



# ***Altamahaw-Ossipee Elementary HVAC & WINDOW RENOVATION***

***2832 N NC Hwy 87  
Elon, NC 27244***

***05.03.23  
22-043***

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**2018 APPENDIX B  
BUILDING CODE SUMMARY  
FOR ALL COMMERCIAL PROJECTS  
(EXCEPT 1 AND 2 FAMILY DWELLINGS AND TOWNHOUSES)**

Name of Project: Altamahaw-Ossipee Elementary HVAC & Window Renovation  
Address: 2832 N NC Hwy 87, Elon Zip Code: 27244

Owner or Authorized Agent: Jimmy Russel Phone #: 336-438-400  
Address: 1712 Vaughn Road, Burlington, NC 27217 Email: jimmy.russell@abss.k12.nc.us

Owned By:  City / County  Private  State  
Code Enforcement Jurisdiction: City: \_\_\_\_\_ County: Alamance State: \_\_\_\_\_

**LEAD DESIGN PROFESSIONAL**

Designer	Firm	Name	License#	Telephone#	Email
Architectural	<u>Lindsey Architecture</u>	<u>Emily Hinton</u>	<u>13412</u>	<u>336-617-4402</u>	<u>emily@lindseyarch.com</u>
Civil					
Electrical	<u>Optima Engineering</u>	<u>Zane Kusevbi</u>	<u>17308</u>	<u>919-926-2200</u>	<u>zkusevbi@optimaengineering.com</u>
Fire Alarm					
Plumbing					
Mechanical	<u>Systems Contractors</u>	<u>Ronald Pitts</u>	<u>32727</u>	<u>336-763-8969</u>	<u>rpitts@systemscontractors.com</u>
Sprinkler-Standpipe					
Structural					
Retaining Walls >5' High					
Other					

2018 NC BUILDING CODE:  New Building  Shell/Core  1st Time Interior Completions  
 Addition  Phased Construction (Shell/Core)  Renovation

2018 NC EXISTING BUILDING CODE:  Prescriptive  Alteration Level I  Historic Property  
 Repair  Alteration Level II  Change of Use  
 Chapter 14  Alteration Level III

Constructed: \_\_\_\_\_ Original Use(s) (Ch.3): \_\_\_\_\_  
Renovated: \_\_\_\_\_ Proposed Use(s) (Ch.3): \_\_\_\_\_

Risk Category (Table 1604.5): Current:  I  II  III  IV Proposed:  I  II  III  IV

**BASIC BUILDING DATA (EXISTING TO REMAIN)**

Construction Type:  I-A  II-A  III-A  IV  V-A  
(check all that apply)  I-B  II-B  III-B  V-B

Sprinklers:  No  Partial  NFPA 13  NFPA 13R  NFPA 13D

Standpipes:  No  Class I  II  III  Wet  Dry

Primary Fire District:  No  Yes Flood Hazard Area:  No  Yes

Special Inspections Required:  No  Yes

Gross Building Area Table:

Floor	Existing (sq. ft.)	New (sq. ft.)	Sub-Total
6th Floor			
5th Floor			
4th Floor			
3rd Floor			
2nd Floor			
Mezzanine			
1st Floor			
Basement			
Total			

**ALLOWABLE AREA (EXISTING TO REMAIN)**

Primary Occupancy:  
 Assembly  A-1  A-2  A-3  A-4  A-5  
 Business  
 Educational  
 Factory  F-1 Moderate  F-2  
 Hazardous  H-1 Detonate  H-2 Deflagrate  H-3 Combust  H-4 Health  H-5 HPM  
 Institutional  I-1  I-2  I-3  I-4  
I-1 Use Condition  1  2  
I-2 Use Condition  1  2  
I-3 Use Condition  1  2  3  4  5  
I-4   
 Mercantile  
Residential  R-1  R-2  R-3  R-4  
Storage  S-1 Moderate  S-2 Low  High Piled  
 Parking Garage  Open  Enclosed  Repair Garage  
Utility and Miscellaneous

Accessory Occupancy Classification(S): A-3  
Incidental Uses (Table 509): \_\_\_\_\_

This separation is not exempt as a Non-Separated Use (see exceptions).  
 Furnace room where any piece of equipment is over 400,000 Btu per hour input  
 Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower  
 Refrigerant machine room  
 Hydrogen fuel gas rooms, not classified as Group H  
 Incinerator rooms  
 Paint shops, not classified as Group H, located in occupancies other than Group F  
 Group E occupancies, laboratories and vocational shops not classified as Group H  
 Ambulatory care facilities, laboratories not classified as Group H  
 Laundry rooms over 100 square feet  
 Group I-2, laundry rooms over 100 square feet  
 Group I-2, laundries equal to or less than 100 square feet  
 Group I-2, commercial kitchens  
 Group I-2, rooms or spaces that contain fuel-fired heating equipment  
 Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces  
 Group I-2, physical plant maintenance shops  
 In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 cubic feet or greater  
 In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet  
 Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons for flooded lead-acid, nickel cadmium or VRLA, or more than 1,000 pounds for lithium-ion and lithium metal polymer used for facility standby power, emergency power or uninterruptible power supplies  
 Fuel storage rooms in public schools and boiler rooms in public schools  
 Storage rooms underneath grandstands or bleacher seats containing combustible or flammable materials

Special Uses:  402  403  404  405  406  407  408  409  410  
 411  412  413  414  415  416  417  418  419  420  
 421  422  423  424  425  426  427  428  429  430

Special Provisions:  510.2  510.3  510.4  510.6  510.7  510.8  510.9

Mixed Occupancy:  No  Yes Separation: \_\_\_\_\_ Hr. Exception: \_\_\_\_\_  
 Non-Separated Use (508.3)  
 Separated Use (508.4) - See below for area calculations for each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

$$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \leq 1$$

Story No.	Description and use	(A) Bldg Area Per Story (Actual)	(B) Table 506.2 <sup>4</sup> Area	(C) Area for Frontage Increase <sup>1,5</sup>	(D) Allowable Area Per Story or Unlimited <sup>2,3</sup>

- Frontage area increase from Section 506.2 are computed thus:
  - Perimeter which fronts a public way or open space having 20 feet minimum width = \_\_\_\_\_ (F)
  - Total Building Perimeter = \_\_\_\_\_ (P)
  - Ratio (F/P) = \_\_\_\_\_ (F/P)
  - W = Minimum width of public way = \_\_\_\_\_ (W)
  - Percent of frontage increase If = 100(F/P-0.25) x W/30 = \_\_\_\_\_ (%)
- Unlimited area applicable under conditions of Section 507.
- Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2).
- The maximum area of open parking garages must comply with Table 406.5.4. The maximum area of air traffic control towers must comply with Table 412.3.1.
- Frontage increase is based on the unsprinklered area value in Table 506.2.

**ALLOWABLE HEIGHT (EXISTING TO REMAIN)**

	Allowable	Shown on Plans	Code Reference
Building Height in Feet (Table 504.3)	--	--	--
Building Height in Stories (Table 504.4)	--	--	--

<sup>1</sup> Provide code reference if the "Shown on Plans" quantity is not based on Table 504.3 or 504.4.  
<sup>2</sup> The maximum height of air traffic control towers must comply with Table 412.3.1.  
<sup>3</sup> The maximum height of open parking garages must comply with Table 406.5.4.

**FIRE PROTECTION REQUIREMENTS (EXISTING TO REMAIN - EXISTING RATINGS SHALL BE MAINTAINED)**

Building Elements	Fire Separation Distance (Feet)	Rating		Detail # and Sheet #	Design # for rated assembly	Sheet # for rated penetration	Sheet # for rated joints
		Req'd	Provided (w/ reduction)				
Structural Frame, including columns, girders, trusses	--	--	--	--	--	--	--
Bearing Walls							
Exterior							
North	--	--	--	--	--	--	--
East	--	--	--	--	--	--	--
West	--	--	--	--	--	--	--
South	--	--	--	--	--	--	--
Interior	--	--	--	--	--	--	--
Nonbearing Walls and Partitions							
Exterior Walls							
North	--	--	--	--	--	--	--
East	--	--	--	--	--	--	--
West	--	--	--	--	--	--	--
South	--	--	--	--	--	--	--
Interior walls and partitions	--	--	--	--	--	--	--
Floor Construction including supporting beams and joists	--	--	--	--	--	--	--
Floor Ceiling Assembly	--	--	--	--	--	--	--
Columns Supporting Floors	--	--	--	--	--	--	--
Roof Construction, including supporting beams and joists	--	--	--	--	--	--	--
Roof Ceiling Assembly	--	--	--	--	--	--	--
Columns Supporting Roof	--	--	--	--	--	--	--
Shaft Enclosures - Exit	--	--	--	--	--	--	--
Shaft Enclosures - Other	--	--	--	--	--	--	--
Corridor Separation	--	--	--	--	--	--	--
Occupancy/Fire Barrier Separation	--	--	--	--	--	--	--
Party/Fire Wall Separation	--	--	--	--	--	--	--
Smoke Barrier Separation	--	--	--	--	--	--	--
Smoke Partition	--	--	--	--	--	--	--
Tenant Dwelling Unit/Sleeping Unit Separation	--	--	--	--	--	--	--
Incidental Use Separation	--	--	--	--	--	--	--

\* Indicates section number permitting reduction

**PERCENTAGE OF WALL OPENING CALCULATIONS (EXISTING TO REMAIN)**

Fire Separation Distance (Feet) From Property Lines	Degree of Openings Protection (Table 705.8)	Allowable Area (%)	Actual Shown on Plans (%)
--	--	--	--
--	--	--	--

**LIFE SAFETY SYSTEMS REQUIREMENTS (EXISTING TO REMAIN)**

Emergency Lighting:  No  Yes  
Exit Signs:  No  Yes  
Fire Alarm:  No  Yes  
Smoke Detection Systems:  No  Yes  Partial  
Carbon Monoxide Detection:  No  Yes

**LIFE SAFETY PLAN REQUIREMENTS (NO CHANGE TO LIFE SAFETY/EGRESS)**

Life Safety Plan Sheet #: \_\_\_\_\_

- Fire and/or smoke rated wall locations (Chapter 7)
- Assumed and real property line locations (if not on the site plan)
- Exterior wall opening area with respect to distance to assumed property lines (705.8)
- Occupancy Use for each area as it relates to occupant load calculation (Table 1004.1.2)
- Occupant loads for each area
- Exit sign locations
- Exit access travel distances (1017)
- Common path of travel distances (Table 1006.2.1 & 1006.3.2(1))
- Dead end lengths (1020.4)
- Clear exit widths for each exit door
- Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
- Actual occupant load for each exit door
- A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
- Location of doors with panic hardware (1010.1.10)
- Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
- Location of doors with electromagnetic egress locks (1010.1.9.9)
- Location of doors equipped with hold-open devices
- Location of doors with emergency escape windows (1030)
- The square footage of each fire area (202)
- The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
- Note any code exceptions or table notes that may have been utilized regarding the items above

**ACCESSIBLE DWELLING UNITS (SECTION 1107) (NOT APPLICABLE)**

Total Units	Accessible Units Required	Accessible Units Provided	Type A Units Required	Type A Units Provided	Type B Units Required	Type B Units Provided	Total Accessible Units Provided
--	--	--	--	--	--	--	--

**ACCESSIBLE PARKING (SECTION 1106) (EXISTING TO REMAIN)**

Lot or Parking Area	Total # of Parking Spaces		# of Accessible Spaces Provided			Total # Accessible Provided
	Required	Provided	Regular with 5' Access Aisle	Van Spaces With 132" Access Aisle	8' Access Aisle	
--	--	--	--	--	--	--
--	--	--	--	--	--	--
TOTAL	--	--	--	--	--	--

**PLUMBING FIXTURE REQUIREMENTS (TABLE 2902.1) (EXISTING TO REMAIN)**

Use	Water Closets			Urinals	Lavatories			Showers / Tubs	Drinking Fountains	
	Male	Female	Unisex		Male	Female	Unisex		Regular	Accessible
Space Existing	--	--	--	--	--	--	--	--	--	--
New	--	--	--	--	--	--	--	--	--	--
Required	--	--	--	--	--	--	--	--	--	--

**SPECIAL APPROVALS**

Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, etc., describe below)

**ENERGY SUMMARY**

**ENERGY REQUIREMENTS**

The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Existing building envelope complies with code:  (If checked, the remainder of this section is not applicable.)

Exempt Building:  Provide code or statutory reference: \_\_\_\_\_

Climate Zone:  3A  4A  5A

Method of Compliance:

Energy Code:  Performance  Prescriptive (SECTION C503)

ASHRAE 90.1:  Performance  Prescriptive

Other:  Performance (specify source) \_\_\_\_\_

**THERMAL ENVELOPE: (Prescriptive method only)**

Roof/Ceiling Assembly (each Assembly)  
Description of assembly: \_\_\_\_\_  
U-Value of total assembly: \_\_\_\_\_  
R-Value of insulation: \_\_\_\_\_  
Skylights in each assembly: \_\_\_\_\_  
U-Value of skylight: \_\_\_\_\_  
Total square footage of skylights in each assembly: \_\_\_\_\_

Exterior Walls (each assembly)  
Description of assembly: \_\_\_\_\_  
U-Value of total assembly: \_\_\_\_\_  
R-Value of insulation: \_\_\_\_\_  
Openings (windows or doors with glazing)  
U-Value of assembly: \_\_\_\_\_  
Solar heat gain coefficient: 0.42  
Projection factor: \_\_\_\_\_  
Door R-Values: \_\_\_\_\_

Walls below grade (each assembly)  
Description of assembly: \_\_\_\_\_  
U-Value of total assembly: \_\_\_\_\_  
R-Value of insulation: \_\_\_\_\_

Floors over unconditioned space (each assembly)  
Description of assembly: \_\_\_\_\_  
U-Value of total assembly: \_\_\_\_\_  
R-Value of insulation: \_\_\_\_\_

Floors slab on grade  
Description of assembly: \_\_\_\_\_  
U-Value of total assembly: \_\_\_\_\_  
R-Value of insulation: \_\_\_\_\_  
Horizontal/vertical requirement: \_\_\_\_\_  
Slab heated: \_\_\_\_\_

**STRUCTURAL DESIGN (NOT APPLICABLE)**

**MECHANICAL (REFER TO MECHANICAL DRAWINGS)**

**ELECTRICAL (REFER TO ELECTRICAL DRAWINGS)**



**Altamahaw-Ossipee Elementary  
HVAC & WINDOW RENOVATION**

2832 N NC Hwy 87  
Elon, NC 27244

MK DATE DESCRIPTION REVISIONS

**BUILDING CODE SUMMARY**

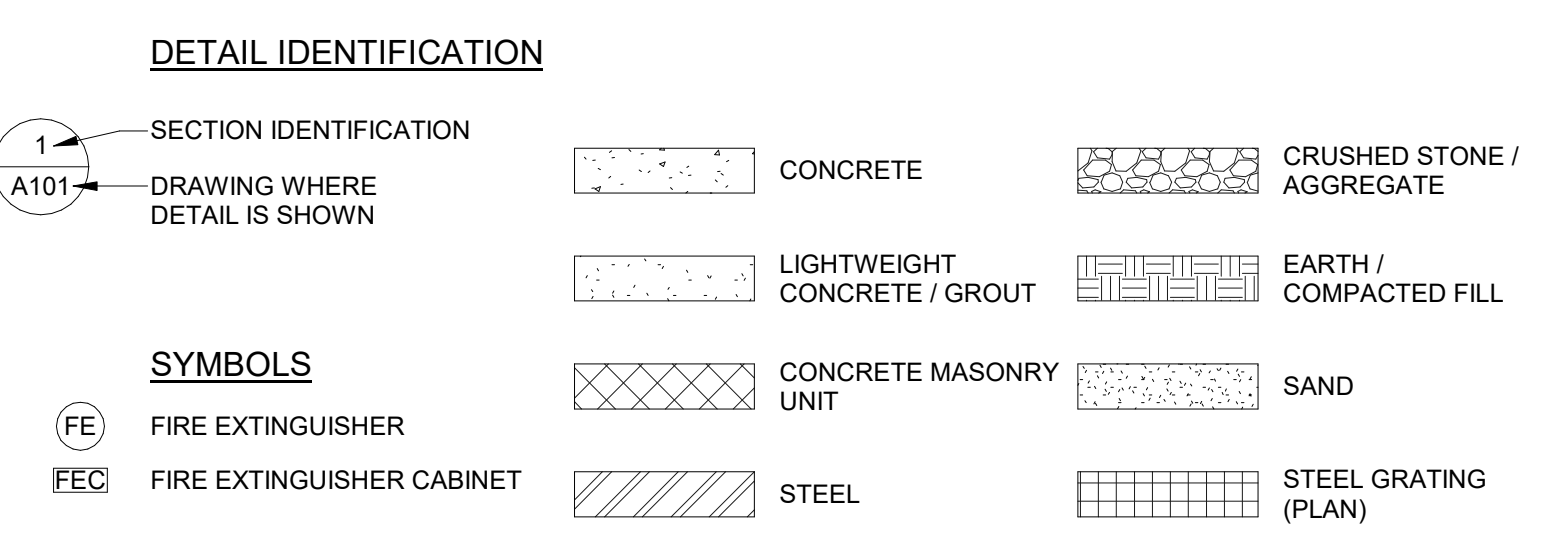
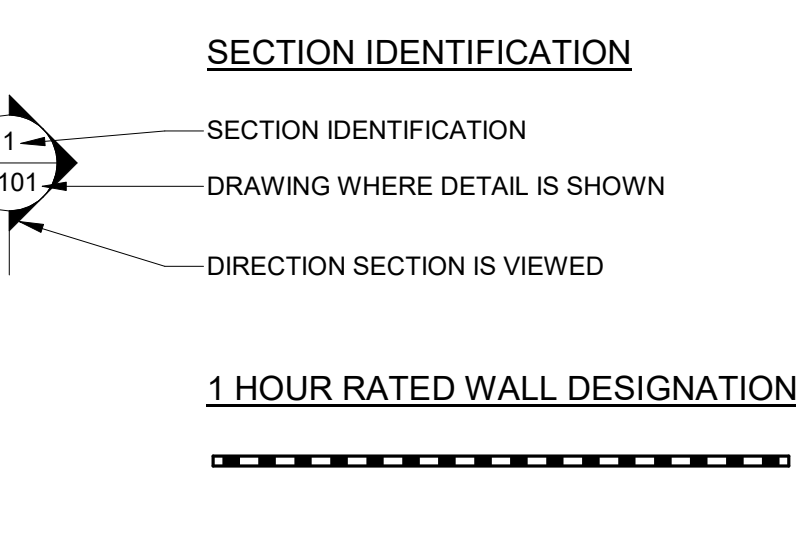
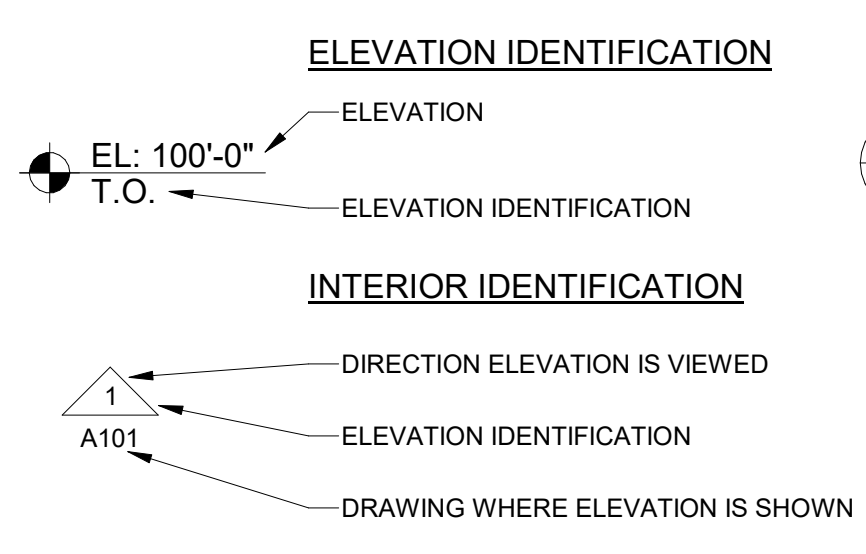
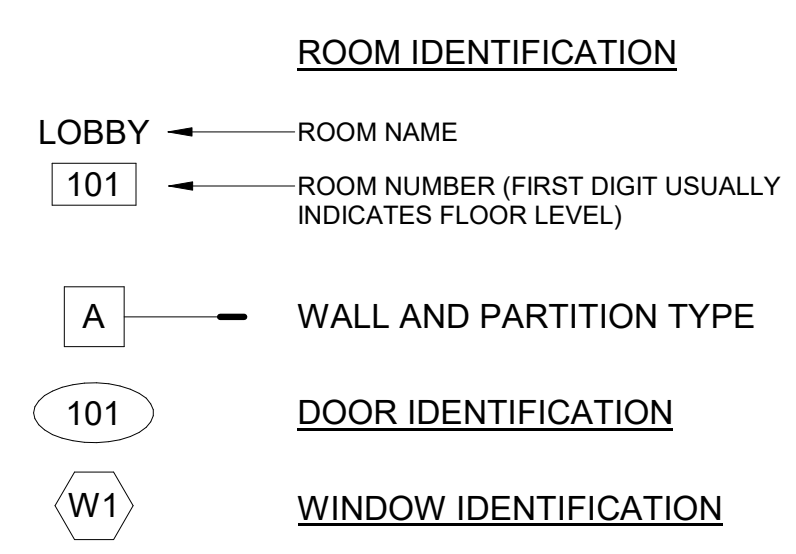
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DRAWN BY ERH  
CHECK BY EKH  
JOB NO. 22-043  
SHEET

**G.O.2**

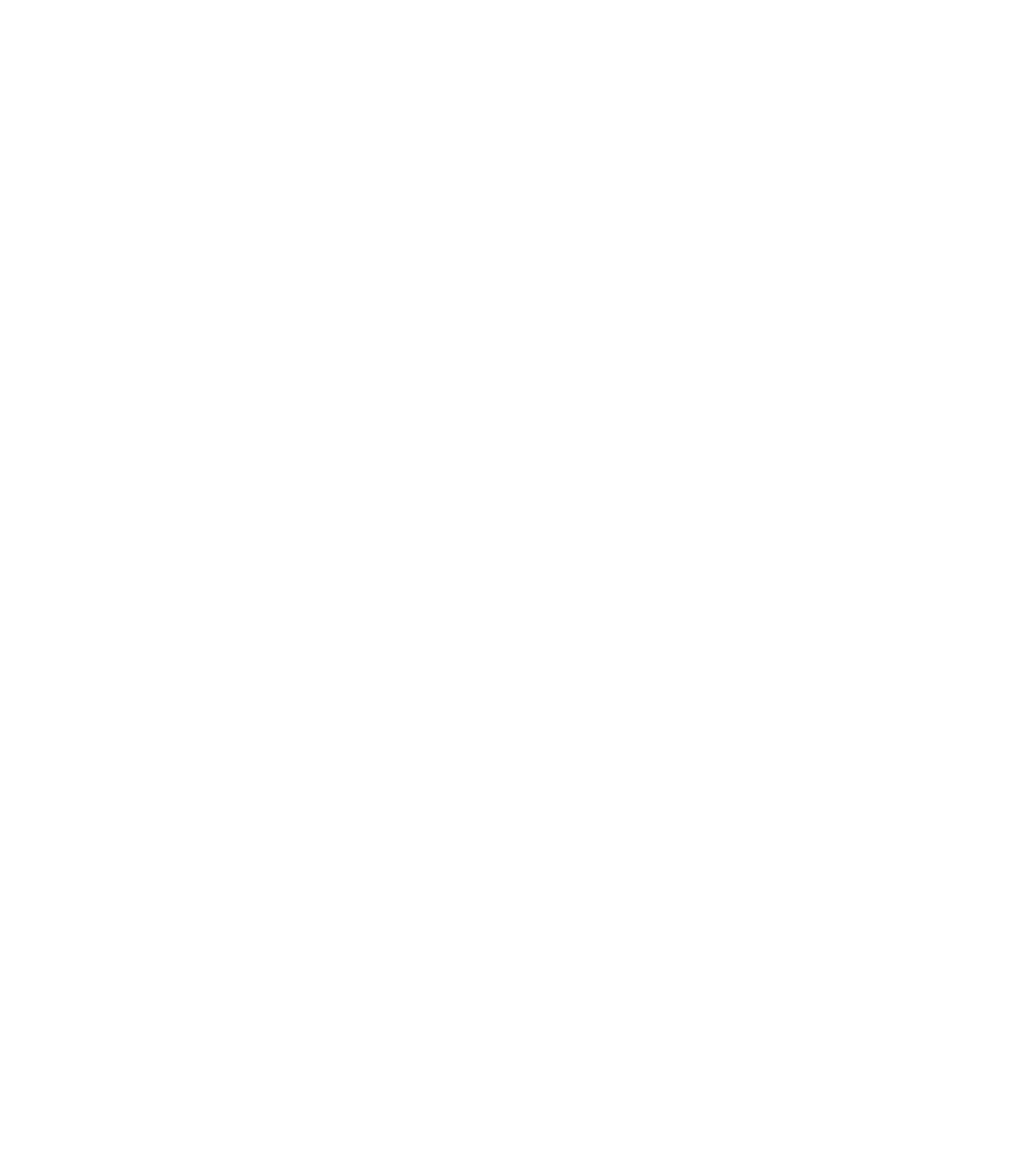
ABV.	ABOVE	F.B.	FACE BRICK	POLY ISO	POLYMERIC ISOMER
A.F.F.	ABOVE FINISHED FLOOR	F.O.C.	FACE OF CONCRETE	PR.	PAIR
ACT.	ACOUSTICAL CEILING TILE	F.O.F.	FACE OF FINISH	PTD.	PAINT(ED)
AC.PL.	ACOUSTICAL PLASTER	F.O.M.	FACE OF MASONRY	P.B.	PANIC BAR
ADD.	ADDENDUM	F.O.S.	FACE OF STUDS	PAR.	PARALLEL
ADH.	ADHESIVE	FGL	FIBERGLASS	P.B.D.	PARTICLE BOARD
ADJ.	ADJACENT	FD.	FIELD DETERMINE	PTN.	PARTITION
ADJT.	ADJUSTABLE	FIN.	FINISH(ED)	PVMT.	PAVEMENT
AGG.	AGGREGATE	F.F.	FINISH FLOOR	PED.	PEDESTAL
A/C	AIR CONDITIONING	F.A.	FIRE ALARM	PERF.	PERFORATE(D)
ALT.	ALTERNATE	F.C.	FIRE CODE	PERIM.	PERIMETER
ALUM.	ALUMINUM	F.E.	FIRE EXTINGUISHER	PLAS.	PLASTER
A.B.	ANCHOR BOLT	F.E.C.	FIRE EXTINGUISHER CAB.	PLAM.	PLASTIC LAMINATE
ANOD.	ANODIZED	F.H.C.	FIRE HOSE CABINET	PL.	PLATE
APPX.	APPROXIMATELY	FPL.	FIREPLACE	PLY.	PLYWOOD
ARCH.	ARCHITECT(URAL)	FP.	FIREPROOF	PT.	POINT
A.D.	AREA DRAIN	F.R.T.	FIRE-RETARDANT	P.V.C.	POLYVINYL CHLORIDE
ASB.	ASBESTOS	FLG.	FLASHING	P.C.F.	POUNDS PER CUBIC FOOT
ASPH.	ASPHALT	FLX.	FLEXIBLE	P.L.F.T.	POUNDS PER LINEAL FOOT
A.T.	ASPHALT TILE	FLR.	FLOOR(ING)	P.S.F.	POUNDS PER SQUARE FOOT
AUTO.	AUTOMATIC	F.D.	FLOOR DRAIN	P.S.I.	POUNDS PER SQUARE INCH
		FLOUR.	FLUORESCENT	PC.	PRE CAST
		F.JT.	FLUSH JOINT	PFB.	PREFABRICATE(D)
BSMT.	BASEMENT	FT.	FOOT (FEET)	PFN.	PRE FINISHED
BM.	BEAM	FTG.	FOOTING	P.L.	PROPERTY LINE
BRG.	BEARING	FTD.	FOOT DRAIN		
BRZ.	BED JOINT	FR.	FOUNDATION	Q.T.	QUARRY TILE
BET.	BETWEEN	FR.	FRAME(D), (ING)	QTY.	QUANTITY
BIT.	BITUMINOUS	FR.A.	FRESH AIR		
BLK.	BLOCK	F.S.	FULL SIZE		
BLKG.	BLOCKING	FUR.	FURRED(ING)	RAD.	RADIATION
BD.	BOARD	FUT.	FUTURE	R.	RADIUS
B.S.	BOTH SIDES			R.W.L.	RAINWATER LEADER
B.W.	BOTH WAYS	GA.	GAUGE	REF.	REFERENCE
BOT.	BOTTOM	GALV.	GALVANIZED	RFL.	REFLECT(ED), (IVE), (OR)
BRK.	BRICK	G.C.	GENERAL CONTRACT(OR)	REFR.	REFRIGERATOR
BRZ.	BRONZE	GL.	GLASS, GLAZING	REG.	REGISTER
BLDG.	BUILDING	GL.B.	GLASS BLOCK	R.C.P.	REINFORCED CONCRETE PIPE
B.U.R.	BUILT UP ROOFING	G.C.M.U.	GLAZED CONCRETE MASONRY UNITS	REM.	REMOVE
				REQ'D.	REQUIRED
CAB.	CABINET	G.S.T.	GLAZED STRUCTURAL TILE	RES.	RESILIENT
C.H.	CABINET HEATER	G.B.	GRAB BAR	R.A.	RETURN AIR
CPT.	CARPET(ED)	GD.	GRADE, GRADING	REV.	REVISION(S), REVISED
C.O.	CASED OPENING	GRN.	GRANITE	R.H.	RIGHT HAND
CSMT.	CASEMENT	GND.	GROUND	R.O.W.	RIGHT OF WAY
C.I.	CAST IRON	G.F.	GROUND FACE	R.	RISER
C.B.	CATCH BASIN	GYP.	GYPSUM	R.D.	ROOF DRAIN
CLKG.	CAULKING	GWB.	GYPSUM WALL BOARD	RF.H.	ROOF HATCH
CLG.	CEILING			RFG.	ROOFING
CEM.	CEMENT	H/C.	HANDICAPPED	RM.	ROOM
CTR.	CENTER	HDW.	HARDWARE	R.O.	ROUGH OPENING
CER.	CERAMIC	HDR.	HEADER	SF.GL.	SAFETY GLASS
CHD.	CHALKBOARD	HTG.	HEATING	SCHED.	SCHEDULE
CIRC.	CIRCUMFERENCE	H.V.A.C.	HEATING/VENTILATING/AIR CONDITIONING	SECT.	SECTION
CLR.	CLEAR(ANCE)	H.D.	HEAVY DUTY	SHTHG.	SHEATHING
CL.	CLOSET	HGT.	HEIGHT	SHT.	SHEET
CLS.	CLOSURE	H.C.	HOLLOW CORE	SHELV.	SHELVING
C.R.	COLD ROLLED	H.M.	HOLLOW METAL	SIM.	SIMILAR
C.W.	COLD WATER	HOR.	HORIZONTAL	SKYL.T.	SKYLIGHT
COL.	COLUMN	H.B.	HOSE BIB	SL.	SLEEVE
COMB.	COMBINATION	H.W.H.	HOT WATER HEATER	S.C.	SOLID CORE
COMPO.	COMPOSITION (COMPOSITE)	HR.	HOUR	SP.	SOUNDPROOF
COMP.	COMPRESS(ED)(ION)(IBLE)			SPK.	SPEAKER
CONC.	CONCRETE			SPEC.	SPECIFICATION(S)
C.M.U.	CONCRETE MASONRY UNIT	INCL.	INCLUDE(D), (ING)	SQ.	SQUARE
CX.	CONNECTION	I.D.	INSIDE DIAMETER	S.F.	SQUARE FOOT (FEET)
CONSTR.	CONSTRUCTION	I.F.	INSIDE FACE	S.S.	STAINLESS STEEL
CONT.	CONTINUOUS OR CONTINUE	INSUL.	INSULATE(D), (ING)	STD.	STANDARD
CONTR.	CONTRACT(OR)	INT.	INTERIOR	STA.	STATION
C.L.L.	CONTRACT LIMIT LINE	INV.	INVERT	STL.	STEEL
C.J.	CONTROL JOINT	JAN.	JANITOR	STOR.	STORAGE
C.P.	CONTROL PANEL	JT.	JOINT	S.D.	STORM DRAIN
CONV.	CONVECTOR			STR.	STRUCTURE
CPR.	COPPER			STR.L.	STRUCTURAL
C.G.	CORNER GUARD	KPL.	KICK PLATE	S.C.T.	STRUCTURAL CLAY TILE
CORR.	CORRUGATED	K.O.	KNOCKOUT	SUSP.	SUSPENDED
CTR.	COUNTER			SYM.	SYMMETRY (ICAL)
CFL.	COUNTER FLASHING	LBL.	LABEL	SYN.	SYNTHETIC
CS.	COUNTERSINK	LAM.	LAMINATE(D)	SYS.	SYSTEM
CRS.	COURSE(S)	LAV.	LAVATORY	TK.BD.	TACK BOARD
CR.G.	CROSS GRAIN	L.H.	LEFT HAND	TKS.	TACK STRIP
C.F.T.	CUBIC FOOT	LTG.	LIGHTING	TEL.	TELEPHONE
C.YD.	CUBIC YARD	LW.	LIGHTWEIGHT	T.V.	TELEVISION
		LTL.	LINTEL	TEMP.	TEMPORARY, TEMPERED
		L.L.	LIVE LOAD	T.C.	TERRA COTTA
DPR.	DAMPER	LVR.	LOUVER	TZ.	TERRAZZO
DP.	DAMPPOOFING			THK.	THICK(NESS)
D.L.	DEAD LOAD	MH.	MANHOLE	THR.	THRESHOLD
DEMOL.	DEMOLISH, DEMOLITION	MFR.	MANUFACTURE(ER)	T.PTN.	TOILET PARTITION
DEP.	DEPRESSED	MRB.	MARBLE	T&G.	TONGUE AND GROOVE
DET.	DETERMINE	MAS.	MASONRY	T.O.F.	TOP OF FOUNDATION
DTL.	DETAIL	M.O.	MASONRY OPENING	T.O.M.	TOP OF MASONRY
DIAG.	DIAGONAL	MATL.	MATERIAL	T.O.SL.	TOP OF SLAB
DIA.	DIAMETER	MECH.	MECHANICAL	T.O.S.	TOP OF STEEL
DIM.	DIMENSION	MED.	MEDIUM	T.O.W.	TOP OF WALL
DPR.	DISPENSER	MBR.	MEMBER	TPO.	THERMOPLASTIC POLYOLEFIN
DIV.	DIVISION	MMB.	MEMBRANE	T.B.	TOWEL BAR
DR.	DOOR	MTL.	METAL	TYP.	TYPICAL
D.H.	DOUBLE HUNG	MWK.	MILLWORK	UC.	UNDERCUT
DS.	DOWN SPOUT	MIN.	MINIMUM	UNF.	UNFINISHED
D.	DRAIN	MIR.	MIRROR	U.N.O.	UNLESS NOTED OTHERWISE
D.T.	DRAIN TILE	MISC.	MISCELLANEOUS	U.S.	UNDERSIDE
DWG.	DRAWING	M.LD.	MOLDING	V.B.	VAPOR BARRIER
D.F.	DRINKING FOUNTAIN	M.R.	MOP RECEPTOR	VER.	VERIFY
DW.	DUMBWATER	MTD.	MOUNT(ED), (ING)	VERT.	VERTICAL
		MOV.	MOVABLE	V.G.	VERTICAL GRAIN
EA.	EACH	MULL.	MULLION	VIN.	VINYL
E.F.	EACH FACE	NAT.	NATURAL	V.C.T.	VINYL COMPOSITION TILE
ELEC.	ELECTRICAL	N.R.C.	NOISE REDUCTION	V.B.	VINYL BASE
E.P.	ELECTRICAL PANEL BOARD			V.T.	VINYL TILE
E.W.C.	ELECTRIC WATER COOLER			V.W.C.	VINYL WALL COVERING
ELEV.	ELEVATION			V.I.F.	VERIFY IN FIELD
EMER.	EMERGENCY			WSCT.	WAINSCOT
ENC.	ENCLOSE(URE)			W.C.	WATER CLOSET
EQ.	EQUAL			WP.	WATERPROOFING
EQUIP.	EQUIPMENT			W.R.	WATER RESISTANT
EST.	ESTIMATE			W.S.	WATER STOP
EXH.	EXHAUST			WT.	WEIGHT
EXIST.	EXISTING			W.W.F.	WELDED WIRE FABRIC
EXIST.	EXISTING	Obs.	OBSCURE	W/.	WITH
E.B.	EXPANSION BOLT	O.C.	ON CENTER(S)	W/O.	WITHOUT
E.J.	EXPANSION JOINT	OP.	OPAQUE	WDW.	WINDOW
EXP.	EXPOSED	OPG.	OPENING	W.G.	WIRED GLASS
EXT.	EXTERIOR	OPP.	OPPOSITE	WD.	WOOD
E.I.F.S.	EXTERIOR INSULATION FINISH SYSTEM	O.D.	OUTSIDE DIAMETER	W.B.	WOOD BASE
		O.A.	OVERALL	W.P.T.	WORKING POINT
		O.H.	OVERHEAD		
		OZ.	OUNCE		

**1** ABBREVIATIONS  
G0.3

**2** GENERAL NOTES  
G0.3 SCALE: 12" = 1'-0"



**3** SYMBOLS  
G0.3 SCALE: 1/8" = 1'-0"



- BUILDING CODES**  
ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH CURRENT APPLICABLE BUILDING CODE WITH LOCAL AMENDMENTS AND WITH ALL OTHER CODES, ORDINANCES AND REQUIREMENTS. IF THERE IS CONFLICT THE MORE STRINGENT SHALL BE USED.
- ADDITIONAL STANDARDS**  
ALL WORK RELATING TO THIS CONSTRUCTION SHALL COMPLY WITH U.S. DEPARTMENT OF LABOR, THE OCCUPATIONAL SAFETY AND HEALTH STANDARDS.
- THE PROJECT DOCUMENTS**  
I) DO NOT SCALE DRAWINGS IN THE DOCUMENTS  
II) DIMENSIONS  
(I) INTERIOR DIMENSIONS ARE FROM FACE OF FINISH TO FACE OF FINISH UNLESS NOTED OTHERWISE.  
(II) DOOR AND WINDOW DIMENSIONS ARE ROUGH OPENING/NOMINAL DIMENSIONS UNLESS NOTED OTHERWISE.  
III) THE DESIGN PROFESSIONAL WHOSE SEAL APPEARS ON THESE DOCUMENTS IS THE ARCHITECT OF RECORD FOR THIS PROJECT. NO OTHER PARTY MAY REVISE, ALTER OR DELETE THESE CONSTRUCTION DOCUMENTS. FOR THE PURPOSES OF THESE CONSTRUCTION DOCUMENTS THE ARCHITECT OF RECORD AND LINDSEY ARCHITECTURE SHALL BE CONSIDERED THE SAME ENTITY.
- RECORD DRAWINGS**  
THE CONTRACTOR SHALL PREPARE AND MAINTAIN A COMPLETE SET OF RECORD CONSTRUCTION DRAWINGS INDICATING ALL ACTUAL WORK, MODIFICATIONS AND REVISIONS TO THE WORK DELINEATED ON THE CONSTRUCTION DOCUMENTS AS WELL AS ANY CONCEALED CONSTRUCTION WORK, INCLUDE ANY INFORMATION THAT WOULD BE HELPFUL TO THE OWNER.

- DEMOLITION AND EXISTING NOTES:**  
I) REFER TO OTHER DEMOLITION DRAWINGS INCLUDED IN THE DRAWING SET FOR DEMOLITION WORK TO BE PERFORMED BY ALL TRADES AS INDICATED. OTHER ASSOCIATED WORK MAY INCLUDE, BUT IS NOT LIMITED TO, PLUMBING, HVAC AND ELECTRICAL REMOVAL. WORK PERFORMED BY SEPARATE TRADES SHALL BE COORDINATED AND ADMINISTERED BY THE GENERAL CONTRACTOR.  
II) THE CONTRACTOR SHALL REMOVE ALL ANCHORS, FASTENERS, ADHESIVES, HANGERS, REINFORCING AND OTHER ASSOCIATED WORK RELATED TO REFERENCED DEMOLITION NOTES. IF ITEMS PROTRUDING FROM WORK TO REMAIN ARE IN SURFACES TO BE COVERED, ITEMS MAY BE CUT OFF FLUSH WITH EXISTING SURFACE. OTHERWISE, ITEM MUST BE COMPLETELY REMOVED AND SURFACE REPAIRED TO MATCH ADJACENT WORK.  
III) IF DAMAGE OCCURS TO EXISTING WORK, CONTRACTOR SHALL REPAIR AND REPLACE EXISTING WORK TO MATCH IN-PLACE WORK. EXTENT OF REPAIR WILL BE DETERMINED BY ARCHITECT AND/OR OWNER.  
IV) DEMOLITION SHALL BE KEPT TO A MINIMUM DISRUPTION OF EXISTING BUILDING OPERATIONS. PROVIDE DUST PARTITIONS AND SAFETY BARRIERS TO PROTECT EXISTING FINISHED AREAS IN BUILDING FROM CONSTRUCTION DUST AND NOISE.  
V) THE DEMOLITION WORK INCLUDES ALL THE WORK REQUIRED TO PREPARE SURFACES TO RECEIVE NEW FINISHES.  
VI) CONTRACTORS SHALL TAKE ALL POSSIBLE PRECAUTIONS AGAINST DAMAGING ANY EXISTING CONSTRUCTION AND EQUIPMENT THAT IS TO REMAIN. ALL DAMAGES CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND AT NO COST TO THE OWNER. ALL REPAIR WORK SHALL BE TO THE COMPLETE SATISFACTION OF THE OWNER.  
VII) REFER TO THE CONTRACT DOCUMENTS FOR LOCATIONS OF FIRE RATED ASSEMBLIES. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND CONFIRM LOCATION OF ALL FIRE RATED ASSEMBLIES. ALL FIRE RATED ASSEMBLIES REQUIRED TO BE DISTURBED TO DO THE WORK UNDER THIS CONTRACT SHALL BE REPLACED OR PATCHED WITH UL APPROVED ASSEMBLIES TO MATCH EXISTING AND TO MAINTAIN EXISTING ASSEMBLY FIRE RATING.



**Altamahaw-Ossipee Elementary  
HVAC & WINDOW RENOVATION**

2832 N NC Hwy 87  
Elon, NC 27244

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		REVISIONS

**ABBREVIATIONS, SYMBOLS,  
AND GENERAL NOTES**

DATE 05.03.2023  
DRAWN BY ERH  
CHECK BY EKH  
JOB NO. 22-043  
SHEET

**G0.3**

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL
1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, and other Division 01 Specification Sections, apply to this Section.
1.2 SUMMARY
A. Section includes administrative and procedural requirements for quality assurance and quality control.
B. Testing and inspecting services are required to verify compliance with requirements specified or indicated.
1.3 DEFINITIONS
A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

1.4 CONFLICTING REQUIREMENTS
A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed.
1.5 REPORTS AND DOCUMENTS
A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections as required by all disciplines.

1.6 QUALITY ASSURANCE
A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

1.7 QUALITY CONTROL
A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility.
B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

1.8 REPAIR AND PROTECTION
A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
B. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes.

1.9 CORRECTIVE ACTION
A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

1.10 PROTECTION OF INSTALLED CONSTRUCTION
A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Final Completion.
B. Comply with manufacturer's written instructions for temperature and relative humidity.

1.11 CORRECTION OF THE WORK
A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

1.12 CORRECTION OF THE WORK
A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

SECTION 017300 - EXECUTION

PART 1 - GENERAL
1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, and other Division 01 Specification Sections, apply to this Section.
1.2 DEFINITIONS
A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.
1.3 QUALITY ASSURANCE
A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1.4 WARRANTY
A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations and with materials so as not to void existing warranties.
PART 2 - PRODUCTS
2.1 MATERIALS
A. General: Comply with requirements specified in other Sections.
B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

2.2 PRODUCTS
A. General: Comply with requirements specified in other Sections.
B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
PART 3 - EXECUTION
3.1 EXAMINATION
A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed.

3.2 PREPARATION
A. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
B. Surface and Substrate Preparation: Comply with manufacturer's recommendations for preparation of substrates to receive subsequent work.
3.3 INSTALLATION
A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

3.4 CUTTING AND PATCHING
A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
B. Temporary Support: Provide temporary support of work to be cut.
C. Protection: Protect in-place construction during cutting and patching to prevent damage.

3.5 OWNER-INSTALLED PRODUCTS
A. Site Access: Provide access to Project site for Owner's construction personnel.
B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

3.6 PROTECTION OF INSTALLED CONSTRUCTION
A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Final Completion.
B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK
A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

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SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL
1.1 SUMMARY
A. Section Includes:
1. Demolition and removal of selected portions of building or structure.
1.2 DEFINITIONS
A. Demolition: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner.

1.3 MATERIALS OWNERSHIP
A. Unless otherwise indicated, demolition waste becomes property of Contractor.
B. Historic Items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
1.4 FIELD CONDITIONS
A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

3.1 EXAMINATION
A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner.
3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS
A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

3.3 PROTECTION
A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with the public using the building, roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.4 DISPOSAL OF DEMOLISHED MATERIALS
A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
B. Burning: Do not burn demolished materials.
3.7 CLEANING
A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.5 OWNER-INSTALLED PRODUCTS
A. Site Access: Provide access to Project site for Owner's construction personnel.
B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

3.6 PROTECTION OF INSTALLED CONSTRUCTION
A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Final Completion.
B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK
A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
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Altamahaw-Ossipee Elementary
HVAC & WINDOW RENOVATION
2832 N NC Hwy 87
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Table with 3 columns: MK, DATE, DESCRIPTION REVISIONS

SPECIFICATIONS

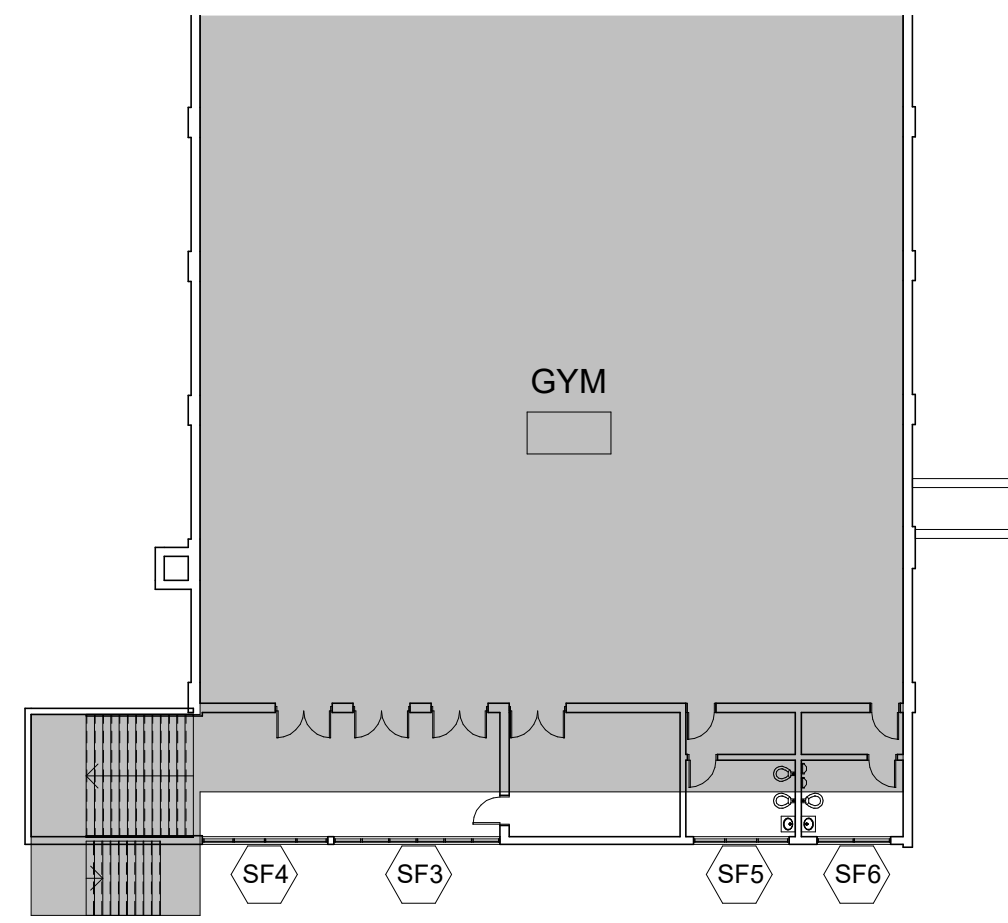
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05.03.2023
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CHECK BY EKH
JOB NO. 22-043
SHEET

G.O.4

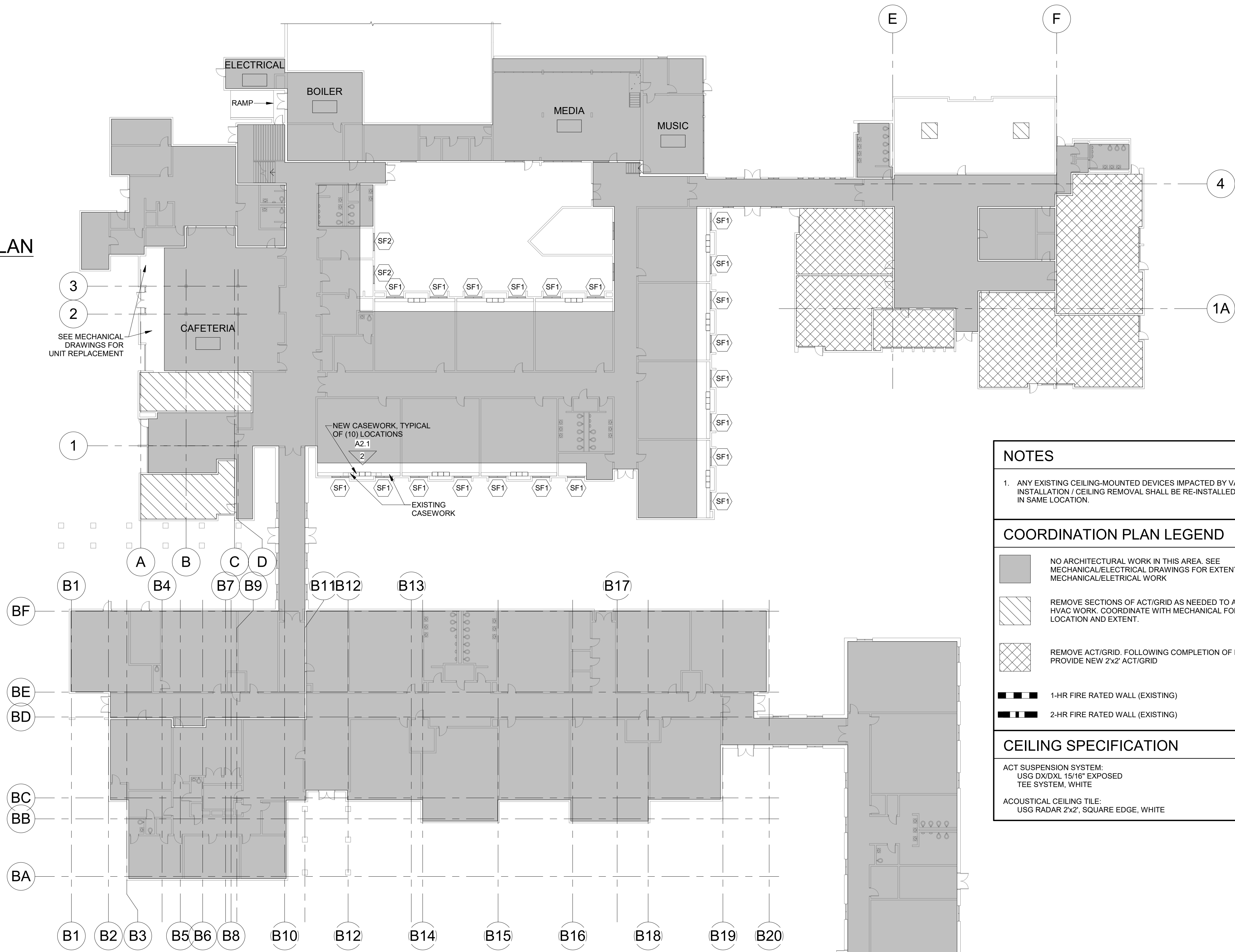


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**2 GYM UPPER LEVEL COORDINATION PLAN**  
 A1.1 SCALE: 3/64" = 1'-0"



**1 MAIN LEVEL ARCHITECTURAL COORDINATION PLAN**  
 A1.1 SCALE: 3/64" = 1'-0"

**NOTES**

- ANY EXISTING CEILING-MOUNTED DEVICES IMPACTED BY VAV INSTALLATION / CEILING REMOVAL SHALL BE RE-INSTALLED IN SAME LOCATION.

**COORDINATION PLAN LEGEND**

- NO ARCHITECTURAL WORK IN THIS AREA. SEE MECHANICAL/ELECTRICAL DRAWINGS FOR EXTENT OF MECHANICAL/ELECTRICAL WORK
- REMOVE SECTIONS OF ACT/GRID AS NEEDED TO ACCOMMODATE HVAC WORK. COORDINATE WITH MECHANICAL FOR EXACT LOCATION AND EXTENT.
- REMOVE ACT/GRID. FOLLOWING COMPLETION OF HVAC WORK, PROVIDE NEW 2'x2' ACT/GRID
- 1-HR FIRE RATED WALL (EXISTING)
- 2-HR FIRE RATED WALL (EXISTING)

**CEILING SPECIFICATION**

ACT SUSPENSION SYSTEM:  
 USG DX/DXL 15/16" EXPOSED  
 TEE SYSTEM, WHITE

ACOUSTICAL CEILING TILE:  
 USG RADAR 2'x2', SQUARE EDGE, WHITE

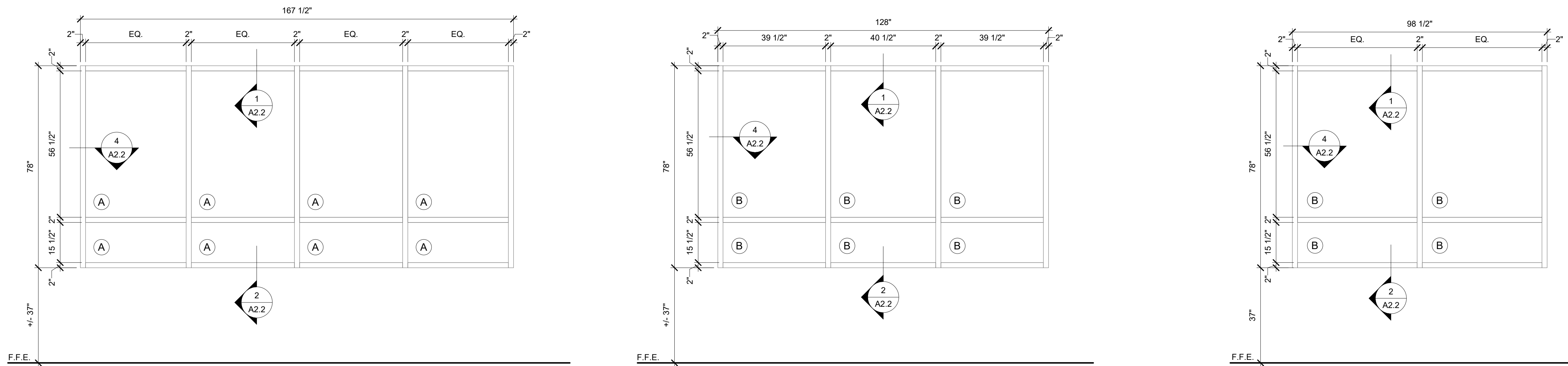
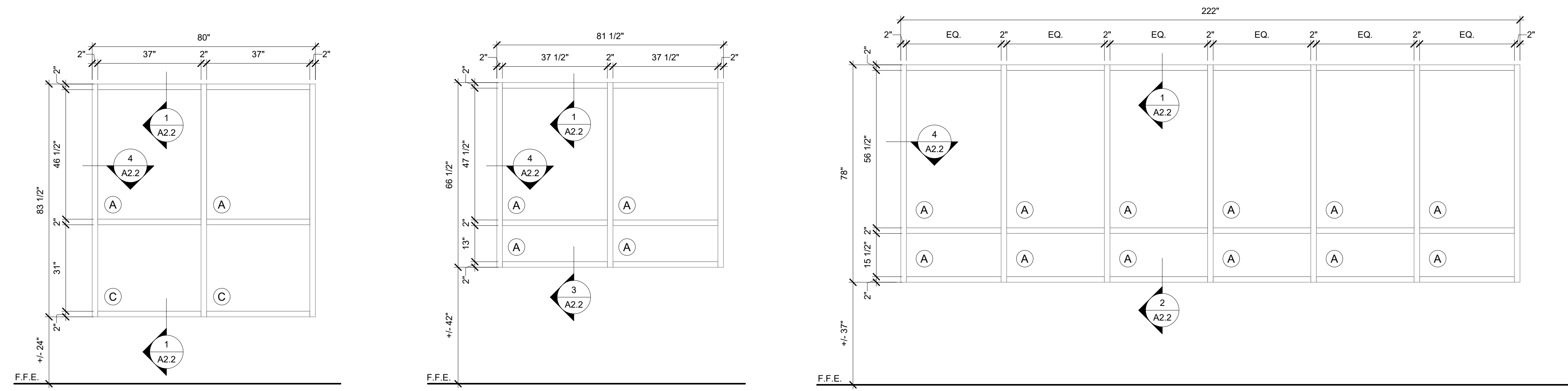


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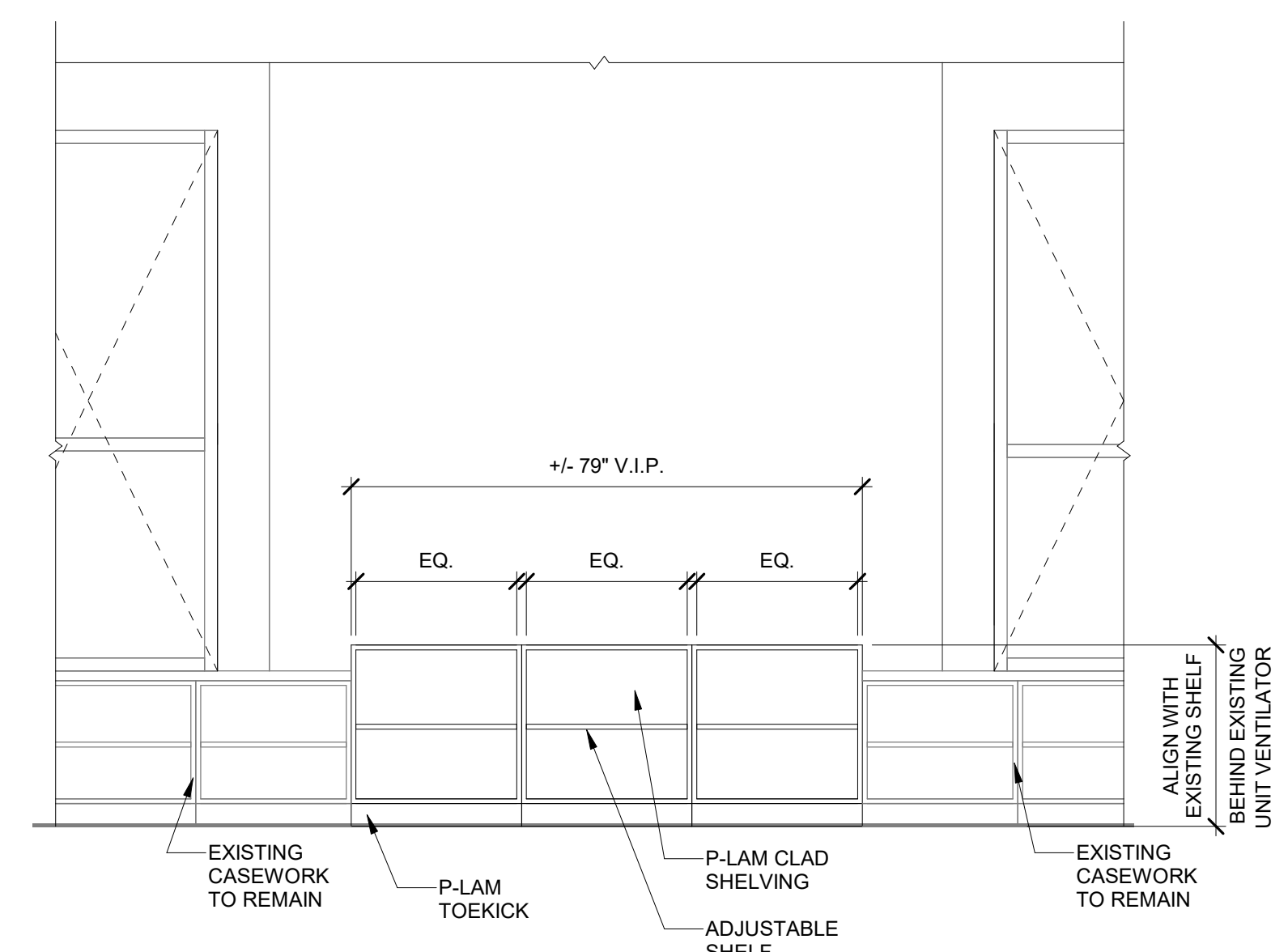
MK	DATE	DESCRIPTION
		REVISIONS

**STOREFRONT ELEVATIONS**

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**1 STOREFRONT ELEVATIONS**  
 A2.1 SCALE: 1/2" = 1'-0"



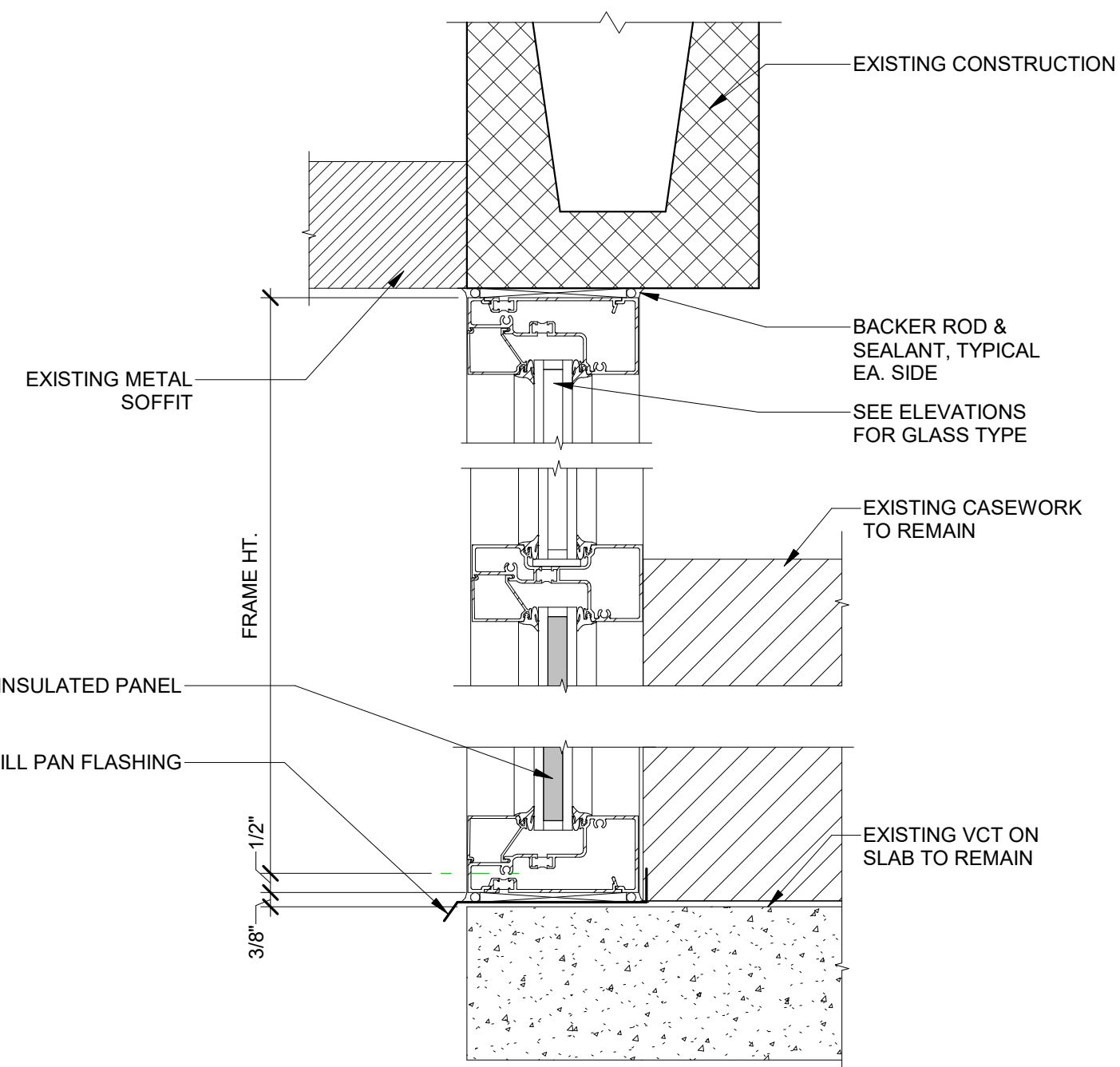
**2 CASEWORK ELEVATION**  
 A2.1 SCALE: 1/2" = 1'-0"

**GLAZING SCHEDULE**

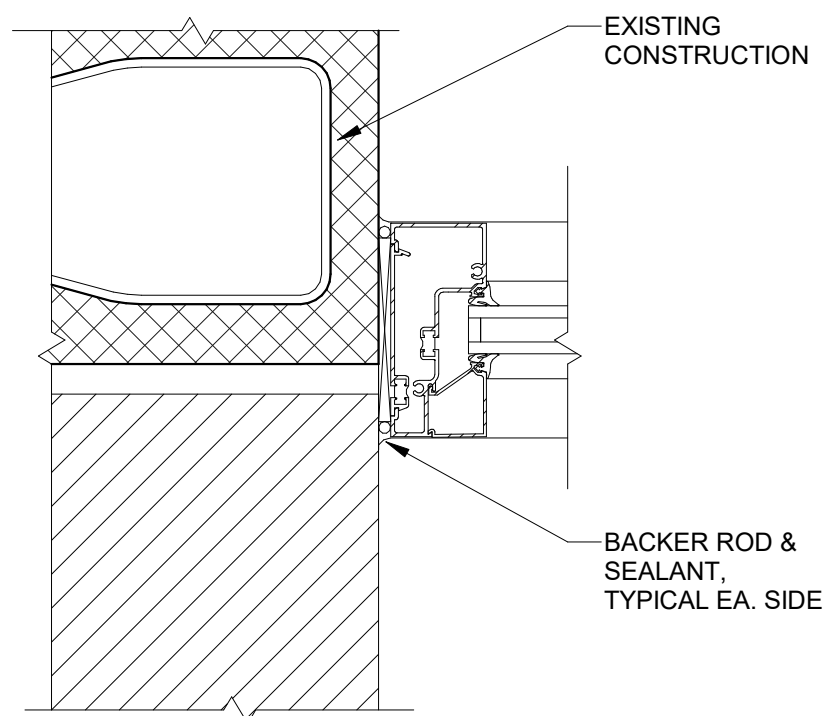
<b>A</b>	1" INSULATED GLASS UNIT EXTERIOR LITE - 1/4" CLEAR SB70XL - 1/2" SPACE INTERIOR LITE - 1/4" CLEAR ANNEALED
<b>B</b>	1" INSULATED GLASS UNIT EXTERIOR LITE - 1/4" CLEAR SB70XL - 1/2" SPACE INTERIOR LITE - 1/4" PATTERN 62 OBSCURE
<b>C</b>	1" INSULATED PANEL .024 CLEAR ANODIZED ALUMINUM SHEET - 1/4" CPA BACKER - POLYSTYRENE CORE - 1/2" CPA BACKER .024 CLEAR ANODIZED ALUMINUM SHEET FACE

**WINDOW NOTES AND SPECIFICATIONS**

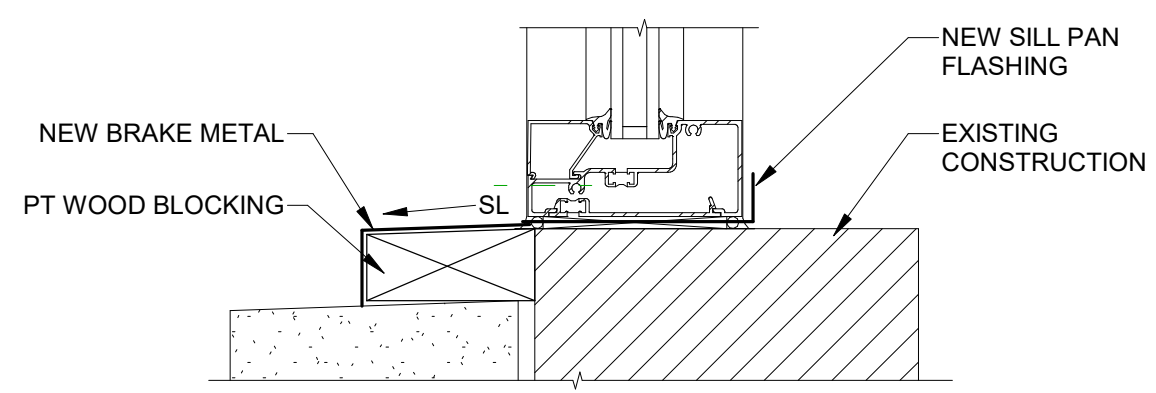
1. STOREFRONT SYSTEM  
 KAWNEER 451T 2"x4-1/2" ALUMINUM STOREFRONT  
 FINISH: AS NOTED ON ELEVATION



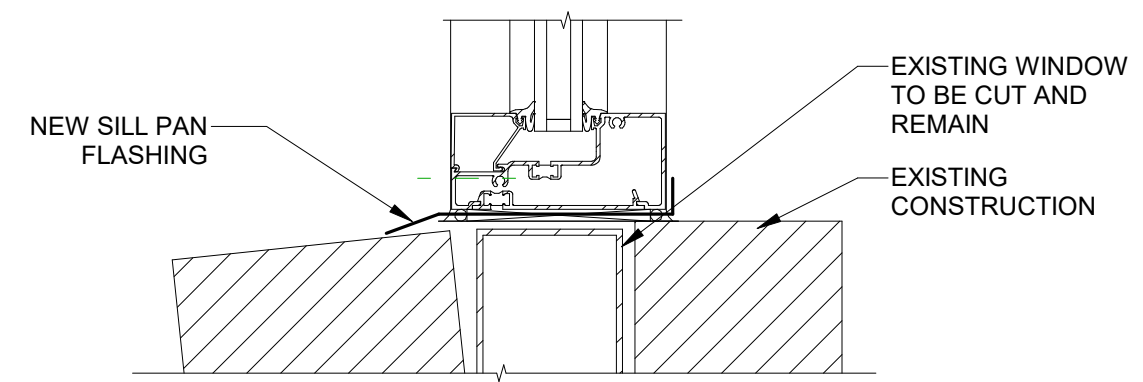
**1 STOREFRONT DETAIL**  
A2.2 SCALE: 3" = 1'-0"



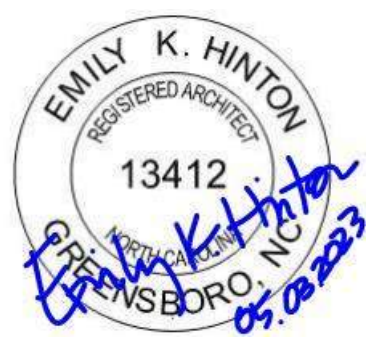
**4 STOREFRONT JAMB DETAIL**  
A2.2 SCALE: 3" = 1'-0"



**2 STOREFRONT SILL DETAIL**  
A2.2 SCALE: 3" = 1'-0"



**3 STOREFRONT SILL DETAIL**  
A2.2 SCALE: 3" = 1'-0"



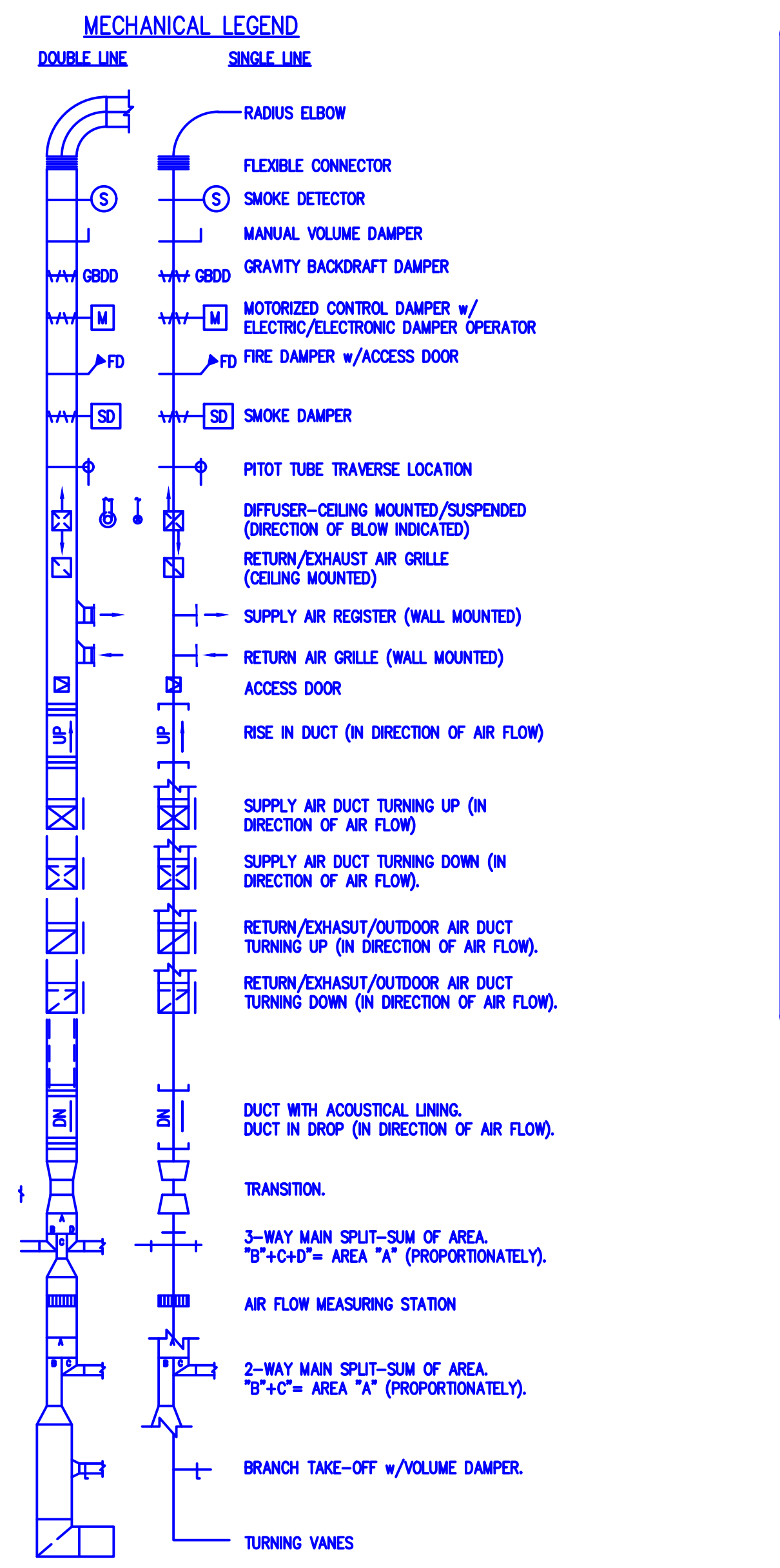
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**STOREFRONT DETAILS**

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C:\Users\Documents\Altamahaw-Ossipee Elementary.dwg(1802).rvt



SYMBOL	DESCRIPTION
(NAME)	NEW PIPING (DARK LINE)
(NAME)	EXISTING PIPING (LIGHT LINE)
(NAME)	EXISTING PIPE/DUCT TO BE REMOVED
○	PIPE TURNING UP
○	PIPE TURNING DOWN
⊥	SHUT OFF VALVE
⊥	GATE VALVE IN VERTICAL
⊥	PRESSURE REDUCING VALVE
⊥	PRESSURE RELIEF VALVE
⊥	UNION
FD	FLOOR DRAIN
HS	HEATING HOT WATER SUPPLY
HR	HEATING HOT WATER RETURN
CV	CHECK VALVE
CBV	CALIBRATED BALANCING VALVE
TDV	TRIPLE DUTY VALVE
STR	STRAINER
TS	THERMOSTAT/TEMPERATURE SENSOR
CD	CARBON DIOXIDE SENSOR
CON	CONNECTION OF NEW TO EXISTING
⊕	EXTENT OF DEMOLITION
DN	DRAWING NOTE NUMBER
TM	THERMOMETER
RE	EXISTING EQUIPMENT TO BE REMOVED
PG	PRESSURE GAUGE

ABBREVIATION	DESCRIPTION
AF	ABOVE FINISHED FLOOR
BTUH	BRITISH THERMAL UNIT PER HOUR
CFM	CUBIC FEET PER MINUTE
CONC.	CONCRETE
DB	DRY BULB
DA	DIAMETER
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EL	ELEVATION
ELEC.	ELECTRICAL
ENT	ENTERING
EWT	ENTERING WATER TEMPERATURE
EX. EXST.	EXISTING
F	FAHRENHEIT
FD	FLOOR DRAIN
FL	FLOOR
PFM	FEET PER MINUTE
FSK	FOIL SCRM KRAFT
FT	FOOT OR FEET
GAL	GALLONS
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
HZ	FREQUENCY HERTZ
HS	HEATING WATER SUPPLY
HR	HEATING WATER RETURN
LAT	LEAVING AIR TEMPERATURE

ABBREVIATION	DESCRIPTION
LWT	LEAVING WATER TEMPERATURE
MBH	THOUSAND BTUH
MIN.	MINIMUM
NG	NATURAL GAS
No	NUMBER
OA	OUTDOOR AIR
OAD	OUTDOOR AIR DUCT
PD	PRESSURE DROP
PH, #	PHASE (ELECTRICAL)
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	PSI GAUGE
P/T	PRESSURE/TEMPERATURE
RA	RETURN AIR
RAD	RETURN AIR DUCT
RH	REHEAT COIL
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SAD	SUPPLY AIR DUCT
SP	STATIC PRESSURE
TEMP	TEMPERATURE
TYP.	TYPICAL
U/G	UNDERGROUND
V	VOLTS OR VENT
VFD	VARIABLE FREQUENCY DRIVE
VEL	VELOCITY
WB	WETBULB

- MECHANICAL GENERAL NOTES
- WORK AS A MINIMUM SHALL CONFORM TO AND MEET THE REQUIREMENTS OF:
    - NORTH CAROLINA STATE BUILDING CODE: MECHANICAL 2018
    - NORTH CAROLINA STATE BUILDING CODE: FUEL GAS CODE 2018
    - NORTH CAROLINA STATE BUILDING CODE: ENERGY CONSERVATION CODE 2018
    - NFPA 70 (NATIONAL ELECTRIC CODE), CURRENT EDITION
    - ASHRAE STANDARD 55-2013
    - ASHRAE STANDARD 62-2013
    - ASHRAE STANDARD 90.1-2013
    - SMACNA: HVAC AIR DUCT LEAKAGE TEST MANUAL, 1985, 1ST EDITION
    - SMACNA: HVAC DUCT CONSTRUCTION STANDARDS METAL & FLEXIBLE, 1985, 1ST EDITION
  - DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT INTENDED TO BE SCALED FOR DIMENSIONS, UNLESS DIMENSIONED.
  - ALL MATERIALS, EQUIPMENT AND DEVICES SHALL, AS A MINIMUM, MEET THE REQUIREMENTS OF UL WHERE UL STANDARDS ARE ESTABLISHED FOR THOSE ITEMS. ALL ITEMS SHALL BE CLASSIFIED BY UL AS SUITABLE FOR THE PURPOSE USED.
  - ALL ITEMS SHALL BE NEW, UNLESS NOTED OTHERWISE.
  - ALL MATERIALS, EQUIPMENT AND DEVICES SHALL BE CURRENT PRODUCTS BY MANUFACTURERS REGULARLY ENGAGED IN THE PRODUCTION OF SUCH PRODUCTS.
  - ALL MECHANICAL EQUIPMENT SHALL HAVE A FACTORY APPLIED PAINTING.
  - COORDINATE LOCATION OF MECHANICAL WORK WITH OTHER TRADES TO AVOID CONFLICTS AND INTERFERENCES.
  - COORDINATE THE EXACT LOCATION OF AIR DEVICES WITH THE ARCHITECTURAL REFLECTED CEILING PLANS.
  - INSTALL ALL EQUIPMENT AND MATERIAL IN ACCORDANCE WITH MANUFACTURER'S WRITTEN PRINTED INSTRUCTIONS AND RECOMMENDATIONS.
  - COORDINATE WITH AND OBTAIN PERMITS AND INSPECTIONS FROM AUTHORITY HAVING JURISDICTION.
  - PROVIDE OWNER WITH CERTIFICATES OF FINAL INSPECTION AND ACCEPTANCE FROM AUTHORITY HAVING JURISDICTION.
  - MAKE CONNECTIONS FROM MECHANICAL EQUIPMENT TO DUCTWORK USING FLEXIBLE DUCT CONNECTIONS.
  - ALL EQUIPMENT, DUCTWORK ABOVE CEILING SHALL BE SUPPORTED FROM BUILDING STRUCTURE ABOVE, UNO.
  - WHERE DUCTWORK PENETRATES FIRE RATED BARRIERS (WALLS, FLOORS AND CEILINGS) SEAL OPENING AROUND DUCTWORK WITH U.L. LISTED FIRE STOPPING MATERIAL TO MAINTAIN THE FIRE RATING OF THE BARRIER.
  - DUCT SIZES INDICATED ARE NET FREE INSIDE DIMENSIONS.
  - ALL DUCTWORK SHALL HAVE TRANSVERSE JOINTS AND LONGITUDINAL SEAMS SEALED IAW SMACNA: HVAC AIR DUCT LEAKAGE TEST MANUAL, 1985, 1ST EDITION.
  - SMOKE DETECTORS SHALL BE FURNISHED AND INSTALLED AS SHOWN ON THE PLANS. THE SMOKE DETECTOR SHALL BE WIRED TO DE-ENERGIZE THE FAN UPON DETECTION OF THE PRODUCTS OF COMBUSTION. ANOTHER SET OF CONTACTS SHALL BE PROVIDED FOR WIRING THE SMOKE DETECTOR TO THE FIRE ALARM SYSTEM (AS APPLICABLE) BY THE ELECTRICAL CONTRACTOR. PROVIDE AN ANNUNCIATOR TO INCLUDE BOTH A VISIBLE AND AN AUDIBLE SIGNAL IN AN APPROVED LOCATION WHEN THE DETECTOR IS NOT TIED INTO A BUILDING FIRE ALARM SYSTEM. THE ANNUNCIATOR SHALL BE IDENTIFIED AS "AIR DUCT DETECTOR TROUBLE".
  - ALL MEDIUM PRESSURE DUCT TO BE GALVANIZED STEEL RECTANGULAR, SPIRAL OR FLAT OVAL.
  - ALL CONTROL WIRING SHALL BE PLENUM CABLE.
  - CONCEALED SUPPLY, RETURN AND OUTSIDE AIR TO BE WRAPPED WITH R-6 FIBERGLASS DUCT WRAP. WRAP SUPPLY DIFFUSER BACKS IN CONCEALED SPACES WITH FULLY DUCTED RETURN.

PROJECT: ALAMANCE/BURLINGTON SCHOOL SYSTEMS, ALTAMAHAW-OSSPEE MS, ELON, NC  
 MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT METHOD OF COMPLIANCE  
 PRESCRIPTIVE X ENERGY COST BUDGET  
 THERMAL ZONE 4A  
 EXTERIOR DESIGN CONDITIONS  
 WINTER DRY BULB 18.0 F  
 SUMMER DRY BULB N/A  
 SUMMER WET BULB N/A  
 INTERIOR DESIGN CONDITIONS  
 WINTER DRY BULB 70F  
 SUMMER DRY BULB 74F  
 HEAT LOAD: EXISTING LOAD PLUS 341 MBH (GYM HEATING LOAD)  
 COOLING LOAD: EXISTING LOAD PLUS 404.2 MBH (GYM COOLING LOAD)  
 DESCRIPTION: HEATING PROVIDED BY EXISTING BOILER. ADMINISTRATION AREA SERVED BY SPLIT SYSTEMS. CLASSROOMS SERVED BY A COMBINATION OF SPLIT SYSTEMS AND UNIT VENTILATORS. NEW SERVED BY GROUND MOUNTED PACKAGED UNIT.  
 EXHAUST FANS: EXISTING  
 LIST OF EQUIPMENT EFFICIENCIES: SEE SCHEDULE.  
 EQUIPMENT SCHEDULES WITH MOTORS (MECHANICAL SYSTEMS): SEE SCHEDULE  
 DESIGNER STATEMENT:  
 TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE DESIGN OF THIS BUILDING COMPLIES WITH THE MECHANICAL SYSTEMS, SERVICE SYSTEMS, AND EQUIPMENT REQUIREMENTS OF THE NORTH CAROLINA STATE BUILDING CODE, ENERGY CODE - 2018 EDITION.  
 SIGNED: *Kevin L. Waters*  
 NAME: KEVIN L. WATERS, PE  
 TITLE: MECHANICAL ENGINEER  
 DATE: 04/28/2023

Mark	Type	Size	Mounting	Manufacturer	Model
R	Return	60x48	Surface		530

Notes:

Capacity	MBH
GPU-1	320
GPU-2	320
GPU-3	90
Total Capacity	730
Most Remote Fixture (FL)	180
Building Gas Main Size 2 PSI (note 1)	1"

- Notes:  
 1. Pipe size determined from table 402.4(5) of the 2018 North Carolina Fuel Gas Code.

TAG	Space Description	Room Number	Occupied Area (Sq Ft)	Area OA Rate (CFM / Sq. Ft.)	Area OA (CFM)	Occupants per 1,000 Sq. Ft.	Number of Occupants	Airflow per Person (CFM)	People OA Total (CFM)	Total Req. OA (CFM)	Ez	Corrected OA (CFM)	Note(s)
SSU-1	Total		962						0	0.8	98		
	Office	100F	336	0.06	20	0	2	5	10	30	1.0	30	
	Office	100E	344	0.06	21	0	4	5	20	41	1.0	41	
	Office	100D	282	0.06	17	0	2	5	10	27	1.0	27	
SSU-2	Total								0	0.8	177		
	Office	102	603	0.06	36	5	3	5	15	51	1.0	51	
	Office	100	536	0.06	32	5	2	5	10	42	1.0	42	
	Office	100A	707	0.06	42	5	2	5	10	52	1.0	52	
	Closet	100B	123	0.06	7	0	0	0	0	7	1.0	7	
	Cooridor	100C	389	0.06	23	0	0	0	0	23	1.0	23	
AHU-1/2	Cafeteria	200	2,620	0.18	472	70	183	7.5	1376	1847	0.8	2309	1
FCU-4	Cafeteria	200	w/above	0.06	0	0	0	0	0	0	0.8	0	2
DSSU-3/4	Classroom	202	N/A	0	0	0	0	0	0	0	0.8	0	3
FCU-1	Office	203	239	0.06	14	0	2	5	10	24	1.0	24	
FCU-2	Office	205	259	0.06	16	0	2	5	10	26	1.0	26	
UV-12	Classroom	204	949	0	0	35	33	7.5	249	249	1.0	249	
UV-11	Classroom	206	885	0	0	35	31	7.5	232	232	1.0	232	
FCU-3	Office	207	223	0.06	13	0	4	5	20	33	1.0	33	
UV-10	Classroom	208	871	0	0	35	30	7.5	229	229	1.0	229	
UV-9	Office	210	194	0.06	12	0	2	5	10	22	1.0	22	
UV-2	Classroom	211	831	0	0	35	29	7.5	218	218	1.0	218	
UV-8	Classroom	212	827	0	0	35	29	7.5	217	217	1.0	217	
UV-3	Classroom	213	831	0	0	35	29	7.5	218	218	1.0	218	
UV-7	Classroom	214	818	0	0	35	29	7.5	215	215	1.0	215	
UV-4	Classroom	215	833	0	0	35	29	7.5	219	219	1.0	219	
UV-6	Classroom	216	818	0	0	35	29	7.5	215	215	1.0	215	
GPU-3	Media Center	217	1,891	0.12	227	0	29	10	290	517	0.8	646	
UV-5	Classroom	218	782	0	0	35	27	7.5	205	205	1.0	205	
SSU-10	Classroom	300	913	0	0	35	32	7.5	240	240	0.8	300	
SSU-3	Classroom	301	817	0	0	35	29	7.5	214	214	0.8	268	
SSU-9	Classroom	302	903	0	0	35	32	7.5	237	237	0.8	296	
SSU-4	Classroom	303	914	0	0	35	32	7.5	240	240	0.8	300	
SSU-5	Classroom	305	823	0	0	35	29	7.5	216	216	0.8	270	
SSU-8	Classroom	306	1,025	0	0	35	36	7.5	269	269	0.8	336	
SSU-7	Classroom	308	898	0	0	35	31	7.5	236	236	0.8	295	
SSU-6	Classroom	310	850	0	0	35	30	7.5	223	223	0.8	279	
GPU-1/2	Gym	400	7,608	0.3	2282	40	304	0	0	2282	0.8	2853	

- Notes:  
 1. Space square footage includes space served by FCU-4.  
 2. Space outdoor air handled by AHU-1/2  
 3. Existing equipment to remain.

Tags	Manufacturer	Model	Area Served	Airflow CFM	OSA CFM	Cooling Capacity BTUH	Heating Capacity BTUH	Electric Heat KW	Weight lb	MCA A	MOP A	Electrical V/Hz/e	Notes
SSU-1	Trane	TEM4A0C43M41	Office	1400	200	40,728	39,000	10	150	58	60	208-230/60/1	1,2,3,4,5,6,7
SSU-2	Trane	TWE1204	Office	4000	300	124,150	117,070	25	442	44	45	460/60/3	1,2,3,4,5,6,7
SSU-3 thru 10	Trane	GAM5B0B36M31	Classroom	1200	150	35,794	31,400	15	150	48	50	208-230/60/1	1,2,3,4,5,6,7

- Notes:  
 1. Indoor unit power fed separate from outdoor unit. Wiring by Electrical Contractor.  
 2. Provide with wall mounted sensor and BACnet DDC controls.  
 3. Verify Voltage before installation  
 4. Provide MERV 8 filters.  
 5. Outdoor air connection is existing and tied into return duct from outdoor air louver.  
 6. Install motorized outdoor air damper in existing outdoor air ductwork control via BAS system.  
 7. Balance to outdoor air setting indicated in table.

Tags	Manufacturer	Model	Area Served	Cooling Capacity BTUH	Heating Capacity BTUH	SEER/EER	Weight lb	Electrical V/Hz/e	MCA A	MOP A	Notes
SSCU-1	Trane	4TWR4042N1	Office	40,728	39,000	14.3	160	208/1/60	24	40	1,2,3
SSCU-2	Trane	TWA1204	Office	124,150	117,070	11.2	433	460/60/3	18	25	1,2,3
SSCU-3 thru 10	Trane	4TWA4036	Office	35,794	31,400	15.0	250	460/60/3	6	15	1,2,3

- Notes:  
 1. Provide with low ambient control and crankcase heater.  
 2. Provide with coil guards.  
 3. Heat Pump

Tag	Manufacturer	Model	Nominal Capacity Tons	Design Airflow CFM	Outside Airflow CFM	Design ESP in H2O	Cooling EDB °F	Cooling EWB °F	Cooling LDB °F	Cooling LWB °F	Gross Total Capacity MBh	Heat Type	Input Heating Capacity MBH	Output Heating Capacity MBH	Heating EAT °F	Heating LAT °F	EER Rating & ARI Conditions	SEER Rating & ARI Conditions	Supply Fan Motor HP	Power Supply V/Hz/e	MCA A	MOP A	Max Unit Operating Weight lb	Notes
GPU-1	Trane	YHJ240A	20	6000	1000	1.25	79.1	65.3	53.1	52.2	230.4	Gas	320.0	260.0	50.0	89.2	10.8	16.8	3.1	460/60/3	54	70	2200	1,2,3,4,5,6,7
GPU-2	Trane	YHJ240A	20	6000	1000	1.25	79.1	65.3	53.1	52.2	230.4	Gas	320.0	260.0	50.0	89.2	10.8	16.8	3.1	460/60/3	54	70	2200	1,2,3,4,5,6,7
GPU-3	Trane	4YCZ5048	4	1600	645	0.8	80.0	67.0	59.1	57.6	47.5	Gas	90.0	72.0	60.0	101.5	11.0	15.0	0.75	208/60/1	34,1	50	531	2,3,4,5,6

- Notes:  
 1. Provide with hot gas reheat for humidity control  
 2. Provide unit with 2" filter frame, crankcase heater and evaporator defrost  
 3. Provide unit with 0-100% economizer with barometric relief  
 4. Provide unit with BACnet DDC controls and zone sensor.  
 5. Provide with five year compressor warranty (parts only)  
 6. Provide unit with condensate float switch  
 7. Provide unit with Single Zone VAV Controls

FOR CONSTRUCTION

**Systems Contractors, LLC**  
 Established 1977  
 Commercial & Industrial HVAC  
 Custom Air Handling Units • HVAC Service  
 P.O. Box 16023, Greensboro, North Carolina, 27416  
 Telephone 336-763-8969 • Fax 336-449-0297

**MECHANICAL SCHEDULES, NOTES, ABBREVIATIONS & SCHEDULES**

ALAMANCE/BURLINGTON SCHOOL SYSTEMS  
 ALTAMAHAW-OSSPEE MS  
 2832 N. North Carolina Highway 87, Elon, NC 27244

REVISED 06/16/23

DRAWN BY: M.HARRISON  
 APPROVED BY: K.WATERS  
 DATE: 04/28/2023  
 PLOT SCALE: 1:1  
 FILE: A-4216\_M01.DWG  
 SHEET NUMBER:

MO.1



Modular Indoor Central-Station Air-Handling Units

- PART 1 - GENERAL
1.01 SUBMITTALS
A. No equipment shall be fabricated or delivered until the receipt of approved shop drawings from the Owner or Owner's approved representative.
B. AHU manufacturer shall provide the following information with each shop drawing/proposal data submission:
1. Dimensioned arrangement drawings for each AHU including a plan and elevation view of the assembled unit with overall dimensions, lift points, unit shipping split locations and dimensions, installation and operating weights, and installation, operation and service clearances.
2. All electrical, piping, and ductwork requirements, including sizes, connection locations, and connection method recommendations.
3. Each component of the unit shall be identified and mechanical specifications shall be provided for unit and accessories describing construction, components, and options.
4. All performance data, including capacities and airside and waterside pressure drops, for components.
5. Fan curves shall be provided for fans with the design operating points indicated. Data shall be corrected to actual operating conditions, temperatures, and altitudes.
C. The AHU manufacturer shall provide appropriate sets of submittals as referenced in the General Conditions and shall submit to the Owner electronic copies of the IOM.
D. The AHU manufacturer shall list any exceptions to the specification.

- 1.02 DELIVERY, STORAGE, AND HANDLING
A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
B. Units shall ship fully assembled up to practical shipping and rigging limitations. Shipping splits shall be clearly defined on submittal drawings. Cost associated with non-conformance to shop drawings shall be the responsibility of the manufacturer. AHU's less than 100-inches wide shall allow for forklift transport and maneuverability on the jobsite.
C. Deliver units to jobsite with fan motor(s), sheave(s), and belt(s) completely assembled and mounted in units.
D. Indoor units shall be shipped in a clear shrink-wrap or stretch-wrap to protect unit from in-transit rain and debris per ASHRAE 62.1 recommendations.
E. Installing contractor shall be responsible for storing AHU in a clean, dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.
1.03 WARRANTY
A. AHU manufacturer shall provide, at no additional cost, a standard parts warranty that covers a period of one year from unit start-up or 18 months from shipment, whichever occurs first. This warrants that all products are free from defects in material and workmanship and shall meet the capacities and ratings set forth in the equipment manufacturer's catalog and bulletins.

- PART 2 - PRODUCTS
2.01 GENERAL
A. Unit layout and configuration shall be as defined in project plans and schedule.
2.02 UNIT CASING
A. The entire air handler shall be constructed of galvanized steel. All doors shall have gaskets around full perimeter to prevent air leakage. Contractor shall be responsible to provide connection flanges and all other framework that is needed to properly support the unit.
B. All panels shall be 2-inch double wall construction to facilitate cleaning of unit interior.
C. Unit floor shall be of sufficient strength to support 300-lb load during maintenance activities, and shall deflect no more than .005-inches when sitting on a support structure.
D. Panel insulation shall provide a minimum thermal resistance (R) value of 13 (R21/FBtu) throughout the entire unit. Insulation shall completely fill the panel cavities in all directions so that no voids exist and settling of insulation is prevented. Panel assembly shall comply with NFPA 90A.
E. Access panels and/or access doors shall be provided in all sections to allow easy access to drain pan, coil(s), motor, drive components and bearings for cleaning, inspection, and maintenance.
F. Access panels and doors shall be fully removable without the use of specialized tools to allow complete access of interior surfaces.

- 2.03 ACCESS DOORS
A. Access doors shall be 2-inch double-wall construction. Interior and exterior shall be of the same construction as the interior and exterior wall panels.
2.04 PRIMARY DRAIN PANS
A. The drain pan shall be designed in accordance with ASHRAE 62.1 being of sufficient size to collect all condensation produced from the coil and sloped in two planes, pitched toward drain connections, promoting positive drainage to eliminate stagnant water conditions when unit is installed level and trapped per manufacturer's requirements. The outlet shall be located at the lowest point of the pan and shall be sufficient diameter to preclude drain pan overflow under any normally expected operating condition. Drainpan shall be polymer
2.05 SUPPLY FAN
A. Fan sections shall have a minimum of one hinged and latched access door located on the drive side of the unit to allow inspection and maintenance of the fan, motor, and drive components. Construct door(s) per Section 2.04.
B. Provide fans of type specified on the schedule. Belt drive fan shafts shall be solid steel, coated with a rust-inhibiting coating, and properly designed so that fan shaft does not pass through first critical speed as unit comes up to rated RPM.
C. Belt drive fans with integral frame motors shall be internally isolated to inhibit noise and vibration through the ductwork and building structure. A flexible connection shall be installed between the fan and unit casing to ensure complete isolation. Fan and motor shall be internally isolated with spring isolators. If fans and motors are not internally isolated, then the entire unit shall be externally isolated from the building, including supply and return duct work, piping, and electrical connections. External isolation shall be furnished by the installing contractor in order to avoid transmission of noise and vibration through the ductwork and building structure.

- D. Belt-driven fans shall be provided with self-aligning, anti-friction bearings selected for L-50 200,000-hour average life per ANSI/AFBMA Standard 9
2.06 MOTORS AND DRIVES
A. All motors, and drives for belt drive fans, shall be factory-installed and run tested. Motors for belt driven fans shall be installed on a base to permit adjustment of belt tension. Slide base shall be designed to accept all motor sizes offered by the air-handler manufacturer for that fan size to allow a motor change in the future, should airflow requirements change. Fan sections without factory-installed motors shall have motors field installed by the contractor. The contractor shall be responsible for all costs associated with installation of motor and drive, alignment of sheaves and belts, run testing of the motor, and balancing of the assembly.
B. Integral horsepower motors shall meet or exceed all NEMA Standards Publication MG 1 - 2006 requirements and comply with NEMA Premium efficiency levels when applicable. Motors shall comply with applicable requirements of NEC and shall be UL listed.
C. All fan types utilizing integral horsepower motors, shall use 4-pole, 1800 rpm, motors, NEMA B design, with Class B insulation, capable to operate continuously at 104 deg F (40 deg C) without tripping overloads.
D. Motors shall have a +/- 10 percent voltage utilization range to protect against voltage variation.
E. V-Belt drives for housed fans shall be 1100 rpm (1050 - 1150 variable) pitch pitched at 1.5 times the motor nameplate. Drives 20 hp and larger or any drives on units equipped with VFDs and housed fans shall be fixed pitch.
F. All housed fans with motors 15 hp and larger shall be equipped with multiple belt drives.
G. Manufacturer shall provide for each unit with a housed fan a nameplate with the following information to assist air balance contractor in start up and service personnel in maintenance:

- 2.07 COILS
A. Coils section header end panel shall be removable to allow for removal and replacement of coils without impacting the structural integrity of the unit.
B. Install coils such that headers and return bends are enclosed by unit casing to ensure that if condensate forms on the header or return bends, it is captured by the drain pan under the coil.
C. Coils shall be manufactured with plate fins to minimize water carryover and maximize airside thermal efficiency. Fin tube holes shall have drawn and belled collars to maintain consistent fin spacing to ensure performance and air pressure drop across the coil as scheduled. Tubes shall be mechanically expanded and bonded to fin collars for maximum thermal conductivity. Use of soldering or tinning during the fin-to-tube bonding process is not acceptable due to the inherent thermal stress and possible loss of bonding at that joint.
D. Hydronic Coils
1. Supply and return header connections shall be such that direction of coil water-flow is counter to direction of unit air-flow.
2. Coils shall be proof-tested to 300 psig and leak-tested to 200 psig air pressure under water.
3. Headers shall be constructed of round copper pipe.

PART 3 - EXECUTION

- 3.01 SHIPPING
A. After loading the equipment for shipment, the AHU manufacturer shall contact the shipping contact on the order and provide the name of the carrier, description of equipment, order number, shipping point, and date of shipment.
3.02 FIELD EXAMINATION
A. The Mechanical Contractor shall verify that the mechanical room is ready to receive work and the opening dimensions are as indicated on the shop drawings and contract documents.
3.03 INSTALLATION
A. The Mechanical Contractor shall be responsible to coordinate ALL of his installation requirements with the Owner and the Owner's selected Mechanical Contractor to ensure that a complete installation for each unit is being provided. Coordination efforts shall include such items as unloading and hoisting requirements, field wiring requirements, field piping requirements, field ductwork requirements, requirements for assembly of field-bolted or welded joints, and all other installation and assembly requirements.

Fan Coil Units

- PART 1 - GENERAL
1.01 WARRANTY
A. The equipment manufacturer shall provide, at no additional cost, a STANDARD PARTS WARRANTY that covers a period of one year from unit start-up or 18 months from shipment, whichever occurs first. This warrants that all products are free from defects in material and workmanship and shall meet the capacities and ratings set forth in the equipment manufacturer's catalog and bulletins.

- PART 2 - PRODUCTS
2.01 GENERAL UNIT DESCRIPTION
A. Manufacturer shall provide unit arranged for draw-through application. Unit layout and configuration shall be as defined in project plans and schedule. Blow-through is only acceptable when consideration is given to capturing downstream moisture carryover. Considerations include downstream moisture eliminators and/or extended blank modules with condensate drain pans.
2.02 UNIT CASING
A. The entire air handler shall be constructed of galvanized steel. The removal of access panels shall not affect the structural integrity of the unit once the unit is installed. Contractor shall be responsible to provide connection flanges and all other framework that is needed to properly support the unit.
B. Access panels shall be on side of the unit in all sections to allow easy access to drain pan, filter, coil(s), and motor components for cleaning, inspection, and maintenance.
C. Access Panels: Removable access panels shall be provided on side of the unit to facilitate service access to drain pans, motors, coil(s). Access panel for filter removal shall be provided on side of the unit.
D. Cabinet: Casing shall be manufactured of heavy gauge galvanized steel.

- 2.03 COILS
A. Install coils such that headers and return bends are enclosed by unit casing to ensure that if condensate forms on the header or return bends, it is captured by the drain pan under the coil.
B. Coils shall be manufactured with plate fins to minimize water carryover and maximize airside thermal efficiency. Fin tube holes shall have drawn and belled collars to maintain consistent fin spacing to ensure performance and air pressure drop across the coil as scheduled. Tubes shall be mechanically expanded and bonded to fin collars for maximum thermal conductivity. Use of soldering or tinning during the fin-to-tube bonding process is not acceptable due to the inherent thermal stress and possible loss of bonding at that joint.
C. Construct coil casings of galvanized steel. End supports shall have belled tube holes to minimize wear of the tube wall during thermal expansion and contraction of the tube.
D. Hydronic Coils
1. Supply and return header connections shall be clearly labeled on outside of units, such that direction of coil water-flow is counter to direction of unit air-flow.
2. Coils shall be proof tested to 450 psig and leak tested to 300 psig air pressure under water.
3. Headers shall be constructed of round copper pipe.
4. Unit shall be provided with minimum 3/8 inch O.D. copper coils. All fins shall be aluminum.
5. All coil connections shall be on same side of unit.

- 2.04 DRAIN PAN
A. Drain Pan(s) shall be constructed of corrosion resistant material. Acceptable materials include polymer or stainless steel. Units with cooling coils shall have drain pans under complete cooling coil section that extend beyond the air-leaving side of the coil to ensure capture of all condensate in section.
B. Drain pan manufacturer shall either insulate bottom of drain pan with closed cell foam or provide double wall internally insulated construction to eliminate bottom sweating.
C. Drain pan shall be sloped in two planes, pitched toward drain connections to ensure complete condensate drainage when unit is installed level and trapped per manufacturer's installation instructions. Units without drain pans sloped in two planes shall coat drain pans with anti-microbial treatment.
D. Drain pan(s) shall have main and auxiliary drain connections with auxiliary outlet higher than the main connection.
E. Coil(s) shall be mounted above the drain pan to facilitate easy and complete inspection, cleaning, and removal. Coil(s) may not sit in drain pan.

- 2.05 FANS
A. Provide single-wheel, dual-width, dual-inlet, forward curved centrifugal fans as specified on the schedule. All fans shall be dynamically balanced.
2.06 MOTORS
A. All motors shall be factory-installed and run tested. To facilitate field replacement of motors, a removable fan inlet cone shall be provided on the drive side of the fan/motor assembly.
B. Motor shall be ECM programmable type. The motor shall be preprogrammed in the factory to meet the specified airflow requirements.
C. Fan motor shall have permanently lubricated and sealed bearings, protected by an internal thermal overload.
D. Single phase motors shall be selected to operate continuously at 104 F (40 C) ambient without tripping on overloads. Motors shall have a +/- 10 percent voltage utilization range to protect against voltage variation.
2.07 FILTERS
A. Provide removable one- or two-inch thick filters easily removable from side of the unit. All units shall use standard filter sizes.
2.08 CONTROLS
A. Fan motor and end devices shall be wired back to a control box enclosure. A junction box shall be provided for single point power connection.
B. The control package shall include the following at a minimum:
1. 24 VAC transformer
2. Disconnect switch
C. The control package shall include the following options :
1. Fan status relay
D. Control Interface - Unit shall be factory run tested and end devices shall be factory wired to terminal strip in an external junction box and tested for wiring continuity.

PART 3 - EXECUTION

- 3.01 SHIPPING
A. Paper copies of the IOM shall also be shipped with each unit.
B. The manufacturer shall identify all shipments with the order number. Enough information shall be provided with each shipment to enable the Mechanical Contractor to confirm the receipt of units when they are received. For parts too small to mark individually, the manufacturer shall place them in containers.
C. To protect equipment during shipment and delivery, unit air inlet and outlet openings shall ship from manufacturer with removable sealed covering. Covering shall not constrain the unit installation process.
D. After loading the equipment for shipment, the manufacturer shall contact the shipping contact on the order and provide the name of the carrier, description of equipment, order number, shipping point, and date of shipment.

Ductless Split Systems

- 1. System Description
The heat pump air conditioning system shall be a Mitsubishi Electric MXZ split system with Variable Compressor Speed Inverter Technology (VCSI), charged with R410A refrigerant. The system shall consist of one, two, three or four slim silhouette, compact wall mounted evaporator section(s) with wireless controller. The outdoor unit shall be a horizontal discharge single phase unit.
2. Quality Assurance
a) The units shall be listed by Electrical Testing Laboratories (ETL) and bear the ETL label.
b) All wiring shall be in accordance with the Canadian Electrical Code.
c) The units shall be rated in accordance with ARI Standard 210 and bear the ARI label.
d) The units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which are a set of standards applying to environmental protection set by the International Standard Organization (ISO).
3. Warranty
The units shall have a manufacturer's warranty for a period of five (5) years from date of installation. The compressor shall have a warranty of seven (7) years from date of installation. If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer.

- 4. General Information
1.0 Indoor Unit General
The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, internal piping, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes shall be charged with dry air before shipment from the factory.
1.1 Unit Cabinet
The casing shall have a white finish. Multi directional drain and refrigerant piping offering four (4) directions for refrigerant piping and two (2) directions for draining shall be standard. There shall be a separate back plate which secures the unit firmly to the wall.
1.2 Fan
The indoor unit fan shall be an assembly with a line-flow fan direct driven by a single motor. The fan shall be statically and dynamically balanced and run on a motor with permanently lubricated bearings. A manual adjustable guide vane shall be provided with the ability to change the airflow from side to side (left to right). A motorized air sweep/louver shall provide an automatic change in airflow by directing the air up and down to provide for uniform air distribution. The indoor unit fan shall consist of three (3) speeds, High, Medium and Low.

- 1.3 Filter
Return air shall be filtered by means of easily removed catechin and enzyme filters.
1.4 Coil
The evaporator coil shall be of nonferrous construction with pre-coated aluminum stake fins on copper tubing. The coil shall be pressure tested at the factory. A condensate pan and drain shall be provided under the coil.
1.5 Electrical
The electrical power of the unit, supplied from the outdoor unit shall be 208 volts or 230 volts, 1 phase, 60 hertz. The system shall be capable of satisfactory operation within voltage limits of 198 volts to 253 volts. The indoor unit shall not have any supplemental electrical heat elements.

- 1.6 Control
This unit shall have a wireless controller to perform input functions necessary to operate the system. The controller shall consist of a Power On/Off switch, Mode Selector, Temperature Setting, Time Control, Fan Speed Select and Auto Vane Selector. Temperature changes shall be by 2°F increments with a range of 65°F to 87°F. There shall be a 24 hour On/Off timer. The microprocessor located in the indoor unit shall have the capability of sensing return air temperature and evaporator coil temperature, receiving and processing commands from the wireless controller, providing emergency operation and controlling the outdoor unit. The control voltage between the indoor unit and the outdoor unit shall be 208 volts or 230 volts AC. The system shall be capable of automatic restart when power is restored after power interruption. The system shall have auto change over between heating and cooling. Control system shall control the continued operation of the air sweep louvers, as well as provide on/off and system/mode function switching.

- 2.0 Outdoor Unit General
The unit shall be able to provide cooling operation at -10°C (14°F) and heating operation at +15°C (60°F). The outdoor unit shall be completely factory assembled, internally piped and wired.
2.1 Unit Cabinet
The casing shall be zinc coated steel with acrylic or polyester coating for corrosion protection.
2.2 Fan
The unit shall be furnished with a direct drive propeller type fan. The fan motor shall have inherent protection, be permanently lubricated bearings. The fan motor shall be mounted for quiet operation. The fan shall be provided with a raised guard to prevent contact with moving parts. The outdoor unit shall have horizontal discharge airflow.

- 2.3 Coil
The condenser coil shall be of nonferrous construction with pre-coated aluminum stake fins on copper tubing. The coil shall be protected with an integral metal guard. Refrigerant flow from the condenser shall be controlled by means of a linear expansion valve (LEV) metering orifice. The linear expansion valve shall be controlled by a microprocessor controlled step motor.
2.4 Electrical
The electrical power of the unit shall be 208 volts or 230 volts, 1 phase, 60 hertz. The unit shall be capable of satisfactory operation within voltage limits of 198 volts to 253 volts. Pulse Amplitude Modulation shall be incorporated into electrical circuit
The outdoor unit shall be controlled by the microprocessor located in the indoor unit. The control voltage between the indoor unit and the outdoor unit shall be 208 volts or 230 volts AC.

Pump Suction Diffusers

- 1. The suction diffuser body shall be made of either cast iron or ductile iron.
2. The suction diffuser shall include a Flow Cone to eliminate recirculation and direct flow completely out of the body and into the pump suction.
3. The suction diffuser shall include a full-length, 4-plane, removable straightening vane.
4. The straightening vane shall be made of either carbon steel or 304 stainless steel.
5. The suction diffuser shall include a full-length removable orifice cylinder with 3/16" perforations and 51% open area.
6. The orifice cylinder shall be made of either carbon steel or 304 stainless steel.
7. The suction diffuser shall have a full-length removable start-up strainer.
8. The start-up strainer shall be made of 16 mesh bronze wire.
9. The suction diffuser shall be available with either flanged end connections or grooved end connections.
10. Flange end connections should be designed according to ANSI Class 150 Standards.
11. Suction diffuser models with either flange x flange or groove x flange end connections should be rated for 175 psi (1,207 kPa) maximum working pressure. Models with groove x groove end connections should be rated for 300 psi (2,068 kPa) working pressure.
12. The suction diffuser shall have a maximum temperature rating of 250°F (121°C).

Base-Mounted, Centrifugal Hydronic Pumps

- 1. The pumps shall be long coupled, base mounted, single stage, end suction, vertical split case design, in cast iron stainless steel flange, specifically designed for quiet operation. Suitable standard operations at 225°F and 175 PSIG working pressure or optional operations at up to 250°F and 250 PSIG working pressures. Working pressures shall not be de-rated at temperatures up to 250F. The pump internals shall be capable of being serviced without disturbing piping connections, electrical motor connections or pump to motor alignment.
2. The pumps shall be composed of three separable components a motor, bearing assembly, and pump end (wet end). The motor shaft shall be connected to the pump shaft via a replaceable flexible coupling.
3. A bearing assembly shall support the shaft via two heavy-duty re-greaseable ball bearings. Bearing assembly shall be replaceable without disturbing the system piping and shall have foot support at the coupling end. Pump bearings shall be re-greaseable without removal of the bearings from the bearing assembly. Thermal expansion of the shaft toward the impeller shall be prevented via an inboard thrust bearing.
4. The bearing assembly shall have a solid SAE1144 steel shaft. A stainless steel shaft sleeve shall be employed to completely cover the wetted area under the seal.
5. Pump shall be equipped with an internally-flushed mechanical seal assembly installed in an enlarged tapered seal chamber. Application of an internally flushed mechanical seal shall be adequate for seal flushing without requiring external flushing lines. Seal assembly shall have Buna bellows and seal gasket, stainless steel spring, and be of a carbon ceramic design with the carbon face rotating against a stationary ceramic face.
6. Bearing assembly shaft shall connect to a stainless steel impeller. Impeller shall be both hydraulically and dynamically balanced to ANSI/HI 9.6.4-2016, balance grade G6.3 and secured by a stainless steel locking cap screw or nut.
7. Pump should be designed to allow for true back pull-out allowing access to the pump's working components, without disturbing motor or piping, for ease of maintenance.
8. A center drop-out type coupling, capable of absorbing torsional vibration, shall be employed between the pump and motor. Pumps for variable speed application shall be provided with a suitable coupling sleeve. Coupling shall allow for removal of pump's wetted and without disturbing pump volute or movement of the pump's motor and electrical connections. On variable speed applications the coupling sleeve should be constructed of an neoprene material to maximize performance life.
9. An ANSI and OSHA rated coupling guard shall shield the coupling during operation. Coupling guard shall be dual rated ANSI B1.1 and OSHA 1910.219 compliant coupling guard and contain viewing windows for inspection of the coupling. No more than .25 inches of either rotating assembly shall be visible beyond the coupling guard.
10. Pump volute shall be of a cast iron design for heating systems with integrally cast pedestal volute support, rated for 175 PSIG with integral cast iron flanges drilled for 125# ANSI companion flanges. (Optional 250 PSIG working pressures are available and are 250# flange drilled.) Volute shall include gauge ports at nozzles, and vent and drain ports.
11. Motors shall meet scheduled horsepower, speed, voltage, and enclosure design. Pump and motors shall be factory aligned, and shall be realigned after installation by the manufacturer's representative. Motors shall be non-overloading at any point on the pump curve and shall meet NEMA specifications and conform to standards outlined in EISA 2007.

- 12. Base plate shall be of structural steel or fabricated steel channel configuration fully enclosed at sides and ends, with securely welded cross members and fully open grouting area (for field grouting). The minimum base plate stiffness shall conform to ANSI/HI 1.3.8.2.1-2019 for grouted Horizontal Baseline Design standards.
13. Pump shall be of a maintainable design and, for ease of maintenance, should use machine fit parts and not press fit components.
14. The pump(s) vibration limits shall conform to Hydraulic Institute ANSI/HI 9.6.4-2016 for recommended acceptable unfiltered field vibration limits (as measured per ANSI/HI 9.6.4-2016 Figure 9.6.4.2.3.1) for pumps with rolling contact bearings.
15. Pump manufacturer shall be ISO-9001 certified.
16. Each pump shall be hydrostatically tested 1.5 times the maximum rated working pressure and name-plated before shipment.

- 17. Pump shall conform to ANSI/HI 9.6.3.1-7-2012 standard for Preferred Operating Region (POR) unless otherwise approved by the engineer.
18. Each pump shall be factory aligned, and shall be realigned after installation by the manufacturer's representative. Motors shall be non-overloading at any point on the pump curve and shall meet NEMA specifications and conform to standards outlined in EISA 2007.

Pump Suction Diffusers

- 1. The suction diffuser body shall be made of either cast iron or ductile iron.
2. The suction diffuser shall include a Flow Cone to eliminate recirculation and direct flow completely out of the body and into the pump suction.
3. The suction diffuser shall include a full-length, 4-plane, removable straightening vane.
4. The straightening vane shall be made of either carbon steel or 304 stainless steel.
5. The suction diffuser shall include a full-length removable orifice cylinder with 3/16" perforations and 51% open area.
6. The orifice cylinder shall be made of either carbon steel or 304 stainless steel.
7. The suction diffuser shall have a full-length removable start-up strainer.
8. The start-up strainer shall be made of 16 mesh bronze wire.
9. The suction diffuser shall be available with either flanged end connections or grooved end connections.
10. Flange end connections should be designed according to ANSI Class 150 Standards.
11. Suction diffuser models with either flange x flange or groove x flange end connections should be rated for 175 psi (1,207 kPa) maximum working pressure. Models with groove x groove end connections should be rated for 300 psi (2,068 kPa) working pressure.
12. The suction diffuser shall have a maximum temperature rating of 250°F (121°C).

Classroom Unit Ventilators

- 1. CABINET
The unit cabinet shall be 14ga corrosion resistant steel, braced and reinforced for rigidity. The finish shall be textured powder coat, color as per the Architect's instruction. The cabinet shall be fully lined with 1" coated glass fiber insulation. The return air grille shall be heavy duty steel.
2. HOT WATER HEATING COIL
The coil shall have 1/2" copper tube of minimum wall thickness 0.016" and shall have aluminum fins. The coil supply and return headers shall be copper pipe, stubbed out for sweat connection. The coil shall be factory pressure tested at not less than 350 p.s.i. A manual air vent shall be factory installed and ball valves fitted. The coil capacity shall be as shown in the schedule.
3. CHILLED WATER COOLING COIL
The coil shall have 1/2" copper tube of minimum wall thickness 0.016" and shall have aluminum fins. The coil supply and return headers shall be copper pipe, stubbed out for sweat connection. The coil shall be factory pressure tested at not less than 350 p.s.i.
4. DIRECT EXPANSION EVAPORATOR COIL
The coil shall have 3/8" copper tube of minimum wall thickness 0.016" and shall have aluminum fins. The coil capacities shall be as shown in the schedule. A galvanized steel pitched drain pan shall be provided. The pan shall have a 'P' trap.
5. CABINET
The unit cabinet shall be 18ga corrosion resistant steel, braced and reinforced for rigidity. The finish shall be textured powder coat, color as per the Architect's instruction. The cabinet shall be fully lined with 1/2" coated glass fiber insulation. The return air grille shall be heavy duty steel.
6. SUPPLY AIR FAN/MOTOR
The fan shall be a direct centrifugal type with a three speed PSC motor mounted on rubber isolation grommets.
7. OUTDOOR/RETURN AIR MIXING DAMPERS
The outdoor and return air dampers shall have airfoil section aluminum extruded blades. The dampers shall have neoprene blade tip and jamb seals. Leakage shall not exceed 4 c.f.m. per sq. ft. at 3" W.G. differential pressure, as determined by a recognized testing laboratory.
8. FILTERS
The filters shall be of the manufacturer's standard disposable type.
9. EXTERIOR WALL LOUVER
The louver shall be aluminum extruded 45 degree blades. The louver shall have 1/2" birdscreen attached to the inner face. The finish on the louver shall be mill finish or a color as per the Architect's instruction. The contractor shall provide a wall sleeve to suit the wall thickness.

10. LINE VOLTAGE WIRING

- All internal line voltage wiring shall be by the unit manufacturer. A suitably rated remote circuit breaker shall be provided and installed by the electrical contractor.
11. INSTALLATION
The unit ventilator shall be installed plumb. Foam sealing tape shall be installed around the perimeter of the opening in the back of the unit before moving the unit into position against the wall. The exterior louver shall be caulked.
12. DDC CONTROLS
Control items shall be furnished as described in the Controls Specification.

Packaged Rooftop HVAC Equipment

- 1. Cabinet:
a. Heavy gauge steel panels
b. Pre-painted steel panels
c. Full perimeter heavy gauge galvanized steel base rail
d. Forklift slots on base rail
e. Raised or flanged edges around duct and power entry openings
f. Insulation:
1. All panels adjacent to conditioned air are fully insulated with non-hygroscopic fiberglass insulation
2. Unit base is fully insulated
3. Unit base insulation also serves as air seal to the roof curb
g. Access Panels are provided for compressor/controls/heating areas, blower access and air filter/economizer access;
h. Exterior panels constructed of heavy-gauge galvanized steel with two layer enamel paint finish
i. Coil Guards

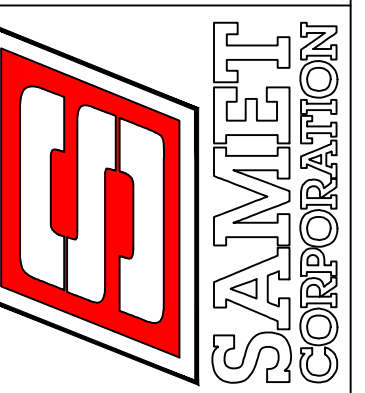
- 2. Cooling System:
a. Refrigerant type: R-410A
b. Compressors:
1. Scroll Type
2. Resiliently mounted on rubber grommets for quiet operation
3. Overload Protected
4. Internal excessive current and temperature protection
5. Isolated from condenser and evaporator fan air streams
6. Refrigerant cooled
c. Thermal Expansion Valve
d. High capacity filter/driers
e. High pressure switches
f. Freezestats
g. Crankcase heaters

- 3. Coil Construction:
1. Tube and fin condensing/evaporator coil general construction:
a. Copper tube construction
2. Rippled-edge aluminum fins
3. Flared shoulder tubing connections
4. Silver soldered construction for improved heat transfer
5. Factory leak tested at manufacturing facility
b. Evaporator Coils:
1. With balanced port thermal expansion valves, freeze protection on each compressor circuit, pressure and leak tested to 500 psi
2. Each compressor circuit on coil divided across face of coil and active through full depth of coil
c. Condensate Drain Pan:
1. Plastic pan, sloped to meet drainage requirements of ASHRAE
2. Side or bottom drain connections
d. Outdoor coil fan motors:
1. Thermal overload protected
2. Shaft up, wire basket mount
e. Outdoor coil fans: PVC coated fan guard furnished

- 4. Gas Heating System:
a. Induced draft
b. Natural gas fired system with direct spark ignition
c. Electronic flame sensors
d. Flame rollout switches
e. High heat limit switches
f. Induced draft failure switch and capable of operating to altitude of 2000 feet (610m) with no derate to manifold pressure
g. Service access for controls, burners and heat exchanger
h. Gas piping system: tight and free of leaks when pressurized to maximum supply pressure
i. Gas Valve: Two-stage, redundant type gas heat valve with manual shutoff
j. Gas Burners: Aluminized steel inshot-type gas burners
k. Gas piping system tight and free of leaks when
5. Supply Air Fan (Blower)
a. Motor
1. Overload protected
b. Supply Air Blower
1. Forward curved blades
2. Wheel is statically and dynamically balanced
3. Equipped with ball bearings and/or adjustable pulley for speed change
4. Blower assembly slides out of unit for servicing
6. Supply Air Filters:
a. 2" MERV 8 Filters
7. Controls:
a. Unit Control
1. 24V transformer (secondary) with built in circuit breaker protection
b. Heat/Cool Staging
1. 2 heat/2 cool staging with a third party DDC control system or thermostat
c. Low voltage terminal block

- EXECUTION
1. MANUFACTURER'S INSTRUCTIONS
a. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and manufacturer's spec data sheets.
2. EXAMINATION
a. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

Systems Contractors, LLC
Established 1977
Commercial & Industrial HVAC
Custom Air Handling Units \* HVAC Service
P.O. Box 16023, Greensboro, North Carolina, 27416
Telephone 336-763-8969 \* Fax 336-449-0297



04/28/2023

ALAMANCE/BUTLINGTON SCHOOL SYSTEMS
AL TAMAHAW-OSSPEE MS

2832 N. North Carolina Highway 87, Elon, NC 27244

MECHANICAL SPECIFICATIONS

Table with 2 columns: REVISION, DATE. Contains one row with dashes.

- 1. MANUFACTURER'S INSTRUCTIONS
a. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and manufacturer's spec data sheets.
2. EXAMINATION
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DRAWN BY: M.HARRISON
APPROVED BY: K.WATERS
DATE: 04/28/2023
PLOT SCALE: 1:1
PROJECT: A-4216\_M01.DWG
SHEET NUMBER:



M.O.2

Air Handling Unit Schedule																																	
Tags	Mfr	Model	Unit Type	Area Served	Base Unit		Fan				Cooling Coil								Re-Heating Coil								Electrical			Notes			
					Unit Airflow CFM	Installed Weight LB	Horsepower hp	External Static Pressure IN H2O	Total Brake HP (All Fans) HP	Total Static Pressure IN H2O	Entering Dry Bulb °F	Entering Wet Bulb °F	Leaving Dry Bulb °F	Leaving Wet Bulb °F	Sensible Capacity MBH	Total Capacity MBH	Entering Water Temp °F	Leaving Water Temp °F	Flow Rate GPM	Coil Rows	Fluid Pressure Drop FT H2O	Entering Dry Bulb °F	Leaving Dry Bulb °F	Total Capacity MBH	Entering Water Temp °F	Leaving Water Temp °F	Flow Rate GPM	Coil Rows	Fluid Pressure Drop FT H2O		Voltage	MCA	MOP
AHU-1	MagicAire	BVE20B	VAHU	Cafeteria	2,000	300	1.5	0.5	1.0	1.2	80	67	58.9	56.8	47.8	65.4	44	54	15.6	4	14.0	60	99	84.9	180	160.0	12.3	2	2.6	115V/1ph	25	45	1,2,3,7
AHU-2	MagicAire	BVE20B	VAHU	Cafeteria	2,000	300	1.5	0.5	1.0	1.2	80	67	58.9	56.8	47.8	65.4	44	54	15.6	4	14.0	60	99	84.9	180	160.0	12.3	2	2.6	115V/1ph	25	45	1,2,3,7
UV-1 thru 8, 10-12	Trane	VUVE125	VUV	Classroom	1,339	350	0.4	0	0.30	0.4	80	67	61.6	58.5	26.9	36.0	44	54	7.0	4	7.0	60	90	44.6	180	160.0	1.3	2	0.2	208V/1ph	5	15	4,5,7
UV-9	Trane	VUVE075	VUV	Classroom	738	250	0.3	0	0.25	0.4	80	67	58.4	55.3	15.6	24.0	44	54	4.8	4	3.4	60	90	21.5	180	160.0	1.0	2	0.5	208V/1ph	3	15	4,5,7
FCU-1, 2	Trane	FCJB040	VFCU	Offices	400	125	0.2	0	0.10	0.4	80	67	55.5	54.4	10.7	15.4	44	54	3.0	4	17.0	60	89	12.5	180	162.0	1.4	1	0.4	115V/1ph	3	15	4,5,7
FCU-3	Trane	FCJB040	VFCU	Offices	400	125	0.2	0	0.1	0.4	80	67	55.5	54.4	10.7	15.4	44	54	3.0	4	17.0	60	89	12.5	180	162.0	1.4	1	0.4	115V/1ph	3	15	6,7

**Notes:**

1. Provide MERV 8 filters.
2. Outdoor air connection is existing and tied into return duct from outdoor air louver.
3. Install motorized outdoor air damper in existing outdoor air ductwork control via BAS system.
4. Outdoor air connection through existing wall louver.
5. Install motorized damper at wall louver and control via BAS system.
6. Outdoor air connection via new brick vent with motorized damper control via BAS.
7. Balance to outdoor air setting indicated in table.

Unit Types: - VAHU = Vertical Air Handler  
 - VUV = Vertical Unit Ventilator  
 - VFCU = Vertical Exposed Fan Coil



Ductless Split System AHU Schedule										
Tags	Manufacturer	Model	Room Served	Airflow CFM	OSA CFM	Cooling Capacity BTUH	Heating Capacity BTUH	Weight lb	Electrical V/hz/e	Notes
DSSU-1	Mitsubishi	MSZ-FS18NA	Hallway	225-437	0	17,200	19,000	29	208/60/1	1,2
DSSU-2	Mitsubishi	MSZ-FS18NA	Hallway	225-437	0	17,200	19,000	29	208/60/1	1,2
DSSU-5	Mitsubishi	MSZ-GL24NA	Hallway	388-738	0	22,400	27,600	40	208/60/1	1,2

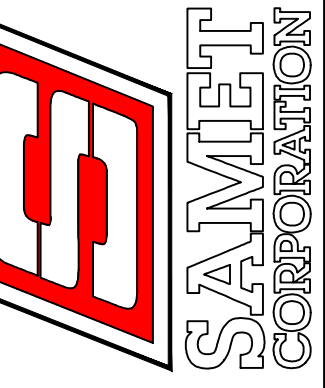
**Notes:**

1. Indoor unit power fed from outdoor unit. Wiring by Electrical Contractor.
2. Provide with wired controller.

Ductless Split System Condensing Unit Schedule													
Tags	Manufacturer	Model	Room Served	Cooling Capacity BTUH	Min. Cooling Capacity BTUH	Heating Capacity BTUH	SEER	Weight lb	Electrical V/hz/e	MCA	A	MOP A	Notes
DSSCU-1/2	Mitsubishi	MXZ-4C36NA3	Hallway	36,400	11,300	43,000	19.2	140	208/1/60	23		25	1,2,3
DSSCU-5	Mitsubishi	MUZ-GL24NA	Hallway	22,400	8,200	27,600	20.5	120	208/1/60	17		20	1,2,4

**Notes:**

1. Provide with wind baffle for low ambient operation.
2. Provide with Inverter compressor and remote thermostat.
3. 1/4" Liquid line and 1/2" Gas line.
4. 3/8" Liquid line and 5/8" Gas line.



04/28/2023

REVISION	DATE
REVISED	06/16/23

DRAWN BY: M.HARRISON  
 APPROVED BY: K.WATERS  
 DATE: 04/28/2023  
 PLOT SCALE: 1:1  
 FILE: A-4216\_MO.1.DWG  
 SHEET NUMBER:





**Split System Condensing Units**

**General - R410A**

All air-cooled condensing units shall have scroll compressors and are factory assembled and wired. Each unit shall ship from the factory with a nitrogen holding charge. Units shall have factory mounted, louvered, full-length steel grilles to protect the condenser coils and piping. Unit surface shall be phosphatized and finished with an air-dry paint. This air-dry paint finish shall be durable enough to withstand a minimum of 672-consecutive-hour salt spray application in accordance with standard ASTM B117.

**Compressors - R-410A**

Scroll compressors have simple mechanical design with only three (3) major moving parts. Scroll type compression provides inherently low vibration. 3-D compressors provide a completely enclosed compression chamber with no leakage paths. The compressor is suction gas cooled, direct drive, 3600 RPM hermetic motors. The Scroll compressor includes a centrifugal oil pump, oil level sight glass, and an oil charging valve.

**Refrigerant Management - R-410A**

Each compressor shall have crankcase heaters installed, properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

**Unit Control - R410A**

Factory provided 115-volt control circuit includes fusing and control power transformer. The unit is wired with magnetic contactors for compressor and condenser motors, three-leg solid-state compressor overload protection, and high/low pressure cutouts. Charge isolation, reset, relay and anti-recycle compressor timer is provided. Across-the-line start is standard.

**Single Circuited, Condenser Coils**

Condenser coils are single circuit having an all Aluminum Microchannel design. The coils are burst tested and leak tested. Factory installed liquid line service valves are standard.

**Condenser Fans - R-410A**

Condenser fans are direct driven with motors having thermal overload protection and permanently lubricated ball bearings.

**Low Ambient Control R-410A**

Low ambient option extends unit operation from 40 F to 0 F (4.5 to -17.8 C) by utilizing an external damper assembly for head pressure control.

**Split System Air Handlers**

**General -**

- Completely factory assembled
- Convertible for horizontal or vertical configuration
- Convertible for cooling only or heat pump application
- Convertible for left or right external connections (refrigerant and/or electrical)
- Convertible for front or bottom air return
- Nitrogen holding charge

**Casing**

- Zinc coated, heavy gauge, galvanized steel
- Weather resistant baked enamel finish
- Access panels with captive screws
- Completely insulated with foil faced, cleanable, fire retardant, permanent, odorless glass fiber material

**Refrigeration System**

- Distributor(s)
- Thermal expansion valves (TXVs)

**Evaporator Coil**

- Draw-through airflow
- Dual circuits are interlaced/intertwined
- Double sloped, removable, cleanable, composite drain pan
- Four drain pan positions

**Indoor Fan**

- Double inlet, double width, forward curved, centrifugal type fan
- Permanently lubricated bearings

**Indoor Motor**

- Thermal overload protection
- Permanently lubricated bearings
- Meet energy policy of 1992 (EPA/ACT)
- Optional oversized motors for high static applications

**Controls - (TWE)**

- Completely internally wired
- Colored and keyed connectors, colored wires
- Magnetic indoor fan contactor
- Detachable low voltage connectors
- Single point power entry
- Evaporator defrost control

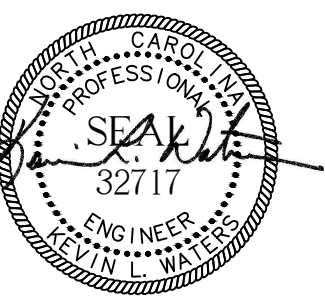
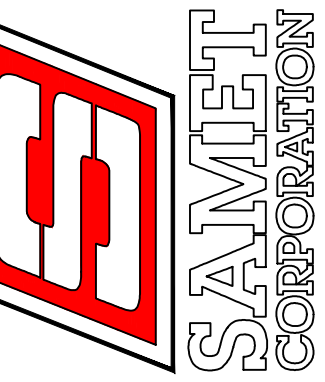
**Filters**

- MERV 8 high efficiency filters

**Electric Heaters**

- Heavy duty nickel chromium elements
- Single point power entry
- Terminal strip connections

**Systems Contractors, LLC**  
Established 1977



04/28/2023

**ALAMANCE/BUTLINGTON  
SCHOOL SYSTEMS  
ALTAHAW-OSSPEE MS**  
2832 N. North Carolina Highway 87, Elon, NC 27744

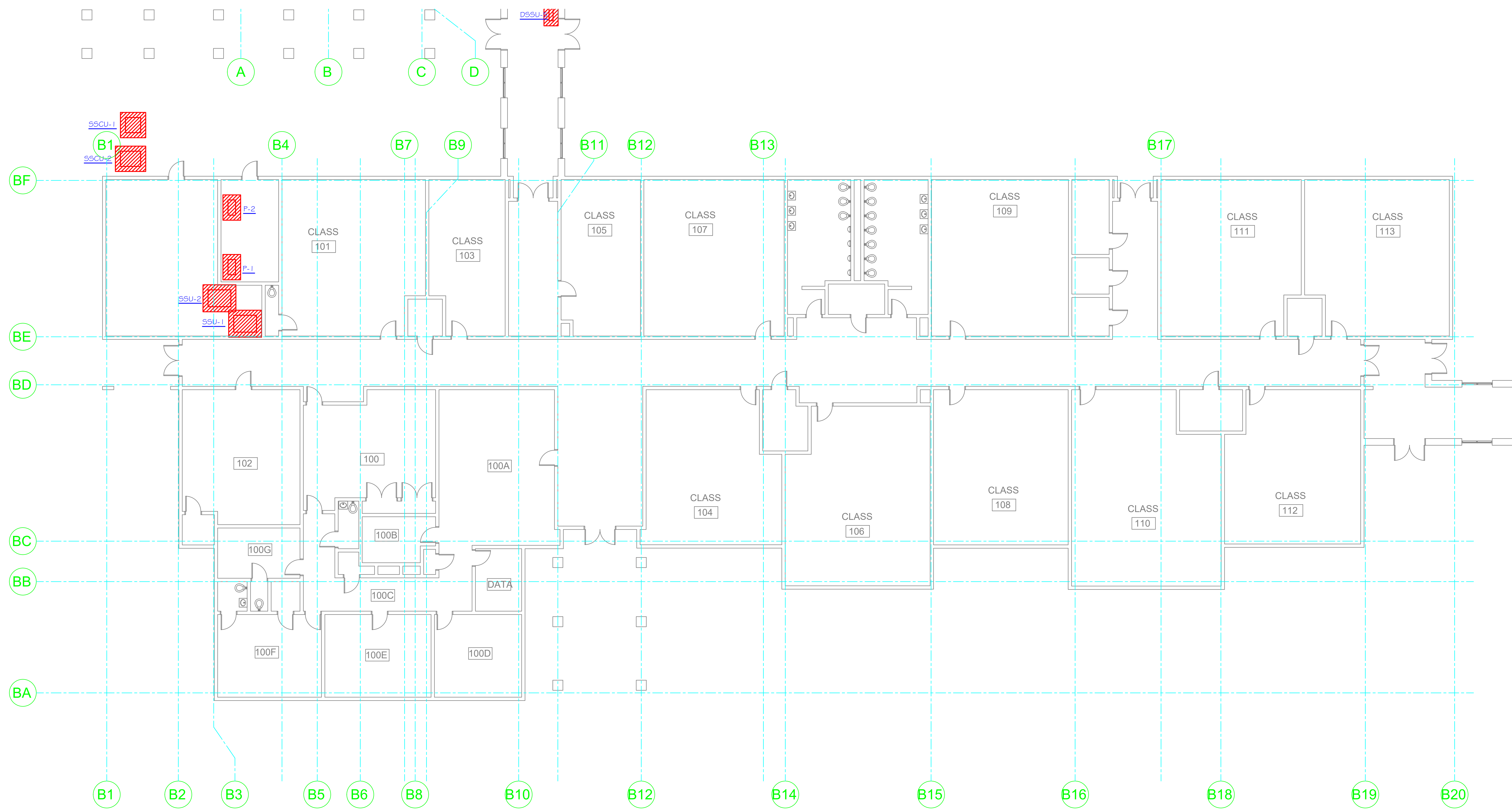
**MECHANICAL  
SPECIFICATIONS**


REVISIONS	DATE
REVISED	06/16/23

DRAWN BY: M.HARRISON  
APPROVED BY: K.WATERS  
DATE: 04/28/2023  
PLOT SCALE: 1:1  
FILE: A-4216\_MO.1.DWG

FOR  
CONSTRUCTION

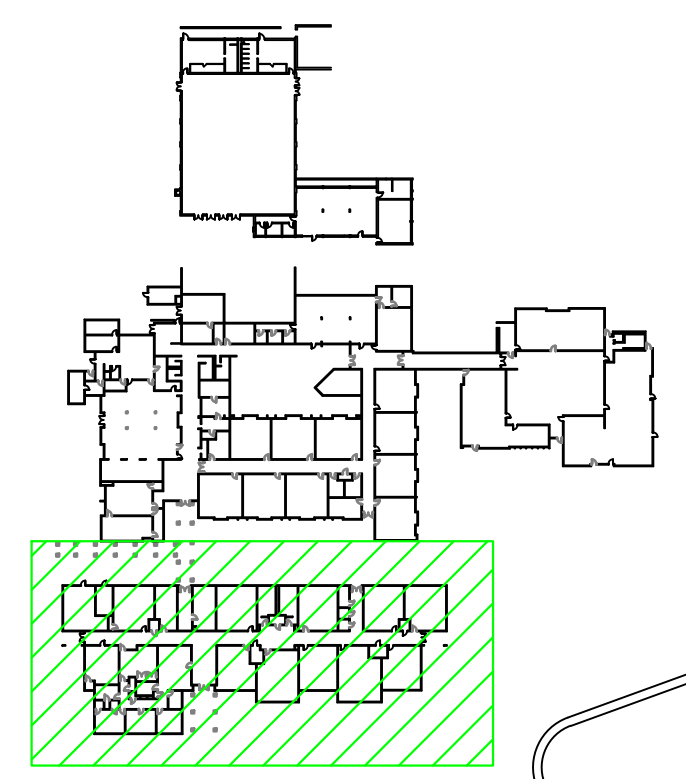
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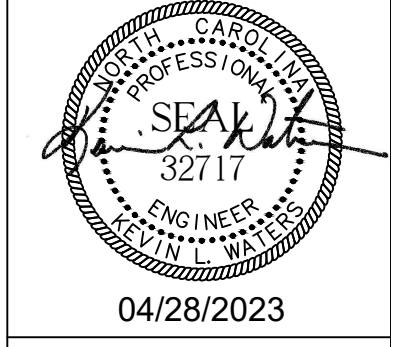
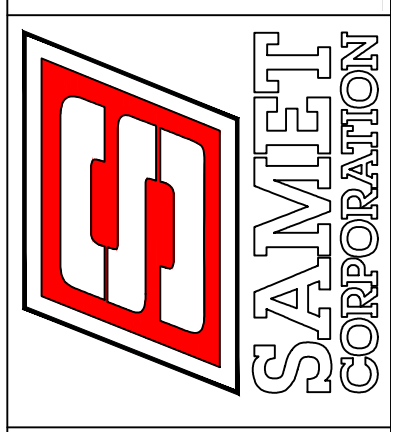
 DEMOLITION

**PARTIAL - LOWER LEVEL PLAN  
CLASSROOMS**  
SCALE: 1/8"=1'-0"

- NOTES:**
1. REMOVE A/C UNIT INLET DUCT TRANSITION THRU DISCHARGE DUCT TRANSITION, INCLUDING THE A/C UNIT.
  2. REMOVE EXISTING ELECTRICAL FROM A/C UNIT TO DISCONNECT INCLUDING WIRE AND CONDUIT.
  3. REMOVE REFRIGERANT PIPING SUFFICIENT TO REMOVE A/C UNIT.
  4. REMOVE HOT WATER PIPING SUFFICIENT TO REMOVE PUMPS.



FOR  
CONSTRUCTION

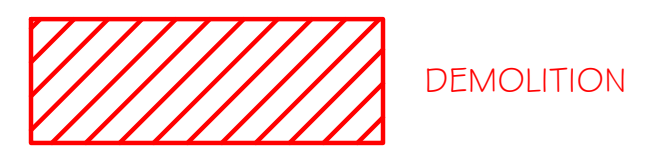
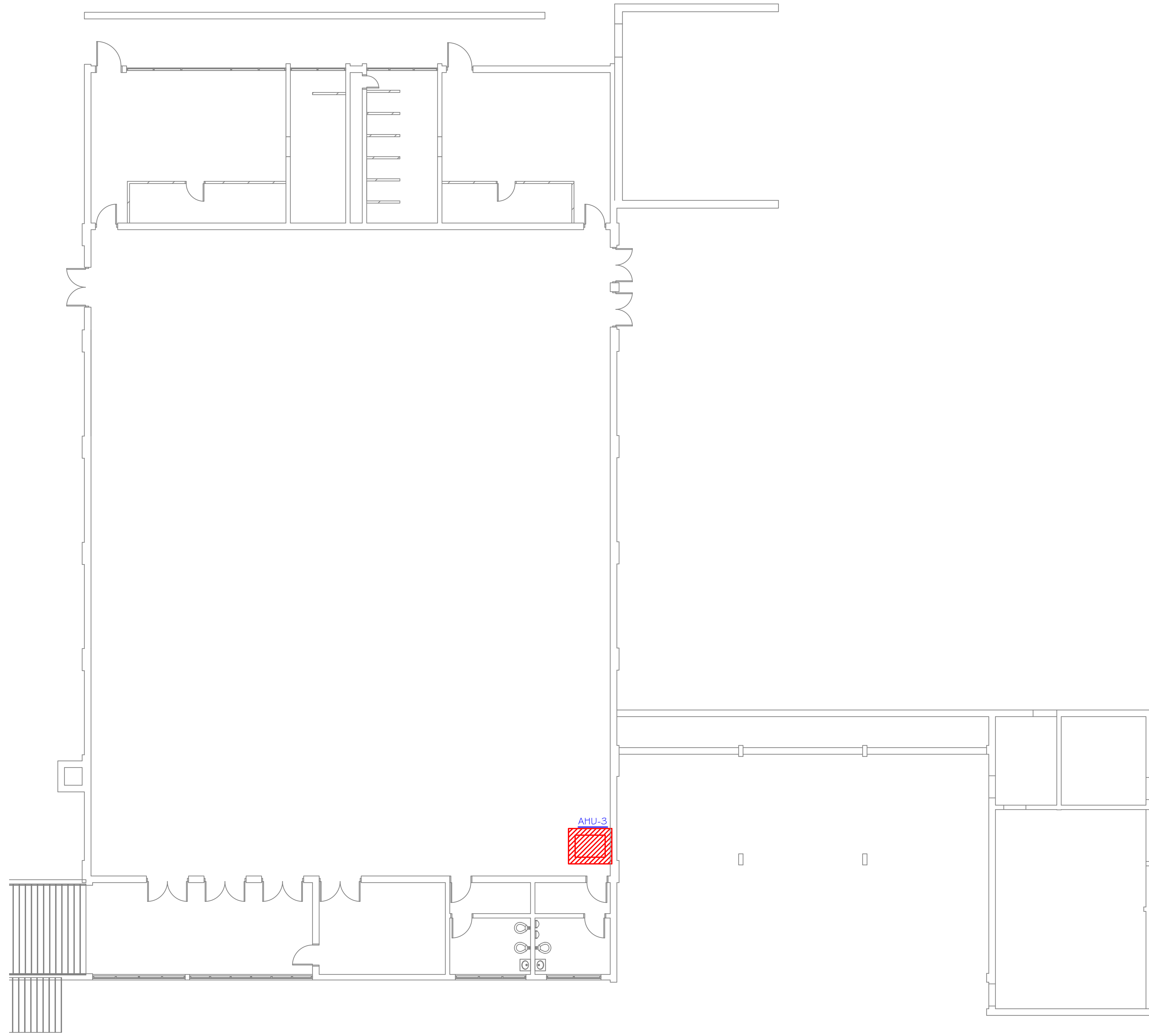


REVISIONS	DATE

DRAWN BY: M.HARRISON  
APPROVED BY: K.WATERS  
DATE: 04/28/2023  
PLOT SCALE: 1:1  
FILE: A-4216\_M1.0.DWG  
SHEET NUMBER:

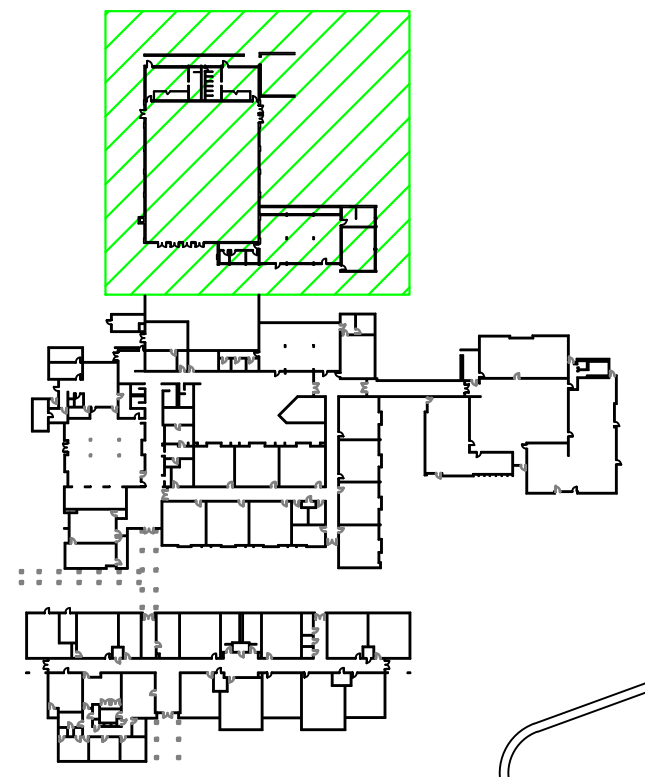






PARTIAL - UPPER LEVEL PLAN  
GYMNASIUM/LIBRARY  
SCALE: 1/8"=1'-0"

- NOTES:
1. REMOVE A/C UNIT INLET DUCT TRANSITION THRU DISCHARGE DUCT TRANSITION. INCLUDING THE A/C UNIT BELOW GYM FLOOR.
  2. REMOVE EXISTING ELECTRICAL FROM A/C UNIT TO DISCONNECT INCLUDING WIRE AND CONDUIT.



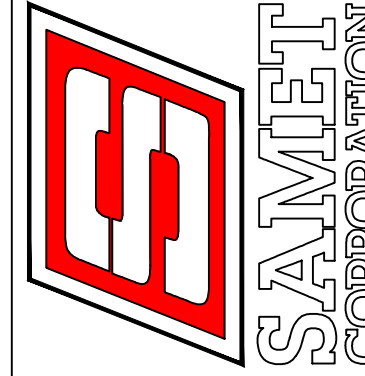
FOR CONSTRUCTION

REVISIONS	DATE

DRAWN BY: M.HARRISON  
 APPROVED BY: R.PITTS  
 DATE: 04/28/2023  
 PLOT SCALE: 1:1  
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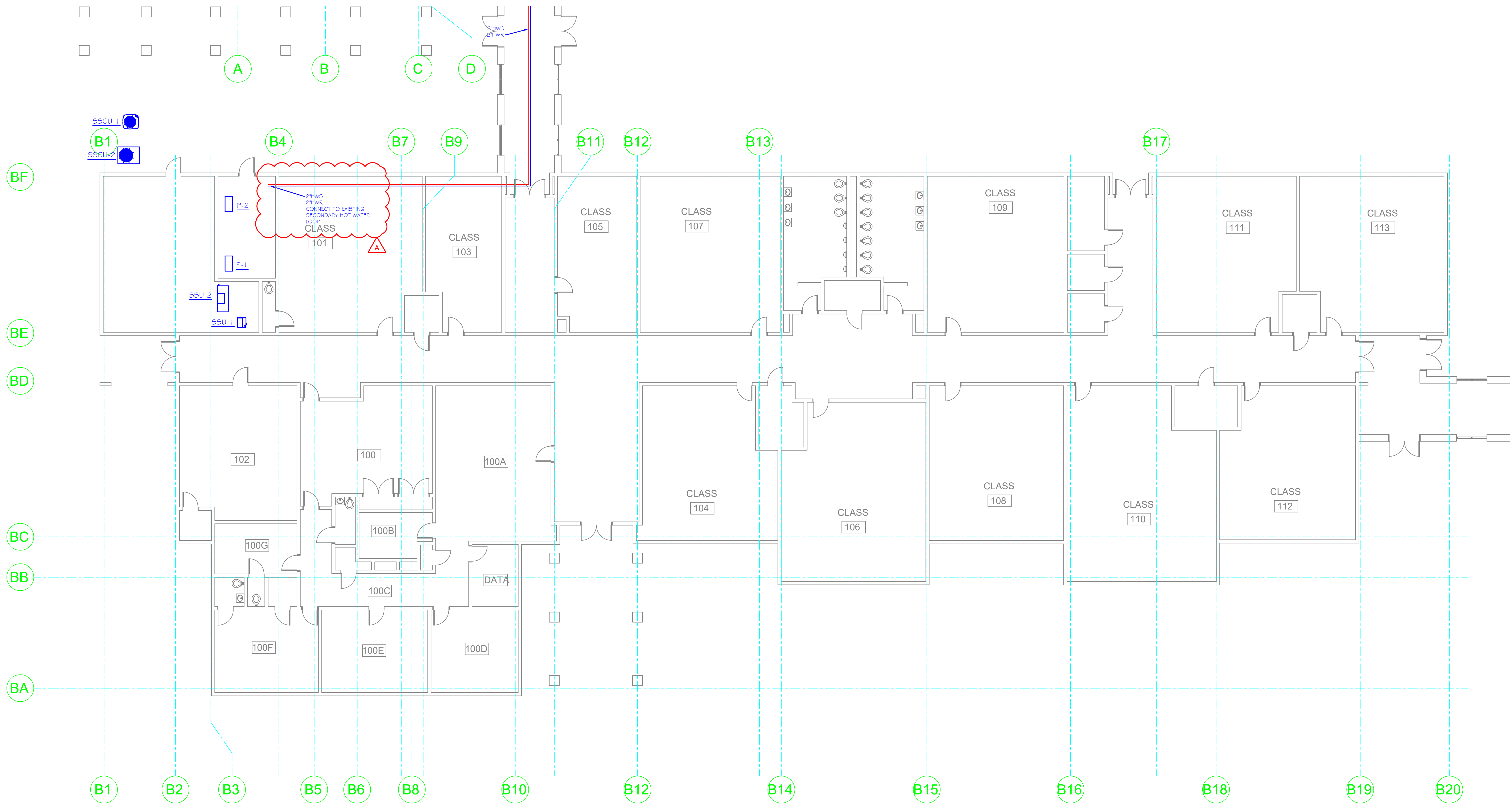
MD1.3

ALAMANCE/BUTLINGTON  
 SCHOOL SYSTEMS  
 ALTAMAHAW-OSSPEE MS  
 2832 N. North Carolina Highway 87, Elon, NC 27244

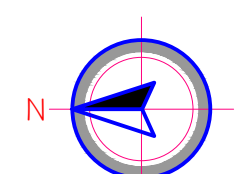


Systems Contractors, LLC  
 Established 1977  
 Commercial & Industrial HVAC  
 Custom Air Handling Units \* HVAC Service  
 P.O. Box 16023, Greensboro, North Carolina, 27416  
 Telephone 336-763-8969 \* Fax 336-449-0297

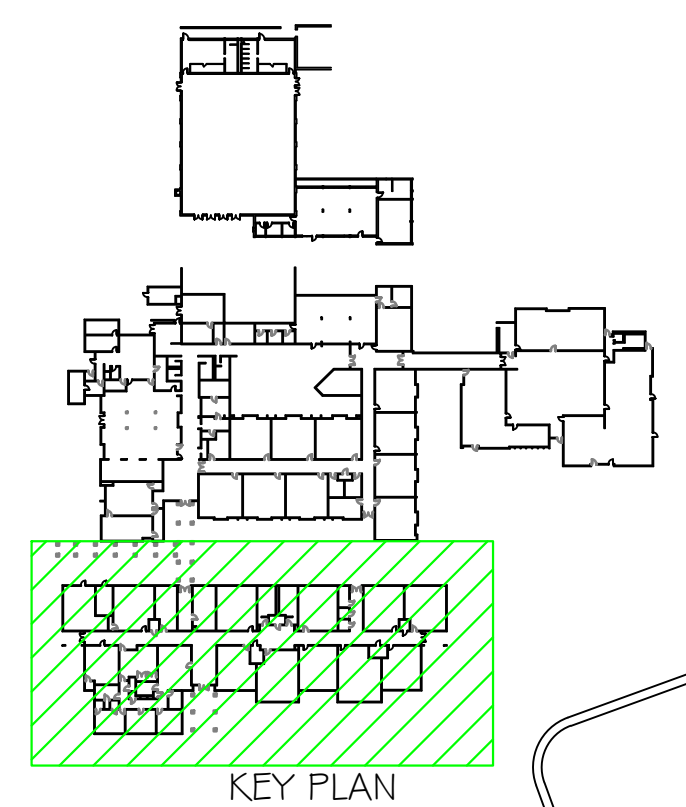




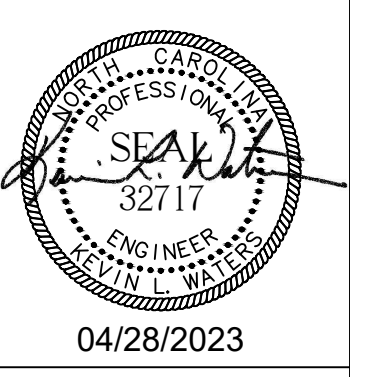
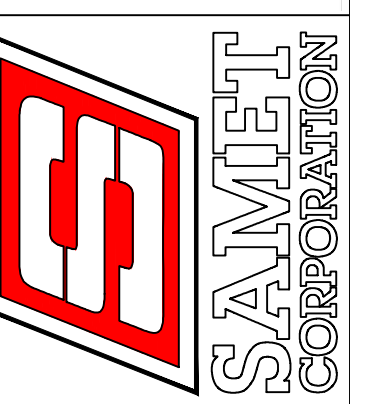
PARTIAL - LOWER LEVEL PLAN  
CLASSROOMS  
SCALE: 1/8"=1'-0"



- NOTES:
1. PROVIDE NEW A/C UNIT (PER SCHEDULE), TRANSITIONS AND FLEXIBLE DUCTWORK PER DETAIL.
  2. PROVIDE NEW CONDUIT AND CONDUCTORS FROM DISCONNECT TO A/C UNIT. VERIFY EXISTING CIRCUIT SIZE MATCHES ORIGINAL DRAWING/NEW EQUIPMENT.
  3. PROVIDE NEW PUMPS AND ACCESSORIES PER SCHEDULE # DETAIL.
  4. PROVIDE NEW CONDUIT AND CONDUCTORS FROM DISCONNECT TO PUMP. VERIFY EXISTING CIRCUIT SIZE MATCHES ORIGINAL DRAWING/NEW EQUIPMENT.
  5. CONNECT REFRIGERANT LINES TO NEW A/C UNIT. VERIFY SIZES MATCH NEW EQUIPMENT REQUIREMENTS.

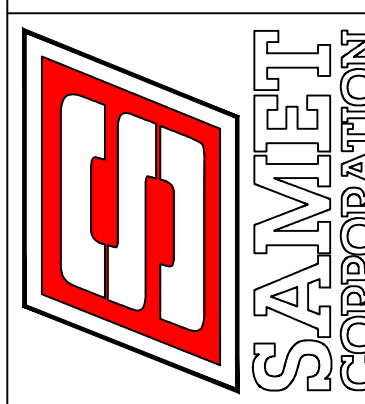


FOR CONSTRUCTION



REVISIONS	DATE
REVISED	06/16/23

DRAWN BY: M.HARRISON  
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FILE: A-4216\_M1.0.DWG  
SHEET NUMBER:



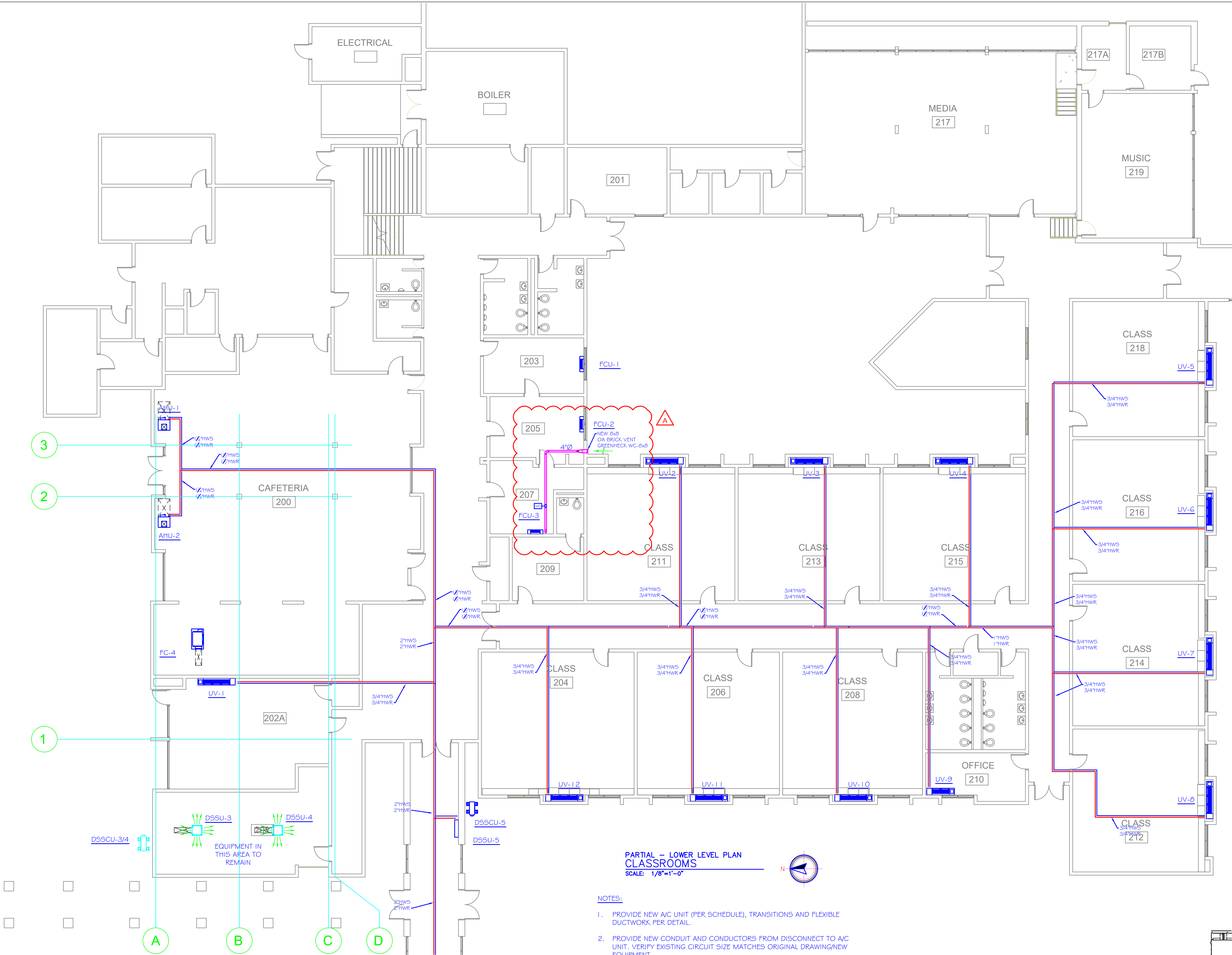
04/28/2023

**MECHANICAL  
 HVAC  
 PARTIAL PLAN**

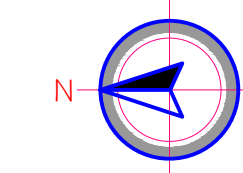
REVISIONS	DATE
REVISED	06/16/23

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 APPROVED BY: K. WATERS  
 DATE: 04/28/2023  
 PLOT SCALE: 1:1  
 FILE: A-4216\_M1.0.DWG  
 SHEET NUMBER:

**M1.1**

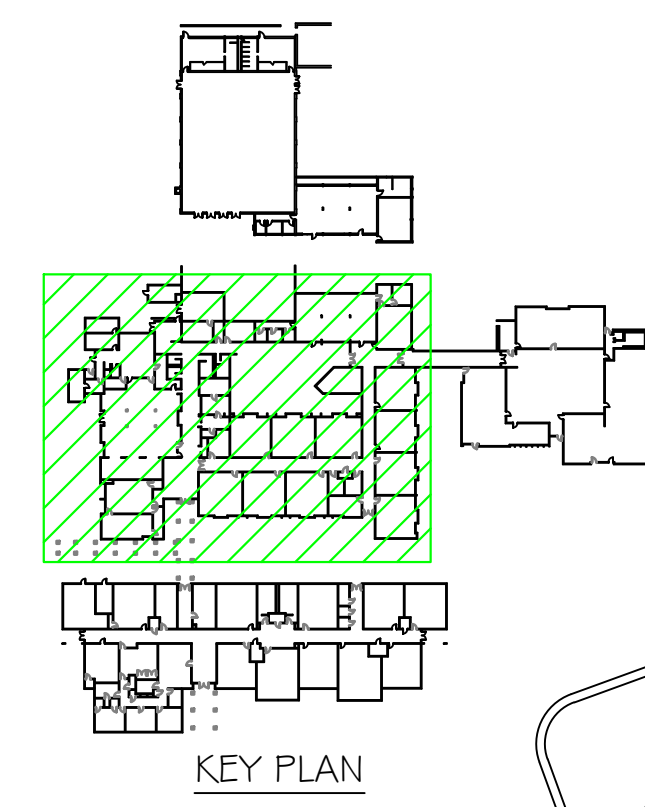


**PARTIAL - LOWER LEVEL PLAN  
 CLASSROOMS**  
 SCALE: 1/8"=1'-0"

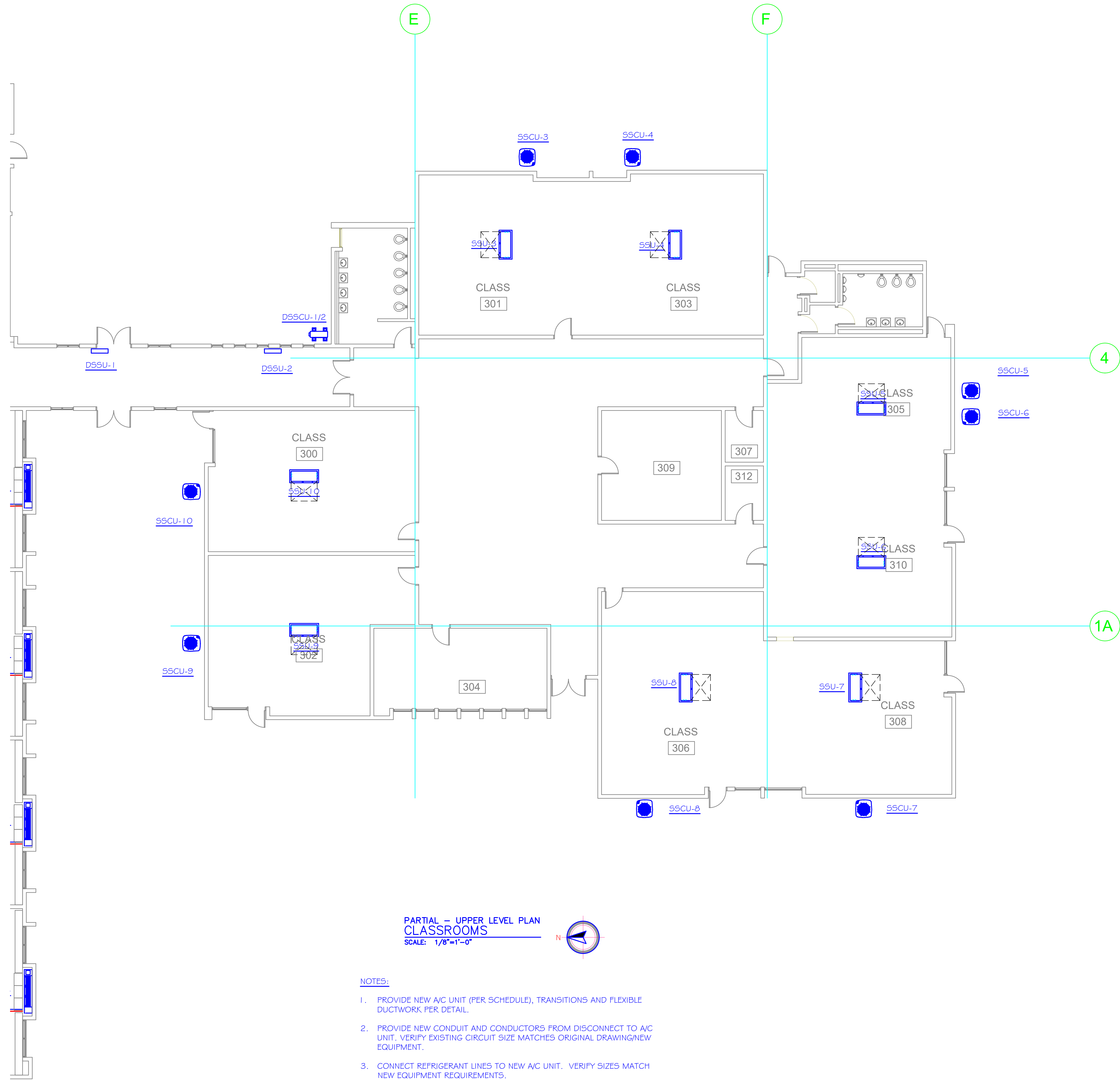


**NOTES:**

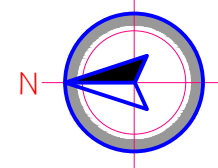
1. PROVIDE NEW AC UNIT (PER SCHEDULE), TRANSITIONS AND FLEXIBLE DUCTWORK PER DETAIL.
2. PROVIDE NEW CONDUIT AND CONDUCTORS FROM DISCONNECT TO A/C UNIT. VERIFY EXISTING CIRCUIT SIZE MATCHES ORIGINAL DRAWING/NEW EQUIPMENT.
3. PROVIDE NEW CHWS/R AND HWS/R PIPING FOR NEW A/C UNIT PER DETAIL.
4. PROVIDE NEW HWS/R PIPING TO NEW UNIT VENTILATORS PER DETAIL.



**FOR  
 CONSTRUCTION**

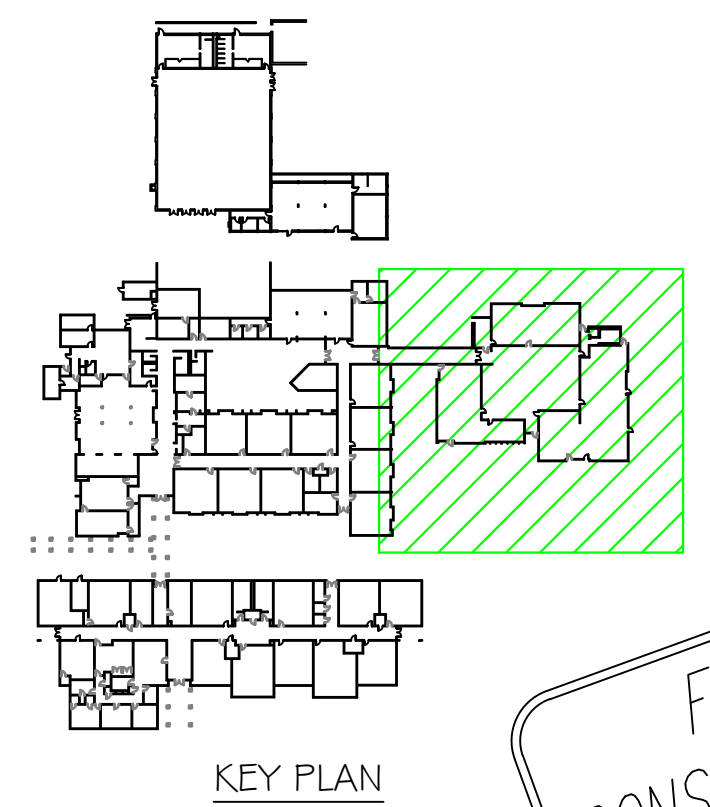


PARTIAL - UPPER LEVEL PLAN  
 CLASSROOMS  
 SCALE: 1/8"=1'-0"



NOTES:

1. PROVIDE NEW A/C UNIT (PER SCHEDULE), TRANSITIONS AND FLEXIBLE DUCTWORK, PER DETAIL.
2. PROVIDE NEW CONDUIT AND CONDUCTORS FROM DISCONNECT TO A/C UNIT. VERIFY EXISTING CIRCUIT SIZE MATCHES ORIGINAL DRAWING/NEW EQUIPMENT.
3. CONNECT REFRIGERANT LINES TO NEW A/C UNIT. VERIFY SIZES MATCH NEW EQUIPMENT REQUIREMENTS.



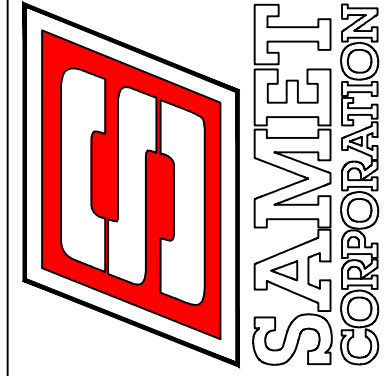
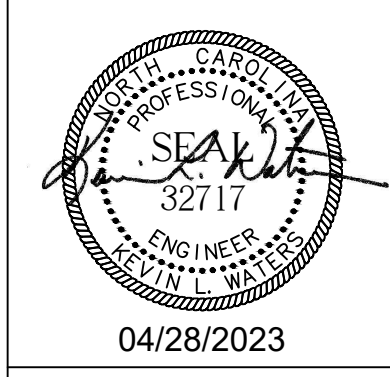
FOR CONSTRUCTION

REVISIONS	DATE

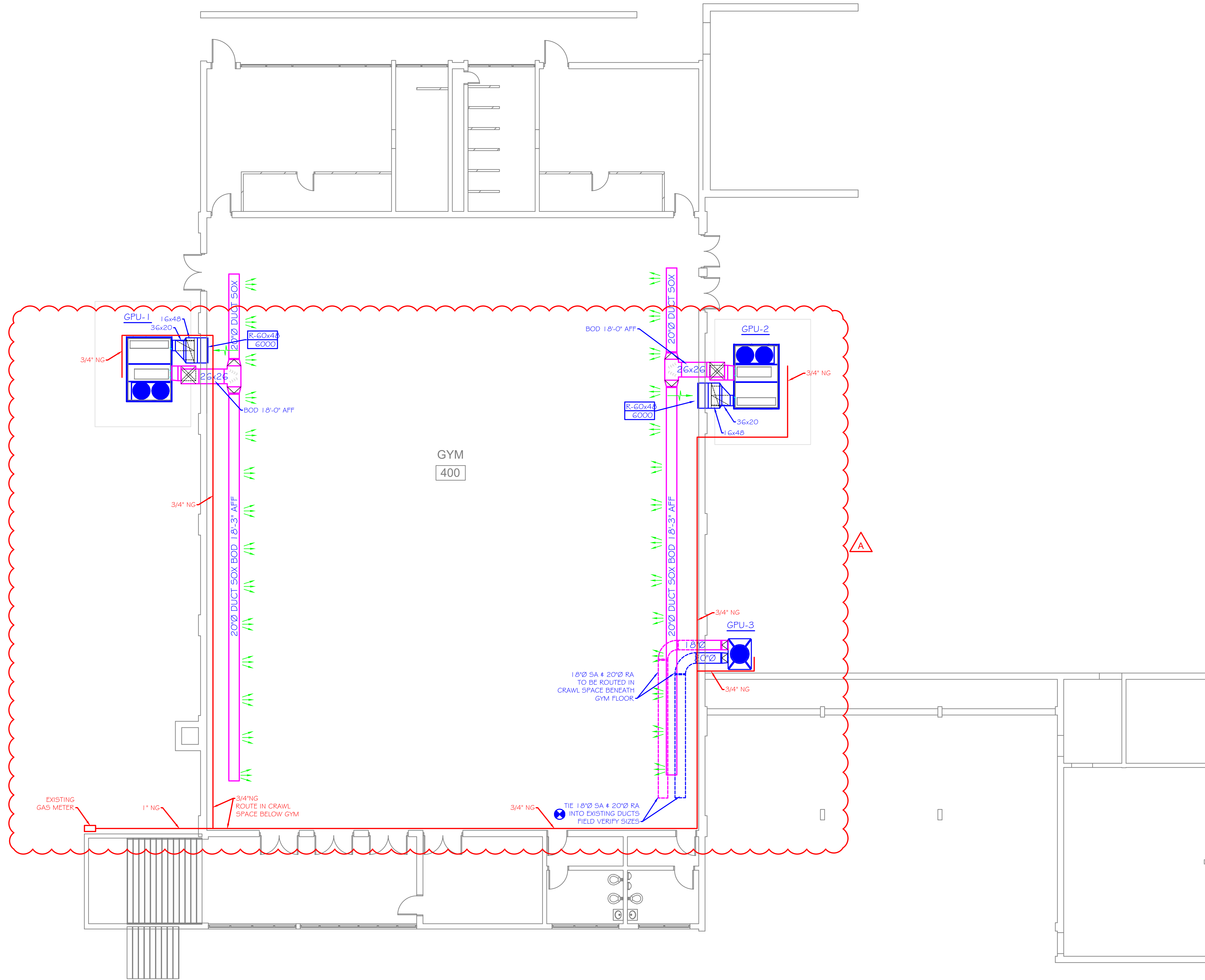
DRAWN BY: M.HARRISON  
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 SHEET NUMBER:

M1.2

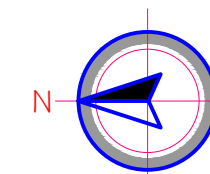
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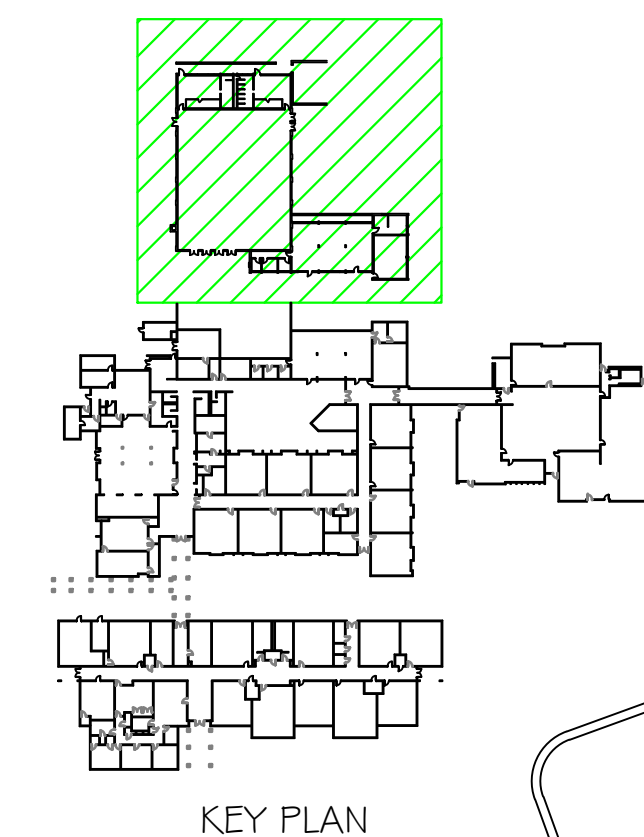


PARTIAL - UPPER LEVEL PLAN  
 GYMNASIUM/ADMINISTRATIVE  
 SCALE: 1/8"=1'-0"

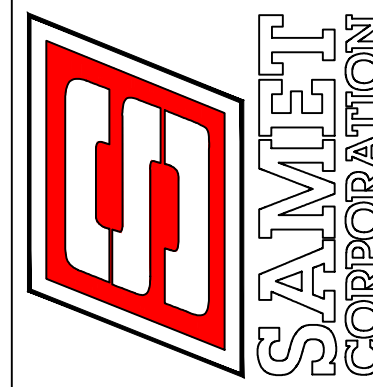


NOTES:

1. PROVIDE NEW A/C UNIT (PER SCHEDULE).
2. PROVIDE DUCTSOX HANGER PER DETAILS.
3. PROVIDE NEW CONDUIT AND CONDUCTORS FROM DISCONNECT TO A/C UNIT. VERIFY EXISTING CIRCUIT SIZE MATCHES ORIGINAL DRAWING/NEW EQUIPMENT.



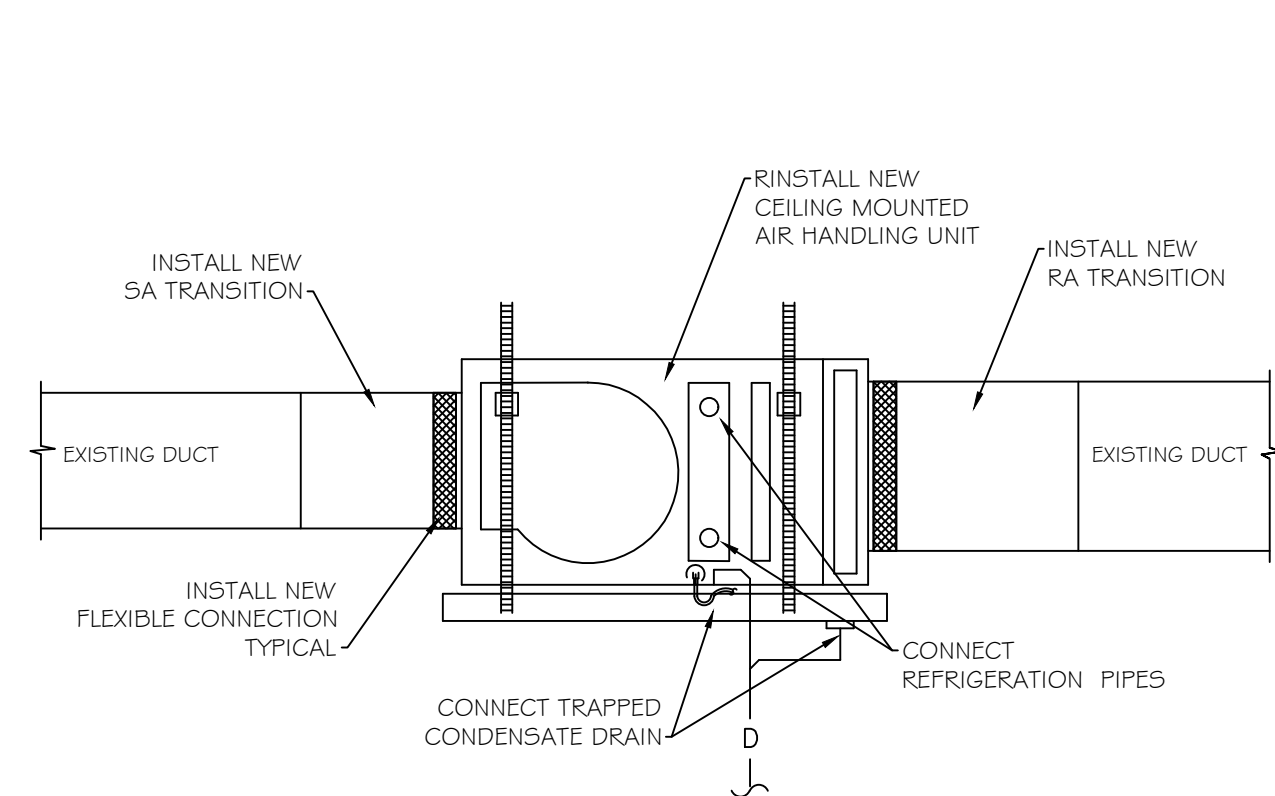
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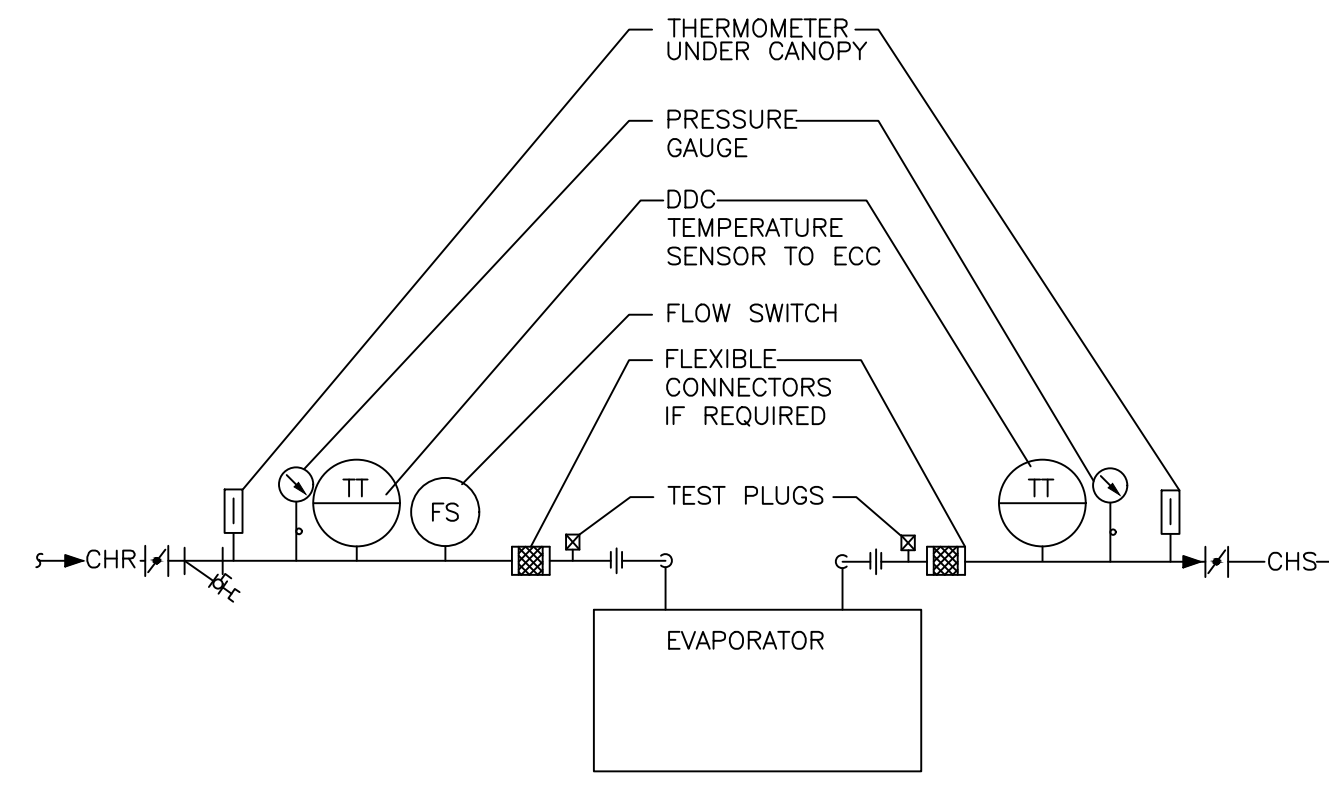
04/28/2023

REVISIONS	DATE
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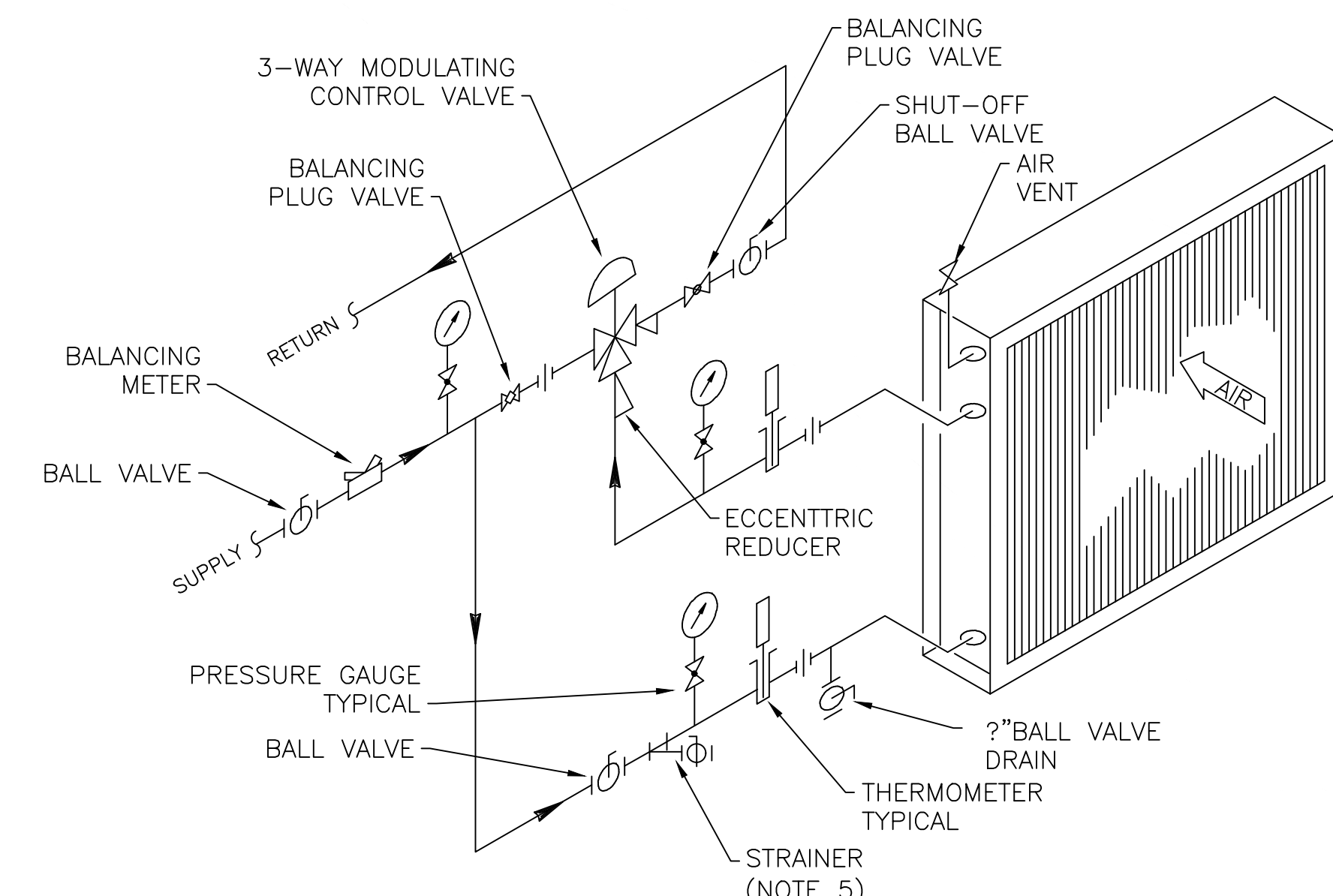
DRAWN BY: M.HARRISON  
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**1 TYPICAL CEILING MOUNTED AHU DETAIL**  
NTS

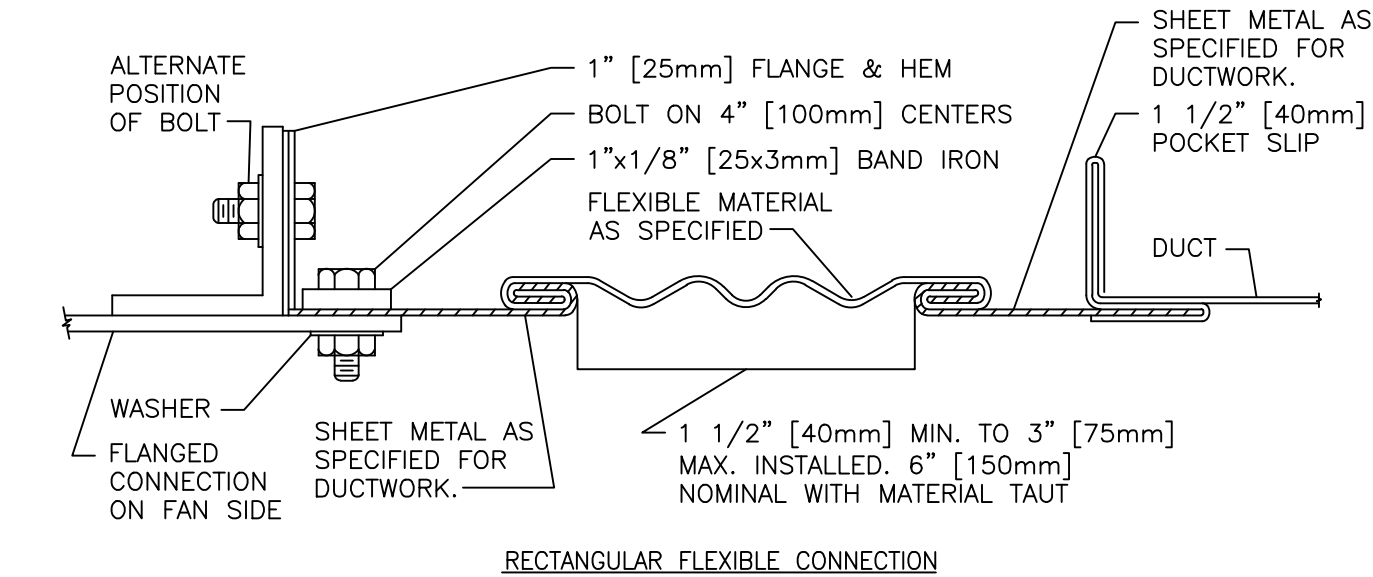


**2 AIR COOLED CHILLER - PIPING CONNECTIONS**  
NTS

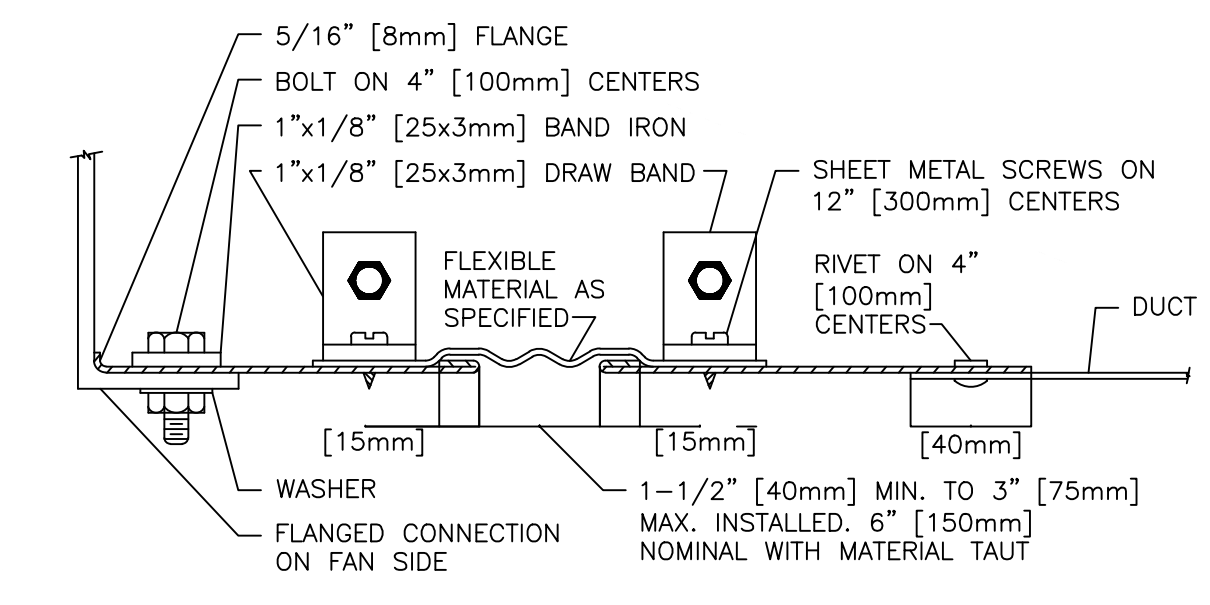


- NOTE:**
1. WHERE PIPE SIZE IS 2 1/2" OR SMALLER, PROVIDE BALL VALVE IN LIEU OF BUTTERFLY VALVE.
  2. PROVIDE THERMOMETERS AND PRESSURE GAUGES, PER SPECS.
  3. INSTALL UNIONS IN PIPE LOCATION OUT OF WAY TO PULL COIL OUT
  4. PROVIDE BALANCE METER IN THE SUPPLY PIPE FOR AHU COIL WITH 50 GPM OR MORE
  5. PROVIDE BALL VALVE DRAIN VALVE AND DRAIN LINE TO FLOOR DRAIN.

**3 TYPICAL WATER COIL PIPING W/ 3-WAY CONTROL VALVE DETAIL**  
NTS

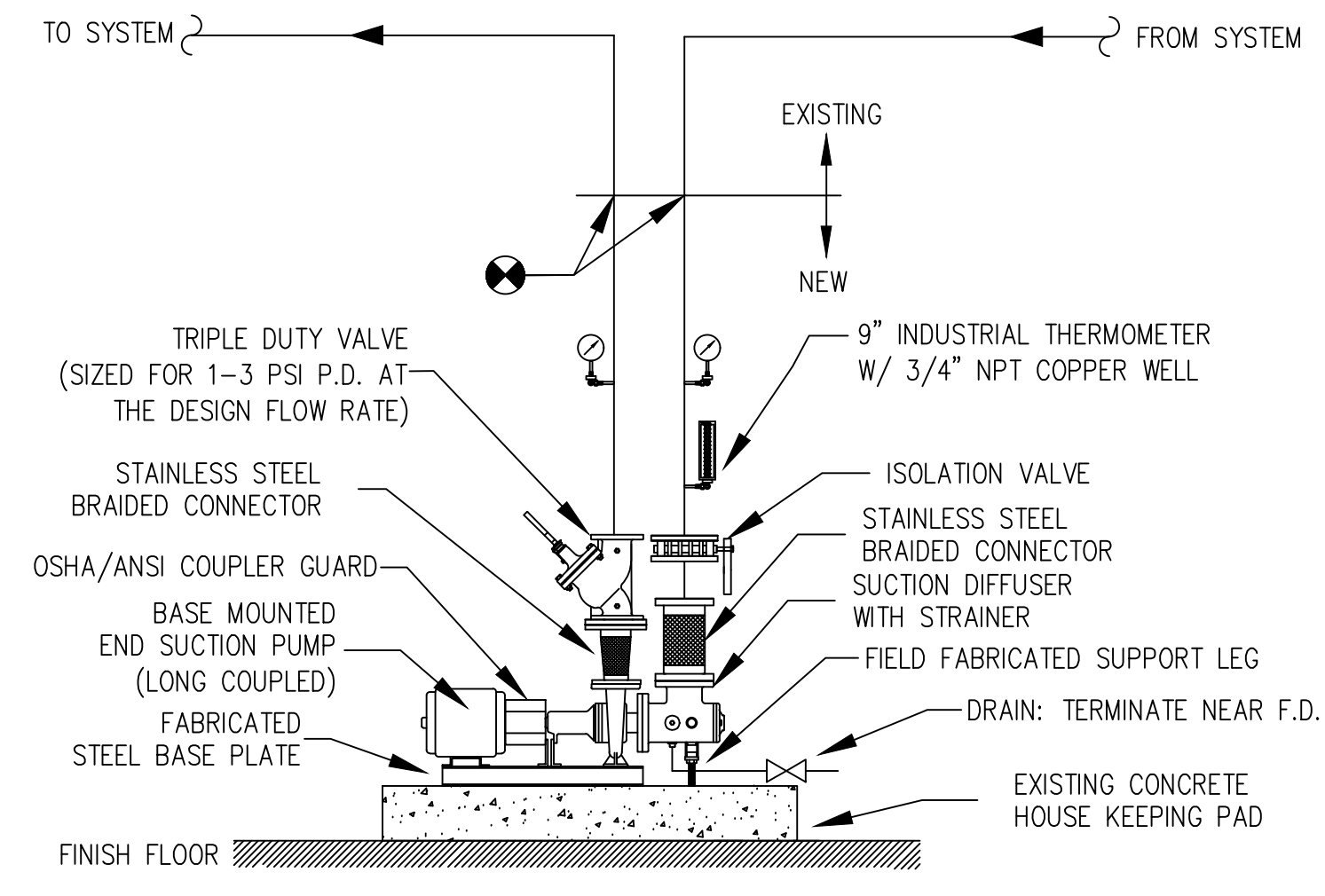


RECTANGULAR FLEXIBLE CONNECTION

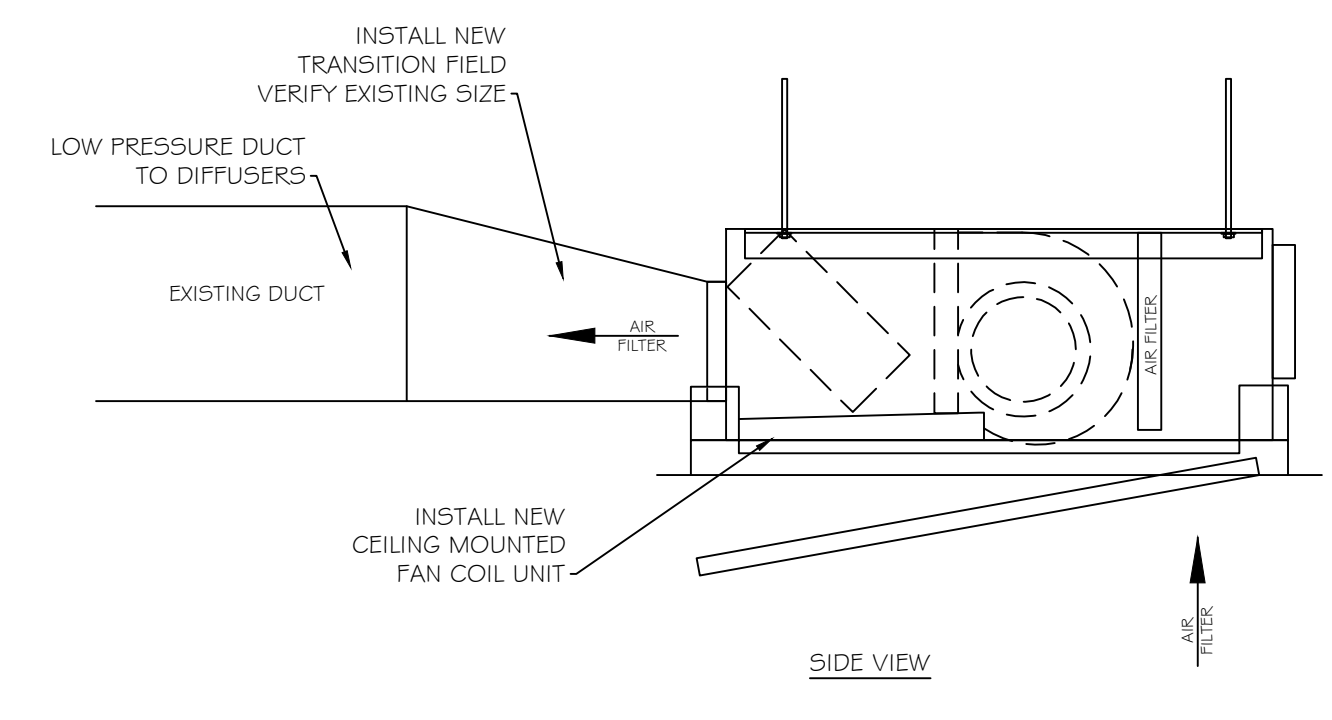


ROUND FLEXIBLE CONNECTION

**4 FLEXIBLE CANVAS CONNECTIONS**  
NTS

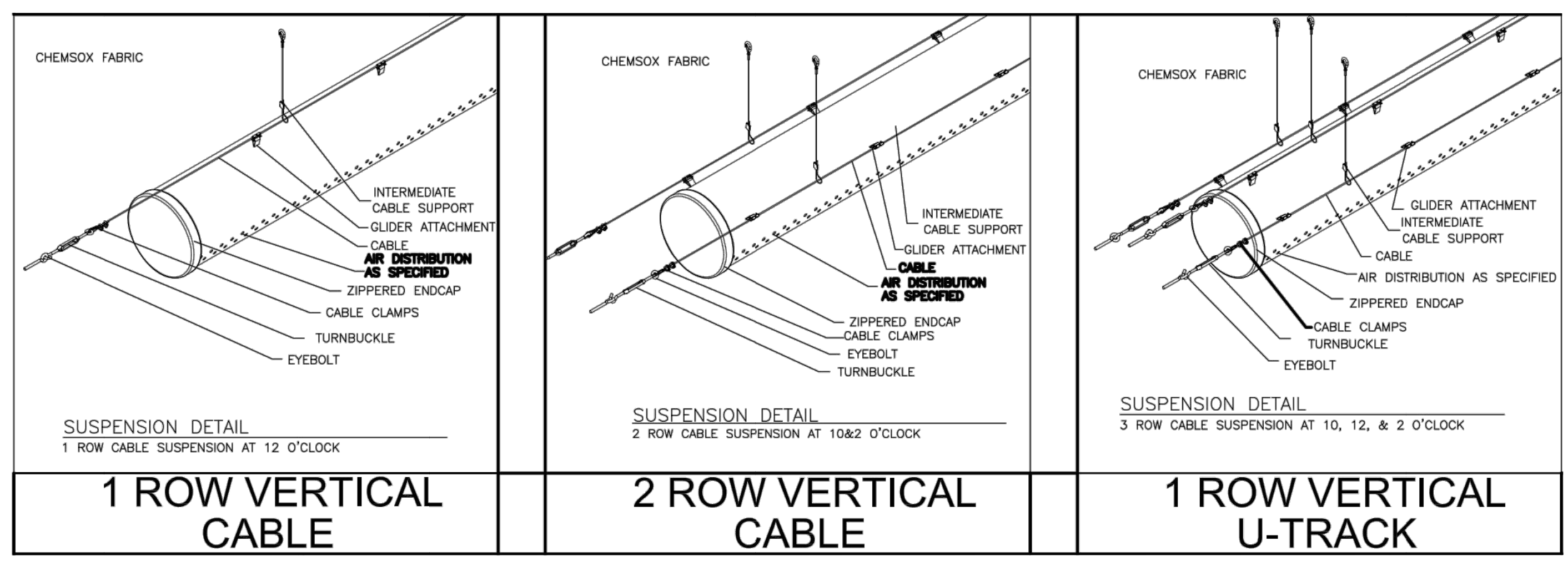


**5 END SUCTION PUMP DETAIL - (BASE MOUNTED ON A HOUSEKEEPING PAD)**  
NTS

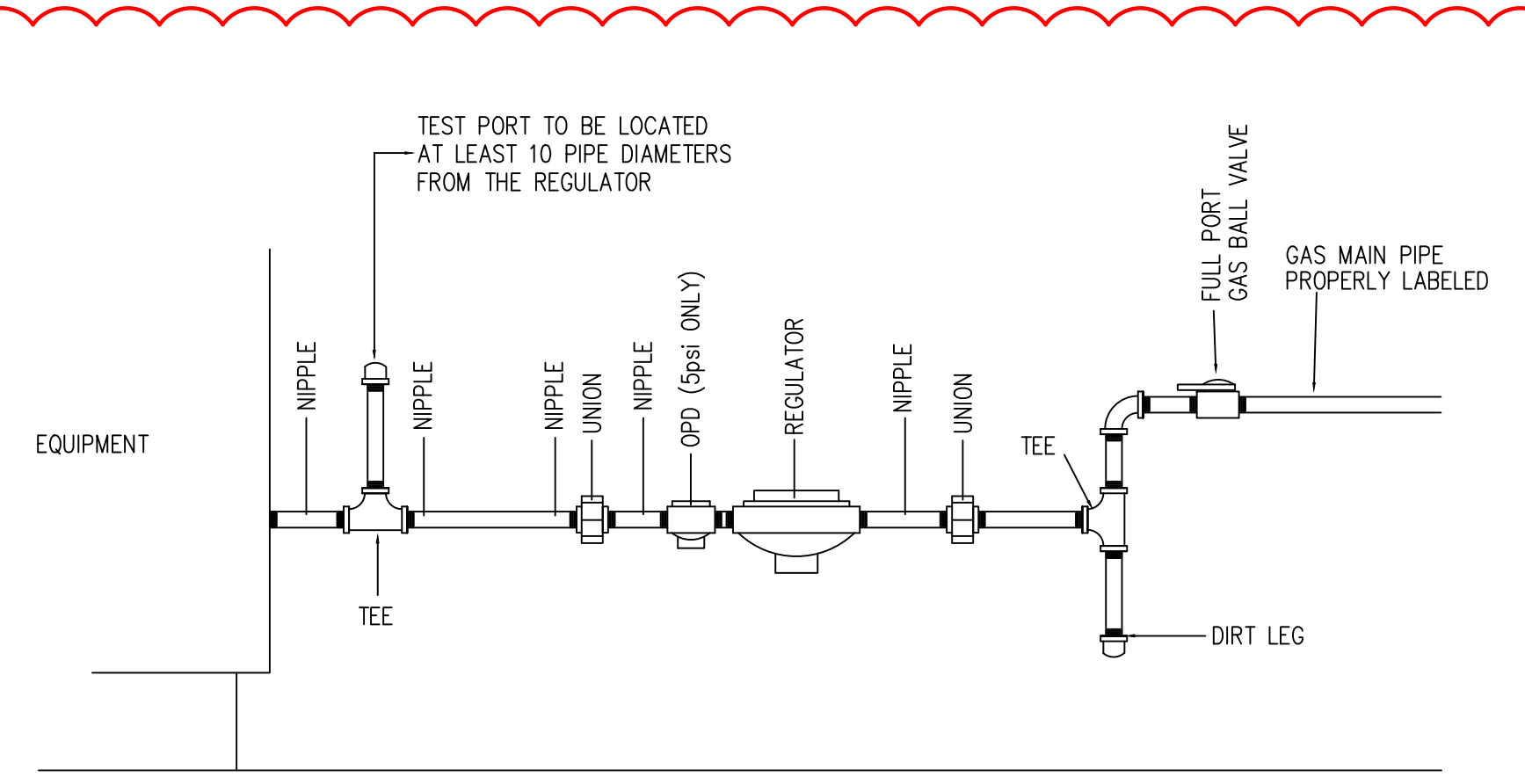


- NOTE:**
1. RECONNECT LOGAS REFRIGERATION LINES
  2. RECONNECT POWER
  3. RECONNECT TRAPPED CONDENSATE DRAIN

**6 TYPICAL FAN COIL DETAIL**  
NTS

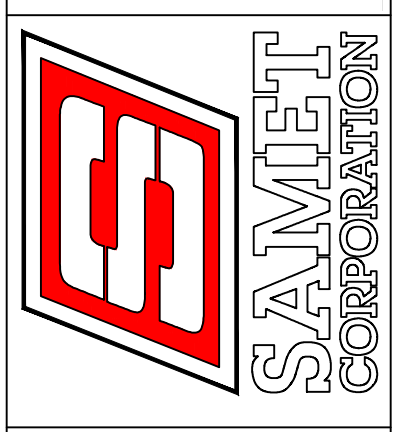


**7 TYPICAL DUCTSOX CABLE HANGER DETAIL**  
NTS



- 1.) MUSHROOM STYLE VENT CAPS REQUIRED FOR OUTDOOR INSTALLATION.
- 2.) PIPING OUTDOORS MUST BE PAINTED.
- 3.) PIPE SIZE BETWEEN THE REGULATOR AND THE EQUIPMENT MUST BE A MINIMUM OF THE EQUIPMENT CONNECTION SIZE.
- 4.) ALL PIPING, INCLUDING DIRT LEGS, MUST HAVE 3-1/2" CLEARANCE FROM THE GROUND, ROOF, ETC.
- 5.) GAS SHUTOFF VALVE & DIRT LEG MUST BE WITHIN 6'-0" OF THE UNIT.
- 6.) GAS REGULATOR VENT MUST BE 5'-0" AWAY FROM THE OUTSIDE AIR INTAKE.
- 7.) GAS REGULATOR VENT MUST BE A MINIMUM 3'-0" AWAY FROM EQUIPMENT COMBUSTION AIR VENT.

**8 GAS PIPING DETAIL**  
NTS



04/28/2023

REVISIONS	DATE
REVISED	06/16/23

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PLOT SCALE: 1:1  
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SHEET NUMBER:

FOR  
CONSTRUCTION

## 2018 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - ELECTRICAL SUMMARY

### C401 METHOD OF COMPLIANCE

- 2018 NCECC CHAPTER 4  
 N/A BASED ON PROJECT SCOPE  
 NC SPECIFIC COMCHECK PROVIDED  
 ASHRAE 90.1-2013

### C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS

- C406.2 EFFICIENT MECH EQUIPMENT  
 C406.3 REDUCED LTG DENSITY  
 C406.4 ENHANCED DIGITAL LTG CNTLS  
 NOT APPLICABLE BASED ON PROJECT SCOPE  
 C406.5 ON-SITE RENEWABLE ENERGY  
 C406.6 DEDICATED OA SYSTEM  
 C406.7 HI-EFF SERVICE WTR HTG  
 C406.7.1 WTR HTG LOAD FRACTION

### C405.2 - LIGHTING CONTROLS (MANDATORY REQUIREMENTS):

- LIGHTING SYSTEMS ARE PROVIDED WITH CONTROLS AS REQUIRED PER SECTION C405.2, EXCEPT WHERE EXEMPT.  
 NOT APPLICABLE

### C405.3 - EXIT SIGNS (MANDATORY REQUIREMENTS):

- INTERNALLY ILLUMINATED EXIT SIGNS DO NOT EXCEED 5 WATTS PER SIDE.  
 NOT APPLICABLE

### C405.4 - INTERIOR LIGHTING POWER REQUIREMENTS (PRESCRIPTIVE) (NON-EXEMPT):

- NOT APPLICABLE PER 2018 NCECC C503.1, EXCEPTION 2.G.

#### C405.4.1 - TOTAL CONNECTED INTERIOR LIGHTING POWER:

\_\_\_\_\_ WATTS SPECIFIED  
 \_\_\_\_\_ % REDUCTION OF SPECIFIED VS. ALLOWED  
 (APPLICABLE IF C406.1.2 IS SELECTED)

#### C405.4.2 - TOTAL ALLOWABLE INTERIOR LIGHTING POWER:

METHOD OF COMPLIANCE:  
 BUILDING AREA METHOD  
 SPACE-BY-SPACE METHOD  
 \_\_\_\_\_ WATTS ALLOWED

### C405.5.1 - EXTERIOR BUILDING LIGHTING POWER (NON-EXEMPT):

- NOT APPLICABLE

#### TOTAL CONNECTED EXTERIOR LIGHTING POWER:

\_\_\_\_\_ WATTS SPECIFIED

#### TOTAL ALLOWABLE EXTERIOR LIGHTING POWER:

\_\_\_\_\_ WATTS ALLOWED

### C405.6 - ELECTRICAL ENERGY CONSUMPTION (DWELLING UNITS):

- SEPARATE ELECTRICAL METERING HAS BEEN PROVIDED FOR EACH DWELLING UNIT IN GROUP R-2 BUILDINGS.  
 NOT APPLICABLE

### C405.7 - ELECTRICAL TRANSFORMERS (MANDATORY REQUIREMENTS):

- ELECTRICAL TRANSFORMERS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMENTS PER C405.7, EXCEPT WHERE EXEMPT.  
 NOT APPLICABLE

### C405.8 - ELECTRICAL MOTORS (MANDATORY REQUIREMENTS):

- ELECTRICAL MOTORS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMENTS PER C405.8, EXCEPT WHERE EXEMPT.  
 NOT APPLICABLE

### C408 - SYSTEM COMMISSIONING:

- PROJECT AREA IS LESS THAN 10,000 SQUARE FEET AND IS EXEMPT FROM THE SYSTEM COMMISSIONING REQUIREMENTS OF SECTION C408.  
 PROJECT AREA IS GREATER THAN 10,000 SQUARE FEET AND REQUIRES SYSTEM COMMISSIONING PER SECTION C408.

## SYMBOL SCHEDULE POWER

SYMBOL	DESCRIPTION
	WIRING SYSTEM CONCEALED IN WALL OR CEILING. WHEN SHOWN, CROSS LINES INDICATE NUMBER OF WIRES. (GROUND WIRES ARE NOT SHOWN).
	WIRING SYSTEM CONCEALED IN OR UNDER SLAB OR UNDERGROUND.
	WIRING SYSTEM EXPOSED.
	CONDUIT TURNED DOWN TO FLOOR BELOW.
	CONDUIT TURNED UP TO FLOOR ABOVE.
	BRANCH CIRCUIT HOMERUN TO PANEL.

## SYMBOL SCHEDULE POWER LEGEND

SYMBOL	DESCRIPTION
	JUNCTION BOX WITH CONNECTION TO EQUIPMENT SERVED. 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING.
	208/120V SINGLE PHASE PANELBOARD. PANEL IS EXISTING.
	480Y/277V THREE PHASE PANELBOARD. PANEL IS EXISTING.
	480-208Y/120V TRANSFORMER. TRANSFORMER IS EXISTING.
	FUSED HEAVY DUTY DISCONNECT SWITCH. NUMERALS INDICATE SWITCH RATING. NEMA 3R ENCLOSURE, UNLESS OTHERWISE NOTED. UNSHADED INDICATES NON-FUSED.

## EXISTING/DEMOLITION LEGEND

SYMBOL	DESCRIPTION
	HALFTONE SYMBOL INDICATES EXISTING
	DASHED SYMBOL INDICATES REMOVED

## ELECTRICAL SHEET INDEX

SHEET NUMBER	SHEET NAME
E0.1	ELECTRICAL LEGEND AND NOTES
E0.2	ELECTRICAL SPECIFICATIONS
E2.1	POWER FLOOR PLAN
E6.1	ELECTRICAL DETAILS
E7.1	ELECTRICAL DIAGRAMS

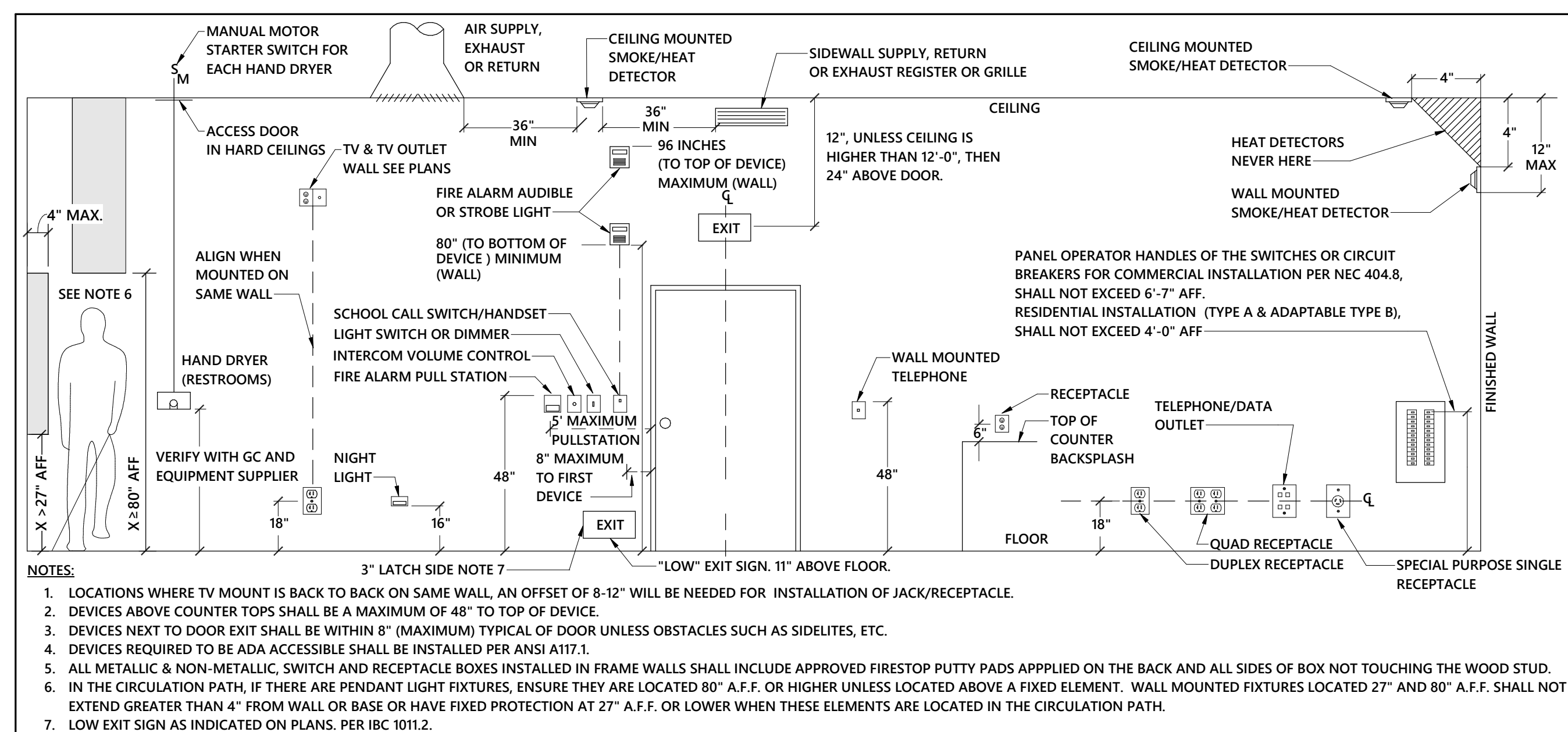
## ELECTRICAL FIXTURES LEGEND - COMMERCIAL

SYMBOL	DESCRIPTION
	WEATHERPROOF GROUND FAULT RECEPTACLE. NEMA 5-20R DUPLEX, CORROSION RESISTANT, WITH IN-USE COVER.

## NFPA FIRE ALARM LEGEND

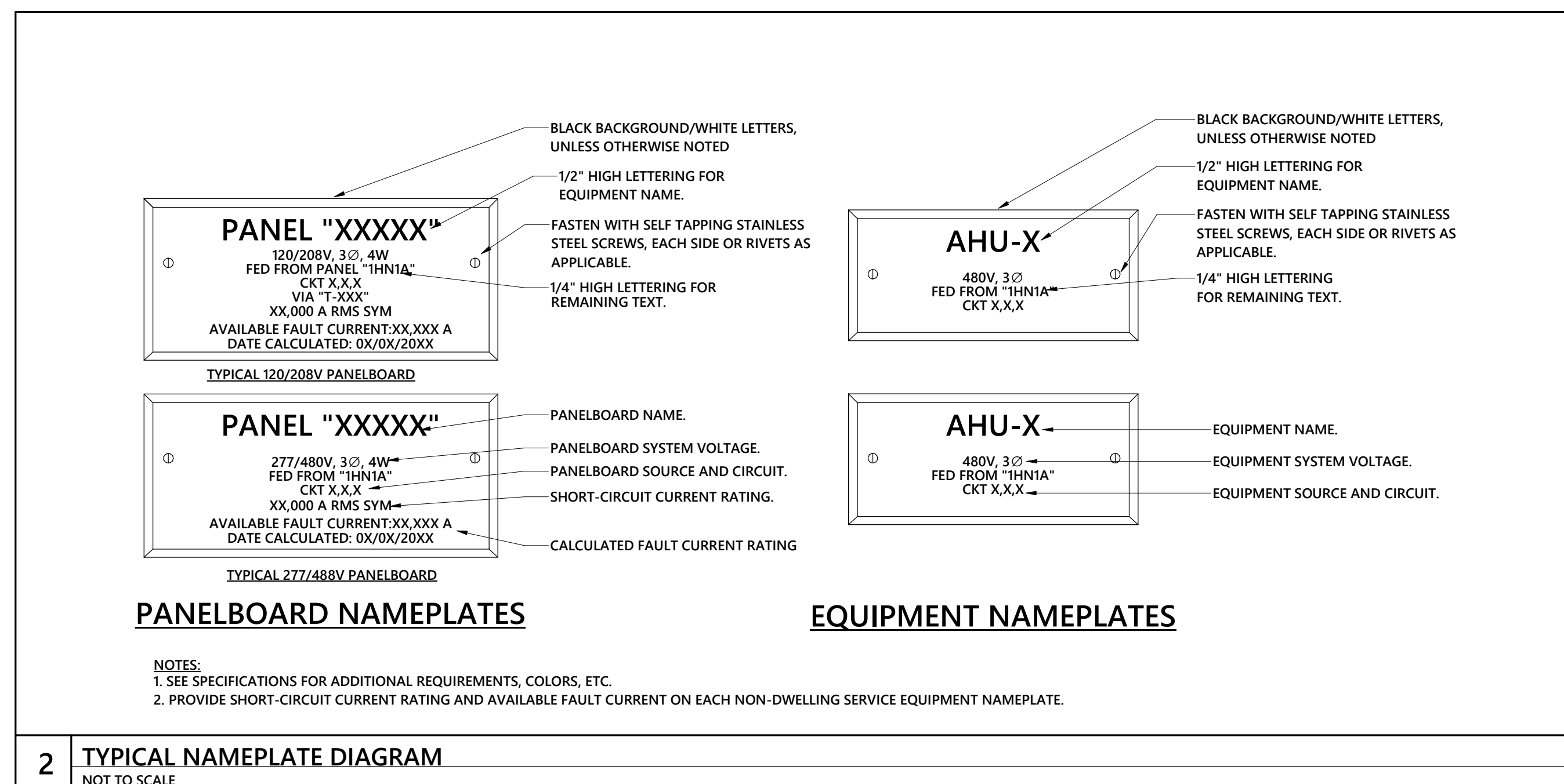
SYMBOL	DESCRIPTION
	DUCT SMOKE DETECTOR (NFPA 72, SECTION 17.7.5.5). COORDINATE EXACT LOCATION WITH MECHANICAL EQUIPMENT.

\*\*Note: AUDIBLE DEVICES WITHIN SLEEPING ROOMS SHALL BE SUBJECT TO LOW FREQUENCY REQUIREMENTS. A SQUARE WAVE 520HZ TONE COMPATIBLE WITH NFPA 72 18.4.5.3. COORDINATE WITH LOCAL CODES AND REQUIREMENTS.



## 1 MOUNTING HEIGHTS OF DEVICES - ELEVATION

NOT TO SCALE



## 2 TYPICAL NAMEPLATE DIAGRAM

NOT TO SCALE

MK	DATE	DESCRIPTION
		REVISIONS

**ELECTRICAL LEGEND AND NOTES**

DATE	01/01/2020
DRAWN BY	Author
CHECK BY	Checker
JOB NO.	22-0419
SHEET	

1. **GENERAL:**

A. THE WORK COVERED BY THESE SPECIFICATIONS CONSISTS OF FURNISHING ALL LABOR, EQUIPMENT, MATERIALS, AND SUPPLIES AS NECESSARY FOR THE COMPLETE AND SATISFACTORY OPERATING ELECTRICAL SYSTEMS AS SHOWN ON THE PLANS.

B. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE 2020 NATIONAL ELECTRICAL CODE, NFPA, NC STATE BUILDING CODE, AND ANY OTHER LOCAL REQUIREMENTS THAT MAY APPLY.

C. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL ELECTRICAL PERMITS AND INSPECTION FEES.

D. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE LISTED BY THE UNDERWRITER'S LABORATORIES, INC. OR BY A STATE APPROVED THIRD PARTY TESTING AGENCY FOR THE USE INTENDED WHERE A STANDARD FOR SUCH MATERIALS AND USE EXISTS. ALL ITEMS OF THE SAME TYPE AND RATING SHALL BE IDENTICAL AND OF THE SAME MANUFACTURER.

E. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CATALOG DATA IN ELECTRONIC FORMAT (PDF) FOR ALL ELECTRICAL ITEMS IN THE SCOPE OF WORK, INCLUDING, BUT NOT LIMITED TO, RACEWAYS, BOXES, FITTINGS, CONDUCTORS, DISCONNECTS, FIRE ALARM, ETC. FOR APPROVAL AS APPLICABLE FOR THE PROJECT. ONE COMPLETE SET OF APPROVED SUBMITTALS SHALL BE MAINTAINED AT THE JOB SITE.

F. ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH THE BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, CONDUIT, WIRING, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, METHODS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COSTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED AFTER BIDS HAVE BEEN ACCEPTED AND ALL COSTS WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. CREDITS SHALL BE GIVEN TO THE OWNER WHERE SUCH EQUIPMENT AND METHODS RESULT IN LESS EXPENSE TO THE CONTRACTOR.

G. ONE COMPLETE SET OF THE LATEST CONSTRUCTION PLANS OF ALL TRADES SHALL BE MAINTAINED AT THE JOB SITE. IN ADDITION, ALL ADDENDUMS, BULLETINS, AND/OR SKETCHES SHALL BE INCORPORATED INTO THE ON-SITE CONSTRUCTION PLANS AS THE JOB PROGRESSES.

H. COMPLETELY ADEQUATE HOUSING SHALL BE PROVIDED FOR ALL MATERIALS STORED ON JOB SITE. ONLY CONDUIT MAY BE STORED OUTSIDE, BUT NOT IN CONTACT WITH THE GROUND.

I. THE CONDUIT AND NEUTRAL SYSTEM SHALL BE GROUNDED AT THE MAIN SERVICE EQUIPMENT. GROUNDING ELECTRODE SYSTEM SHALL BE INSTALLED PER NEC 250.

J. WIRING SHALL BE TESTED FOR CONTINUITY AND GROUNDS BEFORE BEING ENERGIZED. FAULTY WIRING SHALL BE REPAIRED AT NO ADDITIONAL EXPENSE TO THE OWNER.

K. PROVIDE ALL CUTTING AND PATCHING FOR INSTALLATION OF WORK AND REPAIR ANY DAMAGE DONE.

L. THE ELECTRICAL CONTRACTOR SHALL CONNECT ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS (UNLESS OTHERWISE NOTED), EXCEPT FOR CONTROL WIRING FOR EQUIPMENT NOT PROVIDED BY THE ELECTRICAL CONTRACTOR. CONTROL WIRING FOR SUCH EQUIPMENT SHALL BE PROVIDED BY THE RESPECTIVE DISCIPLINE.

M. ALL ELECTRICAL JUNCTION BOXES, SWITCHGEAR, ETC. SHALL BE LABELED ACCORDING TO PANEL AND CIRCUIT NUMBER.

N. UPON COMPLETION OF WORK, CONTRACTOR SHALL PRESENT ENGINEER WITH CERTIFICATE OF APPROVAL FROM LOCAL AND/OR AUTHORITY HAVING JURISDICTION BEFORE WORK WILL BE APPROVED FOR FINAL PAYMENT.

O. CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS FOR A PERIOD OF ONE YEAR EFFECTIVE THE DATE THE PROJECT IS ACCEPTED BY THE OWNER. ANY IMPERFECT MATERIALS OR WORKMANSHIP SHALL BE REPLACED WITHOUT ADDED COST TO THE PROJECT.

P. IT SHALL NOT BE THE INTENT OF ISSUED PLANS AND/OR SPECIFICATIONS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION. THE ELECTRICAL CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL NECESSARY ITEMS FOR A COMPLETE AND OPERATING SYSTEM.

Q. THE WORD "PROVIDE" MEANS THAT THIS CONTRACTOR SHALL FURNISH, FABRICATE, ERECT, CONNECT, AND COMPLETELY INSTALL SYSTEMS IN PROPER OPERATING CONDITION. ALL LABOR, PRODUCT OPTIONS, ACCESSORIES AND INCIDENTAL MATERIALS REQUIRED SHALL BE INCLUDED AS PART OF THIS WORD TO COMPLETE THE INSTALLATION.

R. THE WORD "CONNECT" MEANS THAT THIS CONTRACTOR SHALL PROVIDE (SEE DEFINITION ABOVE) ALL DISCONNECTING MEANS, OVERCURRENT PROTECTION AND WIRING REQUIRED TO PLACE THE EQUIPMENT AND SYSTEMS IN PROPER OPERATING CONDITION AND TO COMPLY WITH CODE REQUIREMENTS.

S. CONTRACTOR SHALL COORDINATE THE ROUGH-IN OF ALL OUTLET LOCATIONS WITH ARCHITECTURAL FLOOR PLANS, ELEVATIONS, AND MILLWORK SHOP DRAWINGS PRIOR TO ROUGH-IN.

T. ELECTRICAL CONTRACTOR SHALL NOT SCALE PLANS. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR EXACT LOCATIONS OF ALL EQUIPMENT, UNLESS OTHERWISE NOTED.

U. IF DURING THE COURSE OF WORK, THE CONTRACTOR DISCOVERS A PROBLEM WITH THE PERFORMANCE OF THE INSTALLATION RELATIVE TO THE PLANS AND SPECIFICATIONS, THE NEC, OR OTHER CODES OR REQUIREMENTS, THE CONTRACTOR SHALL IMMEDIATELY BRING THE PROBLEM TO THE ATTENTION OF THE ARCHITECT AND/OR ENGINEER FOR RESOLUTION PRIOR TO THE EXECUTION OF THE WORK.

V. WHERE THERE ARE CONFLICTS BETWEEN THE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL BRING THE ISSUE TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION PRIOR TO THE EXECUTION OF THE WORK OR ORDERING ANY MATERIALS. NO ADDITIONAL COSTS SHALL BE WARRANTED WITHOUT A CHANGE TO THE PROJECT SCOPE.

W. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PROVIDING TEMPORARY POWER AND LIGHTING FOR ALL TRADES. AT NO TIME SHALL EXISTING BUILDING POWER SYSTEMS BE USED TO POWER EQUIPMENT FROM THE OWNER.

X. THE CONTRACTOR SHALL PROVIDE A MINIMUM TWO WEEK NOTICE FOR ANY PLANNED UTILITY OUTAGES. WRITTEN AUTHORIZATION FROM THE OWNER SHALL BE PROVIDED PRIOR TO ANY OUTAGE. ALL PLANNED UTILITY OUTAGES SHALL BE COORDINATED WITH THE OWNER TO OCCUR DURING NON-OPERATING TIMES, INCLUDING NIGHTS, WEEKENDS AND HOLIDAYS. ALL PLANNED UTILITY OUTAGES SHALL INCLUDE PROVISIONS FOR PROPER BACK-UP OF ALL LIFE-SAFETY SYSTEMS AND INCLUDE AN APPROVED FIRE-WATCH PROGRAM AS REQUIRED BY THE LOCAL FIRE MARSHALL.

Y. EACH BIDDER SHALL VISIT THE JOB SITE PRIOR TO BIDDING TO FAMILIARIZE THEMSELVES WITH EXISTING CONDITIONS AND TO ASCERTAIN THE EXTENT OF WORK REQUIRED. FAILURE TO VISIT SITE SHALL NOT EXCUSE CONTRACTOR FROM PERFORMING REQUIRED WORK NOR SHALL IT BE AN ACCEPTABLE REASON FOR REQUESTING ADDITIONS TO THE CONTRACT.

2. **RACEWAY:**

A. CONDUIT SHALL BE MANUFACTURED BY ALLIED, WHEATLAND, REPUBLIC CONDUIT, WESTERN TUBE, OR APPROVED EQUIVALENT.

B. FOR INTERIOR WORK, CONDUIT SHALL BE ZINC COATED EMT EXCEPT WHERE NOT PERMITTED BY CODE. USE SCHEDULE 40 PVC BELOW CONCRETE SLAB, IN DUCTBANKS, AND FOR EXTERIOR WORK WHERE NOT SUBJECT TO DAMAGE. USE IMC WHERE SUBJECT TO PHYSICAL DAMAGE.

C. EMT FITTINGS SHALL BE COMPRESSION GLAND TYPE, OF MALLEABLE STEEL. CONNECTORS SHALL HAVE INSULATED THROATS. CAST, SET SCREW, OR INDENTER TYPE FITTINGS ARE NOT ACCEPTABLE. ALL FITTINGS FOR EMT SHALL BE MADE OF STEEL.

D. ALL RACEWAY SHALL BE RUN CONCEALED, UNLESS OTHERWISE NOTED. FISH ALL NEW OUTLETS IN EXISTING WALLS, WHERE POSSIBLE. ALL RUNS SHALL BE NEAT AND SQUARE.

E. LOW VOLTAGE CABLING NOT SPECIFIED TO BE INSTALLED IN CONDUIT, SHALL BE INSTALLED IN A J-HOOK SYSTEM CONSISTING OF MINIMUM 2" DIAMETER HOOKS LOCATED ON 3'-0" CENTERS IN ALL ACCESSIBLE CEILINGS. WHERE THERE ARE INACCESSIBLE CEILINGS, PROVIDE CONDUIT FOR ENTIRE LENGTH OF INACCESSIBILITY.

F. RACEWAYS USED FOR LOW VOLTAGE SYSTEMS SUCH AS FIRE ALARM, SHALL BE PROVIDED WITH INSULATED THROAT BUSHINGS AT EACH CONDUIT TERMINATION. THESE BUSHINGS SHALL BE INSTALLED PRIOR TO PULLING LOW-VOLTAGE CABLES.

G. RACEWAY PENETRATIONS THROUGH FLOOR SLABS AND FIRE-RATED WALLS SHALL BE FILLED WITH IMPERVIOUS, NON-SHRINK GROUT SUFFICIENTLY TIGHT TO PREVENT THE TRANSFER OF SMOKE, WATER, AND DUST. ROOF PENETRATIONS SHALL BE WITHIN THE EQUIPMENT ROOF CURB.

H. SUPPORT ALL CONDUIT WITH STRAPS AND CLAMPS.

I. ALL CONDUIT SHALL BE RUN PARALLEL OR PERPENDICULAR TO BUILDING LINES, WHETHER EXPOSED OR NOT AND SUPPORTED FROM STRUCTURE AND PROPERLY SECURED.

J. WHERE CONDUITS PASS THROUGH A BUILDING EXPANSION JOINT, PROVIDE GALVANIZED EXPANSION FITTINGS WITH BONDING JUMPERS.

K. PROVIDE MINIMUM 210# TEST NYLON PULL CORD AND NYLON BUSHINGS IN ALL EMPTY RACEWAYS.

L. LIQUID-TIGHT METAL CONDUIT SHALL ONLY BE USED FOR FINAL CONNECTIONS TO EQUIPMENT AND ALL OTHER ROTATING AND VIBRATING EQUIPMENT, MAXIMUM LENGTH OF 3'-0".

M. FLEXIBLE METAL CONDUIT, MINIMUM SIZE 3/8", SHALL ONLY BE USED FOR FINAL CONNECTION TO LIGHTING FIXTURES, MAXIMUM LENGTH OF 6'-0".

N. PROVIDE PULL BOXES, SUCH THAT NO SINGLE CONDUIT RUN HAS BENDS IN EXCESS OF 360°. PULL BOXES SHALL BE SUITABLE AND APPROVED FOR THE INTENDED USE. WHERE CONDUITS PASS UNDER PAVED AREAS, THEY SHALL BE RGS.

O. ALL CONDUIT BENDS/ELBOWS EMERGING FROM UNDERGROUND SHALL BE IMC AND SHALL EXTEND A MINIMUM OF 18" BELOW GRADE.

P. ALL CONDUITS INSTALLED UNDERGROUND OR IN CONCRETE SHALL HAVE JOINTS MADE WATERTIGHT BY USE OF POLYETRA-FLUOROETHYLENE TAPE.

Q. THE USE OF AC OR NM CABLE IS NOT PERMITTED.

R. MC CABLE MAY ONLY BE UTILIZED WHERE PERMITTED BY CODE AND IT SHALL ONLY BE ALLOWED WHERE CONCEALED BEHIND HARD WALLS AND HARD CEILINGS. MC CABLE SHALL NOT BE EXPOSED.

3. **OUTLET BOXES:**

A. JUNCTION AND PULL BOXES SHALL BE CODE GAUGE GALVANIZED STEEL. ACCEPTED MANUFACTURERS SHALL BE STEEL CITY (THOMAS & BETTS), RACO, CROUSE-HINDS, APPELTON (EMERSON), OR APPROVED EQUIVALENT.

B. OUTLET BOXES SHALL NOT BE MOUNTED BACK TO BACK IN COMMON WALLS.

C. ATTACH EMT WITH CONNECTORS HAVING INSULATED THROAT.

D. ATTACH BOXES TO STUD WORK USING CADDY BAR STRAPS THAT CONNECT TO TWO ADJACENT METAL STUDS TO PREVENT TWISTING OF BOX IN WALL.

E. ALL OUTLET BOXES (INCLUDING TELEPHONE, CABLE TV, AND COMPUTER) SHALL HAVE COVER PLATES, BLANK IF NOT USED.

F. ALL EXTERIOR BOXES SHALL BE WATER-TIGHT.

4. **CONDUCTORS:**

A. CONDUCTORS SHALL BE MANUFACTURED BY SOUTHWIRE (SIMPUUL), ENCORE (SUPERSLICK), UNITED COPPER (SLK), CERRO (SLP), OR APPROVED EQUAL. "PRE-LUBRICATED" BY THE MANUFACTURER.

B. ALL CONDUCTORS SHALL BE COPPER, RATED 75° C WET/DRY EXCEPT WHERE OTHERWISE NOTED OR REQUIRED BY U.L. OR OTHER CODES.

C. ALL CONDUCTORS SHALL BE SINGLE INSULATED CONDUCTOR, THHN/THWN-2. SIZES #10 AWG AND SMALLER SHALL BE SOLID, SIZES #8 AWG AND LARGER SHALL BE STRANDED.

D. BRANCH CIRCUITS SHALL NOT BE SMALLER THAN #12 AWG. CONTROL WIRING MAY BE #14 AWG.

E. CONDUCTORS SHALL BE COLOR CODED BLACK/RED/BLUE FOR 120/208 VOLT SYSTEMS AND BROWN/ORANGE/YELLOW FOR 277/480 VOLT SYSTEMS FOR A, B, AND C PHASES, RESPECTIVELY. NEUTRAL SHALL BE WHITE FOR 120/208 VOLT SYSTEMS AND NATURAL GRAY FOR 277/480 VOLT SYSTEMS. GROUND CONDUCTOR SHALL BE GREEN ON ALL SYSTEMS. ALL CONDUCTOR SIZES SHALL HAVE COLOR-CODED INSULATION. THE USE OF COLORED TAPE ON LARGER WIRE SIZES SHALL NOT BE ALLOWED.

F. INSULATION SHALL BE DUAL RATED TYPE THHN/THWN-2 FOR FEEDERS AND BRANCH CIRCUITS. FIXTURE TAPS SHALL BE #12 THHN/THWN-2 IN FLEX WITH GREEN #12 AWG GROUNDING CONDUCTOR.

G. ALL CONDUCTORS SHALL BE IN CONDUIT.

H. WIRING TO LIGHTING FIXTURES SHALL BE AS REQUIRED BY UL LABEL.

I. MULTI-WIRE BRANCH CIRCUITS SHALL NOT BE ALLOWED.

J. JOINTS IN #10 AWG AND SMALLER SHALL BE MADE UP WITH CRIMPED CONNECTORS WITH INSULATING CAPS (NO TAPE) OR WIRENUTS (MAXIMUM OF 3 CONDUCTORS UNDER ANY CONNECTOR OR WIRENUT). LARGER WIRE SHALL USE SPLIT BOLTS OR BOLTED CLAMPS.

K. ALL WIRING LUGS THROUGHOUT THE PROJECT, INCLUDING, BUT NOT LIMITED TO, BREAKERS, PANELBOARD/SWITCHBOARD LUGS, SAFETY SWITCH LUGS, MOTOR STARTER LUGS, TRANSFORMERS LUGS, WIRING DEVICE TERMINALS, AND ALL EQUIPMENT LUGS/TERMINALS SHALL BE RATED FOR USE WITH 75 DEGREE INSULATED CONDUCTORS AT THEIR 75 DEGREE AMPACITY AND SHALL BE SIZED AND SELECTED TO MATCH THE CONDUCTOR SIZE AND MATERIAL.

L. CIRCUIT JOINTS SHALL NOT BE MADE ON DEVICE TERMINALS.

M. WIRE WITHIN PANELBOARDS SHALL BE NEATLY TRAINED, SQUARED, BUNCHED, AND TAGGED.

N. GROUND ALL EQUIPMENT PER NEC ARTICLE 250. BOND WHERE CONDUITS ENTER ENCLOSURES THROUGH CONCENTRIC KNOCKOUTS. ALL FLEX, INCLUDING FIXTURE TAPS, SHALL INCLUDE GREEN GROUNDING CONDUCTOR, #12 AWG MINIMUM. PROVIDE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR IN EACH CONDUIT AND FOR EACH CIRCUIT, SIZED PER NEC 250-122.

O. ALL CONDUCTORS INSTALLED IN VERTICAL RACEWAYS SHALL BE SUPPORTED AT INTERVALS AS REQUIRED PER NEC 300-19.

P. THE ELECTRICAL CONTRACTOR SHALL FOLLOW AND APPLY THE TABLE BELOW, REGARDLESS WHAT THE PANEL SCHEDULE INDICATES, FOR SIZING ALL 120V & 277V, 20 AMP BRANCH CIRCUITS (COPPER CONDUCTORS) TO ALLOW A MAXIMUM OF 3% VOLTAGE DROP FROM THE CIRCUIT BREAKER TO THE FIRST DEVICE ON THE BRANCH CIRCUIT AND ACHIEVE A MAXIMUM OF 5% VOLTAGE DROP ACROSS THE ENTIRE BRANCH CIRCUIT:

VOLTAGE	CONDUCTOR LENGTH *	BRANCH CIRCUIT
120	0' - 50'	#12
120	51' - 90'	#10
120	91' - 140'	#8
120	141' - 255'	#6
277	0' - 125'	#12
277	126' - 200'	#10
277	201' - 330'	#8
277	331' - 525'	#6

\* - THE LENGTH IS MEASURED FROM THE CIRCUIT BREAKER TO THE FIRST DEVICE WHICH THE BRANCH CIRCUIT SERVES. WHERE THE DISTANCE EXCEEDS ABOVE, CONSULT WITH THE ENGINEER.

1. **WIRING DEVICES:**

A. WIRING DEVICES SHALL BE SPECIFICATION GRADE, MINIMUM, EQUAL TO COOPER QUALITY INDICATED BELOW OR AS MANUFACTURED BY HUBBELL, LEGRAND-PASS & SEYMOUR, LEVITON, OR APPROVED EQUAL, UNLESS OTHERWISE NOTED:

SINGLE-POLE 20 AMP	COOPER AH1221
20 AMP DUPLEX	COOPER S352
20 AMP DUPLEX GFCI	COOPER SG2F20
20 AMP DUPLEX TAMPER	COOPER TRS262
20 AMP DUPLEX GFCI-TAMPER	COOPER TRSG2F20

DUPLEX RECEPTACLES SHALL HAVE A NYLON FACE AND SHALL BE AS FOLLOWS:

THE PART NUMBERS ABOVE ARE FOR WIRING DEVICE TYPE ONLY. SEE BELOW FOR WIRING DEVICE COLOR AND PLATE MATERIAL/COLOR.

B. SEE MOUNTING HEIGHT ELEVATION DETAIL FOR STANDARD MOUNTING HEIGHTS OF ALL DEVICES, UNLESS OTHERWISE NOTED.

C. ALL WIRING DEVICES (SWITCHES AND RECEPTACLES) AND PLATES SHALL MATCH EXISTING IN MATERIAL AND COLOR, UNLESS OTHERWISE NOTED. COVER PLATES IN MASONRY WALLS SHALL BE JUMBO SIZE.

D. EACH DUPLEX RECEPTACLE INDICATED TO BE ON A DEDICATED CIRCUIT SHALL BE 20 AMP TYPE.

E. ADJACENT DEVICES SHALL HAVE A COMMON WALL PLATE.

F. WEATHER-PROOF COVERS SHALL BE "WHILE-IN-USE" SO PLUGS MAY BE INSTALLED WITHOUT COMPROMISING THE WP FUNCTION. COOPER #WU-2 DOUBLE-GANG WITH CLEAR COVER OR APPROVED EQUAL.

G. A MAXIMUM OF 10 GENERAL PURPOSE RECEPTACLES SHALL BE ON EACH BRANCH CIRCUIT.

H. GROUND-FAULT CIRCUIT-INTERRUPTER (GFCI) PROTECTION FOR PERSONNEL SHALL BE PROVIDED FOR ALL LOCATIONS PER NEC 210.8, INSTALLED IN A READILY ACCESSIBLE LOCATION. WHERE A DEVICE LOCATION IS NOT ACCESSIBLE, THE GFCI PROTECTION SHALL BE PROVIDED WITH THE BREAKER SERVING THE DEVICE.

I. ALL GFCI RECEPTACLES SHALL HAVE AUTO-MONITORING / SELF-TEST FUNCTION AND REVERSE LINE-LOAD MISFIRE FUNCTION AND MEET ALL REQUIREMENTS OF UL 943 (LATEST EDITION).

J. TAMPER-RESISTANT RECEPTACLES SHALL BE PROVIDED FOR ALL AREAS PER NEC 406.12, INCLUDING CHILD-CARE FACILITIES, PRESCHOOL AND EDUCATION FACILITIES, BUSINESS OFFICES/CORRIDORS, ASSEMBLY OCCUPANCIES INCLUDING PLACES OF AWAITING TRANSPORTATION/GYMNASIAUS/AUDITORIUMS.

2. **SUPPORTS:**

A. ALL EQUIPMENT SHALL BE ADEQUATELY SUPPORTED FROM STRUCTURE.

B. INSERTS IN MASONRY SHALL BE LEAD OR FIBER IN DRILLED HOLES, OR CAST IN PLACE.

C. NAILS OR POWDER ACTUATED FASTENERS SHALL NOT BE USED.

D. EMT/IMC/RGS SUPPORTS SHALL BE A MAXIMUM OF 8'-0" APART AND A MAXIMUM OF 3'-0" FROM BOXES.

7. **PAINTING:**

A. SUITABLE FINISH COAT SHALL BE PROVIDED FOR ALL EQUIPMENT, PANEL TUBS, COVERS, ETC. SHALL BE PRIMED AND ENAMELED TO BLEND WITH ADJACENT SURFACES, OR SHALL BE MANUFACTURER'S STANDARD COLOR BAKED ENAMEL FINISH, OR AS DIRECTED BY THE ARCHITECT.

B. CONTRACTOR TO PAINT WHERE EXISTING EXPOSED PANELBOARDS, SURFACE RACEWAY, SURFACE BOXES, ETC. HAVEN BEEN REMOVED DURING THE DEMOLITION PHASE, EITHER FOR TEMPORARY WORK OR PERMANENTLY.

8. **EQUIPMENT IDENTIFICATION:**

A. PROVIDE ENGRAVED PHENOLIC NAMEPLATES FOR ALL ELECTRICAL EQUIPMENT SUPPLIED FOR THE PROJECT, INCLUDING BUT NOT LIMITED TO, WIRING TROUGHS, SAFETY SWITCHES, DISCONNECTS, TRANSFORMERS, PANELBOARDS, SWITCHBOARDS, SWITCHGEARS, MOTOR CONTROL CENTERS (MCC), BUSWAYS, GENERATORS, AUTOMATIC TRANSFER SWITCHES (ATS), UNINTEGRATED POWER SUPPLY (UPS), POWER DISTRIBUTION UNITS (PDU), FLOOR/REMOTE DISTRIBUTION CABINETS (FDC/RDC), STATIC TRANSFER SWITCHES (STS), ETC. NAMEPLATE SHALL INDICATE THE DEVICE NAME, SYSTEM VOLTAGE (VOLTAGE/PHASE/WIRE), AND UPSTREAM DEVICE AND CIRCUIT. PROVIDE NAMEPLATES FOR CIRCUIT BREAKERS IN SWITCHGEARS, SWITCHBOARDS AND DISTRIBUTION PANELS.

B. NAMEPLATE COLORS SHALL BE AS FOLLOWS:

120/208V EQUIPMENT	BLUE SURFACE WITH WHITE CORE
277/480V EQUIPMENT	BLACK SURFACE WITH WHITE CORE
FIRE ALARM SYSTEMS	BRIGHT RED SURFACE WITH WHITE CORE

NAMEPLATES UP TO 8 SQUARE INCHES SHALL NOT BE LESS THAN 1/16" THICK. NAMEPLATES LARGER THAN 8 SQUARE INCHES SHALL NOT BE LESS THAN 1/8" THICK.

C. LETTERING HEIGHT SHALL BE 1/2" MINIMUM.

D. NAMEPLATES SHALL BE ATTACHED WITH SELF-DRILLING/SELF-TAPPING SCREWS, EXCEPT RIVETS SHALL BE USED WHERE END OF SCREW IS NOT PROTECTED. QUANTITY AS FOLLOWS:

UP TO 5 SQUARE INCHES:	2 SCREWS
5 TO 12 SQUARE INCHES:	4 SCREWS
ABOVE 12 SQUARE INCHES:	6 SCREWS

9. **DISCONNECTS:**

A. DISCONNECT SWITCHES SHALL BE HEAVY-DUTY TYPE IN NEMA 1 ENCLOSURES, UNLESS OTHERWISE NOTED, FUSED OR NON-FUSED AS INDICATED. SWITCHES SHALL HAVE REJECTION-TYPE FUSE CLIPS. SWITCHES SHALL BE BY EATON, SQUARE-D, GENERAL ELECTRIC, OR APPROVED EQUAL.

B. FUSES LESS THAN 60A SHALL BE CLASS RK5, DUAL-ELEMENT, TIME-DELAY WITH INDICATION.

C. FUSES GREATER THAN 60A SHALL BE CLASS J, DUAL-ELEMENT, TIME-DELAY WITH INDICATION.

D. A SET OF 3 SPARE FUSES OF EACH SIZE AND TYPE SHALL BE FURNISHED TO THE OWNER.

15. **FIRE ALARM SYSTEM:**

A. NEW DEVICES SHALL BE CONNECTED TO THE EXISTING FIRE ALARM SYSTEM IN COMPLIANCE WITH ALL APPLICABLE NFPA 72 AND OTHER STANDARDS AS WELL AS THE AMERICAN'S WITH DISABILITIES ACT (ADA). ALL FINAL CONNECTIONS, TESTING AND ADJUSTMENTS SHALL BE PERFORMED BY OR UNDER DIRECT SUPERVISION OF AN AUTHORIZED FACTORY REPRESENTATIVE. NEW DEVICES SHALL BE COMPATIBLE WITH THE EXISTING FIRE ALARM SYSTEM. THE CONTRACTOR SHALL FIELD VERIFY EXACT SYSTEM MANUFACTURER AND TYPE AND CAPABILITY TO MEET THE INTENT INDICATED ON THE DRAWINGS.

B. INITIATING DEVICE ACTIVATION SHALL CAUSE OPERATION OF THE PROPER ALARM CIRCUIT IN THE CONTROL PANEL, AND OPERATE ALL AUDIBLE AND VISUAL INDICATING ALARMS. ALL AIR HANDLING UNITS SHALL BE STOPPED UPON ANY ALARM INPUT. EACH AIR HANDLER UNIT SHALL BE PROVIDED WITH A SYSTEM CONTROLLED RELAY TO EFFECT SHUTDOWN. ALL ALARM DEVICES AND LAMPS SHALL CONTINUE TO OPERATE UNTIL THE INITIATING DEVICE IS RESET. SUBSEQUENT ALARMS SHALL RESOUND THE SYSTEM. AN AUDIBLE AND VISUAL SIGNAL SHALL INDICATE SYSTEM TROUBLE. THE CONTROL PANEL SHALL PROVIDE FOR ACTIVATING A UL LISTED CENTRAL STATION SIGNAL FOR NOTIFYING THE FIRE DEPARTMENT.

C. MANUAL STATIONS SHALL BE NON-CODED, WITH PULL LEVER AND GLASS ROD, SEMI-FLUSH MOUNTED. COMBINATION LIGHT AND HORN SIGNALS SHALL BE FLUSH MOUNTED. WIRING SHALL BE IN CONDUIT AS PREVIOUSLY SPECIFIED, #14 AWG MINIMUM, THHN. ALL J-BOXES USED FOR THE FIRE ALARM SYSTEM SHALL BE PAINTED RED.

D. SPRINKLER SYSTEM TAMPER SWITCHES SHALL BE CONNECTED INTO A COMMON ZONE WHICH SHALL DISTINGUISH BETWEEN A CONDUIT FAULT AND A CLOSED VALVE. A CLOSED VALVE SHALL BE INDICATED AS AN ALARM CONDITION, BUT WILL NOT ACTIVATE THE AUDIO-VISUAL DEVICES AND SHALL CAUSE A SUPERVISORY SIGNAL TO BE TRANSMITTED TO THE CENTRAL STATION.

E. CONDUCTORS SHALL BE PLENUM-RATED AND INSTALLED IN CONDUIT AND INSTALLED IN COMPLIANCE WITH NFPA 70, ARTICLE 760, IN ADDITION TO WIRING METHODS 300.4.

F. ALL FIRE ALARM WIRING SHALL BE CLASS B.

G. PROVIDE ALL REQUIRED MODULES, POWER EXTENDERS, PROGRAMMING, ETC. FOR A COMPLETE AND OPERATIONAL SYSTEM.

H. SUBMIT FIRE ALARM SHOP DRAWINGS CONSISTING OF PRODUCT DATA, TO THE ENGINEER AND FOR APPROVAL.

I. FILL OUT NFPA 72 CERTIFICATION REPORT AND SUBMIT TO ENGINEER AND AUTHORITY HAVING JURISDICTION.

J. WARRANTY - ALL WORK PERFORMED AND ALL MATERIALS AND EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE FREE FROM DEFECTS AND SHALL REMAIN SO FOR A PERIOD OF AT LEAST TWO (2) YEARS FROM THE DATE OF ACCEPTANCE BY THE PROFESSIONAL ENGINEER AND/OR OWNER. THE FULL COST OF MAINTENANCE, LABOR, AND MATERIALS REQUIRED TO CORRECT ANY DEFECT DURING THIS TWO YEAR PERIOD SHALL BE IMMEDIATELY CORRECTED AT NO ADDITIONAL COST TO THE OWNER. ANY DEFECTS THAT RENDER THE SYSTEM INOPERATIVE SHALL BE REPAIRED WITHIN 24 HOURS OF THE OWNER NOTIFYING THE CONTRACTOR. OTHER DEFECTS SHALL BE REPAIRED WITHIN 48 HOURS OF THE OWNER NOTIFYING THE CONTRACTOR.

K. PROVIDE ALL REPROGRAMMING AND/OR REWORK AND/OR REPLACEMENT OF EXISTING FIRE ALARM PANEL AS REQUIRED.

16. **FIRE STOPPING:**

A. ALL PENETRATIONS OF RATED ASSEMBLIES SHALL BE SEALED WITH RATED MATERIALS MEETING ASTM E-814.

B. PROVIDE FIRESTOPPING DEVICE(S) OR SYSTEM(S) WHICH HAVE BEEN TESTED AND LISTED AS COMPLYING WITH ASTM E-814. INSTALL THE DEVICE(S) OR SYSTEM(S) IN ACCORDANCE WITH THE CONDITIONS OF THEIR LISTING. PROVIDE THE APPROPRIATE DEVICE(S) OR SYSTEM(S) WITH AN "F" RATING EQUAL TO THE RATING OF THE ASSEMBLY BEING PENETRATED.

C. DEVICE(S) AND/OR SYSTEM(S) SHALL BE BY HILTI, 3M OR EQUIVALENT.

1. **ELECTRICAL COORDINATION WITH OTHER TRADES:**

A. THE ELECTRICAL CONTRACTOR SHALL CONNECT AND/OR PROVIDE FINAL CONNECTIONS TO ALL EQUIPMENT SUPPLIED BY OTHERS APPLICABLE TO THE PROJECT, INCLUDING BUT NOT LIMITED TO, MECHANICAL, PLUMBING, FIRE PROTECTION AND SUPPRESSION, OWNER FURNISHED, KITCHEN, LABORATORY, ETC. UNLESS OTHERWISE NOTED.

B. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONNECTIONS PRIOR TO ROUGH-IN USING APPROVED CATALOG SHEETS AND SHOP DRAWINGS.

C. THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANUAL MOTOR STARTER SWITCHES, DISCONNECT SWITCHES, RECEPTACLES, ETC. TO MECHANICAL AND PLUMBING EQUIPMENT. ALL STARTERS, OTHER THAN MANUAL STARTER SWITCHES, SHALL BE PROVIDED BY OTHERS, BUT INSTALLED BY THE ELECTRICAL CONTRACTOR.

D. ALL DISCONNECT SWITCHES AND FUSE SIZES SHALL BE COORDINATED WITH SHOP DRAWINGS PRIOR TO ORDERING OR INSTALLING. ANY EQUIPMENT INSTALLED INCORRECTLY BECAUSE OF LACK OF COORDINATION WILL BE REMOVED AND INSTALLED CORRECTLY AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR.

E. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT RUNS AND LIGHT FIXTURE LOCATIONS ABOVE THE CEILING WITH OTHER TRADES PRIOR TO INSTALLATION.

F. ALL DUCT SMOKE DETECTORS SHALL BE PROVIDED AND CONNECTED BY THE ELECTRICAL CONTRACTOR, BUT INSTALLED BY THE MECHANICAL CONTRACTOR.

G. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY OUTLETS FOR HEAT TAPE CONNECTIONS FOR MECHANICAL SYSTEMS. PROVIDE CLASS B (30mA) GFCI PROTECTION ON THE BREAKER SUPPLYING THE HEAT TAPE.

H. THE ELECTRICAL CONTRACTOR SHALL PROVIDE 120V POWER AT EACH HVAC UNIT HAVING A CONTROLS POWER SUPPLY. CIRCUIT(S) SHALL BE DEDICATED 20A SERVING A MAXIMUM OF 10 HVAC UNITS PER CIRCUIT. COORDINATE ALL LOCATIONS WITH THE MECHANICAL CONTRACTOR.

1. **DEMOLITION NOTES:**

A. PARTIAL AND TOTAL DEMOLITION OF PORTIONS SHALL BE PERFORMED ALONG WITH ALL NECESSARY MODIFICATIONS TO THAT PORTION OF THE EXISTING BUILDING WHICH SHALL REMAIN SO THAT IT CONTINUES TO FUNCTION UNAFFECTED BY THE DEMOLITION AND ASSOCIATED NEW CONSTRUCTION.

B. WHERE INCLUDED AS PART OF THE CONTRACT DOCUMENTS, THE DRAWINGS INDICATE THE GENERAL AREAS OF WORK INVOLVED. HOWEVER, THE ELECTRICAL CONTRACTOR SHALL PERFORM WORK OUTSIDE THOSE AREAS SYSTEMS AS IS NECESSARY TO COMPLY WITH THE INTENT OF THIS SECTION.

C. THE ELECTRICAL CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE EXISTING BUILDING AND WITH THE WORK OF ALL OTHER TRADES AND INCLUDE ALL WORK NECESSARY TO COMPLY WITH THE INTENT OF THE DEMOLITION.

D. IT SHALL BE UNDERSTOOD THAT FIELD CONDITIONS MAY BE ENCOUNTERED DURING THE EXECUTION OF THIS CONTRACT WHICH WILL REQUIRE EXTENSION OR RELOCATION OF EXISTING SYSTEMS OR EQUIPMENT WHICH ARE NOT SPECIFICALLY SHOWN ON THE DRAWINGS, BUT WHICH ARE REQUIRED TO MEET THE STATED INTENT THAT THE BUILDING CONTINUE TO FUNCTION UNAFFECTED BY THE DEMOLITION AND ASSOCIATED NEW CONSTRUCTION. THE ELECTRICAL CONTRACTOR SHALL INCLUDE SUCH WORK AS WOULD NORMALLY BE EXPECTED IN AN EXISTING BUILDING OF THIS AGE AND TYPE.

E. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL TOOLS, EQUIPMENT, LABOR, ETC. IN ORDER TO ACCOMPLISH THE DEMOLITION PORTION OF THE PROJECT.

F. THE DEMOLITION OF CERTAIN AREAS OF THE EXISTING BUILDING SHALL BE PERFORMED BY THE GENERAL CONTRACTOR. IT SHALL BE THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE GENERAL CONTRACTOR TO DIFFERENTIATE THE SCOPE OF WORK BETWEEN SEPARATE TRADES.

G. THE ELECTRICAL CONTRACTOR SHALL INCLUDE COORDINATION WITH THE GENERAL CONTRACTOR AND SUCH DEMOLITION OF THE EXISTING ELECTRICAL SYSTEMS AS IS NECESSARY SO THAT THE DEMOLITION WORK OF THE GENERAL CONTRACTOR SHALL NOT DAMAGE THOSE PORTIONS OF THE ELECTRICAL SYSTEMS WHICH ARE TO REMAIN IN SERVICE, ARE TO BE REUSED, OR ARE TO BECOME THE PROPERTY OF THE OWNER.

H. TURN OVER TO OWNER, UPON REQUEST OR AS NOTED, ITEMS SHOWN AS BEING REMOVED AND NOT REINSTALLED. ITEMS NOT DIRECTED OR REQUESTED TO BE TURNED OVER TO THE OWNER SHALL BE DISPOSED OF BY THE ELECTRICAL CONTRACTOR.

I. EQUIPMENT OR MATERIALS WHICH ARE TO BE REUSED OR TURNED OVER TO THE OWNER SHALL BE CAREFULLY REMOVED, CLEANED, AND STORED IN A CLEAN AND DRY AREA. SHOULD THE ELECTRICAL CONTRACTOR ENCOUNTER SUCH EQUIPMENT WHICH IS NOT IN SATISFACTORY CONDITION FOR REUSE AND NOT IN WORKING ORDER, THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY.

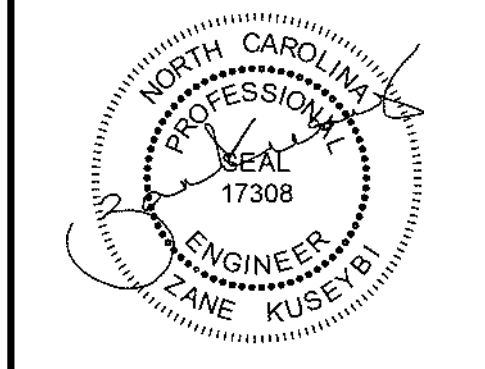
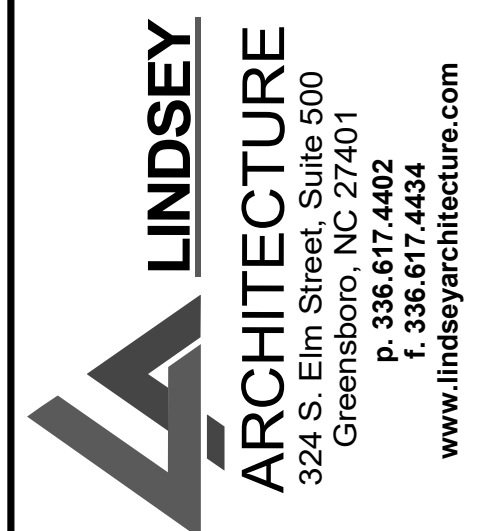
J. DISCONNECT ELECTRICAL SERVICES TO ALL EQUIPMENT REQUIRING REMOVAL. CONDUIT SHALL BE REMOVED BACK TO THE POINT WHERE IT WILL BE CONCEALED AT THE COMPLETION OF THIS CONTRACT. WIRE AND CABLE SHALL BE REMOVED BACK TO THE FIRST OUTLET BOX, CABINET, OR TERMINATION POINT WHICH IS TO REMAIN. CIRCUITS WHICH ARE NOT REUSED SHALL BE REMOVED BACK TO THE SOURCE IN THEIR ENTIRETY.

K. REMOVE AND REINSTALL CEILINGS IN THE EXISTING BUILDING AS REQUIRED FOR THE WORK. COORDINATE WITH THE GENERAL CONTRACTOR. IN SUCH AREAS, REMOVE AND REINSTALL ALL ELECTRICAL DEVICES WHICH ARE TO REMAIN IN OR ON THE CEILING.

L. WHERE NEW CEILINGS CONFLICT WITH EXISTING ELECTRICAL WORK WHICH IS TO REMAIN, RELOCATE THE ELECTRICAL WORK INVOLVED TO CLEAR THE NEW CONSTRUCTION.

M. WHERE NEW WALL OR FLOOR FINISHES CONFLICT WITH EXISTING ELECTRICAL WORK WHICH IS TO REMAIN, RELOCATE THE ELECTRICAL WORK INVOLVED OR PROVIDE BOX EXTENSIONS OR SIMILAR DEVICES AND REINSTALL ON THE NEW FINISH.

N. WHERE EXISTING BRANCH CIRCUITS AND SYSTEMS ARE INTERRUPTED BY NEW WORK OR SYSTEMS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, ETC.), EXTEND AND RECONNECT THOSE EXECUTION OF THIS CONTRACT, PROVIDE TEMPORARY CONNECTIONS UNTIL FINAL CONNECTIONS ARE COMPLETE.



04/06/2023

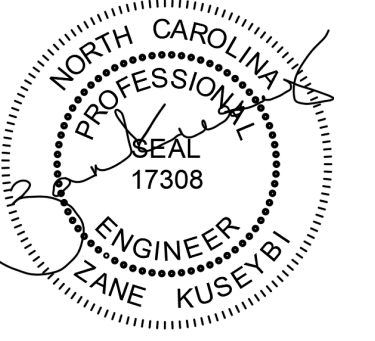
**ALTA MAHAW OSSISPEE ELEMENTARY**  
2832 N NC HIGHWAY 87, ELON, NC 27244

MK	DATE	DESCRIPTION
		REVISIONS

**ELECTRICAL SPECIFICATIONS**

DATE	01/01/2020
DRAWN BY	Author
CHECK BY	Checker
JOB NO.	22-0419
SHEET	

**E0.2**



06/19/2023

**ALTAMAHAW OSSISPEE ELEMENTARY**  
 2832 N NC HIGHWAY 87, ELON, NC 27244

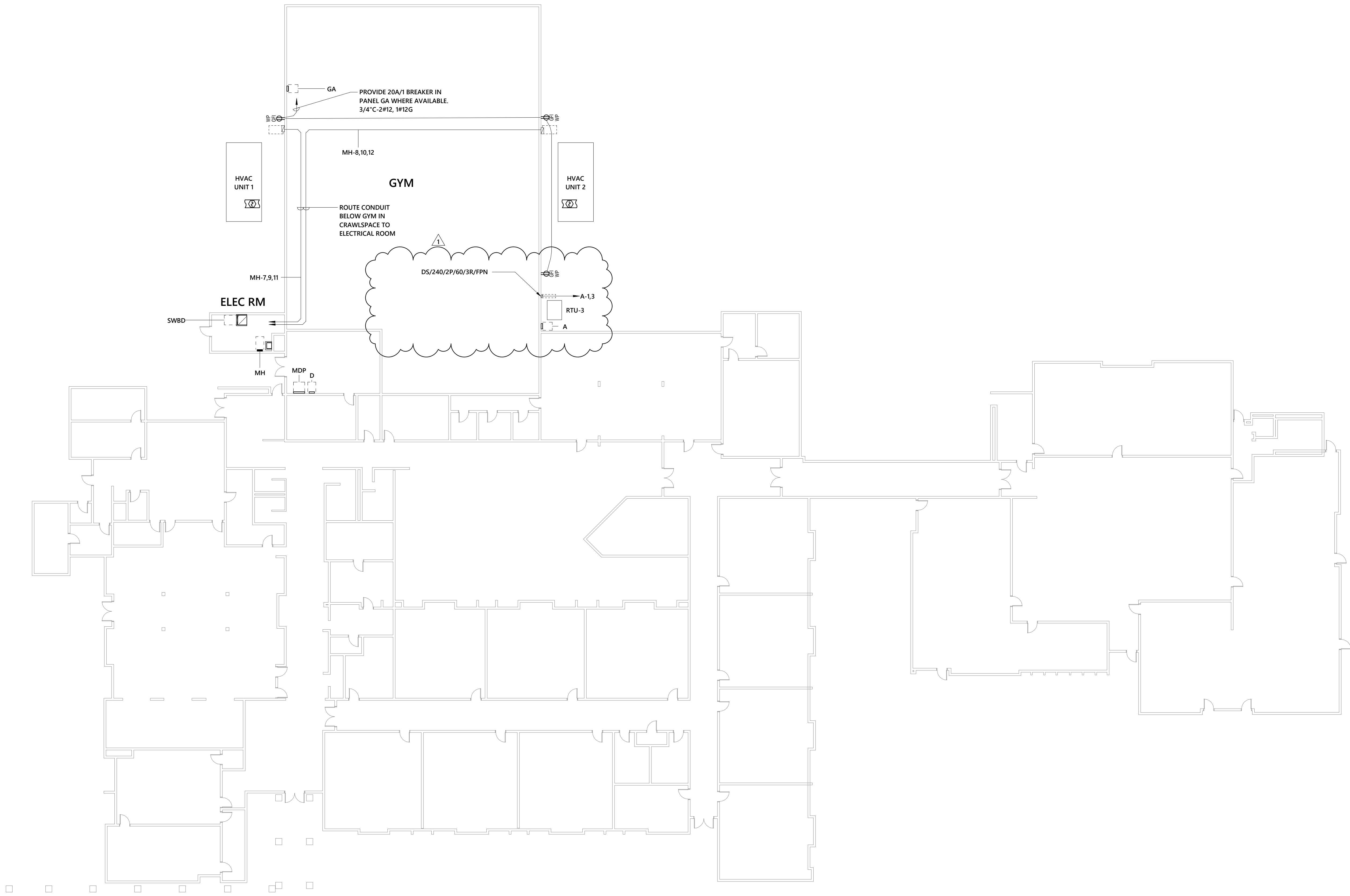
1 06/19/23 Plan Review  
 Comments

MK	DATE	DESCRIPTION
		REVISIONS

**POWER FLOOR PLAN**

DATE 01/01/2020  
 DRAWN BY SAS  
 CHECK BY ZFK  
 JOB NO. 22-0419  
 SHEET

**E2.1**



**1 POWER FLOOR PLAN**  
 1/16" = 1'-0"



**System No. W-L-3065**  
**F Ratings — 1 and 2 Hr (See Item 1)**  
**T Rating — 0 and 1/4 Hr (See Item 3)**

1. Wall Assembly — The 1 or 2 fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:  
 A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. Additional framing (not shown) may be installed around the perimeter of the opening in lieu of the steel wire mesh (Item No. 3A).  
 B. Gypsum Board\* — Nom 5/8 in. (16 mm) thick gypsum board, with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 5-1/2 in. (138 mm) when sleeve (item 2) is employed. Max diam of opening is 4 in. (102 mm) when sleeve (item 2) is not employed.  
 C. The F Rating of the freestop system is equal to the fire rating of the wall assembly.  
 2. Metallic Sleeve — (Optional) — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT) or Schedule 5 (or heavier) steel pipe or min 0.016 in. thick (0.41 mm, No. 28 ga) galv steel sleeve installed flush with wall surfaces. The annular space between steel sleeve and periphery of opening shall be min 0 in. (0 mm, point contact) to max 1 in. (25 mm). When Schedule 5 steel pipe or EMT is used, sleeve may extend up to 16 in. (407 mm) beyond the wall surfaces. As an option when Schedule 5 steel pipe or EMT is used, sleeve may extend continuously beyond one wall surface. When cable bundle penetrates wall assembly at an angle of 45 degrees, no metallic sleeve is used.

Hilti Firestop Systems  
 Page: 1 of 2

3. Cables — Aggregate cross-sectional area of cable in opening to be max 45 percent of the cross-sectional area of the opening. The annular space between the cable bundle and the periphery of the opening to be min 0 in. (0 mm, point contact) to max 1 in. (25 mm). Cables to be rigidly supported on both sides of the wall assembly. Cable bundle, using cables described below, may penetrate the wall at an angle not greater than 45 degrees. Any combination of the following types and sizes of copper conductor cables may be used:  
 A. Max 7/8 No. 12 AWG with polyvinyl chloride (PVC) insulation and jacket.  
 B. Max 25 pair No. 24 AWG telephone cable with PVC insulation and jacket.  
 C1. Max 4 p No. 22 AWG Cat 5 or Cat 6 computer cables.  
 C2. Max RG 6 coaxial cable with polyethylene (PE) insulation and PVC jacket having a max outside diameter of 1/2 in. (13 mm).  
 C3. Max RG 6 coaxial cable with fluorinated ethylene insulation and jacketing.  
 D. Multiple fiber optical communication cable jacketed with PVC and having a max OD of 5/8 in. (16 mm).  
 E. Through Penetrating Products\* — Max three copper conductor No. 8 AWG Metal-Clad Cable\*.  
 F. Max 3/4 in. (19 mm) diam copper ground cable with or without a PVC jacket.  
 G. Max 3/4 in. (19 mm) diam copper ground cable with or without a PVC jacket.  
 H. Fire Resistive Cables\* — Max 1-1/4 in. (32 mm) diam single conductor or multi conductor Type MI cable. A min 1/8 in. (3 mm) separation shall be maintained between MI cables and any other types of cable.  
 I. Max 4/8 with ground 300 kcmil (or smaller) aluminum SER cable with PVC insulation and jacket.  
 J. Through Penetrating Product\* — Sealant or Putty — Fill material applied within the annulus, flush with each end of the steel sleeve or wall surface. Fill material installed symmetrically on both sides of the wall. A min 5/8 in. (16 mm) thickness of sealant is required for the 1 or 2 hr F Rating. An additional 1/2 in. (13 mm) diam bead of fill material shall be applied around the perimeter of sleeve on both sides of the wall when sleeve extends beyond surface of wall.  
 K. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S, CP606, FS-One Sealants or CP618 Putty  
 \*Bearing the UL Classification Mark  
 \*Bearing the UL Listing Mark

Hilti Firestop Systems  
 Page: 2 of 2

**SYSTEM NO. W-L-3065**

**System No. W-L-8004**  
**F Rating — 2 Hr**  
**T Rating — 1/4 Hr**

1. Wall Assembly — The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:  
 A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. OC. (610 mm) Additional framing (not shown) may be installed around the perimeter of the opening in lieu of the steel wire mesh (Item No. 3A).  
 B. Gypsum Board\* — Two layers of nom 5/8 in. (16 mm) thick gypsum wallboard, as specified in the individual Wall and Partition Design. Max area of opening is 96 sq in. (692 cm<sup>2</sup>) with max dimension of 12 in. (305 mm) Max width of opening in wood stud walls is limited to 12 in. (305 mm).  
 2. Through Penetrants — The following types and sizes of pipes, conduits, tubing or cables may be used:  
 A. Nom 3 in. (76 mm) diam (or smaller) electrical metallic tubing (EMT).  
 B. Max 25 pair — No. 24 AWG (or smaller) telephone cable with polyvinyl chloride (PVC) insulation and jacket.  
 C. Max 3/8 in. (9.5 mm) diam (or smaller) Type NM cable with PVC insulation and jacket.  
 D. Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC pipe for use in closed (process or supply) piping systems only.  
 E. Max 300 kcmil (or smaller) power cable with PVC insulation and nylon jacket.  
 The through penetrating items to be rigidly supported on both sides of wall assembly and located as shown in the table below:

Item No.	Max Distance Between Adjacent Pen. Item in. (mm)	Min Distance Between Adjacent Pen. Item in. (mm)	Max Distance From Through Opening in. (mm)	Min Distance From Through Opening in. (mm)
2A	7-7/16 (188)	1-11/16 (43)	14-1/2(370)	1/2 (13 mm)
2B	7-7/16 (188)	1-11/16 (43)	14-1/2(370)	1/2 (13 mm)
2C	7-7/16 (188)	1-11/16 (43)	14-1/2(370)	1/2 (13 mm)
2D	7-7/16 (188)	1-11/16 (43)	14-1/2(370)	1/2 (13 mm)
2E	7-7/16 (188)	1-11/16 (43)	14-1/2(370)	1-1/2 (32 mm)

Hilti Firestop Systems  
 Page: 1 of 2

**System No. W-L-8004**  
**F Rating — 2 Hr**  
**T Rating — 1/4 Hr**

3. Firestop System — The firestop system shall consist of the following:  
 A. Steel Wire Mesh — No. 8 steel wire mesh having a min 1 in. (25 mm) lap along the longitudinal seam. Length of steel wire mesh to be 4-3/4 in. (120 mm) centered and formed to fit periphery of through opening. Steel wire mesh is not required when additional framing members (Item No. 1A) are used.  
 B. Packing Material — Min 4.0 in. (102 mm) thickness of min 3.5 pcf (56 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.  
 C. Fill, Void or Cavity Material\* — Sealant — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall.  
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant  
 \*Bearing the UL Classification Mark

Hilti Firestop Systems  
 Page: 2 of 2

**SYSTEM NO. W-L-8004**

**System No. W-L-8013**

ANSI/UL 1479 (ASTM E814)		CANULC S115	
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)	FT Rating — 0 Hr	FT Rating — 0 Hr
T Rating — 0 Hr		FH Ratings — 1 and 2 Hr (See Item 1)	FH Rating — 0 Hr
L Rating At Ambient — 5 CFM/sq ft		L Rating At Ambient — 6 CFM/sq ft	L Rating At Ambient — 6 CFM/sq ft
L Rating At 400 F — 2 CFM/sq ft		L Rating At 400 F — 2 CFM/sq ft	L Rating At 400 F — 2 CFM/sq ft

System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:  
 A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 in. (51 mm) (51 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. Additional studs installed to completely frame the opening.  
 B. Gypsum Board\* — 5/8 in. (16 mm) thick, 4 ft (1219 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening is 352 sq in. (2271 sq cm) with max dimension of 22 in. (559 mm) wide.  
 The hourly F and FH Ratings of the freestop system are equal to the hourly fire rating of the wall assembly in which it is installed.  
 2. Cable Tray — Max 18 in. (457 mm) wide by max 8 in. (152 mm) deep open-ladder or solid-back cable tray with channel-shaped side rails formed of 0.065 in. (1.65 mm) thick aluminum or 0.080 in. (1.52 mm) thick steel and with 1-1/2 in. (38 mm) wide by 1 in. (25 mm) channel shape rungs spaced 9 in. (229 mm) OC or 0.029 in. (0.74 mm) thick steel solid back, respectively. One cable tray to be installed in the opening. The max annular space between the cable tray and the periphery of the opening shall be min 1 in. (25 mm) to max 7 in. (178 mm). Cable tray to be rigidly supported on both sides of floor or wall assembly.

Hilti Firestop Systems  
 Page: 1 of 2

**System No. W-L-8013**

ANSI/UL 1479 (ASTM E814)		CANULC S115	
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)	FT Rating — 0 Hr	FT Rating — 0 Hr
T Rating — 0 Hr		FH Ratings — 1 and 2 Hr (See Item 1)	FH Rating — 0 Hr
L Rating At Ambient — 5 CFM/sq ft		L Rating At Ambient — 5 CFM/sq ft	L Rating At Ambient — 5 CFM/sq ft
L Rating At 400 F — 2 CFM/sq ft		L Rating At 400 F — 2 CFM/sq ft	L Rating At 400 F — 2 CFM/sq ft

3. Cables — Aggregate cross-sectional area of cables in cable tray to be max 30 percent of the cross-sectional area of the cable tray. Any combination of the following types and sizes of copper conductor cables may be used:  
 A. 7/8 No. 12 AWG with polyvinyl chloride (PVC) insulation and PVC jacket.  
 B. 100 pair — No. 24 AWG cable with PVC insulation and jacket.  
 C. 1/2, 750 kcmil (or smaller) with PVC insulation and jacket.  
 4. Through-Penetrants — One or more pipe or tube to be installed within the opening. The total number of through-penetrants is dependent on the size of the opening and types and sizes of the penetrants. Any combination of the penetrants described below may be used provided that the following parameters relative to the annular spaces and the spacings between the pipes are maintained. The space between the pipe or tube and the periphery of the opening shall be min 1-1/2 in. (38 mm) to max 5-1/4 in. (235 mm). Pipe or tube to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of non-metallic or metallic pipes, or tubes may be used:  
 A. Polyvinyl Chloride (PVC) Pipe — Max 3 in. (76 mm) diam Schedule 40 solid conc PVC pipe (or smaller) for use in closed (process or supply) or vented (drain, waste or vent) piping system.  
 B. Steel Pipe — Nom 6 in. (152 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.  
 C. Conduit — Nom 4 in. (102 mm) diam (or smaller) electrical metallic tubing or 6 in. (152 mm) diam steel conduit.  
 D. Copper Pipe — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.  
 E. Copper Tube — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.  
 4A. Pipe Covering — (Not Shown) Nom 1-1/2 in. (38 mm) thick hollow cylindrical heavy density (min 3.5 pcf) (56kg/m<sup>3</sup>) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.  
 See Pipe and Equipment Covering and Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 may be used.  
 5. Cables — Max 1-1/2 in. (38 mm) diam light bundle of cables installed within the opening and rigidly supported on both surfaces of wall. The space between the cables and periphery of the opening shall range from 1-3/16 in. (30.2 mm) min to a max of 1-1/2 in. (38 mm). Any combination of the following types and sizes of cables may be used:  
 A. 7/8 No. 12 AWG with polyvinyl chloride (PVC) insulation and jacket.  
 B. 25 pair — No. 24 AWG cable with PVC insulation and jacket.  
 C. Type R GU/58 coaxial cable with PVC outer jacket.  
 D. 24 fiber optic cable with PVC sub unit and outer jacket.  
 6. Firestop System — The firestop system shall consist of the following:  
 A. Fill, Void or Cavity Material\* — Fire Blocks For walls incorporating max 3-5/8 in. (92 mm) steel studs or max 2 (51 mm) by 4 in. (102 mm) wood studs. Fire block installed with 5 in. (127 mm) dimension projecting through and centered in opening. For walls constructed of larger steel or wood studs, fire block installed with long dimension passing through and centered in opening. Blocks may or may not be cut flush with both surfaces of wall. When multiple layers of gypsum board are used, blocks may be recessed 1/2 in. (13 mm) from surface of wall. Blocks to be firmly packed in opening. Either one or a combination of the block types specified below may be used.  
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS 657 Fire Block or CFS-BL Firestop Block  
 B. Fill, Void or Cavity Material\* — Sealant or Putty — Fill material to be forced into interstices of cables, between cables and cable trays, around each penetrant and where obvious voids are observed to max extent possible on both surfaces of the penetration.  
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant, CP 618 Putty Stick or CP620 Fire Foam  
 \*Bearing the UL Classification Mark

Hilti Firestop Systems  
 Page: 2 of 2

**SYSTEM NO. W-L-8013**

**LINDSEY ARCHITECTURE**  
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 North Carolina License Number C-0914

**NORTH CAROLINA PROFESSIONAL SEAL**  
 ENGINEER  
 ZANE KUSENB  
 17308  
 04/06/2023

**ALTAMAHAW OSSISPEE ELEMENTARY**  
**2832 N NC HIGHWAY 87, ELON, NC 27244**

MK	DATE	DESCRIPTION
		REVISIONS

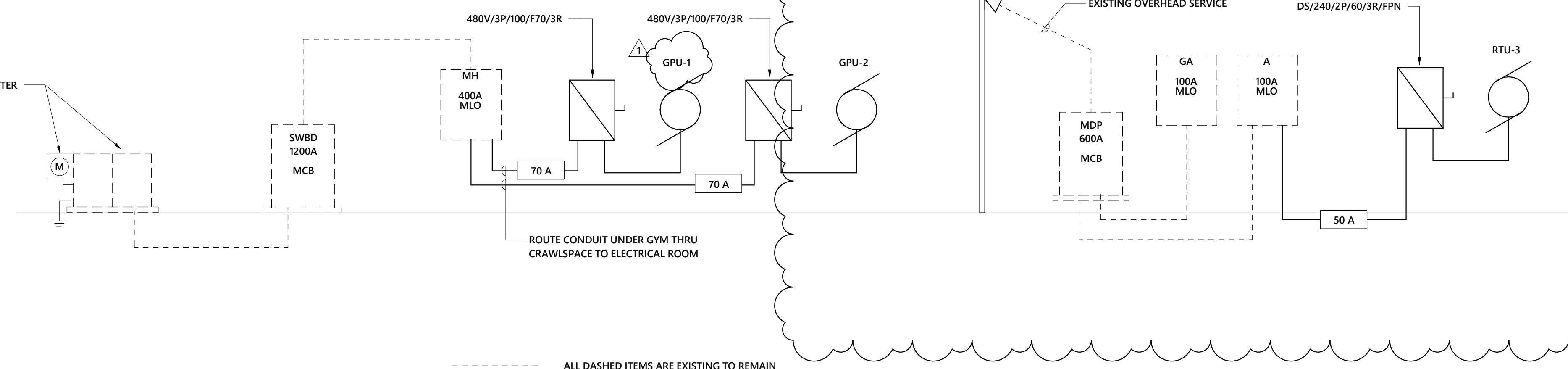
**ELECTRICAL DETAILS**

DATE	01/01/2020
DRAWN BY	Author
CHECK BY	Checker
JOB NO.	22-0419
SHEET	

**E6.1**

FEEDER SCHEDULE FOR COPPER CONDUCTORS TO SPECIFIC BREAKER SIZE	
FEEDER AMPS	WIRE SIZE TEMP 75°C (CU)
50 A	2#8, 1410G, 3/4" C
70 A	3#6, 1410G, 1" C

EXISTING 500KVA TRANSFORMER AND METER

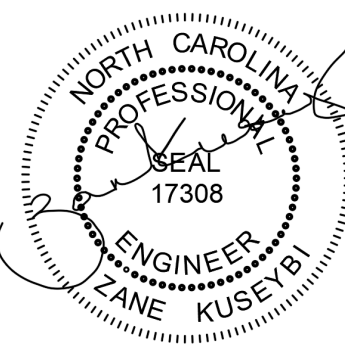


**1 POWER RISER DIAGRAM**  
1/8" = 1'-0"

VOLTAGE: 480Y/277 3Ø														
PANEL: MH														
MOUNTING: SURFACE														
ENCLOSURE: NEMA1														
MAIN: 400 A														
FED FROM: SWBD														
MFR: EXTG														
TYPE: EXTG														
AIC: 35 KAIC														
MAIN TYPE: MLO														
PHASE: 3														
WIRE: 4														
LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A	B	C	Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
F	PANEL H5 & H6	3/0	200 A	3	3	6.67	6.67			3	175 A	2/0	PANEL H3 & H4	F
	GPU-1	6	70 A	9	3	14.90	14.90			3	70 A	6	GPU-2	C
	SPACE ONLY	-	-	13	1	-	-			1	14	-	SPACE ONLY	
	SPACE ONLY	-	-	15	1	-	-			1	16	-	SPACE ONLY	
	SPACE ONLY	-	-	17	1	-	-			1	18	-	SPACE ONLY	
LOAD		Connected Load	Demand Factor	Estimated Demand		NOTES:								
L	LIGHTS	0.00 kVA	0.00%	0.00 kVA		1. EXISTING PANEL TO REMAIN.								
LE	LIGHTING - EXTERIOR	0.00 kVA	0.00%	0.00 kVA		2. BOLD INDICATES NEW WORK.								
H	HEATING	0.00 kVA	0.00%	0.00 kVA										
C	COOLING	89.40 kVA	100.00%	89.40 kVA										
V	VENTILATION	0.00 kVA	0.00%	0.00 kVA										
M	MOTORS	0.00 kVA	0.00%	0.00 kVA										
K	KITCHEN	0.00 kVA	0.00%	0.00 kVA										
R	RECEPTACLES	0.00 kVA	0.00%	0.00 kVA										
WH	WATER HEATER	0.00 kVA	0.00%	0.00 kVA										
MS	MISC.	40.00 kVA	100.00%	40.00 kVA										
S	Spare	0.00 kVA	0.00%	0.00 kVA										
E	ELEVATOR	0.00 kVA	0.00%	0.00 kVA										
LD	LAUNDRY	0.00 kVA	0.00%	0.00 kVA										
EV	EV CHARGING	0.00 kVA	0.00%	0.00 kVA										
TOTAL KVA...		129.40 kVA	TOTAL PER PHASE: (CONNECTED)		LOAD CLASSIFICATION ABBREVIATIONS (CONT.)									
TOTAL KVA (DEMAND):		129.40 kVA	155.7 A	155.7 A	155.7 A	F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.								
TOTAL AMP...		156 A												
TOTAL AMP. (DEMAND):		156 A												

VOLTAGE: 120/240 1Ø														
PANEL: MDP														
MOUNTING: SURFACE														
ENCLOSURE: NEMA1														
MAIN: 600 A														
FED FROM: MDP														
MFR: EXTG														
TYPE: EXTG														
AIC: 65 KAIC														
MAIN TYPE: MCB														
PHASE: 1														
WIRE: 3														
LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A	B	Pole	Ckt No	Trip	Wire	Load Served	LC Abbr	
F	PANEL B	10	30 A	1	2	2.25	2.25			2	2	30 A	10	PANEL D
F	PANEL A	1	100 A	5	2	7.20	6.00			2	6	100 A	1	PANEL C
F	TO GUTTER IN SHOP	1	100 A	9	2	6.00	6.00			2	10	100 A	1	TO GUTTER IN SHOP
F	TO PRESENT HOME EC BLDG	3/0	200 A	13	2	12.00	-			1	14	-	-	SPACE ONLY
				15	2					1	16	-	-	SPACE ONLY
LOAD		Connected Load	Demand Factor	Estimated Demand		NOTES:								
L	LIGHTS	0.00 kVA	0.00%	0.00 kVA		1. EXISTING PANEL TO REMAIN.								
LE	LIGHTING - EXTERIOR	0.00 kVA	0.00%	0.00 kVA		2. BOLD INDICATES NEW WORK.								
H	HEATING	0.00 kVA	0.00%	0.00 kVA										
C	COOLING	14.40 kVA	100.00%	14.40 kVA										
V	VENTILATION	0.00 kVA	0.00%	0.00 kVA										
M	MOTORS	0.00 kVA	0.00%	0.00 kVA										
K	KITCHEN	0.00 kVA	0.00%	0.00 kVA										
R	RECEPTACLES	0.00 kVA	0.00%	0.00 kVA										
WH	WATER HEATER	0.00 kVA	0.00%	0.00 kVA										
MS	MISC.	69.00 kVA	100.00%	69.00 kVA										
S	Spare	0.00 kVA	0.00%	0.00 kVA										
E	ELEVATOR	0.00 kVA	0.00%	0.00 kVA										
LD	LAUNDRY	0.00 kVA	0.00%	0.00 kVA										
EV	EV CHARGING	0.00 kVA	0.00%	0.00 kVA										
TOTAL KVA...		83.40 kVA	TOTAL PER PHASE: (CONNECTED)		LOAD CLASSIFICATION ABBREVIATIONS (CONT.)									
TOTAL KVA (DEMAND):		83.40 kVA	347.5 A	347.5 A	0.0 A	F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.								
TOTAL AMP...		348 A												
TOTAL AMP. (DEMAND):		348 A												

VOLTAGE: 120/240 1Ø														
PANEL: A														
MOUNTING: SURFACE														
ENCLOSURE: NEMA1														
MAIN: 100 A														
FED FROM: MDP														
MFR: EXTG														
TYPE: EXTG														
AIC: 10 KAIC														
MAIN TYPE: MLO														
PHASE: 1														
WIRE: 3														
LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A	B	Pole	Ckt No	Trip	Wire	Load Served	LC Abbr	
C	RTU-3	6	50 A	1	2	4.00	-			1	2	-	-	SPACE ONLY
				3						1	4	-	-	SPACE ONLY
C	AHU (#3)	8	40 A	5	2	3.20	-			1	6	-	-	SPACE ONLY
				7						1	8	-	-	SPACE ONLY
	SPACE ONLY	-	-	9	1	-	-			1	10	-	-	SPACE ONLY
	SPACE ONLY	-	-	11	1	-	-			1	12	-	-	SPACE ONLY
LOAD		Connected Load	Demand Factor	Estimated Demand		NOTES:								
L	LIGHTS	0.00 kVA	0.00%	0.00 kVA		1. EXISTING PANEL TO REMAIN.								
LE	LIGHTING - EXTERIOR	0.00 kVA	0.00%	0.00 kVA		2. BOLD INDICATES NEW WORK.								
H	HEATING	0.00 kVA	0.00%	0.00 kVA		3. BREAKER TO BE REMOVED.								
C	COOLING	14.40 kVA	100.00%	14.40 kVA										
V	VENTILATION	0.00 kVA	0.00%	0.00 kVA										
M	MOTORS	0.00 kVA	0.00%	0.00 kVA										
K	KITCHEN	0.00 kVA	0.00%	0.00 kVA										
R	RECEPTACLES	0.00 kVA	0.00%	0.00 kVA										
WH	WATER HEATER	0.00 kVA	0.00%	0.00 kVA										
MS	MISC.	0.00 kVA	0.00%	0.00 kVA										
S	Spare	0.00 kVA	0.00%	0.00 kVA										
E	ELEVATOR	0.00 kVA	0.00%	0.00 kVA										
LD	LAUNDRY	0.00 kVA	0.00%	0.00 kVA										
EV	EV CHARGING	0.00 kVA	0.00%	0.00 kVA										
TOTAL KVA...		14.40 kVA	TOTAL PER PHASE: (CONNECTED)		LOAD CLASSIFICATION ABBREVIATIONS (CONT.)									
TOTAL KVA (DEMAND):		14.40 kVA	60.0 A	60.0 A	0.0 A	F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.								
TOTAL AMP...		60 A												
TOTAL AMP. (DEMAND):		60 A												



06/19/2023

**ALTAMAHAW OSSISPEE ELEMENTARY**  
2832 N NC HIGHWAY 87, ELON, NC 27244

MK	DATE	DESCRIPTION
1	06/19/23	Plan Review Comments

**ELECTRICAL DIAGRAMS**

DATE	04/06/2023
DRAWN BY	SAS
CHECK BY	ZFK
JOB NO.	22-0419
SHEET	

**E7.1**

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