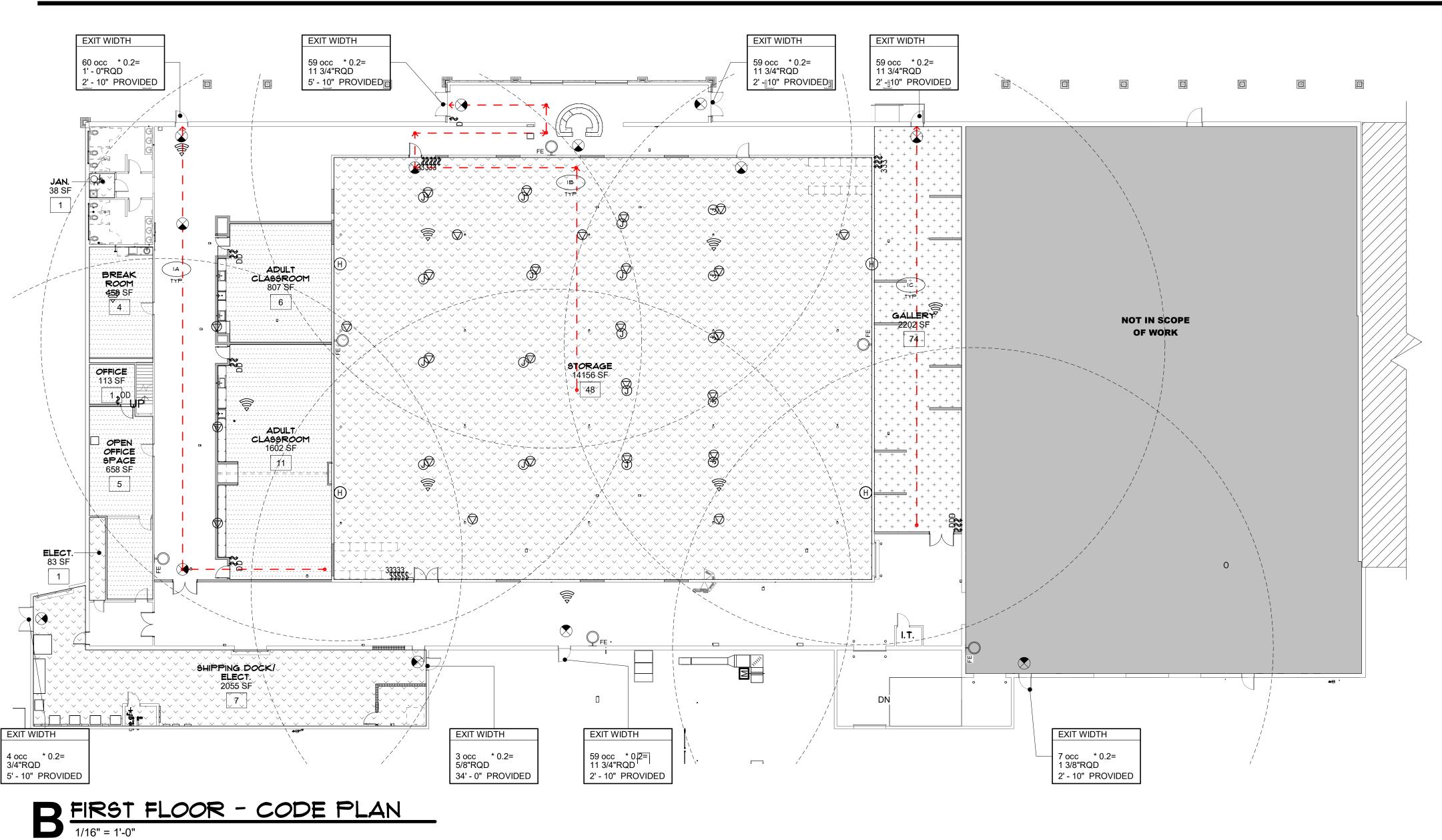
SPECIFICATIONS SPECIFICATION INDEX General Conditions Wood and Plastics)ivision () Division 6 Division 12 Furnishing Thermal and Moisture Protection Division 13 General Requirements Division 7 Special Construction Division 1 Division 2 Site Work Doors and Windows Division 14 Conveying Systems Division 8 Division 3 Division 21 Concrete Division 9 Finishes Fire Suppression Division 22 Division 23 Division 4 Division 10 Plumbing Masonry Specialties Division 5 Metals Division 11 Equipment Mechanical Division 26 Electrical DIVISION 0: GENERAL CONDITIONS Division 28 Fire Detection and Alarm OWNER: Cherokee Nation P.O. BOX 948 TAHLEQUAH, OK 74465 P(918) 453-5009 ARCHITECT: Blue River Architects, LLC 320 S BOSTON AVE, SUITE 103 TULSA, OK 74103 **<u>SITE EXAMINATION</u>**: The Contractor shall visit the project site and examine all existing conditions affecting the work. PROTECTION: The Contractor shall take all responsible precautions to protect from damage, injury or loss of all the Work and all the materials and equipment incorporated therein. The Contractor shall promptly remedy at his own expense and to the Owner's satisfaction, all damage or loss to the Work and all material and equipment incorporated therein. MANUFACTURER'S DIRECTIONS: All manufactured articles, materials and equipment shall be applied, installed connected, erected, sused, cleaned and conditioned as directed by the manufacturer. WORKMANSHIP: Compliance with the Drawings and Specifications with regards to materials and methods will, not in itself, assure acceptance of the construction. Of equal importance is good workmanship, the lack of which will be sufficient cause to refuse acceptance of the Work. Any discrepancies concerning quality of workmanship are to be remedied to the satisfaction of the Owner in accordance with quality construction practices. WORK AND MATERIALS NOT COVERED IN SPECIFICATIONS: Any item not specifically covered by the Drawings and / or Specifications, but which can be assumed as necessary for proper completion of the Work shall be considered as part of the Contract and shall be performed in a good workmanlike manner. All items specified are to have final approval of the Owner. Any item specified as "By Owner is to be selected and / or purchased by the Owner. Coordinate all items provided by the Owner, which is to be incorporated into the Work. SUBCONTRACTOR APPROVAL: The Owner shall have the right to approve all subcontractors prior to the signing of the Contract. The Contract shall use only Owner approved subcontractors during the course of the Work. **DIVISION 1: GENERAL REQUIREMENTS MANUFACTURER'S RECOMMENDATIONS/WARRANTY:** Install all components per manufacturer's recommendations to achieve manufacturer's warranty. **PERMITS, FEES AND NOTICES:** The Contractor shall be responsible for all permits, fees, and notices. **<u>CODE COMPLIANCE</u>**: The Contractor shall be responsible for compliance with all applicable governing local, state, and national laws, ordinances, rules, regulations, and codes. SCOPE OF WORK: The Contractor shall furnish and install all materials and equipment as shown on the Drawings and / or described in these Specifications, and other items selected and / or provided by the Owner. The Contractor shall furnish all labor, tools, equipment, and transportation necessary to complete the **MEASUREMENT AND DIMENSIONS:** Before ordering materials or commencing with work which is dependent upon proper sizing of, or installation in existing previous conditions, the Contractor shall verify all existing dimensions and shall be responsible for their correctness. LAYOUT OF WORK: All work of every character and description shall be laid out on the premises or elsewhere by the Contractor who will be held responsible for its correctness **SPECIFICATIONS DIVISIONS:** The organization of these Specifications into division is for the purpose of uniform coordination of the Work. It shall be the Contractors responsibility for proper coordination and completion of the Work. SITE UTILITIES: Verify location of all site utilities before commencing work CLEARING: Refer to Civil Drawings. **<u>ROUGH GRADING:</u>** Refer to Civil Drawings. **EXCAVATIONS:** Refer to Civil Drawings. TRENCHING: Clean bottom and firm sides for concrete pour. **<u>FINISH GRADING</u>**: Refer to Civil Drawings. **CLEANUP:** Contractor shall maintain site in a neat and orderly condition on a daily basis. **PAVING:** Refer to Civil Drawings. **<u>TOPSOIL</u>**: Stockpile for replacement during final grading. **SOIL TERMITE CONTROL:** Dursban TC by Dow Chemical. Termite treat under all slabs, around both sides of foundation. **DIVISION 4: MASONRY** Reference drawings for masonry veneer information. DIVISION 5: METAL STEEL: ASTM A36. **FRAMING:** ASTM C955, studs formed to Channel, "C", or Sigma: shape with punched wed; U-shaped track in matchin nomial width and compatible height. FRAMING CONNECTIONS: Gage: As required to meet L/240 span rating. Depth: As indicated on the Drawings. Galvanized in accordance with ASTM A653/A653M G90/Z275 coating. DIVISION 6: WOOD AND PLASTICS **CABINETS:** Custom wood cabinets, AWI premium grade; Design and style as indicated on the Drawings. CABINETS WITH PLASTIC LAMINATE FINISH: Custom AWI premium grade; Underlayment APA rated Marine grade plywood suitable for wet locations, 3/4" thickness. Adhesive to be solvent release type for wet areas. **ROUGH CARPENTRY:** Provide fire retardant treated wood. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring. 1. Lumber: S4S, No. 2 or Standard Grade. 2. Boards: standard or No. 3. Miscellaneous Blocking, Furring, and Nailers 1. Lumber: S4S, No. 2 or Standard Grade. 2. Boards: Standard or No. 3. Exterior Wall Sheathing 1. Span Rating: 24/0. 2. 7/16" inch, nominal. **DIVISION 7: THERMAL & MOISTURE PROTECTION** THERMAL INSULATION: CEILING: Fiberglass batt insulation R-30 min. EXTERIOR WALL SHEATHING: Basis of Design: USG Securock Glass-Mat Sheathing AIR BARRIER: Basis of Design: Dryvit Backstop NT 20 mil thickness minimum Air permeance: 0.004 cfm/sf, maximum when tested in accordance with ASTM E2178 SEALANTS: One component polyurethane by Vulkem **DIVISION 8: DOORS, WINDOWS, & GLASS EXTERIOR DOORS:** Hollow metal doors, design and grade selected by Owner. **INTERIOR DOORS:** Hollow metal doors, design and grade selected by Owner, refer to Finish Schedule for Materials. OVERHEAD COILING: Basis of Design - FasTrax Door provided by Ritehite CLEAN ROOM OVERHEAD COILING: Basis of Design - Litespeed Clean Room Door provided by Ritehite **THRESHOLD:** Finish to match door hardware. **IARDWARE:** Schlage cylinderical core. **INTERIOR NON RATED WINDOWS:** Product: Hollow metal frames, 1/4" tempered glazing **DOOR FRAMES:** ANSI 250.8, for level 1 16 gage, factory primed for field finishing, face welded seamless with filled joints. **DIVISION 9: FINISHES DRYWALL:** Moisture resistant gypsum board in all wet areas. 5/8" type 'X' gypsum board. Joint Tape: USG perf-a-tape FLOORS: Refer to Room Finish Schedule. BASE: Refer to Room Finish Schedule. ACOUSTIC LAY-IN CEILING: Refer to Room Finish Schedule for type. Heavy-duty in accordance with ASTM C635/C635M. Provide closed-cell foam gaskets and hold down clips. PLASTIC LAMINATE: Cabinets with plastic laminate finish: Refer to Room Finish Schedule. **EXTERIOR PAINTING AND COATINGS:** Refer to Room Finish Schedule. **INTERIOR PAINTING:** Refer to Room Finish Schedule. FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES: Semi recessed cabinet, Surface mounted when located on cmu 10lb extinguishers. DIVISION 10: SPECIALTIES Not Used **DIVISION 11: EQUIPMENT** Not Used DIVISION 12: FURNISHINGS Not Used **DIVISION 13: SPECIAL CONSTRUCTION** STRUCTURAL STEEL: Shall conform to ASTM A529, ASTM A572, ASTM A992 and/or ASTM A36. **DIVISION 14: CONVEYING SYSTEMS** Not Used **DIVISION 15: MECHANICAL** Refer to Mechanical **DIVISION 16: ELECTRICA** Refer to Electrical **DIVISION 31: EARTHWORK** END OF SPECIFICATIONS

CHEROKEE NATION BUSINESSES STILWELL CULTURAL CENTER



DETAILED CODE INFORMATION THE BUILDING DEPICTED IN THESE CONSTRUCTION DOCUMENTS IS A FORMER MANUFACTURING FACILITY CONVERTED INTO AN ARTS STORAGE FACILITY, GALLARY SPACE, AND BUSINESS AREAS. APPLICABLE CODES 2018 INTERNATIONAL EXISTING BUILDING CODE (IEBC) 2018 INTERNATIONAL BUILDING CODE (IBC) 2018 INTERNATIONAL PLUMBING CODE (IPC) 2020 NATIONAL ELECTRIC CODE (NEC) 2018 INTERNATIONAL FIRE CODE (IFC) 2018 INTERNATIONAL MECHANICAL CODE (IMC) 2010 ADA ACCESSORY GUIDELINES FOR BUILDINGS AND FACILITIES (ADA) 2009 AMERICAN NATIONAL STANDARDS A117.1 USE OR OCCUPANCY 304 GROUP S-1 GENERAL BUILDING HEIGHTS AND AREAS NON-SEPARATED USE GROUPS: S-1: TYPE VB NON-COMBUSTIBLE SPRINKLERED: **TABLE 504.3**ALLOWABLE BUILDING HEIGHT 60 FEET ALLOWABLE NUMBER OF STORIES 2 STORIES **TABLE 504.4** ALLOWABLE BUILDING AREA TABLE 506.2 36,000 SF **TABLE 507.2.1**PUBLIC WAYS IN WIDTH OF 60 FEET IN WIDTH REQUIRED SHALL BE PERMITTED TO BE REDUCED TO NOT LESS THAN 40 FEET IN WIDTH PROVIDED 1. THE REDUCED WIDTH SHALL NOT BE ALLOWED MORE THAN 75 PERCENT OF PERIMETER 2. THE EXTERIOR WALL FACING THE REDUCED WIDTH SHALL AHVE A FIRE RESISTANCE RATING OF NOT LESS THAN 3 HOURS 3. OPENINGS IN EXTERIOR WALL FACING REDUCED WIDTH SHALL HAVE OPENING PROTECTIVES WITH A FIRE RATING OF NOT LESS THAN 3 HOURS THE AREA OF A GROUP B, F, M OR S BUILDING NO MORE THAN TWO STOREIS ABOVE GRADE PLANE SHALL NOT BE LIMITED WHERE **TABLE 507.5** THE BUILDING IS EQUIPPED WITH AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION 903.1.1 AND IS SURROUNDED AND ADJOINED BY PUBLIC WAYS OR YARDS NOT LESS THAN 60 FEET IN WIDTH **TABLE 508.2.1**AREA LIMITATIONS: AGGREGATE ACCESSORY OCCUPANCIES SHALL NOT OCCUPY MORE THAN 10 PERCENT OF THE BUILDING AREA OF THE STORY IN WHICH THEY ARE LOCATED AND SHALL NOT EXCEED THE TABULAR VALUES IN TABLE 503, WITHOUT AREA INCREASES IN ACCORDANCE WITH SECTION 506 FOR SUCH ACCESSORY OCCUPANCIES. **TABLE 508.4**REQUIRED SEPARATION OF OCCUPANCIES S-1 AND B: NONE TYPE OF CONSTRUCTION TABLE 602.3 TYPE VB SPRINKLERED RESISTANCE RATING

TADLE 002.5			
TABLE 601	STRUCTURAL ELEMENT	FIRE RESISTAN	NCE RATING
	STRUCTURAL FRAME	0	
	BEARING WALLS		
	EXTERIOR	0	
	INTERIOR	0	
	NON-BEARING WALLS		
	EXTERIOR	0	
	INTERIOR	0	
	FLOOR CONSTRUCTION	0	
	ROOF CONSTRUCTION	0	
TABLE 602	FIRE-RESISTANCE RATING REC	QUIRED FOR EXTER	RIOR WALLS BASED ON FIRE SEPARATION DISTANCE:
		X < 5	2 HOUR
		5 ≤ X < 10	1 HOUR
		10 ≤ X < 30	0 HOUR
		X ≥ 30	0 HOUR

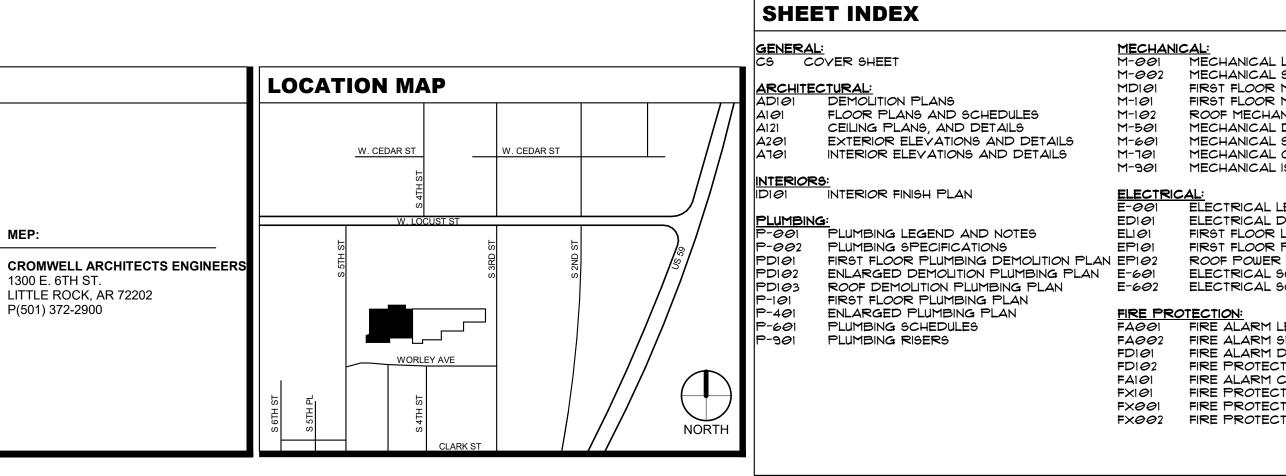
PROJECT	CONTACTS

OWNER:

CHEROKEE NATION P.O. BOX 948 TAHLEQUAH, OK 74465 P(918) 453-5009
ARCHITECT:
BLUE RIVER ARCHITECTS, LLC 320 SOUTH BOSTON, STE. 103 TULSA, OK 74103 P(918) 587-6158

MEP: 1300 E. 6TH ST. P(501) 372-2900

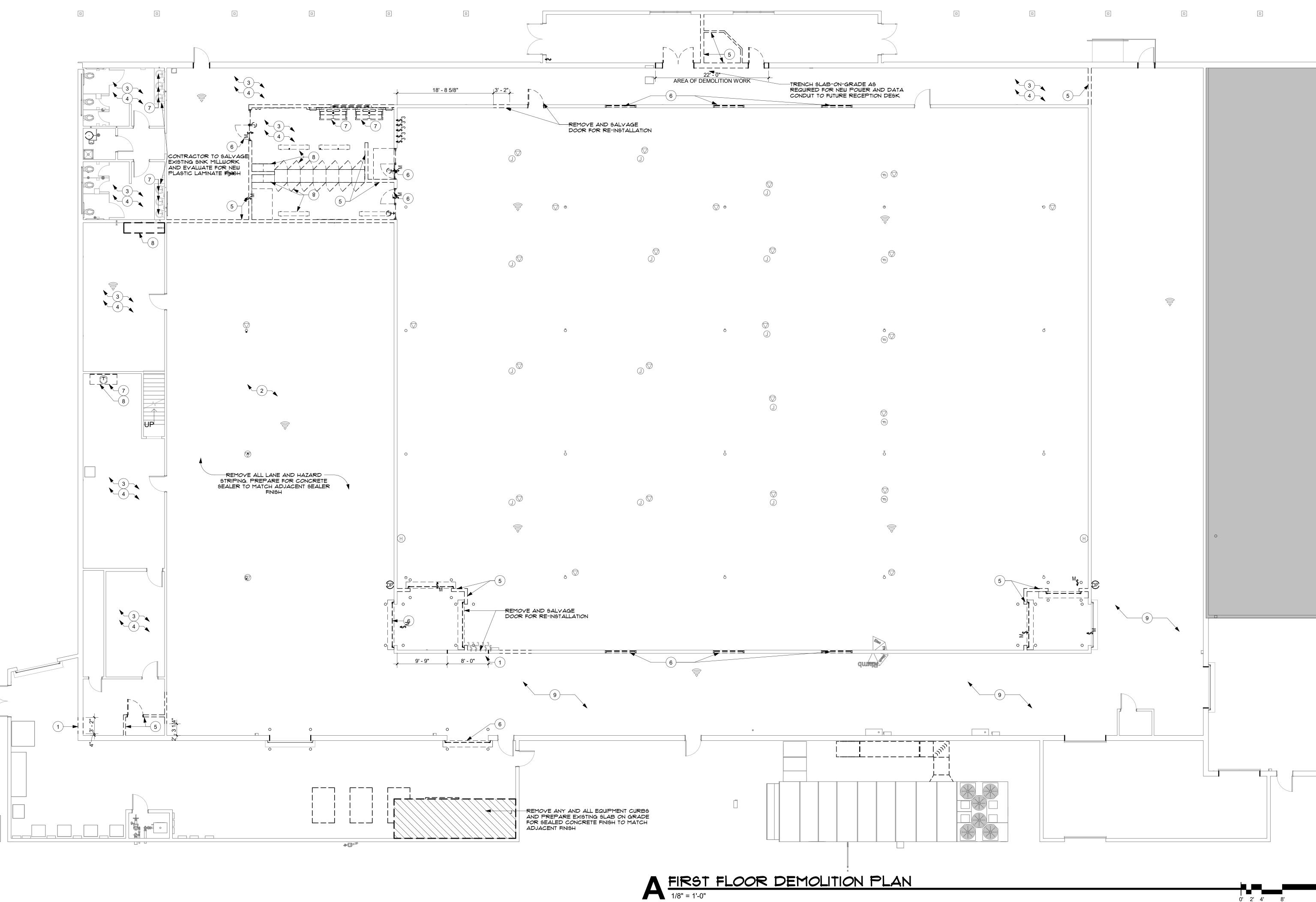
INTERIOR FINISH TABLE 803.11	I <u>ES</u> INTERIOR FINISH REQUIREMENTS: TYPE F SPRI	NKLERED		
	EXIT ENCLOSURES / EXIT PASSAGEWAYS: CORRIDORS PROVIDING EXIT ACCESS ROOMS OR ENCLOSED SPACES:	CLASS C MA CLASS C MA CLASS C MA		
FIRE PROTECTIO	<u>ON SYSTEMS</u> PORTABLE FIRE EXTINGUISHERS PER NFPA 10			
907.2	FIRE ALARM AND DETECTION SYSTEM AN APPROVED FIRE ALARM SYSTEM INSTALLEE SHALL BE PROVIDED IN NEW BUILDINGS AND S			
MEANS OF EGRE	ESS			
TABLE 1004.1.1	FIRST FLOOR: STORAGE, MECHANICAL EQUIPMENT ROOMS ASSEMBLY BUSINESS	300 GSF / OC 30 GSF / OC 150 GSF / OC		
		FIRST FLOOP		
	MEZZANINE: STORAGE, MECHANICAL EQUIPMENT ROOMS BUSINESS	300 GSF / OC 150 GSF / OC		
		MEZZANINE		
1005.3.1	STAIRWAY WIDTH / OCCUPANT	0.3 INCH		
1005.3.2	OTHER EGRESS WIDTH / OCCUPANT	0.2 INCH		
TABLE 1006.2.1	SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY: SPRIN OCCUPANCY: S MAX. OCC. LOAD / SPACE MAX. COMMON PATH OF EGRESS TRAVEL DISTANCE			
1009.3	STAIRWAYS EXCEPTIONS: 3. THE CLEAR WIDTH OF 48 INCHES BETWEEN HANDR/ AUTOMATIC SPRINKLER SYSTEM INSTALLED IN ACCOF			
1011.3	MINIMUM HEADROOM 80 INCHES, MEASURED V	ERTICALLY FRO		
1011.8	VERTICAL RISE: 12 FEET MAX VERTICAL RISE B	ETWEEN FLOOP		
TABLE 1017.2	EXIT ACCESS TRAVEL DISTANCE OCCUPANCY S-1, SPRINKLERED 2	50 FEET		
1020.4	DEAD END CORRIDOR EXCEPTIONS: 2. IN OCCUPANCIES IN GROUPS S, WHERE SPRINKLER SYSTEM, THE LENGTH OF T			
<u>PLUMBING FIXTU</u> TABLE 2902.1 FIXTURE TYPE	<u>JRE COUNT</u> MINIMUM NUMBER OF PLUMBING FACIL FACTOR	ITIES (162 TOTA NUMBER RE		
WATER CLOSET		TOTAL: 1/1		
LAVATORIES	MEN/WOMEN: 1:100	TOTAL: 1/1		
DRINKING FOUN SERVICE SINK	TAIN 1:400	TOTAL: 1 TOTAL: 1		





CCESS CL CLESS CL S PER NFPA 10 (STEM TEM INSTALLED IN A ULDINGS AND STRUC MENT ROOMS 30 15 FII MENT ROOMS 30 15	EXIT WIDTH XXX 30 occ * 0.2 6"RQD 0" PROVIDE EXIT WIDTH XXX 30 occ * 0.2 6"RQD 0" PROVIDE	nbly LINE OF TF - TRAVEL I - COMMON - DEAD EN FIRE EXTIN - 75' MAX T NFPS 10, 3- EXIT SIGN 	AVEL DISTANCE TO PATH OF TR DS = 20' MAX NGUISHER RAVEL DIST/ -2.1) : DOOR I : DOOR I : DOOR I : DOOR I : DOOR I : REQUIE : PROVIE : PROVIE : PROVIE : PROVIE	Business	AX 200' (II MAX (IBC MAX (IBC 4) CULATION WIDTH WIDTH CULATION WIDTH WIDTH D NFPA 7	: 1006.2.1) HER N	
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ENT ROOMS 30 15	0 GSF / OCCUPANT	CCUPANI					
M			F / 300 = F / 150 =	1 OCCU	PANTS		
ANT ACCESS DOORWA' RESS TRAVEL DISTA	49 OCC.	ANT ANT	PANT LOAD :	= 8 OCCUP <i>i</i>	ANTS		
TEM INSTALLED IN A	ANDRAILS IS NOT REQ ACCORDANCE WITH SE CALLY FROM NOSING	ECTION 90			ROUGHC	OUT WITH AN	
RTICAL RISE BETWE	EEN FLOORS AND LAN	DING.		1A	Path ID	Travel Distan 146' - 0"	ice
ED 250 FE	ET			1B 1C		168' - 0 1/2" 99' - 6"	
	E BUILDING IS EQUIPPE EAD-END CORRIDORS				MATIC		
NU	(162 TOTAL OCCUPAN JMBER REQUIRED DTAL: 1/1		N, 81 WOMEI R PROVIDED				
тс	DTAL: 1/1 DTAL: 1 DTAL: 1	3/3 1 1					
M-002 MECH. MDI0I FIRST M-10I FIRST M-102 ROOF M-50I MECH. M-60I MECH. M-10I MECH.	ANICAL LEGEND, SYM ANICAL SPECIFICATIC FLOOR MECHANICAL FLOOR MECHANICAL MECHANICAL PLAN ANICAL DETAILS ANICAL SCHEDULES ANICAL ISOMETRIC VI	DNS DEMO PI PLAN		CATIONS			
EDIØI ELECT ELIØI FIRGT EPIØI FIRGT I EPIØ2 ROOF E-6ØI ELECT E-6Ø2 ELECT	RICAL LEGEND RICAL DEMOLITION P FLOOR LIGHTING PLA FLOOR POWER AND POWER PLAN RICAL SCHEDULES RICAL SCHEDULES	AN	PLAN				
FA002 FIRE 4 FD101 FIRE 4 FD102 FIRE 7 FA101 FIRE 7 FX101 FIRE 7 FX01 FIRE 7 FX01 FIRE 7	N: ALARM LEGENDS AND ALARM SPECIFICATION ALARM DEMOLITION C PROTECTION DEMOLIT ALARM CEILING PLAN PROTECTION FLOOR F PROTECTION SPECIFIC PROTECTION SPECIFIC	NS CEILING PL TION FLOC IS PLANS DLANS (NOTES \$	R PLANS				







DEMOLITION LEGEND

EXISTING PARTITIONS, WIDTH OF _____ PARTITION VARIES REMOVE EXISTING CONCRETE SLAB

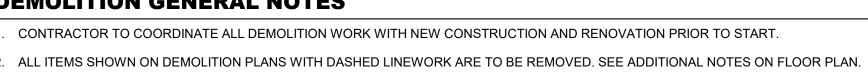
- ____
- (X) DEMOLITION KEYNOTE

DEMOLITION KEYNOTES

- REMOVE PORTION OF PARTITION TO RECIEVE NEW DOOR. PREPARE SURROUNDING EXISTING FINISHES FOR DOOR FRAME.
- REMOVE EXISTING CEILING, LIGHTING, HVAC COMPONENTS, ELECTRICAL, SECURITY, AND CABLE SYSTEM.
- REMOVE EXISTING FLOORING SYSTEM. PREPARE SUBSTRATE TO RECEIVE NEW SELF-LEVELING COMPOUND AND NEW FLOORING SYSTEM. CONCRETE PATCH REPAIR MAY BE REQUIRED FOR EXCESSIVE DAMAGE.
- REMOVE EXISTING FLOOR BASE. PREPARE SUBSTRATE TO RECIEVE NEW WALLBASE.
- REMOVE EXISTING PARTITION TO DECK. CAREFULLY REMOVE ANY DOORS, ELECTRICAL AND PLUMBING COMPONENTS LOCATED WITHIN PARTITION.
- REMOVE EXISTING DOOR AND/OR WINDOW, FRAME, AND HARDWARE. INFILL OPENING TO MATCH ADJACENT PARTITION. PAINT TO MATCH.
- REMOVE PLUMBING FIXTURE
- 8 REMOVE EXISTING MILLWORK AND FURNITURE SYSTEM
- 9) FIELD VERIFY EXTENT OF CEILING DEMOLITION, COORDINATE WITH MECHANICAL

DEMOLITION GENERAL NOTES

- CONTRACTOR TO COORDINATE ALL DEMOLITION WORK WITH NEW CONSTRUCTION AND RENOVATION PRIOR TO START.
- CONTRACTOR IS RESPONSIBLE FOR VERIFYING QUANTITY OF MATERIALS REQUIRED FOR DEMOLITION AND NEW CONSTRUCTION.
- CONTRACTOR TO DISPOSE OF ALL ITEMS IN A LEGAL MANNER.
- SPECIFICALLY IDENTIFIED TO BE REMOVED. REMOVE EXISTING INTERIOR PARTITIONS AS INDICATED ON PLAN TO ACCOMODATE NEW CONSTRUCTION. COORDINATE WITH MECHANICAL AND
- CONTRACTOR SHALL CONTACT THE ARCHITECTS FOR DIRECTIONS TO RETAIN STRUCTURAL INTEGRITY OF THE SUPPORTED STRUCTURE.
- ELSEWHERE IN THE DOCUMENTS.
- EXITS AT ALL TIMES.
- EXTINGUISHERS AND/OR FIRE EXTINGUISHER CABINETS ARE LOCATED ON WALLS TO BE REMOVED.
- NEW LIGHTING. COORDINATE WITH ELECTRICAL PLANS TO DETERMINE IF CIRCUITS WILL BE REUSED, RELOCATED, OR ABANDONED. REMOVE CONDUCTORS AND CONDUIT BACK TO SOURCE FOR CIRCUITS THAT WILL BE ABANDONED.
- REMOVE ELECTRICAL CONDUCTORS BACK TO THE SOURCE. EMPTY CONDUIT WITHIN WALLS AND ABOVE CEILINGS THAT ARE NOT OTHERWISE MODIFIED. IF CIRCUITS ARE TO BE RELOCATED OR REINSTALLED IN NEW WORK, DE-ENERGIZE CIRCUITS UNTIL RELOCATED. REMMOVE CONDUCTORS AND CONDUIT BACK TO SOURCE FOR CIRCUITS THAT WILL BE ABANDONED.
- 2. REMOVE ALL ABANDONED AND NON-OPERATIONAL CABLING ABOVE CEILINGS IN AREA OF WORK. TAKE CARE TO NOT CUT EXISTING DATA OR FIBER THAT IS TO REMAIN FOR THE FUNCTIONING IT ROOM/SERVER.
- 3. REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING DEMOLITION DRAWINGS FOR ADDITIONAL INFORMATION.
- REMAIN AND TERMINATED IN NEW JUNCTION BOX PROVIDED BY CONTRACTOR.
- PATCH AND REPAIRE FLOOR SLAB AS REQUIRED TO MAKE READY FOR NEW CONSTRUCTION. IF REMAINING WALL IS COMPROMISED, NOTIFY ARCHITECT IMMEDIATELY.
- 6. CAREFULLY REMOVE ITEMS IDENTIFIED AS SALVAGE OR SCHEDULED FOR RE-USE. STORE IN PROTECTED AREA UNTIL REINSTALLATION IS
- 7. REMOVE AND DISPOSE OF EXISTING FLOORING IN AREAS SHOWN TO BE REPLACED. REMOVE TO SUBSTRATE, LEAVING SURFACE READY FOR INSTALLATION OF NEW FINISH AS SCHEDULED. PATCH HOLES AND IMPERFECTIONS IN SUBSTRATE AS REQUIRED.
- 18. CONTACT ARCHITECT BEFORE REMOVING OR DEMOLISHING ANY EXISTING CONSTRUCTION OR ITEMS NOT SHOWN TO BE REMOVED.
- 21. REMOVE EXISTING WALL BASE IN AREA OF WORK. WALL BASE VARIES PER LOCATION. CONTRACTOR TO FIELD VERIFY ALL CONDITIONS.
- 22. COORDINATE EXISTING FIRE SPRINKLER DEMOLITION WITH NEW FIRE SPRINKLER DESIGN.



CARE SHALL BE TAKEN TO LOCATE AND PROTECT ANY STRUCTURAL COMPONENTS THAT ARE WITHIN WALLS, CEILINGS OR FLOORS UNLESS

ELECTRICAL DRAWINGS FOR REUSED OR RELOCATED DEVICES OR FIXTURES. CONTRACTOR SHALL CONFIRM IF A WALL IS OR IS NOT LOAD BEARING PRIOR TO REMOVING ANY PORTION. IF A WALL IS FOUND TO BE LOAD BEARING, AND IS NOT ADDRESSED IN THE DRAWINGS, THE

PATCH AND REPAIR EXISTING SUBSTRATES THAT ARE TO REMAIN AS REQUIRED TO PREPARE THEM FOR NEW WORK AND FINISHES AS DEFINED DUST WALLS SHALL BE INSTALLED AS NEEDED TO ISOLATE DEMOLITION AREA FROM OCCUPIED AREA. COORDINATE WITH OWNER. MAINTAIN FIRE

FIRE EXTINGUISHERS IN THE AREA OF WORK SHALL REMAIN. CONTACT ARCHITECT FOR REVISED LOCATION WHERE EXISTING FIRE

. REMOVED EXISTING LIGHT FIXTURES AND CEILINGS IN THEIR ENTIRETY, UNLESS NOTED OTHERWISE. DE-ENERGIZE CIRCUITS UNTIL READY FOR

14. REMOVE OUTLETS, SWITCHES, AND WIRING IN PARTITIONS IDENTIFIED TO BE REMOVED. WIRING TO BE REMOVED BACK TO CLOSEST WALL TO

. REMOVE AND DISPOSE OF EXISTING PARTITIONS SHOWN DASHED. REMOVE PARTITIONS TO STRUCTURE ABOVE, UNLESS NOTED OTHERWISE.

ACHIEVED. REPAIR DAMAGE CAUSE BY CARELESS REMOVAL OR IMPROPER STORAGE, OR REPLACE SUCH ITEMS TO OWNER'S SATISFACTION.

19. CAREFULLY REMOVE FIXTURES, RECEPTACLES, DEVICES, ETC. AS NEEDED TO FACILITATE DEMOLITION. STORE DEVICES AND REINSTALL.

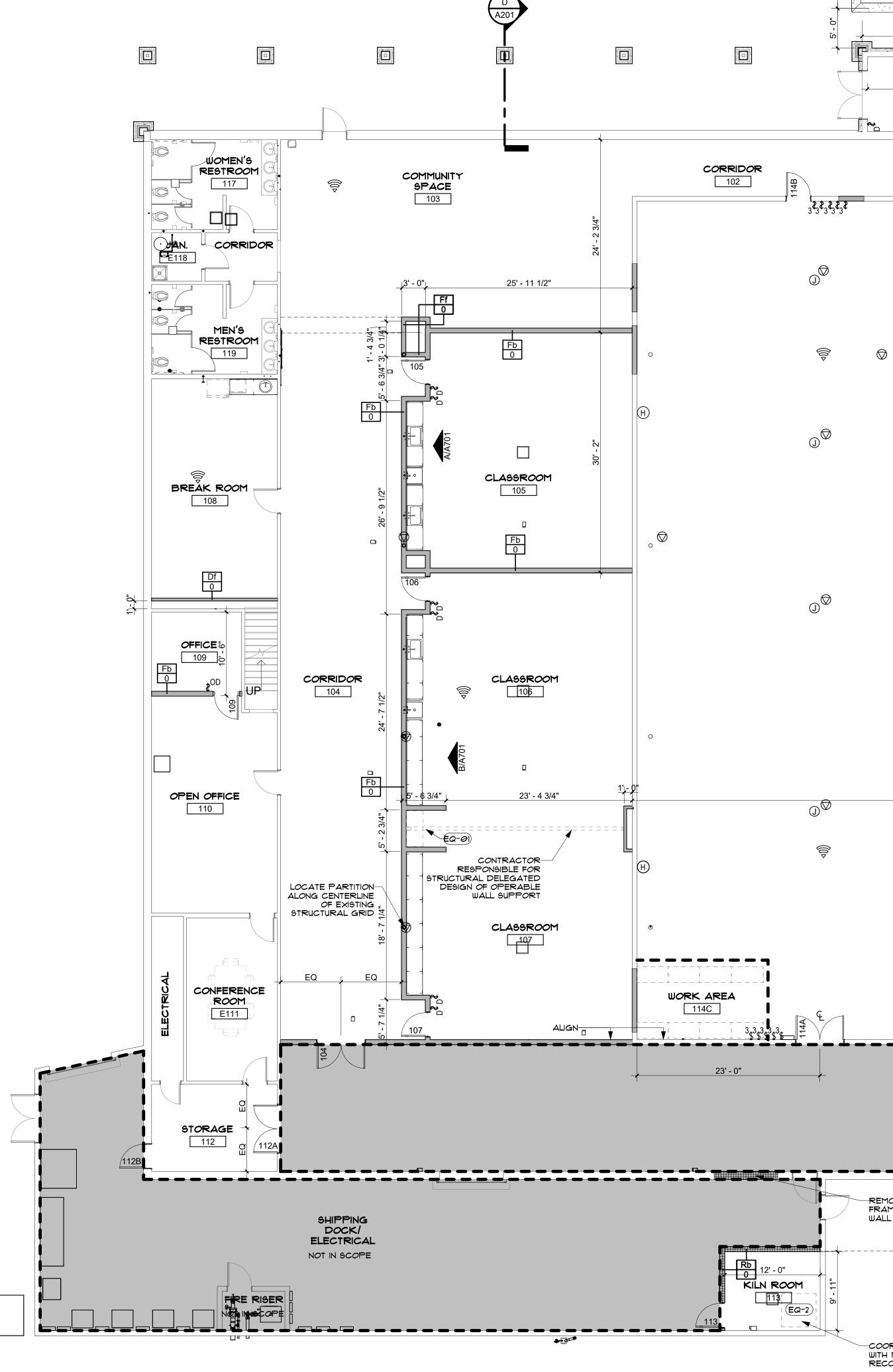
20. REMOVE ALL ITEMS FROM WALLS WITHIN AREAS OF WORK AND PREPARE FOR NEW WORK.

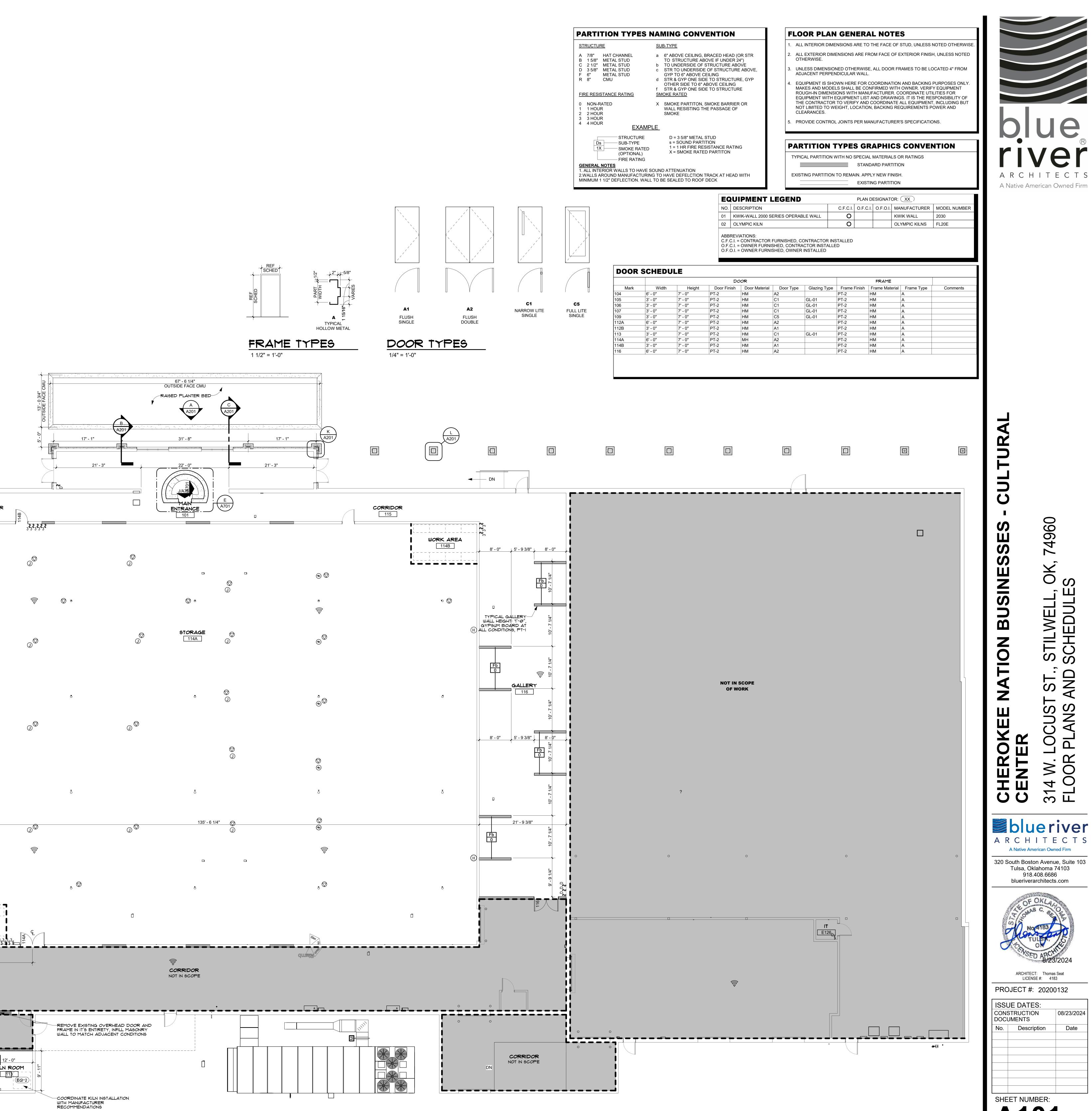
FUTURE OFFICE SPACE NOT IN SCOPE **OF WORK** 0 0



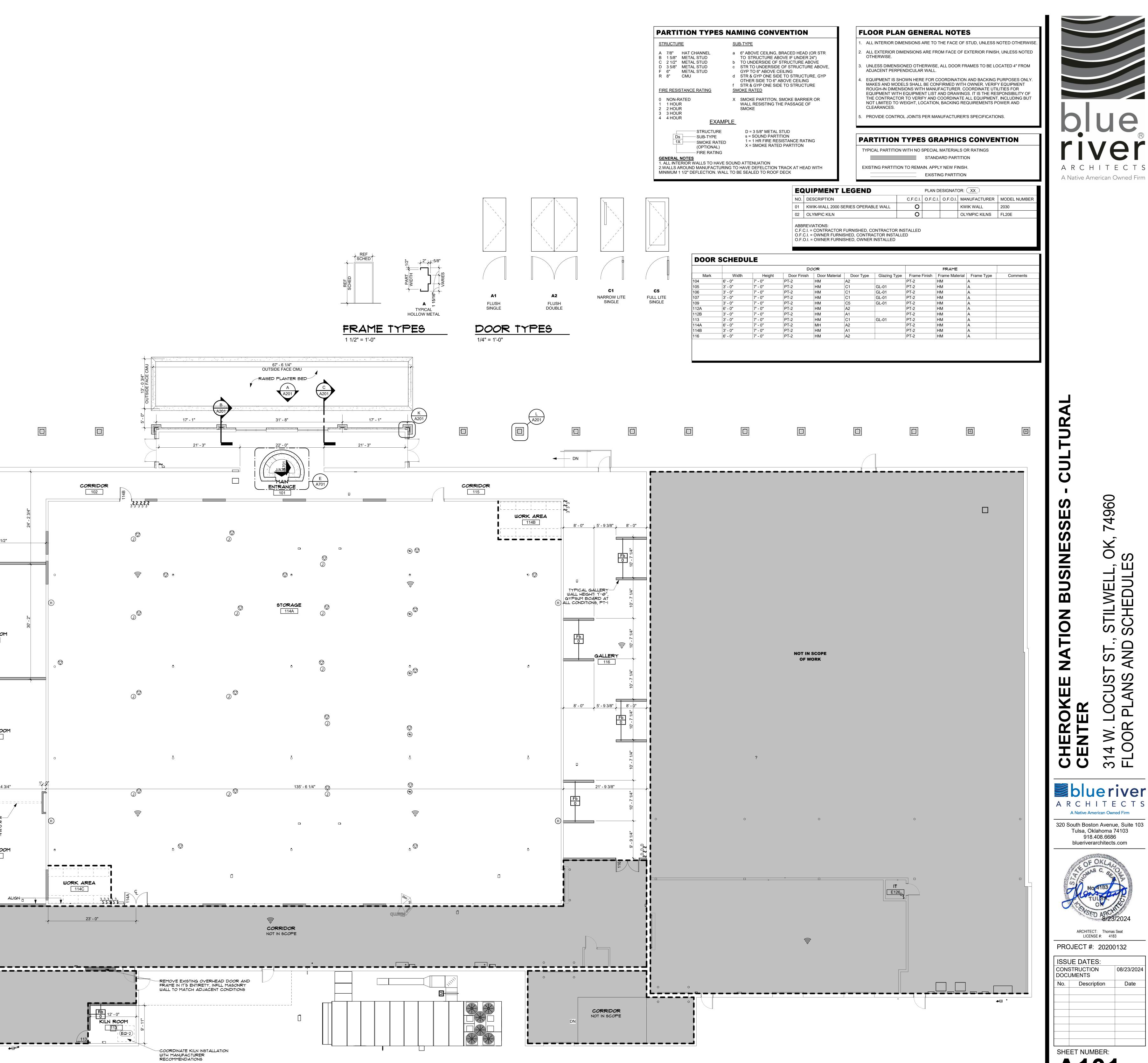




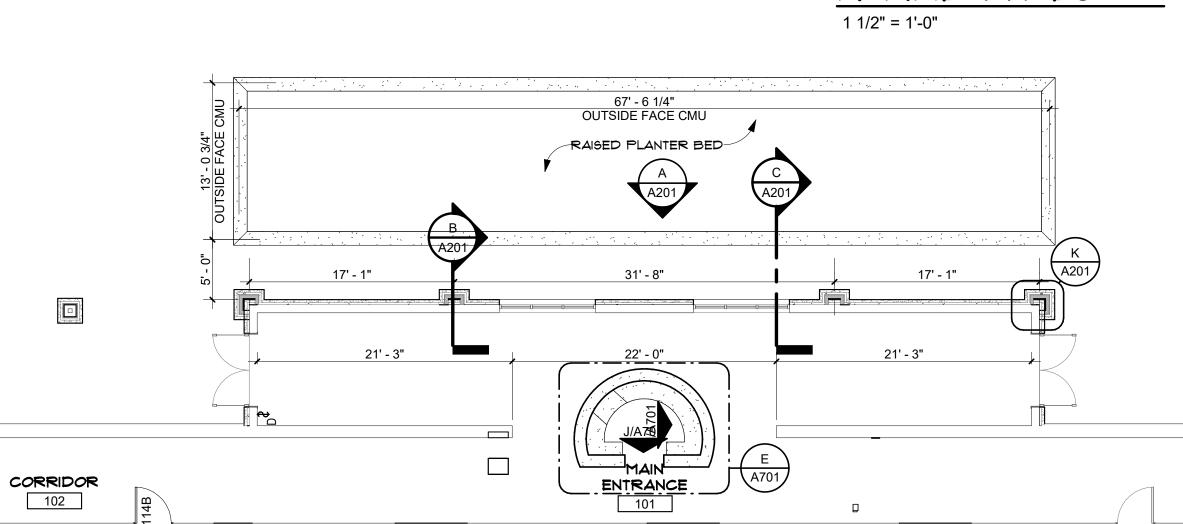


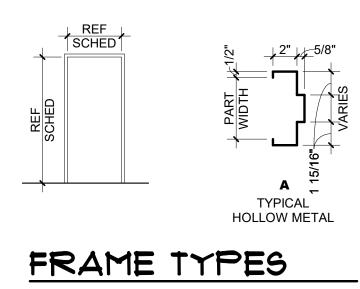




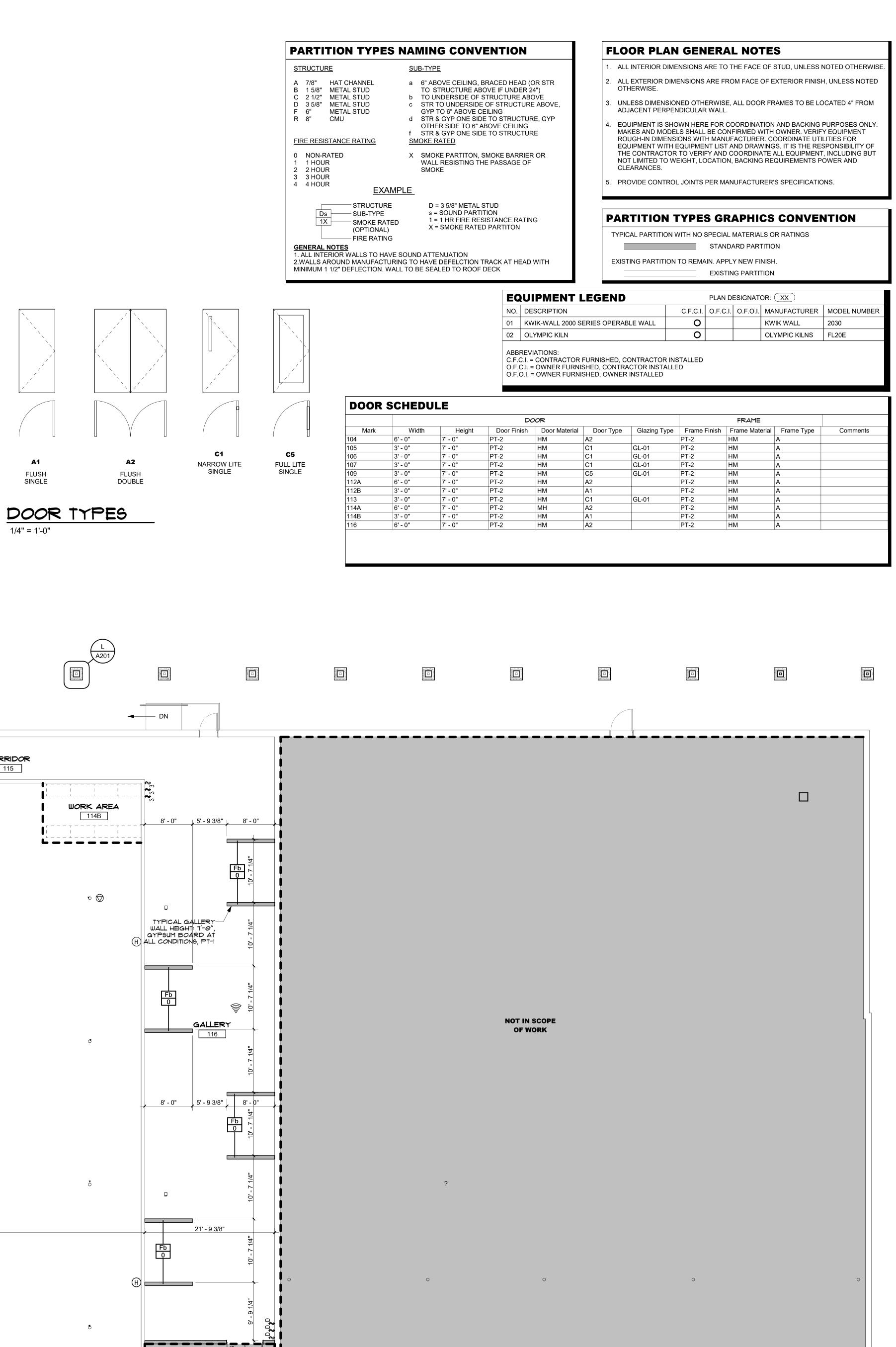


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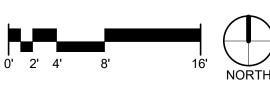




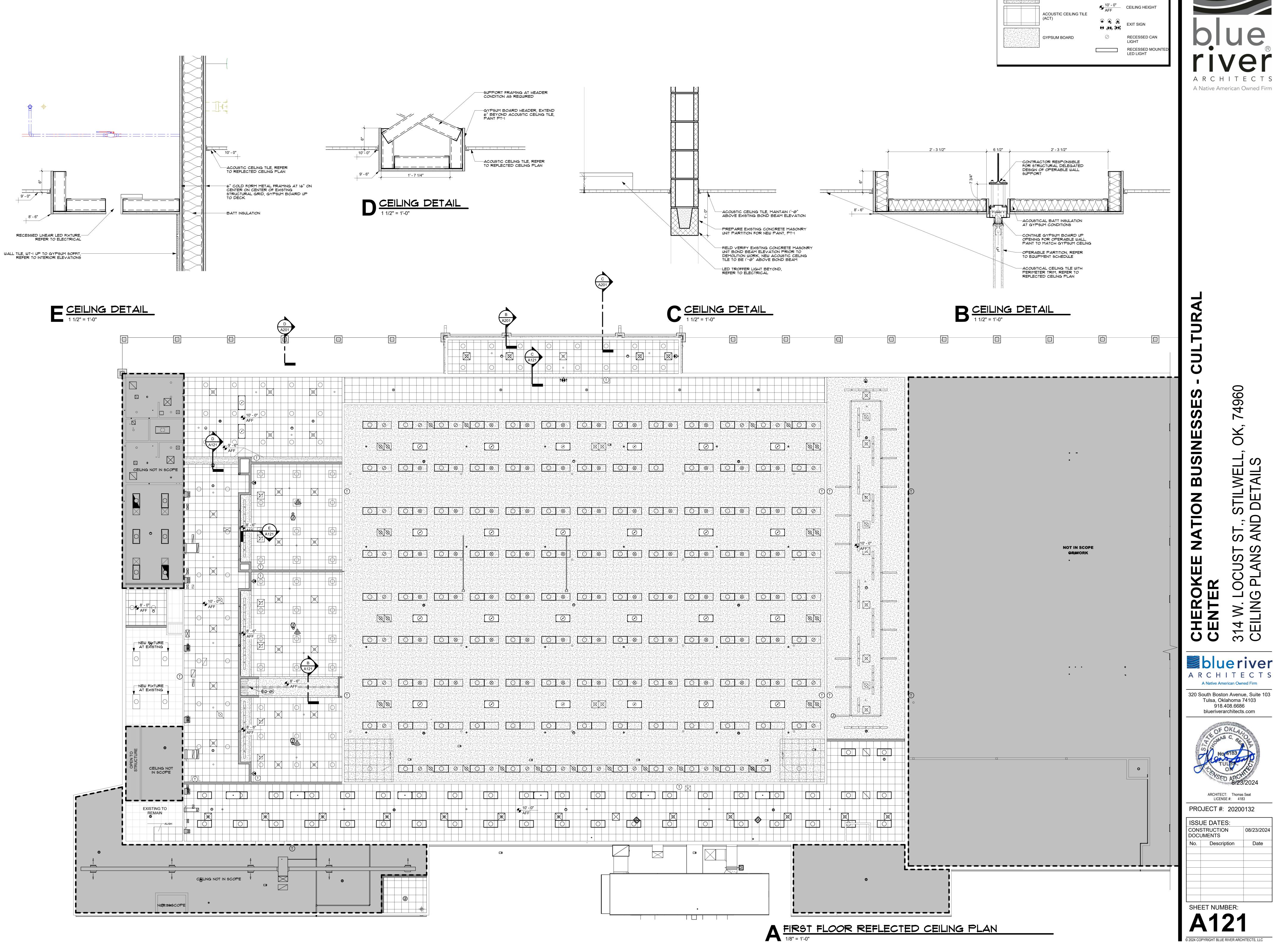












EQ	UIPMENT LEGEND		PLAN DESIGNATOR: XX)				
NO.	DESCRIPTION	C.F.C.I.	O.F.C.I.	0.F.O.I.	MANUFACTURER	MODEL NUMBER	
01	KWIK-WALL 2000 SERIES OPERABLE WALL	0			KWIK WALL	2030	
02	OLYMPIC KILN	0			OLYMPIC KILNS	FL20E	
C.F.(REVIATIONS: C.I. = CONTRACTOR FURNISHED, CONTRACTOF C.I. = OWNER FURNISHED, CONTRACTOR INST						

O.F.O.I. = OWNER FURNISHED, OWNER INSTALLED

REFLECTED CEILING PLAN LEGEND

2X2 LAY IN LENS

2x4 LAY IN LENS

CLEANABLE (ACT)

ACOUSTIC CEILING TILE -

 \square

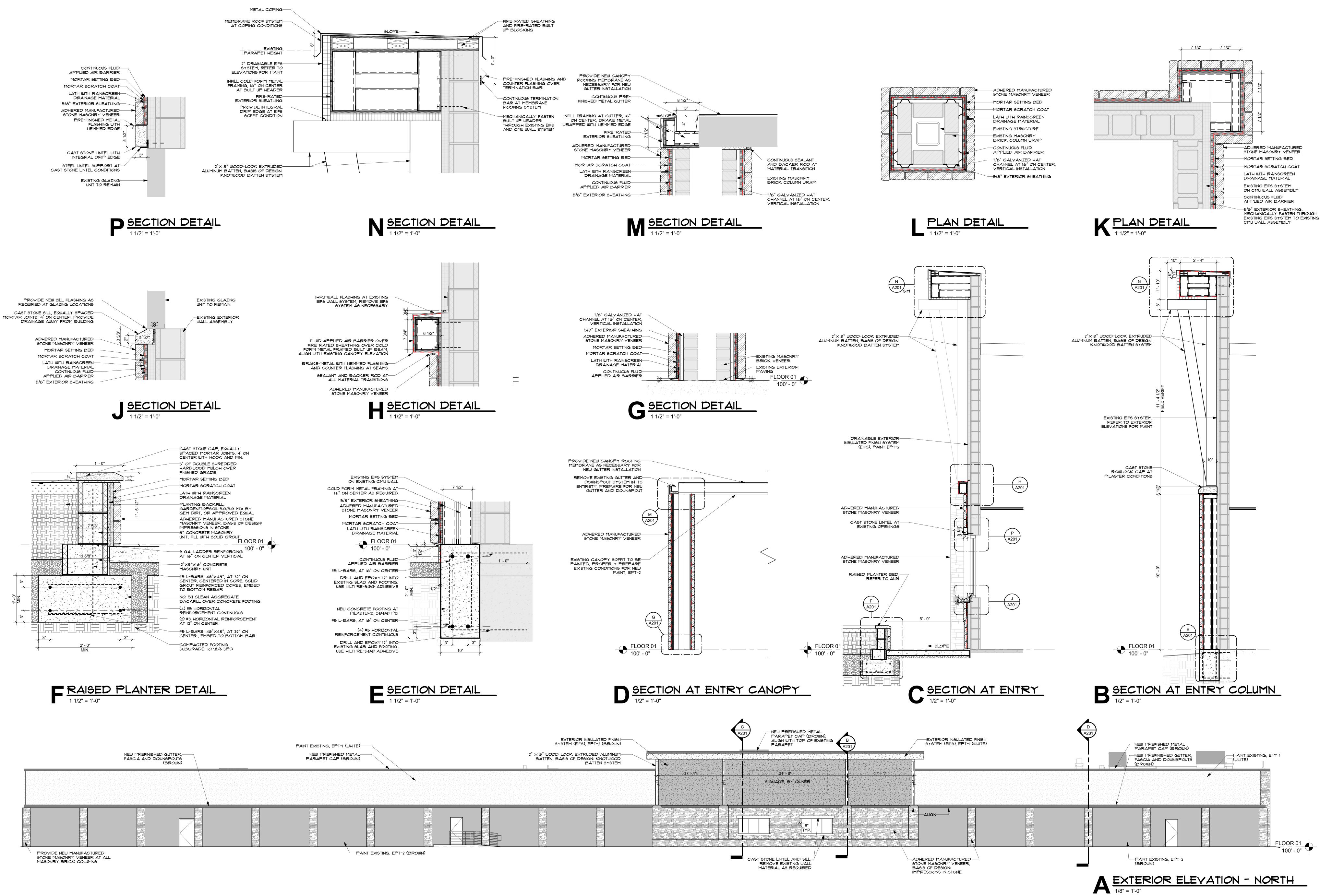
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SUPPLY DIFFUSE

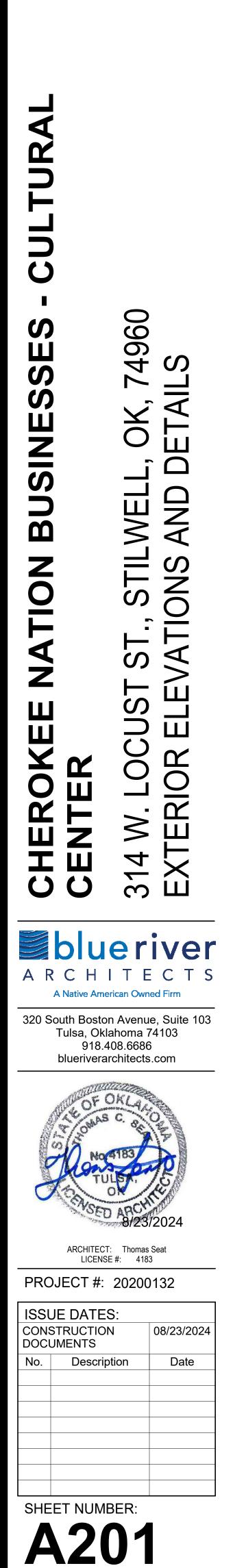
RETURN

EXHAUST FAN

SMOKE DETECTOR



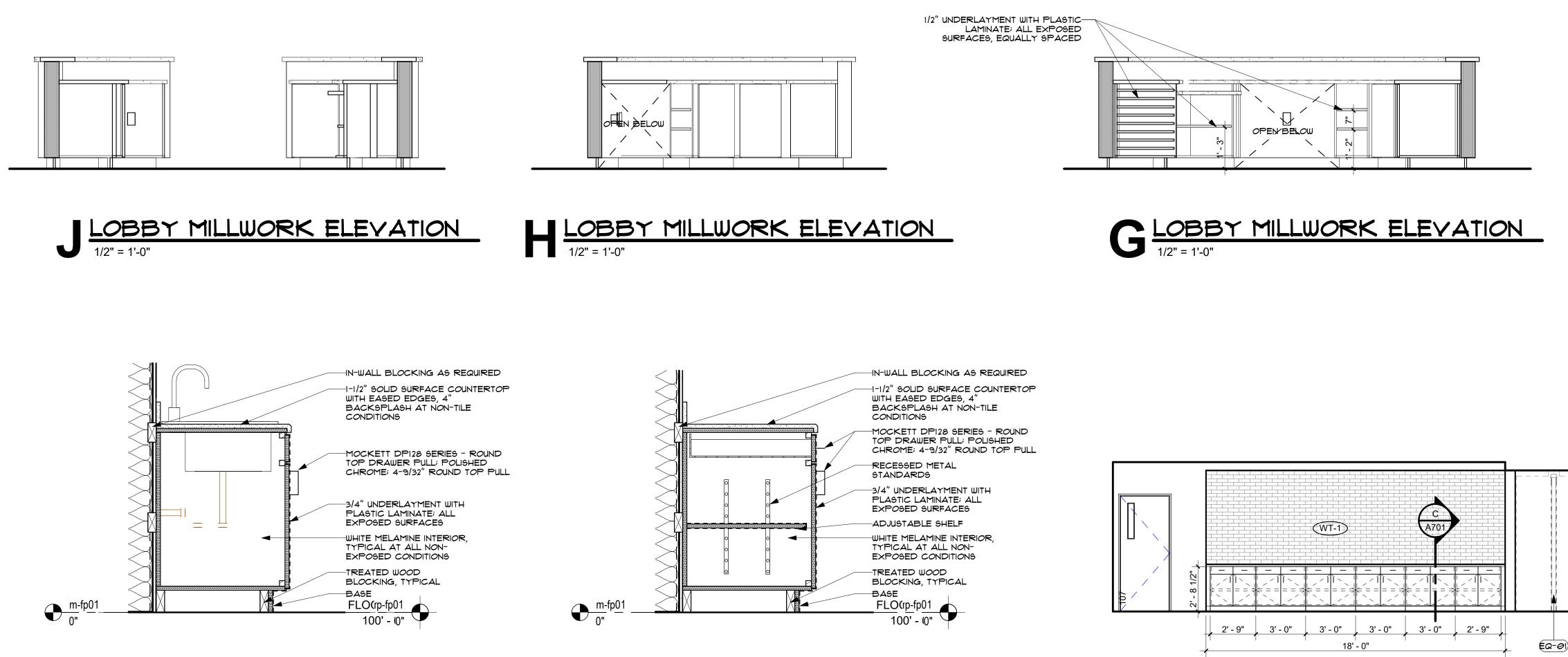






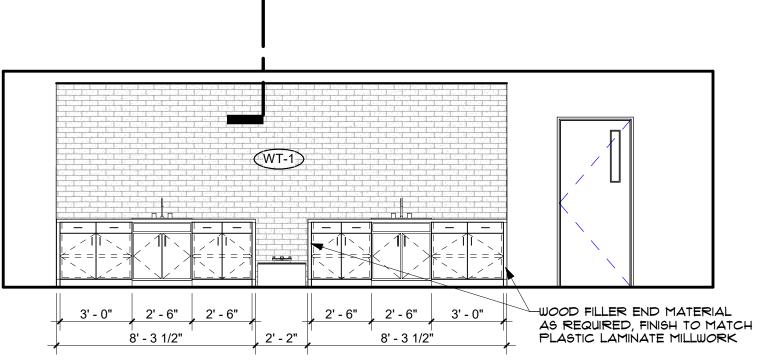
D SINK AT MILLWORK SECTION

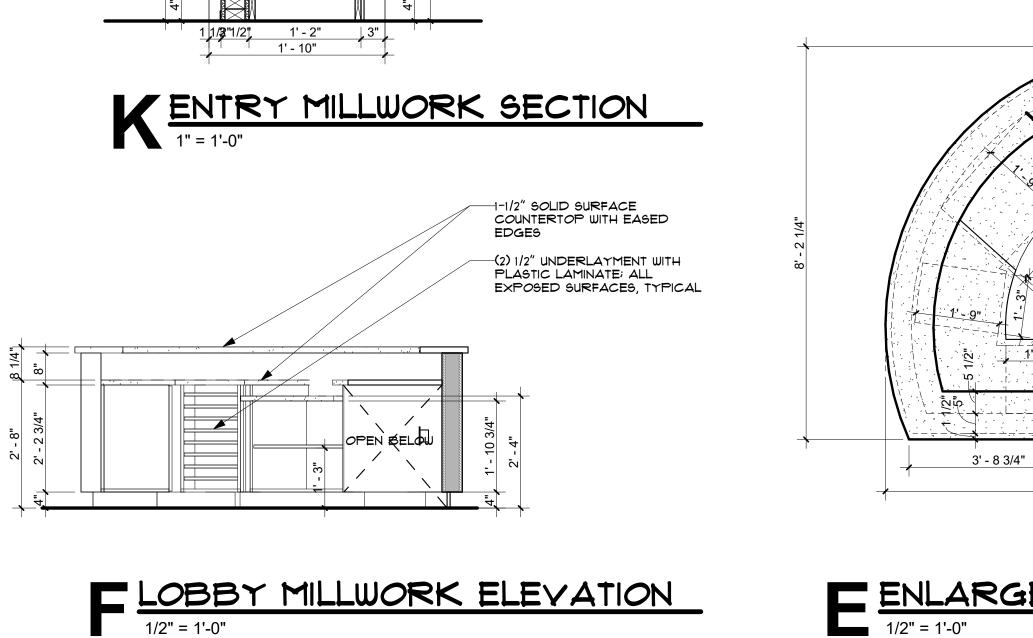


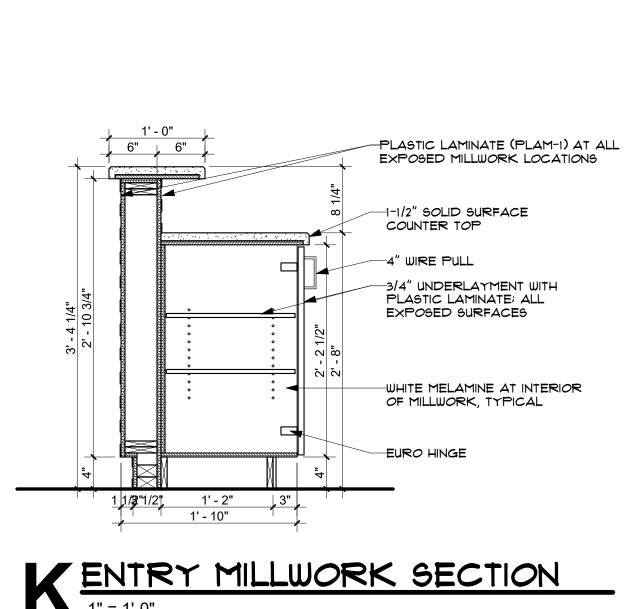




-	2' - 6" 3' - 0" 3' - 0" 2' - 0" 10' - 10" 2' - 5"	2' - 0" 3' - 0" 2' - 6" 10' - 10"	-





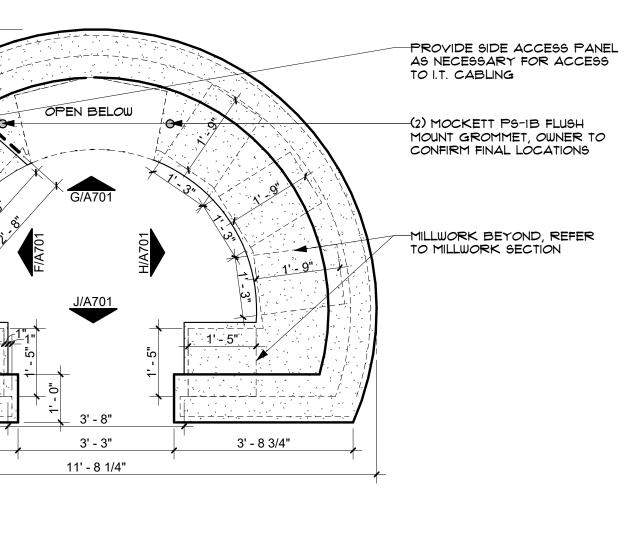






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SHEET NUMBER:



E ENLARGED PLAN - FRONT ENTRANCE DESK

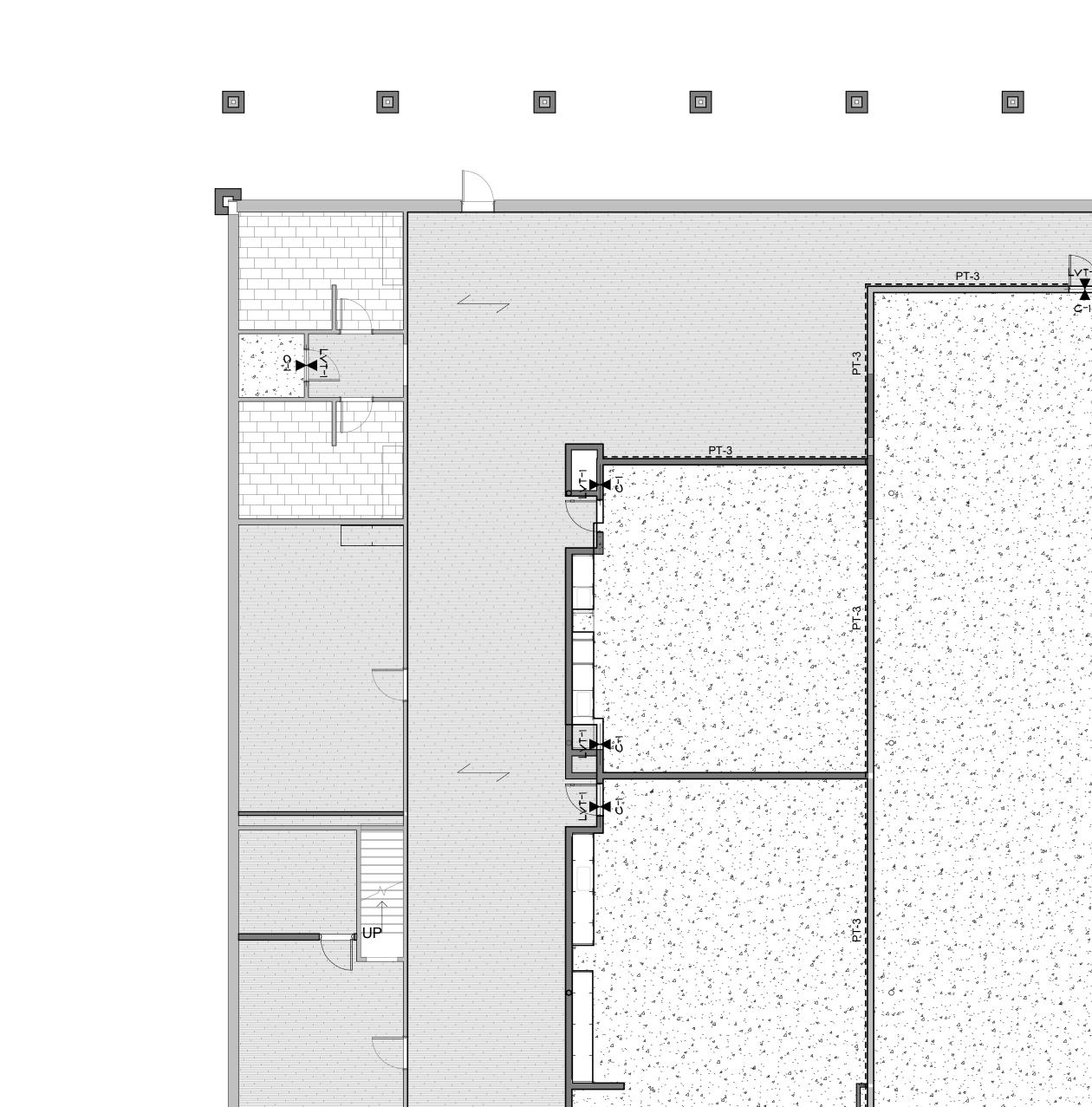
E A121

$A \frac{\text{INTERIOR ELEVATION}}{\frac{1}{4"} = 1'-0"}$

FINISH FLOOR PLAN GENERAL NOTES 1. ALL NEW BUILDING MATERIALS AND PRODUCTS SHALL NOT CONTAIN ASBESTOS 2. REFER TO ROOM FINISH SCHEDULE FOR ADDITIONAL INFORMATION AT BACK OF HOUSE AND NON-ELEVATED AREAS. 3. PROVIDE CORNER AND END-WALL GUARDS AT OUTSIDE GYPSUM BOARD CORNERS. 4. WALL FINISHES TO HAVE MINIMUM CLASS "C" RATING FOR FLAME SPREAD AND SMOKE DEVELOPMENT. 5. FINISH HATCHES AND PATTERNS ARE FOR GRAPHIC PURPOSES ONLY, AND ARE NOT INTENDED TO SHOW EXACT PATTERN OR SIZES OF FINISHES. 6. PROVIDE 1/2" CEMENT BACKER BOARD AT ALL WALLS SHOWN TO RECEIVE TILE. 7. AT ALL WALLS TO RECEIVE TILE: INSTALL TILE PATTERN CENTERED ON EACH MAIN WALL. 8. "LEVEL LINE" OF TILE INSTALLATION TO BE TAKEN AT THE LOW POINT OF THE FLOOR SLAB TO ALLOW TILE TO BE FLUSH WITH VARIATION IN FLOOR SLAB. 9. PROVIDE SEALANT AT ALL TILE INSIDE CORNERS AND AT DOOR FRAMES. COLOR TO MATCH ADJACENT GROUT COLOR. 10. USE SCHLUTER QUADEC TRANSITION STRIP AT ALL EXPOSED VERTICAL AND HORIZONTAL TILE TERMINATIONS AND ALL OUTSIDE CORNERS. PAINT 1. ALL GYPSUM BOARD WALLS TO BE PAINTED PT-1, UNLESS NOTED OTHERWISE. 2. DOOR FRAMES TO BE PT-2, UNLESS NOTED OTHERWISE. 3. ALL ELECTRICAL PANEL DOORS, AND WALL AND CEILING GRILLS ARE TO HAVE A FINISH TO MATCH ADJACENT SURFACE, UNLESS NOTED OTHERWISE. 4. SWITCH PLATES AND ELECTRICAL DEVICES ARE NOT TO BE PAINTED. FLOORING 1. CHANGES IN FLOORING HEIGHTS UP TO 1/4" MAY BE VERTICAL AND WITHOUT REDUCING EDGE TREATMENT. CHANGES IN FLOORING HEIGHTS BETWEEN 1/4" AND 1/2" SHALL BE BEVELED WITH A SLOPE NO GREATER THAN 1:2. IF CHANGES IN FLOORING LEVEL ARE GREATER THAN 1/2", NOTIFY ARCHITECT FOR DETAILS TO PROVIDE ADA COMPLIANT RAMP. 2. FLOOR MATERIAL CHANGES TO OCCUR AT CENTER OF DOORS WHERE EXISTING. 3. PROVIDE STAINLESS STEEL SCHLUTER TRANSITION STRIP BETWEEN CHANGE IN FLOOR SURFACE, UNLESS NOTED OTHERWISE. 4. PROVIDE THRESHOLD AT TRANSITION FROM WET AREAS. 5. REMOVE ALL EXISTING TRAFFIC STRIPING AT AREAS TO REMAIN C-1. PROVIDE CONCRETE SEALAER TO MATCH EXISTING. <u>MILLWORK</u> CONTRACTOR TO FIELD MEASURE AND VERIFY ALL DIMENSIONS PRIOR TO FABRICATION AND INSTALLATION OF MILLWORK. REFER TO FLOOR PLANS AND INTERIOR ELEVATIONS FOR EXACT LOCATIONS OF MILLWORK. 3. COUNTERTOPS AND BACKSPLASHES TO RECEIVE CLEAR SEALANT AT WALL WHERE REQUIRED. 4. ALL SOLID SURFACE COUNTERS TO BE SS-1.

5. PROVIDE SIDE, TOP, AND BOTTOM FILLER PIECES AS REQUIRED TO COMPLETE THE CASEWORK AS INDICATED ON THE PLANS AND INTERIOR ELEVATIONS.

6. PROVIDE FINISHED END PANELS AT ALL EXPOSED CABINET ENDS, KNEE SPACES, AND BANQUETTE ENDS.



FINISH LEGEND

LVT-1 LUXURY VINYL TILE

SIZE: 6" X 48"

FT-1 FLOOR TILE

WALL FINISH

BRICK PATTERN

MANUF: SHAW CONTRACT

COLOR: FROM MANUF. FULL RANGE

COLOR: FROM MANUF. FULL RANGE

STYLE: SOUNDSCAPE

MANUF: CROSSVILLE

STYLE: HYDRO-DEFEND

MATCH EXISTING CONDITIONS

MANUF: SHERWIN WILLIAMS

MANUF: SHERWIN WILLIAMS

COLOR: SW7006 EXTRA WHITE

STYLE: PORTUGAL

SIZE: 12" X 24"

THIRDS

C-1 SEALED CONCRETE

MANUF: H&C

PT-1 GENERAL WALL PAINT

STYLE: EGGSHELL

PT-2 DOOR FRAME PAINT (HM ONLY)

STYLE: SEMI-GLOSS COLOR: SW7668 MARCH WINDS PT-3 ACCENT PAINT

WALL BASE FINISH

<u>CEILING FINISH</u>

RB-1 RUBBER BASE

STYLE: 4" COVE

STYLE: CALLA

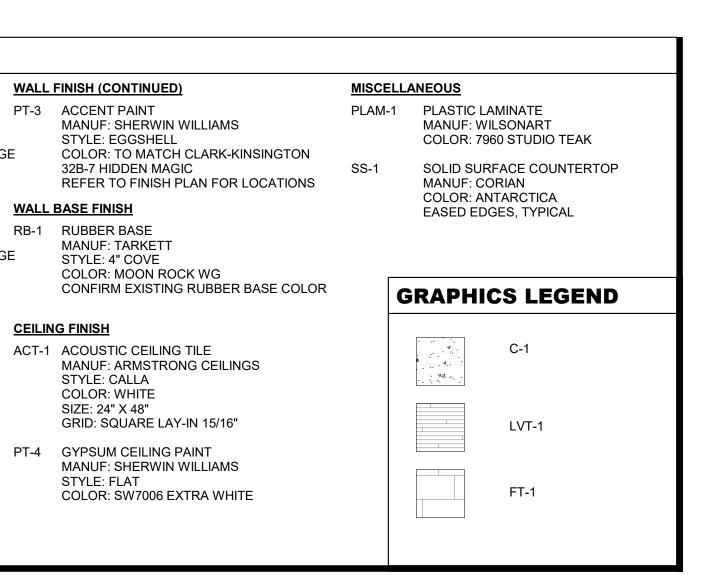
COLOR: WHITE

SIZE: 24" X 48"

STYLE: FLAT

FLOOR FINISH

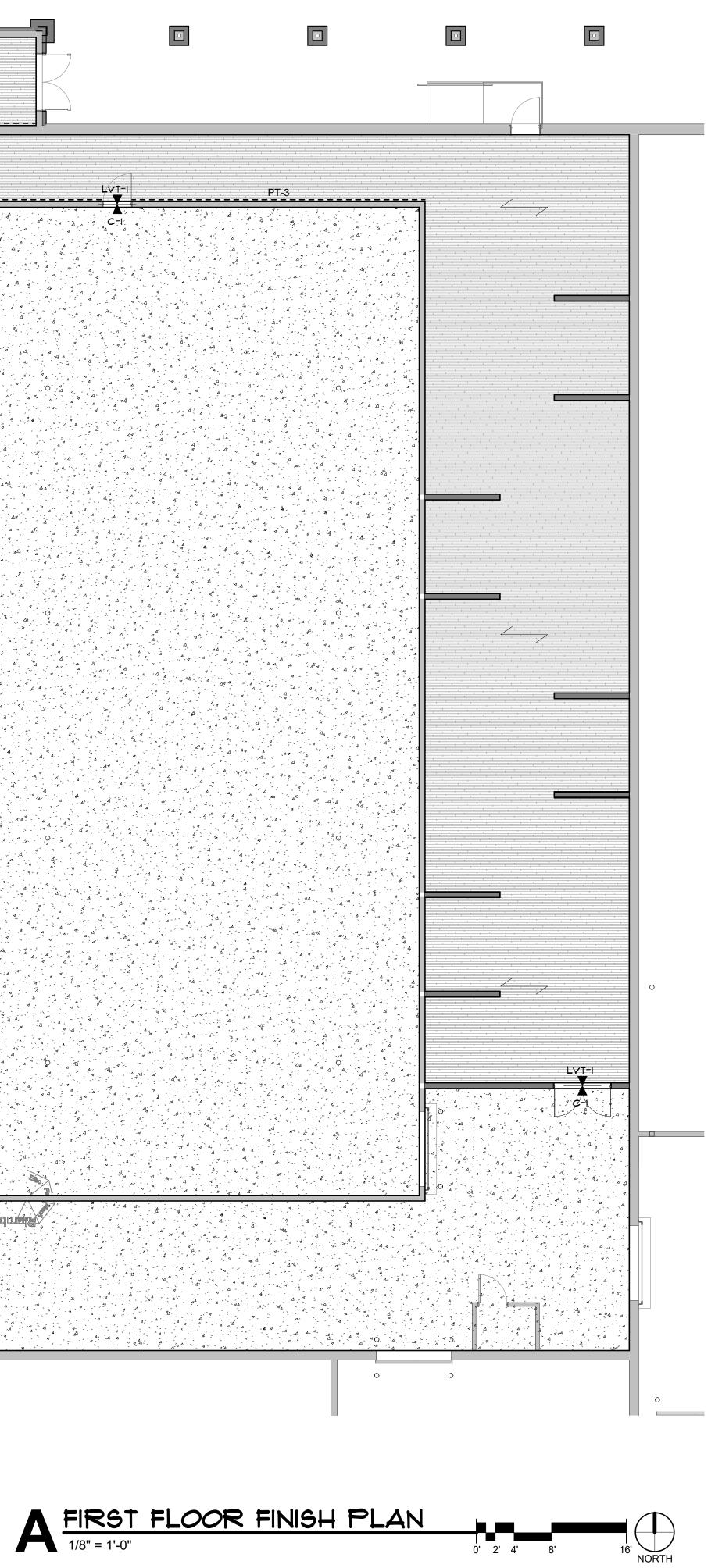
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ROOM				WALL FINISH					
NUMBER	ROOM NAME	FLOOR FINISH	BASE FINISH	NORTH WALL	EAST WALL	SOUTH WALL	WEST WALL	CEILING FINISH	COMMENTS
101	MAIN ENTRANCE	LVT-1	RB-1	PT-1	PT-1	PT-3	PT-1	ACT-1	
102	CORRIDOR	LVT-1	RB-1	PT-1	PT-1	PT-3	PT-1	ACT-1	
103	COMMUNITY SPACE	LVT-1	RB-1	PT-1	PT-1	PT-3	PT-1	ACT-1	
104	CORRIDOR	LVT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	PT-3 AT DOOR POCKET WALLS
105	CLASSROOM	C-1	RB-1	PT-1	PT-3	PT-1	PT-1	ACT-1	
106	CLASSROOM	C-1	RB-1	PT-1	PT-3	PT-1	PT-1	ACT-1	
107	CLASSROOM	C-1	RB-1	PT-1	PT-3	PT-1	PT-1	ACT-1	
108	BREAK ROOM	LVT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
109	OFFICE	LVT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
110	OPEN OFFICE	LVT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
112	STORAGE	C-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
113	KILN ROOM	C-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
114A	STORAGE	EXISTING TO REMAIN	RB-1	EXISTING TO REMAIN					
114B	WORK AREA	EXISTING TO REMAIN	RB-1	EXISTING TO REMAIN					
114C	WORK AREA	EXISTING TO REMAIN	RB-1	EXISTING TO REMAIN					
115	CORRIDOR	LVT-1	RB-1	PT-1	PT-1	PT-3	PT-1	ACT-1	
116	GALLERY	LVT-1	RB-1	PT-1	PT-1	PT-1	PT-1	GYP, PT-1	
117	WOMEN'S RESTROOM	FT-1	RB-1	EXISTING TO REMAIN					
119	MEN'S RESTROOM	FT-1	RB-1	EXISTING TO REMAIN					

	PT-3		PT-3	
		PT-3		
	A the transformer of the second s		<u>,</u>	 <u>-</u>







	ABBRE	VIATIONS		PIPING LEGEND
AC	AIR COMPRESSOR	HVAC	HEATING, VENTILATION, AIR COND.	(E) EXISTING PIPE TAG
ACU AD	AIR CONDITIONING UNIT AREA DRAIN	HP HRWH	HORSE POWER HEAT RECLAIM WATER HEATER	E E E E E E E E E E E E E E E E E E E
AFC	ABOVE FINISH CEILING	HS	HOSE STATION	CW CW DOMESTIC COLD WATER
AFF	ABOVE FINISH FLOOR	HW	HOT WATER	HW HOT WATER 120°F
AFG AHJ	ABOVE FINISHED GRADE AUTHORITY HAVING JURISDICTION	HWG I HWR	HOT WATER GENERATOR HOT WATER RETURN	HWR HOT WATER 120°F RECIRC.
APPROX	APPROXIMATE	HWST	HOT WATER STORAGE TANK	G G NATURAL GAS
ARCH ARD	ARCHITECT/ARCHITECTURAL AUXILIARY ROOF DRAIN	ID KW	INSIDE DIAMETER/DIMENSION KILOWATTS	SANITARY SEWER
BFF	BELOW FINISH FLOOR	LAV	LAVATORY	
BLDG	BUILDING	LF	LINEAR FEET	
BTU BTUH	BRITISH THERMAL UNITS BRITISH THERMAL UNITS/HOUR	LPG LWT	LIQUID PETROLEUM GAS LEAVING WATER TEMPERATURE	
CAP	CAPACITY	MAX	MAXIMUM	
CB CD	CATCH BASIN CONDENSATE DRAIN	MBH MECH	THOUSAND BTU/PER HOUR MECHANICAL	
CFH	CUBIC FEET/HOUR	MDL	MODEL	PRESSURE PIPE SYMBOLS
CFM	CUBIC FEET/MINUTE	MFR	MANUFACTURER	PIPE TEE
CI CLG	CAST IRON CEILING	MH MIN	MANHOLE MINIMUM	
CO	CLEAN OUT	MISC	MISCELLANEOUS	
COL CONC	COLUMN CONCRETE	MTD NA	MOUNTED NOT APPLICABLE	PIPE RISE
CONC	CONNECT	NFPA	NOT APPLICABLE NATIONAL FIRE PROTECTION ASSO.	GRAVITY PIPE SYMBOLS
CONST	CONSTRUCTION	NTS	NOT TO SCALE	
CONT COTG	CONTINUE CLEAN OUT TO GRADE	OA OD	OUTSIDE AIR OUTSIDE DIAMETER/DIMENSION	PIPE CAP
CP	CIRCULATING PUMP	PD	PRESSURE DROP	PIPE WYE 8TH TEE
CR	CONDENSATE RETURN COLD WATER	PLBG	PLUMBING	PIPE TEE PIPE DROP
CW DCOTG	DOUBLE CLEANOUT TO GRADE	PRESS PRV	PRESSURE PRESSURE REDUCING VALVE	PIPE CROSS
DD	DESICCANT DEHUMIDIFIER	PSI	POUNDS PER SQUARE INCH	PIPE PLUG
DEG(°) DEMO	DEGREE DEMOLITION	RA RD	RETURN AIR ROOF DRAIN	PLUMBING TAGS
DF	DRINKING FOUNTAIN	REF	REFERENCE	<u>PIPE TAG</u>
DS	DOWN SPOUT	REQD		
DIA DTL	DIAMETER DETAIL	REV RM	REVISION, REVISED ROOM	/—INVERT: -3' - 5"APPROX. INVERT ELEVATION
	DOMESTIC WATER HEATER (G) GA	S RPM	REVOLUTIONS PER MINUTE	6" SS (10 FU) SIZE, SYSTEM, FU FLOW
(G/E)WH EFF	(E) ELECTRIC EFFICIENT	SC SCH	STEAM CONDENSATE SCHEDULE	SYSTEM ABBREVIATION
ELEV	ELEVATION	SECT	SECTION	FIXTURE TAG
ELEC	ELECTRICAL	SK	SINK	
EQ EQUIP	EQUAL EQUIPMENT	SP SPEC	STATIC PRESSURE SPECIFICATION(S)	4" FS-9OUTLET SZE AND FIXTURE
EWT	ENTERING WATER TEMPERATURE	SS	SANITARY SEWÈR	FS-9P IDENTITY
EX, EXT	EXISTING EXPANSION	ST STL	STEAM STEEL	"P" INDICATES PRIMER CONN
FCO	FLOOR CLEANOUT	SUCT	SUCTION	HYD-2 3 CWFU
FD		TEMP		<u>WSB-1</u>
FL FLEX	FLOW LINE FLEXIBLE CONNECTION	TDH TH	TOTAL DYNAMIC HEAD TOTAL HEAD	3 WFU IDENTITY AND WFU FIXTURE
FLR	FLOOR SINK	TWMV	THREE WAY MODULATING VALVE	UNIT
FPM FS	FLOOR FEET PER MINUTE	TMV TYP	THERMOSTATIC MIXING VALVE TYPICAL	PIPE ACCESSORIES
FPWH	FREEZE PROOF WALL HYDRANT	UL	UNDERWRITERS LABORATORY	
FPRH	FREEZE PROOF ROOF HYDRANT	UR		3-WAY MOTORIZED CONTROL VALVE
G GA	GAS GAUGE	V VLV	VENT VALVE	3-WAY MIXING VALVE
GAL	GALLON	VEL	VELOCITY	
GALV GI	GALVANIZED GREASE INTERCEPTOR	VERT VTR	VERTICAL VENT THROUGH ROOF	BALL VALVE
GPH	GALLONS PER HOUR	VOL	VOLUME	
GPM GT	GALLONS PER MINUTE GREASE TRAP	WC WCO	WATER CLOSET WALL CLEANOUT	₿ ELBOW VALVE
HB	HOSE BIBB	WCO	WATER	GATE VALVE
HT	HEIGHT	WP	WORKING PRESSURE	
HTG	HEATING	WT	WEIGHT	
	GENERAL PLUMB	ING SYM	BOLS	PLUG VALVE
	~			
		NUMBER	SHOWN ON PLANS	STRAINER-WYE
		-		STRAINER-WYE WITH BLOWOFF
		IERE NEW	/ CONNECTS TO	VALVE
	•		IT INDICATED	PLUMBING PHASING
			L ON SHEET WHERE DETAIL	EWH-1 (TYPICAL TAG FOR ALL NEW CONSTRUCTIO
	P-001 APPEARS			
	(1) KEYNOTE			EXISTING PLUMBING EQUIPMENT
				(TYPICAL TAG FOR ALL EXISTING)
	∼ PIPE CON	TINUATIO	Ν	
	SPACE T	AG:		DEWH-1 (TYPICAL TAG FOR ALL DEMOLITION)
		-SPACE N	ΙΔΜΕ	
		-SPACE N		
	100 SF 🔫	-SPACE A		
	ITEM TO E	BE DEMOL	ISHED	SEISMIC DESIGN CRITERIA
		-		1. SEISMIC DESIGN DATA:
	AREA NO	T IN CONT	RACT	A. SEISMIC DESIGN DATA: A. SEISMIC DESIGN CATEGORY: B
				a. SEE SHEET S-001 FOR MORE INFO.
				2. THE FOLLOWING COMPONENT IMPORTANCE FACTORS ARE
			NOTE	USED:
	PLUMBING SH	IEET SET	NUIE	A. WATER HEATERS (STORAGE WATER 140°F): 1.0 B. WATER PIPING (GREATER THAN 120°E): 1.0
		DTE *		B. WATER PIPING (GREATER THAN 120°F): 1.0 C. SEWER PIPING: 1.0
	ALL OF GENERAL NOTES ON THIS OTHER DRAWINGS IN THIS SET. SYI	-		D. NATURAL GAS PIPING: 1.0
	ON THIS SHEET MAY OR MAY N	IOT BE US	ED IN THE CONTAINED	3. SEISMIC BRACING IS NOT REQUIRED FOR THE PLUMBING
	REFERENCI	E DRAWIN	IGS.	COMPONENTS.

MBING EQUIPMENT EW CONSTRUCTION)

PLUMBING GENERAL NOTES

 ALL PLUMBING SYSTEMS SHALL BE INSTALLED AS PER SPECIFICATIONS AND GOVERNING CODES. 2 ALL DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENTS OR GEOMETRIC RELATIONSHIPS OF EQUIPMENT AND SERVICES. THEY ARE NOT INTENDED TO SPECIFY OR SHOW EVERY OFFSET, FITTING OR COMPONENT. CONTRACTOR SHALL NOT SCALE DRAWINGS. INFORMATION AND COMPONENTS SHOWN ON RISER DIAGRAMS OR DETAILS, BUT NOT SHOWN ON PLANS, AND VICE-VERSA, SHALL BE PROVIDED AS IF EXPRESSLY REQUIRED BY BOTH. THE CONTRACTOR SHALL SUBMIT A REQUEST FOR INFORMATION (RFI) IF INFORMATION CONFLICTS. DRAWINGS SPECIFIC TO THIS DISCIPLINE DO NOT LIMIT THE RESPONSIBILITY OF WORK REQUIRED BY CONTRACT DOCUMENTS. REFER TO ARCHITECTURAL, STRUCTURAL ELECTRICAL AND OTHER DRAWINGS FOR COMPLETE INFORMATION.

- 3 BY NECESSITY, THESE DRAWINGS REFLECT A SYSTEM DESIGNED AROUND SPECIFIC REFERENCE PRODUCTS, THE SELECTION OF WHICH HAS IMPACTED THE DESIGNS OF OTHER TRADES (HVAC, ELECTRICAL, STRUCTURAL, ETC.). IF ALTERNATE MANUFACTURERS, FUEL SOURCES, SIZES, OR MODEL NUMBERS ARE SUBMITTED OR BID, IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND ALL SUBCONTRACTORS TO COORDINATE ALL DIFFERENCES PRIOR TO BID. NO EXTRAS WILL BE ALLOWED FOR CHANGES REQUIRED TO OTHER TRADES IF ALTERNATE EQUIPMENT IS BID OR INSTALLED AT THE CONTRACTORS OPTION.
- 4 EXCEPT WHERE MODIFIED BY SPECIFIC NOTATION TO THE CONTRARY, IT SHALL BE UNDERSTOOD THAT THE INDICATION AND/OR DESCRIPTION OF ANY ITEM, IN THE DRAWINGS OR SPECIFICATIONS OR BOTH, CARRIES WITH IT THE INSTRUCTION TO FURNISH AND INSTALL THE ITEM, REGARDLESS OF WHETHER OR NOT THIS INSTRUCTION IS EXPLICITLY STATED AS PART OF THE INDICATION OR DESCRIPTION.
- 5 CONTRACTOR SHALL PAY ALL UTILITY FEES & CHARGES AS PART OF BASE BID IN THE CONTRACT 6 THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL WORK WITH THAT OF OTHER TRADES; i.e., ARCHITECTURAL, HVAC, ELECTRICAL, STRUCTURAL, FIRE PROTECTION AND CIVIL PRIOR TO CONSTRUCTION.
- 7 THE CONTRACTOR SHALL COORDINATE UTILITY LOCATIONS, SIZES AND INVERT ELEVATIONS PRIOR TO CONSTRUCTION; i.e., SANITARY SEWER, STORM DRAIN, FIRE PROTECTION, DOMESTIC WATER AND NATURAL GAS. ALL SERVICES SHALL TERMINATE 5 FEET OUTSIDE THE BUILDING, EXCEPT WHERE SHOWN OTHERWISE. SEE SITE UTILITY DRAWINGS FOR CONTINUATION OF ALL SERVICE LINES. 8 PROVIDE ISOLATION VALVES AT EACH FIXTURE GROUP OR BATTERY OF FIXTURES IN THE DOMESTIC CW. HW.
- HWR AND GAS PIPING. VALVES SHALL BE EASILY ACCESSIBLE. WHERE HARD CEILINGS ARE LOCATED, VALVES SHALL BE ACCESSED THROUGH ACCESS PANELS. ACCESS PANELS SHALL BE COORDINATED WITH ARCHITECT PRIOR TO CONSTRUCTION. 9 PROVIDE STOP VALVES AT ALL PLUMBING FIXTURES ON BOTH HOT AND COLD WATER SUPPLY LINES. VALVES,
- ESCUTCHEONS, FITTINGS, ETC., SHALL BE CHROME PLATED AND INSTALLED TIGHT TO WALL. WHERE PIPING IS EXPOSED, CHROME PLATED PIPE SHALL BE USED. 10 ALL EXPOSED OR ACCESSIBLE P-TRAPS SHALL BE CHROME PLATED AND PROVIDED WITH BOTTOM CLEANOUT
- PLUGS. 11 SLOPE 2-1/2" AND SMALLER DRAIN WASTE AND VENT (DWV) LINES AT MIN, (2%) 1/4" FALL PER FT., 3" TO 6" DWV LINES AT MIN. (1%) 1/8" FALL PER FT. AND 8" AND LARGER DWV LINES AT MIN. (.5%) 1/16" FALL PER FT. SANITARY SEWER AND WATER SHALL BE A MINIMUM OF 10' APART OR THE DOMESTIC WATER SERVICE SHALL
- BE 12" ABOVE THE TOP OF THE SEWER LINE, AT ITS HIGHEST POINT, IF PLACED IN SAME TRENCH. 12 PROVIDE ALL FITTINGS, TRANSITIONS, COUPLINGS, ADAPTERS, UNIONS, AND OTHER ACCESSORIES NEEDED TO COMPLETE CONNECTIONS AND PROPER OPERATIONS OF PLUMBING FIXTURES AND PLUMBING EQUIPMENT.
- 13 REFER TO SPECIFICATIONS FOR ACCEPTABLE MANUFACTURERS OF PLUMBING FIXTURES AND EQUIPMENT, AND PROPER APPLICATIONS OF SAME. 14 PROVIDE CLEANOUTS IN ALL SEWERS, WHETHER SHOWN OR NOT, AT INTERVALS NOT TO EXCEED 50 FEET, AT EACH CHANGE OF DIRECTION GREATER THAN 45°, AND ALL VERTICAL STACKS AT A HEIGHT OF 30" ABOVE
- FINISH FLOOR AT THE BASE OF EACH STACK. 15 WHERE WATER PRESSURES EXCEED 70 PSI, PROVIDE WATER PRESSURE REDUCING VALVES (PRV) CONFORMING TO ASSE 1003 WITH STRAINER IN WATER SUPPLY LINES, SETTING AT 70 PSI. SEE CODE AND MANUFACTURER INFORMATION FOR ACCEPTABLE PRESSURE REQUIREMENTS.
- 16 ALL PIPING PENETRATIONS OF THE RATED CEILING AND WALL MUST BE MADE WITH METAL PIPE OR UL LISTED APPROVED DEVICES. FIRE STOP ALL PIPE PENETRATIONS THRU RATED WALLS. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS, RATINGS AND FIRE STOPPING DETAILS. 17 DO NOT ROUTE ANY PIPING OVER ELEC. ROOMS, COMPUTER ROOMS, OR ELEC. PANELS.
- 18 INSTALL AN AGA LISTED NATURAL GAS COCK. DIRT LEG AND UNION IMMEDIATELY UPSTREAM OF EQUIPMENT CONNECTIONS. AS NOTED ON DRAWINGS PROVIDE AN AGA LISTED VENT LIMITING GAS REGULATOR. GAS REGULATORS SHALL NOT BE INSTALLED IN AIR PLENUMS (SEE HVAC PLANS FOR AIR PLENUM LOCATIONS). PAINT ALL NATURAL GAS PIPING WITH TWO COATS OF OIL BASED YELLOW PAINT IN ALL LOCATIONS NOT SPECIFIED BY ARCHITECT.
- 19 ALL DOMESTIC WATER PIPING ROUTED IN AREAS SUBJECT TO FREEZING TEMPERATURES SHALL BE ROUTED BELOW INSULATION AND WITHIN THE HEATED ENVELOPE OF THE BUILDING. WHERE PIPING CAN NOT BE ROUTED BELOW INSULATION, PIPING SHALL HAVE 5 WATT/FT HEAT TRACING ATTACHED. SEE ARCHITECTURAL DRAWINGS FOR INSULATION PLACEMENT AND DETAILS. COORDINATE ELECTRICAL REQUIREMENTS WITH ELECTRICAL CONTRACTOR AND ENGINEER.
- 20 UNLESS OTHERWISE INDICATED. DO NOT ROUTE WATER PIPING IN EXTERIOR WALLS. WHEN ROUTED IN EXTERIOR WALLS. CAREFULLY POSITION WATER PIPING ON THE HEATED SIDE (INTERIOR SIDE) OF THE WALL INSULATION.
- 21 MAINTAIN 10'-0" MINIMUM CLEARANCE BETWEEN FRESH AIR INTAKES, OPERABLE WINDOWS AND FLUES, PLUMBING VENTS AND GAS REGULATORS. 22 ALL STORM DRAIN, CONDENSATE DRAIN, SEWER & VENT PIPING SHALL BE RODDED AND CLEANED AT END OF CONSTRUCTION. ALL TRAPS SHALL BE CLEANED AND PRIMED AT END OF CONSTRUCTION.
- 23 ALL PIPE DROPS FROM CEILING PLENUM TO FLOOR SHALL BE MADE IN FURROUTS AT COLUMNS, IN WEB OF BEAMS AT COLUMNS OR IN WALLS. PIPING SHALL BE CONCEALED UNLESS APPROVED BY ARCHITECT.
- 24 PROVIDE WATER HAMMER ARRESTORS IN FIXTURE BRANCHES WHERE QUICK CLOSING VALVES ARE INSTALLED; i.e., FLUSH VALVES, ICE MAKERS, DISHWASHERS, ETC. 25 BELOW SLAB WATER PIPE TO BE TYPE K SOFT DRAWN COPPER WITHOUT FITTINGS OR JOINTS. SLEEVE IN
- ENTIRETY WITH ARMAFLEX OR APPROPRIATE POLYETHYLENE SLEEVE MATERIAL. 26 PROVIDE APPROVED BACKFLOW PREVENTION OR ANTI-SIPHON DEVICES AT ALL FIXTURES THAT COULD CONTAMINATE THE POTABLE WATER SYSTEM.
- 27 INSULATE ALL WATER, CONDENSATE, STORM DRAIN PIPING (VERTICAL AND HORIZONTAL) AND ROOF DRAIN BODIES ABOVE FINISH FLOOR. SEE SPECIFICATIONS FOR THICKNESS SCHEDULE. 28 INSULATE ALL EXPOSED HOT WATER & DRAIN PIPING FOR ACCESSIBLE FIXTURES PER ANSI A117.1 AND ADA REQUIREMENTS.
- 29 ALL EXPOSED MATERIALS WITHIN RETURN AIR PLENUMS (EXISTING AND NEW) SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 OR A SMOKE-DEVELOPED INDEX OF NOT MORE THAN 50, AS DETERMINED IN ACCORDANCE WITH ASTM E84 AND U.L. LISTINGS. IF ANY MATERIALS (EXISTING OR NEW) DO NOT MEET THESE STANDARDS, THE ITEMS SHALL BE ENCLOSED IN A GYPSUM-BOARD ENCLOSURE, BE REPLACED WITH PLENUM RATED MATERIALS (I.E. CAST IRON), OR BE WRAPPED WITH AN APPROVED FIRE RATING MATERIAL, SUCH AS 3M FYRE WRAP. PLASTIC PIPING (PVC, ABS, AND CPVC) IS NOT APPROVED TO BE INSTALLED WITHIN RETURN AIR PLENUMS. BY NECESSITY, WE HAVE NOTED AS MANY AREAS AS POSSIBLE ON THE PLANS WHERE THESE CONDITIONS OCCUR, BUT IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXISTING CONDITIONS (WHETHER SHOWN ON THE PLANS OR NOT) AND INCLUDE THE REPLACEMENT/WRAPPING OF THESE ITEMS IN THE BID PRICE (SEE NOTE 7 ABOVE). COORDINATE RETURN AIR PLENUM LOCATIONS AND ANY NOTED DISCREPANCIES FROM THE PLANS WITH MECHANICAL ENGINEER PRIOR TO BID.
- 30 FLOOR DRAINS IN MECHANICAL ROOMS ARE SHOWN FOR GENERAL LOCATION ONLY. FLOOR DRAINS SHALL BE ACCESSIBLE AND SHALL BE VERIFIED WITH EQUIPMENT LAYOUT FOR INTERFERENCES. 31 AN APPROVED TRAP SEAL DEVICE CONFORMING TO ASSE 1072 SHALL BE INSTALLED AT ALL FLOOR AND HUB
- DRAINS. ALL DRAINS SHALL HAVE DEEP SEAL TRAPS, 4" DEEP SEAL MINIMUM. INSTALL TRAP GUARD DEVICES PER MANUFACTURER'S INSTRUCTIONS. 32 DOMESTIC WATER SERVICE PIPING AND FITTINGS; E.G., CHECK VALVES, RPZA, SHUT-OFF VALVES, STRAINERS,
- PRESSURE REGULATORS, ETC. SHALL COMPLY WITH NSF 61 CRITERIA. ALL CAST IRON EQUIPMENT IS TO BE INTERNALLY EPOXY COATED.

SINKS: SINKS SHALL BE MOUNTED WITH THE RIM OR COUNTER SURFACE NO MORE THAN 34" ABOVE FINISHED FLOOR. PROVIDE A CLEARANCE OF AT LEAST 27" HIGH. 30" WIDE. AND 19" DEEP. SINKS SHALL BE A MAXIMUM OF 6-1/2" DEEP. ALL WATER AND DRAIN PIPING UNDER SINKS SHALL BE PROVIDED WITH INSULATING FOAM INSERT, COVERED WITH A 1/8" VINYL OUTER SHELL. ANGLE STOPS SHALL HAVE A FLIP TOP ACCESS.

- EQUAL QUALITY.

ADA REQUIREMENTS

LAVATORIES: LAVATORIES SHALL BE MOUNTED WITH THE RIM OR COUNTER SURFACE NO MORE THAN 34" ABOVE FINISHED FLOOR. PROVIDE A CLEARANCE OF AT LEAST 29" ABOVE FINISHED FLOOR TO THE BOTTOM OF THE APRON. KNEE SPACE SHALL BE 8" FROM THE BOTTOM EDGE OF APRON TO THE LEADING EDGE OF THE BOTTOM OF BOWL. THE BOTTOM OF THE BOWL SHALL BE A MINIMUM OF 27" ABOVE FINISHED FLOOR. ALL WATER AND DRAIN PIPING UNDER LAVATORIES SHALL BE INSULATED WITH FOAM INSERT. COVERED WITH A 1/8" VINYL OUTER SHELL. ANGLE STOPS SHALL HAVE A FLIP TOP ACCESS.

DEMOLITON / RENOVATION NOTES

1 IN THESE GENERAL NOTES, "PLUMBING" SHALL REFER TO, BUT NOT BE LIMITED TO SYSTEMS, COMPONENTS AND EQUIPMENT FOR [HOT WATER, HOT WATER RETURN, COLD WATER, SEWER, SEWER VENTS, STORM SEWER, CONDENSATE WASTE, MEDICAL GAS, MEDICAL GAS OUTLETS, MEDICAL GAS EQUIPMENT, ISOLATION VALVES, BALANCING VALVE, REGULATORS, EQUIPMENT AND PIPING, ETC.]

2 CONTRACTOR SHALL VERIFY EXISTING SITE CONDITIONS INCLUDING. BUT NOT LIMITED TO: * PIPE SYSTEMS, SIZES AND LOCATIONS.* VALVE LOCATIONS.* EQUIPMENT CONDITIONS, CONNECTIONS AND LOCATIONS.* BALANCING VALVES.* HAMMER ARRESTORS.

3 ALL EXISTING PLUMBING EQUIPMENT AND PIPING ADJACENT TO AND/OR IN AREAS OF DEMOLITION SHALL BE PROPERLY IDENTIFIED FOR LOCATION, SIZE, CONDITION AND SYSTEM(S) OPERATION. ALL SYSTEMS SHALL BE COMPARED TO THE PLUMBING DRAWINGS AND EXISTING RECORD DRAWINGS (EXISTING RECORD DRAWINGS SHALL BE REQUESTED FROM [OWNER OR GOVERNMENT]) AND DOCUMENT ALL VARIATIONS. AFTER THE EXISTING SYSTEMS ARE INVESTIGATED AND DOCUMENTED, THE CONTRACTOR SHALL CAP AND/OR REMOVE ALL PLUMBING EQUIPMENT AND PIPING BACK TO POINT OF DEMOLITION BOUNDARY AS NOTED ON PLANS. DEMOLITION BOUNDARY AND PHASING SHALL BE COORDINATED WITH ARCHITECT AND [OWNER OR GOVERNMENT] PRIOR TO CONSTRUCTION. ALL BRANCHES AND DROPS NOT REMOVED SHALL BE CAPPED AND PREPARED FOR FUTURE RECONNECTION WHEN NEW EQUIPMENT AND/OR FIXTURES ARE INSTALLED, AS REQUIRED.

4 COORDINATE AND SCHEDULE THE REMOVAL OF EXISTING PLUMBING AND SYSTEM SHUT-DOWNS WITH OWNER. ARCHITECT AND MAINTENANCE PERSONNEL PRIOR TO CONSTRUCTION.

5 MAINTAIN EXISTING PLUMBING WITH PHASED DEMOLITION AND INSTALLATION OF NEW WORK, PROVIDING TEMPORARY SERVICES AS REQUIRED.

6 EXISTING PLUMBING EQUIPMENT BEING REMOVED AND NOT RE-USED, SHALL REMAIN THE PROPERTY OF THE OWNER (AS APPROVED BY THE OWNER) AND SHALL BE DELIVERED UPON REMOVAL TO LOCATION DESIGNATED BY THE GOVERNMENT. ALL OTHER SYSTEM COMPONENTS REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

7 UPON COMPLETION OF NEW ADDITION, NEW PLUMBING EQUIPMENT AND PIPING WILL BE INSTALLED AS SHOWN ON RENOVATED PLUMBING PLANS. RECONNECT ALL EXISTING BRANCHES AND EQUIPMENT TO NEW SYSTEM PIPING AS REQUIRED FOR OPERATION.

8 REPLACE AND/OR PATCH TO MATCH EXISTING, ANY COMPONENTS OF THE EXISTING PLUMBING SYSTEMS TO FACILITATE ITS INSTALLATION WITHIN THE NEW RENOVATED AREAS. SUCH ITEMS MAY INCLUDE. BUT NOT BE LIMITED TO, FITTINGS, SUPPORTS, NEW MOUNTING SYSTEMS, NEW ACCESS DOORS, ETC.

9 DAMAGED, OR INOPERABLE PLUMBING COMPONENTS INSPECTED PRIOR TO DEMOLITION AND DETERMINED NOT SUITABLE FOR REUSE, THAT WILL EFFECT THE INTEGRITY OF THE OPERATION OF THE PLUMBING SYSTEM, SHALL BE REPLACED WITH NEW OF LIKE, OR

10 PATCH ALL WALLS, FLOORS, ROOFS AND CEILINGS TO MATCH EXISTING OR NEW (IF APPLIED) FOR ALL OPENINGS CREATED BY DEMOLITION WORK OF EQUIPMENT AND PLUMBING SYSTEM PENETRATIONS.

11 REFER TO HVAC PLANS FOR EXTENT OF WORK RELATING TO PLUMBING PIPING CONNECTING TO HVAC EQUIPMENT TO BE REMOVED OR RELOCATED.

12 THE ADJACENT SPACES WILL CONTINUE TO OPERATE DURING CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE WITH OWNER TO INSURE THAT PLUMBING CONSTRUCTION DOES NOT IMPACT HOURS OF OPERATION. SEE ARCHITECTURAL SHEET FOR ADDITIONAL NOTES AND INSTRUCTIONS.



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PROJECT #: 20200132

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1.01 CONTRACT DOCUMENTS AND GENERAL REQUIREMENTS

A. Refer to and comply with all other sections of the project specifications and project plans for the installation of all Mechanical work. Unless specifically noted as "HVAC" or "Plumbing", all references generally to "Mechanical" shall refer to both "HVAC" and "Plumbing".

B. All plan disciplines are intended to compliment one another and therefore the plans shall not be split apart and provided piecemeal to various trades, vendors, etc. for individual coordination. vThese plans are diagrammatic in nature and are intended to establish size, general routing and location, and performance and are not intended to show all possible conditions. All work shall be fully coordinated with other trades to ensure the installation of a complete, operating system that fits in the space allotted. Provide all labor, equipment, appurtenances and materials necessary, and perform all operations required for the installation of complete, functional mechanical systems as outlined on the drawings and described in the specifications.

C. Because this project is a new installation of several trades, unknown circumstances, interferences and possible discrepancies may occur. The contractor is responsible for studying the work of all trades prior to any bid, rough-in, fabrication and shop drawing preparation. The contractor shall be be responsible for making the minor adjustments necessary to ensure all systems are installed complete, operative and warrantable. Where major deviations are required, prior to the placement of any related work, the contractor shall submit a proposed solution to the Architect and Engineer for approval. No additional compensation shall be granted for lack of coordination between the mechanical, plumbing, electrical, structural, architectural and civil trades.

D. Visit the site prior to any bid submission and become familiar with the existing site conditions. Coordinate with all other trades and make adjustments in routing and location and, if necessary, in size, in order to achieve the specified performance without incurring additions to the contract. Where actual site field conditions differ significantly enough from design to affect pricing, the contractor shall notify the building Owner's Representative prior to bid submission for a resolution. No allowance will be made for lack of knowledge of field conditions.

E. Refer to architectural floor plans and reflected ceiling plans to coordinate mechanical equipment with layout of walls and partitions and locations of all ceiling mounted devices. For any items not shown on the reflected ceiling plans, prepare drawings of the proposed locations and present to the Owner's Representative for approval prior to installation. F. All materials and equipment shall be new except those existing items indicated to be re-used. Any equipment or devices to be re-used shall be thoroughly cleaned and serviced to good

working condition. All new equipment shall bear the label of the appropriate testing agency (UL, ETL, FM, CSA, AGA, ASTM, AMCA, PDI, CISPI, etc.). Provide one (1) year parts and labor warranty on all new equipment, systems and components, including workmanship.

G. Provide start-up of all equipment provided under this contract. Start-up will adhere to manufacturer's requirements and recommendations.

H. See all notes on drawings for additional information, requirements, and restrictions regarding the mechanical work for this project.

I. Maintain a clean set of mechanical "as-built" record drawings separate from the field construction set. All changes to the original mechanical design shall be noted in the as-built record drawings in a neat, clean and orderly manner, and in colored ink or pencil. At project completion these drawings shall be submitted to the Architect/Engineer for approval prior to submission to the owner.

1.02 CODES, ORDINANCES, INSPECTIONS AND PERMITS

A. All work, materials, methods and equipment furnished and installed for this project is to comply with, be executed, and be inspected in accordance with local and state codes, laws, ordinances, rules and regulations applicable to particular class of work. Any fees or costs in connection therewith are to be paid by the contractor in order to provide a turn-key installation of all work. All requirements of all respective codes and authorities having jurisdiction shall be provided and complied with, whether or not all specific, applicable requirements are shown on the plans. Provide all energy code regulatory documentation and/or third party inspections/certifications required by the authority having jurisdiction at no additional cost to the Owner.

B. Coordinate with all respective local utilities to ensure complete and operative systems. All service fees, connection fees, meter fees, etc. required by the local utility shall be paid by the contractor. All utility fees shall be determined prior to bid and included in the contractor's price as part of a turn-key job to the owner. C. Arrange with Authority Having Jurisdiction (AHJ) for complete inspection, paying all charges and fees pertaining thereto.

D. Any insulation thickness listed in this specification or shown on the drawings is the minimum acceptable thickness, but is not to be used in lieu of minimum thickness required by locally adopted energy codes. Where a thickness shown on plans or in specifications differs from those required by code, the greater of the two thickness dimensions will be used.

E. All motors will comply with the local energy code

1.03 SHOP DRAWINGS, SUBMITTALS AND SUBSTITUTIONS

- A. Equipment scheduled or specified on drawings with "equal to", "reference product", or similar designations establish the minimum acceptable quality of equipment required for the project. If alternate manufacturer(s) or model(s) are proposed, they will, as a minimum, have the same availability, features, options, safety devices, capacities, quality of construction, serviceability, and characteristics as those of the scheduled or specified equipment. If a list of "acceptable" or "alternate" manufacturers are listed, only products from those manufacturers, in addition to the "equal to" or "reference product" manufacturer will be considered for approval.
- B. Substitution products, when approved, shall be carefully coordinated by the contractor among all connecting disciplines to ensure a complete and operative installation with respect to electrical, structural, architectural, sheet metal, piping, etc. Any changes required to install the substitution products shall be the contractor's responsibility
- C. Submit a minimum of six (6) printed "hard" copies of manufacturer's catalog sheets and/or shop drawings covering all equipment and devices included in this contract. Indicate models, capacities, weights (shipping, installed, operating), finishes, furnished specialties, options, wiring diagrams, control diagrams and sequences, and accessories. Arrange submittals in sets and bind in folders. Information shall not be submitted piecemeal.
- D. At the Contractor's option, submittals and shop drawings may be submitted electronically in PDF format. In all cases, Plumbing submittals and shop drawings shall be provided concurrently as a single package and HVAC submittals and shop drawings shall be provided concurrently as a single package. Piecemeal submission in "hard" copy or electronic copy of individual product/system information, unless specifically requested by the Architect and/or Engineer, will be summarily rejected.
- E. Submittals are required even though equipment being furnished is exactly as specified.

F. Final decision as to whether or not a specific piece of equipment meets specifications will rest with Architect/Engineer.

1.04 GENERAL MECHANICAL EQUIPMENT AND MATERIAL INSTALLATION

- A. Preconstruction Meeting: Prior to the execution of any work, the project superintendent for each Mechanical trade (HVAC and Plumbing) shall have a pre-construction conference with the General Contractor's project superintendent to fully coordinate the work of all trades. It is recommended that the G.C. project superintendent include the other project trades (e.g. electrical, fire protection, etc.) to ensure a fully coordinated project scope of work. The General Contractor shall be responsible for any lack of coordination between trades and shall pay for all changes and/or repairs required.
- B. The engineering construction drawings are not shop drawings. The engineering construction drawings do not provide for all means and methods required to put in place the scope of work of this project. The contractor shall be responsible for all means and methods related construction activities and installation coordination, in particular coordination with the work of other trades. This includes, but not limited to, ductwork and structural elements, piping risers and chase/"wet" wall cavity thicknesses, gravity drain flowline invert coordination with other building elements, sink/faucet tolerances and casework/cabinetry and equipment service access and nearby building elements. Adjustments shall be made as required to install all of the work contained here-in whether explicitly stated or reasonably implied. The contractor's submission of a bid is an admission to the Owner, Engineer, and Architect that the contractor is experienced and knowledgeable with the materials and products required to put in place the scope of work of this project, including the details of means and methods required to install all products, equipment and materials.
- C. Mechanical equipment shall be as indicated in the equipment schedule or approved equivalent, and installed per the manufacturer's recommendations. Coordinate with Electrical Division before ordering equipment requiring electrical connections; coordinate quantity, size, and type of connection(s) and overcurrent protection; and disconnect(s), and starter(s) requirements. Do not mount disconnect switches over unit nameplates. All electrical work shall be done in conformance with these specifications, electrical division specifications, the National Electric Code, and local codes. Where conflicting requirements may occur, the more stringent shall govern.
- D. Support all ductwork, piping and equipment from structure. Do not support from other ductwork, piping, conduit, etc. Support all ductwork with hangers and supports per SMACNA. Support all piping with hangers, supports, anchors and guides per ANSI Code for pressure piping, ANS B31.1 with addenda 31.1 OA-69. Sizing and spacing of hangers shall be per these standards, unless otherwise noted. "C" clamps shall not be used unless tack welded or strapped to structural steel members.
- E. Insulation shall be continuous at all wall and floor penetrations (except at fire dampers) and at hanger supports. Hanger supports for insulated piping shall be outside insulation; provide insulated inserts and sleeves at hangers. Insulation vapor barrier shall be sealed at all joints and seams, and at penetrations by appurtenances (damper rods, valve stems, etc.). Repair insulation at existing ductwork which has been reworked. Tears and punctures of vapor barrier shall be repaired and sealed. All piping and ductwork pressure testing shall be performed before insulation is applied.
- F. Provide sleeves, clamps for piping at all wall and floor penetrations, and fire proofing at all rated wall and floor penetrations. Provide escutcheon plates at all visible wall and ceiling penetrations. Sleeves through concrete floors, concrete or CMU walls and concrete foundations shall be schedule 40 galvanized steel pipe. Sleeves through non-cementious cavity wall construction shall be minimum 20 gauge galvanized sheet steel with welded longitudinal joint. Sleeves in rated construction shall be provided in accordance with the listing of the particular U.L. design being utilized for the protection of the through-penetration. Sleeves through exterior walls, slabs on grade or foundations shall be sealed weathertight using an engineered sleeve seal equal to Metraseal. Provide riser clamps on all floor-floor pipe risers.
- G. Locate new equipment away from walls to structure and rated walls as necessary to provide required clearances for proper operation, maintenance and inspection.

H. Flash all roof and exterior wall penetrations and seal water-tight. Provide wall sleeves for all wall penetrations.

- I. All exterior steel piping shall be painted using a metal primer coat, second coat of enamel, top coat of enamel, and a finish coat of gloss. Natural gas piping shall be painted yellow. All other bare steel service piping color selections shall be approved by the Architect/Engineer prior to applying primer coat.
- K. All waste and vent (DWV) piping 3" and above shall be sloped at 1/8" per foot minimum, piping 2-1/2" and smaller shall be sloped at 1/4" per foot minimum. Provide cleanouts at all changes in directions. Provide additional cleanouts in all DWV piping at maximum 75 ft. intervals for 4" piping and above, and at maximum 50 ft. intervals for 3" piping and smaller.

L. All overhead horizontal water piping shall be pitched to drain to low points.

- M. All equipment suspended from roof structure shall be mounted on structural steel supports frames (channels or angles) bolted to supports and to equipment at each equipment support point (min. two points each on a min. of two frame members). Support frames shall be suspended by bolted all-thread rods from like sized frame members welded or positively bolted to a minimum of two roof frame members above. Support framing system shall be sized to support 200 percent of the total distributed equipment weight, frame members and all-thread rods shall be sized to support 200 percent of their respective point load weights.
- N. Provide pipe supports at all piping changes in direction and at maximum center distances per ANSI Code for pressure piping, with sizing and spacing of hangers per these standards, unless otherwise noted. Mount piping on hangers within 12" of roof support structure above or provide seismic bracing for longer hanger lengths. Support grouped piping on trapeze type channel supports with two hanger rods, anchored to structure above; or rack type channels, supported from floor or grade below with two pipe stands and floor plates bolted to floor; clamp piping to supports. Support individual pipes from above with clevis, adjustable "J", or adjustable band type hangers with hanger rods anchored to structure above; or from wall with wall bracket. Provide riser clamps at floor penetrations and wall support brackets at vertical piping. Vertical risers shall be racked on walls, resiliently mounted to walls with "Unistrut" wall brackets and "Unisorb" clamping, or equivalent. Hanger rods shall be anchored to structure above with concrete anchors, beam clamps, or "C" clamps tack welded or strapped to steel structure. Hangers shall not support insulated piping directly from pipe and shall not crush the insulation system. Hangers shall be mounted outside the insulation with Foam-Glas inserts at all support points. Provide 18 ga. sheet metal saddles at all insulated piping hangers, saddles shall have width equal to 1/2 the pipe circumference and length equal to 4 times the insulation outer diameter. Galvanized pipe support hangers or other metals susceptible to galvanic corrosion are prohibited.

J. All piping below handicap accessible sinks shall be insulated and installed as high as possible and as far back as possible to provide maximum wheelchair access, per ADA requirements.

- 1.05 WARRANTY AND OPERATION INSTRUCTIONS
- A. All materials, equipment, and work will carry, as a minimum, a full one (1) year warranty from time Owner accepts building or the date of substantial completion, whichever is earlier, regardless of start-up date of equipment.
- B. A minimum of two (2) bound copies of operation and maintenance manuals for the entire mechanical system including controls) will be prepared by the Contractor and provided to the Owner. The Owner will be fully instructed in the operation and maintenance of the entire system by the Contractor.
- 1.06 EQUIPMENT CONNECTIONS
- A. Each equipment item with drain connection will be provided with a properly sized drain run to the nearest floor drain or as directed. Minimum drain size will be equal to connection size or as indicated.
- B. Rough-in and make final connection to all equipment provided under other Divisions of these specifications or by the Owner.
- C. Contractor will install rough-ins only after he has received approved shop drawings or has obtained drawings and/or specifications for equipment provided by others. 1.08 CUTTING AND PATCHING
- A. Provide all cutting and patching required to perform the mechanical work.
- B. All cutting, patching and repair work will be done by workmen skilled in the trade required.
- C. The contractor shall be responsible for a neat and clean cutting and patching operation. Where cutting of openings are excessive in size or openings in walls, ceilings, or floors are not trimmed, cut, sawcut, coredrilled, etc. in a neat and clean manner, the Contractor shall be responsible for making repairs as directed by the Architect at no additional cost to the owner.
- 1.09 EXCAVATION. TRENCHING AND BACKFILLING
- A. All excavation, trenching and backfilling in connection with the mechanical system is included as part of this Division.
- B. All excavation, trenching and backfilling required will be done as part of the contract price regardless of any implied conditions on the drawings or in these specifications. C. Have all underground utilities located and marked before excavating. Instruct employees on markings and color codes and train employees on excavation and safety procedures for natural gas lines. When excavation approaches gas lines, expose lines by carefully probing and hand digging.
- D. Walls of trenches shall be minimum 6" from side of nearest mechanical work. Install pipes with minimum 6" clearance between when located in same trench. E. Pipe Trenching: Dig trenches to depth, width, configuration, and grade appropriate to piping being installed. Dig trenches to 6" below level of bottom of pipe to be installed. Install 6" bed of pea gravel or fine granular material, mechanically tamp to firm bed for piping, true to line and grade. Provide depressions only at hubs, couplings, flanges, or other normal pipe protrusions.
- F. Do not backfill until work has been inspected, tested, approved. Do not bury lumber, metal, or other debris with backfill.
- G. Trench Backfill: Backfill to 12" above top of piping with pea gravel or fine granular material. Compact properly and install marker warning tape. Continue backfill to finish grade in 6" layers, each properly moistened and mechanically compacted. Do not compact by hydraulic jetting. Settling shall be refilled, tamped and refinished. 1.10 SUPPORTS AND FOUNDATIONS
- A. Provide all supporting systems required to support all of the mechanical systems in the scope of work of this contract. Seismic bracing, when required, shall be provided by a qualified seismic bracing firm. Seismic bracing shop drawings and calculations shall be required, all sealed/signed by a Professional Engineer with current and active registration in the State in which the project resides.
- B. Provide adequate pipe suspension systems in accordance with recognized industry standards. Mechanical suspension systems will be equal to those manufactured by Grinnell/Anvil or Gripple. C. Maximum allowable piping support intervals (unless reduced by local code):
 - a. Vertical piping 15 ft. on center b. Horizontal ferrous piping through 1" diameter - 6 ft. on center
 - c. Horizontal ferrous piping 1-1/4" through 2" diameter 10 ft. on center d. Horizontal ferrous piping over 2" diameter - 12 ft. on center
 - e. Horizontal cast iron support twice in each section of pipe, minimum. f. Plastic, PVC and CPVC piping - support at half the distance as ferrous pipe.
- 1.11 ELECTRICAL
- A. Furnish and install all electrical interlock and control wiring for proper operation and control of all mechanical equipment. All power and low voltage control wiring to mechanical equipment shall be installed in conduit. Provide conduit as specified in the Electrical drawings and specifications.
- B. Supervise and coordinate all electrical work in connection with mechanical system.
- C. Furnish all motor controllers or contactors for proper operation of all motors.
- D. Furnish equipment with factory supplied starters and disconnects where available.
- 1.12 VALVES
- A. General:
- a. Valves listed below are for general purpose plumbing and mechanical use. b. All valves utilized in potable water service systems shall be certified Lead-Free.
- c. All valve construction shall not contain "yellow brass".
- B. Ball Valves: Nibco 585-70 series.
- C. Butterfly Valves: Nibco LD-2000
- D. Globe Valves: Nibco T-211 or F-718-B.
- E. Check Valves: Nibco T-413-B or F-918-B.
- 1.13 TESTING PLUMBING
- A. Test all piping systems. Test buried pipe before backfilling. Water piping shall be hydrostatically tested at 100 psi for not less than eight hours with no discernible pressure loss. B. Storm, waste and vent systems shall be tested to a minimum hydrostatic head of ten feet, and this pressure shall be maintained a minimum of three hours and proved tight.
- 1.14 MECHANICAL IDENTIFICATION
- A. All piping, valves, and equipment will be appropriately identified with permanent markings. Markings and colors will comply with local AHJ requirements, and will indicate: equipment tag number; fluid (and pressures, where applicable) contained in pipe; direction of flow, etc.
- B. Provide engraved plastic laminate equipment tags on all new and existing mechanical equipment. Nomenclature shall be proposed by HVAC contractor and approved by owner prior to fabrication.
- C. Pipe lines accessible for maintenance shall be identified as to service with Seton Set-Mark or equal semi-rigid plastic identification markers. Direction of flow arrow shall be included on each marker. Color-coded background shall be in accordance with ANSI A13.1-1975, "Scheme for the Identification of Piping Systems". Locations shall be as follows:
- a. Adjacent to each valve and fitting (except plumbing fixtures) b. At each branch and riser takeoff
- c. At each pipe passage through wall, floor and ceiling d. At each pipe passage to underground
- e. On horizontal runs: at 25' intervals
- 1.15 STORAGE, CLEANUP, AND DEBRIS REMOVAL
- A. Coordinate storage of all equipment and materials with the owner's representative and general contractor. Continually maintain the construction site to keep areas clear of materials and debris. Additionally, provide cleanup and removal at the end of each daily work period.

SECTION 22 - PLUMBING

22.01 FIXTURES AND TRIM

22.02 POTABLE WATER PIPING

A. Fixtures will be equal to those scheduled on drawings, with all necessary support, trim and accessories required for a neat, clean, complete and operative installation provided under this contract.

B. All exposed finished metal parts will be chromium-plated, and all fixtures will be provided with some form of supply stop. C. All supply angle stop valves shall be chrome plated brass body, wheel handle, and escutcheon plate. Provide angle stop valves at CW and HW supply connections at all fixtures (point of use electric instantaneous type water heaters, sinks and lavatories, etc.) with flexible risers; and at all appliances (dishwashers, ice makers, coffee makers, vending machines, etc.)

D. All equipment shut-off valves shall be full-port ball valves with 2-piece bronze body, stainless steel ball, and Teflon seat and packing; or Milwaukee "Butterball" with bronze body, stainless steel disk, and Viton disk seat. Provide shut-off valves and unions at all equipment connections (storage type water heaters, pumps, etc.). E. The exact location, elevation, and orientation of all plumbing fixtures shall be coordinated with and provided in accordance with the architectural plans. The Contractor shall coordinate the exact location, elevation, and orientation of all plumbing fixtures prior to any rough-in or top-out of any plumbing piping and services.

Where any fixture or fixture group is designated as ADA accessible, the installation of the fixture or fixture groups shall comply with the requirements of the latest revision of ADAAG, whether or not the requirements are indicated specifically on the drawings.

A. General: All materials shall be ANSI/NSF 14/61 listed for potable water service. "NSF-pw" or "NSF 61" shall be factory, permanently stamped on all materials potable water for potable water use.

B. Below Grade Within 5 Feet of Building Footprint and Beneath Slab: a. 2" diameter and smaller: Copper tubing ASTM B88 Type K annealed with AWS A5.8 BCuP silver brazed (lead free) joints, no fittings. b. No joints allowed below slab or grade. Wrap all below grade copper piping with continuous Armaflex insulation or Polyethylene sleeve.

C. Above Grade/Slab: a. 2-1/2" diameter and smaller: Copper tubing ASTM B88 Type L hard drawn with ASME A16.18 cast bronze or ASME 61.22 wrought copper or bronze fittings and ASTM B32 Grade 95TA solder (lead free) joints. b. Where exposed at fixtures, use seamless brass pipe, chrome plated.

22.03 SANITARY WASTE AND VENT PIPING / STORM DRAIN PIPING

A. Below Grade Within 5 Feet of Building Footprint and Below Slab: a. PVC pipe and fittings: ASTM D2665, solid wall, schedule 40, ASTM D2564 solvent weld.

B. Above Grade: a. ASTM D2665 PVC is an acceptable alternate above grade if all of the following criteria are satisfied:

22.06 INSULATION

A. Domestic Cold Water (Above-Grade): Equal to Owens-Corning 1 inch thick one-piece fiberglass pipe insulation with factory-applied White All-Service (ASJ) Vapor Barrier Jacket. Fittings will be molded or mitered fiberglass for sizes under 3 inch, and molded fiberglass for sizes 3 inch and larger.

- B. Domestic Hot Water and Hot Water Recirculation (Above-Grade): Equal to Owens-Corning 1 inch thick fiberglass, one-piece, pipe insulation with factory-applied White All-Service (ASJ) Vapor Barrier Jacket. Fittings will be insulating cement for sizes under 3 inch.
- Pitcote 300. Insulation will be installed in accordance with manufacturer's instructions.
- product equal to Handi-Lav-Shield as manufactured by Trueboro, Inc., Ellington, CT. E. All insulated piping located exterior to the building will have the exterior of the insulation covered with an aluminum jacket.

22.07 TREATMENT, FLUSHING, AND ISOLATION

landscape irrigation systems, and for connections to any other non-potable type systems.

A. All potable water systems and equipment will be treated and purified in compliance with local health codes and local water jurisdiction requirements. As a minimum, flush entire system, introduce chlorine or hypochlorite to standards required by local utility and health department, but not less than 50 ppm residual chlorine. During sterilization, operate all valves, faucets, etc. so that all portions of the system are reached. Let stand for 24 hours minimum. Flush system with clean water until chlorine content is reduced to 1 ppm at point furthest from where chlorine was introduced. After flushing has been completed provide laboratory report of bacteriological tests on samples taken from system. Repeat sterilization process until satisfactory tests are obtained and approved by Health Department. System shall not be put into service until such approval has been obtained.

B. After the installation of all new sanitary sewer piping systems and prior to building occupancy, all new sanitary drainage piping shall be hydrojetted and cleared. C. Furnish and install backflow prevention devices where potable water systems are stubbed out for connection to mechanical make-up water systems, at stub-outs for

C. Domestic Hot and Cold Water (Below-Grade): Insulate piping located below slab or grade with "Foamglas" 3/4 inch thick and apply asphaltic coating equal to PC

D. Exposed Hot Water, Cold Water, and Drain Pipes Serving Lavatories: Where hot and cold water pipes serving fixtures are exposed, insulate for ADA compliance with



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blueriver ARCHITECTS

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A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com

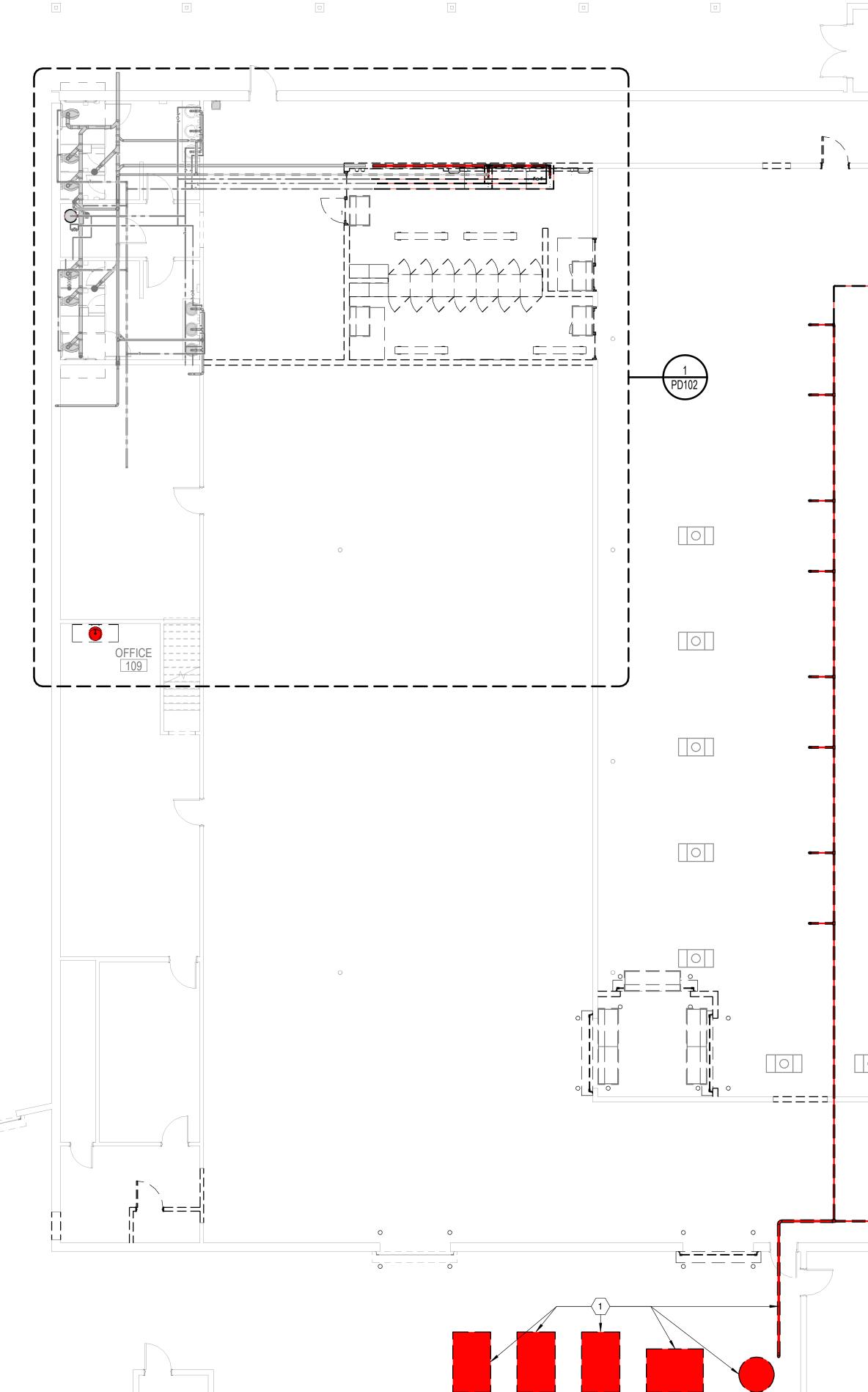
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PROJECT #: 20200132

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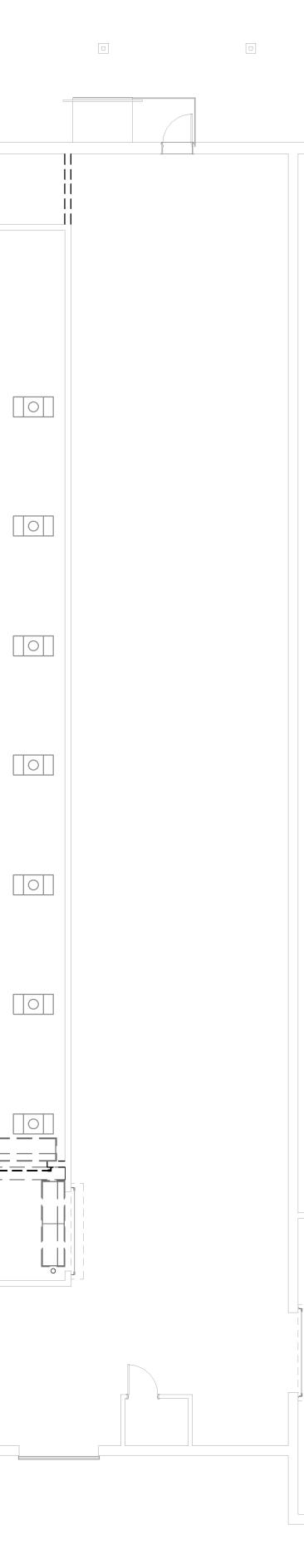
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GENERAL NOTES

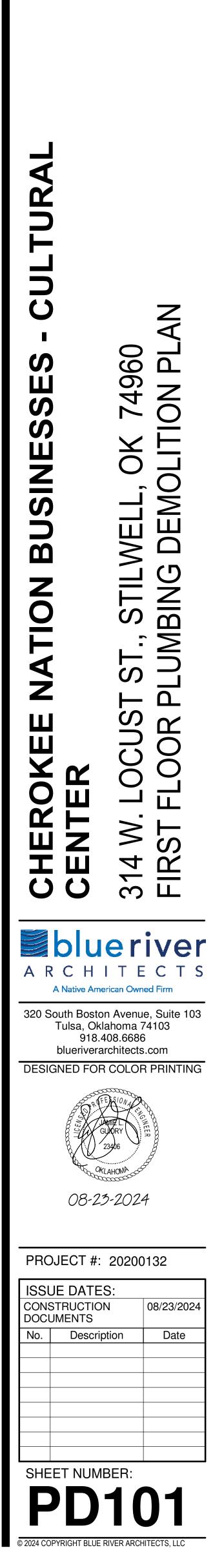
1 REFER TO SHEET P-001 FOR LEGEND AND NOTES.

KEYED NOTES

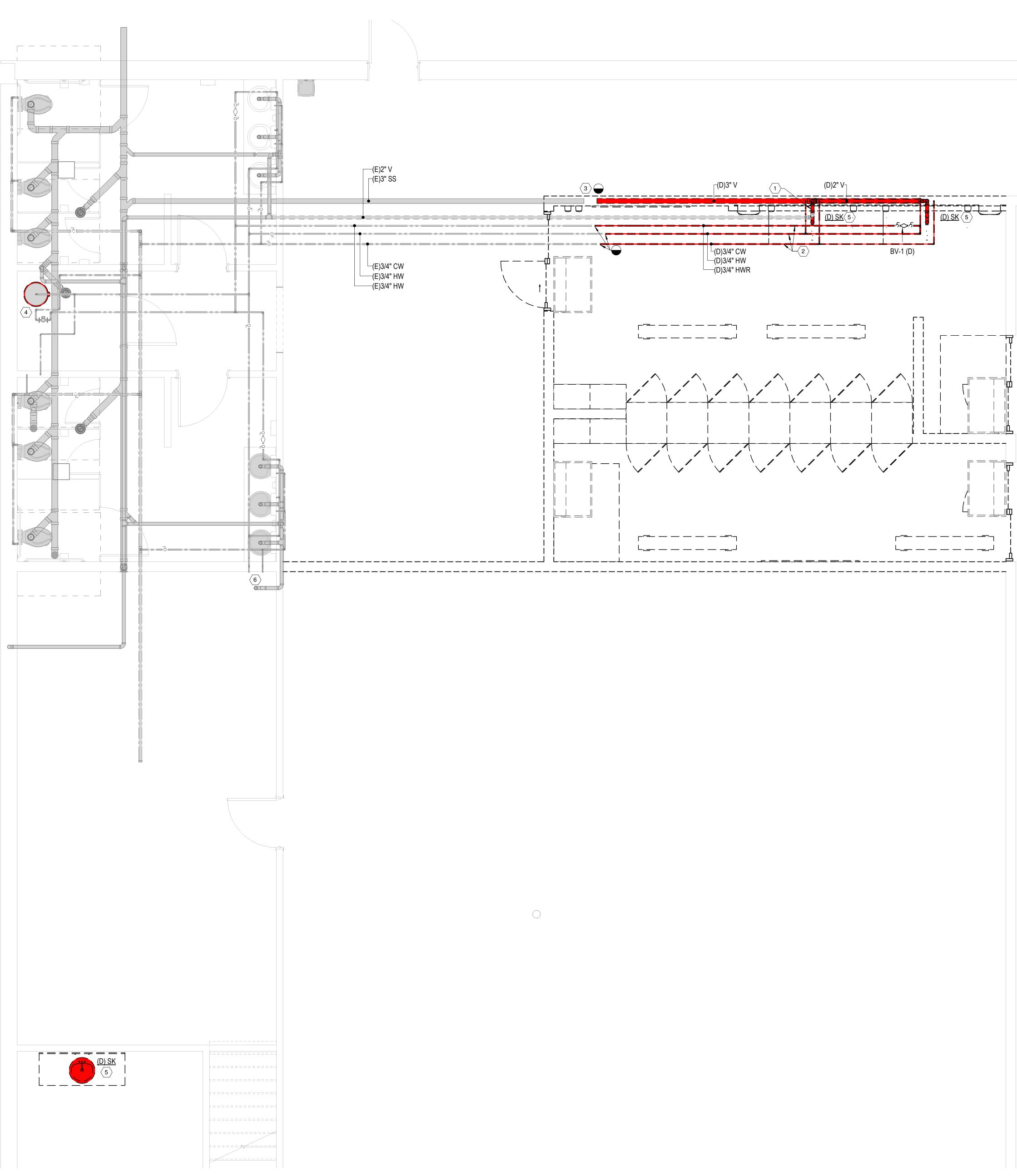
1 REMOVE EXISTING AIR COMPRESSORS AND ALL ASSOCIATED EQUIPMENT. CAP ALL COMPRESSED AIR PIPING ABOVE CEILING AND ABANDON.







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NORTH

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GENERAL NOTES

1 REFER TO SHEET P-001 FOR LEGEND AND NOTES.

KEYED NOTES

- 1 REMOVE EXISTING VENT PIPING TO POINT INDICATED. CAP AND ABANDON UNUSED PIPING.
- 2 REMOVE EXISTING SUPPLY PIPING TO POINT INDICATED.
- 3 ABANDON EXISTING SANITARY SEWER.
- 4 REMOVE EXISTING WATER HEATER AND REPLACE WITH NEW. 5 REMOVE EXISTING PLUMBING FIXTURE AND CAP ALL ASSOCIATED PIPING BEHIND A FINISHED SURFACE.
- 6 EXISTING MILLWORK TO BE REPLACED. REMOVE AND REUSE EXISTING SINK.

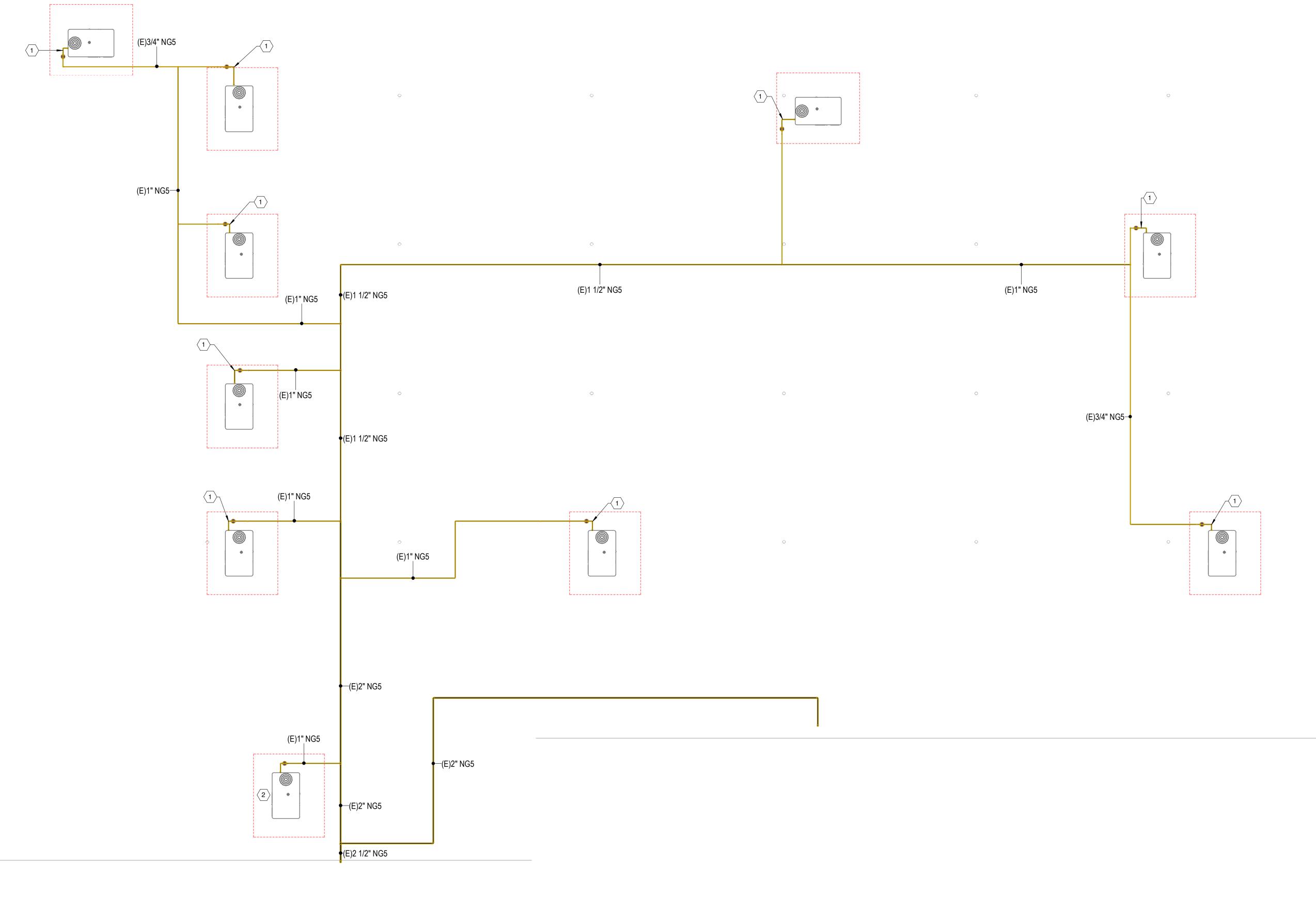


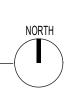
C U, Ш S Δ C S PLUMBIN(Ш И И S NO F 90 DE К RGED Ζ () ()ŪΟ̈́Ū blueriver ARCHITECTS A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com DESIGNED FOR COLOR PRINTING 08-23-2024 PROJECT #: 20200132 ISSUE DATES: CONSTRUCTION 08/23/2024 DOCUMENTS No. Description Date SHEET NUMBER:

PD102

1 = 1'-0"ROOF DEMOLITION PLUMBING PLAN 1/8" = 1'-0"

(E)1" NG5-





GENERAL NOTES

1 REFER TO SHEET P-001 FOR LEGEND AND NOTES.

KEYED NOTES

1 DISCONNECT GAS PIPING FROM EXISTING RTU AND CAP. 2 EXISTING RTU TO REMAIN IN USE.



TURA CUL CHEROKEE NATION BUSINESSES - C CENTER 314 W. LOCUST ST., STILWELL, OK 74960 ROOF DEMOLITION PLUMBING PLAN blueriver ARCHITECTS A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com DESIGNED FOR COLOR PRINTING 08-23-2024 PROJECT #: 20200132 ISSUE DATES: CONSTRUCTION DOCUMENTS 08/23/2024 No. Description Date SHEET NUMBER: **PD103**

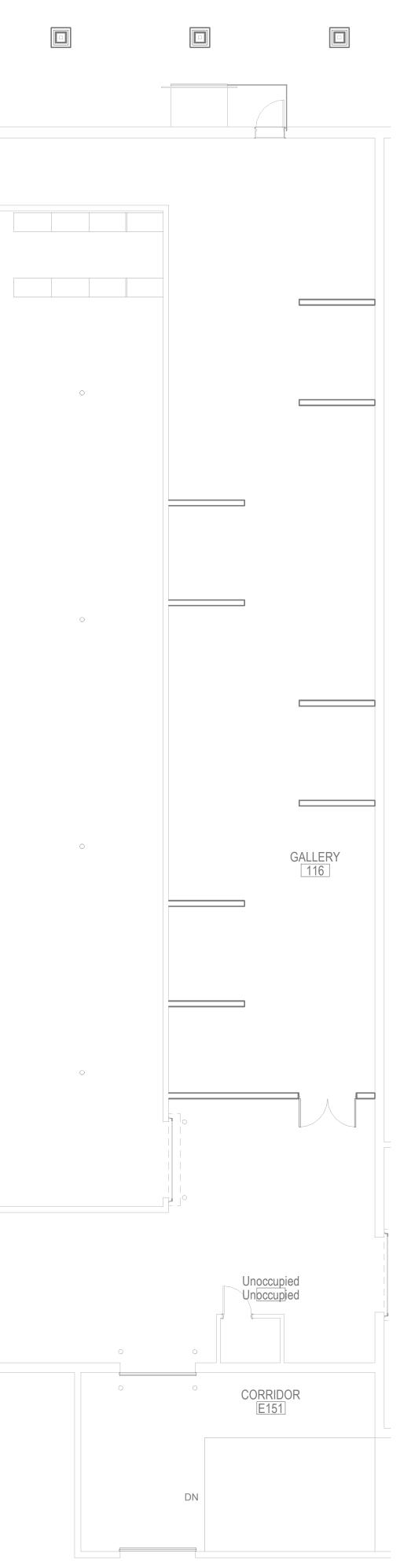
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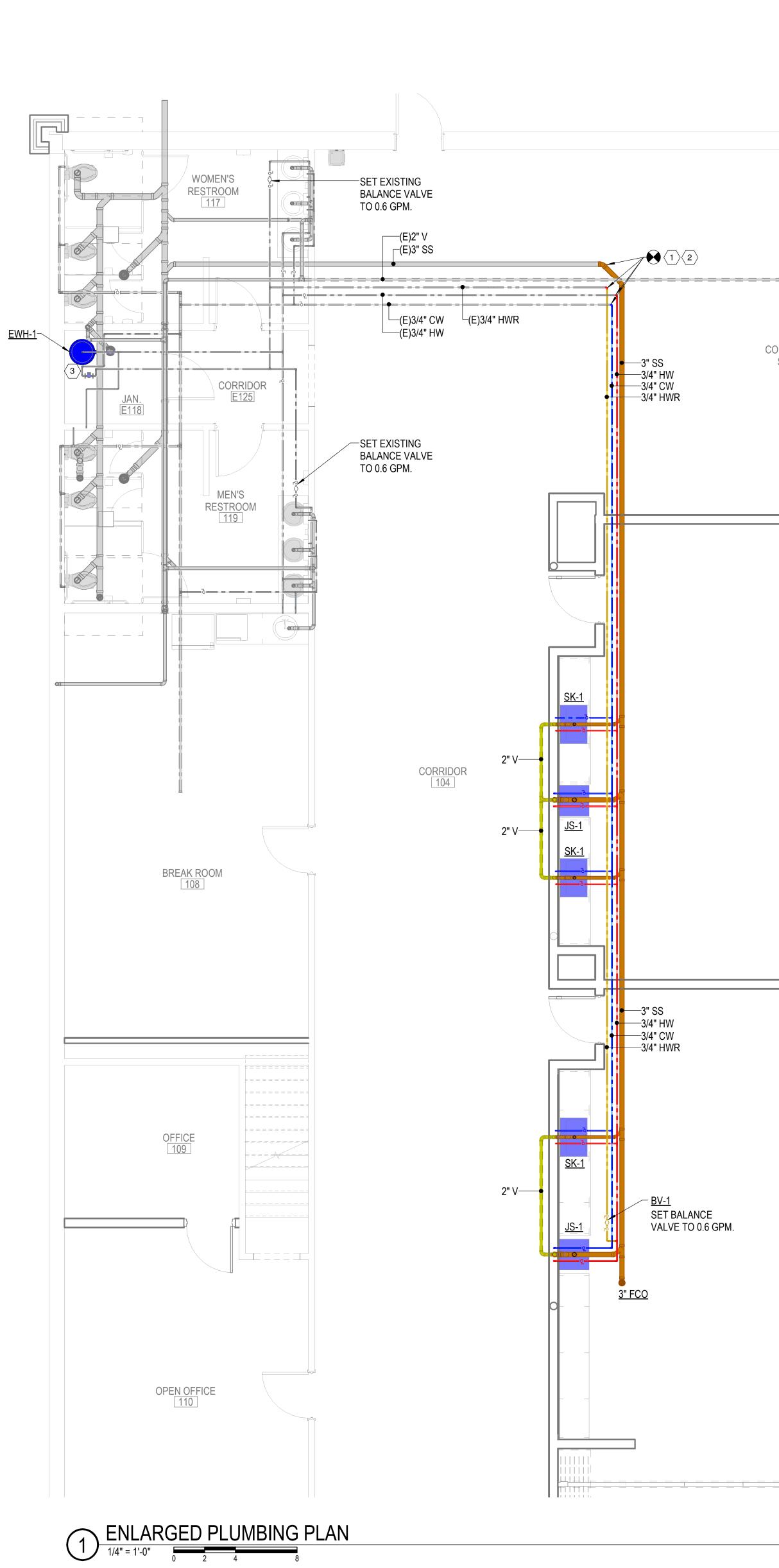
1 REFER TO SHEET P-001 FOR LEGEND AND NOTES.







KEYED NOTES



1 CONNECT NEW BUILDING DRAIN TO EXISTING AT THIS APPROXIMATE LOCATION. FIELD VERIFY EXACT LOCATION. 2 CONNECT NEW SUPPLY PIPING TO EXISTING AT THIS APPROXIMATE LOCATION. FIELD VERIFY EXACT LOCATION. 3 RECONNECT EXISTING SUPPLY PIPING TO NEW WATER HEATER.

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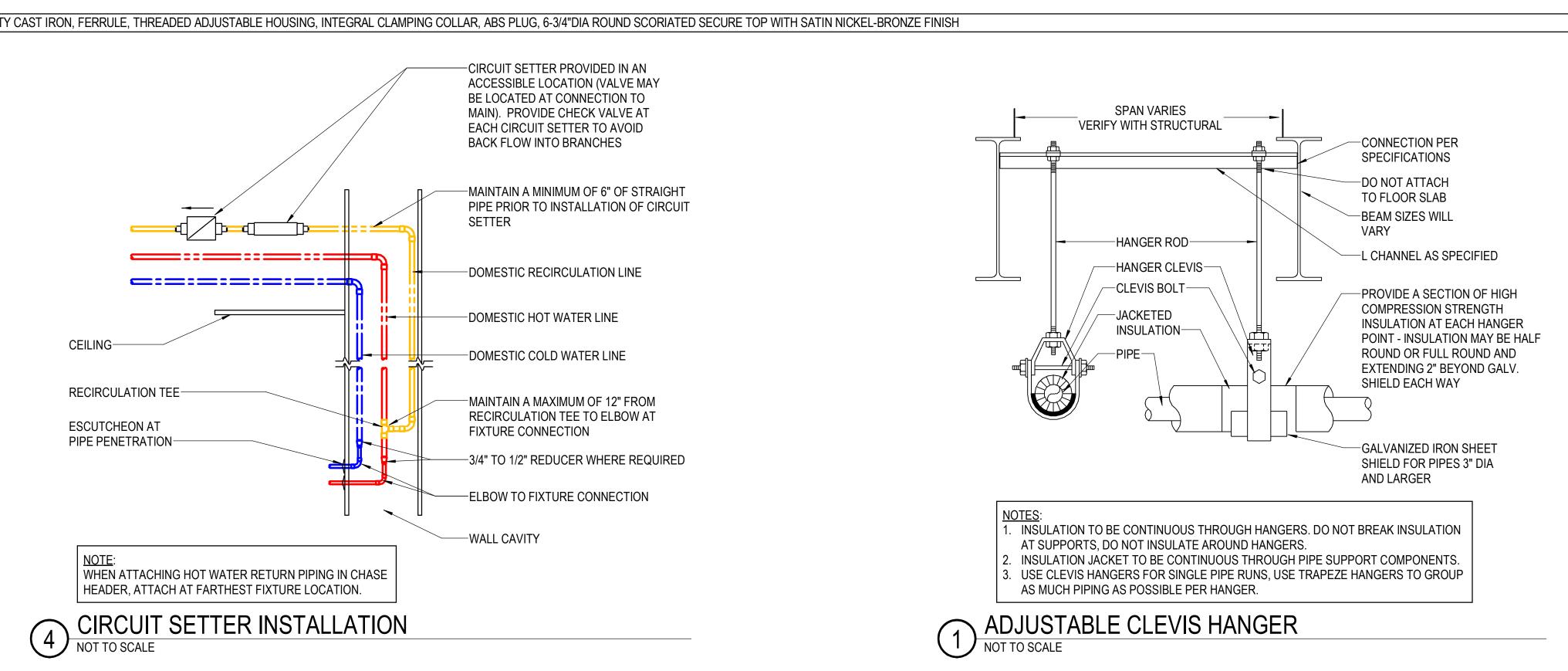
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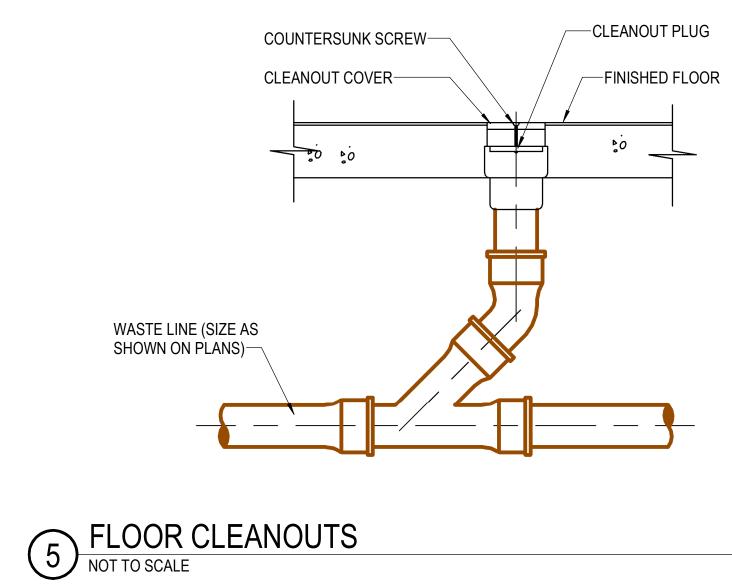


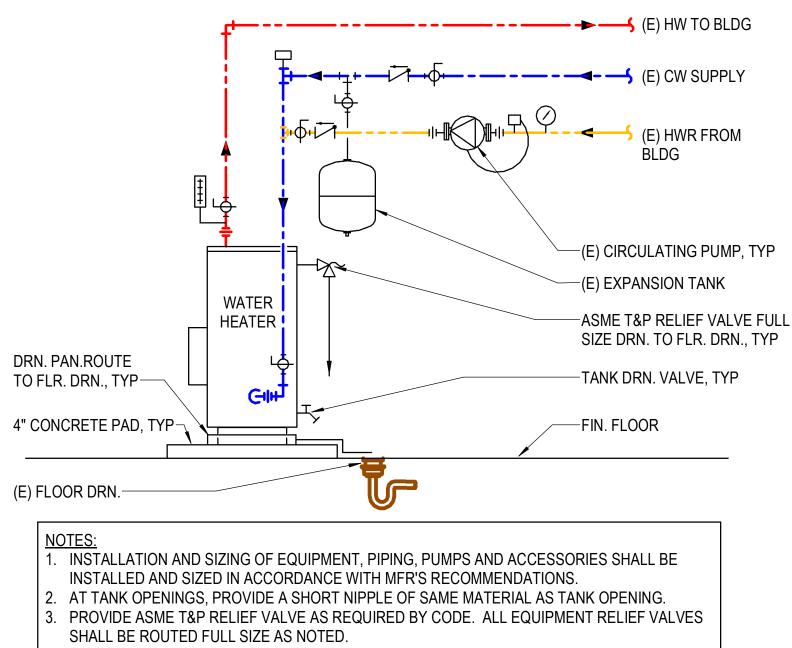
UR ____ CUL 4960 SSES BUSINE S Ш \geq W. LOCUST ST., STILV ARGED PLUMBING PL NATION **CHEROKEE CENTER** 314 W. LOCUS ENLARGED PLI blueriver ARCHITECTS A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com DESIGNED FOR COLOR PRINTING 08-23-2024 PROJECT #: 20200132 ISSUE DATES: CONSTRUCTION DOCUMENTS 08/23/2024 No. Description Date SHEET NUMBER: **P-401**

		BASIS OF DESIGN									
ID	MANUFACTURER & MOI	DEL	ACCESSORIES		COLD	HOT	WASTE	INDIRECT	VENT	TRAP	
SK-1	#170-LF-BP MCGUIRE OFFSE MCGUIRE P-TRA MCGUIRE SUPPL		MCCHIPE OFESET BASKET STRAINER #1151AMC		1/2"	1/2"	2"		2"	1-1/2"	SINI GOO
JS-1	MUSTEE, 63M	JBBER HOSE AND HAN OP HANGER, /ALL GUARD, MUSTEE,	IGER,	3/4"	3/4"	3"		2"	3"	MOF	
			,,								
ID	BASIS OF DESIGN		ELECT								
ID	BASIS OF DESIGN MANUFACTURER & MODEL	UTILITY CONNECTIONS			PHASI	E P(DWER	AMPS	II		
ID EWH-1			ELECT	RICAL	PHASI 1		DWER 3 kW	14.5 FLA		WATER HEATER YURETHANE FC	
	MANUFACTURER & MODEL	UTILITY CONNECTIONS 3/4"CW, 3/4"HW	ELECT CONNECTION TYPE HARDWIRED WITH	RICAL VOLTAGE	PHASI 1		-	14.5 FLA			
	MANUFACTURER & MODEL	UTILITY CONNECTIONS 3/4"CW, 3/4"HW	ELECT CONNECTION TYPE HARDWIRED WITH	RICAL VOLTAGE	PHASI 1		-	14.5 FLA			
EWH-1	MANUFACTURER & MODEL RHEEM, #ELD40	UTILITY CONNECTIONS 3/4"CW, 3/4"HW	ELECT CONNECTION TYPE HARDWIRED WITH	RICAL VOLTAGE	PHASI 1		-	14.5 FLA			

-41 /









PLUMBING FIXTURE

SPECIFICATION

SINK - 31"x22"x7-5/8"D, 1 COMPARTMENT, COUNTER-TOP, SELF RIMMING, 18 GAUGE TYPE 304 STAINLESS STEEL, CENTER DRAIN OUTLET, THREE FAUCET HOLES ON 8" CENTERS, 64oz GLECO TRAP, FAUCET - 2.2 GPM, CHROME PLATED LEAD FREE, 8-13/16" GOOSENECK SWING SPOUT, DECK MTD, 4" WRIST BLADES, CONCEALED DUAL HOT/COLD SUPPLY, 8" FIXED CENTERS, THERMOSTATIC MIXING VALVE SET 110 DEGREES.

SPECIFICATION

10P SINK - 24" x 24" x 10", FLOOR MTD, DURASTONE, FAUCET - HEAVY DUTY CHROME PLATED LEAD FREE, VACUUM BREAKER, PAIL HOOK, 3/4" HOSE THREADED OUTLET, UPPER SUPPORT ROD

PLUMBING EQUIPMENT

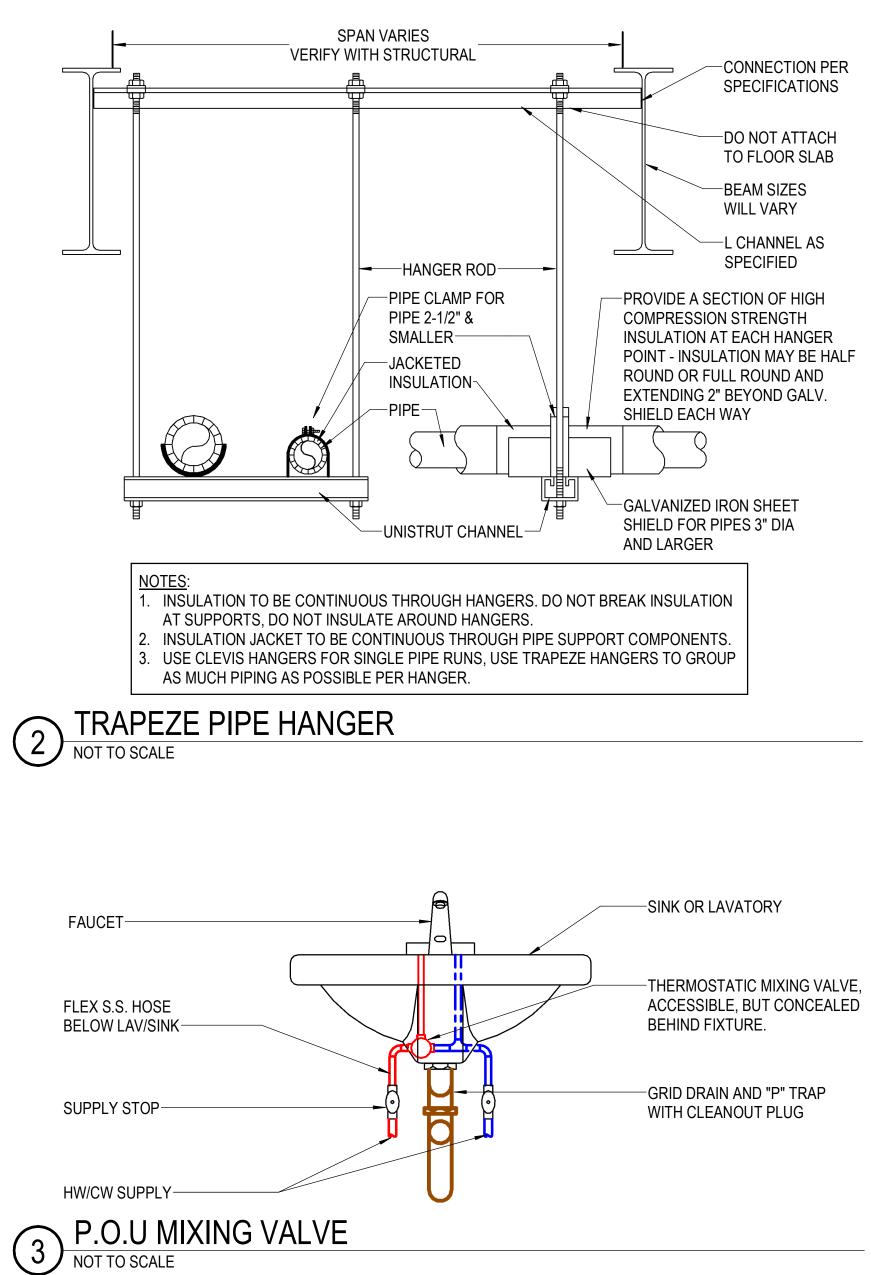
GAL, 12 GPH @ 100°F RISE, 20"DIA 48"H, TANK TYPE, HIGH-TEMP PORCELAIN ENAMEL TANK LINING, MAGNESIUM ANODE ROD RIGIDLY SUPPORTED, 150 PSI WORKING PRESSURE RATING, COPPER RESISTORED SCREW-IN ELEMENTS, INSLUTED WITH 2-1/2" SURFACE MOUNTED THERMOSTATS WITH INTEGRAL MANUAL RESET, HIGH LIMIT CONTROL, CSA/ASME RATED T&P RELIEVE VALVE, UL SEAL OF CERTIFICATION, COMPLETELY FACTORY ASSEMBLED

SPECIFICATION

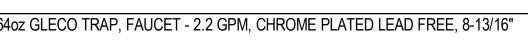
PLUMBING ACCESSORY

. INSTALL SPRING CHECK VALVE IN GRAVITY CLOSED POSITION. 5. DETAIL SHOWS GENERIC HOT WATER SYSTEM FOR GENERAL SYSTEM REQUIREMENTS. 6. ALL ISOLATION BALL VALVE SHALL BE FULL PORT TYPE. . PIPING ARRANGEMENT IS DIAGRAMMATIC AND IS SHOWN FOR CLARITY. PIPING SHALL BE INSTALLED NEATLY AND GROUPED FOR EASY ACCESS AND SERVICEABILITY.

6 WATER HEATER INSTALLATION - EWH-1 NOT TO SCALE



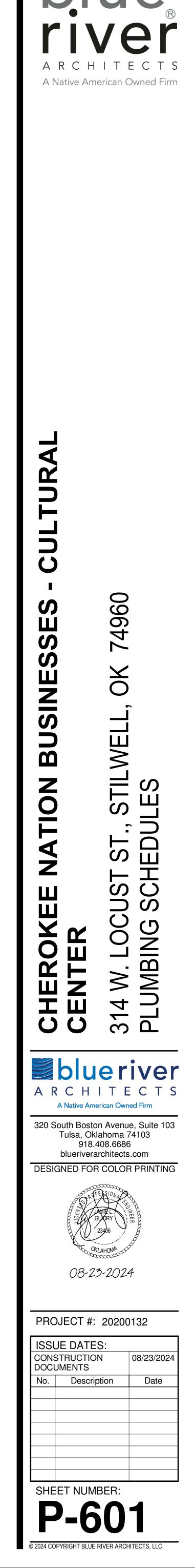
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P.D.I. UNITS	Α	
FIXTURE UNITS	1-11	
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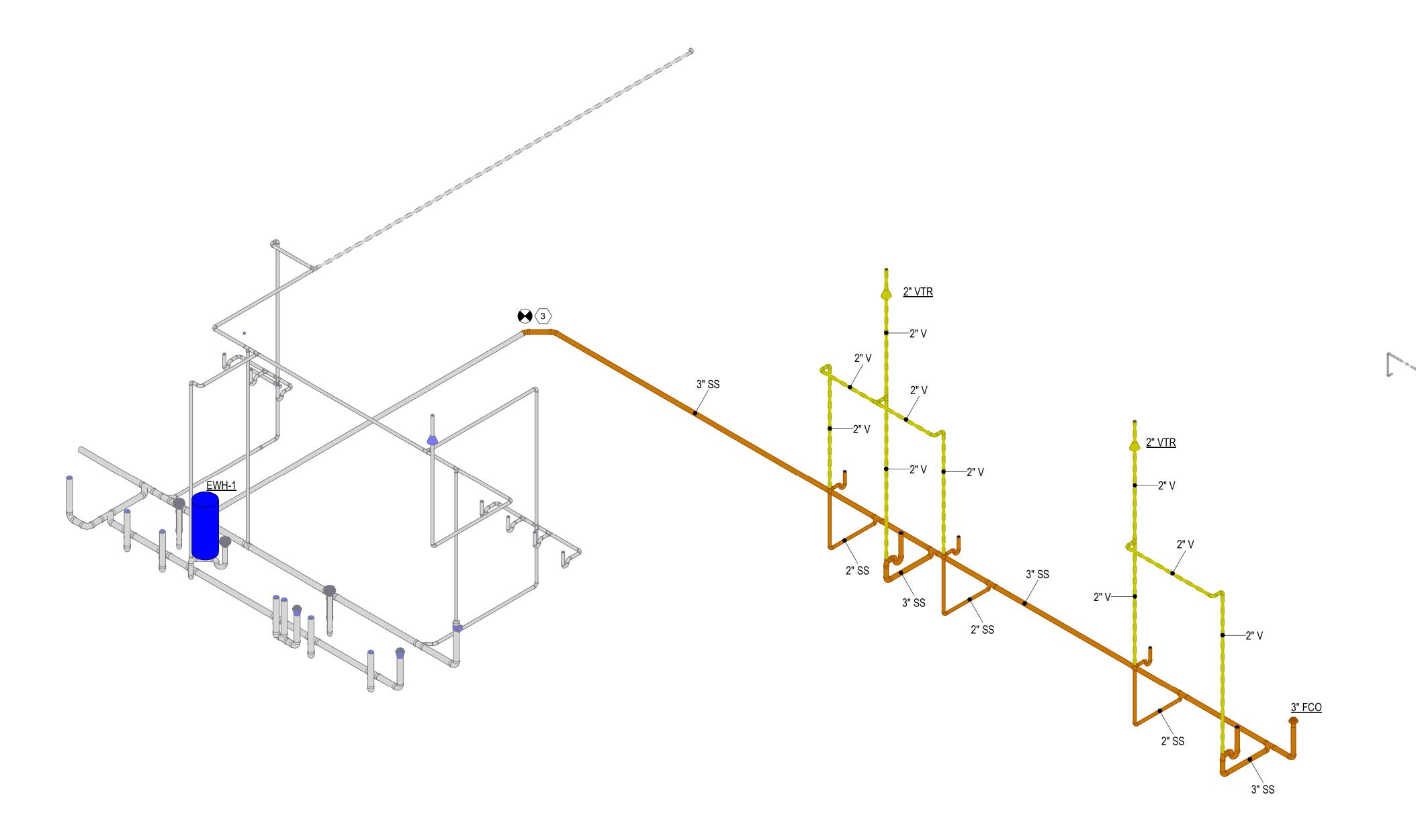


VATER HAMMER ARRESTOR D E

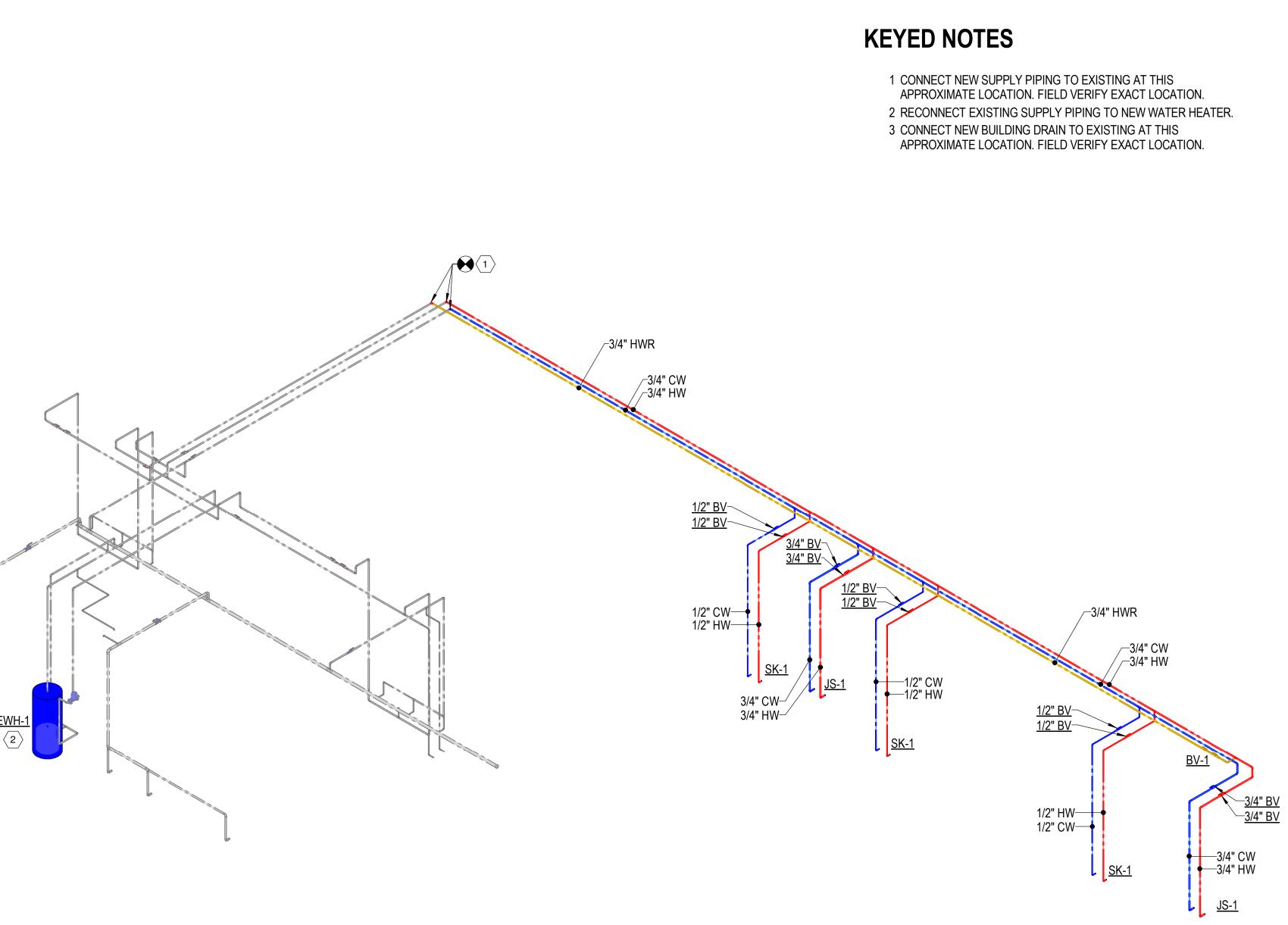
33-60 61-113 114-154 155-330 12-32 ATER HAMMER ARRESSTOR, SEAMLESS COPPER CONSTRUCTION, POLYPROPYLENE NNECTION, MAX. PRESS. 350 PSI, MAX. TEMP. 250°F, PROVIDE PROPERLY SIZED WATER E ON PIPING IMMEDIATELY UPSTREAM OF ALL QUICK CLOSING VLAVES (E.G. FLUSH S, SOLENOID VALVES, ETC.)

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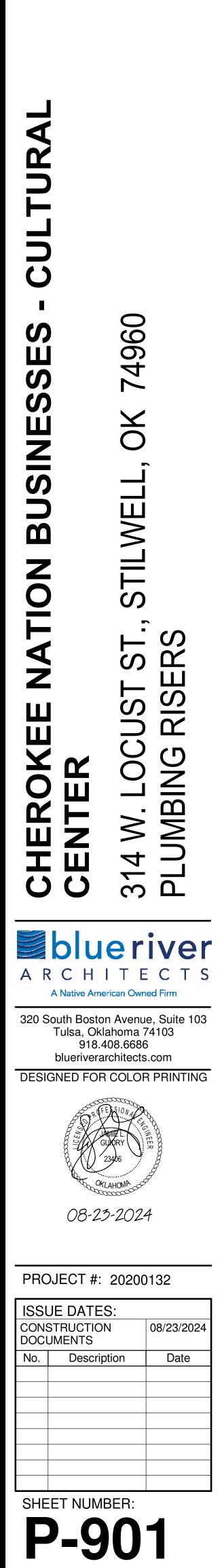


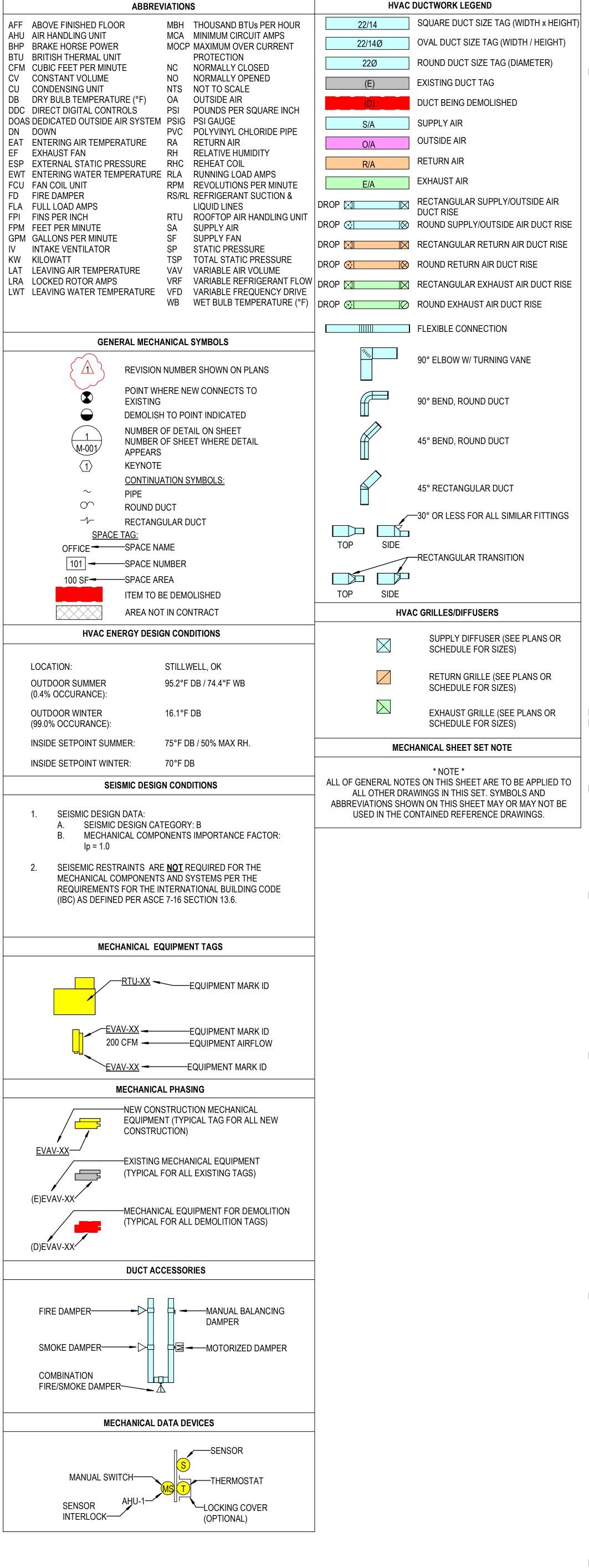
2 DRAIN, WASTE, VENT PLUMBING RISER



1 DOMESTIC WATER RISER NOT TO SCALE







MECHANICAL SPECIFICATIONS

SECTION 23 05 10 **BASIC HVAC REQUIREMENTS** PART 1 GENERAL 1.01 RELATED DOCUMENTS 3.05 RECORDING AND ADJUSTING A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. 1.02 PROJECT MANAGEMENT A. Drawings are diagrammatic, all offsets, fitting, valves and accessories are not shown. Refer to all drawings in the contract documents and plan work accordingly. Coordinate with all trades and crafts. B. In case of interference between trades, Architect Engineer will decide which work is to take precedence regardless of work that might be installed. 1.03 CODES, ORDINANCES, INSPECTIONS, AND PERMITS A. Execute and inspect Work in accordance with local and state codes, laws, ordinances, rules and regulations applicable to particular class of Work. B. Should any part of Drawings or specifications be found to be in conflict with applicable codes or rdinances, notify the Architect Engineer, in writing, 72 hours prior to receiving of bids. After the receiving of bids, any discovery of code violations shall be promptly reported to the Architect Engineer. Any work performed knowingly in violation of codes shall be corrected without additional expense to the Owner or his representative. C. Arrange with County, City, or State, if City has no ordinances covering work, for complete inspection, paying all charges pertaining thereto. Give proper authority all requisite notice relating to work under such; afford Architect Engineer and all authorized inspectors every facility for inspection and be responsible for all violations of law. Upon completion of Work, have Work inspected, if required, obtaining certificate of inspection and approval from inspecting agency and deliver such certificate to Architect Engineer. Comply with Division 01. 1.04 COORDINATION 3.06 DUCT AIR LEAKAGE TESTING (DALT) A. Conduct multi-trade coordination and preinstallation meetings to establish bottom elevations of all piping, ductwork and conduit before fabrication and installation. Comply with Division 01. 3.07 AIR SYSTEM PROCEDURE B. All equipment shall be installed in accordance with the manufacturer's recommendations. It is the contractor's responsibility to follow all installation requirements and guidelines provided in the manufacture's installation manual. If there is a conflict with regards to installation, the contractor shall stop work and notify the design Architect Engineer representative. 1.05 SUBSTITUTIONS A. Comply with Division 01. B. Any proposed substitutions of equipment shall be accompanied by shop drawings showing revised equipment layouts, piping diagrams, ductwork drawings and/or wiring diagrams. Where substituted equipment furnished requires use of larger, more, or differently arranged connections, such connections shall be installed to the complete satisfaction of Architect Engineer without additional cost to Owner. C. Should a substitution be accepted and subsequently proven unsatisfactory for the service intended within the warranty period, the Contractor shall replace this material or equipment with that as originally specified, or corrected as directed by Architect Engineer. 1.07 EQUIPMENT START-UP AND SYSTEM COORDINATION A. Comply with Division 01. B. The Contractor shall be responsible for placing all equipment and system components into operation. Individual components shall be coordinated with other parts of Mechanical, Electrical, Plumbing and/or Fire Protection Systems to ensure that the entire project functions as designed and described by the contract documents. 1.08 CUTTING AND PATCHING A. Comply with Division 01 3.08 MINIMUM DATA TO BE REPORTED B. Provide all cutting and patching required to perform the mechanical work, when alteration, repair, renovation, or addition, to existing construction. 1.09 ACCESS PANELS A. Heating Coils: A. Provide access panels as necessary for servicing of fire dampers, smoke dampers, valves, VAV terminals and any other equipment in concealed Manufacturer. spaces. 1.10 GUARANTY-WARRANTY A. This guarantee shall include capacity and integrated performance of component parts of various systems in strict accord with the true intent and purpose of these specifications. Conduct such tests as herein specified or as may be required by the Architect Engineer to demonstrate capacity and performance ability of various systems to maintain specified conditions. B. Exhaust Fans: B. All materials and equipment shall be new and unused and shall carry a full year's warranty from time Owner accepts building or the date of substantial completion, whichever is earlier, regardless of start-up date of equipment, unless a longer warranty period is specified under other 1. Location. sections. 1.11 EQUIPMENT CONNECTIONS AND INSTALLATION A. Rough-in and make final connection to all equipment requiring same, furnished under other Divisions of these specifications or by the Owner. C. Terminal Unit Data: 1. Provide necessary labor and materials, including trap and vent drainage connections. 2. If equipment or fixtures to be furnished by Owner and/or Owner's vendor are not delivered prior to final acceptance, services shall be capped or plugged at walls or floor as directed, ready for future connection B. No equipment or fixture shall be "roughed-in" until proper rough-in drawings are in the hands of the trade doing the work. 4. Location. C. Unless another form of vibration isolation is used, all equipment shall be mounted at least on neoprene pads. 5. Model number. 1.12 ELECTRICAL 6. Size. A. Furnish and install all electrical interlock, control and other wiring, not covered specifically under the electrical plans and specifications, for proper operation and control of all equipment specified under this Division of the specifications. B. Provide electrical disconnects for all mechanical equipment as per NEC. C. Supervise and coordinate all electrical work in connection with mechanical system. PART 2 PRODUCTS - NOT USED 11. Inlet static pressure. PART 3 EXECUTION - NOT USED END OF SECTION SECTION 23 05 29 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT PART 1 GENERAL PART 1 GENERAL **1.01 SECTION INCLUDES** 1.01 SECTION INCLUDES A. Duct insulation. A. Support and attachment components **1.02 ADMINISTRATIVE REQUIREMENTS** B. Duct liner. C. Insulation jackets. A. Coordination: 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed. 1.02 QUALITY ASSURANCE 2. Coordinate the work with other trades to provide additional framing and materials require for installation. 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations. 4. Coordinate the arrangement of supports with ductwork, equipment and other potential conflicts installed under other sections or by others. 5. Notify Architect Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work. PART 2 PRODUCTS 1.04 FIELD CONDITIONS 2.01 SUPPORT AND ATTACHMENT COMPONENTS A. General Requirements: PART 2 PRODUCTS 2.01 REGULATORY REQUIREMENTS 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of A. Surface Burni mechanical work. 2.02 GLASS FIBER, FLE 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable. 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria A. Insulation: AS as required for the load to be supported with a minimum safety factor of 3.5. Include consideration for vibration, equipment operation, and shock loads where applicable 4. Steel Components: Use corrosion resistant materials suitable for the environment where installed. B. Vapor Barrier Jacket: a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633. b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M. B. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports. C. Hanger Rods to be threaded zinc-plated steel unless otherwise indicated. C. Vapor Barrier Tape: PART 3 EXECUTION 3.01 EXAMINATION 2.03 GLASS FIBER, RIGID A. Verify that field measurements are as indicated. B. Verify that mounting surfaces are ready to receive support and attachment components. C. Verify that conditions are satisfactory for installation prior to starting work 3.02 INSTALLATION A. Install products in accordance with manufacturer's instructions B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems. B. Vapor Barrier Jacket: C. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer. D. Equipment Support and Attachment: 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required. 2. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support. C. Vapor Barrier Tape: E. Secure fasteners according to manufacturer's recommended torque settings. F. Remove temporary supports. 3.03 FIELD QUALITY CONTROL A. Inspect support and attachment components for damage and defects. 2.04 JACKETS B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion C. Correct deficiencies and replace damaged or defective support and attachment components **SECTION 23 05 93** TESTING, ADJUSTING, AND BALANCING FOR HVAC PART 1 GENERAL 1.01 SECTION INCLUDES A. Testing, adjustment, and balancing of air systems. B. Duct Air Leakage Testing PART 3 EXECUTION C. Measurement of final operating condition of HVAC systems. 3.01 EXAMINATION 1.02 SUBMITTALS A. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each B. Verify that surfaces are clean, foreign material removed, and dry. system and component. 3.02 INSTALLATION 1. Submit to Architect Engineer. 2. Submit one week prior to starting the testing, adjusting, and balancing work B. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems. Submit to the the Commissioning Authority within two weeks after completion of testing, adjusting, and balancing. 2. Revise TAB plan to reflect actual procedures and submit as part of final report. 3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect Engineer and for inclusion in operating and maintenance manuals. 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that follow ASHRAE Std 111. 5. Units of Measure: Report data in I-P (inch-pound) units only. Include the following on the title page of each report: a. Name of Testing, Adjusting, and Balancing Agency. b. Address of Testing, Adjusting, and Balancing Agency. c. Telephone number of Testing, Adjusting, and Balancing Agency. 3.03 INSULATION SCHEDULES d. Project name. A. Supply Ducts: 2" Glass Fiber, Flexible e. Project location. f. Project Contractor. g. Report date. PART 2 PRODUCTS - NOT USED PART 3 EXECUTION 3.01 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:

1 AABC (NSTSB). AABC National Standards for Total System Balance. 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.

- 3. SMACNA (TAB). 4. NEBB (TAB)
- 3.02 EXAMINATION

A. Verify systems are complete and operable before commencing work. B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions. 3.03 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 10 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 10 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

MECHANICAL SPECIFICATIONS (cont)

SECTION 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC (cont.)

A. Field Logs: Maintain written logs including: 1. Running log of events and issues.

2. Discrepancies, deficient or uncompleted work by others.

3. Contract interpretation requests. 4. Lists of completed tests.

A. Ensure recorded data represents actual measured or observed conditions B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock

memory stops. C. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in

the final report. D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified. E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

F. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

A. TAB Agency shall perform the leakage test as outlined in Section 23 31 00 HVAC Ducts and Casings

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities B. Measure air quantities at air inlets and outlets.

C. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise

D. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters. E. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

F. Provide system schematic with required and actual air quantities recorded at each outlet or inlet. G. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions. I. Measure temperature conditions across outside air, return air, and exhaust dampers.

J. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, at minimum air flow rate, and full heating air flow rate. K. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain

approximately 0.05 inches positive static pressure near the building entries. L. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

1. Identification/number

3. Air flow, design and actual 4. Entering air temperature, design and actual 5. Leaving air temperature, design and actual.

6. Air pressure drop, design and actual.

2. Air flow, specified and actual. 3. Total static pressure (total external), specified and actual.

1. Manufacturer. 2. Type, constant, variable, single, dual duct.

3. Identification/number

7. Minimum static pressure. 8. Minimum design air flow. 9. Maximum design air flow. 10. Maximum actual air flow.

END OF SECTION

SECTION 23 07 13 **DUCT INSULATION**

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type with three years of documented experience. 1.03 DELIVERY, STORAGE, AND HANDLING A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness. B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

ning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, in accordance with ASTM E84 or UL 723.
EXIBLE
STM C553; flexible, noncombustible blanket.

1. 'K' value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518. 2. Maximum Service Temperature: 250 degrees F 3. Maximum Water Vapor Absorption: 5.0 percent by weight.

1. Kraft paper with glass fiber yarn and bonded to aluminized film. 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.

3. Secure with pressure sensitive tape.

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive. A. Insulation: ASTM C612; rigid, noncombustible blanket.

1. 'K' Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518. 2. Maximum Service Temperature: 450 degrees F

3. Maximum Water Vapor Absorption: 5.0 percent. 4. Maximum Density: 8.0 lb/cu ft.

1. Kraft paper with glass fiber yarn and bonded to aluminized film. 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.

3. Secure with pressure sensitive tape.

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive. D. Indoor Vapor Barrier Finish:

1. Cloth: Untreated; 9 oz/sq yd weight, glass fabric. 2. Vinyl emulsion type acrylic, compatible with insulation, black color.

A. Exterior insulation jackets for outside applications shall be a multi-ply embossed UV-resistant aluminum foil/polymer laminate with a layer of rubberized asphalt specially fomulated for use on insulated duct. The jacket will include a metalized polyester film coated with a high quality low temperature acrylic adhesive that allows for a peel and stick functionality. B. Aluminum (Indoor) Jacket: ASTM B209 (ASTM B209M).

1. Thickness: 0.016 inch sheet. 2. Finish: Smooth. 3. Joining: Longitudinal slip joints and 2 inch laps. 4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner. 5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

A. Verify that ducts have been sealed and air leak tested per Section 23 31 00 - HVAC Ducts and Casings before applying insulation materials.

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Insulated ducts conveying air below ambient temperature: 1. Provide insulation with vapor barrier jackets and finish with tape and vapor barrier jacket.

2. Continue insulation through walls, sleeves, hangers, and other duct penetrations. 3. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

D. External Duct Insulation Application: 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket

2. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off

trapeze hangers and insert spacers. 3. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.

4. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

B. Return Ducts: 2" Glass Fiber, Flexible

C. Ducts Exposed to Outdoors: 2" Glass Fiber, Rigid with Exterior Insulation Jacket. D. Exhaust Ducts: As required for personnel protection.

END OF SECTION

MECHANICAL GENERAL NOTES

ALL WORK SHALL WITH THE 2015 EDITION OF THE "OKLAHOMA MECHANICAL CODE", THE 2006 EDITION OF THE ENERGY CONSERVATION CODE, NFPA 90A, AND ALL CITY, STATE, AND LOCAL REQUIREMENTS. REFER TO PLANS FOR:

- REFLECTED CEILING PLAN FOR EXACT LOCATION OF AIR DEVICES AND CEILING TYPES. - FIRE RATED WALLS AND PARTITIONS. PROVIDE FIRE DAMPERS IN DUCT PENETRATIONS OF ALL FIRE RATED WALLS AND PARTITIONS AS NECESSARY TO MEET CITY AND STATE REQUIREMENTS. ALL DUCTWORK BE CONSTRUCTED FROM GALVANIZED STEEL IN CONFORMANCE WITH SMACNA "HVAC DUCT CONSTRUCTION

STANDARDS." LATEST EDITION

U.L. LISTED DUCT RUN-OUTS MAY BE USED. BUT SHALL NOT EXCEED 5'-0" IN LENGTH. ALL FLEXIBLE DUCT TO BE PROPERLY SUPPORTED WITH NO KINKS OR HARD BENDS.

ALL ROOF, WALL, AND FLOOR OPENINGS SHALL BE REPAIRED UNLESS NOTED OTHERWISE

DUCT FITTINGS: - SUPPLY TAKE-OFFS TO CEILING SUPPLY DIFFUSERS TO BE CONICAL TAP OR 45° SIDE TAP. - ALL DUCT RUN-OUTS TO HAVE LOCKING QUADRANT VOLUME DAMPERS. PROVIDE STAND-OFF BRACKET TO ACCOMMODATE INSULATION THICKNESS - ALL 90° ROUND ELBOWS TO HAVE R/D=1.5 (UNLESS OTHERWISE NOTED) - ALL 90° RECTANGULAR ELBOWS TO HAVE TURNING VANES (UNLESS OTHERWISE NOTED). - PROVIDE HARD ELBOW WHEN TRANSITIONING FROM RIGID TO FLEXIBLE DUCT WHEN CONNECTING TO AIR DEVICES. REFER TO DETAIL.

DUCTWORK SHALL BE COORDINATED WITH STRUCTURAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION, COMPONENTS AND SYSTEMS. ALL DUCTWORK THAT HAS TO BE OFFSET DUE TO AN OBSTRUCTION SHALL BE SLOPED WITH 2-30° ELBOWS UNLESS OTHERWISE NOTED.

PROVIDE PANELS IN CEILINGS OTHER THAN LAY-IN TYPE WHERE NECESSARY: - CLOSELY COORDINATE LOCATIONS AND SIZE OF ACCESS PANELS WITH INSTALLED EQUIPMENT TO ACHIEVE GREATEST ACCESSIBILITY FOR MAINTENANCE PURPOSES. - PROVIDE ACCESS PANEL AT BALANCING DAMPERS, FIRE DAMPERS, CONTROLS, VALVES, TRAPS, CLEAN OUTS, ETC.

COMPLETELY INSULATE THE TOPS OF ALL CEILING DIFFUSERS.

COORDINATE LOCATIONS OF INSTALLED EQUIPMENT TO ACHIEVE THE GREATEST ACCESSIBILITY.

THAN 10' FROM ROOF'S EDGE, OR PARAPET.

EXHAUST FANS.

COVERS.

15. WORK CLOSELY WITH CONTROL CONTRACTOR. PROVIDE ALL NECESSARY DUCT. PIPE TAPS. TEES. WELLS. CONTROL DAMPERS. AIR MEASURING STATIONS, AND OTHER ACCESSORIES REQUIRED BY CONTROL SYSTEM

 SLEEVE AND ALL PIPE AND DUCT PENETRATIONS THROUGH FIRE RATED AND NON-RATED SLABS AND PARTITIONS. 17. RELOCATE EXISTING-TO-REMAIN AIR DEVICES AS NEEDED TO MATCH NEW CEILING GRID LOCATIONS. FIELD VERIFY NEAREST APPROPRIATE DEVICE LOCATION.

THE WORK HEREIN IS MODIFICATION TO EXISTING SYSTEMS AND UNKNOWN CONDITIONS OR INCORRECT LOCATIONS OF EXISTING MECHANICAL ELEMENTS MAY BE DISCOVERED DURING CONSTRUCTION. THE CONTRACTOR SHALL MAKE EVERY EFFORT TO ENSURE THE NEW SYSTEM ADDITIONS INTERACT SEAMLESSLY WITH EXISTING SYSTEMS.

CONTRACTOR TO THOROUGHLY CLEAN ALL EXISTING FAN FILTER UNITS AND REUSED AIR DEVICES

20. ALL NEW AND EXISTING AIR DEVICES WITH SCHEDULED AIRFLOWS SHALL BE RE-BALANCED UPON COMPLETION OF DUCT/SYSTEM MODIFICATIONS.

MECHANICAL DEMOLITION NOTES

CONTRACTOR SHALL SURVEY EXISTING SITE CONDITIONS INCLUDING, BUT NOT LIMITED TO: * DUCT SIZES AND PENETRATION LOCATIONS * EQUIPMENT CONNECTIONS AND LOCATIONS. * CONTROLS.

PROVIDE MODIFICATIONS TO NEW AND EXISTING SYSTEMS TO FACILITATE THE INSTALLATION AND INTERFACE OF NEW AND EXISTING SYSTEMS.

EXISTING SYSTEMS AND INFORMATION SHOWN ON THESE PLANS WERE DEVELOPED USING EXISTING BUILDING DRAWINGS. CONTRACTOR SHALL VERIFY AT SITE ALL EXISTING SYSTEMS. REMOVE ALL PORTIONS OF PIPING SYSTEMS BEING REMOVED OR ABANDONED. TERMINATE EXISTING SYSTEMS ABOVE CEILINGS AND BELOW FLOOR SLABS IN A MANNER THAT WILL NOT CONFLICT WITH NEW WORK. CLOSELY COORDINATE NEW WORK WITH EXISTING SYSTEMS. PROVIDE OFFSETS IN EXISTING AND NEW SYSTEMS AS REQUIRED TO AVOID CONFLICTS.

COORDINATE AND SCHEDULE ALL CONNECTIONS TO EXISTING SYSTEMS AND SYSTEM SHUT-DOWNS WITH MAINTENANCE PERSONNEL. EXISTING EQUIPMENT BEING REMOVED AND DESIGNATED TO REMAIN THE PROPERTY OF THE OWNER SHALL BE DELIVERED UPON REMOVAL TO LOCATION DESIGNATED BY OWNER. ALL OTHER SYSTEM COMPONENTS REMOVED SHALL BECOME THE PROPERTY OF

THE CONTRACTOR.

REMOVE AND RELOCATE SMALL CONDUIT, CABLE, PIPE, DUCT, CEILING HANGERS, ETC. AS NECESSARY TO ACHIEVE A COMPLETE INSTALLED MECHANICAL SYSTEM AS SHOWN ON DRAWINGS.

PATCH ALL WALLS, FLOORS, ROOFS AND CEILINGS TO MATCH EXISTING AND/OR NEW FINISHES FOR ALL OPENINGS CREATED BY DEMOLITION WORK OF EQUIPMENT AND HVAC SERVICE PENETRATIONS. REUSE OF EXISTING OPENINGS IS ENCOURAGED SO LONG AS IT IS ADVANTAGEOUS TO PROJECT SCHEDULE, COST, OR INTEGRITY.

REFER TO ELECTRICAL PLANS FOR EXTENT OF DEMOLITION WORK RELATING TO WIRING FOR SUPPORT OF HVAC EQUIPMENT TO BE

REMOVED.

MAINTAIN 10'-0" MINIMUM BETWEEN OUTSIDE AIR INTAKES AND ALL EXHAUST FANS, FLUES, PLUMBING VENTS, ETC.

ALL ROOF HVAC EQUIPMENT, INCLUDING BUT NOT LIMITED TO EXHAUST FANS, CONDENSING UNITS, AND ROOF-TOP UNITS, SHALL BE A MINIMUM OF 10' FROM THE ROOF'S EDGE, OR PARAPET, UNLESS OTHERWISE NOTED ON PLANS. IN SUCH CASE, CONTRACTOR SHALL COORDINATE WITH ARCHITECT TO PROVIDE SAFETY HANDRAILS AROUND ROOF MOUNTED HVAC EQUIPMENT THAT IS LOCATED LESS

PROVIDE FLEXIBLE CONNECTIONS AT INLETS AND OUTLETS OF ALL AIR HANDLING UNITS, MAKE-UP AIR UNITS, FURNACES, AND/OR

14. ALL WALL-OCCUPANT-CONTROLLED HVAC DEVICES, I.E., THERMOSTATS, HUMIDISTAT, CO2 CONTROLLERS, CONTROL PANELS, ETC., SHALL BE MOUNTED 4'-0" ABOVE FINISHED FLOOR. CONTROLS LOCATED IN PUBLIC AREAS SHALL HAVE CLEAR PLASTIC LOCKING



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DESIGNED FOR COLOR PRINTING



PROJECT #: 20200132

ISSUE DATES:							
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MECHANICAL SPECIFICATIONS (cont)

SECTION 23 31 00 **HVAC DUCTS AND CASINGS**

PART 1 GENERAL 1.01 SECTION INCLUDES

- A. Metal ducts. B. Flexible ducts.
- C. Air plenums and casings D. Duct Leakage Tests and Repair
- 1.02 QUALITY ASSURANCE
- A. Manufacturer Qualifications: Company specializing in manufacturing the type of productsspecified in this section, with minimum three years of documented experience, and approved by manufacturer.
- B. Duct Sealing, Air Leakage Criteria, and Air Leakage Tests: Ducts shall be sealed as per duct sealing requirements of SMACNA HVAC Air Duct Leakage Test Manual for duct pressure classes shown on the drawings.
- 1.03 REGULATORY REQUIREMENTS A. Construct ductwork to NFPA 90A standards.

PART 2 PRODUCTS 2.01 DUCT ASSEMBLIES

- A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise. B. Provide galvanized steel duct unless otherwise indicated.
- C. Acoustical Treatment: Provide sound-absorbing liners and sectional silencers for metal-based ducts.
- D. Acoustical Treatment: Where indicated on the drawings, provide sound-absorbing liners and/or sectional silencers for metal-based ducts. E. Duct Shape and Material in accordance with Allowed Static Pressure Range:
- 1. Round: Plus or minus 4 in-wc of galvanized steel. 2. Rectangular: Plus or minus 3 in-wc of galvanized steel.
- F. Duct Sealing and Leakage in accordance with Static Pressure Class:
 - 1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications: a. Low Pressure Supply Air: 1 in-wc pressure class, galvanized steel.
 - b. Medium and High Pressure Supply Air: 3 in-wc pressure class, galvanized steel.
 - c. Return and Relief Air: 1 in-wc pressure class, galvanized steel. d. General Exhaust Air: 1 in-wc pressure class, galvanized steel.
 - 2. Low Pressure Service: Up to 2 in-wc: a. Seal: Class C, apply to seal off transverse joints.
- b. Leakage: Rectangular: Class 24 or 24 cfm/100 sq ft., Round: Class 12 or 12 cfm/100 sq ft. G. Materials:
- 1. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
- H. Duct Fabrication Requirements: 1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
- 2. Construct tee's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation. Square throat, round heel
- fitting are not allowed. 3. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- 2.02 MANUFACTURED DUCTWORK AND FITTINGS
- A. Material Requirements: 1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
 - B. Round Metal Ducts:
 - 1. Round Single Wall Duct: Round lock seam duct with galvanized steel outer wall. 2. Round Connection System: Interlocking duct connection system per SMACNA (DCS).
 - C. Round Spiral Duct:
 - 1. Round spiral lock seam duct with galvanized steel outer wall. D. Connectors, Fittings, Sealants, and Miscellaneous:
 - 1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
 - 2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS). 3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - b. VOC Content: Not more than 250 g/L, excluding water.
 - c. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84. 4. Gasket Tape:
 - a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.
- 5. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded. 6. Hanger Fasteners: Attach hangers to structure using appropriate fasteners as follows: 2.03 FLEXIBLE DUCTS
- A. Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form spiral helix.

1. Insulation: R6 insulation with polyethylene vapor barrier film. 2. Pressure Rating: 10 in-wc positive and 5 in-wc negative.

- 3. Maximum Velocity: 5500 fpm. 4. Temperature Range: Minus 20 degrees F to 250 degrees F.
- PART 3 EXECUTION
- 3.01 INSTALLATION A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions. C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering
- ductwork system.
 - D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities. E. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
 - F. Use double nuts and lock washers on threaded rod supports.
 - G. Connect terminal units to supply ducts directly or with one foot maximum length of flexible duct. Do not use flexible duct to change direction. H. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.
- 3.02 DUCT LEAKAGE TESTS AND REPAIR
- A. Ductwork leakage testing shall be performed by the Testing and Balancing Contractor directly contracted by the General Contractor and independent of the Sheet Metal Contractor.
- B. Ductwork leakage testing shall be performed for medium pressure supply ductwork only, section by section.
- C. Do not test flex duct run-outs to air devices or terminal units. D. If any portion of the duct system tested fails to meet the permissible leakage level, the Contractor shall rectify sealing of ductwork to bring it into
- compliance and shall retest it until acceptable leakage is demonstrated to the Commissioning Agent. E. All tests and necessary repairs shall be completed prior to insulation or concealment of ductwork.
- F. Make sure all openings used for testing flow and temperatures by TAB Contractor are sealed properly.
 - END OF SECTION

PART

SECTION 23 33 00 AIR DUCT ACCESSORIES

PART 1 GENERAL

- 1.01 SECTION INCLUDES A. Combination fire and smoke dampers.
 - B. Duct access doors C. Duct test holes.
 - D. Fire dampers.
 - E. Flexible duct connections
 - F. Smoke dampers. G. Volume control dampers.
 - H. Miscellaneous Products:
 - 1. Damper operators. 2. Airflow meters, fixed-resistance type.
- 3. Airflow meters, thermal-dispersion type.
- 1.02 SUBMITTALS
- A. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.
- C. Manufacturer's Installation Instructions: Provide instructions for fire dampers
- **1.03 QUALITY ASSURANCE** A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience. B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated. PART 2 PRODUCTS
- 2.01 DUCT ACCESS DOORS
- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- 2.02 FLEXIBLE DUCT CONNECTIONS
- A. Fabricate in accordance with SMACNA (DCS) and as indicated. B. Flexible Duct Connections: Fabric crimped into metal edging strip.
- 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd. a. Net Fabric Width: Approximately 2 inches wide.
- 2. Metal: 3 inches wide, 24 gage, 0.0239 inch thick galvanized steel.
- 2.03 VOLUME CONTROL DAMPERS
- A. Fabricate in accordance with SMACNA (DCS) and as indicated. B. Splitter Dampers:
 - 1. Material: Same gage as duct to 24 inches size in either direction, and two gages heavier for sizes over 24 inches.
 - 2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
- 3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw C. Single Blade Dampers:
- 1. Fabricate for duct sizes up to 6 by 30 inch. 2. Blade: 24 gage, 0.0239 inch, minimum.
- D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- E. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings. 2.04 MISCELLANEOUS PRODUCTS
 - A. Damper Operators: Provide electric operators and damper position switches. Provide outdoor rated actuator and casings when installed outdoors.

SECTION CONTINUES

MECHANICAL SPECIFICATIONS (cont)

<u>SECTION 23 33 00</u> <u>AIR DUCT ACCESSORIES (cont.)</u>			
PART 3 EXECUTION 3.01 PREPARATION	PART 1 GENI		
A. Verify that electric power is available and of the correct characteristics. 3.02 INSTALLATION	1.01	BUILD A.	Provio
 A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated. C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and 			assoc 1.
smoke dampers, and elsewhere as indicated. Provide minimum 8 by 8 inch size for hand access, size for shoulder access, and as indicated. Provide 4 by 4 inch for balancing dampers only. Review locations prior to fabrication.			
D. Provide duct test holes where indicated and required for testing and balancing purposes. E. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.			
F. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment. G. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air			2.
balancing. H. Provide balancing dampers on high velocity systems where indicated. Refer to Section 23 36 00 - Air Terminal Units.			
I. Conduct operational testing, documentation, and training for owner's representative of all fire, smoke, and combination fire and smoke dampers as directed by NFPA 80, chapter 19 -Installation, Testing, and Maintenance of Fire Dampers and NFPA 105, chapter 6 - Installation, Testing, and Maintenance of Fire Dampers and NFPA 105, chapter 6 - Installation, Testing, and Maintenance of Fire Dampers and NFPA 105, chapter 6 - Installation, Testing, and Maintenance of Fire Dampers and NFPA 105, chapter 6 - Installation, Testing, and			3.
Maintenance of Smoke Dampers.		A.	BAS N
END OF SECTION SECTION 23 36 00			ı. 2.
PART 1 GENERAL			۷.
1.01 SECTION INCLUDES A. Controls for terminal units.	1.03	CODES A.	S AND Code
B. Variable volume terminal units. C. Fan powered terminal units.			indica 1.
D. Integral heating coils. E. Integral damper motor operators.			2. 3.
F. Integral controls. 1.02 SUBMITTALS A. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings			4.
that indicate air flow, static pressure, and NC designation. Include electrical characteristics and connection requirements. B. Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection	1.04	SUBM	
requirements. 1. Include schedules listing discharge and radiated sound power level for each of second through sixth octave bands at inlet static pressures		A.	BAS r provid confo
of 1 to 4 in wg. C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts		B.	1. Provid
lists. Include directions for resetting constant-volume regulators. D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.		C.	specif All she
1.03 QUALITY ASSURANCE A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with three years of documented		D.	have Subm
experience. B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and			1. 2.
indicated. 1.04 WARRANTY A Dravide one year manufacturer warranty for air terminal units, integral besting sails, and integral controls			
A. Provide one year manufacturer warranty for air terminal units, integral heating coils, and integral controls. PART 2 PRODUCTS 2.01 SINGLE-DUCT, VARIABLE-VOLUME UNITS			
A. Basis of Design: Price Industries, Inc: www.priceindustries.com/#sle. B. General:			3.
1. Factory-assembled, AHRI 880 (I-P) rated and bearing the AHRI seal, air volume control terminal with damper assembly, flow sensor, externally mounted volume controller, duct collars, and all required features.			4.
 Control box bearing identification, including but not necessarily limited to nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil (right or left hand) connection, where applicable. 			5. 6.
C. Unit Casing: 1. Minimum 22 gauge, 0.0299 inch galvanized steel.			
 Air Inlet Collar: Provide round, suitable for standard flexible duct sizes. Unit Discharge: Rectangular, with slip-and-drive connections. 	1.05	WARR	7. ANTY
 4. Liner not to contain pentabrominated diphenyl ether (CAS #32534-81-9) or octabrominated diphenyl ether. D. Sound Attenuator: 1. Provide where indicated on plane. 		A.	Warra 1.
 Provide where indicated on plans. Construction to consist of a continuous extension of the casing and liner as required to achieve required attenuation. At 2000 fpm inlet velocity, the minimum operating pressure with attenuator added not to exceed 0.14 in-wc. 			
E. Damper Assembly: 1. Heavy-gauge, galvanized steel, or extruded aluminum construction with solid steel, nickel-plated shaft pivoting on HDPE, self-lubricating			2.
bearings. 2. Provide integral position indicator or alternative method for indicating damper position over full range of 90 degrees.			3.
3. Incorporate low leak damper blades for tight airflow shutoff. F. Electric Heating Coil:	1.06	OWNE	
 Listed and provided by the terminal unit manufacturer. Coil Casing: 20 gauge, 0.0359 inch galvanized steel. 		A.	Projec Opera
 Heating Elements: Nickel chrome, supported by ceramic insulators. Integral Control Panel: NEMA 250, Type 2 enclosure with hinged access door for access to all controls and safety devices. 	PART 2 PROI 2.01	DUCTS MATE	RIALS:
 5. Furnish a primary automatic reset thermal cutout and differential pressure airflow switch for proof of airflow. 6. Provide the following additional components, mounted and/or wired within the control enclosure: a. Fused or non-fused door interlocking disconnect switch. 		A.	Use n use th
b. Mercury contactors. c. Fuse block.	2.02	SYSTE A.	
 Factory wired, including all limit switches and steps of control as indicated on the equipment schedule, with the SSR proportional heat control. 		A.	Syste 1.
G. Electrical Requirements: 1. Single-point power connection.			
 Equipment wiring to comply with requirements of NFPA 70. H. Control Transformers: Factory supplied and mounted for electric and electronic control applications. 	2.03	OPER/ A.	ATOR Provid
I. Controls: 1. Terminal Unit Controls:	2.04	B. BUILD	Provid ING CO
 a. Provide accessories for field interfaced controller including thermostat. b. Factory ship DDC controller including airflow sensor, integral airflow transmitter, integral damper actuator, and duct-mounted 		Α.	Manu seque
temperature sensor. c. Sequence of Operation: Zone temperature control with airflow and coil discharge monitoring. 2. Refer to control sequences indicated on drawings	2.05	BUILD A.	There
PART 3 EXECUTION 3.01 INSTALLATION	2.06	UNIT (in CO CONTR Contr
A. Install in accordance with manufacturer's instructions. B. Install the inlets of air terminal units and air flow sensors a minimum of three duct diameters from elbows, transitions, and duct takeoffs.		А. В.	Enviro
C. Provide ceiling access doors or locate units above easily removable ceiling components. D. Support units individually from structure in accordance with SMACNA (SRM).			
E. Do not support from ductwork. F. Connect to ductwork in accordance with Section 23 31 00.			2. 3.
G. Verify that electric power is available and of the correct characteristics. 3.02 ADJUSTING A Reset volume with domner energeter attached to essembly ellowing flow range modulation from 100 percent of design flow to zero percent full flow		C.	Input/
A. Reset volume with damper operator attached to assembly allowing flow range modulation from 100 percent of design flow to zero percent full flow. Set units with heating coils for minimum 30 percent full flow.	PART 3 EXE0 3.01	EXAM	
END OF SECTION		A.	The C Coord
		В.	report The B dis¬cr
SECTION 23 37 00	3.02	PROTE A.	
AIR OUTLETS AND INLETS		B.	dama The B
1.01 SECTION INCLUDES A. Diffusers.			contra imme
B. Registers/grilles. 1.02 SUBMITTALS	3.03	GENE	
A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.		A. B.	Install Provid
1.03 QUALITY ASSURANCE A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.		C. D.	All rur Install
PART 2 PRODUCTS 2.01 DIFFUSERS / REGISTERS / GRILLES A See the Air Device Schedule on the Contract Drawings		E.	structo purpo Verify
A. See the Air Device Schedule on the Contract Drawings PART 3 EXECUTION 3 01 INSTALLATION		с. F.	comm All col
3.01 INSTALLATION A. Install in accordance with manufacturer's instructions. B. Comply with SMACNA (ASMM) for flashing/counter-flashing of roof penetrations and supports for roof curbs and roof mounted equipment.			for pe practic
Comply with SMACNA (ASMM) for hashing/counter-hashing of roor penetrations and supports for roor curbs and roor mounted equipment. C. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.		G. H.	Field All wo
D. Install diffusers to ductwork with air tight connection. E. Paint ductwork visible behind air outlets and inlets matte black.		I.	as ide BAS r
3.02 PROTECTION A. Protect installed products until completion of project.	3.04		
B. Replace, repair, or touch-up damaged products before Substantial Completion.		A.	All fiel labele
END OF SECTION		B.	servic contro Perma
		в. С.	drawir Identii
		D.	Identi Identi Iabel.

MECHANICAL SPECIFICATIONS (cont)

SECTION 23 09 00 **INSTRUMENTATION AND CONTROL FOR HVAC**

UTOMATION SYSTEM - GENERAL DESCRIPTION

vide an extension of the existing Trane Tracer Building Automation System (BAS) to integrate and control all mechanical equipment ciated with this project. All new building controllers, and equipment/plant controllers, shall be integrated into the existing BAS. The Building Automation System shall be as indicated on the drawings and described in these specifications. System must be fully integrated and coordinated with mechanical equipment DDC controllers furnished and installed in the equipment manufacturer's factory as specified in those sections. The intent of the BAS is to integrate all mechanical equipment into one system for global monitoring, control, and alarming associated with the building. It is the BAS manufacturer's responsibility to provide all the design, engineering, and field coordination required to ensure all equipment sequence of operations are met as specified and the designated BAS operators have the capability of managing the building mechanical system to ensure occupant comfort while

maintaining energy efficiency. The BAS shall meet open standard protocol communication standards (As defined in System Communications Section) to ensure the system maintains "interoperability" to avoid proprietary arrangements that will make it difficult for the Owner to consider other BAS manufacturers in future projects.

Direct Digital Control (DDC) technology shall be used to provide the functions necessary for control of mechanical systems and terminal devices on this project. 1.02 QUALITY ASSURANCE Manufacturer Qualifications

The BAS manufacturer shall have an established business office within 50.00 miles of the project site and must provide 24 hours/day, 7 days/week response in the event of a customer warranty or service call. The BAS Manufacturer shall have factory trained and certified personnel providing all engineering, service, startup, and commissioning field labor for the project from their local office location. BAS manufacturer shall be able to provide training certifications for all local office personnel upon request.

) STANDARDS es and Standards: Meet requirements of all applicable standards and codes, except when more detailed or stringent requirements are ated by the Contract Documents, including requirements of this Section. National Electrical Code -- NFPA 70.

Federal Communications Commission -- Part J. ASHRAE/ANSI 135-2012 (BACnet) - (System Level Devices) - Building Controllers shall conform to the listed version of the BACnet specification in order to improve interoperability with various building system manufacturers' control systems and devices. ASHRAE/ANSI 135-2012 (BACnet) - (Unit Level Devices) - Unit Controllers shall conform to the listed version of the BACnet

REQUIREMENTS nanufacturer shall provide shop drawings and manufacturers' standard specification data sheets on all hardware and software being ded for this project. No work may begin on any segment of this project until the Engineer and Owner have reviewed submittals for rmity with the plan and specifications.

specification in order to improve interoperability with various building system manufacturers' control systems and devices.

Provide electronic submittal package in PDF format for review and approval. ide the Engineer and Owner, any additional information or data which is deemed necessary to determine compliance with the fications or which is deemed valuable in documenting and understanding the system to be installed. hop drawings shall be provided to the Owner electronically as .pdf file formats once they have been approved and as-built drawings been completed.

mit the following within 90 days of contract award: A complete bill of materials of equipment to be used indicating quantities, manufacturers and model numbers. Provide all manufacturers' technical cut sheets for major system components. When technical cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means.

a. Building Controllers Unit Controllers

Include:

Auxiliary Control Devices

Provide proposed Building Automation System architectural diagram depicting various controller types, workstations, device locations, addresses, and communication cable requirements Provide detailed termination drawings showing all required field and factory terminations, as well as terminal tie-ins to DDC controls

provided by mechanical equipment manufacturers. Terminal numbers shall be clearly labeled.

Provide a sequence of operation for each controlled mechanical system and terminal end devices. Provide a BACnet Protocol Implementation Conformance Statement (PICS) for each BACnet system level device (i.e. Building Controller & Operator Workstations) type. This defines the points list for proper coordination of interoperability with other building systems if applicable for this project.

Provide Operating and Maintenance (O & M) Manuals REQUIREMENTS

rant all work as follows:

New BAS system labor and materials shall be warranted free from defects for a period of twelve (12) months after final completion acceptance by the Owner. BAS failures during the warranty period shall be adjusted, repaired, or replaced at no charge to the Owner. The BAS manufacturer shall respond to the Owner's request for warranty service within 24 hours of the initiated call and will occur during normal business hours (8AM-5PM).

At the end of the final start-up/testing, if equipment and systems are operating satisfactorily to the Owner and Engineer, the Owner shall sign certificates certifying that the BAS is operational, and has been tested and accepted in accordance with the terms of this specification. The date of Owner's acceptance shall be the start of the warranty period. To ensure that the owner will have the most current operating system provided by the manufacturer, the BAS manufacturer shall include licensing and labor costs to facilitate software/firmware updates throughout the warranty period at no charge to the owner.

OF PROPRIETARY MATERIAL ct specific software and documentation shall become the owner's property upon project completion. This includes the following: rator Graphic Files, As-Built Hardware Design Drawings, Operating & Maintenance Manuals, BAS System Software Database

new products that the manufacturer is currently manufacturing and that have been installed in a minimum of 25 installations. Do not this installation as a product test site unless explicitly approved in writing by the owner or the owner's representative. Spare parts shall ailable for at least five years after completion of this contract. MMUNICATION

m Communications Each workstation, building controller, and equipment controller communication interface shall utilize the BACnet[™] protocol with an Ethernet (IEEE 802.3), Wi-Fi (IEEE 802.11), RS485 (EIA-485), or Zigbee® (802.15.4) physical interface and an appropriate data link technology as defined in ANSI®/ASHRAE® Standard 135-2012. (e.g. BACnet over IP, BACnet over IPv6, BACnet SC, BACnet over MS/TP, BACnet Zigbee).

INTERFACE ide Building Operator Web Interface

vide Mobile App Interface ONTROLLER SOFTWARE

facturer shall provide standard applications and support custom programming to deliver HVAC system control per design intent and ences of operation

SYSTEM CONTROLLERS shall be one or more independent, standalone microprocessor based System Controllers to manage the global strategies described NTROLLER SOFTWARE

ROLLERS ollers shall be capable of operating as a stand-alone controller or as a member of a Building Automation System (BAS).

onment. Controller hardware shall be suitable for the anticipated ambient conditions Operating conditions:

a. Temperature: -40°F to 158°F (-40°C to 70°C) Relative Humidity: 5% to 100% RH (non-condensing)

Controllers used indoors shall be mounted in a NEMA 1 enclosure at a minimum.

Controllers used outdoors and/or in wet ambient shall be mounted within NEMA 4 type waterproof enclosures, and shall be rated for operation at -40° F to 158° F [-40° C to 70° C]. Output: The Controller shall have on board or through expansion module all I/O

Contract Documents shall be thoroughly examined for coordination of control devices, their installation, wiring, and commissioning dinate and review mechanical equipment specifications, locations, and identify any discrepancies, conflicts, or omissions that shall be rted to the Architect/Engineer for resolution before rough-in work is started.

BAS manufacturer shall inspect the jobsite in order to verify that control equipment can be installed as required, and any repancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.

BAS installation contractor shall protect all work and material from damage by their work or personnel, and shall be liable for all

ge thus caused. AS manufacturer shall be responsible for their work and equipment until final inspection, testing, and acceptance. The BAS installing actor shall protect their work against theft or damage, and shall carefully store material and equipment received on site that is not diately installed. The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to ent entry of foreign objects. ORKMANSHIP AND FIELD QUALITY CONTROL:

equipment, piping, wiring/conduit, parallel to building lines (i.e. horizontal, vertical, and parallel to walls) wherever possible. vide sufficient slack and flexible connections to allow for vibration of piping and equipment.

uns of wiring shall be unspliced between main connection points. all equipment in readily accessible locations as defined by National Electric Code (NEC). Control panels shall be attached to

ctural walls or properly supported in a free-standing configuration, unless mounted in equipment enclosure specifically designed for that ose. Panels shall be mounted to allow for unobstructed access for service. integrity of all control wiring to ensure continuity and freedom from shorts and grounds prior to commencing the startup and

nissioning procedures. ntrol device installation and wiring shall comply with Contract Documents, acceptable industry specifications, and industry standards erformance, reliability, and compatibility. Installation and wiring shall be executed in strict adherence to local codes and standard ices referenced in Contract Documents.

provided and installed devices shall meet manufacturer's installation recommendations.

vork, materials, and equipment shall comply with the rules and regulations of applicable local, state, and federal codes and ordinances entified in Contract Documents. manufacturer shall continually monitor the field installation for building code compliance and quality of workmanship. All visible piping

r wiring runs shall be installed parallel to building lines and properly supported. TION OF HARDWARE AND WIRING: eld wiring and cabling, including that within factory mounted, and wired control panels and devices for mechanical equipment, shall be led at each end within 2" of termination with a cable identifier and other descriptive information for troubleshooting, maintenance, and

ice purposes. BAS manufacturer to coordinate this labeling requirement with mechanical equipment manufacturer as it relates to anently label or code each point of field terminal strips to show the instrument or item served and correlate them to the BAS design

fy control panels with minimum 1-cm letters on laminated plastic nameplates. ifiers shall match record documents. All plug-in components shall be labeled such that removal of the component does not remove the

SECTION CONTINUES

MECHANICAL SPECIFICATIONS (cont)

SECTION 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC (cont) 3.05 CONTROL SYSTEM CHECKOUT AND TESTING: Start-up testing. All testing in this section shall be performed by the contractor and shall make up part of the necessary verification of an operating control system. This testing shall be completed before the owner's representative is notified of the system demonstration. The contractor shall furnish all labor and test apparatus required to calibrate and prepare for service all of the instruments, controls, and accessory equipment furnished under this specification. Verify that all control wiring is properly connected and free of all shorts and ground faults. Verify that terminations are tight. Enable the control systems and verify calibration of all input devices individually. Perform calibration procedures according to manufacturer's recommendations. Verify all binary output devices (relays, solenoid valves, two-position actuators and control valves, magnetic starter, etc.) operate properly and normal positions are correct. Verify all analog output devices (I/Ps, actuators, etc) are functional, that startand span are correct, and that direction and normal positions are correct. The contractor shall check all control valves and autoatic dampers to ensure proper action and closure. The contractor shall make any necessary adjustments to valve stem and damper blade travel. Verify the system operation adheres to the sequences of operation. Simulate and observe all modes of operation by overriding and varying inputs and schedules. Tune all DDC loops and optimal start/stop routimes. Alarms and Interlocks Check each alarm separately by including an appropriate signal at a value that will trip the alarm. Interlocks shall be tripped using field contacts to check the logic, as well as to ensure that the fail-safe condition for all actuators is in the proper direction. Interlock actions shall be tested by simulating alarm conditions to check the initiating value of the variable and interlock C. action. 3.06 CLEANING: The BAS manufacturer's installing contractor(s) shall clean up all debris resulting from their installation activities on a daily basis. The installation contractors shall remove all cartons, containers, crates, etc. under his control as soon as their contents have been removed. Waste shall be collected and placed in a location designated by the Owner, Construction Manager, General Contractor, and/or Mechanical Contractor. At the completion of work in any area, the installation contractor shall clean all of their work, equipment, etc., making it free from dust, dirt and debris. At the completion of work, all equipment furnished under this Section shall be checked for paint damage. Any factory finished paint that has been damaged shall be repaired to match the adjacent areas. Any metal cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

3.07 TRAINING: Provide minimum of (4) hours of operator training throughout the contract period. The training will be provided for personnel designated by Α. the Owner These objectives will be divided into logical groupings; participants may attend one or more of these, depending on level of knowledge required: Day-to-day BAS Operators BAS Troubleshooting & Maintenance





Ľ C 960 **у** S S Ш SIN LL, NS O \ge F \mathbf{m} く Ζ T U 0 S Ш S E E E Ž ⊢ ഗ S \square K M M M C Ž ОШ Ζ **4** Ш $\overline{}$ () $\mathbf{V}\mathbf{V}$ $\mathbf{O}\mathbf{Z}$ **blueriver** ARCHITECTS A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com DESIGNED FOR COLOR PRINTING 08-23-2024 PROJECT #: 20200132 ISSUE DATES: CONSTRUCTION 08/23/2024 DOCUMENTS Date No. | Description SHEET NUMBER:

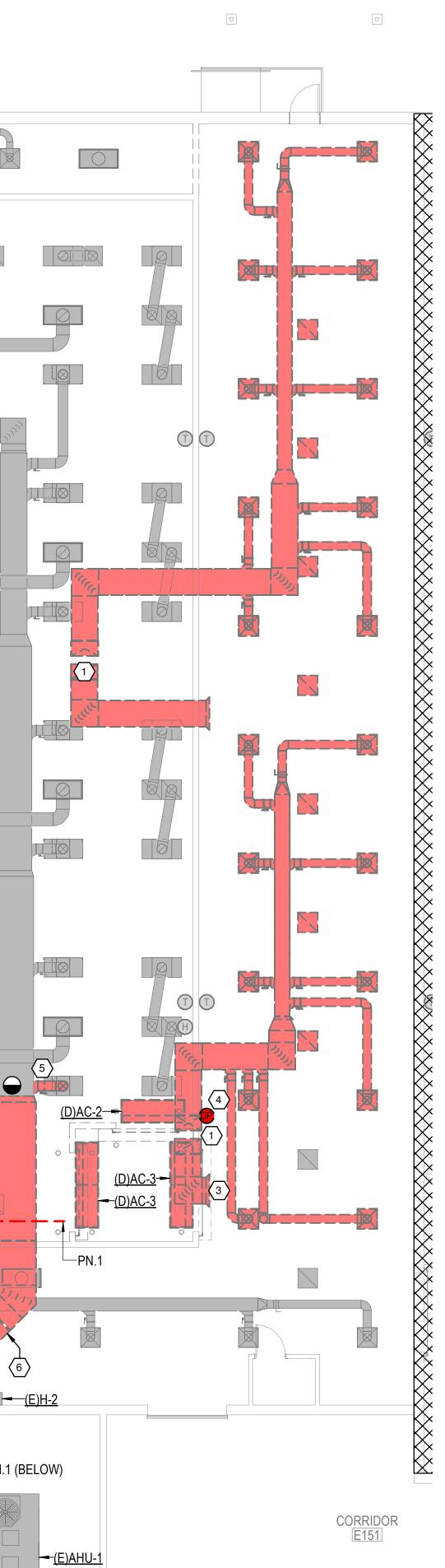
$1 \frac{\text{FIRST FLOOR DEMOLITION PLAN}}{1/8" = 1'-0"} \frac{1}{0} \frac{1}{8} \frac{1}{16} \frac{1}{32}$



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KEYED NOTES

- 1 DEMOLISH SUPPLY, RETURN, AND TRANSITION DUCTWORK UP TO ROOFTOP AIR UNIT. CAP AND SEAL UNIT AIR OPENINGS.
- 2 REMOVE SUPPLY AND RETURN AIR DEVICES. CLEAN AND PREP FOR REUSE IN NEW CONSTRUCTION (TYP).
- 3 DEMOLISH PLENUM DUCTING. INFIL OPENING -REFER TO ARCHITECTUAL.
- 4 REMOVE DATA DEVICE. REPAIR WALL AS NEEDED.
- 5 DEMOLISH DUCTWORK TO LOCATION SHOWN AND CAP.
- 6 DEMOLISH STEAM DISPERSION TUBES AND PIPE CONNECTIONS. PIPE TO REMAIN.
- 7 DEMOLISH OR OTHERWISE BLOCK DUCT REGISTER.



- <u>(</u>E)AHU-2

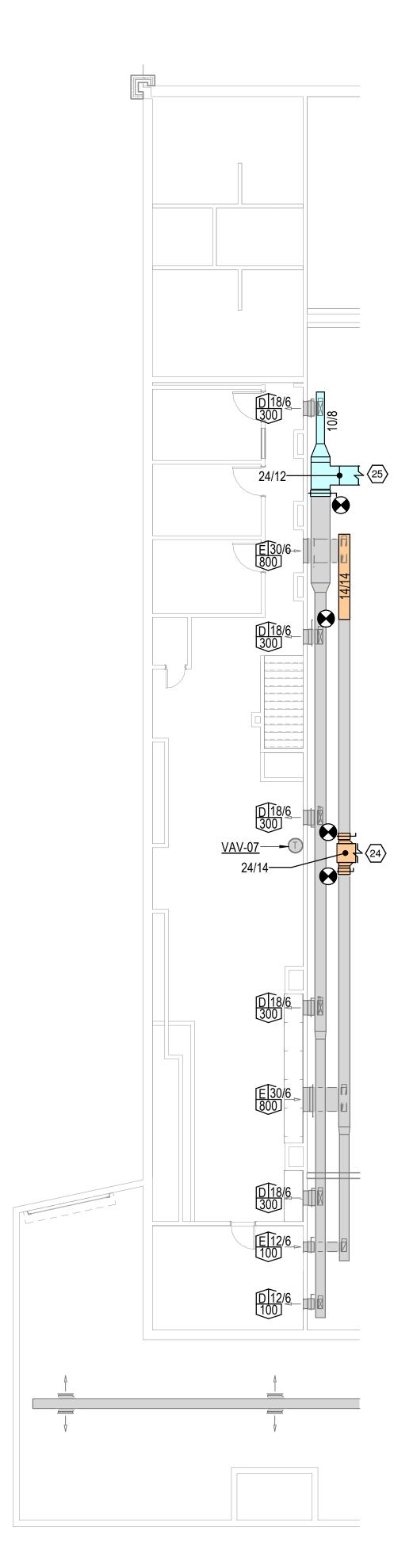


TUR. CUL LOCUST ST., STILWELL, OK, 74960 FLOOR MECHANICAL DEMO PLAN BUSINESSES NATION EROKEE NTER **CENT CENT** 314 W. FIRST Blueriver ARCHITECTS A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com DESIGNED FOR COLOR PRINTING 08-23-2024 PROJECT #: 20200132 ISSUE DATES: CONSTRUCTION DOCUMENTS 08/23/2024 Date No. Description

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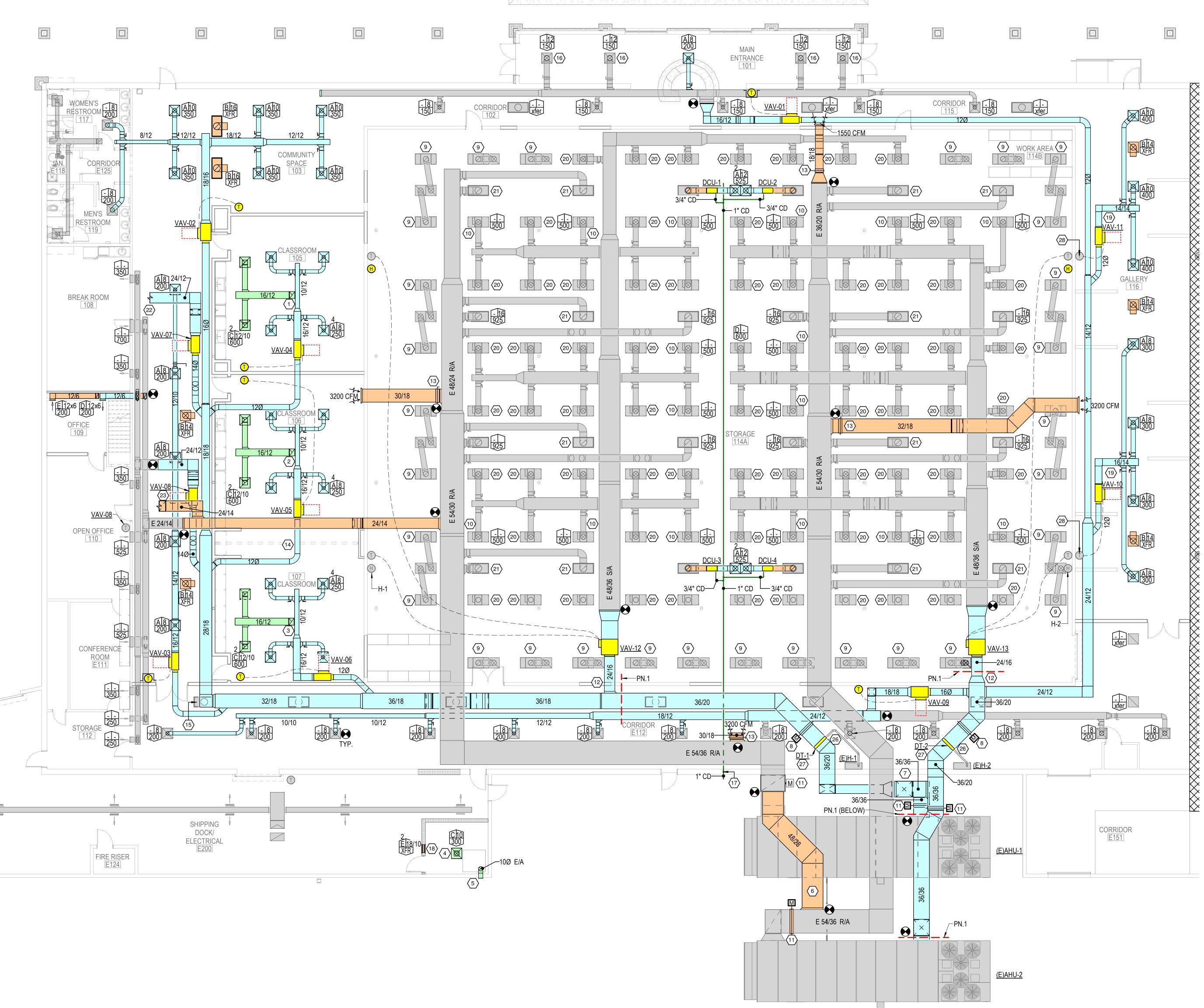
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MD



MECHANICAL CONTRACTOR PRICING NOTE

PN.1 CONTRACTOR TO PROVIDE BREAKOUT PRICE (INCLUDED IN THE BASE BID) REQUIRED TO DEMOLISH AND REPLACE SUPPLY AIR DUCTWORK WITHIN THE BOUNDS OF THE INDICATED BOUNDARY LINES (SEE NEW AND DEMO PLAN). THIS PRICE IS TO DETERMINE THE COST IMPACT OF REPLACING EXISTING DUCTWORK. GENERALLY, ALL SUPPLY AIR DUCTWORK FROM EACH AHU CONNECTION TO THE FIRST VAV BRANCH DUCT IS INCLUDED. THE DUCTWORK SHALL BE CONSIDERED TO BE MEDIUM PRESSURE. EXTERIOR DUCTWORK TO BE DUAL WALL AND CLAD. EXISTING DUCT SUPPORTS AND EXTERIOR WALL OPENINGS MAY BE REUSED, BUT SHALL BE INSPECTED AND REPLACED IF DAMAGED. ANY CONTROL INSTURMENTATION/WIRING SHALL BE REINSTALLED OR REPLACED IN THE SAME LOCATION. EXISTING STEAM DISPERSION TUBES TO BE REPLACED WITH NEW SCHEDULED UNITS AND RECONNECTING TO EXISTING STEAM GENERATORS.



1 = 1'-0"FIRST FLOOR MECHANICAL PLAN 1/8" = 1'-0" $\overline{0}$ $\overline{6"}$ 1' 2'

KEYED NOTES

- EXHAUST DUCTWORK THROUGH ROOF UP TO EF-3.
- EXHAUST DUCTWORK THROUGH ROOF UP TO EF-4.
- EXHAUST DUCTWORK THROUGH ROOF UP TO EF-5.
- EXHAUST DUCTWORK THROUGH ROOF UP TO EF-6.
- PROVIDE AND INSTALL VENT DUCTWORK FROM KILN TO NEW SIDEWALL DISCHARGE. DISCHARGE TO BE 13'-6" A.F.F. MINIMUM. VERIFY REQUIRED VENT SIZE (MINIMUM 10" DIA), ROUTING, AND INSULATION REQUIREMENTS WITH THE MANUFACTURER. AT MINIMUM, PROVIDE 1" THK INSULATION ON VENT DUCT FOR PERSONNEL PROTECTION. PROVIDE WALL CAP WITH BACKDRAFT DAMPER, DUCT TRANSITION, BIRDSCREEN, AND PAINT TO MATCH BUIDLING EXTERIOR (GREENHECK WC-8x8 WALL CAP OR EQUAL).
- INSTALL COMMON RETURN AIR BYPASS DUCT. INSTALL ON/OFF AIR DAMPER AT EACH UNIT RETURN AIR CONNECTION. FIELD VERIFY IDEAL DUCT CONNECTIONS AND ROUTING.
- INSTALL COMMON SUPPLY AIR BYPASS DUCT. INSTALL ON/OFF AIR DAMPER AT EACH UNIT SUPPLY AIR CONNECTION. FIELD VERIFY IDEAL DUCT CONNECTIONS AND ROUTING.
- INSTALL MODULATING AIR DAMPER. REFER M-701 FOR SEQUENCE OF OPERATION.

KEYED NOTES

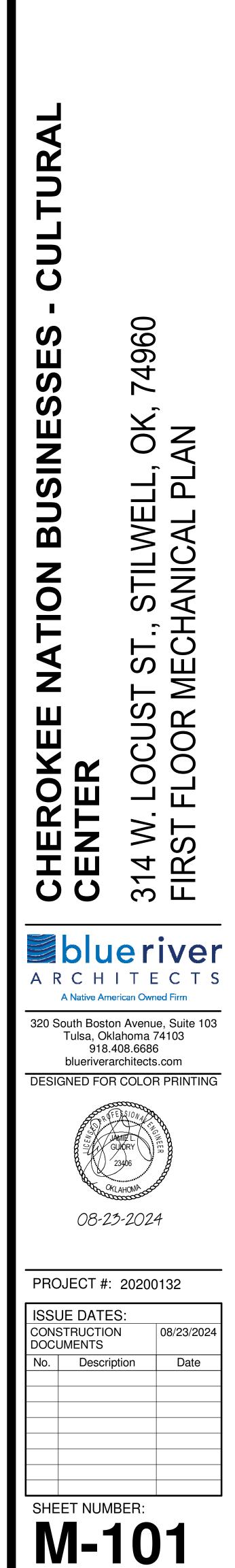
- 9 FAN FILTER AIR UNITS TO REMAIN IN OPERATION. (TYP).
- 10 SUPPLY FAN FILTER UNIT TO REMAIN IN OPERATION. REBALANCE TO SCHEDULED AIRFLOW.
- 11 INSTALL ON/OFF AIR DAMPER.
- 12 REUSE EXISTING WALL PENETRATION WHERE PRACTICAL.
- 13 ADJUST VOLUME BALANCING DAMPER FOR PLENUM DUCT RETURN. ADJUST TO INDICATED AIR FLOW.
- CAREFULLY COORDINATE DUCT INSTALLATION ABOVE OPERABLE WALL SUPPORT. RELOCATED DUCT AS REQUIRED.
- MAINTAIN MAXIMUM CLEARANCE ABOVE PLENUM RETURN 15 REGISTERS. RELOCATE REGISTERS/GRILLES AS NECESSARY. (TYP)
- RELOCATE EXISTING AIR DEVICES AS NECESSARY FOR NEW CEILING GRID. EXTEND BRANCH DUCT AS REQUIRED.
- INSTALL CONDENSATE DRAIN LINE DOWN WALL TO BUILDING 17 EXTERIOR AND DISCHARGE ~6" ABOVE GRADE. COORDINATE WITH OWNER OR ARCHITECT FOR EXACT LOCATION, ROUTING, AND FINISH. IF INSTALLED EXTERIOR TO THE BUILDING PROVIDE SHEET METAL SHROUD OVER EXPOSED PIPING AND PAINT TO MATCH BUILDING EXTERIOR (CHOSEN BY ARCHITECT).
- 18 INSTALL TRANSFER DUCT AND WALL MOUNTED GRILLES.

KEYED NOTES

 PROVIDE CEILING ACCESS PANEL FOR EQUIPMENT AND DAMPER ACCESS. VERIFY LOCATION, TYPE, FINISH, AND SIZE WITH ARCHITECT DURING CONSTRUCTION. DECOMMISSION UNUSED POWERED FAN FILTER DIFFUSERS AND CAP/CLOSE DUCT BRANCH CONNECTION (TYP). CLOSE DUCT BRANCH DAMPER OF UNUSED RETURN AIR DEVICES. IT MAY BE NECESSARY TO CUT AND CAP THE TRUNK DUCT CONNECTION FOR PROPER AIR BALANCE - FIELD VERIFY (TYP). SUPPLY AIR DUCT UP TO SECOND FLOOR. RETURN AIR DUCT UP TO SECOND FLOOR. RETURN AIR DUCT DOWN TO FIRST FLOOR. SUPPLY AIR DUCT DOWN TO FIRST FLOOR. RECONNECT ALL EXISTING PIPING TO NEW STEAM DISPERSION TUBES. PROVIDE AND INSTALL NEW DISPERSION TUBE TO FIT NEW DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE EXISTING HUMIDIFIER MANUFACTURER. 		
 AND CAP/CLOSE DUCT BRANCH CONNECTION (TYP). CLOSE DUCT BRANCH DAMPER OF UNUSED RETURN AIR DEVICES. IT MAY BE NECESSARY TO CUT AND CAP THE TRUNK DUCT CONNECTION FOR PROPER AIR BALANCE - FIELD VERIFY (TYP). SUPPLY AIR DUCT UP TO SECOND FLOOR. RETURN AIR DUCT UP TO SECOND FLOOR. RETURN AIR DUCT DOWN TO FIRST FLOOR. SUPPLY AIR DUCT DOWN TO FIRST FLOOR. SUPPLY AIR DUCT DOWN TO FIRST FLOOR. RECONNECT ALL EXISTING PIPING TO NEW STEAM DISPERSION TUBES. PROVIDE AND INSTALL NEW DISPERSION TUBE TO FIT NEW DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE 	19	DAMPER ACCESS. VERIFY LOCATION, TYPE, FINISH, AND SIZE
 DEVICES. IT MAY BE NECESSARY TO CUT AND CAP THE TRUNK DUCT CONNECTION FOR PROPER AIR BALANCE - FIELD VERIFY (TYP). SUPPLY AIR DUCT UP TO SECOND FLOOR. RETURN AIR DUCT UP TO SECOND FLOOR. RETURN AIR DUCT DOWN TO FIRST FLOOR. SUPPLY AIR DUCT DOWN TO FIRST FLOOR. SUPPLY AIR DUCT DOWN TO FIRST FLOOR. RECONNECT ALL EXISTING PIPING TO NEW STEAM DISPERSION TUBES. PROVIDE AND INSTALL NEW DISPERSION TUBE TO FIT NEW DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE 	20	
 23 RETURN AIR DUCT UP TO SECOND FLOOR. 24 RETURN AIR DUCT DOWN TO FIRST FLOOR. 25 SUPPLY AIR DUCT DOWN TO FIRST FLOOR. 26 RECONNECT ALL EXISTING PIPING TO NEW STEAM DISPERSION TUBES. 27 PROVIDE AND INSTALL NEW DISPERSION TUBE TO FIT NEW DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE 	21	DEVICES. IT MAY BE NECESSARY TO CUT AND CAP THE TRUNK DUCT CONNECTION FOR PROPER AIR BALANCE -
 24 RETURN AIR DUCT DOWN TO FIRST FLOOR. 25 SUPPLY AIR DUCT DOWN TO FIRST FLOOR. 26 RECONNECT ALL EXISTING PIPING TO NEW STEAM DISPERSION TUBES. 27 PROVIDE AND INSTALL NEW DISPERSION TUBE TO FIT NEW DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE 	22	SUPPLY AIR DUCT UP TO SECOND FLOOR.
 25 SUPPLY AIR DUCT DOWN TO FIRST FLOOR. 26 RECONNECT ALL EXISTING PIPING TO NEW STEAM DISPERSION TUBES. 27 PROVIDE AND INSTALL NEW DISPERSION TUBE TO FIT NEW DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE 	23	RETURN AIR DUCT UP TO SECOND FLOOR.
 26 RECONNECT ALL EXISTING PIPING TO NEW STEAM DISPERSION TUBES. 27 PROVIDE AND INSTALL NEW DISPERSION TUBE TO FIT NEW DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE 	24	RETURN AIR DUCT DOWN TO FIRST FLOOR.
 DISPERSION TUBES. PROVIDE AND INSTALL NEW DISPERSION TUBE TO FIT NEW DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE 	25	SUPPLY AIR DUCT DOWN TO FIRST FLOOR.
DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE	26	
	27	DUCT. NEW DISPERSION TUBE SHOULD BE PROVIDED BY THE

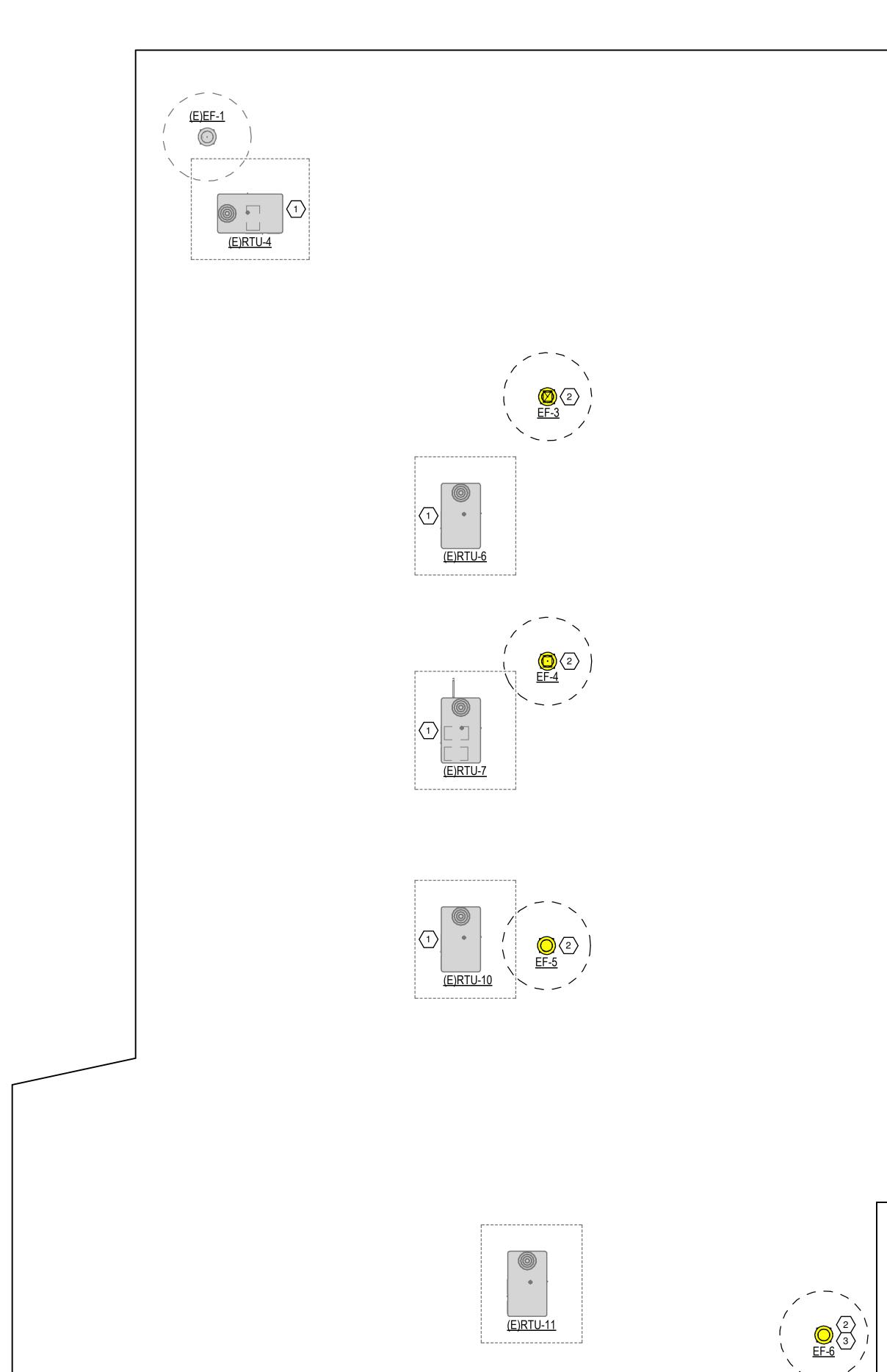
28 COORDINATE INSTALLATION OF NEW DISPLAY CASES WITH EXISTING THERMOSTAT AND RELOCATE IF NEEDED.





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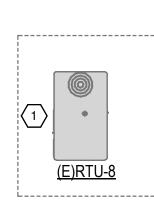
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KEYED NOTES

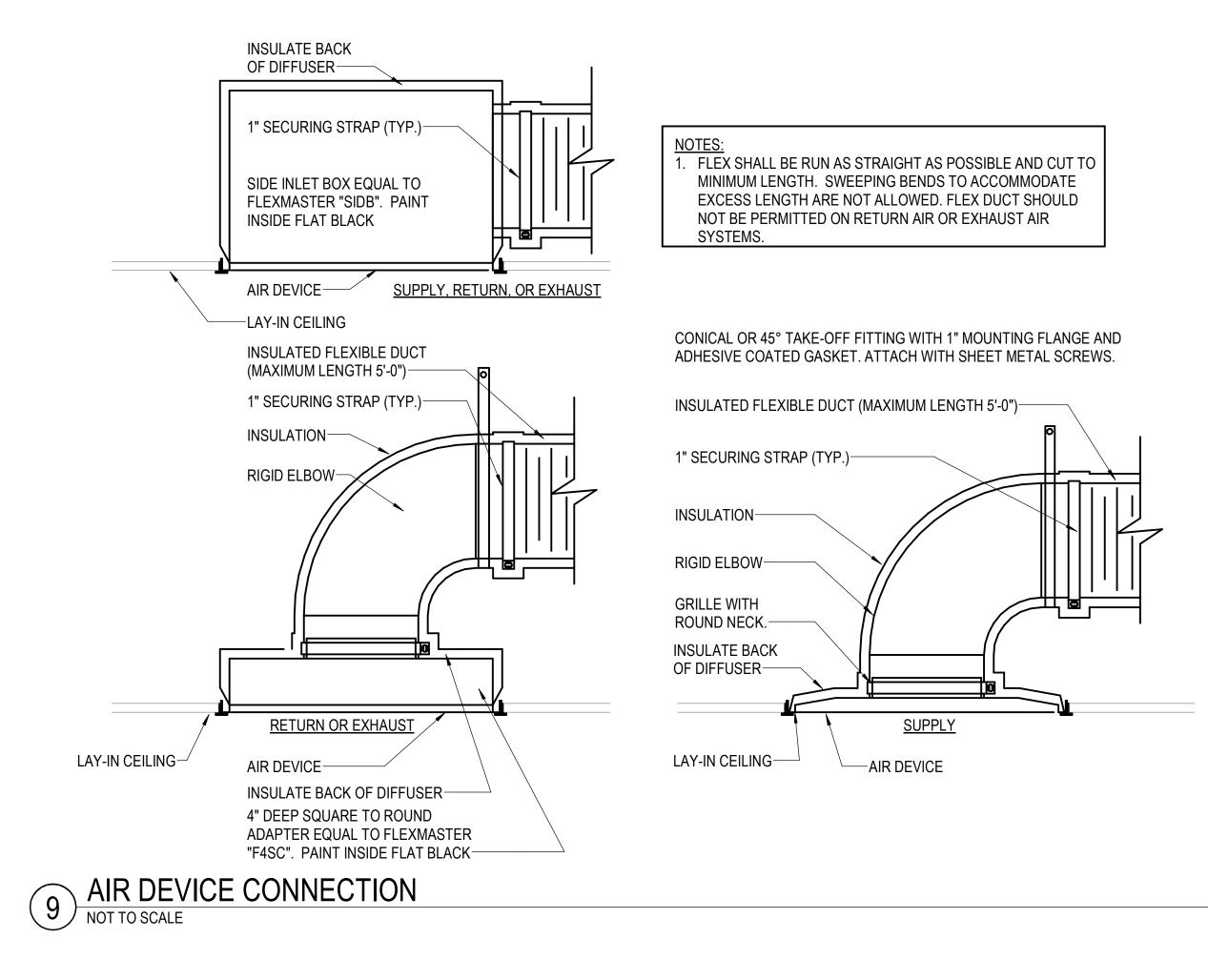
- 1 EXISTING RTU TO BE ABANDONED IN PLACE.
- 2 INSTALL NEW EXHAUST FAN ON MANUFACTURER PROVIDED ROOF CURB.

3 ADJUST EXHAUST FAN MOTOR SPEED TO MAINTAIN NEGATIVE AIR BALANCE WHEN KILN IS IN OPERATION.



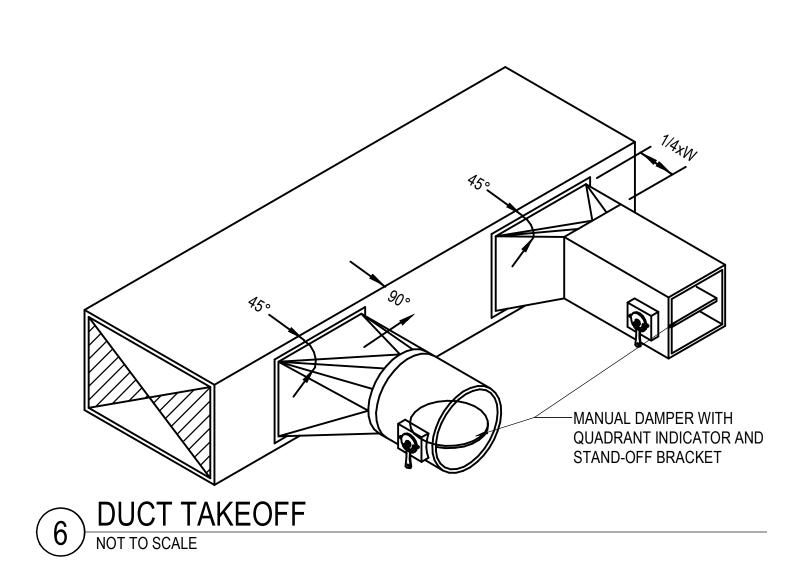


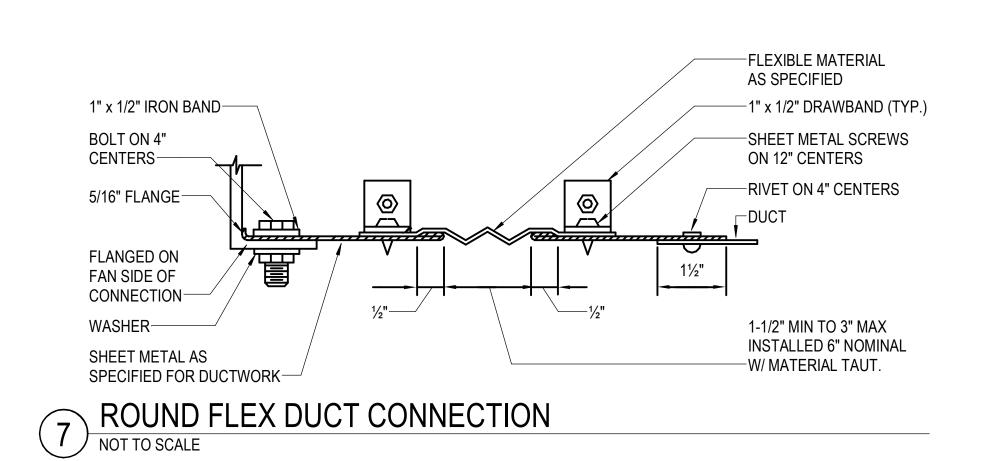


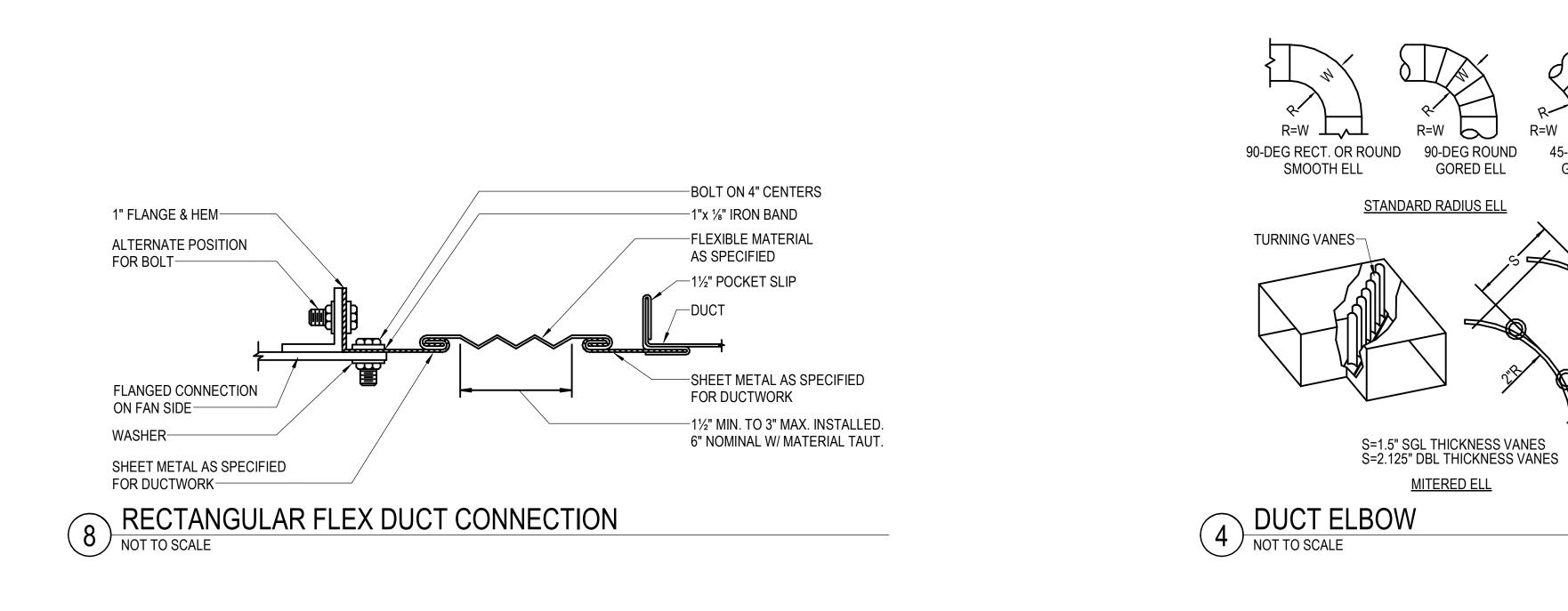


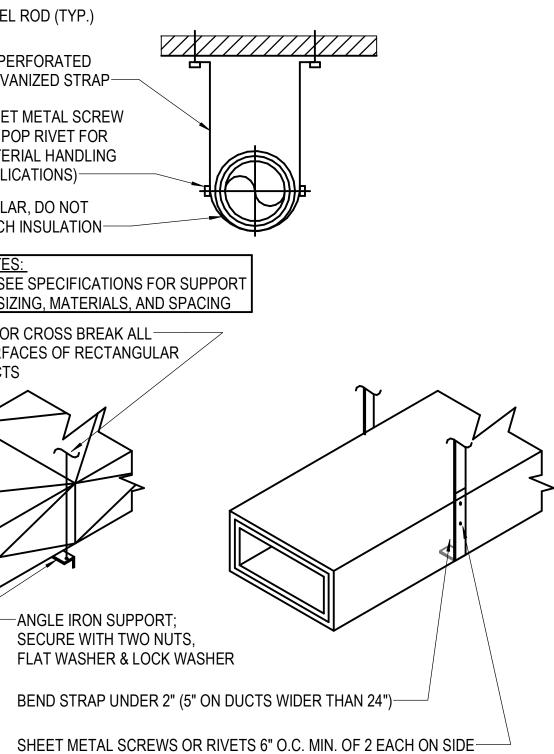
GALVANIZED STRAP -SHEET METAL SCREW (OR POP RIVET FOR MATERIAL HANDLING APPLICATIONS)-COLLAR, DO NOT CINCH INSULATION-NOTES: 1. SEE SPECIFICATIONS FOR SUPPORT SIZING, MATERIALS, AND SPACING RIB OR CROSS BREAK ALL DUCTS \sim L=2H (MAX) -ANGLE IRON SUPPORT; SECURE WITH TWO NUTS, 5 DUCT HANGERS

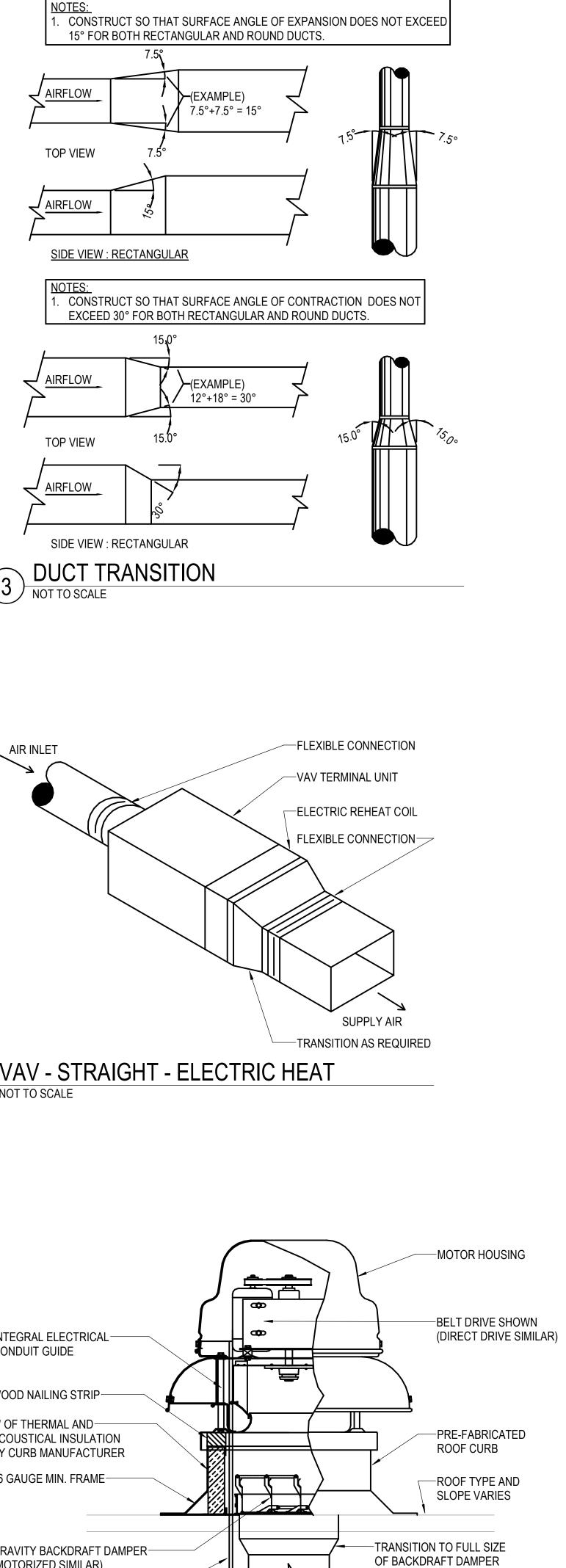
-STEEL ROD (TYP.)

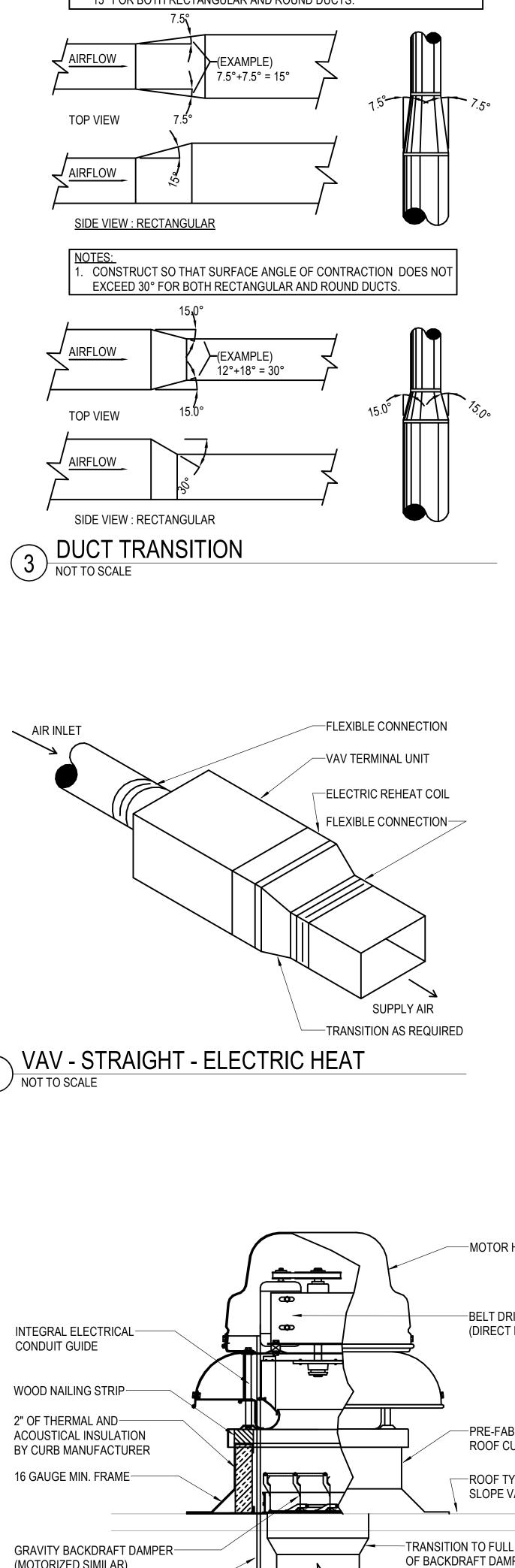


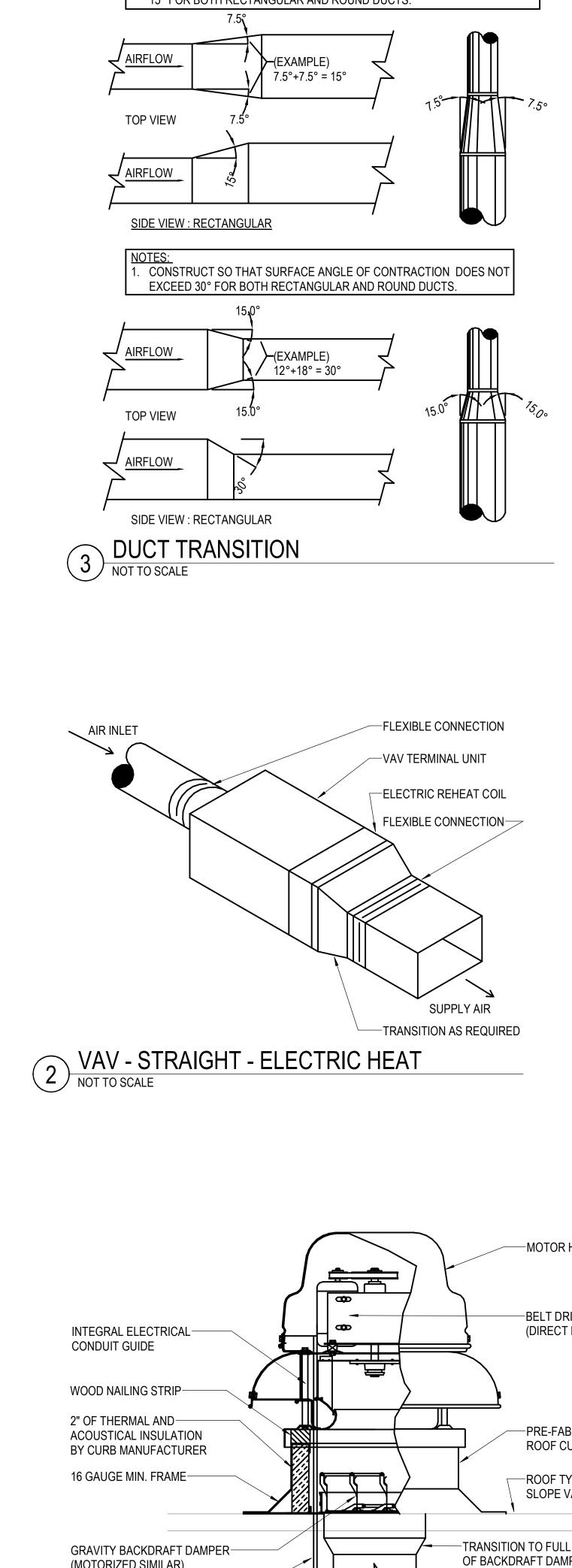


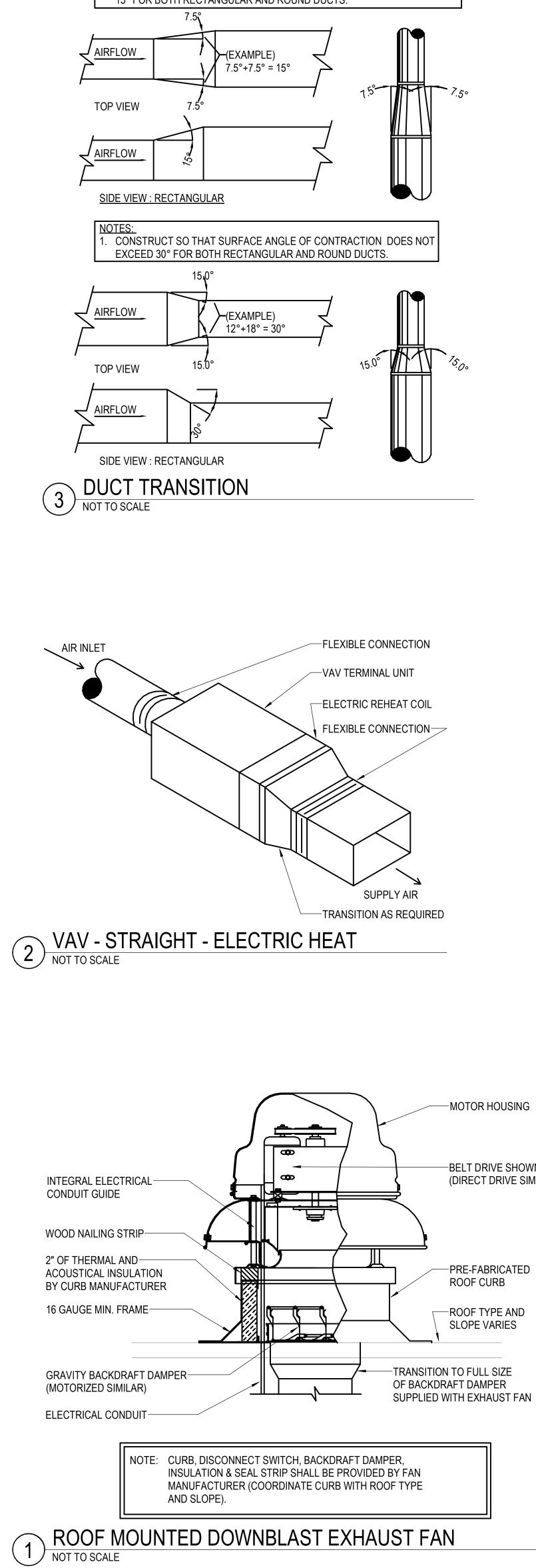


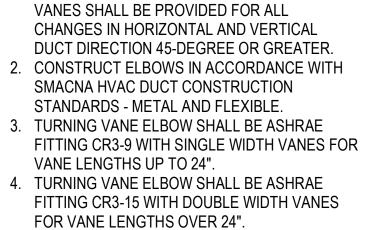












NOTES: 1. WHERE FULL RADIUS TURNS ARE NOT

R=W

45-DEG ROUND

-VANE RAIL

GORED ELL

POSSIBLE, MITERED ELL'S WITH TURNING

5. ROUND ELBOWS SHALL BE SMOOTH OR GORED. 90-DEGREE GORED ELL'S SHALL BE MINIMUM 5-PIECE AND 45-DEGREE GORED

ELL'S SHALL BE MINIMUM 3-PIECE. 6. VANES SHALL BE WELDED TO THE VANE RAIL IN DUCT SYSTEMS WITH AIR VELOCITIES 3000

FPM AND HIGHER. 7. SHORT RADIUS ELBOWS, ELBOWS WITH MITERED THROATS/RADIUS HEELS, AND THROATS/CHAMFERED HEELS ARE NOT

ELBOWS WITH MITERED ACCEPTABLE.





MARK		TYPE	INLET	MAXIMUM	MINIMUM			MAX N.C.			ELECTRIC	CAL DATA				1	
	SERVES		SIZE (IN)	(CFM)	(CFM)	INLET S.P.	A.P.D.		HEATING CFM	E.A.T. DEG. F	L.A.T. DEG. F	VOLTS	PHASE	KW	MANUFACTURER	MODEL	NOTES
VAV-01	MAIN LOBBY	SINGLE DUCT	12	1550	400	1.0	0.5	30	400	55	95	480	3	8.0	PRICE	SDV	1
VAV-02	COMMUNITY SPACE	SINGLE DUCT	16	2500	750	1.0	0.5	30	750	55	95	480	3	12.0	PRICE	SDV	1
VAV-03	WEST CORRIDOR	SINGLE DUCT	12	1000	300	1.0	0.5	30	300	55	95	480	3	5.0	PRICE	SDV	1
VAV-04	ART CLASSROOM #1	SINGLE DUCT	12	1000	300	1.0	0.5	30	300	55	95	480	3	5.0	PRICE	SDV	1
VAV-05	ART CLASSROOM #2	SINGLE DUCT	12	1000	300	1.0	0.5	30	300	55	95	480	3	5.0	PRICE	SDV	1
VAV-06	ART CLASSROOM #3	SINGLE DUCT	12	1000	300	1.0	0.5	30	300	55	95	480	3	5.0	PRICE	SDV	1
VAV-07	SECOND FLOOR OFFICE SUITE	SINGLE DUCT	14	1600	400	1.0	0.5	30	400	55	95	480	3	10.0	PRICE	SDV	1
VAV-08	FIRST FLOOR OFFICE SUITE	SINGLE DUCT	14	2200	700	1.0	0.5	30	600	55	95	480	3	10.0	PRICE	SDV	1
VAV-09	SOUTH CORRIDOR	SINGLE DUCT	16	2600	750	1.0	0.5	30	750	55	95	480	3	20.0	PRICE	SDV	1
VAV-10	SOUTH GALLERY	SINGLE DUCT	12	1200	300	1.0	0.5	30	300	55	95	480	3	5.0	PRICE	SDV	1
VAV-11	NORTH GALLERY	SINGLE DUCT	12	1200	300	1.0	0.5	30	300	55	95	480	3	5.0	PRICE	SDV	1
VAV-12	ART STORAGE	SINGLE DUCT	24x16	4000	800	1.0	0.5	30	800	55	95	480	3	12.0	PRICE	SDV	1
VAV-13	ART STORAGE	SINGLE DUCT	24x16	4000	800	1.0	0.5	30	800	55	95	480	3	12.0	PRICE	SDV	1

MARK
DT-1
DT-2

NOTES: 1. PROVIDE WITH SCR HEATING CONTROL, DOUBLE WALL CONSTRUCTION, AND INTEGRAL DISCONNECT.

	EXHAUST FAN													
MARK		TYPE		FAN DATA			MOTOR DATA				MAX	WEIGHT		
	SERVES		CFM	ESP	HP	FLA	MOCP	RPM	VOLTS	Ø	SONES LEVEL	(LBS)	BASIS OF DESIGN	NOTES
EF-3	ART CLASSROOM 1	DOWNBLAST	1,200	0.15	1/6	1.4	20	1725	115	1	8.4	50	GREENHECK G-120-B	1,2
EF-4	ART CLASSROOM 2	DOWNBLAST	1,200	0.15	1/6	1.4	20	1725	115	1	8.4	50	GREENHECK G-120-B	1,2
EF-5	ART CLASSROOM 3	DOWNBLAST	1,200	0.15	1/6	1.4	20	1725	115	1	8.4	50	GREENHECK G-120-B	1,2
EF-6	KILN ROOM	DOWNBLAST	300	0.10	1/10	0.9	20	1725	115	1	4.2	34	GREENHECK G-080-G	1,2

NOTES:

PROVIDE 1'-0" ROOF CURB, BIRDSCREEN, LOCAL DISCONNECT, AND BACKDRAFT DAMPER. PROVIDE MOTOR-MOUNTED SPEED DIAL AND ECM FAN MOTOR.

	AIR	DEVICE	KEY NO. IF MORE THAN ONE	A 8 MARK 210 CFM	
MARK	TYPE	DESCRIPTION	SIZE	BASIS OF DESIGN	NOTES
A	SUPPLY	SQUARE PLAQUE	SEE PLANS	TITUS OMNI-AA	1
В	RETURN	PERFORATED FACE	SEE PLANS	TITUS PAR-AA	2
С	EXHAUST	EGGCRATE	SEE PLANS	TITUS 50F	3
D	SUPPLY	SIDEWALL	SEE PLANS	TITUS 301RS	4
E	RETURN	SIDEWALL	SEE PLANS	TITUS 350 RL	5
-	-	EXISTING AIR DEVICE	SEE PLANS	-	6

PERFORATED SCREEN WITH 3/16" DIAMETER HOLES ON 1/4" STAGGERED CENTERS FOR LAY-IN CEILING. ALUMINUM CONSTRUCTION, 2 FRAME FOR GYPSUM CEILING LOCATIONS.

3. ½" x ½" x ½" EGGCRATE FOR LAY-IN CEILING. ALUMINUM CONSTRUCTION, WHITE FINISH, PROVIDE SQUARE TO ROUND TRANSITIONS AS REQUIRED. PROVIDE MANUFACTURER'S MOUNTING FRAME FOR GYPSUM CEILING LOCATIONS. 4. SURFACE MOUNT (MANUFACTURER'S TYPE BORDER). STEEL CONSTRUCTION. DOUBLE DEFLECTION 0° (DEGREE) HORIZONTAL

FRONT BLADES AT 3/4" O.C. WHITE FINISH. 5. SURFACE MOUNT (MANUFACTURER'S TYPE BORDER). STEEL CONSTRUCTION. SINGLE DEFLECTION 35° (DEGREE) VERTICAL BLADES

AT 3/4" O.C., WHITE FINISH.

6. EXISTING AIR DEVICE TO REMAIN IN PLACE TO BE AIR BALANCED TO SCHEDULED AIRFLOW PER DEVICE. FIELD VERIFY MOUNTING AND NECK SIZE.

	DEHUMIDIFICATION CONDENSING UNITS														
			CONDEN	ISER FAN	R FAN ELECTRICAL DATA				PINTS	HEAT		WEIGHT			
MARK	SERVES	MOUNTING	NO.	HP (EA.)	MCA	МОСР	VOLTS	Ø	CFM	PER DAY*	GAIN (MBH)	FILTER	(LBS)	BASIS OF DESIGN	NOTES
DCU-1	ART STORAGE	ABOVE CEILING	1	1/2	11.0	15	208	1	525	143	10.5	MERV 11	85	DRISTEEM RL-9	1,2,3
DCU-2	ART STORAGE	ABOVE CEILING	1	1/2	11.0	15	208	1	525	143	10.5	MERV 11	85	DRISTEEM RL-9	1,2,3
DCU-3	ART STORAGE	ABOVE CEILING	1	1/2	11.0	15	208	1	525	143	10.5	MERV 11	85	DRISTEEM RL-9	1,2,3
DCU-4	ART STORAGE	ABOVE CEILING	1	1/2	11.0	15	208	1	525	143	10.5	MERV 11	85	DRISTEEM RL-9	1,2,3

NOTES:

PROVIDE WITH HANGING KIT, DUCT KIT, AND BACNET ONBOARD CONTROLLER. PROVIDE AUXILIARY DRAIN PAN WITH FLOAT SWITCH TO POWER OFF UNIT. PROVIDE CONDENSATE PUMP.

* SIZED FOR WORST CASE DESIGN DAY DURING SUPPLY AIR UNIT ECONOMIZER MODE.

	HUMIDIFIER DISPERSION TUBES - DUCT MOUNTED												
ARK	LOCATION	AIR FLOW	MAX FACE VELOCITY	STEAM FLOW RATE (LB/HR)	STEAM OPERATING PRESSURE (PSIG)	UNIT DIMENSIONS		EDB / RH	LDB / RH	APD	MAX NON- WETTING	BASIS OF DESIGN	NOTES
ARK	LOCATION	(CFM)	(FPM)			WIDTH (IN)	HEIGHT (IN)	(F / %)	(F / %)	(IN. WG)	DISTANCE (IN.)	BAGIO OF BEGIGIN	
T-1	CORRIDOR - 204	14,000	2,000	250	ATM	36	20	55 / 30	57 / 85	0.05	12	DRISTEEM ULTRA-SORB LV	1
Т-2	CORRIDOR - 204	14,000	2,000	250	ATM	36	20	55 / 30	57 / 85	0.05	12	DRISTEEM ULTRA-SORB LV	1

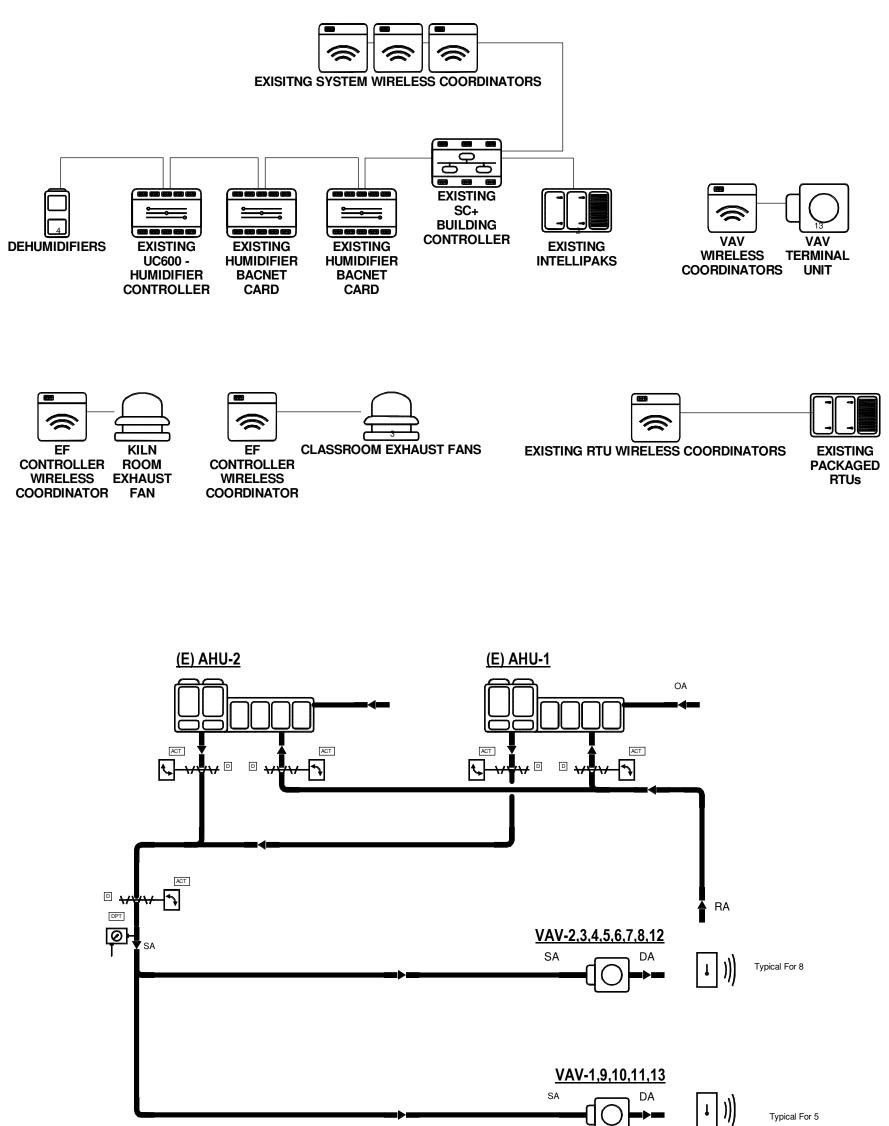
NOTES: 1. RECONNECT DISPERSION TUBE HEADER ASSEMBLY TO EXISTING STEAM GENERATOR SUPPLY PIPING. RECONNECT DRAINS.

NOTES: 1. SQUARE PANEL FACE FOR LAY-IN CEILING. ALUMINUM CONSTRUCTION, WHITE FINISH, PROVIDE MANUFACTURER'S MOUNTING FRAME FOR GYPSUM CEILING LOCATIONS. PROVIDE BACKPAN INSULATION BLANKET.

WHITE FINISH, PROVIDE SQUARE TO SQUARE OR ROUND TRANSITIONS AS REQUIRED. PROVIDE MANUFACTURER'S MOUNTING



UR C 960 S Ш 4 S S $\mathbf{\mathbf{X}}$ SINE 0 ES ES Μ NOI. STIL ST., CHEI NA **CHEROKEE CENTER** 314 W. LOCUST MECHANICAL S S blueriver ARCHITECTS A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com DESIGNED FOR COLOR PRINTING 08-23-2024 PROJECT #: 20200132 ISSUE DATES: CONSTRUCTION 08/23/2024 DOCUMENTS Date No. Description SHEET NUMBER: **M-601**



Sequence of Operation: VARIABLE AIR VOLUME SYSTEM VAV Air System:

Note:

This sequence of operations describes the "system-level" control functions of an air handling unit (AHU) with VAV terminal units that are part of the air system, which includes coordinating the operation of the AHU and the zone-level VAV units during the various operating modes. The "equipment-level" control functions of the AHU and the terminal units are contained in their respective sequence of operations documents.

System Operating Modes:

The Building Automation System (BAS) controller shall include a user-adjustable time-of-day schedule to define when the various areas of the facility are expected to be occupied versus unoccupied. Then, based on current zone conditions, the BAS determines the current system operating mode. The BAS controller shall send the following operating modes to the unit level controllers that are a member of the air system: Occupied Heat/Cool, Unoccupied Heat/Cool and Morning Warmup/Pre-cool.

Occupied Heat/Cool:

During the Occupied Mode, each VAV terminal unit shall be activated to maintain zone temperature at the occupied setpoint (cooling or heating). Meanwhile, the rooftop unit (AHU) modulates the supply fan to deliver the required airflow to the zones, positions the outdoor-air damper to bring in required amount of ventilation, and increases/decreases the source of cooling or heating to maintain discharge air at the desired setpoint.

Unoccupied Heat/Cool:

During the Unoccupied Mode, each VAV terminal unit shall be activated to maintain zone temperature at the unoccupied setpoint (cooling or heating). Meanwhile, the AHU shuts off, unless a zone requires unoccupied cooling or heating. If needed to operate, the AHU modulates the supply fan to deliver the required airflow to the zones, closes the outdoor-air damper and increases/decreases the source of cooling or heating to maintain discharge air at the desired setpoint.

Morning Warm-Up/Pre-Cool:

During the Morning Warm-up/Pre-cool Mode, each VAV terminal shall be activated to raise or lower the zone temperature to the occupied setpoint (heating or cooling) and then closes. Meanwhile, the AHU modulates the supply fan to deliver the required airflow to the zones, closes the outdoor-air damper and increases/decreases the source of cooling or heating to maintain discharge air at the desired setpoint.

Optimized System-Level Control Sequences

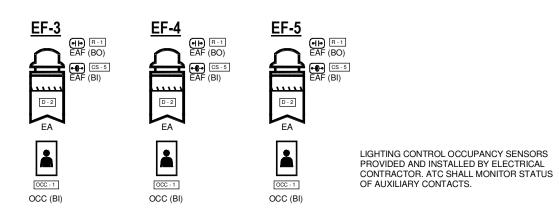
The BAS controller shall perform the following optimized system-level control strategies:

Optimal Start:

The BAS shall initiate Optimal Start mode such that the AHU is started and VAV boxes are enabled to allow the zone temperature to reach the occupied heating or cooling setpoint prior to scheduled occupancy. The system shall wait as long as possible before starting, so that the temperature in each zone reaches the occupied setpoint just in time for scheduled occupancy.

Optimal Stop:

The BAS shall initiate Optimal Stop mode such that cooling or heating is disabled so that the zone temperature does not drift beyond the occupied standby setpoint by the end of the scheduled occupancy period. The AHU supply fan shall continue operating, and ventilation control shall continue, through the end of the scheduled occupancy period.



Sequence of Operation: CLASSROOM EXHAUST FANS EF-3, EF-4, EF-5

Operation:

Auxiliary contacts of the lighting system occupancy sensors shall be monitored for room occupancy status. When the room is occupied as indicated by these sensors, the fan shall be commanded on. When no occupancy is indicated in the room, the fan shall be commanded off.

Fan Status:

The fan status shall be monitored by a current sensing switch. If the fan is signaled to start, and status is not proven within 20 seconds (adj.), an alarm shall annunciate at the BAS.

Unoccupied Economizing (Night Purge):

Between 4:00 AM (adj.) and 6:00 AM (adj), the system controller shall initiate Unoccupied Economizing mode if the current zone temperature is at least 1°F warmer than the occupied cooling setpoint and the outdoor dry-bulb temperature is more than 15°F (adj) cooler than the current zone temperature. When initiated, the AHU is started (OA damper fully open, cooling source is off) and VAV boxes are enabled to allow the zone temperature to cool to the occupied cooling setpoint.

Optimized Control of Discharge Air Temperature (DAT Reset):

At a frequency of once every 2 minutes (adj), the system controller shall monitor the outdoor dry-bulb temperature, as well as the zone temperature and damper position of all VAV terminal units. The system controller shall calculate a new discharge air temperature (DAT) setpoint based on the criteria shown below, and send this newly-calculated DAT setpoint to the AHU controller. When the outdoor air (OA) temperature is warmer than 65°F (adj), the maximum DAT setpoint shall be 55°F (adj). When the OA temperature is colder than 55°F (adj), the maximum DAT setpoint shall be 65°F (adj). When the OA temperature is between 55°F (adj) and 65°F (adj), the maximum DAT setpoint shall be reset proportionally between 55°F (adj) and 65°F (adj).

All values below are adjustable.

1. If the zone temperature exceeds the zone's cooling set point by 5°F for 2 minutes, send 3 requests.

2. Else if the zone temperature exceeds the zone's cooling set point by 3°F for 2 minutes, send 2 requests.

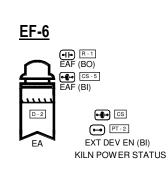
3. Else if the cooling loop is greater than 95%, send 1 request until the cooling loop is less than 85%.

4. Else if the cooling loop is less than 95%, send 0 requests.

System shall default to ignoring the first 2 requests (adj). When Requests > Ignores the system shall respond by adjusting setpoint downward by (Requests – Ignores) * -0.3°F (adj), but no larger than 1.0 °F (adj). When Requests are equal to, or less than Ignores the setpoint shall be reset upward by 0.2°F (adj). Setpoint shall be bound by a minimum and maximum value which can be set per air handler.

Optimized Control of Ventilation (Ventilation Optimization) with OA Flow Measurement:

The actual outdoor airflow shall be sensed at the outdoor air intake of the AHU, and controlled to an airflow setpoint determined according to ASHRAE Standard 62.1. When the BAS time-of-day schedule indicates that a zone is unoccupied, the required outdoor airflow for that zone shall be zero. When the schedule indicates that a zone is occupied, the required outdoor airflow for that zone shall equal the design outdoor airflow, unless the zone is equipped with occupancy sensor and/or a carbon dioxide (CO¬2) sensor, or uses a time-of-day ventilation schedule, to reduce the required outdoor airflow during periods of partial occupancy. The required outdoor-air fraction (current required outdoor airflow divided by the current primary airflow) shall be continuously calculated for each zone (VAV terminal unit). At a frequency of once every 10 minutes, the BAS shall gather this data from all VAV terminal units, calculate the minimum required outdoor airflow for the system according to ASHRAE 62.1, and send this newly-calculated outdoor airflow setpoint to the AHU controller.

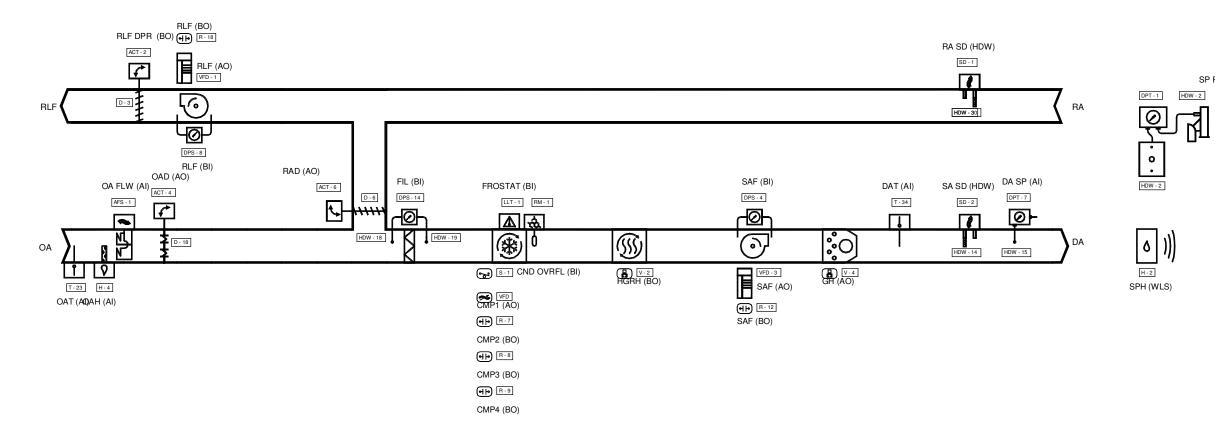


Sequence of Operation: KILN ROOM EXHAUST FAN EF-6 Operation:

The exhaust fan shall be commanded on by the BAS when the kiln is in operation as indicated by a current switch installed in the power circuit for the kiln. When the kiln transitions from operation to not in operation, the exhaust fan shall continue to run for 20 minutes (adjustable) and then be commanded off. Fan Status:

The fan status shall be monitored by a current sensing switch. If the fan is signaled to start, and status is not proven within 20 seconds (adj.), an alarm shall annunciate at the BAS.

(E) AHU-1 and (E) AHU-2



Sequence of Operation: EXISTING INTELLIPAKS AHU-1, AHU-2 Building Automation System Interface:

The Building Automation System (BAS) shall send the controller Occupied Bypass, Morning Warm-up/Pre-Cool, Occupied/Unoccupied and Heat/Cool modes. The BAS shall also send the discharge air temperature setpoint and the duct static pressure setpoint. If a BAS is not present, or communication is lost with the BAS the controller shall operate using default modes and setpoints.

Occupied:

During occupied periods, the supply fan shall run continuously and the mixed air dampers shall open to maintain minimum ventilation requirements. The unit controller shall control the supply fan speed to maintain the current supply duct static pressure setpoint (adj.). Upon a call for DX cooling, the unit controller shall enable the variable speed compressor. If the variable speed compressor cannot satisfy the load conditions, the unit controller shall start a fixed speed compressor. The variable speed compressor shall modulate to maintain the active discharge air temperature setpoint. This process shall repeat until all of the fixed speed compressors have been started or until the load conditions can be satisfied. If economizing is enabled, the outdoor air or mixed air dampers shall modulate to maintain the discharge air temperature setpoint and the relief air damper shall track the mixed air dampers. If the discharge air temperature sensor fails, the DX cooling shall be disabled, the gas heat shall be disabled, and an alarm shall annunciate at the BAS.

Unoccupied:

When the space temperature is below the unoccupied heating setpoint of 60.0 deg F (adi.) the supply fan shall be commanded on, the outside air damper shall remain closed and the gas heat shall be enabled. When the space temperature rises above the unoccupied heating setpoint of 60.0 deg. F (adj.) plus the unoccupied differential of 4.0 deg. F (adj.) the supply fan shall stop and the gas heat shall be disabled. When the space temperature is above the unoccupied cooling setpoint of 85.0 deg. F (adj.) the supply fan shall be commanded on, the outside air damper shall open if economizing is enabled and remain closed if economizing is disabled and the DX cooling shall be enabled. When the space temperature falls below the unoccupied cooling setpoint of 85.0 deg. F minus the Unoccupied differential of 4.0 deg. F (adi.) the supply fan shall stop, the DX cooling shall be disabled and the outside air damper shall close.

Optimal Start:

The BAS shall monitor the scheduled occupied time, occupied space setpoints and space temperature to calculate when the optimal start occurs.

Optimal Stop:

The BAS shall monitor the scheduled unoccupied time, occupied setpoints and space temperature to calculate when the optimal stop occurs. When the optimal stop mode is active the unit controller shall maintain the space temperature to the space temperature offset setpoint. Outside air damper shall remain enabled to provide minimum ventilation.

Morning Warm-Up Mode:

During optimal start, if the average space temperature is below the occupied heating setpoint a morning warm-up mode shall be activated. When morning warm-up is initiated the unit shall enable the heating and fan(s). The outside air damper shall remain closed. When the space temperature reaches the occupied heating setpoint (adj.), the unit shall transition to the occupied mode.

Pre-Cool Mode:

During optimal start, if the average space temperature is above the occupied cooling setpoint, pre-cool mode shall be activated. When pre-cool is initiated the unit shall enable the fan and cooling or economizer. The outside air damper shall remain closed, unless economizing. When the space temperature reaches occupied cooling setpoint (adj.), the unit shall transition to the occupied mode.

Occupied Bypass:

The BAS shall monitor the status of the ON and CANCEL buttons of the space temperature sensors. When an occupied bypass request is received from a space sensor, the unit shall transition from its current occupancy mode to occupied bypass mode and the unit shall maintain the space temperature to the occupied setpoints (adj.).

Heat/Cool Mode:

COOLING: The unit controller shall use the discharge air temperature sensor and discharge air temperature cooling setpoint to determine when to initiate requests for cooling. Discharge air setpoint shall be maintained by controlling the cooling as

HEATING: The unit controller shall use the discharge air temperature sensor and discharge air temperature heating setpoint to determine when to initiate requests for Filter Status: heating. Discharge air setpoint shall be maintained by controlling the heating as required. During Unoccupied Heating or Morning Warm-Up Mode, the unit heat request shall be communicated to the system VAVs prior to commencing heating operation to allow VAV units to open. The variable frequency drive shall be commanded to 100% and the heat shall be staged on and off to satisfy the zone temperature setpoint.

Discharge Air Temperature Reset Control:

The discharge air temperature setpoint, 55.0 deg. F - 65.0 deg. F (adj.) shall be reset based on either the outside air temperature or space average temperature (adj.). The minimum discharge air setpoint shall be set at 55.0 deg. F (adj.). The discharge temperature sensor shall prevent the discharge air temperature from falling below the minimum discharge air setpoint (adj.). If the discharge air temperature continues to fall, the discharge temperature sensor shall act as a low discharge temperature limit, a low temperature alarm shall annunciate, and the unit shall shut down. If the discharge temperature rises above the high limit setpoint the sensor shall act as a high discharge temperature limit and shall keep the unit running, a high temperature alarm shall annunciate.

OUTDOOR AIR TEMPERATURE RESET: The discharge air temperature setpoint shall be adjusted based on the outside air temperature and the cooling and heating load of the building.

SPACE TEMPERATURE RESET: The discharge air temperature setpoint shall be adjusted based on the temperature of the critical space(s).

Dehumidification:

The unit shall be in dehumidification mode if the space humidity is above the dehumidification setpoint. In the dehumidification mode, the supply air fan shall be enabled, the outside air damper shall be commanded to minimum position, and the unit controller shall energize mechanical cooling and the reheat solenoid.

MULTI-CIRCUIT UNITS: During dehumidification mode the outside air temperature shall be monitored. If this temperature rises above the reheat capacity limit setpoint or falls below the reheat capacity limit setpoint – 3.0 deg. F (adj.), the unit shall stage down or stage up the compressors respectively to meet full or part load capacity requirements based on ambient temperature. Factory installed hot gas reheat shall allow application of dehumidification. Dehumidification shall be allowed only when the outside air temperature is above 40.0 deg. F and below 100.0 deg. F. The economizer outside air damper shall drive to minimum position during dehumidification.

MULTI-CIRCUIT UNITS: On a call for dehumidification, the hot gas reheat valve in circuit 1 shall energize and the compressor(s) shall enable. When the humidity control setpoint is satisfies, the valve shall be de-energized and the compressor(s) in circuit 1 shall be disabled. If there is a call for 1st stage cooling while in the dehumidification mode, no action shall take place. If there is a call for 2nd stage cooling, the hot gas reheat valve shall be de-energized, and the unit shall revert to the cooling mode. If 2nd stage cooling is satisfied and there is still a call for dehumidification, the hot gas reheat valve shall once again be energized.

Economizer:

ENABLE (Reference Enthalpy): Outside air (OA) enthalpy shall be compared with the reference enthalpy control setpoint. The economizer shall enable when OA enthalpy is 2.0 BTU/LB less than enthalpy control setpoint. The economizer shall disable when OA enthalpy is greater than enthalpy control setpoint.

OPERATION: The supply air sensor shall measure the dry bulb temperature of the air leaving the evaporator coil while economizing. When economizing is enabled and the unit is operating in the cooling mode, the economizer damper shall be modulated between its minimum position and 100% to maintain the discharge air temperature setpoint. The economizer damper shall modulate toward minimum position in the event the discharge air temperature falls below the discharge low limit temperature setpoint. Compressors shall be delayed from operating until the economizer has opened to 100%.

Ventilation Control:

When in the occupied mode, the flow-measuring outdoor-air and damper shall modulate to maintain the current ventilation airflow setpoint. The ventilation airflow setpoint shall be reset to the optimal ventilation setpoint communicated by the BAS. The BAS shall reset the ventilation setpoint based on the current ventilation needs of the VAV terminals. Supply Fan:

the unoccupied mode.

Supply Duct Static Pressure Control:

During the occupied mode the unit controller shall modulate the output to the variable frequency drive as required to maintain the supply duct static pressure setpoint of 1.5 inches of W.C. (adj.). If the supply duct static pressure falls below 1.3 inches of W.C. (adj.) the unit controller shall increase the output to the variable frequency drive to maintain setpoint. If the supply duct static pressure rises above 1.7 inches of W.C. (adj.) the unit controller shall decrease the output to the variable frequency drive to maintain setpoint. Upon a call for heating or cooling in the unoccupied mode the unit controller shall modulate the speed of the variable frequency drive to 100%.

Static Pressure High Limit:

If for any reason the supply air pressure exceeds the supply air pressure high limit, the supply fan shall shut down. The unit shall be allowed to restart three times after a 15 minute off period. If the overpressurization condition occurs on the fourth restart, the unit shall shut down and a manual reset diagnostic is displayed at the remote panel and/or the BAS system.

Relief Air and Building Pressure Control:

A differential pressure transducer shall actively monitor the difference in pressure between the building (indoors) and outdoors. If the building pressure increases above the differential pressure setpoint, the unit controller shall open the relief air damper, turn on the relief air fan and modulate the relief air fan variable frequency drive to control building pressure to the differential pressure setpoint. If the building pressure decreases below the differential pressure setpoint, the associated controller shall deactivate the relief air fan variable frequency drive.

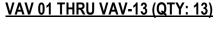
filter alarm shall annunciate at the BAS.

Smoke Detector Shutdown:

shutdown of cooling.

The unit shall shut down in response to a signal from the smoke detector indicating the presence of smoke and an alarm shall annunciate at the BAS. The smoke detector shall be interlocked to the unit through the dry contacts of the smoke detector. A manual reset of the smoke detector shall be required to restart the unit. Condensate Overflow Shutdown:

The unit shall shut down in response to a signal from the condensate overflow sensor. The sensor shall be interlocked to the unit cooling controller for immediate



DA FLW (AI)



DAT (AI)

T - 5

(++) PT-4 EH (AO)



The space temperature setpoint shall be determined either by a local (e.g., thumbwheel) setpoint, the VAV default setpoint or a communicated value. The VAV shall use the locally stored default setpoints when neither a local setpoint nor communicated setpoint is present. If both a local setpoint and communicated setpoint exist, the VAV shall use the communicated value. Reheat Control Mode: Reheat will only be allowed when the supply air temperature is 5.0 deg. F below the

Setpoint Occupied Unoccup Occupie Occupie

Heating

Setpoint Occupied Unoccupi Occupied Occupied Occupied

Reheat will only be allowed when the primary air temperature is 5.0 deg. F below the configured reheat enable setpoint of 70.0 deg. F (adj.). The reheat shall be enabled when the space temperature drops below the active heating setpoint and the minimum airflow requirements are met. During reheat the VAV shall operate at its minimum heating airflow setpoint and energize the heat as follows:

Electric Silicon Controlled Rectifier Reheat (SCR):

If the space temperature is at the heating setpoint, the electric heater shall modulate as required to maintain space temperature at the active heating setpoint while the VAV operates at its minimum heating airflow setpoint. If the discharge air temperature reaches the design heating discharge air temperature setpoint (adj.), the VAV shall modulate airflow between the minimum heating airflow setpoint and the maximum heating airflow setpoint as required to maintain space temperature at the active heating setpoint, while the electric heater modulates to maintain discharge air temperature at the design heating discharge air temperature setpoint. If the airflow reaches the maximum heating airflow setpoint, the VAV shall modulate the electric heater as required to maintain space temperature at the active heating setpoint, while the VAV operates at its maximum heating airflow setpoint

The current ventilation airflow setpoint shall be communicated to the BAS for control of the system outdoor-air intake.

The supply fan shall be enabled while in the occupied mode and cycled on during

A differential pressure switch shall monitor the differential pressure across the filter(s) when the fan is running. If the switch closes during normal operation a dirty

AIR VLV OPN (BO) AIR VLV CLS (BO) Sequence of Operation: VAV TERMINAL UNIT VAV-01 thru VAV-13

ACT - 2

Building Automation System Interface:

The Building Automation System (BAS) shall send the controller Occupied, and Unoccupied commands. The BAS may also send a Heat/Cool mode, priority shutdown commands, space temperature and/or space temperature setpoint. If communication is lost with the BAS, the controller shall operate using its local setpoints.

Occupied:

SP P (A

The occupancy mode will be communicated or hardwired to the controller via a binary input. When the unit is in the occupied mode the VAV will maintain the space temperature at the active occupied heating or cooling setpoint. Applicable ventilation and airflow setpoints will be enforced. The occupied mode will be the default mode of the VAV. Applicable ventilation and airflow setpoints will be enforced. The occupied mode will be the default mode of the VAV.

Occupied Standby:

The occupancy mode will be communicated or hardwired to the controller via a binary input, even though the BAS has scheduled the space as occupied. In the occupied standby mode, the active cooling and heating setpoints shall be relaxed (see cooling and heating mode) and both the ventilation airflow and minimum airflow setpoints shall be lowered (see VAV schedule).

Unoccupied:

Normal operating mode for unoccupied spaces or nighttime operation. When the unit is in unoccupied mode the VAV controller will maintain the space temperature at the stored unoccupied heating or cooling setpoint regardless of the presence of a hardwired or communicated setpoint. When the space temperature drops below its Unoccupied Heating Setpoint, the controller will modulate the air damper and the hot water valve until the zone temperature rises back to 2.0 deg. F above the Unoccupied Heating Setpoint. When the space temperature exceeds the active unoccupied setpoint the hot water valve will the air damper and hot water valve will modulate fully closed.

Occupied Bypass:

Mode used to temporarily place the unit into the occupied operation. Tenants shall be able to override the unoccupied mode from the space sensor. The override shall last for a maximum of 4 hours (adj.). The tenants shall be able to cancel the override from the space sensor at any time. During the override the unit shall operate in occupied mode.

Heat/Cool Mode:

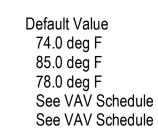
The Heat/Cool mode shall be set by a communicated value or automatically by the VAV. In standalone or auto mode the VAV shall compare the primary air temperature with the configured auto changeover setpoint to determine if the air is "hot"" or ""cold"". Heating mode implies the primary air temperature is hot. Cooling mode implies the primary air temperature is cold."

Cooling Mode:

When the unit is in cooling mode, the VAV controller shall maintain the space temperature at the active cooling setpoint by modulating the airflow between the active cooling minimum airflow setpoint to the maximum cooling airflow setpoint. The VAV shall use the measured space temperature and the active cooling setpoint to determine the requested cooling capacity of the unit. The outputs will be controlled based on the unit configuration and the requested cooling capacity.

Based on the VAV controller occupancy mode, the active cooling setpoint will be one of the following:

Occupied Cooling Setpoint Unoccupied Cooling Setpoint Occupied Standby Cooling Setpoint Occupied Min Cooling Airflow Setpoint Occupied Max Cooling Airflow Setpoint



<u>DCU-2</u> <u>DCU-1</u> ړو) SAF HI (BO) HPR-7 CMP1 (BO) ң 🕞 🕞 СМР1 (ВО) PT - 2 **5**-1 **S**•1 CND OVRFL (BI) CND OVRFL (BI) <u>DCU-4</u> <u>DCU-3</u> لره) SAF HI (BO) HP R-7 CMP1 (BO) н) В-7 СМР1 (ВО) PT - 2 S-1 S-1 CND OVRFL (BI) CND OVRFL (BI)

Sequence of Operation: DEHUMIDIFIERS DCU-1, DCU-2, DCU-3, DCU-4

Building Automation System Interface:

The BACNet controllers provided with the dehumidification units shall be integrated into the control system and receive a communicated relative humidity setpoint subject to staged operation as described below. The building automation system shall also communicate current room relative humidity to each of the units as sensed and averaged by the four average wireless humidity sensors installed in throughout the storage area. If a BAS is not present, or communication is lost with the BAS the dehumidifiers shall operate based on their built in humidity sensor with a setpoint of 55% RH.

Dehumidification During occupied periods, the supply fan shall run continuously. The dehumidification units shall be operated in stages as follows:

Stage 1 - Space Relative Humidity between 50% RH and 50% RH. Lead Dehumidifier shall operate with a setpoint of 50% RH. Stage 2 - Space Relative Humidity between 50% RH and 50% RH. Lead Dehumidifier shall operate with a setpoint of 50% RH. Stage 3 - Space Relative Humidity between 50% RH and 50% RH. Lead Dehumidifier shall operate with a setpoint of 50% RH. Stage 4 - Space Relative Humidity between 50% RH and 50% RH. Lead Dehumidifier shall operate with a setpoint of 50% RH. Setpoints and Dehumidification stage ranges shall be adjustable at the operator workstation. Units shall rotate Lead - Lag 1 - Lag 2 - and Lag 3 status to equalize load time. This rotation shall occur every time at least one dehumidifier was in operation to control humidity and all dehumidifiers have transitioned back to off.

Condensate Overflow Monitoring:

If moisture is detected in the unit condensate overflow pan, the unit shall be disabled and an alarm generated at the BAS.

SP OCC (WLS)

Heat/Cool Setpoint:

configured reheat enable setpoint of 70.0 deg. F (adj.). The reheat will be enabled when the space temperature drops below the active heating setpoint and the minimum airflow requirements are met. During reheat the VAV will operate at its minimum heating airflow setpoint and energize the heat as follows:

Setpoint	Default Value
Occupied Heating Setpoint	71.0 deg F
Unoccupied Heating Setpoint	60.0 deg F
Occupied Standby Heating Setpoint	67.0 deg F
Occupied Min Heating Airflow Setpoint	See VAV Schedule
Occupied Max Heating Airflow Setpoint	See VAV Schedule
Heating Mode:	

When the unit is in heating mode, the VAV controller will maintain the space temperature at the active heating setpoint by modulating the VAV damper (between the active heating minimum and maximum airflow setpoints). Based on the VAV controller occupancy mode, the active heating setpoint will be one of the following:

Default Value

d Heating Setpoint	71.0 deg F
pied Heating Setpoint	60.0 deg F
ed Standby Heating Setpoint	67.0 deg F
ed Min Heating Airflow Setpoint	See VAV Schedule
ed Max Heating Airflow Setpoint	See VAV Schedule

Local Reheat Control:

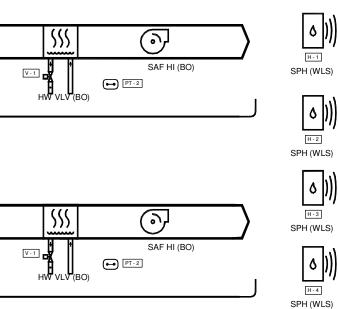
Demand Control Ventilation:

When the unit is in unoccupied mode, the ventilation airflow setpoint will be zero.

CO2 SENSOR: When the unit is in occupied mode, the ventilation airflow setpoint will be continuously calculated using the measured CO2 concentration in the space.

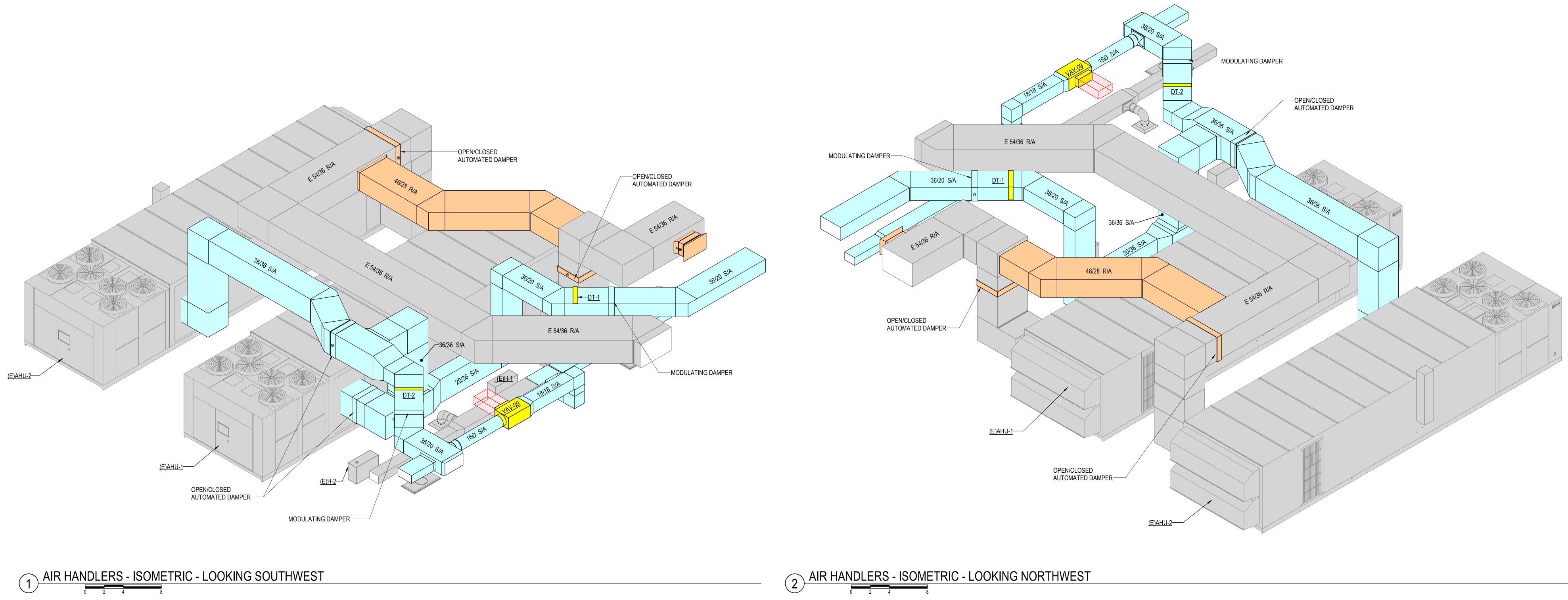
Space Sensor Failure:

If there is a fault with the operation of the zone sensor an alarm shall be annunciated at the BAS. Space sensor failure shall cause the VAV to drive the damper to minimum air flow if the VAV is in the occupied mode, or drive it closed if the VAV is in the unoccupied mode.





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1 AIR HANDLERS - ISOMETRIC - LOOKING SOUTHWEST





ELECTRICAL SYMBOLS

RECEPTACLES (MOUNTED 18" AFF UNLESS INDICATED OTHERWISE)

- DUPLEX RECEPTACLE OUTLET (20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20R)
- DUPLEX RECEPTACLE OUTLET (20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20R) MOUNT 4" ABOVE COUNTER TOP, SINK, OR BACKSPLASH (IF PRESENT)
- SINGLE RECEPTACLE OUTLET (20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20R) Ð
- Ð FLOOR RECEPTACLE OUTLET (20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20R)
- SINGLE RECEPTACLE OUTLET (50A, 250V, 3 POLE, 3 WIRE, NEMA 10-50R)
- SINGLE RECEPTACLE OUTLET (20A, 250V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 6-20R) Ś
- ч SINGLE RECEPTACLE OUTLET (30A, 250V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 6-30R)
- SINGLE RECEPTACLE OUTLET (30A, 250V, 3 POLE, 4 WIRE, TWIST-LOCK, GROUNDING TYPE, ъ NEMA L15-30R)
- чØ SINGLE SPECIAL-PURPOSE RECEPTACLE OUTLET; NUMBER CORRESPONDS TO THE SPECIAL-PURPOSE RECEPTACLE SCHEDULE
- €_R SINGLE RECEPTACLE FOR ELECTRIC RANGE (50A, 125/250V, 3 POLE, 4 WIRE, GROUNDING TYPE, NEMA 14-50R)
- $\mathbf{\Phi}$ DUPLEX RECEPTACLE MOUNTED IN CEILING (20A, 125V, 2 POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20R)
- TWO (2) DUPLEX RECEPTACLES MOUNTED IN DOUBLE GANG BACKBOX (20A, 125V, 2 POLE, 3 €
- TWO (2) DUPLEX RECEPTACLES FLOOR MOUNTED IN DOUBLE GANG BACKBOX (20A, 125V, 2 $\mathbf{\Phi}$
 - LIGHT FIXTURES (SEE FIXTURE SCHEDULE ON E-602 FOR TYPE)
- 0 LIGHT FIXTURE, CEILING MOUNTED

WIRE, GROUNDING TYPE, NEMA 5-20R)

POLE, 3 WIRE, GROUNDING TYPE, NEMA 5-20R)

- LIGHT FIXTURE, CEILING MOUNTED, ON EMERGENCY CIRCUIT LIGHT FIXTURE, CEILING MOUNTED, WITH EMERGENCY SELF CONTAINED BATTERY PACK. BATTERY PACK IS TO REMAIN UNSWITCHED.
- **P** LIGHT FIXTURE, WALL MOUNTED
- ΗΟΗ LIGHT FIXTURE, INDUSTRIAL STRIP, SURFACE OR PENDANT MOUNTED
- **bod** LIGHT FIXTURE, INDUSTRIAL STRIP, SURFACE OR PENDANT MOUNTED, ON EMERGENCY CIRCUIT LIGHT FIXTURE, INDUSTRIAL STRIP, SURFACE OR PENDANT MOUNTED, WITH EMERGENCY SELF CONTAINED BATTERY PACK. BATTERY PACK IS TO REMAIN UNSWITCHED.
- Ο LIGHT FIXTURE, CEILING MOUNTED
- \oslash LIGHT FIXTURE, CEILING MOUNTED, ON EMERGENCY CIRCUIT
- LIGHT FIXTURE, CEILING MOUNTED, WITH EMERGENCY SELF CONTAINED BATTERY PACK. BATTERY PACK IS TO REMAIN UNSWITCHED.
- С LIGHT FIXTURE, WALL MOUNTED
- EMERGENCY BATTERY POWERED LIGHTING UNIT, WITH SELF CONTAINED BATTERY, CHARGER, ETC. (REFER TO FIXTURE SCHEDULE FOR BATTERY TYPE, VOLTAGE, LAMP TYPE, WATTAGE, ETC.) TRIANGLES DEPICT QUANTITY AND AIMING OF LAMP HEADS
- EXIT SIGN, LIGHTED, CEILING MOUNTED. SHADED AREA INDICATES FACE. ARROW DEPICTS DIRECTIONAL ARROW ON SIGN. WHEN REQUIRED BY THE FIXTURE SCHEDULE, AN EMERGENCY SELF-CONTAINED BATTERY PACK IS TO REMAIN UNSWITCHED.

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- EXIT SIGN, LIGHTED, WALL MOUNTED AT 7'-6" AFF (TO BOTTOM OF SIGN) UNLESS INDICATED OTHERWISE. ARROW DEPICTS DIRECTIONAL ARROW ON SIGN. WHEN REQUIRED BY THE FIXTURE SCHEDULE, AN EMERGENCY SELF-CONTAINED BATTERY PACK IS TO REMAIN UNSWITCHED. TRACK LIGHT WITH ADJUSTABLE HEADS, LENGTH AND QUANTITY OF HEADS PER PLANS.
- FLOOD LIGHT, ARROW INDICATES DIRECTION OF BEAM
- DOCK LIGHT
- о⊟ PARKING AREA LIGHT FIXTURE, POLE MOUNTED
 - LIGHT FIXTURE IDENTIFICATION
 - LOWER CASE LETTER BESIDE FIXTURE
 - \bigcirc DENOTES SWITCH CONTROL (WHERE APPLICABLE)
 - UPPER CASE LETTER BESIDE EACH
 - FIXTURE DENOTES FIXTURE TYPE.
 - <u>SWITCHGEAR</u>

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CB

- MAGNETIC MOTOR STARTER (FURNISHED BY DIVISION 23, UNLESS NOTED OTHERWISE)
- ELECTRICAL PANELBOARD, FLUSH MOUNTED
 - ELECTRICAL PANELBOARD, SURFACE MOUNTED
- EXISTING ELECTRICAL PANELBOARD, FLUSH MOUNTED
- EXISTING ELECTRICAL PANELBOARD, SURFACE MOUNTED
 - SAFETY SWITCH; 30A CURRENT RATING UNLESS NOTED OTHERWISE. +4'-0" TO HANDLE
- FUSIBLE SAFETY SWITCH; CURRENT RATING AND FUSE RATING NOTED. +4'-0" TO HANDLE
 - CIRCUIT BREAKER IN WALL MOUNTED ENCLOSURE
 - ELECTRICAL TRANSFORMER, FLOOR MOUNTED UNLESS INDICATED OTHERWISE

AFF

ELECTRICAL SYMBOLS

	TELEPHONE/COMMUNICATIONS/DATA (OUTLETS SHALL BE MOUNTED 18" AFF UNLESS INDICATED OTHERWISE)
	TELEPHONE OUTLET. OUTLET BOX WITH 1" C STUBBED ABOVE ACCESSIBLE CEILING SPACE AND PULL CORD. SUBSCRIPT: W - WALL MOUNTED AT 54" AFF;
	TELEPHONE FLOOR OUTLET. OUTLET BOX WITH 1" C STUBBED ABOVE ACCESSIBLE CEILING SPACE AND PULL CORD.
\triangleright	DATA OUTLET. OUTLET BOX WITH 1" C STUBBED ABOVE ACCESSIBLE CEILING SPACE AND PULL CORD.
	DATA FLOOR OUTLET. OUTLET BOX WITH 1" C STUBBED ABOVE ACCESSIBLE CEILING SPACE AND PULL CORD.
	COMBINATION VOICE/DATA OUTLET. OUTLET BOX WITH 1" C STUBBED ABOVE ACCESSIBLE CEILING SPACE AND PULL CORD.
	COMBINATION VOICE/DATA FLOOR OUTLET. OUTLET BOX WITH 1" C STUBBED ABOVE ACCESSIBLE CEILING SPACE AND PULL CORD.
<u> </u>	4'-0" HIGH x 3/4" THICK FIRE-RETARDANT PLYWOOD BACKBOARD. SEE PLANS FOR LENGTH.
2	WIRELESS ACCESS POINT OUTLET CEILING MOUNTED. OUTLET BOX WITH 1" C STUBBED ABOVE ACCESSIBLE CEILING SPACE AND PULL CORD. NUMBER INDICATES QUANTITY OF

CABLE TRAY

<u>SINGLE LINE</u>

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(A)

SPD

G

CIRCUIT BREAKER, TRIP RATING AS INDICATED, 3 POLE OR AS INDICATED

DATA JACKS. ABSENCE OF A NUMBER INDICATES ONE DATA JACK.

60A	DISCONNECT SWITCH OR LOAD INTERRUPTER SWITCH, CURREN RATING AS INDICATED, 3 POLE OR AS INDICATED

SWITCH WITH GROUND FAULT INTERRUPTER

, F30 FRS FUSE, CURRENT RATING AND TYPE WHEN INDICATED

TRANSFORMER, DESCRIPTION AS NOTED OR PER SCHEDULE

CURRENT TRANSFORMER

POTENTIAL TRANSFORMER

PHASE SELECTOR SWITCH

AMMETER VOLTMETER

WATT-HOUR METER SURGE PROTECTIVE DEVICE

AUTOMATIC TRANSFER SWITCH

GENERATOR

SWITCHES (MOUNTED AT 46", UNLESS INDICATED OTHERWISE) (LOWER CASE LETTER INDICATES DEVICES CONTROLLED)

- SWITCH, SINGLE POLE, 20A
- ^{\$}2 SWITCH, DOUBLE POLE, 20A SWITCH
- \$₃ 3-WAY, 20A SWITCH
- ^{\$}4 4-WAY, 20A SWITCH
- ^{\$}K KEY OPERATED
- SINGLE POLE SWITCH, WITH PILOT LIGHT
- SINGLE POLE MANUAL MOTOR STARTING SWITCH, WITH THERMAL OVERLOAD ELEMENT AND PROVISIONS FOR LOCKING OPEN
- SWITCH, DIMMING (COORDINATE WITH FIXTURE MANUFACTURER)
- ^{\$}X SWITCH. MULLION SWITCH
- ^{\$}LV LOW VOLTAGE WITH MOMENTARY CONTACTS SWITCH
- ^{\$}O OCCUPANCY SENSOR, WALL MOUNTED, DUAL TECHNOLOGY
- ^{\$}OD DIMMER WITH OCCUPANCY SWITCH, WALL MOUNTED, DUAL TECHNOLOGY
- OS DUAL CONTACT OCCUPANCY SENSOR, CEILING MOUNTED, DUAL TECHNOLOGY. OCCUPANCY SENSOR TO ALSO TIE INTO BAS FOR HVAC. PC PHOTOCELL
- MULTIPLE DEVICES LOCATED SIDE BY SIDE (OR ABOVE AND BELOW, IF +6' OF ABOVE AND BELOW, IN DIFFERENT ELEVATIONS ARE SHOWN) AT THE LOCATION INDICATED)

ELECTRICAL SYMBOLS

	MISCELLANEOUS		PAGING DEVICES
ŀŪ	JUNCTION BOX, WALL MOUNT AS INDICATED	S	LOUDSPEAKER OUTLET, CEILING MOUNTED, DIRECTIONAL. SUBSCRIPT
\bigcirc	JUNCTION BOX, CEILING MOUNT AS INDICATED	V	"V" DENOTES VOLUME CONTROL.
ч©	CLOCK OUTLET, WALL MOUNTED 7'-6" AFF	HSX V	LOUDSPEAKER OUTLET, WALL MOUNTED, DIRECTIONAL. SUBSCRIPT "V" DENOTES VOLUME CONTROL.
Q	MOTOR		LOUDSPEAKER OUTLET, CEILING MOUNTED, BI-DIRECTIONAL. SUBSCRIPT "V" DENOTES VOLUME CONTROL.
•@	10' BARE #6 COILED & EXOTHERMICALLY WELDED TO COLUMN	V	Subservir 1 V DENOTES VOLUME CONTROL.
ΓŢ	CABLE TELEVISION OUTLET BOX MOUNTED 18" AFF WITH CONDUIT STUBBED ABOVE CEILING. PROVIDE PULL CORD.	S	LOUDSPEAKER OUTLET, CEILING MOUNTED. SUBSCRIPT "V" DENOTES VOLUME CONTROL. MOUNT TO ROOF TRUSS WITH BAFFLE BOX IN AREAS WITHOUT CEILINGS.
	CONDUIT RUN, EXPOSED	\$ _V	SPEAKER VOLUME CONTROL
	CONDUIT RUN, CONCEALED		
\sim	FLEXIBLE CONDUIT		<u>SECURITY</u>

<u>CIRCUIT</u> INFORMATION

/	HOMERUN DESIGNATION
	PHASE CONDUCTOR(S)
1GL1-1,3,5	EQUIPMENT GROUND (PROVIDE EQUIPMENT GROUND FOR ALL BRANCH CIRCUITS AND FEEDERS, WHETHER SHOWN OR NOT. WHERE SHOWN TO SHARE A CONDUIT, BRANCH CIRCUITS SHALL SHARE EQUIPMENT GROUND UNLESS INDICATED OTHERWISE)
#8, 1"C \	NEUTRAL
	CONDUIT SIZE
\ \	WIRE SIZE
\	CIRCUIT DESIGNATION

- CIRCUIT DESIGNATION INDICATES PANELBOARD AND CIRCUIT(S) TO WHICH HOMERUN IS CONNECTED. • WIRE SIZE SHALL BE NO. 12, UNLESS INDICATED OTHERWISE.
- CONDUIT SIZE SHALL BE MINIMUM ALLOWED BY SPECIFICATIONS FOR NO. 12 SIZE WIRE, 3/4" FOR NO. 10, UNLESS INDICATED OTHERWISE.
- CIRCUIT INFORMATION PROVIDED AT THE HOMERUN SYMBOL SHALL APPLY THE ENTIRE LENGTH OF THE CIRCUIT (FROM PANELBOARD TO LAST LOAD).
- WHEN NO PHASE CONDUCTOR OR NEUTRAL IS INDICATED AT THE HOMERUN SYMBOL, PROVIDE ONE PHASE CONDUCTOR AND ONE NEUTRAL, BOTH NO. 12.
- SWITCHING CONDUCTORS, CONDUCTORS FOR NIGHT LIGHT CIRCUITS (UNSWITCHED), ETC. ARE NOT SHOWN, BUT SHALL BE PROVIDED AS

NECESSARY.

- WIRE SIZE INDICATED ON THESE DOCUMENTS AS INDICATED BY "NO." OR "#" HAS THE SAME MEANING AS "AWG" (N.E.C. NOMENCLATURE). (I.E. "NO. 12" OR "# 12" MEANS "12AWG" IN N.E.C. NOMENCLATURE.)
- ELECTRICAL SPECIFICATIONS:
- A. ALL ELECTRICAL DEVICES, WIRING, INSTALLATION, ETC. SHALL BE IN ACCORDANCE WITH NEC, NFPA, ADA, AND ALL APPLICABLE STATE LAWS AND CODES.
- B. ALL FEEDERS AND BRANCH CIRCUITS SHALL HAVE A GROUND WIRE, SIZED PER NEC. THE USE OF CONDUIT AS A GROUND IS NOT ACCEPTABLE. C. CONDUCTORS: SOFT-DRAWN COPPER WITH INSULATION OF 60-DEGREES C OR
- HIGHER FOR NO. 12 AND NO. 10 AND 75-DEGREES C OR HIGHER FOR NO. 8 AND LARGER. CONDUCTORS NO. 8 AND LARGER SHALL BE STRANDED. CONDUCTORS NO. 10 AND SMALLER SHALL BE SOLID.
- D. CONDUIT: MINIMUM 3/4", UNLESS OTHERWISE INDICATED ON THE PLANS.
- E. ALL CONDUIT USED IN DAMP LOCATIONS SHALL BE GALVANIZED RIGID CONDUIT (GRC) OR INTERMEDIATE METAL CONDUIT (IMC), USING ONLY THREADED COUPLINGS.
- F. ELECTRICAL METALLIC TUBING (EMT) SHALL BE USED IN ALL AREAS WHERE GRC OR IMC IS NOT REQUIRED BY THESE DRAWINGS OR THE NATIONAL ELECTRIC CODE. COUPLINGS AND CONNECTIONS SHALL BE COMPRESSION TYPE. INDENTER TYPE FITTINGS SHALL NOT BE USED.
- G. FLEXIBLE STEEL CONDUIT SHALL BE USED TO CONNECT ALL MOTORS AND OTHER MOVING ELECTRICAL EQUIPMENT. LIQUID-TIGHT FLEXIBLE STEEL CONDUIT SHALL BE USED IN DAMP LOCATIONS WHERE FLEXIBLE CONDUIT IS REQUIRED.
- H. CIRCUIT BREAKERS: MOLDED-CASE, QUICK-MAKE AND QUICK-BREAK THERMAL MAGNETIC TYPE. BREAKERS SHALL HAVE A TRIP INDICATION INDEPENDENT OF THE "ON" OR "OFF" POSITIONS. BREAKERS SHALL HAVE AN INTERRUPTING CAPACITY EQUAL TO THE PANEL BEING INSTALLED IN.
- I. MOTOR STARTERS: PROVIDE MANUAL STARTERS FOR SINGLE PHASE, FRACTIONAL HORSEPOWER MOTORS 1/2 HORSEPOWER AND SMALLER OR AS NOTED ON THE DRAWINGS. STARTERS AND CONTROL EQUIPMENT FOR MOTORS LARGER THAN 1/2
- HORSEPOWER TO BE FURNISHED UNDER DIVISION 22 OR 23(15). J. DISCONNECT SWITCHES: HEAVY-DUTY TYPE, QUICK-MAKE QUICK-BREAK OR AS SHOWN ON THE DRAWINGS. DISCONNECTS FOR MOTOR CIRCUITS SHALL BE MOTOR RATED. PROVIDE DISCONNECT SWITCHES IN NEMA 1 ENCLOSURES; EXCEPT NEMA 3R
- OR NEMA 12 SHALL BE USED IN DAMP/WET LOCATIONS. PROVIDE OTHER ENCLOSURE RATINGS AS INDICATED. DISCONNECT SWITCHES SHALL HAVE A COVER INTERLOCK, WITH DEFEAT DEVICE. TO PREVENT UNAUTHORIZED PERSONNEL FROM OPENING THE DOOR WHEN THE SWITCH IS ON.
- K. ALL VOICE, DATA AND CATV CABLING SHALL BE PLENUM RATED.
- L. ALL SWITCHES, RECEPTACLES AND OTHER DEVICE OUTLETS SHALL BE WHITE. ALL DEVICE PLATES AND COVERS SHALL BE WHITE. CEILING MOUNTED DEVICES (OCCUPANCY SENSORS, MOTION SENSORS, ETC.) SHALL BE WHITE. DEVICE PLATES FOR UNFINISHED WALLS SHALL GALVANIZED STEEL.
- M. ALL CONDUIT SHALL BE ROUTED CONCEALED UNLESS IN ELECTRICAL OR MECHANICAL SPACES.

N. GFCI TYPE RECEPTACLES OR CIRCUIT BREAKERS SHALL BE UTILIZED AS REQUIRED BY CODE. OVERCURRENT PROTECTION AND DISCONNECTING MEANS SHALL BE PROVIDED FOR ALL MOTORS PER CODE.

ELECTRICAL SYMBOLS

MAGNETIC ALARM SWITCH

DURESS ALARM SWITCH

CAPACITIVE DETECTOR

ELECTRIC PUSH-BUTTON

REQUEST TO EXIT PUSH BUTTON

AFF = ABOVE FINISHED FLOOR

IG = ISOLATED GROUND

NIC = NOT IN CONTRACT

GENERAL SYMBOLS NOTES

ALL SYMBOLS MAY NOT BE USED.

2. MOUNTING HEIGHTS ARE ABOVE FINISHED

OUTLET, DEVICE, ETC. UNLESS INDICATED

3. LARGE AMPACITY CIRCUIT DESIGNATION

EXAMPLE: 4 SETS OF 3#500, #250, #1/0G, 4"C

THREE 500 KCM CONDUCTORS, ONE 250 KCM

NEUTRAL AND ONE #1/0 GROUND.

SEISMIC DESIGN CATEGORY IS "B".

COLOR LEGEND:

DEMOLISH

---- DEMOLISH

——— NEW

NEW CONSTRUCTION

LINESTYLE LEGEND:

EXISTING TO REMAIN

EXISTING TO REMAIN

MEANS IN EACH OF FOUR 4" CONDUITS INSTALL

FLOOR OR GRADE TO THE CENTER LINE OF THE

AFL = ABOVE FINISHED LANDING

GFI = GROUND FAULT INTERRUPTER

UIO = UNLESS INDICATED OTHERWISE

WP = WEATHERPROOF CONSTRUCTION

OF/OI = OWNER FURNISHED / OWNER INSTALLED

CF/CI = CONTRACTOR FURNISHED / CONTRACTOR INSTALLED

CARD READER

ELECTRIC STRIKE

ABBREVIATIONS:

TYP = TYPICAL

OTHERWISE.

MOTION DETECTOR

CCTV CAMERA LOCATION, CEILING MOUNTED UNLESS INDICATED OTHERWISE

KEYPAD ACCESS ALARM OVERRIDE CONTROL

М

D

MD

CD

KSH

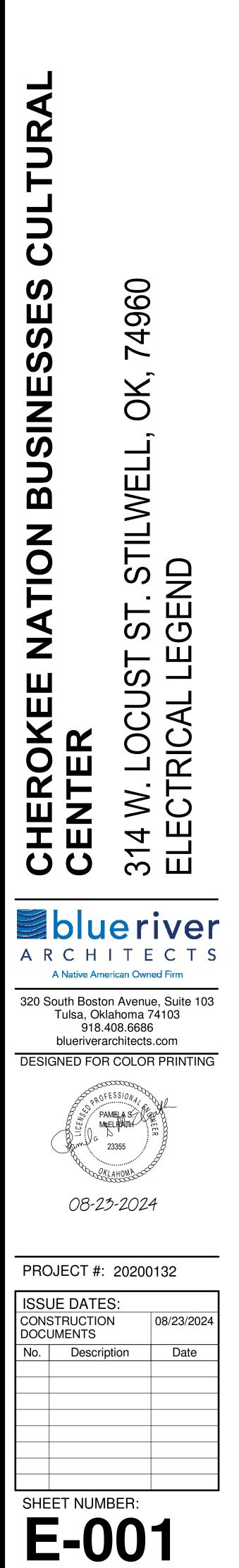
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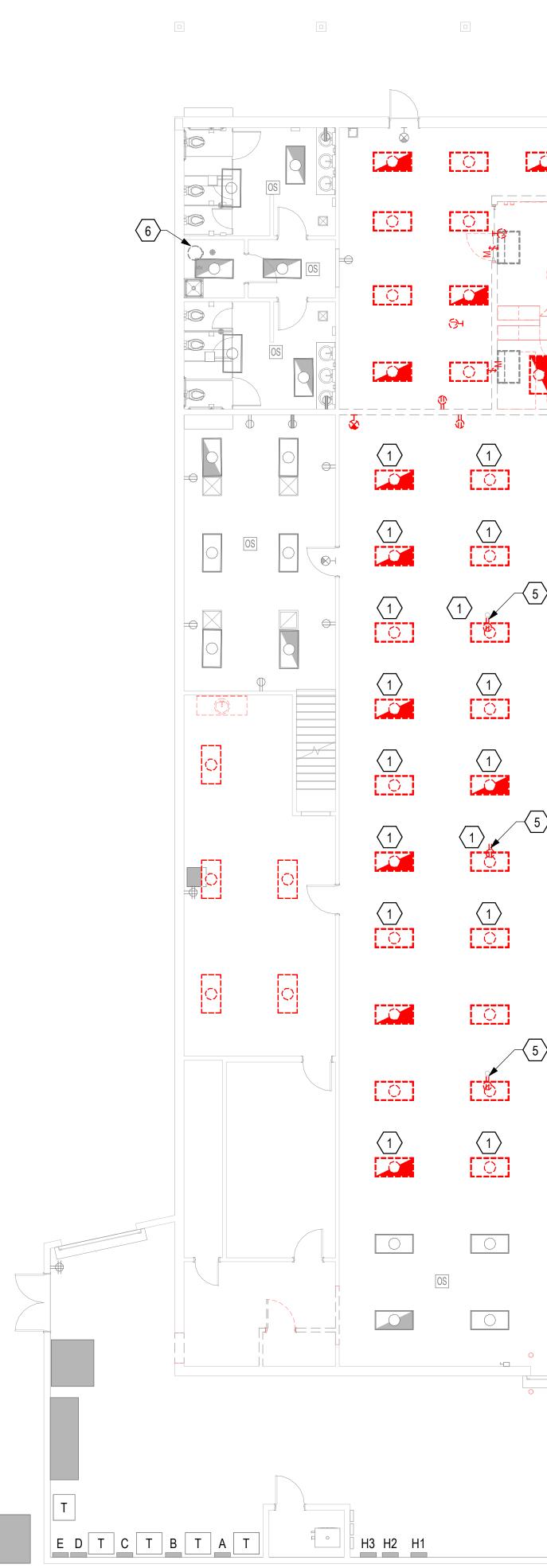
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REX









0 4 8 1 SCALE : 1/8" = 1'-0"

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<u>GENERAL NOTES:</u>

DEVICES.

A. DEVICES INDICATED OR NOTED TO BE DEMOLISHED MAY SHARE A CIRCUIT WITH ITEMS THAT WILL REMAIN. MAINTAIN CIRCUIT CONTINUITY FOR REMAINING FIXTURES AND

B. INFORMATION REGARDING EXISTING CONDITIONS WAS TAKEN FROM RECORD DRAWINGS AND CASUAL SITE OBSERVATIONS. INFORMATION MAY BE INCOMPLETE. VERIFY AND DOCUMENT EXISTING CONDITIONS PRIOR TO DEMOLITION.

C. LIGHTING AND RECEPTACLE CIRCUITS ARE TO BE REUSED FOR NEW LIGHTING AND DEVICES. REMOVE CONDUIT AND CONDUCTORS OF FULLY DEMOLISHED CIRCUITS TO THE POINT OF ORIGIN (PANELBOARD FOR CIRCUITS TO BE COMPLETELY REMOVED AND J-BOX FOR CIRCUITS TO BE PARTIALLLY REMOVED). INSTALL COVERS ON HOLES IN J-BOXES AND PANELBOARDS. TURN OFF AND MARK BREAKERS "SPARE" FOR CIRCUITS COMPLETELY REMOVED.

D. ALL EXISTING PANELBOARDS AND TRANSFORMERS ARE EXISTING TO REMAIN.

YED NOTES:

 $\langle 1 \rangle$ REUSE EXISTING LIGHT FIXTURE IN SAME AREA FOR NEW LAYOUT. 2 DEMO LIGHTS INDICATED IN THIS AREA. OTHERS ARE EXISTING TO REMAIN.

 $\langle 3 \rangle$ RELOCATE EXIT SIGN TO NEW LOCATION.

4 RELOCATE LIGHT SWITCHES TO NEW LOCATION.

5 RELOCATE RECEPTACLE FROM STRUCTURAL POLES TO NEW WALL IN THIS AREA.

> DISCONNECT ELECTRIC WATER HEATER AND MAKE READY FOR NEW WATER HEATER.



CHEROKEE NATION BUSINESSES CULTURAL CENTER 314 W. LOCUST ST. STILWELL, OK, 74960 ELECTRICAL DEMOLITION PLAN blueriver ARCHITECTS A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com DESIGNED FOR COLOR PRINTING 08-23-2024 PROJECT #: 20200132 ISSUE DATES: CONSTRUCTION 08/23/2024 DOCUMENTS No. Description Date SHEET NUMBER: ED1



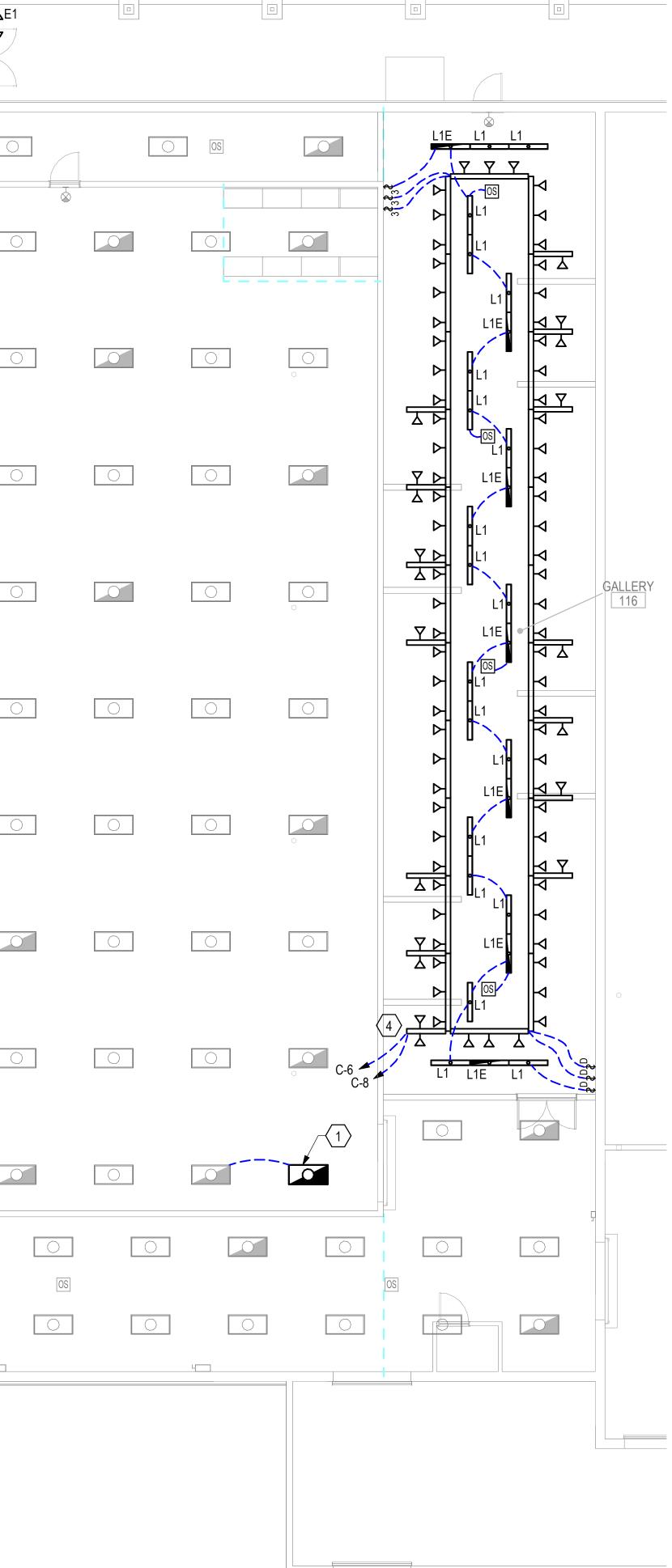
1 FIRST FLOOR LIGHTING PLAN 1/8" = 1'-0" 0 4 8 SCALE : 1/8" = 1'-0"

]			E1 A11	A1 A1 O A1 O A1 O	A1 — — — — — — — — — — — — — — — — — — —	A1 	A1 A1 	A1 D O- A1E D O-		
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			3 2	3 2 3 2 3 2							0
2	0				0	\bigcirc	\bigcirc	0	\bigcirc	\bigcirc	0
2					\bigcirc				\bigcirc		0
2	0				0	\bigcirc	\bigcirc	o STORAGE 114A	\bigcirc	\bigcirc	0
2							\bigcirc		\bigcirc		0
2	0				0			0	\bigcirc	\bigcirc	. ○
<u> </u>										0	
2	°				0			0		\bigcirc	0
2			3 ₅ 3 ₅ 3 ₅ 3 ₅ 3		\bigcirc		\bigcirc	\bigcirc	\bigcirc		
[05	0				CORRIDOR E112			\bigcirc	gwni	
	+' 					 					
			KILN ROOM								

<u>GENERAL NOTES:</u>

D. LOCATE ALL POWER PACKS FOR OCCUPANCY SENSORS ABOVE THE CEILING WHERE ACCESSIBLE. E. SET OCCUPANCY SENSORS TO A 30-MINUTE TIME DELAY. F. SET ALL WALL-MOUNTED OCCUPANCY SENSORS TO MANUAL-ON/AUTOMATIC-OFF.

G. DO NOT COVER RECESSED LIGHTING FIXTURE WITH BATT INSULATION. H. UPDATE PANEL SCHEDULES FOR ANY CIRCUITS THAT ARE BEING AFFECTED IN ALL EXISTING PANELS. PROVIDE TYPED PANEL SCHEDULES IN EACH PANEL AT COMPLETION OF WORK. TURN SPARE BREAKERS OFF.



	<u>KE</u>
1	REL(NEW
2	REL
3	REL
4	TWC ABO
5	REP

TRACK LIGHTING TRACKS AND HEAD QUANTITIES: PROVIDE ALL REQUIRED CONNECTORS AND ACCESSORIES.
(24) - TYPE T8 8' TRACKS (14) - TYPE T4 4' TRACKS
 (12) - TYPE TH1 HEADS (SEE LIGHT FIXTURE SCHEDULE) (12) - TYPE TH2 HEADS (SEE LIGHT FIXTURE SCHEDULE) (20) - TYPE TH3 HEADS (SEE LIGHT FIXTURE SCHEDULE) (20) - TYPE TH4 HEADS (SEE LIGHT FIXTURE SCHEDULE) (20) - TYPE TH5 HEADS (SEE LIGHT FIXTURE SCHEDULE)

NORTH

A. REUSE EXISTING LIGHTING CIRCUITS UNLESS INDICATED OTHERWISE. VERIFY ADEQUATE AMPACITY.

B. ADJUST THE QUANTITY AND LOCATIONS OF OCCUPANCY SENSORS AS NECESSARY FOR FULL ROOM COVERAGE (MAXIMUM OF 500 SQ. FT COVERAGE PER SENSOR). THE DISTANCE BETWEEN SENSORS AND HVAC REGISTERS SHALL BE NO LESS THAN THE MINIMUM DISTANCE RECOMMENDED BY THE SENSOR MANUFACTURER.

C. OCCUPANCY SENSORS SHALL CONTROL ALL NORMAL POWER LIGHT FIXTURES IN THE ROOM IN WHICH THEY ARE INSTALLED UNLESS OTHERWISE INDICATED.

J. LIGHTING CIRCUITRY ONLY SHOWN FOR CONTROL AREA PURPOSES. K. VERIFY FIXTURE REQUIREMENTS FOR VOLTAGE AND DIMMING. PROVIDE ALL NECESSARY ACCESSORIES FOR A COMPLETE SYSTEM.

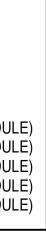


ELOCATE EXISTING FIXTURE FROM THIS AREA OF DEMOLITION TO THIS EW LOCATION.

LOCATE SWITCHES TO THIS LOCATION.

LOCATE EXIT SIGN TO THIS LOCATION.

O CIRCUIT TRACK LIGHTING. PROVIDE POWER TO ACCESSIBLE AREA OVE CEILING. MOUNT TRACK TIGHT TO CEILING. PLACE EXISTING FIXTURE WITH NEW.

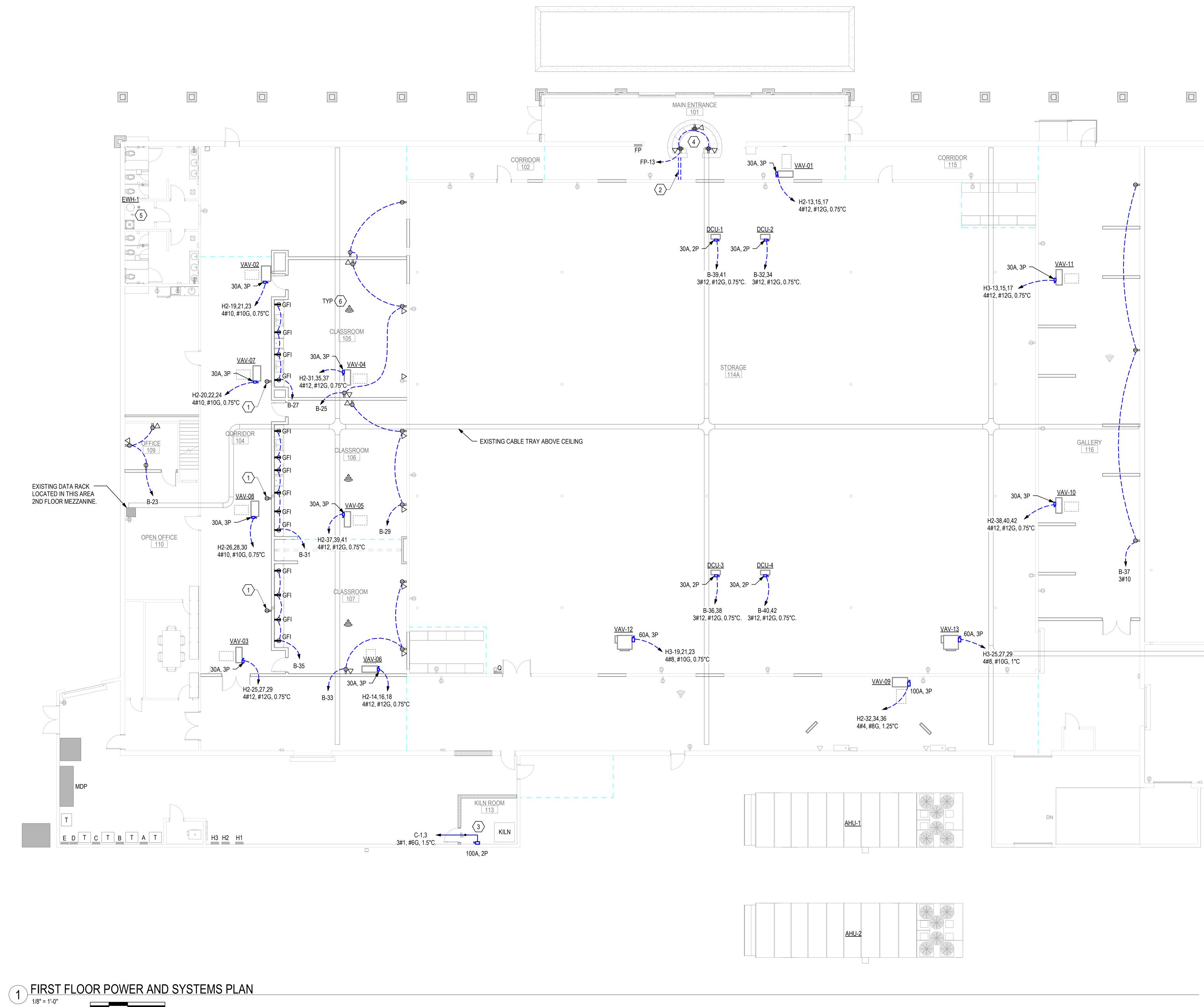




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Б C 4960 S Ш S S S **USINE** QK /ELL, LAN Μ ≥ ⊑ . STIL NOI. ST. IGH NA OOR OOR **CHEROKEE CENTER** 314 W. LOCU: FIRST FLOOF STS blueriver ARCHITECTS A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com DESIGNED FOR COLOR PRINTING 08-23-2024 PROJECT #: 20200132 ISSUE DATES: CONSTRUCTION 08/23/2024 DOCUMENTS No. Description Date

SHEET NUMBER:



0 4 8 SCALE : 1/8" = 1'-0"

NORTH

<u>GENERAL NOTES:</u>

A. INFORMATION REGARDING EXISTING CONDITIONS WAS TAKEN FROM CASUAL SITE OBSERVATIONS. INFORMATION MAY BE INCOMPLETE. VERIFY AND DOCUMENT EXISTING CONDITIONS PRIOR TO DEMOLITION.

B. UPDATE PANEL SCHEDULES FOR ANY CIRCUITS THAT ARE BEING AFFECTED IN ALL EXISTING PANELS. PROVIDE AND INSTALL TYPED WRITTEN PANEL SCHEDULE IN EACH PANEL AT COMPLETION OF WORK. TURN SPARE BREAKERS OFF.

C. EXISTING RECEPTACLES AND EQUIPMENT NOT SHOWN ARE TO REMAIN UNLESS NOTED OTHERWISE.

D. USE EXISTING CABLE TRAY SYSTEM TO MAKE CAT 6 DATA DROPS TO NEW AREAS.



KEYED NOTES:

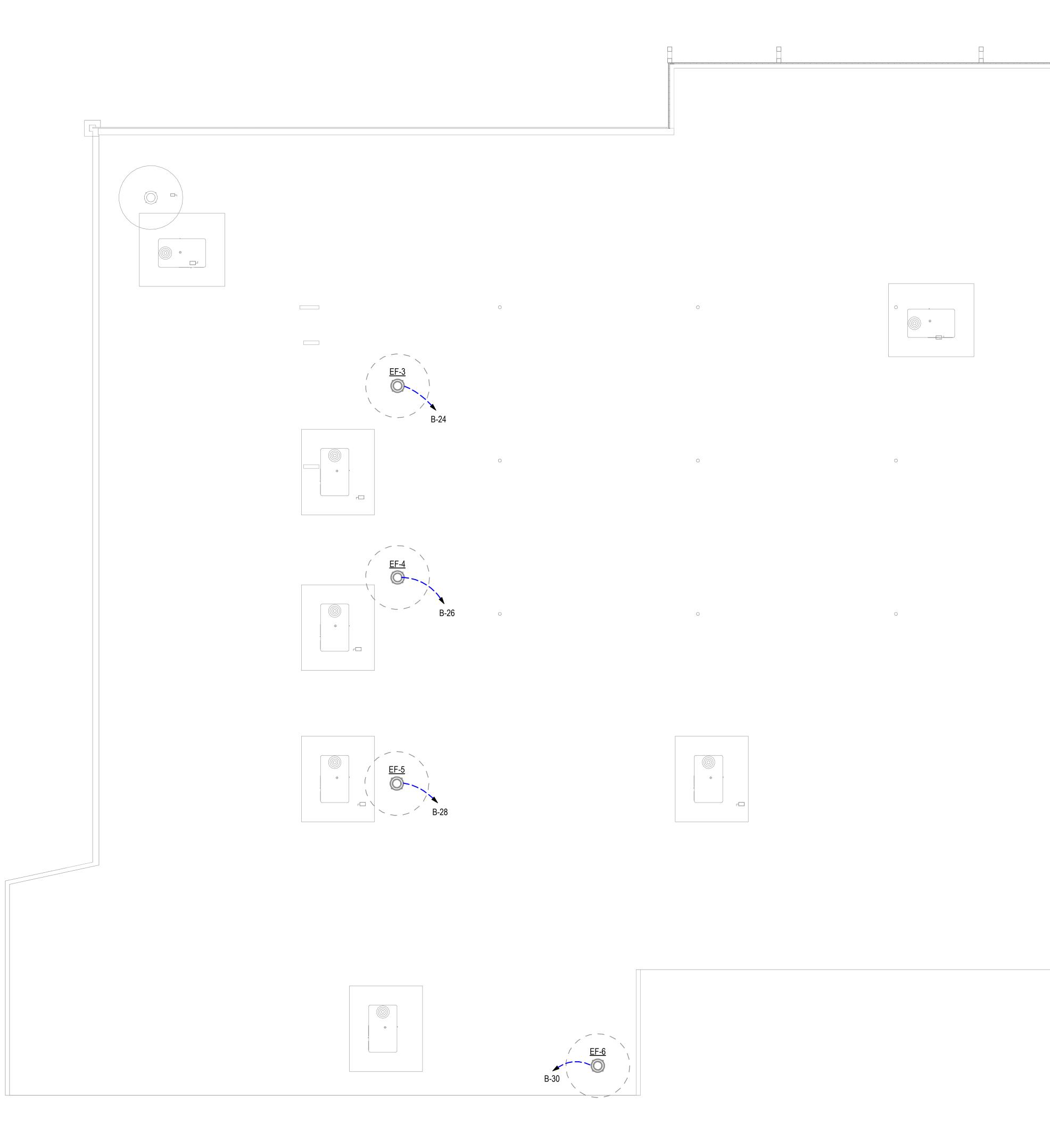
1 RELOCATE EXISTING RECEPTACLE FROM POLE TO NEW WALL. EXTEND WITH SAME SIZE WIRE AND CONDUIT TO NEW LOCATION. 2 SAWCUT CONCRETE TRENCH FOR POWER AND DATA FOR FRONT RECEPTION DESK.

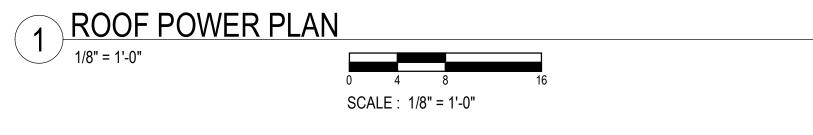
(3) COORDINATE DISCONNECT LOCATION WITH KILN MANUFACTURER'S RECOMMENDATIONS PRIOR TO ROUGH-IN. 4 COORDINATE POWER AND DATA LOCATIONS WITH FURNITURE MANUFACTURER PRIOR TO ROUGH-IN.

5 RECONNECT NEW WATER HEATER TO EXISTING CIRCUIT.

6 PROVIDE CAT 6 CABLE AT CEILING (WITH 10' COILED) FOR WI-FI ACCESS EQUIPMENT. TERMINATE AT NEAREST DATA HUB.

CUL SSES 960-PL/ , OK, 74(STEMS **USINE** S S L ILWEI AND Ω NOI. ST. ST OWER NA Ω OOR 0 Ш **CHEROKEE CENTER** 314 W. LOCUS FIRST FLOOF STS **blueriver** ARCHITECTS A Native American Owned Firm 320 South Boston Avenue, Suite 103 Tulsa, Oklahoma 74103 918.408.6686 blueriverarchitects.com DESIGNED FOR COLOR PRINTING 08-23-2024 PROJECT #: 20200132 ISSUE DATES: CONSTRUCTION 08/23/2024 DOCUMENTS Date No. Description SHEET NUMBER: **EP101**





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NORTH





	PANEL	E	2	MOUNTI					OCATION	EXISTI			MAIN BUS RATING
					-			-	_	EVIOLI		400	
		<u> </u>		_ POL		3		FRAME	400	N ALN I	TRIP		-
	DLTAGE	208Y			SE	3				MIN		BREAK	ER INTERRUPTING CAPACITY
			ORIES	SN + EQP GND				1					
	DEVICE			BRANCH CIRCUI	Γ			4	HASE LOAI				BRANCH CIRCUIT
AMPS	POLES	TYPF		1		VOLT	NO		OLT AMPS		NO	VOLT	
TRIP			LOAD			AMPS		A	В	С		AMPS	DESCRIPTION
20	1			unknown existing			1				2		unknown existing
20	1			unknown existing			3				4		unknown existing
20	1			unknown existing			5				6		unknown existing
20	3			unknown existing			7				8		upstairs server ac
				unknown existing			9				10		upstairs server ac
				unknown existing			11				12		unknown existing
20	1			unknown existing			13				14		unknown existing
30	1			unknown existing			15				16		unknown existing
30	1			unknown existing			17				18		unknown existing
30	1			unknown existing			19				20		server ac east
30	1			unknown existing			21				22		server ac east
**20	1		R	OFFICE 109 REC		540	23			1140	24	600	EF-3
**20	1		R	CLASSROOM 105 REC		900	25	1500			26		EF-4
**20	1		R	CLASSROOM 105 GFI REC	;	720	27		1320		28		EF-5
**20	1		R	CLASSROOM 106 REC		540	29			1020	30		EF-6
**20	1		R	CLASSROOM 106 GFI REC	;	1080	31	1996			32		DCU-2
**20	1		R	CLASSROOM 107 REC	·	540	33		1456		34		DCU-2
**20	1		R	CLASSROOM 107 GFI REC	:	720	35			1636	36		DCU-3
**20	1		R	GALLERY	, 	540	37	1456			38		DCU-3
**15	2		H	DCU-1		916	39		1832		40		DCU-4
			H	DCU-1		916			IUUE	1832	42		DCU-4
						TOTAL	••	4952	4608	5628	16		KVA (CONNECTED)
								1002		0020			KVA (DEMAND)
												10	

			<u></u>							EVIOTI			
	PANEL	(_ IV				-	DCATION				MAIN BUS RATI
	MAIN	-	B	-	POLES	3	-	FRAME			TRIP		
	LTAGE	208Y			PHASE	3				MIN	IMUM	BREAK	ER INTERRUPTING CAPAC
			ORIES	SN + EQP GND				1					
	DEVICE			BRANCH (CIRCUIT			-	HASE LOA				BRANCH CIRCUIT
AMPS	POLES	TYPF				VOLT	NO		OLT AMP		NO	VOLT	
TRIP			LOAD		ON	AMPS		A	В	С		AMPS	DESCRIPTION
**100	2		М	KILN		9600	1	9600			2		air curtain
			М	KILN		9600	3		9600		4		air curtain
15	1			air curtain			5				6		air curtain
15	1			air curtain			7				8		air curtain
20	1			TRACKLIGHT 116			9				10		fan assisted grills
20	1			TRACKLIGHT 116			11				12		fan assisted grills
20	2			fan assisted grills			13				14		tvss
				fan assisted grills			15				16		tvss
20	1			unknown existing			17				18		tvss
20	2			fan assisted grills			19				20		fan assisted grills
				fan assisted grills			21				22		fan assisted grills
20	2			fan assisted grills			23				24		fan assisted grills
				fan assisted grills			25				26		fan assisted grills
20	2			fan assisted grills			27				28		fan assisted grills
				fan assisted grills			29				30		fan assisted grills
20	2			fan assisted grills			31				32		fan assisted grills
				fan assisted grills			33				34		fan assisted grills
20	2			fan assisted grills			35				36		fan assisted grills
				fan assisted grills			37				38		fan assisted grills
20	2			fan assisted grills			39				40		fan assisted grills
				fan assisted grills			41				42		fan assisted grills
						TOTAL		9600	9600	0		19	KVA (CONNECTED)
						. U I / L			5000	Ū			KVA (DEMAND)
												13	

	PANEL		Ρ			CE	LC	OCATION	EXIST	NG		MAIN BUS RATING	G1	00	AMPS	
	MAIN	L		POLES	S		FRAME			TRIP						
VC	DLTAGE			PHASE	E 3				MIN	IIMUM	BREAK	ER INTERRUPTING CAPACITY	<u> </u>	KA		
		CESS	ORIES	SN + EQP GND												
	DEVICE			BRANCH CIRCUIT			PF	IASE LOA	D			BRANCH CIRCUIT			DEVICE	
AMPS	POLES				VOLT	NO	V	OLT AMPS		NO	VOLT			TVPE	POLES	AMPS
TRIP	I ULLS				AMPS	NO	A	В	С		AMPS	DESCRIPTION	LOAD		I ULLO	TRIP
20	1			unknown existing		1				2		unknown existing			1	20
20	1			unknown existing		3				4		unknown existing			1	20
20	1			unknown existing		5				6		unknown existing			1	20
20	1			unknown existing		7				8		unknown existing			1	20
20	1			unknown existing		9				10		unknown existing			1	20
20	1			unknown existing		11				12		unknown existing			1	20
**20	1		R	FRONT RECEPTION	1080	13	1080			14		space				
				space		15				16		space				
					TOTAL		1080	0	0			KVA (CONNECTED)				ECTED)
											1	KVA (DEMAND)	3	AMPS	(DEMAI	ND)

RATING	4(00	AMPS	
PACITY	65K	AIC		
			DEVICE	
	LOAD	TYPE	POLES	AMPS TRIP
			3	20
			 2 	20
			1 3	20
			3	30
			 2	
			2	20
	Н		1	20**
	Н		1	20**
	Н		1	20**
	Н		1	20**
	Н		1 2	15**
	Н			
	Н		2	15**
	Н			
	Н		2	15**
	Н			
	42 42	AMPS AMPS	(CONNE (DEMAN	ECTED) ND)

RATING	4(00	AMPS							
PACITY	65K	AIC								
			DEVICE							
	LOAD	TYPE	POLES	AMPS TRIP						
			1	30						
			1	30						
			1	30						
			1	30						
			2	20						
			3	30						
			2	20						
			 2	20						
			 2	20						
			 2	20						
			 2	20						
			2	20						
53 AMPS (CONNECTED) 53 AMPS (DEMAND)										

	PANEL	H	12	MOUNTING	SURFA	CE	LC	CATION	EXISTI	NG		MAIN BUS RATIN	NG 4	00	AMPS	
	MAIN	L	0	POLES	5		FRAME	-		TRIP					-	
VC	LTAGE	480Y	//277	PHASE	3		-		MIN	IMUM	BREAKER IN	TERRUPTING CAPACI	TY			
	A	CCESS	ORIES	SN + EQP GND											-	
	DEVICE			BRANCH CIRCUIT			PH	ASE LOA	D		BF	ANCH CIRCUIT			DEVICE	
AMPS		T) (D) E			VOLT		-				VOLT					
TRIP	POLES	IYPE	LOAD	DESCRIPTION	AMPS	NO	A	В	С	NO	AMPS	DESCRIPTION	LOAD	IYPE	POLES	TRIP
20	1			front lights		1				2	front	bath rm lights			1	20
20	1			machine floor lights		3				4	east	front lights			1	20
20	1			machine floor lights		5				6	south	n back lights			1	20
20	1			machine floor lights		7				8	west	side lights			1	20
20	1			machine floor lights		9				10	elect	ric rm lights			1	20
20	1			machine floor lights		11				12	old b	reakroom lights			1	20
20	3		Н	VAV-01	4617	13	7503			14	2886 VAV-	-06	Н		3	15
			Н	VAV-01	4617	15		7503		16	2886 VAV-	-06	Н			
			Н	VAV-01	4617	17			7503	18	2886 VAV-	-06	Н			
30	3		Н	VAV-02	6925	19	12696			20	5771 VAV-	-07	Н		3	25
			Н	VAV-02	6925	21		12696		22	5771 VAV-	-07	Н			
			Н	VAV-02	6925	23			12696	24	5771 VAV-	-07	Н			
15	3		Н	VAV-03	2886	25	8657			26	5771 VAV-	-08	Н		3	25
			Н	VAV-03	2886	27		8657		28	5771 VAV-	-08	Н			
			Н	VAV-03	2886	29			8657	30	5771 VAV-	-08	Н			
15	3		Н	VAV-04	2886	31	17891			32	15005 VAV-	-09	Н		3	70
			Н	VAV-04	2886	33		17891		34	15005 VAV-	-09	Н			
			Н	VAV-04	2886	35			17891	36	15005 VAV-		Н			
15	3		Н	VAV-05	2886	37	5772			38	2886 VAV-	-10	Н		3	15
			Н	VAV-05	2886	39		5772		40	2886 VAV-	-10	Н			
			Н	VAV-05	2886	41			5772	42	2886 VAV-		Н			
					TOTAL		52519	52519	52519		158 KVA	(CONNECTED)			(CONN	
											158 KVA	(DEMAND)	190	AMPS	(DEMAN	ND)

	PANEL	H3	Ň	IOUNTING SURF	ACE	LC	CATION	EXISTI	NG		MAIN BUS RATIN	IG 4	00	AMPS	
	MAIN			POLES	/.02	FRAME			TRIP					/ 0	
VC		480Y/27	7	PHASE 3		···· ·		MINI			- ER INTERRUPTING CAPACI	ΤY			
			ES SN + EQP GND		_							· · ·			
	DEVICE		BRANCH	CIRCUIT		PH	IASE LOA	D			BRANCH CIRCUIT				
AMPS				VOLT		-		H		VOLT					
TRIP	POLES	LO	AD DESCRIPTIO	ON AMPS	NO	A	B	С	NO	AMPS	DESCRIPTION	LOAD	IYPE	POLES	TRIP
35	3		air compressor		1				2		bath rm exhaust fan			3	15
			air compressor		3				4		bath rm exhaust fan				
			air compressor		5				6		bath rm exhaust fan				
30	3		battery charger		7				8		unknown existing			2	70
			battery charger		9				10		unknown existing				
			battery charger		11				12		spare			1	20
**15	3	ŀ	I VAV-11	288	6 13	2886			14		spare			1	20
		ŀ	I VAV-11	288	6 15		2886		16		spare			1	20
		ŀ	I VAV-11	288	6 17			2886	18		spare			1	20
**40	3	ŀ	I VAV-12	865	7 19	8657			20		spare			1	20
		ŀ	I VAV-12	865	7 21		8657		22		spare			1	20
	-	ŀ	I VAV-12	865	7 23			8657	24		spare			1	20
**40	3	ŀ	I VAV-13	865	7 25	8657			26		spare			1	20
		ŀ	I VAV-13	865	7 27		8657		28		spare			1	20
		ŀ	I VAV-13	865				8657	30		spare			1	20
20	1		spare		31				32		spare			1	20
20	1		spare		33				34		spare			1	20
20	1		spare		35				36		spare			1	20
20	1		spare		37				38		feed to front xfrmr & pnl			3	25
20	1		spare		39				40		feed to front xfrmr & pnl				
20	1		spare		41				42		feed to front xfrmr & pnl				
				TOTAL		20200	20200	20200			KVA (CONNECTED) KVA (DEMAND)			(CONNI (DEMAI	,
Ĺ										01		13	AIVIE 2		(טא

PANEL SCHEDULE LEGEND

<u>MAIN</u> CB = CIRCUIT BREAKER LO = LUGS ONLY

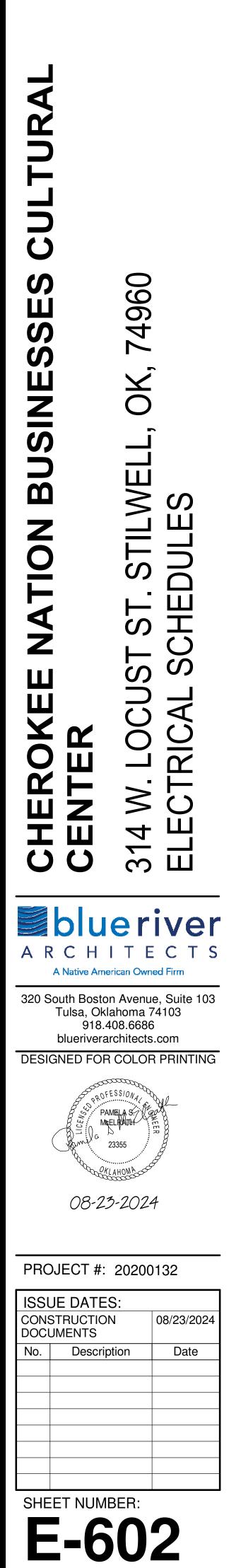
- <u>BRANCH CIRCUIT BREAKER TYPE</u> A = ARC FAULT CIRCUIT INTERRUPTER
- G = GROUND FAULT CIRCUIT INTERRUPTER
- S = SHUNT TRIP V = VARIABLE (ADJUSTABLE TRIP)
- E = EQUIPMENT GROUND FAULT PROTECTION L = LOCKOUT DEVICE
- O = LOCK ON DEVICE OR BREAKER R = RED MARKING ON BREAKER
- <u>Load type</u> L = Lighting
- R = RECEPTACLE
- H = HVAC M = MISCELLANEOUS
- V = VARIOUS S = SUBFED
- <u>MISCELLANEOUS</u> SN = SOLID NEUTRAL EQP GND = EQUIPMENT GROUND BUS IG = INSULATED GROUND BUS SPD = SURGE PROTECTIVE DEVICE AIC = AMPERE INTERRUPTING CAPACITY KAIC = KILO AMPERE INTERRUPTING CAPACITY
- ** = ADD NEW BREAKER TO EXISTING PANEL
- LOWERCASE DESCRIPTIONS INDICATE EXISTING LOADS





		LIGHTIN	G FIX	TURE	SCHEDUL	.E		1
TYPE	MANUFACTURER	CATALOG NUMBER	VOLTAGE	SOURCE	TOTAL FIXTURE LUMENS	MAXIMUM FIXTURE WATTAGE	DESCRIPTION	KEYED NOTES
A1	HE WILLIAMS	LT-22-L39-835-AF-DIM-UNV	120-277	LED	3934	33.1	2X2 TROFFER	
A1E	HE WILLIAMS	LT-22-L39-835-AF-EM/10W-DIM-UNV	120-277	LED	3934	33.1	2X2 TROFFER WITH BATTERY BACKUP	
B1	HE WILLIAMS	LT-24-L52-835-AF-DIM-UNV	120-277	LED	5202	37.2	2X4 TROFFER	
B1E	HE WILLIAMS	LT-24-L52-835-AF-EM/10W-DIM-UNV	120-277	LED	5202	37.2	2X4 TROFFER WITH BATTERY BACKUP	
E1	HE WILLIAMS	EMER/DECO-WHT-D	120-277	LED	N/A	12	EGRESS LIGHT	
L1	HE WILLIAMS	MX2R-TR-4-00-L8-935-F-DIM-UNV	120-277	LED	2799	27	4' RECESSED LINEAR	
L1E	HE WILLIAMS	MX2R-TR-4-00-L8-935-F-EM/10WLP-DIM-UNV	120-277	LED	2799	27	4' RECESSED LINEAR WITH BATTERY BACKUP	
T4	LUMENTURE	KB-22-W	120	LED	N/A	N/A	4' TRACK, 2 CIRCUIT	
Т8	LUMENTURE	KB-28-W	120	LED	N/A	N/A	8' TRACK, 2 CIRCUIT	
TH1	LUMENTURE	T80-30H-2000-15-W-J	120	LED	1439	22	15° LED SPOT HEAD	
TH2	LUMENTURE	T80-30H-2000-25-W-J	120	LED	1930	20	25° LED SPOT HEAD	
TH3	LUMENTURE	T80-30H-2000-40-W-J	120	LED	1934	20	40° LED SPOT HEAD	
TH4	LUMENTURE	T80-30H-2000-60-W-J	120	LED	1815	20	60° LED SPOT HEAD	
TH5	LUMENTURE	T80-30H-2000-WW-W-J	120	LED	1815	20	WALL WASH LED HEAD	
x	CURRENT	CCESRE OR CCEDRE	120-277	LED	N/A	1	EXIT SIGN, BATTERY BACKUP, FACES AND MOUNTING PER PLANS	





Ø	AND	ABBREVIATIONS GPM	GALLONS PER MINUTE	\sim	GENERAL SYMBOLS
/R	ROUND ON ROOF	HD H.P.	HEAD HIGH PRESSURE	<pre>{</pre>	REVISION NUMBER SHOWN ON PLANS
	AIR	HTG	HEATING	۲_ ر	POINT WHERE NEW CONNECTS TO
BV	ABOVE BASE ABOVE	IN INL	INLET	(EXISTING DEMOLISH TO POINT INDICATED
DD	ACOUSTICAL ADDENDUM	INSUL INWG	INCHES WATER GAUGE		1 NUMBER OF DETAIL ON SHEET
	ADDITIONAL ABOVE FINISHED FLOOR	ITC JT	INSPECTOR TEST CONNECT	F	NUMBER OF SHEET WHERE DETAIL
	ABOVE GROUND AUTHORITY HAVING JUR	LAB	LABORATORY	~	
LT	ALTERNATE ALARM VALVE	LB LB/HR	POUND POUNDS PER HOUR	Ň	
LUM	ALUMINUM	LF	LINEAL FOOT		← PIPE CONTINUATION
RCH	ACCESS PANEL ARCHITECT/ARCHITECTU	LOC JRAL LP	LOCATION LOW PRESSURE		SPACE TAG:
	AUTOMATIC AUXILLARY DRAIN	MA MAN	MIXED AIR MANUAL		OFFICESPACE NAME
	BELOW FINISHED FLOOR BUTTERFLY VALVE		MAXIMUM MOTORIZED DAMPER	_	
	BASEMENT BETWEEN	MFR MIN	MANUFACTURER		ITEM TO BE DEMOLISHED
AP	CAPACITY CONSTANT FLOW CNTRL	MISC	MISCELLANEOUS	\bigotimes	AREA NOT IN CONTRACT
FM	CUBIC FEET PER MINUTE	Ξ	MOST HYDRAULICALY DEMANDING AREA		FIRE ALARM DEVICES
	CAST IRON COMMON INTELLIGEBELI	NIC ITY SYS. NFPA	NOT IN CONTRACT		
	CEILING COLUMN	NP	ASSOCIATION NOT POTABLE	#### -	FIRE ALARM CONTROL PANEL
OMB	COMBINATION CONCRETE	NTS O	NOT TO SCALE OXYGEN	 	FIRE ALARM PANEL TYPE
ONT	CONTINUE/CONTINUATIO	ON OPNG	OPENING	CO	NTROL PANELS ABBREVIATIONS:
OR	COORDINATE CONTRACTOR OFFICES I		PRESSURE DROP POST INDICATOR VALVE	APM	AMPLIFIER RACK
UFT	CENTER CUBIC FEET	PR PREL	PAIR PRELIMINARY	ACU BATT	AUTONOMOUS CONTROL UNIT BATTERY CABINET
	DEGREE DETECTOR CHECK ASSY	PS 7. PRIM	PRESSURE PRIMARY	FMCP	COMBI. FIRE ALARM/MASS NOTIFICATION CONTR
CDA	DOUBLE DETECTOR CK.		PRESS. REDUCING VALVE LBS. PER SQ. IN.	DACT FAA	DIGITAL ALARM COMMUNICATOR TRANSMITTER FIRE ALARM ANNUNCIATOR
	DUCTILE IRON	PSIG	LBS. PER SQ. IN. GAUGE	FACP FSCP	FIRE ALARM CONTROL FIRE SUPPRESSION CONTROL
MPR	DISCHARGE DAMPER	PW REC	POTABLE WATER RECESSED	GAP	GRAPHIC ANNUNCIATOR LCD ANNUNCIATOR
	DOWN DRAWING	RED REQD		LOC	LOCAL OPERATORS CONTROL
A	EACH EMERGENCY COMM. SYS	SF STEM SD	SQUARE FOOT SMOKE DAMPER	NAC PRE	NOTIFICATION CIRCUIT POWER BOOSTER PRE-ACTION SYSTEM
AH	EXHAUST HOOD EXISTING	SIM	SIMILAR SLEEVE	PRN MIC	PRINTER REMOTE VOICE
XP	EXPANSION	SP SPS	STATIC PRESSURE STATIC PRESSURE STATION	UPS EVAC	UINTERRUPTABLE POWER SUPPLY VOICE EVACUATION
SP	EXPANSION JOINT EXTERNAL STATIC PRES	SURE SQ	SQUARE	EVAU	
	DEGREES FAHRENHEIT FIRE DAMPER	SS STD	STAINLESS STEEL STANDARD	F	
	FIRE DEPARTMENT VALV FIRE HOSE STATION	′E T SYS	THERMOSTAT SYSTEM		###FIRE ALARM ABORT SWITCH
HV	FIRE HOSE VALVE FINS PER INCH	TCP TD	TEMP. CONTROL PANEL TEMPERATURE DROP		
LEX	FLEXIBLE FLANGE	TEMP TSP	TEMPERATURE TOTAL STATIC PRESSURE	AS	ABORT SWITCH ABBREVIATIONS: ABORT SWITCH
Т	FOOT/FEET	TYP U/G	TYPICAL UNDER GROUND	CO2	CARBON DIOXIDE
	FOOTING FUTURE	U/S	UNDER SLAB	CA DL	CLEAN AGENT DELUGE SPRINKLER
	GALLON GALVANIZED	UNO VL	UNLESS NOTED OTHERWISE VALVE	DC EPO	DRY CHEMICAL EMERGENCY POWER OFF
	GENERATOR GENERAL			F	FOAM HALON
		MENT ABBREVIA	TIONS	PRE	PREACTION SYSTEM
DBP	DOMESTIC WATER BOOS	ST PUMP FDCP	F.A. ACCESS PANEL	WM WC	WATER MIST WET CHEMICAL
-	DETECTOR CHECK ASSY DOUBLE DETECTOR CHE	-	F.A. MASS NOTIFICATION PNL. F.A. ANNUNCIATOR PNL.		
	FIRE HOSE STATION FIRE ALARM	LOC NRSV	LOCAL OPERATOR CONSOLE NON-RISING STEM VALVE	F	FIRE ALARM PULL STATION
FPU	FIRE PUMP	ITC	INSPECTOR'S TEST PANEL	###	FIRE ALARM PULL STATION
		E ALARM PHASI			PULL STATION ABBREVAITIONS:
			ISTRUCTION FIRE	CO2 CA	CARBON DIOXIDE CLEAN AGENT
		EQUIPME	NT (TYPICAL TAG FOR ALL	DL	DELUGE SPRINKLER
	FACP		ISTRUCTION)	DC F	DRY CHEMICAL FOAM
			FIRE ALARM EQUIPMENT	HL M	HALON MANUAL
		/	EXISTING TAGS) (TYPICAL	P WM	PULL STATAION WATER MIST
	(E)FAC			WC	WATER MIST WET CHEMICAL
			RM EQUIPMENT FOR ON (TYPICAL FOR ALL	SYMBOL	DESCRIPTION
	(D)FAC	DEMOLITI	ON TAGS)	⟨ऽ ⟩ _₽	SPOT-TYPE SMOKE DETECTOR (P-PHOTO,
	(-)	LARM SHEET SET	ΓΝΟΤΕ		I-IONIZATION, SB-SOUNDER BASE) DUCT SMOKE DETECTOR
	FIRE AI	LARIVISHEEISEI	-		
	FIRE AI	* NOTE *		< <u>'</u> 	(S-SUPPLY, R-RETURN)
	ALL OF GENERAL NOTES	* NOTE * S ON THIS SHEET	ARE TO BE APPLIED TO		
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GENERAL

- FIRE ALARM SYSTEM AND DEVICES SHALL BE INSTALLED TO THE LATEST EDITION OF NFPA 72, NFPA 70, AND LOCAL REQUIRMENTS. 2. ALL FIRE ALARM INSTALLATIONS, INCLUDING PULLING OF WIRE AND MOUNTING OF DIVICES, SHALL HAVE OVERSIGHT OF A NICET LEVEL II FIRE ALARM TECHNICIAN OR HIGHER. STROBES SHALL BE SYNCHRONIZED PER NFPA 72. ALL FIRE ALARM CABLE SHALL BE RUN IN RED FACTORY COLORED CONDUIT. THESE DESIGN DOCUMENTS PROVIDE GENERAL SPACING, LOCATION, AND COORDINATION CRITERIA.
- CONTRACTOR SHALL BE RESPONSIBLE FOR CIRCUIT CONFIGURATION, SYSTEM PERFORMANCE, SOFTWARE CONFIGURATION, DEVICE PROGRAMMING, SYSTEM COMMISSIONING, AND SYSTEM WARRANTY. CONTRACTOR SHALL SUBMIT FIRE ALARM, DATA CUT-SHEETS, AND VOLTAGE DROP CALCULATIONS TO 6.
- AHJ AND A/E FOR REVIEW AND APPROVAL PRIOR TO BEGINNING ANY WORK ON THE FA SYSTEM. NO FA DOCUMENTS/PLANS SHALL BE USED FOR INSTALLATION OF THIS SYSTEM UNLESS THEY CONTAIN A REVIEW AND APPROVAL STAMP FROM THE AHJ AND THE A/E. THE LOCAL AHJ HAS THE AUTHORITY TO STOP ANY WORK UNTIL SUCH PLANS ARE ON SITE AND IN USE.
- SEPARATE FIRE ALARM SPECIFICATIONS CONTAIN VERY DETAILED INFORMATION ABOUT THIS SYSTEM AND SHALL BE FOLLOWED, ON-SITE AND AVAILABLE DURING ANY CONSTRUCTION. SECONDARY POWER PERFORMANCE TO MEET NFPA 72. 24 HOURS OF STANDBY POWER FOLLOWED BY 15 MINUTES OF ALARM FOR ALL CONNECTED DEVICES AT MAXIMUM LOAD. SECONDARY POWER FOR THE SYSTEM SHALL ALSO BE DESIGNED TO OPERATE MAXIMUM CONNECTER ALARM LOAD FOR 60 MINUTES IMMEDIATELY FOLLOWING DISCONNECTION OF PRIMARY POWER.
- CIRCUITS TO BE 24V TYPICAL. 10. 11. ALL NEW SYSTEMS AND DEVICES MUST INTERFACE WITH APPLICABLE EXISTING SYSTEMS. SHELL PANEL AND DEVICES MUST COMMUNICATE WITH EXISTING SITE FIRE ALARMS AND TENANT FINISH DEVICES MUST INTERFACE WITH EXISTING SHELL PANEL AND SYSTEMS.

LOCATION / SPACING

- 1. IN ACCORDANCE WITH 2019 NFPA 72, STROBES MAY BE MORE THAN 15 FEET FROM THE END OF A CORRIDOR WHEN ROOM SPACING CRITERIA APPLIES USING THE APPROPRIATE CANDELA. 2. WALL MOUNTED SPEAKER, STROBES, OR SPEAKER/STROBES SHALL BE AT 96" OR 6" BELOW THE
- CEILING, WHICHEVER IS LOWER. ALL SMOKE DETECTORS SHALL BE LOCATED WHERE THEY CAN BE READILY SERVICED. ALL SMOKE DETECTORS SHALL BE CEILING MOUNTED OR WITHIN 12" OF THE CEILING.
- SMOKE DETECTORS SHALL NOT BE INSTALLED WITHIN 3' OF AN AIR-SUPPLY OR RETURN GRILLE PER MFG CRITERIA AND APPENDIX 'A' OF NFPA 72.
- EACH POWER BOOSTER PANEL OR FIRE ALARM PANEL SHALL BE PROTECTED BY A SMOKE 6 DETECTOR. WHEN PROVIDED, AREA DETECTORS WITHIN THE SAME SPACE WILL SATISFY THIS
- REQUIREMENT. AIR HANDLER SYSTEMS OVER 2,000 CFM SHALL BE PROVIDED WITH MEANS TO SHUT DOWN UPON THE DETECTION OF SMOKE. THESE DETECTORS SHALL NOT INITIATE A GENERAL FIRE ALARM.
- DAMPER AND HVAC SMOKE DETECTORS SHALL BE PROVIDED BY THE FIRE ALARM CONTRACTOR. LISTED WITH THE FIRE ALARM SYSTEM, AND INCORPORATE ADDRESSABLE MODULES. WHERE APPLICABLE, SMOKE DETECTORS FOR AIR-HANDLER SHUT DOWN SHALL BE ON BOTH SUPPLY 9. AND RETURN DUCTS.
- 10. WALL MOUNTED VISUAL DEVICES TO BE LOCATED SUCH THAT THE ENTIRE LENS OF THE STROBE IS BETWEEN 80" AND 96" AFF. ALL WALL MOUNTED NOTIFICATION DEVICES SHALL BE MOUNTED AT THE SAME HEIGHT AFF TO ACHIEVE A UNIFORM APPEARANCE OR AS DIRECTED BY THE A/E. WATTAGE AND CANDELA ARE GUIDELINES. CONTRACTOR RESPONSIBLE FOR FINAL SPACING AND TOTAL DEVICE POWER.

PERFORMANCE

- ANY SMOKE DETECTOR THAT HAS BEEN INSTALLED PRIOR TO THE CONSTRUCTION CLEANUP OF ALL TRADES AND WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER AND LOCAL AHJ SHALL BE MARKED IN A MANNER THAT WILL IDENTIFY IT FROM RE-USE AND SHALL BE REPLACED PRIOR TO COMMISSIONING OF THE SYSTEM OR TURNING OVER TO THE OWNER. SUCH DETECTORS SHALL BE REPLACED AT THE SOLE EXPENSE OF THE INSTALLING CONTRACTOR. DUCT DETECTORS SHALL BE MONITORED FOR INTEGRITY AND PROVIDE A SUPERVISORY SIGNAL AT 2
- THE FIRE ALARM PANEL. AIR HANDLER SYSTEMS SHALL BE RAN AND BLOWN OUT PRIOR TO INSTALLATION OF SMOKE DETECTORS. FIRE ALARM AUDIBLE ALERT SIGNALS SHALL BE SET TO TEMPORAL CODE PER NFPA 72.
- UNLESS OTHERWISE NOTED THE FOLLOWING MINIMUM SURVIVABILITY CRITERIA SHALL BE MET: SIGNALING LINE CIRCUITS CLASS "B", AND NOTIFICATION CIRCUITS CLASS "B". INITIATING DEVICES SHALL BE INDIVIDUALLY ADDRESSABLE.

ACCEPTANCE TESTING

1.	A COMPLETED AND SIGNED RECORD (CERTIFICATE) OF COMPLETION FORM SHALL BE P THE CONTRACTOR TO THE AHJ, OWNER, AND A/E PRIOR TO COMMISSION TESTING. THIS SHALL CERTIFY THAT THE CONTRACTOR HAS PRE-TESTED EVERY DEVICE AND FUNCTION SYSTEM AND REPAIRED ANY DEFICIENCIES PRIOR TO THE COMMISSIONING TEST.
2.	ALL SMOKE DETECTORS SHALL BE COMMISSIONED USING CANNED SMOKE OR A METHO
۷.	FUNCTIONALLY TEST THE SMOKE CHAMBER. THE USE OF MAGNETS FOR COMMISSION 1
	SMOKE DETECTORS IS STRICTLY PROHIBITED.
3.	EACH AND EVERY DEVICE SHALL BE TESTED DURING COMMISSIONING AND PRIOR TO B
	OVER TO THE OWNER.
4.	EACH NOTIFICATION CIRCUIT SHALL BE TESTED UNDER STANDBY/BATTERY POWER. AN
	THAT MEASURES LESS THAN 20 VOLTS DC OR THE NAMEPLATE VOLTAGE, WHICHEVER
	SHALL BE CONSIDERED AS FAILING THE DESIGN. NOTE: SOME SYSTEMS INCORPORATION
	SYNCHRONIZING MODULES CAN IMPAIR RESULTS. IF THE MODULE CANNOT BE BYPASSI
	VOLTAGE READINGS, THE MANUFACTURER SHOULD BE CONTACTED FOR GUIDANCE. W
	CANNOT BE MEASURED, CIRCUIT WIRE RESISTANCE READINGS AND DEVICE LOAD MAY
	TO DESIGN CALCULATIONS (MAKE SURE CIRCUIT IS REMOVED FROM POWER SUPPLY W
	OBTAINING WIRE RESISTANCE). ONLY A QUALIFIED TECHNICIAN EMPLOYED BY THE INST
	CONTRACTOR SHOULD PERFORM THIS FUNCTION.
5.	EACH CIRCUIT'S END-OF-LINE VOLTAGE SHALL BE DOCUMENTED FOR COMPARISON TO
	END-OF-LINE CALCULATIONS.

NOTICE:

CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY AND ADJUSTING THE EXISTING NOTIFIER FIRE ALARM SYSTEM TO THE NEW FLOOR AND CEILING PLANS AS PER NFPA 72. ALL FIRE ALARM DEVICES SHALL BE COMPATIBLE WITH THE EXISTING NOTIFIER FIRE ALARM SYSTEM.

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DIVISION 28 0000 FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 RELATED DOCUMENTS A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit. B. Transmitters for communication with supervising station.

1.03 REFERENCE STANDARDS

- A. 36 CFR 1191 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition. B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. IEEE C62.41.2 IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).
- D. NFPA 3 Recommended Practice for Commissioning of Fire Protection and Life Safety Systems; 2015. E. NFPA 4 - Standard for Integrated Fire Protection and Life Safety System Testing; 2015. F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and
- G. NFPA 72 National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.
- 1.04 SUBMITTALS
- A. See Section 01 30 00 Administrative Requirements, for submittal procedures. B. Drawings must be prepared using AutoCAD Release 2002 or newer.
- C. Evidence of designer qualifications. D. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction as well as compliance with
- contract documents, including but not limited to floor plans, riser diagrams, and description of operation:
- 1. Copy (if any) of list of data required by authority having jurisdiction. 2. NFPA 72 "Record of Completion", filled out to the extent known at the time.
- 3. Shop Drawings:
- a. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A.14.6.2.4, and complete listing of software required. b. System zone boundaries and interfaces to fire safety systems.
- c. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming. Plans shall show the address for addressable devices. d. Circuit and conduit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations;
- notification appliance circuit voltage drop calculations. 1) Calculation method shall be shown including wire size and values used.
- 2) Calculation shall be Lump Sum at the end of the circuit or Point to Point. Load Centering shall not be used. e. List of all devices on each signaling line circuit, with spare capacity indicated. 4. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations. a. Information to include: Model numbers, listing, ratings, and power requirements. b. Product cut sheets, calculations, certificates, etc. shall be submitted in a bound format or a single electronic document (such as PDF),
- shall be tabbed in a logical manner, and shall contain the information indicated. c. Voltage Drop Calculations - Duplicate on drawings
- 1) Use methods specified in NFPA 72.
- 2) Voltage drop calculations shall start at 85% of nominal voltage, i.e. a 24VDC system shall be calculated as starting at 20.4VDC. 3) Circuit voltage not to drop below 16 VDC or the UL listed minimum voltage for device powered, whichever is higher. 4) Device current to be based on UL listed minimum voltage. 5) Circuit resistance shall include wire length out to last device and back to panel, including elevation changes. 6) Calculation method shall be shown including wire size and values used.
- 7) Calculation shall be Lump Sum at the end of the circuit or Point to Point. Load Centering shall not be used. d. Battery calculations - Duplicate on drawings 1) Use methods specified in NFPA 72.
- 2) A minimum 20% safety factor to the calculated Amp-Hours shall be provided. 5. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
- 6. Certification by the manufacturer of the control unit that the system design complies with Contract Documents. 7. Certification by Contractor that the system design complies with Contract Documents. Incomplete submittals or submittals that do not comply with these specifications may be rejected without a review.
- E. Inspection and Test Reports:
- 1. Submit inspection and test plan prior to closeout demonstration. 2. Submit documentation of satisfactory inspections and tests.
- 3. Submit NFPA 72 "Inspection and Test Form," filled out.
- F. Operating and Maintenance Data: Revise and resubmit until acceptable; have one set available during closeout demonstration: 1. Complete set of specified design documents, as approved by authority having jurisdiction. 2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals. 3. Contact information for firm that will be providing contract maintenance and trouble call-back service. 4. List of recommended spare parts, tools, and instruments for testing.
- 5. Replacement parts list with current prices, and source of supply.
- 6. Detailed troubleshooting guide and large-scale input/output matrix. 7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to
- 8. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.
- G. Project Record Documents: Have one set available during closeout demonstration: 1. Complete set of floor plans showing actual installed locations of components, conduit, and zones. 2. "As installed" wiring and schematic diagrams, with final terminal identifications.
- 3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event. H. Closeout Documents: 1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and
- is in satisfactory operating condition. 2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements. B. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 vear after date of Substantial Completion.

C. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion

DIVISION 28 0000 FIRE DETECTION AND ALARM PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Alarm Control Units and Accessories - Basis of Design: Honeywell Notifier. B. Initiating Devices and Notification Appliances:

- 1. System Sensor.
- 2. Same manufacturer as control units.
- 2.02 FIRE ALARM SYSTEM A. Fire Alarm System: Modify the existing automatic fire detection and alarm system:
- 1. Provide all components necessary, regardless of whether shown in Contract Documents or not.
- 2. Provide all labor to complete required work. 3. Protected Premises: Entire building shown on drawings.
- 4. Comply with the following; where requirements conflict, order of precedence of requirements is as listed: a. ADA Standards. b. The requirements of the local authority having jurisdiction.
- c. Applicable local codes. d. Contract Documents (drawings and specifications).
- e. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents. 5. Evacuation Alarm: Single smoke zone; general evacuation of entire premises.
- 6. Program notification zones as directed by Owner.
- 7. Hearing Impaired Occupants: Provide visible notification devices in all public areas. a. This shall include, but not be limited to, all public restrooms, break rooms, exam rooms, fitting rooms, work rooms, conference rooms,
- open office areas, and corridors.
- 8. Fire Alarm Control Unit: Existing, located at Fire Riser B. Supervising Stations and Fire Department Connections:
- 1. Public Fire Department Notification: Existing means. 2. Remote Supervising Station: Existing means.
- Means of Transmission to Remote Supervising Station: Existing devices. C. Circuits:
- 1. Signaling Line Circuits (SLC) Within Single Building: Class B.
- 2. Signaling Line Circuits (SLC) Between Buildings: Class B. . Notification Appliance Circuits (NAC): Class B.
- D. Spare Capacity: 1. Fire Alarm Control Units: Existing.
- E. Power Sources:
- 1. Primary: Dedicated branch circuits of the facility power distribution system. 2. Secondary: Storage batteries.
- 3. Capacity: Sufficient to operate entire system for period specified by NFPA 72. 4. Unless noted otherwise on the plans, power booster panels (NAC) shall not be fed from a separate notification power booster panel (daisy chained). Each NAC shall be triggered by a SLC circuit.
- 2.03 FIRE SAFETY SYSTEMS INTERFACES
- A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:
- 1. Duct smoke detectors. B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
- 1. Sprinkler water flow
- 2. Smoke detectors 3. Heat detectors
- 4. Manual pull stations
- 2.04 COMPONENTS A. General:

1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable. 2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data. 3. Provide legible, permanent labels for each addressable device, using address used in control panel. B. Fire Alarm Control Units: Existing

- C. Initiating Devices: 1. Addressable Systems:
 - a. Addressable Devices: Individually identifiable by addressable fire alarm control unit.
 - b. Provide suitable addressable interface modules as indicated or as required for connection to conventional (non-addressable) devices and other components that provide a dry closure output.
- 2. Manual pull station: Dual action 3. Smoke Detectors: Photoelectric
- 4. Heat Detectors: Fixed Temperature
- D. Notification Appliances: 1. Horn/Strobe: White trim.
- 2. Strobe: White trim
- E. Conduit: 1. Install all wiring in a conduit or raceway. Conduit fill shall not exceed 40 percent of the interior cross-sectional area where three or more cables are included within a single conduit.
- 2. Install conduit in accordance with the National Electrical Code, NFPA 70. 3. Conduit shall be 3/4 inch minimum.
- 4. Wiring for low voltage control, alarm notification, emergency communication, and similar power-limited auxiliary functions may be installed in the same conduit as initiating and signaling line circuits. Design system to permit simultaneous operation of all circuits without interference or loss of signals.
- 5. Fire Alarm Conduit: All fire alarm wiring shall be in hot-galvanized electric metallic tubing colored RED from the factory. a. Junction covers shall be painted red and labeled "Fire Alarm". b. Fire alarm conduit shall have the wording "Fire Alarm" factory stamped onto each 10' section of conduit. If conduit is to be exposed in a
- finished area, see criteria below. c. If conduit is to be ran in an area with finished exposed ceiling spaces, consult with architect engineer for appropriate conduit and junction box color to match other equipment. 6. Conduits shall not enter the control panel or any other component provided except where entry is specified by the manufacturer.
- F. Wire:
- 1. All fire alarm system wiring shall be new. 2. Wiring shall comply with local, state, and national codes and as recommended by the manufacturer. Number and size of conductors shall be as recommended by the manufacturer, but shall be not less than 18 AWG for initiating device and signaling line circuits, and 16 AWG for notification appliance circuits.
- 3. All wiring and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system. 4. FPLP red cable shall be used for all interior fire alarm circuits including that in conduit. 5. Any wire that goes underground, such as to PIV switches or to other buildings, shall be listed and approved for wet locations in accordance with NFPA 70.
- 6. All field wiring shall be supervised for open circuits, short circuits, and grounded conditions. G. Control Panel: Connected to a separate dedicated branch circuit with a separate dedicated disconnect switch; circuit labeled FIRE ALARM. H. Circuit Conductors: Copper or optical fiber; provide 200 feet extra; color code and label.
- I. Wiring runs shall be tested for continuity, short circuits and grounds before any system devices are installed or energized. J. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.
- K. Locks and Keys: Deliver keys to Owner. L. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
- 1. Frame: Stainless steel or aluminum with polycarbonate or glass cover. 2. Provide one for each control unit where operations are to be performed.
- 3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner. 4. Provide extra copy with operation and maintenance data submittal.

DIVISION 28 0000 FIRE DETECTION AND ALARM

PART 3 EXECUTION 3.01 INSTALLATION

- A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and Contract Documents.
- B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas. C. Obtain Owner's approval of locations of devices, before installation.
- D. Install instruction cards and labels.
- 3.02 INSPECTION AND TESTING FOR COMPLETION A. The contractor is responsible for testing all components in accordance with the manufacturers' required and suggested procedures and in accordance with NFPA 72. If this specification incorporates a detailed Acceptance Test Procedure (ATP) prepared by the engineer than it shall also be
- B. Every fire alarm system shall be pre-tested by the contractor prior to scheduling any inspections by the architect engineer, owner, or local jurisdictions. Testing shall comply with this section and NFPA 72.
- C. Notify Owner 7 days prior to beginning completion inspections and tests. D. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel. 1. A signed Record of Completion shall be provided to the inspector prior to their inspection.
- E. Provide the service of a competent, factory-trained technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. F. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.
- G. Provide all tools, software, and supplies required to accomplish inspection and testing. H. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test. I. All smoke detectors shall be tested using canned smoke, or other approved method that will functionally test the smoke chamber. The use of
- magnets to commission smoke detectors is strictly prohibited. J. Smoke detectors shall not be installed until the construction cleanup of all trades is complete per NFPA 72 and this section. 1. Orange shipping covers, rubber gloves, tape, or other devices shall not be used to try and get around these basic requirements. 2. Smoke detectors installed before the clean-up of all other dust or particle producing trades and without prior written approval of the engineer and local AHJ shall be replaced at the sole expense of the installing contractor. 3. AE reserves the right to permanently and indelibly mark any detector installed this way.
- 4. The contractor is urged to use marked, temporary detectors for pre-testing of system and replace with new detectors prior to final testing. K. All new smoke detectors that show to be "Dirty" through system sensitivity shall be replaced.
- L. Audibility testing shall not be conducted until all doors, windows, walls, ceilings, and carpeting are in place. Final audibility testing that does not affect speaker placement should be done after space is fully furnished.
- M. At a minimum the following tests shall be conducted, documented and given to AE at closeout: 1. Open initiating device circuits and verify that the trouble signal actuates.
- 2. Open and short signaling line circuits and verify that the trouble signal actuates.
- 3. Open and short Notification Appliance Circuits and verify that trouble signal actuates. 4. Ground all circuits and verify response of trouble signals.
- 5. Check presence and audibility of tone throughout building spaces. This includes measuring dBA levels. a. A minimum of 15 dBA above ambient shall be obtained in every occupiable space (throughout) per NFPA 72. This includes storage rooms, electrical rooms, telephone rooms, and any other occupiable space.
- 6. Each of the alarm, trouble, or supervisory conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points. 7. Each notification circuit shall be tested under standby power. End-of-line voltage readings shall be taken at the end-of-line resistor for Class "B" circuits, or at the booster panel for Class "A" circuits. Circuit voltage drop shall be recorded and compared to calculated voltage drop. Note: Some systems incorporating synchronizing modules can impair results. If the module cannot be bypassed for voltage readings, the manufacturer should
- be contacted for guidance. 8. System off-site reporting shall be verified for alarm, supervisory, trouble, correct address, facility name, contact phone number, and contact
- 9. When the system is equipped with optional features or connected to external, non-fire devices, the manufacturer's manual should be consulted to determine the proper testing procedures. N. The commissioning inspector shall use the system record drawings and other documents specified under this specification during the testing procedure to verify operation as programmed. In conducting the commissioning test, the inspector shall request a demonstration of any or all input and
- output functions. O. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents. P. Diagnostic Period: After successful completion of inspections and tests, Operate system in normal mode for at least 14 days without any system or
- equipment malfunctions. 1. Record all system operations and malfunctions. 2. If a malfunction occurs, start diagnostic period over after correction of malfunction
- 3. At end of successful diagnostic period, fill out and submit NFPA 72 "Inspection and Testing Form."

3.03 OWNER PERSONNEL INSTRUCTION A. Provide the following instruction to designated Owner personnel:

- 1. Hands-On Instruction: On-site, using operational system.
- B. Administrative: One-hour session(s) covering issues necessary for non-technical administrative staff; classroom: 1. Initial Training: 1 session pre-closeout.
- C. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on: 1. Initial Training: 1 session pre-closeout.
- D. Furnish the services of instructors and teaching aids; have copies of operation and maintenance data available during instruction. 3.04 CLOSEOUT
- A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
- 1. Be prepared to conduct any of the required tests. 2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator
- instruction chart(s) available during demonstration. 3. Have authorized technical representative of control unit manufacturer present during demonstration.
- 4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration. 5. Repeat demonstration until successful.

3.05 MAINTENANCE

- A. See Section 01 70 00 Execution and Closeout Requirements, for additional requirements relating to maintenance service. B. Provide to Owner, a proposal as an alternate to the base bid, for a maintenance contract for entire warranty period, to include the work described below; include the total cost of contract, proposal to be valid at least until 30 days after date of Substantial Completion.
- C. Perform routine inspection, testing, and preventive maintenance required by NFPA 72, including: Maintenance of fire safety interface and supervisory devices connected to fire alarm system.
- 2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor. 3. Record keeping required by NFPA 72 and authorities having jurisdiction. D. Provide trouble call-back service upon notification by Owner:
- 1. Provide on-site response within 2 hours of notification 2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
- 3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

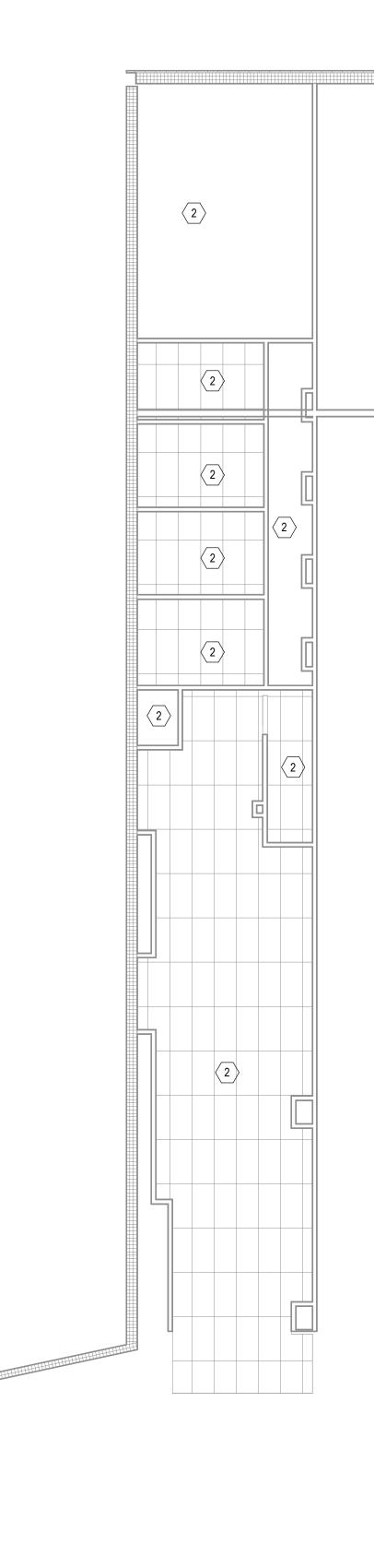
E. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule. F. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced. Submit duplicate of each log entry to Owner's representative upon completion of site visit. G. Comply with Owner's requirements for access to facility and security.

END OF SECTION

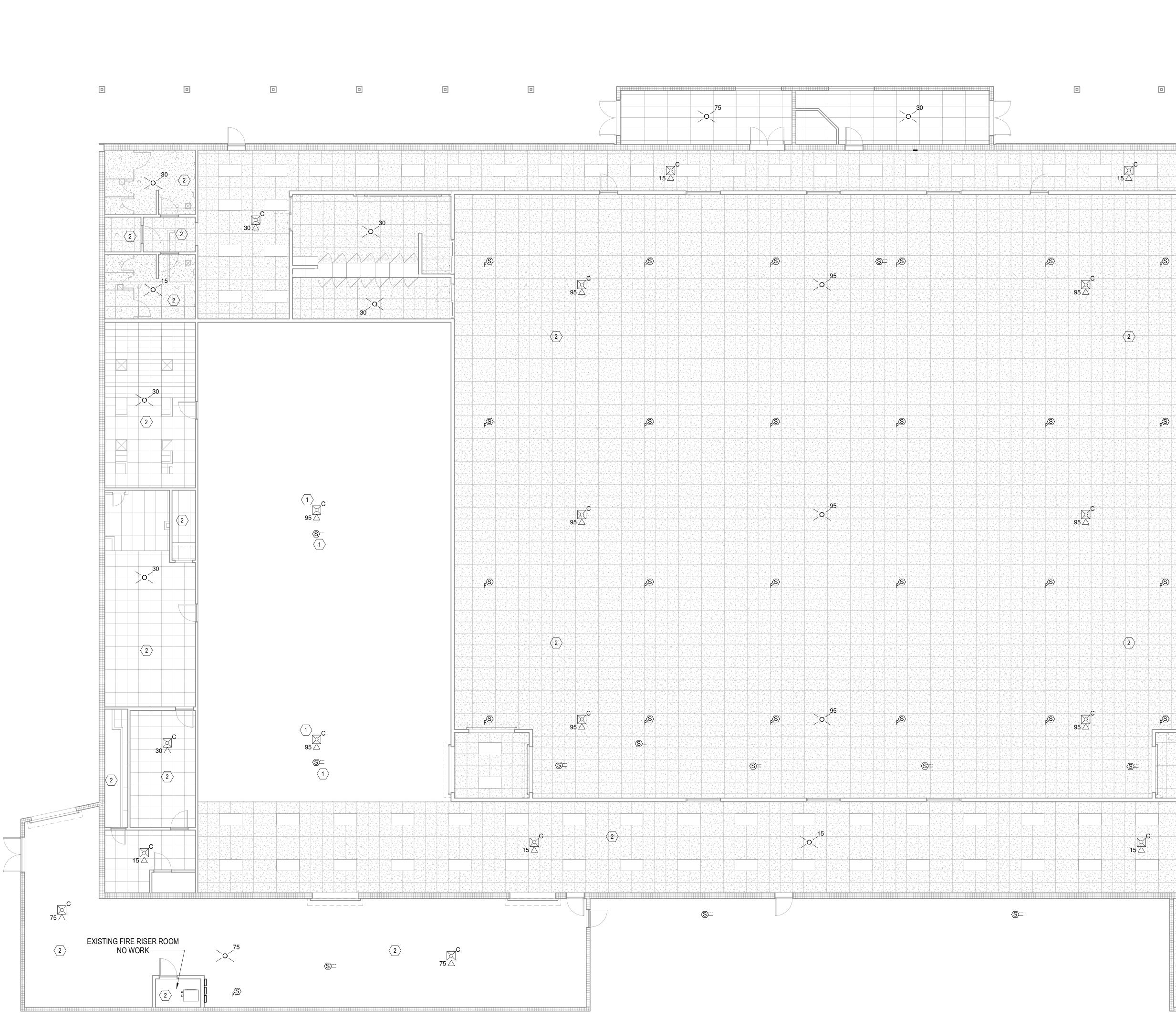


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$1 \quad FIRST FLOOR FIRE ALARM DEMOLITION PLAN$ $1/8" = 1'-0" \quad \boxed{5 \quad 10 \quad 20}$



- **DEMOLITION NOTES:** 1. THE INTENT OF THE PROJECT IS TO RE-USE AS MUCH OF THE EXISTING FIRE DETECTION AND ALARM SYSTEM INSTALLATION AS POSSIBLE. SO THERE IS NOT EXPECTED TO BE SUBSTANTIAL DEMOLITION.
- 2. ANY DEMOLITION OF THE EXISTING FIRE DETECTION AND ALARM SYSTEM IS TO BE TAKEN BACK TO A JUNCTION BOX OR SIMILAR LOCATION IN THE CIRCUIT. IT SHALL NOT BE ACCEPTABLE TO ABANDON ANY
- CONDUITS, J-BOXES, ETC., IN PLACE.
- 3. SURRENDER ALL DEMOLISHED MATERIALS TO THE OWNER FOR FIRST RIGHT OF REFUSAL.

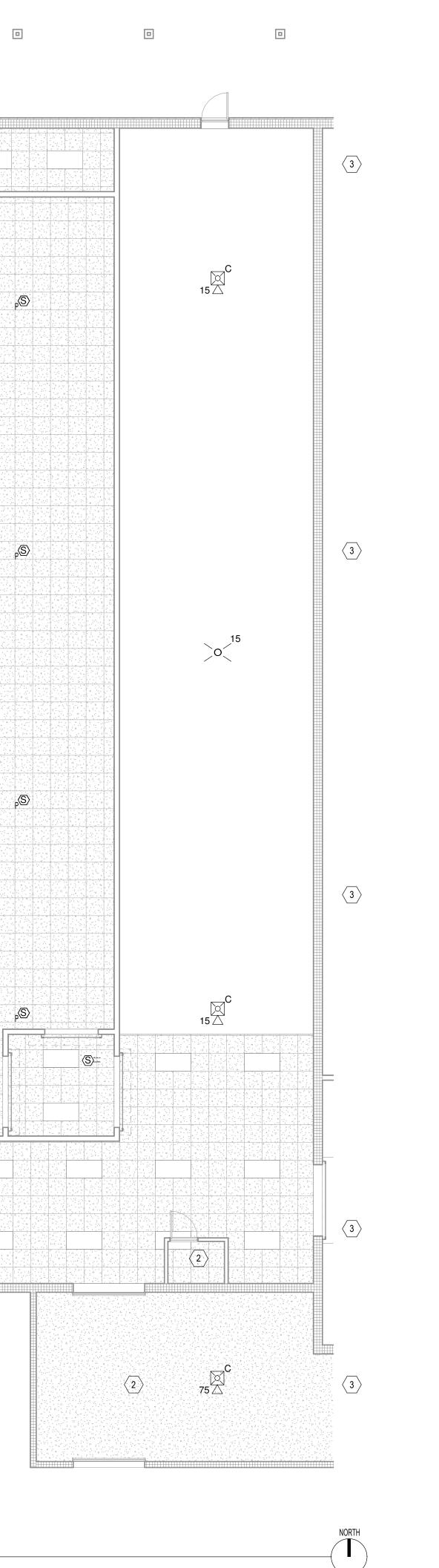
KEYED NOTES:

DEMOLISH/ REMOVE EXISTING DETECTOR/ NOTIFICATION APPLIANCE. NOTE: SAVE ALL DETECTORS AND NOTIFICATION APPLIANCES FOR SPARES FOR OWNER USE.

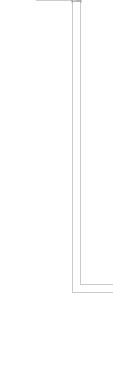
> THERE IS NO NEW FIRE DETECTION AND ALARM WORK PLANNED FOR THIS SPACE. THIS SPACE IS TO REMAIN IN SERVICE AND OPERATION DURING AND AFTER CONSTRUCTION. NOTIFY G.C. AND OWNER WHEN THE FIRE DETECTION AND ALARM SYSTEM WILL BE SHUT DOWN OR OTHERWISE BE PUT INTO A STANBY MODE FOR WORK. RETURN THE FIRE DETECTION AND ALARM SYSTEM TO NORMAL SERVICE EACH DAY. AT NO TIME SHALL THE THE FIRE DETECTION AND ALARM SYSTEM BE LEFT OUT OF SERVICE DURING THE OVERNIGHT OR NON-WORKING HOURS. CONTRACTOR IS TO FOLLOW THE OWNERS THE FIRE DETECTION AND ALARM SYSTEM SHUTDOWN PROCEDURE AT ALL TIMES.

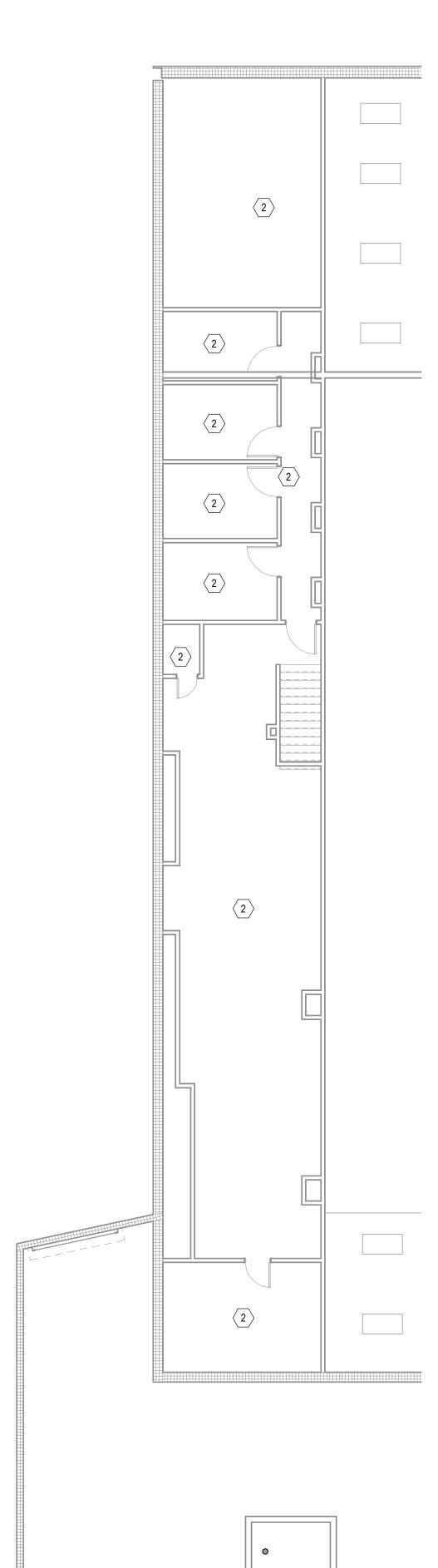
3 THIS AREA OUTSIDE OF THE SCOPE OF THIS PROJECT.







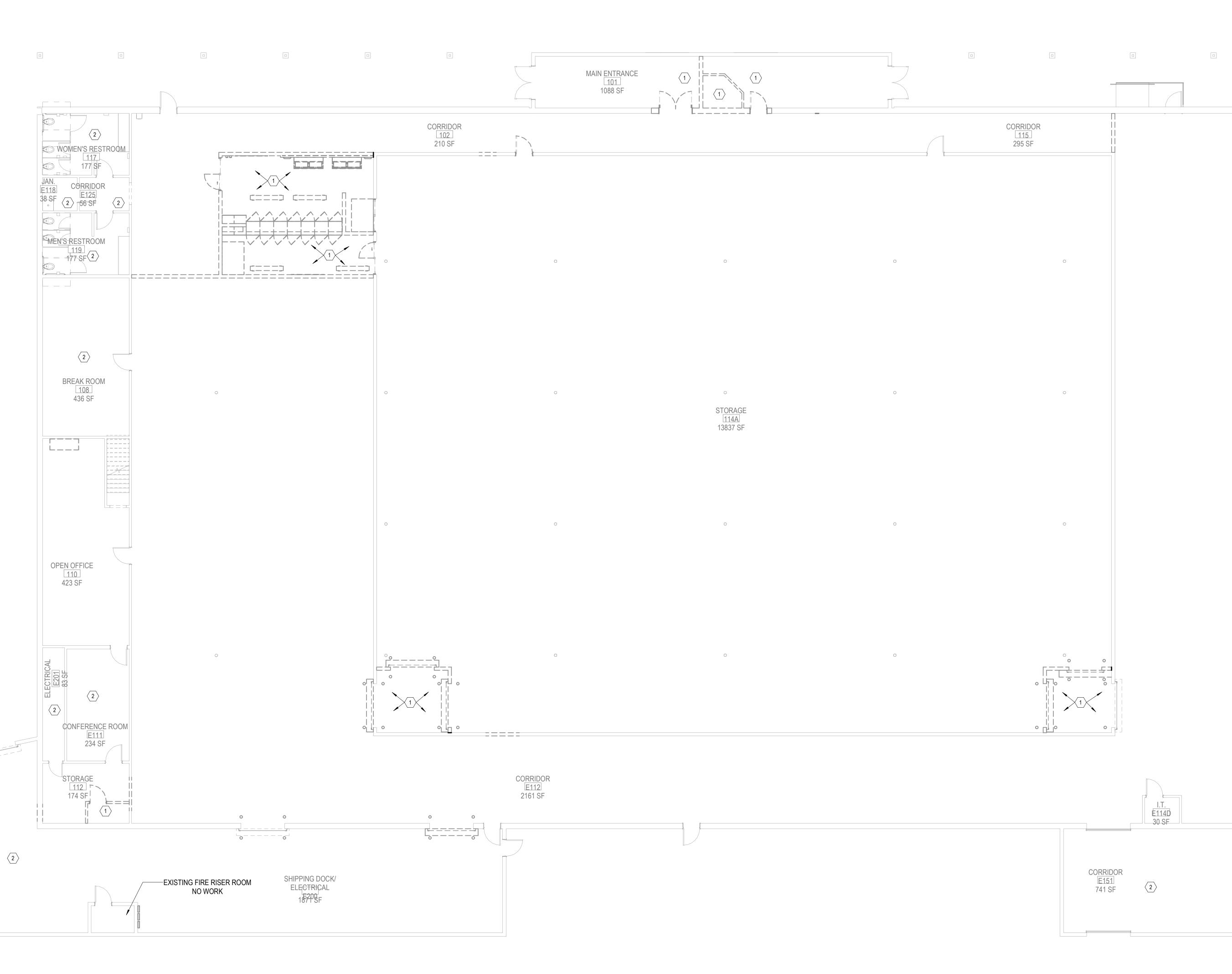






DEMOLITION NOTES:

- 1. THE INTENT OF THE PROJECT IS TO RE-USE AS MUCH OF THE EXISTING SYSTEM PIPING AS POSSIBLE. SO THERE IS NOT EXPECTED TO BE SUBSTANTIAL DEMOLITION.
- 2. ANY DEMOLITION OF THE EXISTING SPRINKLER SYSTEM IS TO BE TAKEN BACK TO THE BRANCH LINE, OR THE CROSS MAIN AND PLUGS OR NIPPLES WITH CAPS SHALL BE INSTALLED. THERE ARE TO BE ABSOLUTELY NO MORE PORTIONS OF THE EXISTING BRANCH LINE PIPING REMAINING INTACT THAN WHAT ARE NECESSARY TO FACILITATE THE RENOVATION WORK. IT SHALL NOT BE ACCEPTABLE TO ABANDON ANY PIPES IN PLACE ABOVE CEILINGS.
- 3. SURRENDER ALL DEMOLISHED MATERIALS (PIPES, FITTINGS, HANGERS, ESPECIALLY SPRINKLER HEADS) TO THE OWNER FOR FIRST RIGHT OF REFUSAL.



 $1 \quad FIRST FLOOR DEMOLITION PLAN$ $1/8" = 1'-0" \quad \frac{1}{0} \quad \frac{1}{5} \quad \frac{1}{10} \quad \frac{1}{20}$

KEYED NOTES: DEMOLISH/ REMOVE EXISTING SPRINKLER HEADS, DROPS, DETECTORS, ETC., IN THIS SPACE. NOTE: SAVE DETECTORS FOR

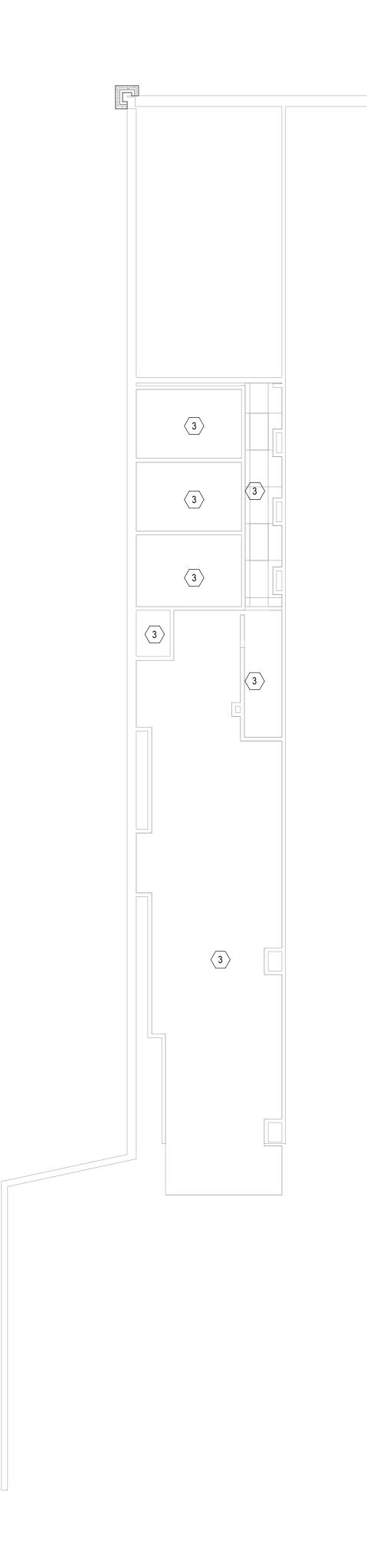
- SPARES FOR OWNER USE. $\langle 2 \rangle$ THERE IS NO NEW FIRE PROTECTION WORK PLANNED FOR THIS SPACE. THIS SPACE IS TO REMAIN IN SERVICE AND OPERATION DURING AND AFTER CONSTRUCTION. NOTIFY G.C. AND OWNER WHEN THE SPRINKLER SYSTEM WILL BE SHUT DOWN FOR WORK. RETURN SPRINKLER SYSTEM TO SERVICE EACH DAY. AT NO TIME SHALL THE SPRINKLER SYSTEM BE LEFT OUT OF SERVICE DURING THE OVERNIGHT OR NON-WORKING HOURS. CONTRACTOR IS TO FOLLOW THE OWNERS SPRINKLER SYSTEM SHUTDOWN PROCEDURE AT ALL TIMES.
- 3 THIS AREA OUTSIDE OF THE SCOPE OF THIS PROJECT.



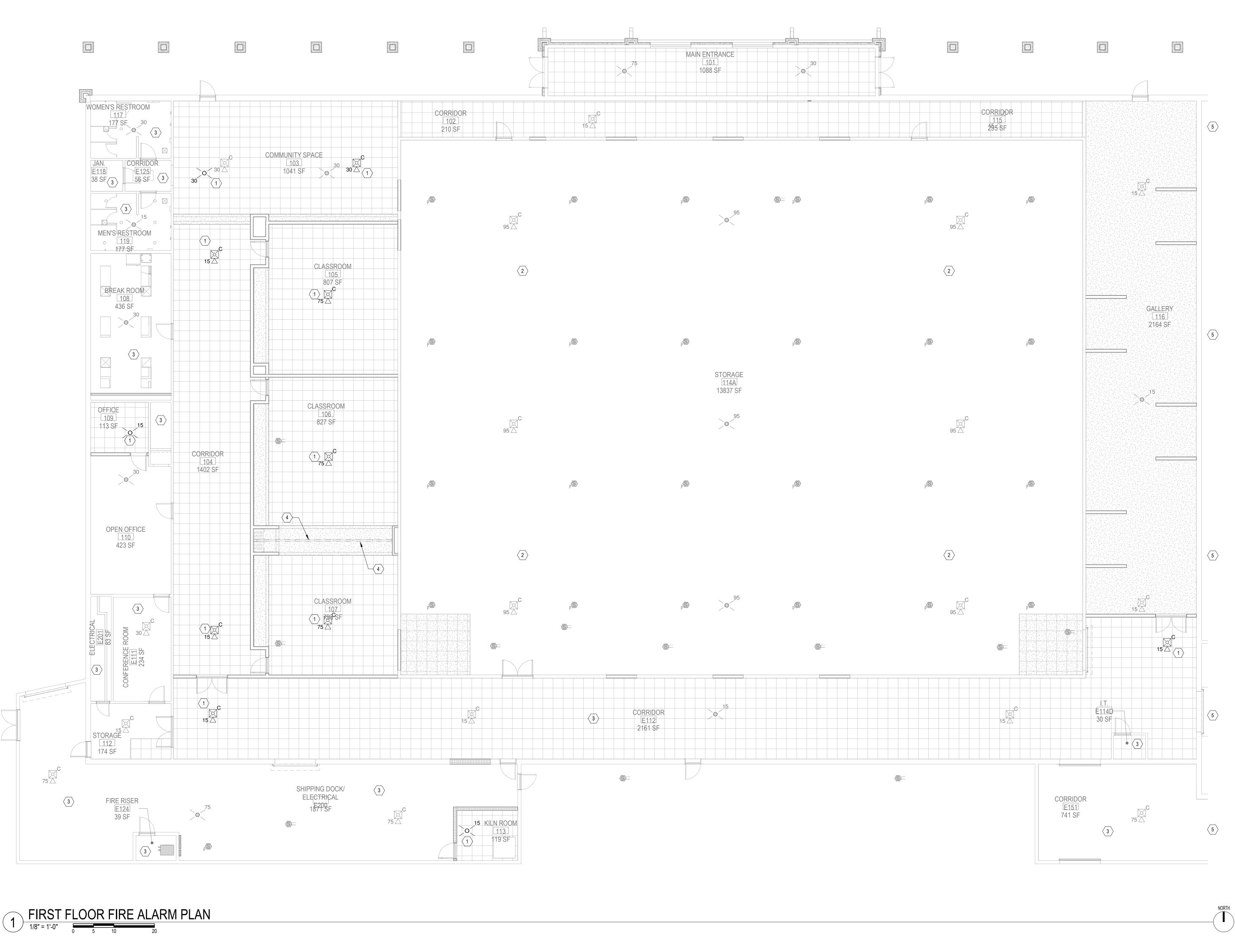


 $\left< \frac{3}{} \right>$

 $\langle 3 \rangle$



 $2 \frac{\text{SECOND FLOOR FIRE ALARM PLAN}}{1/8" = 1'-0"} \frac{1}{0} \frac{1}{5} \frac{1}{10} \frac{1}{20} \frac{1}{20} \frac{1}{5} \frac{1}{10} \frac{1}{20} \frac{1}{5} \frac{1}{10} \frac{1}{20} \frac{1}{5} \frac{1}{10} \frac{1}{20} \frac{1}{5} \frac{1}{10} \frac{1}{5} \frac{1}{10} \frac{1}{5} \frac{1}{10} \frac{1}{5} \frac{1}{10} \frac{1}{5} \frac{1}{5} \frac{1}{10} \frac{1}{5} \frac{1$



IT IS THE INTENT OF THIS PROJECT TO RE-USE ALMOST 100% OF THE EXISTING FIRE DETECTION AND ALARM SYSTEMS AS THEY ARE CURRENTLY INSTALLED. SOME DETECTORS AND NOTIFICATION APPLIANCES MAY NEED TO BE RELOCATED DUE TO NEW WALLS AND CEILINGS OR FOR COORDINATION WITH OTHER DISCIPLINES, PARTICULARLY HVAC.

WHETHER SHOWN IN THESE DOCUMENTS OR NOT, ALL NECESSARY DETECTORS, BACK BOXES, JUNCTION BOXES, CONDUITS, SUPPORTS, CABLE, ETC., THAT ARE REQUIRED TO PROVIDE A COMPLETE, FULLY OPERATIONAL AND FULLY AUTOMATIC PREACTION

INTENT:

PREACTION SYSTEM DETECTORS:

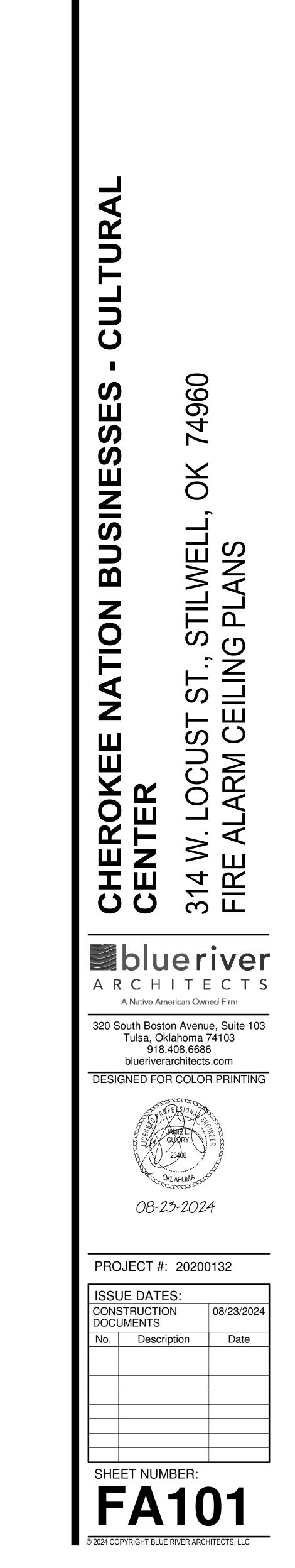
SYSTEM ARE PART OF THE FIRE PROTECTION CONTRACTORS SCOPE OF WORK.

KEYED NOTES:

- 1 NEW NOTIFICATION APPLIANCE.
- $\langle 2 \rangle$ THIS SPACE IS PROTECTED WITH THE DOUBLE INTERLOCK PREACTION SYSTEM.
- $\langle 3 \rangle$ THERE IS NO NEW FIRE DETECTION AND ALARM WORK PLANNED FOR THIS SPACE. THIS SPACE IS TO REMAIN IN SERVICE AND OPERATION DURING AND AFTER CONSTRUCTION. NOTIFY G.C. AND OWNER WHEN THE FIRE DETECTION AND ALARM SYSTEM WILL BE SHUT DOWN FOR WORK. RETURN SPRINKLER SYSTEM TO SERVICE EACH DAY. AT NO TIME SHALL THE FIRE DETECTION AND ALARM SYSTEM BE LEFT OUT OF SERVICE DURING THE OVERNIGHT OR NON-WORKING HOURS. CONTRACTOR IS TO FOLLOW THE OWNERS SPRINKLER SYSTEM SHUTDOWN PROCEDURE AT ALL TIMES.
- $\langle 4 \rangle$ FOLDING PARTITION SPACE SPRINKLER HEADS ACCORDINGLY.
- $\langle {}^5 \rangle$ This area outside of scope of this project.

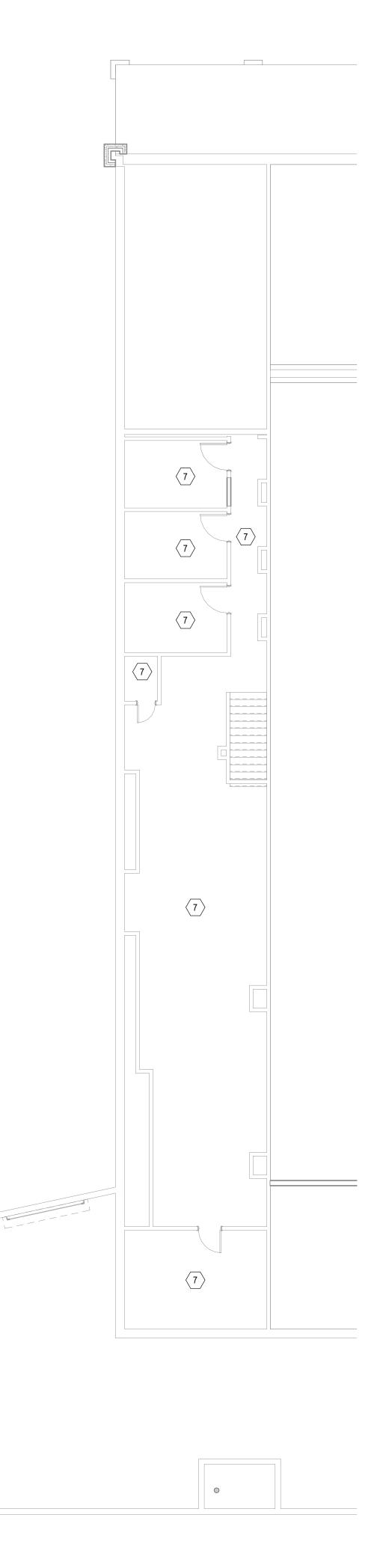
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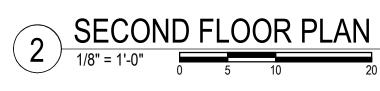




INTENT:

IT IS THE INTENT OF THIS PROJECT TO RE-USE ALMOST 100% OF THE EXISTING FIRE PROTECTION SYSTEMS AS THEY ARE CURRENTLY INSTALLED. SOME PIPES MAY NEED TO BE RAISED DUE TO NEW CEILING HEIGHTS OR FOR COORDINATION WITH OTHER DISCIPLINES, PARTICULARLY HVAC. REMOVE LINKS / BULBS FROM ANY DEMOLISHED SPRINKLER HEADS. SURRENDER ALL DEMOLISHED SPRINKLER HEADS AND OTHER MATERIALS TO THE OWNER FOR FIRST RIGHT OF REFUSAL. INSTALL PLUGS OR NIPPLES WITH CAPS WHEN ARM-OVERS OR BRANCH LINES ARE DEMOLISHED. IT SHALL NOT BE ACCEPTABLE TO LEAVE PIPES IN PLACE THAT DO NOT FEED SPRINKLER HEADS.







NOTICE TO FIRE PROTECTION CONTRACTORS:

THE FIRE PROTECTION SYSTEMS DESIGNER IS CAUTIONED TO CAREFULLY COORDINATE AND CONSIDER ROUTINGS OF ALL FIRE PROTECTION PIPES AND LOCATIONS OF FIRE SPRINKLER HEADS WITH ALL OTHER DISCIPLINES (ALL ARCHITECTURAL FEATURES, STRUCTURAL ELEMENTS, HVAC DUCTWORK, ALL ABOVE CEILING PIPING SYSTEMS, LIGHT FIXTURES, CABLE TRAYS, CONDUITS, DOMESTIC WATER, STORM DRAINS, GAS LINES, OWNERS EQUIPMENT, ABOVE CEILING EQUIPMENT SUPPORTS, ETC.), AS THERE WILL BE LIMITED SPACE ABOVE CEILINGS. THE SHORTEST ROUTE/ DISTANCE BETWEEN ANY TWO POINTS MAY NOT BE THE ACCEPTABLE ROUTE, DUE TO CONSTRUCTION FEATURES OR CONFLICTS WITH OTHER DISCIPLINES. THE FIRE PROTECTION DESIGNER IS CAUTIONED TO PERFORM A THOROUGHLY COORDINATED DESIGN AND CONDUCT A VERY DETAILED SURVEY OF THE FACILITY AND AREAS OF WORK. CAREFULLY REVIEW ALL PROJECT DRAWINGS AND DETAILS DURING DESIGN OF THE FIRE PROTECTION SYSTEMS.

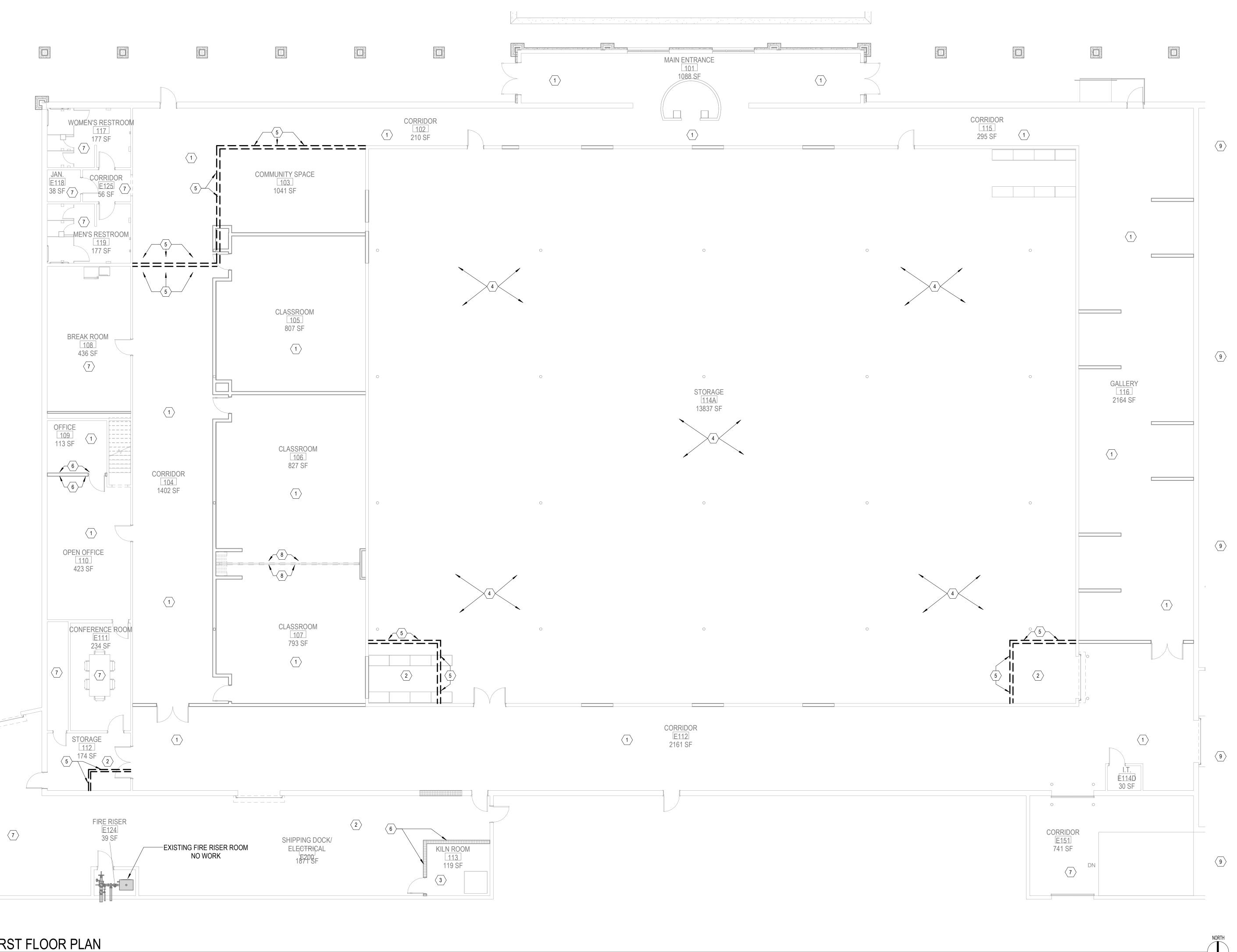
THE INSTALLING FIRE PROTECTION CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE GENERAL CONTRACTOR AND OTHER TRADES PRIOR TO AND DURING INSTALLATION. GREAT CARE AND GOOD CRAFTSMANSHIP DURING INSTALLATION IS EXPECTED AT ALL TIMES TO AVOID UNNECESSARY AND UNWANTED DAMAGE TO ANY PART OR FEATURE OF THE BUILDING. THE INSTALLING FIRE PROTECTION CONTRACTOR IS CAUTIONED TO VERIFY ANY AND ALL PENETRATIONS PRIOR TO CUTTING OR DRILLING HOLES FOR PIPES. THE FIRE PROTECTION CONTRACTOR IS FURTHER CAUTIONED TO PRE-DRILL HOLES FOR HANGER ATTACHMENTS, SO AS TO NOT SPLIT, CRACK OR OTHERWISE DAMAGE ANY STRUCTURAL MEMBERS - ESPECIALLY TO CONCRETE SLABS. PENETRATIONS OF STRUCTURAL MEMBERS IS STRICTLY PROHIBITED WITHOUT A PROPERLY EXECUTED, WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER OF RECORD. IT MAY BE NECESSARY FOR PIPES TO DROP DOWN, GO UNDER AND RISE UP AT BEAMS, OTHER STRUCTURAL FEATURES, ARCHITECTURAL FEATURES OR OTHER BUILDING SYSTEMS. AT ALL TIMES THIS SHALL BE AT THE FIRE PROTECTION CONTRACTOR'S EXPENSE. THE FIRE PROTECTION CONTRACTOR IS CAUTIONED TO COORDINATE WITH ALL OTHER DISCIPLINES.

WARNING: IF THE INSTALLING CONTRACTOR CHOOSES TO USE AND INSTALL FLEXIBLE SPRINKLER DROPS, THEY SHALL BE INSTALLED IN ACCORDANCE WITH THEIR LISTING AND MANUFACTURERS INSTRUCTIONS. ATTENTION SHALL BE PAID TO BOTH THE *RADIUS* OF EACH BEND THAT MAY BE IN ANY SINGLE FLEXIBLE DROP, AS WELL AS THE *TOTAL* NUMBER OF BENDS INSTALLED IN ANY SINGLE FLEXIBLE DROP THAT MAY BE INSTALLED. THIS SHALL BE CLOSELY SCRUTINIZED IN THE FIELD DURING INSTALLATION. CONTRACTORS SHALL REPLACE EVERY FLEXIBLE DROP THAT IS DEEMED NOT TO BE INSTALLED ACCORDING TO ITS LISTING AND APPROVAL AND CROMWELL SHALL HAVE THE FINAL WORD ON WHETHER OR NOT FLEXIBLE SPRINKLER DROPS ARE INSTALLED ACCORDING TO THEIR LISTING. ANY FLEXIBLE SPRINKLER DROPS DEEMED TO BE INSTALLED INCORRECTLY SHALL BE REPLACED WITH LONGER, APPROPRIATE LENGTH FLEXIBLE DROPS, OR REPLACED WITH HARD-PIPED RETURN BENDS. IN EVERY INSTANCE, THIS SHALL BE AT THE CONTRACTORS EXPENSE. CONTRACTORS ARE CAUTIONED NOT TO TRY AND USE SHORT FLEXIBLE SPRINKLER DROPS TO "GET BY", WHEN A LONGER FLEXIBLE SPRINKLER DROP IS WHAT THE INSTALLATION REQUIRES.

AUTOMATIC AIR VENT AND RELIEF VALVE:

PROVIDE THE FOLLOWING PER THE REQUIREMENTS OF NFPA 13:

1. AN AUTOMATIC AIR VENT LOCATED ON THE TOP TANGENT OF A NEW FIRE PROTECTION SYSTEM PIPE, AT A HIGH POINT IN THE SYSTEM PIPING NETWORK. 2. AN AUTOMATIC RELIEF VALVE ON THE FIRE PROTECTION SYSTEM. LOCATE RELIEF VALVE AT AN APPROPRIATE LOCATION TO FACILITATE DRAINAGE AND NOT INTERFERE WITH THE OWNERS OPERATIONS.



1 FIRST FLOOR PLAN 1/8" = 1'-0" 0 5 10 20

KEYED NOTES:

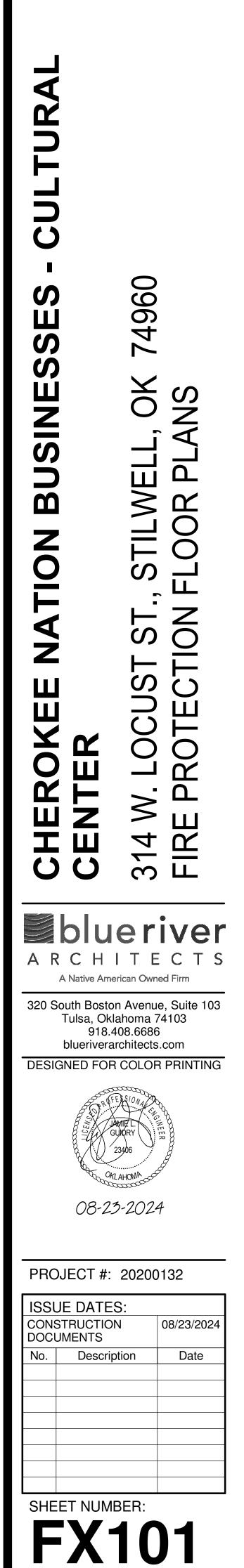
- (1) THIS SPACE SHALL BE CONSIDERED LIGHT HAZARD OCCUPANCY CLASSIFICATION. UTILIZE MINIMUM 5.6 K-FACTOR SPRINKLERS AT A MAXIMUM SPACING OF 225 FT² PER SPRINKLER. SPRINKLERS ARE REQUIRED TO BE LOCATED IN CENTERS OF TILES.
- 2 THIS SPACE SHALL BE CONSIDERED ORDINARY HAZARD GROUP 1 OCCUPANCY CLASSIFICATION. UTILIZE MINIMUM 5.6 K-FACTOR SPRINKLERS AT A MAXIMUM SPACING OF 130 FT² PER SPRINKLER.
- (3) THIS SPACE SHALL BE CONSIDERED ORDINARY HAZARD GROUP 2 OCCUPANCY CLASSIFICATION. UTILIZE MINIMUM 5.6 K-FACTOR
- $\langle 4 \rangle$ THIS SPACE IS PROTECTED WITH THE DOUBLE INTERLOCK PREACTION SYSTEM.
- (5) BRING SPRINKLER HEAD COVERAGE INTO COMPLIANCE WITH NFPA 13 WHERE WALL USED TO BE.
- $\langle 6 \rangle$ BRING SPRINKLER HEAD COVERAGE INTO COMPLIANCE WITH NFPA 13 AT NEW WALL.
- $\langle 7 \rangle$ THERE IS NO NEW FIRE PROTECTION WORK PLANNED FOR THIS SPACE. THIS SPACE IS TO REMAIN IN SERVICE AND OPERATION DURING AND AFTER CONSTRUCTION. NOTIFY G.C. AND OWNER WHEN THE SPRINKLER SYSTEM WILL BE SHUT DOWN FOR WORK. RETURN SPRINKLER SYSTEM TO SERVICE EACH DAY. AT NO TIME SHALL THE SPRINKLER SYSTEM BE LEFT OUT OF SERVICE DURING THE OVERNIGHT OR NON-WORKING HOURS. CONTRACTOR IS TO FOLLOW THE OWNERS SPRINKLER SYSTEM SHUTDOWN PROCEDURE AT ALL TIMES.
- $\langle 8 \rangle$ FOLDING PARTITION SPACE SPRINKLER HEADS ACCORDINGLY.
- $\langle 9 \rangle$ THIS AREA OUTSIDE OF SCOPE OF THIS PROJECT.

PREACTION SYSTEM DETECTORS: WHETHER SHOWN IN THESE DOCUMENTS OR NOT, ALL NECESSARY DETECTORS, BACK BOXES, JUNCTION BOXES, CONDUITS,

SPRINKLERS AT A MAXIMUM SPACING OF 130 FT² PER SPRINKLER. INSTALL MINIMUM 286°F RATED SPRINKLER(S) IN THE KILN ROOM.

SUPPORTS, CABLE, ETC., THAT ARE REQUIRED TO PROVIDE A COMPLETE, FULLY OPERATIONAL AND FULLY AUTOMATIC PREACTION SYSTEM ARE PART OF THE FIRE PROTECTION CONTRACTORS SCOPE OF WORK.

ARCHITECTS A Native American Owned Firm



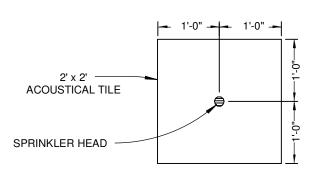
& Ø					TECTION DIDING LEGEND
		GPM	GALLONS PER MINUTE		PIPE SIZE TAG (DIAMETER Ø")
/R	ROUND ON ROOF	HD H.P.	HEAD HIGH PRESSURE	(E)	EXISTING TO REMAIN PIPE
A AB		HTG IN	HEATING INCH	(D)	DEMOLISHED PIPE
ABV ACOUS	, BOTE	INL INSUL	INLET INSULATION	6" FP-D	PIPE SIZE AND SYSTEM TAG
ADD ADDL	ADDENDUM	INWG ITC	INCHES WATER GAUGE INSPECTOR TEST CONNECT	FP-D	FIRE PROTECTION DRY
AFF AG	ABOVE FINISHED FLOOR ABOVE GROUND	JT LAB	JOINT LABORATORY		FIRE PROTECTION PRE-ACTION
AHJ ALT	AUTHORITY HAVING JURISDICTION		POUND	FP-W	FIRE PROTECTION WET
ALV ALUM	ALARM VALVE	LB/HR	POUNDS PER HOUR	FP-0	FIRE PROTECTION OTHER
AP	ACCESS PANEL	LF LOC	LINEAL FOOT LOCATION	FP-C -	FIRE PROTECTION CLEAN AGENT
ARCH AUTO	ARCHITECT/ARCHITECTURAL AUTOMATIC	LP MA	LOW PRESSURE MIXED AIR		
AUX BFF	AUXILLARY DRAIN BELOW FINISHED FLOOR	MAN	MANUAL		SPRINKLERS
BFV BSMT		MAX MCW	MAXIMUM MAKE-UP COLD WATER	K-VALUE SYMBOLS:	SPRINKLER ORIENTATION: CONCEALED
3TWN CAP	BETWEEN CAPACITY	MD MFR	MOTORIZED DAMPER MANUFACTURER	<hr/> 8.0	
CFCV CFM		MIN MISC	MINIMUM MISCELLANEOUS	□	PENDENT
CI CIS	CAST IRON COMMON INTELLIGEBELITY SYS.	MRA	MOST HYDRAULICALY DEMANDING AREA	☐ 14.0 ☐ 25.2	HORIZONTAL SIDEWALL
CEG COL	CEILING COLUMN	NFPA	NOT IN CONTRACT NATIONAL FIRE PROTECTION		• VERTICAL SIDEWALL - 5.6K $<$
	COMBINATION CONCRETE	NP	ASSOCIATION NOT POTABLE		• VERTICAL SIDEWALL - 8.0K
CONT	CONTINUE/CONTINUATION	NTS	NOT TO SCALE		• VERTICAL SIDEWALL - 11.2K 🚄
COR		O OPNG	OXYGEN OPENING		
CTR CUFT	CENTER CUBIC FEET	PD PIV	PRESSURE DROP POST INDICATOR VALVE	METAL	<u>LIC PIPE SYMBOLS</u>
)/° DCA	DEGREE DETECTOR CHECK ASSY.	PR PREL	PAIR PRELIMINARY		PIPE DROP
DCDA	DOUBLE DETECTOR CK. ASSY. DIAMETER	PS PRIM	PRESSURE PRIMARY		PIPE ELBOW
DI DISCH	DUCTILE IRON DISCHARGE	PRV PSI	PRESS. REDUCING VALVE LBS. PER SQ. IN.		PIPE RISE
OMPR	DAMPER	PSIG PW	LBS. PER SQ. IN. GAUGE POTABLE WATER		
DN DWG	DOWN DRAWING	REC RED	RECESSED REDUCER	<u>PLAS</u>	TIC PIPE SYMBOLS PIPE RISE
EA ECS	EACH EMERGENCY COMM. SYSTEM	RED REQD SF	REDUCER REQUIRED SQUARE FOOT		PIPE CAP PIPE WYE 8TH TEE
EAH EX	EXHAUST HOOD EXISTING	SD	SMOKE DAMPER		PIPE TEE
	EXPANSION EXPANSION JOINT	SIM SLV	SIMILAR SLEEVE		PIPE DROP PIPE CROSS
ESP •	EXTERNAL STATIC PRESSURE DEGREES FAHRENHEIT	SP SPS	STATIC PRESSURE STATIC PRESSURE STATION		PIPE PLUG
D DV	FIRE DAMPER FIRE DEPARTMENT VALVE	SQ SS	SQUARE STAINLESS STEEL	PIP	E ACCESSORIES
HR HV	FIRE HOSE STATION FIRE HOSE VALVE	STD T	STANDARD THERMOSTAT		BALL VALVE
PI LEX	FINS PER INCH FLEXIBLE	SYS TCP	SYSTEM TEMP. CONTROL PANEL		BUTTERFLY VALVE
LG	FLANGE	TD TEMP	TEMPERATURE DROP TEMPERATURE		GATE VALVE GLOBE VALVE
T TG	FOOT/FEET FOOTING	TSP TYP	TOTAL STATIC PRESSURE TYPICAL		PRESSURE REDUCING VALVE SWING CHECK VALVE
-UT GAL	FUTURE GALLON	U/G U/S	UNDER GROUND UNDER SLAB		
GALV GEN	GALVANIZED GENERATOR	UNO VL	UNLESS NOTED OTHERWISE VALVE		
GENL	GENERAL	VOL	VOLUME		
	EQUIPMENT ABB	REVIAT	IONS	<u>SPF</u>	RINKLER TAGS
AFMS		FDC	FIRE DEPARTMENT CONTROL	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	SPRINKLER TEMP RATING SPRINKLER CAGE (X)
CF CF	CHEMICAL FEEDER	FDCP FMCP	F.A. ACCESS PANEL F.A. MASS NOTIFICATION PNL.	ECD	SPRINKLER TYPE:
DBP DCA		FAA LOC	F.A. ANNUNCIATOR PNL. LOCAL OPERATOR CONSOLE		"D" = DRY TYPE "O" = OPEN TYPE
DDCA FHR	DOUBLE DETECTOR CHECK ASSY. FIRE HOSE STATION	NRSV ITC	NON-RISING STEM VALVE INSPECTOR'S TEST		EXTENDED COVERAGE
F.A. FPU	FIRE ALARM FIRE PUMP	PNL	PANEL		
				PIP	E ACCESSORY TAGS
	FIRE PROTECTION	SHEET	SET NOTE		
			SET NOTE	<u>PIP</u> #" DCDA - DCDA	ACCESSORY SIZE & ID
	* NOT ALL OF GENERAL NOTES ON THIS	E * SHEET	ARE TO BE APPLIED TO	#" DCDA 🔫	ACCESSORY SIZE & ID
	* NOTI ALL OF GENERAL NOTES ON THIS ALL OTHER DRAWINGS IN THIS SET SHOWN ON THIS SHEET MAY O	E * SHEET SYMBC R MAY N	ARE TO BE APPLIED TO DLS AND ABBREVIATIONS NOT BE USED IN THE	#" DCDA 🔫	ACCESSORY SIZE & ID
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	* NOT ALL OF GENERAL NOTES ON THIS ALL OTHER DRAWINGS IN THIS SET SHOWN ON THIS SHEET MAY O CONTAINED REFERE GENERAL SYME CONTAINED REFERE REVISION NU POINT WHEF EXISTING DEMOLISH T	E * SHEET SYMBC R MAY N NCE DF OLS	ARE TO BE APPLIED TO DLS AND ABBREVIATIONS NOT BE USED IN THE RAWINGS. SHOWN ON PLANS CONNECTS TO	#" DCDA	ACCESSORY SIZE & ID TYPE MARK ACCESSORY SIZE (INLET - OUTLET) EPARTMENT CONNECTIONS 2-WAY PROJECTING 2-WAY BODY
	* NOTI ALL OF GENERAL NOTES ON THIS ALL OTHER DRAWINGS IN THIS SET SHOWN ON THIS SHEET MAY O CONTAINED REFERE GENERAL SYME REVISION NU POINT WHEF EXISTING DEMOLISH T NUMBER OF NUMBER OF	E * SHEET SYMBC R MAY N NCE DF OLS JMBER RE NEW O POIN ^T DETAIL	ARE TO BE APPLIED TO DLS AND ABBREVIATIONS NOT BE USED IN THE RAWINGS. SHOWN ON PLANS CONNECTS TO	#" DCDA	ACCESSORY SIZE & ID TYPE MARK ACCESSORY SIZE (INLET - OUTLET) EPARTMENT CONNECTIONS 2-WAY PROJECTING 2-WAY BODY 2-WAY FLUSH PLATE
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GENERAL NOTES:

- 1. THIS IS AN EXISTING FACILITY WITH EXISTING WET-PIPE AND PREACTION FIRE SUPPRESSION SYSTEMS IN PLACE. PROJECT SCOPE IS TO REVAMP THESE EXISTING FIRE SUPPRESSION SYSTEMS AS NECESSARY TO MAINTAIN/ BRING SUPPRESSION AND FIRE ALARM INTO COMPLIANCE WITH NFPA STANDARDS, THE CHEROKEE NATION, STATE AND LOCAL CODES, TO MATCH NEW FLOOR AND CEILING PLANS. 2. THE EXISTING DOUBLE INTERLOCK PREACTION SYSTEM SHALL MAINTAIN ITS EXISTING SIZE AND FOOTPRINT. THIS SYSTEMS SPACE HAD PREVIOUSLY BEEN USED TO PROTECT A VERY LARGE CLEAN ROOM FOR PPE PRODUCTION. THE SPACE WILL NOW BE USED FOR ART ARCHIVE AND STORAGE. EXISTING AIR LOCKS WILL BE DEMOLISHED. THE PREACTION SYSTEM WILL NEED TO BE LIGHTLY MODIFIED. CONTRACTOR SHALL MODIFY/ INSTALL THE PREACTION SYSTEM IN ACCORDANCE WITH ALL APPLICABLE NFPA STANDARDS; PROJECT SPECIFICATIONS; THE CHEROKEE NATION, AND ALL APPLICABLE STATE & LOCAL CODES & ORDINANCES. 3. THE EXISTING WET-PIPE SYSTEM SHALL MAINTAIN ITS EXISTING SIZE AND FOOTPRINT AS WELL. THIS SYSTEMS SPACE WAS AND WILL CONTINUE TO BE USED TO PROTECT OFFICES. LIGHT STORAGE, COMMON SPACES, RESTROOMS, NEW ART EXHIBITION SPACE, NEW ART CLASSROOMS, NEW KILN SPACE, ETC. CONTRACTOR SHALL MODIFY/ INSTALL THE WET-PIPE SYSTEM IN ACCORDANCE WITH ALL APPLICABLE NFPA STANDARDS; PROJECT SPECIFICATIONS; THE CHEROKEE NATION, AND ALL APPLICABLE STATE & LOCAL CODES & ORDINANCES 4. THE FIRE PROTECTION SYSTEMS INSTALLATION SHALL BE COMPLETE WITH: ALL NECESSARY PIPING, ANY NECESSARY CONTROL OR ISOLATION VALVES, ALL NECESSARY SPRINKLER HEADS, ANY NECESSARY NEW ELECTRONIC SUPERVISION, NECESSARY TRIMMINGS, PRESSURE RELIEF VALVE, NEW AUTOMATIC AIR VENT ASSEMBLY FOR THE WET-PIPE SYSTEM, APPURTENANCES, ACCESSORIES, ETC., AS REQUIRED BY MANUFACTURERS LITERATURE, NFPA STANDARDS, THE CHEROKEE NATION, AND LOCAL AUTHORITIES. 5. THE FIRE PROTECTION CONTRACTOR SHALL BE LICENSED TO PERFORM WORK WITHIN THE STATE OF OKLAHOMA WITH A FULL-TIME, DULY LICENSED R.M.E. ON STAFF AS REQUIRED BY THE OKLAHOMA STATE DEPARTMENT OF HEALTH - OCCUPATIONAL LICENSING DIVISION - ALARM AND LOCKSMITH PROGRAM. THIS IS A DETAIL-ORIENTED PROJECT AND THE FIRE PROTECTION DESIGNER SHALL HAVE A MINIMUM OF FIVE (5) YEARS OF VERIFIABLE DESIGN EXPERIENCE AND HAVE NICET LEVEL III CERTIFICATION IN WATER-BASED SYSTEMS LAYOUT. 6. THE FIRE PROTECTION CONTRACTOR SHALL BASE BID AND PROJECT DESIGN ON SITE SURVEY AND VERY CAREFUL COORDINATION WITH THE ARCHITECTURAL DRAWINGS, MECHANICAL DUCTWORK, MECHANICAL PIPING, PLUMBING PIPING, ELECTRICAL FIXTURES & SYSTEMS, AND ALL STRUCTURAL ELEMENTS IN THE BUILDING. WHETHER EXISTING OR PLANNED. THERE MAY BE LIMITED SPACE ABOVE CEILINGS. 7. REFER TO NOTES ON DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. SEE NOTICE TO CONTRACTORS ON THESE SHEETS AS WELL. 8. ALL FINAL PIPE SIZING SHALL BE ESTABLISHED BY THE INSTALLING FIRE PROTECTION CONTRACTOR BY MEANS OF HYDRAULIC CALCULATIONS BASED ON NFPA STANDARDS. HYDRAULIC CALCULATIONS SHALL BE BASED UPON A CURRENT WATER FLOW TEST (MUST BE WITHIN SIX MONTHS OF DESIGN). COORDINATE WATER FLOW TEST WITH THE CITY OF STILLWELL. PROVIDE NEW WATER FLOW TEST RESULTS IN SUBMITTAL PACKAGE. INCLUDE THE FOLLOWING: DATE TEST IS CONDUCTED, TIME OF TEST, STATIC & RESIDUA PRESSURES, MEASURED FLOW, NAME OF THOSE CONDUCTING TEST, SITE MAP/ LOCATION OF TEST, ETC. DUE TO THE UNIQUE FIRE PROTECTION PIPING ARRANGEMENT, NUMBER AND TYPES OF SYSTEMS, PROVIDE MULTIPLE CALCULATIONS TO VERIFY PIPE SIZES FOR SIMILAR AREAS, ROOMS, ARRANGEMENTS, ETC. PROVIDE MINIMUM OF 10 PSI SAFETY FACTOR FOR ALL HYDRAULIC CALCULATIONS. **EXCEPTION**: IF THE OCCUPANCY HAZARD IS NOT CHANGING, CROMWELL SHALL NOT REQUIRE HYDRAULIC CALCULATIONS. HOWEVER, NO MORE THAN ONE (1) SPRINKLER HEAD MAY BE SUPPLIED FROM AN EXISTING 1" OUTLET. IF TWO (2) SPRINKLERS ARE SUPPLIED FROM AN EXISTING 1" OUTLET, HYDRAULIC CALCULATIONS SHALL BE REQUIRED. OTHER AHJ (OWNER, FIRE MARSHAL, ETC.) MAY REQUIRE HYDRAULIC CALCULATIONS REGARDLESS, AND THE CONTRACTOR SHALL BE PREPARED TO PERFORM AND SUBMIT AS MAY BE REQUIRED. 9. FIRE PROTECTION SHOP DRAWINGS SHALL HAVE COMPLETE CEILING PLANS, REGARDLESS OF TYPE OF CEILING (ACOUSTICAL LAY-IN, GYPSUM, MEMBRANE, CLOUD, EXPOSED, SPLINE, VERTICAL PANEL, ETC.), INDICATING THE LOCATION OF EACH SPRINKLER HEAD, AS WELL AS PIPING LAYOUTS. ALL FIRE PROTECTION PIPING SHALL BE COORDINATED WITH OTHER DISCIPLINES AND STRUCTURAL MEMBERS. PROVIDE ADDITIONAL SPRINKLER HEADS (OVER CODE MINIMUM) IF NECESSARY TO OBTAIN SYMMETRICAL LAYOUTS 10. ABOVEGROUND WET-PIPE AND PREACTION FIRE PROTECTION SYSTEMS PIPING SHALL BE BLACK SCHEDULE 10 STEEL WITH ROLL GROOVED END PREPARATIONS, MEETING ALL NFPA 13 AND FM-GLOBAL REQUIREMENTS AND BLACK SCHEDULE 40 STEEL WITH THREADED END PREPARATIONS, MEETING ALL NFPA 13 AND FM-GLOBAL REQUIREMENTS. ALL FIRE PROTECTION PIPING SHALL BE UL LISTED AND FM-GLOBAL APPROVED.
 - 11. WET-PIPE AND PREACTION FIRE PROTECTION SYSTEMS FITTINGS SHALL BE BLACK CAST IRON THREADED OR FLANGED. CLASS 125: BLACK MALLEABLE IRON THREADED CLASS 250: OR DUCTILE IRON THREADED CLASS 300#; OR GROOVED. GROOVED COUPLINGS AND GROOVED FITTINGS SHALL BE OF THE SAME MANUFACTURER AND SERIES. GROOVED COUPLINGS FOR PREACTION SYSTEM SHALL UTILIZE "FLUSH SEAL" STYLE GASKETS. NO USED FITTINGS OF ANY KIND WILL BE ALLOWED. NO SOCKIT OR SEGMENTED FITTINGS WILL BE ALLOWED. ALL FIRE PROTECTION SYSTEMS FITTINGS SHALL BE UL LISTED AND FM-GLOBAL APPROVED.
 - 12. CPVC PIPING AND FITTINGS SHALL NOT BE ACCEPTABLE ON ANY PORTION OF THIS PROJECT. SCHEDULE 5, SCHEDULE 7, MEGA-FLOW, ALLIED "XL/ BLT", EDDY THREAD, EDDY LITE, SUPER 40 OR SIMILAR THINWALL PIPE TYPES SHALL NOT BE ACCEPTABLE ON ANY PORTION OF THIS PROJECT - NO EXCEPTIONS.
 - 13. ALL NEW FIRE PROTECTION CONTROL AND/ OR ISOLATION VALVES SHALL HAVE ELECTRONIC SUPERVISION, SHALL INTERFACE WITH THE BUILDING FIRE ALARM SYSTEM AND SHALL BE SUPERVISED NORMALLY OPEN, UNLESS NOTED OTHERWISE. 14. SPECIAL CONSIDERATION SHALL BE GIVEN TO AREAS THROUGHOUT THE BUILDING SUCH AS DROPPED SOFFITS, RAISED CEILING AND LIGHTING SOFFITS, MOULDINGS, BEAMS,
 - COLUMNS, ETC., THAT NECESSITATE ADDITIONAL SPRINKLER HEADS. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR BUILDING DETAILS. 15. THE GENERAL CONTRACTOR SHALL CONDUCT A COORDINATION MEETING WITH THE SUBCONTRACTORS TO ESTABLISH CLEARANCE REQUIREMENTS NEEDED FOR MECHANICAL
 - 16. WHETHER SHOWN ON THESE DRAWINGS OR NOT, THE LOCATIONS OF LIGHTING FIXTURES SHALL TAKE PRIORITY OVER THE SPRINKLER HEAD LOCATIONS, AND THE SPRINKLER SYSTEM PIPING SHALL BE OFFSET "UP-OVER-DOWN", AROUND OR WHATEVER MAY BE NECESSARY TO FACILITATE THE LIGHTING LAYOUT.
 - 17. ALL SPRINKLER HEADS SHALL BE LISTED AND APPROVED FOR INTENDED OCCUPANCY AND USE.

PLUMBING AND ELECTRICAL WORK PRIOR TO FABRICATION OF THE SPRINKLER SYSTEMS.

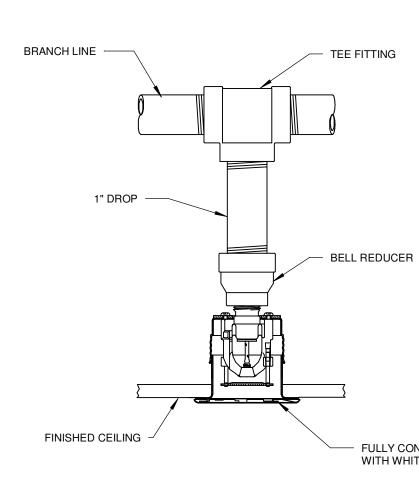
- 18. SPRINKLER HEADS SHALL BE INSTALLED IN CENTERS OF ANY ACOUSTICAL CEILING TILES OR PANELS THIS IS A REQUIREMENT FOR RETURN BENDS. AT THE CONTRACTORS DISCRETION, FM-GLOBAL APPROVED FLEXIBLE SPRINKLER DROPS MAY BE USED IN LIEU OF CONVENTIONAL HARD-PIPED RETURN BENDS. REGARDLESS, SPRINKLER HEADS SHALL ALIGN WITHIN ANY GIVEN ROOM OR COMPARTMENT FOR VISUAL IMPACT. PROVIDE ADDITIONAL SPRINKLER HEADS IF NECESSARY TO COMPLY WITH THIS REQUIREMENT. EXCEPTION: SPRINKLER HEADS IN CLOSETS, STORAGE ROOMS AND JANITORS CLOSETS DO NOT HAVE TO BE LOCATED IN CENTERS OF TILES, BUT THEY SHALL BE LOCATED NO CLOSER TO T-BAR, CEILING MOUNTED FIXTURES OR OTHER EQUIPMENT THAN SIX INCHES (0'- 6").
- 19. REFER TO ELECTRICAL AND MECHANICAL SCHEDULES FOR ANY CEILING / SURFACE MOUNTED EQUIPMENT THAT MAY BE AN OBSTRUCTION TO SPRINKLER DISCHARGE. ALSO, REFER TO ARCHITECTURAL PLANS FOR MILLWORK, FURNITURE, APPLIANCES, OWNERS EQUIPMENT (OVERHEAD DOORS, ABOVE-CEILING SUPPORTING SYSTEMS, ETC.) AND PROVIDE ADDITIONAL SPRINKLER HEADS AS MAY BE NECESSARY.
- 20. ALL SPRINKLER HEAD TEMPERATURE RATINGS SHALL BE AS PER THE REQUIREMENTS OF NFPA 13. CONTRACTOR IS CAUTIONED TO REVIEW LOCATIONS OF SPRINKLER HEADS WITH REGARD TO HVAC DIFFUSERS, MECHANICAL EQUIPMENT, WINDOWS, OWNERS EQUIPMENT, ETC., WHEN SELECTING TEMPERATURE RATINGS.
- 21. SPRINKLER HEADS INSTALLED IN FINISHED CEILINGS SHALL BE UL LISTED AND APPROVED, QUICK RESPONSE, FULLY CONCEALED PENDENT SPRINKLER HEADS, WITH SCREW-ON COVER PLATES. COVER PLATES SHALL BE WHITE FINISH.
- 22. SPRINKLER HEADS INSTALLED IN AREAS WITHOUT CEILINGS OR OPEN TO STRUCTURE SHALL BE UL LISTED AND APPROVED, QUICK RESPONSE, UPRIGHT SPRINKLER HEADS. SPRINKLER HEADS TO BE STANDARD BRASS FINISH.
- 23. PROVIDE AUTOMATIC SPRINKLER PROTECTION AS FOLLOWS: •THROUGHOUT OFFICES, LOBBIES, RESTROOMS, CLASSROOMS, CORRIDORS, ETC., DESIGNED TO PROVIDE A DENSITY OF .10 GPM / SQ.FT. OVER THE MOST REMOTE 1,500 SQ.FT. WITH A 100 GPM HOSE WATER ALLOWANCE.
- •THROUGHOUT STORAGE SPACES, JANITOR CLOSETS, STORAGE ROOMS, MECHANICAL ROOMS, ELECTRICAL ROOMS, KILN ROOMS, ETC., DESIGNED TO PROVIDE A DENSITY OF .15 GPM / SQ.FT. OVER THE MOST REMOTE 1,500 SQ.FT. WITH A 250 GPM HOSE WATER ALLOWANCE.
- 24. PROVIDE MINIMUM 286°F RATED SPRINKLER HEADS IN THE NEW KILN ROOM. PROVIDE HIGHER TEMPERATURE RATED SPRINKLERS AS MAY BE REQUIRED BASED UPON FINAL EQUIPMENT, OWNERS USE, ANTICIPATED HEAT RELEASE, ETC.
- 25. THERE MAY BE INSTANCES WHERE WOOD FRAMING SHALL BE IN PLACE AND UTILIZED ABOVE FINISHED CEILINGS. THEREFORE, SPRINKLER HEADS ABOVE AND BELOW CEILINGS MAY BE REQUIRED IN SOME AREAS. PERFORM THOROUGH SITE SURVEY AND REFER TO ARCHITECTURAL PLANS TO VERIFY LOCATIONS THAT MAY REQUIRE ABOVE AND BELOW PROTECTION. CONTRACTOR IS CAUTIONED TO COORDINATE PIPE ROUTINGS AND SPRINKLER HEAD LOCATIONS WITH ALL DISCIPLINES, ESPECIALLY MECHANICAL. THERE IS VERY LIMITED SPACE ABOVE CEILINGS TO ROUTE PIPES. USE FM-GLOBAL APPROVED, STANDARD COVERAGE, BRONZE, UPRIGHT SPRINKLER HEADS ABOVE FINISHED CEILINGS AS NECESSARY.
- 26. ALL TRAPPED PIPING SHALL BE DRAINABLE. THERE MAY BE INSTANCES WHERE THE FIRE PROTECTION INSTALLATION SHALL HAVE TO BE ROUTED "UP-OVER-DOWN", "DOWN-UNDER-UP" OR OTHERWISE AROUND HVAC SYSTEMS, STRUCTURAL MEMBERS, ETC. PROVIDE MEANS FOR DRAINAGE AS PER NFPA 13. INDIVIDUAL DRAINS SHALL DISCHARGE TO FLOOR DRAINS WHERE POSSIBLE OR EXTERIOR DISCHARGE AS REQUIRED.
- 27. PROVIDE ACCESS PANELS WHERE NECESSARY TO ACCESS FIRE PROTECTION VALVES & EQUIPMENT; WHETHER FOR TESTING, MAINTENANCE, INSPECTION OR DRAINAGE. ACCESS PANELS SHALL BE RATED TO MATCH THE WALL OR CEILING IN WHICH THEY ARE INSTALLED AND TO BE OF SUFFICIENT SIZE TO FACILITATE WORK. ACCESS PANELS SHALL BE THE RESPONSIBILITY OF THE FIRE PROTECTION CONTRACTOR.
- 28. WHEREVER FINISHED CEILINGS EXIST IN THIS PROJECT (WHETHER EXISTING OR PLANNED), THE FIRE PROTECTION SYSTEMS INSTALLATION SHALL BE INSTALLED ABOVE SAID CEILINGS TO PROVIDE A CONCEALED INSTALLATION. UNDER NO CIRCUMSTANCES SHALL THE FIRE PROTECTION SYSTEMS INSTALLATION BE INSTALLED EXPOSED BENEATH CEILINGS.
- 29. PROVIDE PROTECTION FOR SPRINKLER HEADS IN AREAS WHERE THE CEILING OR SURROUNDING AREA IS TO BE PAINTED. FIRE PROTECTION CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE AND REMOVE SPRINKLER PROTECTIONS AFTER PAINTING IS COMPLETE. ANY SPRINKLER HEAD WITH PAINT OR TEXTURE OVERSPRAY SHALL BE REPLACED BY THE FIRE PROTECTION CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER, ARCHITECT OR ENGINEER OF RECORD.
- 30. PROVIDE HEAD GUARDS ON ALL SPRINKLER HEADS AT OR BELOW AN ELEVATION OF 7'- 6" AFF, OR THAT OTHERWISE MAY BE SUBJECT TO MECHANICAL DAMAGE, SUCH AS THOSE UNDER STAIRS. IN MECHANICAL & ELECTRICAL ROOMS. ABOVE SHELVING. ETC. 31. FIRE PROTECTION PLANS SHALL BE SUBMITTED TO THE ARCHITECT (BY MEANS OF THE GENERAL CONTRACTOR), CITY OF STILLWELL FIRE MARSHAL, AND ANY OTHER LOCAL AND
- STATE AUTHORITIES AS MAY BE REQUIRED.
- 32. PROJECT SEISMIC DESIGN CATEGORY IS "B". SEISMIC BRACING SHALL NOT BE REQUIRED FOR THE FIRE PROTECTION SYSTEMS. HOWEVER, CONTRACTOR SHALL PROVIDE NECESSARY VERTICAL SUPPORT FOR ALL VERTICAL RISERS. ESPECIALLY STANDPIPES. UTILIZE 4-WAY SEISMIC BRACES OR SIMILAR TO PROVIDE NECESSARY SUPPORT.
- 33. PRIOR TO THE HYDROSTATIC TEST REQUIRED BY NFPA 13 FOR WET SYSTEMS, IT IS REQUIRED THAT EACH SYSTEM ALSO BE PNEUMATICALLY TESTED FOR TWO (2) HOURS WITH 50 PSI SHOWING NOT MORE THAN 1½ PSI LOSS IN THE TWO HOUR PERIOD AS DESCRIBED IN NFPA 13 FOR PNEUMATIC TESTING REQUIREMENTS FOR DRY SYSTEMS. THIS IS AN INTEGRITY TEST INTENDED TO AVOID WATER DAMAGE ON FINISHED WORK.
- 34. UNDER NO CIRCUMSTANCES SHALL ANTI-FREEZE, CORROSION INHIBITORS OR ANY OTHER CHEMICAL ADDITIVES SHALL BE INTRODUCED INTO THE EXISTING FIRE PROTECTION SYSTEMS. THIS SHALL NOT BE ACCEPTED OR TOLERATED UNDER ANY CIRCUMSTANCES.
- 35. FIRE PROTECTION SYSTEMS, PIPING, VALVES AND ACCESSORIES INDICATED ON THE DRAWINGS ARE DIAGRAMMATIC ONLY. THE FIRE PROTECTION CONTRACTOR IS RESPONSIBLE TO VERIFY EQUIPMENT SELECTIONS, PIPE ROUTINGS, SPRINKLER HEAD LOCATIONS, COORDINATION, ETC., FOR FIT, ADEQUACY, CODE COMPLIANCE, OWNERS UNDERWRITER COMPLIANCE, AND ARCHITECTURAL & STRUCTURAL CONFORMITY. THE FIRE PROTECTION CONTRACTOR SHALL THOROUGHLY SURVEY THE PROPERTY AND REVIEW ALL CIVIL. ARCHITECTURAL, STRUCTURAL, MECHANICAL, PIPING, ELECTRICAL AND PLUMBING CONSTRUCTION DOCUMENTS PRIOR TO BID. THERE MAY BE LIMITED SPACE AVAILABLE FOR PIPE ROUTING.
- 36. REFER TO COMPLETE SET OF PROJECT DOCUMENTS (ALL PLANS AND ALL SPECIFICATIONS). FOR ADDITIONAL INFORMATION AND REQUIREMENTS. 37. CONTRACTORS SHALL SUBMIT RFI'S TYPED ON COMPANY LETTERHEAD TO THE ARCHITECT AND ENGINEER BY MEANS OF THE GENERAL CONTRACTOR. IT SHALL NOT BE ACCEPTABLE TO CONTACT THE ARCHITECT OR ENGINEER DIRECTLY.
- 38. THE INTENT OF THE PROJECT WILL BE TO UTILIZE ALL, OR AS MUCH AS POSSIBLE, OF THE EXISTING FIRE PROTECTION PIPING NETWORK. ANY EXISTING PIPING IS SHOWN FOR INFORMATIONAL PURPOSES. NEW SPRINKLER HEADS MAY BE SUPPLIED FROM EXISTING OUTLETS ON NEW ARM-OVERS. SOME PIPES MAY NEED TO BE REMOVED OR RE-ROUTED AROUND MECHANICAL HVAC SYSTEMS. FIRE PROTECTION CONTRACTOR SHALL COORDINATE WITH ALL DISCIPLINES.



2' x 4' — ACOUSTICAL TILE

SPRINKLER HEAD -

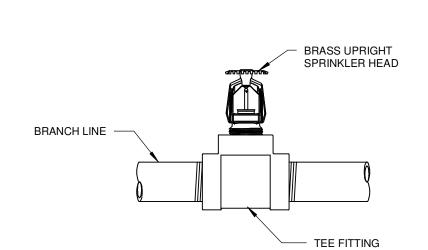
CENTER LINE OF 2' TILE DETAIL / NOT TO SCALE

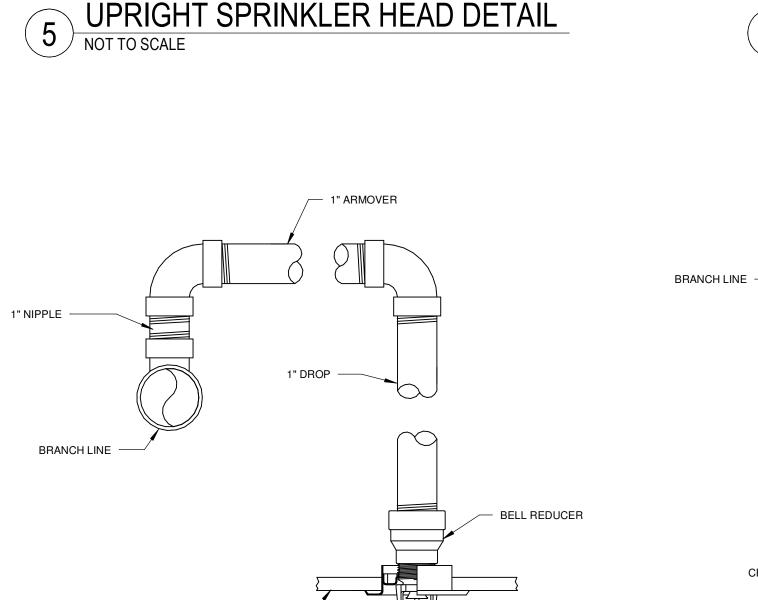




CONCEALED SPRINKLER HEAD DETAIL J NOT TO SCALE





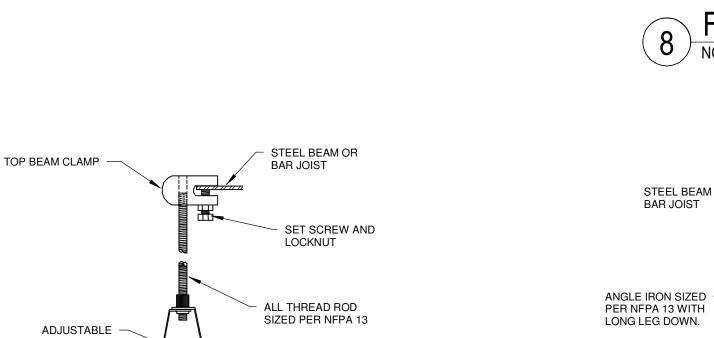




HANGER

RING

FINISHED CEILING



PENDENT SPRINKLER HEAD

WITH SEMI-RECESSED ESCUTCHEON

TOP BEAM CLAMP HANGER DETAIL (9) IUP DEF

BAR JOIST

INTERIM LIFE SAFETY NOTES:

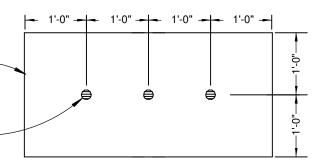
LEFT OUT OF SERVICE DURING NON-WORK HOURS.

SPRINKLER PIPE

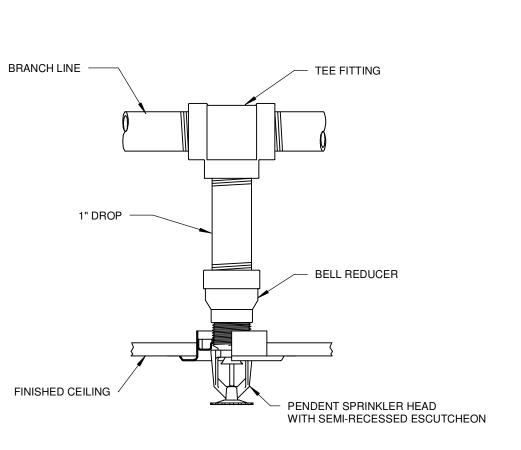
2. THERE MAY BE MORE THAN ONE SPRINKLER SYSTEM PROTECTING THE AREAS OF RENOVATION. THE FIRE SUPPRESSION CONTRACTOR SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH THE AREA OF WORK AND THE FACILITY FIRE SUPPRESSION SYSTEMS.

1. THE FIRE PROTECTION CONTRACTOR IS REQUIRED TO FOLLOW ALL INTERIM LIFE SAFETY MEASURES AS DIRECTED BY THE OWNER.

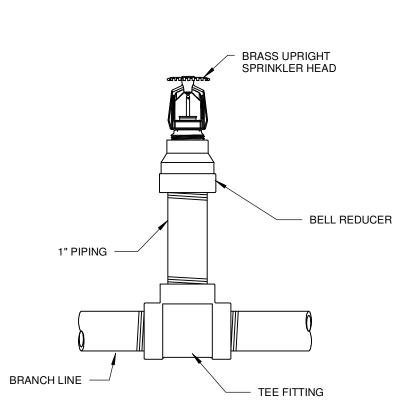
- 3. THE OWNERS SPRINKLER SYSTEM SHUTDOWN PROCEDURE SHALL BE FOLLOWED AT ALL TIMES. AT NO TIME SHALL THE SPRINKLER SYSTEM(S) BE
- 4. THE FIRE SUPPRESSION CONTRACTOR SHALL RESTORE THE SPRINKLER SYSTEM(S) TO NORMAL STANDBY OPERATION AT THE END OF EACH DAYS WORK AND SHALL WALK THE PREMISES TO CHECK FOR LEAKS OR PROBLEMS BEFORE LEAVING FOR THE DAY. THE INSTALLING FIRE SUPPRESSION CONTRACTOR SHALL BE ABLE TO RESPOND TO ANY EMERGENCY SITUATIONS PERTAINING TO THIS WORK WITHIN TWO (2) HOURS.
- 5. CONTRACTORS SHALL BE HELD FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED AS A RESULT OF THEIR NEGLIGENCE. 6. SHUTDOWNS OF FOUR (4) HOURS OR MORE REQUIRE A DEDICATED FIRE WATCH. ADDITIONAL SPRINKLERS, FITTINGS, PIPES AND HANGERS MAY BE REQUIRED TO PROPERLY PROTECT THE CONSTRUCTION AREA. SPRINKLER HEAD DEFLECTOR DISTANCES TO ROOF/ CEILING MAY INCREASE TO 36" DURING THIS TIME PERIOD.



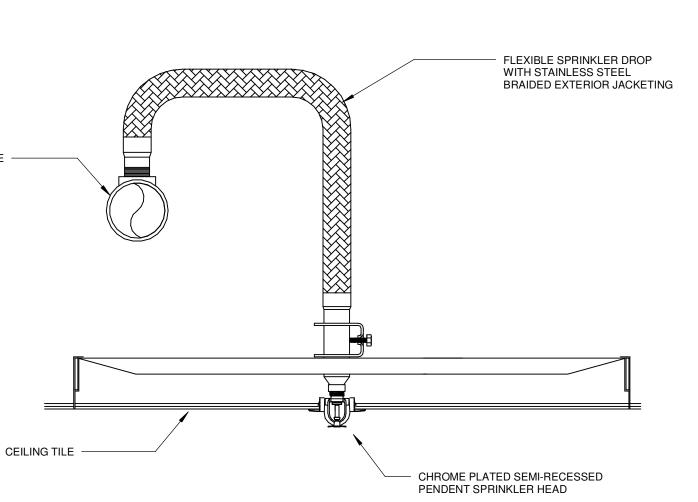
2 CENTER LINE OF 4' TILE DETAIL NOT TO SCALE



4 SEMI-RECESSED SPRINKLER HEAD DETAIL NOT TO SCALE

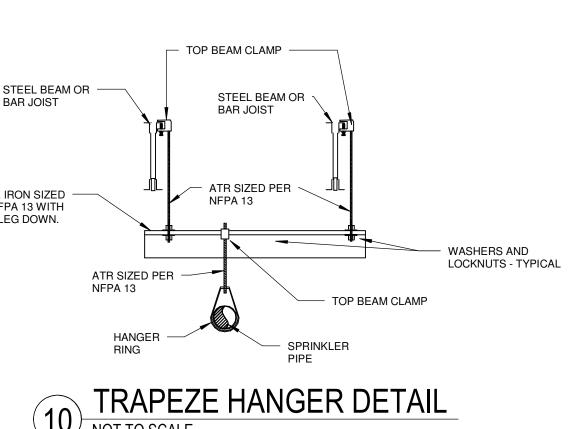


UPRIGHT SPRINKLER HEAD ON 1" SPRIG 6) NOT TO SCALE



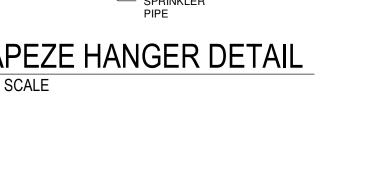
THIS INSTALLATION MAY BE USED IN LIEU OF THE HARD PIPE RETURN BEND INSTALLATION FOR EASE OF INSTALLATION, TENANT FLEXIBILITY, OWNER, OR SPECIFIC SPRINKLER HEAD LOCATION REQUIREMENTS. INCLUDE THE EQUIVALENT PIPE LENGTH AS SPECIFIED IN THE MANUFACTURER'S PRODUCT DATA SHEETS IN THE HYDRAULIC CALCULATION REPORTS.

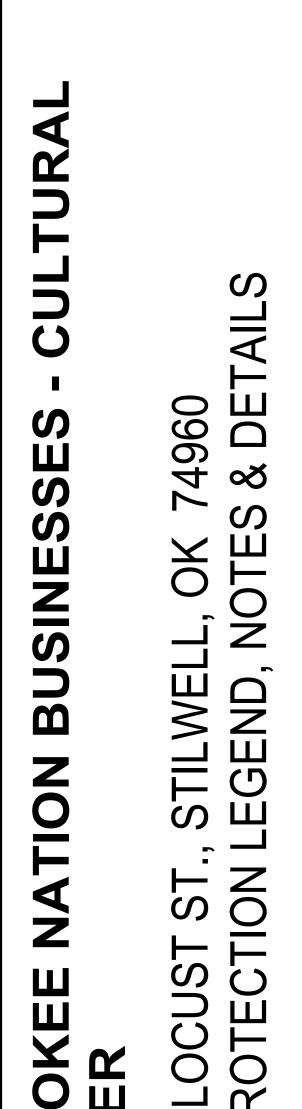
FLEXIBLE SPRINKLER DROP DETAIL (**ð**) NOT TO SCALE













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PROJECT #: 20200132

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DIVISION 210000 FIRE PROTECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

this Section.

1.02 SUMMARY A. Fire protection pipe, fittings, valves, switches, devices, appurtenances, and fire department equipment. B. References, submittals, coordination, and quality assurance.

C. Delivery, storage, protection, and clean up.

- 1.03 REFERENCES A. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings; The American Society of Mechanical Engineers; 2005.
- B. ASME B16.3 Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006). C. ASME B16.4 - Cast Iron Threaded Fittings, Class 125 and 250, 1992. D. ASME F16.5 - Steel Pipe Flanges and Flanged Fittings, 1996.
- E. ASME B16.9 Factory-made Wrought Steel Butt Weld Fittings; The American Society of Mechanical Engineers; 2007. F. ASME B16.11 - Forged Steel Fittings, Socket-welding and Threaded; The American Society of Mechanical Engineers; 2005. G. ASME B1.20.1 - Pipe Threads, General Purpose (Inch), 1983.
- H. ASTM A 53/ A 53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007. ASTM A 135 - Standard Specification for Electric-Resistance Welded Steel Pipe; 2006. J. ASTM A 795/ A 795M - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire
- Protection Use: 2007. K. AWWA C110 - American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In., for Water and Other Liquids; American Water Works Association; 2003.
- L. AWWA C111/A21.11 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; American Water Works Association; 2007 (ANSI/ AWWA C111/ A21.11).
- M. AWWA C151/A21.51 Ductile-Iron Pipe, Centrifugally Cast, for Water; American Water Works Association; 2002, and Errata 2002 (ANSI/ AWWA C151/ A21.51). N. NFPA 13 - Standard for the Installation of Sprinkler Systems: National Fire Protection Association: latest accepted edition.
- O. UL 262 Gate Valves for Fire-Protection Service; Underwriters Laboratories Inc.; 2004. P. UL 312 - Check Valves for Fire-Protection Service; Underwriters Laboratories Inc.; 2004.
- 1.04 SUBMITTALS
- A. Submit shop drawings on all equipment, hydraulic calculations and detailed installation drawings on the proposed systems to the Architect through the general contractor and to the local authority having jurisdiction for approval. Partial submittals are not acceptable.
- B. Submit working plans and hydraulic calculations as per the requirements of NFPA 13. The Sprinkler Contractor shall be required to receive reviewed and approved drawings from all AHJ prior to commencing fabrication or installation. C. Hydraulic calculations: Shall be based on a current (6 months or less) water flow test obtained from the local water utility company, fire department or
- AHJ. A copy of the water flow test results shall be included in the submittals. Hydraulic calculations shall match the drawings exactly, and shall be easy to follow with nodes placed such that they are easy to read on the plans. Failure to comply with this requirement may result in rejection of the
- entire submittal package. D. Coordinate the index sheet of the material submittal to coincide with the arrangement of the product specification order as shown in this division. This will expedite the review process.
- E. Contractor shall identify specific makes, types, model, orientations, finishes, etc., of all materials and equipment to be used on the project. Many data sheets cover a variety of items on one sheet. The contractor shall identify the specific equipment, finish, material, etc., with an arrow, highlight or similar fashion; so that it is clear to the reviewing engineer what is to be provided. Failure to comply with this requirement may result in rejection of the entire submittal package.
- F. Provide a copy of the designer's NICET level 3 certificate. G. Provide a copy of the company's Oklahoma license.
- 1.05 COORDINATION
- A. All work shall be designed, coordinated and installed with other trade work in order to eliminate rework by any tradesman. Contractor shall submit plans and product data to all AHJ and receive approval prior to installation B. Light fixtures take priority within ceilings. HVAC system components take priority above ceilings. Note: There may be limited space to route pipes in
- some places. Coordinate with all disciplines at all times.
- 1.06 QUALITY ASSURANCE A. All work shall be performed in accordance with Owner's insurance carrier's requirements, OSHA, NFPA, and all applicable local and state codes and ordinances. In the event that a code conflict occurs, the most stringent requirement shall apply. The Fire Protection Contractor's system designer shall have obtained NICET Level 3 certification in Fire Protection Engineering Technology Water Based System Layout prior to designing the systems. The Fire Protection Contractor shall be licensed to perform fire protection work within the state of Oklahoma as per the requirements of the Oklahoma Fire Protection Licensing Board. Equipment specified herein shall be as noted or equivalent. The Fire Protection Contractor shall coordinate with other trades on the job in locating the fire protection system in relation to lights, steel framing, building HVAC system, storm drains,
- fiber optics, etc. The Fire Protection Contractor shall, after completion of the work, make any corrections to the system as required for approval by the Owner, Owners Representative, Owners insurance carrier, the Engineer and the local authority having jurisdiction B. The Project Designer (the individual actually performing the drafting of this project), is required to have NICET level 3 certification in fire protection "Water-Based Systems Layout". This individual shall be capable of and required to attend coordination meetings and shall be employer authorized to
- make decisions that impact design, schedules and deadlines, as well as any field conflict resolution issues that may arise. The intent of this requirement is to ensure an experienced and qualified designer is in charge of the design and coordination of this project - not a junior designer or trainee - so as not to impact project milestones or completion.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers, with labeling in place. B. Provide temporary protective coating on all black pipes, cast iron fittings, hanger clamps, cast iron & steel valves, etc., so as to protect from corrosion
- during the storage, staging or installation phases of the project. C. Provide temporary end caps and plugs, for outlets on all pipes and fittings, so as to prevent foreign debris (dirt, trash, rodents, etc.) from entering the
- pipes and thereby becoming introduced into the completed system piping network. D. The Fire Protections Contractor shall be completely responsible to provide all fire protection equipment installed by this contract in new condition on the date of substantial completion as set by the Owner or his agent. Any equipment not found to be in new condition shall be replaced by this contractor at no expense to the Owner.

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to

DIVISION 210000 FIRE PROTECTION

PART 2 - PRODUCTS

2.01 FIRE PROTECTION SYSTEMS A. Sprinkler Systems: Conform work to NFPA 13 including annexes and referenced publications.

B. Welding Materials and Procedures: Conform to ASME Code.

- 2.02 ABOVEGROUND PIPING AND FITTINGS A. Aboveground wet-pipe and preaction system piping shall be Schedule 10 roll grooved black steel meeting all NFPA 13 and Factory Mutual requirements or Schedule 40 threaded or grooved black steel meeting all NFPA 13 and Factory Mutual requirements. All pipe end preparations shall meet the requirements of NFPA 13.
- B. Grooved fittings and couplings shall be UL/ FM approved for minimum 300 PSI working pressure. The use of grooved reducing couplings is acceptable on wet-pipe systems only. Fittings and couplings for screwed pipe shall be standard black, cast iron, class 125#; or standard black, malleable iron, class 250#. No press-fit or sock it type fittings will be acceptable. All grooved fittings to be of the same manufacturer and series. Installer is cautioned to NOT mismatch grooved materials. Welded outlets on piping shall comply the requirements of ANSI B1.20.1; ASTM A-53, Grades A or B, Type E. Welded outlets shall be UL Listed and FM approved for use conforming to NFPA. NOTE: The outlet type used shall match the pipe type installed. For example, a schedule 40 branch line shall connect via a schedule 40 welded outlet however; the pipe being welded may be Schedule 10 or Schedule 40. Segment welded fittings are not acceptable.
- C. CPVC Pipe and fittings: CPVC shall not be allowed on any portion of this project no exceptions. D. Other Pipe Types: Allied "XL/ BLT", Dyna-Flow, Superflow, Eddylite, Eddythread, Super 40, Schedule 7, Schedule 5 and other similar thinwall pipes shall not be allowed on any portion of this project – no exceptions.
- 2.03 PIPE HANGERS AND SUPPORTS
- A. Hangers for steel pipe sizes 1/2 to 4 inches: Adjustable swivel, split ring.
- B. Hangers for steel pipe sizes 6 inches and Over: Carbon steel, adjustable, clevis. C. Vertical Support: Steel riser clamp.
- D. Contractor is cautioned to consider hanger locations when system pressure exceeds 100 PSI.

2.04 VALVES AND APPURTENANCES

- A. Gate Valve (above grade): Valves 2" and smaller shall be made of the best grade brass of screwed pattern, solid wedge disc, outside, screw and yoke, screwed bonnet and malleable iron wheel, Nibco T-104-O 175 lb. non-shock or approved equivalent. B. Non-Rising stem gate valves: Shall be equivalent to Nibco F-609 or M-609. UL/ FM approved, cast iron body, bolted bonnet, solid wedge disk, and
- parallel seat. C. Grooved End Butterfly Valves: Valves shall be equivalent to Tyco Fire Products Model BFV-1 with built in tamper switch. Maximum working pressure 300 PSI, UL/ FM approved, and ductile iron body having epoxy coating. Ductile iron disk, disk seal of grade EPDM type E encapsulated rubber conforming to ASTM D-2000. Both upper stem, lower plug, and stem to be stainless steel.
- D. Grooved End Check Valves: Valves shall be equivalent to Tyco Fire Products Model CV-1F. Maximum working pressure 300 PSI, UL/ FM approved, ductile iron body and cap with stainless steel clapper. E. Threaded Check Valves: Valves 2" and smaller shall be UL/FM approved made of brass, screwed pattern, horizontal swing, Y-pattern, renewable
- composition disc, equivalent to Nibco KT-403-W, 200 lb. WOG non-shock. F. Globe Valves and Angle Valves: Valves shall be UL/FM approved made of brass, screwed pattern, EPDM type W disk, screwed bonnet, and aluminum wheel, Nibco KT-211-W-UL or KT-67HL 175 lb. WOG non-shock or approved equivalent.
- 2.05 SWITCHES AND DEVICES A. OS&Y Tamper Switches: Switches shall be System Sensor Model OS&Y 2. 2 sets of SPDT (form C) contacts; 10.0A @ 125/250 VAC; 2.5A @ 6/12/24 VDC.
- B. Flow Switches: Switches shall be System Sensor WFD series. 2 sets of SPDT (form C); 10.0A, 1/2 HP @ 125/250 VAC; 2.5A @ 6/12/24 VDC. C. Provide electronic supervision for all control valves. Coordinate with electrical. 2.06 SPRINKLERS:
- A. All sprinklers for Light Hazard and Ordinary Hazard Occupancies shall be Listed guick response. B. All sprinklers placed in finished ceilings shall be the fully concealed pendent type with screw-on cover plates. Cover plates shall be white finish. Match existing sprinklers for type of coverage, K-factor, orifice, NPT, etc.
- C. All sprinklers shall be UL Listed and Approved for the designed location and use.
- D. Temperature ratings of sprinklers based on distances from heat sources shall comply with the specific table in NFPA 13. It is NOT acceptable to provide higher "rated" sprinklers throughout a room, compartment, or area unless specifically required to do so by NFPA 13. E. Sprinkler head locations for 2' x 2 and 2' x 4' (or similar) acoustical tile lay in ceiling panel shall be installed at the centerline of the tile. NOTE: This is a requirement for "return bends" to be installed to hit specific locations. This requirement is not in force for non-public small rooms such as toilets, janitor closets or storage rooms. In these rooms, sprinklers shall be installed no closer than 6" to ceiling tee bars.
- F. Flexible sprinkler drops: Flexible stainless hose assemblies and a bracketing system that connect sprinkler heads to the branch lines as manufactured by Victaulic Corporation. Each flexible sprinkler drop unit comes with a mounting bracket and a 1-piece, leak tested sprinkler drop. The mounting bracket is compatible with any suspended or gypsum board ceiling system. All Victaulic commercial sprinkler connections are Factory Mutual (FM) approved and UL listed. The bracket system is made from galvanized sheet metal and is approved and compatible for use with light, medium and heavy load grids or gypsum board ceiling systems. These flexible drops may be used for seismic criteria, ease of installation, tenant flexibility, owner, or specific sprinkler location requirements. The use of other UL/FM approved devices manufactured by other than Victaulic is acceptable for this project. G. Provide compatible sprinkler head guards for all pendent and upright sprinklers when the sprinkler deflector is installed below 7'- 6" AFF. H. Fire Protection Contractor is responsible to provide protection for sprinklers prior to substantial completion date or owner occupancy whichever is later.
- Many times other trades use spray apparatuses to apply textures, sealers, primers or paints. In the process, the sprinklers shall be protected from overspray and mist. The fire protection contractor shall install protection to eliminate the possibility of fire sprinklers being subjected to fumes, chemicals, or other airborne particles that may have an adverse effect on sprinkler operation. I. Acceptable Sprinkler manufacturers:
- 1. Viking
- 2. Reliable 3. Tyco
- 4. Victaulic

DIVISION 210000 FIRE PROTECTION

PART 3 - EXECUTION

- 3.01 DESIGN CRITERIA A. Each sprinkler system shall be hydraulically calculated to include a minimum of 10 PSI safety factor, which shall be clearly indicated in the hydraulic calculation reports B. Should there be a difference between NFPA and other AHJ design criteria, whether listed herein or not, be advise that the most stringent requirements
- shall apply. C. Light Hazard: 0.10 density over the most remote 1,500 square feet remote area. Hose water allowances shall be up to 50 GPM inside with a maximum of 100 GPM total hose water demand.
- D. Ordinary Hazard Group 1: 0.15 density over the most remote 1,500 square feet remote area. Hose water allowances shall be up to 100 GPM inside with a maximum of 250 GPM total hose water demand. E. Ordinary Hazard Group 2: 0.20 density over the most remote 1,500 square feet remote area. Hose water allowances shall be up to 100 GPM inside
- with a maximum of 250 GPM total hose water demand.
- 3.02 PREPARATION A. Properly prepare pipe ends. Ream and de-burr pipe ends regardless of pipe types. Lubricate gaskets prior to assembly to avoid rolling or pinching. B. Remove scale and foreign material, from inside and outside of pipes before assembly. Check for rock, trash and any other debris that may have been introduced during transport, unloading, storing, staging, etc.
- C. Install fire protection system in accordance to OSHA, NFPA, owners insurance underwriter, local codes & ordinances, and manufacturers recommendations. D. All fire protection systems piping shall be designed and installed after coordination with all other trades that may conflict with sprinkler pipe routing. E. Coordinate location of sprinkler heads with Architect's reflected ceiling plan, lighting layout, HVAC diffuser layout and all ceiling-mounted devices.

3.03 INSTALLATION

- A. Initiate a fire watch for the building at all times when the fire sprinkler system is taken out of service. Fire watch shall remain in force until such time the systems are returned to normal, fully automatic standby. Notify the responding fire department during said fire watches B. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.
- C. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradients. D. Install piping to conserve building space, to not interfere with use of space and other work.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. G. Interface all electrical signaling devices with the fire alarm system. 1. Tamper switches
- 2. Flow switches
- H. Additional Pressure Testing: Prior to hydrostatic as required by NFPA 13 for wet systems, for this project it is required that each area be pneumatically tested for two hours with 50 PSI showing not more that 1¹/₂ PSI loss in pressure in the two hour period. Properly executed tests certificates are required for "Close Out Documents"

3.04 PIPE, HANGERS, AND SUPPORT

- A. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work. B. Use hangers with minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
- C. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
- D. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers. E. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- F. Do not penetrate building structural members unless given properly executed written directive from the structural engineer of record.
- G. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, unions, and couplings for servicing are consistently provided. H. Install valves with stems upright or horizontal, not inverted. Remove protective coatings prior to installation.
- I. Provide valves for shut-off or isolating service. J. Provide drain valves at main shut-off valves, low points of piping and apparatus.

3.05 FIRESTOPPING: All pipe penetrations of rated partitions shall be properly caulked with fire caulking including sidewall sprinkler heads penetrating such partitions.

3.06 SPARE PARTS/ SIGNAGE

- A. Provide and install all signage required by NFPA for sprinkler system equipment, pipe, control valves, devices, auxiliary drain valves, etc. Also, provide any signage required by the Authority Having Jurisdiction. B. Provide a system tag at each system control valve. Each tag to be self-indicative of the area controlled by that valve. C. Provide appropriate count sprinkler head cabinet(s) with proportionate number of sprinklers and at least one sprinkler wrench for each type of sprinkler
- installed on the project. Locate the head cabinet(s) in the riser room. 3.07 CLEAN-UP A. Special care shall be taken at all times but especially during "finish out" stage while using the pipe cutting/ threading machine. Provide protection
- below power machine to prevent drips and spills of cutting oil B. All exposed finished surfaces shall be wiped clean of smudges, fingerprints, etc.
- C. Sprinkler Contractor is specifically responsible for removal of all debris created as a direct or indirect result of his portion of the construction project. 3.08 CLOSE OUT: Before application for final payment is requested the contractor is to provide all requirements set forth by the General Conditions of the Specifications and deliver to the Engineer of Record (Cromwell) the following:
- A. One (1) full set of "AS BUILT" drawings. B. One (1) full set of Operating and Maintenance Manuals.
- C. One (1) full set of applicable completed and executed test certificates for each system, including signature(s) of witnessing AHJ. D. One (1) full set of electronic files (.dwg format) containing all fire protection shop drawings used in the performance of the contract. These files shall match the "AS BUILT" drawings stated in item A above.

END OF SPECIFICATIONS



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