

**MECHANICAL GENERAL NOTES:**

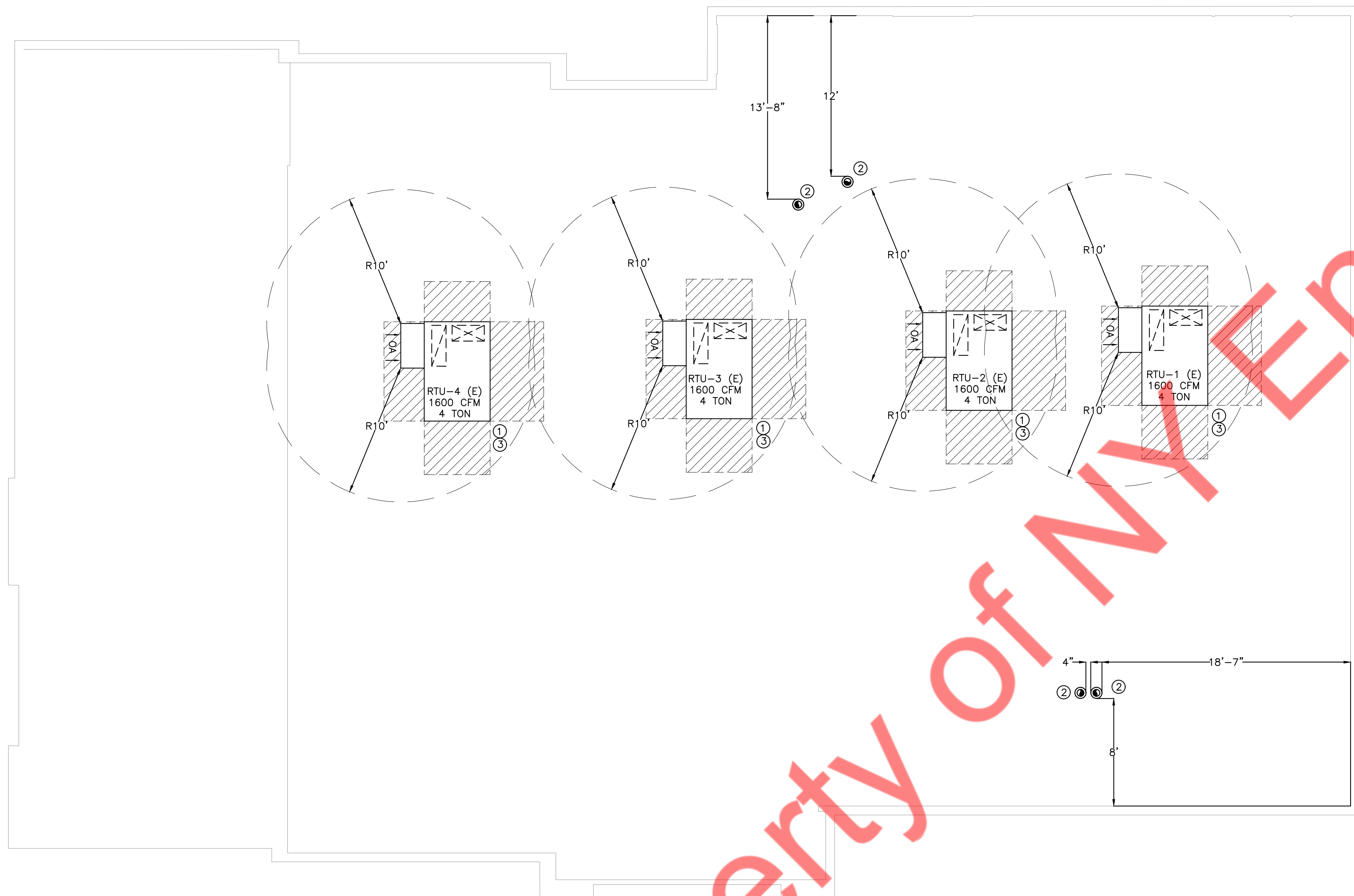
1. ALL WORK SHALL BE PERFORMED IN A CLEAN AND WORKMANLIKE MANNER. CARE SHALL BE EXERCISED TO MINIMIZE ANY INCONVENIENCE OR DISTURBANCE TO OTHER AREAS OF THE BUILDING WHICH ARE TO REMAIN IN OPERATION. ISOLATE WORK AREAS BY MEANS OF TEMPORARY PARTITIONS AND/OR TARPS TO KEEP DUST AND DIRT WITHIN THE CONSTRUCTION AREA.
2. NO PIPING, EQUIPMENT, ETC. SHALL BE REMOVED, DISCONNECTED OR SHUT OWN WITHOUT PRIOR REVIEW WITH THE LANDLORD AND/OR ENGINEER TO CONFIRM THAT AREAS TO REMAIN IN OPERATION WILL NOT BE AFFECTED. IF ANY AREAS NOT WITHIN THE SCOPE OF WORK ARE AFFECTED BY ANY SHUTDOWN, REMOVAL OR DISCONNECTION, SUFFICIENT ADVANCE NOTICE MUST BE GIVEN TO THE LANDLORD INDICATING WHICH AREAS WILL BE AFFECTED, WHEN THE PROPOSED SHUTDOWN WILL OCCUR, AND FOR HOW LONG A PERIOD OF TIME.
3. ALL ITEMS REMOVED SHALL BECOME PROPERTY OF THE LANDLORD AND SHALL BE DISPOSED OF AS PER THE LANDLORD'S INSTRUCTIONS, UNLESS INDICATED OTHERWISE. ALL ITEMS WHICH ARE NOT TO BE STORED ON SITE BY OWNERS SHALL BE REMOVED FROM THE BUILDING IMMEDIATELY.
4. THIS CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO PROCEEDING WITH ANY WORK. WHERE DISCREPANCIES OCCUR BETWEEN THESE DOCUMENTS AND EXISTING CONDITIONS, THE DISCREPANCY SHALL BE REPORTED TO THE LANDLORD AND/OR ENGINEER FOR EXPEDITING AND THE RESOLUTION.
5. CLEAN THE JOB SITE DAILY AND REMOVE FROM THE PREMISES ANY DIRT AND DEBRIS CAUSED BY THE PERFORMANCE OF THE WORK INCLUDED IN THIS CONTRACT.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFEKEEPING OF HIS OWN PROPERTY ON THE JOB SITE. OWNER ASSUMES NO RESPONSIBILITY FOR PROTECTION OF PROPERTIES AGAINST FIRE, THEFT AND ENVIRONMENTAL CONDITIONS.
7. PROVIDE ALL NECESSARY TEMPORARY OR PERMANENT CAPS OR PLUGS FOR PIPING. DO NOT LEAVE PIPING OPEN ENDED.
8. WHERE USED, THE TERM "PROVIDE" SHALL MEAN "FURNISH AND INSTALL".
9. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH THE LANDLORD AND ALL OTHER TRADES PRIOR TO FABRICATION, PURCHASE AND/OR INSTALLATION OF ALL WORK.
10. SUBMISSION OF PROPOSAL DIRECTLY OR INDIRECTLY IN CONNECTION WITH THIS WORK SHALL IMPLY THAT THE BIDDER HAS EXAMINED THE JOB SITE UNDER WHICH HE WILL BE OBLIGATED TO OPERATE SHOULD HE BE AWARDED THE WORK UNDER THIS CONTRACT. NO EXTRA CHARGE WILL BE ALLOWED FOR FAILURE OF ANY BIDDER TO EXAMINE THE SITE PRIOR TO BID.
11. ALL WORK SHALL CONFORM TO ALL STATE AND LOCAL CODES, RULES AND REGULATIONS AND ORDINANCES.
12. CONTRACTOR SHALL SECURE AND PAY ALL FEES AND PERMITS PERTAINING TO THE CONTRACT.
13. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT COMPLIANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS. THE CONTRACTOR SHALL PROVIDE ALL HANGERS AND SUPPORTS REQUIRED FOR A COMPLETE INSTALLATION.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR WORKMEN'S IDENTIFICATION AND BADGING, SAFETY AND FIRE PROTECTION, CONTRACTOR'S LIABILITY INSURANCE, BARRICADES, WARNING SIGNS, TRASH REMOVAL, CUTTING AND PATCHING.
15. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RIGGING, HANDLING AND PROTECTION OF MATERIALS.
16. CONTRACTOR SHALL PROVIDE LABOR TO RECEIVE, UNLOAD, STORE, PROTECT AND TRANSFER TO POINT OF INSTALLATION, OWNER FURNISHED ITEMS.
17. WHERE CONDUIT, CABLES, DUCTWORK OR PIPING PASSES THROUGH FIRE RATED FLOORS OR WALLS, THE SLEEVES SHALL BE COMPLETELY SEALED WITH A FIRE STOP MATERIAL THAT IS UL LISTED AND ACCEPTED BY THE BUILDING DEPARTMENT AND FIRE DEPARTMENT AS BEING SUITABLE FOR THIS SERVICE.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CORING AS IT RELATES TO HIS WORK.
19. CONTRACTOR SHALL REFER TO BUILDING MANAGEMENT'S RULES AND REGULATIONS TO COMPLY WITH BUILDING STANDARDS.
20. FLEXIBLE DUCTWORK LENGTHS SHALL NOT EXCEED 5'-0". USE INSULATED RIGID ROUND DUCTWORK WHERE REQUIRED. ALL NEW FLEXIBLE DUCTWORK CONNECTIONS TO AIR DEVICES SHOWN ON THE DRAWING SHALL BE SIZED ACCORDING TO THE NECK SIZE SCHEDULE.
21. THE ENTIRE AIR SUPPLY SYSTEM SHALL BE BALANCED TO THE AIR QUANTITIES INDICATED ON THIS DRAWING BY AN INDEPENDENT AIR BALANCE CONTRACTOR. THE AIR BALANCE CONTRACTOR SHALL SUBMIT NEBB CERTIFIED AIR BALANCE REPORTS FOR ENGINEERING REVIEW AND TO BUILDING MANAGEMENT. PROVIDE AHU DRIVE ADJUSTMENTS AS REQUIRED.
22. REFER TO DRAWING MEP FOR SPECIFICATIONS THAT APPLY TO THIS SHEET.
23. CONTRACTOR SHALL PROVIDE TO BUILDING OWNER THE AS-BUILT RECORD DRAWINGS AND THE OPERATING AND MAINTENANCE MANUALS WITHIN 90 DAYS OF SYSTEMS ACCEPTANCE. RECORD DRAWINGS SHALL INCLUDE PERFORMANCE DATA FOR EQUIPMENT, DUCT AND PIPE DISTRIBUTION SYSTEMS, AND AIR AND WATER FLOW RATES. O&M MANUALS SHALL INCLUDE EQUIPMENT AND ASSOCIATED OPTIONS REQUIRING SERVICE, REQUIRED MAINTENANCE ACTIVITIES, CONTACT INFO OF SERVICE AGENCIES, HVAC CONTROLS CALIBRATION INFORMATION AND SET-POINTS, AND DESCRIPTION OF EQUIPMENTS' INTENDED OPERATIONS.
24. FOR RETURN AIR PLENUMS, ALL MATERIALS LOCATED WITHIN A RETURN AIR PLENUM SHALL BE RATED AND APPROVED FOR INSTALLATION IN A RETURN AIR PLENUM.

**MECHANICAL KEYED NOTES:**

- ① PROVIDE NEW 24" X 24" SUPPLY AIR DEVICE AT LOCATION INDICATED. BALANCE TO CFM INDICATED. SEE SCHEDULE AND DETAILS. TYPICAL.
- ② PROVIDE NEW 24" X 24" RETURN AIR GRILLE AT LOCATION INDICATED. SEE SCHEDULE AND DETAILS. TYPICAL.
- ③ PROVIDE NEW BLACK "FLOW BAR" SUPPLY SLOT DIFFUSER AT LOCATION INDICATED. COORDINATE WITH ARCHITECT FOR FINAL LOCATION AND DETAIL. BALANCE TO CFM INDICATED. SEE SCHEDULE AND DETAIL. TYPICAL.
- ④ PROVIDE NEW CONTINUOUS PERIMETER LINEAR SLOT FOR FLOW BAR SLOT DIFFUSER. ANY UNUSED SECTION OF SLOT SHALL BE COVERED WITH RETURN AIR HOOD WITH LIGHT SHIELD. COORDINATE WITH ARCHITECT AND REFLECTED CEILING PLAN. TYPICAL.
- ⑤ PROVIDE NEW SUPPLY DUCTWORK AS SHOWN. SUPPORTED DUCTWORK CLOSE TO STRUCTURE. TYPICAL.
- ⑥ PROVIDE NEW EXHAUST FAN (EF). ROUTE EXHAUST DUCT OF MENTIONED SIZE THROUGH ROOF. ENSURE EXHAUST OUTLET IS A MINIMUM OF 10 FEET FROM NEAREST FRESH AIR INTAKE. BALANCE TO CFM INDICATED. SEE SCHEDULE AND DETAIL.
- ⑦ REUSE EXISTING RTUS. CONTRACTOR TO FIELD VERIFY EXACT DUCT PENETRATIONS AND REUSE EXISTING MAIN SA/RA DUCTS.
- ⑧ PROVIDE NEW BLACK "FLOW BAR" RETURN SLOT DIFFUSER AT LOCATION INDICATED. COORDINATE WITH ARCHITECT FOR FINAL LOCATION AND DETAIL. BALANCE TO CFM INDICATED. SEE SCHEDULE AND DETAIL. TYPICAL.
- ⑨ PROVIDE NEW THERMOSTAT AT LOCATION INDICATED AT 4' A.F.F.. CONTRACTOR TO FIELD VERIFY AND COORDINATE WITH BUILDING ENGINEER FOR EXACT THERMOSTAT AND LOCATION.

**1 MECHANICAL FLOOR PLAN**  
SCALE: 3/16" = 1'-0"





- MECHANICAL KEYED NOTES:**
- ① REUSE EXISTING RTU AT LOCATION SHOWN. COORDINATE WITH STRUCTURAL ENGINEER AND ARCHITECT FOR EXACT LOCATION. FIELD VERIFY AND COORDINATE TO MAINTAIN ALL BUILDING EXHAUST TO BE AT LEAST 10 FEET AWAY FROM THE RTU'S OUTSIDE AIR INTAKE OPENING. PROVIDE TRANSITION AS REQUIRED TO FIT ROOF TOP UNIT OPENING FROM THE EXISTING DUCTWORK. SEE SCHEDULE AND DETAILS.
  - ② PROVIDE NEW EXHAUST DUCT AS SHOWN WITH EXHAUST VENT/CAP. FIELD VERIFY AND COORDINATE FOR EXACT LOCATION. FOLLOW MANUFACTURER'S GUIDELINE FOR PROPER INSTALLATION.
  - ③ CONTRACTOR TO FIELD VERIFY EXISTING RTU UNIT'S CAPACITY AND WORKING CONDITION. IF EXISTING UNIT IS NOT IN PROPER OPERATING CONDITION, REPLACE THAT UNIT WITH SIMILAR KIND. PROVIDE ALL ACCESSORIES AS REQUIRED.

1 MECHANICAL ROOF PLAN  
SCALE: 3/16" = 1'-0"

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RTU SCHEDULE				
MARK	RTU-1 (E)	RTU-2 (E)	RTU-3 (E)	RTU-4 (E)
QUANTITY	1	1	1	1
UNIT TYPE	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
MANUFACTURER	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
MODEL	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
STATUS	EXISTING	EXISTING	EXISTING	EXISTING
MOUNTING	ROOF	ROOF	ROOF	ROOF
NOMINAL CAP. (TR)	4	4	4	4
TOTAL COOLING CAP. (BTUH)	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
SENS. COOLING CAP. (BTUH)	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
EE/IEER	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
HEATING KW	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
SUPPLY AIRFLOW (CFM)	1600	1600	1600	1600
OUTDOOR AIR (CFM)	200	200	200	200
FAN HP	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
VOLTAGE/PHASE	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
MCA (A)	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
MOCP(A)	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
WEIGHT (LBS.) (APPROX.)	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
THERMOSTAT	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
REMOTE SENSOR	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING
REQUIRED ACCESSORIES	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING	SAME AS EXISTING

- NOTES:-**
- 1) PROVIDE IECC COMPLIANT THERMOSTAT FOR EACH RTU. THERMOSTAT SHALL BE CALIBRATED TO DISPLAY SPACE TEMPERATURE AT +/- 1°F. THE CONTROL SYSTEM SHALL CONTROL ECONOMIZER, DISCHARGE AIR TEMPERATURE CONTROL, SPACE TEMPERATURE.
  - 2) S.A.E- SAME AS EXISTING.
  - 3) RTU IS AN EXISTING. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND OPERATING CONDITION, INFORM TO ENGINEER/LANDLORD IF RTU IS NOT OPERATING AT ITS 100% RATED CAPACITY.
  - 4) REPLACE FILTERS WITH NEW ONES.
  - 5) SET OUTSIDE AIR DAMPER AS PER AIRFLOW MENTIONED IN THE TABLE ABOVE.

MECHANICAL FAN DETAILS									
TAG	FLOW RATE CFM	STATIC PRESSURE		ELECTRIC DATA			BASIS OF DESIGN		REMARK
		EXTERNAL IN W.G.	SPEED RPM	INPUT WATT	V/PH/Hz	MAXIMUM LOUDNESS DBA	MANUFACTURER	MODEL	
EF-1 (N)	75	0.3	847	32	115/1/60	38	COOK	GC-146	1,2,3
EF-2 (N)	75	0.3	847	32	115/1/60	38	COOK	GC-146	1,2,3
EF-3 (N)	75	0.3	847	32	115/1/60	38	COOK	GC-146	1,2,3
EF-4 (N)	100	0.3	847	32	115/1/60	38	COOK	GC-146	1,2,3

**NOTES:**

1. PROVIDE FAN WITH BACK DRAFT DAMPER, DISCONNECT SWITCH. FAN-MOUNTED SPEED CONTROLLER.
2. SOLID STATE SPEED CONTROL.
3. BALANCE TO SCHEDULED CFM.
4. ALTERNATE MANUFACTURERS ARE ACCEPTABLE PROVIDED THEY MEET THE PERFORMANCE AND SPECIFICATIONS.

AIR BALANCE					
UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR
RTU-1(E)	SEE PLAN	1600 CFM	200 CFM	1400 CFM	-
RTU-2(E)	SEE PLAN	1600 CFM	200 CFM	1400 CFM	-
RTU-3(E)	SEE PLAN	1600 CFM	200 CFM	1400 CFM	-
RTU-4(E)	SEE PLAN	1600 CFM	200 CFM	1400 CFM	-
EF-1 (N)	125 TOILET	-	-	-	75 CFM
EF-2 (N)	102 TOILET	-	-	-	75 CFM
EF-3 (N)	106 TOILET	-	-	-	75 CFM
EF-4 (N)	SOILED LAB	-	-	-	100 CFM
TOTAL:		6400 CFM	800 CFM	5600 CFM	325 CFM
BUILDING PRESSURE:			475 CFM		<b>POSITIVE</b>

DIFFUSER NECK SIZE SCHEDULE		
CFM RANGE	SQUARE NECK SIZE	ROUND NECK SIZE
0 - 120	6X6	6"Ø
125 - 220	8X8	8"Ø
225 - 330	10X10	10"Ø
335 - 450	12X12	12"Ø
455 - 530	15X15	14"Ø
540 - 700	16X16	16"Ø

AIR DEVICE SCHEDULE			
MARK	MANUF.+MODEL	TYPE	REMARK
☒	TITUS OMNI OR EQUAL	CEILING SUPPLY	24X24, 12X12 PLAQUE FACE SUPPLY AIR DIFFUSER. FACE SHALL BE STEEL WITH A STEEL BACK PAN. FACE AND FRAME FINISH SHALL MATCH DECORATIVE CEILING TILES IN AREA. BACK PAN SHALL BE PAINTED BLACK. COORDINATE CEILING MOUNTING TYPE WITH ARCHITECTURAL CEILING TYPE. PROVIDE REMOTE DAMPER OPERATORS IN AREAS WITH INACCESSIBLE CEILINGS.
☒	TITUS OMNI OR EQUAL	CEILING RETURN /EXHAUST	24x24, 12x12 PLAQUE FACE DIFFUSER. DIFFUSER TO HAVE 6" NECK UNLESS OTHERWISE NOTED. FACE SHALL BE ALUMINUM WITH A STEEL BACK PAN. FACE AND FRAME FINISH SHALL MATCH DECORATIVE CEILING TILES. COORDINATE CEILING MOUNTING TYPE WITH ARCHITECTURAL CEILING TYPE.
☒	TITUS FLOWBAR (FL-25-HT) OR EQUAL	CEILING SUPPLY DRYWALL	FLOWBAR SUPPLY DIFFUSER IN DRYWALL CEILING. BORDER TYPE 22. ONE 2.5" SLOT. PROVIDE 48" SUPPLY PLENUM AS INDICATED ON FLOOR PLANS.

LEGEND OF MECHANICAL SYMBOLS	
SYMBOL	DESCRIPTION
	SUPPLY DUCT VIEW INTO DUCT
	SUPPLY DUCT VIEW HEEL OF ELBOW
	RETURN OR EXHAUST DUCT VIEW INTO DUCT
	RETURN OR EXHAUST DUCT VIEW HEEL OF ELBOW
	SQUARE TO ROUND TRANSITION
	SQUARE ELBOW WITH TURNING VANES.
	RADIUS ELBOW WITHOUT TURNING VANES.
	SUPPLY SIDEWALL REGISTER
	RETURN OR EXHAUST SIDEWALL REGISTER
	EXISTING S.A. DIFFUSER
	ROUND S.A. DIFFUSER
	EXISTING FLEX DUCT
	NEW FLEX DUCT
	EXISTING DUCTWORK
	NEW DUCTWORK
	DUCTWORK TO BE REMOVED
	SQUARE CEILING DIFFUSER
	RETURN AIR GRILLE
	RETURN OR EXHAUST AIR REGISTER W/ SQUARE NECK
	PLENUM SLOT DIFFUSER
	MANUAL DAMPER
	FIRE DAMPER WITH ACCESS DOOR
	DRAIN LINE
	PIPE RISING
	PIPE TURNING DOWN
	EXHAUST FAN SPEED CONTROL
	THERMOSTAT
	EXISTING TO REMAIN
	RELOCATED
	RETURN AIR
	SUPPLY AIR
	C.F.M. CUBIC FEET PER MINUTE
	AHU AIR HANDLER UNIT

**NOTES:**

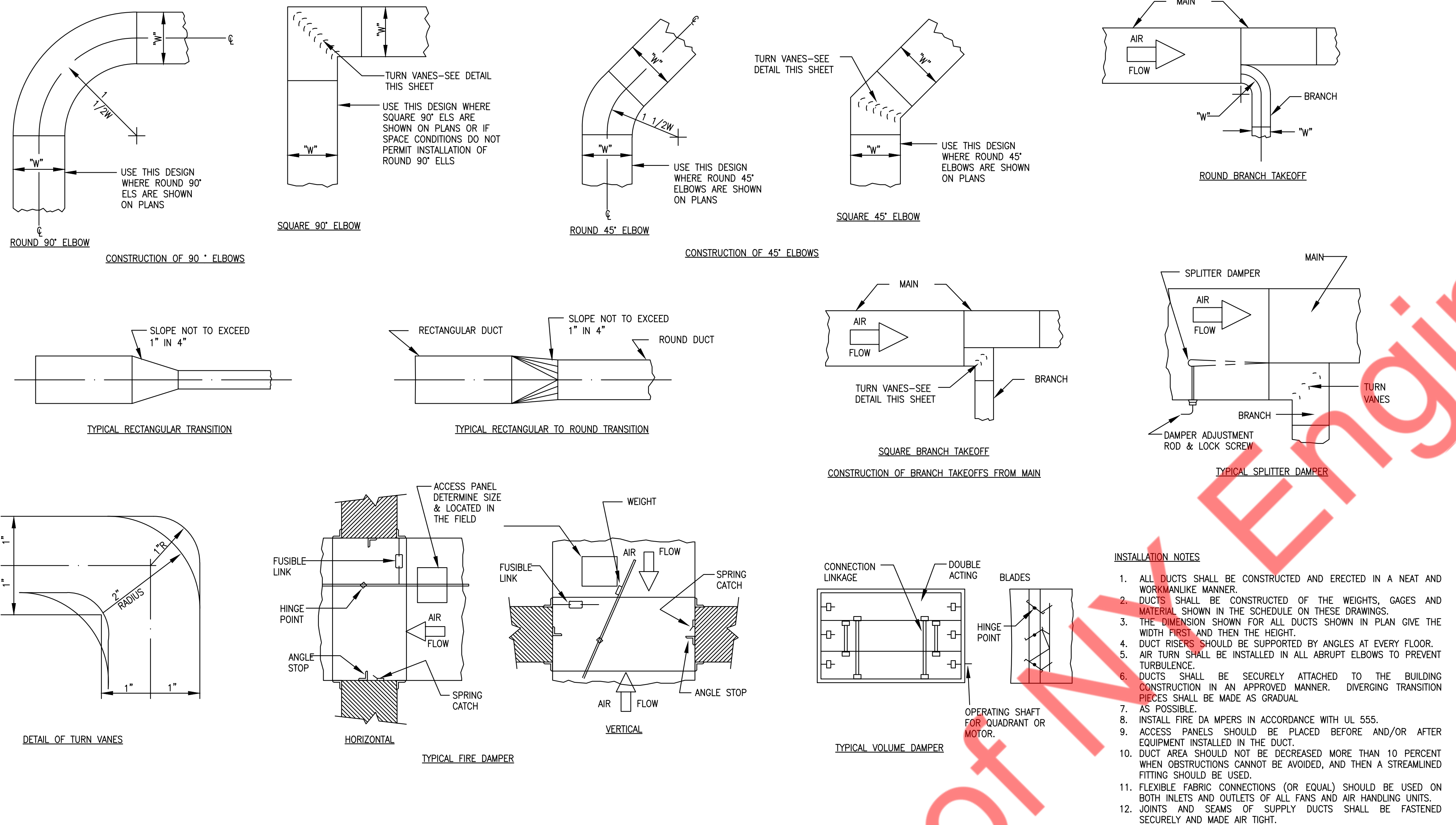
1. ALL SYMBOLS MAY NOT BE USED ON THIS DRAWINGS.

**OUTSIDE AIR ANALYSIS:**

OUTSIDE AIR SHALL BE PROVIDED IN ACCORDANCE WITH THE 2018 INTERNATIONAL MECHANICAL CODE PER TABLE 403.3.1.1.

WAITING:	(Rp	x	Pz	)	+	(	Ra	x	Az	)	=	Vbz	
	(7.5 CFM/PER	x	20 PPL	)	+	(0.06 CFM/SQFT	x	748 SQFT)	=	195 CFM			
VITALS/NURSE TOUCH DOWN:	(-	CFM/PER	x	2 PPL	)	+	(0.06 CFM/SQFT	x	1034 SQFT)	=	63 CFM		
STORAGE/DOC BOX:	(-	CFM/PER	x	- PPL	)	+	(0.12 CFM/SQFT	x	323 SQFT)	=	21 CFM		
CONSULTATION:	(5	CFM/PER	x	2 PPL	)	+	(0.06 CFM/SQFT	x	81 SQFT)	=	15 CFM		
EXAM/LARGE EXAM ROOMS:	(5	CFM/PER	x	9 PPL	)	+	(0.06 CFM/SQFT	x	931 SQFT)	=	106 CFM		
OFFICE/RECEPTION:	(5	CFM/PER	x	6 PPL	)	+	(0.06 CFM/SQFT	x	339 SQFT)	=	51 CFM		
STAFF LOUNGE:	(7.5	CFM/PER	x	5 PPL	)	+	(0.06 CFM/SQFT	x	262 SQFT)	=	54 CFM		
X-RAY ROOM:	(10	CFM/PER	x	2 PPL	)	+	(0.18 CFM/SQFT	x	159 SQFT)	=	49 CFM		
PROCEDURE:	(10	CFM/PER	x	2 PPL	)	+	(0.18 CFM/SQFT	x	150 SQFT)	=	47 CFM		
LABS:	(10	CFM/PER	x	6 PPL	)	+	(0.18 CFM/SQFT	x	208 SQFT)	=	98 CFM		
ELECTRIC/IT:	(5	CFM/PER	x	0 PPL	)	+	(0.06 CFM/SQFT	x	131 SQFT)	=	8 CFM		
												-----	
												TOTAL	= 707 CFM
												OVERALL:	Vbz / Ez = Voz
													1036 CFM / 1 = 707 CFM
												TOTAL OUTSIDE AIR REQUIRED	= 707 CFM
												TOTAL OUTSIDE AIR PROVIDED	= 800 CFM





TABLE—DUCT CONSTRUCTION MIN. SHEET METAL THICKNESS

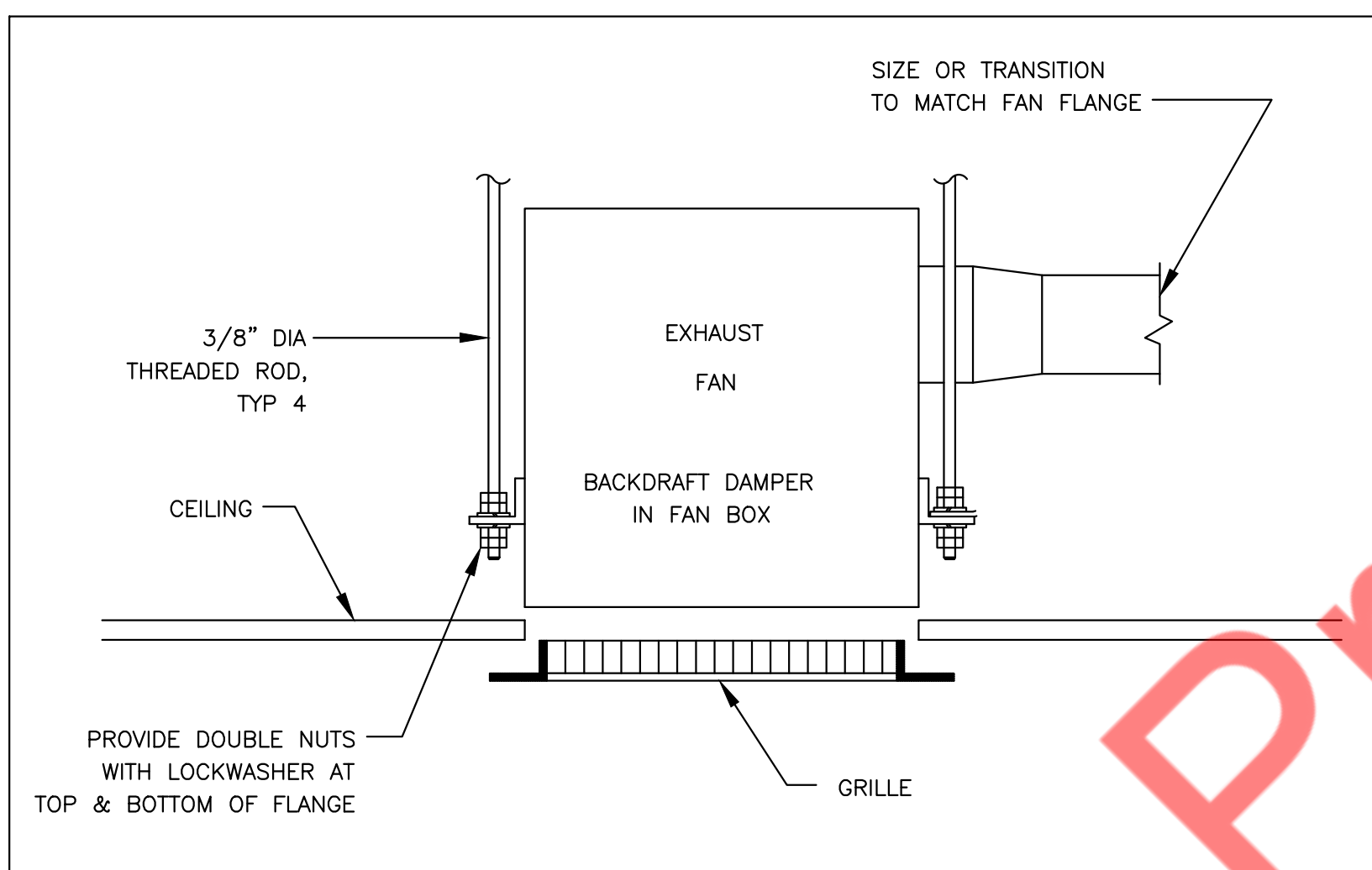
ROUND DUCT DIAMETER (INCHES)	STATIC PRESSURE			
	1/2-INCH WATER GAGE		1-INCH WATER GAGE	
	THICKNESS (INCHES)		THICKNESS (INCHES)	
	GALVANIZED	ALUMINUM	GALVANIZED	ALUMINUM
<12	0.013	0.018	0.013	0.018
12 to 14	0.013	0.018	0.016	0.023
15 to 17	0.016	0.023	0.019	0.027
18	0.016	0.023	0.024	0.034
19 to 20	0.019	0.027	0.024	0.034

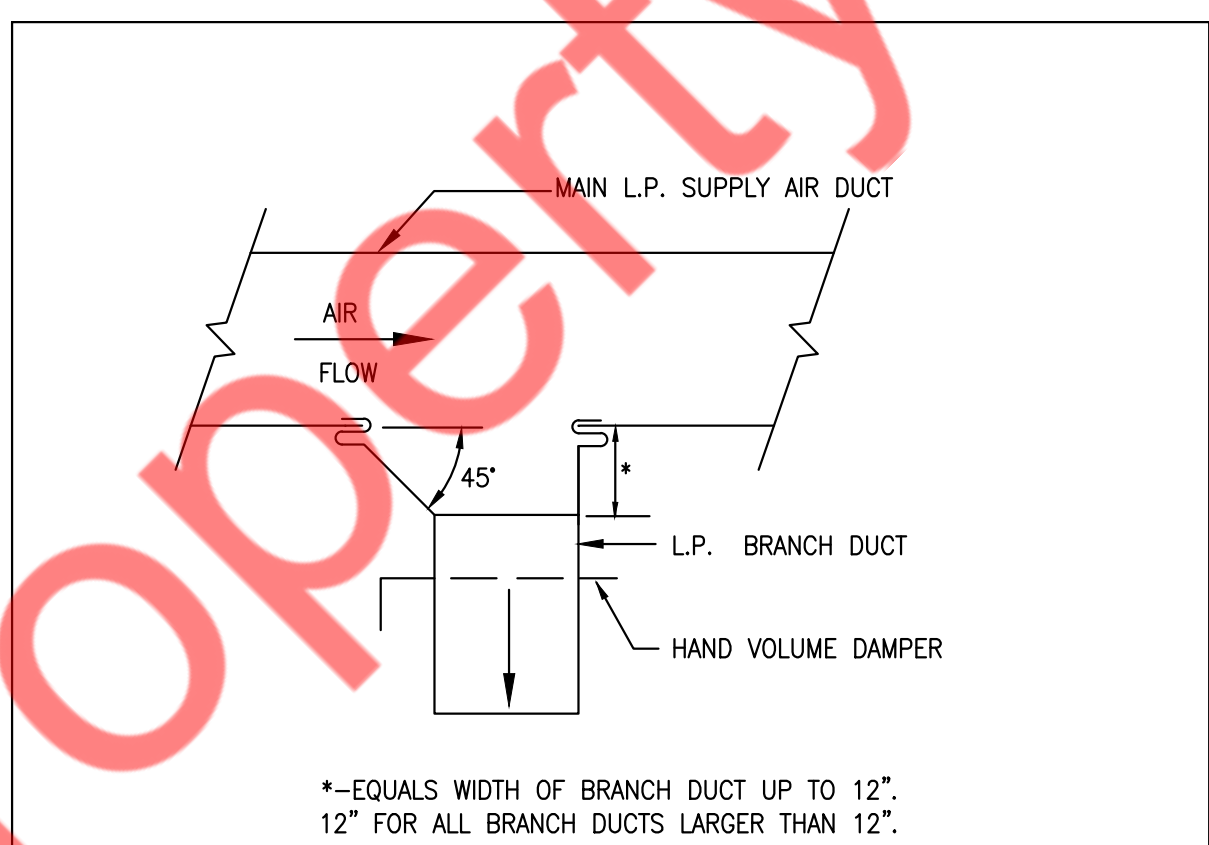
RECTANGULAR DUCT DIMENSION (INCHES)	STATIC PRESSURE			
	1/2-INCH WATER GAGE		1-INCH WATER GAGE	
	THICKNESS (INCHES)		THICKNESS (INCHES)	
	GALVANIZED	ALUMINUM	GALVANIZED	ALUMINUM
≤ 8	0.013	0.018	0.013	0.018
9 to 10	0.013	0.018	0.016	0.023
11 to 12	0.016	0.023	0.019	0.027
13 to 16	0.019	0.027	0.019	0.027
17 to 18	0.019	0.027	0.024	0.034
19 to 20	0.024	0.034	0.024	0.034

- INSTALLATION NOTES**
- ALL DUCTS SHALL BE CONSTRUCTED AND ERECTED IN A NEAT AND WORKMANLIKE MANNER.
  - DUCTS SHALL BE CONSTRUCTED OF THE WEIGHTS, GAGES AND MATERIAL SHOWN IN THE SCHEDULE ON THESE DRAWINGS.
  - THE DIMENSION SHOWN FOR ALL DUCTS SHOWN IN PLAN GIVE THE WIDTH FIRST AND THEN THE HEIGHT.
  - DUCT RISERS SHOULD BE SUPPORTED BY ANGLES AT EVERY FLOOR.
  - AIR TURN SHALL BE INSTALLED IN ALL ABRUPT ELBOWS TO PREVENT TURBULENCE.
  - DUCTS SHALL BE SECURELY ATTACHED TO THE BUILDING CONSTRUCTION IN AN APPROVED MANNER. DIVERGING TRANSITION PIECES SHALL BE MADE AS GRADUAL AS POSSIBLE.
  - AS POSSIBLE.
  - INSTALL FIRE DAMPERS IN ACCORDANCE WITH UL 555.
  - ACCESS PANELS SHOULD BE PLACED BEFORE AND/OR AFTER EQUIPMENT INSTALLED IN THE DUCT.
  - DUCT AREA SHOULD NOT BE DECREASED MORE THAN 10 PERCENT WHEN OBSTRUCTIONS CANNOT BE AVOIDED, AND THEN A STREAMLINED FITTING SHOULD BE USED.
  - FLEXIBLE FABRIC CONNECTIONS (OR EQUAL) SHOULD BE USED ON BOTH INLETS AND OUTLETS OF ALL FANS AND AIR HANDLING UNITS.
  - JOINTS AND SEAMS OF SUPPLY DUCTS SHALL BE FASTENED SECURELY AND MADE AIR TIGHT.

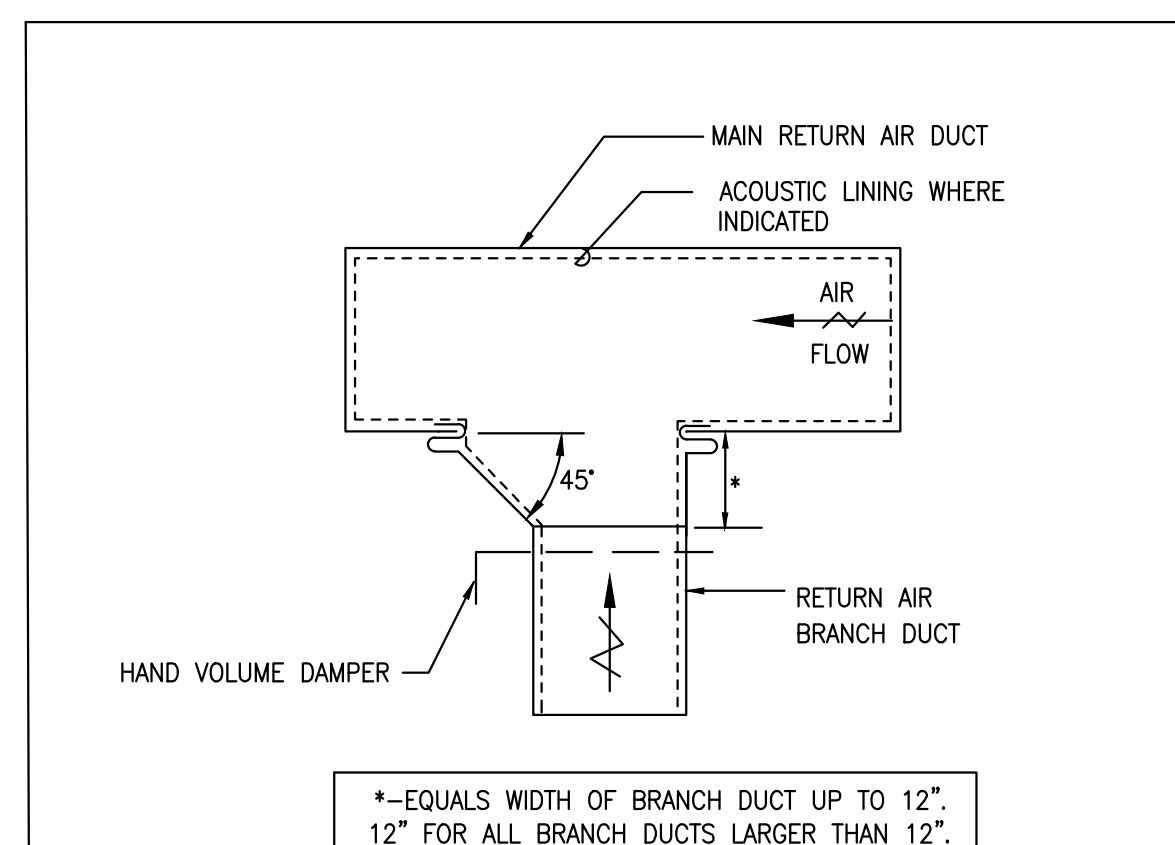
**1 DETAILS OF THE LOW VELOCITY DUCT LAYOUT**  
M3.1 N.T.S.



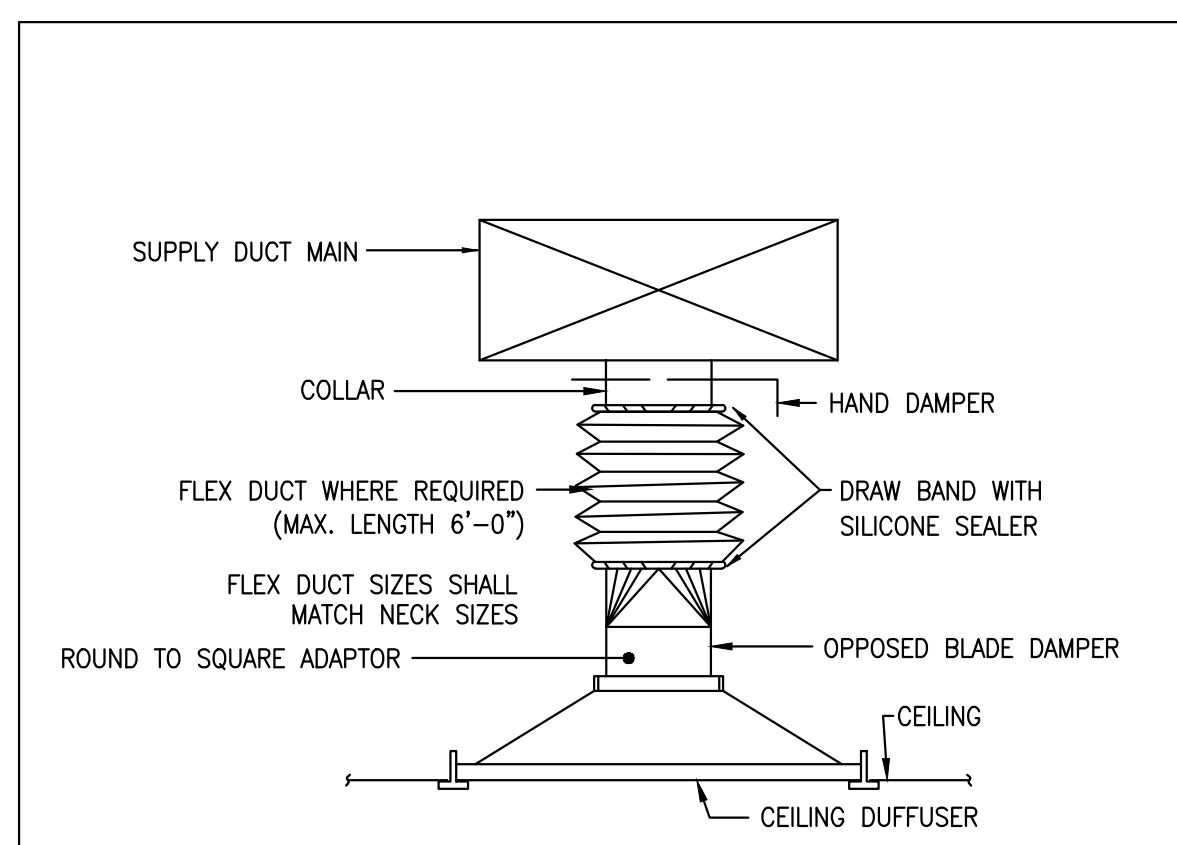
**2 CEILING EXHAUST FAN**  
M3.1 N.T.S.



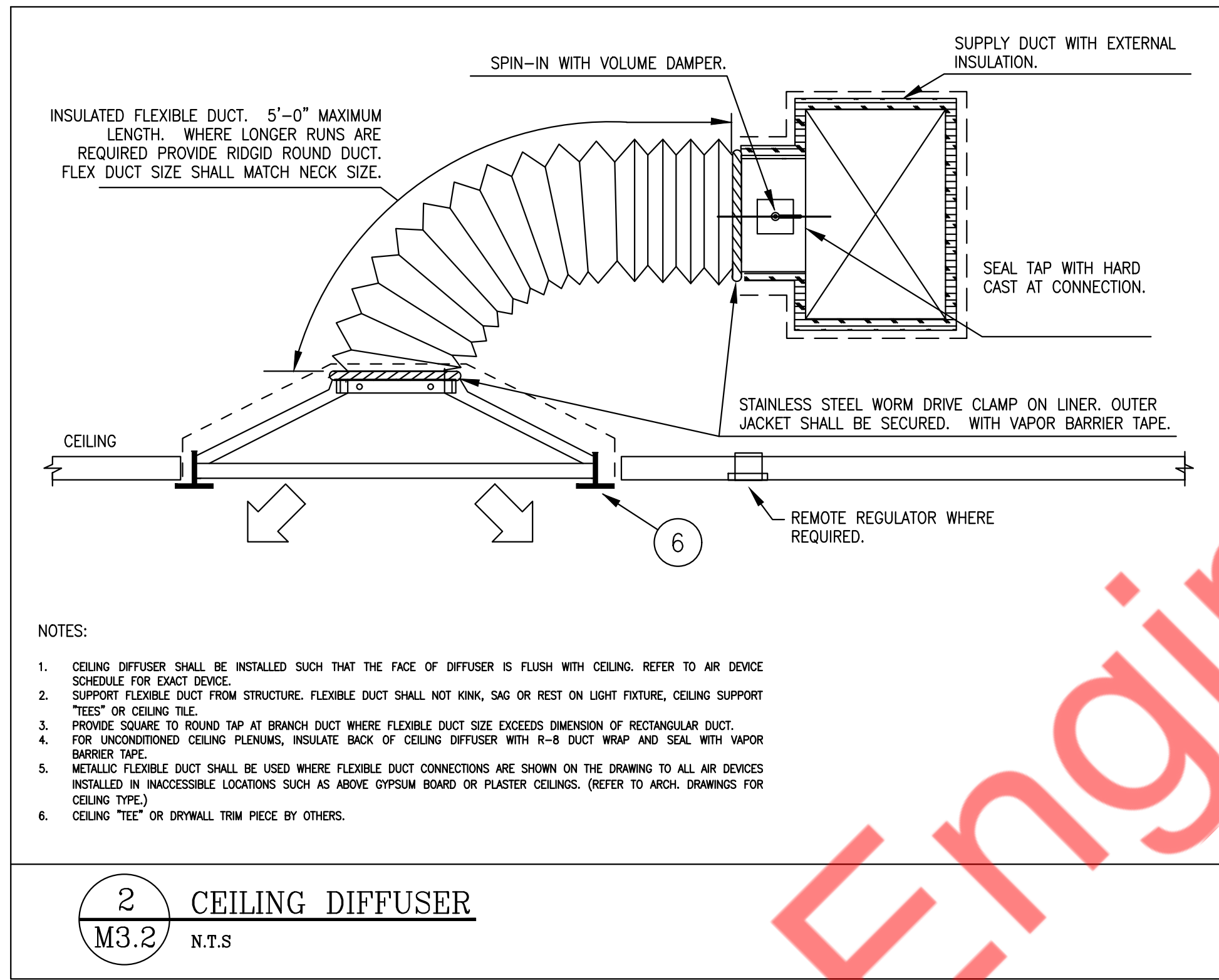
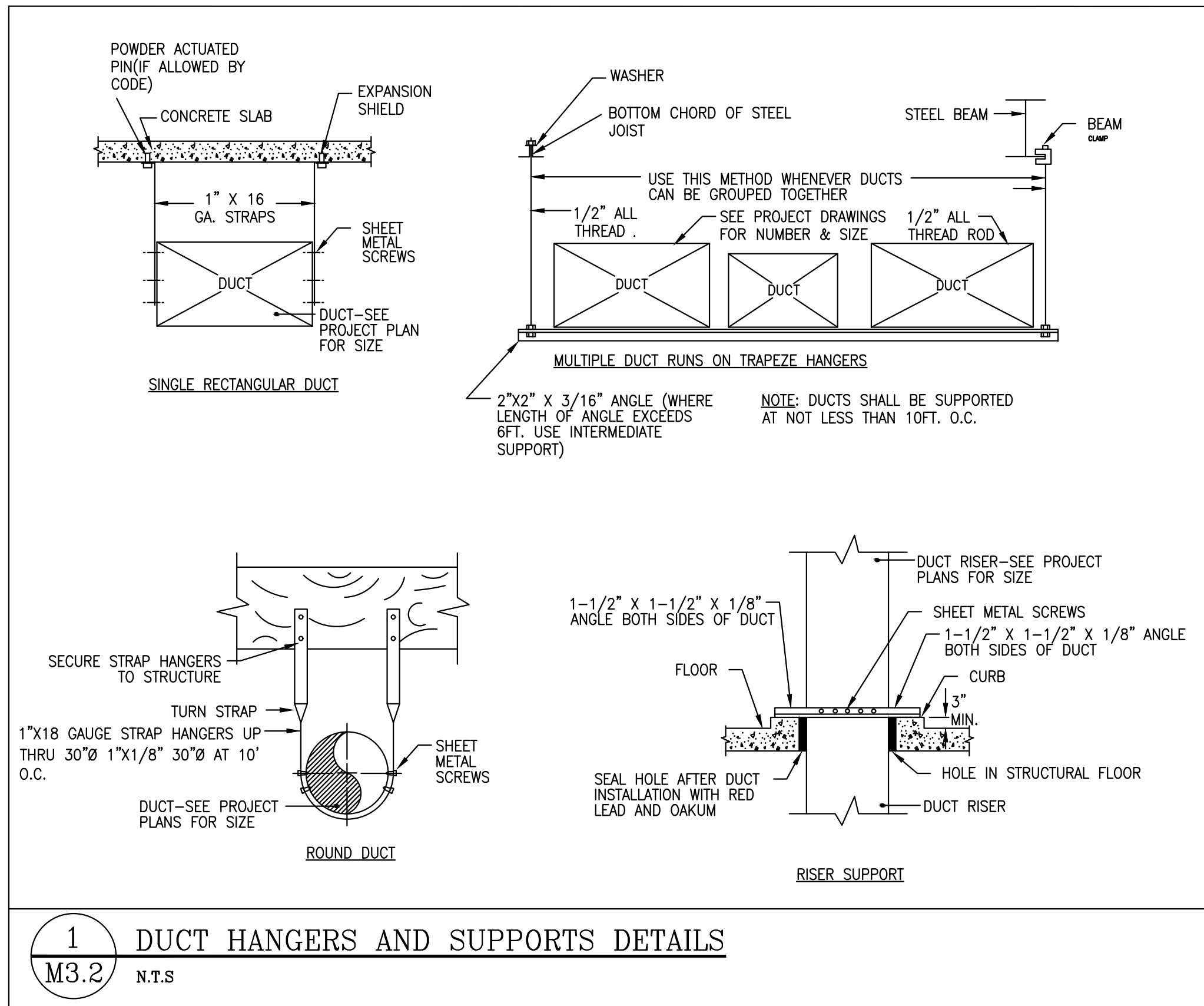
**3 TYP. LOW PRESSURE DUCT TAKE-OFF**  
M3.1 N.T.S.



**4 TYP. RETURN AIR BRANCH TAKE-OFF**  
M3.1 N.T.S.



**5 CEILING DIFFUSER**  
M3.1 N.T.S.



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# ELECTRICAL SYMBOLS LIST

## GENERAL NOTES

### LIGHTING

	LIGHTING FIXTURE AND OUTLET BOX. HALF SHADED FIXTURE OR "EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY SERVICE, U.O.N.
	LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE.
	CIRCUIT NUMBER : INDICATED BY NUMBER
	SWITCHING INDICATED BY LOWER CASE LETTERS.
	DENOTES LUMINAIRE ON EMERGENCY CIRCUIT.
	DENOTES FIXTURES DESIGNATED AS NIGHTLIGHT, WIRED TO 24 HOURS UNSWITCHED CIRCUIT.
	CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONAL ARROWS AS INDICATED. SHADED AREA DENOTES FACE(S). ISOLITE ELITE SERIES LED EXIT SIGN

### SWITCHES AND CONTROLS

	20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE/SWITCHED RECEPTACLE CONTROLLED.
	20A 3-WAY TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED
	CEILING OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE. 'A' LETTER REFERES TO WIRING DIAGRAM.

### WIRING SYSTEMS

	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 2#12 Ø, 2#12 N. & 2#12 G. IN 3/4"Ø, UNLESS OTHERWISE NOTED.
	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 3#12 Ø, 3#12 N. & 3#12 G. IN 3/4"Ø, UNLESS OTHERWISE NOTED.
	CONDUIT AND WIRE TO BUILDING GROUND.
	UNDERGROUND
	EXISTING
	NEW

### ELECTRICAL DRAWING LIST

E0.1	ELECTRICAL SYMBOLS AND GENERAL NOTES
E0.2	ELECTRICAL SPECIFICATIONS SHEET 1 OF 2
E0.3	ELECTRICAL SPECIFICATIONS SHEET 2 OF 2
E1.0	LIGHTING ELECTRICAL PLAN
E2.0	POWER ELECTRICAL PLAN
E2.1	ELECTRICAL ROOF PLAN
E3.0	ELECTRICAL RISER DIAGRAM & PANEL SCHEDULE
E4.0	ELECTRICAL DETAILS

### POWER AND TELECOMMUNICATION

	JUNCTION BOX WITH BLANK COVER PLATE, FLUSH IN FLOOR.
	SIMPLEX RECEPTACLE, +18" AFF OR AS NOTED. SUFFIX DENOTES FOLLOWING: A- NEMA 5-15R B- NEMA 6-15R C- NEMA 14-30R D- NEMA 14-50R
	DUPLEX GFI RECEPTACLE
	DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.
	DEDICATED DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.
	TELEPHONE/DATA OUTLET, 4" SQUARE OUTLET BOX WITH SINGLE GANG COLLAR AND BLANK PLATE. PROVIDE 3/4" E.C., U.O.N., UP TO HUNG CEILING AND TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE.
	QUAD RECEPTACLE
	DATA OUTLET

### MOTORS AND CONTROLS

	AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION WITH JUNCTION BOX AND MOTOR SWITCH.
	AC OUTDOOR UNIT MOTOR AS NOTED WITH CONTROLLER AND DISCONNECT SWITCH WITH WEATHER PROOF.
	NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES AS NOTED.
	30A/240V NON FUSED DISCONNECT SWITCH
	60A/240V NON FUSED DISCONNECT SWITCH
	100A/240V NON FUSED DISCONNECT SWITCH
	200A/240V NON FUSED DISCONNECT SWITCH
	COMBINATION MAGNETIC STARTER AND DISCONNECT SWITCH, FURNISHED BY HVAC/CONTRACTOR, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.
	FUSED DISCONNECT SWITCH AND FUSE AMPERAGE AS INDICATED. TOP NUMBER DENOTS SWITCH SIZE AND BOTTOM NUMBER DENOTES FUSE.
	DUPLEX PUMP. NUMBER INDICATES HP RATING OF PUMP.
	ELECTRICAL HEATER, NUMBER DENOTES HEATER RATING
	WALL MOUNT OCCUPANCY SENSOR SWITCH
	THERMAL OVERLOAD SWITCH AT MOTOR. PROVIDE THERMAL ELEMENTS AS PER MOTOR RATING.
	MANUAL MOTOR SWITCH

### ANNOTATION

	KEYED NOTE REFERENCE
	+24" INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR.
	DETAIL REFERENCE: DETAIL NUMBER INDICATED ON TOP; DRAWING NUMBER INDICATED ON BOTTOM

### POWER DISTRIBUTION

	MAJOR ELECTRICAL COMPONENT OR DEVICE. VOLTAGE AND AMPERAGE AS NOTED.
	DISTRIBUTION PANELBOARD, 120/208V-SURFACE OR FLUSH MOUNTED.

### ELECTRICAL ABBREVIATIONS

A	AMPERES	EA	EACH
A/C, AC	AIR CONDITIONING UNIT	EM	EMERGENCY
AF	AMPERE FRAME/AMP FUSE	EMT	ELECTRICAL METALLIC TUBING
AFF	ABOVE FINISHED FLOOR	EQUIP	EQUIPMENT
AS	AMP SWITCH	ER	EXISTING TO BE RELOCATED
AIC	AMPS INTERRUPTING CAPACITY	FA	FIRE ALARM
AT	AMP TRIP	E	EXISTING
ATS	AUTOMATIC TRANSFER SWITCH	FL	FLOOR
AUTO	AUTOMATIC	G	GROUND
AWG	AMERICAN WIRE GAUGE	GFI	GROUND FAULT INTERRUPTER
C	CONDUIT	GP	GENERAL PURPOSE
C/B,CB	CIRCUIT BREAKER	HP	HORSEPOWER
CKT	CIRCUIT	HWH	HOW WATER HEATER
CLG	CEILING	HZ	HERTZ
COMM	COMMUNICATION	IC	INTERRUPTING CAPACITY
CT	CURRENT TRANSFORMER	PP	POWER PANEL
CU	COPPER	PWR	POWER
DIA	DIAMETER	R	REMOVE
DISC	DISCONNECT	RE	RELOCATED EXISTING
DN	DOWN	REC	RECEPTACLE
DP	DISTRIBUTION PANEL	RGS	RIGID GALVANIZED STEEL
DWG	DRAWING	RR	REMOVE & RELOCATE
JB	JUNCTION BOX	SECT	SECTION
KCMIL	ONE THOUSAND CIRCULAR MILS	SPDT	SINGLE POLE DOUBLE THROW
KV	KILOVOLT	SPST	SINGLE POLE SINGLE THROW
KVA	KILOVOLT-AMPERES	SPEC	SPECIFICATION
KW	KILOWATTS	SW	SWITCH
LTG	LIGHTING	SWBD	SWITCHBOARD
MAX	MAXIMUM	SYM	SYMMETRICAL
MC	MOTOR CONTROLLER	SYS	SYSTEMS
MCB	MAIN CIRCUIT BREAKER	TELE	TELEPHONE
MLO	MAIN LUGS ONLY	TEMP	TEMPERATURE
MTD	MOUNTED	TXF	TOILET EXHAUST FAN
MTS	MANUAL TRANSFER SWITCH	TYP	TYPICAL
N	NEUTRAL	UON	UNLESS OTHERWISE NOTED
NIC	NOT IN CONTRACT	V	VOLT/VOLTAGE
NTS	NOT TO SCALE	VA	VOLT AMPERE
PNL	PANEL	WP	WEATHER PROOF
W	WATT	Ø	PHASE

- ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE CURRENT VERSION OF THE NEC, LOCAL JURISDICTION REQUIREMENTS, AND ALL GOVERNING LOCAL CODES, LAWS, AND REGULATIONS.
- CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.
- FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS SHALL BE SLEEVED AND SEALED WATERTIGHT.
- SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK), NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
- LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED; FURNISH FISH WIRE.
- VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
- CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
- ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
- CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE-EXISTING CONDITIONS OR BETTER.
- MINIMUM SIZE OF CONDUIT SHALL BE 3/4", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.
- CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
- PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVIDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CONCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.
- SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
- FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.
- ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAINIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.
- ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
- ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
- ALL CONDUITS AND EQUIPMENT TO BE CONCEALED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.
- ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.
- OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE-RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE-RATED BOXES OR PUTTY PADS ARE UTILIZED.
- COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITH THE ENGINEER AND OWNER BEFORE INSTALLATION.
- COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.
- REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL LUMINAIRES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
- REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.
- LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.
- NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANELBOARD.

Property of







## ELECTRICAL SPECIFICATIONS (CONT.)

### 3) BOXES:

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

### C. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM FOR ABOVE FLOOR FITTINGS. TELEPHONE SLOTS BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK, NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED. EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS.

FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT, PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS.

CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.

EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.

RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.

### D. PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE-PIECE PLUG WITH POZI-GRIP WEDGING PLUG AS MANUFACTURED BY OZ-GEDNEY. TYPE SF SHALL BE USED FOR ARMORED CABLE.

INSTALL CABLE SUPPORTS AT THE TOP OF A VERTICAL RISE AND PROVIDE INTERMEDIATE ADDITIONAL SUPPORTS AS REQUIRED TO LIMIT SUPPORTED CONDUCTOR LENGTHS TO NOT GREATER THAN THOSE SPECIFIED IN TABLE 300.19(A).

- A. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.

- D. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

- E. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE-PARTITIONS ROOMS.

- F. PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

### 9. WIRE AND CABLE:

- A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.

- B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.

- C. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM. OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.

- D. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).

- E. ARMORED CABLE (BX) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS. WHEN USED IN LIEU OF WIRING IN CONDUIT, STATE IN PROPOSAL THAT PRICE IS BASED UPON THE USE OF HOSPITAL GRADE "BX".

- F. COLOR CODING SHALL BE AS FOLLOWS:

120/208 VOLT SYSTEM:  
BLACK FOR A PHASE  
RED FOR B PHASE  
BLUE FOR C PHASE

- 1) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.

WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.

- G. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.

- H. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OR TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.

- I. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 265/460 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.

- J. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.

- K. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.

PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

### 11. WIRING DEVICES:

- A. WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS OTHERWISE NOTED. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.

- B. LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, RATED 20 AMP, 120/208 VOLT, AC, SIMILAR TO LEVITON DECORA SERIES A5621 (SINGLE POLE), A5623 (3-WAY) AND A5624 (4-WAY).

- C. STRAIGHT BLADE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOTT, DECORA SERIES BY LEVITON. GROUNDED, EXCEPT AS NOTED.

- 1) SINGLE GANG, RECESSED, DUPLEX RECEPTACLE: TAMPER RESISTANT, 2-POLE, 3-WIRE GROUNDING, 15A, 125V, NEMA 5-20R; LEVITON 689 SERIES (COLOR AS SPECIFIED BY ARCHITECT).

- 2) USB CHARGER/ DUPLEX TAMPER-RESISTANT RECEPTACLE: TAMPER RESISTANT,

- E. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.

- F. COLORS: COORDINATE COLORS WITH ARCHITECT.

- G. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.

### 12. LIGHTING FIXTURES:

- A. FIXTURES TO BE AS SPECIFIED BY ARCHITECT AND SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.

- B. FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.

- C. BALLAST: CLASS P, HIGH POWER FACTOR, LOWEST AVAILABLE NEMA RATED NOISE LEVEL, E11 AND CBM APPROVED. ENERGY SAVING TYPE. TRIGGER START FOR 24-INCH LAMPS AND RAPID START FOR 48-INCH, TWO LAMP BALLASTS; NO THREE-LAMP BALLASTS. BALLASTS SHALL BE ADVANCE MAGNETEK, UNIVERSAL OR EQUAL.
- D. LED DRIVERS SHALL BE ELECTRONIC TYPE, LABELED AS COMPLIANT WITH RADIO FREQUENCY INTERFERENCE (RFI) REQUIREMENTS OF FCC TITLE 47, PART 15 AND COMPLY WITH NEMA SSL 1 "ELECTRONIC DRIVERS FOR LED DEVICES, ARRAYS OR SYSTEMS". LED DRIVERS SHALL HAVE A SOUND RATING OF "A", HAVE A MINIMUM EFFICIENCY OF 85% AND BE RATED FOR A THD OF LESS THAN 20% AT ALL INPUT VOLTAGES.

- E. DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE. PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE. DIMMABLE LED DRIVERS SHALL BE 0-10V WHERE NOT INDICATED.

- F. CONTINUOUS ROW, TWO LAMP STRIP FIXTURES SHALL BE STAGGERED TYPE.

- G. FLUORESCENT LIGHTING FIXTURES, INCLUDING GENERAL CONSTRUCTION, LAMPS AND BALLASTS SHALL CONFORM TO THE ENERGY EFFICIENCY REQUIREMENTS OF CONSOLIDATED EDISON CO. AND QUALITY FOR A UTILITY REBATE TO OWNER UNDER CON EDISON'S ENLIGHTENED ENERGY LIGHTING REBATE PROGRAM. CONTRACTOR SHALL COORDINATE REBATE PROGRAM WITH CON EDISON AND ARRANGE FOR CON EDISON TO PERFORM A SURVEY TO INVENTORY ALL EXISTING FIXTURES PRIOR TO DEMOLITION.

- H. EXIT SIGNS SHALL BE PRECISION DIE-CAST ALUMINUM HOUSING WITH LASER-FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED. AC POWERED WITH PREMIUM LONG-LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 5-HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

### 13. TELEPHONE CONDUIT SYSTEM:

- A. PROVIDE COMPLETE SYSTEM OF: RACEWAYS AND ACCESSORIES, OUTLET BOXES, SLEEVES AND FISHWIRES.

- B. EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF TELEPHONE COMPANY.

- C. OUTLETS SHALL BE:

- 1) WALL: 4 IN. SQUARE WITH BUSHED COVER PLATE.

- D. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.

- E. CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM OUTLET BOX TO BUSHED END THRU WALL 6" BELOW THE PLASTER CEILING.

- F. FACE RACEWAYS IN ROOMS SHALL HUBBELL HBL500, HBL750 OR HBL2000 SERIES OR AS ACCEPTABLE.

### 14. GROUNDING AND BONDING:

- A. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH (2017) NATIONAL ELECTRICAL CODE, AND THESE SPECIFICATIONS. THE WIRING SYSTEM SHALL BE INSTALLED AS REQUIRED TO PROVIDE A CONTINUOUSLY GROUNDED SYSTEM. WHERE FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, AN INSULATED GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO GROUNDING BUSHINGS AT EACH END OF THE RUN.

- B. USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.

- C. EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.

- D. WHERE FLEXIBLE METALLIC CONDUIT IS USED AN INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.

- E. IN ADDITION, FURNISH A SEPARATE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR WHERE INDICATED ON DRAWINGS AND FOR THE FOLLOWING BRANCH CIRCUITS:

- 1) CIRCUITS SERVING ANY WALL BOX DIMMER.

- 2) CIRCUITS SERVING ANY ISOLATED GROUND RECEPTACLES. TERMINATE GROUND DIRECTLY AT AN EQUIPMENT GROUNDING CONDUCTOR TERMINAL OF THE SOURCE, OR AS OTHER WISE NOTED ON DRAWINGS.

- 3) CIRCUITS SERVING ANY DUPLEX OR SIMPLEX COMPUTER RECEPTACLES

- 4) ANY CIRCUIT SERVED VIA AN ISOLATION TRANSFORMER OR COMPUTER POWER DISTRIBUTION UNIT.

### 15. PANELBOARDS:

- A. PANELBOARDS SHALL BE OF THE DEAD FRONT TYPE MANUFACTURED IN CODE GAUGE AND SIZE BOXES FOR MOUNTING AS INDICATED ON PLANS COMPLETE WITH TRIM, DOORS AND LOCKS. ALL LOCKS SHALL BE KEYS ALIKE.

- B. CIRCUIT BREAKERS SHALL BE OF THE BOLT-ON THERMAL MAGNETIC MOLDED CASE TYPE, AND SHALL HAVE THE TRIP RATINGS AND NUMBER OF POLES SHOWN IN SCHEDULES ON THE CONTRACT DRAWINGS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL RATED BUS. MINIMUM GUTTER SPACES SHALL BE 5-3/4". SIDES, TOP AND BOTTOM. INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS INDICATED.

- C. LOCKING TABS SHALL BE PROVIDED ON ALL CIRCUIT BREAKERS SERVING EMERGENCY LIGHTING, FIRE ALARM SYSTEM, SECURITY SYSTEMS AND OTHER EMERGENCY OR CRITICAL EQUIPMENT AND AS NOTED ON THE CONTRACT DRAWINGS. A TOTAL OF 5 SPARE LOCKING TABS SHALL BE FURNISHED TO THE OWNER.

- D. BUSES SHALL BE HARD DRAWN COPPER OF 98 PERCENT CONDUCTIVITY AND SHALL HAVE CROSS SECTIONAL AREAS LARGE ENOUGH TO LIMIT THE TEMPERATURE RISE, WHEN CARRYING FULL LOAD, TO 35 DEGREES C. ABOVE AN AMBIENT INSIDE THE ENCLOSURE OF 55 DEGREES C. AS DEFINED IN IEEE STANDARD RULES. MAIN BUS CAPACITY SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS.

- E. ENCLOSURES SHALL BE SURFACE OR FLUSH AS INDICATED. TRIMS SHALL BE SECURED TO PANEL WITH MACHINE SCREWS. COVERS SHALL BE HINGED DOOR-IN-DOOR CONSTRUCTION WITH CYLINDER LOCKS AND CATCHES. LOCKS MUST BE COMPATIBLE WITH BUILDING STANDARD KEY SYSTEM AND WHEN NONE EXISTS, THEY SHALL BE SIMILAR TO A YALE NO. 911 KEY.

- F. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARD SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.

- G. ALL STANDARD PANELBOARDS SHALL BE A MINIMUM OF 20" WIDE AND 5 3/4" DEEP.

- H. FURNISH ALL PANELBOARDS WITH FEED-THRU LUGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

- I. ALL NEW PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED WHITE CORE LAMACOID NAMEPLATE, WITH 3/4 IN. WHITE LETTERING ON A BLACK BACKGROUND, WITH DESIGNATION LISTED (PANELBOARD NAME), FASTENED WITH EPOXY CEMENT OR OVAL HEAD CHROME PLATED MACHINE SCREWS.

- J. THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.

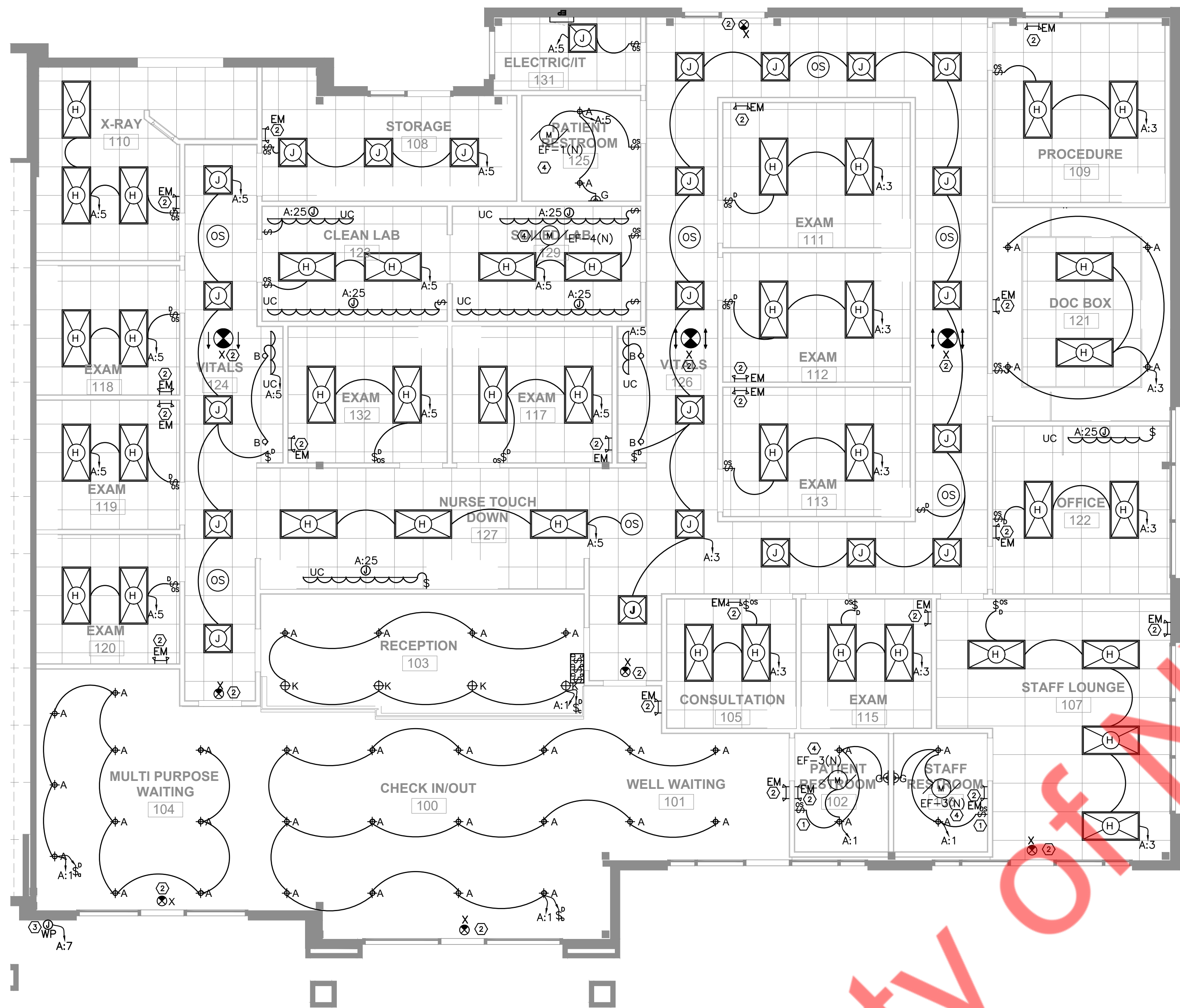
- K. TIE-BARS SHALL NOT BE USED TO CREATE MULTI-POLE CIRCUITS. MAXIMUM 42 CIRCUITS ALLOWED.

- L. ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG.

- M. SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 10,000 AMPERES R.M.S. SYMMETRICAL FOR 208Y/120 VOLT SYSTEM. SERIES RATED PANELBOARDS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.

- N. FOR ALL EXISTING PANELBOARDS, CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS TO REPLACE EXISTING AS REQUIRED AS INDICATED ON DRAWINGS.





1 LIGHTING PLAN - ELECTRICAL  
SCALE: 3/16" = 1'-0"

GENERAL NOTES:

1. VERIFY ALL LUMINAIRE COLORS, TRIMS, LENGTHS, ETC. WITH THE ARCHITECT PRIOR TO PLACING FINAL PURCHASE ORDERS. SUBMISSION OF SHOP DRAWINGS WILL BE INTERPRETED AS HAVING BEEN COORDINATED WITH THE ARCHITECTURAL DRAWINGS.
2. PROVIDE ALL LENGTHS, FEEDS, ACCESSORIES, CONNECTORS, WIRING, POWER SUPPLIES, DRIVERS ETC. FOR A COMPLETE INSTALLATION. THE E.C. SHALL VERIFY THE COMPLETE BILL OF MATERIAL WITH MANUFACTURER'S REPRESENTATIVE AND ENSURE ALL EQUIPMENT ARE INCLUDED IN BID PRICE. COORDINATE INSTALLATION WITH ARCHITECTURAL DETAILS.
3. VERIFY FINAL LUMINAIRE LOCATIONS WITH OTHER CEILING MOUNTED EQUIPMENTS SUCH AS DIFFUSER WITH ARCHITECTURAL REFLECTED CEILING PLANS.
4. VERIFY EXACT MOUNTING HEIGHT AND LOCATIONS OF ALL WALL MOUNTED LUMINAIRE WITH ARCHITECTURAL PLANS AND ELEVATIONS PRIOR TO ROUGH-IN.
5. ANY PROPOSED ALTERNATE LUMINAIRES SHALL BE APPROVED BY THE ARCHITECT PRIOR TO FINAL BID PRICING.
6. SHOULD THE CONTRACTOR PROPOSE TO FURNISH MATERIALS, EQUIPMENT AND DEVICES OTHER THAN THOSE SPECIFIED AND LISTED, THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS, TO THE ENGINEERS AT LEAST TEN (10) BUSINESS DAYS PRIOR TO BID OPENING. THE REQUEST SHALL BE AN ALTERNATE TO THE ORIGINAL BID AND SHALL INCLUDE A COMPLETE SPECIFICATIONS CUTSHEET SUBMITTAL AS OUTLINED IN THE SPECIFICATIONS, COMPLETE WITH DESCRIPTIVE (MANUFACTURER, BRAND NAME, CATALOG NUMBER, ETC.) AND TECHNICAL DATA FOR ALL ITEMS. INDICATE ANY ADDITIONS OR DEDUCTIONS TO THE CONTRACT PRICE WITH THE SUBSTITUTION SUBMITTAL AND ON THE BID FORM.
7. VERIFY FINAL SELECTION OF LIGHT FIXTURES WITH ARCHITECT.

LIGHTING PLAN GENERAL NOTES:

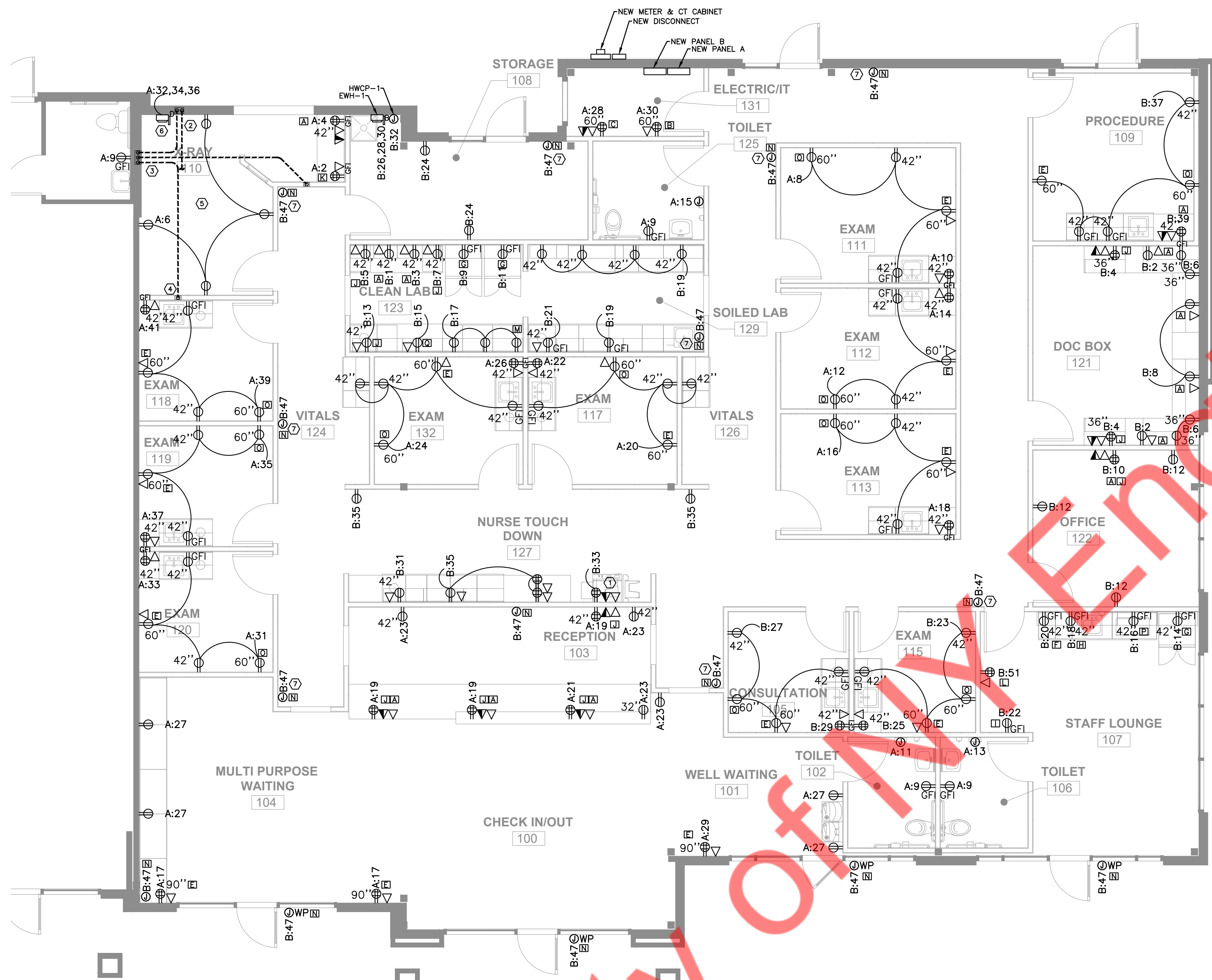
1. CONTRACTOR IS ADVISED THAT ADJUSTMENTS TO EMERGENCY AND EXIT LIGHT FIXTURE LOCATIONS/QUANTITIES MAY BE REQUIRED BY AHJ UPON FINAL INSPECTION.
2. ALL NIGHT LIGHT, EMERGENCY AND EXIT LIGHT FIXTURES SHALL BE CONNECTED AHEAD OF SWITCHED LIGHTING CIRCUIT.
3. CEILING MOUNTED OCCUPANCY SENSOR SHALL BE CONNECTED AHEAD OF ANY LOCAL SWITCHING OR DIMMING SHOWN IN THAT RESPECTIVE AREA. WHERE MORE THAN ONE CEILING OCCUPANCY IS SHOWN IN A GIVEN SPACE, PROVIDE LOW VOLTAGE WIRING BETWEEN SENSORS FOR INTERCONNECTED OPERATION ON A SINGLE POWER PACK.
4. UNLESS OTHERWISE NOTED, LIGHT SWITCHES SHALL BE GANGED TOGETHER UNDER A COMMON FACEPLATE.

LIGHTING KEYED NOTES:

- 1 WALL MOUNTED OCCUPANCY SENSOR. SET OFF TIME TO 15 MINUTES FOR RESTROOM, SET DIP SWITCH TO AUTOMATIC ON.
- 2 WIRE ALL EMERGENCY, EXIT AND NIGHT LIGHT AHEAD OF SWITCHING FOR CONTINUOUS OPERATIONS. CONNECT TO ADJACENT LIGHTING CIRCUIT.
- 3 JUNCTION BOX WITH TOGGLE DISCONNECT PER NEC FOR CONNECTION TO BUILDING MOUNTED SIGNAGE. VERIFY EXACT LOCATION AND CONNECT TO SIGN PER MANUFACTURER'S INSTRUCTION.
- 4 EXHAUST FAN SHALL BE CIRCUITED AND CONTROLLED ALONG WITH LIGHTING FIXTURE IN THE SAME ROOM.

LIGHTING FIXTURE SCHEDULE					
TYPE	DESCRIPTION	MANUFACTURER	MODEL	TYPE	WATTAGE
A	4.5" RECESSED LED DOWNLIGHT	ATLANTIC	COM6-SYL30-3K-U/6LEDWD-WH	LED	40W
B	4" RECESSED LED ADJUSTABLE WALL WASHER	HALO	HC410D010/HM412930/41RWWW	LED	14W
G	DECORATIVE SCONCE	TECH LIGHTING	NYRA 25 BATH 700BCNYR 25-B-LED930	LED	24.2W
H	2X4 RECESSED LED TROFFER	CORELITE CLASS D3X LED	D3X-WO-50L835-LD5-UNV-24-T1-STD	LED	40W
J	2X4 RECESSED LED TROFFER	CORELITE CLASS D3X LED	D3X-WO-35L835-LD5-UNV-22-T1-STD	LED	30.6W
K	PENDANT	TECH LIGHTING	700-TD-S-CW-LED927	LED	72W
UC	LED STRIP LIGHT	GEN LED	CHAC2-F-RBOSWS220-5.0-40-1	LED	5W/LF





**POWER KEYED NOTES:**

- ① POWER & DATA OUTLET FOR PRINTER/FAX. E.C. TO VERIFY FINAL LOCATION WITH TENANT PRIOR TO ROUGH-IN.
- ② PROVIDE FLUSH MOUNTED RECESSED ENCLOSED CIRCUIT BREAKER FOR X-RAY GENERATOR. PROVIDE 150A/2P.
- ③ PROVIDE 12X12X4 JUNCTION BOX WITH SPLIT REMOVABLE COVER PLATE WITH (2) 2" GROMMETED OPENINGS LOCATE COVER 18" AFF TO CENTER.
- ④ PROVIDE 8X8X4 JUNCTION BOX WITH SPLIT REMOVABLE COVER PLATE WITH (2) 2" GROMMETED OPENINGS LOCATE COVER 36" AFF TO CENTER.
- ⑤ REFER TO X-RAY MANUFACTURER'S DRAWINGS FOR COMPLETE INFORMATION ABOUT THIS ROOM. COORDINATE WITH MANUFACTURER FOR MORE INFORMATION.
- ⑥ ROUTE 3#3, #6, 1" C. TO X-RAY DISCONNECT. ROUTE SAME TO RECESSED BOX ON WALL AND LEAVE 3' OF SPARE CONDUCTOR FOR CONNECTION TO GENERATOR. REFER TO PANEL SCHEDULE FOR CIRCUIT.
- ⑦ PROVIDE JUNCTION BOX AND CONDUIT TO ABOVE ACCESSIBLE CEILING FOR SECURITY CAMERA.

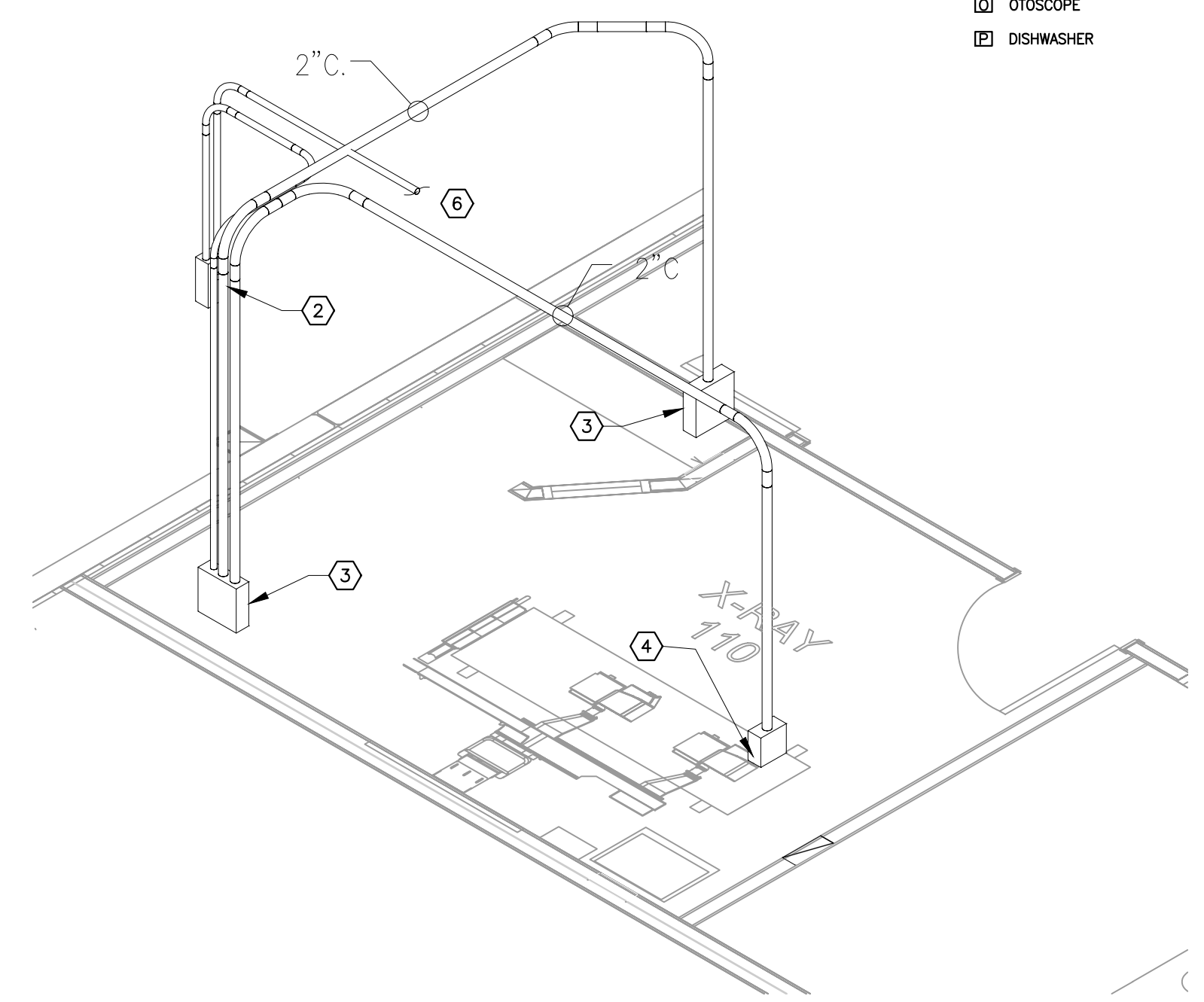
**DRAWING NOTES:**

1. MEP SPECIFICATIONS SHALL APPLY TO WORK ON THIS DRAWING UNLESS OTHERWISE NOTED.
2. REFER TO ARCHITECT FOR EXACT HEIGHT AND LOCATION OF ALL FLOOR AND WALL OUTLETS.
3. ALL DATA/TELEPHONE OUTLETS SHALL BE PROVIDED WITH PULL STRINGS.
4. CONTRACTOR SHALL LOCATE ALL ELECTRICAL AND TELEPHONE OUTLETS WITHIN THE LIMITS OF THE TENANT FURNITURE PLAN PROVIDED BY THE ARCHITECT. CONTRACTOR SHALL MARK INTENDED LOCATION OF ALL OUTLETS PRIOR TO INSTALLATION, THEN SHALL NOTIFY TENANT FOR APPROVAL BEFORE PROCEEDING.
5. CONTRACTOR SHALL PROVIDE NEW CIRCUIT DIRECTORY CARD AT PANELS. CIRCUITS SHALL BE LABELED TO CORRESPOND TO THE CIRCUITS SHOWN ON THE DRAWINGS. CONTRACTOR SHALL CONNECT CIRCUITS AS REQUIRED TO COMPLY WITH THIS DRAWING.
6. CONDUCTORS SHALL BE #12 AWG SOLID COPPER (THWN) IN 1/2" CONDUIT UNLESS OTHERWISE INDICATED.
7. ALL OUTLETS TO BE MOUNTED VERTICALLY UNLESS OTHERWISE INDICATED.
8. CONTRACTOR SHALL PROVIDE ONE PULL STRING FOR EACH VOICE OR DATA OUTLET SHOWN. WHEN VOICE AND DATA OUTLETS ARE SHOWN ADJACENT, CONTRACTOR SHALL PROVIDE ONE PULL STRING (WITH ONE WALL PENETRATION) FOR THE PAIR, UNLESS NOTED OTHERWISE. VOICE AND DATA LINES SHALL BE PULLED BY OTHERS.
9. CONTRACTOR SHALL REFER TO BUILDING MANAGEMENT'S "RULES AND REGULATIONS" TO COMPLY WITH BUILDING STANDARDS.
10. GANG TOGETHER, ALL NEW ELECTRICAL, TELEPHONE AND COMPUTER OUTLETS SHOWN ADJACENT TO EACH OTHER.
11. VERIFY FINAL LOCATIONS FOR ROUGH-INS WITH FIELD MEASUREMENTS AND WITH THE REQUIREMENTS OF THE ACTUAL EQUIPMENT TO BE CONNECTED.
12. COORDINATE THE INSTALLATION OF ELECTRICAL MATERIALS AND EQUIPMENT ABOVE CEILINGS WITH SUSPENSION SYSTEM, MECHANICAL EQUIPMENT AND SYSTEMS AND STRUCTURAL COMPONENTS. COORDINATE ELECTRICAL EQUIPMENT AND MATERIALS INSTALLATION WITH OTHER BUILDING COMPONENTS.
13. VERIFY MECHANICAL EQUIPMENT SWITCH AND CONNECTION REQUIREMENTS, ITEM BY ITEM, WITH THE MECHANICAL CONTRACTOR, BEFORE WIRING EQUIPMENT. RESOLVE ALL DISCREPANCIES WITHOUT FURTHER COST TO OWNER.
14. ALL WIRING IN PATIENT CARE AREA SHALL BE COMPLIANT WITH NEC 517.13A AND B. REFER TO SPECIFICATIONS FOR MORE INFORMATION. ALL RECEPTACLES TO BE TAMPER RESISTANT.
15. ALL BRANCH CIRCUITS HOME RUNS ASSIGN INDICATED ON THIS PLAN SHALL BE CIRCUITED TO THERE RESPECTIVE PANELS, CIRCUIT NUMBER INDICATED, U.O.N.
16. REFER TO DWG. E-0.1 FOR ELECTRICAL GENERAL NOTES, SYMBOL LIST & ABBREVIATIONS.
17. REFER TO DWG. E-0.2 & E-0.3 FOR ADDITIONAL ELECTRICAL SPECIFICATIONS.
18. CONTRACTOR TO COORDINATE WITH ARCHITECT FOR EXACT HEIGHT OF OUTLETS.

**EQUIPMENT LEGEND:**

- Ⓜ PERSONAL COMPUTER
- Ⓜ FILE SERVER
- Ⓜ PHONE EQUIPMENT
- Ⓜ COPIER/PRINTER
- Ⓜ LED TV
- Ⓜ MICROWAVE
- Ⓜ REFRIGERATOR
- Ⓜ COFFEE MAKER
- Ⓜ WATER COOLER
- Ⓜ DESKTOP PRINTER
- Ⓜ X-RAY EQUIPMENT
- Ⓜ TIME CLOCK
- Ⓜ CPC MACHINE
- Ⓜ SECURITY CAMERA
- Ⓜ DISHWASHER

① POWER PLAN — ELECTRICAL  
SCALE: 3/16" = 1'-0"

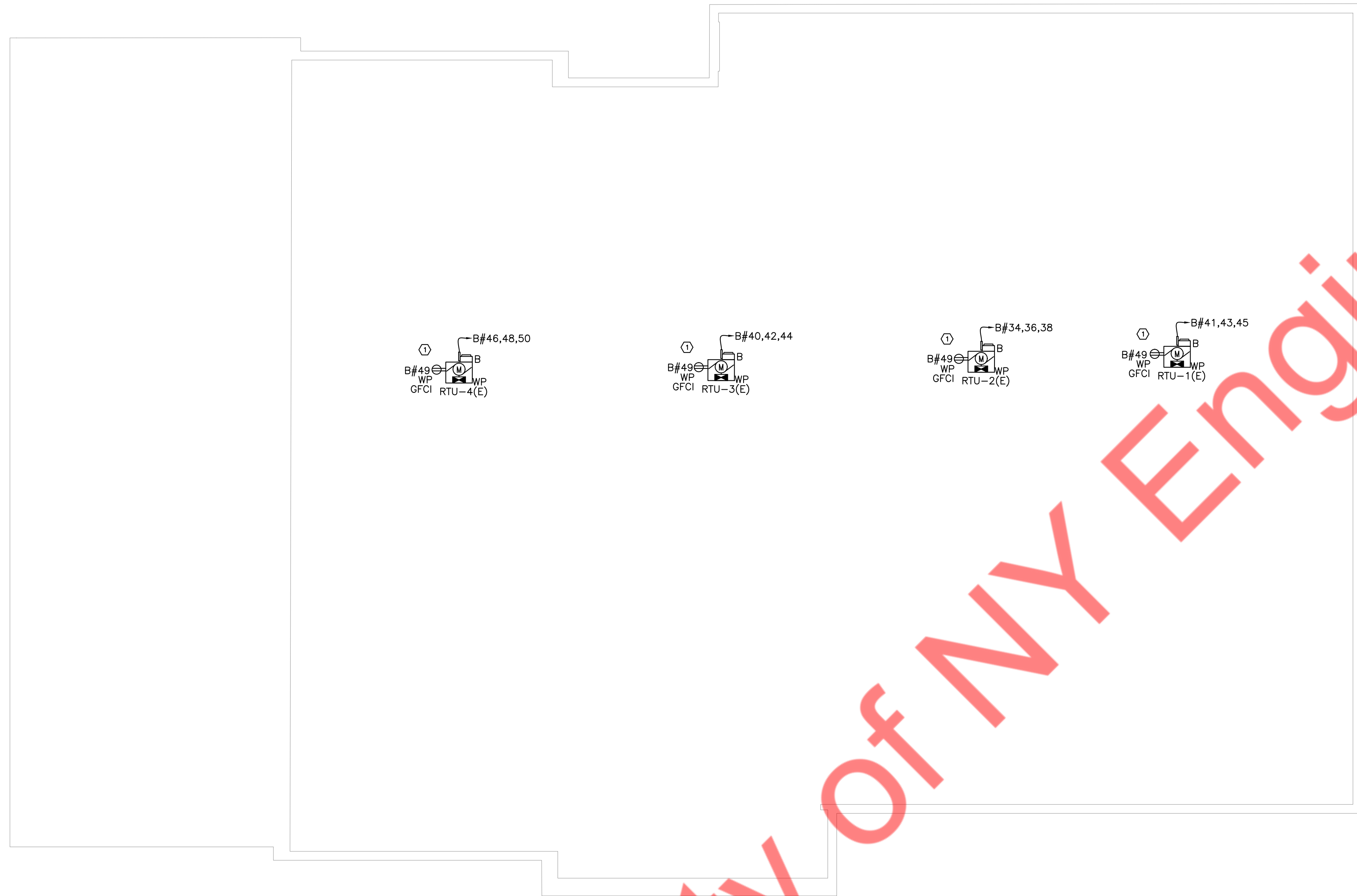


② X-RAY ROOM ISOMETRIC  
SCALE: 1/4" = 1'-0"



POWER KEYED WORK NOTES:

E.C. TO VERIFY THE EXACT LOCATION AND ELECTRICAL POWER REQUIREMENT OF EXISTING MECHANICAL EQUIPMENTS IN FIELD. PROVIDE THE ELECTRICAL CONNECTION AS PER MECHANICAL EQUIPMENTS REQUIREMENT IN FIELD. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY. REUSE AND TIE EXISTING CONNECTIONS IN NEW PANEL IF POSSIBLE



① POWER PLAN — ROOF  
SCALE: 3/16" = 1'-0" ⊕

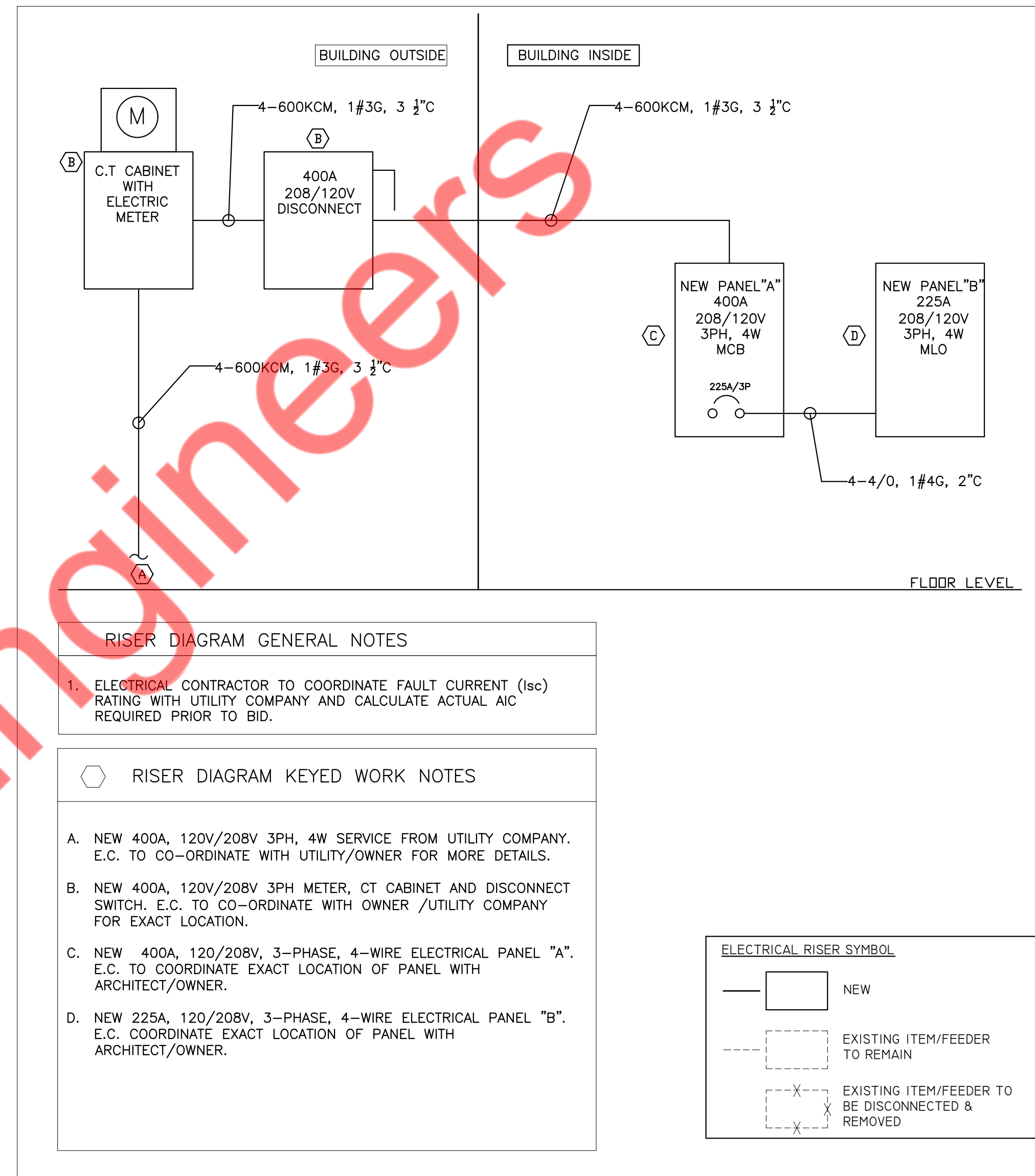
Property of NY Engineers



PANEL: A (NEW)													MOUNTING: SURFACE		
208Y/120		VOLTS,	3	PHASE,	4			WIRE			PANEL LOCATION: ELE. ROOM				
MCB		400A			BUS:			400A			MIN,		FED FROM: MAIN SERVICE		
NOTE:															
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
						A	B	C							
1	20	LIGHTING - 100, 101, 103, 104, 102, 106	L	0.90	2#12, #12G, 3/4"C	1.90			2#12, #12G, 3/4"C	1.00	E	X-RAY 110 - EQUIPMENT	20	2	
3	20	LIGHTING - 105, 115, 107, 122, 121, 109, 111, 112, 113, 126	L	0.90	2#12, #12G, 3/4"C		1.90		2#12, #12G, 3/4"C	1.00	R	X-RAY 110 - PERSONAL COMPUTER	20	4	
5	20	LIGHTING - 110, 118, 119, 120, 124, 127, 132, 117, 129, 123, 108, 125, 131	L	0.90	2#12, #12G, 3/4"C			1.62	2#12, #12G, 3/4"C	0.72	R	X-RAY 110 - RECEPTACLES	20	6	
7	20	EXTERIOR SIGNAGE	L	1.00	2#12, #12G, 3/4"C	1.72			2#12, #12G, 3/4"C	0.72	R	EXAM 111 RECEPTACLES	20	8	
9	20	RESTROOM RECEPTACLES	R	0.72	2#12, #12G, 3/4"C		1.72		2#12, #12G, 3/4"C	1.00	R	EXAM 111 PERSONAL COMPUTER	20	10	
11	20	HAND DRYER 102	R	1.20	2#12, #12G, 3/4"C			1.92	2#12, #12G, 3/4"C	0.72	R	EXAM 112 RECEPTACLES	20	12	
13	20	HAND DRYER 106	R	1.20	2#12, #12G, 3/4"C	2.20			2#12, #12G, 3/4"C	1.00	R	EXAM 112 PERSONAL COMPUTER	20	14	
15	20	HAND DRYER 125	R	1.20	2#12, #12G, 3/4"C		1.92		2#12, #12G, 3/4"C	0.72	R	EXAM 113 RECEPTACLES	20	16	
17	20	LED TV	R	1.00	2#12, #12G, 3/4"C			2.00	2#12, #12G, 3/4"C	1.00	R	EXAM 113 PERSONAL COMPUTER	20	18	
19	20	PERSONAL COMPUTER & PRINTER	R	1.00	2#12, #12G, 3/4"C	1.90			2#12, #12G, 3/4"C	0.90	R	EXAM 117 RECEPTACLES	20	20	
21	20	PERSONAL COMPUTER & PRINTER	R	1.00	2#12, #12G, 3/4"C		2.00		2#12, #12G, 3/4"C	1.00	R	EXAM 117 PERSONAL COMPUTER	20	22	
23	20	RECEPTION AREA RECEPTACLES	R	0.72	2#12, #12G, 3/4"C			1.62	2#12, #12G, 3/4"C	0.90	R	EXAM 132 RECEPTACLES	20	24	
25	20	STRIP LIGHTING UC	L	0.50	2#12, #12G, 3/4"C	1.50			2#12, #12G, 3/4"C	1.00	R	EXAM 132 PERSONAL COMPUTER	20	26	
27	20	WAITING AREA RECEPTACLES	R	0.72	2#12, #12G, 3/4"C		1.08		2#12, #12G, 3/4"C	0.36	R	ELE./IT PHONE EQUIPMENT	20	28	
29	20	LED TV WELL WAITING	R	0.50	2#12, #12G, 3/4"C			0.86	2#12, #12G, 3/4"C	0.36	E	ELE./IT FILE SERVER	20	30	
31	20	EXAM 120 RECEPTACLES	R	0.72	2#12, #12G, 3/4"C	14.05							32		
33	20	EXAM 120 PERSONAL COMPUTER	R	1.00	2#12, #12G, 3/4"C		14.33		3#3,#8G, 1"C	13.33	O	XRAY-MACHINE	100/3P	34	
35	20	EXAM 119 RECEPTACLES	R	0.72	2#12, #12G, 3/4"C			14.05					36		
37	20	EXAM 119 PERSONAL COMPUTER	R	1.00	2#12, #12G, 3/4"C	18.49							38		
39	20	EXAM 118 RECEPTACLES	R	0.72	2#12, #12G, 3/4"C		18.21		4#4/0,#4G, 2"C	17.49	O	TO PANEL B	225/3P	40	
41	20	EXAM 118 PERSONAL COMPUTER	R	1.00	2#12, #12G, 3/4"C			18.49					42		
TOTAL LOAD (KVA)						41.76	41.16	40.56							

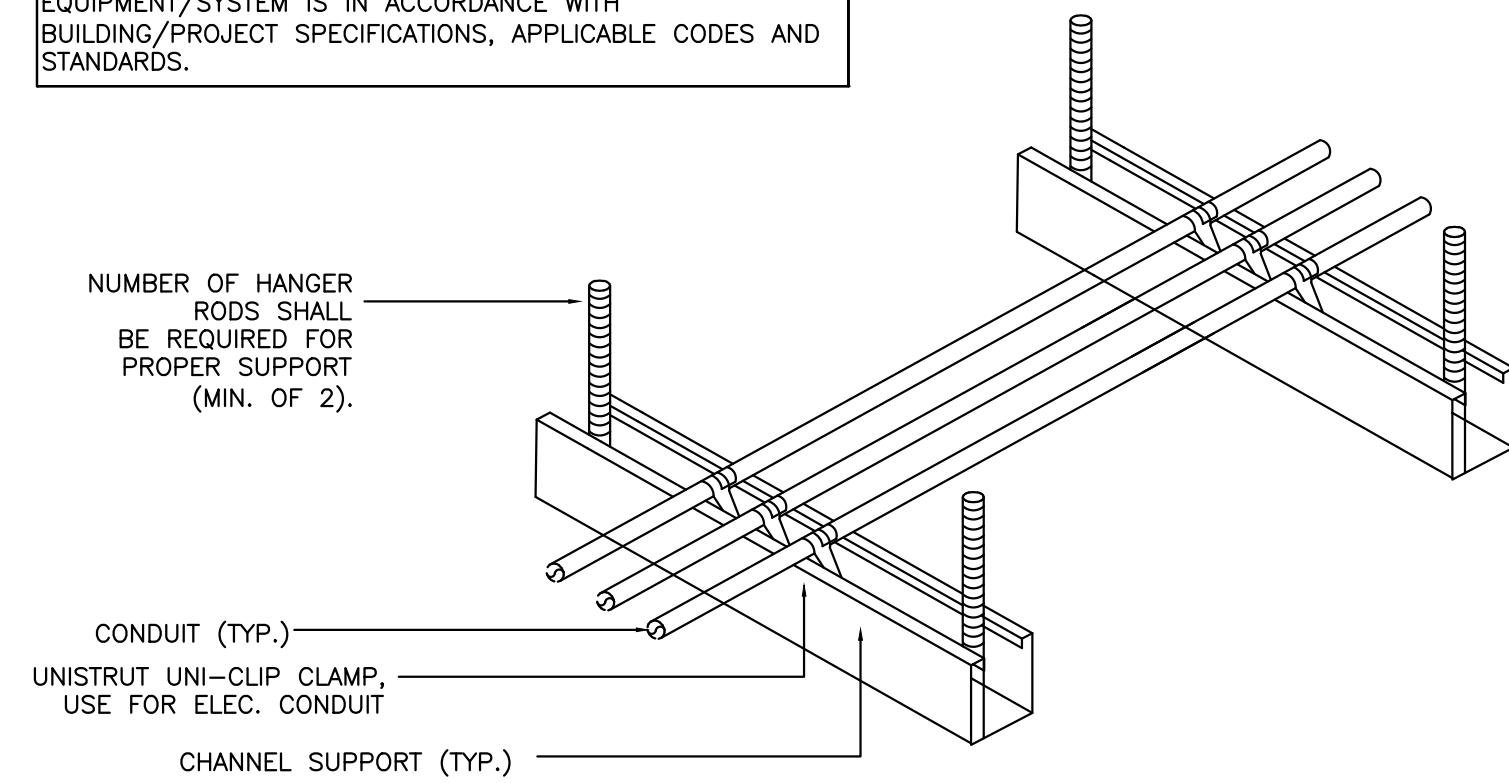
PANEL: B (NEW)													MOUNTING: SURFACE		
208Y/120		VOLTS,	3	PHASE,	4			WIRE			PANEL LOCATION: ELE. ROOM				
MLO		225A			BUS:			225A			MIN,		FED FROM: PANEL A		
NOTE:															
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
						A	B	C							
1	20	CLEAN LAB 123-PERSONAL COMPUTER	E	1.00	2#12, #12G, 3/4"C	2.00			2#12, #12G, 3/4"C	1.00	E	DOC BOX 121 - PERSONAL COMPUTER	20	2	
3	20	CLEAN LAB 123-PERSONAL COMPUTER	E	1.00	2#12, #12G, 3/4"C		2.00		2#12, #12G, 3/4"C	1.00	E	DOC BOX 121 - PERSONAL PRINTER	20	4	
5	20	CLEAN LAB 123-PRINTER	E	1.00	2#12, #12G, 3/4"C			1.90	2#12, #12G, 3/4"C	0.90	R	DOC BOX 121 - RECEPTACLES	20	6	
7	20	CLEAN LAB 123-PRINTER	E	1.00	2#12, #12G, 3/4"C	2.00			2#12, #12G, 3/4"C	1.00	R	DOC BOX 121 - PERSONAL COMPUTER	20	8	
9	20	CLEAN LAB 123-REFRIGERATOR	E	1.00	2#12, #12G, 3/4"C		2.00		2#12, #12G, 3/4"C	1.00	R	OFFICE 122 - PERSONAL COMPUTER	20	10	
11	20	CLEAN LAB 123-REFRIGERATOR	E	1.00	2#12, #12G, 3/4"C			1.54	2#12, #12G, 3/4"C	0.54	R	OFFICE 122 - RECEPTACLES	20	12	
13	20	CLEAN LAB 123-PRINTER	E	1.00	2#12, #12G, 3/4"C	2.00			2#12, #12G, 3/4"C	1.00	E	STAFF LOUNGE 107 - REFRIGERATOR	20	14	
15	20	CLEAN LAB 123-PERSONAL COMPUTER	E	1.00	2#12, #12G, 3/4"C		2.00		2#12, #12G, 3/4"C	1.00	E	STAFF LOUNGE 107 - DISHWASHER	20	16	
17	20	CLEAN LAB 123-RECEPTACLES	R	0.54	2#12, #12G, 3/4"C			1.54	2#12, #12G, 3/4"C	1.00	E	STAFF LOUNGE 107 - COFFEE MAKER	20	18	
19	20	SOILED LAB 129 RECEPTACLES	R	0.90	2#12, #12G, 3/4"C	1.90			2#12, #12G, 3/4"C	1.00	E	STAFF LOUNGE 107 - MICROWAVE	20	20	
21	20	SOILED LAB 129 PRINTER	E	1.00	2#12, #12G, 3/4"C		2.00		2#12, #12G, 3/4"C	1.00	E	STAFF LOUNGE 107 - WATER COOLER	20	22	
23	20	EXAM 115 RECEPTACLES	R	0.72	2#12, #12G, 3/4"C			1.08	2#12, #12G, 3/4"C	0.36	R	STORAGE AREA RECEPTACLES	20	24	
25	20	EXAM 115 PERSONAL COMPUTER	E	1.00	2#12, #12G, 3/4"C	4.33				3.33	H		26		
27	20	CONSULTATION 105 RECEPTACLES	R	0.72	2#12, #12G, 3/4"C		4.05		3#10, #10G, 3/4"C	3.33	H	EWB-1	30/3P	28	
29	20	CONSULTATION 105 - PERSONAL COMPUTER	E	1.00	2#12, #12G, 3/4"C			4.33		3.33	H		30		
31	20	NURSE TOUCH DOWN 127 - PRINTER	E	1.00	2#12, #12G, 3/4"C	1.50			2#12, #12G, 3/4"C	0.50	R	HWCP-1	20	32	
33	20	NURSE TOUCH DOWN 127 - PRINTER	E	1.00	2#12, #12G, 3/4"C		2.90			1.90	H		34		
35	20	NURSE TOUCH DOWN 127 - RECEPTACLES	R	1.00	2#12, #12G, 3/4"C			2.90	3#12, #12G, 3/4"C	1.90	H	RTU-2 (E)	20/3P	36	
37	20	PROCEDURE 109 RECEPTACLES	R	0.90	2#12, #12G, 3/4"C	2.80				1.90	H		38		
39	20	PROCEDURE 109 PERSONAL COMPUTER	E	1.00	2#12, #12G, 3/4"C		2.92			1.92	H		40		
41			H	1.92				3.84	3#12, #12G, 3/4"C	1.92	H	RTU-3 (E)	20/3P	42	
43	20/3P	RTU-1 (E)	H	1.92	3#12, #12G, 3/4"C					1.92	H		44		
45			H	1.92						1.92	H		46		
47	20	SECURITY CAMERA	R	1.00	2#12, #12G, 3/4"C				3#12, #12G, 3/4"C	1.92	H	RTU-4 (E)	20/3P	48	
49	20	ROOF TOP RECEPTACLES	R	0.72	2#12, #12G, 3/4"C					1.92	H		50		
51	20	TIME CLOCK	R	1.00	2#12, #12G, 3/4"C							SPARE	20	52	
53	20	SPARE										SPARE	20	54	
TOTAL LOAD (KVA)						16.53	17.87	17.13							

ABBREVIATIONS:  
L = LIGHTING , R = RECEPTACLE , H = HVAC , E = EQUIPMENT. ,  
M = MISCELLANEOUS





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



**NOTES:**

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

1 CONDUIT SUPPORT DETAIL  
E-4.0 N.T.S

**MANUAL MODE OPERATION:**

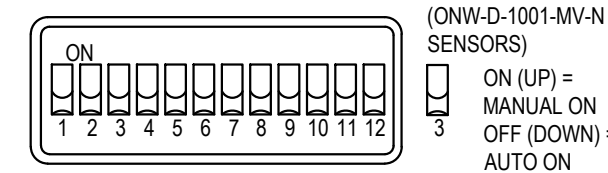
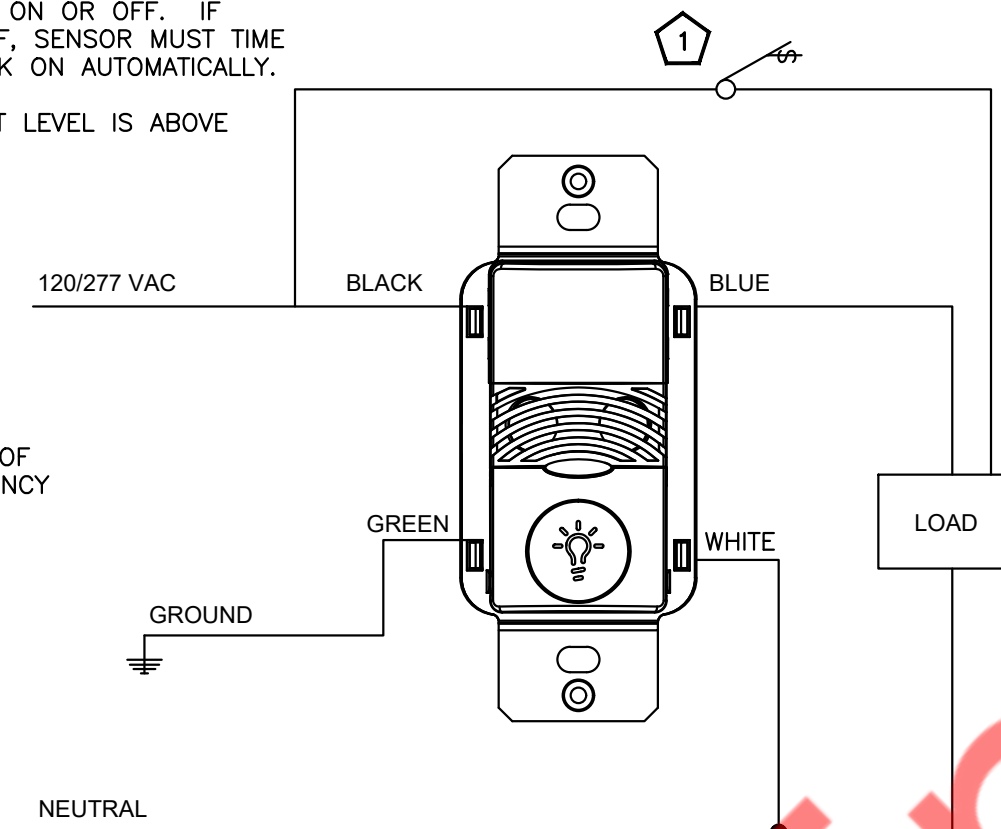
1. PUSHBUTTON PRESS IS REQUIRED TO TURN LOAD ON.
2. LOAD TURNS OFF WHEN SENSOR TIMES OUT OR BY PRESSING PUSH BUTTON.
3. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON.

**AUTOMATIC MODE OPERATION:**

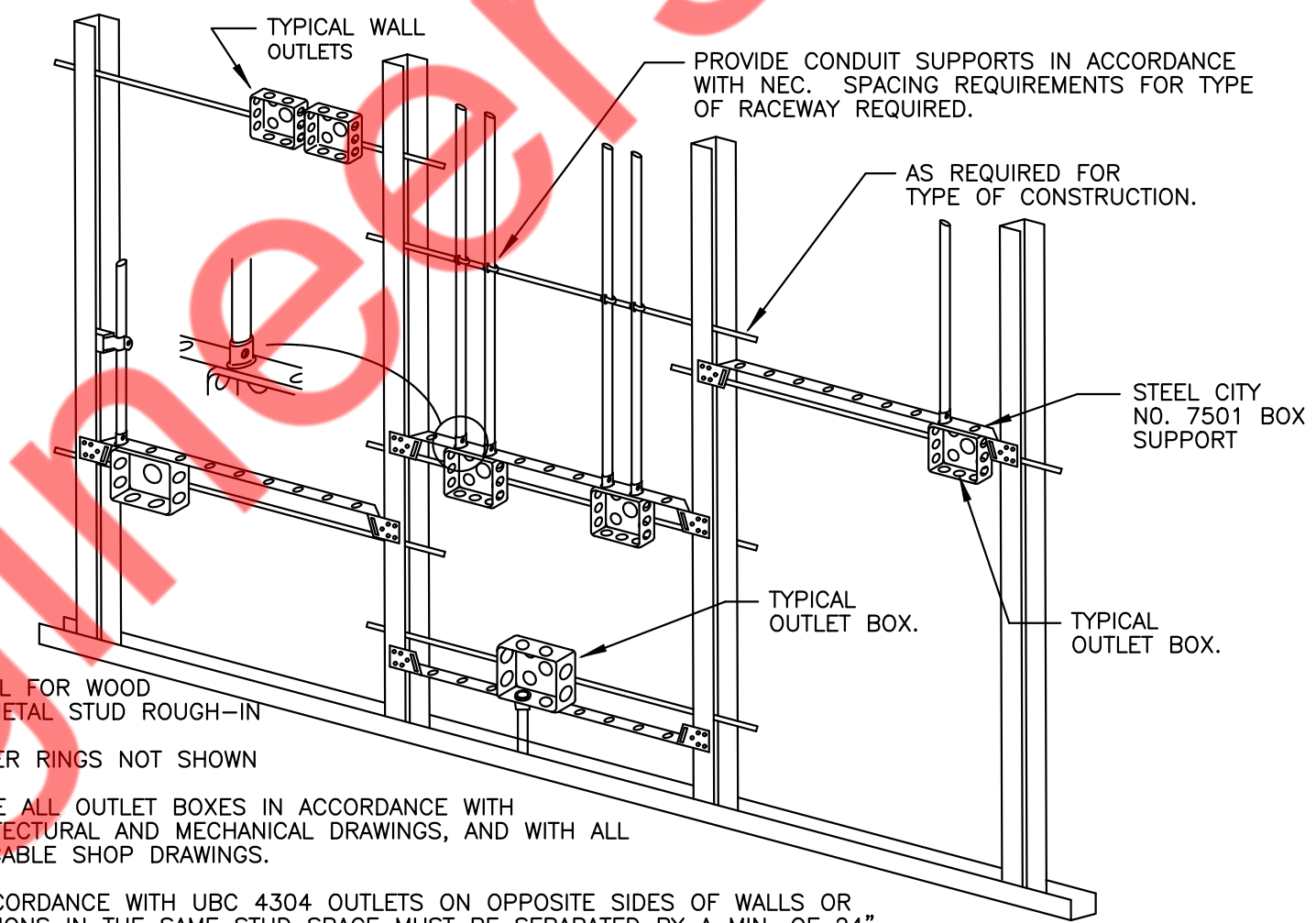
1. WHEN SENSOR ACTIVATES LOAD TURNS ON.
2. PUSHBUTTON CAN BE USED TO TURN LOAD ON OR OFF. IF PUSHBUTTON IS USED TO TURN LOAD OFF, SENSOR MUST TIME OUT FIRST, BEFORE LOAD CAN TURN BACK ON AUTOMATICALLY.
3. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON.

**SENSOR TYPES INCLUDE:**  
ONW-D-1001-MV-N

1 PROVIDE SENSING CONDUCTOR TAPPED AHEAD OF ANY SWITCHES WHERE SWITCH SERVES EMERGENCY FIXTURES.



2 CONNECTION) OCCUPANCY/VACANCY-SINGLE LEVEL WIRING DIAGRAM-LOW VOLTAGE WALL SWITCH SENSOR(NEUTRAL)  
E-4.0 N.T.S



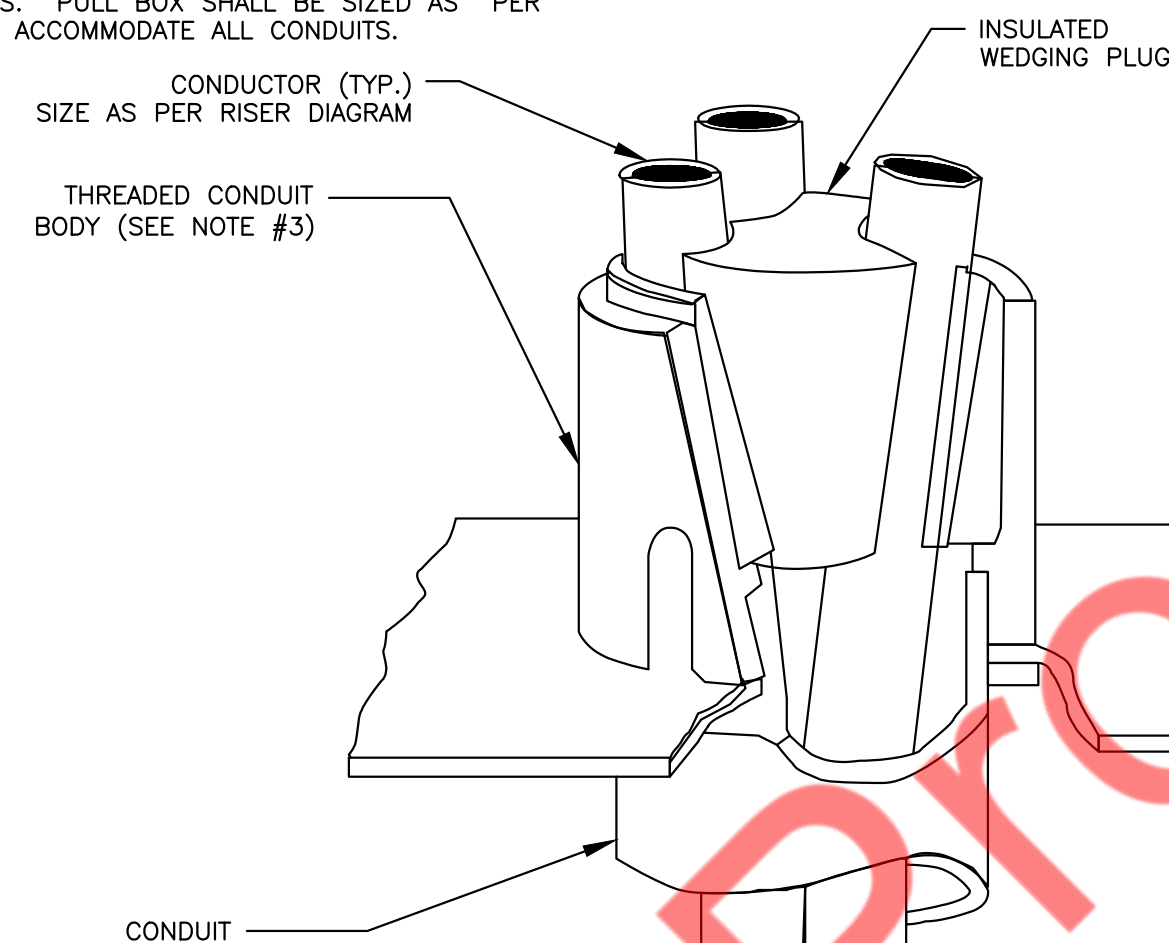
**NOTES:**

- 1 TYPICAL FOR WOOD AND METAL STUD ROUGH-IN
- 2 PLASTER RINGS NOT SHOWN
- 3 LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL AND MECHANICAL DRAWINGS, AND WITH ALL APPLICABLE SHOP DRAWINGS.
- 4 IN ACCORDANCE WITH UBC 4304 OUTLETS ON OPPOSITE SIDES OF WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY A MIN. OF 24" HORIZONTAL DISTANCE.

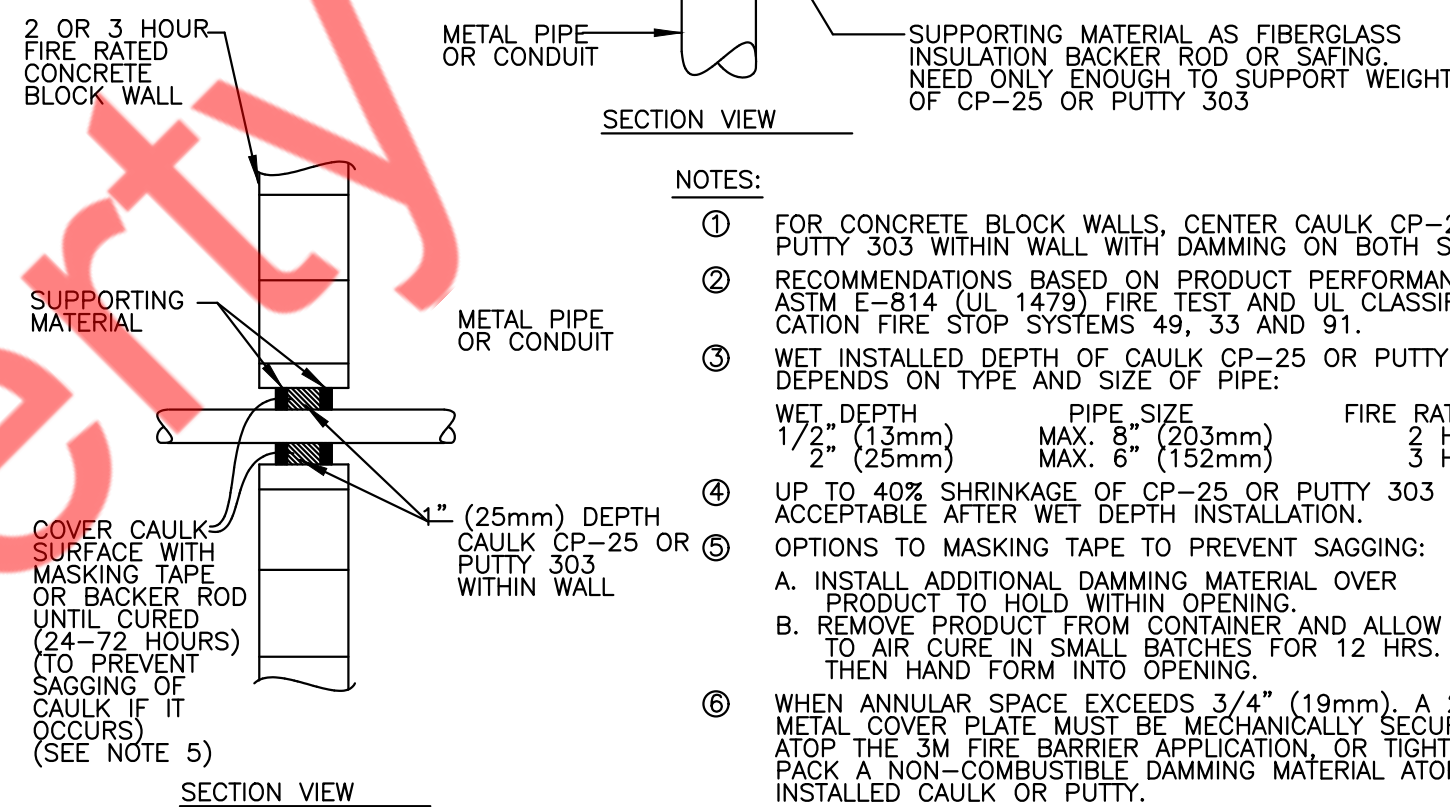
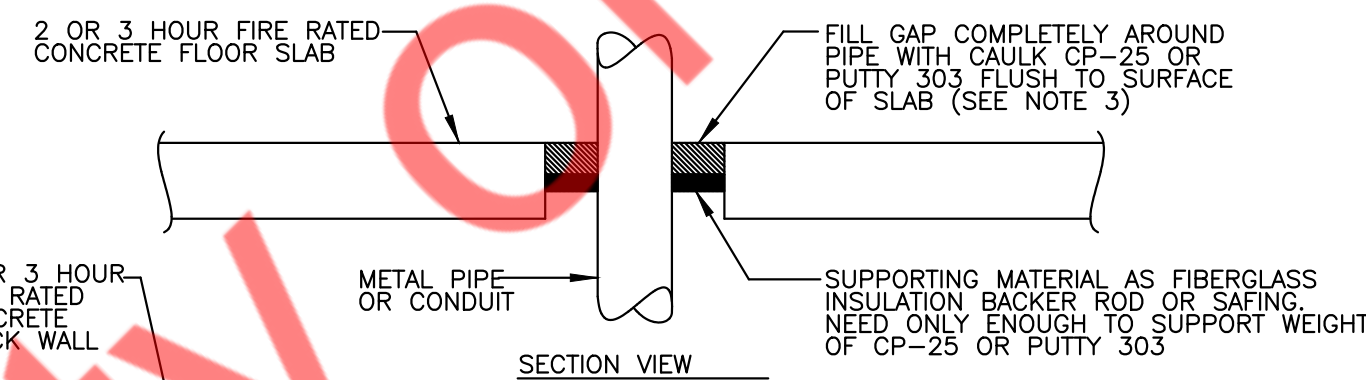
3 DETAIL TYPICAL ROUGH-IN REQUIREMENTS  
E-4.0 N.T.S

**NOTES:**

1. ALL CONDUCTORS IN VERTICAL RACEWAYS SHALL BE SUPPORTED IN ACCORDANCE WITH ARTICLE 300.19 OF NEC. CABLE SUPPORTS SHALL BE LOCATED AT THE INTERVALS REQUIRED BY THE NEC.
2. CABLE SUPPORT SYSTEM SHALL BE AS MANUFACTURED BY O-Z GEDNEY WITH pOzi-GRIP "S-STYLE" WEDGING PLUG OR APPROVED EQUAL.
3. FOR THREADLESS CONDUIT (RIGID, IMC OR EMT), ATTACH CONDUIT BODY TO MALE THREADS OF A SET SCREW OR COMPRESSION CONNECT, AS PERMITTED BY SPECIFICATIONS.
4. PROVIDE PULL BOX AT EACH LOCATION OF CABLE SUPPORTS. PULL BOX SHALL BE SIZED AS PER CODE TO ACCOMMODATE ALL CONDUITS.



4 VERTICAL CABLE SUPPORT DETAIL  
E-4.0 N.T.S



**NOTES:**

- 1 FOR CONCRETE BLOCK WALLS, CENTER CAULK CP-25 OR PUTTY 303 WITHIN WALL WITH DAMMING ON BOTH SIDES.
- 2 RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) FIRE TEST AND UL CLASSIFICATION FIRE STOP SYSTEMS 49, 33 AND 91.
- 3 WET INSTALLED DEPTH OF CAULK CP-25 OR PUTTY 303 DEPENDS ON TYPE AND SIZE OF PIPE:  

WET DEPTH	PIPE SIZE	FIRE RATING
1 1/2" (13mm)	MAX. 8" (203mm)	2 HRS.
2" (25mm)	MAX. 6" (152mm)	3 HRS.
- 4 UP TO 40% SHRINKAGE OF CP-25 OR PUTTY 303 IS ACCEPTABLE AFTER WET DEPTH INSTALLATION.
- 5 OPTIONS TO MASKING TAPE TO PREVENT SAGGING:  
 A. INSTALL ADDITIONAL DAMMING MATERIAL OVER PRODUCT TO HOLD WITHIN OPENING.  
 B. REMOVE PRODUCT FROM CONTAINER AND ALLOW TO AIR CURE IN SMALL BATCHES FOR 12 HRS. THEN HAND FORM INTO OPENING.
- 6 WHEN ANNULAR SPACE EXCEEDS 3/4" (19mm), A 28 AWG METAL COVER PLATE MUST BE MECHANICALLY SECURED ATOP THE 5M FIRE BARRIER APPLICATION, OR TIGHTLY PACK A NON-COMBUSTIBLE DAMMING MATERIAL ATOP INSTALLED CAULK OR PUTTY.

5 FIRE STOP DETAIL  
E-4.0 N.T.S



**PLUMBING SYMBOLS LIST**

— GSAN —	GREASE SANITARY SEWER (UNDERFLOOR)
— SAN —	SANITARY SEWER (UNDERFLOOR)
----	VENT PIPING
----	COLD WATER PIPING
----	HOT WATER PIPING
----	HOT WATER RETURN PIPING
—○—	FILTER WATER PIPING
—○—	P-TRAP
—○—	PIPE UP
—○—	PIPE DROP
—○—	CLEANOUT
—○—	PLUGGED OUTLET/CLEANOUT
—○—	POINT OF CONNECTION

**PLUMBING ABBREVIATIONS**

CO	CLEANOUT
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
V	VENT
LAV	LAVATORY
WC	WATER CLOSET
Typ.	TYPICAL
DN	DOWN
RF-1	REFRIGERATOR
FD-1	FLOOR DRAIN
SQ. FT.	SQUARE FEET
BFP	BACK FLOW PREVENTER
DF	DRINKING FOUNTAIN
EW-1	ELECTRIC WATER HEATER
ET-1	EXPANSION TANK
HWCP-1	HOT WATER CIRCULATION PUMP

**PLUMBING DRAWING LIST**

P1.0	PLUMBING SYMBOLS & SPECIFICATIONS
P2.0	PLUMBING SANITARY FLOOR PLAN
P2.1	PLUMBING WATER AND GAS FLOOR PLAN
P3.0	PLUMBING DETAILS (1 OF 2)
P3.1	PLUMBING DETAILS (2 OF 2)
P4.0	PLUMBING RISERS, DETAILS & SCHEDULES

**BUILDING DEPARTMENT PLUMBING NOTES**

- ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2018 INTERNATIONAL PLUMBING CODE.
- INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 702.2
- PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 305.
- TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 306.
- RODENT PROOFING AS PER PC 304
- MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 303, PC 605, PC 702, PC 902, PC 1102.
- EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.
- DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER PC 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 708
- DRAINAGE PIPE CLEANOUTS AS PER SECTION PC 708.
- VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 308
- WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION PC 601-603, 604, 606, 607, 608, 610
- THE SANITARY DRAINAGE SYSTEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION PC 701, 704, 705, 706, 707, 708, 711.
- VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 901 THROUGH PC 912 THROUGH PC 917
- INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION PC 107.
- GAS PIPING INSTALLATION SHALL BE IN ACCORDANCE WITH INTERNATIONAL FUEL GAS CODE CHAPTER 4.

**PLUMBING SPECIFICATIONS:**

**1. BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS**

**1.01 SCOPE**

- PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.
- OBTAIN ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.
- THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.
- THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK. BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.

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

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

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

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

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

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

**1.02 SUBMITTALS**

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

- PIPE AND FITTINGS
- VALVES
- HANGERS AND SUPPORTS
- PLUMBING PIPING LAYOUT
- TESTS
- PLUMBING FIXTURES
- WATER HEATERS & ACCESSORIES
- MIXING VALVES
- ALL SCHEDULED PLUMBING EQUIPMENT

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

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

D. REVIEW OF SHOP DRAWINGS BY THE ENGINEER SHALL BE LIMITED TO THE INITIAL REVIEW, AND A SECOND REVIEW OF ANY REQUIRED RESUBMITTED DATA. IF THE ENGINEER IS REQUIRED TO REVIEW SHOP DRAWINGS FOR A THIRD (OR MORE) SUBMISSION OF THE SAME ITEM, THE CONTRACTOR SHALL BE LIABLE FOR COMPENSATING THE ENGINEER FOR THESE SUBSEQUENT REVIEWS AS PER THE ENGINEER'S CURRENT HOURLY RATE SCHEDULE.

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

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

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

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

**1.03 SUBSTITUTIONS**

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

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

**1.05 DEFINITIONS**

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

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

C. PROVIDE: TO FURNISH AND INSTALL.

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

**1.06 DRAWINGS**

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

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

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

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

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

F. LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

**1.07 PRODUCTS**

**A. SANITARY AND VENT PIPING:**

- ABOVE GROUND AND UNDERGROUND SANITARY PIPING SHALL BE PVC SCHEDULE 40, COMPLY TO ASTM D2665, ASTM F891 AND CSA B181.2 STANDARDS.
- SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.). VENT PIPING SHALL BE PITCHED TO DRAIN.
- PVC OR OTHER COMBUSTIBLE PLASTIC PIPING SHALL NOT BE INSTALLED IN CEILING PLENUM SPACES.

**B. DOMESTIC WATER PIPING:**

- ABOVE GRADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN COPPER TUBE.
- FITTINGS IN DOMESTIC WATER PIPING SHALL BE WROUGHT COPPER OR CAST BRASS.
- JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.
- THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
- COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
- ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE-RETARDANT, FACTORY-APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY-APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH INTERNATIONAL ENERGY CONSERVATION CODE 2018, SECTION C403.11.3 REFER BELOW TABLE.

MINIMUM PIPE INSULATION THICKNESS						
FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (INCHES)			
	CONDUCTIVITY BTU/IN./ (H?FT2?F)	MEAN RATING TEMPERATURE, °F	<1	1 to 1½	1½ to 4	4 to <8
141-200	0.25-0.29	125	1.5	1.5	2	2
105-140	0.21-0.28	100	1.0	1.0	1.5	1.5
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0

7. WATER DISTRIBUTION SYSTEM AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2018 C404.7, HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER FROM A HEATED-WATER SUPPLY PIPE BACK TO THE HEATED-WATER SOURCE THROUGH A COLD-WATER SUPPLY PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM. PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:

- THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTING OR APPLIANCE.
- THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F (40°C).

8. AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2018, C404.6.1 HEATED-WATER CIRCULATION SYSTEMS SHALL BE PROVIDED WITH A CIRCULATION PUMP. THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. CONTROLS FOR CIRCULATING HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE IDENTIFICATION OF A DEMAND FOR HOT WATER WITHIN THE OCCUPANCY. THE CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE IS NO DEMAND FOR HOT WATER.

9. HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2018 C404.5.1. THE HW PIPE LENGTH FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE.

NOMINAL PIPE SIZE (INCHES)	MIXIMUM PIPING LENGTH (FEET)	
	PUBLIC LAW	OTHER FIXTURES
½"	2'	43'
¾"	0.5'	20'
1"	0.5'	13'
1½"	0.5'	8'
1½"	0.5'	6'
2" OR LARGER	0.5'	4'

10. SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION.

11. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION.

12. AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2018 C404.6.3, THE CONTROLS ON PUMPS THAT CIRCULATE WATER BETWEEN A WATER HEATER AND A HEATED-WATER STORAGE TANK SHALL LIMIT OPERATION OF THE PUMP FROM HEATING CYCLE STARTUP TO NOT GREATER THAN 5 MINUTES AFTER THE END OF THE CYCLE.

**C. HANGERS AND SUPPORTS:**

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

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

3. ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS.

4. PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND STANDARDS AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

5. SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

**D. VALVES:**

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

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

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

4. ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.

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

6. PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.

**E. GAS PIPING:**

1. GAS PIPING SHALL BE SIZED IN ACCORDANCE WITH PIPE SIZING TABLES OR SIZING EQUATIONS IN ACCORDANCE WITH SECTION 402.4.

2. INDIVIDUAL OUTLETS TO GAS RANGES SHALL NOT BE LESS THAN ¾ INCH NPS.

3. METALLIC PIPE SHALL COMPLY WITH SECTIONS 403.4.1 THROUGH 403.4.4.

4. PIPING SYSTEM INSTALLATION SHALL COMPLY WITH REQUIREMENTS OF INTERNATIONAL FUEL GAS CODE 2018 SECTION 404.

5. AS PER INTERNATIONAL FUEL GAS CODE SECTION 404.4; UNDERGROUND PIPING, WHERE INSTALLED BELOW GRADE THROUGH THE OUTER FOUNDATION OR BASEMENT WALL OF A BUILDING, SHALL BE ENCASED IN A PROTECTIVE PIPE SLEEVE, THE ANNULAR SPACE BETWEEN THE GAS PIPING AND THE SLEEVE SHALL BE SEALED.

6. PIPING INSTALLED UNDERGROUND BENEATH BUILDINGS IS PROHIBITED EXCEPT WHERE THE PIPING IS ENCASED IN A CONDUIT OF WROUGHT IRON OR STEEL PIPE DESIGNED TO WITHSTAND THE SUPERIMPOSED LOADS. THE CONDUIT SHALL BE PROTECTED FROM CORROSION IN ACCORDANCE WITH SECTION 404.11 AND SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 404.11.1 OR 404.11.2 OF INTERNATIONAL FUEL GAS CODE.

7. AS PER INTERNATIONAL FUEL GAS CODE 2018 SECTION 404.12; UNDERGROUND PIPING SYSTEMS SHALL BE INSTALLED A MINIMUM DEPTH OF 12 INCHES BELOW GRADE.

8. THE GAS PIPING IS ENCASED IN A CONDUIT OF WROUGHT IRON OR STEEL PIPE TO WITH STAND THE SUPERIMPOSED LOADS.

9. SHUTOFF VALVES SHALL BE LOCATED IN PLACES SO AS TO PROVIDE ACCESS FOR OPERATION AND SHALL BE INSTALLED SO AS TO BE PROTECTED FROM DAMAGE.

F. INSTALL PIPING TO CONSERVE BUILDING SPACE. DO NOT INTERFERE WITH USE OF BUILDING SPACE AND THE WORK OF OTHER TRADES. ALL PIPING RUN IN CEILING SHALL BE INSTALLED TIGHT TO THE STRUCTURE ABOVE.

G. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT. PROVIDE PIPE ANCHORS, GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.

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

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

J. VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.

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

L. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.

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

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

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

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

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

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

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

**2. INSTALLATION**

**2.01 GENERAL**

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

U. EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.

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

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

X. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.

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

Z. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.

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

AB. NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.

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

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

AE. WHEN CONNECTING TO EXISTING STACKS AND RISERS, PROVISION IS TO BE MADE FOR FUTURE CONNECTIONS BY PROVIDING CAPPED AND VALVED OUTLETS ON DOMESTIC WATER RISERS AND PLUGGED OUTLETS ON THE SANITARY AND VENT STACKS.

**2.02 ABOVE GRADE**

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

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

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

**3. TESTING**

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

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

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

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

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

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

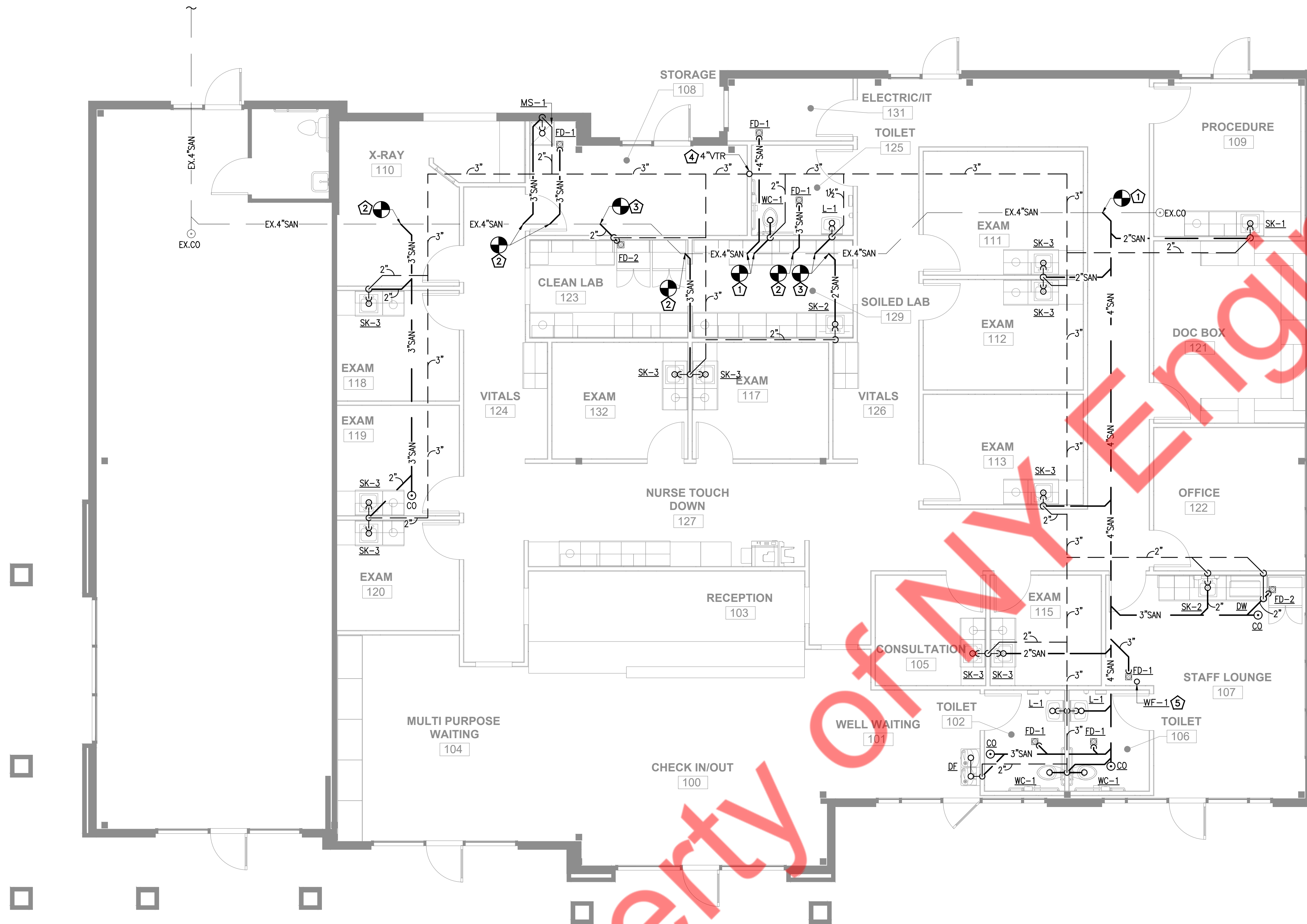
G. ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY CLEANED INSIDE AND OUT, OF DIRT, CUTTINGS, OILS AND OTHER FOREIGN SUBSTANCES AND SHALL BE LEFT CLEAN.

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

J. ALL EQUIPMENT WILL BE FACTORY TESTED.

I. CONTRACTOR SHALL IDENTIFY TO THE OWNER'S REPRESENTATIVE





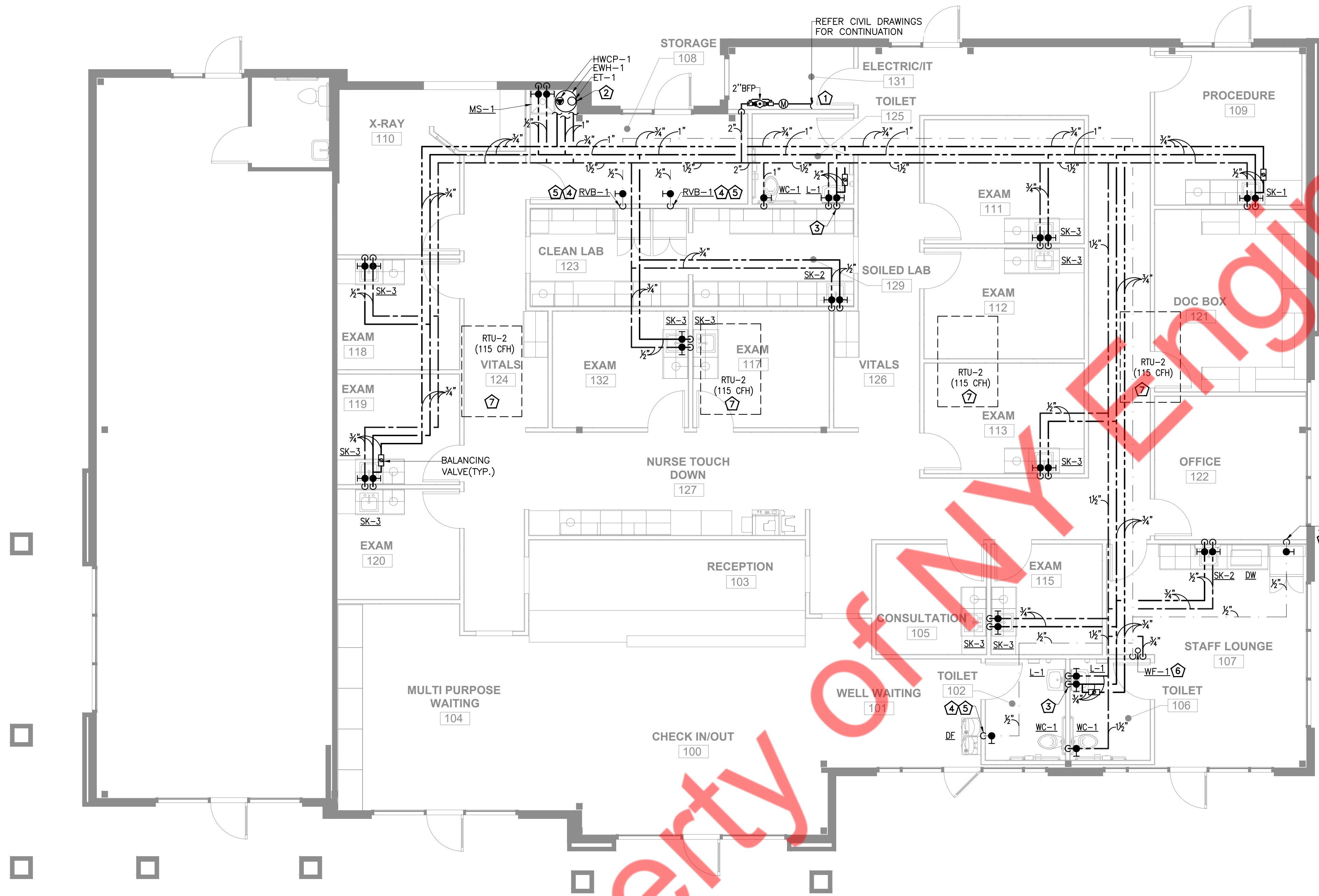
- GENERAL NOTES:**
1. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
  2. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
  3. WATER HEATER DRAIN SPILLS TO THE NEAREST FLOOR DRAIN
  4. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.

- SANITARY KEYED NOTES:**
1. CONNECT NEW 4" SANITARY LINE TO EXISTING 4" SANITARY WASTE LINE OF ADEQUATE SIZE. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING AND INVERT ON SITE.
  2. CONNECT NEW 3" SANITARY LINE TO EXISTING 4" SANITARY WASTE LINE OF ADEQUATE SIZE. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING AND INVERT ON SITE.
  3. CONNECT NEW 2" SANITARY LINE TO EXISTING 4" SANITARY WASTE LINE OF ADEQUATE SIZE. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING AND INVERT ON SITE.
  4. NEW 4" VENT THRU ROOF. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING ON SITE.
  5. ROUTE DRAIN LINE FROM WATER FILTER TO ADJACENT FLOOR DRAIN WITH APPROVED AIR GAP.

1 PLUMBING SANITARY FLOOR PLAN  
3/16" = 1'-0"

Property of M.Y. Engineers





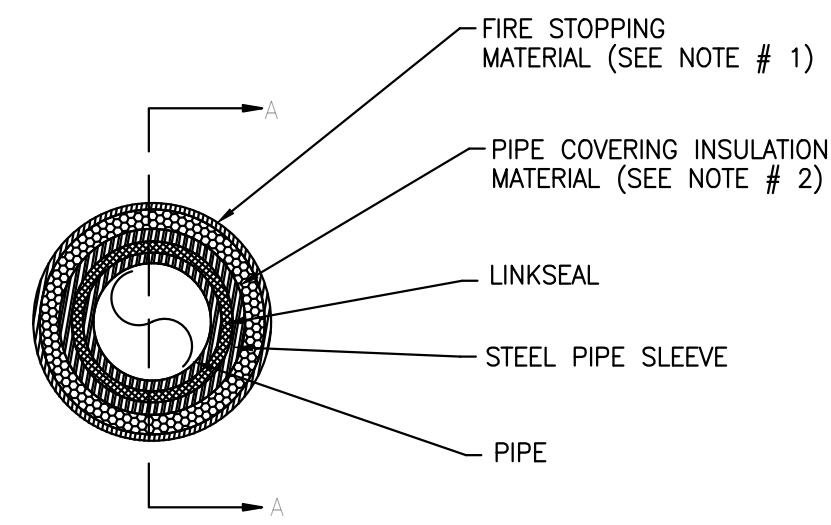
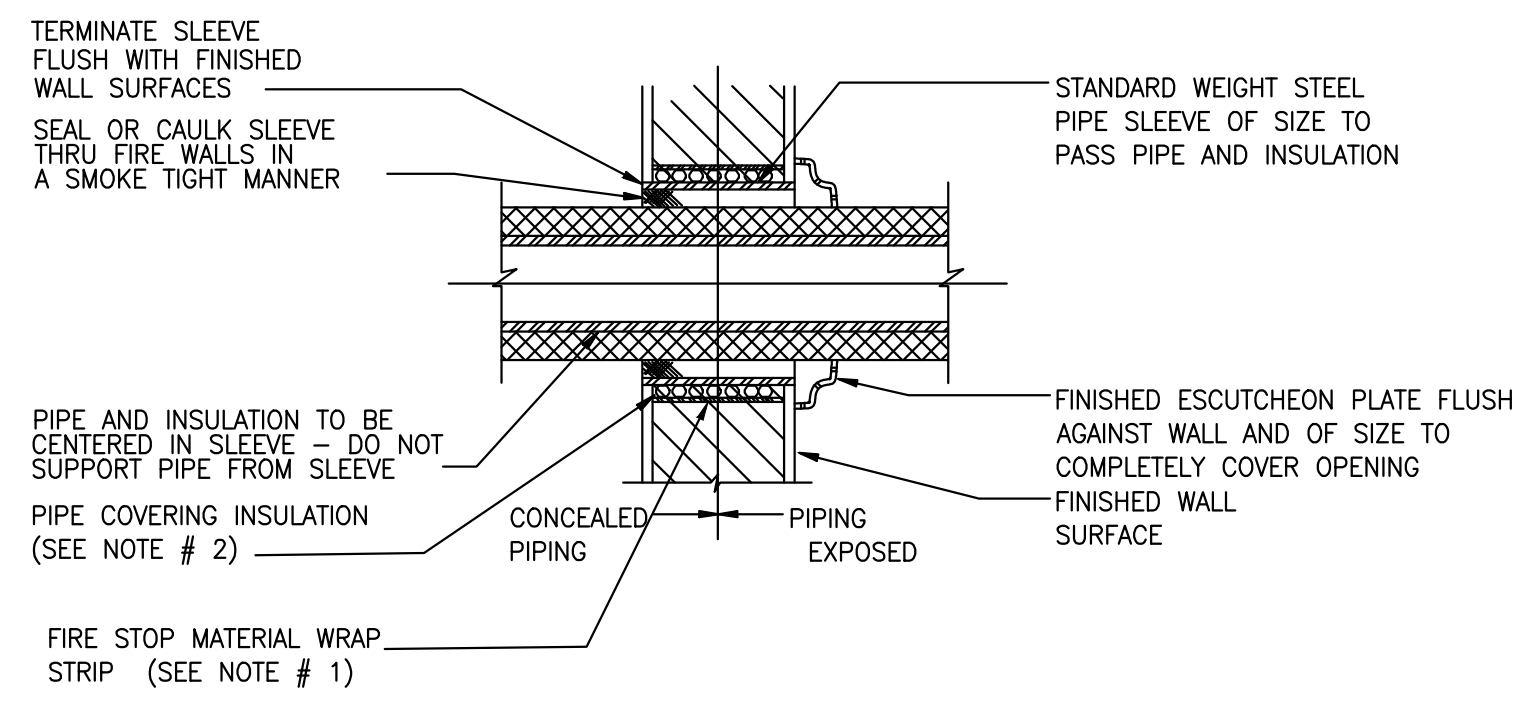
- GENERAL NOTES:**
1. CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER 2018 INTERNATIONAL ENERGY CODE CODE (REFER SHEET P1.1)
  2. PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
  3. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
  4. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
  5. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.

- WATER AND GAS PIPING KEYED NOTES:**
1. CONNECT NEW 2" CW PIPING WITH SHUT OFF VALVE AND TIE-INTO THE EXISTING WATER LINE IN SPACE. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING, WATER SUBMETER AND BACKFLOW PREVENTER REQUIREMENTS WITH LANDLORD.
  2. ROUTE T&P RELIEF TO DRAIN IN NEAREST FLOOR DRAIN.
  3. PROVIDE ASSE 1070 OR SIMILAR APPROVED TEMPERING VALVE FOR LAVATORIES AND HAND SINK. SET AT TEMPERATURE TO A MAXIMUM 110 °F.
  4. REFRIGERATOR BY OTHERS - PLUMBING CONTRACTOR TO PROVIDE COLD WATER CONNECTION CONSISTING OF 1/2" X 3/8" ANGLE PATTERN COMPRESSION STOP 12" A.F.F. (RVB-1) WITH AQUA PURE MODEL NO. AP717.
  5. CONNECT NEW 1/2" VALVED COLD WATER FOR NEW DRINKING FOUNTAIN AND REFRIGERATOR WITH INTEGRAL CHECK VALVE OR PROVIDE WAITS SD-3 BACKFLOW PREVENTOR.
  6. CONTRACTOR TO VERIFY WATER FILTRATIONS SYSTEM LOCATION IN FIELD/SITE.
  7. CONTRACTOR TO FIELD VERIFY RTU-2(E) AND ENSURE GAS PIPING IS IN GOOD CONDITION. REPLACE PIPING IF REQUIRED.

1 PLUMBING WATER & GAS FLOOR PLAN  
3/16" = 1'-0"

Property of M.Y. Engineers

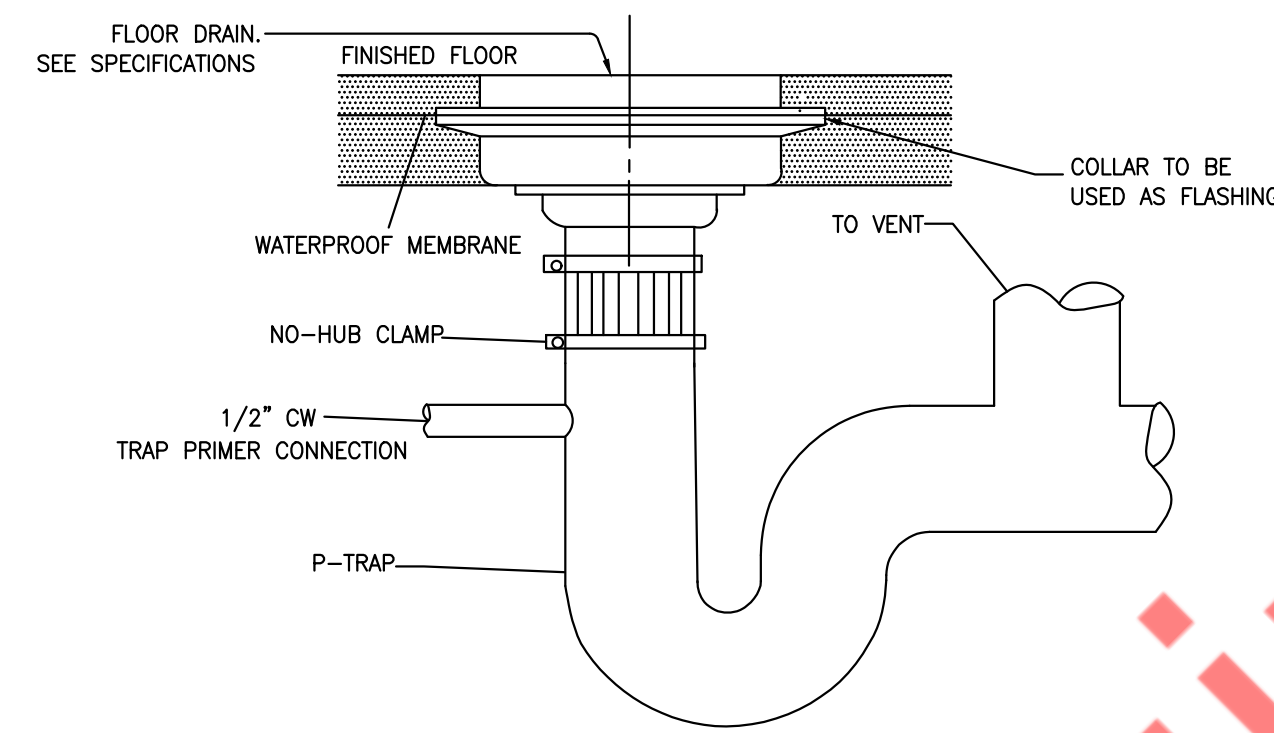
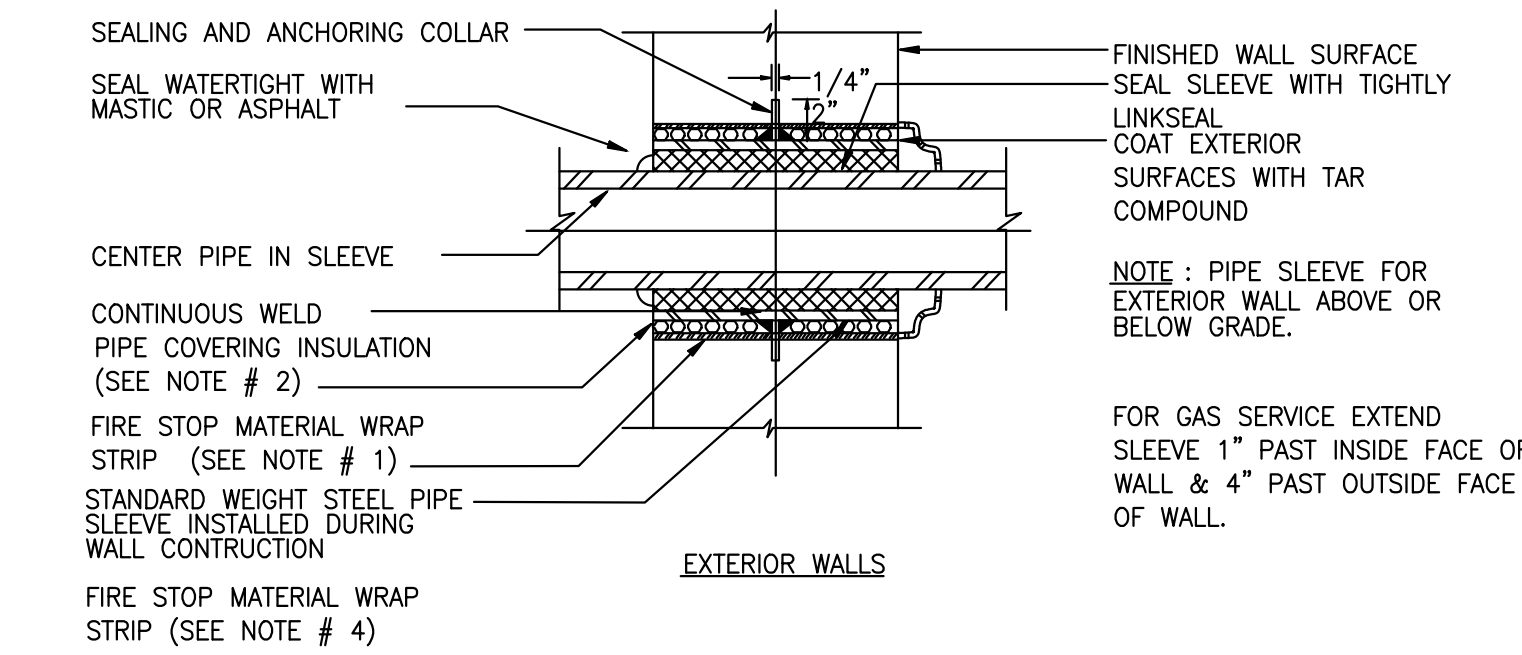




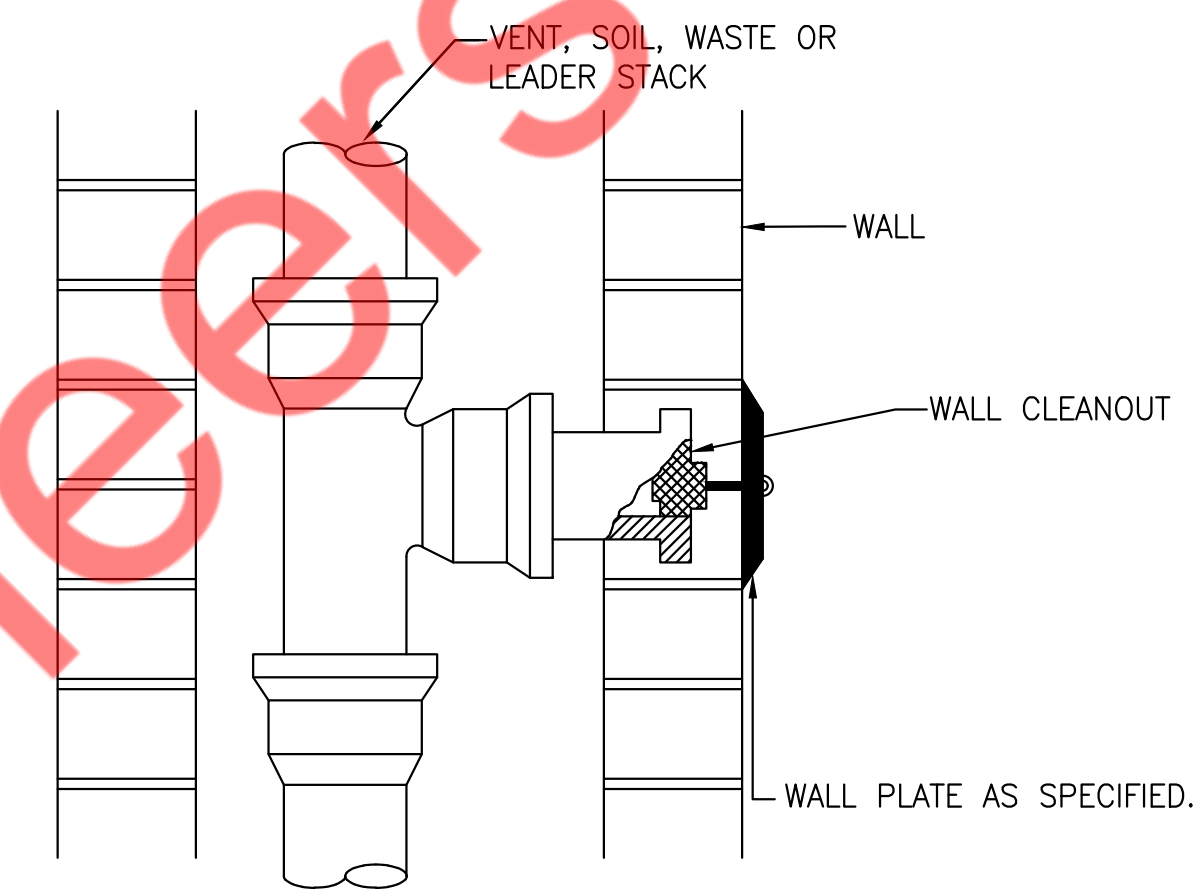
PIPE SLEEVE VIEW

NOTES:

1. FIRESTOP MATERIAL WRAP STRIP SHALL BE 1/2" THICK INTUMESCENT ELASTOMERIC MATERIAL FACED ON ONE SIDE WITH ALUMINUM FOIL SUPPLIED IN 2 IN. WIDE STRIPS AND WRAP AROUND THE PIPE AS PER UL MATERIAL LISTED 3M COMPANY FS-195+ OR FILL CAVITY WITH CAULK OR SEALANT MIN. 1/4" DIA. CONTINUOUS BEAD
2. PIPE COVERING INSULATION SHALL BE 2" THICK HOLLOW CYLINDRICAL HEAVY DENSITY GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKETED, AS PER UL CLASSIFICATION AND MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 OR LESS MAY BE USED.
3. DETAILS ARE ONLY DIAGRAMMATIC WITH RESPECT TO PENETRATION PROTECTION REQUIRED IN ACCORDANCE WITH SECTION 714 OF 2020 FLORIDA BUILDING CODE, 7TH EDITION. A LISTED PENETRATION FIRESTOP SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THE LISTING CRITERIA.

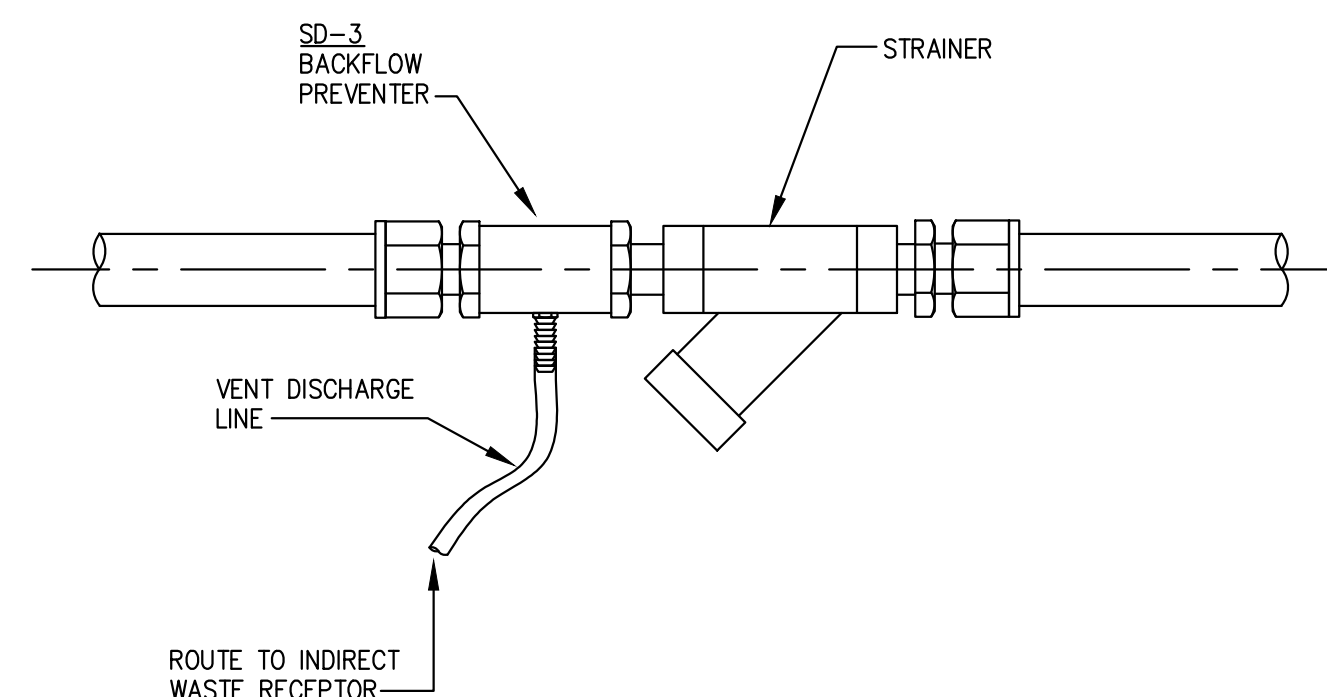


2 FLOOR DRAIN DETAILS  
P3.0 N.T.S

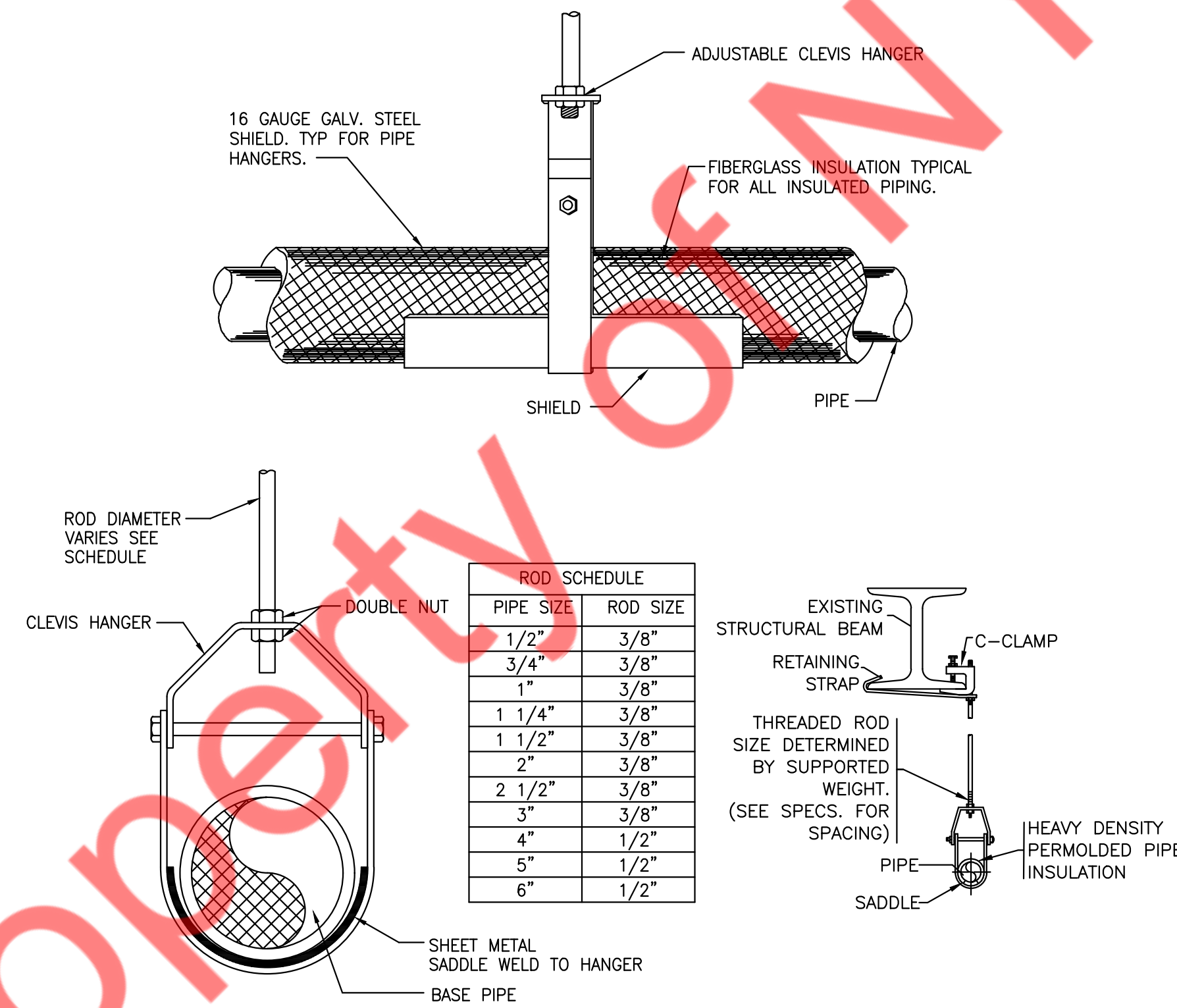


3 WALL CLEANOUT DETAIL  
P3.0 N.T.S

1 PIPE SLEEVE THRU WALL SECTION  
P3.0 N.T.S



4 BACKFLOW PREVENTION DETAILS  
P3.0 N.T.S



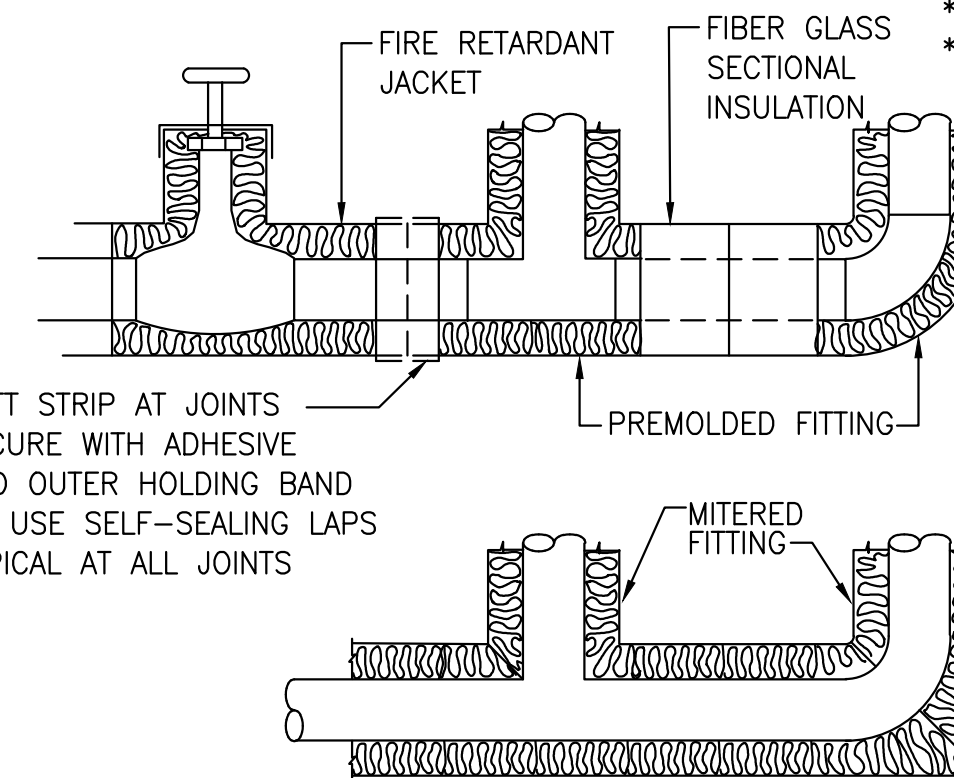
5 HANGER DETAIL  
P3.0 N.T.S

CONCEALED VALVES AND FITTINGS

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

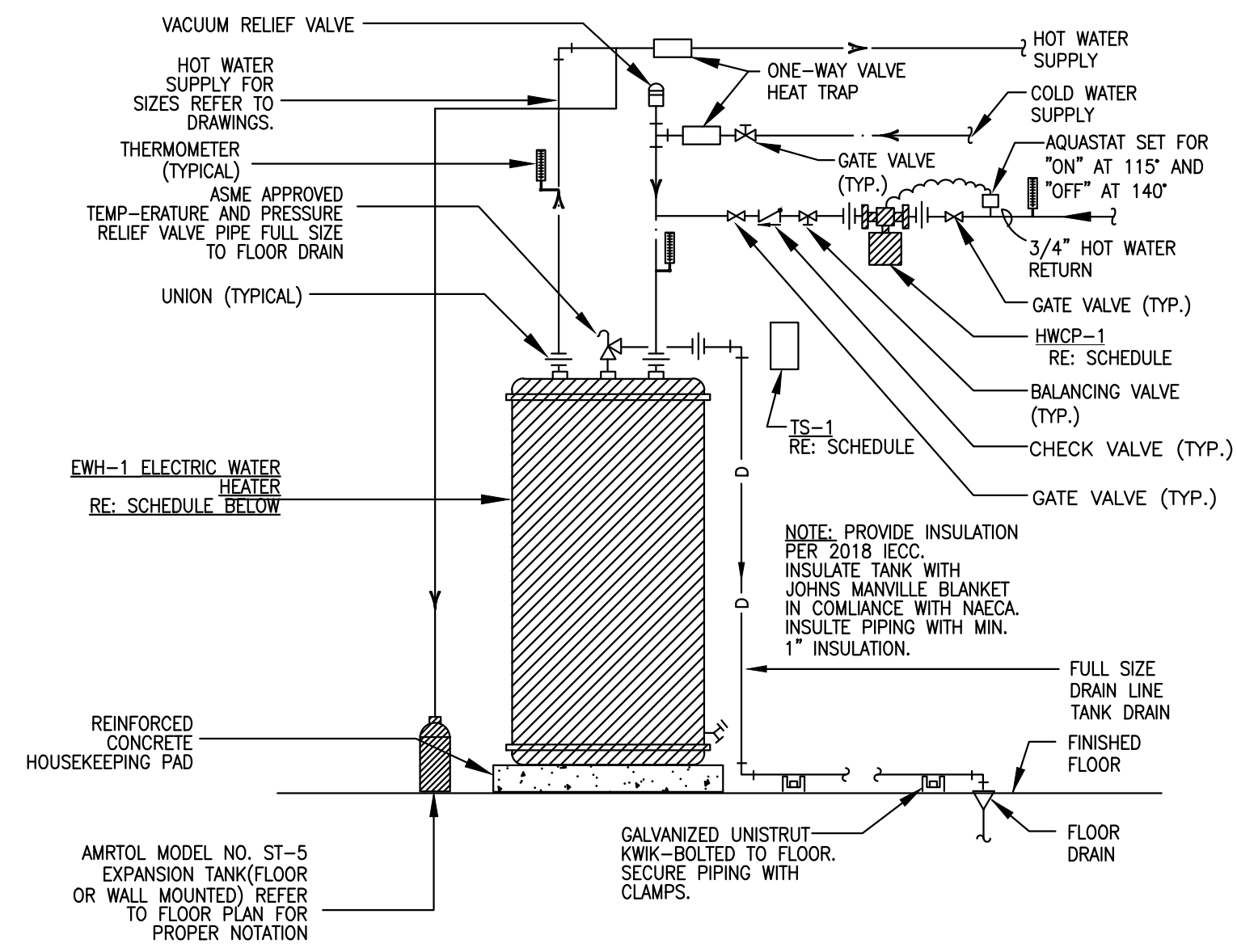
CONCEALED VALVES AND FITTINGS

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

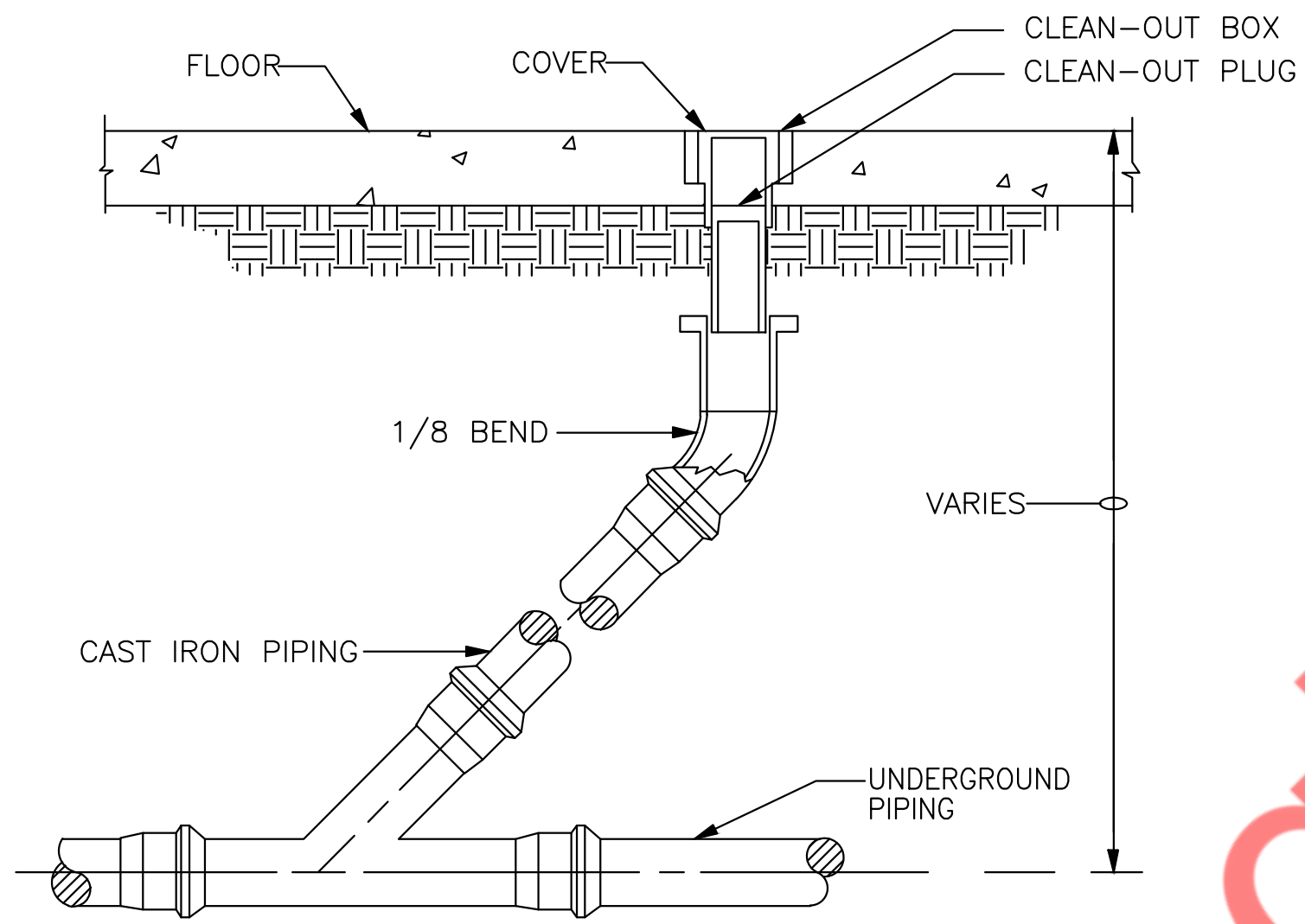


6 INSULATION OF PIPING, VALVES AND FITTINGS FOR EXPOSED AND CONCEALED LOCATIONS  
P3.0 N.T.S

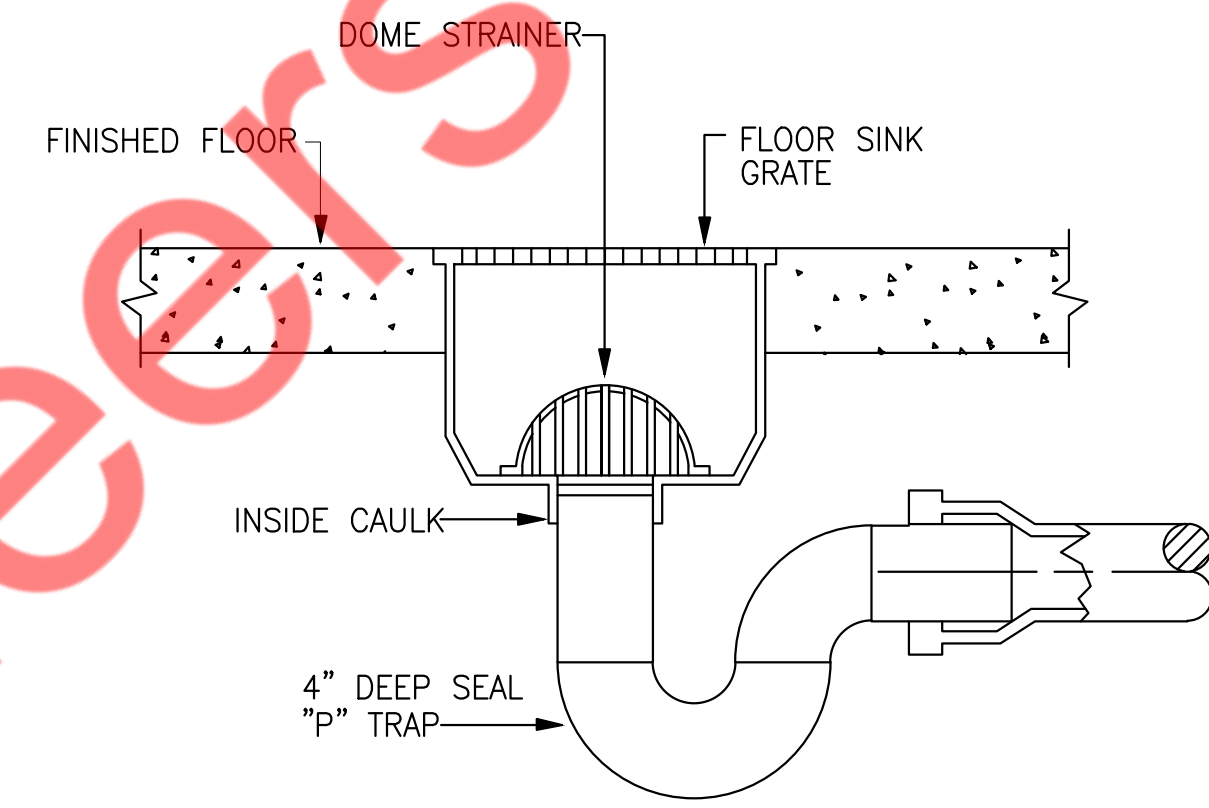




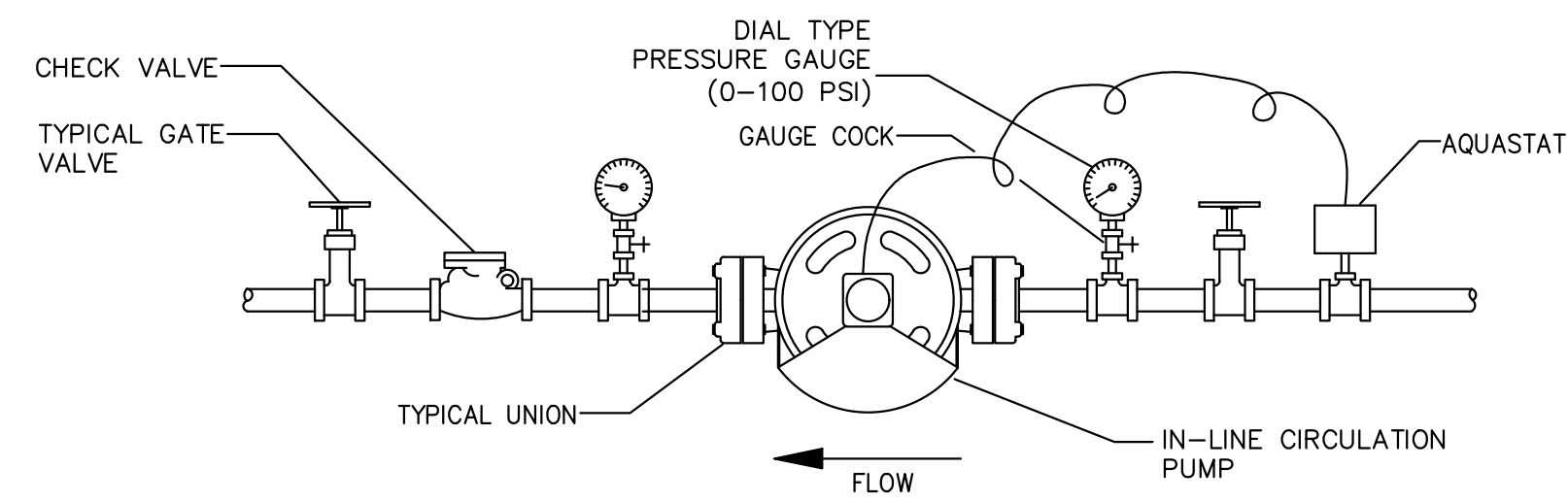
1 ELECTRIC WATER HEATER (FLOOR MOUNTED)  
P3.1 N.T.S



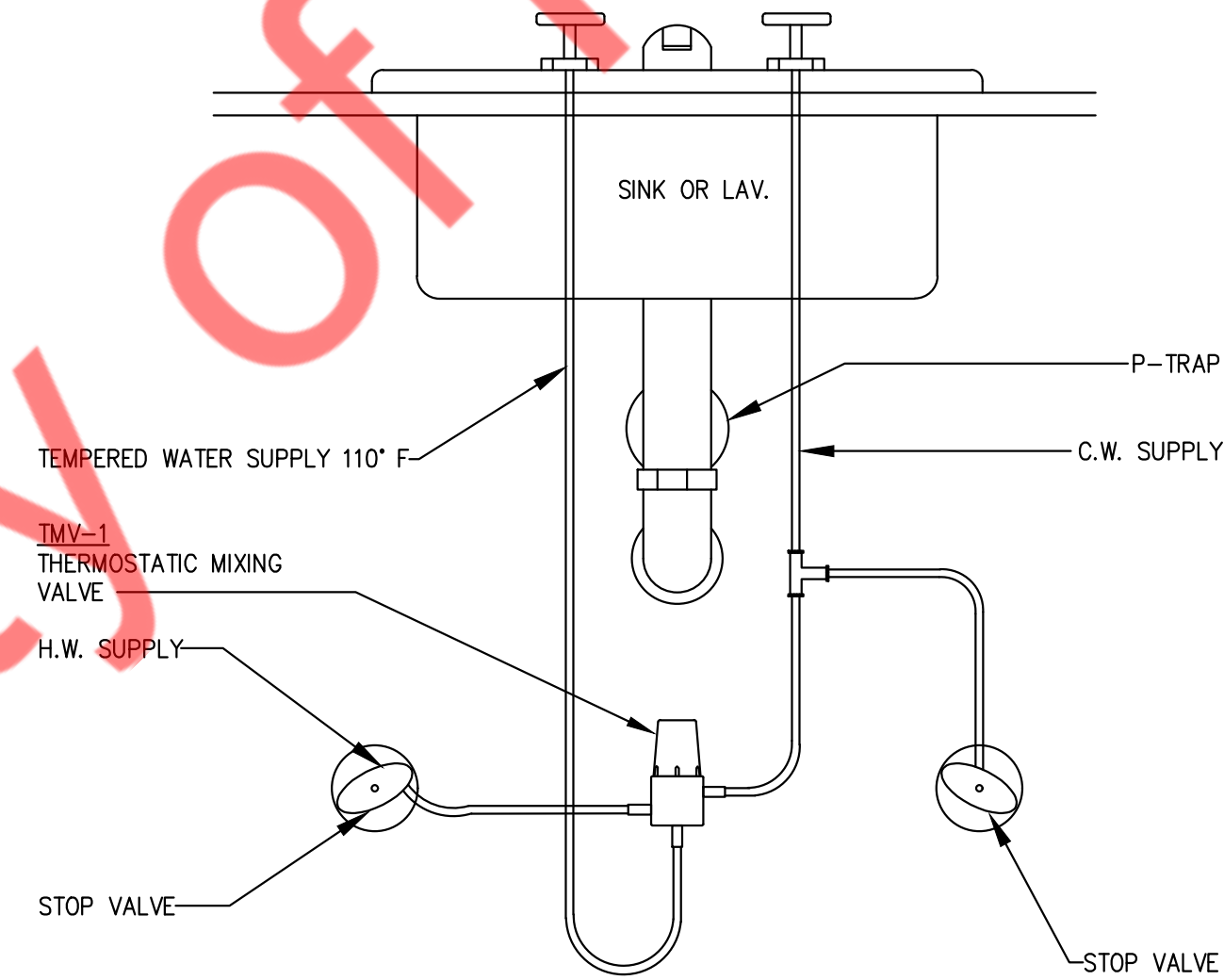
2 FLOOR CLEANOUT DETAIL  
P3.1 N.T.S



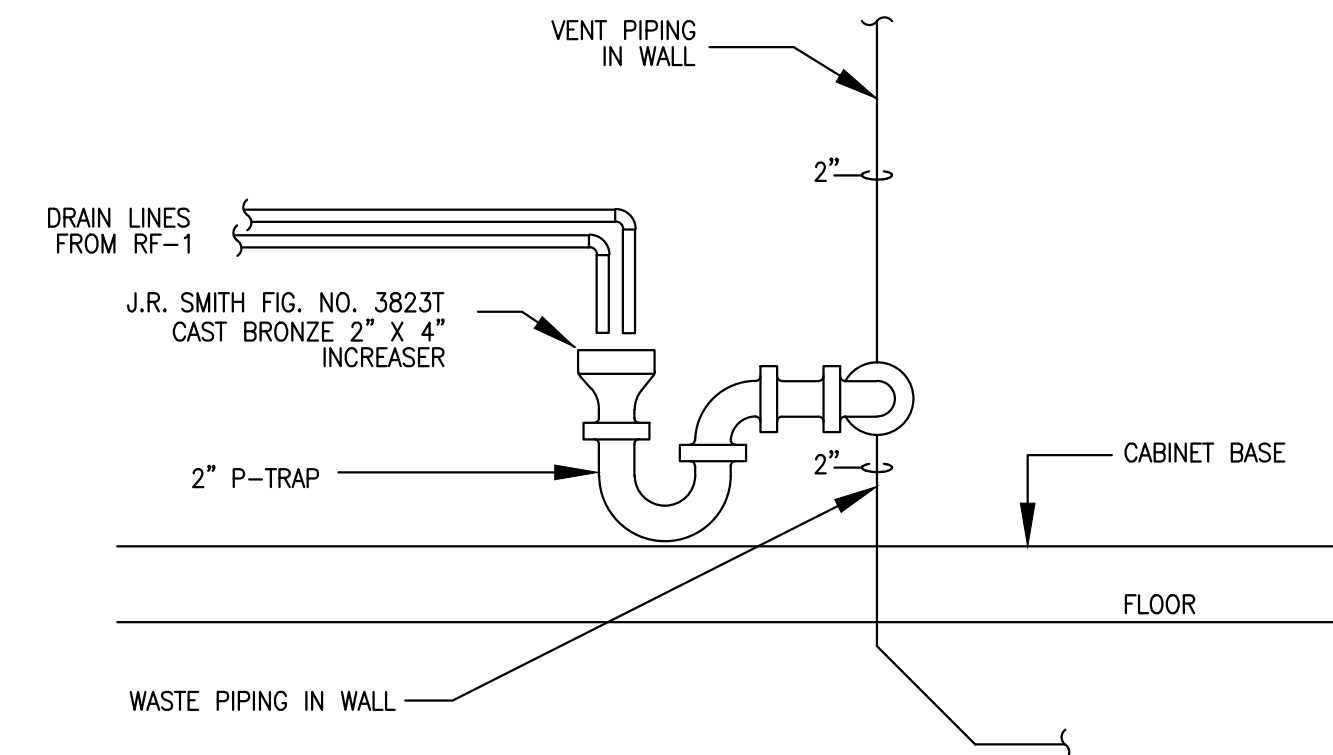
3 FLOOR SINK DETAILS  
P3.1 N.T.S



4 INLINE RECIRCULATING PUMP DETAIL  
P3.1 N.T.S

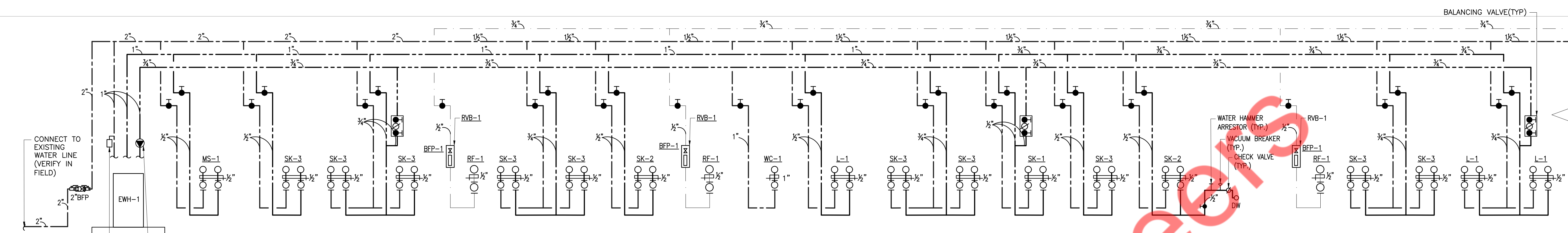


5 THERMOSTATIC MIXING VALVE (TMV-1)  
P3.1 N.T.S

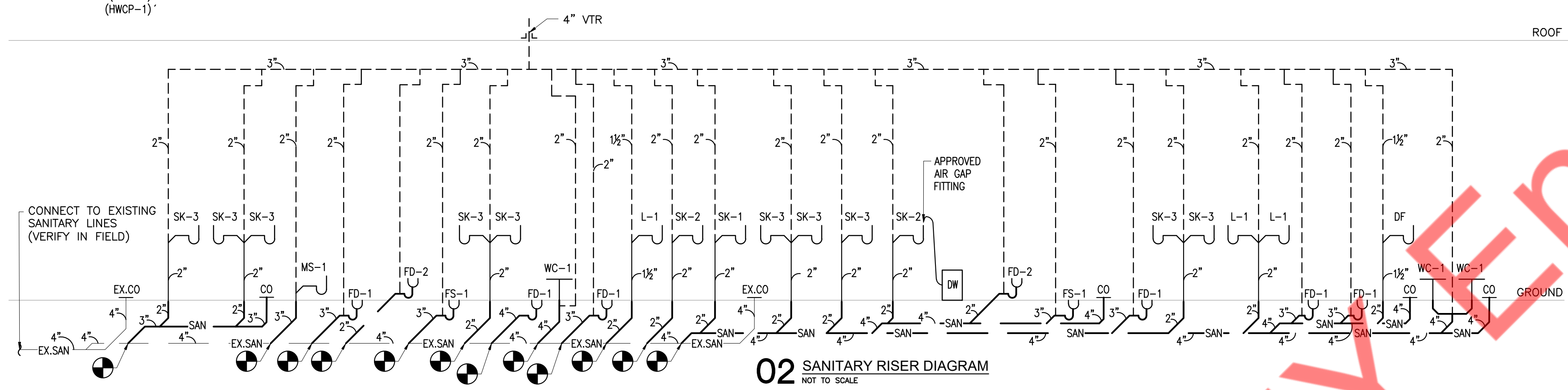


6 FUNNEL DRAIN DETAILS  
P3.1 N.T.S

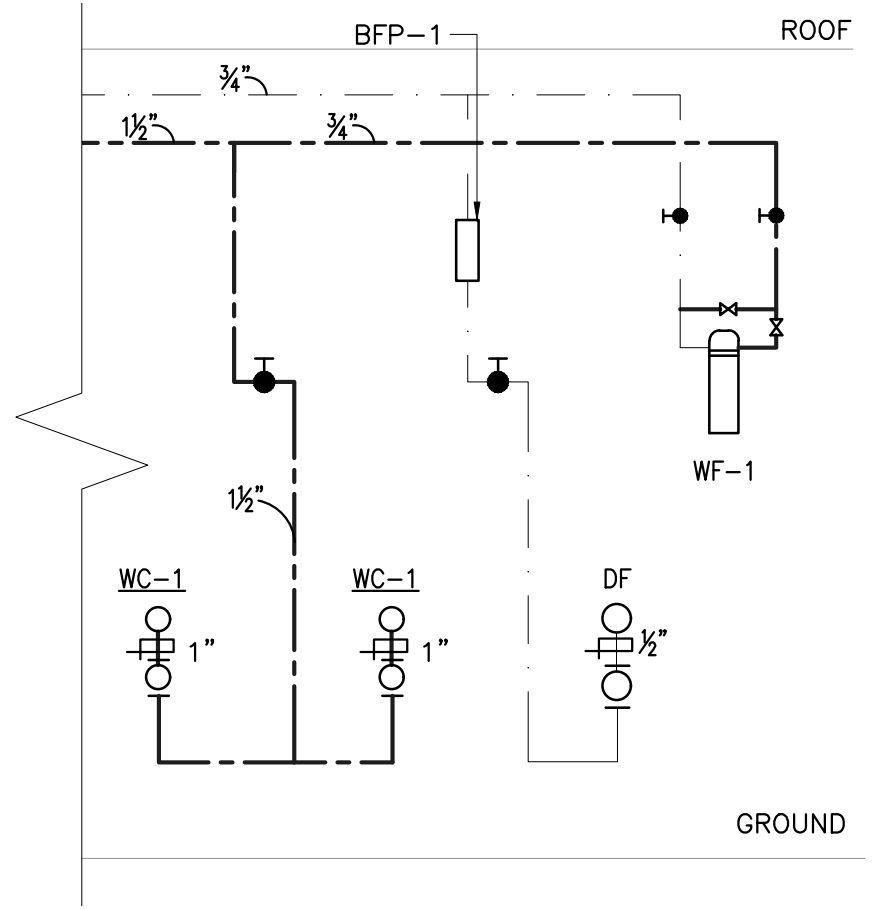




01 DOMESTIC WATER RISER DIAGRAM  
NOT TO SCALE



02 SANITARY RISER DIAGRAM  
NOT TO SCALE



PLUMBING FIXTURE AND CONNECTION SCHEDULE

SYMBOL	DESCRIPTION	SIZE OF CONNECTION					REMARKS	WATER CONSERVATION
		TRAP	SS	SV	CW	HW		
WC-1	WATER CLOSET HANDICAPPED	-	4"	2"	1"	-	AMERICAN STANDARD NO. 3461.001 "MADERA FLO WISE" 1.28 GPF 16-1/2" HEIGHT VITREOUS CHINA, FLOOR MOUNTED, FLUSHMETER WATER CLOSET WITH ELONGATED BOWL, SLOAN 111-1.28 HIGH EFFICIENCY (1.28 GPF) FLUSH VALVE WITH SCREW DRIVER STOP AND PROTECTIVE CAP ON STOP. CHURCH 9500C WHITE FRONT SEAT WITH CONCEALED STAINLESS STEEL SELF-SUSTAINING AND EXTERNAL CHECK HINGE. WATER CLOSET SHALL BE SUITABLE FOR HANDICAPPED.	1.28 G./FLUSH
L-1	LAVATORY HANDICAPPED	1 1/4"	2"	2"	1/2"	1/2"	KOHLER NO. K-2032 "PINOIR" (20-3/4" X 18-1/4") VITREOUS CHINA, WALL-MOUNTED LAVATORY WITH K-2057 SHROUD. CHICAGO NO. 116.212.AB.1 DECK MOUNTED SINGLE HOLE, E2805 VANDAL RESISTANT .5 GPM HYTRONIC DAUL BEAM INFRARED SENSOR 6 VOLT LITHIUM CRP2 BATTERY CONCEALED INTERNAL TEMPERATURE CONTROL MIXER, VANDAL RESISTANT SPRAY OUTLET. MCGUIRE # 8872 CAST BRASS P-TRAP WITH CLEANOUT PLUG, MCGUIRE # 155A CAST BRASS P.O. PLUG WITH OPEN GRID STRAINER AND 17 GAUGE TAILPIECE, MCGUIRE # 216SLK SUPPLIES WITH RISER AND WALL ESCUTCHEON, ANGLE SUPPLY AND P-TRAP SHALL BE INSULATED WITH TRAP WRAP BY TRUEBRO PRODUCTS, INC. OR APPROVED EQUAL. ANGLE SUPPLY TO BE LOCATED OUTSIDE OF THE SHROUD TO THE RIGHT SIDE.	0.5 GPM
SK-1	SINK HANDICAPPED PROCEDURE ROOM	1 1/2"	2"	2"	1/2"	1/2"	ELKAY NO. ELUHAD141455 SINGLE COMPARTMENT STAINLESS STEEL UNDERMOUNT SINK, 18 GAUGE SELF TYPE 304 (16-1/2" X 16-1/2" X 5-3/8" DEEP) JACLO 560-ESF CONTEMPO GOOSE NECK ADA SENSOR FAUCET WITH 5-3/4" SPOUT REACH. COLOR TO BE DETERMINED BY ARCHITECT. PROVIDE TMV-1 AS REQUIRED CHICAGO NO. 1017, ANGLE SUPPLIES WITH STOP, 1/2" CHROME-PLATED BRASS NIPPLES TO WALL, MCGUIRE NO. 151-A CRUMB CUP STRAINER, NO. 8912 (1 1/2") ADJUSTABLE SEMI-CAST CHROME-PLATED BRASS P-TRAP WITH TUBING WASTE TO WALL AND CHROME-PLATED CAST WALL FLANGE WITH SET SCREW SUPPLIES, AND P-TRAP SHALL BE INSULATED WITH TRAP WRAP BY PLUMBEREX SPECIALTY PRODUCTS, INC OR APPROVED EQUAL.	
SK-2	SINK HANDICAPPED BREAK ROOM & LAB	1-1/2"	2"	2"	1/2"	1/2"	ELKAY NO. ECTSRAD25226TBO "CROSSTOWN" SINGLE COMPARTMENT STAINLESS STEEL UNDERMOUNT SINK, 18 GAUGE (25" X 22" X 6" DEEP) WITH THREE FAUCET HOLE PUNCHINGS, LOCATE DRAIN LEFT REAR CHICAGO NO. 201-AH48-317ABCP FAUCET WITH 317 WRIST BLADE HANDLES RIGID/ SWING GOOSENECK SPOUT WITH E3-2 AERATOR, AND TMV-1. CHICAGO NO. 1017, ANGLE SUPPLIES WITH STOP, 1/2" CHROME-PLATED BRASS NIPPLES TO WALL, MCGUIRE NO. 151-A CRUMB CUP STRAINER, NO. 8912 (1 1/2") ADJUSTABLE SEMI-CAST CHROME-PLATED BRASS P-TRAP WITH TUBING WASTE TO WALL AND CHROME-PLATED CAST WALL FLANGE WITH SET SCREW SUPPLIES, AND P-TRAP SHALL BE INSULATED WITH TRAP WRAP BY PLUMBEREX SPECIALTY PRODUCTS, INC OR APPROVED EQUAL.	
SK-3	SINK HANDICAPPED EXAM ROOM	1-1/2"	2"	2"	1/2"	1/2"	ELKAY NO. ELUHAD121255 SINGLE COMPARTMENT STAINLESS STEEL UNDERMOUNT SINK, 18 GAUGE (14-1/2" X 14-1/2" X 5-3/8" DEEP) JACLO 560-ESF CONTEMPO GOOSE NECK ADA SENSOR FAUCET WITH 5-3/4" SPOUT REACH. COLOR TO BE DETERMINED BY ARCHITECT. AND TMV-1. CHICAGO NO. 1017, ANGLE SUPPLIES WITH STOP, 1/2" CHROME-PLATED BRASS NIPPLES TO WALL, MCGUIRE NO. 151-A CRUMB CUP STRAINER, NO. 8912 (1 1/2") ADJUSTABLE SEMI-CAST CHROME-PLATED BRASS P-TRAP WITH TUBING WASTE TO WALL AND CHROME-PLATED CAST WALL FLANGE WITH SET SCREW SUPPLIES, AND P-TRAP SHALL BE INSULATED WITH TRAP WRAP BY PLUMBEREX SPECIALTY PRODUCTS, INC OR APPROVED EQUAL.	
MS-1	SERVICE SINK	3"	3"	2"	1 1/2"	1 1/2"	STERN WILLIAMS MODEL No. SB-902-BP-2 -LB OR APPROVED EQUAL WHITE (24"x24") SERVICE SINK WITH 10" HIGH WALLS, 3" STAINLESS STEEL COMBINATION DOME STRAINER AND LINT BASKET OUTLET, ACID RESISTANT, MOLDED STONE (COLOR AS SPECIFIED BY ARCHITECT). REMOVABLE VINYL-COATED RIM GUARD No. V-70-24. SINK FITTING CHICAGO 897-RCF OR T&S No. B-0665-BSTR ROUGH CHROME PLATED BRASS FINISH, RIGID SPOUT, WALL BRACE, INTEGRAL STOPS, PAUL HOOK, HOSE END, VACUUM BREAKER AND VANDAL PROOF SCREWS. PROVIDE 30" HOSE (MINIMUM) WITH STAINLESS STEEL BRACKET (EQUAL TO STERN - WILLIAMS No. T-35) AND STAINLESS STEEL MOP HANGER (EQUAL TO STERN - WILLIAMS No. T-40). PROVIDE 12" HIGH, 20 GAUGE TYPE 316 STAINLESS STEEL SPLASH GUARDS ON ALL WALLS ADJACENT TO THE SERVICE SINK. PROVIDE AND INSTALL INTERNAL WALL SUPPORTS IN ACCORDANCE WITH THE ARCHITECTS REQUIREMENTS FOR THE WALL BRACE ATTACHMENTS.	
IS-1	TIME SWITCH	-	-	-	3/4"	-	TORK ELECTROMECHANICAL 24 HOUR TIME SWITCH POWERED BY A SELF STARTING SYNCHRONOUS MOTOR. INSTALL ON WALL ADJACENT TO CIRCULATING PUMP. COORDINATE WITH ELECTRICAL AND PROVIDE FOR 120/1/60 HZ POWER REQUIREMENT.	
TMV-1	THERMOSTATIC MIXING VALVE	-	-	-	1/2"	-	SYMMONS NO #7-210-CK THERMOSTATIC MIXING VALVE CONSTRUCTION SHALL BE ROUGH BRASS AND BRONZE WITH BRASS AND STAINLESS STEEL FLOW CONTROL COMPONENTS, WITH INTEGRAL CHECKS AND VALVES. 360 DEGREES HANDLE ADJUSTMENT FOR TEMPERATURE SELECTION. @ 110 F. MAX (SINK/LAVATORY)	
BFP-1	BACKFLOW PREVENTER	-	-	-	SEE PLAN	-	WATTS No. SD-3. 1/4" BACKFLOW PREVENTER WITH 316 STAINLESS STEEL BODY.	
FD-1	FLOOR DRAIN	3"	3"	3"	1/2"	-	J.R. SMITH FIGURE No. 2631C-12 OR APPROVED EQUAL 12"x12" PAINTED CAST IRON FLOOR DRAIN WITH SEDIMENT BUCKET, 1/2" GRATE, SIZE AS NOTED ON PLANS, CLAMPING UNIT, TRAP PRIMER TAP AND DEEP SEAL TRAP.	
RVB-1	REFRIGERATOR VALVE BOX	-	-	-	1/2"	-	GUY GRAY #BIM-875 10-3/4" X 9" 16GA. STEEL WITH EPOXY FINISH, 3/8" O.D. SWEAT CONNECTION PROVIDE FILTER WHEN MAKING FINAL CONNECTION, AQUA-PURE #AP717	
WF-1	WATER FILTER	-	-	-	3/4"	-	AQUA PURE MODEL NO. AP101T WITH APS117 CARTRIDGE.	
BFP	BACKFLOW PREVENTER	-	-	-	2"	-	NEW 2" RPZ WATTS MODEL LF-009	
FD-2	FUNNEL DRAIN	2"	2"	2"	-	-	J.R. SMITH FIGURE No. 3823T CAST BRONZE 2"x 4" FUNNEL DRAIN.	

WATER HEATER SCHEDULE

MARK	SERVICE	STORAGE IN GALLONS	RECOVERY AT 100" RISE	ELECTRICAL	ELEMENT WATTS	NUMBER OF ELEMENTS	MAKE AND MODEL
EW-1	ELEC. WATER HEATER	50	41 GPH	208V./3ø/60Hz	5KW/ELEMENT 10KW TOTAL	2	A.O. SMITH MODEL NO. DEL-50, DUAL ELEMENT, SIMULTANEOUS OPERATION

PUMP SCHEDULE

MARK	LOCATION	SERVICE	GPM	HEAD FT.	MIN. EFF.	HP	VOLTS/ø/Hz	MAKE AND MODEL
HWCP-1	CEILING	DOMESTIC HOT WATER	2	6	--	0.12	120/1ø/60	GRUNDFOS PRODUCT UP 15-18 B5 1" FLANGED, INLINE TYPE

EXPANSION TANKS

UNIT	NUMBER	MANUFACTURER & MODEL NUMBER	SERVICE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	PRESSURE RATING (PSI)	DIMENSIONS		OPERATING WEIGHT (LBS)	NOTES
							DIAMETER (INCH)	HEIGHT (INCH)		
ET-1	1	AMTROL	ST-5	2	0.9	150	8	12.5	25	1

PIPING MATERIAL SCHEDULE

PIPING FUNCTION	PIPING MATERIAL
SANITARY WASTE BELOW SLAB	SCHEDULE 40 PVC
SANITARY WASTE ABOVE GROUND	SCHEDULE 40 PVC
SANITARY VENT	SCHEDULE 40 PVC
DOMESTIC HOT & COLD WATER	COPPER, TYPE "L" HARD DRAWN
FIRE SPRINKLER ABOVE GROUND	BLACK STEEL SCHEDULE 40

NOTE:  
NO HUB COUPLING SHALL HAVE A SHIELD CONSTRUCTED OF 304 CORRUGATED STAINLESS STEEL WITH A MINIMUM THICKNESS OF .016 COUPLING SIZE 1-1/2" - 4" SHALL HAVE FOUR (4) BANDS: APPROVED MANUFACTURERS HUSKY SD 4000 AND MISSION NO TWO BANDS ARE ACCEPT.