REQUIRED BY CODE SHALL BE GROUNDED, GROUNDING BUSHINGS SHALL BE USED REQUIRED AND SHALL BE INSULATED TYPE BL OR APPROVED EQUAL. NO GROUNDING SHALL BE MADE TO GAS PIPING, WHERE EQUIPMENT OR DEVICES ARE SERVED BY NON-METALLIC DUCTS. ENCLOSURES SHALL BE GROUNDED BY MEANS OF A GREEN OR GREEN-YELLOW INSULATED EQUIPMENT GROUND WIRE INSTALLED IN THE DUCT WITH THE CURRENT CARRYING CONDUCTORS AND BE BONDED SECURELY IN EACH CABINET TERMINATING THE GROUND WIRE. COPPER JUNG SHALL BRIDGE FLEXIBLE CONDUIT AND BE INSTALLED IN THE CONDUIT. ALL SERVICE GROUNDS SHALL BE IN ACCORDANCE WITH THE UFER GROUND.
 ALL EMT, FLEXIBLE CONDUIT, MC CABLE, OR PVC CONDUIT SHALL BE PROVIDED WITH AN INSULATED GREEN GROUND WIRE.
16240 TELEPHONE
 PROVIDE EMPTY CONDUIT OR DUCT WITH "JET-LINE" OR EQUAL POLYPROPYLENE PULL LINE AND TERMINAL MOUNTING BOARD AS SHOWN ON DRAWINGS.
 USE LARGE RADIUS RIGID GALVANIZED STEEL CONDUIT FOR BENDS AND OFFSETS IN DUCT RUNS.
 ALL CONDUIT RUNS TO TELEPHONE OUTLET BOXES SHALL BE A MINIMUM OF 3/4" AND HAVE A MAXIMUM OF TWO 90 DEGREE BENDS.
 PLUS SIZE AS INDICATED ON DRAWINGS. TELEPHONE TERMINAL CABINETS SHALL HAVE THE DOOR FASTENED TO THE TRIM WITH CONCEALED HINGES AND BE PROVIDED WITH FLUSH TYPE COMBINATION LATCH AND LOCK, KEYS TO MATCH LIGHTING PANELS, CABINETS AND TRIM SHALL BE FACTORY PAINTED WITH TWO FINISH COATS.

PROVIDE ALL NECESSARY MATERIAL AND LABOR REQUIRED BY THE TELEPHONE COMPANY FOR DELIVERING SERVICE TO THE TERMINAL POINT. DATA ALL CONDUIT, TRENCHING AND BACKFILL SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR IN ACCORDANCE WITH THE TELEPHONE COMPANY FOR USE IN PLENUM.
16800 DATA
 ALL CONDUIT RUNS TO DATA OUTLET BOXED SHALL BE A MINIMUM OF 3/4" AND HAVE A MAXIMUM OF TWO 90 DEGREE BENDS.
 ALL DATA OUTLETS ARE TO HAVE WALL PLATES TO MATCH THE DEVICE PLATE.
GUARANTEE
 GUARANTEE ALL MATERIAL, EQUIPMENT, AND WORKMANSHIP FOR ALL SECTIONS UNDER THIS DIVISION IN WRITING TO BE FREE FROM DEFECT OF MATERIAL AND WORKMANSHIP FOR ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE. REPLACE WITHOUT CHARGE ANY MATERIAL OR EQUIPMENT PROVIDING DEFECTIVE DURING THIS PERIOD. THE GUARANTEE SHALL INCLUDE PERFORMANCE OF THE EQUIPMENT UNDER ALL CONDITIONS INCLUDING INSTALLING ANY ADDITIONAL ITEMS OF CONTROL AND/OR PROTECTIVE DEVICES AS REQUIRED.
GENERAL ELECTRICAL NOTES (NOTES APPLY WHETHER KEYED TO PLAN OR NOT)
1. LIGHTING
 1a. SEE ARCHITECTURAL PLANS AND REFLECTED CEILING PLAN FOR LOCATION OF ALL LIGHT FIXTURES, INCLUDING COVE AND MILL-WORK LIGHTING. WHERE FIXTURE LOCATIONS NEED TO BE CHANGED, COORDINATE WITH ARCHITECT. AVOID ROLL-UP DOORS.
 1b. BEFORE ORDERING FIXTURES, FIELD VERIFY THAT FIXTURES WILL FIT IN AVAILABLE SPACE.
 1c. VERIFY VOLTAGE, COLOR, NUMBER OF LED PER FIXTURE, AND VOLTAGE BEFORE ORDERING NEW FIXTURES TO MATCH EXISTING.
2. EMERGENCY LIGHTING
 2a. EXIT SIGNS SHALL HAVE AN INTEGRAL EMERGENCY BATTERY. EXIT SIGNS SHALL BE SURVIVAL FLUX 600 BP SERIES. UNIVERSAL EXIT, UNLESS OTHERWISE SPECIFIED. VERIFY THAT NO EXIT SIGN OBSTRUCTS A DOOR SWING OR HEADROOM PRIOR TO INSTALLATION. VERIFY WALL OR CEILING MOUNTING.
 2b. TWO HEAD EMERGENCY LIGHTS WITH BATTERY SHALL BE SURE-LITES XR-5, 6 VOLTS 27 WATTS CAPACITY FOR 1-1/2 HOURS. LEAD CALCIUM BATTERY UNLESS OTHERWISE SPECIFIED. VERIFY WALL HEIGHT, LOCATION AND PRIMARY VOLTAGE.
3. POWER
 3a. WITHIN THE AREA OF THIS PROJECT AND SCOPE OF WORK, ANY DUPLEX RECEPTACLE WITHIN (6) SIX FEET OF EACH RECEPTACLE SHALL BE A GROUND FAULT INTERRUPTING RECEPTACLE.
 3b. ALL DUPLEX RECEPTACLES WITH ISOLATED GROUND SHALL HAVE A MINIMUM #12 GREEN GROUND WIRE RUN TO PANEL GROUND BUS.
 3c. ANY 15A OR 20A, 120 VOLT LIGHTING OR OUTLET BRANCH CIRCUIT WITH AN OVERALL LENGTH OF 100 FEET OR LONGER SHALL BE #10 WIRE FOR FULL LENGTH OF CIRCUIT EXCEPT AS NOTED OTHERWISE.
 3d. PROVIDE W.P. DUPLEX OUTLET WITHIN 25 FEET OF ANY EXTERIOR HVAC UNIT.
 3e. OUTLETS ON OPPOSITE SIDES OF FIVE RATED WALLS SHALL BE SEPARATED BY A MINIMUM HORIZONTAL DISTANCE OF 24".
4. EQUIPMENT (RELATED ELECTRICAL WORK)
 4a. EQUIPMENT AS REFERRED TO IN THESE NOTES SHALL MEAN ANY HEATING, VENTILATING OR AIR CONDITIONING EQUIPMENT, PLUMBING OR SERVICE EQUIPMENT, INCLUDING MECHANICAL EQUIPMENT, OFFICE EQUIPMENT, MODULAR FURNITURE SYSTEMS, TENANT OR OWNER EQUIPMENT, SPECIAL OR OTHERWISE THAT IS REFERENCED ON ANY CONTRACT DOCUMENTS FOR THIS PROJECT.
 4b. COMPLETE SET OF CONTRACT DOCUMENTS SHALL BE OBTAINED AND REVIEWED BY THE ELECTRICAL CONTRACTOR FOR THE PURPOSE OF STUDYING THE ARCHITECTURAL, HVAC, PLUMBING, FOOD SERVICE, SPECIALTY SYSTEMS DRAWINGS, ETC. THIS SHALL INCLUDE ANY DRAWINGS PREPARED BY VENDORS, SUCH AS KITCHEN EQUIPMENT DRAWINGS OR MODULAR FURNITURE DRAWINGS, ETC. IT IS THE RESPONSIBILITY OF THE CONTRACTOR THAT IS TO BE DONE BY THE ELECTRICAL CONTRACTOR WHICH MAY NOT BE SHOWN ON THE ELECTRICAL DRAWINGS.
 4c. IF ANY EQUIPMENT REQUIRES ELECTRICAL POWER IT SHALL BE PROVIDED, INCLUDING ALL CIRCUITRY, OVER CURRENT DEVICES, GROUNDING, RECEPTACLES, HARD WIRING, ROUGH-IN, ETC. ALL SUCH WORK SHALL BE DONE BY THE ELECTRICAL CONTRACTOR UNLESS SPECIFIED OTHERWISE IN THESE CONTRACT DOCUMENTS, AND WHETHER OR NOT IT IS INDICATED IN THE ELECTRICAL DOCUMENTS.
 4d. PRIOR TO BID, ANY CONFLICT BETWEEN THE ELECTRICAL DOCUMENTS AND ANY OTHER CONTRACT RELATED DOCUMENTS SHALL BE REPORTED TO THE ELECTRICAL CONTRACTOR. CONFLICT SHALL BE RESOLVED PRIOR TO BID.
 4e. FOR EACH ITEM OF EQUIPMENT, VERIFY THE ELECTRICAL CHARACTERISTICS, INCLUDING LOAD, VOLTAGE, AND PHASE; LOAD BALANCING ON PHASES, AND GROUNDING REQUIREMENTS, ETC.
 4f. VERIFY ROUGH-IN LOCATION, AND FINAL CONNECTION REQUIREMENTS. PROVIDE THE PROPER RECEPTACLES TO MATCH THE CORP CUP FURNISHED WITH THE EQUIPMENT, OR PROVIDE THE APPROPRIATE HARD WIRING.
 4g. PROVIDE ANY INDICATED OR REQUIRED OVERCURRENT PROTECTION AND/OR DISCONNECT SWITCHES, FUSED FOR THE LOAD OR PER MANUFACTURERS RECOMMENDATIONS.
 4h. PROVIDE FOR CONNECTION TO ANY CONTROLLER FURNISHED WITH EQUIPMENT.
 4i. PROVIDE ANY CONTROLLERS, STARTERS, AND CONTROL WIRING NOT INDICATED TO BE PROVIDED BY OTHERS.
 4j. ANY DROPP COORDS SERVING EQUIPMENT SHALL BE PROVIDED WITH KEELMANS STRESS RELIEF GRIPS AT THE JUNCTION BOX CONNECTOR.
 4k. KITCHEN EQUIPMENT SHUT DOWN: WHEN KITCHEN EQUIPMENT IS REQUIRED BY CODE TO BE SHUT DOWN BY A FIRE PROTECTION SYSTEM, SMOKE EQUIPMENT INCLUDING GAS SOLIDUS FOR THIS EQUIPMENT, KITCHEN CIRCUITS, POWER CIRCUITS, AND HOOD EXHAUST FANS AND RELATED MAKE-UP AIR UNIT(S) SHALL BE CONNECTED TO THE KITCHEN FIRE PROTECTION SYSTEM SHUT DOWN MECHANISM VIA SHUNT TRIP BREAKER(S).
 4l. HVAC AND PLUMBING SYSTEMS (RELATED ELECTRICAL WORK)
 4m. ANY CONTROL WIRING AND CONNECTIONS NOT PROVIDED BY THE HVAC CONTRACTOR SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR UNLESS SPECIFIED OTHERWISE.
 4n. WHERE ONE OR MORE DISCONNECT SWITCH IS REQUIRED FOR AN HVAC UNIT, THEY SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.
 4o. SEE MECHANICAL DRAWINGS FOR EXACT LOCATION OF ALL DUCTWORK AND DIFFUSERS TO AVOID ANY CONDUITS WITH LIGHTING FIXTURE LAYOUT, OVERLAY THE LIGHTING AND HVAC PLANS AND REVIEW FOR CONFLICT.
 4p. PROVIDE FOR CONNECTION AND CIRCUITRY OF ANY DUCT DETECTOR FURNISHED UNDER ANOTHER SECTION. REVIEW MECHANICAL PLANS.
 4q. PROVIDE ALL INTERLOCK WIRING FOR ANY HVAC EQUIPMENT REQUIRING INTERLOCKING.

SITE NOTES:
 1. REQUIREMENT FOR TRENCHING AND BACKFILL FOR SITE UTILITIES INCLUDING EXACT ROUTING AND POINT OF TERMINATION SHALL BE VERIFIED WITH THE POWER AND TELEPHONE COMPANIES. THEIR REQUIREMENTS SHALL BE DEEMED PART OF THIS CONTRACT. AVOID CONFLICT WITH EXISTING SITE UTILITIES.
 2. CONTRACTOR SHALL INCLUDE IN THIS BID AN ESTIMATED SUM AS AN UNDERGROUNDING INSTALLING ANY ADDITIONAL ITEMS OF CONTROL AND/OR PROTECTIVE DEVICES AS REQUIRED.
 3. GENERAL ELECTRICAL NOTES (NOTES APPLY WHETHER KEYED TO PLAN OR NOT)
 4. THE REQUIREMENTS FOR THE TELEPHONE COMPANIES SHALL BE VERIFIED WITH THE TELEPHONE COMPANIES PRIOR TO ROUGH-IN. PROVIDE #6 COPPER BOND FROM THE TELEPHONE TERMINAL BOARD TO THE GROUND MINIMUM POINT OF SERVICE CABLING IS PROVIDED BY THE TELEPHONE SERVICE COMPANY TO ONE POINT ONLY. TELEPHONE TERMINAL CABINET OR BOARD ONE BUILDING ONLY ON THE SITE. ADDITIONAL CABLING WILL BE NECESSARY FROM THE MAIN TELEPHONE CABINET OR BOARD TO OTHER TELEPHONE CABINETS OR BOARDS ON THE SITE. THIS CABLING IS NOT PART OF THIS CONTRACT AND SHALL BE PROVIDED BY THE OWNER TO FACILITATE TELEPHONE SERVICE TO ALL TENANTS ON THE SITE.

CLIENT:



New Tenant Renovation:

REVISIONS:		DATE
#	DESCRIPTION	
1	ISSUED FOR PERMIT	10/27/25
2	PERMIT COMMENTS	12/05/25

PROJECT NUMBER:
 DRAWN BY: REVIEWED BY:
 SHEET TITLE:
 ELECTRICAL SPECIFICATIONS & SYMBOLS
 SHEET NO.
E0.1

LIGHTING FIXTURE SCHEDULE GENERAL NOTES

- A. ALL NEW LIGHTING FIXTURES SHOWN ON THE LIGHTING FIXTURES SCHEDULE ARE SUBJECT TO THE ARCHITECT'S APPROVAL. E.C. SHALL COORDINATE MAKE, MODEL, FINISHES, AND OTHER CRITICAL PARAMETERS WITH THE ARCHITECT BEFORE PURCHASING.
- B. ALL LIGHTING FIXTURES SHALL BE LED-TYPE OPERABLE AT 120V.
- C. ALL EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS SHALL HAVE A MINIMUM OF 90 MINUTES OF BATTERY BACKUP OR AS REQUIRED BY AHJ.
- D. WATTS PER FACE FOR EXIT SIGNS SHALL NOT EXCEED 5 WATTS.
- E. FIXTURES LOCATED IN SPECIFIC AREAS (WET OR DAMP LOCATIONS, VAPOR EXPOSED, COLD STORAGE, AND BUILDING EXTERIOR) SHALL BE RATED FOR THAT AREA.

LIGHTING CONTROL DEVICE SCHEDULE

CALLOUT	SYMBOL	MANUFACTURE	CATALOG #	DESCRIPTION
DIMMING SWITCH	S _D	nLIGHT	nPODMRD	LINE VOLTAGE PUSH BUTTON SWITCH POD WITH ON/OFF, + DIMMING AND -DIMMING
OCCUPANCY SENSOR SWITCH	S _{OS}	nLIGHT	WSX-PDT	LINE VOLTAGE WALL SWITCH DUAL TECHNOLOGY SENSOR.
PHOTOCELL	☐	nLIGHT	-	WALL DAYLIGHT SENSOR.

ELECTRICAL CONTRACTOR SHALL COORDINATE COMPATIBILITY OF LIGHT FIXTURES AND LIGHTING CONTROL DEVICES/SYSTEM WITH CONTROL SYSTEM SUPPLIER PRIOR TO ORDERING/ROUGH-IN.

LUMINAIRE SCHEDULE

CALLOUT	SYMBOL	LAMP	MODEL	DESCRIPTION	BALLAST	MOUNTING	VOLTS
EM1	☐	(2) 3.3W INCLUDED	ADVANTAGE ENVIRONMENTAL LIGHTING EM22-16	EM22-16-EMERGENCY UNIT.	N/A	WALL	120V 1P 2W
A	☐	(1) 40W LED	ADVANTAGE ENVIRONMENTAL LIGHTING CTUNE-A24-SSM-35K-40W	LED 2X4 PANEL LIGHTING, DIMMABLE	LED	RECESSED	120V 1P 2W
X1	☐	(2) 1W INCLUDED	ADVANTAGE ENVIRONMENTAL LIGHTING XEM9U2RW	LED EXIT SIGN/EMERGENCY UNIT COMBO.	N/A	CEILING	120V 1P 2W
EM2	☐	(2) 6W LED	BEST LIGHTING DBEL-ACEM-HL-B-SDT	LED DECORATIVE OUTDOOR DIE-CAST AC/EMERGENCY UNIT.	N/A	WALL	120V 1P 2W
B	☐	(1) 9.5W LED	BEST LIGHTING MODEL: H-QSN18110-SA-91/OSNB-42-91 COLOR: BLACK LAMP: LP16552FL4D	10" GOOSENECK ANGLE SHADE	LED	WALL	120V 1P 2W

EXISTING LIGHT FIXTURES NOTE

EXTERIOR NORMAL AND EMERGENCY LIGHTS ARE EXISTING TO REMAIN.
ELECTRICAL CONTRACTOR TO FIELD VERIFY EXISTING EXTERIOR NORMAL & EMERGENCY LIGHTS ARE IN A GOOD WORKING CONDITION, OTHERWISE PROVIDE NEW.

LIGHTING CONTROLS NARRATIVE

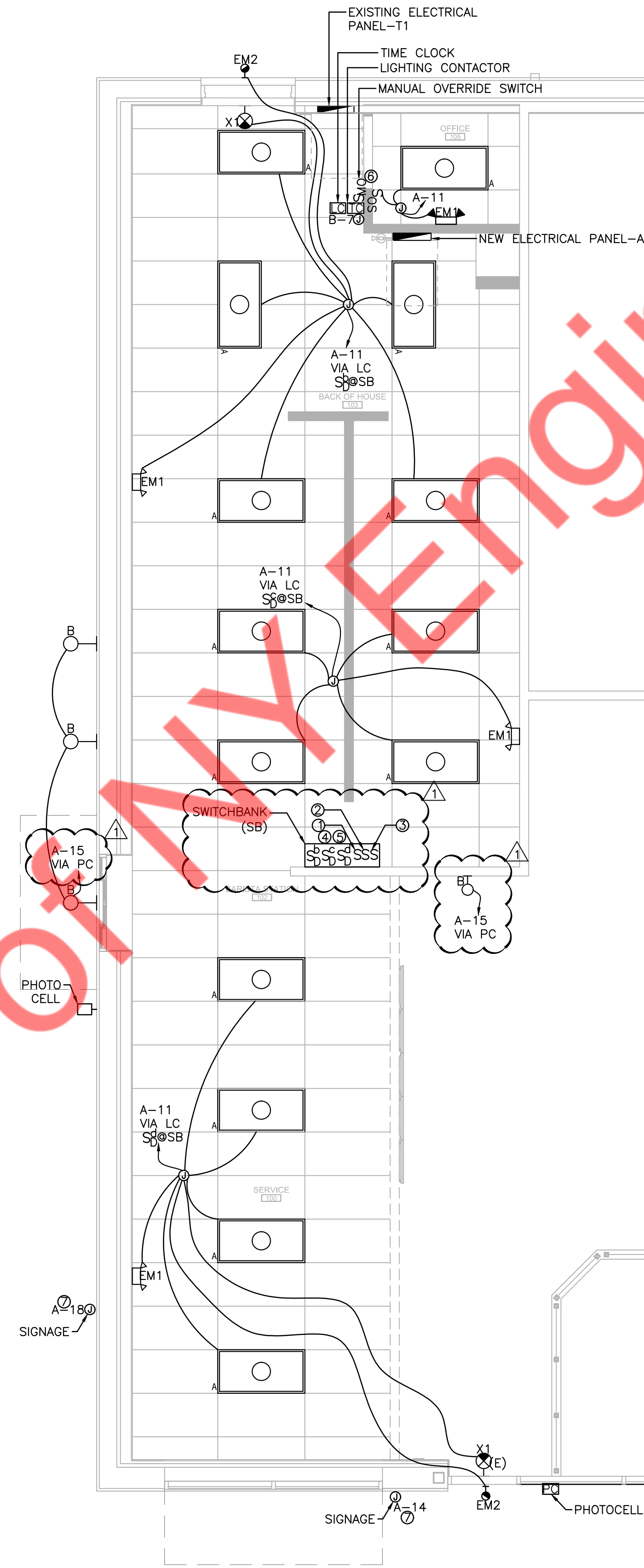
AREA	CONTROLS
OFFICE	LOCAL SWITCH FOR MANUAL ON/OFF OF LIGHT FIXTURES WITH WALL MOUNTED OCCUPANCY SENSOR FOR AUTOMATIC ON/OFF OF FIXTURES.
BACK OF HOUSE	TIME-CLOCK WITH MANUAL OVERRIDE SWITCH. LOCAL MUTLI-LEVEL DIMMING SWITCHES FOR ON/OFF LIGHT FIXTURES AND STEP DIMMING.
BARISTA STATION	TIME-CLOCK WITH MANUAL OVERRIDE SWITCH. LOCAL MUTLI-LEVEL DIMMING SWITCHES FOR ON/OFF LIGHT FIXTURES AND STEP DIMMING.
SERVICE	TIME-CLOCK WITH MANUAL OVERRIDE SWITCH. LOCAL MUTLI-LEVEL DIMMING SWITCHES FOR ON/OFF LIGHT FIXTURES AND STEP DIMMING.
EXTERIOR LIGHTS	EXTERIOR LIGHTS ARE CONTROLLED BY PHOTOCELL.

LIGHTING GENERAL NOTES

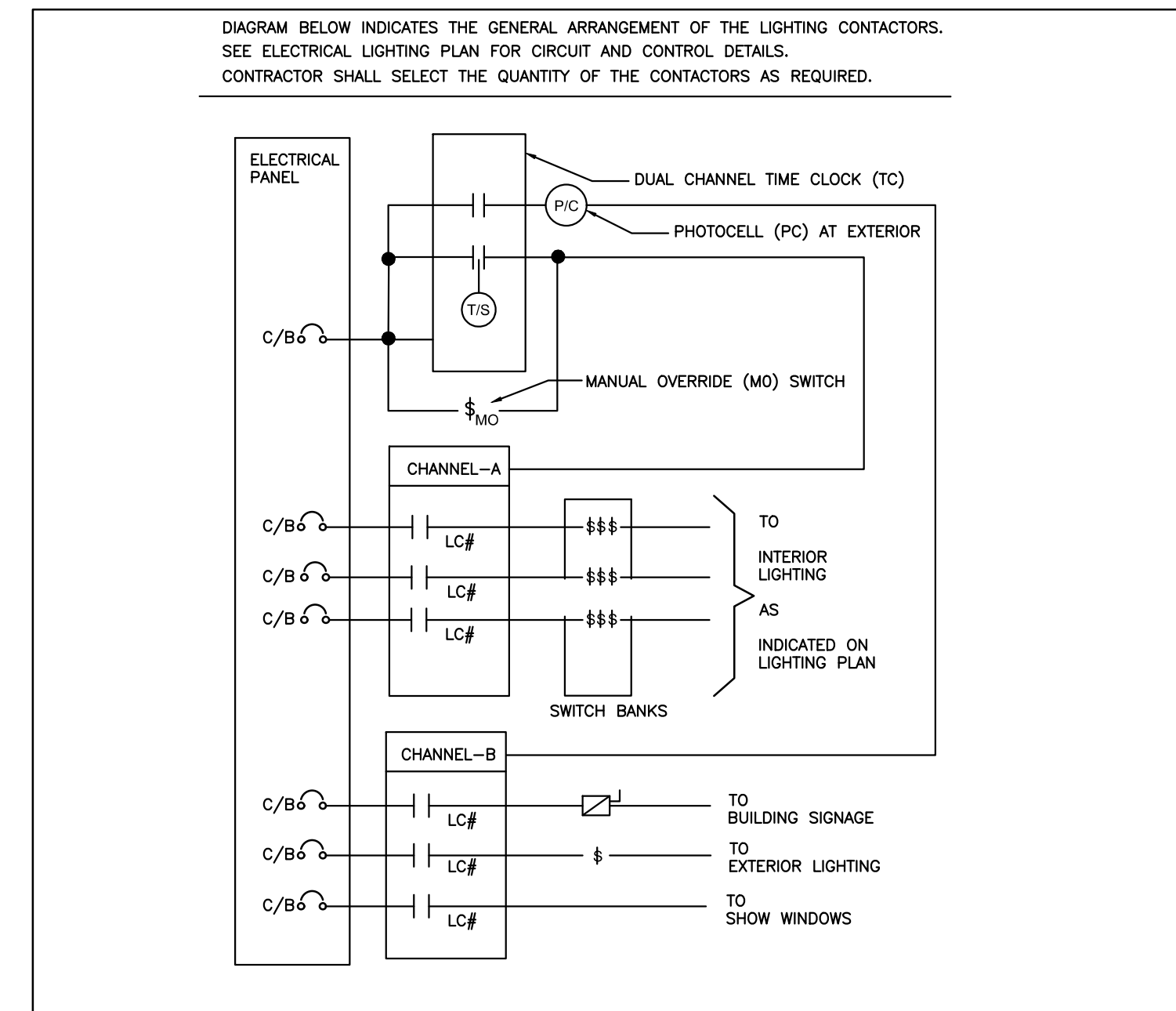
- A. PRIOR TO ROUGH-IN, THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF ALL LIGHT FIXTURES/EXIT SIGN LOCATION/PLACEMENT WITH THE CITY OF --- BUILDING INSPECTOR PRIOR TO ROUGH INSPECTION APPROVAL. ALL CONFLICTS SHALL BE REPORTED TO THE ENGINEER/ARCHITECT.
- B. ALL FIXTURES INSTALLED OUTDOORS SHALL BE RATED FOR DAMP/WET LOCATIONS AS REQUIRED. THE CONTRACTOR SHALL COORDINATE DAMP/WET LOCATION RATING PER NEC ARTICLE 410.10(A). ALL INSTALLATIONS SHALL CONFORM TO NEC ARTICLE 410, ALL SUB ARTICLES.
- C. COORDINATE ALL EXTERIOR BUILDING MOUNTED LIGHT FIXTURES WITH ARCHITECTURAL BUILDING ELEVATIONS FOR HEIGHTS AND LOCATIONS.
- D. PROVIDE EXIT SIGNS FOR ALL EXITS DESIGNATED BY THE CODE STUDY PLAN. REFER TO ARCHITECTURAL CODE PLANS FOR LOCATIONS AND REQUIREMENTS.
- E. ALL EXIT AND EMERGENCY LIGHTS SHALL BE CONNECTED TO UNSWITCHED CIRCUIT LEG.
- F. CONDUIT AND WIRING SHOWN FOR REFERENCE ONLY. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PROVIDE THE NUMBER OF CONDUCTORS REQUIRED FOR HOT-LEGS, NEUTRAL, AND GROUNDING AT EACH DEVICE FOR PROPER BRANCH CIRCUITING SHOWN FOR EACH AREA OR ROOM.
- G. E.C. SHALL REARRANGE (IF REQUIRED) THE EMERGENCY FIXTURES TO PROVIDE INITIAL ILLUMINATION THAT IS NOT LESS THAN AN AVERAGE OF 1 FOOTCANDLE (11 LUX) AND A MINIMUM AT ANY POINT OF 0.1 FOOTCANDLE (1 LUX) MEASURED ALONG THE PATH OF EGRESS AT FLOOR LEVEL. ILLUMINATION LEVELS SHALL BE PERMITTED TO DECLINE TO 0.6 FOOTCANDLE (6 LUX) AVERAGE AND A MINIMUM AT ANY POINT OF 0.06 FOOTCANDLE (0.6 LUX) AT THE END OF THE EMERGENCY LIGHTING TIME DURATION. A MAXIMUM-TO-MINIMUM ILLUMINATION UNIFORMITY RATIO OF 40 TO 1 SHALL NOT BE EXCEEDED.
- H. OCCUPANCY SENSORS IN THE RESTROOMS, LOBBIES, STAIRCASE, AND LOCKER ROOMS SHALL BE SET TO TURN ON ALL THE LIGHTING FIXTURES AUTOMATICALLY AND TURN OFF WITHIN 15 MINUTES AFTER ALL OCCUPANTS HAVE LEFT THE SPACE.
- I. THE TIME CLOCK (MIN. 2 CHANNEL) SHALL BE SCHEDULED AS PER THE REQUIREMENT OF THE PROJECT SPACE. COORDINATE EXACT LOCATION IN THE FIELD.
- J. THE MANUAL OVERRIDE SWITCH SHALL TURN OFF THE INTENDED LIGHTING (TIME CLOCK AND CONTACTORS) BEFORE 2 HOURS. WHEN IT IS INITIATED.
- K. A PHOTOCELL SHALL BE LOCATED INSTALLED IN ANY LOCATION EXPOSED TO THE SUNLIGHT BUT CONCEALED FROM PUBLIC VIEW. COORDINATE EXACT LOCATION IN FIELD.
- L. REFER TO THE LIGHTING CONTACTOR DETAIL FOR TYPICAL CONNECTION OF THE TIME CLOCK, MANUAL OVERRIDE SWITCH, CONTACTORS AND PHOTOCELL.
- M. ELECTRICAL INSPECTOR SHALL FIELD VERIFY THE EXIT AND EMERGENCY LIGHTING ONCE ALL EQUIPMENT, FURNITURE, ETC. ARE IN PLACE. THIS INCLUDES VERIFICATION THAT THERE IS EMERGENCY LIGHTING PROVIDED AT EXTERIOR OF EGRESS DISCHARGE LOCATIONS. ADDITIONAL EXIT SIGNS AND EMERGENCY LIGHTING FIXTURES MAY BE REQUIRED AT THE DISCRETION OF THE FIELD INSPECTOR.

KEYED NOTES

1. PROVIDE SWITCH ON WALL FOR ILLUMINATED MENUBOARD/SPEAKER. COORDINATE EXACT LOCATION WITH OWNER/ARCHITECT PRIOR TO INSTALLATION. VERIFY EXACT POWER REQUIREMENTS PRIOR TO ROUGH-IN.
2. PROVIDE SWITCH ON WALL FOR ILLUMINATED MONUMENT SIGN. COORDINATE EXACT LOCATION WITH OWNER/ARCHITECT PRIOR TO INSTALLATION.
3. PROVIDE SWITCH ON WALL FOR ILLUMINATED SITE SIGN. COORDINATE EXACT LOCATION WITH OWNER/ARCHITECT PRIOR TO INSTALLATION.
4. E.C. SHALL COORDINATE THE EXACT LOCATION OF THE SWITCH BANK IN THE FIELD. ALL THE SWITCHES TAGGED AS (@ SB) IN THE PLAN SHALL BE INSTALLED IN THE SWITCH BANK. REFER TO THE LIGHTING PLAN FOR THE NUMBER OF THE SWITCHES REQUIRED. REFER TO THE LIGHTING CONTACTOR CONNECTION DETAIL FOR MORE INFORMATION.
5. THE SWITCHES SHALL BE LOCATED WHERE THE CONTROLLED LIGHTS ARE VISIBLE, OR SHALL IDENTIFY THE AREA SERVED BY THE LIGHTS AND INDICATE THEIR STATUS.
6. MANUAL OVERRIDE SWITCH. THE OVERRIDE SWITCH, WHEN INITIATED, SHALL PERMIT THE CONTROLLED LIGHTING TO REMAIN ON FOR NOT MORE THAN 2 HOURS.
7. NEW STOREFRONT SIGN. E.C. TO COORDINATES WITH THE MANUFACTURER AND PROVIDES AN ACCESSIBLE JUNCTION BOX WITH A DISCONNECT SWITCH FOR THE TENANT SIGN. CONTRACTOR SHALL COORDINATE THE FINAL LOCATION, MOUNTING HEIGHT, AND NUMBER OF JUNCTION BOXES WITH THE SIGN VENDOR PRIOR TO ROUGH-IN.



1 ELECTRICAL LIGHTING FLOOR PLAN
SCALE: 1/4"=1'-0"



2 LIGHTING CONTACTOR DETAIL
SCALE: N.T.S.

Property

CLIENT:

New Tenant Renovation:



REVISIONS:	#	DESCRIPTION	DATE
		ISSUED FOR PERMIT	10/27/25
		PERMIT COMMENTS	12/05/25

PROJECT NUMBER: _____ REVIEWED BY: _____
 DRAWN BY: _____ SHEET TITLE: _____
 ELECTRICAL LIGHT FLOOR PLAN
 SHEET NO. **E1.0**

MECHANICAL EQUIPMENT SCHEDULE								
CALLOUT	DESCRIPTION	SYMBOL	VOLTS	FLA	MCA	MOCP	WIRE CALLOUT	NOTES
EF-1(N)	EXHAUST FAN	⊙	120V 1P 2W	0.033		20	3/4"C,2#12,#12G	DISCONNECTING MEANS INTERNALLY INSIDE THE EXHAUST FAN. INTERLOCK FAN OPERATION WITH RESTROOM LIGHT SWITCH.
RTU-1(E)	ROOFTOP UNIT	⊙	208-240V 3P 4W	-	31	45	3/4"C,3#8,#10G	PROVIDE 60A/2P NEMA 3R DISCONNECT SWITCH FUSED PER UNIT NAMEPLATE.

MECHANICAL GENERAL NOTES

- A. VERIFY ALL MECHANICAL UNIT LOCATIONS WITH MECHANICAL PLANS.
- B. THE ELECTRICAL CONTRACTOR SHALL NOT MOUNT DISCONNECT EQUIPMENT DIRECTLY TO MECHANICAL UNITS FOR DISCONNECTS 200A AND LARGER. THE ELECTRICAL CONTRACTOR SHALL PROVIDE A SELF-SUPPORTING SYSTEM FOR DISCONNECT EQUIPMENT.
- C. PROVIDE NEMA 3R FUSIBLE DISCONNECT SWITCHES FOR ALL MECHANICAL UNITS LOCATED OUTSIDE.
- D. ALL EXTERIOR RECEPTACLES SHALL BE WEATHER RESISTANT GFCI (PASS & SEYMOUR 2095DSWRBK OR EQUAL), INSTALLED IN A WEATHERPROOF ENCLOSURE WITH A WHILE IN USE COVERPLATE (PASS & SEYMOUR #WUIC100CL OR EQUAL).
- E. EXHAUST FANS MOUNTED OUTSIDE SHALL HAVE A WEATHERPROOF DISCONNECT MOUNTED EXTERIOR TO THE UNIT. INTERNAL DISCONNECT SWITCHES SHALL NOT BE ALLOWED.
- F. E.C. SHALL VERIFY THE EXACT LOCATION AND OPERABLE CONDITION OF THE EXISTING MECHANICAL/PLUMBING UNIT IN THE FIELD. PROVIDE NEW CIRCUIT; DISCONNECT/SWITCH IF EXISTING IS INOPERABLE.
- G. E.C. SHALL FIELD VERIFY THE EXACT CONNECTION AND POWER REQUIREMENTS OF THE ICE MACHINE CONDENSER WITH EQUIPMENT VENDOR PRIOR TO BID. PROVIDE POWER PROVISION ACCORDINGLY.
- H. LABEL ALL RTUS, EXHAUST FANS, HEATING UNITS AND CONDENSER UNIT OF THEIR POWER SOURCE LOCATION AND CIRCUIT NUMBER.


KEYED NOTES

- 1. CONTRACTOR SHALL VERIFY THE EXISTING POWER SOURCE, BREAKER, CONDUIT ROUTING, WIRE SIZE, AND DISCONNECTING MEANS SERVING THE EXISTING RTU FROM THE RESPECTIVE SOURCE PANEL ON SITE. REPLACE ANY INOPERABLE, DAMAGED, UNDERSIZED, OR NON-CODE-COMPLIANT COMPONENTS WITH NEW, PROPERLY RATED MATERIALS AND DEVICES PRIOR TO INSTALLATION.



Property of NY Engine

CLIENT:



EST. 1998
SCOOTER'S COFFEE®

REVISIONS:		
#	DESCRIPTION	DATE
	ISSUED FOR PERMIT	10/27/25
△	PERMIT COMMENTS	12/05/25

PROJECT NUMBER: _____
DRAWN BY: _____ REVIEWED BY: _____
SHEET TITLE:
ELECTRICAL POWER
ROOF PLAN
SHEET NO.
E2.1

SCOOTERS'S, NORTH AURORA, IL														
PANEL:	T1	(EXISTING)											MOUNTING: SEMI RECESSED	
208Y/120	VOLTS	PHASE	3	AIC RATING (in kA)		22	DEMAND LOAD		69.70	DEMAND CURRENT		193.70	PANEL LOCATION: BOH	
400A	MLO	WIRE	4										FED FROM: MDP	
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	NOTES	PER PHASE (KVA)			NOTES	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
						A	B	C						
1	20/1P	E4A_U/C REFRIGERATOR	E	0.26	RWC	0.62			RWC	0.36	R	E8_POS	20/1P	2
3	20/1P	E30_DRIVE THROUGH MONITOR	E	1.08	RWC			4.08	RWC	3.00	E	E3A_RAPID COOK OVEN	30/2P	4
5	20/1P	E26_ZOOM TIMER	R	0.36	RWC			3.36	RWC	3.00	E		30/2P	6
7	20/1P	E4B_U/C REFRIGERATOR	E	0.26	RWC	3.26			RWC	3.00	E	E3A_RAPID COOK OVEN	30/2P	8
9	20/1P	SHOW WINDOW RECP.	L	1.20	RWC			4.20	RWC	3.00	E		30/2P	10
11	20/1P	SHOW WINDOW RECP.	L	1.20	RWC			2.52	RWC	1.32	E	E5_COFFEE GRINDER	20/1P	12
13	20/1P	E4B_U/C REFRIGERATOR	E	0.26	RWC	2.58			RWC	2.32	E	E5_COFFEE GRINDER	20/1P	14
15	20/1P	E11A_WORKTOP REFRIDGE.	E	0.54	RWC			6.57	RWC	6.03	E	E6_COFFEE BREAWER	30/2P	16
17	20/1P	E13_REACH IN REFRIGE.	E	0.36	RWC			6.39	RWC	6.03	E		30/2P	18
19	20/1P	E13_REACH IN REFRIGE.	E	0.36	RWC	0.72			RWC	0.36	R	E8_POS	20/1P	20
21	20/1P	GENERAL RECP.-LOBBY	R	0.54	RWC			1.26	RWC	0.72	R	PANEL SERVICE RECP.	20/1P	22
23	20/1P	MENUBOARD RECP.	R	0.54	RWC			4.78	RWC	4.24	H		20/1P	24
25	20/1P	E13_REACH IN REFRIGE.	E	0.36	RWC	4.60			ETR	4.24	H	RTU-1 (E)	50/3P	26
27	20/1P	GENERAL RECP.-KITCHEN	R	0.90	RWC			5.14	RWC	4.24	H		50/3P	28
29	20/1P	E9_EXPRESSO MACHINE	E	3.12	RWC			3.30	RWC	0.18	R	ROOF SERVICE RECP.	20/1P	30
31	30/2P	E9_EXPRESSO MACHINE	E	3.12	RWC			4.92	RWC	1.80	E	E1_BEVARAGE BLENDER	20/1P	32
33	30/2P	E9_EXPRESSO MACHINE	E	3.12	RWC			4.92	RWC	1.80	E	E1_BEVARAGE BLENDER	20/1P	34
35	30/2P	E9_EXPRESSO MACHINE	E	3.12	RWC			4.92	RWC	1.80	E	E1_BEVARAGE BLENDER	20/1P	36
37	30/2P	E9_EXPRESSO MACHINE	E	3.12	RWC			6.93	RWC	3.81	X		30/2P	38
39	30/2P	E9_EXPRESSO MACHINE	E	3.12	RWC			6.93	RWC	3.81	X	PANEL A	70/3P	40
41	20/1P	E13_REACH IN FREEZER	E	0.73	RWC			4.54	RWC	0.93	E	E2A_CUBESTYLE ICE MAKER	20/2P	42
43	20/1P	E13_REACH IN FREEZER	E	0.73	RWC	1.66			RWC	0.93	E		20/2P	44
45	20/1P	E13_REACH IN FREEZER	E	0.73	RWC	1.66			RWC	0.93	E		20/2P	46
47	20/1P	SPARE						0.00				SPARE	20/1P	48
49	20/1P	SPARE						0.00				SPARE	20/1P	50
51	20/1P	SPARE						0.00				SPARE	20/1P	52
53	20/1P	SPARE						0.00				SPARE	20/1P	54
						25.29		34.76		29.81				

SCOOTERS'S, NORTH AURORA, IL														
PANEL:	A	(NEW)											MOUNTING: SEMI RECESSED	
208Y/120	VOLTS	PHASE	3	AIC RATING (in kA)		-	DEMAND LOAD		11.44	DEMAND CURRENT		31.80	PANEL LOCATION: BOH	
125A	MLO	WIRE	4										FED FROM: T1	
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	NOTES	PER PHASE (KVA)			NOTES	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
						A	B	C						
1	20/1P	GENERAL RECP.	R	0.18	RWC	0.36			RWC	0.18	R	WIFI ROUTER	20/1P	2
3	20/1P	OFFICE RECP.	R	0.36	RWC			0.72	RWC	0.36	R	DATA RACK	20/1P	4
5	20/1P	E22B_WATER TREATMENT	E	0.48	RWC			0.96	RWC	0.48	R	E22A_WATER TREATMENT	20/1P	6
7	20/1P	E25B_WATER PUMP	R	1.92	RWC	2.10			RWC	0.18	R	SERVICE RECP.	20/1P	8
9	20/1P	DRIVE THROUGH ORDER	R	1.06	RWC			1.46	RWC	0.40	R	BOTTOM LETTEERS, TOP LETEERS	20/1P	10
11	20/1P	LIGHTING_INDOOR	L	0.35	RWC			1.55	RWC	1.20	R	MONUMENT SIGN	20/1P	12
13	20/1P	LIGHTING_INDOOR	L	0.35	RWC	1.70			RWC	1.20	L	EXTERIOR SIGNAGE	20/1P	14
15	20/1P	LIGHTING_OUTDOOR	L	0.20	RWC			0.70	RWC	0.50	M	EF-3	20/1P	16
17	20/1P	SPARE						1.20	RWC	1.20	L	EXTERIOR SIGNAGE	20/1P	18
19	20/1P	SPARE						0.00				SPARE	20/1P	20
21	20/1P	SPARE						0.00				SPARE	20/1P	22
23	20/1P	SPARE						0.00				SPARE	20/1P	24
						4.16		2.88		3.71				

SCOOTERS'S, NORTH AURORA, IL						
ELECTRICAL SERVICE LOAD CALCULATION						
LOAD DESCRIPTION	LOAD TAG	CONNECTED LOAD (KVA)		TOTAL KVA	D.F.	DEMAND (KVA)
		PANEL A	PANEL B			
TOTAL LIGHTING	L	2.40	2.95	5.35	125%	6.69
TOTAL RECEPTACLE	R	3.96	6.32	10.28	#	10.14
TOTAL EQUIPMENT	E	59.35	0.48	59.83	65%	38.89
TOTAL OTHER	O	0.00	0.50	0.50	100%	0.50
TOTAL HVAC	H	12.72	0.00	12.72	100%	12.72
NON COINCIDENT	N	0.00	0.00	0.00	0%	0.00
TOTAL MOTOR	M	0.00	0.50	0.00	100%	0.00
LARGEST MOTOR					25%	0.00
# = Demand factor 100% for first 10kVA and 50% for rest of the receptacle load						68.94
SERVICE VOLTAGE	208Y/120					
DEMAND (KVA)	68.94					
DEMAND (AMPS)	191.58					
SERVICE SIZE	239.47					
SPARE	20%					
SWITCH SIZE	400.00					

BRANCH CIRCUIT WIRING CHART	
BREAKER	BRANCH CIRCUIT SIZE
15/1P	2#12 + 1#12G, 3/4"C
20/1P	2#12 + 1#12G, 3/4"C
25/1P	2#10 + 1#10G, 3/4"C
30/1P	2#10 + 1#10G, 3/4"C
35/1P	2#8 + 1#10G, 3/4"C
40/1P	2#8 + 1#10G, 3/4"C
45/1P	2#8 + 1#10G, 3/4"C
50/1P	2#8 + 1#10G, 3/4"C
15/2P	2#12 + 1#12G, 3/4"C
20/2P	2#12 + 1#12G, 3/4"C
25/2P	2#10 + 1#10G, 3/4"C
30/2P	2#10 + 1#10G, 3/4"C
35/2P	2#8 + 1#10G, 3/4"C
40/2P	2#8 + 1#10G, 3/4"C
45/2P	2#8 + 1#10G, 3/4"C
50/2P	2#8 + 1#10G, 3/4"C
60/2P	2#6 + 1#10G, 3/4"C
70/2P	2#4 + 1#8G, 1"C
80/2P	2#4 + 1#8G, 1"C
90/2P	2#3 + 1#8G, 1"C
100/2P	2#3 + 1#8G, 1"C
110/2P	2#1 + 1#6G, 1 1/4"C
15/3P	3#12 + 1#12G, 3/4"C
20/3P	3#12 + 1#12G, 3/4"C
25/3P	3#10 + 1#10G, 3/4"C
30/3P	3#10 + 1#10G, 3/4"C
35/3P	3#8 + 1#10G, 3/4"C
40/3P	3#8 + 1#10G, 3/4"C
45/3P	3#8 + 1#10G, 3/4"C
50/3P	3#8 + 1#10G, 3/4"C
60/3P	3#6 + 1#10G, 3/4"C
70/3P	3#4 + 1#8G, 1"C
80/3P	3#4 + 1#8G, 1"C
90/3P	3#3 + 1#8G, 1"C
100/3P	3#3 + 1#8G, 1"C
110/3P	3#1 + 1#6G, 1 1/4"C
125/3P	3#1 + 1#6G, 1 1/4"C
150/3P	3#1/0 + 1#6G, 1 1/4"C
175/3P	3#2/0 + 1#6G, 1 1/2"C
200/3P	3#3/0 + 1#6G, 1 1/2"C
225/3P	3#4/0 + 1#6G, 2"C
250/3P	4#250KCM + 1#4G, 2 1/2"C
300/3P	4#350KCM + 1#4G, 3"C
350/3P	4#600KCM + 1#3G, 3 1/2"C
400/3P	4#600KCM + 1#3G, 3 1/2"C

PANEL SCHEDULE ABBREVIATIONS AND NOTES	
TAG	DESCRIPTION
L	LIGHTING
R	RECEPTACLE
H	HVAC
E	ELECTRICAL EQUIPMENT
M	LARGEST MOTOR
O	OTHER
N	NON COINCIDENT
X	LINKED CELL
*	VERIFY/COORDINATE IN FIELD
RWC	REFER TO THE WIRING CHART FOR WIRE SIZE
RRF	REFER RISER FOR FEEDER SIZE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
AFCI	ARC FAULT CIRCUIT INTERRUPTER
NBEP	NEW BREAKER IN THE EXISTING PANEL
HACR	HEAT AIR CONDITIONING AND REFRIGERATION
PAN	PROVIDE ADDITIONAL WIRE FOR NEUTRAL
LO	LOCKOUT BREAKER
STB	SHUNT TRIP BREAKER
SB	SPLIT BREAKER
ETR	EXISTING TO REMAIN
SAE	SAME AS EXISTING
VIF	VERIFY IN FIELD
LC	WIRE THROUGH LIGHTING CONTACTOR
NCL	NON COINCIDENT LOAD
DFB	DUAL FUNCTION BREAKER (AFCI+GFCI)
CB	COMBINATION BREAKER (S/P)

PANEL SCHEDULES GENERAL NOTES

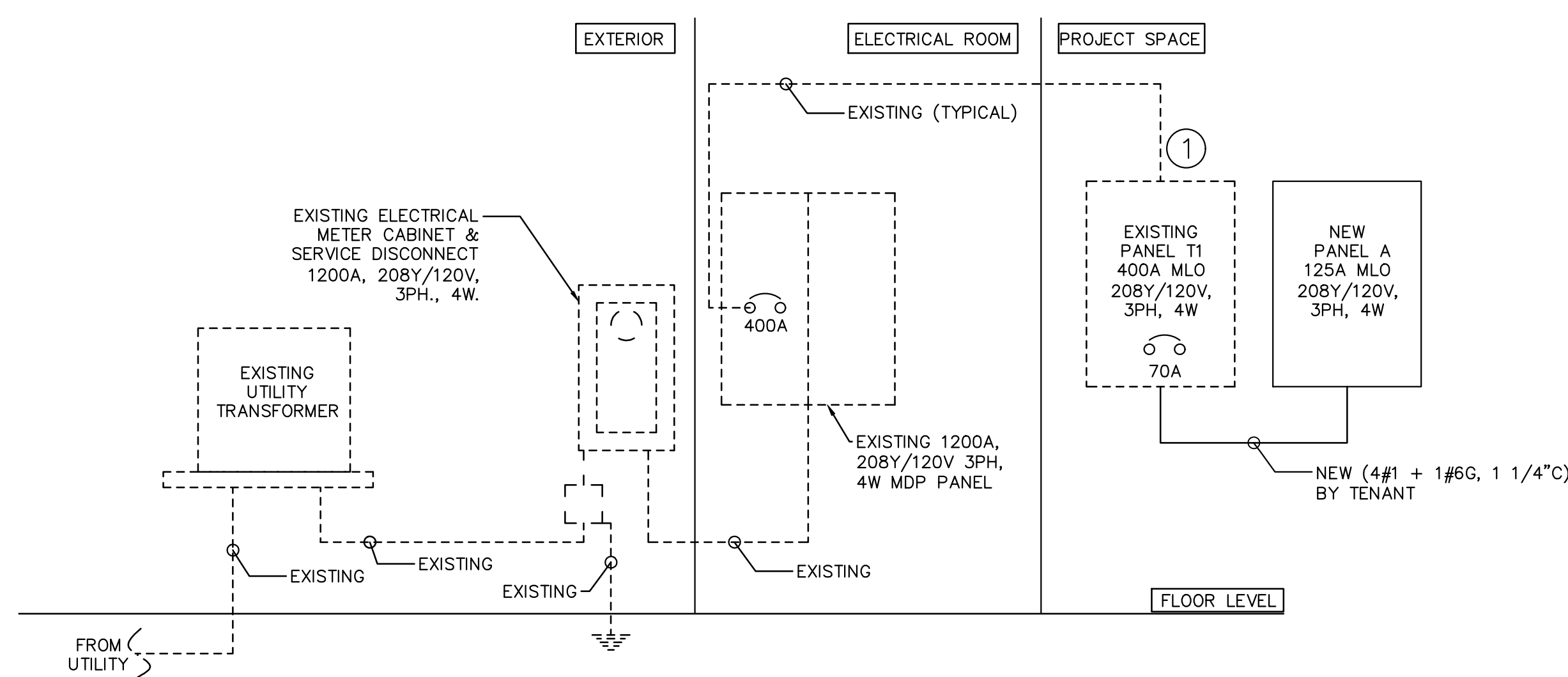
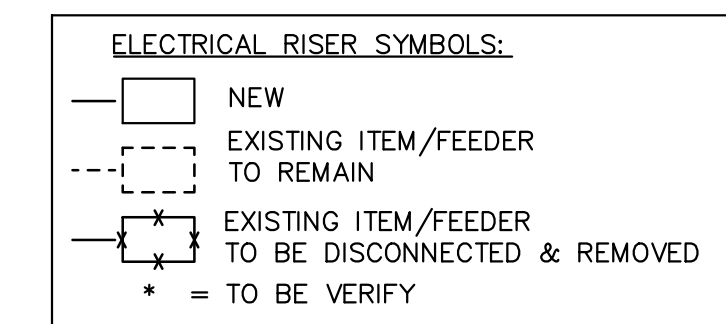
- ALL PANEL BOARDS SHALL HAVE A TYPE WRITTEN DIRECTORY IDENTIFYING EACH NUMBERED CIRCUIT PLACED IN A DIRECTORY HOLDER INSIDE THE DOOR.
- THE CONTRACTOR SHALL PERMANENTLY MARK WITH PERMANENT MARKER THE CIRCUIT IDENTIFICATIONS ON THE COVERPLATES OF RECEPTACLES, EQUIPMENT, AND LIGHTING JUNCTION BOXES. (STICK ON LABELS NOT ACCEPTABLE)
- PER NEC 210.4(B) ALL MULTIWIRE BRANCH CIRCUITS ARE TO BE PROVIDED WITH A DEVICE THAT WILL DISCONNECT POWER TO ALL UNGROUNDED CONDUCTORS SIMULTANEOUSLY AT THE POINT OF ORIGIN.
- ALL LIFE SAFETY CIRCUITS SHALL REQUIRE A LOCK ON DEVICE. FIRE ALARM CIRCUITS SHALL HAVE RED IDENTIFICATION AND BE IDENTIFIED AS FIRE ALARM CIRCUIT.
- PER NEC 408.4(A) EVERY CIRCUIT AND CIRCUIT MODIFICATION SHALL BE LEGIBLY IDENTIFIED AS TO ITS CLEAR, EVIDENT AND SPECIFIC PURPOSE OR USE.
- PER NEC 700.12(E)2 INSTALLATION OF UNIT EQUIPMENT, EMERGENCY LIGHTS, EXIT SIGNS & OTHER UNIT EQUIPMENT SHALL BE CLEARLY IDENTIFIED WITHIN & AT THE DISTRIBUTION PANEL.
- COORDINATE AVAILABLE FAULT CURRENT WITH UTILITY/LANDLORD/OWNER. CALCULATE THE EXACT AIC RATING OF EACH PIECE OF EQUIPMENT IN THE FIELD. PROVIDE THE EQUIPMENT ACCORDINGLY. AIC RATING SHALL BE WRITTEN ON EACH EQUIPMENT PER STANDARD.
- THE VOLTAGE AND FREQUENCY FLUCTUATION IN THE ELECTRICAL UTILITY SERVICE AT THE SERVICE ENTRY SHALL NOT BE MORE THAN +/- 5% AND +/- 1%, RESPECTIVELY. PROVIDE THE REGULATORS IF SUCH CASE IS OBSERVED.

ONE-LINE GENERAL NOTES

- SWITCHBOARD COMPONENTS, INCLUDING OVERCURRENT PROTECTIVE DEVICES SHALL BE FULLY RATED FOR THE AVAILABLE FAULT CURRENT SHOWN.
- PROVIDE ARC FLASH AND SHOCK HAZARD WARNING IDENTIFICATION PER NEC ARTICLE 110.16
- "NO DESIGN CHANGES MAY BE MADE TO THE SYSTEM WITHOUT THE PRIOR APPROVAL OF THE DESIGN ENGINEER AND THE ELECTRICAL INSPECTOR."
- PER NEC 240.2 CURRENT LIMITING OVERCURRENT A DEVICE THAT, WHEN INTERRUPTING CURRENTS IN ITS CURRENT-LIMITING RANGE, REDUCES THE CURRENT FLOWING IN THE FAULTED CIRCUIT TO A MAGNITUDE SUBSTANTIALLY LESS THAN THAT OBTAINABLE IN THE SAME CIRCUIT IF THE DEVICE WERE REPLACED WITH A SOLID CONDUCTOR HAVING COMPARABLE IMPEDANCE.
- COORDINATE THE EXACT LOCATION OF ALL THE NEW ELECTRICAL DEVICES SHOWN ON THE RISER. AND ENSURE THE CLEAR WORKING AND DEDICATED SPACE HAS BEEN PROVIDED AS PER NEC 110.26.
- THE VOLTAGE AND FREQUENCY FLUCTUATION IN THE ELECTRICAL UTILITY SERVICE AT THE SERVICE ENTRY SHALL NOT BE MORE THAN +/- 5% AND +/- 1%, RESPECTIVELY. PROVIDE THE REGULATORS IF SUCH CASE IS OBSERVED.

ONE-LINE KEYED NOTES

- E.C TO VERIFY IF THE EXISTING ELECTRICAL SUB-METER SHOWN ON THE PLAN CAN MEASURE THE TENANTS ELECTRICAL USAGE. IF NOT AVAILABLE, COORDINATE WITH THE OWNER/LANDLORD TO CONFIRM THE BILLING ARRANGEMENT AND PROVIDE THE NECESSARY METERING ACCORDINGLY.



1 ONE LINE DIAGRAM
SCALE: N.T.S.

CLIENT:



REVISIONS:		
#	DESCRIPTION	DATE
	ISSUED FOR PERMIT	10/27/25
Δ	PERMIT COMMENTS	12/05/25

PROJECT NUMBER:
DRAWN BY: REVIEWED BY:
SHEET TITLE:

ONE LINE DIAGRAM
SHEET NO.
E3.0