### DUCT SYMBOLS

	DOCI SIMBOLS	
DOUBLE LINE SYMBOL	<u>DESCRIPTION</u>	SINGLE LINE SYMBOL
<u>λ</u> 20×16 Υ	DUCT- FIRST NUMBER IS VISIBLE DIMENSION.	20x16
<b>₽</b>	RADIUS ELBOW W/VANE(S) (1.5=R/D STANDARD)	+5
	DUCT SECTION, POSITIVE PRESSURE	
	DUCT SECTION, NEGATIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) POSITIVE PRESSURE DUCT & AIRFLOW DN(RIGHT) POSITIVE PRESSURE	<b>⊗</b> \\
	DUCT & AIRFLOW UP(LEFT) NEGATIVE PRESSURE DUCT & AIRFLOW DN(RIGHT) NEGATIVE PRESSURE	<b>⊗</b> \\
	DUCT & AIRFLOW UP(LEFT) NEG./POS. PRESSURE DUCT & AIRFLOW DN(RIGHT) NEG./POS. PRESSURE	
<u> </u>	CHANGE OF ELEVATION=RISE (R), DROP (D)	5 <del>%</del> R → ⊗ 5
20x16	DUCT W/INTERNAL LINING CLEAR INSIDE DIMENSIONS SHOWN	
X BBY	ACCESS DOOR=SIDE (L), BOTTOM (M), TOP (R)	\$D \$ <del>\\\\ \\\\\</del> <del>\\</del> <del>\\</del> <del>\\</del> <del>\\</del> <del>\\</del> <del></del>
<u> </u>	FLEXIBLE CONNECTOR	\$— <b>\</b> \\\\\\\\\\
ķ	FLEXIBLE DUCT	<b>X</b>
FD	FD- FIRE DAMPER, SD-SMOKE DAMPER, FSD- FIRE/SMOKE DAMPER.	FSD S
(TYPE)	MANUAL VOLUME DAMPER-SPECIFIC TYPE, NO LABEL-BUTTERFLY, OBD-OPPOSED BLADED DAMPER, PBD-PARALLEL BLADE DAMPER	(TYPE)
M M	MOTORIZED DAMPER OR ZONE CONTROL DAMPER	\$ <b>*</b> M
	BRANCH TAP-W/45 DEG. ENTRY	\ \\
£ 3	BRANCH TAP-CONICAL SPIN-IN	5
8 3	BRANCH TAP-STRAIGHT SPIN-IN	\$
λ20x10 ]10x10 \	TRANSITION	20x10 10x10
X////X	EXISTING DUCTWORK TO BE DEMOLISHED	
X	EXISTING DUCTWORK TO REMAIN	
RTU-# FCU-# XXX-#	HVAC — EQUIP AS NOTED	
<b>♦</b>	AIR DEVICE, SUPPLY— CEILING. CLEAR	
A X"ø X CFM	AIR DEVICE TAG SPIN—IN DIMENSION AIRFLOW (CFM)	
	AIR DEVICE, RETURN— CEILING.	
	AIR DEVICE, EXHAUST— CEILING.	
	AIR DEVICE, SUPPLY— SIDEWALL.	
-~-	AIR DEVICE, RETURN/EXHAUST— SIDEWALL.	
<b>→</b>	POINT OF NEW CONNECTION	
	MECHANICAL DRAWING LIST	

	POINT OF NEW CONNECTION					
	MECHANICAL DRAWING LIST					
M-1	MECHANICAL SYMBOLS & NOTES					
M-2	MECHANICAL NOTES					
M-3	MECHANICAL DETAILS					
M-4 MECHANICAL SCHEDULES						
M-5	MECHANICAL FLOOR PLAN					

# CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

- A. CHICAGO BUILDING CODE(14B).
- B. CHICAGO MECHANICAL CODE(14M).
- CHICAGO PLUMBING CODE(14P).
- D. CHICAGO FIRE PREVENTION CODE(14F).
- E. CHICAGO ENERGY CONSERVATION CODE(14N).
- F. CHICAGO ELECTRICAL CODE(14E).

### MECHANICAL ABBREVIATIONS

BD	BACKDRAFT DAMPER					
CDS	CEILING DIFFUSER SUPPLY					
CDR	CEILING DIFFUSER RETURN					
CFM	CUBIC FEET OF AIR PER MINUTE					
CD	CONDENSATE DRAIN PIPE					
DN	DOWN					
EER	ENERGY EFFICIENCY RATIO					
FC	FLEXIBLE CONNECTION					
11000	HEATING SEASONAL					
HSPF	PERFORMANCE FACTOR					
IEED	INTEGRATED ENERGY					
IEER	EFFICIENCY RATIO					
0550	SEASONAL ENERGY					
SEER	EFFICIENCY RATIO					
VD	VOLUME DAMPER					
EF	EXHAUST FAN					
SAE	SAME AS EXISTING					
FCU	FAN COIL UNIT					
VIF	VIF VERIFY IN FIELD					

# GENERAL MECHANICAL NOTES AND SPECIFICATIONS

# GENERAL

- 1. COORDINATE WORK AMONG ALL DISCIPLINES. IT IS NOT THE INTENT OF THESE DOCUMENTS TO DICTATE WHO MUST DO THE WORK. ALL WORK SHOWN IS THE RESPONSIBILITY OF THE (PRIME) CONTRACTOR.
- 2. FIELD VERIFY ALL CONDITIONS AND MEASURE DIMENSIONS WITHIN THE BUILDING PRIOR TO ORDERING EQUIPMENT AND/OR PROCEEDING WITH INSTALLATION.
- 3. ALL EQUIPMENT SHALL BE FACTORY TESTED, AND CONTRACTOR SHALL VERIFY THEIR CONDITION PRIOR TO INSTALLATION. CONTRACTOR IS RESPONSIBLE FOR EQUIPMENT DAMAGED DURING MOVING AND INSTALLATION.
- 4. EQUIPMENT FOUND DEFECTIVE PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED AT NO COST TO OWNER.
- 5. SUBMISSION OF BID PROPOSAL IS CONSIDERED AN ACKNOWLEDGEMENT THAT CONTRACTOR VISITED SITE, AND VERIFIED ALL EXISTING CONDITIONS, AND INCLUDED ANY MODIFICATIONS TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND OPERATIONAL MECHANICAL SYSTEM.
- 6. COORDINATE WITH OWNER AND ENGINEER FOR ANY DISRUPTION IN UTILITY SERVICES, PARTICULARLY THOSE THAT MIGHT AFFECT OTHER BUILDINGS.
- 7. CONTRACTOR SHALL NOT PROCEED WITH ANY WORK INVOLVING A CHANGE IN PROJECT SCOPE OR COST WITHOUT FIRST HAVING OBTAINED ENGINEER'S APPROVAL IN WRITING. UNLESS ENGINEER HAS AGREED TO SUCH CHANGE PRIOR TO IT BEING DONE, AND HAS AGREED THAT AN INCREASE IN COST ASSOCIATED WITH SUCH CHANGE IS WARRANTED; CONTRACTOR WILL NOT BE REIMBURSED FOR SUCH CHANGE.
- 8. TESTING, ADJUSTING AND BALANCING (TAB) CONTRACTOR SHALL BE RETAINED BY THE PRIME CONTRACTOR TAB SHALL NOT BE A PART OF THE MECHANICAL CONTRACT.

#### CODES AND ORDINANCES

- 1. PERFORM ALL WORK PER LATEST VERSION OF INTERNATIONAL MECHANICAL CODE, AND APPLICABLE LOCAL CODES AND ORDINANCES, UNLESS DRAWINGS OR SPECIFICATIONS HAVE MORE STRINGENT REQUIREMENTS.
- 2. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS AND FEES ASSOCIATED WITH PROJECT, INCLUDING FEES FOR INSPECTIONS, APPLICATIONS, AND PROVISION OF NEW SERVICES.
- 3. NOTIFY ENGINEER OF ANY ASPECTS OF DESIGN WHICH ARE THOUGHT TO BE IN NONCOMPLIANCE WITH APPLICABLE CODES.

### **COORDINATION**

- 1. COORDINATE ALL WORK WITH OTHER TRADES; COORDINATE SCHEDULE OF WORK WITH A SUB-CONTRACTORS TO ACHIEVE SMOOTH FLOW OF CONSTRUCTION.
- 2. CONTRACTOR SHALL REVIEW COMPLETE DOCUMENTS PRIOR TO SUBMITTAL OF PROPOSAL TO GAIN COMPLETE UNDERSTANDING OF PROJECT SCOPE, WORK BY OTHERS, AND MECHANICAL WORK ASSOCIATED WITH OTHER DISCIPLINES.
- 3. ENGINEER/ ARCHITECT MUST BE GIVEN AT LEAST A TEN (10) WORKING DAY NOTICE TO PERFORM ALL TYPES OF INSPECTIONS. COORDINATE WORK SCHEDULE WITH ARCHITECT AND ENGINEER TO PLAN ACCORDINGLY FOR APPROPRIATE INSPECTIONS.
- 4. COORDINATE LIGHT LOCATIONS WITH ELECTRICAL CONTRACTOR PRIOR TO INSTALLATION OF AIR DEVICES. LIGHT LOCATIONS TAKE PRECEDENCE OVER AIR DEVICES

# RETURN AIR SYSTEMS

- 1. MECHANICAL DESIGN ASSUMES A MINIMUM 1" DOOR UNDERCUTS FOR ALL DOORS AND WALL PARTITIONS WITHIN CONDITIONED SPACES.
- 2. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER IF ANY DOOR OR PARTITION IS NOT PROVIDED WITH A MINIMUM 1" UNDERCUT OR IF ANY OF THE SPECIFIED SYSTEM RETURN PATHS ARE COMPROMISED DURING CONSTRUCTION IN ANY WAY.
- 3. AT A MINIMUM, THE CONTRACTOR SHALL PROVIDE A FIBERGLASS DUCTED TRANSFER BOOT/GRILL ABOVE CEILING FOR ANY DOOR OR PARTITION THAT IS NOT PROVIDED WITH A MINIMUM 1" UNDERCUT.
- 4. RETURN BOOT SHALL TERMINATE IN NEW RETURN AIR DEVICES. RETURN AIR DEVICES SHALL BE WHITE ALUMINUM PERFORATED LAY—IN TYPE WITH ALL NECESSARY MOUNTING HARDWARE TO MATCH OTHER RETURN DEVICES ON SITE. PROVIDE FRAMED AIR DEVICE IF IN HARD CEILING.

# METAL AND FLEXIBLE DUCTS

- 1. DRAWINGS ARE DIAGRAMMATIC IN NATURE. FOR CLARITY SAKE, MOST DUCTOFFSETS/RISES/DROPS ARE NOT SHOWN. RECTANGULAR AND ROUND DUCTWORK SHALL BE GALVANIZED STEEL. SIZES SHOWN ARE INSIDE CLEAR DIMENSION.
- 2. PRIOR TO CONSTRUCTION, CONTRACTOR IS REQUIRED TO COORDINATE HEIGHTS OF DUCTWORK LAYOUT WITH EXISTING STRUCTURE, OTHER TRADES, AND PROPOSED CEILING HEIGHT TO CONFIRM ADEQUATE VERTICAL SPACE FOR STACKING.
- 3. CONSTRUCT AND LEAKAGE TEST ALL DUCTWORK BASED ON SMACNA REQUIREMENTS. COORDINATE PRESSURE CLASSES WITH EQUIPMENT SCHEDULES.
- 4. ALL GALVANIZED SHEET METAL DUCT WORK SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS—METAL AND FLEXIBLE".
- 5. USE 2" GLASS FIBER-REINFORCED FABRIC JOINT AND SEAM TAPE. USE WATER BASED JOINT AND SEAM SEALER. USE FIRE RESISTANT SEALER FOR FILLING OPENINGS AROUND DUCT PENETRATIONS THROUGH WALLS. ACCEPTABLE PRODUCTS ARE DOW CORNING, FIRE STOP FOAM AND FIRE STOP SEALER OR EQUAL.
- 6. USE SHEET METAL SCREWS OR BLIND RIVETS COMPATIBLE WITH DUCT MATERIALS WHEN SECURING ALL DUCTWORK TO STRUCTURE.
- 7. FLEXIBLE DUCT MAY BE USED TO CONNECT TO SUPPLY DIFFUSERS. MAXIMUM LENGTH OF FLEXIBLE DUCT LIMITED TO 6 FEET. PROVIDE FLEXMASTER TYPE 8M UL 181 CLASS I AIR DUCT OR EQUAL. FLEXIBLE DUCT SHALL HAVE MIN. R-8 INSULATING VALUE.
- 8. FLEXIBLE DUCT CLAMP SHALL BE OF STAINLESS STEEL BANDS WITH CADMIUM PLATED HEX SCREW TO TIGHTEN BAND WITH WORM GEAR ACTION.
- 9. PROVIDE TURNING VANES IN ALL SPLITS, TEES AND SWEPT 90 DEGREE ANGLE DUCT FITTINGS.

  MANUFACTURED TURNING VANES TO BE 1-1/2" WIDE, DOUBLE VANE, CURVED BLADES OF GALVANIZED SHEET STEEL SET 3/4" O.C. ACCEPTABLE MANUFACTURER'S ARE DUCTMATE INDUSTRIES, METALAIRE, WARD INDUSTRIES OR EQUAL.
- 10. WHERE RECTANGULAR TEE FITTINGS ARE SHOWN, PROVIDE FITTING WITH ADJUSTABLE DIVIDER SHEET AND TURNING VANES.

- 11. WHERE RECTANGULAR MAIN AND BRANCH CONNECTIONS ARE SHOWN, PROVIDE EXTRACTOR VANES.
- 12. PROVIDE MANUAL VOLUME CONTROL DAMPERS WHERE SHOWN ON DRAWINGS. DAMPERS TO HAVE NEOPRENE BLADE SEALS AND GALVANIZED STEEL FRAMES, TIE BARS, DAMPER AND BRACKETS. ACCEPTABLE MANUFACTURER'S ARE RUSKIN CO., NAILOR INDUSTRIES, FLEXMASTER OR EQUAL.
- 13. ABOVE INACCESSIBLE CEILINGS AND WHERE DUCT CONFIGURATION DOES NOT ALLOW FOR INSTALLATION OF DAMPER IN DUCTWORK OR DIFFUSER, PROVIDE REMOTE MANUAL DAMPER BY YOUNG REGULATOR, (BOWDEN CABLE CONTROL SYSTEM). CONTRACTOR MAY PROVIDE OPPOSED BLADE DAMPER THAT IS INTEGRAL TO GPD WITH ENGINEEP'S APPROVAL

### CHICAGO BUILDING DEPARTMENT NOTES

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

- 1. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- 2. VENTILATION FOR ALL AREA SHALL COMPLY WITH CHAPTER 18-28-401 OF CHICAGO MECHANICAL CODES.
- 3. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF THE INTERNATIONAL MECHANICAL CODE 2018:
  - A. VENTILATION SYSTEM BALANCING CHAPTER 18-28-401 OF CHICAGO MECHANICAL CODES.
- 4. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
  - A. STANDARDS OF HEATING CHICAGO MECHANICAL CODE CHAPTER 18—28—309.1

    B. DUCT CONSTRUCTION AND INSTALLATION— CHICAGO MECHANICAL CODE CHAPTER 18—28 603
- 5. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- 6. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY CHICAGO MECHANICAL CODES 18-28-401
- 7. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE—RATED WALL AND SMOKE WALL CONSTRUCTION AND
- 8. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.
- 9. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.
- 10. SMOKE DETECTOR SHALL MEET UL 268A.

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

### 1.1 SUMMARY

- A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:
- AIR SYSTEMS: CONSTANT AND VARIABLE VOLUME SYSTEMS.
   MOTORS.
- 1.2 QUALITY ASSURANCE

A. THE CONTRACTOR SHALL PROCURE THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES IN HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS. THE TAB AGENT SHALL HAVE THE FOLLOWING QUALIFICATIONS: AABC, NEBB OR TABB CERTIFIED.

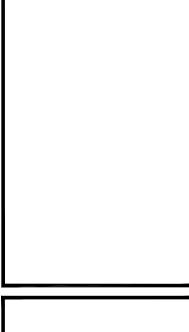
# 1.3 EXECUTION

- A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL EXISTING AIR AND HYDRONIC SYSTEMS THAT ARE TO REMAIN OR TO BE INCORPORATED INTO NEW WORK PRIOR TO THE STARTING OF WORK IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- B. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDRONIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- C. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.
- D. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.
- E. THE CONTRACTOR SHALL HAVE FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
- F. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS SECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.
- G. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.
- H. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.
- I. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.
- J. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.

END OF SECTION 230593

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## SECTION 230713 - DUCT INSULATION

### 1.1 QUALITY ASSURANCE

SURFACE-BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME-SPREAD INDEX OF 25, AND SMOKE-DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE-DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTME 84.

### 1.2 FIELD QUALITY CONTROL

A. FIELD INSPECTIONS: BY OWNER-ENGAGED AGENCY.

### 1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE;

- A. CONCEALED, RECTANGULAR, ROUND AND FLAT-OVAL, SUPPLY-RETURN, OUTDOOR-AND EXHAUST-AIR DUCT AND AIR PLENUM INSULATION:
- B. FLEXIBLE ELASTOMERIC, MINERAL-FIBER BLANKET, MINERAL-FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS:

```
UNCONDITIONED SPACES: R-6
WITHIN BUILDING ENVELOPE ASSEMBLY: R-12
EXTERIOR OF BUILDING: R-12
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# 1.4 ITEMS NOT INSULATED:

- 1. FIBROUS-GLASS DUCTS.
- 2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND
- ASHRAE/IESNA 90.1.
- 3. FACTORY-INSULATED FLEXIBLE DUCTS.
- 4. FACTORY—INSULATED PLENUMS AND CASINGS.
- 5. FLEXIBLE CONNECTORS.6. VIBRATION—CONTROL DEVICES.
- 7. FACTORY—INSULATED ACCESS PANELS AND DOORS.
- 8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.

### 1.5 PRODUCTS

- A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:
- 1. JOHNS-MANVILLE
- 2. OWENS-CORNING

# 1.6 ACOUSTICAL TREATMENT

1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5" THICK R-6 AS MANUFACTURED BY DUCTMATE, 1-1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE FIBERGLASS DUCT LINER. LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED,

END OF SECTION 230713

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

### 1.1 PRODUCTS

- A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS INDICATED ON DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED UNLESS OTHERWISE NOTED IN BAKED WHITE ENAMEL.
- B. MANUFACTURERS: TITUS

  1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
- a. CARNES.
- b. HART & COOLEY INC.
- c. KRUEGER.
- d. **METALAIRE, INC.**
- e. NAILOR INDUSTRIES INC.
- f. RUSKIN
- C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.
- D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED BLADE DAMPER UNLESS OTHERWISE

END OF SECTION 233713



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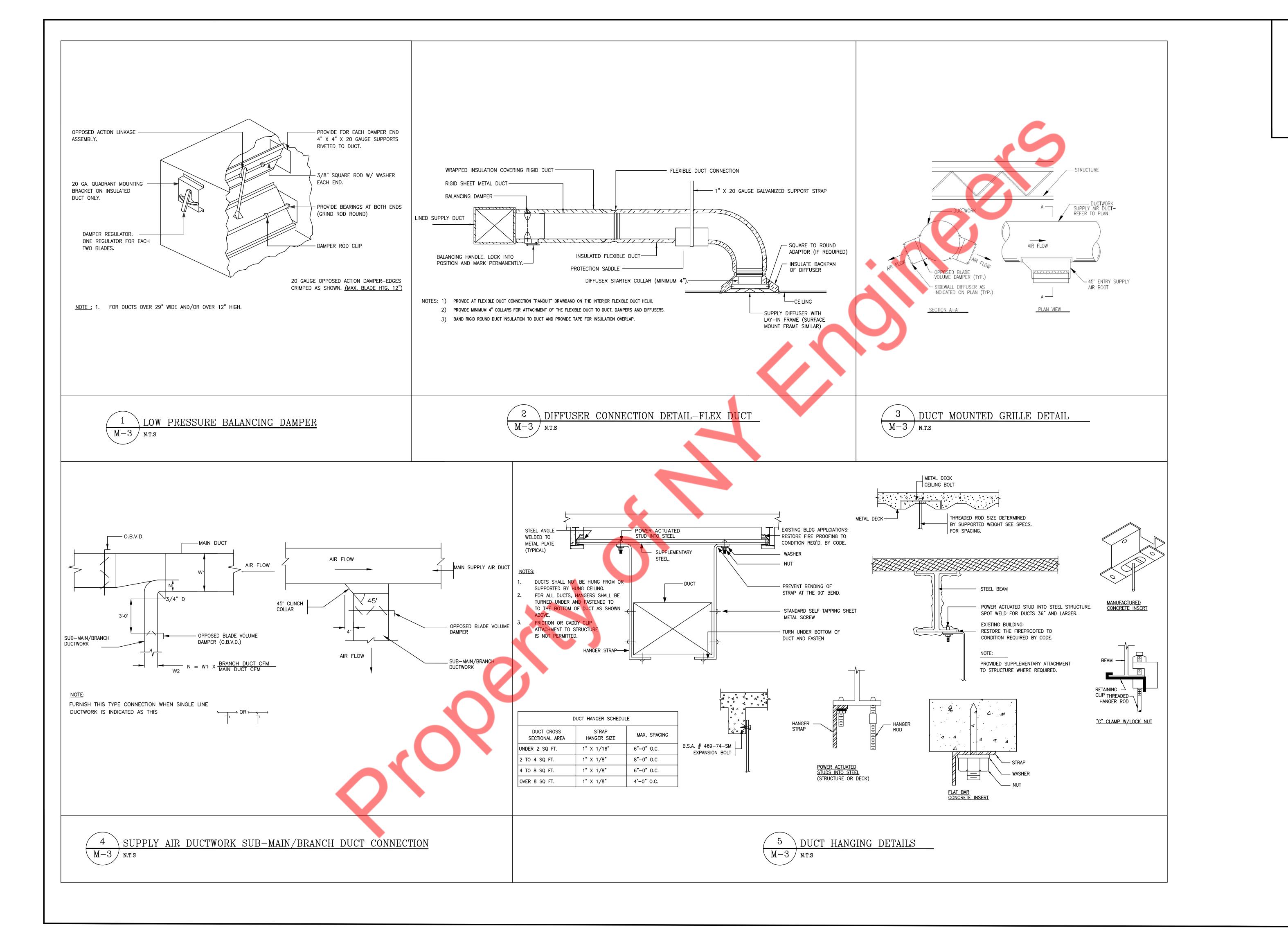
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FAN COIL UNIT SCHEDULE																									
				AREA		SUPPLY FAN				HEATING	CAPACITY					COOL	ING CAP	ACITY				ELEC	CTRICAL		OPERATING
UNITID	MANUFACTURER	STATUS	MODEL	SERVED	SUPPLY	OUTSIDE	ESP (IN.	МВН	GPM	EWT	LWT	EAT	LAT	TOTAL	SESN.	GPM	EWT	LWT	EAT	LAT	VOLTS	PHASE	MCA (A)	MOCP (A)	WEIGHT
		JERVED	CFM	AIR CFM	OF W.G.)	IVIDII	GFIVI	DEG F	DEG F	DEG F	DEG F	МВН	МВН	MBH	DEG F	DEG F	DEG F	DEG F	VOLIS	PHASE	PHASE IVICA (A)	WIOCF (A)	(LBS.)		
FCU-4(E)	AAON	EXISTING	H3-BRB-8-0- 26HC-12Q	SEE PLAN	1620	535	S.A.E	S.A.E	5 (V.I.F)	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	12 (V.I.F)	S.A.E	S.A.E	S.A.E	S.A.E	208 (V.I.F)	3 (V.I.F)	4 (V.I.F)	15 (V.I.F)	S.A.E
ECUL 4/E\ 8	LOTES																								

### FCU-4(E) NOTES:

1. EXISTING FCU TO REMAIN AND TO BE REUSED WITH ALL ITS VALVE PACKAGES, DAMPER AND ACTUATORS AS A COMPLETE SYSTEM. REPLACE FILTERS IF REQUIRED.

2. S.A.E: SAME AS EXISTING. V.I.F.: VERIFY IN THE FIELD.

3. CONTRACTOR TO FIELD VERIFY EXACT LOCATION UNITS ON SITE.

4. COORDINATE FINAL LOCATIONS OF T-STAT AND T-SENSOR WITH ARCHITECT/OWNER.

5. CONTRACTOR TO BALANCE OUTSIDE AIR DAMPER ON FCU TO MATCH VALUES MENTIONED IN THE ABOVE TABLE.

6. IF REQUIRED REPLACE/REPAIR THE CONDENSATE WATER PUMP IF EXISTING NOT FOUND OR DAMAGED.

7. CONTRACTOR TO FIELD VERIFY AND ADJUST THE FAN MOTOR SETTING TO INCREASE THE SUPPLY AIR QUANTITY OF THE EXISTING FCU-4(E) AS VALUE MENTIONED ABOVE.

8. REPLACE THE FILTERS IF REQUIRED.

VENTILATION CALCULATIONS AS PER TABLE 18-28-403.3 OF CHICAGO MECHANICAL CODE								
ROOM DESCRIPTI	ORDINANCE	REUIREMENTS	MINIMUM R	EQUIRED	ACTUAL PROVIDED			
ROOM DESCRIPTI	ON	MECHANICAI	LVENITLATION	MECHANICAL V	ENITLATION	SUPPLY AIR	EXHAUST	
ROOM NAME	FLOOR	SUPPLY AIR	EXHAUST AIR	SUPPLY AIR	EXHAUST AIR	(CFM)	AIR (CFM)	
ROOIVI NAIVIE	AREA (SF)	(CFM/SF)	(CFM/SF)	(CFM)	(CFM)	(CFIVI)	AIN (CFIVI)	
ORDERING	221	1.5	1.5	335	335	340	240	
EXISTING TOILET	46	0	2	0	95	-	100	
SEATING AREA	445	1.5	1.5	670	670	670	670	
RETAIL AREA	103	1	1	105	105	110	110	
STORAGE (B.O.H)	308	0.5	0.5	155	155	300	300	
PREPARATION	129	1.5	2	195	260	200	200	
TOTAL	1252	-	-	1460	1620	1620	1620	

AIR BALANCE						
UNIT	ADEA CEDVED	SUPPLY	OUTSIDE	RETURN	EXHAUST	
UNII	AREA SERVED	AIR	AIR	AIR	AIR	
FCU-4(E)	SEE PLAN	1620 CFM	535 CFM	1085 CFM	ı	
EXISTING GENERAL	SEE PLAN					
<b>EXHAUST SYSTEM</b>	SEE PLAIN	-	-	-	435 CFM	
<b>EXISTING TOILET</b>	SEE PLAN					
<b>EXHAUST SYSTEM</b>	SEE PLAIN	-	-	-	100 CFM	
TOTAL	L <b>:</b>	1620 CFM	535 CFM	1085 CFM	535 CFM	
BUILDING PR	ESSURE:			0 CFM	NEUTRAL	
CONTRACTOR TO BALANCE THE SYSTEM AS PER THE AIR QUANTITIES MENTIONED ABOVE.						

HEATING SCHEDULE							
BUILDING LOAD (MBH)	17.07 MBH						
VENTILATION LOAD (MBH)	43.48 MBH						
TOTAL HEAT LOAD (MBH)	60.55 MBH						
HEATING SYSTEM OUTPUT CAPACITY (MBH)	76.9 MBH (V.I.F)						
HEATING SYSTEM EQUIPMENT	FCU-4 (E)						

	MECHANICAL AIR TERMINAL DEVICES SCHEDULE								
MANUFACTURER	TITUS	S.A.E	TITUS	TITUS	TITUS	TITUS	TITUS		
DESIGNATION	А	EX (EXISTING)	В	С	R	R1	E		
USE	SUPPLY	SUPPLY/EXHAUST	SUPPLY	SUPPLY	RETURN	RETURN	EXHAUST		
MODEL	TDC-AA	S.A.E	TDC-AA	S300 FL	56 FL	TDC-AA	56 FL		
MOUNTING	CEILING	DUCT/CEILING	HARD CEILING	DUCT	WALL	CEILING	WALL		
LOCATION	AS SHOWN	AS SHOWN	AS SHOWN	AS SHOWN	AS SHOWN	AS SHOWN	AS SHOWN		
FACE SIZE	24"X24"	AS SHOWN	12"X12"	AS SHOWN	AS SHOWN	24"X24"	AS SHOWN		
NECK SIZE	REFER TABLE- A	S.A.E	REFER TABLE-A	-	-	REFER TABLE-	-		
FRAME TYPE	LAY IN	S.A.E	FLANGED	FLANGED	FLANGED	LAY IN	FLANGED		
ACCESSORIES	VOLUME	VOLUME/ AIR	VOLUME	AIR SCOOP DAMPER	VOLUME DAMPER	-	VOLUME		
	DAMPER	SCOOP DAMPER	DAMPER	DAIVIPER	DAIVIPER		DAMPER		

### NOTES:

1. MAX. NC LEVEL 30 OR LESS.

COORDINATE WITH ARCHITECT FOR PAINT & FINISH.
 PROVIDE 4-WAY AIR THROW PATTERN UNLESS NOTES OR INDICATED.

4. PROVIDE INSULATED BACKS ON ALL DIFFUSERS.

5. CONTRACTOR TO FIELD VERIFY AND CONFIRM EXISTING GRILLES/DIFFUSERS AND DAMPERS ARE IN GOOD SHAPE. IF NOT REPLACE IT WITH ITS SAME TYPE

6. EX - EXISTING GRILLE/DIFFUSERS.

NECK SIZE	TABLE-A
Ø6"	0-100
Ø8"	101-200
Ø10"	201-400
Ø12"	401-600



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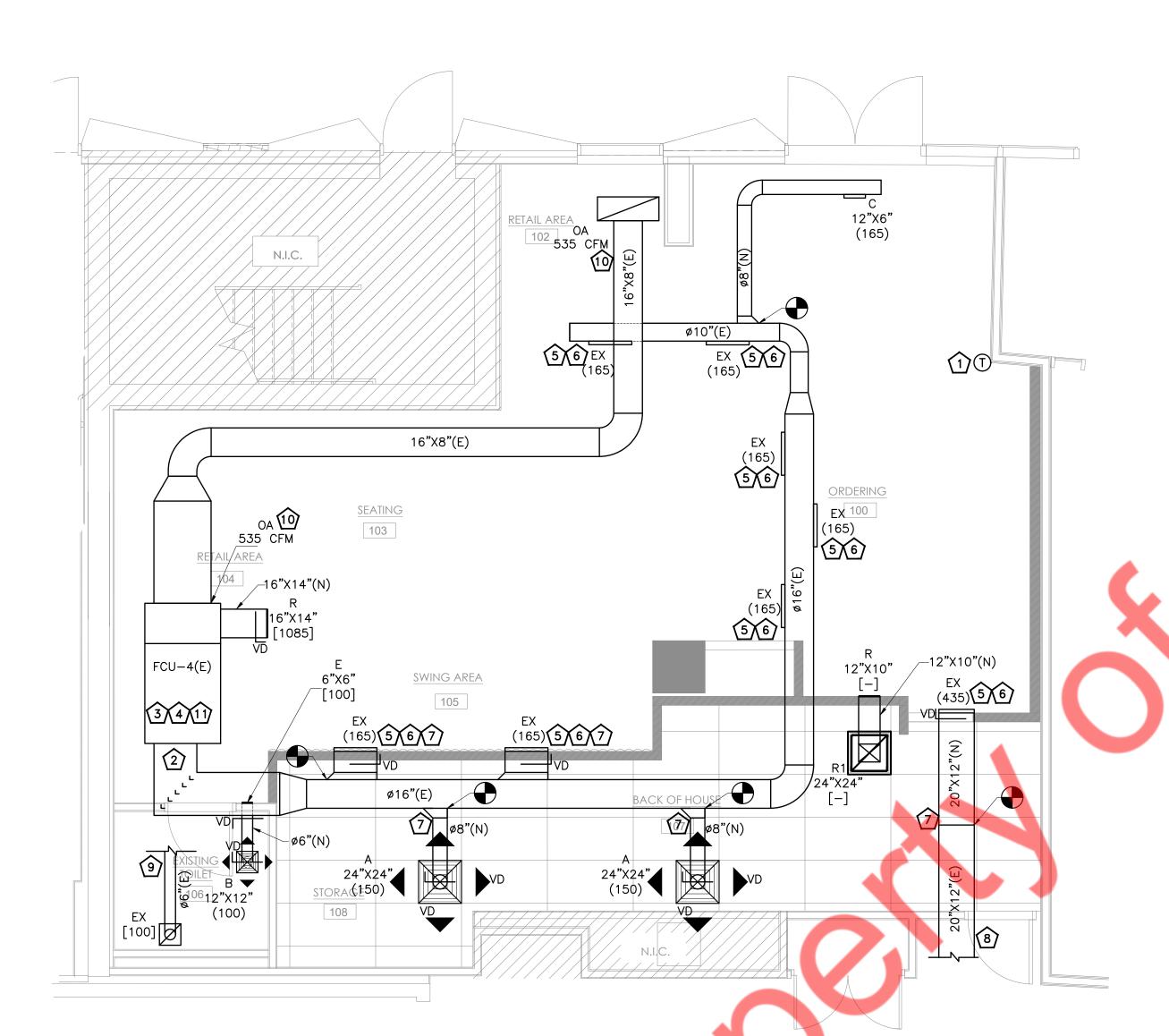
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MECHANICAL SCHEDULES



Drawn

м 1



1/4" = 1'-0"

MECHANICAL FLOOR PLAN

# MECHANICAL GENERAL NOTES

- A. CONTRACTOR SHALL BALANCE EACH DEVICE WITH THE CFM SHOWN
- B. CONTRACTOR SHALL PROVIDE MINOR DUCTWORK MODIFICATIONS TO THE EXISTING DUCTWORK AS SHOWN IN THE PLAN C. NEW DUCTWORK SHOWN ON PLAN ARE SCHEMATIC ONLY.
- CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR DUCTWORK ROUTING. OFFEST AND RUN DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA DUCTWORK, FITTINGS, INSULATIONS AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION.
- EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT AT FIELD BEFORE FABRICATION OF DUCTWORK ETC. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM
- CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS
- FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO G. ALL EXPOSED DUCTWORK SHALL BE INTERNALLY INSULATED AND
- ALL CONCEALED DUCTWORK SHALL BE EXTERNALLY INSULATED. H. COORDINATE WITH ALL TRADES FOR MATERIALS IN RATED AND PLENUM SPACES.
- I. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT LENGTH AS
- PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS/SLABS. COORDINATE WITH ARCHITECTURAL DRAWING FOR FIRE RATING OF THE WALLS.
- K. TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO GENERAL
- CONTRACTOR AND OWNER.
  L. CONTRACTOR TO FIELD VERIFY THE CONDITION OF THE EXISTING FAN COIL UNIT.

# MECHANICAL FLOOR PLAN KEY NOTES:

- LOCATION OF DIGITAL THERMOSTAT/HUMIDISTAT CONTROL. REUSE THE EXISTING THERMOSTAT IF THOSE ARE IN GOOD CONDITION IF NOT PROVIDE NEW ONE OF SAME KIND. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN. PROVIDE LOCKABLE COVER.
- 2 EXISTING DUCTWORK ALONG WITH GRILLES AND ITS DAMPER ARRANGEMENT TO REMAIN AND REUSED. CONTRACTOR TO FIELD VERIFY THE CONDITION OF THE EXISTING DUCTWORK/INSULATION IF FOUND DAMAGED REPLACE/REPAIR IT WITH SAME
- EXISTING FAN COIL UNIT WITH ALL ITS VALVE PACKAGE, ACTUATORS, ACCESSORIES AND COMPLETE PIPING SYSTEM TO REMAIN AND REUSED AS IS. CONTRACTOR TO FILED VERIFY AND CONFIRM THE OPERATING CONDITION OF THE SYSTEM AND INFORM ENGINEER IF FOUND ANY DISCREPANCIES.
- CONTRACTOR TO CLEAN AND FLUSH THE EXISTING DRAIN LINES AND VERIFY THE CONDITION OF THE SAME, REPAIR/REPLACE THE EXISTING DRAIN LINE WITH THE SAME TYPE OR ANY APPROVED TYPE IF FOUND DAMAGED. IF REQUIRED CONTRACTOR TO PROVIDE CONDENSATE PUMP IF EXISTING IS NOT IN GOOD
- REUSE THE EXISTING SUPPLY/EXHAUST AIR GRILLE ALONG WITH ITS DAMPER AND ACCESSORIES. CONTRACTOR SHALL FIELD VERIFY THE CONDITION OF THE GRILLE & DAMPER AND REPLACE/PROVIDE NEW ONE OF SAME KIND IF FOUND DAMAGED.
- 6 CONTRACTOR SHALL ADJUST THE DAMPER OF THE EXISTING GRILLE TO DELIVER/EXHAUST THE AIR QUANTITY AS SHOWN.
- CONTRACTOR TO PROVIDE NEW DUCTWORK TO EXTEND OR RELOCATE THE EXITING GRILLE.
- FROM EXISTING BUILDING GENERAL EXHAUST DUCTWORK. TO REMAIN AND REUSED.
- FROM EXISTING BUILDING TOILET EXHAUST DUCTWORK. TO REMAIN AND REUSED.
- CONTRACTOR TO ADJUST EXISTING OUTSIDE AIR DAMPER TO AIR QUANTITY AS SHOWN IN PLAN.
- CONTRACTOR TO FILED VERIFY AND ADJUST THE EXISTING FAN MOTOR SETTING OF FCU-4(E) AS MANUFACTURER'S INSTRUCTION AND INCREASE THE SUPPLY AIR QUANTITY AS SHOWN IN THE UNIT SCHEDULE.

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MECHANICAL FLOOR PALN

Sheet No.

M-5

#### ELECTRICAL SYMBOLS LIST POWER AND TELECOMMUNICATION LIGHTING MOTORS AND CONTROLS LIGHTING FIXTURE AND OUTLET BOX. HALF SHADED FIXTURE OR "EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY DISCONNECT (SAFETY) SWITCH "200/3/150" DENOTES AMPERES/POLE/FUSE, SERVICE, U.O.N. "NF" DENOTES NON-FUSED, "N3R" DENOTES NEMA 3R LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE. AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION WITH JUNCTION BOX AND MOTOR SWITCH. CIRCUIT NUMBER: INDICATED BY NUMBER RECEPTACLES AND OUTLETS SWITCHING INDICATED BY LOWER CASE LETTERS. DUPLEX CONVENIENCE RECEPTACLE DENOTES LUMINAIRE ON EMERGENCY CIRCUIT. DEDICATED POWER OUTLET DENOTES FIXTURES DESIGNATED AS NIGHTLIGHT, WIRED TO 24 HOURS "D" DENOTES DEDICATED POWER OUTLET, UNSWITCHED CIRCUIT. "GFI" DENOTES GROUND FAULT INTERRUPTER, "WP" DENOTES WEATHERPROOF, CEILING MOUNTED DUPLEX OUTLET ISOLITE ELITE SERIES LED EXIT SIGN QUAD OUTLET STRIP LIGHTING FIXTURE AND OUTLET BOX. EMERGENCY LIGHT WITH BATTERY UNIT JUNCTION BOX POWER DISTRIBUTION WIRING SYSTEMS DISTRIBUTION PANELBOARD, SURFACE OR FLUSH POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF COMMUNICATIONS 1#12 Ø, 1#12 N. & 1#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED. POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, TELEPHONE OUTLET, ELECTRICAL CONTRACTOR NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF TO PROVIDE MUD RING AND PULL STRING ALONG WITH CAT6 CABLE TO ABOVE CEILING 2#12 Ø, 2#12 N. & 2#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED. POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, DATA OUTLET, ELECTRICAL CONTRACTOR TO PROVIDE NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF MUD RING ALONG WITH CAT 6 CABLE AND PULL STRING TO ABOVECEILING 3#12 Ø, 3#12 N. & 3#12 G. IN 3/4°C, UNLESS OTHERWISE NOTED.

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SPEAKER

# DRAWING/DETAIL REFERENCE KEY

REFER TO

DRAWING/DETAIL NUMBER-

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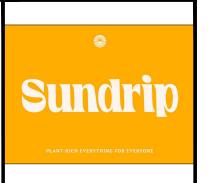
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GENERAL NOTES

A. NOT ALL SYMBOLS SHOWN ON THIS SYMBOL LIST ARE USED IN THE CONTRACT DOCUMENTS.

Λ Γ	
AE	BREVIATIONS
A	AMPERES
A/C, AC	AIR CONDITIONING UNIT
AF	AMPERE FRAME/AMP FUSE
AFF	ABOVE FINISHED FLOOR
AS	AMP SWITCH
AIC	AMPS INTERRUPTING CAPACITY
AWG	AMERICAN WIRE GAUGE
С	CONDUIT
C/B,CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
CU	COPPER
•C	DEGREE CELSIUS
<b>'</b> F	DEGREE FAHRENHEIT
DIA	DIAMETER
DN	DOWN
DP	DISTRIBUTION PANEL
DWG	DRAWING
J.B.	JUNCTION BOX
KCMIL	ONE THOUSAND CIRCULAR MILS
KV	KILOVOLT
KVA	KILOVOLT-AMPERES
KW	KILOWATTS
LTG	LIGHTING
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MTD	MOUNTED
N	NEUTRAL
NTS	NOT TO SCALE
EA	EACH EMPTY CONDUIT/
EC	ELECTRICAL CONTRACTOR
ЕМ	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
FL	FLOOR
G	GROUND
GFI	GROUND FAULT INTERRUPTER
HP	HORSEPOWER
HZ	HERTZ
IC	INTERRUPTING CAPACITY
PP	POWER PANEL
PVC	POLYVINYL CHLORIDE
R	REMOVE
REC	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
SECT	SECTION
SW	SWITCH
Р	POLES
TYP	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
V	VOLT/VOLTAGE
VA	VOLT AMPERE
WP	WEATHER PROOF
	EXISTING
N.I.C.	NOT IN CONTRACT
	HOT IN CONTINUO

RECIRCULATION PUMP



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ELECTRICAL SYMBOLS & ABBREVIATIONS

ob No.

E-0

CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONAL ARROWS AS INDICATED. SHADED AREA DENOTES FACE(S). © UNDERGROUND **EXISTING** NEW SWITCHES AND CONTROLS 20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED. WALL BOX DIMMER SWITCH. DENOTES LIGHTING FIXTURE CONTROLLED. WALL MOUNTED VACANCY SENSOR SWITCH, DOOR SWITCH PHOTOCELL IN NEMA 3R ENCLOSURE. CEILING OCCUPANCY SENSOR. ELECTRICAL DRAWING LIST ELECTRICAL SYMBOLS & ABBREVIATIONS ELECTRICAL SPECIFICATIONS-1 ELECTRICAL SPECIFICATIONS-2 E-3ELECTRICAL LIGHTING PLAN E-4 ELECTRICAL POWER PLAN E-5 ELECTRICAL RISER DIAGRAM & PANEL SCHEDULE CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

- A. CHICAGO BUILDING CODE(14B).
- B. CHICAGO MECHANICAL CODE(14M).
- C. CHICAGO PLUMBING CODE(14P).
- D. CHICAGO FIRE PREVENTION CODE(14F).
- E. CHICAGO ENERGY CONSERVATION CODE(14N).
- F. CHICAGO ELECTRICAL CODE(14E).

# ELECTRICAL SPECIFICATIONS

#### GENERAL:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION,"
  AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS
  AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED, MAINTAIN HEADROOM AND SPACE CONDITIONS.
- C. BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
- D. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- E. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- F. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
- G. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.
- H. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT ND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
- I. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- J. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- K. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- L. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- M. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATED OF INSPECTION AND APPROVAL.

# 2. GENERAL PROVISIONS FOR ELECTRICAL WORK:

- A. DEFINITIONS:
  - 1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
  - 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
  - 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE. AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
  - 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
  - 5) "WIRING": RACEWAY. FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
  - 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
  - 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
  - 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
- TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.
- C. QUALITY ASSURANCE
  - 1) QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
  - 2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.
  - 3) CURRENT CHARACTERISTICS:
  - a. SERVICE: 120/208 VOLT, 3 PHASE, 3 WIRE, 60 HERTZ.
  - b. DISTRIBUTION: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

- 4) HEIGHTS OF OUTLETS:
- a. FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:
- RECEPTACLES AND TELEPHONES: 1 FT-6 IN.
- WALL SWITCHES: 4 FT-0 IN.
- WALL FIXTURES: 7 FT-0 IN.
- MOTOR CONTROLLERS: 5 FT-0 IN.
- CLOCKS: 7 FT 6 IN
- b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.
- D. PRODUCT DELIVERY, STORAGE AND HANDLING
- 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES
- 2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS SHALL BE PERMITTED, CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.
- E. MATERIALS
- NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN.
  WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH
  DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET,
  TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE.
  NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH
  COMPONENT.
- 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
- 3) INSERTS AND SUPPORTS:
- a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
  - SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
  - MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
  - CLIP FORM NAILS FLUSH WITH INSERTS.
  - MAXIMUM LOADING 75 PERCENT OF RATING.
- b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW
- c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
- d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
- F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD—APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
- G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
- H. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH
- I. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

# 3. SCOPE OF WORK:

- A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMING WITH NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
- B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLIED OR SPECIFIED HEREIN.
- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER, DATE IS EARLIER, THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDED THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR
- D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- E. CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE ILLINOIS STATE BUILDING CODE. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.
- F. AREAS WITH NO ELECTRICAL WORK SHALL REMAIN AS IS. CONTRACTOR SHALL MAINTAIN CONTINUITY OF ALL ELECTRICAL

SYSTEMS TO ALL AREAS NOT COVERED BY THIS RENOVATION AND SHALL PROVIDE 48 HOUR NOTICE TO LANDLORD OF ANY PLANNED POWER INTERRUPTIONS OR SIGNAL SYSTEM OUTAGES.

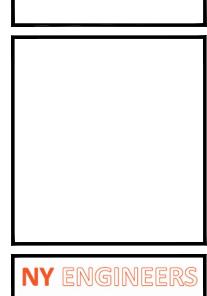
- 4. SHOP DRAWINGS
  - A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
  - B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
  - 1) PROJECT NAME AND LOCATION
  - 2) NAME OF ARCHITECT AND ENGINEER
  - 3) ITEM IDENTIFICATION
  - 4) APPROVAL STAMP OF PRIME CONTRACTOR
  - C. SUBMISSIONS:
  - 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
  - 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.
  - D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
  - 1) SAFETY/DISCONNECT SWITCHES
  - 2) FUSES
  - 3) CIRCUIT BREAKERS
  - 4) PANELBOARDS/LOADCENTER (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).
  - 5) RACEWAYS
  - 6) WIRE AND CABLE
  - 7) WALL SWITCHES
  - 8) INSERTION RECEPTACLES
  - 9) MOMENTARY CONTACT SWITCHES

SYSTEMS AS DIRECTED BY THE ENGINEER.

- 10) TIME SWITCHES
- 11) LIGHTING FIXTURES.
- ASSIST AND PROVIDE ALL NECESSARY INFORMATION, DIAGRAMS, SKETCHES, ETC. TO THE HVAC CONTRACTOR, FOR THE PREPARATION OF COORDINATED SHOP DRAWINGS INDICATING ROUTING OF FEEDERS, CONTROL CONDUITS, RECESSED FIXTURES AND ADJACENT NEARBY PIPING AND DUCTWORK WHERE APPLICABLE, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT FOUR(4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL SHOP DRAWING. PROVIDE SHOP DRAWINGS FOR PANELS, FIXTURES, WIRING DEVICES, CONDUIT, CABLE, DISCONNECT SWITCH, RELAYS, CONTRACTORS, AND OTHER
- AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS
- UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- . THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK.
  "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.
- 6. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:
  - A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.
  - B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.
- C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 6808F. THREE-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 7810F. KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE- QUICK-BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.
- 7. FUSES:
- A. CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.
- B. MOTOR CIRCUITS ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW—PEAK DUAL—ELEMENT TIME—DELAY LPN—RK (AMP)SP (250V) /LPS—RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000

- AMPERES RMS SYMMETRICAL.
- C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.
- D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.
- E. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL—MAGNETIC, QUICK—MAKE—QUICK—BREAK, BOLT—ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP—FREE HANDLE. MULTI—POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT—TRIPPING, OPEN A ND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
- 1) 120 VOLTS, 100-AMP FRAME: 10,000 AMPS, 1 POLE.
- 2)120/240 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM
- 3) 277/480 VOLTS, 100-AMP FRAME: 22,000 AMPS MINIMUM.





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# ELECTRICAL SPECIFICATIONS (CONT.) 8) 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.
- N. 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 SHALL 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.

- O. 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.
- P. 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).

- Q. 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.
- R. 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.
- S. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE—PARTITIONS ROOMS.
- T. 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 IPCEA 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'.
- COLOR CODING SHALL BE AS FOLLOWS:
  - 120/208 VOLT SYSTEM: BLACK FOR A PHASE RED FOR B PHASE

BLUE FOR C PHASE

- 3) 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 OF 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
- 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.
- LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.
- 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.

- 10. 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 SLOT, 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.
- MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.
- 11. LIGHTING FIXTURES:
- . 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.
- 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, ET1 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
- 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 FOR USE. AC POWERED WITH PREMIUM LONG—LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3—HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.
- 12. TELEPHONE CONDUIT SYSTEM:
- PROVIDE COMPLETE SYSTEM OF: RACEWAYS AND ACCESSORIES, OUTLET BOXES, SLEEVES AND FISHWIRES.
- EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF TELEPHONE
- C. OUTLETS SHALL BE:
  - 1) WALL: 4 IN. SQUARE WITH BUSHED COVER PLATE.
- 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.
- FACE RACEWAYS IN ROOMS SHALL HUBBELL HBL500, HBL750 OR HBL2000 SERIES OR AS ACCEPTABLE.
- 13. GROUNDING AND BONDING:
- A. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH LATEST 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.
- USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.
- EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.
- . WHERE FLEXIBLE METALLIC CONDUIT IS USED AN INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.

- 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 AT 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.



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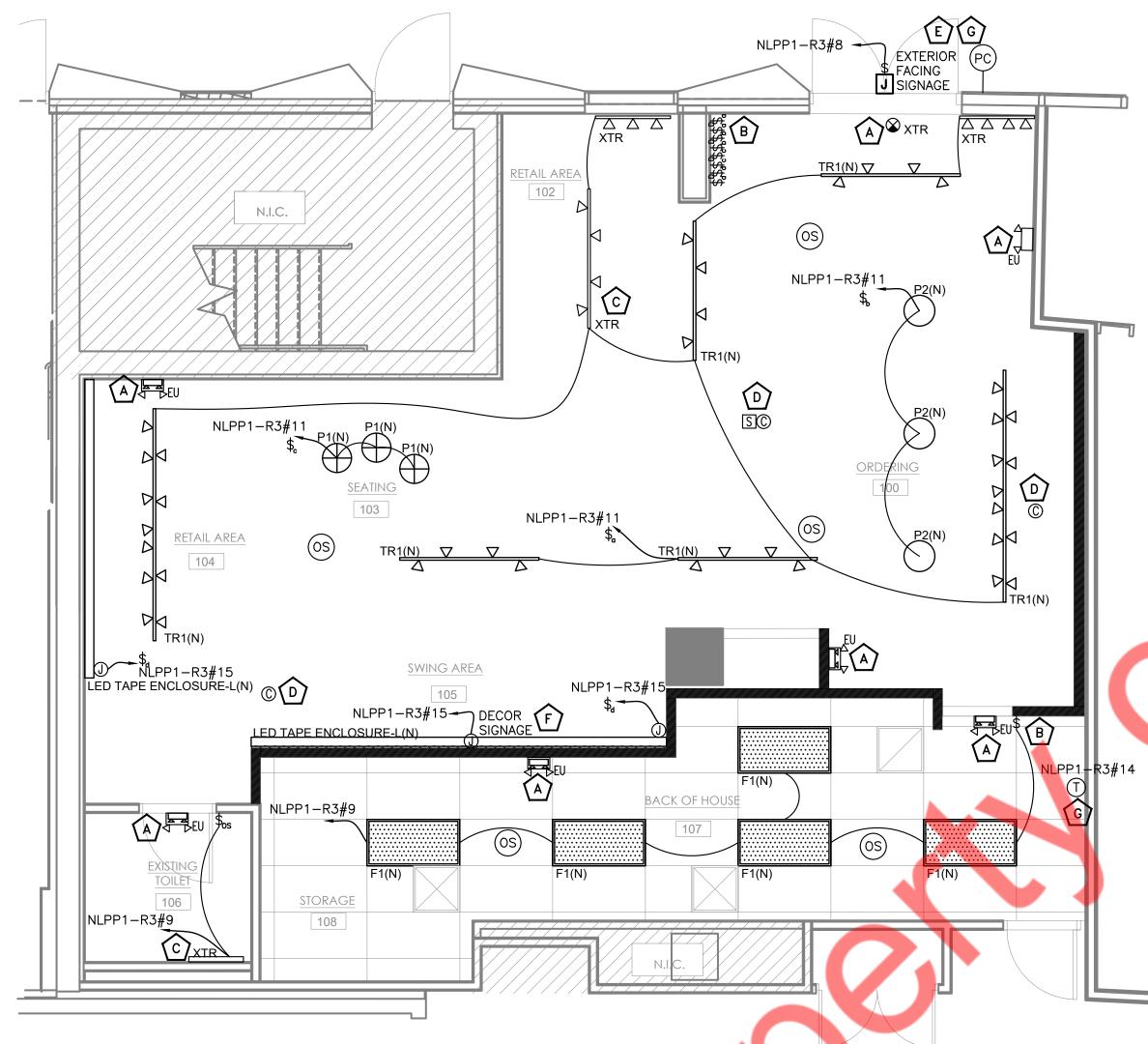
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LIGHTING PLAN

(#) ELECTRICAL LIGHTING PLAN GENERAL NOTES:

- 1. SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT FIXTURE LOCATIONS AND ORIENTATIONS. 2. REFER TO ARCHITECTURAL ELEVATIONS AND SECTIONS FOR ADDITIONAL LIGHTING FIXTURE
- MOUNTING DETAILS AND INFORMATION.
- 3. THIS LIGHTING PLAN IS FOR TENANT ONLY.
- 4. VERIFY ALL MOUNTING HEIGHTS AND LED LENGTHS WITH ARCHITECT AND ENGINEER PRIOR TO ORDERING FIXTURES. 5. PROVIDE EMERGENCY LIGHTS WITH BATTERY BACKUP.
- 6. FOR CCTV CAMERA REQUIREMENTS. E.C. SHALL COORDINATE WITH SECURITY DRAWINGS/SPECIALIST FOR EXACT REQUIREMENTS AS PER THE EXISTING SITE CONDITIONS. REFER TO SHEET A102.
- 7. FOR SPEAKER. E.C. SHALL COORDINATE WITH IT DRAWINGS/SPECIALIST FOR EXACT REQUIREMENTS AS PER THE EXISTING SITE CONDITIONS. REFER SHEET A102.
- # ELECTRICAL LIGHTING PLAN KEYED WORK NOTES:
- CONNECT ALL EMERGENCY EGRESS AND NIGHT LIGHTING(24X7 ON) FIXTURES TO THE NEAREST LIGHTING BRANCH CIRCUIT AHEAD OF ALL SWITCHING AND CONTROLS PER STATE AND LOCAL CODES.
- E.C. SHALL COORDINATE EXACT LOCATION OF SWITCHES WITH ARCHITECT/OWNER. E.C. SHALL CONFIRM CLEAR SPACE FOR SWITCH, NO OBJECT IN FRONT ON SWITCH LOCATION.
- EXISTING LIGHT FIXTURE TRACK IN THIS AREA DENOTED BY (XTR) SHALL REMAIN AS IT IS. PROVIDE NEW HEADS & CONTROLS ALONG WITH REVISED CIRCUITING AS SPECIFIED ON DRAWINGS.
- E.C SHALL COORDINATE EXACT LOCATION AND REQUIREMENTS WITH OWNER. REFER POWER PLANS FOR POWER REQUIREMENTS.
- E.C TO COORDINATE THE EXTERIOR FACING SIGNAGE CONNECTION REQUIREMENTS WITH SIGN VENDOR. BASE BID ACCORDINGLY.
- E.C TO COORDINATE THE DECOR SIGNAGE CONNECTION REQUIREMENTS WITH SIGN VENDOR. BASE BID ACCORDINGLY.
- G ALL EXTERIOR SIGNAGE SHALL BE CONTROLLED WITH EXTERIOR MOUNTED PHOTOCELL. PHOTOCELL SHALL NOT BE MOUNTED 10' ABOVE GROUND. E.C TO VERIFY LOCATION IN FIELD PRIOR TO ROUGH—IN.
- # ELECTRICAL LIGHTING CONTROL GENERAL NOTES:
  - E.C. SHALL INSTALL SENSOR DEVICES AS PER MANUFACTURERS INSTRUCTIONS.
- 2. E.C. SHALL PROVIDE OWNER TRAINING ON THE OPERATION OF ALL LIGHTING CONTROL DEVICES PRIOR TO TURN OVER.
- CONTRACTOR SHALL REVISIT SITE 30 DAYS POST TURN OVER TO ADJUST LIGHTING CONTROL DEVICES AS PER OWNER REQUIREMENTS.
- PROVIDE POWER PACKS AS REQUIRED FOR CONTROLLING PURPOSE.
- ENABLE WALK THROUGH MODE ON ALL SENSORS PROVIDED ALL LOW VOLTAGE CONDUITS SHALL BE COORDINATED WITH ARCHITECT/OWNER AND REFER A102 FOR MORE DETAILS.

### LIGHTING FIXTURE SCHEDULE:

			LIGHTING FIXTURE SCHE	DULE				
TYPE DESCRIPTION		MANUFACTURER /SUPPLIER	CATALOGUE#	MOUNTING	VOLTAGE	LAMPS PER FIXTURE	WATTAGE (W)	REMARK
P1	PENDANT	ED ELLEN DEGENERES	DUNNE PENDENT	HANGING	120	3	43	
P2	PENDANT	ALDER & ORE	MEMPHIS PENDENT	HANGING	120	1	72	
TR1	TRACK LIGHTING	WAC LIGHTING	PL-LED14-27	CEILING	120	1	9.4	
F1	LED 2X4 RECESSED TROFFER	LITHONIA	2WRTL-G-L48-5000LM-IAW- AFL-MVOLT-EXI-35K-80CRI	CEILING	120	1	38.7	
K	BLUE LED RIBBON TAPE LIGHT 30 FEET	STEPIDEZIGNS	STVO12RI	WALL	120	_	3W/FEET	
XTR	EXIT SIGN	WE SPEC	WS-E-R-W	WALL/CEILING	120	_	3	EMERGENC FIXTURE
EU	EMERGENCY LIGHT BATTERY PACK	WE SPEC	WS-BE-W	WALL/CEILING	120	_	2.2	EMERGENC' FIXTURE
(XTR)	EXISTING TO REMAIN	_	_	_	_	_	_	_

# <u>LIGHTING FIXTURE SCHEDULE NOTES:</u>

- REFER TO ARCHITECTURAL SCHEDULE FOR EXACT INFORMATION, INCLUDING MANUFACTURER, MODEL NUMBER, COLORS, FINISHES, TRIMS. LAMP COLOR TEMPERATURE AND CEILING TYPES.
- REFER TO ARCHITECTURAL SHEETS FOR WALL, COLUMN, AND PENDANT MOUNTING HEIGHTS UNLESS NOTED OTHERWISE.
- PROVIDE DIMMING DRIVERS WHERE REQUIRED. COORDINATE CONTROL TYPE PRIOR TO BID. REFER TO FLOOR PLANS AND LIGHTING CONTROL SCHEDULES FOR MORE INFORMATION. COORDINATE EXACT CONTROL REQUIREMENTS WITH LIGHTING MANUFACTURERS AND COORDINATE WITH CONTROL MANUFACTURERS PRIOR TO BID.
- E.C. SHALL COORDINATE VOLTAGES REQUIRED FOR FIXTURES PRIOR TO ORDERING. ALL FIXTURES SHALL BE UL OR ETL LISTED.
- PROVIDE CURRENT LIMITERS FOR ALL TRACK LIGHTING. LIMITERS SHALL BE SIZED TO CARRY THE LOAD FOR THE QUANTITY OF HEADS SHOWN TO BE INSTALLED
- PLUS TWO EXTRA HEADS. SIZE LIMITER TO THE NEAREST NOMINAL SIZE PROVIDED BY THE MANUFACTURER. ALL FIXTURES SHALL BEAR A MAXIMUM WATTAGE LABEL AS INDICATED ABOVE. THE DISTRIBUTOR SHALL AFFIX THE MAX WATTAGE LABEL PRIOR TO SHIPMENT WHERE
- A REDUCTION IN MAXIMUM WATTAGE IS REQUIRED FOR ENERGY CODE COMPLIANCE. ALL LIGHT COLOR TEMPERATURE TO BE 2700K, UNLESS NOTED OTHERWISE.
- 10. ALL LIGHTING SHOULD MAINTAIN MINIMUM 85 CRI.
- 11. NO LAMPS SHOULD HAVE VISIBLE LED CHIPS. 12. ALL FRONT OF THE HOUSE LIGHTS TO BE DIMMABLE.

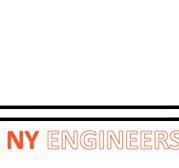
# <u>LIGHTING CONTROL SCHEDULE:</u>

	LOW VOLTAGE LIGHTING CONTROL DEVICE SCHEDULE											
TAG	DESCRIPTION	AREA	MAKE/MODEL	MOUNTING	OPERATION	SENSING	REMARKS					
OS	CEILING MOUNTED OCCUPANCY SENSOR, DUAL TECHNOLOGY	FRONT OF HOUSE, BACK OF HOUSE	CM-PDT-10	CEILING	AUTO ON/OFF	INFRARED/MICROPHONICS	MAXIMUM 10 SENSORS PER POWER PACK. PROVIDE LOW VOLTAGE MOMENTARY SWITCH FOR OVERRIDE WHERE INDICATED.					

# **ABBREVIATIONS:**

N	NEW LIGHT FIXTURE
XTR	EXISTING TO REMAIN



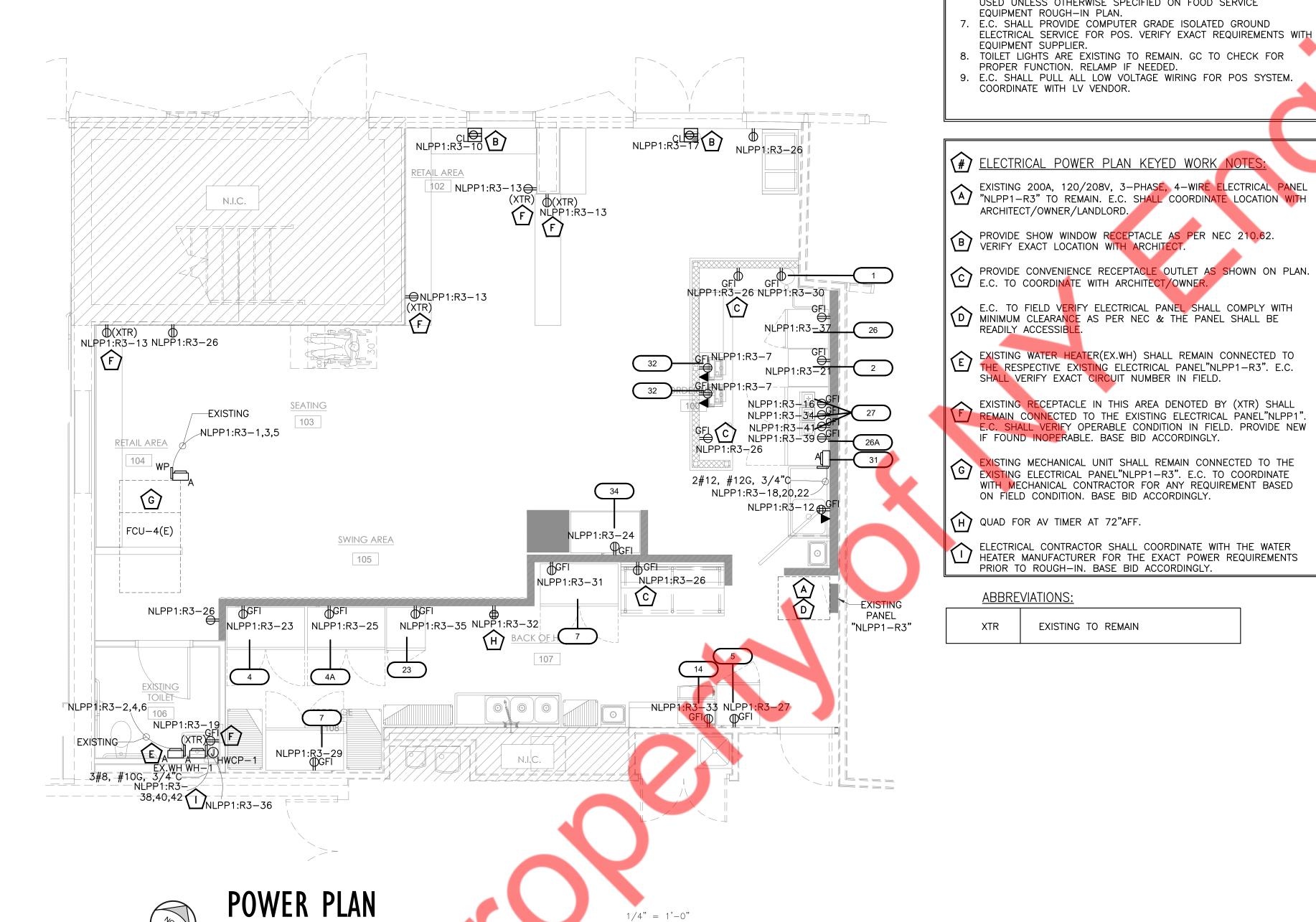


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Drawing Title **ELECTRICAL** LIGHTING PLAN



1/4" = 1'-0"

# **EQUIPMENT SCHEDULE:**

ELECTRICAL POWER PLAN GENERAL NOTES:

ROUGH-IN.

1. E.C. SHALL COORDINATE WITH THE ARCHITECT/OWNER FOR THE EXACT HEIGHT/LOCATIONS OF THE RECEPTACLES PRIOR TO

FACEPLATES, BRACKETS, ETC TO COMPLETE INSTALLATION. E.C. SHALL ALSO MAKE ALL FINAL CONNECTIONS TO EQUIPMENTS.

6. ALL ELECTRICAL CONDUIT TO BE RUN WITHIN WALL SURFACE AND BOXES AND RECEPTACLES ARE TO BE INSET FLUSH WITH WALL SURFACE. SURFACE MOUNTED ELECTRICAL WORK IS NOT TO BE

ELECTRICAL SERVICE FOR POS. VERIFY EXACT REQUIREMENTS WITH

USED UNLESS OTHERWISE SPECIFIED ON FOOD SERVICE

2. E.C. TO VERIFY ALL EXISTING EQUIPMENT TO BE RE-USED. 3. UNLESS OTHERWISE SPECIFIED, THE ELECTRICIAN IS TO FURNISH ALL 208 VOLT CORDS, PLUGS AND RECEPTACLES WHERE NECESSARY.
4. E.C. TO SUPPLY AND INSTALL ALL CONDUIT, WIRING, BOXES,

5. ALL ELECTRICAL WORK PERFORMED IS TO BE DONE IN ACCORDANCE WITH ALL STATE AND LOCAL CODES.

EQUIPMENT ROUGH-IN PLAN.

COORDINATE WITH LV VENDOR.

ARCHITECT/OWNER/LANDLORD.

SHALL VERIFY EXACT CIRCUIT NUMBER IN FIELD.

PRIOR TO ROUGH-IN. BASE BID ACCORDINGLY.

EXISTING TO REMAIN

WITH MECHANICAL CONTRACTOR FOR ANY REQUIREMENT BASED ON FIELD CONDITION. BASE BID ACCORDINGLY.

ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE WATER

READILY ACCESSIBLE

**ABBREVIATIONS:** 

XTR

PROPER FUNCTION. RELAMP IF NEEDED.

EQUIPMENT SUPPLIER.

DESCRIPTION SOUP KETTLE	VOLT	PHASE	<u>a</u>	LOAD		<del> </del>			
		PHA				O	9		
SOUP KETTLE			AMP	НМЭ	HP	DIRECT	SUL	NEMA	REMARKS
	120	1	3.3					5-15P	NEW OUTLET
ICE CREAM DIPPING CABINET	120	1	3.0		1 / 4			5-15P	NEW OUTLET
REACH IN REFRIGERATOR	120	1	2.3		2 / 3			5-15P	NEW OUTLET
REACH IN REFRIGERATOR	120	1	2.3		2 / 3			5-15P	NEW OUTLET
REACH IN FREEZER	120	1	4.8		1 / 2			5-15P	NEW OUTLET
REACH IN FREEZER	120	1	5.5		1 / 2			5-15P	NEW OUTLET
ICE MAKER	120	1	0.7					5-15P	NEW OUTLET
REACH IN GLASS DOOR REFRIGERATOR	120	1	2.3					5-15P	NEW OUTLET
UNDER COUNTER REFRIGERATOR	120	1	2.7		1 / 6			5-15P	NEW OUTLET
UNDER COUNTER REFRIGERATOR	120	1	2.7		1 / 6			5-15P	NEW OUTLET
BLENDER	120	1	15.0					5-15P	NEW OUTLET
JUICER	208	3	15.0					5-15P	NEW OUTLET
POS TERMINAL	120	1	4.0					5-15P	NEW OUTLET
OPEN DISPLAY MERCHANDISER	120	1	14.0					5-20P	CONFIRM OUTLET WITH SPECS
	ICE CREAM DIPPING CABINET  REACH IN REFRIGERATOR  REACH IN FREEZER  REACH IN FREEZER  ICE MAKER  REACH IN GLASS DOOR REFRIGERATOR  UNDER COUNTER REFRIGERATOR  BLENDER  JUICER  POS TERMINAL	ICE CREAM DIPPING CABINET 120  REACH IN REFRIGERATOR 120  REACH IN FREEZER 120  REACH IN FREEZER 120  ICE MAKER 120  REACH IN GLASS DOOR 120  REACH IN GLASS DOOR 120  UNDER COUNTER REFRIGERATOR 120  UNDER COUNTER REFRIGERATOR 120  BLENDER 120  JUICER 208  POS TERMINAL 120	ICE CREAM DIPPING CABINET         120         1           REACH IN REFRIGERATOR         120         1           REACH IN REFRIGERATOR         120         1           REACH IN FREEZER         120         1           REACH IN FREEZER         120         1           ICE MAKER         120         1           REACH IN GLASS DOOR REFRIGERATOR         120         1           UNDER COUNTER REFRIGERATOR         120         1           UNDER COUNTER REFRIGERATOR         120         1           BLENDER         120         1           JUICER         208         3           POS TERMINAL         120         1	ICE CREAM DIPPING CABINET       120       1       3.0         REACH IN REFRIGERATOR       120       1       2.3         REACH IN REFRIGERATOR       120       1       2.3         REACH IN FREEZER       120       1       4.8         REACH IN FREEZER       120       1       5.5         ICE MAKER       120       1       0.7         REACH IN GLASS DOOR REFRIGERATOR       120       1       2.3         UNDER COUNTER REFRIGERATOR       120       1       2.7         UNDER COUNTER REFRIGERATOR       120       1       2.7         BLENDER       120       1       15.0         JUICER       208       3       15.0         POS TERMINAL       120       1       4.0	ICE CREAM DIPPING CABINET   120   1   3.0   1   / 4	ICE CREAM DIPPING CABINET       120       1       3.0       1 / 4       5-15P         REACH IN REFRIGERATOR       120       1       2.3       2 / 3       5-15P         REACH IN REFRIGERATOR       120       1       2.3       2 / 3       5-15P         REACH IN FREEZER       120       1       4.8       1 / 2       5-15P         REACH IN FREEZER       120       1       5.5       1 / 2       5-15P         ICE MAKER       120       1       0.7       5-15P         REACH IN GLASS DOOR REFRIGERATOR       120       1       2.3       5-15P         UNDER COUNTER REFRIGERATOR       120       1       2.7       1 / 6       5-15P         UNDER COUNTER REFRIGERATOR       120       1       2.7       1 / 6       5-15P         BLENDER       120       1       15.0       5-15P         JUICER       208       3       15.0       5-15P         POS TERMINAL       120       1       4.0       5-15P			

1. IF APPLICABLE, GC TO CHECK EXISTING PLUG AND REPLACE AS NEEDED.

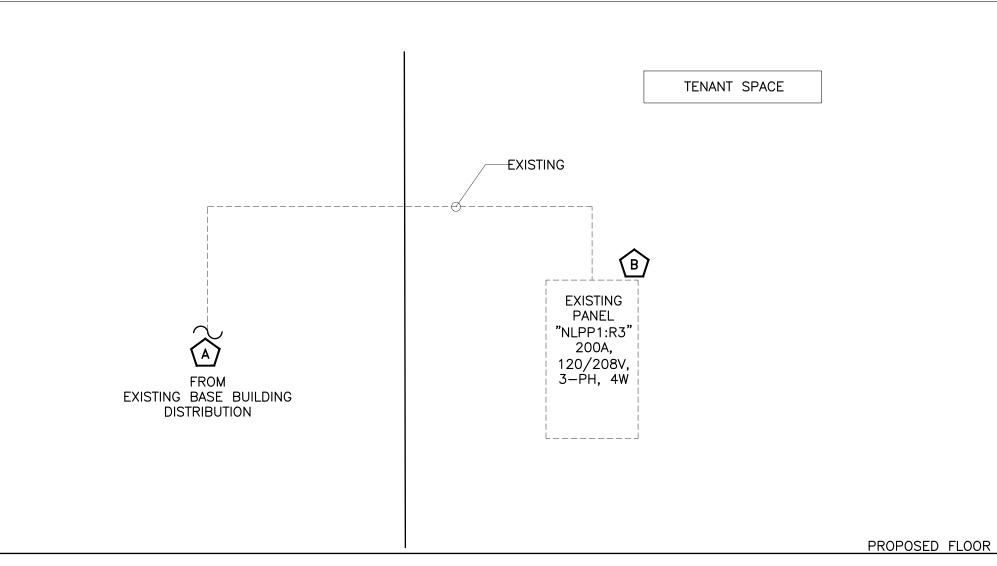
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Drawing Title

ELECTRICAL POWER PLAN

Job No.



1 ELECTRICAL RISER DIAGRAM SCALE:NTS

# ELECTRICAL RISER KEYED WORK NOTES:

- EXISTING 200A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL INCOMING SERVICE UP TO THE ELECTRICAL PANEL"NLPP1: E3" FOR THE LEASED SPACE FROM THE EXISTING BASE BUILDING DISTRIBUTION. E.C. SHALL COORDINATE WITH THE BASE BUILDING/LANDLORD/OWNER FOR EXACT POWER DISTRIBUTION. REPORT TO ENGINEER ON RECORD FOR ANY DISCREPANCIES.
- EXISTING 200A, 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL"NLPP1: E3" AND ITS INCOMING FEEDER TO REMAIN. E.C. SHALL VERIFY EXACT SIZE, LOCATION & OPERABLE CONDITION OF PANEL. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.

# ELECTRICAL GENERAL NOTE:

- 1. ABOVE RISER DIAGRAM IS FOR REFERENCE PURPOSES ONLY. E.C. SHALL VERIFY EXACT POWER DISTRIBUTION IN FIELD AND INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY.
- 2. E.C. SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND DISTRIBUTION.
- 3. ELECTRICAL CONTRACTOR TO COORDINATE FAULT CURRENT (Isc) RATING WITH UTILITY COMPANY AND AHJ PRIOR TO COMMENCING ANY WORK.
- 4. E.C. TO VERIFY OPERABLE CONDITIONS OF EXISTING DEVICES IN FIELD. REPLACE/RECTIFY IF FOUND IN OPERABLE. BASE BID ACCORDINGLY.
- 5. EXISTING ELECTRICAL DISTRIBUTION TO BE MAINTAINED AND UTILIZED TO SERVE PROJECT SPACE. POWER RISER DIAGRAM INDICATED FOR REFERENCE PURPOSES ONLY.

# **ELECTRICAL RISER SYMBOLS:**

—	NEW
	EXISTING ITEM/FEEDER TO REMAIN
X	EXISTING ITEM/FEEDER TO BE DISCONNECTED & REMOVED

# PANEL SCHEDULE:

PANEL:	NEL: NLPP1-R3(E)								) \	MOUNTING: SURF	ACE				
08Y/120	VOLTS,	3	PHASE	<u> </u>		4	WIRE				-4				
.001/120	VOL13,	3	FIIASL	-,		4	VVINE								
MAIN CB:	200A	MLO:	NA		BUS:	200A	MIN,					-			
IOTE: L - LIGI	HTING, R - F	RECEPTACLE, H - HVAC, E - KITCEHN EQU	JIPMEN	TS, O - OTH	ER/MISCIL	LANEOUS	1					1			
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD		LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	P A	ER PHASE (KV	A) C	MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1				Н	0.48		1.85	В			1.37	Н			2
3	15/3P	FCU-4 (E)	-	Н	0.48	EXISTING	2.03	1.85		EXISTING	1.37	<u></u> Н	EX. WH	20/3P	4
5			-	Н	0.48				1.85		1.37	Н		, ,	6
7	20	POS TERMINAL(#32)		R	0.96	2#12, #12G, 3/4"C	2.16			EXISTING	1.20	L	EXTERIOR FACING SIGNAGE	20	8
9	20	LIGHTING-BOH AREA, EXISTING TOILET	Т	L	0.22	2#12, #12G, 3/4"C		1.02		2#12, #12G, 3/4"C	0.80	L	SHOW WINDOW RECEPTACLE	20	10
11	20	RETAIL,ORDERING, SEATING LIGHTING	i	L	1.17	2#12, #12G, 3/4"C	•		1.47	2#12, #12G, 3/4"C	0.30	L	MENU	20	12
13	20	GENERAL USE OUTLETS		R	0.72	2#12, #12G, 3/4"C	0.82			EXISTING	0.10	L	TIMECLOCK	20	14
15	20	FRONT OF HOUSE LIGHTING/DÉCOR SIGNAGE		L	1.00	2#12, #12G, 3/4"C		2.80		2#12, #12G, 3/4"C	1.80	Е	BLENDER(#27)	20	16
17	20	SHOW WINDOW RECEPTACLE		L	1.02	2#12, #12G, 3/4"C			2.82		1.80	Е			18
19	20	GFI OUTLET RESTROOM		R	0.80	EXISTING	2.60			3#12, #12G, 3/4"C	1.80	E	JUICER(#31)	20/3P	20
21	20	ICE CREAM DIPPING(#2)		Е	0.36	2#12, #12G, 3/4"C		2.16			1.80	Е			22
23	20	REACH IN REFRIGERATOR(#4)		Е	0.28	2#12, #12G, 3/4"C			1.96	2#12, #12G, 3/4"C	1.68	Е	OPEN DISPLAY MERCHANDISER(#34)	20	24
25	20	REACH IN REFRIGERATOR(#4A)		Е	0.28	2#12, #12G, 3/4"C	1.36			2#12, #12G, 3/4"C	1.08	R	GENERAL OUTLET	20	26
27	20	REACH IN FREEZER(#5)		Е	0.58	2#12, #12G, 3/4"C		0.58					SPARE	20	28
29	20	REACH IN FREEZER(#7)		E	0.58	2#12, #12G, 3/4"C			0.97	2#12, #12G, 3/4"C	0.40	E	SOUP KETTLE(#1)	20	30
31	20	REACH IN FREEZER(#7)		Е	0.58	2#12, #12G, 3/4"C	0.94			2#12, #12G, 3/4"C	0.36	R	RECEPTACLE-FOR AV TIMER	20	32
33	20	ICE MAKER(#14)		Е	0.08	2#12, #12G, 3/4"C		1.88		2#12, #12G, 3/4"C	1.80	E	BLENDER(#27)	20	34
35	20	REACH IN GLASS DOOR REFRIG.(#23)		Е	0.76	2#12, #12G, 3/4"C			0.85	2#12, #12G, 3/4"C	0.09	М	HWCP-1	20	36
37	20	U/C REFRIGERATOR(#26)		Е	0.32	2#12, #12G, 3/4"C	3.65				3.33	0			38
39	20	U/C REFRIGERATOR(#26A)		E	0.32	2#12, #12G, 3/4"C		3.65		3#8, #10G, 3/4"C	3.33	0	WH-1	40/3P	40
41	20	BLENDER(#27)		E	1.80	2#12, #12G, 3/4"C			5.13		3.33	0			42
			TO	OTAL LOAD	(KVA)		13.37	13.94	15.05						

# PANEL SCHEDULE GENERAL NOTES:

- A. ALL CIRCUITING SHOWN IN PANEL "NLPP1:R3" FOR REFERENCE PURPOSE ONLY. E.C. SHALL VERIFY CIRCUITING OF THE EXISTING DEVICES IN FIELD AND INFORM ENGINEER FOR DISCREPANCIES.
- B. ELECTRICAL CONTRACTOR TO VERIFY THE EXACT PANEL SIZES AND INCOMING FEEDER SIZE.
- C. E.C. SHALL PROVIDE NEW CIRCUIT BREAKERS IN PLACE OF EXISTING CIRCUIT BREAKERS WHEREVER NECESSARY TO BE IN LINE WITH THE PANEL SCHEDULE
- D. ELECTRICAL CONTRACTOR SHALL VERIFY EXACT CIRCUIT NUMBER & BREAKER SIZE OF EXISTING DEVICES IN FIELD.
- E. E.C. SHALL VERIFY THE EXISTING EQUIPMENT LOAD & RATINGS IN FIELD AND ACCORDINGLY CONSIDER THE ELECTRICAL LOAD IN PANEL BOARD SCHEDULE.

PANEL SCHEDULE KEYED WORK NOTES:

E.C TO PROVIDE ONE 40A/3P CIRCUIT BREAKER IN PLACE OF (3) 20A/1P CIRCUIT BREAKER. BASE BID ACCORDINGLY.

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Drawing Title ELECTRICAL RISER DIAGRAM & PANEL SCHEDULE

### PLUMBING SYMBOLS LIST

	FLOWDING STWIDOLS LIST
	VENT PIPING COLD WATER PIPING
	HOT WATER PIPING
	HOT WATER RETURN PIPING
	EXISTING COLD WATER PIPING
— —	EXISTING HOT WATER PIPING SANITARY WASTE
$\infty$	P-TRAP
o	PIPE UP
С	PIPE DROP
<u> </u>	CLEANOUT
	POINT OF CONNECTION
	FLOOR SINK
	HUB DRAIN
	FLOOR DRAIN
	BALANCING VALVE
$\sqsubseteq$	SECONDARY BFP

# PLUMBING ABBREVIATIONS

	T LOWDING ADDINE VIATIONS
СО	CLEANOUT
CODP	CLEAN OUT DECK PLATE
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
V	VENT
LAV	LAVATORY
TYP.	TYPICAL
DN	DOWN
FD	FLOOR DRAIN
BFP	BACK FLOW PREVENTER
N.I.C.	NOT IN SCOPE
FS	FLOOR SINK
EX.	EXISTING
HD	HUB DRAIN
WH	WATER HEATER
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
	DITIMBING DEVIVING LIST

### PLUMBING DRAWING LIST

P-1 PLUMBING SPECIFICATIONS, SYMBOLS & ABBREVIATIONS

P-2 PLUMBING SPECIFICATIONS

P-3 PLUMBING DETAILS

P-4 PLUMBING WATER SUPPLY LAYOUT

P-5 PLUMBING DRAINAGE & VENT LAYOUT

P-6 PLUMBING SCHEDULE AND RISERS

### **BUILDING DEPARTMENT PLUMBING NOTES**

- 1. ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER, STORM) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHICAGO PLUMBING CODE.
- 2. INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 18-29-702.2
- 3. PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 18-29-305.
- 4. TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 18-29-306.
- 5. RODENT PROOFING AS PER PC 18-29-304
- 6. MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 18-29-303, 18-29-605.4, 18-29-702, 18-29-902, 18-29-1102.
- 7. VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 18-29-308.
- 8. WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION 18–29–604, 605, 606, 607, 608, 610
- 9. THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION PC 18-29-701, 704, 705, 706, 707, 708, 711.
- 10. VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 18-29-901 THROUGH PC 18-29-912 THROUGH PC 18-29-917
- 11. INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION PC 18-29-105.4.6.

# CODE COMPLIANCE

- ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:
- A. CHICAGO BUILDING CODE(14B).
- B. CHICAGO MECHANICAL CODE(14M).
- C. CHICAGO PLUMBING CODE(14P).
- D. CHICAGO FIRE PREVENTION CODE(14F).
- E. CHICAGO ENERGY CONSERVATION CODE(14N).
- F. CHICAGO ELECTRICAL CODE(14E).

### PLUMBING SPECIFICATIONS:

1. BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS

### 1.01 SCOPE

- A. 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.
- B. 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.
- C. 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.
- D. THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.
- E. 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. 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.
- G. COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.
- H. 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.
- I. 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.

- 1. PIPE AND FITTINGS
- VALVES
   HANGERS AND SUPPORTS
- 3. HANGERS AND SUPPORTS4. PLUMBING PIPING LAYOUT
- 5. TESTS
- 6. PLUMBING FIXTURES
- 7. MIXING VALVES8. 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. THE DRAWINGS REFLECT 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 PIPE MATERIAL SCHEDULE

# A. GREASE WASTE/ SANITARY DRAIN AND VENT PIPE MATERIAL:

ABOVE AND UNDERGROUND PIPING SHALL BE CAST—IRON, HUB AND SPIGOT AS PER ASTM A74, ASTM A888, CISPI 301
SLOPE OF DRAINAGE SYSTEM SHALL BE 1/4" PER FOOT OF RUN FOR PIPE OVER 2 1/2" (I.D.) AND SMALLER (I.D.), 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) TO 6" (I.D.) . VENT PIPING SHALL BE PITCHED TO

# B. DOMESTIC HW, CW & FW PIPE MATERIAL:

SPECIALTIES FOR DOMESTIC WATER.

C403.12.3. REFER BELOW TABLE.

WATER SERVICE PIPING SHALL BE COPPER OR COPPER ALLOY TUBING (TYPE K) AS PER ASTM B74: ASTM B88. ASTM B251 AND ASTM B447.

WATER DISTRIBUTION PIPE SHALL BE COPPER AND COPPER ALLOY TUBING (TYPE K, L OR M) AS PER ASTM B74, ASTM B88, ASTM B251, ASTM B447. FITTINGS IN DOMESTIC WATER PIPING SHALL BE COPPER OR COPPER ALLOY AS PER ASMEB16.15: ASME B16.18, ASME B16.22

JOINTS BETWEEN COPPER AND COPPER ALLOY PIPE AND FITTINGS SHALL COMPLY WITH CHICAGO PLUMBING CODE SECTION 18-29-605.14.1 THROUGH 18-29605.14.5

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

1. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE—RETARDANT, FACTORY—APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY—APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH SECTION C404.4 CHICAGO

ENERGY CONSERVATION CODE 14N (ADOPTS 2021 IECC) TABLE

MINIMUM PIPE INSULATION THICKNESS										
FLUID OPERATING EMPERATURE 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	<u>&gt;</u> 8			
141-200	0.25-0.29	125	1.5	1.5	2	2	2			
105-140	0.21-0.28	100	1.0	1.0	1.5	1.5	1.5			
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0			

2. HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER CHICAGO ENERGY CONSERVATION CODE 14N (ADOPTS 2021 IECC) 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	MAXIMUM PIPING LENGTH (FEET)				
(INCHES)	PUBLIC LAV	OTHER FIXTURES			
1/2"	2'	43'			
3/4"	0.5'	21'			
1"	0.5'	13'			
11/4"	0.5'	8'			
1½"	0.5'	6'			
2" OR LARGER	0.5'	4'			

3. AS PER CHICAGO ENERGY CONSERVATION CODE 14N (ADOPTS 2021 IECC) C404.6.1, AUTOMATIC CONTROLS SHALL BE INSTALLED THAT LIMITS THE OPERATION OF A RECIRCULATING PUMP AND THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD—WATER PIPING TO 104°F (40°C).

4. SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION.

### 5. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION.

#### C. HANGERS AND SUPPORTS:

- 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 PIPF.
  - 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:

- 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 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 VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
- E. 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.
- F. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.
- G. REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE—PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.
- H. PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.
- 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.
- ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED J. WITH INTEGRAL VACUUM BREAKERS.
- ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE K. BARRIER CAULK OR APPROVED EQUAL.
- UNION OF 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.
- M. AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.
- INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS,
  N. 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.

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### M. ELECTRIC WATER HEATER

- TANKS SHALL 50 GALLONS CAPACITY AND SHALL HAVE 150 PSI WORKING PRESSURE AND BE EQUIPPED WITH EXTRUDED HIGH DENSITY ANODE.
- 2. ALL INTERNAL SURFACES OF THE HEATER(S) EXPOSED TO WATER SHALL BE GLASS—LINED WITH AN ALKALINE BOROSILICATE COMPOSITION THAT HAS BEEN FUSED TO STEEL BY FIRING AT A TEMPERATURE RANGE OF 1400°F TO 1600°F.
- 3. EACH ELEMENT SHALL BE CONTROLLED BY AN INDIVIDUALLY MOUNTED THERMOSTAT AND HIGH TEMPERATURE CUT—OFF SWITCH. ALL INTERNAL CIRCUITS SHALL BE FUSED. THE OUTER JACKET SHALL BE OF BAKED ENAMEL FINISH AND SHALL BE PROVIDED WITH FULL SIZE CONTROL COMPARTMENT FOR PERFORMANCE OF SERVICE AND MAINTENANCE THROUGH HINGED FRONT PANEL AND SHALL ENCLOSE THE TANK WITH FOAM INSULATION. ELECTRICAL JUNCTION BOX WITH HEAVY DUTY TERMINAL BLOCK SHALL BE PROVIDED. THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.

#### O. MIXING VALVES

- 1. VALVE BODY SHALL BE MADE OF CAST BRASS. THE INTERNAL COMPONENTS SHALL BE MADE OF BRASS WITH CORROSION RESISTANT AND LEAD FREE INTERNAL COMPONENTS.
- 2. THE VALVE SHALL CONTAIN AN ADVANCED PARAFFIN SENSOR WITH A TEMERATURE RANGE OF 100°F TO 160°F AND FACTORY SET AT 120°F WITH A LOCK NUT TO PREVENT UNAUTHORISED TEMPERATURE CHANGES.
- 3. CHECKS AND SCREENS MUST BE INTERGRAL TO THE VALVE. EXTERNAL INLET SHUT OFFS WILL BE INCLUDED WITH THE VALVE AND SHALL BE RELIABLE BALL VALVE DESIGN. BODY MATERIAL SHALL BE LEAD FREE BRASS WITH CORROSION RESISTANT INTERNAL COMPONENTS.

### P. HOT WATER RE-CIRCULATING PUMP

- 1. IN-LINE PUMP: SINGLE STAGE VOLUTE TYPE PUMP SHALL BE MADE OF LEAD-FREE BRONZE IMPELLER.
- 2. THE PUMP SHALL HAVE A GROUND AND POLISHED STEEL SHAFT WITH A HARDENED INTEGRAL THRUST COLLAR. THE SHAFT SHALL BE SUPPORTED BY TWO HORIZONTAL SLEEVE BEARINGS DESIGNED TO CIRCULATE OIL. THE PUMPS ARE TO BE EQUIPPED WITH A MECHANICAL SEAL WITH CARBON SEAL FACE ROTATING AGAINST CERAMIC SEAT. THE MOTOR SHALL BE NON-OVERLOADING AT ANY POINT ON PUMP CURVE.
- 3. DIRECT CONNECT PUMP TO ELECTRIC MOTOR WITH FLEXIBLE COUPLING. THE MOTOR SHALL BE OF THE DRIP-PROOF, SLEEVE-BEARING, QUIET OPERATING, RUBBER-MOUNTED CONSTRUCTION. EQUIPMENT MOTOR WITH BUILT-IN THERMAL OVERLOAD PROTECTION.
- 4. INSTALL IN-LINE CIRCULATING PUMPS BETWEEN PIPE FLANGES IN PIPING SYSTEMS. INSTALL OVERHEAD PIPE SUPPORTS, BOTH SIDES OF IN-LINE PUMPS, INSTALLED IN HORIZONTAL PIPING RUNS.

# Q. VERIFY EXACT LOCATIONS OF ALL EXISTING UTILITIES.

### 2. INSTALLATION

### 2.01 GENERAL

- A. COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.
- B. 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.
- C. NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.
- D. PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS, THE PLUMBING CONTRACTOR SHALL NOTIFY THE OWNER AND OFFER A PROPOSED SCHEDULE OF WORK. OWNER 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 OWNER AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY MANAGER IS REQUIRED.

#### 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.

### 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
- 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.
- I. ALL EQUIPMENT WILL BE FACTORY TESTED.

SUM BID FOR THIS CONTRACT.

- J. CONTRACTOR SHALL IDENTIFY TO THE OWNER'S REPRESENTATIVE ANY LEAKS OR DAMAGE THAT OCCURS AS A RESULT OF SYSTEM TESTING. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO LIMIT ANY POTENTIAL DAMAGE. CORRECTIVE ACTION REQUIRED AS A RESULT OF TESTING SHALL BE PERFORMED IMMEDIATELY AND AT THE CONTRACTOR'S EXPENSE.
- K. REPORT IN WRITING TO AUTHORITIES HAVING JURISDICTION, THE ARCHITECT AND THE OWNER THE RESULTS OF ALL TESTING.

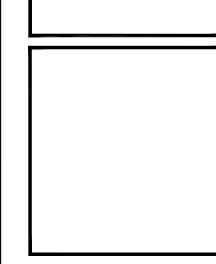
# L. TESTING REQUIREMENTS

- a. TEST ALL DOMESTIC WATER PIPING HYDROSTATICALLY TO 125 PSIG.
- HYDROSTATIC TEST PRESSURES SHALL REMAIN CONSTANT WITH NO VARIATION FOR 120 MINUTES.
- c. TESTS SHALL BE WITNESSED BY THE BUILDING ENGINEER.
   d. THE PLUMBING CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL DAMAGE DUE TO TEST FAILURES AND LEAKAGE IN THE TEST AREA AND ADJACENT TENANT OR LANDLORD
- M. REFILL ENTIRE POTABLE HOT AND COLD WATER SUPPLY SYSTEM WITH CHLORINE SOLUTION (HTH OLIN CHEMICAL CORP.) AT A STRENGTH TO MEET STANDARDS OF THE DEPARTMENT OF HEALTH, AND FOR A PERIOD OF RETENTION AS STIPULATED.
- N. THOROUGHLY FLUSH PIPING SYSTEM WITH FRESH WATER IMMEDIATELY PRIOR TO FINAL ACCEPTANCE.

### 4. WARRANTY

A. EQUIPMENT, MATERIALS AND WORKMANSHIP FURNISHED UNDER THIS CONTRACT SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. THE CONTRACTOR SHALL KEEP THE WORK IN GOOD REPAIR FOR ONE YEAR AFTER THE DATE OF FINAL APPROVAL. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROMPTLY CORRECT AND REPAIR ANY AND ALL BREAKS, FAILURES OR WEAR DUE TO FAULTY MATERIALS, WORKMANSHIP OR EQUIPMENT. ALL SETTLEMENTS OF SURFACES THAT MAY OCCUR WITHIN THAT PERIOD SHALL ALSO BE PROMPTLY REPAIRED.





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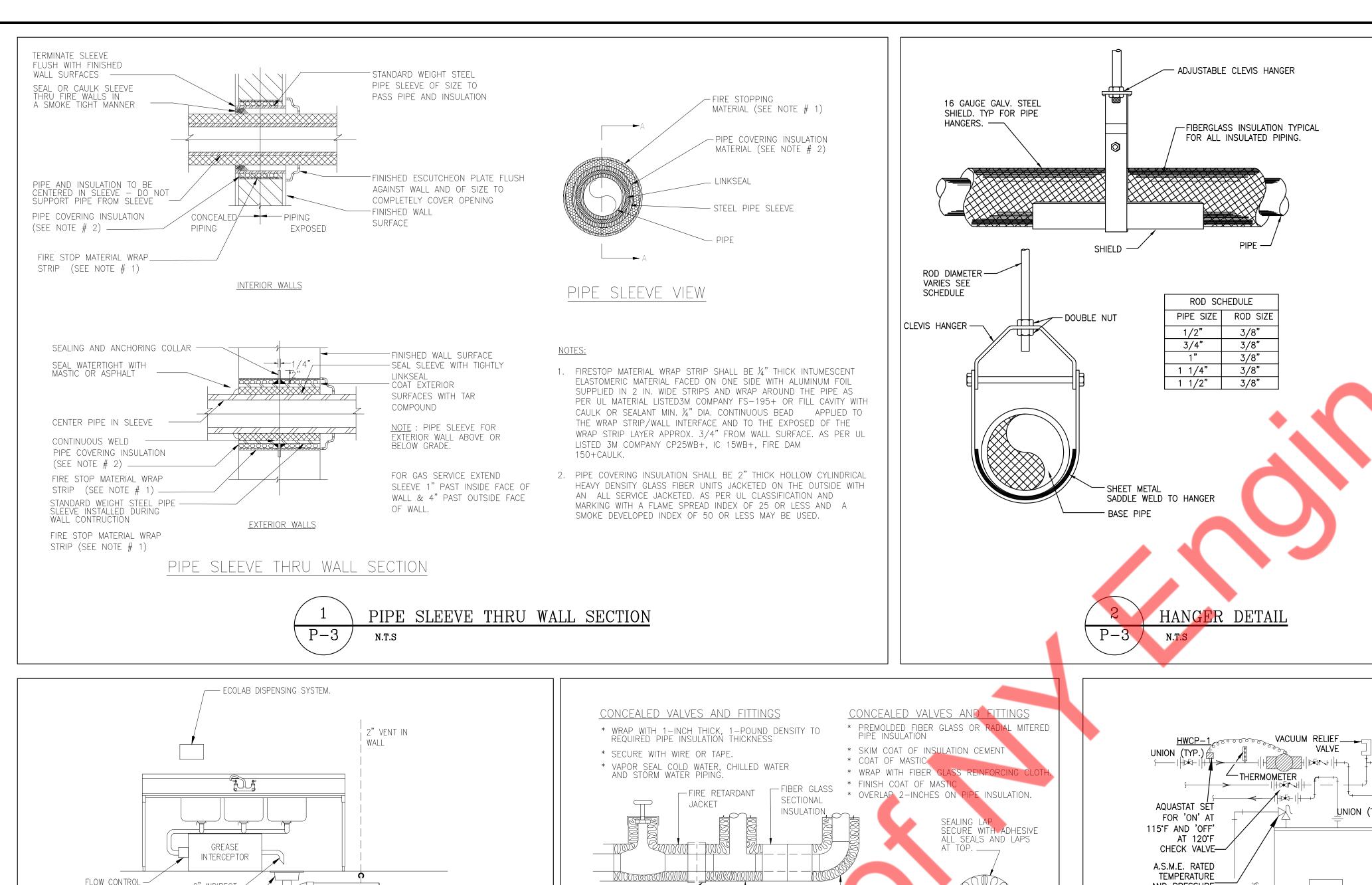
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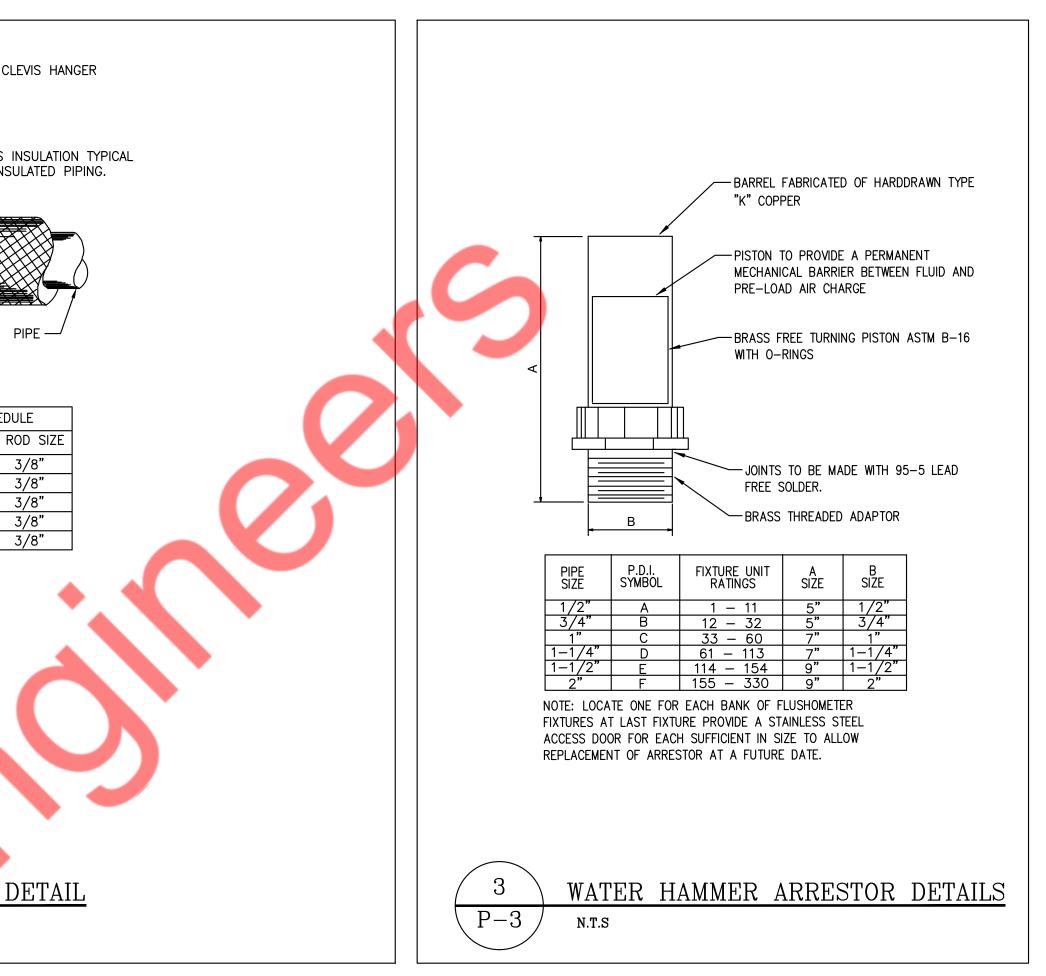
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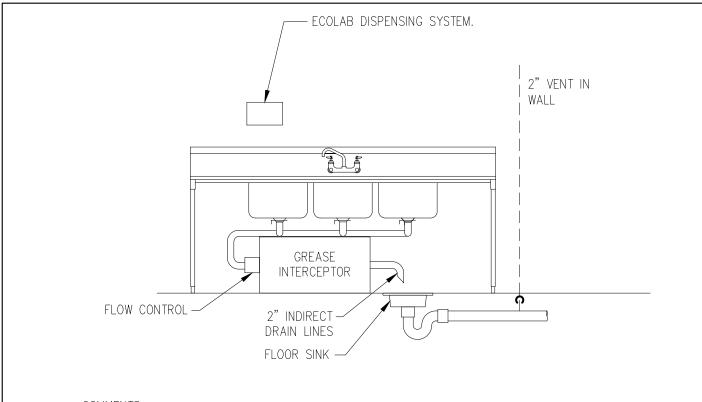
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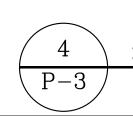




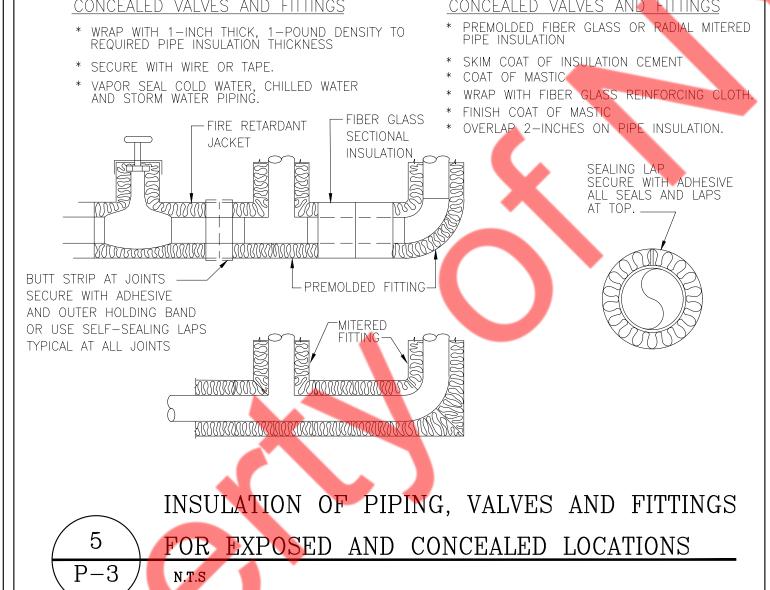
1. LOCATE GREASE INTERCEPTOR UNDER SINK AS NECESSARY ALLOWING EASY ACCESS TO THE REMOVABLE COVER FOR PERIODIC CLEANING.

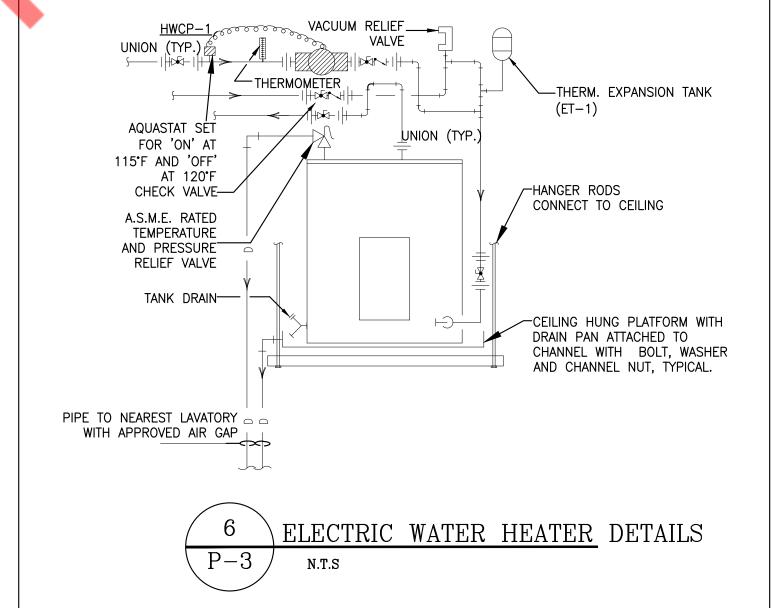
2. ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS OR MEET LOCAL CODE REQUIREMENTS. HUBLESS CAST IRON PIPE, FITTINGS AND CONNECTORS ALL AROUND SINK AND TRAP. CONNECT GREASE TRAP FROM CENTER COMPARTMENT.

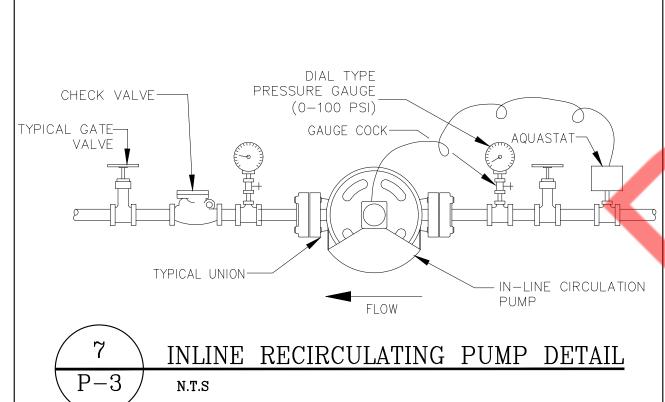
3. COORDINATE INDIVIDUAL BAY DRAINAGE, AIR GAP, & DRAIN FUNNEL WITH LOCAL CODE REQUIREMENTS.

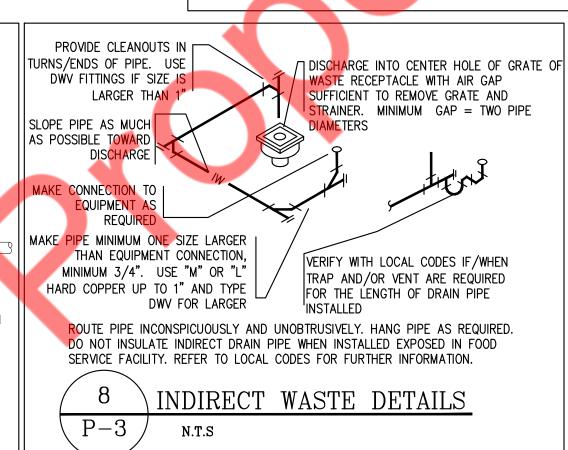


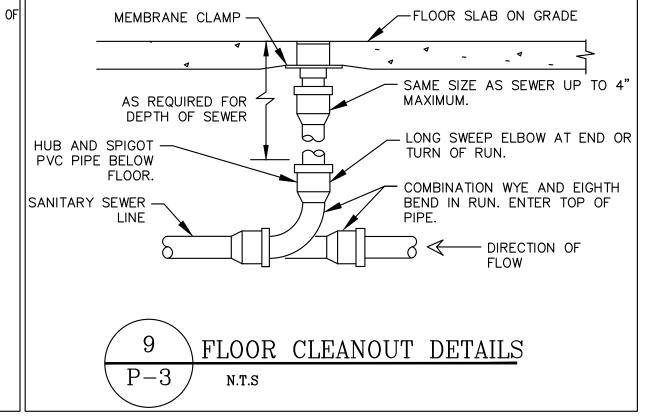
3-COMPARTMENT SINK DETAILS N.T.S

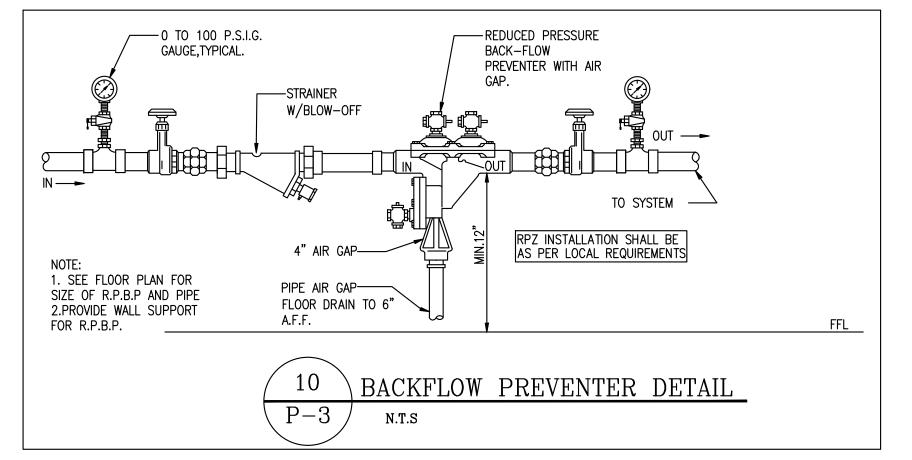


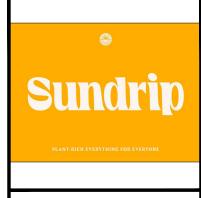


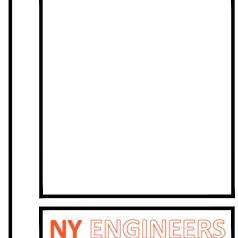




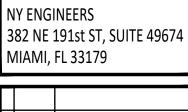


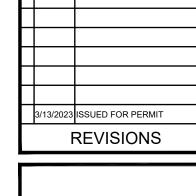


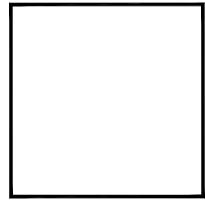








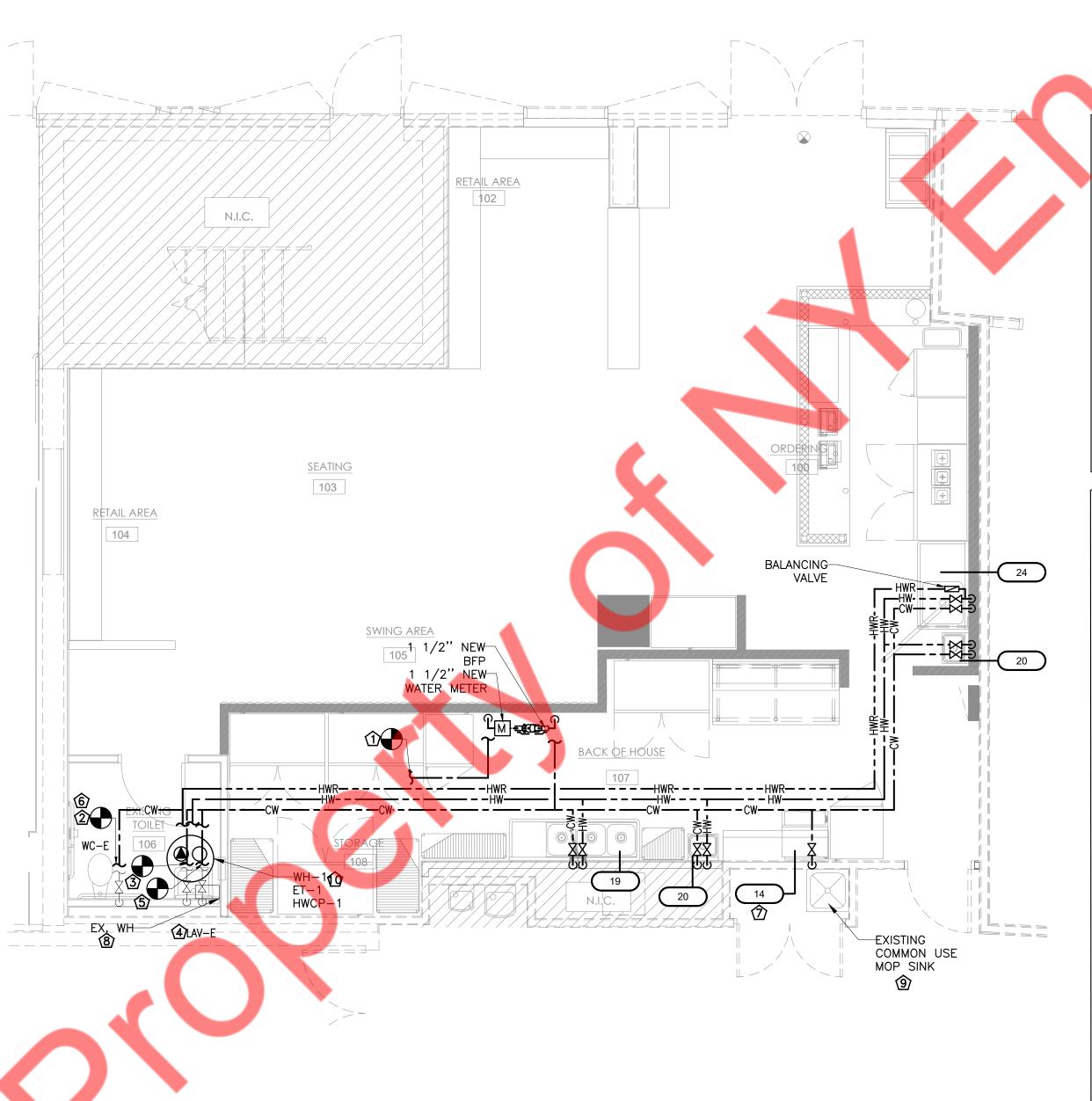




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# GENERAL WATER NOTES

BUILDING STAFF.

- CONTRACTOR SHALL LEAVE NO DEAD ENDS TO CONCEALED, EXPOSED, OR UNDERGROUND PIPING.
   LOCATION OF EXISTING PLUMBING PIPING ARE TENTATIVE. CONTRACTOR SHALL VERIFY IN FIELD AND DETERMINE THE EXACT LOCATION OF EXISTING PLUMBING PIPES.
   COORDINATE ALL SERVICE SHUTDOWNS WITH THE LANDLORD,
- 4. PROVIDE CUTTING, CORE DRILLING IN WALLS FOR ALL PIPE PENETRATIONS, CONNECTION, AND ALL ASSOCIATED WORK. PROVIDE PATCHING, RESTORATION, AND FINISHING WORK TO MATCH EXISTING CONDITIONS IN ALL ASPECTS.
- MATCH EXISTING CONDITIONS IN ALL ASPECTS.

  5. CONTRACTOR TO MAKE ALL FINAL PLUMBING CONNECTIONS TO EQUIPMENT AS PER MANUFACTURER'S SPECIFICATIONS.

  6. CONTRACTOR TO FIELD VERIFY THE EXISTING WATER PIPE SIZE,
- LOCATION ON SITE.

  7. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.

  8. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, SHUT-OFF VALVES AS REQUIRED.
- 9. CW/HW/HWR PIPING TO BE PROVIDED WITH INSULATION AS PER 2021 CHICAGO ENERGY CONSERVATION CODE (REFER
- SHEET P-1)

  10. REFER RISER DIAGRAM FOR WATER PIPE SIZING.

# WATER PLAN KEY NOTES

- CONNECT NEW 1 1/2" WATER CW PIPING WITH NEW CHECK VALVE AND BALL VALVE TO EXISTING WATER LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXACT SIZE AND LOCATION ON
- EXTEND TO CONNECT NEW 1" CW LINE TO EXISTING WATER CLOSET PIPING. CONTRACTOR TO FIELD VERIFY THE CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED.
- EXTEND TO CONNECT NEW 1/2" CW LINE TO EXISTING WATER HEATER PIPING. CONTRACTOR TO FIELD VERIFY THE CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED.
- EXISTING LAV WITH EXISTING WATER HEATER, HW & CW PIPE CONNECTION TO REMAIN. CONTRACTOR TO FIELD VERIFY CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED.
- EXTEND TO CONNECT NEW 1/2" CW LINE TO EXISTING LAV PIPING. CONTRACTOR TO FIELD VERIFY THE CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED.
- EXTEND TO CONNECT NEW 1" CW LINE TO EXISTING WATER CLOSET PIPING. CONTRACTOR TO FIELD VERIFY THE CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED.
- PROVIDE ASSE 1022 DUAL CHECK WITH ATMOSPHERIC VENT SECONDARY BFP FOR ICE MACHINE AS PER THE CODE.
- CONTRACTOR TO FIELD VERIFY THE CONDITION OF EXISTING WATER HEATER AND REPLACE IF REQUIRED. COORDINATE WITH ELECTRICAL CONTRACTOR FOR ELECTRICAL REQUIREMENTS.
- EXISTING COMMON MOP SINK WITH HW & CW PIPE CONNECTION TO REMAIN. CONTRACTOR TO FIELD VERIFY CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED. PROVIDE NEW WATER CONNECTIONS FROM MAIN WATER LINES IF NOT EXISTING.
- PROVIDE NEW WATER HEATER IN CEILING AS MENTIONED IN SCHEDULE WITH REQUIRED ACCESSORIES AS PER MANUFACTURER RECOMMENDATION AND SITE CONDITIONS. DISCHARGE DRAIN PIPE TO NEAREST LAVATORY WITH APPROVED AIR GAP.

Sundrip

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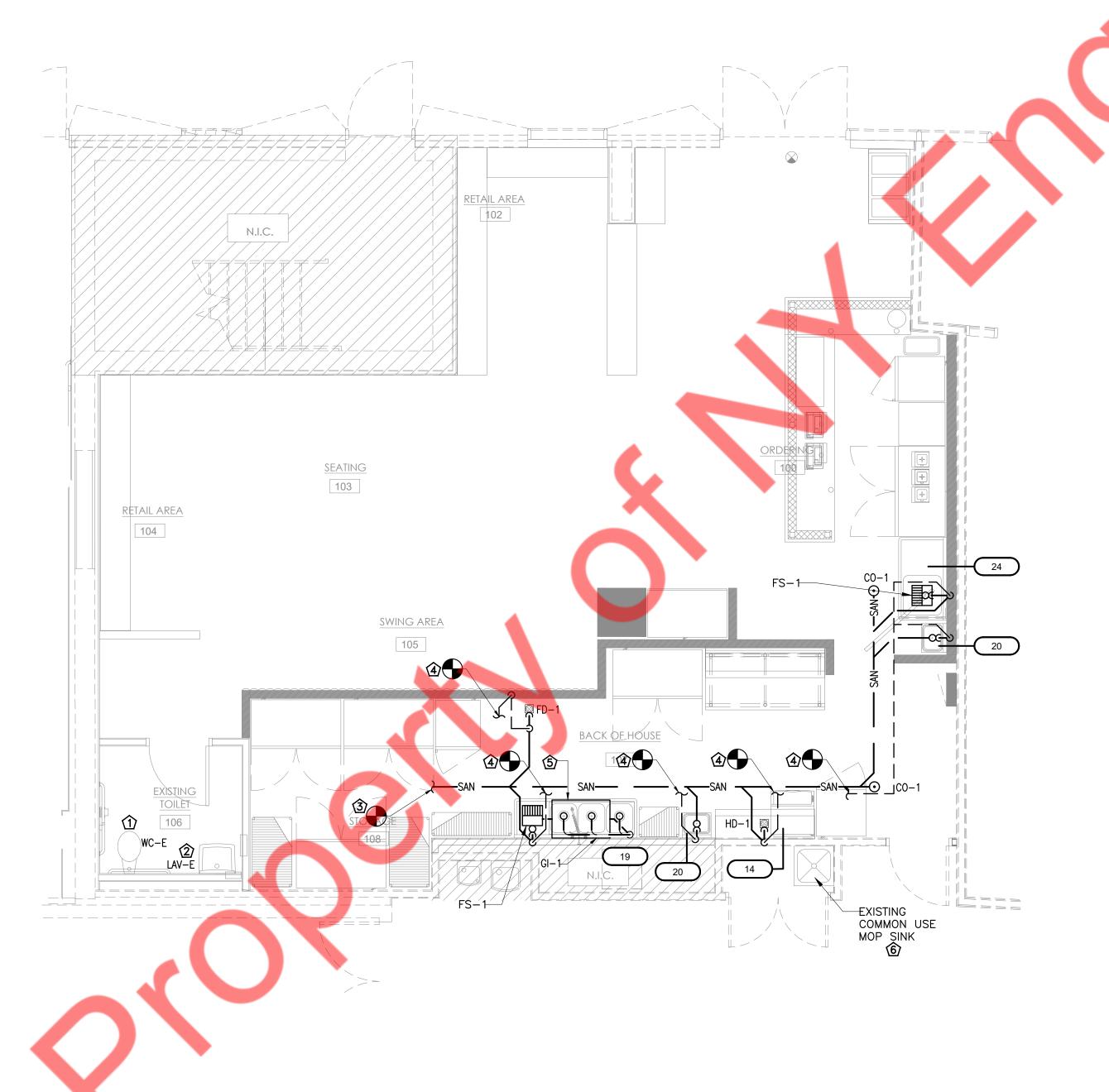
Drawing Title	

PLUMBING WATER
SUPPLY LAYOUT

Job No.

Sheet No.

PLUMBING WATER SUPPLY LAYOUT 1/4" = 1'-0"





CONTRACTOR SHALL LEAVE NO DEAD ENDS TO CONCEALED, EXPOSED, OR UNDERGROUND PIPING WHEN REMOVING SANITARY

LOCATION OF EXISTING PLUMBING PIPING ARE TENTATIVE. CONTRACTOR SHALL VERIFY IN FIELD AND DETERMINE THE EXACT LOCATION OF EXISTING PLUMBING PIPES. COORDINATE ALL SERVICE SHUTDOWNS WITH THE LANDLORD,

- BUILDING STAFF. PROVIDE CUTTING, CORE DRILLING IN WALLS FOR ALL PIPE PENETRATIONS, CONNECTION, AND ALL ASSOCIATED WORK. PROVIDE PATCHING AND FINISHING WORK TO MATCH EXISTING CONDITIONS IN ALL ASPECTS.
- CONTRACTOR TO MAKE ALL FINAL PLUMBING AND GAS CONNECTIONS TO EQUIPMENT AS PER MANUFACTURER'S SPECIFICATIONS. CONTRACTOR TO FIELD VERIFY THE EXISTING SANITARY PIPE SIZE,
- LOCATION & INVERT ON SITE. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.

# DRAINAGE AND VENT PLAN KEY NOTES

- EXISTING WATER CLOSET WITH EXISTING SANITARY & VENT CONNECTION TO REMAIN. CONTRACTOR TO FIELD VERIFY CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED.
- EXISTING LAV WITH EXISTING SANITARY & VENT CONNECTION TO REMAIN. CONTRACTOR TO FIELD VERIFY CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED.
- CONNECT 4" NEW SANITARY PIPE TO THE 4" EXISTING SANITARY PIPE CONTRACTOR TO FIELD VERIFY THE EXITING LOCATION, SIZE AND INVERT ON THE SITE.
- CONNECT 2" NEW VENT PIPE TO THE EXISTING VENT PIPE IN AREA CONTRACTOR TO FIELD VERIFY THE EXITING LOCATION & SIZE ON SITE.
- GREASE TRAP SCHIER GB 2 OR EQUIVALENT SHALL BE PROVIDED. CONTRACTOR SHALL COORDINATE FINAL LOCATION WITH ARCHITECT.
- © EXISTING COMMON MOP SINK WITH EXISTING SANITARY & VENT CONNECTION TO REMAIN. CONTRACTOR TO FIELD VERIFY CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED. PROVIDE NEW SANITARY & VENT CONNECTION IF NOT EXISTING.

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Drawing Title

PLUMBING DRAINAGE 8 VENT LAYOUT

PLUMBING DRAINAGE AND VENT LAYOUT

1/4" = 1'-0"

			KITCHEN EQUIPMENT	SCHEDULE				
					CONNECTION			
TAG	COMPONENT	QTY.	MANUFA/MODEL	SOIL/WASTE	VENT	COLD WATER	HOT WATER	- REMARKS
WC-E	EXISTING WATER CLOSET	1		E	E	Е	_	_
LAV-E	EXISTING LAVATORY	1	_	E	E	E	E	_
14	ICE MACHINE	1	_	¾"	_	1/2"	-	INDIRECT TO HUB DRAIN
19	THREE COMPARTMENT SINK	1	_	11/2"	-	_	_	INDIRECT TO FLOOR SINK
19A	THREE COMPARTMENT SINK FAUCET	1	_	_	-	1/2"	1/2"	-
20	HAND SINK	2	JOHN BOOS/PBHS-W-1410 SSLR-X	2"	1½"	_	-	-
21A	HAND SINK FAUCET	2	T&S/BRASS MODEL B-1146	_	-	1/2"	1/2"	_
24	PREP TABLE WITH SINK	1	_	11/2"	_	_	_	INDIRECT TO FLOOR SINK
24A	DECK MOUNT FAUCET	1	T&S/BRASS MODEL B-0221	_	_	1/2"	1/2"	_
FS-1	FLOOR SINK	2	ZURN/#Z1900-3NH-K -4	3"	2"	_	_	SET FLOOR SINK LEVEL WITH FINISH FLOOR.
HD-1	HUB DRAIN	1	ZURN/#Z1870-FDA-3BW	3"	2"	_	-	304 STAINLESS STEEL, HUB DRAIN. DRAIN MEETS U.S. FDA STANDARDS FOR CORROSION RESISTANCE
FD-1	FLOOR DRAIN	1	ZURN/#ZN415-B-3NH	3"	2"	_	_	INSTALL PER MANUFACTURERS RECOMMENDATIONS.

	ELECTRIC STORAGE WATER HEATER										
TAG No.	NO. OF ELEMENTS	FIXTURES SERVING	STORAGE GALONS	RECOVERY CAP. (GPM @ RISE)	TYPE	VOLTS	ELEC PHASE	TRICAL HERTZ	INPUT KW	MANUFACTURER & MODEL NO.	REMARKS
<u>WH-1</u>		HAND SINK, PREP SINK 3 COM SINK.	48	45 GPH @ 90°F	ELECTRIC WATER HEATER	208	3	60	10	A.O.SMITH DEL-50 (DURA-POWER)	-DIMENSIONS 26½"DIA X 36"H -HEATERS SHALL HAVE 150PSI WORKING PRESSURE.

NOTE:
1. VACUUM RELIEF VALVE SHALL CONFIRM WITH ANSI Z21.22.
2. PROVIDE EXPANSION TANK (ET-1) WATTS AMTROL ST-5 OR SIMILAR.

	RECIRCULATING PUMP SCHEDULE								
MARK	SERVICE	GPM	TOTAL HEAD FT.	MOTOR HP	MANUFACTURER & REMARKS				
HWCP-1	HW RECIRCULATION	2	10	0.115	GRUNDFOS UP 15-18 B5 W/AQUASTAT + TIMER				

THERMOSTATIC MIXING VALVE											
ITEM	CAPACITY (GPM)	PRESSURE DROP (PSI)	MINIMUM FLOW (GPM)	MAKE	CW INLET	HIGH TEMP. INLET	LOW TEMP. OUTLET	REMARKS			
TMV-1	5	5	0.5	ACORN MV17-1	1/2"	1/2"(140°F)	1/2"(120°F)	-BRONZE BODY AND LEAD FREE CONSTRUCTION -ASSE CERTIFIED			

NOTES: 1. PROVIDE TMV AT HAND SINK AND PREEP SINK

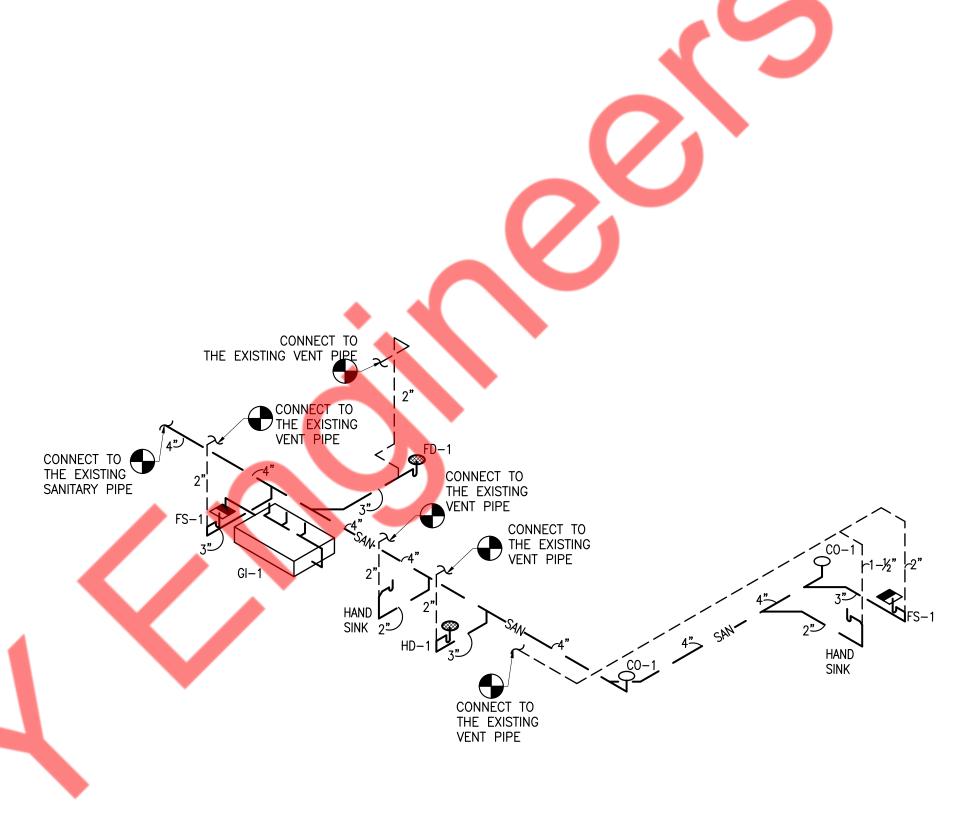
# GREASE INTERCEPTOR SCHEDULE

MARK	MANUFACTURER	MODEL	FLOW RATE (GPM)	LIQUID CAPACITY(G)	GREASE CAPACITY(LBS)	NOTES
<u>GI-1</u>	SCHIER	GB2	35	20	130.5	1, 2, 3

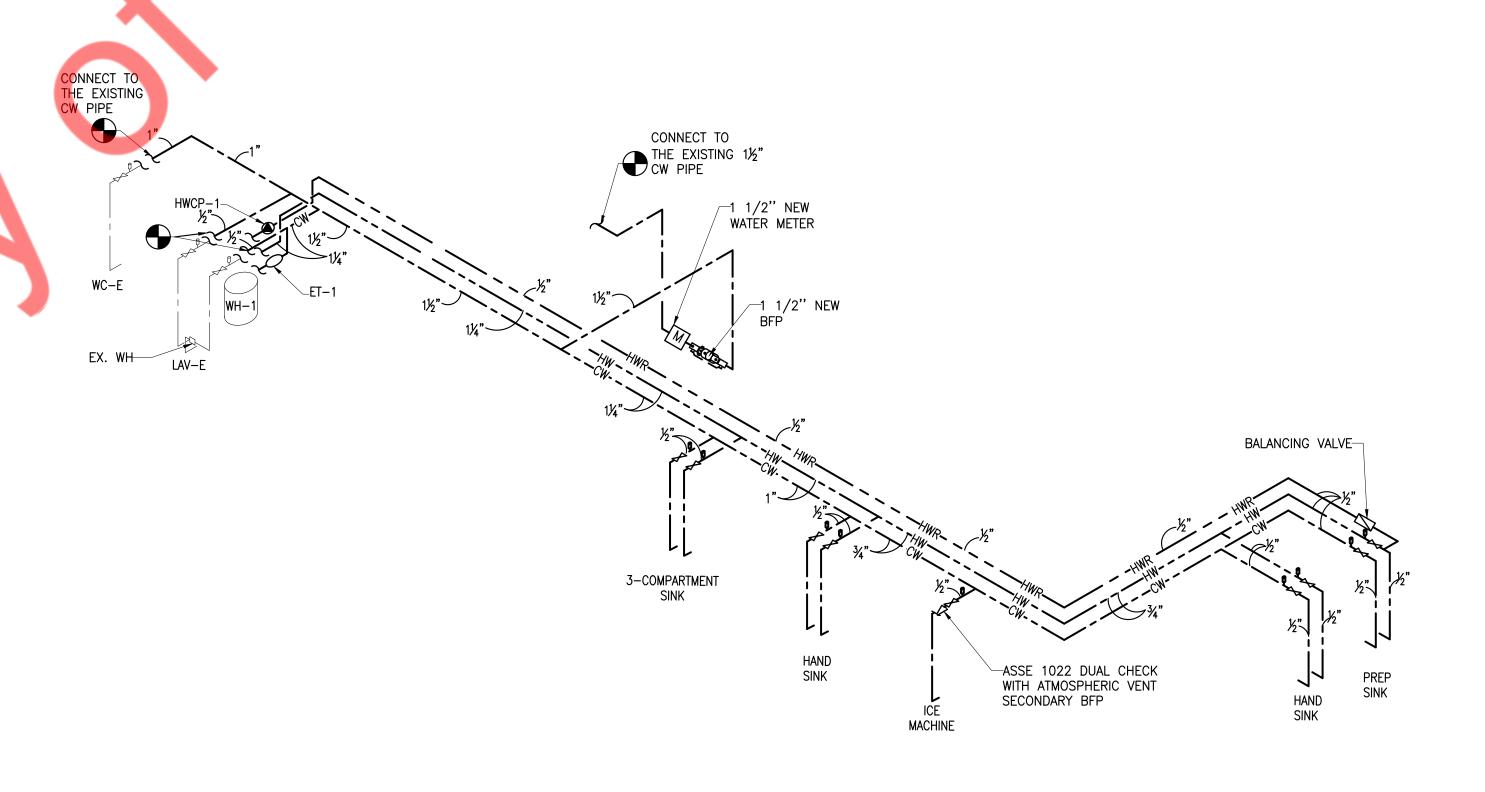
- NOTES: 1. CONTRACTOR SHALL SUBMIT PROPOSED GREASE INTERCEPTOR INSTALLATION PLANS AND SPECIFICATIONS TO LOCAL AUTHORITIES FOR THIER APPROVAL BEFORE ACQUISTION. SEE MANUFACTURERS INSTALLATION MANUAL FOR ADDITIONAL INSTRUCTIONS.

  2. PROVIDE WITH C24HP H20 LOAD RATED PICKABLE CAST IRON LIDS WITH "SAFE MANWAY" FALL PROTECTION COVER.

  3. PROVIDE WITH AK1 ANCHOR KIT



# DRAINAGE AND VENT RISER



WATER SUPPLY RISER

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PLUMBING SCHEDULE 8