

**GDI ENGINEERING**



# **West Texas Graduation Services**

Commercial

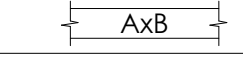
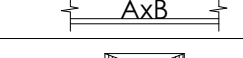

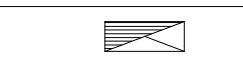
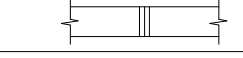

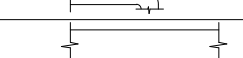


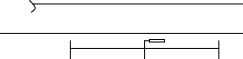
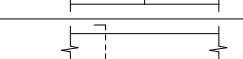
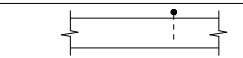
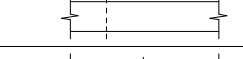
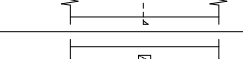

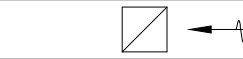





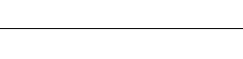




**Lubbock - Texas**



MECHANICAL SPECIFICATIONS
PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM. DEFINITIONS: 1. FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION. 2. INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE. 3. PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE. 4. WARRANTY: PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION. 5. PROVIDE OPERATION MANUALS, MAINTENANCE MANUALS AND SCHEMATICS FOR ALL MECHANICAL EQUIPMENT INSTALLED. 6. COORDINATION: COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE. 7. ROOF PENETRATIONS SHALL COMPLY WITH "SMACNA" AND "NRCA" STANDARDS, AND WITH THE REQUIREMENTS OF THE EXISTING ROOFING WARRANTY, IF APPLICABLE. DO NOT PERFORM ROOFING PENETRATIONS IN A MANNER WHICH WOULD VOID OR OTHERWISE LIMIT THE EXISTING ROOF WARRANTY. 8. DUCT DIMENSIONS: UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS. 9. SHEET METAL DUCTWORK: 9.1. PROVIDE SHEET METAL DUCTWORK FABRICATED AND INSTALLED IN ACCORDANCE WITH ASHRAE AND SMACNA STANDARDS, FOR 1" W.G. PRESSURE CLASS, SEAL CLASS "A". 9.2. SHEET METAL SHALL BE GALVANIZED SHEET STEEL OF LOCK FORMING QUALITY, WITH 590 ZINC COATING. SHEET STEEL SHALL COMPLY WITH ASTM A653 STANDARD SPECIFICATION FOR STEEL SHEET METAL, ZINC COATED (GALVANIZED) OR ZINC-IRON ALLOY COATED (GALVANNEALD) BY THE HOT DIP PROCESS, AND A924 STANDARD SPECIFICATION FOR GENERAL REQUIREMENTS FOR SHEET, METALLIC-COATED BY THE HOT DIP PROCESS. 9.3. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. 9.4. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. 9.5. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT. 9.6. PROVIDE TURNING VANES AT ALL 90° ELBOWS. 9.10. TRAPEZE DUCT HANGERS: PROVIDE MINIMUM 1" X 2" X 1" X 18 GAUGE CHANNELS WITH MINIMUM 1" X 18 GAUGE STRAPS TO STRUCTURAL SUPPORT. 9.11. ROUND SHEET METAL DUCT: PROVIDE SPIRAL SEAM (ALL SIZES) OR SNAP LOCK (DUCT SIZES UP TO 10") GALVANIZED STEEL COMPLYING WITH SMACNA STANDARDS. 9.12. SPIRAL SEAM DUCTWORK SHALL HAVE SMACNA SEAM TYPE RL-1. 9.13. FIBER GLASS DUCT BOARD IS AN ACCEPTABLE ALTERNATIVE IF APPROVED BY OWNER AND THE LOCAL BUILDING CODE OFFICIAL. PRODUCT AND INSTALLATION MUST MEET NAIMA STANDARDS AND OTHER APPLICABLE CODES AND REGULATIONS. 9.14. EXPOSED DUCTWORK: EXPOSED DUCTWORK SHALL BE CLEANED OF DEBRIS AND OIL, THEN WIPED DOWN WITH VINEGAR OR OTHER SURFACE PREPARING CHEMICAL TO PREPARE DUCT FOR PAINT. 9.15. DUCT SEALANT: PROVIDE POLYMERIC RUBBER TYPE SEALANT FOR USE ON BOTH INTERIOR LOCATED DUCTWORK AND DUCTWORK EXPOSED TO OUTDOOR CONDITIONS. SEALER SHALL HAVE HIGH BONDING STRENGTH FOR SURE, FIRST TIME SEALING OF JOINTS IN LOW, MEDIUM, AND HIGH PRESSURE DUCT SYSTEMS. SEALER SHALL BE HIGH IN SOLID CONTENT. 9.16. PROVIDE A TWO PART TAPE SEALING SYSTEM, CONSISTING OF WOVEN FIBER TAPE IMPREGNATED WITH A GYPSUM MINERAL COMPOUND, AND A MODIFIED ACRYLIC/SILICONE ACTIVATOR THAT REACTS EXOTHERMICALLY WITH THE TAPE. TWO PART TAPE SEALING SYSTEM MUST BE RATED FOR BOTH INDOOR AND OUTDOOR APPLICATION. TAPE SHALL NOT CONTAIN ASBESTOS. 9.20. DUCT INSULATION: MATERIAL FOR SUPPLY AND RETURN AIR DUCT ABOVE CEILING INSIDE THE BUILDING SHALL HAVE THE EQUIVALENT THERMAL RESISTANCE OF MINIMUM R-6. THE REQUIRED R VALUES ARE FOR INSTALLED INSULATION WITH 25% COMPRESSION AT THE CORNERS. 9.21. PROVIDE PINS AND WASHERS IN ACCORDANCE WITH SMACNA REQUIREMENTS AND AS REQUIRED TO PREVENT INSULATION FROM SAGGING. 9.22. PROVIDE ADEQUATE INSULATION AT THE SUPPLY AIR DIFFUSERS TO PREVENT CONDENSATION. 9.23. FLEXIBLE DUCT : UL #181 LISTED, CLASS 1, AND CONTAIN A 0.1 PERM RATED POLYETHYLENE INNER LINER, WITH R-8 FIBERGLASS INSULATION. FLEXIBLE DUCTS SHALL BE SECURED TO RIGID SHEET METAL COLLARS AND AIR DIFFUSERS WITH NYLON TIES OR STAINLESS STEEL WORM GEAR STRAPS. 9.24. SEAL ALL CONNECTIONS AND JOINTS AIRTIGHT. 9.25. SUPPORT FLEXIBLE DUCTS FROM THE BUILDINGS STRUCTURE WITH MINIMUM 1" WIDE, 18 GAUGE, GALVANIZED STEEL STRAP AT MAXIMUM 4'-0" CENTERS, PROVIDE 4" WIDE SHEET METAL SADDLES AT EACH SUPPORT EACH STRAP. SAG OF FLEXIBLE DUCT BETWEEN HANGERS SHALL NOT EXCEED 1/2" PER FOOT OF SUPPORT SPACING. 9.26. RADIUS FOR TURNS OF FLEXIBLE DUCTS SHALL BE A MINIMUM OF ONE DUCT DIAMETER. 9.27. FLEXIBLE DUCT RUNS SHALL NOT EXCEED 10'-0" IN LENGTH AND SHALL BE THE SAME SIZE AS THE DIFFUSER NECK CONNECTION. 9.28. ROUND VOLUME DAMPERS: PROVIDE MINIMUM 3/8" SQUARE STEEL AXLE, MOLDED SYNTHETIC BEARINGS, WITH LOCKING POSITION REGULATOR. REGULATOR SHALL BE POSITIONED WITH SHEET METAL BRACKET BEYOND DUCT COVERING. WHERE POSITIONING REGULATOR IS NOT ACCESSIBLE, PROVIDE COUPLING AND EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS REQUIRED.

9.29. RECTANGULAR VOLUME DAMPERS: PROVIDE MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM ½" HEXAGONAL AXLE, BOLDED SYNTHETIC BEARINGS, WITH 3/8" SQUARE PLATED STEEL CONTROL SHAFT. LINKAGES SHALL BE CONCEALED IN THE FRAME. OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT EXCEED 6". 9.30. DUCT TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES, SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE. 9.31. FLEXIBLE DUCT CONNECTORS: PROVIDE U.L. LABELED 30 OUNCE NEOPRENE COATED FIBERGLASS FABRIC DUCT CONNECTORS. DUCT ACCESS DOORS: PROVIDE HINGED ACCESS DOORS IN DUCTWORK WHERE REQUIRED FOR ACCESS TO EQUIPMENT. 9.32. PROVIDE INSULATED ACCESS DOORS FOR INSULATED DUCTWORK. CONSTRUCT OF SAME OR THICKER GAUGE SHEET METAL AS DUCT IN WHICH IT IS INSTALLED. 9.33. PROVIDE FLUSH FRAMES FOR UN-INSULATED DUCTS, AND EXTENDED FRAMES FOR EXTERNALLY INSULATED DUCTS. 9.34. PROVIDE CONTINUOUS HINGE ON ONE SIDE, WITH ONE HANDLE-TYPE LATCH FOR ACCESS DOORS 12" HIGH AND SMALLER, AND TWO HANDLE-TYPE LATCHES FOR LARGER ACCESS DOORS. 10. HVAC CONTROL SYSTEM: PROVIDE ALL THE NECESSARY CONTROLS AND CONTROL WIRING IN CONDUIT COMPATIBLE TO SYSTEMS SHOWN ON EQUIPMENT SCHEDULE. 11. PROGRAMMABLE THERMOSTAT FOR EACH SYSTEM SHALL ENABLE THE SUPPLY FAN AND CYCLE THE COOLING AND HEATING STAGES TO MAINTAIN SPACE SET-POINT. 12. SUPPLY FAN RUNS CONTINUOUSLY DURING THE OCCUPIED MODE. EACH THERMOSTAT SHALL HAVE A DEAD BAND OF AT LEAST 5 DEGREES (ADJ) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING IS SHUT OFF. EACH THERMOSTAT SHALL HAVE SETBACK AND SET-UP CAPABILITY DURING THE UNOCCUPIED MODE. FOR SETBACK, THE HEATING SHALL RESTART AND TEMPORARILY OPERATE ACCORDING TO A SET-POINT ADJUSTABLE DOWN TO 55 DEGREES. FOR SET-UP, THE COOLING SHALL RESTART AND TEMPORARILY OPERATE ACCORDING TO A SET-POINT ADJUSTABLE UP TO 85 DEGREES OR TO PREVENT HIGH SPACE HUMIDITY LEVELS. 13. WHERE DEMAND CONTROLLED VENTILATION IS SPECIFIED ON PLANS, EACH SYSTEM SHALL BE PROVIDED WITH A MOTORIZED OUTSIDE AIR DAMPER THAT WILL AUTOMATICALLY SHUT WHEN THE SYSTEM OR SPACES SERVED ARE NOT IN USE. VENTILATION OUTSIDE AIR DAMPERS SHALL BE CAPABLE OF AUTOMATICALLY CLOSING DURING PREOCCUPANCY BUILDING WARM-UP, COOL DOWN, AND SETBACK, EXCEPT WHEN VENTILATION REDUCES ENERGY COSTS (e.g., NIGHT PURGE) OR WHEN VENTILATION MUST BE SUPPLIED TO MEET CODE REQUIREMENTS. 14. COMMISSIONING / VERIFICATION: HVAC CONTROL SYSTEM SHALL BE TESTED TO ENSURE THAT CONTROL ELEMENTS ARE CALIBRATED, ADJUSTED, AND IN PROPER WORKING CONDITION, AND THAT THE SYSTEM MEETS THE DESIGN REQUIREMENTS. 15. TEST AND BALANCE: CONTRACT DIRECTLY A THIRD PARTY TO PROVIDE TEST AND BALANCE OF THE HVAC SYSTEM. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR SCHEDULING, TEST AND ADJUST ALL MECHANICAL SYSTEM AND EQUIPMENT TO ASSURE PROPER BALANCE AND OPERATION. PERFORM TESTS IN ACCORDANCE WITH NEBB PROCEDURAL STANDARDS-1999 OR AABC 2002, AND ASHRAE STANDARD 111. ELIMINATE NOISE AND VIBRATION, AND ASSURE PROPER FUNCTION OF CONTROLS. SUBMIT COMPLETED TEST AND BALANCE REPORT TO OWNER'S REPRESENTATIVE. BALANCING CONTRACTOR SHALL BE INDEPENDENT AND CERTIFIED WITH NEBB OR AABC. BALANCE ALL SYSTEMS WITHIN 5% OF AIR FLOW INDICATED ON DRAWINGS, AND REPORT ALL DISCREPANCIES TO THE HVAC CONTRACTOR FOR CORRECTION. MARK FINAL BALANCE POSITIONS ON DAMPERS WITH PERMANENT MARKER. 16. COMPLETION REQUIREMENTS: THE CONTRACTOR SHALL PROVIDE, WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, RECORD DRAWINGS AND AN OPERATING AND MAINTENANCE MANUAL TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE OWNER. THE RECORD DRAWING SHALL BE OF THE ACTUAL INSTALLATION AND INCLUDE AS A MINIMUM THE LOCATION AND PERFORMANCE DATA ON EACH PIECE OF EQUIPMENT, GENERAL CONFIGURATION OF DUCT AND PIPE DISTRIBUTION SYSTEM INCLUDING SIZES, AND THE TERMINAL AIR OR WATER DESIGN FLOW RATES. THE OPERATING AND MAINTENANCE MANUALS SHALL BE IN ACCORDANCE WITH INDUSTRY-ACCEPTED STANDARDS AND SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING: (A) SUBMITTAL DATA STATING EQUIPMENT SIZE AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE; (B) OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE, EXCEPT EQUIPMENT NOT FURNISHED AS PART OF THE PROJECT. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED; (C) NAMES AND ADDRESSES OF AT LEAST ONE SERVICE AGENCY; (D) HVAC CONTROLS SYSTEMS MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS, SCHEMATICS, AND CONTROL SYSTEM SEQUENCE DESCRIPTIONS. DESIRED OR FIELD-DETERMINED SET-POINTS SHALL BE PERMANENTLY RECORDED ON CONTROL DRAWINGS AT CONTROL DEVICES OR, FOR DIGITAL CONTROL SYSTEMS, IN PROGRAMMING COMMENTS; (E) A COMPLETE NARRATIVE OF HOW EACH SYSTEM EACH SYSTEM IS INTENDED TO OPERATE, INCLUDING SET-POINTS.
--

HVAC GENERAL NOTES
1. SEE ARCHITECTURAL PLANS FOR TYPE OF CEILING AND LOCATIONS OF WALL MOUNTED DEVICES. 2. DO NOT OPERATE AIR HANDLERS OR EXHAUST FANS UNTIL ALL INTERIOR CLEANING AND PAINTING IS COMPLETE. THE CLEANING OF FOULED COILS OR FAN ASSEMBLIES DUE TO PAINT OR CONSTRUCTION DEBRIS WILL THE RESPONSIBILITY OF THE HVAC CONTRACTOR. 3. RECTANGULAR DUCT SIZES INDICATED ARE ACTUAL SHEET METAL DIMENSIONS IN INCHES. ALL ROUND DUCT SIZES INDICATE NET FREE INSIDE DIAMETER AND DO NOT ACCOUNT FOR ANY INSULATION. ROUND DUCTS ARE EXTERNALLY INSULATED. 4. MAJOR EQUIPMENT SHOWN ON THE PLANS AND ELEVATIONS ILLUSTRATE THE GENERAL ARRANGEMENT AND SPACE ALLOCATION. VERIFY THE SPACE REQUIREMENTS FOR EACH SYSTEM COMPONENT USING MANUFACTURER CERTIFIED SHOP DRAWINGS AND MAKE THE NECESSARY ADJUSTMENTS IN EQUIPMENT PLACEMENT AND CONNECTIONS IN ORDER TO ACCOMMODATE THE EXACT EQUIPMENT TO BE INSTALLED IN COORDINATION WITH ARCHITECTURAL SPACES. 5. REFER TO DETAILS FOR SUPPORTS. ANCHOR BOLTS AND HANGERS FOR ALL EQUIPMENT, OTHER MISCELLANEOUS STEEL BRACING, SUPPORTS, AND REINFORCEMENT STEEL REQUIRED TO SUPPORT EQUIPMENT SHALL BE FURNISHED AS PART OF THE SCOPE OF DIVISION 23. 6. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE CODES, STANDARDS, AND AUTHORITIES HAVING JURISDICTION. 7. DUCTWORK AND PLENUMS SHALL BE SEALED IN ACCORDANCE WITH THE MECHANICAL CODE AND SMACNA METHOD AND COMMERCIAL ENERGY CONSERVATION CODE. SEAL ALL LONGITUDINAL AND TRANSVERSE JOINTS. SEAL ALL PENETRATIONS OF FLOORS, SMOKE WALLS, FIRE WALLS, AND EXTERIOR WALLS. 8. DO NOT RUN DUCT ON PIPE OVER ELECTRICAL PANELS. COORDINATE LOCATION OF DUCTS AND EQUIPMENT IN MECHANICAL ROOMS WITH THE ELECTRICAL AND PLUMBING CONTRACTOR BEFORE ANY INSTALLATION. 9. ALL DUCT RUN-OUTS TO SUPPLY AND EXHAUST AND DIFFUSERS AND RECEPTORS SHALL HAVE NORMAL BALANCING DAMPERS. PROVIDE YOUNG REGULATORS WITH REMOTE ADJUSTMENT WHERE CEILING IS INACCESSIBLE. 10. ALL DUCTWORK SHALL BE INSTALLED AND MANUFACTURED IN ACCORDANCE WITH LATEST SMACNA STANDARDS. 11. SECURE ALL PERMITS AND PROVIDE ANY REQUIRED TEMPORARY UTILITIES. 12. ALL FLEXIBLE DUCT SHALL BE UL 181, CLASS 1 AIR DUCT BLACK LINER. MAXIMUM LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 6'-0". PROVIDE RIGID ROUND INSULATED AIR DUCT RUN-OUT AS REQUIRED. FLEXIBLE DUCT SHALL HAVE THE EQUIVALENT OF ONLY TWO 90 DEGREE ELBOWS. MAXIMUM FLEX DUCTS ARE SAME SIZE AS DIFFUSER NECK. 13. THE AIR QUANTITIES SHOWN ON THE DRAWINGS FOR INDIVIDUAL OUTLETS MAY BE CHANGED TO OBTAIN UNIFORM TEMPERATURE WITH EACH ZONE, BUT THE TOTAL AIR QUANTITY SHOWN FOR EACH ZONE MUST BE OBTAINED. 14. INSTALL SMOKE DETECTOR FOR ALL UNITS WITH THE CAPACITY OF 2200 CFM AND HIGHER AS REQUIRED BY CODE. FIRE ALARM CONTRACTOR TO FURNISH AND TERMINATE. 15. ALL SUPPLY AND RETURN AIR DUCTS LOCATED IN UNCONDITIONED ATTICS OUTSIDE THE ENVELOPE OR OUTSIDE THE BUILDING SHALL BE INSULATED USING R-8 INSULATION. EXTERNALLY INSULATED DUCT SHALL BE R-8 (INSTALLED) OR MINIMUM REQUIRED BY CURRENT HOUSTON COMMERCIAL ENERGY CONSERVATION CODE. 16. ALL SUPPLY AND RETURN DUCTS LOCATED IN A CONDITIONED SPACE OR INSIDE THE ENVELOPE SHALL BE INSULATED USING MINIMUM R-6 INSULATION (INSTALLED R-VALUE), EXTERNALLY INSULATED DUCT SHALL BE R-5.6 OR MINIMUM REQUIRED BY CURRENT ENERGY CONSERVATION CODE. 17. PROVIDE RECORD DRAWINGS OF THE ACTUAL INSTALLATION TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER. RECORD DRAWINGS SHALL INCLUDE AS A MINIMUM THE LOCATION AND PERFORMANCE DATA ON EACH PIECE OF EQUIPMENT. GENERAL CONFIGURATION OF DUCT AND PIPE DISTRIBUTION SYSTEM INCLUDING SIZES, AND THE TERMINAL AIR OR WATER DESIGN FLOW RATES. 18. PROVIDE OPERATING AND MAINTENANCE MANUALS TO THE BUILDING OWNER OR DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER. THESE MANUALS SHALL BE IN ACCORDANCE WITH INDUSTRY ACCEPTED STANDARDS AND SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING: A) SUBMITTAL DATA STATING EQUIPMENT SIZE AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. B) OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE EXCEPT EQUIPMENT NOT FURNISHED AS PART OF THE PROJECT. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED. C) NAMES AND ADDRESSES OF AT LEAST ONE SERVICE AGENCY. D) HVAC CONTROLS SYSTEM MAINTENANCE AND CALIBRATION INFORMATION INCLUDING WIRING DIAGRAMS, SCHEMATICS, AND CONTROL SEQUENCE DESCRIPTIONS, AND DESIRED OR FIELD-DETERMINED SET POINTS SHALL BE PERMANENTLY RECORDED ON CONTROL DRAWINGS AT CONTROL DEVICES OR FOR DIGITAL CONTROL SYSTEMS, IN PROGRAMMING COMMENTS. E) A COMPLETE NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE, INCLUDING SUGGESTED SET POINTS. 19. DUCTWORK THAT IS DESIGNED TO OPERATE AT STATIC PRESSURES IN EXCESS OF 3 IN W.G. SHALL BE LEAK TESTED ACCORDING TO INDUSTRY-ACCEPTED TEST PROCEDURES. REPRESENTATIVE SECTIONS TOTALING NO LESS THAN 25% OF THE TOTAL INSTALLED DUCT AREA FOR THE DESIGNATED PRESSURE CLASS SHALL BE TESTED. DUCT SYSTEMS WITH PRESSURE RATINGS IN EXCESS OF 3 IN W.G SHALL BE IDENTIFIED ON THE DRAWINGS. THE MAXIMUM PERMITTED DUCT LEAKAGE SHALL BE NO MORE THAN 1% OF THE TOTAL AIRFLOW IN THE SECTION TESTED OR AS REQUIRED BY CURRENT COMMERCIAL ENERGY CONSERVATION CODE. 20. ALL HVAC SYSTEMS SHALL BE BALANCED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING STANDARDS. A WRITTEN BALANCE REPORT SHALL BE PROVIDED TO THE OWNER OF DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER. 21. HVAC CONTROL SYSTEMS SHALL BE TESTED TO ENSURE THAT CONTROL ELEMENTS ARE CALIBRATED, ADJUSTED, AND PROPER WORKING CONDITION AS REQUIRED BY COMMERCIAL ENERGY CONSERVATION CODE. 22. PROVIDE AND INSTALL 7-DAY PROGRAMMABLE THERMOSTAT.

LEGEND		
		DUCT WORK (WIDTHxDEPTH)
		LINED DUCT WORK (WIDTHxDEPTH DIMENSIONS ARE FOR I.D.)
		SUPPLY DUCT, SECTION
		RETURN DUCT, SECTION
		EXHAUST DUCT, SECTION
	FLEX. CONN.	FLEXIBLE CONNECTION
		DUCT TRANSITION, ROUND AND RECTANGULAR
		SPLITTER DAMPER
		EXTRACTOR AT BRANCH DUCT
		TURNING VANES
		FLEXIBLE DUCT
		SINGLE LINE DUCT WORK
	AVD	AUTOMATIC VOLUME DAMPER
	MVD	MANUAL VOLUME DAMPER
	BDD	BACKDRAFT DAMPER
	MD	MODULATING DAMPER
	AFD	AUTOMATIC FIRE DAMPER
	AD	ACCESS DOOR
	SD	SUPPLY DIFFUSER
	RR	RETURN REGISTER
	ER	EXHAUST REGISTER
	SWR	SIDE WALL SUPPLY REGISTER
	SWE	SIDE WALL RETURN OR EXHAUST
	LD	LINEAR DIFFUSER
		THERMOSTAT
		DUCT SMOKE DETECTOR
	T/B	TO BELOW
	F/B	FROM BELOW
	T/A	TO ABOVE
	F/A	FROM ABOVE

SPECIAL NOTICE TO CONTRACTORS
1. ALL CONTRACTORS (GENERAL CONTRACTOR AND SUB-CONTRACTORS) BIDDING THIS PROJECT ARE REQUIRED TO VISIT THE JOB SITE AND VERIFY THE EXISTING CONDITIONS PRIOR TO SUBMITTING THEIR BID. CONTRACTORS ARE TO CAREFULLY REVIEW ALL CONSTRUCTION DOCUMENTS AND NOTE ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CONDITIONS OBSERVED AT THE JOB SITE PRIOR TO SUBMISSION OF ANY BID. THE BUILDING OWNER REPRESENTATIVE LISTED BELOW MAY BE CONTACTED FOR ACCESS TO THE JOB SITE. 2. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING THE LOCATION AND CONDITION OF ALL POINTS OF CONNECTION, LOCATION AND CONDITION OF ALL BUILDING (ROOF/FLOOR/CEILING) PENETRATIONS, LOCATION AND CONDITION OF ALL UTILITIES AND BUILDING SYSTEMS INCLUDING, BUT NOT LIMITED TO, GAS, WATER, SEWER, VENT, ELECTRICAL, BUILDING MECHANICAL SYSTEMS, DUCT CONNECTIONS, EXHAUST/OUTSIDE AIR CONNECTIONS, SECURITY, FIRE ALARM, DATA, AND PHONE PRIOR TO SUBMISSION OF THEIR BID. 3. ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CONDITIONS OBSERVED SHALL BE BROUGHT TO THE ATTENTION, IN WRITING, TO THE ARCHITECT AND/OR ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION. 4. NO WORK SHALL BE DONE ON ANY PART OF THE BUILDING BEYOND THE POINT INDICATED IN EACH SUCCESSIVE INSPECTION WITHOUT FIRST OBTAINING THE WRITTEN APPROVAL OF THE CODE OFFICIAL. NO CONSTRUCTION SHALL BE CONCEALED WITHOUT BEING INSPECTED AND APPROVED.

SCOPE OF WORK:
1. ADDITION OF A STORAGE AREA. 2. ADDITION OF OFFICE SPACES WITHIN THE EXISTING STORAGE AREA. 3. ADDITION OF A NEW SPLIT HEAT PUMP FOR THE NEW OFFICES. 4. VENTILATING & AIR CONDITIONING THE NEW STORAGE FROM THE EXISTING STORAGE. 5. REPLACING THE TOILET EXHAUST FANS WITH NEW UNITS. 6. ADDITION OF AN EXHAUST FAN FOR THE MOP SINK.

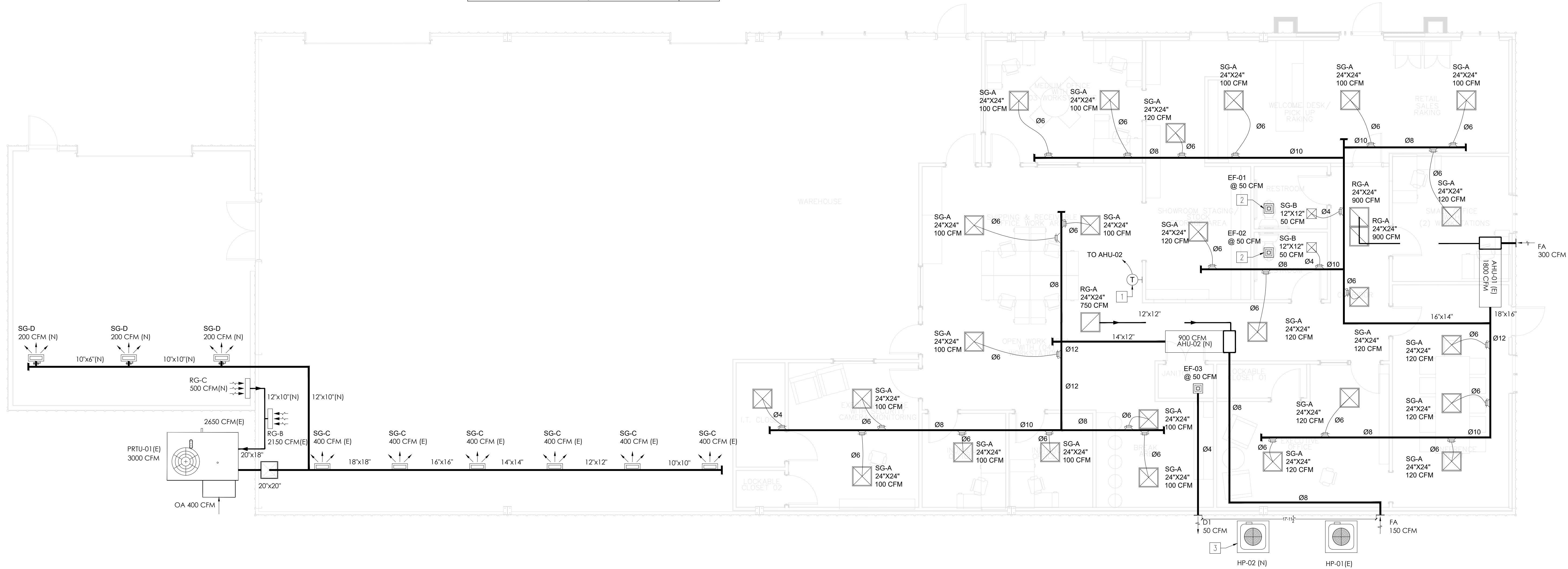
MECHANICAL LIST OF DRAWINGS (LoD):		
SHEET TAG	TITLE	SCALE
M 1.00	MECHANICAL GENERAL NOTES, SPECIFICATIONS & LEGEND.	NTS
M 2.00	MECHANICAL LAYOUT, SCHEDULE OF EQUIPMENT & VENTILATION CALCULATION.	3/16"=1'-0"
M 3.00	MECHANICAL GENERAL DETAILS.	NTS



## MECHANICAL KEYED NOTES:

- 1 ROOFTOP THERMOSTAT - 7 DAY PROGRAMMABLE - WITH ECONOMIZER FEATURE CONTROL - MOUNT AT + 48" ABOVE FINISH FLOOR LEVEL MIN.
- 2 REPLACE THE EXISTING TOILETS' EXHAUST FANS WITH NEW ONES AS PER THE SCHEDULE OF EQUIPMENT - CONNECT THE FANS WITH THE EXISTING DUCTWORK.
- 3 PROVIDE HOUSEKEEPING PAD FOR NEW OUTDOOR MECHANICAL UNIT - FOLLOW THE MANUFACTURER'S RECOMMENDATION FOR THE MINIMUM PAD DIMENSIONS.

Ventilation Load Calculation (IMC)												
Zone #	Room Name	IMC Occupancy Class	Area (ft²) AZ	Ra (CFM/ft²)	AZ x Ra (CFM)	Pz (Persons/1000ft²)	Persons	Rp (CFM/persons)	Rp x Persons (CFM)	Vbz Calcu.CFM	Corrected CFM After EF=0.8	Source of OA
1	RETAIL SALES 101	SALES	385	0.12	46.2	15	6	7.5	43	90	112	AHU-01
2	SMALL OFFICE 104	OFFICE SPACES	155	0.06	9.3	5	1	5	4	13	16	AHU-01
3	EXECUTIVE OFFICE 106	OFFICE SPACES	265	0.06	15.9	5	1	5	7	23	28	AHU-01
4	INDIVIDUAL OFFICE 113	OFFICE SPACES	85	0.06	5.1	5	0	5	2	7	9	AHU-02
5	INDIVIDUAL OFFICE 114	OFFICE SPACES	85	0.06	5.1	5	0	5	2	7	9	AHU-02
6	EXECUTIVE OFFICE MONITORING 118	OFFICE SPACES	285	0.06	17.1	5	1	5	7	24	30	AHU-02
7	MEDIUM OFFICE 117	OFFICE SPACES	205	0.06	12.3	5	1	5	5	17	22	AHU-01
8	WORKING AREA 115-116	OFFICE SPACES	575	0.06	34.5	5	3	5	14	49	61	AHU-02
9	CORRIDOR	CORRIDORS	300	0.06	18	0	0	0	0	18	23	AHU-01
10	CONFERENCE ROOM 105	OFFICE SPACES	280	0.06	16.8	5	1	5	7	24	30	AHU-01
11	BREAK AREA	OFFICE SPACES	125	0.06	7.5	5	1	5	3	11	13	AHU-02
12	WAREHOUSE 121	WAREHOUSES	3120	0.06	187.2	0	0	0	0	187	234	PRTU-01
13	EXTRA STORAGE 124	STORAGE ROOMS	640	0.12	76.8	0	0	0	0	77	96	PRTU-01
14	SHOWROOM STAGING/ STORAGE 103	STORAGE ROOMS	225	0.12	27	0	0	0	0	27	34	AHU-01
TOTAL OA - AHU-01 / EXISTING					264							
TOTAL OA - AHU-02 / NEW					123							
TOTAL OA - PRTU-01 / EXISTING					330							

SCHEDULE No. 1  
PACKAGED ROOFTOP UNIT - EXISTING

TAG	PRTU-01
LOCATION	SEE PLANS
MANUFACTURER	GOODMAN
MODEL	CPH090XXX3BXXXAC
NOMINAL CAPACITY (TONS)	7.5
EER / SEER	11.5 / 14.0
SELECTED SUPPLY AIR FLOW (CFM)	3000
OUTDOOR AIR FLOW (CFM)	350
MCA	40
MOCP (A)	50
VOLTS / PH / Hz	208-230 / 3 / 60

## NOTES:

1. RTU SHOULD HAVE OUTDOOR AIR INLET & MANUAL VOLUME DAMPER.
2. PROVIDE ROOF CURB AS NECESSARY.

SCHEDULE No. 4  
FAN SCHEDULE

TAG	EF-01 & EF-03
LOCATION	RESTROOMS & MOP
SELECTED FLOW (CFM)	87
SELECTED PRESSURE DROP (IN. H2O)	0.2"
ELECTRICAL (V / PH / HZ)	115 / 1 / 60
MCA	0.2 A
MOTOR SPEED	900 RPM
FAN TYPE	CEILING FAN
MANUFACTURER	GREENHECK OR EQUAL
MODEL	SP-A90
WEIGHT	12 lbs
DIMENSIONS HxWxL	9" x 13" x 11"

## NOTES:

1. PROVIDE UL LISTING.
2. PROVIDE ENERGY STAR COMPLIANCE.
3. INTERLOCK WITH OCCUPANCY SENSOR.
4. PROVIDE MOTOR WITH THERMAL OVERLOADS.

SCHEDULE No. 2  
SPLIT AIR HANDLING UNIT

TAG	AHU-02
SERVING	CORRIDOR
MANUFACTURER	CARRIER
MODEL	FJADNxB30
POWER SUPPLY	208-230V / 1Ø / 60Hz
UNIT AMPACITY (A)	5.3
MOCP (A)	15
AIR FLOW (CFM)	900
EXTERNAL STATIC PRESSURE (INCHES OF WATER)	0.4
FAN MOTOR HP	1/2
TOTAL COOLING CAPACITY (BTU/H)	25,927
SENSIBLE COOLING CAPACITY (BTU/H)	20,005
HEATING CAPACITY (BTU/H)	20,967
APPROX. WEIGHT (lbs)	150
DIMENSIONS WxDxH	17 8/8" x 22 1/16" x 49 3/8"

## NOTES:

1. PROVIDE CONDENSATE PUMP, IF REQUIRED.
2. PROVIDE DISCONNECT SWITCH.
3. PROVIDE 2" MERV 8 THROWAWAY FILTER.
4. PROVIDE VIBRATION ISOLATION.
5. DIMENSIONS ARE PROVIDED FOR UPRIGHT UNIT.
6. COOLING & HEATING CAPACITIES ARE RATED FOR THIS SITE CONDITIONS.

EXISTING DX SPLIT HEAT PUMP UNIT SCHEDULE

TAG	LOCATION	MANUF.	OUTDOOR MODEL	QTY	NOMINAL COOLING CAPACITY ELECTRIC	ELECTRIC HEATER (kW)	BLOWER DATA			ELECTRICAL DATA			NOTES
							SUPPLY	O/A (CFM)	REQ. O/A (CFM)	MOCP	MCA	V/PH/Hz	
(E) AHU-01 (E) HP-01	-	-	-	1	5.0 TONS	11 kW	1800 CFM	300	266	60	40	208 - 230/1/60	-

SCHEDULE No. 3  
HEAT PUMP CONDENSER SCHEDULE

TAG	HP-02
MANUFACTURER	CARRIER
OUTDOOR MODEL	255CA530A003
CONNECTED INDOOR UNIT	AHU-02
POWER SUPPLY	208-230V / 1Ø / 60Hz
SEER2 / EER2 / HSPF2	14.3 / 12 / 7.5
MINIMUM CIRCUIT AMPACITY	18.2 A
COMPRESSOR RLA	14.1 A
MAX OVERCURRENT DEVICE	30 A
NOMINAL COOLING CAPACITY (BTU/H)	28,400
NOMINAL HEATING CAPACITY (BTU/H)	28,600
APPROXIMATE WEIGHT (lbs.)	180
OUTDOOR DIMENSIONS (H x W x D) (inch)	28 11/16" x 31 3/16" x 31 3/16"

## NOTES:

1. PROVIDE DISCONNECT SWITCH.
2. PROVIDE VIBRATION ISOLATION.
3. PROVIDE FREEZE THERMOSTAT.
4. PROVIDE CONCRETE BASE SLAB.

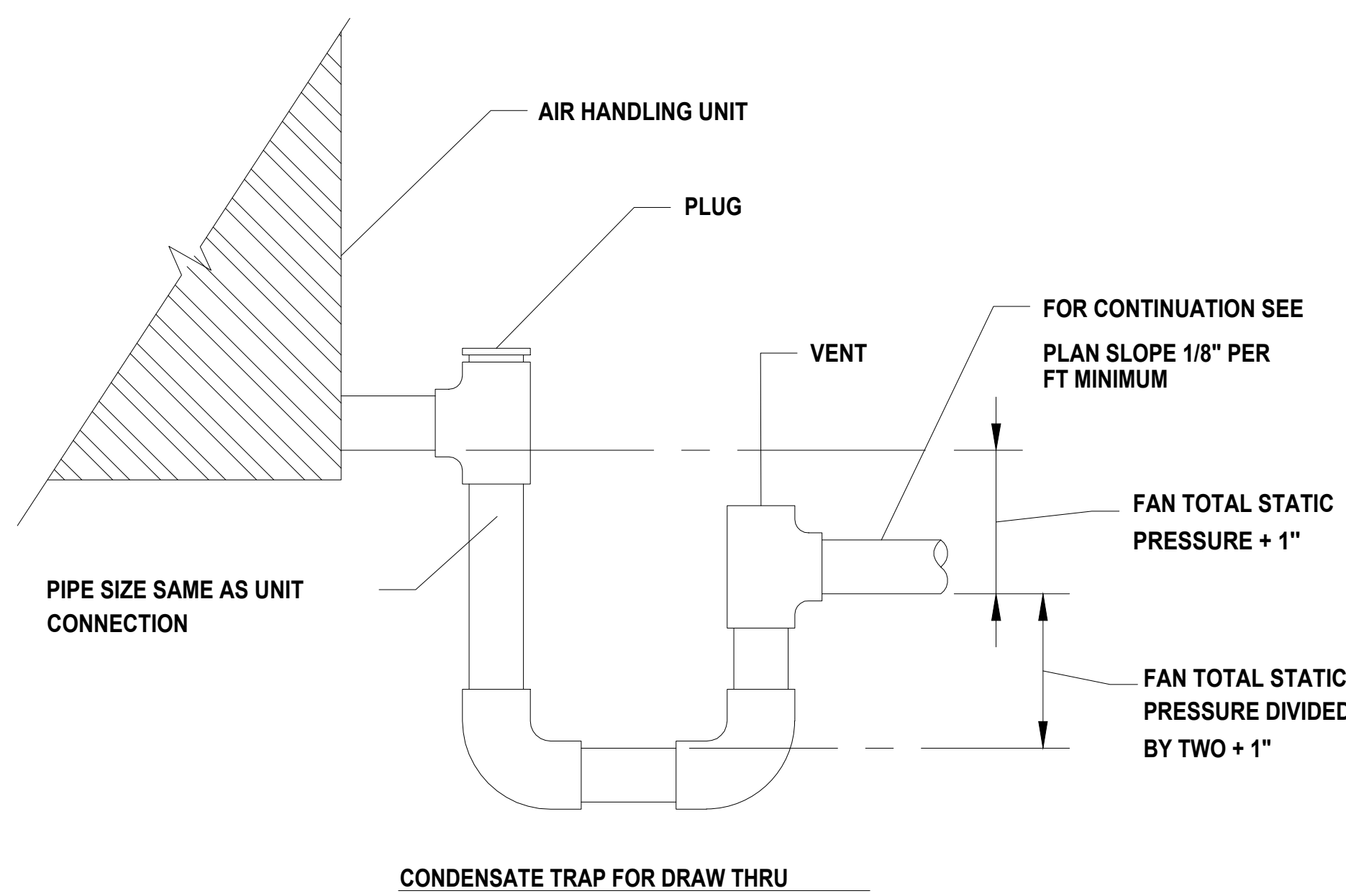
SCHEDULE No. 5  
AIR OUTLETS

TAG	DESCRIPTION	MANUFACTURER	MODEL	SIZE	MOUNTING
SG-A	SUPPLY SQUARE DIFFUSER	GREENHECK OR EQUAL	XG-D5A-16x16 NECK	24" x 24"	CEILING WITH PLENUM BOX & ROUND INLET.
SG-B	SUPPLY SQUARE DIFFUSER	GREENHECK OR EQUAL	XG-D5A-6x6 NECK	24" x 24"	CEILING WITH PLENUM BOX & ROUND INLET.
SG-C		EXISTING TO REMAIN UNCHANGED			
SG-D	DOUBLE DEFLECTION REGISTER	GREENHECK OR EQUAL	XG-H4004-AF-1-XG	14" x 10"	DUCT MOUNTED.
RG-A	RETURN SQUARE DIFFUSER	GREENHECK OR EQUAL	XG-D5A-24x24 NECK	24" x 24"	CEILING WITH RECTANGULAR DUCT CONX.
RG-A	RETURN SQUARE DIFFUSER	GREENHECK OR EQUAL	XG-D5A-24x24 NECK	24" x 24"	CEILING WITH RECTANGULAR DUCT CONX.
RG-C		EXISTING TO REMAIN UNCHANGED			
D1	4" DRAINABLE BLADE EXHAUST AIR LOUVER	GREENHECK OR EQUAL	EDJ-401-14x14	14" x 14"	FACADE MOUNTED.
FA	4" DRAINABLE BLADE OUTDOOR AIR LOUVER	GREENHECK OR EQUAL	EDJ-401-18x18	18" x 18"	FACADE MOUNTED.

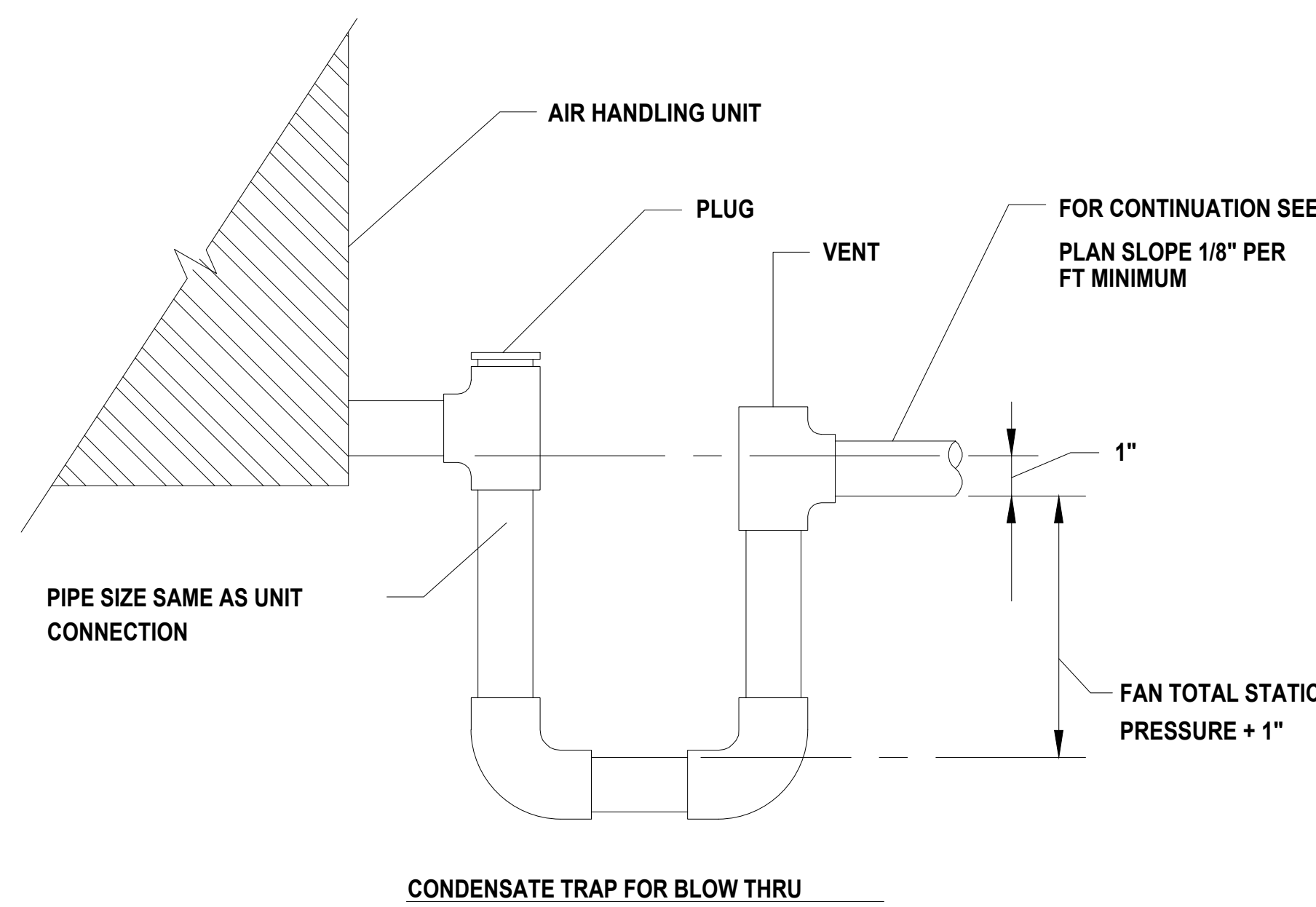
## NOTES:

1. COORDINATE FINISH, COLOR, BORDER AND EXACT LOCATION WITH THE OWNER PRIOR TO ORDERING.
2. PROVIDE OPPOSED BLADE DAMPER ACCESSIBLE THROUGH DIFFUSER FACE FOR GYP BD. CEILING INSTALLATIONS.
3. PROVIDE DUCT TRANSITIONS AS REQUIRED.

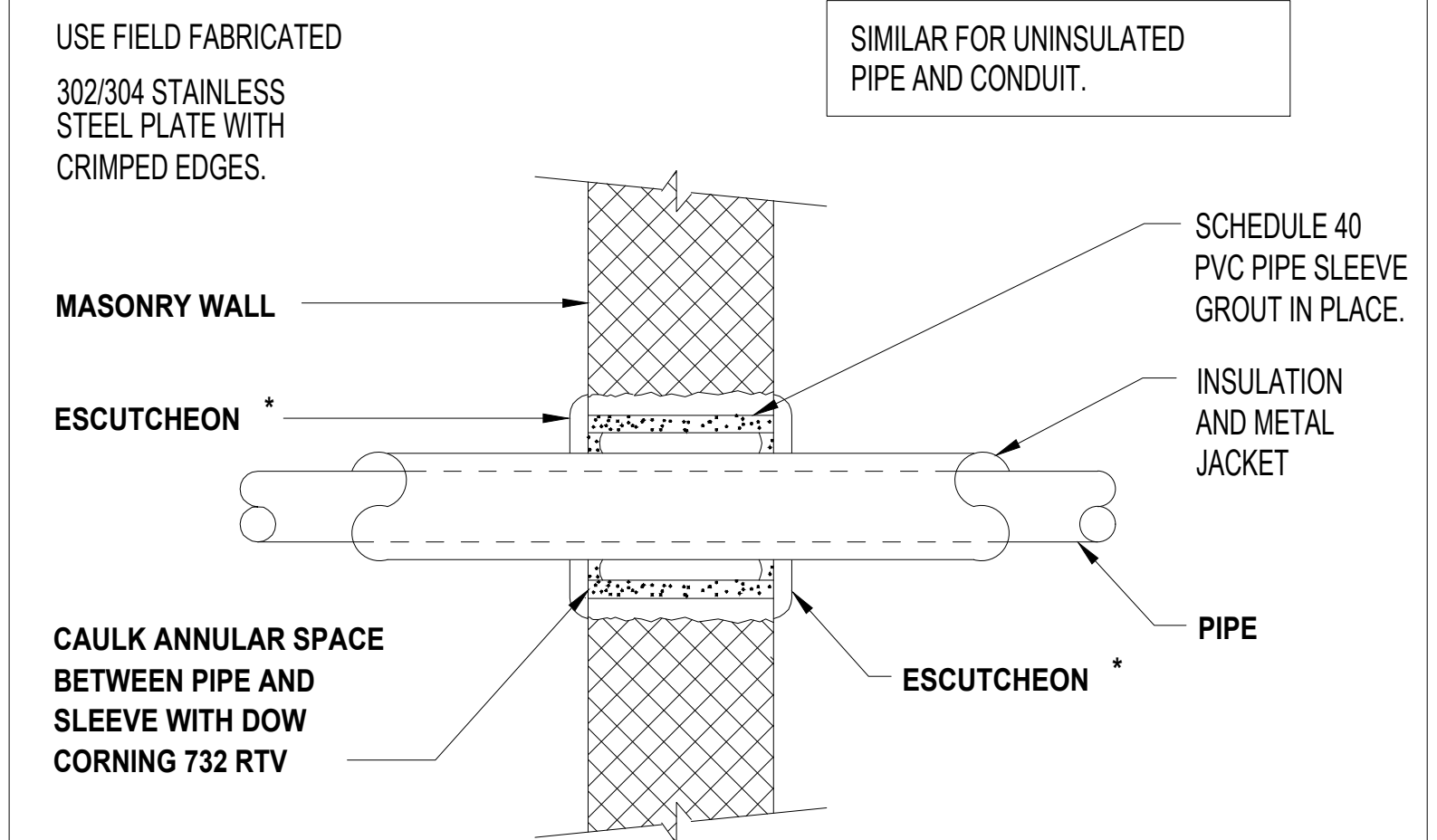




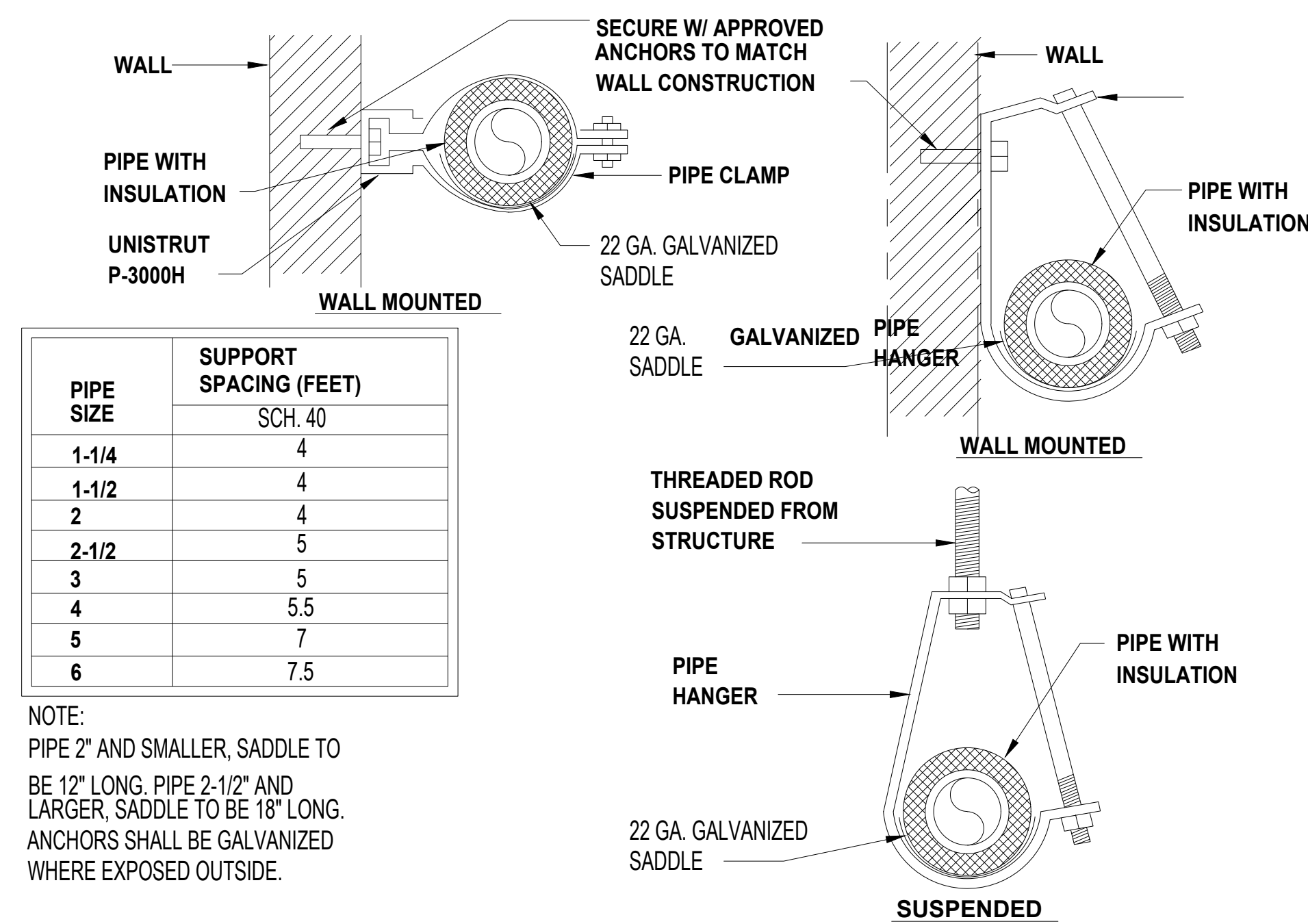
**1** **CONDENSATE DRAIN DETAIL**  
SCALE: N.T.S.



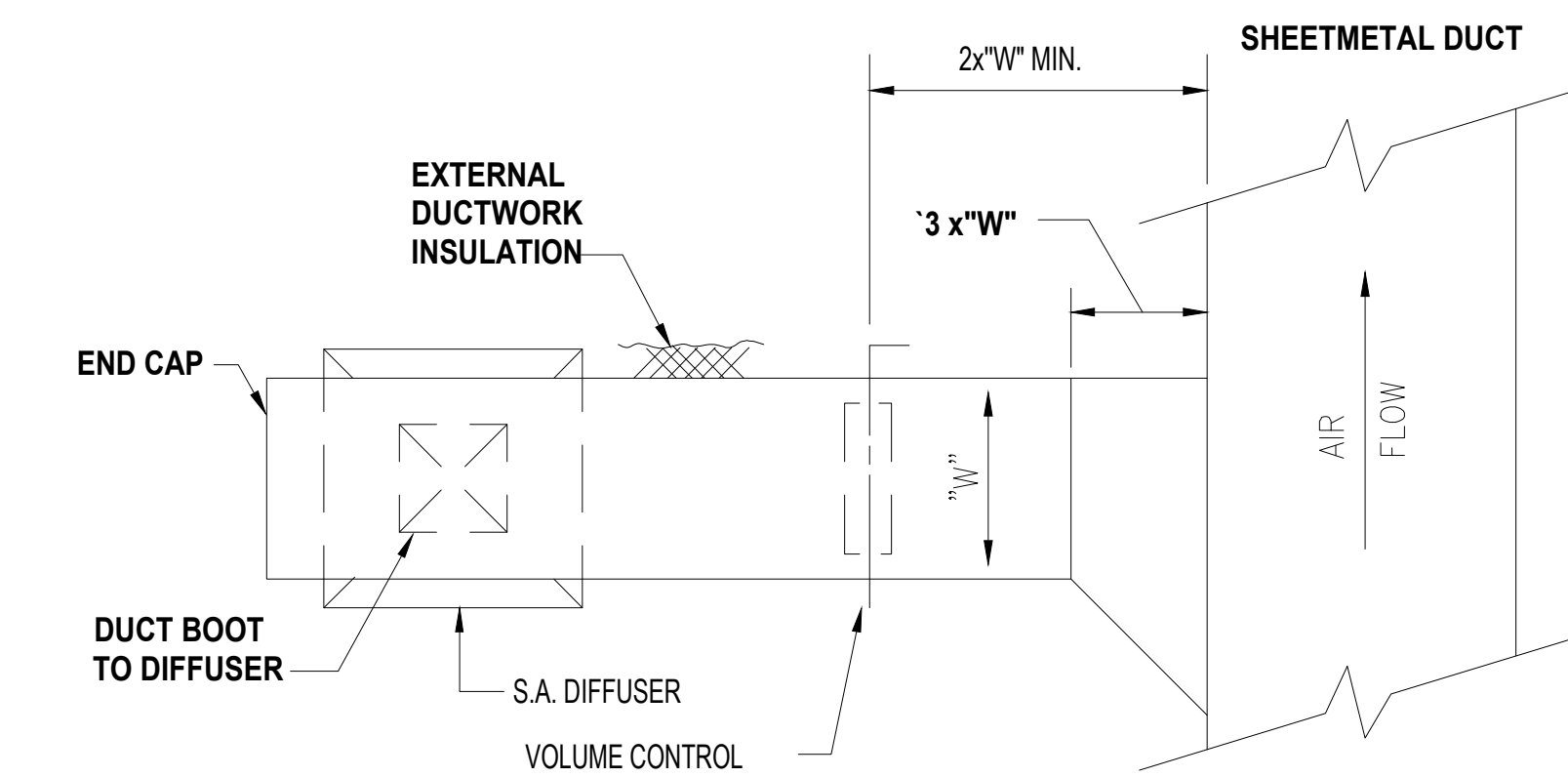
**2** **DUCT ROOF PENETRATION**  
SCALE: N.T.S.



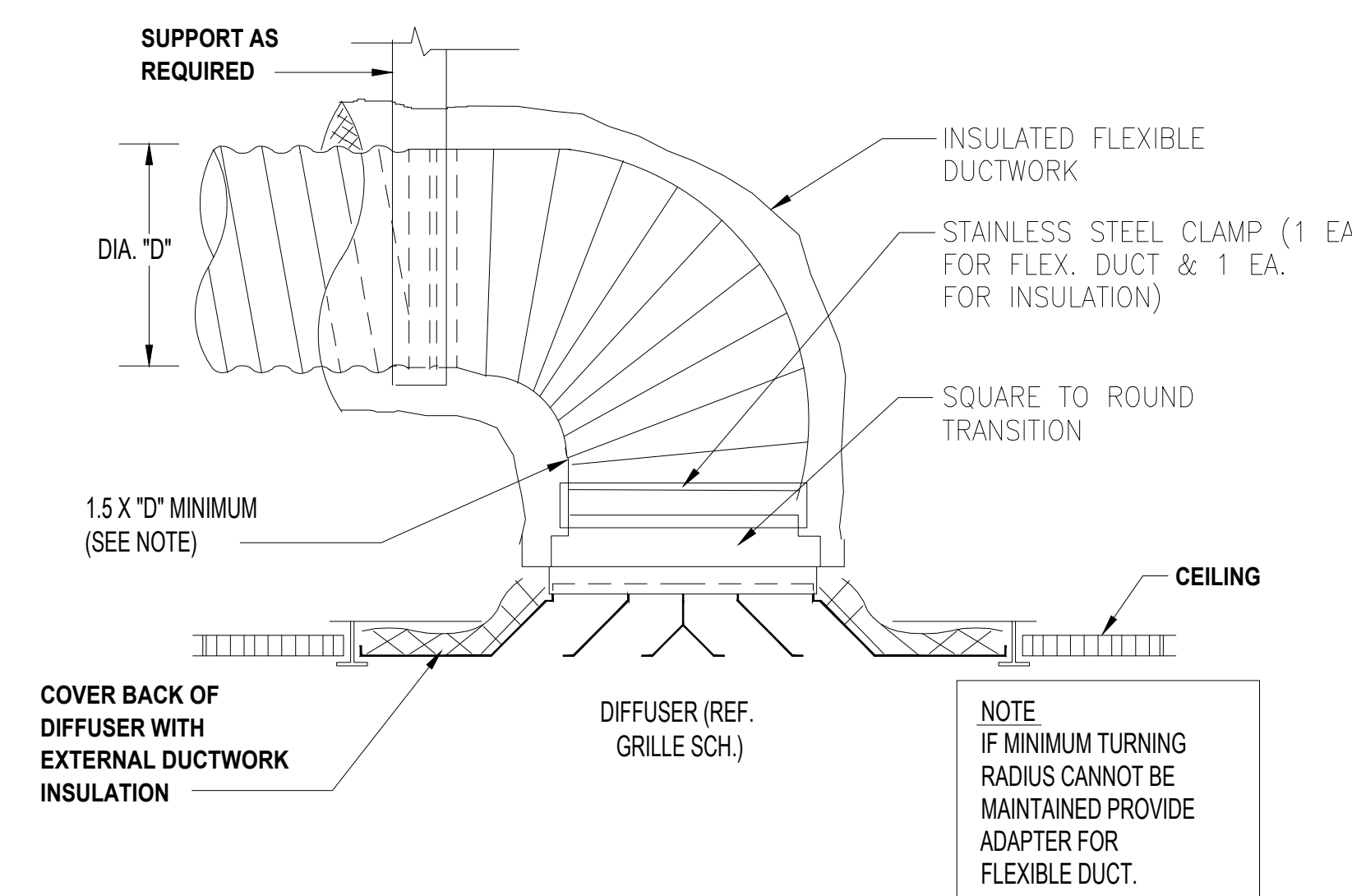
**3** **PIPE THRU EXTERIOR WALL**  
SCALE: N.T.S.



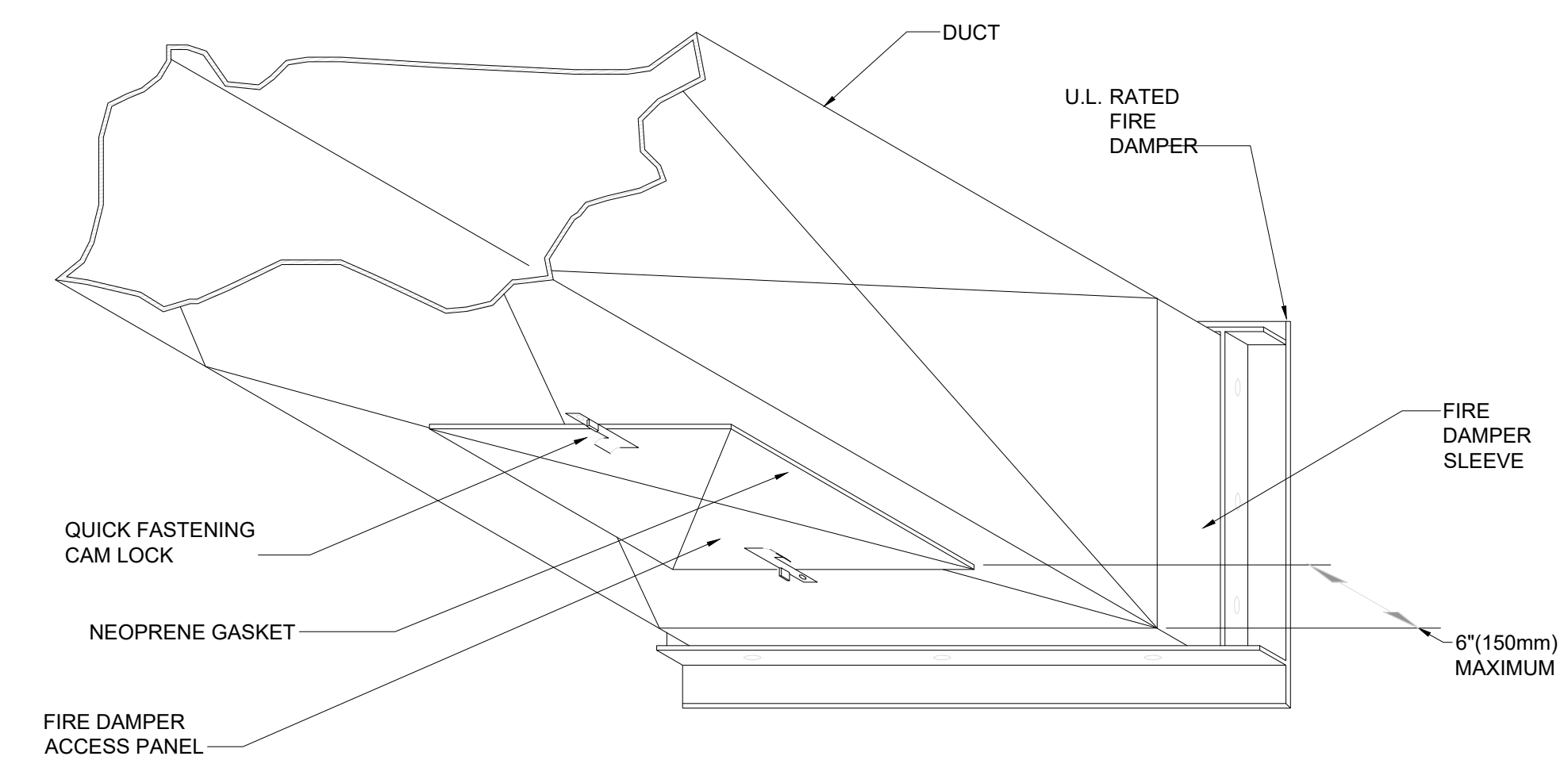
**5** **CONDENSATE SUPPORT & INSTALLATION DETAIL**  
SCALE: N.T.S.



**6** **RIGID SUPPLY DUCT TAP TO SINGLE AIR DIFFUSER**  
SCALE: N.T.S.



**7** **FLEXIBLE DUCT CONNECTION TO SUPPLY AIR DIFFUSER**  
SCALE: N.T.S.



**8** **FIRE DAMPER ACCESS DETAIL**  
SCALE: N.T.S.



ELECTRICAL SPECIFICATIONS							
PART 1		PART 2		PART 2		PART 3	
GENERAL		PRODUCTS		PRODUCTS		EXECUTION	
1.01	<p>SCOPE OF WORK: Furnish and install all materials and equipment and provide all labor, tools, transportation, superintendence and services required and necessary to complete the work shown on the drawings and/or specified herein. Also include all other work and miscellaneous items, not specifically mentioned, but reasonably inferred for a complete installation including all accessories and appurtenances required for testing the system. It is the intent of the drawings and specifications that all systems be complete, and ready for operation.</p> <p>REGULATORY REQUIREMENTS: Code compliance is mandatory. Nothing in these Drawings and Specification permits work not conforming to these codes. Where work is shown to exceed minimum code requirements, comply with drawings and specifications. All work and materials shall comply with the latest rules, codes and regulations, including, but not limited to the following: Occupational Safety and Health Act Standards (OSHA). NFPA #70: National Electric Code (NEC). NFPA #101: Life Safety Code. State Fire Marshal. Local Utilities Companies.</p>	2.01	<p>MATERIAL APPROVAL: All materials must be new and bear Underwriter's Laboratories label. Materials that are not covered by UL testing standards shall be tested and approved by an independent testing laboratory or a governmental agency. Material not in accordance with these specifications may be rejected either before or after installation.</p> <p>CONDUITS AND OTHER RACEWAYS: A. Rigid Steel: Hot-dipped galvanized. B. Intermediate Metal Conduit (IMC): Hot-dipped galvanized. C. Electrical Metallic Tubing (EMT): Electro-galvanized. D. Wireway: Code gauge steel, with knockouts and hinged cover, corrosion resistant gray baked enamel finish. E. Provide fittings and accessories approved for the purpose equal in all respects to the conduit or raceway. EMT connectors and couplings shall be steel setscrew type indoors and steel compression type in wet locations and outdoors.</p>	2.12	<p>DRY TYPE TRANSFORMERS: General: Equipment shall conform to or exceed requirements of NEMA, ANSI Standard C89.2 for Dry Type Transformers for General Applications. Acceptable products are those of General Electric Company's "QL" Line or equivalent Square D, Siemens-ITE, or Eaton.</p> <p>Electrical Ratings: 1. Primary windings voltage: 480 Volts, 3-Phase, delta. Secondary windings voltages: 240Y/120 Volts, 3-Phase grounded. Frequency: 60 Hz. KVA rating: As shown on drawings. Taps: 5k (6) 2.5% full capacity taps; 2 above and 4 below, rated voltage. Impedance: For transformers larger than 75 KVA, 4.5% minimum, 5.75% maximum. 2. Winding temperature rise shall be 150 degrees Centigrade in accordance with UL Specification Article 506. 3. Transformer shall be capable of operating at 100% of nameplate rating continuously while in an ambient temperature not exceeding 40 degrees Centigrade.</p>	3.06	<p>INSTALLATION OF WIRES: A. Pull no wire into any portion of the conduit system until all construction work which might damage the wire has been completed. B. Install all wire continuous from outlet to outlet or terminal to terminal. Splices in cables when required shall be made in handholes, pull boxes or junction boxes. Make branch circuit splices in outlet boxes with 8" of correctly color-coded tails left in the box. C. Splices in wires and cables shall be made utilizing materials and methods described herein before. D. Make all ground, neutral and line connections to receptacle and wiring device terminals as recommended by manufacture. Provide ground jumper from outlet box to ground terminal of devices when the device is not approved for grounding through the mounting screws. E. Provide <b>Brady wire markers</b> where number of conductors in a box exceeds four. F. Megger and record insulation resistance of all 600 Volt insulated conductors size #4/0 and larger using 500 Volt megger for one minute. Make tests with circuits isolated from source and load.</p>
1.02	<p>LICENSE, FEES AND PERMITS: Electrical contractor shall pay for all licenses, permits and inspection fees required by the authority having jurisdiction and shall arrange for all required inspections.</p> <p>SAFETY AND INDEMNITY: The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of work. This requirement will apply continuously and not be limited to normal working hours. No act, service, drawing review or construction review by the Owner, the Engineers or their Consultants, is intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.</p> <p>DRAWINGS AND SPECIFICATIONS: All drawings and all Divisions of these specifications shall be considered as a whole and work of this Division shown anywhere therein shall be furnished under this Division. Drawings are diagrammatic and indicate the general arrangement of equipment and wiring. Most direct routing of conduits and wiring is not assured. Exact requirements shall be governed by conditions of the job. Consult all other drawings in preparation of the bid. Extra lengths of wiring or addition of pull or junction boxes, etc., necessitate by such conditions shall be included in the bid.</p> <p>CONDITIONS AT SITE: The electrical contractor shall have examined the site and familiarized themselves with all discernible existing conditions. No extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.</p> <p>WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS: Only quality workmanship will be accepted. Haphazard or poor installation will be cause for rejection of work.</p> <p>SHOP DRAWINGS AND MATERIALS LISTS: Submit to Owner in a single package six (6) copies of complete shop drawings and materials list, as noted below, for review within fifteen (15) days after award of contract. Submittals required as follows: 1. Wiring devices: switches, receptacles, device plates. 2. Enclosures for utility company metering. 3. Main fused disconnect switch. 4. Panelboards. 5. Disconnect switches. 6. Lighting fixtures, lamps and lighting control equipment.</p>	2.02	<p>WIRES AND CABLES: A. For power and lighting system 600V or less: 1. Conductor: minimum size #12 AWG. a. #12 and #10 AWG solid copper. b. #8 AWG and larger shall be stranded copper. 2. Insulation type: a. #12 to #1 AWG: THWN for wet or underground and THHN for dry locations. b. #1/0 through #4/0 AWG: XHHW (55 mils). c. #250 MCM and larger: XHHW (65 mils). d. Grounding wire: TW. B. For signal and communications circuit: 1. Special cables shall be as specified on drawings. 2. Conductors for general use shall be stranded copper conductor, #16 AWG minimum, with THWN insulation for underground or wet locations and THHN insulation for dry locations. C. Acceptable Products: General Electric, Anaconda, Okanite, Parantite or Triangle products conforming or exceeding applicable IPC/CEA standards.</p> <p>OUTLET BOXES, JUNCTION AND PULL BOXES: A. Outlet boxes: 4" square x 1-1/2" deep (or larger) galvanized sheet steel KO-type with plaster ring and cover for general interior use and cast metal type FS or FD with matching screw covers for exterior and exposed interior locations (gasketed in damp or wet locations). B. Junction boxes shall be same as outlet boxes up to 42 cu. in. and codegauge steel in larger sizes with surface or flush-type screw-mounted trim covers, both boxes and covers inhibitor-primed and painted inside out. C. Pull boxes shall be same as junction boxes unless indicated otherwise on the drawings, with covers. D. Telephone outlet boxes shall be the type and size required by the serving telephone company but not smaller than 4-1/16" square x 2-1/8" deep with single-gang ring and Sierra #S-754N split plate bushing.</p>			3.07	<p>IDENTIFICATION: A. Provide nameplates for switchgears, panelboards, and all similar devices. Nameplates shall be screwed (no adhesives) engraved bakelite or photo-etched metallic nameplate identification showing panel designation, voltage and phase in minimum 1/4" high letters. B. Provide dymo labels on all lighting switches and convenience and special purpose receptacles to show panel and circuit number to which the device is connected. C. Each panelboard shall contain a metal-framed circuit directory inside cover, with plastic protector. D. Panelboard Schedule: After completion of work, provide typewritten updated panelboard schedules for all panelboards.</p>
1.03		2.03					
1.04		2.04					
1.05		2.05					
1.06		2.06					
1.07		2.07					
1.08		2.08					
1.09		2.09					
1.10		2.10					
1.11		2.11					
1.12		2.12					
1.13		2.13					
1.14		2.14					
1.15		2.15					
1.16		2.16					



GENERAL NOTES

- A. ALL EXISTING COMPONENTS OF THIS ELECTRICAL DIAGRAM ARE TO REMAIN AS INSTALLED AND ARE SHOWN FOR REFERENCE ONLY.
- B. ALL WORK SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL FIRE PROTECTION
- C. ASSOCIATION (NFPA) 70, NATIONAL ELECTRICAL CODE. ALL ITEMS ARE ON AN OR EQUAL BASIS.
- D. ALL SINGLE PHASE BRANCH CIRCUITS (RECEPTACLES, LIGHTING, ETC., ARE 1/2" CONDUIT OR EMT WITH THIN, 90C WIRING, UNLESS NOTED OTHERWISE. ALL OTHER CONDUIT AND WIRING SHALL BE AS INDICATED ON THE PLANS. ACTUAL ROUTING AND HOME RUN GROUPINGS ARE TO BE DETERMINED IN THE FIELD.
- E. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC EXCEPT FOR DETAILS AND ELEVATIONS. DO NOT SCALE FROM DIAGRAMMATIC DRAWINGS. EXACT LOCATIONS OF DEVICES AND PANELS ARE TO BE DETERMINED AND ROUGHED-IN DURING CONSTRUCTION TO AVOID INTERFERENCE, TO MEET USER REQUIREMENTS, TO PROVIDE ADEQUATE MOUNTING, AND TO MEET NEC LINEAR ACCESS AND CLEARANCE REQUIREMENTS.
- F. BACK TO BACK MOUNTING OF RECEPTACLES IS NOT PERMITTED.
- G. IN ADDITION TO THE NEC REQUIREMENTS FOR GFCI PROTECTION FOR RECEPTACLES, THE FOLLOWING RECEPTACLES SHALL ALSO HAVE GFCI PROTECTION: (1)-ALL RECEPTACLES LOCATED WITHIN 8 FEET OF A SINK, (2)-ALL RECEPTACLES WHICH ARE PROVIDED FOR CONVENIENCE IN SERVICING HVAC EQUIPMENT REGARDLESS OF LOCATION AS REQUIRED TO ACCOMMODATE CONDUCTOR PULLING EASE, FIELD LIFE SAFETY.
- H. PROVIDE A LAMICOID NAMEPLATE (WHITE LETTERS ON BLACK BACKGROUND, ON EACH PANELBOARD, MOTOR STARTER, CONTACTOR, TRANSFORMER, ETC. LETTERS SHALL BE 0.75 INCH MAINIMUM.
- I. CONTRACTOR SHALL CUT AS REQUIRED TO INSTALL ELECTRICAL EQUIPMENT REPAIR OF FLOOR OR WALLS SHALL BE COORDINATED WITH GENERAL CONTRACTOR CONTRACTOR SHALL ALSO REPAIR ALL OPENINGS LEFT DUE TO EQUIPMENT REMOVAL.
- J. CONDUCTORS ARE COPPER UNLESS OTHERWISE SHOWN. ALL CONDUCTORS LARGER THAN #10 SHALL BE STRANDED.
- K. PANELBOARDS SHALL CONTAIN A TYPEWRITTEN DIRECTORY WITH A PLASTIC COVER AFFIXED TO THE INSIDE DOOR.
- L. ALL FIXTURES, DEVICES, CONDUIT, AND EQUIPMENT SHALL BE SECURED WITH APPROVED HANGERS AND ANCHORS AND IN ACCORDANCE WITH APPROVED STANDARDS OF INSTALLATION.
- M. ALL BREAKERS SHOWN IN THE PANELBOARD SCHEDULE SHALL BE RATED AS SHOWN FOR BOTH CIRCUIT CAPACITY AND FAULT CURRENT INTERRUPTING CAPACITY.
- N. ALL PANELBOARDS, DISCONNECT SWITCHES, MOTOR STARTERS, AND CONTACTORS SHALL BE NEMA 1, UNLESS OTHERWISE NOTED.
- O. ELECTRICAL CONTRACTOR MUST BE AVAILABLE AT TIME OF DBS INSPECTION, COORDINATE WITH GENERAL CONTRACTOR.
- P. FIELD VERIFY THE AVAILABLE FAULT CURRENT AT THE LANDLORD'S EXISTING PANEL AND PROVIDE A NEW, FULLY RATED, PANEL TO MATCH EXISTING.
- Q. CONTRACTOR TO MAKE FINAL CONNECTIONS IN EMS PANEL FOR LANDLORD PROVIDED LIGHTING CIRCUITS. 50% OF THE GENERAL LIGHTING CIRCUITS SHOULD BE ROUTED THROUGH THE CUSTOMER CONTROL ZONE.

GENERAL ELECTRICAL NOTES

#	DESCRIPTION
1	GENERAL CONTRACTOR SHALL VERIFY FIELD CONDITIONS BEFORE SUBMITTING BID.
2	ALL WORK SHALL BE DONE IN ACCORDANCE WITH 2019 NEC AS AMENDED BY 2019 ENERGY CODE AND ANY ADDITIONAL STATE OR LOCAL CODES WHICH MAY APPLY.
3	GENERAL CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, CERTIFICATES, ETC. REQUIRED.
4	GENERAL CONTRACTOR SHALL OBTAIN AND PAY FOR BOTH ROUGH AND FINAL UNDER-WRITERS OR OTHER APPROVED INSPECTION AGENCY CERTIFICATES "ELECTRICAL INSPECTION", THESE CERTIFICATES SHALL BE PRESENTED WITH REQUEST FOR FINAL PAYMENT.
5	IT IS THE INTENT OF THESE PLANS TO PROVIDE A COMPLETE OPERATING ELECTRICAL SYSTEM. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL WIRING, EQUIPMENT, MATERIAL, ETC. REQUIRED, EXCEPT WHERE SPECIFICALLY NOTED AS BEING FURNISHED BY OTHERS. SHOULD THERE BE ANY QUESTIONS CONCERNING RESPONSIBILITY, THEY SHALL BE ADDRESSED TO ARCHITECT PRIOR TO BID. NO EXTRA CHARGES WILL BE ALLOWED.
6	ELECTRICAL SERVICE SHALL BE COORDINATED WITH THE EXISTING FIELD CONDITIONS.
7	CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS TO ALL CONTROLS, OWNER-SUPPLIED EQUIPMENT, MECHANICAL AND PLUMBING EQUIPMENT AS REQUIRED.
8	REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATION DETAILS. ALL FIXTURE AND DEVICE LOCATIONS SHOWN ON ARCHITECTURAL DRAWINGS SUPERSEDE THOSE SHOWN ON ELECTRICAL PLANS.
9	CIRCUIT NUMBER ON THE DRAWINGS SHALL BE AS PER APPROVED PLANS.
10	BRANCH CIRCUIT CONDUCTOR INSULATION SHALL BE COLOR CODED AND SHALL BE 600 VOLT. TYPE THHN/THWN.
11	CABLES IN HIGH TEMPERATURE AREAS SHALL HAVE INSULATION TYPE SUITABLE FOR THE TEMPERATURE. CABLES USED IN SPACES FOR ENVIRONMENTAL AIR SHALL CONFORM WITH APPLICABLE C.E.C REQUIREMENTS.
12	ALL WIRING USED IN RETURN OR DISCHARGE AIR PLENUMS SHALL BE PLENUM RATED OR INSTALLED PER METHODS APPROVED BY THE LATEST EDITION OF THE C.E.C. FOR SUCH APPLICATION.
13	ALL WIRE AND CABLE CONDUCTORS SHALL BE COPPER WITH INSULATION RATED 600V. CONDUCTORS SIZED #10 AWG AND SMALLER SHALL BE SOLID OD STRANDED, AND CONDUCTORS SIZED LARGER THAN #10 AWG SHALL BE STRANDED WIRE.
14	BRANCH CIRCUITS FOR POWER AND LIGHTING SHALL NOT BE LESS THAN #12 AWG. OR AS NOTED. WIRES ARE TO BE SIZED FOR THE APPROPRIATE VOLTAGE DROPS. SEE WIRE SIZE SCHEDULE ON THIS SHEET.
15	ALL DATA CABLES SHALL BE CAT6, PLENUM RATED, TO BE PROVIDED BY OWNER SELECTED VENDOR. ELECTRICAL WORK SHALL BE TO PROVIDE OUTLET BOXES AND "RING AND STRING" FOR PULLING OF CABLES IN CONCEALED SPACES.
16	CONTROL WIRING SHALL NOT BE LESS THAN #14 AWG UNLESS OTHERWISE NOTED.
17	HOMERUNS SHOWN ARE SCHEMATIC. CONTRACTOR MAY ORIGINATE HOMERUNS FROM DIFFERENT LOCATIONS. ALL WIRE INCLUDING HOMERUNS SHALL BE DELINEATED ON AS-BUILT DRAWINGS.
18	ALL WIRING INSTALLED UNDER THIS CONTRACT SHALL BE TESTED FOR PROPER CONNECTIONS AND SHORT CIRCUITS PRIOR TO THE TURNING OVER OF WORK AS A COMPLETE UNIT.
19	PROVIDE ALL ELECTRICAL SYSTEM GROUNDING IN ACCORDANCE WITH C.E.C. REQUIREMENTS EVEN IF IT IS NOT SHOWN ON THE DRAWINGS. INCLUDE ADDITIONAL GROUNDINGS CONDUCTORS IN ALL RACEWAYS EVEN THOUGH THE DRAWINGS SHOW ONLY CIRCUIT AND/OR NEUTRALS CONDUCTORS. THE PLUMBING AND PIPING SYSTEM SHALL NOT BE USED AS A GROUND. ALL TRANSFORMER NEUTRALS SHALL BE GROUNDED TO BUILDING STEEL IN ACCORDANCE WITH NEC 250-70.
20	ALL CONDUITS PASSING THROUGH PARTITIONS ARE TO BE APPROPRIATELY SLEEVED AND SEALED.
21	FURNISH AND INSTALL ALL CONDUIT WITH PULL WIRES AS REQUIRED. ALL OUTLET BOXES SHALL BE STEEL. EXTRA DEEP WITH GROUNDING PIGTAILS. GROUNDING PUSH-CLIPS ARE NOT ACCEPTABLE.
22	ALL PENETRATIONS SHALL BE INSTALLED AND SEALED PER NATIONAL STATE AND LOCAL CODES
23	DO NOT MAKE ANY CHANGES OR SUBSTITUTIONS WITHOUT SPECIFIC WRITTEN APPROVAL FROM THE ARCHITECT OR ENGINEER.
24	GARANTEE ALL WORK, MATERIAL AND EQUIPMENT FOR A PERIOD OF ONE YEAR FROM THE DATE OF APPROVAL AND FINAL ACCEPTANCE.
25	THIS DESIGN IS BASED ON INITIAL DESIGN DATA. GENERAL CONTRACTOR TO SUPPLY AND INSTALL FEEDERS, FUSES AND CIRCUIT BREAKERS TO MATCH THE NAMEPLATE RATING OF ALL EQUIPMENT. THIS SHALL BE INCLUDED IN THE INITIAL BID PROPOSAL AND NO EXTRAS SHALL BE ENTERTAINED.
26	SERVICE EQUIPMENT IN OTHER THAN DWELLING UNITS SHALL BE LEGIBLY MARKED IN THE FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT. THE FIELD MARKINGS SHALL INCLUDE THE DATE THE FAULT CURRENT CALCULATION WAS PERFORMED AND BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLV ED. NEC 110.24(A).



GENERAL ELECTRICAL NOTES

#	DESCRIPTION
27	LABEL ALL JUNCTION BOXES, OUTLETS, LIGHT SWITCH, ETC. WITH CIRCUIT NUMBER ON INTERIOR ON COVER PLATE. USE SELF-ADHESIVE "DYMO" LABEL 1/8" HIGH LETTERS.
28	GENERAL CONTRACTOR SHALL PROVIDE SEISMIC RESTRAINTS AND SUPPORTS FOR ALL FLOOR, WALL, AND CEILING MOUNTED ELECTRICAL EQUIPMENT TO RESIST EARTHQUAKE EFFECTS DETERMINED IN ACCORDANCE WITH THE BUILDING CODE.
29	THE G.C. SHALL PROVIDE ALL EQUIPMENT, MATERIALS AND LABOR TO COMPLETE ALL ELECTRICAL WORK IN A NEAT AND WORKMANLIKE MANNER AND IN ACCORDANCE WITH GOOD COMMERCIAL PRACTICE INCLUDING THE INSTALLATION OF ALL THE EQUIPMENT MATERIALS AND SYSTEMS AND THE FINAL CONNECTIONS TO THE OWNER'S EQUIPMENT AND FIXTURES AS REQUIRED BY THE OWNER. THE G.C. SHALL ALSO FURNISH TEMPORARY WIRING AND LIGHTING TO PROVIDE A MINIMUM OF 25 FC IN WORK AREAS FOR USE OF ALL THE TRADES DURING CONSTRUCTION AND THE INSTALLATION OF THE OWNERS FIXTURES. THE G.C. IS RESPONSIBLE TO REMOVE ALL TEMPORARY WIRING UPON COMPLETION OF CONSTRUCTION OF ALL TRADES.
30	THIS CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL SUPPLEMENTARY SUPPORT, INCLUDING SUPPORT STEEL AS REQUIRED TO HANG ALL EQUIPMENT AND LIGHTING FROM THE EXISTING STRUCTURE IN ACCORDANCE WITH THE ARCHITECTURAL/STRUCTURAL SUPPORT AND LOADING CRITERIA.
31	IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO PROVIDE FULLY DIMENSIONED COORDINATION DRAWINGS FOR ALL OF HIS RESPECTIVE WORK. THESE DRAWINGS MUST BE FULLY COORDINATED WITH ALL EXISTING CONDITIONS. ALL HVAC, PLUMBING, FIRE PROTECTION, ELECTRICAL, LIGHTING, STRUCTURAL AND ARCHITECTURAL SYSTEMS PRIOR TO PREPARING COMPOSITE MULTI DISCIPLINE COORDINATION DRAWINGS.
32	ALL DISCONNECTING MEANS AND EQUIPMENT INDICATED ON THE DRAWING SHALL BE IDENTIFIED BY NAMEPLATE IN COMPLIANCE WITH NATIONAL ELECTRICAL CODE
33	ALL WIRING FOR THE EMERGENCY LIGHTING AND EMERGENCY SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE
34	THE WIRING METHODS AND MATERIALS INDICATED IN THE SPECIFICATIONS AND ON THE DRAWINGS SHALL BE INSTALLED AND CONNECTED IN ACCORDANCE WITH THE REQUIREMENTS OF NATIONAL ELECTRICAL CODE
35	THE ELECTRICAL SERVICE AND DISTRIBUTION SYSTEM AS INDICATED ON THE RISER DIAGRAM AND MATERIALS INDICATED IN THE SPECIFICATIONS SHALL BE IN COMPLIANCE WITH THE REQUIREMENTS OF NATIONAL ELECTRICAL CODE
36	ALL OVER CURRENT PROTECTION SHALL BE IN COMPLIANCE WITH THE NATONAL ELECTRICAL CODE
37	ALL GROUNDING REQUIREMENTS OF THE COMPLETE ELECTRICAL DISTRIBUTION SYSTEM AND AS INDICATED IN THE SPECIFICATIONS SHALL BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE
38	PRIOR IO ANY REQUIRED CUTTING AND PATCHING OF CONCRETE FLOOR A ND/OR CUTTING OF ROOF, CONTRACTOR SHALL COORDINATE WITH BUILDING ENGINEER.
39	FOR ALL LIGHTING FIXTURES MOUNTED IN HUNG CEILING THE GENERAL CONTRACTOR SHALL PROVIDE AND INSTALL INDIVIDUAL SUPPORT AT EACH CORNER OF RECESSED LIGHTING TROFFER CONNECTED TO BUILDING STEEL ABOVE ALL CONDUIT AND MC CABLE MOUNTED ABOVE HUNG CEILING SHALL BE INDIVIDUALLY SUPPORTED IN THE SAME FASHION AS PER NEC REQUIREMENTS.
40	
41	DO NOT SCALE FROM THESE DRAWINGS.
42	PLANS ARE PREPARED WITH REQUIRED BRANCH CIRCUITS INDICATED BY CIRCUITS NUMBERS. PROVIDE AND INSTALL ALL CONDUITS, CONDUCTORS, BOXES, MISCELLANEOUS FITTINGS, ETC. FOR A COMPLETE AND OPERABLE SYSTEM (HOME RUN SHOWN). BRANCH CIRCUIT INSTALLATION SHALL COMPLY WITH SPECIFICATIONS AND C.E.C.
43	ELECTRICAL RECEPTACLE, SWITCH AND CONTROL HEIGHTS (CBC 118-308.) RECEPTACLE HEIGHTS: ELECTRICAL RECEPTACLE OUTLETS ON BRANCH CIRCUITS OF 30 AMPERES OR LESS AND COMMUNICATION SYSTEM RECEPTACLES SHALL BE LOCATED NO MORE THAN 48 INCHES (1219MM) MEASURED FROM THE TOP OF THE RECEPTACLE OUTLET BOX OR RECEPTACLE HOUSING NOR LESS THAN 15 INCHES (381MM) MEASURED FROM THE BOTTOM OF THE RECEPTACLE OUTLET BOX OR RECEPTACLE HOUSING TO THE LEVEL OF FINISHED FLOOR OR WORKING PLATFORM. IF THE REACH IS OVER AN OBSTRUCTION (FOR EXAMPLE, A KITCHEN BASE CABINET) BETWEEN 20 AND 25 INCHES (508 AND 635MM) IN DEPTH, THE MAXIMUM HEIGHT MEASURED AT THE BOX IS REDUCED TO 44 INCHES (1118MM) FOR FORWARD APPROACH, OR 46 INCHES (1168MM) FOR SIDE APPROACH, PROVIDED THE OBSTRUCTION IS NO MORE THAN 24 INCHES (610MM) IN DEPTH. OBSTRUCTION SHALL NOT EXCEED MORE THAN 25 INCHES (635MM) FROM THE WALL BENEATH THE RECEPTACLE.
44	SWITCH AND CONTROL HEIGHTS: (CBC 118-308.) CONTROL OR SWITCHES INTENDED TO BE USED BY THE OCCUPANT OF THE ROOM OR AREA TO CONTROL LIGHTING AND RECEPTACLE OUTLETS, APPLIANCES, ALARMS OR COOLING, HEATING AND VENTILATING EQUIPMENT SHALL BE LOCATED NO MORE THAN 48 INCHES (1219MM) MEASURED FROM THE TOP OF THE OUTLET BOX NOR LESS THAN 15 INCHES (381MM) MEASURED FROM THE BOTTOM OF THE OUTLET BOX TO THE LEVEL OF THE FINISHED FLOOR OR WORKING PLATFORM. IF THE REACH IS OVER A PHYSICAL BARRIER OR AN OBSTRUCTION (FOR EXAMPLE, A KITCHEN BASE CABINET) BETWEEN 20 AND 25 INCHES (508 AND 635MM) IN DEPTH, THE MAXIMUM HEIGHT IS REDUCED TO 44 INCHES (1118MM) FOR FORWARD APPROACH, OR 46 INCHES (1168MM) FOR SIDE APPROACH, PROVIDED THE OBSTRUCTION IS NO MORE THAN 24 INCHES (610MM) IN DEPTH. PHYSICAL BARRIERS OR OBSTRUCTIONS SHALL NOT EXTEND MORE THAN 25 INCHES (635MM) FROM THE WALL BENEATH A CONTROL.

WIRE SCHEDULE AND NOTES

LOAD PER PH (KVA)	WIRE SIZE (AWG)	MAXIMUM LENGTH OF BRANCH CIRCUIT PER UTILIZATION VOLTAGE			NOTES AND REMARKS
		(120, 1PH, MAX V.D. 3%)	(240, 1PH, MAX V.D. 3%)	(240, 3PH, MAX V.D. 3%)	
< 1.92	# 12	56 FT	85 FT	98 FT	5
	# 10	94 FT	141 FT	163 FT	5
	# 8	144 FT	217 FT	250 FT	5
	# 6	230 FT	345 FT	398 FT	5
< 1.44	# 12	75 FT	113 FT	130 FT	5
	# 10	125 FT	188 FT	217 FT	5
	# 8	192 FT	289 FT	334 FT	5
	# 6	306 FT	460 FT	531 FT	5
< 1.26	# 12	86 FT	129 FT	149 FT	
	# 10	143 FT	215 FT	248 FT	
	# 8	220 FT	330 FT	381 FT	
< 1.08	# 12	100 FT	150 FT	173 FT	
	# 10	167 FT	250 FT	289 FT	
	# 8	256 FT	385 FT	445 FT	
< 0.9	# 12	120 FT	180 FT	240 FT	
	# 10	200 FT	300 FT	347 FT	
< 0.72	# 12	150 FT	225 FT	260 FT	
	# 10	250 FT	376 FT	434 FT	
#	NOTES				
1	CONTRACTOR SHALL REFER TO THIS TABLE PRIOR TO START OF BRANCH CIRCUIT ROUGH-IN.				
2	CONTRACTOR SHALL USE THE APPROPRIATE WIRE SIZE IN CONJUNCTION WITH THE LENGTH OF THE PROPOSED FIELD VERIFIED ROUTING OF BRANCH CIRCUIT WIRING (INCLUDING VERTICAL & LATERAL RUN, ROUTED PARALLEL/PERPENDICULAR TO THE BUILDING STRUCTURE).				
3	SEE PANEL SCHEDULE FOR THE CORRESPONDING KVA LOAD PER PHASE OF A PARTICULAR BRANCH CIRCUIT.				
4	RESISTANCE VALUES USED ARE FOR UNCOATED COPPER WIRES IN STEEL CONDUIT. 75 DEGREE C., OPERATING AT 60HZ.				
5	THE VALUES IN "120V, 1PH" COLUMN IS TO BE USED FOR GENERAL PURPOSE RECEPTACLE LOADS.				

ABBREVIATIONS AND TAGS

ABB.	DESCRIPTION	ABB.	DESCRIPTION
EWB	ELECTRIC WATER HEATER	SD	SMOKE DETECTOR
(E)	EXISTING TO REMAIN	TEL	TELEPHONE
EC	ELECTRICAL CONTRACTOR	TX	TRANSFORMER
FA	FIRE ALARM	TV	TELEVISION
FMT	FLEXIBLE METALLIC TUBING	UAC	UNDER ANOTHER CONTRACT
GC	GENERAL CONTRACTOR	UAS	UNDER ANOTHER SECTION
GFCI	GROUND FAULT INTERUPTER	UON	UNLESS OTHERWISE NOTED
IG	ISOLATED GROUND	V.D.	VOLTAGE DROP
LL	LANDLORD	W	WIRE
LV	LOW VOLTAGE	WP	WEATHERPROOF
	MECHANICAL UNIT TAG. SEE MECHANICAL DRAWINGS FOR ADDITIONAL DESCRIPTION.		DETAIL TAG. REFER TO DETAIL 4 ON SHEET NUMBER E 4.

Electrical List Of Drawings		
Sheet Index	Description	Scale
E100	ELECTRICAL SPECIFICATIONS	NTS
E101	GENERAL NOTES & ABBREVIATIONS	NTS
E201	LIGHTING PLAN	3/16"=1'-0"
E301	POWER PLAN	3/16"=1'-0"
E401	ONE LINE DIAGRAM & GROUNDING DETAILS & PANEL BOARD SCHEDULES	NTS
E500	GENERAL DETAILS	NTS

GENERAL NOTES & ABBREVIATIONS





**GDI ENGINEERING**  
INNOVATING SOLUTIONS  
GDI ENGINEERING  
3707 Cypress Creek Parkway, Suite 310  
Houston, TX 77068  
Office: 346-509-5860  
www.gdiengdesign.com

2023-5505 WEST TEXAS  
GRADUATION SERVICES  
4319 50TH STREET  
LUBBOCK, TEXAS 79413

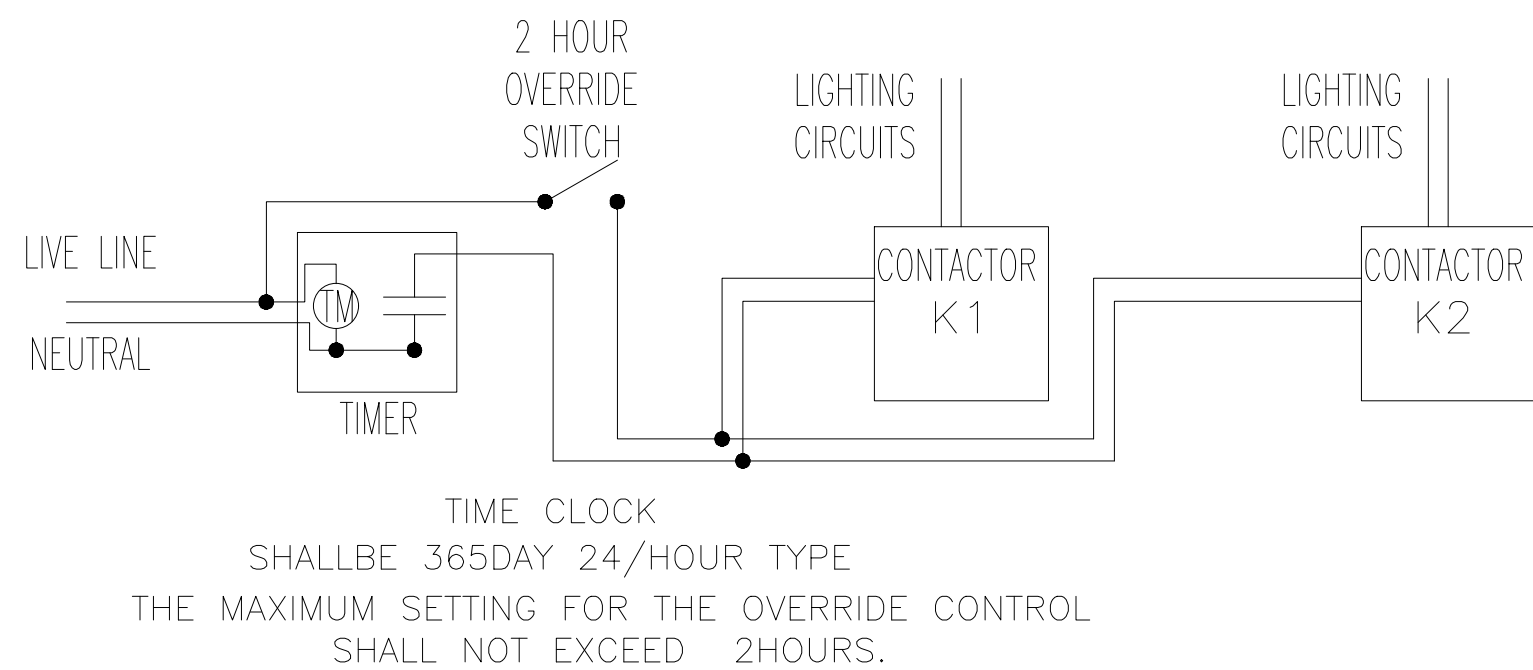
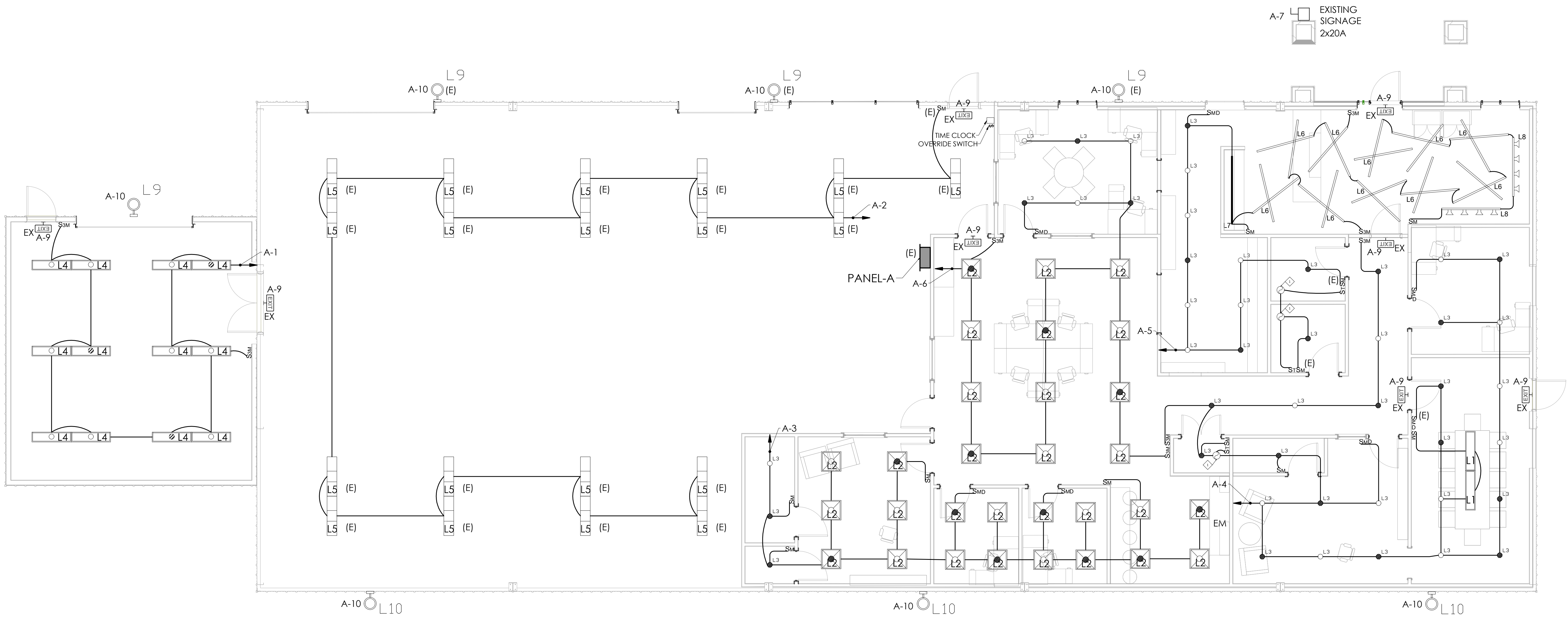
LIGHTING PLAN

Drawn By: A.B. Scale: 3/16" = 1'-0"

Date: 01.16.2024 PROJ NO.:

E201

SHEET NO.



ELECTRICAL LEGEND

- JUNCTION BOX FOR EXHAUST FANS
- D DIMMER
- S<sub>M</sub> OCCUPANCY SENSOR
- S ONE WAY LIGHTING SWITCH
- S<sub>2</sub> TWO WAYS LIGHTING SWITCH
- EM EMERGENCY LIGHTING WALL MOUNTED WITH INTERNAL BACK UP BATTERY WITH MINIMUM 90 MINS AUTONOMY
- EXIT EXIT SIGN WALL MOUNTED WITH INTERNAL BACK UP BATTERY WITH MINIMUM 90 MINS AUTONOMY
- SELF CONTAINED SMOKE/CARBON MONOXIDE (120 W/BATTERY BACKUP) - CEILING MOUNTED

NOTE-GEN-CENLEFT

TAG	SYMBOL	DESCRIPTION	TYPE	W	V	MOUNT.	MANUF.	MODEL	QUANTITY
L1		PENDANT LINEAR LIGHT 1'x4'	LED	40W	120V	SUSP.	MAXLITE	MLFP14DI3635I	2
L2		2'x2' RECESSED LED LIGHT 4000LUMEN	LED	36.1W	120V	REC.	H.E WILLIAMS	AP LED	18
L3		RECESSED DOWNLIGHT - 5"	LED	15W	120V	REC.	HALO	EWB/H55ICAT	21
L4		HIGH BAY 1'x4' LED LIGHT	LED	35W	120V	REC.	WARELIGHT	TRCBLED1X4 /35/4000K-G2	9
L5		EXISTING TO REMAIN LIGHT	LED	42.3W	120V	SURF.	EXISTING	EXISTING	19
L6		(2) 6'-0" LED LINEAR PENDANTS PAIRS	LED	40W	120V	SUSP.	H.E WILLIAMS	MX2	10
L7		LINEAR LED UNDER-CABINET WORK LIGHT	LED	29.7W	120V	REC.	H.E WILLIAMS	75L LED	1
L8		SUSPENDED TRACK LIGHT	LED	20W	120V	SUSP.	LITHONIA	LTFSTCYL	2
L9		FLOOD LIGHT SIMILAR TO EXISTING WITH PHOTOCELL	LED	36W	120V	WALL	H.E WILLIAMS	VF1 LED	1
L10		WALL PACK	LED	20W	120V	WALL	LITHONIA	TWS LED ALO SSW2 MVOLT PE DDB	3
EX		EXIT SIGN	LED	4.3W	120V	WALL	SURELITES	SCX70G	7
L2		AS L2 EQUIPPED WITH EM BATTERY FOR 90MIN BACKUP	LED	36.1W	120V	REC.	H.E WILLIAMS	AP LED	12
L3		AS L3 EQUIPPED WITH EM BATTERY FOR 90MIN BACKUP	LED	15W	120V	REC.	HALO	EWB/H55ICAT	24
L4		AS L4 EQUIPPED WITH EM BATTERY FOR 90MIN BACKUP	LED	35W	120V	REC.	WARELIGHT	TRCBLED1X4 /35/4000K-G2	3



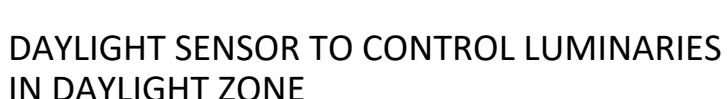
**GDI ENGINEERING**  
3707 Cypress Creek Parkway, Suite 310  
Houston, TX 77068  
Office: 346-509-5860  
[www.gdienadesign.com](http://www.gdienadesign.com)



ALL EXTERIOR OUTLETS TO REMAIN  
DATA PORTS AND LAYOUT PER NETWORK CONSULTANT;  
ADD NOTE STATING GENERAL CONTRACTOR TO  
COORDINATE WITH NETWORK CONSULTANT FOR SERVER  
CLOSET REQUIREMENTS

- 1—PROVIDE NEMA 3R DISCONNECT SWITCH FOR ELECTRIC WATER HEATER
- 2—PROVIDE NEMA 3R DISCONNECT SWITCH FOR AIR HANDLING UNIT
- 3—PROVIDE NEMA 3R DISCONNECT SWITCH FOR HEAT PUMP
- 4—PROVIDE NEMA 3R DISCONNECT SWITCH FOR PRTU

## ELECTRICAL LEGEND



2023-5505 WEST TEXAS  
GRADUATION SERVICES  
4319 50TH STREET  
LUBBOCK, TEXAS 79413

POWER PLAN

Drawn By: A.E

Scale:  $3/16" = 1'-0"$ 

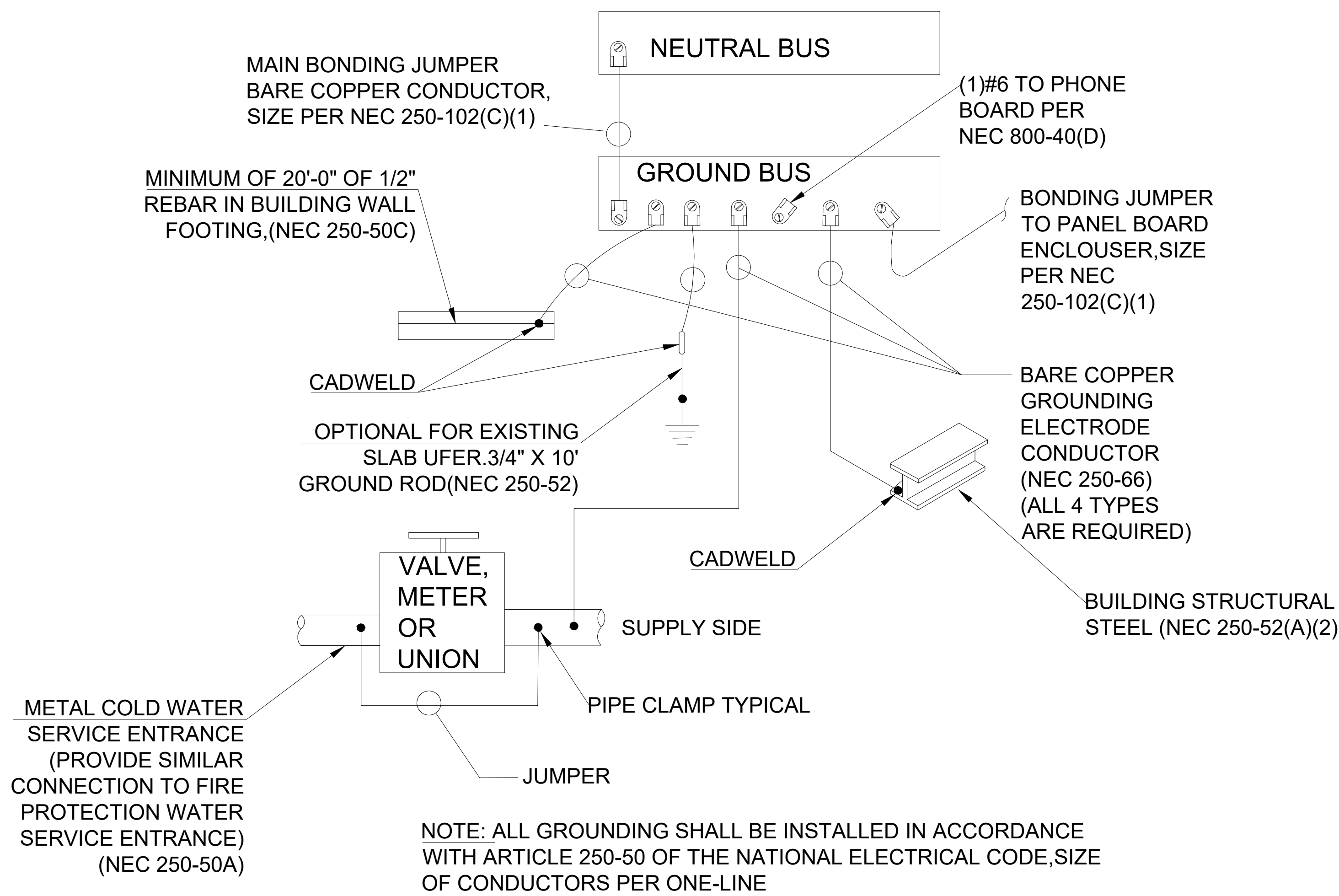
Date: 01.16.20

PROJ NO -

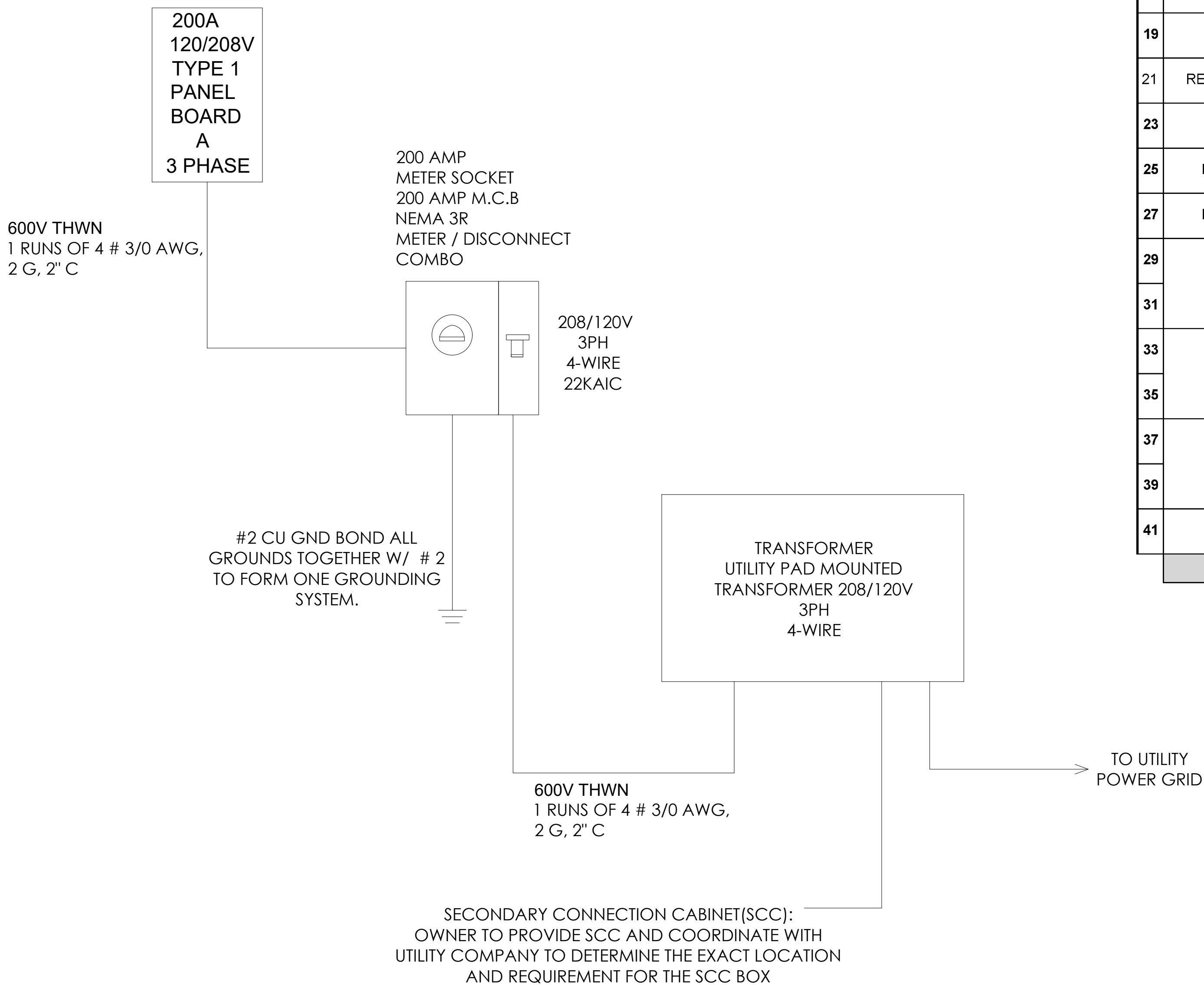
E301

SHEET NO.





## GROUNDING DETAIL

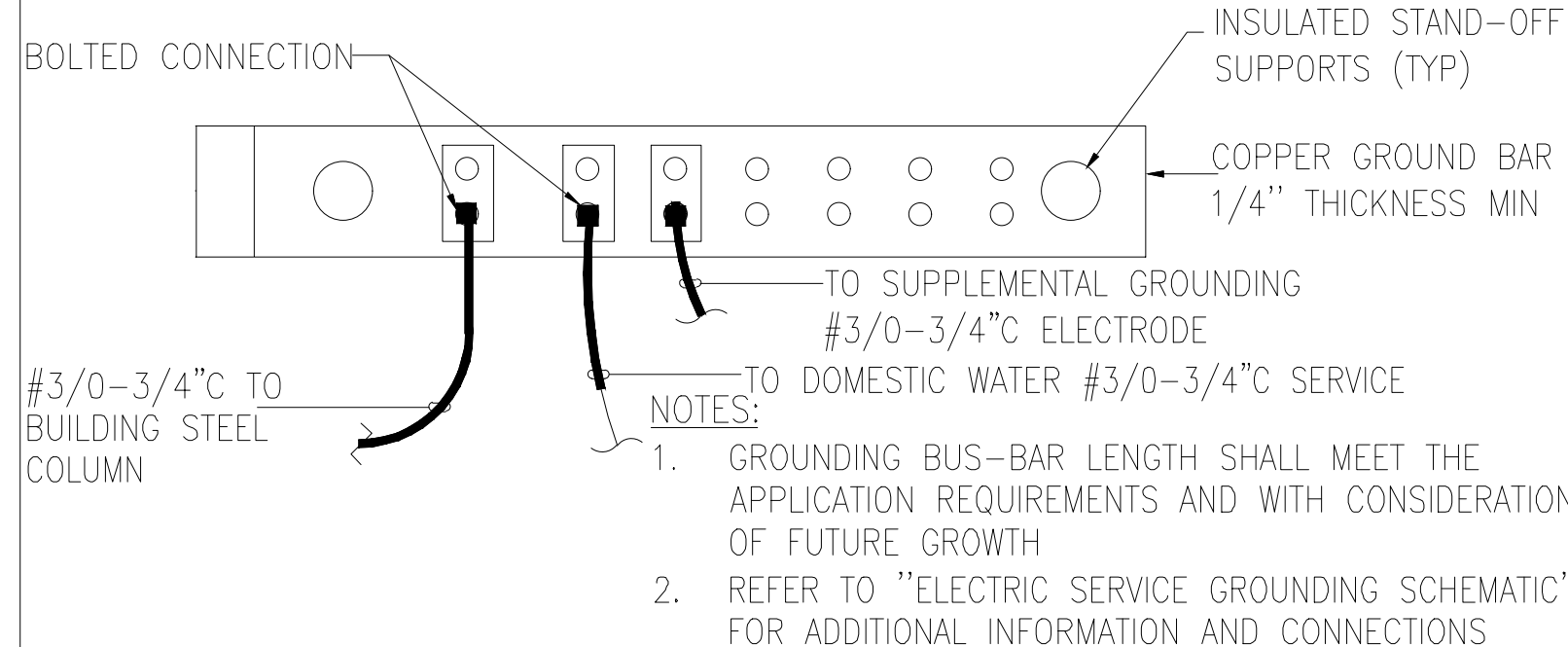
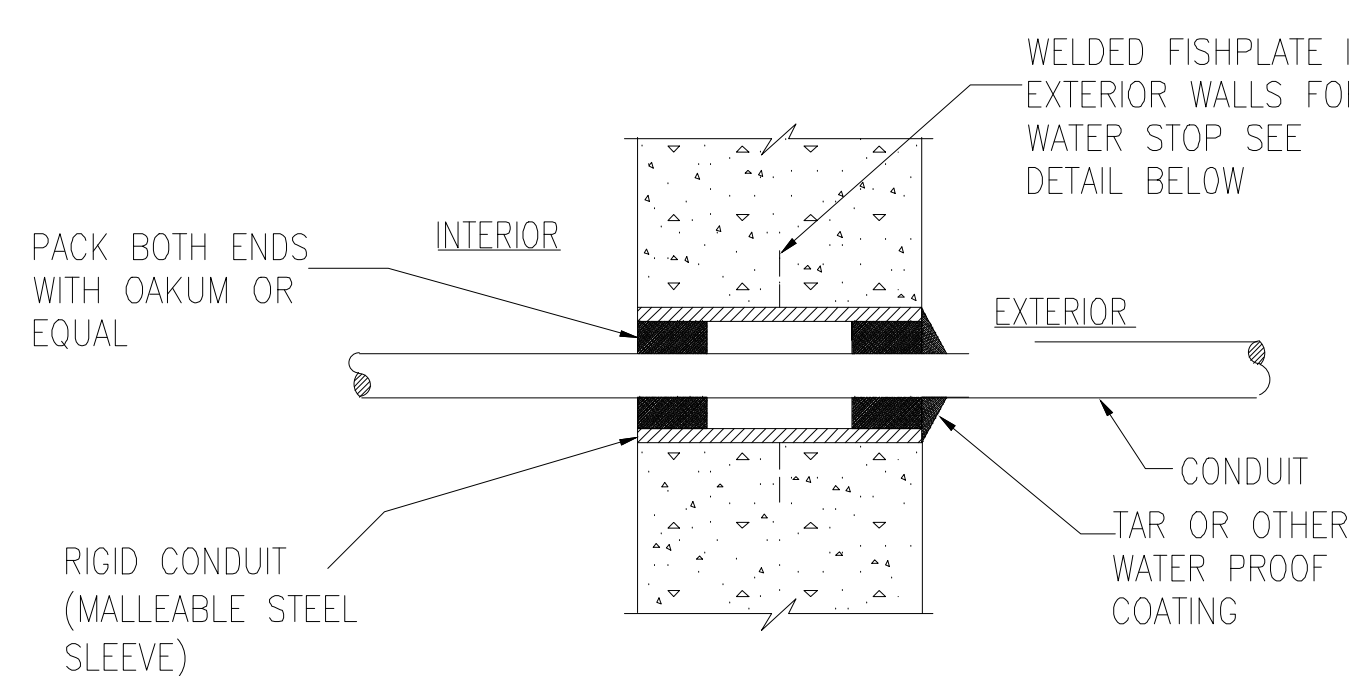
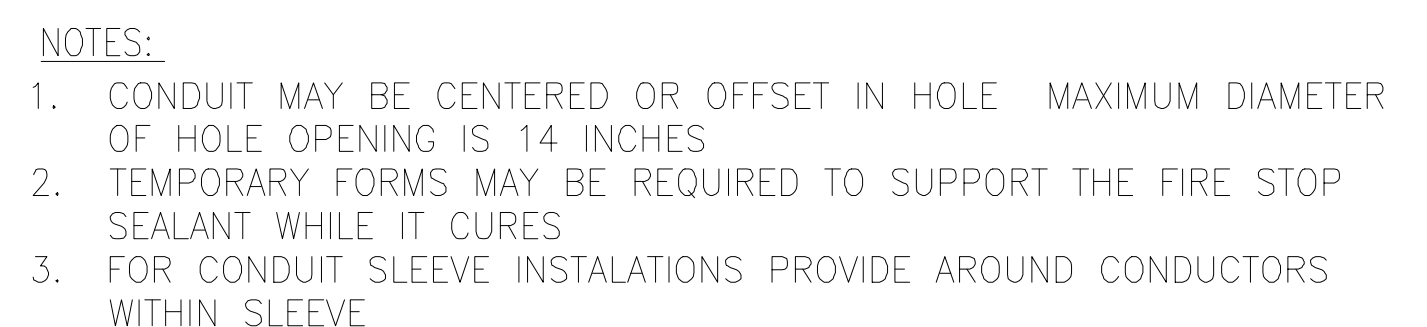
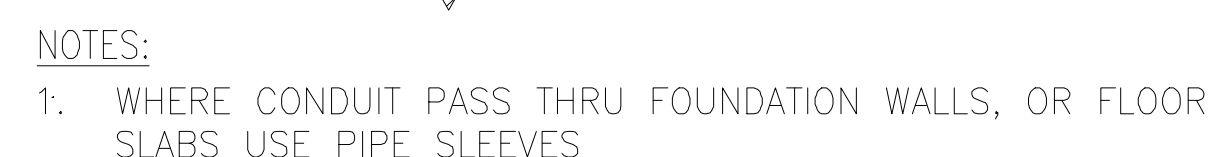


Location: -				CONNECTED LOAD			DEMAND TOTAL
* LOAD SUMMARY	CL	DF		A	B	C	
L Lighting	4.62	1.25		1.86	1.29	1.47	5.78
R Convenience Recept	20.34			7.20	7.02	6.12	15.17
H Heating (Space)	4.00	1.25		2.00		2.00	5.00
C Cooling		1.00					
A HVAC	41.64	1.00		10.24	13.62	17.78	41.64
P Process		1.00					
O Other Continuous		1.25					
K Kitchen	0.90	1.00			0.90		0.90
N Noncontinuous		1.00					
M Motor		1.00					
Total	71.50			21.29	22.83	27.37	68.49

Total Demand Load (KVA)	68.49
Total Demand Current (A)	190.10
Min. Feeder Ampacity (A)	199.60

	DESCRIPTION	*	WIRE	GRD	CB	KVA	A	B	C	KVA	CB	WIRE	GRD	DESCRIPTION	*		
1	LIGHTING ADDITIONAL STORAGE	L	2x 14 AWG - #14G		15A-1P	0.42	1.22			0.80	15A-1P	2x 14 AWG - #14G		LIGHTING EXISTING WAREHOUSE	L 2		
3	LIGHTING OFFICES	L	2x 14 AWG - #14G		15A-1P	0.69		1.19		0.50	15A-1P	2x 14 AWG - #14G		LIGHTING MEETING ROOM - OFFICES - CORRIDOR	L 4		
5	LIGHTING RECEPTION - BATHROOMS	L	2x 14 AWG - #14G		15A-1P	0.90			1.47	0.57	15A-1P	2x 14 AWG - #14G		LIGHTING OFFICES	L 6		
7	SIGNAGE	L	2x 12 AWG - #12G		20A-1P	0.50	0.64			0.14	15A-1P	2x 14 AWG - #14G		OUTDOOR LIGHTING	L 8		
9	EXIT SIGNS	L	2x 14 AWG - #14G		15A-1P	0.10		1.36		1.26	20A-1P	2x 12 AWG - #12G		EXISTING OUTDOOR OUTLETS TO REMAIN + NEW OUTDOOR OUTLET	R 10		
11	RECEPTACLES STORAGE ADDITION	R	2x 12 AWG - #12G		20A-1P	1.08			2.52	1.44	20A-1P	2x 12 AWG - #12G		RECEPTACLES WAREHOUSE	R 12		
13	RECEPTACLES WAREHOUSE	R	2x 12 AWG - #12G		20A-1P	1.44	2.52			1.08	20A-1P	2x 12 AWG - #12G		RECEPTACLES OFFICE	R 14		
15	RECEPTACLES OFFICE	R	2x 12 AWG - #12G		20A-1P	1.26		1.98		0.72	20A-1P	2x 12 AWG - #12G		RECEPTACLES SERVER ROOM	R 16		
17	RECEPTACLES OFFICE	R	2x 12 AWG - #12G		20A-1P	1.08			2.52	1.44	20A-1P	2x 12 AWG - #12G		RECEPTACLES OFFICES	R 18		
19	RECEPTACLES OFFICE	R	2x 12 AWG - #12G		20A-1P	1.08	2.16			1.08	20A-1P	2x 12 AWG - #12G		RECEPTACLES OFFICE	R 20		
21	RECEPTACLES MEETING ROOM	R	2x 12 AWG - #12G		20A-1P	1.26		2.16		0.90	20A-1P	2x 12 AWG - #12G		FRIDGE	K 22		
23	RECEPTACLES GFCI	R	2x 12 AWG - #12G		20A-1P	0.72			1.08	0.36	20A-1P	2x 12 AWG - #12G		RECEPTACLES GFCI BATHROOMS	R 24		
25	RECEPTACLES RECEPTION	R	2x 12 AWG - #12G		20A-1P	1.26	2.52			1.26	20A-1P	2x 12 AWG - #12G		RECEPTACLES RECEPTION	R 26		
27	RECEPTACLES RECEPTION	R	2x 12 AWG - #12G		20A-1P	1.44		2.52		1.08	20A-1P	2x 12 AWG - #12G		RECEPTACLES OFFICE	R 28		
29	EWH-01	H	3x 10 AWG - #10G	30A-2P	2.00			6.80	4.80	60A-2P	3x 4 AWG - #8G	HP-01	A	30			
31		H			2.00	6.80			4.80				A	32			
33	AHU-01	A	3x 4 AWG - #8G	60A-2P	6.00		8.18		2.18	30A-2P	3x 10 AWG - #10G	HP-02	A	34			
35		A			6.00			8.18	2.18				A	36			
37	AHU-02	A	3x 14 AWG - #14G	15A-2P	0.64	5.44			4.80	50A-3P	4x 6 AWG - #8G	PRTU-01	A	38			
39		A			0.64		5.44		4.80				A	40			
41	SPACE								4.80	4.80					A 42		
							(KVA)										
Total Connected Load							21.29	22.83	27.37								







PLUMBING SPECIFICATIONS

1. THE WORK INCLUDES MODIFICATION TO THE EXISTING PLUMBING SYSTEM AND PROVIDING NEW MATERIALS, FITTINGS AND ACCESSORIES NECESSARY FOR A COMPLETE FUNCTIONING PLUMBING SYSTEM.

2. ALL WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND/OR ORDINANCES AND IS SUBJECT TO INSPECTION.

3. HOOK-UP CHARGES, PERMITS AND ALL OTHER EXPENSES RELATED TO A COMPLETE AND FUNCTIONING PLUMBING SYSTEM ARE INCLUDED AS A PART OF THIS SECTION.

4. WARRANTY: PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT.

5. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION.

6. THE INTENT OF THE DRAWINGS IS TO INDICATE THE GENERAL EXTENT OF WORK REQUIRED FOR THE PROJECT. THE DRAWINGS FOR PLUMBING WORK ARE DIAGRAMMATIC, SHOWING THE GENERAL LOCATION, TYPE, FIXTURES AND EQUIPMENT REQUIRED.

7. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENTS.

8. REFER TO MANUFACTURER'S STANDARD ROUGH-IN DRAWINGS FOR PLUMBING FIXTURE INSTALLATION REQUIREMENTS. COMPLY WITH ALL APPLICABLE ADA INSTALLATION REQUIREMENTS.

9. COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.

10. PIPING SYSTEMS

- GENERAL:

A. ALL PIPING SHALL BE RUN PARALLEL TO BUILDING LINES AND SUPPORTED AND ANCHORED AS REQUIRED TO FACILITATE EXPANSION AND CONTRACTION.

B. ALL PIPING SHALL BE CONCEALED EXCEPT IN UNFINISHED SPACES.

C. INSTALL AS REQUIRED TO MEET ALL CONSTRUCTION CONDITIONS AND TO ALLOW FOR INSTALLATION OF OTHER WORK SUCH AS DUCTS AND ELECTRICAL CONDUIT.

D. AT ALL CONNECTIONS BETWEEN FERROUS PIPING AND NONFERROUS PIPING, PROVIDE AN ISOLATING DIALECTIC UNION.

E. ALL HANGERS SHALL BE COMPATIBLE WITH PIPING MATERIAL TO PREVENT CORROSION.

F. PROVIDE ALL FITTINGS, ACCESSORIES, OFFSETS, AND MATERIALS NECESSARY TO FACILITATE THE PLUMBING SYSTEM'S FUNCTIONING AS INDICATED BY THE DESIGN AND THE EQUIPMENT INDICATED.

11. FIXTURES/EQUIPMENT FURNISHED BY OTHERS: PLUMBING CONTRACTOR SHALL PROVIDE UTILITY CONNECTIONS REQUIRED SUCH AS WATER, GAS, AIR, SUPPLIES, WASTE OUTLET, TRAPS, ETC.

12. AT ALL PLUMBING TYPE FIXTURES OR EQUIPMENT FURNISHED BY OWNER, GENERAL CONTRACTOR, FOOD SERVICE CONTRACTOR, EQUIPMENT SUPPLIER, ETC. INCLUDED ARE STOP VALVES, ESCUTCHEONS, AND CHROME PLATED BRASS TUBING WITH COMPRESSION FITTINGS.

13. SEWER AND WASTE PIPING:

A. PROVIDE ALL DRAINS AND SEWERS WITHIN THE SPACE WITH CONNECTION TO THE EXISTING DRAINAGE SYSTEMS ON-SITE.

B. SANITARY DRAINAGE PIPING ABOVE FLOOR SHALL BE CO-EXTRUDED PVC DWV (SCHEDULE 40) PIPE, FITTINGS AND CONNECTIONS.

C. SANITARY DRAINAGE PIPING BELOW GRADE SHALL BE CO-EXTRUDED PVC DWV (SCHEDULE 40) PIPE WITH SOLVENT WELD FITTINGS MAY BE USED (WHERE PERMITTED BY CODE/LOCAL AUTHORITIES).

D. ALL DRAINAGE PIPING SHALL BE UNIFORMLY PITCHED, 1/4" PER FOOT UNLESS OTHERWISE REQUIRED BY EXISTING CONDITIONS, OR INDICATED ON THE DRAWINGS.

14. VENTS: PROVIDE A COMPLETE SYSTEM OF STANDARD WEIGHT CAST IRON NO-HUB VENT RISERS WHERE THE CEILING SPACE IS USED AS A RETURN AIR PLENUM OR USE CO-EXTRUDED PVC DWV (SCHEDULE 40) PIPE (WHERE PERMITTED BY CODE/LOCAL AUTHORITIES).

15. WHERE THERE IS A DUCTED RETURN AIR SYSTEM. DO NOT USE PVC PIPE IN RETURN AIR PLENUM SPACES. THE VENT SYSTEM SHALL BE CARRIED THROUGH THE ROOF WITH APPROPRIATE FLASHING.

16. CONDENSATE AND INDIRECT DRAIN PIPING: PIPING ABOVE FLOOR SHALL BE CO-EXTRUDED PVC DWV (SCHEDULE 40) PIPE, FITTINGS AND CONNECTIONS. PIPING BELOW GRADE SHALL BE CO-EXTRUDED PVC DWV (SCHEDULE 40) PIPE WITH SOLVENT WELD FITTINGS.

17. CLEANOUTS: PROVIDE CLEANOUTS AT THE END OF EACH HORIZONTAL RUN, AND AT THE BASE OF ALL VERTICAL WASTE AND DRAIN PIPES. CLEANOUTS SHALL BE OF THE SAME SIZE AS THE PIPES THEY SERVE, CONFORMING TO CODE REQUIREMENTS. PROVIDE SUITABLE WALL OR FLOOR CLEANOUTS WITH ACCESSORIES TO OBSCURE FROM VIEW.

18. WATER DISTRIBUTION PIPING:

A. LAYOUT WATER PIPING SO THAT THE ENTIRE SYSTEM CAN BE DRAINED. HOT AND COLD WATER PIPING SHALL BE 1/2" MIN. CPVC PIPE WITH SOLVENT FITTING.

B. PROVIDE WATER HAMMER ARRESTERS AT EACH FIXTURE OR GROUP OF FIXTURES AS REQUIRED.

C. INSTALL CHROME PLATED BRASS ESCUTCHEON PLATES AT ALL PENETRATIONS THROUGH FINISHED SURFACES (INCLUDING CABINET INTERIORS).

19. PIPE INSULATION: INSULATE (AS ALLOWED BY CODE) ALL LISTED SERVICE PIPING AS FOLLOWS. DOMESTIC COLD/HOT WATER, HOT WATER RETURN, STORM WATER PIPING. PROVIDE 1" PREFORMED FIBERGLASS, ASJ/SS-11, FLAME SPREAD 25, SMOKE DEVELOPED 50, ASTM C-547. FOR CONDENSATE PIPING PROVIDE 1/2" THICK INSULATION OF SAME CHARACTERISTICS AS LISTED FOR 1" ABOVE. WHERE PERMITTED BY LOCAL CODES, PROVIDE 1/2" SELF-ADHESIVE UNICELLULAR FOAM PIPE INSULATION WITH PRE-FORMED PVC FITTING COVERS - EQUAL TO SELF-ADHESIVE ARMSTRONG 2000 WITH K FACTOR OF 0.27 AT 75 DEGREES MEAN TEMPERATURE. INSULATE ANY EXPOSED CONDENSATE PIPING WITH WASTE TEMPERATURE BELOW 60 DEGREES F.

20. SHUTOFF VALVES, WITH UNIONS SHALL BE PROVIDED FOR SERVICE TO EACH PLUMBING FIXTURE, FOOD SERVICE EQUIPMENT ITEM OR OTHER EQUIPMENT ITEM, TO FACILITATE ISOLATION FOR REPAIR OR REPLACEMENT. VALVES SHALL BE EQUAL TO JENKINS #902-T BALL VALVE, CHROME-FINISHED BRONZE, TEFLON SEATS AND PACKING, 400 LB. W.O.G., SOLDER END.

21. ACCESS PANELS SHALL BE PROVIDED WHERE CONCEALED CONTROL DEVICES, VALVES, ETC. ARE CONCEALED WITHIN WALLS, WHERE ACCESS FOR ADJUSTMENT AND MAINTENANCE IS POSSIBLE THROUGH LAY-IN SUSPENDED CEILINGS, ACCESS PANELS ARE NOT REQUIRED.

22. PIPING SYSTEM- PVC SCHEDULE 40, SCHEDULE 80 AND CPVC PIPE WITH SOLVENT FITTINGS SHALL BE USED WHERE PEMITTED BY CODE/LOCAL AUTHORITIES.

23. INSTALLATION:

A. THOROUGHLY CLEAN ITEMS BEFORE INSTALLATION.

B. CAP PIPE OPENINGS TO EXCLUDE DIRT UNTIL FIXTURES ARE INSTALLED AND FINAL CONNECTIONS HAVE BEEN MADE.

C. PROCEED AS RAPIDLY AS CONSTRUCTION WILL PERMIT.

D. SET FIXTURES LEVEL AND IN PROPER ALIGNMENT.

E. INSTALL SUPPLIES IN PROPER ALIGNMENT WITH FIXTURES.

F. INSTALL SILICONE SEALANT BETWEEN FIXTURES AND ADJACENT MATERIAL, FOR SANITARY JOINT, AND OMIT ESCUTCHEONS.

G. REPAIR EXISTING PLUMBING SYSTEM COMPONENTS DAMAGED BY CONSTRUCTION OPERATIONS AND RESTORE TO ORIGINAL CONDITIONS.

H. TEST WATER SYSTEM UNDER 150 PSIG HYDROSTATIC PRESSURE, FOR FOUR (4) HOURS MINIMUM.

I. WHEN TESTING INDICATES MATERIALS OR WORKMANSHIP IS DEFICIENT, REPLACE OR REPAIR AS REQUIRED, AND REPEAT TEST UNTIL STANDARDS ARE ACHIEVED.

24. ROOF PENETRATIONS SHALL COMPLY WITH "SMACNA" AND "NRCA" STANDARDS, AND WITH THE REQUIREMENTS OF THE EXISTING ROOFING WARRANTY, IF APPLICABLE.

25. DO NOT PERFORM ROOFING PENETRATIONS IN A MANNER WHICH WOULD VOID OR OTHERWISE LIMIT THE EXISTING ROOFING WARRANTY.

PLUMBING GENERAL NOTES

- BEFORE BEGINNING EXCAVATIONS OR DEMOLITION OF ANY NATURE WHATSOEVER, CONTRACTOR SHALL LOCATE ALL SERVICES AND UTILITIES OCCURRING WITHIN THE BOUNDS OF THE PROJECT. THE CONTRACTOR SHALL THEN PROCEED WITH CAUTION IN HIS WORK SO THAT NO UTILITY OR LINE SERVING AREAS THAT ARE TO REMAIN BE DAMAGED WITH A RESULTANT LOSS OF SERVICE. SIZE AND LOCATION ON RECORD DRAWINGS.
- IT IS THE INTENTION OF THESE DRAWINGS TO CALL FOR FINISHED WORK, IE. FULLY ADJUSTED, TESTED, AND READY FOR OPERATION WHENEVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN "FURNISH AND INSTALL COMPLETE AND READY FOR USE".
- THE PLUMBING DRAWINGS ARE DIAGRAMMATIC AND DO NOT NECESSARILY SHOW EVERY COMPONENT AND/OR ACCESSORY REQUIRED FOR A COMPLETE INSTALLATION. THE CONTRACTOR SHALL INCLUDE SUCH ITEMS AS ARE REQUIRED TO ENSURE THAT THE ENTIRE SYSTEM IS FUNCTIONING IN COMPLIANCE WITH APPLICABLE CODES, ACCEPTED INDUSTRY STANDARDS, AND MANUFACTURER'S INSTALLATION REQUIREMENTS UPON COMPLETION OF THE WORK.
- ALL CUTTING, DRILLING, AND PATCHING OF WALLS, FLOORS, AND/OR STRUCTURAL MEMBERS, FOR THE INSTALLATION OF THE PLUMBING AND FIRE PROTECTION SYSTEMS SHALL BE PROVIDED. STRUCTURAL COMPONENTS SHALL NOT BE CUT, DRILLED, OR MODIFIED IN A WAY WITHOUT THE STRUCTURAL ENGINEER'S REVIEW AND PRIOR WRITTEN APPROVAL.
- CONTRACTOR SHALL COORDINATE EQUIPMENT CONNECTIONS WITH EQUIPMENT DRAWINGS AND SUPPLIER. INSTALL EQUIPMENT AND MAKE FINAL FINAL CONNECTIONS FURNISHING CUTOFF VALVES, P-TRAPS, PRV'S, AND PIPING REQUIRED.
- COORDINATE WATER, WASTE, AND VENT PIPING WITH OTHER TRADES TO AVOID SPACING OR ROUTING PROBLEMS.
- EQUIPMENT AND CONNECTION AND PIPING SHALL BE FURNISHED AND INSTALLED TO MEET OR EXCEED STATE AND LOCAL CODES AND REQUIREMENTS.
- FURNISH AND INSTALL SHOCK ABSORBERS IN COLD WATER LINES AT CONNECTIONS TO FLUSH VALVES AND QUICK CLOSING VALVES.
- PENETRATIONS THROUGH WALLS AND FLOORS SHALL BE SLEEVED AND PATCHED TO MAINTAIN INTEGRITY OF WALL OR FLOOR RATING.
- DRAWINGS ARE SCHEMATIC IN NATURE. CONTRACTOR IS RESPONSIBLE FOR COORDINATING EXACT ROUTING OF ALL SERVICES WITH EXISTING CONDITIONS AND WITH ALL OTHER TRADES.
- FLOOR DRAINS. LOCATE FLOOR DRAINS 1/2" BELOW FINISH FLOOR ELEVATION UNLESS SHOWN OTHERWISE (COORDINATE WITH ARCHITECTURAL DRAWINGS).
- DRAWINGS SHOW KNOWN EXISTING SERVICES IN REASONABLE PROXIMITY. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS.
- EXISTING EQUIPMENT, SERVICES, AND CONNECTIONS WHICH ARE DAMAGED DURING CONSTRUCTION SHALL BE REWORKED OR REPLACED AS REQUIRED TO PROVIDE ORIGINAL OPERATION.
- CONTRACTOR SHALL COORDINATE THE INTERRUPTION OF EXISTING SERVICES WITH OWNER PRIOR TO CONSTRUCTION.
- PLUMBING CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTIONAL AND MAKE FINAL CONNECTIONS TO FIXTURES AND EQUIPMENT. PROVIDE BACKFLOW PREVENTER AT THE LOCATIONS REQUIRED BY CODE AND ALL COVERING AUTHORITIES. VENT PENETRATIONS THROUGH ROOF SHALL MAINTAIN 25' CLEARANCE FROM ANY FRESH AIR INTAKE.

GENERAL NOTES

- THE INTENT OF THESE PLANS AND SPECIFICATIONS IS TO INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, AND SERVICES NECESSARY TO FURNISH, INSTALL, TEST, AND ADJUST A COMPLETE WORKABLE PLUMBING INSTALLATION AS SHOWN, PRESCRIBED, OR REASONABLY IMPLIED BUT NOT LIMITED TO THAT EXPLICITLY INDICATED IN THE CONTRACT DOCUMENTS, BUT NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE INTENT THEREOF.
- COORDINATE ENTIRE INSTALLATION OF THE PLUMBING SYSTEM WITH THE WORK OF OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION. FIELD VERIFY ALL DIMENSIONS AND CONDITIONS. REPORT ANY DISCREPANCIES, IN WRITING, TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.
- CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS WITH ALL CHANGES NOTED THEREON AT THE COMPLETION OF THE PROJECT IN ACCORDANCE WITH THE SPECIFICATIONS. PROVIDE ONE YEAR WARRANTY ON ALL PARTS AND LABOR.
- THE DRAWINGS ARE DIAGRAMMATIC AND INTENDED TO SHOW SCOPE. CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER TRADES TO PROVIDE THE BEST ARRANGEMENT OF ALL DUCT, PIPE, CONDUIT, ETC.
- ALL CUTTING AND PATCHING OF THE EXISTING STRUCTURE SHALL BE PROVIDED UNDER OTHER SECTIONS OF THE WORK. PROVIDE NECESSARY REQUIREMENTS TO THE PROJECT SUPERINTENDENT.
- CONDENSATE DRAINS SHALL BE PROVIDED FOR EACH AIR CONDITIONING UNIT. HORIZONTAL CONDENSATE DRAINS ABOVE ANY CEILING SHALL BE INSULATED WITH MIN. 3/8" THICK CLOSED CELL INSULATION.
- PIPING:
- WASTE, VENT, AND STORM DRAIN PIPING SHALL BE CO-EXTRUDED PVC SCHEDULE 40) PIPE
- WATER PIPE SHALL BE CPVC PIPE
- CONDENSATE PIPING SHALL BE CO-EXTRUDED PVC (SCHEDULE 40) PIPE
- INSIDE GAS PIPING SHALL BE BLACK IRON SCHEDULE 40 WITH MALLEABLE IRON FITTINGS. OUTSIDE SHALL BE GALVANIZED IRON SCHEDULE 40 WITH GALVANIZED FITTINGS. GAS LINE TO BE PAINTED GRAY IN COLOR. A 24 HOUR METERED GAS TEST SHALL BE REQUIRED.
- ALL PIPING NOT ENCLOSED IN CONDITION SPACE OR AT EXTERIOR WALLS SHALL BE INSULATED.
- PIPING: PVC SCHEDULE 40, SCHEDULE 80 AND CPVC PIPING WITH SOLVENT WELD FITTINGS SHALL BE USED WHERE PERMITTED BY CODE/LOCAL AUTHORITIES
- ALL VENTS OR EXHAUSTS SHALL BE AT LEAST 10 FT. AWAY OR 3 FT. ABOVE ANY WINDOW, DOOR, OPENING, OR AIR INTAKE.
- CLEANOUTS SHALL BE INSTALLED PER THE UNIFORM PLUMBING CODE.
- PROVIDE WATER TIGHT FLASHINGS WHEREVER PIPES PASS THROUGH EXTERIOR WALLS, ROOFS, OR FLOORS.
- PROVIDE ISOLATION FOR ALL PIPES THAT COME IN CONTACT WITH THE STRUCTURE.
- LOCATION OF EXISTING UTILITIES AND POINTS OF CONNECTION ARE APPROXIMATE. CONTRACTOR SHALL VERIFY EXACT LOCATIONS AND DEPTHS OF EXISTING UTILITIES AND SERVICES PRIOR TO STARTING WORK OF THIS SECTION. IF INDICATED POINTS OF CONNECTION CANNOT BE MADE TO EXISTING UTILITIES AS FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO INSTALLING ANY WORK WHICH MAY BE AFFECTED.
- VALVES SHALL BE NIBCO, JENKINS, HAMMOND, RED & WHITE OR APPROVED EQUAL. SERVICE PRESSURE SHALL BE SUITABLE FOR SERVICE INTENDED. THE MAIN WATER SHUT OF VALVE SHALL BE A FULL PORT BALL TYPE AND APPROVED FOR SERVICE INTENDED.
- CONTRACTOR SHALL PROVIDE ALL SHUT OFF VALVES AS NECESSARY TO ISOLATE ANY EQUIPMENT, PLUMBING ITEMS, OR FIXTURES, THAT MAY NEED SERVICING OR ARE SUBJECT TO FAILURE WHETHER OR NOT SUCH VALVES ARE SHOWN ON THE DRAWINGS.
- PROVIDE HANGERS AND SUPPORTS AS REQUIRED. PLUMBERS TAPE AND WIRE ARE NOT ACCEPTABLE.
- CONTRACTOR IS RESPONSIBLE FOR HIS OWN TRENCHING, BACKFILL, AND COMPACTION OF TRENCHES NECESSARY TO COMPLETE HIS SCOPE OF WORK. BACKFILLED TRENCHES SHALL BE RETURNED TO THEIR ORIGINAL GRADE UNLESS NOTED OTHERWISE.
- CONTRACTOR SHALL AFFIX A MAINTENANCE LABEL TO ALL EQUIPMENT REQUIRING ROUTINE MAINTENANCE AND SHALL PROVIDE MAINTENANCE AND OPERATIONAL MANUALS IN ACCORDANCE WITH THE SPECIFICATIONS.
- ALL EQUIPMENT THAT REQUIRES KEYS OR SPECIAL TOOLS TO OPERATE SHALL SUPPLY THE OWNER WITH TWO OF ANY SUCH KEYS OR TOOLS FOR EACH PIECE OF EQUIPMENT THAT REQUIRE THE SAME.
- ANY CHANGE OR DEVIATION FROM THESE PLANS OR SPECIFICATIONS SHALL REQUIRE THE APPROVAL, IN WRITING, OF THE ENGINEER PRIOR TO COMMENCEMENT OF SUCH WORK.
- ALL PLUMBING, ELECTRICAL, AND GAS LINES SHALL BE CONCEALED WITHIN THE BUILDING STRUCTURE TO AS GREAT EXTENT AS POSSIBLE. ALL LINES NOT CONCEALED SHALL BE SECURED 6" OFF THE FLOOR AND 3/4" FROM THE WALLS USING STANDOFF BRACKETS
- AN APPROVED BACKFLOW PREVENTOR SHALL BE PROPERLY INSTALLED UPSTREAM OF ANY POTENTIAL HAZARD BETWEEN THE POTABLE WATER SUPPLY AND SOURCE OF CONTAMINATION.
- WATER SUPPLY CARBONATORS SHALL BE PROTECTED BY AN APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTOR. THE RELIEF VALVE SHALL DRAIN IN-DIRECTLY TO A FLOOR SINK WITH A 1" MIN. AIR GAP.

WATER SAVING STANDARDS:

THE WATER SAVING PERFORMANCE STANDARDS FOR A PLUMBING FIXTURE ARE THOSE ESTABLISHED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), CURRENT REVISION, OR THE FOLLOWING STANDARDS, WHICHEVER ARE THE MORE RESTRICTIVE:

1-THE MAXIMUM FLOW FROM A SINK OR LAVATORY FAUCET OR A FAUCET AERATOR SHALL NOT EXCEED 0.5 GALLONS OF WATER PER MINUTE AT A PRESSURE OF 60 POUNDS PER SQUARE INCH WHEN TESTED IN ACCORDANCE WITH ANSI TESTING PROCEDURES.

2- THE MAXIMUM VOLUME OF WATER PER FLUSH FROM A TOILET SHALL NOT EXCEED AN AVERAGE OF 1.28 GALLONS WHEN TESTED IN ACCORDANCE WITH ANSI TESTING PROCEDURES.

3- THE MAXIMUM VOLUME OF WATER PER FLUSH FROM A URINAL AND THE ASSOCIATED FLUSH VALVE, IF ANY, SHALL NOT EXCEED AN AVERAGE OF ONE GALLON WHEN TESTED IN ACCORDANCE WITH ANSI TESTING PROCEDURES

SPECIAL NOTICE TO CONTRACTORS

1. ALL CONTRACTORS (GENERAL CONTRACTOR AND SUB-CONTRACTORS) BIDDING THIS PROJECT ARE REQUIRED TO VISIT THE JOB SITE AND VERIFY THE EXISTING CONDITIONS PRIOR TO SUBMITTING THEIR BID. CONTRACTORS ARE TO CAREFULLY REVIEW ALL CONSTRUCTION DOCUMENTS AND NOTE ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CONDITIONS OBSERVED AT THE JOB SITE PRIOR TO SUBMISSION OF ANY BID. THE BUILDING OWNER REPRESENTATIVE LISTED BELOW MAY BE CONTACTED FOR ACCESS TO THE JOB SITE.

2. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING THE LOCATION AND CONDITION OF ALL POINTS OF CONNECTION, LOCATION AND CONDITION OF ALL BUILDING (ROOF/FLOOR/CEILING) PENETRATIONS, LOCATION AND CONDITION OF ALL UTILITIES AND BUILDING SYSTEMS INCLUDING, BUT NOT LIMITED TO, GAS, WATER, SEWER, VENT, ELECTRICAL, BUILDING MECHANICAL SYSTEMS, DUCT CONNECTIONS, EXHAUST/OUTSIDE AIR CONNECTIONS, SECURITY, FIRE ALARM, DATA, AND PHONE PRIOR TO SUBMISSION OF THEIR BID.

3. ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CONDITIONS OBSERVED SHALL BE BROUGHT TO THE ATTENTION, IN WRITING, TO THE ARCHITECT AND/OR ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

PLUMBING LEGEND

SYMBOL	ABBRV.	DESCRIPTION
	SS or W	NEW SEWER OR WASTE
	V	NEW VENT
	CW	NEW COLD WATER
	HW	NEW HOT WATER
	G	NEW GAS
	CD	NEW CONDENSATE DRAIN
	CA	COMPRESSED AIR
	FCO	FLOOR CLEANOUT
	WCO	WALL CLEANOUT
	FD	FLOOR DRAIN
	FS	FLOOR SINK
	TP	TRAP PRIMER & TRAP PRIMER PIPING
	SOV	SHUT-OFF VALVE
	CV	CHECK VALVE
	PRV	BACKFLOW PREVENTER W SOV'S
	T & P	
	DN	PIPE DOWN
	UP	PIPE UP
	POC	POINT OF CONNECTION
	-	PLUMBING NOTE CALL-OUT
	ABV	ABOVE
	AFF	ABOVE FINISH FLOOR
	AP	ACCESS PANEL
	BEL	BELOW
	BLDG	BUILDING
	CLG	CEILING
	CONT	CONTINUATION
	EL	ELEVATION
	FIN	FINISH
	FL	FLOOR
	GR	GRADE
	NTS	NOT TO SCALE
	OC	ON CENTER
	S= %	SLOPE AT A PERCENTAGE
	SHT	SHEET
	TYP	TYPICAL
	VTR	VENT THRU ROOF
	WCO	WALL CLEAN-OUT

PLUMBING LIST OF DRAWINGS (LoD):

SHEET TAG	TITLE	SCALE
P 1.00	PLUMBING GENERAL NOTES, SPECIFICATIONS & LEGEND.	NTS
P 2.00	DRAINAGE LAYOUT & RISER DIAGRAM.	3/16"=1'-0"
P 3.00	WATER SUPPLY LAYOUT & RISER DIAGRAM.	3/16"=1'-0"
P 4.00	PLUMBING DETAILS.	NTS

SCOPE OF WORK:

- REPLACING THE EXISTING ELECTRIC WATER HEATER WITH A NEW ONE - RELOCATE THE EXISTING ELECTRIC WATER HEATER TO THE JANITOR ROOM.
- RELOCATE THE EXISTING MOP SINK TO THE JANITOR ROOM.
- RELOCATION THE EXISTING MOP SINK CONNECTION TO SUPPLY THE NEW BREAK ROOM 2 BOWL SINK.



2023-5505 WEST TEXAS  
GRADUATION SERVICES  
4319 50TH STREET  
LUBBOCK, TEXAS 79413

PLUMBING  
SPECIFICATIONS,  
LEGEND & GENERAL  
NOTES.

Drawn By: M.F

Scale: NTS

Date: 01.22.2024

PROJ NO.:

P1.00

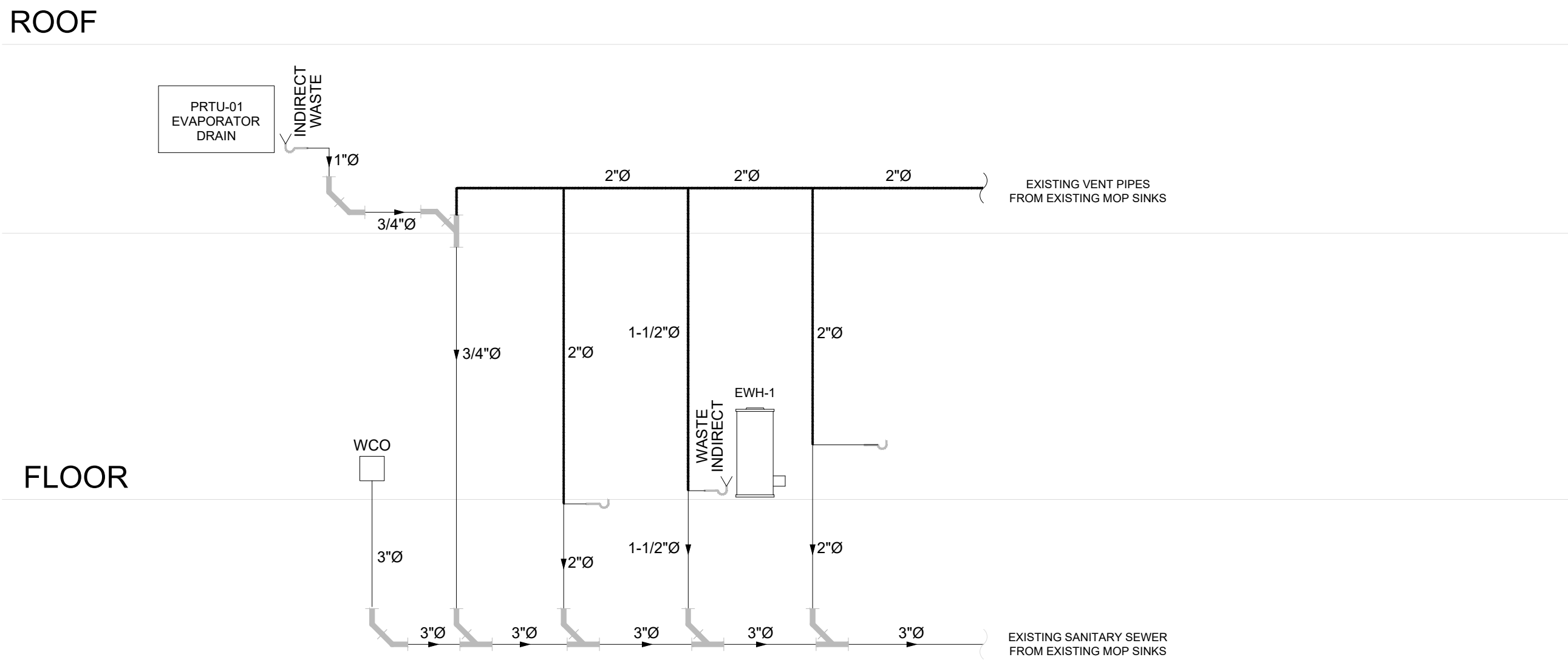
SHEET NO.



- DRAINAGE KEYED NOTES:
- 1 → DRAIN CONNECTION WITH EXISTING BUILDING SEWER - CONTRACTOR TO VERIFY IN FIELD THE EXACT DRAIN POINT.
  - 2 → DRAIN CONNECTION WITH EXISTING MAIN VENT PIPE - CONTRACTOR TO VERIFY IN FIELD THE EXACT VENT POINT.
  - 3 → 2 BOWL SINK DRAIN TRAPPED & VENTED CONNECTION.
  - 4 → MOP SINK DRAIN TRAPPED & VENTED CONNECTION.
  - 5 → VENT PIPE RISE FROM LOW LEVEL TO CEILING LEVEL IN WALL.
  - 6 → 3" WALL CLEAN-OUT.
  - 7 → 3/4" DRAIN DROP IN WALL & VENT RISE.
  - 8 → 3/4" INDIRECT WASTE CONDENSATE DRAIN FROM AIR HANDLING UNIT.
  - 9 → FLOOR FUNNEL DRAIN FROM ELECTRIC WATER HEATER DRAIN & T&P VALVE DISCHARGE - PROVIDE AIR GAP.



**DRAINAGE LAYOUT - 3/16" = 1'-0"**



**DRAINAGE RISER DIAGRAM - NTS**

2023-5505 WEST TEXAS  
GRADUATION SERVICES  
4319 50TH STREET  
LUBBOCK, TEXAS 79413

DRAINAGE LAYOUT  
& RISER DIAGRAM

Drawn By: M.F.      Scale: SEE SHEET  
Date: 01.22.2024      PROJ. NO.:

**P2.00**

SHEET NO.





SCHEDULE No. 1 ELECTRIC WATER HEATER	
TAG	EWH-01
LOCATION	UTILITY ROOM
SERVES	WHOLE OFFICE
MANUFACTURER	BRADFORD WHITE
MODEL	LE33053-3
TYPE	ELECTRIC - TANK
HEATER CAPACITY (KW)	4.0
FIRST HOUR RATING (GPH)	35
RECOVERY 90°F RISE (GPH)	18
UEF	0.92
NOMINAL TANK CAPACITY (GAL)	30
RATED STORAGE VOLUME (GAL)	27
APPROXIMATE SHIPPING WEIGHT (LBS)	100
HEIGHT x DIAMETER	48" x 20"

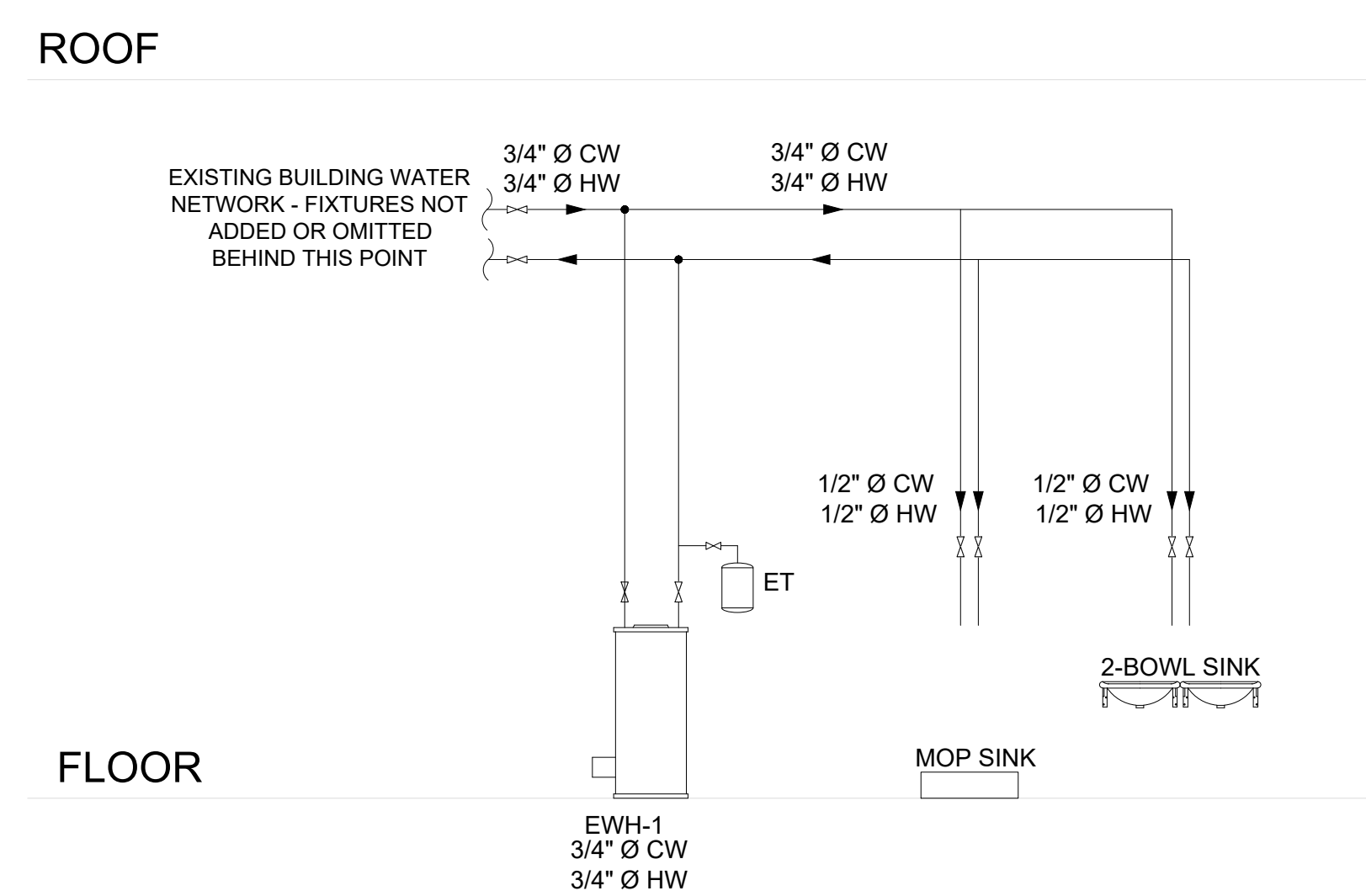
PLUMBING KEYED NOTES:

1. DCW & DHW DROP IN WALL TO FIXTURE TERMINAL -  
RELOCATED CONNECTION FROM EXISTING MOP SINK  
TO NEW 2 BOWL SINK.
2. DCW & DHW DROP IN WALL TO FIXTURE TERMINAL -  
RELOCATED MOP SINK TO NEW 2 BOWL SINK.  
  
RELOCATED CONNECTION OF ELECTRIC WATER  
HEATER - PROVIDE NEW ELECTRIC WATER HEATER IN  
THE MAJOR ROOM AS PER THE SCHEDULE OF  
EQUIPMENT.
3. PROVIDE EXPANSION TANK WATTS PL-12 OR EQUAL -  
PROVIDE BASE SUPPORT AND A DRAIN PAN FOR  
THE ELECTRIC WATER HEATER.
4. EXISTING COLD & HOT WATER PIPES TO RESTROOMS  
TO REMAIN UNCHANGED.
5. RELOCATE THE CONNECTION OF THE HOSE BIB - PROVIDE  
A NEW HOSE BIB OUTLET WITH INTEGRATED VACUUM  
BREAKER.

NOTES:

1. HEATER SHALL HAVE CSA CERTIFIED AND ASME RATED T&P RELIEF VALVE.
2. HEATER SHALL HAVE ANODE ROD FOR PROTECTION.
3. HEATER SHALL MEET OR EXCEED THE THERMAL EFFICIENCY AND/OR STANDBY LOSS REQUIREMENTS OF THE US DOE AND CURRENT EDITION OF ASHRAE/IESNA 90.1.
4. HEATER SHALL HAVE FACTORY SUPPLIED INSULATION BLANKET.
5. PROVIDE EXPANSION TANK AS PER KEYED NOTES.

**WATER SUPPLY LAYOUT - 3/16" = 1'-0"**



## WATER SUPPLY RISER DIAGRAM - NTS

2023-5505 WEST TEXAS  
GRADUATION SERVICES  
4319 50TH STREET  
LUBBOCK, TEXAS 79413

## WATER SUPPLY LAYOUT & RISER

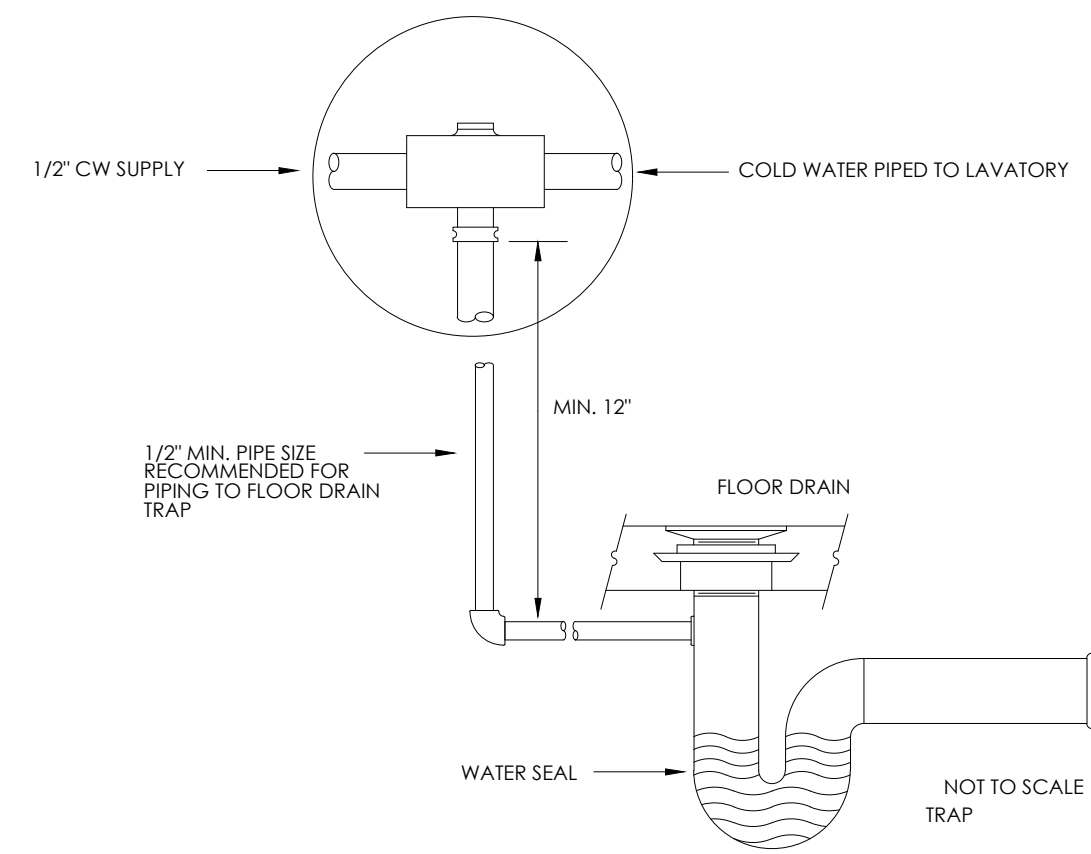
Drawn By: M.F	Scale: SEE SHEET
---------------	------------------

Date: 01.22.2024	PROJ.NO.:
------------------	-----------

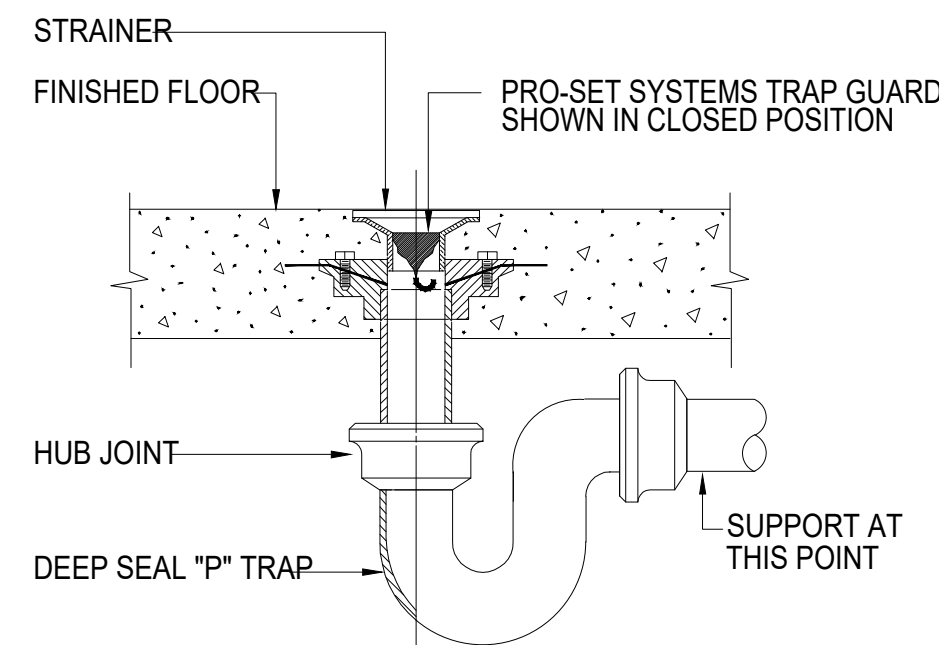
P3.00

SHEET NO.



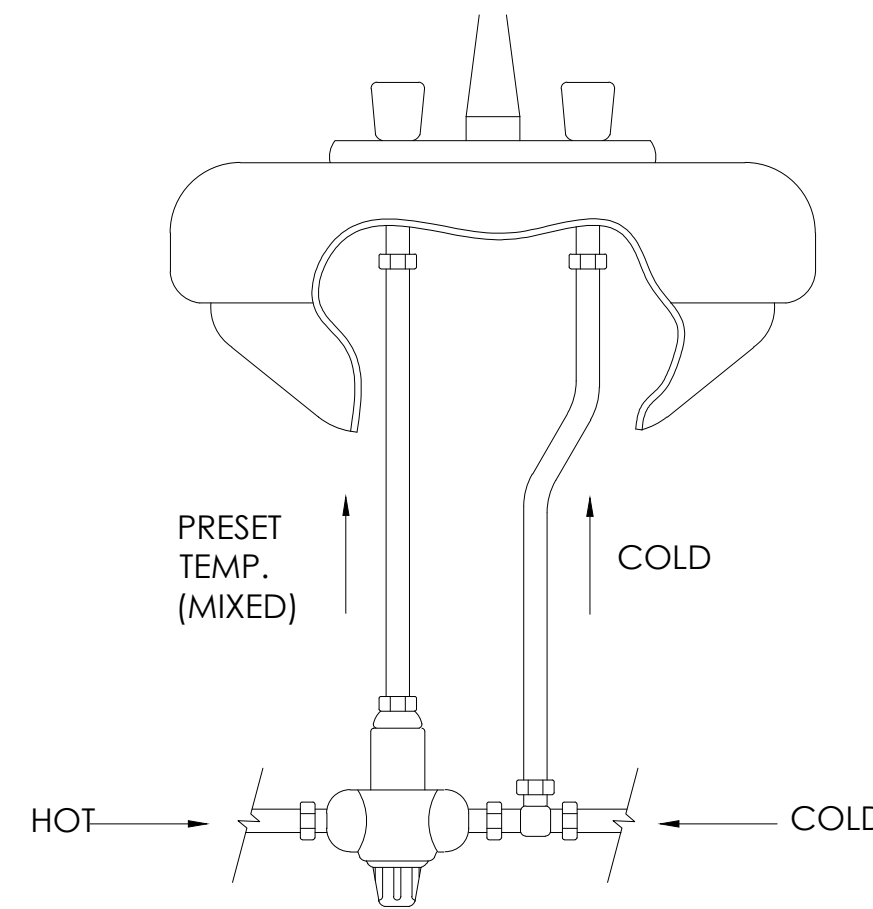


**1 TRAP PRIMER DETAIL**  
SCALE: N.T.S.

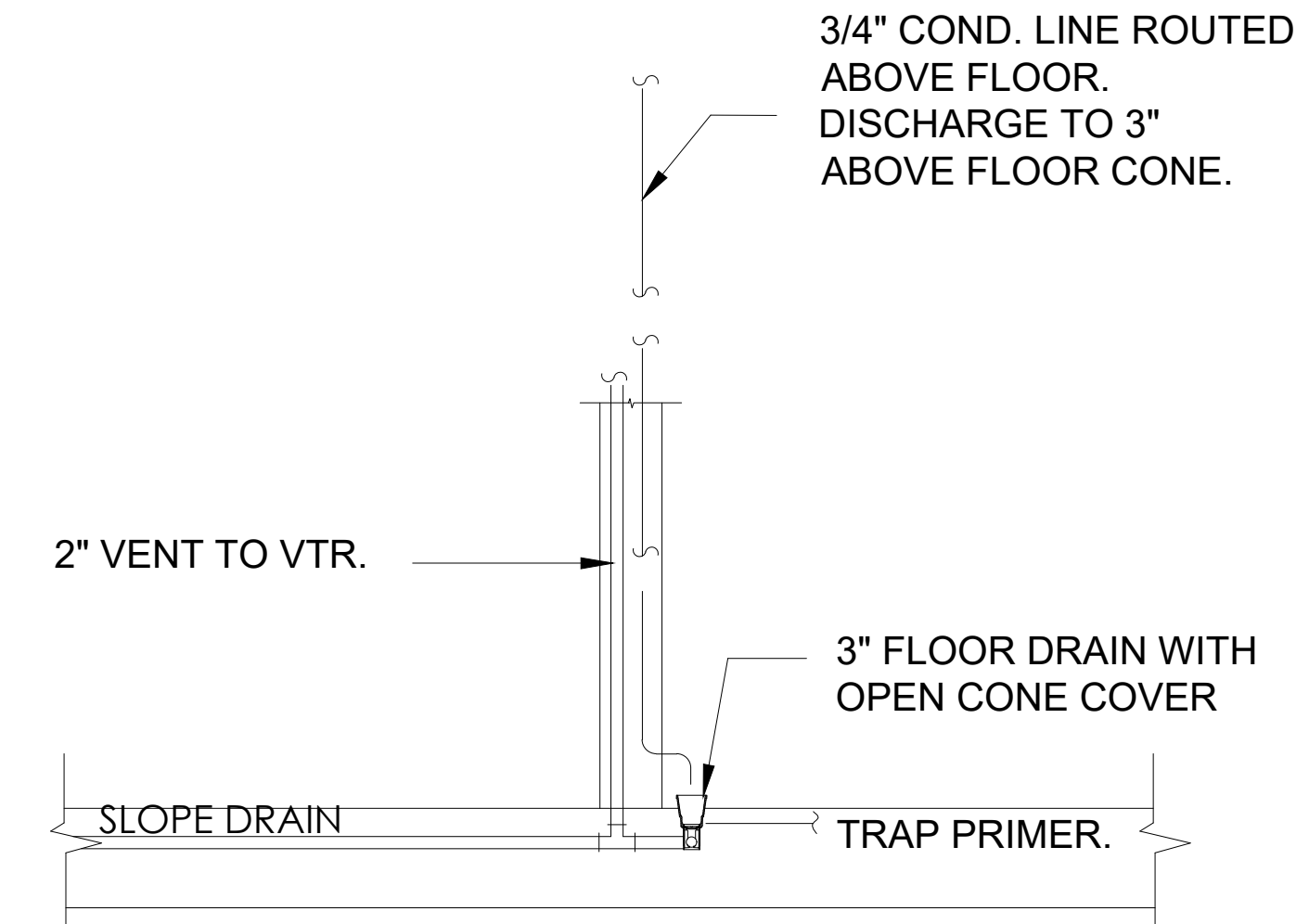


- NOTES:
1. TRAP GUARD SHALL BE FACTORY FITTED TO MATCH EACH FLOOR DRAIN (AND FLOOR SINK) BY SIZE, MODEL, AND MANUFACTURER.
  2. FLOOR SINK/HUB DRAIN TRAP GUARD INSTALLATION IS SIMILAR.
  3. INSTALLATION OF TRAP GUARD TO BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
  4. INSERT TRAP GUARD ONLY AFTER FINAL RODDING OF DRAINS. INSTALL TRAP GUARD WITH CLEAR SILICONE CAULK FOR GAS TITE SEAL. FOR DRAIN RODDING AFTER INSTALLATION, INSERT SEWER TAPE THROUGH LIGHTLY GREASED 1-1/2" PVC PIPE TO PROTECT TRAP GUARD.

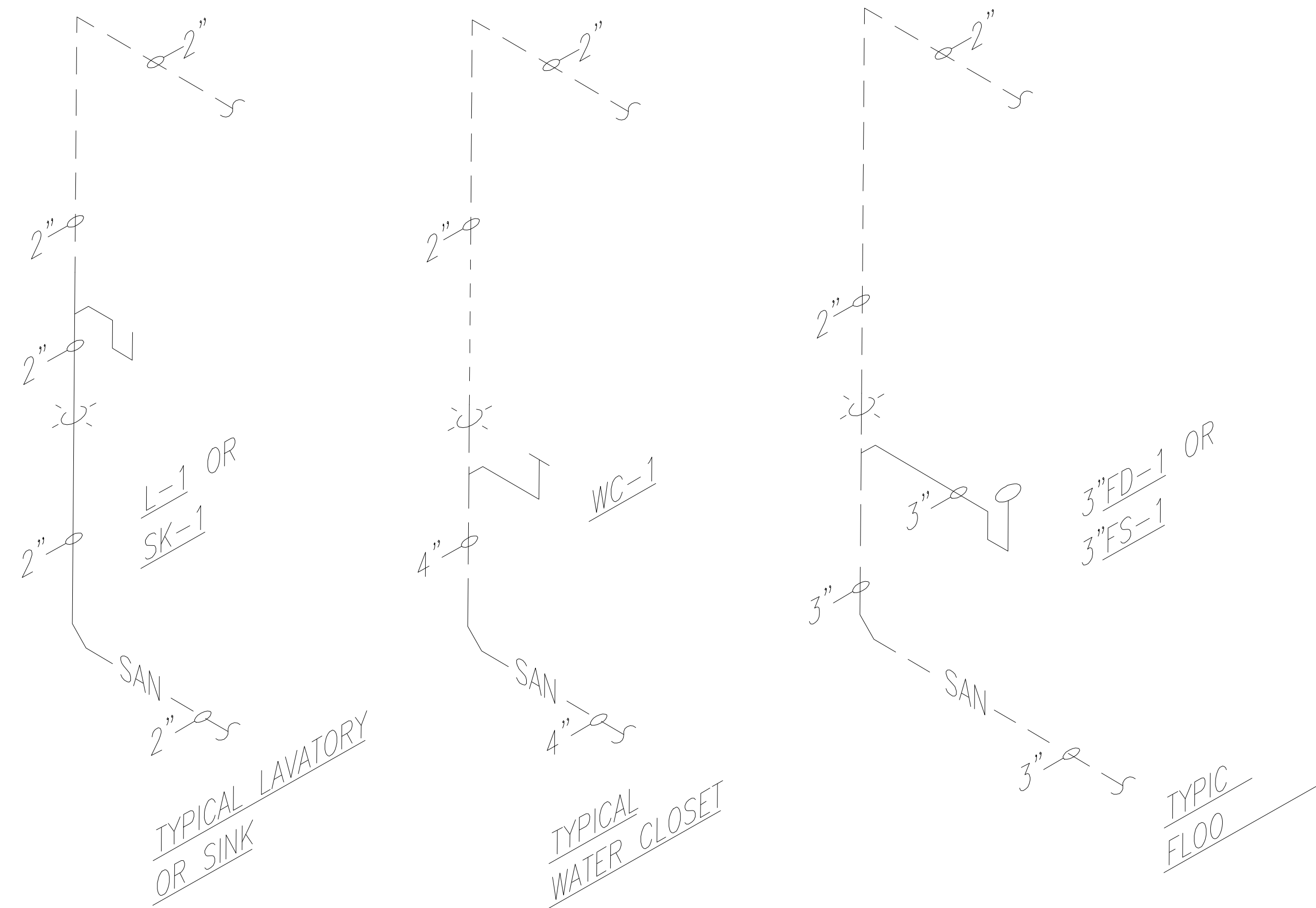
**2 FLOOR DRAIL WITH TRAP SEAL PROTECTION**  
SCALE: N.T.S.



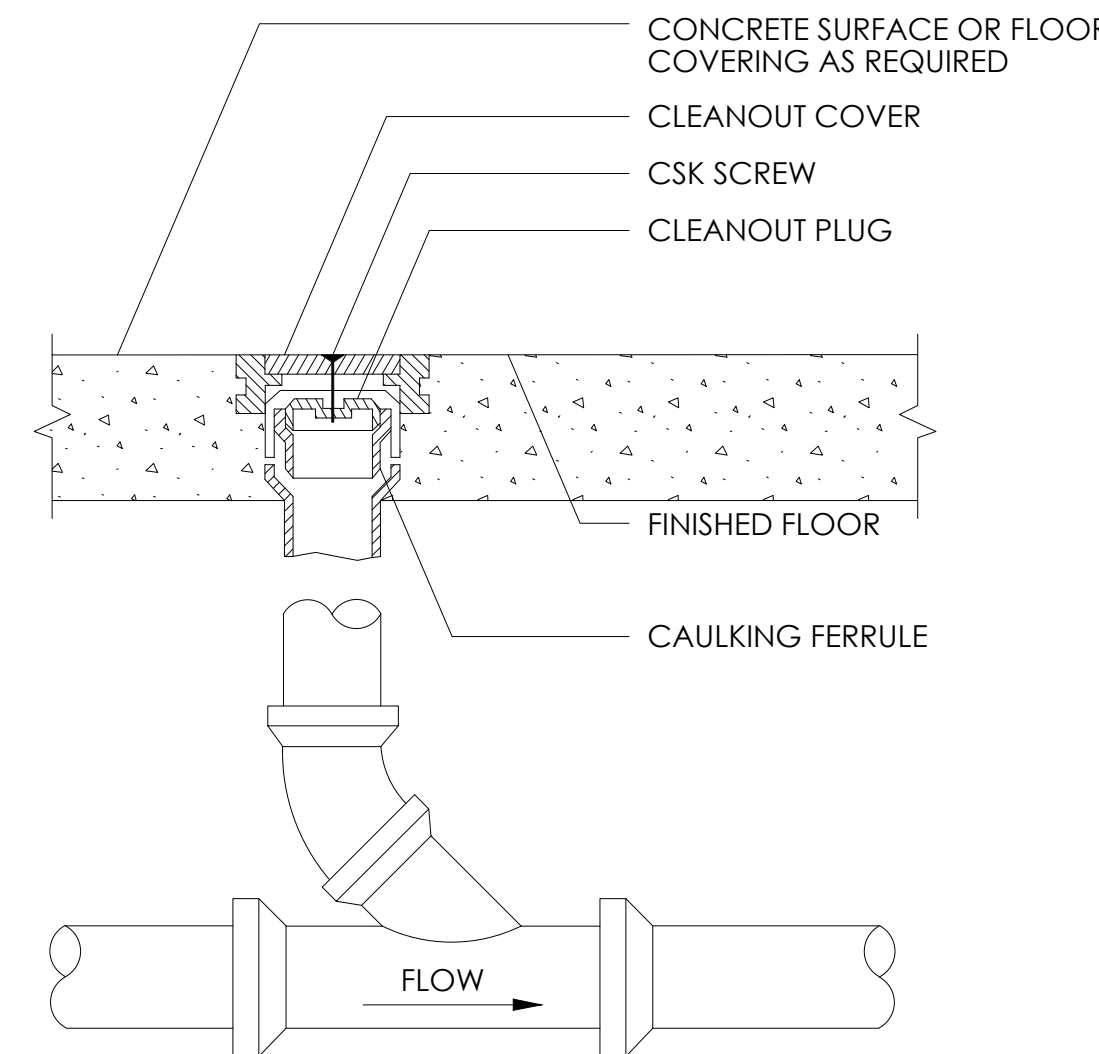
**3 THERMOSTATIC MIXING VALVE DETAIL**  
SCALE: N.T.S.



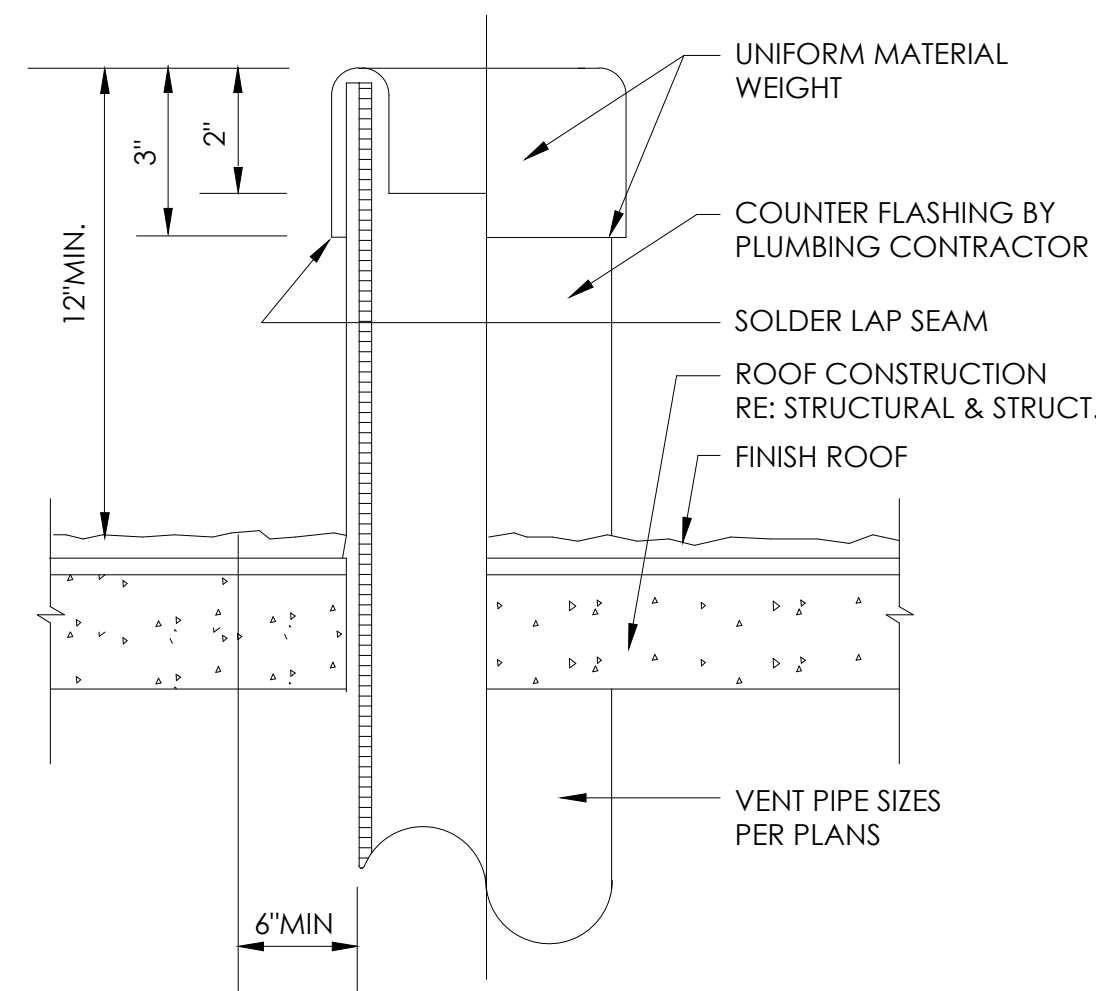
**4 CONDENSATE DRAIN TERMINATION DETAIL**  
SCALE: N.T.S.



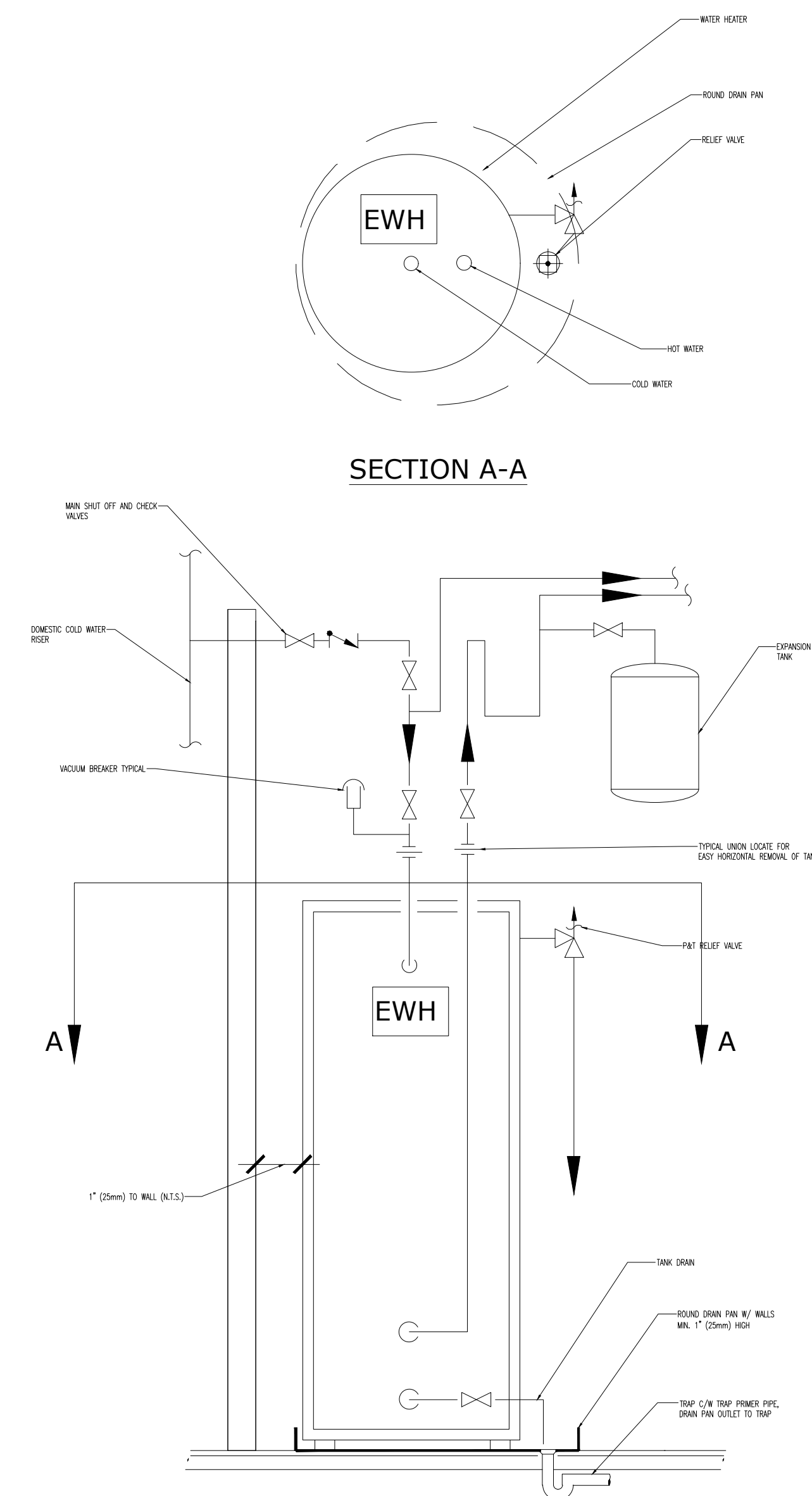
**5 TYPICAL WASTE & VENT RISERS**  
SCALE: N.T.S.



**6 FLOOR CLEAN-OUT DETAIL**  
SCALE: N.T.S.



**7 VENT THRU ROOF DETAIL**  
SCALE: N.T.S.



**8 GAS WATER HEATER DETAIL**  
SCALE: N.T.S.