

ENERGY STATEMENT	
Mechanical Systems, Service Systems and Equipment Method of Compliance Prescriptive (X) Energy Cost Budget ()	
Project Name: Biltmore Hills Community Center Renovations , Raleigh, North Carolina	
Thermal Zone: Wake County - Thermal Zone 4	
Exterior Design Conditions, 2009 ASHRAE Fundamentals Handbook Climatic Data: Winter Dry Bulb - 19.3 Deg. F. Summer Dry Bulb - 81.7 Deg. F.	
Interior Design Conditions: Winter Dry Bulb - 65 Deg. F. Summer Dry Bulb - 73 Deg. F. Relative Humidity - 50%	
Cooling Load: 255,000 Btuh	
Heating Load: 229,500 Btuh	
Mechanical Space Conditioning System: Packaged DX Units with Gas Heat	
Boiler - Not applicable to the project. Chiller - Not applicable to this project.	
Equipment Efficiencies: SEE MECHANICAL SCHEDULES	
Equipment Schedules With Motors: Multiphased motors are used on this project and are included in the efficiency rating of the unit. See drawings for unit efficiencies.	
Designer Statement: To the best of my knowledge and belief, the design of this building complies with the mechanical systems, service systems and equipment requirements of the North Carolina State Energy Building Code.	

REQUIRED OUTSIDE AIR CALCULATION											
BUILDING DATA		TABLE 403.3			BREATHING ZONE O.A.			ZONE OUTDOOR AIR		SYSTEM OUTDOOR AIR	
AREA TYPE	AREA	Ra (CFMSQFT)	Rp (CFM/PERSON)	Pz ZONE POPULATION	Vbz-p	Vbz-a	TOTAL Vbz (CFM)	Ez	TOTAL Vent (CFM)	O.A. REQUIRED FOR UNIT (CFM)	O.A. PROVIDED BY UNIT (CFM)
RTU-1 - GYMNASIUM	2800	0.3	7.5	0	0	0	0	0.8	750		
RTU-1 - SPECTATOR AREAS	1880	0.03	7.5	20	150	113.4	263.4	0.8	329.25	1079.25	1080
RTU-2 - GYMNASIUM	2300	0.3	0	0	0	600	600	0.8	750		
RTU-2 - SPECTATOR AREAS	1880	0.03	7.5	20	150	113.4	263.4	0.8	329.25	1079.25	1080

*CALCULATED PER 2012 N.C. MECHANICAL CODE

PACKAGED AIR CONDITIONING UNIT W/ GAS HEAT SCHEDULE (BASIS OF DESIGN)																				
MARK	MANUFACTURER	MODEL	SUPPLY FAN CFM	O.A. CFM MIN/MAX	O.A. FEATURE	SUPPLY FAN E.S.P. (IN. W.G.)	SUPPLY FAN HP	GAS INPUT (MBH)	HEAT OUTPUT (MBH)	MODULATING TURN DOWN	AFUE (%)	TOTAL COOLING CAPACITY (MBH)	SENSIBLE COOLING CAPACITY (MBH)	SEER / EER	MCA	MOCP	VOLTAGE	CONDENSATE DRAIN SIZE (IN.)	OPERATING WEIGHT (LBS)	NOTES
RTU-1	TRANE	YHH150G3	4375	500 / 1080	ECONOMIZER	1.00	3.0	350	280	2.5:1	80	162.4	119.7	12.1	64	90	208/3	25	114	1.14
RTU-2	TRANE	YHH150G3	4375	500 / 1080	ECONOMIZER	1.00	3.0	350	280	2.5:1	80	162.4	119.7	12.1	64	90	208/3	25	114	1.14

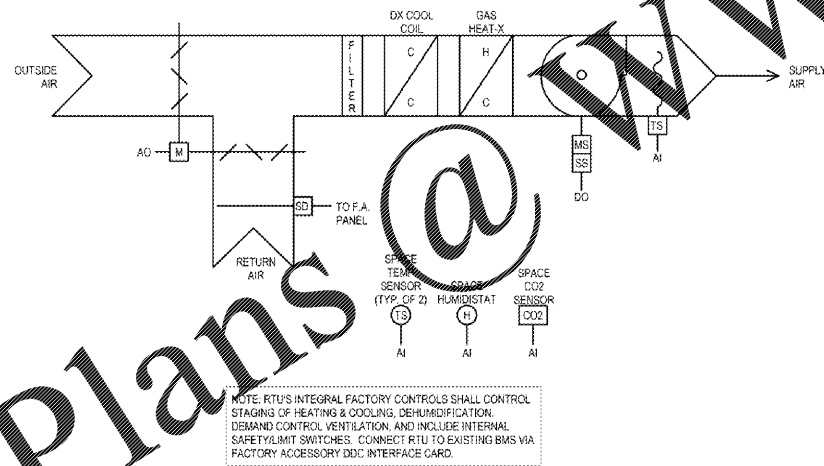
NOTES:
1. PROVIDE SINGLE POINT ELECTRICAL CONNECTION.
2. PROVIDE SMOKE DETECTOR IN RETURN DUCT TO SHUT DOWN UNIT ON ALARM.
3. PROVIDE WITH ECONOMIZER W/ FACTORY COMPARATIVE ENTHALPY KIT.
4. PROVIDE FACTORY ROOF CURB.
5. PROVIDE WITH MODULATING GAS HEAT.
6. PROVIDE WITH MAGNET INTERFACE FOR CONNECTION TO EXISTING BAS CONTROLS.
7. PROVIDE WITH HOT GAS REHEAT (DEHUMIDIFICATION).
8. PROVIDE WITH DEMAND CONTROL VENTILATION. PROVIDE CO2 SENSOR & WIRING KIT.
9. PROVIDE WITH MULTI-SPEED INDOOR FAN SYSTEM.
10. PROVIDE WITH BAROMETRIC RELIEF.
11. PROVIDE UNIT WITH DIAL COMPRESSORS FOR 3 STAGES OF COMPRESSOR OPERATION.
12. PROVIDE UNIT WITH FACTORY DIFFERENTIAL PRESSURE SWITCHES FOR FAN FAILURE & DIRTY FILTER INDICATION.
13. REFER TO SEQUENCE OF OPERATION.
14. REFER TO BOOK SPECIFICATIONS FOR ACCEPTABLE MANUFACTURER ALTERNATIVES.

AIR DISTRIBUTION SCHEDULE (BASIS OF DESIGN)						
MARK	MANUFACTURER	MODEL	AIRFLOW (CFM)	NECK SIZE (IN.)	DESCRIPTION	NOTES
RT	ITTUS	55F	ON DWG	34" X 26"	EGGCRATE RETURN GRILLE	1-3

NOTES:
1. THIS CEILING IS NOT RATED.
2. PROVIDE TRANSITIONS AT NECK AS REQUIRED.
3. PROVIDE WITH WHITE FINISH.

RAFT BARRIER HEATER SCHEDULE (BASIS OF DESIGN)						
MARK	MANUFACTURER	MODEL	HEATER KW	VOLTAGE / PHASE	DESCRIPTION	NOTES
RBH-1	MARKEL	ROBT-PD-3-300	0.9	277/1	3" LONG PEDESTAL ELECTRIC HEATER	1-4

NOTES:
1. HEATER SHALL BE CONTROLLED BY ONBOARD THERMOSTAT.
2. PROVIDE WITH INTEGRAL FACTORY DISCONNECT SWITCH & 6" CONTROL EXTENSION.
3. PROVIDE WITH FACTORY ACCESSORY FLOOR PEDESTALS TO SUPPORT HEATER AS RECOMMENDED BY MANUFACTURER.
4. CONFIRM HEATER COLOR WITH ARCHITECT PRIOR TO ORDERING.



1 RTU CONTROL SCHEMATIC
SCALE: NONE

SEQUENCE OF OPERATION

BUILDING AUTOMATED SEQUENCE OF OPERATION
SP = SETPOINT
LAT = LEAVING AIR TEMPERATURE
RH = RELATIVE HUMIDITY
SA = SUPPLY AIR
RA = RETURN AIR
EA = EXHAUST AIR
OA = OUTSIDE AIR
S.A.T. = SUPPLY AIR TEMPERATURE
ADJ = ADJUSTABLE
DCV = DEMAND CONTROL VENTILATION

OCCUPANCY SCHEDULES
OCCUPIED AND UNOCCUPIED: CONTACT BUILDING OWNER FOR SCHEDULING.

PACKAGED UNITS (RTU-1 & RTU-2)
SPACE HUMIDITY (RH) SETPOINT = 55% (ADJ.)
UNITS SHALL OPERATE AS LEAD/LAG/STANDBY. ROTATE LEAD UNIT EVERY 180 HOURS (ADJ.)
CO2 LEVEL SETPOINT = 400 PPM (ADJ.)
SPACE TEMPERATURE SHALL BE AVERAGED AMONG TEMPERATURE SENSORS LOCATED IN GYMNASIUM

OCCUPIED:
SPACE TEMP SETPOINTS = COOL SP = 74 DEG. F (ADJ.), HEAT SP = 70 DEG. F (ADJ.)

UNOCCUPIED:
SPACE TEMP SETPOINTS = COOL SP = 80 DEG. F (ADJ.), HEAT SP = 85 DEG. F (ADJ.)

COOLING:
WHEN SPACE TEMPERATURE RISES ABOVE SPACE TEMPERATURE SETPOINT, BAS SHALL INDEX ON LEAD UNIT. UNITS ONBOARD CONTROLS SHALL MODULATE COOLING STAGES & FAN SPEED TO MAINTAIN SPACE TEMPERATURE. AFTER 15 MINUTES (ADJ.) IF SPACE TEMPERATURE SETPOINT IS STILL NOT MET, BAS SHALL INDEX ON LAG UNIT. LAG UNIT SHALL OPERATE UNTIL SPACE TEMPERATURE MATCHES SETPOINT. LEAD UNIT SHALL CONTINUE TO OPERATE UNTIL SPACE TEMPERATURE FALLS 1 DEG (ADJ) BELOW SETPOINT.

HEATING:
WHEN SPACE TEMPERATURE FALLS BELOW SPACE TEMPERATURE SETPOINT, BAS SHALL INDEX ON LEAD UNIT. UNITS ONBOARD CONTROLS SHALL MODULATE GAS HEAT TO MAINTAIN SPACE TEMPERATURE. AFTER 15 MINUTES (ADJ.) IF SPACE SETPOINT IS NOT MET, BAS SHALL INDEX ON LAG UNIT. LAG UNIT SHALL OPERATE UNTIL SPACE TEMPERATURE MATCHES SETPOINT. LEAD UNIT SHALL CONTINUE TO OPERATE UNTIL SPACE TEMPERATURE RISES 1 DEG (ADJ) ABOVE SETPOINT.

DEHUMIDIFICATION:
IF SPACE %RH RISES ABOVE 5% (ADJ) ABOVE SETPOINT AND THERE IS NO CALL FOR COOLING, UNIT SHALL ENTER DEHUMIDIFICATION MODE AND HOT GAS REHEAT SHALL BE USED TO REHEAT THE 83°F (ADJ.) AIR LEAVING THE COOLING COIL UP TO 75°F. ONCE SPACE HUMIDITY FALLS 3% (ADJ) BELOW SETPOINT, UNIT SHALL RETURN TO REGULARLY SCHEDULED MODE OF OPERATION.

DEMAND CONTROL VENTILATION:
DURING OCCUPIED HOURS THE OPERATING UNIT(S) OUTSIDE AIR DAMPER(S) SHALL BE AT THE MINIMUM CFM SETTING. (REFER TO RTU SCHEDULE FOR MINIMUM O.A. CFM SETTING). WHEN CO2 LEVEL RISES ABOVE SETPOINT, BAS SHALL ENABLE DCV AT OPERATING RTU(S). UNIT(S) SHALL UTILIZE ONBOARD CONTROLS FOR DCV OPERATION. ONCE CO2 LEVEL FALLS 5% (ADJ.) BELOW SETPOINT, UNIT(S) DAMPERS SHALL RETURN TO MINIMUM O.A. POSITION.

ALARMS:
FAN FAILURE, HIGH SPACE HUMIDITY (RH ABOVE 85%), HIGH SPACE TEMPERATURE (85 DEG. F), LOW SPACE TEMPERATURE (50 DEG. F), CO2 LEVEL ABOVE SETPOINT FOR MORE THAN 20 MINUTES (ADJ), DIRTY FILTER.

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PROJECT: Project Number

BILTMORE HILLS COMMUNITY CENTER RENOVATIONS

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DATE:



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RALEIGH, NC

DRAWING TITLE
MECHANICAL DETAILS AND SCHEDULES

NO.	REVISIONS	DATE

DRAWN BY: MCC
CHECKED BY: MCC
DATE ISSUED: 8/13/18
M-601
4 OF 4