

MECHANICAL SYMBOLS:

ABBREVIATIONS:

AC	AIR CONDITIONING UNIT
AD	ACCESS DOOR
APF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
ATU	AIR TERMINAL UNIT (ie VAV, DUAL DUCT BOX, ETC.)
CF	CENTRIFUGAL FAN
CD	COOLING COIL CONDENSATE
CO	CLEAN OUT
CFM	CUBIC FEET PER MINUTE
CUH	CABINET UNIT HEATER
CW	COLD WATER
DB	DRY BULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROL
DB	DECIBELS
DP	DEW POINT TEMPERATURE
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EF	EXISTING FAN
EX	EXISTING
FC	FORWARD CURVED FAN
FLR	FLOOR
FD	FIRE DAMPER
FSD	COMBINATION FIRE/SMOKE DAMPER
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HP	HORSEPOWER
MAX.	MAXIMUM
MIN.	MINIMUM
N.T.S.	NOT TO SCALE
NOM.	NOMINAL
OA	OUTDOOR AIR
PD	PRESSURE DROP
PF	PRE-FILTER
PH	PREHEAT
RA	RETURN AIR
REA	RELIEF AIR
RF	RETURN FAN
RH	REHEAT COIL
RH	RELATIVE HUMIDITY
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
Sp. Gr.	SPECIFIC GRAVITY
SP	STATIC PRESSURE
SPS	STATIC PRESSURE SENSOR
SS	STAINLESS STEEL
TCP	TEMPERATURE CONTROL PANEL
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB TEMPERATURE
X	EXISTING
XR	EXISTING TO BE REMOVED
XRL	EXISTING TO BE RELOCATED

GENERAL SYMBOLS:

	POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
	LIMIT OF DEMOLITION
	EXISTING TO REMAIN
	EXISTING TO BE REMOVED
	EXISTING TO BE RELOCATED

CALL OUTS:

	REFERENCE TO CODED NOTE
	EQUIPMENT OR FIXTURE MARK
	UNIT NUMBER
	AIR DISTRIBUTION DEVICE
	CONNECTION SIZE AT DEVICE
	SECTION/DETAIL/ELEVATION MARK

DUCTWORK SYMBOLS:

	RECTANGULAR DUCT SIZE
	ROUND DUCT SIZE
	MANUAL BALANCING DAMPER ON DUCT TO BE MOUNTED OVER ACCESSIBLE CEILING
	SINGLE LINE
	INDICATES TRANSITION
	SUPPLY DUCT (UP & DOWN)
	EXHAUST DUCT (UP & DOWN)

CONTROL SYMBOLS:

	PNEUMATIC THERMOSTAT
	DDC THERMOSTAT
	SENSOR
	ELECTRONIC TEMPERATURE SENSOR

VAV TERMINALS

MARK	MAX. AIRFLOW (CFM)	MIN. AIRFLOW (CFM)	TERMINAL TYPE (NOTE 2)	CONTROL TYPE (NOTE 5)	ELECTRIC HEATING COIL PERFORMANCE					VOLTAGE (V)
					AIRFLOW (CFM)	CAPACITY (MBH)	ENTERING AIR TEMP (°F)	LEAVING AIR TEMP (°F)	POWER (KW)	
NOT USED	—	—	—	—	—	—	—	—	—	—
NOT USED	—	—	—	—	—	—	—	—	—	—
NOT USED	—	—	—	—	—	—	—	—	—	—
VAV-4	1700	500	E	1	1500	70.9	55.0	99.0	22.0	480-30
VAV-5	400	120	B	1	120	5.8	55.0	100.0	2.0	277-10
VAV-6	600	180	C	1	350	16.9	55.0	100.0	5.0	277-10
VAV-7	350	350	B	1	350	16.8	55.0	99.0	5.0	277-10
VAV-11	200	60	A	1	60	2.2	55.0	89.0	1.0	277-10
VAV-12	300	90	A	1	90	1.9	55.0	75.0	1.0	277-10
VAV-13	500	150	B	1	150	3.2	55.0	75.0	1.0	277-10
VAV-14	675	200	C	1	200	24.7	55.0	101.0	8.0	277-10
VAV-15	600	180	B	1	300	14.7	55.0	100.0	5.0	277-10
VAV-16	390	120	B	1	150	6.9	55.0	98.0	3.0	277-10
VAV-17	500	150	E	1	350	17.1	55.0	100.0	5.0	277-10
VAV-18	425	130	B	1	150	7.0	55.0	98.0	3.0	277-10
VAV-19	350	100	B	1	120	11.7	55.0	98.0	4.0	277-10
VAV-20	400	120	B	1	250	12.3	55.0	101.0	4.0	277-10
VAV-8	400	400	B	1	400	12.4	55.0	84.0	4.0	277-10
VAV-9	1600	500	E	1	1000	57.1	55.0	108.0	18.0	480-30
VAV-21	525	160	B	1	160	3.5	55.0	75.0	2.0	277-10
VAV-22	1500	200	D	1	1000	52.5	55.0	104.0	16.0	480-30
VAV-23	525	160	B	1	160	3.5	55.0	75.0	2.0	277-10
VAV-24	250	75	A	1	75	1.6	55.0	75.0	1.0	277-10
VAV-25	150	75	A	1	75	1.6	55.0	75.0	1.0	277-10
VAV-26	275	85	B	1	125	7.3	58.0	103.0	2.0	277-10
VAV-27	615	80	C	1	250	12.1	58.0	103.0	4.0	277-10
VAV-28	2020	1070	E	1	1070	36.5	58.0	90.0	11.0	480-30
VAV-29	1910	1910	E	1	1900	43.1	58.0	78.0	13.0	480-30
VAV-30	200	200	A	1	200	4.5	58.0	79.0	2.0	277-10
VAV-31	200	200	A	1	200	4.5	58.0	79.0	2.0	277-10
VAV-32	515	305	B	1	305	7.4	58.0	80.0	3.0	277-10
VAV-33	545	320	B	1	320	7.9	58.0	81.0	3.0	277-10
VAV-34	50	40	A	1	40	1.8	58.0	100.0	1.0	277-10
VAV-35	350	225	B	1	225	10.3	58.0	101.0	4.0	277-10
VAV-36	475	445	B	1	445	12.7	58.0	84.0	4.0	277-10
VAV-37	460	125	B	1	150	7.5	58.0	104.0	2.0	277-10
VAV-38	220	100	A	1	100	3.2	58.0	88.0	1.0	277-10
VAV-39	160	85	A	1	85	3.7	58.0	98.0	2.0	277-10

VAV TERMINAL NOTES:

- TERMINALS SHALL BE CAPABLE OF OPERATING WITH A MINIMUM INLET PRESSURE OF 0.5 IN. W.G. PROVIDE WITH SCREW ACCESS (UN-HINGED) WHERE TERMINALS ARE INSTALLED IN THE BEAM/JOIST SPACE.
- REFER TO "VARIABLE AIR VOLUME TERMINALS: CONNECTION SCHEDULE" FOR TERMINAL SIZE, DUCT CONNECTIONS AND DUCT SIZES.
- REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- NOT USED.
- REFER TO CONTROLS DRAWINGS FOR CONTROL STRATEGIES.
- PROVIDE DOOR INTERLOCK DISCONNECT SWITCH.

VARIABLE AIR VOLUME TERMINALS : CONNECTION SCHEDULE

TERMINAL TYPE	INLET		MAX. AIRFLOW (CFM)	TERMINAL AIR PRESSURE DROP (IN W.G.)	RADIATED NOISE (NC)	DISCHARGE	
	TERMINAL NECK SIZE (IN)	SUPPLY DUCT (IN)				TERMINAL CONN. SIZE (IN)	DISCHARGE DUCT (IN)
A	6"ø	8"ø	350	1.0"	25	12x8	10x10
B	8"ø	10"ø	700	1.0"	27	12x10	12x12
C	10"ø	12"ø	1200	1.0"	28	14x12.5	20x10
D	12"ø	14"ø OR 16x10	1600	1.0"	30	16x15	22x12
E	14"ø	18x12	2400	1.0"	30	20x18	30x12
F	16"ø	24x12	3200	1.0"	25	24x18	30x14

NOTES:

- UNLESS OTHERWISE NOTED ON PLANS, PROVIDE DUCT SIZES AS INDICATED. CONTRACTOR IS PERMITTED TO UTILIZE AN EQUIVALENT FREE AREA AS NECESSARY.
- CONTRACTOR SHALL PROVIDE ALL TRANSITIONS/OFFSETS AS NECESSARY.

AIR DISTRIBUTION DEVICE (DIFFUSERS, REGISTERS AND GRILLES)

MARK	TYPE	FACE SIZE (INCHES)	NECK SIZE (INCHES)	STYLE	COLOR	MATERIAL	FACTORY DAMPER	NOTES
S1	SUPPLY DIFFUSER	24x24	SEE TAG	LOUVERED FACE LAY-IN	WHITE	ALUMINUM	—	1
S2	SUPPLY DIFFUSER	NOTE 2	SEE TAG	LOUVERED FACE LAY-IN	WHITE	STEEL	—	1
R1	RETURN GRILLE	24x12	SEE TAG	ECCENTRIC LAY-IN	WHITE	ALUMINUM	—	1
R2	REGISTER	24x12	SEE TAG	SURFACE MOUNTED	WHITE	STEEL	—	1

NOTES:

- REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- TAG NECK SIZE INDICATES NOMINAL DUCT CONNECTION OF GRILLE. FACE SIZE IS DICTATED BY NOMINAL DUCT CONNECTION SIZE. CONTRACTOR SHALL TRANSITION FROM DUCT SIZE TO THE NECK SIZE.

PACKAGED ROOFTOP UNITS

MARK	RTU-1	RTU-2	RTU-3	RTU-4
TYPE	VERTICAL	VERTICAL	VERTICAL	VERTICAL
SUPPLY FAN				
SUPPLY AIR FLOW (CFM)	4000	8000	4000	4000
MINIMUM OUTDOOR AIR FLOW (CFM)	1000	2800	1000	1000
TOTAL/EXTERNAL STATIC PRESSURE (IN W.G.)	1.91/1.2	3.51/2.0	1.91/1.2	1.91/1.2
BRAKE HORSEPOWER/TYPE	3/ECM		3/ECM	3/ECM
RPM	1,211	2,230	1,211	1,211
DX COOLING				
TOTAL CAPACITY (MBH)	129.2	213.6	129.2	129.2
SENSIBLE CAPACITY (MBH)	101.4	179.7	101.4	101.4
ENTERING AIR (DB/WB °F)	80/67	80/67	80/67	80/67
OUTDOOR TEMPERATURE (°F)	95	95	95	95
REFRIGERANT	R-410A	R-410A	R-410A	R-410A
NO. COMPRESSORS/TYPE	2/INVERTER SCROLL	2/SCROLL	2/INVERTER SCROLL	2/INVERTER SCROLL
NO. CONDENSER FANS/MOTOR TYPE	2/ECM	2/	2/ECM	2/ECM
ENERGY RATING STANDARD CONDITIONS (EER)/IEER	12.3/19.2	11.0/11.8	12.3/19.2	12.3/19.2
GAS HEAT				
INPUT/OUTPUT (MBH)	200/160	240-192	200/160	200/160
NO. OF STAGES	2	2	2	2
ELECTRICAL				
VOLTS-PHASE-HERTZ	460-3-60	460-3-60	460-3-60	460-3-60
MINIMUM AMPACITY	23.2	46.2	23.2	23.2
MAX. OVERCURRENT PROTECTION (AMPS)	30	50	30	30
OPERATING WEIGHT (LBS.)	2,430	2,950	2,430	2,430
FEATURES OR ACCESSORIES				
5 YEAR COMPRESSOR WARRANTY	YES	YES	YES	YES
INTERNAL SPRING VIBRATION CURB	YES	YES	YES	YES
2-INCH, 30% STANDARD SIZE THROWAWAY FILTERS	YES	YES	YES	YES
BAROMETRIC RELIEF	YES	YES	YES	YES
FULL ECONOMIZER	YES	YES	YES	YES
FACTORY DISCONNECT	NO	NO	NO	NO
BACNET INTERFACE (ANDOVER CONTROLS)	YES	YES	YES	YES

NOTES:

- SINGLE POINT POWER CONNECTION.
- SLIDE OUT, STAINLESS STEEL DRAIN PAN.
- BUILT-IN RIGGING CAPABILITIES.
- 10-YEAR HEAT EXCHANGER WARRANTY.
- PROVIDE WITH THROUGH THE BASE ELECTRICAL, TIME DELAY RELAY, ANTI-SHORT CYCLE TIMER, LOW AMBIENT CONTROL, CONDENSER COIL GUARD, HINGED SERVICE ACCESS DOORS.
- RETURN AIR SMOKE DETECTOR, DISCONNECT, AND CONVENIENCE RECEPTACLE BY EC. REFER TO ELECTRICAL PLANS.
- COMPRESSORS MODULATING WITH INVERTER.
- CONDENSER FAN HEAD PRESSURE CONTROL.
- ADAPTER CURB.
- FULL ECONOMIZER.
- ELEVATION: 1000 FT.
- REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

HVAC GENERAL NOTES:

- LOCATIONS AND ROUTING OF EXISTING PIPING, DUCTWORK AND EQUIPMENT IS PRESUMED FROM EXISTING DRAWINGS. MECHANICAL CONTRACTOR SHALL FIELD VERIFY ALL PRIOR TO COMMENCEMENT OF CONSTRUCTION. NOTIFY ENGINEER OF ANY CONDITIONS WHICH WILL NOT PERMIT THE WORK TO BE PERFORMED AS INDICATED ON THESE DRAWINGS.
- COORDINATE ALL SHUT-DOWNS OF EXISTING MECHANICAL SYSTEMS WITH OWNER A MINIMUM OF TEN WORKING DAYS IN ADVANCE.
- PRIOR TO INSTALLATION, VERIFY PRECISE LOCATION OF NEW WALL MOUNTED DEVICES WITH OWNER AND ARCHITECT. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR PRECISE LOCATION OF CEILING MOUNTED DEVICES. COORDINATE ROOF MOUNTED EQUIPMENT WITH ARCHITECT PRIOR TO INSTALLATION.
- PROVIDE ADEQUATE SERVICE CLEARANCE FOR ALL MECHANICAL EQUIPMENT. REFER TO INSTRUCTIONS FROM THE EQUIPMENT MANUFACTURER. MAINTAIN A MINIMUM OF 18 INCH CLEARANCE AT CONTROLS FOR VARIABLE AIR VOLUME TERMINALS AND VENTURI VAV TERMINALS.
- NEW DUCTS OR PIPING SHALL NOT BE ROUTED ABOVE ELECTRICAL PANELS. REFER TO ELECTRICAL DRAWINGS FOR LOCATION OF PANELS.
- UNLESS NOTED OTHERWISE, BRANCH DUCTS TO DIFFUSERS SHALL BE THE SAME SIZE AS THE NECK OF THE DIFFUSER.
- NO TEMPERATURE SENSING CONTROL DEVICES SHALL BE LOCATED OVER HEAT PRODUCING DEVICES.
- MECHANICAL DRAWINGS ARE DIAGRAMMATIC. WHERE DUCT SIZE SHOWN IS IN CONFLICT WITH STRUCTURE OR OTHER BUILDING SYSTEM, CONTRACTOR MAY MODIFY DUCT SIZE AND PROVIDE EQUIVALENT FREE AREA DUCT.
- WHERE EQUIPMENT IS TO BE REMOVED, REMOVE ALL ASSOCIATED PIPING, DUCTWORK, CONTROLS, CONCRETE PADS, SUPPORTS, ETC. PATCH WALL AND FLOOR OPENINGS TO MATCH ADJACENT SURFACES.
- CONTRACTOR SHALL REMOVE AND REPLACE CEILING TILES AND GRID AS REQUIRED TO COMPLETE DEMOLITION AND NEW WORK IN AREAS OUTSIDE OF RENOVATION PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY TILES OR GRID DAMAGED DUE TO THIS WORK.

AC UNITS

MARK	AC-1, CU-1
AREA SERVED	STORAGE
CONFIGURATION	WALL MOUNTED SINGLE ZONE
FAN	
AIRFLOW (CFM)	920
EXTERNAL STATIC PRESSURE (IN. W.G.)	0.3
FAN MOTOR (HORSEPOWER)	0.1
DX COOLING	
TOTAL CAPACITY (MBH)	34.2
SENSIBLE CAPACITY (MBH)	23.8
ENTERING AIR DRY BULB (°F)	80
ENTERING AIR WET BULB (°F)	67
CONDENSING UNIT RATING CONDITIONS (°F)	95.0
REFRIGERANT	R-410A
NO. COMPRESSORS / CAPACITY STEPS	1
LOW AMBIENT CAPABILITY TO (°F)	-30
AIR COOLED CONDENSING UNIT	CU-3
NO. OF FANS	1
FAN MOTOR (HORSEPOWER)	0.1
ELECTRICAL - INDOOR UNIT	
VOLTS - PHASE - HZ	208-1-60
FULL LOAD AMPS	0.57
OVER-CURRENT PROTECTION DEVICE (AMPS)	1.0
ELECTRICAL - OUTDOOR UNIT	
VOLTS - PHASE - HZ	208-1-60
FULL LOAD AMPS	12.0
OVER-CURRENT PROTECTION DEVICE (AMPS)	25
OPERATING WEIGHT	
EVAPORATING UNIT (LBS)	46
CONDENSING UNIT (LBS)	163
ACCESSORIES	
7 YEAR COMPRESSOR WARRANTY	YES
CONDENSATE PUMP	NO
MAKE AND MODEL	
MANUFACTURER	mitsubishi
INDOOR UNIT MODEL	PKA-A36KA4
MANUFACTURER	mitsubishi
CONDENSING UNIT MODEL	PUY-A36NHA4

NOTES:

- SYSTEM SHALL BE INTERFACED WITH NEW CONTROLS SYSTEM IN BUILDING.

FOR CONSTRUCTION

ADDENDUM 01	07-03-13
FINAL CD SUBMISSION	03-24-13
Revisions:	Date

CONSULTANTS:



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Drawing Title
MECHANICAL LEGEND AND SCHEDULE

Approved: Project Director

Project Title
VAMC UPGRADE LEARNING
EXCHANGE - PHASE 2

Location
10701 E. BLVD., CLEVELAND, OHIO 44107Date
03/29/13Checked By
WFWDrawn By
JWF

Project Number
541-13-106

Building Number
1

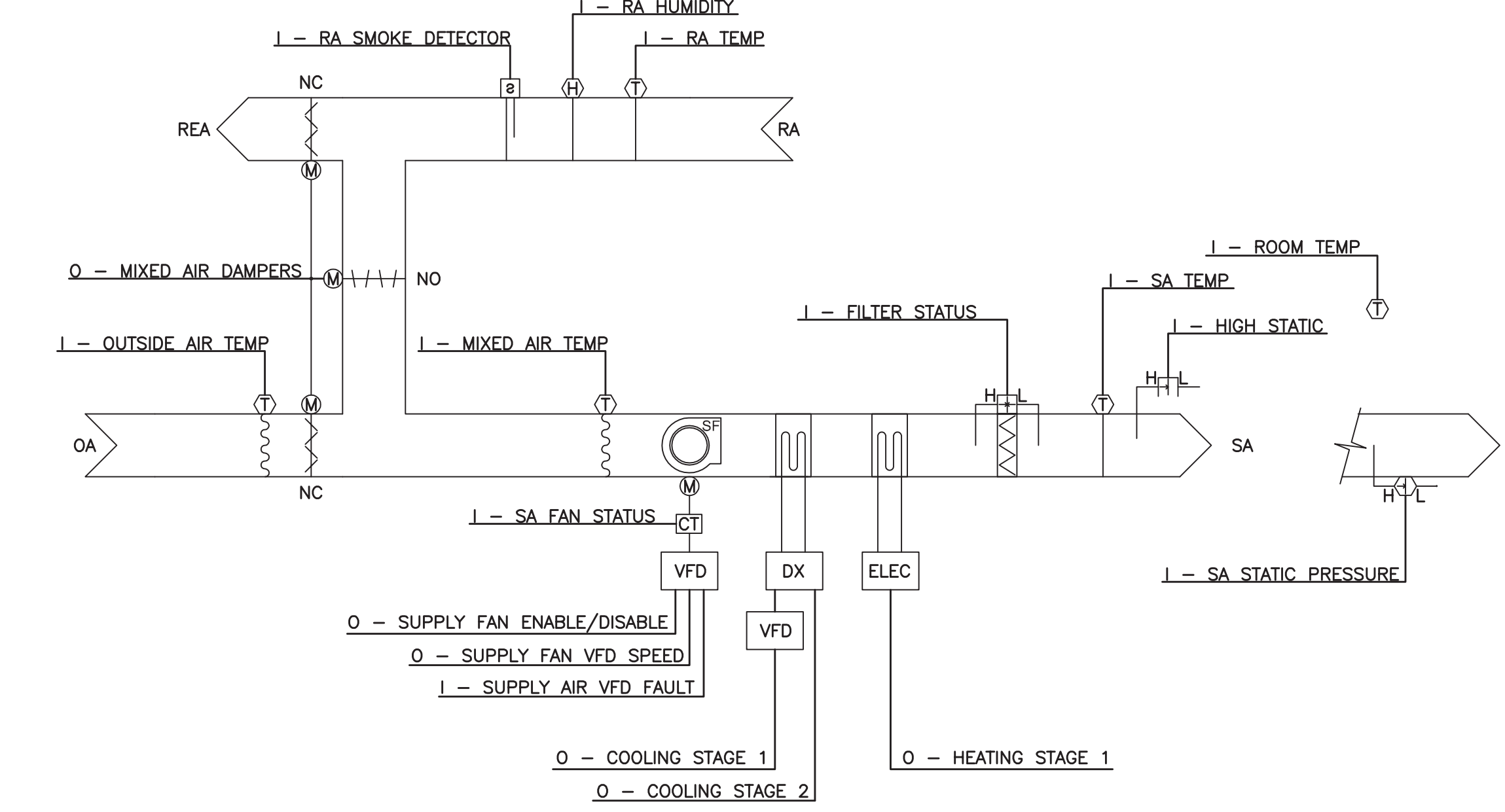
Drawing Number

1-M1

Office of
Construction
and Facilities
Management

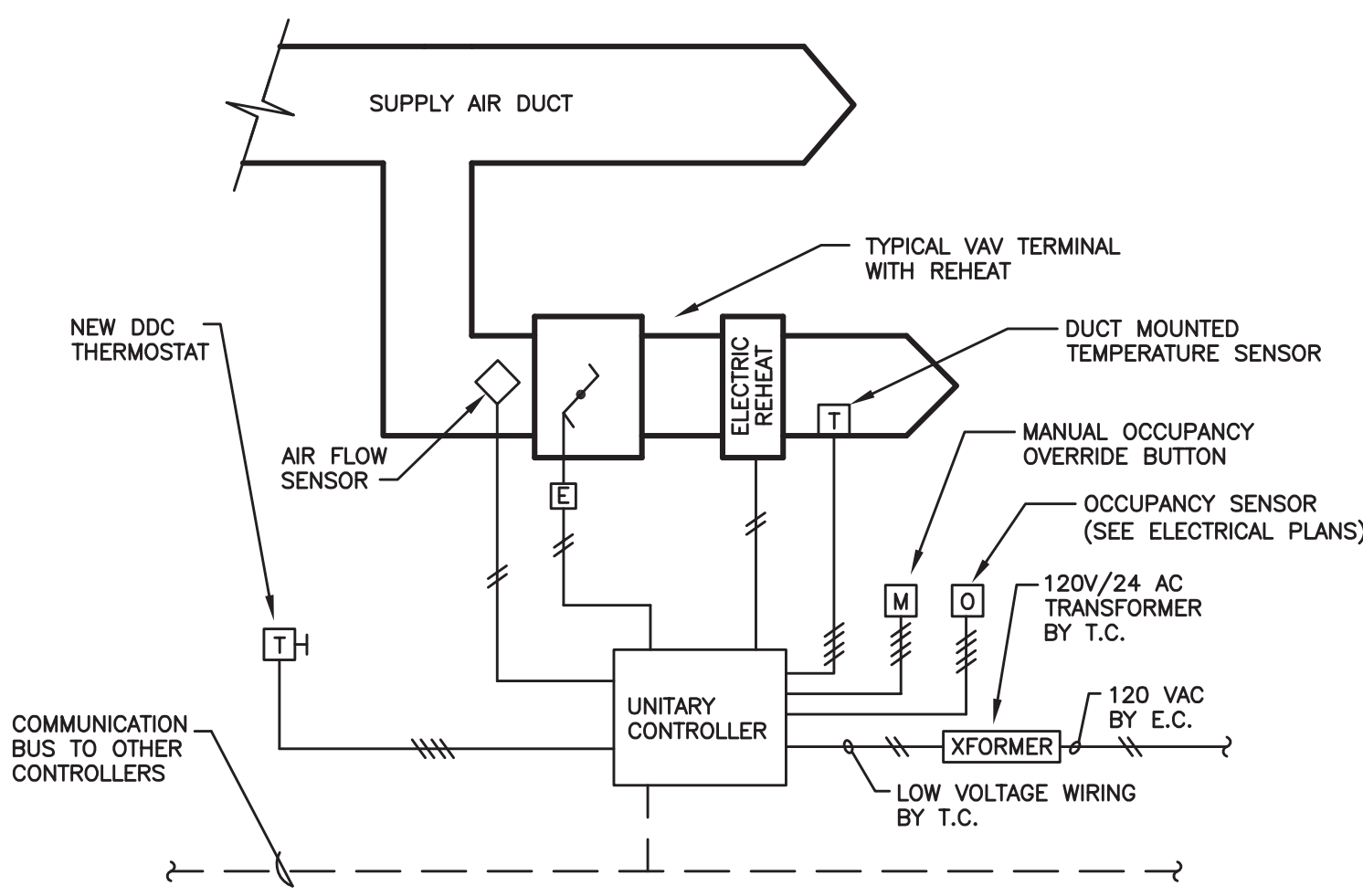


three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
three eighths inch = one foot
one half inch = one foot
one quarter inch = one foot
one eighth inch = one foot



SEQUENCE OF OPERATION FOR ROOFTOP AIR HANDLING UNIT (RTU-1 THRU RTU-4)

1. RUN CONDITIONS -
 - 1.1 OCCUPIED MODE:
 - A. DURING OCCUPIED HOURS (0700 TO 1800)(ADJ.)
 - (1) THE UNIT FAN SHALL RUN CONTINUOUSLY.
 - (2) THE UNIT SHALL SEQUENCE HEATING AND COOLING TO MAINTAIN 55° F LEAVING AIR SETPOINT.
 - (3) OUTSIDE AIR DAMPER(S) SHALL BE OPERABLE (OPEN TO MINIMUM POSITION).
 - (4) ECONOMIZER SHALL BE ABLE TO BE ENABLED.
 - B. DURING UNOCCUPIED HOURS (1800 TO 0700)(ADJ.)
 - (1) THE UNIT FAN SHALL BE OFF, UNLESS ON SPACE CALL FOR HEAT/COOL. (INTERMITTENT OPERATION)
 - (2) ON CALL FOR COOLING:
 - (a) THE UNIT SHALL SEQUENCE UNIT COOLING TO MAINTAIN 55° F LEAVING AIR SETPOINT.
 - (b) ECONOMIZER SHALL BE ABLE TO BE ENABLED.
 - (3) ON CALL FOR HEATING: THE UNIT SHALL SEQUENCE UNIT HEATING TO MAINTAIN 55° F LEAVING AIR SETPOINT.
 - (4) OUTSIDE AIR DAMPER(S) SHALL BE CLOSED, UNLESS ECONOMIZER COOLING IS REQUIRED.
 - (5) UNIT VAV BOX OCCUPANCY CONTROLS SHALL BE LOCKED OUT. ALL BOXES SHALL REVERT TO THEIR INDIVIDUAL MINIMUM UNOCCUPIED AIR FLOW RATES.
 - 1.2 SETBACK CONDITIONS:
 - A. EACH VAV BOX TEMPERATURE SENSOR SHALL BE ABLE TO MODULATE UNIT COOLING/HEATING DURING UNOCCUPIED MODE.
 - B. USER OVERRIDE: ON USER INPUT TO SPACE TEMPERATURE SENSOR, THE SYSTEM SHALL OPERATE AS OCCUPIED FOR 60 MINUTES (ADJ.).
 - 1.3 ALARMS:
 - A. HIGH LEAVING AIR TEMPERATURE
 - B. LOW LEAVING AIR TEMPERATURE
 - C. OPEN OUTSIDE AIR DAMPER DURING UNOCCUPIED MODE.
2. SMOKE DETECTION
 - 2.1 THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS. ALL SMOKE DAMPERS SHALL CLOSE.
3. SUPPLY FAN
 - 3.1 THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.
 - 3.2 TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.
 - 3.3 THE CONTROLLER SHALL MODULATE THE SUPPLY FAN VFD TO MAINTAIN PRESSURE, 0.75" SP (ADJ.), SETPOINT AT SUPPLY AIR PRESSURE SENSOR. THE SENSOR SHALL BE LOCATED 2/3 DOWN THE LONGEST BRANCH.
 - 3.4 THE SUPPLY FAN VFD SPEED SHALL NOT DROP BELOW 30% (ADJ.).
 - 3.5 ALARMS:
 - A. SUPPLY FAN FAILURE
 - B. SUPPLY FAN IN HAND
 - C. SUPPLY FAN RUNTIME EXCEEDED
 - D. HIGH DISCHARGE STATIC (1.75" SP, ADJ).
 - E. LOW DUCT STATIC (0.3" SP, ADJ)
4. COOLING COIL (DX)
 - 4.1 THE COOLING SHALL BE STAGED TO MAINTAIN COOLING SETPOINT, DISCHARGE AIR TEMPERATURE OF 55 DEG F (ADJ)
 - 4.2 TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE DELAY BETWEEN STAGES. EACH STAGE SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME.
- 4.3 VARIABLE REFRIGERANT COMPRESSOR(S) SHALL MODULATE TO BEST LOAD MATCH CONNECTED LOAD.
- 4.4 THE COOLING SHALL BE ENABLED WHENEVER ALL THE FOLLOWING ARE TRUE:
 - A. OUTSIDE AIR TEMPERATURE IS GREATER THAN 60 DEG F (ADJ.)
 - B. THE ECONOMIZER IS DISABLED OR FULLY OPEN
 - C. THE SUPPLY AIR TEMPERATURE IS ABOVE COOLING SETPOINT.
 - D. THE SUPPLY FAN STATUS IS ON.
 - E. THE HEATING IS NOT ACTIVE.
5. HEATING (NATURAL GAS)
 - 5.1 THE HEATING CONTROLS SHALL MODULATE THE NATURAL GAS CONTROL VALVE TO MAINTAIN DISCHARGE AIR TEMPERATURE.
 - 5.2 THE HEATING SHALL BE STAGED TO MAINTAIN HEATING SETPOINT, TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME.
 - 5.2 THE HEATING SHALL BE ENABLED WHENEVER ALL ARE TRUE:
 - A. OUTSIDE AIR TEMPERATURE IS LESS THAN 60 DEG F (ADJ.)
 - B. THE DISCHARGE AIR TEMPERATURE IS BELOW HEATING SETPOINT.
 - C. THE SUPPLY FAN STATUS IS ON.
 - D. THE COOLING IS NOT ACTIVE.
6. ECONOMIZER
 - 6.1 THE ECONOMIZER DAMPERS SHALL MODULATE TO MAINTAIN A SETPOINT 2 DEG F (ADJ.) LESS THAN THE COOLING SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM POSITION OPEN WHEN NOT IN ECONOMIZER.
 - 6.2 THE ECONOMIZER SHALL BE ENABLED WHENEVER ALL ARE TRUE:
 - A. OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEG F (ADJ.)
 - B. OUTSIDE AIR TEMPERATURE IS LESS THAN RETURN AIR TEMPERATURE.
 - C. SUPPLY FAN STATUS IS ON.
 - 6.3 THE ECONOMIZER SHALL CLOSE WHENEVER MIXED AIR TEMPERATURE DROPS TO 40 DEG F (ADJ) OR ON LOSS OF SUPPLY FAN STATUS
7. GENERAL:
 - 7.1 OUTSIDE AIR DAMPER SHALL CLOSE AND RETURN AIR DAMPER SHALL BE OPEN WHEN THE UNIT IS OFF.
8. FILTERS:
 - 8.1. THE CONTROLLERS SHALL MONITOR FILTER STATUS
 - 8.2. ALARMS
 - A. PREFILTER CHANGE REQUIRED
9. DEMAND CONTROL VENTILATION
 - 9.1 DEMAND CONTROL VENTILATION SHALL ONLY BE ACTIVE DURING OCCUPIED MODE AND WHEN ECONOMIZER IS OFF.
 - 9.2 EACH RTU SHALL HAVE A MINIMUM OF THREE (3) CRITICAL ZONES (TO BE FIELD ESTABLISHED).
 - 9.3 UNDER NORMAL CONDITIONS, THE OUTSIDE AIR SET POINT SHALL BE SET AT 10% OPEN.
 - 9.4 CARBON MONOXIDE SENSORS IN THE RETURN OF EACH CRITICAL ZONE SHALL ESTABLISH "OA OVERRIDE MODE".
 - 9.5 DURING "OA OVERRIDE MODE":
 - A. OPEN OA DAMPER AN ADDITIONAL 5% (ADJ.)
 - B. REVIEW CRITICAL ZONE FOR 15 MINUTES (ADJ)
 - C. IF CRITICAL ZONE IS IN CONTINUED ALARM, THAN OPEN OA DAMPER ADDITIONAL 5% (ADJ).
 - D. REPEAT UNTIL ZONE IS NO LONGER IN ALARM OR MAXIMUM OUTSIDE AIR POSITION IS MET (35%).



SEQUENCE OF OPERATION FOR VAV BOXES

- OPERATION (REFER TO VAV SCHEDULE):**
- A. SPACE THERMOSTAT SHALL MODULATE DAMPER TO MAINTAIN SET POINT.
 - B. ON CALL FOR HEAT, RETURN DAMPER TO MINIMUM POSITION AND MODULATE ELECTRIC RESISTANCE HEAT ELEMENT TO MAINTAIN SETPOINT.
 - C. DUCT MOUNTED TEMPERATURE SENSOR SHALL REPORT REHEAT COIL LEAVING AIR TEMPERATURE TO BUILDING AUTOMATION SYSTEM.
- OCCUPANCY CONTROL (APPLIES TO ALL VAV BOXES):**
- A. OCCUPANCY SHALL BE DETERMINED FROM ELECTRICAL LIGHTING OCCUPANCY SENSOR SYSTEM FOR RESPECTIVE SERVICE AREA. CONTRACTOR SHALL TIE INTO ELECTRICAL OCCUPANCY SENSOR VIA AUXILIARY DRY CONTACTS ON SENSORS. REFER TO ELECTRICAL PLANS FOR ADDITIONAL INFORMATION.
 - B. ROOM OVERRIDE SHALL BE POSSIBLE FROM MANUAL OCCUPANCY BUTTON ON TEMPERATURE SENSOR. OVERRIDE SHALL BE LIMITED TO 60 MINUTES (ADJ.)
 - C. OCCUPIED: VAV TERMINAL SHALL OPERATE UNDER STANDARD COOLING/HEATING MODES TO MAINTAIN ROOM THERMOSTAT SETPOINTS AS LISTED IN ROOM DESIGN SCHEDULE ON DRAWING 1-H1.
 - D. UNOCCUPIED:
 1. VAV TERMINAL SHALL RESET TO UNOCCUPIED MINIMUM. UNOCCUPIED MINIMUM SHALL BE 50% OF OCCUPIED MINIMUM (OCCUPIED MINIMUM IS LISTED MINIMUM AIR FLOW IN VAV SCHEDULE).
 2. VAV TERMINAL SHALL OPERATE COOLING/HEATING MODES TO MAINTAIN 'UNOCCUPIED' SPACE THERMOSTAT SETPOINTS:
- UNOCCUPIED SPACE THERMOSTAT SETPOINTS:
- a. HEATING: 68° F (ADJ.)
 - b. COOLING: 78° F (ADJ.)

GENERAL CONTROLS NOTES:

A. IN DIAGRAMS, 'I' INDICATES AN INPUT, 'O' INDICATES AN OUTPUT.

B. DAMPER OPERATORS TO BE PROVIDED BY TEMPERATURE CONTROLS CONTRACTOR.

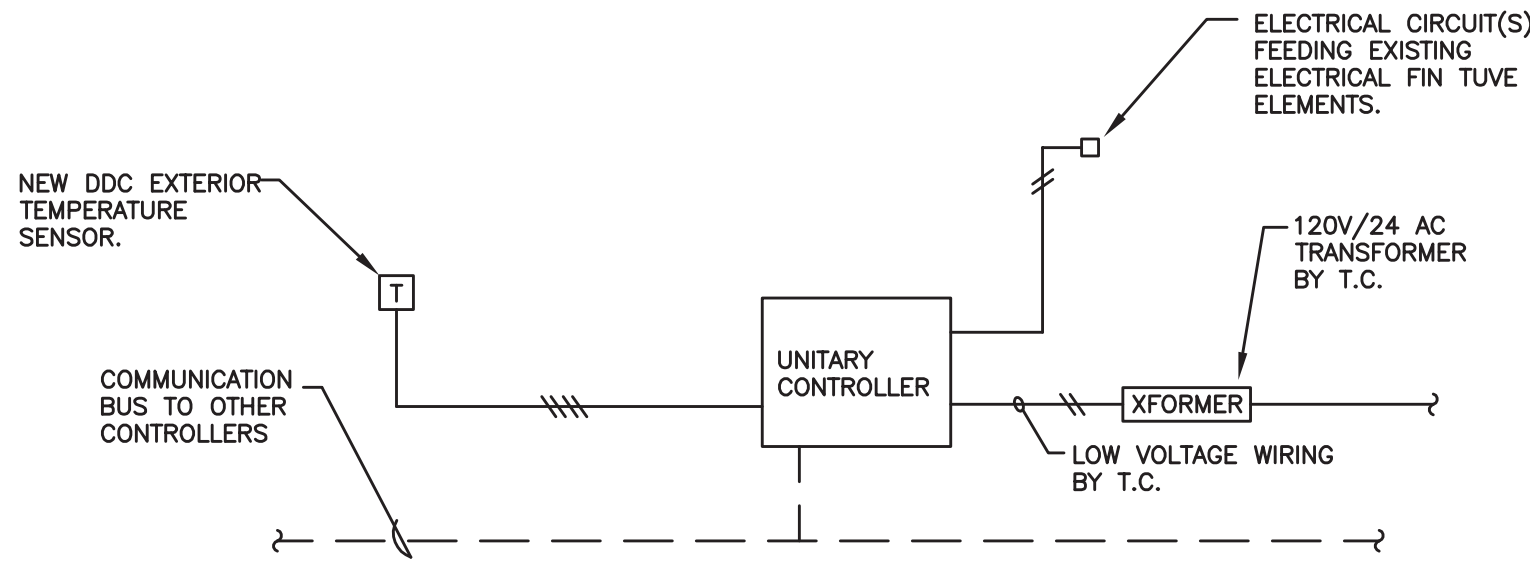
C. TEMPERATURE CONTROL TEST SHALL INCLUDE, BUT NOT BE LIMITED TO:

- DAMPER OPERATION
- VALVE ACTUATION RESPONSE AND VALIDATION OF CORRECT OPERATION
- VERIFIED ENTIRE CONTROL SEQUENCE OPERATES PER DESIGN
- ACCOUNT FOR ALL CONTROL POINTS LISTED

D. ALL SYSTEMS SHALL BE COMMISSIONED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

E. TEMPERATURE CONTROLS SHALL BE ANDOVER. ALL CONTROLS WORK SHALL INTERFACE WITH EXISTING ANDOVER-BUILDING CONTROL SYSTEM.

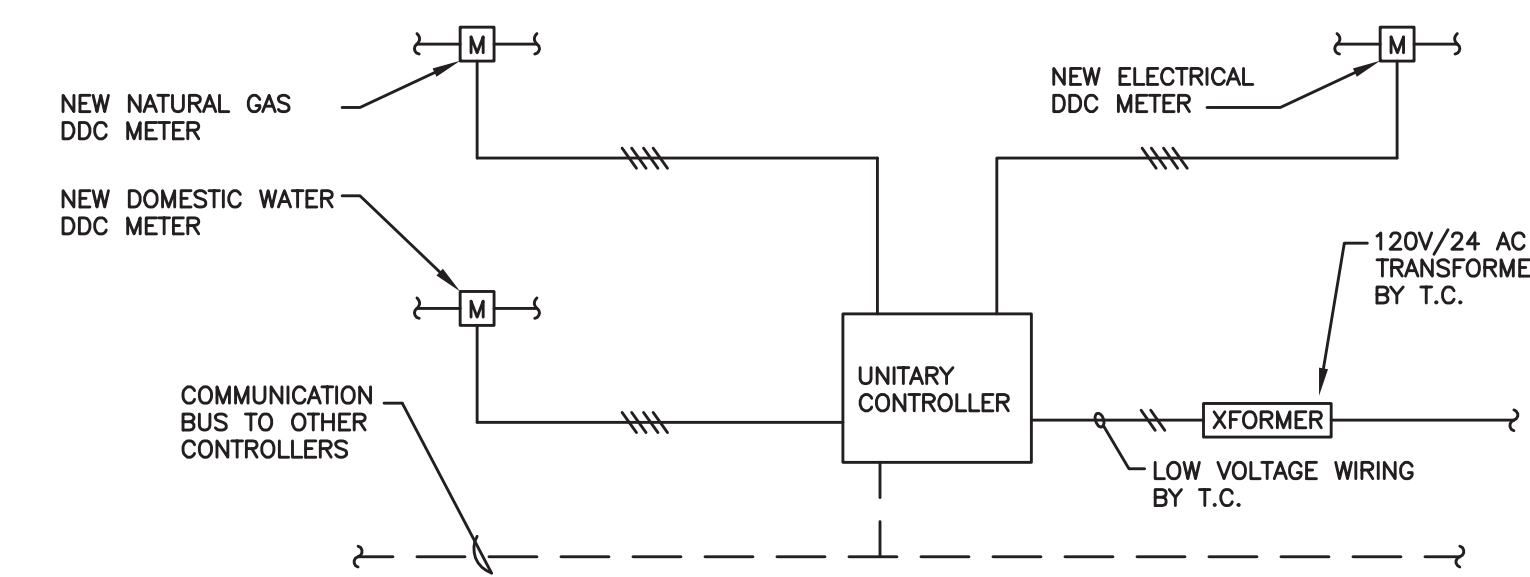
CONTROLS MUST BE COMPLIANT WITH NEW VA CONTROLS SYSTEM DEFINED UNDER CONTRACT IN: PROJECT. NO. 541-10-1014 SPEC SECTION 25-99-99.



FINNED TUBE RADIATION CONTROL DIAGRAM

SEQUENCE OF OPERATION FOR FINNED TUBE RADIATION

- RUN CONDITIONS:**
- A. ELECTRIC BASEBOARD CONTROL SHALL LOCK OUT CONTROL ABOVE 60 DEG F. (ADJ.)
 - B. EXISTING LOCAL CONTROLS SHALL MODULATE THERMOSTAT.



UTILITY METERING

FOR CONSTRUCTION

CONSULTANTS:			ARCHITECT/ENGINEERS: FRIEDRICK, FRIEDRICK & HELLER ENGINEERS, INC. 872 EAST ROYALTON ROAD BROADVIEW HTS., OHIO 44107 Tel: (440) 360-9880 Fax: (440) 360-9889	Drawing Title HVAC CONTROL DETAILS		Project Title VAMC UPGRADE LEARNING EXCHANGE - PHASE 2		Project Number 541-13-106		Office of Construction and Facilities Management
				Approved: Project Director		Location 10701 E. BLVD., CLEVELAND, OHIO 44107		Building Number 1		
ADDENDUM 01 07-03-13				Date 03/29/13		Checked By WFW		Drawn By JWF		
FINAL CD SUBMISSION 03-24-13										
Revisions:										




three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot



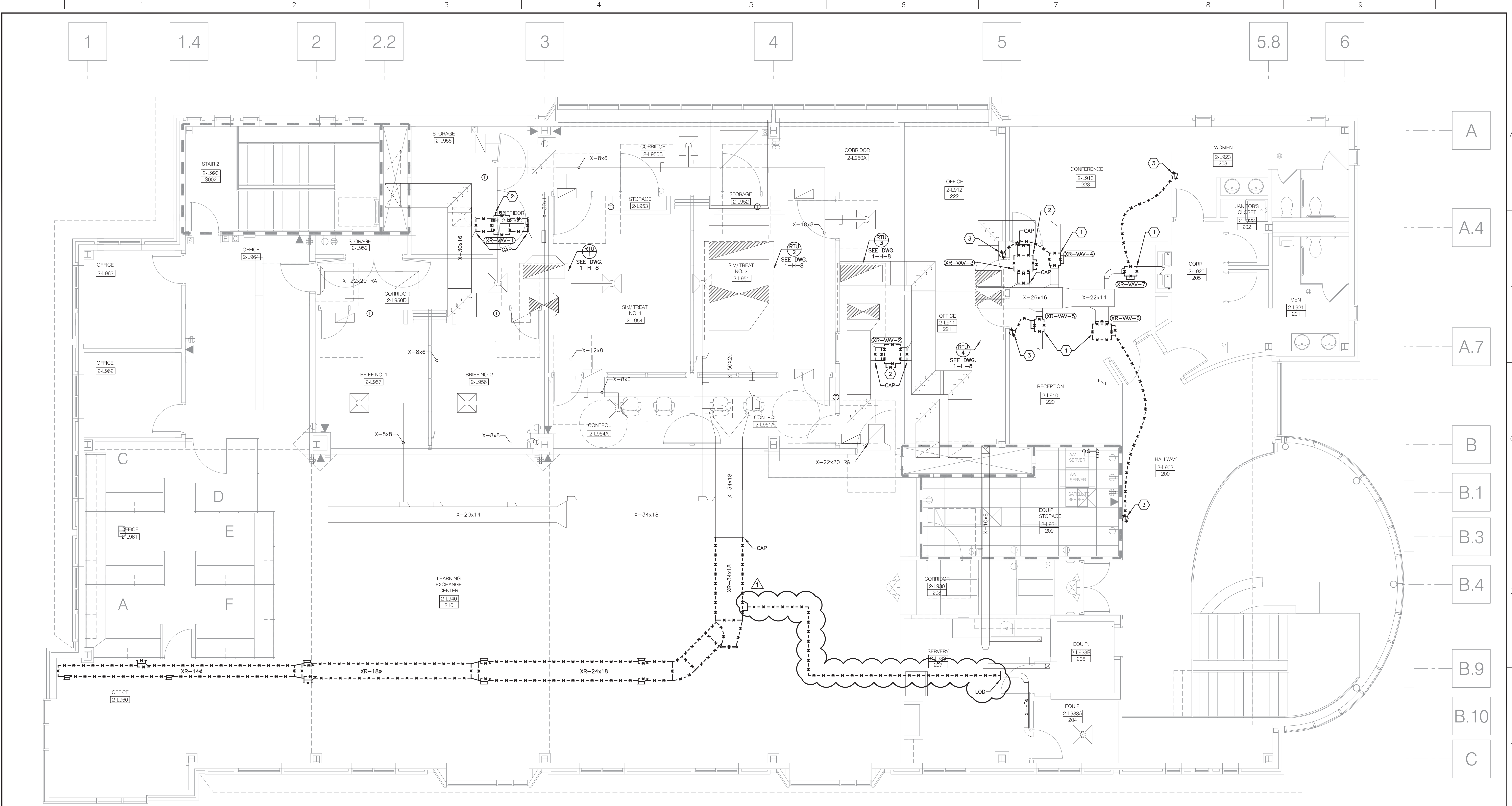
FIRST FLOOR HVAC DUCTWORK PLAN
SCALE: 1/4" = 10'
1

- CODED NOTES:
- 1 INSTALL NEW VAV BOX IN EXISTING DUCTWORK. SEE DWG 1-M1 FOR SCHEDULE.
 - 2 ROUTE 3/4" CONDENSATE DOWN IN WALL AND STUB OUT BELOW SINK. TIE INTO SINK DRAIN 2" ABOVE TRAP.

FOR CONSTRUCTION

		<div>CONSULTANTS:</div>	<div><div>03/29/13</div></div>	<div>ARCHITECT/ENGINEERS:</div> <div><div>FREDRICK, FREDRICK & HELLER ENGINEERS, INC. 872 EAST ROYALTON ROAD BROADVIEW HTS., OHIO 44147 TEL: (440) 360-9880 FAX: (440) 360-9889</div></div>	<div>Drawing Title</div> <div>FIRST FLOOR HVAC PLAN</div>	<div>Project Number</div> <div>541-13-106</div>	<div>Project Title</div> <div>VAMC UPGRADE LEARNING EXCHANGE - PHASE 2</div>	<div>Project Number</div> <div>541-13-106</div>	<div>Office of Construction and Facilities Management</div> <div>Department of Veterans Affairs</div>
						<div>Building Number</div> <div>1</div>	<div>Location</div> <div>10701 E. BLVD., CLEVELAND, OHIO 44107</div>	<div>Drawing Number</div> <div>1-M5</div>	
<div>ADDENDUM 01</div> <div>07-03-13</div>	<div>07-03-13</div>				<div>Approved: Project Director</div>	<div>Date</div> <div>03/29/13</div>	<div>Checked By</div> <div>WFW</div>	<div>Drawn By</div> <div>JWF</div>	
<div>FINAL CD SUBMISSION</div> <div>03-24-13</div>	<div>03-24-13</div>								

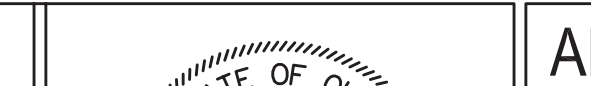


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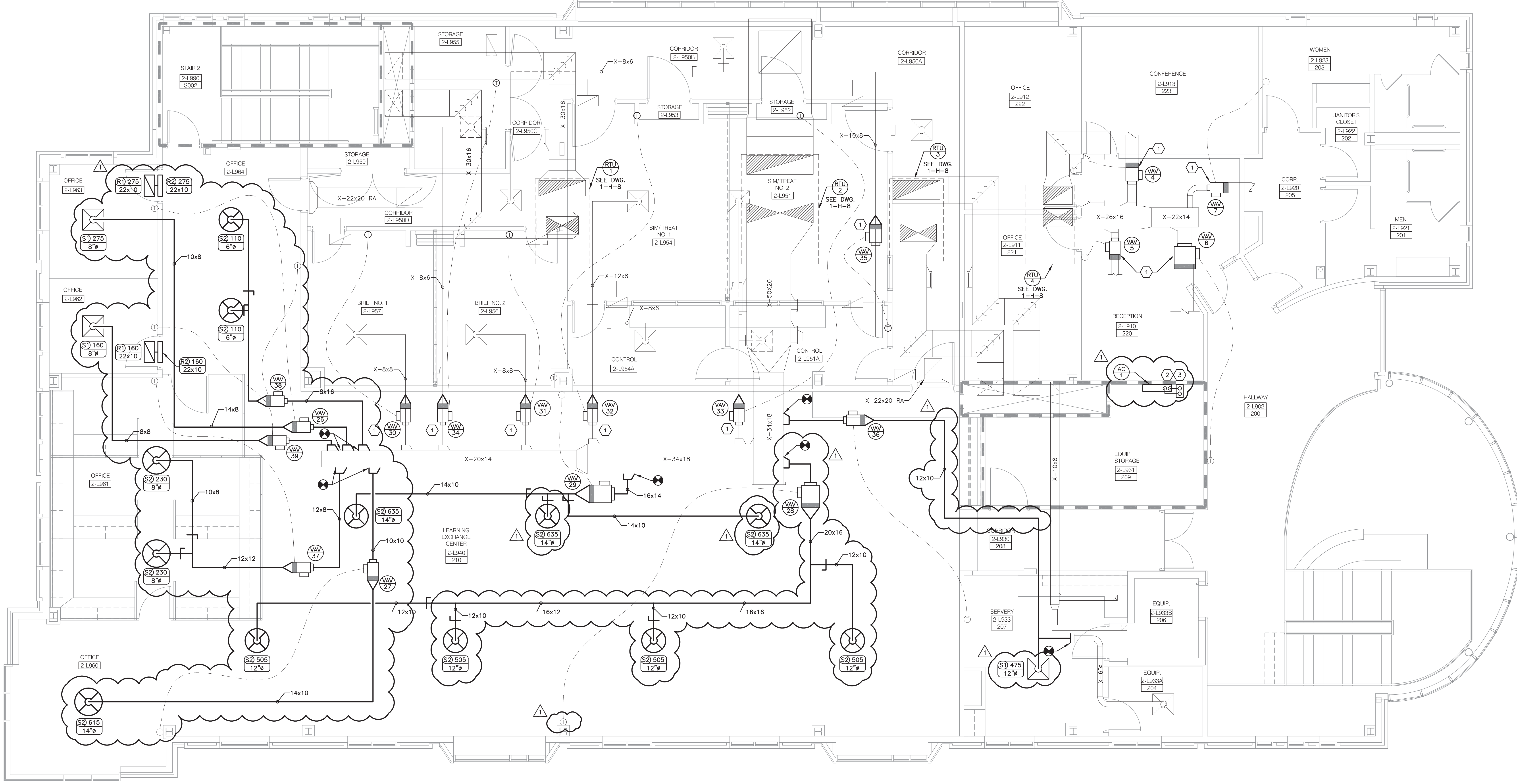
SECOND FLOOR HVAC DEMOLITION PLAN
SCALE: 1/4" = 1'-0"
1

- CODED NOTES:**
- 1 REMOVE TERMINAL BOX COMPLETE. DUCTWORK TO REMAIN.
 - 2 REMOVE BYPASS DAMPER AND ASSOCIATED DUCTWORK BACK TO MAIN AND CAP.
 - 3 REMOVE EXISTING ROOM THERMOSTAT.

FOR CONSTRUCTION

		CONSULTANTS:		ARCHITECT/ENGINEERS:	 FREDERICK, FREDRICK & HELLER ENGINEERS, INC. 672 EAST ROYALTON BROADVIEW HTS., OHIO 44147 TEL: (440) 361-8880 FAX: (440) 361-8889	Drawing Title		Project Title		Project Number		Office of Construction and Facilities Management	
						SECOND FLOOR HVAC DEMOLITION PLAN		VAMC UPGRADE LEARNING EXCHANGE - PHASE 1		541-13-106			
						Approved: Project Director		Location		Building Number			
								10701 E. BLVD., CLEVELAND, OHIO 44107		1			
ADDENDUM 01	07-03-13					Date		Checked By		Drawn By		1-M6	
FINAL CD SUBMISSION	03-24-13					03/29/13		WFW		JWF			
Revisions:	Date												




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SECOND FLOOR HVAC PLAN
SCALE: 1/4" = 1'-0"
1

- CODED NOTES:**
- 1. INSTALL NEW VAV BOX IN EXISTING DUCTWORK. SEE DWG. 1-M1 FOR SCHEDULE.
 - 2. ROUTE 3/4" CONDENSATE DRAIN PIPING DOWN IN WALL TO FIRST FLOOR.
 - 3. 5/8" O.D. GAS LINE AND 3/8" LIQUID LINE UP THRU ROOF TO CU-1.

FOR CONSTRUCTION

		CONSULTANTS:				ARCHITECT/ENGINEERS:		 FRIEDRICK, FREDRICK & HELLER ENGINEERS, INC. 872 EAST ROYALTON ROAD BROADVIEW HTS., OHIO 44147 TEL: (440) 381-9880 FAX: (440) 346-9889		Drawing Title SECOND FLOOR HVAC PLAN		Project Title VAMC UPGRADE LEARNING EXCHANGE - PHASE 1		Project Number 541-13-106		Office of Construction and Facilities Management					
										Approved: Project Director		Location 10701 E. BLVD., CLEVELAND, OHIO 44107		Building Number 1				Drawing Number 1-M7			
APPENDUM 01		07-03-13										Date 03/29/13		Checked By WFW		Drawn By JWF		 Department of Veterans Affairs			
FINAL CD SUBMISSION		03-24-13																			
Revisions:		Date																			

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WIRING DEVICES

- 20A-125V, HOSPITAL GRADE, GROUNDED DUPLEX RECEPTACLE, MOUNT AT 18" AFF UNLESS OTHERWISE NOTED.
- 20A-125V, HOSPITAL GRADE, GROUNDED TAMPER RESISTANT RECEPTACLE, MOUNT AT 18" AFF UNLESS OTHERWISE NOTED.
- DOUBLE 20A-125V, HOSPITAL GRADE, GROUNDED DUPLEX RECEPTACLE, MOUNT AT 18" AFF UNLESS OTHERWISE NOTED.
- 20A-125V, HOSPITAL GRADE, GROUND FAULT INTERRUPTER RECEPTACLE, MOUNT AT 18" AFF UNLESS OTHERWISE NOTED.
- RECESSED METALLIC MULTI-SERVICE FIRE RATED FLOOR BOX, 4" CORE DRILL (SIMILAR TO HUBBELL #S1PTAL SERIES) - INSTALLED IN CONCRETE FLOOR WITH (1)DUPLEX RECEPTACLE AND (1)TELEPHONE/DATA OUTLET - POWER AND COMMUNICATIONS CABLING SHALL BE ROUTED IN SEPARATE 1" CONDUITS. FLOOR BOX SHALL BE FURNISHED WITH HINGED DOORS, FLUSH COVER AND CARPET FLANGE. CONTRACTOR SHALL VERIFY THAT DEPTH OF EXISTING CONCRETE FLOOR THICKNESS MEETS INSTALLATION REQUIREMENTS OF THE FLOOR BOX.

FIRE ALARM SYSTEM LEGEND

- FIRE ALARM CONTROL PANEL (EXISTING NOTIFIER AFP-100 SYSTEM).
- FIRE ALARM REMOTE ANNUNCIATOR - FLUSH MOUNT AT 5'-0" AFF TO TOP OF DEVICE.
- FIRE ALARM POWER SUPPLY EXTENDER - CONNECT TO 120V LIFE SAFETY CIRCUIT. SURFACE MOUNT AT 5'-0" AFF TO TOP OF DEVICE.
- FIRE ALARM TERMINAL CABINET.
- NOTIFICATION APPLIANCE CIRCUIT EXTENDER
- MANUAL FIRE ALARM PULL STATION - MOUNT AT 48" AFF TO CENTERLINE OF DEVICE.
- FIRE ALARM AUDIBLE VISUAL SIGNAL DEVICE (ADA TYPE) MOUNTED 80" AFF UNLESS NOTED. WHITE HOUSING WITH RED "FIRE" LETTERING.
S - SPEAKER
D - FLASHING DOME LIGHT
C - COMBINATION SPEAKER WITH FLASHING DOME LIGHT
- SMOKE DETECTOR - ADDRESSABLE INTELLIGENT PHOTOELECTRIC TYPE - CEILING MOUNTED.
- DUCT DETECTOR - ADDRESSABLE INTELLIGENT PHOTOELECTRIC DETECTOR, SAMPLING TUBES AND PROGRAMMABLE RELAY BASE. PROVIDE DUCT DETECTOR TEST/RESET SWITCH WITH REMOTE INDICATOR LAMP FOR EACH DUCT DETECTOR.
- MAGNETIC TYPE DOOR HOLDER OUTLET. 24VDC
- PNEUMATICALLY ACTUATED COMBINATION SMOKE/FIRE DAMPER - FURNISHED AND INSTALLED BY THE MC. EC SHALL PROVIDE (1) CONTROL MODULE AND (1) MONITOR MODULE
- CONTROL MODULE - ADDRESSABLE RELAY FOR CONTROL OF SMOKE DAMPERS, ELEVATOR RECALL, MAGNETIC DOOR HOLDERS, AUTOMATIC DOORS, ETC.
- MONITOR MODULE - ADDRESSABLE SUPERVISED FOR MONITORING TAMPER SWITCH, FLOW SWITCH, DAMPER POSITION ETC.
- TAMPER SWITCH - MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL TAMPER SWITCH. ELECTRICAL CONTRACTOR SHALL PROVIDE MONITOR MODULE AND TEST SWITCH.
- FLOW SWITCH - MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL FLOW SWITCH. ELECTRICAL CONTRACTOR SHALL PROVIDE MONITOR MODULE AND TEST SWITCH.

FIRE ALARM SYSTEM NOTES:
F1: PROVIDE A 2-GANG MINIMUM SIZE BACKBOX FOR ALL OF THE ABOVE FIRE ALARM DEVICES. ALL FIRE ALARM SYSTEM CONDUCTORS SHALL BE INSTALLED IN 3/4" MINIMUM SIZE COMPLETE CONDUIT SYSTEM WITH COLOR CODED WIRING AS INDICATED ON SHOP DRAWINGS - MAINTAIN BUILDING COLOR CODING. ALL NETWORK AND NETWORK CABLES SHALL BE "COMMUNICATION GRADE" TYPE CABLE. FURNISH, INSTALL AND CONNECT ALL FIRE ALARM DEVICES IN ACCORDANCE WITH WIRING DIAGRAMS PREPARED BY SYSTEM VENDOR. EXISTING FIRE ALARM SYSTEM BY NOTIFIER. REFER TO SPECIFICATIONS SECTION 283100 FOR ELECTRICAL REQUIREMENTS.

WIRING TERMINATIONS

- JUNCTION BOX, CEILING OR WALL MOUNTED, 4" SQ. WITH GROUND LUG, UNLESS OTHERWISE NOTED. COORDINATE MOUNTING LOCATION WITH EQUIPMENT.
SC - SINK STATION CONTROLS. CONNECT PER MANUFACTURES WIRING DIAGRAM.
CP - MECHANICAL EQUIPMENT CONTROL PANEL. CONNECT PER MANUFACTURES WIRING DIAGRAM.
- JUNCTION BOX, ABOVE CEILING FOR CONNECTION TO 120V AUTOMATIC DOOR. ELECTRICAL CONTRACTOR SHALL CONNECT AUTOMATIC DOOR INCLUDING PUSH PAD OPERATORS PER MANUFACTURER'S INSTRUCTIONS TO 120V EMERGENCY LIFE SAFETY CIRCUIT. GENERAL CONTRACTOR SHALL FURNISH AND INSTALL AUTOMATIC DOOR.
- JUNCTION BOX MOUNTED AT 48" AFF FOR CONNECTION TO AUTOMATIC DOOR PUSH PAD DEVICE. PROVIDE 3/4"C TO DOOR CONTROLLER WITH WIRING PER MANUFACTURER'S REQUIREMENTS.
- MOTOR - NUMBER DENOTES HORSEPOWER
- TEMPERATURE CONTROL PANEL FURNISHED AND INSTALLED BY OTHERS. EC SHALL PROVIDE 120V CONNECTION (HARDWIRED OR RECEPTACLE, AS REQUIRED).
- EC SHALL PROVIDE 20A-120V CIRCUIT IN ABOVE FINISHED CEILING MOUNTED JUNCTION BOX FOR VAV TERMINALS. CONNECT ALL VAV'S IN AREA TO CIRCUIT INDICATED. MC SHALL PROVIDE CONTROL TRANSFORMER AND CONTROL WIRING FOR 24VAC VAV TERMINALS. VERIFY LOCATION OF ALL ADJACENT VAV'S WITH MECHANICAL DRAWINGS.
- MEDICAL GAS ALARM PANEL - CONNECT TO 20A, 120V LIFE SAFETY CIRCUIT, WALL MOUNTED, COORDINATE MOUNTING HEIGHT WITH MC.

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	LOCATION	MOUNTING	LAMP INFORMATION				BALLAST/DRIVER INFORMATION			MANUFACTURER/NOTES
				QUANTITY	WATTS	TYPE	COLOR TEMP.	QUANTITY	TYPE	VOLTAGE	
EXIT SIGN	EXIT SIGN - LED TYPE, SEALED LEAD CALCIUM BATTERY, SINGLE OR DOUBLE FACE, UNIVERSAL MOUNTING, DIE CAST ALUMINUM HOUSING WITH WHITE BODY, WHITE FACE AND RED STENCIL LETTERS. CONNECT TO EMERGENCY LIFE SAFETY CIRCUIT AHEAD OF LOCAL SWITCHING. UL 924 LISTED, UL DAMP LOCATION, UL LISTED FOR 2C.	VARIOUS		-	LESS THAN 2W	LED	-	-	-	120-277V	-
EXIT SIGN WITH EMERGENCY BATTERY LIGHTING UNIT	EXIT SIGN WITH EMERGENCY BATTERY LIGHTING UNIT - LED TYPE, SEALED LEAD CALCIUM BATTERY, SINGLE OR DOUBLE FACE, UNIVERSAL MOUNTING, DIE CAST ALUMINUM HOUSING WITH WHITE BODY, WHITE FACE AND RED STENCIL LETTERS. CONNECT TO EMERGENCY LIFE SAFETY CIRCUIT AHEAD OF LOCAL SWITCHING. UL 924 LISTED, UL DAMP LOCATION, UL LISTED FOR 2C.	VARIOUS		-	LESS THAN 2W	LED	-	-	-	120-277V	-
EMERGENCY BATTERY LIGHTING UNIT	EMERGENCY BATTERY LIGHTING UNIT - SEALED LEAD CALCIUM BATTERY, HIGH-IMPACT POLYCARBONATE HOUSING, SELF-DIAGNOSTIC CIRCUITRY, PUSHBUTTON TEST SWITCH/POWER INDICATOR LIGHT. CONNECT AHEAD OF LOCAL SWITCHING (UNSWITCHED "HOT" LIGHTING CIRCUIT). WALL MOUNT AT 90" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED.	VARIOUS		2	12W	PAR26	-	-	-	120-277V	-

LIGHTING FIXTURES

- FLUORESCENT LIGHTING FIXTURE CONNECTED TO NORMAL CIRCUIT AS INDICATED - TYPE AS SPECIFIED IN SCHEDULE. "A" INDICATES TYPE, "3" INDICATES CIRCUIT NUMBER ASSIGNMENT, "a" INDICATES LOCAL SWITCHING CONTROL. CONNECT FIXTURES SO THAT ALL LAMPS ARE CONTROLLED BY \$.
- LED OR COMPACT FLUORESCENT LIGHTING FIXTURE, CONNECTED TO NORMAL CIRCUIT - TYPE AS SPECIFIED IN SCHEDULE.
- LED OR COMPACT FLUORESCENT LIGHTING FIXTURE, CONNECT TO EMERGENCY CIRCUIT - TYPE AS SPECIFIED IN SCHEDULE.
- EXIT SIGN - CONNECT TO CIRCUIT AHEAD OF LOCAL SWITCHING. TYPE AS SPECIFIED IN SCHEDULE.
- EMERGENCY BATTERY LIGHTING FIXTURE - CONNECT TO CIRCUIT AHEAD OF LOCAL SWITCHING. TYPE AS SPECIFIED IN SCHEDULE.

LIGHTING CONTROLS

- 20A-1P-120/277V WALL SWITCH MOUNTED AT 48" AFF UNLESS OTHERWISE NOTED.
- 20A-3WAY-120/277V WALL SWITCH MOUNTED AT 48" AFF UNLESS OTHERWISE NOTED.
- OCCUPANCY/VACANCY SENSOR - PROVIDE COMPLETE OCCUPANCY SENSOR SYSTEM INCLUDING SENSOR, POWER SUPPLY AND RELAY UNIT.
- SENSOR DESIGNATIONS
U - ULTRASONIC TYPE SENSOR - MINIMUM 1200SQFT COVERAGE
R - INFRARED TYPE SENSOR - MINIMUM 1200SQFT COVERAGE
D - DUAL TECHNOLOGY TYPE SENSOR - MINIMUM 1200SQFT COVERAGE
- RELAY DESIGNATIONS
- PROVIDE RELAY WITH NORMALLY OPEN (N.O.) CONTACT(S), # DENOTES THE QUANTITY OF N.O. RELAYS. IF BLANK, PROVIDE (1) N.O. RELAYS.
H - PROVIDE FORM C RELAY IN RELAY UNIT FOR HVAC SWITCHING
- OTHER DESIGNATIONS
S - "SPECIAL COVERAGE", TWO SIDED, 90 LINEAR FT. COVERAGE
- EXAMPLES:
ULTRASONIC SENSOR WITH (2) N.O. CONTACTS
DUAL TECHNOLOGY SENSOR WITH (1) N.O. CONTACT AND (1) FORM C RELAY

LIGHTING CONTROLS SYSTEM GENERAL NOTES:

- ALL COMPONENTS FOR OCCUPANCY AND DAYLIGHT HARVESTING SYSTEM SHALL BE FROM A SINGLE MANUFACTURER AND UL LABELED.
- SENSORS (OCCUPANCY/VACANCY, DAYLIGHT HARVESTING, ETC.) MAY BE STAND ALONE, COMBINATION, OR INTEGRATED WITH LIGHTING FIXTURES.
- PROVIDE ALL ADDITIONAL COMPONENTS NECESSARY FOR COMPLETE SYSTEM PER MANUFACTURER'S REQUIREMENTS.
- SUBMIT WIRING DIAGRAMS SHOWING COMPLETE LIGHTING CONTROLS CONNECTIONS TO ENGINEER FOR REVIEW WITH SHOP DRAWINGS.

MOTOR AND MOTOR CONTROLLERS (FLOOR PLAN VIEW)

- COMBINATION FUSED MAGNETIC MOTOR STARTER COMPLETE WITH "HAND-OFF-AUTO" SELECTOR SWITCH AND RED "RUN" PILOT LIGHT IN COVER. NEMA SIZE 0 CONTACTS AND NEMA 1 ENCLOSURE MINIMUM UNLESS OTHERWISE NOTED.
- VARIABLE SPEED MOTOR CONTROLLER - (REFER TO SPECIFICATIONS SECTION 282911).
- 120V-1# OR 277V-1# (AS REQUIRED) MANUAL MOTOR STARTER WITH INTEGRAL OVERLOAD PROTECTION
- 120V-1# OR 277V-1# (AS REQUIRED) MOTOR STARTER COMPLETE WITH INTEGRAL OVERLOAD PROTECTION AND "HAND-OFF-AUTO" SELECTOR SWITCH.
- 120V-1# OR 277V-1# (AS REQUIRED) LOCKABLE MANUAL SWITCH (NO THERMAL OVERLOADS).
- CONTROLLER FURNISHED WITH EQUIPMENT.

GENERAL LEGEND

- CODED NOTE - "1" INDICATES NOTE NUMBER.
- MECHANICAL EQUIPMENT IDENTIFIER
- DETAIL REFERENCE - "1" INDICATES DETAIL NUMBER, "1-E01" INDICATED DRAWINGS NUMBER.
- COLUMN GRID

GENERAL ELECTRICAL INSTALLATION NOTES:

- ALL MOUNTING HEIGHTS ARE TO CENTER OF DEVICE UNLESS OTHERWISE NOTED.
- ALL NEW WALL MOUNTED ELECTRICAL DEVICES ARE TO BE INSTALLED FLUSH IN WALL UNLESS OTHERWISE NOTED. ALL ELECTRICAL CONDUIT SHALL BE CONCEALED BEHIND FINISHED WALLS AND ABOVE FINISHED CEILING UNLESS OTHERWISE NOTED. THE COST TO CUT AND PATCH WALLS SHALL BE THE RESPONSIBILITY OF THE TRADE REQUIRING THE CUTTING.
- CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF CEILINGS REQUIRED FOR ELECTRICAL WORK. CONTRACTOR SHALL REPLACE ANY DAMAGED CEILING TILES.
- PRIOR TO INSTALLATION, VERIFY PRECISE LOCATION OF NEW OR RELOCATED WALL OR CEILING MOUNTED DEVICES WITH ARCHITECTURAL ELEVATIONS AND REFLECTED CEILING PLANS.
- COORDINATE ALL SHUT-DOWNS OF EXISTING ELECTRICAL SYSTEMS WITH OWNER A MINIMUM OF FOURTEEN (14) WORKING DAYS IN ADVANCE. ALL SHUT-DOWNS SHALL OCCUR DURING WEEKENDS OR BETWEEN 8:00PM AND 7:00AM ON WEEKDAYS ("OFF-HOURS"). INCLUDE ALL PREMIUM TIME CHARGES IN BID.
- ALL NOISE GENERATING OPERATIONS, INCLUDING CUTTING OF CEILINGS, WALLS AND FLOORS, CORING, DRILLING, ETC. SHALL BE SCHEDULED DURING WEEKENDS OR BETWEEN 8:00PM AND 7:00AM ON WEEKDAYS ("OFF-HOURS"). INCLUDE ALL PREMIUM TIME CHARGES IN BID.
- CONTRACTOR SHALL CONNECT ALL MECHANICAL EQUIPMENT COMPLETE PER MANUFACTURER'S WIRING DIAGRAMS AND INSTRUCTIONS. COORDINATE WITH MECHANICAL CONTRACTOR AND VERIFY LOCATION, VOLTAGE, AMPS, NO. OF WIRES, AND PROTECTION REQUIREMENTS PRIOR TO ROUGH-IN. CONTACT ENGINEER WITH ANY DISCREPANCIES FROM DESIGN DRAWINGS.
- PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR FINAL CONNECTION TO MECHANICAL EQUIPMENT OR OTHER EQUIPMENT WHICH MAY PROPAGATE VIBRATION.
- ALL FLUORESCENT LAMPS THAT WILL NOT BE REUSED SHALL BE DISPOSED OF IN ACCORDANCE WITH EPA STANDARDS, AND WRITTEN EVIDENCE OF PROPER DISPOSAL SHALL BE FURNISHED TO THE OWNER.
- ALL WORK SHALL BE PERFORMED IN STRICT CONFORMANCE WITH THE PHASING REQUIREMENTS OF THE PROJECT. ALL COSTS ASSOCIATED WITH THESE REQUIREMENTS SHALL BE INCLUDED IN THE BID SUBMITTAL.
- CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LIGHTING TO ADEQUATELY LIGHT ALL CONSTRUCTION AREAS, TEMPORARILY PARTITIONED AREAS, AND EXIT CORRIDORS MAINTAINED DURING CONSTRUCTION.
- DEFINITION: "PROVIDE" - FURNISH, INSTALL AND CONNECT COMPLETE.
- PROJECT AND PHASING SCOPE LINES INDICATE WHERE GENERAL CONSTRUCTION BOUNDARIES OCCUR. ELECTRICAL WORK AND UTILITY TIE-INS MAY OCCUR OUTSIDE OF SCOPE LINES.

ABBREVIATIONS

AC	ABOVE COUNTER AT 9" UNLESS OTHERWISE NOTED	AFC	ABOVE FINISHED CEILING
AF	AMP FRAME	AT	AMP TRIP
AFF	ABOVE FINISHED FLOOR	ATS	AUTOMATIC TRANSFER SWITCH
CM	CEILING MOUNTED	COTR	CONTRACTING OFFICER/TECHICAL REPRESENTATIVE
EC	ELECTRICAL CONTRACTOR	EG	EQUIPMENT GROUND
EOL	END OF LINE	EW	ELECTRIC WATER COOLER
GC	GENERAL CONTRACTOR	GFCI	GROUND FAULT CIRCUIT INTERRUPTER
IG	ISOLATED GROUND	IRM	INFORMATION RESOURCES MANAGEMENT
MC	MECHANICAL CONTRACTOR	MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY	NEC	NATIONAL ELECTRICAL CODE
NF	NOT FUSED	SM	SURFACE MOUNTED
TC	TELECOMMUNICATIONS CONTRACTOR	TCC	TEMPERATURE CONTROLS CONTRACTOR
TV	TELEVISION	VSC	VARIABLE SPEED MOTOR CONTROLLER
WP	WEATHERPROOF ENCLOSURE - NEMA 4 TYPE		
X	EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, CONDUIT, ETC. - TO REMAIN		
XB	INDICATES EXISTING OUTLET, LIGHTING FIXTURE, CONDUIT, ETC - TO BE REMOVED. PROVIDE BLANK COVER FOR OUTLET AND MAINTAIN CIRCUIT CONTINUITY.		
XL	NEW LOCATION OF EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, ETC.		
XN	EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, ETC. - TO BE REPLACED WITH NEW OF SPECIFIED TYPE		
XR	EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, CONDUIT, ETC. - TO BE REMOVED COMPLETE- MAINTAIN CIRCUIT CONTINUITY TO ADJACENT OUTLETS. EXTEND CONDUIT AND WIRING AS REQUIRED		
XRR	EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, ETC. - TO BE REMOVED AND REINSTALLED AT NEW LOCATION - EXTEND CONDUIT AND WIRING AS REQUIRED		
VAMC	VETERANS AFFAIRS MEDICAL CENTER		

POWER DISTRIBUTION EQUIPMENT (FLOOR PLAN VIEW)

- 208/120V-3#-4W PANELBOARD UNLESS OTHERWISE NOTED. MOUNT AT 78" AFF TO TOP OF PANEL.
- 480/277V-3#-4W PANELBOARD UNLESS OTHERWISE NOTED. MOUNT AT 78" AFF TO TOP OF PANEL.
- GENERAL PURPOSE, 3 PHASE DRY-TYPE TRANSFORMER - TYPE AS NOTED ON PLANS.
- FUSED DISCONNECT SWITCH - SIZE AND TYPE AS NOTED. PROVIDE CLASS RK1 FUSES UNLESS OTHERWISE NOTED. NEMA 1 ENCLOSURE UNLESS OTHERWISE NOTED.
- GROUNDING BUSBAR

BRANCH CIRCUIT WIRING

- BRANCH CIRCUIT HOME RUN TO PANEL - ARROWHEADS INDICATE CIRCUITS. WIRE INDICATED ARE GREEN GROUND, SEPARATE NEUTRALS (SHARED NEUTRALS ARE NOT PERMITTED FOR BRANCH CIRCUITS) AND THREE HOT LEGS (A DIFFERENT PHASE FOR EACH CIRCUIT) MAXIMUM THREE CIRCUITS PER CONDUIT. 3/4" MINIMUM CONDUIT WITH WIRE SIZE INDICATED ON DRAWING ("XX" INDICATES AWG SIZE). ALL POWER WIRING SHALL BE STRANDED COPPER CONDUCTORS WITH THHN/THWN INSULATION. PROVIDE SEPARATE EQUIPMENT GROUNDING CONDUCTOR (SAME SIZE AS PHASE AND NEUTRAL, UNLESS OTHERWISE NOTED) FOR EACH CONDUIT. CONDUIT WIRE FILLS SHALL BE IN ACCORDANCE WITH LATEST NATIONAL ELECTRIC CODE.
- CONDUIT UP
- CONDUIT DOWN

FOR CONSTRUCTION

ADDENDUM 01	07-04-13
FINAL CD SUBMISSION	03-24-13
Revisions:	Date

CONSULTANTS:



ARCHITECT/ENGINEERS:



Drawing Title
ELECTRICAL LEGEND

Approved: Project Director

Project Title
VAMC UPGRADE LEARNING EXCHANGE - PHASE 2

Location
10701 E. BLVD., CLEVELAND, OHIO 44107

Date
03/29/13

Checked By
JDM

Drawn By
JDM

Project Number
541-13-106

Building Number
1

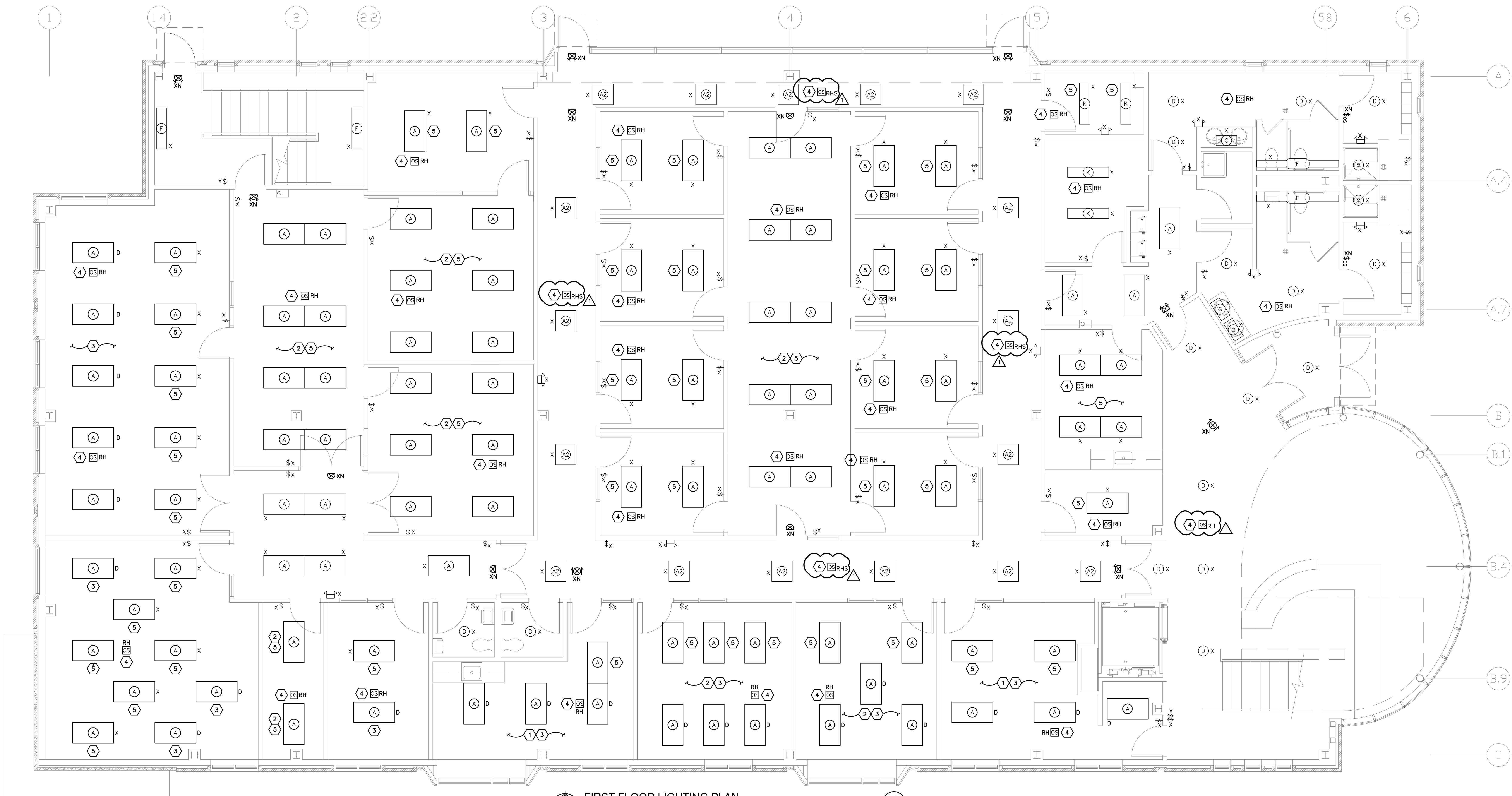
Drawing Number

1-E1

Office of
Construction
and Facilities
Management






three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
one quarter inch = one foot
one eighth inch = one foot
one eighth inch = one foot



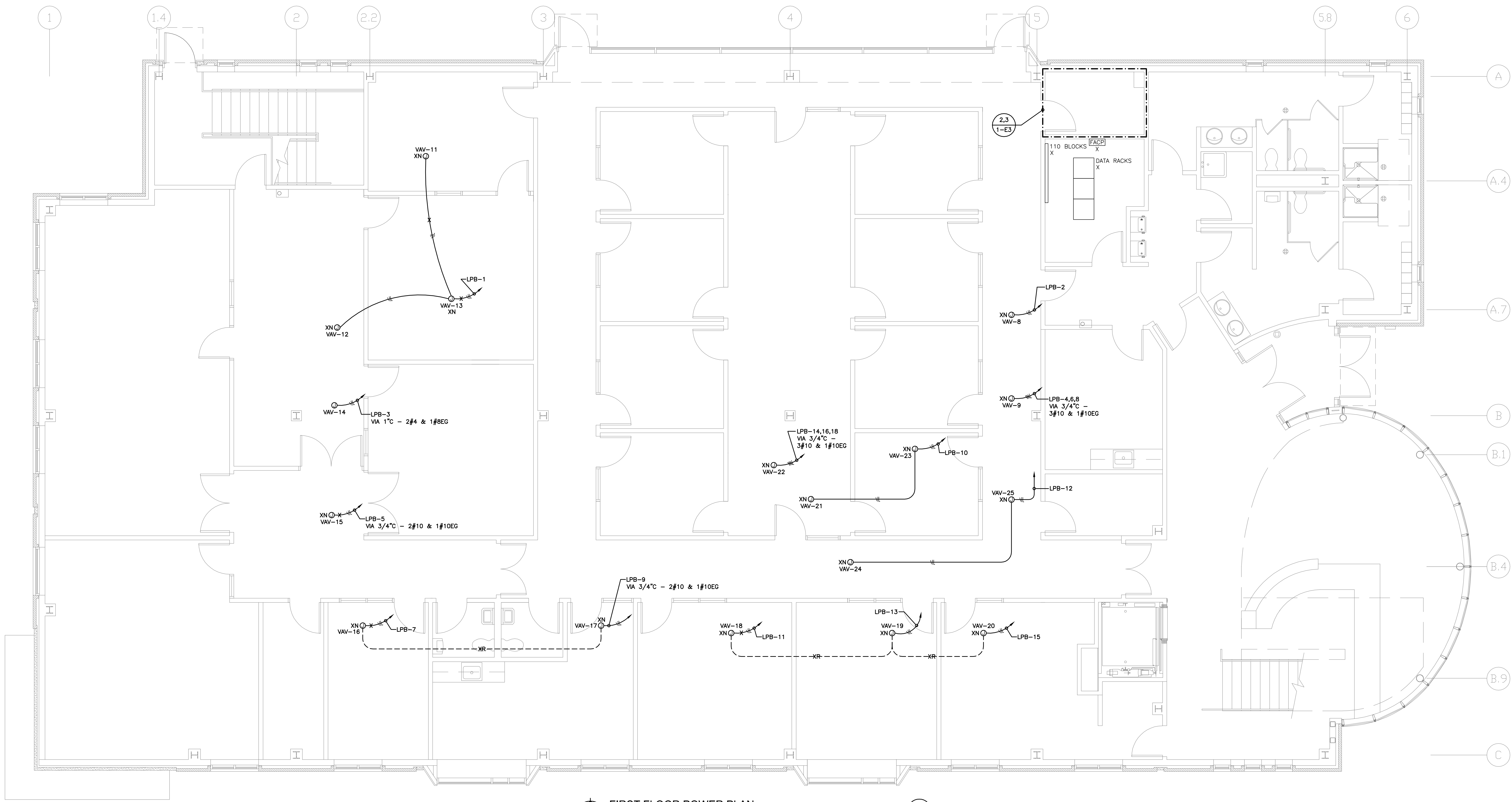
FIRST FLOOR LIGHTING PLAN
SCALE: 1/4" = 10'

- CODED NOTES:**
- 1 EXISTING TYPE 'A' FIXTURE HAS (3)32WT8-SP35 LAMPS INSTALLED. CONTRACTOR SHALL CLEAN FIXTURES AND REPLACE ALL LAMPS IN TYPE 'A' FIXTURES WITH (3)28WT8-SP35 LAMPS IN DESIGNATED ROOM. LAMPS SHALL HAVE A MINIMUM 2562 MEAN LUMENS AND A 85 CRI RATING.
 - 2 EXISTING TYPE 'A' FIXTURE HAS (3)32WT8-SP35 LAMPS INSTALLED. CONTRACTOR SHALL CLEAN AND REPLACE ALL LAMPS IN TYPE 'A' FIXTURES WITH (3)25WT8-SP35 LAMPS IN DESIGNATED ROOM. LAMPS SHALL HAVE A MINIMUM 2256 MEAN LUMENS AND A 85 CRI RATING.
 - 3 EXISTING TYPE 'A' FIXTURES IN ROOM. REPLACE ALL FIXTURE BALLASTS DESIGNATED WITH A 'D' WITH INTEGRAL DAYLIGHT HARVESTING BALLAST (GREEN BALLAST, INC. - DAYLIGHT HARVESTING 3 LAMP TB BALLAST).
 - 4 PROVIDE NEW OCCUPANCY SENSOR IN ROOM AS DESIGNATED. REWIRE ALL ROOM LIGHTING FIXTURES (EXCEPT "NIGHT LIGHTS") TO BE CONTROLLED BY OCCUPANCY SENSOR AND EXISTING LOCAL SWITCH.
 - 5 PROVIDE NEW PROGRAM RAPID START BALLAST DESIGNED TO BE COMPATIBLE WITH ENERGY SAVINGS T8 LAMPS. BALLAST SHALL HAVE NEMA PREMIUM RATING (NO SUBSTITUTES).

FOR CONSTRUCTION

		CONSULTANTS:			ARCHITECT/ENGINEERS:  FREDRICK, FREDRICK & HELLER ENGINEERS, INC. 872 EAST ROYALTON ROAD BROOKLYN WTS., OHIO 44147 TEL: (440) 886-9999 FAX: (440) 886-9999	Drawing Title FIRST FLOOR LIGHTING PLAN		Project Title VAMC UPGRADE LEARNING EXCHANGE - PHASE 2		Project Number 541-13-106		Office of Construction and Facilities Management 			
						Approved: Project Director		Location 10701 E. BLVD., CLEVELAND, OHIO 44107		Building Number 1			Drawing Number 1-E2		
APPENDUM 01 FINAL CD SUBMISSION Revisions:		07-04-13 03-24-13 Date						Date 03/29/13		Checked By JDM				Drawn By JDM	

one eighth inch = one foot
one quarter inch = one foot
one half inch = one foot
three quarters inch = one foot
one inch = one foot
one and one half inches = one foot
two inches = one foot
three inches = one foot



FIRST FLOOR POWER PLAN
SCALE: 1/4" = 1'0"
1

MECHANICAL EQUIPMENT GENERAL NOTES:

M1. MECHANICAL EQUIPMENT SHALL BE CONNECTED COMPLETE PER MANUFACTURER'S WIRING DIAGRAMS AND DETAILS UNLESS OTHERWISE NOTED ON DRAWINGS.

M2. CONTRACTOR SHALL CONCEAL CONDUIT AND WIRING IN WALLS AND ABOVE CEILING AND PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR FINAL CONNECTION TO MECHANICAL EQUIPMENT. PROVIDE RIGID ALUMINUM CONDUITS AT EXTERIOR LOCATIONS. SEAL ALL ROOF PENETRATION WATER-TIGHT AND ALL WALL PENETRATIONS TO MAINTAIN FIRE RATING.

M3. CONTRACTOR SHALL PROVIDE ALL LOCAL DISCONNECTING MEANS FOR ALL MECHANICAL EQUIPMENT, UNLESS EQUIPMENT IS NOTED TO BE FURNISHED WITH INTEGRAL DISCONNECTS. LABEL ALL DISCONNECT SWITCHES TO INDICATE POWER SOURCE AND EQUIPMENT SERVED.

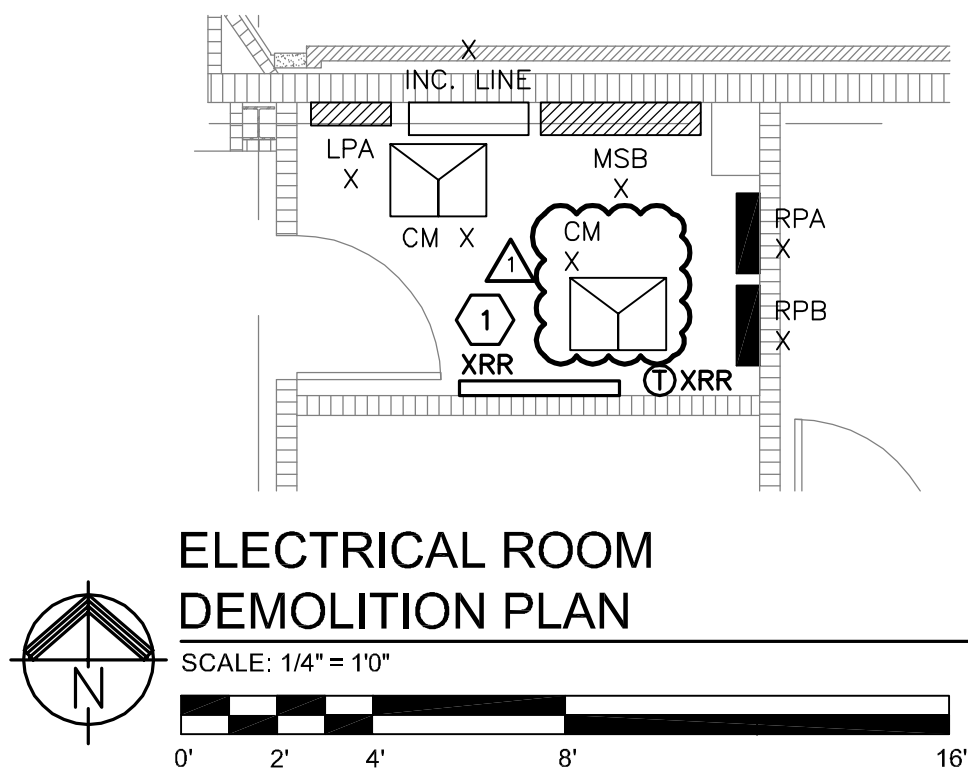
M4. COORDINATE EXACT INSTALLATION LOCATION OF ALL MECHANICAL EQUIPMENT WITH MECHANICAL PLANS PRIOR TO ROUGH-IN.

M5. CONDUITS SHALL BE RIGID ALUMINUM AT EXTERIOR LOCATIONS.

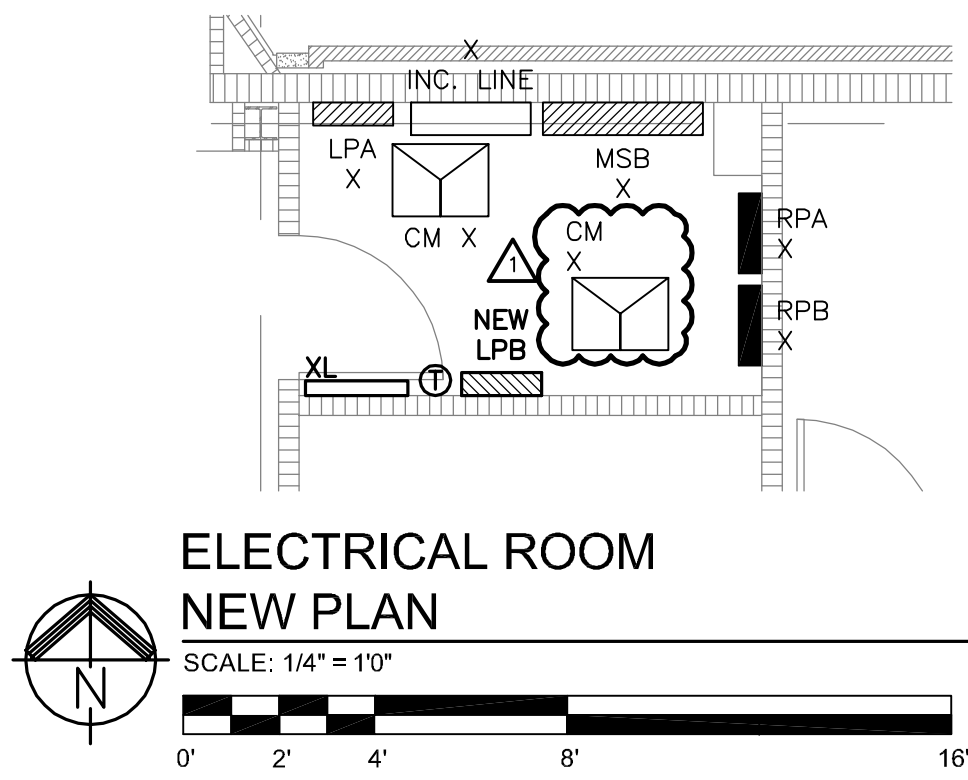
M6. SHARED NEUTRALS ARE NOT PERMITTED FOR BRANCH CIRCUITS.

ELECTRICAL PLAN CODED NOTES:

1 CONTRACTOR SHALL RELOCATE EXISTING OUTSIDE LIGHTING CONTACTORS, EXHAUST FAN CONTACTORS, TEMPERATURE PANEL, THERMOSTAT AND CONTROL WIRING COMPLETE TO ALLOW FOR NEW PANELBOARD 'LPB' TO BE INSTALLED. MAINTAIN ALL CLEARANCES PER NEC 110.26.



2

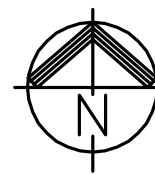
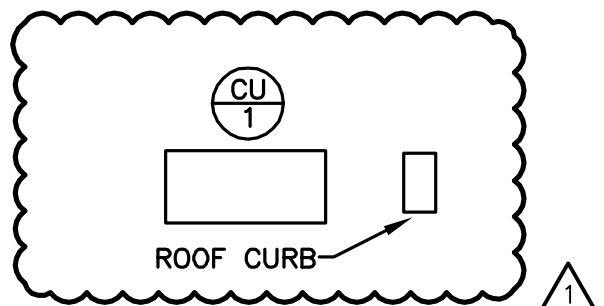
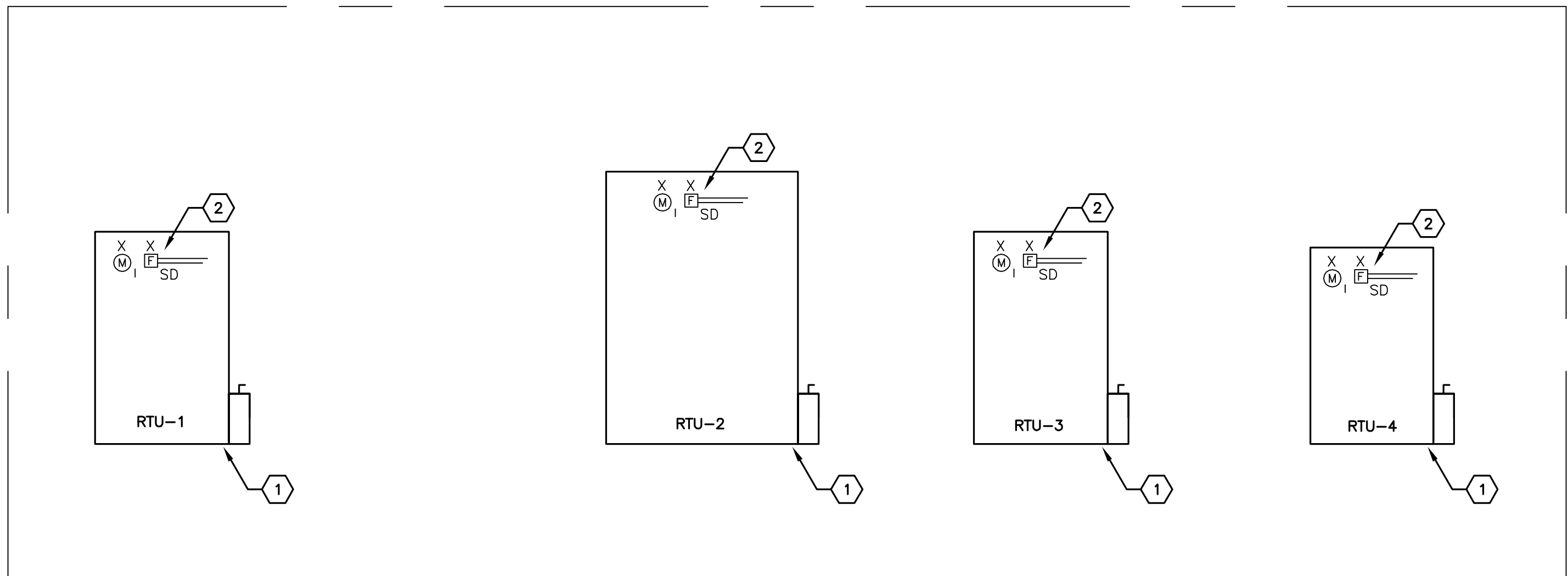


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FOR CONSTRUCTION

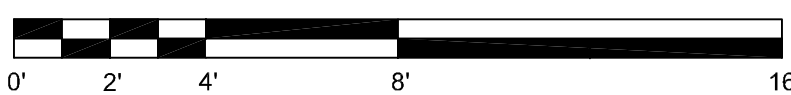
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							Approved: Project Director		Location 10701 E. BLVD., CLEVELAND, OHIO 44107		Building Number 1					
APPENDUM 01		07-04-13								Date 03/29/13		Checked By MFL		Drawn By JDM		Department of Veterans Affairs
FINAL CD SUBMISSION		03-24-13														
Revisions:		Date														

three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot



ELECTRICAL ROOF PLAN

SCALE: 1/4" = 10'



1

MECHANICAL EQUIPMENT GENERAL NOTES:

- M1. MECHANICAL EQUIPMENT SHALL BE CONNECTED COMPLETE PER MANUFACTURER'S WIRING DIAGRAMS AND DETAILS UNLESS OTHERWISE NOTED ON DRAWINGS.
- M2. CONTRACTOR SHALL CONCEAL CONDUIT AND WIRING IN WALLS AND ABOVE CEILING AND PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR FINAL CONNECTION TO MECHANICAL EQUIPMENT. PROVIDE RIGID ALUMINUM CONDUITS AT EXTERIOR LOCATIONS. SEAL ALL ROOF PENETRATION WATER-TIGHT AND ALL WALL PENETRATIONS TO MAINTAIN FIRE RATING.
- M3. CONTRACTOR SHALL PROVIDE ALL LOCAL DISCONNECTING MEANS FOR ALL MECHANICAL EQUIPMENT, UNLESS EQUIPMENT IS NOTED TO BE FURNISHED WITH INTEGRAL DISCONNECTS. LABEL ALL DISCONNECT SWITCHES TO INDICATE POWER SOURCE AND EQUIPMENT SERVED.
- M4. COORDINATE EXACT INSTALLATION LOCATION OF ALL MECHANICAL EQUIPMENT WITH MECHANICAL PLANS PRIOR TO ROUGH-IN.
- M5. CONDUITS SHALL BE RIGID ALUMINUM AT EXTERIOR LOCATIONS.
- M6. SHARED NEUTRALS ARE NOT PERMITTED FOR BRANCH CIRCUITS.
- M7. EXTEND LIGHTING PROTECTION SYSTEM AND PROVIDE AIR TERMINALS ON ALL (4) CORNERS OF NEW ROOF TOP UNITS. VERIFY ADDITIONAL REQUIREMENTS WITH SPECIFICATIONS.

CODED NOTES:

- 1 EXISTING RTU-1 THRU RTU-4 TO BE REPLACED WITH NEW UNITS. ELECTRICAL CONTRACTOR SHALL DISCONNECT EXISTING RTU'S AND RECONNECT AT NEW LOCATION. EXTEND AND RELOCATE DISCONNECT, CONDUITS, WIRING, ETC AS NECESSARY. REFER TO MECHANICAL DRAWINGS FOR EXACT LOCATION OF ROOF TOP UNITS.
- 2 EXISTING RTU DUCT DETECTOR, REMOTE TEST SWITCH AND MONITOR MODULE SHALL BE MAINTAINED AND CONNECTED TO NEW UNIT. VERIFY EXACT LOCATION OF NEW UNITS AND DUCT WORK WITH MECHANICAL DRAWINGS.
- 3 PROVIDE POWER CONNECTION FROM PANEL LPC 30A-2P BKR CCT#14,15 VIA 3/4" C-ROUTED THROUGH MECHANICAL CURB TO OUTDOOR CONDENSING UNIT WITH LOCAL NEMA-3R DISCONNECT. INDOOR UNIT AC-1 RECEIVES POWER VIA INTERCONNECTED WIRING. PROVIDE CONDUIT AND WIRING PER MANUFACTURERS WIRING DIAGRAMS AND CONNECT COMPLETE.

FOR CONSTRUCTION

ADDENDUM 01	07-04-13
FINAL CD SUBMISSION	03-24-13
Revisions:	Date

CONSULTANTS:



ARCHITECT/ENGINEERS:



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Drawing Title
ELECTRICAL ROOF PLAN

Approved: Project Director

Project Title
**VAMC UPGRADE LEARNING
EXCHANGE - PHASE 2**

Location
10701 E. BLVD., CLEVELAND, OHIO 44107

Date
03/29/13

Checked By
JDM

Drawn By
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Project Number
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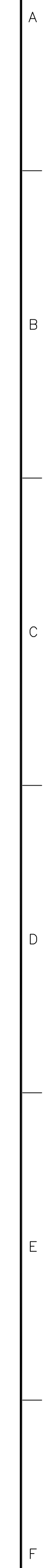
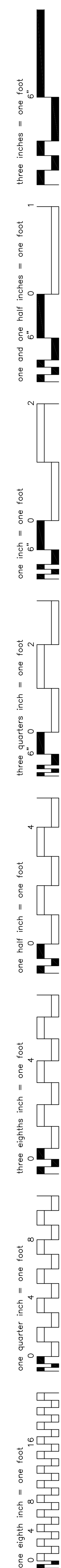
Building Number
1

Drawing Number

1-E5

Office of
Construction
and Facilities
Management





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 Department of
Veterans Affairs