IT BUILDING
HVAC EQUIPMENT REPLACEMENT

THE CITY OF LYNCHBURG
LYNCHBURG, VIRGINIA

CITY PROJECT NUMBER: BM149
MARCH 2016

MEAD PROJECT NUMBER: 262-226

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SET NO. _____

SHEET METAL

- RECTANGULAR DUCT DOWN
- ROUND DUCT DOWN
- RECTANGULAR SUPPLY DUCT UP
- RECTANGULAR RETURN DUCT UP
- ROUND DUCT UP
- FLEXIBLE CONNECTION
- LINED DUCT (2 LINE)
- LINED DUCT (1 LINE)
- ROUND DUCT
- OR — DUCT WITH TURNING VANES
- ROUND DUCT UP
- ROUND DUCT DOWN
- SPIN–IN FITTING WITH DAMPER
- LATERAL SQUARE TO ROUND TAKEOFF
- REDUCER
- SQUARE TO ROUND
- FLEXIBLE DUCT
- ROUND DUCT
- FD# — VERTICAL FIRE DAMPER, PARTITION RATING
- FD# — HORIZONTAL FIRE DAMPER, FLOOR RATING
- MOD — MOTOR OPERATED DAMPER RUSKIN CD–60 OR EQUAL
- MANUAL VOLUME DAMPER RUSKIN MD–35 OR EQUAL
- PARALLEL BLADE DAMPER
- OPPOSED BLADE DAMPER
- BDD — BACKDRAFT DAMPER
- CEILING DIFFUSER
- RETURN OR RELIEF AIR REGISTER
- DENOTES EXISTING EQUIPMENT
- DENOTES EXISTING EQUIPMENT TO BE REMOVED
- EXTENT OF DEMOLITION
- POINT OF CONNECTION NEW TO EXISTING
- # — DEMOLITION PLAN NOTE
- # — NEW WORK PLAN NOTE

SYMBOLS

MECHANICAL EQUIPMENT TAG

- EQUIPMENT DESIGNATION (SEE ABBREVIATIONS)
- NUMBER DESIGNATION

AIR DISTRIBUTION DEVICE TAG

- DEVICE TYPE (SEE ABBREVIATIONS)
- AIR QUANTITY (CFM)

- T — THERMOSTAT
- FORCED AIRFLOW
- INDUCED AIRFLOW

ABBREVIATIONS

ABV	ABOVE
AFF	ABOVE FINISHED FLOOR
BOD	BOTTOM OF DUCT
BTUH	BRITISH THERMAL UNIT PER HOUR
CFM	CUBIC FEET PER MINUTE
DB	DRY BULB
DN	DOWN
DX	DIRECT EXPANSION
(E)	EXISTING
EAT	ENTERING AIR TEMPERATURE
ETR	EXISTING TO REMAIN
FC	FORWARD CURVED
FD	FIRE DAMPER
FPM	FEET PER MINUTE
HP	HORSEPOWER
LAT	LEAVING AIR TEMPERATURE
LPG	LIQUIFIED PETROLEUM GAS
LVG.	LEAVING
MAX.	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MFR.	MANUFACTURER
MIN.	MINIMUM
MOD	MOTOR OPERATED DAMPER
MVD	MANUAL VOLUME DAMPER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
PD	PRESSURE DROP
PSIG	POUNDS PER SQUARE INCH GAUGE
RA	RETURN AIR
REL	RELIEF AIR
RH	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SD	SMOKE DAMPER
SP	STATIC PRESSURE (INCHES OF WATER)
TYP.	TYPICAL
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB TEMPERATURE, DEG. °F
WL	WALL LOUVER

GENERAL NOTES

1. WHERE DUCTWORK, PIPING, OR ANY OTHER MECHANICAL EQUIPMENT IS INSTALLED ABOVE THE CEILING STRUCTURE, SUFFICIENT CLEARANCE SHALL BE PROVIDED BELOW ALL LOW POINTS OF THIS EQUIPMENT FOR THE INSTALLATION OF THE FINISHED CEILING AND ITS STRUCTURE AND ALL CEILING–MOUNTED EQUIPMENT INCLUDING CEILING–MOUNTED MECHANICAL EQUIPMENT, LIGHT FIXTURES, PLUMBING LINES, SPRINKLER HEADS, ETC. CLEARANCES REQUIRED FOR THE INSTALLATION OF THIS CEILING–MOUNTED EQUIPMENT SHALL BE VERIFIED AND COORDINATED WITH THE GENERAL CONTRACTOR AND ALL INVOLVED SUBCONTRACTORS BEFORE INSTALLING THE MECHANICAL EQUIPMENT.

2. WHERE SPACE IS LIMITED, ROUTES AND CLEARANCES AND INSTALLATION PROCEDURES FOR DUCTWORK, PIPING, VALVES, AND OTHER MECHANICAL EQUIPMENT SHALL BE VERIFIED AND COORDINATED WITH OTHER WORK BEFORE EQUIPMENT IS INSTALLED.

3. ALL STRUCTURAL STEEL AND OTHER MATERIALS REQUIRED FOR OVERHEAD–SUSPENDED MECHANICAL EQUIPMENT SHALL BE PROVIDED BY MECHANICAL CONTRACTOR UNLESS DETAILED ON STRUCTURAL DRAWINGS. ALL NECESSARY REINFORCING IN BUILDING STRUCTURE SHALL BE PROVIDED BY GENERAL CONTRACTOR.

4. IF ANY EQUIPMENT OTHER THAN THAT SHOWN OR SPECIFIED IS FURNISHED, THE CONTRACTOR SHALL VERIFY THAT THE EQUIPMENT CAN BE INSTALLED IN THE SPACE AVAILABLE, INCLUDING PASSAGE THROUGH DOORS AND ACCESS DOORS AND ACCESS TO THOSE PARTS OF THE EQUIPMENT REQUIRING SERVICE.

5. OFFSET DUCTS AND PIPING WHERE NECESSARY TO CLEAR OTHER WORK SUCH AS BEAMS, PIPES, ELECT., ETC., COORDINATE INSTALLATION WITH WORK OF OTHER TRADES TO AVOID SPACE CONFLICTS.

6. ROUTE CONDENSATE FROM ALL CONDENSATE DRAIN PANS TO NEAREST PLUMBING WASTE CONNECTION. PROVIDE AIR GAP PER CODE. PROVIDE CONDENSATE PUMP IF NECESSARY.

7. SUBMIT RECORD DRAWINGS INDICATING EXACT TO–SCALE LOCATIONS. MAINTAIN A MINIMUM OF ONE INTACT SET OF PROJECT PLANS AND SPECIFICATIONS AT JOB SITE MARKED TO SHOW ALL DEVIATIONS PERMITTED DURING CONSTRUCTION AS THE WORK IS INSTALLED. INCLUDE FINAL LINE SIZE AND ROUTING OF ALL CONCEALED REFRIGERANT LINES. ALL MARKS SHALL BE RED IN COLOR, COMPLETE CLEAR AND LEGIBLE.

MECHANICAL SPECIFICATIONS:

1.0 GENERAL

1.01 THE CONTRACT DOCUMENTS APPLY TO THESE SPECIFICATIONS.

1.02 DESCRIPTION: THE IT BUILDING IS HEATED AND COOLED BY FOURTEEN SPLIT SYSTEM AIR CONDITIONERS, ELEVEN GAS FURNACES, AND THREE AIR HANDLERS. THE COMPUTER ROOM IS COOLED BY A 20 TON AIR HANDLER, DUAL CIRCUITED WITH TWO CONDENSERS. THE WORK ROOM AND CONFERENCE ROOM ARE SERVED BY TWO DUCTLESS SPLIT SYSTEMS.

1.03 THIS PROJECT INCLUDES DEMOLITION AND REPLACEMENT OF THE EXISTING FURNACES, AIR HANDLING UNITS AND CONDENSERS ALONG WITH ASSOCIATED WIRING, LINE SETS, VENT PIPING, AND OTHER ATTACHED EQUIPMENT.

BASE BID INCLUDES; NINE FURNACES, TWO AIR HANDLING UNITS, AND TEN CONDENSING UNITS. F–2,3,4,5,6,9,10,11, & 12. AHU–7 & 8. CU–2,3,4,5,6,7,8,9,10, & 11.

ADD ALTERNATE NO. 1 INCLUDES; TWO FURNACES AND TWO CONDENSING UNITS. F–1 & F. CU–1 & F.

ADD ALTERNATE NO. 2 INCLUDES; ONE AIR HANDLER AND TWO CONDENSING UNITS. AHU–C. CU–CA & CB.

ADD ALTERNATE NO. 3 INCLUDES; TWO DUCTLESS SPLIT SYSTEMS. FCU–A & CU–A. FCU–B1, B2 & CU–B.

1.04 PROVIDE ALL NECESSARY LABOR AND MATERIALS FOR THE WORK SHOWN ON THE DRAWINGS, WHICH INCLUDES INSTALLATION OF HVAC SYSTEMS AND ALL PLUMBING PIPING AND FIXTURES.

1.05 WORK SHALL MEET REQUIREMENTS OF LOCAL BUILDING CODES AND ORDINANCES, APPICABLE REQUIREMENTS OF THE VUSBC AND NFPA.

1.06 SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

A. HEATING AND AIR CONDITIONING EQUIPMENT

1.07 PLACING IN SERVICE:

A. BEFORE BEING PLACED INTO OPERATION, ALL EQUIPMENT REQUIRING PREOPERATIONAL ATTENTION SHALL BE SERVICED IN ACCORDANCE WITH THE REQUIREMENTS OF THESE SPECIFICATIONS AND THE MANUFACTURER'S RECOMMENDATIONS.

B. THIS SERVICING SHALL INCLUDE LUBRICATION, CONTROL CALIBRATIONS AND ADJUSTMENTS, AND TESTING AND ADJUSTING OF OPERATING CONTROLS.

C. AT THE COMPLETION OF PERFORMANCE TEST AND FOLLOWING APPROVAL OF TEST RESULTS, THE CONTRACTOR SHALL RECHECK ALL EQUIPMENT AND VERIFY THAT EACH ITEM IS FUNCTIONING CORRECTLY.

D. FURNISH ALL NECESSARY EQUIPMENT AND ASSUME ALL COSTS INVOLVED TO PERFORM ALL TESTING, CLEANING, AND BALANCING OPERATIONS REQUIRED.

2.0 PRODUCTS

2.01 PIPE AND PIPE FITTINGS

A. COPPER TUBE TYPE K, L: ANSI/ASTM B88.

B. PVC PIPE: SCH. 40, GRADE PVC 2116: ASTM D1785 AND ASTM D2241.

2.02 PIPING SYSTEM SHALL BE SUPPORTED IN ACCORDANCE WITH ANSI B31.1 "POWER PIPING" SO AS TO MAINTAIN REQUIRED PITCH OF LINES, PREVENT VIBRATION AND PROVIDE FOR EXPANSION AND CONTRACTION MOVEMENT. REFER TO NFPA–13 FOR SPRINKLER PIPING REQUIREMENTS.

2.03 BOND AND PROPERLY GROUND NATURAL GAS PIPING IN ACCORDANCE WITH TRAC PIPE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PER CODE.

2.04 PIPING SCHEDULE

SERVICE	SIZE	PIPE TYPE	FITTING TYPE
CONDENSATE DRAINS	ALL SIZES	SCH 40 PVC	
REFRIGERANT	ALL SIZES	AS RECOMMENDED BY MFR	FITTINGS AS RECOMMENDED BY MFR
NATURAL GAS	ALL SIZES	TRAC PIPE AS MFR BY OMEGAFLEX, INC.	FITTINGS AS RECOMMENDED BY MFR

NOTE: REFRIGERANT PIPING OUTDOORS SHALL BE RIGID COPPER, CLEANED AND CAPPED. OUTDOOR REFRIGERANT PIPING SHALL BE SUPPORTED BY ERICO CADDY PYRAMID ST SUPPORTS AND ATTACHED WITH CADDY CUSHION CLAMPS. NEW INDOOR REFRIGERANT PIPING SHALL BE TUBING AS RECOMMENDED BY EQUIPMENT MANUFACTURER. ROUTE AND SUPPORT TUBING IN SAME LOCATION WHERE EXISTING REFRIGERANT LINES ARE REMOVED.

2.05 INSULATION SCHEDULE

SERVICE	TYPE INSUL.	THICKNESS INCHES	FINISH IN CNCL. AREAS	FINISH IN FNSH AREAS	NOTES
(1) PIPING					
CONDENSATE	FLEXIBLE ELASTOMERIC	0.5	NONE		
REFRIGERANT LOW TEMP, ALL SIZES	FLEXIBLE ELASTOMERIC	0.75	NONE	TWO COATS ARMAFLEX FINISH	1

NOTES:

1. APPLY FLEXIBLE ELASTOMERIC INSULATION ON PIPING EXPOSED OUTDOORS.

3.0 EXECUTION

3.01 TEST FIELD–ASSEMBLED REFRIGERANT PIPING AND APPARATUS FOR ONE HOUR WITH DRY CARBON DIOXIDE OR NITROGEN, PLUS A SMALL AMOUNT OF REFRIGERANT. TEST PRESSURES SHALL BE IN ACCORDANCE WITH THE AMERICAN STANDARD SAFETY CODE FOR MECHANICAL REFRIGERATION.

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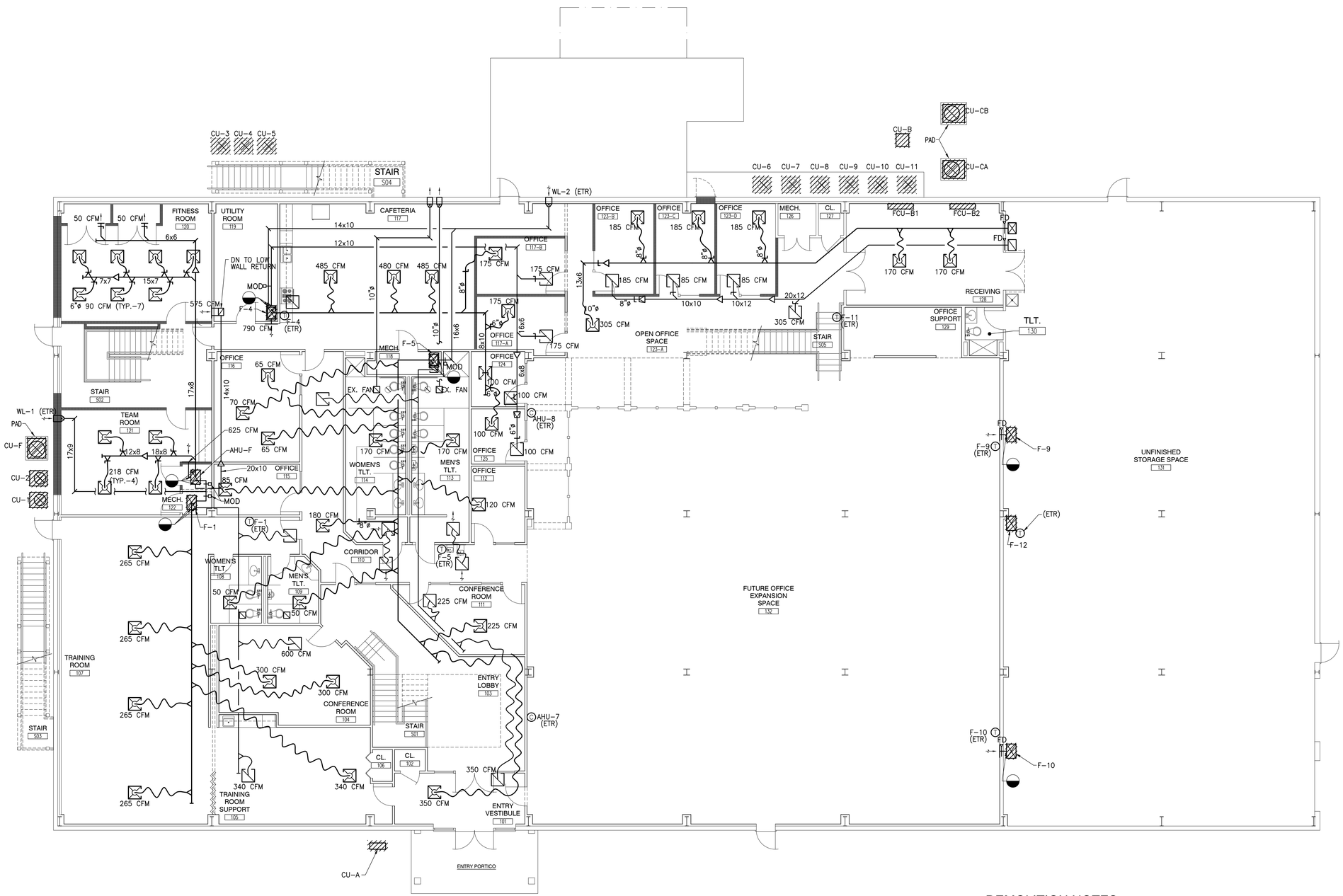
IT BUILDING HVAC EQUIPMENT REPLACEMENT
LYNCHBURG, VIRGINIA

LEGEND, SPECIFICATIONS, NOTES, AND ABBREVIATIONS

DATE ISSUED:	03/08/16
SCALE:	NONE
JOB. NO.	262–226
DESIGNED:	CLS
DRAWN:	RDC
CHECKED:	CLS
APPROVED:	CLS

DRAWING NO.
M0.1
SHEET 1 OF 6
REVISION



LEVEL ONE HVAC DEMOLITION PLAN

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

NORTH

DEMOLITION NOTES

1. COORDINATE EQUIPMENT SHUTDOWN SCHEDULE WITH THE OWNER.
2. REUSE EXISTING CONTROLS.
3. REFER TO SCHEDULES FOR WORK INCLUDED IN BASE BID, ADD ALTERNATE #1, #2, AND #3.

8' 0' 8' 16'

GRAPHIC SCALE

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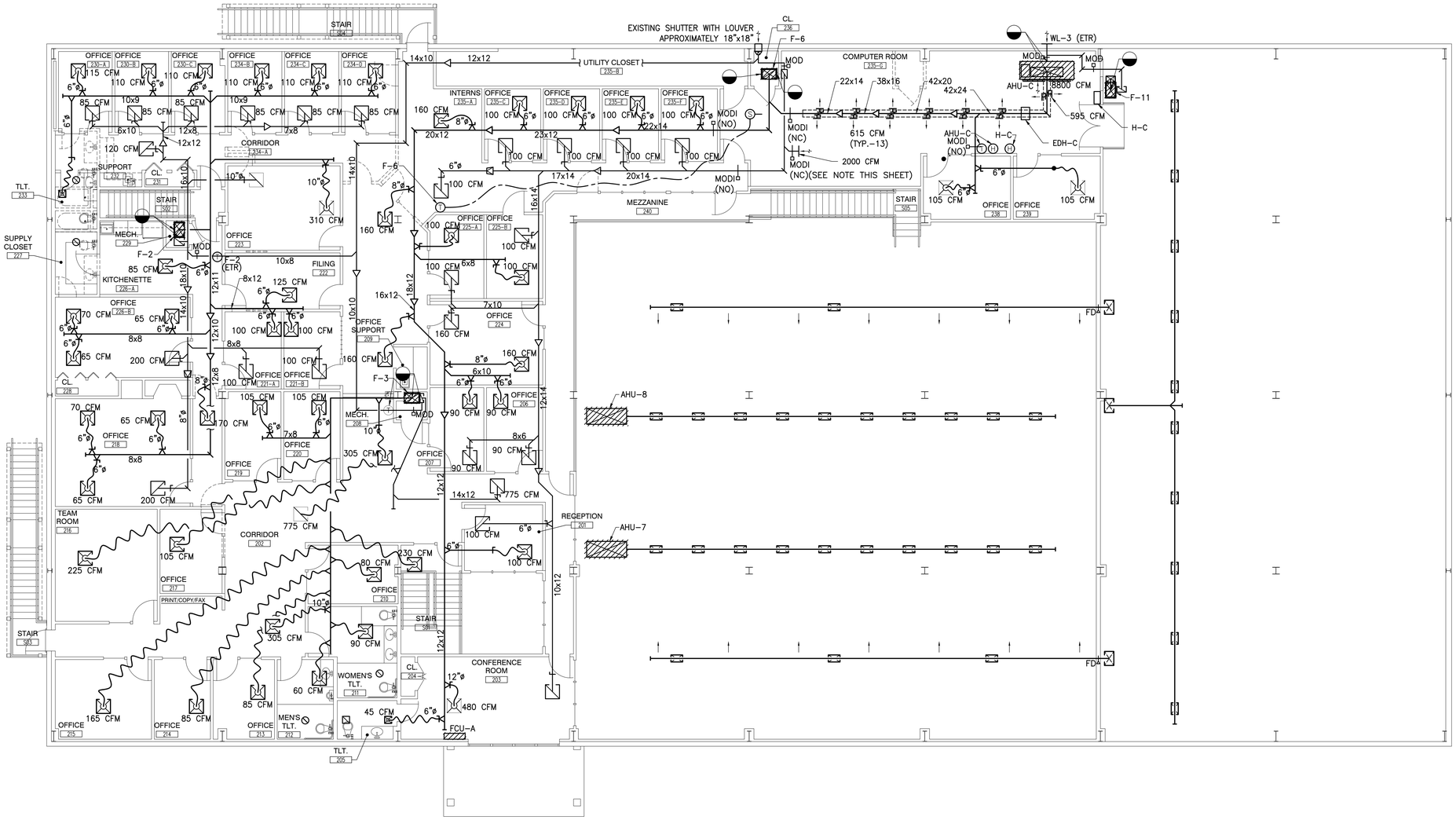
NOTE: EXISTING CONTROL AND SEQUENCE OF OPERATION SHALL REMAIN AS FOLLOWS. MODI EQUAL TO RUSKIN MODEL PSD – PRESSURE SEAL BUBBLE – TIGHT ISOLATION DAMPER WITH 120V 2–POSITION MOTOR OPERATOR. NC INDICATES NORMALLY CLOSED AND NO INDICATES NORMALLY OPEN POSITION.

WHENEVER AHU–C IS OPERATING AND PRODUCING AIR CIRCULATION DAMPERS MODI SHALL BE IN NORMAL POSITION. IF AT ANY TIME AHU–C IS NOT CIRCULATING AIR TO THE COMPUTER ROOM, DAMPERS MODI SHALL CHANGE TOP THEIR OPPOSITE POSITION AND F–6 SHALL THEN CONDITION SPACE 235–G AS BACK–UP COOLING. WHENEVER THIS CONDITION OCCURS THE OUTSIDE AIR DAMPERS AT F–6 AND AHU–C SHALL BE CLOSED.



LEVEL TWO HVAC DEMOLITION PLAN

SCALE: 1/8"=1'–0"

NORTH

DEMOLITION NOTES

1. COORDINATE EQUIPMENT SHUTDOWN SCHEDULE WITH THE OWNER.
2. REUSE EXISTING CONTROLS.
3. PROVIDE TEMPORARY COOLING FOR AHU–C SYSTEM AREA.
4. REFER TO SCHEDULES FOR WORK INCLUDED IN BASE BID, ADD ALTERNATE #1, #2, AND #3.

8' 0' 8' 16'

GRAPHIC SCALE

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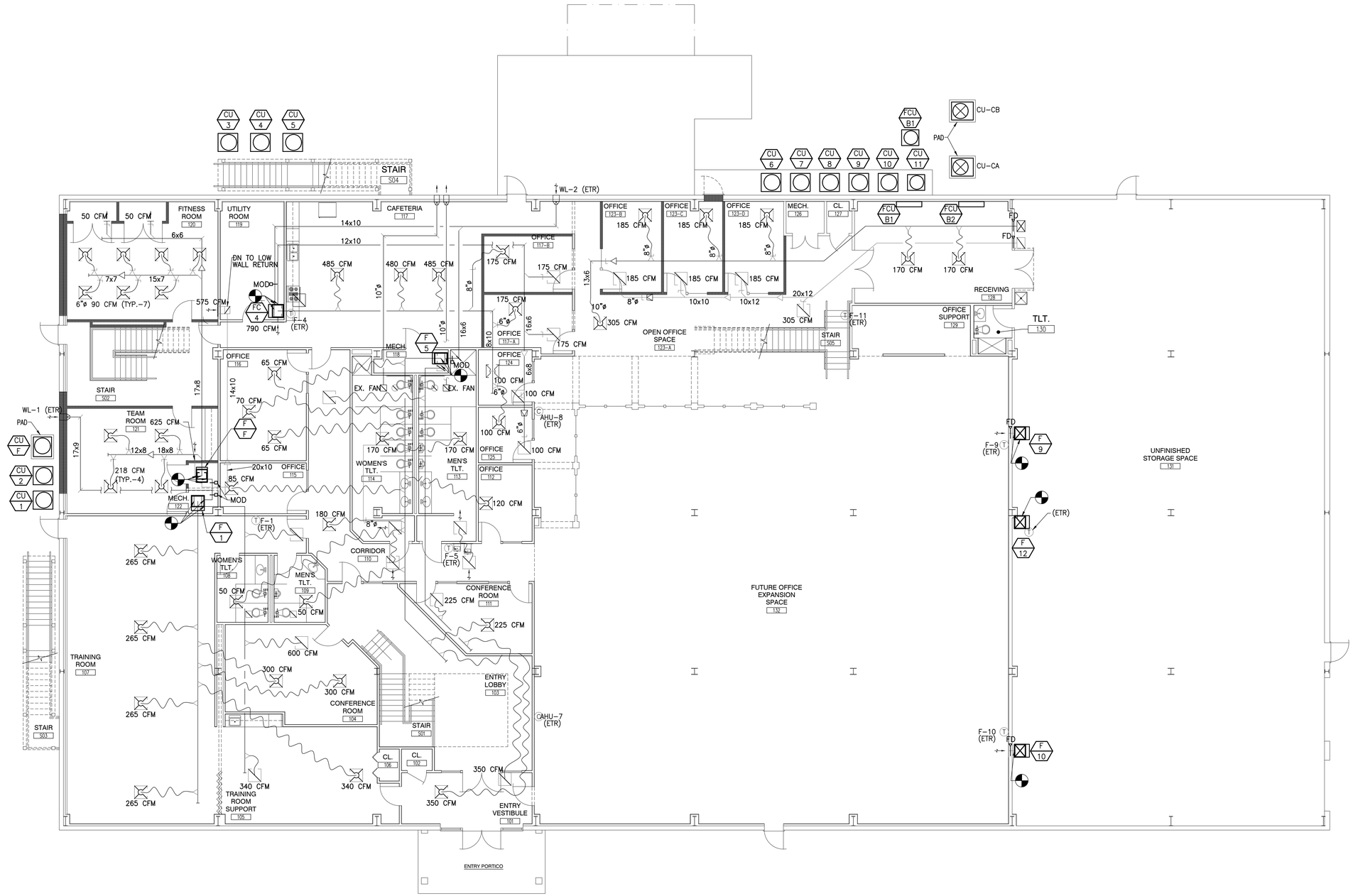

LEVEL ONE HVAC NEW WORK PLAN

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

NORTH

NEW WORK NOTES

1. REFER TO SCHEDULES FOR WORK INCLUDED IN BASE BID, ADD ALTERNATE #1, #2 AND #3.

8' 0' 8' 16'

GRAPHIC SCALE

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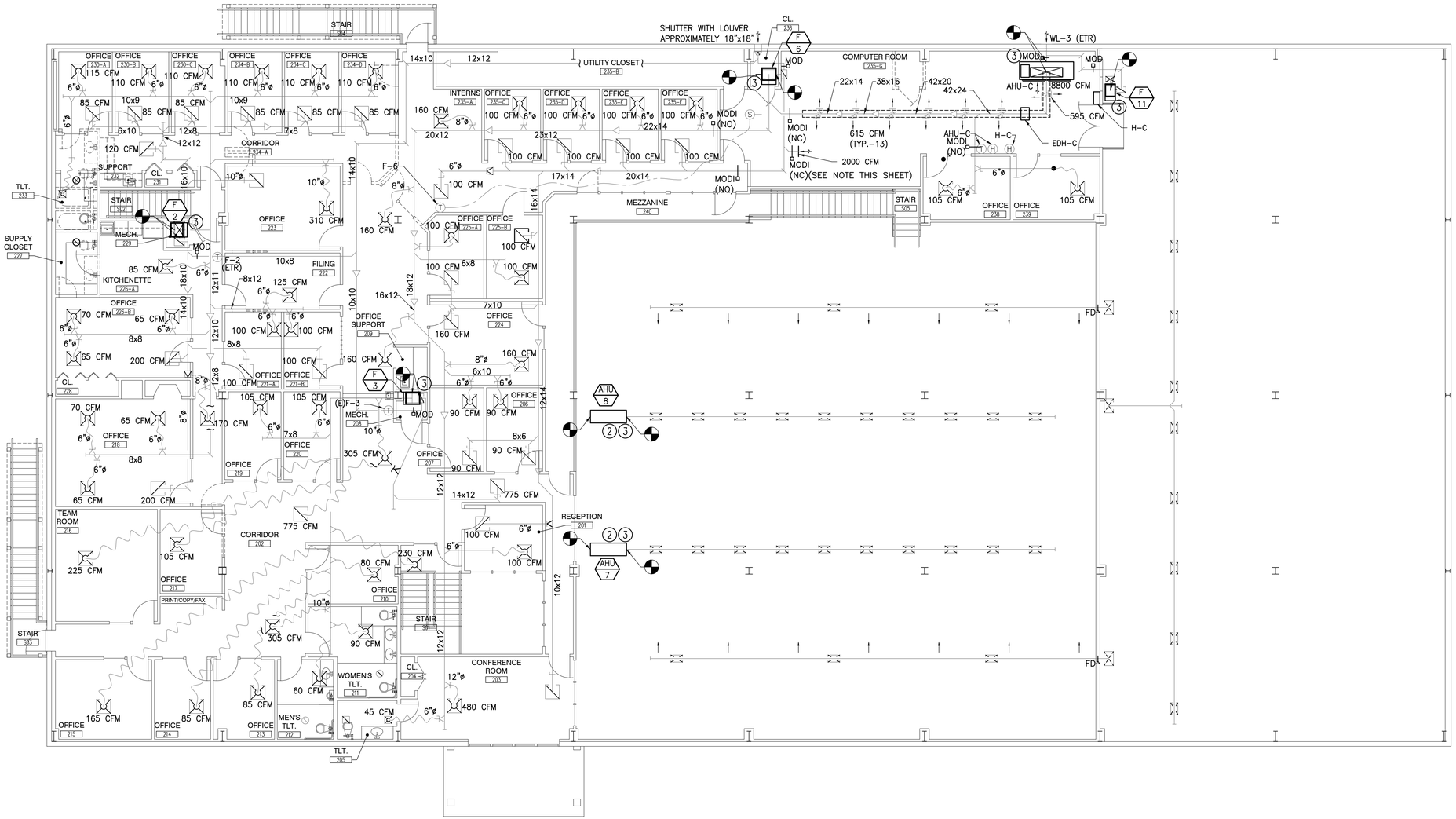

LEVEL TWO HVAC NEW WORK PLAN

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

NORTH

NEW WORK NOTES

1. REFER TO SCHEDULES FOR WORK INCLUDED IN BASE BID, ADD ALTERNATE #1, #2 AND #3.
2. PAINT AHU-7 AND AHU-8 FLAT BLACK TO MATCH EXISTING.
3. PROVIDE AND INSTALL SECONDARY DRAIN PAN BELOW UNIT WITH FLOAT SWITCH SYSTEM SHUTDOWN.

8' 0' 8' 16'

GRAPHIC SCALE

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M2.1
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MISCELLANEOUS EQUIPMENT SCHEDULE

	MARK	DESCRIPTION
ALT #3	FCU–A & CU–A	DUCTLESS SPLIT SYSTEM EQUAL TO LG MODEL LSU186HE OUTDOOR UNIT MATCHED TO LSN186HE INDOOR WALL–MOUNT FAN COIL UNIT. PROVIDE WITH 208/230V/1PH/60HZ ELECTRICAL CHARACTERISTICS, LOW AMBIENT COOLING OPERATION, AND 5 YEAR COMPRESSOR WARRANTY.
ALT #3	FCU–B1, B2 & CU–B	DUCTLESS SPLIT SYSTEM EQUAL TO ENVIROMASTER MC4 OUTDOOR UNIT MATCHED TO TWO WLHA2403 INDOOR WALL–MOUNT FAN COIL UNITS. PROVIDE WITH 208/230V/1PH/60HZ ELECTRICAL CHARACTERISTICS, LOW AMBIENT COOLING OPERATION, AND 5 YEAR COMPRESSOR WARRANTY.

AIR HANDLING UNIT SCHEDULE

	MARK	MODEL	CFM		EXT SP in wg	HP	FUEL	Volts/Ph/Hz	COOLING COIL			REMARKS
			FAN	OA					MODEL	TONS	NOM MBH	
	AHU–7	TAM7B0C60H51SA	–	–	–	1.0	N/A	208/1/60	N/A	N/A	N/A	1,3,4
	AHU–8	TAM7B0C60H51SA	–	–	–	1.0	N/A	208/1/60	N/A	N/A	N/A	1,3,4
ALT #2	AHU–C	TWE240	8800	40	0.78	5	N/A	208/1/60	–	15	160.2	1,2,3,4

REMARKS:
1. MODEL NUMBERS BASED ON TRANE.
2. WITH 2–CIRCUIT EVAPORATOR.
3. WITH SINGLE POINT POWER CONNECTION.
4. VERIFY EXISTING AIR FLOW AND REBALANCE TO INITIAL MEASUREMENTS.

CONDENSING UNIT SCHEDULE

	MARK	MODEL	NOMINAL TONS	SYSTEM SERVED	V/Ph/Hz	REMARKS
ALT #1	CU–1	4TTA3060D	5	F–1	208/3/60	1,2
	CU–2	4TTA3060D	5	F–2	208/3/60	1,2
	CU–3	4TTA3048D	4	F–3	208/3/60	1,2
	CU–4	4TTA3060D	5	F–4	208/3/60	1,2
	CU–5	4TTA3048D	4	F–5	208/3/60	1,2
	CU–6	4TTA3060D	5	F–6	208/3/60	1,2
	CU–7	4TTA3060D	5	AHU–7	208/3/60	1,2
	CU–8	4TTA3060D	5	AHU–8	208/3/60	1,2
	CU–9	4TTA3060D	5	F–9	208/3/60	1,2
	CU–10	4TTA3060D	5	F–10	208/3/60	1,2
	CU–11	4TTA3036B	3	F–11	208/3/60	1,2
ALT #2	CU–CA	TTA090	7.5	AHU–C	208/3/60	1,2
ALT #2	CU–CB	TTA090	7.5	AHU–C	208/3/60	1,2
ALT #1	CU–F	4TTA3048	4	F–F	208/3/60	1,2

REMARKS:
1. MODEL NUMBER BASED ON TRANE.
2. FURNISH WITH LOUVERED STEEL HAIL GUARDS.
3. VERIFY VOLTAGE AND CIRCUIT CAPACITY.
4. PROVIDE WITH LOW AMBIENT COOLING OPERATION.
5. PROVIDE WITH 5 YEAR COMPRESSOR WARRANTY.

FURNACE AND COIL SCHEDULE

	MARK	MODEL	CFM		EXT SP in wg	HP	FUEL	Volts/Ph/Hz	COOLING COIL			REMARKS
			FAN	OA					MODEL	TONS	NOM MBH	
ALT #1	F–1	TUH1D120A9H51A	1653	361	1.2	1.0	NG	115/1/60	4TXCD061BC3CH	5	61	1,2,3,4,5
	F–2	TUH1D120A9H51A	1535	303	0.73	1.0	NG	115/1/60	4TXCD061BC3CH	5	61	1,2,3,4,5
	F–3	TUH2C100A9V5VA	1496	360	0.78	1.0	NG	115/1/60	4TXCD063BC3CH	4	63	1,2,3,4,5
	F–4	TUH1D120A9H51A	1618	608	0.75	1.0	NG	115/1/60	4TXCD061BC3CH	5	61	1,2,3,4,5
	F–5	TUH2C100A9V5VA	1335	377	0.83	1.0	NG	115/1/60	4TXCD063BC3CH	4	63	1,2,3,4,5
	F–6	TUH1D120A9H51A	1582	443	0.72	1.0	NG	115/1/60	4TXCD061BC3CH	5	61	1,2,3,4,5
	F–9	TUH1D120A9H51A	–	–	–	1.0	NG	115/1/60	4TXCD061BC3CH	5	61	1,2,3,4,5
	F–10	TUH1D120A9H51A	–	–	–	1.0	NG	115/1/60	4TXCD061BC3CH	5	61	1,2,3,4,5
	F–11	TUH2B080A9V3VA	905	136	0.59	0.5	NG	115/1/60	4TXCB004CC3CH	3	04	1,2,3,4,5
	F–12	TUH1D120A9H51A	–	–	–	1.0	NG	115/1/60	N/A	N/A	N/A	1,2,3,4,5
ALT #1	F–F	TUH2C100A9V5VA	1560	400	0.59	1	NG	115/1/60	4TXCD063BC3CH	4	63	1,2,3,4,5

REMARKS:
1. MODEL NUMBERS BASED ON TRANE.
2. RECONNECT TO EXISTING GAS SUPPLY.
3. RECONNECT TO EXISTING COMBUSTION INLET AND VENT PIPING.
4. PROVIDE ACID NEUTRALIZER FOR CONDENSING FURNACE CONDENSATE.
5. VERIFY EXISTING AIR FLOW AND REBALANCE TO INITIAL MEASUREMENTS.

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LYNCHBURG, VIRGINIA

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SCALE: NONE
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DRAWN: RDC
CHECKED: CLS
APPROVED: CLS

DRAWING NO.
M3.0
SHEET 6 OF 6
REVISION