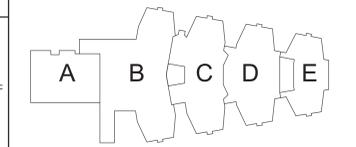


1 First Floor Key Plan  
1" = 20'-0"

**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050



Key Plan  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

Rev. No.	Date	Description



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**BID SET**



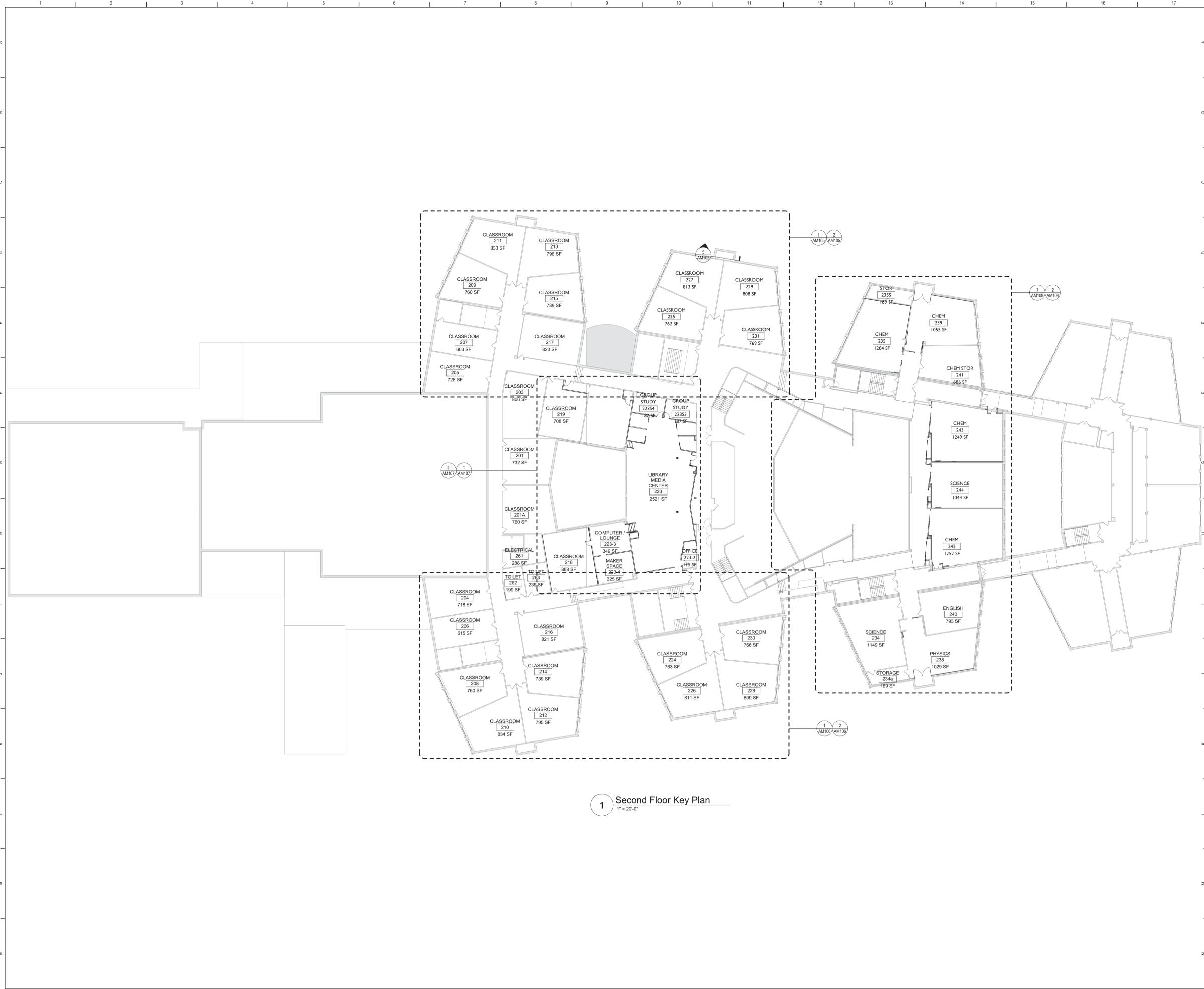
**TETRA TECH**  
ARCHITECTS & ENGINEERS

Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

First Floor Key Plan

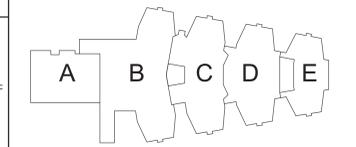
Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number:
Project No.:	AM051	



1 Second Floor Key Plan  
1" = 20'-0"

**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050



Key Plan  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

Rev. No.:	Date:	Description:



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**BID SET**



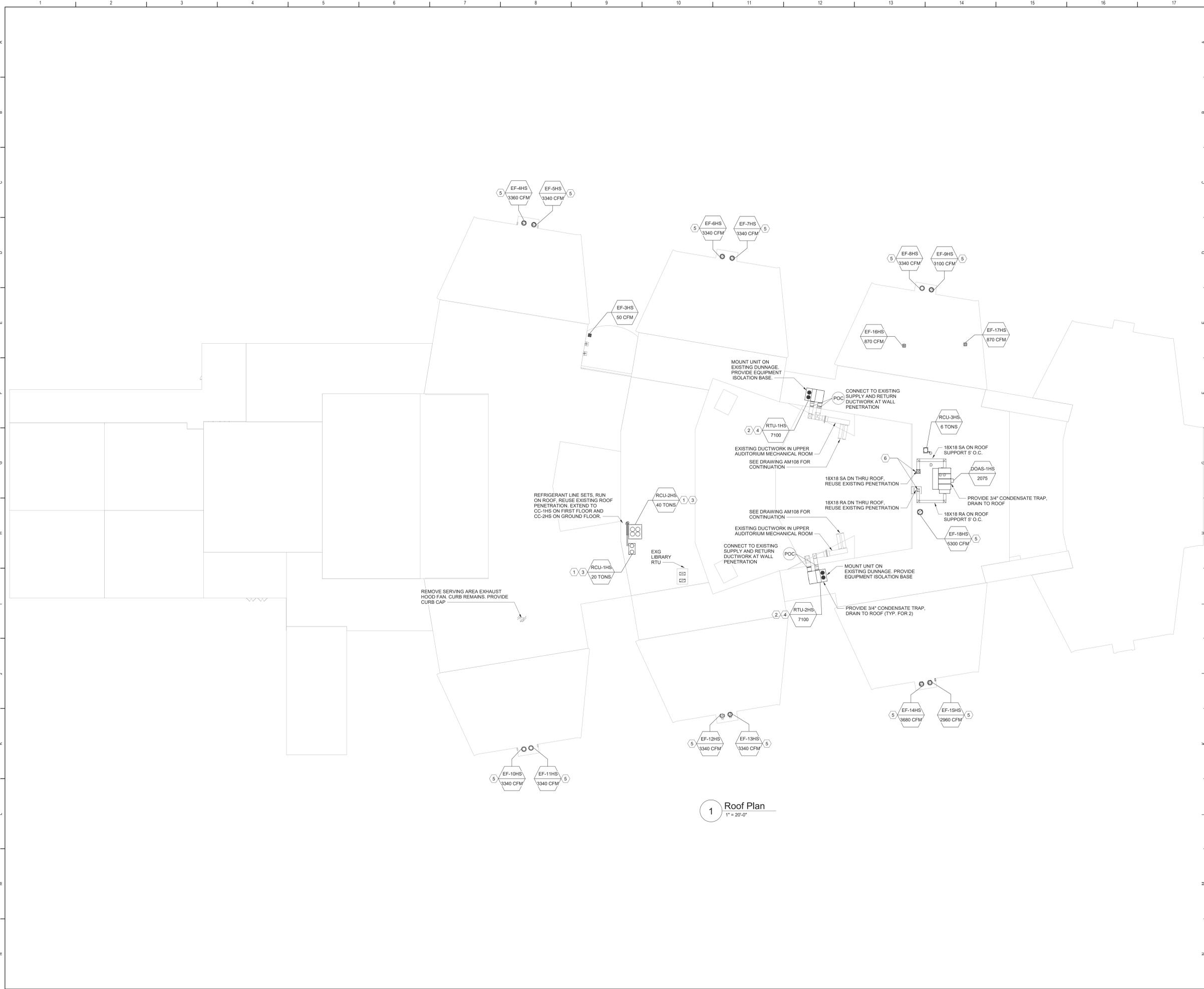
**TETRA TECH**  
ARCHITECTS & ENGINEERS

Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

Second Floor Key Plan

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number: AM052
Project No.:		121111-19002



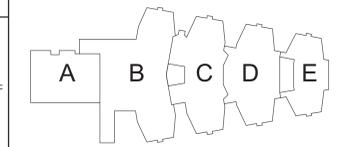
1 Roof Plan  
1" = 20'-0"

**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050

**KEYED NOTES**

- ① REMOVE AIR COOLED CONDENSING UNIT AND CONNECTED REFRIGERANT TUBING.
- ② REMOVE ROOF TOP UNIT. DISCONNECT SUPPLY AND RETURN DUCTWORK FROM WALL PENETRATION TO UNIT OPENINGS. EXISTING DUNNAGE REMAINS.
- ③ MOUNT AIR COOLED CONDENSING UNIT ON BASE MOUNTING RAIL. EXTEND REFRIGERANT TUBING TO RESPECTIVE DX COOLING COIL.
- ④ MOUNT ROOF TOP UNIT ON EXISTING DUNNAGE. EXTEND SUPPLY AND RETURN FROM UNIT AND CONNECT TO EXISTING DUCTWORK. INSULATE DUCTWORK AS REQUIRED IN SPECIFICATION.
- ⑤ REMOVE EXHAUST FAN AND CURB. INSTALL NEW FAN AND CURB. MODIFY ROOF PENETRATION AS REQUIRED TO COMPLETE WORK.
- ⑥ REMOVE INTAKE/EXHAUST HOOD. REMOVE INTAKE/EXHAUST DAMPER AND ASSOCIATED CONTROLS.



Key Plan  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

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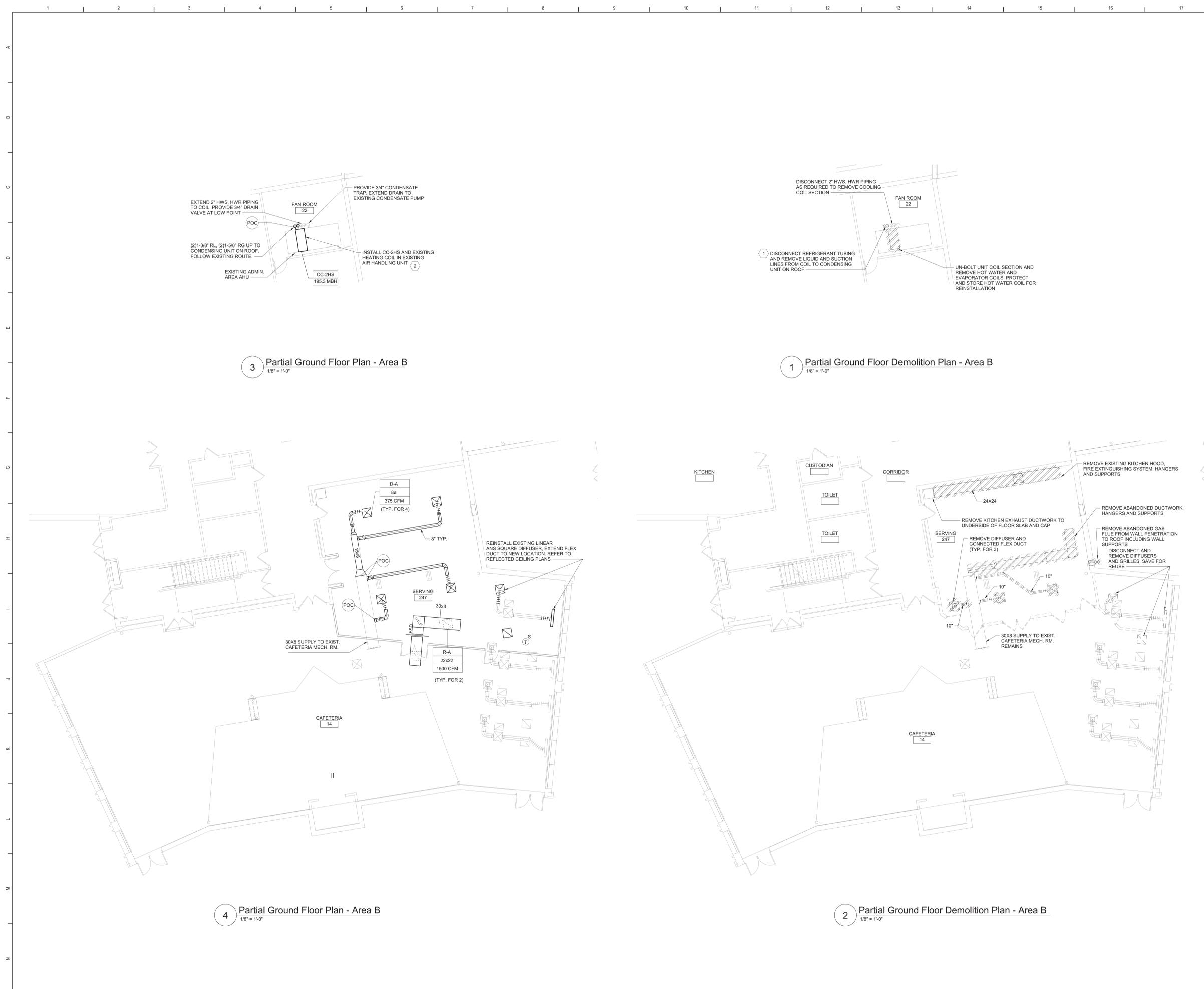


Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

Roof Plan

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number: AM053
Project No.: 121111-19002		



**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050

**KEYED NOTES**

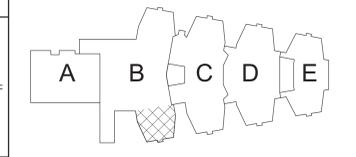
- ① EVACUATE R-22 REFRIGERANT FROM UNIT DIRECT EXPANSION COIL AND DISPOSE. REMOVE COIL AND CONNECTED REFRIGERANT TUBING UP TO CONDENSING UNIT ON ROOF.
- ② PROVIDE DX COOLING COIL IN EXISTING AIR HANDLING UNIT. EXTEND NEW REFRIGERANT TUBING UP TO NEW CONDENSING UNIT ON ROOF. REFER TO COOLING COIL SCHEDULES FOR PERFORMANCE DATA.

**3 Partial Ground Floor Plan - Area B**  
1/8" = 1'-0"

**1 Partial Ground Floor Demolition Plan - Area B**  
1/8" = 1'-0"

**4 Partial Ground Floor Plan - Area B**  
1/8" = 1'-0"

**2 Partial Ground Floor Demolition Plan - Area B**  
1/8" = 1'-0"



Key Plan  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

Rev. No.:      Date:      Description:



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Mahopac, NY

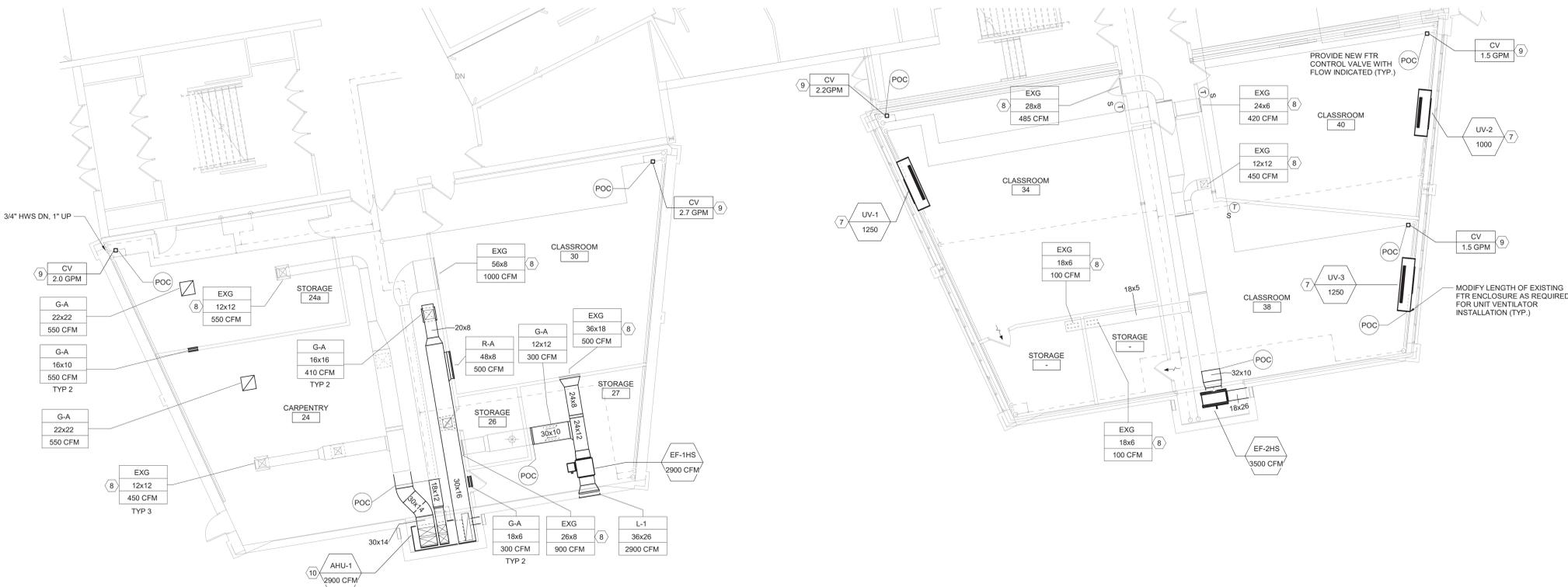
Reconstruction To:  
Mahopac High School

Partial Ground Floor Plans - Area B

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number:
Project No.:	AM100	
121111-19002		



1 Partial Ground Floor Demolition Plans - Areas C + D  
1/8" = 1'-0"



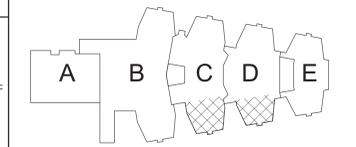
2 Partial Ground Floor Plans - Areas C + D  
1/8" = 1'-0"

**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050

**KEYED NOTES**

- 1 DISCONNECT HOT WATER PIPING AND REMOVE UNIT VENTILATOR. REMOVE PIPING INSIDE CABINET ENCLOSURE FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. LOUVER AND WALL BOX TO REMAIN. CLEAN AND PREPARE OPENING TO RECEIVE NEW WORK.
- 2 REMOVE HEATING AND VENTILATION (H&V) UNIT. REMOVE HOT WATER PIPING FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. REMOVE OUTSIDE AIR INTAKE DUCT FROM UNIT TO LOUVER INCLUDING DAMPER AND ACTUATOR. LOUVER REMAINS. REMOVE MULTI-ZONE SUPPLY DUCTWORK FROM UNIT TO LOCATION INDICATED ON DRAWING INCLUDING ZONE DAMPER. REMOVE ZONE DAMPER ACTUATOR AND SAVE FOR RE-USE. REMOVE RETURN AIR DUCTWORK TO LOCATION INDICATED ON DRAWING INCLUDING DAMPER. REMOVE EXHAUST AIR DUCTWORK FROM RETURN DUCTWORK CONNECTION TO UNDERSIDE OF ROOF DECK.
- 3 REMOVE DUCTWORK INCLUDING REGISTERS, GRILLES, DIFFUSERS, HANGERS AND SUPPORTS TO LOCATION INDICATED.
- 4 REMOVE SPACE TEMPERATURE SENSOR AND CONNECTED WIRING.
- 5 REMOVE FINNED TUBE CONTROL VALVE. PLUG EXISTING PNEUMATIC TUBING.
- 6 REMOVE UTILITY SET FAN, CONTROLS, HANGERS AND SUPPORTS AND CONNECTED DUCTWORK TO LOCATION INDICATED.
- 7 INSTALL UNIT VENTILATOR, CENTER UNIT WITH OUTSIDE AIR OPENING. EXTEND HOT WATER PIPING TO UNIT. PROVIDE SHUT-OFF VALVES, BALANCE VALVE, ETC. AS INDICATED ON COIL PIPING DETAIL. INSTALL SPACE TEMPERATURE SENSOR IN LOCATION INDICATED.
- 8 DISCONNECT SUPPLY DIFFUSER, RETURN/EXHAUST GRILLE OR REGISTER. CLEAN THOROUGHLY AND REINSTALL. BALANCE AIRFLOW TO CFM INDICATED.
- 9 PROVIDE NEW FTR CONTROL VALVE WITH FLOW INDICATED (TYP.)
- 10 SEE 5/AM102 FOR MORE INFORMATION.



Key Plan  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

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Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

Partial Ground Floor Plans Areas C and D

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number: AM101
Project No.:	12111-19002	





1 Partial First Floor Demolition Plan - Areas B + C  
1/8" = 1'-0"

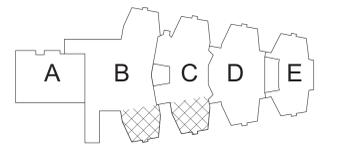


**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050

**KEYED NOTES**

- 1 REMOVE HEATING AND VENTILATION (H&V) UNIT. REMOVE HOT WATER PIPING FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. REMOVE OUTSIDE AIR INTAKE DUCT FROM UNIT TO LOUVER INCLUDING DAMPER AND ACTUATOR. LOUVER REMAINS. REMOVE MULTI-ZONE SUPPLY DUCTWORK FROM UNIT TO LOCATION INDICATED ON DRAWING INCLUDING ZONE DAMPER. REMOVE ZONE DAMPER ACTUATOR AND SAVE FOR RE-USE. REMOVE RETURN AIR DUCTWORK TO LOCATION INDICATED ON DRAWING INCLUDING DAMPER. REMOVE EXHAUST AIR DUCTWORK FROM RETURN DUCTWORK CONNECTION TO UNDERSIDE OF ROOF DECK.
- 2 REMOVE DUCTWORK INCLUDING REGISTERS, GRILLES, DIFFUSERS, HANGERS AND SUPPORTS TO LOCATION INDICATED.
- 3 REMOVE FINNED TUBE CONTROL VALVE. PLUG EXISTING PNEUMATIC TUBING.
- 4 PROVIDE NEW FTR CONTROL VALVE WITH FLOW INDICATED
- 5 DISCONNECT RETURN/EXHAUST GRILLE OR REGISTER. CLEAN THOROUGHLY AND REINSTALL. BALANCE AIRFLOW TO CFM INDICATED.
- 6 SEE 9/AM102 FOR MORE INFORMATION.



Key Plan  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

Rev. No.: Date: Description:



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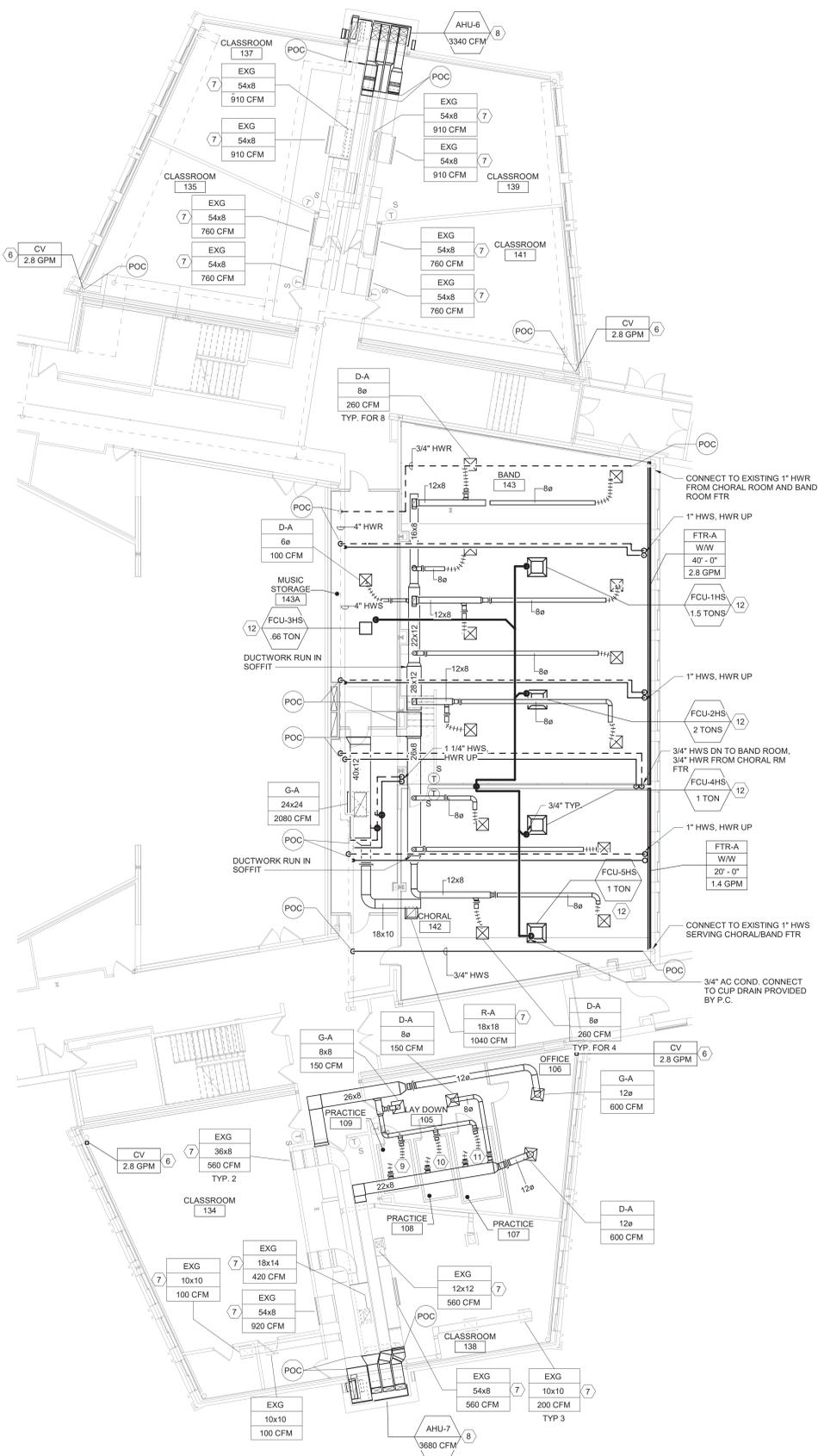


Mahopac Central School District  
Mahopac, NY

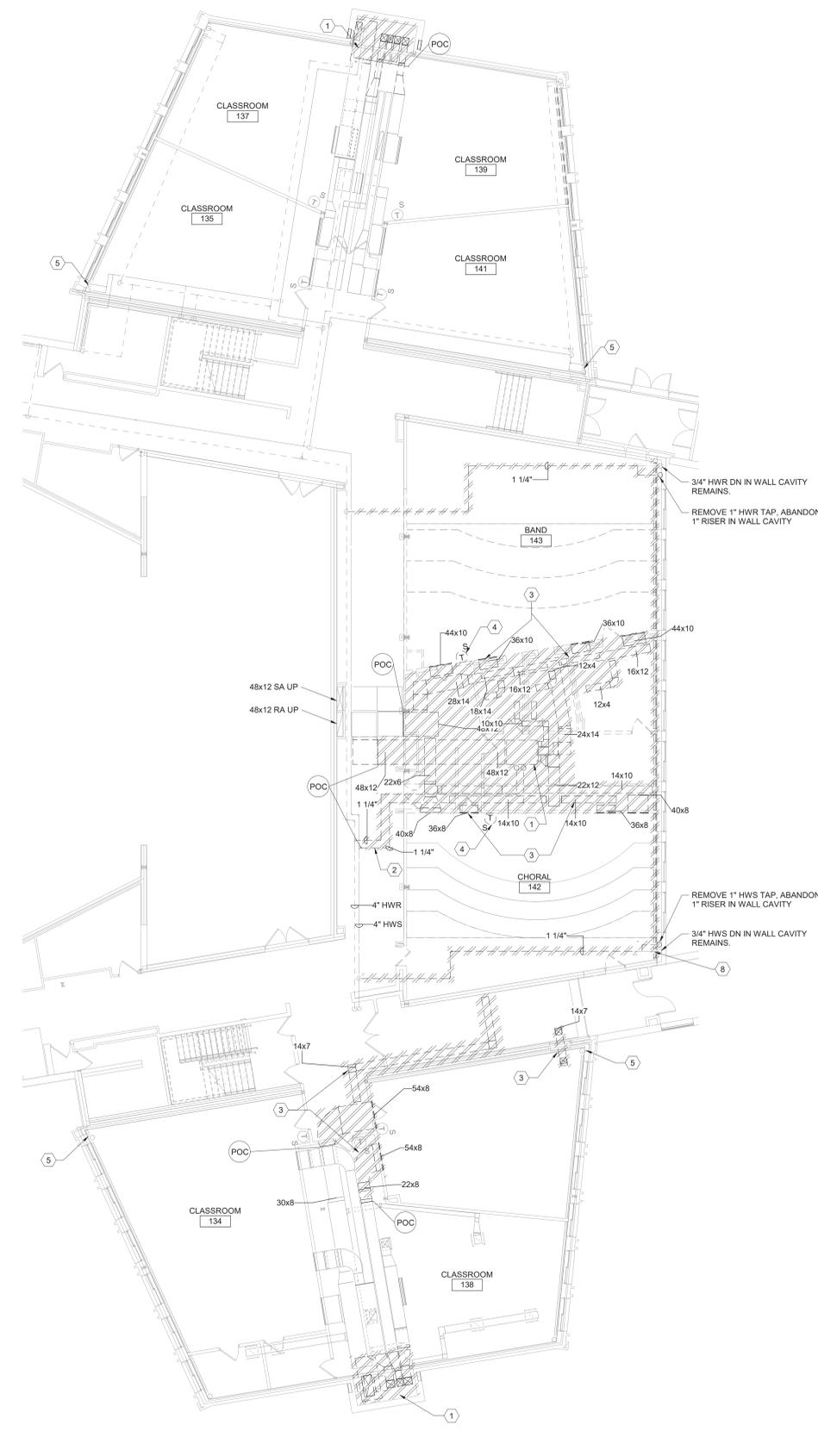
Reconstruction To:  
Mahopac High School

Partial First Floor Plans Areas B and C

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number: AM103
Project No.:	12111-19002	



2 Partial First Floor Plan - Area D  
1" = 10'-0"



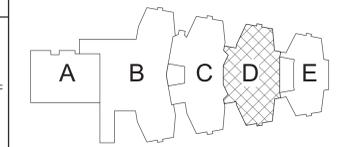
1 Partial First Floor Demolition Plan - Area D  
1" = 10'-0"

**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050

**KEYED NOTES**

- 1 REMOVE HEATING AND VENTILATION (H&V) UNIT. REMOVE HOT WATER PIPING FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. REMOVE OUTSIDE AIR INTAKE DUCT FROM UNIT TO LOUVER INCLUDING DAMPER AND ACTUATOR. LOUVER REMAINS. REMOVE MULTI-ZONE SUPPLY DUCTWORK FROM UNIT TO LOCATION INDICATED ON DRAWING INCLUDING ZONE DAMPER. REMOVE ZONE DAMPER ACTUATOR AND SAVE FOR RE-USE. REMOVE RETURN AIR DUCTWORK TO LOCATION INDICATED ON DRAWING INCLUDING DAMPER. REMOVE EXHAUST AIR DUCTWORK FROM RETURN DUCTWORK CONNECTION TO UNDERSIDE OF ROOF DECK.
- 2 REMOVE HOT WATER SUPPLY AND RETURN PIPING INCLUDING FITTINGS, HANGERS AND SUPPORTS TO LOCATION INDICATED.
- 3 REMOVE DUCTWORK INCLUDING REGISTERS, GRILLES, DIFFUSERS, HANGERS AND SUPPORTS TO LOCATION INDICATED.
- 4 REMOVE SPACE TEMPERATURE SENSOR AND CONNECTED WIRING.
- 5 REMOVE FINNED TUBE CONTROL VALVE. PLUG EXISTING PNEUMATIC TUBING.
- 6 PROVIDE NEW FTR CONTROL VALVE WITH FLOW INDICATED.
- 7 DISCONNECT RETURN/EXHAUST GRILLE OR REGISTER. CLEAN THOROUGHLY AND REINSTALL. BALANCE AIRFLOW TO CFM INDICATED.
- 8 SEE 8/AM102 FOR MORE INFORMATION.
- 9 CONNECT 8" SA/RA FLEX DUCTS TO PRACTICE ROOM 109. BALANCE AIRFLOW TO 50 CFM. AIR INLETS AND OUTLETS PROVIDED WITH PRE-MANUFACTURED ROOM PACKAGE.
- 10 CONNECT 8" SA/RA FLEX DUCTS TO PRACTICE ROOM 108. BALANCE AIRFLOW TO 75 CFM. AIR INLETS AND OUTLETS PROVIDED WITH PRE-MANUFACTURED ROOM PACKAGE.
- 11 CONNECT 8" SA/RA FLEX DUCTS TO PRACTICE ROOM 107. BALANCE AIRFLOW TO 100 CFM. AIR INLETS AND OUTLETS PROVIDED WITH PRE-MANUFACTURED ROOM PACKAGE.
- 12 REFER TO DETAIL 8/AM501 FOR REFRIGERANT PIPING AND CONTROL SCHEMATIC.



Key Plan  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

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Mahopac Central School District  
Mahopac, NY

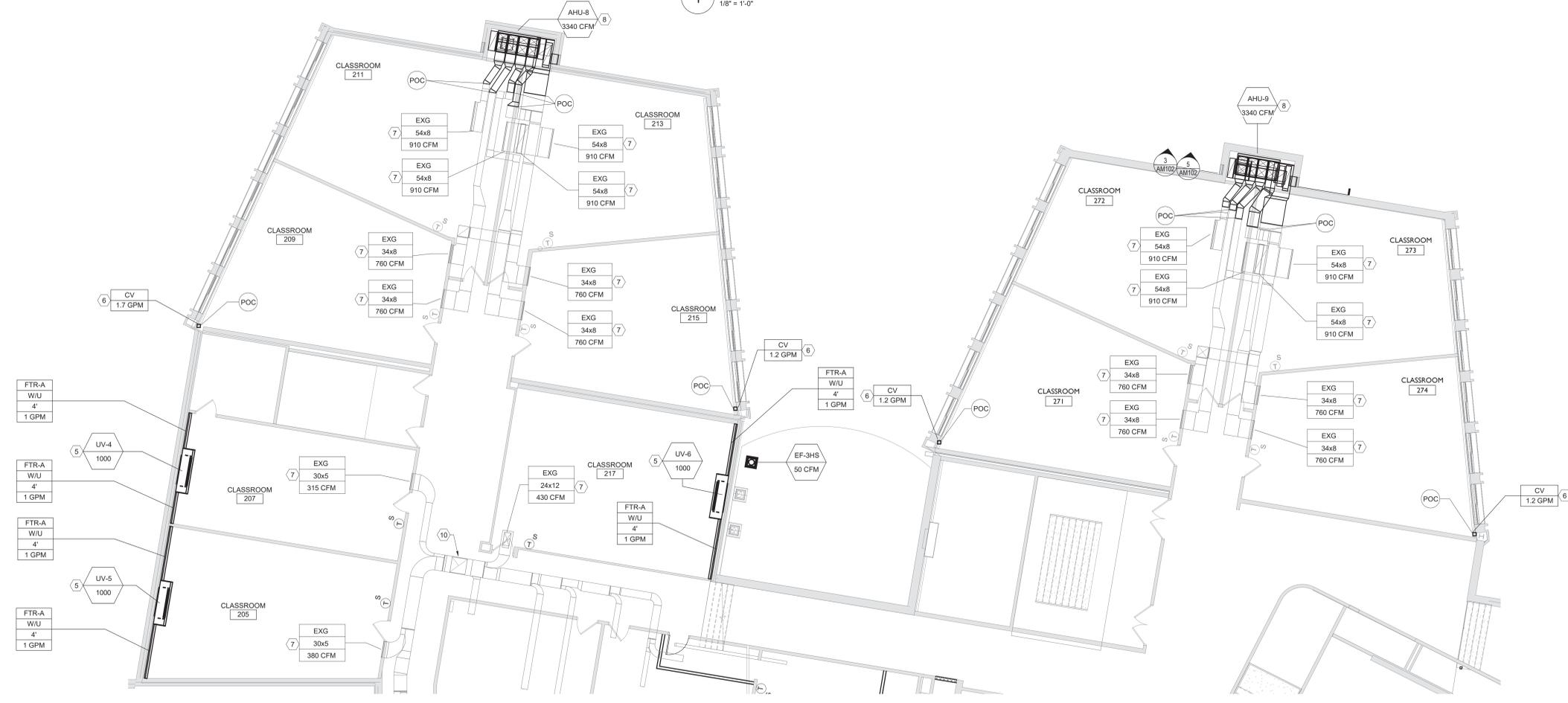
Reconstruction To:  
Mahopac High School

First Floor Plans - Area D

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number: AM104
Project No.:	12111-19002	



1 Partial Second Floor Demolition Plan - Area B + C  
1/8" = 1'-0"



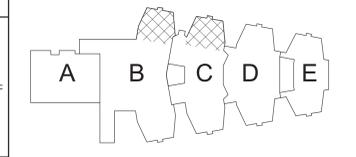
2 Partial Second Floor Plan - Areas B + C  
1/8" = 1'-0"

**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050

**KEYED NOTES**

- 1 DISCONNECT HOT WATER PIPING AND REMOVE UNIT VENTILATOR. REMOVE PIPING INSIDE CABINET ENCLOSURE FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. LOUVER AND WALL BOX TO REMAIN. CLEAN AND PREPARE OPENING TO RECEIVE NEW WORK.
- 2 REMOVE HEATING AND VENTILATION (H&V) UNIT. REMOVE HOT WATER PIPING FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. REMOVE OUTSIDE AIR INTAKE DUCT FROM UNIT TO LOUVER INCLUDING DAMPER AND ACTUATOR. LOUVER REMAINS. REMOVE MULTI-ZONE SUPPLY DUCTWORK FROM UNIT TO LOCATION INDICATED ON DRAWING INCLUDING ZONE DAMPER. REMOVE ZONE DAMPER ACTUATOR AND SAVE FOR RE-USE. REMOVE RETURN AIR DUCTWORK TO LOCATION INDICATED ON DRAWING INCLUDING DAMPER. REMOVE EXHAUST AIR DUCTWORK FROM RETURN DUCTWORK CONNECTION TO UNDERSIDE OF ROOF DECK.
- 3 REMOVE SPACE TEMPERATURE SENSOR AND CONNECTED WIRING.
- 4 REMOVE FINNED TUBE CONTROL VALVE. PLUG EXISTING PNEUMATIC TUBING.
- 5 INSTALL UNIT VENTILATOR. CENTER UNIT WITH OUTSIDE AIR OPENING. EXTEND HOT WATER PIPING TO UNIT. PROVIDE SHUT OFF VALVES, BALANCE VALVE, ETC. AS INDICATED ON COIL PIPING DETAIL. INSTALL SPACE TEMPERATURE SENSOR IN LOCATION INDICATED.
- 6 PROVIDE FTR CONTROL VALVE WITH FLOW INDICATED
- 7 DISCONNECT RETURN/EXHAUST GRILLE OR REGISTER. CLEAN THOROUGHLY AND REINSTALL. BALANCE AIRFLOW TO CFM INDICATED.
- 8 SEE 5/AM102 FOR MORE INFORMATION.
- 9 REMOVE FINNED TUBE ENCLOSURE INCLUDING BACK-PLATE, COVER, SUPPORTS, PIPE HANGERS, CRADLES, FINNED TUBE ELEMENTS AND CONNECTED PIPING.
- 10 MEASURE ALL EXISTING GRILLES ASSOCIATED WITH THE EXHAUST FAN AS THEY ARE. REBALANCE THE FAN TO ACHIEVE THE O.A. FLOWS OF ROOMS WE ARE REPLACING UVS AND MAINTAIN PRE-MEASURED EA FLOWS IN THE EXISTING SPACES.



Key Plan  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

Rev. No.: Date: Description:



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Mahopac Central School District  
Mahopac, NY

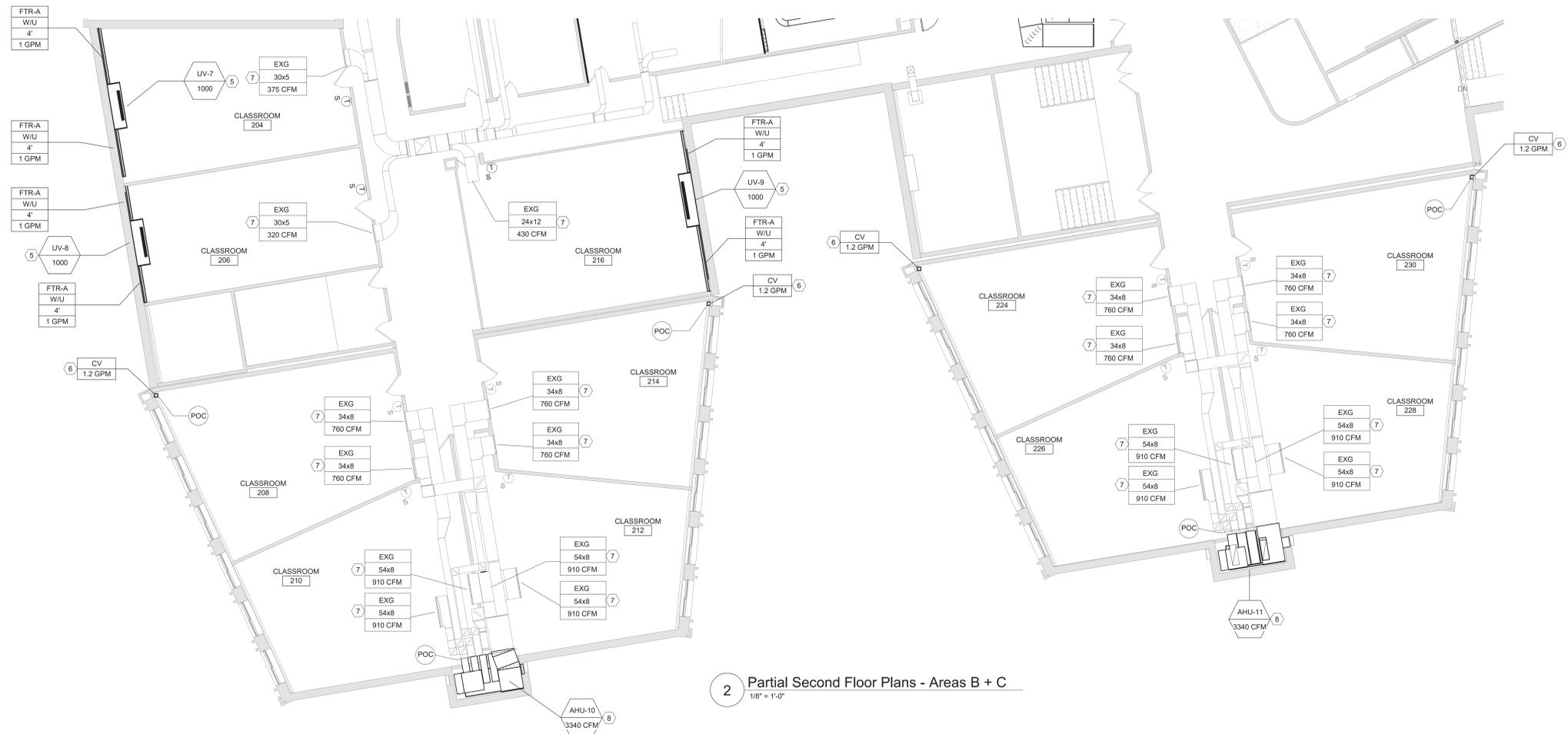
Reconstruction To:  
Mahopac High School

Partial Second Floor Plans  
Areas B and C

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number: AM105
Project No.:	12111-19002	



1 Partial Second Floor Demolition Plans - Areas B + C  
1/8" = 1'-0"



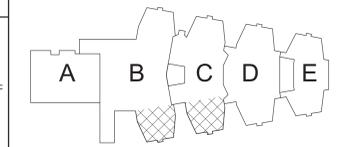
2 Partial Second Floor Plans - Areas B + C  
1/8" = 1'-0"

**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050

**KEYED NOTES**

- 1 DISCONNECT HOT WATER PIPING AND REMOVE UNIT VENTILATOR. REMOVE PIPING INSIDE CABINET ENCLOSURE FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. LOUVER AND WALL BOX TO REMAIN. CLEAN AND PREPARE OPENING TO RECEIVE NEW WORK.
- 2 REMOVE HEATING AND VENTILATION (H&V) UNIT. REMOVE HOT WATER PIPING FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. REMOVE OUTSIDE AIR INTAKE DUCT FROM UNIT TO LOUVER INCLUDING DAMPER AND ACTUATOR. LOUVER REMAINS. REMOVE MULTI-ZONE SUPPLY DUCTWORK FROM UNIT TO LOCATION INDICATED ON DRAWING INCLUDING ZONE DAMPER. REMOVE ZONE DAMPER ACTUATOR AND SAVE FOR RE-USE. REMOVE RETURN AIR DUCTWORK TO LOCATION INDICATED ON DRAWING INCLUDING DAMPER. REMOVE EXHAUST AIR DUCTWORK FROM RETURN DUCTWORK CONNECTION TO UNDERSIDE OF ROOF DECK.
- 3 REMOVE SPACE TEMPERATURE SENSOR AND CONNECTED WIRING.
- 4 REMOVE FINNED TUBE CONTROL VALVE. PLUG EXISTING PNEUMATIC TUBING.
- 5 INSTALL UNIT VENTILATOR. CENTER UNIT WITH OUTSIDE AIR OPENING. EXTEND HOT WATER PIPING TO UNIT. PROVIDE SHUT OFF VALVES, BALANCE VALVE, ETC. AS INDICATED ON COIL PIPING DETAIL. INSTALL SPACE TEMPERATURE SENSOR IN LOCATION INDICATED.
- 6 PROVIDE NEW FTR CONTROL VALVE WITH FLOW INDICATED
- 7 DISCONNECT RETURN/EXHAUST GRILLE OR REGISTER. CLEAN THOROUGHLY AND REINSTALL. BALANCE AIRFLOW TO CFM INDICATED.
- 8 SEE S/AM102 FOR MORE INFORMATION.
- 9 REMOVE FINNED TUBE ENCLOSURE INCLUDING BACK-PLATE, COVER, SUPPORTS, PIPE HANGERS, CRADLES, FINNED TUBE ELEMENTS AND CONNECTED PIPING.
- 10 MEASURE ALL EXISTING GRILLES ASSOCIATED WITH THE EXHAUST FAN AS THEY ARE. REBALANCE THE FAN TO ACHIEVE THE O.A. FLOWS OF ROOMS WE ARE REPLACING UNITS AND MAINTAIN PRE-MEASURED EA FLOWS IN THE EXISTING SPACES.



Key Plan  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

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Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

Partial Second Floor Plans  
Area B and C

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number: AM106
Project No.:	12111-19002	



2 Partial Second Floor Plan - Area C  
1/8" = 1'-0"

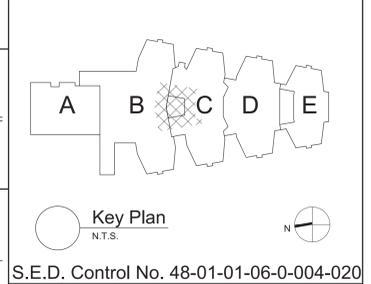
1 Partial Second Floor Demolition Plan - Area C  
1/8" = 1'-0"

**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050

**KEYED NOTES**

- ① REMOVE FINNED TUBE RADIATION AND ALL ASSOCIATED ACCESSORIES. REMOVE HOT WATER SUPPLY AND RETURN PIPING INCLUDING FITTINGS, HANGERS AND SUPPORTS AS NEEDED.
- ② REMOVE DUCTWORK INCLUDING VAVS AND ACCESSORIES, REGISTERS, GRILLES, DIFFUSERS, HANGERS AND SUPPORTS TO LOCATION INDICATED.
- ③ REMOVE SPACE TEMPERATURE SENSOR AND CONNECTED WIRING.



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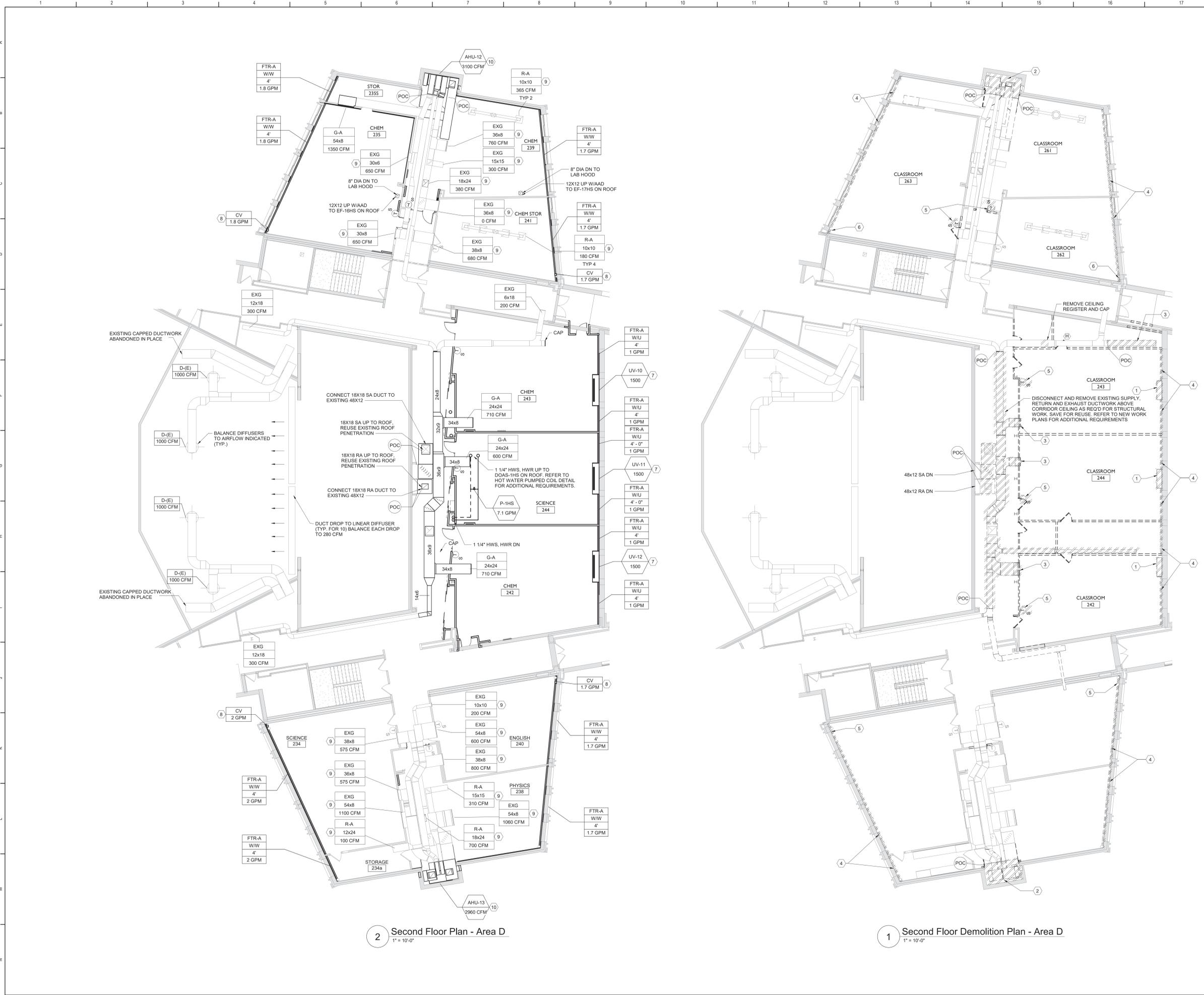


Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

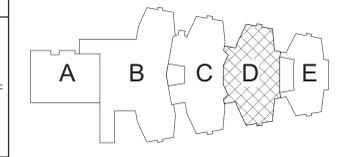
Partial Second Floor Plans - Area C

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number:
Project No.:	AM107	
121111-19002		



**GENERAL NOTES:**

1. FOR GENERAL NOTES SEE DRAWING AM050
- KEYED NOTES**
- DISCONNECT HOT WATER PIPING AND REMOVE UNIT VENTILATOR. REMOVE PIPING INSIDE CABINET ENCLOSURE FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. LOUVER AND WALL BOX TO REMAIN. CLEAN AND PREPARE OPENING TO RECEIVE NEW WORK.
  - REMOVE HEATING AND VENTILATION (H&V) UNIT. REMOVE HOT WATER PIPING FROM COIL UP TO AND INCLUDING MANUAL SHUT OFF VALVES, CONTROL VALVES, BALANCE VALVES, AND FITTINGS. REMOVE OUTSIDE AIR INTAKE DUCT FROM UNIT TO LOUVER INCLUDING DAMPER AND ACTUATOR. LOUVER REMAINS. REMOVE MULTI-ZONE SUPPLY DUCTWORK FROM UNIT TO LOCATION INDICATED ON DRAWING INCLUDING ZONE DAMPER. REMOVE ZONE DAMPER ACTUATOR AND SAVE FOR RE-USE. REMOVE RETURN AIR DUCTWORK TO LOCATION INDICATED ON DRAWING INCLUDING DAMPER. REMOVE EXHAUST AIR DUCTWORK FROM RETURN DUCTWORK CONNECTION TO UNDERSIDE OF ROOF DECK.
  - REMOVE DUCTWORK INCLUDING REGISTERS, GRILLES, DIFFUSERS, HANGERS AND SUPPORTS TO LOCATION INDICATED.
  - REMOVE FINNED TUBE ENCLOSURE INCLUDING BACK-PLATE, COVER, SUPPORTS, PIPE HANGERS, CRADLES, FINNED TUBE ELEMENTS AND CONNECTED PIPING.
  - REMOVE SPACE TEMPERATURE SENSOR AND CONNECTED WIRING.
  - REMOVE FINNED TUBE CONTROL VALVE. PLUG EXISTING PNEUMATIC TUBING.
  - INSTALL UNIT VENTILATOR. CENTER UNIT WITH OUTSIDE AIR OPENING. EXTEND HOT WATER PIPING TO UNIT. PROVIDE SHUT-OFF VALVES, BALANCE VALVE, ETC. AS INDICATED ON COIL PIPING DETAIL. INSTALL SPACE TEMPERATURE SENSOR IN LOCATION INDICATED.
  - PROVIDE NEW FTR CONTROL VALVE WITH FLOW INDICATED.
  - DISCONNECT RETURN/EXHAUST GRILLE OR REGISTER, CLEAN THOROUGHLY AND REINSTALL. BALANCE AIRFLOW TO CFM INDICATED.
  - SEE 5/AM102 FOR MORE INFORMATION.



**Key Plan**  
N.T.S.

S.E.D. Control No. 48-01-01-06-0-004-020

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**BID SET**



Mahopac Central School District  
Mahopac, NY

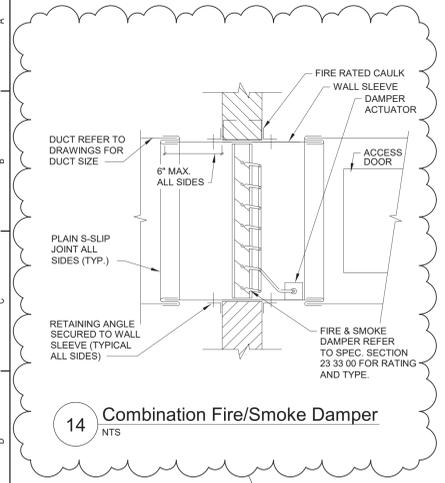
Reconstruction To:  
Mahopac High School

Second Floor Plans - Area D

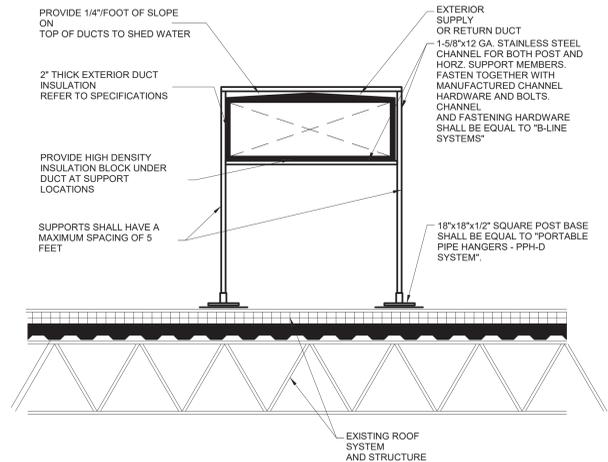
Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number:
Project No.:	AM108	

2 Second Floor Plan - Area D  
1" = 10'-0"

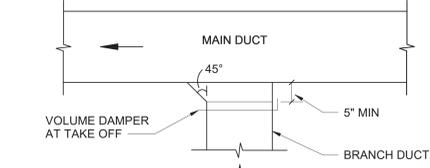
1 Second Floor Demolition Plan - Area D  
1" = 10'-0"



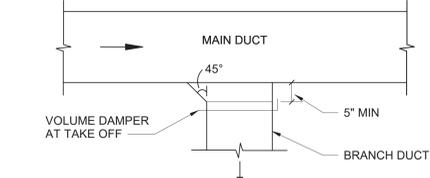
14 Combination Fire/Smoke Damper  
NTS



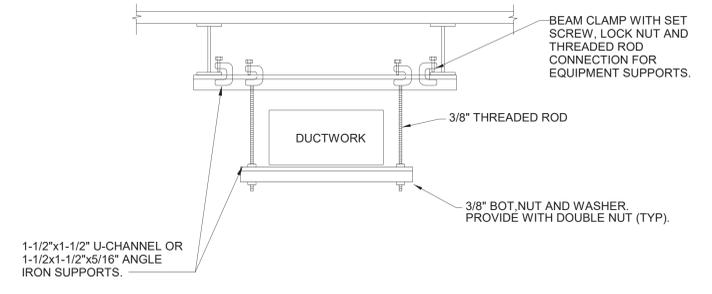
10 Roof Duct Support Detail  
NTS



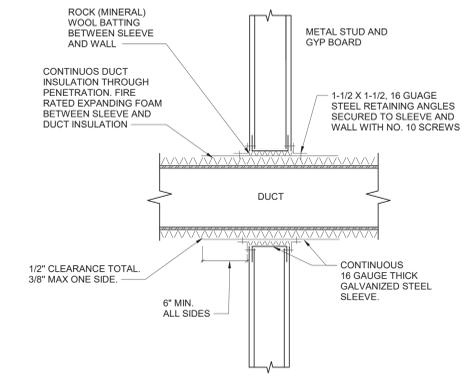
5 Exhaust/Return Branch Connection  
NTS



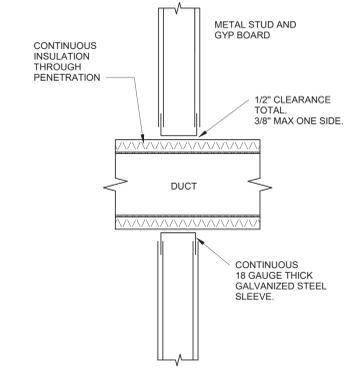
6 Supply Branch Connection  
NTS



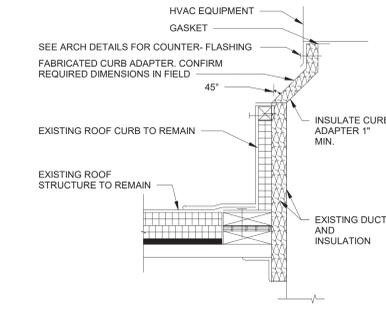
1 Duct Hanger  
NTS



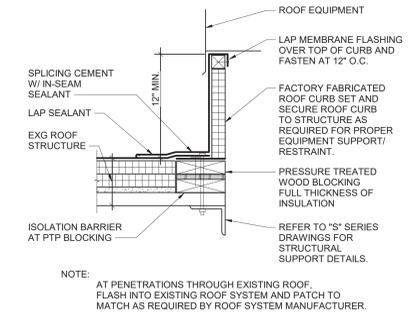
2 Duct Penetration at 1 Hour Rated Wall  
NTS



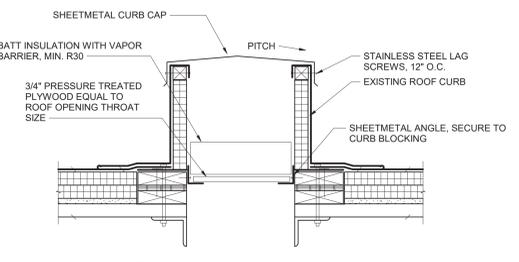
3 Duct Penetration at Interior Wall  
NTS



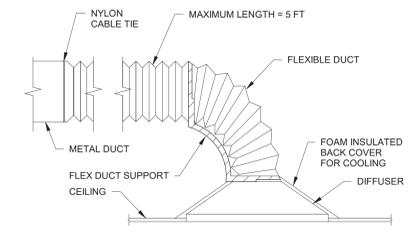
11 Curb Adapter Detail  
NTS



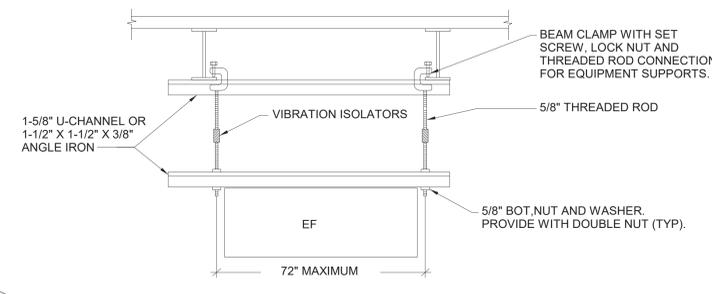
7 Roof Curb Detail  
NTS



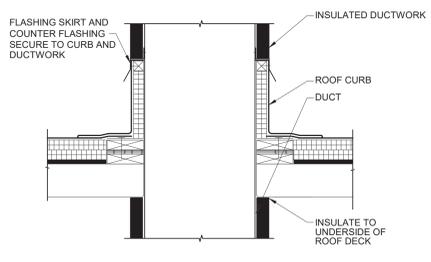
12 Roof Curb Cap Detail  
NTS



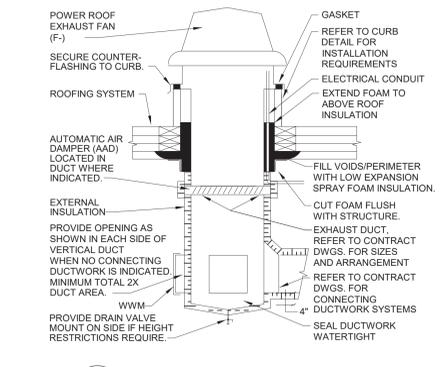
8 SA Ceiling Diffuser With Flex Duct  
NTS



4 Equipment Hanger  
NTS



13 Duct Thru Roof Detail  
NTS



9 Powered Roof Exhaust Fan Detail  
NTS

S.E.D. Control No. 48-01-01-06-0-004-020

1	12/2/2020	SED Addendum No 1
Rev. No.	Date	Description

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**TETRA TECH**  
ARCHITECTS & ENGINEERS

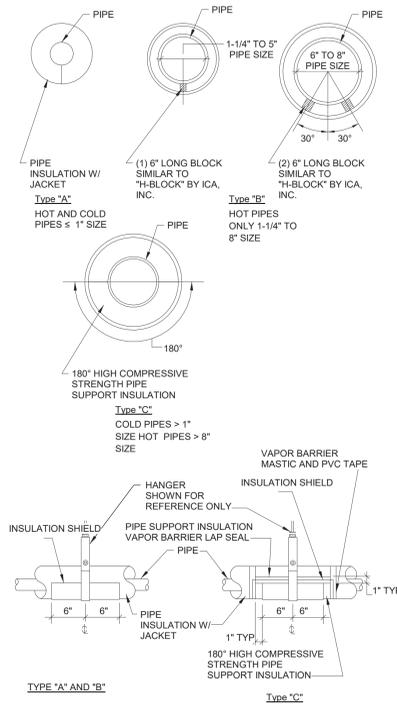
Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

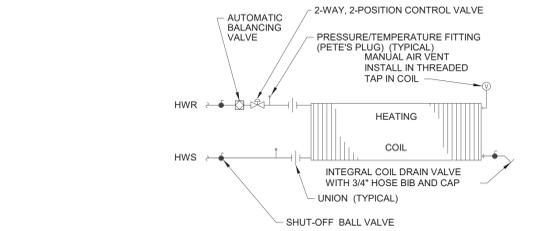
Details

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number: <b>AM500</b>
Project No.: 121111-19002		

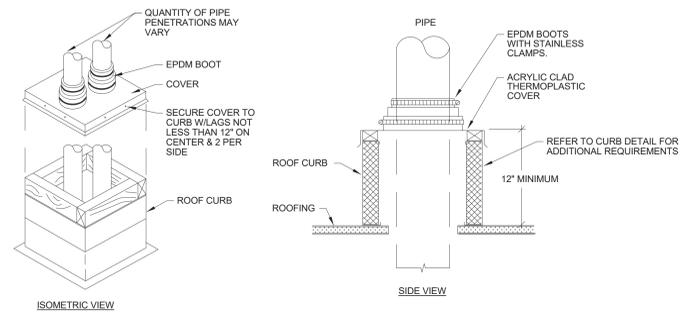
**BID SET**



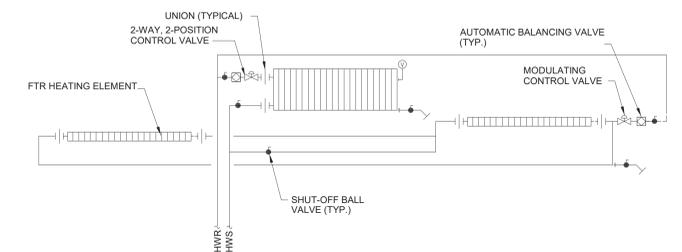
9 Pipe Insulation and Supports  
12" = 1'-0"



5 Unit Ventilator Face and Bypass Coil Piping Detail  
NTS



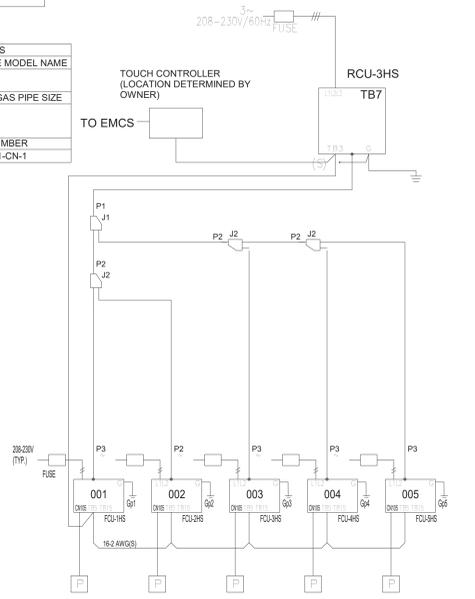
6 Pipe Roof Penetration Detail  
NTS



7 Unit Ventilator / Finned Tube Piping Schematic  
NTS

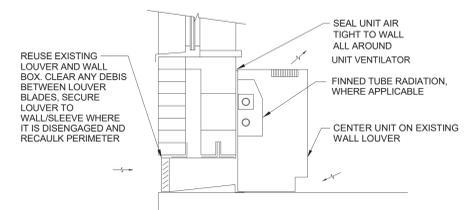
DISPLAY	DESCRIPTION
---	POWER WIRE
---	CONTROL WIRE
---	REF. PIPE

PIPING AND CONTROLS	
SYMBOL	BRANCH PIPE MODEL NAME
J1	CMY-Y102LS-G2
J2	CMY-Y102SS-G2
SYMBOL LIQUID PIPE/GAS PIPE SIZE	
P1	3/8 / 7/8
P2	3/8 / 5/8
P3	1/4 / 1/2
SYMBOL MODEL NUMBER	
P	PAC-UKPRC001-CN-1

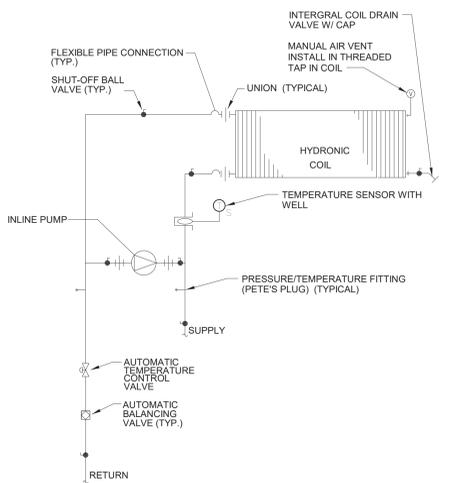


8 Variable Refrigerant System Schematic - Band/Chorus/Music Storage  
NTS

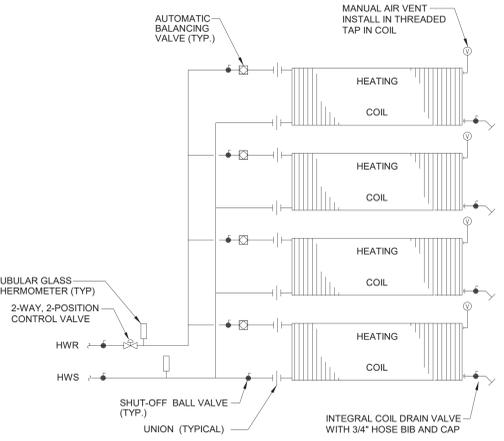
1. PROVIDE MANUFACTURERS CONTROL SIGNAL ADAPTER AS REQUIRED.  
2. CONTROL WIRING AND REFRIGERANT ROUTING SHALL BE DETERMINED IN THE FIELD AND COORDINATED WITH THE MANUFACTURER FOR FINAL REFRIGERANT TUBING SIZES.



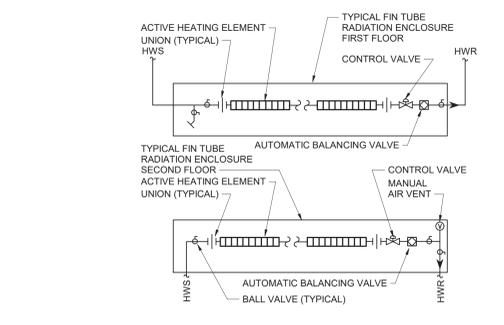
1 Vertical Unit Ventilator Installation Detail  
NTS



2 Hot Water Pumped Coil Detail  
NTS



3 Multi-Zone AHU Coil Detail  
NTS



4 Hot Water Fin Tube Radiation  
NTS

SEE PLANS FOR ENCLOSURE, ELEMENT, AND CAPACITY REQUIREMENTS.

S.E.D. Control No. 48-01-01-06-0-004-020

Rev. No.	Date	Description



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**BID SET**



Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

Details

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number:
Project No.:	AM501	
121111-19002		

FINNED TUBE RADIATION (FTR) SCHEDULE												
EQUIP. TAG	SERVES	MODEL	TYPE	LENGTH (IN)	HEIGHT (IN)	DEPTH (IN)	FIN SIZE (IN)	FINS/FT	TIERS	AWT (DEG F)	BTU/LF	NOTES
FTR-A	SEE PLANS	TYPE S	SLANT	SEE PLANS	14	4	3 1/4 X 3 1/4	40	1	170	675.0	1,2
NOTES: 1. COLOR SELECTION BY ARCHITECT. 2. LEGEND: WW - WALL TO WALL, W/U - WALL TO UNIT.												

REPLACEMENT AHU COOLING COIL SCHEDULE															
EQUIPMENT TAG	LOCATION	MANUFACTURER	MODEL	AIRFLOW (CFM)	DX COIL DATA				REFRIGERANT	DX COIL DATA		NOTES			
					ROWS	COIL H (IN.)	COIL W (IN.)	CIRCUITS		EDB(F)	EWB(F)		LDB(F)	LWB(F)	TOTAL CAPACITY (MBH)
CC-1HS	ADMIN. AHU	YORK	BDX	12000	4	45	78	2	80.0	67.0	59.3	56.5	R410a	399.1	1,2
CC-2HS	LOWER AUDITORIUM AHU	YORK	CDX	4500	4	30.25	48	2	83.0	69.0	56.7	55.4	R410a	195.3	1,2

NOTES:  
1. SPLIT COIL.  
2. CONTRACTOR SHALL VERIFY COIL SIZES IN FIELD AND CONFIRM WITH MANUFACTURER PRIOR TO RELEASE.

PUMP (P) SCHEDULE													
EQUIP. NO.	LOCATION	TYPE	SERVES	FLOWRATE (GPM)	WPD (FT HD)	MAX. OP. TEMP (°F)	MIN. EFF. %	SUCTION CONNECTION (IN)	DISCHARGE CONNECTION (IN)	VOLTAGE	MOTOR HP	FLA	NOTES
P-1HS	CHEM. 204 CLG.	Wet Rotor Circulator	DOAS-1HS	7.1 GPM	11	203 °F	37.10%	3/4"	3/4"	120	60 VA	1 A	1

NOTES:  
1. PROVIDE UNIT MANUFACTURER'S COMBINATION STARTER.

VAV SCHEDULE					
Mark	ROOM NAME	MODEL	MIN AIRFLOW (CFM)	MAX AIRFLOW (CFM)	NOTES
VAV-1	219A	10	165	1400	1
VAV-2	22354	4	25	225	1
VAV-3	22354	8	105	900	1
VAV-4	22353	6	60	500	1
VAV-5	22353	4	25	225	1
VAV-6	223	12	240	2000	1
VAV-7	223-4	8	105	900	1
VAV-8	223	12	240	2000	1
VAV-9	223-2	4	25	225	1
VAV-10	223-4	8	105	900	1

NOTES:  
1. DESIGN BASIS: TRANE

ROOFTOP UNIT (RTU) SCHEDULE																			
EQUIP. NO.	LOCATION	MODEL	SERVES	AIR QUANTITY		COOLING DATA				ELECTRICAL		NOTES							
				TOTAL AIRFLOW	OUTDOOR AIR (CFM)	ESP (IN. WG.)	TSP (IN. WG.)	EDB (DEG.)	EWB (DEG.)	LDB (DEG.)	LWB (DEG.)		COOLING SENSIBLE (MBH)	TOTAL CAPACITY (MBH)	EER	MCA	MOP	VOLTS	PHASE
RTU-1HS	ROOF	THH240G	UPPER AUDITORIUM	7100	1000	26	38	76 °F	66 °F	59 °F	57 °F	201.4	258.3	11.0	96.0	125	208	3	1
RTU-2HS	ROOF	THH240G	UPPER AUDITORIUM	7100	1000	26	38	76 °F	66 °F	59 °F	57 °F	201.4	258.3	11.0	96.0	125	208	3	1

NOTES:  
1. PROVIDE UNIT MANUFACTURER'S COMBINATION STARTER.

AIR HANDLING UNIT (AHU) SCHEDULE															
Mark	LOCATION	SERVES	MODEL	ZONES	AIRFLOW (CFM)	OA (CFM)	SUPPLY FAN				ELECTRICAL				NOTES
							ESP (IN. WG.)	TSP (IN. WG.)	FLA	MCA	VOLTAGE	HERTZ	PHASE	NOTES	
AHU-1	24	24,25,26,27,28	AHU-I-03-H-MZ-TB	2	2900	1580	0.6	1.65	4	5	208	60	3		
AHU-2	113	111,113,115	AHU-I-03-H-MZ-TB	3	3360	1715	0.6	1.65	4	5	208	60	3		
AHU-3	182/183	180,182,183,184	AHU-I-03-H-MZ-TB	4	3340	1750	0.6	1.65	4	5	208	60	3		
AHU-4	189/190	132,133,189,190	AHU-I-03-H-MZ-TB	4	3340	1750	0.6	1.65	4	5	208	60	3		
AHU-5	168/167	165,166,167,171	AHU-I-03-H-MZ-TB	4	3340	1740	0.6	1.65	4	5	208	60	3		
AHU-6	186/187	185,186,187,188	AHU-I-03-H-MZ-TB	4	3340	1740	0.6	1.65	4	5	208	60	3		
AHU-7	176	105,106,175,176	AHU-I-03-H-MZ-TB	3	3140	1585	0.6	1.65	4	5	208	60	3		
AHU-8	217/213	209,211,213,215	AHU-I-03-H-MZ-TB	4	3340	1720	0.6	1.65	4	5	208	60	3		
AHU-9	272/273	271,272,273,274	AHU-I-03-H-MZ-TB	4	3340	1725	0.6	1.65	4	5	208	60	3		
AHU-10	210/212	208,210,212,214	AHU-I-03-H-MZ-TB	4	3340	1720	0.6	1.65	4	5	208	60	3		
AHU-11	228/228	224,226,228,230	AHU-I-03-H-MZ-TB	4	3340	1740	0.6	1.65	4	5	208	60	3		
AHU-12	239	235,239,241	AHU-I-03-H-MZ-TB	3	3100	1485	0.6	1.65	4	5	208	60	3		
AHU-13	238	234,236,238,240	AHU-I-03-H-MZ-TB	3	2960	1630	0.6	1.65	4	5	208	60	3		

NOTES:  
1. DESIGN BASIS: ANNEX AIR.  
2. PROVIDE MANUFACTURERS COMBINATION STARTER.

AHU COIL SCHEDULE														
DWG LABEL	AIRFLOW (CFM)	HEATING DATA				COIL 1		COIL 2		COIL 3		COIL 4		NOTES
		EAT (°F)	LAT (°F)	EWT (°F)	LWT (°F)	AIRFLOW (CFM)	CAPACITY (MBH)							
AHU-1	2900	29	95	180	160	1000	71	7.1	1800	135	13.5	-	-	-
AHU-2	3360	34	95	180	160	1480	98	9.8	940	62	6.2	-	-	-
AHU-3	3340	34	95	180	160	910	60	6	760	50	5	910	60	6
AHU-4	3340	34	95	180	160	910	60	6	760	50	5	910	60	6
AHU-5	3340	34	95	180	160	910	60	6	760	50	5	910	60	6
AHU-6	3340	34	95	180	160	910	60	6	760	50	5	910	60	6
AHU-7	3140	37	95	180	160	1120	70	7	900	57	5.7	1120	70	7
AHU-8	3340	34	95	180	160	910	60	6	760	50	5	910	60	6
AHU-9	3340	34	95	180	160	910	60	6	760	50	5	910	60	6
AHU-10	3340	34	95	180	160	910	60	6	760	50	5	910	60	6
AHU-11	3340	34	95	180	160	910	60	6	760	50	5	910	60	6
AHU-12	3100	31	95	180	160	1400	97	9.7	680	47	4.7	1060	74	7.4
AHU-13	2960	32	95	180	160	1060	72	7.2	800	55	5.5	1150	78	7.8

DEDICATED OUTDOOR AIR HANDLING UNIT (DOAS) SCHEDULE																
MARK	MANUFACTURER	MODEL	LOCATION	SUPPLY FAN		EXHAUST FAN		ELECTRICAL				NOTES				
				OA (CFM)	ESP (IN. WG.)	EA (CFM)	ESP (IN. WG.)	HP	VOLTAGE	PHASE	HERTZ		FLA	MCA	MOP	
DOAS-1HS	RENEWAIRE	DN-3	ROOF	2000	1	5	2075	1	5	230	3	60	8.6-7.2	19.4	25	1

NOTES:  
1. PROVIDE UNIT MANUFACTURER'S COMBINATION STARTER.

DOAS COILS SCHEDULE														
Mark	AIRFLOW (CFM)	SUMMER PERFORMANCE				WINTER PERFORMANCE				DX COOLING COIL		HEATING COIL		NOTES
		EDB (°F)	LDB (°F)	EDB (°F)	LDB (°F)	EDB (°F)	LDB (°F)	EDB (°F)	LDB (°F)	CAPACITY (MBH)	LDB (°F)	CAPACITY (MBH)	FLOW (GPM)	
DOAS-1HS	2000	95	80.6	75	10	53.1	70	52.8	52.1	98.8	101.5	104.5	7.1	

FAN COIL UNIT (FCU) SCHEDULE																		
DWG LABEL	LOCATION	MANUFACTURER	MODEL	ARRANGEMENT	CFM (HIGH)	HEATING DATA		TOTAL CAPACITY (MBH)	COOLING DATA				ELECTRICAL			NOTES		
						CLG. CASSETTE	CLG. CASSETTE		SENS. CAPACITY (MBH)	EDB (°F)	EWB (°F)	LDB (°F)	LWB (°F)	MCA	VOLTAGE		HERTZ	PHASE
FCU-1HS	BAND ROOM	MITSUBISHI	PLFY-P18NBMU-ER2	CLG. CASSETTE	636	86.7	11.4	18.0	13.7	80.0	67.0	59.6	56.0	0.64	208/230	60	1	1,2
FCU-2HS	BAND ROOM	MITSUBISHI	PLFY-P24NBMU-ER2	CLG. CASSETTE	777	88.4	15.5	24.0	17.2	80.0	67.0	59.1	55.6	0.64	208/230	60	1	1,2
FCU-3HS	MUSIC STORAGE	MITSUBISHI	PMFY-P08NBMU-ER5	CLG. CASSETTE	328	84.6	5.2	8.0	6.2	80.0	67.0	62.1	56.9	0.25	208/230	60	1	1,2
FCU-4HS	CHORUS ROOM	MITSUBISHI	PLFY-P12NBMU-ER2	CLG. CASSETTE	494	84.6	7.7	12.0	9.5	80.0	67.0	61.9	56.9	0.64	208/230	60	1	1,2
FCU-5HS	CHORUS ROOM	MITSUBISHI	PLFY-P12NBMU-ER2	CLG. CASSETTE	494	84.6	7.7	12.0	9.5	80.0	67.0	61.9	56.9	0.64	208/230	60	1	1,2

NOTES:  
1. PROVIDE UNIT MANUFACTURER'S COMBINATION STARTER.  
2. REFER TO VRF SYSTEM SCHEMATIC FOR REFRIGERANT TUBING SIZES AND MANUFACTURERS RECOMMENDED PIPING ARRANGEMENT

FAN (F) SCHEDULE														
Mark	MANUFACTURER	MODEL	Serves	AIRFLOW (CFM)	SONES	ESP (IN WG.)		FAN DATA				ELECTRICAL		NOTES
						DRIVE	MOTOR RPM	BHP	HP	VOLTAGE	PHASE			
EF-1HS	LOREN COOK	19SSQN-B	AHU-1	2900	7.6	0.25	711	0.355	1/2	208	3	1,2,3		
EF-2HS	LOREN COOK	245CA4SWSI	ROOMS 35-39	3500	5	0.5	BELT	1553	0.332	3/4	208	3	1,2,3	
EF-3HS	LOREN COOK	70C1D5C	S101	50	3.3	0.25	DIRECT	1267	0.013	1/6	120	1	1	
EF-4HS	LOREN COOK	245ACEB	AHU-2	3360	5.7	0.33	BELT	491	0.406	1/2	208	3	1,2,3	
EF-5HS	LOREN COOK	245ACEB	AHU-8	3340	5.7	0.33	BELT	490	0.405	1/2	208	3	1,2,3	
EF-6HS	LOREN COOK	245ACEB	AHU-3	3340	5.7	0.33	BELT	490	0.405	1/2	208	3	1,2,3	
EF-7HS	LOREN COOK	245ACEB	AHU-9	3340	5.7	0.33	BELT	490	0.405	1/2	208	3	1,2,3	
EF-8HS	LOREN COOK	245ACEB	AHU-6	3340	5.7	0.33	BELT	490	0.405	1/2	208	3	1,2,3	
EF-9HS	LOREN COOK	245ACEB	AHU-12	3100	5.2	0.33	BELT	475	0.367	1/2	208	3	1,2,3	
EF-10HS	LOREN COOK	245ACEB	AHU-4	3340	5.7	0.33	BELT	490	0.405	1/2	208	3	1,2,3	
EF-11HS	LOREN COOK	245ACEB	AHU-10	3340	5.7	0.33	BELT	490	0.405	1/2	208	3	1,2,3	
EF-12HS	LOREN COOK	245ACEB	AHU-5	3340	5.7	0.33	BELT	490	0.405	1/2	208	3	1,2,3	
EF-13HS	LOREN COOK	245ACEB	AHU-11	3340	5.7	0.33	BELT	490	0.405	1/2	208	3	1,2,3	
EF-14HS	LOREN COOK	245ACEB	AHU-7	3140	5.3	0.33	BELT	478	0.374	1/2	208	3	1,2,3	
EF-15HS	LOREN COOK	245ACEB	AHU-13	2960	5.0	0.33	BELT	468	0.349	1/2	208	3	1,2,3	
EF-16HS	LOREN COOK	ACRUD-101R17D	CHEM HOOD 235	870	11.4	0.23	DIRECT	1725	1.147	1/6	120	1	1,2	
EF-17HS	LOREN COOK	ACRUD-101R17D	CHEM HOOD 239	870	11.4	0.23	DIRECT	1725	1.147	1/6	120	1	1,2	
EF-18HS	LOREN COOK	330 ACEB	ROOMS 242-244	5300	7.7	0.5	BELT	410	0.91	1	208	3	1,2,3	

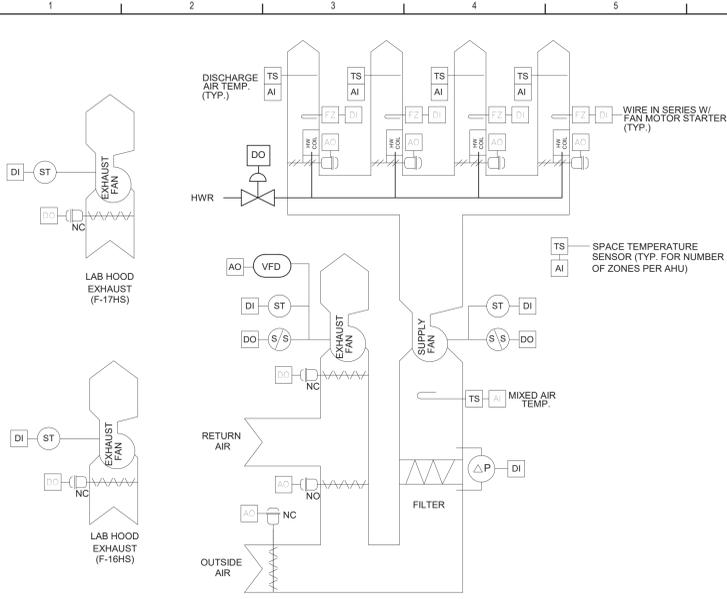
NOTES:  
1. PROVIDE MANUFACTURERS COMBINATION STARTER.  
2. PROVIDE WITH MANUFACTURERS STANDARD 12" HIGH, INSULATED ROOF CURB  
3. PROVIDE WITH VARIABLE SPEED DRIVE.

UNIT VENTILATOR (UV) SCHEDULE															
EQUIP. NO.	LOCATION	MANUFACTURER	MODEL	SA CFM	MIN. OA	NO. ROWS	HEATING DATA		HW COIL		ELECTRICAL		NOTES		
							EAT	LAT	GPM	WPD (FT HD)	MCA	VPH		MOP	
UV-1	CLASSROOM 035	TRANE	VUVE1250	1250	585	1	40.8	97.8	74.1	4.9	11.1	9.0	115/1	15	1,2,3,4
UV-2	CLASSROOM 039	TRANE	VUVE1000	1000	420	1	40.8	93.7	56.2	3.8	5.7	4.5	115/1	15	1,2,3,4
UV-3	CLASSROOM 038	TRANE	VUVE1250	1250	550	1	40.7	98.8	73.2	4.9	10.8	9.0			

SYSTEM VALUES AHU-1				
Vps	3050	(UNCORRECTED OA) Vou	1223	
(CORRECTED OA) Vot	1325	D	1.00	
OA%	43	Ev	0.92	
ADDITIONAL OA%	8			
SYSTEM VALUES AHU-2				
Vps	3360	(UNCORRECTED OA) Vou	1457	
(CORRECTED OA) Vot	1715	D	1.00	
OA%	51	Ev	0.85	
ADDITIONAL OA%	18			
SYSTEM VALUES AHU-3				
Vps	3340	(UNCORRECTED OA) Vou	1479	
(CORRECTED OA) Vot	1750	D	1.00	
OA%	52	Ev	0.84	
ADDITIONAL OA%	18			
SYSTEM VALUES AHU-4				
Vps	3340	(UNCORRECTED OA) Vou	1473	
(CORRECTED OA) Vot	1750	D	1.00	
OA%	52	Ev	0.84	
ADDITIONAL OA%	19			
SYSTEM VALUES AHU-5				
Vps	3340	(UNCORRECTED OA) Vou	1479	
(CORRECTED OA) Vot	1740	D	1.00	
OA%	52	Ev	0.85	
ADDITIONAL OA%	18			
SYSTEM VALUES AHU-6				
Vps	3340	(UNCORRECTED OA) Vou	1479	
(CORRECTED OA) Vot	1740	D	1.00	
OA%	52	Ev	0.85	
ADDITIONAL OA%	18			
SYSTEM VALUES AHU-7				
Vps	3340	(UNCORRECTED OA) Vou	1204	
(CORRECTED OA) Vot	1585	D	1.00	
OA%	47	Ev	0.78	
ADDITIONAL OA%	32			
SYSTEM VALUES AHU-8				
Vps	3340	(UNCORRECTED OA) Vou	1469	
(CORRECTED OA) Vot	1720	D	1.00	
OA%	51	Ev	0.85	
ADDITIONAL OA%	17			
SYSTEM VALUES AHU-9				
Vps	3340	(UNCORRECTED OA) Vou	1480	
(CORRECTED OA) Vot	1725	D	1.00	
OA%	52	Ev	0.88	
ADDITIONAL OA%	17			
SYSTEM VALUES AHU-10				
Vps	3340	(UNCORRECTED OA) Vou	1470	
(CORRECTED OA) Vot	1720	D	1.00	
OA%	51	Ev	0.85	
ADDITIONAL OA%	17			
SYSTEM VALUES AHU-11				
Vps	3340	(UNCORRECTED OA) Vou	1480	
(CORRECTED OA) Vot	1740	D	1.00	
OA%	52	Ev	0.85	
ADDITIONAL OA%	18			
SYSTEM VALUES AHU-12				
Vps	3140	(UNCORRECTED OA) Vou	1167	
(CORRECTED OA) Vot	1485	D	1.00	
OA%	47	Ev	0.79	
ADDITIONAL OA%	27			
SYSTEM VALUES AHU-13				
Vps	3110	(UNCORRECTED OA) Vou	1417	
(CORRECTED OA) Vot	1630	D	1.00	
OA%	52	Ev	0.87	
ADDITIONAL OA%	15			
SYSTEM VALUES DOAS-1				
Vps	2075	(UNCORRECTED OA) Vou	1063	
(CORRECTED OA) Vot	2075	D	1.00	
OA%	100	Ev	0.80	
ADDITIONAL OA%	25			
SYSTEM VALUES LIBRARY AHU				
Vps	5200	(UNCORRECTED OA) Vou	1008	
(CORRECTED OA) Vot	1360	D	1.00	
OA%	26	Ev	0.74	
ADDITIONAL OA%	35			

### BUILDING/EQUIPMENT VENTILATION CALCULATIONS

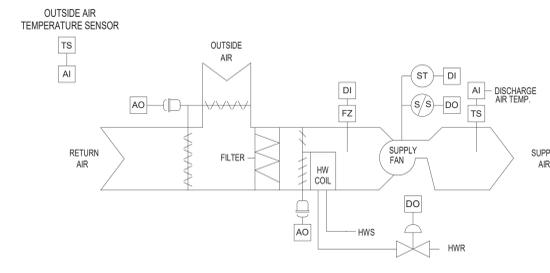
EQUIPMENT NUMBER	ZONE ID				MINIMUM VENTILATION RATES								DESIGN		
	ROOM NUMBER	ROOM NAME	OCCUPANCY CLASSIFICATION	Az - AREA (SF)	Pz - ZONE OCCU. #/1000 FT	ZONE OCCU.	Rp (CFM/Person)	RpP	Ra (CFM/SF)	RaA	Vbz (CFM)	EZ	Voz (CFM)	Vpz (CFM)	Zp
AHU-1	24	CARPENTRY	WOODMETAL SHOPS	1354	20	27	10	271	0.18	244	515	0.8	645	1350	0.48
	25	COMPUTER LAB	COMPUTER LAB	554	25	13	10	134	0.12	64	198	0.8	245	550	0.45
	26	STORAGE	STORAGE ROOMS	91	0	0	0	0	0.12	11	11	0.8	15	50	0.30
	27	STORAGE	STORAGE ROOMS	332	0	0	0	0	0.12	40	40	0.8	50	100	0.50
AHU-2	28	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	980	35	34	10	343	0.12	118	461	0.8	575	1000	0.58
	111	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	940	35	33	10	329	0.12	113	442	0.8	550	940	0.59
	113	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	1222	35	43	10	428	0.12	147	574	0.8	720	1480	0.49
AHU-3	115	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	937	35	33	10	328	0.12	112	440	0.8	550	940	0.59
	180	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	767	35	27	10	268	0.12	92	360	0.8	450	760	0.59
	182	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	806	35	28	10	282	0.12	97	379	0.8	475	910	0.52
	183	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	802	35	28	10	281	0.12	96	377	0.8	470	910	0.52
AHU-4	184	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	771	35	27	10	270	0.12	93	362	0.8	455	760	0.60
	132	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	772	35	27	10	270	0.12	93	363	0.8	455	760	0.60
	133	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	796	35	28	10	278	0.12	95	373	0.8	465	910	0.51
	189	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	793	35	28	10	278	0.12	95	373	0.8	465	910	0.51
AHU-5	190	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	834	35	29	10	292	0.12	100	392	0.8	490	910	0.54
	165	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	781	35	27	10	266	0.12	91	358	0.8	445	760	0.59
	166	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	811	35	28	10	284	0.12	97	381	0.8	475	910	0.52
	167	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	808	35	28	10	283	0.12	97	380	0.8	475	910	0.52
AHU-6	171	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	768	35	27	10	268	0.12	92	360	0.8	450	760	0.59
	185	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	762	35	27	10	267	0.12	91	358	0.8	445	760	0.59
	186	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	812	35	28	10	284	0.12	97	382	0.8	475	910	0.52
	187	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	807	35	28	10	282	0.12	97	379	0.8	475	910	0.52
AHU-7	188	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	796	35	27	10	268	0.12	92	360	0.8	450	760	0.59
	105	LAY DOWN	STORAGE ROOMS	212	0	0	0	0	0.12	25	25	0.8	30	150	0.20
	106	OFFICE	OFFICE SPACES	913	5	2	5	8	0.08	19	27	0.8	35	600	0.06
	107	PRACTICE	CLASSROOMS (AGE 9 PLUS)	70	35	2	10	25	0.12	8	33	0.8	40	50	0.80
AHU-8	108	PRACTICE	CLASSROOMS (AGE 9 PLUS)	50	35	2	10	18	0.12	6	24	0.8	30	50	0.60
	109	PRACTICE	CLASSROOMS (AGE 9 PLUS)	38	35	1	10	13	0.12	5	18	0.8	20	50	0.40
	175	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	1135	35	40	10	397	0.12	136	533	0.8	685	1120	0.59
	175A	STORAGE	STORAGE ROOMS	78	0	0	0	0	0.12	9	9	0.8	10	100	0.10
AHU-9	175B	STORAGE	STORAGE ROOMS	81	0	0	0	0	0.12	10	10	0.8	10	100	0.10
	176	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	1117	35	39	10	391	0.12	134	525	0.8	655	1120	0.58
	209	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	759	35	27	10	266	0.12	91	357	0.8	445	760	0.59
	211	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	833	35	29	10	292	0.12	100	392	0.8	490	910	0.54
AHU-10	213	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	795	35	28	10	278	0.12	95	374	0.8	465	910	0.51
	215	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	739	35	26	10	259	0.12	89	347	0.8	435	760	0.57
	271	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	781	35	27	10	266	0.12	91	358	0.8	445	760	0.59
	272	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	812	35	28	10	284	0.12	97	382	0.8	475	910	0.52
AHU-11	273	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	807	35	28	10	282	0.12	97	379	0.8	475	910	0.52
	274	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	788	35	27	10	269	0.12	92	361	0.8	450	760	0.59
	208	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	760	35	27	10	266	0.12	91	357	0.8	445	760	0.59
	210	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	833	35	29	10	292	0.12	100	392	0.8	490	910	0.54
AHU-12	212	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	795	35	28	10	278	0.12	95	374	0.8	465	910	0.51
	214	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	739	35	26	10	259	0.12	89	347	0.8	435	760	0.57
	224	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	763	35	27	10	267	0.12	92	359	0.8	450	760	0.59
	226	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	811	35	28	10	284	0.12	97	381	0.8	475	910	0.52
AHU-13	228	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	808	35	28	10	283	0.12	97	380	0.8	475	910	0.52
	230	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	766	35	27	10	268	0.12	92	360	0.8	450	760	0.59
	235	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	1204	35	42	10	421	0.12	144	566	0.8	705	1300	0.54
	235S	STORAGE	STORAGE ROOMS	169	0	0	0	0	0.12	23	23	0.8	30	100	0.30
DOAS-1	239	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	1055	35	37	10	369	0.12	127	496	0.8	620	1060	0.58
	241	STORAGE	STORAGE ROOMS	686	0	0	0	0	0.12	82	82	0.8	105	680	0.15
	234	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	1150	35	40	10	403	0.12	138	541	0.8	675	1150	0.59
	236	STORAGE	STORAGE ROOMS	169	0	0	0	0	0.12	20	20	0.8	25	100	0.25
LIBRARY AHU	238	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	1029	35	36	10	360	0.12	123	484	0.8	605	1060	0.57
	240	CLASSROOM	CLASSROOMS (AGE 9 PLUS)	793	35	28	10	278	0.12	95	373	0.8	465	910	0.51
	142	CHORAL	MUSIC/THEATER/DANCE	2844	35	93	10	925	0.08	159	1084	0.8	1355	1355	1.00
	143	BAND	MUSIC/THEATER/DANCE	1291	35	45	10	452	0.08	77	528	0.8	680	660	1.00
LIBRARY AHU	143A	MUSIC STORAGE	STORAGE ROOMS	410	0	0	0	0	0.12	49	49	0.8	60	60	1.00
	223	LIBRARY	LIBRARIES	2518	10	25	5	128	0.12	302	428	0.8	535	2700	0.20



**AIR HANDLING UNIT - MULTI-ZONE, HOT WATER (WITH LAB HOOD EXHAUST) - SEQUENCE OF OPERATIONS:**

- NOTE: FOR TEMPERATURE CONTROL SEQUENCE, REFER TO 4IAM701
- WHEN A LAB HOOD EXHAUST FAN (F-16HS, 17HS) IS ENERGIZED, MANUALLY VIA SWITCH ON HOOD, THE F-9HS VFD SHALL RAMP DOWN LINEARLY TO ACHIEVE THE FOLLOWING AIRFLOW QUANTITIES WHICH SHALL BE DETERMINED DURING THE AIR BALANCING PROCESS.
  - 1 LAB HOOD FAN ON, F-9HS EXHAUST FLOW: 2230 CFM
  - 2 LAB HOOD FANS ON, F-9HS EXHAUST AIR FLOW: 1360 CFM

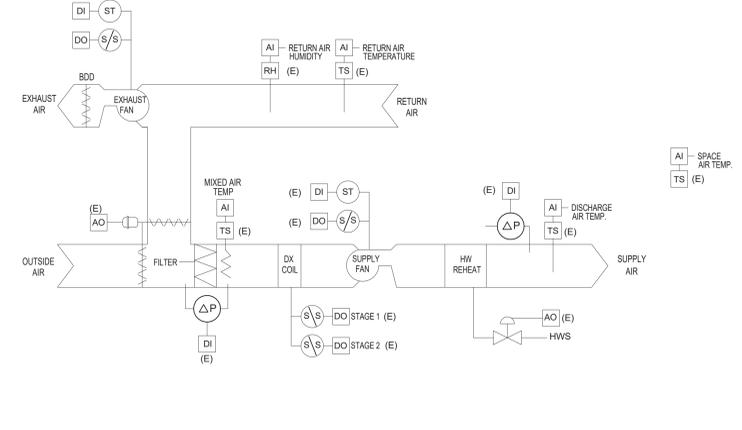
**6 AHU - Multizone Classroom Unit Chemistry Room**  
NTS



**UNIT VENTILATOR - HOT WATER - FACE AND BY-PASS - SEQUENCE OF OPERATIONS:**

- OCCUPIED MODE:**
  - SUPPLY FAN AND ASSOCIATED EXHAUST FAN SHALL RUN CONTINUOUSLY.
  - THE OUTSIDE AIR DAMPER SHALL OPEN TO THE POSITION REQUIRED TO MAINTAIN THE MINIMUM OUTSIDE AIR QUANTITY INDICATED. OUTSIDE AIR DAMPER SHALL NEVER BE POSITIONED BELOW THIS MINIMUM POSITION EXCEPT IN CASE OF ALARM.
  - WHEN THE OUTSIDE AIR TEMPERATURE IS 65 DEG. F. OR LOWER (ADJ.), OPEN HOT WATER VALVE TO ALLOW FLOW THROUGH THE COIL.
  - THE FACE AND BY-PASS DAMPER SHALL MODULATE TO MAINTAIN SPACE HEATING SETPOINT SUBJECT TO DISCHARGE HIGH LIMIT OF 110 DEG. F (ADJUSTABLE) AND DISCHARGE LOW LIMIT OF 40 DEG. F (ADJUSTABLE).
  - WHEN THE SPACE TEMPERATURE RISES 3 DEG. F (ADJUSTABLE) ABOVE THE SPACE HEATING SETPOINT, AND THE OUTSIDE AIR TEMPERATURE IS LOWER THAN THE SPACE TEMPERATURE, THE OUTSIDE AIR DAMPER SHALL MODULATE OPEN TO MAINTAIN THE OCCUPIED SETPOINT. THIS SHALL BE DONE SUBJECT TO DISCHARGE LOW LIMIT OF 55 DEG. F (ADJUSTABLE), AND WITH THE FACE AND BY-PASS DAMPER POSITIONED TO FULL BY-PASS OF THE COIL. CLOSE 2-WAY, 2-POSITION VALVE DURING ECONOMIZER SEQUENCE.
- UNOCCUPIED MODE:**
  - SUPPLY FAN AND ASSOCIATED EXHAUST FAN SHALL BE OFF.
  - THE OUTSIDE AIR DAMPER AND THE ASSOCIATED RELIEF/EXHAUST AIR DAMPER SHALL BE CLOSED.
  - MODULATE FINNED TUBE RADIATION VALVE, WHERE APPLICABLE, TO MAINTAIN ROOM TEMPERATURE SETPOINT.
  - UPON A DROP IN SPACE TEMPERATURE, BELOW UNOCCUPIED SETPOINT, START FAN AND MODULATE FACE AND BYPASS DAMPER AS REQUIRED UNTIL SETPOINT IS ACHIEVED. USE A 5 DEG. (ADJ.) DEADBAND TO MINIMIZE SHORT CYCLING.
  - A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO OCCUPIED MODE FOR 1 HOUR (ADJ.). AT EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.
- WARM-UP MODE:**
  - THE UNIT SHALL START PER AN OPTIMUM START PROGRAM.
  - THE OUTSIDE AIR DAMPER AND THE ASSOCIATED EXHAUST AIR DAMPER SHALL BE CLOSED AND EXHAUST FAN SHALL BE OFF.
  - THE SUPPLY FAN SHALL RUN AND THE FACE AND BY-PASS DAMPER SHALL MODULATE TO MAINTAIN OCCUPIED SPACE HEATING SETPOINT SUBJECT TO DISCHARGE HIGH LIMIT OF 110 DEG. F (ADJUSTABLE) AND DISCHARGE LOW LIMIT OF 70 DEG. F (ADJ.).
- SAFETIES / ALARMS**
  - A SEPARATE LOW LIMIT FREEZE STAT WITH AUTOMATIC RESET SHALL BE INSTALLED WITH SENSING ELEMENT SERPENTINED ACROSS THE FACE OF THE COIL. WHENEVER COIL FREEZE-UP CONDITIONS OCCUR (36 DEG. F., ADJ.) THE SUPPLY FAN SHALL STOP, THE OUTSIDE AIR DAMPER SHALL CLOSE AND THE FACE AND BYPASS DAMPER SHALL BE POSITIONED TO FULL FACE TO THE COIL. AN ALARM SHALL ALSO BE ACTIVATED.
  - FAN STATUS IS OFF WHEN SCHEDULED TO RUN.

**4 UV - Hot Water - Face and Bypass Control**  
NTS

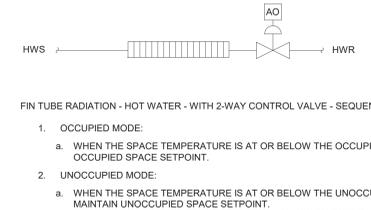


**ROOFTOP UNIT - AUDITORIUM - SEQUENCE OF OPERATIONS:**

NOTE: ALL POINTS DESIGNATED AS (E) ARE EXISTING. REMOVE UNIT MOUNTED CONTROL DEVICES, SENSORS, ETC. FROM EXISTING RTU AND SAVE FOR REUSE. INSTALL EXISTING REMOVED DEVICES AND SENSORS FOLLOWING INSTALLATION OF NEW ROOFTOP UNITS. PROVIDE CONTROL FOR UNIT MOUNTED EXHAUST FAN AS INDICATED.

- EXISTING SEQUENCE OF OPERATION SHALL REMAIN IN PLACE.
- RTU EXHAUST FAN SHALL RUN WHENEVER SUPPLY FAN RUNS.

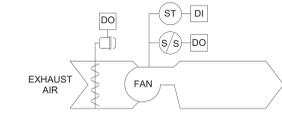
**5 Auditorium Rooftop Unit Control**  
NTS



**FIN TUBE RADIATION - HOT WATER - WITH 2-WAY CONTROL VALVE - SEQUENCE OF OPERATIONS:**

- OCCUPIED MODE:**
  - WHEN THE SPACE TEMPERATURE IS AT OR BELOW THE OCCUPIED HEATING SETPOINT, THE CONTROL VALVE SHALL MODULATE TO MAINTAIN OCCUPIED SPACE SETPOINT.
- UNOCCUPIED MODE:**
  - WHEN THE SPACE TEMPERATURE IS AT OR BELOW THE UNOCCUPIED HEATING SETPOINT, THE CONTROL VALVE SHALL MODULATE TO MAINTAIN UNOCCUPIED SPACE SETPOINT.
  - A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT IN OCCUPIED MODE FOR 1 HOUR (ADJUSTABLE). AT EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.
- WARM-UP MODE:**
  - WHEN THE SPACE TEMPERATURE IS AT OR BELOW THE OCCUPIED HEATING SETPOINT, THE CONTROL VALVE SHALL MODULATE TO MAINTAIN OCCUPIED SPACE SETPOINT.
- SAFETIES:**
  - IF THE SPACE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY 10 DEG. F (ADJUSTABLE), THE CONTROL VALVE SHALL OPEN 100%. AN ALARM SHALL BE ACTIVATED.

**1 Fin Tube Radiation - Hot Water With Two Way Control Valve**  
NTS

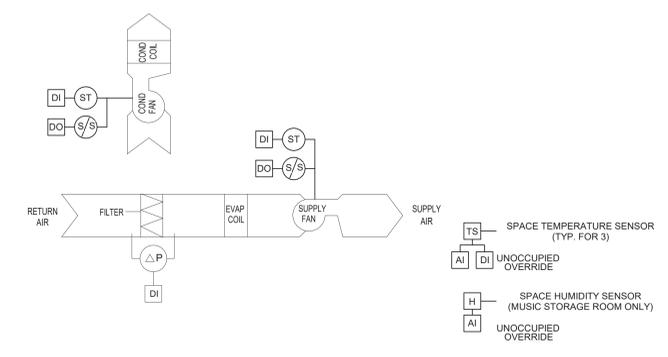


**EXHAUST FAN - CONSTANT SPEED - SEQUENCE OF OPERATIONS:**

INTERLOCK THE OPERATION OF THE EXHAUST FANS AND AUTOMATIC DAMPERS WITH THEIR RESPECTIVE HEATING AND COOLING EQUIPMENT.

- OCCUPIED MODE:**
  - THE EXHAUST FAN SHALL RUN CONTINUOUSLY AND THE AUTOMATIC AIR DAMPER SHALL OPEN.
- UNOCCUPIED MODE:**
  - THE EXHAUST FAN SHALL BE OFF AND THE AUTOMATIC AIR DAMPER SHALL BE CLOSED.
- WARM-UP MODE:**
  - THE EXHAUST FAN SHALL BE OFF AND THE AUTOMATIC AIR DAMPER SHALL BE CLOSED.
- SAFETIES:**
  - UPON A FAILURE OF THE FAN, AS SENSED BY A CURRENT SENSING STATUS SWITCH, AN ALARM SHALL BE ACTIVATED.

**2 Exhaust Fan - Constant Speed**  
NTS



**HEAT PUMP UNIT (FAN COIL UNIT) - SEQUENCE OF OPERATIONS:**

- OCCUPIED MODE:**
  - UNIT SHALL MAINTAIN A 75 DEG. F. (ADJ.) COOLING SETPOINT.
  - UNIT SHALL MAINTAIN A 70 DEG. F. (ADJ.) HEATING SETPOINT.
- UNOCCUPIED MODE:**
  - UNIT SHALL MAINTAIN A 75 DEG. F. (ADJ.) COOLING SETPOINT.
  - UNIT SHALL MAINTAIN A 55 DEG. F. (ADJ.) HEATING SETPOINT.
- FAN:** THE FAN SHALL RUN ANY TIME THE UNIT IS COMMANDED TO RUN UNLESS SHUTDOWN ON SAFETIES.
- HEATING AND COOLING:** THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND CYCLE THE COMPRESSOR TO MAINTAIN ITS SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE, ADJUSTABLE MINIMUM RUNTIME. THE COMPRESSOR SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.
  - ON MODE CHANGE, THE COMPRESSOR SHALL BE DISABLED AND REMAIN OFF UNTIL AFTER THE REVERSING MINIMUM HAS CHANGED POSITION.
  - FINNED TUBE RADIATION, WHERE APPLICABLE WILL PROVIDE FIRST STAGE OF HEATING.
- THE CONTROLLER SHALL MONITOR ALARMS AS FOLLOWS:
  - FAN FAILURE ALARM: COMMANDED ON BUT STATUS IS OFF.
  - FILTER STATUS.
- THE CORRESPONDING DOAS UNIT SHALL WORK IN CONJUNCTION WITH SPACE FCU'S WHEN INDEXING BETWEEN HEATING AND COOLING.

**3 Heat Pump (FCU) Control**  
NTS

**TEMPERATURE CONTROLS SYMBOLS LIST**

- [AI] ANALOG IN
- [AO] ANALOG OUT
- [COM] COMMUNICATIONS PORT
- [CS] AIRBORNE CONTAMINANT SENSOR
- [DI] DIGITAL IN
- [DM] DAMPER MOTOR
- [DO] DIGITAL OUT
- [EMCS] ENERGY MANAGEMENT CONTROL SYSTEM
- [F] FLOW (WATER/AIR)
- [FM] FLOW METER
- [FS] AIR FLOW SENSOR
- [FZ] FREEZE STAT
- [H] HUMIDITY SENSOR
- [HL] HIGH LIMIT
- [KWH] KILOWATT HOUR METER
- [LL] LOW LIMIT
- [M/S] MANUAL SWITCH STOP / START
- [P] PRESSURE SENSOR
- [DP] DIFFERENTIAL PRESSURE
- [PS] POSITION SENSOR
- [S/S] STOP / START
- [SD] SMOKE DETECTOR
- [ST] STATUS
- [START] STARTER
- [T] ADJUSTABLE THERMOSTAT
- [TS] TEMPERATURE SENSOR
- [VFD] VARIABLE FREQUENCY DRIVE
- [WS] WATER SENSOR
- [%] PERCENT
- [ES] END SWITCH
- [VAV] VAV AIRFLOW SENSOR
- TEMPERATURE SENSOR CAPILLARY TUBE

S.E.D. Control No. 48-01-01-06-0-004-020

Rev. No.: Date: Description:



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Tetra Tech Engineers, Architects & Landscape Architects, P.C.

**BID SET**

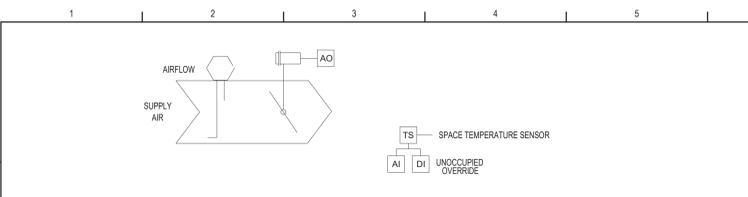
**TETRA TECH ARCHITECTS & ENGINEERS**

Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

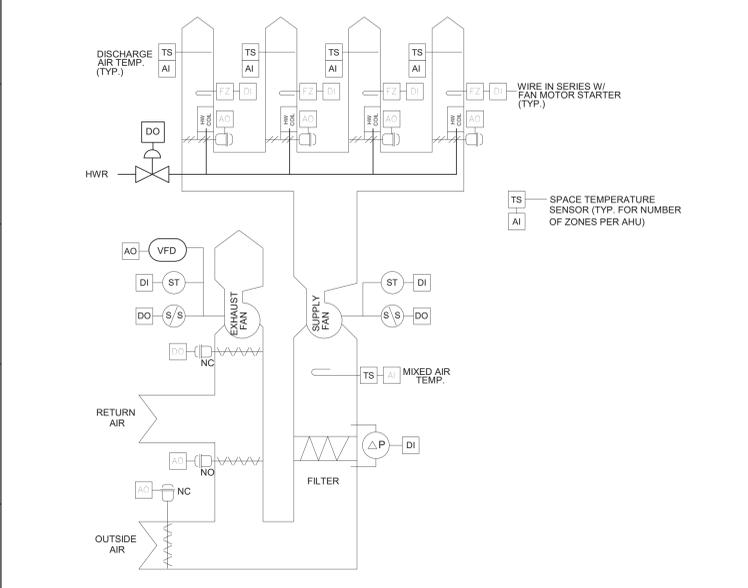
Controls

Drawn By: DPM/jjk Date: 8/21/20 Drawing Number:  
Project No.: 12111-19002 **AM700**



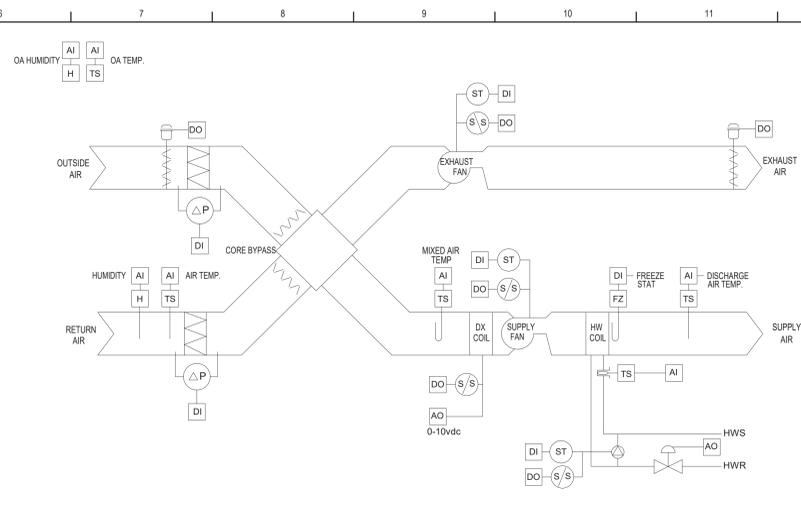
- VARIABLE AIR VOLUME TERMINAL DEVICE:**
- 1. RUN CONDITIONS:**
    - THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:
      1. OCCUPIED MODE: THE UNIT SHALL MAINTAIN A 75 DEG. F. COOLING SETPOINT AND 70 DEG. F. HEATING SETPOINT (ADJ.)
      2. UNOCCUPIED MODE: THE UNIT SHALL MAINTAIN AN 85 DEG. F. COOLING SETPOINT AND 55 DEG. F. HEATING SETPOINT (ADJ.)
    - ZONE SETPOINT ADJUST: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS BY A USER DEFINABLE AMOUNT (ADJ.)
    - THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF THE SCHEDULED OCCUPIED PERIOD. OVERRIDE: A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.
  - 2. FLOW CONTROL:**
    - WHEN ZONE TEMPERATURE IS GREATER THAN ITS COOLING SETPOINT, THE DAMPER SHALL MODULATE BETWEEN THE MINIMUM OCCUPIED AIRFLOW AND MAXIMUM COOLING AIRFLOW (ADJ.) UNTIL THE ZONE IS SATISFIED.
    - WHEN THE ZONE TEMPERATURE IS BETWEEN THE COOLING SETPOINT AND THE HEATING SETPOINT, THE ZONE DAMPER SHALL MAINTAIN THE MINIMUM REQUIRED ZONE VENTILATION.
    - WHEN THE ZONE TEMPERATURE IS LESS THAN ITS HEATING SETPOINT, THE CONTROLLER SHALL ENABLE HEATING TO MAINTAIN THE ZONE TEMPERATURE AT ITS HEATING SETPOINT. ADDITIONALLY, IF WARM AIR IS AVAILABLE FROM THE RTU/AHU, THE ZONE DAMPER SHALL MODULATE BETWEEN THE MINIMUM OCCUPIED AIRFLOW AND THE MAXIMUM HEATING AIRFLOW UNTIL THE ZONE IS SATISFIED.
  - 3. PERIMETER HEATING (WHERE AVAILABLE)**
    - THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE PERIMETER HEATING COIL VALVE AS REQUIRED TO MAINTAIN IT HEATING SETPOINT.

**3 VAV Terminal Device**  
NTS



- AIR HANDLING UNIT - MULTI-ZONE, HOT WATER - SEQUENCE OF OPERATIONS:**
- 1. OCCUPIED MODE:**
    - THE SUPPLY AND EXHAUST FANS SHALL RUN CONTINUOUSLY BASED UPON AN OPERATOR ADJUSTABLE SCHEDULE.
    - WHEN SCHEDULED, OPEN THE OUTSIDE AIR DAMPER AND RETURN AIR DAMPERS TO THE POSITIONS REQUIRED TO MAINTAIN THE MINIMUM OUTSIDE AIR QUANTITY INDICATED. OPEN EXHAUST AIR DAMPER AND MODULATE EXHAUST FAN VFD TO EQUAL MINIMUM OUTSIDE AIR QUANTITIES AS SCHEDULED. THE OUTSIDE AIR DAMPER SHALL NEVER BE POSITIONED BELOW THIS MINIMUM POSITION EXCEPT IN CASE OF ALARM.
    - OPEN THE HOT WATER 2-WAY VALVE WHEN THE OUTSIDE AIR TEMPERATURE IS 50 DEG. F. (ADJ.).
    - UPON A CALL FOR HEAT, THE RESPECTIVE ZONE DAMPER SHALL MODULATE OPEN TO THE HEATING COIL WITH BYPASS DAMPER ACTING LINEARLY TO CLOSE.
    - MODULATE THE THE FACE AND BYPASS DAMPERS AS REQUIRED TO MAINTAIN SPACE TEMPERATURE SETPOINT.
  - 2. ECONOMIZER:**
    - WHEN THE AVERAGE SPACE TEMPERATURE RISES 3 DEG. F. (ADJ.) ABOVE THE SPACE HEATING SETPOINT AND THE OUTSIDE AIR TEMPERATURE IS LOWER THAN THE AVERAGE SPACE TEMPERATURE, OPEN THE OUTSIDE AIR DAMPER BEYOND MINIMUM POSITION, CLOSE RETURN AIR DAMPER, RAMP EXHAUST FAN SPEED TO 100% AND BEGIN ECONOMIZER COOLING AND MODULATE FACE AND BYPASS DAMPER TO BYPASS POSITION.
  - 3. UNOCCUPIED MODE:**
    - THE SUPPLY AND EXHAUST FAN SHALL BE OFF.
    - THE OUTSIDE AIR DAMPER SHALL BE FULLY CLOSED AND THE RETURN AIR DAMPER SHALL BE FULLY OPEN.
    - WHERE SPACE HAS FINNED TUBE RADIATION, RADIATION SHALL PROVIDE FIRST STAGE UNOCCUPIED HEATING.
    - ON DROP IN SPACE TEMPERATURE BELOW THE UNOCCUPIED HEATING SETPOINT, CYCLE THE FAN ON AND MODULATE THE FACE AND BYPASS DAMPER TO MAINTAIN SPACE HEATING SETPOINT.
    - A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO OCCUPIED MODE FOR 1 HOUR (ADJUSTABLE). AT EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.
  - 4. MORNING PURGE:**
    - ONE HOUR PRIOR TO MORNING WARM UP, THE UNIT SHALL PERFORM A 30 MINUTE PURGE SEQUENCE
      - OPEN OUTSIDE AND EXHAUST DAMPERS
      - START SUPPLY AND EXHAUST FAN (FULL SPEED)
      - MAINTAIN UNOCCUPIED TEMPERATURE CONDITIONS.
  - 5. WARM-UP MODE:**
    - THE UNIT SHALL START PER AN OPTIMUM START PROGRAM.
    - THE UNIT SHALL START PRIOR TO SCHEDULED OCCUPANCY BASED ON THE TIME NECESSARY FOR THE ZONES TO REACH THEIR OCCUPIED SETPOINTS. THE START TIME SHALL AUTOMATICALLY ADJUST BASED ON CHANGES IN OUTSIDE AIR TEMPERATURE AND ZONE TEMPERATURES.
    - THE OUTSIDE AIR DAMPER SHALL BE FULLY CLOSED AND THE RETURN AIR DAMPER SHALL BE FULLY OPEN. THE RESPECTIVE EXHAUST FAN SHALL BE OFF.
  - 6. SAFETIES:**
    - DIFFERENTIAL PRESSURE ACROSS THE AIR FILTERS SHALL GENERATE AN ALARM WHENEVER THE DIFFERENTIAL PRESSURE EXCEEDS ITS ADJUSTABLE SETPOINT.
    - A SEPARATE LOW LIMIT FREEZE STAT WITH AUTOMATIC RESET SHALL BE INSTALLED WITH SENSING ELEMENT SERPENTINED ACROSS THE DISCHARGE FACE OF THE COIL. WHENEVER COIL FREEZE-UP CONDITIONS ARISE (36 DEG. F. ADJUSTABLE) THE SUPPLY FAN SHALL STOP. THE OUTSIDE AIR DAMPER SHALL CLOSE 100%, AND THE FACE DAMPER SHALL OPEN 100% TO HEATING COIL. AN ALARM SHALL BE ACTIVATED.
    - ALARMS SHALL BE PROVIDED AS FOLLOWS:
      - SUPPLY FAN FAILURE: ON, BUT STATUS IS OFF.
      - SUPPLY FAN IN HAND, COMMANDED OFF BUT STATUS IS ON.
      - EXHAUST FAN FAILURE: ON, BUT STATUS IS OFF.
      - EXHAUST FAN IN HAND, COMMANDED OFF BUT STATUS IS ON.
      - HIGH HEATING SUPPLY AIR TEMPERATURE: IF HEATING SUPPLY AIR TEMPERATURE IS GREATER THAN 120 DEG. F. (ADJ.)
      - LOW HEATING SUPPLY AIR TEMPERATURE: IF THE HEATING SUPPLY AIR TEMPERATURE IS 10 DEG. F. BELOW SETPOINT FOR 5 MINUTES (ADJ.)
      - FIRE ALARM SIGNAL SHALL SHUT SUPPLY AND EXHAUST FAN OFF, CLOSE OUTSIDE AND EXHAUST AIR DAMPERS.

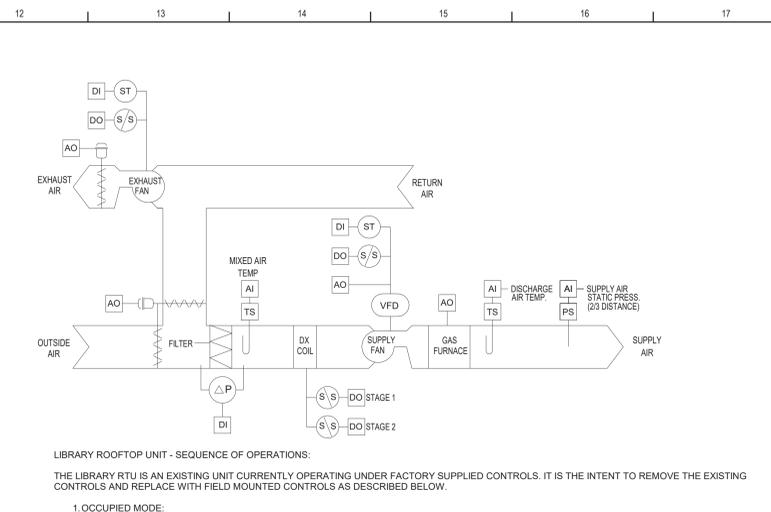
**4 AHU - Multizone Classroom Units**  
NTS



- MUSIC ROOMS DOAS ROOFTOP UNIT - SEQUENCE OF OPERATIONS:**
- 1. OCCUPIED MODE:**
    - THE SUPPLY AND EXHAUST FAN SHALL RUN CONTINUOUSLY.
    - THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING AND EMERGENCY SHUTDOWN SIGNAL.
    - ALARMS SHALL BE PROVIDED AS FOLLOWS:
      1. SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
      2. SUPPLY FAN IN HAND: COMMANDED OFF BUT STATUS IS ON.
  - 2. UNOCCUPIED MODE:**

THE SUPPLY AND EXHAUST FAN SHALL BE OFF. THE OUTSIDE AIR DAMPER AND THE ASSOCIATED EXHAUST DAMPER SHALL BE FULLY CLOSED. A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT IN OCCUPIED MODE FOR 1 HOUR (ADJUSTABLE). AT EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.
  - 3. SUPPLY AIR TEMPERATURE SETPOINT - OPTIMIZED:**
    - HEATING SHALL BE ENABLED WHENEVER:
      - OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEG. F. (ADJ.)
      - SUPPLY FAN STATUS IS ON.
      - COOLING IS NOT ACTIVE.
    - COOLING SHALL BE ENABLED WHENEVER:
      - OUTSIDE AIR TEMPERATURE IS GREATER THAN 60 DEG. F. (ADJ.)
      - ECONOMIZER IS DISABLED.
      - SUPPLY FAN STATUS IS ON.
      - HEATING IS NOT ACTIVE.
    - WHEN THE OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEG. F. (ADJ.), START THE HOT WATER COIL PUMP.
      - MODULATE THE HEATING COIL HOT WATER VALVE AS REQUIRED TO MAINTAIN THE HEATING SUPPLY AIR TEMPERATURES AS DESCRIBED BELOW.
    - UPON A CALL FOR COOLING, MODULATE THE COOLING AS REQUIRED TO MAINTAIN THE COOLING SUPPLY AIR TEMPERATURES AS DESCRIBED BELOW.
    - THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A SUPPLY AIR TEMPERATURE SETPOINT RESET BASED ON ZONE COOLING AND HEATING REQUIREMENTS.
    - THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET FOR COOLING BASED ON ZONE COOLING REQUIREMENTS AS FOLLOWS:
      - INITIAL SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 55 DEG. F. (ADJ.)
      - AS COOLING INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 53 DEG. F. (ADJ.)
      - AS COOLING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY BE RESET UPWARD TO A MAXIMUM OF 72 DEG. F. (ADJ.)
    - IF MORE ZONES NEED HEATING THAN COOLING, THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET FOR HEATING AS FOLLOWS:
      - THE INITIAL SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 82 DEG. F. (ADJ.)
      - AS HEATING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 85 DEG. F. (ADJ.)
      - AS HEATING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 72 DEG. F. (ADJ.)
  - 4. ECONOMIZER (BYPASS):**
    - WHEN THE OUTSIDE AIR ENTHALPY IS BELOW THE RETURN AIR ENTHALPY, THE ECONOMIZER WILL MODULATE TO BYPASS AIR AROUND THE ENERGY RECOVERY CORE.
    - DURING NORMAL OPERATION, THE BYPASS DAMPER SHALL REMAIN CLOSED AND THE AIR WILL PASS THRU THE ENERGY RECOVERY CORE.
    - THE ECONOMIZER SHALL BE ENABLED WHENEVER:
      - THE OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEG. F. (ADJ.)
      - AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
      - AND THE SUPPLY FAN IS ON.
    - THE ECONOMIZER SHALL BE DISABLED WHENEVER:
      - THE MIXED AIR TEMPERATURE DROPS FROM 40 TO 35 DEG. F. (ADJ.)
      - SUPPLY FAN IS OFF.
  - 5. MORNING PURGE:**
    - ONE HOUR PRIOR TO SCHEDULED OCCUPANCY, THE UNIT SHALL PERFORM A 30 MINUTE DURATION PURGE SEQUENCE.
      - OPEN OUTSIDE AND EXHAUST DAMPERS
      - OPEN BYPASS DAMPER
      - START SUPPLY AND EXHAUST FANS.
      - MAINTAIN UNOCCUPIED SETBACK TEMPERATURE CONDITIONS.
  - 6. SAFETIES AND ALARMS:**
    - AN AUTOMATIC RESET FREEZE/STAT SET AT 38 DEG. F. SHALL DISABLE THE SUPPLY AND EXHAUST FAN, CLOSE THE OUTSIDE AND EXHAUST DAMPERS AND OPEN THE TWO-WAY HEATING VALVE. 100% FREEZE/STAT SHALL BE WIRED IN SERIES WITH FAN MOTOR STARTER.
    - SUPPLY WATER TEMPERATURE TO HOT WATER COIL FALLS BELOW 90 DEG. F. (ADJ.) WITH VALVE OPEN SHALL DISABLE THE SUPPLY AND EXHAUST FAN AND CLOSE THE OUTSIDE AND EXHAUST DAMPERS.
    - HIGH SUPPLY AIR TEMPERATURE ALARM: 120 DEG. F. (ADJ.) SUPPLY AIR TEMPERATURE.
    - FIRE ALARM SIGNAL SHALL DISABLE THE UNIT.
    - SUPPLY FAN, EXHAUST FAN, PUMP ALARM:
      - FAILURE: COMMANDED ON BUT STATUS IS OFF.
      - UNIT IN HAND: COMMANDED OFF BUT STATUS IS ON.
    - RETURN OR OUTSIDE AIR FILTER PRESSURE DIFFERENTIAL EXCEEDS SETPOINT.

**2 Music Rooms - DOAS Rooftop Unit**  
NTS



- LIBRARY ROOFTOP UNIT - SEQUENCE OF OPERATIONS:**
- THE LIBRARY RTU IS AN EXISTING UNIT CURRENTLY OPERATING UNDER FACTORY SUPPLIED CONTROLS. IT IS THE INTENT TO REMOVE THE EXISTING CONTROLS AND REPLACE WITH FIELD MOUNTED CONTROLS AS DESCRIBED BELOW.
- 1. OCCUPIED MODE:**
    - THE SUPPLY AND EXHAUST FAN SHALL RUN CONTINUOUSLY OR A DEFINABLE NUMBER OF UNOCCUPIED ZONES NEED HEATING OR COOLING.
    - OPEN OUTSIDE, AND RETURN AIR DAMPER TO MINIMUM POSITION AS SCHEDULED. DURING OCCUPIED PERIODS, THE OA DAMPER SHALL NEVER FALL BELOW THE MINIMUM POSITION.
    - THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING AN EMERGENCY SHUTDOWN SIGNAL.
    - THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A HIGH STATIC SHUTDOWN SIGNAL (25% GREATER THAN SETPOINT).
    - ALARMS SHALL BE PROVIDED AS FOLLOWS:
      1. SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
      2. SUPPLY FAN IN HAND: COMMANDED OFF BUT STATUS IS ON.
  - 2. UNOCCUPIED MODE:**
    - THE SUPPLY AND ASSOCIATED EXHAUST FAN SHALL BE OFF.
    - THE OUTSIDE AIR DAMPER AND THE ASSOCIATED EXHAUST DAMPER SHALL BE FULLY CLOSED AND THE RETURN AIR DAMPER SHALL BE FULLY OPEN.
    - WHERE SPACE HAS FINNED TUBE RADIATION, RADIATION SHALL PROVIDE FIRST STAGE UNOCCUPIED HEATING.
    - ON DROP IN SPACE TEMPERATURE BELOW THE UNOCCUPIED HEATING SETPOINT, CYCLE THE FAN ON AND THE GAS FURNACE SHALL FIRE AT THE FULL FIRING RATE TO MAINTAIN REDUCED SPACE TEMPERATURE. USE 5 DEG. F. (ADJUSTABLE) DEADBAND TO MINIMIZE SHORT CYCLING.
    - A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT IN OCCUPIED MODE FOR 1 HOUR (ADJUSTABLE). AT EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.
  - 3. SUPPLY AIR DUCT STATIC PRESSURE CONTROL:**
    - THE CONTROLLER SHALL MEASURE DUCT STATIC PRESSURE VIA SENSOR MOUNTED 25' DOWNSTREAM OF SUPPLY FAN AND MODULATE THE SUPPLY FAN VFD SPEED TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT SUBJECT TO THE MINIMUM FAN SPEED REQUIRED TO DELIVER THE MINIMUM AMOUNT OF OUTDOOR AIR AS SCHEDULED.
    - THE STATIC PRESSURE SETPOINT SHALL BE RESET BASED UPON THE POSITION OF THE ZONE DAMPERS WITH A GOAL OF REDUCING THE STATIC PRESSURE UNTIL AT LEAST ONE ZONE DAMPER IS NEARLY WIDE OPEN.
      1. INITIAL DUCT STATIC PRESSURE SETPOINT SHALL BE 1.5 IN. WC. (ADJ.)
      2. IF NO ZONE DAMPER IS NEARLY WIDE OPEN, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 1.3 IN. WC. (ADJ.)
      3. AS ONE OR MORE DAMPERS NEARS THE WIDE OPEN POSITION, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 1.8 IN. WC. (ADJ.)
  - 4. SUPPLY AIR TEMPERATURE SETPOINT - OPTIMIZED:**
    - HEATING SHALL BE ENABLED WHENEVER:
      - OUTSIDE AIR TEMPERATURE IS LESS THAN 60 DEG. F. (ADJ.)
      - SUPPLY FAN STATUS IS ON.
      - COOLING IS NOT ACTIVE.
    - COOLING SHALL BE ENABLED WHENEVER:
      - OUTSIDE AIR TEMPERATURE IS GREATER THAN 65 DEG. F. (ADJ.)
      - ECONOMIZER IS DISABLED.
      - SUPPLY FAN STATUS IS ON.
      - HEATING IS NOT ACTIVE.
    - THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A SUPPLY AIR TEMPERATURE SETPOINT RESET BASED ON ZONE COOLING AND HEATING REQUIREMENTS.
    - THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET FOR COOLING BASED ON ZONE COOLING REQUIREMENTS AS FOLLOWS:
      - INITIAL SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 55 DEG. F. (ADJ.)
      - AS COOLING INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 53 DEG. F. (ADJ.)
      - AS COOLING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY BE RESET UPWARD TO A MAXIMUM OF 72 DEG. F. (ADJ.)
    - IF MORE ZONES NEED HEATING THAN COOLING, THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET FOR HEATING AS FOLLOWS:
      - THE INITIAL SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 82 DEG. F. (ADJ.)
      - AS HEATING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 85 DEG. F. (ADJ.)
      - AS HEATING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 72 DEG. F. (ADJ.)
  - 5. ECONOMIZER:**
    - THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE OA/SA DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2 DEG. F. LESS THAN THE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPER SHALL MAINTAIN A MINIMUM POSITION AS SCHEDULED WHENEVER OCCUPIED.
    - THE ECONOMIZER SHALL BE ENABLED WHENEVER:
      - THE OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEG. F. (ADJ.)
      - AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE AVERAGE OF THE OCCUPIED ZONES.
      - AND THE SUPPLY FAN IS ON.
    - THE ECONOMIZER SHALL BE DISABLED WHENEVER:
      - THE MIXED AIR TEMPERATURE DROPS FROM 40 TO 35 DEG. F. (ADJ.)
      - SUPPLY FAN IS OFF.
  - 6. MORNING PURGE:**
    - ONE HOUR PRIOR TO MORNING WARM-UP SEQUENCE, THE UNIT SHALL PERFORM A 30 MINUTE DURATION PURGE SEQUENCE.
      - OPEN OUTSIDE AND EXHAUST DAMPERS
      - CLOSE RETURN DAMPER
      - START SUPPLY AND EXHAUST FANS.
      - MAINTAIN UNOCCUPIED SETBACK TEMPERATURE CONDITIONS.
  - 7. SAFETIES:**
    - THE UNIT SHALL START PER AN OPTIMUM START PROGRAM.
    - THE OUTSIDE AIR DAMPER AND EXHAUST DAMPER SHALL BE FULLY CLOSED, THE RETURN AIR DAMPER SHALL BE FULLY OPEN, AND THE ASSOCIATED EXHAUST FAN SHALL BE OFF.
    - THE SUPPLY FAN SHALL RUN AND THE GAS FURNACE SHALL MODULATE TO MAINTAIN OCCUPIED SETPOINT.

**1 VAV Rooftop Unit**  
NTS

S.E.D. Control No. 48-01-01-06-0-004-020

Rev. No.:	Date:	Description:



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**TETRA TECH**  
ARCHITECTS & ENGINEERS

Mahopac Central School District  
Mahopac, NY

Reconstruction To:  
Mahopac High School

Controls

Drawn By: DPM/jjk	Date: 8/21/20	Drawing Number: <b>AM701</b>
Project No.:		12111-19002

**BID SET**