Florida Building Code, Sixth Edition (2017) - Energy Conservation

EnergyGauge Summit® Fla/Com-2017, Effective Date: Dec 31, 2017
ASHRAE 90.1-2013 - Energy Cost Budget Option

Check List

Applications for compliance with the Florida Building Code, Energy Conservation shall include:

- [x] This Checklist
- [x] The full compliance report generated by the software that contains the project summary, compliance summary, certifications and detailed component compliance reports.
- [x] The compliance report must include the full input report generated by the software as contigous part of the compliance report.
- [x] Boxes appropriately checked in the Mandatory Section of the complaince report.

PROJECT SUMMARY

Short Desc: 20031
Owner: Belmont Academy
Address1: 5037 SR 240
Address2:

Description: 2nd Floor Build-Out

City: Lake City
State: FL
Zip: 32024

Type: School/University
Class: Addition to existing Building
Jurisdiction: LAKE CITY, COLUMBIA COUNTY, FL (221200)
Conditioned Area: 17248 SF
Conditioned & UnConditioned Area: 17248 SF
No of Stories: 2
Area entered from Plans 17332 SF
Permit No: 0
Max Tonnage 99.3
If different, write in: _____

Registered Professionals:		
	Name	**Registration/License No.**
Owner/Agent:		
Prepared By:		
Licensee:	John W. Wells, III, P.E.	PE49347
Engineering Business:	Consulting Engineering Associates, Inc.	Registry 3962
Architect:		
Licensee:	Nicholas Paul Geisler Architect	AR0007005
Engineering Business:	Nicholas Paul Geisler Architect	AR0007005
Electrical Designer:		
Licensee:	David D. Patton, Jr., P.E.	PE52909
Engineering Business:	Consulting Engineering Group	PE52909
Lighting Designer:		
Licensee:	David D. Patton, Jr., P.E.	PE52909
Engineering Business:	Consulting Engineering Group	PE52909
Mechanical Designer:		
Licensee:	John W. Wells, III, P.E.	PE49347
Engineering Business:	Consulting Engineering Associates, Inc.	Registry 3962

Compliance Summary

Component	Design	Criteria	Result
Gross Energy Cost (in $)	10,227.0	12,569.0	**PASSED**
LIGHTING CONTROLS			**PASSES**
EXTERNAL LIGHTING			**No Entry**
HVAC SYSTEM			**PASSES**
PLANT			**PASSES**
WATER HEATING SYSTEMS			**PASSES**
PIPING SYSTEMS			**PASSES**
Met all required compliance from Check List?			**Yes/No/NA**

IMPORTANT MESSAGE
Info 5009 -- -- -- An input report of this design building must be submitted along with this Compliance Report

CERTIFICATIONS

John W. Wells, III, State of Florida, Professional Engineer, License No. 49347. This item has been electronically signed and sealed by John W. Wells, III, PE on the date included in the certificate using a Digital Signature. Printed copies of this document are not considered signed and the signature must be verified on any electronic copies.

John William Wells, III 2020.10.02 12:45:34 -04'00' 2020.012.20048

I hereby certify that the plans and specifications covered by this calculation are in compliance with the Florida Energy Code

Prepared By: John W. Wells, III, PE Building Official: _____

Date: _____ Date: _____

I certify that this building is in compliance with the FLorida Energy Efficiency Code

Owner Agent: _____ Date: _____

If Required by Florida law, I hereby certify (*) that the system design is in compliance with the Florida Energy Efficiency Code

Architect:	Nicholas Paul Geisler Architec	Reg No:	AR0007005
Electrical Designer:	Consulting Engineering Group	Reg No:	PE52909
Lighting Designer:	Consulting Engineering Group	Reg No:	PE52909
Mechanical Designer:	Consulting Engineering Assoc	Reg No:	PE49347
Plumbing Designer:	Consulting Engineering Assoc	Reg No:	PE49347

(*) Signature is required where Florida Law requires design to be performed by registered design professionals. Typed names and registration numbers may be used where all relevant information is contained on signed/sealed plans.

Project: 20031
Title: 2nd Floor Build-Out
Type: School/University
(WEA File: FL_JACKSONVILLE_INTL_ARPT.tm3)

Building End Uses

	1) Proposed	2) Baseline
Total	*645.20*	*794.33*
	$10,227	*$12,569*
ELECTRICITY(MBtu/kWh/$)	645.20	794.33
	189048	232751
	$10,227	*$12,569*
AREA LIGHTS	82.80	181.20
	24251	53079
	$1,312	*$2,866*
DOMHOT WATER	77.20	77.20
	22629	22629
	$1,224	*$1,222*
MISC EQUIPMT	115.40	115.40
	33821	33821
	$1,830	*$1,826*
PUMPS & MISC	15.10	0.38
	4411	115
	$239	*$6*
SPACE COOL	306.90	318.33
	89935	93275
	$4,865	*$5,037*
SPACE HEAT	9.90	12.78
	2903	3741
	$157	*$202*
VENT FANS	37.90	89.05
	11098	26092
	$600	*$1,409*

Credits Applied: None
Passing Criteria = 12569
Design (including any credits) = 10227
Passing requires Proposed Building cost to be at most 100% of Baseline cost. This Proposed Building is at 81.4%

PASSES

External Lighting Compliance

Description	Category	Tradable?	Allowance (W/Unit)	Area or Length or No. of Units (Sqft or ft)	ELPA (W)	CLP (W)

None

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Lighting Controls Compliance

Acronym	Ashrae ID	Description	Area (sq.ft)	Design CP	Min CP	Compli-ance
classroom #1	14	Classroom/Lecture Hall	582	1	1	**PASSES**
storage	3	Storage & Warehouse - Bulky Active Storage	40	1	1	**PASSES**
classroom #2	14	Classroom/Lecture Hall	678	1	1	**PASSES**
classroom #3	14	Classroom/Lecture Hall	697	1	1	**PASSES**
classroom #4	14	Classroom/Lecture Hall	666	1	1	**PASSES**
corridors	5	Corridor	4,283	3	2	**PASSES**
classroom #5	14	Classroom/Lecture Hall	782	1	1	**PASSES**
classroom #6	14	Classroom/Lecture Hall	783	1	1	**PASSES**
classroom #7	14	Classroom/Lecture Hall	795	2	1	**PASSES**
classroom	14	Classroom/Lecture Hall	618	1	1	**PASSES**
janitor	3	Storage & Warehouse - Bulky Active Storage	155	2	2	**PASSES**
classroom #9	14	Classroom/Lecture Hall	782	1	1	**PASSES**
classroom #10	14	Classroom/Lecture Hall	783	1	1	**PASSES**
classroom #11	14	Classroom/Lecture Hall	793	2	1	**PASSES**
Men's rr	6	Toilet and Washroom	468	2	1	**PASSES**
women's rr	6	Toilet and Washroom	469	2	1	**PASSES**
electrical room	1	Electrical Mechanical Equipment Room - General	169	1	1	**PASSES**
classroom	14	Classroom/Lecture Hall	656	1	1	**PASSES**
classroom #13	14	Classroom/Lecture Hall	611	1	1	**PASSES**
Flex Space	15	Conference/meeting (Multiple Functions)	322	1	1	**PASSES**
Flex Space	15	Conference/meeting (Multiple Functions)	226	1	1	**PASSES**
Restroom	6	Toilet and Washroom	43	1	1	**PASSES**
Restroom	6	Toilet and Washroom	43	1	1	**PASSES**
Storage	2	Storage & Warehouse - Inactive Storage	50	1	1	**PASSES**
west stair	4	Stair - Active Traffic	89	1	1	**PASSES**
Elev Mach Rm	1	Electrical Mechanical Equipment Room - General	50	1	1	**PASSES**
east stair 1st fl	4	Stair - Active Traffic	310	1	1	**PASSES**
E stair corr 1st FL	5	Corridor	824	1	1	**PASSES**
east stair 2nd FL	4	Stair - Active Traffic	326	1	1	**PASSES**

PASSES

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System Report Compliance

AHU-2 **System 1** **Variable Air Volume Built-up System** **No. of Units 1**

Component	Category	Capacity	Design Eff	Eff Criteria	Design IPLV	IPLV Criteria	Compliance
Cooling System	Compliance Not Applicable	784700					PASSES
Heating System	Electric Furnace	432362	1.00	1.00			PASSES
Air Handling System -Supply	Air Handler (Supply) - Variable Volume	12200	0.75	0.97			PASSES

PTAC **System 2** **Room Units (Airconditioners & Heat pumps)** **No. of Units 1**

Component	Category	Capacity	Design Eff	Eff Criteria	Design IPLV	IPLV Criteria	Compliance
Cooling System	Room Airconditioners Casement Only	18000	9.50	8.70			PASSES
Heating System	PTHP All Capacities (Heating Mode)	16400	2.92	2.92			PASSES
Air Handling System -Supply	Air Handler (Supply) - Constant Volume	400	0.80	0.82			PASSES

ACU-1 **System 3** **Constant Volume Air Cooled Split System < 65000 Btu/hr** **No. of Units 1**

Component	Category	Capacity	Design Eff	Eff Criteria	Design IPLV	IPLV Criteria	Compliance
Cooling System	Air Conditioners Air Cooled Split System < 65000 Btu/h Cooling Capacity	18000	14.20	13.00	8.00		PASSES
Heating System	Heat Pumps Air Cooled (Heating Mode) Split System < 65000 Btu/h Cooling Capacity	19000	9.80	8.20			PASSES
Air Handling System -Supply	Air Handler (Supply) - Constant Volume	710	0.10	0.82			PASSES

ACU-2 **System 4** **Constant Volume Air Cooled Split System < 65000 Btu/hr** **No. of Units 1**

Component	Category	Capacity	Design Eff	Eff Criteria	Design IPLV	IPLV Criteria	Compliance

Cooling System	Air Conditioners Air Cooled Split System < 65000 Btu/h Cooling Capacity	9000	24.60	13.00	8.00	**PASSES**
Heating System	Heat Pumps Air Cooled (Heating Mode) Split System < 65000 Btu/h Cooling Capacity	10900	12.80	8.20		**PASSES**
Air Handling System -Supply	Air Handler (Supply) - Constant Volume	307	0.10	0.82		**PASSES**

PASSES

Plant Compliance

Description	Installed No	Size	Design Eff	Min Eff	Design IPLV	Min IPLV	Category	Compliance
Hermetic screw or scroll chiller	1	99	2.990	2.960	4.510	4.015	Water Chilling Packages (Elec), Air Cooled (Pos Displ) < 150 Tons	**PASSES**

PASSES

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Water Heater Compliance

Description	Type	Category	Design Eff	Min Eff	Design Loss	Max Loss	Compliance
Water Heater 1	Electric water heater	<= 12 [kW]	0.96	0.95			**PASSES**

PASSES

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Piping System Compliance

Category	Pipe Dia [inches]	Is Runout?	Operating Temp [F]	Ins Cond [Btu-in/hr .SF.F]	Ins Thick [in]	Req Ins Thick [in]	Compliance
Domestic and Service Hot Water Systems	1.00	False	120.00	0.28	1.00	0.50	**PASSES**

PASSES

Mandatory Requirements (as applicable)

Mandatory requirements compiled by US Department of Energy and Pacific Northwest National Laboratory. Adopted with permission

Topic	Section	Component	Description	Yes	N/A	Exempt
1. To be checked by Designer or Engineer						
Insulation	5.8.1.2	Envelope	Below-grade wall insulation installed per manufacturerâ€™s instructions.	☐	☑	☐
Insulation	5.8.1.2	Envelope	Slab edge insulation installed per manufacturerâ€™s instructions.	☐	☑	☐
Insulation	5.5.3.5	Envelope	Slab edge insulation depth/length.	☐	☑	☐
Insulation	6.4.4.1.5	Envelope	Bottom surface of floor structures incorporating radiant heating insulated to >=R-3.5.	☐	☑	☐
Fenestration	5.5.3.6	Envelope	U-factor of opaque doors associated with the building thermal envelope meets requirements.	☐	☑	☐
SYSTEM_SPECIFIC	6.5.1, 6.5.1.1, 6.5.1.3, 6.5.1.4	Mechanical	Air economizers provided where required (and not exempted), meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.	☐	☑	☐
SYSTEM_SPECIFIC	6.5.1, 6.5.1.2, 6.5.1.3	Mechanical	Water economizers provided where required, meet the requirements for design capacity, maximum pressure drop and integrated economizer control.	☐	☑	☐
SYSTEM_SPECIFIC	6.5.1.5	Mechanical	Economizer operation will not increase heating energy use during normal operation.	☐	☑	☐
SYSTEM_SPECIFIC	6.5.2.2.1	Mechanical	Three-pipe hydronic systems using a common return for hot and chilled water are not used.	☐	☑	☐
SYSTEM_SPECIFIC	6.5.2.2.3	Mechanical	Hydronic heat pump systems connected to a common water loop meet heat rejection and heat addition requirements.	☐	☑	☐
SYSTEM_SPECIFIC	6.5.1.6	Mechanical	Water economizer specified on hydronic cooling and humidification systems designed to maintain inside humidity at >35 Â°F dewpoint if an economizer is required.	☐	☑	☐
SYSTEM_SPECIFIC	6.5.3.1.1	Mechanical	HVAC fan systems at design conditions do not exceed allowable fan system motor nameplate hp or fan system bhp.	☑	☐	☐
SYSTEM_SPECIFIC	6.5.3.1.2	Mechanical	HVAC fan motors not larger than the first available motor size greater than the bhp.	☑	☐	☐
HVAC	6.5.6.1	Mechanical	Exhaust air energy recovery on systems meeting Tables 6.5.6.1-1, and 6.5.6.1-2.	☐	☑	☐
SYSTEM_SPECIFIC	7.4.2	Mechanical	Service water heating equipment meets efficiency requirements.	☑	☐	☐
SYSTEM_SPECIFIC	7.5.2	Mechanical	Service water heating equipment used for space heating complies with the service water heating equipment requirements.	☐	☑	☐
Insulation	5.8.1.2	Envelope	Above-grade wall insulation installed per manufacturerâ€™s instructions.	☑	☐	☐
Insulation	5.8.1.2	Envelope	Floor insulation installed per manufacturerâ€™s instructions.	☐	☑	☐
Controls	10.4.3	Mechanical	Elevators are designed with the proper lighting, ventilation power, and standby mode.	☑	☐	☐
SYSTEM_SPECIFIC	6.4.1.1, 6.8.1-7a	Mechanical	Heat Rejection Equipment: Minimum Efficiency Requirement Table 6.8.1-7	☐	☑	☐
SYSTEM_SPECIFIC	6.4.1.1, 6.8.1-7b	Mechanical	Heat Rejection Equipment: Minimum Efficiency Requirement Table 6.8.1-7	☐	☑	☐
SYSTEM_SPECIFIC	6.4.1.1, 6.8.1-7c	Mechanical	Heat Rejection Equipment: Minimum Efficiency RequirementTable 6.8.1-7	☐	☑	☐

SYSTEM_SPECIFIC	6.4.1.1, 6.8.1-7d	Mechanical	Heat Rejection Equipment: Minimum Efficiency Requirement Table 6.8.1-7	☐	☑	☐
SYSTEM_SPECIFIC	6.5.5.3	Mechanical	Centrifugal fan open-circuit cooling towers having combined rated capacity >= 1100 gpm meets minimum efficiency requirement: Table 6.8.1-7	☐	☑	☐
SYSTEM_SPECIFIC	6.4.1.1, 6.8.1-7e	Mechanical	Heat Rejection Equipment: Minimum Efficiency Requirement Table 6.8.1-7	☐	☑	☐
SYSTEM_SPECIFIC	6.4.1.1, 6.8.1-7f	Mechanical	Heat Rejection Equipment: Minimum Efficiency Requirement Table 6.8.1-7	☐	☑	☐
SYSTEM_SPECIFIC	6.4.1.1, 6.8.1-7g	Mechanical	Heat Rejection Equipment: Minimum Efficiency Requirement Table 6.8.1-7.	☐	☑	☐
SYSTEM_SPECIFIC	6.4.1.1, 6.8.1-7h	Mechanical	Heat Rejection Equipment: Minimum Efficiency Requirement Table 6.8.1-7	☐	☑	☐
SYSTEM_SPECIFIC	6.4.1.1, 6.8.1-7i	Mechanical	Heat Rejection Equipment: Minimum Efficiency Requirement Table 6.8.1-7	☐	☑	☐
SYSTEM_SPECIFIC	7.5.3	Mechanical	Gas-fired water-heating equipment installed in new buildings: where a singular piece of water-heating equipment >= 1,000 kBtu/h serves the entire building, thermal efficiency must be >= 90 Et. Where multiple pieces of water-heating equipment serve the building with combined rating is >= 1,000 kBtu/h, the combined input-capacity-weighted-average thermal efficiency , thermal efficiency must be >= 90 Et. Exclude input rating of equipment in individual dwelling units and equipment <= 100 kBtu/h.	☐	☑	☐

2. To be checked by Plan Reviewer

Plan Review	4.2.2, 5.4.3.1.1, 5.7	Envelope	Plans and/or specifications provide all information with which compliance can be determined for the building envelope and document where exceptions to the standard are claimed.	☐	☐	☐
Plan Review	4.2.2, 6.4.4.2.1, 6.7.2	Mechanical	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	☐	☐	☐
Plan Review	4.2.2, 7.7.1, 10.4.2	Mechanical	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and document where exceptions to the standard are claimed. Hot water system sized per manufacturer's sizing guide.	☐	☐	☐
Plan Review	4.2.2, 8.4.1.1, 8.4.1.2, 8.7	Project	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the electrical systems and equipment and document where exceptions are claimed. Feeder connectors sized in accordance with approved plans and branch circuits sized for maximum drop of 3%.	☐	☐	☐
Plan Review	4.2.2, 9.4.3, 9.7	Interior Lighting	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐	☐	☐
Plan Review	9.7	Exterior Lighting	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐	☐	☐

Insulation	5.8.1.7.3	Envelope	Insulation in contact with the ground has <=0.3% water absorption rate per ASTM C272.	☐	☐	☐
Air Leakage	5.4.3.4	Envelope	Vestibules are installed where building entrances separate conditioned space from the exterior, and meet exterior envelope requirements. Doors have self-closing devices, and are >=7 ft apart (>= 16 ft apart for adjoinging floor area >= 40000 sq.ft.). Vestibule floor area <=7 50 sq.ft. or 2 percent of the adjoining conditioned floor area.	☐	☐	☐
HVAC	6.4.3.4.4	Mechanical	Ventilation fans >0.75 hp have automatic controls to shut off fan when not required.	☐	☐	☐
HVAC	6.4.3.8	Mechanical	Demand control ventilation provided for spaces >500 ft2 and >25 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.	☐	☐	☐
HVAC	6.4.4.1.4	Mechanical	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.	☐	☐	☐
HVAC	6.5.2.3	Mechanical	Dehumidification controls provided to prevent reheating, recooling, mixing of hot and cold airstreams or concurrent heating and cooling of the same airstream.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.3.1.3	Mechanical	Fans have efficiency grade (FEG) >= 67. The total efficiency of the fan at the design point of operation <= 15% of maximum total efficiency of the fan.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.3.5	Mechanical	Motors for fans >= 1/12 hp and < 1 hp are electronically-commutated motors or have a minimum motor efficiency of 70%. These motors are also speed adjustable for either balancing or remote control.	☐	☐	☐
SYSTEM_SPECIFIC	6.4.3.10	Mechanical	DDC system installed and capable of providing control logic including monitoring zone and system demand for fan pressure, pump pressure, heating, and cooling; transferring zone and system demand information from zones to air distribution system controllers and from air distribution systems to heating and cooling plant controllers; automatically detecting and alerting system operator when zones and systems excessively drive the reset logic; allow operator removal of zone(s) from the reset algorithm; AND capable of trending and graphically displaying input and output points.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.3.2.3	Mechanical	Reset static pressure setpoint for DDC controlled VAV boxes reporting to central controller based on the zones requiring the most pressure. Controls provide: zone damper monitoring or indicator of static pressure need; autodetection, alarm, and operator override of zones excessively triggering reset logic.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.3.3	Mechanical	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.3.4	Mechanical	Multiple zone HVAC systems have supply air temperature reset controls.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.4.1	Mechanical	System turndown requirement met through multiple single-input boilers, one or more modulating boilers, or a combination of single-input and modulating boilers. Boiler input between 1.0 MBtu/h and 5 MBtu/h has 3:1 turndown ratio, boiler input between 5.0 MBtu/h and 10 MBtu/h has 4:1 turndown ratio, boiler input > 10.0 MBtu/h has 5:1 turndown ratio.	☐	☐	☐
HVAC	6.5.4.2	Mechanical	HVAC pumping systems >10 hp designed for variable fluid flow.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.4.3, 6.5.4.3.1, 6.5.4.3.2	Mechanical	Fluid flow shutdown in pumping systems to multiple chillers or boilers when systems are shut down.	☐	☐	☐

SYSTEM_SPECIFIC	6.5.4.4	Mechanical	Temperature reset by representative building loads in pumping systems >10 hp for chiller and boiler systems >300,000 Btu/h.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.4.5.2	Mechanical	Hydronic heat pumps and water-cooled unitary air conditioners with pump systems >5 hp have controls or devices to reduce pump motor demand.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.4.6	Mechanical	Chilled-water and condenser water piping sized according to design flow rate and total annual hours of operation (Table 6.5.4.6).	☐	☐	☐
SYSTEM_SPECIFIC	6.5.5.2.1	Mechanical	Fan systems with motors >=7.5 hp associated with heat rejection equipment to have capability to operate at 2/3 of full-speed and auto speed controls to control the leaving fluid temperature or condensing temp/pressure of heat rejection device.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.5.2.2	Mechanical	Multicell heat rejection equipment with variable-speed fan drives installed that operate the maximum number of fans allowed that comply with manufacturers specs and control all fans to the same fan speed required for the instantaneous cooling duty.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.5.2.3	Mechanical	NA	☐	☐	☐
HVAC	6.5.7.1.1	Mechanical	Kitchen hoods >5,000 cfm have make up air >=50% of exhaust air volume.	☐	☐	☐
HVAC	6.5.7.1.1	Mechanical	Kitchen hoods >5,000 cfm have make up air >=50% of exhaust air volume.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.7.1.2	Mechanical	Conditioned supply air to space with a kitchen hood shall not exceed the greater of a) supply flow required to meet space heating or cooling, or b) hood exhaust flow minus the available air transfer from available spaces.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.7.1.3	Mechanical	Kitchen hoods with a total exhaust airflow rate >5000 cfm meet replacement air, ventilation system, or energy recovery requirements shown in Table 6.5.7.1.3.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.7.1.4	Mechanical	Kitchen hoods with a total exhaust airflow rate >5000 cfm meet replacement air, ventilation system, or energy recovery requirements.	☐	☐	☐
HVAC	6.5.7.2	Mechanical	Fume hoods exhaust systems >=5,000 cfm have VAV hood exhaust and supply systems, direct make-up air or heat recovery.	☐	☐	☐
HVAC	6.5.8.1	Mechanical	Unenclosed spaces that are heated use only radiant heat.	☐	☐	☐
SYSTEM_SPECIFIC	7.5.1	Mechanical	Combined space and water heating system not allowed unless standby loss less than calculated maximum. AHJ has approved or combined connected load <150 kBtu/h.	☐	☐	☐
Controls	8.4.2	Project	At least 50% of all 125 volt 15- and 20-Amp receptacles are controlled by an automatic control device.	☐	☐	☐
Other Equipment	10.4.1	Mechanical	Electric motors meet requirements where applicable.	☐	☐	☐
HVAC	6.4.3.3.2	Mechanical	Setback controls allow automatic restart and temporary operation as required for maintenance.	☐	☐	☐
SYSTEM_SPECIFIC	6.4.3.3.3	Mechanical	Systems with setback controls and DDC include optimum start controls. Optimum start algorithm considers mass radiant slab floor temperature.	☐	☐	☐
SYSTEM_SPECIFIC	6.4.3.3.4	Mechanical	Zone isolation devices and controls.	☐	☐	☐
Wattage	9.4.2	Exterior Lighting	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐	☐	☐

3. To be checked by Inspector

Insulation	5.8.1.7	Envelope	Exterior insulation protected against damage, sunlight, moisture, wind, landscaping and equipment maintenance activities.	☐	☐	☐
HVAC	6.4.3.7	Mechanical	Freeze protection and snow/ice melting system sensors for future connection to controls.	☐	☐	☐
Air Leakage	5.4.3.1	Envelope	Continuous air barrier is wrapped, sealed, caulked, gasketed, and/or taped in an approved manner, except in semiheated spaces in climate zones 1-6.	☐	☐	☐
Air Leakage	5.4.3.2	Envelope	Factory-built and site-assembled fenestration and doors are labeled or certified as meeting air leakage requirements.	☐	☐	☐
Fenestration	5.8.2.1, 5.8.2.3, 5.8.2.4, 5.8.2.5	Envelope	Fenestration products rated (U-factor, SHGC, and VT) in accordance with NFRC or energy code defaults are used.	☐	☐	☐
Fenestration	5.8.2.2	Envelope	Fenestration and door products are labeled, or a signed and dated certificate listing the U-factor, SHGC, VT, and air leakage rate has been provided by the manufacturer.	☐	☐	☐
SYSTEM_SPECIFIC	7.4.4.1	Mechanical	Temperature controls installed on service water heating systems (<=120Â°F to maximum temperature for intended use).	☐	☐	☐
SYSTEM_SPECIFIC	7.4.4.2	Mechanical	Automatic time switches installed to automatically switch off the recirculating hot-water system or heat trace.	☐	☐	☐
SYSTEM_SPECIFIC	7.4.6	Mechanical	Heat traps installed on non-circulating storage water tanks.	☐	☐	☐
HVAC	6.4.1.4, 6.4.1.5	Mechanical	HVAC equipment efficiency verified. Non-NAECA HVAC equipment labeled as meeting 90.1.	☐	☐	☐
SYSTEM_SPECIFIC	6.4.1.5.2	Mechanical	PTAC and PTHP with sleeves 16 in. by 42 in. labeled for replacement only.	☐	☐	☐
HVAC	6.4.3.4.1	Mechanical	Stair and elevator shaft vents have motorized dampers that automatically close.	☐	☐	☐
HVAC	6.4.3.4.2, 6.4.3.4.3	Mechanical	Outdoor air and exhaust systems have motorized dampers that automatically shut when not in use and meet maximum leakage rates. Check gravity dampers where allowed.	☐	☐	☐
HVAC	6.4.3.4.5	Mechanical	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.	☐	☐	☐
HVAC	6.5.3.2.1	Mechanical	DX cooling systems >= 75 kBtu/h (>= 65 kBtu/h effective 1/2016) and chilled-water and evaporative cooling fan motor hp >= Â¼ designed to vary indoor fan airflow as a function of load and comply with operational requirements.	☐	☐	☐
HVAC	6.4.4.1.1	Mechanical	Insulation exposed to weather protected from damage. Insulation outside of the conditioned space and associated with cooling systems is vapor retardant.	☐	☐	☐
HVAC	6.4.4.1.2	Mechanical	HVAC ducts and plenums insulated. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.	☐	☐	☐
HVAC	6.4.4.1.3	Mechanical	HVAC piping insulation thickness. Where piping is installed in or under a slab, verification may need to occur during Foundation Inspection.	☐	☐	☐
HVAC	6.4.4.2.1	Mechanical	Ducts and plenums sealed based on static pressure and location.	☐	☐	☐
SYSTEM_SPECIFIC	6.4.4.2.2	Mechanical	Ductwork operating >3 in. water column requires air leakage testing.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.2.1	Mechanical	Zone controls can limit simultaneous heating and cooling and sequence heating and cooling to each zone.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.2.2.2	Mechanical	Two-pipe hydronic systems using a common distribution system have controls to allow a deadband >=15 Â°F, allow operation in one mode for at least 4 hrs before changeover, and have rest controls to limit heating and cooling supply temperature to <=30 Â°F.	☐	☐	☐

HVAC	6.5.2.4.1	Mechanical	Humidifiers with airstream mounted preheating jackets have preheat auto-shutoff value set to activate when humidification is not required.	☐	☐	☐
HVAC	6.5.2.4.2	Mechanical	Humidification system dispersion tube hot surfaces in the airstreams of ducts or air-handling units insulated >= R-0.5.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.3.2.2	Mechanical	VAV fans have static pressure sensors positioned so setpoint <=1.2 in. w.c. design pressure.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.4.5.1	Mechanical	Two-position automatic valve interlocked to shut off water flow when hydronic heat pump with pumping system >10 hp is off.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.6.2	Mechanical	Condenser heat recovery system that can heat water to 85 Â°F or provide 60% of peak heat rejection is installed for preheating of service hot water.	☐	☐	☐
HVAC	6.5.7.1.5	Mechanical	Approved field test used to evaluate design air flow rates and demonstrate proper capture and containment of kitchen exhaust systems.	☐	☐	☐
SYSTEM_SPECIFIC	6.5.9	Mechanical	Hot gas bypass limited to: <=240 kBtu/h â€“ 15% >240 kBtu/h â€“ 10%	☐	☐	☐
HVAC	6.4.3.9	Mechanical	Heating for vestibules and air curtains include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating systems controlled by a thermostat in the vestibule with setpoint <= 60F.	☐	☐	☐
Controls	6.5.10	Mechanical	Doors separating conditioned space from the outdoors have controls that disable/reset heating and cooling system when open.	☐	☐	☐
Controls	9.4.1.1	Interior Lighting	Automatic control requirements prescribed in Table 9.6.1, for the appropriate space type, are installed. Mandatory lighting controls (labeled as 'REQ') and optional choice controls (labeled as 'ADD1' and 'ADD2') are implemented.	☐	☐	☐
Controls	9.4.1.1	Interior Lighting	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible and visible to occupants.	☐	☐	☐
Controls	9.4.1.2	Interior Lighting	Parking garage lighting is equipped with required lighting controls and daylight transition zone lighting.	☐	☐	☐
Controls	9.4.1.1f	Interior Lighting	Daylight areas under skylights and roof monitors that have more than 150 W combined input power for general lighting are controlled by photocontrols.	☐	☐	☐
Controls	9.4.1.4	Exterior Lighting	Automatic lighting controls for exterior lighting installed.	☐	☐	☐
Controls	9.4.1.3	Interior Lighting	Separate lighting control devices for specific uses installed per approved lighting plans.	☐	☐	☐
Wattage	9.6.2	Interior Lighting	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐	☐	☐
Wattage	9.6.4	Interior Lighting	Where space LPD requirements are adjusted based on room cavity ratios, dimensions are consistent with approved plans.	☐	☐	☐
Insulation	5.5.3.1	Envelope	Roof R-value. For some ceiling systems, verification may need to occur during Framing Inspection.	☐	☐	☐
Insulation	5.8.1.2, 5.8.1.3	Envelope	Roof insulation installed per manufacturerâ€™s instructions. Blown or poured loose-fill insulation is installed only where the roof slope is <=3 in 12.	☐	☐	☐
Insulation	5.8.1.1	Envelope	Building envelope insulation is labeled with R-value or insulation certificate has been provided listing R-value and other relevant data.	☐	☐	☐
Insulation	5.8.1.9	Envelope	Building envelope insulation extends over the full area of the component at the proposed rated R or U value.	☐	☐	☐
Insulation	5.8.1.4	Envelope	Eaves are baffled to deflect air to above the insulation.	☐	☐	☐
Insulation	5.8.1.5	Envelope	Insulation is installed in substantial contact with the inside surface separating conditioned space from unconditional space.	☐	☐	☐

Insulation	5.8.1.6	Envelope	Recessed equipment installed in building envelope assemblies does not compress the adjacent insulation.	☐	☐	☐
Insulation	5.8.1.7.1	Envelope	Attics and mechanical rooms have insulation protected where adjacent to attic or equipment access.	☐	☐	☐
Insulation	5.8.1.7.2	Envelope	Foundation vents do not interfere with insulation.	☐	☐	☐
Insulation	5.8.1.8	Envelope	Insulation intended to meet the roof insulation requirements cannot be installed on top of a suspended ceiling. Mark this requirement compliant if insulation is installed accordingly.	☐	☐	☐
SYSTEM_SPECIFIC	6.4.3.1.1	Mechanical	Heating and cooling to each zone is controlled by a thermostat control.	☐	☐	☐
HVAC	6.4.3.1.2	Mechanical	Thermostatic controls have a 5 Â°F deadband.	☐	☐	☐
HVAC	6.4.3.2	Mechanical	Temperature controls have setpoint overlap restrictions.	☐	☐	☐
HVAC	6.4.3.3.1	Mechanical	HVAC systems equipped with at least one automatic shutdown control.	☐	☐	☐
SYSTEM_SPECIFIC	6.4.3.5	Mechanical	Heat pump controls prevent supplemental electric resistance heat from coming on when not needed.	☐	☐	☐
HVAC	6.4.3.6	Mechanical	When humidification and dehumidification are provided to a zone, simultaneous operation is prohibited. Humidity control prohibits the use of fossil fuel or electricity to produce RH > 30% in the warmest zone humidified and RH < 60% in the coldest zone dehumidified.	☐	☐	☐
HVAC	6.4.3.6	Mechanical	When humidification and dehumidification are provided to a zone, simultaneous operation is prohibited. Humidity control prohibits the use of fossil fuel or electricity to produce RH > 30% in the warmest zone humidified and RH < 60% in the coldest zone dehumidified.	☐	☐	☐
SYSTEM_SPECIFIC	7.4.4.3	Mechanical	Public lavatory faucet water temperature <=110Â °F.	☐	☐	☐
SYSTEM_SPECIFIC	7.4.4.4	Mechanical	Controls are installed that limit the operation of a recirculation pump installed to maintain temperature of a storage tank.	☐	☐	☐
SYSTEM_SPECIFIC	7.4.5.1	Mechanical	Pool heaters are equipped with on/off switch and no continuously burning pilot light.	☐	☐	☐
SYSTEM_SPECIFIC	7.4.5.2	Mechanical	Pool covers are provided for heated pools and pools heated to >90Â°F have a cover >=R-12.	☐	☐	☐
SYSTEM_SPECIFIC	7.4.5.3	Mechanical	Time switches are installed on all pool heaters and pumps.	☐	☐	☐
Wattage	9.2.2.3	Interior Lighting	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐	☐	☐
SYSTEM_SPECIFIC	7.4.3	Mechanical	All piping in circulating system insulated	☐	☐	☐
SYSTEM_SPECIFIC	7.4.3	Mechanical	First 8 ft of outlet piping is insulated	☐	☐	☐
SYSTEM_SPECIFIC	7.4.3	Mechanical	All heat traced or externally heated piping insulated	☐	☐	☐

4. To be checked by Inspector at Project Completion and Prior to Issuance of Certificate of Occupancy

Plan Review	6.7.2.4	Mechanical	Detailed instructions for HVAC systems commissioning included on the plans or specifications for projects >=50,000 ft2.	☐	☐	☐
Plan Review	6.7.2.4	Mechanical	Detailed instructions for HVAC systems commissioning included on the plans or specifications for projects >=50,000 ft2.	☐	☐	☐
Post Construction	6.7.2.1	Mechanical	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	☐	☐	☐

Post Construction	6.7.2.2	Mechanical	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	☐	☐	☐
Post Construction	6.7.2.3	Mechanical	An air and/or hydronic system balancing report is provided for HVAC systems serving zones >5,000 ft2 of conditioned area.	☐	☐	☐
HVAC	6.7.2.4	Mechanical	HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.	☐	☐	☐
Post Construction	8.7.1	Interior Lighting	Furnished as-built drawings for electric power systems within 30 days of system acceptance.	☐	☐	☐
Post Construction	8.7.2	Interior Lighting	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐	☐	☐

Input Data Report

Project Information

Project Name: 20031 **Project Title:** 2nd Floor Build-Out

Address: 5037 SR 240 **State:** FL **Zip:** 32024

Owner: Belmont Academy

Building Type: School/University **Building Classification:** Addition to existing Building

No.of Stories: 2 **GrossArea (SF):** 17,248

Bldg. Rotation: None

Zones

No	Acronym	Description	Type	Area [sf]	Multi	Total Area [sf]	
1	AHU-2	Zone 1	CONDITIONED	15738.0	1	15738.0	☐
2	PTAC	Zone 2	CONDITIONED	50.0	1	50.0	☐
3	ACU-1	Zone 3	CONDITIONED	1134.0	1	1134.0	☐
4	ACU-2	Zone 4	CONDITIONED	326.0	1	326.0	☐

Spaces

No	Acronym	Description	Type	Depth [ft]	Width [ft]	Height [ft]	Mult	Total Area [sf]	Total Vol[cf]	
In Zone: AHU-2										
1	classroom #1	Zo0Sp1	Classroom/Lecture Hall	1.00	582.00	10.00	1	582.0	5820.0	☐
2	storage	Zo0Sp2	Storage & Warehouse - Bulky Active Storage	1.00	40.00	10.00	1	40.0	400.0	☐
3	classroom #2	Zo0Sp3	Classroom/Lecture Hall	1.00	678.00	10.00	1	678.0	6780.0	☐
4	classroom #3	Zo0Sp4	Classroom/Lecture Hall	1.00	697.00	10.00	1	697.0	6970.0	☐
5	classroom #4	Zo0Sp5	Classroom/Lecture Hall	1.00	666.00	10.00	1	666.0	6660.0	☐
6	corridors	Zo0Sp6	Corridor	1.00	4283.00	10.00	1	4283.0	42830.0	☐
7	classroom #5	Zo0Sp7	Classroom/Lecture Hall	1.00	782.00	10.00	1	782.0	7820.0	☐
8	classroom #6	Zo0Sp8	Classroom/Lecture Hall	1.00	783.00	10.00	1	783.0	7830.0	☐
9	classroom #7	Zo0Sp9	Classroom/Lecture Hall	1.00	795.00	10.00	1	795.0	7950.0	☐
10	classroom	Zo0Sp10	Classroom/Lecture Hall	1.00	618.00	10.00	1	618.0	6180.0	☐
11	janitor	Zo0Sp11	Storage & Warehouse - Bulky Active Storage	1.00	155.00	10.00	2	310.0	3100.0	☐
12	classroom #9	Zo0Sp12	Classroom/Lecture Hall	1.00	782.00	10.00	1	782.0	7820.0	☐
13	classroom #10	Zo0Sp13	Classroom/Lecture Hall	1.00	783.00	10.00	1	783.0	7830.0	☐
14	classroom #11	Zo0Sp14	Classroom/Lecture Hall	1.00	793.00	10.00	1	793.0	7930.0	☐
15	Men's rr	Zo0Sp18	Toilet and Washroom	1.00	468.00	10.00	1	468.0	4680.0	☐
16	women's rr	Zo0Sp20	Toilet and Washroom	1.00	469.00	10.00	1	469.0	4690.0	☐
17	electrical room	Zo0Sp22	Electrical Mechanical Equipment Room - General	1.00	169.00	10.00	1	169.0	1690.0	☐
18	classroom	Zo1Sp27	Classroom/Lecture Hall	1.00	656.00	10.00	1	656.0	6560.0	☐
19	classroom #13	Zo1Sp28	Classroom/Lecture Hall	1.00	611.00	10.00	1	611.0	6110.0	☐
20	Flex Space	Zo1Sp29	Conference/meeting (Multiple Functions)	1.00	322.00	10.00	1	322.0	3220.0	☐
21	Flex Space	Zo1Sp30	Conference/meeting (Multiple Functions)	1.00	226.00	10.00	1	226.0	2260.0	☐
22	Restroom	Zo1Sp32	Toilet and Washroom	1.00	43.00	10.00	1	43.0	430.0	☐
23	Restroom	Zo1Sp32	Toilet and Washroom	1.00	43.00	10.00	1	43.0	430.0	☐
24	Storage	Zo1Sp34	Storage & Warehouse - Inactive Storage	1.00	50.00	10.00	1	50.0	500.0	☐
25	west stair	Zo1Sp35	Stair - Active Traffic	1.00	89.00	10.00	1	89.0	890.0	☐
In Zone: PTAC										
1	Elev Mach Rm	Zo0Sp1	Electrical Mechanical Equipment Room - General	1.00	50.00	10.00	1	50.0	500.0	☐
In Zone: ACU-1										
1	east stair 1st fl	Zo0Sp1	Stair - Active Traffic	1.00	310.00	10.00	1	310.0	3100.0	☐
2	E stair corr 1st	Zo0Sp2	Corridor	1.00	824.00	10.00	1	824.0	8240.0	☐
In Zone: ACU-2										
1	east stair 2nd F	Zo0Sp1	Stair - Active Traffic	1.00	326.00	10.00	1	326.0	3260.0	☐

Lighting

No	Type	Category	No. of Luminaires	Watts per Luminaire	Power [W]	Control Type	No.of Ctrl pts	
In Zone: AHU-2								
	In Space: classroom #1							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
	In Space: storage							
1	LED	General Lighting	1	34	34	Occupancy sensor without Daylighting	1	☐
	In Space: classroom #2							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
	In Space: classroom #3							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
	In Space: classroom #4							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
	In Space: corridors							
1	LED	General Lighting	35	34	1190	Occupancy sensor without Daylighting	2	☐
2	LED	General Lighting	13	11	143	Occupancy sensor with Daylighting On/Off	1	☐
	In Space: classroom #5							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
	In Space: classroom #6							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
	In Space: classroom #7							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
2	LED	General Lighting	1	20	20	Occupancy Sensor with Timer without Daylighting	1	☐
	In Space: classroom							
1	LED	General Lighting	8	34	272	Occupancy sensor without Daylighting	1	☐
	In Space: janitor							
1	LED	General Lighting	2	34	68	Occupancy sensor without Daylighting	1	☐
	In Space: classroom #9							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
	In Space: classroom #10							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
	In Space: classroom #11							
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
2	LED	General Lighting	1	20	20	Occupancy sensor with Daylighting On/Off	1	☐

In Space: Men's rr								
1	LED	General Lighting	5	29	145	Occupancy sensor without Daylighting	1	☐
2	LED	General Lighting	2	20	40	Occupancy sensor with Daylighting On/Off	1	☐
In Space: women's rr								
1	LED	General Lighting	4	34	136	Occupancy sensor without Daylighting	1	☐
2	LED	General Lighting	3	20	60	Occupancy sensor with Daylighting On/Off	1	☐
In Space: electrical room								
1	LED	General Lighting	2	34	68	Manual On/Off	1	☐
In Space: classroom								
1	LED	General Lighting	11	34	374	Occupancy sensor without Daylighting	1	☐
In Space: classroom #13								
1	LED	General Lighting	9	34	306	Occupancy sensor without Daylighting	1	☐
In Space: Flex Space								
1	LED	General Lighting	6	34	204	Occupancy sensor without Daylighting	1	☐
In Space: Flex Space								
1	LED	General Lighting	5	34	170	Occupancy sensor without Daylighting	1	☐
In Space: Restroom								
1	LED	General Lighting	1	20	20	Occupancy sensor with Daylighting On/Off	1	☐
In Space: Restroom								
1	LED	General Lighting	1	20	20	Occupancy sensor with Daylighting On/Off	1	☐
In Space: Storage								
1	LED	General Lighting	1	20	20	Occupancy sensor with Daylighting On/Off	1	☐
In Space: west stair								
1	LED	General Lighting	1	29	29	Manual On/Off	1	☐
In Zone: PTAC								
In Space: Elev Mach Rm								
1	Compact Fluorescent	General Lighting	1	64	64	Manual On/Off	1	☐
In Zone: ACU-1								
In Space: east stair 1st fl								
1	Compact Fluorescent	General Lighting	2	64	128	Manual On/Off	1	☐
In Space: E stair corr 1st FL								
1	Compact Fluorescent	General Lighting	8	64	512	Programmable timer with Daylighting 3 step	1	☐
In Zone: ACU-2								
In Space: east stair 2nd FL								
1	LED	General Lighting	2	34	68	Occupancy sensor without Daylighting	1	☐

Walls (Walls will be rotated clockwise by building rotation value)

No	Description	Type	Width [ft]	H (Effec) [ft]	Multiplier	Area [sf]	Orientation	Conductance [Btu/h.sf.F]	Heat Capacity [Btu/sf.F]	Dens. [lb/cf]	R-Value [h.sf.F/Btu]	
In Zone:	**AHU-2**											
1	Pr0Zo1Wa5	8" CMU, R-13 Ins., Gyp. Brd	163.00	10.00	1	1630.0	North	0.0607	6.434	32.43	16.5	☐
2	Pr0Zo1Wa6	8" CMU, R-13 Ins., Gyp. Brd	163.00	10.00	1	1630.0	South	0.0607	6.434	32.43	16.5	☐
3	Pr0Zo1Wa8	8" CMU, R-13 Ins., Gyp. Brd	68.00	10.00	1	680.0	East	0.0607	6.434	32.43	16.5	☐
4	Pr0Zo1Wa8	8" CMU, R-13 Ins., Gyp. Brd	119.00	10.00	1	1190.0	West	0.0607	6.434	32.43	16.5	☐
In Zone:	**PTAC**											
1	Pr0Zo2Wa1	8" CMU, R-13 Ins., Gyp. Brd	6.00	10.00	1	60.0	East	0.0607	6.434	32.43	16.5	☐
2	Pr0Zo2Wa2	8" CMU, R-13 Ins., Gyp. Brd	12.00	10.00	1	120.0	South	0.0607	6.434	32.43	16.5	☐
In Zone:	**ACU-1**											
1	Pr0Zo3Wa1	8" CMU, R-13 Ins., Gyp. Brd	11.00	10.00	1	110.0	North	0.0607	6.434	32.43	16.5	☐
2	Pr0Zo3Wa3	8" CMU, R-13 Ins., Gyp. Brd	38.00	10.00	1	380.0	East	0.0607	6.434	32.43	16.5	☐
In Zone:	**ACU-2**											
1	Pr0Zo4Wa2	8" CMU, R-13 Ins., Gyp. Brd	38.00	10.00	1	380.0	East	0.0607	6.434	32.43	16.5	☐

Windows (Windows will be rotated clockwise by building rotation value)

No	Description	Orientation	Shaded	U [Btu/hr sf F]	SHGC	Vis.Tra	W [ft]	H (Effec) [ft]	Multiplier	Total Area [sf]	
In Zone:	**ACU-1**										
	In Wall:	**east**									
1	Pr0Zo3Wa3Wi1	East	No	0.5000	0.44	0.76	4.00	4.00	2	32.0	☐
2	Pr0Zo3Wa3Wi2	East	No	0.5000	0.44	0.76	7.00	3.00	1	21.0	☐
In Zone:	**AHU-2**										
	In Wall:	**east**									
1	Pr0Zo1Wa8Wi1	East	No	0.5000	0.44	0.76	8.00	4.00	2	64.0	☐
	In Wall:	**north**									
1	Pr0Zo1Wa5Wi1	North	No	0.5000	0.44	0.76	10.00	9.60	1	96.0	☐
	In Wall:	**south**									
1	Pr0Zo1Wa6Wi1	South	No	0.5000	0.44	0.76	10.00	4.80	1	48.0	☐
	In Wall:	**west**									
1	Pr0Zo1Wa8Wi1	West	No	0.5000	0.44	0.76	8.00	4.00	2	64.0	☐

Doors

No	Description	Type	Shade?	Width [ft]	H (Effec) [ft]	Multi plier	Area [sf]	Cond. [Btu/h.sf.F]	Dens. [lb/cf]	Ht Cap. [Btu/sf. F]	R [h.sf.F/ Btu]	
In Zone:												
In Wall:												☐

Roofs

No	Description	Type	Width [ft]	H (Effec) [ft]	Multi plier	Area [sf]	Tilt [deg]	Cond. [Btu/h.Sf. F]	Heat Cap [Btu/sf. F]	Dens. [lb/cf]	R-Value [h.sf.F/Btu	
In Zone: AHU-2												
1	Pr0Zo1Rf1	Shingles, R-25 Ins, Mtl Deck	188.10	100.00	1	18810.0	0.00	0.0378	0.27	4.66	26.5	☐
In Zone: ACU-2												
1	Pr0Zo4Rf1	Shingles, R-25 Ins, Mtl Deck	32.60	10.00	1	326.0	0.00	0.0378	0.27	4.66	26.5	☐

Skylights

No	Description	Type	U [Btu/hr sf F]	SHGC	Vis.Trans	W [ft]	H (Effec) [ft]	Multi-plier	Area [Sf]	Total Area [Sf]	
In Zone:											
In Roof:											☐

Floors

No	Description	Type	Width [ft]	H (Effec) [ft]	Multiplier	Area [sf]	Cond. [Btu/h.sf.F	Heat Cap. [Btu/sf. F]	Dens. [lb/cf]	R-Value [h.sf.F/Btu

In Zone:

Systems

AHU-2 **System 1** **Variable Air Volume Built-up System** **No. Of Units** 1

Component	Category	Capacity	Efficiency	IPLV	
1	Cooling System	784700.00			☐
2	Heating System	432362.00	1.00		☐
3	Air Handling System -Supply	12200.00	0.75		☐

PTAC **System 2** **Room Units (Airconditioners & Heat pumps)** **No. Of Units** 1

Component	Category	Capacity	Efficiency	IPLV	
1	Cooling System	18000.00	9.50		☐
2	Heating System	16400.00	2.92		☐
3	Air Handling System -Supply	400.00	0.80		☐

ACU-1 **System 3** **Constant Volume Air Cooled Split System < 65000 Btu/hr** **No. Of Units** 1

Component	Category	Capacity	Efficiency	IPLV	
1	Cooling System	18000.00	14.20	8.00	☐
2	Heating System	19000.00	9.80		☐
3	Air Handling System -Supply	710.00	0.10		☐

ACU-2 **System 4** **Constant Volume Air Cooled Split System < 65000 Btu/hr** **No. Of Units** 1

Component	Category	Capacity	Efficiency	IPLV	
1	Cooling System	9000.00	24.60	8.00	☐
2	Heating System	10900.00	12.80		☐
3	Air Handling System -Supply	307.00	0.10		☐

Plant

	Equipment	Category	Size	Inst.No	Eff.	IPLV
1	Hermetic screw or scroll chiller	Cooling Equipment	99.3[Tons]	1	2.99[COP]	4.51

Water Heaters

	W-Heater Description	Capacity	Cap.Unit	I/P Rt.	Efficiency	Loss	
1	Electric water heater	50 [Gal]		10 [kW]	0.9600 [Ef]	[Btu/h]	☐

Ext-Lighting

Description	Category	No. of Lumin-aires	Watts per Lumin-aire	Area/Len/No [sf/ft/No]	Control Type	Wattage [W]	
							☐

Piping

No	Type	Operating Temp [F]	Insulation Conductivity [Btu-in/h.sf.F]	Nomonal pipe Diameter [in]	Insulation Thickness [in]	Is Runout?	
1	Domestic and Service Hot Water Systems	120.00	0.28	1.00	1.00	No	☐

Fenestration Used

Name	Glass Type	No. of Panes	Glass Conductance [Btu/h.sf.F]	SHGC	VLT
ApLbWnd13	User Defined	2	0.5000	0.4350	0.7600

Materials Used

Mat No	Acronym	Description	Only R-Value Used	RValue [h.sf.F/Btu]	Thick [ft]	Cond-uctivity [Btu/h.ft.F	Density [lb/cf]	Sp. Heat [Btu/lb.F]	
187	Matl187	GYP OR PLAS BOARD,1/2IN	No	0.4533	0.0417	0.0920	50.00	0.2000	☐
4	Matl4	Steel siding	No	0.0002	0.0050	26.0000	480.00	0.1000	☐
1001	ApLbMat1001	Outside surface resistance	Yes	0.3300					☐
1002	ApLbMat1002	Inside surface resistance	Yes	0.6900					☐
1003	ApLbMat1003	ASPHALT-SHINGLE AND SIDING	Yes	0.4400					☐
1005	ApLbMat1005	R-25 Generic Insulation	No	25.0000	0.5450	0.0218	0.30	0.2000	☐
1006	ApLbMat1006	R-13 Generic Insulation	No	13.0000	0.2837	0.0218	0.30	0.2000	☐
1007	ApLbMat1007	CC BLK LW,8IN,HOLLOW	No	2.0021	0.6667	0.3330	45.00	0.2000	☐

Constructs Used

No	Name	Simple Construct	Massless Construct	Conductance [Btu/h.sf.F]	Heat Cap [Btu/sf.F]	Density [lb/cf]	RValue [h.sf.F/Btu]	
1060	Shingles, R-25 Ins, Mtl Deck	No	No	0.04	0.27	4.66	26.5	☐

Layer	Material No.	Material	Thickness [ft]	Framing Factor	
1	1001	Outside surface resistance		0.000	☐
2	1003	ASPHALT-SHINGLE AND SIDING		0.000	☐
3	4	Steel siding	0.0050	0.000	☐
4	1005	R-25 Generic Insulation	0.5450	0.000	☐
5	1002	Inside surface resistance		0.000	☐

No	Name	Simple Construct	Massless Construct	Conductance [Btu/h.sf.F]	Heat Cap [Btu/sf.F]	Density [lb/cf]	RValue [h.sf.F/Btu]	
1062	8" CMU, R-13 Ins., Gyp. Brd	No	No	0.06	6.43	32.43	16.5	☐

Layer	Material No.	Material	Thickness [ft]	Framing Factor	
1	1001	Outside surface resistance		0.000	☐
2	1007	CC BLK LW,8IN,HOLLOW	0.6667	0.000	☐
3	1006	R-13 Generic Insulation	0.2837	0.000	☐
4	187	GYP OR PLAS BOARD,1/2IN	0.0417	0.000	☐
5	1002	Inside surface resistance		0.000	☐

LOAD SUMMARY CALCULATIONS

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John W. Wells, III, PE
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Consulting Engineering Associates, Inc.
CA3962
8365 Gunn Highway
Tampa, FL 33626

Project Name: Belmont Academy 2nd Floor Expansion
Project Address: 1476 SW Walter Ave, Lake City, FL 32024

CODES APPLICABLE TO THESE LOAD CALCULATIONS:
Florida Building Code, Sixth Edition (2017):
- Building
- Energy Conservation
- Mechanical

Calculations produced using Elite Software – CHVAC Commercial HVAC Loads, Version 8.02.37

Air Handler #1 - AHU-2 - Total Load Summary

Air Handler Description:	AHU-2 Variable Air Volume
Supply Air Fan:	Draw-Thru with program estimated horsepower of 4.15 HP
Fan Input:	90% motor and fan efficiency with 2 in. water across the fan
Sensible Heat Ratio:	0.74 --- This system occurs 1 time(s) in the building. ---
Air System Peak Time:	5pm in July.
Outdoor Conditions:	Clg: 95° DB, 78° WB, 117.45 grains, Htg: 29° DB
Indoor Conditions:	Clg: 75° DB, 50% RH, Htg: 70° DB

Because of the diversity in room, plenum and ventilation loads, the room sensible peak time in July at 6pm is different from the total system peak time, hence the air system CFM was computed using a room sensible load of 250,470.

Summer: Ventilation controls outside air, ----- Winter: Ventilation controls outside air.

Room Space sensible loss:	66,670 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	269,412 Btuh	6,090 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			336,082 Btuh
Heating Supply Air: 66,670 / (.999 X 1.08 X 10) =		6,090 CFM	
Winter Vent Outside Air (100.0% of supply) =		6,090 CFM	
Room space sensible gain:	249,140 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	10,527 Btuh		
Supply duct sensible gain:	0 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			259,667 Btuh
Cooling Supply Air: 260,996 / (.999 X 1.1 X 20) =		11,875 CFM	
Summer Vent Outside Air (51.3% of supply) =		6,090 CFM	
Return duct sensible gain:	0 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	133,854 Btuh	6,090 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			133,854 Btuh
Total sensible gain on air handling system:			393,521 Btuh
Room space latent gain:	89,930 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	218,919 Btuh		
Total latent gain on air handling system:			308,849 Btuh
Total system sensible and latent gain:			702,370 Btuh

Check Figures

Total Air Handler Supply Air (based on a 20° TD):	11,875 CFM
Total Air Handler Vent. Air (51.29% of Supply):	6,090 CFM
Total Conditioned Air Space:	15,444 Sq.ft
Supply Air Per Unit Area:	0.7689 CFM/Sq.ft
Area Per Cooling Capacity:	263.9 Sq.ft/Ton
Cooling Capacity Per Area:	0.0038 Tons/Sq.ft
Heating Capacity Per Area:	21.76 Btuh/Sq.ft
Total Heating Required With Outside Air:	336,082 Btuh
Total Cooling Required With Outside Air:	58.53 Tons

Air Handler #1 - PTAC - Total Load Summary

Air Handler Description:	PTAC Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.05 HP
Fan Input:	80% motor and fan efficiency with 0.75 in. water across the fan
Sensible Heat Ratio:	1.00 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	6pm in August.
Outdoor Conditions:	Clg: 92° DB, 77° WB, 116.35 grains, Htg: 29° DB
Indoor Conditions:	Clg: 75° DB, 50% RH, Htg: 70° DB

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	1,358 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			1,358 Btuh
Heating Supply Air: 1,358 / (.999 X 1.08 X 25) =		50 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	6,904 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	126 Btuh		
Supply duct sensible gain:	0 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			7,030 Btuh
Cooling Supply Air: 7,030 / (.999 X 1.1 X 19) =		337 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	0 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			0 Btuh
Total sensible gain on air handling system:			7,030 Btuh
Room space latent gain:	0 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			0 Btuh
Total system sensible and latent gain:			7,030 Btuh

Check Figures

Total Air Handler Supply Air (based on a 19° TD):	337 CFM
Total Air Handler Vent. Air (0.00% of Supply):	0 CFM
Total Conditioned Air Space:	50 Sq.ft
Supply Air Per Unit Area:	6.7329 CFM/Sq.ft
Area Per Cooling Capacity:	85.4 Sq.ft/Ton
Cooling Capacity Per Area:	0.0117 Tons/Sq.ft
Heating Capacity Per Area:	27.16 Btuh/Sq.ft
Total Heating Required With Outside Air:	1,358 Btuh
Total Cooling Required With Outside Air:	0.59 Tons

Air Handler #2 - ACU-1 - Total Load Summary

Air Handler Description:	ACU-1 Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.10 HP
Fan Input:	80% motor and fan efficiency with 0.75 in. water across the fan
Sensible Heat Ratio:	1.00 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	3pm in August.
Outdoor Conditions:	Clg: 96° DB, 78° WB, 115.98 grains, Htg: 29° DB
Indoor Conditions:	Clg: 75° DB, 50% RH, Htg: 70° DB

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	10,780 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			10,780 Btuh
Heating Supply Air: 10,780 / (.999 X 1.08 X 25) =		400 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	14,112 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	257 Btuh		
Supply duct sensible gain:	0 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			14,369 Btuh
Cooling Supply Air: 14,369 / (.999 X 1.1 X 19) =		688 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	0 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			0 Btuh
Total sensible gain on air handling system:			14,369 Btuh
Room space latent gain:	0 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			0 Btuh
Total system sensible and latent gain:			14,369 Btuh

Check Figures

Total Air Handler Supply Air (based on a 19° TD):	688 CFM
Total Air Handler Vent. Air (0.00% of Supply):	0 CFM
Total Conditioned Air Space:	1,134 Sq.ft
Supply Air Per Unit Area:	0.6068 CFM/Sq.ft
Area Per Cooling Capacity:	947.0 Sq.ft/Ton
Cooling Capacity Per Area:	0.0011 Tons/Sq.ft
Heating Capacity Per Area:	9.51 Btuh/Sq.ft
Total Heating Required With Outside Air:	10,780 Btuh
Total Cooling Required With Outside Air:	1.20 Tons

(3)

Air Handler #3 - ACU-2 - Total Load Summary

Air Handler Description:	ACU-2 Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.03 HP
Fan Input:	80% motor and fan efficiency with 0.75 in. water across the fan
Sensible Heat Ratio:	1.00 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	3pm in July.
Outdoor Conditions:	Clg: 97° DB, 78° WB, 114.35 grains, Htg: 29° DB
Indoor Conditions:	Clg: 75° DB, 50% RH, Htg: 70° DB

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	4,628 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			4,628 Btuh
Heating Supply Air: 4,628 / (.999 X 1.08 X 25) =		172 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	4,812 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	88 Btuh		
Supply duct sensible gain:	0 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			4,899 Btuh
Cooling Supply Air: 4,899 / (.999 X 1.1 X 19) =		235 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	0 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			0 Btuh
Total sensible gain on air handling system:			4,899 Btuh
Room space latent gain:	0 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			0 Btuh
Total system sensible and latent gain:			4,899 Btuh

Check Figures

Total Air Handler Supply Air (based on a 19° TD):	235 CFM
Total Air Handler Vent. Air (0.00% of Supply):	0 CFM
Total Conditioned Air Space:	326 Sq.ft
Supply Air Per Unit Area:	0.7197 CFM/Sq.ft
Area Per Cooling Capacity:	798.5 Sq.ft/Ton
Cooling Capacity Per Area:	0.0013 Tons/Sq.ft
Heating Capacity Per Area:	14.20 Btuh/Sq.ft
Total Heating Required With Outside Air:	4,628 Btuh
Total Cooling Required With Outside Air:	0.41 Tons