MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT

DE BROWN STATES

CONTRACT 2C20-064

21 Tuttle Rd. Bristol, CT 06010 April 15, 2020

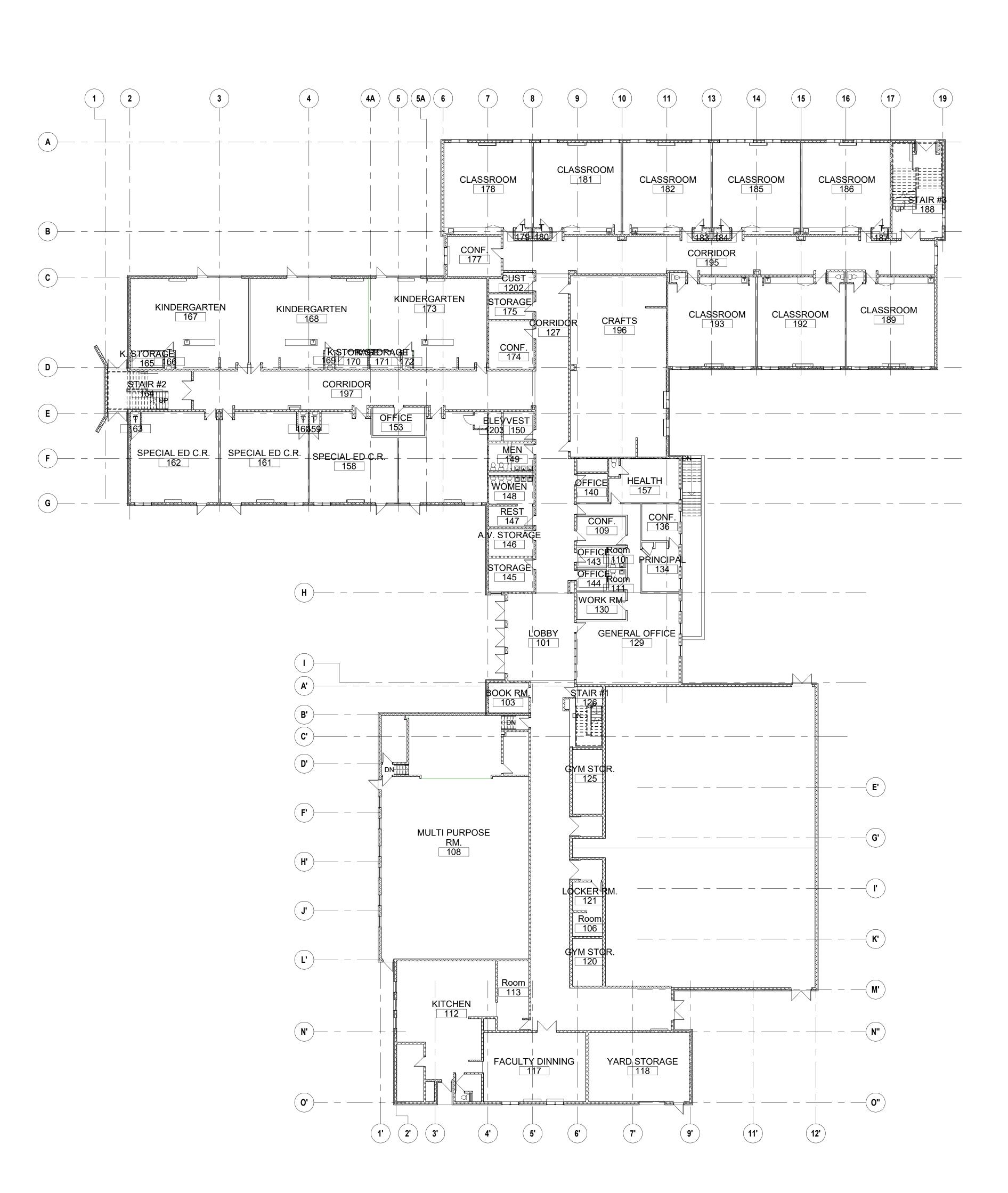
CITY OF BRISTOL, CT Mayor Ellen Zoppo-Sassu



Weston & Sampson Engineers, Inc.
100 Foxborough Boulevard Suite 25
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON



ISSUED FOR: ADDENDUM #1



Project:

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100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
www.westonandsampson.com

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Consultants:



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PROJECT TRUE

Drawn By: JCB

Drawn By: JCB

Reviewed By: AC

Approved By:
W&S Project No: Do Not Use

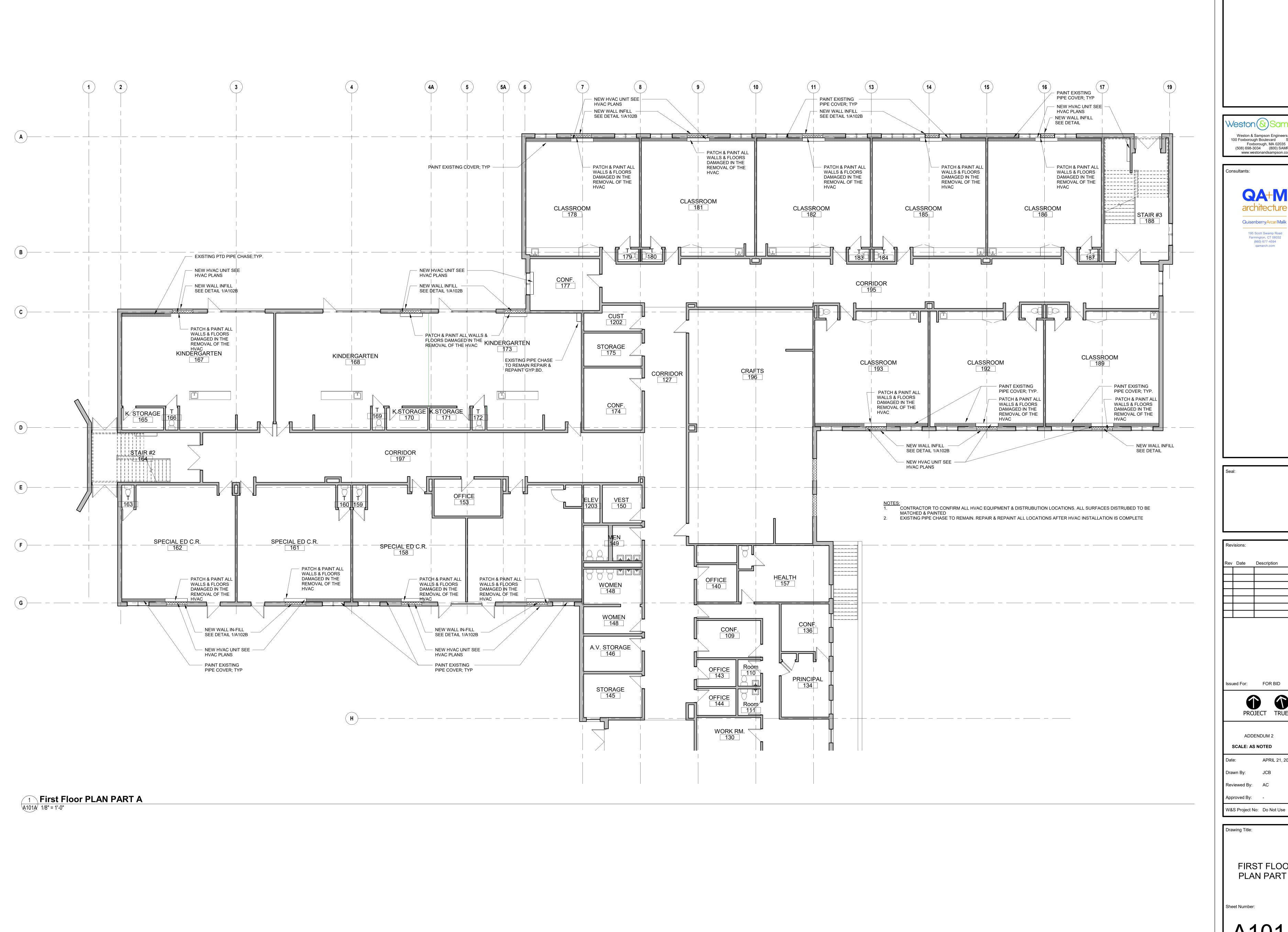
Drawing Title:

OVERALL FIRST FLOOR PLAN

Sheet Number:

A101

1 OVERALL First Floor PLAN
A101 1/16" = 1'-0"



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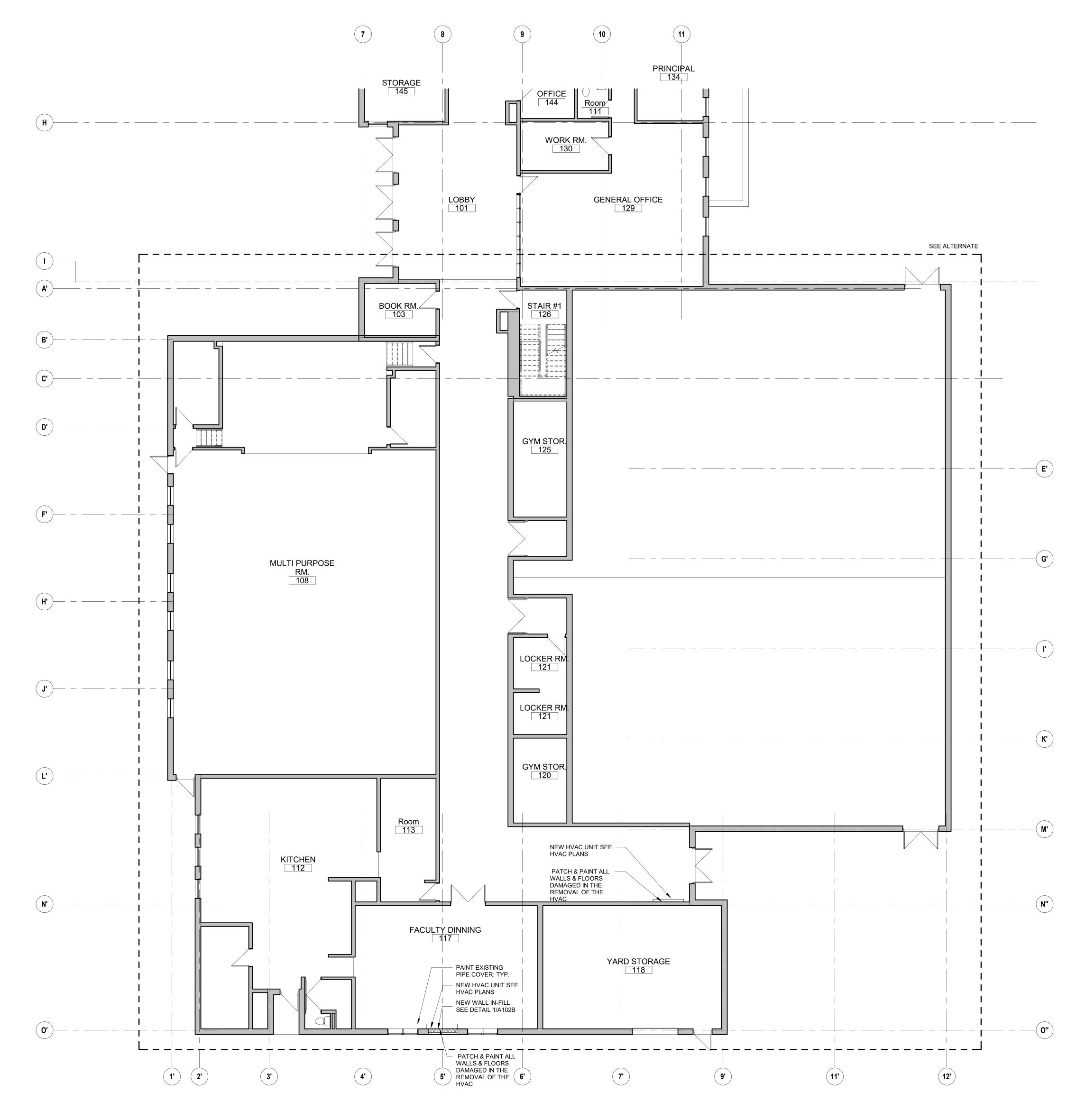
ADDENDUM 2 SCALE: AS NOTED

APRIL 21, 2020

Reviewed By: AC

FIRST FLOOR PLAN PART A

Sheet Number:



NOTES:

1. CONTRACTOR TO CONFIRM ALL HVAC EQUIPMENT & DISTRUBUTION LOCATIONS. ALL SURFACES DISTRUBED TO BE MATCHED & PAINTED

2. EXISTING PIPE CHASE TO REMAIN. REPAIR & REPAINT ALL LOCATIONS AFTER HVAC INSTALLATION IS COMPLETE

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100 Foxborough Boulevard Suite 250
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(508) 698-3034 (800) SAMPSON
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Approved By: W&S Project No: Do Not Use

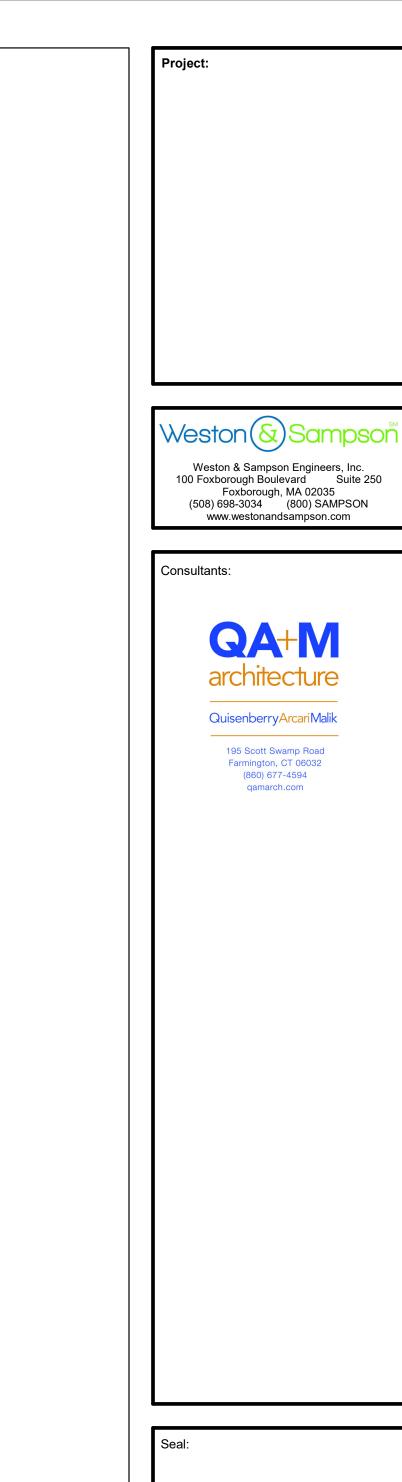
Drawing Title:

FIRST FLOOR PLAN PART B

Sheet Number:

A101B

1 First Floor PLAN PART B
A101B 1/8" = 1'-0"



10

CLASSROOM

227

CLASSROOM

226

STORAGE 223 CONF 222

STORAGE 210

CONF 209

> CORRIDOR 202

CLASSROOM

220

CLASSROOM

212

CLASSROOM

218

CLASSROOM

214

CLASSROOM

217

CLASSROOM

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CLASSROOM

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CLASSROOM

213

13

CLAS\$ROOM

229

STAIR 231

CLASSROOM 232

CLAS\$ROOM

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CLASSROOM 233

CLASSROOM

228

207

LIBRARY 203

206

SECRETARY OFFICE 205 208

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SCALE: AS NOTED

Date: APRIL 2, 2020

Drawn By: JCB

Reviewed By: AC

Approved By:

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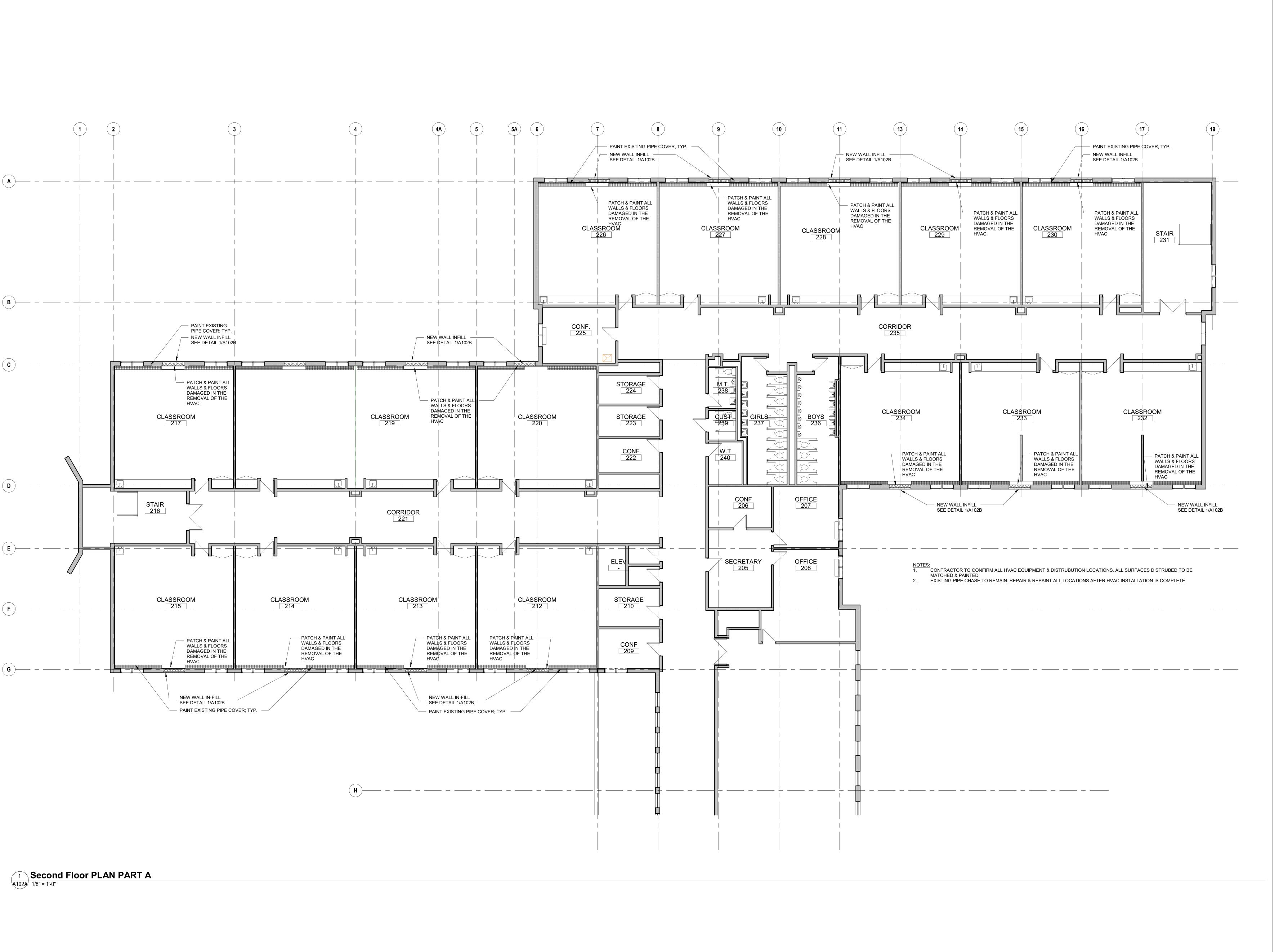
Drawing Title:

OVERALL SECOND FLOOR PLAN

Sheet Number:

A102





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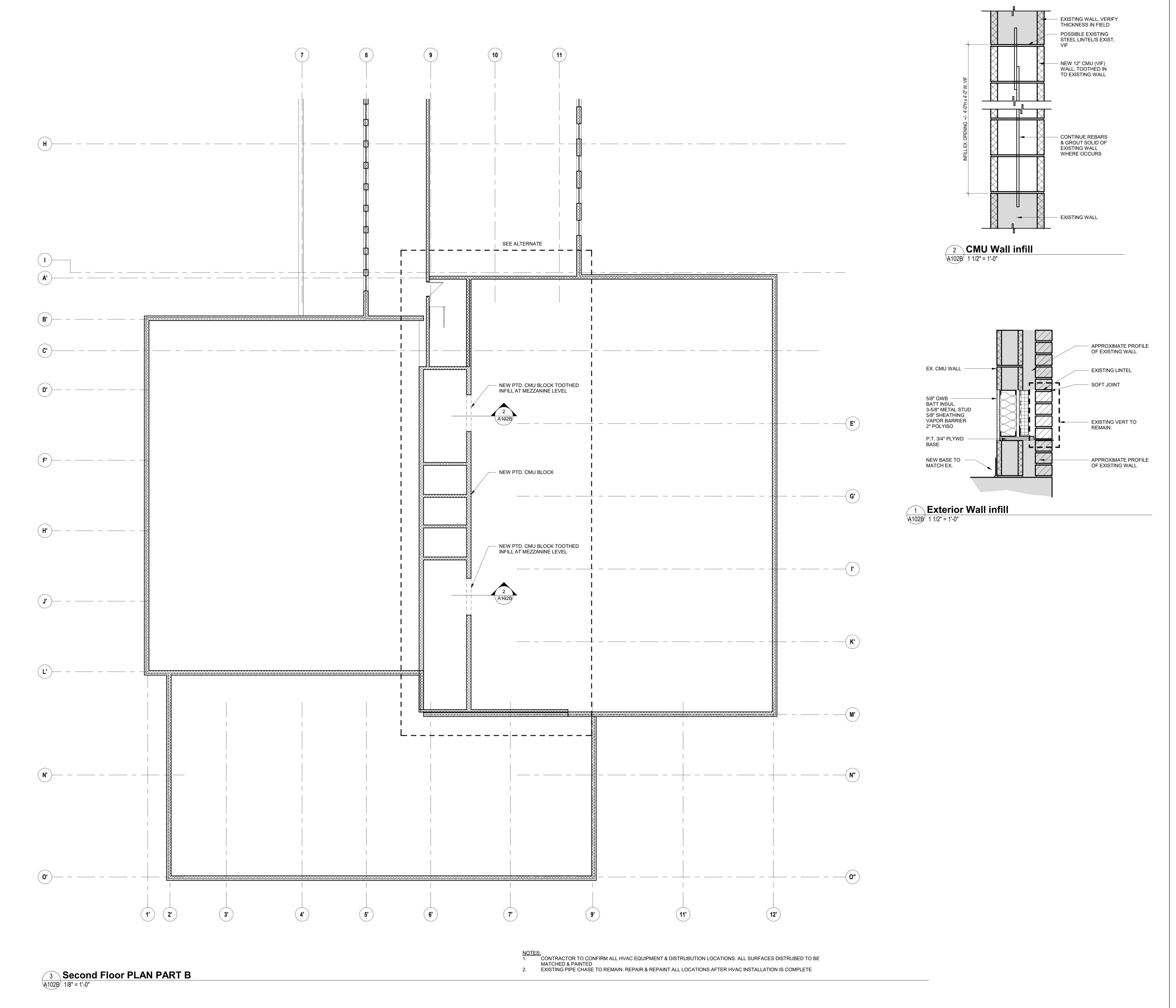
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SECOND FLOOR PLAN PART A

Sheet Number:

A102A



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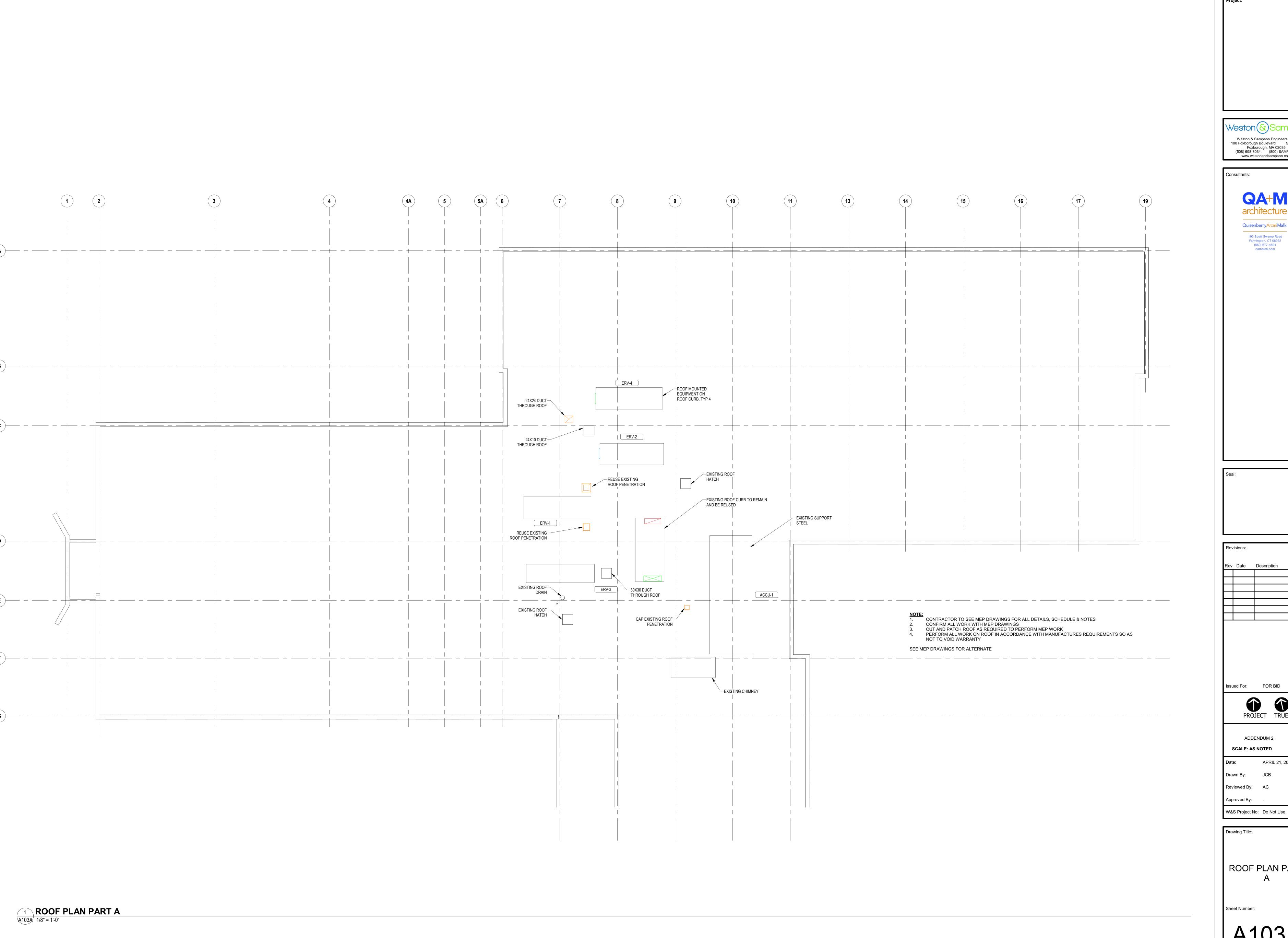
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SECOND FLOOR

PLAN PART B

Sheet Number:

A102B



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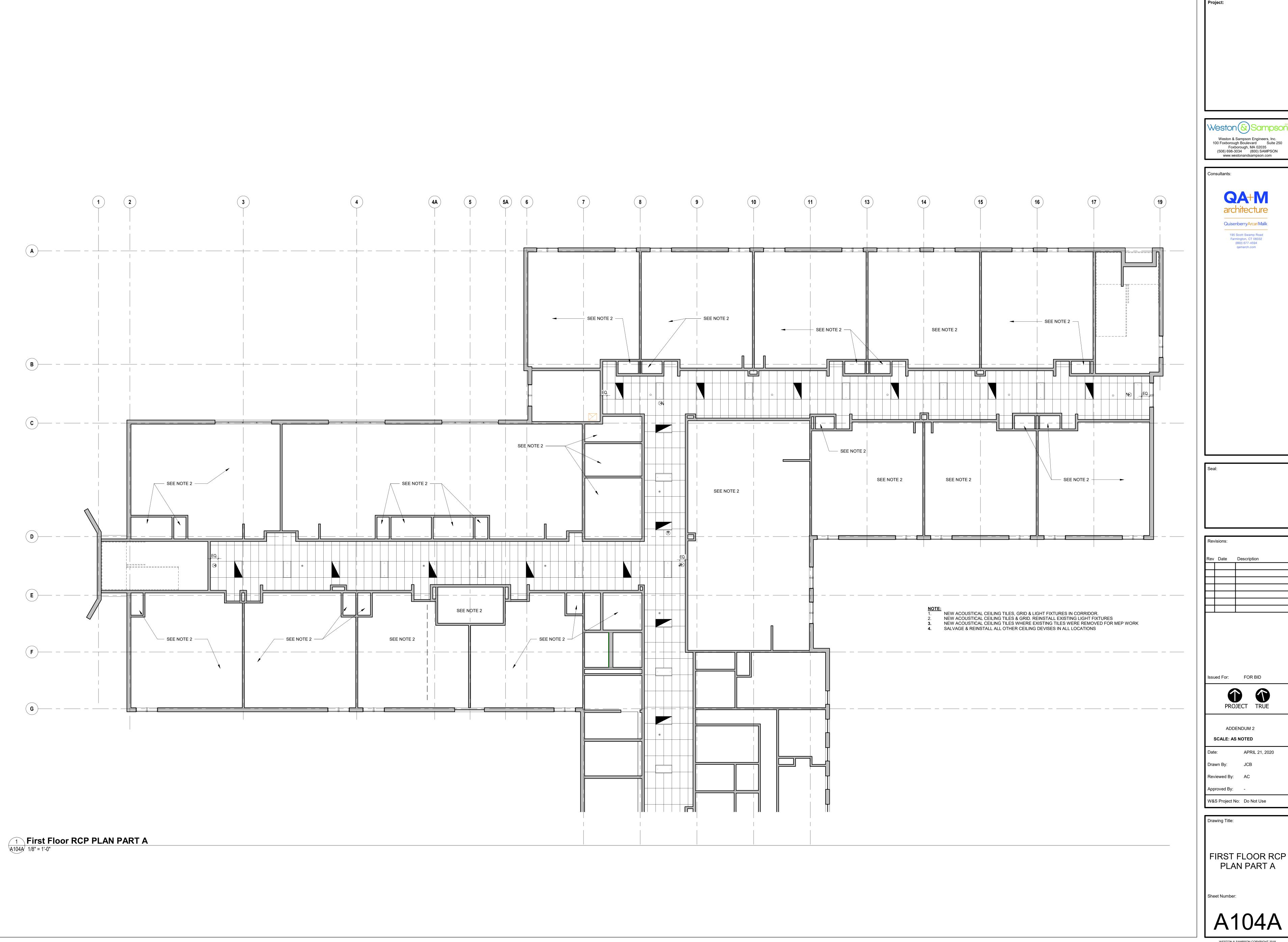
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ROOF PLAN PART

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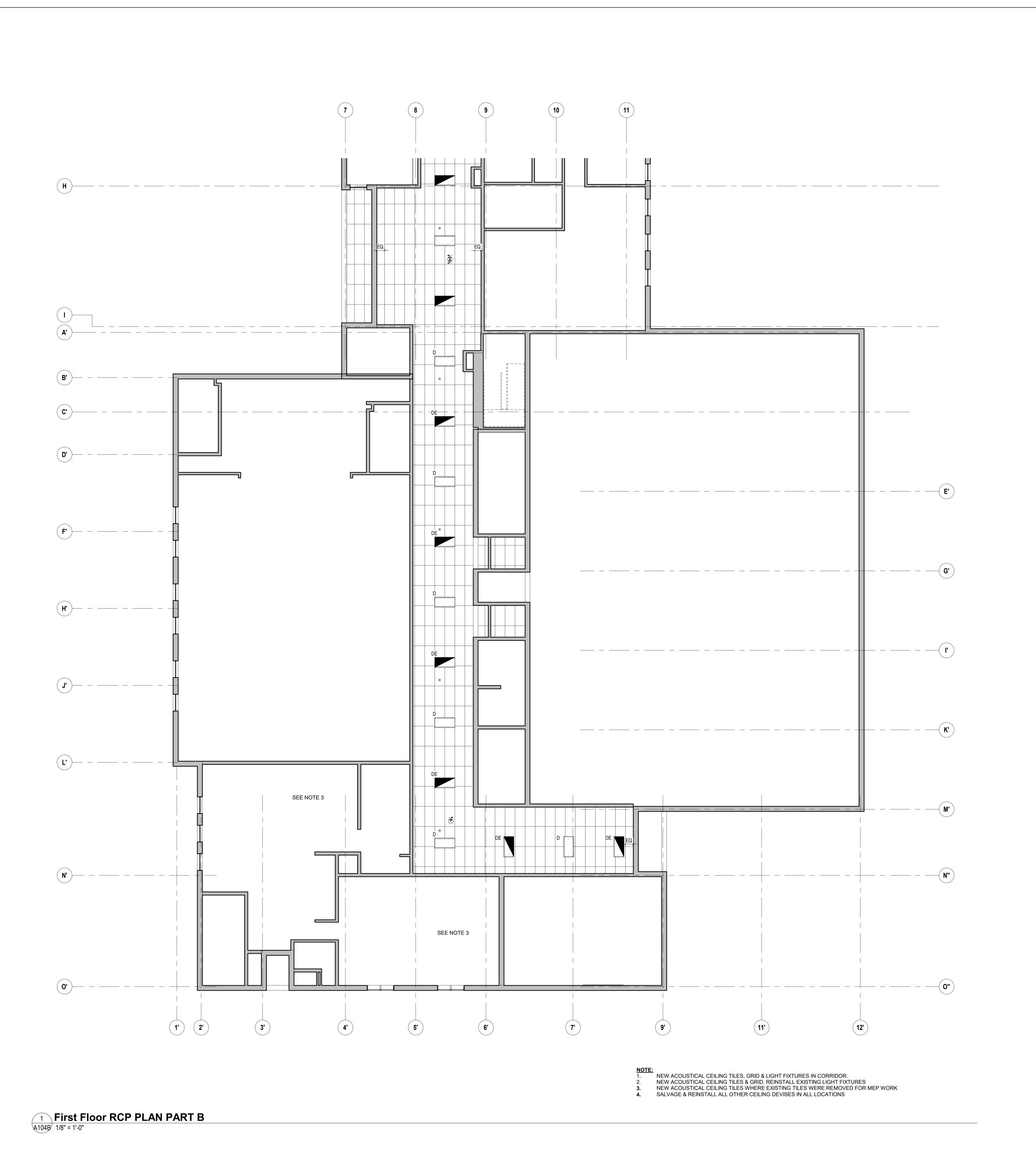


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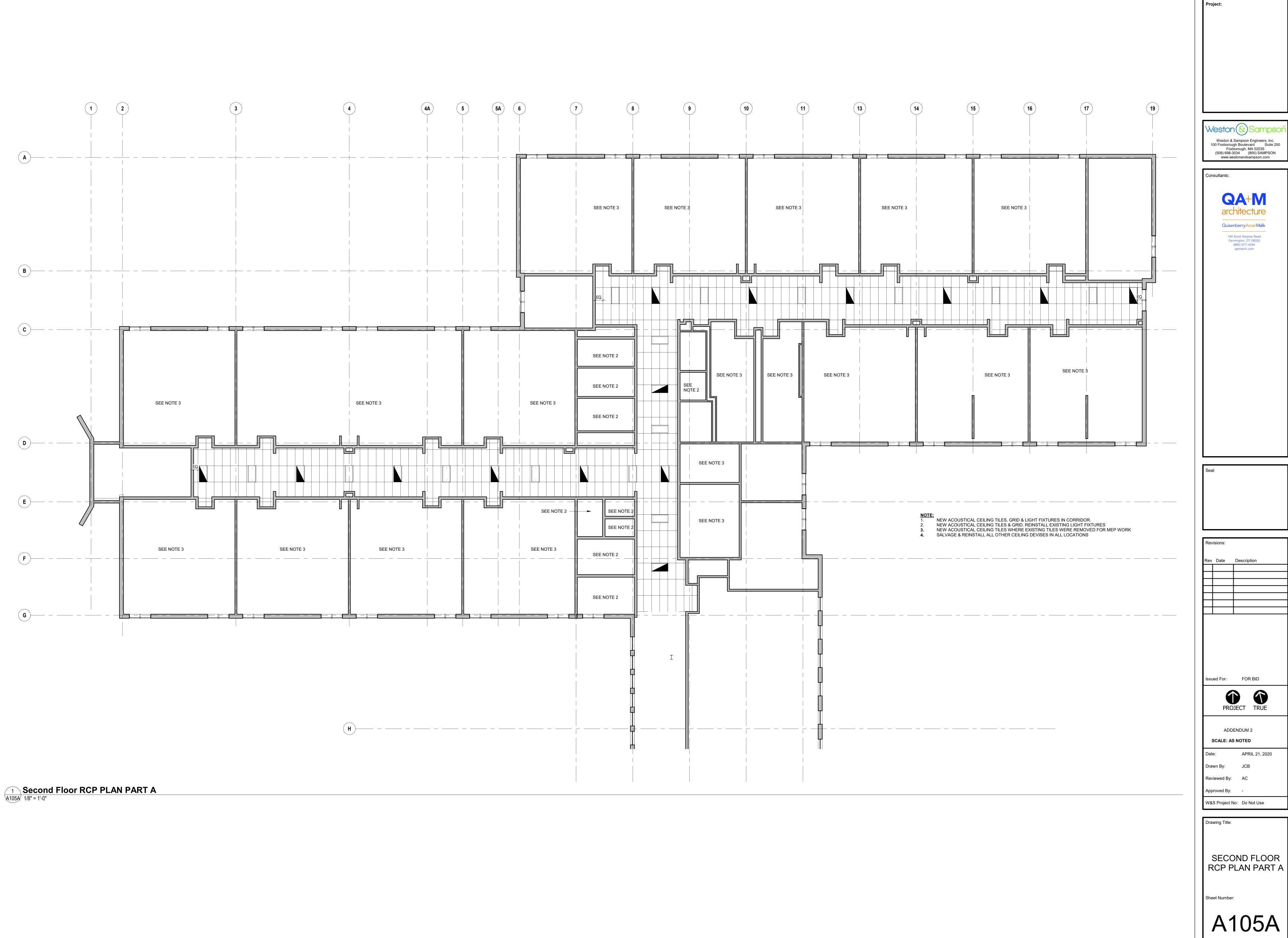
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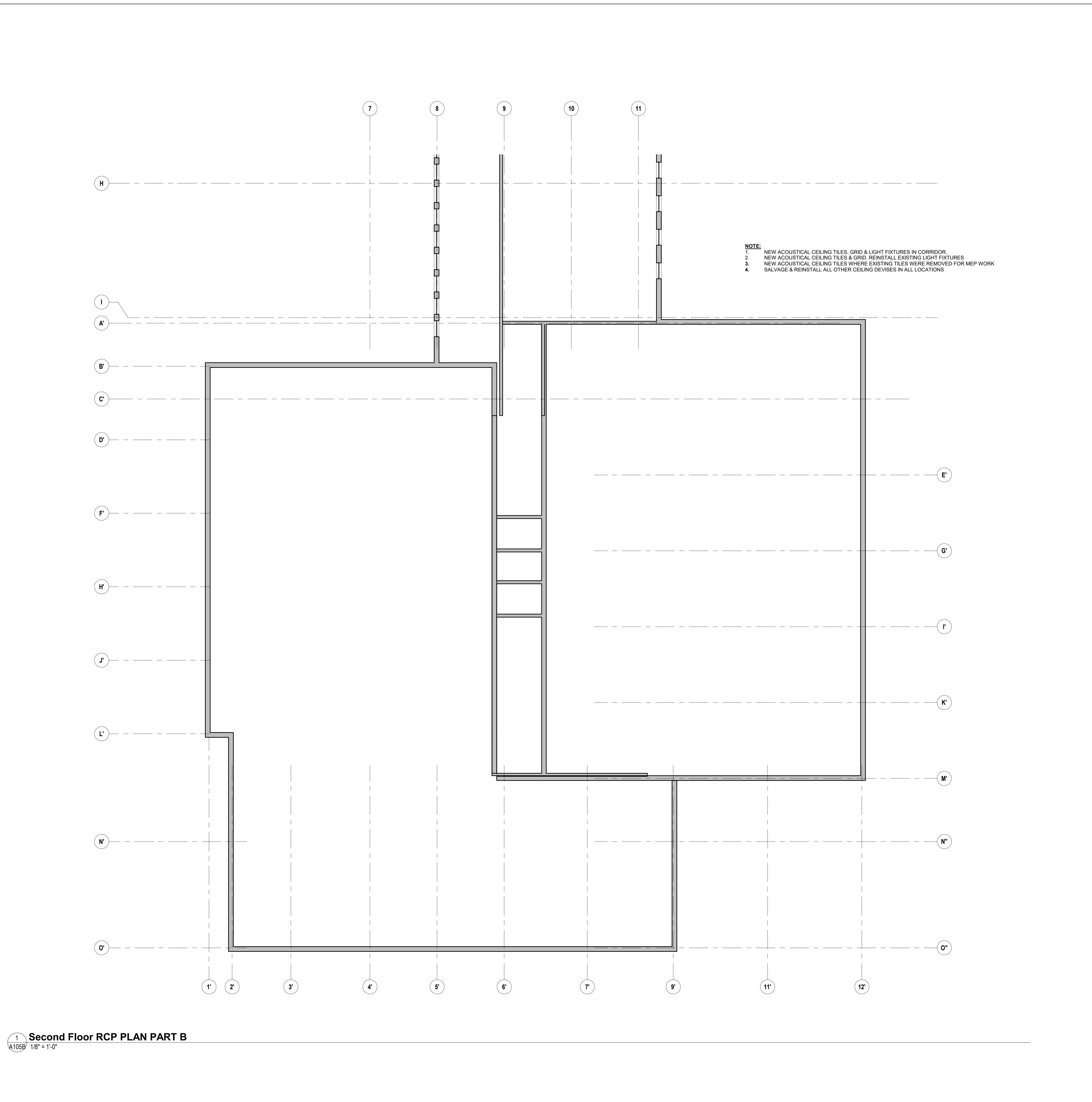
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FIRST FLOOR RCP PLAN PART B

Sheet Number:

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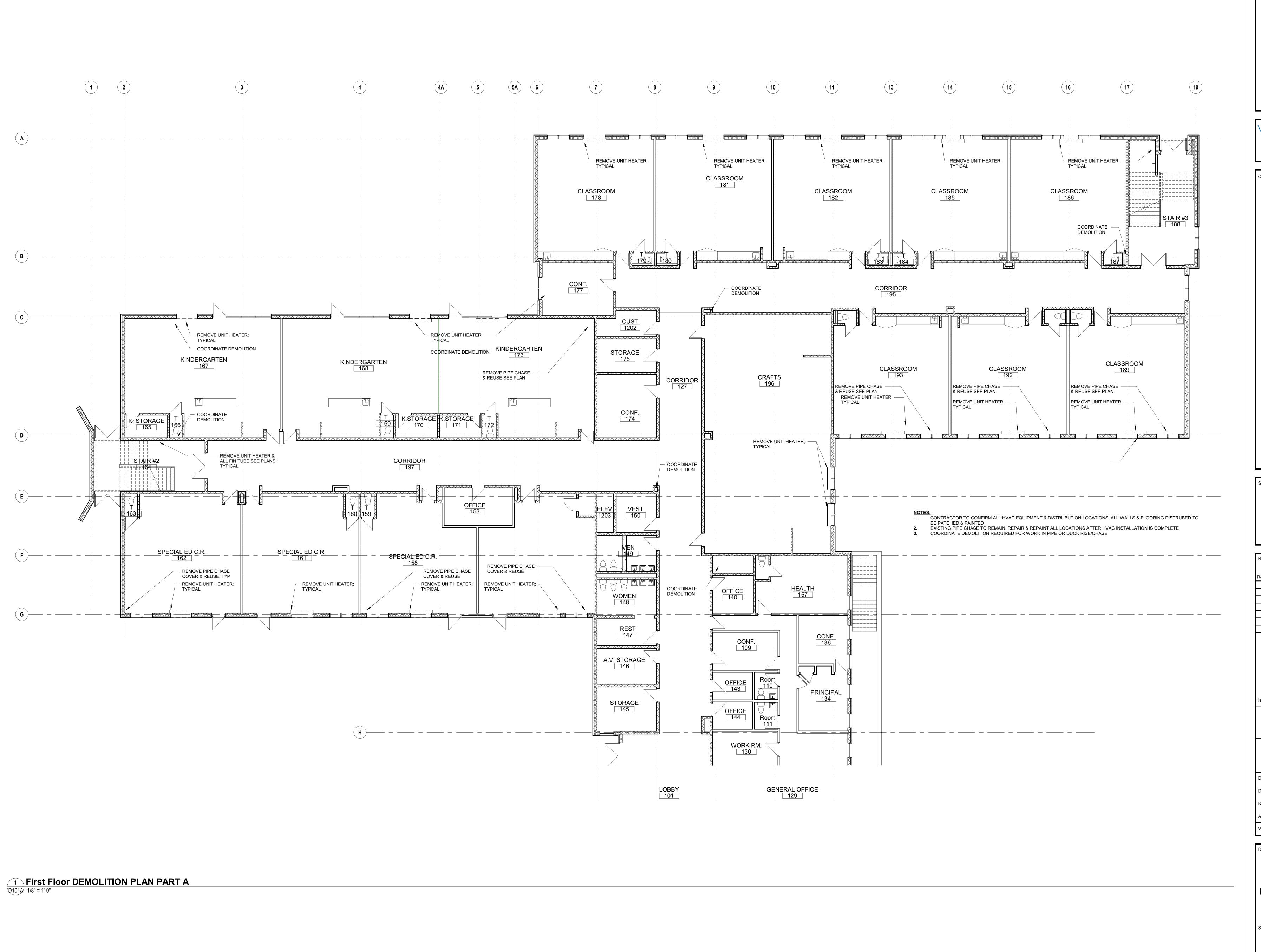
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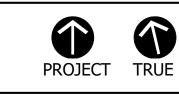
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FIRST FLOOR DEMOLITION PLAN PART A

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1 First Floor DEMOLITION PLAN PART B
1/8" = 1'-0"

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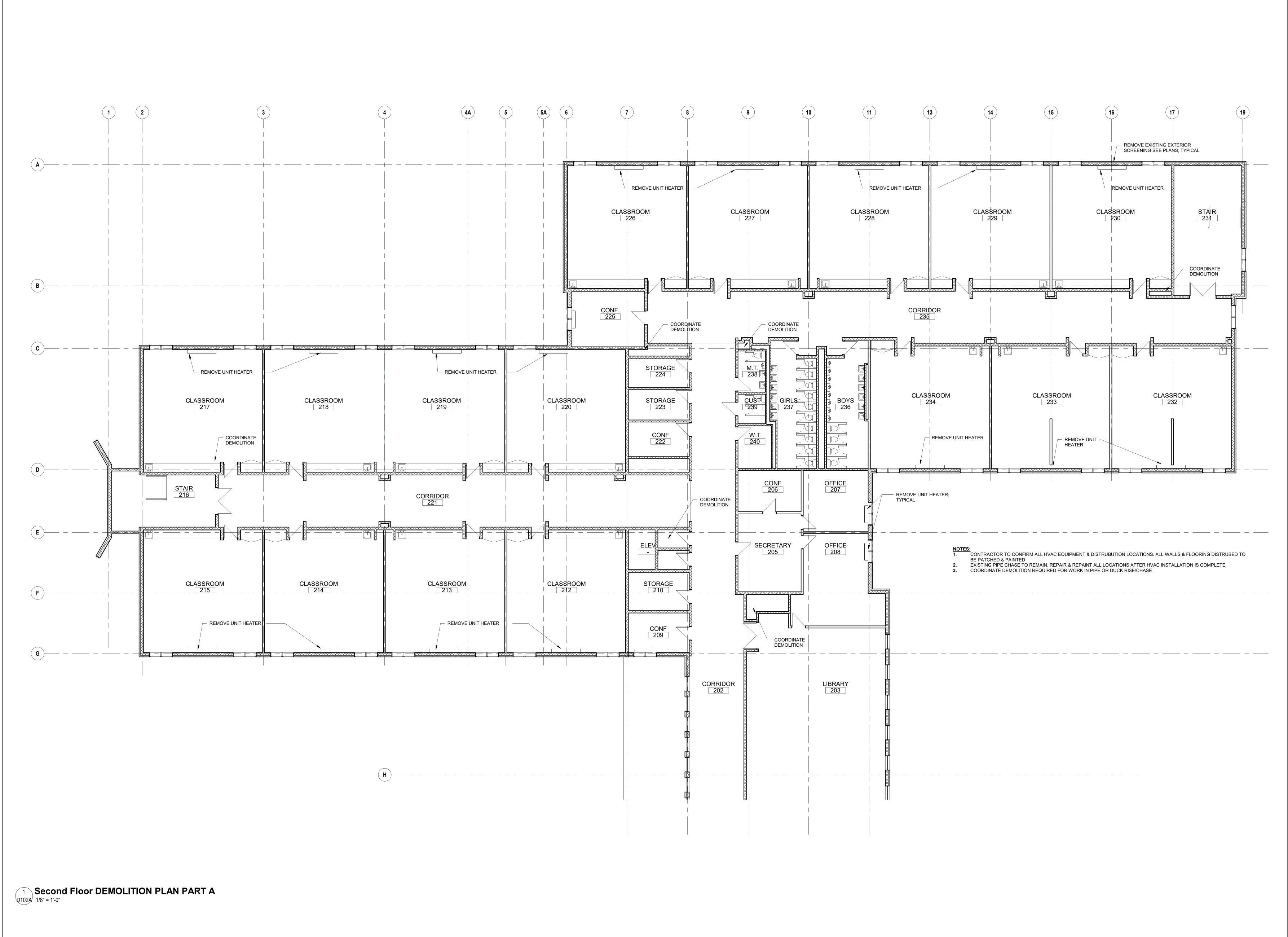
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FIRST FLOOR DEMOLITION PLAN PART B

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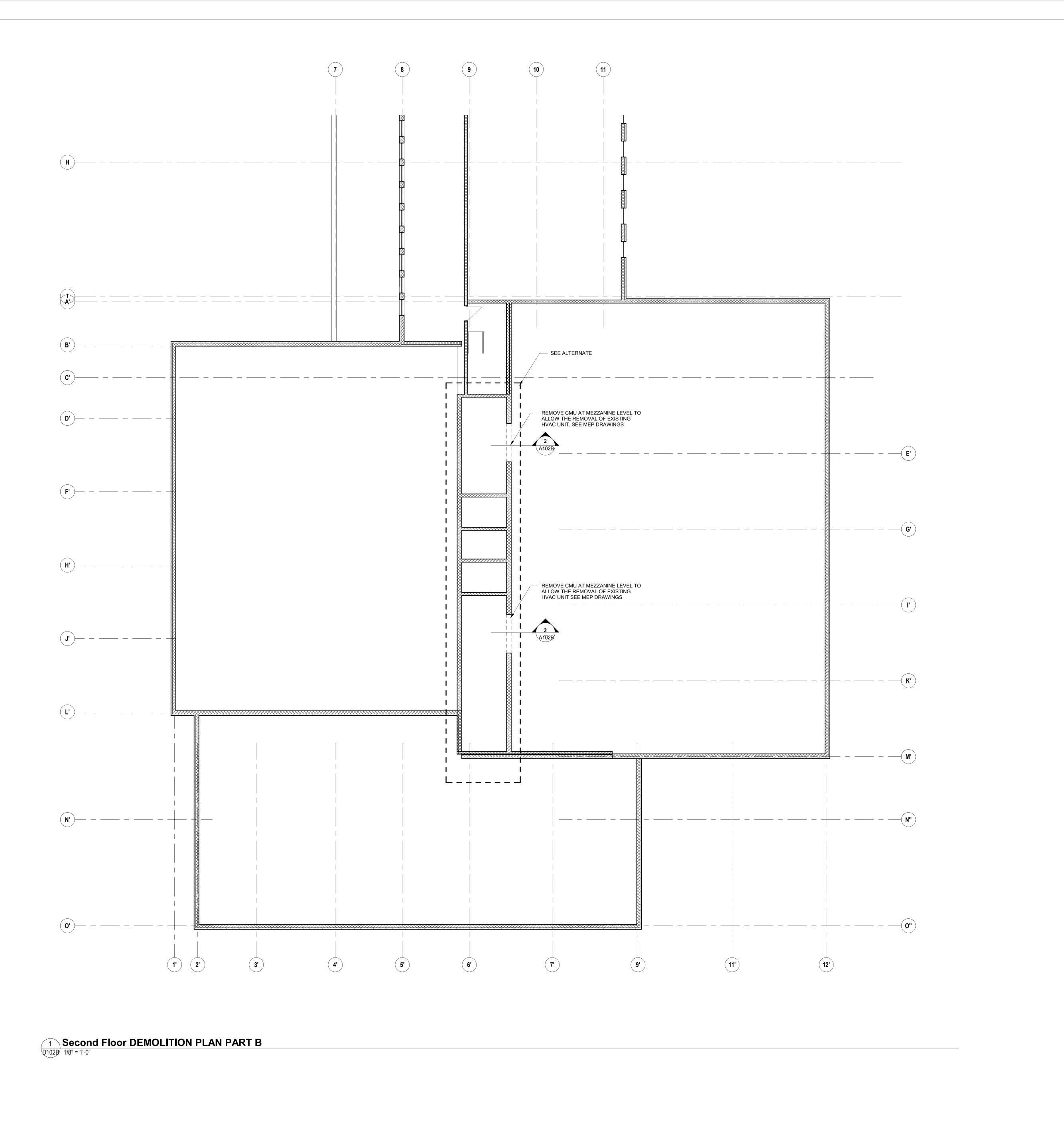
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Sheet Number:

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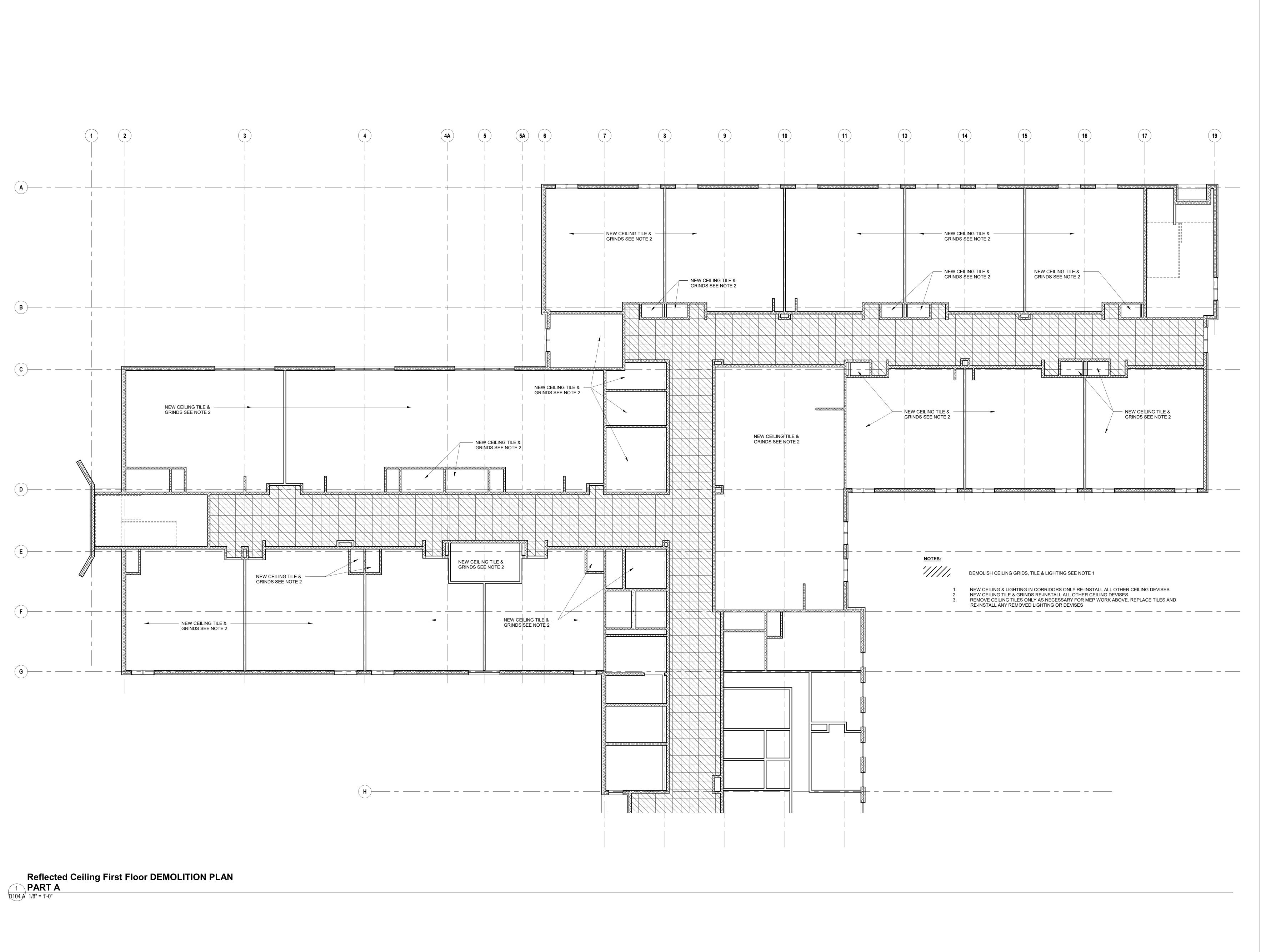
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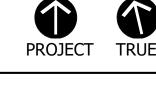
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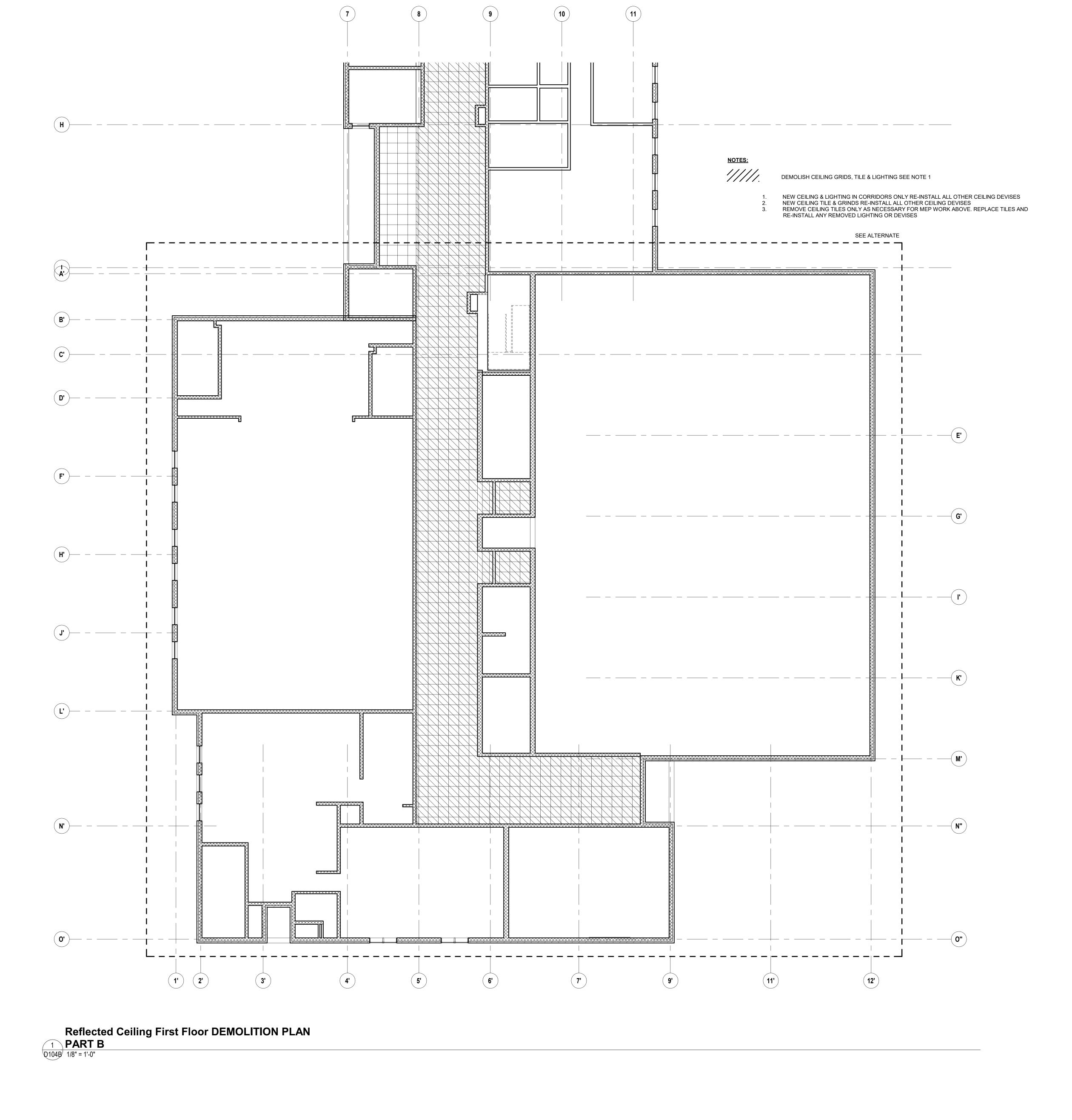
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Date: APRIL 21, 202

Drawn By: Author

Reviewed By: Checker

Approved By: Approver

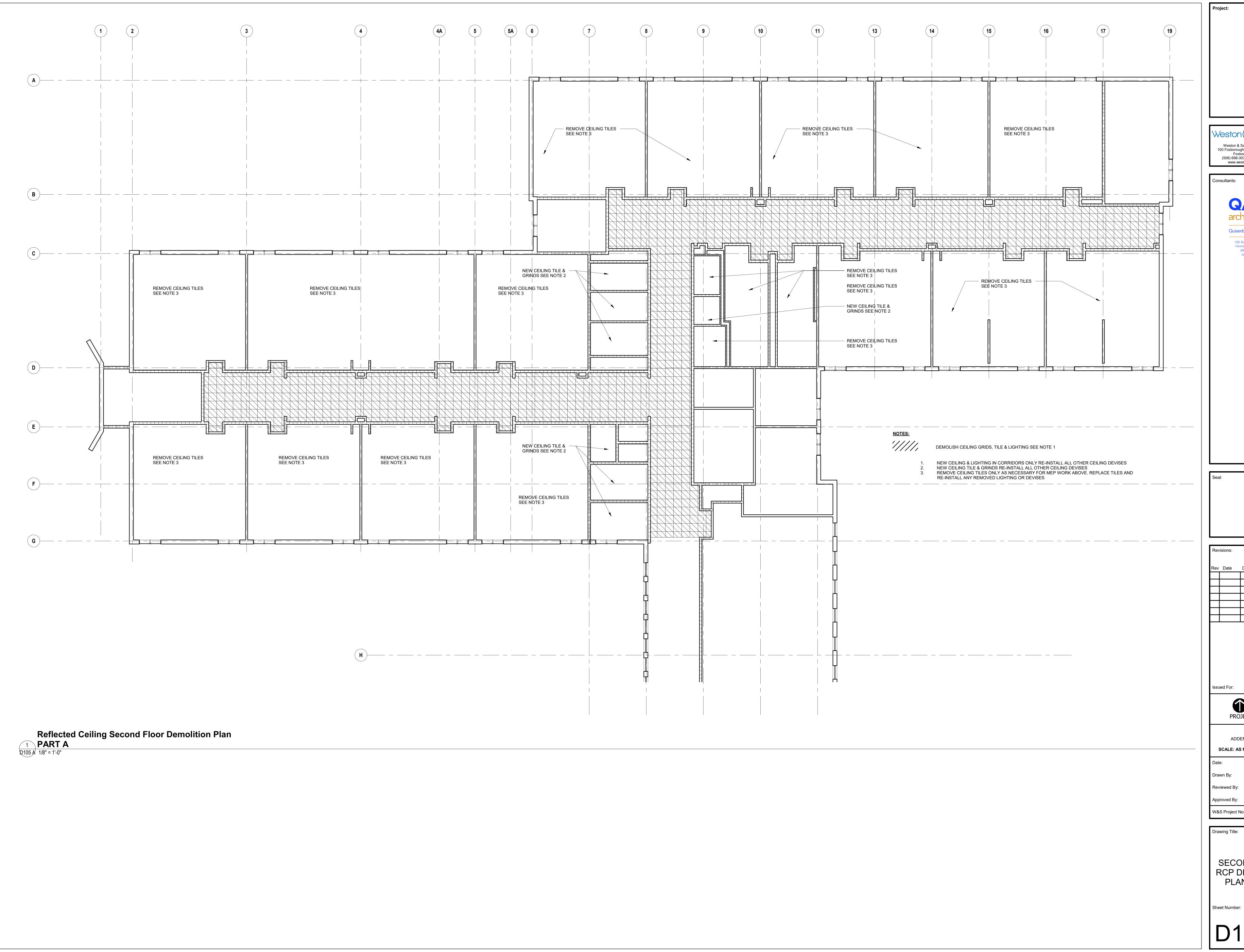
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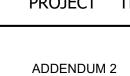


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Drawn By: JCB

Reviewed By: AC

Reviewed By: AC

Approved By: -

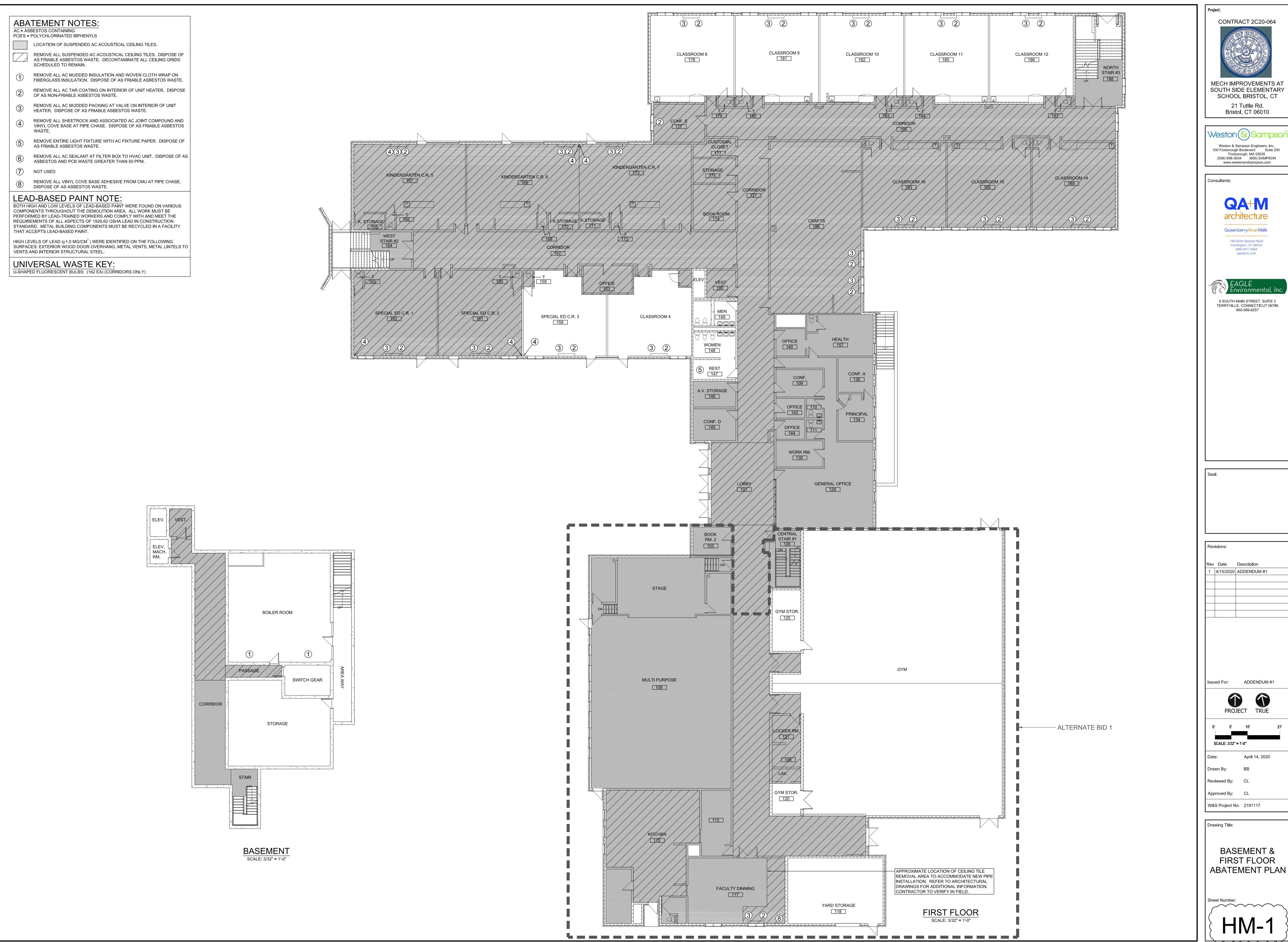
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Sheet Number:

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CONTRACT 2C20-064 MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY

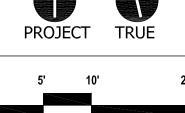
Weston & Sampsor

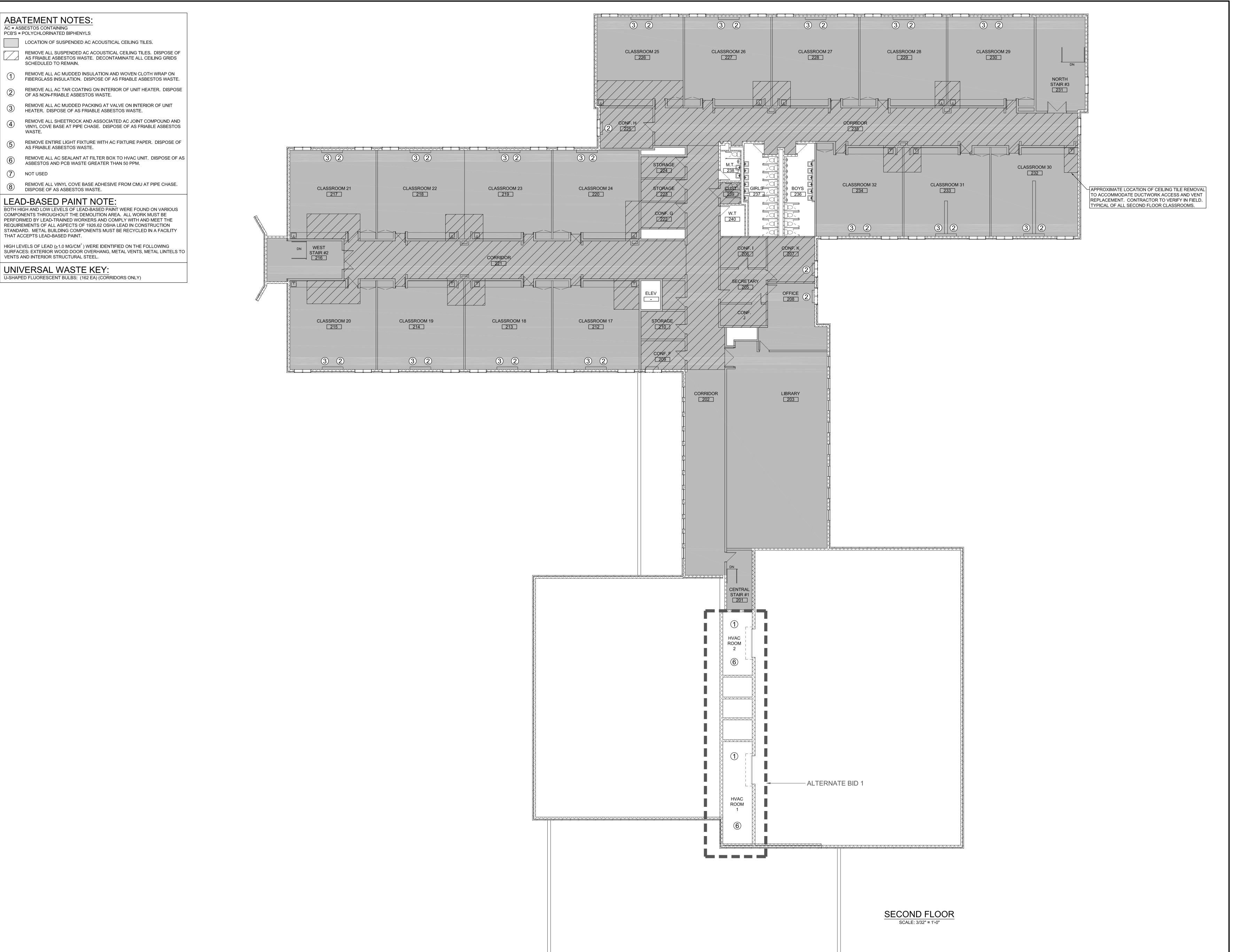
Quisenberry Arcari Malik



4/15/2020 ADDENDUM #1

ADDENDUM #1







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SCHOOL BRISTOL, CT

21 Tuttle Rd.
Bristol, CT 06010

Weston Sampson

Weston & Sampson Engineers, Inc.
100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
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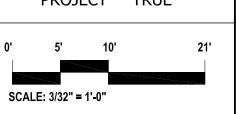
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1 4/15/2020 ADDENDUM#1

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April 14, 2020

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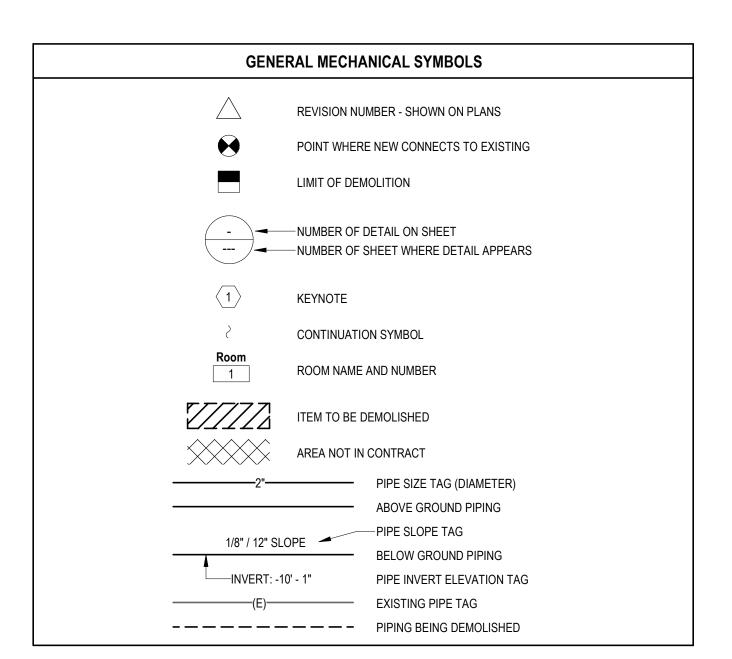
W&S Project No: 2191117

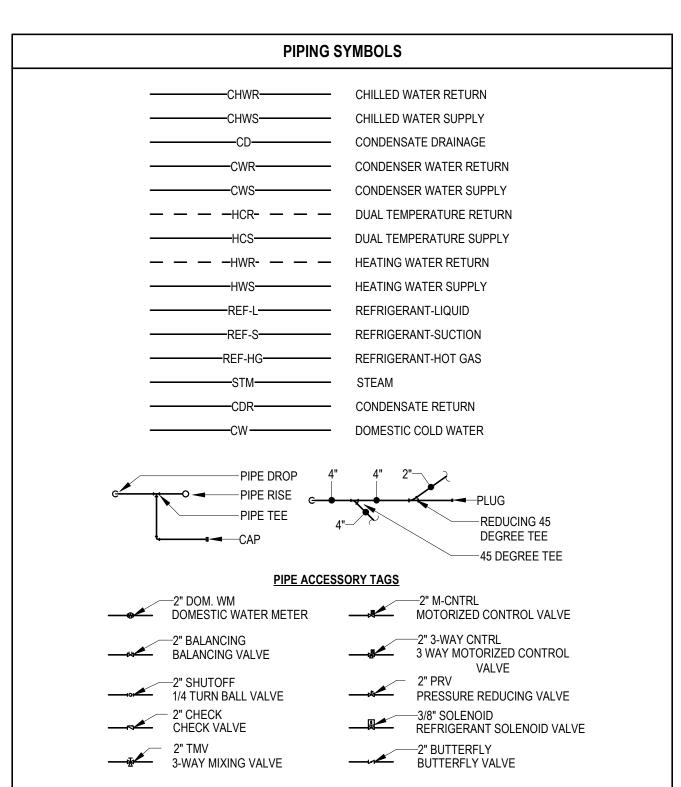
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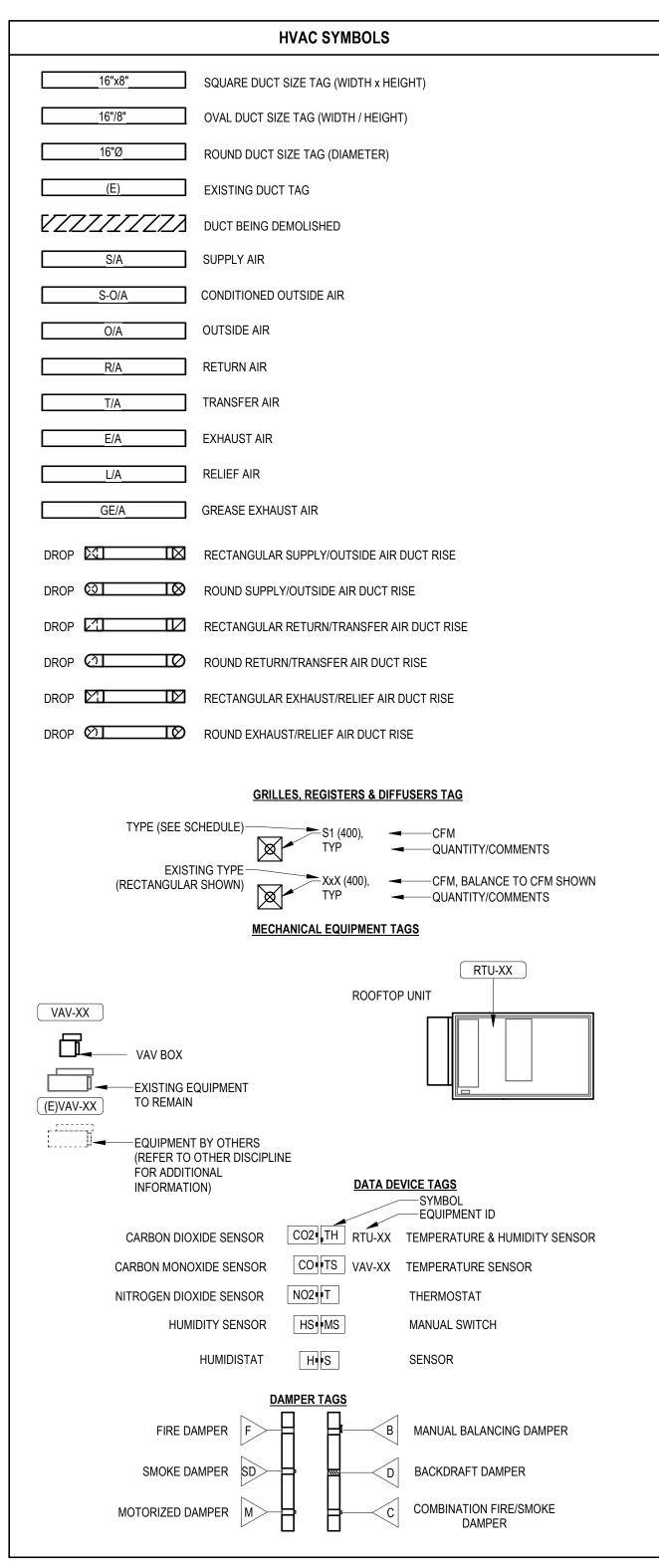
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SECOND FLOOR ABATEMENT PLAN

HM-2









HVAC NOTES

1. SUPPLY AND RETURN PIPING TO COILS ARE THE SAME SIZE.

PIPING SHALL BE TYPE "L" COPPER.

- 2. CONTRACTOR SHALL LOCATE THERMOSTATS AND TEMPERATURE SENSORS AT 4'-0" AFF, A MINIMUM OF 8" FROM LIGHT SWITCH.
- REFER TO PIPING DRAWINGS FOR THERMOSTAT AND TEMPERATURE SENSOR LOCATIONS.
- CONDENSATE DRAINS SHALL BE SUPPLIED FOR ALL COOLING EQUIPMENT. CONTRACTOR SHALL ENSURE PROPER INSTALLATION AND DRAINAGE AS REQUIRED BY FEDERAL, STATE, AND LOCAL CODES. CONDENSATE
- PROVIDE A 4" HOUSEKEEPING PAD FOR EACH PIECE OF MECHANICAL EQUIPMENT. COORDINATE SIZES WITH MECHANICAL EQUIPMENT SELECTED.
- ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK SHALL BE RATED FOR PRESSURE CLASS OF 2" W.G. UNLESS NOTED OTHERWISE.
- THIS CONTRACTOR SHALL BE REQUIRED TO REPLACE FILTERS ON HVAC EQUIPMENT AFTER ALL DUST PRODUCING CONSTRUCTION HAS BEEN COMPLETED AND PRIOR TO THE FINAL PUNCH.

PROJECT NOTES

- REMOVE ALL UNUSED PIPING, DUCTWORK AND ACCESSORIES.
- THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING, PRIOR TO FINAL BID, ALL EXISTING CONDITIONS FOR MECHANICAL SYSTEMS.
- WHERE FLOOR DRAINS OCCUR WITHIN THE LIMITS OF CONSTRUCTION, PREVENT CONSTRUCTION DEBRIS FROM ENTERING DRAIN BODY BY SEALING DRAIN OPENING PRIOR TO START OF WORK. UNSEAL DRAINS AT COMPLETION OF CONSTRUCTION.

THE CONTRACTOR SHALL BE FAMILIAR WITH ALL THE CONDITIONS BOTH EXISTING AND THOSE ILLUSTRATED

- 4. COORDINATE INSTALLATION OF PIPING, DUCTWORK, CONDUIT, LIGHTS, CABLE TRAY, STRUCTURE, AND EQUIPMENT TO PREVENT CONFLICTS.
- BY THESE DOCUMENTS AS WELL AS THOSE WHICH CAN BE REASONABLY ANTICIPATED INCLUDING, BUT NOT LIMITED TO ARCHITECTURAL, ELECTRICAL, VENTILATION, PLUMBING, AND OTHER SYSTEMS INVOLVED ON THIS
- FINAL PRODUCT SHALL BE A COMPLETE AND FUNCTIONING SYSTEM, AND SHALL CONFORM TO ALL REQUIREMENTS OF APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING BUT NOT LIMITED TO THE INTERNATIONAL BUILDING CODE AND INTERNATIONAL MECHANICAL CODE.
- 7. LOCATE EQUIPMENT REQUIRING ACCESS 2'-0" MAXIMUM ABOVE CEILING.
- 8. ALL ROOF MOUNTED EQUIPMENT SHALL BE A MINIMUM 10'-0" FROM EDGE OF ROOF.
- 9. LOCATE DUCTWORK, PIPING AND MECHANICAL EQUIPMENT AWAY FROM THE SPACE ABOVE ELECTRICAL PANELS. TRANSFORMERS AND OTHER ELECTRICAL EQUIPMENT.
- 10. FIRE SEAL AROUND DUCT AND PIPING PENETRATIONS OF FIRE RATED WALLS. REFER TO SPECIFICATION.
- 11. PROVIDE SLEEVES AND/OR OPENINGS TO RUN PIPES AND DUCTS THROUGH FOUNDATIONS, FLOORS, WALLS,
- 12. ADJUST PIPING AND DUCTWORK SIZES TO PROPERLY CONNECT TO MECHANICAL EQUIPMENT.
- 13. PIPE SIZES SHOWN SHALL BE CONTINUED IN THE DIRECTION OF FLOW UNTIL ANOTHER SIZE IS SHOWN.
- 14. FOR DETAILS, EQUIPMENT CONNECTIONS, AND PIPE SIZES NOT SHOWN ON THE SEGMENTS, REFER TO DETAILS, SCHEDULES, AND SPECIFICATIONS.
- 15. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE RESPECTIVE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AT A LEVEL OF QUALITY AND WORKMANSHIP CONSISTENT WITH THE SPECIFICATIONS.
- 16. LOCATIONS OF PIPING, DUCTWORK AND EQUIPMENT AS INDICATED ON THE DRAWING. ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. WORK SHALL BE COORDINATED WITH ALL OTHER TRADES TO AVOID INTERFERENCE IN THE FIELD.
- 17. INSTALL EXPOSED PIPING AND DUCTWORK AS HIGH AS PRACTICAL IN ROOMS WITHOUT CEILINGS.

SCOPE OF WORK

- PROVIDE DEMOLITION OF THE EXISTING UNIT VENTILATORS AND PIPING, PROVIDE INSTALLATION OF NEW FAN COIL UNITS AND PIPING AS INDICATED ON THE PLANS.
- PROVIDE DEMOLITION OF THE EXISTING CHILLED WATER AND HEATING HOT WATER PUMPS (P-1, P-2, P-5) AND
- PROVIDE DEMOLITION OF THE EXISTING CHILLER, REMOTE CONDENSERS, AND PIPING (CHILLED WATER AND REFRIGERANT), PROVIDE INSTALLTION OF NEW CHILLER, REMOTE CONDENSERS, AND PIPING (CHILLED WATER

- EXHAUST FANS AS INDICATED ON THE PLANS.
- INSTALLTION OF NEW AIR HANDLING UNIT, DUCTWORK, AND PIPING AS INDICATED ON THE PLANS. THE EXISTING
- 10. PROVIDE DEMOLITION OF THE EXISTING CABINET UNIT HEATERS. CONVECTORS, UNIT HEATERS, PROVIDE INSTALLTION OF NEW CABINET UNIT HEATERS, CONVECTORS, UNIT HEATERS AS INDICATED ON THE PLANS.
- 11. IF WORK IS DONE DURING THE HEATING SEASON, THE CONTRACTOR SHALL PROVIDE TEMPORARY HEAT AT NO

DESIGN CONDITIONS

CODES/STANDARDS

2015 INTERNATIONAL MECHANICAL CODE 2015 INTERNATIONAL ENERGY CONSERVATION CODE 2018 CONNECTICUT STATE BUILDING CODE AMENDMENTS

WINTER 10°F DB/ 6°F WB

SUMMER 88°F DB/ 77°F WB

INDOOR CONDITIONS (°F)

	OFFICES	70	74
	CONFERENCE ROOM	70	74
	BATHROOM	68	78
	CLASSROOMS	70	74
	GYM	68	78
	STORAGE/MECH	68	78

0.12

OFFICES	5	0.06	
CONFERENCE ROOM	5	0.06	
BATHROOM	0	0	50*
CLASSROOMS	10	0.12	
GYM	7.5	0.06	
STORAGE/MECH	0	0.12	
CORRIDOR	0	0.06	
MULTI-PURPOSE ROOM	7.5	0.06	
APT POOM	10	N 18	

LIBRARY * PER FIXTURE (INCLUDING SHOWERS)

2. PROVIDE DEMOLITION OF THE EXISTING COMPRESSOR AND CONTORL AIR PIPING.

PIPING, PROVIDE INSTALLATION OF NEW CHILLED WATER AND HEATING HOT WATER PUMPS AND PIPING AS INDICATED ON THE PLANS.

AND REFRIGERANT) AS INDICATED ON THE PLANS.

PROVIDE DEMOLITION OF THE EXISTING ROOF MOUNTED EXHAUST FANS (EF 1-7) AND DUCTWORK, PROVIDE INSTALLTION OF NEW ENERGY RECOVERY UNITS, DUCTWORK, AND PIPING AS INDICATED ON THE PLANS.

). PROVIDE DEMOLITION OF THE EXISTING ROOFTOP UNIT (AC-2), DUCTWORK, AND PIPING, PROVIDE INSTALLTION OF NEW ROOFTOP UNIT, DUCTWORK, AND PIPING AS INDICATED ON THE PLANS.

PROVIDE DEMOLITION OF THE EXISTING HEATING AND VENTILATION UNITS (H&V 1-3), DUCTWORK, AND PIPING. PROVIDE INSTALLTION OF NEW AIR HANDLING UNITS, DUCTWORK, AND PIPING AS INDICATED ON THE PLANS.

PROVIDE DEMOLITION OF THE EXISTING ROOF MOUNTED EXHAUST FANS (EF 8-9), PROVIDE INSTALLTION OF NEW

PROVIDE DEMOLITION OF THE EXISTING AIR HANDLING UNIT (AC-1), DUCTWORK, AND PIPING, PROVIDE

REMOTE CONDENSING UNIT (ACCU-1) SHALL REMAIN AND BE REUSED.

ADDITIONAL COST TO THE OWNER.

2015 INTERNATIONAL BUILDING CODE

OUTDOOR AIR TEMPERATURE

ASHRAE - HARTFORD

WINTER SUMMER

MULTI-PURPOSE ROOM 70

MINIMUM VENTILATION

ART ROOM

SPACE CFM/PERSON CFM/SF CFM

CONTRACT 2C20-064

MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT 21 Tuttle Rd.

Weston & Sampsor Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

Bristol, CT 06010

Consultants:

QA+M QuisenberryArcariMalik

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(860) 677-4594

Farmington, CT 06032

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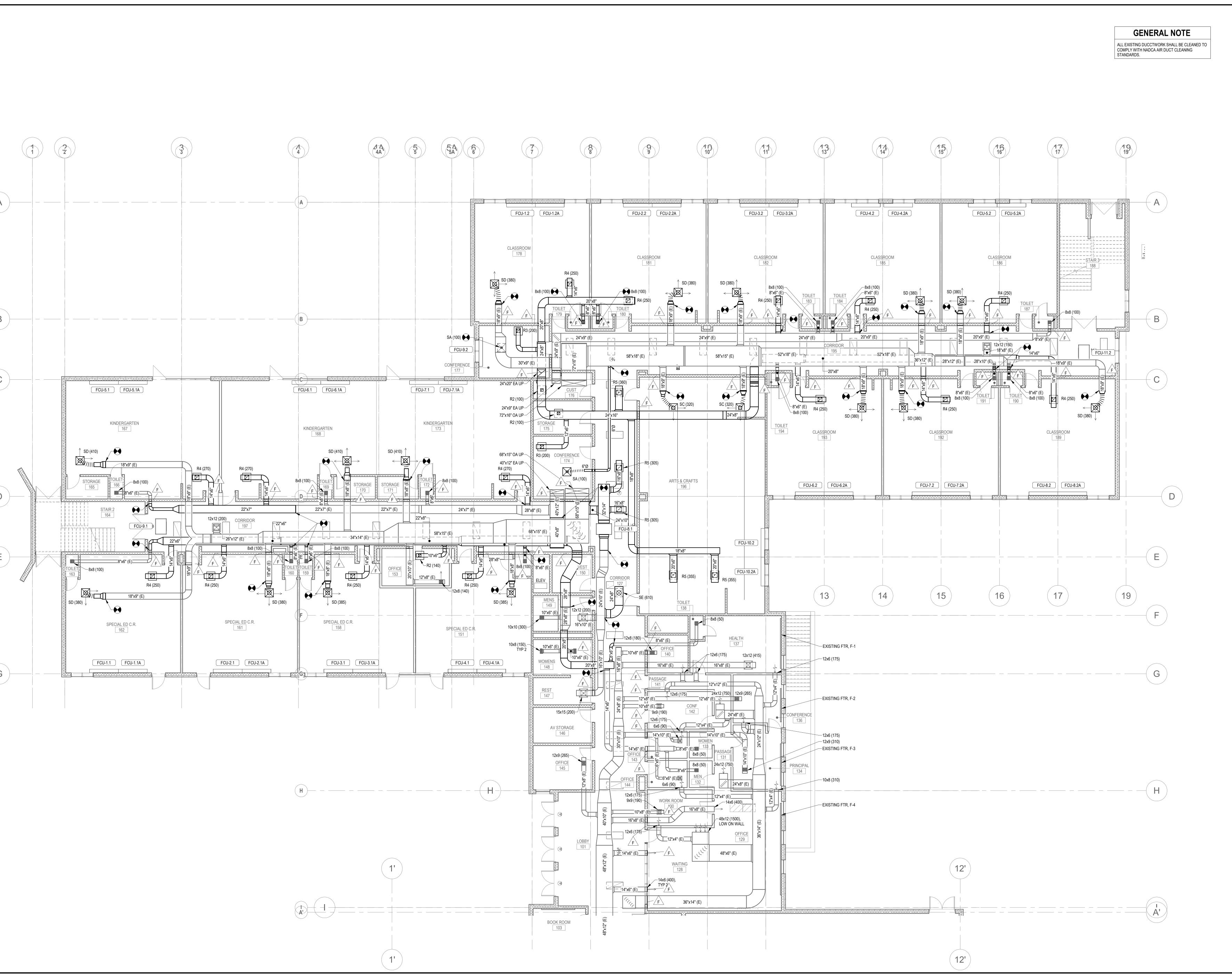
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W&S Project No: 2191117

Drawing Title:

LEGENDS, NOTES AND **ABBREVIATIONS**

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CONTRACT 2C20-064

MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT

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100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
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Consultants:

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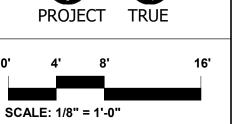
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Approved By: SEH

W&S Project No: 2191117

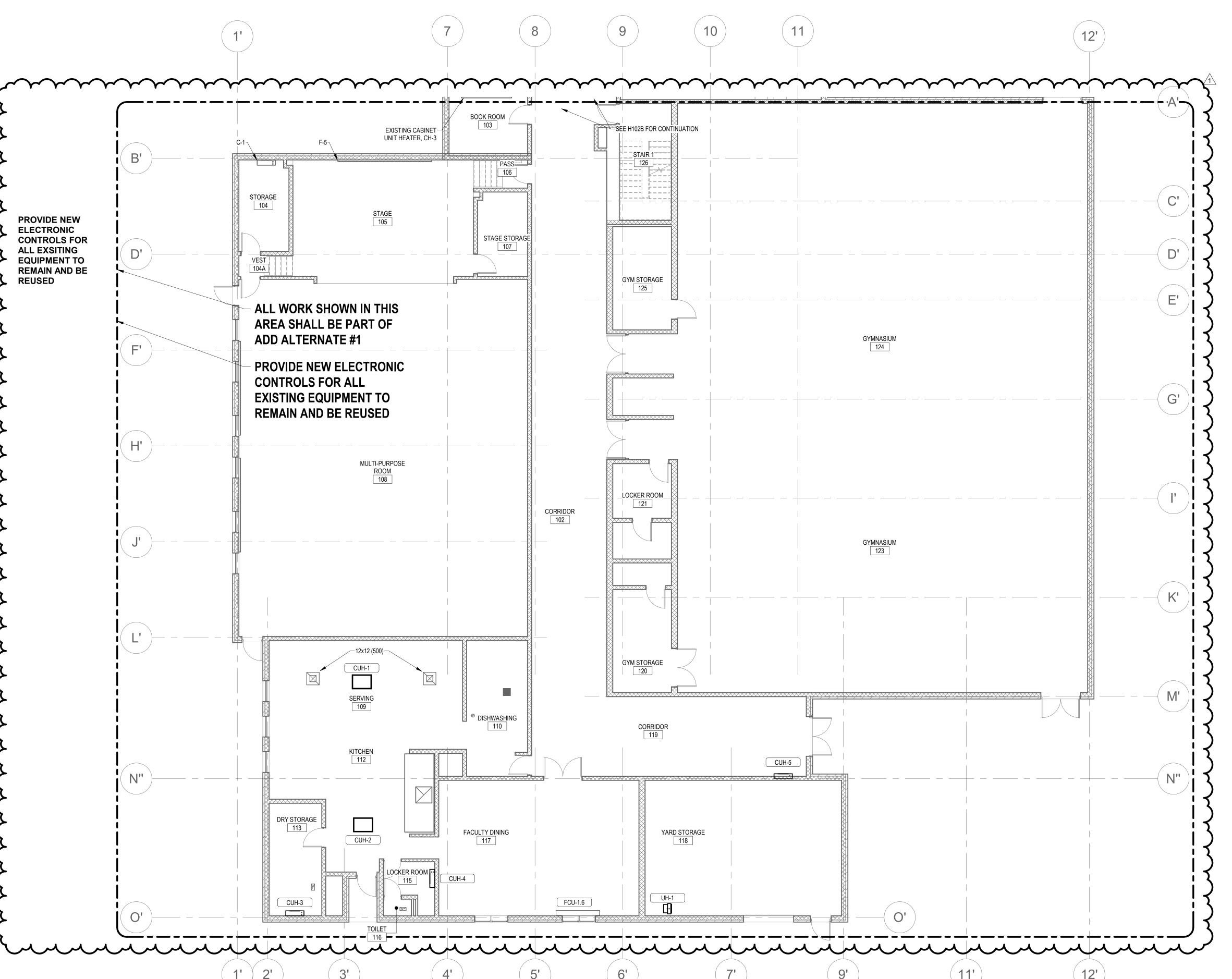
W&S Project No: 2191117

Drawing Title:

FIRST FLOOR DUCTWORK PLAN PART A

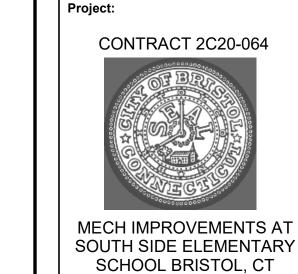
Sheet Number:

H101A



GENERAL NOTES

1. ALL EXISTING DUCCTWORK SHALL BE CLEANED TO COMPLY WITH NADCA AIR DUCT CLEANING STANDARDS. 2. ALL NEW HANGERS SHALL BE ATTACHED TO THE EXISTING STEEL VIA CLAMP ON STYLE HANGERS, NO WELDING ALLOWED AS THE STEEL IS COVERED WITH LEAD PAINT.



Weston & Sampson Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

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Consultants:

QA+M QuisenberryArcariMalik 195 Scott Swamp Road Farmington, CT 06032

(860) 677-4594 qamarch.com

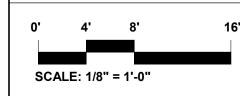


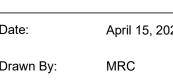


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Rev	Date	Description
1	4/15/2020	ADDENDUM #1

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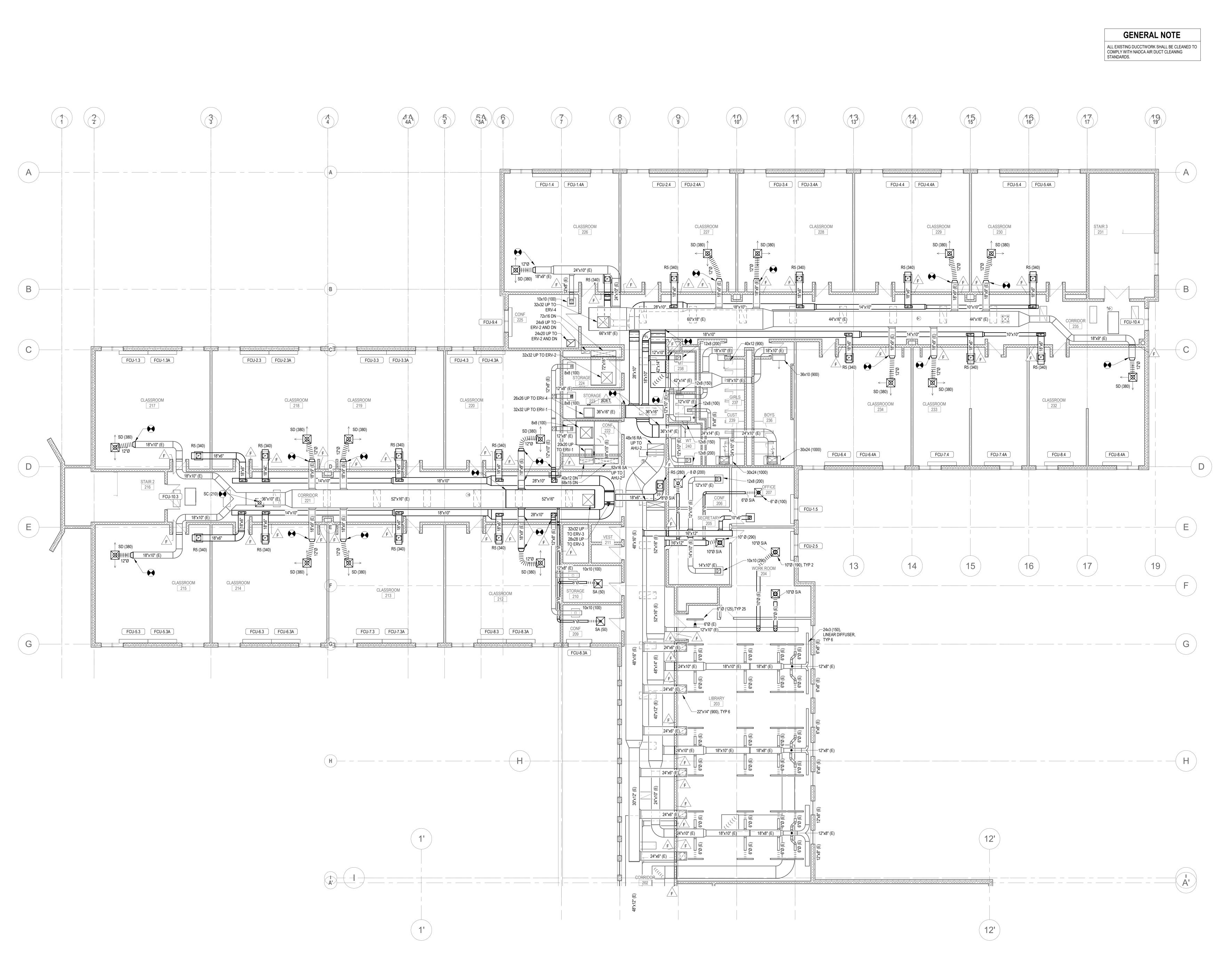


W&S Project No: 2191117

Drawing Title:

FIRST FLOOR DUCTWORK PLAN PART B

Sheet Number:



CONTRACT 2C20-064

MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT

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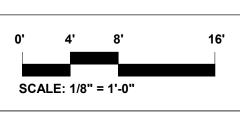
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Rev	Date	Description	

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PROJECT TRUE



Date: April 2, 2020

Drawn By: MRC

Reviewed By: SEH

Approved By: SEH

Approved By: SEH

W&S Project No: 2191117

Drawing Title:

SECOND FLOOR DUCTWORK PLAN PART A

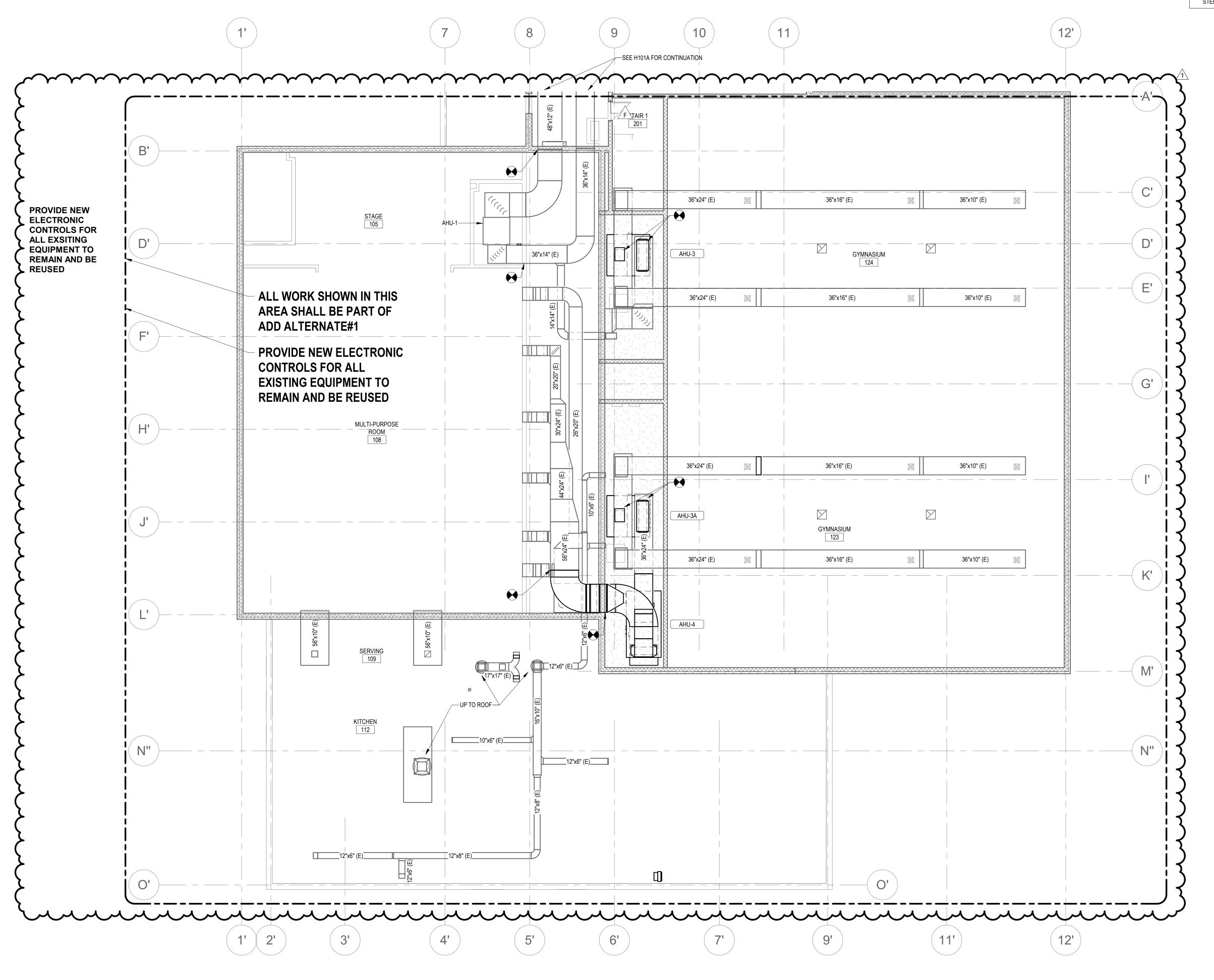
Sheet Number:

H102A

GENERAL NOTES

1. ALL EXISTING DUCCTWORK SHALL BE CLEANED TO COMPLY WITH NADCA AIR DUCT CLEANING STANDARDS.

2. ALL NEW HANGERS SHALL BE ATTACHED TO THE EXISTING STEEL VIA CLAMP ON STYLE HANGERS, NO WELDING ALLOWED AS THE STEEL IS COVERED WITH LEAD PAINT.



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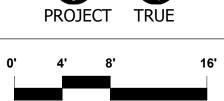


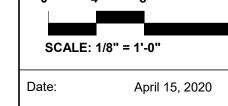


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Rev	Date	Description
1	4/15/2020	ADDENDUM #1

Issued For: ADDENDUM #1





Drawn By: MRC

Reviewed By: SEH
Approved By: SEH

Approved By: SEH

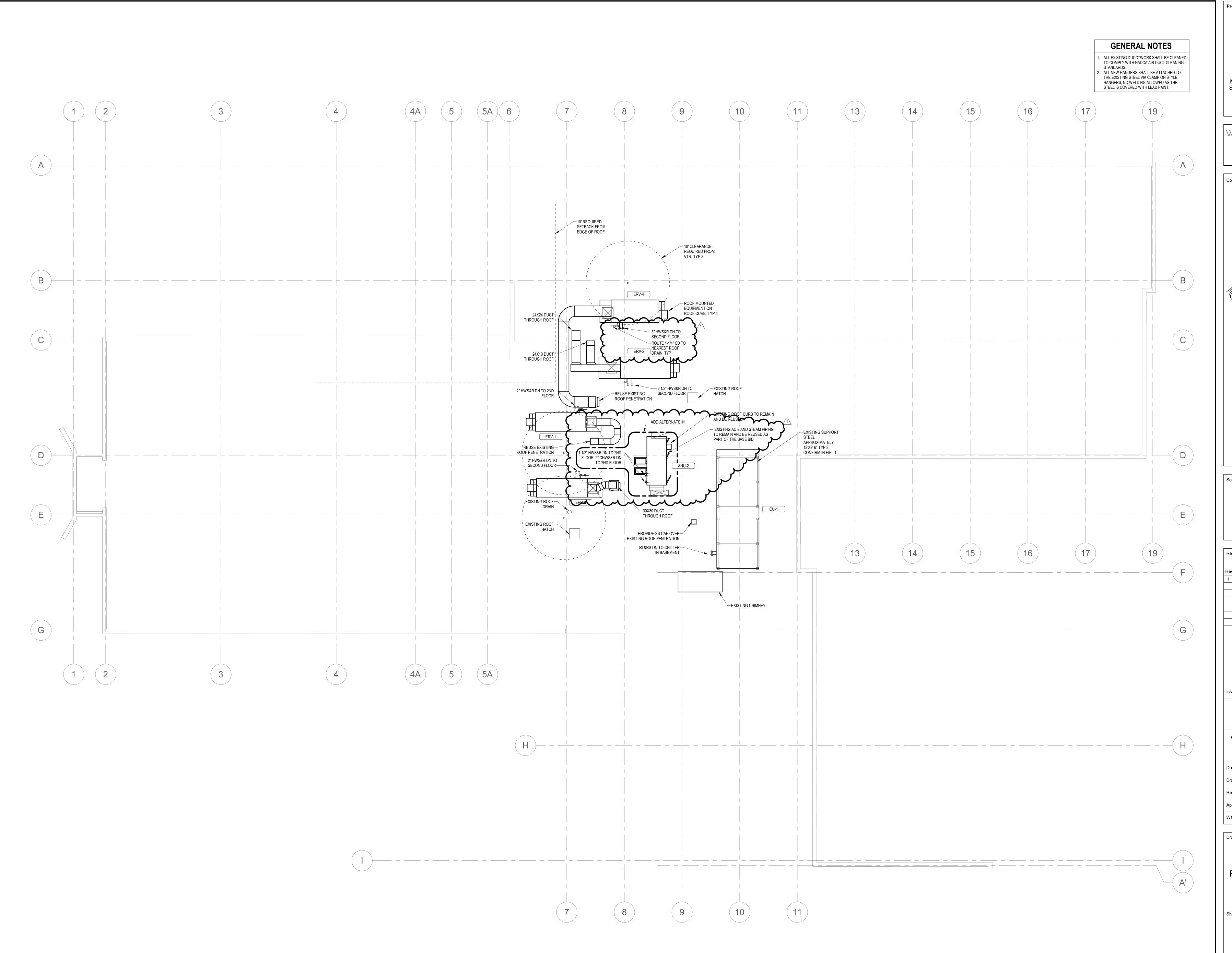
W&S Project No: 2191117

Drawing Title:

SECOND FLOOR DUCTOWKR PLAN PART B

Sheet Number:

H102B



Project:

CONTRACT 2C20-064

MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT

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100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
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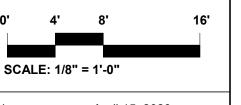
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Rev Date Description

1 4/15/2020 ADDENDUM #1

Issued For: ADDENDUM #1





ate: April 15, 2020 rawn By: MRC

Reviewed By: SEH

Approved By: SEH

Approved By: SEH

W&S Project No: 2191117

W&S Project No: 2191117

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ROOF PLAN PART A

Sheet Number:

H103A

12' C' **PROVIDE NEW** EF-8 ELECTRONIC CONTROLS FOR **ALL EXSITING** D' **EQUIPMENT TO REMAIN AND BE** REUSED E' - ALL WORK SHOWN IN THIS AREA SHALL BE PART OF **ADD ALTERNATE #1** EXISTING ACCU-1 - PROVIDE NEW ELECTRONIC **CONTROLS FOR ALL EXISTING EQUIPMENT TO** G' REMAIN AND BE REUSED REFRIGERANT PIPING ON ROOF AND DN 1' 2' 3' 4' 5' 6' 7' 9' 11' 12'

GENERAL NOTES

1. ALL EXISTING DUCCTWORK SHALL BE CLEANED TO COMPLY WITH NADCA AIR DUCT CLEANING STANDARDS.

2. ALL NEW HANGERS SHALL BE ATTACHED TO THE EXISTING STEEL VIA CLAMP ON STYLE HANGERS, NO WELDING ALLOWED AS THE STEEL IS COVERED WITH LEAD PAINT.



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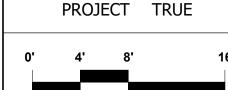


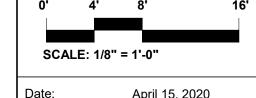


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Rev	Date	Description
1	4/15/2020	ADDENDUM #1

Issued For: ADDENDUM #1





Date: April 15, 2020

Drawn By: MRC

Reviewed By: SEH

Approved By: SEH

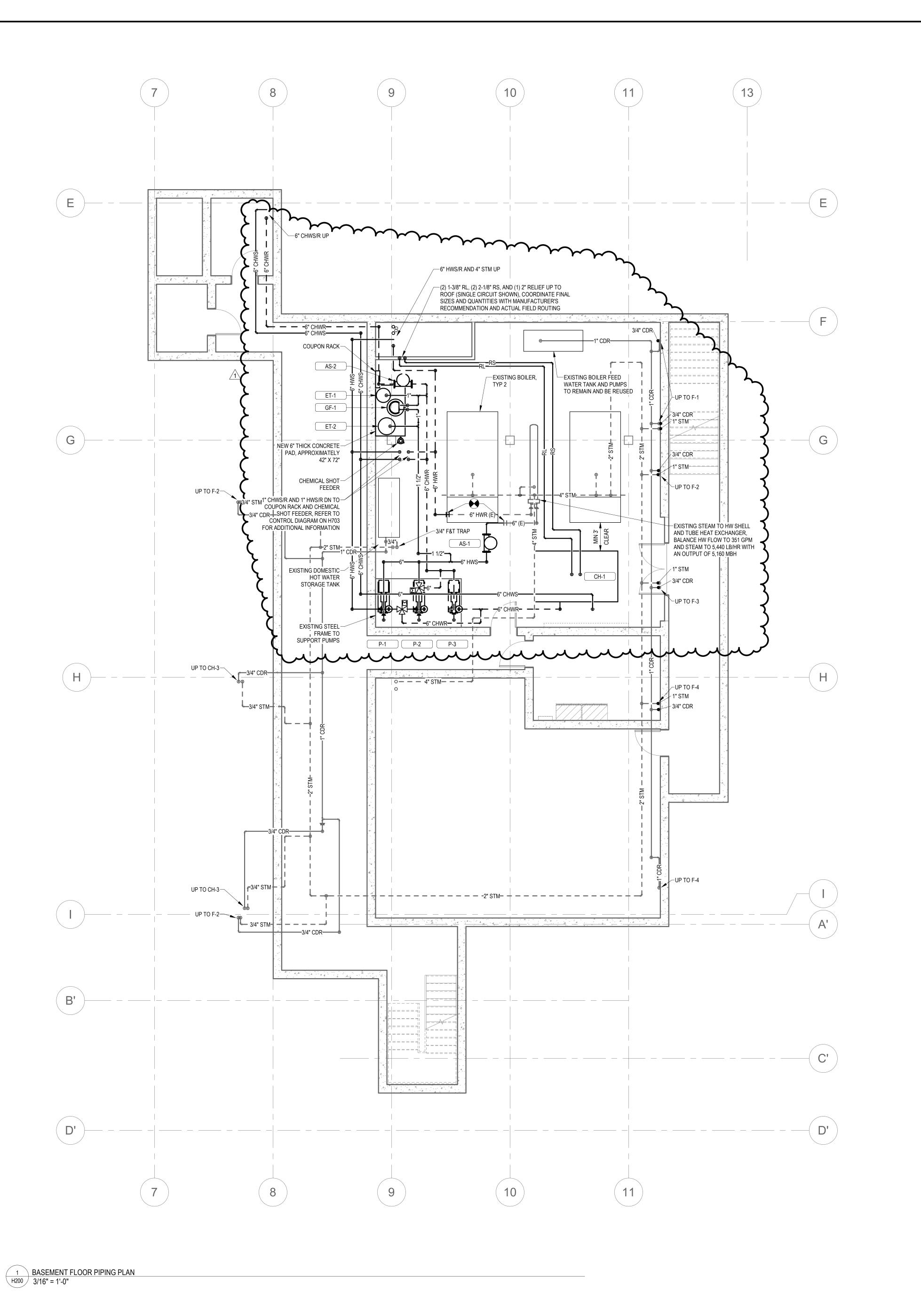
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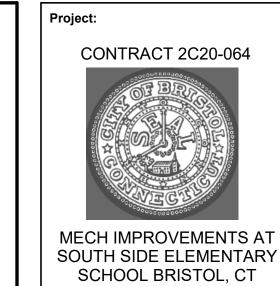
Drawing Title:

ROOF PLAN PART B

Sheet Number:

H103B





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1	4/15/2020	ADDENDUM #1

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Drawn By: HJH

Reviewed By: SEH

Approved By: SEH

Approved By: SEH

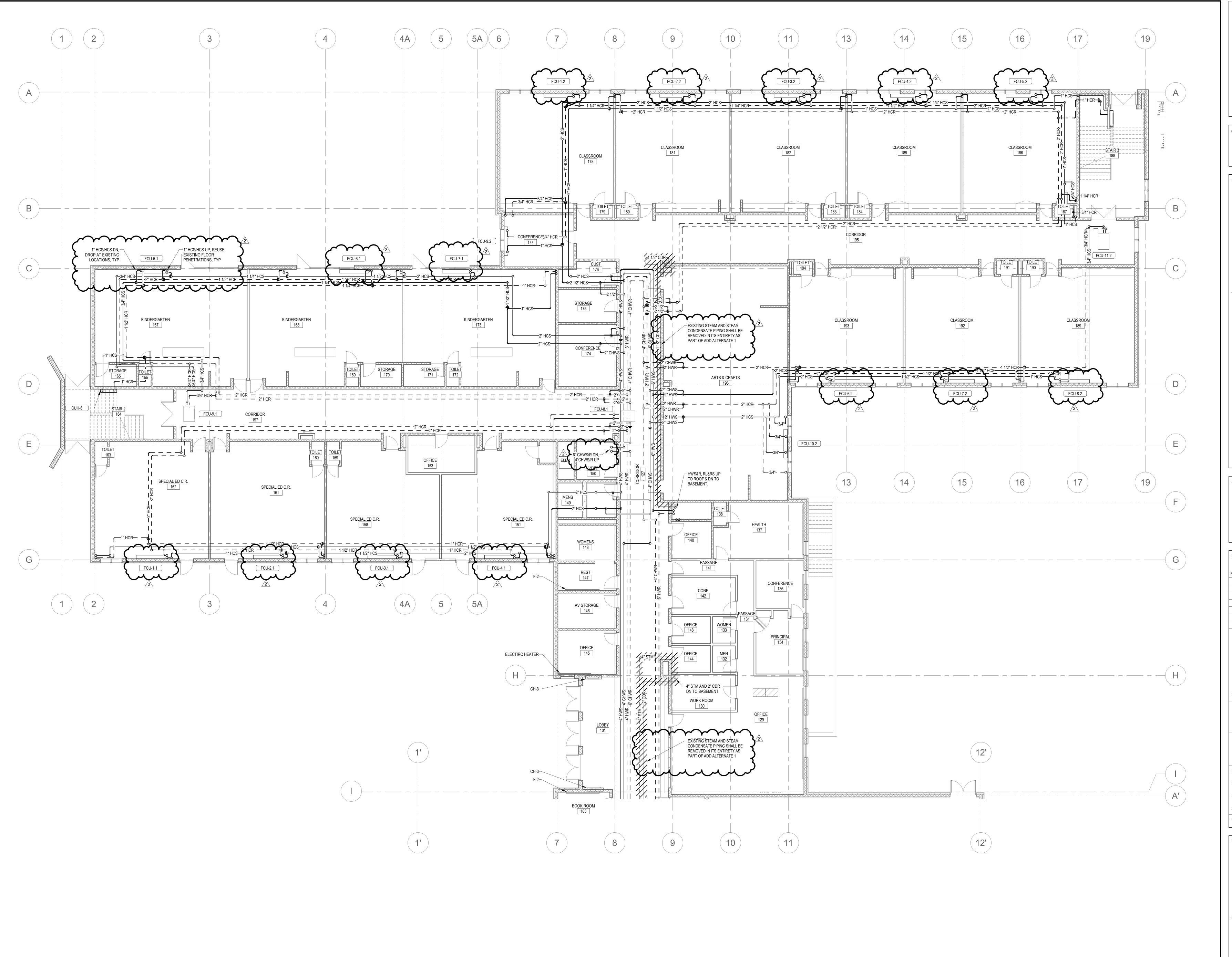
W&S Project No: 2191117

Drawing Title:

BASEMENT NEW WORK PIPING PLAN

Sheet Number:

H200





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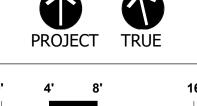


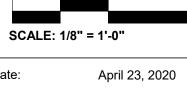
Seal:

Rev Date Description

2 4/23/2020 ADDENDUM #2

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Date: April 23, 2020

Drawn By: MRC

Reviewed By: SEH

Approved By: SEH

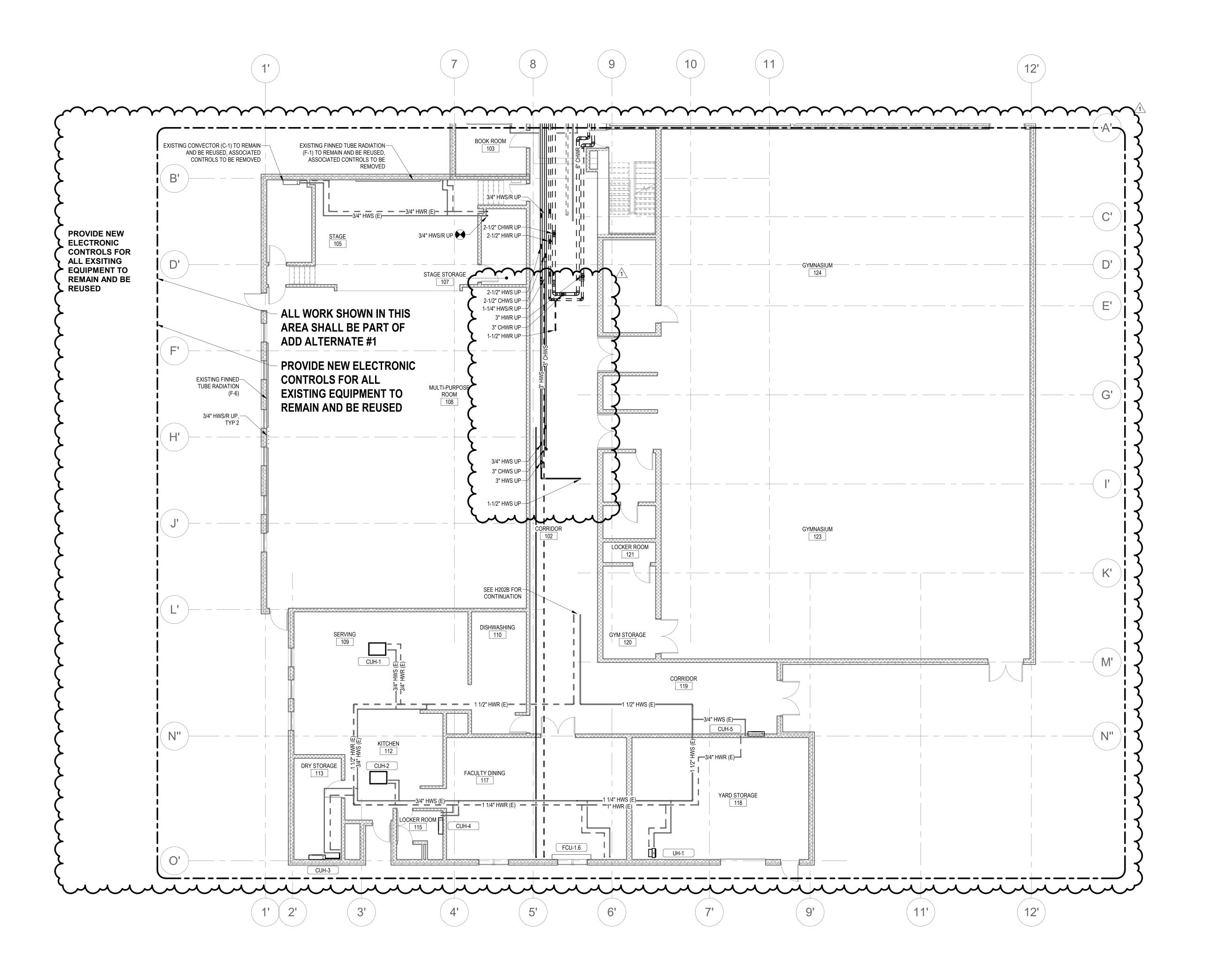
W&S Project No: 2191117

Drawing Title:

FIRST FLOOR PIPING PLAN PART A

Sheet Number:

H201A



HVAC GENERAL NOTES:

1. ALL PIPING 3/4" UNLESS OTHERWISE NOTED.

Project:

CONTRACT 2C20-064

MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY

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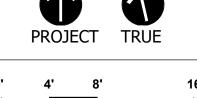
EAGLE Environmental, Inc.

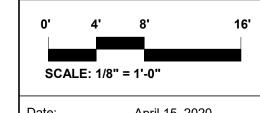


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Issued For: ADDENDUM #1





Date: Apr

Drawn By: MR

Reviewed By: SEI

Approved By: Si

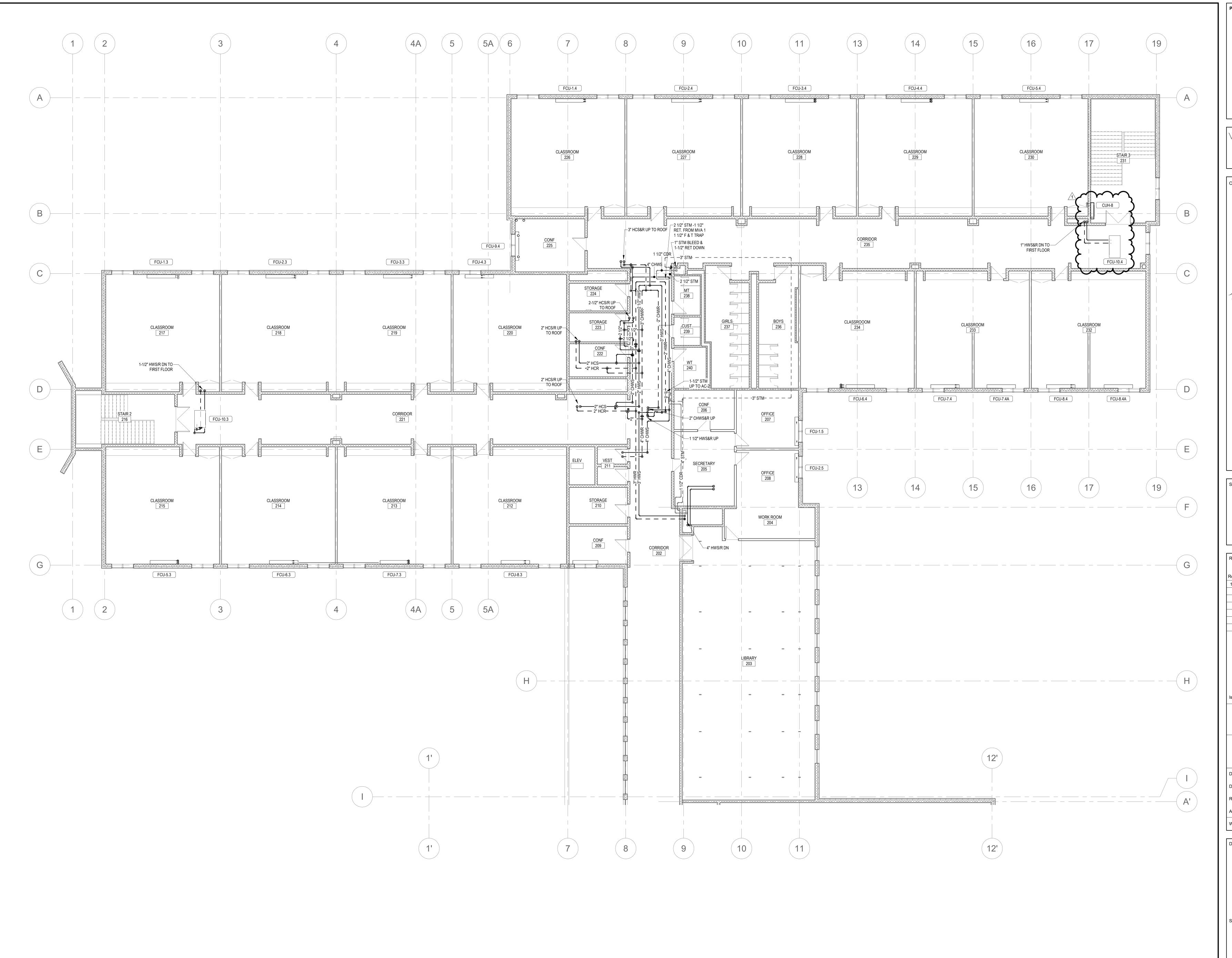
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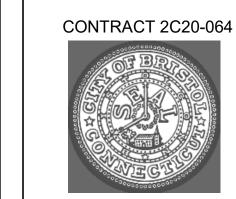
Drawing Title:

FIRST FLOOR PIPING PLAN PART B

Sheet Number:

H201B





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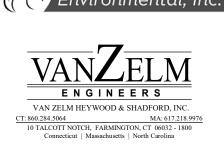
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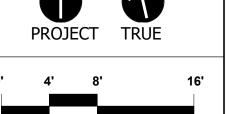


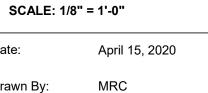
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1 4/15/2020 ADDENDUM #1

ADDENDUM #1



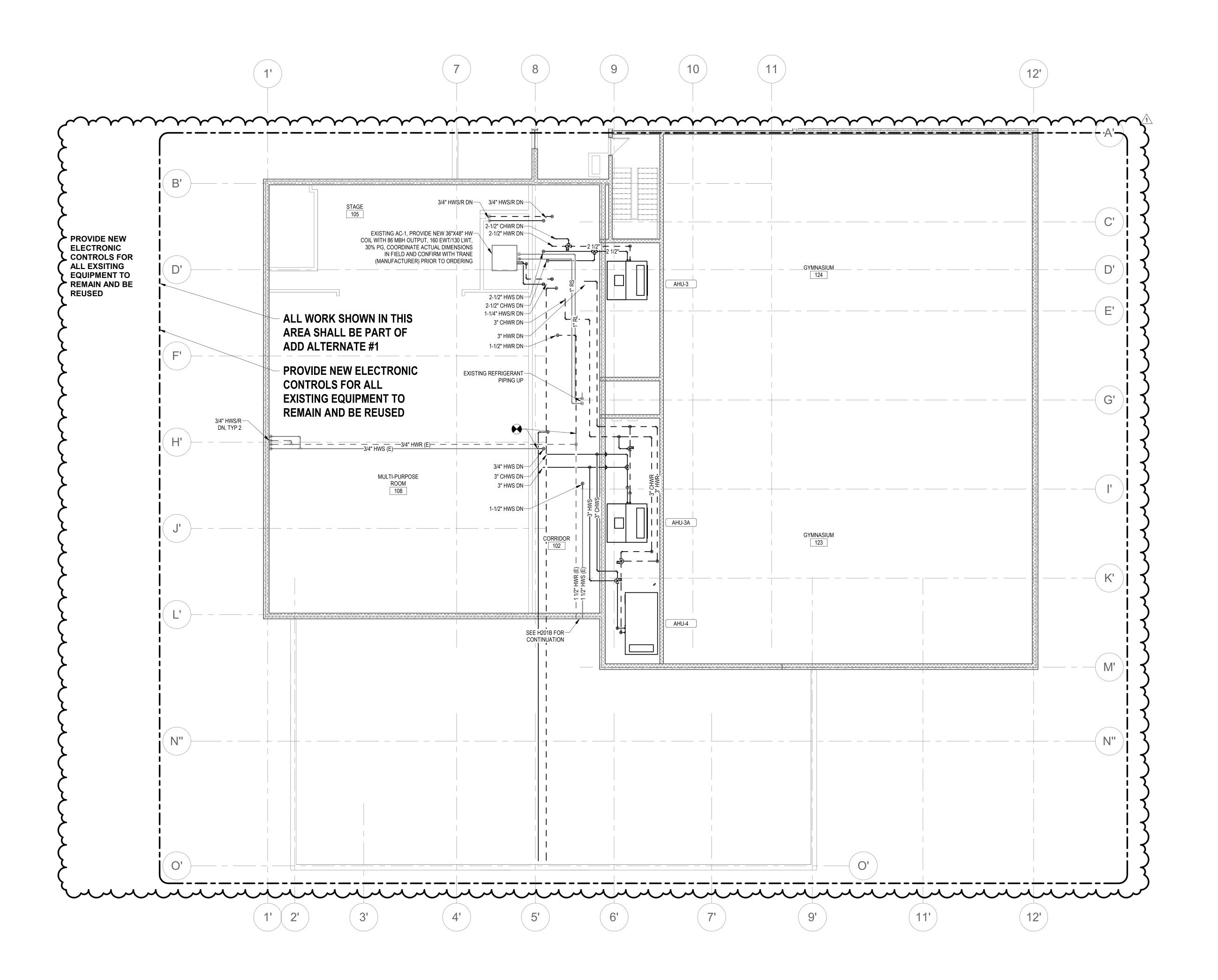


W&S Project No: 2191117

Drawing Title:

SECOND FLOOR PIPING PART PLAN A

Sheet Number:



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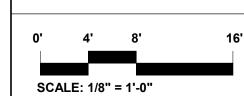


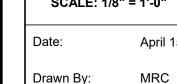


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Rev	Date	Description
1	4/15/2020	ADDENDUM #1







Drawn By: MI

Reviewed By: SE

Approved By: SEH

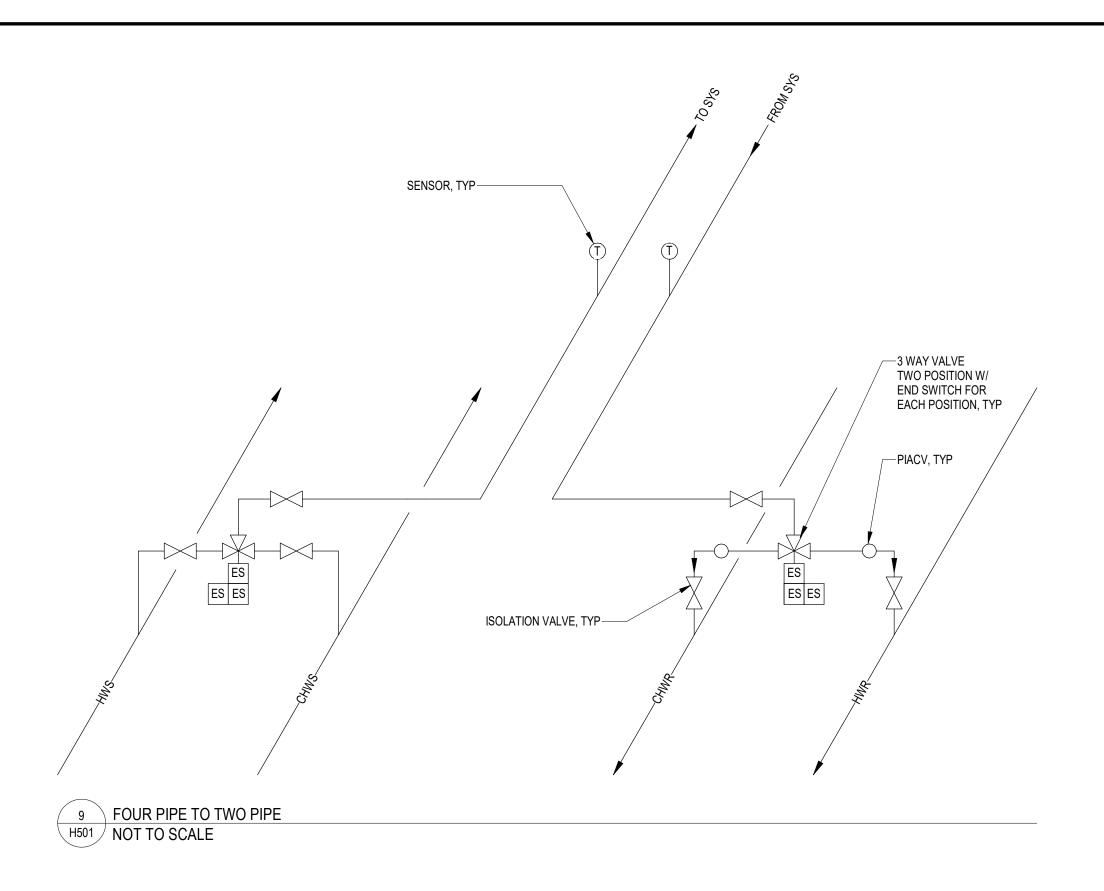
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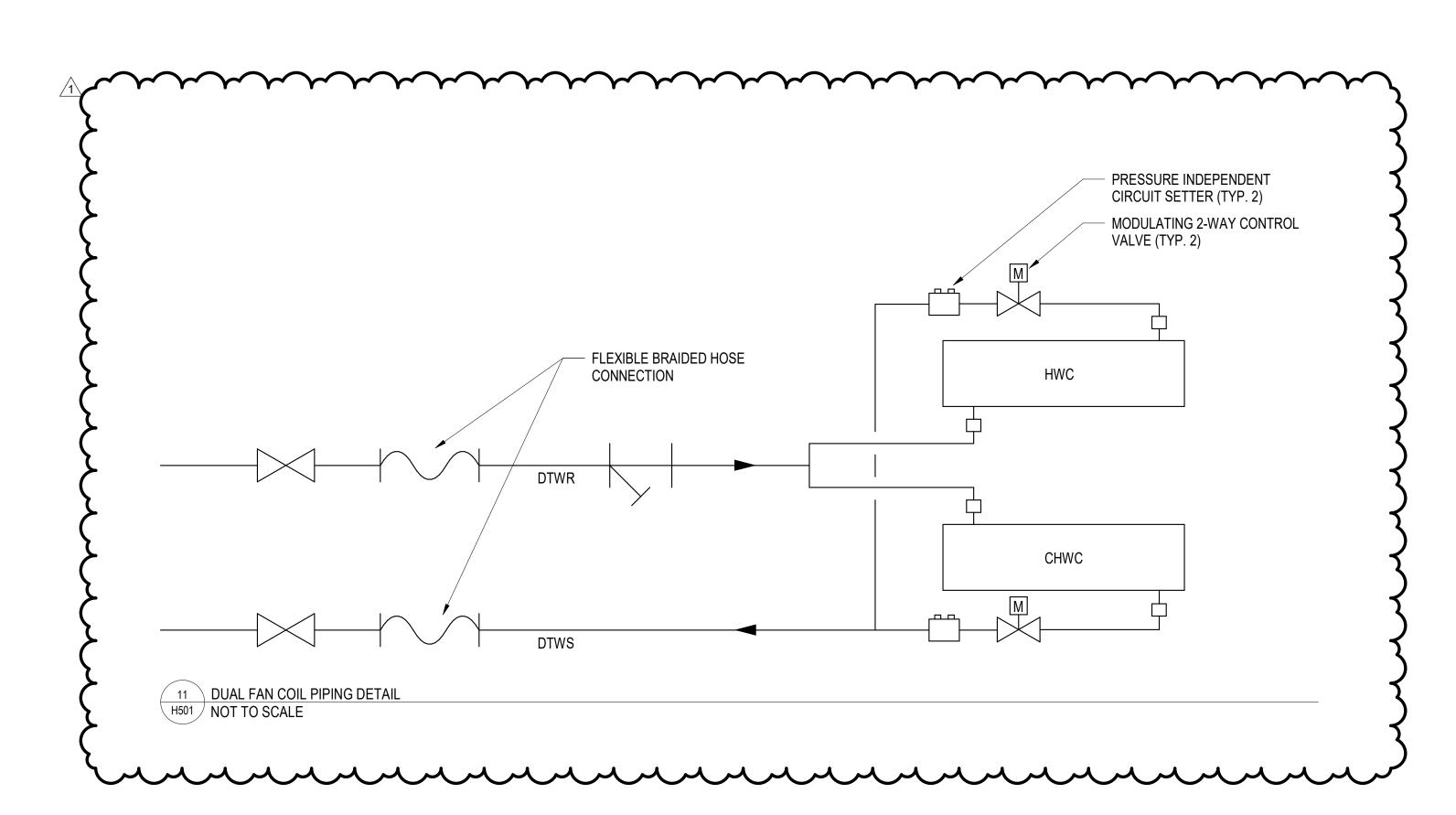
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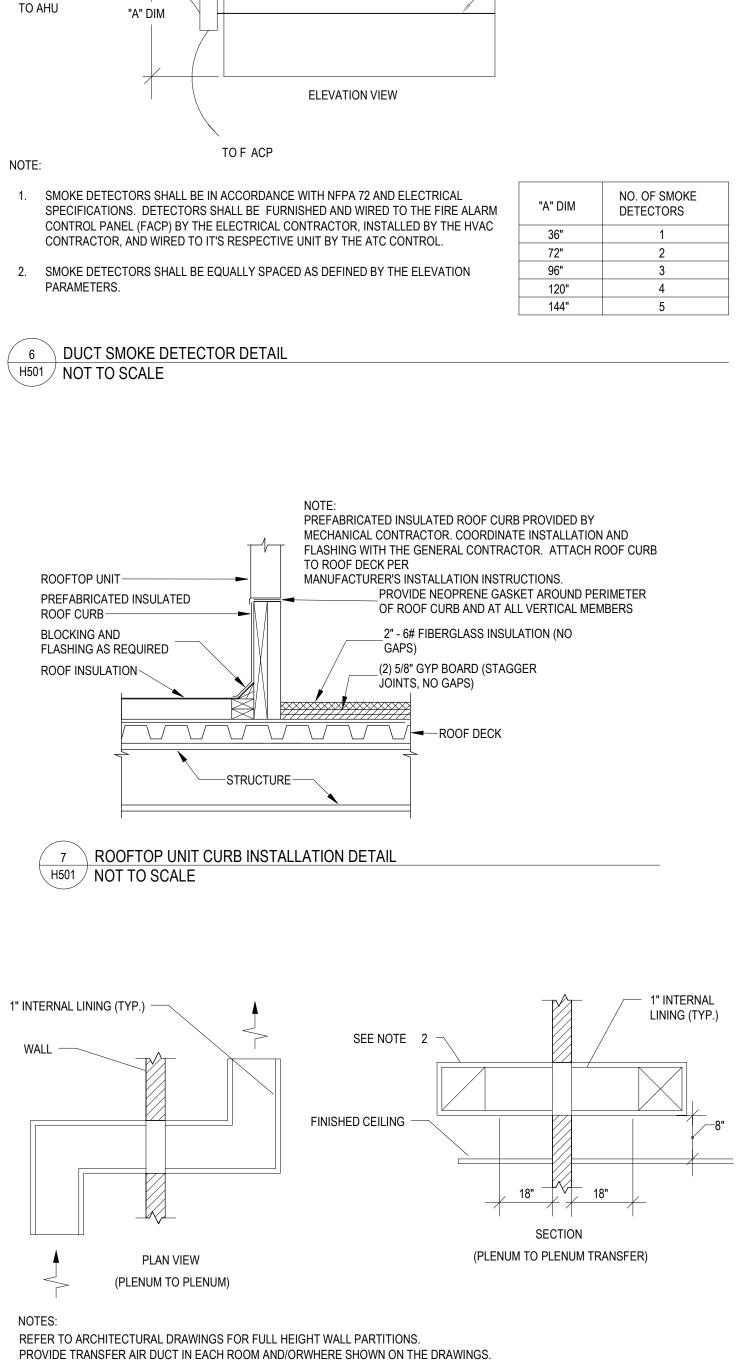
SECOND FLOOR PIPING PLAN PART B

Sheet Number:

H202B







144" MAX

∠AIR SAMPLING TUBE

AIR SAMPLING SMOKE

REFER TO FLOOR PLANS FOR TRANSFER DUCT SIZE.

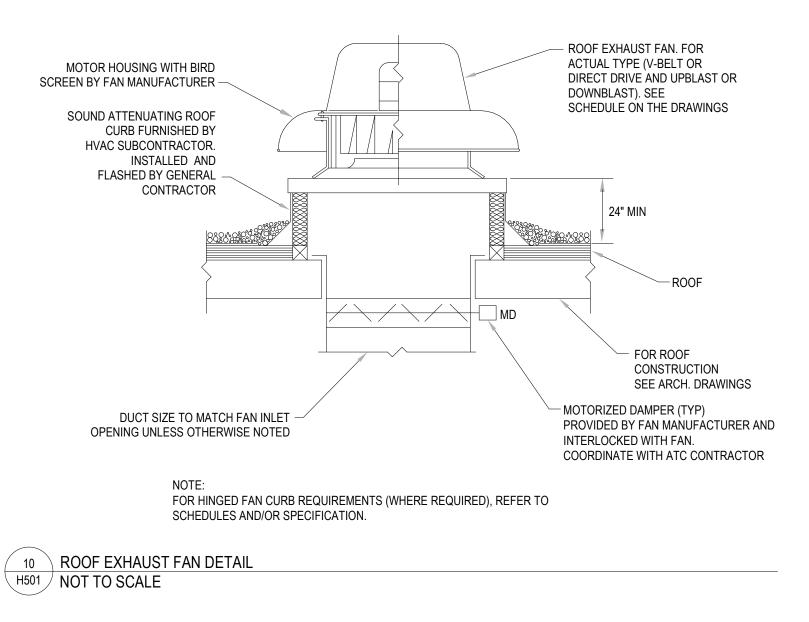
8 TRANSFER DUCT DETAIL

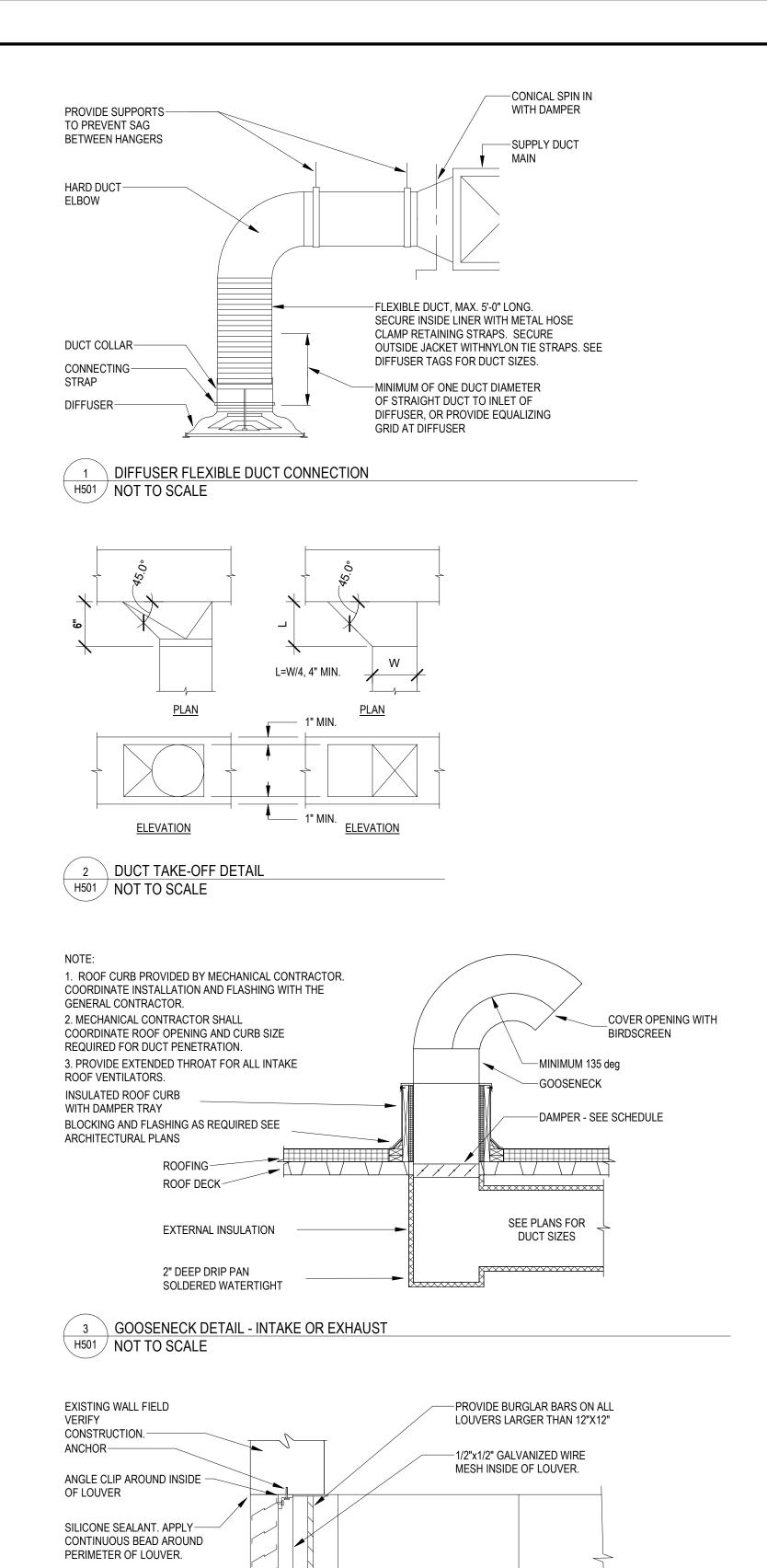
2 OPEN END DUCT.

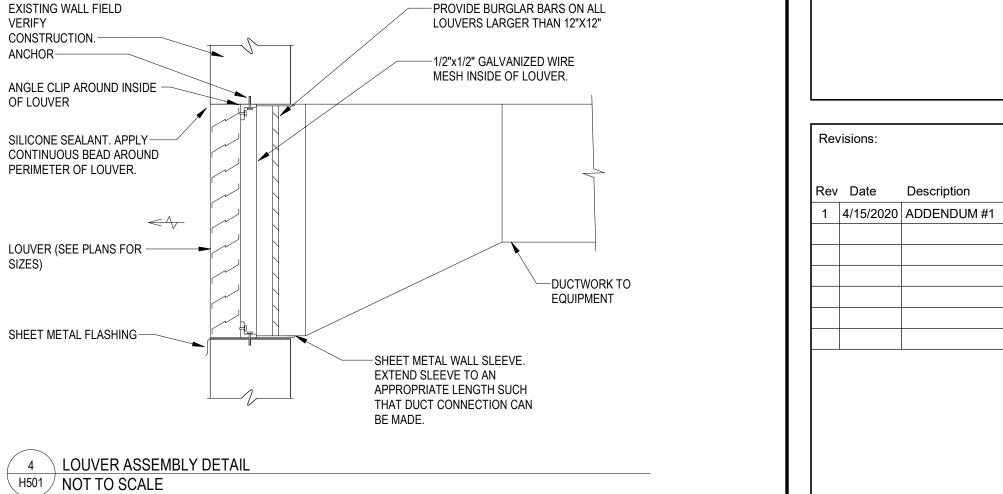
H501 NOT TO SCALE

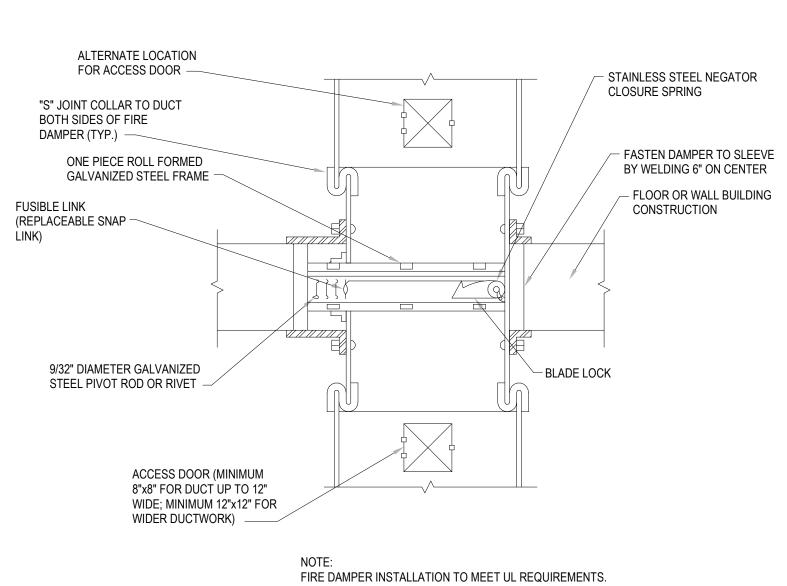
1 SUPPORT TRANSFER DUCT FROM STRUCTURE ABOVE.

DETECTOR









SIZES)

5 FIRE DAMPER DETAINOT TO SCALE

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HVAC DETAILS

Issued For: ADDENDUM #1

Reviewed By:

Drawing Title:

Sheet Number:

W&S Project No: 2191117

April 15, 2020

CONTRACT 2C20-064

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QuisenberryArcariMalik

195 Scott Swamp Road

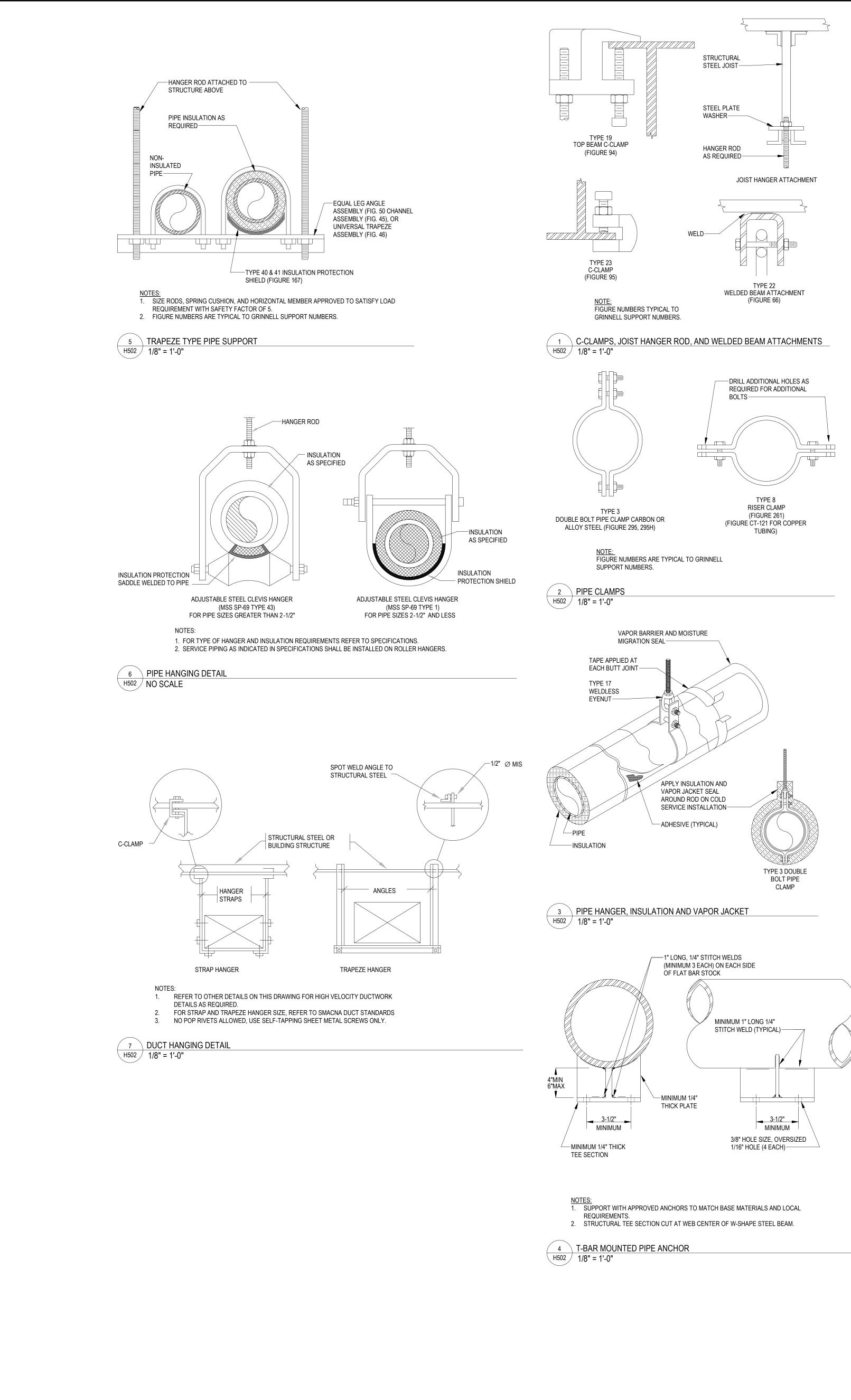
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qamarch.com

ENGINEERS

VAN ZELM HEYWOOD & SHADFORD, INC. CT: 860.284.5064 MA: 617.218.9976
10 TALCOTT NOTCH, FARMINGTON, CT 06032 - 1800
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Issued For: BID SET

Date: April 2, 2020

Drawn By: MRC

Reviewed By: SEH

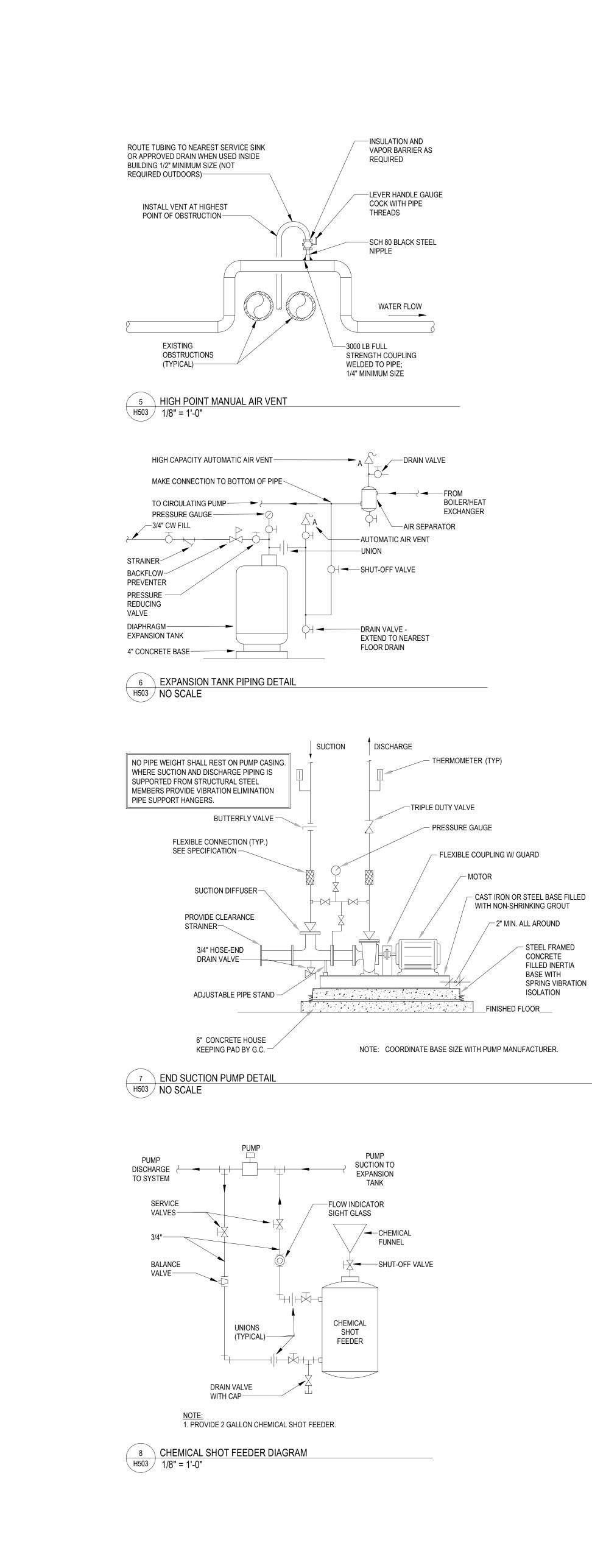
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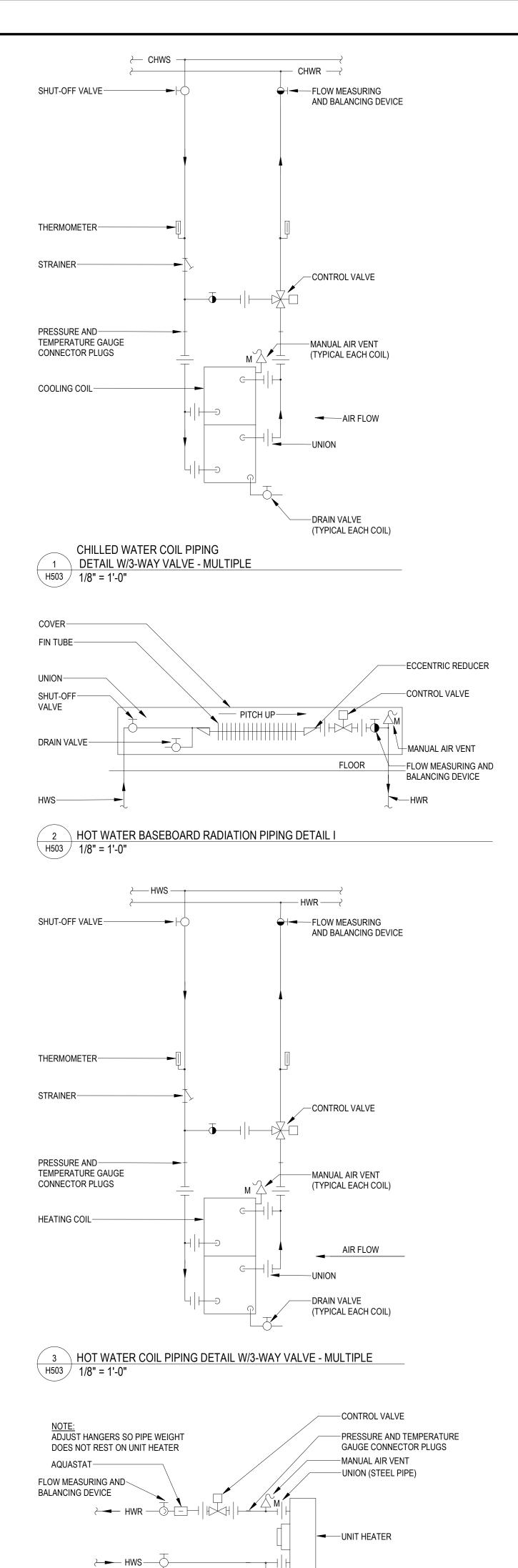
Drawing Title:

HVAC DETAILS

Sheet Number:

H502





NO PIPING

BELOW CASING
—DRAIN VALVE

SHUT-OFF VALVE-

4 HOT WATER UNIT HEATER PIPING DETAIL W/2-WAY VALVE I

1/8" = 1'-0"



Seal:

Revisions:

Rev Date Description

Issued For: BID SET

Drawn By:

Reviewed By:

Drawing Title:

Sheet Number:

W&S Project No: 2191117

HVAC DETAILS

April 2, 2020

																					AIR HAI	NDLING U	NIT SCH	HEDULE																									
	LOCATION											FAN											COOLING	COIL						COOLING	PLANT				HEATING	COIL			HE	ATING PLA	ANT								
							AIRFLOW	(CFM)	PRESS		WHEE	EL			MOTO	₹	ı	IOMINAL	CAP	(MBH)			AIR	RSIDE				WATERS	IDE	GLYC	OL		ı	AIRSIDE			WATER	SIDE		GLYCOL									
1						OUTSIDE AIR							DRIVE					CAP			EAT DB	EAT WB	LAT DB L					EWT L	WT			CAP	EAT DB L	AT DB			EWT	LWT			WE	IGHT							
ID	NAME	MANUFACTURER	MODEL NO.	TYPE	ARRANGEMENT	(DESIGN CFM)	DESIGN	MIN	SP TSP	RPM	TYPE	DIA	TYPE	QTY	IP E	HP	RPM	(TONS)	TOTAL	SENSIBLE	(°F)	(°F)	(°F)	(°F) \	VELOCITY	PD FI	PI GPM	(°F) (°F) PD	TYPE	%	(MBH)	(°F)	(°F)	PD FPI	GPM	(°F)	(°F)	PD TY	'PE %	6 ((lb)	FLA N	ICA	MOCP	V	PH	REMAR	KS
AHU-2	ROOF	Johnson Controls, Inc.	Soltion XTO	OUTDOOR	DOWNFLOW	700	4500	1000	1.00 2.48	3 2825	AF	12"	BELT	1 5	00 3	3.65	1800	10.6	127.8	106.0	79.6	65.5	57.7	56.1	523	0.55	9 22.4	44	56 12.4	PG	30	297	54.0	75.4	0.16 10	20.8	160	130	9.9 P	G 30	0 2	2850	14.0 1	17.5	30.0	208	3	1 THRU	7
AHU-3	MECH MEZZ	Johnson Controls, Inc.	AMI	INDOOR	VERTICAL	2600	9000	2600).75 2.00	870	FC	18"	BELT	1 7	50 6	5.26	870	27.5	329.5	247.6	80.9	66.8	56.1	55.0	416	0.72 1	10 53.4	44	56 19.4	PG	30	213	46.0	102.2	0.14 14	16.2	160	130	4.1 P	PG 30	0 1	880	20.0 2	25.0	45.0	208	3	1 THRU	, 7
AHU-3A	MECH MEZZ	Johnson Controls, Inc.	AMI	INDOOR	VERTICAL	2600	9000	2600).75 2.00	870	FC	18"	BELT	1 7	50 6	5.26	870	27.5	329.5	247.6	80.9	66.8	56.1	55.0	416	0.72 1	10 53.4	44	56 19.4	PG	30	213	46.0	102.2	0.00 14	16.2	160	130	4.1 P	PG 30	0 1	880	20.0 2	25.0	45.0	208	3	1 THRU	, 7
AHU-4	MECH MEZZ	Johnson Controls, Inc.	Solution XTI	INDOOR	HORIZONTAL	2600	8000	2600).75 3.71	2581	AF	12"	DIRECT	1 10	.00.	3.00	1800	29.0	348.6	247.9	81.3	67.1	52.5	52.3	567	1.36 1	11 60.9	44	56 17.5	PG	30	1045	43.0	129.7	1.70 0	73.3	160	130	0.9 P	G 30	0 2	2510	27.4 3	34.3	60.0	208	3	1 THRU	, <mark>7</mark>

1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.

2. PROVIDE HIGH EFFICIENCY HEATING AND VENTIALTION UNIT WITH FACTORY INSTALLED HOT WATER COIL, DUAL ENTHALPY ECONOMIZER, MERV 8 FILTER. PROVIDE WITH INSULATED PIPE CABINET. CABINET SHALL INCLUDE FULL PERIMETER BASERAILS FOR SHIPPING AND RIGGING. 3. PROVIDE GALVANIZED STEEL FULLY INSULATED CABINET. PROVIDE HINGED ACCESS DOORS WITH SINGLE LEVER LATCH MECHANISM. EXTERIOR SHALL BE A WEATHER RESISTANT BAKED ENAMEL FINISH. PROVIDE WITH FACTORY INSULATED ROOF CURB, INCLUDIGN THE PIPE CABINET, FOR PITCHED ROOF.

4. UNITS SHALL BE SINGLE POINT POWER WITH FACTORY DISCONNECT. 5. PROVIDE FLEXIBLE CONNECTIONS AT SUPPLY AND RETURN OPENINGS.

6. PROVIDE PREMIUM EFFICIENCY DIRECT DRIVE MOTOR.

7. PROVIDE WITH 1 YEAR COMPLETE UNIT WARRANTY (PARTS AND LABOR) AND 5 YEAR EXTENDED PARTS WARRANTY.

/--ADD ALTERNATE #1

																					EN	ERGY	RECO	VERY	VENT	TILATO	R (100)% OA)																			
CYMPOL MANUEACTURED	MODEL	DESCRIPTION			SU	IPPLY FAN	N						EXHAUST	FAN				E	ENERGY R	RECOVER	RY WHEEL	L (SUMME	R)	ENI	NERGY RE	COVERY W	VHEEL (WI	NTER)			CH	HILLED W	ATER COIL	_				НОТ	WATER CO	IL		FILTERS		ELECT	RICAL	WEIGHT	DELIA DICO
SYMBOL MANUFACTURER	MODEL	DESCRIPTION	TYPE	DRIVE	CFM	E.S.P.	TOT. FA	AN PM B	HP MOT	OR TY	PE D	RIVE	FM E.S.	.P. TOT S.P.	. FAN RPM	внр МО	OTOR HP	EAT DB W		LAT WB	BASE EFF.%		OLING SENS.	EAT DB W	VB DB	LAT WB	BASE EFF.%	MBH HEATING	ROWS	DB W	B DB	AT WB	EWT L	.WT GP	PM WPI	D APD IN	ROWS	EAT L	AT GPM	WPD A	IN OA E	EFF. EXH.	EFF. '	V P FL	A MCA MOCP	, (LBS)	REMARKS
ERV-1 JOHNSON CONTROLS	XTO-39x54	DOAS	AF	BELT	3500	1.50	3.85 33	370 3.2	22 5.0) A	F B	BELT 3	500 1.5	3.73	3341	3.21	5.0	88.0 73	3.0 79.6	67.1	61	211	127	7.00 2.9	.90 46.89	39 37.88	62.64	293	8	79.6 67	7.1 54.3	54.0	42.0 5	3.9 37	.2 16.0	0.66	8	46.89 14	41.6 20.5	1.5	0.3 MER	⟨V 8 MEF	₹V 8 2	08 3 14.	0 17.5 30.0	5634	1 THRU 11
ERV-2 JOHNSON CONTROLS	XTO-42x63	DOAS	AF	BELT	4200	1.50 4	4.01 25	549 4.0	07 5.0) A	F B	BELT 4	200 1.5	0 4.48	3135	5.26	7.5	88.0 73	3.0 78.85	66.38	69	265	157	7.00 2.9	.90 51.0	05 41.02	69.35	366	10	78.85 66	38 53.1	52.9	42.0 5	4.0 46	.5 15.9	9 0.48	10	51.05 14	4.64 25.6	0.7 0.	.32 MER	RV 8 MER	₹V 8 2	08 3 21.	1 26.4 45.0	6355	1 THRU 11
ERV-3 JOHNSON CONTROLS		DOAS	AF	BELT	3500	1.00	3.35 33	370 3.2	22 5.0) A	F B	BELT 3	500 1.0	0 3.23	3341	3.21	5.0	88.0 73	3.0 79.6	67.1	61	211	127	7.00 2.9	.90 46.89	39 37.88	62.64	293	8	79.6 67	7.1 54.3	54.0	42.0 5	3.9 37.	.2 16.0	0.66	8	46.89 14	41.6 20.5	1.5 0	0.3 MER	RV 8 MER	₹V 8 2°	08 3 14.	0 17.5 30.0	5634	1 THRU 11
ERV-4 JOHNSON CONTROLS	XTO-45x66	DOAS	AF	BELT	5300	1.00	3.62 28	840 5.4	41 7.5	5 A	F B	BELT 5	300 1.0	0 2.99	2691	4.59	5.0	88.0 73	3.0 78.54	66.16	71	324	194	7.00 2.9	.90 52.7	71 42.11	71.71	398	8	78.54 66	16 53.9	53.7	42.0 5	4.0 56	.9 9.1	1 1.07	8	52.71 13	33.74 27.9	0.4 0.	.33 MER	RV 8 MER	₹V 8 2′	08 3 21.	1 26.4 45.0	6519	1 THRU 11
NOTES: 1. REFER TO SPECIFICATIONS, DETAILS, A	ND CONTROL DRAWI	NGS FOR ADDITIONAL	NEORMATION																																												m

1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.
2. PROVIDE DOUBLE WALL INSULATED CABINET. INSULATION SHALL BE 2" THICK INJECTED FOAM. PROVIDE HINGED ACCESS DOORS WITH SINGLE LEVER LATCH MECHANISM. EXTERIOR SHALL BE A WEATHER RESISTANT BAKED ENAMEL FINISH.

3. PROVIDE TOTAL ENTHALPY ROTARY AIR TO AIR TYPE ENERGY WHEEL. 4. PROVIDE FACTORY DAMPERS, FANS, MOTORS, VFDS, ACTUATORS, CONTROL WIRING BY THE ATC CONTRACTOR.

5. PROVIDE SUPPLY AND EXHAUST AIR FILTERS -2" THICK MERV 8, PLEATED, DISPOSABLE TYPE. PROVIDE 4 SETS OF SPARE FILTERS.

6. PROVIDE UNIT WITH EACH MOTOR WIRED INDIVIDUALLY, DISCONNECT BY DIV 23.

7. PROVIDE FACTORY STARTUP OF ERV.

8. PROVIDE FLEXIBLE CONNECTIONS AT ALL DUCT CONNECTIONS.

9. PROVIDE PREMIUM BEHINDLY OF MOVER WITH SHAFT GROUNDING RINGS (WHERE AND LABBLE)

10. PROVIDE WITH 1 YEAR COMPLETE UNIT WARRANTY (PARTS AND LABOR) AND 5 YEAR EXTENDED PARTS WARRANTY.

11. PROVIDE SINGLE COIL FOR CHILLED WATER AND HOT WATER. SCHEDULE INDICATES REQUIRED PERFORMANCE DURING WACH MODE OF OPERATION.

									F	AN CO	OIL UNI	TS HOT/C	HILLED	WATE	R 4-PIPE														
	LOCATION								FAN DATA	_		(COOLING	(COOLING AIRSI	IDE	COOLING V	WATERSID	E HEAT	TING AIRSIDE	HEATIN	G WATERSII	DE GL	YCOL		ELECTRIC	CAL DATA		
						AIRFLOW	<i>'</i>	FOR		МОТО	R (HIGH SF	PEED) CAP	ACITY (MBH)	EAT (°F	LAT (°F)						_								
ID	NAME	NO. MANUFACTURER	MODEL	TYPE	ARRANGEMENT	MAX MIN	N TYPE C	ESP (IN WG) DRIVE TYPE	QTY	HP RPI	M ECM TO	TAL SENS	DB W	/B DB WB	PD (IN WC)	GPM (FT HD) EWT	LWT CAP MBH	EAT LAT	I -	PD HD) EWT	LWT TYP	≣ %	WEIGHT (lb)	MCA MOP	V F	PH RE	EMARKS
FCU-1.1	SPECIAL ED C.R.	162 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080 560	FC	4 0.05	DIRECT	2	0.25 160	00 YES 17	7.3 16.6	75 6	3 61 57.6	0.12	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120	1 1	THRU 7
FCU-2.1	SPECIAL ED C.R.	161 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080 560) FC	4 0.05	DIRECT	2	0.25 160	00 YES 17	7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120	1 1	THRU 7
FCU-3.1	SPECIAL ED C.R.	158 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080 560) FC	4 0.05	DIRECT	2	0.25 160	00 YES 17	7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120	1 1	THRU 7
FCU-4.1	SPECIAL ED C.R.	151 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED		1080 560		4 0.05	DIRECT	2	0.25 160	00 YES 17	16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-5.1	KINDERGARTEN	167 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080 560		4 0.05	DIRECT	2	0.25 160	00 YES 17	16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-6.1	KINDERGARTEN	168 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080 560		4 0.05	DIRECT	2	0.25 160		16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-7.1	KINDERGARTEN	173 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080 560		4 0.05	DIRECT	2	0.25 160		7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-8.1	CORRIDOR	127 JOHNSON CONTROLS	FNP-12	HORIZONTAL	DUCTED	1475 1020		2 0.05	DIRECT		0.5 150		.9 27.9	75 6	3 57.8 56.1	0.5	5.6 0.98	56	44 20.2	70 81.2	1.3 0	.17 160	130 PG	30	195	9.63 15	120		3 THRU 8
FCU-9.1	CORRIDOR	197 JOHNSON CONTROLS	FNX-6	HORIZONTAL	RECESSED	670 530		1 0.1	DIRECT	· ·	0.33 105	120 11	.3 11.0	75 6		0.32	2.1 2.27	56	44 10.1	70 83.2	0.7 0	.34 160	130 PG	30	175	6.25 15	120		3 THRU 8
FCU-1.2	CLASSROOM	178 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080 560		4 0.05	DIRECT		0.25 160		16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-2.2	CLASSROOM	181 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-3.2	CLASSROOM	182 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-4.2	CLASSROOM	185 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		16.6	75 6	61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-5.2	CLASSROOM	186 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		16.6	75 6		1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-6.2	CLASSROOM	193 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-7.2	CLASSROOM	192 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-8.2	CLASSROOM	189 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		.3 16.6	/5 6	3 61 57.6	1./3	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-9.2	CONFERENCE	177 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160	1 1 1 11	16.6	/5 6	3 61 57.6	1./3	3.2 1.73	56	44 30.7	70 95.1	 	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-10.2	ARTS & CRAFTS	196 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		7.3 16.6	75 6	3 61 5/.6	1./3	3.2 1.73		44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-11.2	CLASSBOOM	195 JOHNSON CONTROLS	FNX-8	HORIZONTAL	RECESSED	890 645	5 FC	1 0.05	DIRECT		0.33 105		17.9	75 6		0.46	3.6 2.17	56	44 19.1	70 89.2		.42 160	130 PG	30	210	6.25 15	120		3 THRU 8
FCU-1.3	CLASSROOM CLASSROOM	217 JOHNSON CONTROLS218 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED FLOOR MOUNTED	UPFLOW UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160 0.25 160		.3 16.6 .3 16.6	75 6		1./3	3.2 1.73	50	44 30.7	70 95.1		.33 160 .33 160	130 PG	30	255	5.0 15 5.0 15	120		THRU 7
FCU-2.3 FCU-3.3	CLASSROOM	219 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW UPFLOW	1080	FC FC	4 0.05 4 0.05	DIRECT		0.25 160		.3 16.6 .3 16.6	75 6		1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255 255	5.0 15	120		THRU 7
FCU-3.3	CLASSROOM	220 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-4.3 FCU-5.3	CLASSROOM	215 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-6.3		214 JOHNSON CONTROLS		FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT	2	0.25 160		3 16.6		3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	21 1	33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-7.3		213 JOHNSON CONTROLS		FLOOR MOUNTED		1080	FC		DIRECT	2	0.25 160		7.3 16.6			1.73	3.2 1.73	56	44 30.7	70 95.1	21 1	33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-8.3		212 JOHNSON CONTROLS		FLOOR MOUNTED		1080		4 0.05	DIRECT	 	0.25 160		7.3 16.6			1.73	3.2 1.73	56	44 30.7	70 95.1	21 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-9.3		209 JOHNSON CONTROLS		FLOOR MOUNTED		1080		4 0.05	DIRECT		0.25 160		7.3 16.6	75 6		1.73	3.2 1.73	56	44 30.7	70 95 1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-10.3		221 JOHNSON CONTROLS		HORIZONTAL	RECESSED	1790 1475	5 FC	2 0.05	DIRECT		0.33 105		.3 20.3			0.32	3.8 1.61	56	44 30.5	70 85	2.0 1	.24 160	130 PG	30	275	11.25 15	120		3 THRU 8
FCU-1.4		226 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT		0.25 160		7.3 16.6	75 6		1.73	3.2 1.73	56	44 30.7	70 95.1		.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-2.4		227 JOHNSON CONTROLS		FLOOR MOUNTED	UPFLOW	1080		4 0.05	DIRECT		0.25 160		.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-3.4		228 JOHNSON CONTROLS		FLOOR MOUNTED		1080		4 0.05	DIRECT		0.25 160	-	7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-4.4		229 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED		1080		4 0.05	DIRECT		0.25 160	-	7.3 16.6			<u> </u>	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-5.4		230 JOHNSON CONTROLS		FLOOR MOUNTED		1080		4 0.05	DIRECT		0.25 160	- - - - - - - - - - 	7.3 16.6			1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-6.4		234 JOHNSON CONTROLS		FLOOR MOUNTED		1080		4 0.05	DIRECT	 	0.25 160		7.3 16.6			1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-7.4		233 JOHNSON CONTROLS		FLOOR MOUNTED		1080		4 0.05	DIRECT		0.25 160		7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-7.4A		233 JOHNSON CONTROLS		FLOOR MOUNTED	UPFLOW	1080		4 0.05	DIRECT		0.25 160		7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120		THRU 7
FCU-8.4		232 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080		4 0.05	DIRECT	2	0.25 160	00 YES 17	7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120	1 1	THRU 7
FCU-8.4A		232 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED		1080		4 0.05	DIRECT	2	0.25 160	00 YES 17	7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120	1 1	THRU 7
FCU-9.4		225 JOHNSON CONTROLS		FLOOR MOUNTED		1080		4 0.05	DIRECT	2	0.25 160	00 YES 17	7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120	1 1	THRU 7
FCU-10.4		235 JOHNSON CONTROLS	FNX-12	HORIZONTAL	RECESSED	1385 940		2 0.05	DIRECT	1	0.5 150	00 YES 28	.2 26.3	75 6	3 57.6 56	0.51	5.3 1.93	56	44 34.1	70 91.2	2.2 4	.75 160	130 PG	30	285	9.63 15	120	1 1,?	3 THRU 8
FCU-1.5	OFFICE	207 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT	2	0.25 160	00 YES 17	7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120	1 1	THRU 7
ECH25	WORK POOM	204 TOHNSON CONTROLS	_EW _12	FLOOP MOUNTED		1080	- 5	4 -0.05		2	0-25160	0_YES17	16.6	- - - - - - - - - -	<u> </u>	_1_73_	-32 -173	<u> </u>	44_30_7	70051_	21-1	33160	_130 PC	30	_255_	- 50 -15-	120	1-1-	JHPU7-
FCU-1.6	FACULTY DINING	117 JOHNSON CONTROLS	FWI-12	FLOOR MOUNTED	UPFLOW	1080	FC	4 0.05	DIRECT	2	0.25 160	00 YES 17	7.3 16.6	75 6	3 61 57.6	1.73	3.2 1.73	56	44 30.7	70 95.1	2.1 1	.33 160	130 PG	30	255	5.0 15	120	1 1	THRU 7

/—ADD ALTERNATE #1

1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION. 2. PROVIDE WITH GALVANIZED STEEL INSULATED CABINET (ELASTOMERIC CLOSED CELL FOAM) WITH POWDER COAT PAINT (COORDINATE FINAL COLOR WITH ARCHITECT AND OWNER), SLOPE TOP WITH TOP STAMPED SUPPLY GRILLE, LEVELING LEGS, END POCKETS, CONTROL ENCLOSURE, AND FALSE BACKS AND BOTTOMS TO ACCOMMODATE THE HORIZONTAL PIPE

3. PROVIDE EXTENDED STAINLESS STEEL DRAIN PAN UNDER ALL UNINSULATED PIPING AND VALVES (INCLUDING THE CONTROL VALVE), VALVE ACTUATOR SHALL BE INSTALLED IN AN UPRIGHT MANNER IN WHICH CONDENSATION FROM UNINSULATED PIPING WILL NOT DAMAGE THE MOTOR OR ELECTRONICS. 4. PROVIDE WITH FORWARD CURVED, DWDI CENTRIFUGAL TYPE FAN AND ECM TYPE MOTOR.

5. PROVIDE WITH PIPING AT EACH COIL (HW AND CHW), INCLUDING ISOLATION VALVE (FULL PORT BRASS BALL VALVE ON SUPPLY), MANUAL AIR VENT, UNIONS, 2-WAY MODULATING PIACV. ACTUATOR TO BE LOW VOLTAGE (24 VOLTS). FAIL SAFE NORMALLY OPEN WITH MANUAL OVERRIDE. CONTRACTOR SHALL REFER TO PLANS FOR RIGHT OR LEFT HAND CONNECTIONS. 6. PROVIDE WITH INTEGRAL FILTER RACK AND 3 SETS OF 1" MERV 8 PLEATED DISPOSABLE FILTERS.

7. PROVIDE WITH FACTORY UNIT MOUNTED DISCONNECT SWITCH (TOGGLE TYPE SWITCH), FAN RELAYS, SCR FAN SPEED CONTROL, AND CONDENSATE OVERFLOW SWITCH.

8. PROVIDE WITH GALVANIZED STEEL INSULATED CABINET (ELASTOMERIC CLOSED CELL FOAM) WITH POWDER COAT PAINT (COORDINATE FINAL COLOR WITH ARCHITECT AND OWNER), CONTROL ENCLOSURE, DUCTED DISCHARGE, BOTTOM RETURN GRILLE (ON RECESSED UNITS) AND DUCTED RETURN (ON CONCEALED).

										AIR	COO	LED W	ATER (CHIL	LER							
CVMDOL	MANUEACTURER	MODEL	LOCATION		(HILLE	D WATER			СОМ	PRESSO	RS		CCD	REFR	IGERANT	COND.	MAX	TONC	CURRENT		DEMARKS
SYMBOL	MANUFACTURER	MODEL	LOCATION	EWT	LWT	GPM	PD GLYCOI	. %	NO	CKT QTY	RLA EA	MCA EA	MOCP EA	EER	LBS (EA)	TYPE	AMB F	KW	TONS	V PH HTZ	WEIGHT	REMARKS
CH-1	TSI	33A0LM160-2	BASEMENT	56.0	44.0	321	7.5 PG	30	4	2	288	323	400	10.94	150	R410A	95	165.9	151.2	208 3 60	-	1 THRU 9
NOTES:															•			•		•		

1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION. 2. PROVIDE CABINET WITH BAKED ON POWDER PAINT.

3. COMF'RESSORS SHALL BE HERMETIC, SCROLL TYPE WITH VIBRATION ISOLATOR MOUNTS. 4. PROVIDE REMOTE CONDENSER UNIT AND ALL REFRIGERANT PIPING AND APPURTENANCES REQUIRED.

5. EACH REFRIGERANT CIRCUIT SHALL INCLUDE A DISCHARGE SERVICE BALL TYPE ISOLATION VALVE, HIGH SIDE PRESSURE RELIEF, LIQUID LINE SHUT-OFF VALVE WITH CHARGING PORT, LOW SIDE PRESSURE RELIEF DEVICE, FILTER DRIER, SOLENOID VALVE, SIGHT GLASS WITH MOISTURE INDICATOR, THERMOSTATIC EXPANSION VALVE, AND FLEXIBLE CLOSED CELL FOAM INSULATED SUCTION LINE AND SUCTION PRESSURE TRANSDUCER.

6. F'ROVIDE DUAL POINT POWER SUPPLY WITH INTEGRAL STARTER AND CONTROL POWER TRANSFORMER. DISCONNECT SHALL BE BY DIV. 26. 7. PROVIDE FACTORY MOUNTED LOCK ON THE CONTROL PANEL (WITH 2 KEYS TO BE TURNED OVER TO THE OWNER).

8. F'ROVIDE WITH MICROPROC ESSOR BASED CONTROL SYSTEM, BAS INTERFACE SIGNAL COMPATIBLE WITH THE EXISTING BAS, POWER FACTOR CORRECTION CAF'ACITORS, HOT GAS BYF'ASS, AND FACTORY FLOW SWITCH. 9. PROVIDE 1 YEAR PARTS AND LABOR WARRANTY ON ENTIRE CHILLER AFTER START-UP, 2ND THRU STH YEAR COMPRESSOR WARRANTY (PARTS AND LABOR) AND FULL START-UP BY MANUFACTURER'S SERVICE DEPARTMENT.

			CO	NDENSING UN	NIT SCHI	EDULE						
ID	MANUFACTURER	MODEL NO.	TOTAL COOLING CAP (MBH)	REFRIGERANT TYPE	EER OR SEER	WEIGHT (LB)	RLA	MCA	МОР	V	PH	REMARKS
CU-1	TSI	FCX-206-V	1814	R-410A	10.94	7500	75.0	78.0	90.0	208	3	1 THRU 5

1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.

2. PROVIDE WITH LOW AMBIENT CONTROLS AND ACCESSORIES FOR OPERATION DOWN TO 30°F. 3. PROVIDE UNIT WITH DUAL CIRCUIT WITH 2 STEPS OF CAPACITY, PRESSURE GAUGES, AND SERVICE VALVE.

4. PROVIDE DUAL POINT POWER AND FACTORY CONTROL CIRCUIT AND TRANSFORMER. DISCONNECT SWITCH BY DIV 26. 5. PROVIDE WITH DIRECT DRIVE CONDENSER FANS WITH PERMANENTLY LUBRICATED BALL BEARINGS AND THERMAL OVERLOAD PROTECTION.



MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT 21 Tuttle Rd. Bristol, CT 06010

Weston & Sampson Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

Consultants:

QuisenberryArcariMalik 195 Scott Swamp Road

Farmington, CT 06032 (860) 677-4594 qamarch.com





Revisions: Rev Date Description

> 1 | 4/15/2020 | ADDENDUM #1 2 | 4/23/2020 | ADDENDUM #2

ADDENDUM #2 Issued For:

W&S Project No: 2191117

Drawing Title:

SCHEDULES

Sheet Number:

			GLYCOL	MAKE-UP	UNIT SC	HEDUI	LE				
				PUMP		DRY					
					UNIT VOL	WEIGHT					
ID	LOCATION	MANUFACTURER	MODEL NO.	FLOW (GPM)	(GAL)	(lb)	FLA	MOCP	V	PH	REMARKS
GF-1	BASEMENT	AXIOM	SF100-L	1.0	55.0	35	0.7	15	120	1	1 THRU 4

- 1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.
- 2. PROVIDE FACTORY PRESSURE REDUCING VALVE, PRESSURE GAUGE, SYSTEM CONNECTION HOSE, UNION, AND CHECK VALVE. 3. PROVIDE FACTORY SECOND PRESSURE REDUCING VALVE, PRESSURE GAUGE, SYSTEM CONNECTION HOSE, UNION, AND CHECK VALVE TO ALLOW FO RINDEPENDANT
- PRESSURE SUPPLY TO A SECOND SYSTEM. 4. PROVIDE FACTORY PUMP WITH THERMAL CUT-OUT, INTEGRAL PRESSURE SWITCH, AND CORD AND PLUG.

			AIR S	SEPARATOR S	CHEDULE				
						UNIT DIN	MENSIONS		
ID	LOCATION	MANUFACTURER	MODEL NO.	FLOW (GPM)	PIPE SIZE (IN)	HEIGHT (IN)	DIAMETER (IN)	DRY WEIGHT (lb)	REMARKS
AS-1	BASEMENT	Bell & Gossett	RL-6F	350	6	44	26	280	1 THRU 3
AS-2	BASEMENT	Bell & Gossett	RL-6F	390	6	44	26	280	1 THRU 3

- 1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.
- 2. PROVIDE BALL TYPE BLOWDOWN VALVE, HOSE CONNECTION WITH CAP AND CHAIN. 3. PROVIDE HIGH CAPACITY AIR VENT WITH 1/2" COPPER TUBING FROM THE AIR VENT TO THE NEAREST DRAIN.

				EXPAN	SION TAN	IK SCH	HEDULE				
					VOLUME	UNIT D	IMENSIONS	PRESS RELIEF	DRY WEIGHT	FULL WEIGHT	
ID	LOCATION	MANUFACTURER	MODEL NO.	TYPE	TANK	HEIGHT	DIAMETER	(PSIG)	(lb)	(lb)	REMARKS
ET-1	BASEMENT	TACO	CA90-125	BLADDER	23.0	29"	20"	85	120	312	1 THRU 3
ET-2	BASEMENT	BELL & GOSSETT	B-50LA	BLADDER	106.0	65"	24"	85	309	1184	1 THRU 3

- 1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.
- 2. TANK SHALL BE ASME RATED. TANK SHALL BE DIAPHRAGM TYPE.

				CABINET U	VIT HEATE	R (HOT W	VATER)										
STANDOL	MANYFACTORER	MARELY	PRANCEMENT /	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	CFIV	MBI	GPM	EWE	WATER	SIDE GLYCOL	\ _%	MAX PD		MOTOR OLTS	PH	NEMARK -	~~~
CUH-1	STERLING	RC-1200-08	CEILING RECESSED	KITCHEN 112	860	33.2	2.2	160	130	PG	30	0.55	1/10, 1/15	115	1	1 THRU 5	
CUH-2	STERLING	RC-1200-08	CEILING RECESSED	KITCHEN 112	860	33.2	2.2	160	130	PG	30	0.55	1/10, 1/15	115	1	1 THRU 5	
CUH-3	STERLING	W-1070-02	WALL MOUNT	DRY STORAGE 113	230	10	0.66	160	130	PG	30	0.05	1/15	115	1	1 THRU 5	ADD ALTER
CUH-4	STERLING	W-1070-02	WALL MOUNT	LOCKER ROOM 115	230	10	0.66	160	130	PG	30	0.05	1/15	115	1	1 THRU 5	
CUH-5	STERLING	W-1070-12	WALL MOUNT	CORRIDOR 119	1230	46.1	3.0	160	130	PG	30	1.02	1/10	115	1	1 THRU 5	
CUH-6	STERLING STERLING	W-1070-12 W-10 70- 12	WALL MOUNT	STAIR 164 STAIR 186	1230	46.1	3.0	160	130 130	PG	30	1.02	1/10	115	Image: Control of the	THRU 5	m
CUH-8	STERLING	W-1070-12	WALL MOUNT	STAIR 231	1230	46.1	3.0	160	130	PG	30	1.02	1/10	115	1	1 THRU 5	

- 1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION. 2. PROVIDE STAMPED LOUVERS, 18 GAUGE CABINET, 16 GAUGE FRONT PANEL. ALL PAINTED SURFACES SHALL BE POWDER COATED. ALL UNPAINTED SURFACES SHALL BE GALVANIZED. PROVIDE WITH HINGED FRONT PANEL AND SAFETY CHAIN.
- 3. PROVIDE FACTORY PROVIDED, FIELD INSTALLED DISCONNECT SWITCH AND SPEED CONTROL.

4. PROVIDE WITH ECM TYPE MOTOR BUILT FOR CONTINUOUS USE. 5. PROVIDE WITH 1 YEAR COMPLETE UNIT WARRANTY (PARTS AND LABOR).

						PUM	PS										
SYMBOL	MANUFACTURER	MODEL/	SERVES	LOCATION	GPM	HEAD	TYPE	IMP. DIA.	MAX NPSHR	ВНР	MOTOR	PUMP SPEED	PUMP EFF	OPERATING WEIGHT	ELECT	RICAL	REMARKS
STWIDOL	MANOTACTONEN	SERIES	SLIVES	LOCATION	OI W	FT.	'''' =	(IN)	(FT)	Dill	HP	(RPM)	(%)	(LBS)	V	PH	KLIMARKO
P-1	BELL & GOSSETT	e-1510	HW	BASEMENT	351	35	END SUCTION	9.875	5.24	3.85	5.0	1,125	79.3	435	208	3	1 THRU 4
P-2	BELL & GOSSETT	e-1510	HC	BASEMENT	390	46	END SUCTION	11	5.5	5.9	7.5	1,139	79.2	560	208	3	1 THRU 4
P-3	BELL & GOSSETT	e-1510	CHW	BASEMENT	390	46	END SUCTION	11	5.5	5.9	7.5	1,139	79.2	560	208	3	1 THRU 4
NOTES:				_			-							-			

- 1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.
- 2. PROVIDE PREMIUM EFFICIENCY MOTOR, CAST BRONZE IMPELLOR, AND STEEL SHAFT. 3. PROVIDE NEOPRENE TYPE VIBRATION ISOLATION.

				EXHAUST	FAN SO	HEDUL	E.						
SYMBOL	MANUFACTURER	MODEL	TYPE	SERVICE	CFM	S.P. (IN.)	FAN RPM	ВНР	HP	FLA	V	PH	REMARKS
EF-8	GREENHECK	G-183-VG	DIRECT	GYM	2,200	0.38	728	0.25	0.75	10.6	120	1	1 THRU 4
EF-9	GREENHECK	G-183-VG	DIRECT	GYM	2,200	0.38	728	0.25	0.75	10.6	120	1	1 THRU 4

- 1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.
- 2. PROVIDE GALVANIZED STEEL HOUSING. 3. PROVIDE ECM TYPE MOTOR WITH DIAL ON MOTOR AND FACTORY MOUNTED TOGGLE TYPE DISCONNECT SWITCH. 4. PROVIDE 24" HIGH FACTORY INSULATED ROOF CURB.

+																											
, 1											UNI	T HEATER	SCHED	ULF													
-											<u> </u>																
ļ		LOCATION							FAN					HEA	ATING COIL					G PLANT							
' U									MO	TOR			AIRS	SIDE		WATE	ERSIDE		GLY	/COL							
							AIRFLOW								FLOW						UNIT						
J	ID	NAME	NO.	MANUFACTURER	MODEL NO.	TYPE	(CFM)	QTY	POWER	RPM	ECM	CAP (BTU/H)	EAT(db) °F	LAT(db) °F	(GPM)	EWT °F	LWT °F	PD (FT H20)	TYPE	%	WEIGHT (LB)	FLA	MCA	MOCP	VOLT	PH	REMARKS
	UH-1			MODINE	HSB/HC 86	HYDRONIC	1340	1	0.13	1625	No	60200	60.0	101.6	6.3	160	110	1.0	PG	30	52	2.3	4.3	15.0	120	1	1 THRU 6

- 1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION. 2. PROVIDE STAMPED LOUVERS, 20 GAUGE CABINET. ALL PAINTED SURFACES SHALL BE POWDER COATED. ALL UNPAINTED SURFACES SHALL BE GALVANIZED.
- 3. PROVIDE FACTORY PROVIDED, FIELD INSTALLED DISCONNECT SWITCH. 4. PROVIDE WITH TEFC TYPE MOTOR WITH THERMAL OVERLOAD PROTECTION.
- 5. PROVIDE WITH OSHA FAN GUARD AND AIR DEFLECTION LOUVERS.
- 6. PROVIDE WITH 1 YEAR COMPLETE UNIT WARRANTY (PARTS AND LABOR).

REGISTER, GRILLE, & DIFFUSER SCHEDULE												
TAG	AIRFLOW RANGE (CFM)	NECK SIZE (IN)	OVERALL SIZE (IN)	MATERIAL	SERVICE	MOUNTING	TYPE	PD (IN WG)	NC	MANUFACTURER	MODEL	REMARKS
SA	0 - 100	6"ø	12" x 12"	STEEL	SUPPLY	LAY-IN OR SURFACE	PLAQUE	0.08	<16	PRICE	SPD	1 THRU 6
SB	101 - 200	8"ø	24" x 24"	STEEL	SUPPLY	LAY-IN OR SURFACE	PLAQUE	0.04	<19	PRICE	SPD	1 THRU 6
SC	201 - 325	10"ø	24" x 24"	STEEL	SUPPLY	LAY-IN OR SURFACE	PLAQUE	0.06	<18	PRICE	SPD	1 THRU 6
SD	326 - 550	12"ø	24" x 24"	STEEL	SUPPLY	LAY-IN OR SURFACE	PLAQUE	0.13	21	PRICE	SPD	1 THRU 6
R1 OR E1	0 - 90	6" x 6"	8" x 8"	ALUMINUM	RETURN OR EXHUAST	LAY-IN OR SIDEWALL	DOUBLE DEFLECTION	0.01	25	PRICE	60	1 THRU 6
R2 OR E2	91 - 155	8" x 8"	10" x 10"	ALUMINUM	RETURN OR EXHUAST	LAY-IN OR SIDEWALL	DOUBLE DEFLECTION	0.01	24	PRICE	60	1 THRU 6
R3 OR E3	156 - 240	10" x 10"	12" x 12"	ALUMINUM	RETURN OR EXHUAST	LAY-IN OR SIDEWALL	DOUBLE DEFLECTION	0.01	26	PRICE	60	1 THRU 6
R4 OR E4	241 - 270	12" x 12"	14" x 14"	ALUMINUM	RETURN OR EXHUAST	LAY-IN OR SIDEWALL	DOUBLE DEFLECTION	0.01	21	PRICE	60	1 THRU 6
R5 OR E5	271 - 355	14" x 14"	16" x 16"	ALUMINUM	RETURN OR EXHUAST	LAY-IN OR SIDEWALL	DOUBLE DEFLECTION	0.01	23	PRICE	60	1 THRU 6

1. REFER TO SPECIFICATIONS AND DETAILS FOR ADDITIONAL INFORMATION.

3. PROVIDE APPROPRIATE BORDER FOR INSTALLATION TYPE.

NEGATIVE RATING SPECIFIED (-4"W.G. MIN.).

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- 2. RUNOUTS TO DIFFUSERS SHALL BE THE SAME SIZE AS THE INLET/NECK SIZE.
- 4. PROVIDE FACTORY POWDER COAT FINISH. COORDINATE FINAL COLOR WITH ARCHITECT/OWNER
- 5. COORDINATE BLOW PATTERN WITH MECHANICAL PLANS. 6. CONTRACTOR SHALL VERFIY QUANTITY OF REGISTERS, GRILLES, AND DIFFUSERS REQUIRED.

DDECCLIDE OLVEC	STATIC PRESSURE CLASS	SMACNA SEAL CLASS	SMACNA LEAKA	AGE CLASS	DESIGN VELOCITY LIMITS
PRESSURE CLASS	STATIC PRESSURE CLASS		RECTANGULAR	ROUND	DESIGN VELOCITY LIMITS
3"	3" POS OR NEG	Α	6	3	2500 FPM OR LESS
2"	2" POS OR NEG	А	6	3	2000 FPM OR LESS
INLESS OTHERWISE	SPECIFIED OR SHOWN ON TH	IE DRAWINGS, USE THE FOL	LOWING PRESSURE CLAS	SSIFICATIONS FOR T	HE TYPES OF DUCTWORK LISTED.
4" (POS) CLASS::	ALL SUPPLY DUCTWORK BETWEEN THE DISCHARGE OF AIR SUPPLY UNITS TO THE INLETS OF SUPPLY TERMINAL VOLUME BOXES.				
	ALL MEDIUM PRESSURE EXHAUST AND RETURN SYSTEMS				
4" (NEG AND POS):	ALL MEDIUM PRESSURE EXP	HAUST AND RETURN SYSTEM	1S		

FOR ROUND DUCTWORK, NEGATIVE PRESSURE OVER 2"W.G., REFER TO SMACNA ROUND INDUSTRIAL DUCT CONSTRUCTION STANDARDS AND BUILD TO

MINIMUM DUCT INSULATION R-VALUES						
LOCATION	SUPPLY	RETURN	RAW OUTDOOR	EXHAUST		
LOCATION	SUPPLY	RETURN	AIR	W/ ENERGY RECOVERY	W/O ENERGY RECOVERY	
ATTIC TYPE SPACE (EXPOSED ROOF AREA)	R-8	R-8	R-4	R-8	R-6*	
OUTDOORS	R-8	R-8	-0-	R-8	R-8*	
UNCONDITIONED SPACE (SHAFT OR CEILING WITH DUCTED RETURNS)	R-5	R-5	R-4	R-5	-0-	
EXPOSED IN MECHANICAL ROOM	R-5	R-5	R-5	R-5	-0-	
EXPOSED IN ZONE SERVED (**ONLY DUCTS THAT PROVIDE COOLING)	R-4**	-0-	R-4	-0-	-0-	

* R-VALUE SHOWN IS ONLY IF AREA OF BUILDING BEING EXHAUSTED IS HUMIDIFIED. IF NOT HUMIDIFIED, NO INSULATION (-0-), UNLESS FIRE WRAP OR LINING IS

DUCT LINING SCOPE: ACOUSTIC DUCT LINING OF THE TYPE AND THICKNESS SPECIFIED SHALL BE INSTALLED ON ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK WITHIN 20 FEET OF ALL TYPES OF AIR HANDLING UNITS (INCLUDING RTU, ERV, FCU, ETC., AND ALL BRANCHES WITHIN 20') ALL FANS (INCLUDING BRANCHES), AND WHERE DETAILED OR SHOWN ON DRAWINGS.

- NOTES: (SEE SPECIFICATIONS FOR R-VALUES OF VARIOUS DUCT INSULATION AND LINERS)
- REFER TO SPECIFICATIONS AND DETAILS FOR ADDITIONAL INFORMATION.
- R-VALUES SHOWN MAY BE OBTAINED BY ADDING THE R-VALUES OF BOTH THE LINING (WHERE SHOWN OR USED) AND EXTERNAL DUCT INSULATION. R-VALUES SHOWN ARE AS INSTALLED. USE R-VALUES FOR 25% COMPRESSION FOR NON-RIGID INSULATION.

	MINIMUM INSULATION THICKNESS IN INCHES FOR INDOOR PIPE SIZES (SEE NOTES BELOW)						
PIPING SYSTEM TYPES	FLUID TEMPERATURE RANGE (°F)	<1"	1" & 1-1/4"	1-1/2" - 3"	4" - 6"	8" AND UP	K-FACTOR (BTU-INCH/°F-HR-SF) AT AVG TEMPERATURE (°F)
STEAM	251-350	3	4	4.5	4.5	1.5	0.29-0.32 @ 200°F
LOW PRESSURE STEAM OR ANY STEAM CONDENSATE	201-250	2.5	2.5	2.5	3	3	0.27-0.30 @ 150°F
LOW TEMPERATURE HEATING	141-200	1.5	1.5	2	2	2	0.25-0.29 @ 125°F
CHILLED WATER OR REFRIGERANT OR COOLING COIL CONDENSATE DRAIN	<60	0.5	1	1	1	1	0.20-0.27 @ 75°F

- 1 REFER TO SPECIFICATIONS AND DETAILS FOR ADDITIONAL INFORMATION.
- 2. FOR MINIMUM THICKNESS OF ALTERNATIVE INSULATION TYPES OUTSIDE THE STATED CONDUCTIVITY RANGE, SEE TEST METHOD FOR STEADY STATE HEAT TRANSFER PROPERTIES OF HORIZONTAL PIPE INSULATIONS, ASTM C 335-95, AND THE STATE ENERGY CODE.
- 3. FOR DUAL TEMPERATURE SYSTEMS (HEATING AND COOLING) USE THE THICKER INSULATION VALUE REQUIRED FOR EITHER HEATING OR COOLING AND PROVIDE VAPOR BARRIER JACKET.
- 4. FOR OUTDOOR CHILLED WATER AND GLYCOL ADD MINIMUM 50% TO THICKNESS LISTED. FOR OUTDOOR HEATING WATER ADD MINIMUM 50% TO THICKNESS LISTED. AN EXCEPTION TO THE 50% INCREASE IN THICKNESS IS ALLOWED FOR PIPING WITHIN RTU/AHU PIPE ENCLOSURES AND VESTIBULES.

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	21 Tuttle Rd. Bristol, CT 06010
	Waston (F) Sampaon

Weston & Sampsor Weston & Sampson Engineers, Inc.

100 Foxborough Boulevard Suite 250
Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

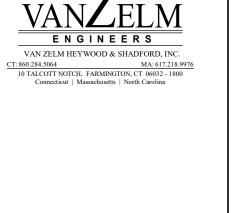
CONTRACT 2C20-064

Consultants:

QuisenberryArcariMalik 195 Scott Swamp Road Farmington, CT 06032 (860) 677-4594



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Revisions: Rev Date Description 1 4/15/2020 ADDENDUM #1

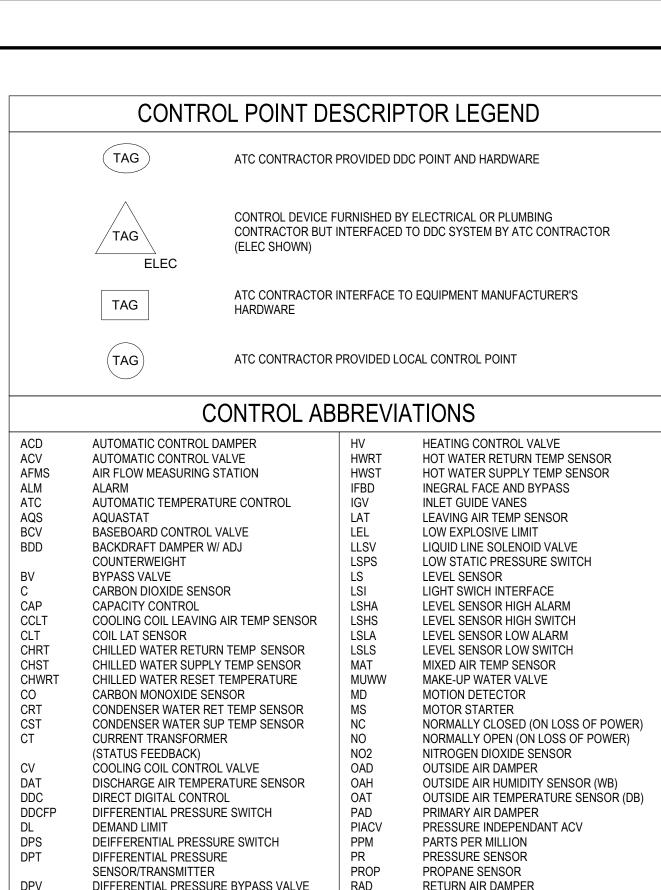
Issued For: ADDENDUM #1

April 15, 2020 Drawn By: Reviewed By: SEH Approved By: W&S Project No: 2191117

Drawing Title:

SCHEDULES

Sheet Number:



GENERAL ATC NOTES

TAD

VFDS

RETURN AIR HUMIDITY SENSOR

REHEAT CONTROL VALVE

RELATIVE HUMIDITY

SUPPLY AIR DAMPER

SMOKE DAMPER

SPEED CONTROL

START/STOP

THERMOSTAT

VFD SPFFD

SMOKE DETECTOR

SMOKE/FIRE DETECTOR

TRANSFER AIR DAMPER

TEMPERATURE SENSOR VARIABLE FREQUENCY DRIVE

VFD OUTPUT (FEEDBACK)

VIBRATION SWITCH

STATIC PRESSURE SENSOR

START/STOP HIGH SPEED/CAPACITY

START/STOP LOW SPEED/CAPACITY

SUPPLY SMOKE ISOLATION DAMPER

SUCTION STATIC PRESSURE SENSOR

RUN INDICATOR

RETURN AIR TEMPERATURE SENSOR

RETURN SMOKE ISOLATION DAMPER

DISCHARGE STATIC PRESSURE SENSOR

ELECTRONICALLY COMMUTATED MOTOR

FILTER DIFFERENTIAL PRESSURE SWITCH

HEATING COIL LEAVING AIR TEMP SENSOR

EXHAUST AIR DAMPER

FND SWITCH

FAULT ALARM

FLOW SWITCH

FRFF7FSTAT

HIGH EFFICIENCY

HOT GAS BYPASS

HAND SWITCH

ECM

ERW

HCV

HEGA

HEPA

HIH

ENTERING AIR TEMPERATURE

ENERGY RECOVERY WHEE

FLOW METER/TRANSMITTER

RELATIVE HUMIDITY SENSOR

HE GAS ABSORBER FILTER

HE PARTICULATE AIR FILTER

HIGH HUMIDITY LIMIT SENSOR

HIGH/LOW HUMIDITY LIMIT SENSOR

HANDS-OFF AUTOMATIC SWITCH

HIGH LIMIT PRESSURE SENSOR

HIGH STATIC PRESSURE SWITCH

HEATING COIL CONTROL VALVE

- PROVIDE NEW DDC AUTOMATIC TEMPERATURE CONTROL SYSTEM INCLUDING OPERATOR WORKSTATION. CONTROL SOFTWARE TO ALLOW GRAPHIC REPRESENTATION OF THE HVAC SYSTEM WITH "POINT AND CLICK" SELECTION OF ALL EQUIPMENT. ALL TEMPERATURE SETPOINT CHANGES, SCHEDULING, ETC. SHALL BE ADJUSTABLE THROUGH THE USE OF A MOUSE. PROVIDE GRAPHIC REPRESENTATION OF ALL FLOOR PLANS SHOWING HVAC EQUIPMENT, VALVES DAMPERS, TEMPERATURE SENSORS, HUMIDITY SENSORS, ETC.
- OPERATOR WORKSTATION SHALL CONSIST OF CURRENT GENERATION MULTI-CORE INTEL PROCESSOR OPERATING AT 2.4 GHZ MINIMUM SPEED. INCLUDE 2GB RAM AND A MINIMUM OF (1) 160GB/7200RPM HARD DISK DRIVE. PROVIDE A X16 PCIE GRAPHICS CARD, FOUR USB 2.0 PORTS, 100/1000 BASE-T NETWORK CARD, AND 16X DVD±RW DRIVE. PROVIDE 19IN. LCD FLAT SCREEN MONITOR.
- NEW DDC CONTROL SYSTEM SHALL BE CONNECTED TO AND CONTROL NEW AIR HANDLING UNITS, AIR COOLED CONDENSING UNITS, FANS, VAV TERMINAL UNITS, EXISTING PUMPS, ETC.
- OPERATOR WORKSTATION TO BE INSTALLED IN THE MAINTENANCE OFFICE. FINAL LOCATION TO BE DETERMINED BY THE OWNER. PROVIDE SECURITY ACCESS/PASSWORD PROGRAMMING FOR DDC CONTROL SYSTEM.
- ALL ATC CONTROLS SHALL BE HARDWIRED. NO WIRELESS TECHNOLOGY SHALL BE ALLOWED. ALL EXPOSED WIRING IN THE SHOPS, MAINTENANCE OR STORAGE AREAS SHALL BE INSTALLED IN MINIMUM 1/2 INCH GALVANIZED EMT
- INSTALL ALL NEW CONTROL WIRING FOR OFFICES AND OTHER SIMILAR OCCUPIED SPACES IN THE WALLS. WHERE WIRING WOULD BE EXPOSED IN THESE AREAS, THE WIRING SHALL BE INSTALLED IN WIRE MOLD.
- ALL DDC CONTROLLERS CONTROLLING THE H&V UNITS SHALL BE PROVIDED WITH AN OPERATOR DISPLAY/INTERFACE ALLOWING THE USER TO PERFORM OPERATIONS TASKS ON THE ATC SYSTEM. PROVIDE
- THE CONTRACTOR SHALL CARRY 16 HOURS OF ADDITIONAL ON-SITE PROGRAMMING (ABOVE BASE CONTRACT) TO ALLOW FOR FIELD MODIFICATIONS THAT MAY BE NEEDED TO OPTIMIZE THE VARIOUS SYSTEMS TO FULLY CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS, SEQUENCE OF CONTROLS AND WORK WITH THE ACTUAL OPERATING CONDITIONS AS INSTALLED. THIS WORK SHALL BE DONE AT NO ADDITIONAL COST,
- ON-SITE TRAINING SHALL ALSO INCLUDE A MINIMUM OF 24 HOURS OF HANDS ON INSTRUCTION GEARED TOWARD OPERATION AND MAINTENANCE OF THE SYSTEMS, PRIOR TO TRAINING, THE NECESSARY LESSON PLANS, TRAINING DOCUMENTS, HANDOUTS, ETC. SHALL BE PROVIDED WITH THE CURRICULUM OUTLINE, WHICH SHALL INCLUDE AS A
- a. INITIAL SESSION b. 2ND SESSION, 2 WEEKS LATER c. REMAINING 8 HRS TO BE SCHEDULED BY THE OWNER AS NEEDED.

TEST FORMS/NARRATIVES TO ENGINEER FOR REVIEW AND APPROVAL.

- 10. ALL TRAINING SHALL BE RECORDED AND COPIED TO DVD BY THE ATC CONTRACTOR. THREE COPIES OF THE RECORDED SESSIONS SHALL BE SUBMITTED TO THE OWNER FOR THEIR USE.
- . PROVIDE WIRING FROM ELECTRICAL SOURCE TO MISCELLANEOUS ATC DEVICES. REFER TO HVAC PLANS, HVAC
- MECHANICAL ROOM PLANS, AND ELECTRICAL PLANS FOR LOCATION OF POWER SOURCES FOR ATC SYSTEM. 12. SUBMIT ACCEPTANCE TESTING PLAN, PRE-FUNCTIONAL PERFORMANCE TEST FORMS/NARRATIVES AND FUNCTIONAL
- 3. PROVIDE DEMOLITION OF EXISTING CONTROL COMPONENTS WHICH ARE BEING REPLACED BY THE NEW ATC
- 14. ALL MOTOR RATED RELAYS FOR FANS, ETC. SHALL BE FURNISHED BY DIVISION 250000 AND TURNED OVER TO
- DIVISION 260000 FOR INSTALLATION. 15. THE HVAC SYSTEM SHALL BE INDEXED TO HEATING WHEN HOT WATER IS AVAILABLE (GENERALLY BETWEEN THE MONTHS OF OCTOBER AND APRIL). THE HVAC SYSTEM SHALL BE INDEXED TO COOLING WHEN DX IS AVAILABLE
- (GENERALLY BETWEEN THE MONTHS OF MAY AND SEPTEMBER). 16. LOCATION OF ALL NEW DDC CONTROL PANELS SHALL BE FIELD VERIFIED WITH THE EXISTING CONDITIONS BY THE

DDC MATRIX							
	DDC CONTROL	MATRIX	LOCATE ATC PANELS IN MECHANICAL ROOM.				
	EQUIPMENT	CONTROLS BY:	COORDINATE LOCATION OF PANELS.				

DDC CONTROL MATRIX				
EQUIPMENT	CONTROLS B			
CATEGORY	MFR	ATC		
STM HX		Х		
PUMPS		Χ		
AHU-X	Χ			
FAN COIL UNITS		Χ		
ERV-X	Χ			
EXHAUST FANS		Χ		
UH & CUH		Χ		

X

CONTRACTOR.

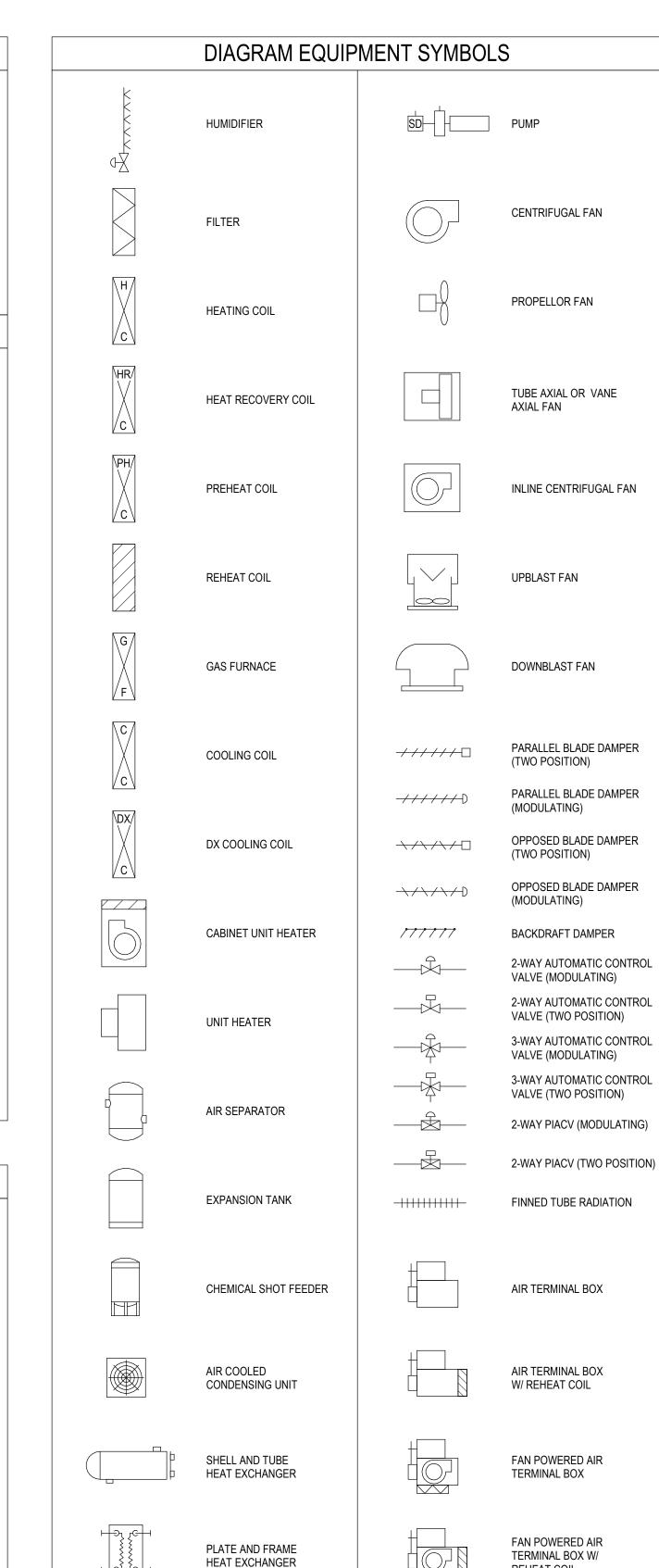
BOILERS

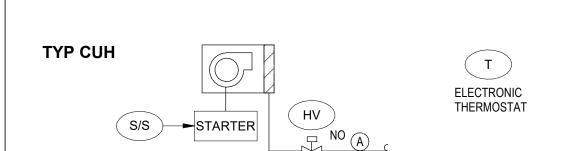
2. EQUIPMENT PROVIDED WITH PACKAGED CONTROL WILL BE PROVIDED WITH BACNET COMMUNICATION ACCESSORIES TO INTEGRATED INTO BMS. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ATC CONTRACTOR AND EQUIPMENT MANUFACTURERS.

GLOBAL POINTS



GLOBAL OUTDOOR AIR TEMPERATURE AND RELATIVE HUMIDITY SENSORS.



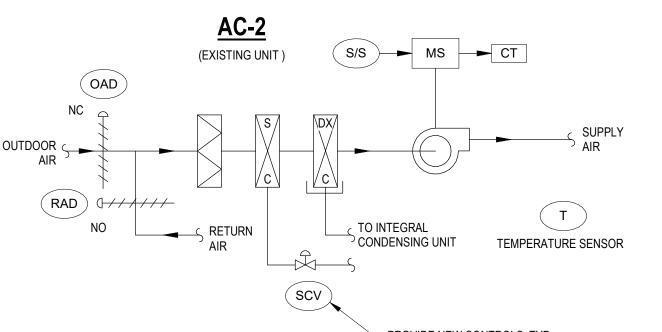


REHEAT COIL

CABINET UNIT HEATER CONTROLS

- CABINET UNIT HEATER SHALL BE STARTED AND STOPPED VIA ELECTRONIC THERMOSTAT.
- ALL SETPOINTS SHALL BE ADJUSTABLE.
- 3. MOTOR RATED RELAYS SHALL BE PROVIDED TO INTERFACE MANUAL MOTOR STARTER WITH CONTROL WIRING TO SATISFY CONTROL SEQUENCE.
- 4. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.
- THE UNIT HEATER FAN SHALL BE DE-ENERGIZED. UPON A DROP IN SPACE TEMPERATURE BELOW THE SETPOINT OF 60°F (ADJ), THE CONTROL VALVE (HV) SHALL OPEN AND FLOW SHALL BE PROVEN BY THE AQUASTAT PRIOR TO THE FAN BEING ENERGIZED.
- 2. THE OPPOSITE SHALL OCCUR ON A RISE IN SPACE TEMPERATURE ABOVE 62°F (ADJ).
- 3. THE CONTROL VALVE (HV) SHALL BE LOCKED OUT IF THE BAS IS INDEXED TO COOLING.

CABINET UNIT HEATER CONTROL SEQUENCE



AIR HANDLING UNIT (AC-2) SHALL BE STARTED AND STOPPED BY A NEW DDC CONTROLLER, EXISTING AAON CONTROLS TO REMAIN AND BE REUSED. PROVIDE NEW BMS GATEWAY AS REQUIRED.

- REPLACE ALL OF THE EXISTING PNUEMATIC CONTROLS/ACTUATORS WITH ELECTRONIC AS REQUIRED AND PROVIDE ALL NEW ATC POINTS AND RELAYS AS REQUIRED TO MEET THE CONTROL SEQUENCES.
- ALL SETPOINTS SHALL BE ADJUSTABLE. ALL NEW ACTUATORS SHALL BE ELECTRONIC. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.
- LOCAL HAND-OFF-AUTOMATIC SWITCH (H-O-A) FOR FANS SHALL OVERRIDE DDC START/STOP COMMANDS. ALL HARDWIRED SAFETIES SHALL BE ACTIVE IN BOTH "H" AND "A" POSITIONS.
- PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM (FAN, VALVES, DAMPERS, ETC.) WITH REAL TIME UPDATING OF CONDITIONS (STATUS, TEMPERATURE, ETC.).
- CONDENSING UNIT.

COMPRESSOR SAFETIES SHALL REMAIN ON THE EXISTING INTEGRAL

- WHILE DE-ENERGIZED (OR OFF ON SAFETY OR MANUAL DISCONNECT) AHU SHALL BE OFF WITH THE OAD AND STEAM CONTROL VALVE (SCV) CLOSED. THE RAD SHALL BE OPEN.
- WHEN COMMANDED TO START, THE AHU OAD AND RAD SHALL MODULATE OPEN TO THEIR MINIMUM POSITION. THE AHU SUPPLY FAN SHALL START. THE SPACE TEMPERATURE SENSOR SHALL MODULATE THE SCV TO MAINTAIN THE SPACE TEMPERATURE SET POINT. THE AHU SUPPLY FAN SHALL RUN CONTINUOUSLY.
- WHEN THE OUTDOOR AIR ENTHALPY IS BELOW THE SETPOINT OF 27.0 BTU/LBM (ADJ), OUTDOOR AND RETURN AIR DAMPERS SHALL BE PROPORTIONALLY MODULATED UP TO 100% OUTDOOR AIR TO MAINTAIN SET POINT. THE REVERSE SHALL OCCUR ON A DROP BELOW THE COOLING SUPPLY AIR TEMPERATURE SET POINT.
- THE SUPPLY AIR TEMPERATURE SHALL BE LIMITED TO 55°F AND SHALL NOT RESULT IN A REDUCTION BELOW THE MINIMUM OUTDOOR AIRFLOW.

(RAD) (//////

AIR HANDLING UNIT (AC-1) SHALL BE STARTED AND STOPPED BY A NEW

REPLACE ALL OF THE EXISTING PNUEMATIC CONTROLS/ACTUATORS WITH

DDC CONTROLLER, EXISTING TRANE CONTROLS TO REMAIN AND BE

ELECTRONIC AS REQUIRED AND PROVIDE ALL NEW ATC POINTS AND

ALL SETPOINTS SHALL BE ADJUSTABLE. ALL NEW ACTUATORS SHALL BE

LOCAL HAND-OFF-AUTOMATIC SWITCH (H-O-A) FOR FANS SHALL OVERRIDE

DDC START/STOP COMMANDS. ALL HARDWIRED SAFETIES SHALL BE

COMPRESSOR SAFETIES SHALL REMAIN ON THE EXISTING OUTDOOR

WHILE DE-ENERGIZED (OR OFF ON SAFETY OR MANUAL DISCONNECT) AHU

WHEN COMMANDED TO START, THE AHU OAD AND RAD SHALL MODULATE

OPEN TO THEIR MINIMUM POSITION. THE AHU SUPPLY FAN SHALL START

MAINTAIN THE SPACE TEMPERATURE SET POINT. THE AHU SUPPLY FAN

THE SPACE TEMPERATURE SENSOR SHALL MODULATE THE SCV TO

WHEN THE OUTDOOR AIR ENTHALPY IS BELOW THE SETPOINT OF 27.0

THE SUPPLY AIR TEMPERATURE SHALL BE LIMITED TO 55°F AND SHALL NOT RESULT IN A REDUCTION BELOW THE MINIMUM OUTDOOR AIRFLOW.

PROPORTIONALLY MODULATED UP TO 100% OUTDOOR AIR TO MAINTAIN

SET POINT. THE REVERSE SHALL OCCUR ON A DROP BELOW THE COOLING

BTU/LBM, OUTDOOR AND RETURN AIR DAMPERS SHALL BE

SHALL BE OFF WITH THE OAD AND STEAM CONTROL VALVE (SCV) CLOSED.

ELECTRONIC. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.

PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM (FAN, VALVES, DAMPERS, ETC.) WITH REAL TIME UPDATING OF CONDITIONS (STATUS,

REUSED. PROVIDE NEW BMS GATEWAY AS REQUIRED.

RELAYS AS REQUIRED TO MEET THE CONTROL SEQUENCES.

ACTIVE IN BOTH "H" AND "A" POSITIONS.

TEMPERATURE, ETC.).

THE RAD SHALL BE OPEN.

SHALL RUN CONTINUOUSLY.

SUPPLY AIR TEMPERATURE SET POINT.

CONDENSING UNIT.

—PROVIDE NEW CONTROLS, TYP

THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLY FAN SHALL RUN CONTINUOUSLY AND MODULATE TO MAINTAIN SPACE SETPOINT OF 76°F (ADJ). UPON A RISE IN SPACE TEMPERATURE ABOVE THE COOLING SETPOINT OF 76°F (ADJ), THE MECHANICAL COOLING SHALL STAGE AS REQUIRED TO MAINTAIN THE SPACE SETPOINT.

THE UNIT SHALL BE OFF, THE STEAM CONTROL VALVE (SCV) SHALL BE CLOSED, NO MECHANICAL COOLING SHALL BE PROVIDED.

OCCUPIED HEATING MODE THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLY FAN SHALL RUN CONTINUOUSLY. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 72°F (ADJ). THE SCV SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE.

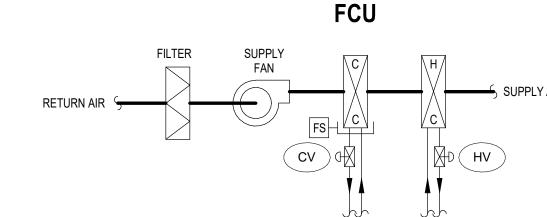
THE OAD SHALL BE CLOSED AND RAD SHALL BE OPEN. THE SUPPLY FAN SHALL BE DE-ENERGIZED. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 55°F (ADJ), THE SCV SHALL OPEN 100% AND THE SUPPLY FAN SHALL BE ENERGIZED. WHEN THE SPACE TEMPERATURE REACHES 65°F (ADJ), THE SUPPLY FAN SHALL DE-ENERGIZE AND SCV

SHALL CLOSE.

EXISTING AIR HANDLING UNIT (AC-2)

THE FOLLOWING SAFETIES SHALL SHUT DOWN THE H&V UNIT. A. UPON A FAILURE OF THE AHU SUPPLY FAN AS SENSED BY THE CURRENT SENSOR, A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. THE AHU SHALL BE DE-ENERGIZED, THE OAD SHALL BE CLOSED, AND THE RAD SHALL BE OPEN.

1. IF SUPPLY FAN FAILS OR ANY SAFETY IS TRIPPED. THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.



FAN COIL UNIT CONTROLS

- FAN COIL UNIT SHALL BE CONTROLELD VIA DDC CONTROLLER (PROVIDED BY THE BAS CONTRACTOR).
- COORDINATE OCCUPIED/UNOCCUPIED SCHEDULE WITH OWNER...
- ALL SETPOINTS SHALL BE ADJUSTABLE. ALL ACTUATORS SHALL BE ELECTRONIC.
- MOTOR RATED RELAYS SHALL BE PROVIDED TO INTERFACE MANUAL

PROVIDE PIACY TYPE VALVE FOR HEATING AND COOLING COILS.

- MOTOR STARTER WITH CONTROL WIRING TO SATISFY CONTROL
- 6. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.
- 7. FAN COIL UNIT SHALL BE INDEXED TO HEATING/COOLING BY THE BAS. 8. PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM (FCU, VALVES, SENSORS, ETC.) WITH REAL TIME UPDATING OF CONDITIONS (STATUS,
- 9. PROVIDE FLOAT SWITCH (FS) IN COOLING COIL DRAIN PAN.

TEMPERATURE, MODE, ETC.).

- WHILE IN OCCUPIED MODE, THE SUPPLY FAN SHALL BE OFF AND THE HEATING VALVE (HV) AND COOLING VALVE (CV) SHALL BE CLOSED.
- WHILE IN UNOCCUPIED MODE, THE SUPPLY FAN SHALL BE OFF AND THE HEATING VALVE (HV) AND COOLING VALVE (CV) SHALL BE CLOSED. THE FAN COIL UNIT SHALL HAVE AN ECM TYPE MOTOR WITH SPEED
- CONTROLLER. SPEED CONTROLLER SHALL BE CONTROLLED BY THE BAS. OCCUPIED HEATING CONTROL (IF INDEXED TO HEATING BY THE BAS)
- THE 2-WAY COOLING CONTROL VALVE (CV) SHALL BE CLOSED AND LOCKED OUT WHILE THE BAS IS INDEXED TO HEATING. END SWITCH SHALL PROVE THE VALVE IS CLOSED PRIOR TO ENTERING HEATING MODE.
- UPON A CALL FOR HEATING FROM THE SPACE TEMPERATURE SENSOR (T), THE FAN SHALL BE ENERGIZED TO LOW SPEED AND THE 2-WAY HEATING CONTROL VALVE (HV) SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT OF 70°F (ADJ).

IF ADDITIONAL HEATING IS REQUIRED AND THE HEATING CONTROL VALVE

IS 100% OPEN, THE BAS SHALL INCREASE THE SPEED OF THE FAN AS

REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT OF 70°F 4. THE REVERSE SHALL OCCUR UPON A RISE IN ROOM TEMPERATURE ABOVE

<u>UNOCCUPIED HEATING CONTROL (IF INDEXED TO HEATING BY THE BAS)</u> THE 2-WAY COOLING CONTROL VALVE (CV) SHALL BE CLOSED AND LOCKED OUT WHILE THE BAS IS INDEXED TO HEATING. END SWITCH SHALL PROVE THE VALVE IS CLOSED PRIOR TO ENTERING HEATING MODE.

- UPON A CALL FOR HEATING FROM THE SPACE TEMPERATURE SENSOR (T) THE FAN SHALL BE ENERGIZED TO HIGH SPEED AND THE 2-WAY HEATING CONTROL VALVE (HV) SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT OF 65°F (ADJ).
- THE REVERSE SHALL OCCUR UPON A RISE IN ROOM TEMPERATURE.
- OCCUPIED COOLING CONTROL (IF INDEXED TO COOLING BY THE BAS) 1. THE 2-WAY HEATING CONTROL VALVE (HV) SHALL BE CLOSED AND LOCKED OUT WHILE THE BAS IS INDEXED TO COOLING. END SWITCH SHALL PROVE THE VALVE IS CLOSED PRIOR TO ENTERING COOLING MODE.
- 2. UPON A CALL FOR COOLING FROM THE SPACE TEMPERATURE SENSOR (T), THE FAN SHALL BE ENERGIZED TO LOW SPEED AND THE 2-WAY COOLING CONTROL VALVE (CV) SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT OF 74°F (ADJ).
- 3. IF ADDITIONAL COOLING IS REQUIRED AND THE COOLING CONTROL VALVE IS 100% OPEN, THE BAS SHALL INCREASE THE SPEED OF THE FAN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT OF 74°F
- 4. THE REVERSE SHALL OCCUR UPON A DROP IN ROOM TEMPERATURE

BELOW 72°F (ADJ).

WORKSTATION.

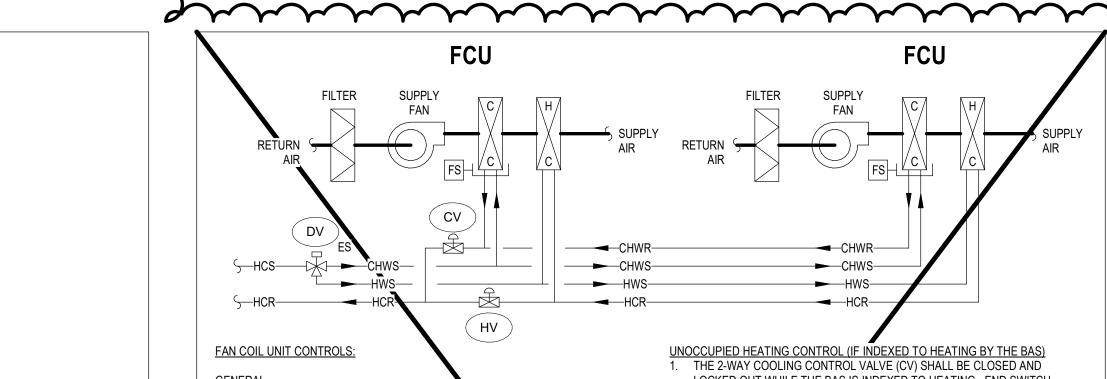
UNOCCUPIED COOLING CONTROL (IF INDEXED TO COOLING BY THE BAS) THE UNIT SHALL BE OFF, THE HEATING AND COOLING CONTROL VALVES SHALL BE CLOSED.

- WHEN THE FLOAT SWITCH (FS) IN THE DRAIN PAN DETECTS A HIGH WATER LEVEL, THE COOLING COIL CONTROL VALVE (CV) SHALL CLOSE.
- 1. IF THE SUPPLY FAN FAILS OR IF ANY SAFETY IS TRIPPED, A DETAILED
- ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. IF, DURING THE OCCUPIED MODE, THE TEMPERATURE SENSOR (T) SENSES A TEMPERATURE MORE THAN 5°F ABOVE OR BELOW THE SETPOINT FOR MORE THAN 5 MINUTES (ADJ), THE BAS SHALL GIVE A DETAILED ROOM

"HIGH" OR "LOW" TEMPERATURE ALARM SIGNAL TO THE OPERATOR

3. IF THE TEMPERATURE FALLS BELOW 50°F (ADJ) FOR MORE THAN 5 MINUTES (ADJ), THE BAS SHALL GIVE A DETAILED ALARM SIGNAL TO THE OPERATOR WORKSTATION.

SINGLE FAN COIL UNIT



7. FAN COIL UNIT SHALL BE INDEXED TO HEATING/COOLING BY THE BAS.

WHILE IN OCCUPIED MODE, THE SUPPLY FAN SHALL BE OFF AND THE

WHILE IN UNOCCUPIED MODE, THE SUPPLY FAN SHALL BE OFF AND THE

CONTROLLER. SPEED CONTROLLER SHALL BE CONTROLLED BY THE BAS.

THE 3-WAY DIVERTER VALVE (DV) SHALL BE OPEN TO THE HW COILS WHILE

THE BAS IS INDEXED TO HEATING. END SWITCH SHALL PROVE THE VALVE

UPON A CALL FOR HEATING FROM THE SPACE TEMPERATURE SENSOR (T),

THE FAN SHALL BE ENERGIZED TO LOW SPEED AND THE 2-WAY HEATING

3. IF ADDITIONAL HEATING IS REQUIRED AND THE HEATING CONTROL VALVE

IS 100% OPEN, THE BAS SHALL INCREASE THE SPEED OF THE FAN AS

REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT OF 70°F

4. THE REVERSE SHALL OCCUR UPON A RISE IN ROOM TEMPERATURE ABOVE

CONTROL VALVE (HV) SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN

HEATING VALVE (HV) AND COOLING VALVE (CV) SHALL BE CLOSED.

HEATING VALVE (HV) AND COOLING VALVE (CV) SHALL BE CLOSED.

3. THE FAN COIL UNIT SHALL HAVE AN ECM TYPE MOTOR WITH SPEED

OCCUPIED HEATING CONTROL (IF INDEXED TO HEATING BY THE BAS)

POSITION PRIOR TO ENTERING HEATING MODE.

THE SPACE TEMPERATURE SETPOINT OF 70°F (ADJ).

(ADJ)

9. PROVIDE FLOAT SWITCH (FS) IN COOLING COIL DRAIN PAN.

- 2. COORDINATE OCCUPIED/UNOCCUPIED SCHEDULE WITH OWNER..
- ELECTRONIC.
- 4. PROVIDE PIACV TYPE VALVE FOR HEATING AND COOLING COILS.
- 5. MOTOR RATED RELAYS SHALL BE PROVIDED TO INTERFACE MANUAL MOTOR STARTER WITH CONTROL WIRING TO SATISFY CONTROL
- 6. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.

TEMPERATURE, MODE, ETC.).

THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLY FAN SHALL RUN CONTINUOUSLY. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 72°F (ADJ), THE SCV SHALL MODULATE

TEMPERATURE SENSOR

I. THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLY FAN

SETPOINT OF 76°F (ADJ). UPON A RISE IN SPACE TEMPERATURE ABOVE

THE COOLING SETPOINT OF 76°F (ADJ), THE MECHANICAL COOLING SHALL

SHALL RUN CONTINUOUSLY AND MODULATE TO MAINTAIN SPACE

STAGE AS REQUIRED TO MAINTAIN THE SPACE SETPOINT.

I. THE UNIT SHALL BE OFF AND THE DX COOLING SHALL BE OFF.

OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE.

SHALL BE DE-ENERGIZED. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 55°F (ADJ), THE SCV SHALL OPEN 100% AND THE SUPPLY FAN SHALL BE ENERGIZED. WHEN THE SPACE TEMPERATURE

EXISTING AIR HANDLING UNIT (AC-1)

CONDENSING UNIT

-PROVIDE NEW CONTROLS, TYP

JNOCCUPIED COOLING MODE

A. UPON A FAILURE OF THE AHU SUPPLY FAN AS SENSED BY THE CURRENT SENSOR, A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. THE AHU SHALL BE DE-ENERGIZED,

SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.

THE OAD SHALL BE CLOSED AND RAD SHALL BE OPEN. THE SUPPLY FAN REACHES 65°F (ADJ), THE SUPPLY FAN SHALL DE-ENERGIZE AND HV SHALL I. THE FOLLOWING SAFETIES SHALL SHUT DOWN THE H&V UNIT.

THE OAD SHALL BE CLOSED, AND THE RAD SHALL BE OPEN.

IF SUPPLY FAN FAILS OR ANY SAFETY IS TRIPPED. THE DDC CONTROLLER

LOCKED OUT WHILE THE BAS IS INDEXED TO HEATING. END SWITCH FAN COIL UNIT SHALL BE CONTROLELD VIA DDC CONTROLLER (PROVIDED SHALL PROVE THE VALVE IS CLOSED PRIOR TO ENTERING HEATING MODE. BY THE BAS CONTRACTOR). 2. UPON A CALL FOR HEATING FROM THE SPACE TEMPERATURE SENSOR (T), 3. ALL SETPOINTS SHALL BE ADJUSTABLE. ALL ACTUATORS SHALL BE THE SPACE TEMPERATURE SETPOINT OF 65°F (ADJ).

THE FAN SHALL BE ENERGIZED TO HIGH SPEED AND THE 2-WAY HEATING CONTROL VALVE (HV) SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN 3. THE REVERSE SHALL OCCUR UPON A RISE IN ROOM TEMPERATURE.

OCCUPIED COOLING CONTROL (IF INDEXED TO COOLING BY THE BAS) 1. THE 3-WAY DIVERTER VALVE (DV) SHALL BE OPEN TO THE CHW COILS WHILE THE BAS IS INDEXED TO COOLING. END SWITCH SHALL PROVE THE VALVE POSITION PRIOR TO ENTERING COOLING MODE. UPON A CALL FOR COOLING FROM THE SPACE TEMPERATURE SENSOR (T),

CONTROL VALVE (CV) SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN 8. PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM NOT IN CONTRACT URE SETPOINT OF 74°F (ADJ).
SENSORS, ETC.) WITH REAL TIME UPDATING OF CC. IS REQUIRED AND THE COOLING CONTROL VALVE IS 100% OPEN, THE BAS SHALL INCREASE THE SPEED OF THE FAN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT OF 74°F

> 4. THE REVERSE SHALL OCCUR UPON A DROP IN ROOM TEMPERATURE BELOW 72°F (ADJ).

UNOCCUPIED COOLING CONTROL (IF INDEXED TO COOLING BY THE BAS)

SHALL BE CLOSED. 1. WHEN THE FLOAT SWITCH (FS) IN THE DRAIN PAN DETECTS A HIGH WATER LEVEL, THE COOLING COIL CONTROL VALVE (CV) SHALL CLOSE.

1. IF THE SUPPLY FAN FAILS OR IF ANY SAFETY IS TRIPPED, A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.

IF, DURING THE OCCUPIED MODE, THE TEMPERATURE SENSOR (T) SENSES A TEMPERATURE MORE THAN 5°F ABOVE OR BELOW THE SETPOINT FOR MORE THAN 5 MINUTES (ADJ), THE BAS SHALL GIVE A DETAILED ROOM "HIGH" OR "LOW" TEMPERATURE ALARM SIGNAL TO THE OPERATOR

3. IF THE TEMPERATURE FALLS BELOW 50°F (ADJ) FOR MORE THAN 5 MINUTES (ADJ). THE BAS SHALL GIVE A DETAILED ALARM SIGNAL TO THE OPERATOR WORKSTATION.

CLASSROOM FAN COIL UNIT

Revisions: Rev Date Description 4/15/2020 ADDENDUM #1 THE FAN SHALL BE ENERGIZED TO LOW SPEED AND THE 2-WAY COOLING Issued For: THE UNIT SHALL BE OFF, THE HEATING AND COOLING CONTROL VALVES Drawn By: Reviewed By: Drawing Title:

W&S Project No: 2191117

ADDENDUM #1

April 15, 2020

CONTRACT 2C20-064

MECH IMPROVEMENTS AT

SOUTH SIDE ELEMENTARY

SCHOOL BRISTOL, CT

21 Tuttle Rd.

Bristol, CT 06010

Weston(&)Sampso

Weston & Sampson Engineers, Inc

100 Foxborough Boulevard Suite 250

Foxborough, MA 02035

(508) 698-3034 (800) SAMPSON

www.westonandsampson.com

QuisenberryArcariMalik

195 Scott Swamp Road

Farmington, CT 06032

(860) 677-4594

qamarch.com

ENGINEERS

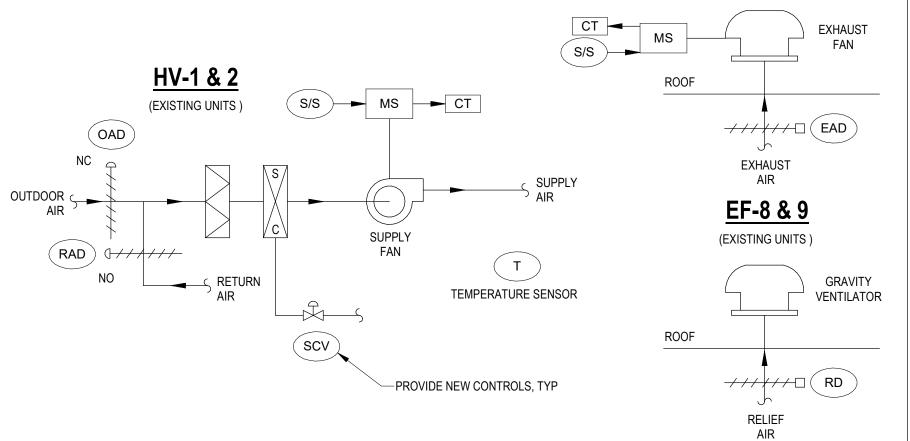
VAN ZELM HEYWOOD & SHADFORD, IN

T: 860.284.5064 MA: 617.218.9 10 TALCOTT NOTCH, FARMINGTON, CT 06032 - 1800

Consultants:

CONTROLS

Sheet Number:



EXISTING HEATING AND VENTILATION UNITS (HV-1 & 2)

SENSOR, TYP-

ISOLATION VALVE, TYP-

SWITCHES FOR BOTH CYCLES TO PROVE VALVE IS IN THE FULL HEATING

ON A CALL FOR HEATING OR COOLING FROM ANY SPACE THERMOSTAT,

OPERATION. IF SPACES IN THE SAME ZONE ARE CALLING FOR COOLING +

NUMBER OF SPACES ARE CALLING FOR HEATING AND COOLING IN THE

SAME ZONE AT THE SAME TIME, THE MODE (HEATING OR COOLING) WITH

HEATING AT THE SAME TIME, THE MAJORITY CALL PREVAILS. IF THE SAME

THE 3-WAY VALVE SHALL POSITION FOR THE APPROPRIATE 2-PIPE

THE GREATEST SUMMED OFFSET FROM SETPOINT PREVAILS.

UNTIL A CALL FOR THE OPPOSITE MODE.

SYSTEM SHALL REMAIN IN IT'S CURRENT HEATING OR COOLING MODE

EACH INDIVIDUAL 2-PIPE SYSTEM SHALL BE EITHER IN HEATING OR

OR FULL COOLING MODE.

COOLING MODE.

NORMAL OPERATIONS

. HEATING AND VENTILATION UNITS (HV-1 & 2) AND ASSOCIATED EXHAUST FANS (EF-8 & 9, RESPECTIVELY) SHALL BE STARTED AND STOPPED BY A NEW DDC CONTROLLER, EXISTING CONTROLS TO REMAIN AND BE REUSED. PROVIDE NEW BMS GATEWAY AS REQUIRED.

- REPLACE ALL OF THE EXISTING PNUEMATIC CONTROLS/ACTUATORS WITH ELECTRONIC AS REQUIRED AND PROVIDE ALL NEW ATC POINTS AND RELAYS AS REQUIRED TO MEET THE CONTROL SEQUENCES.
- . ALL SETPOINTS SHALL BE ADJUSTABLE. ALL NEW ACTUATORS SHALL BE ELECTRONIC. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT. 4. LOCAL HAND-OFF-AUTOMATIC SWITCH (H-O-A) FOR FANS SHALL OVERRIDE
- 5. PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM (FAN, VALVES, DAMPERS, ETC.) WITH REAL TIME UPDATING OF CONDITIONS (STATUS, TEMPERATURE, ETC.).

ACTIVE IN BOTH "H" AND "A" POSITIONS.

DDC START/STOP COMMANDS. ALL HARDWIRED SAFETIES SHALL BE

- FAN CONTROL WHILE DE-ENERGIZED (OR OFF ON SAFETY OR MANUAL DISCONNECT) HV SHALL BE OFF WITH THE OAD, EAD, AND STEAM CONTROL VALVE (SCV) CLOSED. THE RAD SHALL BE OPEN.
- WHEN COMMANDED TO START, THE HV OAD AND RAD SHALL MODULATE OPEN TO THEIR MINIMUM POSITION, EAD SHALL OPEN. THE HV SUPPLY FAN AND THE EXHAUST FAN SHALL START. THE SPACE TEMPERATURE SENSOR SHALL MODULATE THE SCV TO MAINTAIN THE SPACE TEMPERATURE SET POINT. THE HV SUPPLY FAN SHALL RUN CONTINUOUSLY.
- WHEN THE OUTDOOR AIR IS BETWEEN 50°F AND 60°F (ADJ), OUTDOOR AND RETURN AIR DAMPERS SHALL BE PROPORTIONALLY MODULATED UP TO 100% OUTDOOR AIR TO MAINTAIN SET POINT. THE RELIEF DAMPER (RD) SHALL BE OPEN.
- 2. IF THE SPACE TEMPERATURE DROPS 5°F BELOW SETPOINT WHILE IN ECONOMIZER MODE. THE SYSTEM SHALL RETURN TO OCCUPIED MODE.

. NO COOLING IS AVAILABLE.

- THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING, THE EAD SHALL BE OPEN, AND RD SHALL BE CLOSED. THE HV SUPPLY FAN SHALL RUN CONTINUOUSLY. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 72°F (ADJ), THE SCV SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE.
- THE OAD SHALL BE CLOSED AND RAD SHALL BE OPEN. THE SUPPLY FAN SHALL BE DE-ENERGIZED. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 55°F (ADJ), THE SCV SHALL OPEN 100% AND THE SUPPLY FAN SHALL BE ENERGIZED. WHEN THE SPACE TEMPERATURE REACHES 65°F (ADJ), THE SUPPLY FAN SHALL DE-ENERGIZE AND HV SHALL

THE FOLLOWING SAFETIES SHALL SHUT DOWN THE H&V UNIT. A. UPON A FAILURE OF THE HV SUPPLY FAN AS SENSED BY THE CURRENT SENSOR, A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. THE AHU SHALL BE DE-ENERGIZED, THE OAD SHALL BE CLOSED, AND THE RAD SHALL BE OPEN.

SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE

- WHILE DE-ENERGIZED (OR OFF ON SAFETY OR MANUAL DISCONNECT) HV SHALL BE OFF WITH THE OAD AND STEAM CONTROL VALVE (SCV) CLOSED. THE RAD SHALL BE OPEN. 1. IF SUPPLY FAN FAILS OR ANY SAFETY IS TRIPPED, THE DDC CONTROLLER WHEN COMMANDED TO START, THE HV OAD AND RAD SHALL MODULATE
 - WHEN THE OUTDOOR AIR IS BETWEEN 50°F AND 60°F (ADJ) AND THE KITCHEN EXHUAST FANS ARE OPERATING, OUTDOOR AND RETURN AIR DAMPERS SHALL BE PROPORTIONALLY MODULATED UP TO 100% OUTDOOR AIR TO MAINTAIN SET POINT.

(EXISTING UNIT)

OUTDOOR _

 $(\mathsf{RAD}\)$ $\bigcirc{\hspace{-0.05cm}\mid\hspace{-0.05cm}} {}/{}/{}/{}/{}/{}/{}/{}/{}$

HEATING AND VENTILATION UNITS (HV-1 & 2) AND ASSOCIATED EXHAUST

NEW DDC CONTROLLER. EXISTING CONTROLS TO REMAIN AND BE

ELECTRONIC AS REQUIRED AND PROVIDE ALL NEW ATC POINTS AS

B. ALL SETPOINTS SHALL BE ADJUSTABLE. ALL NEW ACTUATORS SHALL BE

4. LOCAL HAND-OFF-AUTOMATIC SWITCH (H-O-A) FOR FANS SHALL OVERRIDE

DDC START/STOP COMMANDS. ALL HARDWIRED SAFETIES SHALL BE

DAMPERS, ETC.) WITH REAL TIME UPDATING OF CONDITIONS (STATUS,

OPEN TO THEIR MINIMUM POSITION, EAD SHALL OPEN. THE HV SUPPLY

THE SCV TO MAINTAIN THE SPACE TEMPERATURE SET POINT. THE HV

FAN SHALL START. THE SPACE TEMPERATURE SENSOR SHALL MODULATE

ELECTRONIC. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.

5. PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM (FAN, VALVES,

REUSED. PROVIDE NEW BMS GATEWAY AS REQUIRED.

REQUIRED TO MEET THE CONTROL SEQUENCES.

ACTIVE IN BOTH "H" AND "A" POSITIONS.

SUPPLY FAN SHALL RUN CONTINUOUSLY.

TEMPERATURE, ETC.).

FANS (EF-8 & 9, RESPECTIVELY) SHALL BE STARTED AND STOPPED BY A

2. IF THE SPACE TEMPERATURE DROPS 5°F BELOW SETPOINT WHILE IN ECONOMIZER MODE, THE SYSTEM SHALL RETURN TO OCCUPIED MODE

STOPPED BY A NEW DDC CONTROLLER, EXISTING BURNER CONTROLS TO

REMAIN AND BE REUSED. PROVIDE NEW BMS GATEWAY AS REQUIRED.

. REPLACE ALL OF THE EXISTING PNUEMATIC CONTROLS/ACTUATORS WITH

ELECTRONIC AS REQUIRED AND PROVIDE ALL NEW ATC POINTS AS

3. ALL SETPOINTS SHALL BE ADJUSTABLE. ALL ACTUATORS SHALL BE

ELECTRONIC. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.

4. PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM WITH REAL TIME

REQUIRED TO MEET THE CONTROL SEQUENCES.

NO COOLING IS AVAILABLE.

PROVIDE NEW CONTROLS, TYP

OCCUPIED HEATING MODE

1. THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING, AND THE EAD SHALL BE OPEN. THE HV SUPPLY FAN SHALL RUN CONTINUOUSLY. UPON A REPLACE ALL OF THE EXISTING PNUEMATIC CONTROLS/ACTUATORS WITH DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 72°F (ADJ), THE SCV SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE.

TEMPERATURE SENSOR

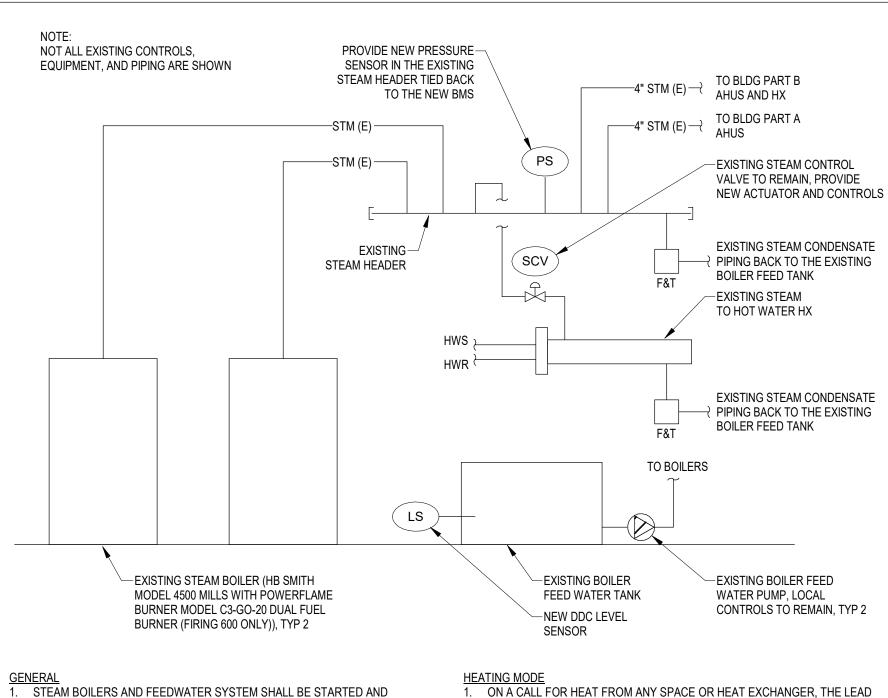
UNOCCUPIED HEATING MODE THE OAD SHALL BE CLOSED AND RAD SHALL BE OPEN. THE SUPPLY FAN SHALL BE DE-ENERGIZED. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 55°F (ADJ), THE SCV SHALL OPEN 100% AND THE SUPPLY FAN SHALL BE ENERGIZED. WHEN THE SPACE TEMPERATURE REACHES 65°F (ADJ), THE SUPPLY FAN SHALL DE-ENERGIZE AND HV SHALL

THE FOLLOWING SAFETIES SHALL SHUT DOWN THE H&V UNIT. A. UPON A FAILURE OF THE HV SUPPLY FAN AS SENSED BY THE CURRENT SENSOR, A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. THE AHU SHALL BE DE-ENERGIZED,

1. IF SUPPLY FAN FAILS OR ANY SAFETY IS TRIPPED, THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE

THE OAD SHALL BE CLOSED, AND THE RAD SHALL BE OPEN.

EXISTING HEATING AND VENTILATION UNITS (HV-3)



- 3-WAY VALVES SHALL BE 2-POSITION. SUPPLY SIDE SHALL BE MIXING WHEN 1 OR MORE OF THE SPACE THERMOSTATS CHANGES IT'S CALL TYPE, RETURN SIDE SHALL BE DIVERTING TYPE. VALVES SHALL HAVE END-
 - **REQUIREMENTS OF IECC 2015:** a. A MINIMUM OF 4-HOURS SHALL PASS FROM THE TIME OF THE 1st THERMOSTATES CALL AND CHANGEOVER IS INITIATED.
 - b. A SUPPLY OR RETURN TEMPERATURE SENSOR SHALL READ NO MORE THEN 30F OF TEMPERATURE TEMPERATURE SETPOINT.
 - SHOULD A 3-WAY VALVE END SWITCH FAIL TO MAKE, SYSTEM SHALL ALARM "FAILED 3-WAY CHANGEOVER VALVE." 2. IF THE 2-PIPE SYSTEM SUPPLY TEMPERATURE VARY MORE THAN 5F (ADJ)
 - FROM THE SUPPLY TEMPERATURE OF THE 4-PIPE SUPPLY TEMPERATURE IT IS DRAWING FROM, SYSTEM SHALL ALARM "LEAKING 3-WAY CHANGEOVER VALVE".

HW & CHW 3-WAY VALVE CONTROL SEQUENCE

FROM HEATING TO COOLING (OR VISA VERSA) THE SYSTEM SHALL MEET 2 CONDITIONS PRIOR TO INITIATING CHANGEOVER IN ORDER TO MEET THE

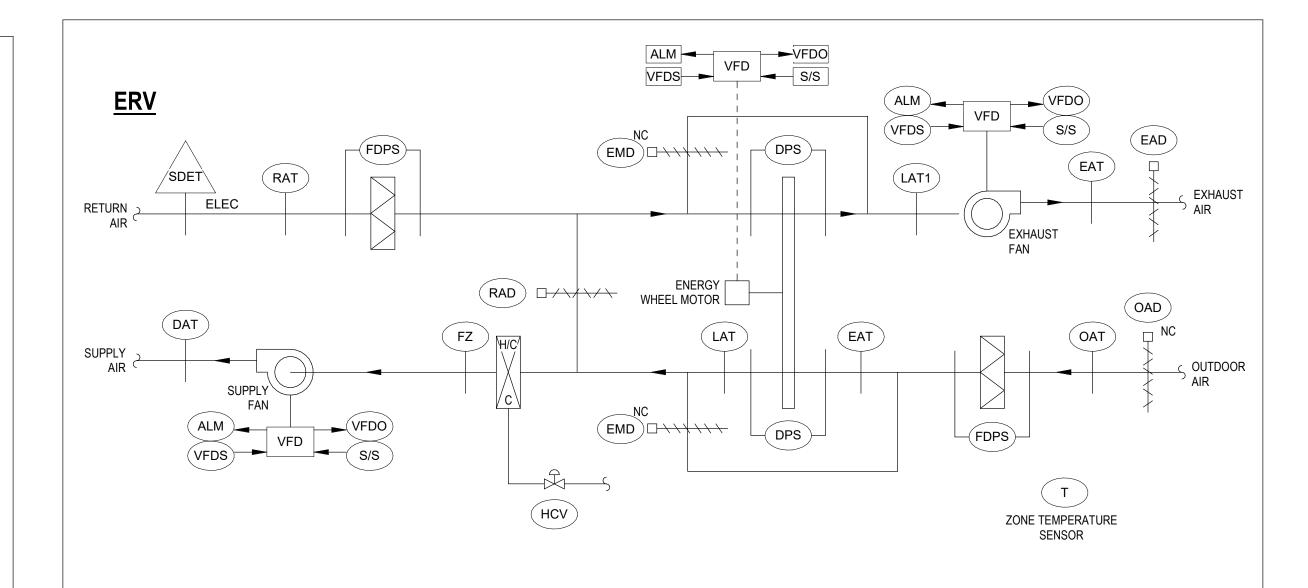
TWO POSITION W/ END SWITCH FOR

PIACV, TYP

EACH POSITION, TYP

- UPDATING OF CONDITIONS (STATUS, WATER LEVEL, PRESSURE, BURNER FIRE RATE, ETC.). DIFFERENCE FROM THE CHANGEOVER FLUID'S SUPPLY
- ON A CALL FOR HEAT FROM ANY SPACE OR HEAT EXCHANGER, THE LEAD BOILER BURNER SHALL BE ENERGIZED.
- 2. THE BURNER ASSOCIATED WITH THE LEAD BOILER SHALL STAGE AS REQUIRED TO MAINTAIN 12PSI STEAM SETPOINT IN THE EXISTING STEAM
- 3. SHOULD THE LEAD BOILER BURNER FAIL TO FIRE, THE STANDBY BOILER AND BURNER SHALL FIRE.
- 1. WHEN LOW WATER LEVEL IS SENSED (TIED INTO THE EXISTING LOW WATER CUT-OUT) A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.
- 2. IF A FLAME FAILURE OCCURS (TIED INTO THE EXISTING BOILER BURNER CONTROLLER) A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.
- 3. IF LOW PRESSURE IS SENSED IN THE EXISTING STEAM HEADER A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.
- 4. IF LOW FEED WATER LEVEL IS SENSED IN THE EXISTING TANK A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.
- 5. IF A BOILER FEED PUMP FAILS A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.

EXISTING STEAM BOILER CONTROLS



ENERGY RECOVERY UNIT CONTROLS:

- THE ENERGY RECOVERY UNIT (ERV) SHALL BE STARTED AND STOPPED VIA A DEDICATED FULLY PROGRAMMABLE DDC CONTROLLER.
- 2. COORDINATE UNOCCUPIED AND OCCUPIED SCHEDULE WITH OWNER.
- 3. ALL SETPOINTS SHALL BE ADJUSTABLE. ALL ACTUATORS SHALL BE ELECTRONIC.
- 4. THE ERV MANUFACTURER SHALL PROVIDE THE VFDS.
- 5. LOCAL HAND/OFF/AUTO SWITCHES (HOA) FOR FANS SHALL OVERRIDE DDC START/STOP (S/S) COMMANDS. ALL HARDWIRED SAFETIES SHALL BE ACTIVE IN BOTH "H" AND "A" POSITIONS.
- 6. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.
- ALL TEMPERATURE SENSORS IN THE UNIT AND DUCTWORK SHALL BE AVERAGING TYPE EXCEPT FOR FREEZESTATS WHICH SHALL BE LOW POINT READING TYPE.
- 8. ERV SHALL BE INDEXED TO HEATING AND COOLING BY THE BUILDING AUTOMATION SYSTEM.
- WHILE IN UNOCCUPIED MODE (OR OFF ON SAFETY OR MANUAL DISCONNECT) ERV SUPPLY AND EXHAUST FANS SHALL BE OFF WITH THE OUTSIDE AIR DAMPER (OAD), EXHAUST AIR DAMPER (EAD),
- AND THE RETURN AIR DAMPER (RAD) OPEN. ENERGY RECOVERY WHEEL SHALL BE OFF. WHEN STARTED IN OCCUPIED MODE, THE ERV SUPPLY FAN SHALL START IN RECIRCULATION MODE (100% RETURN AIR) AT MINIMUM SPEED WITH RAD OPEN AND THE OAD, EAD, AND EMD CLOSED

ECONOMIZER MODE DAMPERS (EMD), AND HEATING/COOLING CONTROL VALVE (HCV) ARE CLOSED,

- . THE SUPPLY FAN VFD SHALL SLOWLY INCREASE THE SPEED OF THE VFD TO THE DESIGN
- I. AFTER START-UP, ONCE THE SUPPLY FAN OPERATION IS STABLE AND IN OCCUPIED MODE THE OAD AND EAD SHALL SLOWLY OPEN TO OUTDOOR AIR POSITION AND THE EXHAUST FAN AND THE ENERGY WHEEL SHALL START. THE RAD AND EMD SHALL REMAIN CLOSED.

WITH THE EXHAUST FAN AND ENERGY RECOVERY WHEEL OFF.

- ECONOMIZER. IF THE OUTSIDE AIR ENTHALPY IS BELOW THE SETPOINT OF 27.0 BTU/LBM (ADJ), THE SUPPLY AND EXHAUST FANS SHALL START AND THE EMD SHALL BE MODULATED TO MAINTAIN SETPOINT. THE RAD SHALL BE CLOSED AND THE ENERGY RECOVERY WHEEL SHALL BE OFF. DAT SHALL LIMIT SUPPLY AIR TEMPERATURE TO 52°F MINIMUM DURING THE COOLING SEASON (LIMIT SHALL NOT RESULT IN REDUCTION TO MINIMUM OUTDOOR AIRFLOW). IF ADDITIONAL COOLING IS
- I. IF THE OUTDOOR AIR ENTHALPY IS ABOVE SETPOINT, AND THE SPACE TEMPERATURE SENSORS ARE CALLING FOR COOLING, THEN THE OAD AND EAD SHALL OPEN, THE RAD AND EMD SHALL CLOSE, THE ENERGY RECOVERY WHEEL SHALL BE ENERGIZED, AND THE HCV SHALL MODULATE TO MAINTAIN COOLING SETPOINT TEMPERATURE. DAT SHALL LIMIT SUPPLY AIR TEMPERATURE TO 55° F MINIMUM DURING THE COOLING SEASON.

SETPOINT OF 72°F (ADJ).

- THE SUPPLY AIR AND EXHAUST FANS SHALL BE OFF, THE OAD, EMD, AND EAD SHALL BE CLOSED, THE RAD SHALL BE OPEN, AND THE HEATING/COOLING CONTROL VALVE (HCV) SHALL BE CLOSED. NO COOLING SHALL BE PROVIDED.
- 1. THE SUPPLY AIR AND EXHAUST FANS SHALL RUN CONTINUOUSLY. THE OAD AND EAD SHALL BE OPEN AND THE RAD AND EMD SHALL BE CLOSED, AND THE HEATING/COOLING CONTROL VALVE (HCV) SHALL BE CLOSED. NO COOLING SHALL BE PROVIDED.
- 2. THE HEATING/COOLING CONTROL VALVE (HCV) SHALL MODULATE TO MAINTAIN THE DAT

THE SUPPLY AIR AND EXHAUST FANS SHALL BE DE-ENERGIZED. THE OAD, EMD, AND EAD SHALL BE CLOSED AND RAD SHALL BE OPEN, AND THE HEATING/COOLING CONTROL VALVE (HCV) SHALL BE CLOSED. NO VENTILATION SHALL BE PROVIDED. REFER TO FAN COIL CONTROL SEQUENCE FOR ADDITIONAL INFORMATION.

- 1. THE FREEZESTAT SHALL CAUSE AN ALARM AT THE OPERATOR WORKSTATION AND BE INTERLOCKED TO THE SUPPLY AND EXHAUST FANS FOR FAN SHUTDOWN WHEN SENSING A TEMPERATURE OF 37°F (ADJ) OR LESS. IN ADDITION, THE OAD AND EAD SHALL CLOSE AND THE RAD AND HV SHALL OPEN, THE ENERGY RECOVERY WHEEL SHALL BE OFF.
- UPON A FAILURE OF THE SUPPLY OR EXHAUST FAN THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL TO THE OPERATOR WORKSTATION. THE ERV SHALL BE DE-ENERGIZED. THE OAD AND EAD SHALL CLOSE, THE ENERGY RECOVERY WHEEL SHALL DE-ENERGIZE, AND THE RAD SHALL OPEN.
- WHEN THE SMOKE DETECTOR SENSES SMOKE THE ERV SHALL BE DE-ENERGIZED. THE OAD AND EAD SHALL CLOSE, THE ENERGY RECOVERY WHEEL SHALL DE-ENERGIZE, AND THE RAD SHALL OPEN. A DETAILED ALARM SHALL BE SENT TO THE OPERATOR WORKSTATION. THE ERV SHALL ALSO BE SHUTDOWN UPON RECEIVING A SIGNAL FROM THE FIRE ALARM CONTROL PANEL. COORDINATE CONNECTION TO THE FIRE ALARM PANEL WITH DIV 26.
- 1. IF THE SUPPLY OR EXHAUST FAN FAILS OR ANY SAFETY IS TRIPPED. THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SHALL BE SENT TO THE OPERATOR WORKSTATION.
- 2. IF FILTER PRESSURE DROP EXCEEDS SETPOINT (INITIALLY 0.6" WG) FOR 10 MINUTES (ADJ), THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SHALL BE SENT TO THE OPERATOR
- 3. IF PRESSURE DROP FOR THE ENERGY WHEEL EXCEEDS SETPOINT (INITIALLY 0.6" WG) FOR 10 MINUTES (ADJ), THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SHALL BE SENT TO THE
- 4. IF THE COOLING DAT RISES ABOVE 60°F (ADJ) FOR 5 MINUTES (ADJ) OR LONGER A DETAILED ALARM SHALL BE SENT TO THE OPERATOR WORKSTATION.
- 5. IF THE HEATING DAT DROPS BELOW 50°F (ADJ) FOR 5 MINUTES (ADJ) OR LONGER A DETAILED ALARM SHALL BE SENT TO THE OPERATOR WORKSTATION.

ENERGY RECOVERY UNIT

CONTRACT 2C20-064

MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT

Weston & Sampson Engineers, Inc 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

21 Tuttle Rd.

Bristol, CT 06010

Consultants:

QuisenberryArcariMalik



195 Scott Swamp Road

Farmington, CT 06032

qamarch.com

(860) 677-4594



Revisions:

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4/15/2020 ADDENDUM #1 2 4/23/2020 ADDENDUM #2

ADDENDUM #2 Issued For:

April 23, 2020

Reviewed By:

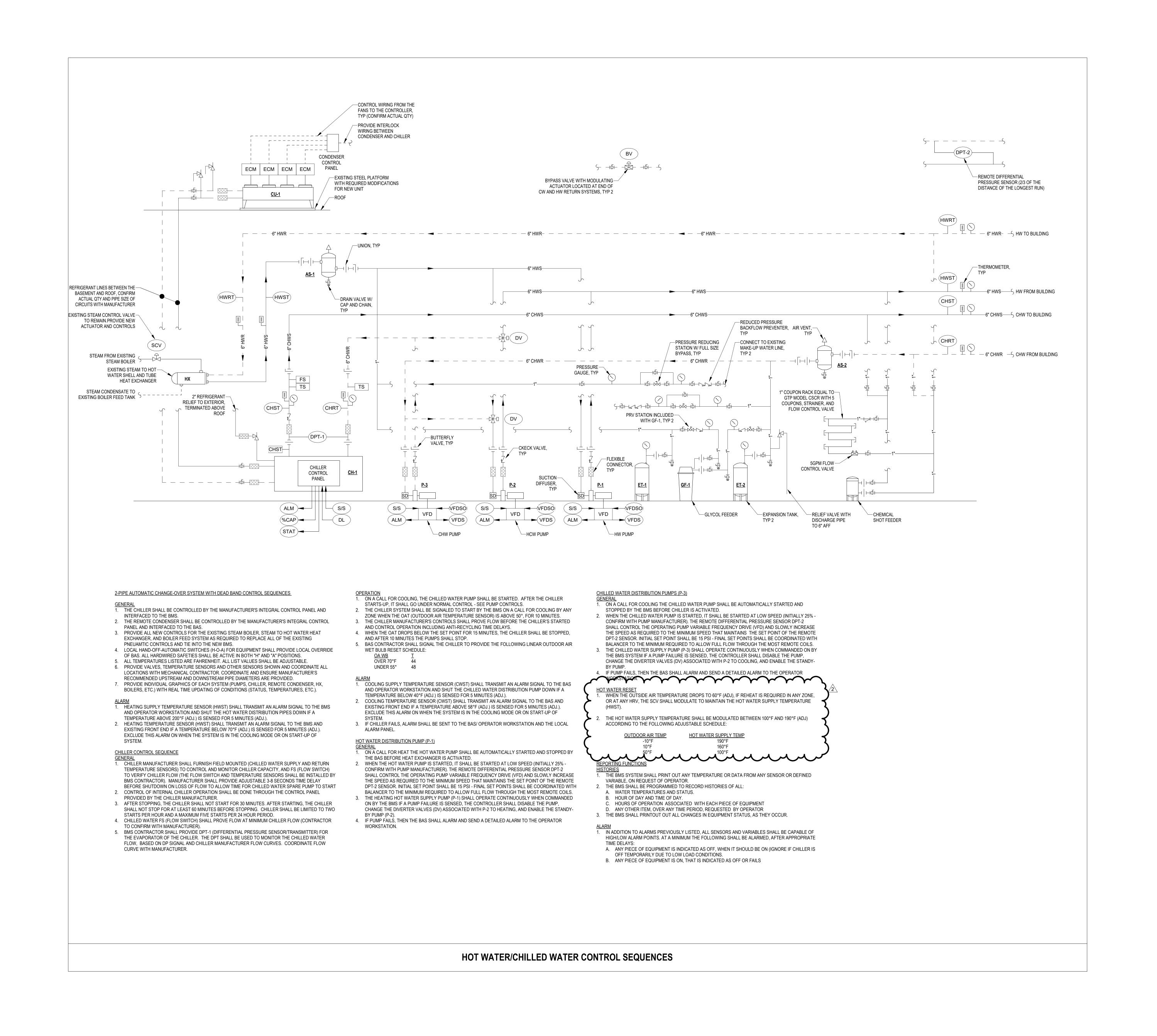
Drawn By:

W&S Project No: 2191117

Drawing Title:

CONTROLS

Sheet Number:



CONTRACT 2C20-064

MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT 21 Tuttle Rd. Bristol, CT 06010

Weston & Sampson Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

Consultants:

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195 Scott Swamp Road Farmington, CT 06032 (860) 677-4594 qamarch.com





Revisions:				
Rev	Date	Description		
1	44/185220220	ANDIDIENNIDUM/#1		
2	4/23/2020	ADDENDUM #2		

Issued For: ADDENDUM #2

April 23, 2020 Drawn By: Reviewed By:

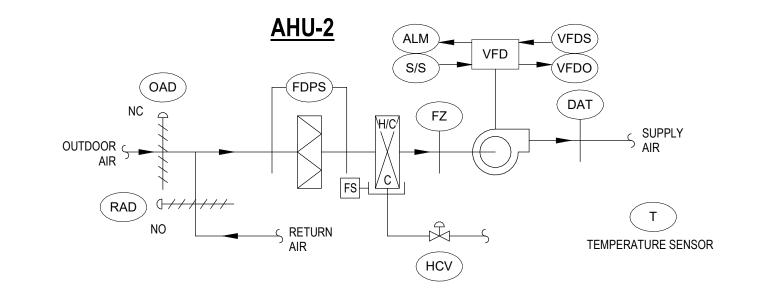
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W&S Project No: 2191117

CONTROLS

Sheet Number:

—ADD ALTERNATE #1



1. AIR HANDLING UNIT (AHU-2) SHALL BE CONTROLLED BY DDC CONTROLLER.

2. ALL SETPOINTS SHALL BE ADJUSTABLE.

ALL ACTUATORS SHALL BE ELECTRONIC. MANUFACTURER TO WIRE ALL CONTROL POINTS TO A TERMINAL STRIP FOR THE ATC CONTRACTOR TO

4. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.

5. LOCAL HAND-OFF-AUTOMATIC SWITCH (H-O-A) FOR FANS SHALL OVERRIDE DDC START/STOP COMMANDS. ALL HARDWIRED SAFETIES SHALL BE ACTIVE IN BOTH "H" AND "A" POSITIONS.

PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM (FAN. VALVES. DAMPERS, ETC.) WITH REAL TIME UPDATING OF CONDITIONS (STATUS, TEMPERATURE, ETC.).

WHILE DE-ENERGIZED (OR OFF ON SAFETY OR MANUAL DISCONNECT) AHU SHALL BE OFF WITH THE OAD AND HCV CLOSED. THE RAD SHALL BE

WHEN COMMANDED TO START, THE AHU OAD AND RAD SHALL MODULATE OPEN TO THEIR MINIMUM POSITION. THE AHU SUPPLY FAN SHALL START. THE SPACE TEMPERATURE SENSOR SHALL MODULATE THE HEATING/COOLING VALVE (HCV) TO MAINTAIN THE SPACE TEMPERATURE SET POINT. THE AHU SUPPLY FAN SHALL RUN CONTINUOUSLY.

ECONOMIZER MODE WHEN THE OUTDOOR AIR ENTHALPY IS BELOW THE RETURN AIR ENTHALPY SETPOINT, OUTDOOR AND RETURN AIR DAMPERS SHALL BE PROPORTIONALLY MODULATED UP TO 100% OUTDOOR AIR TO MAINTAIN SET POINT. THE REVERSE SHALL OCCUR ON A DROP BELOW THE COOLING SUPPLY AIR TEMPERATURE SET POINT.

THE SUPPLY AIR TEMPERATURE SHALL BE LIMITED TO 55°F AND SHALL NOT RESULT IN A REDUCTION BELOW THE MINIMUM OUTDOOR AIRFLOW.

THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLYFAN SHALL RUN CONTINUOUSLY. UPON A DROP IN SPACE TEMPERATURE BELOW THE COOLING SETPOINT OF 76°F (ADJ), THE HCV SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE.

THE UNIT SHALL BE OFF, THE HEATING/COOLING CONTROL VALVE (HCV)

OCCUPIED HEATING MODE THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLY FAN SHALL RUN CONTINUOUSLY. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 68°F (ADJ), THE HCV SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE.

UNOCCUPIED HEATING MODE THE OAD SHALL BE CLOSED AND RAD SHALL BE OPEN. THE SUPPLY FAN SHALL BE DE-ENERGIZED. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 60°F (ADJ), THE HCV SHALL OPEN 100% AND THE SUPPLY FAN SHALL BE ENERGIZED. WHEN THE SPACE TEMPERATURE REACHES 65°F (ADJ), THE SUPPLY FAN SHALL DE-ENERGIZE AND HV SHALL

SAFETIES

1. THE FOLLOWING SAFETIES SHALL SHUT DOWN THE H&V UNIT. A. THE FREEZESTAT SHALL SHUTDOWN AHU, CLOSE THE OAD, OPEN THE

HCV. AND OPEN THE RAD WHENEVER THE TEMPERATURE IS BELOW 37°F (ADJ). A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. B. UPON A FAILURE OF THE AHU SUPPLY FAN AS SENSED BY THE

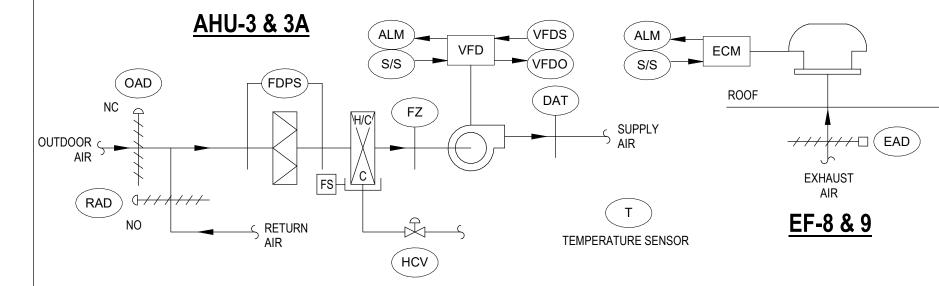
CURRENT SENSOR, A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. THE AHU SHALL BE DE-ENERGIZED, THE OAD SHALL BE CLOSED, AND THE RAD SHALL BE OPEN. C. WHEN THE FLOAT SWITCH (FS) IN THE DRAIN PAN DETECTS A HIGH WATER LEVEL, THE COOLING COIL CONTROL VALVE (CV) SHALL CLOSE.

1. IF SUPPLY FAN FAILS OR ANY SAFETY IS TRIPPED, THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE

2. IF THE FILTER PRESSURE DROP EXCEEDS SETPOINT (INITIALLY 0.4" WG) FOR 10 MINUTES, THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.

DISCHARGE AIR TEMPERATURE SENSOR SHALL LIMIT THE HEATING DISCHARGE AIR TEMPERATURE TO NO LOWER THAN 50°F (ADJ). IF THE LIMITS ARE EXCEEDED BY 2°F FOR 5 MINUTES (ADJ) OR LONGER, THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.

EXISTING AIR HANDLING UNIT (AHU-2)



AIR HANDLING UNIT (AHU-3 & 3A) SHALL BE CONTROLLED BY DDC CONTROLLER. UNIT SHALL BE INTERLOCKED WITH EXHAUST FAN (EF-8 &

2. ALL SETPOINTS SHALL BE ADJUSTABLE.

ALL ACTUATORS SHALL BE ELECTRONIC. MANUFACTURER TO WIRE ALL CONTROL POINTS TO A TERMINAL STRIP FOR THE ATC CONTRACTOR TO

4. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.

LOCAL HAND-OFF-AUTOMATIC SWITCH (H-O-A) FOR FANS SHALL OVERRIDE DDC START/STOP COMMANDS. ALL HARDWIRED SAFETIES SHALL BE ACTIVE IN BOTH "H" AND "A" POSITIONS.

PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM (FAN, VALVES, DAMPERS, ETC.) WITH REAL TIME UPDATING OF CONDITIONS (STATUS, TEMPERATURE, ETC.).

FAN CONTROL WHILE DE-ENERGIZED (OR OFF ON SAFETY OR MANUAL DISCONNECT) AHU SHALL BE OFF WITH THE OAD AND HCV CLOSED. THE RAD SHALL BE

WHEN COMMANDED TO START, THE AHU OAD AND RAD SHALL MODULATE OPEN TO THEIR MINIMUM POSITION. EXHAUST FAN DAMPER SHALL OPEN, THE AHU SUPPLY FAN SHALL START, AND THEN EXHAUST FAN SHALL START. THE SPACE TEMPERATURE SENSOR SHALL MODULATE THE HEATING/COOLING VALVE (HCV) TO MAINTAIN THE SPACE TEMPERATURE SET POINT. THE AHU SUPPLY FAN AND EXHAUST FAN SHALL RUN

ECONOMIZER MODE WHEN THE OUTDOOR AIR ENTHALPY IS BELOW THE RETURN AIR ENTHALPY SETPOINT, THE EXHAUST, OUTDOOR AND RETURN AIR DAMPERS SHALL BE PROPORTIONALLY MODULATED UP TO 100% OUTDOOR AIR TO MAINTAIN SET POINT. THE REVERSE SHALL OCCUR ON A DROP BELOW THE COOLING SUPPLY AIR TEMPERATURE SET POINT.

THE SUPPLY AIR TEMPERATURE SHALL BE LIMITED TO 55°F AND SHALL NOT RESULT IN A REDUCTION BELOW THE MINIMUM OUTDOOR AIRFLOW. THE EXISTING GRAVITY VENTILATORS SHALL BE USED TO RELIEVE THE

BUILDING PRESSURE WHEN ECONOMIZER MODE IS ACTIVATED.

 THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLY AND EXHAUST FAN SHALL RUN CONTINUOUSLY. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 68°F (ADJ), THE HCV SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE

UNOCCUPIED COOLING MODE 1. THE UNIT SHALL BE OFF, THE HEATING/COOLING CONTROL VALVE (HCV) SHALL BE CLOSED.

OCCUPIED HEATING MODE

THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLY AND EXHAUST FAN SHALL RUN CONTINUOUSLY. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 68°F (ADJ), THE HCV SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE.

UNOCCUPIED HEATING MODE

AIR HANDLING UNIT (AHU-3 & 3A) AND EXHAUST FAN (EF-8 & 9)

manne ma

THE OAD SHALL BE CLOSED AND RAD SHALL BE OPEN. THE SUPPLY FAN SHALL BE DE-ENERGIZED. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 60°F (ADJ), THE HCV SHALL OPEN 100% AND THE SUPPLY FAN SHALL BE ENERGIZED. WHEN THE SPACE TEMPERATURE REACHES 65°F (ADJ), THE SUPPLY FAN SHALL DE-ENERGIZE AND HV SHALL

THE FOLLOWING SAFETIES SHALL SHUT DOWN THE H&V UNIT. A. THE FREEZESTAT SHALL SHUTDOWN AHU, CLOSE THE OAD, OPEN THE HCV, AND OPEN THE RAD WHENEVER THE TEMPERATURE IS BELOW 37°F (ADJ). A DETAILED ALARM SIGNAL SHALL BE SENT TO THE

OPERATOR WORKSTATION. B. UPON A FAILURE OF THE AHU SUPPLY FAN AS SENSED BY THE CURRENT SENSOR, A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. THE AHU SHALL BE DE-ENERGIZED, THE OAD SHALL BE CLOSED, AND THE RAD SHALL BE OPEN. WHEN THE FLOAT SWITCH (FS) IN THE DRAIN PAN DETECTS A HIGH

CLOSE. 1. IF SUPPLY FAN OR ANY EXHAUST FAN FAILS OR ANY SAFETY IS TRIPPED, THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE

WATER LEVEL, THE COOLING COIL CONTROL VALVE (CV) SHALL

SENT TO THE OPERATOR WORKSTATION. 2. IF THE FILTER PRESSURE DROP EXCEEDS SETPOINT (INITIALLY 0.4" WG) FOR 10 MINUTES, THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM

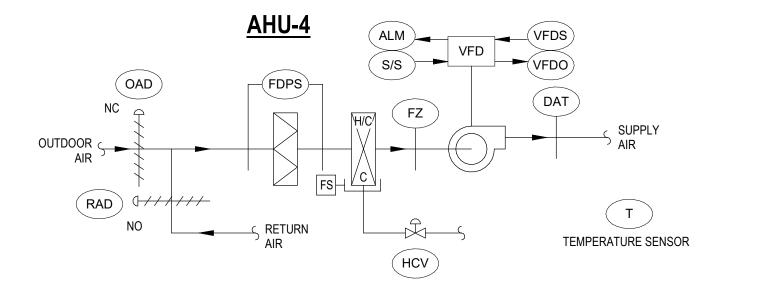
SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. 3. DISCHARGE AIR TEMPERATURE SENSOR SHALL LIMIT THE HEATING

DISCHARGE AIR TEMPERATURE TO NO LOWER THAN 50°F (ADJ). IF THE

CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO

LIMITS ARE EXCEEDED BY 2°F FOR 5 MINUTES (ADJ) OR LONGER, THE DDC

THE OPERATOR WORKSTATION.



1. AIR HANDLING UNIT (AHU-4) SHALL BE CONTROLLED BY DDC CONTROLLER.

2. ALL SETPOINTS SHALL BE ADJUSTABLE 3. ALL ACTUATORS SHALL BE ELECTRONIC. MANUFACTURER TO WIRE ALL CONTROL POINTS TO A TERMINAL STRIP FOR THE ATC CONTRACTOR TO

4. ALL TEMPERATURES LISTED ARE IN FAHRENHEIT.

5. LOCAL HAND-OFF-AUTOMATIC SWITCH (H-O-A) FOR FANS SHALL OVERRIDE DDC START/STOP COMMANDS. ALL HARDWIRED SAFETIES SHALL BE ACTIVE IN BOTH "H" AND "A" POSITIONS.

6. PROVIDE INDIVIDUAL GRAPHICS OF EACH SYSTEM (FAN, VALVES, DAMPERS, ETC.) WITH REAL TIME UPDATING OF CONDITIONS (STATUS, TEMPERATURE, ETC.).

. WHILE DE-ENERGIZED (OR OFF ON SAFETY OR MANUAL DISCONNECT) AHU SHALL BE OFF WITH THE OAD AND HCV CLOSED. THE RAD SHALL BE

2. WHEN COMMANDED TO START, THE AHU OAD AND RAD SHALL MODULATE OPEN TO THEIR MINIMUM POSITION. EXHAUST FAN DAMPER SHALL OPEN, THE AHU SUPPLY FAN SHALL START, AND THEN EXHAUST FAN SHALL START. THE SPACE TEMPERATURE SENSOR SHALL MODULATE THE HEATING/COOLING VALVE (HCV) TO MAINTAIN THE SPACE TEMPERATURE SET POINT. THE AHU SUPPLY FAN AND EXHAUST FAN SHALL RUN CONTINUOUSLY.

ECONOMIZER MODE . WHEN THE OUTDOOR AIR ENTHALPY IS BELOW THE RETURN AIR ENTHALPY SETPOINT, THE EXHAUST, OUTDOOR AND RETURN AIR DAMPERS SHALL BE PROPORTIONALLY MODULATED UP TO 100% OUTDOOR AIR TO MAINTAIN SET POINT. THE REVERSE SHALL OCCUR ON A DROP BELOW THE COOLING SUPPLY AIR TEMPERATURE SET POINT.

THE SUPPLY AIR TEMPERATURE SHALL BE LIMITED TO 55°F AND SHALL NOT RESULT IN A REDUCTION BELOW THE MINIMUM OUTDOOR AIRFLOW. 3. THE EXISTING KITCHEN EXHAUST SYSTEM SHALL PROVIDE PRESSURE

SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE

RELIEF FROM THE SPACE.

TEMPERATURE.

THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLY AND EXHAUST FAN SHALL RUN CONTINUOUSLY. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 68°F (ADJ), THE HCV

UNOCCUPIED COOLING MODE THE UNIT SHALL BE OFF, THE HEATING/COOLING CONTROL VALVE (HCV) SHALL BE CLOSED.

OCCUPIED HEATING MODE

THE OAD AND RAD SHALL BE IN THE MINIMUM SETTING. THE SUPPLY AND EXHAUST FAN SHALL RUN CONTINUOUSLY. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 68°F (ADJ), THE HCV SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE.

UNOCCUPIED HEATING MODE

THE OAD SHALL BE CLOSED AND RAD SHALL BE OPEN. THE SUPPLY FAN SHALL BE DE-ENERGIZED. UPON A DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT OF 60°F (ADJ), THE HCV SHALL OPEN 100% AND THE SUPPLY FAN SHALL BE ENERGIZED. WHEN THE SPACE TEMPERATURE REACHES 65°F (ADJ), THE SUPPLY FAN SHALL DE-ENERGIZE AND HV SHALL CLOSE.

SAFETIES

1. THE FOLLOWING SAFETIES SHALL SHUT DOWN THE H&V UNIT. A. THE FREEZESTAT SHALL SHUTDOWN AHU, CLOSE THE OAD, OPEN THE HCV. AND OPEN THE RAD WHENEVER THE TEMPERATURE IS BELOW 37°F (ADJ). A DETAILED ALARM SIGNAL SHALL BE SENT TO THE

OPERATOR WORKSTATION. B. UPON A FAILURE OF THE AHU SUPPLY FAN AS SENSED BY THE CURRENT SENSOR, A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION. THE AHU SHALL BE DE-ENERGIZED, THE OAD SHALL BE CLOSED, AND THE RAD SHALL BE OPEN. C. WHEN THE FLOAT SWITCH (FS) IN THE DRAIN PAN DETECTS A HIGH WATER LEVEL, THE COOLING COIL CONTROL VALVE (CV) SHALL

1. IF SUPPLY FAN FAILS OR ANY SAFETY IS TRIPPED, THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.

2. IF THE FILTER PRESSURE DROP EXCEEDS SETPOINT (INITIALLY 0.4" WG) FOR 10 MINUTES, THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.

DISCHARGE AIR TEMPERATURE SENSOR SHALL LIMIT THE HEATING DISCHARGE AIR TEMPERATURE TO NO LOWER THAN 50°F (ADJ). IF THE LIMITS ARE EXCEEDED BY 2°F FOR 5 MINUTES (ADJ) OR LONGER, THE DDC CONTROLLER SHALL GIVE A DETAILED ALARM SIGNAL SHALL BE SENT TO THE OPERATOR WORKSTATION.

AIR HANDLING UNIT (AHU-4)

CONTRACT 2C20-064 MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT 21 Tuttle Rd. Bristol, CT 06010

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Consultants:

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Revisions: Rev Date Description 4/15/2020 ADDENDUM #1

ADDENDUM #1 Issued For:

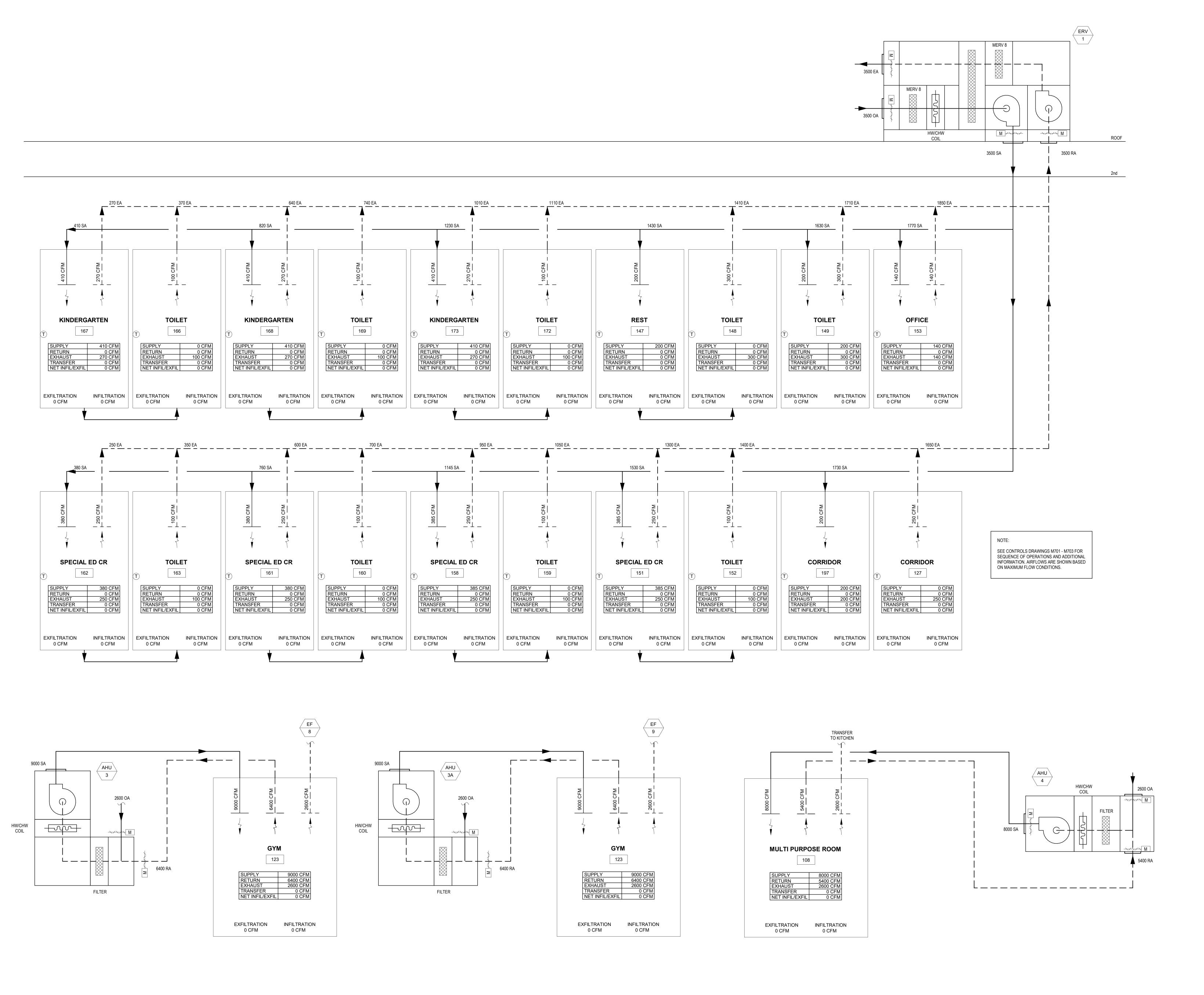
April 15, 2020 Drawn By: HJH Reviewed By: SEH Approved By:

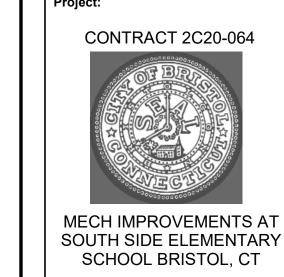
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ADD ALTERNATE CONTROLS

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Consultants:

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April 2, 2020

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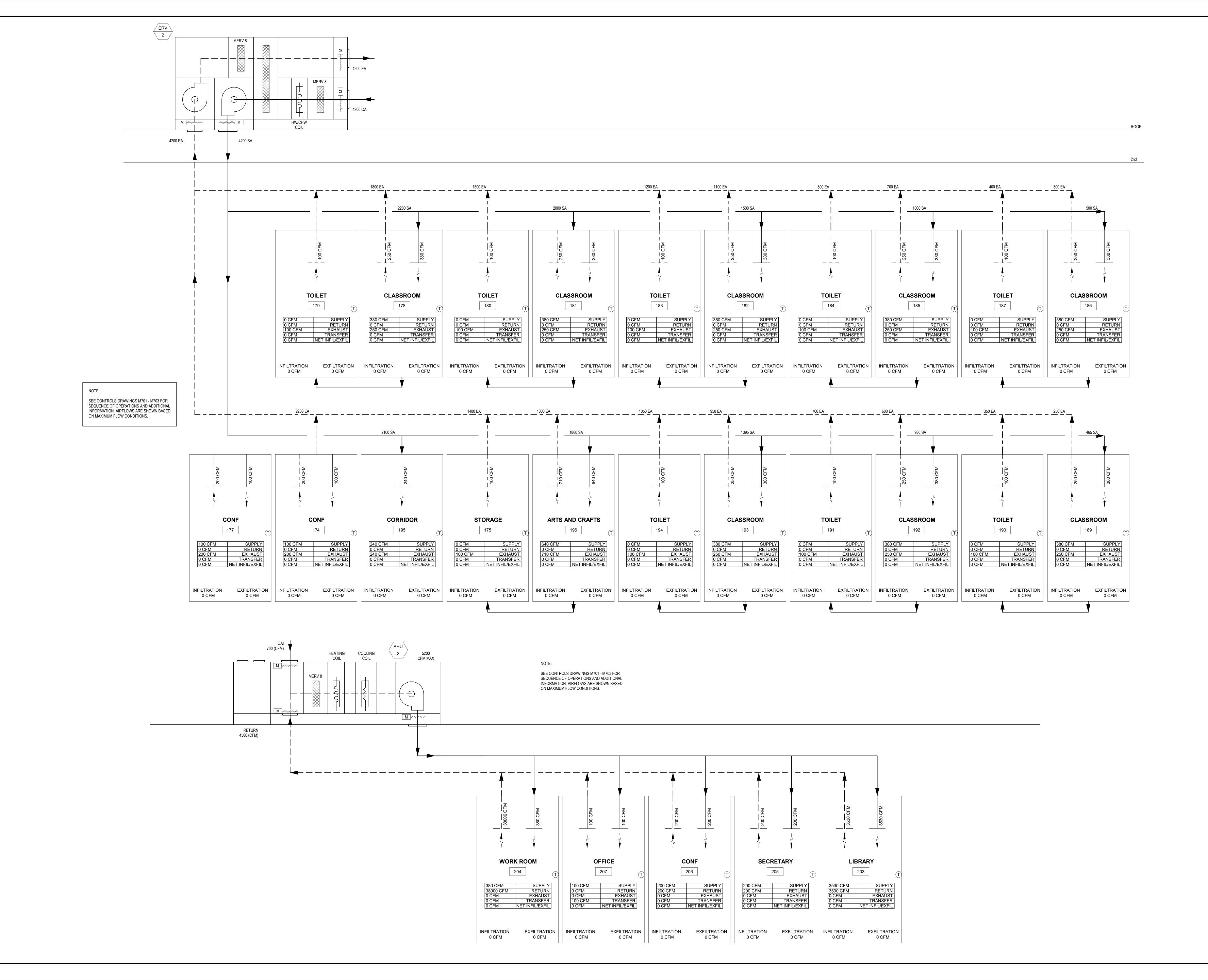
W&S Project No: 2191117

Drawing Title:

AIRFLOW DIAGRAM

Sheet Number:

H801



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Foxborough, MA 02035
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www.westonandsampson.com

Bristol, CT 06010

Consultants:

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Farmington, CT 06032 (860) 677-4594 qamarch.com

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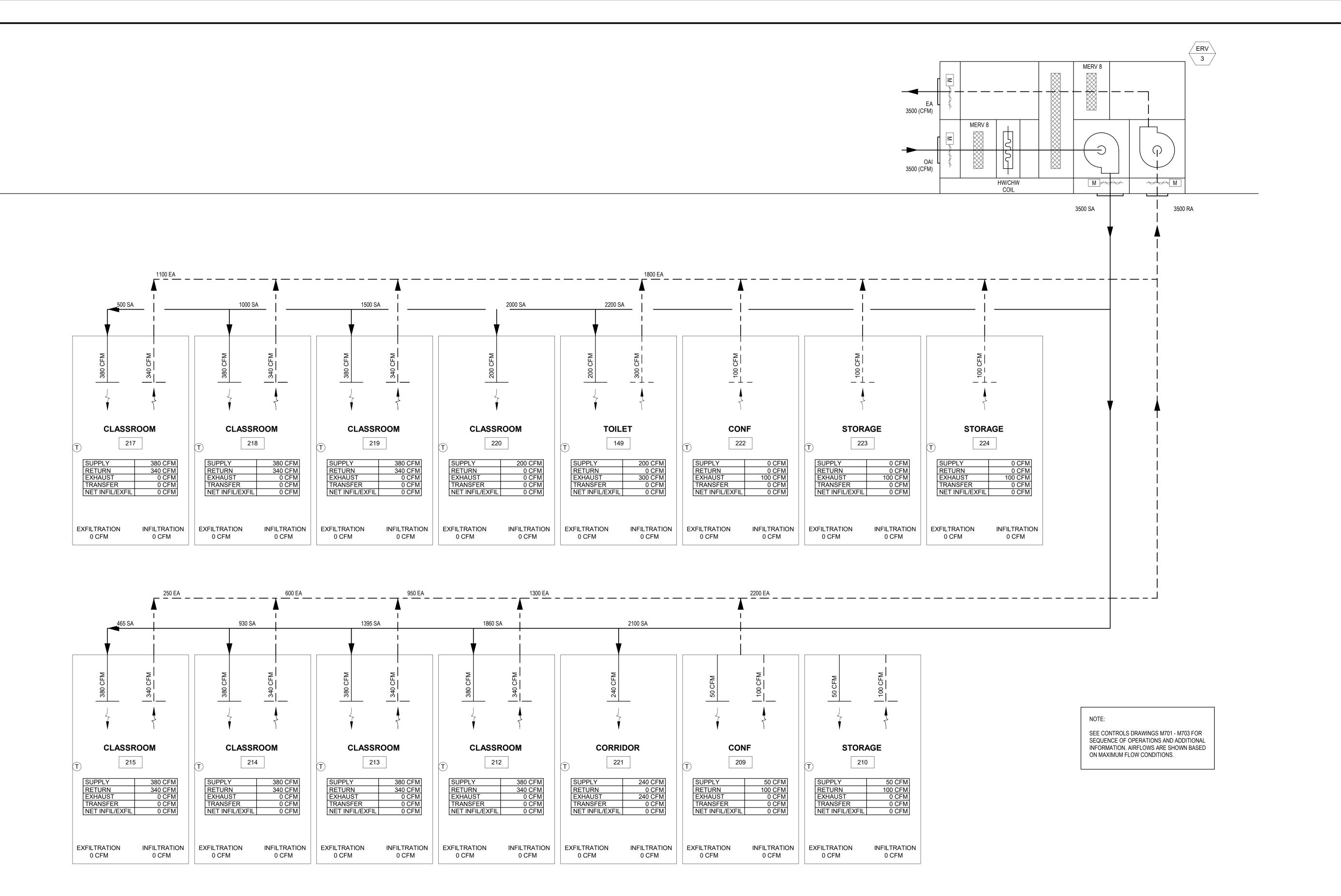
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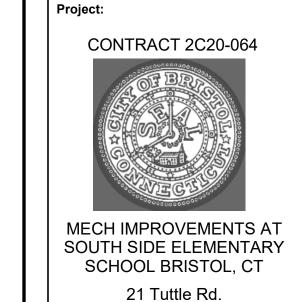
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AIRFLOW DIAGRAMS

Sheet Number:

H802





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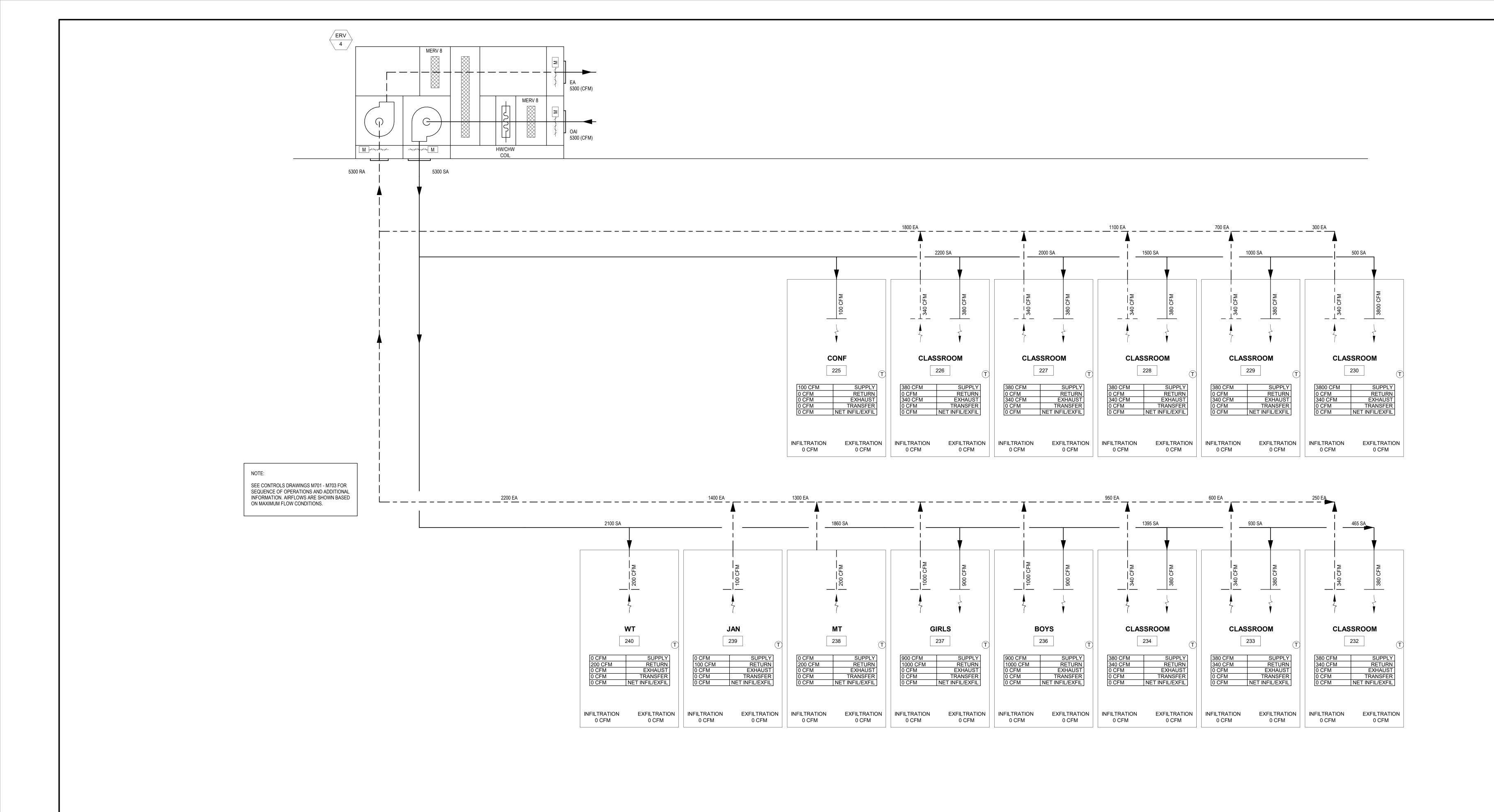
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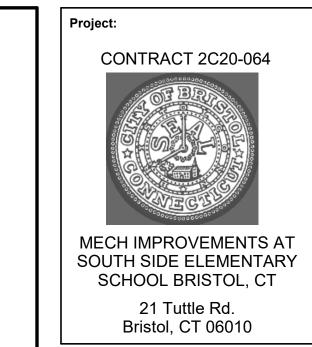
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AIRFLOW DIAGRAMS

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H803





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QuisenberryArcariMalik

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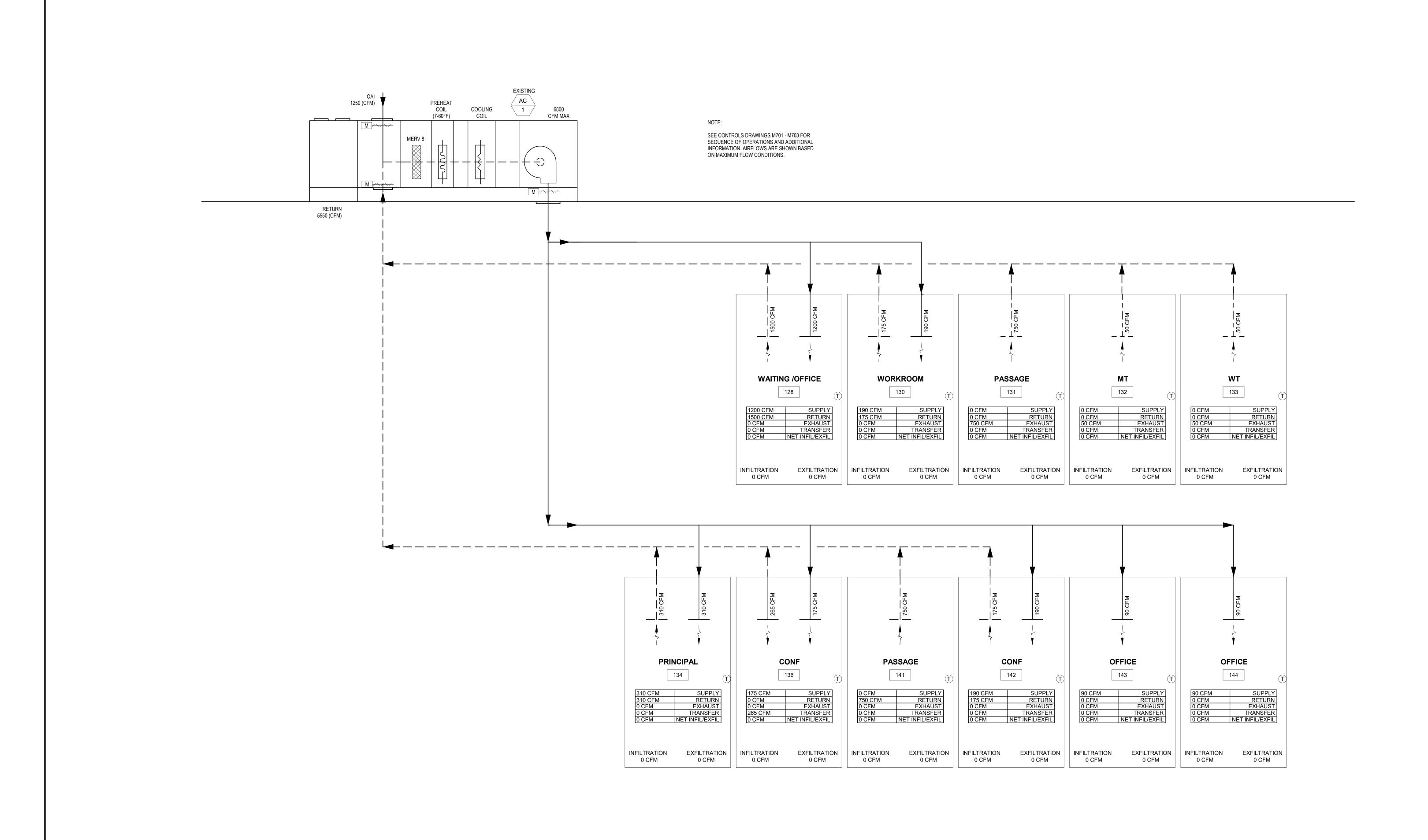
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Drawing Title:

AIRFLOW DIAGRAMS

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H804



Project:

CONTRACT 2C20-064

MECH IMPROVEMENTS AT SOUTH SIDE ELEMENTARY SCHOOL BRISTOL, CT

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AIRFLOW DIAGRAMS

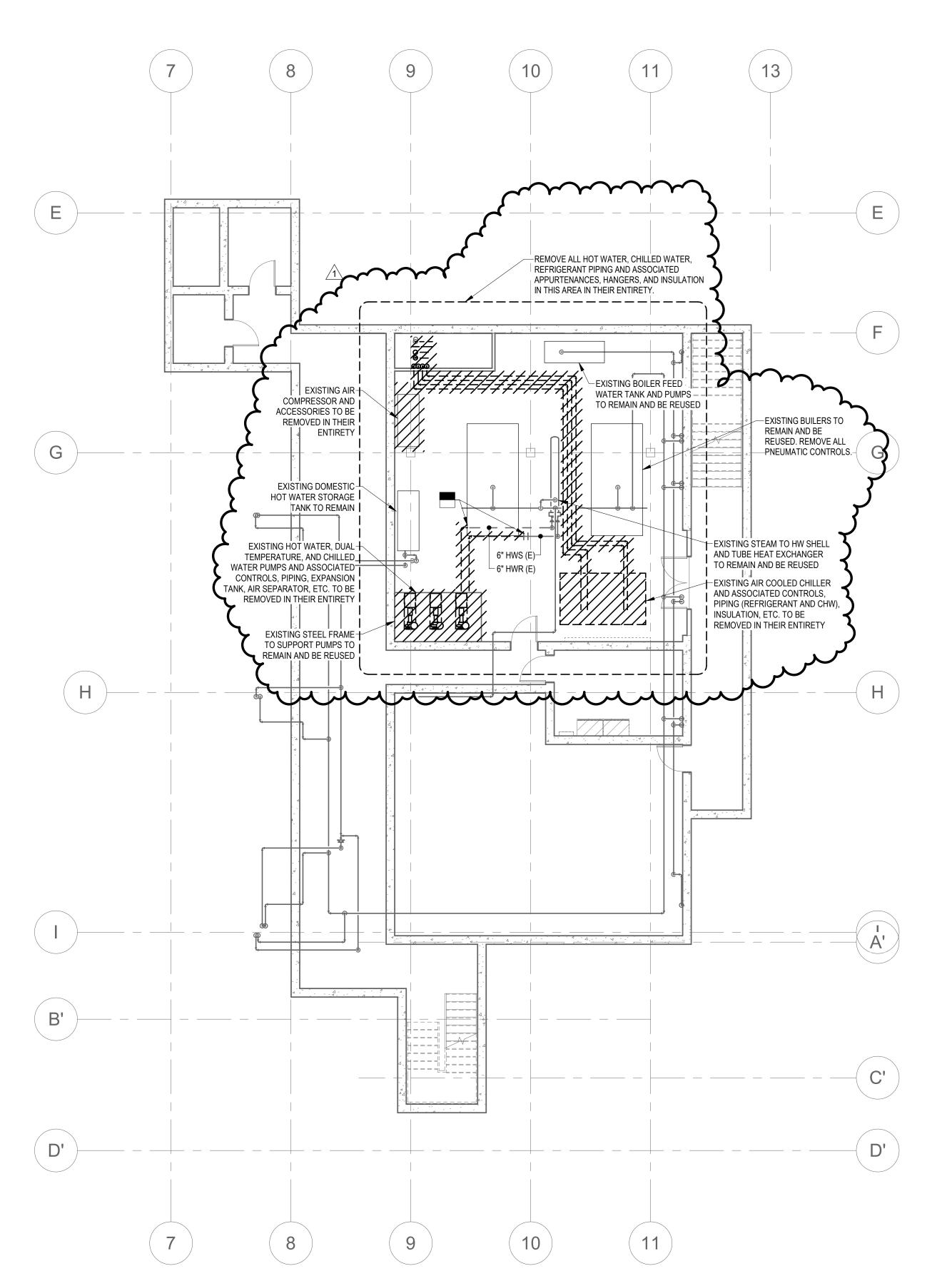
Sheet Number:

H805

GENERAL NOTES

1. REMOVE ALL OF THE EXISTING UNIT VENTILATORS AND ASSOCIATED CONTROLS, PIPING, AND SLEEVE (INCLUDING THE OUTSIDE AIR INTAKE GRILLE) IN THEIR ENTIRETY. PATCHING OF THE FLOOR, INTERIOR, EXTERIOR WALL AND ROOF SHALL BE COORDINATED WITH THE ARCHITECTUAL PLANS.

2. REFERANCE HM-1 & HM-2



OFNEDAL NOTE



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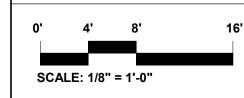


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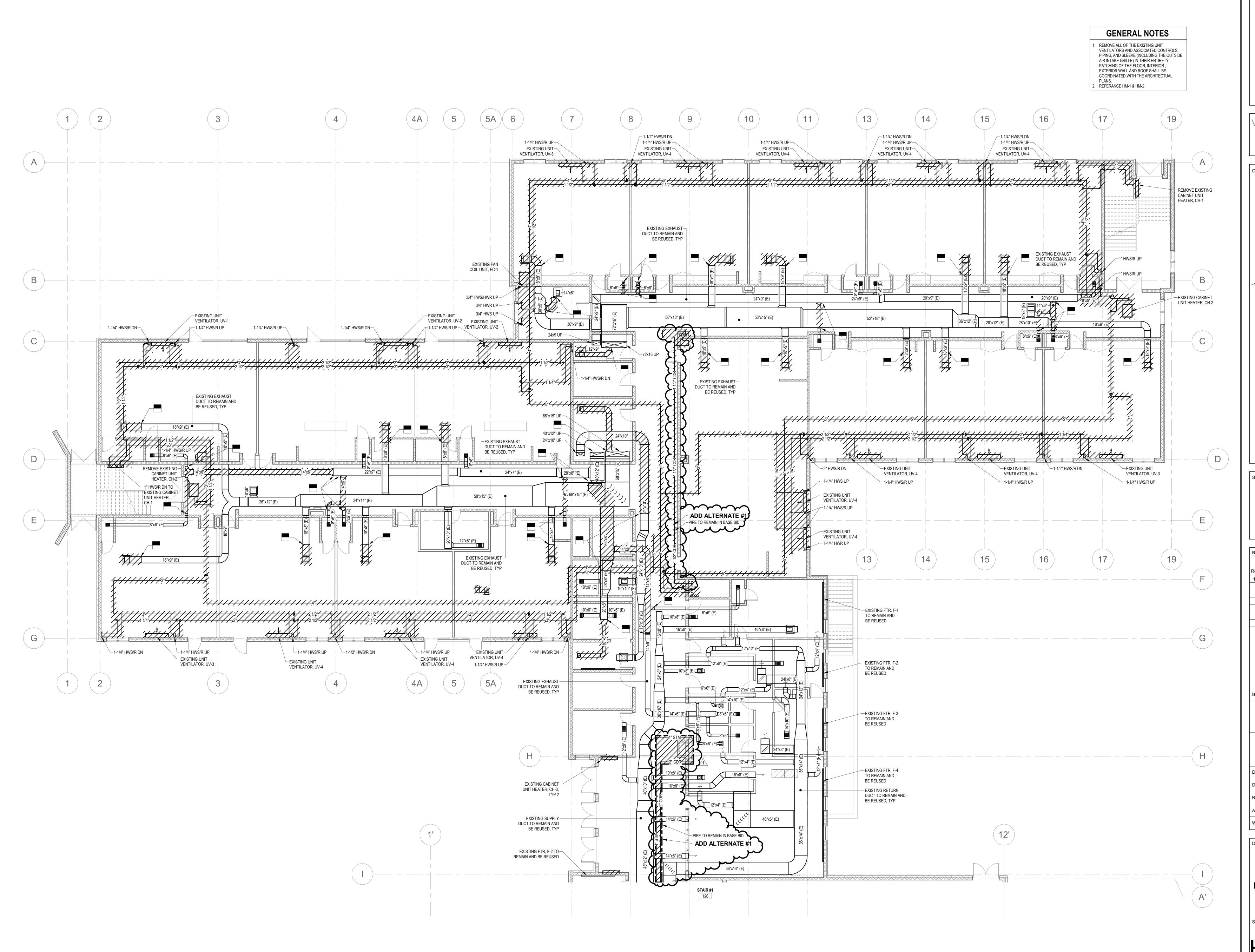
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Drawing Title:

BASEMENT DEMOLITON PLAN

Sheet Number:

HD100





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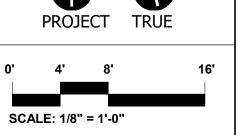


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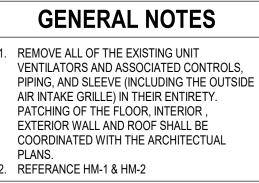
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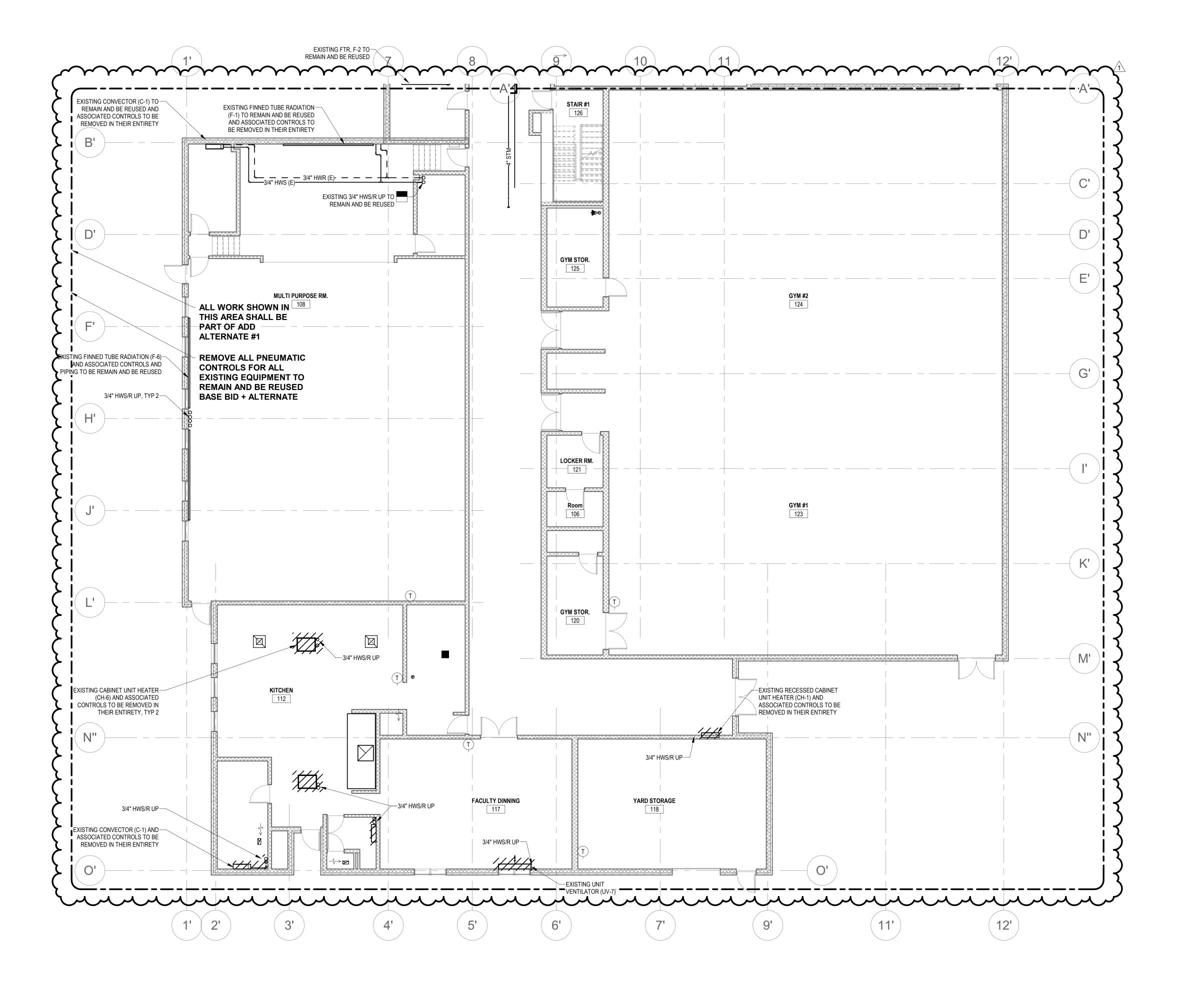
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FIRST FLOOR DEMOLITION PLAN PART A

Sheet Number:

PATCHING OF THE FLOOR, INTERIOR, EXTERIOR WALL AND ROOF SHALL BE





CONTRACT 2C20-064

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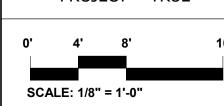
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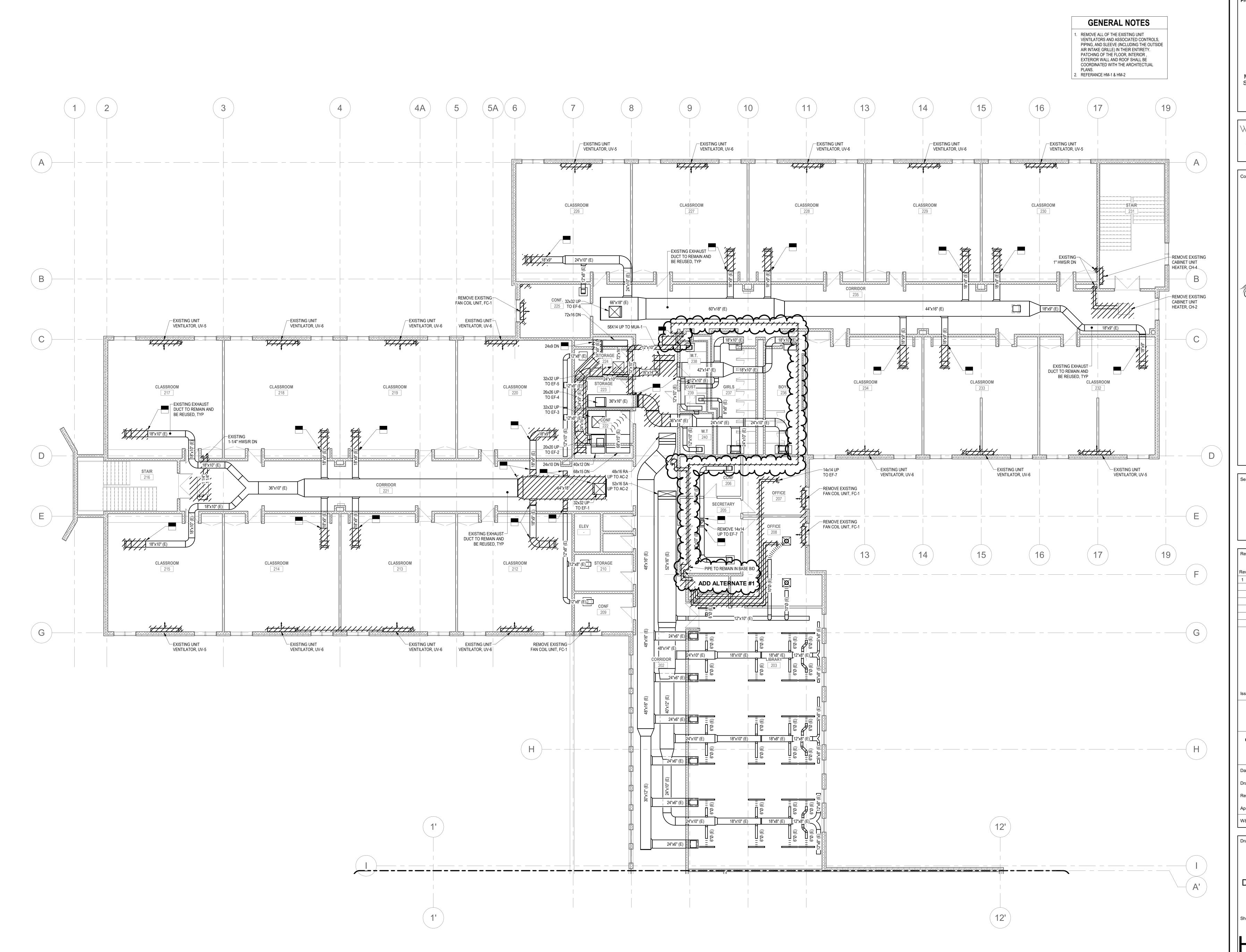




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FIRST FLOOR
DEMOLITION PLAN PART B

Sheet Number:



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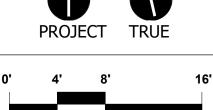
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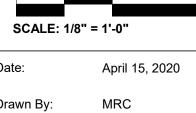
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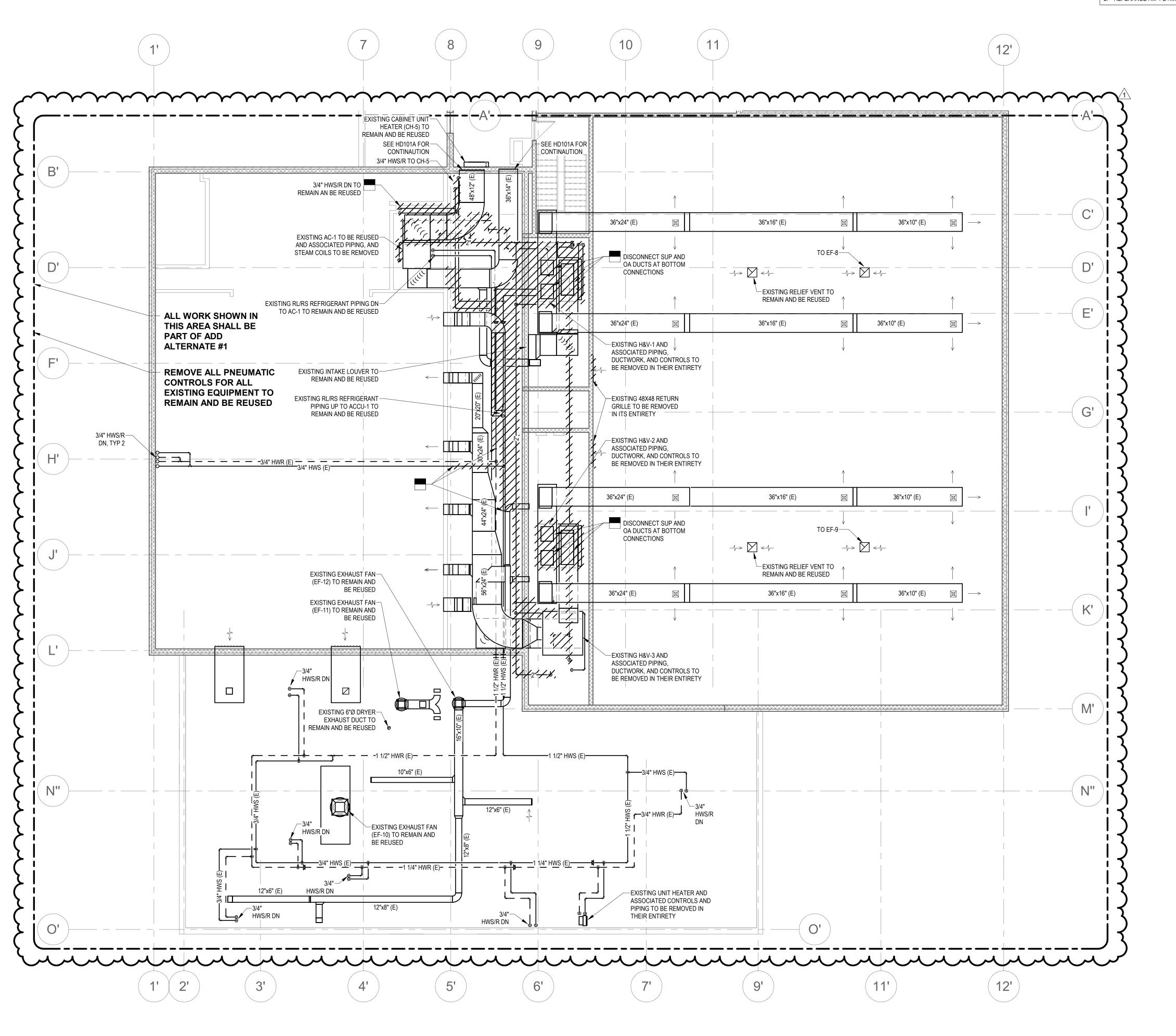
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SECOND FLOOR DEMOLITION PLAN PART A

GENERAL NOTES

1. REMOVE ALL OF THE EXISTING UNIT VENTILATORS AND ASSOCIATED CONTROLS, PIPING, AND SLEEVE (INCLUDING THE OUTSIDE AIR INTAKE GRILLE) IN THEIR ENTIRETY. PATCHING OF THE FLOOR, INTERIOR, EXTERIOR WALL AND ROOF SHALL BE COORDINATED WITH THE ARCHITECTUAL PLANS.

2. REFERANCE HM-1 & HM-2





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195 Scott Swamp Road
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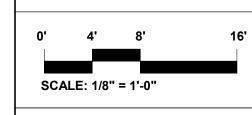


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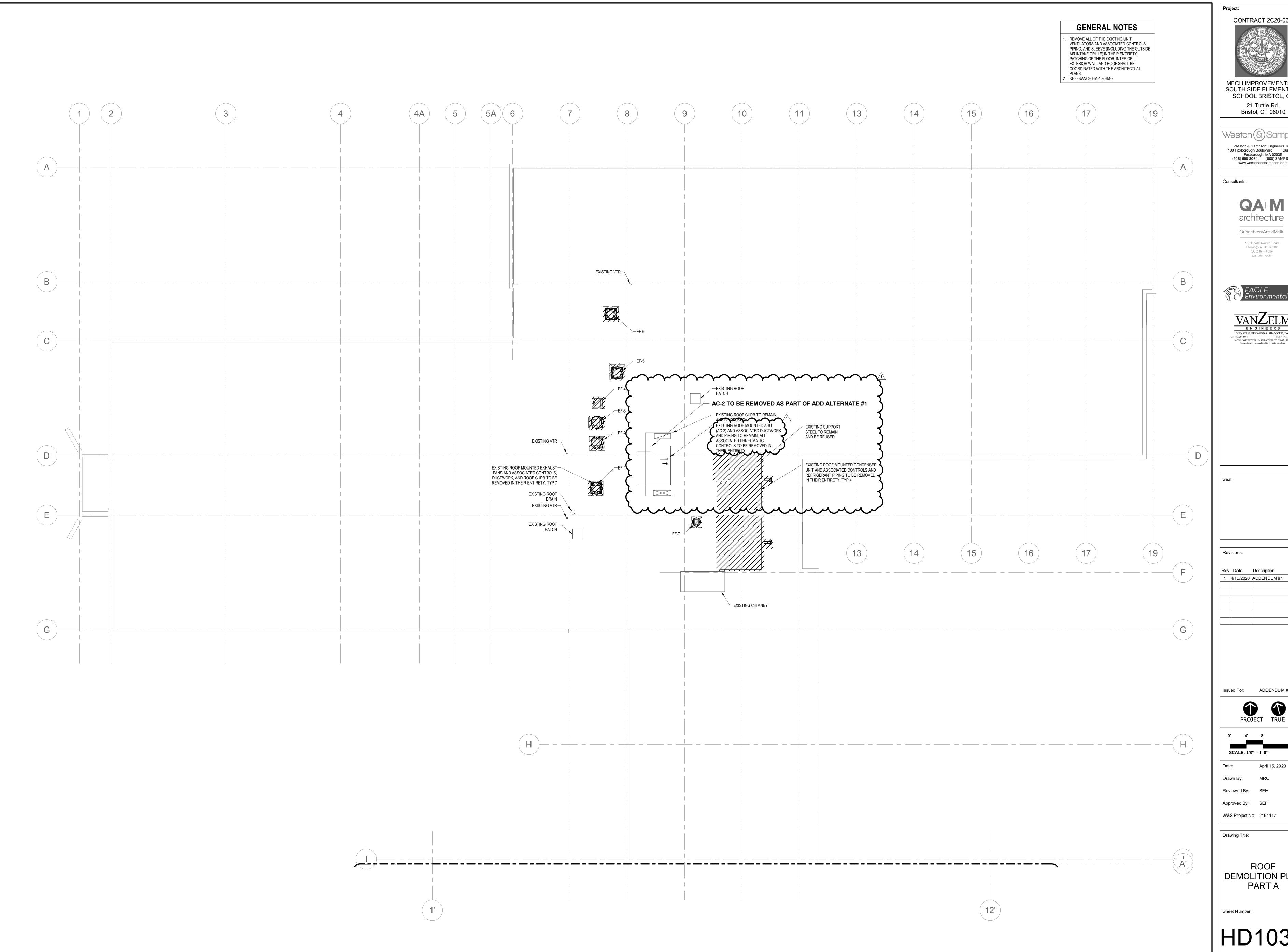
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Drawing Title:

SECOND FLOOR DEMOLITION PLAN PART B

Sheet Number:

HD102B



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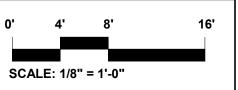
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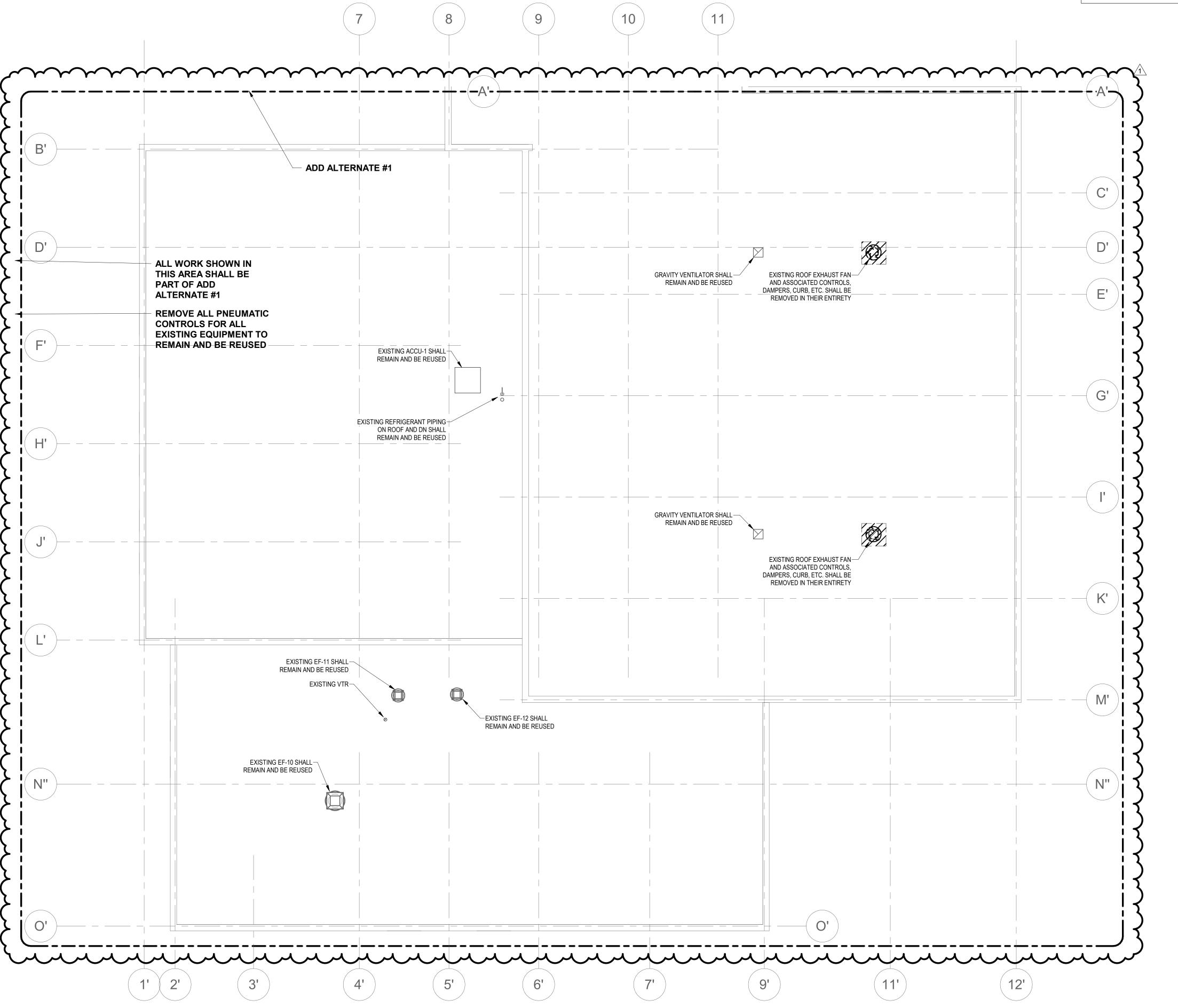




W&S Project No: 2191117

ROOF DEMOLITION PLAN PART A

GENERAL NOTES 1. REMOVE ALL OF THE EXISTING UNIT VENTILATORS AND ASSOCIATED CONTROLS, PIPING, AND SLEEVE (INCLUDING THE OUTSIDE AIR INTAKE GRILLE) IN THEIR ENTIRETY. PATCHING OF THE FLOOR, INTERIOR, EXTERIOR WALL AND ROOF SHALL BE COORDINATED WITH THE ARCHITECTUAL PLANS. 2. REFERANCE HM-1 & HM-2



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21 Tuttle Rd.
Bristol, CT 06010

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(508) 698-3034 (800) SAMPSON

www.westonandsampson.com

Consultants:

QA+Marchitecture

QuisenberryArcariMalik

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Farmington, CT 06032

(860) 677-4594 qamarch.com

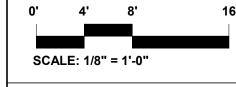




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Approved By: SEH

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Drawing Title:

ROOF DEMOLITION PLAN PART B

Sheet Number:

HD103B

ELECTRICAL ABBREVIATIONS LIST LTG LIGHTING CMPR COMPRESSOR SYM SYMMETRICAL 1P 1 POLE (2P, 3P, 4P, ETC.) AS AMP SWITCH DS SAFETY DISCONNECT SWITCH FIXT FIXTURE HTG HEATING MOA MULTIOUTLET ASSEMBLY PA PUBLIC ADDRESS ROOM VOLT ANGLE LTNG LIGHTNING HTR HEATER PULL BOX OR PUSHBUTTON AMP TRIP CONN CONNECTION DOUBLE THROW FLR FLOOR MSP MOTOR STARTER PANELBOARD PB RSC RIGID STEEL CONDUIT SYS SYSTEM VA VOLT-AMPERES AC ABOVE COUNTER OR AIR ATS AUTOMATIC TRANSFER SWITCH CONST CONSTRUCTION DRAWING FLUOR FLUORESCENT HV HIGH VOLTAGE LV LOW VOLTAGE MSBD MAIN SWITCHBOARD PNEUMATIC ELECTRIC RTU ROOF TOP UNIT TELEPHONE VDT VIDEO DISPLAY TERMINAL DELTA CONDITIONER CONT CONTINUATION OR CONTINUOUS EC ELECTRICAL CONTRACTOR AUTO AUTOMATIC FU FUSE HVAC HEATING, VENTILATING AND AIR MAX MAXIMUM MT MOUNT PEDESTAL SURFACE CONDUIT TEL/DATA TELEPHONE/DATA VFRT VFRTICAL ACLG ABOVE CEILING TERM TERMINAL AUX AUXILIARY MAG.S MAGNETIC STARTER EMPTY CONDUIT POWER FACTOR VFD VARIABLE FREQUENCY DRIVE CONTR CONTRACTOR ELEC ELECTRIC, ELECTRICAL FUDS FUSED SAFETY DISCONNECT SWITCH CONDITIONING MT.C SEC SECONDARY INCHES MANUAL TRANSFER SWITCH ADO AUTOMATIC DOOR OPENER AV AUDIO VISUAL CONV CONVECTOR ELEV ELEVATOR HWP HYDRONIC WATER PUMP M/C MOMENTARY CONTACT SHEET TWIST LOCK GA GAUGE NUMBER AMP FRAME MECHANICAL CONTRACTOR SIM AWG AMERICAN WIRE GAUGE CP CIRCULATING PUMP EM EMERGENCY INTERRUPTING CAPACITY MTR POST INDICATING VALVE TAMPER RESISTANT WATT GALLON MOTOR, MOTORIZED SIMILAR PHASE AFF ABOVE FINISHED FLOOR BATT BATTERY CATHODE-RAY TUBE EMS MCB MAIN CIRCUIT BREAKER S/N SOLID NEUTRAL T-STAT THERMOSTAT WITH ENERGY MANAGEMENT SYSTEM GALV GALVANIZED ISOLATED GROUND N.C. NORMALLY CLOSED PANFI CENTER LINE NATIONAL ELECTRICAL CODE AFG ABOVE FINISHED GRADE CURRENT TRANSFORMER EMT SPEC SPECIFICATION TELEPHONE TERMINAL CABINET BD BOARD ELECTRICAL METALLIC TUBING GC GENERAL CONTRACTOR INTERMEDIATE METAL CONDUIT MCC MOTOR CONTROL CENTER POWER POLE WG WIRE GUARD P PLATE NEMA NATIONAL ELECTRICAL ARC FAULT CIRCUIT BLDG BUILDING CTR CENTER ELECTRIC PNEUMATIC GEN GENERATOR INCAND INCANDESCENT MDC MAIN DISTRIBUTION CENTER PAIR SPKR SPEAKER TELEVISION WH WATER HEATER MDP MAIN DISTRIBUTION PANEL INTERRUPTER BMS BUILDING MANAGEMENT SYSTEM CU COPPER GFI GROUND FAULT CIRCUIT INTERRUPTER IR INFRARED MANUFACTURER'S ASSOCIATION PRI PRIMARY TVTC TELEVISION TERMINAL CABINET W/O WITHOUT FOUIP FOUIPMENT SP SPARE NFDS NON-FUSED SAFETY DISCONNECT PROJ PROJECTION AHU AIR HANDLING UNIT DOMESTIC WATER CIRCULATING EWC ELECTRIC WATER COOLER GFP GROUND FAULT PROTECTOR SURFACE RACEWAY TYP WEATHERPROOF CONDUIT INTERLOCK WITH MFR MANUFACTURER ALUMINUM CAB CABINET EXIST EXISTING GND GROUND J-BOX JUNCTION BOX MFS MAIN FUSED DISCONNECT SWITCH PRV POWER ROOF VENTILATOR SS STAINLESS STEEL UNDER COUNTER XFMR TRANSFORMER ALT ALTERNATE DEPT DEPARTMENT EXH EXHAUST CATALOG GRS GALVANIZED RIGID STEEL (CONDUIT) KV KILOVOLT MH MANHOLF NOT IN CONTRACT PT POTENTIAL TRANSFORMER SSW SELECTOR SWITCH UNDERGROUND ELECTRICAL XFR TRANSFER AMP AMPERE CATV CABLE TELEVISION DET DETAIL EXP EXPLOSION PROOF GYP BD GYPSUM BOARD KVA KILOVOLT-AMPERE MIC MICROPHONE NIGHT LIGHT PVC POLYVINYL CHLORIDE (CONDUIT) S/S STOP/START PUSHBUTTONS UG UNDERGROUND HOA HANDS-OFF-AUTOMATIC SWITCH AMPL AMPLIFIER CB CIRCUIT BREAKER DIA DIAMETER FIRE ALARM KVAR KILOVOLT-AMPERE REACTIVE MIN MINIMUM NORMALLY OPEN PWR POWER STA STATION UNIT HEATER HORIZ HORIZONTAL ANNUN ANNUNCIATOR CCTV CLOSED CIRCUIT TELEVISION DISC DISCONNECT FABP FIRE ALARM BOOSTER POWER KW KILOWATT NORMAL POWER FACTOR QUAN QUANTITY STD STANDARD UNDERGROUND TELEPHONE MISC MISCELLANEOUS NPF APPROX APPROXIMATELY CKT CIRCUIT DIST DISTRIBUTION SUPPLY PANEL HP HORSEPOWER KWH KILOWATT HOUR MLO MAIN LUGS ONLY NTS NOT TO SCALE RCPT RECEPTACLE SURF SURFACE MOUNTED UTIL UTILITY AQ-STAT AQUASTAT CLG CEILING DN DOWN FACP FIRE ALARM CONTROL PANEL HPF HIGH POWER FACTOR LOC LOCATE OR LOCATION MMS MANUAL MOTOR STARTER OH OVERHEAD REQD REQUIRED SW SWITCH UNIT VENTILATOR OR ARCH ARCHITECT, ARCHITECTURAL COMB COMBINATION DPR DAMPER FCU FAN COIL UNIT HT HEIGHT LIGHT MOA MULTIOUTLET ASSEMBLY OVERLOADS RM ROOM SWBD SWITCHBOARD ULTRAVIOLET OL

	ELECTRICAL (NOTE: NOT ALL SYM	. SYMBOL LEGEN I BOLS MAY BE APF	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
\mapsto	SURFACE LIGHT (TYPE DENOTED)		
$\vdash \triangleleft extstyle extstyle $	WALL MOUNTED FLOODLIGHT (TYPE DENOTED)	$\vdash \bigcirc$ \bigcirc	JUNCTION BOX
	RECESSED LIGHT (TYPE DENOTED)	PB	PULL BOX
ط	POLE MOUNTED LIGHT (TYPE DENOTED)	= /	
			CIRCUIT BREAKER PANEL
_ ==	POLE MOUNTED LIGHT (TYPE DENOTED)		POWER OR DISTRIBUTION PANEL
	SURFACE LINEAR LIGHT (TYPE DENOTED)		
	SUSPENDED OR PENDANT LIGHT (TYPE DENOTED)	/ XX -1	MOTOR (SEE SCHEDULE)
	RECESSED LINEAR LIGHT (TYPE DENOTED)	Ą	COMB. MOTOR STARTER (FUSED)
	STRIP LIGHT (TYPE DENOTED)	Ó	SAFETY DISC. SW. (NON-FUSED)
	EMERGENCY BATTERY LIGHT (TYPE DENOTED)		SAFETY DISC. SW. (FUSED)
⊗ ▼	EXIT SIGN (TYPE DENOTED)	_	, ,
	LIGHT FIXTURE ON (EM) LIFE SAFETY BRANCH	R	RELAY
S	SINGLE POLE SW.	긛	ENCLOSED CIRCUIT BREAKER
S 2	2 POLE SINGLE THROW SW.	HP	TIME CONTROL SWITCH (TIME SWITCH)
ه. د	3-WAY SW.	\Rightarrow	DUPLEX RECEPT.
$\overset{\Leftrightarrow}{A}_{A}$	4-WAY SW.	=	RECEPT MOUNTED 44" AFF OR 6" ABOVE
\$ ₫	KEYED SW. SW. W/PILOT	н	COUNTER (DUPLEX SHOWN)
\$°	DIMMER SWITCH		FOURPLEX RECEPT.
∜	DIMINIER SWITCH		FLOOR RECEPT. (DUPLEX SHOWN)
⊢©\$	WALL MOUNTED LOW VOLTAGE DUAL TECHNOLOGY OCCUPANCY SENSOR BY XXX	GENG ←	CEILING MOUNTED RECEPTACLE (SINGLE SHOWN)
	MODEL #XXX OR APPROVED EQUAL		FIRE ALARM REMOTE ANNUNCIATOR
	"D" INDICATES DIMMABLE SWITCH "a" LOWER CASE LETTER INDICATES	(3)	SMOKE DETECTOR (TYPE DENOTED)
	SWITCH LEG	•	LINEAR HEAT DETECTOR
Q ₩	WALL MOUNTED LOW VOLTAGE DUAL TECHNOLOGY VACANCY SENSOR BY XXX	(DS)	DUCT SMOKE DETECTOR (TYPE DENOTED)
	MODEL #XXX OR APPROVED EQUAL "D" INDICATES DIMMABLE SWITCH		•
	"a" LOWER CASE LETTER INDICATES SWITCH LEG	RTS	REMOTE TEST STATION
∑ E	JIMER SWITCH		CCTV CAMERA
(S)	CEILING MOUNTED LOW VOLTAGE DUAL TECHNOLOGY OCCUPANCY SENSOR BY WATTSTOPER	(3)	PA SPEAKER
}			
ţ			
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	DEMOLITION NOTES
1.	THE ELECTRICAL CONTRACTOR WILL WORK IN CONJUNCTION WITH THE GENERAL CONTRACTOR TO DEMOLISH THE EXISTING ELECTRICAL SYSTEM. THE ELECTRICAL CONTRACTOR IS TO DEACTIVATE, DISCONNECT AND REMOVE THOSE SYSTEMS WHICH WILL BE DEMOLISHED. THE ELECTRICAL CONTRACTOR WILL REMOVE AND DISPOSE OF ALL ELECTRICAL SYSTEM MATERIALS INCLUDING DEVICES, FIXTURES, RACEWAYS, CABLE, MOTOR CONTROLS AND APPURTENANCES. SYSTEMS REQUIRING TOTAL AND/OR PARTIAL DEMOLITION SHALL CONSIST OF BUT NOT BE LIMITED TO THE FOLLOWING:
	A. NORMAL AND EMERGENCY POWER BRANCH CIRCUIT SYSTEM B. NORMAL LIGHTING SYSTEM C. EMERGENCY AND EXIT LIGHTING SYSTEM D. COMMUNICATIONS SYSTEM E. FIRE ALARM SYSTEM F. SECURITY SYSTEM
2.	EXISTING SYSTEMS THAT ARE TO REMAIN AND BE PROTECTED DURING DEMOLITION/CONSTRUCTION INCLUDE:
	A. POWER DISTRIBUTION SYSTEM B. EXTERIOR LIGHTING SYSTEM C. HVAC SYSTEM AND POWER WIRING
3.	SYSTEMS WHICH PASS THROUGH THE AREA BEING DEMOLISHED BUT CONTINUE TO AREAS NOT WITHIN THE DEMOLITION SCOPE ARE TO REMAIN. THE ELECTRICAL CONTRACTOR IS TO IDENTIFY (SPRAY PAINT OR EQUIVALENT) AND PROTECT THOSE SYSTEMS WHICH ARE ACTIVE AND ARE TO REMAIN.
4.	ALL EXISTING CAST IN PLACE RECEPTACLE, PULL, JUNCTION AND OTHER DEVICE BOXES WHICH CANNOT BE REMOVED OR EFFECTIVELY COVERED ARE TO BE PROVIDED WITH FINISHED PLATES AS APPROVED BY THE ARCHITECT.
5.	ALL CONDUIT AND WIRE WHICH IS NO LONGER IN USE IS TO BE REMOVED. CONDUIT AND WIRE IS TO BE REMOVED BACK TO ITS SOURCE OR NEAREST DEVICE WHICH IS SCHEDULED TO REMAIN. COORDINATE THE REMOVAL OF ALL COMMUNICATIONS CONDUIT AND WIRE WITH THE COMMUNICATIONS CONTRACTOR. FIRE ALARM CABLING IS TO BE RETURNED TO THE NEAREST DEVICE SCHEDULED TO REMAIN, CONTROL PANEL, TERMINAL CABINET, ETC. UNDER NO CIRCUMSTANCES ARE ABANDONED CONDUIT AND WIRE OR SYSTEM COMPONENTS TO REMAIN.
6.	MAKE ANY NECESSARY RE-CIRCUITING, EXTENSIONS OF EXISTING CIRCUITS AND RELOCATIONS REQUIRED TO PROPERLY RE-ENERGIZE REMAINING EXISTING SERVICES OR EQUIPMENT THAT MAY BE INTERFERED WITH BY NEW CONSTRUCTION, REMOVALS OR RELOCATIONS. ALL SHUTDOWNS TO RELOCATE ACTIVE FEEDERS OR BRANCH CIRCUITS WILL BE PERFORMED ON OFF HOURS AS MUTUALLY AGREED TO WITH THE OWNER.
7.	PRIOR TO REMOVAL OF EQUIPMENT, CONFIRM THAT FEEDER AND BRANCH CIRCUITS ARE NO LONGER ACTIVE. SHOULD IT BE DISCOVERED THE FEEDER OR BRANCH CIRCUITS ARE ACTIVE, NOTIFY THE ARCHITECT IMMEDIATELY FOR DIRECTION.
8.	ELECTRICAL CONTRACTOR IS TO REMOVE ALL LAMPS, BALLASTS AND OTHER ELECTRICAL COMPONENTS CLASSIFIED AS HAZARDOUS MATERIALS. ELECTRICAL CONTRACTOR IS TO OBTAIN THE SERVICES OF A LICENSED HAZARDOUS MATERIALS CONTRACTOR TO DISPOSE OF THE MATERIALS. PROVIDE WRITTEN DOCUMENTATION TO THE OWNER'S REPRESENTATIVE FROM THE HAZARDOUS MATERIALS CONTRACTOR.
9.	. ELECTRICAL DEMOLITION ABBREVIATIONS:
	"EX" DENOTES EXISTING EQUIPMENT TO REMAIN. TEMPORARILY SUPPORTC CEILING ITEMS AS REQUIRED AND REINSTALL IN NEW CEILING
	"RL" DENOTES EXISTING EQUIPMENT TO BE DISCONNECTED AND RELOCATED. ALL EXISTING CONDUIT AND WIRE SHALL BE REMOVED BACK TO ITS SOURCE AND ALL DEVICES ASSOCIATED WITH THE EQUIPMENT SHALL BE REMOVED OR ALL CONDUIT AND WIRE SHALL BE INTERCEPTED AND EXTENDED AS REQUIRED. ALL NEW CONDUIT AND WIRE SHALL MATCH EXISTING IN STYLE AND SIZE. ALL EXISTING ELECTRICAL DEVICES ASSOCIATED WITH THE EXISTING EQUIPMENT SHALL BE REMOVED AND NEW DEVICES AS SHOWN SHALL BE PROVIDED.
	"NL" DENOTES NEW LOCATION OF RELOCATED EXISTING EQUIPMENT.
	"RE" DENOTES EXISTING EQUIPMENT TO BE DISCONNECTED AND REMOVED ALL EXISTING CONDUIT AND WIRE SHALL BE REMOVED BACK TO ITS SOURCE AND ALL DEVICES ASSOCIATED WITH THE EQUIPMNET SHALL BE REMOVED.
	"RX" DENOTES EXISTING EQUIPMENT TO BE DISCONNECTED AND REMOVED. ALL EXISTING CONDUIT AND WIRE SHALL BE MADE SAFE TO BE RE-USED FOR NEW EQUIPMENT OR DEVICE.
	"EXR" DENOTES NEW EQUIPMENT INSTALLED IN EXISTING CIRCUIT. CONTRACTOR EXTEND EXISTING CIRCUIT, IF NECCESSARY AND TO CONNECT NEW EQUIPMENT, FIXTURE OR DEVICE.

GENERAL ELECTRICAL NOTES

- DRAWINGS ARE DIAGRAMMATIC ONLY. THE EXACT LOCATION, MOUNTING HEIGHTS, SIZE OF EQUIPMENT AND ROUTING OF RACEWAYS SHALL BE COORDINATED AND DETERMINED IN THE FIELD.
- THE EXACT LOCATION AND MOUNTING HEIGHTS OF ALL LIGHTING FIXTURES LOCATED IN MECHANICAL/ELECTRICAL EQUIPMENT SPACES SHALL BE COORDINATED IN THE FIELD BY THE ELECTRICAL CONTRACTOR BEFORE INSTALLATION

OF SAME, SO AS TO AVOID INTERFERENCE WITH DUCTS, PIPING AND OTHER MECHANICAL/ELECTRICAL EQUIPMENT.

- REFLECTED CEILING PLANS FOR ANY AND ALL AREAS PREPARED BY THE ARCHITECT SHOWING THE LOCATION OF LIGHTING FIXTURES SHALL TAKE PRECEDENCE OVER THE LOCATIONS OF SAME SHOWN ON THE LIGHTING DRAWINGS. THE ELECTRICAL CONTRACTOR SHALL INSTALL THE LIGHTING FIXTURES IN ANY GIVEN AREA TO AGREE WITH THE ARCHITECT'S REFLECTED CEILING PLANS.
- ALL STRAIGHT FEEDER, BRANCH CIRCUIT AND AUXILIARY SYSTEM CONDUIT RUNS SHALL BE PROVIDED WITH SUFFICIENT PULL BOXES TO LIMIT THE MAXIMUM LENGTH OF ANY SINGLE CABLE PULL TO 150 FEET. EXACT SIZES OF PULL BOXES AND LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ELECTRICAL CONTRACTOR.
- FURNISH ALL REQUIRED ACCESS PANELS AS REQUIRED TO SUIT FIELD CONDITIONS FOR THE PROPER OPERATION AND MAINTENANCE OF THE ELECTRICAL SYSTEM. THE EXACT SIZES AND PHYSICAL LOCATIONS SHALL BE TO SUIT ACCESSIBILITY AND CONSTRUCTION CONDITIONS. ALL ACCESS PANELS PROVIDED BY THE ELECTRICAL CONTRACTOR SHALL MATCH EXACTLY THE ACCESS PANELS FURNISHED AND INSTALLED BY THE GENERAL CONTRACTOR. THE ACCESS PANELS WILL BE INSTALLED BY THE TRADE CONTRACTOR UNDER THE APPROPRIATE SECTION OF THE SPECIFICATIONS FOR THE SURFACE IN WHICH THE PANELS ARE LOCATED.
- THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE HVAC AS TO THE EXACT LOCATION OF THEIR RESPECTIVE EQUIPMENT; THE POWER WIRING, CONTROL WIRING AND ALL ELECTRICAL CONNECTIONS AND CONDUIT TURN-UPS SHALL BE COORDINATED WITH THE RESPECTIVE CONTRACTORS BEFORE THE START OF CONSTRUCTION IN
- SLEEVES ARE TO BE UTILIZED FOR PASSAGE OF CONDUITS THROUGH FLOORS OR WALLS. CONDUITS AND BOXES ARE TO BE SUPPORTED BY THE USE OF PRESET FASTENERS INSTALLED IN FLOORS, WALLS OR COLUMNS. CONDUITS AND BOXES ARE TO BE INSTALLED CONCEALED IN MASONRY WALLS AND ABOVE HUNG CEILINGS. ALL SLEEVES ARE TO BE SEALED WITH APPROVED FIRE STOPPING SEALANT.
- ALL LIGHTING FIXTURES. ELECTRICAL DEVICES. CABLES AND RACEWAYS ARE TO BE INDEPENDENTLY SUPPORTED OF THE CEILING SYSTEM. FIXTURES ARE TO BE SUPPORTED FROM THE STRUCTURE BY THE USE OF JACK CHAIN, THREADED ROD OR OTHER MEANS APPROVED BY THE ENGINEER. CEILING SYSTEM TIE WIRES AND GRID ARE NOT TO BE UTILIZED FOR THE SUPPORT OF ELECTRICAL DEVICES, CABLES AND RACEWAYS. APPROVED SUPPORTS, HANGERS, CLIPS, ETC. ARE TO BE UTILIZED.
- THE LOCATION AND MOUNTING HEIGHTS OF ALL POWER, LIGHTING, COMMUNICATIONS AND AUXILIARY SYSTEM DEVICES SHOWN ON THE ARCHITECTURAL DRAWINGS SHALL TAKE PRECEDENCE OVER THE LOCATIONS SHOWN ON THE ELECTRICAL DRAWINGS. THE ELECTRICAL CONTRACTOR SHALL INSTALL ALL POWER, LIGHTING, COMMUNICATIONS AND AUXILIARY SYSTEM DEVICES TO AGREE WITH THE ARCHITECTURAL DRAWINGS
- COMBINED HOMERUNS OF TWO (2) OR THREE (3) CIRCUITS MAY BE UTILIZED. HOWEVER, THE NEUTRAL CONDUCTOR IS TO BE INCREASED TO #10AWG. COMBINED HOMERUNS ARE TO BE LIMITED TO 20A, LIGHTING AND POWER CIRCUITS.
- INSTALLATION OF BACK TO BACK DEVICES ARE TO BE AVOIDED. ALLOW ONE WALL FRAMING MEMBER BETWEEN EACH BACK TO BACK DEVICE AS A MINIMUM.
- WORK SHALL CONFORM TO THE CONNECTICUT ELECTRICAL CODE, CONNECTICUT BUILDING CODE, NFPA AND REQUIREMENTS OF LOCAL AUTHORITIES HAVING JURISDICTION.
- B. THE WORD "CONTRACTOR" AS USED IN THE "ELECTRICAL WORK" SHALL MEAN THE ELECTRICAL SUBCONTRACTOR. CONTRACTOR SHALL PAY FOR ALL PERMITS, INSURANCE AND TESTS, AND SHALL PROVIDE LABOR AND MATERIAL TO COMPLETE THE ELECTRICAL WORK SHOWN.
- EXCEPT AS OTHERWISE NOTED, THE ELECTRICAL WORK SHALL INCLUDE DEMOLITION, PANELBOARDS, CIRCUIT BREAKERS, FEEDERS, WIRING, RACEWAYS, LIGHTING FIXTURES, DEVICES, TELEPHONE AND DATA OUTLETS, SAFETY SWITCHES, FIRE ALARM AND NURSE CALL SYSTEMS, TRANSFORMERS AND CONNECTION NECESSARY TO OPERATE
- MOTORS AND OTHER EQUIPMENT. AUTOMATIC TEMPERATURE CONTROLS SHALL BE PROVIDED AND INSTALLED BY THE MECHANICAL SUBCONTRACTOR. STARTERS, VFD'S AND OTHER CONTROL DEVICES FOR EQUIPMENT SHALL BE FURNISHED BY THE MECHANICAL SUBCONTRACTOR FOR INSTALLATION AND CONNECTION BY THIS CONTRACTOR.
- THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY LIGHTING AND POWER AND THE GENERAL CONTRACTOR SHALL PAY ALL ENERGY CHARGES FOR TEMPORARY POWER AND LIGHTING.
- DURING CONSTRUCTION, THE ELECTRICAL CONTRACTOR SHALL KEEP HIS PORTION OF THE WORK NEAT, CLEAN AND
- ALL SYSTEMS SHALL BE TESTED FOR SHORT CIRCUIT AND GROUNDS PRIOR TO ENERGIZING AND ANY DEFECTS SHALL
- 0. ALL CUTTING AND PATCHING REQUIRED FOR ELECTRICAL WORK SHALL BE INCLUDED AS PART OF THIS SECTION.
- COMPLETE SHOP DRAWINGS SHALL BE SUBMITTED FOR ELECTRICAL EQUIPMENT. WHERE SPECIFIED ELECTRICAL EQUIPMENT IS SUBSTITUTED, THE ELECTRICAL CONTRACTOR SHALL SUBMIT COMPLETE SPECIFICATIONS ON THE SUBSTITUTE AS WELL AS THE ITEM ORIGINALLY SPECIFIED.
- 22. MATERIALS SHALL BE SPECIFICATION GRADE AND UL LISTED.

SPECIFICALLY NOTED OTHERWISE.

BY A LOWER CASE LETTER.

CONTROLLED BY SWITCH "b".

WATTAGE IF NOT INDICATED.

CIRCUITS 1, 3, 5.

- WHERE MATERIAL IS CALLED OUT IN THE LEGEND BY MANUFACTURER, TYPE OR CATALOG NUMBER, SUCH DESIGNATIONS ARE TO ESTABLISH STANDARDS OR DESIRED QUALITY. ACCEPTANCE OR REJECTIONS OF PROPOSED SUBSTITUTIONS SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER.
- . REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF EQUIPMENT AND DEVICE PRIOR TO ROUGHING IN
- 25. WORK SHALL BE COORDINATED WITH THAT OF OTHER TRADES TO ELIMINATE INTERFERENCES.
- 6. EXACT LOCATIONS OF MECHANICAL EQUIPMENT, DEVICES, ETC. SHALL BE VERIFIED WITH HEATING, VENTILATION AND AIR CONDITIONING SUBCONTRACTOR PRIOR TO ROUGHING FOR SAME. (DELETE IF NO ARCHITECT ON PROJECT)
- . ELECTRICAL CONTRACTOR SHALL OBTAIN SHOP DRAWINGS/SPECIFICATIONS OF ALL EQUIPMENT FROM THE GENERAL CONTRACTOR PRIOR TO PURCHASING AND INSTALLING ELECTRICAL EQUIPMENT FOR SAME. NOTIFY ENGINEER OF
- ANY DISCREPANCIES BETWEEN ACTUAL EQUIPMENT INSTALLED AND CONTRACT DOCUMENTS.
- 28. ELECTRICAL WORK SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL COMPLETION. 29. WORK SHALL BE GROUNDED IN ACCORDANCE WITH CODE REQUIREMENTS. COMPLETE EQUIPMENT (INSULATED
- GREEN WIRE) GROUNDING SYSTEM SHALL BE INSTALLED. WIRE SHALL BE TYPE "THHN-THWN" INSULATED FOR 600 VOLTS, MINIMUM SIZE #12 AWG COPPER UNLESS

THE LIGHTING FIXTURE TYPE IS INDICATED BY AN UPPER CASE LETTER. THE CIRCUIT DESIGNATION IS INDICATED BY A NUMBER. THE SWITCH DESIGNATION IS INDICATED

EXAMPLE 2: THE FIXTURE TYPE SHOWN AS A NUMERATOR INDICATES ALL LIGHTING

FIXTURES IN THE ROOM OR SPACE ARE THE SAME TYPE. THE CIRCUIT NUMBER AND

CONTROLLED BY THE SAME SWITCHES, CENTER/OUTBOARD MULTILEVEL SWITCHING.

INDICATED BY A NUMBER. EXAMPLE: THE WALL MOUNTED EXIT LIGHT TYPE "E" WITH

EXIT LIGHTS. STEM INDICATES WALL MOUNTING. NO STEM INDICATES CEILING

MOUNTING. SHADED AREA INDICATES ILLUMINATED FACE(S). ARROW INDICATES DIRECTIONAL ARROW ON ILLUMINATED FACE(S). THE CIRCUIT DESIGNATION IS

THE CONTROL DEVICE DESIGNATION IS INDICATED BY A LOWER CASE LETTER.

EXAMPLE: SINGLE POLE SWITCH "d" TO CONTROL LIGHTING FIXTURES INDICATED BY

TO CONTROL LIGHTING FIXTURES INDICATED BY "e". SEE SPECIFICATIONS FOR

SPECIAL CONNECTIONS. THE EQUIPMENT IS INDICATED BY A NUMBER IN A CIRCLE.

OF CONNECTION. THE CIRCUIT DESIGNATION IS INDICATED BY A NUMBER(S)

SEE THE MOTOR AND EQUIPMENT SCHEDULE FOR THE LOAD DESCRIPTION AND TYPE

ADJACENT TO THE SYMBOL. EXAMPLE: EQUIPMENT NO. 1; 3 PHASE CONNECTION TO

WALL BOX DIMMER WITH SIZE AS INDICATED AT DEVICE. EXAMPLE: WALL BOX DIMMER

EXAMPLE 1: LIGHTING FIXTURE TYPE "A" IS CONNECTED TO CIRCUIT 12 AND

SWITCH DESIGNATION SHOWN AS A DENOMINATOR INDICATES ALL LIGHTING

FIXTURES IN THE ROOM OR SPACE ARE CONNECTED TO THE SAME CIRCUIT.

SINGLE FACE AND DIRECTIONAL ARROW IS CONNECTED TO CIRCUIT 14.

ELECTRICAL SYMBOL NOTES

- 30. WIRING METHODS:
- A. EXTERIOR ABOVE GRADE FEEDERS SHALL BE RGS CONDUIT.
- B. INTERIOR FEEDERS SHALL BE EMT OR RGS CONDUIT C. INTERIOR LIGHTING AND RECEPTACLE BRANCH CIRCUITS IN PARTITIONS SHALL BE MC CABLE. . INTERIOR BRANCH CIRCUITS ABOVE HUNG CEILINGS SHALL BE EMT CONDUIT.
- . INTERIOR BRANCH CIRCUITS FOR HVAC, PLUMBING AND FIRE PROTECTION EQUIPMENT SHALL BE EMT OR
- EMERGENCY, CRITICAL AND LIFE/SAFETY BRANCH LIGHTING CIRCUITRY SHALL BE EMT CONDUIT. H. EQUIPMENT CONNECTIONS SHALL BE LIQUID TIGHT FLEXIBLE METAL CONDUIT.
- FIRE ALARM SYSTEM WIRING SHALL BE EMT. J. TELEPHONE AND DATA SHALL BE EMPTY EMT W/PULL WIRE.

F. LIGHTING FIXTURE CONNECTIONS SHALL BE MC CABLE.

- 31. CONNECTORS FOR RIGID CONDUIT SHALL BE MADE WITH THREADED COUPLINGS.
- 32. CONNECTORS FOR ELECTRIC METALLIC TUBING AND FLEXIBLE LIQUID TIGHT CONDUIT SHALL BE COMPRESSION TYPE WITH INSULATED THROATS.
- 33. CONDUIT AND TUBING SHALL BE SUPPORTED ON GALVANIZED WALL BRACKETS. TRAPEZE HANGERS OR PIPE STRAPS SECURED BY MEANS OF TOGGLE BOLTS OR INSERTS IN WOOD CONSTRUCTION.
- 34. BOXES SHALL BE GALVANIZED STEEL AND SHALL BE SIZED TO ACCOMMODATE THE EQUIPMENT OR APPARATUS TO BE INSTALLED. WHERE BOXES OF A STANDARD MAKE ARE NOT AVAILABLE, SPECIAL BOXES SHALL BE MANUFACTURED. FIXTURES SUPPORTED ON THE CEILING OR ON THE WALL SHALL HAVE SUITABLE FIXTURE SUPPORT FOR THE SPECIFIC FIXTURE.
- 35. DISCONNECT SWITCHES, AND CONTROLLERS SHALL HAVE NAMEPLATES OF BLACK LAMINATED PLASTIC WITH ENGRAVED WHITE LETTERS, SECURED WITH SELF-TAPPING SCREWS.
- 36. CONNECTIONS AT MOTORS SHALL BE MADE WITH 18" LENGTH OF 1/2 INCH FLEXIBLE LIQUID TIGHT CONDUIT.
- 37. CONTRACTOR SHALL PHASE BALANCE PANELBOARDS IN THE FIELD. LOAD ON EACH PHASE SHALL BE BALANCED WITHIN 10% OF EACH OTHER.
- WALL PLATES SHALL BE PROVIDED FOR EACH SWITCH, RECEPTACLE, DATA AND TELEPHONE OUTLET. PROVIDE WALL PLATES WITH STAINLESS STEEL FINISH FOR ALL DEVICES IN FINISHED AREAS. FOR DEVICES IN UNFINISHED AREAS, PROVIDE CAST IRON OR ALLOY OF SUITABLE TYPE TO MATCH OUTLET BOXES SPECIFIED.
- 39. TOGGLE SWITCHES SHALL BE OF THE SINGLE POLE A.C. QUIET TOGGLE TYPE FOR MOUNTING IN A SINGLE-GANG SPACING. TOGGLE SWITCHES SHALL BE FULLY RATED 20 AMPERES AT 120/277 VOLT.
- 40. DUPLEX WALL RECEPTACLES SHALL BE 2 POLE. 3 WIRE, GROUNDING TYPE 20 AMPERE, 125 VOLT WITH METAL
- PLASTER EARS. RECEPTACLES SHALL BE NEMA STANDARD CONFIGURATION 5-20R. 41. FUSED OR UNFUSED SAFETY SWITCHES SHALL BE TOTALLY ENCLOSED, HEAVY DUTY TYPE. SWITCHES SHALL HAVE VOLTAGE, HORSEPOWER AND AMPERE RATING SUITABLE FOR THE APPLICATION. PROVIDE NUMBER OF
- POLES AS REQUIRED. SWITCHES LOCATED EXTERIOR TO THE BUILDING OR IN DAMP/WET LOCATIONS SHALL BE IN A NEMA 3R ENCLOSURE.
- 42. FUSES SHALL BE DUAL ELEMENT, TIME DELAY TYPE, AS MANUFACURED BY BUSSMAN, RELIANCE OR APPROVED
- 43. FURNISH AND INSTALL SLEEVES IN FLOORS, BEAMS, WALLS, ETC. REQUIRED FOR INSTALLING THIS WORK.
- 44. CONDUIT PASSING THROUGH FIRE RATED WALLS AND FLOORS SHALL BE PROVIDED WITH ALL NECESSARY MATERIALS TO ENSURE THAT THE FIRE RATED INTEGRITY IS MAINTAINED.
- 45. FEEDER TAPS WILL NOT BE ALLOWED IN PANELBOARD GUTTERS.
- 46. CONDUIT RUNS AS SHOWN ON THE PLANS ARE DIAGRAMMATIC ONLY; EXACT LOCATION AND METHOD OF SUPPORT SHALL BE DETERMINED IN THE FIELD.
- 47. CONTRACTOR SHALL CHECK EXISTING CONDITIONS TO DETERMINE EXACT EXTENT OF WORK TO BE PERFORMED PRIOR TO BIDDING. DIMENSIONS RELEVANT TO EXISTING WORK SHALL BE VERIFIED IN THE FIELD.
- 48. IN AREAS NOT AFFECTED BY THIS RENOVATION, THIS SUBCONTRACTOR SHALL MAINTAIN CONTINUITY OF
- ELECTRIC SERVICE. 49. WHERE CONNECTIONS ARE MADE IN EXISTING PANELS, THE PANEL INDEX SHALL BE REVISED TO INDICATE THE
- NEW LOADS SERVED. NEW CIRCUIT BREAKERS ADDED TO EXISTING PANELS SHALL BE THE SAME FRAME SIZE, VOLTAGE RATING AND INTERRUPTING CAPACITY AS EXISTING PANEL AND CIRCUIT BREAKERS.
- 50. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED POWER SUPPLIES, APPURTENANCES, FINAL CONNECTIONS, TESTING AND WORK REQUIRED FOR ADDITIONS TO THE EXISTING FIRE ALARM SYSTEM. PAY ALL COSTS ARISING THERE FROM, FOR A COMPLETE AND OPERATIONAL SYSTEM.
- 51. ELECTRICAL SHUTDOWN SHALL BE AT A TIME AND DATE APPROVED BY THE OWNER.
- 52. PROVIDE AS-BUILT "CADD" DRAWINGS AT THE COMPLETION OF THE PROJECT.
- 53. ALL RECEPTACLES LOCATED WITHIN THE MAINTENANCE BAY'S AND GARAGE AREAS SHALL BE GFI TYPE OUTLETS.
- 54. ELECTRICAL CONTRACTOR SHALL LABEL ALL ELECTRICAL DEVICES INCLUDING BUT NOT LIMITED TO RECEPTACLES, TEL/DATA OUTLETS, DISCONNECT SWITCHES, PANELBOARDS, THERMAL MOTOR SWITCHES,
- CONTROL PANELS, JUNCTION BOXES, ETC. A. RECEPTACLES - PANEL NAME AND CIRCUIT DESIGNATION
- B. TEL/DATA OUTLETS NUMBER OF DATA AND TELEPHONE PORTS . DISCONNECTS/THERMAL MOTOR SWITCHES - PANEL NAME, CIRCUIT DESIGNATION AND EQUIPMENT SERVING.
- PANELBOARDS PANEL NAME, VOLTAGE, AMPERAGE, PHASE AS WELL AS PANEL AND CIRCUIT IT IS FED FROM. CONTROL PANEL - PANEL NAME AND CIRCUIT DESIGNATION
- F. JUNCTION BOXES PANEL NAME AND CIRCUIT DESIGNATION

7,9 ELECTRIC HEATER CONNECTIONS. THE HEATER TYPE IS INDICATED BY A NUMBER FOLLOWING THE UPPER CASE LETTER "H". SEE THE HEATER SCHEDULE FOR

EXAMPLE: MOTOR SF-1; 3 PHASE CONNECTION TO CIRCUITS 2, 4, 6.

CONDUIT UNLESS SPECIFIC EQUIPMENT REQUIRES A DIFFERENT SIZE.

TYPE. SEE APPROPRIATE SCHEDULE OR SPECIFICATIONS.

CONNECTED TO CIRCUITS 7. 9.

LPN-102; CIRCUITS 1, 3, 5.

1) OR 1 SPECIAL NOTE. SEE THE G. ES. INDICATED IN THE HEXAGON.

ELECTRICAL REQUIREMENTS. THE CIRCUIT DESIGNATION IS INDICATED BY A NUMBER(S)

ADJACENT TO THE HEATER. EXAMPLE: ELECTRIC BASEBOARD HEATER TYPE "H1"

CHARACTERS ADJACENT TO THE MOTOR SYMBOL. SEE THE MOTOR AND EQUIPMENT

PANELBOARDS. PANELBOARD DOORS MAY BE SHOWN TO INDICATE OPENING SIDE OF

RECESSED PANELBOARDS. SEE PANELBOARD IDENTIFICATION FOR DESIGNATION

SPECIAL NOTE. SEE THE SPECIAL NOTES ON THAT SHEET FOR THE NOTE NUMBER

HOME RUN TO BRANCH CIRCUIT PANELBOARD. THE PANELBOARD DESIGNATION IS

VSHOWN ADJACENT TO THE HOME RUN ARROW AS A NUMERATOR AND THE CIRCUIT

PANELBOARD AND CIRCUIT DESIGNATION. EXAMPLE: HOME RUN TO PANELBOARD

SYMBOL NOTATIONS: UPPER CASE LETTERS ADJACENT TO SYMBOLS INDICATE A UNIT

DESIGNATION IS SHOWN AS THE DENOMINATOR. CIRCUIT BREAKER SIZES (AMPS/NUMBER OF POLES) ARE SHOWN IN THE PANELBOARD SCHEDULE WITH THE CORRESPONDING

CONDUIT SHOWN WITHOUT SLASH MARKS SHALL CONTAIN 2 # 12 CONDUCTORS IN 3/4"

SCHEDULE FOR THE MOTOR DESCRIPTION AND ELECTRICAL REQUIREMENTS. THE

CIRCUIT DESIGNATION IS INDICATED BY A NUMBER(S) ADJACENT TO THE SYMBOL.

MOTOR CONNECTIONS. THE MOTOR IS INDICATED BY A NUMBER WITHIN OR

55. ADDRESS QUESTIONS TO THE ENGINEER IN WRITING BEFORE AWARD OF CONTRACT, OTHERWISE ENGINEER INTERPERTATION OF MEANING AND INTENT OF DRAWINGS SHALL BE FINAL.

ELECTRICAL DRAWINGS

- ELECTRICAL TITLE SHEET LEVEL 1 LIGHTING PLAN PART A E102
- LEVEL 2 LIGHTING PLAN PART A BASEMENT POWER PLAN LEVEL 1 POWER PLAN PART A
- LEVEL 1 POWER PLAN PART B E204 LEVEL 2 POWER PLAN PART A LEVEL 2 POWER PLAN PART B
- E206 ROOF POWER PLAN PART A E207 ROOF POWER PLAN PART B ELECTRICAL DETAILS SHEET
- ELECTRICAL SCHEDULES SHEET BASEMENT DEMOLITION PLAN
- ED102 LEVEL 1 DEMOLITION PLAN PART A ED103 LEVEL 1 DEMOLITION PLAN PART B
- ED104 LEVEL 2 DEMOLITION PLAN PART A ED105 LEVEL 2 DEMOLITION PLAN PART B ED106 ROOF DEMOLITION PLAN PART A ED107 ROOF DEMOLITION PLAN PART B

Consultants: LEVEL 1 LIGHTING PLAN PART B

> Quisenberry Arcari Malik 195 Scott Swamp Road Farmington, CT 06032

CITY OF BRISTOL. CT

HVAC SYSTEM UPGRADES

AT SOUTH SIDE

ELEMENTARY SCHOOL

21 Tuttle Rd.

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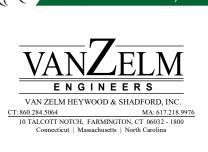
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Revisions:		
Rev	Date	Description
1	04/15/20	ADDENDUM #1
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Issued For: BID SET

SCALE: AS NOTED 04/02/2020

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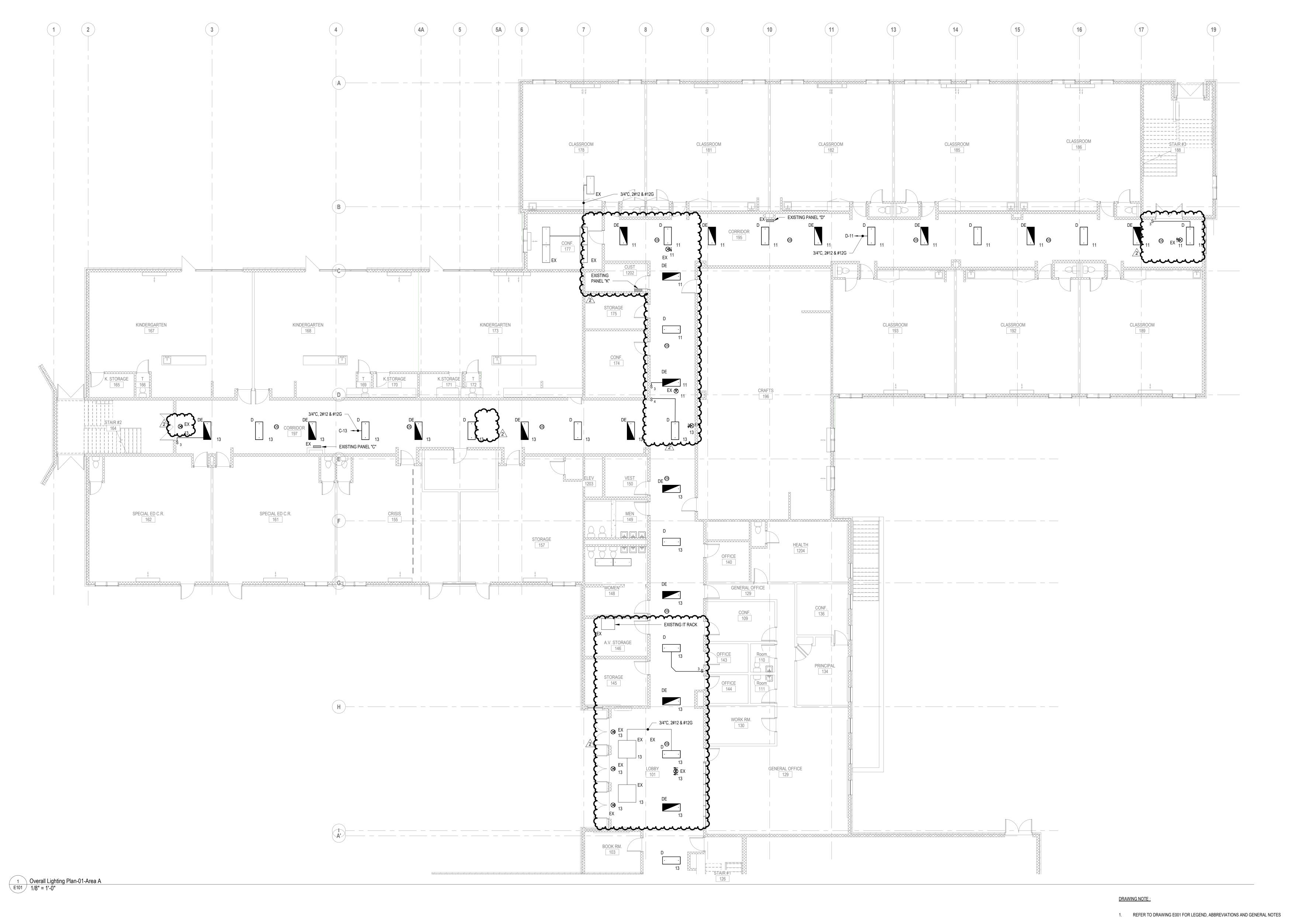
W&S Project No: 2170808

Drawing Title:

ELECTRICAL

TITLE SHEET

Sheet Number:



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21 Tuttle Rd.

CITY OF BRISTOL, CT

Weston Sampson Engineers, Inc.
100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
www.westonandsampson.com

Bristol, CT 06010

Consultants:





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Rev	Date	Description		
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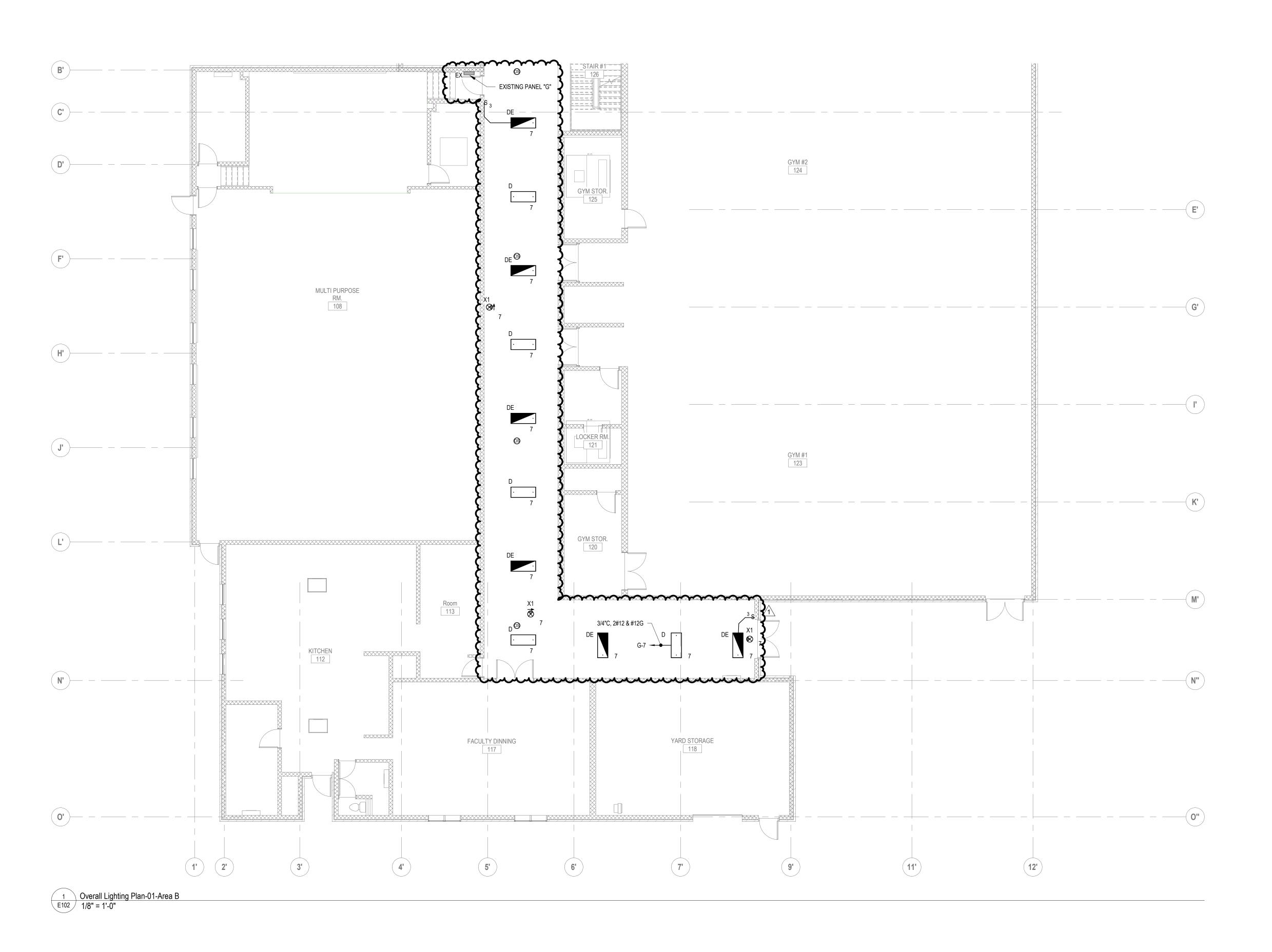
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Drawing Title:

LEVEL 1 LIGHTING PLAN PART A

Sheet Number:

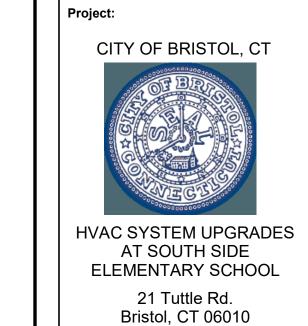


DRAWING NOTE:

1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES

ALTERNATE NOTE:

1. ALL WORK INCLUDED IN THIS DRAWING SHALL BE INCLUDED AS PART OF ALTERNATE 1



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100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
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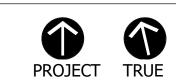


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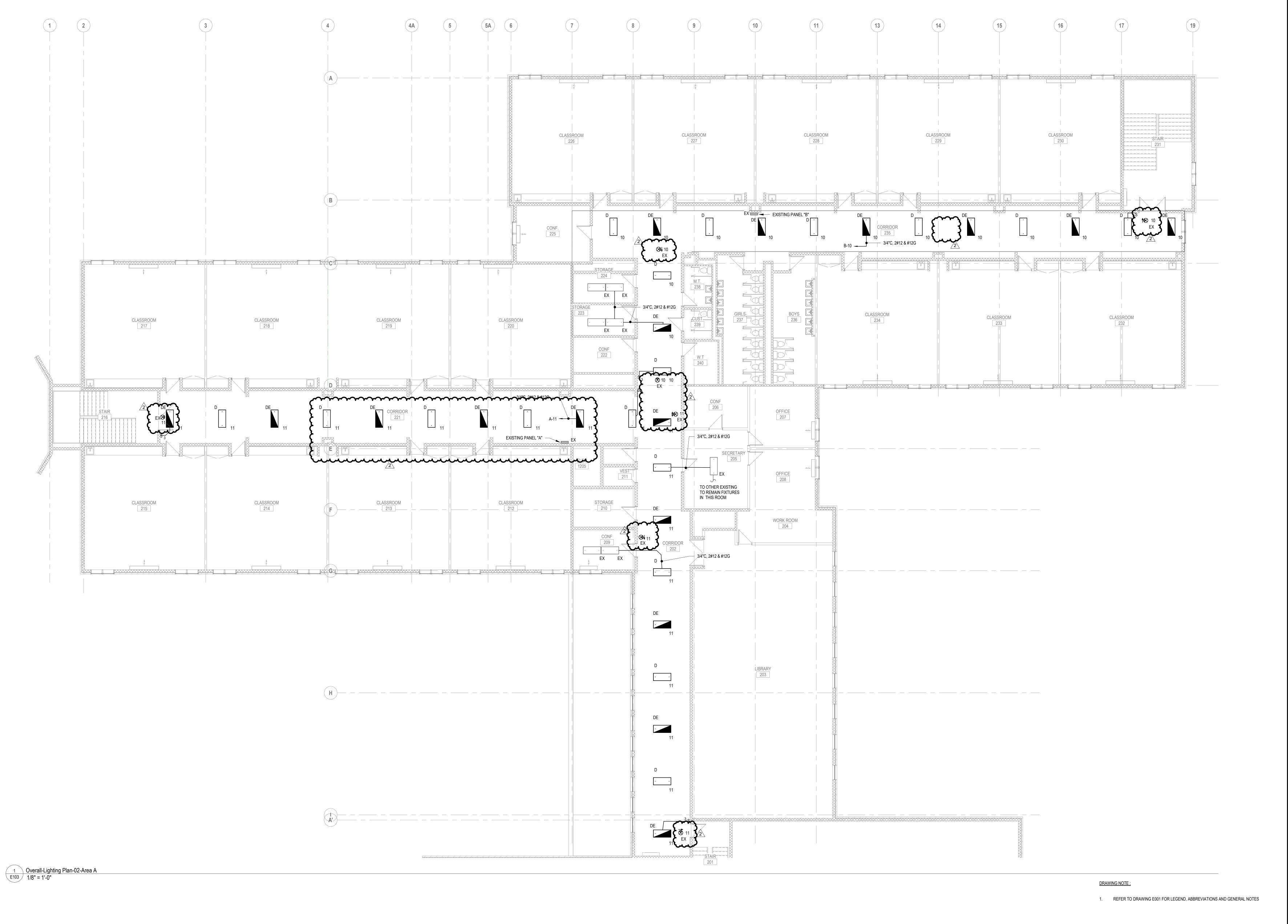
W&S Project No: 2170808

Drawing Title:

LEVEL 1 LIGHTING PLAN PART B

Sheet Number:

E102



CITY OF BRISTOL, CT **HVAC SYSTEM UPGRADES**

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Consultants:

Quisenberry Arcari Malik 195 Scott Swamp Road Farmington, CT 06032 (860) 677-4594

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Rev	Date	Description		
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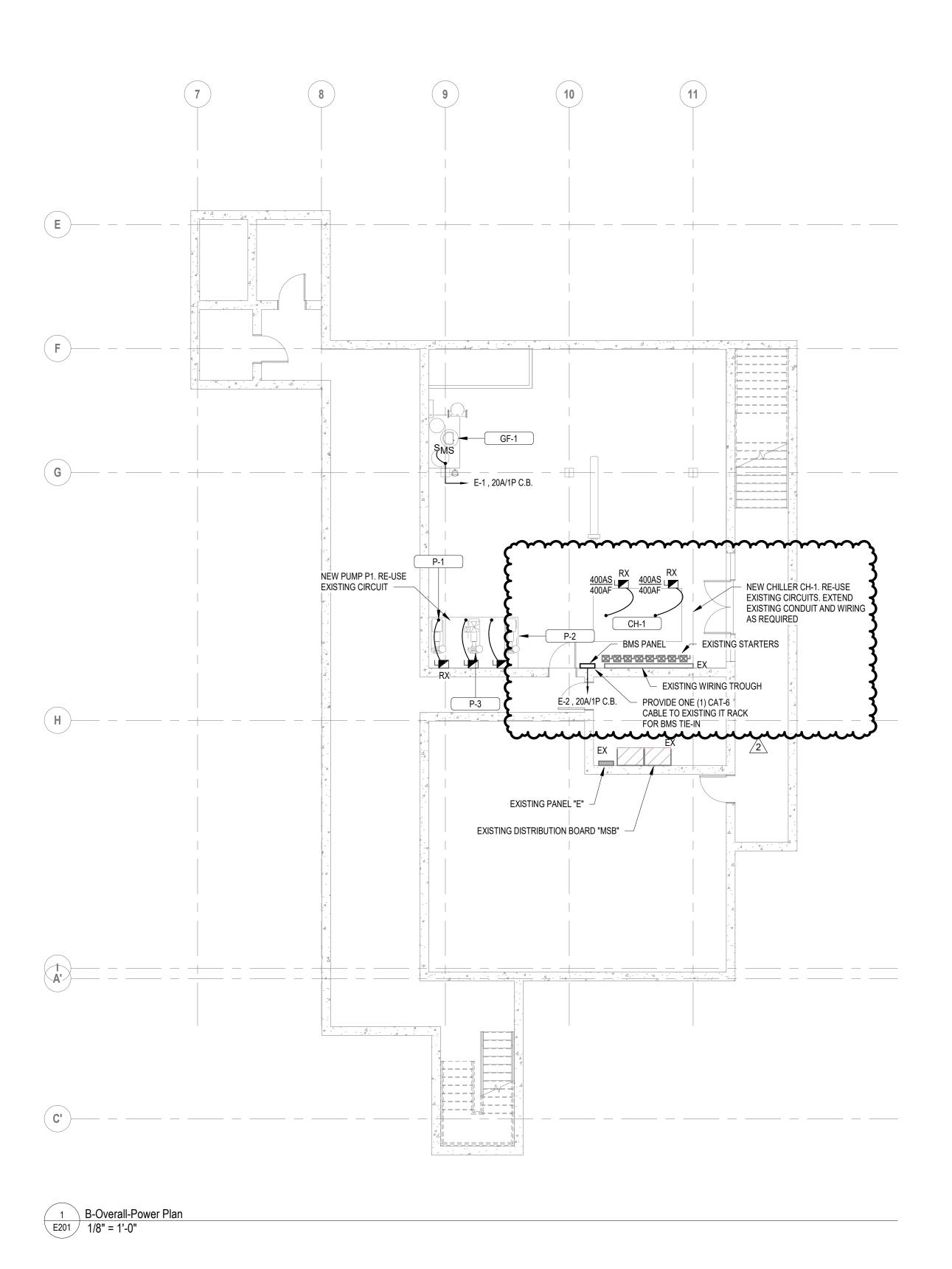
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Drawing Title:

LEVEL 2 LIGHTING PLAN PART A

Sheet Number:



Project:

CITY OF BRISTOL, CT

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AT SOUTH SIDE
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21 Tuttle Rd.

Weston & Sampson Engineers, Inc.

100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
www.westonandsampson.com

Bristol, CT 06010

Consultants:





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Reviewed By: DN

Approved By: RFM

W&S Project No: 2170808

Drawing Title:

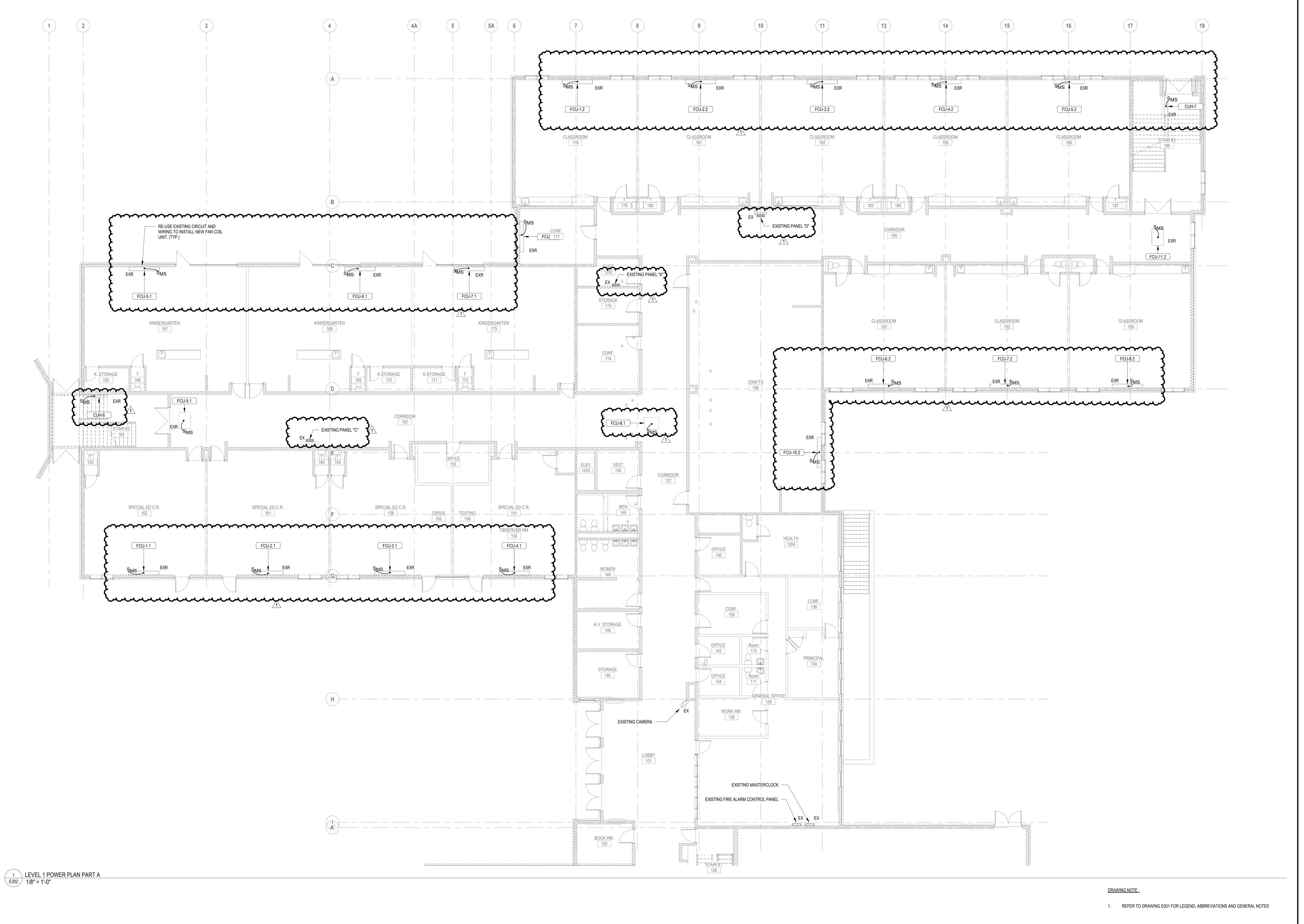
DRAWING NOTE:

1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES

BASEMENT POWER PLAN

Sheet Number:

E201



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		Rev Date 1 04/15/20	

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SCALE: AS NOTED

Date: 04/02/20

Drawn By: MK

Reviewed By: DNM

Approved By: RFM
W&S Project No: 2170808

Drawing Title:

LEVEL 1 POWER PLAN PART A

Sheet Number:

E202



DRAWING NOTE :

1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES

ALTERNATE NOTE :

1. ALL WORK INCLUDED IN THIS DRAWING SHALL BE INCLUDED AS PART OF ALTERNATE 1

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	2	04/23/20	ADDENDUM #2

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SCALE: AS NOTED

Date: 04/
Drawn By: MK

Approved By: RFM

W&S Project No: 2170808

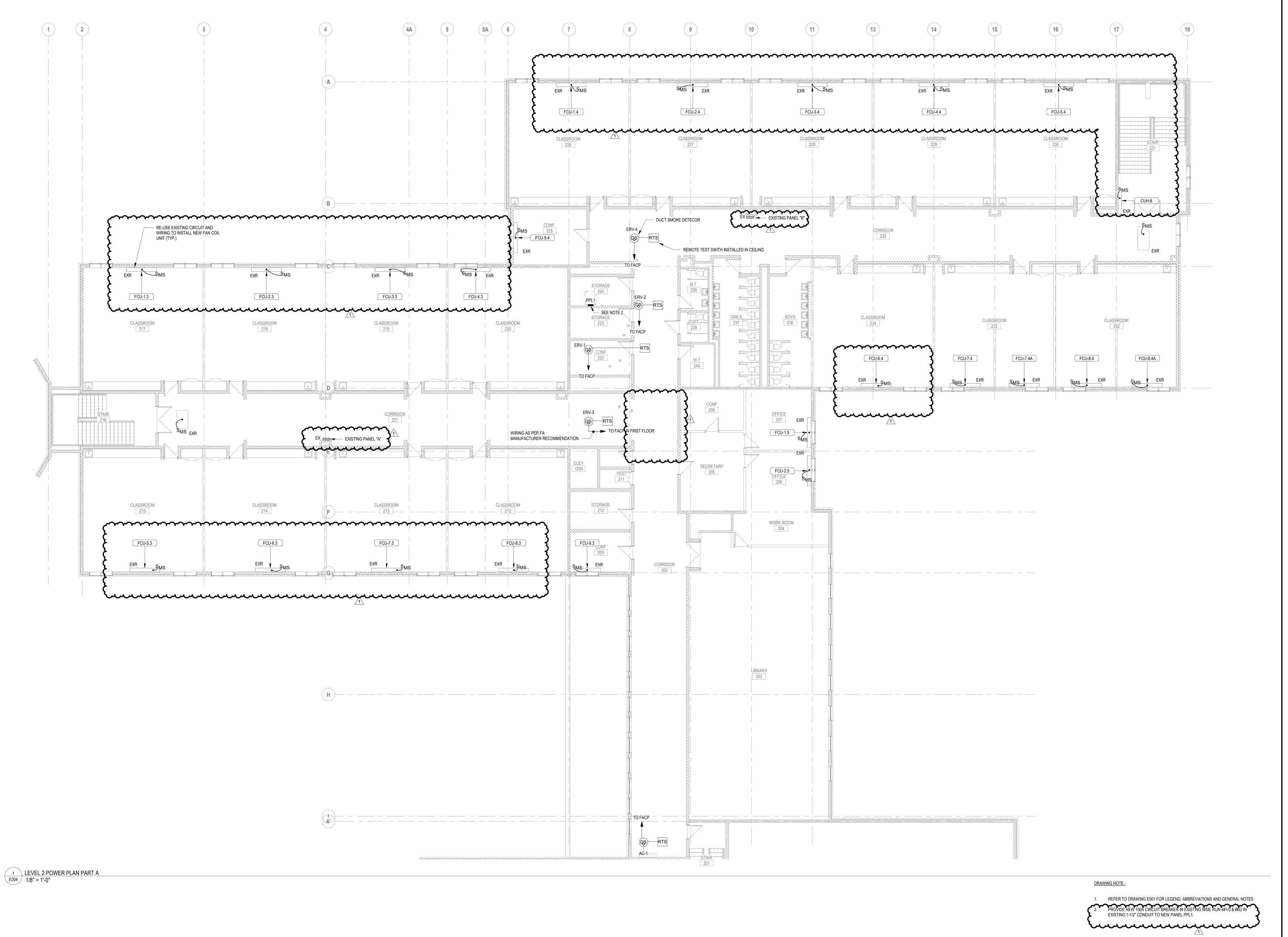
Drawing Title:

Drawing Title:

LEVEL 1 POWER
PLAN PART B

Sheet Number:

E203



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Date: 04/02/2

Drawn By: MK

Reviewed By: DNM

Approved By: DNM

Approved By: RFM

W&S Project No: 2170808

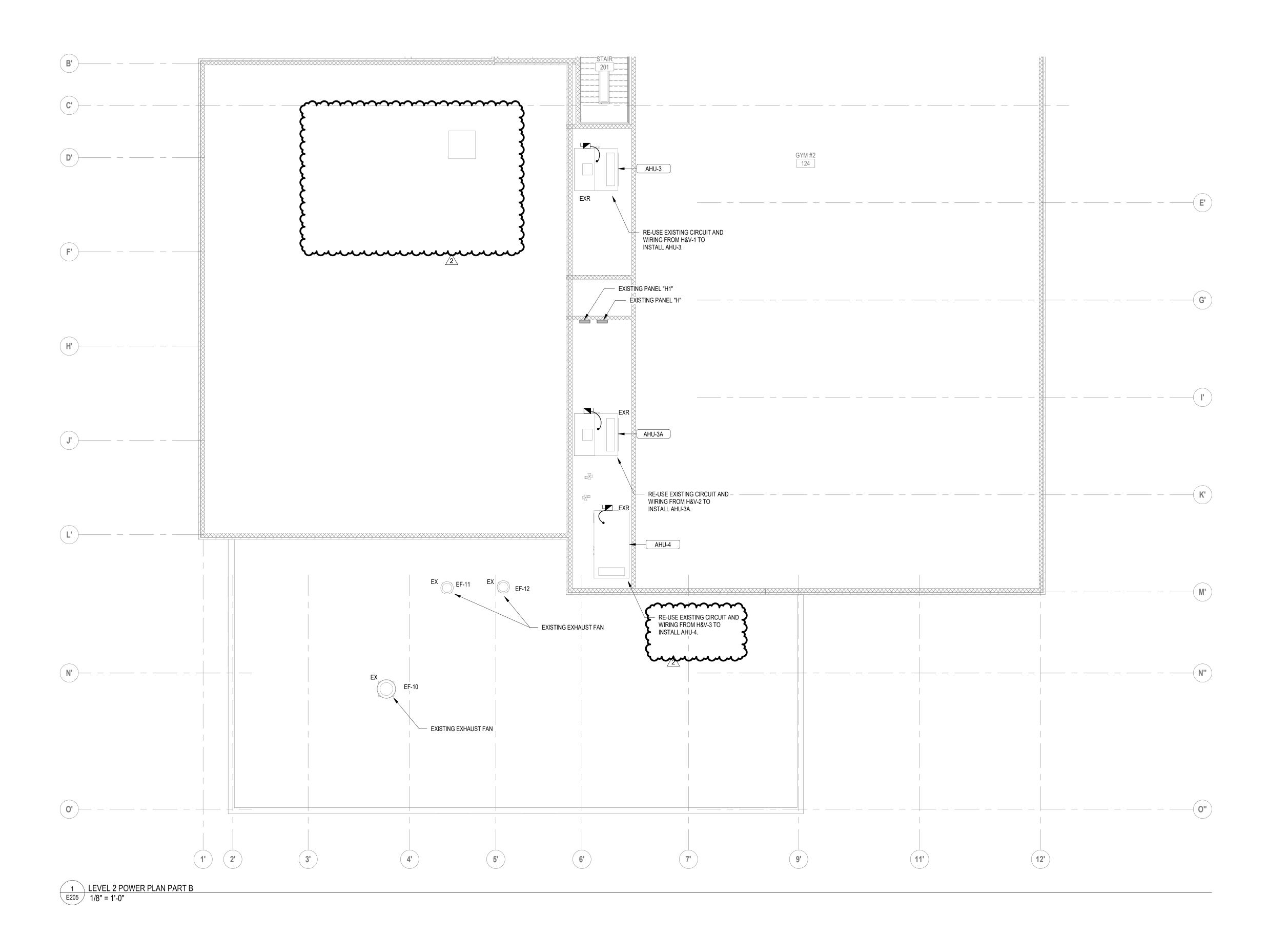
Drawing Title:

Drawing Title:

LEVEL 2 POWER PLAN PART A

Sheet Number:

E204

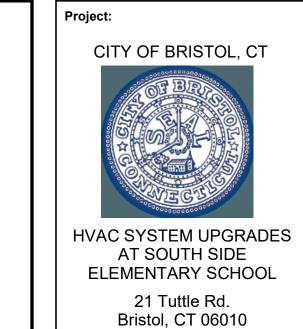


DRAWING NOTE :

- 1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES
- 2. CONTRACTOR TO PROVIDE SUPPORT FOR EXISTING TO REMAIN DEVICES.

ALTERNATE NOTE :

1. ALL WORK INCLUDED IN THIS DRAWING SHALL BE INCLUDED AS PART OF ALTERNATE 1



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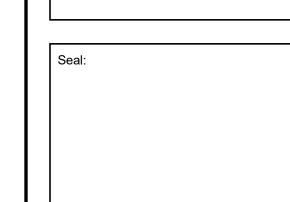


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2 04/23/20 ADDENDUM #2

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Drawn By: M

Approved By: RFI

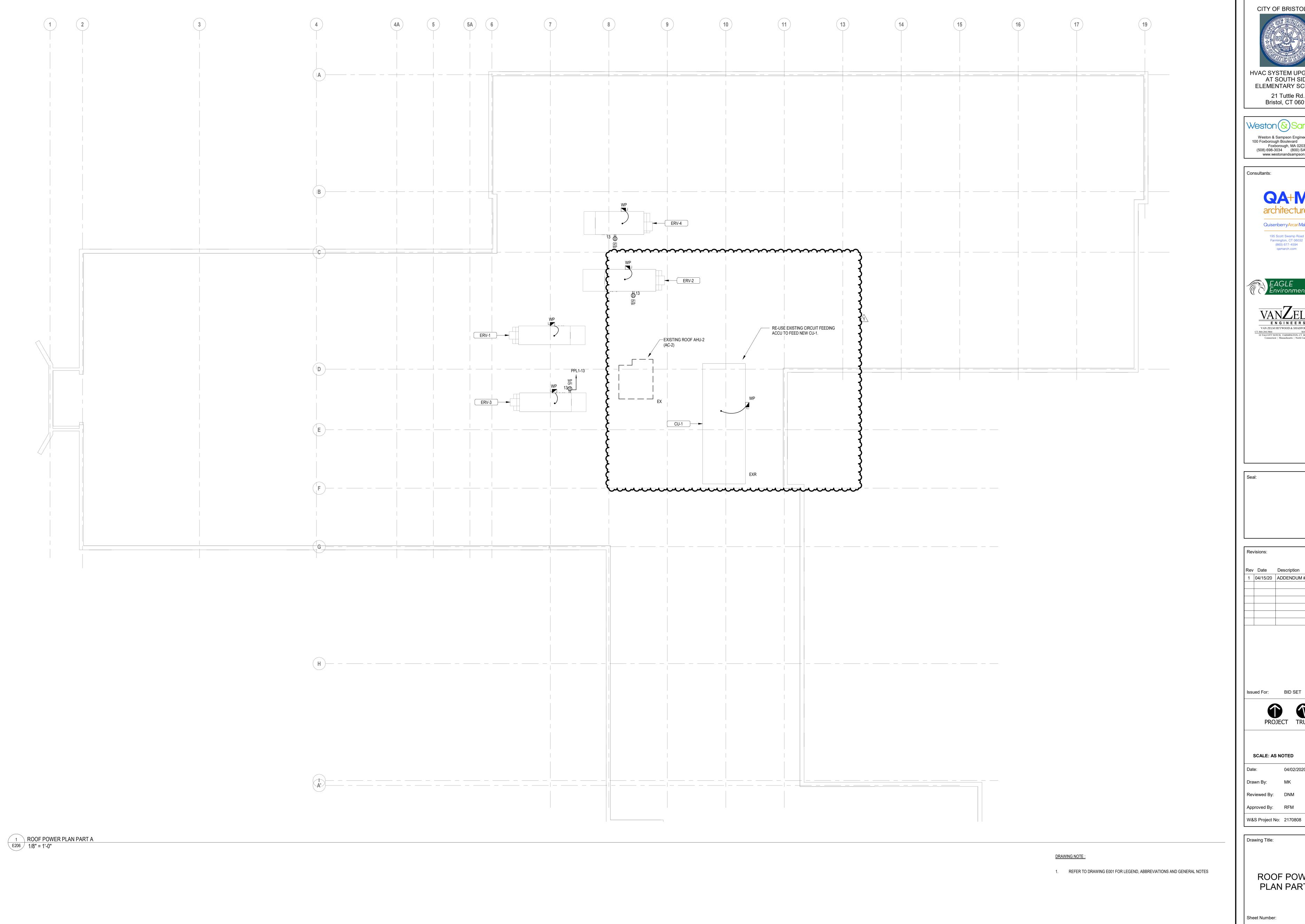
W&S Project No: 2170808

Drawing Title:

LEVEL 2 POWER PLAN PART B

Sheet Number:

E205



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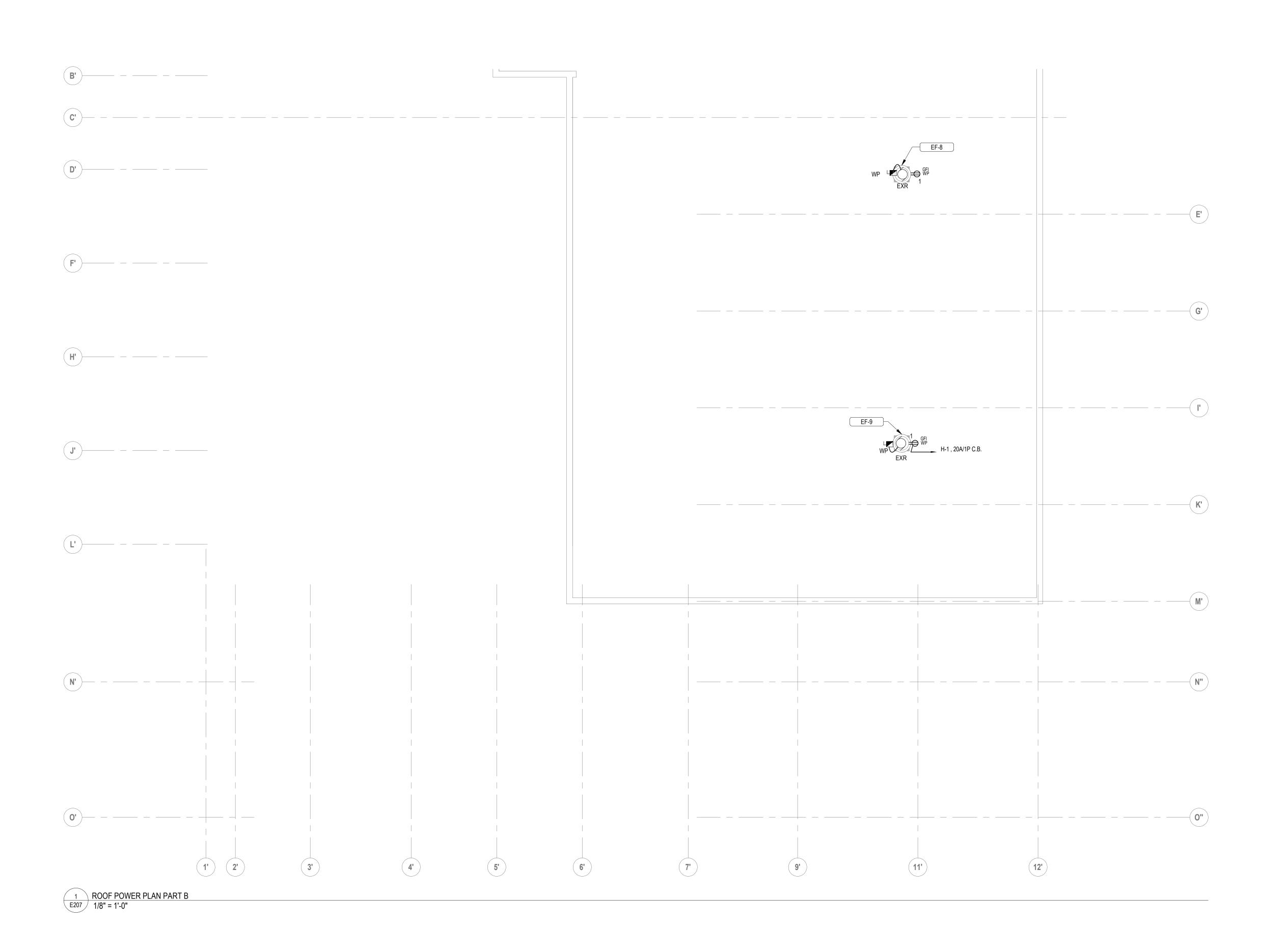




Drawing Title:

ROOF POWER PLAN PART A

Sheet Number:



DRAWING NOTE :

1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES

ALTERNATE NOTE:

1. ALL WORK INCLUDED IN THIS DRAWING SHALL BE INCLUDED AS PART OF ALTERNATE 1

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Date: 04/0
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Reviewed By: DNM

Approved By: RFM

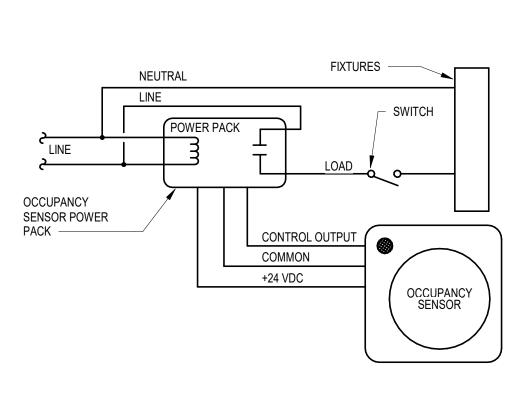
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W&S Project No: 2170808

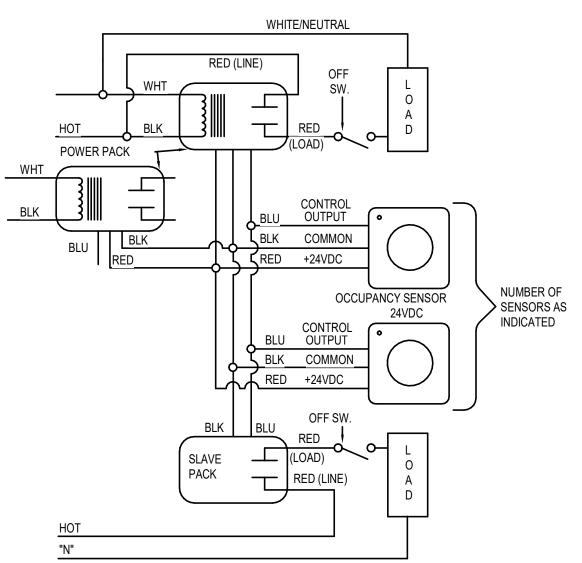
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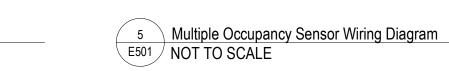
ROOF POWER PLAN PART B

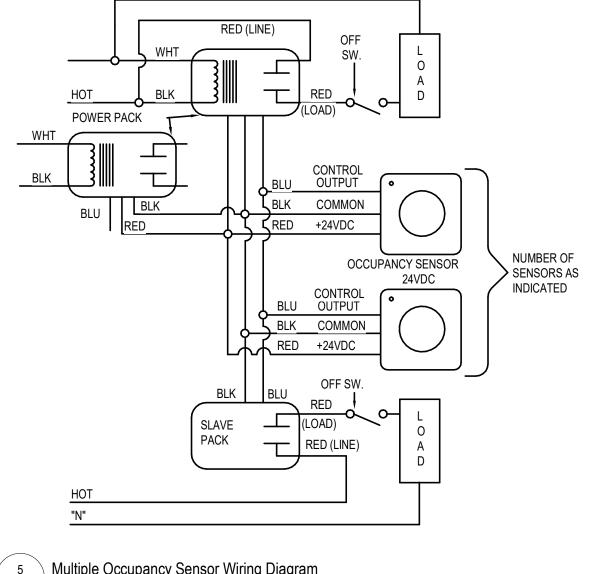
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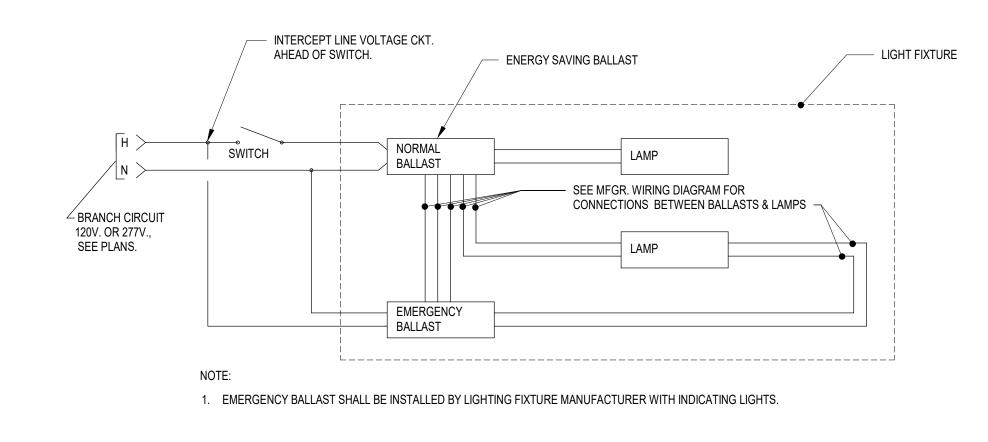


2 Ceiling Mounted Occupancy Sensor Wiring Diagram
NOT TO SCALE

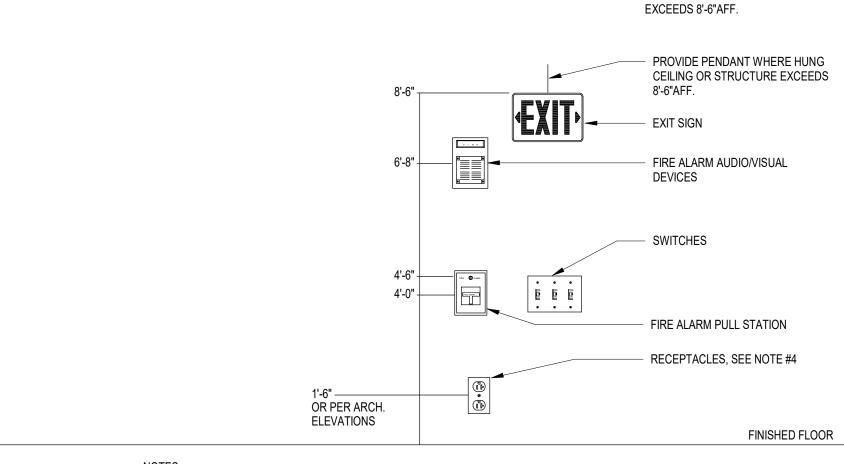








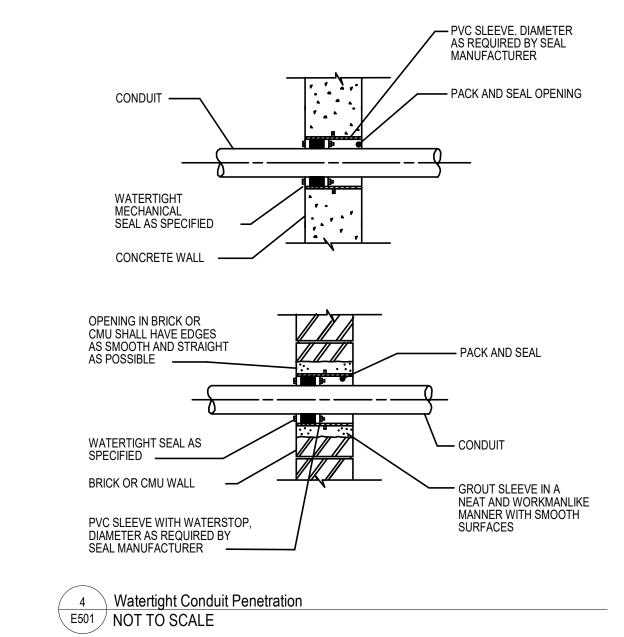


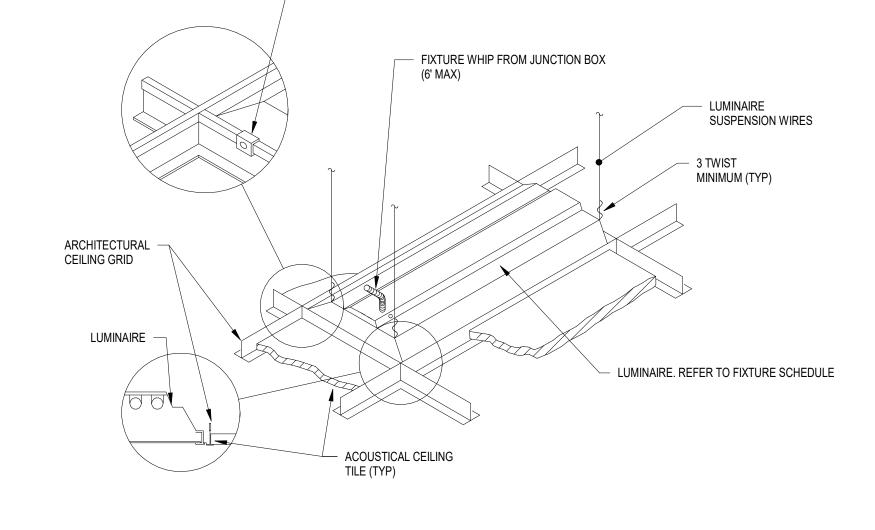


HUNG CEILING OR STRUCTURE

1. ALL MOUNTING HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF DEVICE EXCEPT EXIT 2. DEVICES SHALL BE INSTALLED ON A COMMON VERTICAL CENTERLINE WHEREVER POSSIBLE. 3. ALL DEVICES SHALL BE INSTALLED AT MOUNTING HEIGHTS AS INDICATED ON THIS DETAIL UNLESS OTHERWISE NOTED ON ARCH. ELEVATIONS & DETAILS.



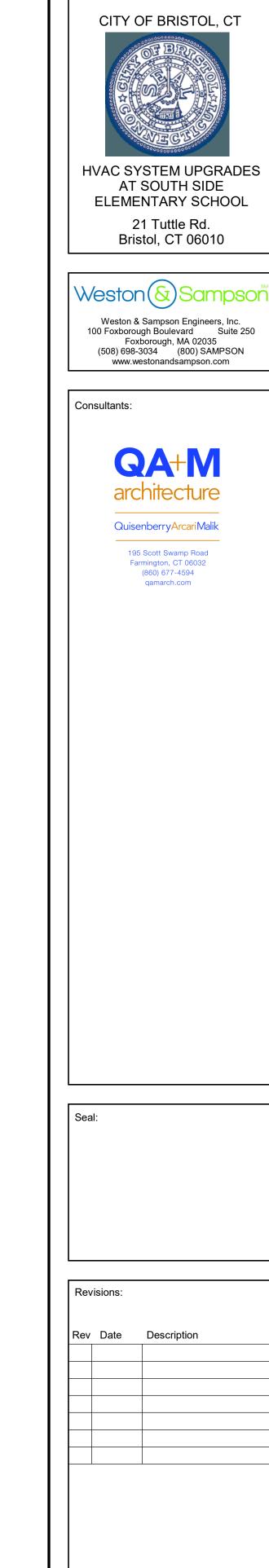


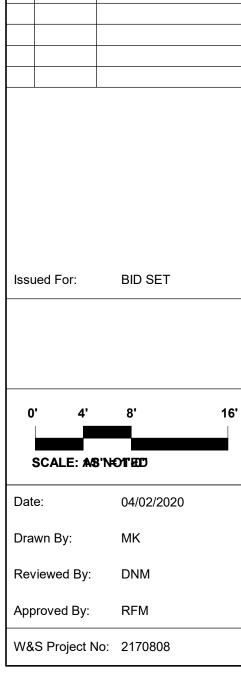


LUMINAIRE MANUFACTURER'S MOUNTING

HARDWARE AS PER SPECIFICATION

GENERAL NOTE: INSTALL IN ACCORDANCE WITH MANUFACTURER'S MOUNTING INSTRUCTIONS AND USING THE RECOMMENDED MOUNTING





Drawing Title:

Sheet Number:

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ELECTRICAL

DETAILS SHEET

LIGHTING FIXTURE SCHEDULE									
TYPE	DESCRIPTION	MANUFACTURER	CATALOG NUMBER	NO. OF LAMPS	LAMP TYPE	MOUNTING	VOLTAGE	LOAD (WATTS)	NOTES
D	2' X 4' LED RECESSED LIGHT FIXTURE	METALUX	24 CZ-LD5-35-UNV-L835-CD1-U	-	LED/ 3321 LUMENS/ 3500K	RECESSED GRID	120	25	
DE	2' X 4' EMERGENCY LED RECESSED LIGHT FIXTURE	METALUX	24 CZ-LD5-35-UNV-L835-CD1-U	-	LED/ 3321 LUMENS/ 3500K	RECESSED GRID	120	25	NOTE 1
X1	LED EXIT SIGN. MOUNTING, NUMBER OF FACES AND ARROWS AS SHOWN ON FLOOR PLANS	EMERGI-LITE	WPREMDNR	-	LED	UNIVERSAL	120	2.5	
NOTES:									•

1. PROVIDE WITH INTEGRAL EMERGENCY LED DRIVER

HVAC EQUIPMENT SCHEDULE															
		LOCATI	ION		LOAD						CONDUIT & WIRE	STARTER	CONTROL DEVICE	DISCONNECT	
NO.	DESCRIPTION	NAME	NUMBER	HP	Α	W	VOLT	PHASE	Panel	Circuit Number	SIZE	COMPONENT	COMPONENT	COMPONENT	NOTES
ERV-1	ENERGY RECOVERY VENTILATOR			5.00 hp	14.0 A	4539 W	208 V	3	PPL1	1,3,5	3/4"C., 3#10 & #10G	VFD	-	30AF/30AT	
ERV-2	ENERGY RECOVERY VENTILATOR			7.50 hp	21.1 A	6841 W	208 V	3	PPL1	7,9,11	1"C., 3#8 & #10G	VFD	-	60AF/45AT	
ERV-3	ENERGY RECOVERY VENTILATOR			5.00 hp	14.0 A	4539 W	208 V	3	PPL1	2,4,6	3/4"C., 3#10 & #10G	VFD	-	30AF/30AT	
ERV-4	ENERGY RECOVERY VENTILATOR			7.50 hp	21.1 A	6841 W	208 V	3	PPL1	8,10,12	1"C., 3#8 & #10G	VFD	-	60AF/45AT	
CU-8.1	1 FAN COIL UNIT	CORRIDOR	127	0.00 hp	7.7 A	832 W	120 V	1	К	1	3/4"C., 2#12 & #12G	-	-	20A/1P	PROVIDE 20A/1P C.B. IN PANEL K
P-2	PUMP	BIOLER ROOM	013	7.50 hp	24.2 A	7847 W	208 V	3	BASEMENT WIRING TROUGH	1,3,5	1"C., 3#8 & #10G	VFD	-	60AF/60AT	
P-3	PUMP	BIOLER ROOM	013	7.50 hp	24.2 A	7847 W	208 V	3	BASEMENT WIRING TROUGH	2,4,6	1"C., 3#8 & #10G	VFD	-	60AF/60AT	

The state of the s

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Panel ID: PPL1
Voltage: 208Y/120
Phase/Wire: 3/4
Fed From: MSB
Location: STORAGE 224

MCB Rating: 100.0 A

A.I.C. Rating: 10,000 AMPS SYMMETRICAL

Manufacturer:

		СВ									СВ		
CKT	DESCRIPTION	Size	Poles	ļ.	4	ı	В	(Poles	Size	DESCRIPTION	CKT
1				1.7	1.7								2
3	ERV-1	30 A	3			1.7	1.7			3	30 A	ERV-3	4
5								1.7	1.7				6
7				2.5	2.5								8
9	ERV-2	45 A	3			2.5	2.5			3	45 A	ERV-4	10
11								2.5	2.5				12
13	RCPT	20 A	1	0.5	0.0								14
15	SPARE	20 A	1			0.0	0.0			3	20 A	SPARE	16
17	SPARE	20 A	1					0.0	0.0				18
19	SPACE			0.0	0.0							SPACE	20
21	SPACE					0.0	0.0				1	SPACE	22
23	SPACE							0.0	0.0			SPACE	24
25	SPACE			0.0	0.0						1	SPACE	26
27	SPACE					0.0	0.0					SPACE	28
29	SPACE							0.0	0.0		ŀ	SPACE	30
	Total kVA: 9.0 kVA 8.4 kVA 8.4 kVA												

Total Connected Load (kVA) 25.8 kVA

Total Connected Current (Amps) 71.7 A

NOTE: PROVIDE 150A PANEL WITH 100A MCB

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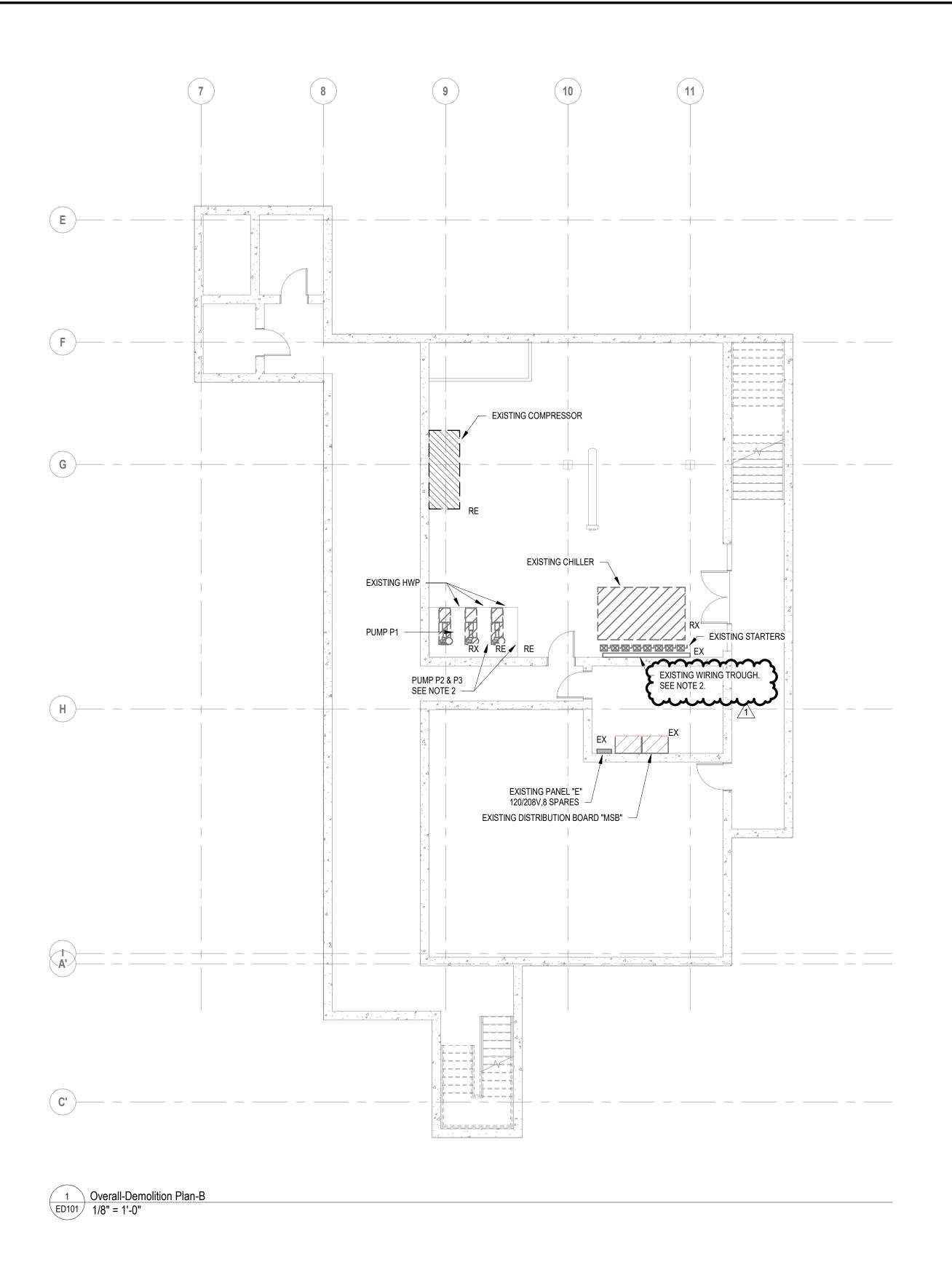
W&S Project No: 2170808

Drawing Title:

ELECTRICAL SCHEDULES SHEET

Sheet Number:

E601



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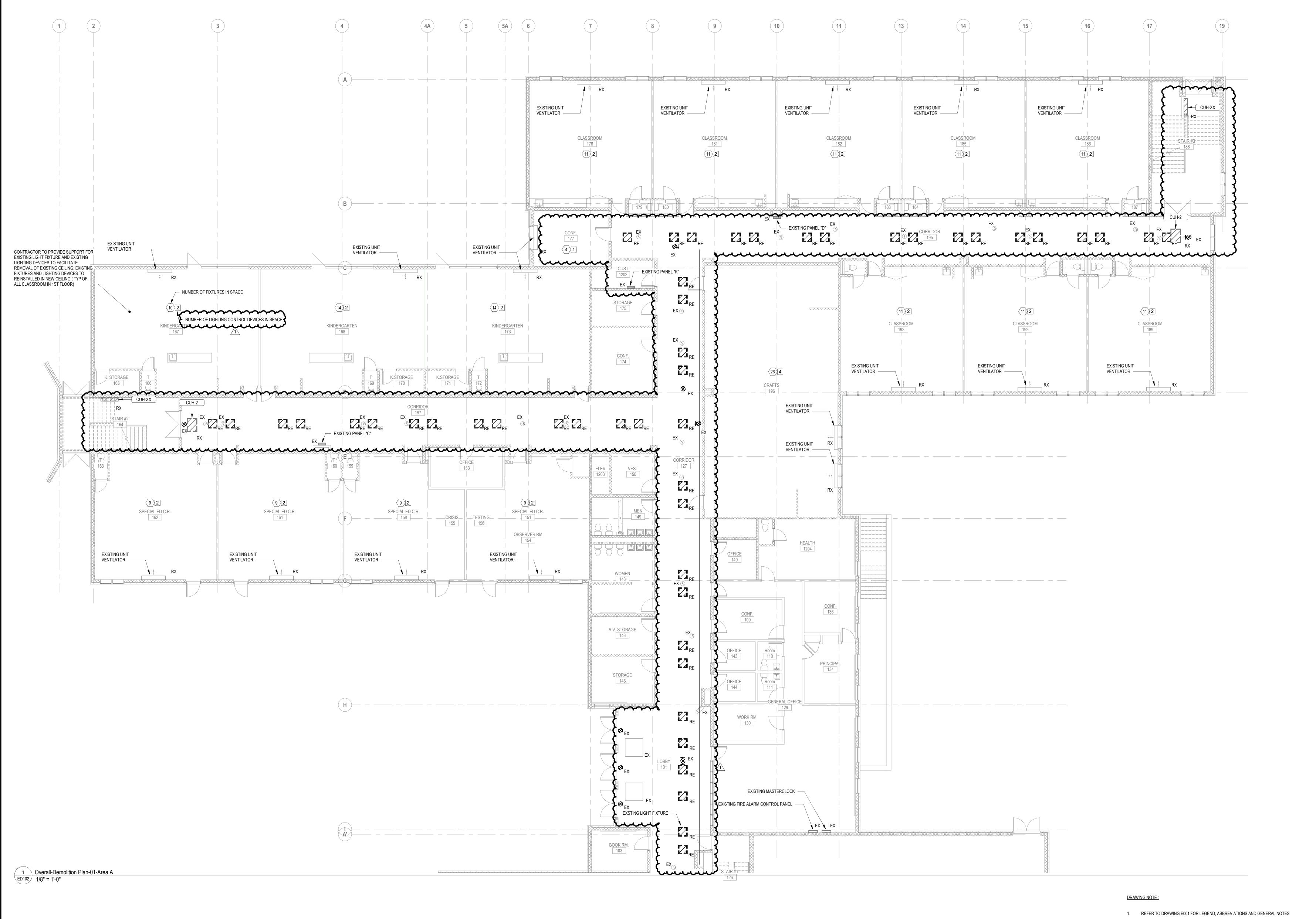
Drawing Title:

BASEMENT DEMOLITION PLAN

Sheet Number:

DRAWING NOTE:

- 1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES
- DEMO AND REMOVE EXISTING STARTER FOR PUMPS P1, P2, & P3 LOCATED ON WIRING TROUGH. REMOVE BACK TO SOURCE WIRING AND CONDUIT FOR PUMPS P2 & P3 ONLY.



2. CONTRACTOR TO PROVIDE SUPPORT FOR EXISTING TO REMAIN DEVICES.

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Date: 04/02/2020

Drawn By: MK

Reviewed By: DNM

Approved By: RFM

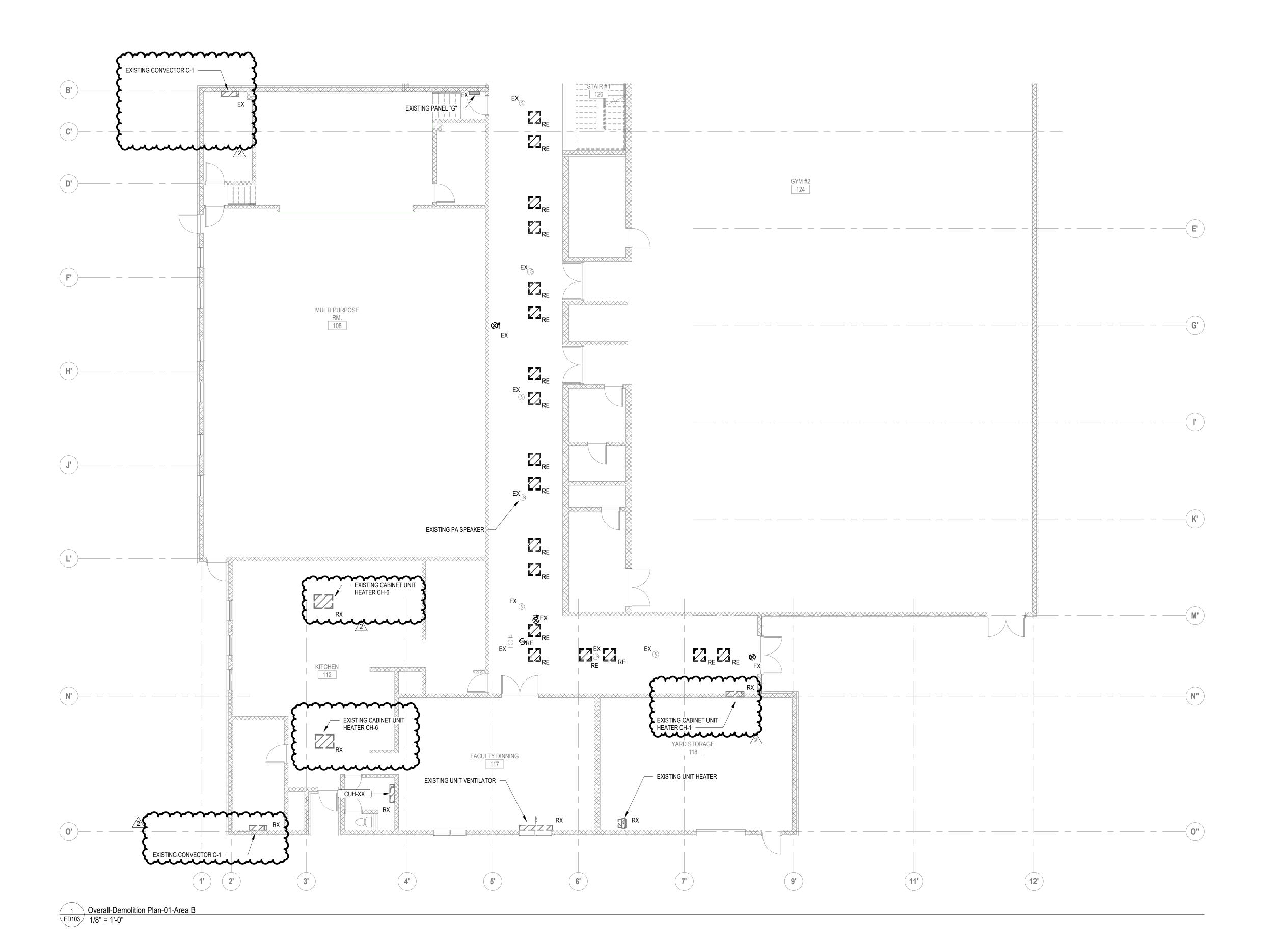
W&S Project No: 2170808

Drawing Title:

LEVEL 1 DEMOLITION PLAN PART A

Sheet Number:

ED102

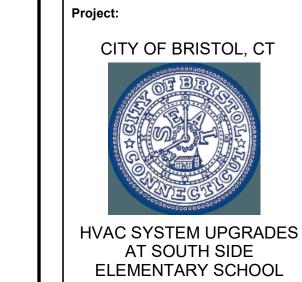


DRAWING NOTE :

- 1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES
- 2. CONTRACTOR TO PROVIDE SUPPORT FOR EXISTING TO REMAIN DEVICES.

ALTERNATE NOTE :

1. ALL WORK INCLUDED IN THIS DRAWING SHALL BE INCLUDED AS PART OF ALTERNATE 1



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SCALE: AS NOTED

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Drawn By: Mk

Approved By: RFI

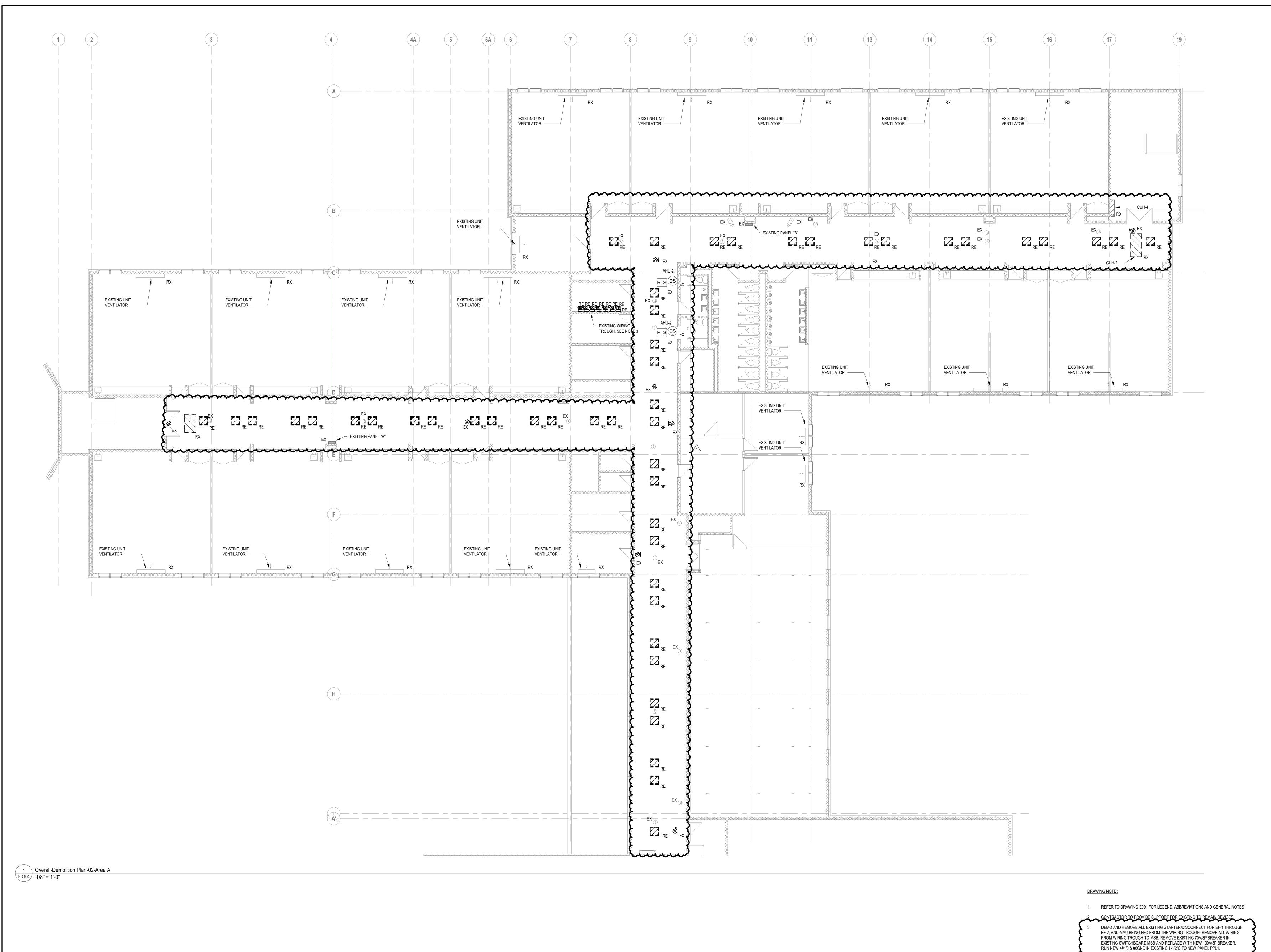
W&S Project No: 2170808

Drawing Title:

LEVEL 1 DEMOLITION PLAN PART B

Sheet Number:

ED103



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Approved By: RFM

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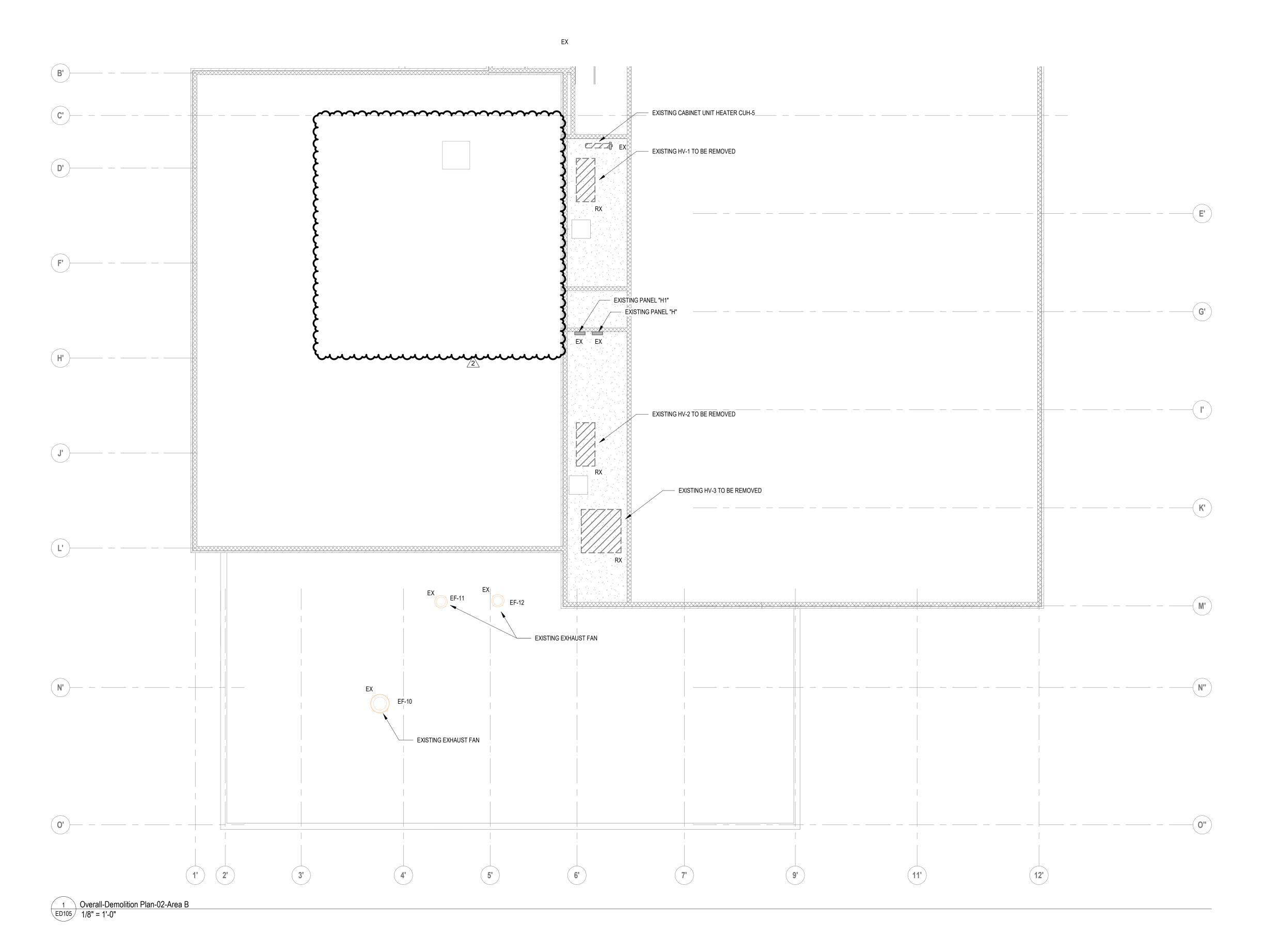
W&S Project No: 2170808

Drawing Title:

LEVEL 2 DEMOLITION PLAN PART A

Sheet Number:

ED104



DRAWING NOTE :

- 1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES
- 2. CONTRACTOR TO PROVIDE SUPPORT FOR EXISTING TO REMAIN DEVICES.

ALTERNATE NOTE :

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Reviewed By: DN

W&S Project No: 2170808

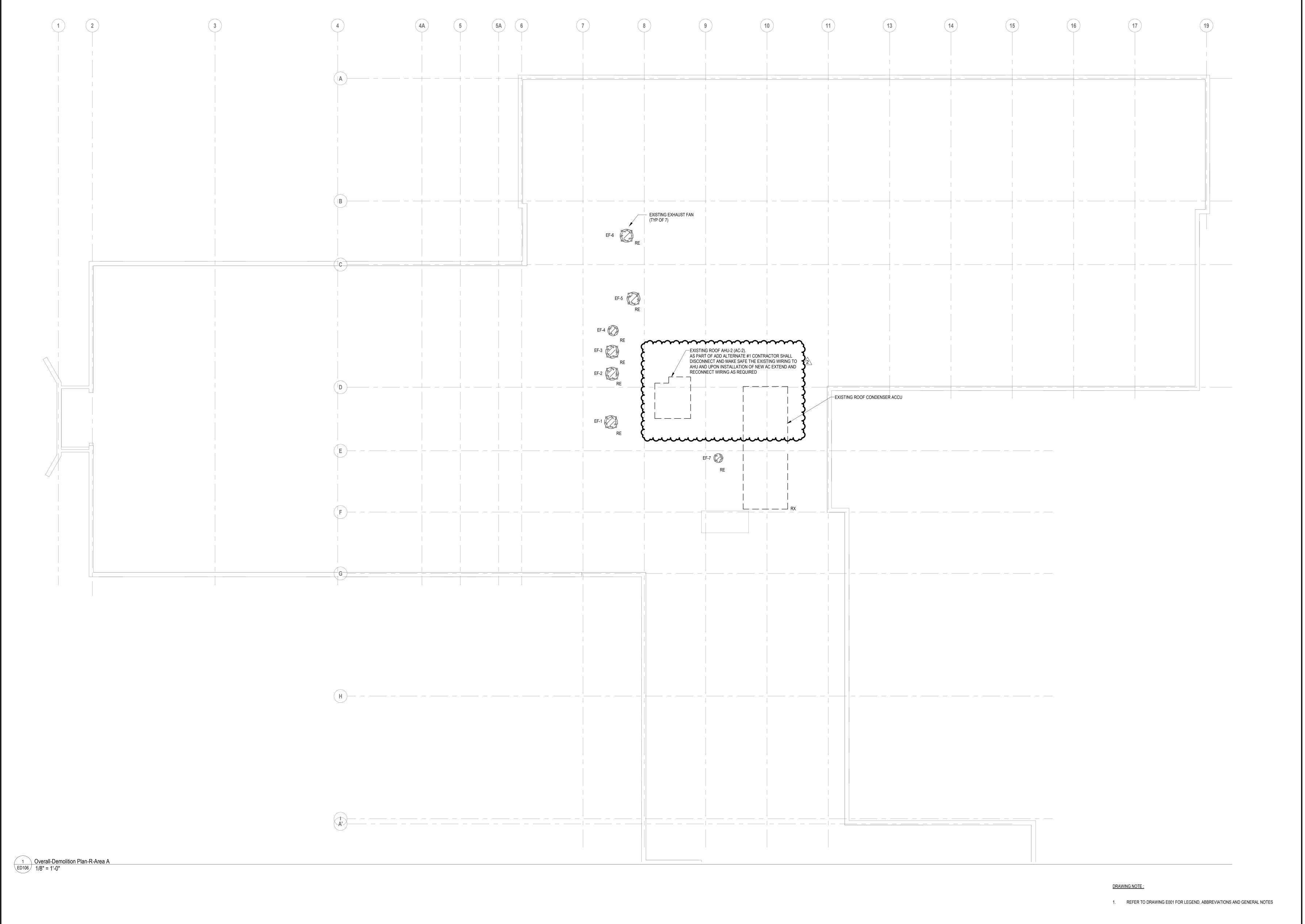
Drawing Title:

Drawing Title:

LEVEL 2 DEMOLITION PLAN PART B

Sheet Number:

ED105



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Date: 04/0

Drawn By: MK

Reviewed By: DN

Approved By: RFM

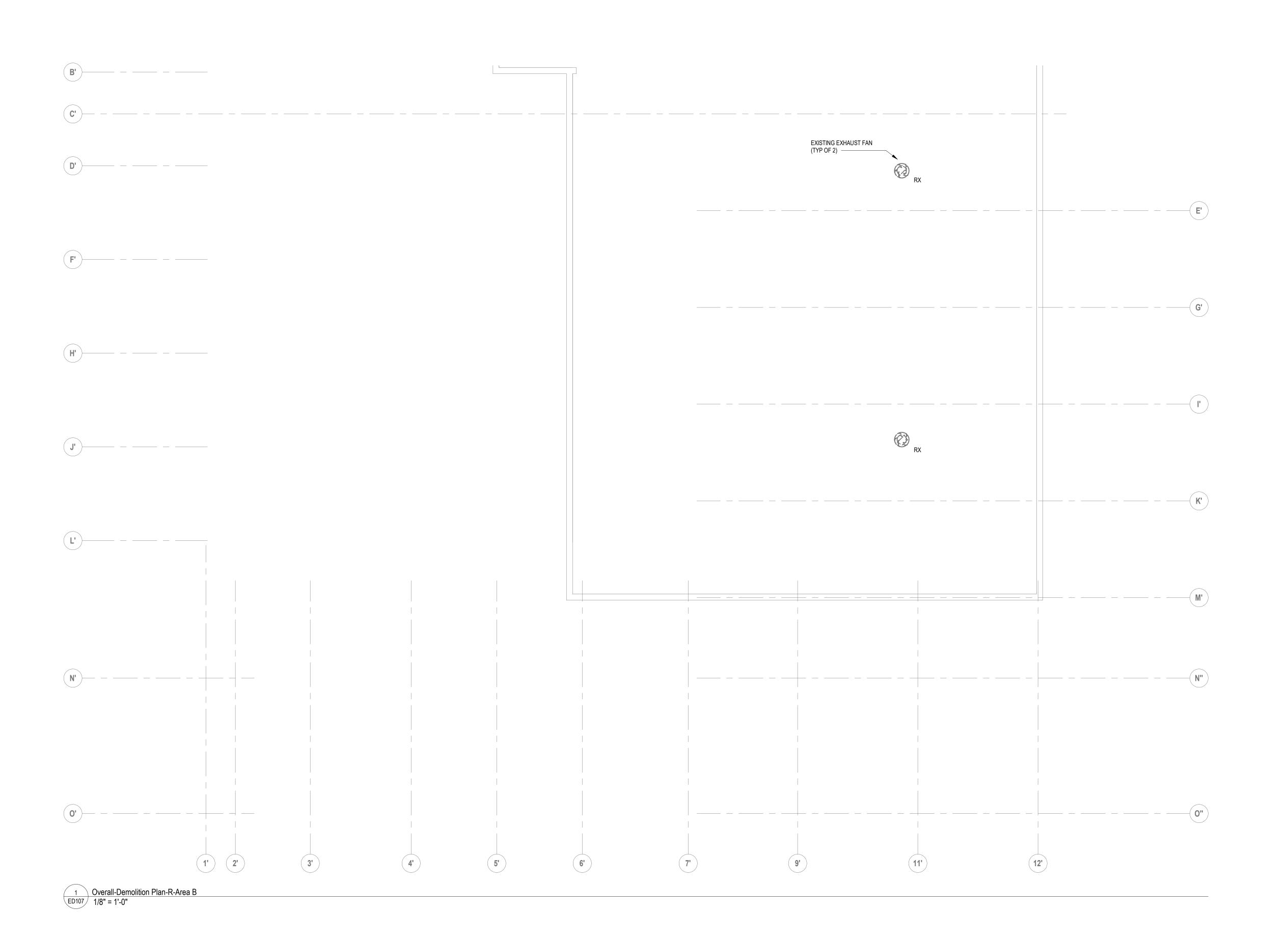
W&S Project No: 2170808

Drawing Title:

ROOF DEMOLITION PLAN PART A

Sheet Number:

ED106



DRAWING NOTE:

1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES ALTERNATE NOTE:

1. ALL WORK INCLUDED IN THIS DRAWING SHALL BE INCLUDED AS PART OF ALTERNATE 1 Cummunum Management

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SCALE: AS NOTED

W&S Project No: 2170808

Drawing Title:

PART B

Sheet Number: